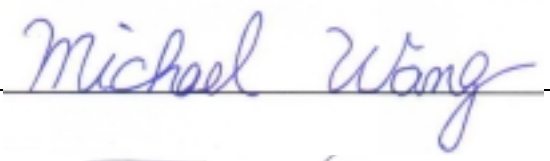
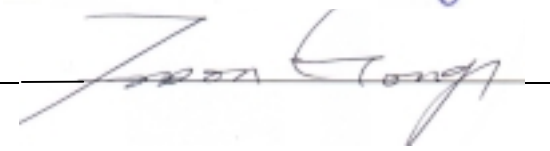
EMI TEST REPORT

According to

FCC Part 15 Class B Subpart C

EQUIPMENT	:	WIRELESS REMOTE CONTROLLER
FCC ID.	:	OZIRC-01
APPLICANT	:	SAN SHIH ELECTRICAL ENTERPRISE CO., LTD.
ADDRESS		NO. 45, SEC. 3, PA TE RD., PAN CHIAO 220, TAIPEI HSIEN, TAIWAN, R. O. C.

TEST ENGINEER : 

CHECK BY : 

ISSUE DATE : MAY 02, 2000

- The test result refers exclusively to the test presented test model / sample.
- Without the written authorization of the test lab., the Test Report may not be copied.

PEP TESTING LABORATORY

12-3Fl, No. 27-1, Lane 169, Kang-Ning St., Hsi-Chih.
Taipei Hsien, Taiwan, R. O. C.
TEL : 886-02-2692-2097

Table of Contents

Figures

1. GENERAL INFORMATION

1.1 Verification of Compliance

EUT:	WIRELESS REMOTE CONTROLLER
FCC ID:	OZIRC-01
Applicant:	SAN SHIH ELECTRICAL ENTERPRISE CO., LTD.
Address:	NO. 45, SEC. 3, PA TE RD., PAN CHIAO 220, TAIPEI HSIEN, TAIWAN, R. O. C.
Test Type:	CERTIFICATION
Result:	PASS
Tested Lab.:	PEP Testing Laboratory
Test Date:	APR. 19, 2000
Report Number:	E890054

The above equipment was tested by PEP Testing Laboratory for compliance with the requirement set forth in the FCC rules and regulations Part 15, subpart C. This said equipment in the configuration described in the report, shows, the maximum emission levels emanating from equipment are within the compliance requirements.

The estimated uncertainty of the test result is given as following. The method of uncertainty calculation is provided in PEP Testing lab. Doc. No. PEPD-15 .

	Prob. Dist.	Uncertainty(dB)	Uncertainty(dB)
		Radiation	Conduction
Combined Std. Uncertainty $\boldsymbol{u}_c$	norm.	± 2.08	± 1.77

M.Y. Tsui

M.Y. Tsui
EMC Manager

Date: May. 1. 2000

1.2 Equipment Modifications

To achieve compliance to Class B levels, the following change(s) were made in EUT :

N/A

This modified product was used as EUT for final EMC test and report. The above modifications will be implemented in each production unit sold under the FCC ID : OZIRC-01

Approved by:

C. F. Chen / MANAGER

DATE

1.3 Product Information

System Configuration

ITEM	DESCRIPTION	FCC ID	CABLE
Product	WIRELESS REMOTE CONTROLLER	OZIRC-01	
Housing	ABS		
Battery	12V		
Fundamental.	303 MHz		
Device Type	Periodic Operation		

(1) EUT submitted for grant.

1.4 Test Methodology

Radiated tests were performed according to the procedures in ANSI C63.4-1992 at an antenna to EUT distance of 3 meters.

