

ENGINEERING TEST RECORD
REPORT OF MEASUREMENTS (MICROWAVE OVEN TEST DATA SHEET)

FCC ID CODE : APYDMR0129
TESTED PRODUCT : Microwave Oven, Model R-120D
NOMINAL FREQUENCY : 2450 MHz
INPUT POWER RATING : 120 V, 60 Hz
OUTPUT POWER RATING : 600 W
EMPLOYING MAGNETRON : 2M231H(L), mfd by Toshiba
TEST DATE : January 11 - 14, 2000

TESTED BY:

K. Fushino
K. Fushino

Microwave Oven Engineering Dept.
Kitchen Appliance Systems Div.
Sharp Corp. (Yao Plant)

Reviewed by:

Y. Honkawa
Y. Honkawa

Microwave Oven Engineering Dept.
Kitchen Appliance Systems Div.
Sharp Corp. (Yao Plant)

DATA SUMMARY (FCC Measurement Procedure MP-5)

1. FREQUENCY MEASUREMENTS : See attached data sheet
2. RADIATED FIELD STRENGTH : See attached data sheet

MEASUREMENT TEST SITE : Sharp Corporation
Kitchen Appliance Systems Division
Yao Factory, EMI Anechoic Chamber

Note: For further details of Test Site, refer to attached "Description of Measurement Facilities".

TOTAL POWER INPUT TO OVEN : 962 W
POWER DEVELOPED IN DUMMY LOAD : 550 W
(by calorimetric method with water load under well heated microwave oven)
SUPPLY VOLTAGE : 120 V ac
PERMISSIBLE : 26.22 uV/m at 300 m

1. FREQUENCY MEASUREMENTS

FCC ID : APYDMR0129
Tested Unit : Microwave Oven, Model R-120D
Magnetron Type No. : 2M231H(L), mfd by Toshiba
Tested : January 14, 2000

(1-1) Frequency VS Line Voltage Variation Test

Test Result (Room Temperature: 20 degC)
Load: 1000 cc water in the glass beaker

Line Voltage Variation (V)	Frequency against the tolerance for center frequency 2450 MHz	Allowed Tolerance for the ISM Band (2450 MHz)
96 (80%)	+ 0 MHz - 30 MHz	+/- 50 MHz
108 (90%)	+ 17 MHz - 21 MHz	
120 (Nominal)	+ 20 MHz - 28 MHz	
132 (110%)	+ 18 MHz - 27 MHz	
150 (125%)	+ 22 MHz - 23 MHz	

(1-2) Frequency VS Load Variation Test

Test Results (room temperature: 20 degC)
Initial Load: 1000 cc water in the glass beaker

Volume of Water (cc)	Frequency against the tolerance for center frequency 2450 MHz	Allowed Tolerance for the ISM Band (2450 MHz)
1000	+ 20 MHz - 28 MHz	+/- 50 MHz
800	+ 15 MHz - 16 MHz	
600	+ 25 MHz - 26 MHz	
400	+ 20 MHz - 8 MHz	
200	+ 15 MHz - 31 MHz	

2. RADIATED FIELD STRENGTH

DATA SHEET (FCC Measurement Procedure MP-5)

FCC ID: APYDMR0129

Tested Model: R-120D

Magnetron: 2M231H(L), mfd by Toshiba

Date: January 11 - 14, 2000

	Frequency (MHz)	Load (ml)	Place of the load	Antenna Factor (dB)	Cable Loss (dB)	Reading Data (dBuV @:3m)		Radiated Field Strength (uV/m @:300m)	
						Vertical	Horizen	Vertical	Horizen
Fundamental	2443	1000	Center	20.70	1.03	73	73	344.25	344.25
2nd Harmonic	4904	700	Center	20.50	1.58	27	21	2.84	1.43
	4900	700	R.F.Corner	20.50	1.58	27	24	2.84	2.01
	4899	300	Center	20.50	1.58	31	23	4.51	1.79
	4887	300	R.F.Corner	20.50	1.58	30	24	4.02	2.01
3rd Harmonic	7261	700	Center	19.00	2.08	22	21	1.43	1.27
	7240	700	R.F.Corner	19.00	2.08	22	21	1.43	1.27
	7358	300	Center	19.20	2.10	27	25	2.60	2.07
	7355	300	R.F.Corner	19.20	2.10	25	25	2.07	2.07
4th Harmonic	9892	700	Center	20.00	2.66	24	23	2.15	1.92
Sprious	-	700	Center	-	-	-	-	-	-
	-	700	Center	-	-	-	-	-	-
	-	700	Center	-	-	-	-	-	-
	-	700	Center	-	-	-	-	-	-
Emission Sideband	2400	1000	Center	20.70	1.01	37	37	5.35	5.35
	2415	1000	Center	20.70	1.02	43	42	10.76	9.59
	2485	1000	Center	20.70	1.03	23	22	1.11	0.99
	2500	1000	Center	20.80	1.04	21	22	0.89	1.00

Emission observed from 100 MHz through 18 GHz by spectrum analyzer. No significant emission was detected except for above data.

