JAPAN QUALITY ASSURANCE ORGANIZATION
21-25, KINUTA 1-CHOME, SETAGAYA-KU, TOKYO 157 JAPAN
PHONE (03) 3416-0111, TELEX 242-2531 JQA J FAX (03) 3416-9691

EMI TEST REPORT

JQA APPLICATION NO.	: 400-90890R
Model No.	: WCS-999T
Type of Equipment	: Transmitter
Regulations Applied	: CFR 47 FCC Rules and Regulations Part 15
FCC ID	: AK8WCS999T2
Applicant	: Sony Corporation Shinagawa Technology Center
Address	: Shinagawa INTERCITY C Tower, 2-15-3, Konan, Minato-ku, Tokyo 108-6201, Japan
Manufacture	: Sony Corporation
Address	: 7-35, Kitashinagawa 6-chome, Shinagawa-ku, Tokyo 141-0001, Japan
Received date of EUT	: March 28, 2000
Final Judgment	: **Passed**

TEST RESULTS IN THIS REPORT are obtained in use of equipment that is traceable to Electrotechnical Lab. of MITI Japan and Communications Research Lab. of MPT Japan.

The test results only respond to the tested sample. It is not allowed to copy this report even partly without the allowance of the JQA EMC Engineering Dept. Testing Div.

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1 DOCUMENTATION

1.1 TEST REGULATION

FCC Rules and Regulations Part 15 Subpart A and C (June 23, 1989) Intentional Radiators

Test procedure :

AC power line conducted emission, radiated emission, frequency stability and occupied bandwidth tests were performed according to the procedures in ANSI C63.4-1992.

1.2 GENERAL INFORMATION

1.2.1 Test facility :

1) Test Facility located at EMC Engineering Dept. Testing Div. :
   - No.2 and 3 Anechoic Chambers(3 meters Site).
   - Shielded Enclosure.
   Expiration date of FCC test facility filing : June 04, 2002

2) EMC Engineering Dept. Testing Div. is recognized under the National Voluntary Laboratory accreditation Program for satisfactory compliance established in title 15, Part 285 Code of Federal Regulations.
   NVLAP Lab Code : 200189-0 (Effective through : June 30, 2000)

1.2.2 Description of the Equipment Under Test (EUT) :

1)	Type of Equipment	: Transmitter
2)	Product Type	: Prototype
3)	Category	: Low Power Communication Device Transmitter
4)	EUT Authorization	: Certification
5)	FCC ID	: AK8WCS999T2
6)	Trade Name	: SONY
7)	Model No.	: WCS-999T
8)	Operating Frequency Range	: 913 MHz - 914.3 MHz
9)	Highest Frequency Used in the EUT	: 914.29 MHz
10)	Serial No.	: None
11)	Date of Manufacture	: -
12)	Power Rating	: DC 1.5V(Battery)
13)	EUT Grounding	: None

1.2.3 Definitions for symbols used in this test report :

_x_ - indicates that the listed condition, standard or equipment is applicable for this report.

___ - indicates that the listed condition, standard or equipment is not applicable for this report.

1.3 TEST CONDITION

1.3.1 The measurement of the AC Power Line Conducted Emission

___ - was performed in the following test site.
_x_ - was not applicable.

Test location :

Safety Testing Center EMC Engineering Dept. Testing Div.
21-25, Kinuta 1-chome, Setagaya-ku, Tokyo 157-8573, Japan

___ - Shielded Enclosure
___ - Anechoic Chamber No. 2 (portable Type)

Used test instruments :

Type	Model No.	Manufacturer	Serial No.	Last Cal.	Interval
___ - Test Receiver	ESH-2	Rohde & Schwarz	880370/016	Sep. 1999	1 Year
___ - Test Receiver	ESH-3	Rohde & Schwarz	881460/035	May 1999	1 Year
___ - Test Receiver	ESH-3	Rohde & Schwarz	881460/030	Jun. 1999	1 Year
___ - LISN(for Peripheral)	KNW-407	Kyoritsu Electrical	8-833-6	Apr. 1999	1 Year
___ - LISN(for EUT)	KNW-407	Kyoritsu Electrical	8-855-2	Apr. 1999	1 Year
___ - LISN	KNW-407	Kyoritsu Electrical	8-757-1	Apr. 1999	1 Year
___ - RF Cable	3D-2W	Fujikura	155-21-005	Apr. 1999	1 Year
___ - RF Cable	3D-2W	Fujikura	155-21-006	Apr. 1999	1 Year
___ - 50ohm Termination	-	SUHNER	154-06-501E0	Jan. 2000	1 Year
___ - 50ohm Termination	-	SUHNER	154-06-502E0	Jan. 2000	1 Year

1.3.2 The measurement of the Radiated Emission(30 MHz - 1000 MHz)

_x_ - was performed in the following test site.
___ - was not applicable.

Test location :

Safety Testing Center EMC Engineering Dept. Testing Div.
21-25, Kinuta 1-chome, Setagaya-ku, Tokyo 157-8573, Japan

_x_ - Anechoic Chamber No. 2 (3 meters)
___ - Anechoic Chamber No. 3 (3 meters)

Validation of Site Attenuation :

1) Last Confirmed Date :March, 2000
2) Interval :1 year

Used test instruments :

	Type	Model No.	Manufacturer	Serial No.	Last Cal.	Interval
___	Test Receiver	ESV	Rohde & Schwarz	872148/039	May 1999	1 Year
___	Test Receiver	ESVS10	Rohde & Schwarz	826148/002	Jun. 1999	1 Year
_x_	Test Receiver	ESVP	Rohde & Schwarz	881487/004	May 1999	1 Year
___	Test Receiver	ESVP	Rohde & Schwarz	881487/005	Dec. 1999	1 Year
_x_	Antenna	KBA-511A	Kyoritsu Electrical	0-170-1	Nov. 1999	1 Year
___	Antenna	KBA-511A	Kyoritsu Electrical	0-201-13	Nov. 1999	1 Year
_x_	Antenna	KBA-611	Kyoritsu Electrical	0-147-14	Nov. 1999	1 Year
___	Antenna	KBA-611	Kyoritsu Electrical	0-210-5	Nov. 1999	1 Year
_x_	RF Cable	5D-2W	Fujikura	155-21-001E0	Feb. 2000	1 Year
___	RF Cable	5D-2W	Fujikura	155-21-002E0	Feb. 2000	1 Year

1.3.3 The measurement of the Radiated Emission(Above 1000 MHz)

_x_ - was performed in the following test site.
___ - was not applicable.

