

TEST REPORT

APPLICANT : Sony Corporation

ADDRESS : 1-7-1 Konan, Minato-ku, Tokyo 108-0075, Japan

PRODUCTS : Digital Wireless Microphone

MODEL No. : DWM-01

SERIAL No. : --, --, --
(Sample No.) : (1021, 1022, 1023)

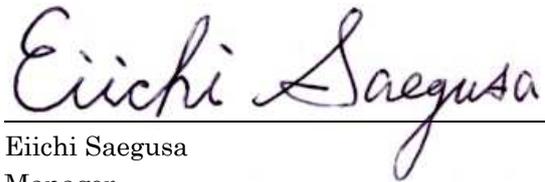
FCC ID : AK8DWM01

TEST STANDARD : CFR 47 FCC Rules and Regulations Part 74

TESTING LOCATION : Japan Quality Assurance Organization
SAFETY & EMC CENTER
EMC Engineering Department Testing Division
1-21-25, Kinuta, Setagaya-ku, Tokyo 157-8573, Japan

TEST RESULTS : **Passed**

DATE OF TEST : March 1, 2010 - March 19, 2010



Eiichi Saegusa

Manager

Japan Quality Assurance Organization

SAFETY & EMC CENTER

EMC Engineering Dept. Testing Division

1-21-25, Kinuta, Setagaya-ku, Tokyo 157-8573, Japan

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- The measurement values stated in Test Report was made with traceable to National Institute of Advanced Industrial Science and Technology (AIST) of Japan and National Institute of Information and Communications Technology (NICT) of Japan.
 - The applicable standard, testing condition and testing method which were used for the tests are based on the request of the applicant.
 - The test results presented in this report relate only to the offered test sample.
 - The contents of this test report cannot be used for the purposes, such as advertisement for consumers.
 - This test report shall not be reproduced except in full without the written approval of JQA.

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Definitions for Abbreviation and Symbols Used In This Test Report

“EUT” means Equipment Under the Test.

“AE” means Associated Equipment.

“N/A” means that Not Applicable.

“N/T” means that Not Tested.

-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.

Documentation**1 Test Regulation**

Applied Standard : CFR 47 FCC Rules and Regulations Part 74 Subpart H Low Power Auxiliary Stations

Test Procedure : RF power output, modulation characteristics, occupied bandwidth, field strength of spurious radiation and frequency stability tests were performed according to the procedures in FCC Rules and Regulations Part 2 and TIA-603-C.

2 Test Location

Japan Quality Assurance Organization
SAFETY & EMC CENTER
EMC Engineering Department Testing Division
1-21-25, Kinuta, Setagaya-ku, Tokyo 157-8573, Japan

3 Recognition of Test Laboratory

Japan Quality Assurance Organization
SAFETY & EMC CENTER
EMC Engineering Department Testing Division
is accredited under ISO/IEC 17025 by following accreditation bodies and the test facility of Testing Division is registered by the following bodies .

VLAC Code : VLAC-001-1 (Effective through : April 3, 2010)
NVLAP Lab Code : 200189-0 (Effective through : June 30, 2010)
VCCI Registration Number : R-002, R-003, C-002, C-966 (Effective through : April 3, 2010)
FCC Registration Number : 349652 (Date of Listing : April 1, 2010)
IC Registration Number : 2079A-1, 2079A-2 (Effective through : October 22, 2010)
Accredited as conformity assessment body for Japan electrical appliances and material law by METI. (Effective through : February 22, 2013)

4 Description of the Equipment Under Test

1	Manufacturer	: Sony EMCS Corporation Kosai Tec. 554 Sakaijuku Kosai-shi, Shizuoka-ken, 431-0496, Japan
2	Products	: Digital Wireless Microphone
3	Trade Name	: SONY
4	Model No.	: DWM-01
5	Serial No. (Sample No.)	: --, --, -- (1021, 1022, 1023)
6	FCC ID	: AK8DWM01
7	Product Type	: Prototype
8	Date of Manufacture	: --
9	Power Rating	: 3.0 VDC (Battery)
10	EUT Grounding	: None
11	Category	: Broadcast Transmitter Held to Face
12	Received Date of EUT	: February 22, 2010
13	EUT Authorization	: Certification
14	Operating Frequency Range	: 470.125 MHz - 541.875 MHz, 566.125 MHz - 607.875 MHz / 614.125 MHz - 637.875 MHz and 638.125 MHz - 697.875 MHz
15	Fundamental Frequency Generated/used in the EUT	: 1.3 MHz, 1.5 MHz, 8 MHz, 19.2 MHz and 98.034 MHz
16	EUT Highest Frequency Used/Generated	: 98.304 MHz (the part of Unintentional Radiators) 697.875 MHz (the part of Intentional Radiators)
17	Necessary Bandwidth	: 192 kHz (Manufacturer defined, Digital Modulation)
18	Emission Designator	: 192KG1E, 192KG1D
19	RF Output Power	: 50 mW / 10 mW / 1 mW (Selectable, Manufacturer defined)
20	Antenna Type	: Integral Internal antenna (not accessible to the user)
21	Antenna Gain	: +2.14 dBi

5 Test Condition

5.1 RF Output Power

The requirements are -Applicable -Tested -Not tested by applicant request.]
-Not Applicable

Test site & instruments :

Type	Number of test site & instruments (Refer to Appendix C)	
Test Site	1	
Test Receiver	13	
Spectrum Analyzer	--	
Antenna	167	168
Cable	38	
Antenna(for Substitution)	234	235
Cable(for Substitution)	49	
Signal Generator	171	
Power Meter	210	
Power Sensor	211	
Thermo-Hygrometer	204	

5.2 Modulation Characteristics

The requirements are -Applicable -Tested -Not tested by applicant request.]
-Not Applicable

Test site & instruments :

Type	Number of test site & instruments (Refer to Appendix C)	
Test Site	--	
Test Receiver	--	
Spectrum Analyzer	--	
Antenna	--	
Cable	--	
Attenuator	--	
Function Generator	--	
FM Linear Detector	--	
Level Meter	--	
Thermo-Hygrometer	--	

5.3 Radiated Emissions

The requirements are -Applicable -Tested -Not tested by applicant request.]
-Not Applicable

Test site & instruments : (for 30 MHz - 1000 MHz)

Type	Number of test site & instruments (Refer to Appendix C)	
Test Site	1	
Test Receiver	13	
Spectrum Analyzer	--	
Antenna	167	168
Cable	38	
Antenna(for Substitution)	234	235
Cable(for Substitution)	49	
Signal Generator	171	
Power Meter	210	
Power Sensor	211	
Thermo-Hygrometer	204	

Test site & instruments : (for above 1 GHz)

Type	Number of test site & instruments (Refer to Appendix C)	
Test Site	1	
Test Receiver	13	
Spectrum Analyzer	--	
Antenna	198	
Cable	48	195
Antenna(for Substitution)	31	
Cable(for Substitution)	50	
RF Amplifier	57	
Band Reject Filter	--	
High Pass Filter	208	
Power Meter	210	
Power Sensor	211	
Thermo-Hygrometer	204	

5.4 Occupied Bandwidth

The requirements are -Applicable -Tested -Not tested by applicant request.]
-Not Applicable

Test site & instruments :

Type	Number of test site & instruments (Refer to Appendix C)
Test Site	7
Test Receiver	13
Spectrum Analyzer	--
Antenna	--
Cable	45
Attenuator	80
Function Generator	58
FM Linear Detector	--
Level Meter	--
Thermo-Hygrometer	203

5.5 Frequency Stability

The requirements are -Applicable -Tested -Not tested by applicant request.]
-Not Applicable

Test site & instruments :

Type	Number of test site & instruments (Refer to Appendix C)
Test Site	--
Test Receiver	13
Spectrum Analyzer	--
Antenna	--
Cable	45
Attenuator	80
Frequency Counter	--
DC Power Supply	77
Oven	76
Multimeter	165
Thermo-Hygrometer	203

6 Preliminary Test and Test Setup**6.1 RF Power Output and Radiated Emissions****6.1.1 30MHz - 1000MHz**

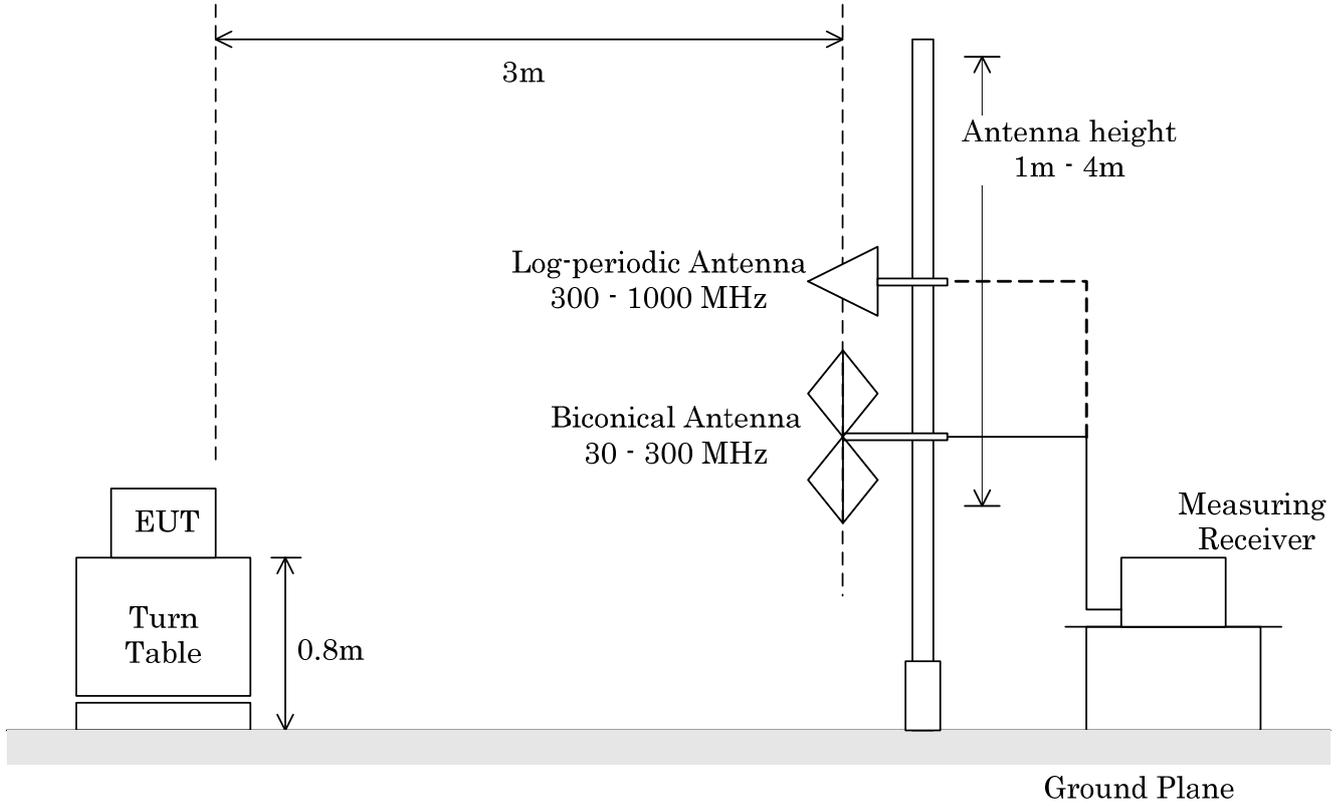
The radiated power output and the field strength of the transmitter harmonic and spurious radiation were measured at the distance at 3 meters away from the transmitter under test which was placed on a non-conducting turntable 0.8 meter in height. The receiving antenna was oriented for vertical polarization and raised or lowered through 1 to 4 meters until the maximum signal level was detected on the measuring instrument. The transmitter under test was rotated through 360° until the maximum signal was received. The measurement was repeated with the receiving antenna in the horizontal polarization.

The transmitter was removed and replaced with a half-wave dipole antenna. The center of the half-wave dipole antenna was placed approximately at the same location as the center of the transmitter. (In the case of the lower frequencies, where the half-wave dipole antenna is very long, this will be impossible to achieve when the antenna is polarized vertically. In such a case the lower end of the antenna was adjusted to 0.3m above the ground). The half-wave dipole antenna was fed with a signal generator, and the output level of the signal generator was adjusted to obtain the previously recorded maximum reading at the particular harmonics and spurious frequency and recorded. This procedure was repeated with the receiving antenna and the half-wave dipole antenna in the orthogonal polarization.