Microwave Leakage at 5 cm on fundamental : 0.08 mW/cm²

ENGINEERING TEST RECORD

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TESTED PRODUCT : Microwave Oven, Model R-120D
NOMINAL FREQUENCY : 2450 MHz
INPUT POWER RATING : 120 V, 60 Hz
OUTPUT POWER RATING : 600 W
EMPLOYING MAGNETRON : OM52S, mfd by Samsung
TEST DATE : January 17 – 19, 2000

TESTED BY:

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Microwave Oven Engineering Dept.
Kitchen Appliance Systems Div.
Sharp Corp. (Yao Plant)

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2. RADIATED FIELD STRENGTH : See attached data sheet

MEASUREMENT TEST SITE : Sharp Corporation
Kitchen Appliance Systems Division
Yao Factory, EMI Anechoic Chamber

Note: For further details of Test Site, refer to attached "Description of Measurement Facilities".

TOTAL POWER INPUT TO OVEN : 976 W
POWER DEVELOPED IN DUMMY LOAD : 568 W
(by calorimetric method with water load under well heated microwave oven)
SUPPLY VOLTAGE : 120 V ac
PERMISSIBLE : 26.64 uV/m at 300 m

1. FREQUENCY MEASUREMENTS

FCC ID : APYDMR0129
Tested Unit : Microwave Oven, Model R-120D
Magnetron Type No. : OM52S, mfd by Samsung Electronics
Tested : January 19, 2000

(1-1) Frequency VS Line Voltage Variation Test

Test Result (Room Temperature: 20 degC)
Load: 1000 cc water in the glass beaker

Line Voltage Variation (V)	Frequency against the tolerance for center frequency 2450 MHz	Allowed Tolerance for the ISM Band (2450 MHz)
96 (80%)	+ 8 MHz - 16 MHz	+/- 50 MHz
108 (90%)	+ 23 MHz - 21 MHz	
120 (Nominal)	+ 25 MHz - 30 MHz	
132 (110%)	+ 23 MHz - 23 MHz	
150 (125%)	+ 22 MHz - 26 MHz	

(1-2) Frequency VS Load Variation Test

Test Results (room temperature: 20 degC)
Initial Load: 1000 cc water in the glass beaker

Volume of Water (cc)	Frequency against the tolerance for center frequency 2450 MHz	Allowed Tolerance for the ISM Band (2450 MHz)
1000	+ 25 MHz - 30 MHz	+/- 50 MHz
800	+ 28 MHz - 36 MHz	
600	+ 29 MHz - 17 MHz	
400	+ 23 MHz - 9 MHz	
200	+ 20 MHz - 13 MHz	

2. RADIATED FIELD STRENGTH

DATA SHEET (FCC Measurement Procedure MP-5)

FCC ID: APYDMR0129

Tested Model: R-120D

Magnetron: OM52S, mfd by Samsung Electronics

Date: January 17 - 19, 2000

	Frequency (MHz)	Load (ml)	Place of the load	Antenna Factor (dB)	Cable Loss (dB)	Reading Data (dBuV @:3m)		Radiated Field Strength (uV/m @:300m)	
						Vertical	Horizen	Vertical	Horizen
Fundamental	2443	1000	Center	20.70	1.03	63	60	108.86	77.07
2nd Harmonic	4906	700	Center	20.50	1.58	23	23	1.79	1.79
	4572	700	R.F.Corner	20.40	1.50	24	22	1.97	1.57
	4907	300	Center	20.50	1.58	34	33	6.37	5.68
	4892	300	R.F.Corner	20.50	1.58	34	33	6.37	5.68
3rd Harmonic	7359	700	Center	19.20	2.10	28	25	2.92	2.07
	7370	700	R.F.Corner	19.20	2.10	28	25	2.92	2.07
	7364	300	Center	19.20	2.10	32	26	4.62	2.32
	7348	300	R.F.Corner	19.20	2.10	30	27	3.67	2.60
4th Harmonic	9800	700	Center	20.00	2.62	Noise<24	Noise<24	Noise<2.14	Noise<2.14
Sprious	-	700	Center	-	-	-	-	-	-
	-	700	Center	-	-	-	-	-	-
	-	700	Center	-	-	-	-	-	-
	-	700	Center	-	-	-	-	-	-
Emission Sideband	2400	1000	Center	20.70	1.01	37	39	5.35	6.74
	2415	1000	Center	20.70	1.02	43	45	10.76	13.54
	2485	1000	Center	20.70	1.03	26	25	1.56	1.39
	2500	1000	Center	20.80	1.04	28	28	2.00	2.00

Emission observed from 100 MHz through 18 GHz by spectrum analyzer. No significant emission was detected except for above data.

