HEWLETT® PACKARD

EMC Accessories Catalog

A fully equipped electromagnetic compatibility (EMC) laboratory requires a wide variety of instruments, equipment, and accessories to allow measurements to be made accurately and efficiently. On a smaller scale, design engineers and test technicians also need an assortment of measurement tools to evaluate their product designs prior to formal EMC compliance testing.

This EMC accessories catalog helps you quickly find the equipment you need to make your EMC measurements.

You'll find a large selection of antennas, current probes, LISNs, cables, tripods, preamplifiers, and other accessories. Each is designed to enhance your EMC measurement capabilities and provide lasting value.

Hewlett-Packard is continually expanding its line of EMC accessories to ensure the most comprehensive line of EMC test equipment available. Be sure to check with your local HP sales representative if you need an item that is not listed in this product overview.

Transducers and Accessories

HP 11966 Series Antennas

HP 11967 Series Conducted EMC Accessories

HP 11968 Series EMC Positioning Accessories

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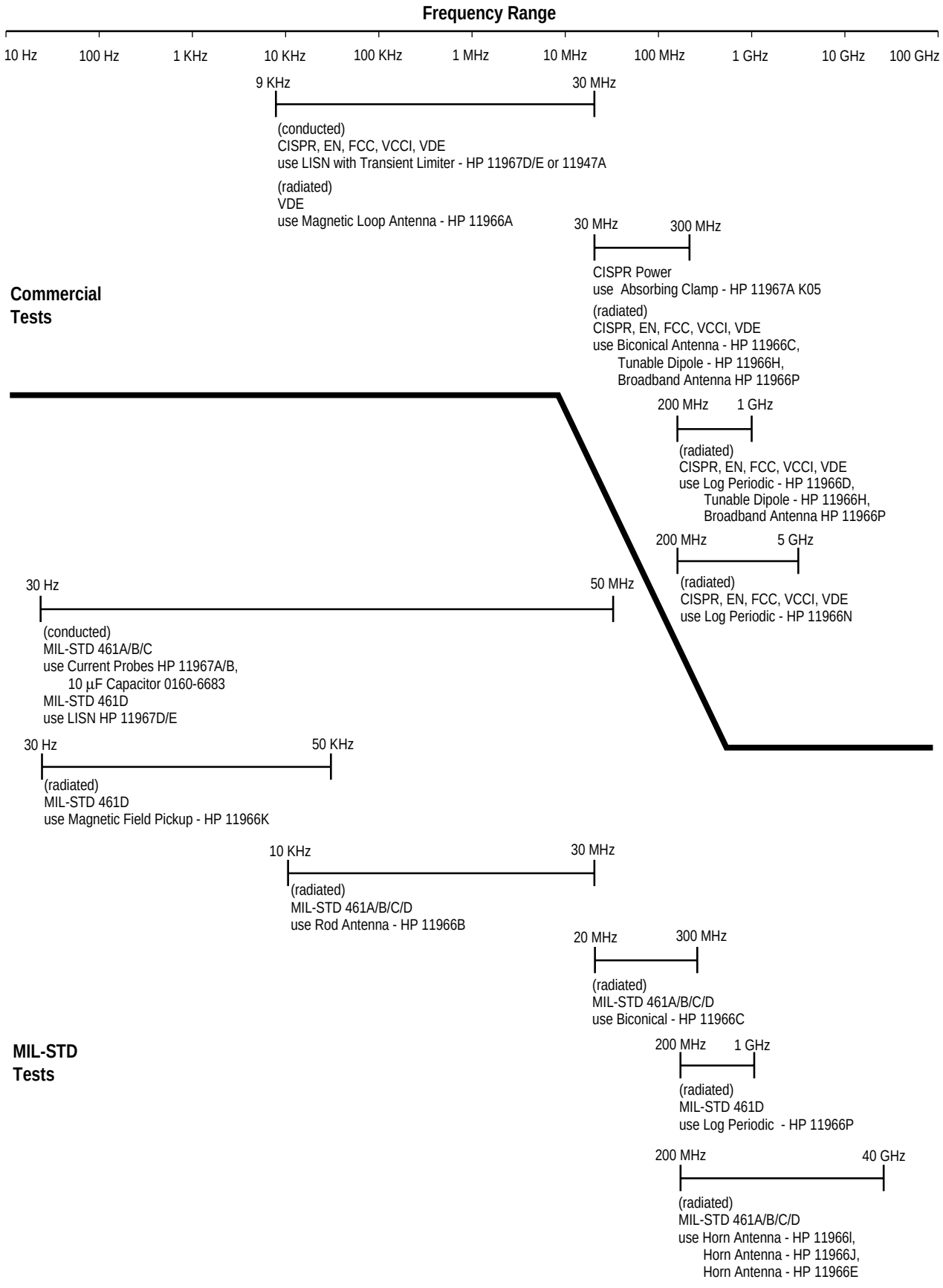
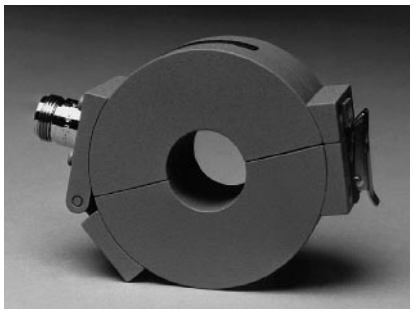
Listed by Hewlett-Packard Model Number

Recommended Transducers for Commercial and MIL-STD EMI Testing



Conducted EMI Accessories

HP 11967A Current Probe
This current probe is designed for MIL-STD 461A/B/C CE-03 measurements of conducted emissions on power and has a constant transfer impedance of 0.5 Ω (±2 dB) from 50 kHz to 50 MHz.



Frequency Range	15 kHz - 50 MHz
Max Primary Power	350 A, DC - 60 Hz
Aperature Diameter	25 mm (1 in)
Connector Type	N female

HP 11967B Current Probe
This current probe is designed for MIL-STD 461A/B/C CE-01 and 461D CE101 measurements of conducted emissions on power and interconnecting leads. The probe has a constant transfer impedance of 0.3 Ω (±2 dB) from 2 kHz to 2 MHz.

