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No. : MH184530

Applicant (C01496): Shenzhen Shen's Tongchuang Aeronautic Model Co., Ltd

The opposition of Xinjiang Community Education Base,

Guangming New District, Shenzhen, China

Manufacturer: Shenzhen Shen's Tongchuang Aeronautic Model Co., Ltd

The opposition of Xinjiang Community Education Base,

Guangming New District, Shenzhen, China

**Description of Sample(s):** Product: Transmitter

Brand Name: N/A Model Number: TX1P17A FCC ID: XUN015495

**Date Sample(s) Received:** 2010-09-14

**Date Tested:** 2010-09-23

**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 <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.

Remark(s): --

Dr. LEE Kam Chuen,
Authorized Signatory
Flootro Magnetic Competibility D

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

Product: Transmitter

Manufacturer: Shenzhen Shen's Tongchuang Aeronautic Model Co., Ltd

Brand Name: N/A Model Number: TX1P17A

Input Voltage: 6Vd.c. ("AA" size battery×4)

### 1.2 Description of EUT Operation

The Equipment Under Test (EUT) is a Shenzhen Shen's Tongchuang Aeronautic Model Co., Ltd, Transmitter. The transmission signal is frequency hopping with channel frequency range 2410.0.-2475.0MHz during normal use. The EUT was set to fixed frequency test mode by application.

#### 1.3 Date of Order

2010-09-14

#### 1.4 Submitted Sample(s):

1 Sample

### 1.5 Test Duration

2010-09-23

### 1.6 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: 2009 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 /	To	est Resu	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	$\boxtimes$				
4	A		4			4		

Note: N/A - Not Applicable



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3.0 Test Results

3.1 Emission

3.1.1 Radiated Emissions

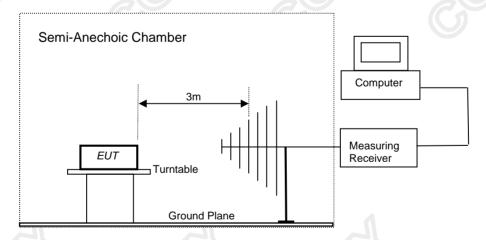
Test Requirement: FCC 47CFR 15.249
Test Method: ANSI C63.4:2003
Test Date: 2010-09-23
Mode of Operation: Tx mode

#### **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 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	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 Tx mode: Pass

	Field Strength of Fundamental Emissions					
			Peak Value			
Frequency	Measured	Correction	Field	Field	Limit @3m	E-Field
	Level @3m	Factor	Strength	Strength		Polarity
MHz	dBμV/m	dBμV/m	dBμV/m	μV/m	μV/m	
2410.0	73.1	36.8	109.9	312,607.9	500,000	Vertical
4820.0	21.1	41.9	63.0	1,412.5	5,000	Vertical
7230.0	20.8	47.8	68.6	2,691.5	5,000	Vertical
9640.0					500	Vertical
* 12050.0					500	Vertical
14460.0					500	Vertical
16870.0					500	Vertical
* 19280.0					500	Vertical
21690.0				(())	500	Vertical
24100.0	24100.0 No Emission Detected 500				500	Vertical

Field Strength of Fundamental Emissions						
		A	Average Valu	e		
Frequency	Measured	Correction	Field	Field	Limit @3m	E-Field
	Level @3m	Factor	Strength	Strength		Polarity
MHz	dBμV/m	dBμV/m	dBμV/m	μV/m	μV/m	
+ 2410.0	53.6	36.8	90.4	33,113.1	50,000	Vertical
+ 4820.0	1.6	41.9	43.5	149.6	500	Vertical
+ 7230.0	1.3	47.8	49.1	285.1	500	Vertical

### Remarks:

No additional spurious emissions found between lowest internal used/generated frequency and 30 MHz

\*: 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.

