Name of Test: Field Strength of Spurious Radiation

Specification: 47 CFR 2.1053(a)

Guide: ANSI/TIA/EIA-603-1992/2001, Paragraph 1.2.12 and Table 16, 47 CFR 22.917

Measurement Procedure

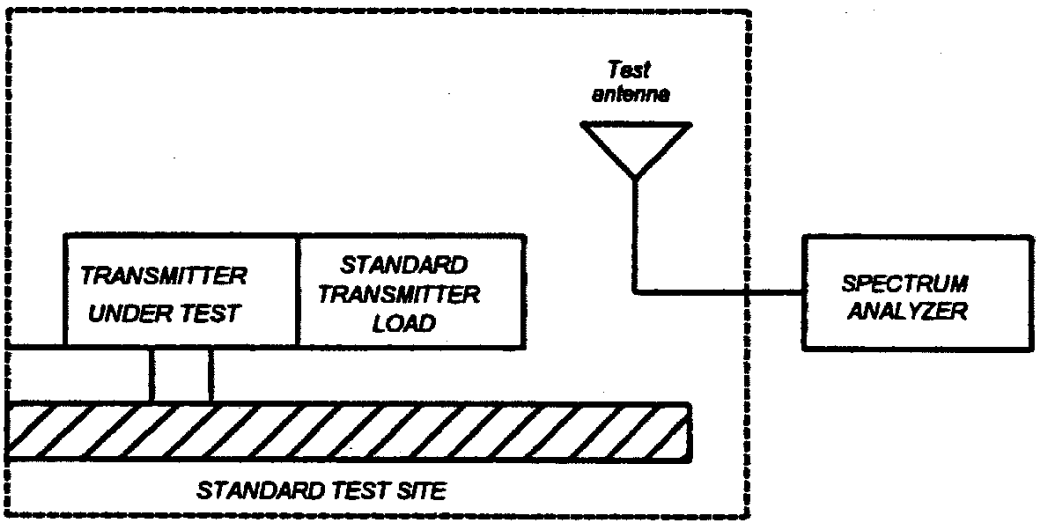
Definition:
Radiated spurious emissions are emissions from the equipment when transmitting into a non-radiating load on a frequency or frequencies which are outside an occupied band sufficient to ensure transmission of information of required quality for the class of communications desired.

Method of Measurement:

A) Connect the equipment as illustrated

B) Adjust the spectrum analyzer for the following settings:
   1) Resolution Bandwidth 100 kHz (<1 GHZ), 1 MHZ (> 1GHz).
   2) Video Bandwidth ≥ 3 times Resolution Bandwidth, or 30 kHz (22.917)
   3) Sweep Speed ≤2000 Hz/second
   4) Detector Mode = Mean or Average Power

C) Place the transmitter to be tested on the turntable in the standard test site. The transmitter is transmitting into a non-radiating load that is placed on the turntable. The RF cable to this load should be of minimum length.

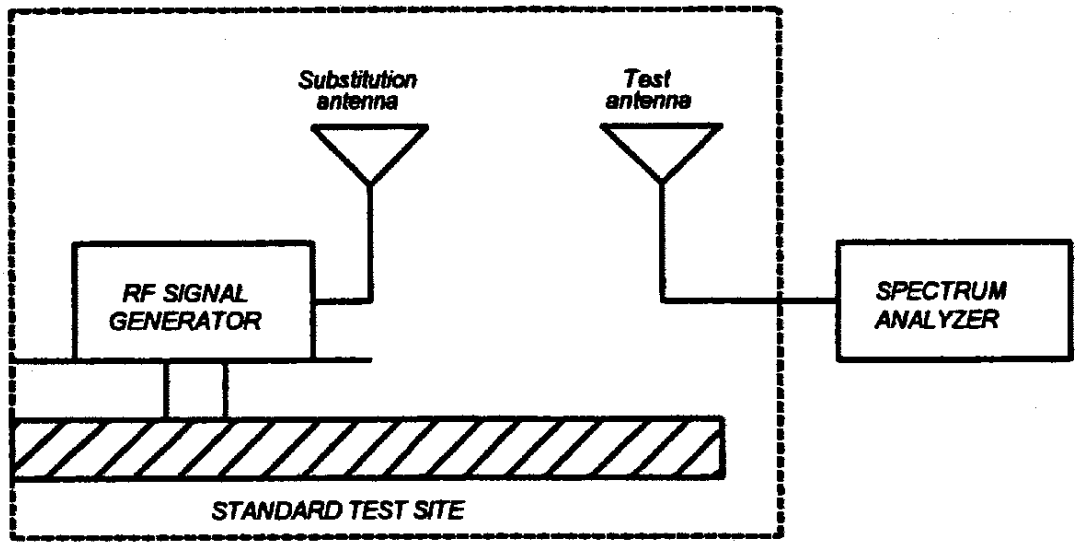


Name of Test: Field Strength of Spurious Radiation (Cont.)

D) For each spurious measurement the test antenna should be adjusted to the correct length for the frequency involved. This length may be determined from a calibration ruler supplied with the equipment. Measurements shall be made from the lowest radio frequency generated in the equipment to the tenth harmonic of the carrier, except for the region close to the carrier equal to ± the test bandwidth (see section 1.3.4.4).

