

**ELECTROMAGNETIC EMISSIONS COMPLIANCE REPORT
CERTIFICATION TO FCC PART 15 REQUIREMENTS**

for

INTENTIONAL RADIATOR

304MHz WIRELESS REMOTE CONTROLLER TRANSMITTER

MODEL NO: RC-03S-2

FCC ID NO: OZIRC-02

REPORT NO: 01E9317

ISSUE DATE: March 19, 2001

Prepared for

**SAN SHIH ELECTRICAL ENTERPRISE CO., LTD.
NO. 45, SEC. 3, PA TE RD.,
PAN CHIAO CITY, TAIPEI,
TAIWAN, R. O. C.**

Prepared by

**COMPLIANCE ENGINE ERING SERVICES, INC.
d.b.a.
COMPLIANCE CERTIFICATION SERVICES
1366 BORDEAUX DRIVE
SUNNYVALE, CA 94089, USA
TEL: (408) 752-8166
FAX: (408) 752-8168**



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TEST DATA

- Maximum Modulation Percentage Plot
- Emission Bandwidth Plot
- Radiated Emission Worksheet for Average Measurement

1. VERIFICATION OF COMPLIANCE

COMPANY NAME: SAN SHIH ELECTRICAL ENTERPRISE CO., LTD.
NO. 45, SEC. 3, PA TE RD., PAN CHIAO CITY,
TAIPEI, TAIWAN, R. O. C.

CONTACT PERSON: BEND YU / PRESIDENT

TELEPHONE NO.: 02-2299-3939

EUT DESCRIPTION: 304MHz WIRELESS REMOTE CONTROLLER TRANSMITTER

MODEL NAME/NUMBER: RC-03S-2

FCC ID: OZIRC-02

DATE TESTED: March 12 & March 13, 2001

REPORT NUMBER: 01E9317

TYPE OF EQUIPMENT	SECURITY EQUIPMENT (INTENTIONAL RADIATOR)
EQUIPMENT TYPE	304MHz WIRELESS REMOTE CONTROLLER TRANSMITTER
MEASUREMENT PROCEDURE	ANSI C63.4 / 1992
LIMIT TYPE	CERTIFICATION
FCC RULE	CFR 47, PART 15

The above equipment was tested by Compliance Certification Services for compliance with the requirements set forth in the FCC CFR 47, PART 15. The results of testing in this report apply to the product/system which was tested only. Other similar equipment will not necessarily produce the same results due to production tolerance and measurement uncertainties. **Warning** : This document reports conditions under which testing was conducted and results of tests performed. This document may not be altered or revised in any way unless done so by Compliance Certification Services and all revisions are duly noted in the revisions section. Any alteration of this document not carried out by Compliance Certification will constitute fraud and shall nullify the document.



RICK YEO / EMC MANAGER
COMPLIANCE ENGINEERING SERVICES, INC.

PAGE NO: 1

COMPLIANCE ENGINEERING SERVICES, INC.

1366 BORDEAUX DRIVE, SUNNYVALE, CA 94089, USA

CCS DOCUMENT NO:CCSUP4020B

TEL:(408)752-8166 FAX:(408)752-8168

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2. Product Description

Fundamental Frequency	304 MHz
Power Source	12V Battery
Transmitting Time	Periodic < 5 seconds
Associated Receiver	Model Name: R-12(P); RR-22(P); RR-32(P) / (DoC)

3. Test Facility

The open area test sites and conducted measurement facilities used to collect the radiated data are located at No. 199, Chung Sheng Road, Hsin Tien City, Taipei, Taiwan R.O.C. The sites are constructed in conformance with the requirements of ANSI C63.7, ANSI C63.4 and CISPR Publication 22.

4. Measurement Standards

The site is constructed and calibrated in conformance with the requirements of ANSI C63.4/1992.

5. Test Methodology

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 tenth harmonic of the highest fundamental frequency or to 40 GHz, whichever is lower. (CFR 47 Section 15.33)

6. Measurement Equipment Used

Manufacturer	Model Number	Description	Cal Due Date
H.P.	8566B	Spectrum Analyzer (100Hz – 22GHz)	12/2001
H.P.	8595EM	Spectrum Analyzer (9KHz – 6.5GHz)	01/2002
EMCO	3115	Antenna (1-18GHz)	09/2001
EMCO	3142	Antenna (30-2000MHz)	06/2001
T.E.C.	PA-102	Amplifier(30-2000MHz)	05/2001
MITEQ	NSP2600-44	Amplifier(1-26GHz)	12/2001

7. POWERLINE RFI LIMIT

CONNECTED TO AC POWER LINE	SECTION 15.207
CARRIER CURRENT SYSTEM IN THE FREQUENCY RANGE OF 450 KHZ TO 30 MHz	SECTION 15.205 AND SECTION 15.209, 15.221, 15.223, 15.225 OR 15.227, AS APPROPRIATE.
BATTERY POWER	NO REQUIRED.

