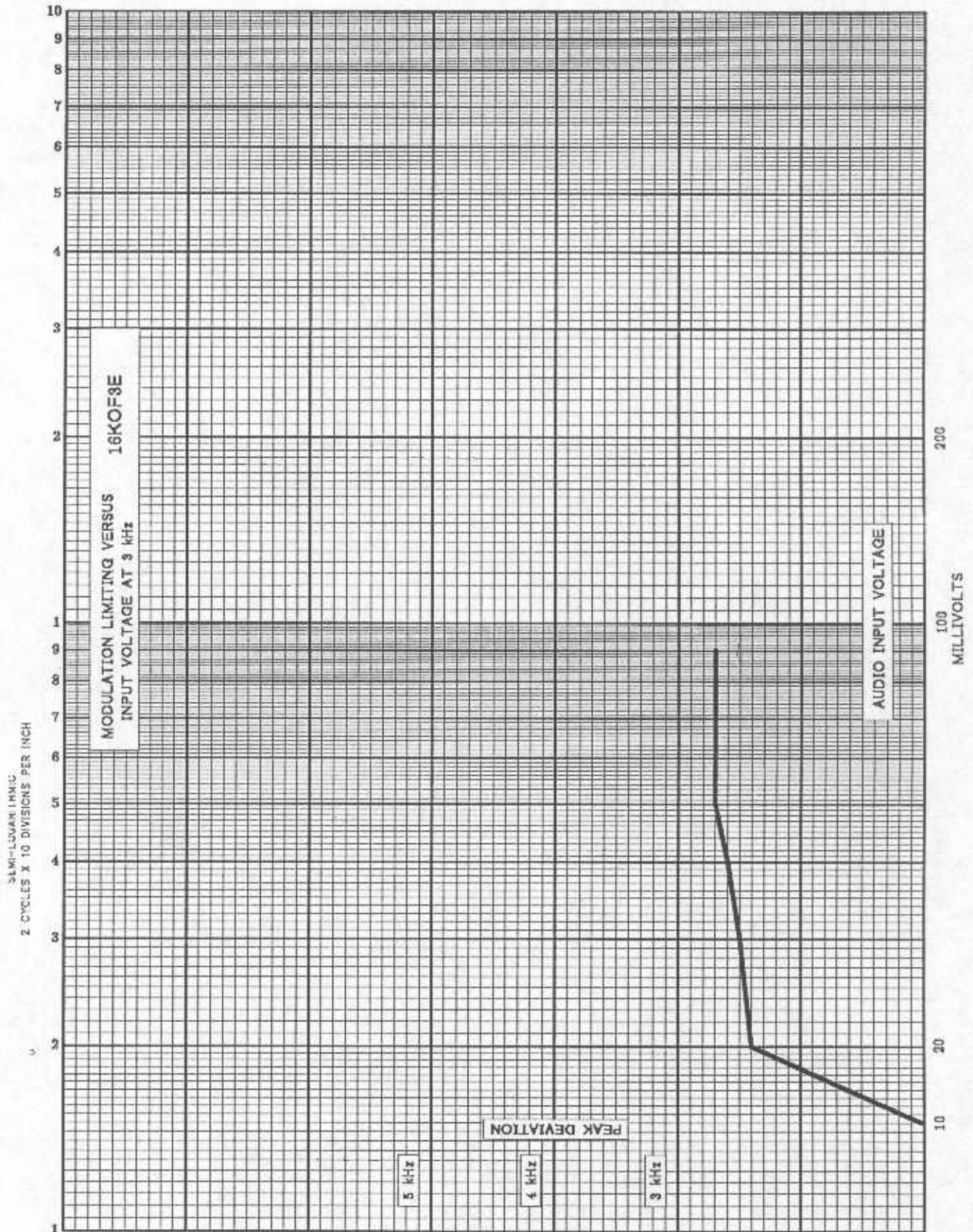


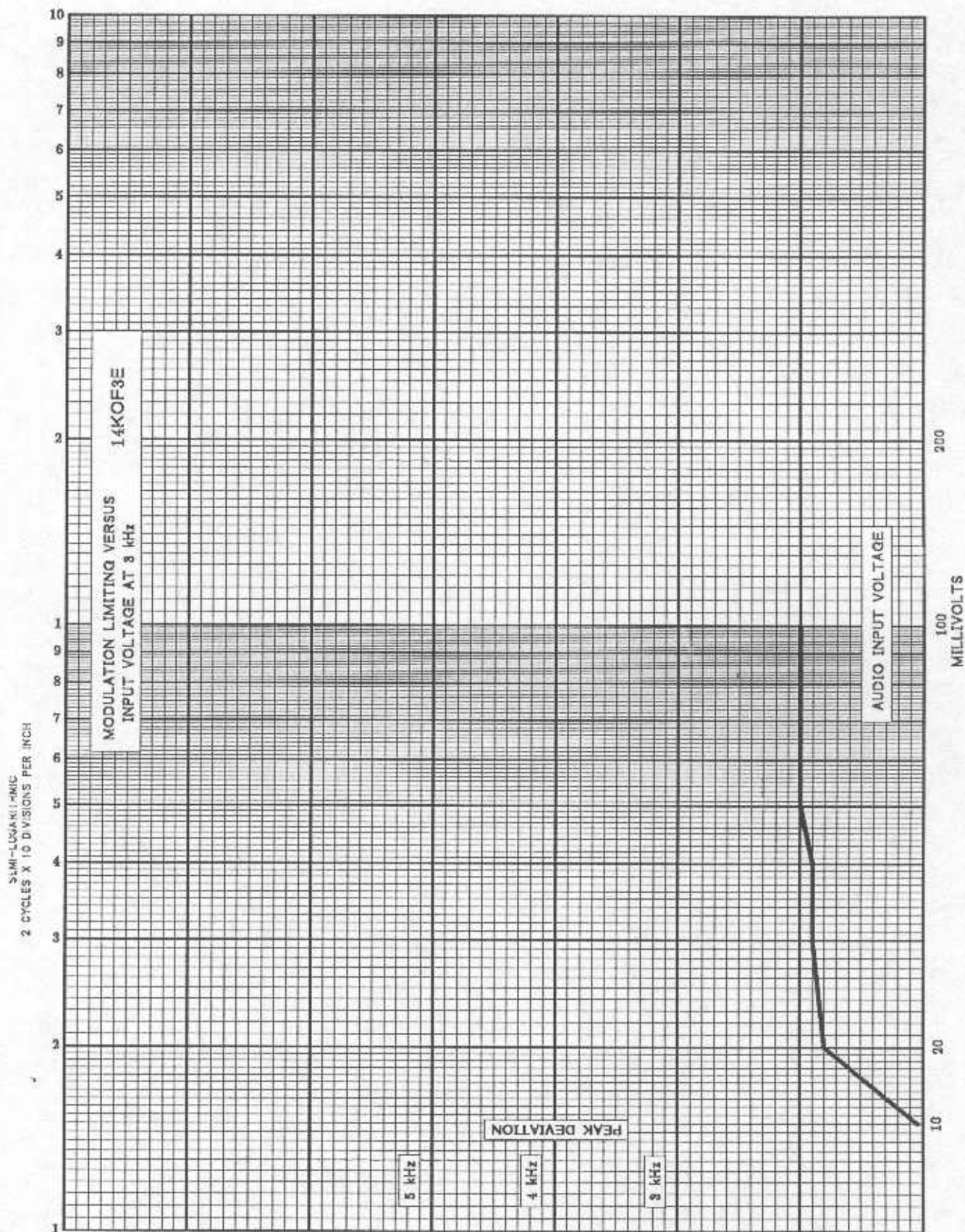


MODULATION LIMITING (3 kHz) 16KOF3E

NAME OF TEST: Percentage Modulation Versus Input Voltage at 3 kHz

14KOF3E

TEST DATA:	Input Voltage (mV)	Deviation (kHz)
	10	1.0
	20	1.8
	30	1.9
	40	1.9
	50	2.0
	60	2.0
	70	2.0
	80	2.0
	90	2.0
	100	2.0



MODULATION LIMITING (3 kHz) 14KOF3E

NAME OF TEST: Transmitter Occupied Bandwidth 75 Watts

RULE PART NO.: 2.989 (c) (1)

MINIMUM STANDARD: Sidebands and Spurious From 10 kHz thru 20 kHz down 25 dB minimum. From 20 kHz thru 50 kHz down 35 dB minimum. Greater than 50 kHz down 64 dB minimum.

TEST RESULTS: Meets minimum standard - see data on the following pages).

TEST CONDITIONS: Prevailing room conditions
Multiple Voltage Switching Power Supply, Tectrol Inc. TC84S-1081

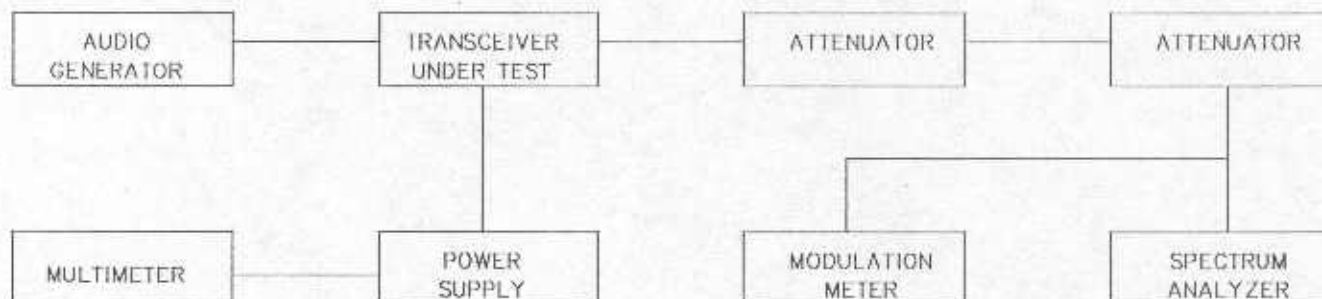
TEST EQUIPMENT:
Audio Generator, Model HP 8903A
Attenuator, Tenuline Model 8340-200
Attenuator, Tenuline Model 8323
Multimeter, Model 8012A Fluke
Spectrum Analyzer, Model HP 8563E
Power Supply, Tectrol Inc. TC84S-1081
Modulation Analyzer, Model HP 8901A

PERFORMED BY:

Roger P. Mann
Roger P. Mann

DATE: 6-10-94

TEST SET-UP:



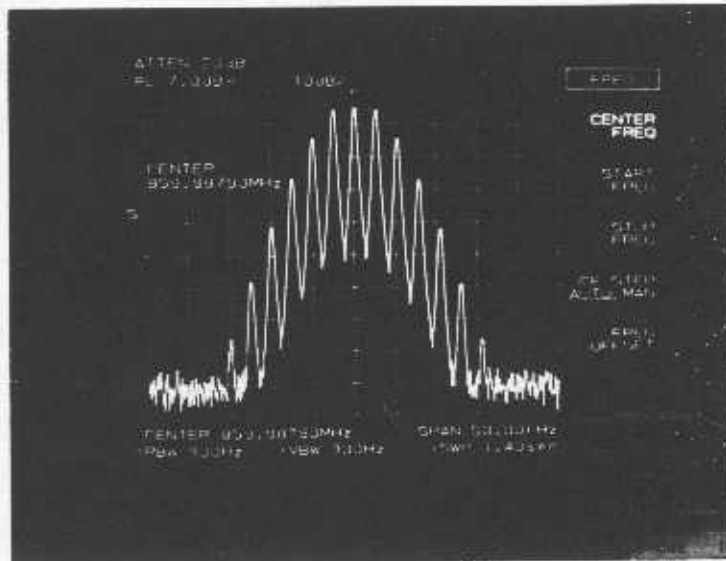
TEST SET-UP

NAME OF TEST:

Transmitter Occupied Bandwidth 75 Watts
(Continued) In Support of Emission Designator 16KOF3E

MEASUREMENTS:

1. Audio input adjusted for 16 dB greater than required for 50% of rated deviation.
2. Audio modulation frequency: 2,500 Hz
3. $F_o = 859.9875$ MHz.



