

APPLICATION NOTE #19
AR RF/MICROWAVE INSTRUMENTATION PRODUCTS THAT
PROVIDE 10 V/m CW, PM OR WITH 80% AM AT A DISTANCE OF 1 METER¹

The Amplifier / Antenna / Cell combinations shown in Table 1 provide various means of generating 10 V/m, CW or Pulse Modulated, as well as with 80% amplitude modulation inside a TEM Cell or ARCell, between the elements of an E-field generator, or at a distance of one meter (unless otherwise noted) from a radiating antenna, from 10 kHz to 40 GHz. This table is used in conjunction with the enclosed product selection flow chart and system diagrams. The appropriate combination of products is determined by first noting the physical size of the Device Under Test (DUT). The size of the test object determines the appropriate path taken on the flow chart. Follow the path that accommodates the maximum expected DUT size.

As an example, to test a device 14 inches or less on a side across the entire frequency band from 10 kHz to 40 GHz, select items 15, 16, 17, 18, 19, 20 and 21. If the test object were greater than 39 inches, items 1, 2, 3, 4, 5, 6 and 7 would be appropriate. When testing small objects, a TEM cell offers an economical solution in that it is used in lieu of both a radiating antenna and a shielded enclosure. For a test object 4 inches or less in height, select items 25 and 26. If the DUT is 2 inches or less in height, then items 27 and 28 can be used.

The TC1000A, TC2000C, TC3000A, and TC4000A ARCells offer semi-anechoic performance and also include built in field generators. ARCells offer convenient, cost effective alternatives to conventional susceptibility test systems consisting of a shielded room or anechoic chamber. With four enclosures to choose from, one can test devices from 12"/side to 39"/side from 10 kHz to 4.2 GHz. The maximum field level, frequency range, and test volume is cell dependent. See Application Note 34 for additional details on the ARCell.

To accurately determine field strength in the area of the DUT, a field monitor such as the AR RF/Microwave Instrumentation model FM7004 and an appropriate field probe are required. Contact the factory for specific recommendations.

The power amplifier recommendations that follow provide sufficient margin and should prove adequate to accommodate nominal system losses.