1.5 Supporting Test Devices

N/A

1.6 Test Equipment

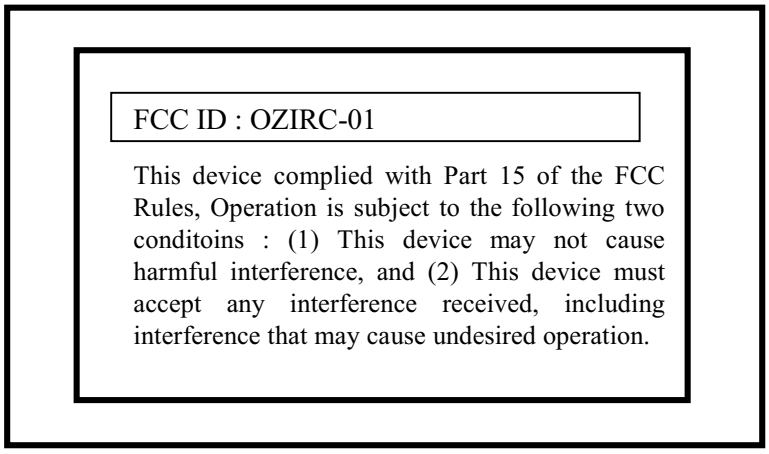
Manufacture	Model	Serial No.	Description	Last Cal dd/mm/yy	Cal. due dd/mm/yy
R & S	ESBI	845658 / 003	EMI Receiver	12/02/00	11/02/01
Rolf Heine	NNB-4/63TL	98008	Line Impedance Stabilization Networks	02/12/99	01/12/00
COM-Power	AH-118	10056	Double Ridge Guide Hom Antenna	10/08/99	09/08/00
Schwarzbeck	VULB	3074	30-1500MHz LOGBICON TRI-LOG Antenna	05/03/00	04/03/01
Rohde & Schwarz	ESMI-Z7	1045-5020	Preamplifier 20MHz-7GHz	05/08/99	05/08/00

All Test Equipment Used are Calibrated Traceable to NIST Standards.

1.7 Statement for the Document Use

This report shall not be reproduced except in full, without the written approval of the laboratory.
And this report must not be used by the client to claim product endorsement by NVLAP or any agency of the U.S. Government.

2. PRODUCT LABELING



3. SYSTEM TEST CONFIGURATION

3.1 Justification

The system was configured for testing in a typical fashion (as a customer would normally use it).
and its antenna was permanently attached to the EUT (Made on the PCB).
This manually operated transmitter will deactivate immediately after releasing the “OFF” or “ON” switch button.
Testing was performed in “ON” mode. It is worst case.

3.2 Special Accessories

N/A

3.3 Configuration of Tested System

Figure 3.1 and Figure 3.3 illustrate this system, which is tested standing along.

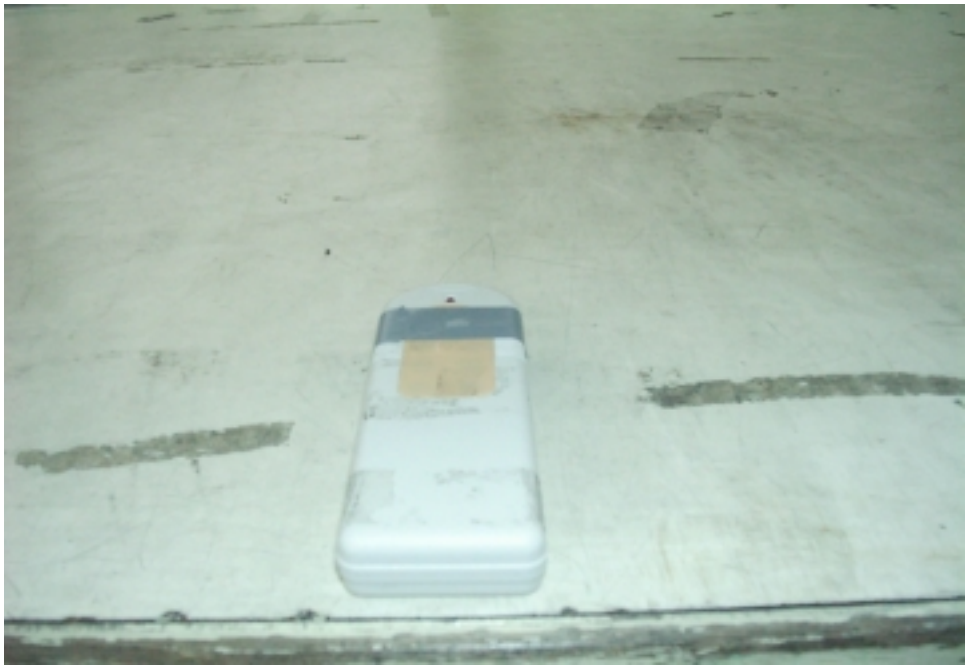


Figure 3.1 Radiated Test Setup (Axis-X)

Figure 3.2 Radiated Test Setup (Axis-Y)

Figure 3.3 Radiated Test Setup (Axis-Z)

