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No. L0095

Test Report No.:
FCC2005-0008

TEST REPORT

EUT	:	**Transmitter of A7 Tornado Electric Airplane**
MODEL/TYPE	:	**MTC 53XX**
FCC ID	:	**P4SMTC53XX**
CLIENT	:	**MEGATECH INTERNATIONAL INC.**
Classification of Test	:	**COMMISSION TEST**

Guangzhou Testing & Inspection Institute for Household Electrical Appliances

广州日用电器检测所 GTIHEA

国家日用电器质量监督检验中心

Add.: 204 Xingang West Road Guangzhou 510302 P.R. China
Telephone: 86-20-84451692 Fax: 86-20-84183160
E-mail: EMC@ GTIHEA.COM

Client	**Name: MEGATECH INTERNATIONAL INC.** **Address: 8300 Tonnelle Ave, North Bergen, NJ07047, USA**
Manufacturer	**Name: SHANGHAI C.C. LEE MODEL CO., LTD.** **Address: Huachang Industrial District, Shanghai, P. R. China**
Equipment under Test	**Name** : TRANSMITTER OF A7 TORNADO ELECTRIC AIRPLANE **Model/ type** : MTC 53XX **FCC ID** : P4SMTC53XX **Trade mark** : Megatech **Serial no.** : — **Sampling** : —

Date of Receipt.	**2005.08.02**	Date of Testing	**2005.08.02-2005.11.02**

Test Specification	**Test Result**
FCC PART 15,Subpart C, 2005	**PASS**

Evaluation of Test Result	This device complies with the requirements of Federal Communications Commission (FCC) Rules and Regulations Part 15. **Issue Date: November 8, 2005**

Tested by:	Reviewed by:	Approved by:
Deng Junyong	Wang Xiaoyan	Name Signature
Name Signature	Name Signature	Name Signature

Other Aspects:

NONE

Abbreviations: OK, Pass = passed Fail = failed N/A= not applicable EUT= equipment, sample(s) under tested

Contents

1. General Product Information

Transmitter inputs:
Left-hand stick at middle or back: Stops the motor-model glides/descends;
Left-hand stick forward: Motor runs at high speed-model climbs;
Right-hand stick to right: Model turns right;
Right-hand stick to left: Plane turns left.
For more details, refer to the Flight Manual.

1.1 Product Description

Equipment Type	:	Intentional radiator
Frequency Characteristics	:	49.86 MHz
Modulation Type	:	Pluse
Ratings	:	8×1.5V DC
Antenna Type	:	Telescopic antenna

1.2 Independent Operation Modes

The basic operation mode of the EUT is Transmitting. Because there are two sticks, so there are five kinds of combination for transmitting operation:

No.	Left-hand Stick	Right-hand Stick	The direction of the receiver
Operation Mode 1	Forward	——	Forward
Operation Mode 2	——	Move to left	Left
Operation Mode 3	——	Move to right	Right
Operation Mode 4	Forward	Move to left	Forward and left
Operation Mode 5	Forward	Move to right	Forward and right

1.3 Submitted Documents

Operating Instructions and Installation Manual
Rating Label
Wiring Diagram
Construction Drawing
Photographs of EUT
Material Bill (Parts List)

2. Test Sites

2.1 Test Facilities

The tests and measurements refer to this report were performed by EMC testing Lab. Of Guangzhou Testing & Inspection Institute for Household Electric Appliances.

Add. : 204, Xingang West Road, Guangzhou, 510300, P.R. China
Telephone : 86-20-84451692
Fax : 86-20-84183160

The EMC testing laboratory has been recognized by China National Commission for Laboratory Assessment, and authorized by Nemko of Norway since 1997(Aut. No. ELA139), and authorized by TüV Rheinland of Germany since 1998(Aut. No. 9868976-1216), and registered by FCC since 2001(Registered No. 102430).

2.2 Description of Non-standard Method and Deviations

The testing and measurement method used in this report are all the standard method applied, no any non-standard method and deviations from the used standard were used.

2.3 List of Test and Measurement Instruments

Refer to **Appendix A**.

3. Test Set-up and Operation Modes

3.1 Principle of Configuration Selection

Emission: The equipment under test (EUT) was configured to measure its highest possible radiation level. The test modes were adapted accordingly in reference to the Operating Instructions.

3.2 Physical Configuration for Testing

Refer to relative descriptions in this test report.

3.3 Test Operation Mode and Test Software

Refer to **Test Setup.**

3.4 Special Accessories and Auxiliary Equipment

None.

3.5 Countermeasures to Achieve EMC Compliance

None.

4. Emission test results (intentional radiator)

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

Test Standards and Results Summary						
No	Test Item	Test Requirement	Test Method	Test Result		
				Pass	Failed	N/A
1	Conducted Emissions 0.15MHz to 30MHz	FCC 47 CFR 15.207	ANSI C63.4: 2003	☐	☐	☒
2	Radiated Emission (General Requirement)	FCC 47 CFR 15.209	ANSI C63.4: 2003	☒	☐	☐
3	20dB Bandwidth	FCC 47 CFR 15.215	ANSI C63.4: 2003	☒	☐	☐
4	Radiated Emission (Additional Provisions)	FCC 47 CFR 15.235	ANSI C63.4: 2003	☒	☐	☐

Note: N/A – Not Applicable

4.1 Conducted Emission (0.15MHz~30MHz)

Results: N/A

The EUT is operated by a single source of internal battery power [located in the battery compartment], therefore power line conducted emission was deemed unnecessary.

4.2 Radiated Emission (General Requirement)

RESULT : Pass

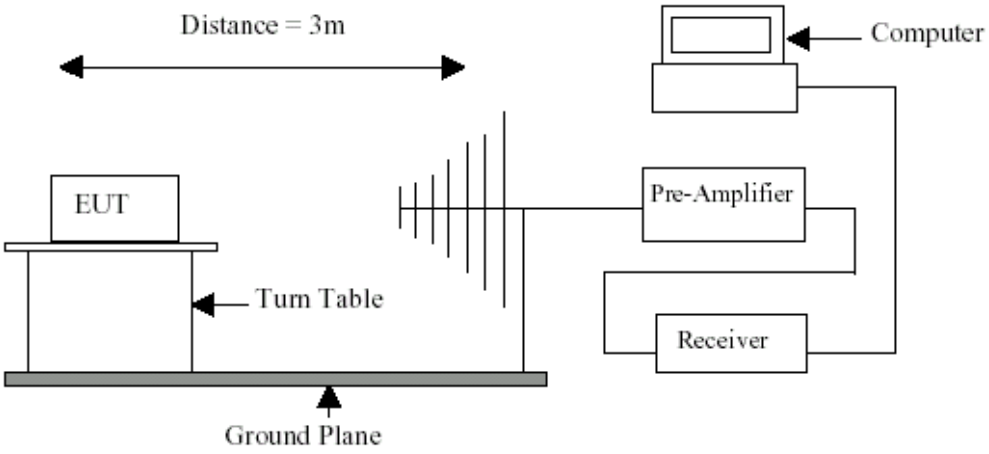
Test procedure	:	ANSI C63.4: 2003
Frequency range	:	Above 30MHz
Limits	:	Section 15.209 and Section 15.235 (a)
Test Site	:	3m Anechoic Chamber (Registration Number: 102430)

Test Setup:

The EUT was placed on a wooden turntable, which could rotate from 0° to 360°, 0.8m high above the ground, at a distance of 3m in anechoic chamber, from the loop antenna and bi-direction transmission broadband antenna, which was mounted on the antenna tower. For broadband antenna, measurements in both horizontal and vertical polarities were performed, and the height is varied from 1m to 4m in both horizontal and vertical polarizations.

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. The emissions worst-case are shown in Test Results below.

