



STC Test Report

Date : 2010-07-26

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No. : MH184069

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: Radio stunt
Brand Name: N/A
Model Number: 96105
FCC ID: VC99610527T

Date Sample(s) Received: 2010-05-05

Date Tested: 2010-05-06, 2010-06-24

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): ----

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

The Hong Kong Standards and Testing Centre Ltd.

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Appendix A

List of Measurement Equipment

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Duty Cycle Correction During 100 msec

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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: Radio stunt
Manufacturer: Grandex International Development Limited
Brand Name: N/A
Model Number: 96105
Rating: 3Vd.c("AA" size battery x 2)

1.3.1 Description of EUT Operation

The Equipment Under Test (EUT) is a Grandex International Development Limited, Radio stunt. 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 IC, and type is amplitude modulation.

1.4 Date of Order

2010-05-05

1.5 Submitted Sample(s):

1 Sample

1.6 Test Duration

2010-05-06, 2010-06-24

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

EMISSION Results Summary						
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)

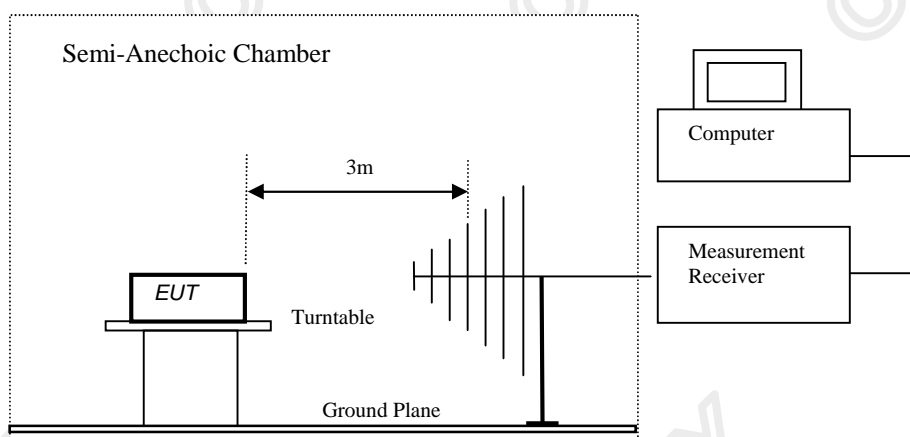
Test Requirement: FCC 47CFR 15.227
Test Method: ANSI C63.4:2003
Test Date: 2010-06-24
Mode of Operation: Tx mode

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

Results of Tx mode: PASS

Field Strength of Fundamental Emissions Peak Value						
Frequency MHz	Measured Level @3m dB μV	Correction Factor dB/m	Field Strength dB $\mu\text{V}/\text{m}$	Field Strength $\mu\text{V}/\text{m}$	Limit @3m $\mu\text{V}/\text{m}$	E-Field Polarity
27.145	42.0	18.6	60.6	1,071.5	100,000	Vertical