Microwave Leakage at 5 cm on fundamental : 0.06 mW/cm²

DESCRIPTION OF THE MEASUREMENT FACILITIES

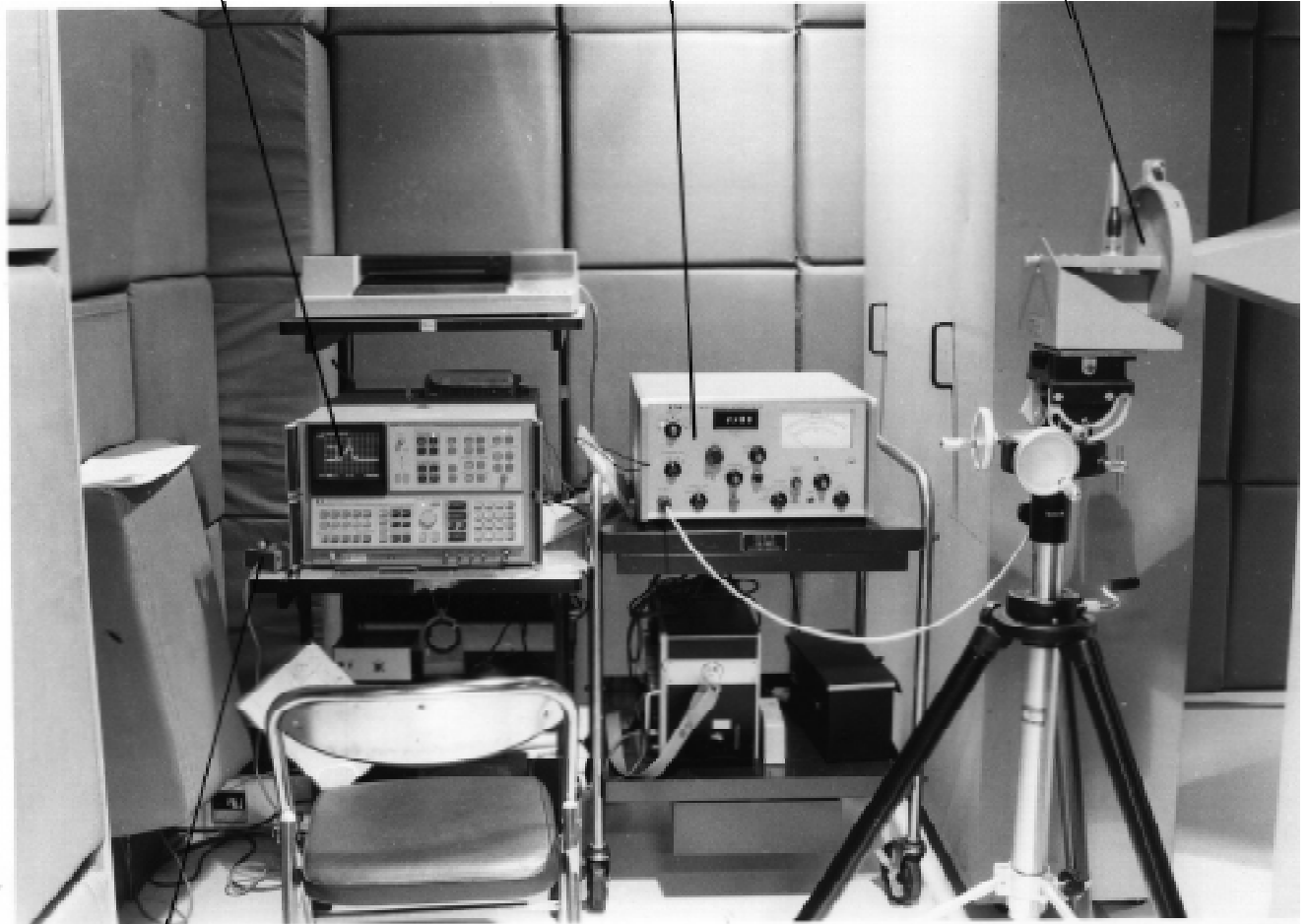
SHARP CORPORATION, KITCHEN APPLIANCE SYSTEMS DIVISION
EMI ANECHOIC CHAMBER

PHOTOGRAPH OF TEST EQUIPMENT #1

Spectrum Analyzer