0 dB Reference

Unmodulated Carrier = 0 dB
Horizontal = 5 kHz/Div.
Vertical = 10 dB/Div.
Bandwidth = .3 kHz
Scan Time = 1.4 Sec./Div.

The spectrum was checked to ± 60 kHz.

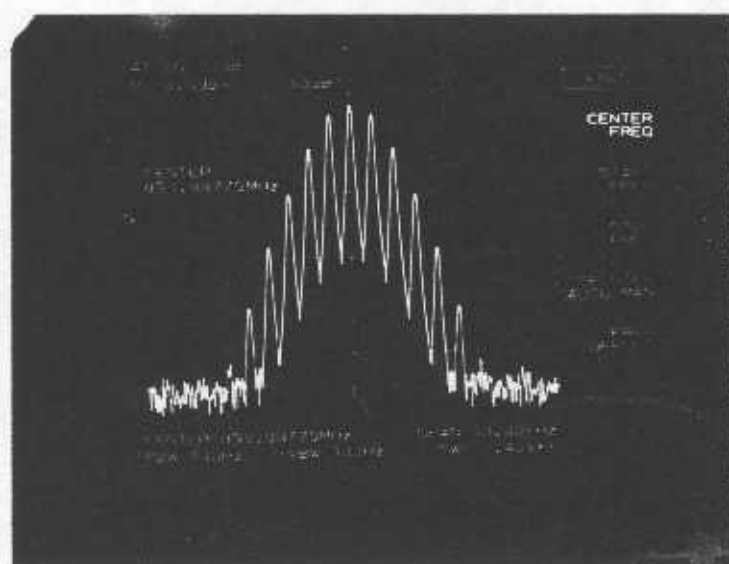
All other sidebands are less than -65 dBc.

NAME OF TEST:

Transmitter Occupied Bandwidth 75 Watts
(Continued) In Support of Emission Designator 14KOF3E

MEASUREMENTS:

1. Audio input adjusted for 16 dB greater than required for 50% of rated deviation.
2. Audio modulation frequency: 2,500 Hz
3. $F_0 = 859.9875$ MHz.



0 dB Reference

Unmodulated Carrier = 0 dB
Horizontal = 5 kHz/Div.
Vertical = 10 dB/Div.
Bandwidth = .3 kHz
Scan Time = 1.4 Sec./Div.

The spectrum was checked to ± 60 kHz.

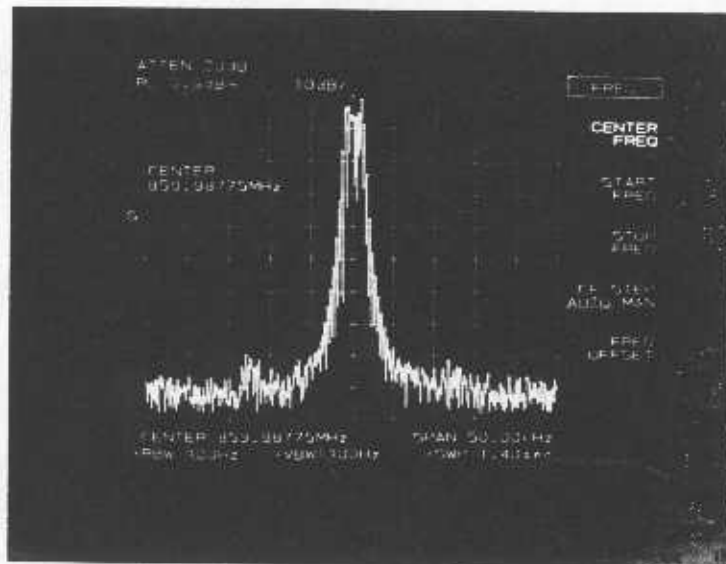
All other sidebands are less than -65 dBc.

NAME OF TEST:

Transmitter Occupied Bandwidth 75 watts
(Continued) In Support of Emission Designator 16K0F3D

MEASUREMENTS:

1. Internal subaudible data generator enabled,
data deviation set for 1 kHz deviation.
2. $F_o = 859.9875$ MHz.



0 dB Reference

Unmodulated Carrier = 0 dB
Horizontal = 5 kHz/Div.
Vertical = 10 dB/Div.
Bandwidth = .3 kHz
Scan Time = 1.4 Sec./Div.

The spectrum was checked to +/-60 kHz.

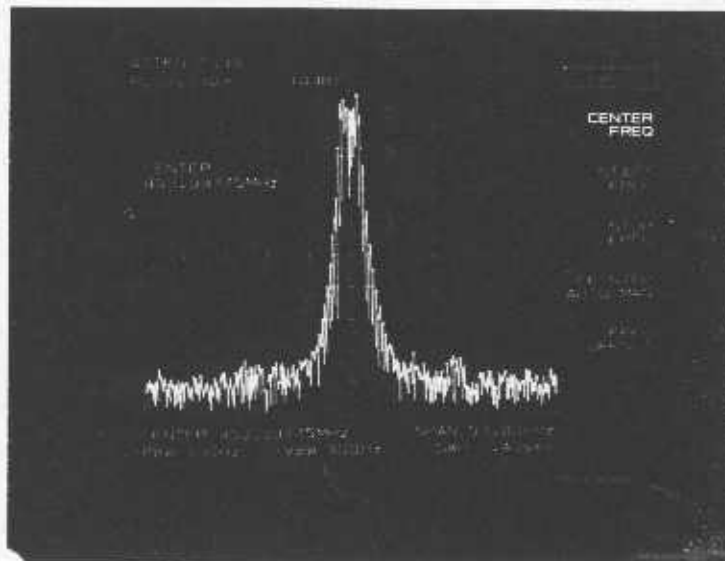
All other sidebands are less than -65 dBc.

NAME OF TEST:

Transmitter Occupied Bandwidth 75 watts
(Continued) In Support of Emission Designator 14K0F3D

MEASUREMENTS:

1. Internal subaudible data generator enabled,
data deviation set for 1 khz deviation.
2. $F_o = 859.9875$ MHz.



0 dB Reference

Unmodulated Carrier = 0 dB
Horizontal = 5 kHz/Div.
Vertical = 10 dB/Div.
Bandwidth = .3 kHz
Scan Time = 1.4 Sec./Div.

The spectrum was checked to ± 60 kHz.

All other sidebands are less than -65 dBc.

NAME OF TEST: Transmitter Occupied Bandwidth 175 Watts

RULE PART NO.: 2.989 (c) (1)

MINIMUM STANDARD: Sidebands and Spurious From 10 kHz thru 20 kHz down 25 dB minimum. From 20 kHz thru 50 kHz down 35 dB minimum. Greater than 50 kHz down 64 dB minimum.

TEST RESULTS: Meets minimum standard - see data on the following pages).

TEST CONDITIONS: Prevailing room conditions
Multiple Voltage Switching Power Supply, Tectrol Inc. TC84S-1081

TEST EQUIPMENT:

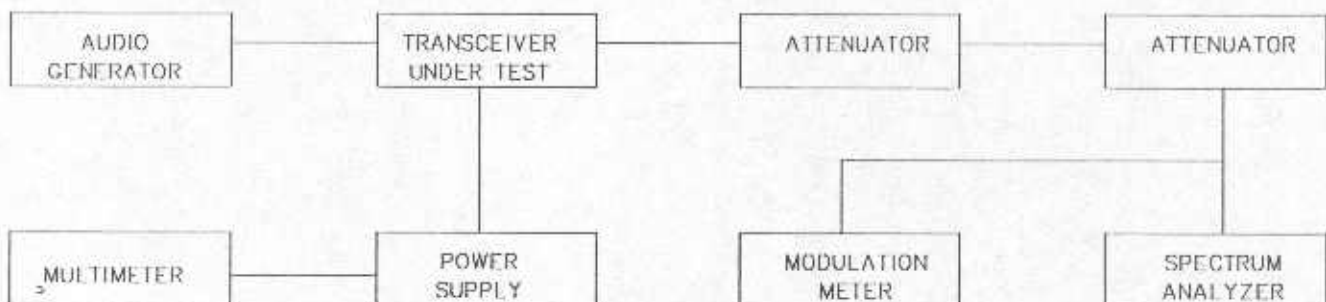
Audio Generator, Model HP 8903A
Attenuator, Tenuline Model 8340-200
Attenuator, Tenuline Model 8323
Multimeter, Model 8012A Fluke
Spectrum Analyzer, Model HP 8563E
Power Supply, Tectrol Inc. TC84S-1081
Modulation Analyzer, Model HP 8901A

PERFORMED BY:

Roger P. Mann

Roger P. Mann DATE: 6-10-94

TEST SET-UP:



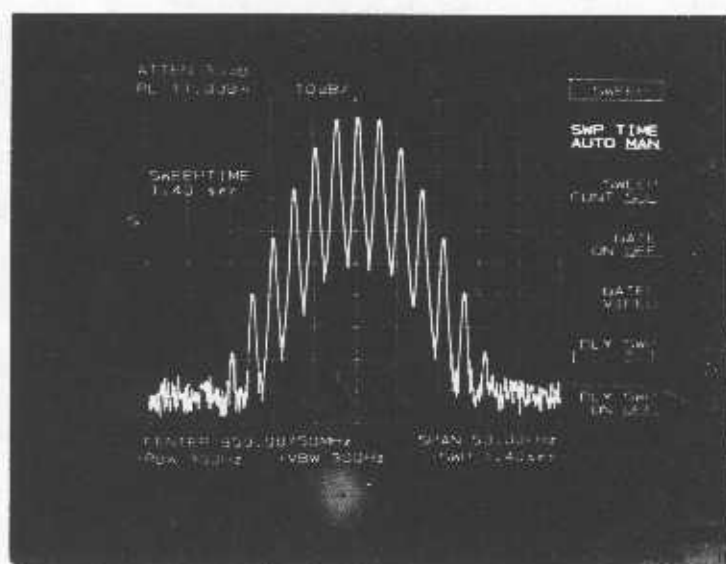
TEST SET-UP

NAME OF TEST:

Transmitter Occupied Bandwidth 175 Watts
(Continued) In Support of Emission Designator 16KOF3E

MEASUREMENTS:

1. Audio input adjusted for 16 dB greater than required for 50% of rated deviation.
2. Audio modulation frequency: 2,500 Hz
3. $F_o = 859.9875$ MHz.



0 dB Reference

Unmodulated Carrier = 0 dB
Horizontal = 5 kHz/Div.
Vertical = 10 dB/Div.
Bandwidth = .3 kHz
Scan Time = 1.4 Sec./Div.