4. SYSTEM SCHEMATICS

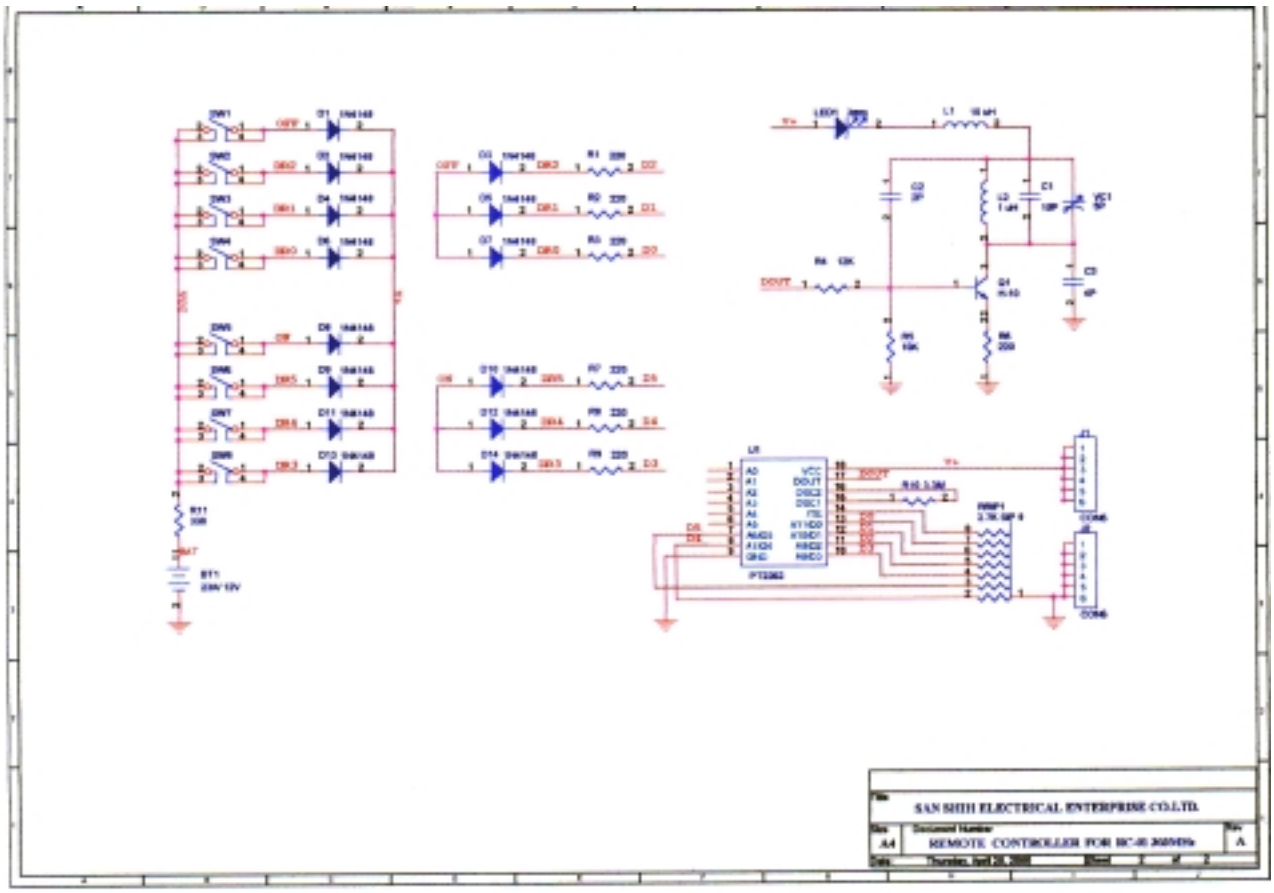


Figure 4.1 System Schematics

5. RADIATED EMISSION DATA

5.1 Field Strength Calculation

The corrected field strength is calculated by :

$$FS = RA + AF + CF + AT$$

Where FS: Corrected Field Strength in dB μ V/m

RA: Amplitude of Receiver read peak value in dB μ V / m

AF: Antenna Factor in dB/m

CF: Cable Attenuation Factor in dB

AT: Average Transducer in dB

The pulse train timing plots are showed in figure 5.1, 5.2 and 5.3. The total time for each pulse train is **44.2** ms, the long pulse is **1.08** ms, and short pulse is **400**μs. The maximum setting for high voltage is **12** long pulses and **13** short pulses.

Average Transducer = [(1.08ms **x 12) + (400** μs **x 13)] / 44.2** ms **= 0.41 = 20 log 0.41 = - 7.7 dB**

The maximum average field strength = the peak value read by receiver + Average Transducer (AT)

5.2 Test Methods and Conditions

The EUT exercise program was loaded during the radiated emission test. The initial step in collecting radiated data is a EMI Receiver scan of the measurement range 30MHz – 5GHz using peak detector. IF bandwidth is 120kHz and video bandwidth is 300kHz for measuring 30MHz-1GHz. Both bandwidth are 1MHz for above 1GHz measurement.