8. RADIATED EMISSION LIMITS

GENERAL REQUIREMENTS	SECTION 15.209
RESTRICTED BANDS OF OPERATION	SECTION 15.205
PERIODIC OPERATION IN THE BAND 40.66 -40.70 MHz AND ABOVE 70 MHz.	SECTION 15.231

9. SYSTEM TEST CONFIGURATION

Use a block of foam and combined it with EUT wrapping rubber band around it. This way it can test X.Y, and Z axis. To activate continuous transmission, place a small plastic block between rubber band and EUT push button.



Radiated Open Site Test Set-up

10. Test Procedure
Radiated Emissions, 15.231(4)(b)

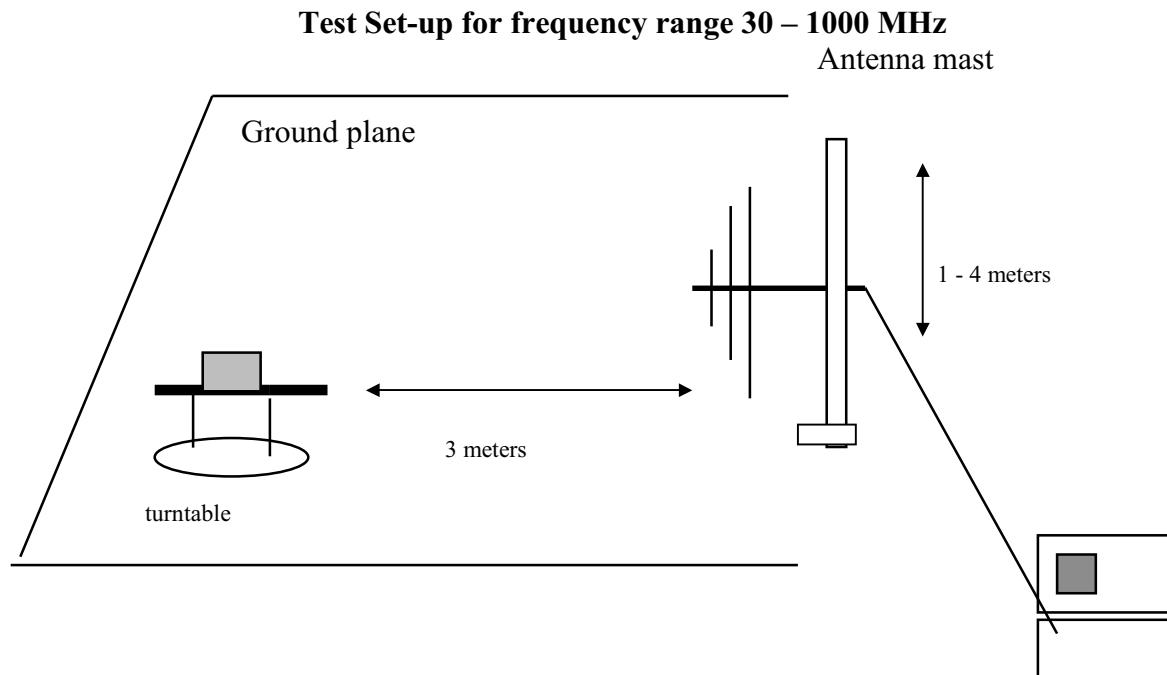


Fig. 1

1. The EUT was placed on a wooden table on the outdoor ground plane. The search antenna was placed 3-meters from the EUT.
2. The turntable was slowly rotated to locate the direction of maximum emission at each emission falling in the restricted bands of 15.205. The EUT was moved throughout the XY, XZ, and YZ planes to maximize emissions received by the search antenna.
3. Once maximum direction was determined, the search antenna was raised and lowered in both vertical and horizontal polarizations. The maximum readings so obtained are recorded in the data listed below.

