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No. : HM158845

**Applicant (STS002):** Futaba Corporation

629 Oshiba, Mobara, Chiba Prefecture 297-8588, Japan

Manufacturer: Dongang Electronic Co., Ltd.

3<sup>rd</sup> Floor, No. 48, GongHe Industry Road, GongLe, Xixiang

Town, BaoAn Area, Shenzhen City

**Description of Samples:** Model Name: Remote Controller and Receiver

Brand Name: Futaba
Model Number: RCC-R11
FCC ID: AZPRRC-R11

**Date Samples Received:** 2007-05-18

**Date Tested:** 2007-05-22

**Investigation Requested:** Perform ElectroMagnetic Interference measurement in

accordance with FCC 47CFR [Codes of Federal Regulations] Part 15: 2006 and ANSI C63.4:2003 for FCC Certification.

**Conclusions:** The submitted product <u>COMPLIED</u> 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: ----

LEE Kam Chuen, 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

# 1.2 Applicant Details Applicant

Futaba Corporation 629 Oshiba , Mobara, Chiba Prefecture 297-8588, Japan

#### Manufacturer

Dongang Electronic Co., Ltd. 3<sup>rd</sup> Floor, No. 48, GongHe Industry Road, GongLe, Xixiang Town, BaoAn Area, Shenzhen City

# The Hong Kong Standards and Testing Centre Ltd. 10 Dai Wang Street, Taipo Industrial Estate, N.T., Hong Kong



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# 1.3 Equipment Under Test [EUT] Description of Sample

Model Name: Remote Controller and Receiver Manufacturer: Dongang Electronic Co., Ltd.

Brand Name: Futaba
Model Number: RCC-R11

Input Voltage: 6Vd.c. ("AAA" size battery x 4)

#### 1.3.1 Description of EUT Operation

The Equipment Under Test (EUT) is a Futaba Corporation, Remote Controller and Receiver, the transmission signal is frequency hopping with channel frequency range 2.410-2.470 GHz.

#### 1.4 Date of Order

2007-05-18

#### 1.5 Submitted Sample(s):

1 Sample

#### 1.6 Test Duration

2007-05-22

#### 1.7 Country of Origin

China

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#### **2.0 Technical Details**

#### **Investigations Requested** 2.1

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

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

EMISSION Results Summary								
T C III			T 61 /			1.		
Test Condition	Test Requirement	Test Method	Class /	T	est Resi	ılt		
			Severity	Pass	Fail	N/A		
Field Strength of Fundamental & Harmonics Emissions	FCC 47CFR 15.249	ANSI C63.4:2003	N/A					
Radiated Emissions	FCC 47CFR 15.209	ANSI C63.4:2003	N/A					
Conducted Emissions on AC, 0.15MHz to 30MHz	FCC 47CFR 15.207	ANSI C63.4:2003	N/A			$\boxtimes$		

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: 2007-05-22

Test Date: 2007-05-22

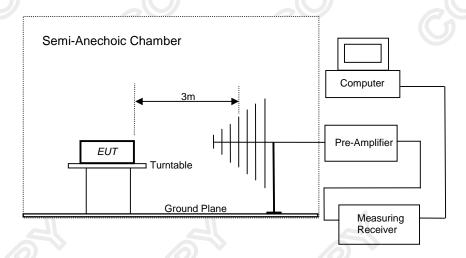
Mode of Operation: On Mode & On Mode Connected to PC

#### **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 HKSTC 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	Field Strength of	Field Strength of	
Fundamental	Fundamental Emission	Harmonics Emission	
[MHz]	[microvolts/meter]	[microvolts/meter]	
902-928	50,000 [Average]	500 [Average]	
2400-2483.5	50,000 [Average]	500 [Average]	

#### **Results of Lowest Channel Frequency: Pass**

	Field Strength of Fundamental Emissions Peak Value					
Frequency	Measured	Correction	Field	Field	Limit @3m	E-Field
	Level @3m	Factor	Strength	Strength		Polarity
MHz	$dB\mu V/m$	$dB\mu V/m$	$dB\mu V/m$	uV/m	μV/m	-
2410.0	29.1	29.7	58.8	871.0	50,000	Horizontal
* 4820.0				500	Horizontal	
7230.0					500	Vertical
9640.0					500	Vertical
* 12050.0					500	Vertical
14460.0		No Emissio	on Detected		500	Vertical
16870.0				500	Vertical	
* 19280.0			500	Vertical		
21690.0					500	Vertical
24100.0					500	Vertical

Field Strength of Fundamental Emissions						
Average Value						
Frequency	Measured	Correction	Field	Field	Limit @3m	E-Field
	Level @3m	Factor	Strength	Strength		Polarity
MHz	$dB\mu V/m$	dBμV/m	$dB\mu V/m$	uV/m	μV/m	
2410.0	4.6	29.7	34.3	51.9	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.

