FCC Part 15
EMI TEST REPORT

of

E.U.T. : 2.4 GHz Wireless Audio Video Sender

MODEL : EVS5000

FCC ID. : BY42400A

for

APPLICANT : TRANS ELECTRIC CO., LTD.

ADDRESS : 765, CHUNGSAN RD., SEC. 2, HUATANG, CHANGHO, TAIWAN, R.O.C.

Test Performed by

ELECTRONICS TESTING CENTER, TAIWAN
NO. 8 LANE 29, WENMIMG ROAD,
LOSHAN TSUN, KWEISHAN HSIANG,
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Report Number : ET88R-08-054-01

TEST REPORT CERTIFICATION

Applicant : TRANS ELECTRIC CO., LTD.
765, CHUNGSAN RD., SEC. 2, HUATANG, CHANGHO, TAIWAN, R.O.C.

Manufacturer : DONGGUAN A MARK ELECTRONIC CO., LTD.
CHANGTONG INDUSTRIAL DISTRICT, YAN TAIN FENG GANG TOWN DONGGUAN CITY GUANG DONG P.R. CHINA

Description of EUT :

a) Type of EUT : 2.4 GHz Wireless Audio Video Sender

b) Trade Name : EMERSON

c) Model No. : EVS5000

d) The data also apply to model : PX TR2400

e) AC Power Adaptor : Model : TEAD-41-120500U
I/P: 120V,60Hz; O/P: DC 12V, 500mA

Regulation Applied : FCC Rules and Regulations Part 15 Subpart C(1996)

I HEREBY CERTIFY THAT: The data shown in this report were made in accordance with the procedures given in ANSI C63.4, and the energy emitted by the device was founded to be within the limits applicable. I assume full responsibility for accuracy and completeness of these data.

Note: 1. The result of the testing report relate only to the item tested.
2. The testing report shall not be reproduced expect in full, without the written approval of ETC.

Issued Date : OCT. 04, 1999

Test Engineer : Tien Lu Liau
(Tien Lu Liau)

Approve & Authorized Signer : Will Yauo
Will Yauo, Supervisor
EMI Test Site of ELECTRONICS TESTING CENTER, TAIWAN

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1 GENERAL INFORMATION

1.1 Product Description

a) Type of EUT : 2.4 GHz Wireless Audio Video Sender

b) Trade Name : EMERSON

c) Model No. : EVS5000

d) AC Power Adaptor : Model : TEAD-41-120500U
I/P: 120V,60Hz; O/P: DC 12V, 0.5A

1.2 Characteristics of Device

2.4 GHz Wireless Audio Video Sender, using FM method for Audio/Video signal modulation. It has better signal to noise ratio than Amplitude Modulation.

1.3 Modist List

The Side of RF Module use conductive copper tapes to improve grounding effect.

1.4 Test Methodology

For 2.4 GHz Wireless Audio Video Sender, both conducted and radiated emissions were performed according to the procedures illustrated in ANSI C63.4(1992). Other required measurements were illustrated in separate sections of this test report for details.

1.5 Test Facility

The open area test site and conducted measurement facility used to collect the radiated data is located on the roof top of Building at No.34, Lin 5, Ding Fu Tsun, Linkou Hsiang, Taipei Hsien, Taiwan, R.O.C.

This site has been fully described in a report submitted to your office, and accepted in a letter dated Feb. 10 , 1997.

2 PROVISIONS APPLICABLE

2.1 Definition

Unintentional radiator:
A device that intentionally generates and radio frequency energy for use within the device, or that sends radio frequency signals by conduction to associated equipment via connecting wiring, but which is not intended to emit RF energy by radiation or induction.

Class A Digital Device:
A digital device which is marketed for use in commercial or business environment; exclusive of a device which is market for use by the general public, or which is intended to be used in the home.

Class B Digital Device :
A digital device which is marketed for use in a residential environment notwithstanding use in a commercial, business of industrial environment. Example of such devices that are marketed for the general public.

Note : A manufacturer may also qualify a device intended to be marketed in a commercial, business, or industrial environment as a Class B digital device, and in fact is encouraged to do so, provided the device complies with the technical specifications for a Class B Digital Device. In the event that a particular type of device has been found to repeatedly cause harmful interference to radio communications, the Commission may classify such a digital device as a Class B Digital Device, Regardless of its intended use.