Test Setup (Broadband antenna):



Transducer

Loop Antenna 6502

Freq. (MHz)	Magnetic field Value (dB)	Electric field Value (dB)
0.009	-34.9	16.6
0.010	-35.5	16.0
0.020	-38.1	13.4
0.050	-38.8	12.7
0.075	-38.8	12.7
0.100	-39.0	12.5
0.150	-39.0	12.5
0.250	-39.0	12.5
0.500	-39.1	12.4
0.750	-39.3	12.2
1.000	-38.9	12.6
2.000	-39.2	12.3
3.000	-39.6	12.0
4.000	-39.7	11.8
5.000	-39.9	11.6
10.000	-39.6	11.9
15.000	-40.1	11.4
20.000	-40.6	10.9
25.000	-41.1	10.4
30.000	-41.9	9.6

Broadband antenna, 3141, 3m, 26MHz~2GHz

Freq. (MHz)	3141 (3m) Value (dB)	Cable Value (dB)	Total Value (dB)
26	12.0	0.30	12.30
30	8.7	0.35	9.05
60	6.7	0.70	7.40
100	9.8	1.14	10.94
150	9.4	1.38	10.78
200	10.1	1.62	11.72
250	12.1	1.96	14.06
300	14.5	1.96	16.46
350	15.7	2.36	18.06
400	16.1	2.68	18.78
450	16.9	2.79	19.69
500	17.7	2.87	20.57
550	18.8	3.21	22.01
600	19.9	3.55	23.45
650	20.5	3.58	24.08
700	21.8	3.54	25.34
750	21.5	3.89	25.39
800	22.1	4.11	26.21
850	22.4	4.06	26.46
900	22.9	4.20	27.10

Freq. (MHz)	3141 (3m)	Cable	Total

	Value (dB)	Value (dB)	Value (dB)
950	23.0	4.50	27.50
1000	24.1	4.56	28.66
1300	26.2	5.00	31.20
1700	27.2	6.00	33.20
2000	30.3	7.00	37.30

Note for Transducer Factor:

Correction Factor included Antenna Factor and Cable Attenuation. All factors were inputted into the ESI 26 testing receiver, for frequencies between the known sampling points the transducer factor is approximated using modified spline interpolation by software of ESI 26. So, the readings displayed in the graphs are the final testing results we needed without any calculation.

Radiated Emissions limits

(a) The field strength of any emission within 26.96-27.28 MHz band shall not exceed 10,000 microvolts/meter (80 dB μ V/m) at 3 meters. The emission limit in this paragraph is based on measurement instrumentation employing an average detector. The provisions in Section 15.35 for limiting peak emissions apply.

(b) The field strength of any emissions which appear outside of this band shall not exceed the general radiated emission limits in Section 15.209.

Frequency (MHz)	Measurement Distance (meters)	Field Strength (microvolts/meter)	Field Strength (dB μ V/m)
30-88	3	100	40.0
88-216	3	150	43.5
216-960	3	200	46.0
Above 960	3	500	54.0

The emission limits shown in the above table are based on measurement employing a CISPR quasi-peak detector and above 1GHz are based on measurements employing an average detector.

The field strength of emissions appearing within restricted bands of operation shall not exceed the limits shown in Section 15.209. At frequencies equal to or less than 1000 MHz, compliance with the limits in Section 15.209 shall be demonstrated using measurement instrumentation employing a CISPR quasi-peak detector. Above 1000 MHz, compliance with the emission limits in Section 15.209 shall be demonstrated based on the average value of the measured emissions.

Test Conditions (the worst case):

Ambient Temperature : 25 ℃/ 25 ℃ (Before Test/After Test);
Relative Humidity : 60 %/ 60 % (Before Test/After Test);
Power Supply : 8×1.5V DC ;
Operating Mode of the EUT : Transmitting (Left-hand Stick move to forward)

Radiated Emissions					
Description	Freq. (MHz)	Detector	Result dB(μV/m)	Limits dB (μV/m)	Limits (μV/m)
Fundamental emission	49.86	PK	67.22	100	100000
Fundamental emission	49.86	AV	61.78	80	10000

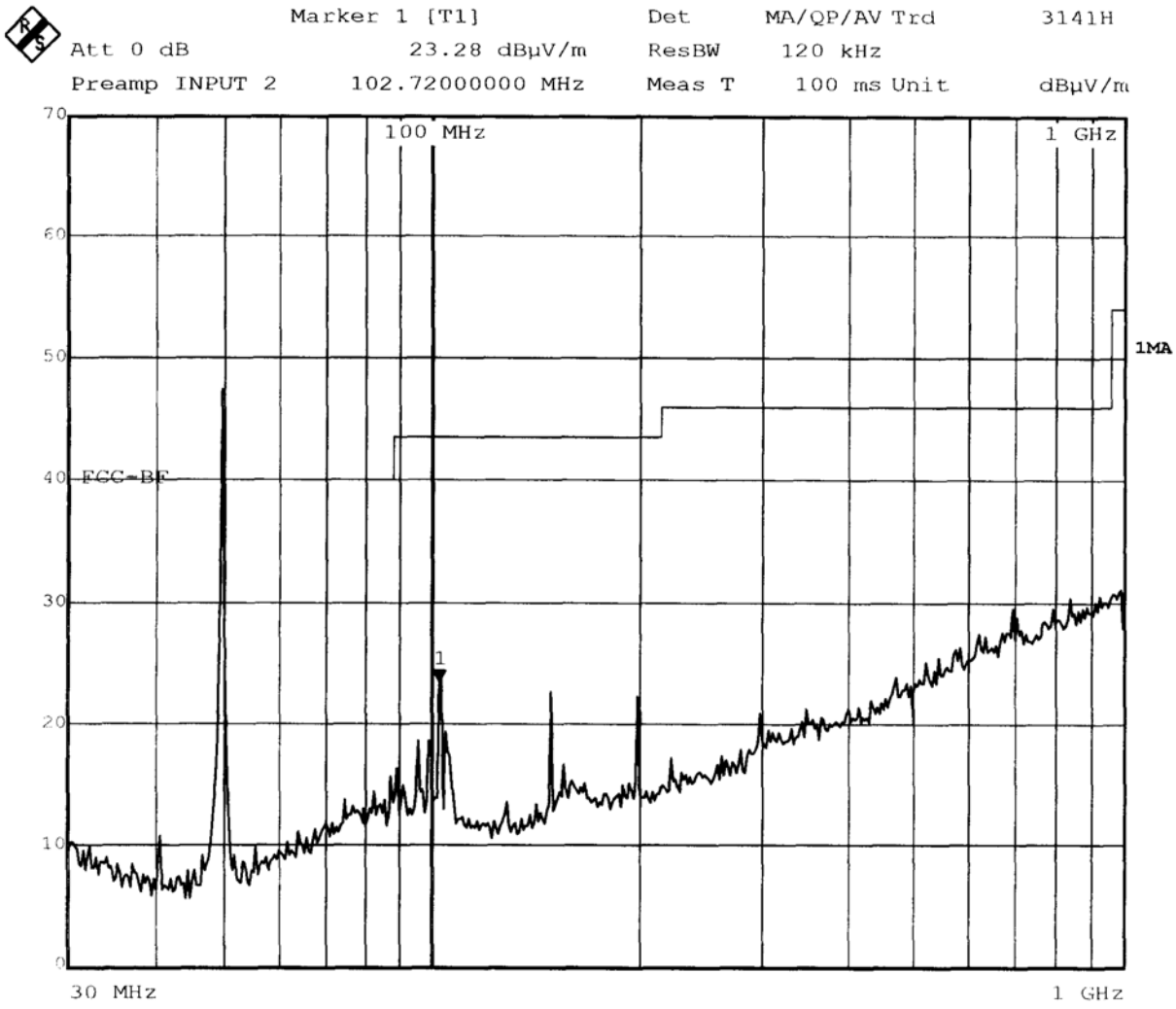
Radiated Emissions (QP detector)					
Description	Freq. (MHz)	Antenna Polarity	Result dB(μV/m)	Limits dB (μV/m)	Limits (μV/m)
Spurious emission	103.64	H	22.45	43.5	150
Spurious emission	149.60	H	21.70	43.5	150
Spurious emission	199.44	H	21.77	43.5	150
Spurious emission	99.72	V	30.10	43.5	150
Spurious emission	149.60	V	28.1	43.5	150

Remark:
Note 1: 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.

