

HomeTek Technology Inc.

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FCC TEST REPORT FOR

APPLICANT	:	<u>CHANG TJER INDUSTRIAL CO., LTD.</u>
ADDRESS	:	<u>NO. 38-46, YA TAN RD., TA YA HSIANG,</u> <u>TAICHUNG HSIEN, 428, TAIWAN, R. O. C.</u>
EUT	:	<u>Remote Control system for Dust Collector</u>
MODEL NO.	:	<u>RC-161+RC-170-110V, RC-160+RC-170-220V</u>
TRADE NAME	:	<u>CT</u>
FCC ID	:	<u>UPIRCSYSTEM</u>

Under Part 15, SUBPART B AND SUBPART C
CLASS B

Certification

MEASUREMENT PROCEDURE USED

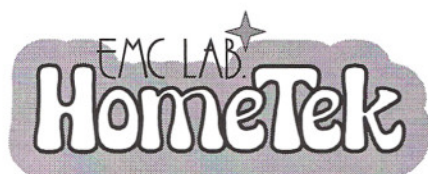
FCC RULES AND FCC / ANSI C63.4-2003

PREPARED BY :

HomeTek Technology Inc.

No. 67-9, Shir Men Road, Tu Cheng City,
Taipei Hsien. Taiwan

Report # : FB5J001



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CERTIFICATION

EUT	:	Remote Control system for Dust Collector		
MODEL NO.	:	RC-161+RC-170-110V, RC-160+RC-170-220V		
TRADE NAME	:	CT		
FCC ID	:	UPIRCSYSTEM		
Receipt Date	:	10/02/2006	Final Test Date:	10/11/2006
REPORT #	:	FB5J001		
APPLICANT	:	CHANG TJER INDUSTRIAL CO., LTD.		
ADDRESS	:	NO. 38-46, YA TAN RD., TA YA HSIANG, TAICHUNG HSIEN, 428, TAIWAN, R. O. C.		

MEASUREMENT PROCEDURE USED :

FCC RULES AND REGULATION PART 15, SUBPART B AND SUBPART C
AND FCC / ANSI C63.4-2003

We hereby show that:

The measurement shown in this test report were made in accordance with and no deviation with the procedures indicated, and the maximum energy emitted by the equipment was found to be within the FCC limits applicable.

This test result of this report applies to above tested sample only.

This test report shall not be reproduce in part without written approval of HomeTek Technology Inc.

APPROVED BY : 

ALAIN LIN / Supervisor



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GENERAL INFORMATION

- 1 APPLICANT : CHANG TJER INDUSTRIAL CO., LTD.
- 2 ADDRESS : NO. 38-46, YA TAN RD., TA YA HSIANG,
TAICHUNG HSIEN, 428, TAIWAN, R. O. C.
- 3 MANUFACTURER : CHANG TJER INDUSTRIAL CO., LTD.
- 4 ADDRESS : NO. 38-46, YA TAN RD., TA YA HSIANG,
TAICHUNG HSIEN, 428, TAIWAN, R. O. C.
- 5 DESCRIPTION OF EUT :
 EUT : Remote Control system for Dust Collector
 FCC ID : UPIRCSYSTEM
 Model Number : RC-161+RC-170-110V,
 RC-160+RC-170-220V
 Serial # : N/A

5.1 The difference among series of models RC-161+RC-170-110V and RC-160+RC-170-220V are shown as below:

Input / Output Model No.	110V	220V
RC-161+RC-170-110V	Yes	No
RC-160+RC-170-220V	No	Yes

The PCB Layout is same. The worst case of EMI test Model is RC-161+RC-170-110V and the final test data were shown in this test report.

6 FEATURES OF EUT :

- 6.1 The “Thermal relay Protection” on the remote control system is designed to protect the integrated circuit board on the remote control system and not the motor on your machine.
- 6.2 To ensure that your machines motor is protected, if not already supplied with your machine have a thermal relay protector installed on the motor.
- 6.3 Make sure the remote control system is used only on machines that have electrical specifications and horsepower ratings within the limits listed below. Using this remote control system outside of these listed limits will result in damage to the remote control and/or to the motor of your machine.



MODIFICATION LIST

THE FOLLOWING ACCESSORIES WERE ADDED TO THE EUT DURING TESTING :

NO MODIFICATION BY HOMETEK TECHNOLOGY INC.



