



STC Test Report

Date : 2008-08-25

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No. : MH182465

Applicant (STD003):

ShenZhen Zhongherong Electric Technology Co., Ltd.
Floor1-3 No. 28 Building Northern Yongfa Tech Area Heyi
Village, Jinxiu Road Shajing District Baoan Shenzhen, China

Manufacturer:

ShenZhen Zhongherong Electric Technology Co., Ltd.
Floor1-3 No. 28 Building Northern Yongfa Tech Area Heyi
Village, Jinxiu Road Shajing District Baoan Shenzhen, China

Description of Samples:

Product: 2.4G Transmitter
Brand Name: ESKY
Model Number: EK2-0404G
FCC ID: WIC-SZESKY001

Date Samples Received: 2008-08-06

Date Tested: 2008-08-07

Investigation Requested:

Perform ElectroMagnetic Interference measurement in
accordance with FCC 47CFR [Codes of Federal Regulations]
Part 15: 2007 and ANSI C63.4:2003 for FCC Certification.

Conclusions:

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.

Remarks:

Dr. LEE Kam Chuen,
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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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

1.2 Applicant Details

Applicant

ShenZhen Zhongherong Electric Technology Co., Ltd.
Floor1-3 No. 28 Building Northern Yongfa Tech Area Heyi Village, Jinxiu Road Shajing
District Baoan Shenzhen, China

Manufacturer

ShenZhen Zhongherong Electric Technology Co., Ltd.
Floor1-3 No. 28 Building Northern Yongfa Tech Area Heyi Village, Jinxiu Road Shajing
District Baoan Shenzhen, China

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1.3 Equipment Under Test [EUT]

Description of Sample

Product: 2.4G Transmitter
Manufacturer: ShenZhen Zhongherong Electric Technology Co., Ltd.
Brand Name: ESKY
Model Number: EK2-0404G
Input Voltage: 12Vd.c. ("AA" size battery x 8)

1.3.1 Description of EUT Operation

The Equipment Under Test (EUT) is a ShenZhen Zhongherong Electric Technology Co., Ltd., 2.4G Transmitter, the transmission signal is Fixed, point-to-point operation with channel frequency range 2.410-2.473 GHz.

1.4 Date of Order

2008-08-06

1.5 Submitted Sample(s):

1 Sample

1.6 Test Duration

2008-08-07

1.7 Country of Origin

China

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2.0 Technical Details

2.1 Investigations Requested

Perform Electromagnetic Interference measurements in accordance with FCC 47CFR [Codes of Federal Regulations] Part 15: 2007 Regulations 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	Fail	N/A
Field Strength of Fundamental & Harmonics Emissions	FCC 47CFR 15.249	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

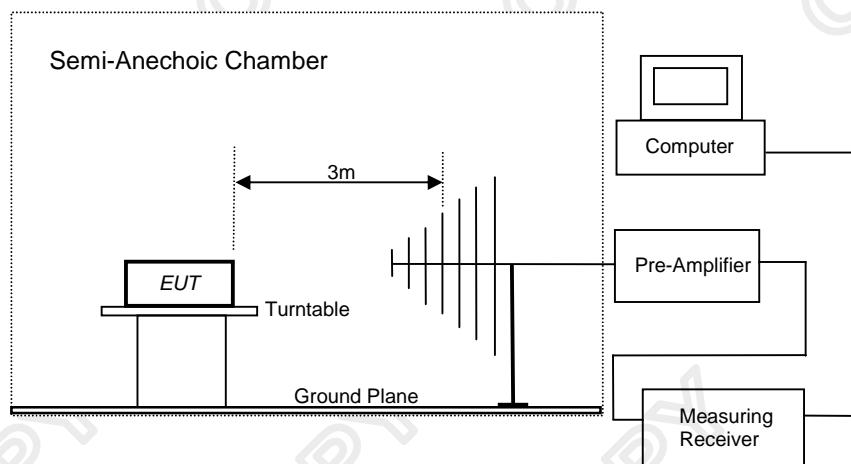
Test Requirement: FCC 47CFR 15.249
Test Method: ANSI C63.4:2003
Test Date: 2008-08-07
Mode of Operation: Communication mode (Tx unit)

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 G/F of The Hong Kong Standards and Testing Centre Ltd. with a metal ground plane filed with the FCC pursuant to section 2.948 of the FCC rules, with Registration Number: 607756.

