

TEST DATA OF JMA-1020

Type	JMA-1020	Ser. No. LT20501
Scanner Unit		Ser. No. LT20501
Display Unit		Ser. No. LT20501

Ship's Main                      DC12V

Date                                      February 10, 1999

Section Chief                      *M. Pundit*

Inspector                              *K. Ganesa*

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LIST OF GENERAL INFORMATION REQUIRED FOR TYPE ACCEPTANCE

IN ACCORDANCE WITH FCC RULES AND REGULATIONS,  
VOLUME II, PART 2 AND TO

80

Sub-Part

2.983 (a): NAME AND ADDRESS OF MANUFACTURE

Japan Radio Co., Ltd.  
Akasaka Twin Tower Main Bldg  
FL/5&6 17-22 Akasaka 2-chome  
Minato-ku Tokyo 107 JAPAN

VENDOR:

Japan Radio Co., Ltd.  
1011 SW KLUCKITAT WAY BLDG.B SUITE100  
SEATTLE, WA. 98134

2.983 (b): FCC ID: CKEJMA1020

MODEL NO: JMA-1020

2.983 (c): QUANTITY PRODUCTION PLANNED.

2.983 (d): TECHNICAL DESCRIPTION: SEE ATTACHED EXHIBITS

(1): TYPE OF EMISSION: 60M8PON

(2): FREQUENCY RANGE, GHz: 9.3 to 9.5

(3): POWER RATING, kW PEAK: 2kw  
SWITCHABLE \_\_\_\_\_ ADJUSTABLE \_\_\_\_\_ N/A x

(4): MAXIMUM POWER CONSUMPTION, Watts: 100 WAVE.

NAME OF TEST: SUMMARY OF CALCULATIONS  
PARAGRAPH:  
GUIDE:  
TEST CONDITIONS: STANDARD TEMPERATURE & HUMIDITY  
TEST EQUIPMENT: AS PER ATTACHED PAGE

PROCEDURE

Tests and calculations for the indicated parameters were conducted and made as follows:

1. The average power, pulse widths, pulse rise and decay times, and the interval between successive output pulses were measured.
2. The pulse repetition frequency (P.R.F.) was then calculated from the reciprocal of the interval.
3. The duty cycle was calculated from the product of the P. F.R. and the pulse width.
4. The average power was corrected for attenuation.
5. The peak power was calculated by dividing the average power by the duty cycle.
6. The spurious and harmonic radiation characteristics, the occupied bandwidth and the receiver radiation were measured.
7. MEASUREMENT RESULTS: ATTACHED

THE APPLICANT HAS BEEN CAUTIONED AS TO THE FOLLOWING:

15.21 INFORMATION TO USER.

The users manual or instruction manual for an intentional 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.

15.27(a) SPECIAL ACCESSORIES.

Equipment marketed to a consumer must be capable of complying with the necessary regulations in the configuration in which the equipment is marketed. Where special accessories, such as shielded cables and/or special connectors are required to enable an unintentional or intentional radiator to comply with the emission limits in this part, the equipment must be marketed with, i.e. shipped and sold with, those special accessories. However, in lieu of shipping or packaging the special accessories with the unintentional or intentional radiator, the responsible party may employ other methods of ensuring that the special accessories are provided to the consumer, without additional charge.

Information detailing any alternative method used to supply the special accessories for a grant of equipment authorization or retained in the verification records, as appropriate. The party responsible for the equipment, as detailed in § 2.909 of this chapter, shall ensure that these special accessories are provided with the equipment. The instruction manual for such devices shall include appropriate instructions on the first page of text concerned with the installation of the device that these special accessories must be used with the device. It is the responsibility of the user to use the needed special accessories supplied with the equipment.

Sub-part  
2.983te):

## TEST AND MEASUREMENT DATA

All tests and measurement data shown were performed in accordance with FCC Rules and Regulations, Volume II; Part 2, Sub-part J, Sections 2.981, 2.983, 2.985, 2.987, 2.989, 2.991, 2.993, 2.995, 2.997, 2.999 and the following individual Parts:

- 21 - Domestic Public Fixed Radio Services
- 22 - Public Mobile Services
- 22 Subpart H - Cellular Radiotelephone Service
- 22.901(d) - Alternative technologies and auxiliary services
- 23 - International Fixed Public Radio communication services
- 24 - Personal Communications Services
- 74 Subpart H - Low Power Auxiliary Stations
- X 80 - Stations in the Maritime Services
- 80 Subpart E - General Technical Standards
- 80 Subpart F - Equipment Authorization for Compulsory Ships
- 80 Subpart K - Private Coast Stations and Marine Utility Stations
- 80 Subpart S - Compulsory Radiotelephone Installations for Small Passenger Boats
- 80 Subpart T - Radiotelephone Installation Required for Vessels on the Great Lakes
- 80 Subpart U - Radiotelephone Installations Required by the Bridge-to-Bridge Act
- 80 Subpart V - Emergency Position Indicating Radio beacons (EPIRB'S)
- 80 Subpart W - Global Maritime Distress and Safety System (GMDSS)
- 80 Subpart X - Voluntary Radio Installations
- 87 - Aviation Services
- 90 - Private Land Mobile Radio Services
- 94 - Private Operational-Fixed Microwave Service
- 95 Subpart A - General Mobile Radio Service (GMRS)
- 95 Subpart C - Radio Control (R/C) Radio Service
- 95 Subpart D - Citizens Band (CB) Radio Service
- 95 Subpart F - Interactive Video and Data Service (IVDS)

## 1 Mechanical Tests

### Appearance and Structure

Scanner Unit	Good
Display Unit	Good

## 2 Electrical Tests

### 2.1 Working of each operation unit

Scanner Unit	Good
Display Unit	
EBL/VRM Switch	Good
JOG DIAL	
RANGE	Good
SEA	Good
RAIN	Good
GAIN	Good
TUNE	Good
JOYSTICK·MENU/ENT Switch	Good
OFFSET Switch	Good
CONT/DIM Switch	Good
ST-BY/OFF Switch	Good
X-MIT/OFF Switch	Good

### 2.2 Scanner unit

VSWR	frequency (MHz)	VSWR
	9415	1.35
	9445	1.15
	9475	1.40
Scanner Rotation Speed		33 rpm

### 2.3 Transmitter

Magnetron Ser. No.	B9991A
Operating Frequency (at 0.25 n.m.)	9430 MHz
(at 1.5 n.m.)	9428 MHz
(at 16 n.m.)	9427 MHz
Peak Output Power (at 0.25 n.m.)	1.520 KW
(at 1.5 n.m.)	1.701 KW
(at 16 n.m.)	1.854 KW
Pulse Length (at 0.25 n.m.)	0.082 $\mu$ S
(at 1.5 n.m.)	0.32 $\mu$ S
(at 16 n.m.)	0.82 $\mu$ S
Diode limiter Ser. No.	C8404A

## 2.4 Receiver

MIC Frontend Ser. No.	A0020A
IF Center Frequency	60 MHz
IF Band Width	8 MHz/ 3 MHz

## 2.5 Display

### Input Voltage and Current

(at 0.25 n. m.)	12V 2.3A
(at 1.5 n. m.)	12V 2.4A
(at 16 n. m.)	12V 2.5A

### Repetition Frequency

(at 0.25 n. m.)	2160 Hz
(at 1.5 n. m.)	1188 Hz
(at 16 n. m.)	595 Hz

## 3 Overall Tests

Working time of Timer	1 m 30 s
Input Variation (10.2 V dc - 16 V dc)	Good
Overall Sensitivity	Good
Minimum Range	Good
Bearing Accuracy	Good
Mechanical Noise	Good

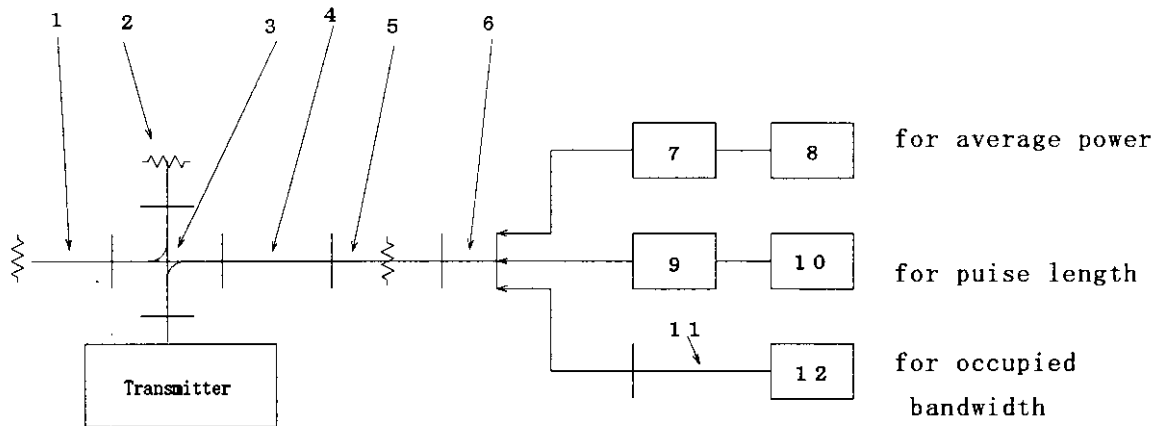


TEST INSTRUMENTATION LIST

Dummy Load	X910B	HP
High power Dummy Load	4D371A	Shimada
Directional Coupler-1	R11421 Coupling 30dB Directivity 30dB	Shimada
Directional Coupler-2	5D351 Coupling 20dB Directivity 20dB	Shimada
Adaptor	X281A	HP
Attenuator	X382A	HP
Tapered W/G-1	195X KU	AIRCOM
Tapered W/G-2	11518A	HP
External Mixer	11517A	HP
Coaxial Cable-1	10503A	HP
Coaxial Cable-2	MI 04	Takeda Riken
Spectrum Analyzer-1	TR4133	Takeda Riken
Spectrum Analyzer-2	8592A	HP
Oscilloscope	465B	SONY/Tectronix
Crystal Detector	423B	HP
Frequency Meter	X532B	HP
Power Meter	435A	HP
Power Sensor	8481A	HP
Signal Generator	TR4511	ADVANTEST
Test Antenna-1	1/2 Coaxial(Untuned)	
Test Antenna-2	AILTECH 94612-1	Log Periodic
Test Antenna-3	AILTECH 94626-1	HP-11519A
Test Antenna-4	AILTECH 94627-1	HP-11519A
Temperature Chamber	-30°C~+80°C	Onisi Netugaku
Shield Room	31040/SIT1300F2	TDK

(Sec.2.985) 1.0 RF Power Output

(Sec.2.989) 2.0 Occupied Bandwidth



1	Dummy Load	X910B	HP
2	high power Dummy Load	4D371A	Shimada
3	Directional Coupler	5D351	Shimada
	Coupling	30 dB	
	Directivity	30 dB	
4	Frequency Meter	X532B	HP
5	Attenuator	X382A	HP
6	Adaptor	X281A	HP
7	Power Sensor	8481A	HP
8	Power Meter	435A	HP
9	Crystal Detector	423B	HP
10	Oscilloscope	465B	SONY/Tectronix
11	Coaxial Cable	MI-04	Takeda Riken
12	Spectrum Analyzer	8592A	Hewlett Packard

Measurement Point ; Transmitter Output

CKEJMA1020

NAME OF TEST: MODULATION CHARACTERISTICS -  
MODULATION LIMITING

PARAGRAPH: 47 CFR 2.987 (b)

GUIDE:

TEST CONDITIONS: N/A

TEST EQUIPMENT: N/A

PLEASE SEE TECHNICAL DESCRIPTION AND DRAWING, ATTACHED

FCC Submittal Material Data

(Sec. 2.985)

1.0 RF Power Output

1.1 Peak Power	(at 0.25 n.m.)	1.520 KW
	(at 1.5 n.m.)	1.701 KW
	(at 16 n.m.)	1.854 KW
1.2 Average Power	(at 0.25 n.m.)	0.269 W
	(at 1.5 n.m.)	0.646 W
	(at 16 n.m.)	0.905 W

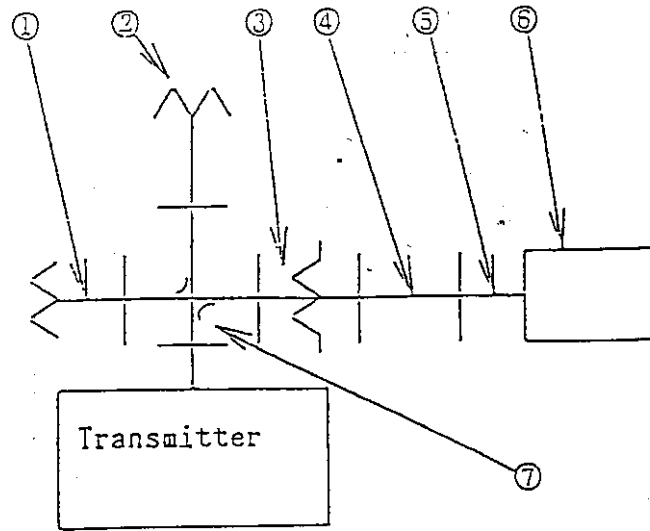
1.3 Load Impedance

	VSWR 1.05 at 9.4 - 9.5 GHz
Type	4D371A (Shimada co.)

(Sec.2.991)

### 3.0 Spurious signals at antenna port

Condition 1; 0 to 20 GHz

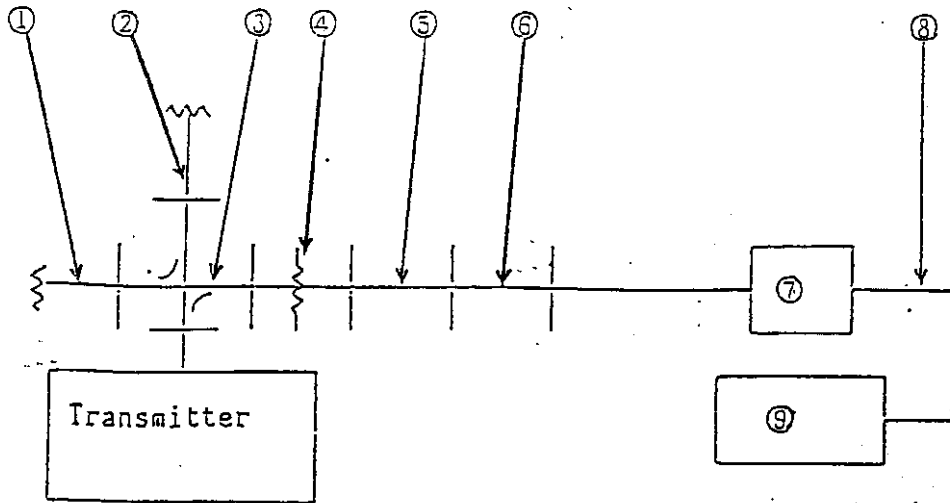


1	Dummy Load	X910B	HP
2	High power Dummy Load	4D371A	Shimada
3	Attenuator	X382A	HP
4	Adaptor	X281A	HP
5	Coaxial Cable	MI-04	Takeda Riken
6	Spectrum Analyzer	TR4133	Takeda Riken
7	Directional Coupler	R11421	Shimada
	Coupling	30 dB	
	Directivity	30 dB	
★	Attenuation	3 ; 10dB	
★	Measurement Point;	Rotary Joint Output	

(Sec.2.991)

3.0 Spurious signals at antenna port

Condition 2; 12.4 to 40 GHz



1	Dummy Load	X910B	HP
2	High power Dummy Load	4D371A	Shimada
3	Directional Coupler	R11421	Shimada
	Coupling	30 dB	
	Directivity	30 dB	
4	Attenuator	X382A	HP
5	Tapered W/G	195-X KU	AIRCOM
6	Tapered W/G	11518A	HP
7	External Mixer	11517A	HP
8	Coaxial Cable	10503A	HP
9	Spectrum Analyzer	TR4133	Takeda Riken

★ Attenuation on ATT4 ; 10dB

★ Measurement Point ; Rotary Joint Output

SECTION 5

TEST: Spurious Emissions Field Strength

EQUIPMENT: JMA-1020 S/N LT20501

FCC SPECIFICATION: Sections 2.993 and 80.211.

MINIMUM STANDARD: Mean power of emissions originating in equipment lowest generated frequency to at least 40 GHz shall be attenuated below the mean power of the transmitter by at least 43 plus 10 log (mean power in watts) decibels. Since transmitter mean power is 0.62 watts maximum (long pulse) or 32.58 dBm:

$$\begin{aligned} \text{Emissions} &\leq 27.90 \text{ dBm} - [43 + 10 \log(0.62)] \text{ dBm} \\ &\leq -13.0 \text{ dBm} \end{aligned}$$

TEST RESULTS: No spurious emissions observed above minimum standard.

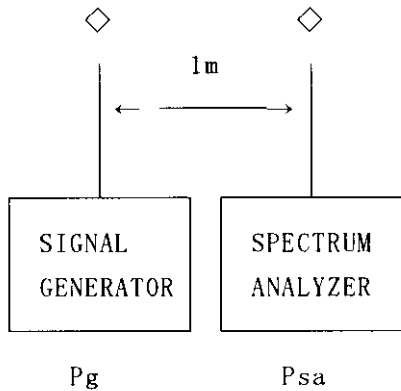
TEST CONDITIONS:  $T_{amb} = 20^{\circ}\text{C}$  to  $25^{\circ}\text{C}$  RHamb = 40% ~ 60%  
Euut input = 12 VDC  
Stabiliization: UUT energized for 10 minutes minimum.

TEST EQUIPMENT: JRC Original - Shielded Room  
Other equipment - see test set-ups.

DATE: 18 - 20 JAN. 1999

TEST ENGINEER: K. YUASA

CALIBRATION OF TESTS 1~5 (0~1 GHz)



A signal source of known amplitude was used as a calibrating signal with identical antennas on the generator and the spectrum analyzer.

From previous testing in the shielded room, the antenna factors are considered much greater than path loss.

Hence half of the difference in signals  $P_g$  and  $P_{sa}$  is due to each antenna.

The calibrating signal on the analyzer is therefore:

$$P_{cal} = P_{sa} - (P_{sa} - P_g) / 2 = (P_{sa} + P_g) / 2 \text{ dBm.}$$

The log ref level on the analyzer is adjusted so as to read other signals directly:

$$\text{LRL (adjusted)} = \text{LRL (set)} + P_{cal} - P_{sa} \text{ dBm.}$$

The calibrating signal used was selected on the basis of best average amplitude over the frequency range of interest.