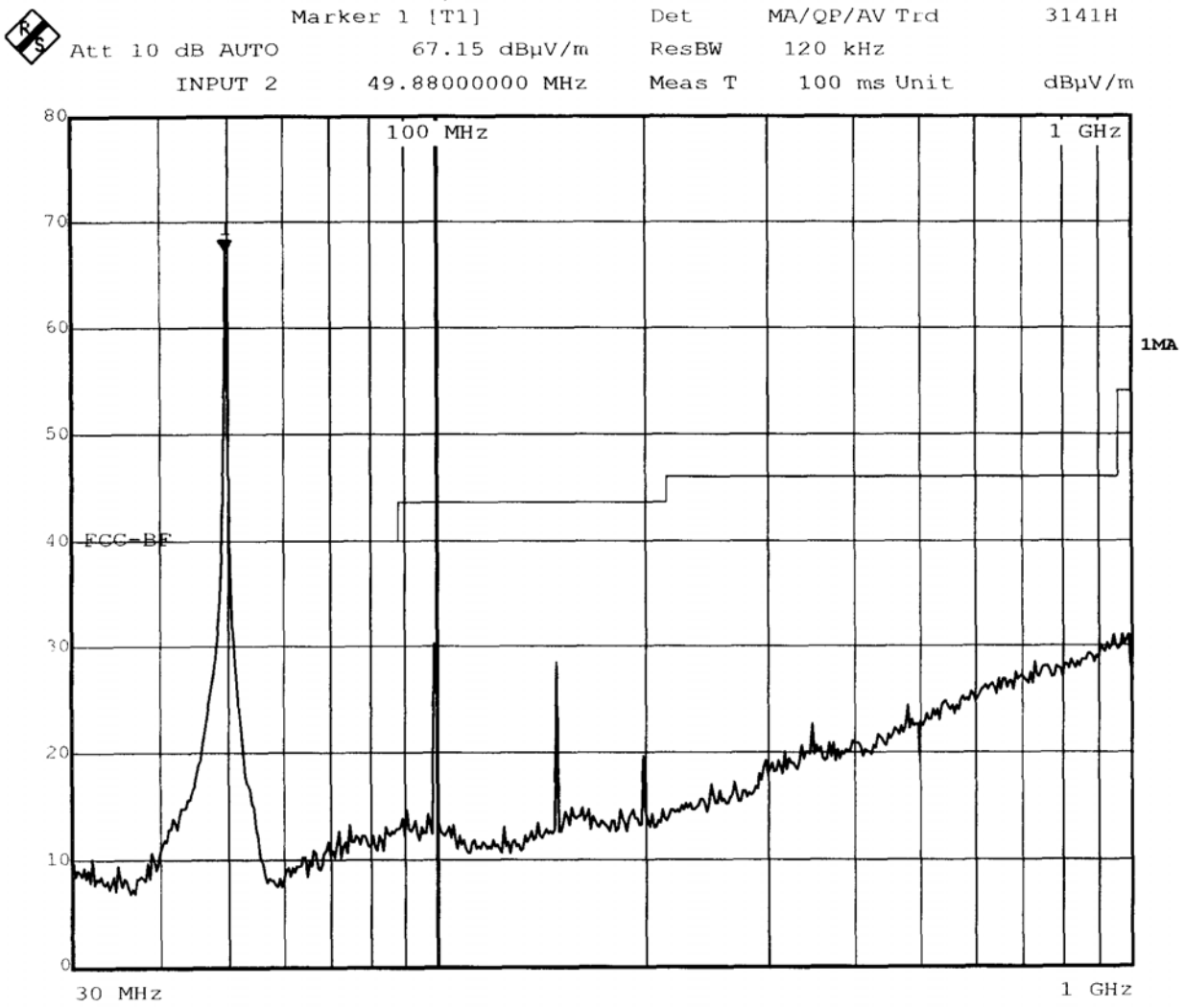
Note 2: Correction Factor including Antenna Factor and Cable Attenuation has been considered in the results.

Calculated measurement uncertainty:
±3.1 dB (<30MHz)
±5.9 dB (30MHz ~ 1GHz)

Transmitting (Horizontal)



Transmitting (Vertical)



4.3 20dB Bandwidth

RESULT : Pass

Test procedure : ANSI C63.4: 2003
Limits : Section 15.215 (c)
Test Site : 3m Anechoic Chamber (Registration Number: 102430)

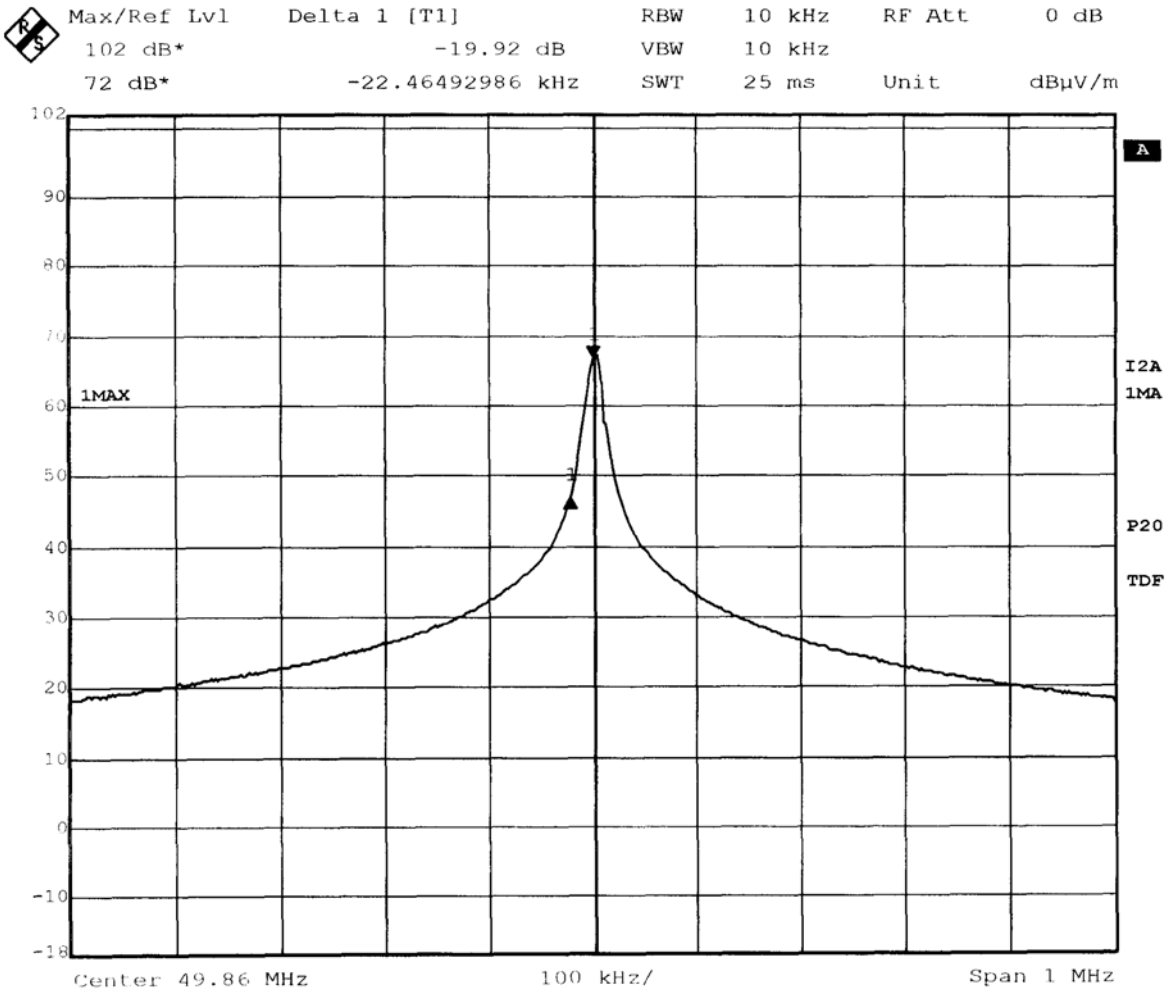
Test Setup:
Same as 4.2.