Test Setup:



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Limits for Field Strength of Fundamental & Harmonics Emissions [FCC 47CFR 15.249]:

Frequency Range of Fundamental	Field Strength of Fundamental Emission [millivolts/meter]	Field Strength of Harmonics Emission [microvolts/meter]
902-928 MHz	50	500
2400-2483.5 MHz	50	500
5725-5875 MHz	50	500
24-24.25 GHz	250	2500

Results of Communication mode (Tx, Lowest Channel Frequency): Pass

Field Strength of Fundamental Emissions						
Peak Value						
Frequency MHz	Measured Level @3m dB μ V/m	Correction Factor dB μ V/m	Field Strength dB μ V/m	Field Strength μ V/m	Limit @3m μ V/m	E-Field Polarity
2410.8	59.9	34.8	94.7	54,325.0	500,000	Horizontal
* 4823.6	25.9	42.1	68.0	2,511.9	5,000	Horizontal
7232.4					50,000	Vertical
9643.2					50,000	Vertical
* 12054.0					5,000	Vertical
14464.8					50,000	Vertical
16875.6					50,000	Vertical
* 19286.4					5,000	Vertical
21697.2					50,000	Vertical
24108.0					50,000	Vertical

**Emissions detected are more than
20 dB below the FCC Limits**

Field Strength of Fundamental Emissions						
Average Value						
Frequency MHz	Measured Level @3m dB μ V/m	Correction Factor dB μ V/m	Field Strength dB μ V/m	Field Strength μ V/m	Limit @3m μ V/m	E-Field Polarity
2410.8	39.9	34.8	74.7	5,432.5	50,000	Horizontal
* 4823.6	5.9	42.1	48.0	251.2	500	Horizontal

Remarks:

*: Denotes restricted band of operation.

Measurements were made using a peak detector. Any emission less than 1000 MHz and falling within the restricted bands of FCC Rules Part 15 Section 15.205 and the limits of FCC Rules Part 15 Section 15.209 were applied.

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

Calculated measurement uncertainty : 30MHz to 1GHz 5.2dB
1GHz to 18GHz 5.1dB

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Limits for Field Strength of Fundamental & Harmonics Emissions [FCC 47CFR 15.249]:

Frequency Range of Fundamental	Field Strength of Fundamental Emission [millivolts/meter]	Field Strength of Harmonics Emission [microvolts/meter]
902-928 MHz	50	500
2400-2483.5 MHz	50	500
5725-5875 MHz	50	500
24-24.25 GHz	250	2500

Results of Communication mode (Tx, Middle Channel Frequency): Pass

Field Strength of Fundamental Emissions Peak Value						
Frequency MHz	Measured Level @3m dB μ V/m	Correction Factor dB μ V/m	Field Strength dB μ V/m	Field Strength μ V/m	Limit @3m μ V/m	E-Field Polarity
2440.8	59.9	34.9	94.8	54,954.1	500,000	Horizontal
*	4823.6				5,000	Horizontal
	7322.4				50,000	Vertical
	9763.2				50,000	Vertical
*	12204.0				5,000	Vertical
	14644.8				50,000	Vertical
	17085.6				50,000	Vertical
*	19526.4				5,000	Vertical
	21967.2				50,000	Vertical
	24408.0				50,000	Vertical

**Emissions detected are more than
20 dB below the FCC Limits**

Field Strength of Fundamental Emissions Average Value						
Frequency MHz	Measured Level @3m dB μ V/m	Correction Factor dB μ V/m	Field Strength dB μ V/m	Field Strength μ V/m	Limit @3m μ V/m	E-Field Polarity
2440.8	39.9	34.9	74.8	5,495.4	50,000	Horizontal

Remarks:

*: Denotes restricted band of operation.

Measurements were made using a peak detector. Any emission less than 1000 MHz and falling within the restricted bands of FCC Rules Part 15 Section 15.205 and the limits of FCC Rules Part 15 Section 15.209 were applied.