Intentional radiator:
A device that intentionally generates and emits radio frequency energy by radiation or induction.

2.2 Requirement for Compliance

(1) Conducted Emission Requirement

For unintentional device, according to §15.107(a) Line Conducted Emission Limits is as following:

Frequency MHz	Emissions μV	Emissions dBμV
0.45 - 30.0	250	48.0

For intentional device, according to §15.207(a) Line Conducted Emission Limits is same as above table.

(2) Radiated Emission Requirement

For unintentional device, according to §15.109(a), except for Class A digital devices, the field strength of radiated emissions from unintentional radiators at a distance of 3 meters shall not exceed the following values:

Frequency MHz	Distance Meters	Radiated dBμV/m	Radiated μV/m
30 - 88	3	40.0	100
88 - 216	3	43.5	150
216 - 960	3	46.0	200
above 960	3	54.0	500

For intentional device, according to §15.209(a), the general requirement of field strength of radiated emissions from intentional radiators at a distance of 3 meters shall not exceed the above table.

For intentional radiator device, per §15.249(a), the field strength of emissions shall comply with the following :

Frequency	**Distance**	**Fundamental**		**Harmonic**	
MHz	**Meters**	**dBμV/m**	**mV/m**	**dBμV/m**	**μV/m**
902 - 928	3	94	50	54	500
2400 - 2483.5	3	94	50	54	500
5725 - 5875	3	94	50	54	500
24000 - 24250	3	108	250	68	2500

In accordance with §15.249(d), limits shown in above table are based on average limits for frequencies above 1000 MHz, and frequencies below 1000 MHz are based on quasi peak. However, the peak field strength of any emission shall not exceed the maximum permitted average limits by more than 20 dB.

(3) Spurious in Out Band Requirement

For intentional device, according to §15.249 (c), emissions radiated outside of the specified frequency bands, except for harmonics, shall be attenuated by at least 50 dB below the level of fundamental or to the general radiated emission limits in §15.209.

(4) Antenna Requirement

For intentional device, according to §15.203, an intentional radiator shall be designed to ensure that no antenna other than that furnished by the responsible party shall be used with the device.

2.3 Restricted Bands of Operation

Only spurious emissions are permitted in any of the frequency bands listed below :

MHz	MHz	MHz	GHz
0.090 - 0.110	16.42-16.423	399.9-410	4.5-5.25
0.495 - 0.505 **	16.69475 - 16.69525	608-614	5.35-5.46
2.1735 - 2.1905	16.80425 - 16.80475	960-1240	7.25-7.75
4.125-4.128	25.5-25.67	1300-1427	8.025-8.5
4.17725-4.17775	37.5-38.25	1435-1626.5	9.0-9.2
4.20725-4.20775	73-74.6	1645.5-1646.5	9.3-9.5
6.215-6.218	74.8-75.2	1660-1710	10.6-12.7
6.26775-6.26825	108-121.94	1718.8-1722.2	13.25-13.4
6.31175-6.31225	123-138	2200-2300	14.47-14.5
8.291-8.294	149.9-150.05	2310-2390	15.35-16.2
8.362-8.366	156.52475 - 156.52525	2483.5-2500	17.7-21.4
8.37625-8.38675	156.7-156.9	2655-2900	22.01-23.12
8.41425-8.41475	162.0125-167.17	3260-3267	23.6-24.0
12.29-12.293	167.72-173.2	3332-3339	31.2-31.8
12.51975-12.52025	240-285	3345.8-3358	36.43-36.5
12.57675-12.57725	322-335.4	3360-4400	Above 38.6
13.36-13.41			

** : Until February 1, 1999, this restricted band shall be 0.490-0.510 MHz

2.4 Labeling Requirement

The device shall bear the following statement in a conspicuous location on the device :

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 received, including interference that may cause undesired operation.

2.5 User Information

The users manual or instruction manual for an intentional or unintentional radiator shall caution the user that changes or modifications not expressly approved by the party responsible for compliance could void the user's authority to operate the equipment.

For a Class B digital device or peripheral, the instructions furnished the user shall include the following or similar statement, placed in a prominent location in the text of the manual.

