

FCC PART 15 SUBPART C EMI MEASUREMENT AND TEST REPORT

For

YUYAO CHAOHUI ELECTRONIC CO., LTD

NO.11 MAOSHENG ROAD, YUYAO ECONOMIC & TECHNICAL DEVELOPMENT ZONE,
ZHEJIANG

FCC ID: RC7CH-409

2003-08-13

This Report Concerns: ☒ Original Report	Equipment Type: Wireless Remote Controller
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Report No.: R0307214	
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1 - GENERAL INFORMATION

1.1 Product Description for Equipment Under Test (EUT)

The YUYAO CHAOHUI ELECTRONIC CO., LTD's product, model number: CH-409 or the "EUT" as referred to in this report is a transmitter of a Wireless Remote Controller which is measured approximately 2.0"L x 1.3"W x 0.5"H.

** The test data gathered is from typical production samples provided by the manufacturer.*

1.2 Objective

This Type approval report is prepared on behalf of YUYAO CHAOHUI ELECTRONIC CO., LTD in accordance with Part 2, Subpart J, and Part 15, Subparts B and C of the Federal Communication Commissions rules.

The objective of the manufacturer is to demonstrate compliance with FCC rules, Part 15, Sec 231 for conducted and radiated margin.

1.3 Related Submittal(s)/Grant(s)

No Related Submittals

1.4 Test Methodology

All measurements contained in this report were conducted with ANSI C63.4 –1992, American National Standard for Methods of Measurement of Radio-Noise Emissions from Low-Voltage Electrical and Electronic Equipment in the range of 9 kHz to 40 GHz. All radiated and conducted emissions measurement was performed at BACL. The radiated testing was performed at an antenna-to-EUT distance of 3 meters.

1.5 Test Facility

The Open Area Test site used by BACL to collect radiated and conducted emission measurement data is located in the back parking lot of the building at 230 Commercial Street, Sunnyvale, California, USA.

Test site at BACL has been fully described in reports submitted to the Federal Communication Commission (FCC) and Voluntary Control Council for Interference (VCCI). The details of these reports has been found to be in compliance with the requirements of Section 2.948 of the FCC Rules on February 11 and December 10, 1997 and Article 8 of the VCCI regulations on December 25, 1997. The facility also complies with the radiated and AC line conducted test site criteria set forth in ANSI C63.4-1992.

The Federal Communications Commission and Voluntary Control Council for Interference has the reports on file and is listed under FCC file 31040/SIT 1300F2 and VCCI Registration No.: C-1298 and R-1234.

The test site has been approved by the FCC and VCCI for public use and is listed in the FCC Public Access Link (PAL) database.

Additionally, BACL is a National Institute of Standards and Technology (NIST) accredited laboratory, under the National Voluntary Laboratory Accredited Program (Lab Code:200167-0). The scope of the accreditation covers the FCC Method - 47 CFR Part 15 - Digital Devices, IEC/CISPR 22: 1997, and

AS/NZS 3548: Electromagnetic Interference - Limits and Methods of Measurement of Information Technology Equipment test methods.

1.6 Test Equipment List

Manufacturer	Description	Model	Serial Number	Cal. Due Date
HP	Spectrum Analyzer	8568B	Panel 2408A00105 Display 2403A06544	2004-05-01
HP	Spectrum Analyzer	8593A	29190A00242	2004-05-01
HP	Amplifier	8447E	1937A01054	2004-05-01
HP	Quasi-Peak Adapter	85650A	2521A00718	2004-05-01
Com-Power	Biconical Antenna	AB-100	14012	2004-05-01
Com-Power	LISN	LI-200	12005	2004-03-28
Com-Power	LISN	LI-200	12008	2004-03-28
Com-Power	Log Periodic Antenna	AL-100	16091	2004-05-01
Com-Power	Log Periodic Antenna	AB-900	15049	2004-05-01
HP	Voltmeter	6236B	2003A05705	Not Required

* **Statement of Traceability:** BACL certifies that all calibration has been performed using suitable standards traceable to NIST.

2 - SYSTEM TEST CONFIGURATION

2.1 Justification

The EUT was configured for testing in a typical fashion (as normally used in a typical application).

The final qualification test was performed with the EUT operating at normal mode.