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

Calculated measurement uncertainty : 30MHz to 1GHz 5.2dB
1GHz to 18GHz 5.1dB

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Limits for Field Strength of Fundamental & Harmonics Emissions [FCC 47CFR 15.249]:

Frequency Range of Fundamental	Field Strength of Fundamental Emission [millivolts/meter]	Field Strength of Harmonics Emission [microvolts/meter]
902-928 MHz	50	500
2400-2483.5 MHz	50	500
5725-5875 MHz	50	500
24-24.25 GHz	250	2500

Results of Communication mode (Tx, Highest Channel Frequency): Pass

Field Strength of Fundamental Emissions						
Peak Value						
Frequency MHz	Measured Level @3m dB μ V/m	Correction Factor dB μ V/m	Field Strength dB μ V/m	Field Strength μ V/m	Limit @3m μ V/m	E-Field Polarity
2472.9	59.9	35.0	94.9	55,590.4	500,000	Horizontal
*	4823.6				5,000	Horizontal
	7418.8				50,000	Vertical
	9891.8				50,000	Vertical
*	12364.7				5,000	Vertical
	14837.6				50,000	Vertical
	17310.6				50,000	Vertical
*	19783.5				5,000	Vertical
	22256.5				50,000	Vertical
	24729.4				50,000	Vertical

**Emissions detected are more than
20 dB below the FCC Limits**

Field Strength of Fundamental Emissions						
Average Value						
Frequency MHz	Measured Level @3m dB μ V/m	Correction Factor dB μ V/m	Field Strength dB μ V/m	Field Strength μ V/m	Limit @3m μ V/m	E-Field Polarity
2472.9	39.9	35.0	74.9	5,559.0	50,000	Horizontal

Remarks:

*: Denotes restricted band of operation.

Measurements were made using a peak detector. Any emission less than 1000 MHz and falling within the restricted bands of FCC Rules Part 15 Section 15.205 and the limits of FCC Rules Part 15 Section 15.209 were applied.

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

Calculated measurement uncertainty : 30MHz to 1GHz 5.2dB
1GHz to 18GHz 5.1dB

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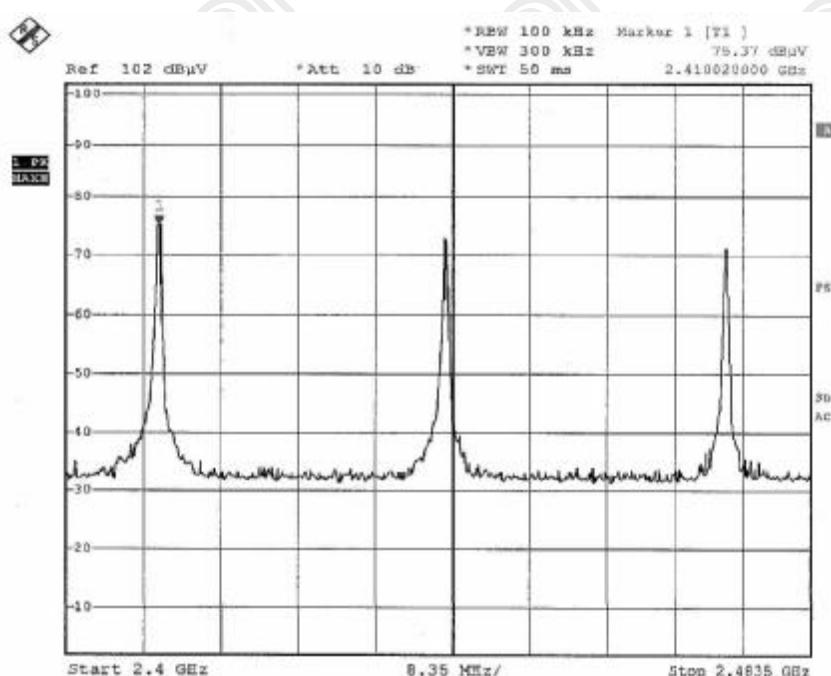
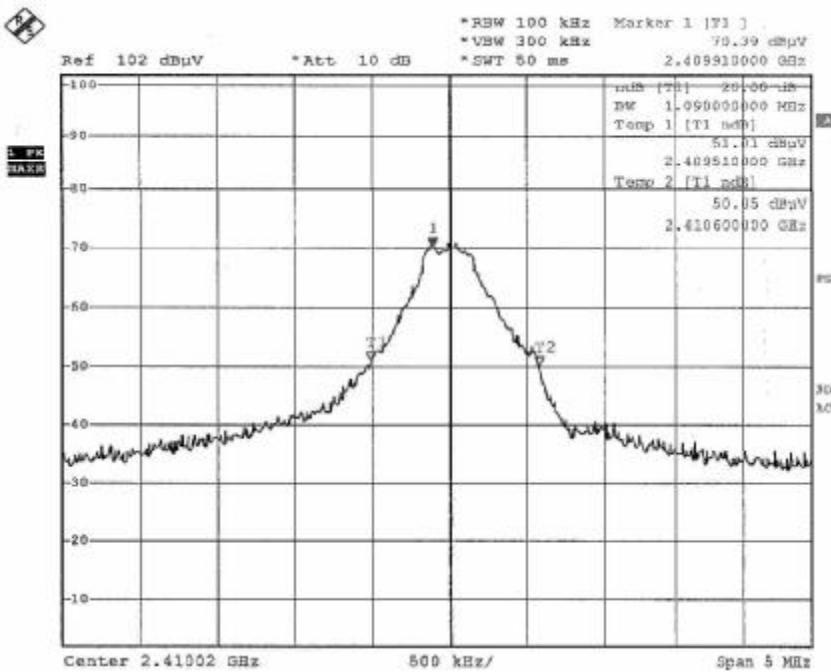
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Lowest Channel Frequency: 2.41002GHz BW=1.090MHz