8566B

Field Strength Meter
NM-67

Horn Antenna



Turn Table Controller

PHOTOGRAPH OF TEST EQUIPMENT #2

Horn Antenna

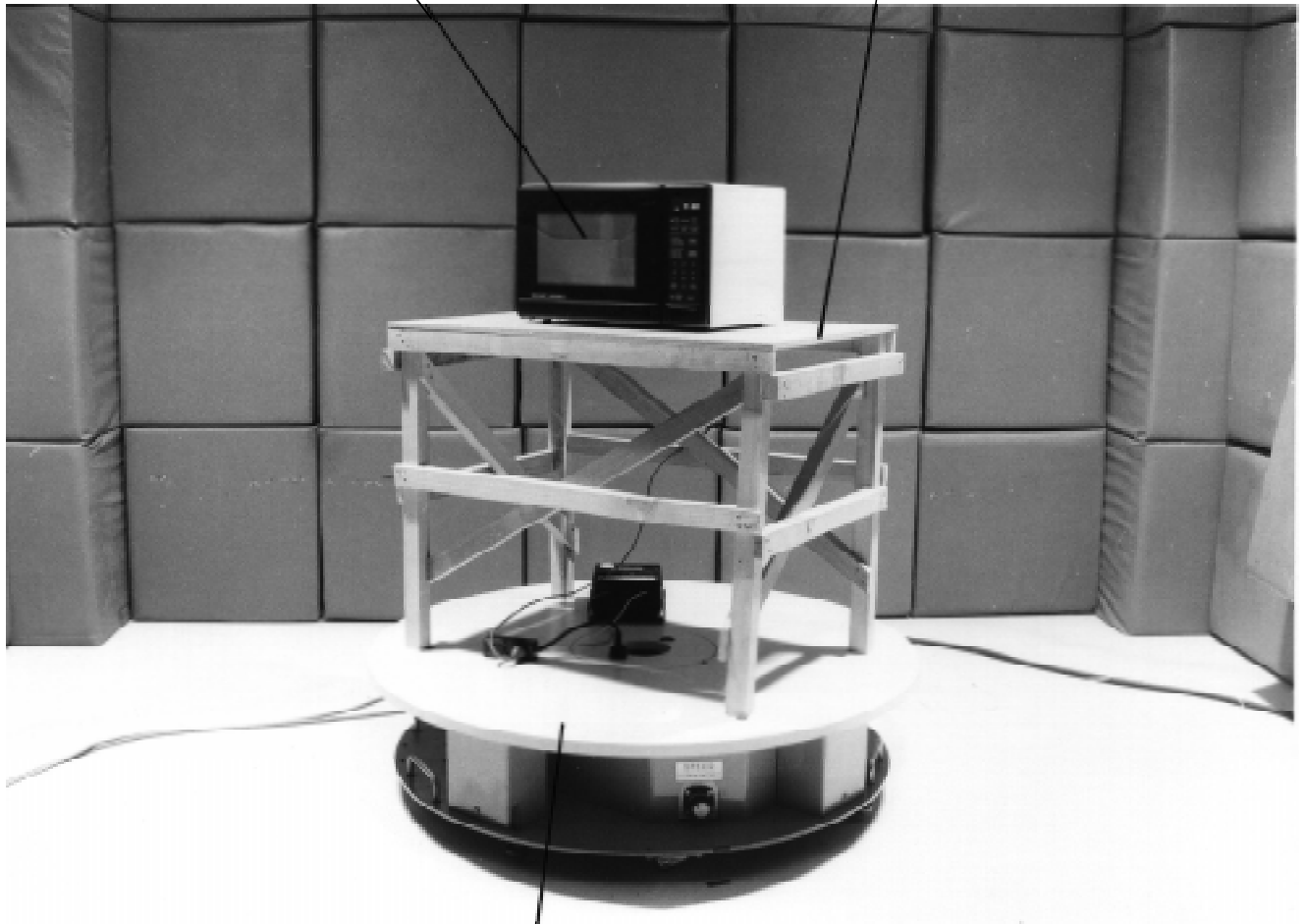


Field Strength Meter
NM-67

PHOTOGRAPH OF TEST EQUIPMENT #3

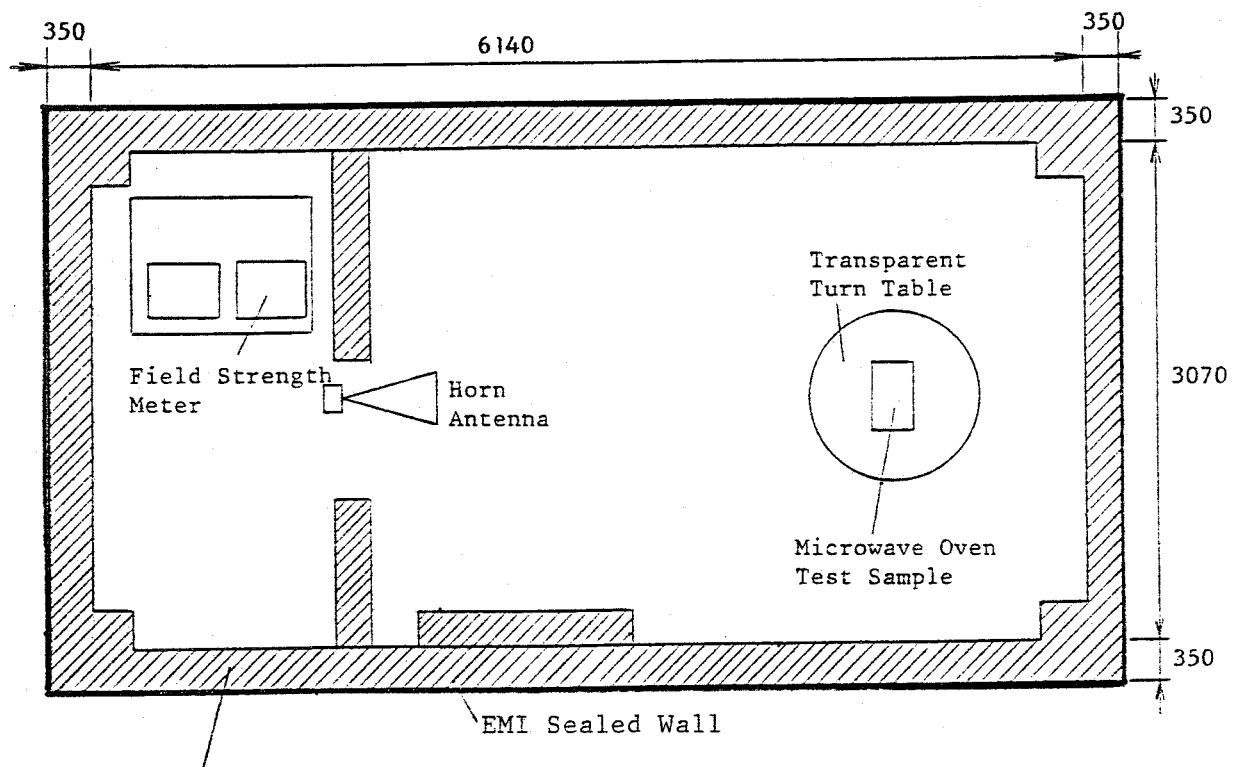
