Application Note 33A

Equipment Packages configured for RADIATED IMMUNITY TESTING per the European Union's EMC DIRECTIVES (2004/108/EC & 89/336/EEC) and the MEDICAL DEVICES DIRECTIVE (MDD 93/42/EEC)

To test for either of the two EMC DIRECTIVES, select package A, B, C, or D

PACKAGE A

Use to test for the Generic Immunity of Residential and Light Industrial equipment at a distance of **1 meter** from an antenna per EN 61000-6-1

Frequency range	80 MHz - 1 GHz	1 GHz - 2 GHz	2 GHz - 2.7 GHz
Field Level	3 V/m	3 V/m	1 V/m
Modulation	80% 1 kHz AM	80% 1 kHz AM	80% 1 kHz AM

Model	Description	Frequency	Power
10W1000C	RF Power Amplifier	500 kHz -1000 MHz	10 Watts
1S1G4A	RF Power Amplifier	0.8 - 4.2 GHz	1 Watt
DC3001A	Dual Directional Coupler	100 kHz - 1000 MHz	100 Watts
DC7144A	Dual Directional Coupler	0.8 - 4.2 GHz	400 Watts
AT6080	Log-Periodic Antenna	80 MHz - 6 GHz	3000 Watts
PM2002	Power Meter		
PH2000	Power Head	10 kHz - 8 GHz	-60 to +20 dBm
MP06000	Field Monitoring Package	100 kHz - 6 GHz	
SG6000	Signal Generator	100 kHz - 6 GHz	
SW1006	EMC Test Software		

PACKAGE B

Use to test for the Generic Immunity of Residential and Light Industrial equipment at a distance of **3 meters** from an antenna per EN 61000-6-1

Frequency range	80 MHz - 1 GHz	1 GHz - 2 GHz	2 GHz - 2.7 GHz
Field Level	3 V/m	3 V/m	1 V/m
Modulation	80% 1 kHz AM	80% 1 kHz AM	80% 1 kHz AM

Model	Description	Frequency	Power
30W1000B	RF Power Amplifier	1 - 1000 MHz	30 Watts
10S1G4A	RF Power Amplifier	0.8 - 4.2 GHz	10 Watts
DC3001A	Dual Directional Coupler	100 kHz - 1000 MHz	100 Watts
DC7144A	Dual Directional Coupler	0.8 - 4.2 GHz	400 Watts
AT6080	Log-Periodic Antenna	80 MHz - 6 GHz	3000 Watts
PM2002	Power Meter		
PH2000	Power Head	10 kHz - 8 GHz	-60 to +20 dBm
MP06000	Field Monitoring Package	100 kHz - 6 GHz	
SG6000	Signal Generator	100 kHz - 6 GHz	
SW1006	EMC Test Software		

PACKAGE C

Use to test for the Generic Immunity of Heavy Industrial equipment
at a distance of **1 meter** from an antenna per EN 61000-6-2

Frequency range	80 MHz - 1 GHz	1 GHz - 2 GHz	2 GHz - 2.7 GHz
Field Level	10 V/m	3 V/m	1 V/m
Modulation	80% 1 kHz AM	80% 1 kHz AM	80% 1 kHz AM

Model	Description	Frequency	Power
30W1000B	RF Power Amplifier	1 - 1000 MHz	30 Watts
1S1G4	RF Power Amplifier	0.8 - 4.2 GHz	1 Watt
DC3001A	Dual Directional Coupler	100 kHz - 1000 MHz	100 Watts
DC7144A	Dual Directional Coupler	0.8 - 4.2 GHz	400 Watts
AT6080	Log-Periodic Antenna	80 MHz - 6 GHz	3000 Watts
PM2002	Power Meter		
PH2000	Power Head	10 kHz - 8 GHz	-60 to +20 dBm
MP06000	Field Monitoring Package	100 kHz - 6 GHz	
SG6000	Signal Generator	100 kHz - 6 GHz	
SW1006	EMC Test Software		