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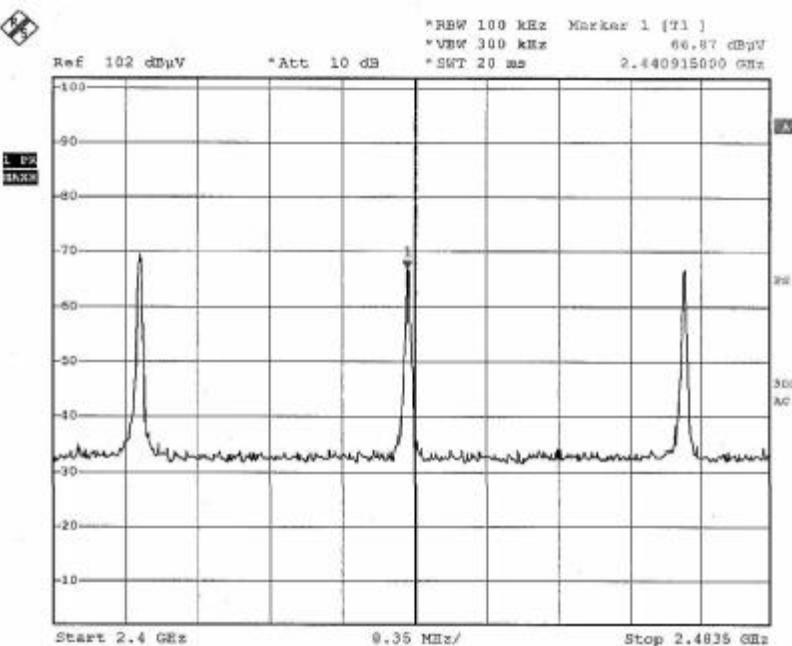
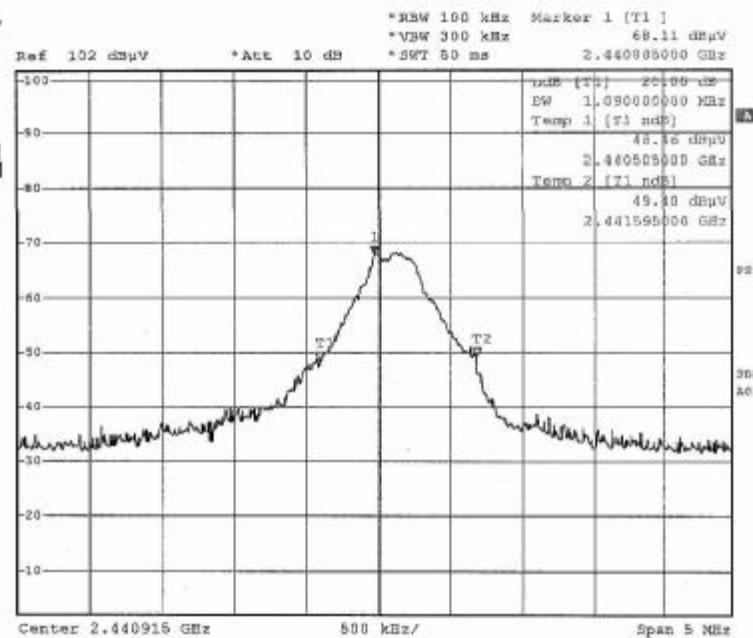
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Middle Channel Frequency: 2.440915GHz BW=1.090MHz