The spectrum was checked to ± 60 kHz.

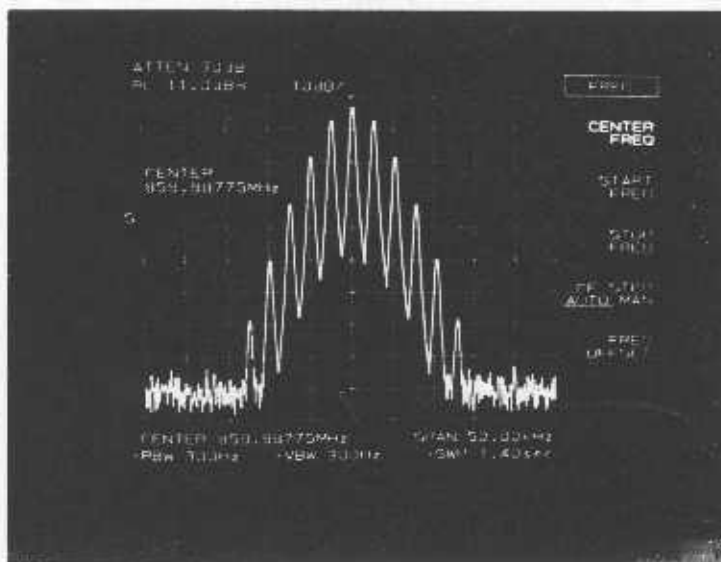
All other sidebands are less than -65 dBc.

NAME OF TEST:

Transmitter Occupied Bandwidth 175 Watts
(Continued) In Support of Emission Designator 14KOF3E

MEASUREMENTS:

1. Audio input adjusted for 16 dB greater than required for 50% of rated deviation.
2. Audio modulation frequency: 2,500 Hz
3. $F_o = 859.9875$ MHz.



The spectrum was checked to ± 60 kHz.

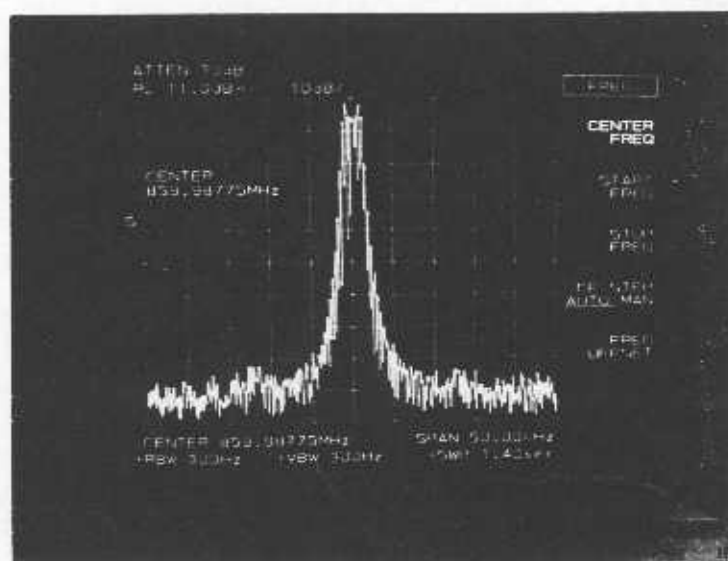
All other sidebands are less than -65 dBc.

NAME OF TEST:

Transmitter Occupied Bandwidth 175 watts
(Continued) In Support of Emission Designator 16K0F3D

MEASUREMENTS:

1. Internal subaudible data generator enabled,
data deviation set for 1 khz deviation.
2. $F_o = 859.9875$ MHz.



0 dB Reference

Unmodulated Carrier = 0 dB
Horizontal = 5 kHz/Div.
Vertical = 10 dB/Div.
Bandwidth = .3 kHz
Scan Time = 1.4 Sec./Div.

The spectrum was checked to ± 60 kHz.

All other sidebands are less than -65 dBc.

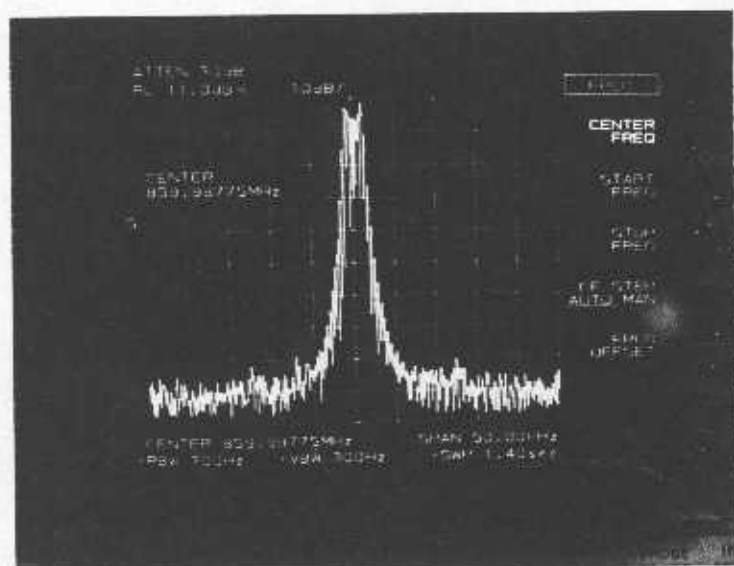
NAME OF TEST:

Transmitter Occupied Bandwidth 175 watts
(Continued) In Support of Emission Designator 14K0F3D

MEASUREMENTS:

1. Internal subaudible data generator enabled,
data deviation set for 1 kHz deviation.

2. $F_o = 859.9875 \text{ MHz}$.



0 dB Reference

Unmodulated Carrier = 0 dB

Horizontal = 5 kHz/Div.

Vertical = 10 dB/Div.

Bandwidth = .3 kHz

Scan Time = 1.4 Sec./Div.

The spectrum was checked to $\pm 60 \text{ kHz}$.

All other sidebands are less than -65 dBc .

NAME OF TEST: Transmitter Occupied Bandwidth 75 Watts
LTR Data Interface Modem as Modulation Source
In Support of Emission Designator 16K0F1D

RULE PART NUMBER: 2.989(h), 90.209(b)(4), 90.209(c), and 90.209(g)

MINIMUM STANDARD: Sidebands and Spurious [Rule 90.209(g), P=75 Watts]

Greater than 5kHz up to and including 10 kHz Down 83 Log (f/5) db
greater than 10 kHz up to and including 250% of the authorized
bandwidth: At least 116 Log (f/6.1) db or 50 + 10 Log (P)
or 70 dB whichever is lesser attenuation.

greater than 5kHz to 10 kHz:	Down	83 Log (f/5) db
greater than 10 kHz to 21.7 kHz:	Down	116 Log (f/6.1) db
greater than 21.7 to 50 kHz:	Down	50 + 10 Log P minimum
Greater than 50 kHz:	Down	43 + 10 Log P minimum

TEST RESULTS: Meets minimum standard. See test results on following page.

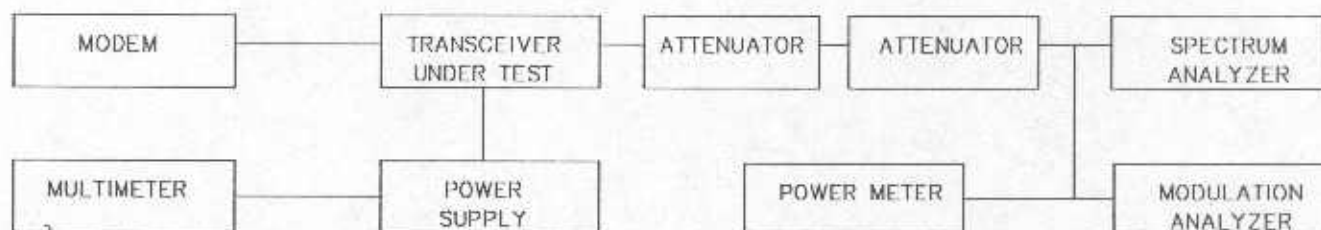
TEST EQUIPMENT:

Audio Generator, Model HP 8903A
Attenuator, Tenuline Model 8340-200
Attenuator, Tenuline Model 8323
Multimeter, Model 8012A Fluke
Spectrum Analyzer, Model HP 8563E
Power Supply, Tectrol Inc. TC84S-1081
Modulation Source, E.F. Johnson LTR Data Modem
Modulation Analyzer, Model HP 8901A

PERFORMED BY:

Roger P. Mann DATE: 6-13-94
Roger P. Mann

TEST SETUP:



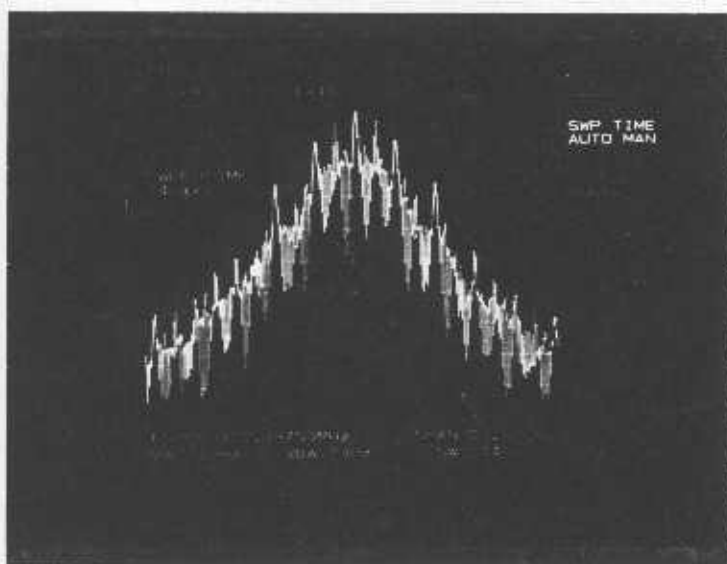
TEST SET-UP

NAME OF TEST:

Transmitter Occupied Bandwidth 75 Watts
LTR Data Interface Modem as modulation source
In Support of Emission Designator 16K0F1D

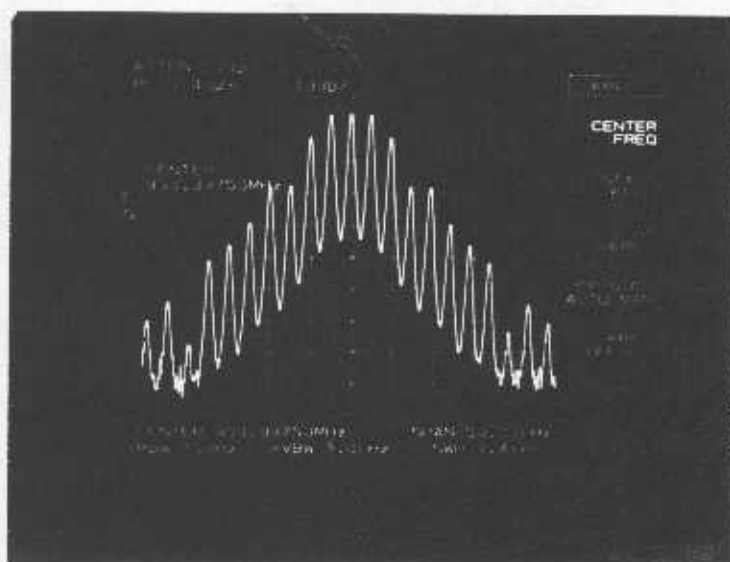
MEASUREMENTS TAKEN:

1. Subaudible supervisory signaling data generator adjusted for 1kHz deviation.
2. Data modulation level adjusted for peak total deviation (high speed data plus subaudible supervisory data) of 4 kHz.
3. $F_o = 859.9875$ MHz
4. Two conditions recorded to cover range of operating conditions [per section 2.989(h)]:
 - a. Representative high speed (4848 baud) data stream generated by modem alphabetic sequence).
 - b. "Dotting pattern" consisting of alternating 0's and 1's, Manchester encoded (looks like 2424 Hz tone).