Field Strength of Fundamental Emissions Average Value							
Frequency MHz	Measured Level @3m dB μV	Adjusted by Duty Cycle dB	Correction Factor dB/m	Field Strength dB $\mu\text{V}/\text{m}$	Field Strength $\mu\text{V}/\text{m}$	Limit @3m $\mu\text{V}/\text{m}$	E-Field Polarity
27.145	37.3	-4.7	18.6	55.9	623.7	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
Above960	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 μV	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
54.29	7.1	9.3	16.4	6.6	100	Vertical
81.40	25.0	6.9	31.9	39.4	100	Vertical
108.60	5.8	8.5	14.3	5.2	150	Vertical
135.70	14.0	7.6	21.6	12.0	150	Vertical
162.87	19.6	9.8	29.4	29.5	150	Vertical
190.00	6.2	10.2	16.4	6.6	150	Vertical
217.20	6.6	11.1	17.7	7.7	200	Vertical
434.30	7.3	18.5	25.8	19.5	200	Vertical
461.50	8.3	18.7	27.0	22.4	200	Vertical
488.60	6.7	20.7	27.4	23.4	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: 2010-05-06
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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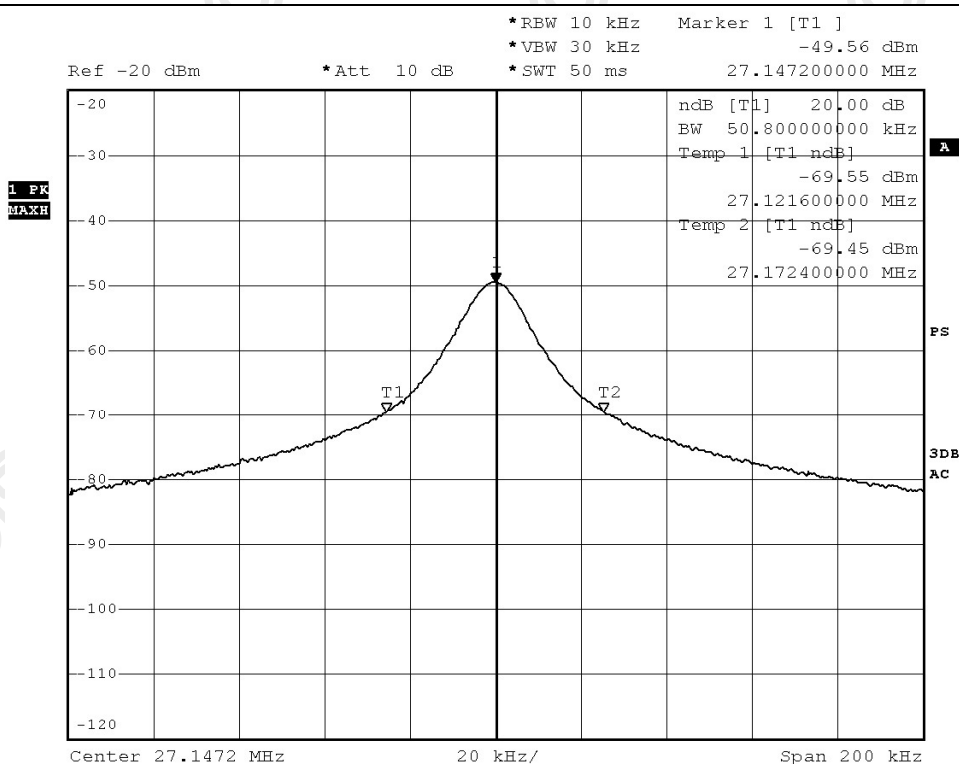
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Limits for 20dB Bandwidth of Fundamental Emission:

Frequency Range [MHz]	20dB Bandwidth [kHz]	FCC Limits [MHz]
27.04	50.8	within 26.96-27.28

20dB Bandwidth of Fundamental Emission



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Appendix A

List of Measurement Equipment

Radiated Emission

EQP NO.	DESCRIPTION	MANUFACTURER	MODEL NO.	SERIAL NO.	LAST CAL	DUE CAL
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

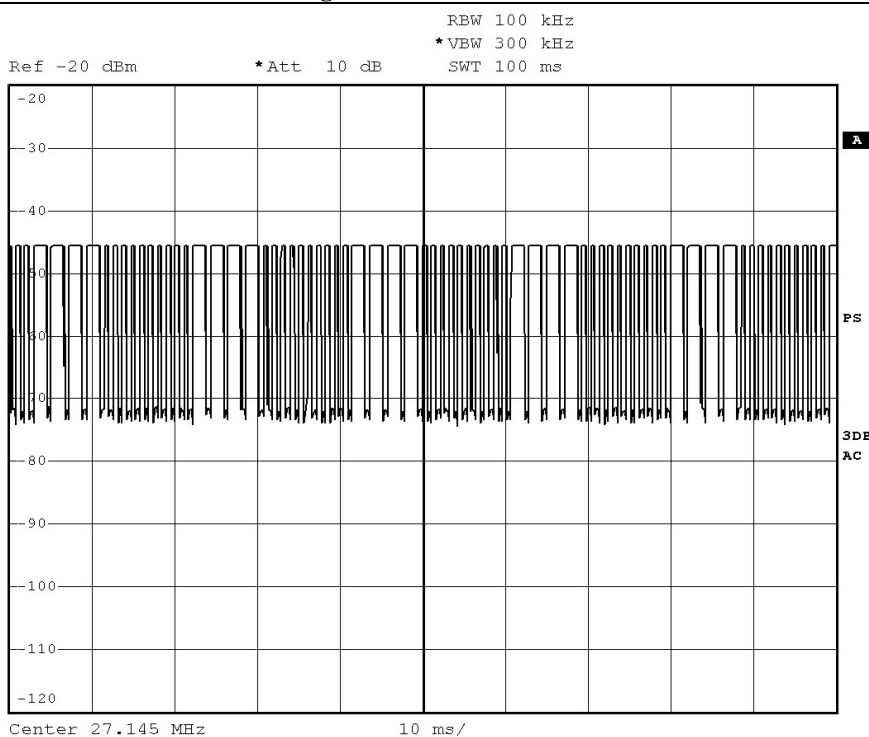
Each function key sends a different series of characters, but each packet period (100msec) never exceeds a series of 20 long pulses (1.6msec) and 53 short pulses (0.5msec). Assuming any combination of short and long pulses may be obtained due to encoding the worst case transmit duty cycle would be considered ($20 \times 1.6\text{msec} + 53 \times 0.5\text{msec}$) per 100msec = -4.7dB duty cycle. Figure A through B show the characteristics of the pulse train for one of these functions.