Test set-up for measurements above 1GHz

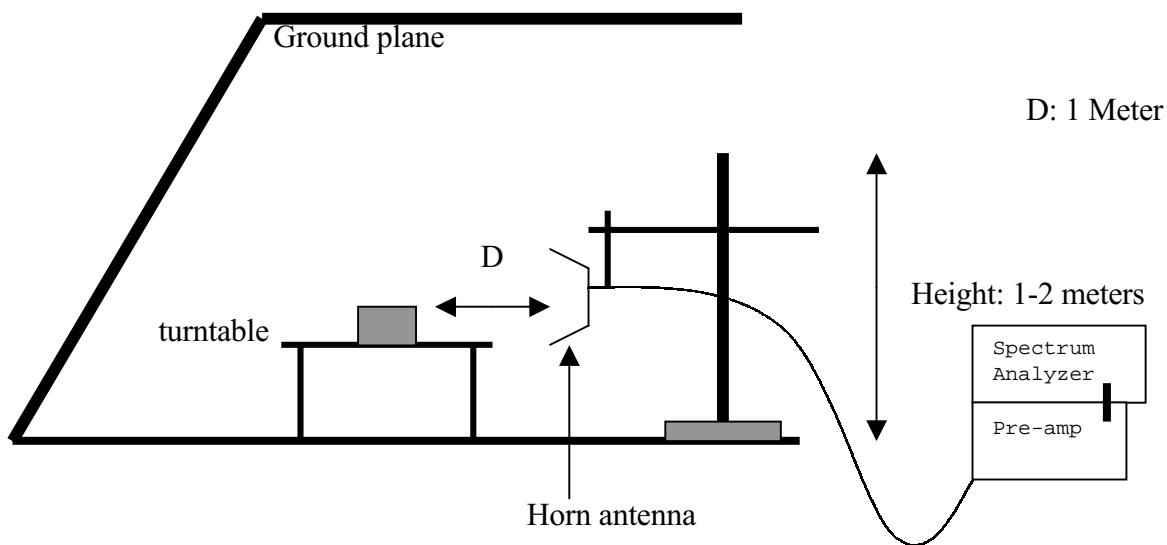


FIG. 2

1. The EUT was placed on a wooden table on the outdoor ground plane. The search antenna was placed 1-meters from the EUT. The EUT antenna was mounted vertically as per normal installation.
2. The turntable was slowly rotated to locate the direction of maximum emission at each emission falling in the restricted bands of 15.205. The EUT was moved throughout the XY, XZ, and YZ planes to maximize emissions received by the search antenna.
3. Once maximum direction was determined, the search antenna was raised and lowered in both vertical and horizontal polarizations. The maximum readings so obtained are recorded in the data listed below.

11. Equipment Modifications

To achieve compliance to FCC Section 15.231 technical limits, the following change(s) were made during compliance testing:

NONE

12. TEST RESULT

Powerline RFI Class B	Eut	Radiated Emission Limits	Eut
SECTION 15.207		SECTION 15.209	X
SECTION 15.205, 15.209, 15.221, 15.223, x 15.225 OR 15.227		SECTION 15.205	
BATTERY POWER	X	SECTION 15.231 (b)	X
		SECTION 15.231 (e)	

12.1 Maximum Modulation Percentage (M%)

CALCULATION:

$$\text{Average Reading} = \text{Peak Reading (dBuV/m)} + 20\log(\text{Duty Cycle})$$

In order to determine possible Maximum Modulation percentage, alternations are made to the EUT. We measured:

WHERE	1 Period	= 26.1 mS
	Long pulse	= 0.450 mS
	Short pulse	= 0.075 mS
	No of Long pulse	= 8
	No of Short pulse	= 17

$$\text{Duty Cycle} = (N_1L_1 + N_2L_2 + \dots + N_{n-1}L_{n-1} + N_nL_n) / 100 \text{ or } T$$