10 V/m CW, PM, or 80% AM at a distance of 1 meter¹

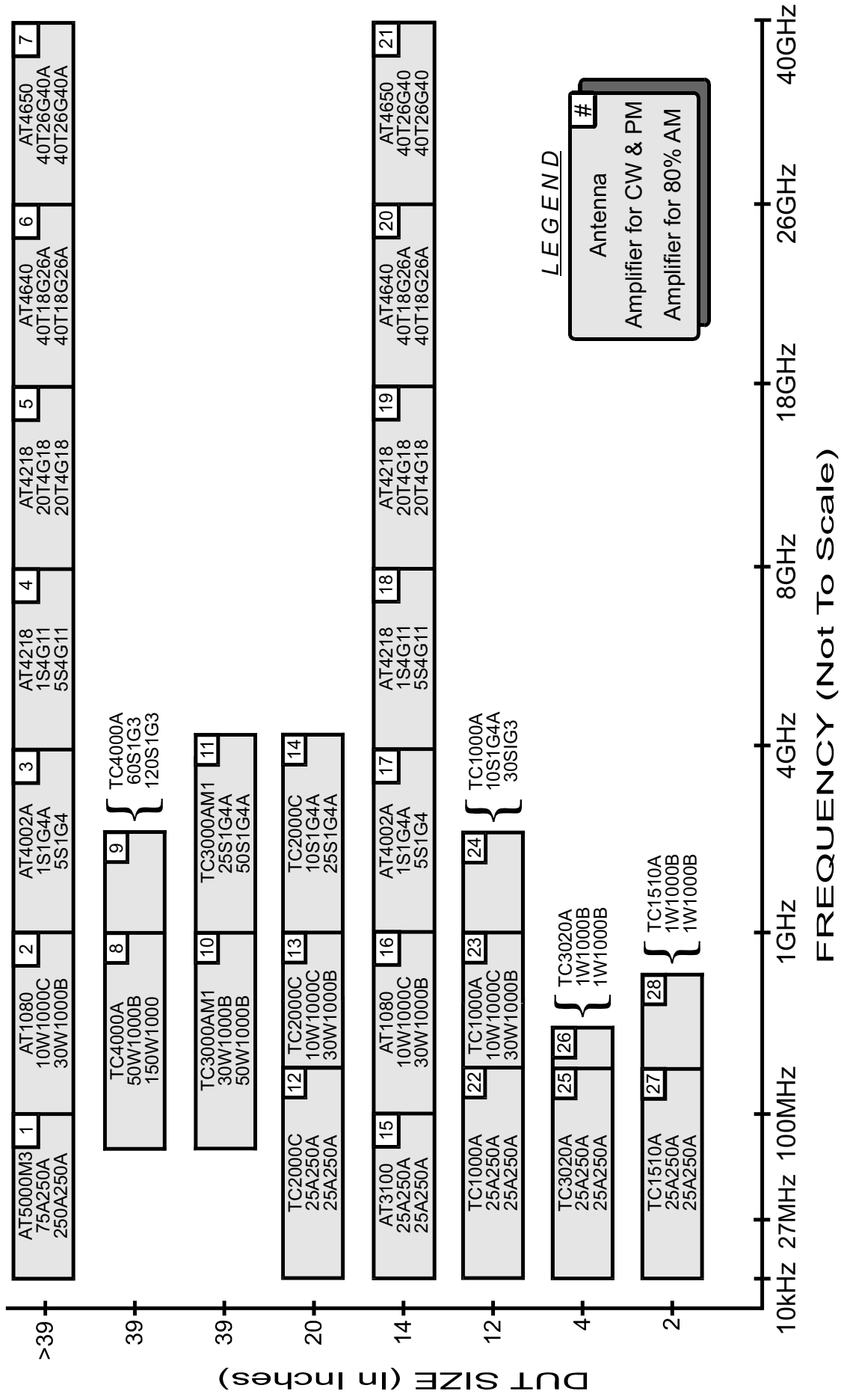
| ITEM 2 | FREQUENCY | AMPLIFIER (CW & PULSE) | AMPLIFIER (80% AM) | ANTENNA or CELL | DUT PLACEMENT |
|-----------|-------------------|---------------------------|-----------------------|--------------------|------------------|
| 1 | 10 kHz – 100 MHz | 75A250A | 500A100A | AT5000M3 | 1 meter |
| 2 | 100 MHz – 1 GHz | 10W1000C | 30W1000B | AT1080 | 1 meter |
| 3 | 1 GHz – 4 GHz | 1S1G4A | 5S1G4 | AT4002A | 1 meter |
| 4 | 4 GHz – 8 GHz | 1S4G11 | 20T4G18 | AT4218 | 3 meters |
| 5 | 8 GHz – 18 GHz | 20T4G18 | 20T4G18 | AT4218 | 3 meters |
| 6 | 18 GHz – 26 GHz | 40T18G26A | 40T18G26A | AT4640 | 3 meters |
| 7 | 26 GHz – 40 GHz | 40T26G40A | 40T26G40A | AT4650 | 3 meters |
| 8 | 80 MHz – 1 GHz | 50W1000B | 150W1000 | TC4000A | 3 meters |
| 9 | 1 GHz – 2.7 GHz | 60S1G3 | 120S1G3 | TC4000A | 3 meters |
| 10 | 80 MHz – 1 GHz | 30W1000B | 50W1000B | TC3000AM1 | 1.5 meters |
| 11 | 1 GHz – 4.2 GHz | 25S1G4A | 50S1G4A | TC3000AM1 | 1.5 meters |
| 12 | 10 kHz – 250 MHz | 75A250A | 25A250A | TC2000C | < 1 meter |
| 13 | 250 MHz – 1 GHz | 10W1000C | 30W1000B | TC2000C | <1 meter |
| 14 | 1 GHz – 4.2 GHz | 10S1G4A | 25S1G4A | TC2000C | <1 meter |
| 15 | 10 kHz – 100 MHz | 25A250A | 25A250A | AT3100 | Between |
| 16 | 100 MHz – 1 GHz | 10W1000C | 30W1000B | AT1080 | 1 meter |
| 17 | 1 GHz – 4 GHz | 1S1G4A | 5S1G4 | AT4002A | 1 meter |
| 18 | 4 GHz – 8 GHz | 1S4G11 | 20T4G18 | AT4218 | 3 meters |
| 19 | 8 GHz – 18 GHz | 20T4G18 | 20T4G18 | AT4218 | 3 meters |
| 20 | 18 GHz – 26 GHz | 40T18G26A | 40T18G26A | AT4640 | 3 meters |
| 21 | 26 GHz – 40 GHz | 40T26G40A | 40T26G40A | AT4650 | 3 meters |
| 22 | 10 KHz – 250 MHz | 75A250A | 25A250A | TC1000A | < 1 meter |
| 23 | 250 MHz – 1 GHz | 10W1000C | 30W1000B | TC1000A | <1 meter |
| 24 | 1 GHz – 2.7 GHz | 10S1G4A | 30S1G3 | TC1000A | <1 meter |
| 25 | 10 kHz – 250 MHz | 25A250A | 25A250A | TC3020A | Center of Cell |
| 26 | 250 MHz – 375 MHz | 1W1000B | 1W1000B | TC3020A | Center of Cell |
| 27 | 10 kHz – 250 MHz | 25A250A | 25A250A | TC1510A | Center of Cell |
| 28 | 250 MHz – 750 MHz | 1W1000B | 1W1000B | TC1510A | Center of Cell |

