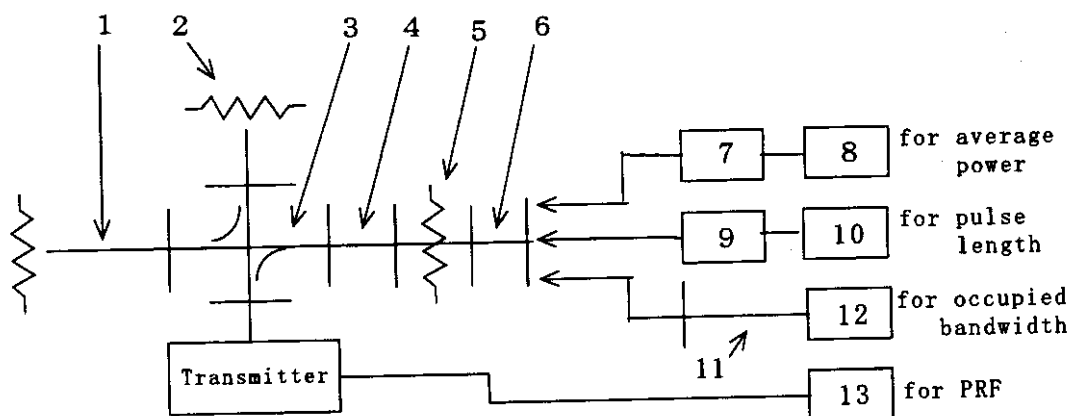


1.3 Load Impedance
 (Sec. 2.985) 1.0 RF Power Output
 (Sec. 2.989) 2.0 Occupied Bandwidth



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	8563E	Hewlett Packard
13 Frequency Counter	5300A	HP

Measurement Point ; Transmitter Output

FCC Submittal Material Data

(Sec. 2. 985)

1. 0 RF Power Output

1. 1 Peak Power

(at 0. 25 n. m.)	14. 2 KW
(at 1. 5 n. m.)	14. 1 KW
(at 3. 0 n. m.)	14. 6 KW
(at 6. 0 n. m.)	15. 1 KW
(at 24 n. m.)	15. 2 KW

1. 2 Average Power

(at 0. 25 n. m.)	3. 25 W
(at 1. 5 n. m.)	7. 05 W
(at 3. 0 n. m.)	10. 0 W
(at 6. 0 n. m.)	10. 4 W
(at 24 n. m.)	9. 65 W

VSWR 1. 05 at 9. 4 - 9. 5 GHz

Type

4D371A (Shimada co.)

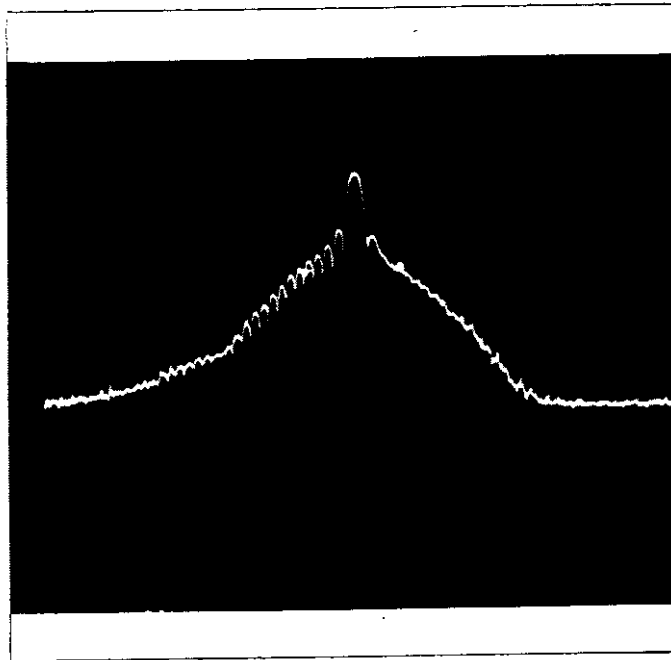
(Sec. 2.989)

2.0 Occupied Bandwidth

2.1 Short Pulse PRF 2082 Hz

Short Pulse Length 0.11 μ S

Scale
10dB/Div



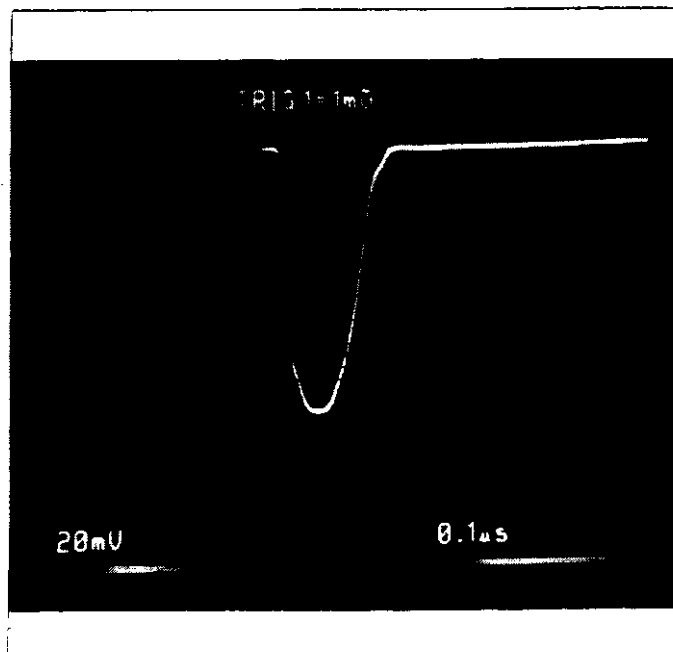
RF Spectrum
Short Pulse

OBW=61.3 MHz

Scale 40 MHz/ Div
Center Frequency 9418 MHz

(Sec. 2.987)

Scale
20mV/Div



← 3dB

Detected RF
Pulse

Short Pulse

Scale 100nS/Div

(Sec. 2.989)

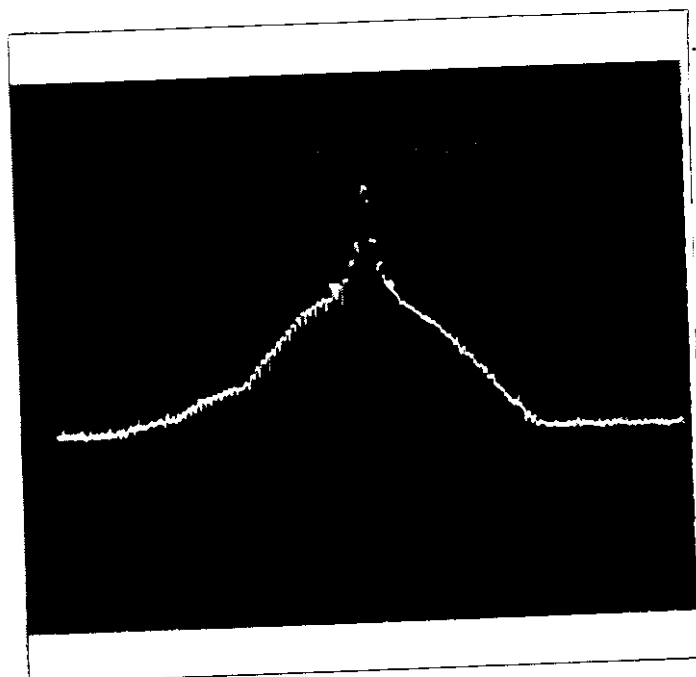
2.2 ShortMedium Pulse PRF

2082 Hz

ShortMedium Pulse Length

0.24 μ S

Scale
10dB/Div



RF Spectrum
ShortMedium Pulse

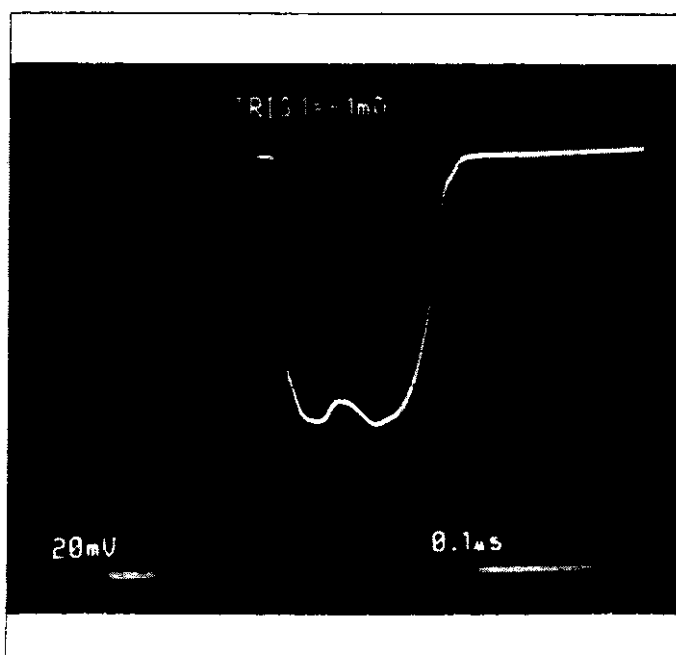
OBW=36.7 MHz

Scale 40 MHz/ Div

Center Frequency 9418 MHz

(Sec. 2.987)

Scale
20mV/Div



← 3dB

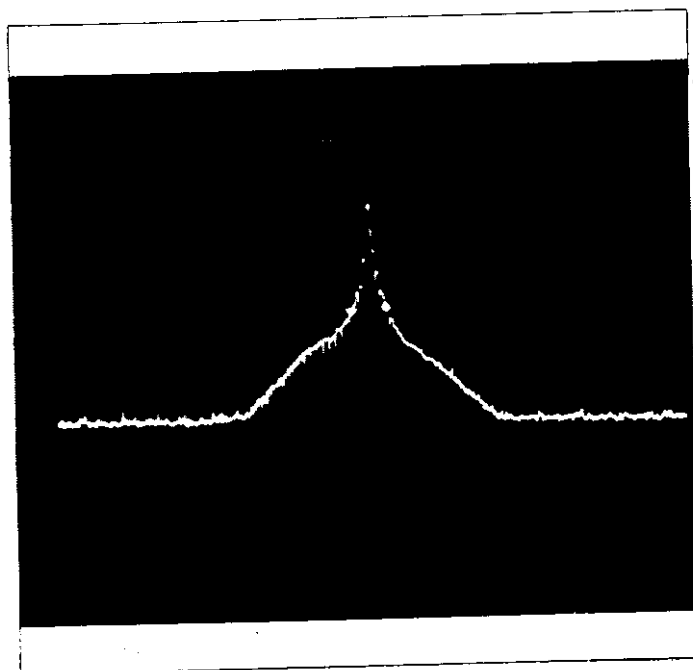
Detected RF
Pulse

Short Medium Pulse

Scale 100nS/Div

(Sec. 2.989) 2.2 Medium Pulse PRF 1562 Hz
Medium Pulse Length 0.44 μ S

Scale
10dB/Div



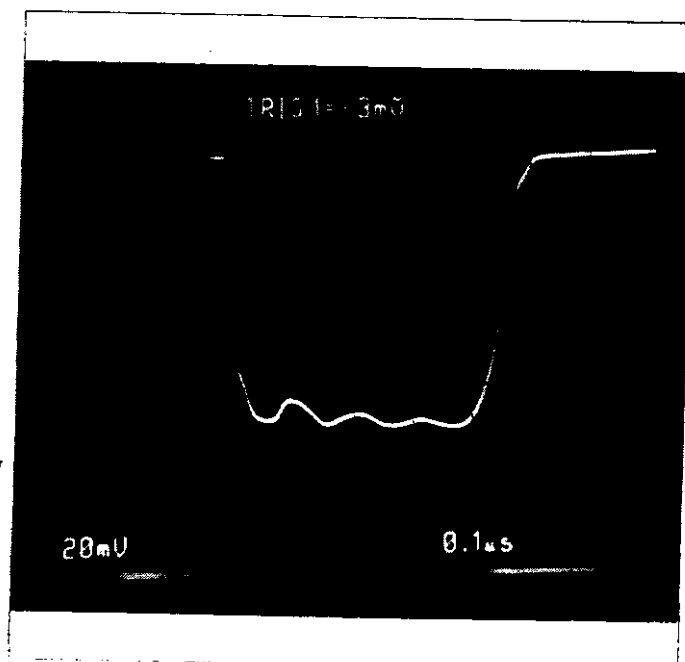
RF Spectrum
Medium Pulse

OBW=22.0 MHz

Scale 40 MHz/ Div
Center Frequency 9418 MHz

(Sec. 2.987)

Scale
20mV/Div



← 3dB

Detected RF
Pulse

Medium Pulse

Scale 100nS/Div

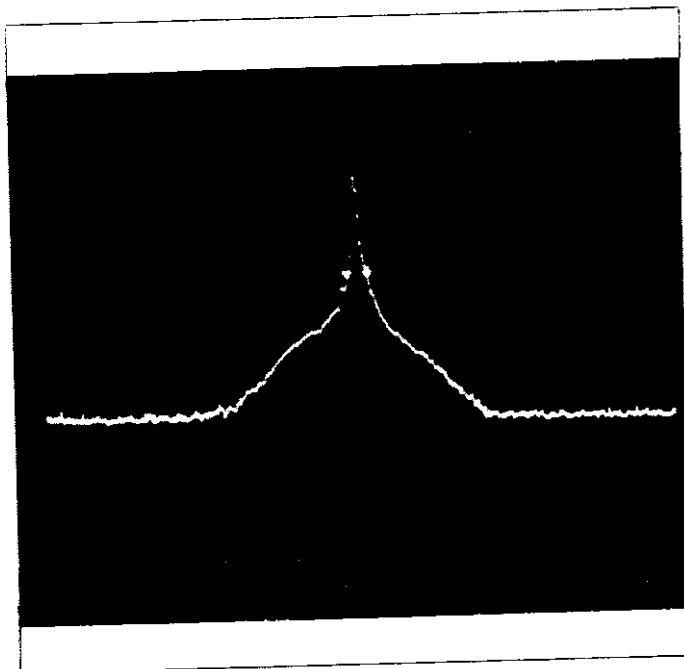
(Sec. 2.989)

2.3 Long Medium Pulse PRF
Long Medium Pulse Length

781 Hz

0.88 μ S

Scale
10dB/Div



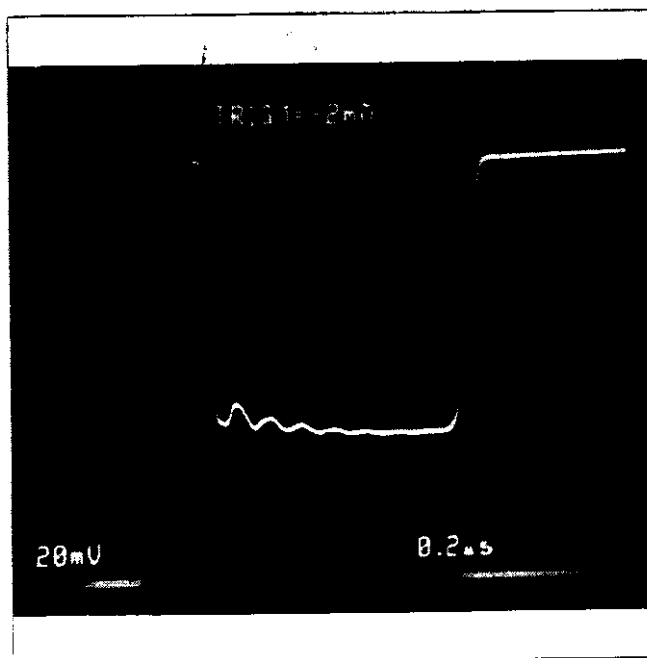
RF Spectrum
Long Medium Pulse

OBW=12.7 MHz

Scale 40 MHz/ Div
Center Frequency 9418 MHz

(Sec. 2.987)

Scale
20mV/Div



← 3dB

Detected RF
Pulse

Long Medium Pulse

Scale 200 nS/Div

(Sec. 2.989)

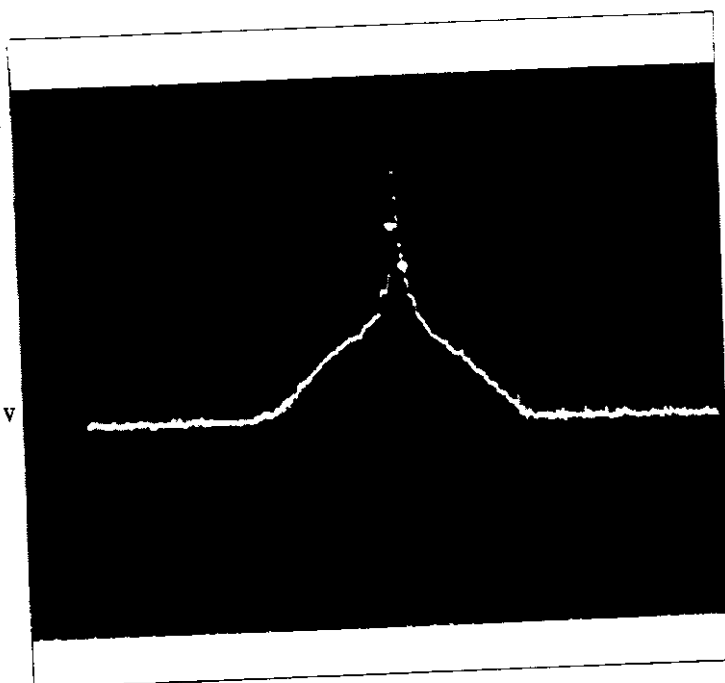
2.2 Long Pulse PRF

521 Hz

Long Pulse Length

1.22 μ S

Scale
10dB/Div



RF Spectrum
Long Pulse

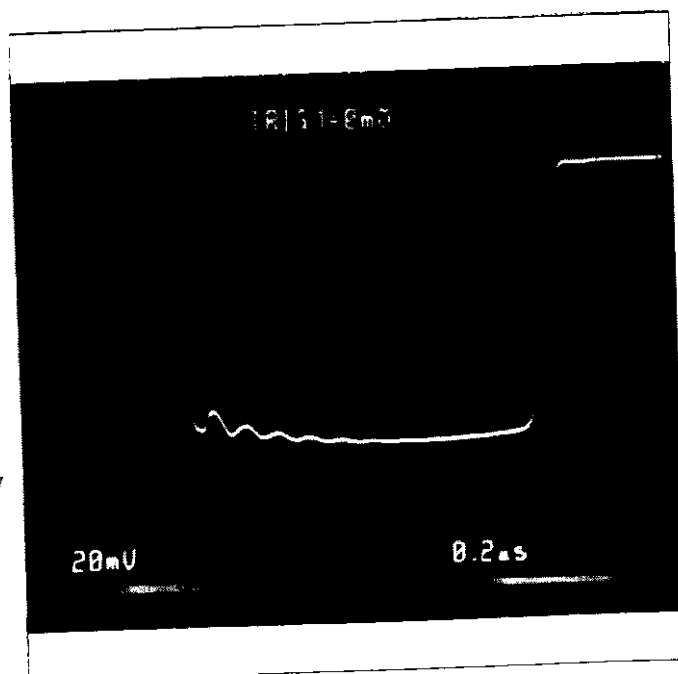
OBW=8.0 MHz

Scale 40 MHz/ Div

Center Frequency 9418 MHz

(Sec. 2.987)

Scale
20mV/Div



← 3dB

Detected RF
Pulse

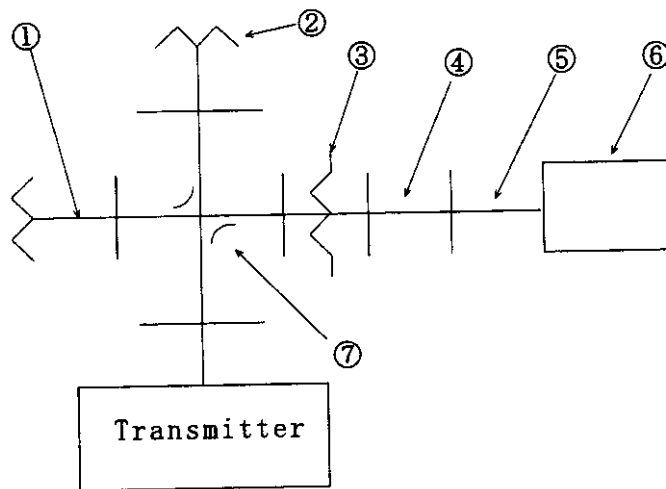
Long Pulse

Scale 200nS/Div

(Sec. 2. 991)

3.0 Spurious signals at antenna port

Condition 1; 0 to 20 GHz



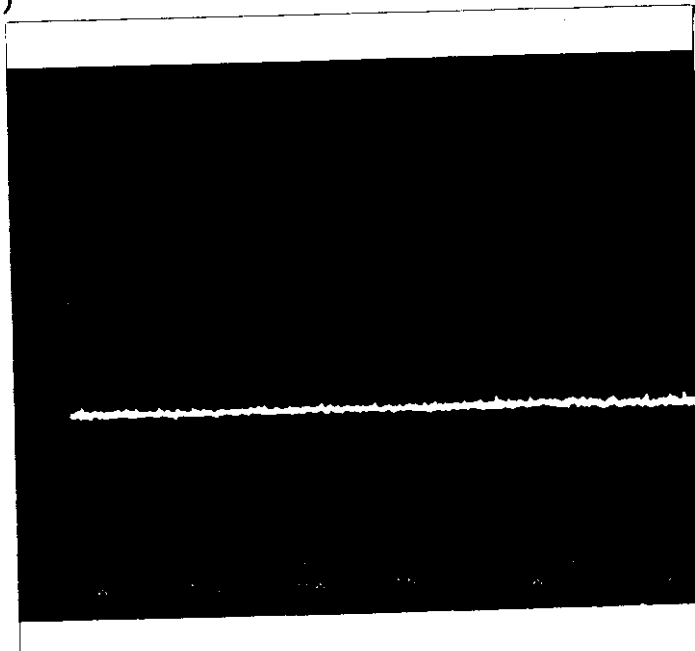
1	Dummy Load	X910B	HP
2	High power Dummy Load	4D371A	Shimada
3	Attenuator	X382A	HP
4	Adaptor	X281A	HP
5	Coaxial Cable	MI-04	Takeda Riken
6	Spectrum Analyzer	8563E	HP
7	Directional Coupler	R11421	Shimada
	Coupling	30 dB	
	Directivity	30 dB	
★	Attenuation	3 ; 25dB	
★	Measurement Point	Rotary Joint Output	

(Sec. 2. 991)

Scale

↑ 10dB/Div

→ 400 MHz
/Div



Spurious
Signals

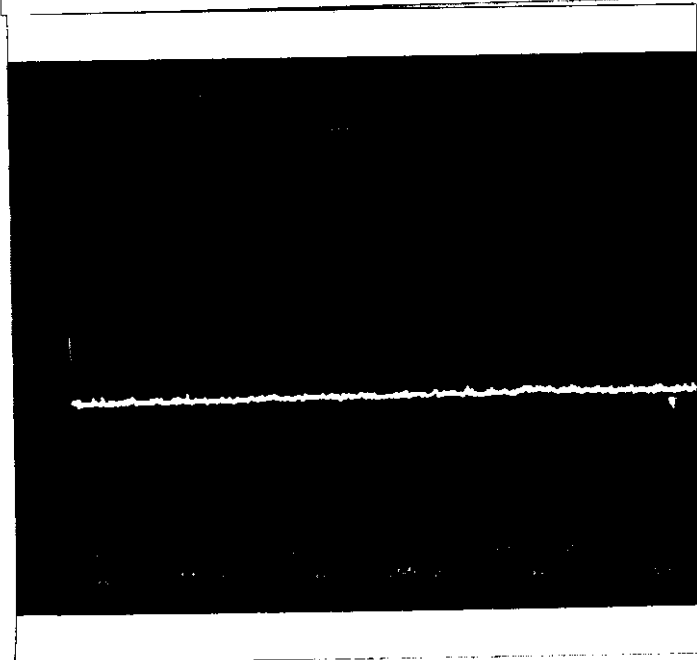
OFF

0 to 3.6 GHz

Scale

↑ 10dB/Div

→ 400 MHz
/Div



Spurious
Signals

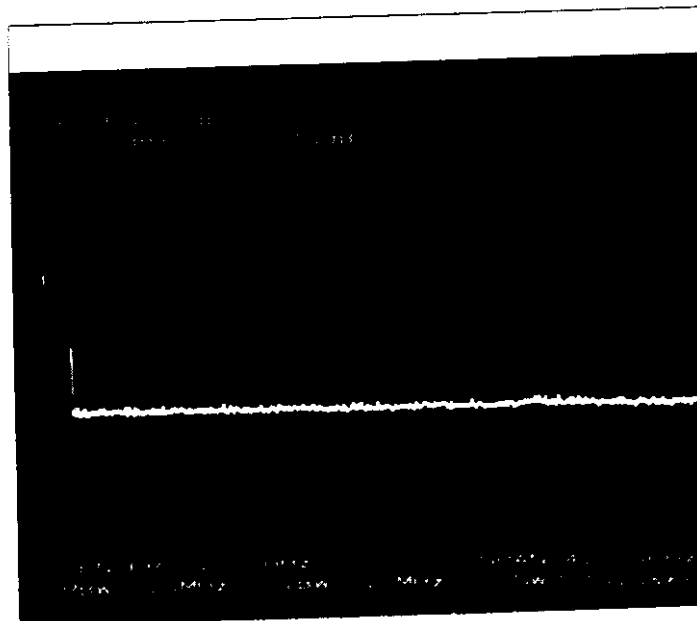
Stand-By

0 to 3.6 GHz

Scale

↑ 10dB/Div

→ 400 MHz
/Div



Spurious
Signals

Short Pulse

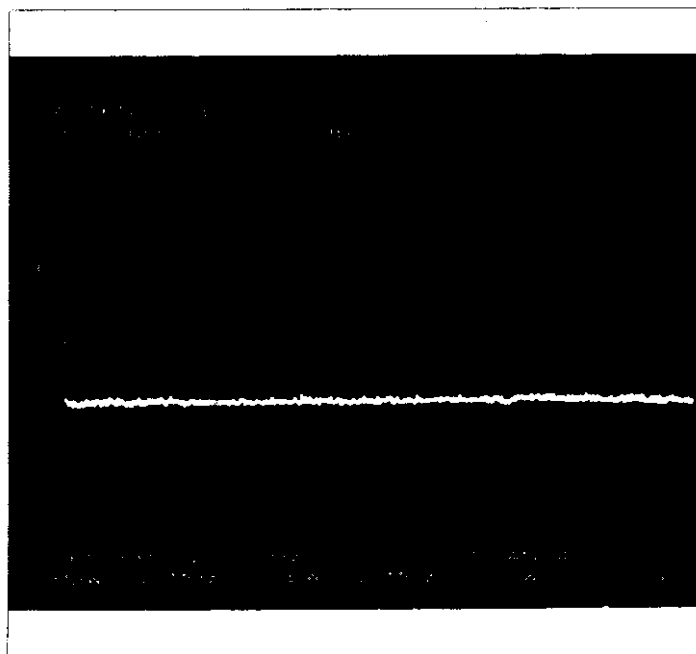
0 to 3.6 GHz

(Sec. 2.991)

Scale

↑ 10dB/Div

→ 400 MHz
/Div



Spurious
Signals

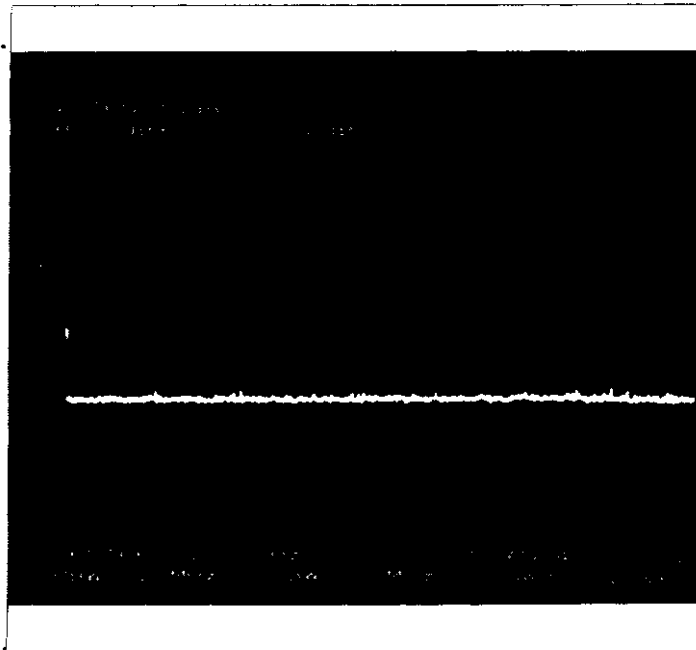
Short Medium
Pulse

0 to 3.6 GHz

Scale

↑ 10dB/Div

→ 400 MHz
/Div



Spurious
Signals

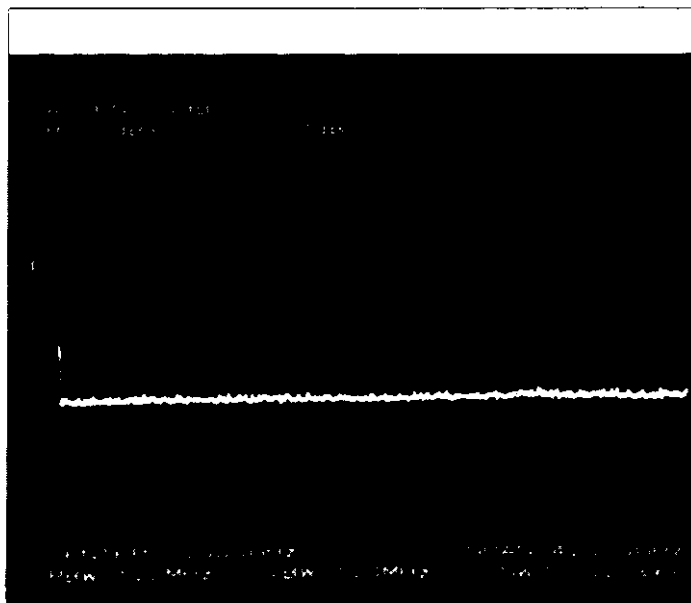
Medium Pulse

0 to 3.6 GHz

Scale

↑ 10dB/Div

→ 400 MHz
/Div



Spurious
Signals

Long Medium Pulse

0 to 3.6 GHz

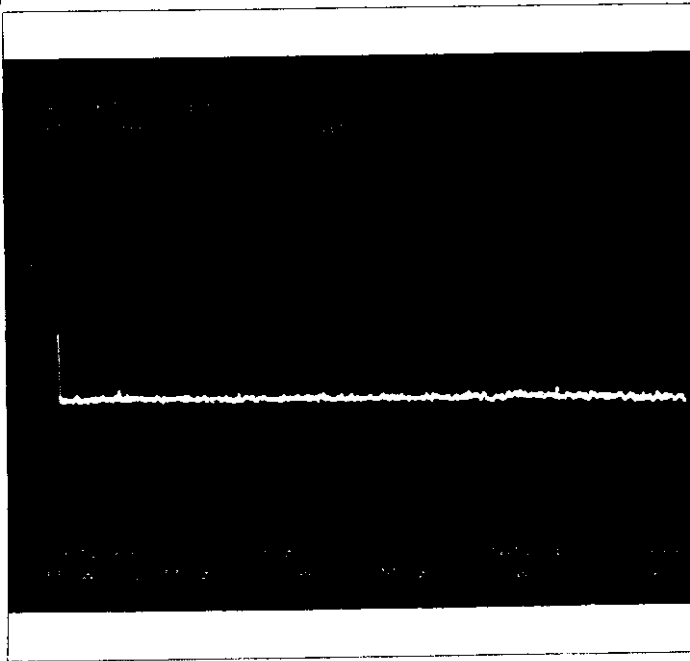
(Sec. 2.991)