Case I: High Speed Data

Unmodulated Carrier Reference 0 db.
Vertical: 10 db/division
Horizontal: 5 kHz/division
Video Filter: 10 kHz
All other sidebands < -70 db



Case II: Dotting Pattern

Unmodulated Carrier Reference 0 db
Vertical: 10 db/division
Horizontal: 5 kHz/division
Video Filter: 10 kHz
All other sidebands < -70db

NAME OF TEST: Transmitter Occupied Bandwidth 75 Watts
LTR Data Interface Modem as Modulation Source
In Support of Emission Designator 14K0F1D

RULE PART NUMBER: 2.989(h), 90.209(b)(4), 90.209(c), and 90.209(i)

MINIMUM STANDARD Sidebands and Spurious [Rule 90.209(i), P=75 Watts]

> 4 kHz or less	0 dB
> 4 kHz up to and including 8.5 kHz:	Down 107 Log (f/4)db
> 8.5 kHz up to and including 15 kHz:	Down 40.5 Log (f/1.16)db
> 15 kHz up to and including 25 kHz:	Down 116 Log (f/6.1)db
Greater than 25 kHz:	Down 43 + 10 Log P or 80 dB whichever is lesser attenuation

TEST RESULTS: Meets minimum standard. See test results on following page

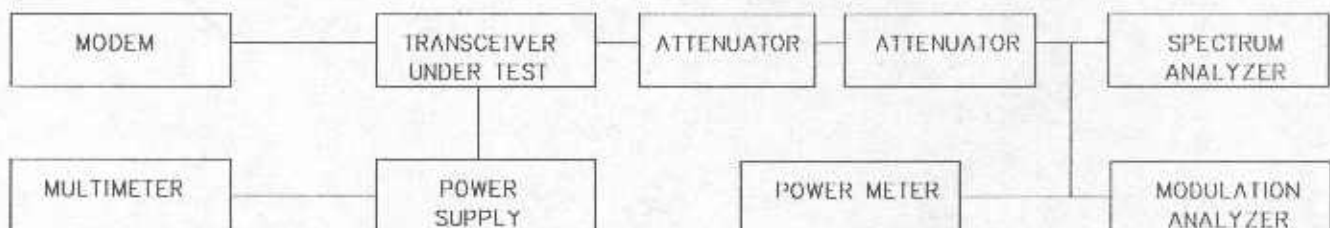
TEST EQUIPMENT:

- Audio Generator, Model HP 8903A
- Attenuator, Tenuline Model 8340-200
- Attenuator, Tenuline Model 8323
- Multimeter, Model 8012A Fluke
- Spectrum Analyzer, Model HP 8563E
- Power Supply, Tectrol Inc. TC84S-1081
- Modulation Source, E.F. Johnson LTR Data Modem
- Modulation Analyzer, Model HP 8901A

PERFORMED BY:

Roger P. Mann DATE: 6-13-94
Roger P. Mann

TEST SETUP:



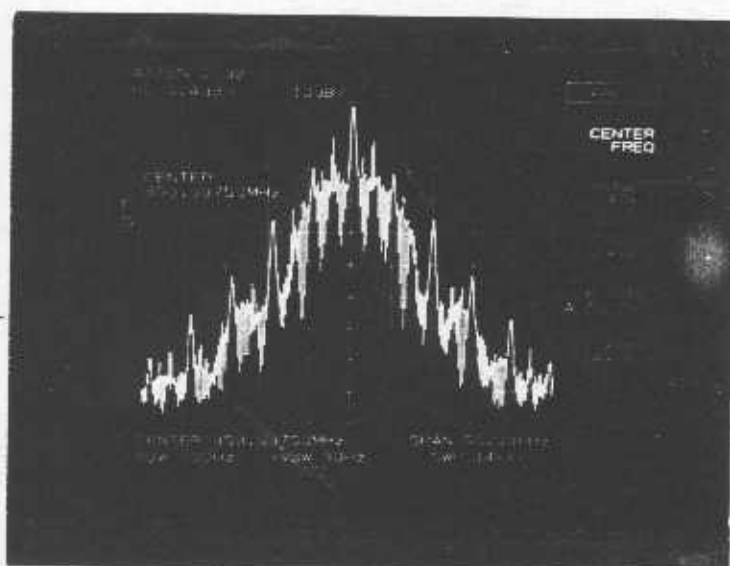
TEST SET-UP

NAME OF TEST:

Transmitter Occupied Bandwidth 75 Watts
LTR Data Interface Modem as modulation source
In Support of Emission Designator 14K0F1D

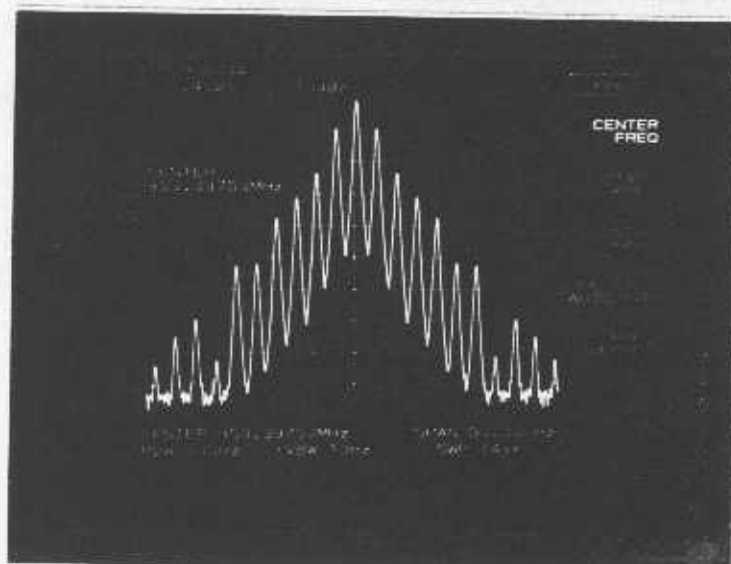
MEASUREMENTS TAKEN:

1. Subaudible supervisory signaling data generator adjusted for 1kHz deviation.
2. Data modulation level adjusted for peak total deviation (high speed data plus subaudible supervisory data) of 2 kHz.
3. $F_o = 859.9875$ MHz
4. Two conditions recorded to cover range of operating conditions [per section 2.989(h)]:
 - a. Representative high speed (4848 baud) data stream generated by modem alphabetic sequence).
 - b. "Dotting pattern" consisting of alternating 0's and 1's, Manchester encoded (looks like 2424 Hz tone).



Case I: High Speed Data

Unmodulated Carrier Reference 0 db.
Vertical: 10 db/division
Horizontal: 5 kHz/division
Video Filter: 10 kHz
All other sidebands < -70 db



Case II: Dotting Pattern

Unmodulated Carrier Reference 0 db
Vertical: 10 db/division
Horizontal: 5 kHz/division
Video Filter: 10 kHz
All other sidebands < -70db

NAME OF TEST: Transmitter Occupied Bandwidth 175 Watts
LTR Data Interface Modem as Modulation Source
In Support of Emission Designator 16K0F1D

RULE PART NUMBER: 2.989(h), 90.209(b)(4), 90.209(c), and 90.209(g)

MINIMUM STANDARD Sidebands and Spurious [Rule 90.209(g), P=175 Watts]

Greater than 5kHz up to and including 10 kHz Down 83 Log (f/5) db
greater than 10 kHz up to and including 250% of the authorized
bandwidth: At least 116 Log (f/6.1) db or 50 + 10 Log (P)
or 70 dB whichever is lesser attenuation.

greater than 5kHz to 10 kHz:	Down	83 Log (f/5) db
greater than 10 kHz to 24.2 kHz:	Down	116 Log (f/6.1) db
greater than 24.2 to 50 kHz:	Down	50 + 10 Log P minimum
Greater than 50 kHz:	Down	43 + 10 Log P minimum

TEST RESULTS: Meets minimum standard. See test results on following page.

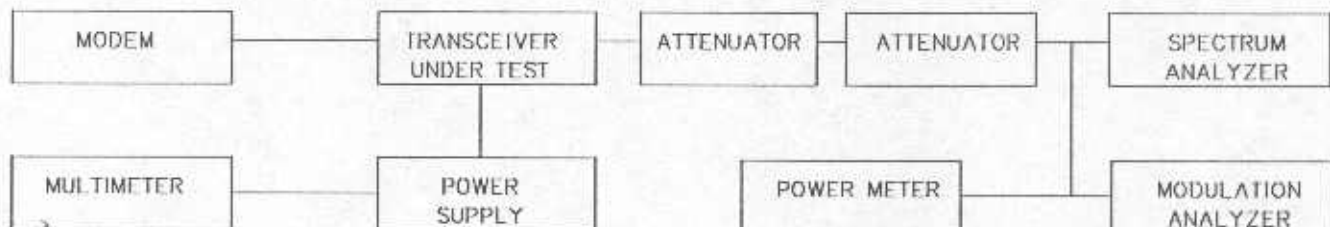
TEST EQUIPMENT:

Audio Generator, Model HP 8903A
Attenuator, Tenuline Model 8340-200
Attenuator, Tenuline Model 8323
Multimeter, Model 8012A Fluke
Spectrum Analyzer, Model HP 8563E
Power Supply, Tectrol Inc. TC84S-1081
Modulation Source, E.F. Johnson LTR Data Modem
Modulation Analyzer, Model HP 8901A

PERFORMED BY:

Roger P. Mann DATE: 6-13-94
Roger P. Mann

TEST SETUP:



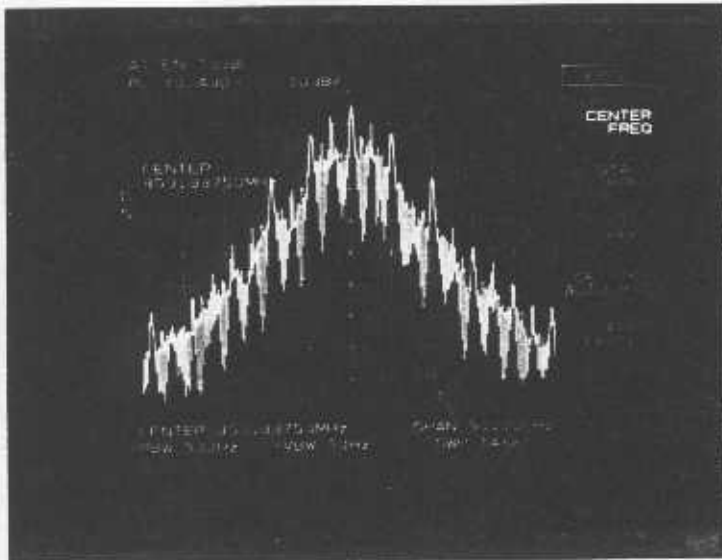
TEST SET-UP

NAME OF TEST:

Transmitter Occupied Bandwidth 175 Watts
LTR Data Interface Modem as modulation source
In Support of Emission Designator 16K0F1D

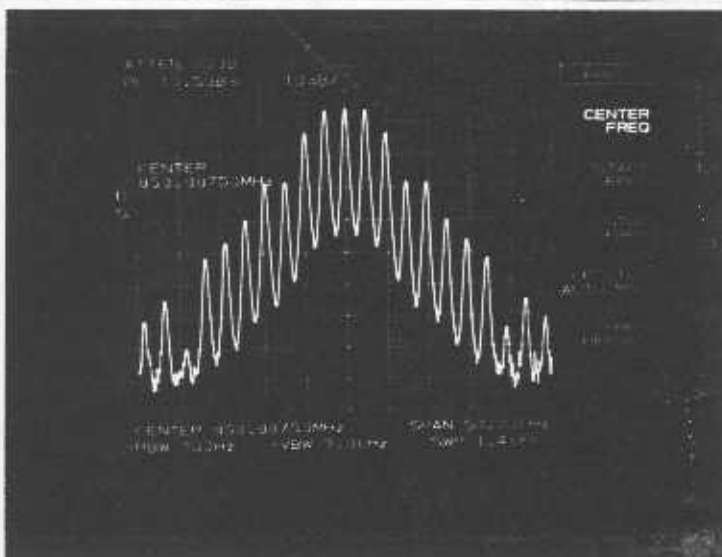
MEASUREMENTS TAKEN:

1. Subaudible supervisory signaling data generator adjusted for 1kHz deviation.
2. Data modulation level adjusted for peak total deviation (high speed data plus subaudible supervisory data) of 4 kHz.
3. $F_o = 859.9875$ MHz
4. Two conditions recorded to cover range of operating conditions [per section 2.989(h)]:
 - a. Representative high speed (4848 baud) data stream generated by modem alphabetic sequence).
 - b. "Dotting pattern" consisting of alternating 0's and 1's, Manchester encoded (looks like 2424 Hz tone).



Case I: High Speed Data

Unmodulated Carrier Reference 0 db.
Vertical: 10 db/division
Horizontal: 5 kHz/division
Video Filter: 10 kHz
All other sidebands < -70 db



Case II: Dotting Pattern

Unmodulated Carrier Reference 0 db
Vertical: 10 db/division
Horizontal: 5 kHz/division
Video Filter: 10 kHz
All other sidebands < -70db

NAME OF TEST: Transmitter Occupied Bandwidth 175 Watts
LTR Data Interface Modem as Modulation Source
In Support of Emission Designator 14K0F1D

RULE PART NUMBER: 2.989(h), 90.209(b)(4), 90.209(c), and 90.209(i)

MINIMUM STANDARD Sidebands and Spurious [Rule 90.209(i), P=175 Watts]

> 4 kHz or less	0 dB
> 4 kHz up to and including 8.5 kHz:	Down 107 Log (f/4)db
> 8.5 kHz up to and including 15 kHz:	Down 40.5 Log (f/1.16)db
> 15 kHz up to and including 25 kHz:	Down 116 Log (f/6.1)db
Greater than 25 kHz:	Down 43 + 10 Log P or 80 dB whichever is lesser attenuation

TEST RESULTS: Meets minimum standard. See test results on following page

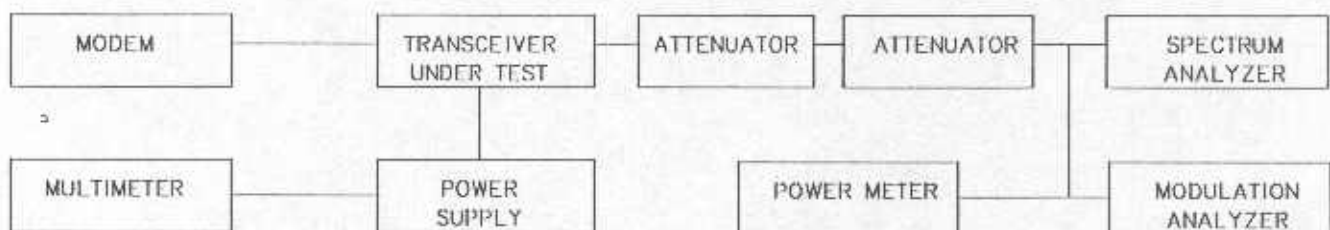
TEST EQUIPMENT:

Audio Generator, Model HP 8903A
Attenuator, Tenuline Model 8340-200
Attenuator, Tenuline Model 8323
Multimeter, Model 8012A Fluke
Spectrum Analyzer, Model HP 8563E
Power Supply, Tectrol Inc. TC84S-1081
Modulation Source, E.F. Johnson LTR Data Modem
Modulation Analyzer, Model HP 8901A

PERFORMED BY:

Roger P. Mann DATE: 6-13-94
Roger P. Mann

TEST SETUP:



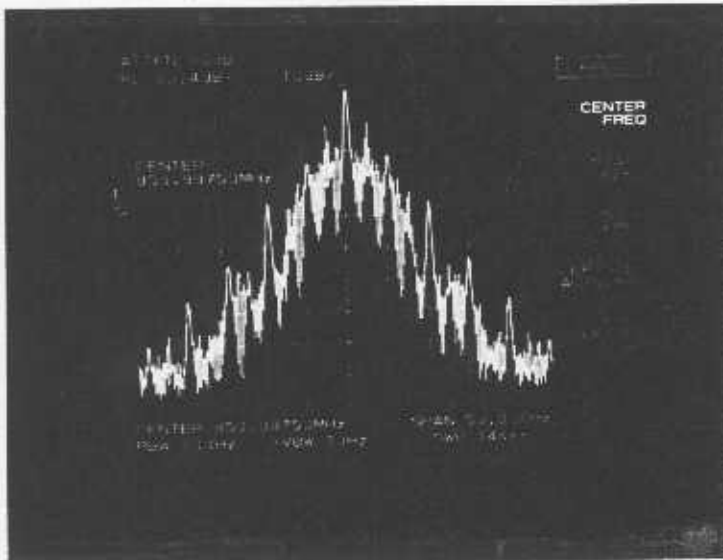
TEST SET-UP

NAME OF TEST:

Transmitter Occupied Bandwidth 175 Watts
LTR Data Interface Modem as modulation source
In Support of Emission Designator 14K0F1D

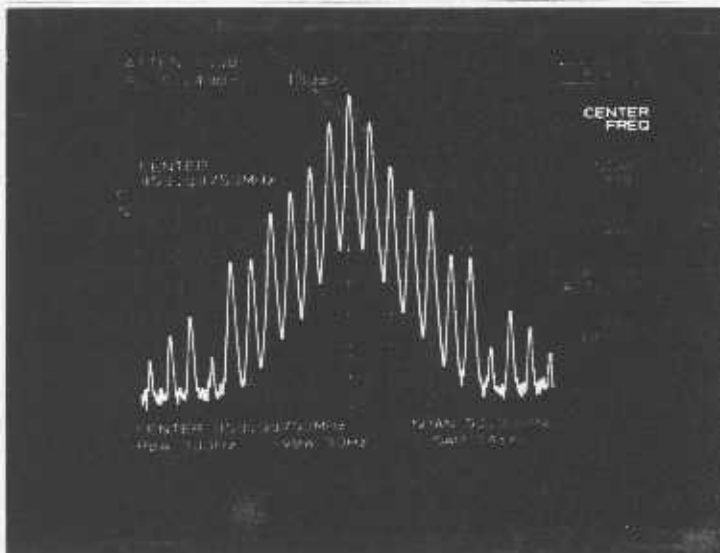
MEASUREMENTS TAKEN:

1. Subaudible supervisory signaling data generator adjusted for 1kHz deviation.
2. Data modulation level adjusted for peak total deviation (high speed data plus subaudible supervisory data) of 2 kHz.
3. $F_o = 859.9875 \text{ MHz}$
4. Two conditions recorded to cover range of operating conditions [per section 2.989(h)]:
 - a. Representative high speed (4848 baud) data stream generated by modem alphabetic sequence).
 - b. "Dotting pattern" consisting of alternating 0's and 1's, Manchester encoded (looks like 2424 Hz tone).



Case I: High Speed Data

Unmodulated Carrier Reference 0 db.
Vertical: 10 db/division
Horizontal: 5 kHz/division
Video Filter: 10 kHz
All other sidebands < -70 db



Case II: Dotting Pattern

Unmodulated Carrier Reference 0 db
Vertical: 10 db/division
Horizontal: 5 kHz/division
Video Filter: 10 kHz
All other sidebands < -70db

NAME OF TEST: Transmitter Spurious and Harmonic Outputs 75 Watts

RULE PART NO.: 2.991

MINIMUM STANDARD FOR 75 W: $43 + 10 \log_{10} (75W) = -61.8 \text{ dBc}$

TEST RESULTS: Meets minimum standard. See data.

TEST CONDITIONS: RF voltage measured at antenna terminals.
Prevailing room conditions, temperature 26 C

Multiple Voltage Switching Power Supply, Tectrol Inc.
TC84S-1081

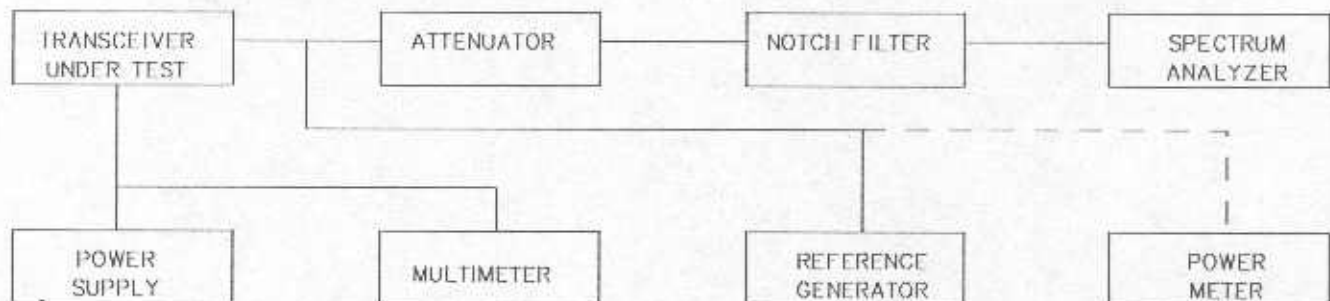
TEST EQUIPMENT:

Attenuator, Tenuline Model 8323
Multimeter, Model 8012A Fluke
Spectrum Analyzer, Model HP 8563E
Power Supply, Tectrol Inc. TC84S-1081
Power Meter, Model HP436A
Reference Generator, Model HP-8350A

PERFORMED BY:

Roger P. Mann DATE: 6-13-94
Roger P. Mann

TEST SET-UP:



TEST SET-UP

NAME OF TEST: Transmitter Spurious and Harmonic Outputs 75 Watts
(Continued)

1. The transmitter carrier output frequencies F_c is 859.9875 MHz. The reference oscillator frequency F_{osc} is 17.50 MHz.
2. After carrier reference was established on spectrum analyzer, the notch filter was adjusted to null the carrier F_c to extend the range of the spectrum analyzer for harmonic measurements.
3. At each spurious frequency a 0 dBm reference was established using a reference generator and power meter.
4. Spectrum was scanned to the tenth harmonic.