TEST	CAL sig	$P_{sa}$	$P_g$	$P_{cal}$	LRL (set)	LRL (adj)
1	250 KHz	-67	0	-33.5	-10	23.5
2	2.5 MHz	-48	0	-24.0	-10	14.0
3	25 MHz	-43	0	-21.5	-10	11.5
4	250 MHz	-31	0	-15.5	-10	5.5
5	500 MHz	-24	0	-12.0	-10	2.0

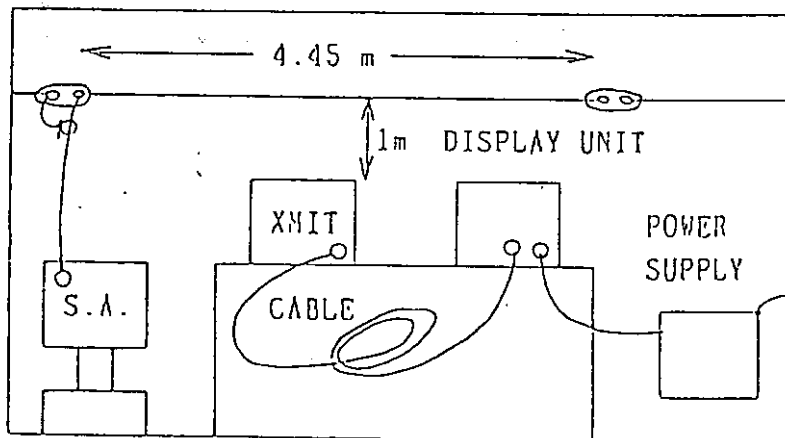
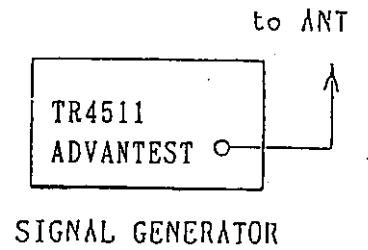
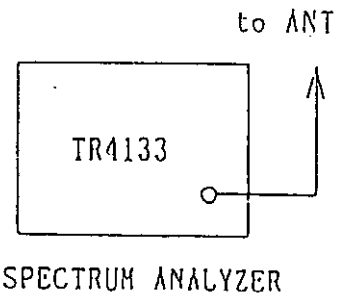
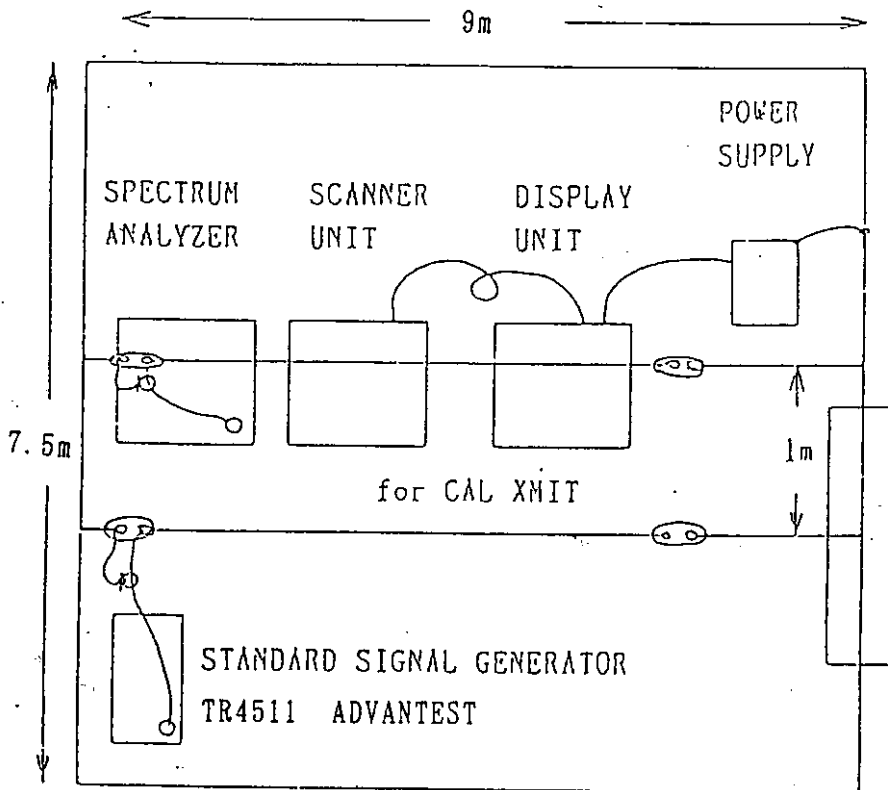


# RFI TEST

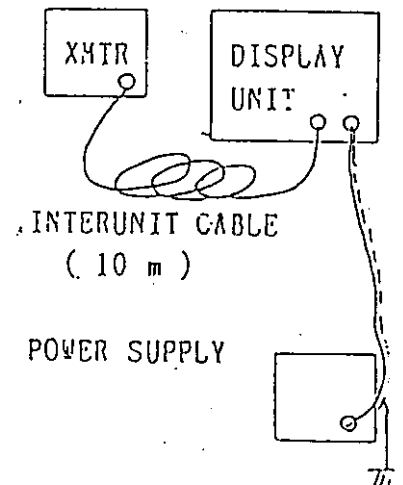
## TEST SET-UP #1 ( 0 - 50 MHz )

- TEST #1 0 - 500 KHz
- TEST #2 0 - 5 MHz
- TEST #3 0 - 50 MHz

### TEST EQUIPMENT



JRC ORIGINAL  
RF ANECHOIC CHAMBER: SIDE VIEW



TEST SET UP # 2 (50 MHz - 40 GHz)

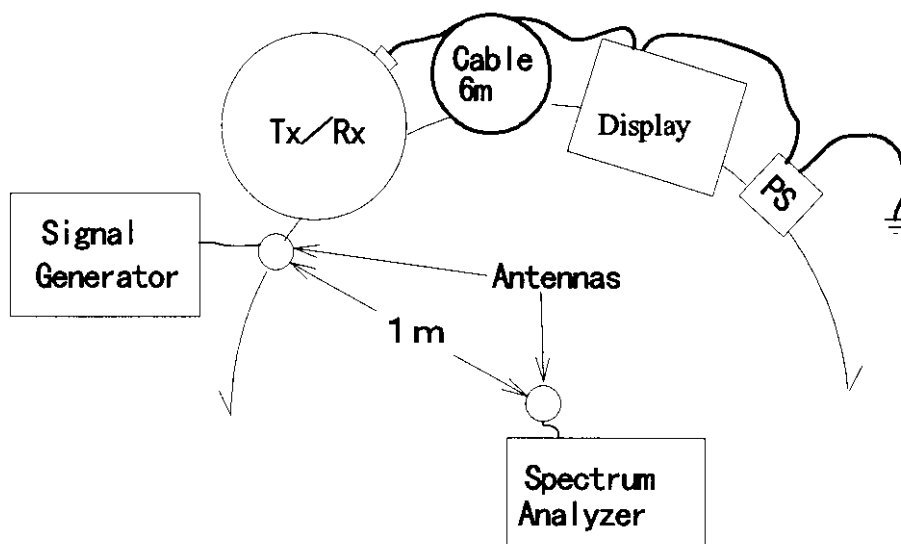
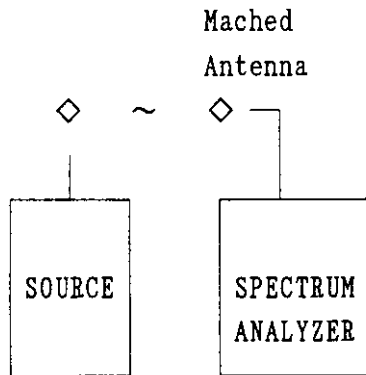


TABLE OF TEST EQUIPMENT USED

Frequency	Test Antenna	Spectrum Analyzer	Signal Generator	Misc.
0 - 1000 MHz	1/2 Coaxial (Untuned)	TAKEDA RIKEN TR4133	ADVANTEST TR4511	-
1 - 18 GHz	AILTECH 94612-1 Log Periodic	HP 8592A	NA	-
18 - 26 GHz	AILTECH 94626-1 HP-11519A	TAKEDA RIKEN TR4133	NA	-
26 - 40 GHz	AILTECH 94627-1 HP-11519A	"	NA	-

CALIBRATION OF TESTS 6 ~ 10 (1 ~ 40 GHz)

Instead of using a signal source of known amplitude to calibrate the receiving system, the path and antenna characteristics were computed.



A half wave dipole was assumed to be the transmitting antenna.  
(FCC 2.993)

The power density at distance R is:  $P = \frac{1.64 P_t}{4\pi R^2}$

Where  $P_t$  is power transmitted.

The power to the analyzer is:  $P_{sa} = P_{Ar} = \frac{PG\lambda^2}{4\pi}$

Where G is the receiving antenna gain and  $A_r$  is the effective area of the receiving antenna

Hence  $P_{sa} = \frac{1.64 P_t}{4\pi R^2} \times \frac{PG\lambda^2}{4\pi} = \frac{1.6 G\lambda^2}{16\pi^2} \times P_t$  at 1 meter

and  $P_t = \frac{16\pi^2 P_{sa}}{1.64 G\lambda^2} = \frac{96.3 P_{sa}}{G\lambda^2}$

$= P_{sa} \text{ (dBm)} + 19.8 \text{ (dB)} - G \text{ (dB)} - 20 \log \lambda \text{ (dB)}$

TEST	HORN GAIN (AVG) dB		WAVELENGTH (dB)		Pt - Psa		LOG REF LEVEL
	LOA	HI	LO	HI	LO	HI	
6	6		-10.5	-21.6	24.3	35.4	0 dBm
7	6		-21.3	-28.0	35.1	41.8	0 dBm
8	6		-27.6	-34.1	41.4	47.9	0 dBm
9	6		-31.2	-35.6	45.0	49.4	0 dBm
10	23.3	24.9	-35.6	-38.8	32.1	33.7	0 dBm
11	23.6	25.1	-39.4	-42.5	35.6	37.2	0 dBm

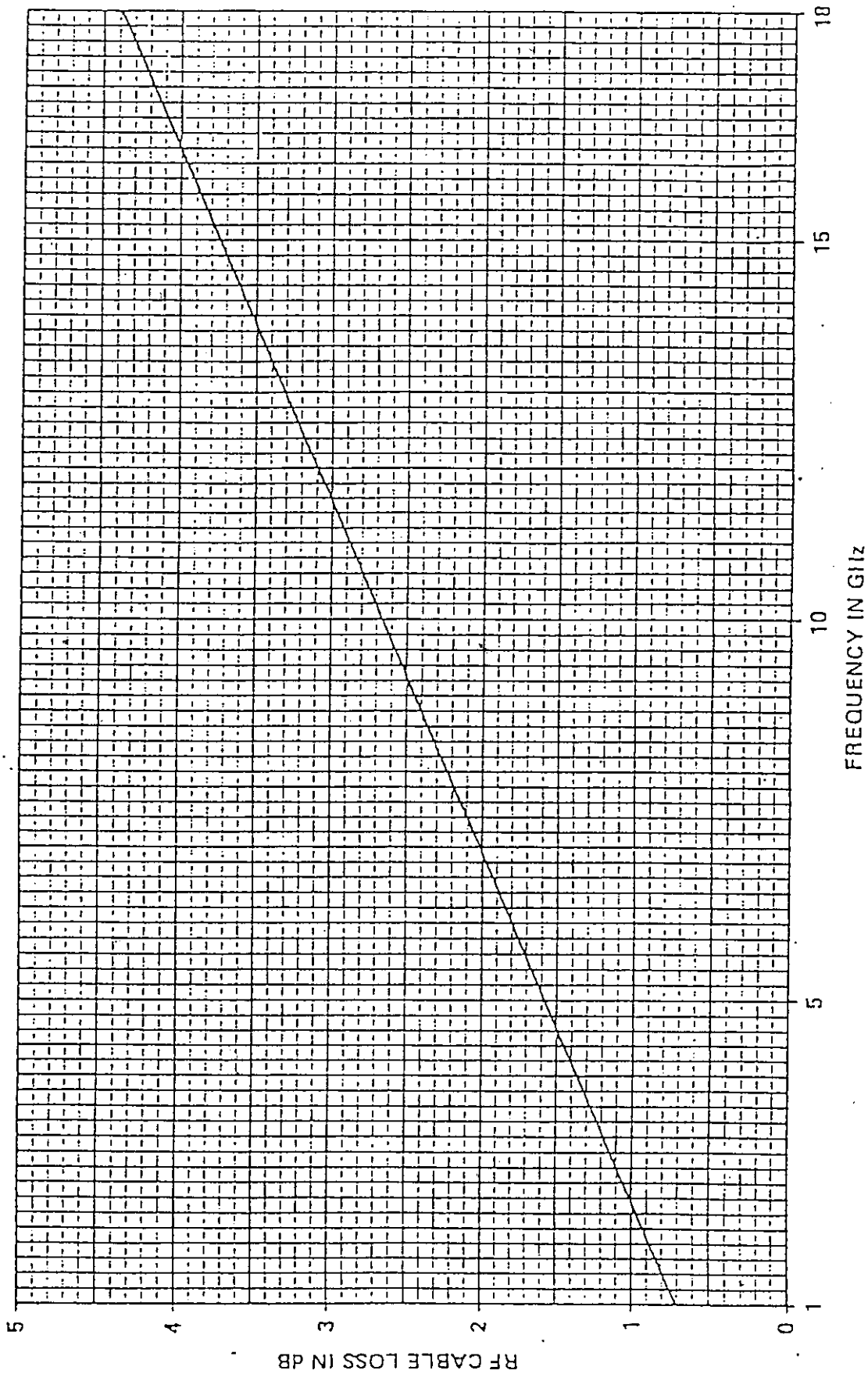


Figure 4-2. Model 94615-1 RF Cable Loss Chart



TITLE Model 94612-1 Log Periodic Antenna Instructions

DWG NO. 1-500783-344

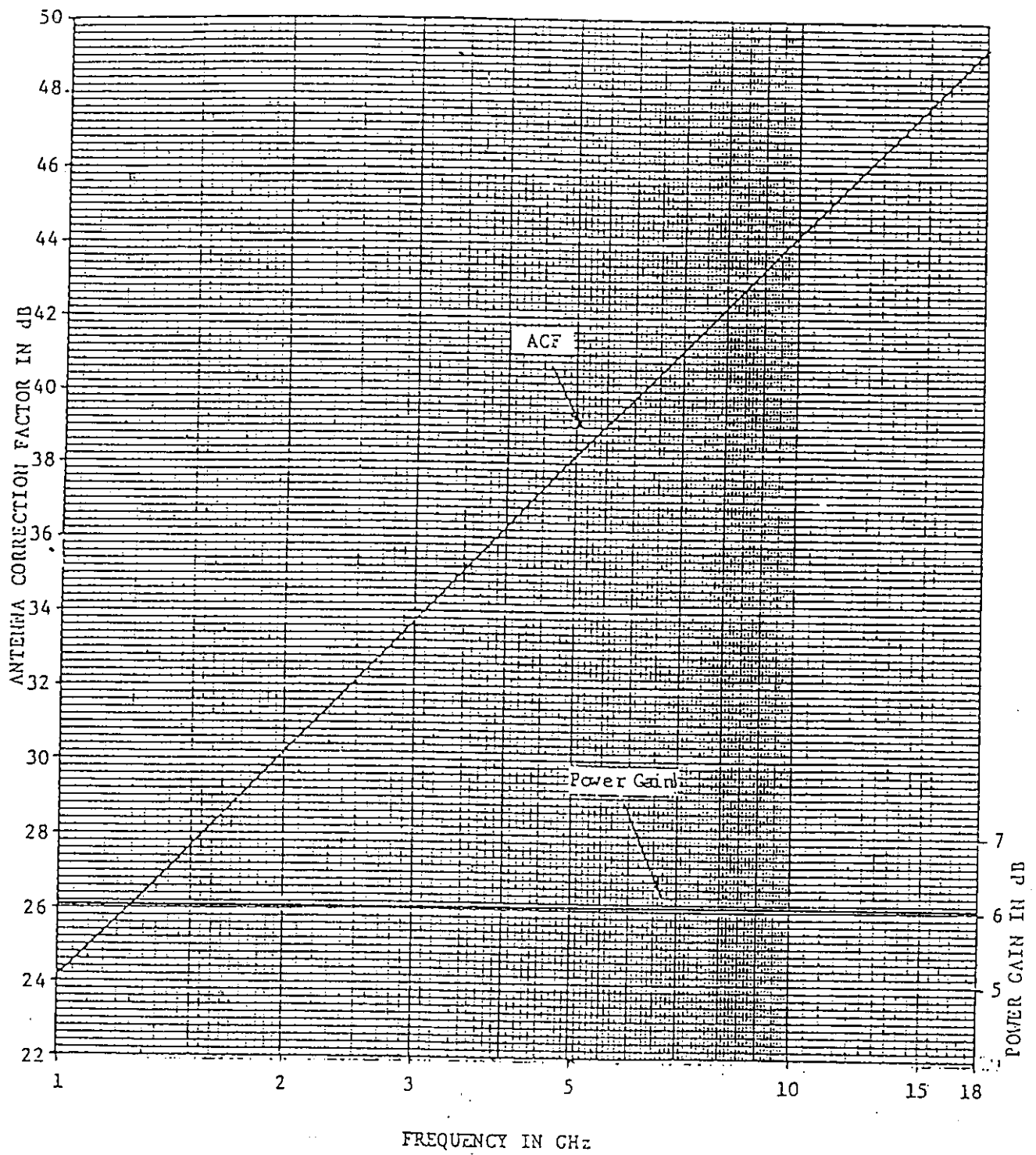


Figure 4-1. Antenna Correction Factor and Power Gain, Model 94612-1 Antenna

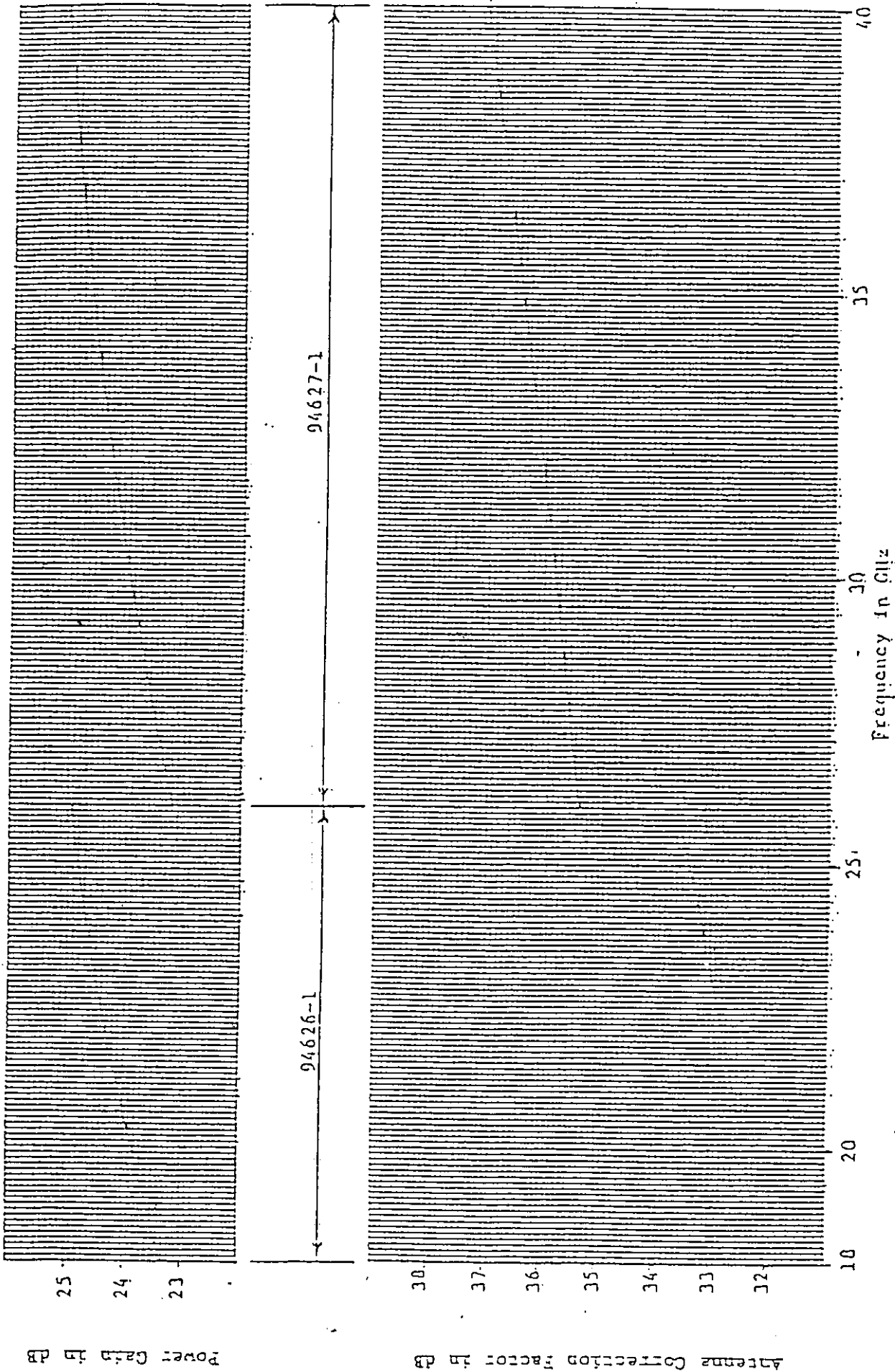


Figure 1-1. Antenna Correction Factor and Power Gain for H01H Antenna





NAME OF TEST: RECEIVER RADIATED EMISSIONS

PARAGRAPHS:

- 15.109: RADIATION INTERFERENCE LIMITS
- 15.231(b): FIELD STRENGTH OF EMISSIONS FROM INTENTIONAL RADIATORS
- 15.33: FREQUENCY RANGE OF RADIATED MEASUREMENTS
- 80.217: SUPPRESSION OF INTERFERENCE ABOARD SHIPS

GUIDE: SEE MEASUREMENT PROCEDURE BELOW

TEST CONDITIONS: STANDARD TEMPERATURE & HUMIDITY

TEST EQUIPMENT: AS PER ATTACHED PAGE

SEARCH ANTENNAS:

- 1GHz - 18GHz: Log Peliodic 94612-1
- 18GHz - 26GHz: Horn Antenna 94626-1
- 26GHz - 40GHz: Horn Antenna 94627-1

MEASUREMENT PROCEDURE

1. At first, bench tests were performed to locate the spurious emissions at the antenna terminals.
2. In the field, tests were conducted over the range shown. The test sample was set up on a wooden turntable above ground, and at a distance of three meters from the antenna connected to the Spectrum Analyzer.
3. In order to obtain the maximum response at each frequency, the turntable was rotated, and the search antennas were raised and lowered. The E.U.T. was also adjusted for maximum response. Tests conducted in Horizontal & Vertical polarization modes.
4. The field strength was calculated from:  

$$E \mu V/m @ 3 m = \text{LOG}_{10}^{-1}(\text{dBm} + 107 + \text{A.F.} + \text{C.L.})$$

5. MEASUREMENT RESULTS: ATTACHED FOR "WORST CASE" CONDITIONS.

**MEASUREMENT RESULTS: RECEIVER RADIATED EMISSIONS**

SPECTRUM SEARCHED = 0 to 10 x Fc  
 WORST CASE = V  
 LIMITS = 15.109(a)  
 RESTRICTED BAND MEASUREMENTS = 15.205  
 ALL OTHER EMISSIONS = ≥ 20 dB BELOW LIMIT

**TESTS WERE CONDUCTED WITH:**

- a. All controls and switches operated.
- b. Half-wave dipole antenna or manufacturer/applicant supplied antenna.

**SAMPLE CALCULATION:**

EMISSION FREQUENCY, MHz = 9489.4  
 LEVEL = LOG10<sup>-1</sup>  $\frac{(-69.2 + 107 + 44 + 1.0)}{20}$   
 LEVEL, μV/m @ 3 m = 13803  
 LEVEL, μV/m @ 1 N.M. = 22.4

**RESULTS**

**RADIATED RECEIVER SPURIOUS EMISSIONS**

All other emissions in the range specified by rule 15.33 (b) were more than 20 dB below the limits of 15.109 (a).