5.3 Test Data

The following data lists the significant emission frequencies, polarity and position, peak reading of the EMI Receiver, calculated average reading, the FCC limit, and the difference between the peak reading and the limit. Explanation of the correction and calculation are given in section 5.1.

Radiated Test Data

Frequency (MHz)	Polarity [H or V] Position (X,Y,Z)	Antenna Height (m)	Azimuth (Degree)	Peak Reading (dB μ V/m) **(a)**	Antenna Factor (dB) **(b)**	Cable Loss (dB) **(c)**	Average Trans-ducer (dB) **(d)**	Calculated Average Reading (dB μ V/m) **(e)**	Limit (dB μ V / m) **(f)**	Margin (dB) **(g)**
302.6	H.X	3.9	181.2	60.82	14.92	1.14	-7.7	69.18	73.63	-4.45
606.6	H.X	4	180	27.53	20.89	2.97	-7.7	43.69	53.63	-9.94
909.9	H.X	3.8	181.1	24.32	24.14	3.56	-7.7	44.32	53.63	-9.31
1213.2	H.X	3.9	180.2	27.68	26.48	4.14	-7.7	50.60	54	-3.40
1516.5	H.X	3.9	180.3	18.84	28.56	5.01	-7.7	44.71	54	-9.29
302.6	H.Y	3.8	180	59.70	14.92	1.14	-7.7	68.06	73.63	-5.57
606.6	H.Y	3.8	180	29.13	20.89	2.97	-7.7	37.49	53.63	-8.34
909.9	H.Y	3.7	181	16.32	24.14	7.56	-7.7	36.32	53.63	-17.31
1213.2	H.Y	3.9	180.2	24.47	26.48	4.14	-7.7	47.39	54	-6.61
1516.5	H.Y	3.9	180.3	16.57	28.56	5.01	-7.7	42.44	54	-11.56
302.6	H.Z	3.9	181.2	46.63	14.94	1.25	-7.7	55.12	73.63	-18.51
606.6	H.Z	3.8	180.3	20.88	20.89	2.97	-7.7	37.04	53.63	-16.59
909.9	H.Z	3.8	180	13.47	24.14	3.56	-7.7	33.47	53.63	-20.16
1213.2	H.Z	3.8	180	18.35	26.48	4.14	-7.7	41.27	54	-12.73
1516.5	H.Z	3.8	181.6	14.27	28.63	5.01	-7.7	40.21	54	-13.79
302.6	V. Z	3.9	181	48.84	14.92	1.14	-7.7	57.20	73.63	-16.43
606.6	V. X	3.9	180	19.07	20.89	2.97	-7.7	35.23	53.63	-18.40
909.9	V. X	3.9	180	13.56	24.14	3.56	-7.7	33.56	53.63	-20.07
1213.2	V. X	3.8	181.2	21.20	26.48	4.14	-7.7	44.12	54	-9.88
1516.5	V. X	3.9	180.1	18.58	28.56	5.01	-7.7	44.45	54	-9.55
1819.8	V. X	3.9	180.1	11.80	29.84	5.60	-7.7	39.54	53.63	-14.09
302.6	V. Y	3.9	180	44.83	14.92	1.14	-7.7	53.19	73.63	-20.44
606.6	V. Y	3.8	180	19.16	20.89	2.97	-7.7	35.32	53.63	-18.31
909.9	V. Y	3.8	181	14.02	24.14	3.56	-7.7	34.02	53.63	-19.61
1213.2	V. Y	3.9	180.2	21.87	26.48	4.14	-7.7	44.81	54	-9.19
1516.5	V. Y	3.9	180.1	19.30	28.56	5.01	-7.7	45.17	54	-8.83
1819.8	V. Y	3.9	180.6	9.78	29.84	5.60	-7.7	37.52	53.63	-16.11
302.6	V. Z	3.9	180	59.79	14.94	1.25	-7.7	68.28	73.63	-5.35
606.6	V. Z	3.9	181	25.83	20.89	2.97	-7.7	41.99	53.63	-11.64
909.9	V. Z	3.8	180	19.65	24.14	3.56	-7.7	39.65	53.63	-13.98
1213.2	V. Z	3.9	180	28.05	26.48	4.14	-7.7	50.97	54	-3.03
1516.5	V. Z	3.9	181	18.65	28.63	5.01	-7.7	44.59	54	-9.41
1819.8	V. Z	3.9	180	13.47	29.84	5.60	-7.7	41.21	53.63	-12.42

(1) See Figure 3.1, 3.2 and 3.3 for definition of position X, Y, Z .