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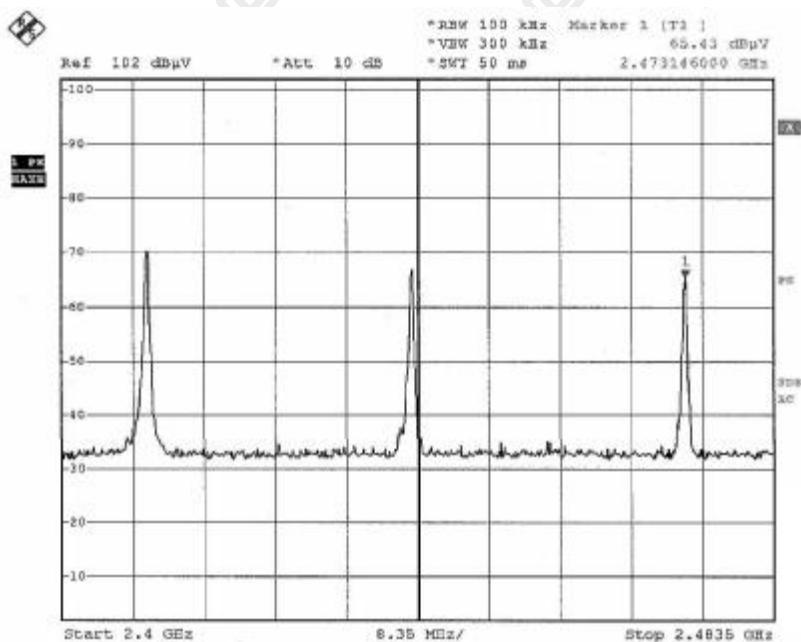
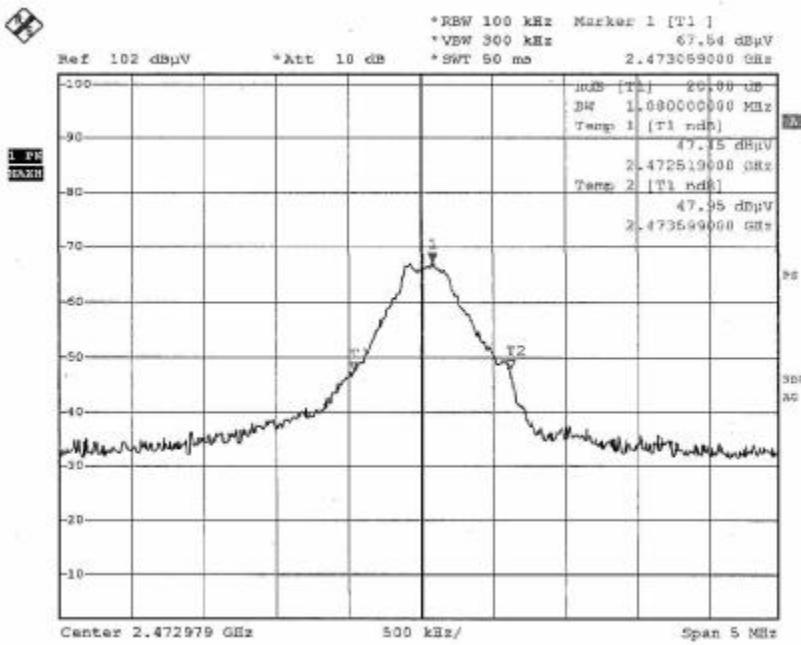
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Highest Channel Frequency: 2.473146GHz BW=1.080MHz