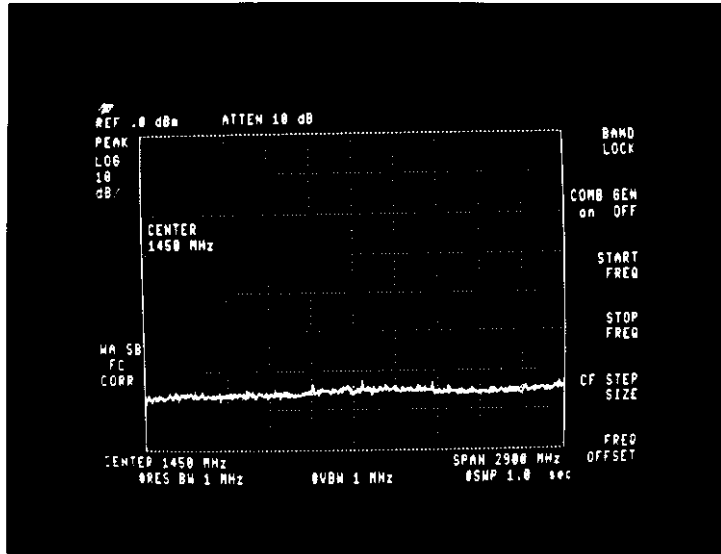
TUNED, MHz	EMISSION, MHz	PEAK	RBW, kHz	VBW, kHz	METER, dBuV	A.F,C.L dB	μV/ m@ 3m	μV/m @1N.M.
9445.0	9489.4	P	30.0	30.0	37.8	45	13803	22.4

TEST #6

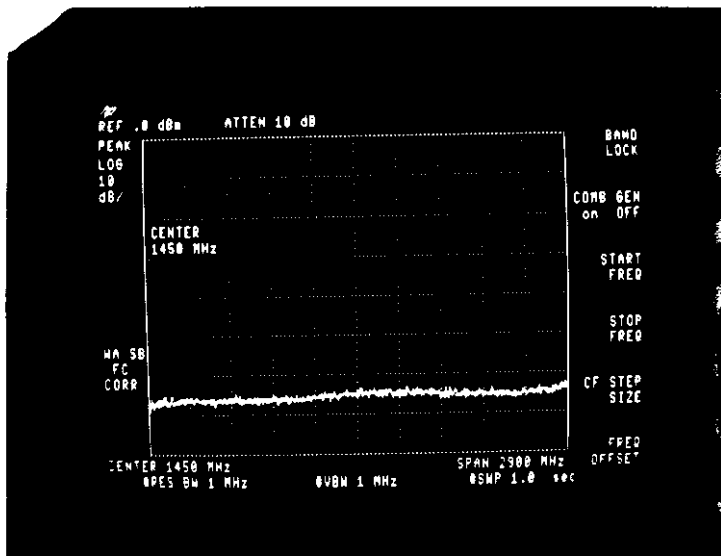
Frequency Band: 1~2.9 GHz

Log Ref. Level: 0 dBm

Maximum Spurious Signal Observed: (See Calibration Procedure  
for Test 6~11)