(2) Restricted band.

(3) Fundamental limit is 3750-12500 microvolts/meter linear interpolations.

(4) Spurious limit is 375-1250 micrcrovolts/meter linear interpolations.

(5) (e) = (a) + (b) + (c) + (d) , (g) = (e) - (f)

5.4 Occupied Bandwidth

The bandwidth of the emission shall be no wider than 0.25% of the center frequency, in this case, **0.756445 MHz** . Bandwidth is determined at the points 20dB down from the modulated carrier. Figure 5.4 shows the occupied bandwidth plot [It's about **0.274 MHz**] .

Figure 5.1 Pulse Train Timing

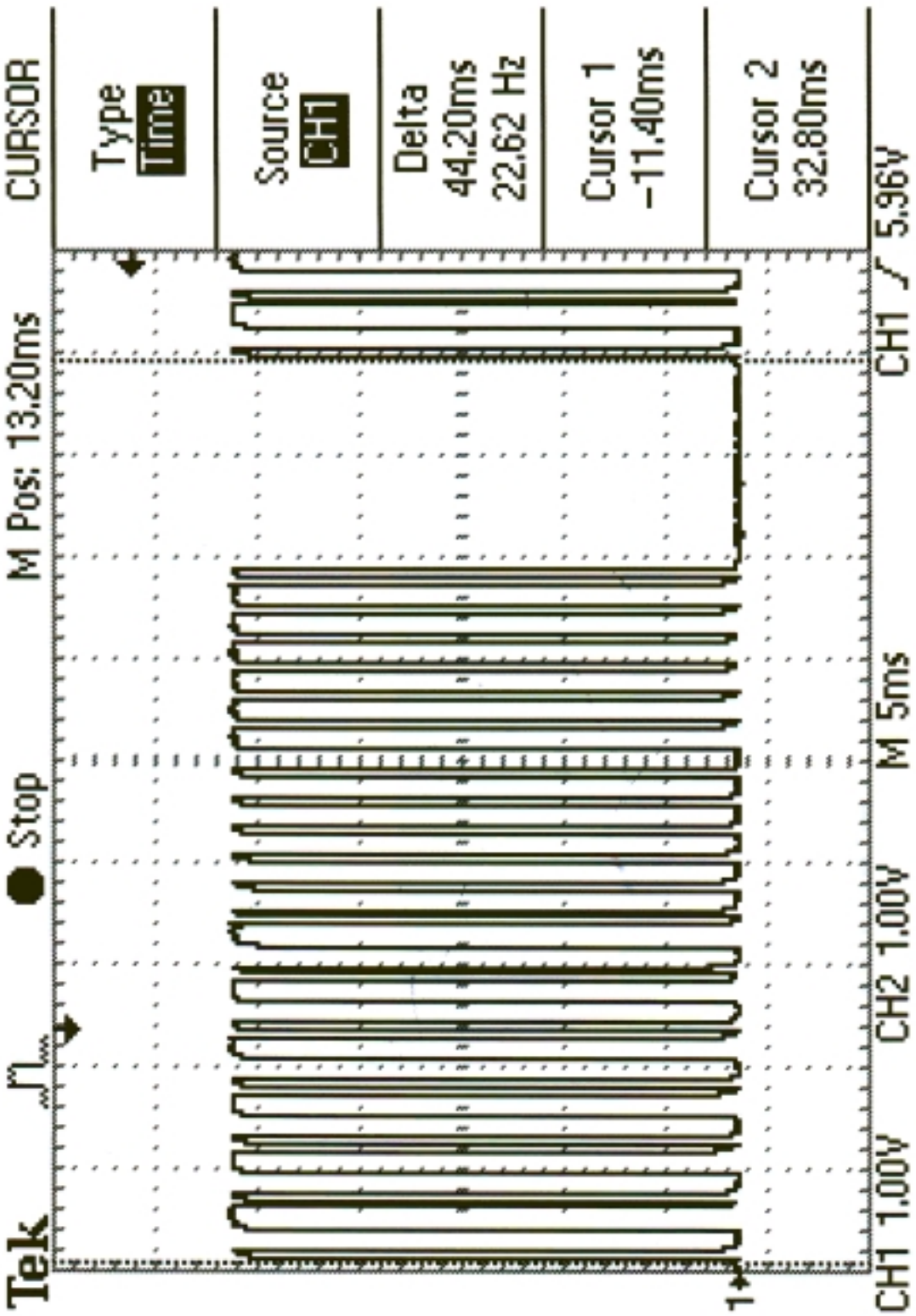


Figure 5.2 Short Pulse Timing