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Limits for Radiated Emissions [FCC 47 CFR 15.209 Class B]:

Frequency [MHz]	Field Strength [microvolts/meter]	Measurement Distance [meter]
0.009-0.490	2400/F(kHz)	300
0.490-1.705	24000/F(kHz)	30
1.705-30.0	30	30
30-88	100**	3
88-216	150**	3
216-960	200**	3
Above 960	500	3

** Except as provided in paragraph (g), fundamental emissions from intentional radiators operating under this Section shall not be located in the frequency bands 54-72 MHz, 76-88 MHz, 174-216 MHz or 470-806 MHz. However, operation within these frequency bands is permitted under other sections of this Part, e.g., Sections 15.231 and 15.241.

The emission limits shown in the above table are based on measurements employing a CISPR quasi-peak detector except for the frequency bands 9-90 kHz, 110-490 kHz and above 1000 MHz. Radiated emission limits in these three bands are based on measurements employing an average detector.

Radiated Emissions Peak					
Emission Frequency MHz	E-Field Polarity	Level @3m dB μ V/m	Limit @3m dB μ V/m	Level @3m μ V/m	Limit @3m μ V/m
Emissions detected are more than 20 dB below the FCC Limits					

Remarks:

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

Correction Factor included Antenna Factor and Cable Attenuation.

Calculated measurement uncertainty : 30MHz to 1GHz 5.2dB
1GHz to 18GHz 5.1dB

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Appendix A

List of Measurement Equipment

Radiated Emission

EQP NO.	DESCRIPTION	MANUFACTURER	MODEL NO.	SERIAL NO.	LAST CAL	DUE CAL
EM020	HORN ANTENNA	EMCO	3115	4032	2006/07/11	2009/07/11
EM215	MULTIDEVICE CONTROLER	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	--	2006/05/02	2009/05/02
EM174	BICONILOG ANTENNA	EMCO	3142C	00029071	2008/01/24	2009/01/24
EM181	EMI TEST RECEIVER	ROHDE & SCHWARZ	ESIB7	100072	2008/06/16	2009/06/16
EM022	LOOP ANTENNA	EMCO	6502	1189-2424	2006/07/26	2009/07/26

Remarks:-

CM Corrective Maintenance
N/A Not Applicable or Not Available
TBD To Be Determined

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Appendix B

Duty Cycle Correction During 100msec

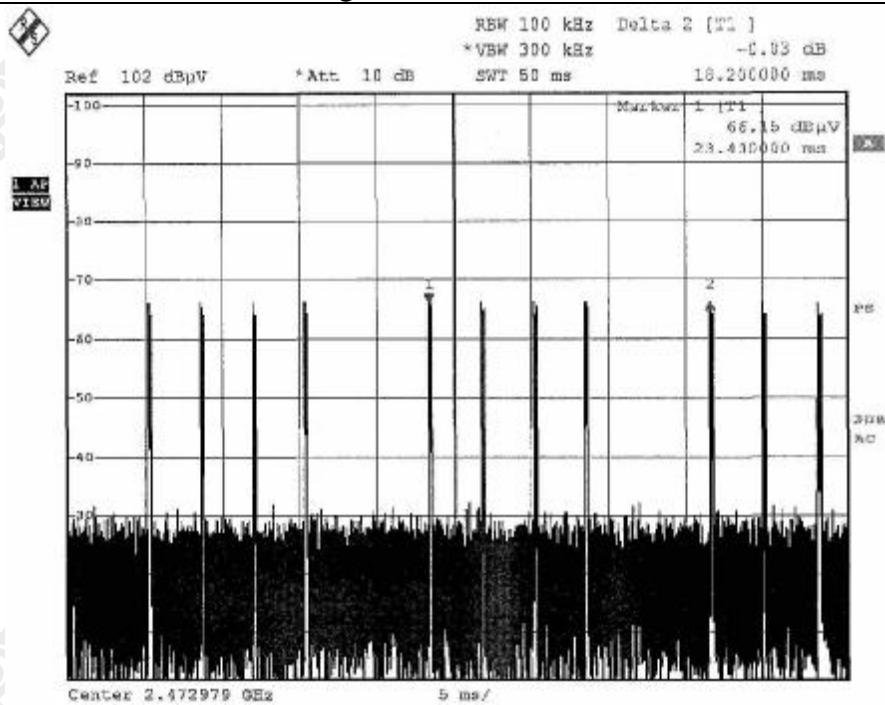
Each function key sends a different series of characters, but each packet period (18.48msec) never exceeds a series of 4 long (0.24msec) or 4 short (0.2msec) pulses. Assuming any combination of short and long pulses may be obtained due to encoding the worst case transmit duty cycle would be considered $4 \times 0.24\text{msec} / 18.48\text{msec} = 0.052\%$ duty cycle. Figure A through C show the characteristics of the pulses train for one of these functions.