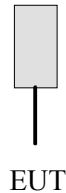
2.2 Block Diagram

Appendix A contains a copy of the EUT's block diagram as reference.

2.3 Equipment Modifications

No modifications were made by BACL to ensure the EUT to comply with the applicable limits and requirements.

2.4 Configuration of Test System



3 - SUMMARY OF TEST RESULTS

FCC Rules	REQUIREMENTS	SUMMARY	RESULT
FCC 15.203	Antenna Requirement	<i>See Pictures</i>	Compliant
FCC 15.205	Spurious Radiated Emissions	<i>Section 5</i>	Compliant
FCC 15.207 (a)	Conducted Emissions	<i>Section 4</i>	N/A
FCC 15.209	Unwanted Emissions	<i>Section 5</i>	Compliant
FCC 15.231(a)(1)	Deactivation	<i>Section 7</i>	Compliant
FCC 15.231(c)	20dB Bandwidth	<i>Section 6</i>	Compliant
FCC 15.231(b)	Field Strength	<i>Section 5</i>	Compliant
FCC 15.231(b)(2)	Pulse desensitization or derating was not required because peak measurements were employed	<i>N/A</i>	N/A

4 - AC Line Conducted Emissions

Not applicable because of battery powered.

5 - Radiated Emission Data

5.1 EUT Setup

The radiated emission tests were performed in the open area 3-meter test site, using the setup accordance with the ANSI C63.4 - 1992. The specification used was the FCC Class B limits.

The EUT was placed on the center of the back edge on the test table.

The EUT used new battery.

5.2 Spectrum Analyzer Setup

According to FCC Rules, 47 CFR 15.33, the EUT was tested to 1000 MHz.

During the radiated emission test, the spectrum analyzer was set with the following configurations:

Start Frequency	30 MHz
Stop Frequency	1000 MHz
Sweep Speed	Auto
IF Bandwidth.....	100 KHz
Video Bandwidth	1 MHz
Quasi-Peak Adapter Bandwidth.....	120 KHz
Quasi-Peak Adapter Mode	Normal
Resolution Bandwidth.....	1MHz

5.3 Test Procedure

Maximizing procedure was performed on the six (6) highest emissions to ensure EUT is compliant with all installation combination.

All data was recorded in the peak detection mode. Quasi-peak readings performed only when an emission was found to be marginal (within -4 dB μ V of specification limit), and are distinguished with a "QP" in the data table.

The EUT was operating at normal to represent *worst* case results during final qualification test. Therefore, this configuration was used for final test data recorded in the table(s) listed under section 4.7 of this report.

5.4 Corrected Amplitude & Margin Calculation

The Corrected Amplitude is calculated by adding the Antenna Factor and Cable Factor, and subtracting the Amplifier Gain from the Amplitude reading. The basic equation is as follows:

$$\text{Corr. Ampl.} = \text{Indicated Reading} + \text{Antenna Factor} + \text{Cable Factor} - \text{Amplifier Gain}$$

The "**Margin**" column of the following data tables indicates the degree of compliance with the applicable limit. For example, a margin of -7dB μ V means the emission is 7dB μ V below the maximum limit for Class B. The equation for margin calculation is as follows:

$$\text{Margin} = \text{Corr. Ampl.} - \text{FCC Limit}$$

5.5 Equipment List

HP, Amplifier, Cal Due Date: 2004-05-01

Com-Power, Log Periodic Antenna, Cal. Due Date: 2004-05-01

5.5 Test Results

According to the final data in section 5.5, the EUT complied with the FCC 15.205, 15.231 (b) standards and had the worst margin of:

- 20.0 dB μ V at 944.79 MHz in the Horizontal polarization, 30 to 1000 MHz, 3 meters