Scale

↑ 10dB/Div

→ 400 MHz

/Div



Spurious
Signals

Long Pulse

0 to 3.6 GHz

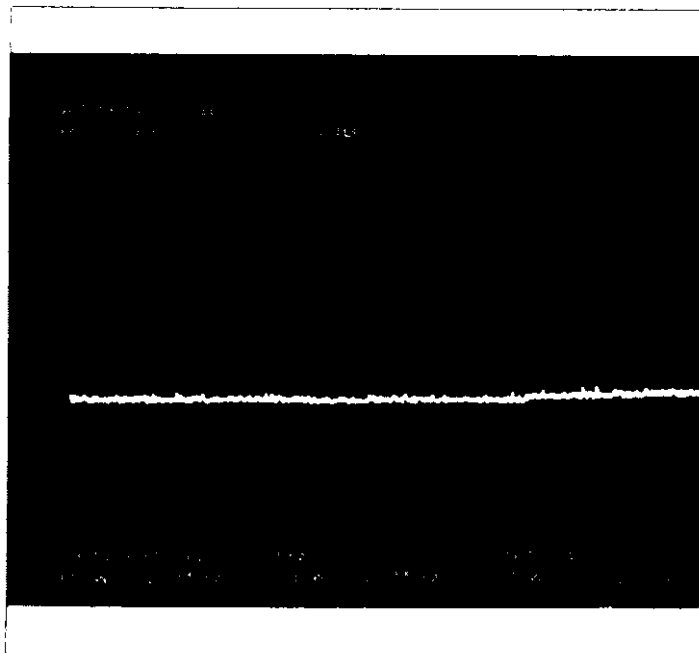
(Sec. 2.991)

Scale

↑ 10dB/Div

→ 400 MHz

/Div



Spurious
Signals

OFF

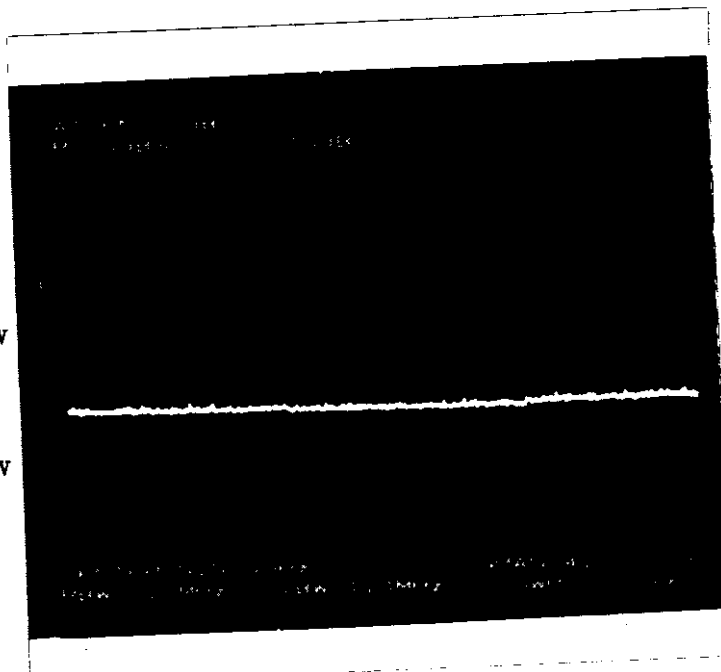
3.5 to 7.5 GHz

Scale

↑ 10dB/Div

→ 400 MHz

/Div



Spurious
Signals

Stand-By

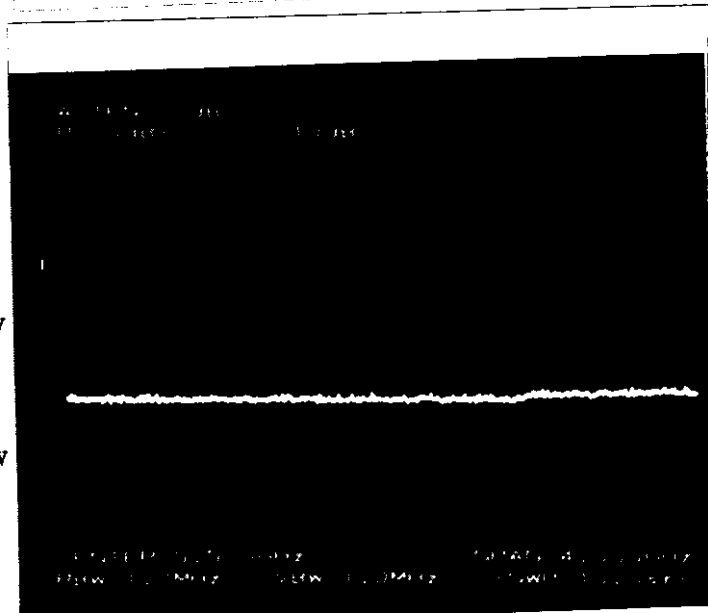
3.5 to 7.5 GHz

Scale

↑ 10dB/Div

→ 400 MHz

/Div



Spurious
Signals

Short Pulse

3.5 to 7.5 GHz

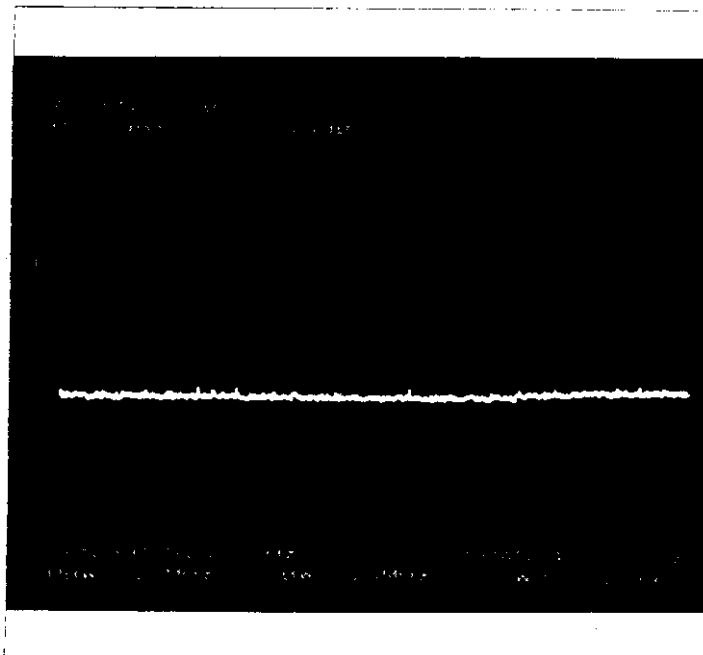
(Sec. 2.991)

Scale

↑ 10dB/Div

→ 400 MHz

/Div



Spurious
Signals

Short Medium
Pulse

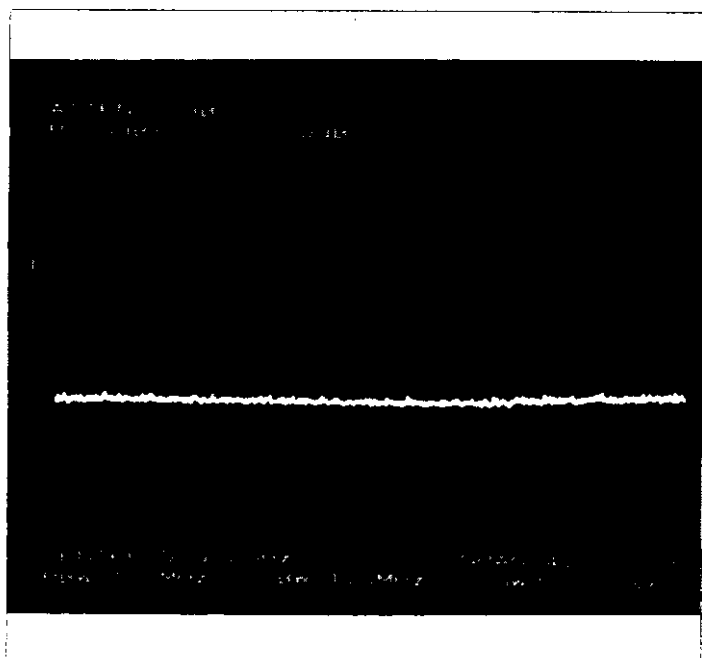
3.5 to 7.5 GHz

Scale

↑ 10dB/Div

→ 400 MHz

/Div



Spurious
Signals

Medium Pulse

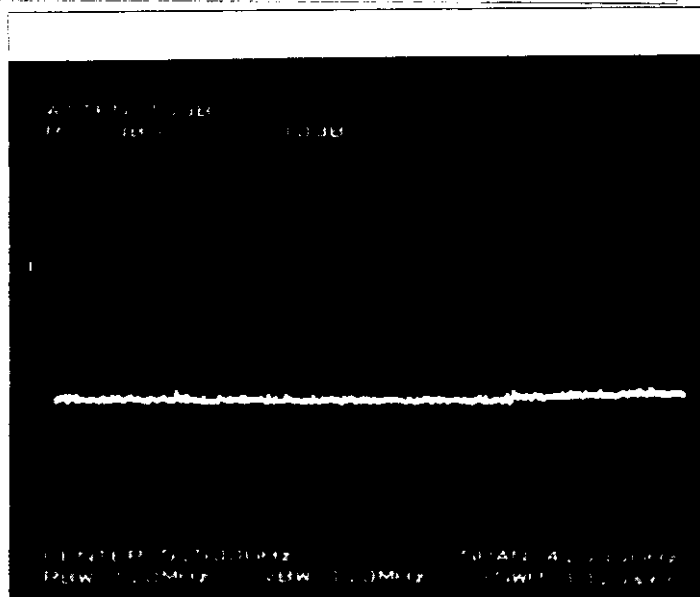
3.5 to 7.5 GHz

Scale

↑ 10dB/Div

→ 400 MHz

/Div



Spurious
Signals

Long Medium Pulse

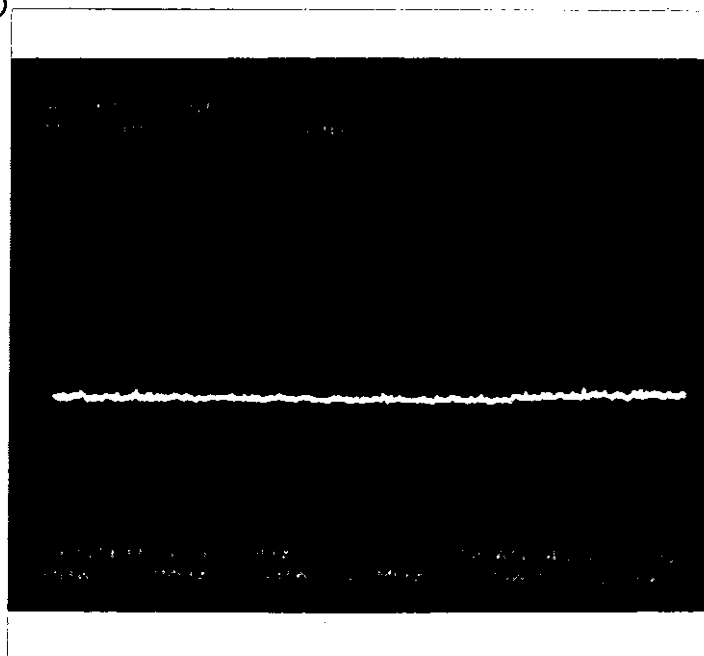
3.5 to 7.5 GHz

(Sec. 2.991)

Scale

↑ 10dB/Div

→ 400 MHz
/Div



Spurious
Signals

Long Pulse

3.5 to 7.5 GHz

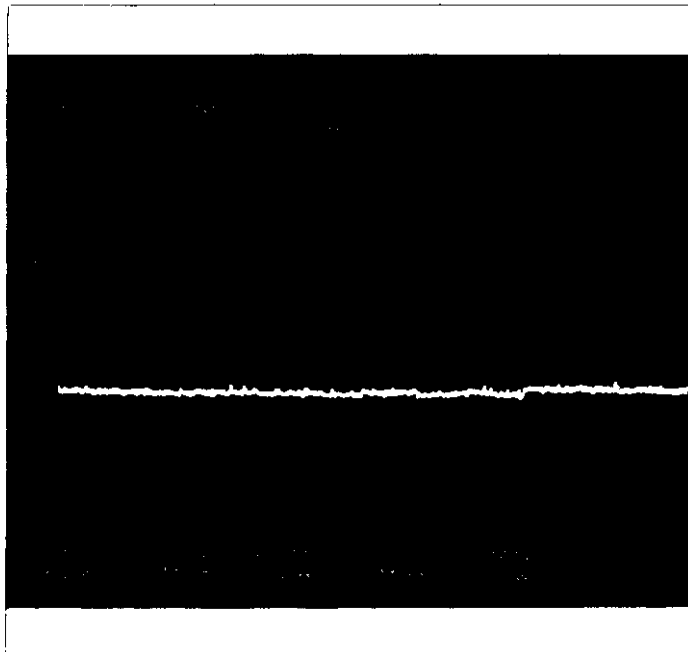
(Sec. 2.991)

Scale

↑ 10dB/Div

→ 800 MHz

/Div



Spurious
Signals

OFF

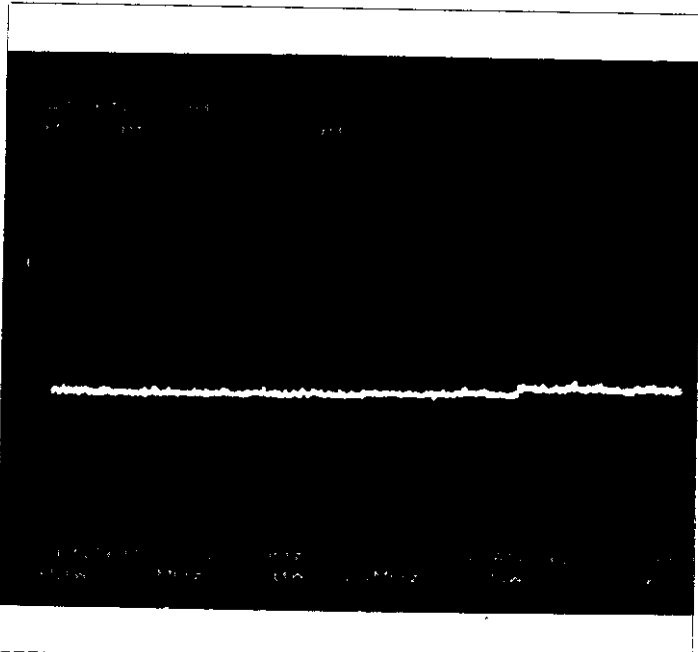
7.2 to 15.2 GHz

Scale

↑ 10dB/Div

→ 800 MHz

/Div



Spurious
Signals

Stand-By

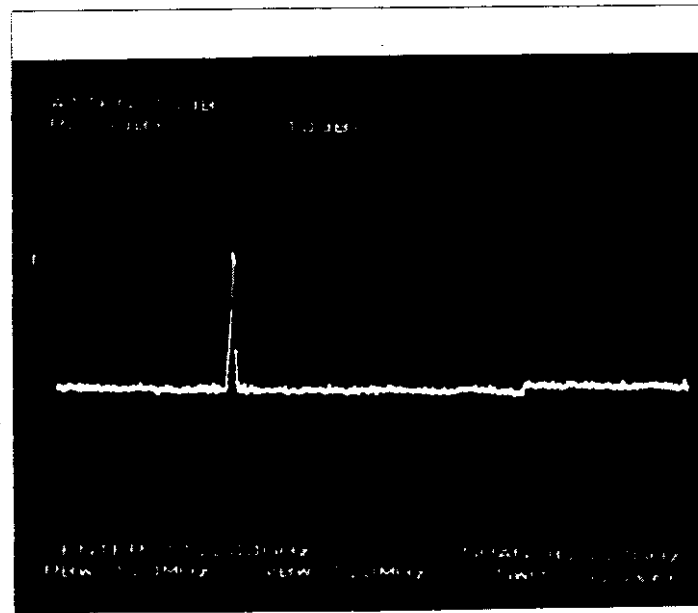
7.2 to 15.2 GHz

Scale

↑ 10dB/Div

→ 800 MHz

/Div



Spurious
Signals

Short Pulse

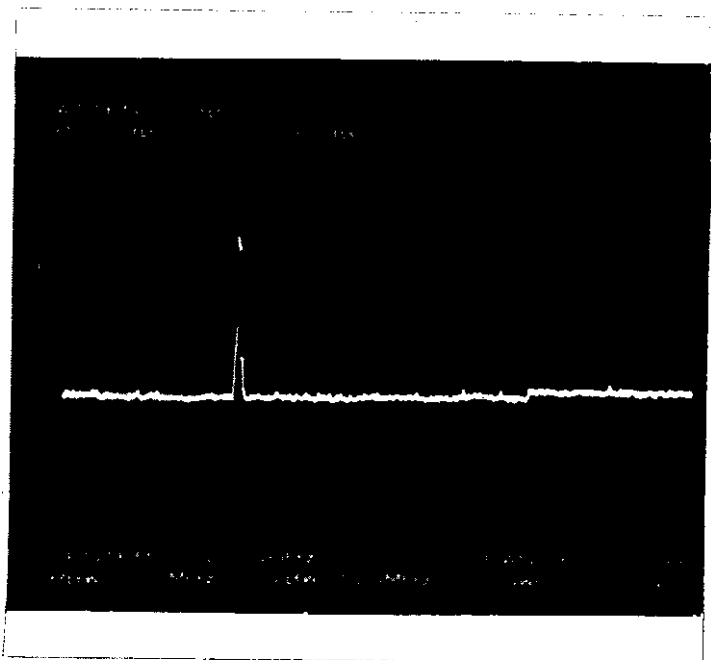
7.2 to 15.2 GHz

(Sec. 2.991)

Scale

↑ 10dB/Div

→ 800 MHz
/Div



Spurious
Signals

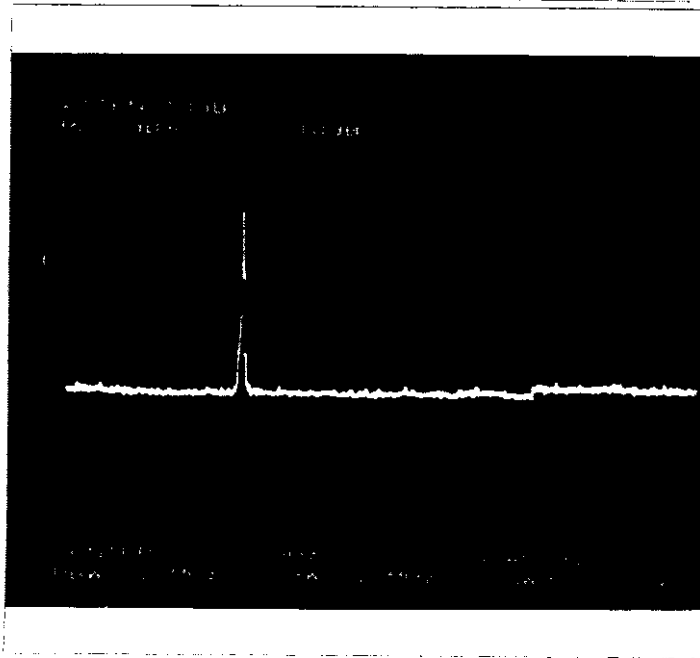
Short Medium
Pulse

7.2 to 15.2 GHz

Scale

↑ 10dB/Div

→ 800 MHz
/Div



Spurious
Signals

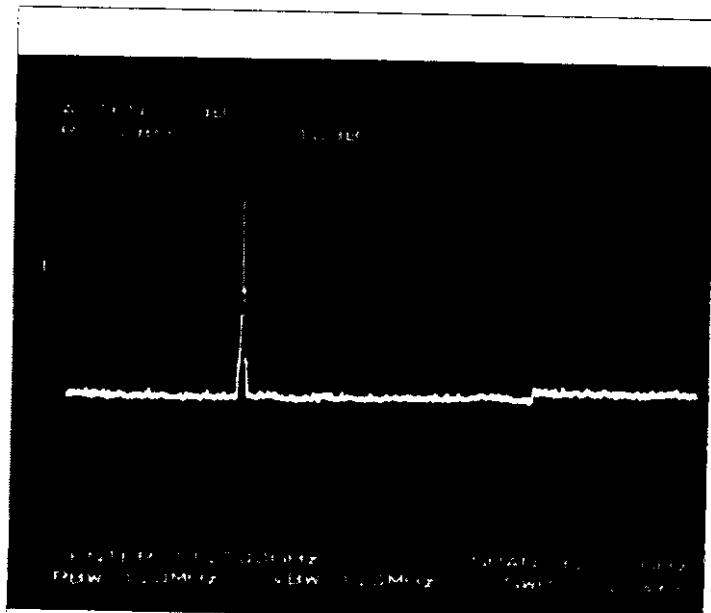
Medium Pulse

7.2 to 15.2 GHz

Scale

↑ 10dB/Div

→ 800 MHz
/Div



Spurious
Signals

Long Medium Pulse

7.2 to 15.2 GHz

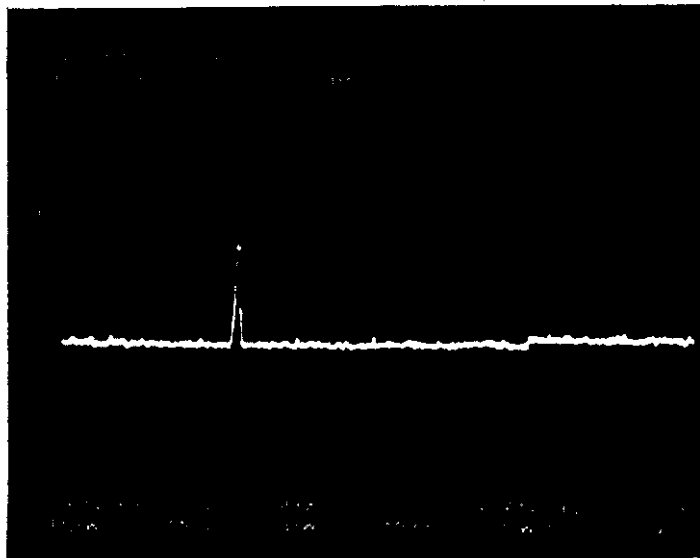
(Sec. 2.991)

Scale

↑ 10dB/Div

→ 400 MHz

/Div



Spurious
Signals

Long Pulse

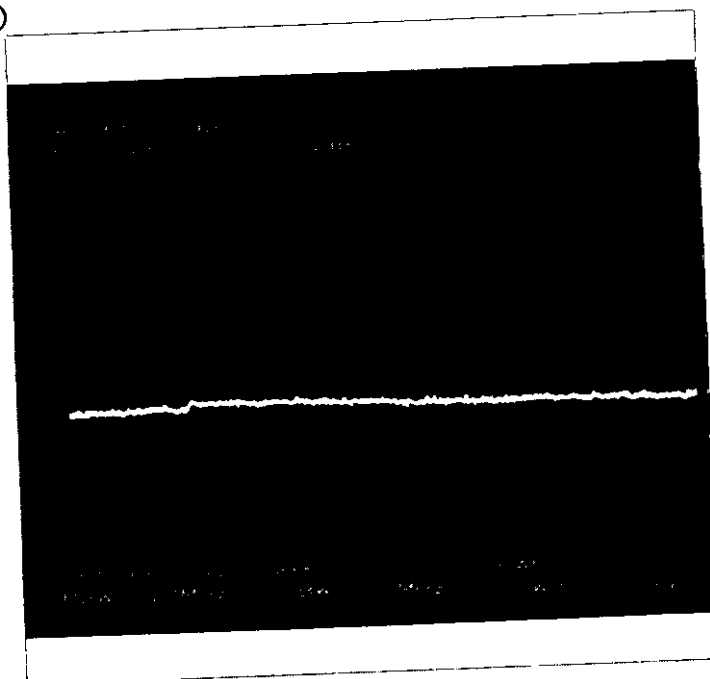
7.2 to 15.2 GHz

(Sec. 2.991)

Scale

↑ 10dB/Div

→ 1.2 GHz
/Div



Spurious
Signals

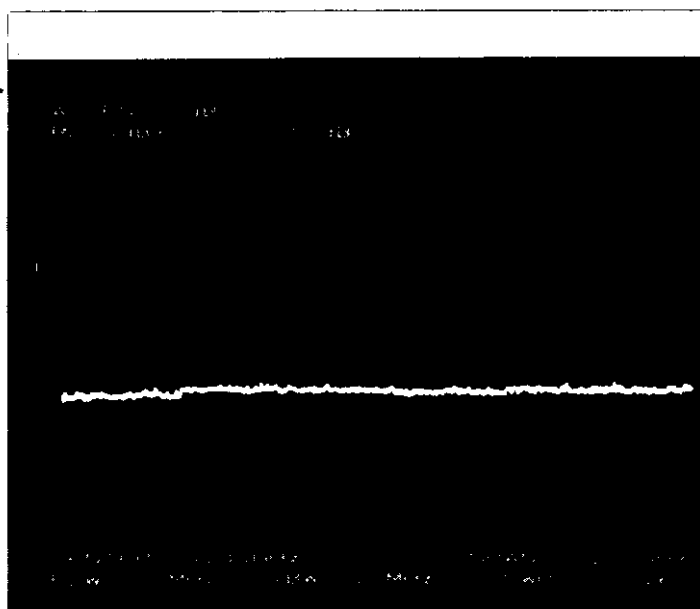
OFF

10.9 to 20 GHz

Scale

↑ 10dB/Div

→ 1.2 GHz
/Div



Spurious
Signals

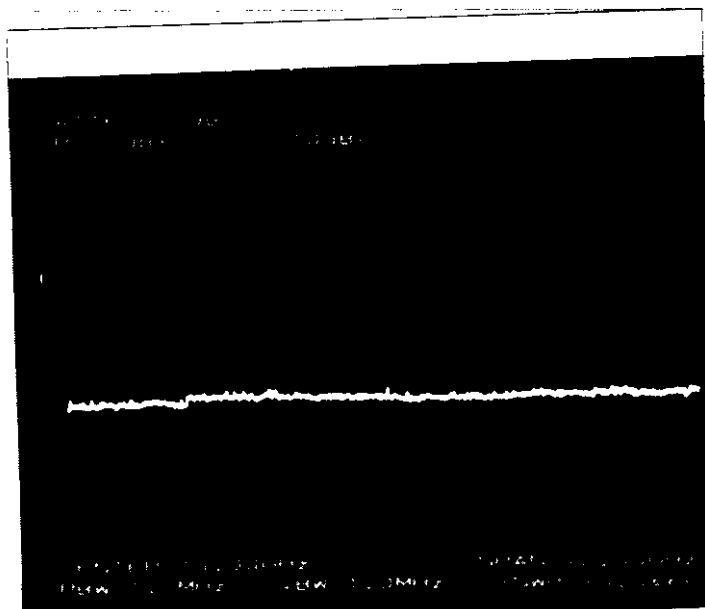
Stand-By

10.9 to 20 GHz

Scale

↑ 10dB/Div

→ 1.2 GHz
/Div



Spurious
Signals

Short Pulse

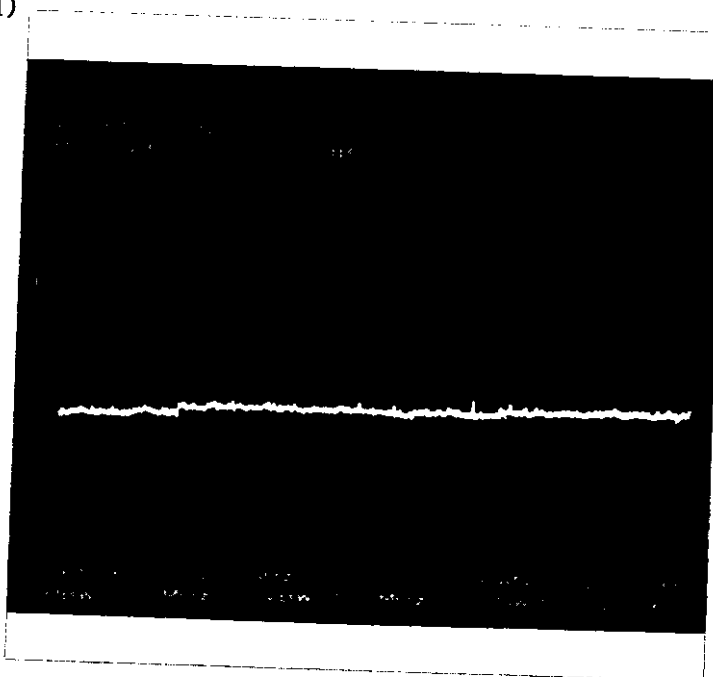
10.9 to 20 GHz

(Sec. 2.991)