E) For each spurious frequency, raise and lower the test antenna from 1 m to 4 m to obtain a maximum reading on the spectrum analyzer with the test antenna at horizontal polarity. Repeat this procedure to obtain the highest possible reading. Record this maximum reading.

F) Repeat step E) for each spurious frequency with the test antenna polarized vertically. Where the direct reading is within 6dB of the limit a substitution measurement as detailed in G) to M) below should be carried out and the results used in place of the direct measured value.



G) Reconnect the equipment as illustrated.

H) Keep the spectrum analyzer adjusted as in step B).

I) Remove the transmitter and replace it with a substitution antenna (the antenna should be half-wavelength for each frequency involved). The center of the substitution antenna should be approximately at the same location as the center of the transmitter. At lower frequencies, where the substitution antenna is very long, this will be impossible to achieve when the antenna is polarized vertically. In such case the lower end of the antenna should be 0.3 m above the ground.

Name of Test: Field Strength of Spurious Radiation (Cont.)

J) Feed the substitution antenna at the transmitter end with a signal generator connected to the antenna by means of a non-radiating cable. With the antennas at both ends horizontally polarized and with the signal generator tuned to a particular spurious frequency, raise and lower the test antenna to obtain a maximum reading at the spectrum analyzer. Adjust the level of the signal generator output until the previously recorded maximum reading for this set of conditions is obtained. This should be done carefully repeating the adjustment of the test antenna and generator output.

K) Repeat step J) with both antennas vertically polarized for each spurious frequency.

L) Calculate power in dBm into a reference ideal half-wave dipole antenna by reducing the readings obtained in steps J) and K) by the power loss in the cable between the generator and the antenna and further corrected for the gain of the substitution antenna used relative to an ideal half-wave dipole antenna.

M) The levels recorded in step L) are absolute levels of radiated spurious emissions in dBm. The radiated spurious emissions in dB can be calculated by the following:

Radiated spurious emissions dB =

$10\log_{10}$(TX power in watts/0.001) – the levels in step l)

NOTE: It is permissible that other antennas provided can be referenced to a dipole.

Test Equipment

	Asset	Description		s/n	Cycle	Last Cal
Transducer						
	i00088	EMCO 3109-B 25MHz-300MHz		2336	24 mo.	Sep-03
X	i00089	Aprel 2001 200MHz-1GHz		001500	24 mo.	Sep-03
X	i00103	EMCO 3115 1GHz-18GHz		9208-3925	24 mo.	Jan-04
Amplifier						
X	i00028		HP 8449A	2749A00121	12 mo.	May-04
Spectrum Analyzer						
X	i00029		HP 8563E	3213A00104	12 mo.	May-04
X	i00033	HP 85462A		3625A00357	12 mo.	Sep-04
Substitution Generator						
X	i00067	HP 8920A Communication TS		3345U01242	12 mo.	Jun-04
	i00207	HP 8753D Network Analyzer		3410A08514	12 mo.	Jul-04

Microphone, Antenna Port, and Cabling

Microphone	Yes	Cable Length	1.0	Meters
Antenna Port Terminated	Yes	Load	Yes	Antenna Gain -
All Ports Terminated by Load	N/A	Peripheral	-	

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Measurement Results

g04c0055: 2004-Dec-17 Fri 09:41:00
STATE: 2:High Power Ambient Temperature: 15°C ± 3°C

Frequency Tuned, MHz	Frequency Emission, MHz	Level, dBm	Direct / Substitution	Margin, dB
146.000000	292.008800	-14.0	S	-1.0
155.000000	310.011300	-17.1	S	-4.1
174.000000	348.011300	-15.8	S	-2.8
146.000000	438.011300	-14.2	S	-1.2
155.000000	465.011300	-16.9	S	-3.9
174.000000	522.011300	-15.4	S	-2.4
146.000000	584.008800	-15.3	S	-2.3
155.000000	620.011300	-19.2	D	-6.2
174.000000	696.011300	-20.0	D	-7.0
146.000000	730.008800	-17.8	S	-4.8
155.000000	775.011300	-25.4	D	-12.4
174.000000	870.011300	-44.5	D	-31.5
146.000000	876.008800	-22.4	D	-9.4
155.000000	930.008800	-19.8	D	-6.8
146.000000	1022.001667	-62.2	D	-49.2
174.000000	1044.000000	-67.1	D	-54.1
155.000000	1085.001667	-73.1	D	-60.1
146.000000	1168.001667	-73.5	D	-60.5
174.000000	1217.998333	-69.1	D	-56.1
155.000000	1240.001667	-71.0	D	-58.0
146.000000	1314.001667	-58.6	D	-45.6
174.000000	1391.998333	-63.1	D	-50.1
155.000000	1395.001667	-62.1	D	-49.1
146.000000	1460.001667	-68.6	D	-55.6
155.000000	1550.001667	-52.6	D	-39.6
174.000000	1565.998333	-40.9	D	-27.9
174.000000	1739.998333	-50.5	D	-37.5

Performed by: David E. Lee,
Compliance Test Manager