AMBIENT

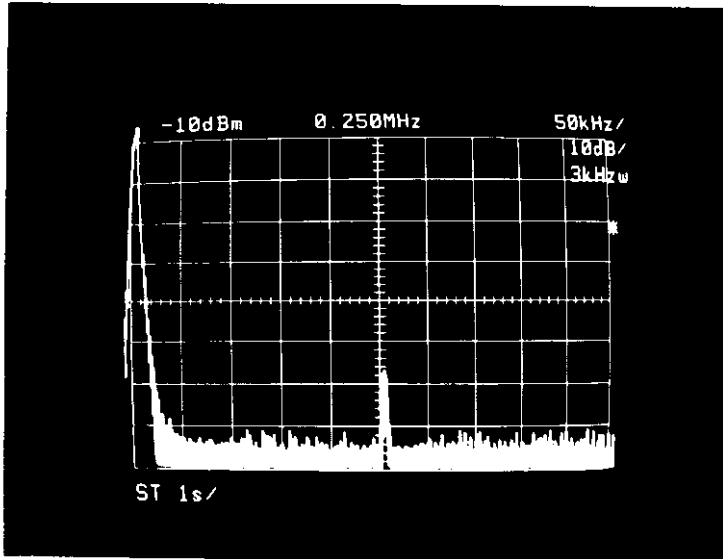


STANDBY

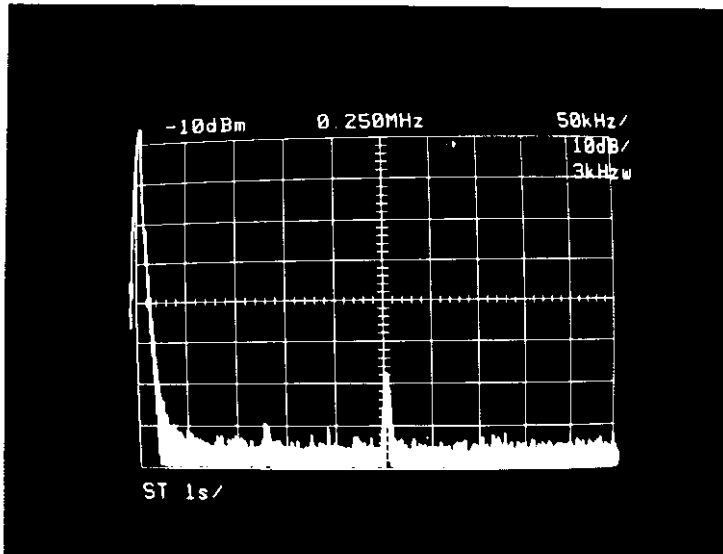
TEST #1

Frequency Band: 0~500 KHz

Log Ref. Level: 23.5 dBm



Ambient

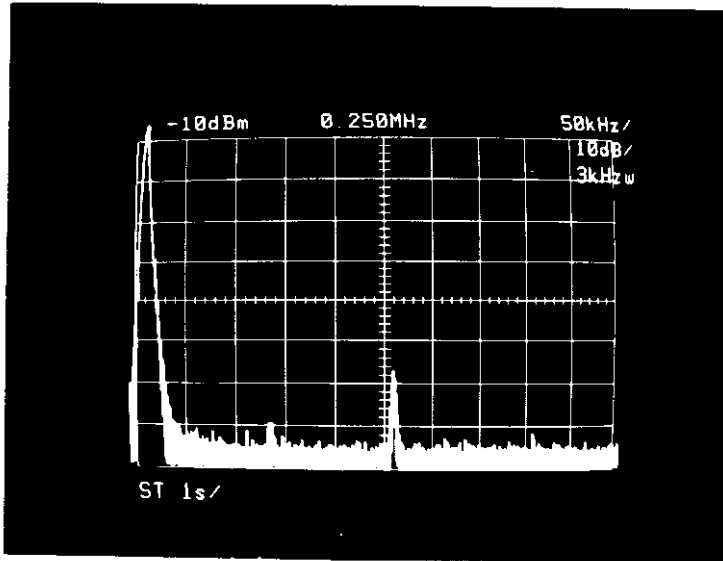


Stand-By

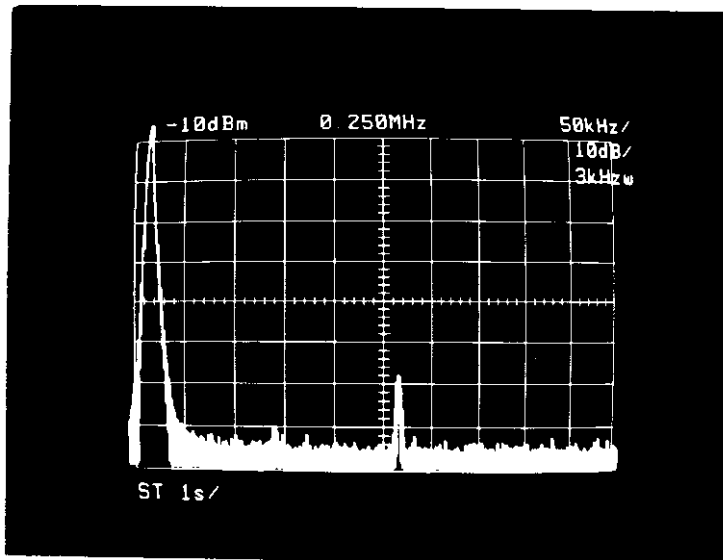
TEST #1

Frequency Band: 0~500 KHz

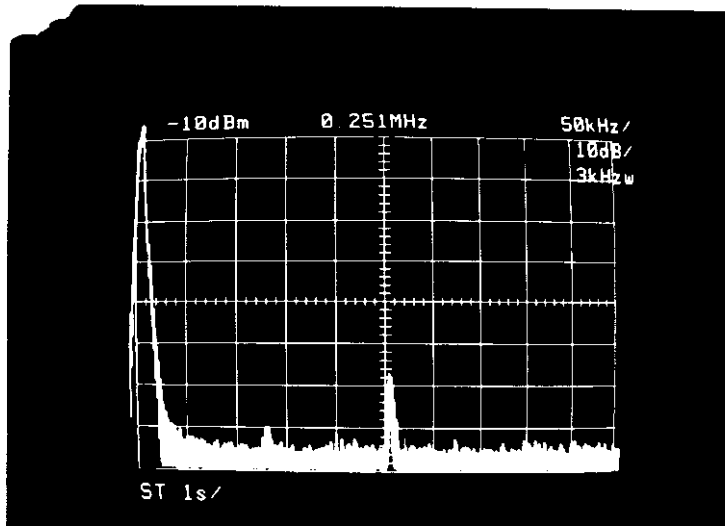
Log Ref. Level: 23.5 dBm



Short Pulse



Medium Pulse

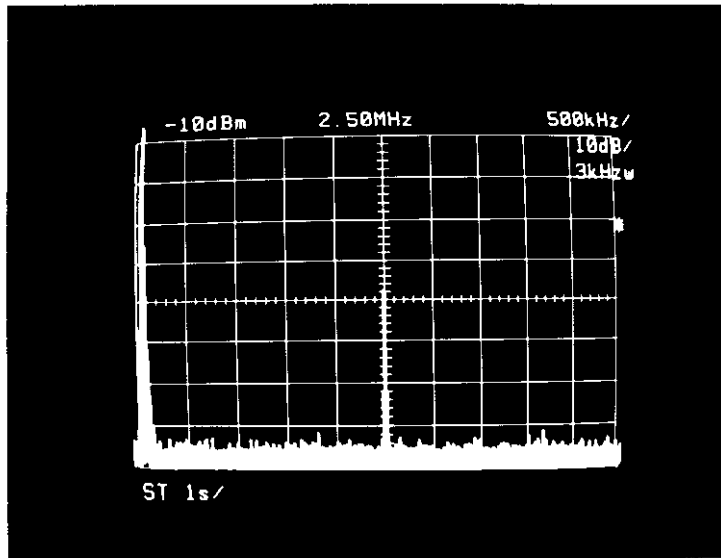


Long Pulse

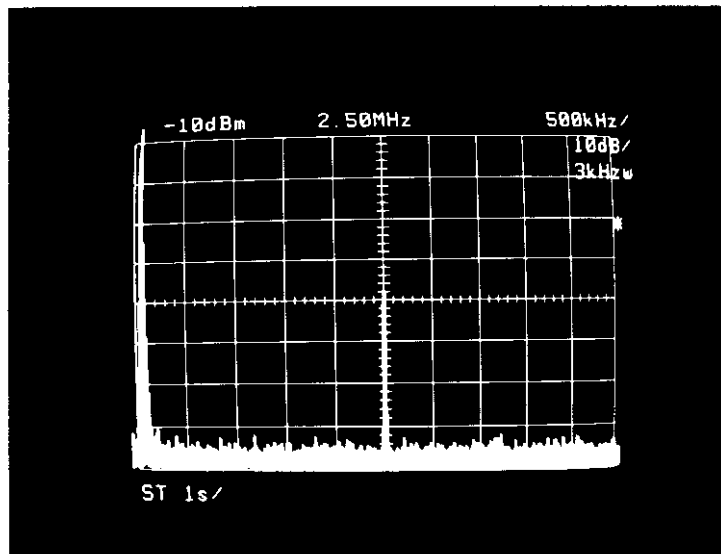
TEST #2

Frequency Band: 0 ~ 5 MHz

Log Ref. Level: 14.0 dBm



Ambient

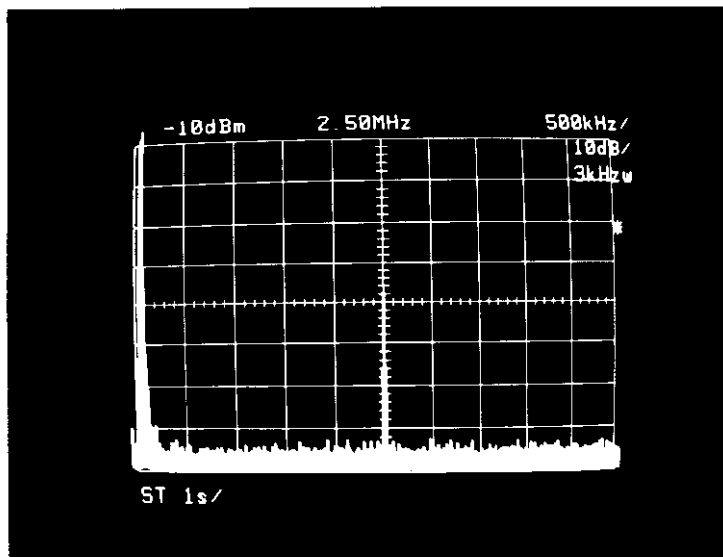


Stand-By

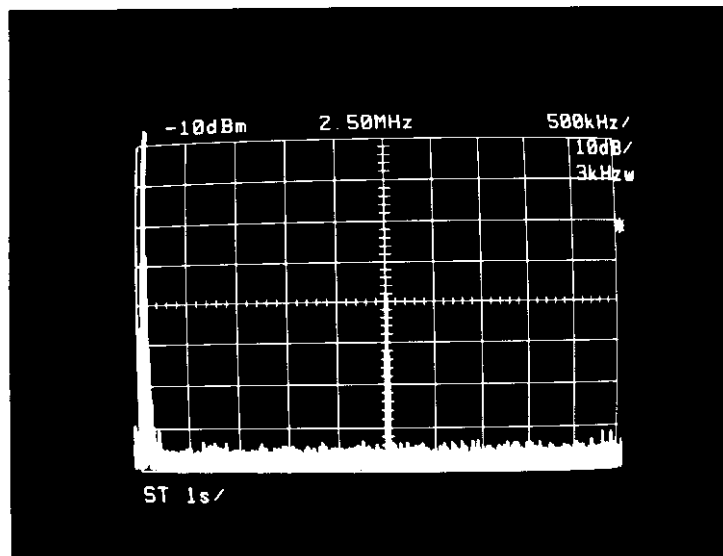
TEST #2

Frequency Band: 0 ~ 5 MHz

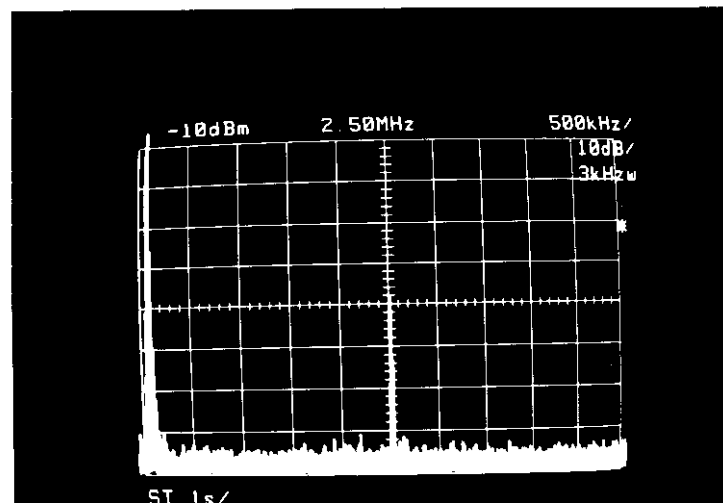
Log Ref. Level: 14.0 dBm



Short Pulse



Medium Pulse

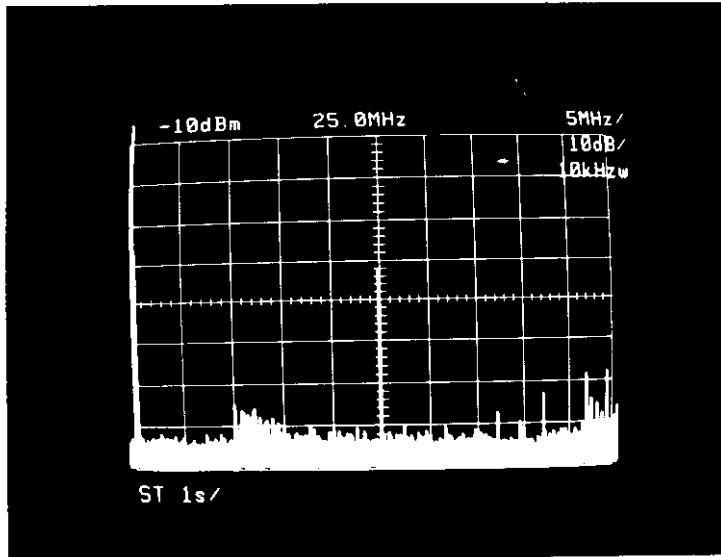


Long Pulse

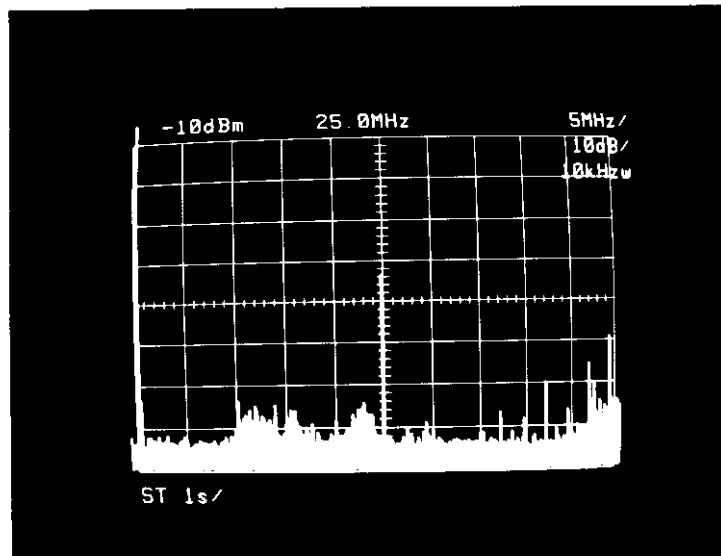
TEST #3

Frequency Band: 0~50 MHz

Log Ref. Level: 11.5 dBm



Ambient



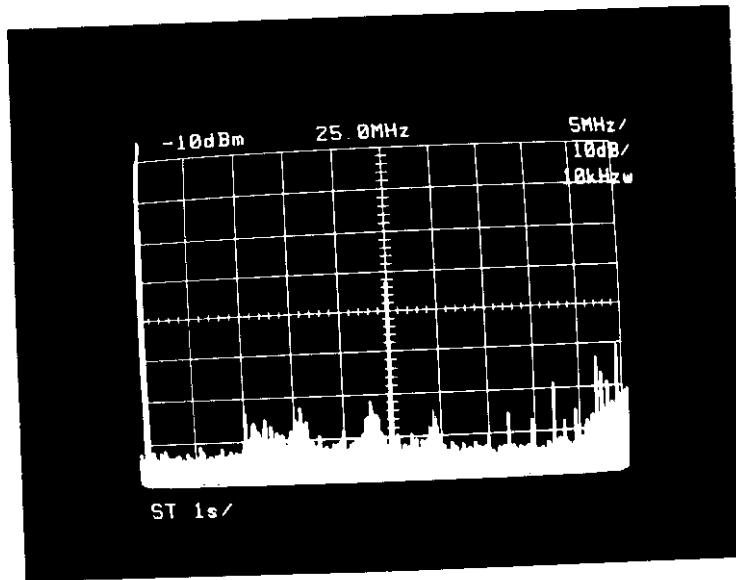
Stand-By



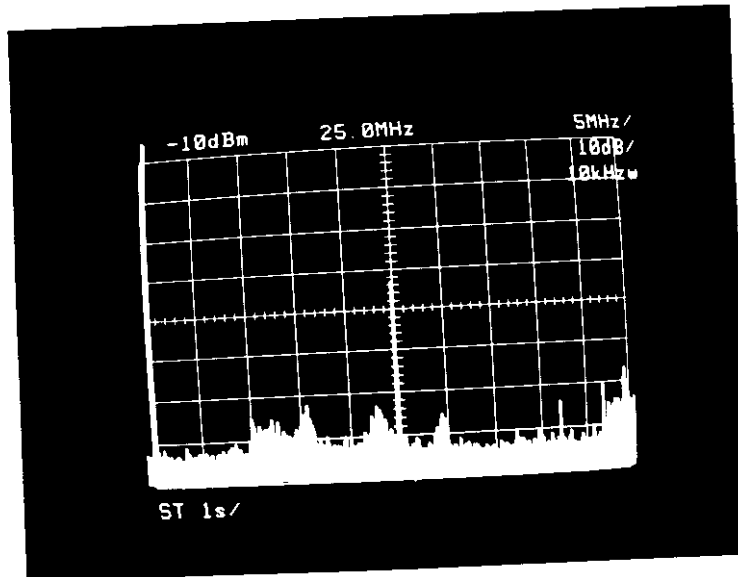
TEST #3

Frequency Band: 0~50 MHz

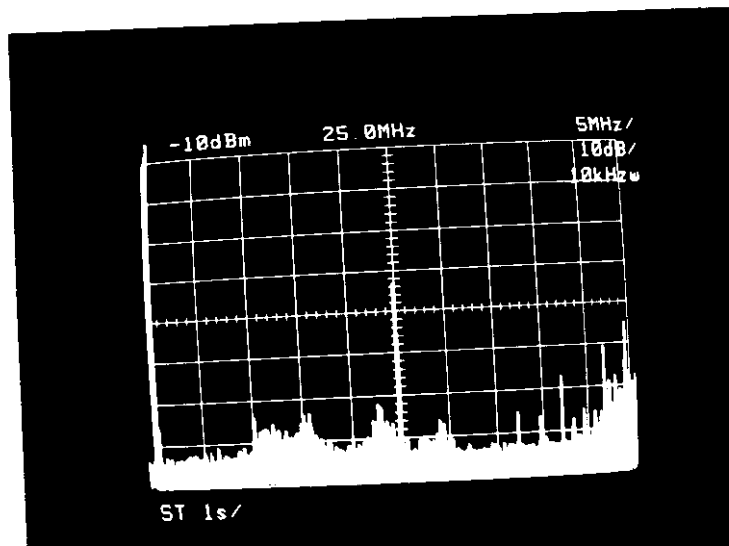
Log Ref. Level: 11.5 dBm



Short Pulse



Medium Pulse

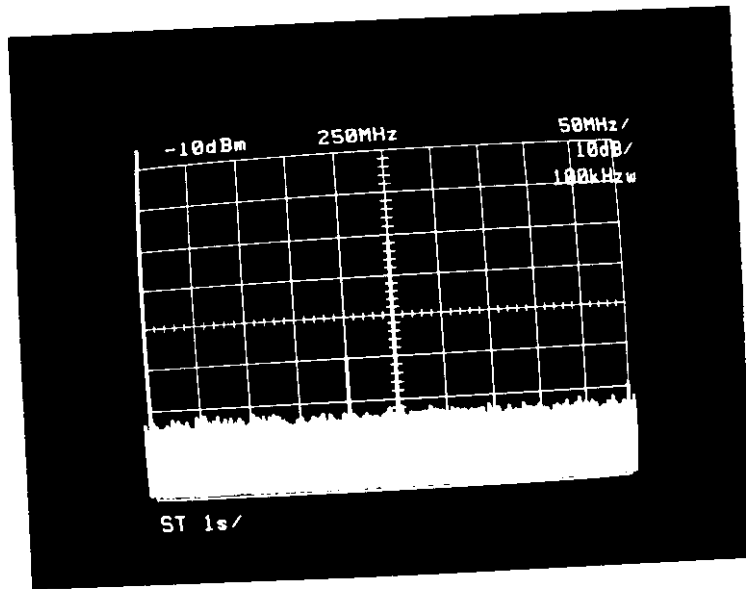


Long Pulse

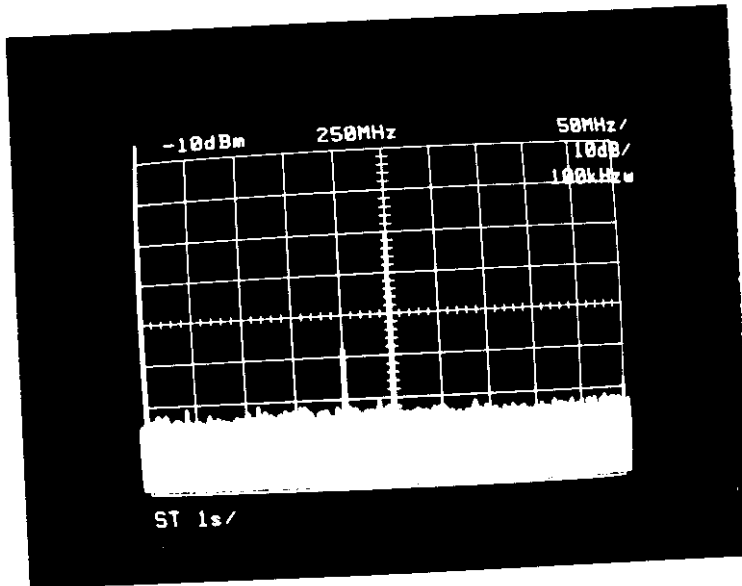
TEST #4

Frequency Band: 0~500 MHz

Log Ref. Level: 5.5 dBm



Ambient



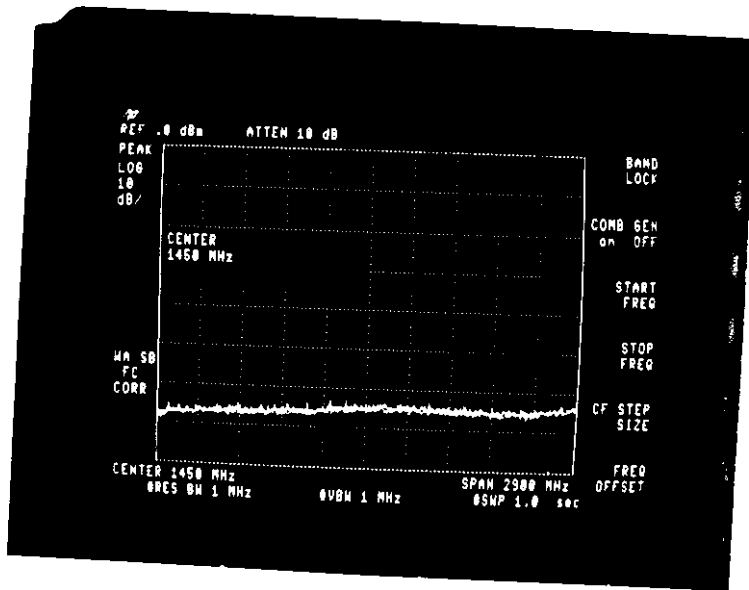
Stand-By

TEST #6

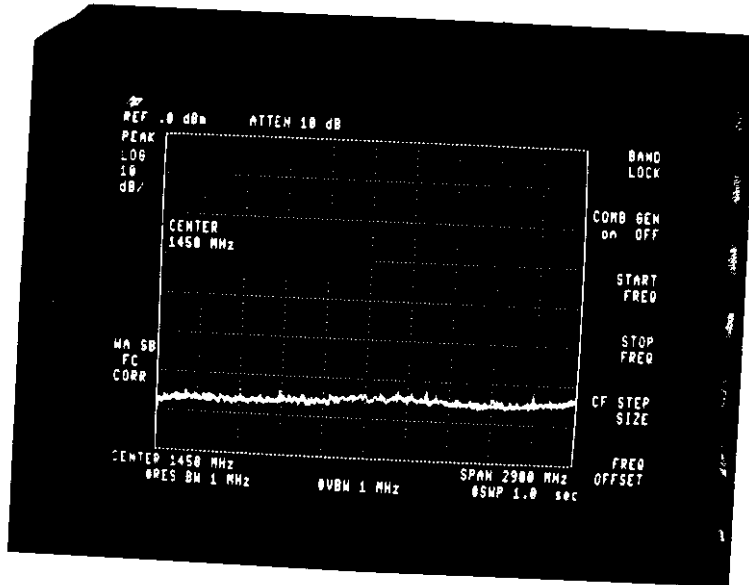
Frequency Band: 1~2.9 GHz

Log Ref. Level: 0 dBm

Maximum Spurious Signal Observed: (See Calibration Procedure for Test 6~11)



SHORT PULSE



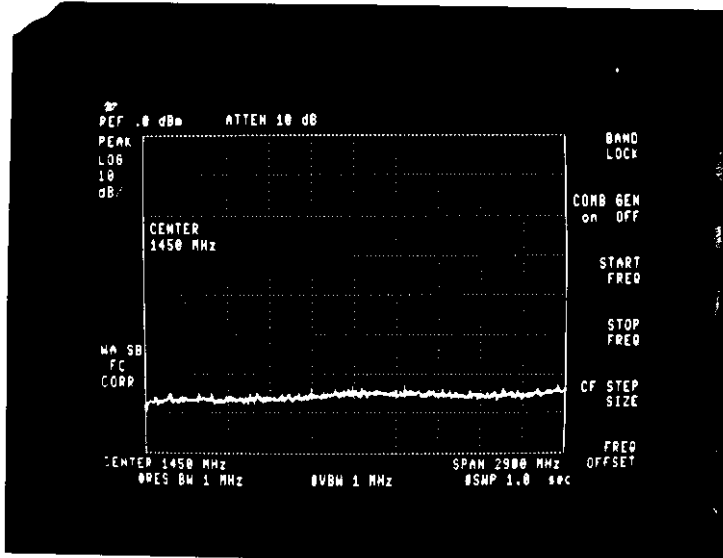
MEDIUM PULSE

TEST #6

Frequency Band: 1~2.9 GHz

Log Ref. Level: 0 dBm

Maximum Spurious Signal Observed: (See Calibration Procedure  
for Test 6~11)



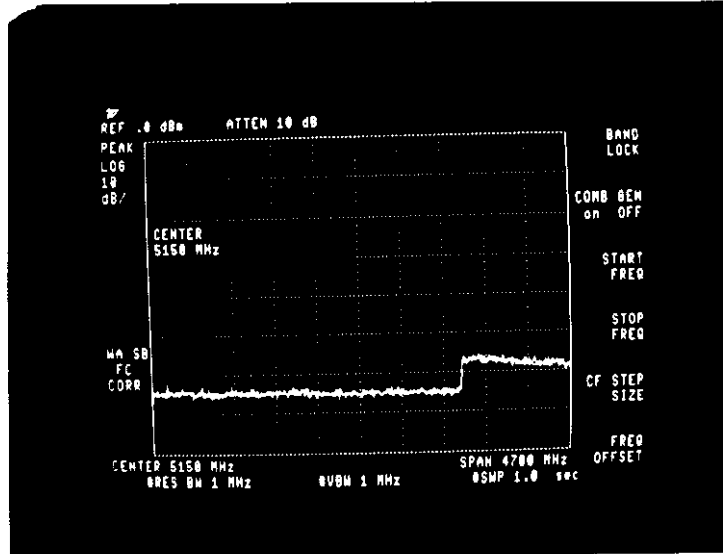
LONG PULSE

TEST #7

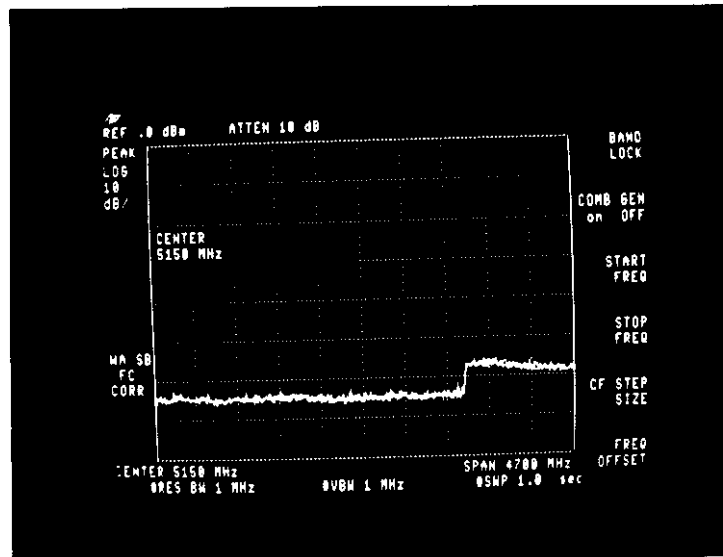
Frequency Band: 2.8~7.5 GHz

Log Ref. Level: 0 dBm

Maximum Spurious Signal Observed: (See Calibration Procedure for Test 6~11)



AMBIENT



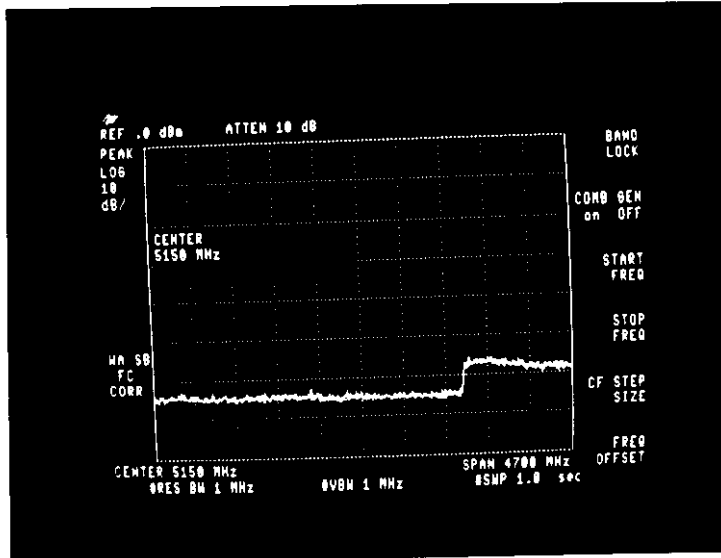
STANDBY

TEST #7

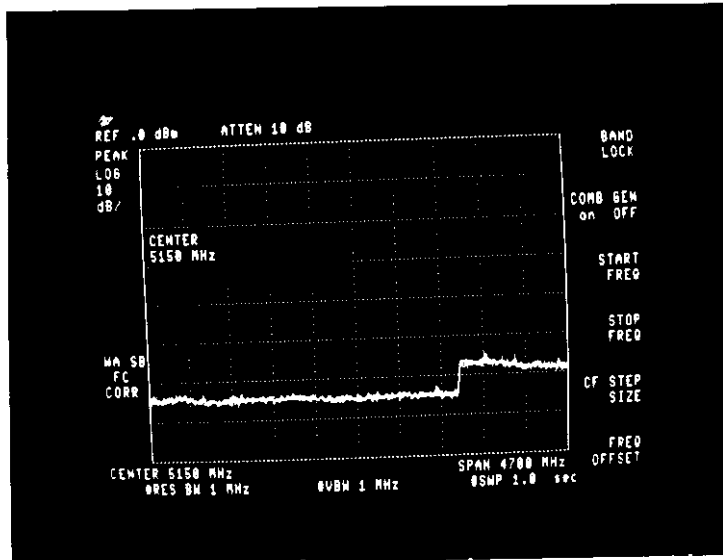
Frequency Band: 2.8~7.5 GHz

Log Ref. Level: 0 dBm

Maximum Spurious Signal Observed: (See Calibration Procedure for Test 6~11)



SHORT PULSE



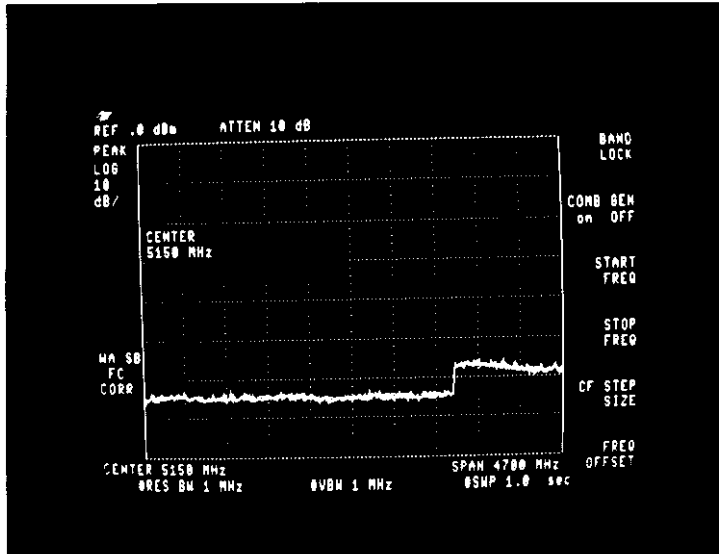
MEDIUM PULSE

TEST #7

Frequency Band: 2.8~7.5 GHz

Log Ref. Level: 0 dBm

Maximum Spurious Signal Observed: (See Calibration Procedure  
for Test 6~11)



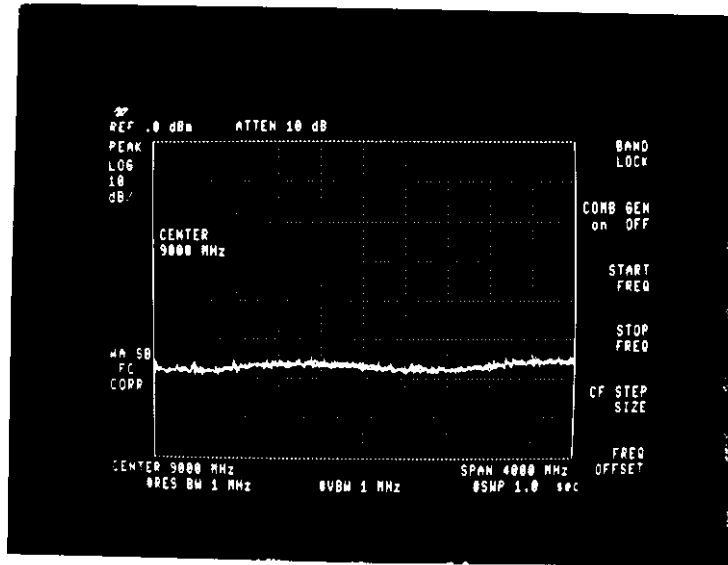
LONG PULSE

TEST #8

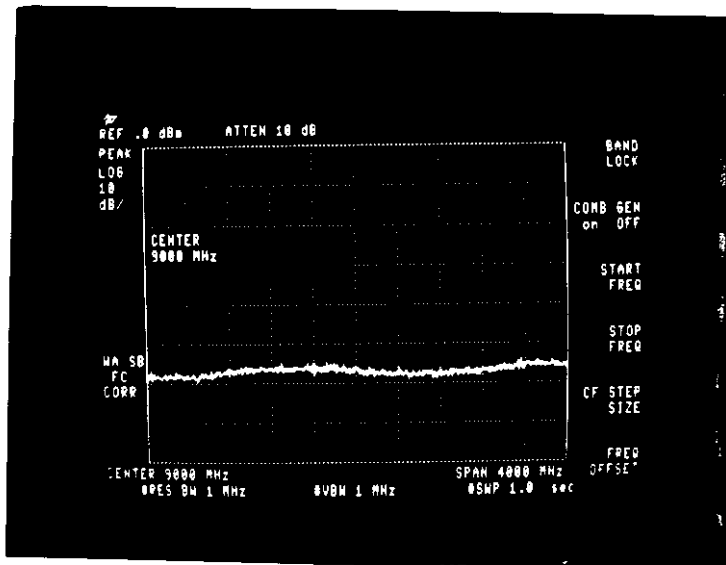
Frequency Band: 7~11 GHz

Log Ref. Level: 0 dBm

Maximum Spurious Signal Observed: (See Calibration Procedure for Test 6~11)



AMBIENT



STANDBY

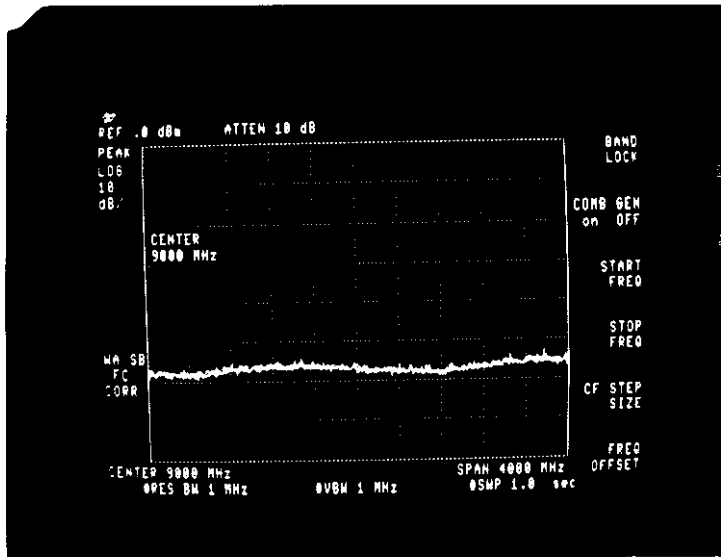


TEST #8

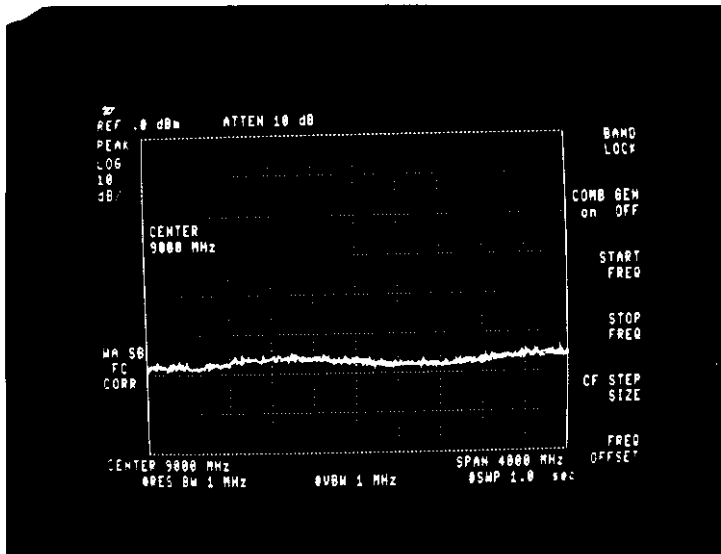
Frequency Band: 7~11 GHz

Log Ref. Level: 0 dBm

Maximum Spurious Signal Observed: (See Calibration Procedure for Test 6~11)