The Federal Communications Commission Radio Frequency Interference Statement includes the following paragraph.

This equipment has been tested and found to comply with the limits for a Class B Digital Device, pursuant to Part 15 of the FCC Rules. These limits are designed to provide reasonable protection against harmful interference in a residential installation.

This equipment generates, uses and can radiate radio frequency energy and, if not installed and used in accordance with the instruction may cause harmful interference to radio communication. However, there is no guarantee that interference will not occur in a particular installation.

If this equipment does cause harmful interference to radio or television reception, which can be determined by turning the equipment off and on, the user is encouraged to try to correct the interference by one or more of the following measures:

-- Reorient or relocate the receiving antenna.

-- Increase the separation between the equipment and receiver.

-- Connect the equipment into an outlet on a circuit different from that to which the receiver is connected.

-- Consult the dealer or an experienced radio / TV technician for help.

3 SYSTEM TEST CONFIGURATION

3.1 Justification

All measurement were intentional to maximum the emissions from EUT by varying the connection cables, therefore, the test result is sure to meet the applicable requirement.

3.2 Devices for Tested System

Device	Manufacture	Model / FCC ID.	Description
2.4 GHz Wireless Audio Video Sender (Tx)*	TRANS ELECTRIC CO., LTD.	EVS5000 BY42400A	2.0m Unshielded AC Adaptor Power Cord 1.5m AV Cable

Remark "*" means equipment under test.

4 RADIATED EMISSION MEASUREMENT

4.1 Applicable Standard

For intentional radiators, according to §15.249 (a), operation within the frequency band of 2.4 to 2.4835 GHz, the fundamental field strength shall not exceed 94 dBuV/m and the harmonics shall not exceed 54 dBuV/m. For out band emission except for harmonics shall be comply with §15.209 or at least attenuated by 50 dB below the level of the fundamental.

4.2 Measurement Procedure

1. Setup the configuration per figure 5 and 6 for frequencies measured below and above 1 GHz respectively.

2. For emission frequencies measured below 1 GHz, a pre-scan is performed in a shielded chamber to determine the accurate frequencies 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.

3. For emission frequencies measured below and above 1 GHz, set the spectrum analyzer on a 100 kHz and 1 MHz resolution bandwidth respectively for each frequency measured in step 2.

4. The search antenna is to be raised and lowered over a range from 1 to 4 meters in horizontally polarized orientation. Position the highness when 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.

   Note : A band pass filter was used to avoid pre-amplifier saturated when measure TX operation mode in frequency band above 1 GHz.

5. Repeat step 4 until all frequencies need to be measured were complete.

6. Repeat step 5 with search antenna in vertical polarized orientations.

7. Check the three frequencies of highest emission with varying the placement of cables associated with EUT to obtain the worse case and record the result.