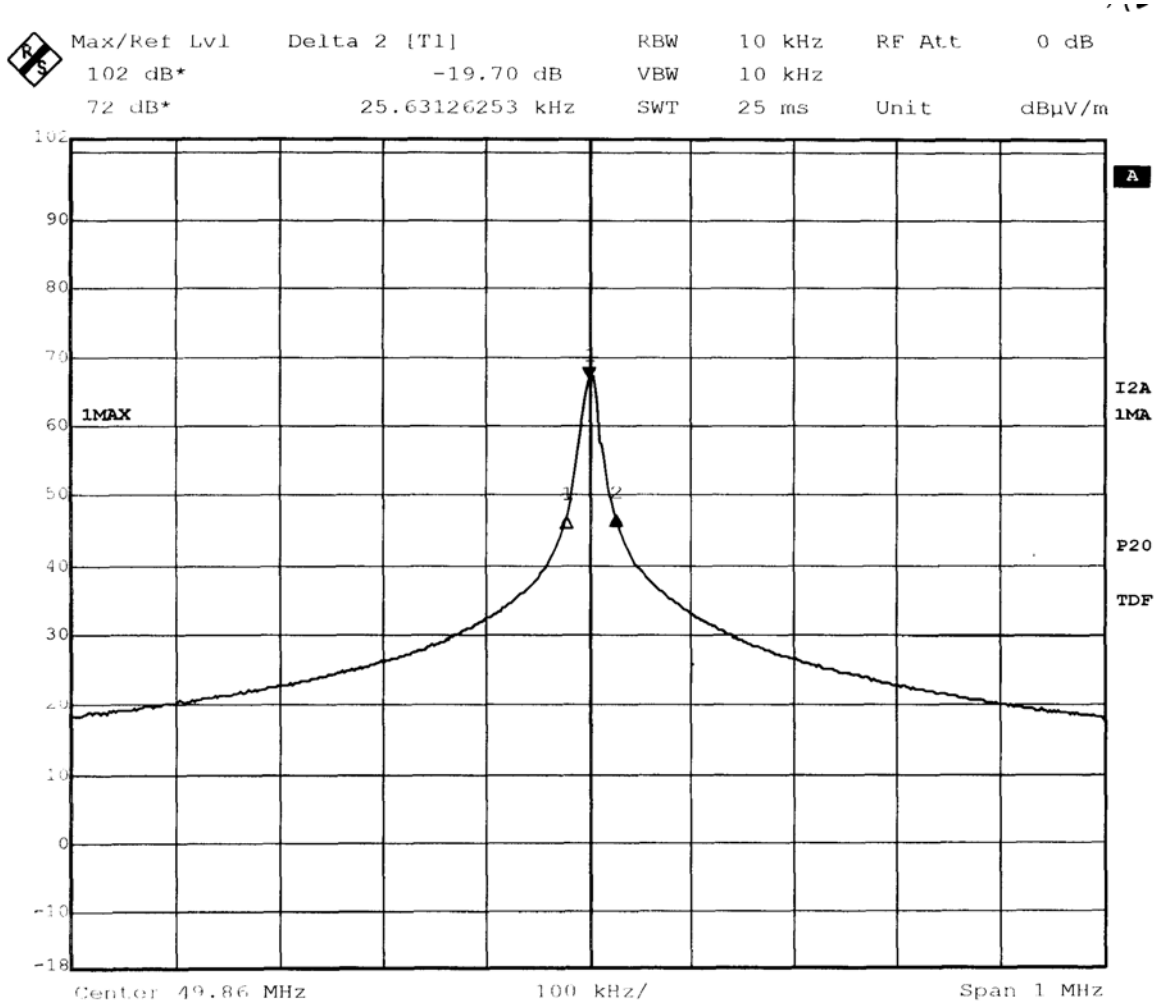
Test Results (the worst case):

Test Conditions
Ambient Temperature : 25 ℃/ 25 ℃ (Before Test/After Test);
Relative Humidity : 60 %/ 60 % (Before Test/After Test);
Power Supply : 8×1.5V DC ;
Operating Mode of the EUT : Transmitting (Left-hand Stick move to forward) .

Fundamental Frequency [MHz]	20dB Bandwidth [kHz]	FCC Limits [MHz]
49.86	22.46 + 25.63 = 48.09	Within 49.82-49.90

Scan Graph and Scan Settings




Max/Ref Lvl
102 dB*
72 dB*
Delta 2 [T1]
-19.70 dB
25.63126253 kHz
RBW 10 kHz
VBW 10 kHz
SWT 25 ms
RF Att 0 dB
Unit dBµV/m
1MAX
A
I2A
1MA
P20
TDF
Center 49.86 MHz
100 kHz/
Span 1 MHz

4.4 Radiated Emission (Additional Provisions)

RESULT : Pass

Test procedure : ANSI C63.4: 2003
Limits : Section 15.235 (b)
Test Site : 3m Anechoic Chamber (Registration Number: 102430)

Test Setup:
Same as 4.2.

1. The field strength of any emissions between 49.81 and 49.82 MHz & 49.90 and 49.91 MHz shall be attenuated at least 26 dB below the level of the unmodulated carrier or to the general limits in Section 15.209, whichever permits the higher emission levels