The input power into the half-wave dipole antenna was calculated from the impedance and signal generator voltage obtained in these reading. The level of the harmonics and spurious emissions in dB were calculated from the following formula:

$$\text{Attenuation(dB)} = 10 \log_{10} \frac{\text{Transmitter Power(ERP)}}{\text{Calculated Spurious Power}}$$

- Side View -

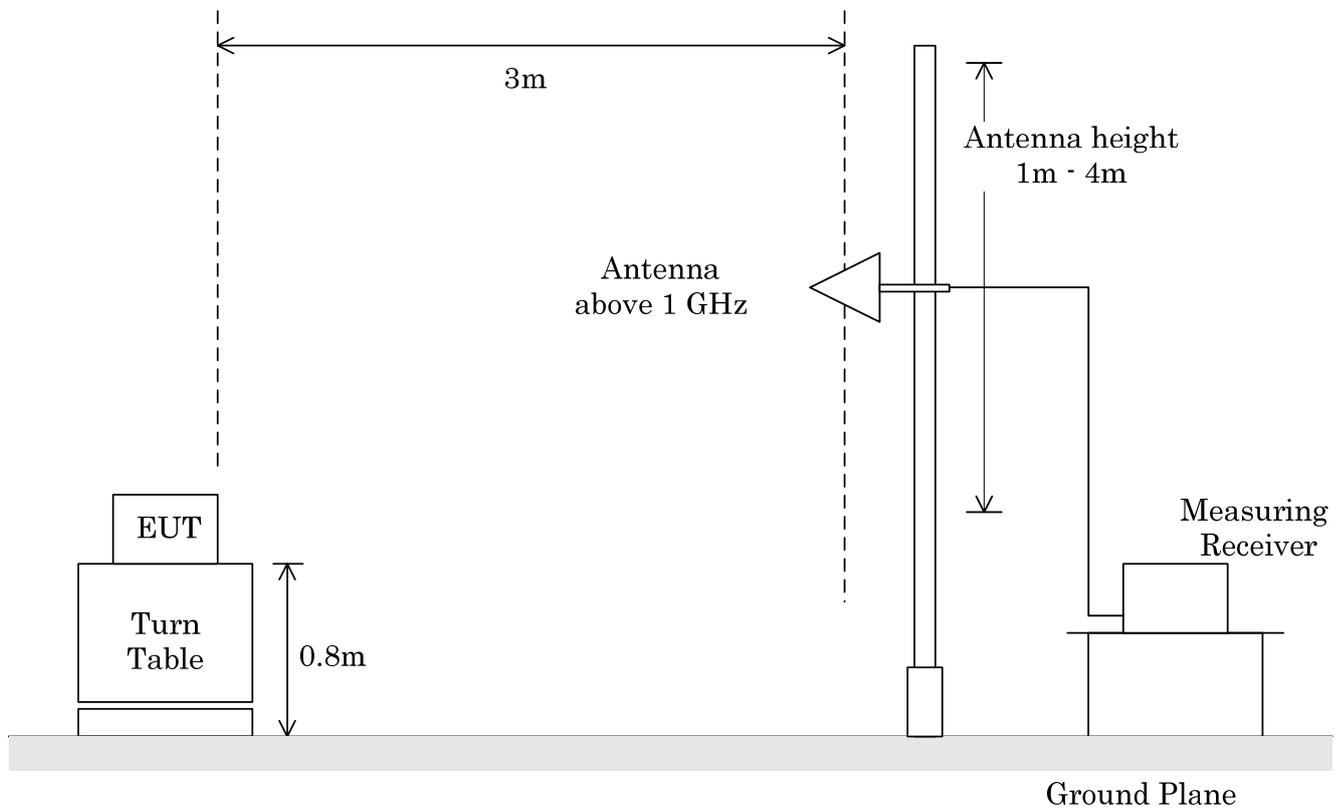


6.1.2 above 1000MHz

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.

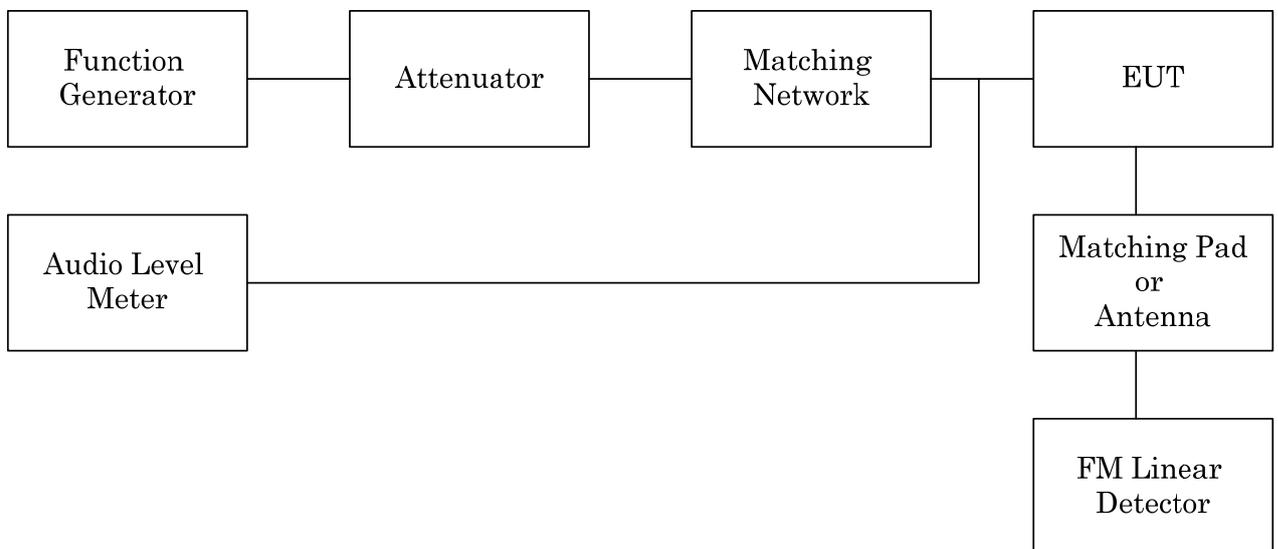
- Side View -



6.2 Modulation Characteristics

The audio signal generator was connected to the input circuit of the unit under test through a matching network. The audio signal input was adjusted to obtain 50% modulation at the maximum audio frequency response of the transmitter, and this point was taken as the 0 dB reference level. The frequency of the input signal was changed from 100 Hz to 20 kHz and the input level to obtain 50% modulation was plotted.

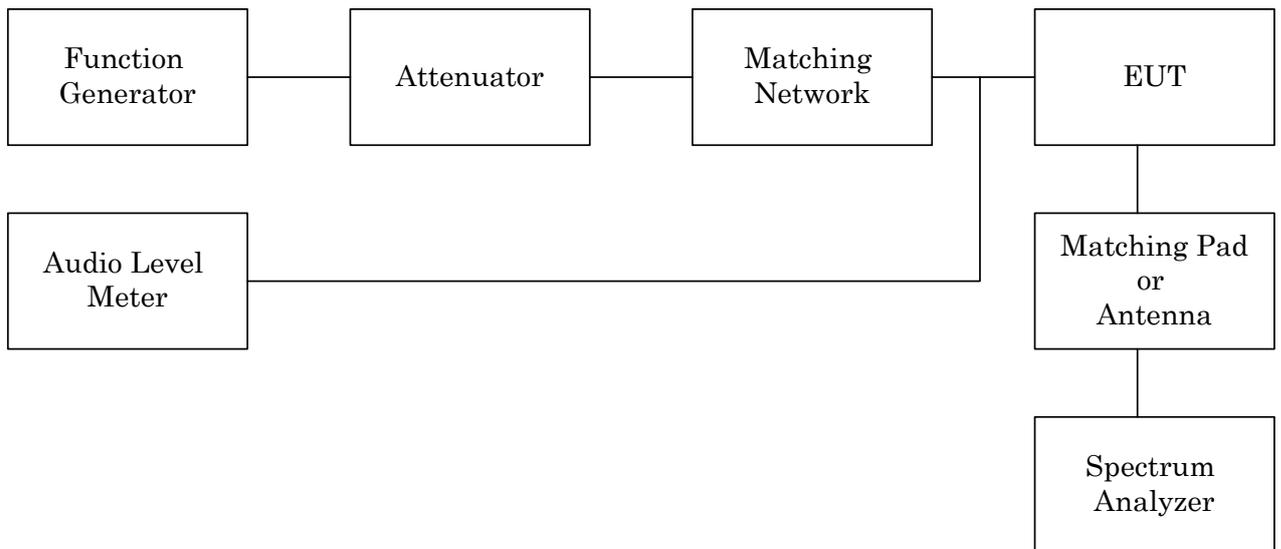
The modulation response was measured up to maximum modulation for each of three tones: 100 Hz, 2500 Hz and 15 kHz. The audio input level was changed from 10% modulation up to maximum rated modulation.



6.3 Occupied Bandwidth

According to description of FCC Rules §2.1049, the occupied bandwidth measurements were carried out. By using a spectrum analyzer the measurements of the emission were made under the transmitting modes of the EUT.

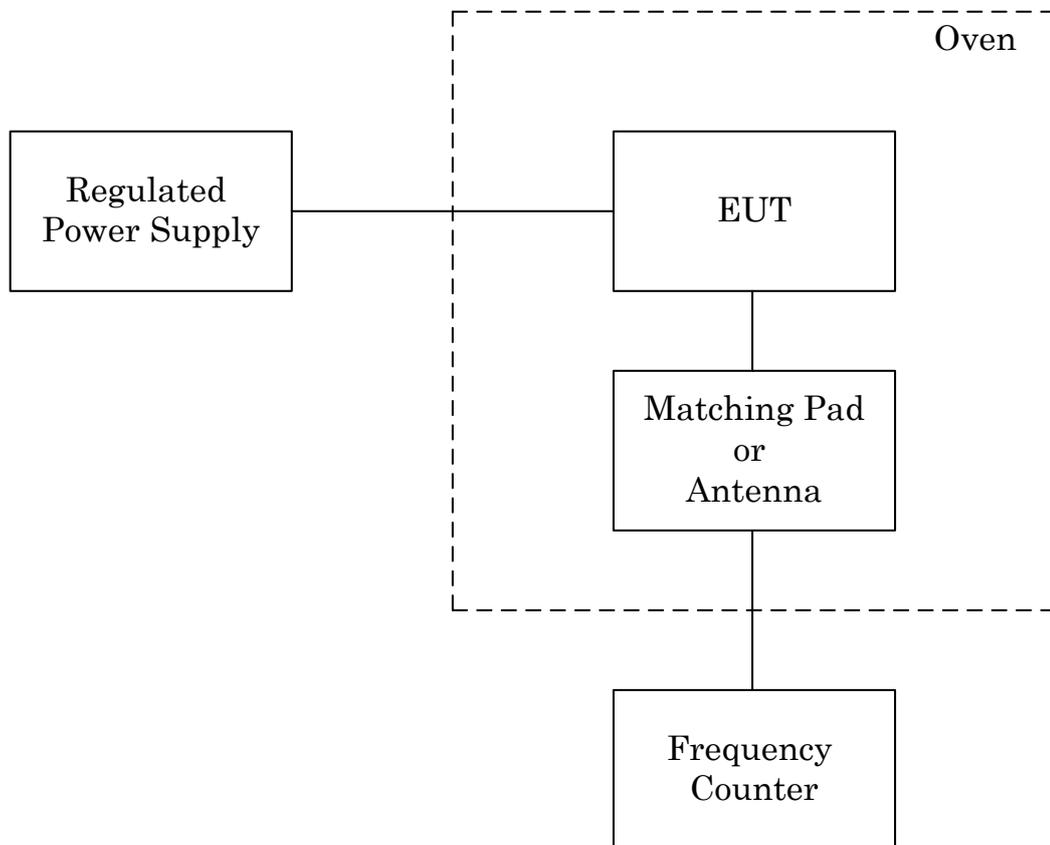
The transmitter was modulated at the input level producing 85% modulation at the maximum response frequency, and with the frequency 2500 Hz.