CONDUCTED POWER LINE TEST

1 TEST PROCEDURE

According to **ANSI C63.4 – 2003**.

2 RESULT OF CONDUCTED EMISSION TEST

N/A(Conducted Power Line Test is not applicable to this EUT
(Model : RC-161+RC-170-110V).

RADIATED EMISSION TEST (3M)

1 TEST INSTRUMENTS & FACILITIES

The following test Instruments was used during the radiated emission test :

Item	Instruments /facilities	Specification	Manufacturer	Model # / S/N#	Date of Cal.
1	OPEN AREA TEST SITE	<input checked="" type="checkbox"/> OATS 3			JUL/2006
2	EMI TEST RECEIVER	20Hz ~ 26.5GHz	ROHDE & SCHWARZ	ESMI 845442/006	FEB/2006
3	PRE-AMPLIFIER	9KHz ~ 3000MHz	ADVANTEST	BB525C 90081001	OCT/2005
4	ANTENNA (BI-LOG)	25MHz ~ 2GHz	SCHAFFNER	CBL6112B S/N : 2614	JUN/2006
5	Horn Antenna	1G ~ 18GHz	BJXIBAO	040506	OCT/2006
6	Attenuation	50Ω/6dB	JYE BAO	FAT-N (M-F) 001	JUL/2006
7	Cable	10m	SUHNER	RG214/U OS3-003	DEC/2005
8	Cable	14m	BELDEN	9913 OS3-001	DEC/2005
9	EMI 32 (software)	N/A	AUDIX	19991013-0923	N/A

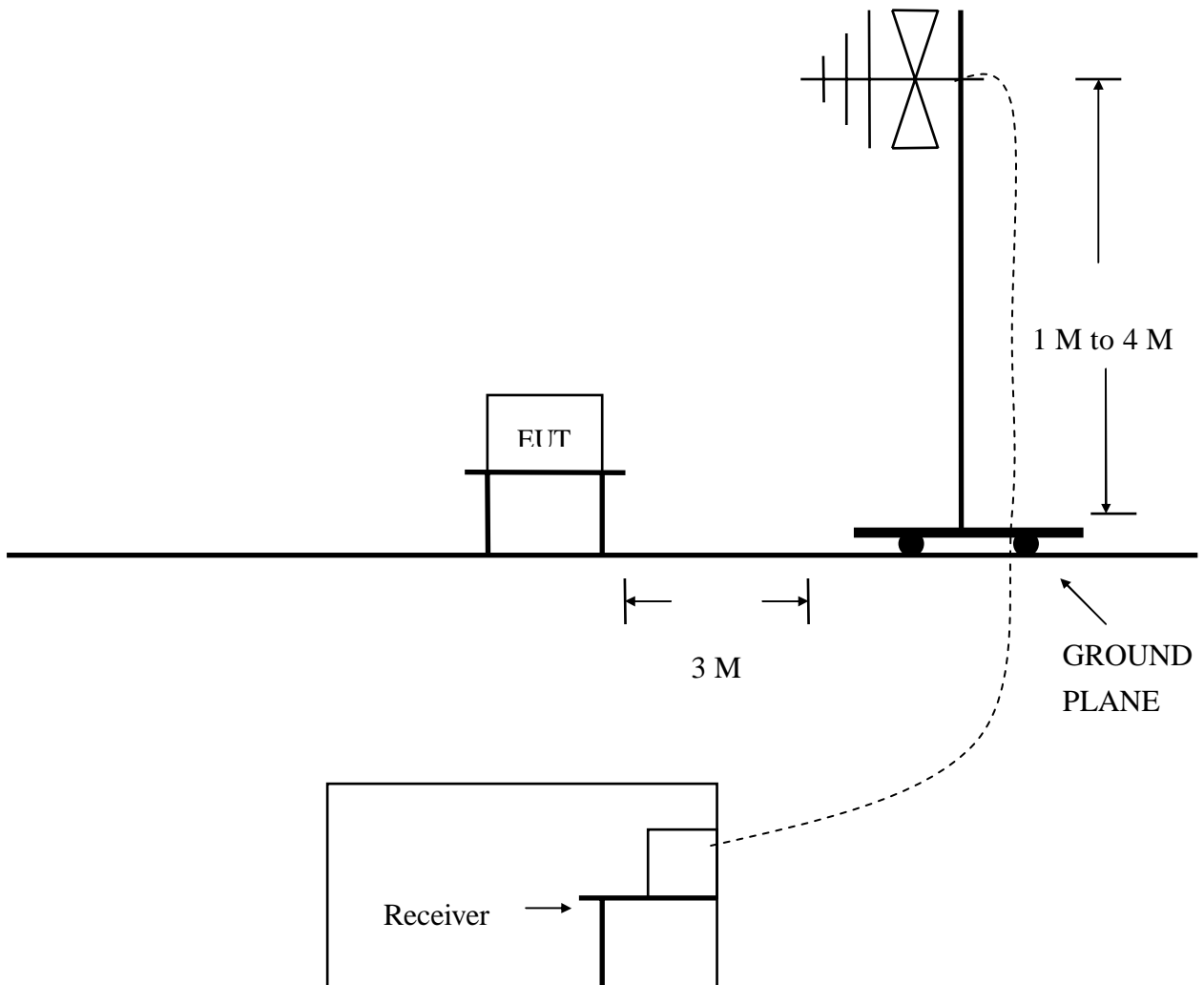
Note : Items 1 ~ 8 were calibrated within period of 1 year.