Scale

↑ 10dB/Div

→ 1.2 GHz
/Div



Spurious
Signals

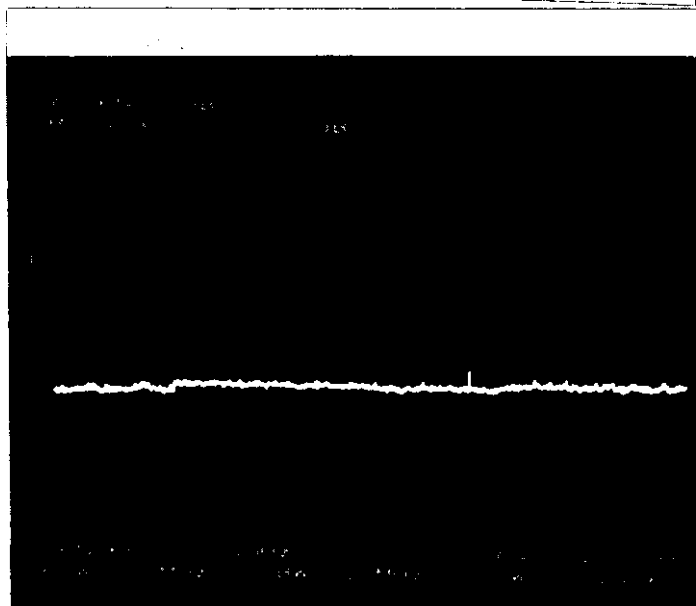
Short Medium
Pulse

10.9 to 20 GHz

Scale

↑ 10dB/Div

→ 1.2 GHz
/Div



Spurious
Signals

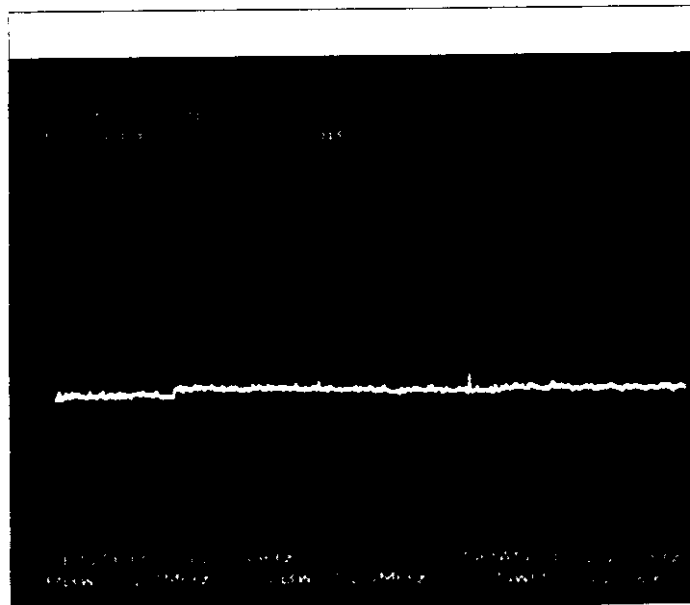
Medium
Pulse

10.9 to 20 GHz

Scale

↑ 10dB/Div

→ 1.2 GHz
/Div



Spurious
Signals

Long Medium Pulse

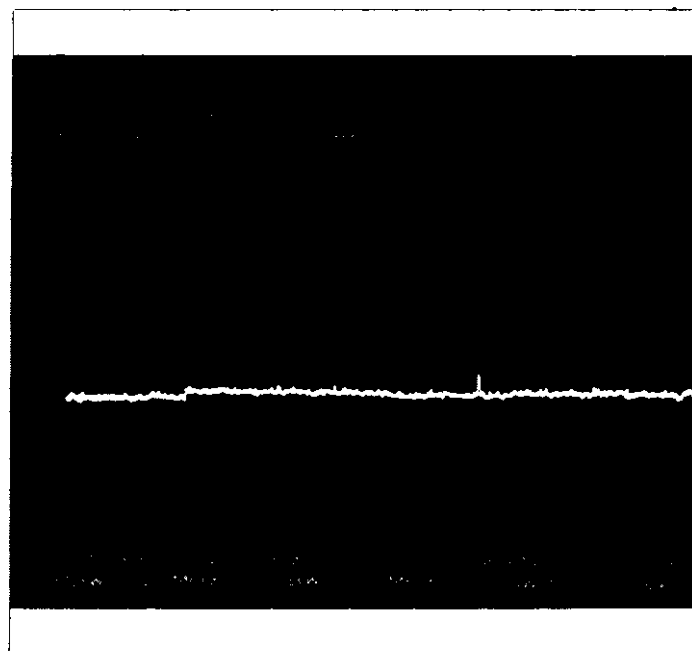
10.9 to 20 GHz

(Sec. 2.991)

Scale

↑ 10dB/Div

→ 400 MHz
/Div



Spurious
Signals

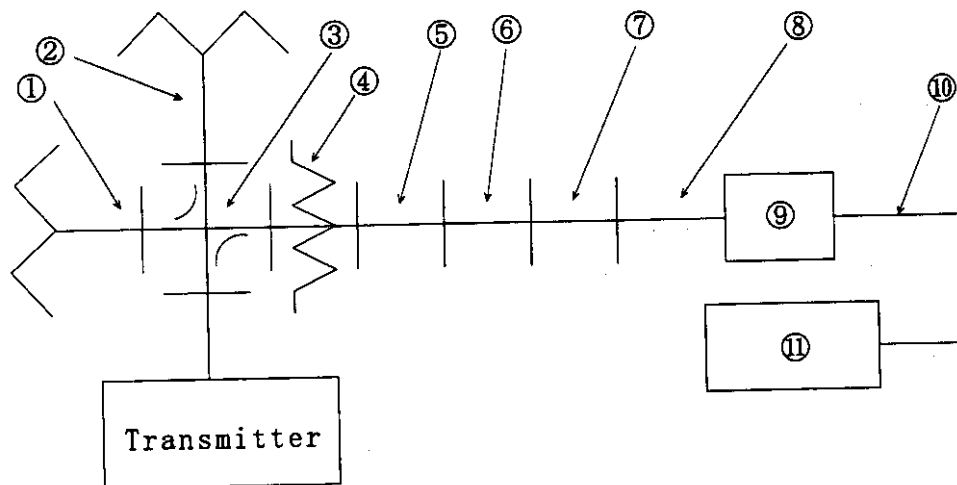
Long Pulse

10.9 to 20 GHz

(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	11818A	HP
7	Tapered W/G	11519A	HP
8	Tapered W/G	11520A	HP
9	External Mixer	11517A	HP
10	Coaxial Cable	10503A	HP
11	Spectrum Analyzer	TR4133B	Takeda Riken

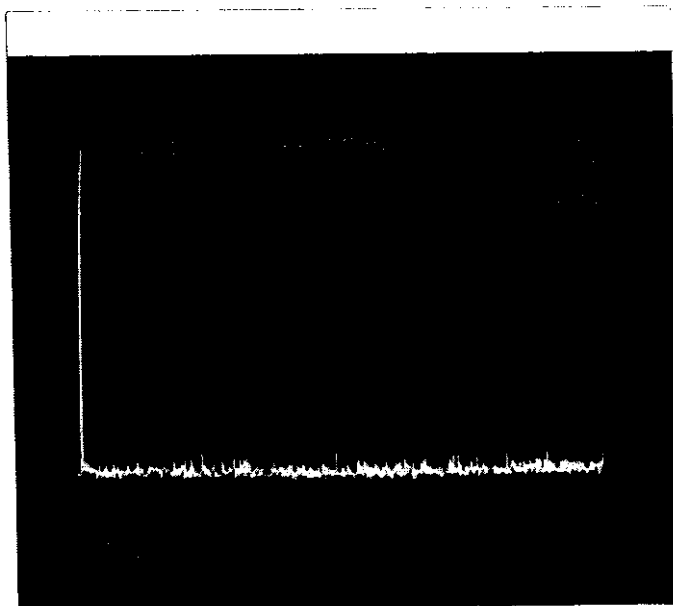
★ Attenuation on ATT4 ; 50dB

★ Measurement Point ; Rotary Joint Output

(Sec. 2.991)

Scale
↑ 10dB/Div

→ 1.6 GHz
/Div



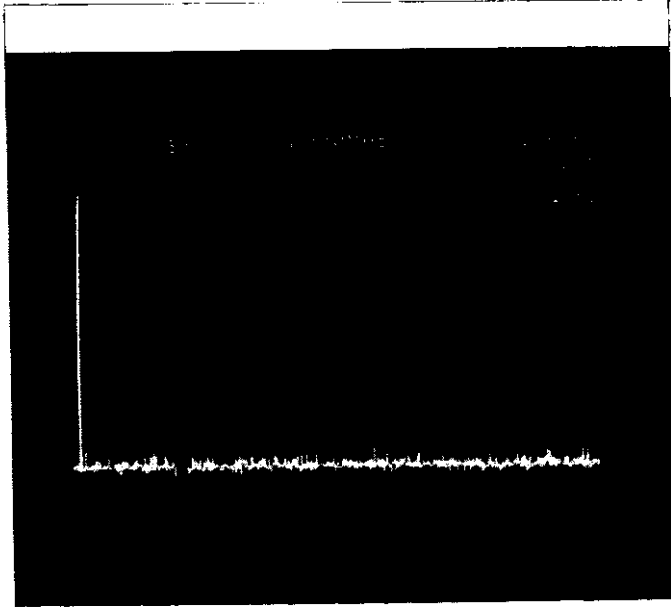
Spurious
Signals

OFF

12.4 to 28 GHz

Scale
↑ 10dB/Div

→ 1.6 GHz
/Div



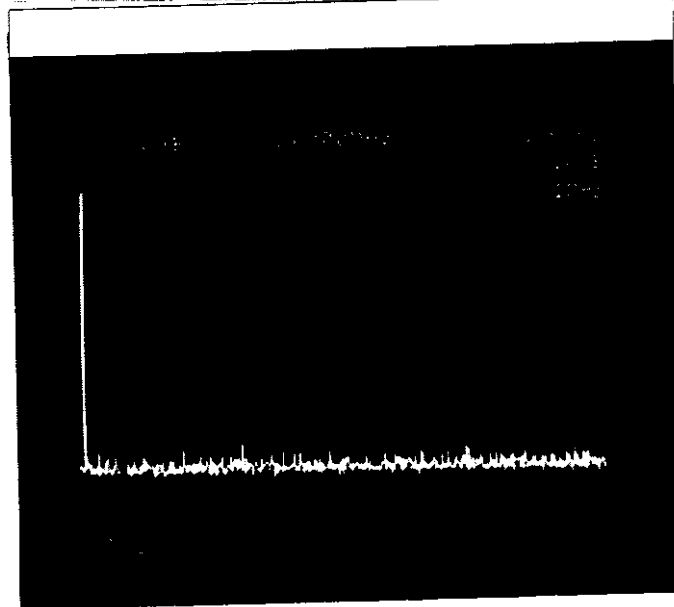
Spurious
Signals

Stand-By

12.4 to 28 GHz

Scale
↑ 10dB/Div

→ 1.6 GHz
/Div



Spurious
Signals

Short Pulse

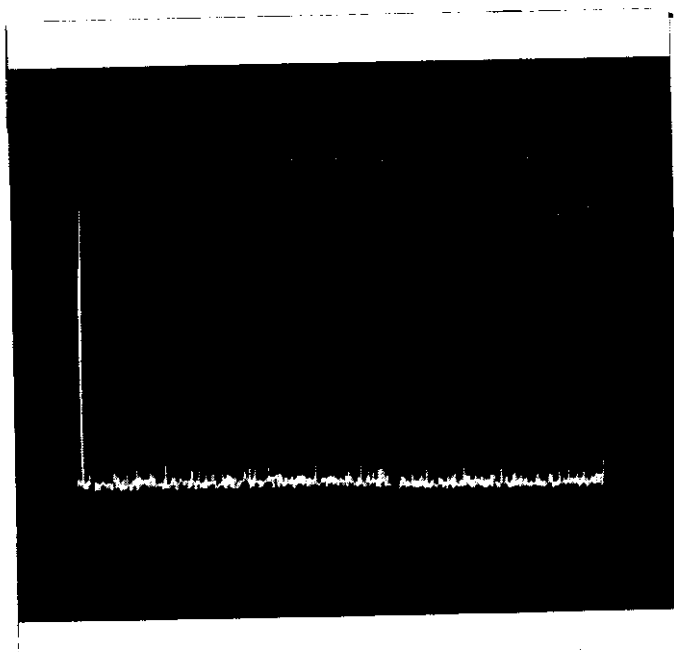
12.4 to 28 GHz

(Sec. 2.991)

Scale

↑ 10dB/Div

→ 1.6 GHz
/Div



Spurious
Signals

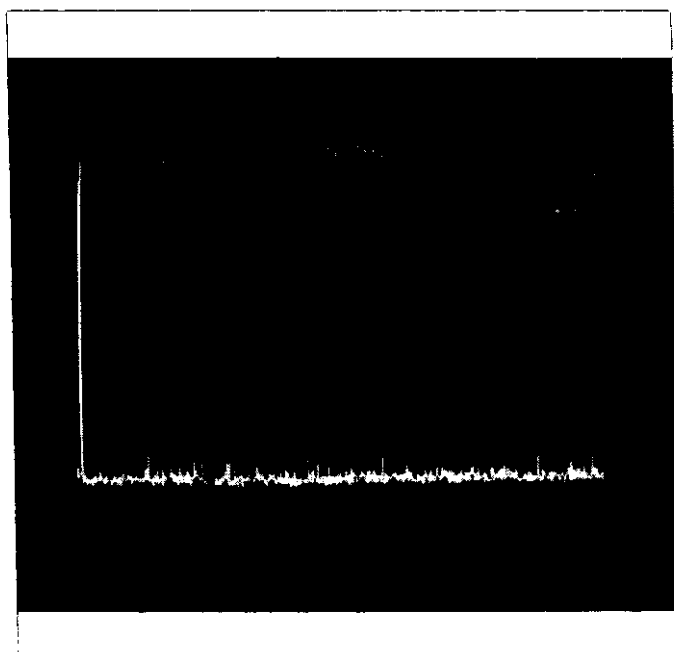
Short Medium
Pulse

12.4 to 28 GHz

Scale

↑ 10dB/Div

→ 1.6 GHz
/Div



Spurious
Signals

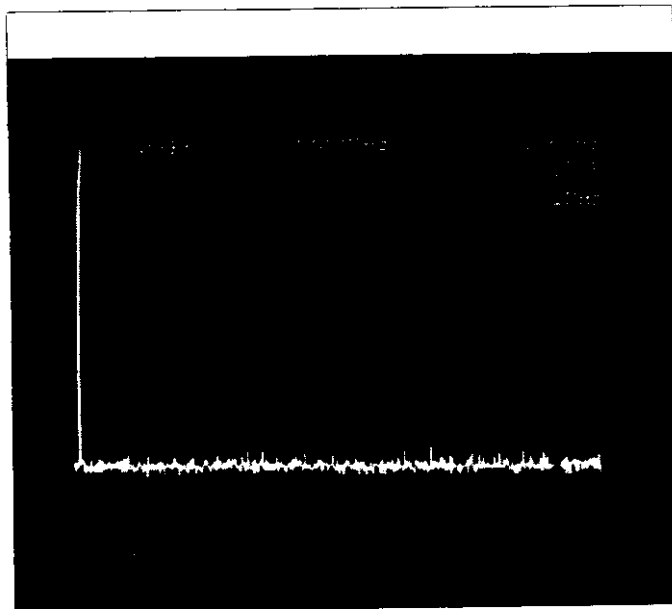
Medium Pulse

12.4 to 28 GHz

Scale

↑ 10dB/Div

→ 1.6 GHz
/Div



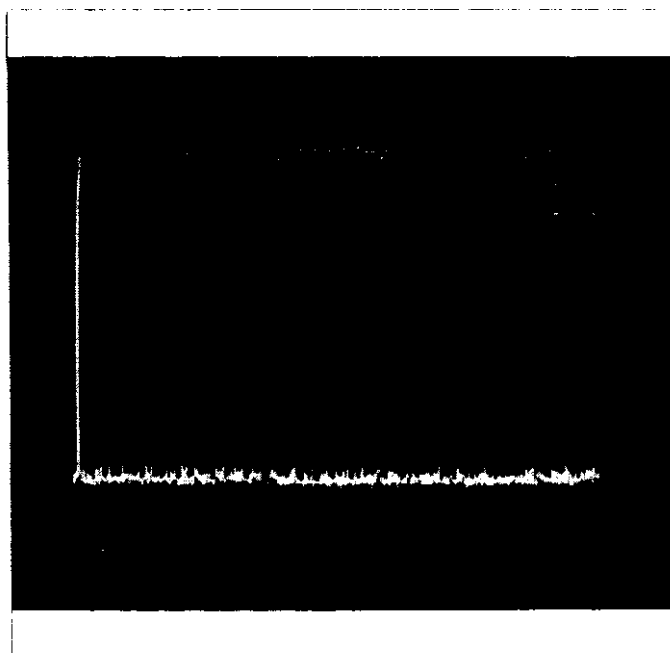
Spurious
Signals

Long Medium Pulse

12.4 to 28 GHz

(Sec. 2.991)

Scale
↑ 10dB/Div
→ 400 MHz
/Div



Spurious
Signals

Long Pulse

12.4 to 28 GHz

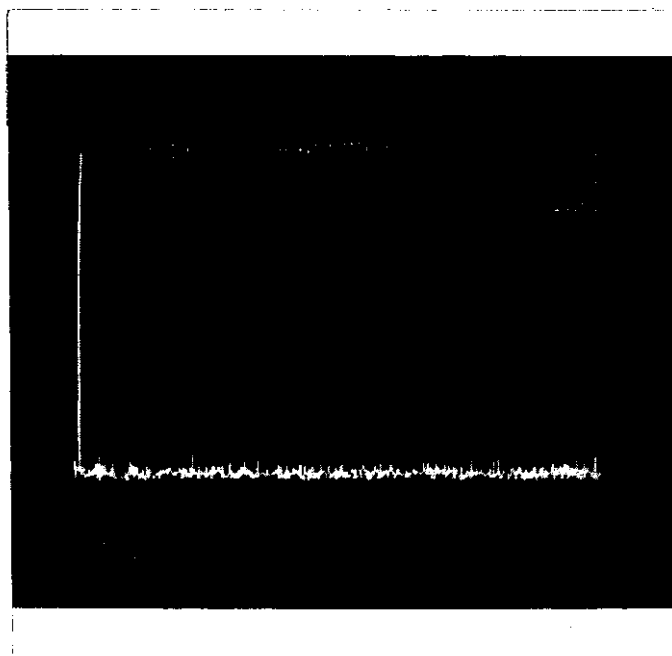
(Sec. 2.991)

Scale

↑ 10dB/Div

→ 3.2 GHz

/Div



Spurious
Signals

OFF

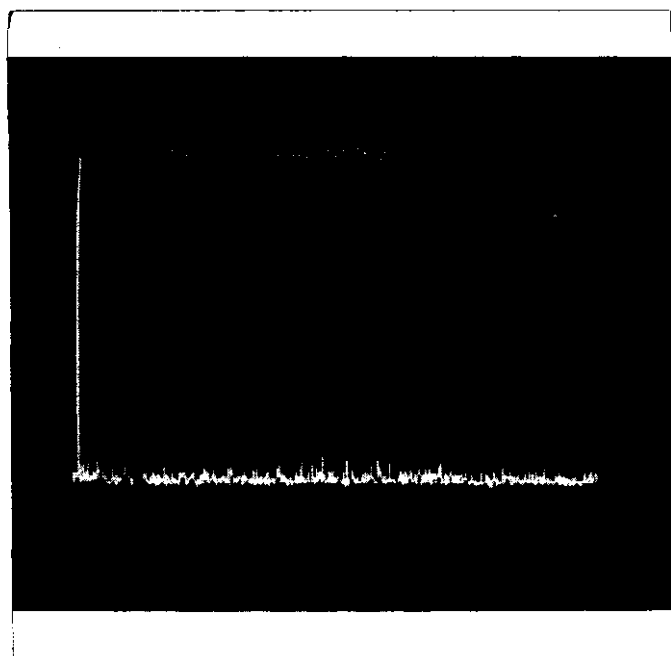
28 to 60 GHz

Scale

↑ 10dB/Div

→ 3.2 GHz

/Div



Spurious
Signals

Stand-By

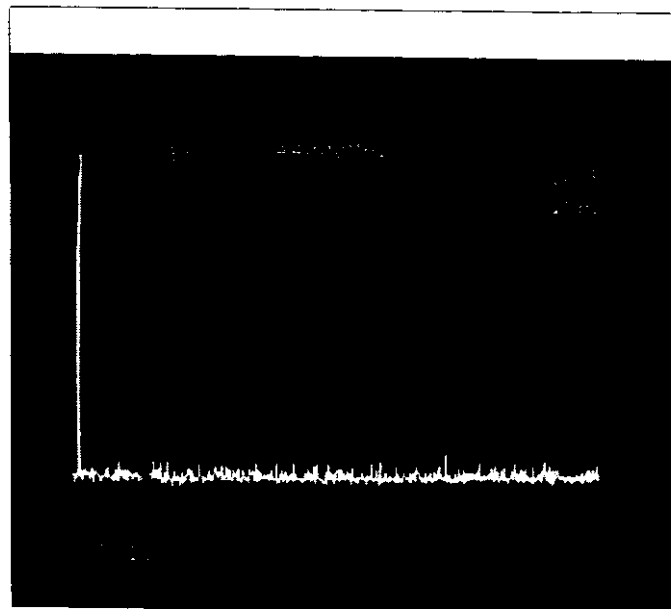
28 to 60 GHz

Scale

↑ 10dB/Div

→ 3.2 GHz

/Div



Spurious
Signals

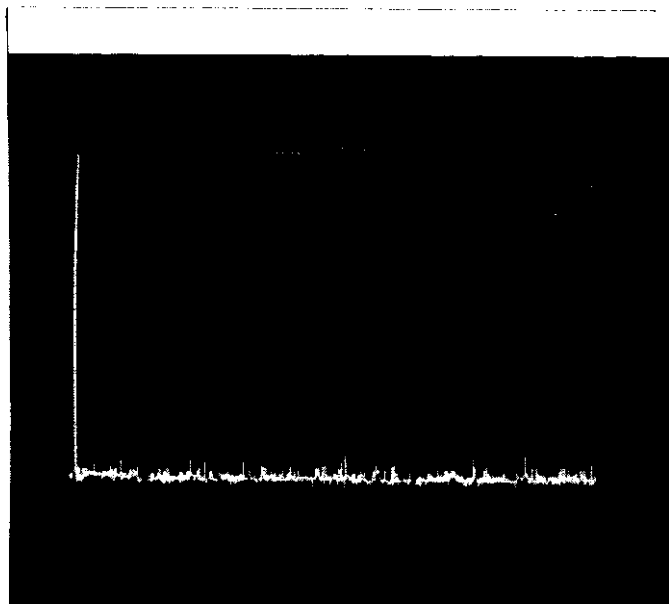
Short Pulse

28 to 60 GHz

(Sec. 2.991)

Scale
↑ 10dB/Div

→ 3.2 GHz
/Div



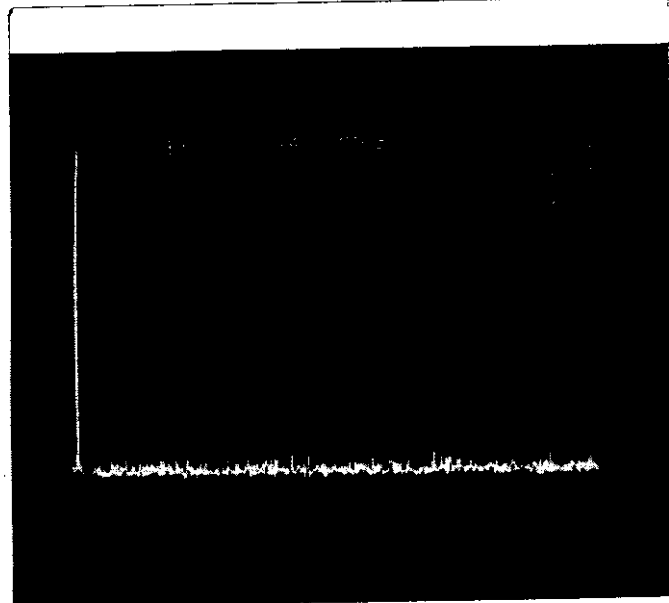
Spurious
Signals

Short Medium Pulse

28 to 60 GHz

Scale
↑ 10dB/Div

→ 3.2 GHz
/Div



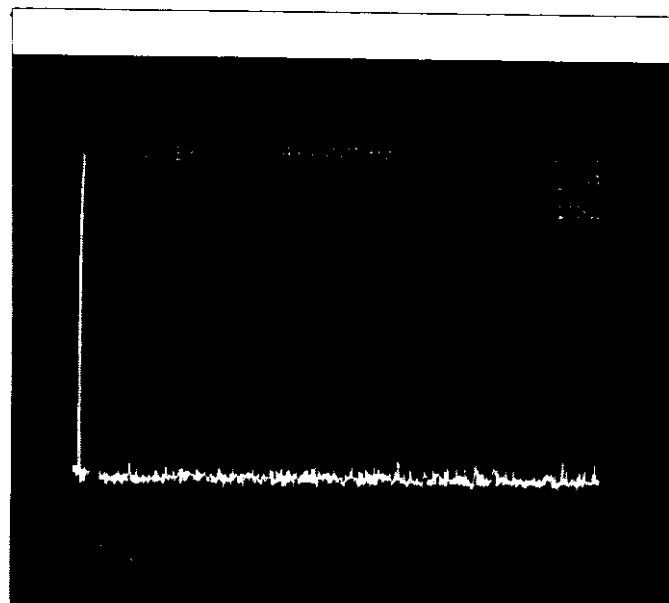
Spurious
Signals

Medium Pulse

28 to 60 GHz

Scale
↑ 10dB/Div

→ 3.2 GHz
/Div



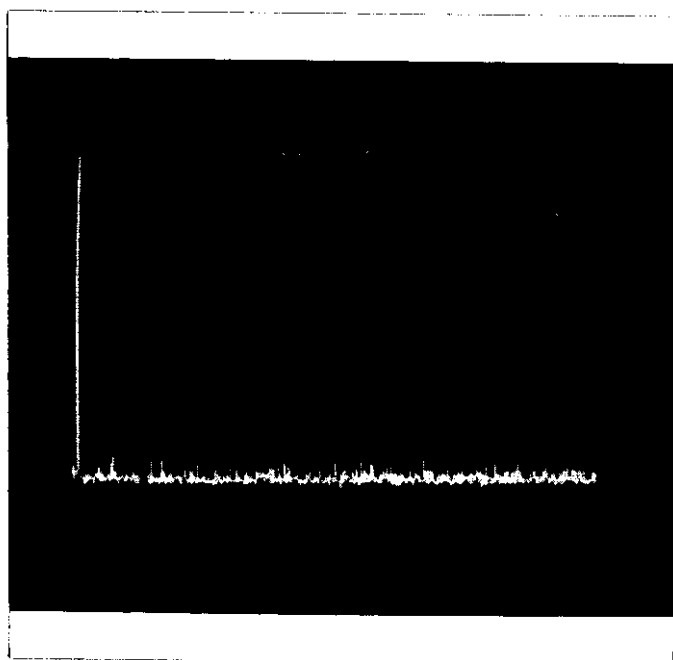
Spurious
Signals

Long Medium Pulse

28 to 60 GHz

(Sec. 2. 991)

Scale
↑ 10dB/Div
→ 3.2 GHz
/Div

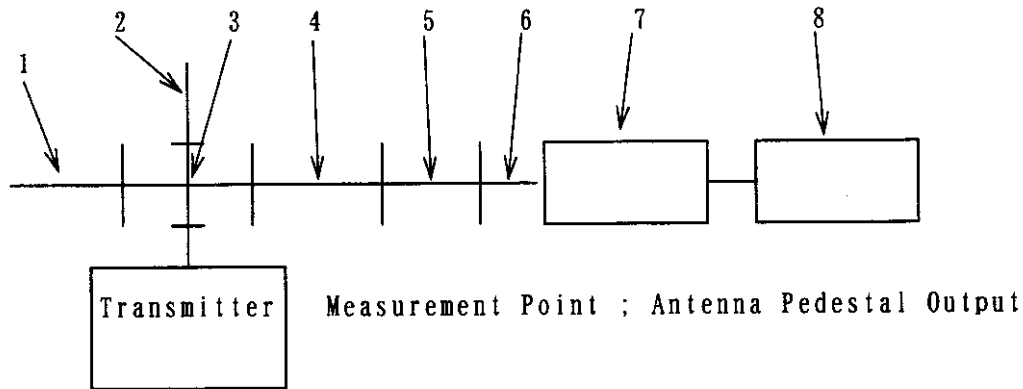


Spurious
Signals

Long Pulse

28 to 60 GHz

(Sec. 2. 995) 4. 0 Frequency Stability



1 Dummy Load	X910B	HP
2 High Power Dummy Load	4D371A	Shimada
3 Directional Coupler	5D351	Shimada
Coupling	20 dB	
Directivity	20 dB	
4 Frequency Meter	X532B	HP
5 Attenuator	X382A	HP
6 Adapter	X281A	HP
7 Power Sensor	8481A	HP
8 Power Meter	435A	HP
Temperature Chamber		Onisi Netugaku

Measurement ProcEDURE

- 1 The antenna pedestal and display unit were set up in the temperature chamber and the measurement equipment were set outside the temperature chamber.
- 2 With power removed, the temperature was decreased to 30 and permitted to stabilize for three hours. Power was applied and measured warm up time. After 30 minutes place the radar in X MIT, measured frequency at 21.6V, 24V, 26.4V
- 3 With power off, the temperature was raised in 10 steps. The sample was permitted to stabilize at each step for at least three hours. Power was applied and measured warm up time. After 30 minutes place the radar in X MIT, measured frequency at 21.6V, 24V, 26.4V

Temperature	Operating Frequency MHz									Warm Up Time
	Short Pulse			Medium Short Puls			Medium			
	21. 6V	24. 0V	26. 4V	21. 6V	24. 0V	26. 4V	21. 6V	24. 0V	26. 4V	
-30	9423	9424	9425	9428	9428	9425	9425	9426	9425	3' 04"
-20	9423	9423	9424	9423	9424	9424	9423	9425	9424	3' 04"
-10	9421	9422	9422	9423	9422	9422	9421	9422	9422	3' 04"
0	9421	9422	9421	9422	9421	9421	9419	9422	9421	3' 04"
+10	9421	9421	9420	9421	9420	9420	9420	9420	9420	3' 04"
+20	9421	9420	9419	9421	9420	9419	9421	9419	9419	3' 05"
+30	9419	9419	9419	9419	9419	9419	9420	9418	9419	3' 05"
+40	9418	9419	9419	9418	9419	9419	9420	9418	9419	3' 05"
+50	9418	9419	9419	9418	9419	9419	9419	9418	9419	3' 05"
+55	9417	9419	9419	9417	9419	9419	9417	9417	9419	3' 05"

Temperature	Operating Frequency MHz						Warm Up Time
	Medium Long Puls			Long Pulse			
	21. 6V	24. 0V	26. 4V	21. 6V	24. 0V	6. 4V	
-30	9424	9425	9424	9424	9424	9424	3' 04"
-20	9423	9424	9423	9423	9423	9423	3' 04"
-10	9421	9422	9421	9421	9421	9421	3' 04"
0	9419	9421	9419	9419	9419	9419	3' 04"
+10	9420	9420	9419	9419	9419	9419	3' 04"
+20	9421	9419	9417	9417	1917	9417	3' 05"
+30	9419	9419	9417	9417	9417	9417	3' 05"
+40	9418	9418	9417	9417	9417	9417	3' 05"
+50	9417	9418	9417	9416	9417	9417	3' 05"
+55	9416	9417	9417	9416	9417	9417	3' 05"

SECTION 5

TEST: Spurious Emissions Field Strength

EQUIPMENT: JMA-3925 S/N LS 5 4 9 6 6

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 9.14 watts maximum (long pulse) or 39.61 dBm:

$$\begin{aligned} \text{Emissions} &\leq 39.61 \text{ dBm} - [43 + 10 \log(9.14)] \text{ dBm} \\ &\leq -13.0 \text{ dBm} \end{aligned}$$

TEST RESULTS: No spurious emissions observed above minimum standard.

