Power Output Measurement

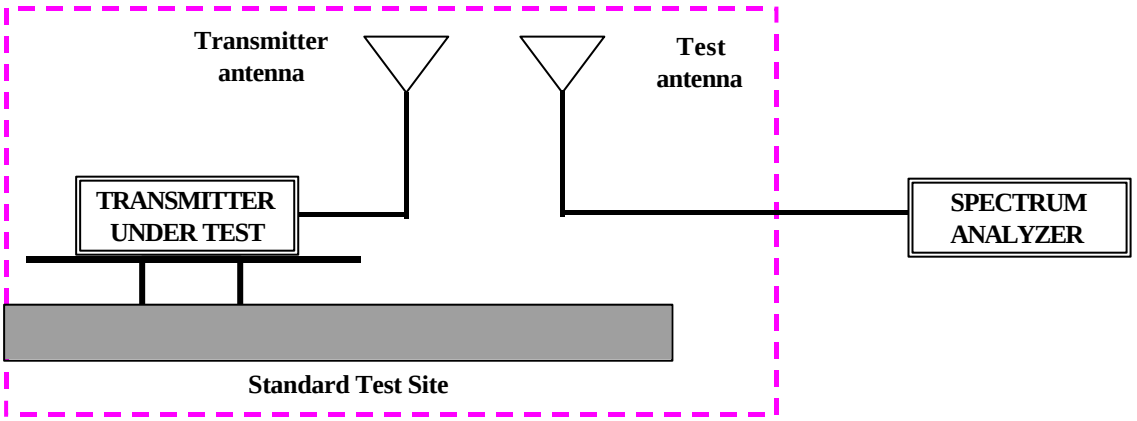
A Rules and Specification Limits

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

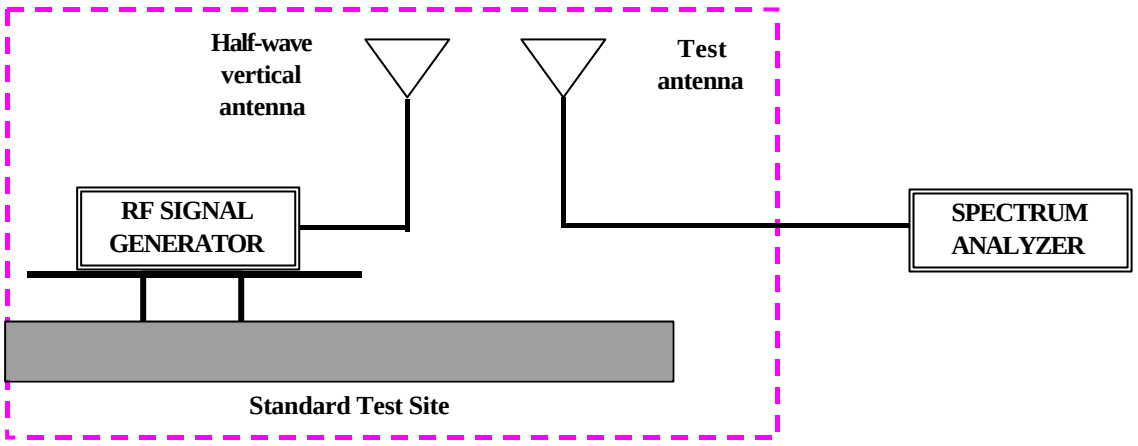
74.861 (e)(1) : The power of the measured unmodulated carrier power at output of the transmitter power amplifier (antenna input power) may not exceed the following:

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(dBm) = FI_r (dBm) – Corrected (dB)
   Corrected (dB) = AF(dB) + [CL(dB) – 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 (watt) = FI ^{2}(Volt) X d^2 (meter) / 49.2

   P : Power in Watt

   D : Measurement Distance (3 m)

C. List of test Instrument

				Calibration Date	
Instrument Name	Model No.	Brand	Serial No.	Last time	Next time
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 (> 30MHz)	3488A	HP	N/A	11/20/00	11/20/01
Auto Switch Box (> 30MHz)	ASB-01	TRC	9904-01	11/20/00	11/20/01
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: 794.900 MHz

The maximum field measured is 1.46 dBm

FI (Volt) = $10^{98.837/20}$ X 10^{-6} = 0.087468 V
FI (mW) = $(0.087468 \text{ X } 3)^2$/ 49.2 = 1.3995 mW

Angle of Turn Table (°)	Spectrum Reading (dBm)	Corrected (dB)	Actually Value (dBm)	E. R. P. (mW)	Average (mW)
0°	-5.24	-5.25	0.01	1.002	0.9769
45°	-6.01	-5.25	-0.76	0.839	
90°	-4.33	-5.25	0.92	1.236	
135°	-4.61	-5.25	0.64	1.158	
180°	-5.11	-5.25	0.14	1.032	
225°	-20.51	-5.25	-15.26	0.029	
270°	-3.54	-5.25	1.71	1.482	
315°	-5.41	-5.25	-0.16	1.037	

(2) Frequency: 800.200 MHz

The maximum field measured is 0.82dBm

FI (Volt) = $10^{98.197/20}$ X 10^{-6} = 0.0812549 V

FI (mW) = $(0.0812549 \text{ X } 3)^2 / 49.2$ = 1.2077 mW

Angle of Turn Table (°)	Spectrum Reading (dBm)	Corrected (dB)	Actually Value (dBm)	E. R. P. (mW)	Average (mW)
0°	-6.51	-5.25	-1.26	0.748	0.681
45°	-8.87	-5.25	-3.62	0.435	
90°	-8.10	-5.25	-2.85	0.519	
135°	-5.29	-5.25	-0.04	0.991	
180°	-5.35	-5.25	-0.10	0.977	
225°	-13.64	-5.25	-8.39	0.145	
270°	-5.14	-5.25	0.11	1.026	
315°	-7.44	-5.25	-2.19	0.604	

(3) Frequency: 804.900 MHz

The maximum field measured is 3.32 dBm

FI (Volt) = $10^{100.697/20}$ X 10^{-6} = 0.108355V

FI (mW) = $(0.108355 \text{ X } 3)^2$/ 49.2 = 2.14771 mW

Angle of Turn Table (°)	Spectrum Reading (dBm)	Corrected (dB)	Actually Value (dB μV/m)	E. R. P. (mW)	Average (mW)
0°	-4.16	-5.29	1.13	1.297	1.336
45°	-6.76	-5.29	-1.47	0.713	
90°	-4.78	-5.29	0.51	1.245	
135°	-2.21	-5.29	3.08	2.032	
180°	-5.55	-5.29	-0.26	0.942	
225°	-7.21	-5.29	-1.92	0.643	
270°	-2.27	-5.29	3.03	2.009	
315°	-2.73	-5.29	2.56	1.803	