Table 1

¹ The RF fields generated by the products recommended in this application note are at a distance of one meter unless otherwise noted.

² The Item numbers match the Block numbers on the enclosed Product Selection Flow Chart.

Equipment Selection Chart required to generate 10V/m (CW, PM, & 80% AM) @ a distance of 1-3m. (See table for details)



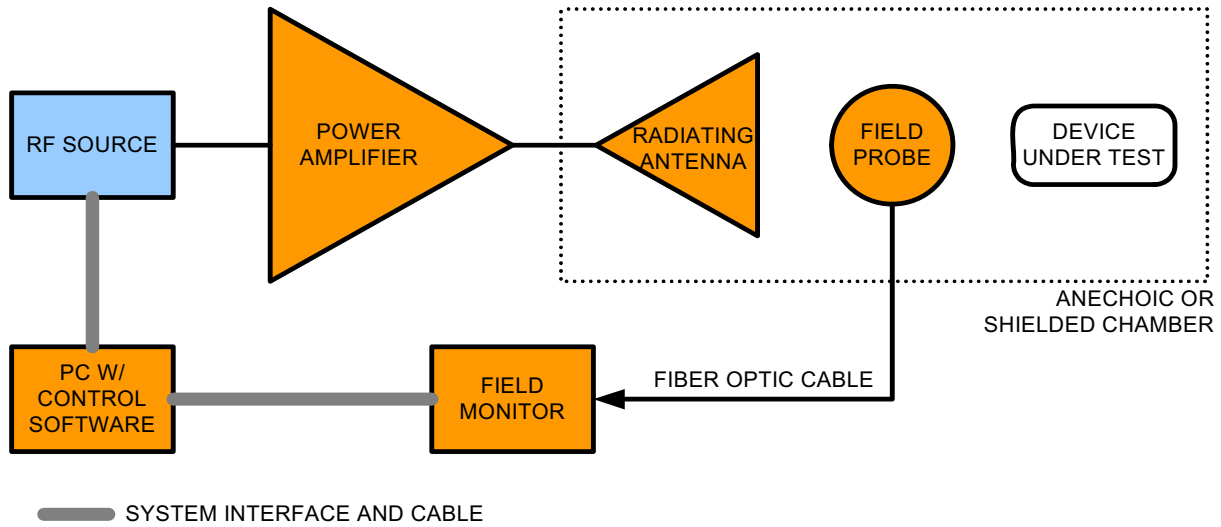
LEGEND

- # Antenna
- Amplifier for CW & PM
- Amplifier for 80% AM

* The numbered cells represent either Amplifier / Antenna or Amplifier / Cell combinations. The actual distance from the field generator to the DUT may vary from 1 meter. See Table 1 for details.