Frequency Range	20 Hz - 2 MHz
Max Primary Power	100 A, DC - 400 Hz
Aperature Diameter	25 mm (1 in)
ConnectorType	N female

0160-6683 10 µF Capacitor
Many MIL-STD 461A/B/C conducted emissions test setups require a 10 µF capacitor be placed between each line being tested and the metallic tabletop surface where the test is being made.

Capacitance Value	10 µF ± 10%
Maximum Voltage	600 VDC, 250 V at 400 Hz
Maximum Current	50A
Connector Type	1/4-28 feed-thru stud

Conducted EMI Accessories

HP 11967D 10A Line Impedance Stabilization Network

This V-network, two line, single phase line impedance stabilization network (LISN) meets the requirements of the FCC, VDE, and the European Norms (ENs) for commercial conducted emissions testing. NEMA power outlet comes standard with product.

Frequency Range	9 kHz - 30 MHz
Power Source Frequency	DC - 60 Hz
Maximum Current	10 A
Maximum Voltage	460 VAC line-to-line 250 VAC line-to-ground
Network Inductance	50 µH - 250 µH
Network Impedance	50 Ω
Connector Type	BNC female
Option 001	SCHUKO outlet
Option 002	British outlet

HP 11967E 25A Line Impedance Stabilization Network

This LISN is a two line single phase device. It has a standard NEMA power outlet adapter.

Frequency Range	9 kHz - 30 MHz
Power Source Frequency	DC - 60 Hz
Maximum Current	25 A
Maximum Voltage	460 VAC line-to-line 250 VAC line-to-ground
Network Inductance	30 µH - 250 µH
Network Impedance	50 Ω
Connector Type	BNC female
Option 001	SCHUKO outlet
Option 002	British outlet
Option 003	Australian outlet

HP 11967A K05 Absorbing Clamp

The absorbing clamp is used in CISPR 14 based tests to measure interference power levels on cables connected to electronic and electrical devices.

Frequency Range	30 MHz - 1 GHz
Aperature Size	27 mm
Connector Type	BNC female

Antennas[1]

HP 11966A Active Magnetic Loop Antenna

The HP 11966A active loop antenna was designed specifically for three-meter VDE 0871 Limit B magnetic-emissions testing. A built-in preamplifier in the antenna base matches the low impedance of the loop with the 50 watt input of the EMI receiver and provides a consistent, linear antenna factor over the frequency range of the antenna. A built-in saturation indicator alerts the operator to overload conditions. The standard unit is supplied with a 120 VAC/60 Hz battery charger. Option 220 replaces the standard battery charger with a 220 VAC/50 Hz unit.

Frequency Range	10 kHz - 30 MHz
Loop Diameter	600 mm (23.6 inches)
Battery Type	Rechargeble, sealed lead-acid
Impedance	50 Ω
Connector Type	BNC female
Mounting Base	(to attach unit to tripod) 1/4 inch x 20 female thread

Frequency (MHz)	Typical Antenna Factor (dB)
0.01	17.7
0.02	13.4
0.05	10.0
0.07	10.4
0.1	10.2
0.15	10.1
0.25	10.1
0.5	10.2
0.75	10.3
1	10.4
2	10.5
3	10.5
4	10.6
5	10.6
10	10.6
15	10.3
20	9.6
25	8.6
30	7.1

HP 11966B Active Monopole Antenna

This broadband active rod E-field antenna has a preamplifier built into its base. This design provides sensitivity, high dynamic range, and a flat antenna factor, yet eliminates the need for manual tuning or bandswitching. A built-in saturation indicator alerts the operator to overload conditions. The standard unit is supplied with a 120 VAC/60 Hz battery charger. Option 220 replaces the standard battery charger with a 220 VAC/50 Hz unit.

Frequency Range	30 Hz - 50 MHz
Internal Atten	10 and 30 dB
Saturation Point	22 V/m (using 30 dB atten)
Battery Type	Rechargeble, sealed lead-acid
Impedance	50 Ω
Connector Type	BNC female
Mounting Base	(to attach unit to tripod) 1/4 inch x 20 female thread

Frequency (MHz)	Typical Antenna Factor (dB)
0.0001	5.3
0.0003	1.7
0.0005	1.2
0.0007	1.1
0.0009	1.0
0.001	1.1
0.003	0.9
0.005	0.8
0.007	0.9
0.009	0.6
0.01	1.0
0.03	0.7
0.05	0.6
0.07	0.5
0.09	0.5
0.1	0.6
0.3	0.5
0.5	0.5
0.7	0.5
0.9	0.6
1	0.6
3	1.4
5	1.6
7	1.9
9	2.2
20	2.9
50	9.6

1. All antennas sold by HP are individually calibrated. They include a calibration certificate showing actual performance data. The antenna factors shown in this catalog are intended to show typical performance only.

Antennas [1]

HP 11966A K24
Biconical Antenna

The rugged balun design of this antenna makes it especially suitable for susceptibility tests where high input powers are needed.

Frequency Range	20 MHz - 300 MHz
Max Contin Power	2000
VSWR (avg)	1.9 : 1
Impedance	50 Ω
Connector Type	N female
Mounting Base	1/4 inch x 20 female thread

HP 11966A K38
Biconical Antenna

This versatile antenna is useful for both emissions and immunity measurements and can handle up to 300 watts of continuous power.

Frequency Range	30 MHz - 300 MHz
Max Contin Power	300 W
VSWR (avg)	< 2.5 : 1
Impedance	50 Ω
Connector Type	N female
Mounting Base	1/4 inch x 20 female thread

HP 11955A
Biconical Antenna

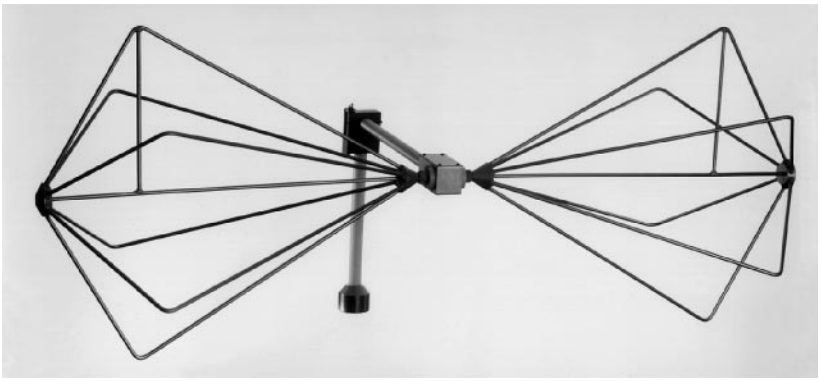
This economical antenna has typical antenna factors.