PACKAGE D

Use to test for the Generic Immunity of Heavy Industrial equipment
at a distance of **3 meters** from an antenna per EN 61000-6-2

Frequency range	80 MHz - 1 GHz	1 GHz - 2 GHz	2 GHz - 2.7 GHz
Field Level	10 V/m	3 V/m	1 V/m
Modulation	80% 1 kHz AM	80% 1 kHz AM	80% 1 kHz AM

Model	Description	Frequency	Power
150W1000	RF Power Amplifier	80 - 1000 MHz	150 Watts
10S1G4A	RF Power Amplifier	0.8 - 4.2 GHz	10 Watts
DC6180A	Dual Directional Coupler	80 - 1000 MHz	600 Watts
DC7144A	Dual Directional Coupler	0.8 - 4.2 GHz	400 Watts
AT6080	Log-Periodic Antenna	80 MHz - 6 GHz	3000 Watts
PM2002	Power Meter		
PH2000	Power Head	10 kHz - 8 GHz	-60 to +20dBm
MP06000	Field Monitoring Package	100 kHz - 6 GHz	
SG6000	Signal Generator	100 kHz - 6 GHz	
SW1006	EMC Test Software		

Please note that this application note does not address the conducted immunity testing required of the above standards. The CI00250 RF Conducted Immunity Generator has been designed to address this need. Please contact an applications engineer at AR RF/Microwave Instrumentation 800-933-8181 for guidance in applying this product.

MEDICAL DEVICES DIRECTIVE (MDD 93/42/EEC)
For testing to the Medical Directive select packages E or F

PACKAGE E

Use to conduct EMC testing of Medical **Non-Life Support** Equipment at a distance of **3 meters** from an antenna per EN 60601-1-2, 2nd Edition

Frequency range	80 MHz - 2.5 GHz
Field Level	3 V/m
Modulation	80% 1 kHz AM
	80% 2 Hz AM

Model	Description	Frequency	Power
30W1000B	RF Power Amplifier	1 - 1000 MHz	30 Watts
10S1G4A	RF Power Amplifier	0.8 - 4.2 GHz	10 Watts
DC3001A	Dual Directional Coupler	100 kHz - 1000 MHz	100 Watts
DC7144A	Dual Directional Coupler	0.8 - 4.2 GHz	400 Watts
AT6080	Log-Periodic Antenna	80 MHz - 6 GHz	3000 Watts
PM2002	Power Meter		
PH2000	Power Head	10 kHz - 8 GHz	-60 to +20dBm
MP06000	Field Monitoring Package	100 kHz - 6 GHz	
SG6000	Signal Generator	100 kHz - 6 GHz	
SW1006	EMC Test Software		

PACKAGE F

Use to conduct EMC testing of Medical **Life Support** Equipment at a distance of **3 meters** from an antenna per EN 60601-1-2, 2nd Edition

Frequency range	80 MHz - 2.5 GHz
Field Level	10 V/m
Modulation	80% 1 kHz AM
	80% 2 Hz AM

Model	Description	Frequency	Power
150W1000	RF Power Amplifier	80 - 1000 MHz	150 Watts
50S1G4	RF Power Amplifier	0.8 - 4.2 GHz	50 Watts
DC6180A	Dual Directional Coupler	80 - 1000 MHz	600 Watts
DC7144A	Dual Directional Coupler	0.8 - 4.2 GHz	400 Watts
AT6080	Log-Periodic Antenna	80 MHz - 6 GHz	3000 Watts
AT4418	Double Ridge Horn Antenna	1 - 18 GHz	300 Watts
PM2002	Power Meter		
PH2000	Power Head	10 kHz - 8 GHz	-60 to +20dBm
MP06000	Field Monitoring Package	100 kHz - 6 GHz	
SG6000	Signal Generator	100 kHz - 6 GHz	
SW1006	EMC Test Software		

Please note that this application note does not address the conducted immunity testing required of the above standards. The CI00250 can meet all the above standards as per IEC 61000-4-6 requirements. Please contact an applications engineer at AR RF/Microwave Instrumentation 800-933-8181.

