



ROGERS

Labs, Inc.

4405 West 259TH Terrace • Louisburg, KS 66053 • PHONE & FAX: (913) 837-3214

Test Report
For
Application of Certification

For

ALLIEDSIGNAL INC.
ONE TECHNOLOGY CENTER
23500 West 105th Street
Olathe, KS 66061
Phone: (913) 782-0400

MODEL: ITU100
SATELLITE TRANSCEIVER SYSTEM
P/N: 064-01083-0101

FREQUENCY: 1616-1626 MHz
FCC ID: ASYITU100

Test Date: May 10, 1999

Certifying Engineer: Scot D Rogers.

Scot D. Rogers
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FORWARD:

In accordance with the Federal Communications Code of Federal Regulations, dated October 1, 1998, Part 2 Subpart J, Paragraphs 2.907, 2.911, 2.913, 2.925, 2.926, 2.1031 through 2.1057; Part 25(c), 25.202, 25.213, and FCC Report and Order FCC 98-58, and FCC Report and Order FCC 98-92 the following is submitted:

Device Description and Use

The equipment under test (EUT) was a satellite transceiver used globally for general communications. The unit operates in the 1616 MHz to 1626 MHz frequency range and is compatible with the existing satellite communications systems. This unit is a repack of the Motorola Transceiver Unit (FCC I.D.: IHDT6NE1).

The transceiver portion is remotely mounted in a radio bay with a handset located in a convenient location. The antenna is located external to the aircraft body.

List of Test Equipment

A Hewlett Packard 8591EM and or 8562A Spectrum Analyzer was used as the measuring device for the emissions testing. The analyzer settings used are described in the following table. Refer to Appendix for a complete list of Test Equipment.

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MODEL: ITU100 S/N: Y208 P/N: 064-01083-0101

Test #: 990510 FCC ID#: ASYITU100

Test to: FCC Parts 2 and 25

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HP 8591EM SPECTRUM ANALYZER SETTINGS		
CONDUCTED EMISSIONS:		
RBW	AVG. BW	DETECTOR FUNCTION
9 kHz	30 kHz	Peak/Quasi Peak
RADIATED EMISSIONS (30 - 1000 MHz):		
RBW	AVG. BW	DETECTOR FUNCTION
120 kHz	300 kHz	Peak/Quasi Peak
HP 8562A SPECTRUM ANALYZER SETTINGS		
RADIATED EMISSIONS (1 - 40 GHz):		
RBW	AVG. BW	DETECTOR FUNCTION
1 MHz	1 MHz	Peak/Average
ANTENNA CONDUCTED EMISSIONS:		
RBW	AVG. BW	DETECTOR FUNCTION
100 kHz	300 kHz	Peak

Equipment Tested

The EUT system was assembled with the following equipment.

<u>EQUIPMENT</u>	<u>MODEL/PART#</u>
Blackbox	ITU100
Handset	WH100
Junction Box	JB100

2.1033(c) Application for Certification

- Manufacturer: ALLIEDSIGNAL INC.
One Technology Center
23500 West 105th Street
Olathe, KS 66061

ROGERS LABS, INC.	ALLIEDSIGNAL INC.
4405 W. 259th Terrace	MODEL: ITU100 S/N: Y208 P/N: 064-01083-0101
Louisburg, KS 66053	Test #: 990510 FCC ID#: ASYITU100
Phone/Fax: (913) 837-3214	Test to: FCC Parts 2 and 25

2. Identification: Model: ITU100
FCC I.D.: ASYITU100
3. Refer to Installation and Operating Instruction Manual Exhibit.
4. Emission Type:
41K7Q7W
5. Frequency Range:
1616-1626 MHz
6. Operating Power Level:

The RF output, DC current and RF input power are all time-averaged values which reflect a 9.2% (8.28 mS T_x Bursts/90 mS frame) transmit duty cycle characteristic of transceiver operation.

RF Output Power: 0.607 Watts
7. Max P_o:

Peak Power: 6.6 Watts.
8. Power into final amplifier:

DC Voltage: 7.5 Volts
DC Current: 0.404 Amps
RF Input: 0.092 mW
9. Tune Up Procedure: Refer to Exhibit.
10. Refer to Exhibits for function of semiconductors and other active devices.
11. Refer to Exhibit for FCC ID Label.
12. Refer to Exhibit for photographs of equipment.
13. Refer to Exhibit for details of modulation techniques.

2.1046 RF Power Output

Measurements Required:

Measurements shall be made to establish the radio frequency power delivered by the transmitter into the standard output termination. The power output shall be monitored and recorded and no adjustment shall be made to the transmitter after the test has begun, except as noted below:

If the power output is adjustable, measurements shall be made for the highest and lowest power levels.

Test Arrangement:



The r.f. power output was measured at the antenna terminals by replacing the antenna with a spectrum analyzer, 26dB Attenuation and cable. The spectrum analyzer had impedance of 50Ω to match the impedance of the standard antenna. A HP 8591EM Spectrum Analyzer was used to measure the r.f. power at the antenna port. The data was taken in dBm and converted to watts as shown in the following Table. Refer to Figure 1 showing the peak output power of the transmitter. Data taken per Paragraph 2.1046(a) and applicable parts of Part 25.

P_{dBm} = power in dB above 1 milliwatt.

Milliwatts = $10^{(P_{dBm}/10)}$

Watts = (Milliwatts) (0.001) (W/mW)

Results:

FREQUENCY	Peak P_{dBm}	Peak P_{mW}	Peak P_w
1616	38.12	6500	6.5
1621	38.19	6600	6.6
1626	38.12	6500	6.5

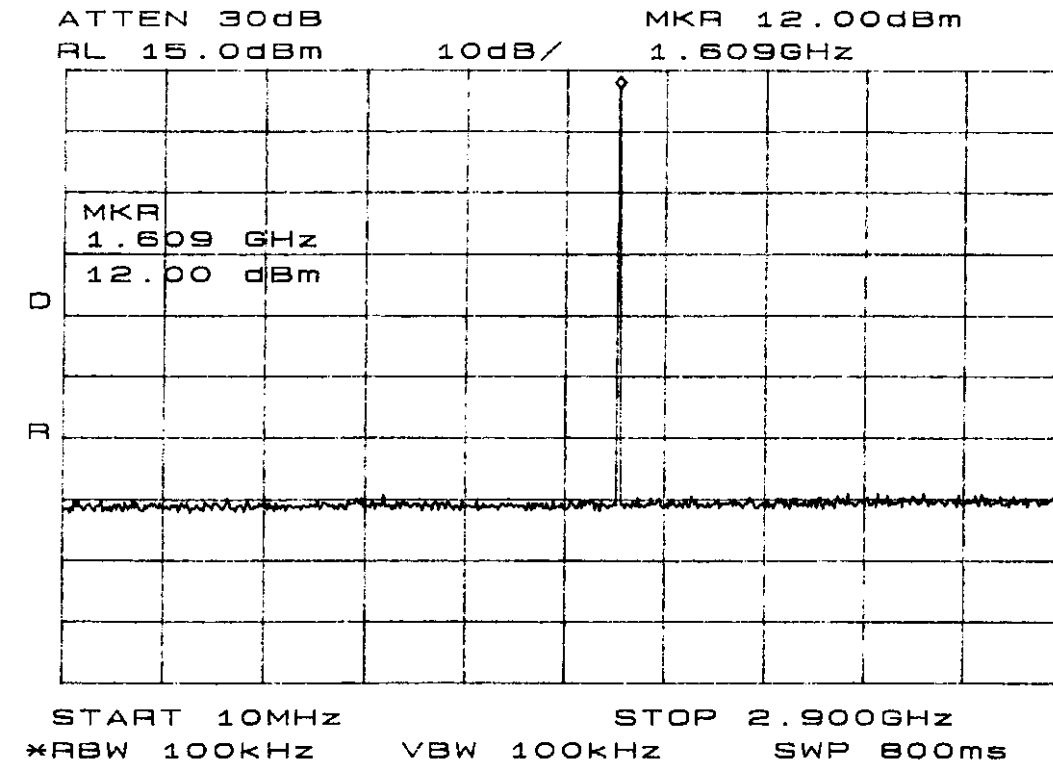


Figure 1 Peak Output Power @ 1621 MHz

The specifications of Paragraph 2.1046(a) and 25.204 are met. There are no deviations to the specifications.

2.1047 Modulation Characteristics

Measurements Required:

A curve or equivalent data that shows that the equipment will meet the modulation requirements of the rules under which the equipment is to be licensed shall be submitted.

Results:

Refer to Exhibit for Modulation Characteristics. Specifications of Paragraphs 2.1047 and applicable part of 25 are met. There are no deviations to the specifications.

2.1049 Occupied Bandwidth

Measurements Required:

The occupied bandwidth, that is the frequency bandwidth such that below its lower and above its upper frequency

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Test #: 990510 FCC ID#: ASYITU100

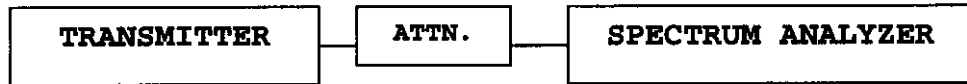
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limits, the mean powers radiated are equal to 0.5 percent of the total mean power radiated by a given emission.

Test Arrangement:



Results:

f_c	O.B. kHz
1616	35
1621	35
1626	33

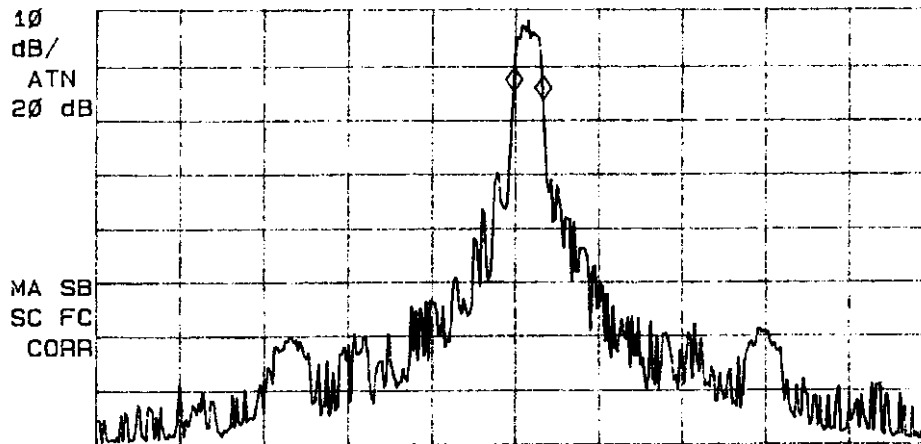
Refer to Figures 2,3 and 4 for plots of Occupied Bandwidth measurements.

10:50:17 MAY 13, 1999

MARKER Δ
35 kHz
-1.51 dB

ACTV DET: PEAK
MEAS DET: PEAK QP AVG
MKR 35 kHz
-1.51 dB

LOG REF 10.0 dBm



CENTER 1.616000 GHz SPAN 1.000 MHz
#IF BW 3.0 kHz AVG BW 3 kHz SWP 333 msec

Figure 2 Occupied Bandwidth 1616 MHz

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14: 24: 44 MAY 11, 1999
17

MARKER Δ
35 kHz
1.43 dB

ACTV DET: PEAK
MEAS DET: PEAK QP
MKR 35 kHz
1.43 dB

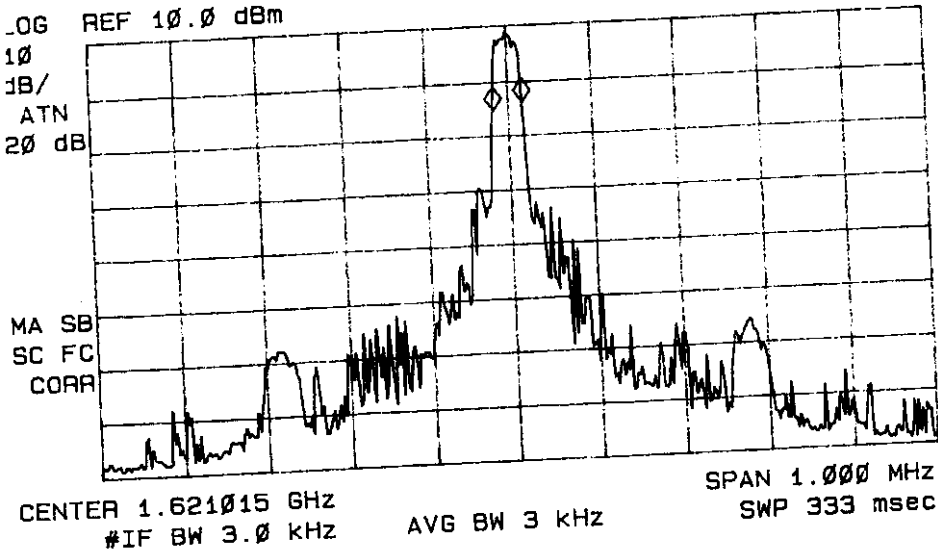


Figure 3 Occupied Bandwidth 1621 MHz

10: 58: 04 MAY 13, 1999
17

MARKER Δ
33 kHz
-.50 dB

ACTV DET: PEAK
MEAS DET: PEAK QP AVG
MKR 33 kHz
-.50 dB

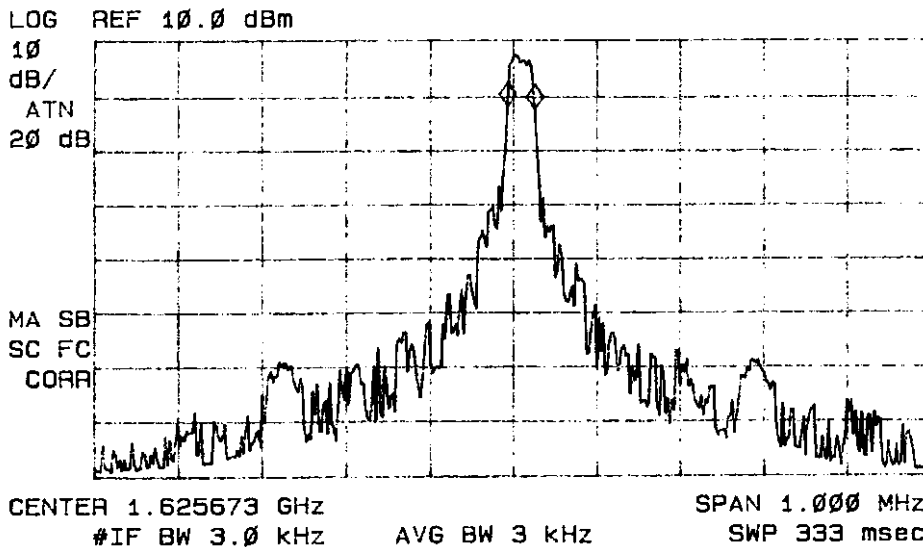


Figure 4 Occupied Bandwidth 1626 MHz

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Requirements of 2.1049 and applicable parts of Paragraph 25 are met. There are no deviations to the specifications.