Frequency Range	30 MHz - 300 MHz
Max Contin Power	0.5 W
VSWR (avg)	1.8 : 1
Impedance	50 Ω
Connector Type	N female
Mounting Base	1/4 inch x 20 female thread

HP 11966C
Biconical Antenna

This state-of-the-art antenna uses ferrites in the balun and along the feedline to eliminate common-mode currents.
It employs a novel element-cage design that allows an extremely smooth response curve.

Frequency Range	30 MHz - 300 MHz
Max Contin Power	0.5 W
VSWR (avg)	< 1.8 : 1 (with 6 db pads)
Impedance	50 Ω
Connector Type	N female
Mounting Base	1/4 inch x 20 female thread



1. All antennas sold by HP are individually calibrated except for HP 11955A and HP 11956A which have typical antenna factors. They include a calibration certificate showing actual performance data. The antenna factors shown in this catalog are intended to show typical performance only.

	HP 11966A K24	HP 11966A K38
Frequency (MHz)	**Antenna Factors (dB)**	
20	11.5	—
30	13.0	13.5
40	14.7	15
50	12.2	12.7
60	10.1	10.4
70	8.9	8.9
80	8.0	8.5
90	8.9	8.8
100	9.6	9.6
110	11.3	11.3
120	12.8	12.6
130	14.5	14.1
140	15.9	16.0
150	16.5	16.6
160	16.0	16.5
170	15.3	15.6
180	14.5	14.8
190	14.5	14.5
200	13.8	14.1
210	14.0	14.1
220	14.5	14.4
230	15.8	15.8
240	16.8	17.0
250	18.3	18.9
260	19.9	20.3
270	21.4	22.0
280	22.6	23.1
290	20.9	21.0
300	24.6	22.7

Frequency (MHz)	**Typical Antenna Factor (dB)**
30	19.0
40	17.9
50	13.2
60	9.0
70	6.6
80	7.6
90	9.2
100	10.5
110	12.0
120	14.0
130	16.3
140	18.4
150	19.4
160	19 0
170	18.3
180	17.6
190	17.0
200	16.7
210	17.0
220	17.4
230	18.2
240	19.1
250	20.4
260	22.4
270	24.5
280	25.5
290	25.0
300	24.9

Antennas [1]

HP 11956A
Log Periodic Antenna

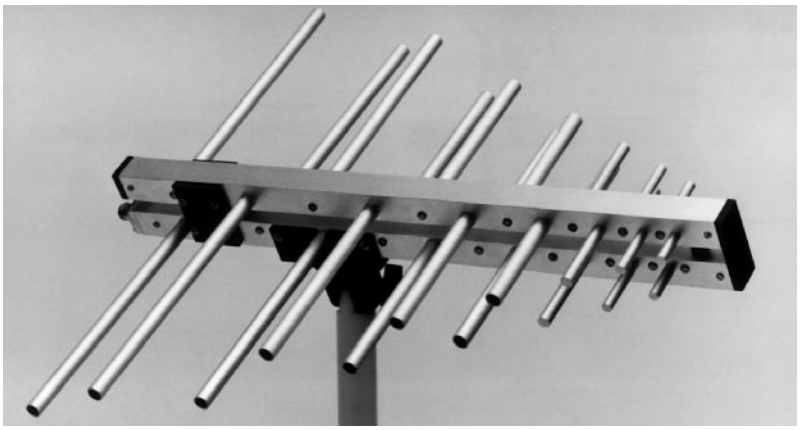
This economical antenna has typical antenna factors.

Frequency Range	200 MHz - 1 GHz
VSWR (avg)	< 2 : 1
Impedance	50 Ω
Connector Type	Type-N
Mounting Base	1/4 inch x 20 female thread

HP 11966D
Log Periodic Antenna

The HP 11966D is a broadband, relatively high-gain antenna that is suitable for both commercial and military EMC measurements.

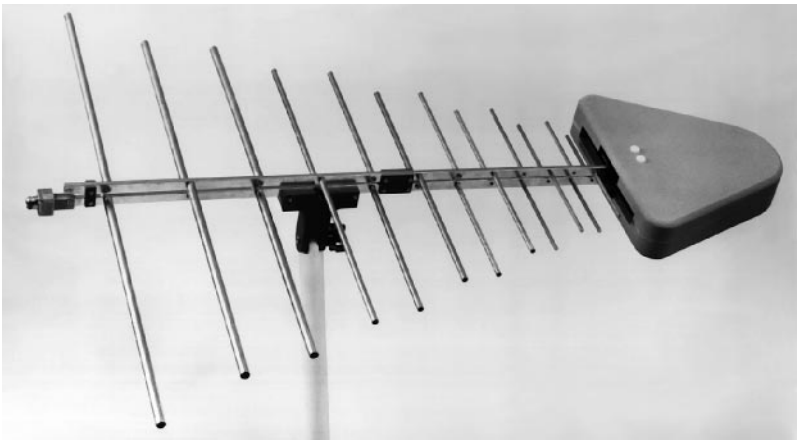
Frequency Range	200 MHz - 1 GHz
Max Contin Power	1000 W
VSWR (avg)	< 2 : 1
Impedance	50 Ω
Connector Type	N female
Mounting Base	1/4 inch x 20 female thread



Frequency (MHz)	Typical Antenna Factor (dB)
200	17 0
225	14.8
250	14 3
275	14.9
300	16.8
325	17.5
350	18.7
375	17.5
400	17.1
425	17.4
450	18.4
475	19.8
500	20.5
525	19.2
550	19.5
575	19.7
600	20.7
625	21.5
650	22.0
675	21.6
700	21.6
725	22.1
750	22.7
775	22.8
800	22.6
825	22.6
850	23.2
875	24.0
900	24.4
925	24.3
950	23.9
975	24.4
1000	25.1

HP 11966N
Log Periodic Antenna

This antenna has similar performance characteristics to the HP 11966D, but has an extended frequency range to 5 GHz. This is useful for some of the new commerical test requirements, such as FCC part 15 limits for high-speed unintentional radiators, which now extend beyond 1 GHz.