6.4 Frequency Stability

The transmitter was placed in the temperature cycle chamber and was kept at a temperature of $-30^{\circ}\text{C} \pm 1^{\circ}\text{C}$ for approximately one hour. The rated test voltage was applied to the transmitter and the unit was turned on for ten minutes. The transmit frequency was measured during this period and recorded. A similar measurement was performed with the temperatures changed from -20°C to 50°C at interval of 10°C . In the latter case, the unit was kept for approximately one hour at the prescribed temperature after completion of the test preceding with it.

The frequency stability tests were performed at the normal supply voltage and if required, with variation of primary supply voltage. (Refer to FCC Rules §2.1055)



7 Equipment Under Test Modification

- No modifications were conducted by JQA to achieve compliance to the limitations.
 To achieve compliance to the limitations, the following changes were made by JQA during the compliance test.

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

Applicant : Not Applicable

Date : Not Applicable

Typed Name : Not Applicable

Position : Not Applicable

Signatory : Not Applicable

8 Responsible PartyResponsible Party of Test Item (Product)

Responsible Party :	
Contact Person :	_____
	Signatory

9 Deviation from Standard

- No deviations from the standard described in clause 1.
 The following deviations were employed from the standard described in clause 1.

10 Test Results**10.1 Output Power [§74.861(e)(1)(ii)]**

The requirements are -Applicable [-Tested -Not tested by applicant request.]
-Not Applicable

-Passed -Failed -Not judged

Uncertainty of measurement results

30-300	MHz	<u>± 1.2</u>	dB(2σ)
300-1000	MHz	<u>± 1.2</u>	dB(2σ)
1-18	GHz	<u>± 2.0</u>	dB(2σ)
18-40	GHz	<u>± 5.3</u>	dB(2σ)

Remarks : _____

10.2 Modulation Characteristics [§74.861(e)(6)]

The requirements are -Applicable [-Tested -Not tested by applicant request.]
-Not Applicable

-Passed -Failed -Not judged

Uncertainty of measurement results

± 1.5 %(2σ)

Remarks : Because the EUT has digital modulation.

10.3 Radiated Emissions [§74.861(e)(6)]

The requirements are -Applicable -Tested -Not tested by applicant request.]
-Not Applicable
-Passed -Failed - Not judged

Uncertainty of measurement results

30-300	MHz	<u>± 1.2</u>	dB(2σ)
300-1000	MHz	<u>± 1.2</u>	dB(2σ)
1-18	GHz	<u>± 5.0</u>	dB(2σ)
18-40	GHz	<u>± 5.3</u>	dB(2σ)

Remarks : _____

10.4 Occupied Bandwidth [§74.861(e)(6)]

The requirements are -Applicable -Tested -Not tested by applicant request.]
-Not Applicable
-Passed -Failed -Not judged

Uncertainty of measurement results

± 0.9 %(2σ)

Remarks : _____

10.5 Frequency Stability [§74.861(e)(4)]

The requirements are -Applicable -Tested -Not tested by applicant request.]
-Not Applicable
-Passed -Failed -Not judged

Uncertainty of measurement results

± 3.8 ppm(2σ)

Remarks : _____

11 Summary**General Remarks**

The EUT was tested according to the requirements of CFR 47 FCC Rules and Regulations Part 74 Subpart H under the test configuration, as shown in clause 12 to 14.

The conclusion for the test items of which are required by the applied regulation is indicated under the test result.

Test Result :

The "as received" sample;

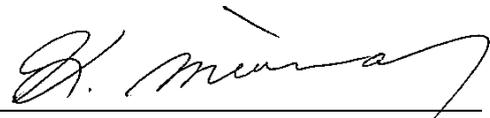
- fulfill the test requirements of the regulation mentioned on clause 1.
- doesn't fulfill the test requirements of the regulation mentioned on clause 1.

Reviewed by:



Shigeru Osawa
Deputy Manager
SAFETY & EMC CENTER
EMC Engineering Dept. Testing Division

Tested by:



Katsunori Miura
Assistant Manager
SAFETY & EMC CENTER
EMC Engineering Dept. Testing Division

12 Operating Condition

Power Supply Voltage : 3.0 VDC (fresh Alkaline Battery used or DC Power Supply)

Operation Mode

The EUT is set with the test mode, the specification of the test mode is as following.

- (1) TX Mode (470.125MHz)
- (2) TX Mode (584.125MHz)
- (3) TX Mode (697.875MHz)

Used application to controlled : The test mode is instructed by the applicant.

13 Test Configuration

The equipment under test consists of :

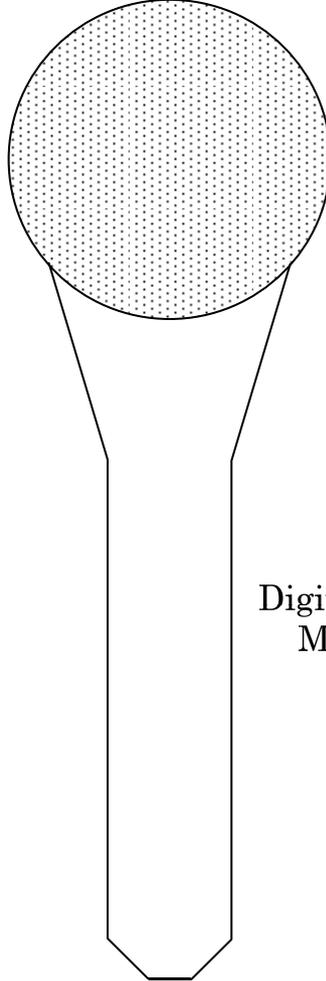
Sign	Item	Manufacturer	Model No.	Serial No. (Sample No.)	FCC ID
A	Digital Wireless Microphone	Sony EMCS Corporation Kosai TEC.	DWM-01	--, --, -- (1021,1022,1023)	AK8DWM01

The auxiliary equipment used for testing :

Sign	Item	Manufacturer	Model No.	Serial No.	FCC ID
-	--	--	--	--	--

Type of Cable:

No.	Description	Identification (Manu. Etc.)	Connector Shielded	Cable Shielded	Ferrite Core	Length (m)
-	--	--	--	--	--	--

14 Equipment Under Test Arrangement (Drawings)

A :
Digital Wireless
Microphone
(EUT)

Appendix A : Test Data

A.1 Output Power

Date : March 19, 2010
 Temp. : 18 °C Humi. : 35 %

Frequency Range: 470.125 MHz - 697.875 MHz

(1) Output Level Setting: 50 mW

Frequency (MHz)	Meter Reading for EUT (dBμV)	Antenna Input Level for Substitution (dBm)	Antenna Gain (dBi)	Output Power ERP(mW)
470.125	93.7	16.9	2.15	48.98
584.125	89.2	15.5	2.15	35.48
697.875	90.2	17.9	2.15	61.66

(2) Output Level Setting: 10 mW

Frequency (MHz)	Meter Reading for EUT (dBμV)	Antenna Input Level for Substitution (dBm)	Antenna Gain (dBi)	Output Power ERP(mW)
470.125	86.5	9.8	2.15	9.55
584.125	82.1	8.4	2.15	6.92
697.875	82.6	10.0	2.15	10.00

(3) Output Level Setting: 1 mW

Frequency (MHz)	Meter Reading for EUT (dBμV)	Antenna Input Level for Substitution (dBm)	Antenna Gain (dBi)	Output Power ERP(mW)
470.125	77.6	0.3	2.15	1.07
584.125	71.8	-1.9	2.15	0.65
697.875	73.2	0.5	2.15	1.12

Note : 1. Specified limit (§74.861(e)(1)(ii)); 250 mW

2. A sample calculation:

$$ERP = 10^{(AIL / 10)} = 10^{(16.9 / 10)} = 48.98 \text{ (mW)}$$

ERP : Output Power

AIL : Antenna Input Level for Substitution

3. Measurement has been performed as Substitution Method as described on TIA-603-C.

A.2 Modulation CharacteristicsDate : March 5, 2010Temp. : 25 °C Humi. : 38 %

Maximum Deviation: It does not define, because the EUT has digital modulation.

Specified Limits: Max deviation ± 75 kHz (§74.861(e)(3))

This test item is not tested, because the EUT has digital modulation.

A.3 Radiated Emissions

Date : March 19, 2010
 Temp. : 18 °C Humi. : 35 %

A.3.1 Output Power Setting of the EUT : 50mW

Mode of EUT : TX Mode

Test Port : Enclosure

Operating Frequency : 470.125 MHz
 Reference Carrier Power (ERP) : 49.0 mW
 Distance of Measurement : 3.0 m

Frequency (MHz)	Substituted Power ERP(dBm)		Limits (dB)	Attenuation Ratio (dB)	
	Horiz.	Vert.		Horiz.	Vert.
461.871	-54.0	-54.4	29.9	70.9	71.3
478.361	-53.9	-53.8	29.9	70.8	70.7
940.250	-40.4	-42.7	29.9	57.3	59.6
1410.375	< -57.8	< -57.8	29.9	> 74.7	> 74.7
1880.500	< -56.2	< -56.2	29.9	> 73.1	> 73.1
2350.625	< -54.3	< -54.3	29.9	> 71.2	> 71.2
2820.750	< -52.7	< -52.7	29.9	> 69.6	> 69.6
3290.875	< -51.5	< -51.5	29.9	> 68.4	> 68.4
3761.000	< -50.5	< -50.5	29.9	> 67.4	> 67.4
4231.125	< -49.8	< -49.8	29.9	> 49.8	> 49.8
4701.250	< -49.1	< -49.1	29.9	> 49.1	> 49.1

Operating Frequency : 584.125 MHz
 Reference Carrier Power (ERP) : 35.5 mW
 Distance of Measurement : 3.0 m

Frequency (MHz)	Substituted Power ERP(dBm)		Limits (dB)	Attenuation Ratio (dB)	
	Horiz.	Vert.		Horiz.	Vert.
516.093	-59.2	-54.6	28.5	74.7	70.1
557.046	-58.7	-62.9	28.5	74.2	78.4
649.480	-54.0	-58.0	28.5	69.5	73.5
1168.250	< -58.2	< -58.2	28.5	> 73.7	> 73.7
1752.375	< -56.7	< -56.7	28.5	> 72.2	> 72.2
2336.500	< -54.4	< -54.4	28.5	> 69.9	> 69.9
2920.625	< -52.4	< -52.4	28.5	> 67.9	> 67.9
3504.750	< -51.0	< -51.0	28.5	> 66.5	> 66.5
4088.875	< -50.0	< -50.0	28.5	> 65.5	> 65.5
4673.000	< -49.2	< -49.2	28.5	> 49.2	> 49.2
5257.125	< -48.4	< -48.4	28.5	> 48.4	> 48.4
5841.250	< -47.7	< -47.7	28.5	> 47.7	> 47.7

Operating Frequency : 697.875 MHz
 Reference Carrier Power (ERP) : 61.7 mW
 Distance of Measurement : 3.0 m

Frequency (MHz)	Substituted Power ERP(dBm)		Limits (dB)	Attenuation Ratio (dB)	
	Horiz.	Vert.		Horiz.	Vert.
524.278	-67.9	-64.2	30.9	85.8	82.1
652.400	-50.1	-54.4	30.9	68.0	72.3
689.624	-54.8	-64.8	30.9	72.7	82.7
706.111	-60.5	-60.9	30.9	78.4	78.8
1395.750	< -57.5	< -57.5	30.9	> 75.4	> 75.4
2093.625	-50.6	-52.7	30.9	68.5	70.6
2791.500	-51.1	-50.7	30.9	69.0	68.6
3489.375	-50.5	-50.6	30.9	68.4	68.5
4187.250	< -49.4	< -49.4	30.9	> 67.3	> 67.3
4885.125	< -48.1	< -48.1	30.9	> 48.1	> 48.1
5583.000	< -46.9	< -46.9	30.9	> 46.9	> 46.9
6280.875	< -45.8	< -45.8	30.9	> 45.8	> 45.8
6978.750	< -44.8	< -44.8	30.9	> 44.8	> 44.8

A.3.2 Output Power Setting of the EUT : 10mW

Mode of EUT : TX Mode

Test Port : Enclosure

Operating Frequency : 470.125 MHz
 Reference Carrier Power (ERP) : 9.6 mW
 Distance of Measurement : 3.0 m