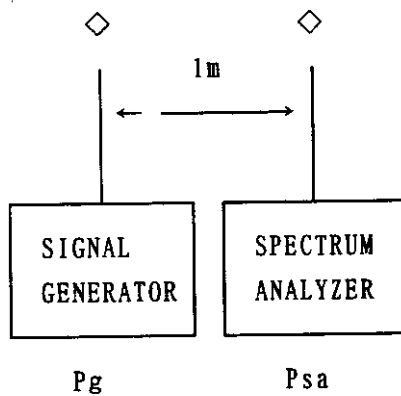
TEST CONDITIONS: Tamb = 20°C to 25°C RHamb = 40% ~ 60%
Euut input = 24 VDC
Stabilization: UUT energized for 10 minutes minimum.

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

DATE: 9 - 10 OCT. 1998

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	Psa	Pg	Pcal	LRL(set)	LRL(adj)
1	250 KHz	-68	0	-34.0	-10	24.0
2	2.5 MHz	-47	0	-23.5	-10	13.5
3	25 MHz	-36	0	-18.0	-10	8.0
4	250 MHz	-28	0	-14.0	-10	4.0
5	500 MHz	-22	0	-11.0	-10	1.0

RFI TEST

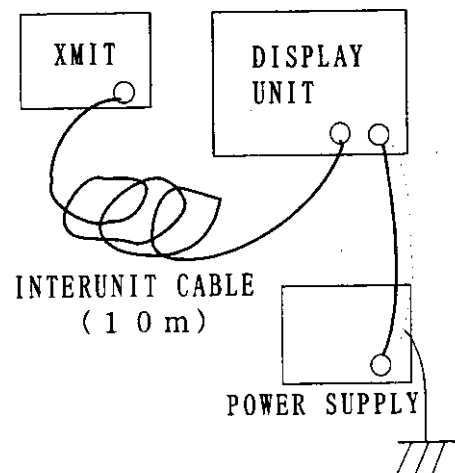
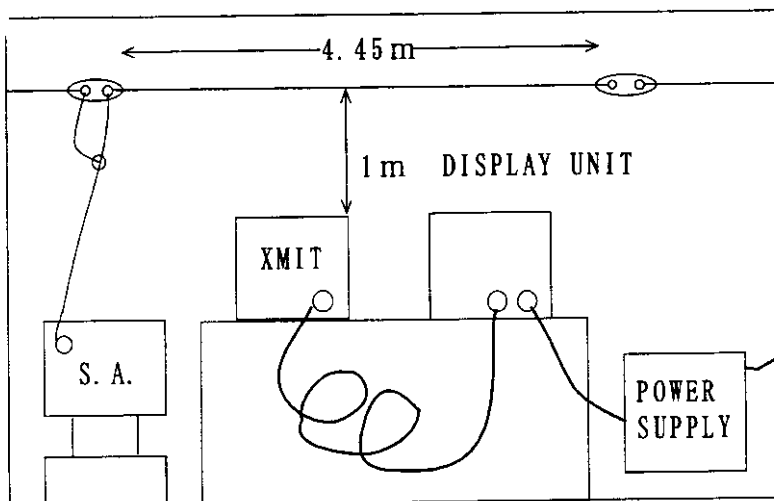
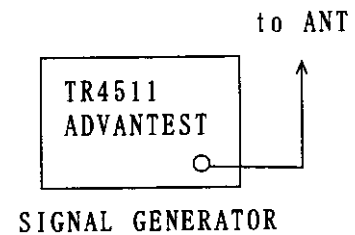
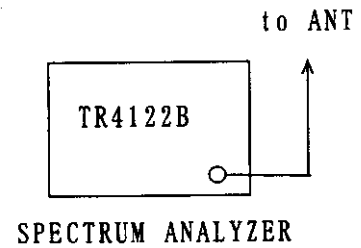
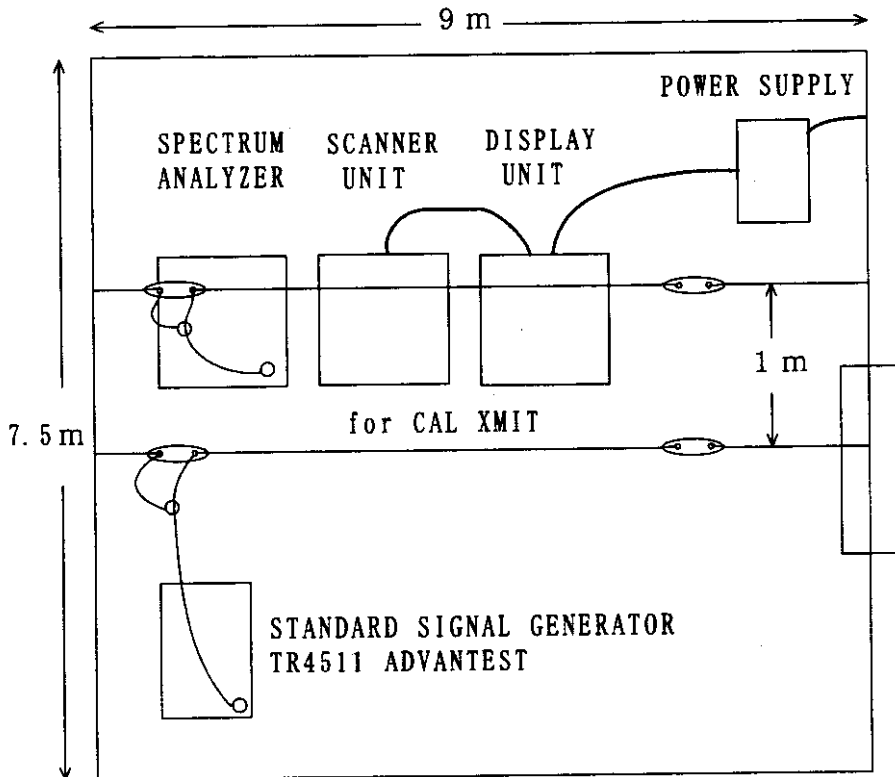
TEST SET-UP #1(0~50MHz)

TEST #1 0~500 KHz

TEST #2 0~ 5 MHz

TEST #3 0~ 50 MHz

TEST EQUIPMENT



JRC ORIGINAL
RF ANECHOIC CHAMBER:SIDE VIEW

CABLE

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

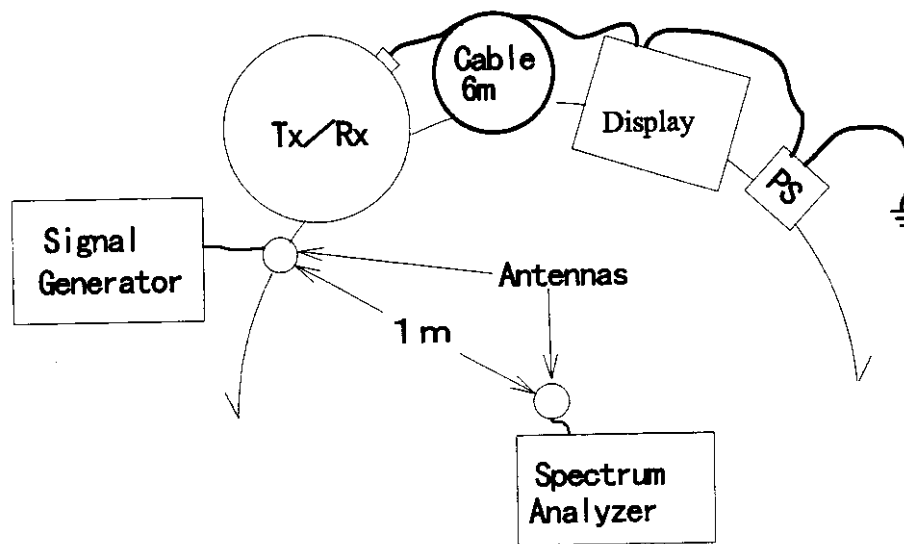


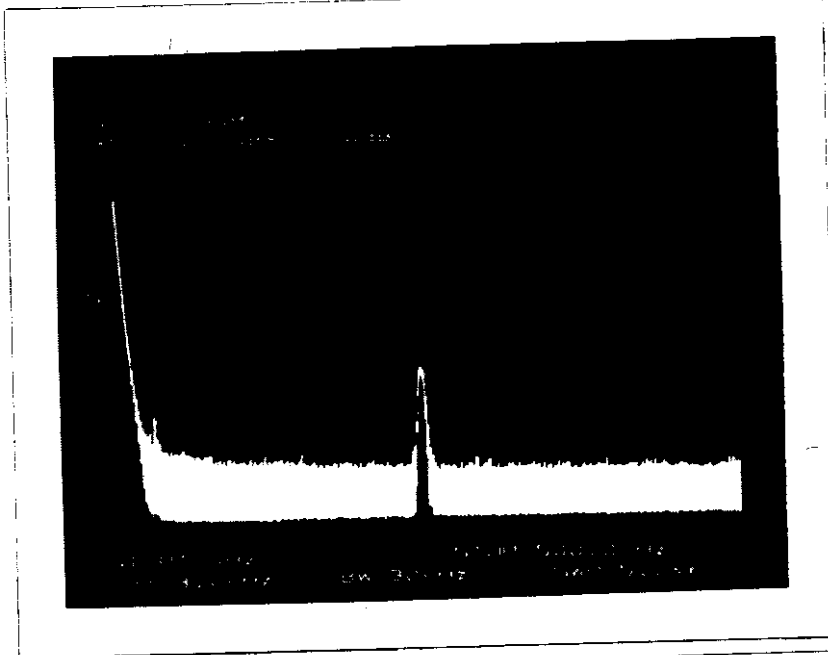
TABLE OF TEST EQUIPMENT USED

Frequency	Test Antenna	Spectrum Analyzer	Signal Generator	Misc.
0 - 1000 MHz	1/2 Coaxial (Untuned)	TAKEDA RIKEN TR4133B	ADVANTEST TR4511	-
1 - 18 GHz	AILTECH 94612-1 Log Periodic	"	NA	-
18 - 26 GHz	AILTECH 94626-1 HP-11519A	"	NA	-
26 - 40 GHz	AILTECH 94627-1 HP-11519A	"	NA	-