Test location :

Safety Testing Center EMC Engineering Dept. Testing Div.
21-25, Kinuta 1-chome, Setagaya-ku, Tokyo 157-8573, Japan

_x_ - No. 2 site (3 meters)
___ - No. 3 site (3 meters)

Validation of Site Attenuation :

1) Last Confirmed Date : N/A
2) Interval : N/A

Used test instruments :

	Type	Model No.	Manufacturer	Serial No.	Last Cal.	Interval
___	Spectrum Analyzer	8563E	Hewlett Packard	3221A00201	May 1999	1 Year
___	Spectrum Analyzer	8560E	Hewlett Packard	3240A00189	May 1999	1 Year
___	Spectrum Analyzer	8566B	Hewlett Packard	2140A01091	Apr. 1999	1 Year
___	RF Pre-selector	85685A	Hewlett Packard	2648A00522	Apr. 1999	1 Year
_x_	Spectrum Analyzer	8566B	Hewlett Packard	2747A05855	May 1999	1 Year
_x_	RF Pre-selector	85685A	Hewlett Packard	2091A00933	May 1999	1 Year
_x_	Log-Periodic Antenna	HL 025	Rohde & Schwarz	340182/015	Nov. 1999	1 Year
___	RF Amplifier	DBP-0102N5334272B	DBS Microwave Inc.	012	Jun. 1999	1 Year
_x_	RF Amplifier	WJ-6882-814	Watkins-Johnson	0414	Jun. 1999	1 Year
_x_	RF Amplifier	WJ-5315-556	Watkins-Johnson	106	Jun. 1999	1 Year
___	RF Amplifier	WJ-5320-307	Watkins-Johnson	645	Jun. 1999	1 Year
_x_	RF Cable(10m)	S 04272B	Suhner	155-21-011E0	May 1999	1 Year
___	RF Cable(2m)	SUCOFLEX 104	Suhner	155-21-012E0	May 1999	1 Year
_x_	RF Cable(1m)	SUCOFLEX 104	Suhner	155-21-013E0	May 1999	1 Year

1.3.4 The measurement of the Frequency Stability

___ - was performed.
_x_ - was not applicable.

Used test instruments :

	Type	Model No.	Manufacturer	Serial No.	Last Cal.	Interval
___	- Frequency Counter	53131A	Hewlett Packard	3546A11807	June 1999	1 Year
___	- Oven	-	Ohnishi Co. Ltd.	-	Aug. 1999	1 Year
___	- DC Power Supply	6628A	Hewlett Packard	3224A00284	July 1999	1 Year

1.3.5 The measurement of the Occupied Bandwidth

_x_ - was performed.
___ - was not applicable.

Used test instruments :

	Type	Model No.	Manufacturer	Serial No.	Last Cal.	Interval
___	- Spectrum Analyzer	8566B	Hewlett Packard	2140A01091	Apr. 1999	1 Year
_x_	- Spectrum Analyzer	8566B	Hewlett Packard	2747A05855	May 1999	1 Year
_x_	- Function Generator	3325A	Hewlett Packard	2512A21776	June 1999	1 Year
___	- FM Linear Detector	MS61A	Anritsu Corp.	M77486	Sep. 1999	1 Year
_x_	- Measuring Amplifier	2636	B & K	1614851	June 1999	1 Year
_x_	- AF Amplifier	P-500L	Accuphase	BOY806	June 1999	1 Year
_x_	- Microphone	4134	B & K	1269477	June 1999	1 Year
_x_	- Preamplifier	2639	B & K	1268763	June 1999	1 Year
_x_	- Pistonphone	4220	B & K	1165008	June 1999	1 Year
_x_	- Artificial Mouth	4227	B & K	1274869	N/A	N/A

1.4 EUT MODIFICATION / Deviation from Standard

1.4.1 EUT MODIFICATION

_x_ -No modifications were conducted by JQA to achieve compliance to Class B levels.
___ - To achieve compliance to Class B levels, the following changes were made by JQA during the compliance test.

The modifications will be implemented in all production models of this equipment.

Applicant : Date :

Typed Name : Position :

1.4.2 Deviation from Standard:

_x_ - No deviations from the standard described in clause 1.1.
___ - The following deviations were employed from the standard described in clause 1.1:

1.5 TEST RESULTS

AC Power Line Conducted Emission	___ - **Applicable**	_x_ - **NOT Applicable**
The requirements are	___ - **PASSED**	___ - **NOT PASSED**

Remarks :

Radiated Emission [§15.249(a)(c)]	_x_ - **Applicable**	___ - **NOT Applicable**
The requirements are	_x_ - **PASSED**	___ - **NOT PASSED**

Remarks:

Frequency Stability	___ - **Applicable**	_x_ - **NOT Applicable**
The requirements are	___ - **PASSED**	___ - **NOT PASSED**

Remarks:

Occupied Bandwidth [§15.249(c)]	_x_ - **Applicable**	___ - **NOT Applicable**
The requirements are	_x_ - **PASSED**	___ - **NOT PASSED**

Remarks:

1.6 SUMMARY

General Remarks :

The EUT was tested according to the requirements of FCC Rules and Regulations Part 15 Subpart A and C (June 23, 1989) under the test configuration, as shown in clause 1.7 to 1.10.
The conclusion for the test items of which are required by the applied regulation is indicated under the final judgment.

Final Judgment :

The "as received" sample;

_x_ - fulfill the test requirements of the regulation mentioned on clause 1.1.

___ - fulfill the test requirements of the regulation mentioned on clause 1.1, but with certain qualifications.

___ - doesn't fulfill the test regulation mentioned on clause 1.1.

Begin of testing : April 5, 2000

End of testing : April 6, 2000

- JAPAN QUALITY ASSURANCE ORGANIZATION -

Approved by:

Masaaki Takahashi
Manager
JQA EMC Engineering Dept.

Issued by:

Shigeru Osawa
Assistant Manager
JQA EMC Engineering Dept.

1.7 TEST CONFIGURATION / OPERATION OF EUT

1.7.1 Test Configuration

The equipment under test (EUT) consists of :

Symbol	Item	Manufacturer	Model No.	FCC ID	Serial No.
A	Transmitter	Sony Corporation	WCS-999T	AK8WCS999T2	None

The measurements was carried out with the following supported connected :

Symbol	Item	Manufacturer	Model No.	Serial No.
B	Microphone (with 1.0 m cable)	Sony Corporation	-	-

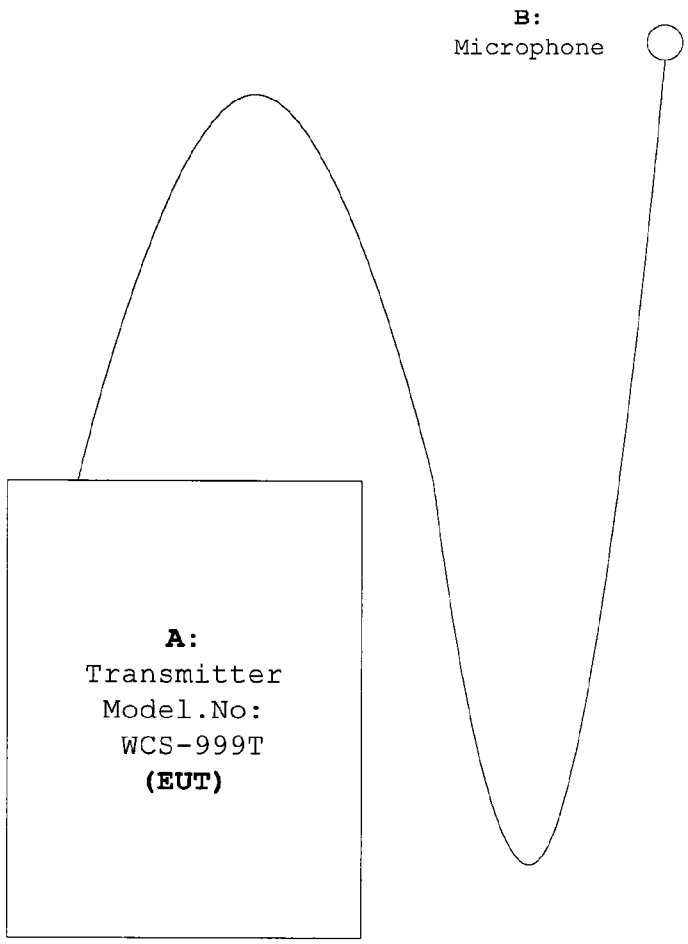
1.7.2 Operating condition

Power supply Voltage : 1.5VDC(Battery)
The tests have been carried out under the transmitting condition.
(Operating Frequency: 913.02 MHz and 914.29 MHz)