Frequency (MHz)	Substituted Power ERP(dBm)		Limits (dB)	Attenuation Ratio (dB)	
	Horiz.	Vert.		Horiz.	Vert.
461.871	-64.2	-63.8	22.6	73.8	73.4
478.361	-63.5	-63.5	22.6	73.1	73.1
940.250	-45.6	-47.5	22.6	55.2	57.1
1410.375	< -57.4	< -57.4	22.6	> 67.0	> 67.0
1880.500	< -55.7	< -55.7	22.6	> 65.3	> 65.3
2350.625	< -54.0	< -54.0	22.6	> 63.6	> 63.6
2820.750	< -52.5	< -52.5	22.6	> 62.1	> 62.1
3290.875	< -51.4	< -51.4	22.6	> 61.0	> 61.0
3761.000	< -50.3	< -50.3	22.6	> 59.9	> 59.9
4231.125	< -49.3	< -49.3	22.6	> 49.3	> 49.3
4701.250	< -48.4	< -48.4	22.6	> 48.4	> 48.4

Operating Frequency : 584.125 MHz
 Reference Carrier Power (ERP) : 6.9 mW
 Distance of Measurement : 3.0 m

Frequency (MHz)	Substituted Power ERP(dBm)		Limits (dB)	Attenuation Ratio (dB)	
	Horiz.	Vert.		Horiz.	Vert.
516.093	-65.1	-62.1	21.4	73.5	70.5
557.046	-65.0	-68.6	21.4	73.4	77.0
649.480	-59.4	-63.0	21.4	67.8	71.4
1168.250	< -58.2	< -58.2	21.4	> 66.6	> 66.6
1752.375	< -56.2	< -56.2	21.4	> 64.6	> 64.6
2336.500	< -54.1	< -54.1	21.4	> 62.5	> 62.5
2920.625	< -52.3	< -52.3	21.4	> 60.7	> 60.7
3504.750	< -50.9	< -50.9	21.4	> 59.3	> 59.3
4088.875	< -49.6	< -49.6	21.4	> 58.0	> 58.0
4673.000	< -48.5	< -48.5	21.4	> 48.5	> 48.5
5257.125	< -47.5	< -47.5	21.4	> 47.5	> 47.5
5841.250	< -46.5	< -46.5	21.4	> 46.5	> 46.5

Operating Frequency : 697.875 MHz
 Reference Carrier Power (ERP) : 10.0 mW
 Distance of Measurement : 3.0 m

Frequency (MHz)	Substituted Power ERP(dBm)		Limits (dB)	Attenuation Ratio (dB)	
	Horiz.	Vert.		Horiz.	Vert.
524.278	-74.0	-71.2	23.9	84.9	82.1
652.400	-56.9	-61.2	23.9	67.8	72.1
689.624	-61.2	-70.5	23.9	72.1	81.4
706.111	-66.4	-66.1	23.9	77.3	77.0
1395.750	< -57.5	< -57.5	23.9	> 68.4	> 68.4
2093.625	< -54.9	< -54.9	23.9	> 65.8	> 65.8
2791.500	< -52.6	< -52.6	23.9	> 63.5	> 63.5
3489.375	< -50.9	< -50.9	23.9	> 61.8	> 61.8
4187.250	< -49.4	< -49.4	23.9	> 60.3	> 60.3
4885.125	< -48.1	< -48.1	23.9	> 48.1	> 48.1
5583.000	< -46.9	< -46.9	23.9	> 46.9	> 46.9
6280.875	< -45.8	< -45.8	23.9	> 45.8	> 45.8
6978.750	< -44.8	< -44.8	23.9	> 44.8	> 44.8

A.3.3 Output Power Setting of the EUT : 1mW

Mode of EUT : TX Mode
 Test Port : Enclosure

Operating Frequency : 470.125 MHz
 Reference Carrier Power (ERP) : 1.1 mW
 Distance of Measurement : 3.0 m

Frequency (MHz)	Substituted Power ERP(dBm)		Limits (dB)	Attenuation Ratio (dB)	
	Horiz.	Vert.		Horiz.	Vert.
461.871	-73.6	-72.6	12.8	73.4	72.4
478.361	-72.1	-71.6	12.8	71.9	71.4
940.250	-53.0	-55.8	12.8	52.8	55.6
1410.375	< -57.4	< -57.4	12.8	> 57.2	> 57.2
1880.500	< -55.7	< -55.7	12.8	> 55.5	> 55.5
2350.625	< -54.0	< -54.0	12.8	> 53.8	> 53.8
2820.750	< -52.5	< -52.5	12.8	> 52.3	> 52.3
3290.875	< -51.4	< -51.4	12.8	> 51.2	> 51.2
3761.000	< -50.3	< -50.3	12.8	> 50.1	> 50.1
4231.125	< -49.3	< -49.3	12.8	> 49.3	> 49.3
4701.250	< -48.4	< -48.4	12.8	> 48.4	> 48.4

Operating Frequency : 584.125 MHz
 Reference Carrier Power (ERP) : 0.65 mW
 Distance of Measurement : 3.0 m

Frequency (MHz)	Substituted Power ERP(dBm)		Limits (dB)	Attenuation Ratio (dB)	
	Horiz.	Vert.		Horiz.	Vert.
516.093	-69.0	-65.5	11.1	67.1	63.6
557.046	-66.7	-71.1	11.1	64.8	69.2
649.480	-65.0	-68.3	11.1	63.1	66.4
1168.250	< -58.2	< -58.2	11.1	> 56.3	> 56.3
1752.375	< -56.2	< -56.2	11.1	> 54.3	> 54.3
2336.500	< -54.1	< -54.1	11.1	> 52.2	> 52.2
2920.625	< -52.3	< -52.3	11.1	> 50.4	> 50.4
3504.750	< -50.9	< -50.9	11.1	> 49.0	> 49.0
4088.875	< -49.6	< -49.6	11.1	> 47.7	> 47.7
4673.000	< -48.5	< -48.5	11.1	> 48.5	> 48.5
5257.125	< -47.5	< -47.5	11.1	> 47.5	> 47.5
5841.250	< -46.5	< -46.5	11.1	> 46.5	> 46.5

Operating Frequency : 697.875 MHz
 Reference Carrier Power (ERP) : 1.1 mW
 Distance of Measurement : 3.0 m

Frequency (MHz)	Substituted Power ERP(dBm)		Limits (dB)	Attenuation Ratio (dB)	
	Horiz.	Vert.		Horiz.	Vert.
524.278	-74.2	-71.2	13.0	74.2	71.2
652.400	-62.0	-66.1	13.0	62.0	66.1
689.624	-68.1	-74.4	13.0	68.1	74.4
706.111	-71.9	-69.9	13.0	71.9	69.9
1395.750	< -57.5	< -57.5	13.0	> 57.5	> 57.5
2093.625	< -54.9	< -54.9	13.0	> 54.9	> 54.9
2791.500	< -52.6	< -52.6	13.0	> 52.6	> 52.6
3489.375	< -50.9	< -50.9	13.0	> 50.9	> 50.9
4187.250	< -49.4	< -49.4	13.0	> 49.4	> 49.4
4885.125	< -48.1	< -48.1	13.0	> 48.1	> 48.1
5583.000	< -46.9	< -46.9	13.0	> 46.9	> 46.9
6280.875	< -45.8	< -45.8	13.0	> 45.8	> 45.8
6978.750	< -44.8	< -44.8	13.0	> 44.8	> 44.8

- Note : 1. The spectrum was checked from 30 MHz to 10th harmonics.
 All emissions not listed were found to be more than 20 dB below the limits.
2. The symbol of “<” means “or less.”
 The symbol of “>” means “or greater.”
3. Specified Limits: (§74.861(e)(6)(iii))
 $Attenuation\ Ratio = 43 + 10\log_{10}(\text{mean output power in watt})$
 This Limit is equivalent to -13 dBm(absolute value).
4. Measuring Instrument Setting:
 Less than 1000 MHz
 Detector function : Peak
 IF Bandwidth : 120 kHz
 Above 1000 MHz
 Resolution Bandwidth : 1 MHz

A.4 Occupied BandwidthDate : March 5, 2010Temp. : 25 °C Humi. : 38 %

Necessary Bandwidth: 192 kHz (Manufacturer specified)

Maximum Deviation: It does not define, because the EUT has digital modulation.

Input Level: -60.0 dBV(Manufacturer specified)

Specified Limits: §74.861(e)(6)(i)(ii)

Refer to the attached graphs.