Test data on next page.

NAME OF TEST: Transmitter Spurious and Harmonic Outputs 75 Watts
(Continued)

MEASUREMENTS TAKEN:

Radio #FEP 8 75 Watts Transmitter spurious and harmonics

48.8 dBm

<u>Frequency</u>	<u>Relation</u>	<u>Level (dBm)</u>	<u>Level Relative to Carrier (dBc)</u>
1719.978500	2 fc	-70	-119
2579.996250	3 fc	-56	-105
3439.950000	4 fc	-75	<-124
4299.993750	5 fc	-62	-111
5159.992500	6 fc	-75	<-124
6019.912500	7 fc	-68	-117
6879.900000	8 fc	-51	-100
7739.887500	9 fc	-71	-120
8599.875000	10 fc	-67	-116

All other responses are less than -124 dBc.

NAME OF TEST: Transmitter Spurious and Harmonic Outputs 175 Watts

RULE PART NO.: 2.991

MINIMUM STANDARD FOR 175 W: $43 + 10 \log_{10} (175W) = -65.4 \text{ dBc}$

TEST RESULTS: Meets minimum standard. See data.

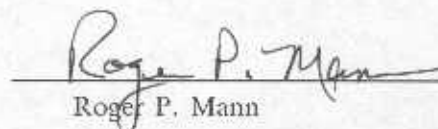
TEST CONDITIONS: RF voltage measured at antenna terminals.
Prevailing room conditions, temperature 26 C

Multiple Voltage Switching Power Supply, Tectrol Inc.
TC84S-1081

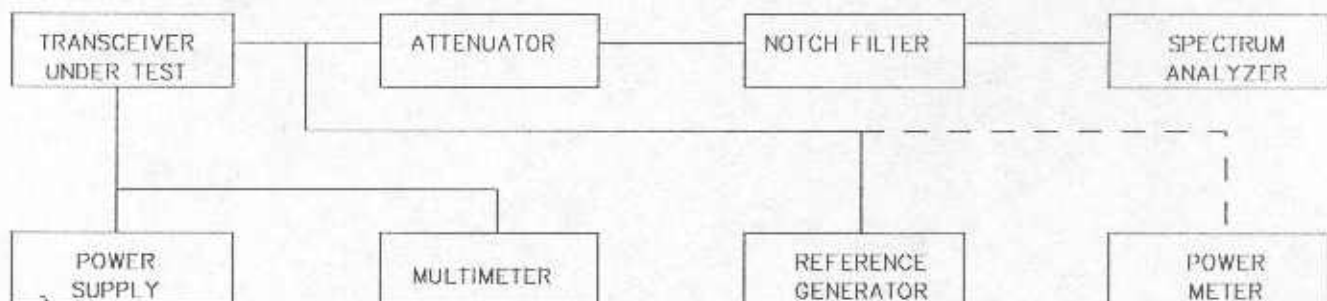
TEST EQUIPMENT:

Attenuator, Tenuline Model 8323
Multimeter, Model 8012A Fluke
Spectrum Analyzer, Model HP 8563E
Power Supply, Tectrol Inc. TC84S-1081
Power Meter, Model HP436A
Reference Generator, Model HP-8350A

PERFORMED BY:

 DATE: 6-13-94
Roger P. Mann

TEST SET-UP:



TEST SET-UP

NAME OF TEST: Transmitter Spurious and Harmonic Outputs 175 Watts
(Continued)

1. The transmitter carrier output frequencies F_c is 859.9875 MHz. The reference oscillator frequency F_{osc} is 17.50 MHz.
2. After carrier reference was established on spectrum analyzer, the notch filter was adjusted to null the carrier F_c to extend the range of the spectrum analyzer for harmonic measurements.
3. At each spurious frequency a 0 dBm reference was established using a reference generator and power meter.
4. Spectrum was scanned to the tenth harmonic.

Test data on next page.

NAME OF TEST: Transmitter Spurious and Harmonic Outputs 175 Watts
(Continued)

MEASUREMENTS TAKEN:

Radio #8 175 Watts Transmitter spurious and harmonics

52.4 dBm

<u>Frequency</u>	<u>Relation</u>	<u>Level (dBm)</u>	<u>Level Relative to Carrier (dBc)</u>
1719.978500	2 fc	-61	-113
2579.996250	3 fc	-46	-98
3439.950000	4 fc	-72	-124
4299.993750	5 fc	-62	-114
5159.992500	6 fc	-67	-119
6019.912500	7 fc	-64	-116
6879.900000	8 fc	-54	-106
7739.887500	9 fc	-68	-120
8599.875000	10 fc	-59	-111

All other responses are less than -124 dBc.

NAME OF TEST: Spurious Radiation Attenuation 75 Watts

RULE PART NUMBER: 2.993

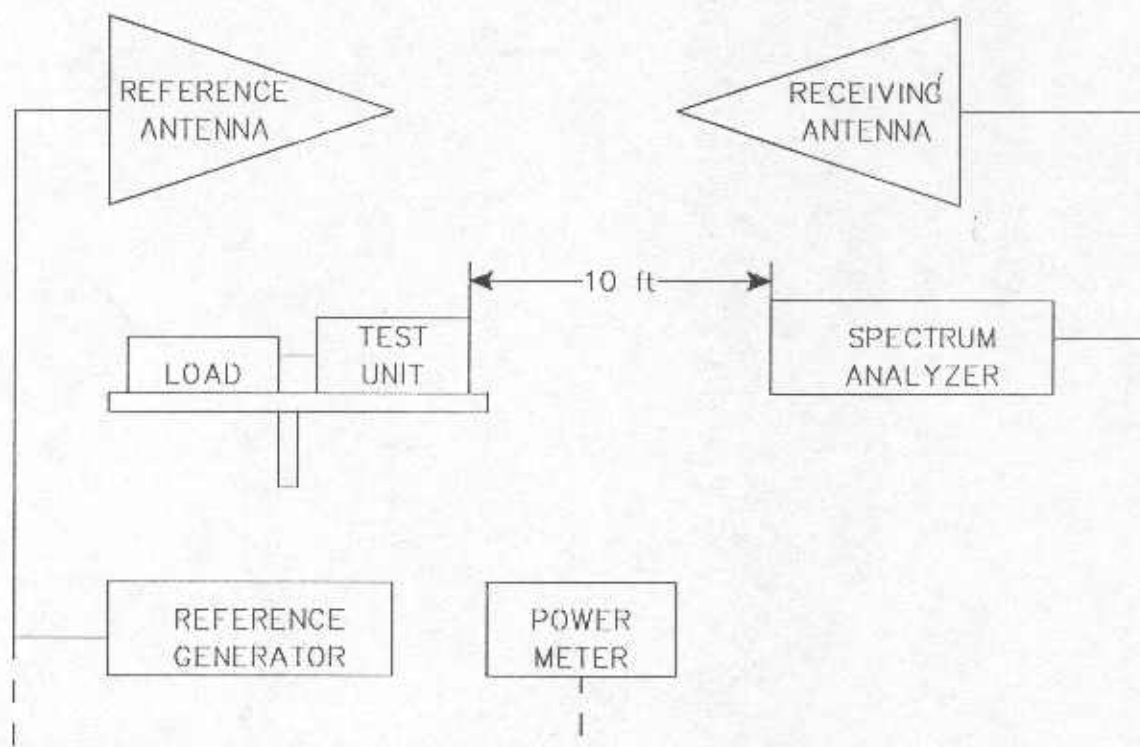
MINIMUM STANDARD: $(43 + 10 \log_{10} P_o)$, P_o at 75W
 $43 + 10 \log_{10} 75 = 43 + 18.8 = 61.8 \text{ dB}$

TEST RESULTS: Meets minimum standard, see data.

TEST CONDITIONS: Standard

TEST EQUIPMENT: Dipole Antenna Kits, Model KT-105D
 Log Spiral Antenna, Model 93491-2
 Log Periodic Antenna, Model LPA-112
 Reference Generator, Model HP-8350B
 Power Meter, Model HP-436A
 Load, Lucas Weinschel 40-10-33
 Spectrum Analyzer, Model HP 8563E
 Power Supply, Tectrol Inc. TC84S-1081

TEST SET-UP:



TEST SET-UP

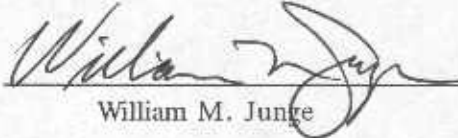
NAME OF TEST:

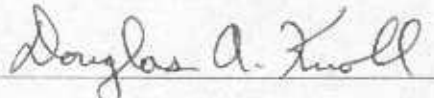
Spurious Radiation Attenuation 75 Watts
(Continued)

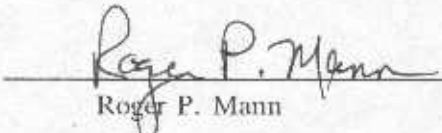
TEST PROCEDURE:

Radiated spurious attenuation was measured according to
TIA/EIA Standard 603 Section 2.2.12

TEST PERFORMED BY:

 DATE: 6-6-94
William M. Junge

 DATE: 6-6-94
Douglas A. Knoll

 DATE: 6-6-94
Roger P. Mann

NAME OF TEST:

Spurious Radiation Attenuation 75 Watts
(Continued)
Raw Spurious Data

Carrier Frequency = 859.9875 MHz

Power Output = 75.0 Watts = 48.8 dBm

Spurious Frequency, MHz	Spurious Level dB	Reference Level dBm	Antenna Gain Referenced to A Dipole dB	Circular Polarization Correction dB	Spurious Attenuation dB	
1719.978500	-71	-36.0	1.2	3.0	-85.6	H
	-65	-28.0	1.2	3.0	-87.6	V
2579.996250	-77	-39.6	1.2	3.0	-88	H
	-73	-35.6	1.2	3.0	-88	V
3439.950000	-71	-35.0	1.2	3.0	-86.6	H
	-73	-38.0	1.2	3.0	-85.6	V
4299.993750	-81	-36.0	1.2	3.0	-95.6	H
	-79	-35.0	1.2	3.0	-94.6	V
5159.992500	-83	-42.0	1.2	3.0	-91.6	H
	-85	-43.0	1.2	3.0	-92.6	V
6019.912500	-95	-44.0	1.2	3.0	-101.6	H
	-98	-47.0	1.2	3.0	-101.6	V
6879.900000	-103	-52.0	1.1	3.0	-101.7	H
	-103	-46.0	1.1	3.0	-107.7	V

V = Vertical Polarization

H = Horizontal Polarization

NAME OF TEST:

Spurious Radiation Attenuation 75 Watts

(Continued)

Raw Spurious Data

Carrier Frequency = 859.9875 MHz

Power Output = 75.0 Watts = 48.8 dBm

Spurious Frequency, MHz	Spurious Level dB	Reference Level dBm	Antenna Gain Referenced to A Dipole dB	Circular Polarization Correction dB	Spurious Attenuation dB	
7739.887500	-98	-44.0	0.90	3.0	-104.9	H
	-103	-52.0	0.90	3.0	-101.9	V
8599.875000	-103	-41.0	0.50	3.0	-113.3	H
	-103	-47.0	0.50	3.0	-107.3	V

