

NAME OF TEST: Receiver Spurious Radiated and Conducted

RULE PART NUMBER: 2.1051,2.1053,15.207,15.209, 90.543(c)

MINIMUM STANDARD: See data

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

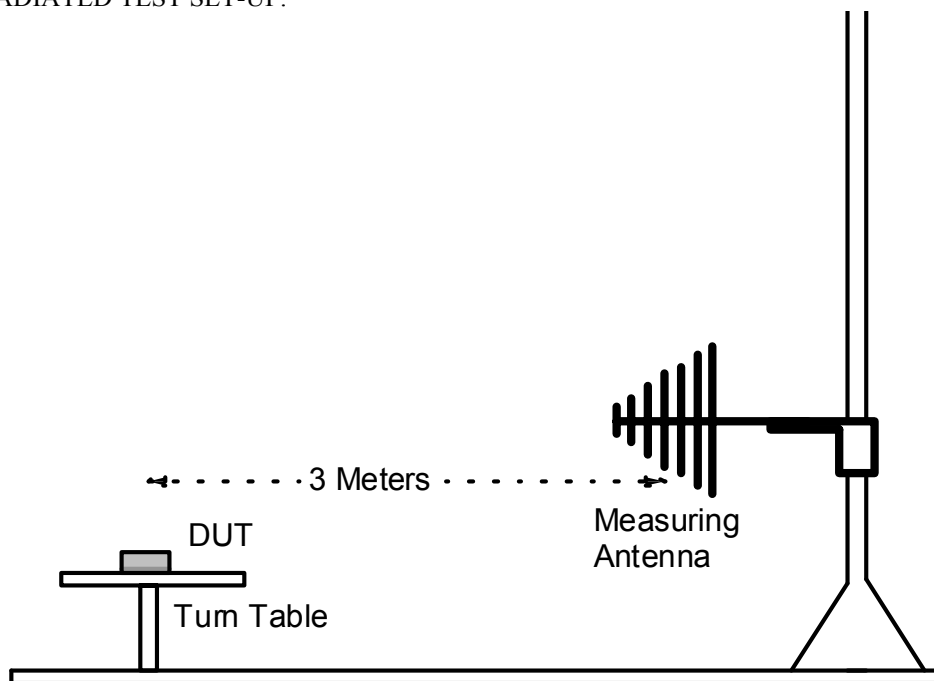
TEST CONDITIONS: Standard Test Conditions, 25 C

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: Jan 2, 2003

NAME OF TEST: Receiver Spurious Radiation (15.209)

RX Tuned: 770 MHz									
Freq (MHz)		ACP (dB)	Spectrum Analyzer (dBm)	Conversion To (dBuV)	Cable Loss (dB)	Extrapolate Distance To (Meters)	Field Intensity (uV/m)	Limit	Margin (dB)
825 Bilog	H	22.5	-103.5	3.50	3.60	10	9	210	27.3
	V	22.5	-111.7	-4.70	3.60	10	4	210	35.5
1650	H	28.1	-104.0	3.00	5.70	10	21	300	23.2
	V	28.1	-99.0	8.00	5.70	10	37	300	18.2
2475	H	30.9	-107.2	-0.20	5.80	10	20	300	23.5
	V	30.9	-106.8	0.20	5.80	10	21	300	23.1
3300	H	33.1	-103.2	3.80	7.70	10	51	300	15.4
	V	33.1	-101.5	5.50	7.70	10	62	300	13.7
4125	H	34.1	-110.0	-3.00	9.00	10	30	300	19.9
	V	34.1	-109.7	-2.70	9.00	10	31	300	19.6
4950	H	35.7	-110.7	-3.70	9.80	10	37	300	18.2
	V	35.7	-110.5	-3.50	9.80	10	38	300	18.0
5775	H	36.3	-111.7	-4.70	10.50	10	38	300	17.9
	V	36.0	-111.5	-4.50	10.50	10	38	300	18.0
6600	H	37.4	-108.0	-1.00	12.00	10	79	300	11.6
	V	37.4	-107.0	0.00	12.00	10	88	300	10.6
7425	H	38.6	-108.3	-1.30	13.00	10	98	300	9.7
	V	38.6	-108.3	-1.30	13.00	10	98	300	9.7
8250	H	39.0	-109.5	-2.50	14.20	10	103	300	9.3
	V	39.0	-108.3	-1.30	14.20	10	119	300	8.1

NAME OF TEST: Receiver Spurious Conducted (15.207)

Tuned	770	MHz
Spec	-57	dBm
Highest Spur	-68	dBm

Harmonic	Freq (MHz)	Main (dBm)	Div (dBm)
LO Fundamental	825	-73	-76
2	1650	-112	-102
3	2475	-110	-112
4	3300	-111	-95
5	4125	-78	-69
6	4950	-74	-68
7	5775	-94	-108
8	6600	-92	-98
9	7425	-102	-100
10	8250	-83	-85

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 : -103.5 dBm
- 2) Add cable loss to spectrum analyzer measurement: $-103.5 + 3.6 = -99.9$ dBm
- 3) Signal is converted to dBμV by adding 107 dB: $-99.9 + 107 = 7.1$ dBμV
- 4) From Chart 1 the ACF(Antenna Correction Factor) for 825 MHz is 22.5 dB.
Convert dBμV to dBμV/m by adding manufacturer ACF:
 $7.1 + 22.5 = 29.6$ dBμV/m
- 5) Convert from dBμV/m to μV/m:
$$\mu\text{V/m} = 10^{((\text{dB}\mu\text{V/m})/20)} \Rightarrow \mu\text{V/m} = 10^{(29.6/20)} = 30.2 \mu\text{V/m}$$
- 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 $\Rightarrow 10/3 \Rightarrow 3 \frac{1}{3}$
 - b) Power density is proportional to $1/r^2$ 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)

$$P_{10} = P_3 / r^2 \Rightarrow V_{10}^2 / R = V_3^2 / R r^2 \Rightarrow V_{10} = V_3 / r$$
 - c) $V_{10} = (\mu\text{V/m}) / (\text{Scaling Factor}) \Rightarrow V_{10} = 30.2 / (3 \frac{1}{3}) = 9.1 \mu\text{V/m}$