+: Adjusted by Duty Cycle = -19.5dB

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 Tx mode: Pass

	Field Strength of Fundamental Emissions					
			Peak Value			
Frequency	Measured	Correction	Field	Field	Limit @3m	E-Field
	Level @3m	Factor	Strength	Strength		Polarity
MHz	dBμV/m	dBμV/m	dBμV/m	μV/m	μV/m	
2443.0	71.3	36.9	108.2	257,039.6	500,000	Vertical
* 4886.0	20.9	42.0	62.9	1,396.4	5,000	Vertical
* 7329.0	21.1	48.0	69.1	2,851.0	5,000	Vertical
9772.0					500	Vertical
* 12215.0					500	Vertical
14658.0					500	Vertical
17101.0					500	Vertical
* 19544.0					500	Vertical
21987.0				(())	500	Vertical
24430.0 <b>No Emission Detected</b> 500 Vert				Vertical		

Field Strength of Fundamental Emissions						
		A	Average Valu	e		
Frequency	Measured	Correction	Field	Field	Limit @3m	E-Field
	Level @3m	Factor	Strength	Strength		Polarity
MHz	dBμV/m	dBμV/m	dΒμV/m	μV/m	μV/m	
+ 2443.0	51.8	36.9	88.7	27,227.0	50,000	Vertical
+* 4886.0	1.4	42.0	43.4	147.9	500	Vertical
+* 7329.0	1.6	48.0	49.6	302.0	500	Vertical

#### Remarks:

No additional spurious emissions found between lowest internal used/generated frequency and 30 MHz

\*: 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. +: Adjusted by Duty Cycle = -19.5dB

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 Tx mode: Pass

	Field Strength of Fundamental Emissions					
			Peak Value			
Frequency	Measured	Correction	Field	Field	Limit @3m	E-Field
	Level @3m	Factor	Strength	Strength		Polarity
MHz	dBμV/m	dBμV/m	dBμV/m	μV/m	μV/m	
2475.0	70.8	37.1	107.9	248,313.3	500,000	Vertical
* 4950.0	20.3	42.0	62.3	1,303.2	5,000	Vertical
* 7425.0	20.0	48.2	68.2	2,570.4	5,000	Vertical
9900.0					500	Vertical
* 12375.0					500	Vertical
14850.0					500	Vertical
17325.0			500	Vertical		
* 19800.0					500	Vertical
* 22275.0				(())	500	Vertical
24750.0 <b>No Emission Detected</b> 500 Ver				Vertical		

Field Strength of Fundamental Emissions						
		A	verage Valu	e		
Frequency	Measured	Correction	Field	Field	Limit @3m	E-Field
	Level @3m	Factor	Strength	Strength		Polarity
MHz	dΒμV/m	dBμV/m	dBμV/m	μV/m	μV/m	
+ 2475.0	51.3	37.1	88.4	26,302.7	50,000	Vertical
+* 4950.0	0.8	42.0	42.8	138.0	500	Vertical
+* 7425.0	0.5	48.2	48.7	272.3	500	Vertical

#### Remarks:

No additional spurious emissions found between lowest internal used/generated frequency and 30 MHz

\*: 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. +: Adjusted by Duty Cycle = -19.5dB

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

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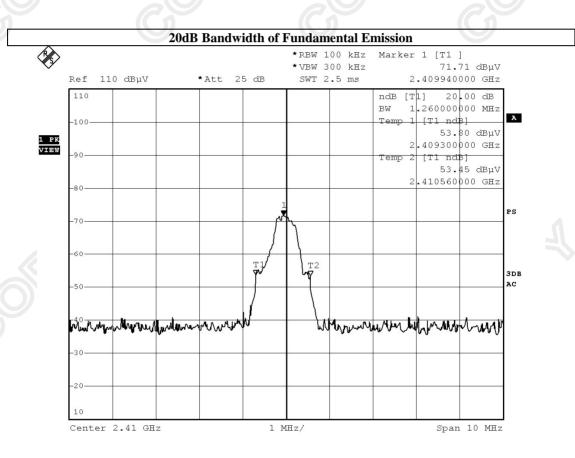


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### Limits for 20dB Bandwidth of Fundamental Emission:

Frequency Range [MHz]	20dB Bandwidth [MHz]
2410	1.26



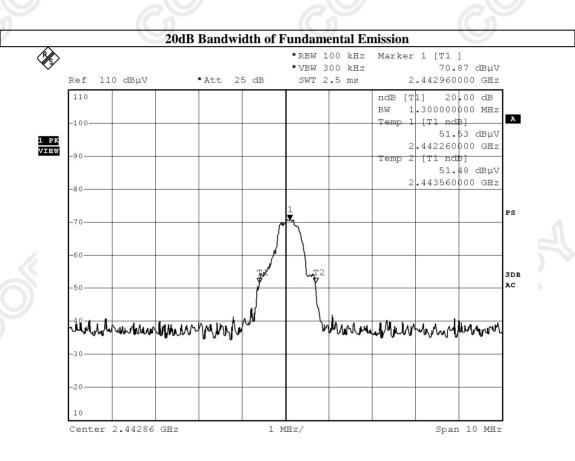


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### Limits for 20dB Bandwidth of Fundamental Emission:

Frequency Range		20dB Bandwidth
	[MHz]	[MHz]
	2443	1.30



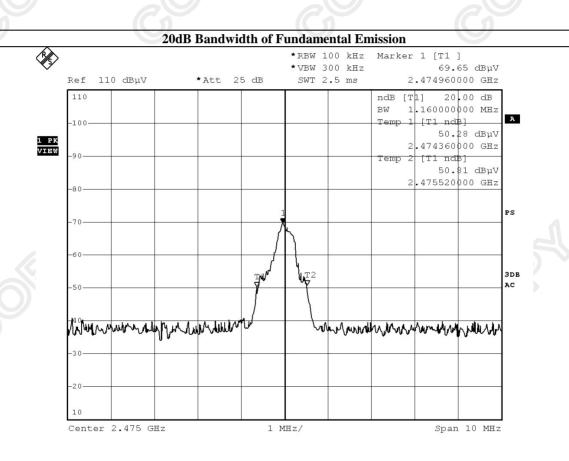


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### Limits for 20dB Bandwidth of Fundamental Emission:

Frequency Range		20dB Bandwidth
	[MHz]	[MHz]
	2475	1.16





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### **Band Edge Measurement:**

Frequency Range	Radiated Emission Attenuated below the			
	Fundamental			
[MHz]	[dB]			
2400.0 – Lowest Fundamental	-49.75			
	(Actual Radiated Emission level = $20.60$ dB $\mu$ V/m)			

# Radiated Emission Attenuation From The Lowest Fundamental Frequency to 2.4000GHz \*RBW 100 kHz Marker 1 [T1 ] VBW 300 kHz 70.35 dBµV SWT 2.5 ms 2.409921600 GHz 90 dBµV \*Att 10 dB Ref Delta [T1 ] -49.75 dB 921600000 МНZ 1 PK VIEW -50 ЗDВ Start 2.4 GHz 1.06 MHz/ Stop 2.4106 GHz



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### **Band Edge Measurement:**

Frequency Range	Radiated Emission Attenuated below the			
	Fundamental			
[MHz]	[dB]			
Highest Fundamental – 2483.5	-43.21			
	(Actual Radiated Emission level = $22.09 dB \mu V/m$ )			

## Radiated Emission Attenuation From The Highest Fundamental Frequency to 2.4835GHz \*RBW 100 kHz Marker 1 [T1 ] VBW 300 kHz 65.30 dBµV SWT 2.5 ms 2.474869600 GHz 90 dBuV \*Att 10 dB Ref Delta [T1 ] -43.21 dB В 630400000 MHZ 1 PK VIEW 3DB Start 2.4742 GHz 930 kHz/ Stop 2.4835 GHz



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

Frequency Range [MHz]	Quasi-Peak Limits [μV/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

Please refer to the following table for result details

Radiated Emissions						
<b>Quasi-Peak</b>						
Emission	E-Field	Level	Limit	Level	Limit	
Frequency	Polarity	@3m	@3m	@3m	@3m	
MHz		dBμV/m	dBμV/m	μV/m	μV/m	
74.4	Vertical	24.5	40.0	16.8	100	
148.8	Vertical	32.6	43.5	42.7	150	
247.9	Vertical	34.3	46.0	51.9	200	
297.6	Vertical	27.5	46.0	23.7	200	
867.9	Horizontal	42.4	46.0	131.8	200	
967.1	Vertical	44.2	54.0	162.2	500	

#### Remarks:

No additional spurious emissions found between lowest internal used/generated frequency and 30 MHz

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	2009/09/02	2011/09/02
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	2010/02/09	2012/02/09
EM181	EMI TEST RECEIVER	ROHDE & SCHWARZ	ESIB7	100072	2010/07/01	2011/07/01
EM145	EMI TEST RECEIVER	R & S	ESCS 30	830245/021	2010/01/17	2011/01/17
EM022	LOOP ANTENNA	EMCO	6502	1189-2424	2009/07/26	2011/07/26