Remarks:

Duty Cycle Correction = $20\log(0.052) = -25.7\text{dB}$
(-20dB used as field strength of fundamental emissions calculation)

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

Figure A [Pulse Train]



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Figure B [Long Pulse]

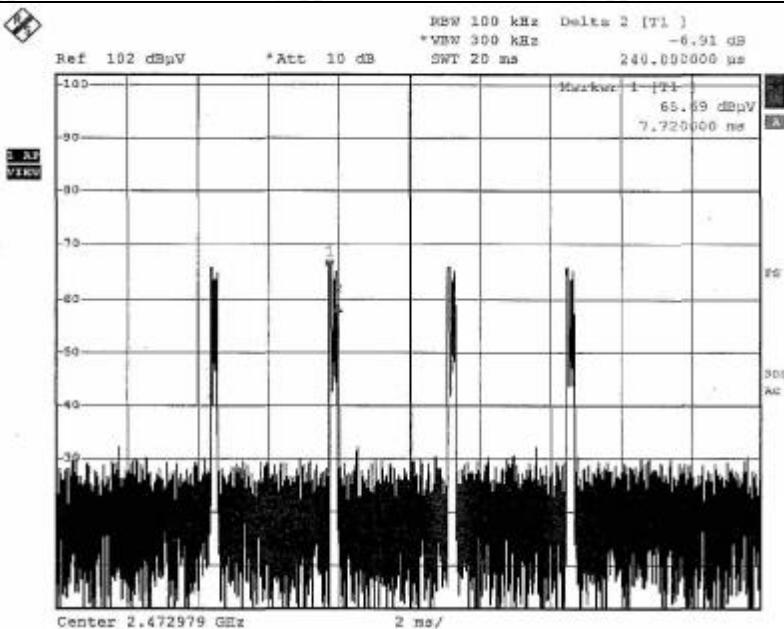
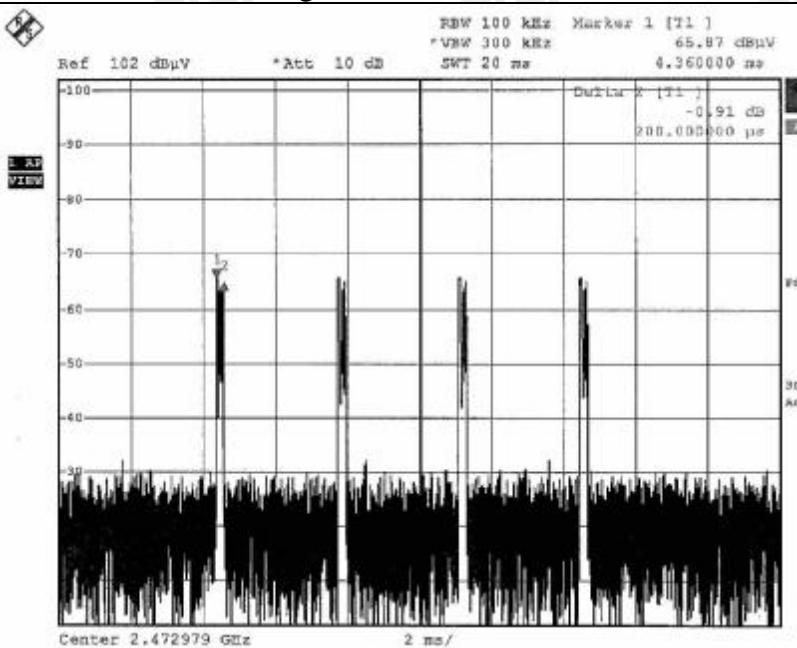


