

# Element 2 (Technician) Graphics – For use on/after July 1, 2003

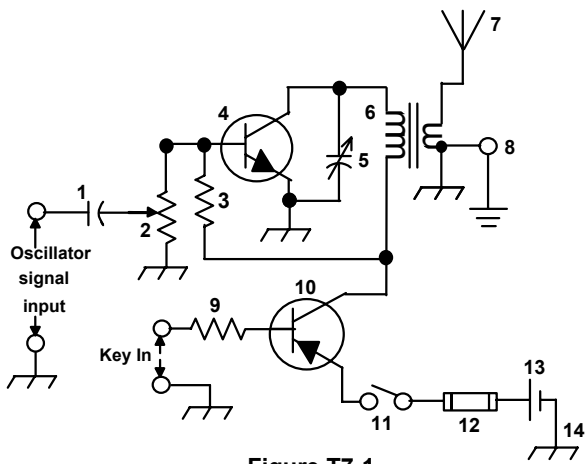


Figure T7-1

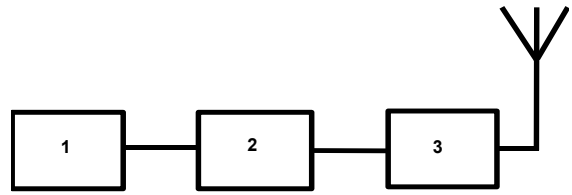


Figure T8-4

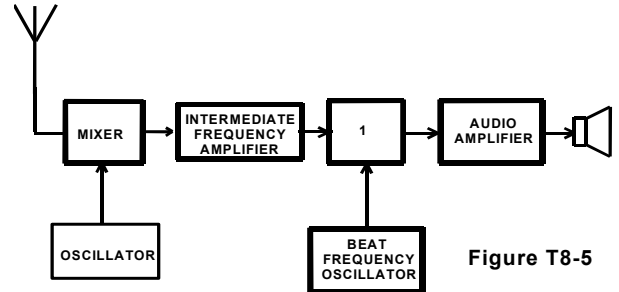


Figure T8-5

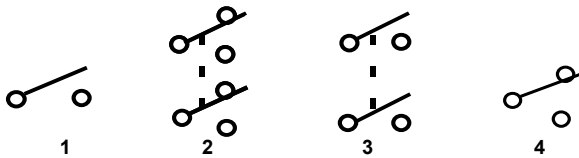


Figure T7-2

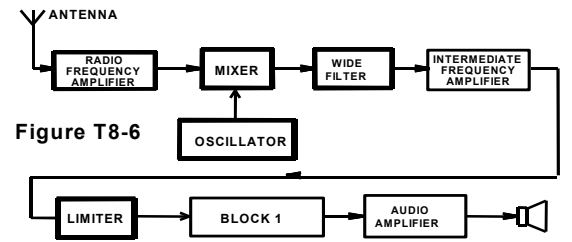


Figure T8-6

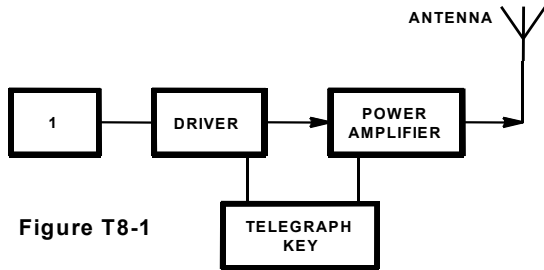


Figure T8-1

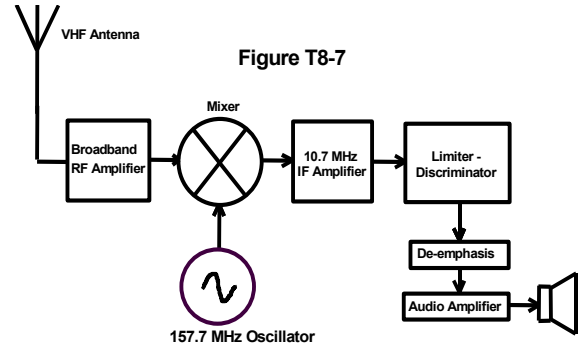


Figure T8-7

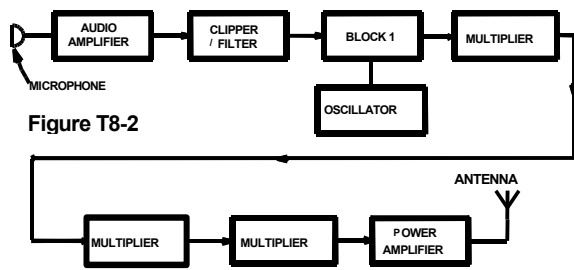


Figure T8-2

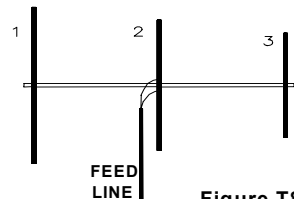


Figure T8-8

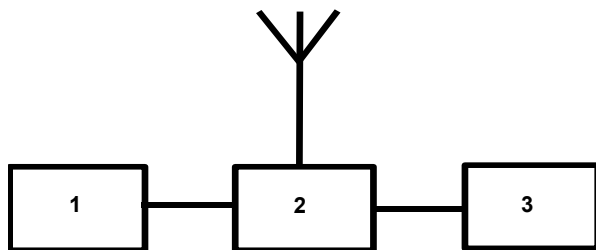


Figure T8-3

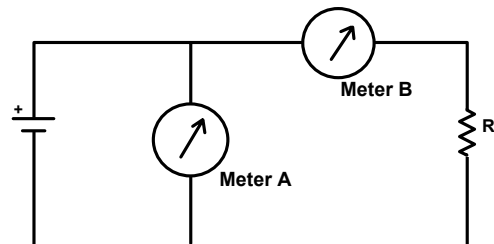


Figure T8-9

**Figure T0- 1**

| (A) Limits for Occupational/Controlled Exposure |                                 |                               |                                     |                          |
|---|---------------------------------|-------------------------------|-------------------------------------|--------------------------|
| Frequency Range (MHz)                           | Electrical Field Strength (V/m) | Magnetic Field Strength (A/m) | Power Density (mW/cm <sup>2</sup> ) | Averaging Time (minutes) |
| 0.3-3.0   | 614                             | 1.63                          | (100)*                              | 6                        |
| 3.0-30  | 1842/f                          | 4.89/f                        | (900/f <sup>2</sup> )*              | 6                        |
| 30-300  | 61.4                            | 0.163                         | 1.0                                 | 6                        |
| 300-1500  | ----                            | ----                          | f/300                               | 6                        |
| 1500-100,000                                    | ----                            | ----                          | 5                                   | 6                        |

| (B) Limits for General Population/Uncontrolled Exposure |                                 |                               |                                     |                          |
|---|---------------------------------|-------------------------------|-------------------------------------|--------------------------|
| Frequency Range (MHz)                                   | Electrical Field Strength (V/m) | Magnetic Field Strength (A/m) | Power Density (mW/cm <sup>2</sup> ) | Averaging Time (minutes) |
| 0.3-1.34  | 614                             | 1.63                          | (100)*                              | 30                       |
| 1.34-30   | 824/f                           | 2.19/f                        | (180/f <sup>2</sup> )*              | 30                       |
| 30-300  | 27.5                            | 0.073                         | 0.2                                 | 30                       |
| 300-1500  | ----                            | ----                          | f/1500                              | 30                       |
| 1500-100,000  | ----                            | ----                          | 1.0                                 | 30                       |

f=frequency in MHz    \*=Plane-wave equivalent power density

Estimated distances to meet RF power density guidelines in the main beam of a 17-element Yagi on a five-wavelength boom designed for weak signal communications on the 144 MHz amateur radio band (estimated gain, 16.8 dBi). Calculations include the EPA ground reflection factor of 2.56.