Frequency Range	200 MHz - 5 GHz
Max Contin Power	80 W
VSWR (avg)	2 : 1
Impedance	50 Ω
Connector Type	N female
Mounting Base	1/4 inch x 20 female thread

Frequency (GHz)	Antenna Factor (dB)
0.2	10
0.5	17
1.0	23
1.5	27
2.0	29
2.5	32
3.0	34
3.5	37
4.0	38
4.5	41
5.0	42

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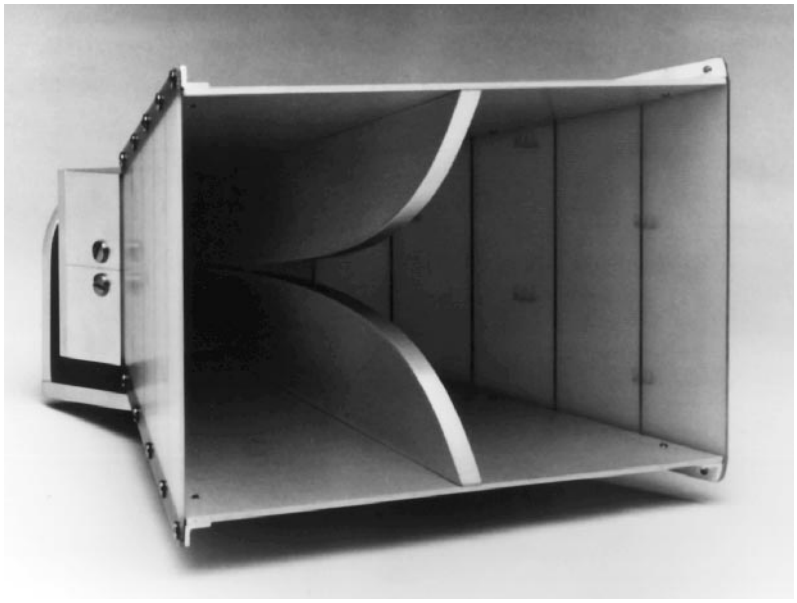
Antennas[1]

HP 11966E Double Ridged Waveguide Horn Antenna

This antenna covers a very broad frequency range and provides excellent gain and VSWR characteristics. It is suitable for receiving and transmitting signals and can handle up to 300 watts of power.

Frequency Range	1 GHz - 18 GHz
Maxi Contin Power	300 W
VSWR (avg)	< 1.5 : 1
Impedance	50 Ω
Connector Type	N female
Mounting Base	1/4 inch x 20 female thread



Frequency (MHz)	Typical Antenna Factor (dB)
1000	24.4
1500	25.7
2000	28.4
2500	29.4
3000	31.0
3500	32.2
4000	33.8
4500	33 0
5000	34.7
5500	35.4
6000	35.4
6500	35.7
7000	36.5
7500	37 8
8000	38.0
8500	38.1
9000	38.4
9500	38.4
10000	38.5
10500	38.6
11000	39.0
11500	39.3
12000	39.4
12500	39.0
13000	39.9
13500	41.3
14000	41.4
14500	41.3
15000	39.9
15500	37.5
16000	38.2
16500	39.8
17000	41.7
17500	44.6
18000	46.9

HP 11966I Horn Antenna

This horn covers the RF range and is very useful as a receiving antenna for MIL-STD emissions tests. Its high power handling capability also makes it an excellent transmitting antenna for susceptibility/immunity tests.

Frequency Range	200 MHz - 2 GHz
Max Contin Power	800 W
VSWR (avg)	1.6 : 1
Impedance	50 Ω
Connector Type	N female
Mounting Base	1/4 inch x 20 female thread

Frequency (GHz)	Antenna Factor (dB)
0.2	11
0.4	14
0.6	18
0.8	19
1.0	22
1.2	23
1.4	25
1.6	26
1.8	25
2.0	32

HP 11966J Horn Antenna

The double-ridged design of this horn enables it to cover two waveguide bands with a single antenna.

Frequency Range	18 GHz - 40 GHz
Max Contin Power	50 W
VSWR (avg)	1.6 : 1
Impedance	50 Ω
Connector Type	K female
Mounting Base	1/4 inch x 20 female thread

Frequency (GHz)	Antenna Factor (dB)
18	45
20	44
25	46
30	47
35	50
40	46

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Antennas [1]

HP 11966A K30
Passive Rod Antenna
The HP 11966A K30 is a passive broadband electric field monopole transmitting antenna that has a frequency range of 1 kHz to 30 MHz. It features manual band switching between 0.001 to 5 MHz, and 5 to 30 MHz.

Frequency Range	1 kHz - 30 MHz
Max Contin Power	300 W
Impedance	50 Ω
ConnectorType	N female
Mounting Base	1/4 inch x 20 female thread

HP 11966A K12
Passive Loop Set
The HP 11966A K12 passive loop set is designed for measuring shielding effectiveness. It consists of two loop antennas. The first one has a built-in, battery operated preamplifier. The preamplifier provides greater sensitivity and uniform antenna factors. The second antenna is band-selectable in four bands and can accept up to 1 kW input power.