2 EUT OPERATING CONDITION

- 2.1 Configure the EUT according to the **ANSI C63.4 - 2003**.
- 2.2 The crystal frequency of the EUT is 315 MHz.
- 2.3 The radiated emission in the frequency range from 30 MHz - 3150 MHz was test in a horizontal and vertical polarization at HomeTek Lab's open site III.
- 2.4 Turn on all the power of EUT and peripheral.
- 2.5 The EUT was operated in its normal operating mode for the purpose of the measurements.
- 2.6 The receiving antenna polarized horizontally was varied from 1 to 4 meters and the wooden turntable was rotated through 360 degrees to obtain the highest reading on the ESMI test receiver or on the display of the spectrum analyzer. And also, each emission was to be maximized by changing the orientation of the EUT.
- 2.7 **The photos of radiated test configuration, please refer to appendix A.**

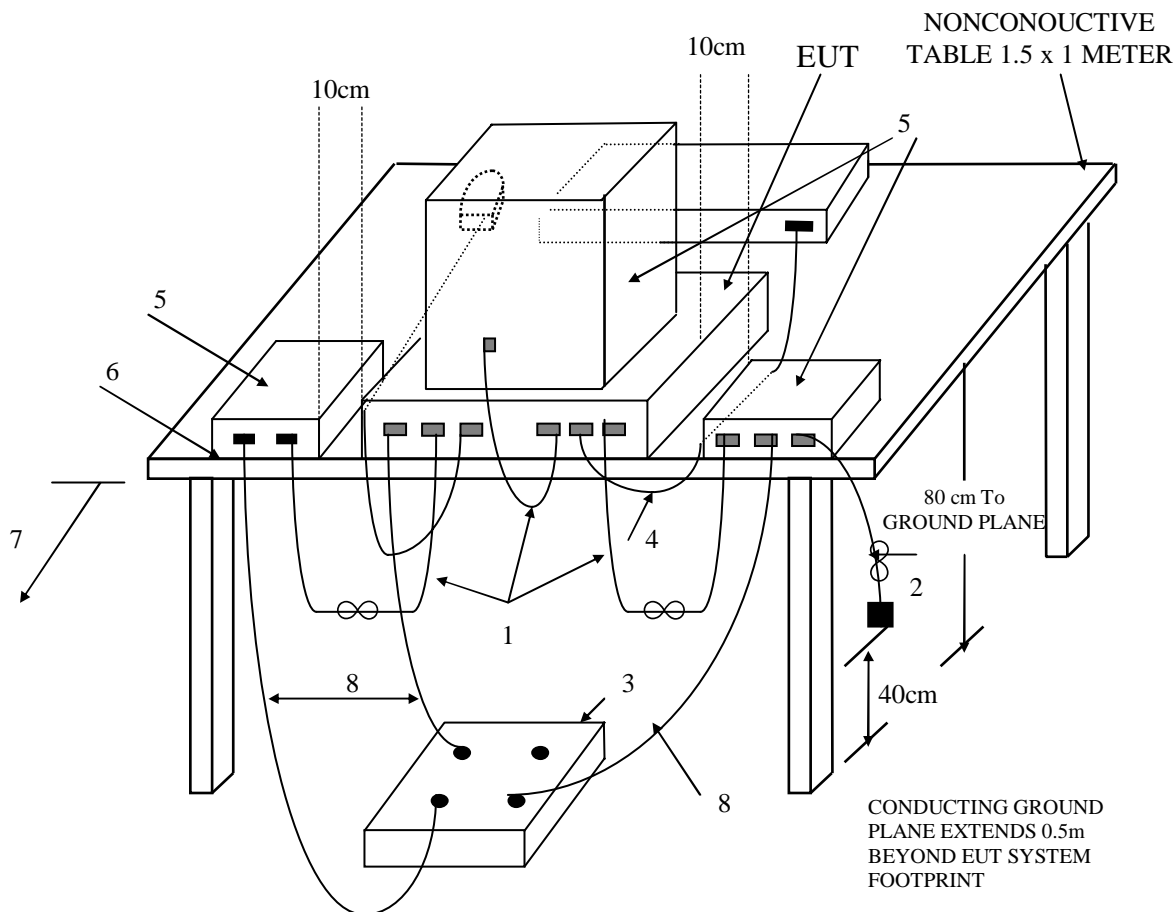
3 TEST SETUP

3.1 TEST SETUP OF OPEN SITE.



3.2 TEST SETUP OF EUT

ELECTRICAL AND ELECTRONIC EQUIPMENT IN THE RANGE OF 9kHz TO 40 GHz

ANSI
C63.4-2003


(Details for setup configuration, please refer to appendix A.)

LEGEND:

1. Interconnecting cables that hang closer than 40 cm to the ground plane shall be folded back and forth forming a bundle 30 to 40 cm long, hanging approximately in the middle between ground plane and table.
2. I/O cables that are connected to a peripheral shall be bundled in center. The end of the cable may be terminated if required using correct terminating impedance. The total length shall not exceed 1m.
3. If LISNs are kept in the test setup for radiated emissions, it is preferred that they be installed under the ground plane with the receptacle flush with the ground plane.
4. Cables of hand-operated devices, such as keyboards, mice, etc., have to be placed as close as possible to the controller.
5. Non-EUT components of EUT system being tested.
6. The rear of all components of the system under test shall be located flush with the rear of the table.
7. No vertical conducting wall used.
8. Power cords drape to the floor and are routed over to receptacle.

Test Configuration

Tabletop Equipment Radiated Emission

4 CONFIGURATION OF THE EUT

The EUT was configured according to **ANSI C63.4 - 2003**. All I/O ports were connected to the appropriate peripherals. All peripherals and cables are listed below (including internal device) :

4.1 EUT