1.7.3 Generating and Operating frequency of EUT

913.02 MHz and 914.29 MHz

1.8 EUT ARRANGEMENT (DRAWINGS)



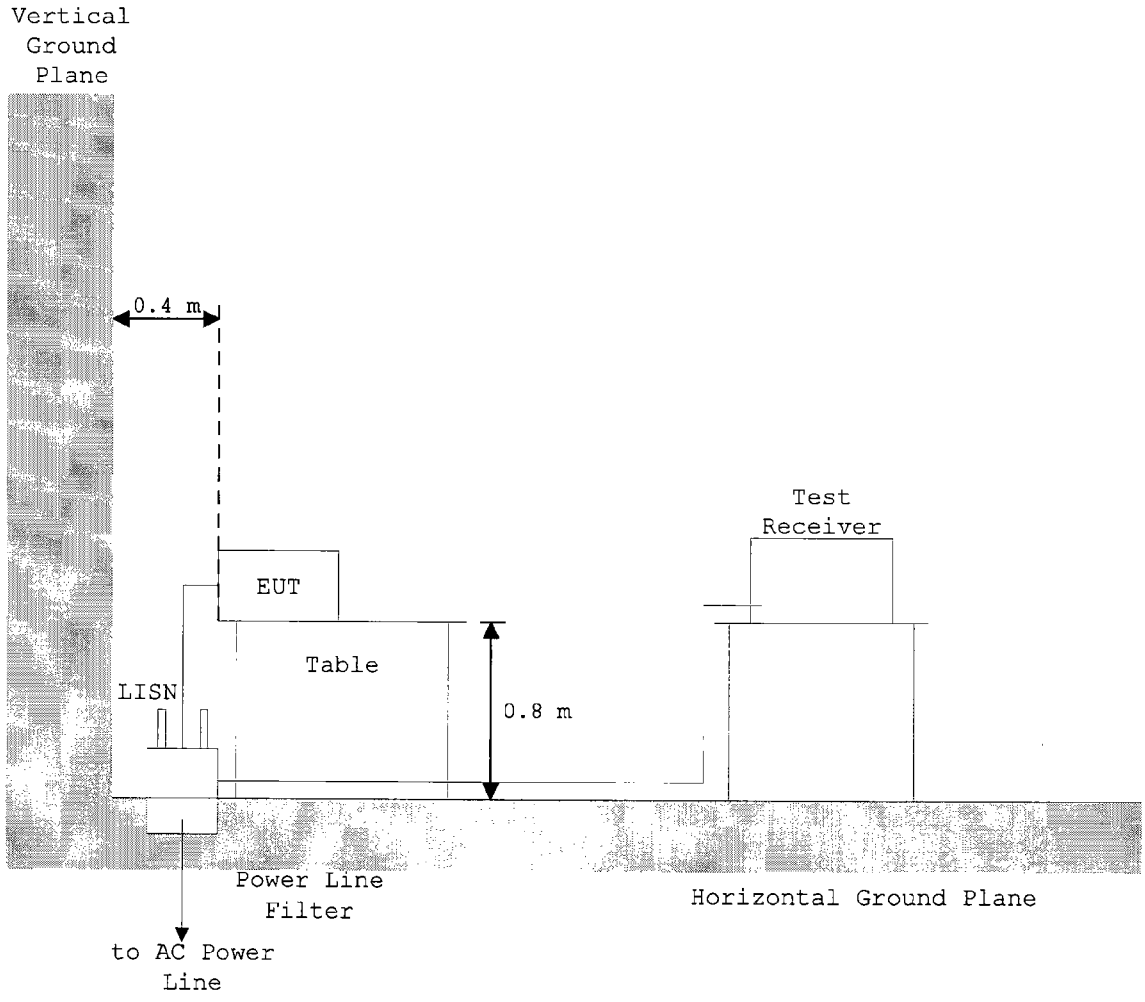
1.9 PRELIMINARY TEST AND TEST-SETUP (DRAWINGS)

1.9.1 AC Power Line Conducted Emission (450 kHz - 30 MHz) :

According to description of ANSI C63.4-1992 sec.13.1.3.1, the AC power line preliminary conducted emissions measurements were carried out.
The preliminary conducted measurements were performed using the spectrum analyzer to observe the emission characteristics of the EUT.
The EUT configuration, cable configuration and mode of operation were determined for producing the maximum level of emissions. These configurations were used for final AC power line conducted emissions measurements.

Shielded Enclosure

- Side View -

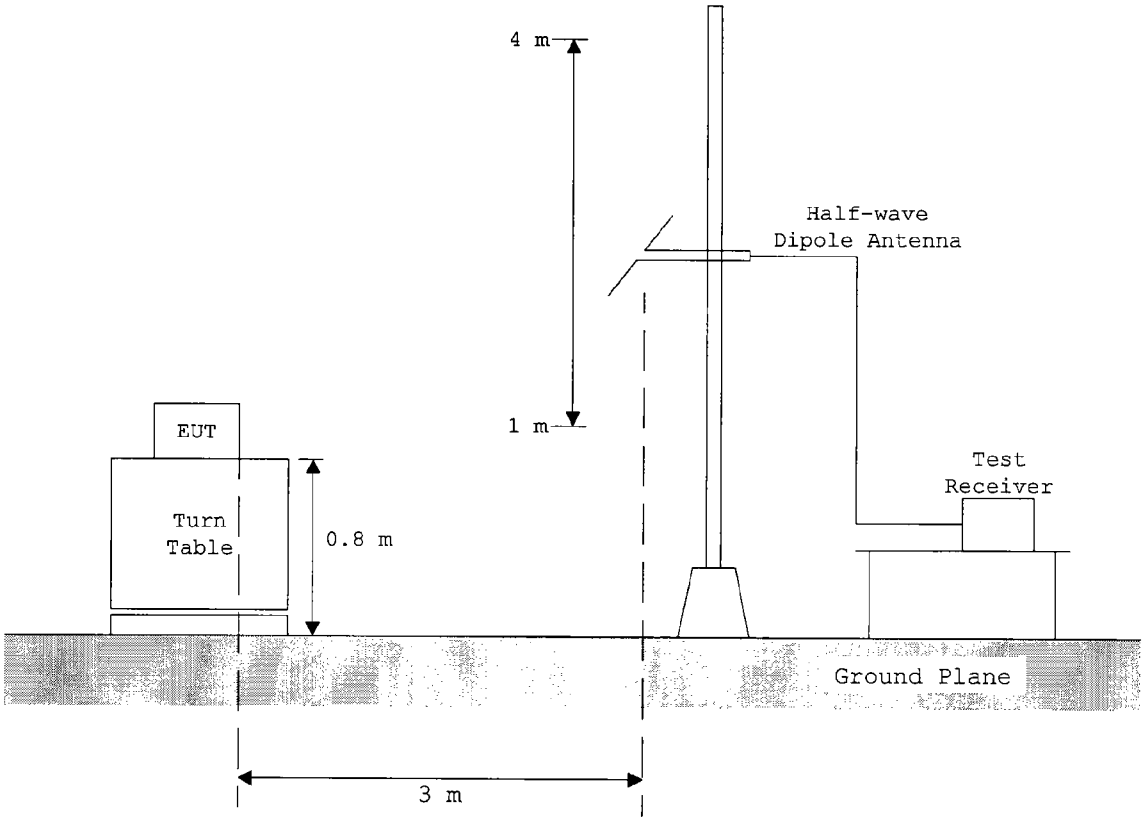


1.9.2 Radiated Emission (30 MHz - 1000 MHz) :

According to description of ANSI C63.4-1992 sec.13.1.4.1, the preliminary radiated emissions measurement were carried out. The preliminary radiated measurements were performed at the measurement distance that specified for compliance to determine the emission characteristics of the EUT.
The EUT configuration, cable configuration and mode of operation were determined for producing the maximum level of emissions. These configurations were used for the final radiated emissions measurements.