SHORT PULSE



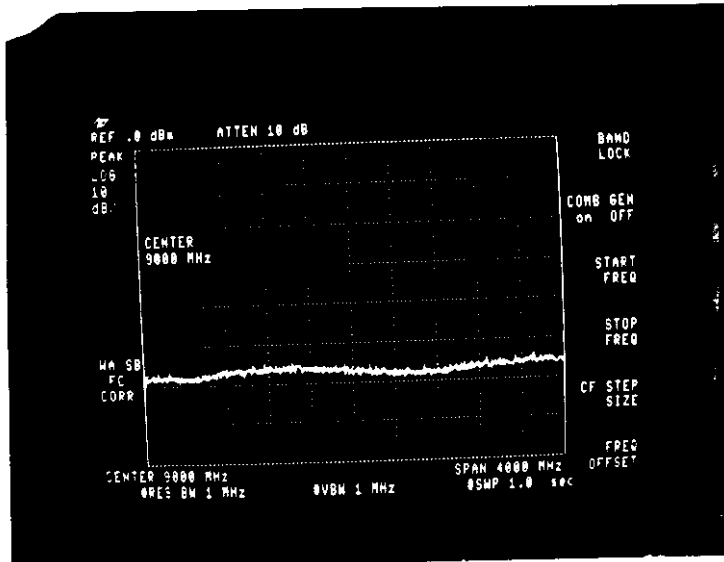
MEDIUM PULSE

TEST #8

Frequency Band: 7~11 GHz

Log Ref. Level: 0 dBm

Maximum Spurious Signal Observed: (See Calibration Procedure  
for Test 6~11)



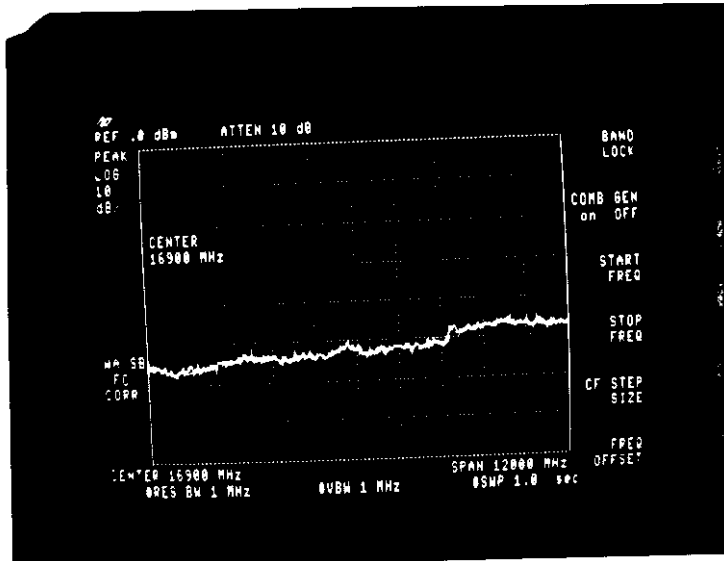
LONG PULSE

TEST #9

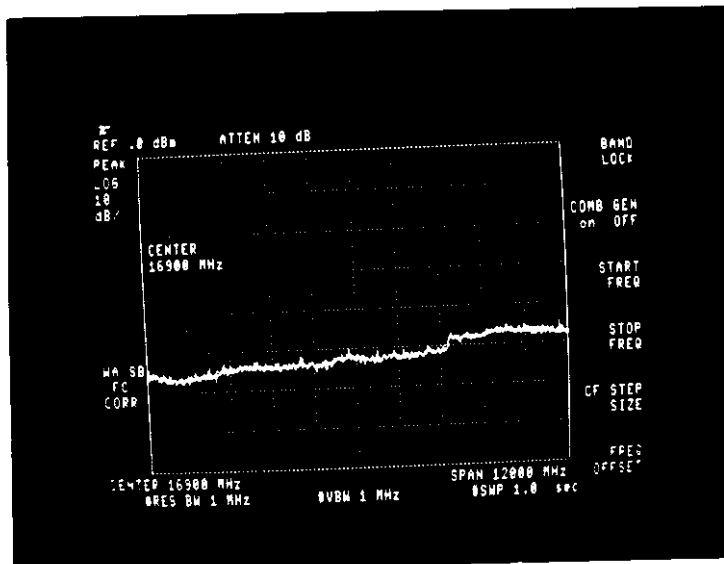
Frequency Band: 10.9~20 GHz

Log Ref. Level: 0 dBm

Maximum Spurious Signal Observed: (See Calibration Procedure for Test 6~11)



AMBIENT



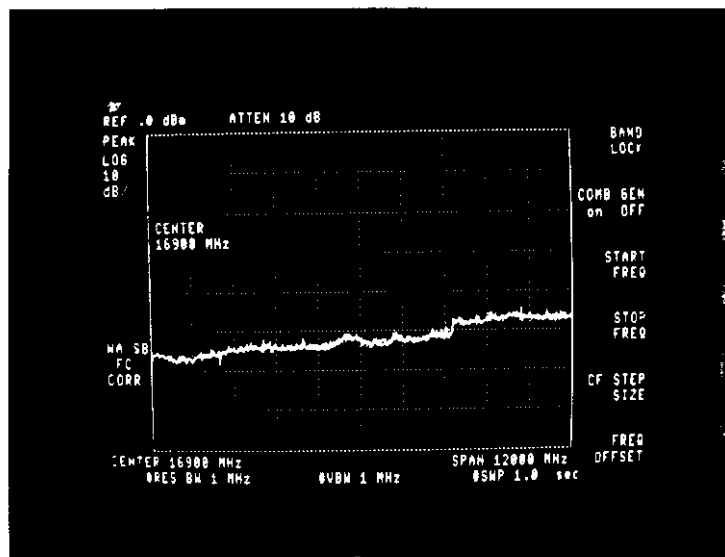
STANDBY

TEST #9

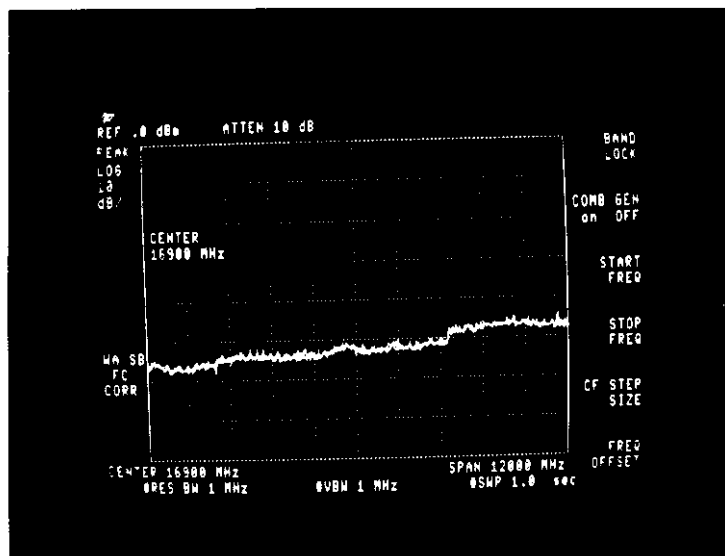
Frequency Band: 10.9~20 GHz

Log Ref. Level: 0 dBm

Maximum Spurious Signal Observed: (See Calibration Procedure for Test 6~11)



SHORT PULSE



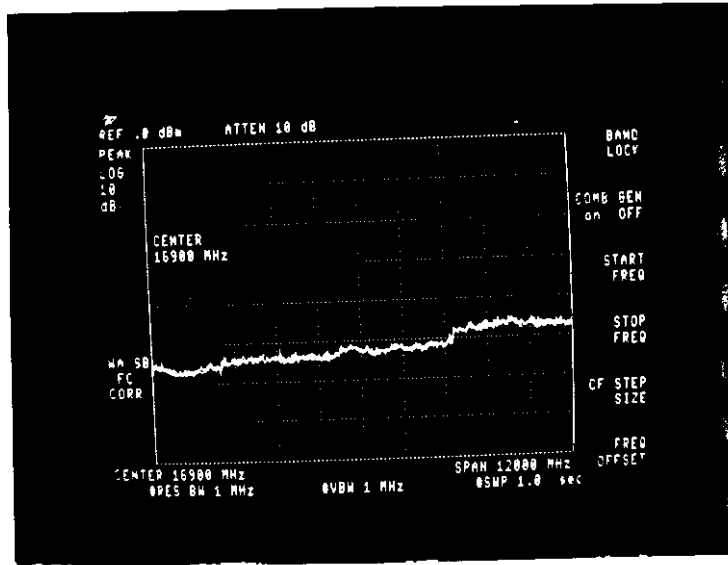
MEDIUM PULSE

TEST #9

Frequency Band: 10.9~20 GHz

Log Ref. Level: 0 dBm

Maximum Spurious Signal Observed: (See Calibration Procedure  
for Test 6~11)



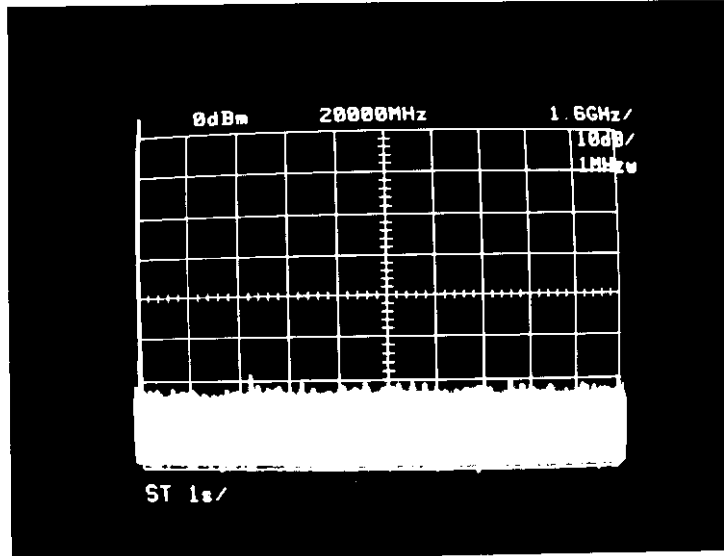
LONG PULSE

TEST #10

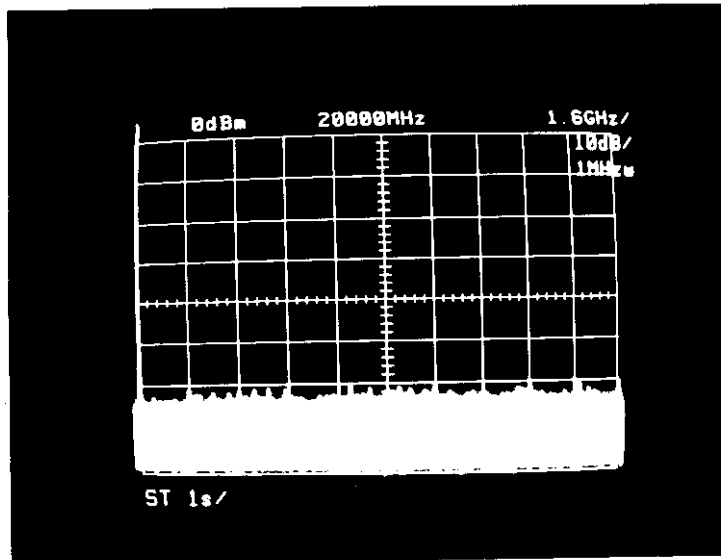
Frequency Band: 12.4~28 GHz

Log Ref. Level: 0 dBm

Maximum Spurious Signal Observed: (See Calibration Procedure  
for Test 6~11)



AMBIENT



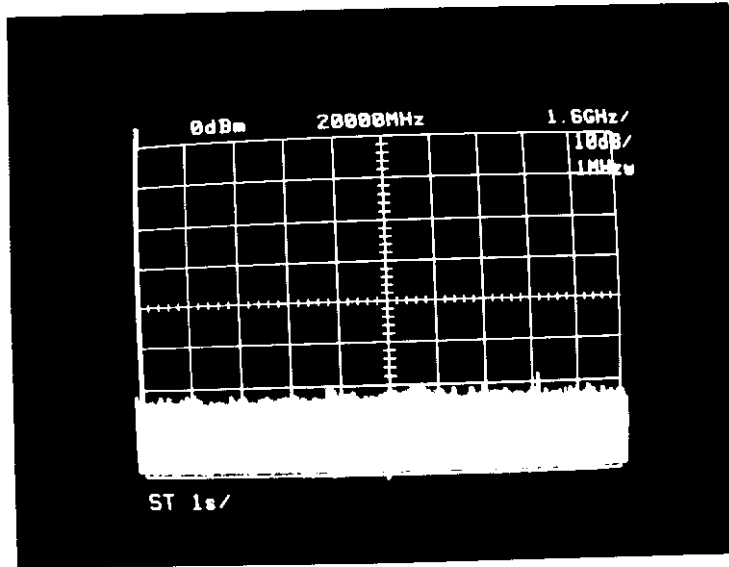
STANDBY

TEST #10

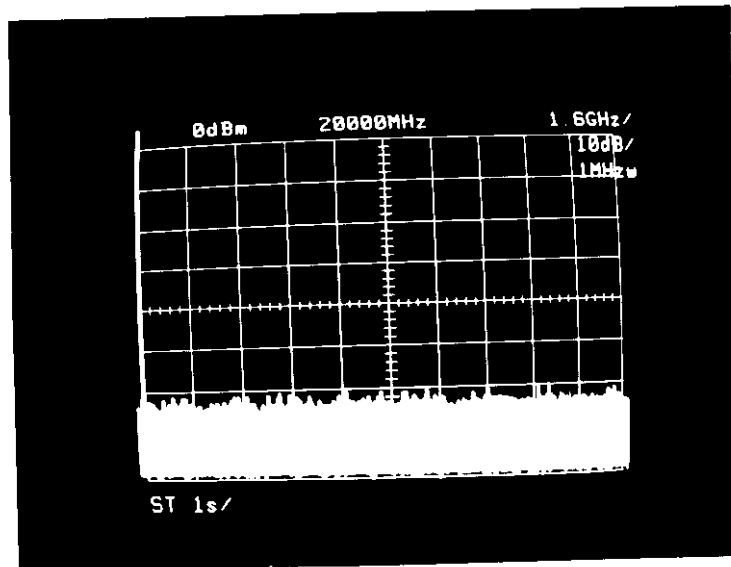
Frequency Band: 12.4~28 GHz

Log Ref. Level: 0 dBm

Maximum Spurious Signal Observed: (See Calibration Procedure  
for Test 6~11)



SHORT PULSE



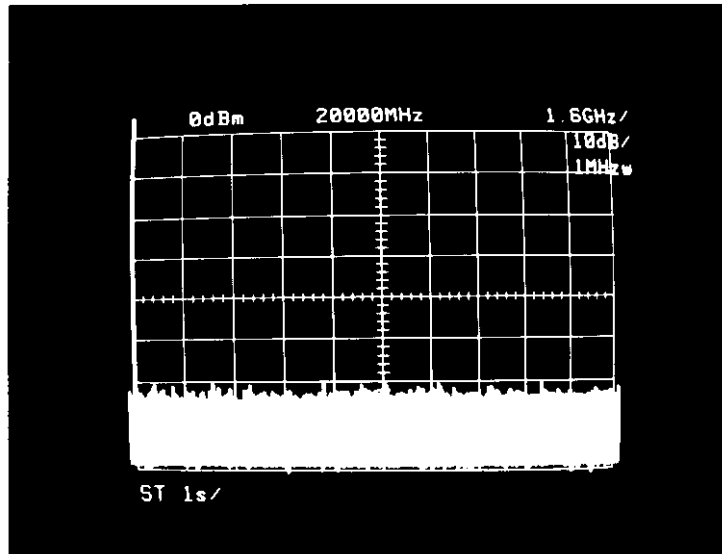
MEDIUM PULSE

TEST #10

Frequency Band: 12.4~28 GHz

Log Ref. Level: 0 dBm

Maximum Spurious Signal Observed: (See Calibration Procedure  
for Test 6~11)



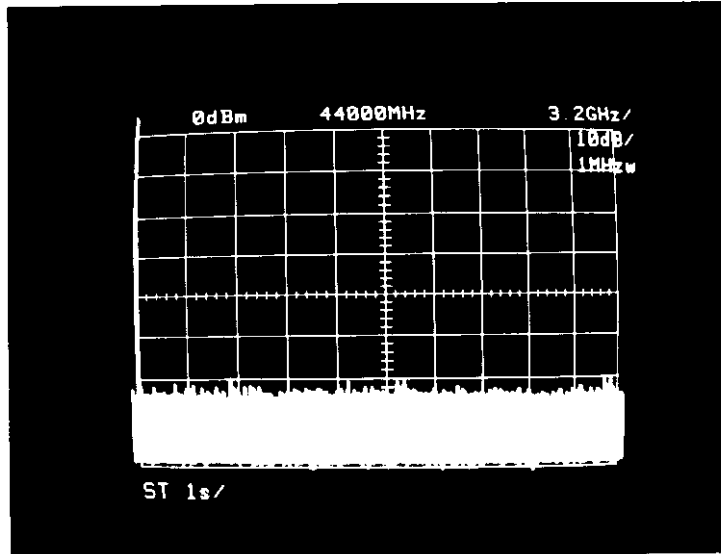


TEST #11

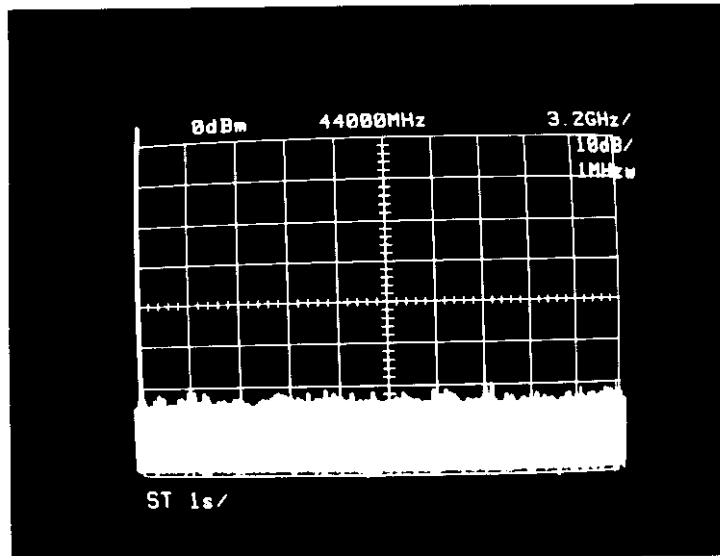
Frequency Band: 28~40 GHz

Log Ref. Level: 0 dBm

Maximum Spurious Signal Observed: (See Calibration Procedure  
for Test 6~11)



AMBIENT



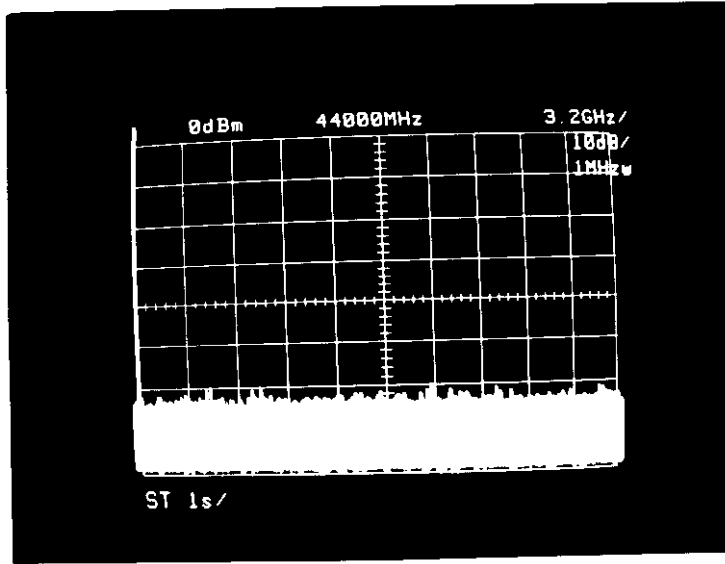
STANDBY

TEST #11

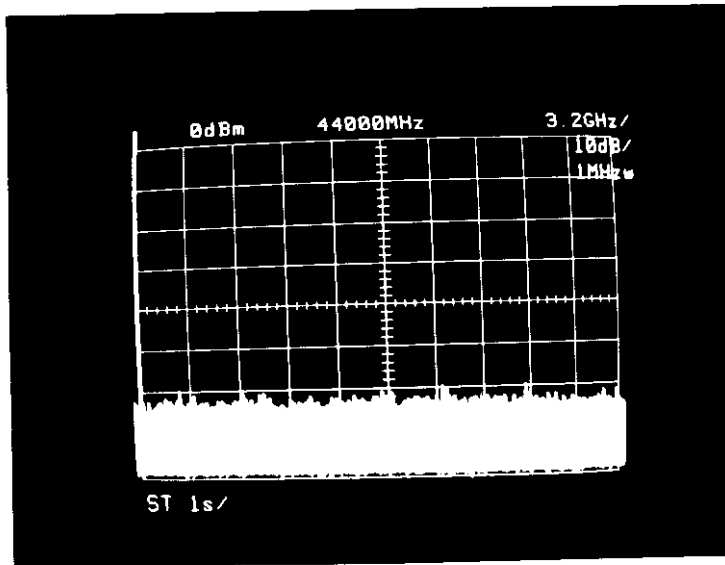
Frequency Band: 28~40 GHz

Log Ref. Level: 0 dBm

Maximum Spurious Signal Observed: (See Calibration Procedure  
for Test 6~11)