EUT Type	: <input type="checkbox"/> Proto Type <input checked="" type="checkbox"/> Engineer Type <input type="checkbox"/> Mass Production
Condition when received	: <input checked="" type="checkbox"/> Good <input type="checkbox"/> Damage : _____
Device	: Remote Control system for Dust Collector
Applicant	: CHANG TJER INDUSTRIAL CO., LTD.
Manufacturer	: CHANG TJER INDUSTRIAL CO., LTD.
Model Number	: RC-161+RC-170-110V, RC-160+RC-170-220V
Serial Number	: N/A
FCC ID	: UPIRCSYSTEM
I/O Port	: N/A
Power Cord	: N/A
Power Supply Type	: Battery

4.2 REMARK : N/A

5 TEST PROCEDURE

- 5.1 The EUT was test according to **ANSI C63.4 – 2003 & FCC Part 15.205/15.209/15.231**.
- 5.2 The radiated test was performed at HomeTek Lab's Open Site III.
- 5.3 This site is on file with the FCC laboratory division, test firm registration number: 713630, expiration Date : 2005/10/20.
- 5.4 For emission frequencies measured below 1 GHz, a pre-scan is performed in a shielded chamber to determine the accurate frequencies. The signal of higher emissions will be checked on a open test site. As the same purpose, for emission frequencies measured above 1 GHz, a pre-scan also be performed with a 1 meter measuring distance before final test.
- 5.5 For emission frequencies measured below and above 1 GHz, set the spectrum analyzer or a 100KHz and 1MHz resolution bandwidth respectively for each frequency measured in item 5.4.
- 5.6 The receiving antenna is to be raised and lowered over a range from 1 to 4 meters in horizontally polarized orientation. Move the antenna to a position where the highest value is indicated on spectrum analyzer, then change the orientation of EUT on test table over a range from 0° to 360° with a speed as slow as possible and keep the azimuth that highest emission is indicated on the spectrum analyzer. Vary the antenna position again and record the highest value as a final reading. A RF test receiver is also used to confirm emissions measured.
- 5.7 Repeat item 5.6 until all frequencies need to be measured were completed.
- 5.8 Repeat item 5.7 with search antenna in vertical polarized orientations.
- 5.9 Check seven frequencies of highest emission with varying the placement of cables (if any) associated with EUT to obtain the worst case and record the result.
- 5.10 The frequency range from 30 MHz to 3150 MHz were investigated, the measurement were made at 3 meters, with a antenna.

