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Name of Test: Field Strength of Spurious Radiation

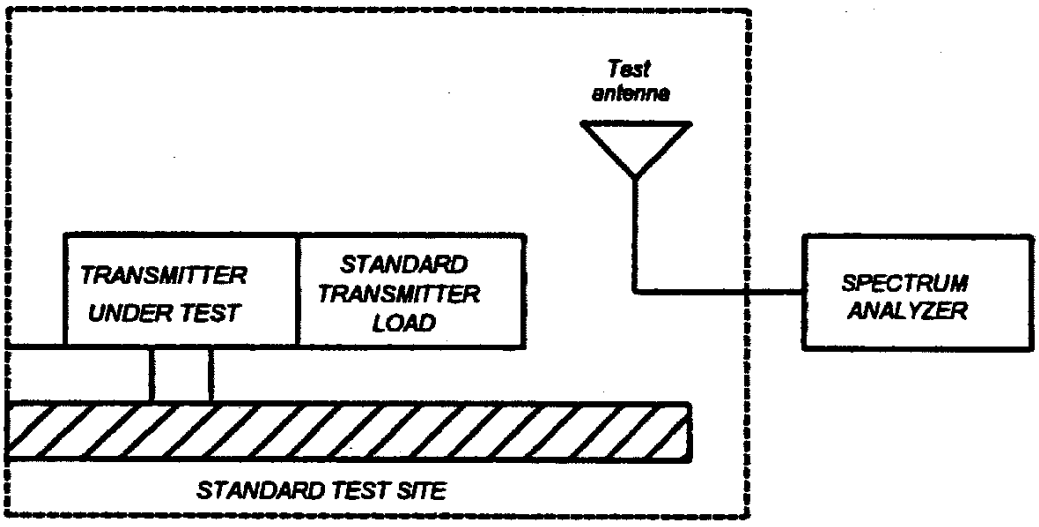
Specification: 47 CFR 2.1053(a)

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.

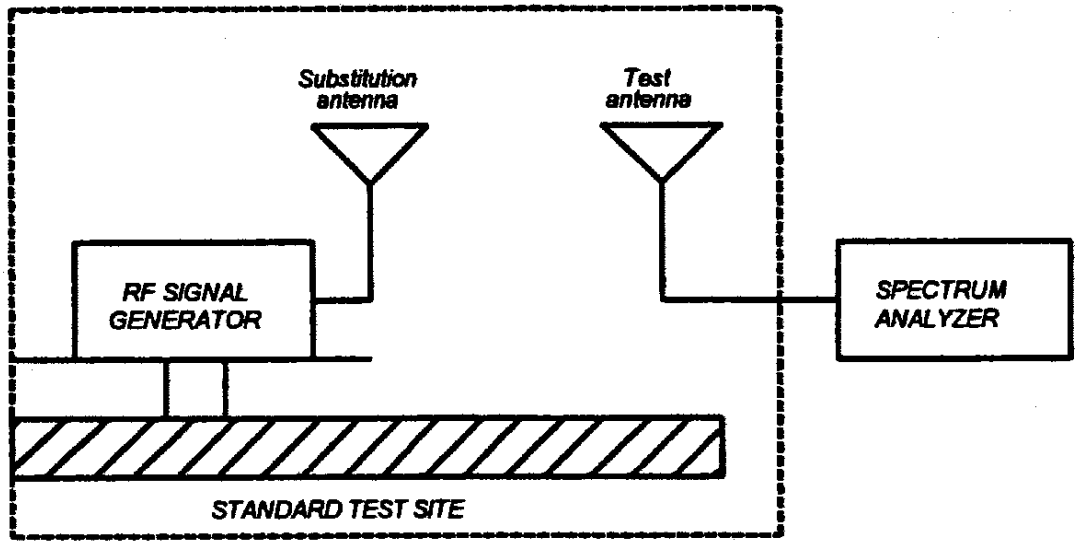


Name of Test: Field Strength of Spurious Radiation (Cont.)

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.



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					
X	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.	May-04
	i00207	HP 8753D Network Analyzer	3410A08514	12 mo.	Jun-04

Microphone, Antenna Port, and Cabling

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

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Measurement Results

All Other Emissions (Worst Case Combinations) = 50 + Log (50) = -66.98dBc
41.75dB-66.98 = -25.23dBm

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STATE: 2:High Power Ambient Temperature: 33°C ± 3°C

Frequency Tuned, MHz	Frequency Emission, MHz	Generator, dBm	Limit, dBm	Margin, dB
136.000000	272.005000	-43.6	-25.2	-18.4
136.000000	408.007500	-50.4	-25.2	-25.2
136.000000	544.010000	-54.3	-25.2	-29.1
136.000000	680.012500	-43.3	-25.2	-18.1
136.000000	816.015000	-51.3	-25.2	-26.1
136.000000	952.017500	-53.5	-25.2	-28.3
136.000000	1088.020000	-53.5	-25.2	-28.3
136.000000	1224.022500	-48.7	-25.2	-23.5
136.000000	1360.025000	-47.5	-25.2	-22.3
136.000000	1496.027500	-48.7	-25.2	-23.5

Performed by: David E. Lee,
Compliance Test Manager

END OF TEST REPORT