2.1051 Spurious Emissions at Antenna Terminals

Measurements Required:

The radio frequency voltage or power generated within the equipment and appearing on a spurious frequency shall be checked at the equipment output terminals when properly loaded with a suitable artificial antenna.

Test Arrangement:



The r.f. output was coupled to a HP 8562A Spectrum Analyzer through a 26 dB notch filter. The spectrum analyzer was used to observe the r.f. spectrum with the transmitter operating in its normal mode. The frequency spectrum from 0 to 22 GHz was observed and plots produced of the frequency spectrum. Figures 5 through 9 represent data for the ITU100. Data taken per 2.1051 and applicable parts of Part 25.

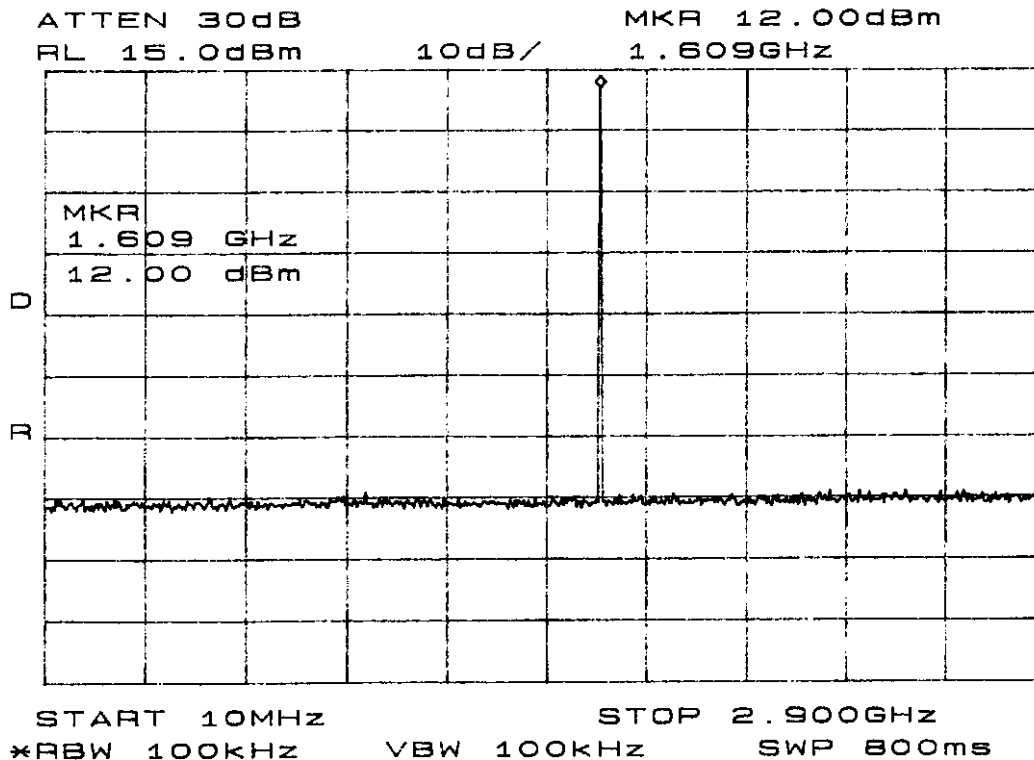


Figure 5 Emissions at Antenna Terminal

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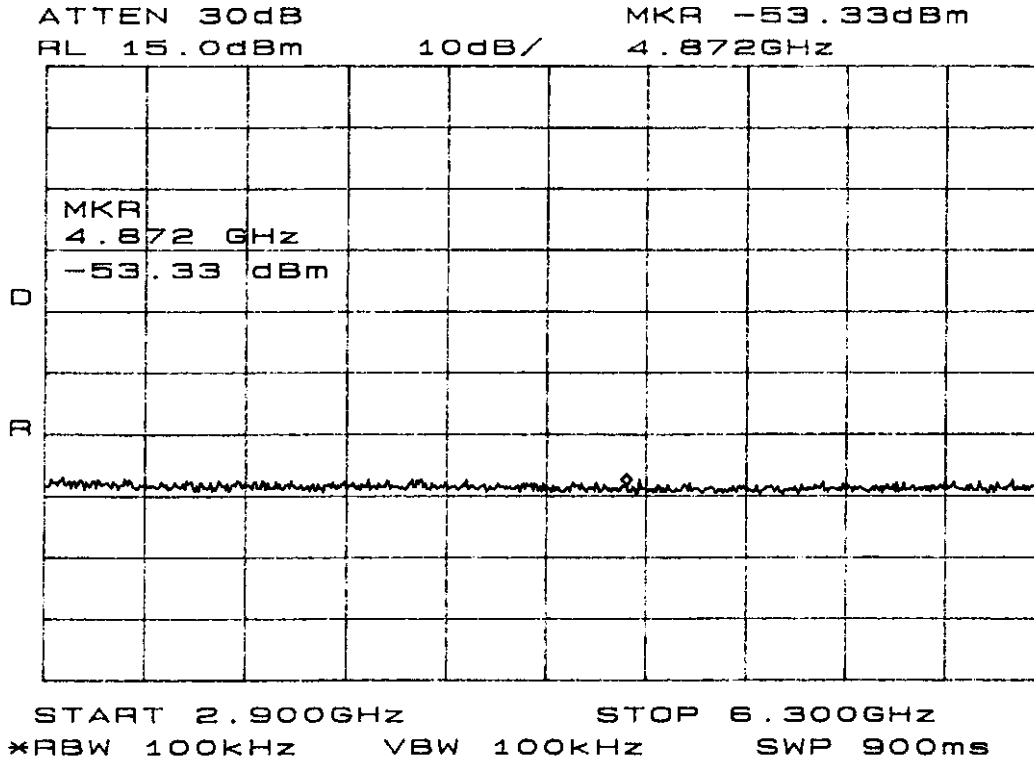


Figure 6 Emissions at Antenna Terminal

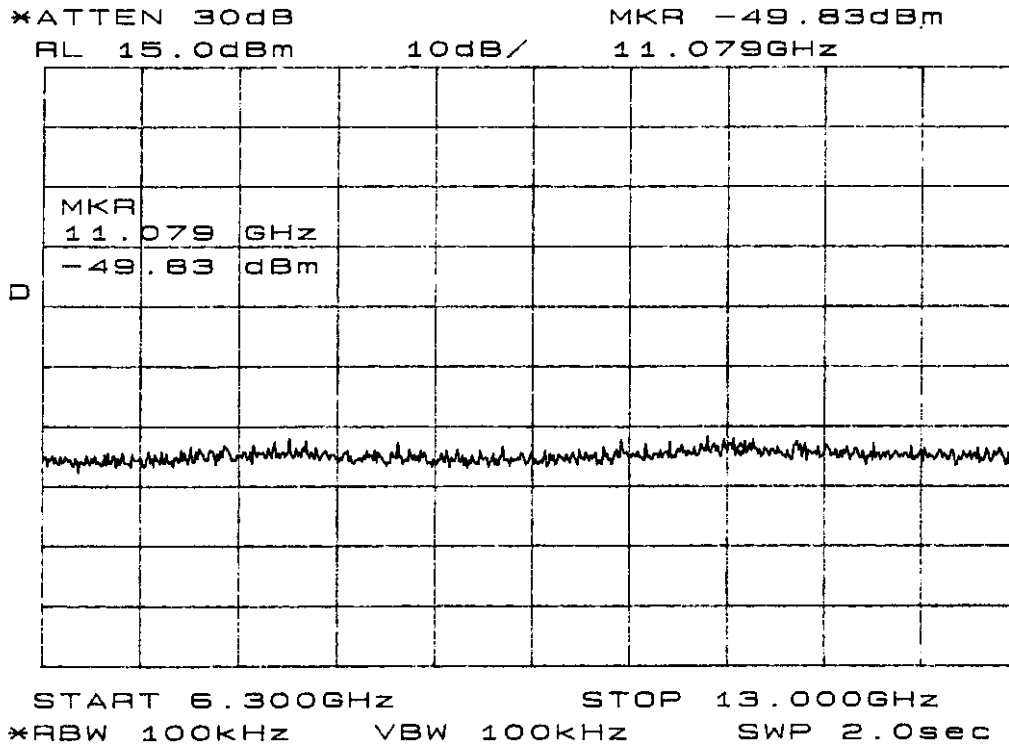


Figure 7 Emissions at Antenna Terminal

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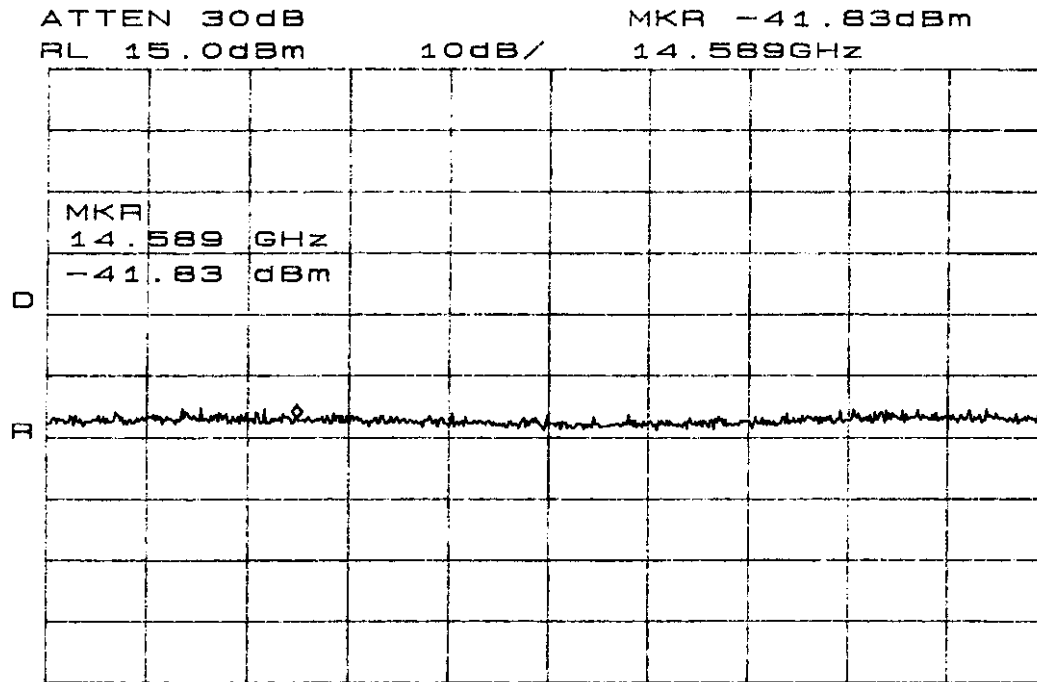
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FCC ID#: ASYITU100

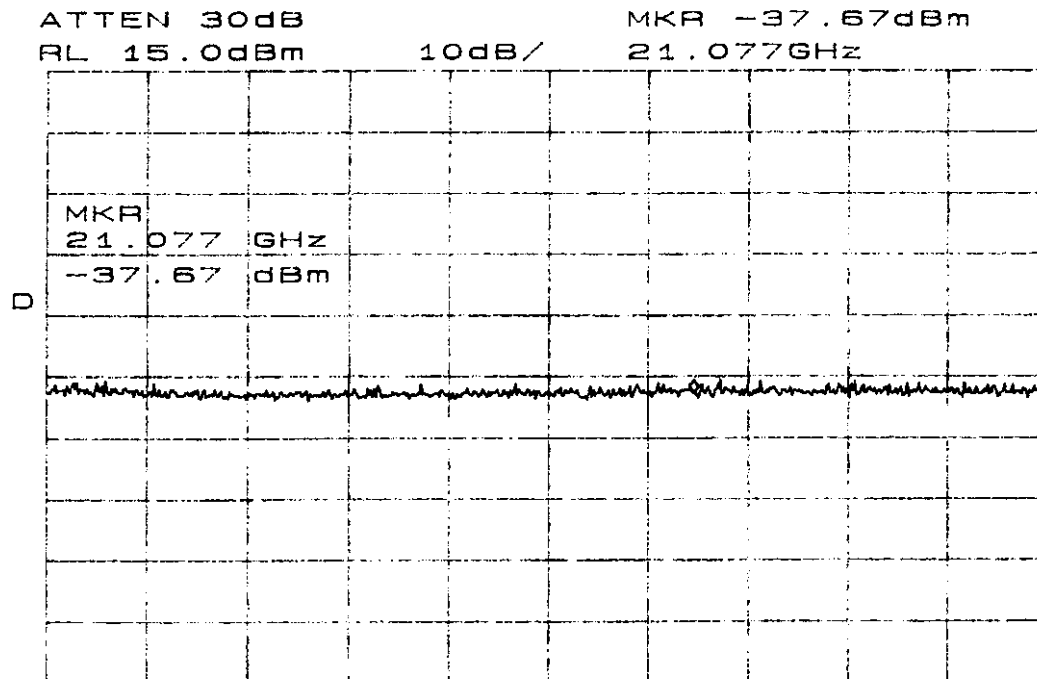
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START 13.000GHz STOP 19.400GHz
*RBW 100kHz VBW 100kHz SWP 2.0sec
Figure 8 Emissions at Antenna Terminal



START 19.400GHz STOP 22.000GHz
*RBW 100kHz *VBW 100kHz SWP 700ms
Figure 9 Emissions at Antenna Terminal

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Results:

Data taken per 2.1051 and applicable parts of Part 25. Specifications of Paragraphs 2.1051, 2.1057 and 25.202(f) are met. There are no deviations to the specifications.