6 LIMIT OF RADIATED EMISSION

15.231(b) in addition to the provisions of Section 15.205, the field strength of emissions from intentional radiators operated under this Section shall not exceed the following:

Fundamental frequency (MHz)	Measurement Distance	Field Strength of Fundamental (microvolts/meter)	Field Strength of Spurious Emissions (microvolts/meter)
46.66 – 40.70	3 (M)	2,250	225
70 – 130	3 (M)	1,250	125
130 – 174	3 (M)	1,250 to 3,750 **	125 to 375 **
174 – 260	3 (M)	3,750	375
260 – 470	3 (M)	3,750 to 12,500 **	375 to 1,250 **
Above 470	3 (M)	12,500	1,250

** Linear interpolations

[Where F is the frequency in MHz, the formulas for calculating the maximum permitted fundamental field strengths are as follows: for the band 130-174 MHz, $\mu\text{V/m}$ at 3 meters = $56.81818(F) - 6136.3636$; for the band 260-470 MHz, $\mu\text{V/m}$ at 3 meters = $41.6667(F) - 7083.3333$. The maximum permitted unwanted emission level is 20 dB below the maximum permitted level.]

- (1) The above field strength limits are specified at a distance of 3 meters. The tighter limits apply at the band edges.
- (2) Intentional radiators operating under the provisions of this Section shall demonstrate compliance with the limits on the field strength of emissions, as shown in the above table, based on the average value of the measured emissions. As an alternative, compliance with the limits in the above table may be based on the use of measurement instrumentation with a CISPR quasi-peak detector. The specific method of measurement employed shall be specified in the application for equipment authorization. If average emission measurements are employed, the provisions in Section 15.35 for averaging pulsed emissions and for limiting peak emissions apply. Further, compliance with the provisions of Section 15.205 shall be demonstrated using the measurement instrumentation specified in that section.
- (3) The limits on the field strength of the spurious emissions in the above table are based on the fundamental frequency of the intentional radiator. Spurious emissions shall be attenuated to the average (or, alternatively, CISPR quasi-peak) limits shown in this table or to the general limits shown in Section 15.209, whichever limit permits a higher field strength.

Section 15.33 Frequency range of radiated measurements:

(a) Unless otherwise noted in the specific rule section under which the equipment operates for an intentional radiator the spectrum shall be investigated from the lowest radio frequency signal generated in the device, without going below 9 KHz, up to at least the frequency shown in this paragraph;

(1) If the intentional radiator operates below 10GHz: to the tenth harmonic of the highest fundamental frequency or to 40 GHz, whichever is lower.

7 RESULT OF RADIATED EMISSION TEST

- 7.1 The frequency range from 30 MHz to 3150 MHz was investigated.
- 7.2 All readings below or equal 1 GHz are quasi-peak or peak values with resolution bandwidth of 120 KHz. The reading of fundamental frequency is peak or average values. With resolution bandwidth of 120KHz.
- 7.3 The measurements were made at 3 meters of HomeTek Lab's open site III.
- 7.4 Temperature : 26 °C, Humidity : 52 % RH.
- 7.5 Deviation form the test standards and rules : None.
- 7.6 Radiated Emission data : **Horizontal**

PRODUCT EMISSIONS AVERAGE DATA 15.231 BANDS								
Frequency (MHz)	Emission Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Read Level (dBuV)	ANT Factor (dB/m)	Cable Loss (dB)	Preamp Factor (dB)	Detector
* 314.97	70.28	75.60	-5.32	77.95	13.52	2.44	23.63	Average
629.95	51.76	55.60	-3.84	51.93	18.79	3.82	22.78	Average
944.95	51.37	55.60	-4.23	46.76	20.66	5.24	21.29	Average
1259.92	46.62	55.60	-8.98	35.67	23.25	6.32	18.62	Average
1889.90	40.16	55.60	-15.44	19.04	26.73	7.67	13.28	Average