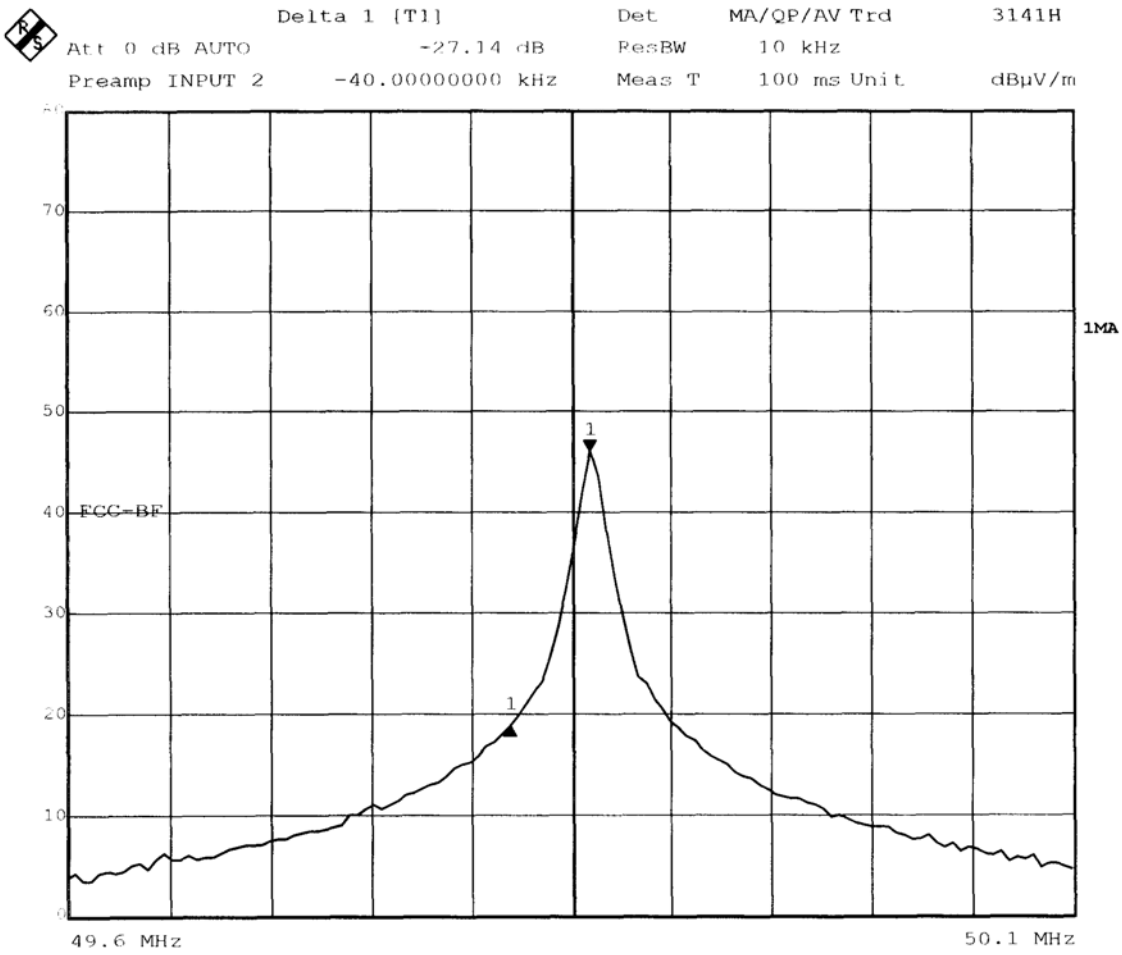
2. The field strength of emissions below 49.81 MHz or above 49.91 MHz shall not exceed the general radiated emission limits in Section 15.209.

Test Results (the worst case):

Test Conditions
Ambient Temperature : 25 ℃/ 25 ℃ (Before Test/After Test);
Relative Humidity : 60 %/ 60 % (Before Test/After Test);
Power Supply : 8×1.5V DC ;
Operating Mode of the EUT : Transmitting (Left-hand Stick move to forward)

Radiated Emissions (QP detector)				
Freq. (MHz)	Antenna Polarity	Fundamental Frequency	Attenuation dB (μV/m)	Limits (μV/m)
49.82	H	49.86	27.14	26
49.90	H	49.86	26.72	26
49.82	V	49.86	27.46	26
49.90	V	49.86	26.96	26

Transmitting (Horizontal)

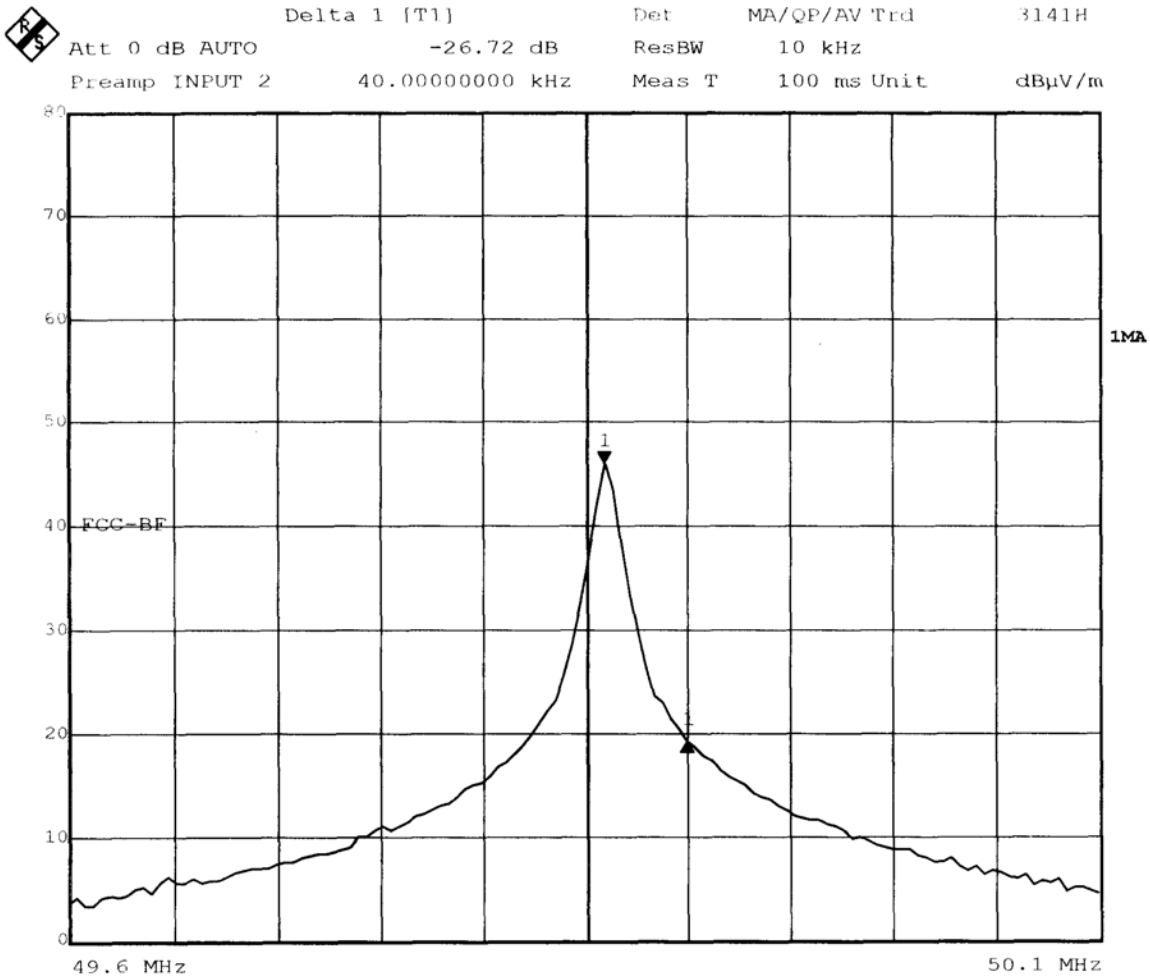


Note:

▼1: Fundamental Frequency 49.86 MHz

▲1: Band edge 49.82 MHz

Transmitting (Horizontal)