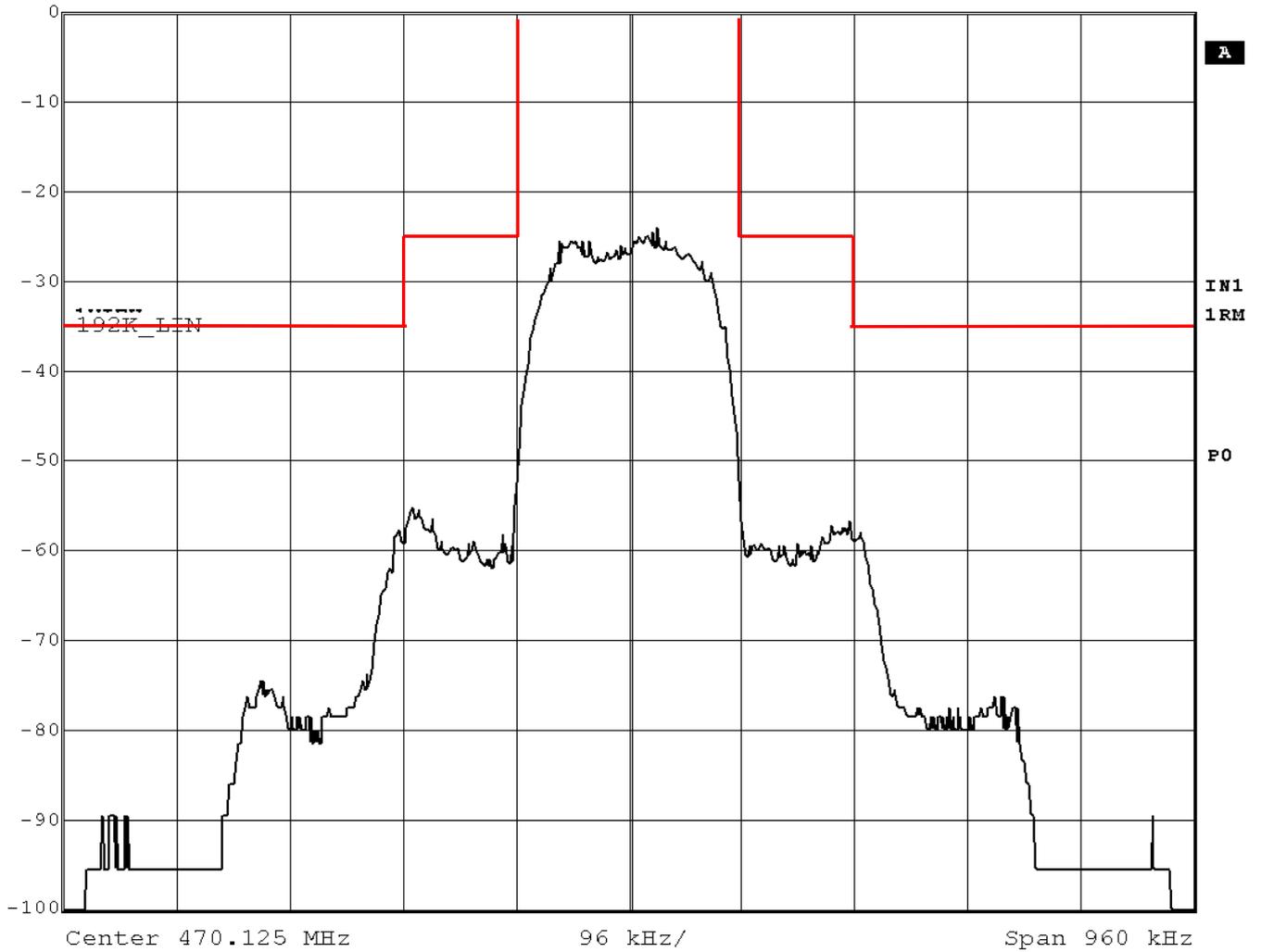
Emission Limitation

FCC ID : AK8DWM01
 Model : DWM-01

Model of EUT : Transmit(H:50mW Setting)
 Carrier Frequency : 470.125MHz



Ref Lvl	RBW	300 Hz	RF Att	30 dB
3.4 dBm	VBW	3 kHz	Unit	dB
	SWT	60 s		



Emission Limitation

FCC ID : AK8DWM01

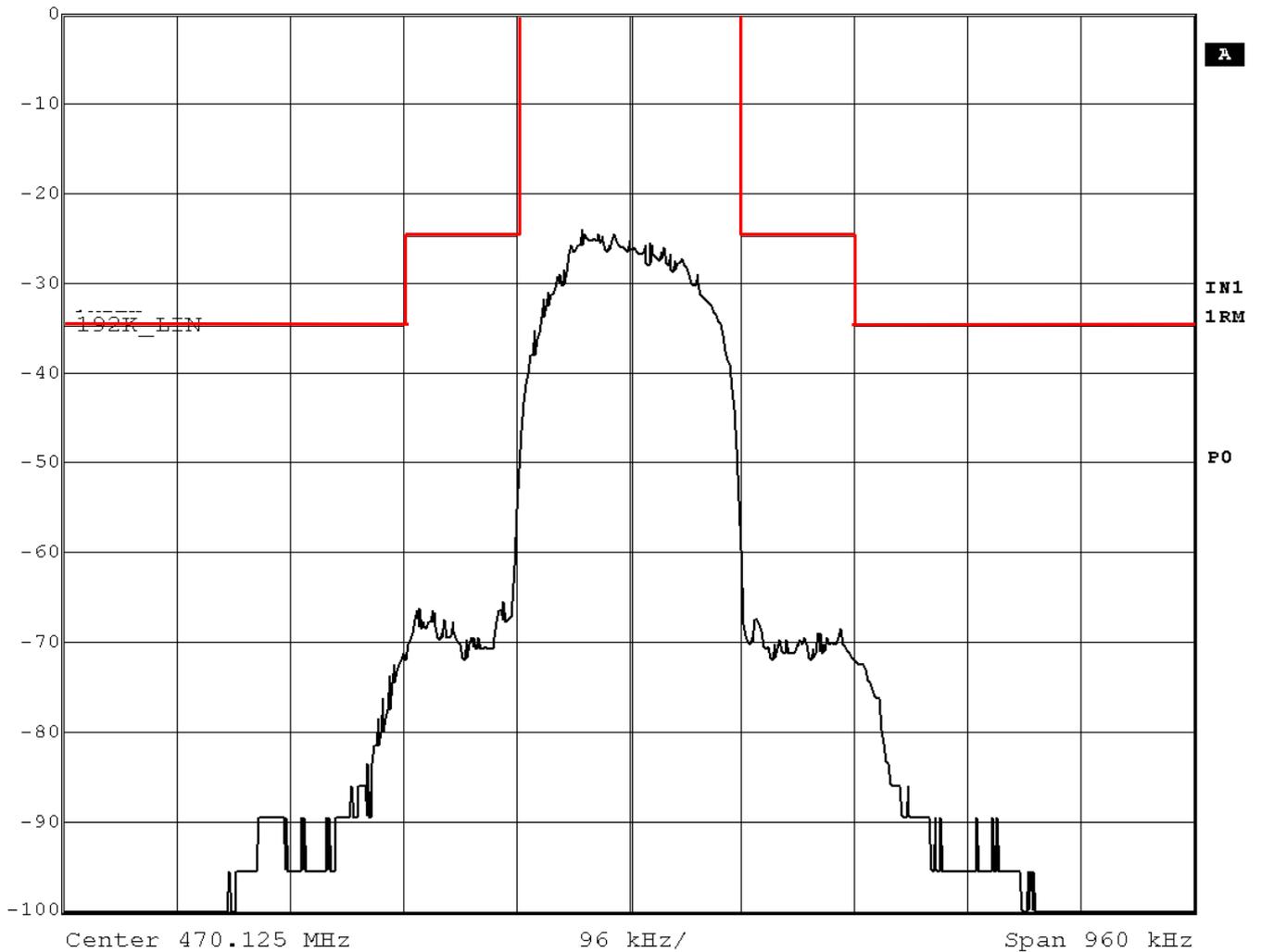
Model : DWM-01

Model of EUT : Transmit(M:10mW Setting)

Carrier Frequency : 470.125MHz

Ref Lvl
-3.4 dBm

RBW	300 Hz	RF Att	30 dB
VBW	3 kHz	Unit	dB
SWT	60 s		



Emission Limitation

FCC ID : AK8DWM01

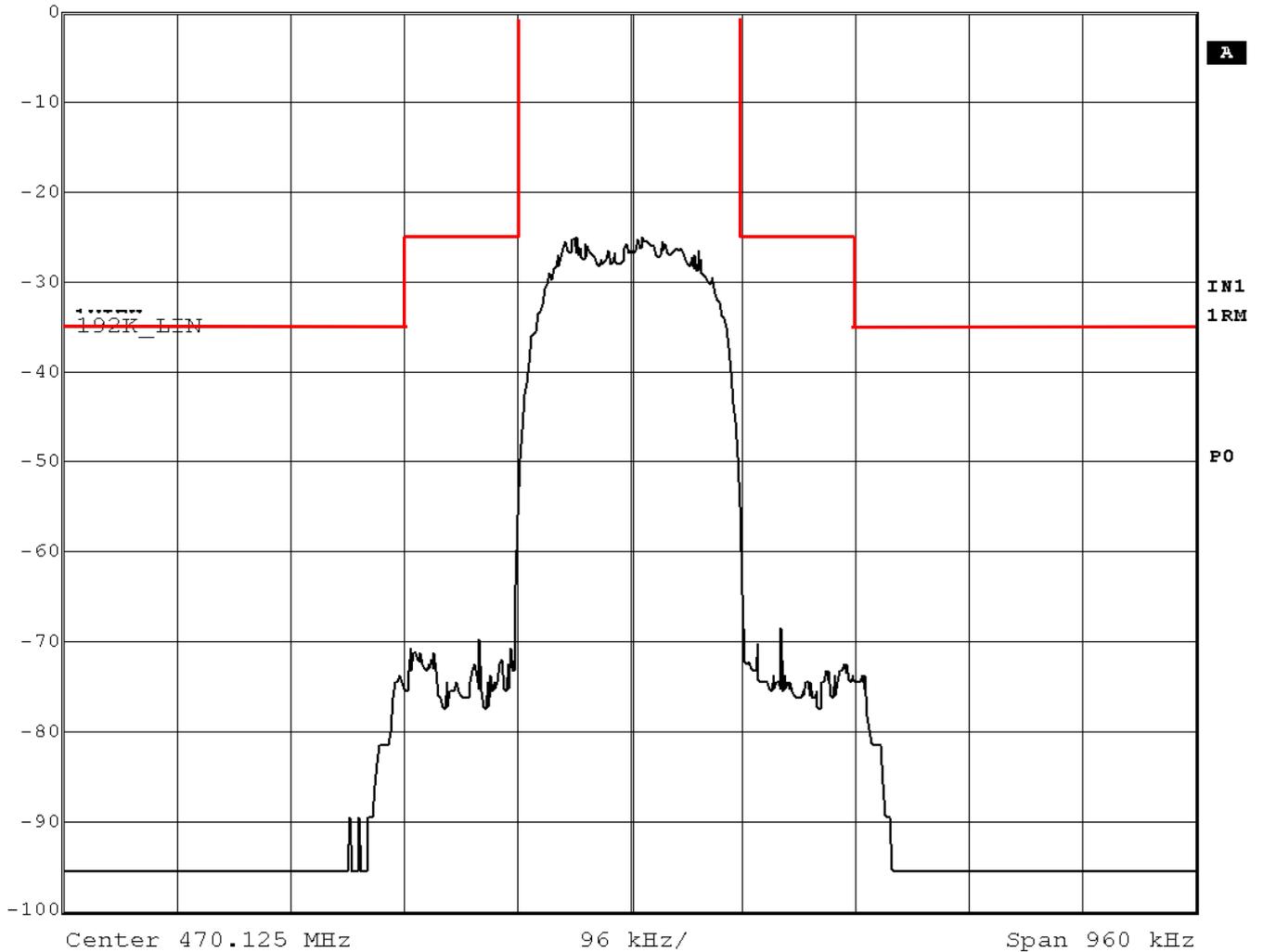
Model : DWM-01

Model of EUT : Transmit(L:1mW Setting)

Carrier Frequency : 470.125MHz

Ref Lvl
-13.4 dBm

RBW	300 Hz	RF Att	30 dB
VBW	3 kHz		
SWT	60 s	Unit	dB



Emission Limitation

FCC ID : AK8DWM01

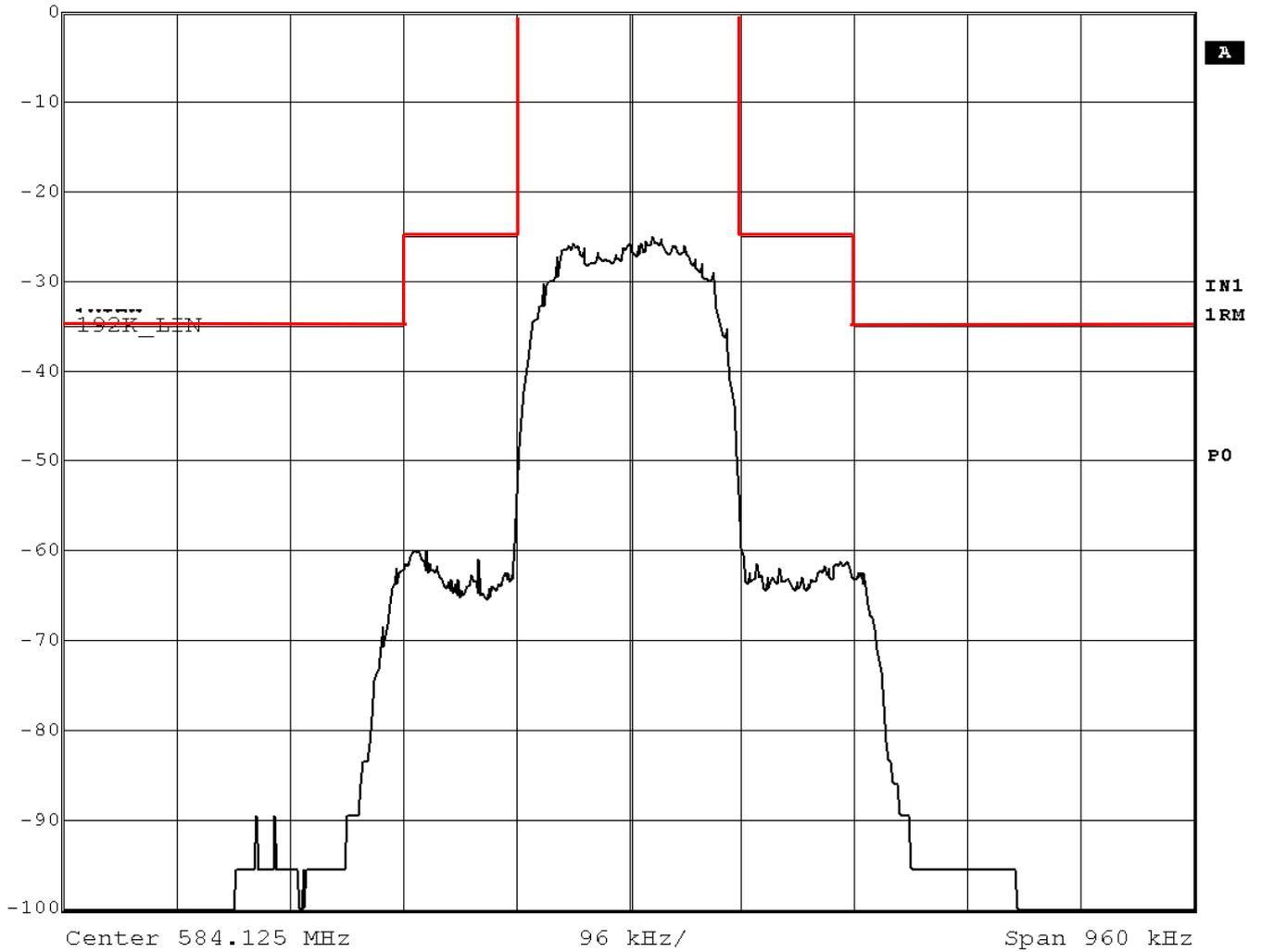
Model : DWM-01

Model of EUT : Transmit(H:50mW Setting)