Microwave Oven
Test Sample

Wooden Table

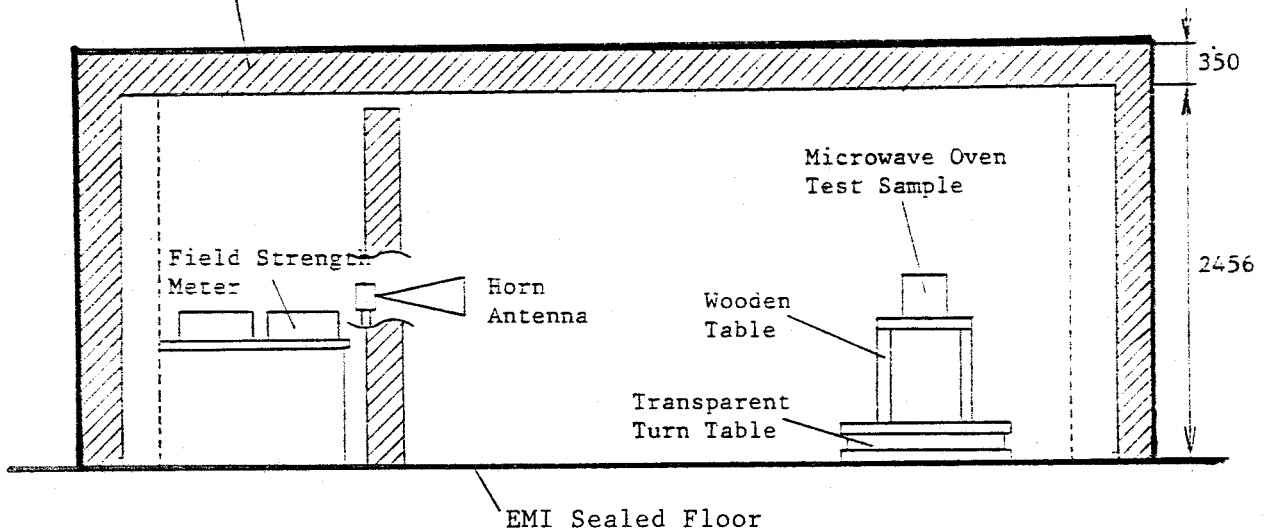


Transparent Turn Table

4. DIMENSIONS OF TEST SITE



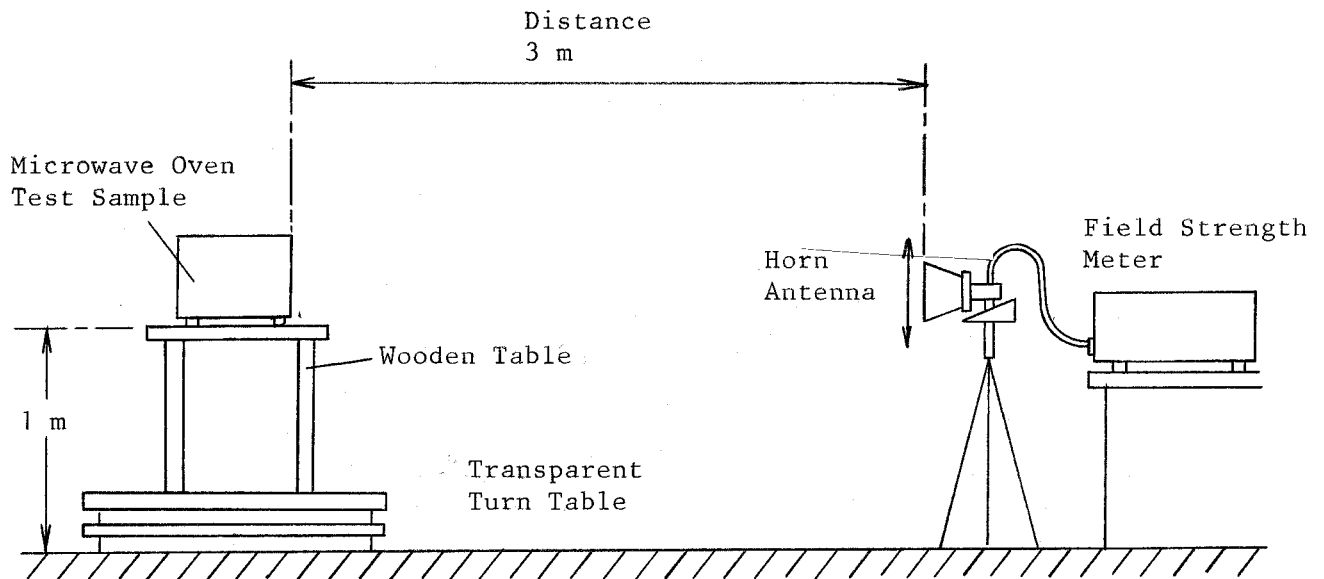
Electric Magnetic Wave Absorber: Cat. No. AEP-12EM WP
Mfd by Advanced ElectroMagnetic, Inc.