Frequency Range	1 kHz - 30 MHz
Connector Type	BNC on antenna 1 N female on antenna 2
Sensitivity (ant 1)	-29 dB μA/M (@ 1 MHz)
Dynamic Range (ant 1)	116 dB @ 1 MHz
Max Power (ant 2)	1 kW
Mounting Base	1/4 inch x 20 female thread

HP 11966A K40
Royce Field Site Source
The HP 11966A K40 Royce field site source generates radiated emissions of a consistent frequency and amplitude. The emissions are used to create a base standard for a specific test site. The site could be either an indoor or outdoor facility. The Royce source is used in place of a DUT and a normal radiated emissions test is then performed. These test results become the bases by which future site tests are compared. Deviation from the base data could indicate test site problems. Frequency range: 10 MHz to 600 MHz.

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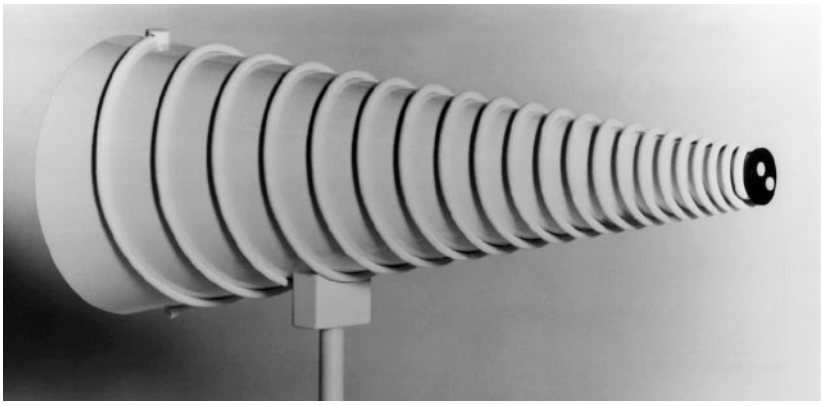
Antennas[1]

HP 11966F Conical Log Spiral Antenna

The HP 11966F was designed specifically for MIL-STD 461A/B/C radiated measurements. Because it is circularly polarized, it can receive fields in any polarity. This eliminates the need to duplicate the measurement in both horizontal and vertical orientation to find maximum emissions.

Frequency Range	200 MHz - 1 GHz
Max Contin Power	100 W
VSWR (avg)	< 2.5 : 1
Impedance	50 Ω
Connector Type	N female
Mounting Base	1/4 inch x 20 female thread

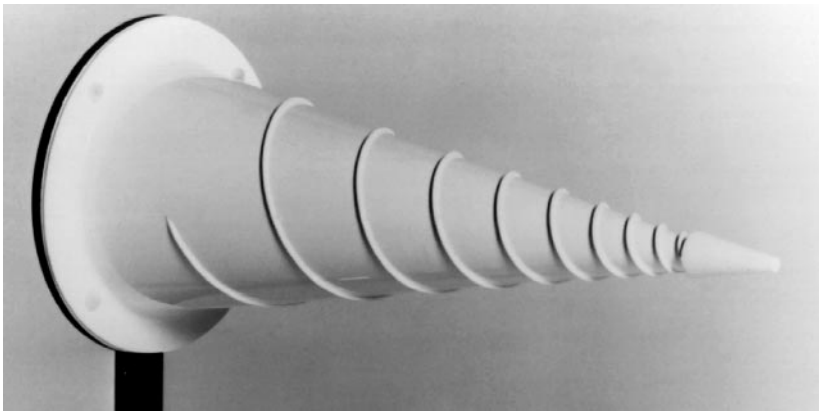


Frequency (MHz)	Typical Antenna Factor (dB)
200	17.0
225	14.8
250	14.3
275	14.9
300	16.8
325	17.5
350	18.7
375	17.5
400	17.1
425	17.4
450	18.4
475	19.8
500	20.5
525	19.2
550	19.5
575	19.7
600	20.7
625	21.5
650	22.0
675	21.6
700	21.6
725	22.1
750	22.7
775	22.8
800	22.6
825	22.6
850	23.2
875	24.0
900	24.4
925	24.3
950	23.9
975	24.4
1000	25.1

HP 11966G Conical Log Spiral Antenna

This antenna is similar to the HP 11966F, but it is designed to operate in the 1 to 10 GHz region. It is ideally suited for MIL-STD 461A/B/C microwave radiated measurements.

Frequency Range	1 GHz - 10 GHz
Max Contin Power	50 W
VSWR (avg)	< 2 : 1
Impedance	50 Ω
Connector Type	N female



Frequency (MHz)	Typical Antenna Factor (dB)
1000	27.1
2000	33.3
3000	36.1
4000	40.4
5000	42.3
6000	43.3
7000	45.1
8000	46.1
9000	47.9
10000	49.9

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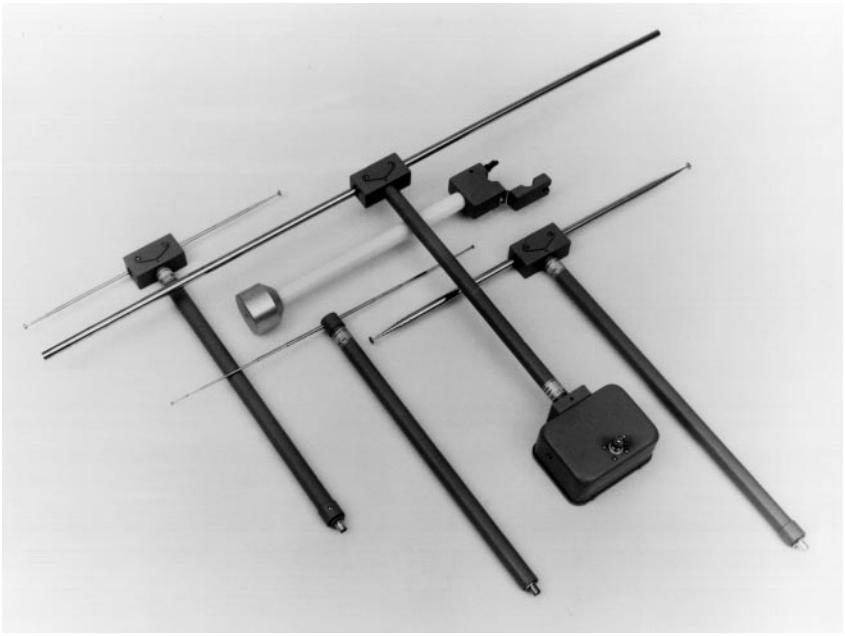
Antennas[1]

HP 11966H Dipole Antenna Set

The HP 11966H dipole antenna set consists of four baluns with adjustable and removable stainless steel elements. They can be used for site-attenuation measurements as well as for general EMI testing. Included are a mounting clamp, five-meter measuring tape, ruler and storage case.