FREQUENCY	SPURIOUS FREQ. (GHz)	LEVEL BELOW CARRIER (dB)
1616	3230	-90.3
	4848	-91.0
1621	3642	-90.8
	4863	-91.3
1626	3252	-90.6
	4878	-91.1

2.1053 Field Strength of Spurious Radiation**Measurements Required:**

Measurements shall be made to detect spurious emissions that may be radiated directly from the cabinet, control circuits, power leads, or intermediate circuit elements under normal conditions of installation and operation.

Test Arrangement:

The transmitter was placed on a wooden turntable 0.8 meters above the ground plane and at a distance of 3 meters from the FSM antenna. The antenna port was terminated into a 50 Ω load. The transmitter was activated and the frequency spectrum was observed. The turntable was rotated through 360 degrees to locate the position registering the highest amplitude emission. The frequency spectrum was then searched for spurious emissions generated from the transmitter and support equipment. The amplitude of each spurious emission was maximized by raising and lowering the FSM antenna, rotating the turntable; and changing antenna polarization between horizontal and vertical before data was recorded. A Biconilog antenna was used to measure frequencies from 30 to 1000 MHz and/or a log

periodic antenna was used for frequencies of 200 MHz to 5 GHz and pyramidal horn antennas were used for frequencies of 5 GHz to 40 GHz. Emission levels were measured and recorded from the spectrum analyzer in dBμV. This level was then added to the antenna factor less the amplifier gain to calculate the field strength at 3 meters. Data was taken at the ROGERS LABS, INC. 3 meters open area test site (OATS). A description of the test facility is on file with the FCC, Reference: 31040/SIT, 1300F2, dated February 6, 1998. The testing procedure used conforms to the procedures stated in the ANSI 63.4-1992 document.

Calculations made are as follows:

CFS = Calculated Field Strength
 FSM = Field Strength Measurement
 CFS = FSM + Antenna Factor - Amplifier Gain
 CFS = 40.6 + 15.2 - 35
 CFS = 20.8

The limit for emissions are defined by the following equations:

Limit = Amplitude of spurious emission must be attenuated by this amount below the level of the fundamental.

$$\begin{aligned}\text{Attenuation} &= 43 + 10 \log_{10}(P_w) \\ &= 43 + 10 \log_{10}(0.6) \\ &= 40.8 \text{ dB}\end{aligned}$$

$$\text{Limit} = \text{FS}_{\text{Fund}} - 40.8$$

FS_{Fund} is calculated with the following equation.

$$\begin{aligned}\text{FS}_{\text{Fund}} (\text{V/m}) &= \sqrt{[(30 \text{ PG})/R^2]} = \sqrt{[30(0.6)/9]} = 1.414 \text{ V/m} \\ \text{FS}_{\text{Fund}} \text{ dB}\mu\text{V/m @ 3m} &= 20 \log(1.414 \text{ E6}) = 123 \text{ dB}\mu\text{V/m} \\ \text{Limit} &= 123 - 40.8 = 82.2 \text{ dB}\mu\text{V/m @ 3m}\end{aligned}$$

Radiated (6 Highest Emissions)

Freq. In MHz	FSM Hor. (dBμV)	FSM Vert. (dBμV)	Ant. Fact. (dB)	Ampl. Gain (dB)	Comp. Hor. (dBμV/m) @ 3m	Comp. Vert. (dBμV/m) @ 3m	FCC Limit (dBμV/m) @ 3m
33.1	40.6	42.1	15.2	35	20.8	22.3	40.0
37.9	44.0	41.9	15.2	35	24.2	22.1	40.0
55.2	43.3	43.8	7.3	35	15.6	16.1	40.0
68.0	44.5	41.4	6.7	35	16.2	13.1	40.0
78.2	42.8	43.5	8.0	35	15.8	16.5	40.0
560.0	34.4	38.1	18.7	35	18.1	21.8	46.0

Other emissions present had amplitudes at least 10 dB below the limit.

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Results:

Channel	Frequency (MHz)	FSM Horz. (dBuV)	FSM Vert. (dBuV)	Ant. Factor (dB)	Amp. Gain (dB)	CFS Horz. @ 3m (dBuV/m)	CFS Vert. @ 3m (dBuV/m)
1616.00	3230.0	29.5	28.5	35.6	25	40.1	39.1
	4848.0	31.3	31.0	27.3	25	33.6	33.3
	6464.0	37.0	35.3	29.9	25	41.9	40.2
	8080.0	36.8	36.0	29.9	25	41.7	40.9
	9696.0	36.6	35.3	33.5	25	45.1	43.8
	11312.0	38.0	38.5	33.5	25	46.5	47.0
1621.02	3242.0	31.5	32.0	35.6	25	42.1	42.6
	4863.0	31.1	30.5	27.3	25	33.4	32.8
	6484.1	36.0	36.3	29.9	25	40.9	41.2
	8105.1	36.6	36.5	29.9	25	41.5	41.4
	9726.1	35.3	33.8	33.5	25	43.8	42.3
	11347.1	37.5	38.3	33.5	25	46.0	46.8
1626.0	3252.0	30.3	30.74	35.6	25	40.9	41.3
	4878.0	30.8	31.5	27.3	25	33.1	33.8
	6504.0	36.3	36.3	29.9	25	41.2	41.2
	8130.0	35.8	37.8	29.9	25	40.7	42.7
	9756.0	36.8	37.0	33.5	25	45.3	45.5
	11382.0	38.3	38.6	33.5	25	46.8	47.1

Specifications of Paragraph 2.1053, 2.1057 and 25.202 are met.
There are no deviations to the specifications.

2.1055 Frequency Stability**Measurements Required:**

The frequency stability shall be measured with variations of ambient temperature from -30° to +50° centigrade. Measurements shall be made at the extremes of the temperature range and at intervals of not more than 10° centigrade through the range. A period of time sufficient to stabilize all of the components of the oscillator circuit at each temperature level shall be allowed prior to frequency measurement. In addition

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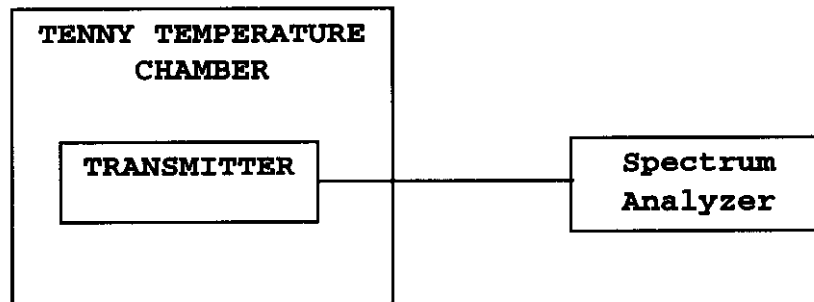
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to temperature stability the frequency stability shall be measured with variation of primary supply voltage as follows:

- (1) Vary primary supply voltage from 85 to 115 percent of the nominal value for other than hand carried battery equipment.
- (2) For hand carried, batteries powered equipment, reduce primary supply voltage to the battery operating end point which shall be specified by the manufacturer.
- (3) The supply voltage shall be measured at the input to the cable normally provided with the equipment, or at the power supply terminals if cables are not normally provided.

Test Arrangement:



The measurement procedure outlined below shall be followed:

Step 1: The transmitter shall be installed in an environmental test chamber whose temperature is controllable. Provision shall be made to measure the frequency of the transmitter.

Step 2: With the transmitter inoperative (power switched "OFF"), the temperature of the test chamber shall be adjusted to +25°C. After a temperature stabilization period of one hour at +25°C, the transmitter shall be switched "ON" with standard test voltage applied.

Step 3: The carrier shall be keyed "ON", and the transmitter shall be operated unmodulated at full r.f. power output at the duty cycle for which it is rated, for duration of at least 5 minutes. The r.f. carrier frequency shall be monitored and measurements shall be recorded.

Step 4: The test procedures outlined in Steps 2 and 3, shall be repeated after stabilizing the transmitter at the environmental temperatures specified, -30°C to 50°C in 10 degree increments.

The frequency stability was measured with variations in the power supply voltage from 85 to 115 percent of the nominal value. A Sorenson DC Power Source was used to vary the voltage for the power input from 23.8 Vdc to 32.2 Vdc. The frequency was measured and the variation in parts per million was calculated. Data was taken per Paragraphs 2.1055 and 25.202.

Results:

FREQ. (MHz)	FREQUENCY STABILITY VS TEMPERATURE IN PARTS PER MILLION (PPM)								
	Temperature in °C								
	-30	-20	-10	0	+10	+20	+30	+40	+50
1621	-0.9	0.5	0	0.5	0	-0.1	0	0.5	-0.9

FREQUENCY IN MHz	STABILITY VS VOLTAGE VARIATION $\pm 15\%$ IN PPM INPUT VOLTAGE		
	23.8 V _{dc}	28.0 V _{dc}	32.2 V _{dc}
1621	0	0	0

Specifications of Paragraphs 2.1055 and 25.202(d) are met. There are no deviations to the specifications.

98-92 Authorization of GMPCS transmitters

Measurements Required:

Voluntary submittal for certification upon meeting all of the relevant Part 25 standards concerning frequency range, tolerance, out-of-band emission, spurious emission limits to protect GPS, and radiation hazards. NTIA has proposed an out-of-band emission limit of -70 dBW/MHz averaged over any 20 mS period for wide band emissions and -80 dBW/700 Hz for narrow band emissions occurring between 1559 - 1605 MHz. For Purposes of interim type approval, manufacturers may demonstrate compliance with the narrowband standard of -80 dBW across 700 Hz or less in accordance with the RTCA Inc.

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Final Report in context of GPS protection requirements.
These results also demonstrate compliance with CFR 47,
Part 25.213.

Test Arrangement:



Results:

Data taken per the requirements are shown in figures 10 through 33. All the requirements are met there are no deviations to the specifications.