Figure 1 : Frequencies measured below 1 GHz configuration

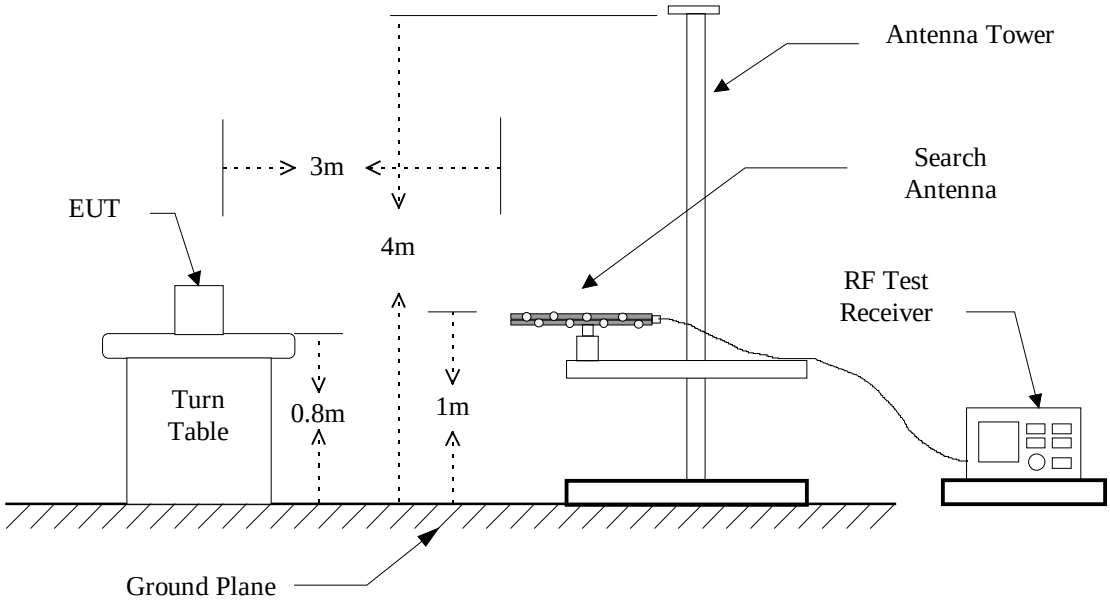
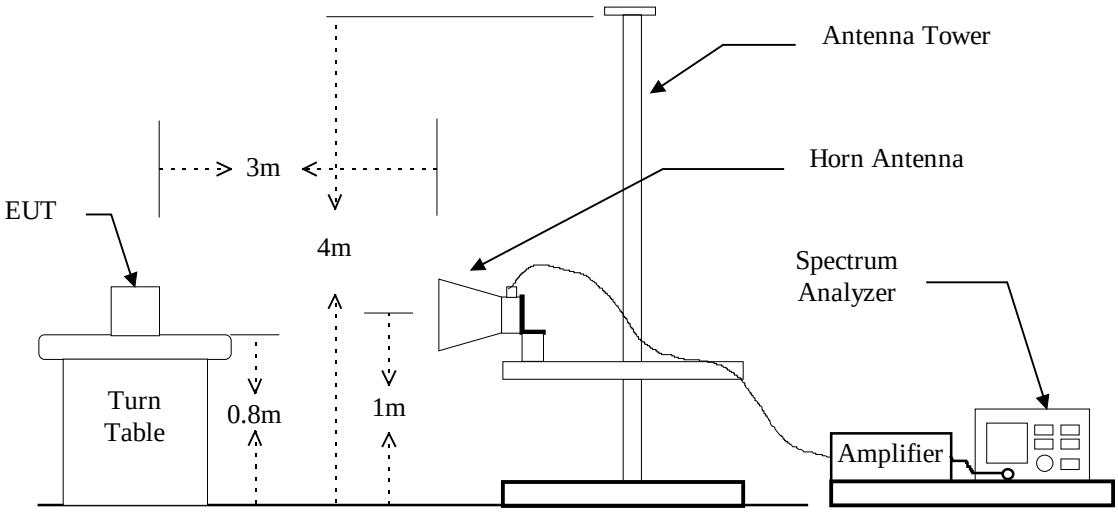


Figure 2 : Frequencies measured above 1 GHz configuration



4.3 Measuring Instrument

The following instrument are used for radiated emissions measurement :

Equipment	Manufacturer	Model No.	Next Cal. Date
Spectrum Analyzer	Hewlett-Packard	8568B	12/02/1999
Pre-selector	Hewlett-Packard	85685A	12/07/1999
Quasi Peak Detector	Hewlett-Packard	85650A	12/02/1999
RF Test Receiver	Rohde & Schwarz	ESVS 30	01/10/2000
RF Test Receiver	Rohde & Schwarz	ESBI	09/15/2000
Log periodic Antenna	EMCO	3146	09/15/2000
Biconical Antenna	EMCO	3110	09/15/2000
Horn Antenna	EMCO	3115	08/04/2000
Preamplifier	Hewlett-Packard	8449B	06/21/2000
Preamplifier	Hewlett-Packard	8447D	11/30/1999
Micro Wave EMI Test System	Hewlett-Packard	84125C	01/24/2000

Measuring instrument setup in measured frequency band when specified detector function is used :

Frequency Band (MHz)	Instrument	Function	Resolution bandwidth	Video Bandwidth
30 to 1000	RF Test Receiver	Quasi-Peak	120 kHz	N/A
	Spectrum Analyzer	Peak	100 kHz	100 kHz
Above 1000	Spectrum Analyzer	Peak	1 MHz	1 MHz
	Spectrum Analyzer	Average	1 MHz	300 Hz