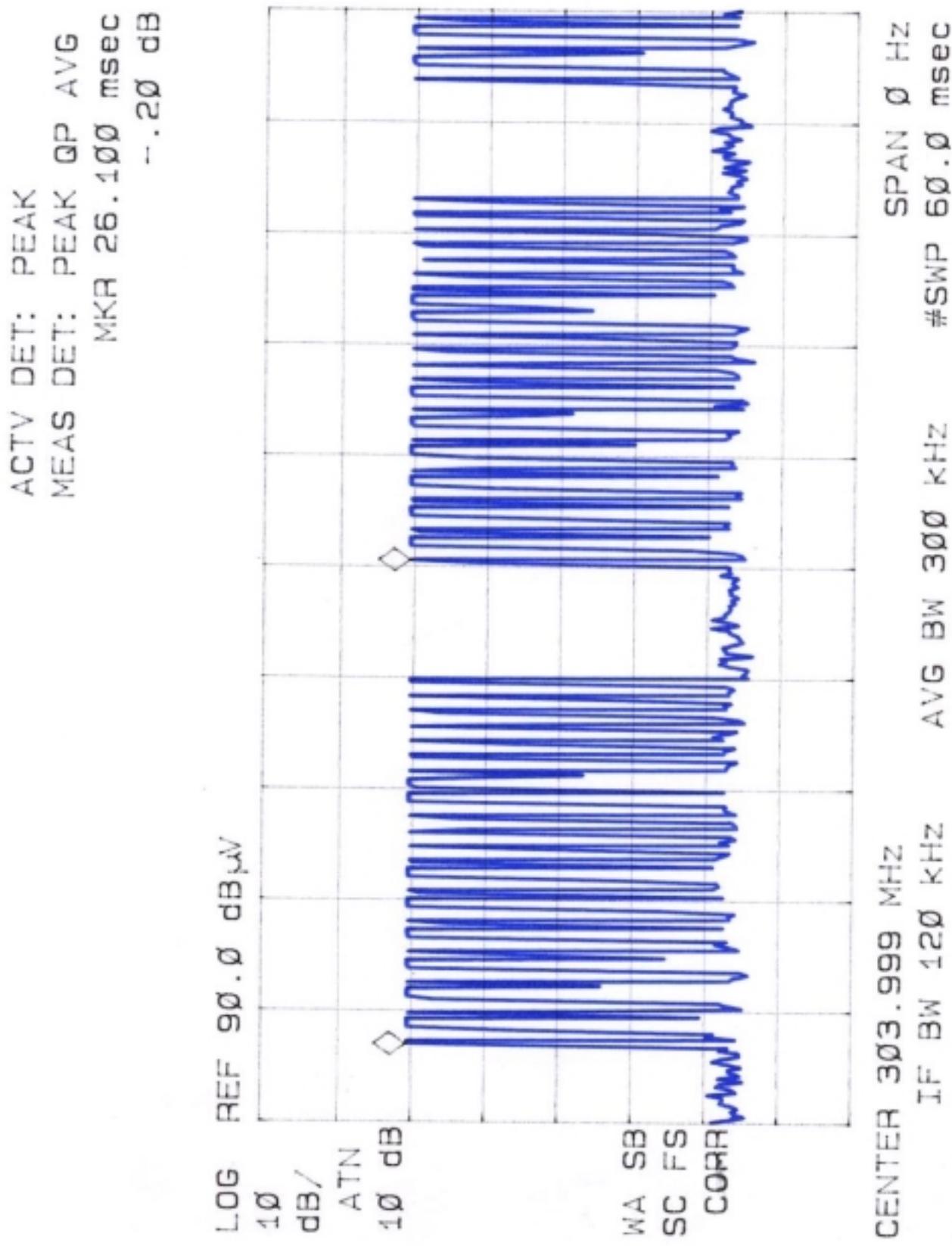
$$\text{Duty Cycle} = ((8 \times 0.450) + (17 \times 0.075)) / 26.1 = 0.1868 = 18.68\% \text{ or } -14.57\text{dB}$$

12.2 The Emissions Bandwidth

The bandwidth of the emissions were investigated per 15.231(c)