Frequency Range	28 MHz -1 GHz Balun 1: 28 - 60 MHz Balun 2: 60 - 140 MHz Balun 3: 140 - 400 MHz Balun 4: 400 - 1000 MHz
Max Contin Power	20 W
VSWR (avg)	< 1.6 : 1
Impedance	50 Ω
ConnectorType	N female

Frequency (MHz)	Typical Antenna Factor (dB)
30	0.2
40	1.2
50	3.0
60	4.9

Frequency (MHz)	Typical Antenna Factor (dB)
60	4.2
70	5.1
80	6.3
90	8.3
100	9.3
110	10.4
120	11.6
130	11.0
140	12.2

Frequency (MHz)	Typical Antenna Factor (dB)
140	13.0
180	13.7
220	15.7
260	17.7
300	18.3
340	18.8
400	21.5

Frequency (MHz)	Typical Antenna Factor (dB)
400	22.0
500	24.6
600	24.7
700	25.8
800	26.8
900	28.4
1000	28.7

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Antennas[1]

HP 11966K Magnetic Field Pickup Coil

This antenna is designed specifically for MIL-STD 462 RE-01 and RE-101 measurements. The loop is constructed of aluminum and has 36 turns of 7 x 41 Litz wire for lower inductance.

Frequency (kHz)	Typical Antenna Factor (dB)
0.02	84
0.04	78
0.06	74
0.08	72
0.1	70
0.2	64
0.4	58
0.6	54
0.8	52
1.0	50
2.0	44
4.0	38
6.0	34
8.0	32
10.0	30
20.0	25
40.0	24
50.0	23

Frequency Range 20 Hz - 50 kHz
Loop Diameter 133 mm (5.25 inches)
Connector Type BNC female

HP 11967A K06 Cavity Rejection Networks

The HP 11967A K06 cavity rejection networks have a continuously tunable frequency range from 1 GHz to 10 GHz in four bands. They also offer low insertion loss with very sharp resonances.

Frequency Range 1 GHz - 10 GHz
Rejection 80 dB minimum at tuned frequency
Insertion Loss 5 dB or less (avg)
Bandwidth 0.2 % of tuned frequency at 20 dB point and 0.4 % at 10 dB point
Connector Type N female

HP 11967A K23 Bridged-T Rejection Networks

The HP 11967A K23 bridged-T rejection networks are designed for radio frequency interference testing according to various military specifications. The three networks are passive and continuously tunable over the 10 kHz to 1 GHz frequency range.

Frequency Range Network 1: 10 kHz - 100 MHz
Network 2: 100 MHz - 400 MHz
Network 3: 400 MHz - 1 GHz
Maximum Power 2 kW
Connector Type N female

Antennas

HP 11966P
Broadband Antenna

The HP 11966P broadband antenna covers 30 MHz to 1 GHz. This broadband antenna removes the need to change antennas above 200 MHz when making radiated EMI measurements. The antenna's high power handling capability makes it ideal for immunity testing generating fields of up to 10 volts/meter.

Frequency (MHz)	Typical Antenna Factor (dB)
30	18.2
50	8.0
70	5.0
90	8.0
100	9.5
150	11.0
200	10.0
250	12.0
300	13.0
350	14.5
400	16.2
450	16.7
500	18.5
550	19.0
600	19.8
650	20.4
700	21.1
750	22.0
800	23.0
850	23.0
900	23.0
950	25.0
1000	25.0

Frequency Range	30 MHz - 1 GHz
Maximum Continuous Power	130 W
VSWR (avg)	2 : 1
Impedance (nominal)	50 Ω
Connector Type	N (female)

Note: Tripod not included

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EMC Accessory Application Guide

Commercial Measurements

Agency	Test	Frequency Range	Recommended Accessories
FCC	Part 15		
	conducted	450 kHz - 30 MHz	HP 11967D or E LISN
	radiated	30 MHz - 300 MHz	HP 11966C Biconical Antenna
		200 MHz - 1 GHz	HP 11966D Log Periodic Antenna
			or
		28 MHz - 1 GHz	HP 11966H Dipole Antenna Set[1]
			HP 11966P Broadband Antenna
		200 MHz - 5 GHz	HP 11966N Log Periodic Antenna
VDE	0871, 0875		
	conducted	10 kHz - 30 MHz	HP 11967D or E LISN
	radiated	10 kHz - 30 MHz	HP 11966A Active Loop
		30 MHz - 300 MHz	HP 11966C Biconical Antenna
		200 MHz - 1 GHz	HP 11966D Log Periodic Antenna
			or
		28 MHz - 1 GHz	HP 11966H Dipole Antenna Set[1]
CISPR	14		
	power	30 MHz - 300 MHz	HP 11967A KO5 Absorbing Clamp
	22		
	conducted	150 kHz - 30 MHz	HP 11967D or E LISN
	radiated	28 MHz - 1 GHz	HP 11966H Dipole Antenna Set[1]
VCCI			
	conducted	150 kHz - 30 MHz	HP 11967D or E LISN
	radiated	30 MHz - 300 MHz	HP 11966C Biconical Antenna
		200 MHz - 1 GHz	HP 11966D Log Periodic Antenna
			or
		28 MHz - 1 GHz	HP 11966H Dipole Antenna Set[1]
CENELEC	EN 55014		
	conducted	150 kHz - 30 MHz	HP 11967D or E LISN
	radiated	30 MHz - 300 MHz	HP 11966C Biconical Antenna
	EN 55022		
	conducted	150 kHz - 30 MHz	HP 11967D or E LISN
	radiated	30 MHz - 1 GHz	HP 11966C Biconical Antenna
			HP 11966D Log Periodic Antenna
	EN 55011		
	conducted	150 kHz - 30 MHz	HP 11967D or E LISN
	radiated	150 kHz - 1 GHz	HP 11966A Active Loop Antenna
			HP 11966C Biconical Antenna
			HP 11966D Log Periodic Antenna

1. These adjustable dipole antennas are particularly suited for making accurate site attenuation measurements, such as those outlined in the FCC's OST-55 bulletin. They can also be used for making measurements of emissions from the equipment under test (EUT). Broadband antennas, such as biconical and log periodic antennas, are typically used for emissions measurements of the EUT because of their ease of use.

