

Power Output Measurement

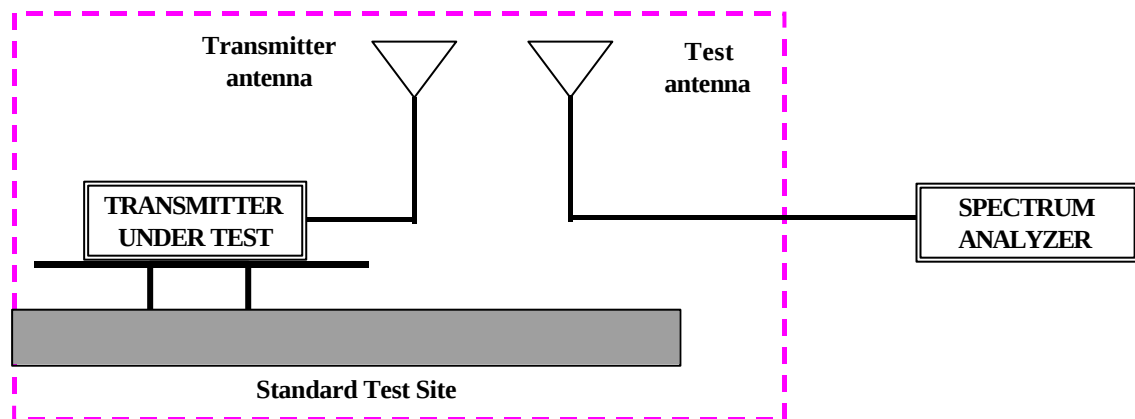
A Rules and Specification Limits

2.1046(a), ANSI/ TIA/ EIA-603-1992, Paragraph 2.2.1.

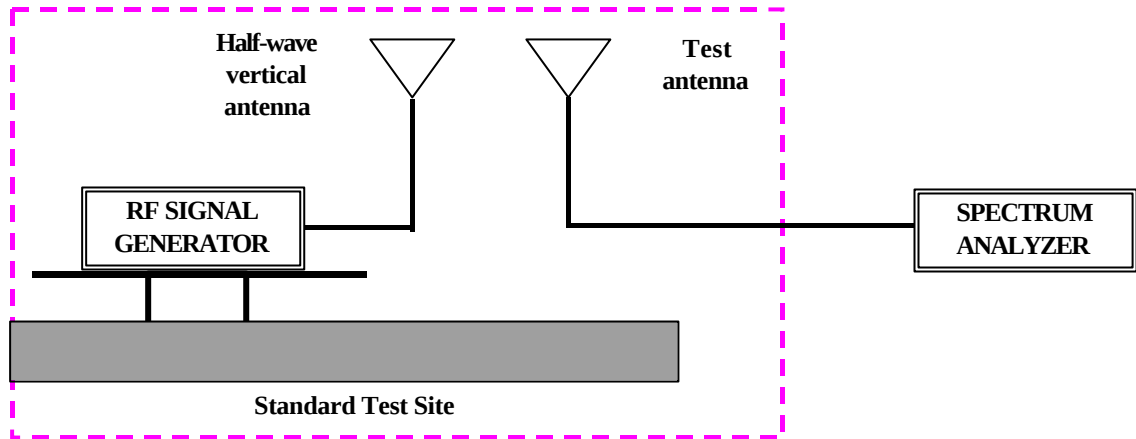
74.861 (e)(1) : The power of the measured unmodulated carrier power at output of the transmitter power amplifier (antenna input power) may not exceed the following:

1. 54 – 72, 76 – 88 and 174 – 216 MHz band 50 mW.
2. 470 – 608 and 614 – 806 MHz band 250 mW.

B Test condition and setup



1. Measurement was made on anechoic chamber. The EUT system was placed on non-conductive turntable which is 0.8 meters height, top surface 1.0 X 1.5 meter. The EUT was placed in three direction of the space in order to obtain maximum emission.
2. Connect the equipment as illustrated. Place the transmitter to be tested on the turntable in the standard test site.
3. Raise and lower the test antenna from 1m to 4m with the transmitter facing the antenna and record the highest received signal.
4. Repeat step (3) for seven additional readings at 45 interval positions of the turn-table.



5. Replace the transmitter under test with a half-wave vertically polarized antenna. The center of the antenna should be at the same location as the transmitter under test. Connect the antenna to a signal generator with a known output and record the value.