SHORT PULSE



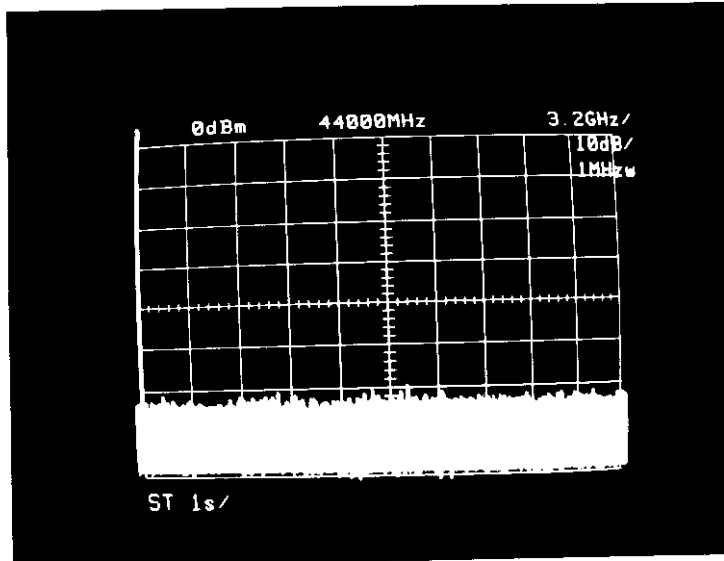
MEDIUM PULSE

TEST #11

Frequency Band: 28~40 GHz

Log Ref. Level: 0 dBm

Maximum Spurious Signal Observed: (See Calibration Procedure  
for Test 6~11)

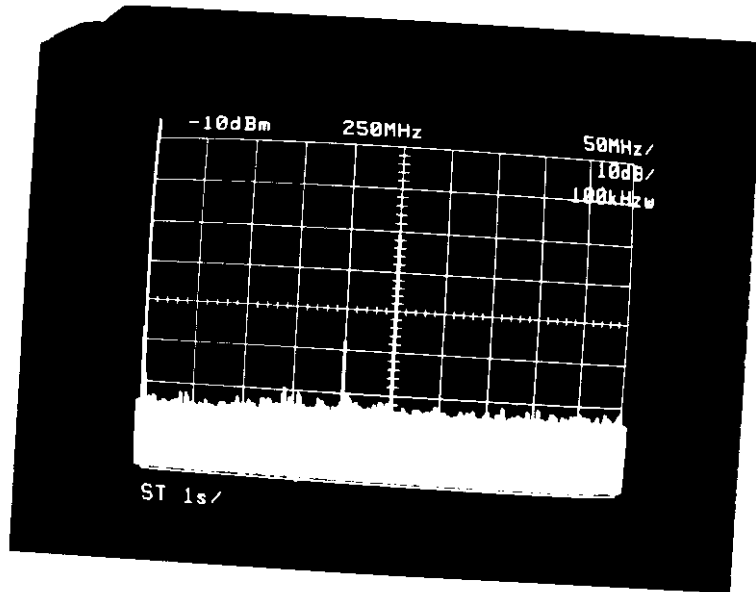


LONG PULSE

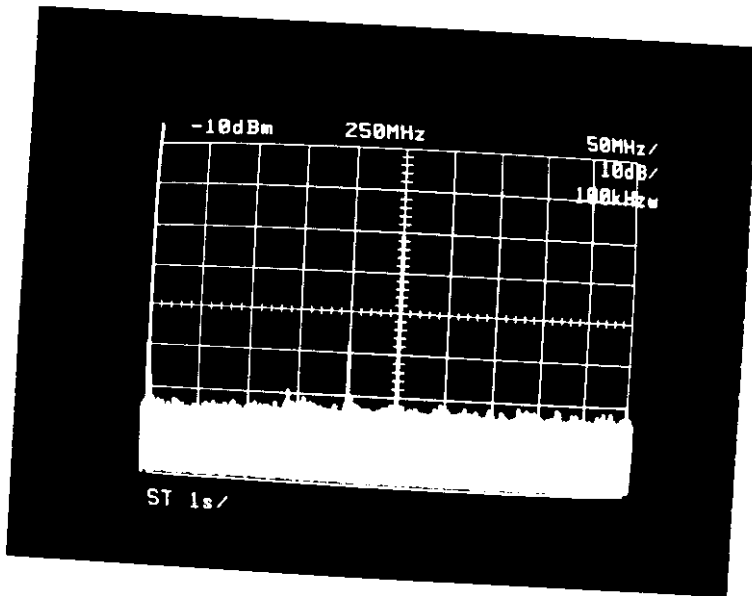
Frequency Band: 0~500 MHz

TEST #4

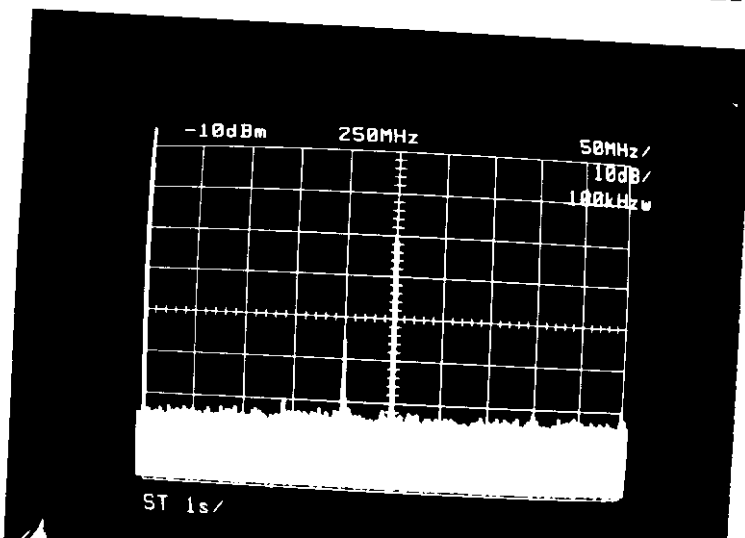
Log Ref. Level: 5.5 dBm



Short Pulse



Medium Pulse

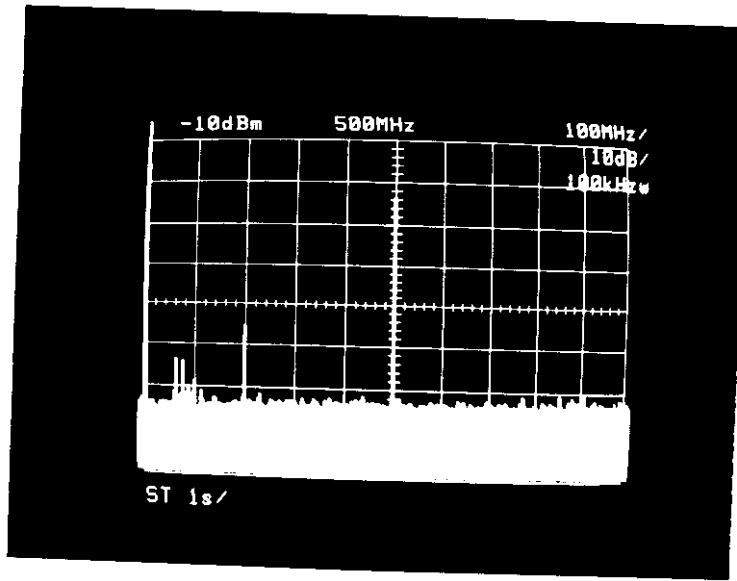


Long Pulse

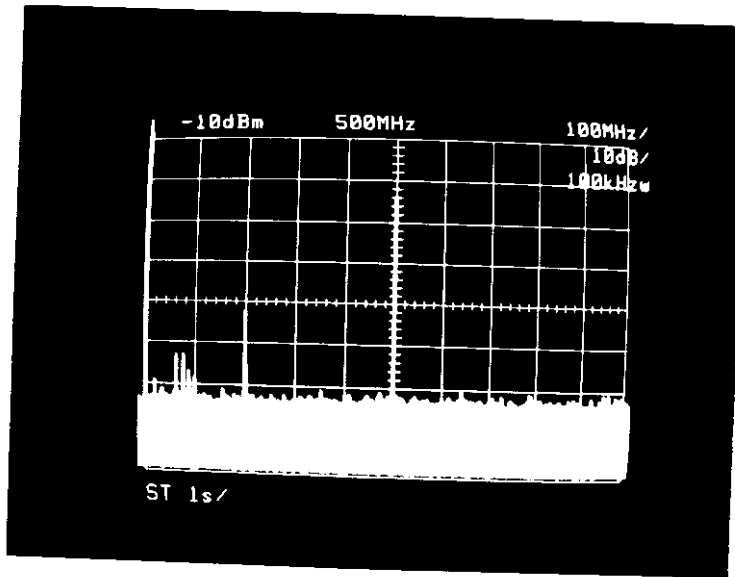
Frequency Band: 0~1 GHz

TEST #5

Log Ref. Level: 2.0 dBm



Ambient

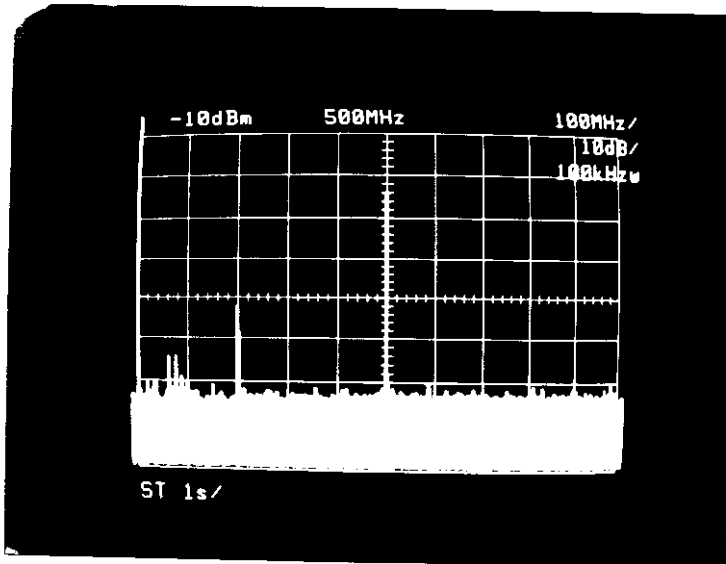


Stand-By

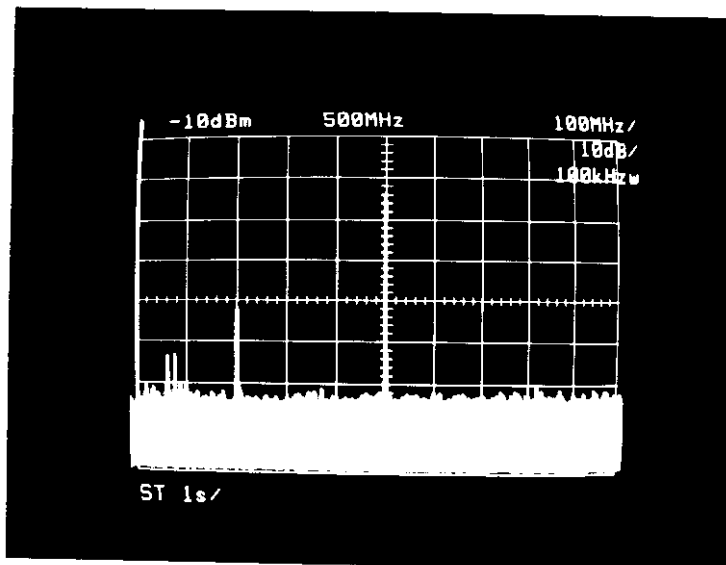
TEST #5

Frequency Band: 0~1 GHz

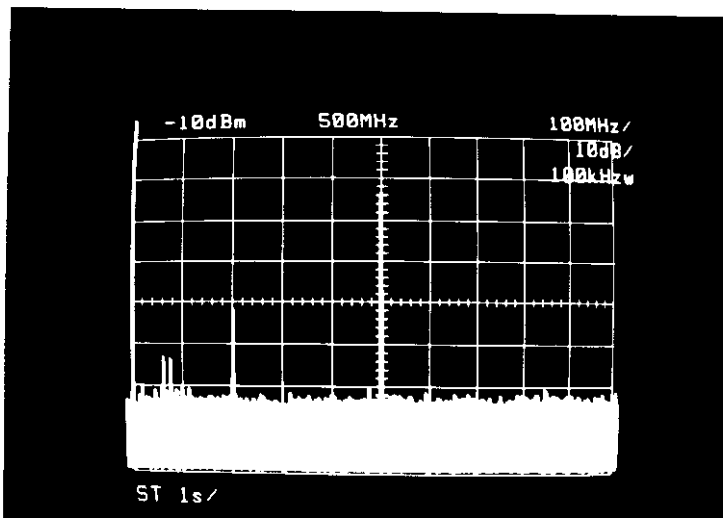
Log Ref. Level: 2.0 dBm



Short Pulse



Medium Pulse



Long Pulse

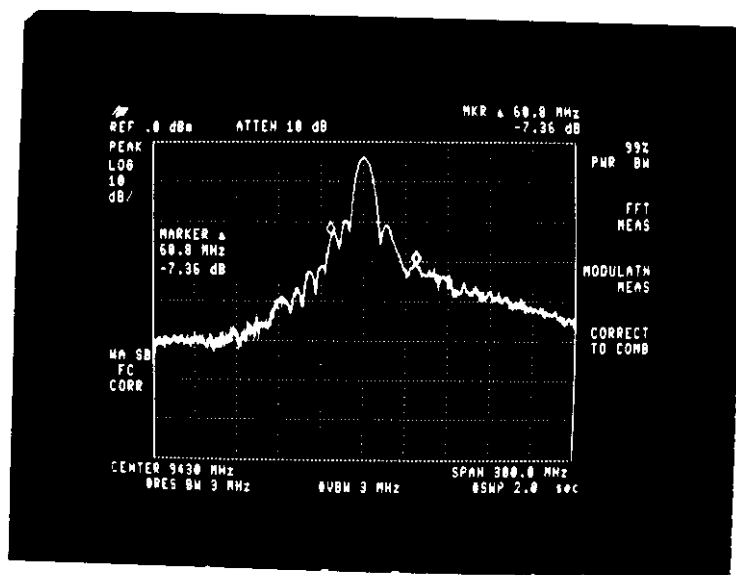
(Sec. 2.989)

2.0 Occupied Bandwidth

2.1 Short Pulse PRF 2160 Hz

Short Pulse Length 0.082  $\mu$ S

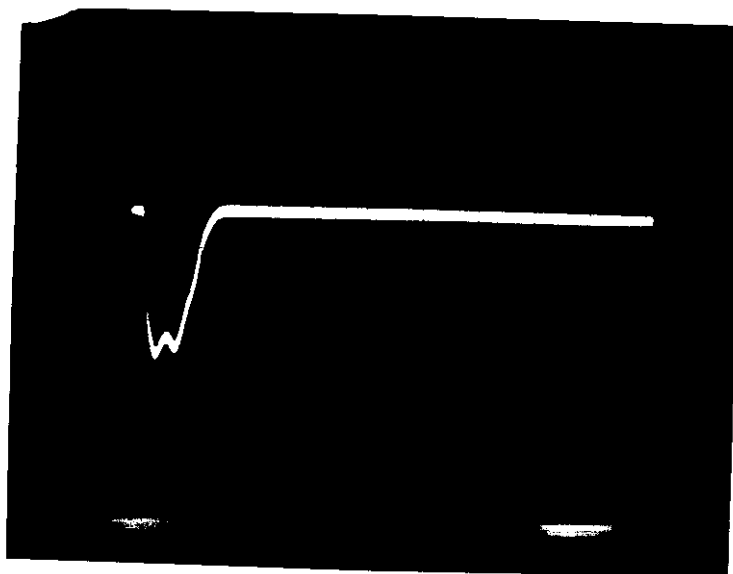
Scale  
10dB/Div



Scale 30 MHz/Div  
Center Frequency 9430 MHz

(Sec. 2.987)

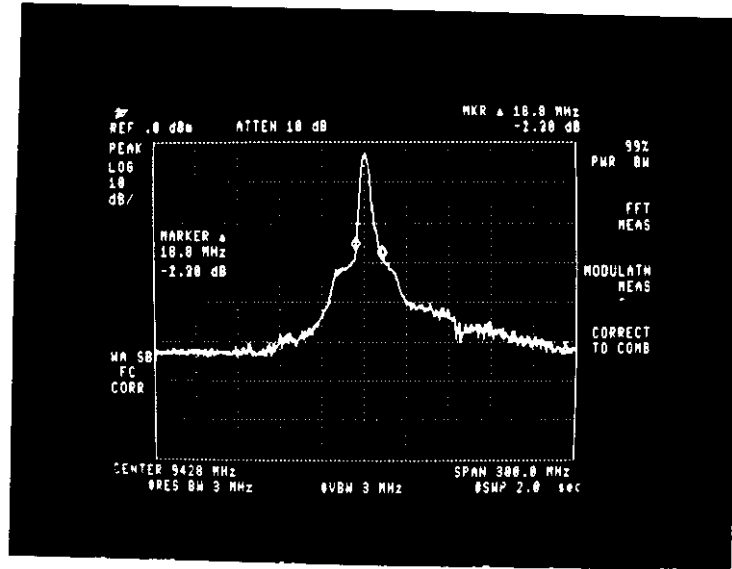
Scale  
0.1  $\mu$ S/Div



Scale 0.1  $\mu$ S Div

(Sec. 2.989)      2.2 Medium Pulse PRF      1188 Hz  
                          Medium Pulse Length      0.32  $\mu$ S

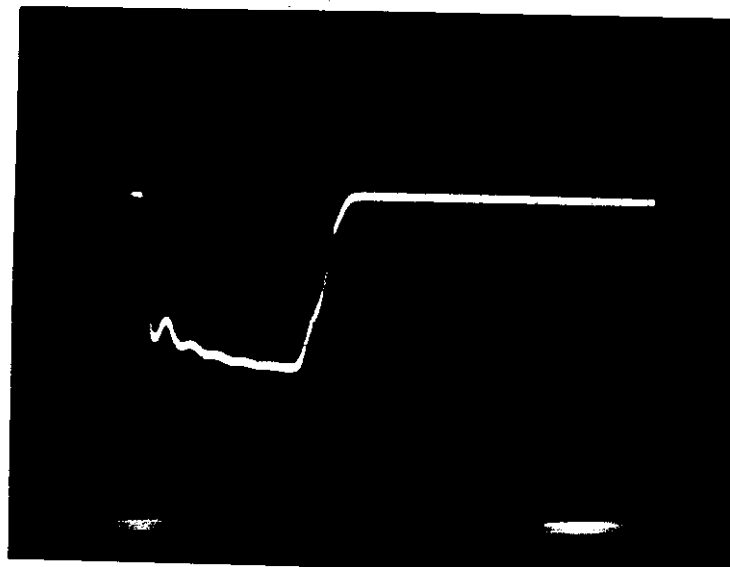
Scale  
 10dB Div



Scale 30 MHz/ Div  
 Center Frequency 9428 MHz

(Sec. 2.987)

Scale  
 0.1V Div



Scale 0.1  $\mu$ S Div

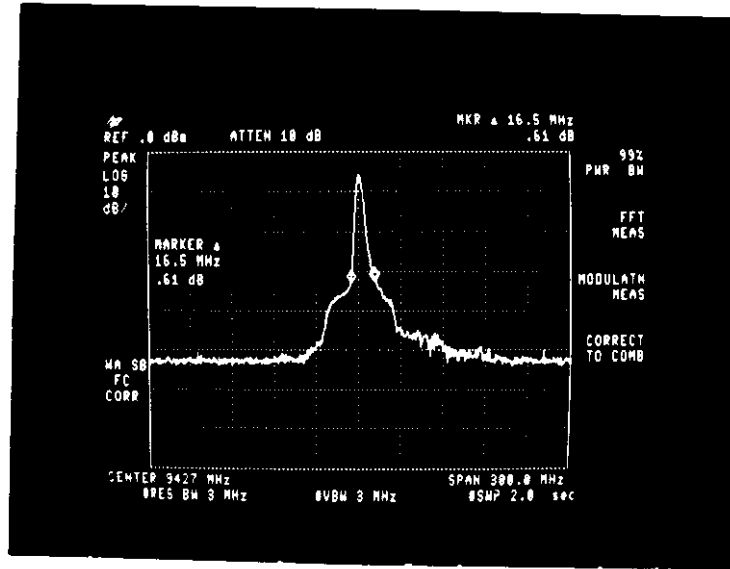


(Sec. 2.989)

2.3 Long Pulse PRF  
Long Pulse Length

595 Hz  
0.82  $\mu$  S

Scale  
10dB Div



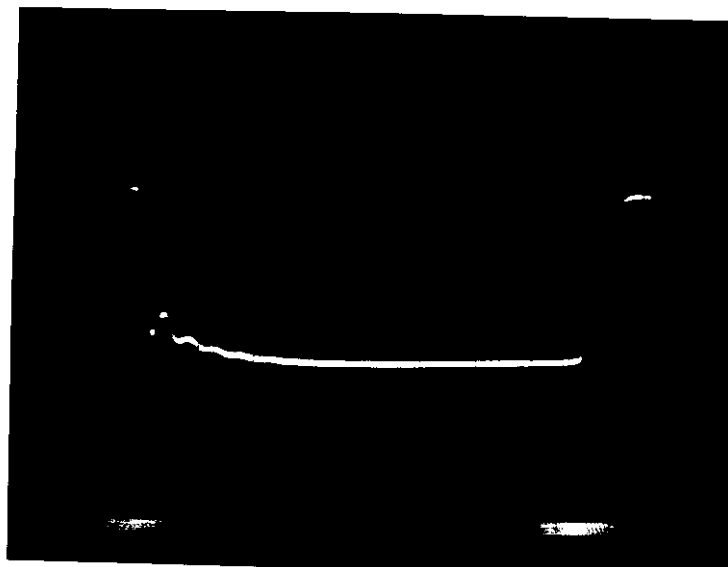
RF Spectrum  
Long Pulse

OBW-16.5 MHz

Scale 30 MHz Div  
Center Frequency 9427 MHz

(Sec. 2.987)