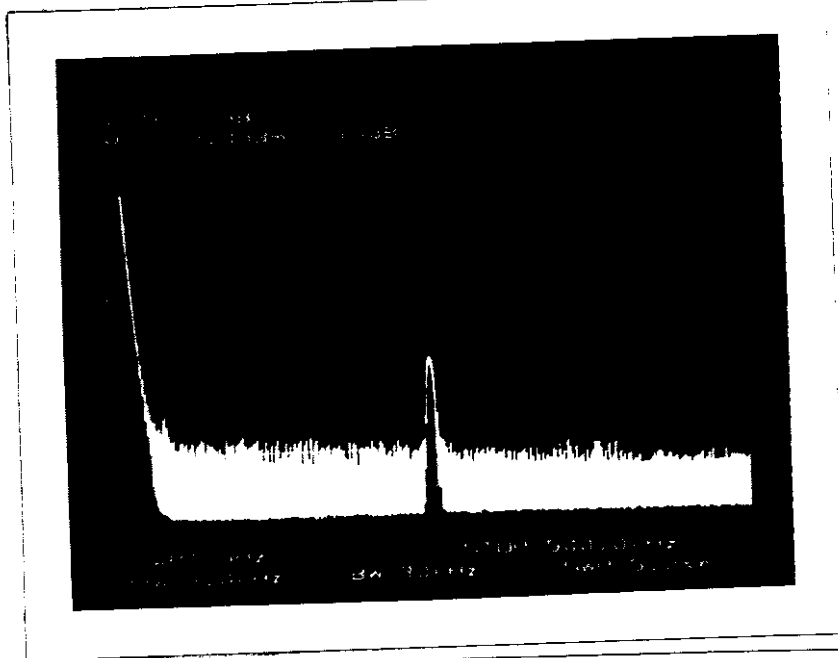
TEST #1

Frequency Band: 0~500 KHz

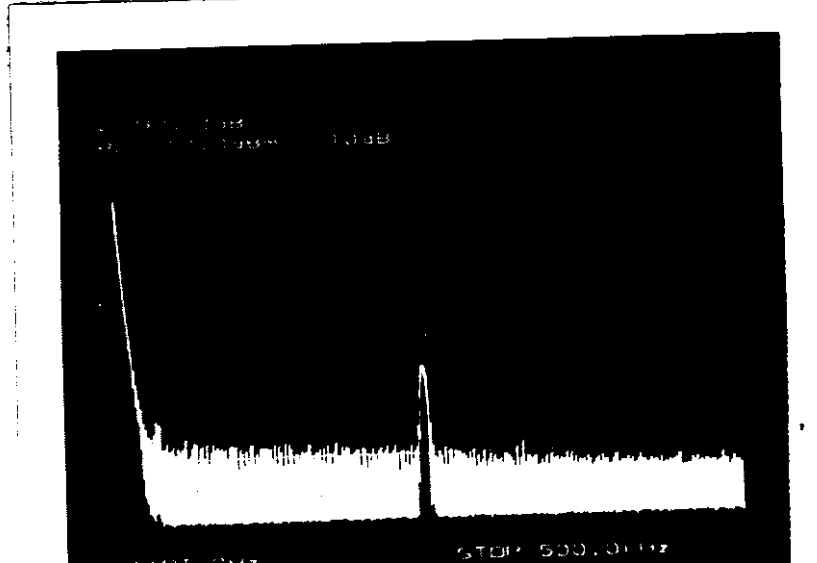
Log Ref. Level: 24.0 dBm



Ambient



Stand-By

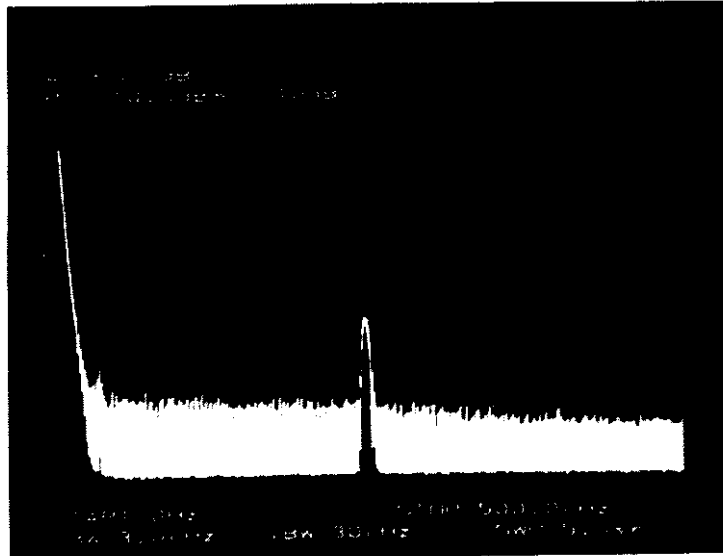


Short Pulse

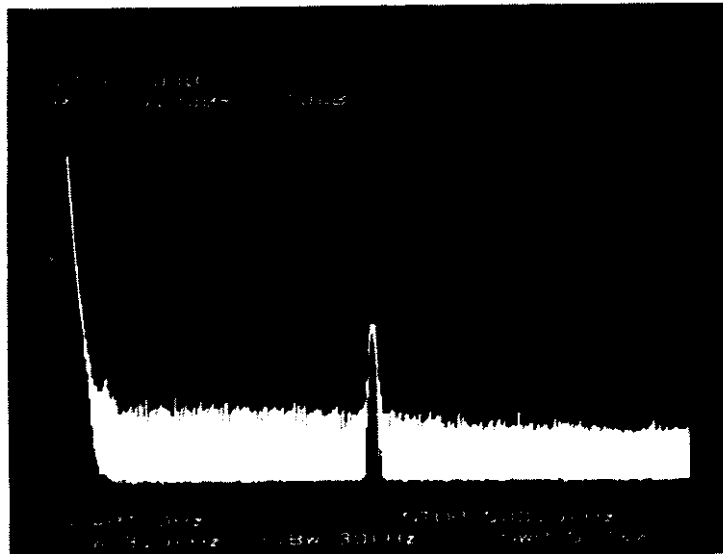
TEST #1

Frequency Band: 0~500 KHz

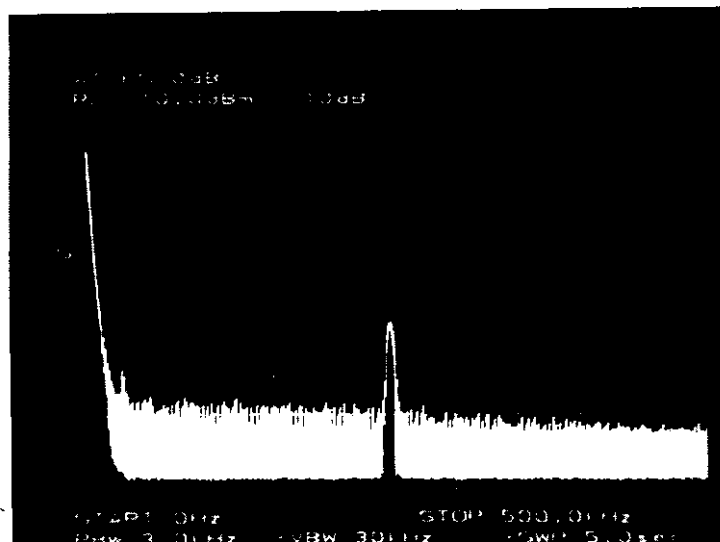
Log Ref. Level: 24.0 dBm



Medium
Short Pulse



Medium Pulse

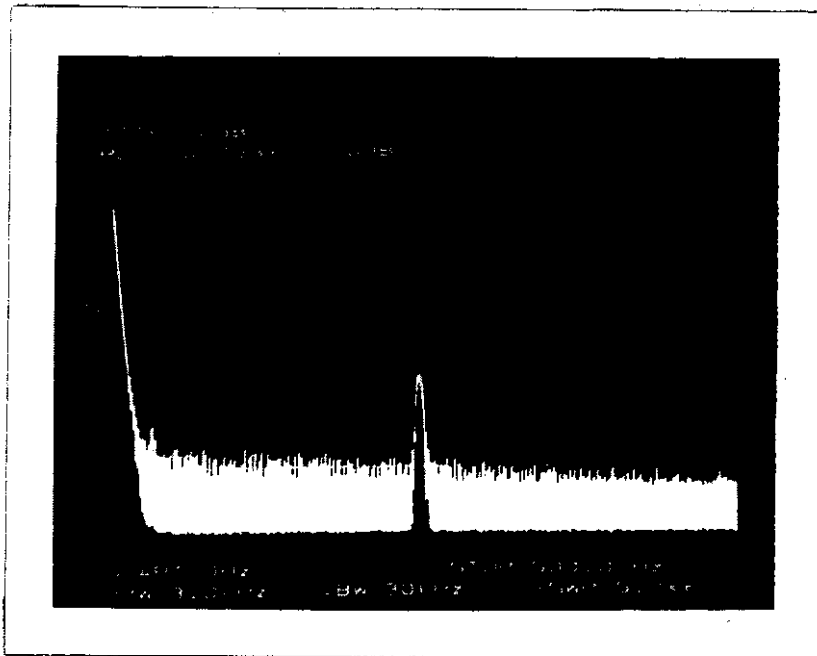


Medium
Long Pulse

TEST #1

Frequency Band: 0~500 KHz

Log Ref. Level: 24.0 dBm

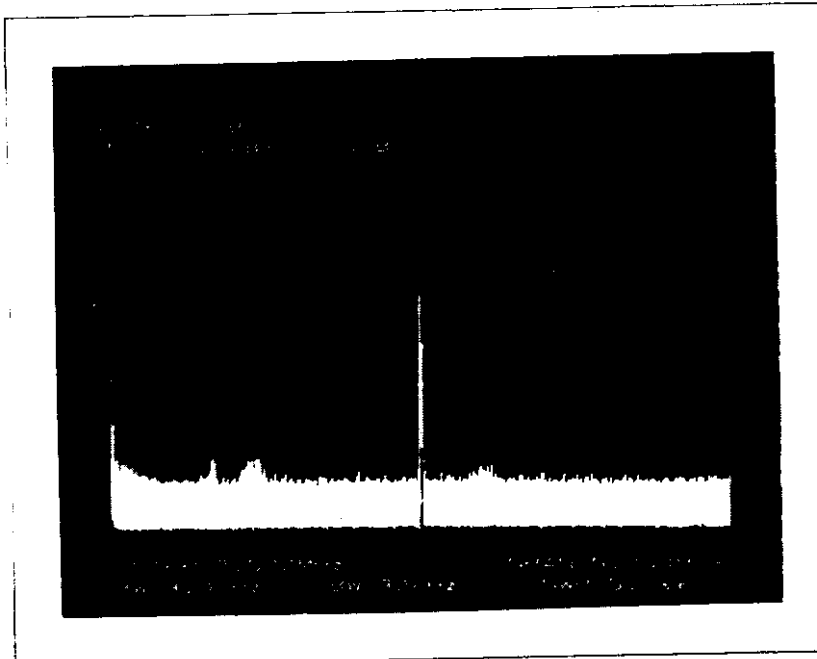


Long Pulse

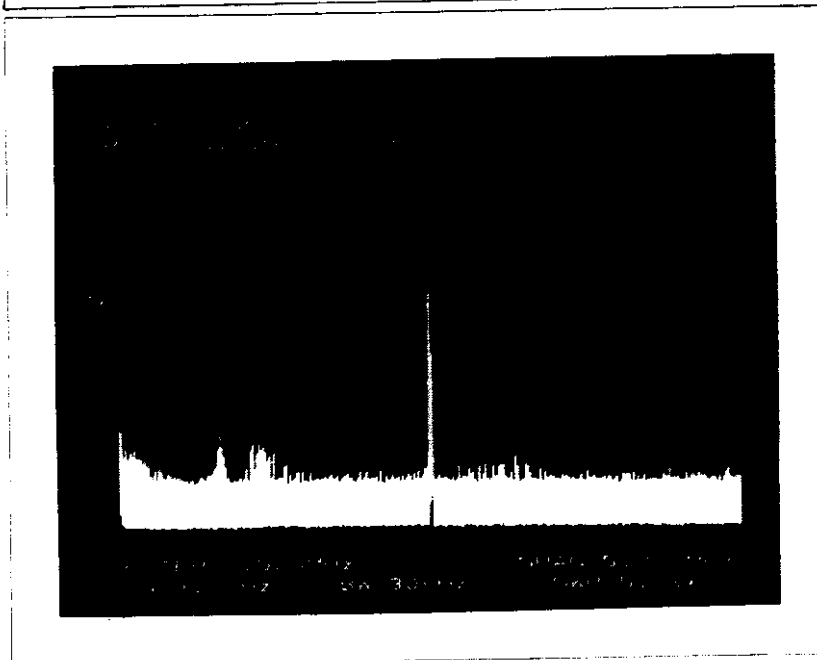
TEST #2

Frequency Band: 0~5 MHz

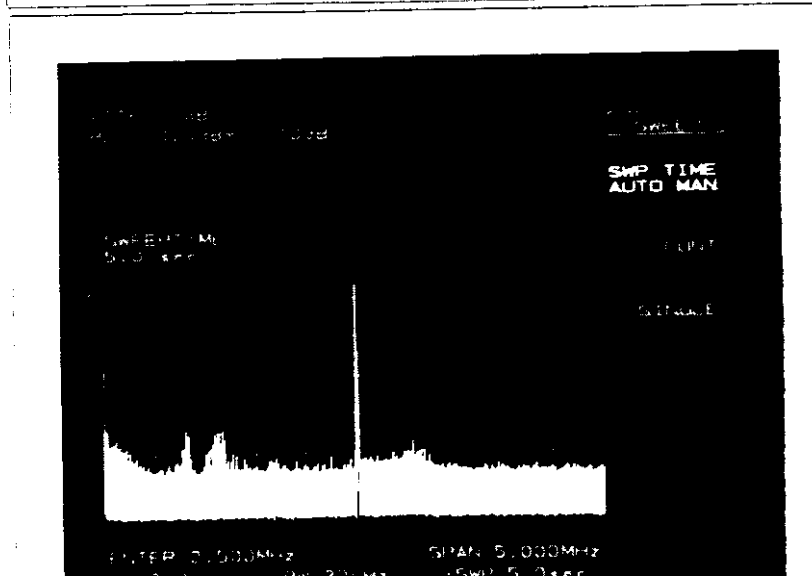
Log Ref. Level: 13.0 dBm



Ambient



Stand-By

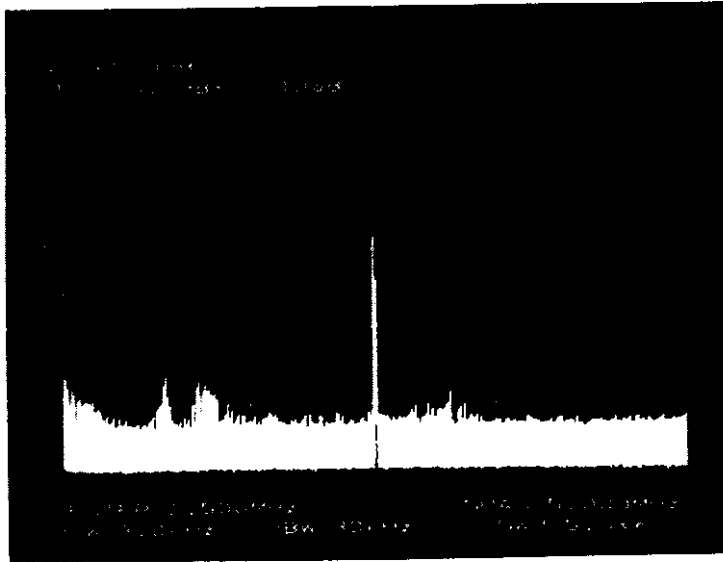


Short Pulse

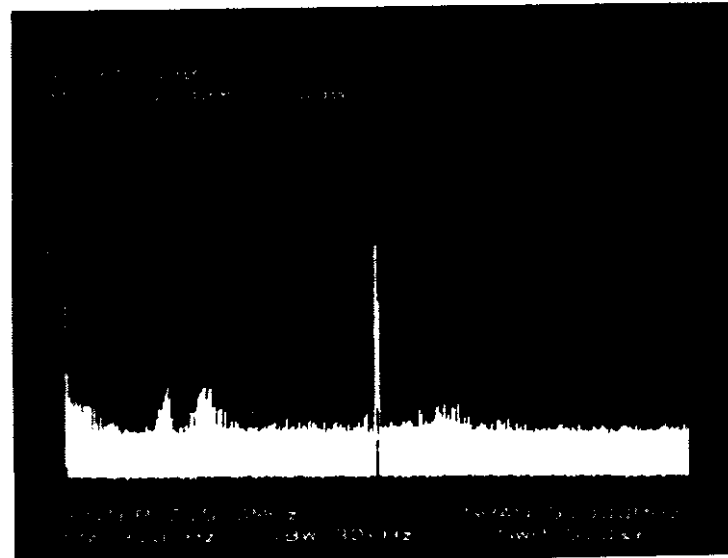
TEST #2

Frequency Band: 0 ~ 5 MHz

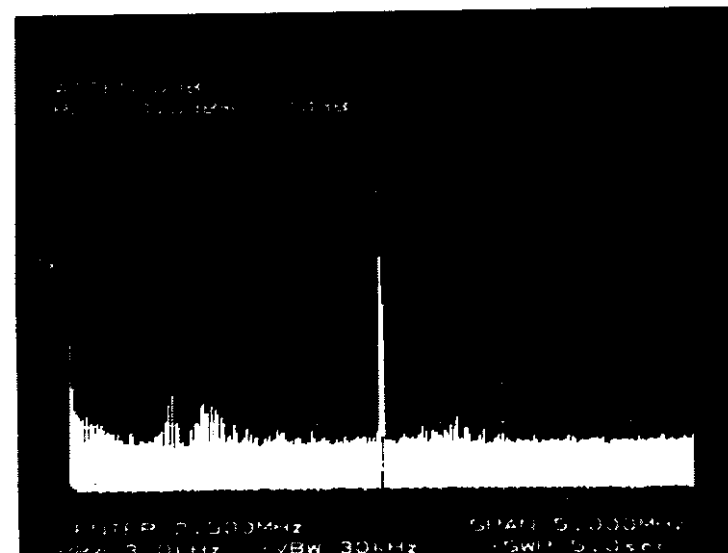
Log Ref. Level: 13.0 dBm



Medium
Short Pulse



Medium Pulse

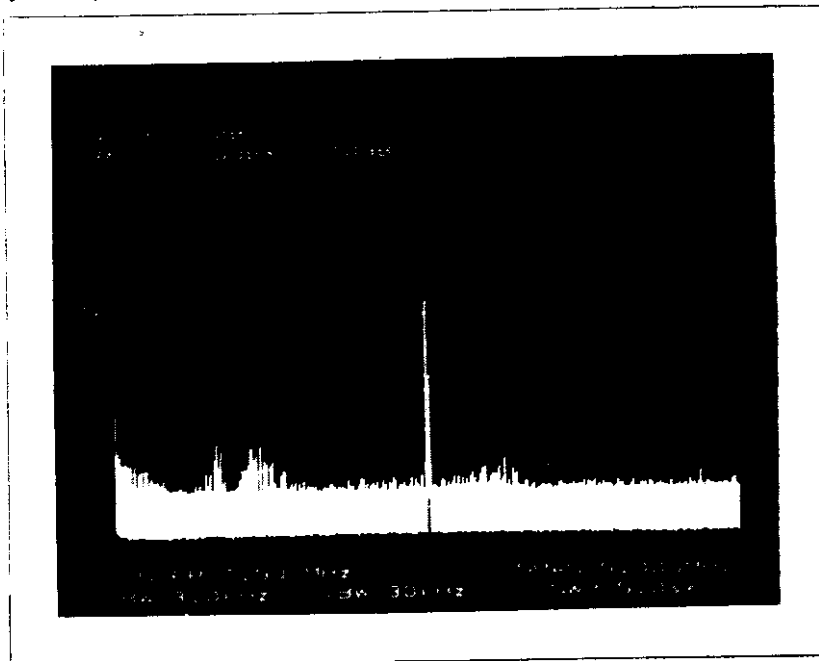


Medium
Long Pulse

TEST #2

Frequency Band: 0~5 MHz

Log Ref. Level: 13.0 dBm

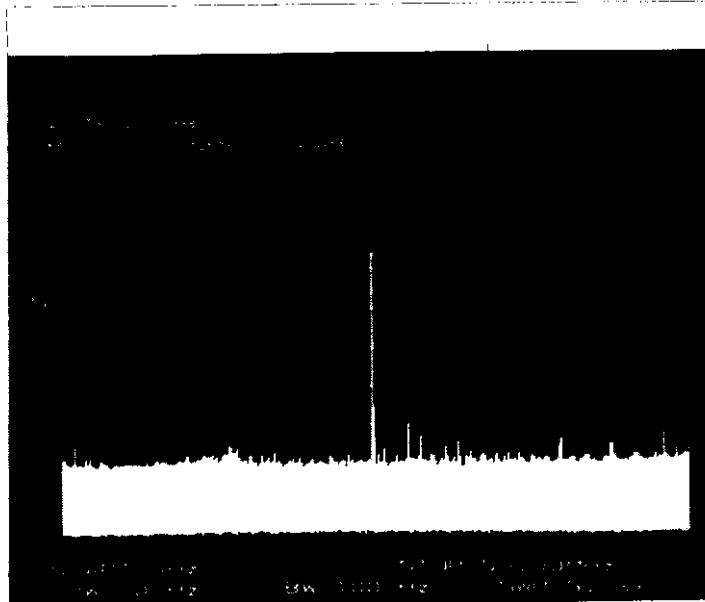


Long Pulse

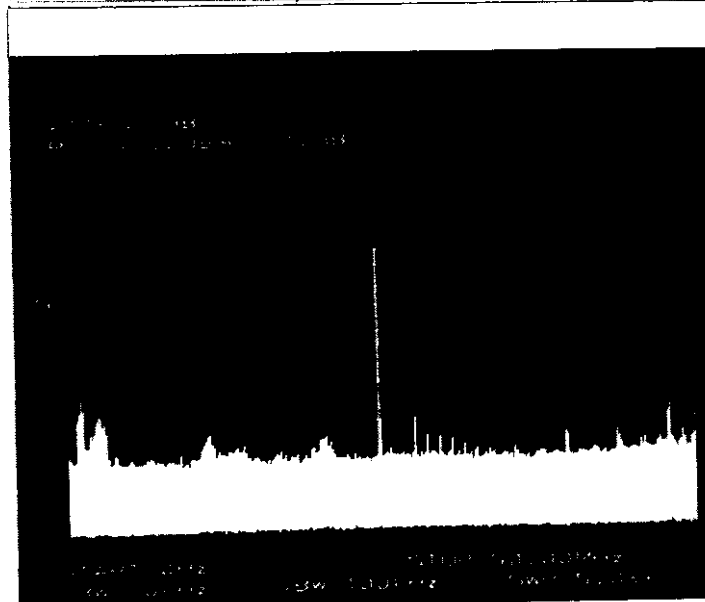
TEST #3

Frequency Band: 0~50 MHz

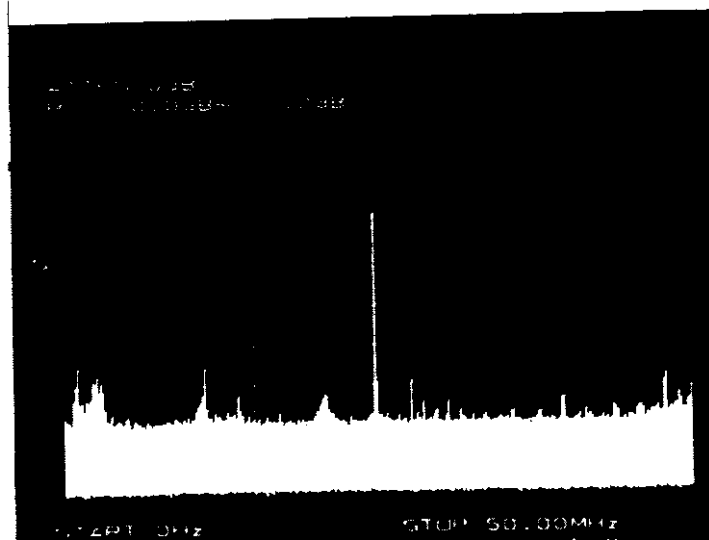
Log Ref. Level: 7.5 dBm



Ambient



Stand-By

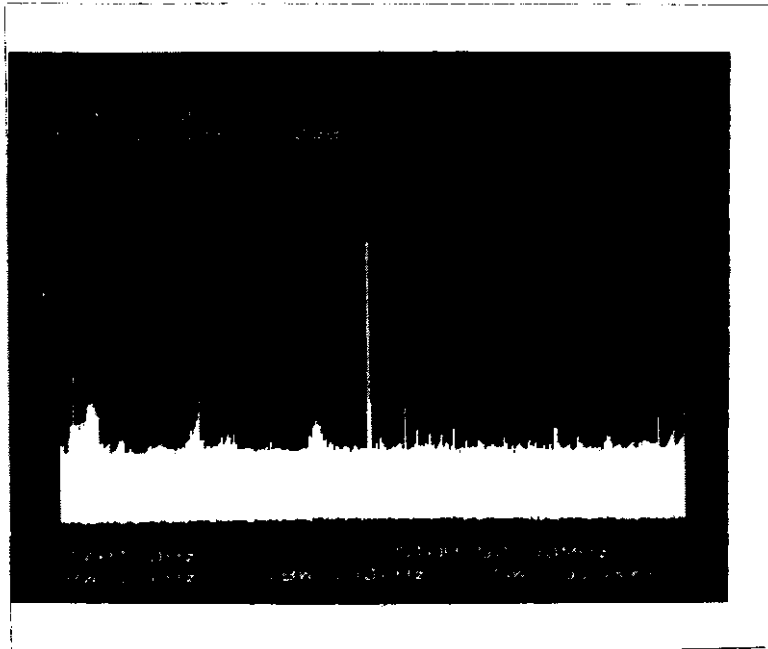


Short Pulse

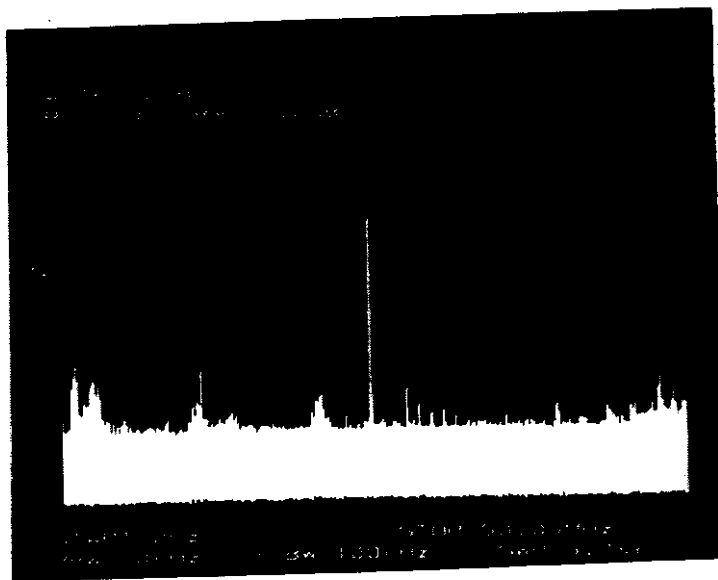
TEST #3

Frequency Band: 0~50 MHz

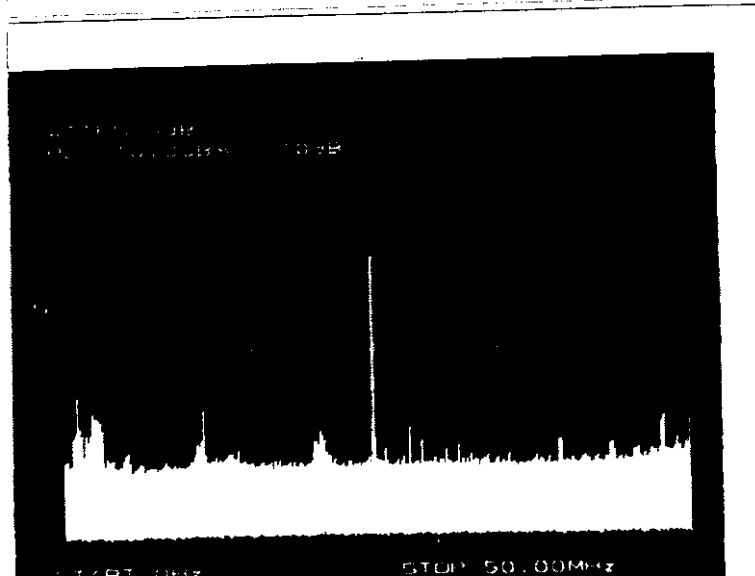
Log Ref. Level: 7.5 dBm



Medium
Short Pulse



Medium Pulse

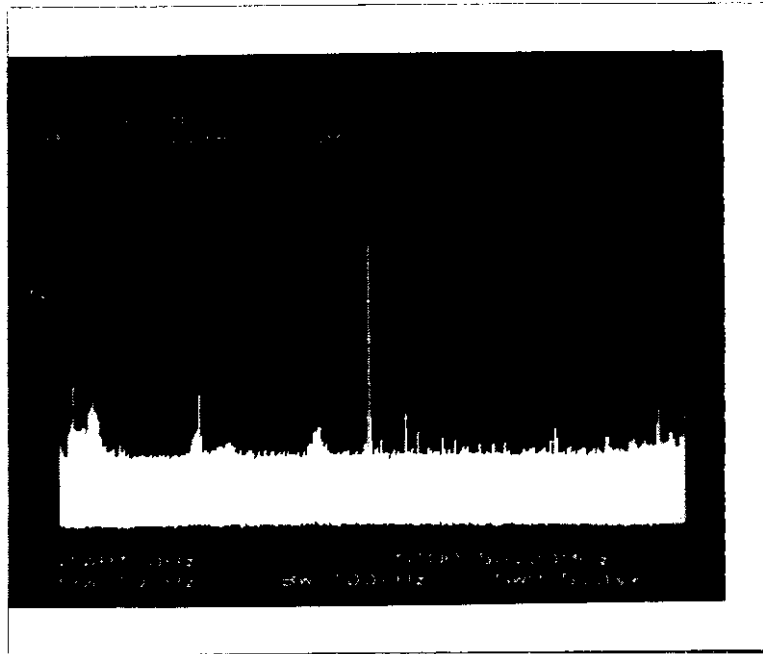


Medium
Long Pulse

TEST #3

Frequency Band: 0~50 MHz

Log Ref. Level: 7.5 dBm

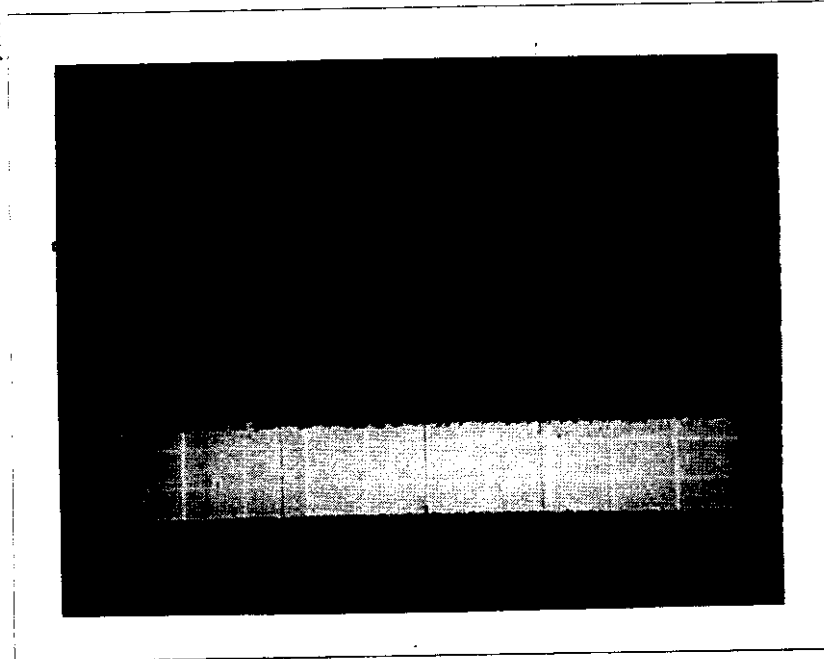


Long Pulse

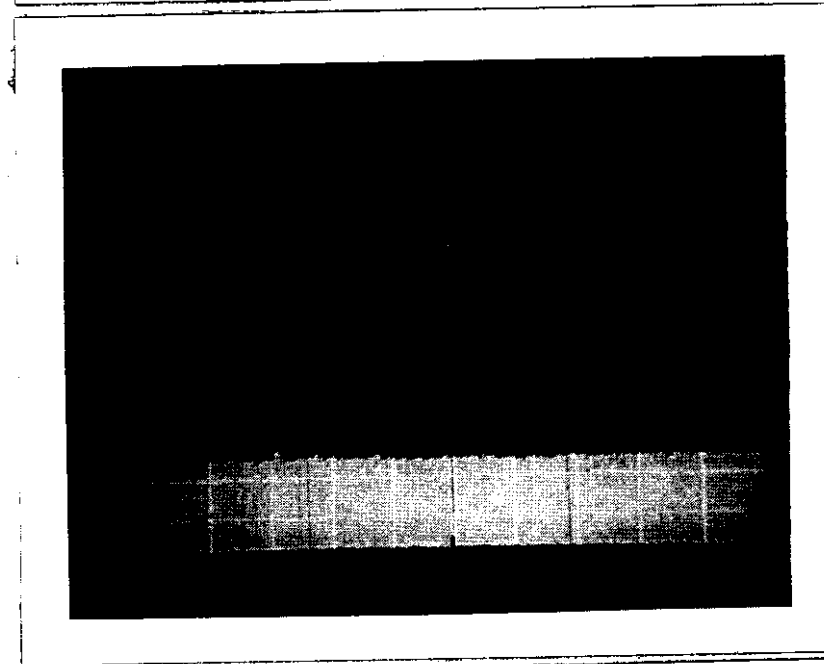
TEST #4

Frequency Band: 0~500 MHz

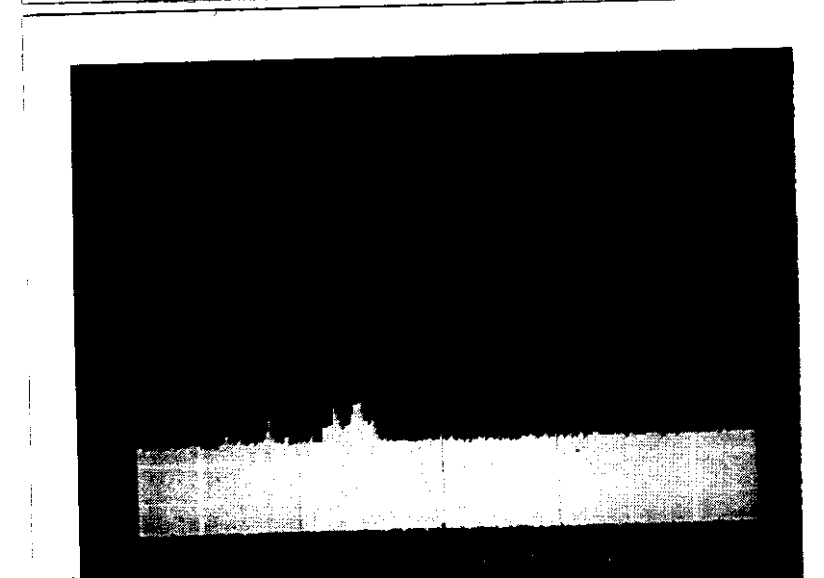
Log Ref. Level: 4.0 dBm



Ambient



Stand-By

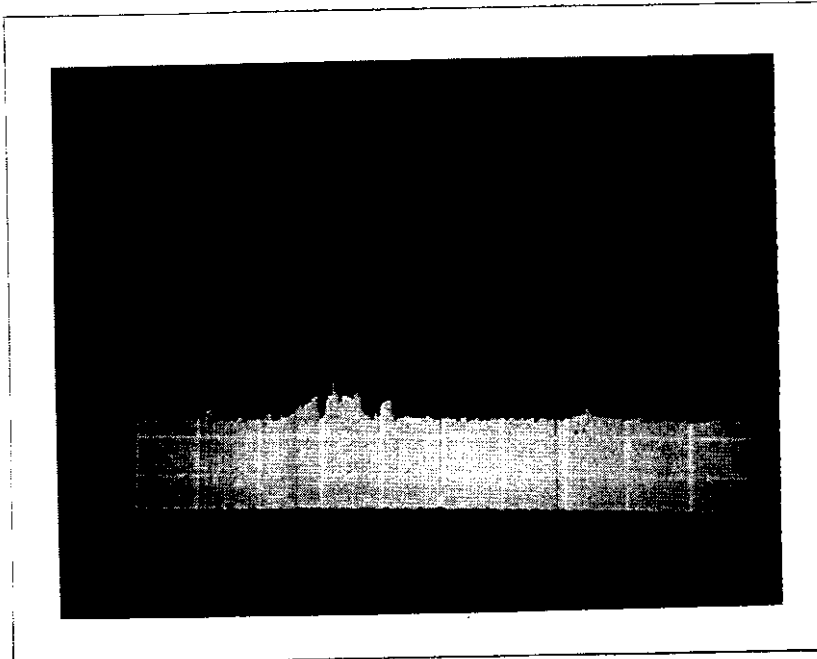


Short Pulse

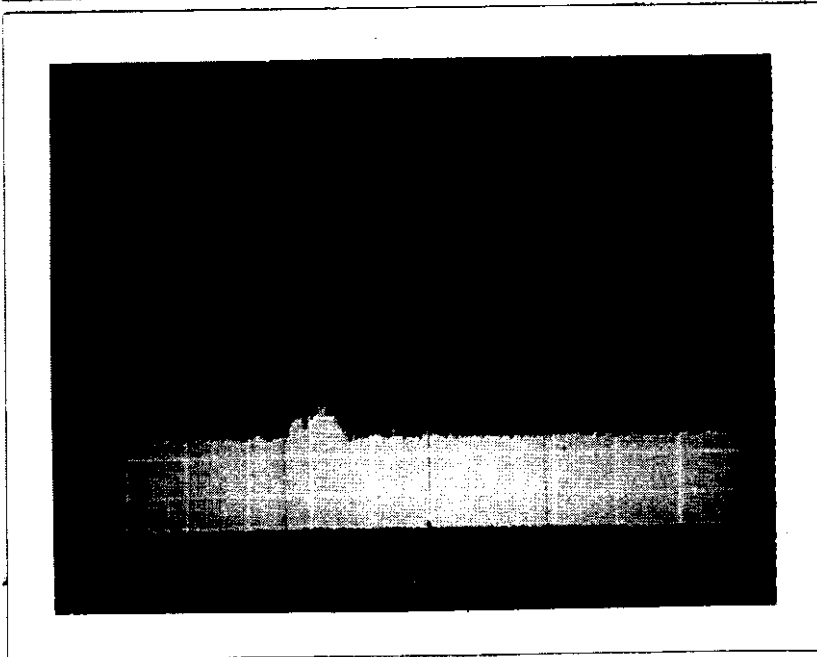
TEST #4

Frequency Band: 0~500 MHz

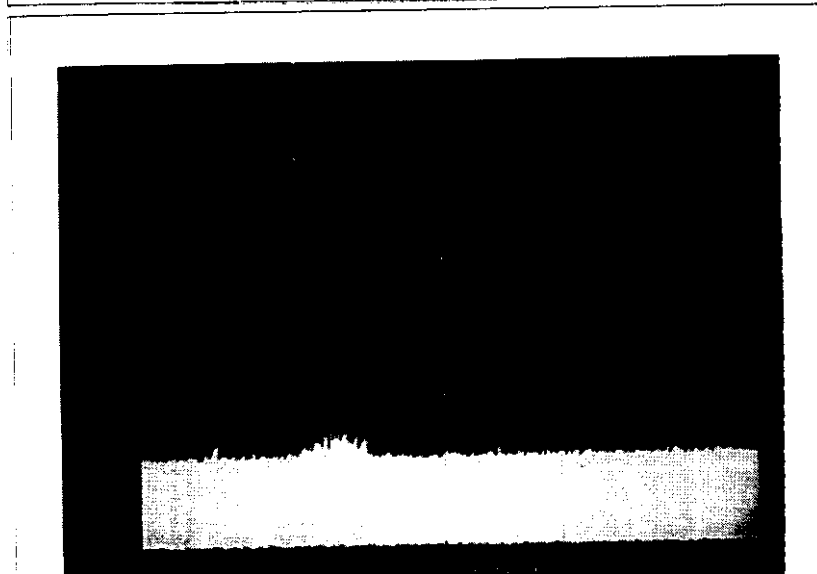
Log Ref. Level: 4.0 dBm



Medium
Short Pulse



Medium Pulse

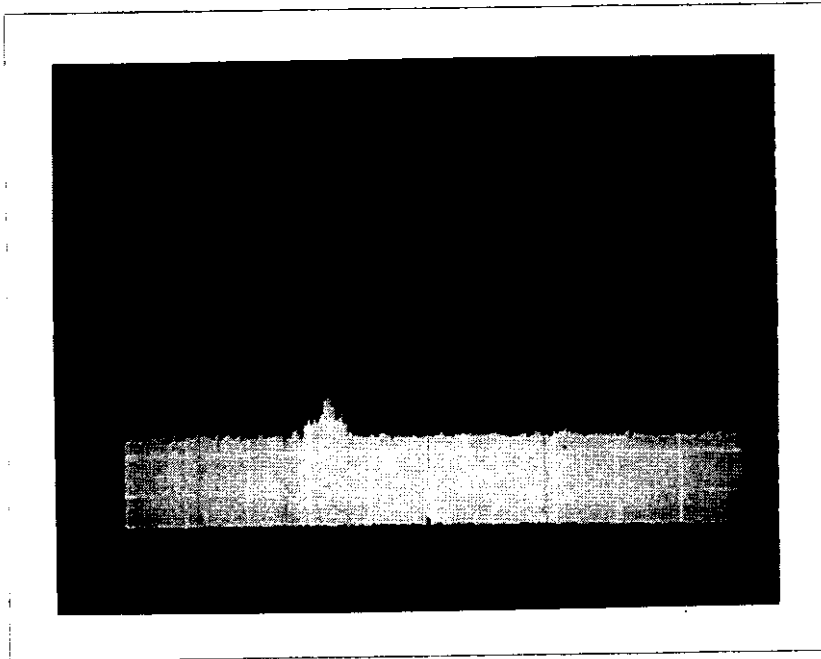


Medium
Long Pulse

TEST #4

Frequency Band: 0~500 MHz

Log Ref. Level: 4.0 dBm

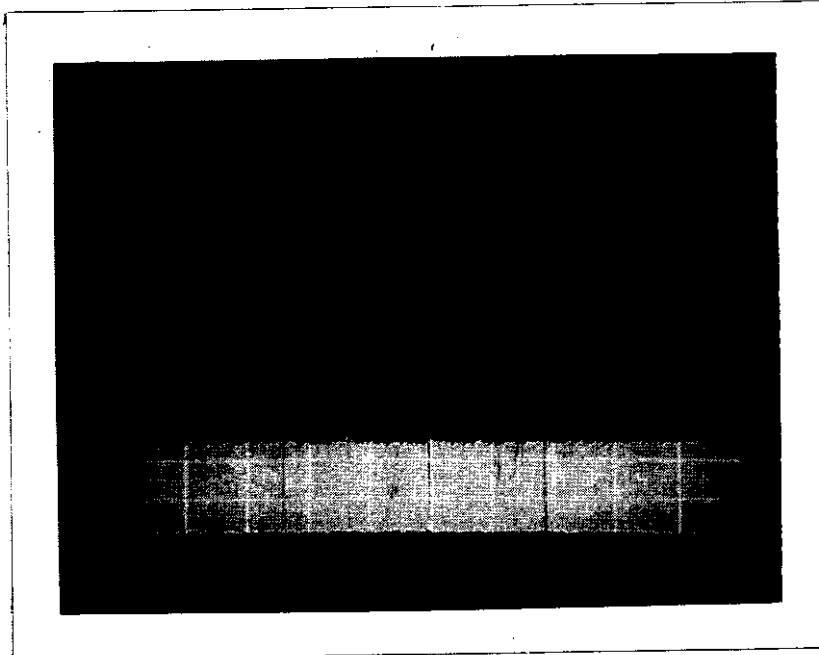


Long Pulse

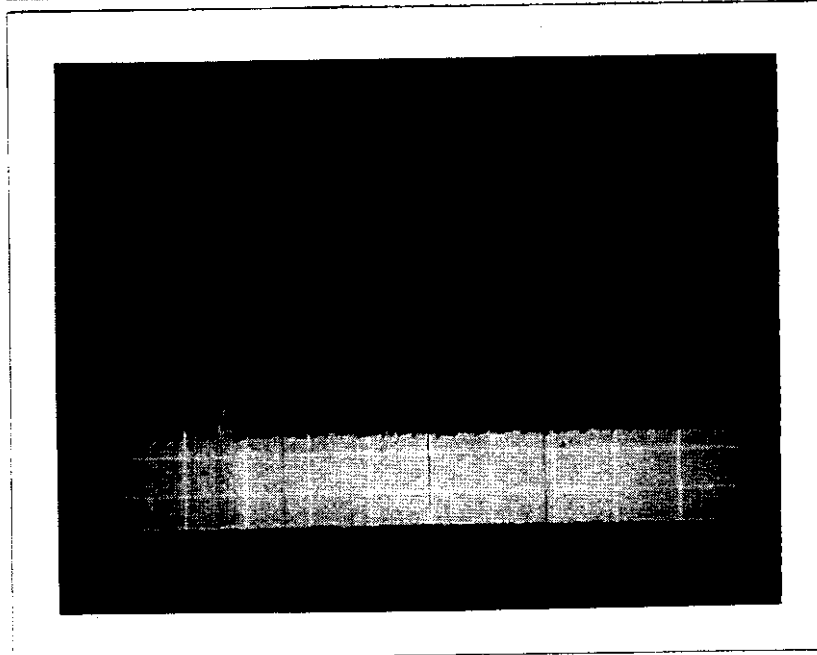
TEST #5

Frequency Band: 0~1 GHz

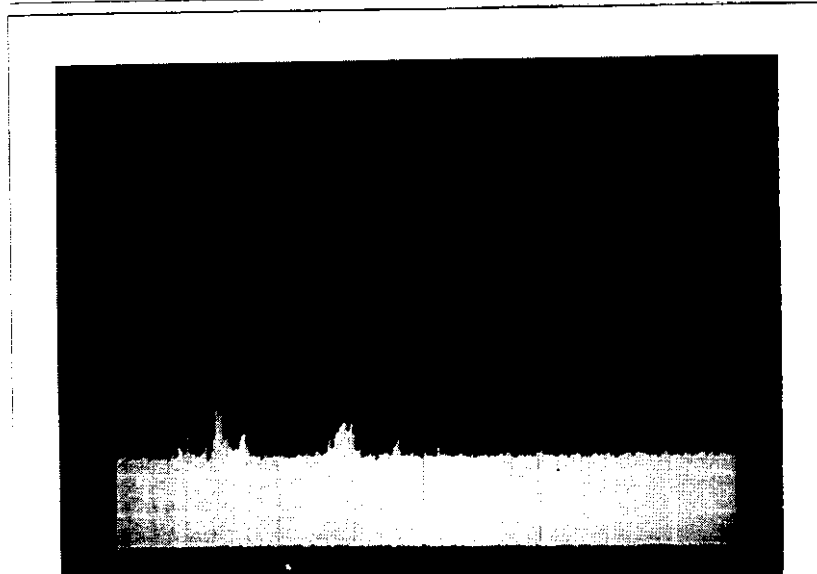
Log Ref. Level: -4.0 dBm



Ambient



Stand-By

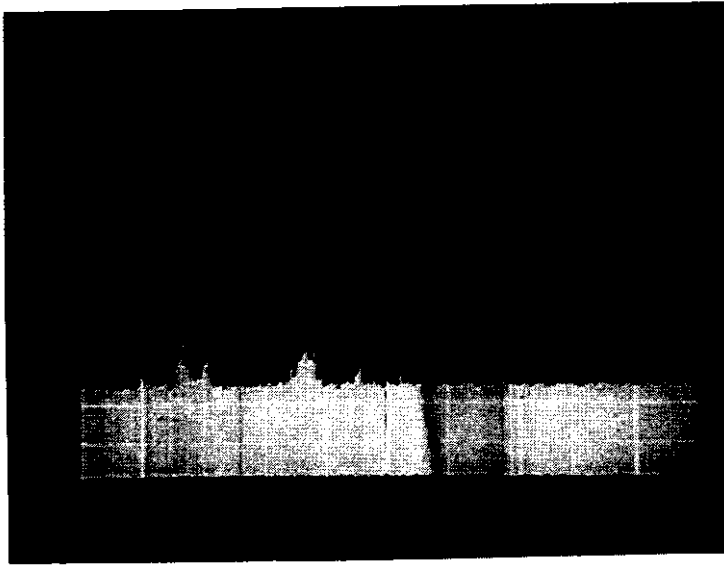


Short Pulse