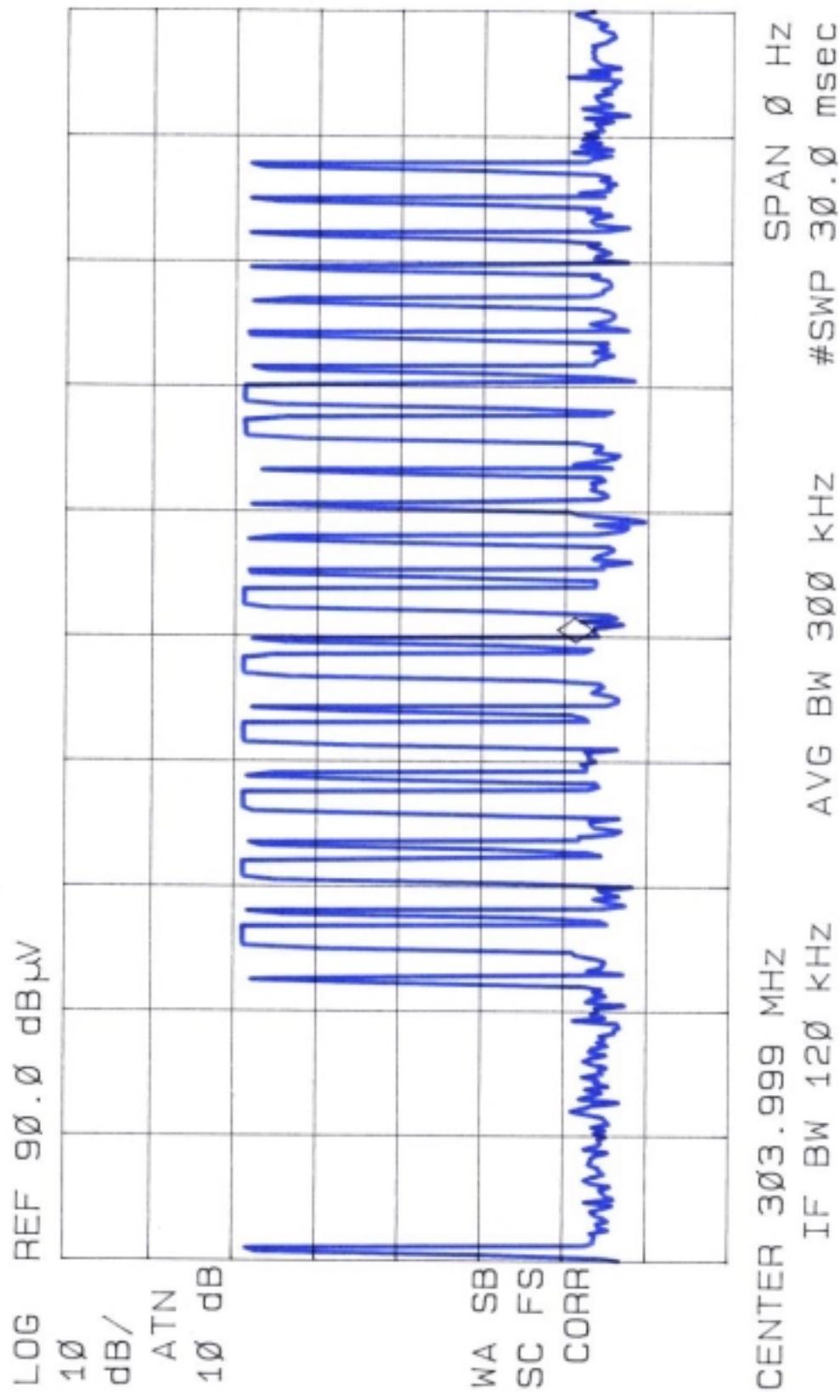
Center Frequency	Measured	Limits
304 MHz	306.6 kHz < (refer to plot)	304X0.25% = 760 kHz