Anechoic Chamber

- Side View -

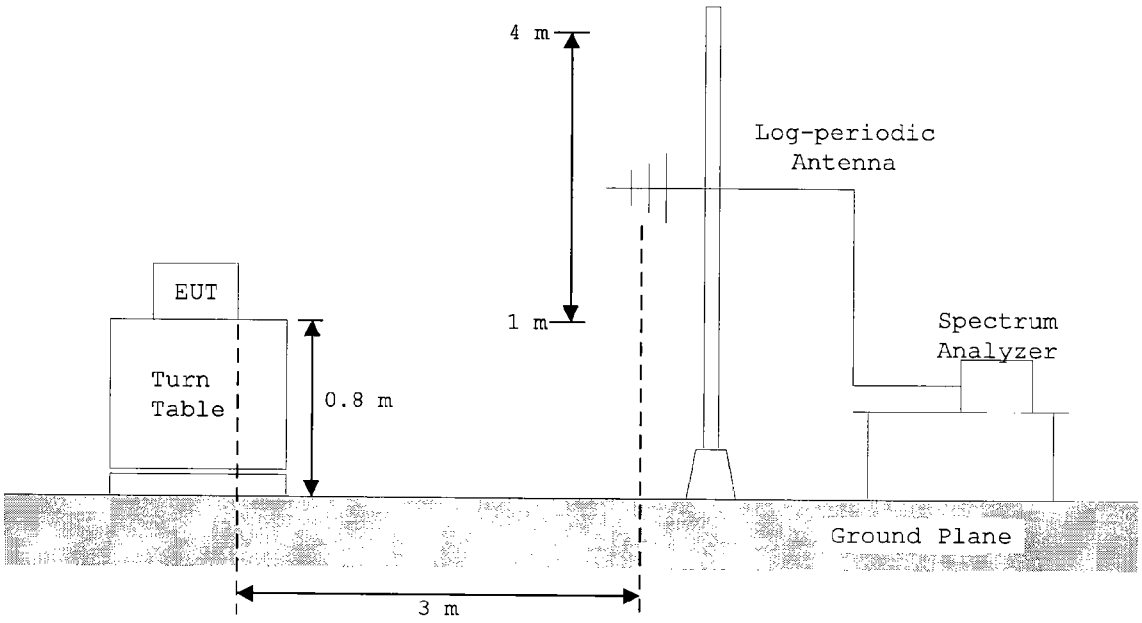


1.9.3 Radiated Emission (Above 1 GHz) :

According to description of ANSI C63.4-1992 sec.13.1.4.1, the preliminary radiated emissions measurements were carried out. The preliminary radiated measurements were performed at the measurement distance that specified for compliance to determine the emission characteristics of the EUT.
The EUT configuration, cable configuration and mode of operation were determined for producing the maximum level of emissions. These configurations were used for the final radiated emissions measurements.

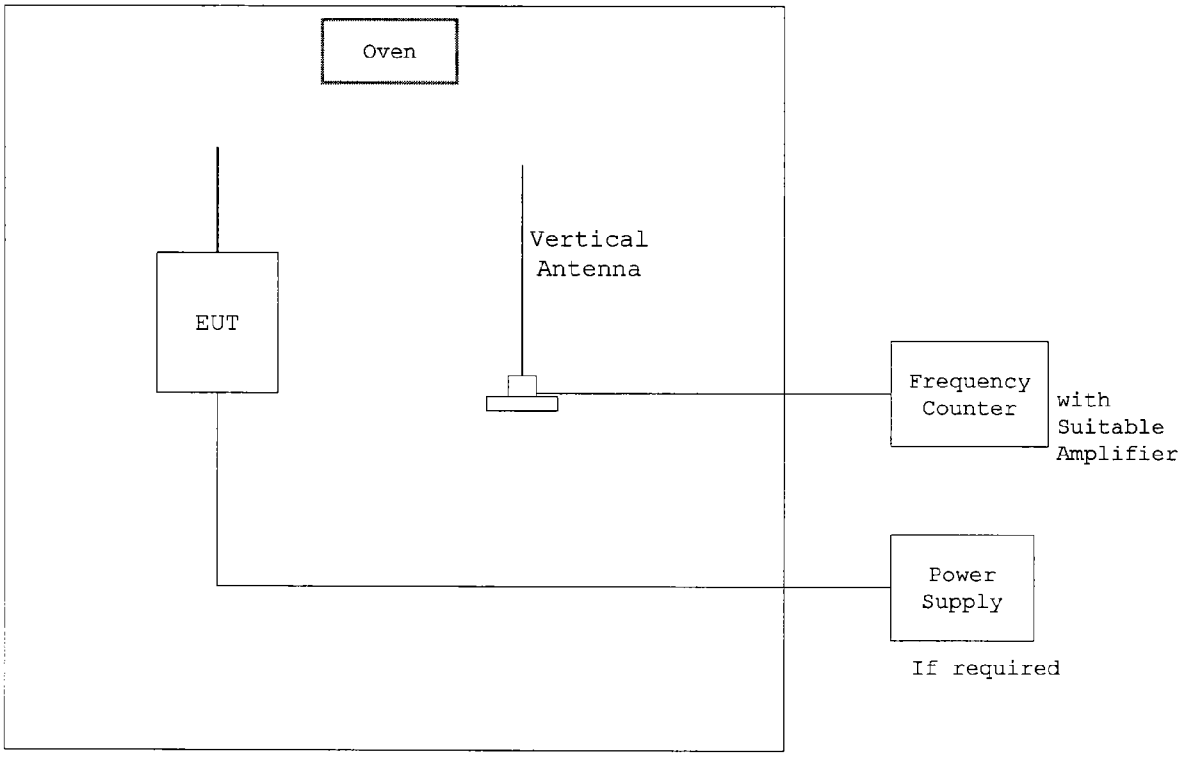
Anechoic Chamber

- Side View -



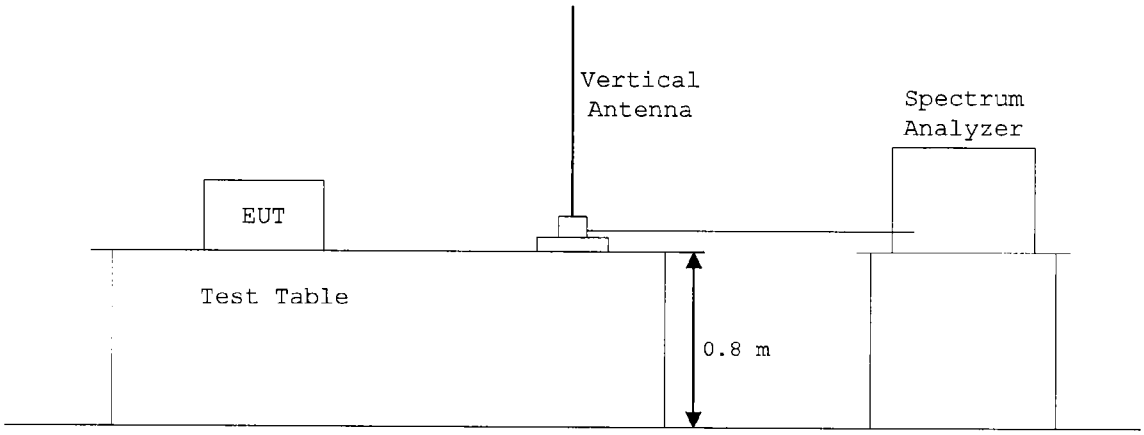
1.9.4 Frequency Stability :

According to description of ANSI C63.4-1992 sec.13.1.5 and sec.13.1.6, the frequency stability measurements were carried out. By using frequency counter with suitable RF amplifier, the carrier frequency of the transmitter under test was measured with a temperature variation of -20°C to +50°C at the normal supply voltage, and if required, with a variation in the primary voltage from 85 % to 115 % the rated supply voltage at the temperature of +20°C.
These measurements were carried out after allow sufficient time (approximately 1 hour) for the temperature of the chamber to stabilize.