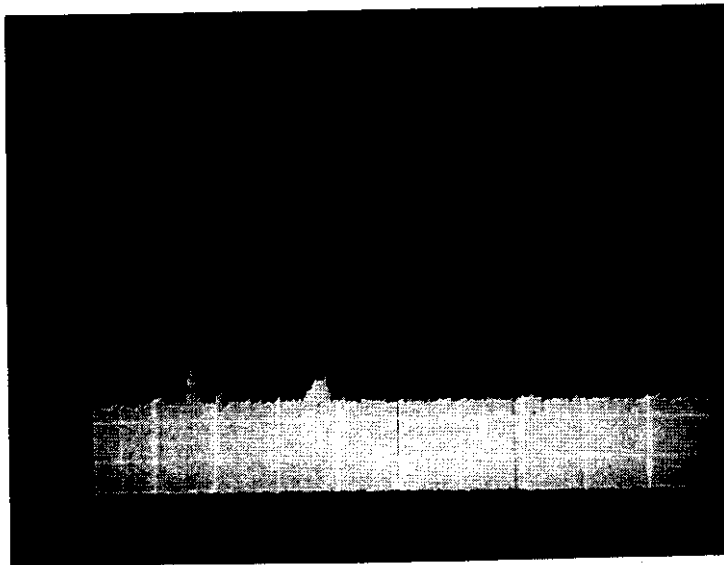
TEST #5

Frequency Band: 0~1 GHz

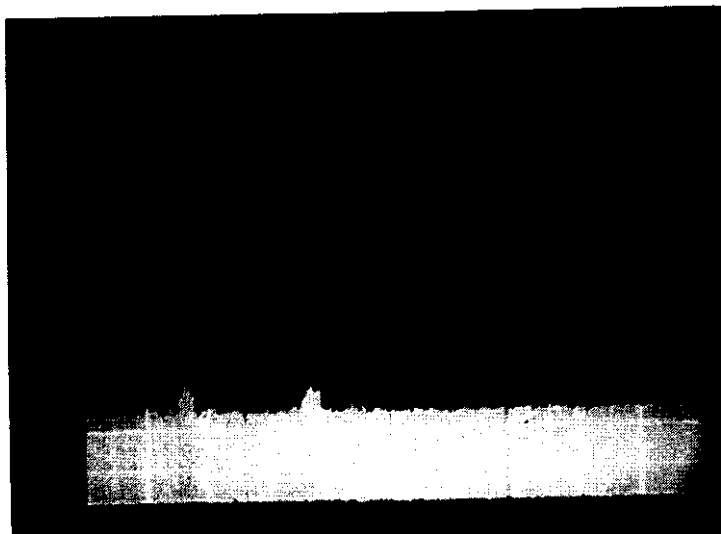
Log Ref. Level: -4.0 dBm



Medium
Short Pulse



Medium Pulse

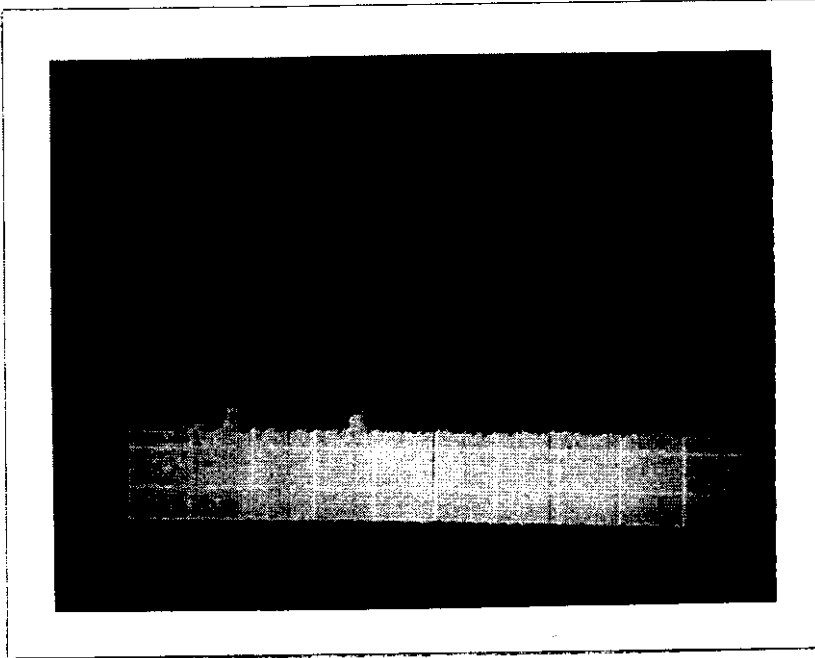


Medium
Long Pulse

TEST #5

Frequency Band: 0~1 GHz

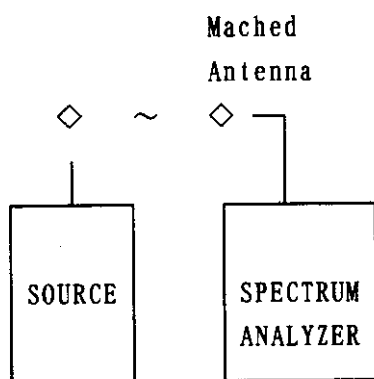
Log Ref. Level: -4.0 dBm



Long Pulse

CALIBRATION OF TESTS 6 ~ 13 (1 ~ 60 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)

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

Where P_t is power transmitted.

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

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

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

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

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

TEST	HORN GAIN (AVG) dB		WAVELENGTH (dB)		Pt - Psa		LOG REF LEVEL
	LOA	HI	LO	HI	LO	HI	
6	6		-10.5	-24.4	24.3	38.2	0 dBm
7	6		-23.5	-29.0	37.3	42.8	0 dBm
8	6		-29.0	-32.4	42.8	46.5	0 dBm
9	6		-32.0	-34.5	46.2	48.3	0 dBm
10	6		-34.0	-36.0	45.8	49.7	0 dBm
11	23.3	24.9	-35.6	-38.8	32.1	33.7	0 dBm
12	24.7	23.7	-38.4	-39.7	33.5	35.8	0 dBm
13	23.6	25.1	-39.4	-46.0	35.6	37.2	0 dBm

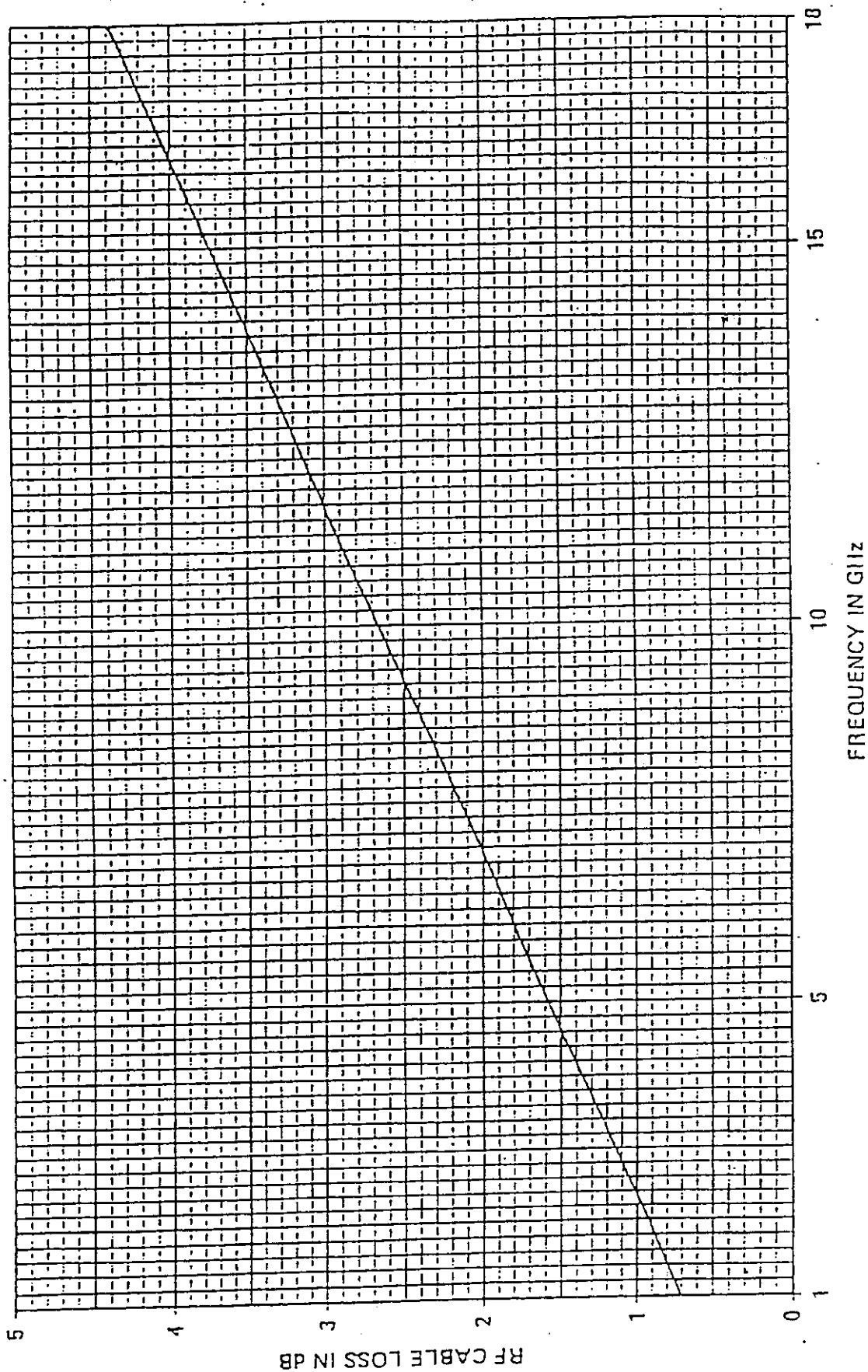


Figure 4-2. Model 94615-1 RF Cable Loss Chart

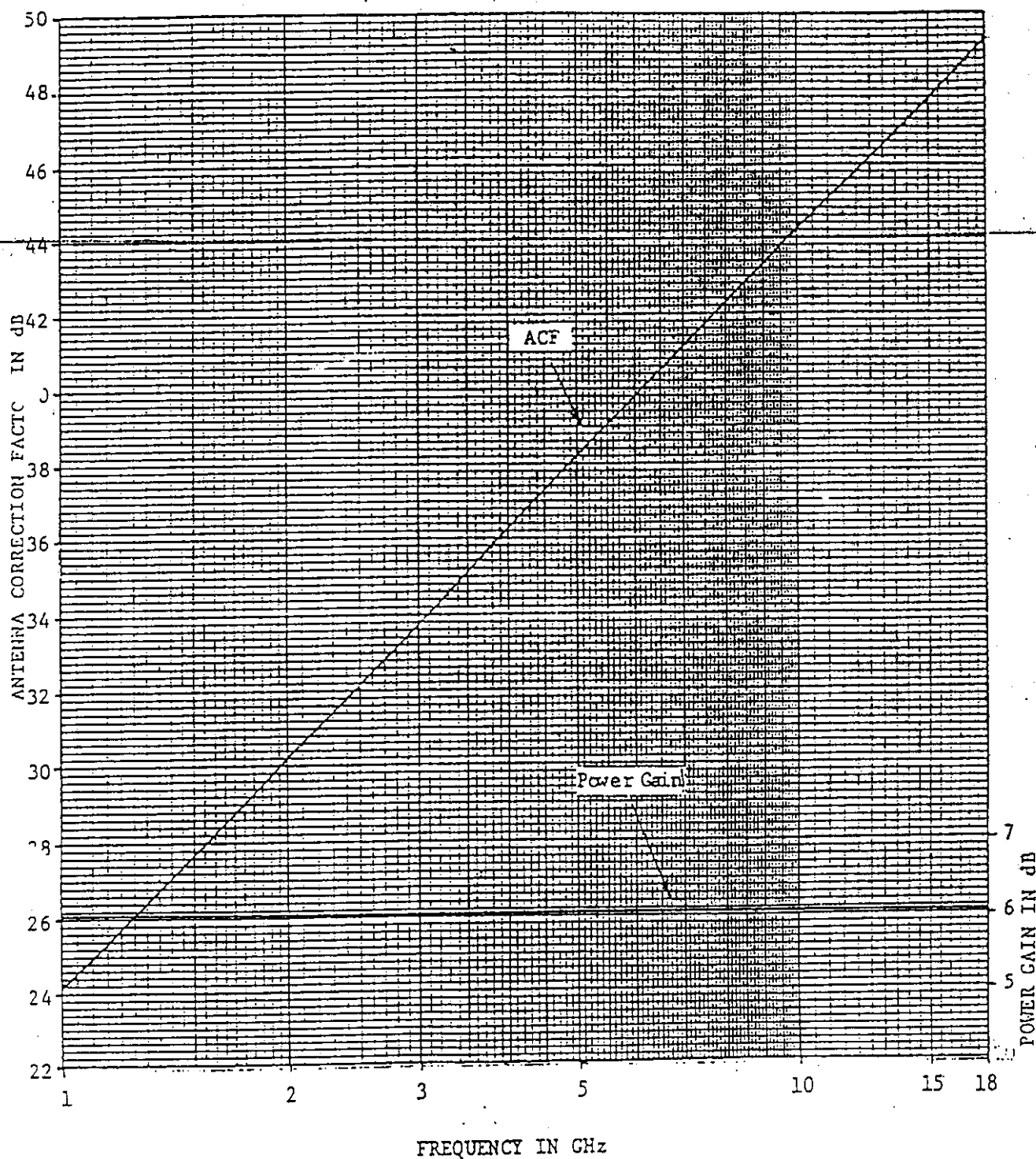


Figure 4-1. Antenna Correction Factor and Power Gain, Model 94612-1 Antenna

Power Gain in dB

Antenna Correction Factor in dB

USER'S GUIDE

94627 Microwave Antennas

Dwg. 1-404351-

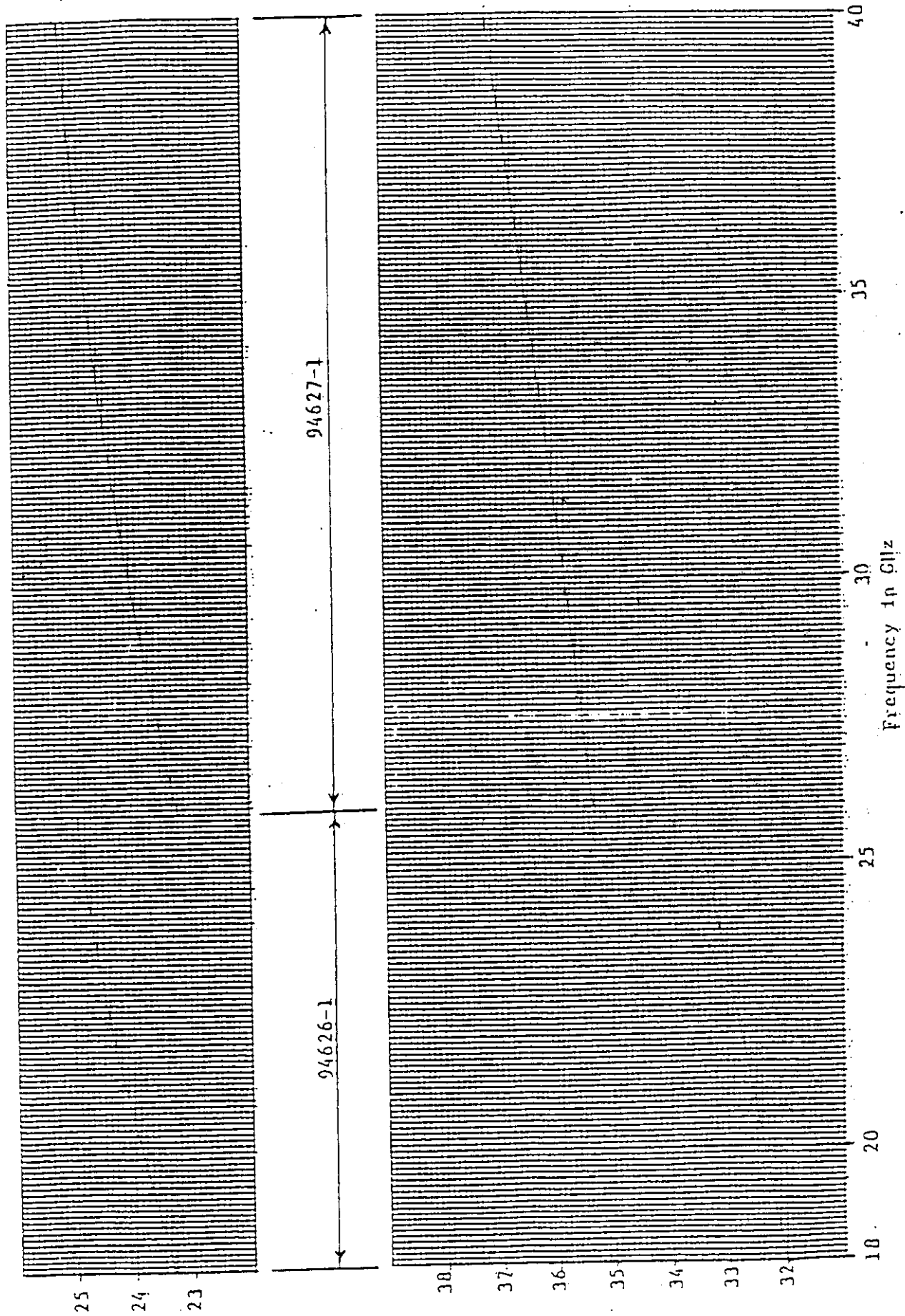


Figure 1-1. Antenna Correction Factor and Power Gain for 110th Antenna

TEST #6

Frequency Band: 1~5GHz

Log Ref. Level: 0 dBm

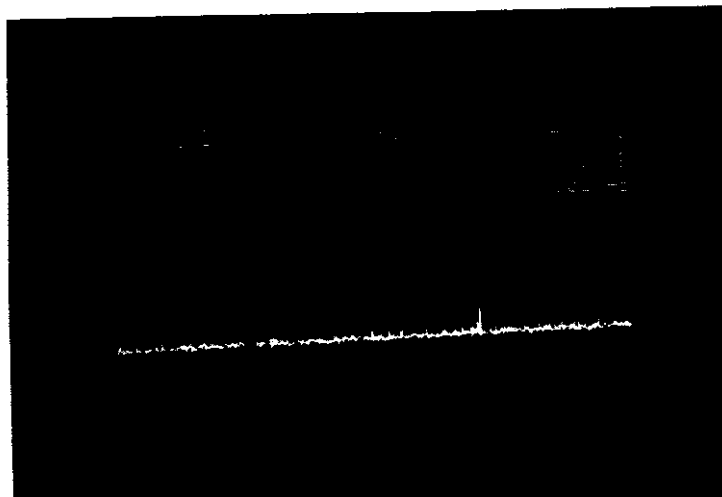
Maximum Spurious Signal Observed: (See Calibration Procedure
for Test 6~13),



Ambient



Stand-By



Short Pulse

TEST #6

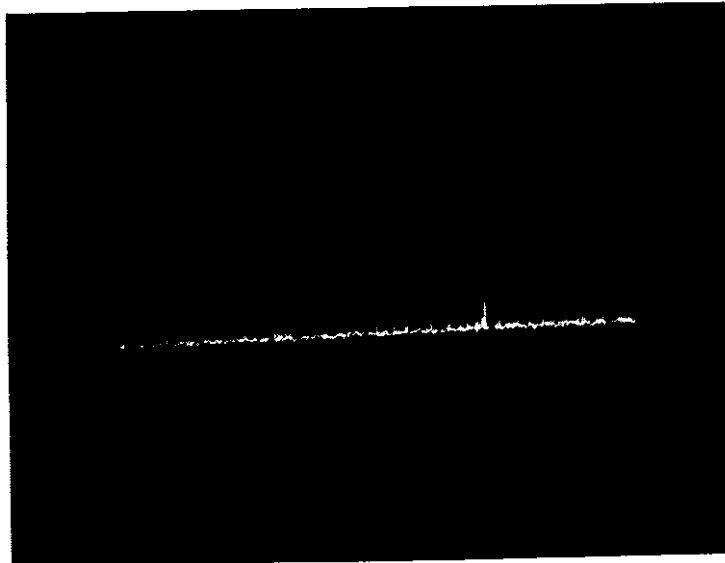
Frequency Band: 1~5 GHz

Log Ref. Level: 0 dBm

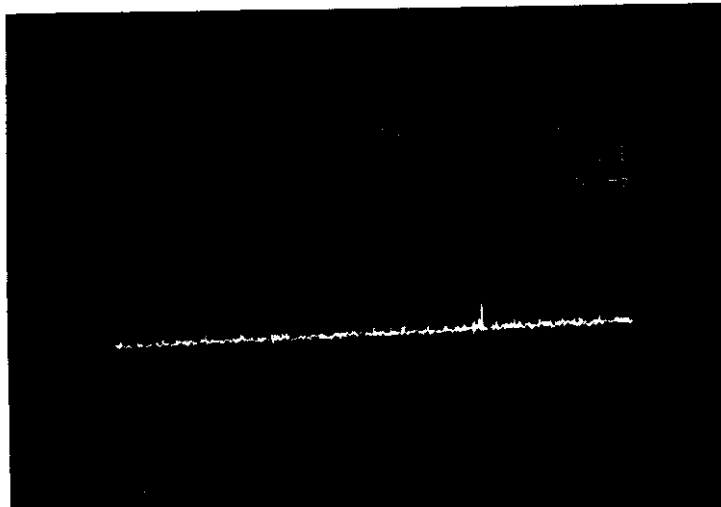
Maximum Spurious Signal Observed: (See Calibration Procedure
for Test 6~13)



Short-
Medium Pulse



Medium Pulse



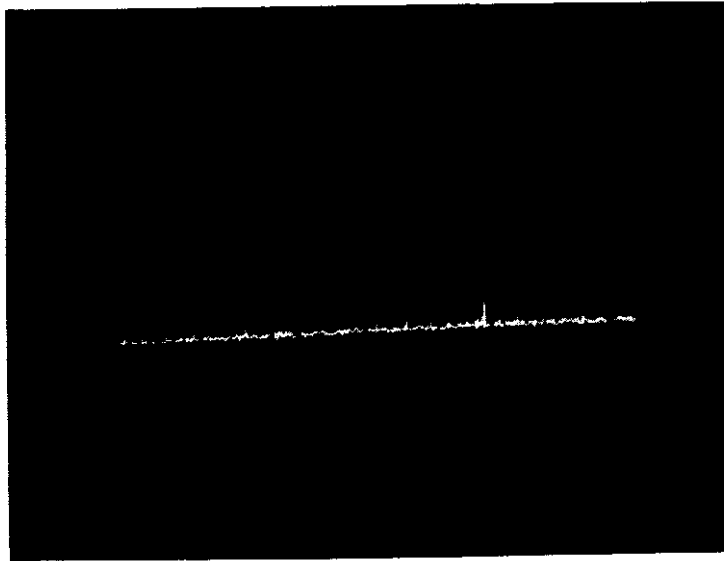
Medium-
Long Pulse

TEST #6

Frequency Band: 1~5 GHz

Log Ref. Level: 0 dBm

Maximum Spurious Signal Observed: (See Calibration Procedure
for Test 6~13)



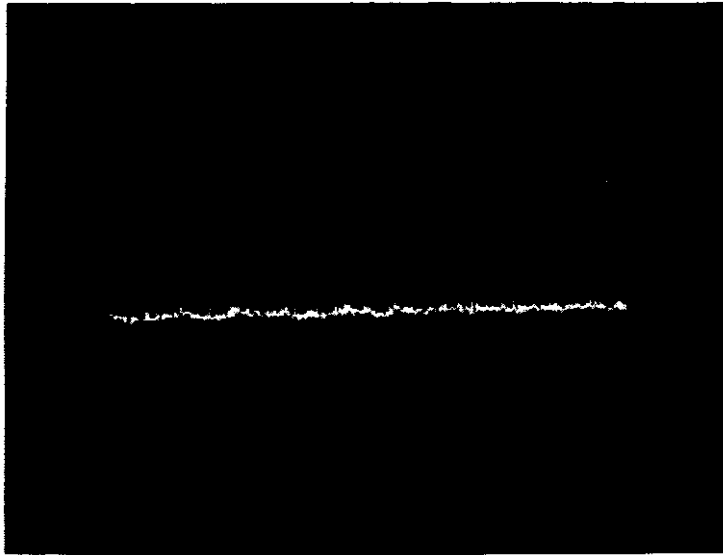
Long Pulse

TEST #7

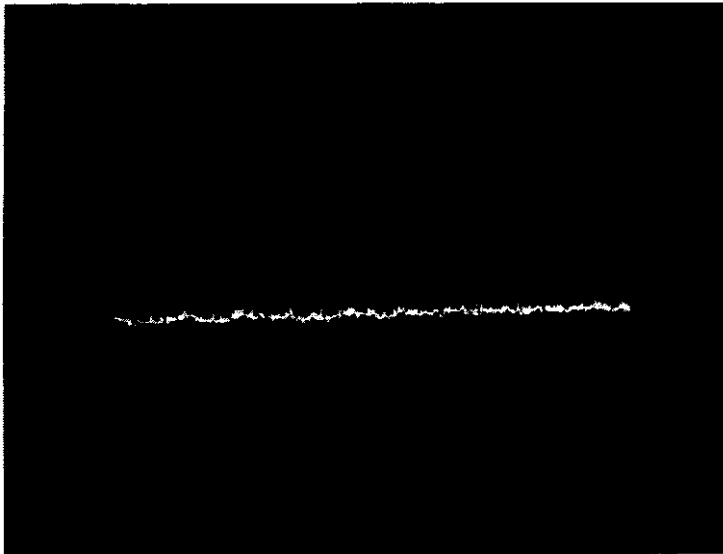
Frequency Band: 4.5~8.5 GHz

Log Ref. Level: 0 dBm

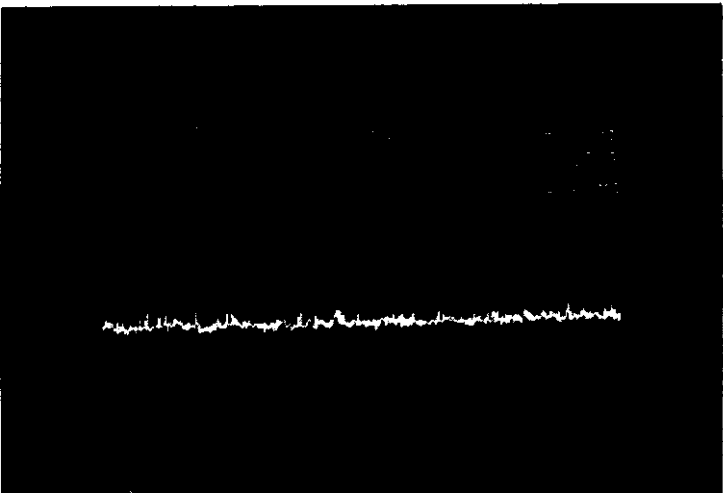
Maximum Spurious Signal Observed: (See Calibration Procedure
for Test 6~13)