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	Field Strength of	Field Strength of		
Fundamental	Fundamental Emission	Harmonics Emission		
[MHz]	[microvolts/meter]	[microvolts/meter]		
902-928	50,000 [Average]	500 [Average]		
2400-2483.5	50,000 [Average]	500 [Average]		

#### **Results of Mid Channel Frequency: Pass**

	Field Strength of Fundamental Emissions						
			Peak Value				
Frequency	Measured	Correction	Field	Field	Limit @3m	E-Field	
	Level @3m	Factor	Strength	Strength		Polarity	
MHz	$dB\mu V/m$	$dB\mu V/m$	$dB\mu V/m$	uV/m	μV/m		
2440.0	31.6	29.8	61.4	1,174.9	50,000	Horizontal	
* 4880.0		500 Horizontal					
7320.0					500	Vertical	
9760.0					500	Vertical	
* 12200.0					500	Vertical	
14640.0		No Emissio	on Detected		500	Vertical	
17080.0	500 Vertical						
* 19520.0	500 Vertical						
21960.0					500	Vertical	
24400.0					500	Vertical	

Field Strength of Fundamental Emissions						
Average Value						
Frequency	Measured	Correction	Field	Field	Limit @3m	E-Field
	Level @3m	Factor	Strength	Strength		Polarity
MHz	$dB\mu V/m$	dBμV/m	$dB\mu V/m$	μ <b>V/m</b>	μV/m	-
2440.0	5.3	29.8	35.1	56.9	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.

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	Field Strength of Harmonics Emission		
[MHz]	[microvolts/meter]	[microvolts/meter]		
902-928	50,000 [Average]	500 [Average]		
2400-2483.5	50,000 [Average]	500 [Average]		

#### **Results of Highest Channel Frequency: Pass**

	Field Strength of Fundamental Emissions Peak Value					
Frequency	Measured	Correction	Field	Field	Limit @3m	E-Field
	Level @3m	Factor	Strength	Strength		Polarity
MHz	$dB\mu V/m$	$dB\mu V/m$	$dB\mu V/m$	uV/m	μV/m	-
2470.0	29.0	29.9	58.9	881.0	50,000	Horizontal
* 4940.0					500	Horizontal
7410.0					500	Vertical
9880.0					500	Vertical
* 12350.0					500	Vertical
14820.0		No Emissio	on Detected		500	Vertical
17290.0					500	Vertical
* 19760.0			500	Vertical		
22230.0					500	Vertical
24700.0					500	Vertical

Field Strength of Fundamental Emissions						
Average Value						
Frequency	Measured	Correction	Field	Field	Limit @3m	E-Field
	Level @3m	Factor	Strength	Strength		Polarity
MHz	$dB\mu V/m$	$dB\mu V/m$	$dB\mu V/m$	μV/m	μV/m	
2470.0	4.2	29.9	34.1	50.7	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.

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

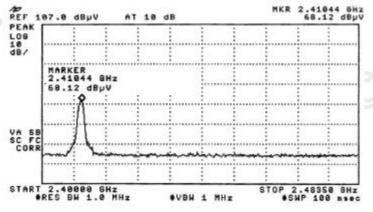
The Hong Kong Standards and Testing Centre Ltd.

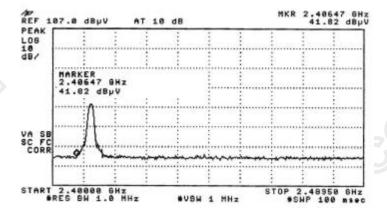


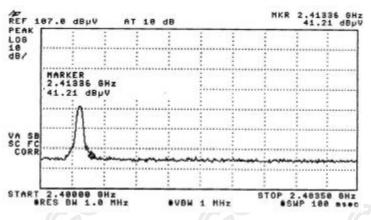
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#### **Lowest Channel Frequency**