1.9.5 Occupied Bandwidth :

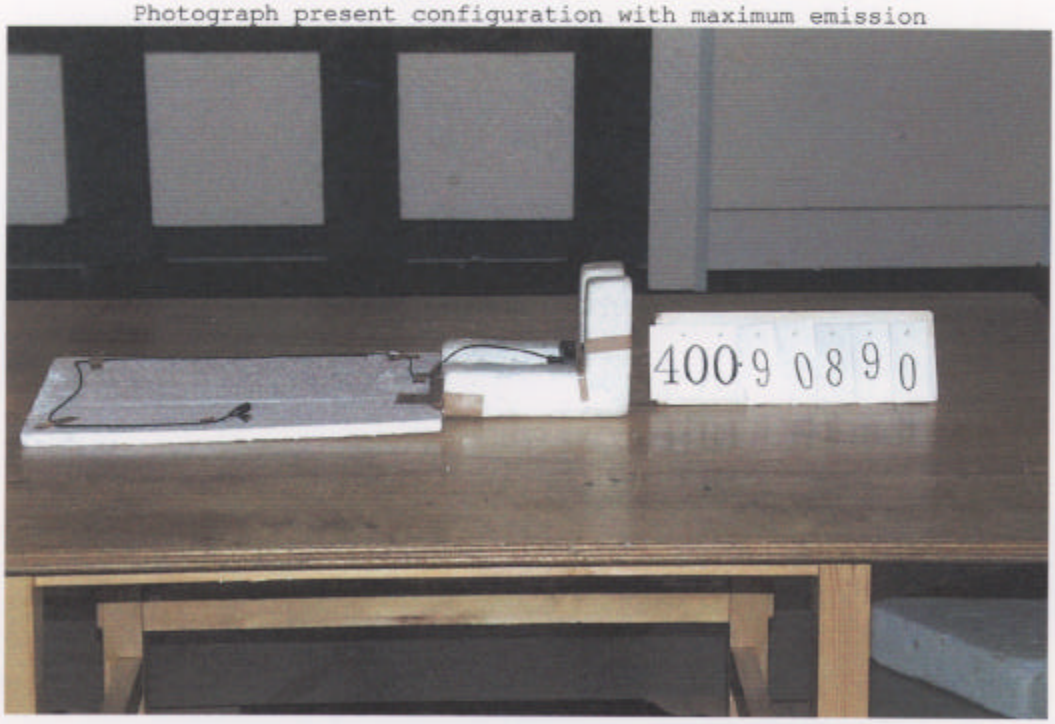
According to description of ANSI C63.4-1992 sec.13.1.7, the occupied bandwidth measurements were carried out. By using a spectrum analyzer with a vertical antenna for picking up the signal, the measurements of the emission were made under the transmitting modes of the EUT.
The resolution bandwidth of spectrum analyzer was set to the value specified in sec.13.1.7.

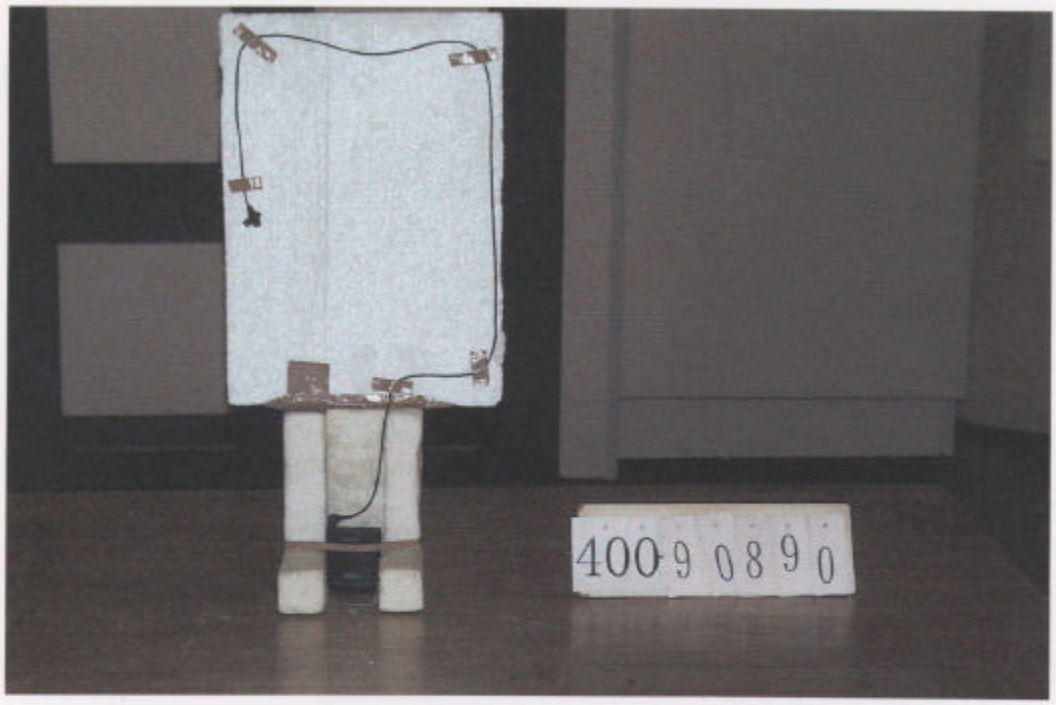


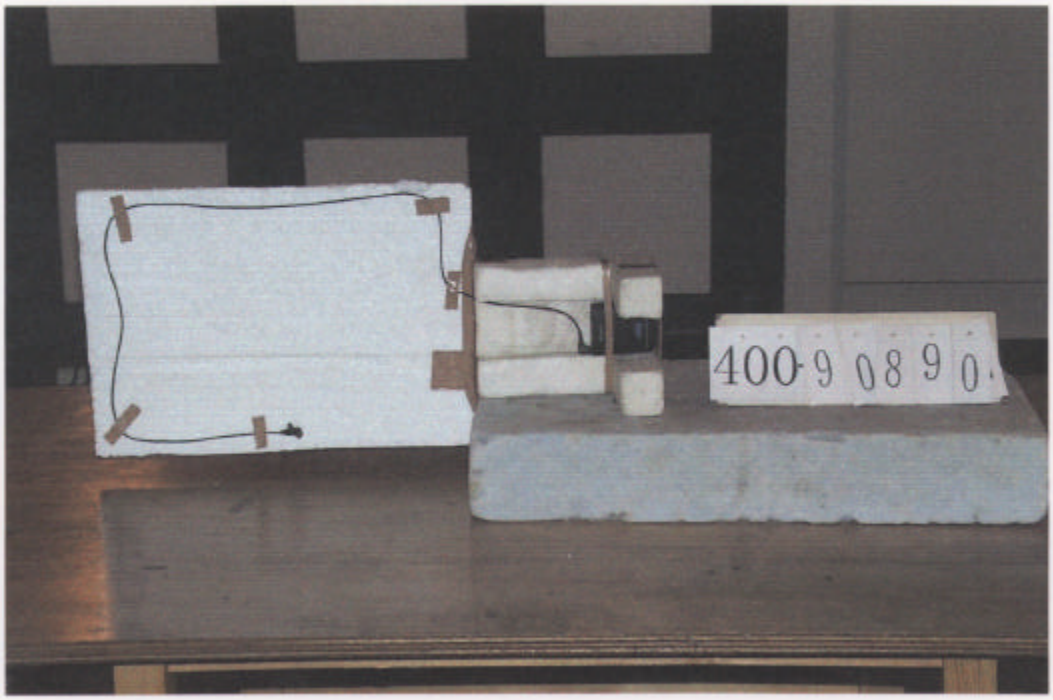
1.9 TEST ARRANGEMENT (PHOTOGRAPHS)