4.4 Radiated Emission Data

4.4.1 Tx Portion

a. CH 1

Operation Mode : Transmitting

Fundamental Frequency : 2410 MHz

Test Date : SEP. 22, 1999 Temperature : 21 Humidity : 65 %

Frequency (MHz)	Reading (dBuV) H Peak	H Ave	V Peak	V Ave	Factor (dB) Corr.	Result @3m (dBuV/m) Peak	Result @3m (dBuV/m) Ave	Limit @3m (dBuV/m) Peak	Limit @3m (dBuV/m) Ave.	Margin (dB)	Table Deg. (Deg.)	Ant. High (m)
2409.975	73.6	76.3	90.3	90.0	-3.0	87.3	87.0	114.0	94.0	-7.0	0	1.50
4819.950	50.8	48.5	51.5	49.3	2.6	54.1	51.9	74.0	54.0	-2.1	90	1.50
7229.925	51.0	46.2	47.4	42.6	5.8	56.8	52.0	74.0	54.0	-2.0	350	1.50
9639.900	---	---	---	---	7.3	---	---	74.0	54.0	---	---	---
12049.875	---	---	---	---	9.2	---	---	74.0	54.0	---	---	---
2397.422	42.5	32.8	50.3	43.7	-3.1	47.2	40.6	74.0	54.0	-13.4	0	1.50

Note :

1. Item of margin shown in above table refer to average limit.
2. It is considered that the results of average comply with average limit when measuring data with a peak function detector meet the average limit. Mark "***" means that Peak result is meet average limit.
3. Remark "---" means that the emissions level is too low to be measured.
4. Item "Margin" referred to Average limit while there is only peak result.

b. CH 2

Operation Mode : Transmitting

Fundamental Frequency : 2430 MHz

Test Date : SEP. 22, 1999 Temperature : 21 Humidity : 65 %

Frequency	Reading (dBuV)				Factor	Result @3m (dBuV/m)		Limit @3m (dBuV/m)		Margin	Table	Ant.
	H		V		(dB)	Peak	Ave	Peak	Ave.	(dB)	Deg. (Deg.)	High
(MHz)	Peak	Ave	Peak	Ave	Corr.							(m)
2429.983	74.9	74.6	89.8	89.0	-3.0	86.8	86.0	114.0	94.0	-8.0	0	1.50
4859.966	51.5	49.0	52.1	49.9	2.6	54.7	52.5	74.0	54.0	-1.5	90	1.50
7289.949	50.7	46.3	48.0	43.2	5.9	56.6	52.2	74.0	54.0	-1.8	350	1.50
9719.932	---	---	---	---	7.3	---	---	74.0	54.0	---	---	---
12149.950	---	---	---	---	9.3	---	---	74.0	54.0	---	---	---

Note :

1. Item of margin shown in above table refer to average limit.
2. It is considered that the results of average comply with average limit when measuring data with a peak function detector meet the average limit. Mark "***" means that Peak result is meet average limit.
3. Remark "---" means that the emissions level is too low to be measured.
4. Item "Margin" referred to Average limit while there is only peak result.

c. CH 4

Operation Mode : Transmitting

Fundamental Frequency : 2470 MHz

Test Date : SEP. 22, 1999 Temperature : 21 Humidity : 65 %

Frequency	Reading (dBuV)				Factor	Result @3m (dBuV/m)		Limit @3m (dBuV/m)		Margin	Table Deg.	Ant. High
	H		V		(dB)	Peak	Ave	Peak	Ave.	(dB)	(Deg.)	(m)
(MHz)	Peak	Ave	Peak	Ave	Corr.							
2469.898	75.8	75.7	88.9	88.2	-2.8	86.1	85.4	114.0	94.0	-8.6	0	1.50
4939.796	51.8	49.2	52.7	50.5	2.8	55.5	53.3	74.0	54.0	-0.7	90	1.50
7409.694	50.8	46.5	48.5	43.7	6.1	56.9	52.6	74.0	54.0	-1.4	350	1.50
9879.592	---	---	---	---	7.4	---	---	74.0	54.0	---	---	---
12349.490	---	---	---	---	9.3	---	---	74.0	54.0	---	---	---
2482.450	43.3	31.9	49.3	42.3	-2.8	46.5	39.5	74.0	54.0	-14.5	0	1.50

Note :

1. Item of margin shown in above table refer to average limit.
2. It is considered that the results of average comply with average limit when measuring data with a peak function detector meet the average limit. Mark "***" means that Peak result is meet average limit.
3. Remark "---" means that the emissions level is too low to be measured.
4. Item "Margin" referred to Average limit while there is only peak result.