Figure C [Short Pulse]



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Appendix C

Photographs of EUT

Front View of the product



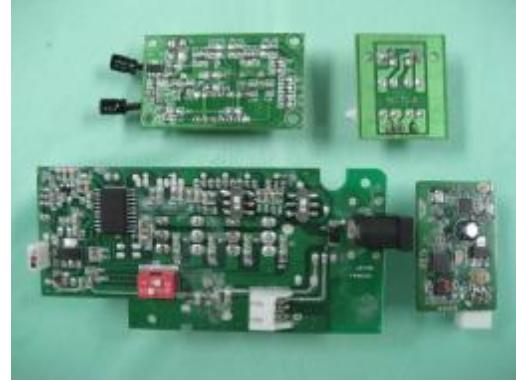
Rear View of the product



Inner Circuit Top View



Inner Circuit Bottom View



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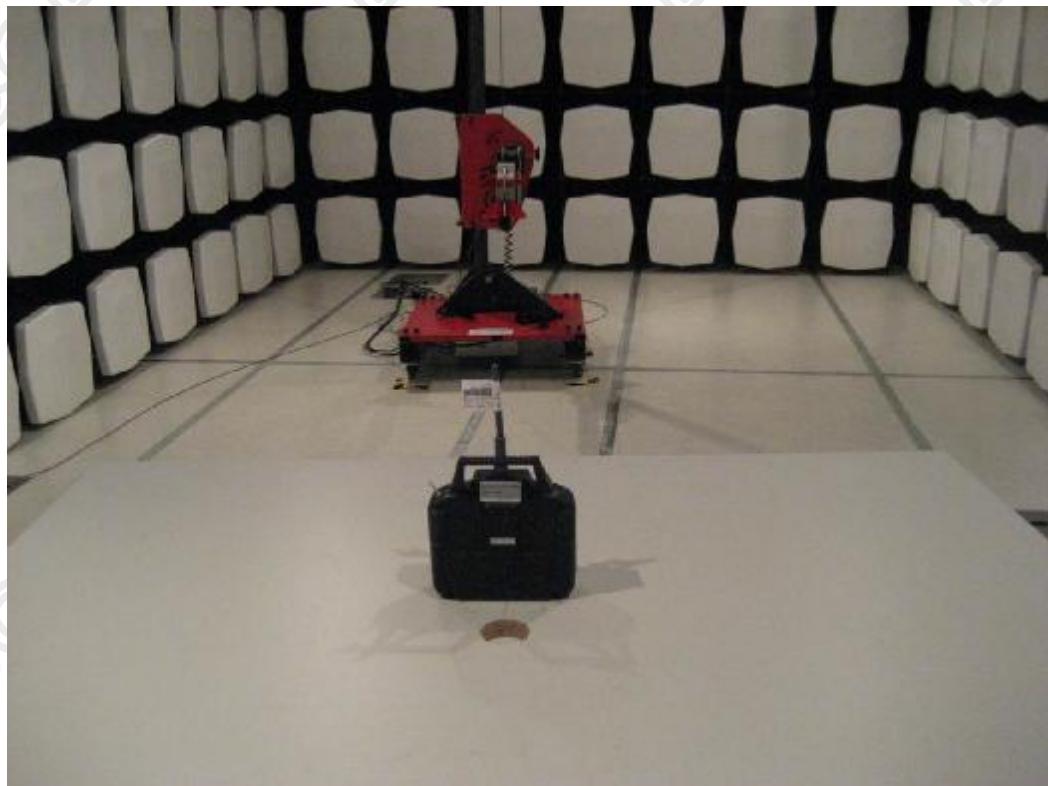
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Photographs of EUT

Measurement of Radiated Emission Test Set Up



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