PHOTOGRAPHS OF EUT CONFIGURATION FOR RADIATED EMISSIONS MEASUREMENT

Photograph present configuration with maximum emission






400-9 08 9 0-

TEST DATA

2.2 Radiated Emissions Measurement

Date : April 5, 2000
Temp.: 22 °C Humi.: 63 %

Operating Frequency : 912.9 MHz
Distance of Measurement : 3.0 meters

	Correction	Meter Reading			Field Strength at 3 m	
Frequency	Factor	Horiz.	Vert.	Limits	Horiz.	Vert.
(MHz)	(dB/m)	(dBμV)	(dBμV)	(dBμV/m)	(dBμV/m)	(dBμV/m)
Fundamental						
913.020	32.4	57.2	55.6	94.0	89.6	88.0
Harmonics & other Frequency components						
1826.040	30.7	19.8	17.7	54.0	50.5	48.4
2739.060	-10.9	53.1	49.1	54.0	42.2	38.2
3652.080	-7.1	37.3	35.1	54.0	30.2	28.0
4565.100	-4.1	42.3	37.4	54.0	38.2	33.3
5478.120	-1.7	< 30.0	< 30.0	54.0	< 28.3	< 28.3
6391.140	0.5	< 30.0	< 30.0	54.0	< 30.5	< 30.5
7304.160	2.4	< 30.0	< 30.0	54.0	< 32.4	< 32.4
8217.180	11.1	< 30.0	< 30.0	54.0	< 41.1	< 41.1
9130.200	12.7	< 30.0	< 30.0	54.0	< 42.7	< 42.7

Operating Frequency : 914.29 MHz
Distance of Measurement : 3.0 meters

	Correction	Meter Reading			Field Strength at 3 m	
Frequency	Factor	Horiz.	Vert.	Limits	Horiz.	Vert.
(MHz)	(dB/m)	(dBμV)	(dBμV)	(dBμV/m)	(dBμV/m)	(dBμV/m)
Fundamental						
914.290	32.4	57.0	55.3	94.0	89.4	87.7
Harmonics & other Frequency components						
1828.580	30.8	19.9	16.7	54.0	50.7	47.5
2742.870	-10.8	53.9	51.5	54.0	43.1	40.7
3657.160	-7.1	37.8	38.1	54.0	30.7	31.0
4571.450	-4.1	40.1	38.6	54.0	36.0	34.5
5485.740	-1.7	< 30.0	< 30.0	54.0	< 28.3	< 28.3
6400.030	0.5	< 30.0	31.9	54.0	< 30.5	32.4
7314.320	2.4	< 30.0	< 30.0	54.0	< 32.4	< 32.4
8228.610	11.1	< 30.0	< 30.0	54.0	< 41.1	< 41.1
9142.900	12.8	< 30.0	< 30.0	54.0	< 42.8	< 42.8

Note: 1. The spectrum was checked from 25 MHz to 10th harmonics of the fundamental frequency component. All emissions not listed were found to be more than 20 dB below the limits.

2. The symbol of "<" means "or less".

3. The cable loss, antenna factor and preamplifier gain were included in the correction factor.

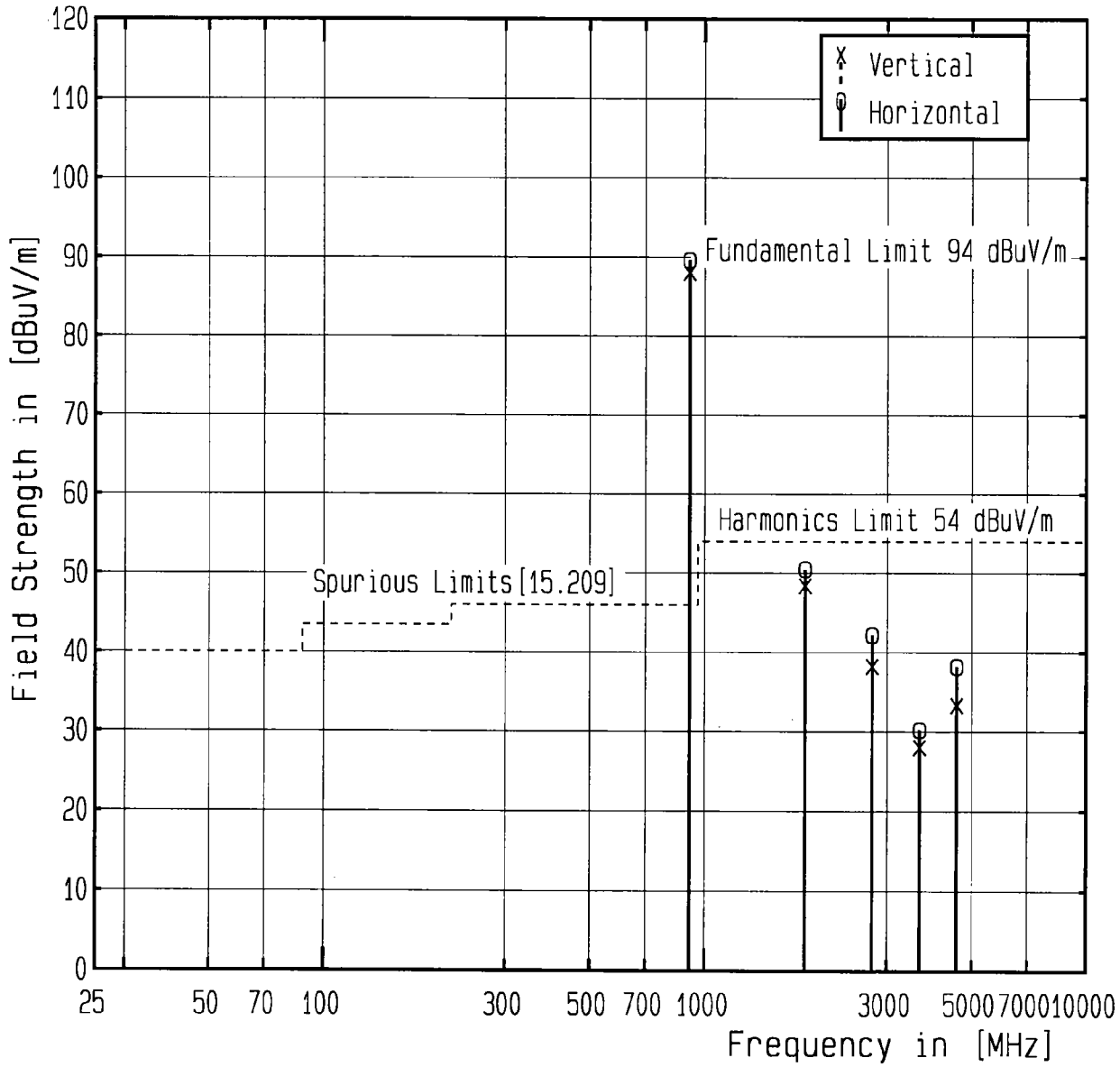
4. Sample calculation :
   at 913.020 MHz
   Cf + Mr = 32.4 + 57.2 = 89.6 dBμV/m
   Where,
   Cf = Correction Factor
   Mr = Meter Reading