Scale  
0.1V Div



← -3dB

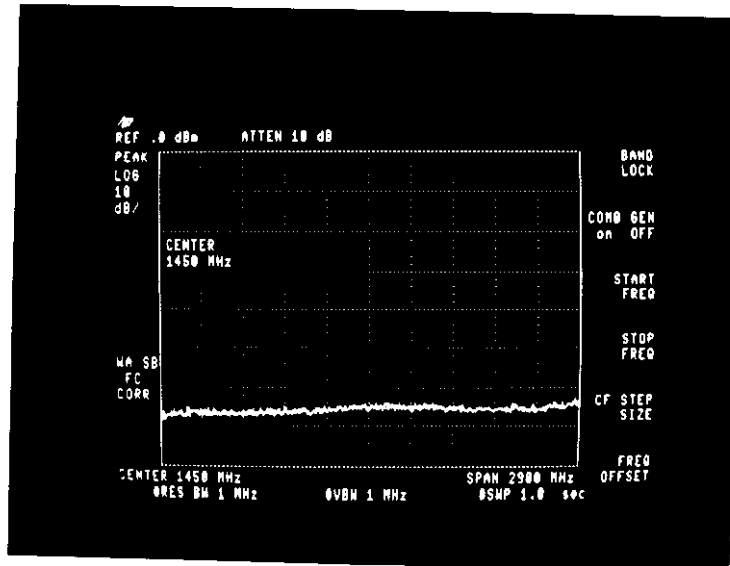
Detected RF  
Pulse

Long Pulse

Scale 0.1  $\mu$  S Div

(Sec. 2.991)

Scale  
↑ 10dB/Div  
→ 290 MHz  
/Div

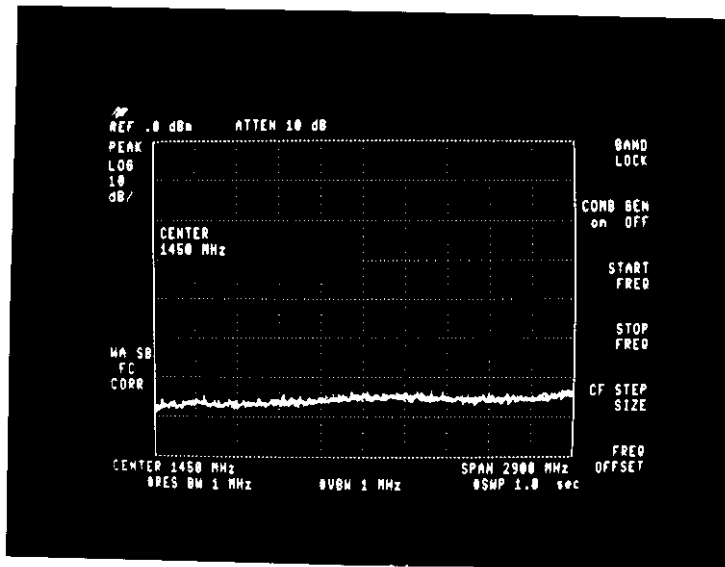


Spurious  
Signals

OFF

0 to 2.9 GHz

Scale  
↑ 10dB/Div  
> 290 MHz  
/Div

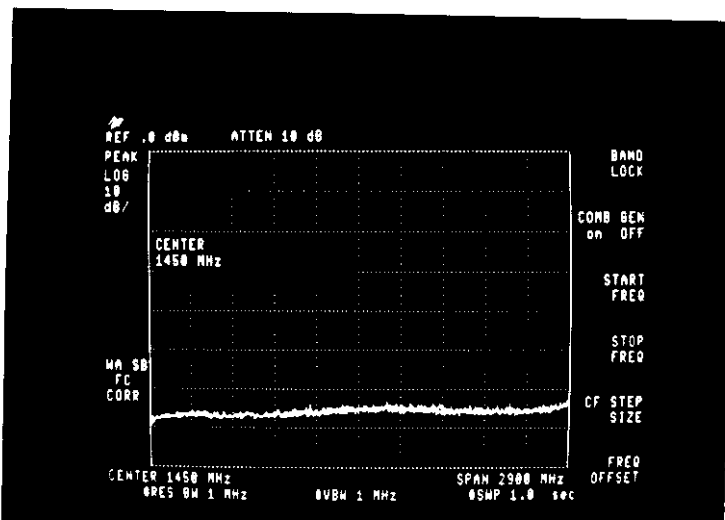


Spurious  
Signals

Stand-By

0 to 2.9 GHz

Scale  
↑ 10dB/Div  
> 290 MHz  
/Div



Spurious  
Signals

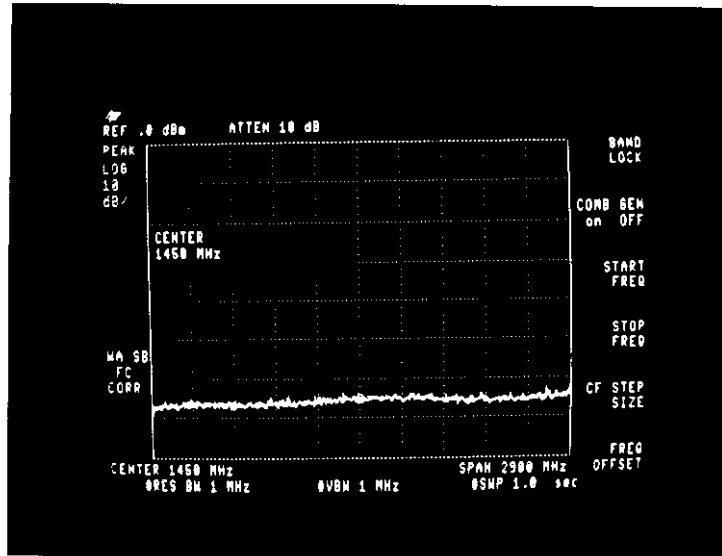
Short Pulse

0 to 2.9 GHz

(Sec. 2.991)

Scale  
↑ 10dB/Div

→ 290 MHz  
/Div



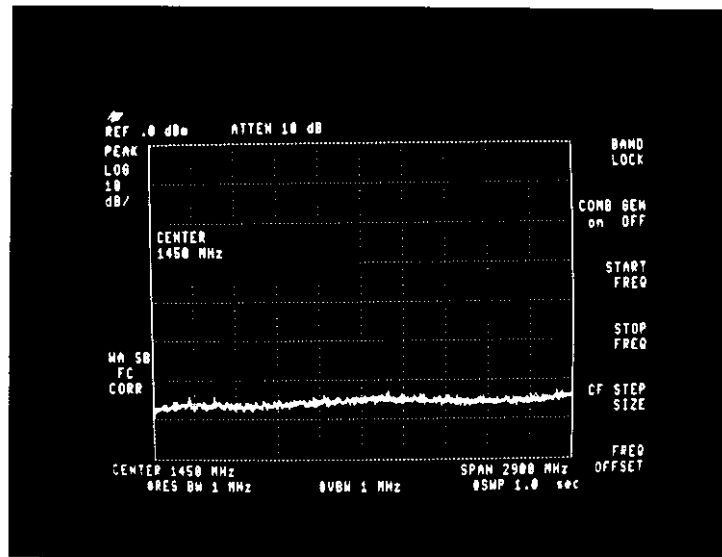
Spurious  
Signals

Medium Pulse

0 to 2.9 GHz

Scale  
↑ 10dB/Div

→ 290 MHz  
/Div



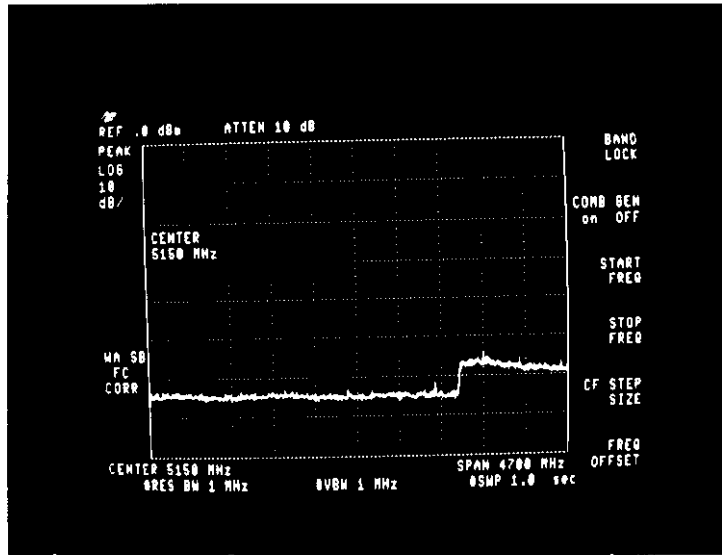
Spurious  
Signals

Long Pulse

0 to 2.9 GHz

(Sec. 2.991)

Scale  
↑ 10dB/Div  
→ 470 MHz  
/Div

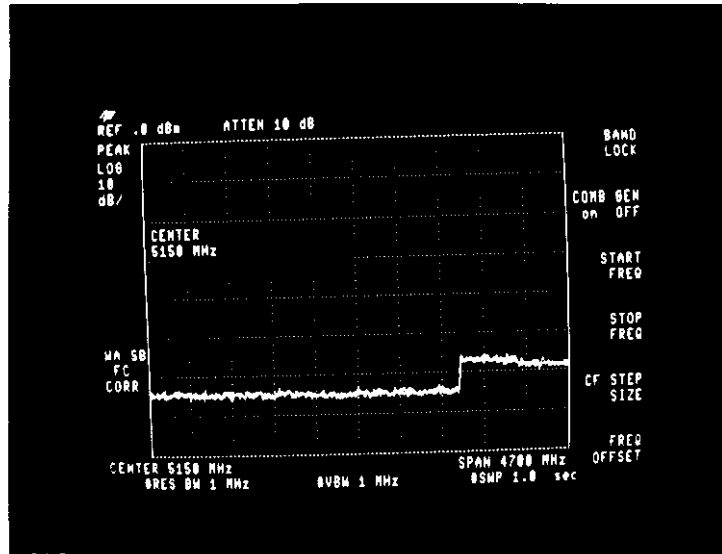


Spurious  
Signals

OFF

2.8 to 7.5 GHz

Scale  
↑ 10dB/Div  
→ 470 MHz  
/Div

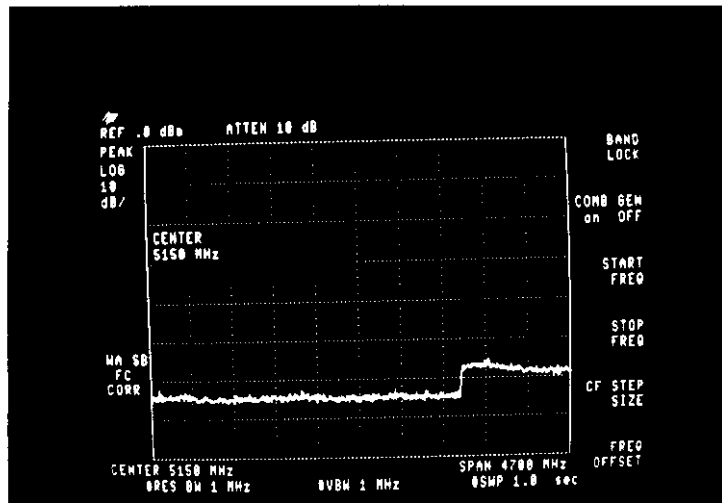


Spurious  
Signals

Stand By

2.8 to 7.5 GHz

Scale  
↑ 10dB/Div  
→ 470 MHz  
/Div



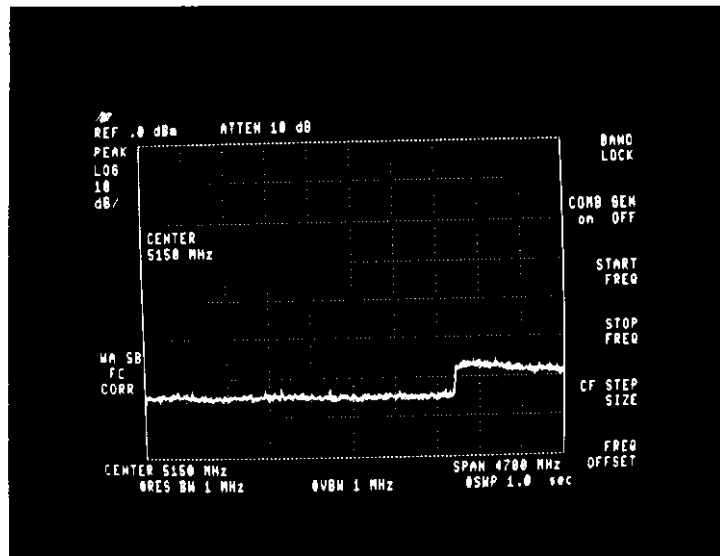
Spurious  
Signals

Short Pulse

2.8 to 7.5 GHz

(Sec. 2.991)

Scale  
↑ 10dB/Div  
→ 470 MHz  
/Div

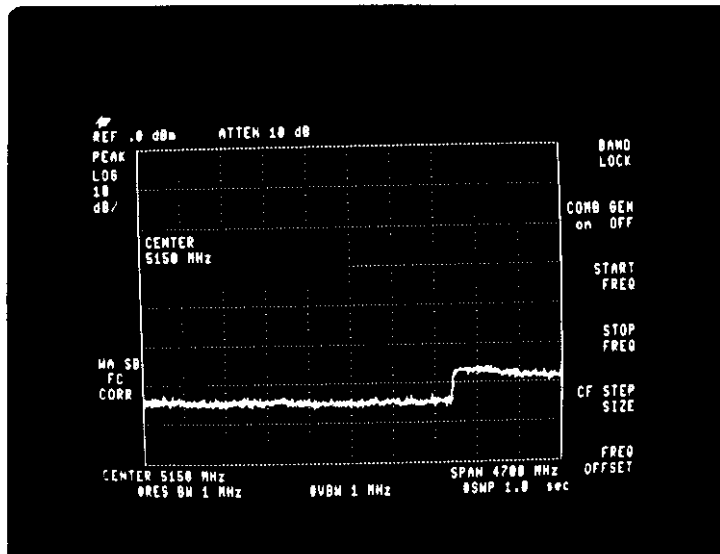


Spurious  
Signals

Medium Pulse

2.8 to 7.5 GHz

Scale  
↑ 10dB/Div  
→ 470 MHz  
/Div



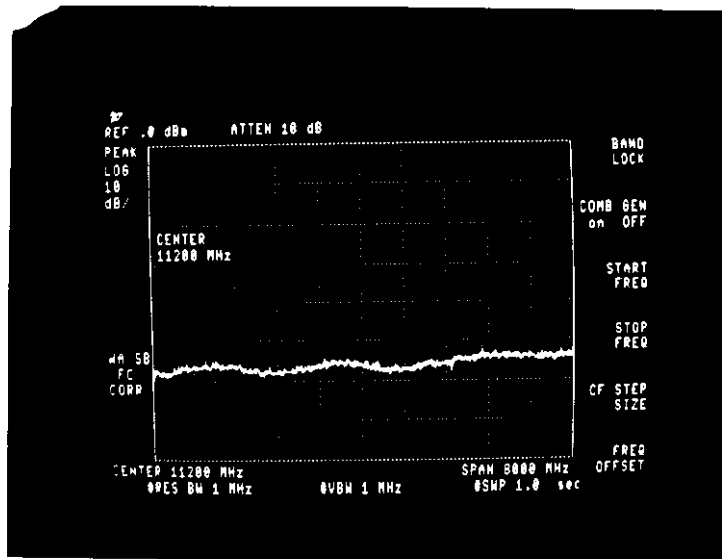
Spurious  
Signals

Long Pulse

2.8 to 7.5 GHz

(Sec. 2.991)

Scale  
↑ 10dB/Div  
→ 800 MHz  
/Div

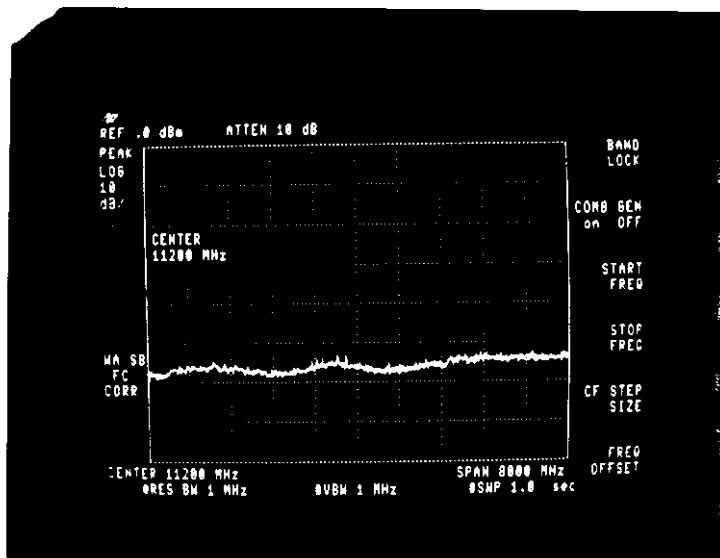


Spurious  
Signals

OFF

7.2 to 15.2 GHz

Scale  
↑ 10dB/Div  
→ 800 MHz  
/Div

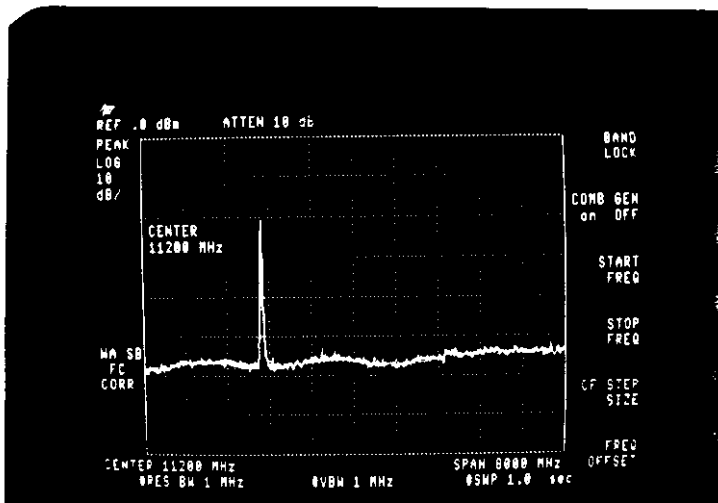


Spurious  
Signals

Stand-By

7.2 to 15.2 GHz

Scale  
↑ 10dB/Div  
→ 800 MHz  
/Div



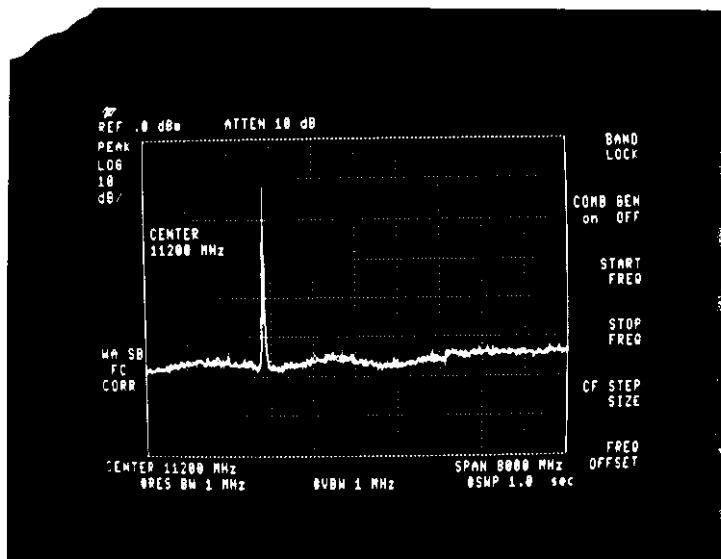
Spurious  
Signals

Short Pulse

7.2 to 15.2 GHz

(Sec. 2.991)

Scale  
↑ 10dB/Div  
→ 800 MHz  
/Div

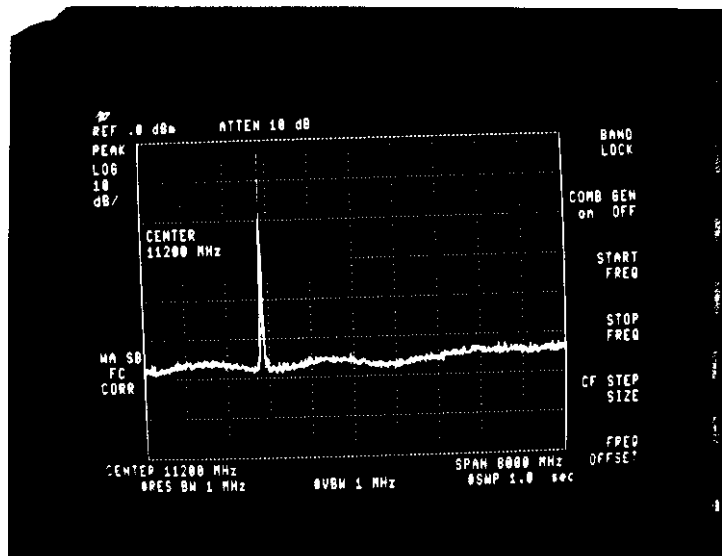


Spurious  
Signals

Medium Pulse

7.2 to 15.2 GHz

Scale  
↑ 10dB/Div  
→ 800 MHz  
/Div



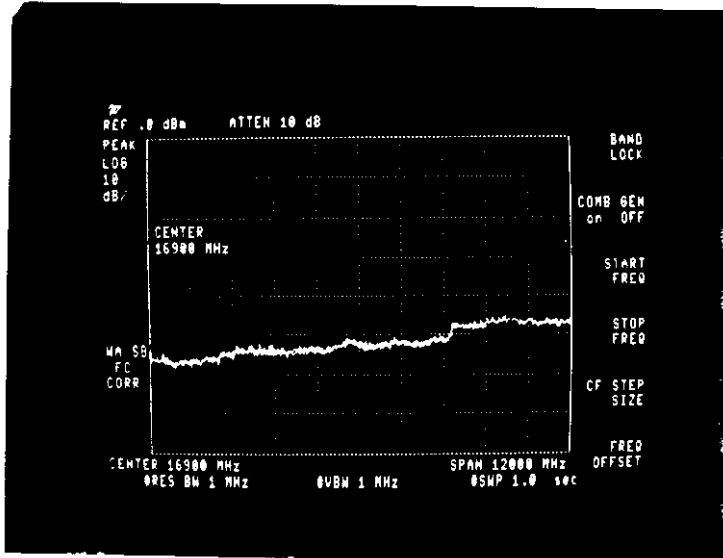
Spurious  
Signals

Long Pulse

7.2 to 15.2 GHz

(Sec. 2.991)