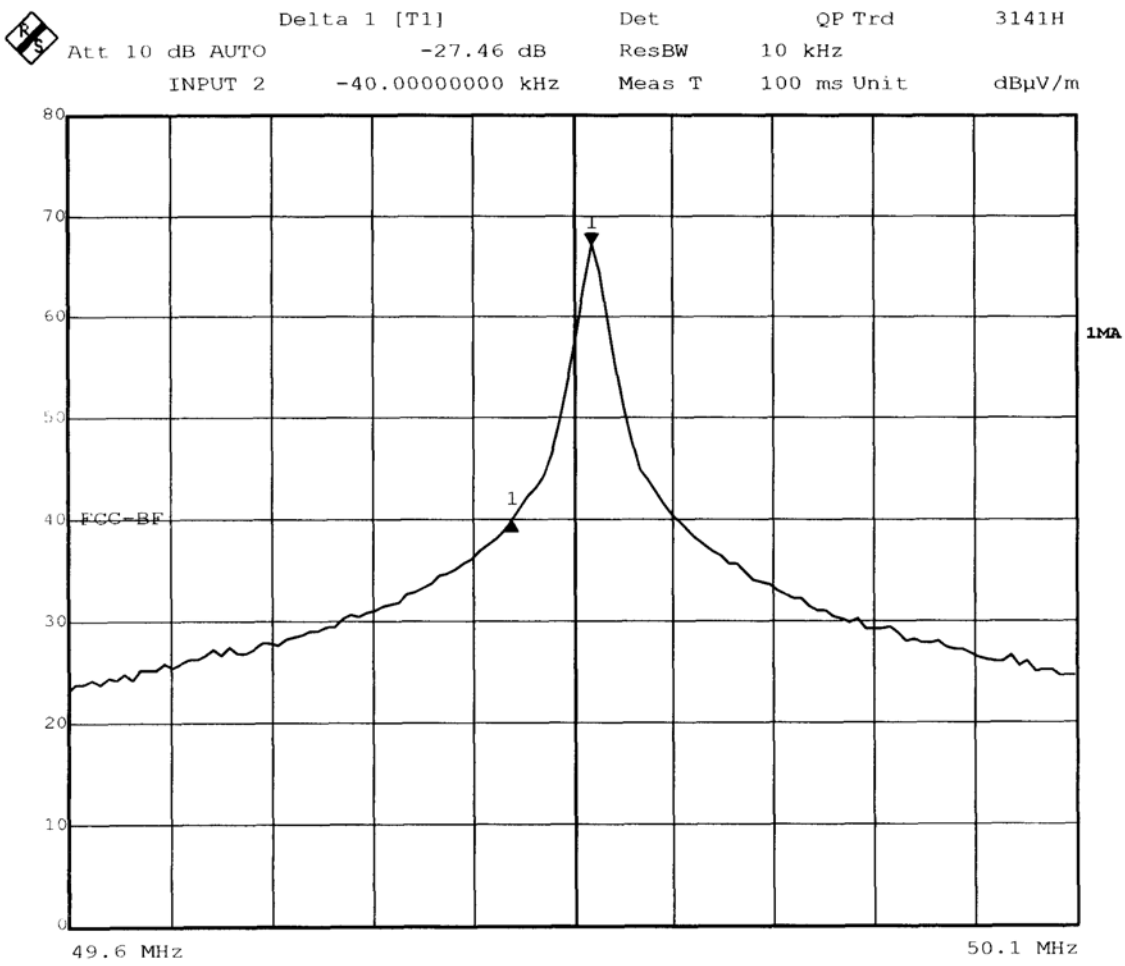


Note:

▼1: Fundamental Frequency 49.86 MHz

▲1: Band edge 49.90 MHz

Transmitting (Vertical)

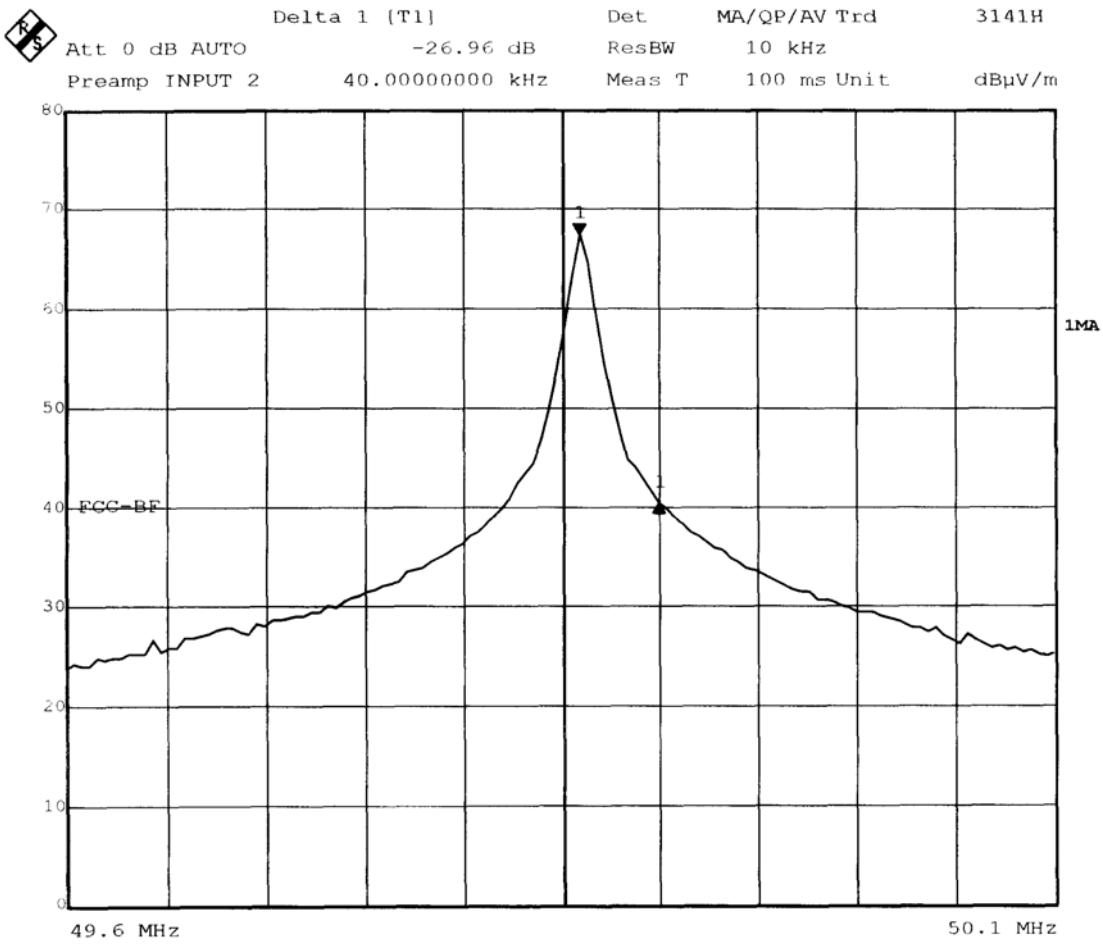


Note:

▼1: Fundamental Frequency 49.86 MHz

▲1: Band edge 49.82 MHz

Transmitting (Vertical)



Note:

▼1: Fundamental Frequency 49.86 MHz

▲1: Band edge 49.90 MHz

5. Photographs & Nameplates of the EUT

5.1 Outlook:

Front View of the Transmitter

Rear View of the Transmitter

Note: Label used by EMC Testing Dept. of GTIHEA

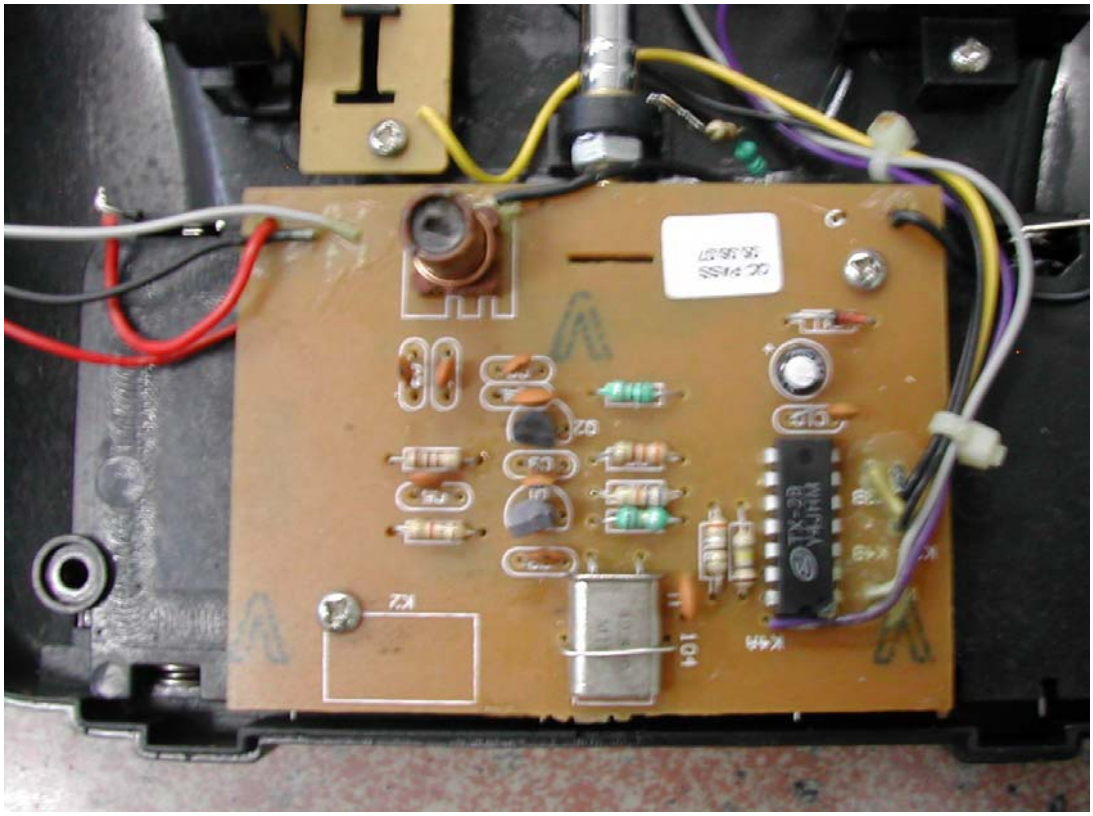
5.2 Structure of internal wires:

Internal Structure of the Transmitter

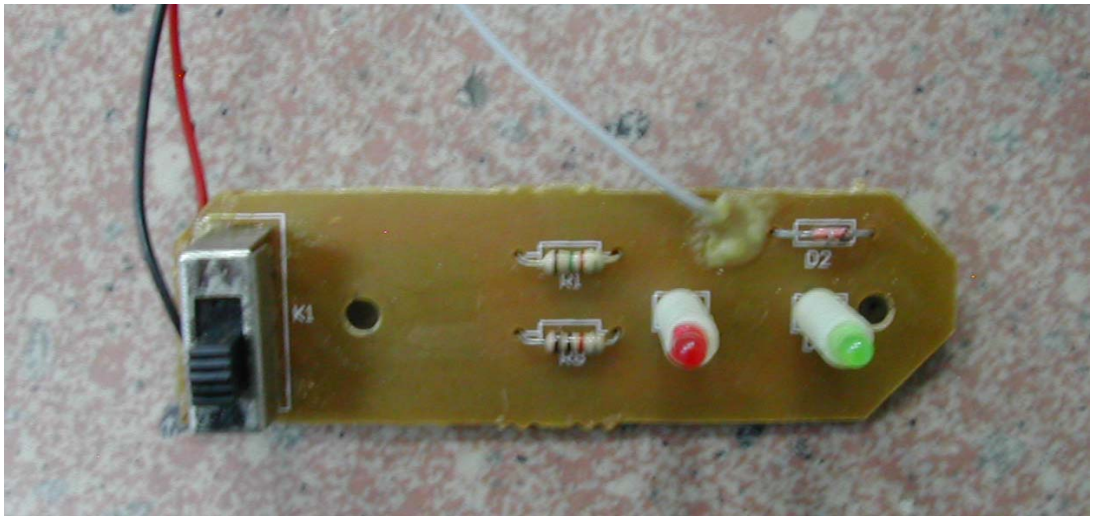
Note: Inner circuit board 1 Note: Inner circuit board 2

Top View of the Transmitter's Inner Circuit

(Inner circuit board 1)

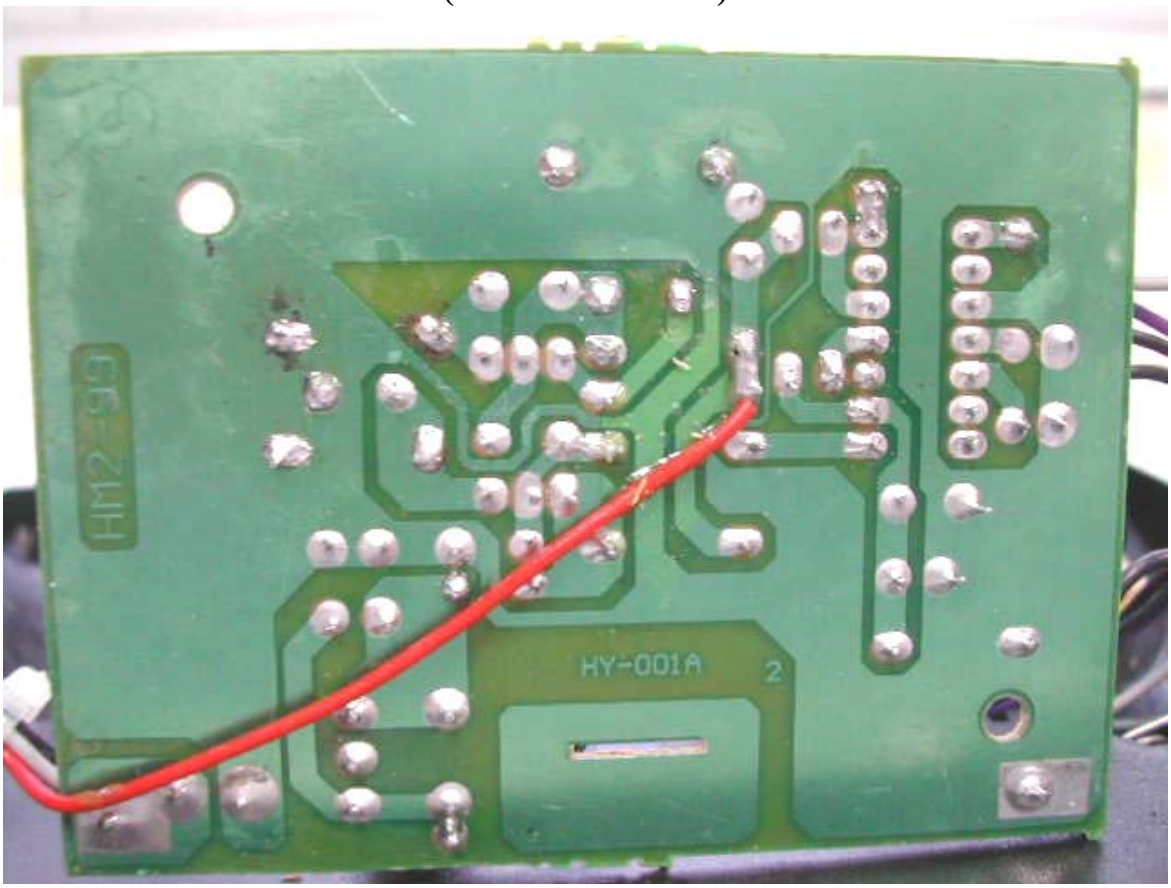


(Inner circuit board 2)