#### Remarks:-

CM Corrective Maintenance

N/A Not Applicable To Be Determined **TBD** 



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#### Appendix B

#### **Duty Cycle Correction During 100msec**

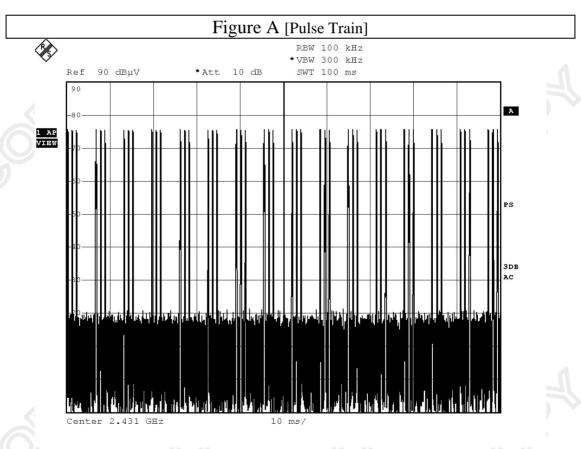
Each sample unit sends a different series of characters, but each pulse period (100msec) never exceeds a series of 48 (0.22msec) pulses. Assuming any combination of sole pulses may be obtained due to encoding the worst case transmit duty cycle would be considered 48x0.22msec per 100msec=10.56% duty cycle. Figure A through B show the characteristics of the pulse train for one of these functions.

#### Remarks:

Duty Cycle Correction = 20Log (0.1056) =-19.5 dB

Duty Cycle Correction = -20dB, if the calculation duty cycle correction >-20dB.

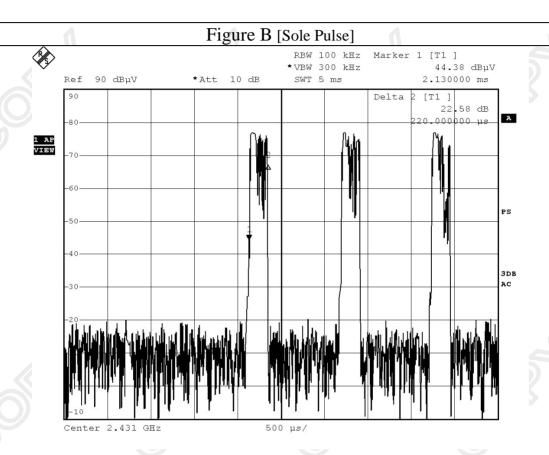
The following figures [Figure A to Figure B] showed the characteristics of the pulse train for one of these functions.





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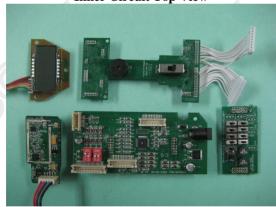
### Appendix C

### Photographs of EUT

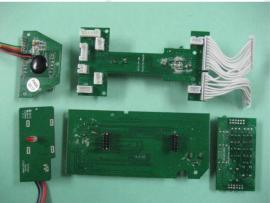




**Inner Circuit Top View** 



**Inner Circuit Bottom View** 

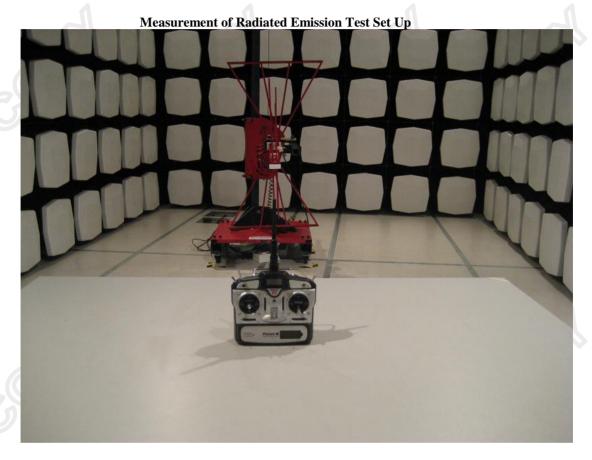




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### **Photographs of EUT**



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