NAME OF TEST:
Field Strength of Spurious Radiation

RULE PART NUMBER: 2.1033 c (14), 2.1041, 2.1053, 90.210 (d)(3)

MINIMUM STANDARD: For 27 Watts: $50+10Log_{10}(25) = 64.3$ dBc
For 10 Watts: $50+10Log_{10}(10) = 60$ dBc

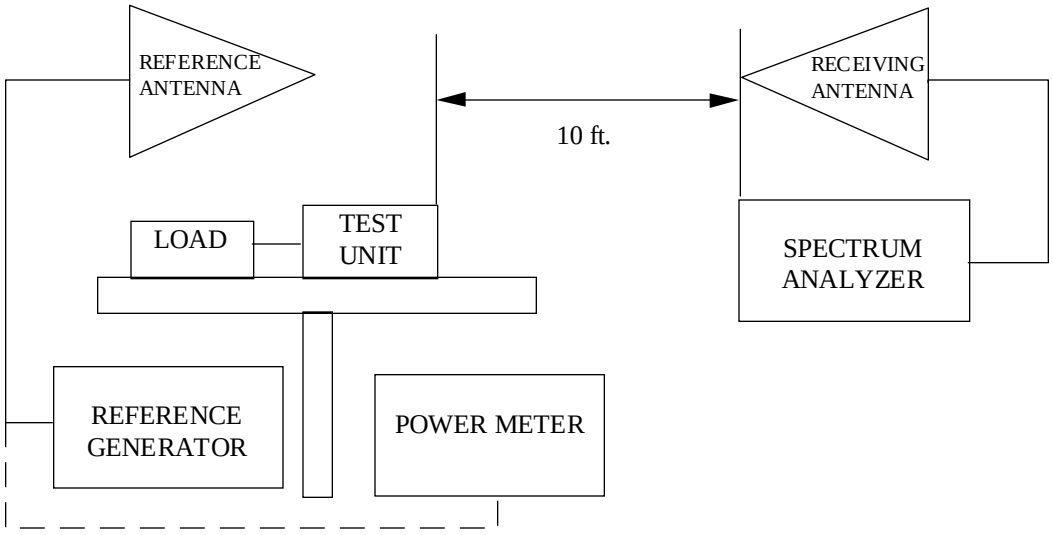
UNIT UNDER TEST
TEST RESULTS: Meets minimum standard (see data on the following page)

TEST CONDITIONS: Standard Test Conditions, 25 C
TEST PROCEDURE: TIA/EIA - 603, 2.2.12

TEST EQUIPMENT:
Log Spiral Antenna, Model 93491-2
Horn Antenna, Model EMCO 3115
Reference Generator, Model HP83732A
Attenuator, BIRD Model / 100-A-MFN-20 / 20 dB / 100 Watt
Attenuator, BIRD Model / 50-A-MFN-03 / 3 dB / 50 Watt
Spectrum Analyzer, Model HP8563E
Power Meter, Model HP 8901B
Power Supply, Model HP6038A

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

TEST SET-UP:



PERFORMED BY:

Allen Frederick

Date:07/02/02

NAME OF TEST: Spurious Radiation Attenuation
(Continued)

Freqency:	899 MHz			Spec =		-64.3 dBc		
Power:	27 Watts			Highest Spur =		-70.9 dBc		
	44.3 dBm							
Spurious Frequency (MHz)	Polarization (Horz/Vert)	Spurious Level (dBm)	Substitution Generator (dBm)	Cable Loss (dB)	Antenna Gain (dBd)	Circular Polarization Correction (dB)	Path Loss dB	Spurious Attenuation dBc
1798	V	-67.0	-20.7	6.83	1.20	3.0	46.33	-73.6
	H	-72.2	-24.5	6.83	1.20	3.0	47.67	-77.4
2697	V	-69.2	-16.2	9.00	1.20	3.0	53.00	-71.3
	H	-68.5	-15.8	9.00	1.20	3.0	52.67	-70.9
3596	V	-78.3	-19.2	11.83	1.20	3.0	59.17	-77.1
	H	-81.5	-22.8	11.83	1.20	3.0	58.67	-80.8
4495	V	-76.8	-14.3	12.83	1.20	3.0	62.50	-73.3
	H	-77.8	-15.2	12.83	1.20	3.0	62.67	-74.1
5394	V	-79.2	-12.3	14.17	1.20	3.0	66.83	-72.6
	H	-84.7	-17.8	14.17	1.20	3.0	66.83	-78.1
6293	V	-94.8	-18.5	16.00	1.20	3.0	76.33	-80.6
	H	-98.2	-21.3	16.00	1.20	3.0	76.83	-83.5
7192	V	-100.8	-25.8	17.33	1.20	3.0	75.00	-89.2
	H	-102.8	-27.6	17.33	1.20	3.0	75.17	-91.1
8091	V	-97.8	-17.7	20.17	1.20	3.0	80.17	-83.9
	H	-102.0	-21.7	20.17	1.20	3.0	80.33	-88.0
8990	V	-97.8	-13.3	22.83	1.20	3.0	84.50	-82.3
	H	-97.7	-12.5	22.83	1.20	3.0	85.17	-81.4