Typical Pre-Compliance Radiated Immunity Test Systems

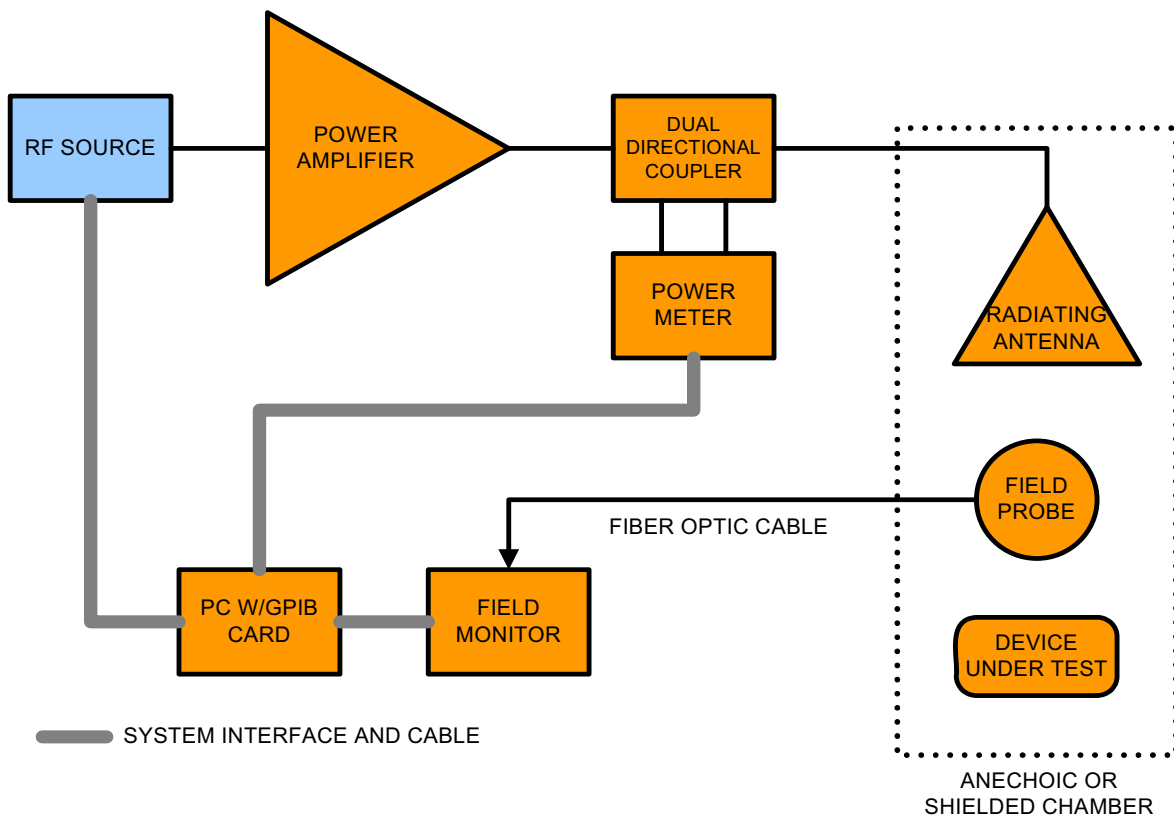
(Use in applications that call for “loop leveled” or “real-time leveled”)



BASIC LOOP LEVELED SYSTEM

Full Compliance Radiated Immunity Test Systems

(Use in applications that call for “substitution method” testing)



Fully Automated Multi-Band System
Full Compliance Radiated Immunity Test Systems
(Use in applications that call for "substitution method" testing)