Carrier Frequency : 584.125MHz



Ref Lvl	RBW	300 Hz	RF Att	30 dB
2.8 dBm	VBW	3 kHz	Unit	dB
	SWT	60 s		



Emission Limitation

FCC ID : AK8DWM01

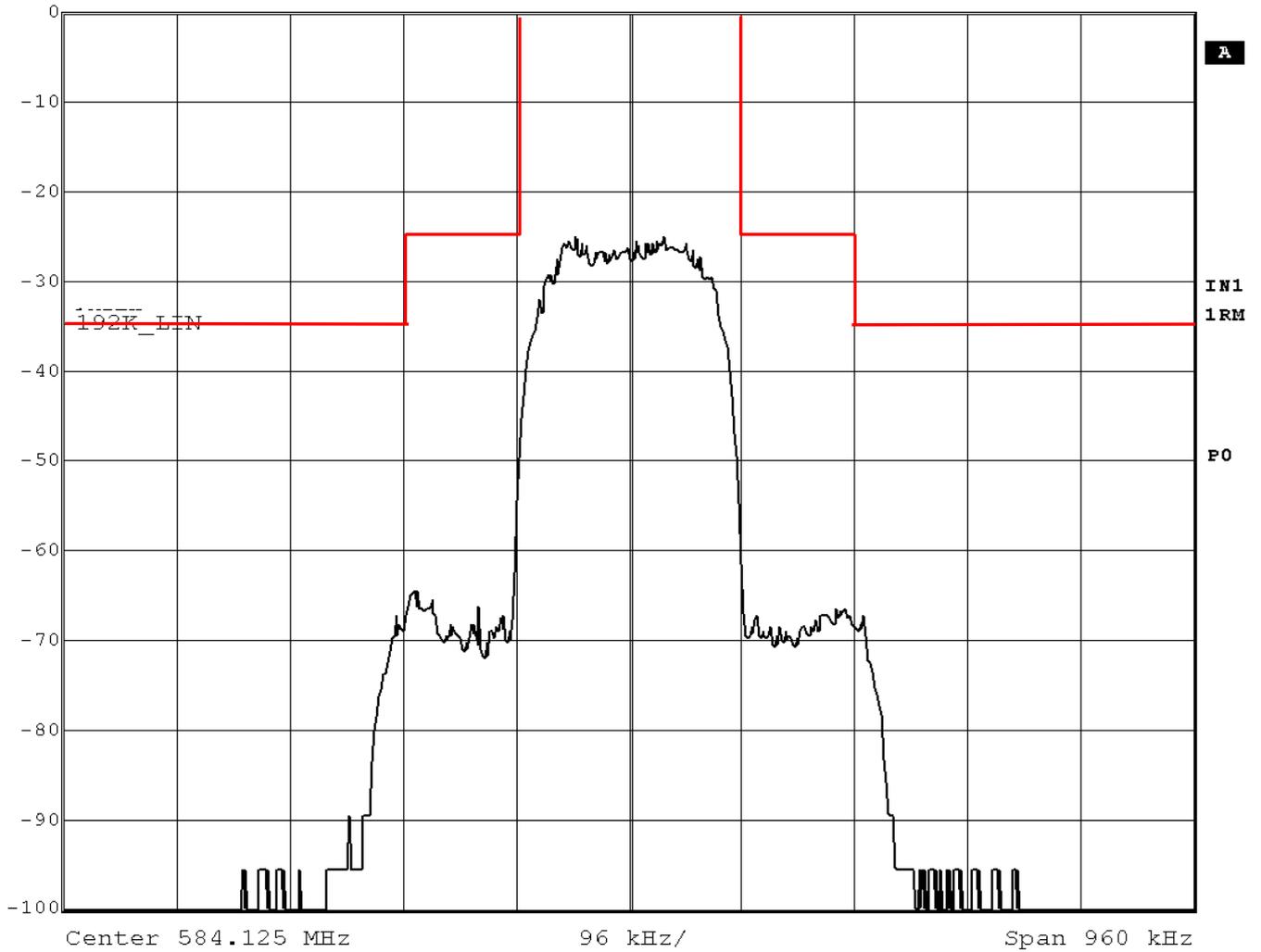
Model : DWM-01

Model of EUT : Transmit(M:10mW Setting)

Carrier Frequency : 584.125MHz



Ref Lvl	RBW	300 Hz	RF Att	30 dB
-4.1 dBm	VBW	3 kHz	Unit	dB
	SWT	60 s		



Emission Limitation

FCC ID : AK8DWM01

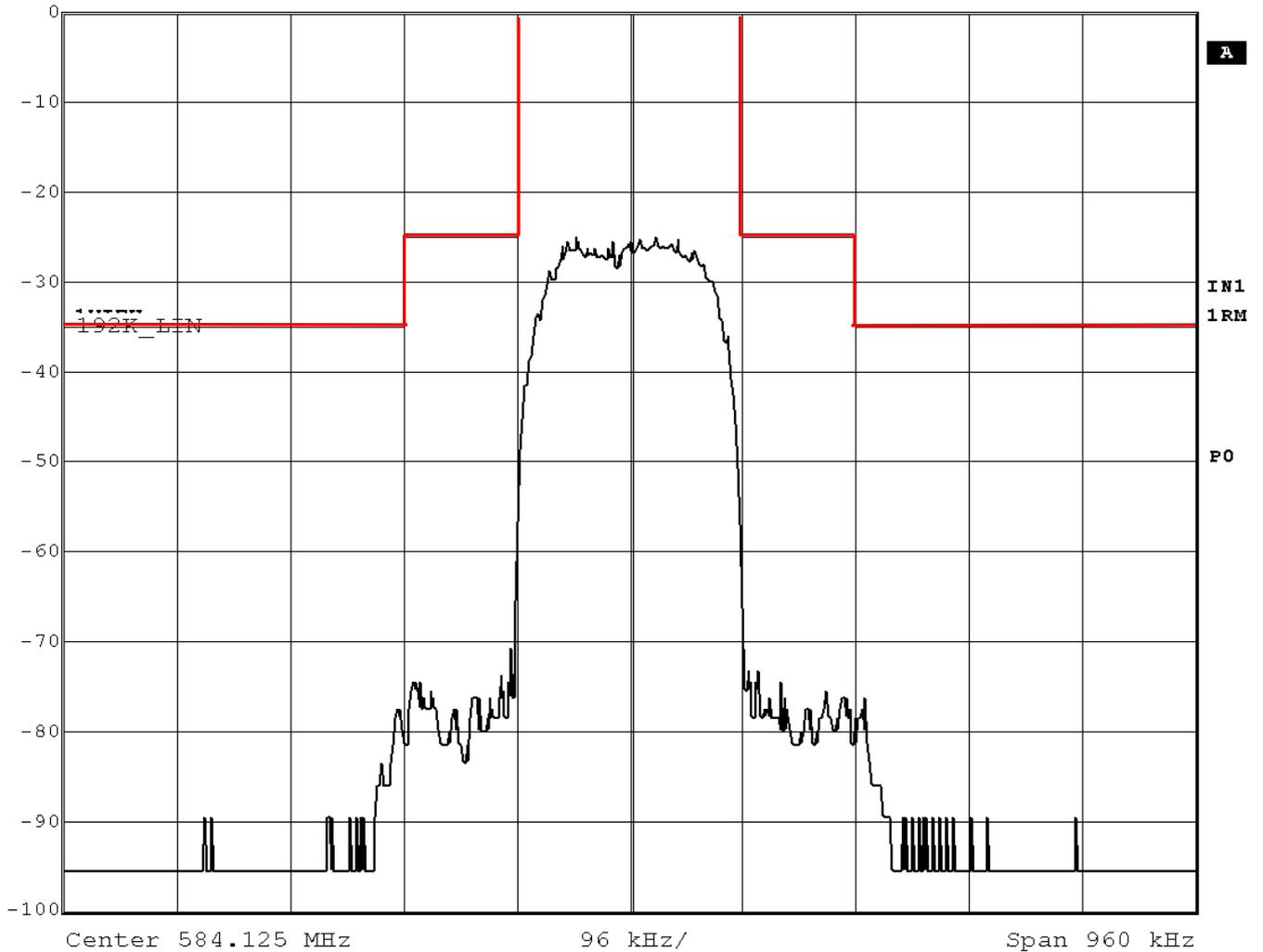
Model : DWM01

Model of EUT : Transmit(L:1mW Setting)

Carrier Frequency : 584.125MHz



Ref Lvl	RBW	300 Hz	RF Att	30 dB
-14.1 dBm	VBW	3 kHz	Unit	dB
	SWT	60 s		



Emission Limitation

FCC ID : AK8DWM01

Model : DWM-01

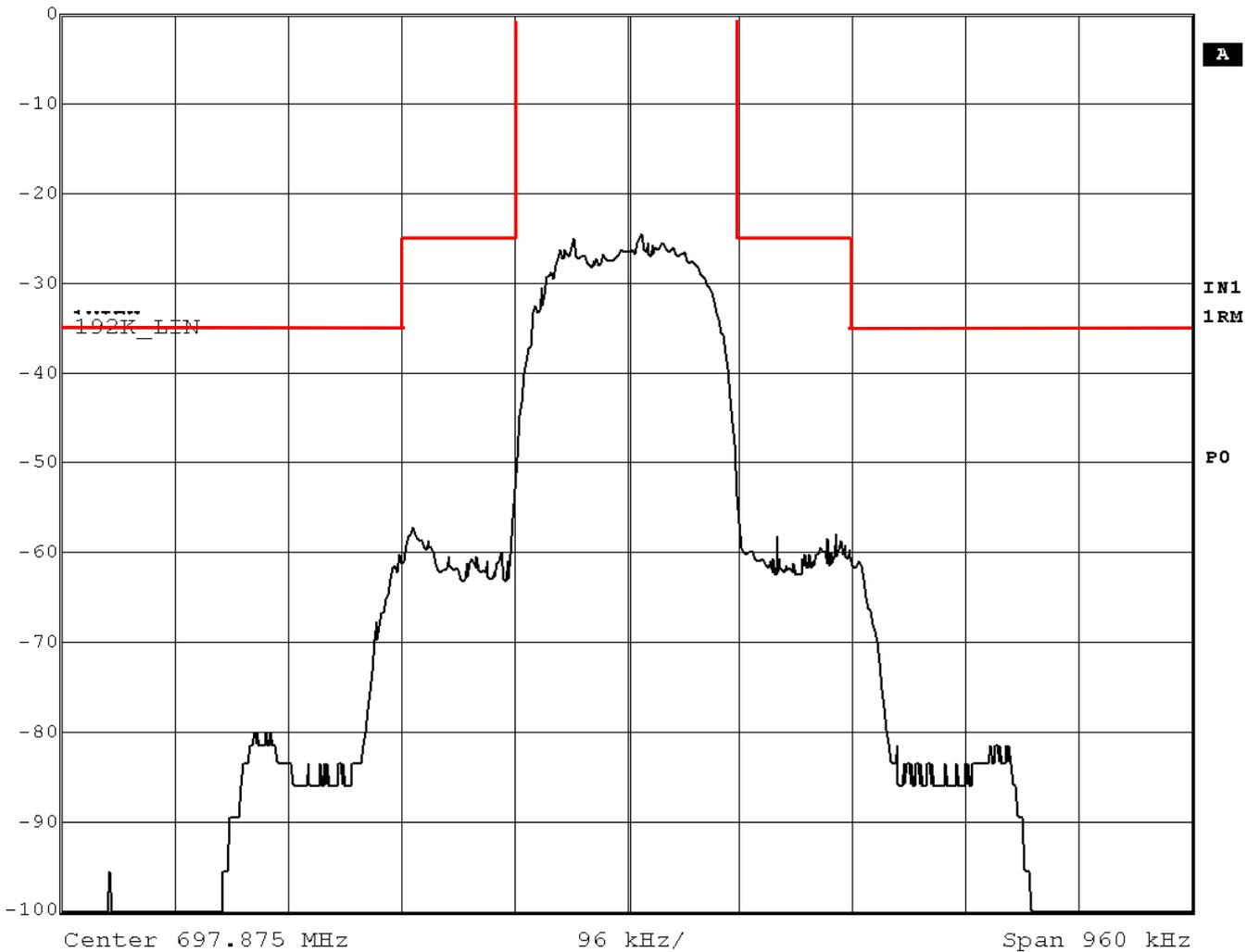
Model of EUT : Transmit(H:50mW Setting)