(mm)

EMI Anechoic Chamber equipped by Akzo Kashima Ltd.

5. ARRANGEMENT OF INSTRUMENTATION



6. DESCRIPTION OF MEASUREMENT EQUIPMENTS

6-1. FIELD STRENGTH METER

- a) #UHR4000, Mfd by CHASE (100 MHz through 1.0 GHz)

BANDWIDTH	120 kHz
DETECTOR FUNCTION	Linear average value; AVERAGE 1: 1 ms averaging AVERAGE 2: 600 ms averaging
CALIBRATION DATE	July 21, 1999

- b) #NM-67, Mfd by EATON (1.0 GHz through 18 GHz)

BANDWIDTH	10MHz
DETECTOR FUNCTION	Linear average value; Field Intensity
CALIBRATION DATE	October 20, 1999

6-2. RADIATED FREQUENCY OBSERVATION SUB-EQUIPMENT

SPECTRUM ANALYZER	#8566B, Mfd by HEWLETT. PACKARD
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6-3. ANTENNA

<u>RANGE FOR FREQUENCY</u>	<u>ANTENNA</u>
From 100 MHz to 140 MHz	#DM-105A-T1, Mfd by SINGER
From 140 MHz to 400 MHz	#DM-105A-T2, Mfd by SINGER
From 400 MHz to 1.0 GHz	#DM-105A-T3, Mfd by SINGER
From 1.0 GHz to 2.0 GHz	#91888-2, Mfd by EATON
From 2.0 GHz to 3.6 GHz	#91889-2, Mfd by EATON
From 3.6 GHz to 7.6 GHz	#94613-1 with Reflector #91892-1 Mfd by EATON
From 7.3 GHz to 12.0 GHz	#91891-2 with Reflector #91892-1 Mfd by EATON
From 12.0 GHz to 18.0 GHz	#94614-1 with Reflector #91892-1 Mfd by EATON

6-4. CABLE

<u>RANGE FOR FREQUENCY</u>	<u>CABLE</u>
From 100 MHz to 1.0 GHz	#RG-55/U
From 1.0 GHz to 18.0 GHz	#94615-1

6.5. PERTINENT DETAILS

a) Calculation Formula	(See Attachment 1)
b) Antenna Correction Factor	(See Attachment 2)
c) Cable Loss	(See Attachment 3)
d) Calibration Curve	(See Attachment 4)

6-6. TEST CONDITION

a) Antenna height variation	From <u>1.1 m</u> to <u>2.1 m</u>
b) Antenna to test unit distance	<u>3 m</u>

CALCULATION OF RADIATED FIELD STRENGTH (uV/m)

$$E_f = 10^{\left(\frac{F_a + F_c + D}{20}\right)} * K$$

E_f : Radiated Field Strength at 300 m (uV/m)

F_a : Antenna Factor (dB)

F_c : Cable Factor (dB)

D : Reading Data of the Field Strength Meter (dBuV at 3 m)

K : Conversion Factor

$K = 0.0137 * \log F - 0.0401$ (if $F < 4575$ MHz)

$K = 0.01$ (if $F \geq 4574$ MHz)

F : Emission Frequency

Emission Frequency (MHz)	K
1830	0.0046
2745	0.0070
3660	0.0090
4575 and above	0.0100

In case of emission frequency less than 1.0 GHz, conversion factor $K=0.01$ is used for the measurement of 3 m distance.