Remarks:

Duty Cycle Correction = -4.7dB

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

Figure A [Pulse Train]



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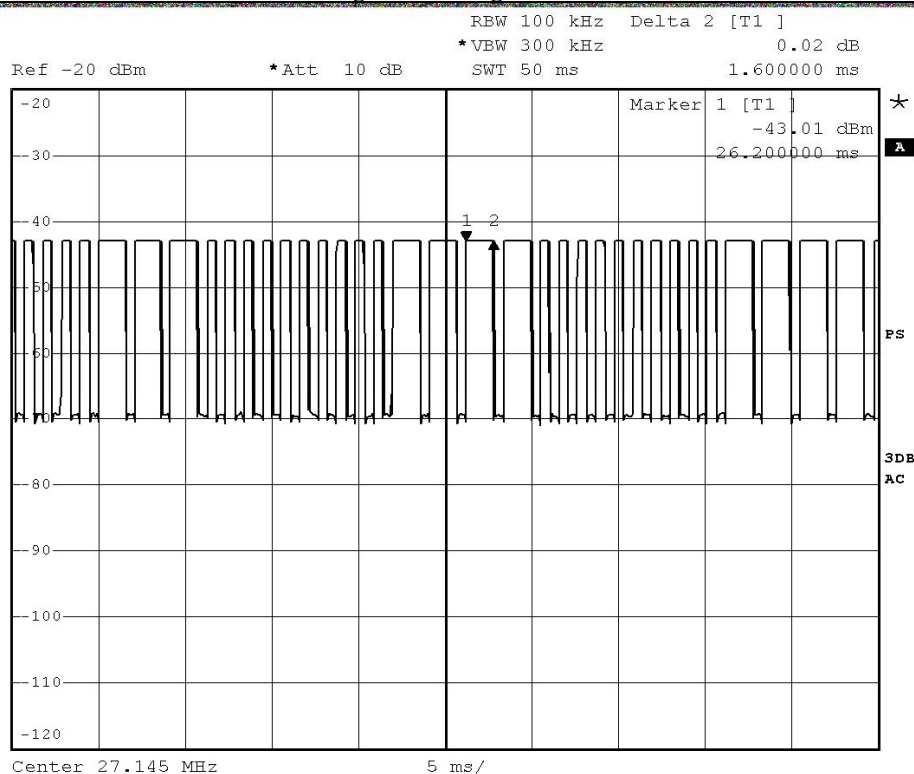
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Figure B [Long Pulse]



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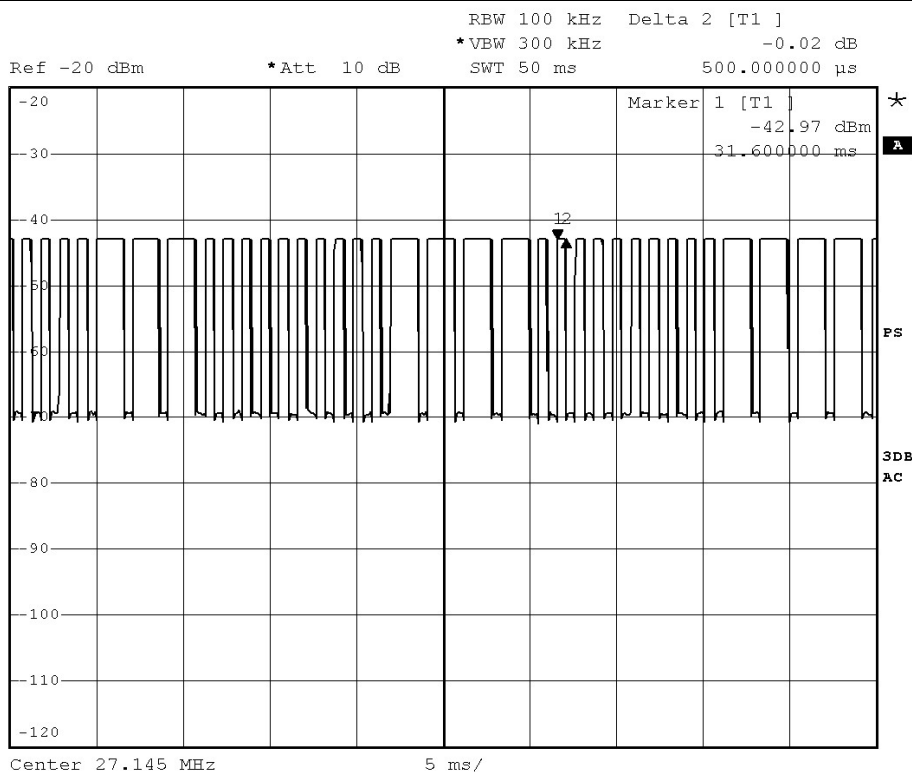
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Figure C [Short Pulse]