Military Measurements

Agency	Test	Frequency Range	Recommended Accessories
MIL-STD	461/462		
	CE-01	30 Hz - 15 kHz	HP 11967B Current Probe 0160-6683 10 µf Capacitor
	CE-03	15 kHz - 50 MHz	HP 11967A Current Probe 0160-6683 10 µf Capacitor
	CE-06	10 kHz - 12.4 GHz	11729-60014 Preamplifier
	RE-01	30 Hz - 15 kHz	HP 11966K Magnetic Coil
	RE-02	14 kHz - 30 MHz 30 MHz - 300 MHz 200 MHz - 1 GHz 1 GHz - 10 GHz	HP 11966B Active Rod HP 11966C Biconical Antenna HP 11966D Log Periodic Antenna[2] or HP 11966F Conical Spiral Antenna HP 11966E Waveguide Horn Antenna or HP 11966G Conical Spiral Antenna HP 8449B Preamplifier[3]
	RE-03	10 kHz - 30 MHz 30 MHz - 300 MHz 200 MHz - 1 GHz 1 GHz - 10 GHz 1 GHz - 18 GHz 1 GHz - 26.5 GHz	HP 11966B Active Rod HP 11966C Biconical Antenna HP 11966D Log Periodic Antenna or HP 11966F Conical Spiral Antenna HP 11966G Conical Spiral Antenna HP 11966E Waveguide Horn Antenna HP 8449B Preamplifier[3]
	CE-101	30 Hz - 10 kHz	HP 11967B Current Probe 0160-668310 µf Capacitor
	CE-102	10 kHz - 10 MHz	HP 11967D or E LISN
	RE-101	30 Hz - 50 kHz	HP 11966K Magnetic Field Pickup Coil
	RE-102	10 kHz - 30 MHz 30 MHz - 200 MHz 200 MHz - 2 GHz 25 Hz - 18 GHz	HP 11966B Active Rod HP 11966C Biconical Antenna HP 11966I Horn Antenna HP 11966E Double-ridged Horn Antenna

2. MIL-STD radiated emission 02 tests can be performed with either linearly polarized antennas, such as the log periodic, or circularly polarized antennas, such as the conical spiral. Linear antennas offer slightly better gain and antenna factor, but they require separate scans over the full frequency range once in horizontal polarization and again in vertical polarization. While circularly polarized antennas typically are slightly less sensitive, they allow the measurement to be made in a single scan because they can receive signals that have either horizontal or vertical polarization.

3. The HP 8449B microwave preamplifier offers improved sensitivity for microwave emissions measurements. With improved sensitivity, wider receiver bandwidths can be used, result in faster measurement times.

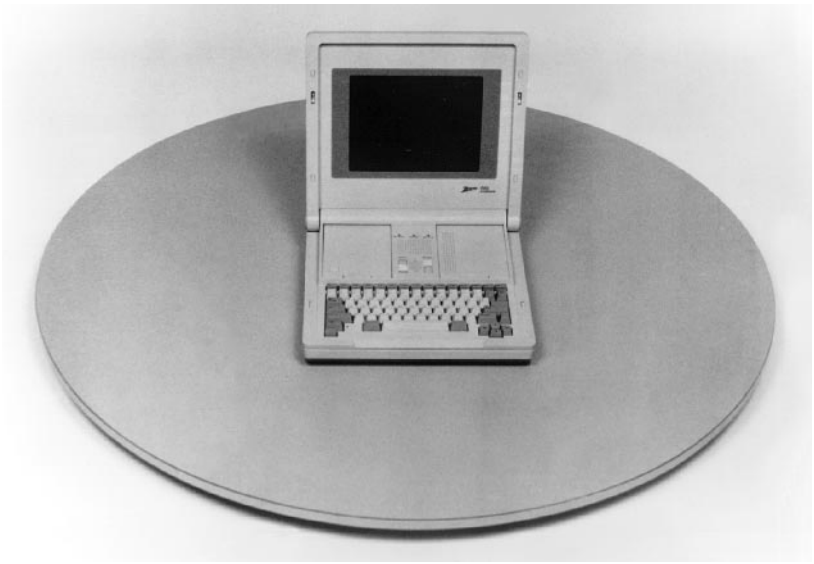
Antenna Masts

HP 11968B Manual Antenna Positioning Mast
The 11968B is a lightweight, portable, antenna positioning mast. Antenna height is controlled with a manual winch. The cross boom can be rotated 90 degrees to enable measurements in horizontal and vertical polarization. This low-cost unit is ideal for precompliance testing and is also suitable for final qualification measurements.

Mast Height	4.4 m (14.4 ft)
Maximum Load at Tip of Cross-Boom	11.3 kg (25 lb)

Equipment Testing Turntable

HP 11968E
Manual Equipment
Test Turntable
This manually operated, non-metallic turntable is suitable for both indoor and outdoor use. It is especially useful in cost sensitive applications, such as precompliance testing.



Diameter	1.2 m (14 ft)
Height	76 mm (3 in)
Maximum Load	455 kg (1000 lb)

HP 85876B Commercial Radiated EMI Measurement Software
The HP 85876B commercial EMI measurement software runs in Microsoft® 3.1 or later, Windows 95 or Windows NT 4.0 PC computing platform. It contains sophisticated measurement algorithms and automation capabilities that can help you increase your EMI test throughput. A built-in report generator enables you to port graphics and data to popular word processing and spread-sheet programs. This software is compatable with the HP 8542E, 8522E, 8546A, 85462A, 8571A, 8572A and other 8566B-based systems. The software also supports tower and turntable controllers Sunol Sciences CON 94 revision 3.1, EMCO 1050, 1060 and 2090 revision 2.0 or later, and Deisel HD100 revision 5.5.