Freqency:	899 MHz			Spec =		-60.0 dBc		
Power:	10 Watts			Highest Spur =		-71.1 dBc		
	40.0 dBm							
Spurious Frequency (MHz)	Polarization (Horz/Vert)	Spurious Level (dBm)	Substitution Generator (dBm)	Cable Loss (dB)	Antenna Gain (dBd)	Circular Polarization Correction (dB)	Path Loss dB	Spurious Attenuation dBc
1798	V	-72.7	-26.3	6.83	1.20	3.0	46.33	-75.0
	H	-74.2	-26.5	6.83	1.20	3.0	47.67	-75.1
2697	V	-80.3	-27.3	9.00	1.20	3.0	53.00	-78.1
	H	-79.0	-26.3	9.00	1.20	3.0	52.67	-77.1
3596	V	-85.7	-26.5	11.83	1.20	3.0	59.17	-80.1
	H	-86.7	-28.0	11.83	1.20	3.0	58.67	-81.6
4495	V	-86.0	-23.5	12.83	1.20	3.0	62.50	-78.1
	H	-84.0	-21.3	12.83	1.20	3.0	62.67	-76.0
5394	V	-82.0	-15.2	14.17	1.20	3.0	66.83	-71.1
	H	-84.8	-18.0	14.17	1.20	3.0	66.83	-74.0
6293	V	-100.2	-23.9	16.00	1.20	3.0	76.33	-81.7
	H	-103.7	-26.9	16.00	1.20	3.0	76.83	-84.7
7192	V	-97.7	-22.7	17.33	1.20	3.0	75.00	-81.8
	H	-98.0	-22.8	17.33	1.20	3.0	75.17	-82.0
8091	V	-100.2	-20.0	20.17	1.20	3.0	80.17	-82.0
	H	-102.5	-22.2	20.17	1.20	3.0	80.33	-84.1
8990	V	-100.7	-16.2	22.83	1.20	3.0	84.50	-80.8
	H	-104.7	-19.5	22.83	1.20	3.0	85.17	-84.2

CALCULATIONS FOR FIELD STRENGTH OF SPURIOUS RADIATION TESTS:

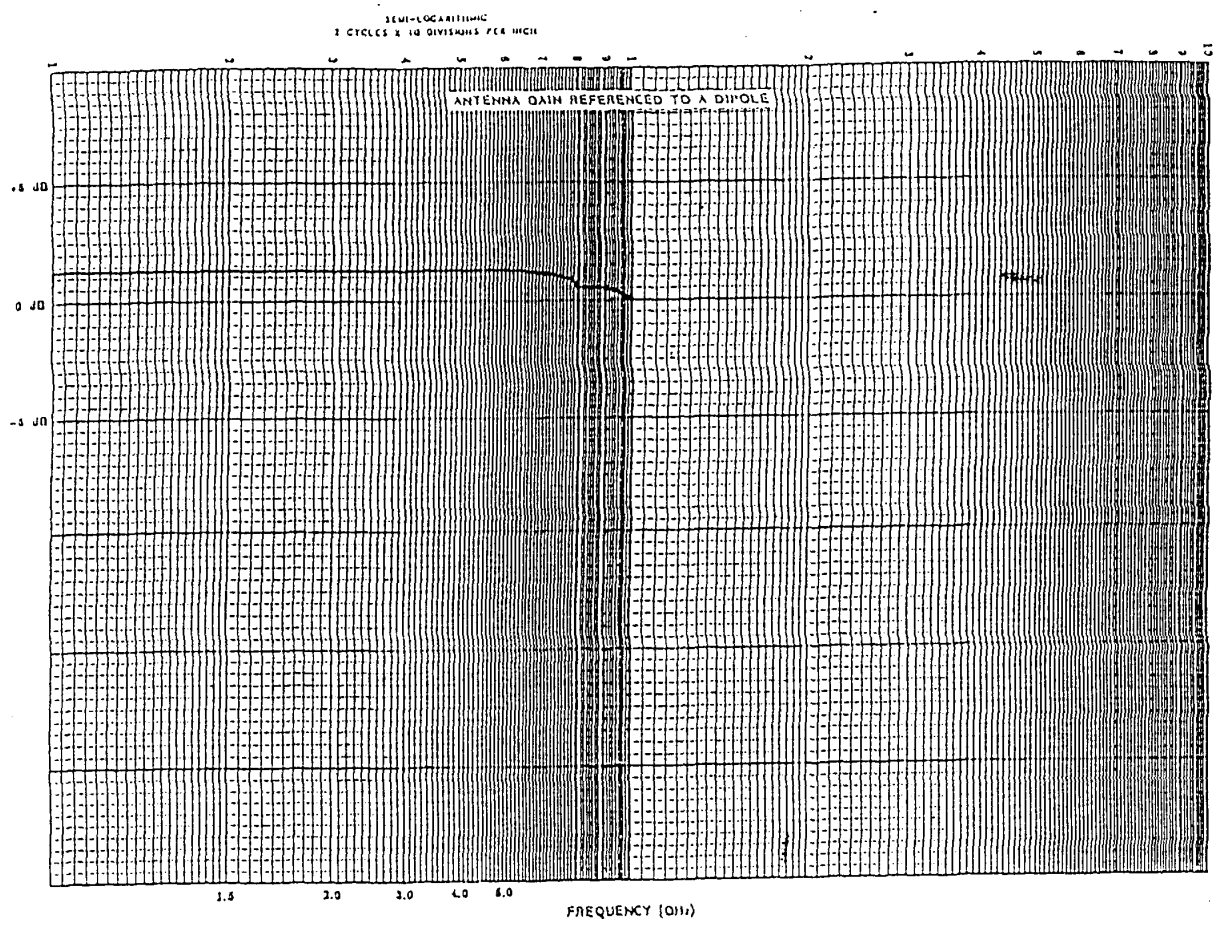
The transmitter carrier frequency was set to 899.000 MHz. The reference oscillator frequency of all of the transceivers is 17.50 MHz. The output of the transceivers was searched from 17.50 MHz to the tenth harmonic of the carrier frequencies. The tests were conducted with the transceiver/modem/GPS inside of the enclosure.

Because the antennas used for the measurements recorded above 1 GHz were not flat in gain and differed from a dipole, the generator output was corrected for gain at each spurious frequency. The cable loss in the measurements is the loss in the cable between the signal generator and the substitution antenna. An additional 3 dB correction was also made to the spurious responses measured above 1 GHz to correct for the 3 dB polarization loss in the reference path.

EXAMPLE:

At 1798 MHz (899 MHz tuned), 20 Watts and horizontal polarization.

r = Substitution Gen - Cable Loss	-20.7 - 6.83	= -27.53
R = Reference Generator (dBm)	-27.53	
A = Antenna Gain (dB)	1.2	
P = Polarization Correction Factor (dB)	3.0	
R' (Corrected Reference (dBm)) = R + A - P	=> -27.53+ 1.2 - 3.0	= -29.33 dBm
Po = Radiated Carrier Power (dBm)	27 Watts = 44.3 dBm	
Radiated Spurious Emission (dBc) = Po - R'	=> -29.33 - (+44.3)	= **-73.6 dBc**



ANTENNA GAIN GRAPH OF SUBSTITUTION ANTENNA
REFERENCED TO A DIPOLE