Ambient



Stand-By



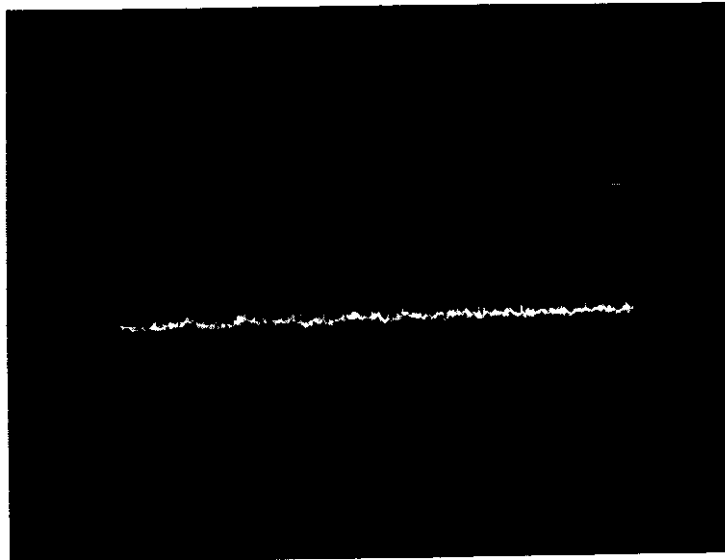
Short Pulse

TEST #7

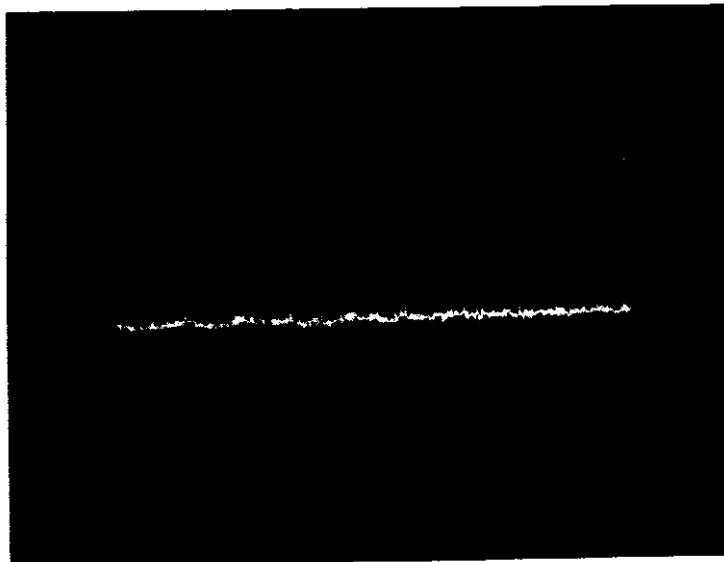
Frequency Band: 4.5~8.5 GHz

Log Ref. Level: 0 dBm

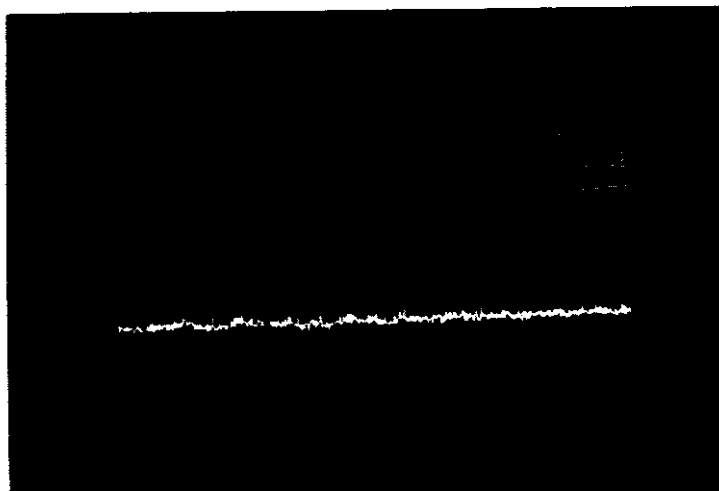
Maximum Spurious Signal Observed: (See Calibration Procedure
for Test 6~13)



Short-
Medium Pulse



Medium Pulse



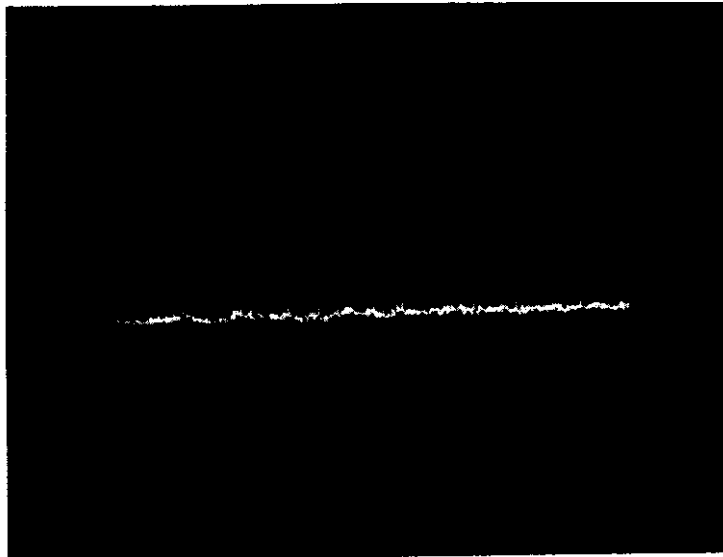
Medium-
Long Pulse

TEST #7

Frequency Band: 4.5~8.5 GHz

Log Ref. Level: 0 dBm

Maximum Spurious Signal Observed: (See Calibration Procedure
for Test 6~13)



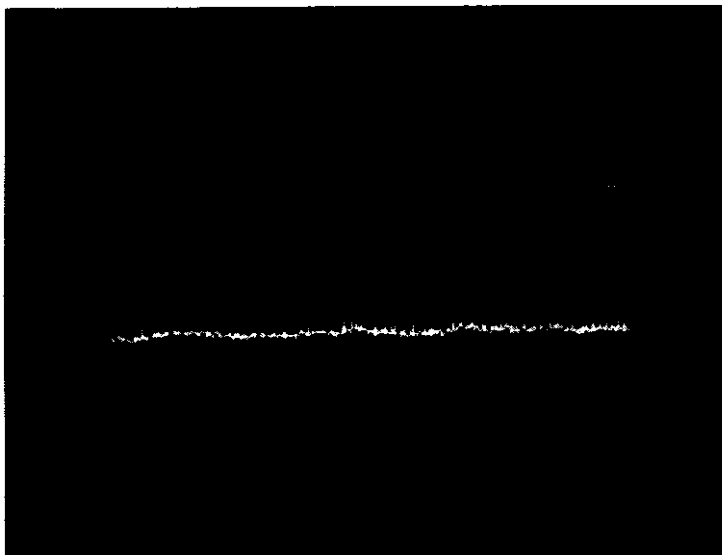
Long Pulse

TEST #8

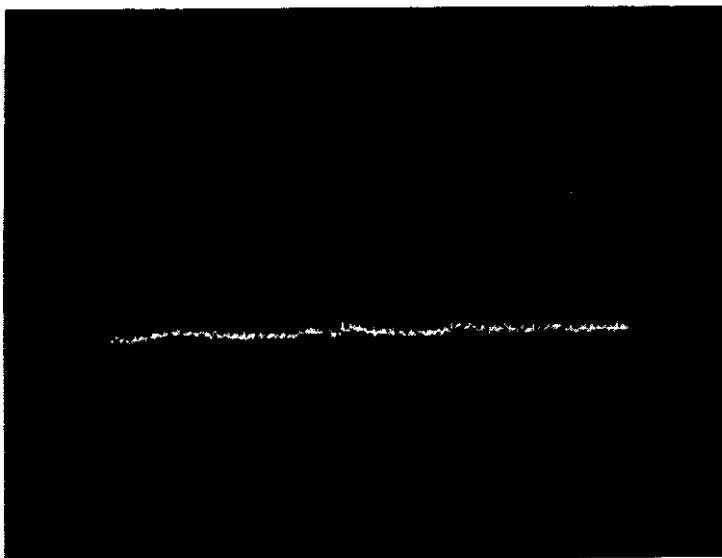
Frequency Band: 8.5~12.5 GHz

Log Ref. Level: 0 dBm

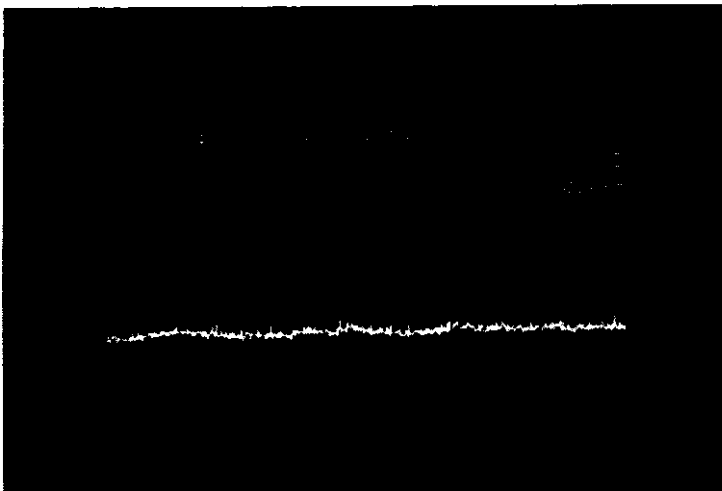
Maximum Spurious Signal Observed: (See Calibration Procedure
for Test 6~13)



Ambient



Stand-By



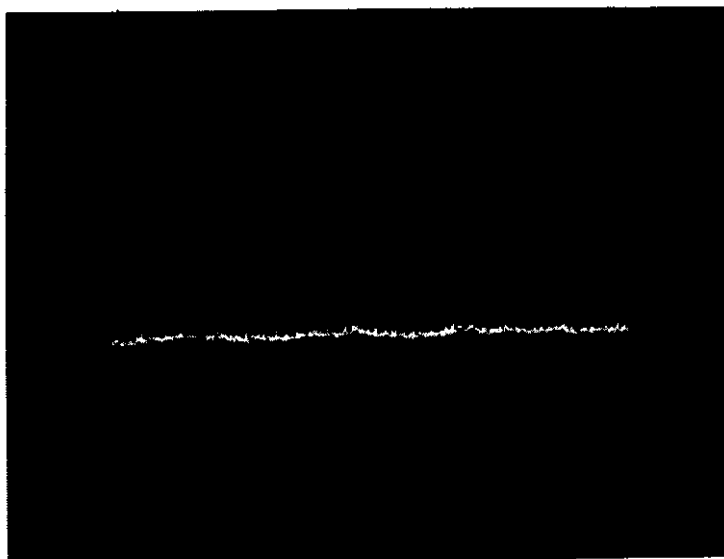
Short Pulse

TEST #8

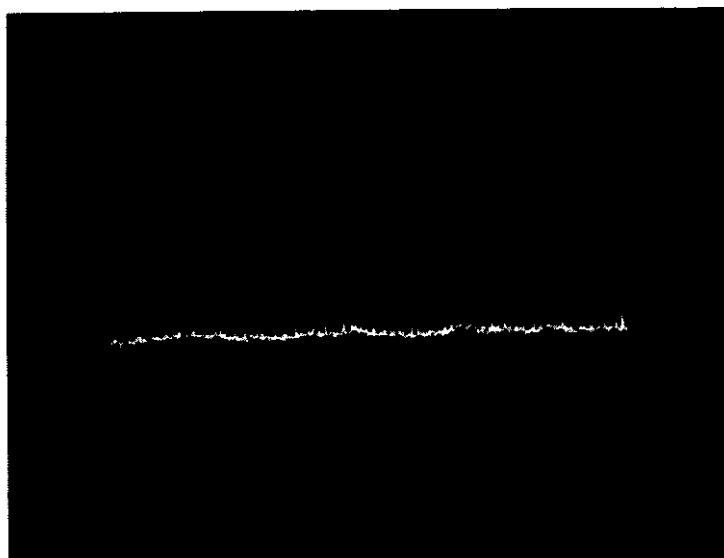
Frequency Band: 8.5~12.5 GHz

Log Ref. Level: 0 dBm

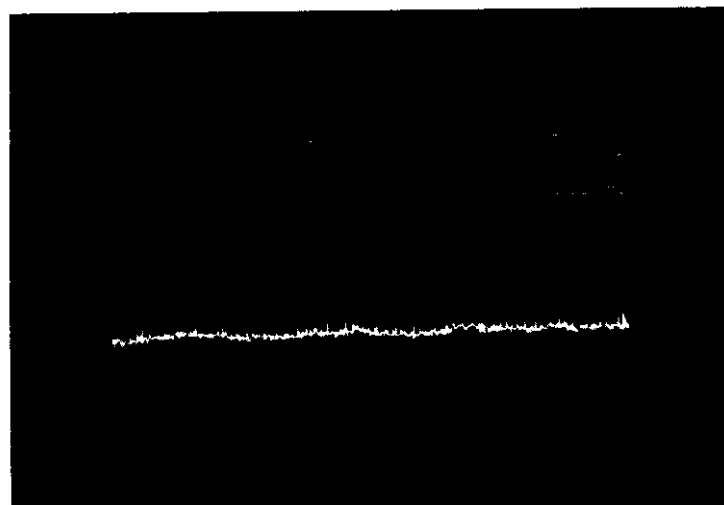
Maximum Spurious Signal Observed: (See Calibration Procedure
for Test 6~13)



Short-
Medium Pulse



Medium Pulse



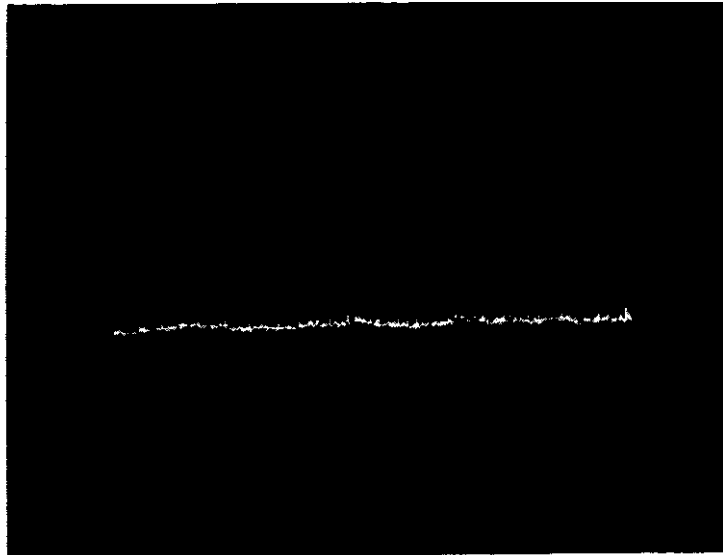
Medium-
Long Pulse

TEST #8

Frequency Band: 8.5~12.5 GHz

Log Ref. Level: 0 dBm

Maximum Spurious Signal Observed: (See Calibration Procedure
for Test 6~13)



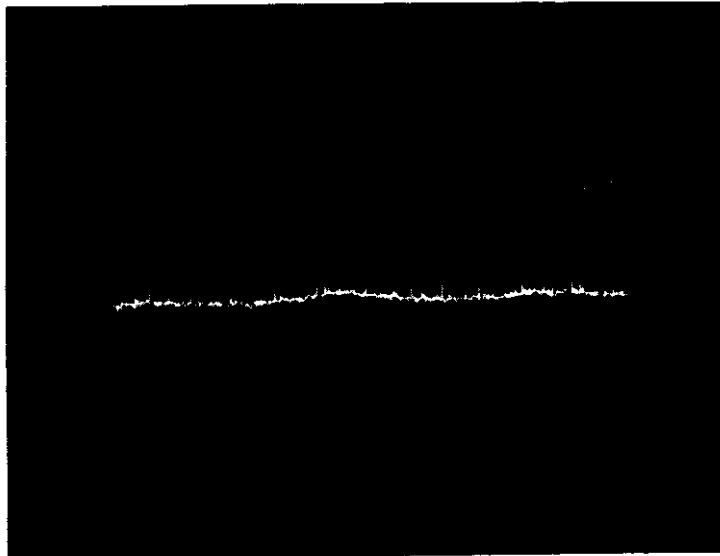
Long Pulse

TEST #9

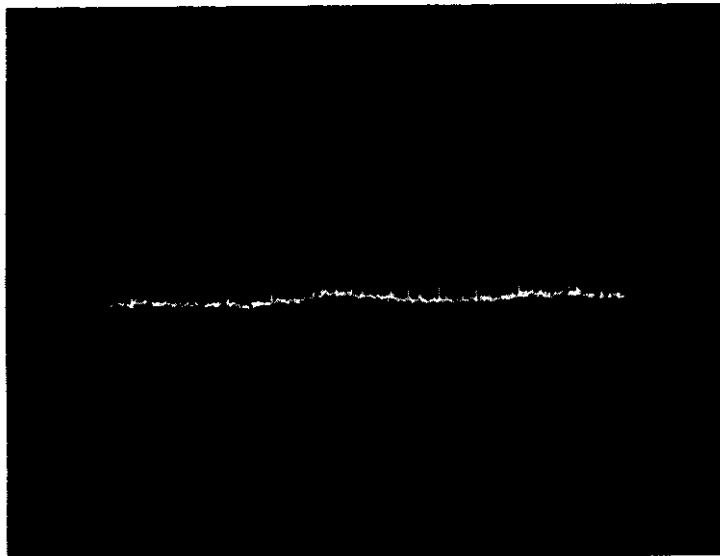
Frequency Band: 12~16 GHz

Log Ref. Level: 0 dBm

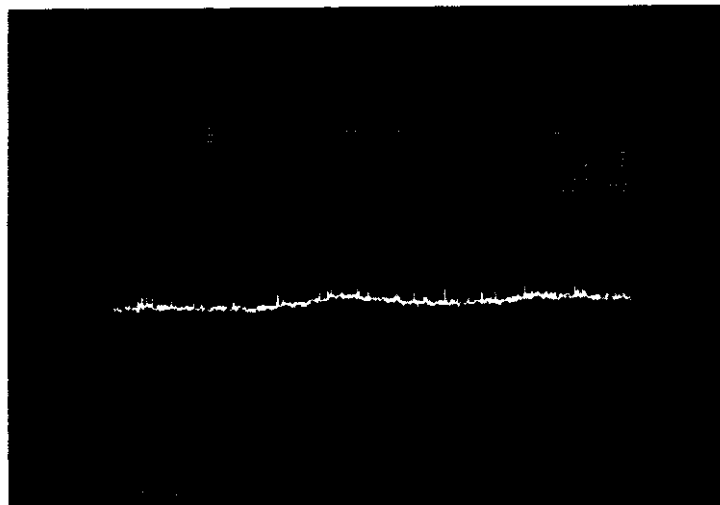
Maximum Spurious Signal Observed: (See Calibration Procedure
for Test 6~13)



Ambient



Stand-By



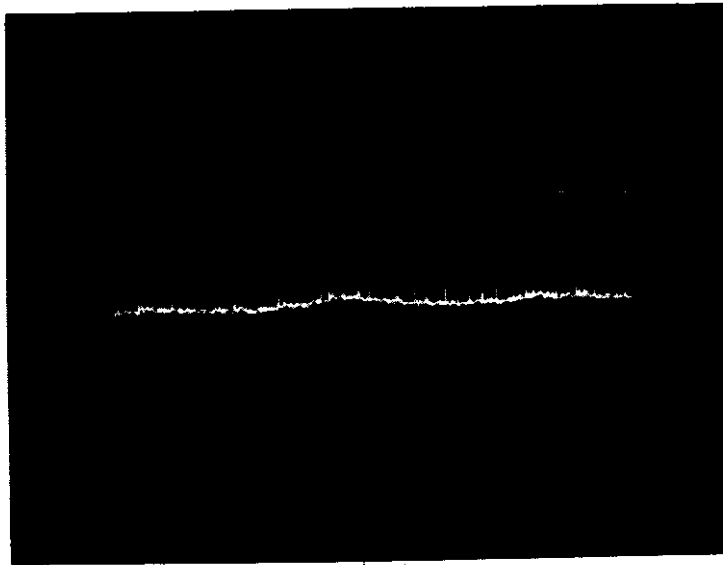
Short Pulse

TEST #9

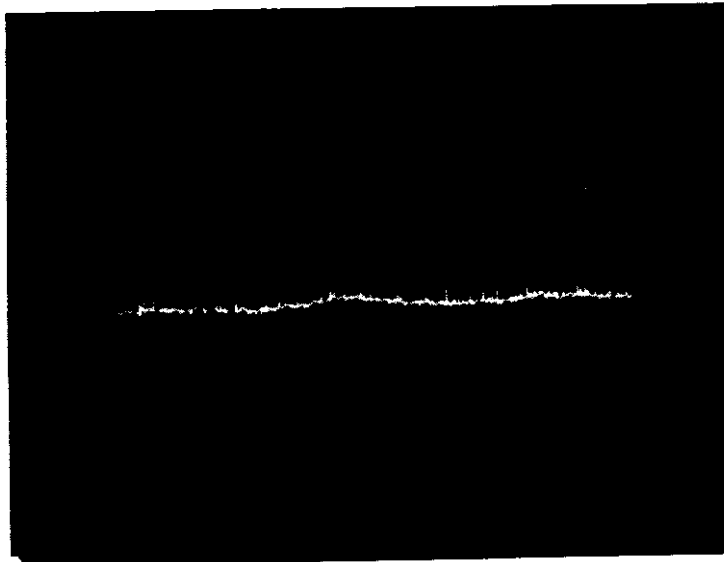
Frequency Band: 12~16 GHz

Log Ref. Level: 0 dBm

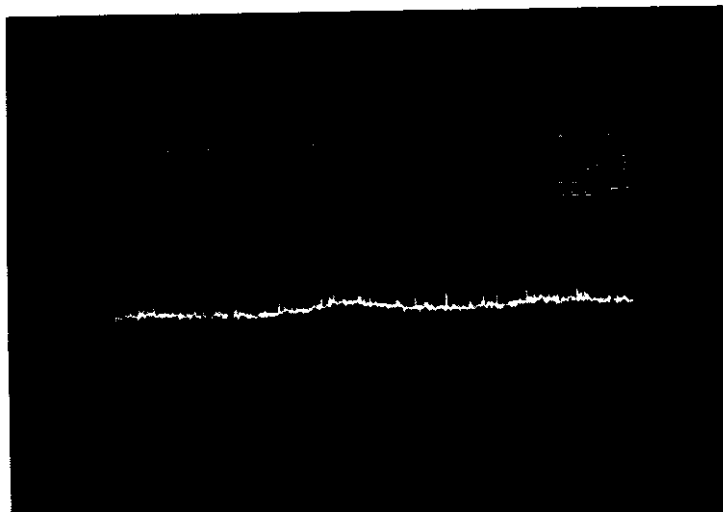
Maximum Spurious Signal Observed: (See Calibration Procedure
for Test 6~13)



Short-
Medium Pulse



Medium Pulse



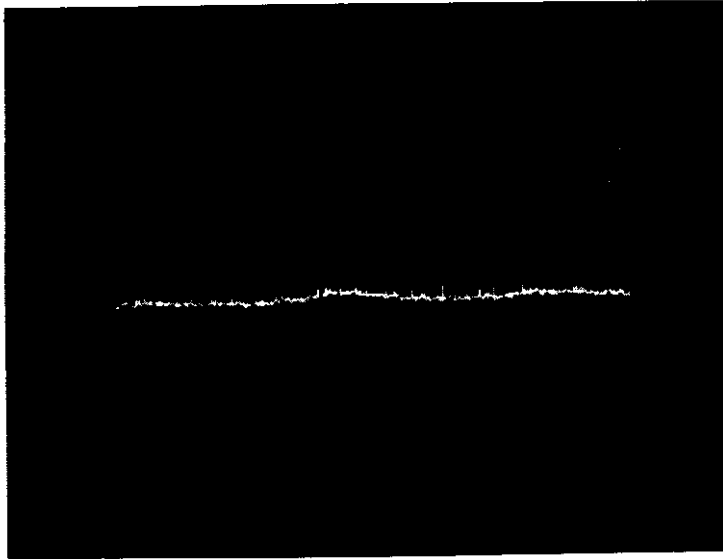
Medium-
Long Pulse

TEST #9

Frequency Band: 12~16 GHz

Log Ref. Level: 0 dBm

Maximum Spurious Signal Observed: (See Calibration Procedure
for Test 6~13)



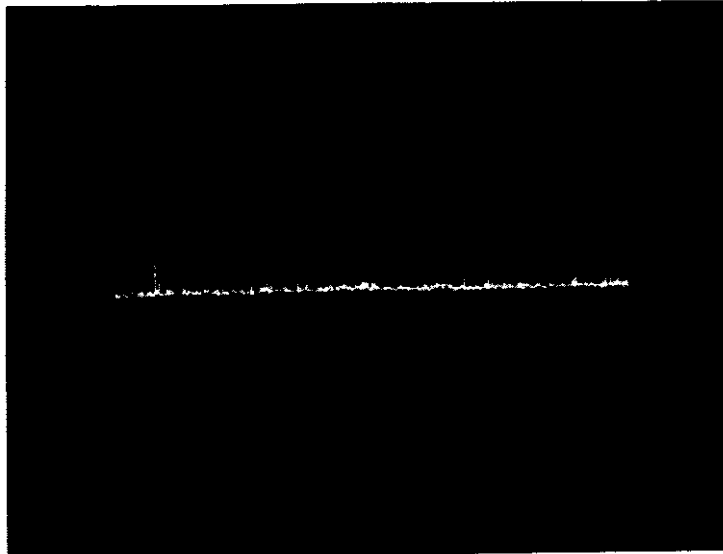
Long Pulse

TEST #10

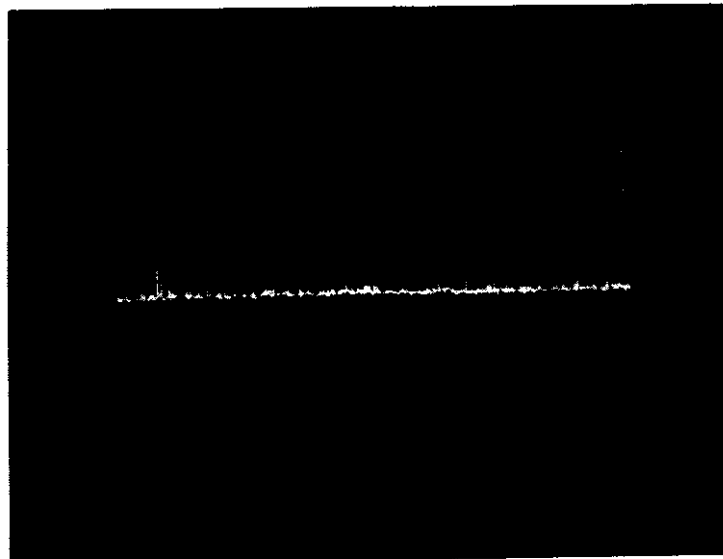
Frequency Band: 15~19 GHz

Log Ref. Level: 0 dBm

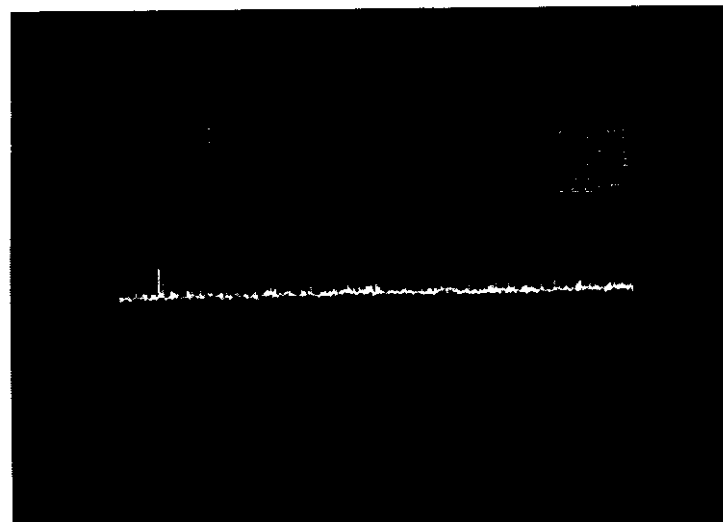
Maximum Spurious Signal Observed: (See Calibration Procedure
for Test 6~13)