General IEC 61000-4-3 Edition 3: 2006 equipment selection

1 Meter Distance of Antenna from the EUT

Test Level (cal level)	Product Description	Frequency ranges		
		80 - 1000 MHz	1 - 4.2 GHz	4.2 - 6+ GHz
Level 1 1V/m (1.8V/m)	Amplifier Antenna Directional coupler	10W1000C AT6080 DC3001A	1S1G4A AT4418 DC7144A	1S4G11 ⊂Same DC7440A
Level 2 3V/m (5.4V/m)	Amplifier Antenna Directional coupler	10W1000C AT6080 DC3001A	1S1G4A AT4418 DC7144A	1S4G11 ⊂Same DC7440A
Level 3 10V/m (18V/m)	Amplifier Antenna Directional coupler	50W1000B AT6080 DC3002A	5S1G4 AT4418 DC7144A	5S4G11 ⊂Same DC7440A
Level X: Medical/Scooter 20V/m (36V/m)	Amplifier Antenna Directional coupler	150W1000 AT6080 DC6180A	25S1G4A AT4418 DC7144A	15S4G8A ⊂Same DC7440A
Level 4 30V/m (54V/m)	Amplifier Antenna Directional coupler	250W1000A AT6080 DC6180A	50S1G4A AT4418 DC7144A	35S4G8A* ⊂Same DC7440A

3 Meter Antenna Distance from EUT

Test Level (cal level)	Product Description	Frequency ranges		
		80 - 1000 MHz	1 - 4.2 GHz	4.2 - 6+ GHz
Level 1 1V/m (1.8V/m)	Amplifier Antenna Directional coupler	10W1000C AT6080 DC3001A	1S1G4A AT4418 DC7144A	1S4G11 ⊂Same DC7440A
Level 2 3V/m (5.4V/m)	Amplifier Antenna Directional coupler	10W1000C AT6080 DC3001A	10S1G4A AT4418 DC7144A	5S4G11 ⊂Same DC7440A
Level 3 10V/m (18V/m)	Amplifier Antenna Directional coupler	150W1000 AT6080 DC6180A	50S1G4A AT4418 DC7144A	35S4G8A* ⊂Same DC7440A
Level X: Medical/Scooter 20V/m (36V/m)	Amplifier Antenna Directional coupler	500W1000A AT6080 DC6180A	100S1G4 AT4418 DC7144A	35S4G8A* AT4003A DC7440A
Level 4 30V/m (54V/m)	Amplifier Antenna Directional coupler	1000W1000C* AT6080 DC6280AM1	200S1G4A* AT4418 DC7144A	90S4G8* AT4003A DC7440A

Note: All the antennas listed above were chosen for their broad beamwidth to meet the 1.5m x 1.5m uniform field requirement at 3 meters. While there are higher gain antennas available that require less power, their narrowband characteristics result in a uniform field that is less than that required. In general, beamwidth is inversely proportional to antenna gain. A case in point is the AT4003A recommended for level 4 testing from 4.2 GHz to in excess of 6 GHz. It is used without the gain enhancer attached to meet 1.5m x 1.5m field uniformity requirement.

* Please refer to Application Note 40A titled Subampability which explains the ability of these amplifiers to be combined to increase power and/or be separated to use sections in different locations.

Additional recommended equipment

MP06000 RF field monitor and laser power probe for 16 point field calibration
SG6000 Signal generator (100 kHz - 6 GHz)
PM2002 & PH2000 power meter and head for monitoring forward RF power from the amplifier
SC1000 RF System Controller switch matrix to facilitate system integration and reconfiguration
SW1006 RF Test Software to fully automate testing

Complete systems can be custom designed to meet your unique requirements. Please contact an applications engineer at 1-800-933-8181 to discuss your needs.