5. Measuring Instrument Setting:
   Below 1000 MHz
   Detector function : CISPR Quasi-peak
   IF Bandwidth : 120 kHz
   Above 1000 MHz
   Detector function : Peak
   IF Bandwidth : 1 MHz
   Video Bandwidth : 10 Hz

Tested by : Shigeru Osawa
Shigeru Osawa
Testing Engineer

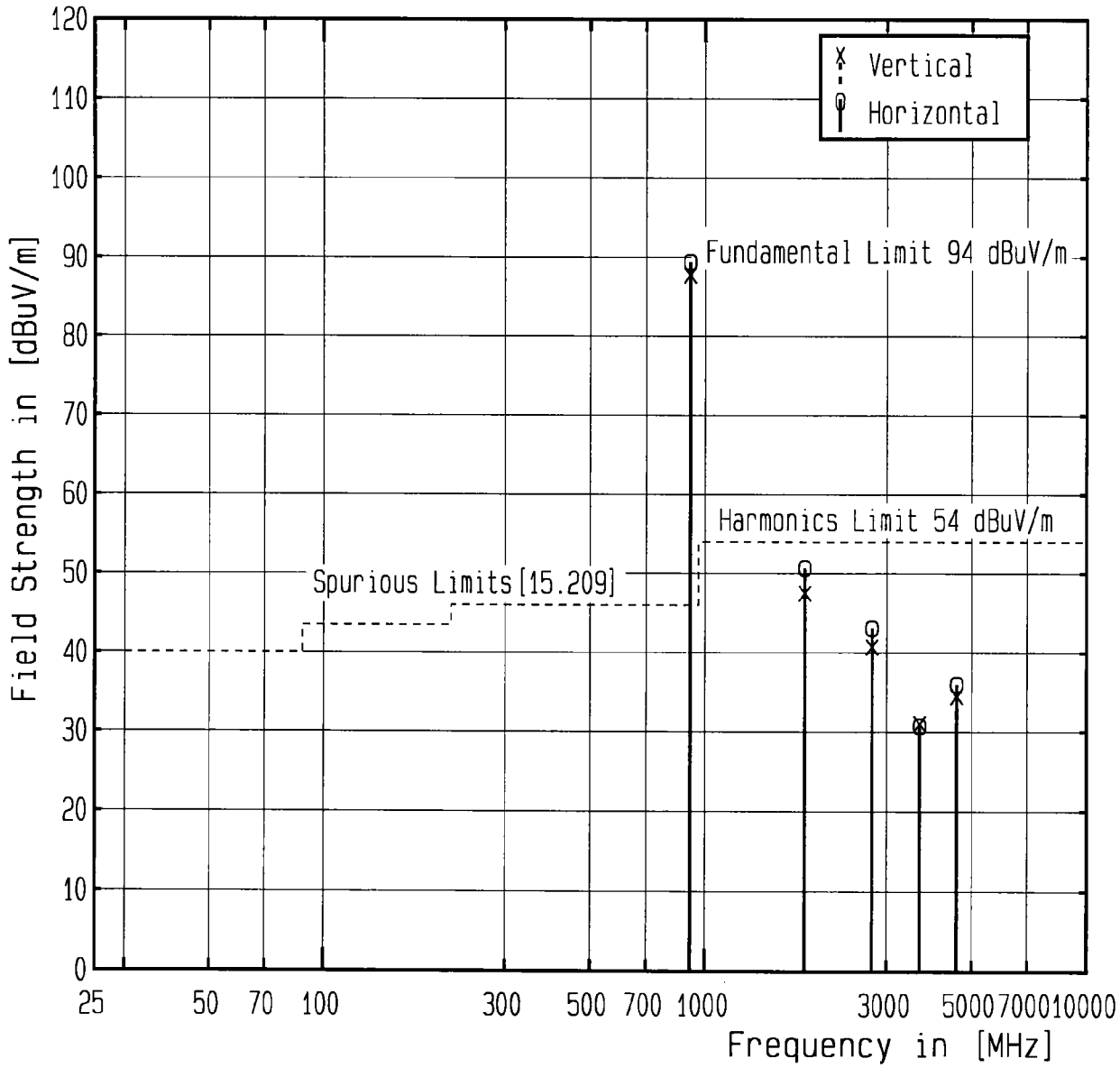
Transmitter Fundamental and Spurious Emissions

Model No. : WCS-999T
Operating Frequency : 913.02 MHz
Test Condition :



Transmitter Fundamental and Spurious Emissions

Model No. : WCS-999T
Operating Frequency : 914.29 MHz
Test Condition :



2.4 Occupied Bandwidth Measurement

Date : April 6, 2000
Temp.: 24°C Humi.: 40 %

Measurements Results :
Specified Limits : Emission radiated outside of the specified frequency bands(902 MHz - 928 MHz), except for harmonics, shall be attenuated by at least 50 dB below the level of the fundamental or to the general radiated emission limits in §15.209, whichever is the lesser attenuation.

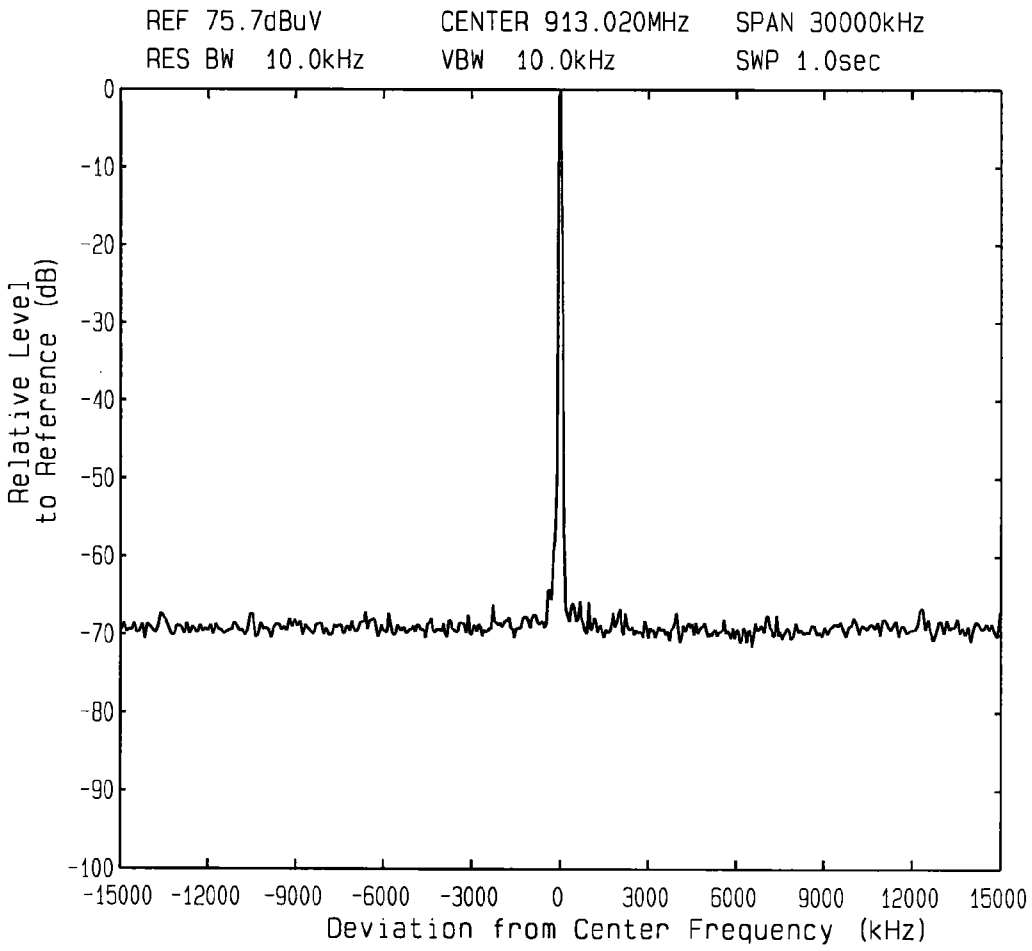
Refer to the attached graphs.