47



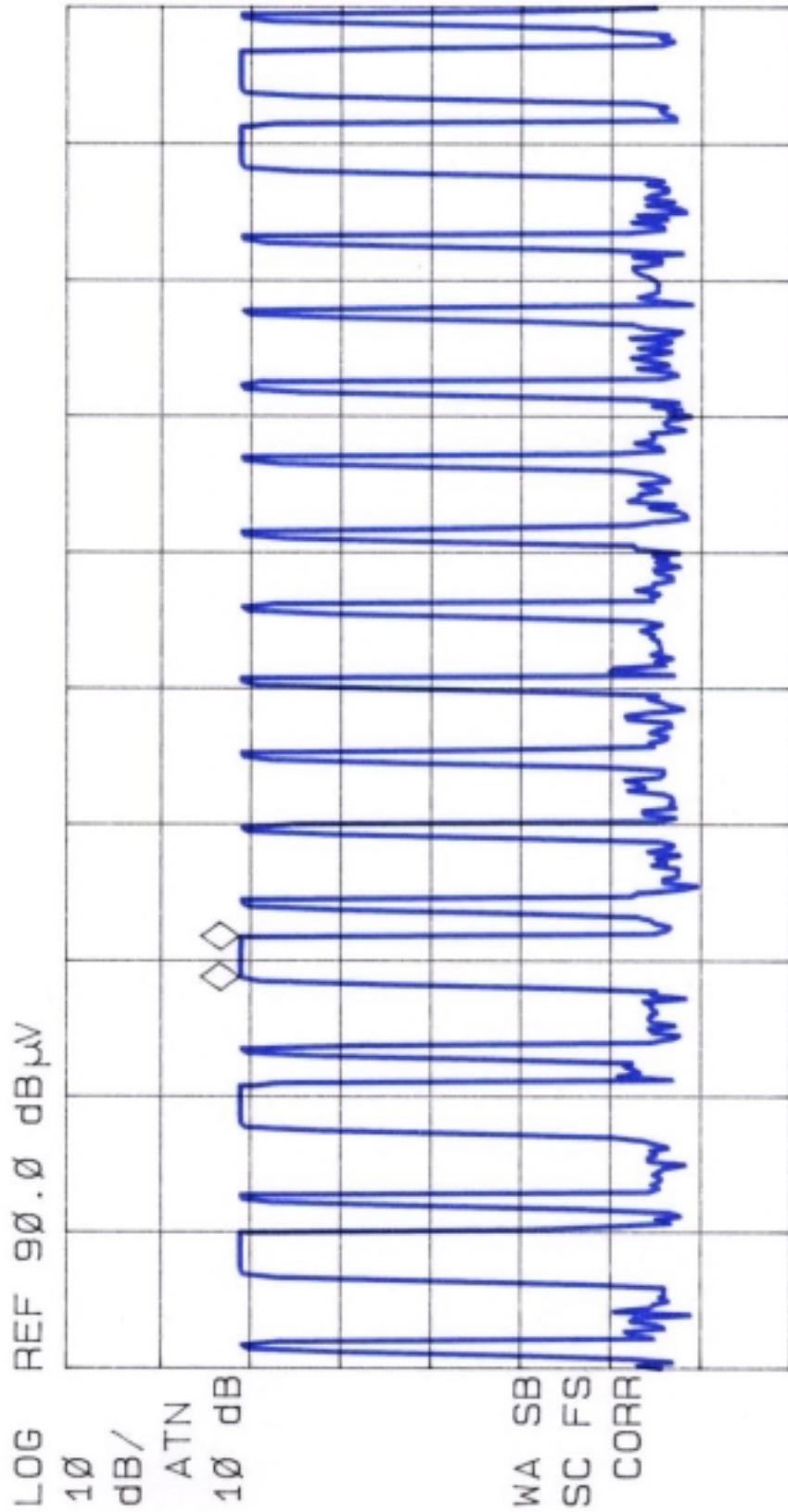
40

ACTV DET: PEAK
MEAS DET: PEAK QP AVG
MKR 15.150 msec
26.35 dB μ V



hp

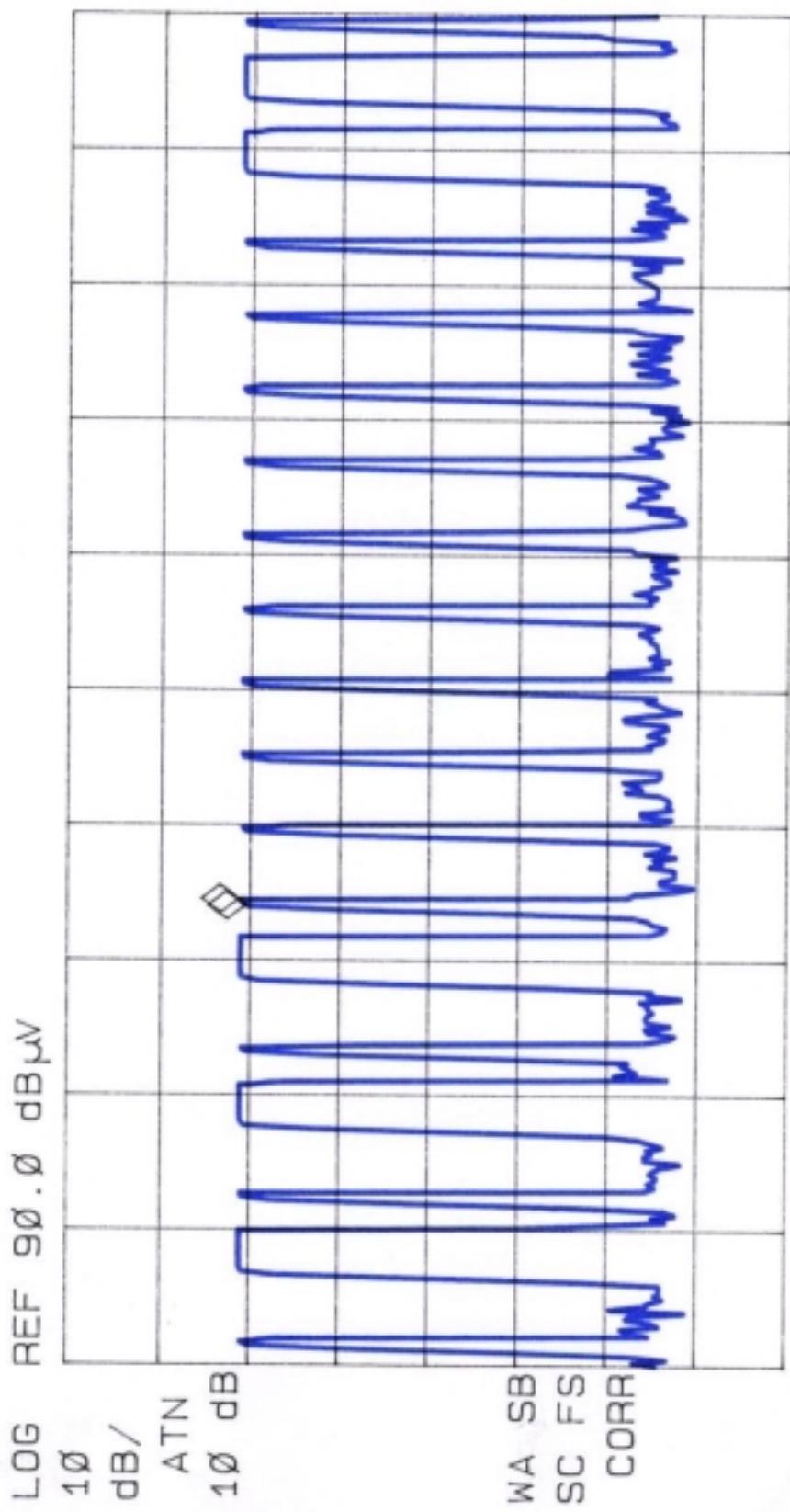
ACTV DET: PEAK
MEAS DET: PEAK QP AVG
MKR 45Ø. ØØ µsec
- Ø2 dB