6. $FI_a(\text{dBm}) = FI_r(\text{dBm}) - \text{Corrected (dB)}$
 $\text{Corrected (dB)} = AF(\text{dB}) + [CL(\text{dB}) - \text{Amplitude Gain}]$
 FI_a : Actual Field Intensity
 FI_r : Reading of the Field Intensity
 AF : Antenna Factor
 CL : Cable Loss

7. The field intensity in Watt can then be determined by the following equation:

$$P (\text{watt}) = FI^2 (\text{Volt}) \times d^2 (\text{meter}) / 49.2$$

P : Power in Watt

D : Measurement Distance (3 m)

C. List of test Instrument

<u>Instrument Name</u>	<u>Model No.</u>	<u>Brand</u>	<u>Serial No.</u>	<u>Calibration Date</u>	
				<u>Last time</u>	<u>Next time</u>
EMI Receiver	8546A	H P	3520A00242	06/29/01	06/29/02
RF Filter Section	85460A	H P	3448A00217	06/29/01	06/29/02
Bi-log Antenna	CBL6141A	Schaffner	4206	03/09/01	03/09/02
Switch/Control Unit	3488A	HP	N/A	11/20/00	11/20/01
(> 30MHz)					
Auto Switch Box	ASB-01	TRC	9904-01	11/20/00	11/20/01
(> 30MHz)					
Spectrum Analyzer	8564E	HP	US36433002	08/01/01	08/01/02
Microwave Preamplifier	83051A	HP	3232A00347	08/01/01	08/01/02
Horn Antenna	3115	EMCO	9704 – 5178	08/01/01	08/01/02
Anechoic Chamber (cable calibrated together)				05/20/01	05/20/02

The level of confidence of 95%, the uncertainty of measurement of radiated emission is ± 4.96 dB.

D. Measurement Result

(1) Frequency: 700.704 MHz

The maximum field measured is 3.015 dBm

$$FI \text{ (Volt)} = 10^{100.392/20} \times 10^{-6} = 0.104616 \text{ V}$$

$$FI \text{ (mW)} = (0.104616 \times 3)^2 / 49.2 = 2.002 \text{ mW}$$

Angle of Turn Table (°)	Spectrum Reading (dBm)	Corrected (dB)	Actually Value (dBm)	E. R. P. (mW)	Average (mW)
0°	-7.58	-6.09	-1.49	0.709	1.0063
45°	-1.84	-6.09	4.25	2.660	
90°	-8.57	-6.09	-2.48	0.564	
135°	-4.39	-6.09	1.70	1.479	
180°	-3.52	-6.09	2.57	1.807	
225°	-9.61	-6.09	-3.52	0.444	
270°	-10.50	-6.09	-4.41	0.362	
315°	-22.11	-6.09	-16.02	0.025	

(2) Frequency: 744.204 MHz

The maximum field measured is 2.70dBm

$$FI \text{ (Volt)} = 10^{100.077/20} \times 10^{-6} = 0.100890 \text{ V}$$

$$FI \text{ (mW)} = (0.100890 \times 3)^2 / 49.2 = 1.8619 \text{ mW}$$

Angle of Turn Table (°)	Spectrum Reading (dBm)	Corrected (dB)	Actually Value (dBm)	E. R. P. (mW)	Average (mW)
0°	-7.11	-5.39	-1.72	0.672	0.581
45°	-4.56	-5.39	0.83	1.210	
90°	-9.25	-5.39	-3.86	0.411	
135°	-10.48	-5.39	-5.09	0.309	
180°	-7.00	-5.39	-1.61	0.690	
225°	-6.01	-5.39	-0.63	0.864	
270°	-20.19	-5.39	-14.80	0.033	
315°	-8.76	-5.39	-3.37	0.460	

(3) Frequency: 785.704 MHz

The maximum field measured is -4.78 dBm

$$FI \text{ (Volt)} = 10^{92.597/20} \times 10^{-6} = 0.042643V$$

$$FI \text{ (mW)} = (0.042643 \times 3)^2 / 49.2 = 0.0332638 \text{ mW}$$

Angle of Turn Table (°)	Spectrum Reading (dBm)	Corrected (dB)	Actually Value (dB μ V/m)	E. R. P. (mW)	Average (mW)
0°	-13.73	-5.26	-8.47	0.142	0.160
45°	-12.00	-5.26	-6.74	0.221	
90°	-21.60	-5.26	-16.34	0.023	
135°	-10.49	-5.26	-5.23	0.299	
180°	-11.60	-5.26	-6.34	0.232	
225°	-12.55	-5.26	-7.29	0.186	
270°	-24.14	-5.26	-18.88	0.129	
315°	-18.29	-5.26	-13.03	0.049	