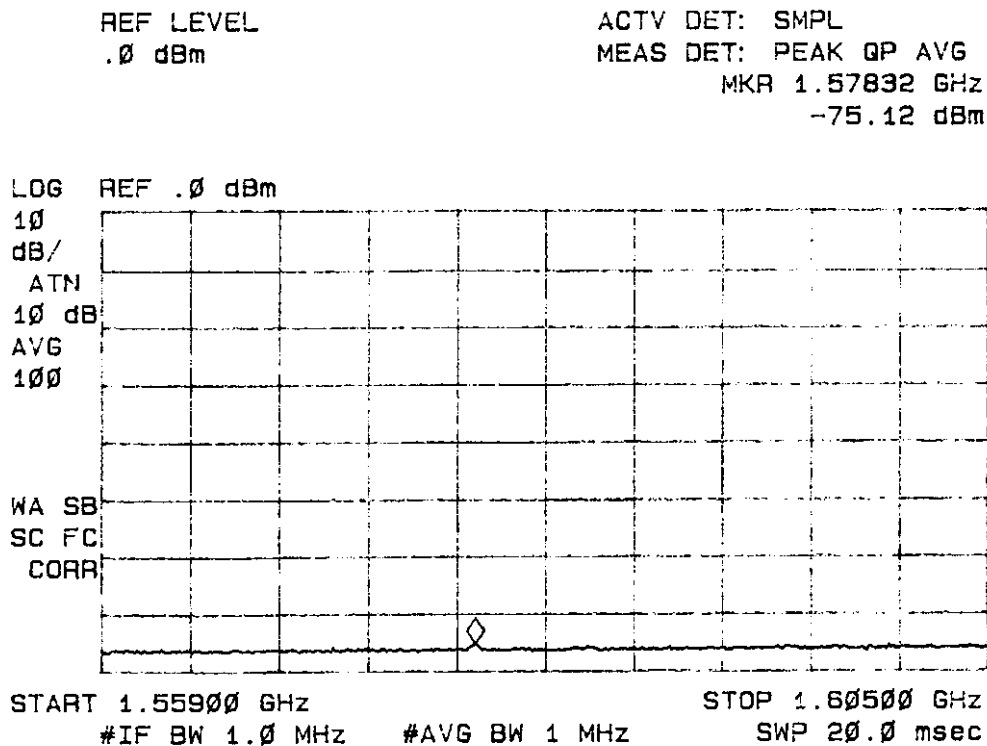


Figure 10 Wide band emissions

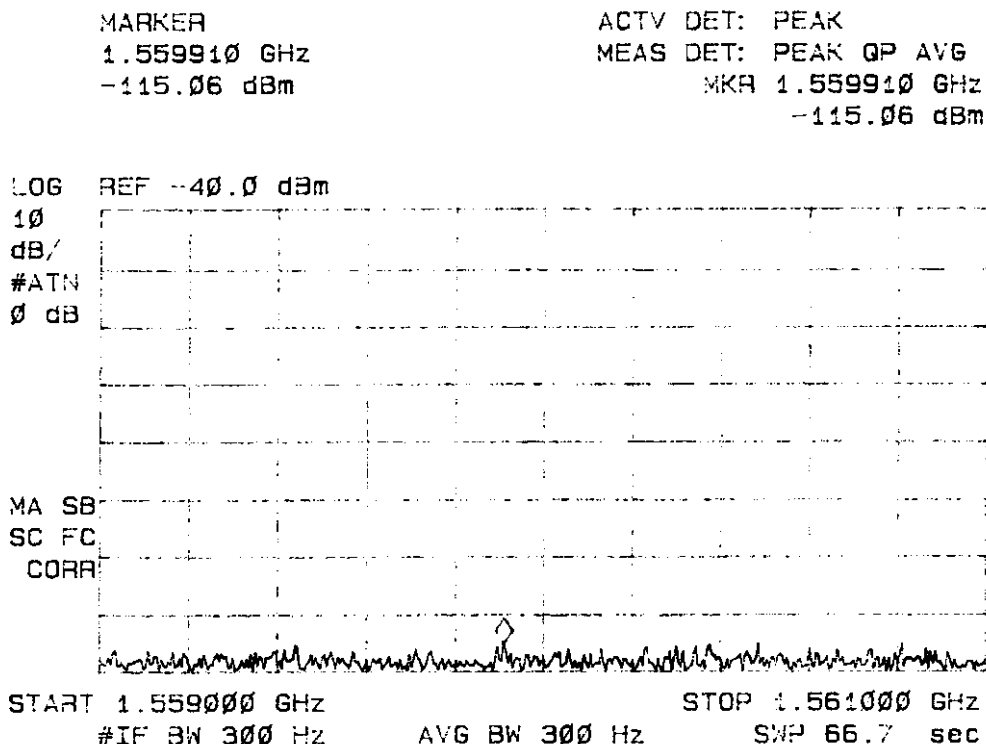


Figure 11 Narrow band emissions

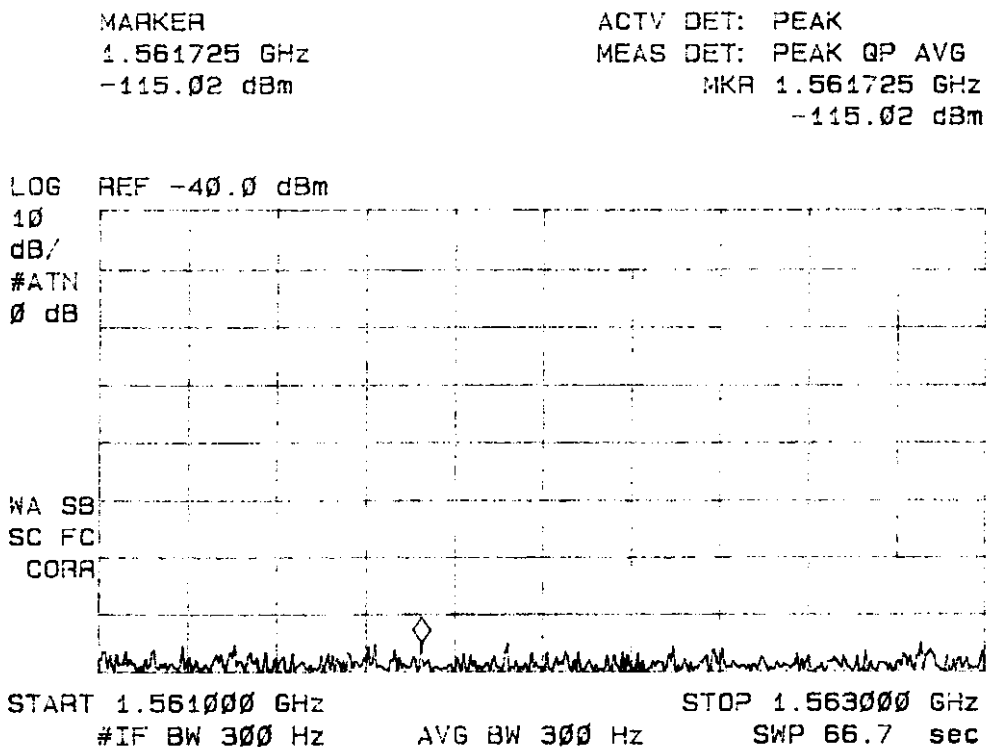


Figure 12 Narrow band emissions

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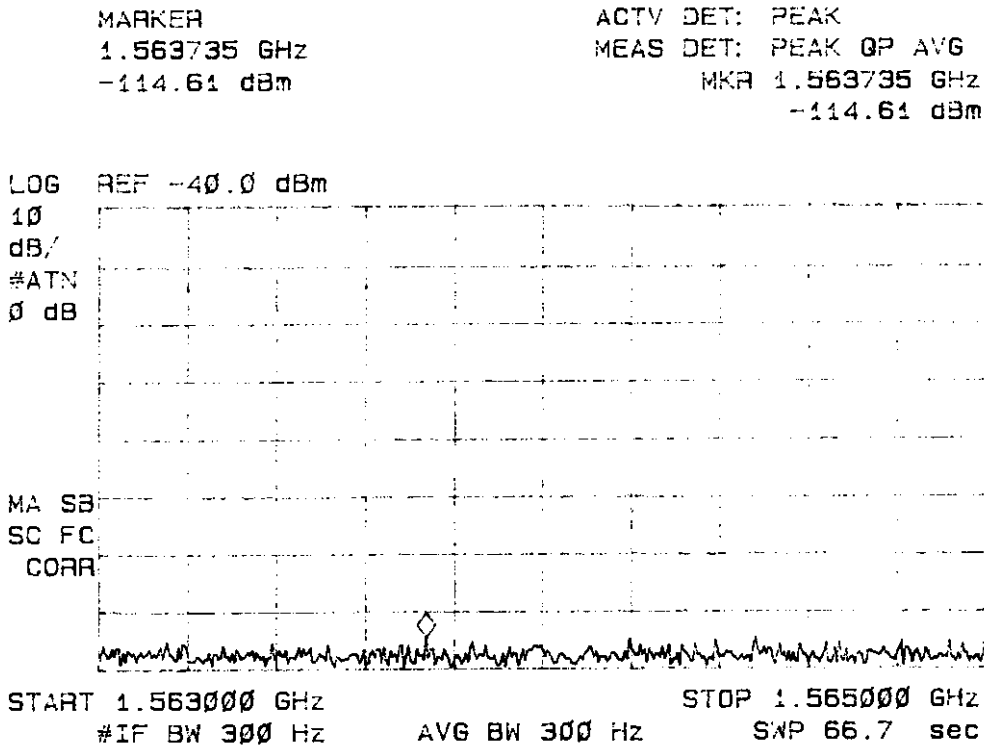


Figure 13 Narrow band emissions

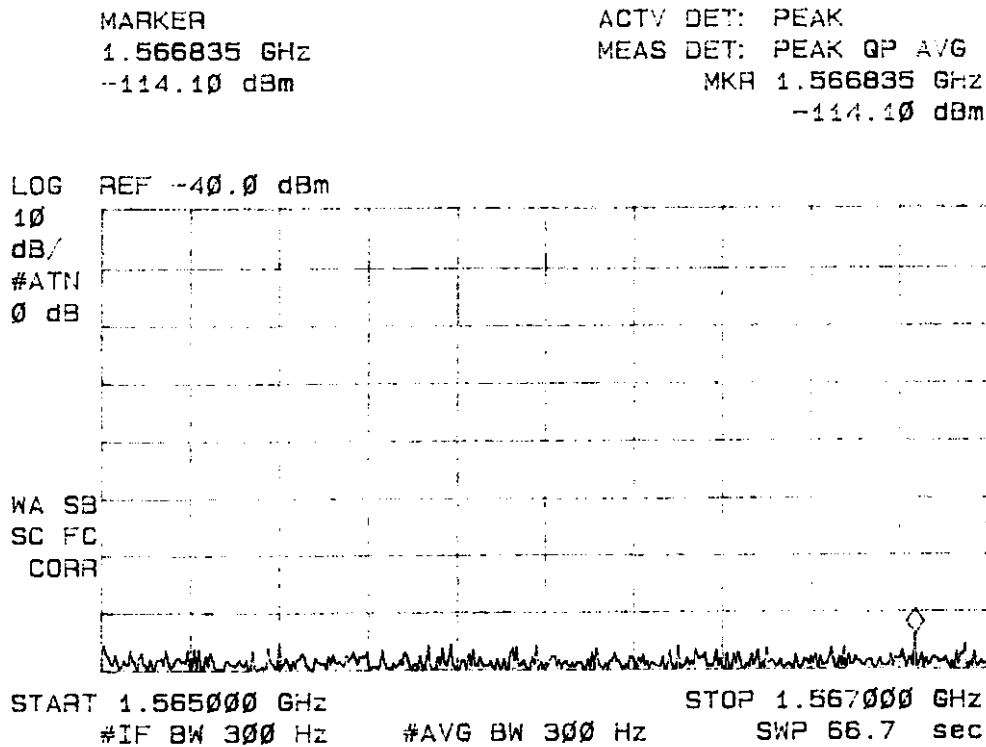


Figure 14 Narrow band emissions

ROGERS LABS, INC.

4405 W. 259th Terrace

Louisburg, KS 66053

Phone/Fax: (913) 837-3214

ALLIEDSIGNAL INC.

MODEL: ITU100 S/N: Y208 P/N: 064-01083-0101

Test #: 990510 FCC ID#: ASYITU100

Test to: FCC Parts 2 and 25

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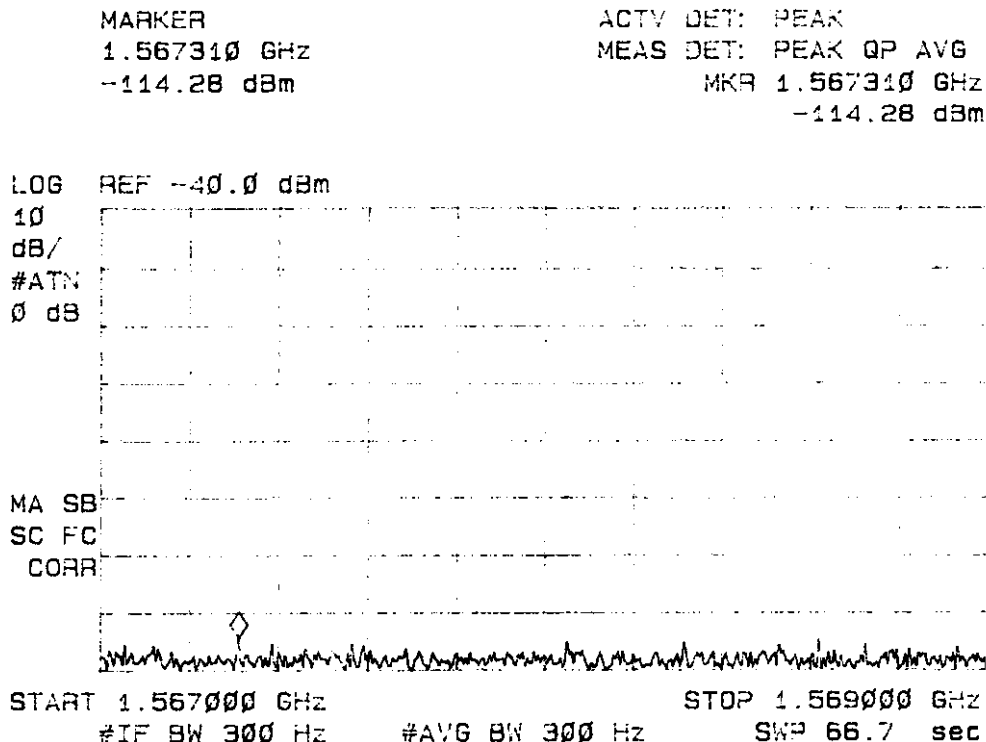