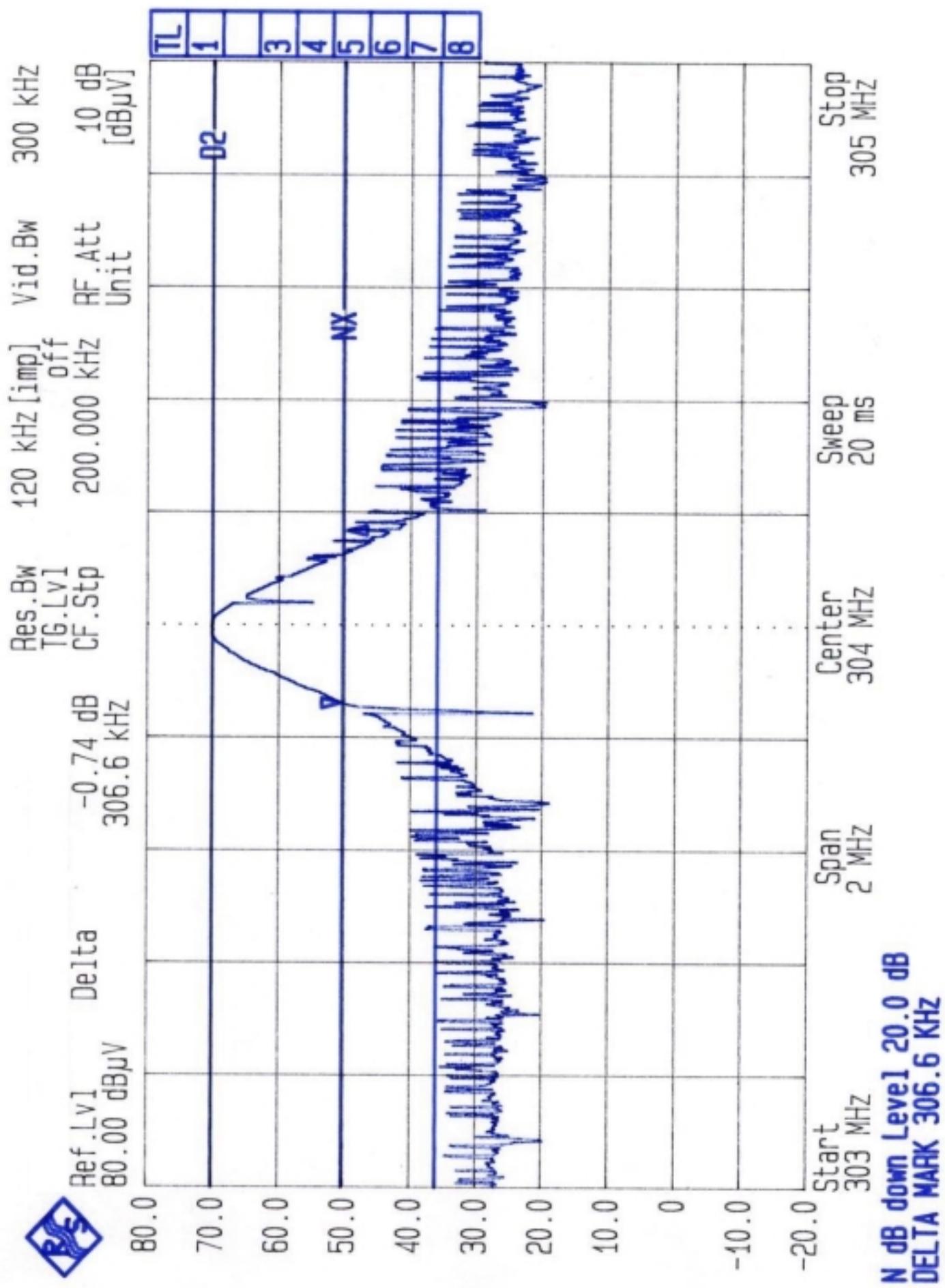
CENTER 3Ø3. 999 MHz
IF BW 12Ø kHz
AVG BW 3ØØ kHz
#SWP 15. Ø msec