Ambient



Stand-By



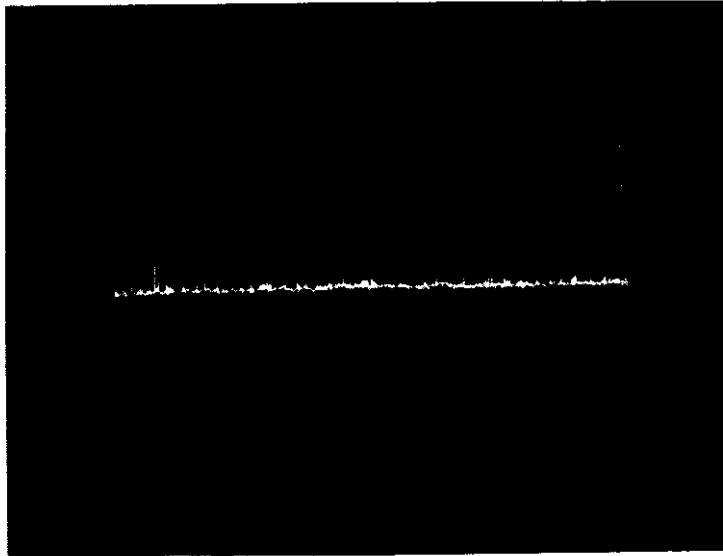
Short Pulse

TEST #10

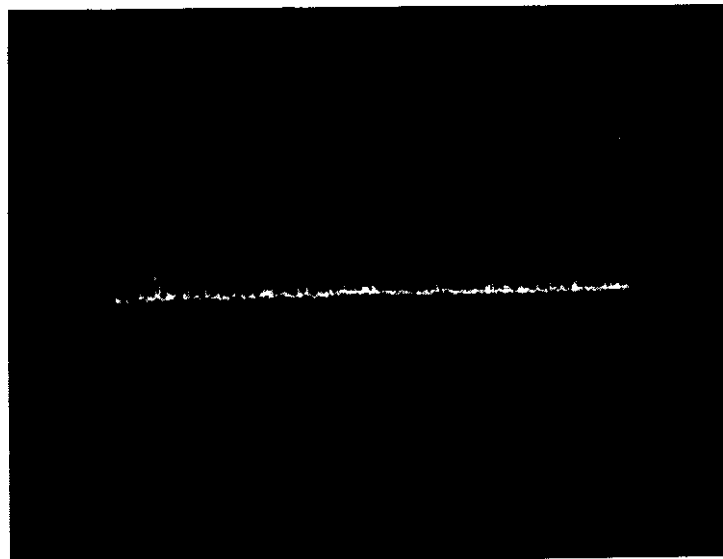
Frequency Band: 15~19 GHz

Log Ref. Level: 0 dBm

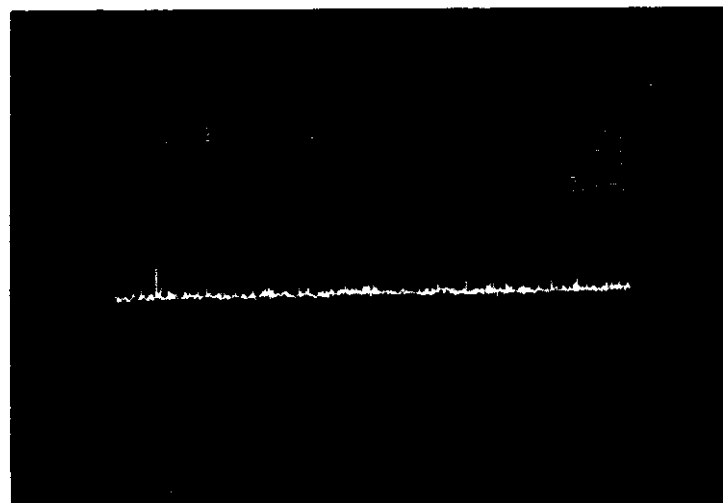
Maximum Spurious Signal Observed: (See Calibration Procedure
for Test 6~13)



Short-
Medium Pulse



Medium Pulse



Medium-
Long Pulse

TEST #10

Frequency Band: 15~19 GHz

Log Ref. Level: 0 dBm

Maximum Spurious Signal Observed: (See Calibration Procedure
for Test 6~13)



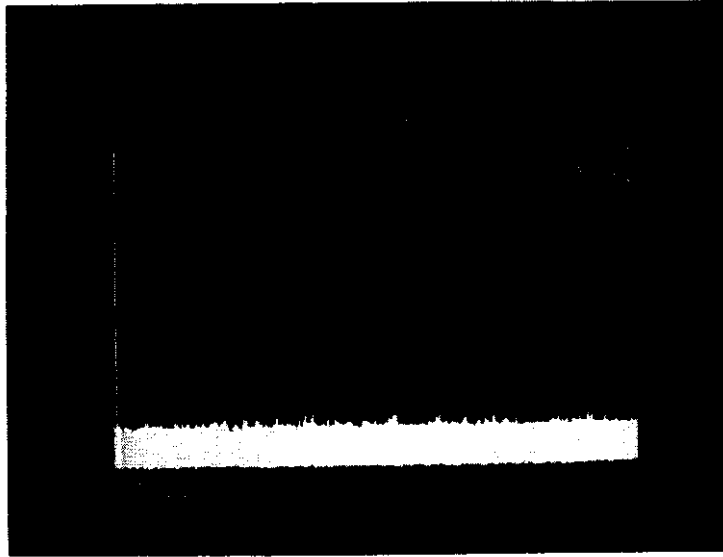
Long Pulse

TEST #11

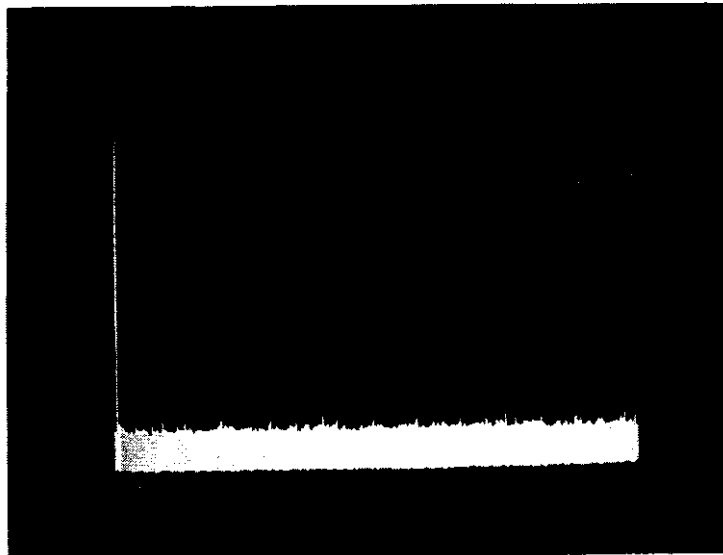
Frequency Band: 12.4~28 GHz

Log Ref. Level: 0 dBm

Maximum Spurious Signal Observed: (See Calibration Procedure
for Test 6~13)



Ambient



Stand-By



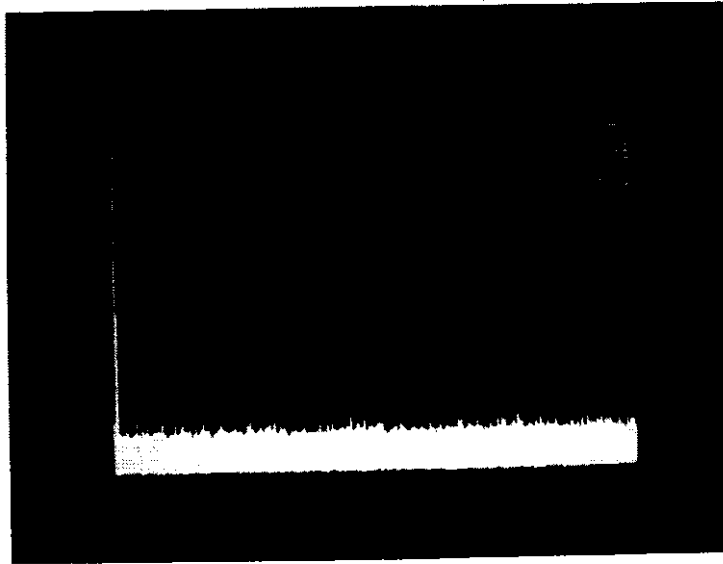
Short Pulse

TEST #11

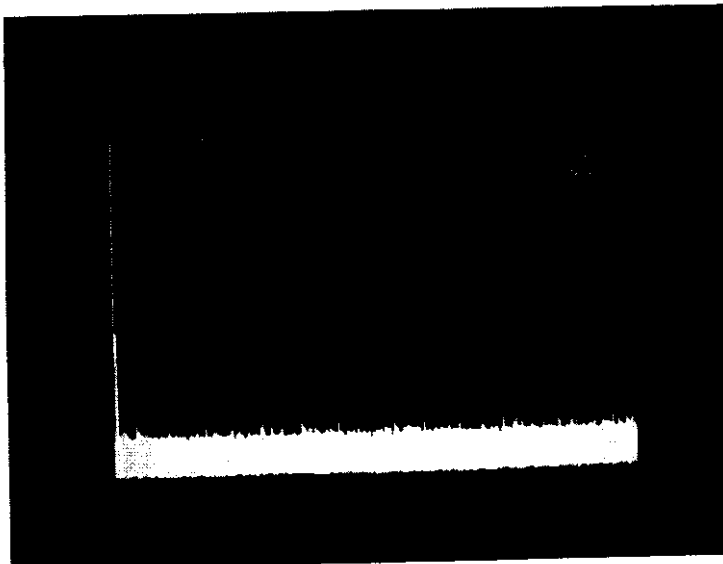
Frequency Band: 12.4~28 GHz

Log Ref. Level: 0 dBm

Maximum Spurious Signal Observed: (See Calibration Procedure
for Test 6~13)



Short-
Medium Pulse



Medium Pulse



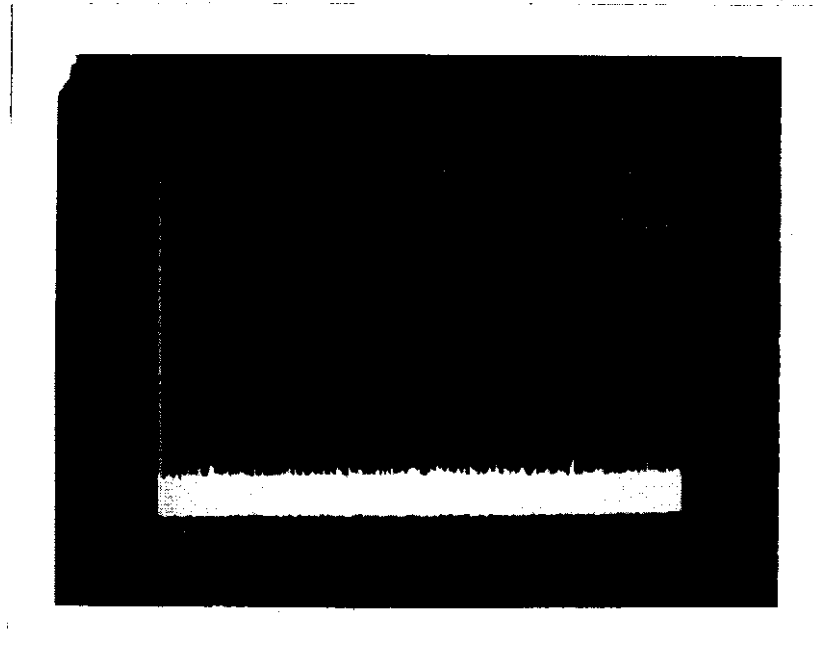
Medium-
Long Pulse

TEST #11

Frequency Band: 12.4~28 GHz

Log Ref. Level: 0 dBm

Maximum Spurious Signal Observed: (See Calibration Procedure
for Test 6~13)



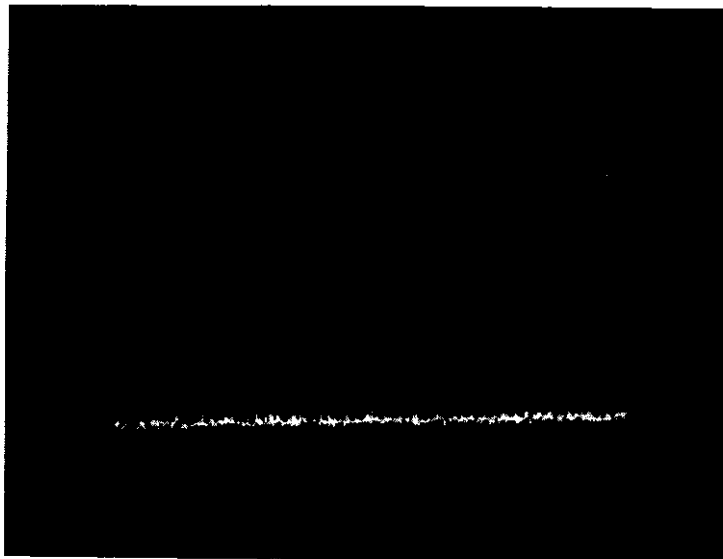
Long Pulse

TEST #12

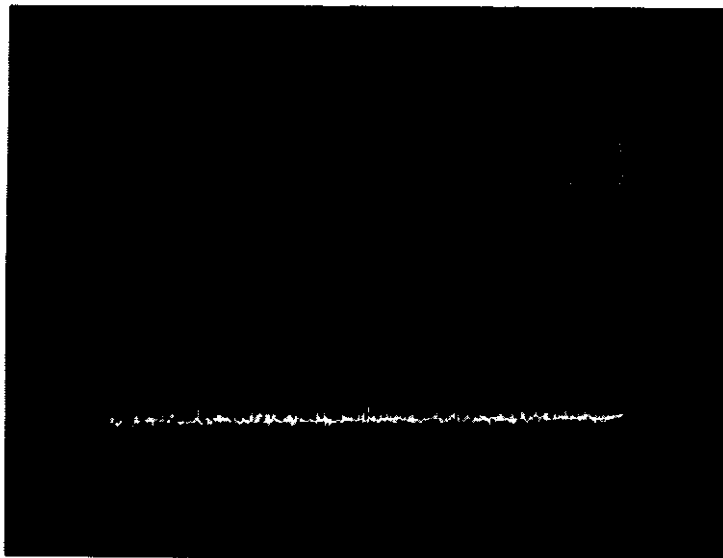
Frequency Band: 25~29 GHz

Log Ref. Level: 0 dBm

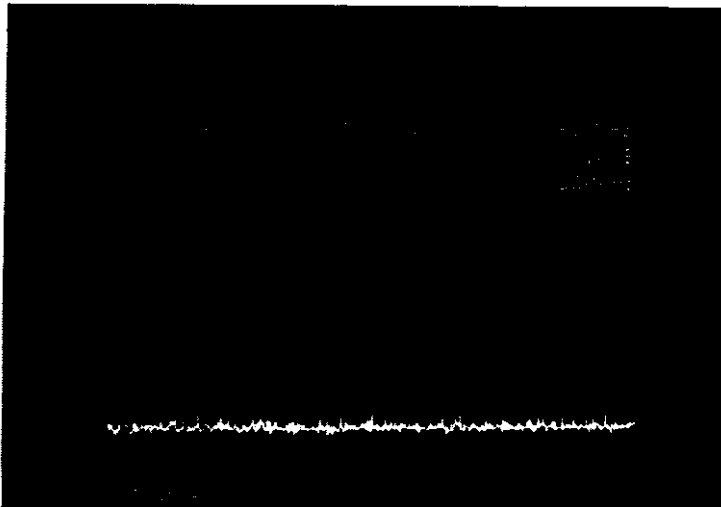
Maximum Spurious Signal Observed: (See Calibration Procedure
for Test 6~13)



Ambient



Stand-By



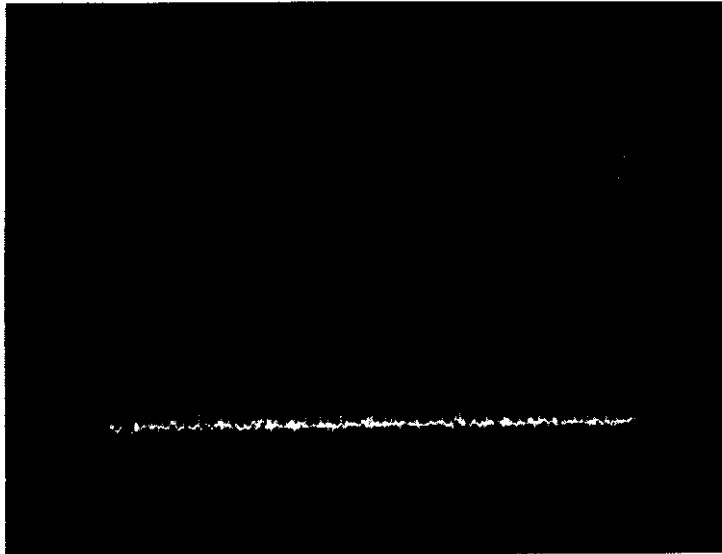
Short Pulse

TEST #12

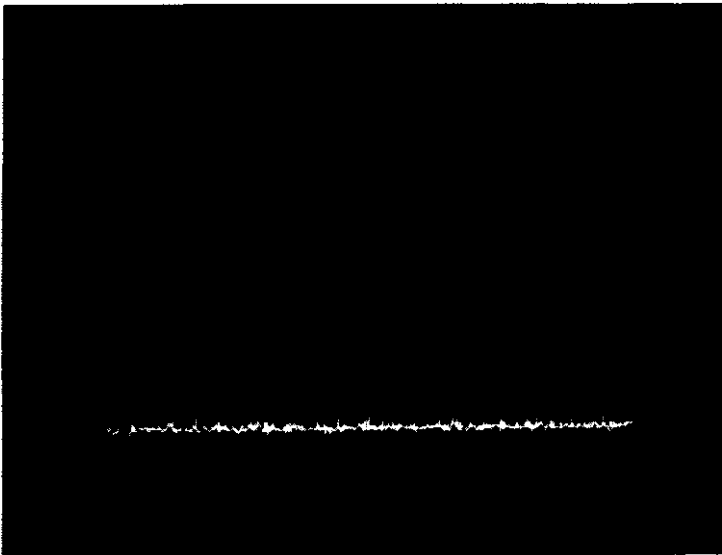
Frequency Band: 25~29 GHz

Log Ref. Level: 0 dBm

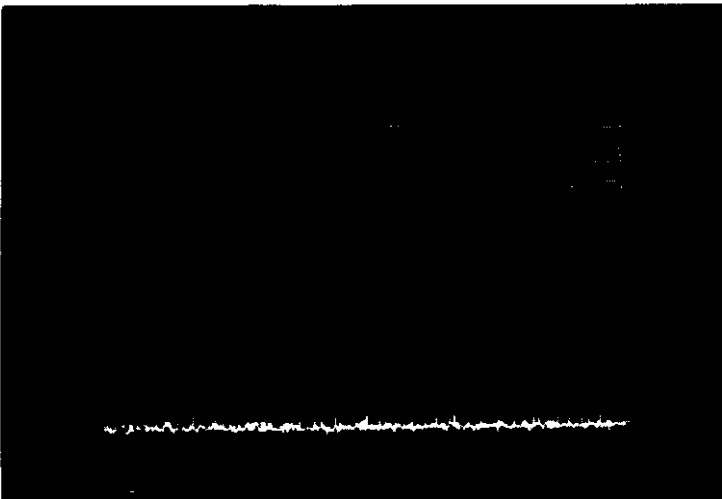
Maximum Spurious Signal Observed: (See Calibration Procedure
for Test 6~13)



Short-
Medium Pulse



Medium Pulse



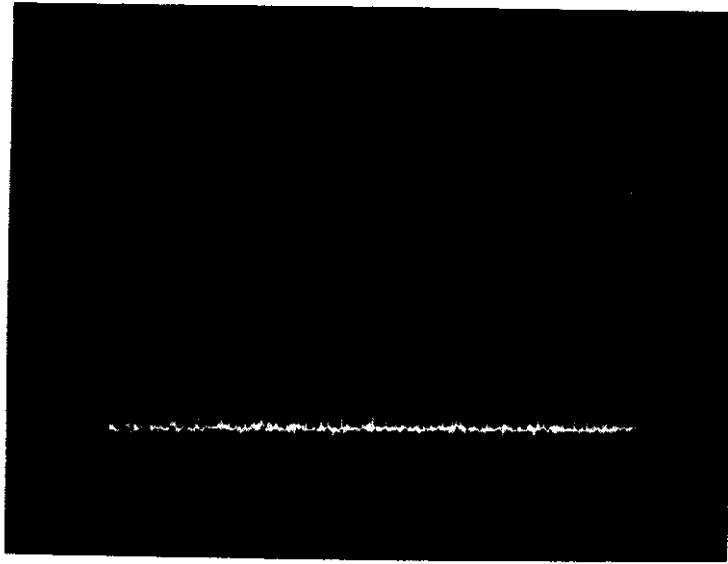
Medium-
Long Pulse

TEST #12

Frequency Band: 25~29 GHz

Log Ref. Level: 0 dBm

Maximum Spurious Signal Observed: (See Calibration Procedure
for Test 6~13)



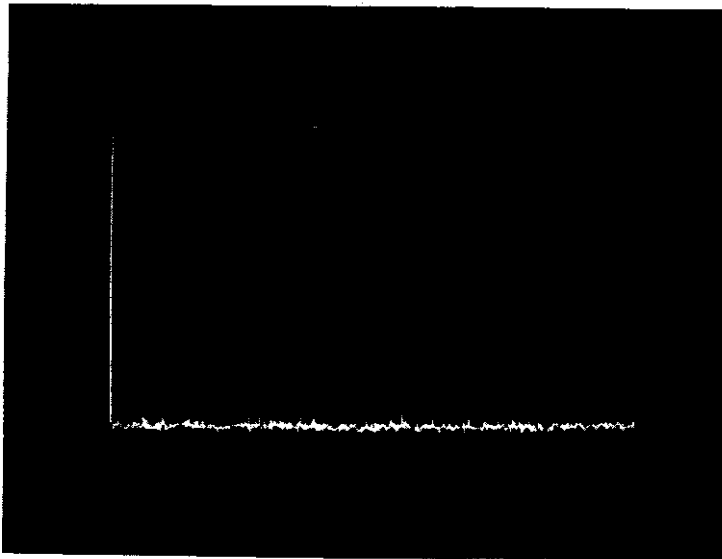
Long Pulse

TEST #13

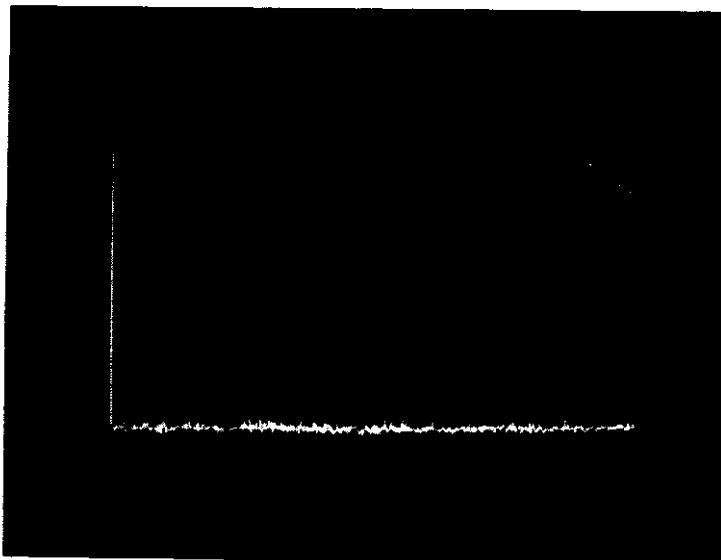
Frequency Band: 28~60 GHz

Log Ref. Level: 0 dBm

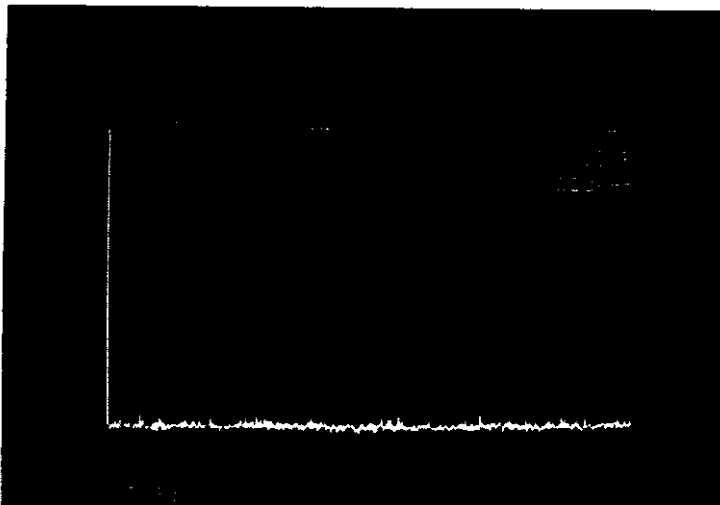
Maximum Spurious Signal Observed: (See Calibration Procedure
for Test 6~13)



Ambient



Stand-By



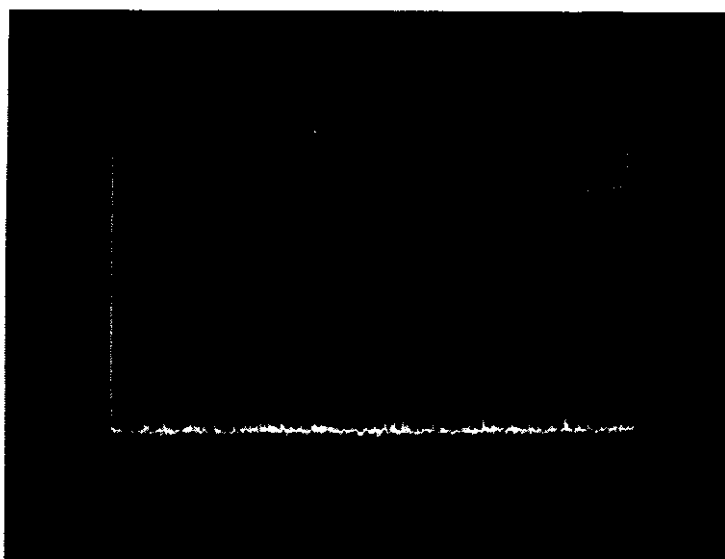
Short Pulse

TEST #13

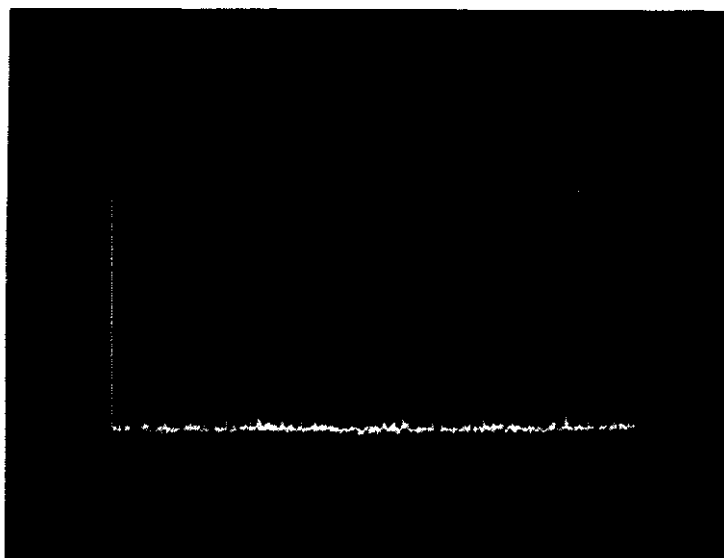
Frequency Band: 28~60 GHz

Log Ref. Level: 0 dBm

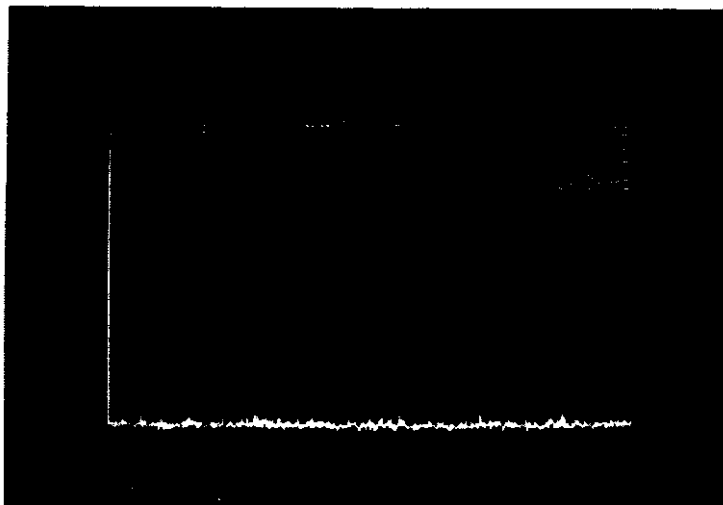
Maximum Spurious Signal Observed: (See Calibration Procedure
for Test 6~13)



Short-
Medium Pulse



Medium Pulse



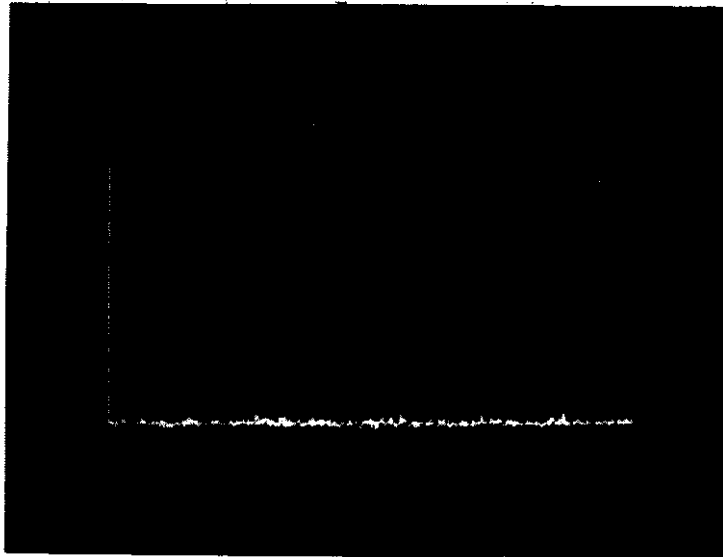
Medium-
Long Pulse

TEST #13

Frequency Band: 28~60 GHz

Log Ref. Level: 0 dBm

Maximum Spurious Signal Observed: (See Calibration Procedure
for Test 6~13)



Long Pulse

•CKEJMA3925

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 - 18 GHz: LOGPERIODIC ANTENNA 94612-1
- 18GHz - 26.5 GHz: HORN ANTENNA 94626-1
- 26.5GHz - 40 GHz: 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:
$$E \cdot V/m @ 3 m = \frac{\text{LOG}_{10-1}(\text{dBm} + 107 + \text{A.F.} + \text{C.L.})}{20}$$
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	= $\geq$ 20 dB BELOW LIMIT

TESTS WERE CONDUCTED WITH:

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

SAMPLE CALCULATION:

EMISSION FREQUENCY, MHz	=Less then noise level
LEVEL = $\text{LOG}_{10}^{-1} \frac{(-66 + 107 + 45)}{20}$	
LEVEL, $\mu\text{V/m}$ @ 3 m	= 19952.6
LEVEL, $\mu\text{V/m}$ @ 1 N.M.	= 32.3

RESULTS

RADIATED RECEIVER SPURIUS EMISSIONS

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

TUNED, MHz	EMISSION, MHz	PEAK	RBW, kHz	VBW, kHz	METER, A.F.C. L dB μ V	A.F.C. L dB	μ V/m @3m	μ V/m @1N. M.
9405	9384	P	30.0	30.0	36.1	45	19952.6	32.3