PRODUCT EMISSIONS AVERAGE DATA 15.205 BANDS								
Frequency (MHz)	Emission Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Read Level (dBuV)	ANT Factor (dB/m)	Cable Loss (dB)	Preamp Factor (dB)	Detector
1574.90	48.86	54.00	-5.14	31.18	25.36	6.95	14.63	Average

PRODUCT EMISSIONS QP DATA 15.209 BANDS								
Frequency (MHz)	Emission Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Read Level (dBuV)	ANT Factor (dB/m)	Cable Loss (dB)	Preamp Factor (dB)	Detector
154.49	41.19	43.50	-2.31	53.42	10.09	1.71	24.03	QP
472.47	40.06	46.00	-5.94	43.14	16.97	3.22	23.27	QP
787.45	44.71	46.00	-1.29	42.92	19.70	4.27	22.18	QP
1102.44	46.39	54.00	-7.61	38.45	21.94	6.08	20.08	QP
1417.42	49.08	54.00	-4.92	35.49	24.07	6.48	16.96	QP
1732.39	48.22	54.00	-5.78	28.72	25.77	7.25	13.52	QP

* noise floor.

- Emission Level = Read Level – Preamp Factor + ANT Factor + Cable Loss.
- Sample Calculation for 1732.39 MHz .
- Corrected Reading : (28.72) - (13.52) + (25.77) + (7.25) = 48.22 .

7.7 Radiated Emission data : **Vertical**

PRODUCT EMISSIONS AVERAGE DATA 15.231 BANDS								
Frequency (MHz)	Emission Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Read Level (dBuV)	ANT Factor (dB/m)	Cable Loss (dB)	Preamp Factor (dB)	Detector
* 314.98	65.09	75.60	-10.51	74.93	13.52	2.44	25.80	Average
629.96	50.07	55.60	-5.53	51.84	18.79	3.82	24.38	Average
944.94	49.34	55.60	-6.26	46.67	20.66	5.24	23.23	Average
1259.96	50.70	55.60	-4.90	41.74	23.25	6.32	20.61	Average

PRODUCT EMISSIONS QP DATA 15.209 BANDS								
Frequency (MHz)	Emission Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Read Level (dBuV)	ANT Factor (dB/m)	Cable Loss (dB)	Preamp Factor (dB)	Detector
157.50	38.48	43.50	-5.02	52.41	10.04	1.72	25.69	QP
472.47	39.84	46.00	-6.16	44.71	16.97	3.22	25.06	QP
787.42	40.55	46.00	-5.45	40.41	19.70	4.27	23.83	QP
1102.44	45.82	54.00	-8.18	39.83	21.94	6.08	22.03	QP

* noise floor.

- Emission Level = Read Level – Preamp Factor + ANT Factor + Cable Loss.
- Sample Calculation for 1102.44 MHz .
- Corrected Reading : (39.83) - (22.03) + (21.94) + (6.08) = 45.82 .

REMARK :

1. Model : RC-161+RC-170-110V
2. Measuring mode : 315MHz Mode.
3. “*”, means this frequency is fundamental.
4. Result : **PASSED**

EMISSION BANDWIDTH MEASUREMENT

1 TEST INSTRUMENTS & FACILITIES

The following test Instruments was used during the bandwidth emission test :

Item	Instruments /facilities	Specification	Manufacturer	Model # / S/N#	Date of Cal.
1	EMI TEST RECEIVER	20Hz ~ 26.5GHz	ROHDE & SCHWARZ	ESMI 845442/006	FEB/2006
2	ANTENNA (BI-LOG)	25MHz ~ 2GHz	SCHAFFNER	CBL6112B S/N : 2614	JUN/2006

Note : Item 1~2 were calibrated within period of 1 year.

2 EUT OPERATING CONDITION

2.1 Configure the EUT according to the **ANSI C63.4 - 2003& FCC Part 15.231**.

2.2 15.231(c) The bandwidth of the emission shall be no wider than 0.25% of the center frequency for devices operating above 70MHz and below 900MHz. For devices operating above 900MHz, the emission shall be no wider than 0.5% of the center frequency. Bandwidth is determined at the points 20 dB down from the modulated carrier.

3 TEST PROCEDURE

ANSI C63.4-2003 Occupied Bandwidth Measurements.