ANTENNA FACTOR (dB)

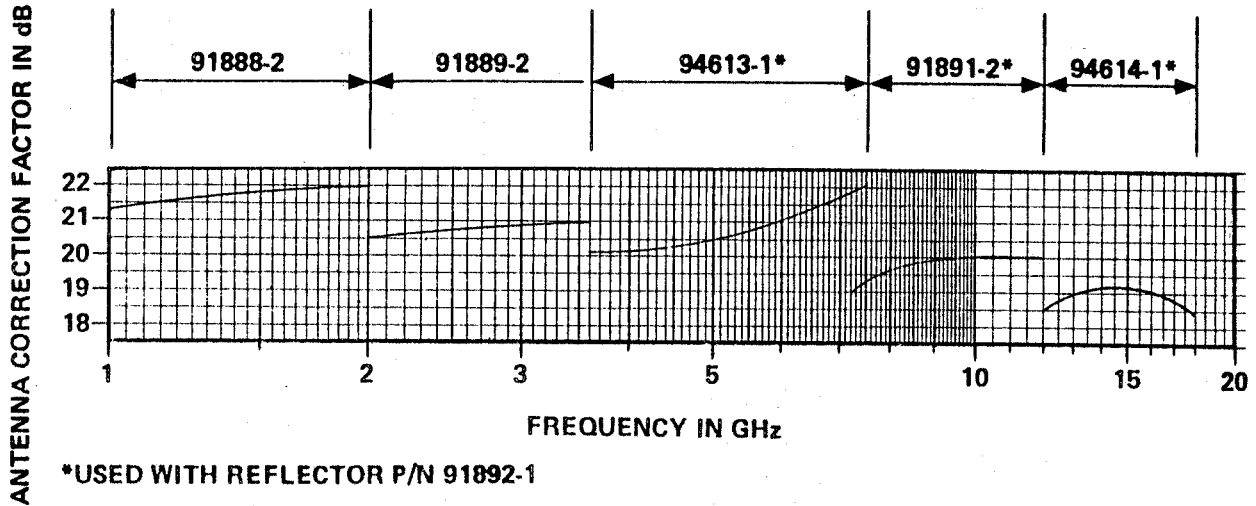


Figure 5-3. Antenna Correction Factors, 1-18 GHz Horn Antennas

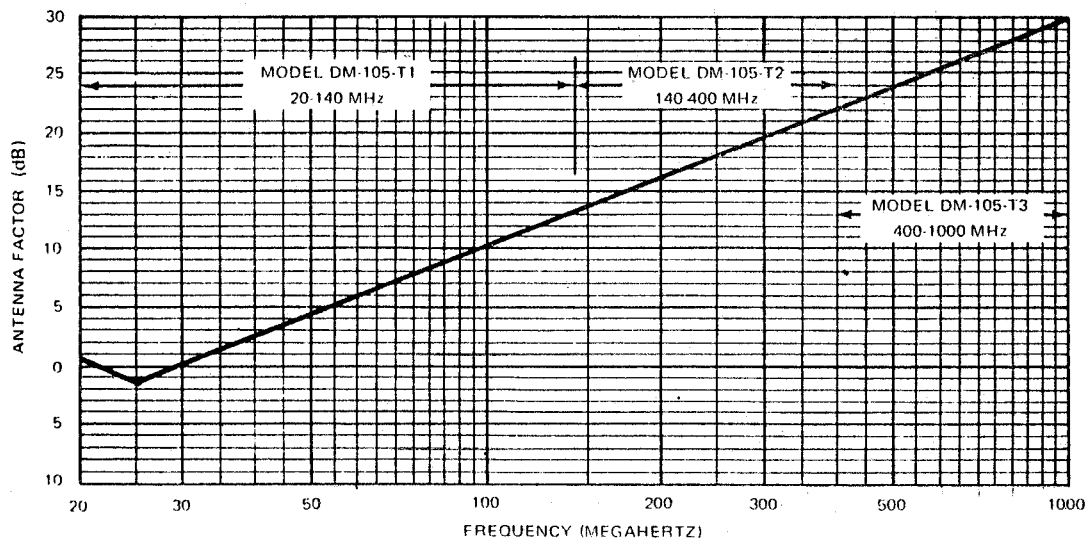


Figure 2-18. Antenna Factor Versus Frequency Characteristics, Models DM-105-T1, DM-105-T2 and DM-105-T3 Dipole Antennas

