NAME OF TEST: Receiver Spurious Radiated and Conducted

RULE PART NUMBER: 2.1033 c (14),15.207,15.209

MINIMUM STANDARD: See data

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

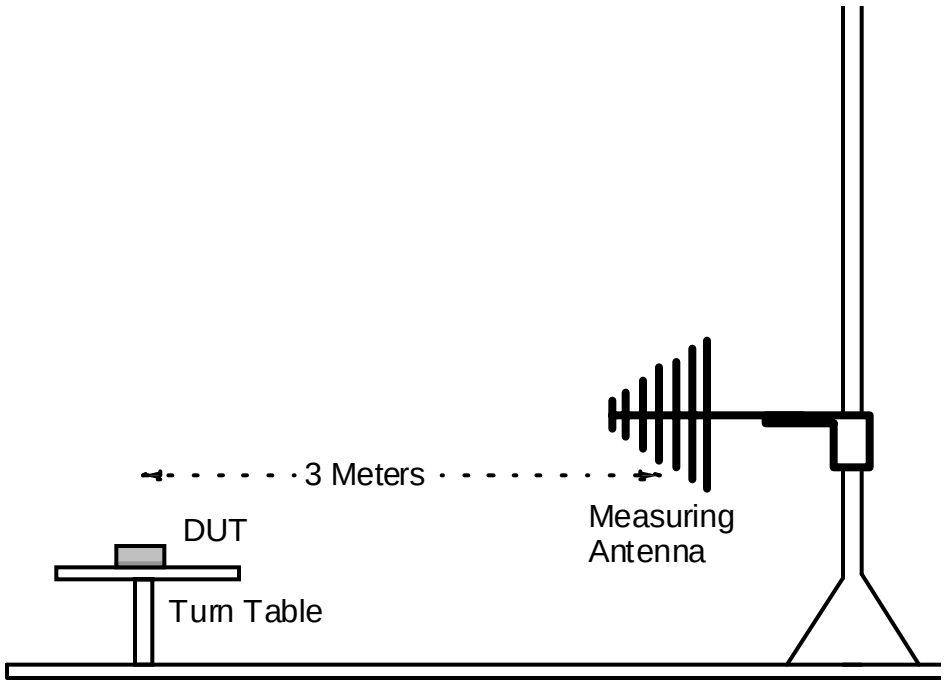
TEST CONDITIONS: Standard Test Conditions, 25 C

TEST PROCEDURE: TIA/EIA - 603, 2.1.1, 2.1.2

TEST EQUIPMENT: Horn Antenna, Model EMCO 3115
Dipole Antenna, Model EMCO 3121c
Reference Generator, Model HP83732A
Spectrum Analyzer, Model HP8563E
Power Supply, Model HP 6038A
Attenuator, BIRD Model / 50-A-MFN-03 / 3 dB / 50 Watt

MEASUREMENT PROCEDURE: Radiated spurious attenuation was measured according to TIA/EIA Standard 603 Section 2.1.1, Conducted Section 2.1.2

RADIATED TEST SET-UP:



PERFORMED BY:

Allen Frederick

Date:07/18/02

NAME OF TEST: Receiver Spurious Radiation (15.209)

Tuned Freq: 938 MHz
Worst Case: 6.9 dB

Freq (MHz)		ACP (dB)	Spectrum Anaylyzer (dBm)	Conversion To (dBuV)	Cable Loss (dB)	Extrapolate Distance To (Meters)	Field Intensity (uV/m)	Spec Limit (uV/m)	Spec (Spec An) (dB)	Margin (dB)
883	H	28.8	-83.8	23.17	4.33	10	197	210	-76.4	7.4
	V	28.8	-84.0	23.00	4.33	10	192	210	-76.4	7.6
1766	H	28.1	-101.0	6.00	5.17	10	27	300	-80.2	20.8
	V	28.1	-98.8	8.20	5.17	10	35	300	-80.2	18.6
2649	H	30.9	-92.8	14.17	6.33	10	112	300	-84.2	8.6
	V	30.9	-91.1	15.90	6.33	10	136	300	-84.2	6.9
3532	H	33.1	-108.0	-1.00	8.67	10	33	300	-88.8	19.2
	V	33.1	-106.5	0.50	8.67	10	39	300	-88.8	17.7
4415	H	34.1	-101.0	6.00	9.50	10	91	300	-90.6	10.4
	V	34.1	-98.0	9.00	9.50	10	128	300	-90.6	7.4
5298	H	35.7	-109.2	-2.20	10.00	10	45	300	-92.7	16.5
	V	35.7	-109.5	-2.50	10.00	10	43	300	-92.7	16.8
6181	H	36.3	-109.7	-2.70	11.00	10	51	300	-94.3	15.4
	V	36.0	-109.5	-2.50	11.00	10	50	300	-94.0	15.5
7064	H	37.4	-106.3	0.70	12.50	10	101	300	-96.9	9.4
	V	37.4	-106.8	0.20	12.50	10	96	300	-96.9	9.9
7947	H	38.6	-108.2	-1.20	14.00	10	111	300	-99.6	8.6
	V	38.6	-107.5	-0.50	14.00	10	120	300	-99.6	7.9
8830	H	39.0	-112.0	-5.00	17.00	10	107	300	-103.0	9.0
	V	39.0	-112.0	-5.00	17.00	10	107	300	-103.0	9.0

NAME OF TEST: Receiver Spurious Conducted (15.207)

Tuned Freq 938 MHz
Spec Limit: -57 dBm
Worse Case:
Main: -71 dBm
Div: -71 dBm

Relation to Tuned Freq	Freq (MHz)	Diversity (dBm)	Main (dBm)
	883	-71	-71
2	1766	-81	-97
3	2649	-98	-100
4	3532	-86	-105
5	4415	-80	-81
6	5298	-88	-90
7	6181	-92	-103
8	7064	-103	-95
9	7947	-89	-97
10	8830	-101	-108

CALCULATIONS FOR: Receiver Spurious Radiation (15.209)

The DUT was scanned for spurious radiation throughout the range of frequencies described in section 1. Measurements were made at a distance of 3 meters. Data will be extrapolated to 10 Meters as shown in following example:

1) Signal measured on spectrum analyzer : **-83.8 dBm**

2) Add cable loss to spectrum analyzer measurement: -83.8 + 4.33 = **-79.47 dBm**

3) Signal is converted to dBµV by adding 107 dB: -79.47 + 107 = **27.53 dBµV**

4) From Chart 1 the ACF(Antenna Correction Factor) for 883 MHz is 28.8 dB.
Convert dBµV to dBµV/m by adding manufacturer ACF:
27.53 + 28.8 = **56.33 dBµV/m**

5) Convert to from dBµV/m to µV/m:
$\mu V/m = 10^{((dB\mu V/m)/20)}$ => $\mu V/m = 10^{(56.33/20)}$ = **655.39 µV/m**

6) Measurements were taken at 3 meters so they need to be extrapolated to 10 meters as specified in section 15.109(b).

a) Scaling factor from 3 meters to 10 meters => 10/3 => 3 1/3

b) Power density is proportional to $1/r2$ where r is the radius or distance.
P_{10} = Power at 10 meters
P_3 = Power at 3 meters
V_{10} = rms Voltage at 10 meters
V_3 = rms Voltage at 3 meters
R = terminating load (50 Ω)

$P_{10} = P_3 / r^2$ => $V_{10}^2/R = V_3^2/Rr^2$ => $V_{10} = V_3/r$

c) V_{10} = (µV/m) / (Scaling Factor) => V_{10} = 655.39 / (3 1/3) = **196.6 µV/m**