Figure 15 Narrow band emissions

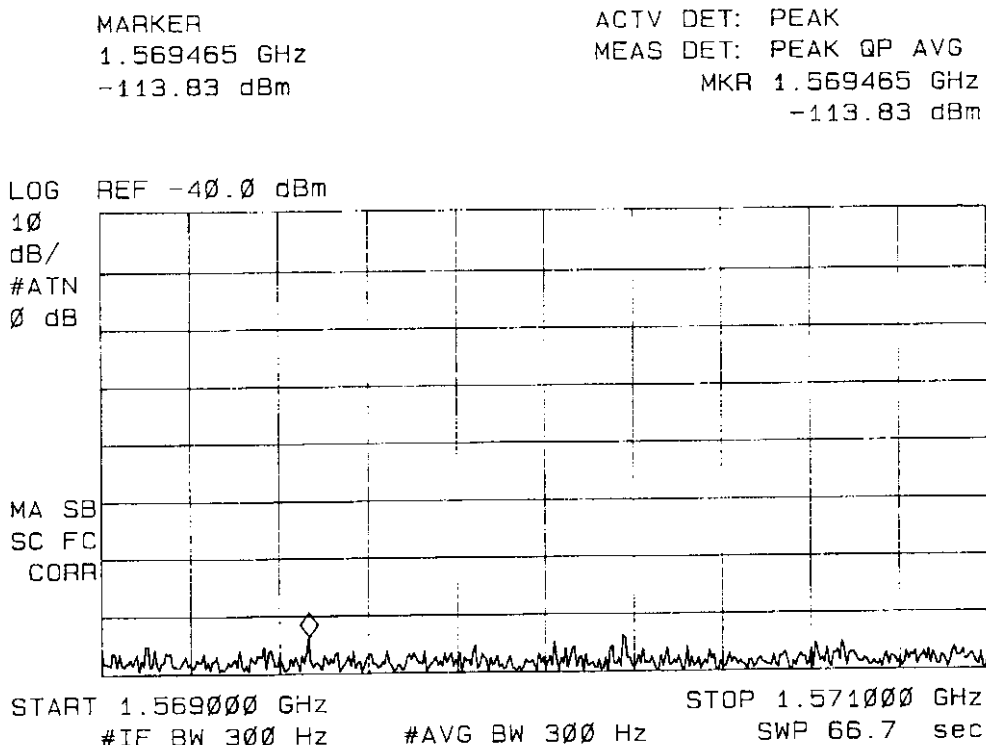


Figure 16 Narrow band emissions

ROGERS LABS, INC.

4405 W. 259th Terrace

Louisburg, KS 66053

Phone/Fax: (913) 837-3214

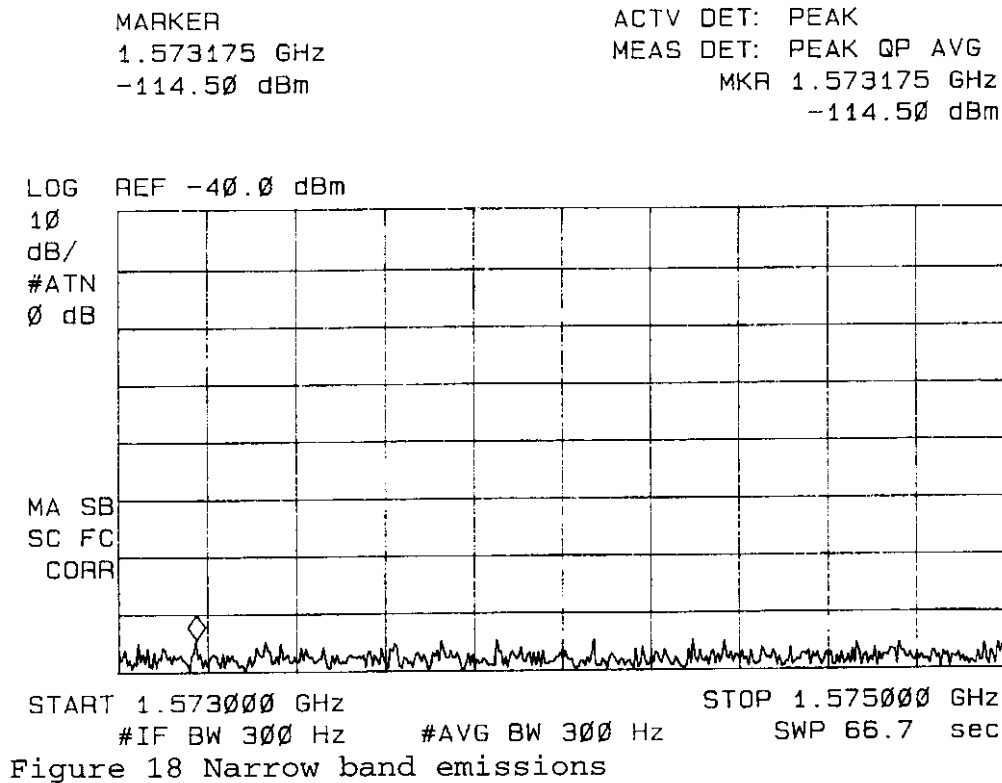
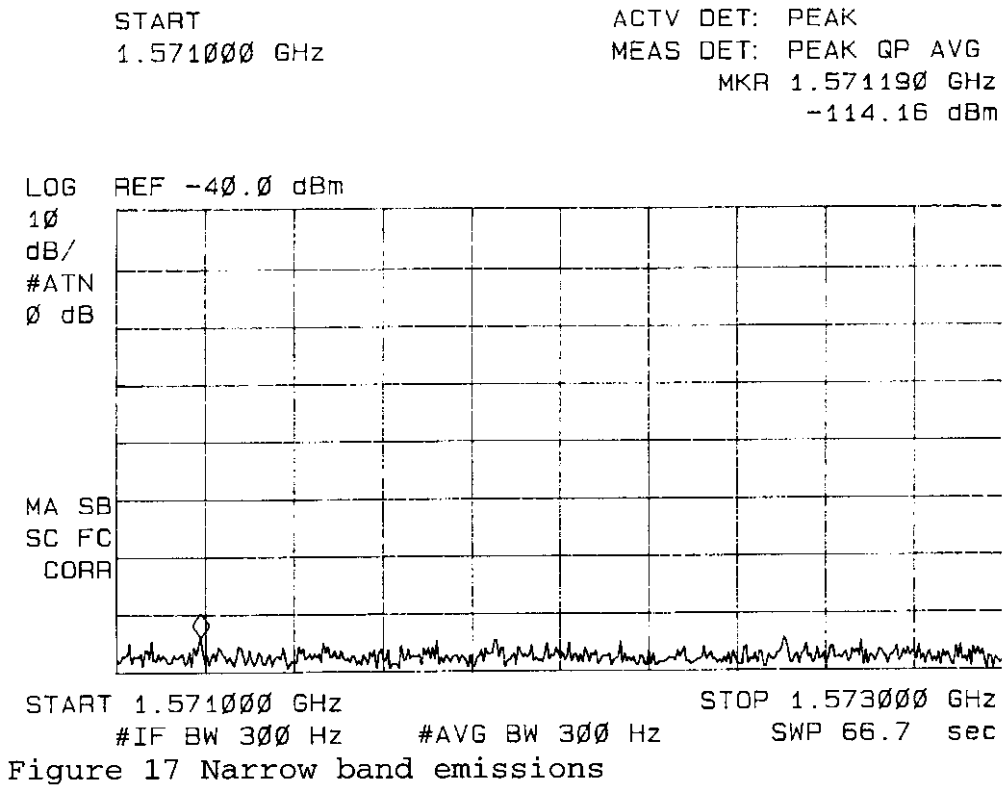
ALLIEDSIGNAL INC.

MODEL: ITU100 S/N: Y208 P/N: 064-01083-0101

Test #: 990510 FCC ID#: ASYITU100

Test to: FCC Parts 2 and 25

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ROGERS LABS, INC.

4405 W. 259th Terrace

Louisburg, KS 66053

Phone/Fax: (913) 837-3214

ALLIEDSIGNAL INC.

MODEL: ITU100 S/N: Y208 P/N: 064-01083-0101

Test #: 990510 FCC ID#: ASYITU100

Test to: FCC Parts 2 and 25

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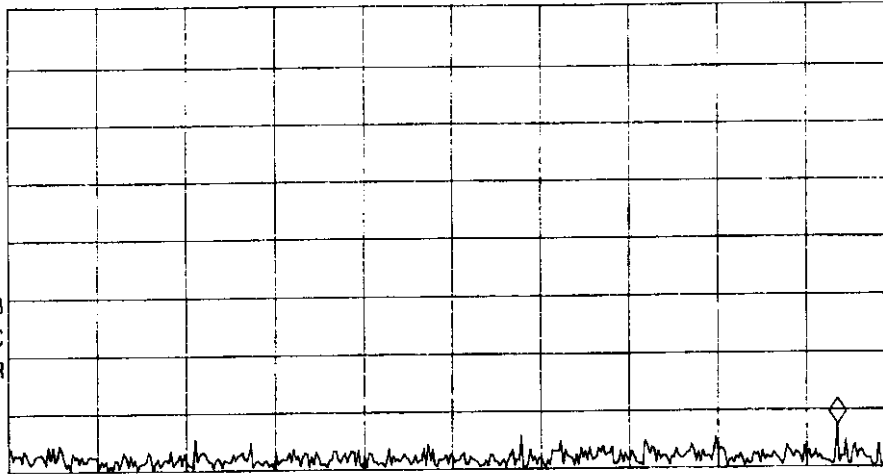
MARKER
1.576870 GHz
-112.62 dBm

ACTV DET: PEAK
MEAS DET: PEAK QP AVG
MKR 1.576870 GHz
-112.62 dBm

LOG REF -40.0 dBm

10
dB/
#ATN
0 dB

MA SB
SC FC
CORR



START 1.575000 GHz STOP 1.577000 GHz
#IF BW 300 Hz #AVG BW 300 Hz SWP 66.7 sec

Figure 19 Narrow band emissions

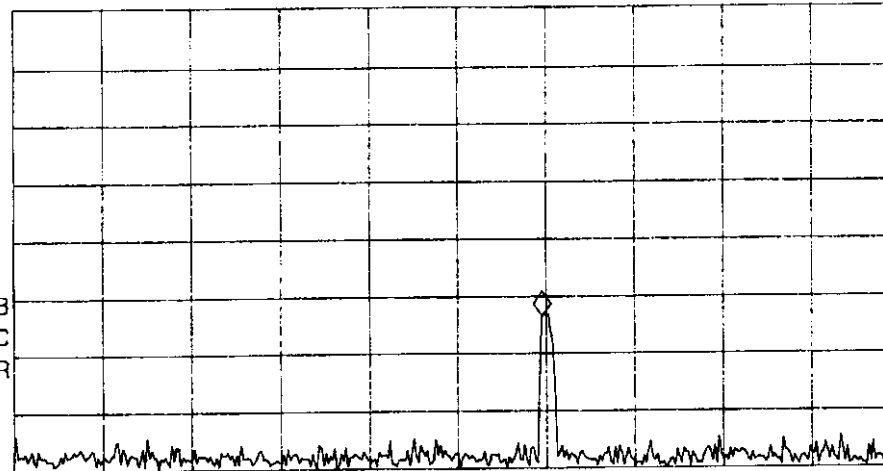
STOP
1.579000 GHz

ACTV DET: PEAK
MEAS DET: PEAK QP AVG
MKR 1.578190 GHz
-93.72 dBm

LOG REF -40.0 dBm

10
dB/
#ATN
0 dB

MA SB
SC FC
CORR



START 1.577000 GHz STOP 1.579000 GHz
#IF BW 300 Hz #AVG BW 300 Hz SWP 66.7 sec

Figure 20 Narrow band emissions

ROGERS LABS, INC.
4405 W. 259th Terrace
Louisburg, KS 66053
Phone/Fax: (913) 837-3214

ALLIEDSIGNAL INC.
MODEL: ITU100 S/N: Y208 P/N: 064-01083-0101
Test #: 990510 FCC ID#: ASYITU100
Test to: FCC Parts 2 and 25