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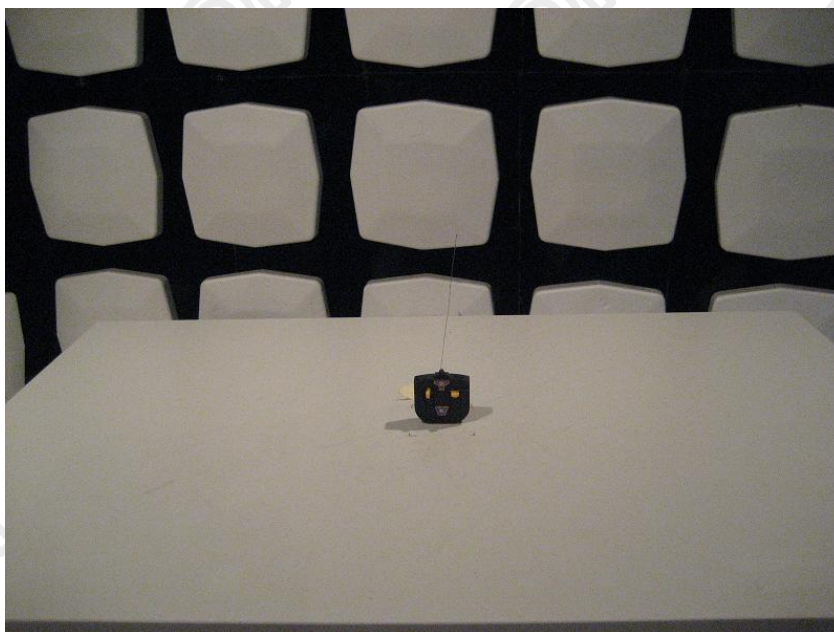
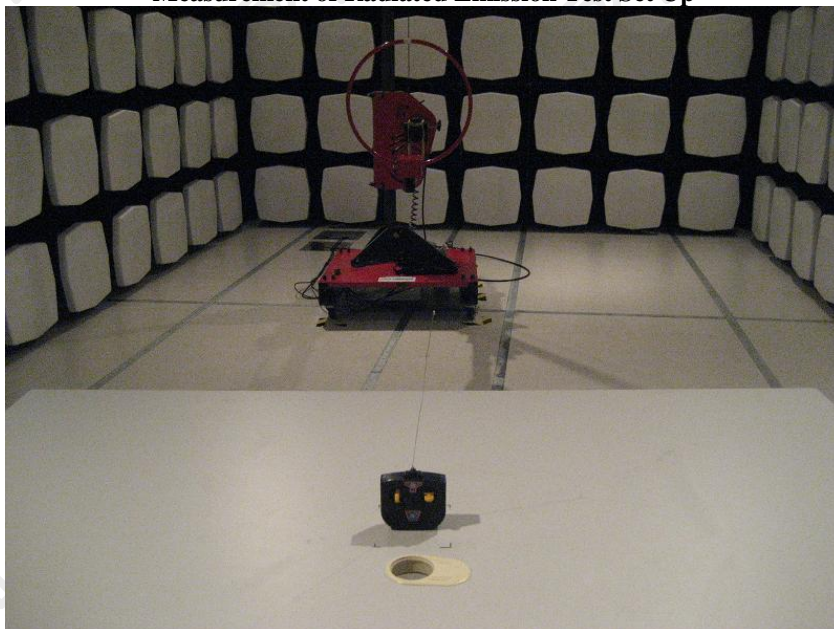
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Photographs of EUT

Measurement of Radiated Emission Test Set Up



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

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