Carrier Frequency : 697.875MHz



Ref Lvl
3.3 dBm

RBW	300 Hz	RF Att	30 dB
VBW	3 kHz		
SWT	60 s	Unit	dB



Emission Limitation

FCC ID : AK8DWM01

Model : DWM-01

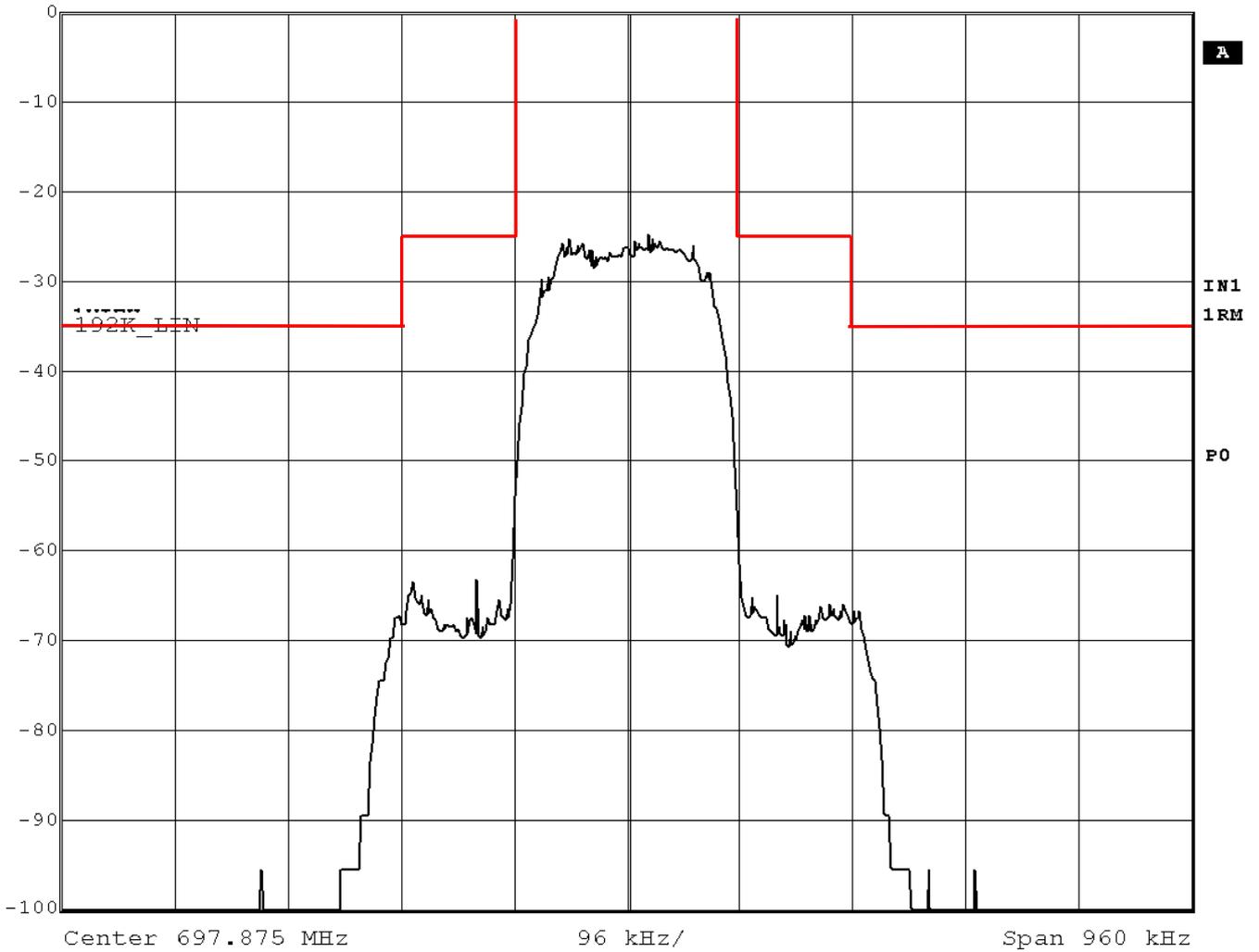
Model of EUT : Transmit(M:10mW Setting)

Carrier Frequency : 697.875MHz



Ref Lvl
-3.4 dBm

RBW	300 Hz	RF Att	30 dB
VBW	3 kHz		
SWT	60 s	Unit	dB



Emission Limitation

FCC ID : AK8DWM01

Model : DWM-01

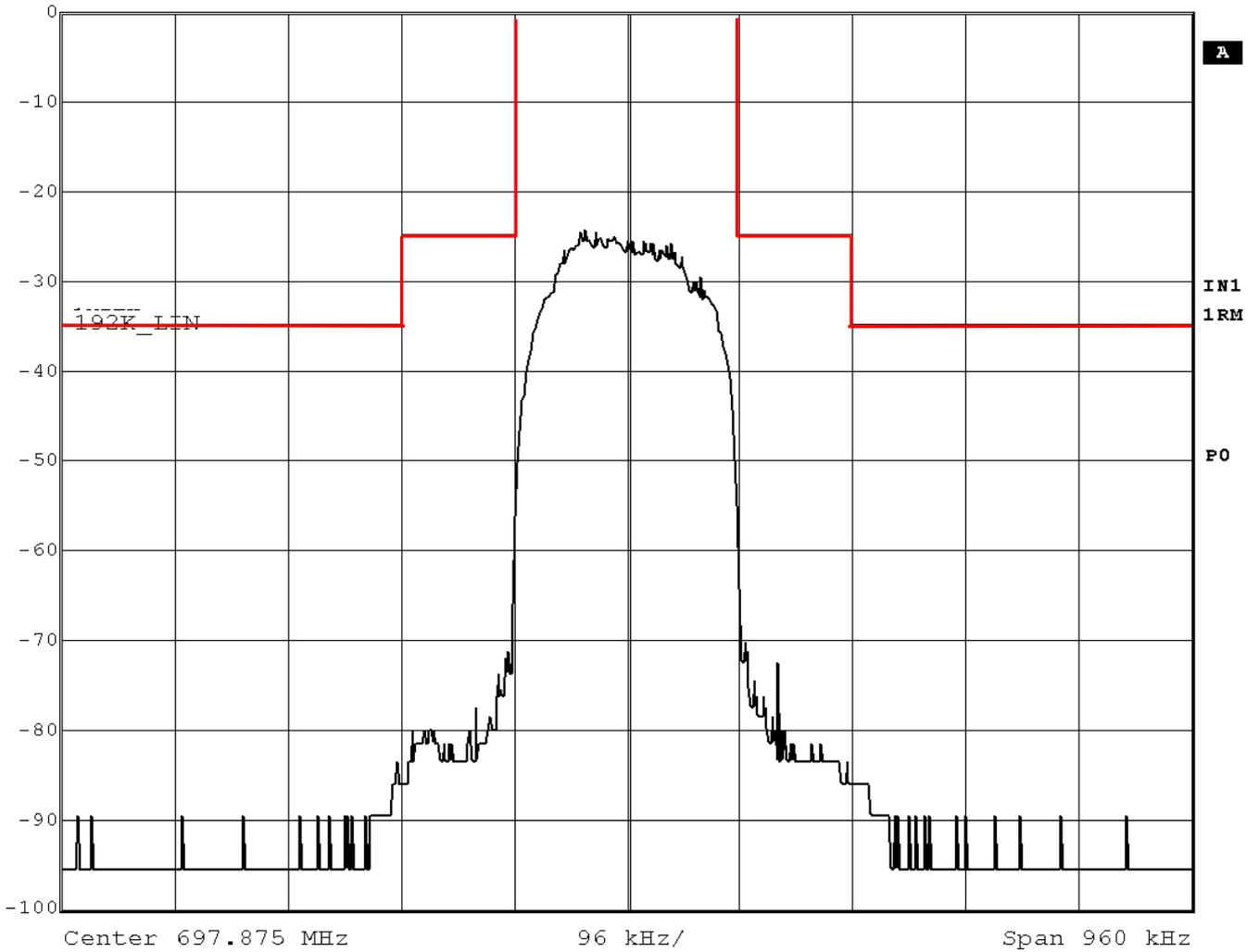
Model of EUT : Transmit(L:1mW Setting)

Carrier Frequency : 697.875MHz



Ref Lvl
-13.3 dBm

RBW	300 Hz	RF Att	30 dB
VBW	3 kHz		
SWT	60 s	Unit	dB



A.5 Frequency Stability

Date : March 8, 2010
 Temp. : 23 °C Humi. : 48 %

Mode of EUT : TX Mode

Test Port : Temporary antenna connector

Ambient Temp. (°C)	Frequency (MHz)	Transmitting Frequency (MHz)	Maximum Tolerance (%)
-30	470.125	470.124699	-0.000064
	584.125	584.125601	+0.000103
	697.875	697.875000	0.000000
-20	470.125	470.124699	-0.000064
	584.125	584.124098	-0.000154
	697.875	697.873497	-0.000215
-10	470.125	470.125601	+0.000128
	584.125	584.125345	+0.000059
	697.875	697.874399	-0.000086
0	470.125	470.124699	-0.000064
	584.125	584.124399	-0.000103
	697.875	697.874699	-0.000043
+10	470.125	470.125301	+0.000064
	584.125	584.124699	-0.000052
	697.875	697.873798	-0.000172
+20	470.125	470.124699	-0.000064
	584.125	584.125601	+0.000103
	697.875	697.874699	-0.000043
+30	470.125	470.124098	-0.000192
	584.125	584.125000	0.000000
	697.875	697.875000	0.000000
+40	470.125	470.125000	0.000000
	584.125	584.125000	0.000000
	697.875	697.875601	+0.000086
+50	470.125	470.124399	-0.000128
	584.125	584.124399	-0.000103
	697.875	697.875000	0.000000

Supply Voltage: 3.0VDC
 Specified limit: ±0.005% (74.861(e)(4))

Ambient Temp. (°C)	Frequency (MHz)	Transmitting Frequency (MHz)	Maximum Tolerance (%)
-30	470.125	470.124098	-0.000192
	584.125	584.125601	+0.000103
	697.875	697.877705	+0.000388
-20	470.125	470.126202	+0.000256
	584.125	584.124699	-0.000052
	697.875	697.874399	-0.000086
-10	470.125	470.126202	+0.000256
	584.125	584.125000	0.000000
	697.875	697.875301	+0.000043
0	470.125	470.124399	-0.000128
	584.125	584.124399	-0.000103
	697.875	697.873497	-0.000215
+10	470.125	470.123798	-0.000256
	584.125	584.124699	-0.000052
	697.875	697.874399	-0.000086
+20	470.125	470.125301	+0.000064
	584.125	584.125902	+0.000154
	697.875	697.874098	-0.000129
+30	470.125	470.124098	-0.000192
	584.125	584.125000	0.000000
	697.875	697.874699	-0.000043
+40	470.125	470.125301	+0.000064
	584.125	584.125000	0.000000
	697.875	697.875601	+0.000086
+50	470.125	470.124399	-0.000128
	584.125	584.125000	0.000000
	697.875	697.876202	+0.000172

Supply Voltage: 2.55VDC(Battery operating end point, Manufacturer defined.)
 Specified limit: ±0.005% (§ 74.861(e)(4))

Appendix C : Test Instruments

10-Mar-2010

No	Type	Model	Manufacturer	Serial	ID	Last Cal.	Interval
Test Facilities:							
1	Anechoic Chamber A	-	TDK	-	800-01-502E0	Apr 2009	1 Year
2	Anechoic Chamber B	-	TDK	-	800-01-503E0	Apr 2009	1 Year
3	Shield Room A	-	TDK	-	800-01-501E0	-	-
4	Shield Room B	-	Ray Proof	-	800-01-010E0	-	-
5	Shield Room C	-	TDK	-	800-01-504E0	-	-
6	Shield Room D	-	Emerson	-	800-01-022E0	-	-
7	Shield Room E	-	TDK	-	800-01-505E0	-	-

Measuring Instruments:

10	Test Receiver	ESHS10	Rohde & Schwarz	835871/004	119-01-505E0	May 2009	1 Year
11	Test Receiver	ESVS10	Rohde & Schwarz	826148/002	119-03-504E0	Jun 2009	1 Year
12	Test Receiver	ESVS10	Rohde & Schwarz	832699/001	119-03-506E0	Sep 2009	1 Year
13	Test Receiver	ESI26	Rohde & Schwarz	100043	119-04-511E0	Oct 2009	1 Year
14	Spectrum Analyzer	R3182	Advantest	120600581	122-02-521E0	Mar 2009	1 Year
19	Spectrum Analyzer	R3132	Advantest	120500072	122-02-520E0	May 2009	1 Year
20	Spectrum Analyzer	R3132	Advantest	150400998	122-02-523E0	Jul 2009	1 Year
65	Power Meter	436A	Hewlett Packard	1725A01930	100-02-501E0	Apr 2009	1 Year
66	Power Sensor	8482A	Hewlett Packard	1551A01013	100-02-501E0	Apr 2009	1 Year
68	FM Linear Detector	MS61A	Anritsu	M77486	123-02-008E0	Oct 2009	1 Year
69	Level Meter	ML422C	Anritsu	M87571	114-02-501E0	Jun 2009	1 Year
70	Measuring Amplifier	2636	B & K	1614851	082-01-502E0	May 2009	1 Year
75	Frequency Counter	53131A	Hewlett Packard	3546A11807	102-02-075E0	May 2009	1 Year
83	FFT Analyzer	R9211C	Advantest	02020253	122-02-506E0	Jun 2009	1 Year
84	Noise Meter	MN-446	Meguro	53030478	082-01-144E0	Apr 2009	1 Year
163	Digital Oscilloscope	54502A	Hewlett Packard	2934A05573	121-02-502E0	May 2009	1 Year
165	Multimeter	VOAC7413	Iwatsu Electric	0267973	114-02-502E0	Apr 2009	1 Year
172	Test Receiver	ESCI	Rohde & Schwarz	100408	119-04-512E0	Oct 2009	1 Year
210	Peak Power Meter	ML2495A	Anritsu	0836023	100-02-507E0	Nov 2009	1 Year
211	Power Sensor	MA2491A	Anritsu	0811206	100-02-507E0	Nov 2009	1 Year
212	Power Sensor	MA2411B	Anritsu	0738312	100-02-507E0	Nov 2009	1 Year
230	Spectrum Analyzer	U3751	Advantest	150800116	122-02-003T	Mar 2010	1 Year
232	Digital Oscilloscope	TDS3052C	Tektronix, Inc.	C010708	121-02-504E0	Jun 2009	1 Year

Antennas:

21	Loop Antenna	HFH2-Z2	Rohde & Schwarz	881058/62	119-05-033E0	Jul 2009	1 Year
234	Dipole Antenna	KBA-511A	Kyoritsu	0-316-5	119-05-123E0	Nov 2009	2 Year
235	Dipole Antenna	KBA-611	Kyoritsu	0-317-3	119-05-124E0	Nov 2009	2 Year
27	Biconical Antenna	BBA9106	Schwarzbeck	-	119-05-078E0	Nov 2008	1 Year
28	Log-periodic Antenna	UHALP9107	Schwarzbeck	-	119-05-079E0	Nov 2008	1 Year
31	Horn Antenna	3115	EMC Test Systems	6442	119-05-514E0	Jan 2010	2 Year
32	Horn Antenna	3116	EMC Test Systems	2547	119-05-515E0	Jun 2009	2 Year
167	Biconical Antenna	BBA9106	Schwarzbeck	VHA91032325	119-05-520E0	Jun 2009	1 Year
168	Log-periodic Antenna	UHALP9108A	Schwarzbeck	0666	119-05-521E0	Jun 2009	1 Year
169	Biconical Antenna	BBA9106	Schwarzbeck	VHA91032399	119-05-522E0	Jun 2009	1 Year
170	Log-periodic Antenna	UHALP9108A	Schwarzbeck	0724	119-05-523E0	Jun 2009	1 Year
198	Log-periodic Antenna	HL050	Rohde & Schwarz	100251	119-05-524E0	Sep 2009	1 Year
225	Loop Sensor/Radiating Loop	F55103-2-0.13M	FCC	03018	119-05-516E0	-	-
236	Horn Antenna	3160-03	EMC Test Systems	00078687	119-05-525E0	Oct 2008	2 Year
237	Horn Antenna	3160-08	EMC Test Systems	00026081	119-05-517E0	Feb 2010	2 Year
238	Horn Antenna	3160-09	EMC Test Systems	00023883	119-05-518E0	May 2009	2 Year
239	Horn Antenna	3160-10	EMC Test Systems	00026026	119-05-519E0	Jul 2009	2 Year

10-Mar-2010

No	Type	Model	Manufacturer	Serial	ID	Last Cal.	Interval
<u>Cables:</u>							
38	RF Cable	5D-2W	Fujikura	-	155-21-001E0	Feb 2010	1 Year
39	RF Cable	5D-2W	Fujikura	-	155-21-002E0	Feb 2010	1 Year
40	RF Cable	3D-2W	Fujikura	-	155-21-005E0	Apr 2009	1 Year
41	RF Cable	3D-2W	Fujikura	-	155-21-006E0	Apr 2009	1 Year
42	RF Cable	3D-2W	Fujikura	-	155-21-007E0	Apr 2009	1 Year
43	RF Cable	RG213/U	Rohde & Schwarz	-	155-21-010E0	Apr 2009	1 Year
44	RF Cable(10m)	S 04272B	Suhner	-	155-21-011E0	May 2009	1 Year
45	RF Cable(1.5m 18GHz)	S 04272B	Suhner	-	155-21-012E0	May 2009	1 Year
46	RF Cable(1m 18GHz)	SUCOFLEX104	Suhner	-	155-21-013E0	May 2009	1 Year
47	RF Cable(1m N)	S 04272B	Suhner	-	155-21-015E0	Jun 2009	1 Year
48	RF Cable(1m 26GHz)	SUCOFLEX 104E	Suhner	14543/4E	155-21-016E0	Dec 2009	1 Year
49	RF Cable(4m 26GHz)	SUCOFLEX104	Suhner	190630	155-21-017E0	Dec 2009	1 Year
50	RF Cable(10m)	F130-S1S1-394	MEGA PHASE	10510	155-21-018E0	Dec 2009	1 Year
51	RF Cable(5m)	3D-2W	Fujikura	-	155-21-009E0	Apr 2009	1 Year
52	RF Cable(7m)	RG223/U	Suhner	-	155-21-021E0	May 2009	1 Year
195	RF Cable(10m)	F130-S1S1-394	MEGA PHASE	20051	155-21-020E0	Apr 2009	1 Year
241	RF Cable(6m 40GHz)	SUCOFLEX 102E	Suhner	6257/2E	155-21-024E0	Oct 2009	1 Year
<u>Networks:</u>							
33	LISN	KNW-407	Kyoritsu	8-833-6	149-04-052E0	Nov 2009	1 Year
34	LISN	KNW-407	Kyoritsu	8-855-2	149-04-055E0	May 2009	1 Year
35	LISN	KNW-407	Kyoritsu	8-1130-6	149-04-062E0	May 2009	1 Year
36	LISN	KNW-242C	Kyoritsu	8-837-13	149-04-054E0	Apr 2009	1 Year
37	Absorbing Clamp	MDS21	Luthi	03293	119-06-506E0	Aug 2009	1 Year
164	LISN	KNW-403D	Kyoritsu	8-1474-3	149-04-059E0	Apr 2009	1 Year
173	Pulse Limiter	ESH3-Z2	Rohde & Schwarz	-	156-01-501E0	Apr 2009	1 Year
174	Pulse Limiter	ESH3-Z2	Rohde & Schwarz	-	156-01-502E0	Apr 2009	1 Year
175	Pulse Limiter	ESH3-Z2	Rohde & Schwarz	-	156-01-503E0	Apr 2009	1 Year
194	High Impedance Probe	HP-2	JQA	001	149-06-503E0	Oct 2009	1 Year
248	High Impedance Probe	KNW-411	Kyoritsu	8-2071-2	149-06-504E0	Feb 2010	1 Year
<u>Amplifiers:</u>							
53	AF Amplifier	P-500L	Accuphase	BOY806	127-01-501E0	Feb 2010	1 Year
54	RF Amplifier	WJ-6882-814	Watkins-Johnson	0414	127-04-017E0	Jun 2009	1 Year
55	RF Amplifier	WJ-5315-556	Watkins-Johnson	106	127-04-006E0	Jun 2009	1 Year
56	RF Amplifier	WJ-5320-307	Watkins-Johnson	645	127-04-005E0	Jun 2009	1 Year
57	RF Amplifier	JS4-00102600- 28-5A	MITEQ	669167	127-04-502E0	Apr 2009	1 Year
226	Differential Amplifier	5303	NF	155726- 5305046	127-01-502E0	Apr 2009	1 Year

10-Mar-2010

No	Type	Model	Manufacturer	Serial	ID	Last Cal.	Interval
Generators:							
58	Function Generator	3325B	Hewlett Packard	2847A03284	118-08-124E0	Jul 2009	1 Year
59	Function Generator	VP-7422A	Matsushita Communication	050351E122	118-08-503E0	Jul 2009	1 Year
60	Signal Generator	8664A	Hewlett Packard	3035A00140	118-03-014E0	May 2009	1 Year
61	Signal Generator	8664A	Hewlett Packard	3438A00756	118-04-502E0	May 2009	1 Year
62	Signal Generator	6061A	Gigatronics	5130593	118-04-024E0	Mar 2009	1 Year
171	Signal Generator	SML03	Rohde & Schwarz	102651	118-04-509E0	Feb 2010	1 Year
222	Signal Generator	8673D	Hewlett Packard	2938A00988	118-04-015E0	Jul 2009	2 Year
Others:							
63	Termination(50)	-	Suhner	-	154-06-501E0	Jan 2010	1 Year
64	Termination(50)	-	Suhner	-	154-06-502E0	Jan 2010	1 Year
71	Microphone	4134	B & K	1253497	147-01-502E0	May 2009	1 Year
72	Preamplifier	2639	B & K	1268763	127-01-504E0	-	-
73	Pistonphone	4220	B & K	1165008	147-02-501E0	Mar 2009	1 Year
74	Artificial Mouth	4227	B & K	1274869	-	-	-
76	Oven	-	Ohnishi	-	023-02-018E0	-	-
77	DC Power Supply	6628A	Hewlett Packard	3224A00284	072-05-503E0	Jun 2009	1 Year
78	Band RejectFilter	BRM12294	Micro-tronics	003	149-01-501E0	Jan 2010	1 Year
79	High Pass Filter	F-100-4000-5-R	RLC Electronics	0149	149-01-502E0	Feb 2010	1 Year
80	Attenuator	43KC-10	Anritsu	-	148-03-506E0	Feb 2010	1 Year
81	Attenuator	43KC-20	Anritsu	-	148-03-507E0	Feb 2010	1 Year
82	Attenuator	355D	Hewlett Packard	219-10782	148-03-065E0	Apr 2009	1 Year
85	RF Detector	75KC-50	Anritsu	305002	100-02-506E0	Jul 2009	1 Year
200	Artificial Hand	AH-1	ES Factory	001	155-07-561E0	Jul 2009	1 Year
201	Barometer	TYPE6	Yanagi	16076	209-02-014E0	Mar 2010	2 Year
202	Thermo-Hygrometer	-	Empex	-	141-01-504E0	Mar 2008	2 Year
203	Thermo-Hygrometer	EX-2727	Empex	-	141-01-505E0	Mar 2008	2 Year
204	Thermo-Hygrometer	EX-2727	Empex	-	141-01-506E0	Mar 2008	2 Year
205	Thermo-Hygrometer	EX-2727	Empex	-	141-01-507E0	Mar 2008	2 Year
206	Low Pass Filter	LPM13323	Micro-tronics	001	149-01-505E0	Jul 2009	1 Year
207	High Pass Filter	HPM13321	Micro-tronics	001	149-01-506E0	Jul 2009	1 Year
208	High Pass Filter	HPM13322	Micro-tronics	001	149-01-507E0	Jul 2009	1 Year
242	Power Divider	1575	Aeroflex Weischel	1153	086-02-501E0	Oct 2009	1 Year
243	Power Divider	1575	Aeroflex Weischel	1157	086-02-502E0	Oct 2009	1 Year
244	Power Divider	1575	Aeroflex Weischel	1161	086-02-503E0	Oct 2009	1 Year