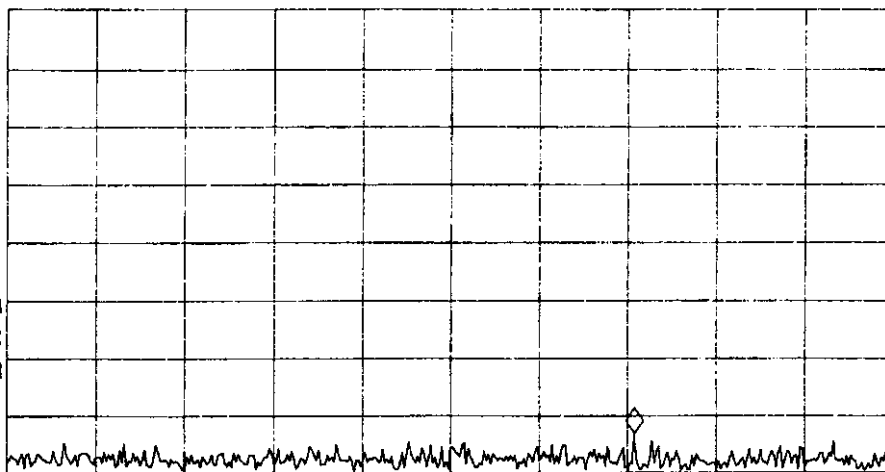
MARKER
1.580415 GHz
-113.11 dBm

ACTV DET: PEAK
MEAS DET: PEAK QP AVG
MKR 1.580415 GHz
-113.11 dBm

LOG REF -40.0 dBm

10
dB/
#ATN
0 dB

MA SB
SC FC
CORR



START 1.579000 GHz

STOP 1.581000 GHz

#IF BW 300 Hz

#AVG BW 300 Hz

SWP 66.7 sec

Figure 21 Narrow band emissions

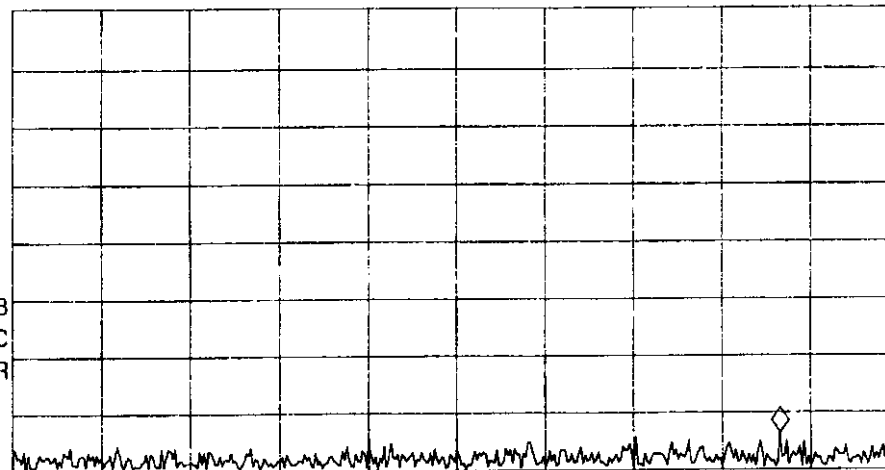
MARKER
1.582730 GHz
-113.68 dBm

ACTV DET: PEAK
MEAS DET: PEAK QP AVG
MKR 1.582730 GHz
-113.68 dBm

LOG REF -40.0 dBm

10
dB/
#ATN
0 dB

MA SB
SC FC
CORR



START 1.581000 GHz

STOP 1.583000 GHz

#IF BW 300 Hz

#AVG BW 300 Hz

SWP 66.7 sec

Figure 22 Narrow band emissions

ROGERS LABS, INC.

4405 W. 259th Terrace

Louisburg, KS 66053

Phone/Fax: (913) 837-3214

ALLIEDSIGNAL INC.

MODEL: ITU100 S/N: Y208 P/N: 064-01083-0101

Test #: 990510

FCC ID#: ASYITU100

Test to: FCC Parts 2 and 25

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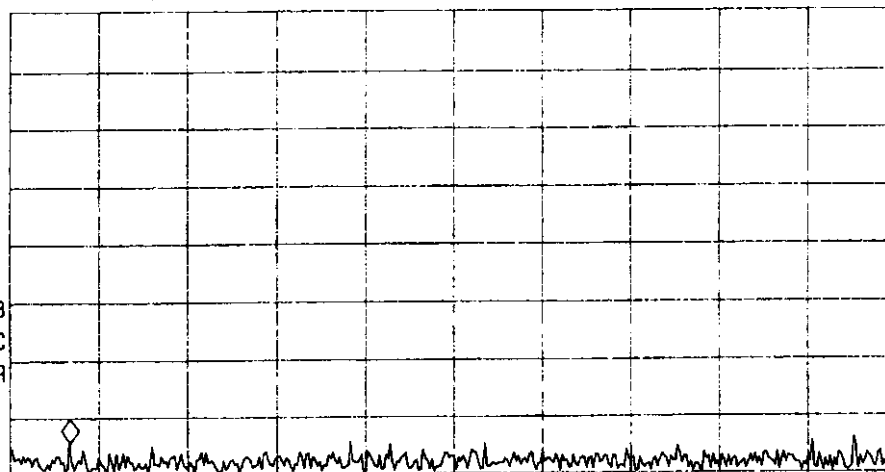
MARKER
1.583135 GHz
-114.47 dBm

ACTV DET: PEAK
MEAS DET: PEAK QP AVG
MKR 1.583135 GHz
-114.47 dBm

LOG REF -40.0 dBm

10
dB/
#ATN
0 dB

MA SB
SC FC
CORR



START 1.583000 GHz

#IF BW 300 Hz

#AVG BW 300 Hz

STOP 1.585000 GHz

SWP 66.7 sec

Figure 23 Narrow band emissions

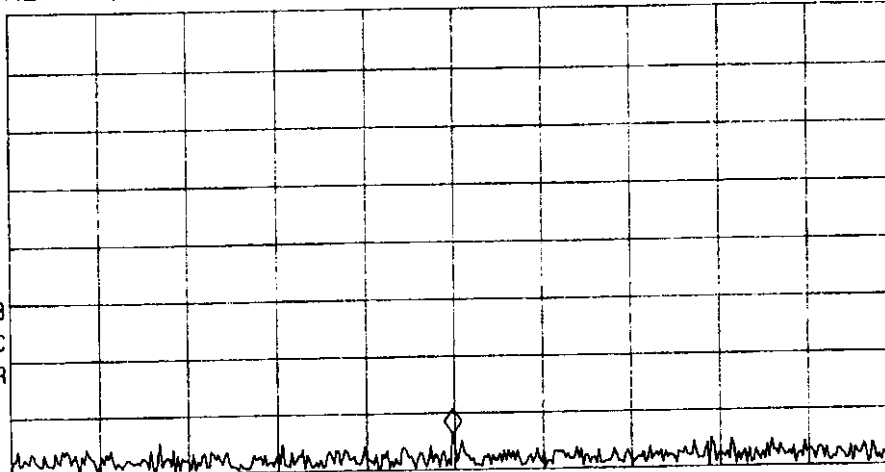
MARKER
1.585995 GHz
-113.75 dBm

ACTV DET: PEAK
MEAS DET: PEAK QP AVG
MKR 1.585995 GHz
-113.75 dBm

LOG REF -40.0 dBm

10
dB/
#ATN
0 dB

MA SB
SC FC
CORR



START 1.585000 GHz

#IF BW 300 Hz

#AVG BW 300 Hz

STOP 1.587000 GHz

SWP 66.7 sec

Figure 24 Narrow band emissions

ROGERS LABS, INC.

4405 W. 259th Terrace

Louisburg, KS 66053

Phone/Fax: (913) 837-3214

ALLIEDSIGNAL INC.

MODEL: ITU100 S/N: Y208 P/N: 064-01083-0101

Test #: 990510

FCC ID#: ASYITU100

Test to: FCC Parts 2 and 25

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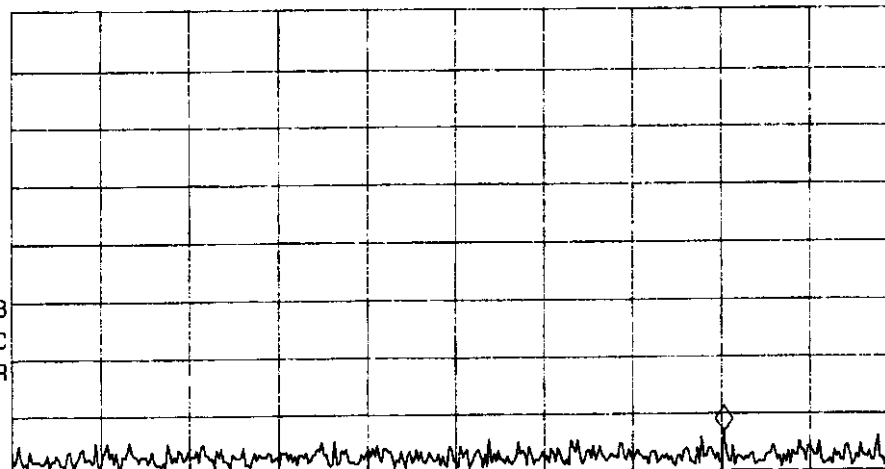
MARKER
1.588605 GHz
-113.21 dBm

ACTV DET: PEAK
MEAS DET: PEAK QP AVG
MKR 1.588605 GHz
-113.21 dBm

LOG REF -40.0 dBm

10
dB/
#ATN
0 dB

MA SB
SC FC
CORR



START 1.587000 GHz

STOP 1.589000 GHz

#IF BW 300 Hz

#AVG BW 300 Hz

SWP 66.7 sec

Figure 25 Narrow band emissions

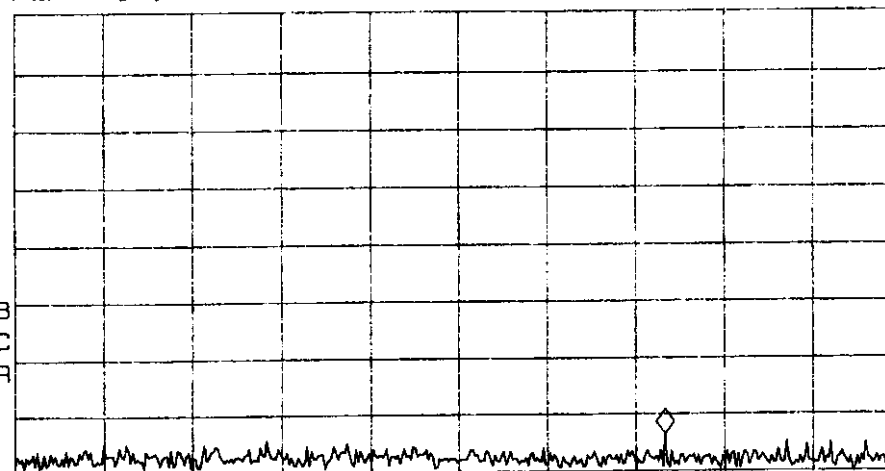
MARKER
1.590465 GHz
-113.65 dBm

ACTV DET: PEAK
MEAS DET: PEAK QP AVG
MKR 1.590465 GHz
-113.65 dBm

LOG REF -40.0 dBm

10
dB/
#ATN
0 dB

MA SB
SC FC
CORR



START 1.589000 GHz

STOP 1.591000 GHz

#IF BW 300 Hz

#AVG BW 300 Hz

SWP 66.7 sec

Figure 26 Narrow band emissions

ROGERS LABS, INC.

ALLIEDSIGNAL INC.

4405 W. 259th Terrace

MODEL: ITU100 S/N: Y208 P/N: 064-01083-0101

Louisburg, KS 66053

Test #: 990510 FCC ID#: ASYITU100

Phone/Fax: (913) 837-3214

Test to: FCC Parts 2 and 25

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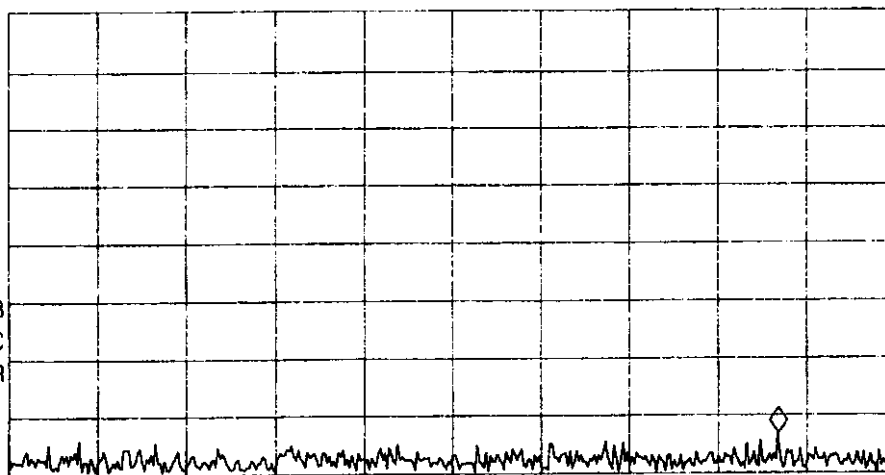
MARKER
1.592735 GHz
-113.20 dBm

ACTV DET: PEAK
MEAS DET: PEAK QP AVG
MKR 1.592735 GHz
-113.20 dBm

LOG REF -40.0 dBm

10
dB/
#ATN
0 dB

MA SB
SC FC
CORR



START 1.591000 GHz STOP 1.593000 GHz
#IF BW 300 Hz #AVG BW 300 Hz SWP 66.7 sec

Figure 27 Narrow band emissions

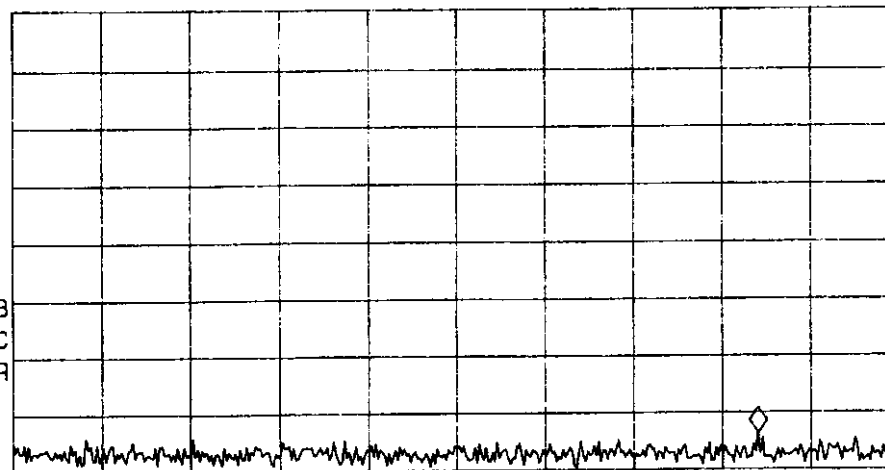
MARKER
1.594680 GHz
-113.69 dBm

ACTV DET: PEAK
MEAS DET: PEAK QP AVG
MKR 1.594680 GHz
-113.69 dBm

LOG REF -40.0 dBm

10
dB/
#ATN
0 dB

MA SB
SC FC
CORR



START 1.593000 GHz STOP 1.595000 GHz
#IF BW 300 Hz #AVG BW 300 Hz SWP 66.7 sec

Figure 28 Narrow band emissions

ROGERS LABS, INC.