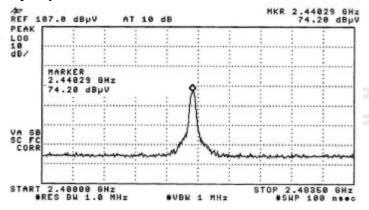


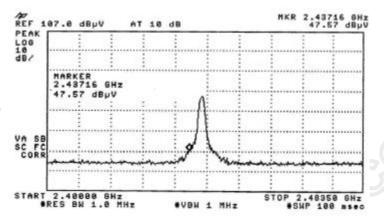
## **STC Test Report**

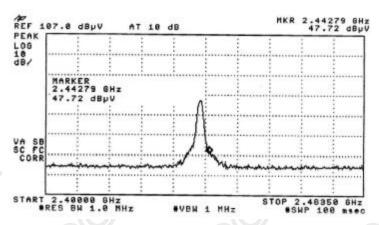
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### **Mid Channel Frequency**





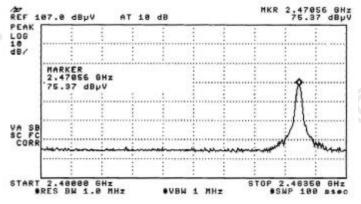


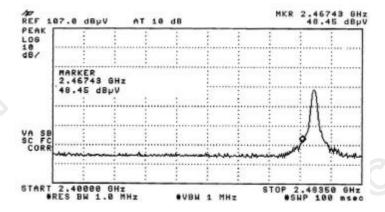


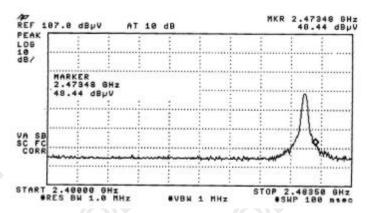
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#### **Highest Channel Frequency**









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

Frequency Range [MHz]	Quasi-Peak Limits [ 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 On Mode Connect to PC: Pass

Radiated Emissions Peak					
Emission	E-Field	Level	Limit	Level @3m	Limit
Frequency	Polarity	@3m	@3m	@3m	@3m
MHz		dBμV/m	dBμV/m	$\mu V/m$	μV/m
219.0	33.4	36.2	46	64.6	200

Remarks:

Correction Factor included Antenna Factor and Cable Attenuation.

Calculated measurement uncertainty 30MHz to 1GHz ±5.2dB

> 1GHz to 18GHz  $\pm 5.1 dB$



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#### 3.1.2 Conducted Emissions (0.15MHz to 30MHz)

Test Requirement: FCC 47CFR 15.107
Test Method: ANSI C63.4:2003

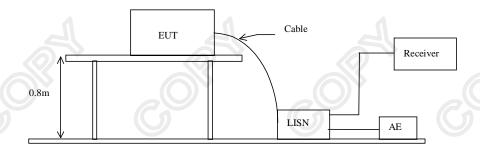
Test Date: 2007-05-22

Mode of Operation: Rx On Mode Connected to PC

#### **Test Method:**

The test was performed in accordance with ANSI C63.4: 2003, with the following: an initial measurement was performed in peak and average detection mode on the live line, any emissions recorded within 30dB of the relevant limit line were re-measured using quasi-peak and average detection on the live and neutral lines with the worst case recorded in the table of results.

#### **Test Setup:**





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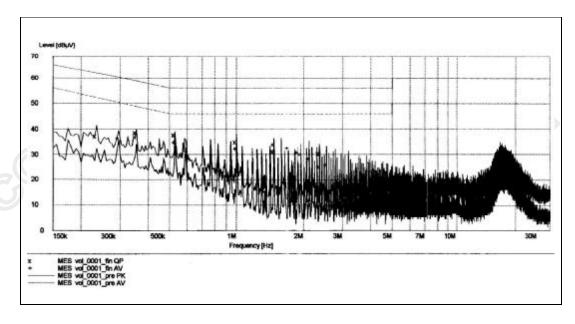
### Limit for Conducted Emissions (FCC 47 CFR 15.107):

	Frequency Range	Quasi-Peak Limits	Average	
	[MHz]	[dBµV]	[dBµV]	
	0.15-0.5	66 to 56*	56 to 46*	
7	0.5-5.0	56	46	
	5.0-30.0	60	50	

<sup>\*</sup> Decreases with the logarithm of the frequency.

Limits for Conducted Emissions Test, please refer to limit lines (Quasi-Peak and Average) in the following diagram.