INDICATED		TABLE	ANTENNA		CORRECTION FACTOR Cable			CORRECTED AMPLITUDE	FCC 15.231		
Frequency MHz	Ampl. dB μ V/m	Angle Degree	Height Meter	Polar H/ V	Antenna dB μ V/m	Cable dB	Amp. dB	Corr. Ampl. dB μ V/m	Limit dB μ V/m	Margin dB	Comment
944.79	38.3	0	1	H	23.5	5.0	30.0	36.8	55.62	-18.8	AVE
629.86	39.0	180	1.8	H	19.5	4.0	29.0	33.5	55.62	-22.1	AVE
1259.73	32.4	270	1.6	H	24.2	5.3	30.0	31.9	55.62	-23.7	AVE
944.79	31.5	0	1	V	23.5	5.0	30.0	30.0	55.62	-25.6	AVE
314.93	58.8	200	1	H	13.9	2.9	27.3	48.3	75.62	-27.3	Fund. AVE
1259.73	28.7	30	1	V	24.2	5.3	30.0	28.2	55.62	-27.4	AVE
629.86	30.2	30	1	V	19.5	4.0	29.0	24.7	55.62	-30.9	AVE
314.93	38.9	180	1	V	13.9	2.9	27.3	28.4	75.62	-47.2	Fund. AVE

6 - 20dB Bandwidth

6.1 Requirement

Per 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.

6.2 Equipment List

HP, Amplifier, Cal Due Date: 2004-05-01

HP, Spectrum Analyzer, Cal Due Date: 2004-05-01

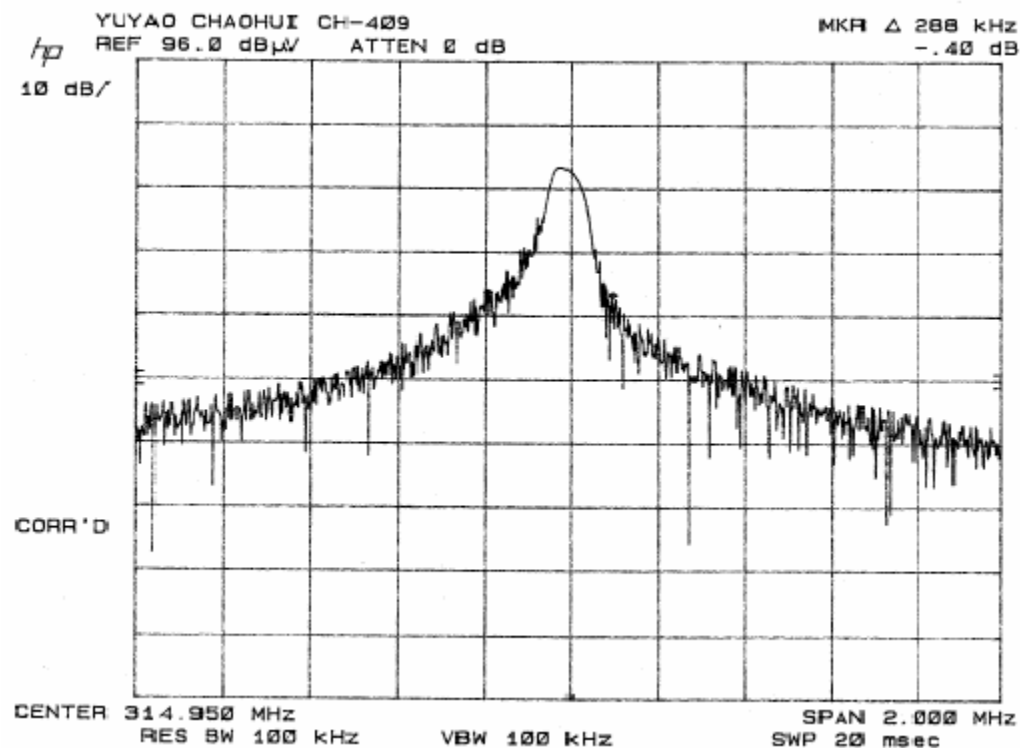
HP, Quasi-Peak Adapter, Cal Due Date: 2004-05-01

Com-Power, Log Periodic Antenna, Cal. Due Date: 2004-05-01

6.3 Test Result

288 kHz < 0.25% of 314.95 MHz (787.375 kHz)

Complies with the requirement.



7 - Deactivation

7.1 Requirement

Per 15.231(a)(1), a manually operated transmitter shall employ a switch that will automatically deactivate the transmitter within not more than 5 seconds of being released.

7.2 Test Equipment

HP, Amplifier, Cal Due Date: 2004-05-01

HP, Spectrum Analyzer, Cal Due Date: 2004-05-01

HP, Quasi-Peak Adapter, Cal Due Date: 2004-05-01

Com-Power, Log Periodic Antenna, Cal. Due Date: 2004-05-01

7.3 Test Result

Complies with the requirement.