Scale  
↑ 10dB/Div  
> 1.2 GHz  
/Div

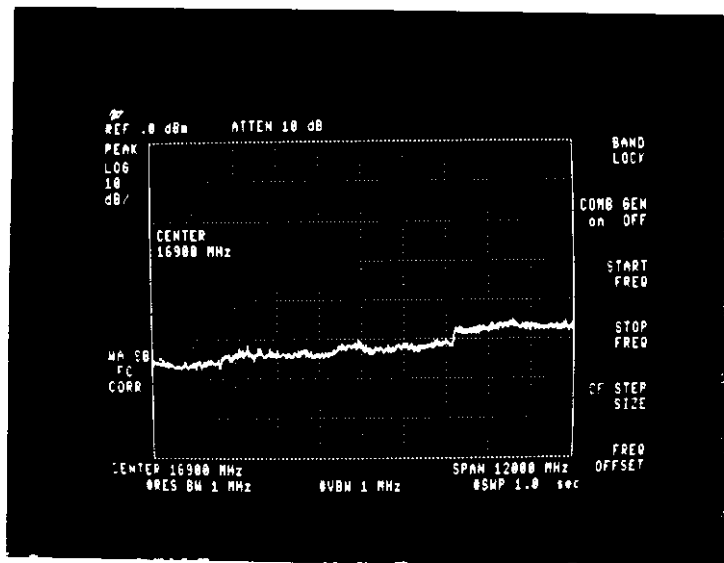


Spurious  
Signals

OFF

10.9 to 20 GHz

Scale  
↑ 10dB/Div  
→ 1.2 GHz  
/Div

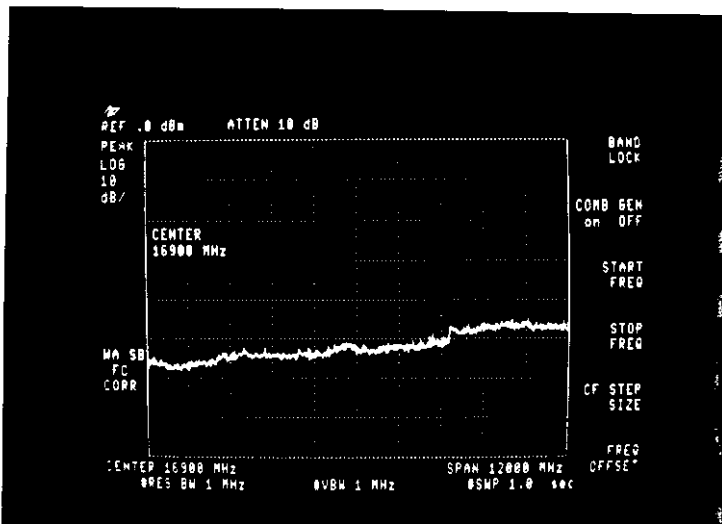


Spurious  
Signals

Stand-By

10.9 to 20 GHz

Scale  
↑ 10dB/Div  
→ 1.2 GHz  
/Div



Spurious  
Signals

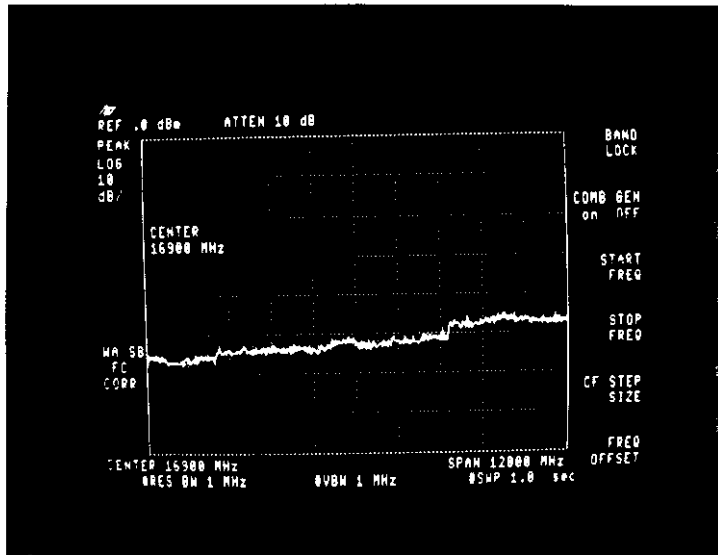
Short Pulse

10.9 to 20 GHz



(Sec. 2.991)

Scale  
↑ 10dB/Div  
→ 1.2 GHz  
/Div

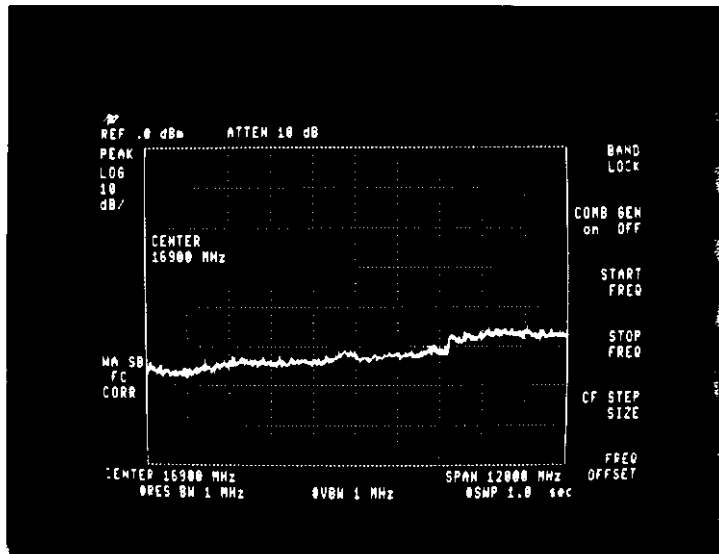


Spurious  
Signals

Medium Pulse

10.9 to 20 GHz

Scale  
↑ 10dB/Div  
→ 1.2 GHz  
/Div



Spurious  
Signals

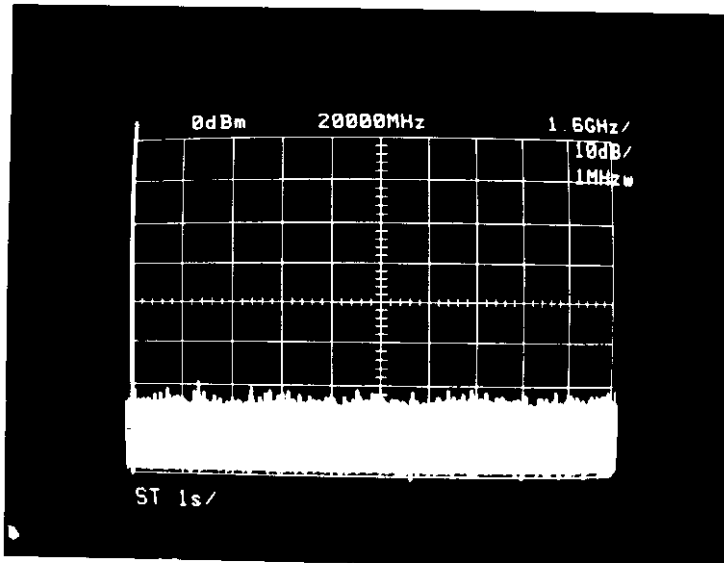
Long Pulse

10.9 to 20 GHz

(Sec. 2.991)

Scale  
↑ 10dB/Div

→ 1.6 GHz  
/Div



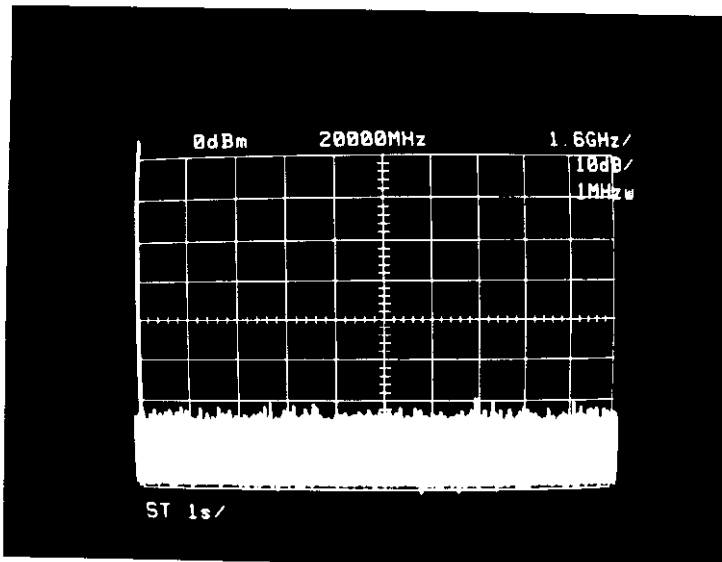
Spurious  
Signals

OFF

12.4 to 28 GHz

Scale  
↑ 10dB/Div

→ 1.6 GHz  
/Div



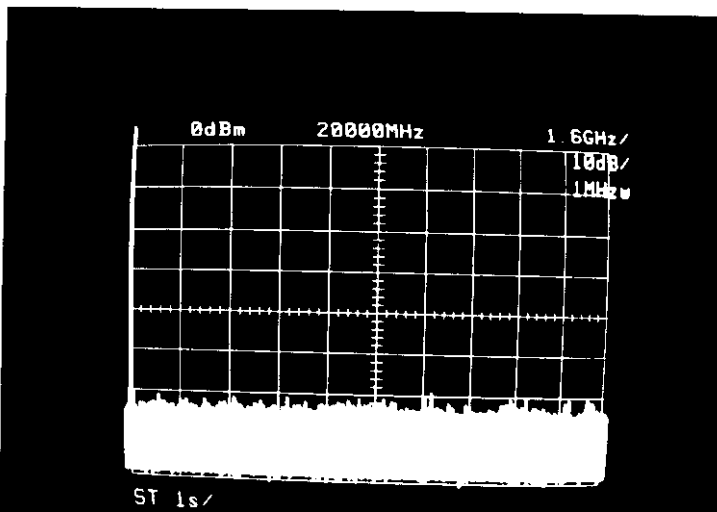
Spurious  
Signals

Stand-By

12.4 to 28 GHz

Scale  
↑ 10dB/Div

→ 1.6 GHz  
/Div



Spurious  
Signals

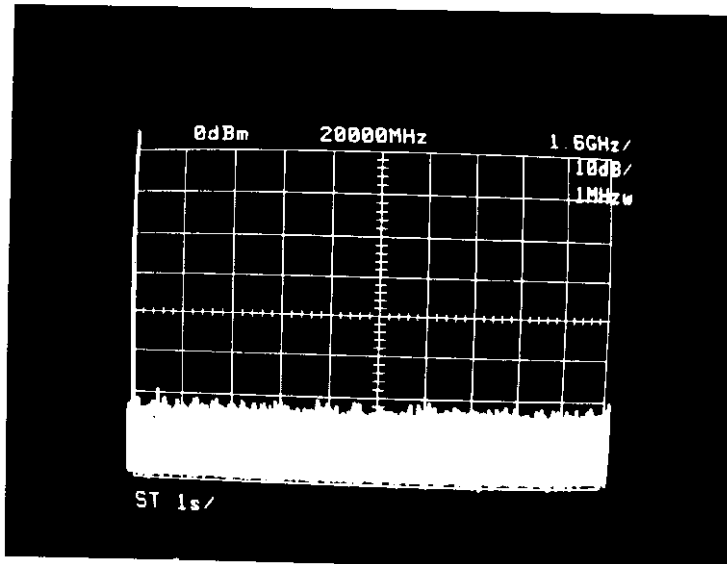
Short Pulse

12.4 to 28 GHz

(Sec. 2.991)

Scale  
↑ 10dB/Div

→ 1.6 GHz  
/Div



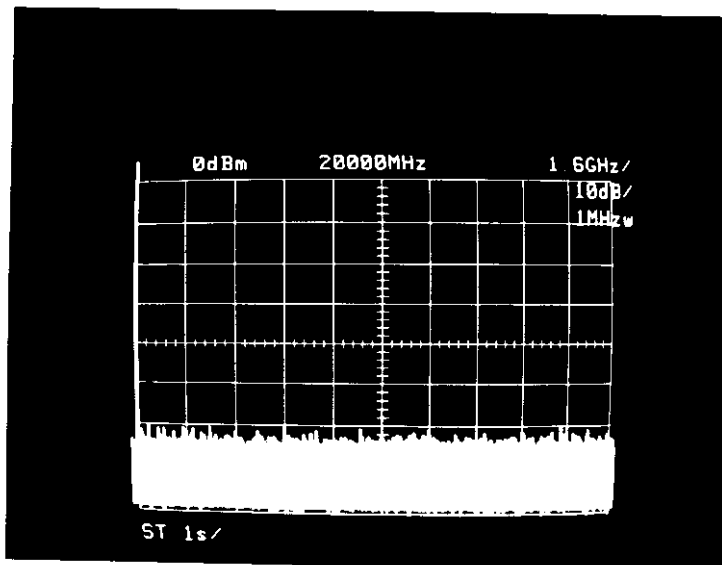
Spurious  
Signals

Medium Pulse

12.4 to 28 GHz

Scale  
↑ 10dB/Div

→ 1.6 GHz  
/Div



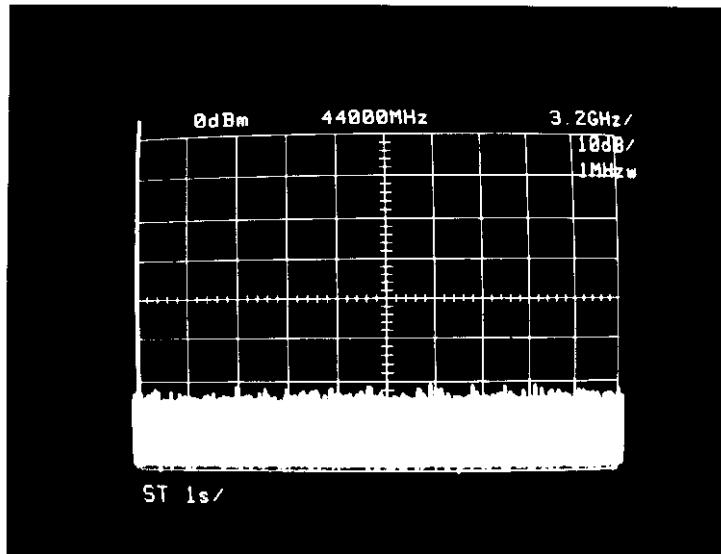
Spurious  
Signals

Long Pulse

12.4 to 28 GHz

(Sec. 2.991)

Scale  
↑ 10dB/Div  
→ 3.2 GHz  
/Div

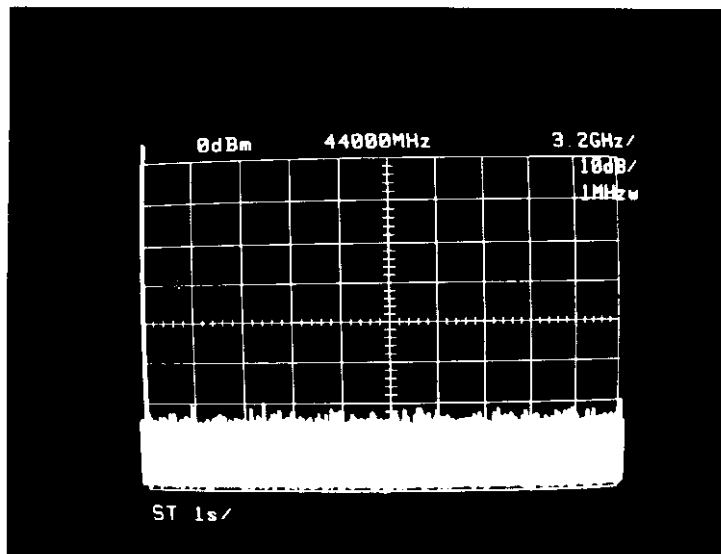


Spurious  
Signals

OFF

28 to 60 GHz

Scale  
↑ 10dB/Div  
→ 3.2 GHz  
/Div

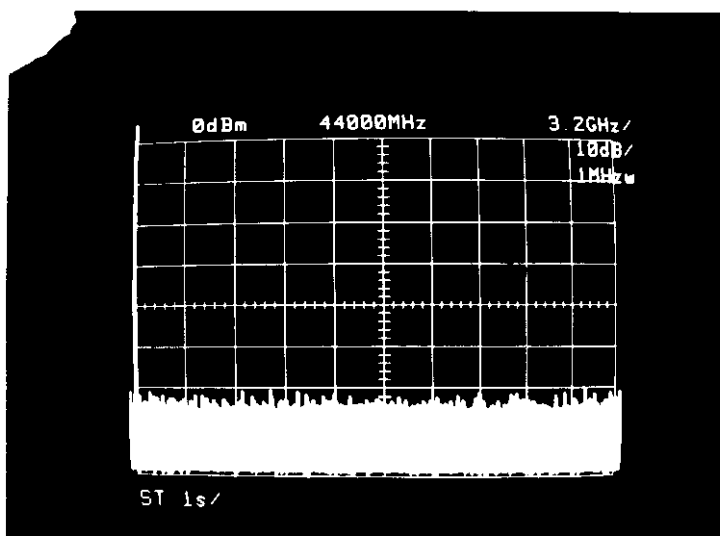


Spurious  
Signals

Stand By

28 to 60 GHz

Scale  
↑ 10dB/Div  
→ 3.2 GHz  
/Div



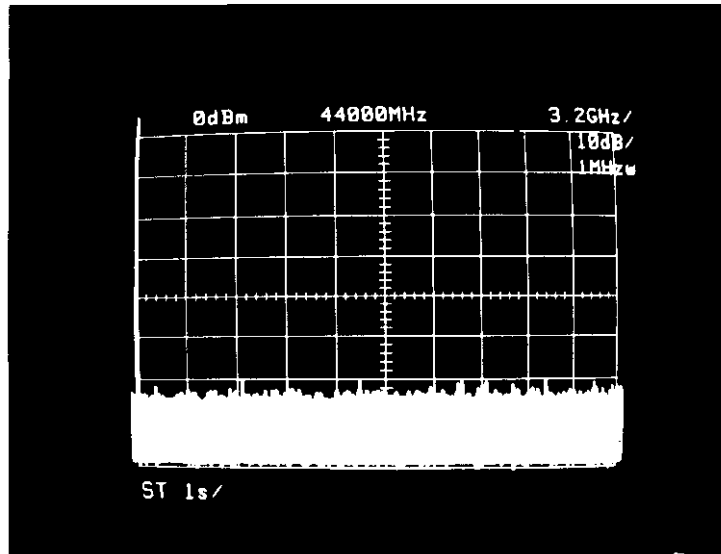
Spurious  
Signals

Short Pulse

28 to 60 GHz

(Sec. 2.991)

Scale  
↑ 10dB/Div  
→ 3.2 GHz  
/Div

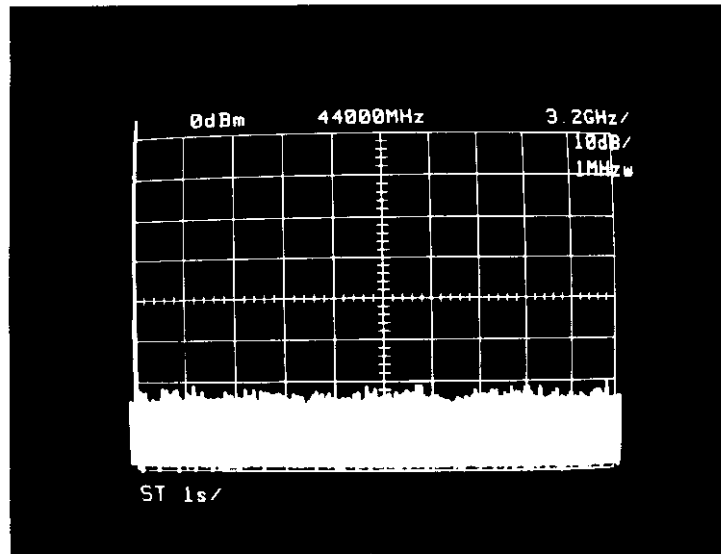


Spurious  
Signals

Medium Pulse

28 to 60 GHz

Scale  
↑ 10dB/Div  
→ 3.2 GHz  
/Div



Spurious  
Signals

Long Pulse

28 to 60 GHz