4.4.2 Other Emissions

Operation Mode : Transmitting

Test Date : SEP. 22, 1999 Temperature : 21 Humidity: 65 %

Frequency (MHz)	Ant-Pol H/V	Meter Reading (dBuV)	Corrected Factor (dB)	Result @3m (dBuV/m)	Limit @3m (dBuV/m)	Margin (dB)	Table Degree (Deg.)	Ant. High (m)
30.000	H/V	---	-9.8	---	40.0	---	---	---
80.000	H/V	---	-15.0	---	40.0	---	---	---
150.000	H/V	---	-10.0	---	43.5	---	---	---
350.000	H/V	---	-10.5	---	46.0	---	---	---
500.000	H/V	---	-4.4	---	46.0	---	---	---

Note :

1. Item of margin shown in above table refers to Q.P. limit.
2. Remark "---" means that the emission level is too low to be measured.

4.5 Field Strength Calculation

The field strength is calculated by adding the Antenna Factor, High Pass Filter Loss(if used) and Cable Loss, and subtracting the Amplifier Gain (if any) from the measured reading. The basic equation calculation is as follows:

Result = Reading + Corrected Factor

where Corrected Factor

= Antenna FACTOR + Cable Loss + High Pass Filter Loss - Amplifier Gain

4.6 Photos of Radiation Measuring Setup

Please see setup photos in Exhibit-F

5 CONDUCTED EMISSION MEASUREMENT

5.1 Standard Applicable

For intentional device, Line Conducted Emission Limits are in accordance to §15.207(a), any emissions level shall not exceed 48 dBuV.

5.2 Measurement Procedure

1. Setup the configuration per figure 3.

2. A preliminary scan with a spectrum monitor is performed to identify the frequency of emission that has the highest amplitude relative to the limit by operating the EUT in selected modes of operation, typical cable positions, and with a typical system configuration.

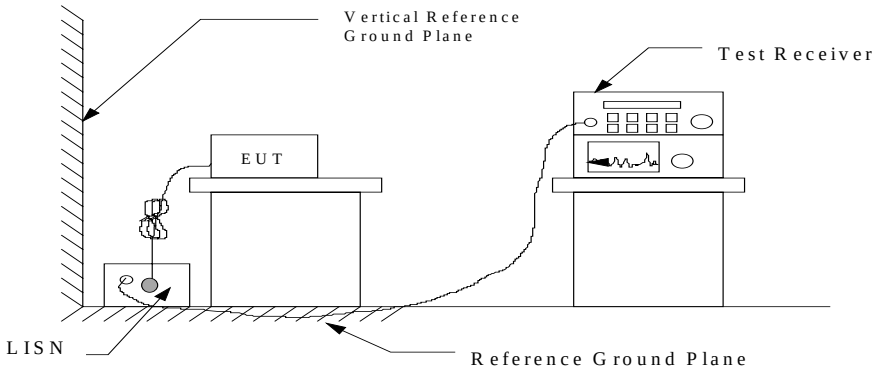
3. Record the 6 or 8 highest emissions relative to the limit.

4. Measure each frequency obtained from step 3 by a test receiver set on quasi peak detector function, and then record the accuracy frequency and emission level. If all emissions measured in the specified band are attenuated more than 20 dB from the limit, this step would be ignored, and the peak detector function would be used.