V = Vertical Polarization

H = Horizontal Polarization

NAME OF TEST: Spurious Radiation Attenuation 175 Watts

RULE PART NUMBER: 2.993

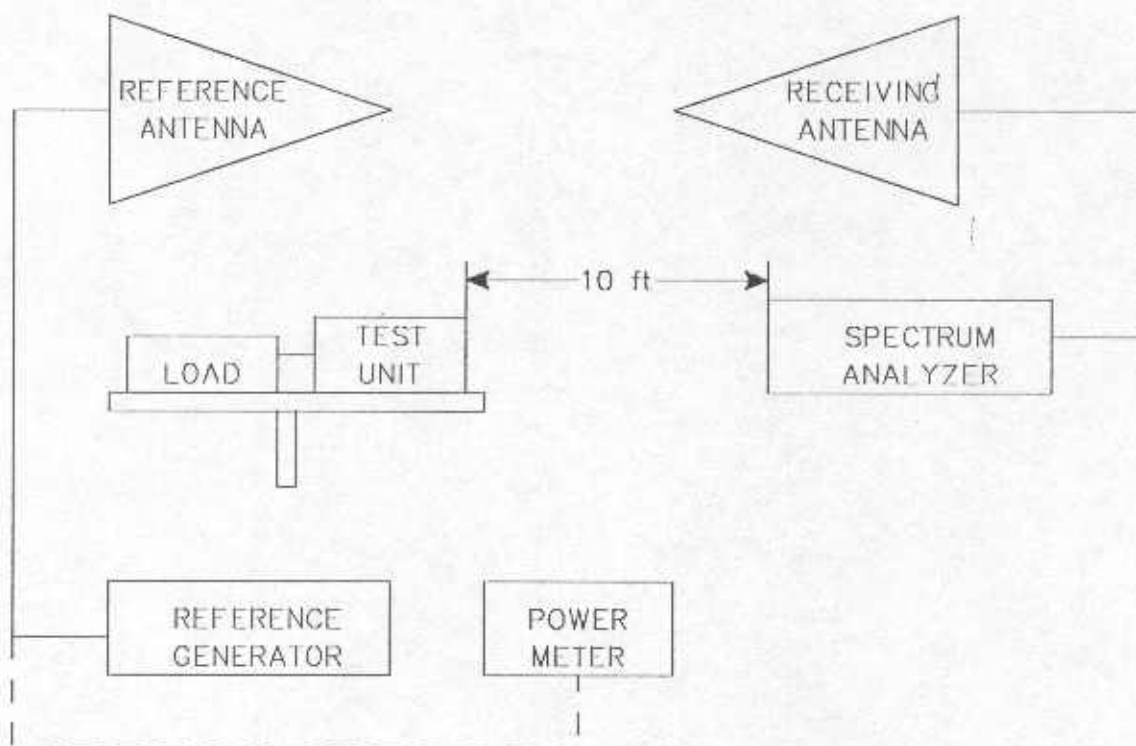
MINIMUM STANDARD: $(43 + 10 \log_{10} P_o)$, P_o at 175W
 $43 + 10 \log_{10} 175 = 43 + 22.4 = 65.4 \text{ dB}$

TEST RESULTS: Meets minimum standard, see data.

TEST CONDITIONS: Standard

TEST EQUIPMENT: Dipole Antenna Kits, Model KT-105D
 Log Spiral Antenna, Model 93491-2
 Log Periodic Antenna, Model LPA-112
 Reference Generator, Model HP-8350B
 Power Meter, Model HP-436A
 Load, Lucas Weinschel 40-10-33
 Spectrum Analyzer, Model HP 8563E
 Power Supply, Tectrol Inc. TC84S-1081

TEST SET-UP:



TEST SET-UP

NAME OF TEST:

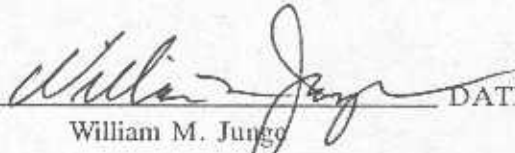
Spurious Radiation Attenuation 175 Watts
(Continued)

TEST PROCEDURE:

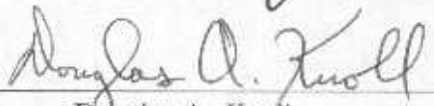
Radiated spurious attenuation was measured according to
TIA/EIA 603.

Measurements were made for both horizontal and vertical
antenna orientation. The spectrum was searched from 14
MHz to 10 GHz.

TEST PERFORMED BY:



William M. Jungo DATE: 6-6-94



Douglas A. Knoll DATE: 6-6-94



Roger P. Mann DATE: 6-6-94

NAME OF TEST:

Spurious Radiation Attenuation 175 Watts
(Continued)
Raw Spurious Data

Carrier Frequency = 859.9875 MHz

Power Output = 175.0 Watts = 52.4 dBm

Spurious Frequency, MHz	Spurious Level dB	Reference Level dBm	Antenna Gain Referenced to A Dipole dB	Circular Polarization Correction dB	Spurious Attenuation dB	
1719.975000	-69	-34.0	1.2	3.0	-89.2	H
	-69	-33.0	1.2	3.0	-90.2	V
2579.962500	-76	-39.0	1.2	3.0	-91.2	H
	-74	-37.0	1.2	3.0	-91.2	V
3439.950000	-72	-36.0	1.2	3.0	-90.2	H
	-74	-39.0	1.2	3.0	-89.2	V
4299.937500	-80	-36.0	1.2	3.0	-98.2	H
	-79	-35.0	1.2	3.0	-98.2	V
5159.925000	-81	-38.0	1.2	3.0	-97.2	H
	-81	-40.0	1.2	3.0	-95.2	V
6019.912500	-96	-47.0	1.2	3.0	-103.2	H
	-95	-46.0	1.2	3.0	-103.2	V
6879.900000	-103	-47.0	1.1	3.0	-110.3	H
	-103	-51.0	1.1	3.0	-106.3	V

V = Vertical Polarization

H = Horizontal Polarization

NAME OF TEST:

Spurious Radiation Attenuation 175 Watts
(Continued)
Raw Spurious Data

Carrier Frequency = 859.9875 MHz

Power Output = 175.0 Watts = 52.4 dBm

Spurious Frequency, MHz	Spurious Level dB	Reference Level dBm	Antenna Gain Referenced to A Dipole dB	Circular Polarization Correction dB	Spurious Attenuation dB
7739.887500	-95	-41.0	0.90	3.0	-108.5 H
	-99	-51.0	0.90	3.0	-102.5 V
8599.875000	-103	-45.0	0.50	3.0	-112.9 H
	-103	-44.0	0.50	3.0	-113.9 V

V = Vertical Polarization

H = Horizontal Polarization

CALCULATIONS:

Because the antennas used above 1 GHz were not flat in gain and differed from a dipole, the generator output was corrected for antenna gain at each spurious frequency. The power was measured directly at the reference antenna and therefore requires no coaxial cable loss correction. An additional 3 dB correction was made above 1 GHz to correct for the 3 dB polarization loss in the reference path.

EXAMPLE:

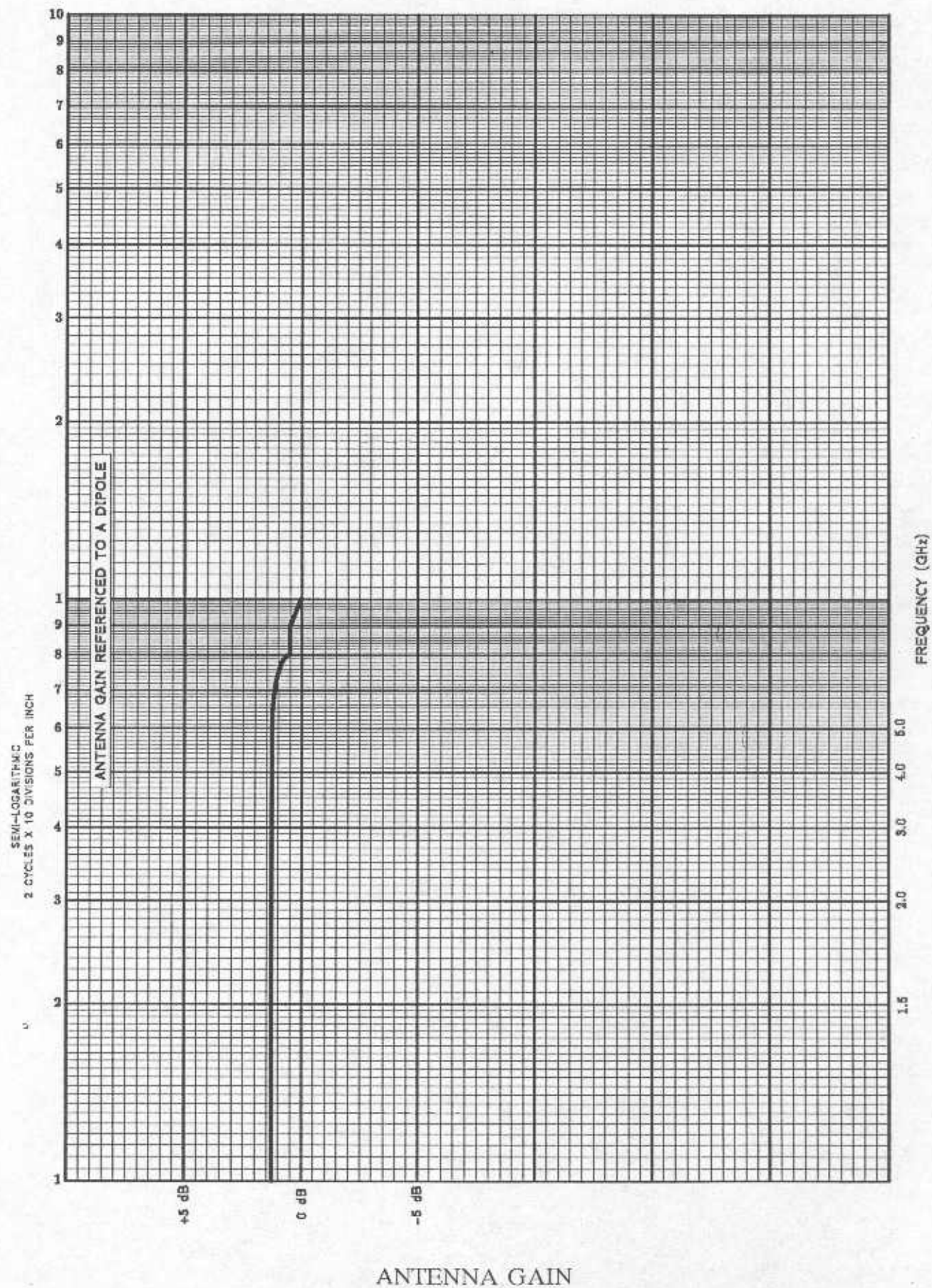
At 1719.975000 MHz and 175 Watts

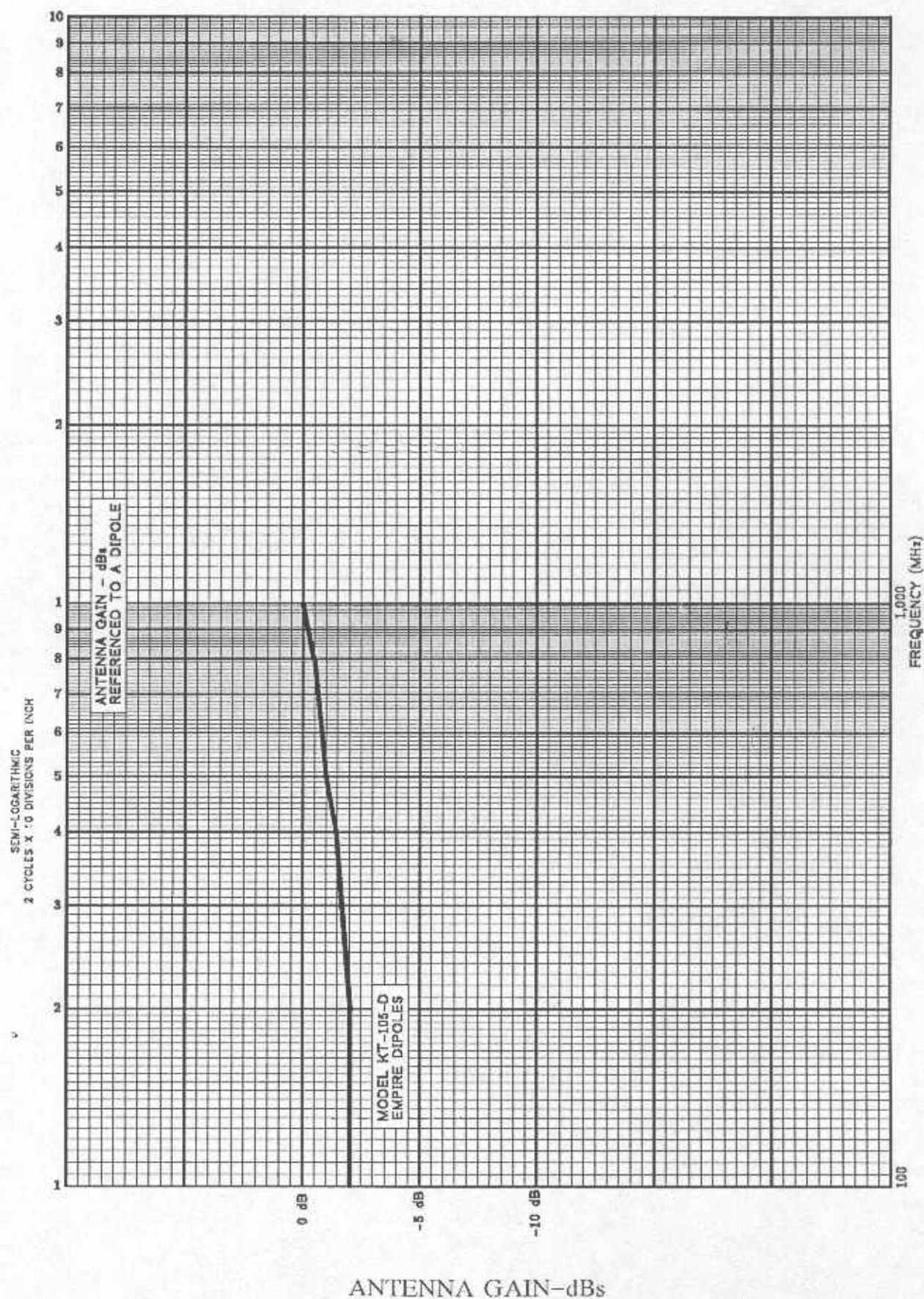
R - Reference Generator (dBm)	-34.0
S - Analyzer Level (dB)	-69
A - Antenna Gain (dB)	1.2
P - Polarization Correction Factor	3.0
R'' - Corrected Reference (dBm)	
Po - Carrier Power Output (dBm)	52.4
R' - Observed Spurious Level (dBm)	

$$R' = S - R = -69 - (-34.0) = -35.0 \text{ dBm}$$

$$R'' = R' + A - P = -35.0 + 1.2 - 3.0 = -36.8 \text{ dBm}$$

$$\text{Spurious Attenuation} = R'' - P_o = -36.8 - 52.4 = -89.2 \text{ dB}$$





NAME OF TEST: Frequency Stability with Variation in Ambient Temperature

RULE PART NUMBER: 2.995 (a) (1)

MINIMUM STANDARD: $\pm 0.000100\%$ from test frequency, 1.00 ppm

TEST RESULTS: Meets minimum standard, see data on the following page.

Maximum deviation ± 800 Hz from test

Maximum deviation of 0000930% for .930 ppm

TEST CONDITIONS:

Multiple Voltage Switching Power Supply, Tectrol Inc.
TC84S-1081

TEST EQUIPMENT:

Attenuator #1, Tenuline Model 8323

Attenuator #2, Tenuline Model 8340-200

Frequency Counter, Fluke 7220A

Multimeter, Model 8012A Fluke

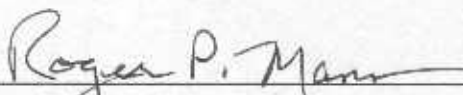
Power Supply, Tectrol Inc. TC84S-1081

Thermometer, Model 412A Doric

Voltmeter, Model 8012A Fluke

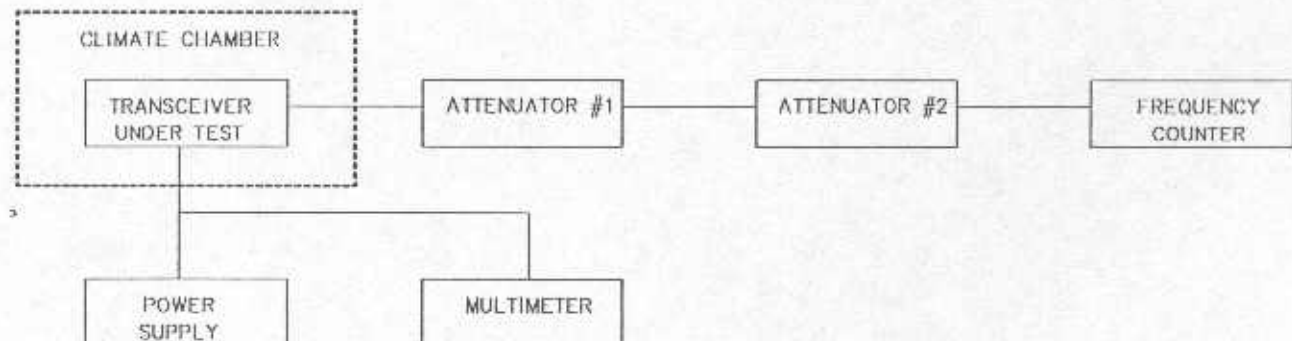
Climate Chamber, Model Tenney Jr.

PERFORMED BY:


Roger P. Mann

DATE: 6-14-94

TEST SET-UP:



TEST SET-UP

NAME OF TEST: Frequency Stability with Variation in Ambient Temperature
(Continued)

MEASUREMENTS TAKEN:

1.00 PPM Oscillator

Temperature (C)	Frequency (MHz)	PPM from Channel Frequency
+60	859.988300	.930
+50	859.988260	.884
+40	859.988040	.630
+30	859.987620	.140
+25	859.987500	0.00
+20	859.987270	-.267
+10	859.986760	-.860
0	859.986700	-.930
-10	859.986840	-.767
-20	859.987500	-0.00
-30	859.987350	-.174

1.0 PPM Oscillator

Channel Frequency	859.987500 MHz
Tolerance Requirements	.000100%
Highest Variation	.0000930%

NAME OF TEST: Frequency Stability with Variation in Supply Voltage

RULE PART NUMBER: 2.995 (d)

MINIMUM STANDARD: $\pm 0.000100\%$ from test frequency, 1.00 ppm for $\pm 15\%$ change in supply voltage

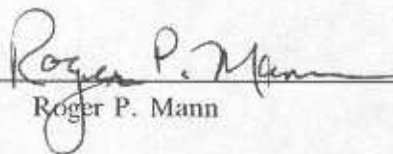
TEST RESULTS: Meets minimum standard, see measurements on next page.

Maximum deviation 0 Hz from test
Frequency = $.00000\%$ for, 0 ppm

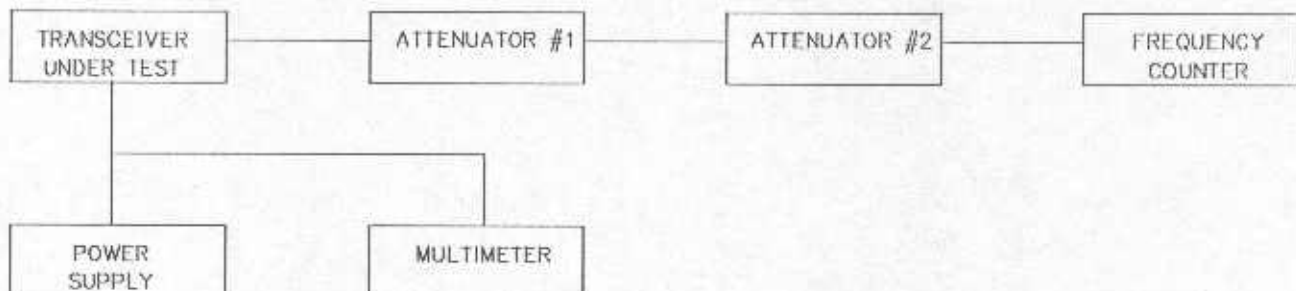
TEST CONDITIONS: Standard test conditions, room temperature 26 C.
Multiple Voltage Switching Power Supply, Tectrol Inc.
TC84S-1081.

TEST EQUIPMENT: Attenuator #1, Tenuline Model 8323
Attenuator #1, Tenuline Model 8340-200
Frequency Counter, Fluke 7220A
Power Supply, HHP 6284A
Multimeter, Model 8012A Fluke

PERFORMED BY:

 DATE: 6-13-94
Roger P. Mann

TEST SET-UP:



TEST SET-UP

NAME OF TEST: Frequency Stability with Variation in Supply Voltage

MEASUREMENTS TAKEN: 75 Watts

1.00 PPM				
	<u>Voltage (VDC)</u>	<u>Frequency (MHz)</u>	<u>Change in PPM</u>	<u>Frequency (Hz)</u>
STD	26.5	859.987500	0	0
+15%	30.5	859.987500	0	0
-15%	22.5	859.987500	0	0
Tolerance Requirements		+/- .000100%		
Highest Variation (from channel frequency)		0 Hz = +.000000%		

Approximately ten minutes between cycles

Transmitter keyed one minute during test

NAME OF TEST: Frequency Stability with Variation in Supply Voltage

MEASUREMENTS TAKEN: 175 Watts

1.00 PPM

	<u>Voltage (VDC)</u>	<u>Frequency (MHz)</u>	<u>Change in PPM</u>	<u>Frequency (Hz)</u>
STD	26.5	859.987500	0	0
+15%	30.5	859.987500	0	0
-15%	22.5	859.987500	0	0
Tolerance Requirements		+/- .000100%		
Highest Variation (from channel frequency)		0 Hz = +.00000%		

Approximately ten minutes between cycles

Transmitter keyed one minute during test

FCC LABEL

FCC ID: ATH2422008-1
E.F. JOHNSON CO. U.S.A.
MODEL 242-2008
MADE IN WASECA MN. USA

Serial No20081A194A 00400