4405 W. 259th Terrace

Louisburg, KS 66053

Phone/Fax: (913) 837-3214

ALLIEDSIGNAL INC.

MODEL: ITU100 S/N: Y208 P/N: 064-01083-0101

Test #: 990510 FCC ID#: ASYITU100

Test to: FCC Parts 2 and 25

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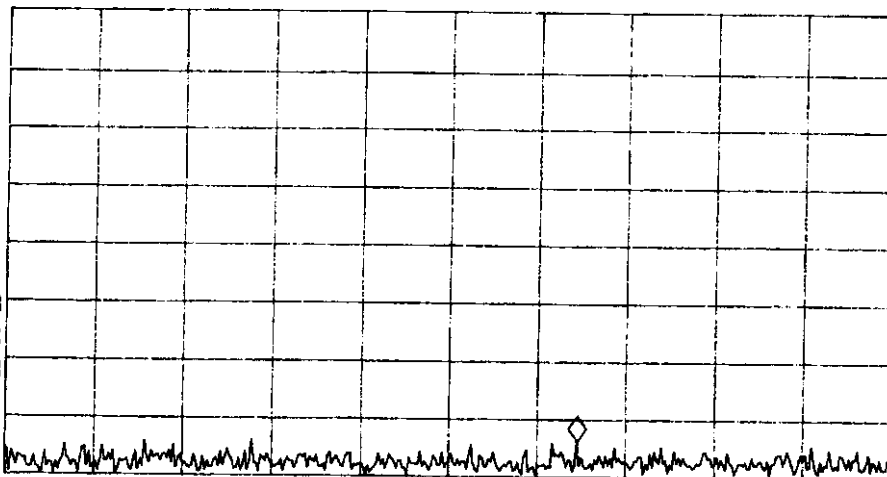
MARKER
1.596290 GHz
-113.78 dBm

ACTV DET: PEAK
MEAS DET: PEAK QP AVG
MKR 1.596290 GHz
-113.78 dBm

LOG REF -40.0 dBm

10
dB/
#ATN
0 dB

MA SB
SC FC
CORR



START 1.595000 GHz

#IF BW 300 Hz

#AVG BW 300 Hz

STOP 1.597000 GHz

SWP 66.7 sec

Figure 29 Narrow band emissions

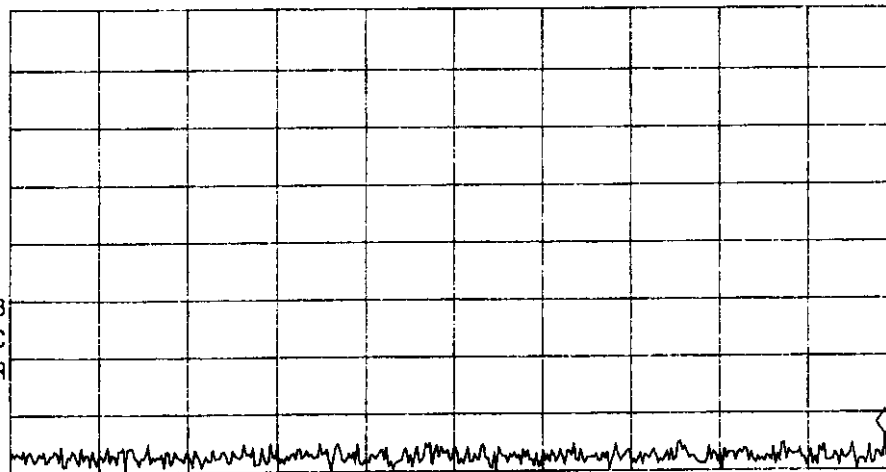
MARKER
1.598975 GHz
-114.01 dBm

ACTV DET: PEAK
MEAS DET: PEAK QP AVG
MKR 1.598975 GHz
-114.01 dBm

LOG REF -40.0 dBm

10
dB/
#ATN
0 dB

MA SB
SC FC
CORR



START 1.597000 GHz

#IF BW 300 Hz

#AVG BW 300 Hz

STOP 1.599000 GHz

SWP 66.7 sec

Figure 30 Narrow band emissions

ROGERS LABS, INC.

4405 W. 259th Terrace

Louisburg, KS 66053

Phone/Fax: (913) 837-3214

ALLIEDSIGNAL INC.

MODEL: ITU100 S/N: Y208 P/N: 064-01083-0101

Test #: 990510

FCC ID#: ASYITU100

Test to: FCC Parts 2 and 25

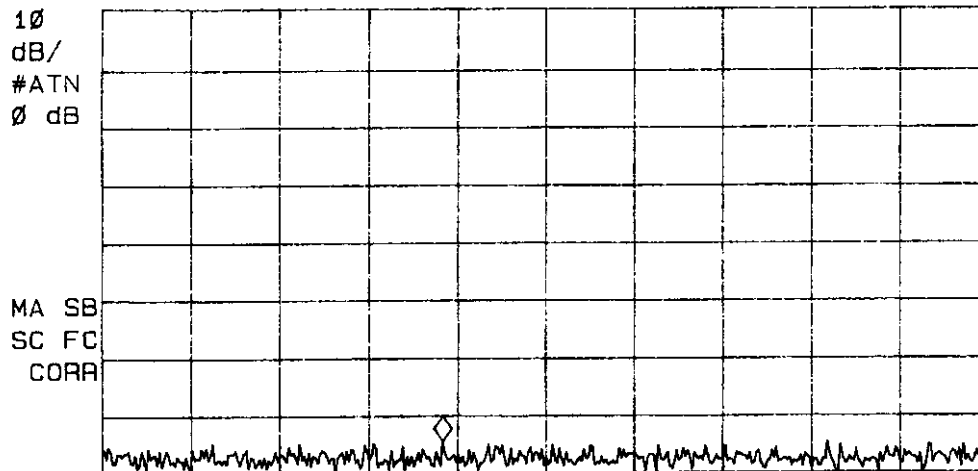
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MARKER
1.599765 GHz
-114.42 dBm

ACTV DET: PEAK
MEAS DET: PEAK QP AVG
MKR 1.599765 GHz
-114.42 dBm

LOG REF -40.0 dBm



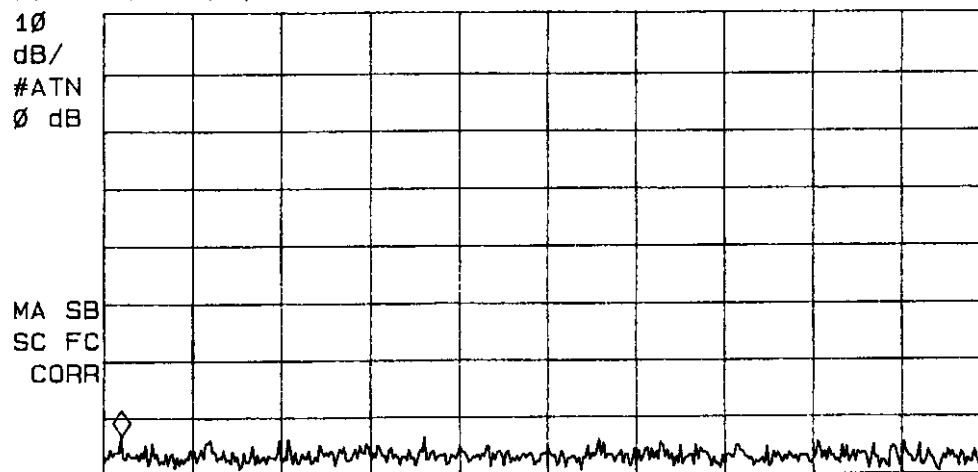
START 1.599000 GHz STOP 1.601000 GHz
#IF BW 300 Hz #AVG BW 300 Hz SWP 66.7 sec

Figure 31 Narrow band emissions

MARKER
1.601040 GHz
-113.12 dBm

ACTV DET: PEAK
MEAS DET: PEAK QP AVG
MKR 1.601040 GHz
-113.12 dBm

LOG REF -40.0 dBm



START 1.601000 GHz STOP 1.603000 GHz
#IF BW 300 Hz #AVG BW 300 Hz SWP 66.7 sec

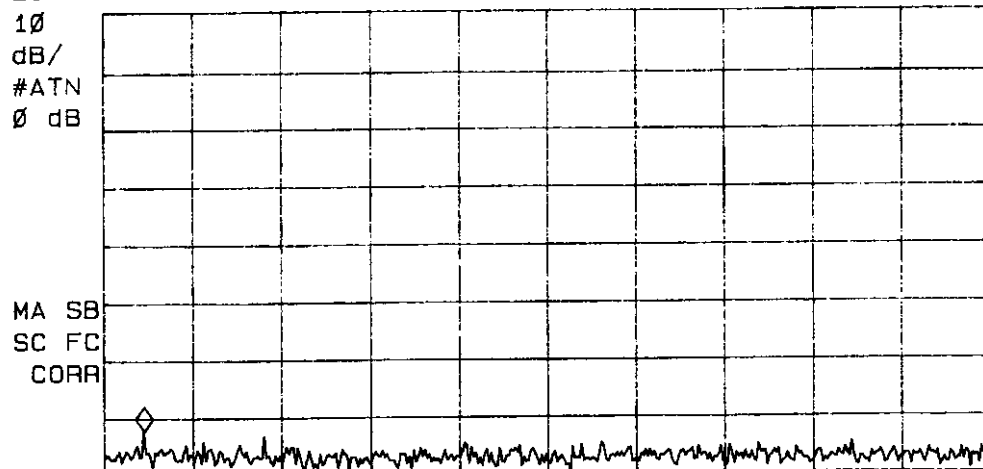
Figure 32 Narrow band emissions

14

MARKER
1.603090 GHz
-112.32 dBm

ACTV DET: PEAK
MEAS DET: PEAK QP AVG
MKR 1.603090 GHz
-112.32 dBm

LOG REF -40.0 dBm



START 1.603000 GHz STOP 1.605000 GHz
#TF BW 300 Hz #AVG BW 300 Hz SWP 66 7 sec

Figure 33 Narrow band emissions

ROGERS LABS, INC.

4405 W. 259th Terrace

Louisburg, KS 66053

Phone/Fax: (913) 837-3214

ALLIEDSIGNAL INC.

MODEL: ITU100 S/N: Y208 P/N: 064-01083-0101

Test #: 990510 FCC ID#: ASYITU100

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APPENDIX

Model: ITU100

1. Photos of Radiated Emissions Test Set Up
2. Test Equipment List.
3. Rogers Qualifications.
4. FCC Site Approval Letter.

ROGERS LABS, INC.

4405 W. 259th Terrace

Louisburg, KS 66053

Phone/Fax: (913) 837-3214

ALLIEDSIGNAL INC.

MODEL: ITU100 S/N: Y208 P/N: 064-01083-0101

Test #: 990510 FCC ID#: ASYITU100

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TEST EQUIPMENT LIST FOR ROGERS LABS, INC.

The equipment is used daily and kept in good calibration and operating condition. Calibration of critical items are checked for accuracy each time used.

List of Test Equipment:Calibration Date:

Scope: Tektronix 2230	2/99
Wattmeter: Bird 43 with Load Bird 8085	2/99
Power Supplies: Sorensen SRL 20-25, DCR 150, DCR 140	2/99
H/V Power Supply: Fluke Model: 408B (SN: 573)	2/99
R.F. Generator: Boonton 102F	2/99
R.F. Generator: HP 606A	2/99
R.F. Generator: HP 8614A	2/99
R.F. Generator: HP 8640B	2/99
Spectrum Analyzer: HP 8562A,	2/99
Mixers: 11517A, 11980A & 11980K	
HP Adapters: 11518, 11519, 11520	
Spectrum Analyzer: HP 8591 EM	6/98
Frequency Counter: Weston 1255	2/99
Frequency Counter: Leader LDC 825	2/99
Antenna: EMCO Log Periodic	9/98
Antenna: BCD 235/BNC Antenna Research	9/98
Antenna: EMCO Dipole Set 3121C	2/99
Antenna: C.D. B-100	2/99
Antenna: Solar 9229-1 & 9230-1	2/99
Antenna: EMCO 6509	2/99
Microline Freq. Meter: Model 27B	2/99
Dana Modulation Meter: Model 9008	2/99
Audio Oscillator: H.P. 200CD	2/99
R.F. Power Amp 65W Model: 470-A-1000	9/97
R.F. Power Amp 50W M185- 10-500	9/97
R.F. PreAmp CPPA-102	9/97
Shielded Room 5 M x 3 M x 3.0 M (100 dB Integrity)	
LISN 50 μ Hy/50 ohm/0.1 μ f	9/98
LISN Compliance Eng. 240/20	2/99
SCS Power Amp Model: 2350A	2/99
Power Amp A.R. Model: 10W 1000M7	2/99
Power Amp EIN Model: A300	1/99
Linear Amp Mini Circuits: ZHL-1A (2 Units)	2/99
Combiner Unit Mini Circuits: ZSC-2-1 (2 Units)	2/99
ELGAR Model: 1751	2/99
ELGAR Model: TG 704A-3D	2/99
ELGAR Model: 400SD (PB)	2/99
ESD Test Set 2000i	10/95
Fast Transient Burst Generator Model: EFT/B-100	10/95
Current Probe: Singer CP-105	8/97
Current Probe: Solar 9108-1N	8/97
Field Intensity Meter: EFM-018	10/95

03/01/99

ROGERS LABS, INC.