Hz

ACTV DET: PEAK
MEAS DET: PEAK QP AVG
MKR 75.000 usec
.70 dB



CENTER 303.999 MHz
IF BW 120 kHz
AVG BW 300 kHz
#SWP 15.0 msec
SPAN 0 Hz





COMPLIANCE

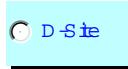
Certification Services

FCC, VCCI, CISPR, CE, AUSTEL, NZ
UL, CSA, TUV, BSMI, DHHS, NVLAP

No. 199 Chung Sheng Road
Hsin Tien City, Taipei, Taiwan, R.O.C.
PHONE: 02-2217-0894 FAX: 02-2217-1254

Project #: 01E9317
Report #: 9317D1
Date & Time: 3/13/01
Test Engr.: VINCE CHIANG

<i>Company:</i>	SAN SHIH ELECTRICAL ENTERPRISE CO., LTD.
<i>EUT Description:</i>	RC-03S-2 (Alarm TX / 304MHz)
<i>Test Configuration :</i>	EUT ONLY
<i>Type of Test:</i>	FCC 15.231(b) / FCC 15.209
<i>Mode of Operation:</i>	NORMAL MODE



$$M\% = ((t_1+t_2+t_3+\dots)/T) * 100\% = 18.68\%$$

$$\text{Av Reading} = \text{Pk Reading} + 20 \cdot \log(\text{M}\%)$$

$$20 \cdot \log(M\%) = -14.572$$

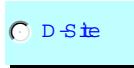


FCC, VCCI, CISPR, CE, AUSTEL, NZ
UL, CSA, TUV, BSMI, DHHS, NVLAP

No. 199 Chung Sheng Road
Hsin Tien City, Taipei, Taiwan, R.O.C.
PHONE: 02-2217-0894 FAX: 02-2217-1254

Project #: 01E9317
Report #: 9317D2
Date & Time: 3/13/2001
Test Engr: VINCE CHIANG

Company:	SAN SHIH ELECTRICAL ENTERPRISE CO., LTD.
EUT Description:	RC-03S-2 (Alarm TX / 304MHz)
Test Configuration :	EUT ONLY
Type of Test:	FCC 15.231(b) / FCC 15.209
Mode of Operation:	NORMAL MODE



$$M\% = ((t_1+t_2+t_3+\dots)/T) * 100\% = 18.68\%$$

$$\text{Av Reading} = \text{Pk Reading} + 20 \cdot \log(M\%)$$

$$20 \cdot \log(M\%) = -14.572$$



FCC, VCCI, CISPR, CE, AUSTEL, NZ
UL, CSA, TUV, BSMI, DHHS, NVLAP

1366 BORDEAUX DRIVE, SUNNYVALE, CA 94089
PHONE: (408) 752-8166 FAX: (408) 752-8168

Project #: 01E9317
Report #: 9317D3
Date & Time: 3/13/2001
Test Engr: Vince Chiang

Company: SAN SHIH ELECTRICAL ENTERPRISE CO., LTD.
EUT Description: RC-03S-2 (Alarm Tx / 304MHz)
Test Configuration : EUT ONLY
Type of Test: FCC 15.231(b)/FCC 15.209
Mode of Operation: NORMAL MODE

D-Site

E-Site

6 Worst

Descending

Freq. (MHz)	Pk Rdg (dBuV)	Av Rdg (dBuV)	AF (dB)	Closs (dB)	Pre-amp (dB)	Dist dB	Level (dBuV/m)	Limit FCC_B	Margin (dB)	Pol (H/V)	Az (Deg)	Height (Meter)	Mark
1216	55.47	40.90	25.2	2.7	43.31	-9.5	15.97	54.0	-38.03	1mV	0	1.0	A
1520	49.16	34.59	25.2	3.1	43.16	-9.5	10.22	54.0	-43.78	1mV	0	1.0	A
1216	51.94	37.37	25.2	2.7	43.31	-9.5	12.44	54.0	-41.56	1mH	0	1.2	A
1520	48.47	33.90	25.2	3.1	43.16	-9.5	9.53	54.0	-44.47	1mH	0	1.2	A

* No other emission were found within 20dB under the limits upto 3.5 GHz.

Total data #:4
V.2d

P(Peak): RBW=VBW=1MHz
A(Average): Pk Reading - 14.572dB

Distance = $20\log(1/3) = -9.5\text{dB}$