5. Confirm the highest three emissions with variation of the EUT cable configuration and record the final data.

6. Repeat all above procedures on measuring each operation mode of EUT.

Figure 3 : Conducted emissions measurement configuration



5.3 Conducted Emission Data

a. CH 1

Operation Mode : Transmitting
Test Date : SEP. 17, 1999 Temperature : 24 Humidity: 50 %

Frequency	Reading (dBuV)		Factor	Result (dBuV)		Limit	Margin
(MHz)	Va	Vb	(dB)	Va	Vb	(dBuV)	(dB)
0.450	38.2	36.3	0.2	38.4	36.5	48.0	-9.6
0.480	36.8	35.6	0.2	37.0	35.8	48.0	-11.0
0.501	36.2	35.1	0.2	36.4	35.3	48.0	-11.6
0.537	34.5	33.2	0.2	34.7	33.4	48.0	-13.3
0.566	33.0	31.5	0.2	33.2	31.7	48.0	-14.8
0.811	22.9	20.6	0.3	23.2	20.9	48.0	-24.8

b. CH 2

Operation Mode : Transmitting
Test Date : SEP. 17, 1999 Temperature : 24 Humidity: 50 %

Frequency	Reading (dBuV)		Factor	Result (dBuV)		Limit	Margin
(MHz)	Va	Vb	(dB)	Va	Vb	(dBuV)	(dB)
0.450	38.5	37.3	0.2	38.7	37.5	48.0	-9.3
0.470	37.0	37.0	0.2	37.2	37.2	48.0	-10.8
0.490	36.5	36.3	0.2	36.7	36.5	48.0	-11.3
0.510	35.6	35.6	0.2	35.8	35.8	48.0	-12.2
0.600	30.4	30.3	0.2	30.6	30.5	48.0	-17.4
0.748	24.1	23.2	0.3	24.4	23.5	48.0	-23.6

c. CH 4

Operation Mode : Transmitting
Test Date : SEP. 17, 1999 Temperature : 24 Humidity: 50 %

Frequency	Reading (dBuV)		Factor	Result (dBuV)		Limit	Margin
(MHz)	Va	Vb	(dB)	Va	Vb	(dBuV)	(dB)
0.450	37.1	37.5	0.2	37.3	37.7	48.0	-10.3
0.466	38.3	37.0	0.2	38.5	37.2	48.0	-9.5
0.484	37.9	36.7	0.2	38.1	36.9	48.0	-9.9
0.523	35.9	35.0	0.2	36.1	35.2	48.0	-11.9
0.560	34.0	33.1	0.2	34.2	33.3	48.0	-13.8
0.671	28.0	26.9	0.2	28.2	27.1	48.0	-19.8
0.801	23.2	21.5	0.3	23.5	21.8	48.0	-24.5

Note : Please see appendix 1 for Plotted Data

5.4 Result Data Calculation

The result data is calculated by adding the LISN Factor to the measured reading. The basic equation with a sample calculation is as follows:

RESULT = READING + LISN FACTOR

Assume a receiver reading of 22.5 dBμV is obtained, and LISN Factor is 0.1 dB, then the total of disturbance voltage is 22.6 dBμV.

RESULT = 22.5 + 0.1 = 22.6 dBμV
Level in μV = Common Antilogarithm[(22.6 dBμV)/20]
= 13.48 μV

5.5 Conducted Measurement Equipment

The following test equipment are used during the conducted test .

Equipment	**Manufacturer**	**Model No.**	**Next Cal. Date**
RF Test Receiver	Rohde and Schwarz	ESH3	01/10/2000
Spectrum Monitor	Rohde and Schwarz	EZM	N.C.R.
Line Impedance Stabilization network	Kyoritsu	KNW-407	11/30/1999
Plotter	Hewlett-Packard	7440A	N/A
Shielded Room	Riken	N/A	N.C.R.

5.6 Photos of Conduction Measuring Setup

Please see setup photos in Exhibit-F

6 ANTENNA REQUIREMENT

6.1 Standard Applicable

According to §15.203, an intentional radiator shall be designed to ensure that no antenna other than that furnished by the responsible party shall be used with the device.

6.2 Antenna Construction

The antenna is permanently mounted on RF box, no consideration of replacement.

7 BAND EDGES MEASUREMENT

7.1 Description

According to 15.249(c), out band emission except for harmonics shall be comply with §15.209 or at least attenuated by 50 dB below the level of the fundamental.

The emission from this device on band edges comply with FCC 15.249(general requirements for radiated emission), please refer to section 4.4 of this test report.

APPENDIX 1 : PLOTTED DATA FOR CONDUCTED EMISSION