ALLIEDSIGNAL INC.

4405 W. 259th Terrace

MODEL: ITU100 S/N: Y208 P/N: 064-01083-0101

Louisburg, KS 66053

Test #: 990510 FCC ID#: ASYITU100

Phone/Fax: (913) 837-3214

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QUALIFICATIONS

Of

SCOT D. ROGERS, ENGINEER**ROGERS LABS, INC.**

Mr. Rogers has approximately 12 years experience in the field of electronics. Six years working in the automated controls industry and 6 years working with the design, development and testing of radio communications and electronic equipment.

POSITIONS HELD:

Systems Engineer:	A/C Controls Mfg. Co., Inc. 6 Years
Electrical Engineer:	Rogers Consulting Labs, Inc. 5 Years
Electrical Engineer:	Rogers Labs, Inc. Current

EDUCATIONAL BACKGROUND:

- 1) Bachelor of Science Degree in Electrical Engineering from Kansas State University.
- 2) Bachelor of Science Degree in Business Administration Kansas State University.
- 3) Several Specialized Training courses and seminars pertaining to Microprocessors and Software programming.


Scot D. Rogers
7/8/99
Date

1/11/99

ROGERS LABS, INC.

4405 W. 259th Terrace

Louisburg, KS 66053

Phone/Fax: (913) 837-3214

ALLIEDSIGNAL INC.

MODEL: ITU100 S/N: Y208 P/N: 064-01083-0101

Test #: 990510 FCC ID#: ASYITU100

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FEDERAL COMMUNICATIONS COMMISSION

7435 Oakland Mills Road
Columbia, MD 21046
Telephone: 301-725-1585 (ext-218)
Facsimile: 301-344-2050

February 6, 1998

IN REPLY REFER TO
31040/SIT
1300F2

Rogers Labs, Inc.
4405 West 259th Terrace
Louisburg, KS 66053

Attention: Scot D. Rogers

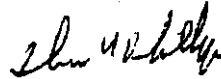
Re: Measurement facility located at above address
(3 and 10 meter site)

Gentlemen:

Your submission of the description of the subject measurement facility has been reviewed and found to be in compliance with the requirements of Section 2.948 of the FCC Rules. The description has, therefore, been placed on file and the name of your organization added to the Commission's list of facilities whose measurement data will be accepted in conjunction with applications for certification or notification under Parts 15 or 18 of the Commission's Rules. Our list will also indicate that the facility complies with the radiated and AC line conducted test site criteria in ANSI C63.4-1992. Please note that this filing must be updated for any changes made to the facility, and at least every three years the data on file must be certified as current.

Per your request, the above mentioned facility has been also added to our list of those who perform these measurement services for the public on a fee basis. This list is updated monthly and is available on the Laboratory's Public Access Link (PAL) at 301-725-1072, and also on the Internet at the FCC Website www.fcc.gov/oet/info/database/testsite/.

Sincerely,



Thomas W. Phillips
Electronics Engineer
Customer Service Branch

ROGERS LABS, INC.
4405 W. 259th Terrace
Louisburg, KS 66053
Phone/Fax: (913) 837-3214

ALLIEDSIGNAL INC.
MODEL: ITU100 S/N: Y208 P/N: 064-01083-0101
Test #: 990510 FCC ID#: ASYITU100
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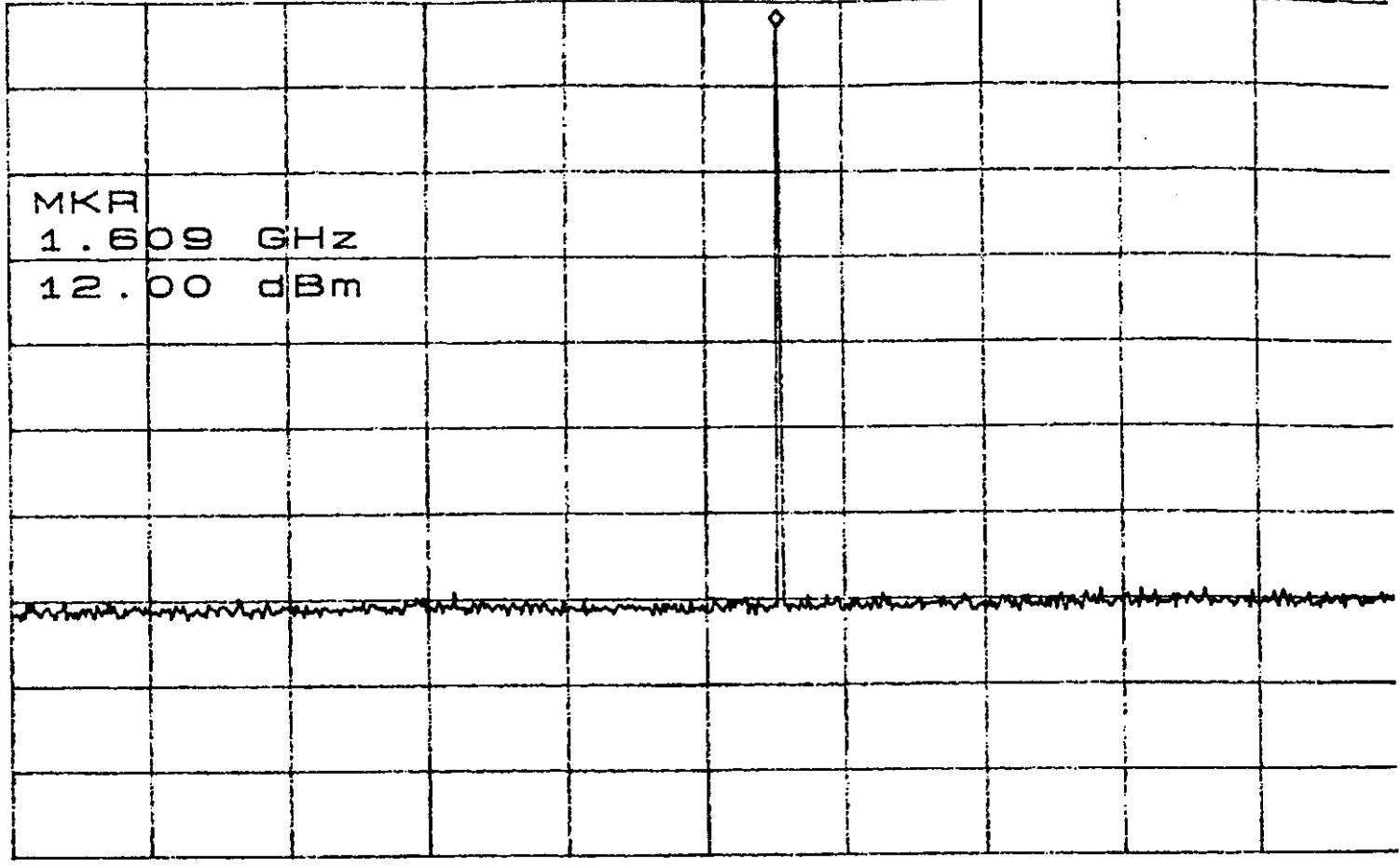
RL 15.0dBm

10dB/

MKR 12.000dBm
1.609GHz

MKR
1.609 GHz
12.00 dBm

D
μ



START 10MHz STOP 2.900GHz
*RBW 100kHz VBW 100kHz SWP 800ms

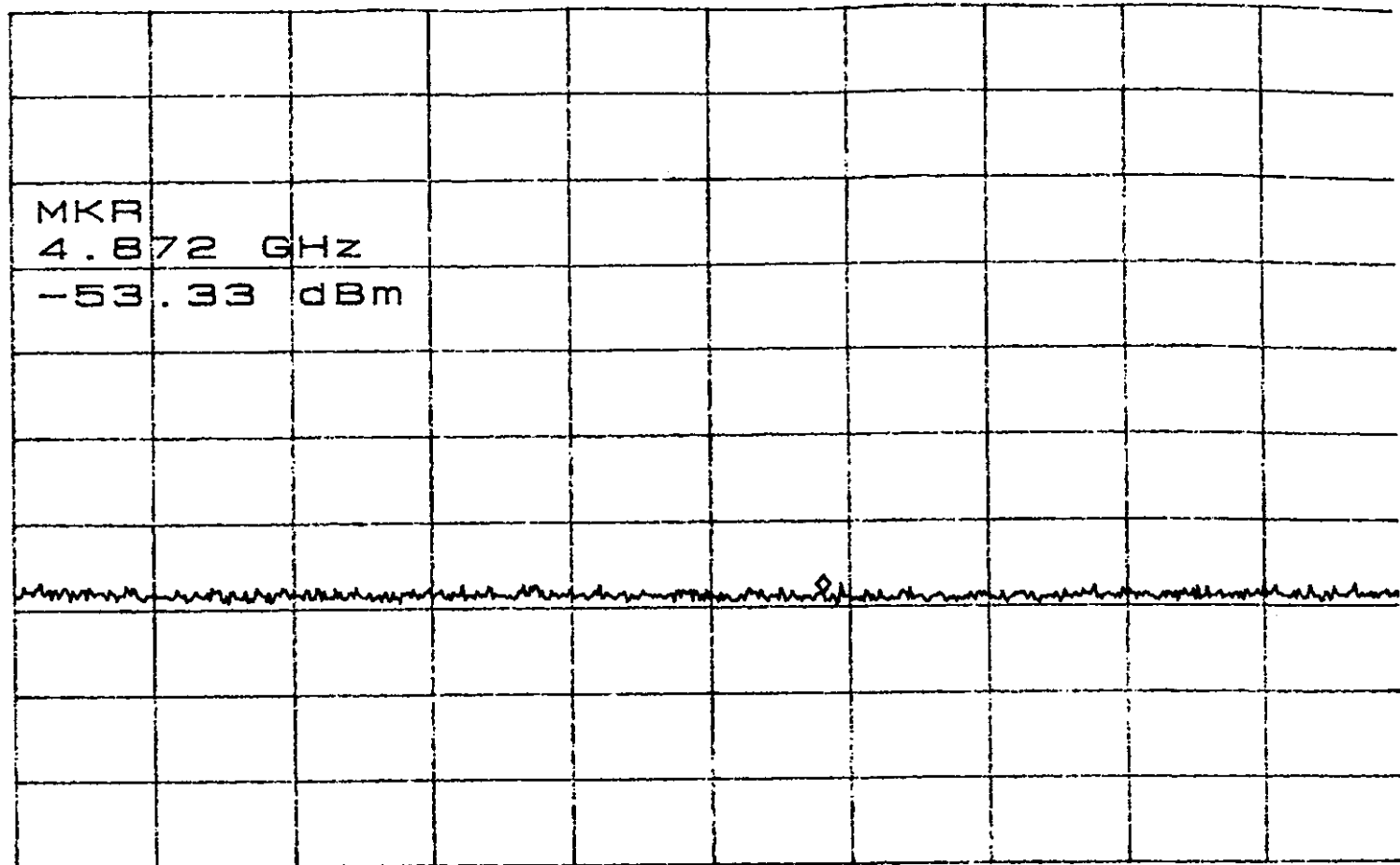
ATTEN 30dB
RL 15.0dBm

10dB/

MKR 4.872GHz
4.872GHz

0
MKR
4.872 GHz
-53.33 dBm

dB



START 2.900GHz STOP 6.300GHz
*RBW 100kHz VBW 100kHz SWP 900ms

ATTEN 30dB
RL 15.0dBm

10dB/

MKR 6.7240GHz
-44.50dBm

D

R

MKR
6.7240 GHz
-44.50 dBm

START 6.3000GHz

STOP 6.9000GHz

*RBW 100kHz

VBW 100kHz

SWP 200ms

RL 15.0dBm

10dB/

11.343GHz

D
R

MKR
11.343 GHz
-47.50 dBm

START 6.900GHz

STOP 13.000GHz

*RBW 100kHz

VBW 100kHz

SWP 2.0sec

ATTEN 50dB

MKR -41.83dBm

RL 15.0dBm

10dB/

14.589GHz

D

R

MKR
14.589 GHz
-41.83 dBm

START 13.000GHz

STOP 19.400GHz

*RBW 100kHz

VBW 100kHz

SWP 2.0sec

ATTEN 30dB

MKR -37.67dBm

RL 15.0dBm

10dB/

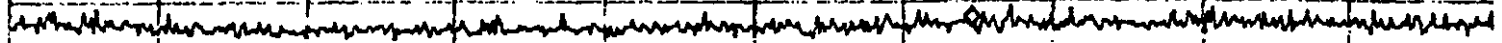
21.077GHz

D

MKR

21.077 GHz

-37.67 dBm



START 19.400GHz

STOP 22.000GHz

*RBW 100kHz

*VBW 100kHz

SWP 700ms