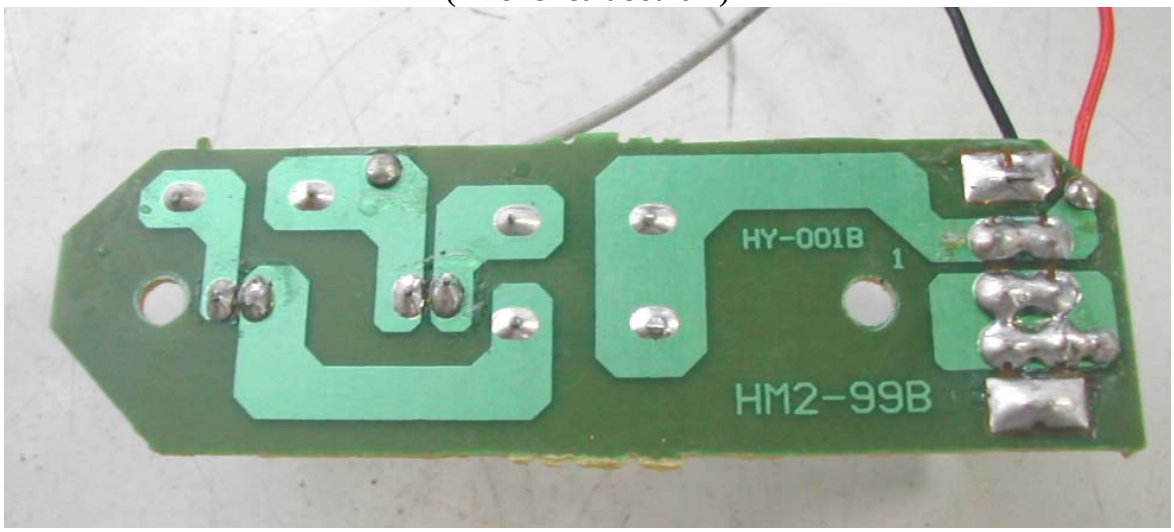


Bottom View of the Transmitter's Inner Circuit

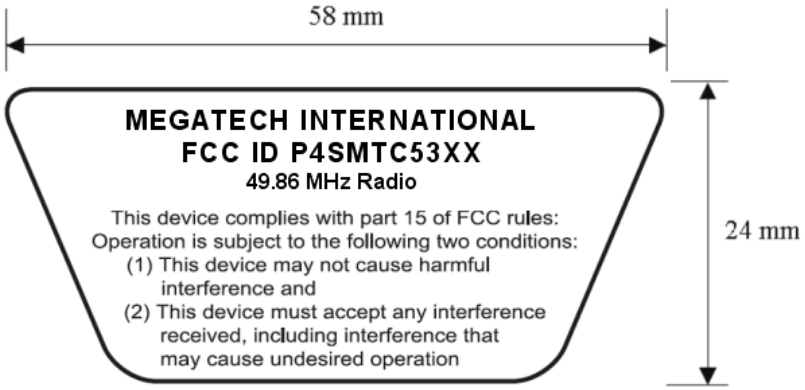
(Inner circuit board 1)



(Inner circuit board 2)



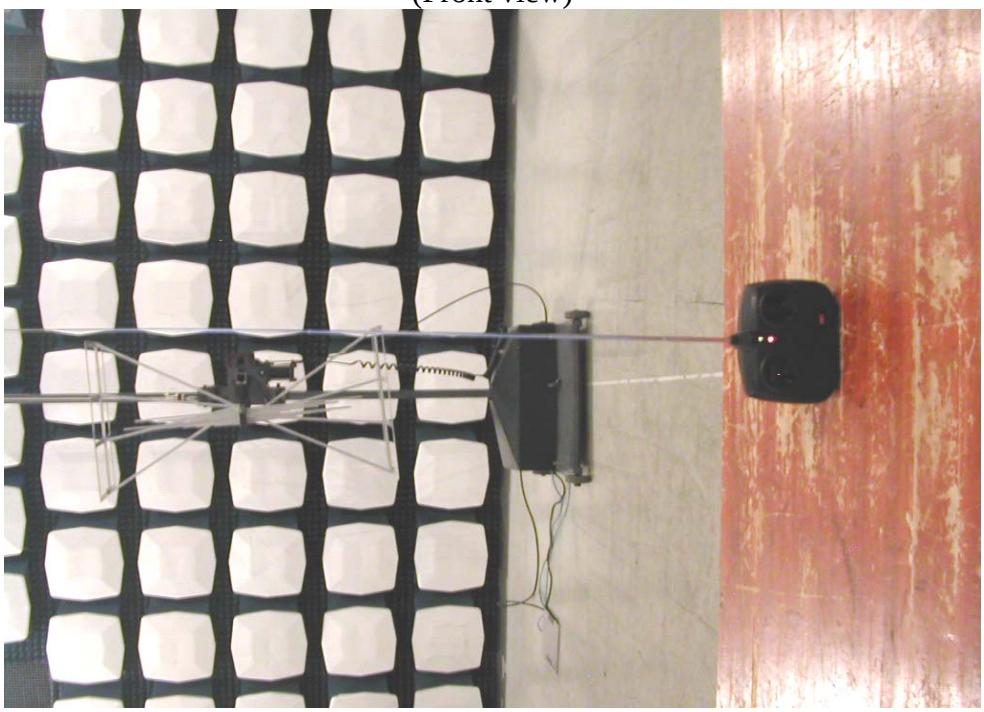
5.3 Nameplate:



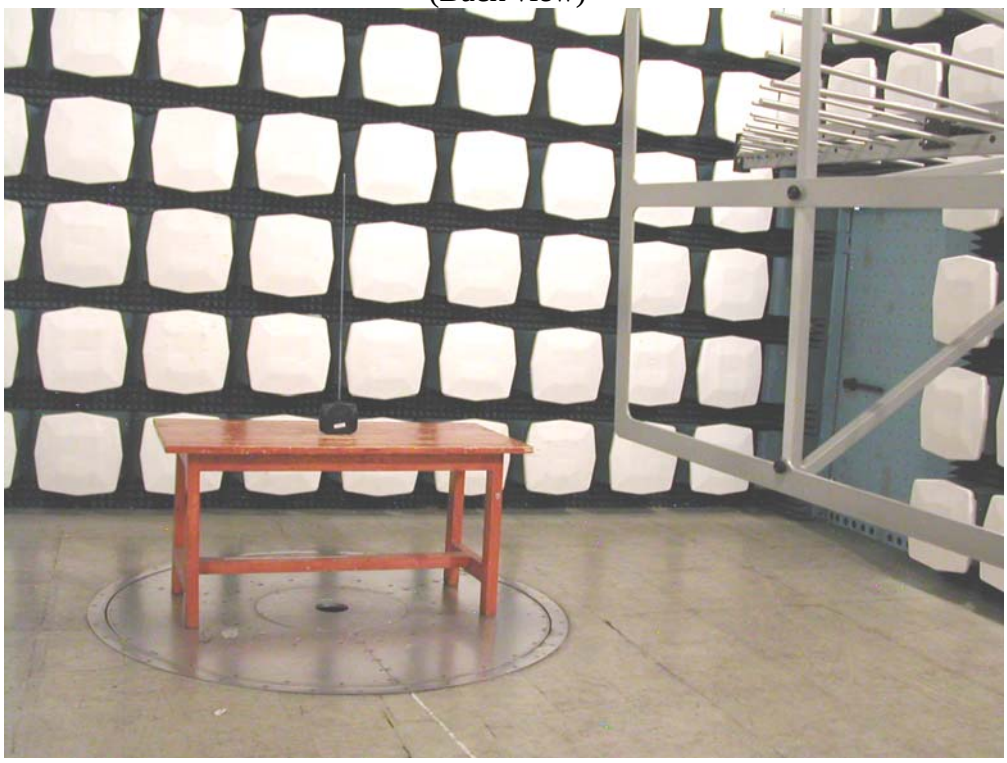
FCC label location

6. Photograph of the test setup

Spurious Emission
(Front view)



Spurious Emission
(Back view)



Appendix A

Test Equipment	Mature Date of Calibration	Type/Model	Serial No.	Manufacturer
EMI Testing Receiver	2006.10.08	ESI26	834000/009	R & S
Broadband Antenna	2007.06.04	3141	1178	EMCO
Pre-amplifier	2007.06.04	AFS4-00101800-55-LN	----	R & S

End of Document