#### Results of Rx On Mode Connected to PC: PASS





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### Results of Rx On Mode Connected to PC: PASS`

		Quasi-peak		Average	
Conductor Live or Neutral	Frequency MHz	Level dBµV/m	Limit dBµV/m	Level μV/m	Limit μV/m
Live	0.235	37.2	62	_*_	_*_
Live	0.295	_*_	_*_	36.3	50
Live	0.355	38.5	59	_*_	_*_
Live	0.530	37.6	56	34.7	46
Live	1.000	34.9	56	32.2	46
Live	1.470	31.2	56	33.8	46
Live	1.710	_*_	_*_	32.4	46
Live	1.885	_*_	_*_	30.6	46
Live	1.945	_*_	_*_	29.6	46
Live	2.120	_*_	_*_	28.3	46
Live	2.355	30.3	56	25.0	46
Live	2.535	_*_	_*_	25.7	46

#### Remarks:

Calculated measurement uncertainty: ±3.97dB

-\*- Emission(s) that is far below the corresponding limit line.



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## Appendix A

### List of Measurement Equipment

#### **Radiated Emission**

EQP NO.	DESCRIPTION	MANUFACTURER	MODEL NO.	SERIAL NO.
EM007	SPECTRUM ANALYZER	HEWLETT PACKARD	HP85660B	3144A21192
EM008	SPECTRUM ANALYZER DISPLAY	HEWLETT PACKARD	HP85662A	3144A20514
EM009	QUASI PEAK ADAPTOR	HEWLETT PACKARD	HP85650A	3303A01702
EM010	RF PRESELECTOR	HEWLETT PACKARD	HP85685A	3221A01410
EM011	ATTENUATOR/SWITCH	HEWLETT PACKARD	HP11713A	2508A10595
EM012	PRE-AMPLIFIER	HEWLETT PACKARD	HP8449B	3008A00262
EM020	HORN ANTENNA	ETS-Linggren	3115	4032
EM022	LOOP ANTENNA	ETS-Linggren	6502	1189-2424
EM072	SIGNAL GENERATOR	HEWLETT PACKARD	8640B	1948A11892
EM083	OPEN AREA TEST SITE	HKSTC	N/A	N/A
EM131	EMC ANALYZER	HEWLETT PACKARD	8595EM	3710A00155
EM145	EMI TEST RECEIVER	ROHDE & SCHWARZ	ESCS 30	830245/021
EM195	ANTENNA POSITIONING MAST	ETS-Linggren	2075	2368
EM196	MULTI-DEVICE CONTROLLER	ETS-Linggren	2090	1662
EM215	MULTIDEVICE CONTROLER	ETS-Linggren	2090	00024676
EM216	MINI MAST SYSTEM	ETS-Linggren	2075	00026842
EM217	ELECTRIC POWERED TURNTABLE	ETS-Linggren	2088	00029144
EM218	ANECHOIC CHAMBER	ETS-Linggren	FACT-3	
EM219	BICONILOG ANTENNA	ETS-Linggren	3142C	00029071
EM229	EMI TEST RECEIVER	ROHDE & SCHWARZ	ESIB40	100248

#### **Line Conducted**

EQP NO.	DESCRIPTION	MANUFACTURER	MODEL NO.	SERIAL NO.
EM078	VARIAC	SHANGHAI VOLTAGE	TDGC-3/0.5	N/A
EM081	SMALL SCREENED ROOM	MIKO INST HK	N/A	N/A
EM119	LISN	ROHDE & SCHWARZ	ESH3-Z5	0831.5518.52
EM127	ISOLATION TRANSFORMER 220 TO 300V	WING SUN	N/A	N/A
EM233	PULSE LIMITER	ROHDE & SCHWARZ	ESH3-Z2	100314
EM181	EMI TEST RECEIVER	ROHDE & SCHWARZ	ESIB7	100072
EM154	SHIELDING ROOM	SIEMENA MATSUSHITA COMPONENTS	N/A	803-740-057-99A
M197	LISN	ETS-Linggren	4825/2	1193

#### Remarks:-

CM Corrective Maintenance

Not Applicable or Not Available N/A

**TBD** To Be Determined

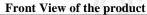


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### Appendix B

### Photographs of EUT





Rear View of the product



**Inner Circuit Top View** 



**Inner Circuit Bottom View** 





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### **Photographs of EUT**

Measurement of Radiated Emission Test Set Up







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#### Photographs of EUT

Measurement of Conducted Emission Test Set Up





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