(...) 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 either the fundamental frequency or first-order modulation products in all typical modes of operation, including the unmodulated carrier, even if atypical. Once the reference level is established, the equipment is conditioned with typical modulating signals to produce worst-case (i.e., the widest) bandwidth. (...) In order to measure the modulated signal properly, a resolution bandwidth that is small compared to the bandwidth required by the procuring or regulatory agency shall be used on the measuring instrument. However, the 6dB resolution bandwidth of the measuring instrument shall be set to a value greater than 5% of the bandwidth requirements.

4 LIMIT OF BANDWIDTH EMISSION

The 20dB bandwidth limit = $0.0025 * 315\text{MHz} = 0.7875\text{MHz} = 787.5\text{KHz}$.

5 RESULT OF BANDWIDTH EMISSION TEST

5.1 Bandwidth setting of the analyzer: RBW = 10KHz, VBW = 10KHz.

5.2 The measured 20dB bandwidth is: **0.05MHz**.

5.3 The EUT meets the requirements of this section.

5.4 Model: RC-161+RC-170-110V.

5.5 Result: **PASSED**.

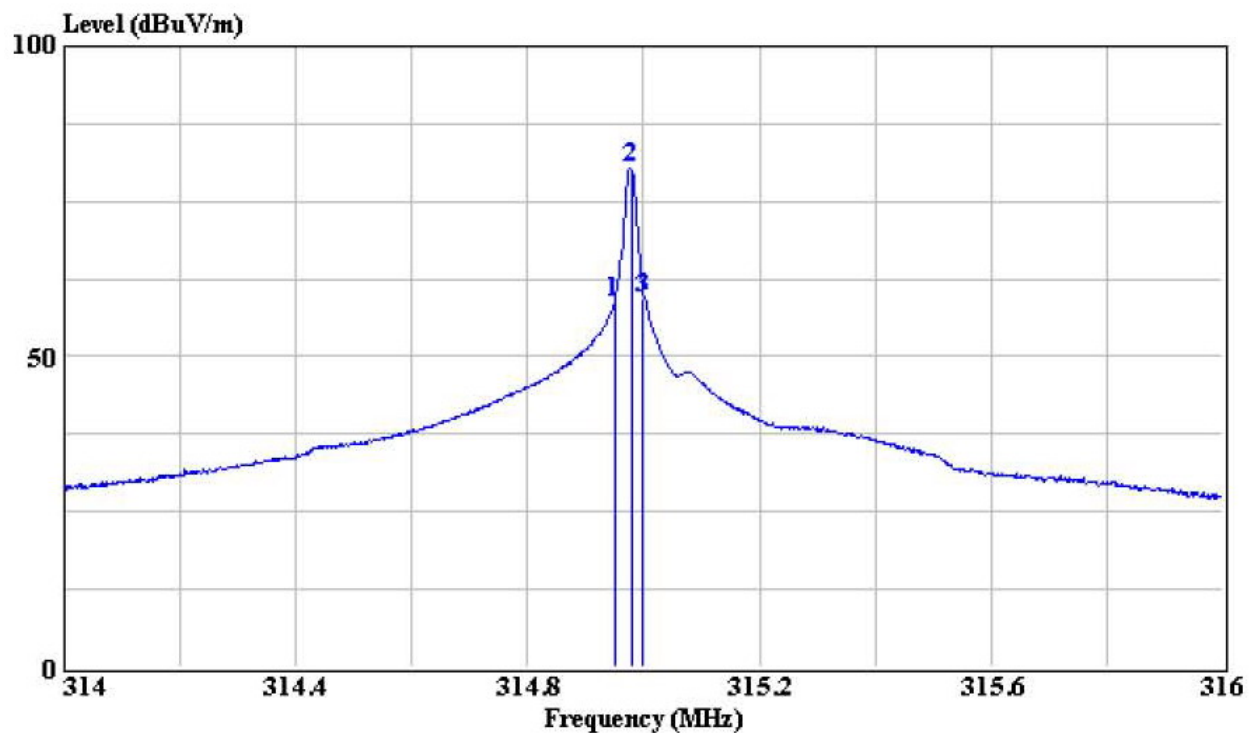


PHOTO OF FCC ID LABEL**SAMPLE OF FCC ID LABEL :**

FCC ID : UPIRCSYSTEM

This device complies with part 15 of the FCC Rules.
Operation is subject to the following two conditions: (1)
This device may not cause harmful interference. And (2)
this device must accept any interference that may cause
undesired operation.

Please refer to appendix B photo of ID location.