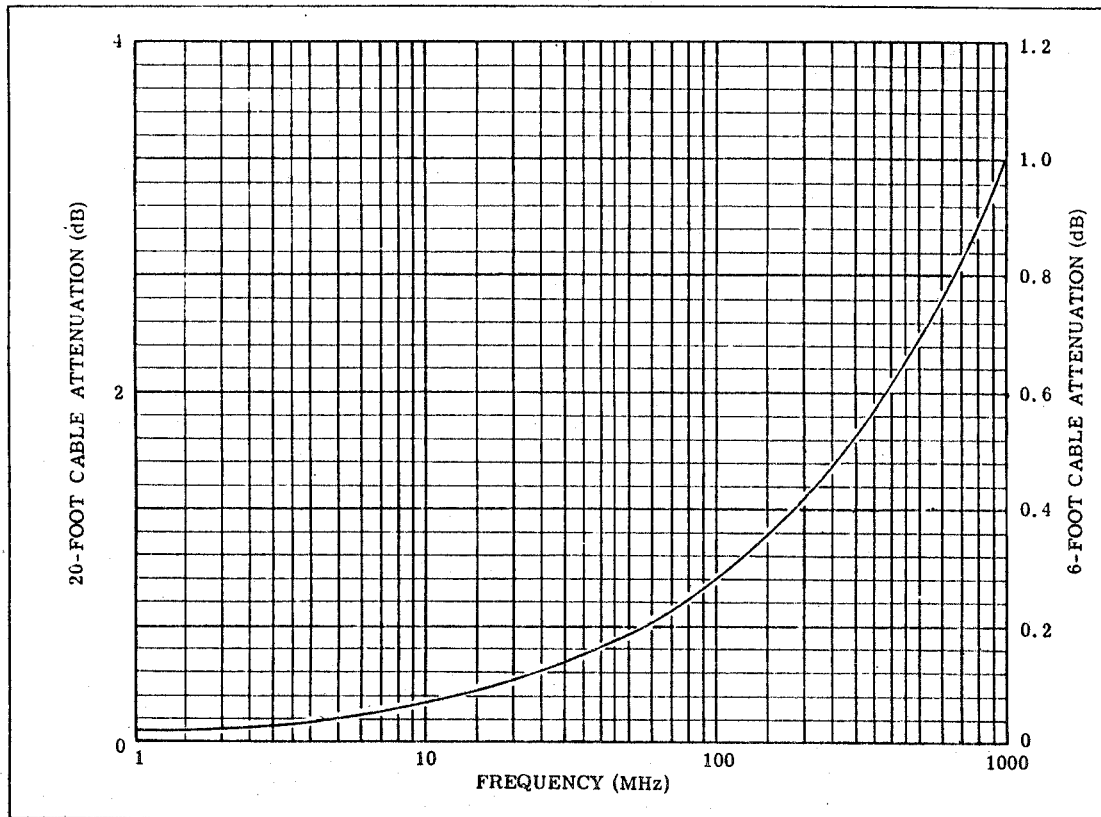


Figure 2-10. Attenuation Vs. Frequency for RG-55/U Coaxial Cable

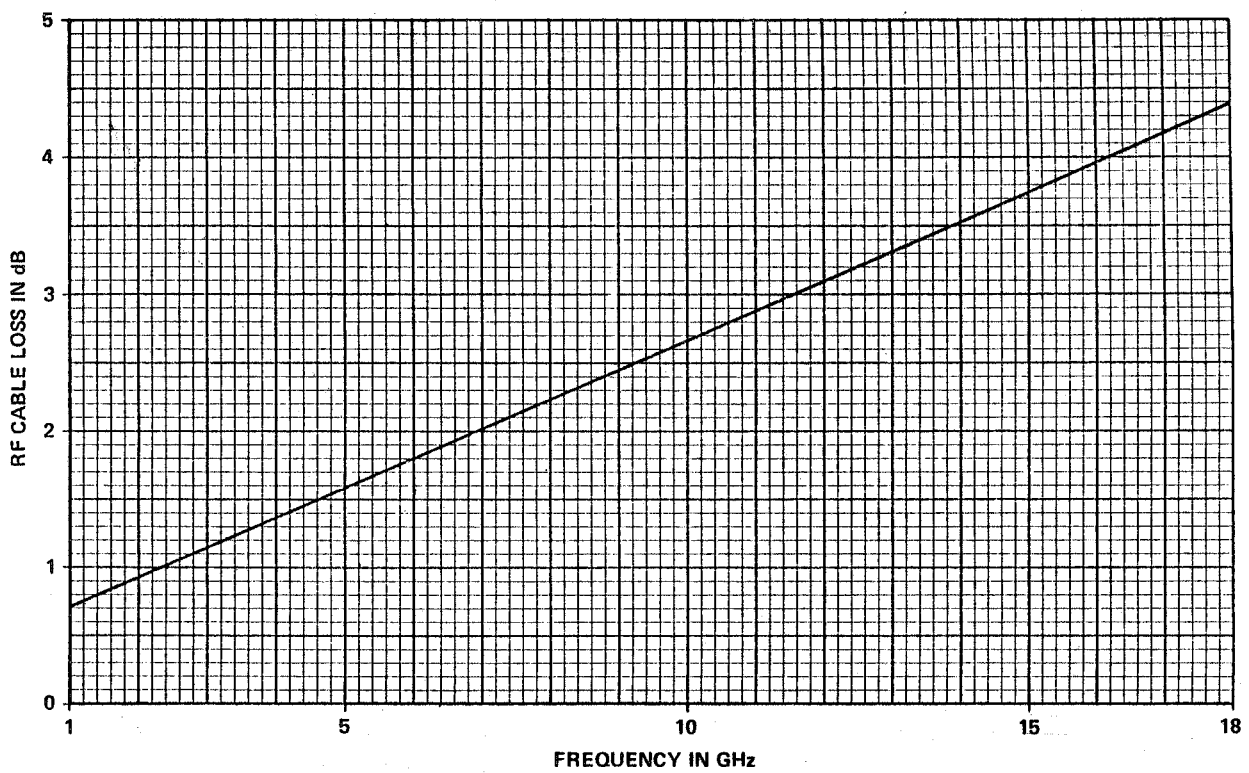


Figure 5-1. Model 94615-1 RF Cable Loss Chart

CALIBRATION CURVE

For Model NM-67