Frequency: 144 MHz  
 Estimated antenna gain: 16.8 dBi  
 Controlled limit: 1 mw/cm<sup>2</sup>  
 Uncontrolled limit: 0.2 mw/cm<sup>2</sup>

| Transmitter power (watts) | Distance to controlled limit | Distance to uncontrolled limit |
|---------------------------|------------------------------|--------------------------------|
| 10                        | 10.2'                        | 22.9'                          |
| 100                       | 32.4'                        | 72.4'                          |
| 500                       | 72.4'                        | 162'                           |
| 1500                      | 125.5'                       | 280.6'                         |

**Figure T0- 2**

Estimated distances to meet RF power density guidelines with a horizontal half-wave dipole antenna (estimated gain, 2 dBi). Calculations include the EPA ground reflection factor of 2.56.

Frequency: 7 MHz  
 Estimated antenna gain: 2 dBi  
 Controlled limit: 18.37 mw/cm<sup>2</sup>  
 Uncontrolled limit: 3.67 mw/cm<sup>2</sup>

| Transmitter power (watts) | Distance to controlled limit | Distance to uncontrolled limit |
|---------------------------|------------------------------|--------------------------------|
| 100                       | 1.4'                         | 3.1'                           |
| 500                       | 3.1'                         | 6.9'                           |
| 1000                      | 4.3'                         | 9.7'                           |
| 1500                      | 5.3'                         | 11.9'                          |

Estimated distances to meet RF power density guidelines with a VHF quarter-wave ground plane or mobile whip antenna (estimated gain, 1 dBi). Calculations include the EPA ground reflection factor of 2.56.

Frequency: 146 MHz  
 Estimated antenna gain: 1 dBi  
 Controlled limit: 1 mw/cm<sup>2</sup>  
 Uncontrolled limit: 0.2 mw/cm<sup>2</sup>

| Transmitter power (watts) | Distance to controlled limit | Distance to uncontrolled limit |
|---------------------------|------------------------------|--------------------------------|
| 10                        | 1.7'                         | 3.7'                           |
| 50                        | 3.7'                         | 8.3'                           |
| 150                       | 6.4'                         | 14.4'                          |

Estimated distances to meet RF power density guidelines in the main beam of a typical 3-element "triband" Yagi for the 14, 21 and 28 MHz amateur radio bands. Calculations include the EPA ground reflection factor of 2.56.

Frequency: 28 MHz  
 Antenna gain: 8 dBi  
 Controlled limit: 1.15 mw/cm<sup>2</sup>  
 Uncontrolled limit: 0.23 mw/cm<sup>2</sup>

| Transmitter power (watts) | Distance to controlled limit | Distance to uncontrolled limit |
|---------------------------|------------------------------|--------------------------------|
| 100                       | 11'                          | 24.5'                          |
| 500                       | 24.5'                        | 54.9'                          |
| 1000                      | 34.7'                        | 77.6'                          |
| 1500                      | 42.5'                        | 95.1'                          |

Estimated distances to meet RF power density guidelines in the main beam of UHF 5/8 ground plane or mobile whip antenna (estimated gain, 4 dBi). Calculations include the EPA ground reflection factor of 2.56.

Frequency: 446 MHz  
 Estimated antenna gain: 4 dBi  
 Controlled limit: 1.49 mw/cm<sup>2</sup>  
 Uncontrolled limit: 0.3 mw/cm<sup>2</sup>

| Transmitter power (watts) | Distance to controlled limit | Distance to uncontrolled limit |
|---------------------------|------------------------------|--------------------------------|
| 10                        | 1.9'                         | 4.3'                           |
| 50                        | 4.3'                         | 9.6'                           |
| 150                       | 7.5'                         | 16.7'                          |