Tested by : Shigeru Osawa
Shigeru Osawa
Testing Engineer

Emission Limitation

FCC ID : AK8WCS999T2
Model : WCS-999T

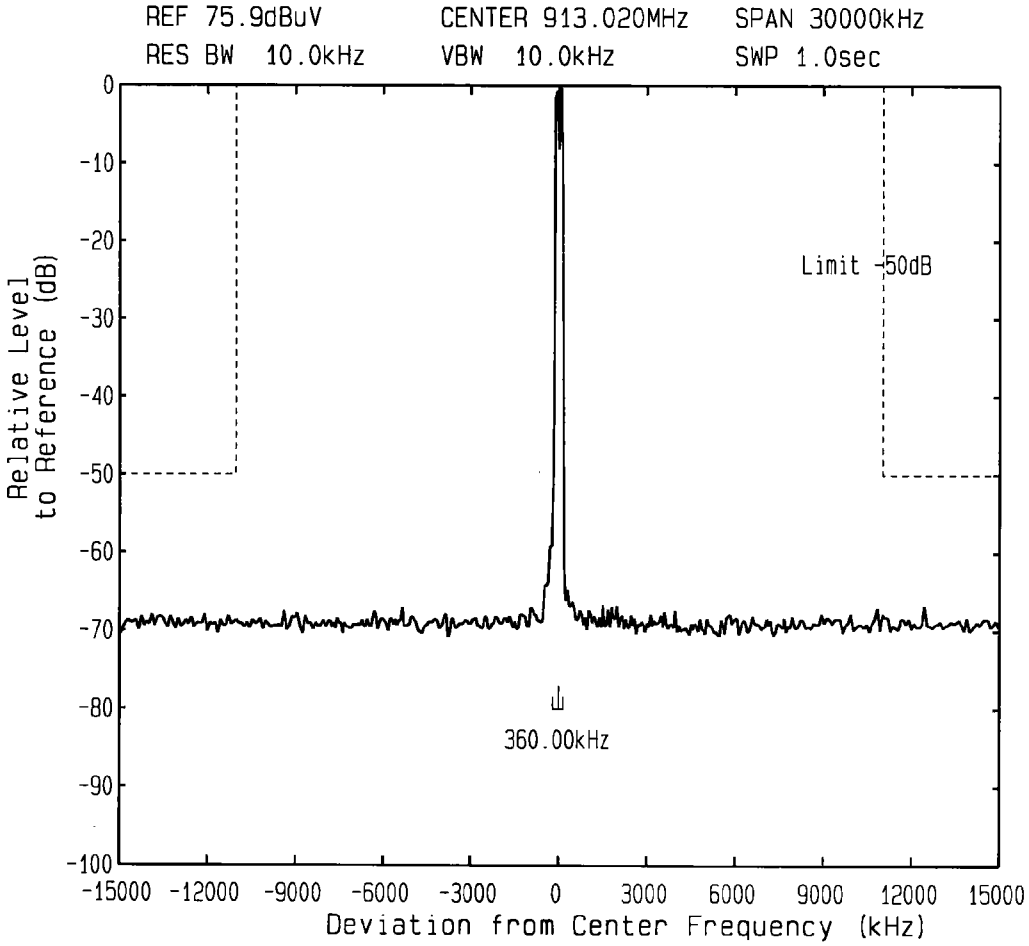
Mode of EUT : Transmit
Reference Carrier Level



Emission Limitation

FCC ID : AK8WCS999T2
Model : WCS-999T

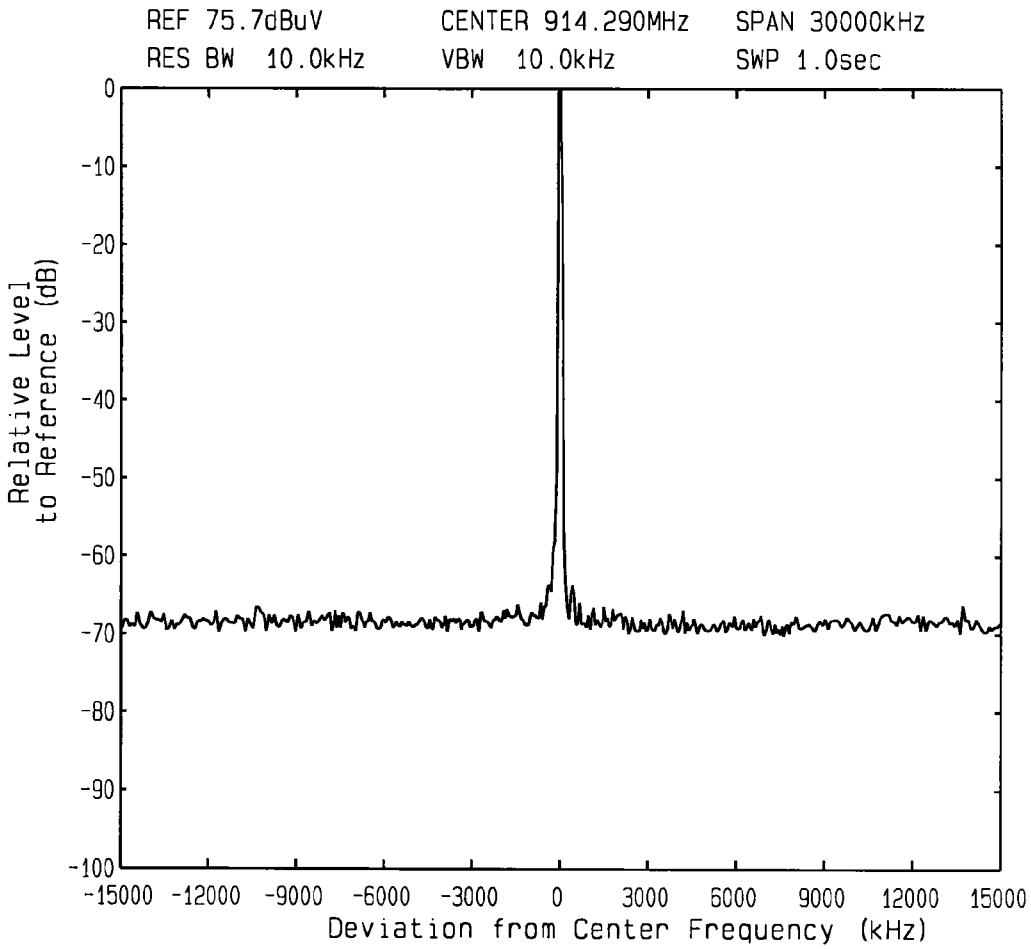
Mode of EUT : Transmit
External Modulation : 1 kHz, 100 dBSPL



Emission Limitation

FCC ID : AK8WCS999T2
Model : WCS-999T

Mode of EUT : Transmit
Reference Carrier Level



Emission Limitation

FCC ID : AK8WCS999T2
Model : WCS-999T

Mode of EUT : Transmit
External Modulation : 1 kHz, 100 dBSPL