HP 11961A
EMI Measurement Software
Performs radiated and conducted emissions measurements automatically. Measurements are corrected for transducer losses and system gains. Use the report generation capabilities to document measurement results.

HP 85878A
EMI Report Generator
Link the power of HP EMC analyzers or EMI receivers to your PC. Archive and view displays, measurement lists, graphs and more. Generate reports automatically.

HP 11968A K07
Shielded Room Kit
The HP 11968A K07 shielded room kit provides the cables and bulkhead connector to interface either the HP 11968A antenna mast or the HP 11968D turntable inside a shielded room to the controllers outside the room.

Cables[1]

HP 11966L
This 10 meter (32.8 ft) antenna cable is constructed of RG-214/U coaxial cable with type-N male connectors at both ends.

HP 11966M
This 10 meter (32.8 ft) antenna cable is constructed of RG-223/U coaxial cable with type-BNC male connectors at both ends.

HP 11966A K47
Five meter low-loss cable with APC 3.5 male connectors.

HP 11966A K48
Ten meter low-loss cable with APC 3.5 male connectors.

HP 11500A Cable
Six foot long RG-214/U cable with type-N connectors.

HP 11500F Cable
150 centimeter cable with APC 3.5 male connector.

8120-1840
122 centimeter (48 inches) coaxial cable with type-BNC male connectors at both ends.

Limiters

HP 11947A
Transient Limiter
In precompliance applications where a spectrum analyzer is used for measurements instead of an EMI receiver, it is always a good idea to use a transient limiter. Transient limiters protect the spectrum analyzer input from damage caused by high-level transients from line impedance stabilization networks (LISNs) during EMI testing for conducted emissions.

Frequency Range	9 kHz - 200 MHz
Insertion Loss	10 dB
Maximum Input Level	Continuous: 2.5 W (+34 dBm) Pulse: 10 kW for 10 µsec DC: ±12 V

1. Other custom cable lengths and types are available. For more information, consult your local HP sales representative.

Preamplifiers

HP 8447F Option H64
Dual Preamplifier

This dual preamplifier improves receiver and spectrum analyzer sensitivity. It is ideally suited for use with the HP 11940A and 11941A close-field probes to detect low-level emissions from a device under test. Radiated emission measurements using a spectrum analyzer and antenna are improved by the increased sensitivity that this unit offers.

	Band 1	Band 2
Frequency Range	9 kHz - 50 MHz	100 kHz - 1.3 GHz
Noise Figure	< 7.0 dB	8.5 dB
Gain	28 dB	26 dB
Gain Flatness	±2.0 dB	±1.5 dB
Connector Type	N female	N female

11729-60014
Low Noise Preamplifier

This amplifier provides the sensitivity needed for MIL-STD 461C CE-06 receiver/transmitter key-up testing.

Frequency Range	10 Hz - 25 MHz
Gain	40 dB
Power Requirements	+24 V DC
Connector Type	SMC female

HP 8449B
Microwave Preamplifier

A high-gain, low-noise preamplifier to provide additional sensitivity for MIL-STD radiated measurements.

Frequency Range	1 GHz - 26.5 GHz
Noise Figure	1.0 - 12.5 GHz 8.5 dB
	12.5 - 22.0 GHz 12.5 dB
	22.0 - 26.5 GHz 14.5 dB
Minimum Gain	23.5 dB
Gain Flatness	1.0 - 26.5 GHz ± 4.5 dB
	2.0 - 22.0 GHz ± 3.5 dB
Connector Type	APC - 3.5 female

Magnetic Field Probes

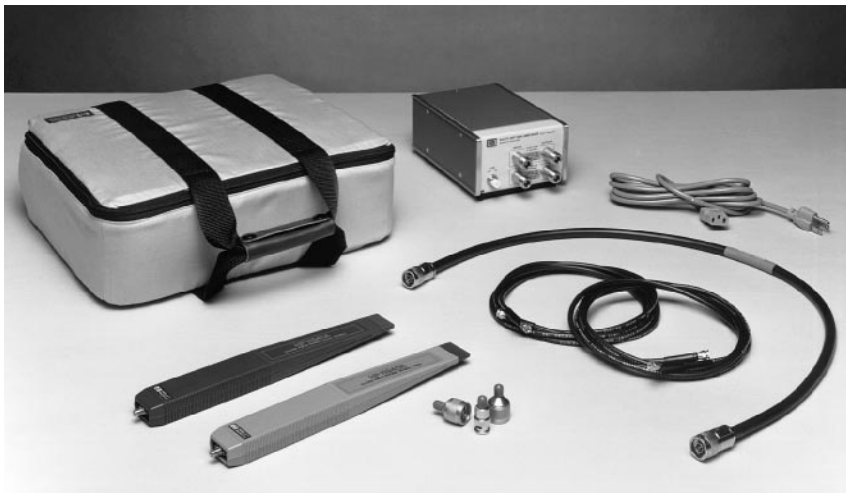
HP 11940A and 11941A Close Field Probes

These hand-held probes are specially designed to measure magnetic field radiation from surface currents, slots, cables, and ICs for EMC diagnostic and troubleshooting measurements. Their unique design results in a high level of electric field rejection. This significantly reduces errors allowing calibrated and repeatable measurements. Each probe is calibrated and comes with a two-meter, RG-223 coaxial cable, an SMA(f) to Type-N(m) adapter, and an SMA(f) to BNC(m) adapter.

Frequency Range	11940A: 30 MHz - 1 GHz 11941A: 9 kHz - 30 MHz
Maximum Input Power	0.5 W
Temperature Range	Variation over 0 °C to + 40 °C
Dielectric Breakdown	± 1 dB, typical
Connector	SMA, replaceable barrel
VSWR	< 3 : 1, typical for 11940A only
Antenna Factor Accuracy	Individually calibrated to within ± 2 dB in a 377 Ω field impedance

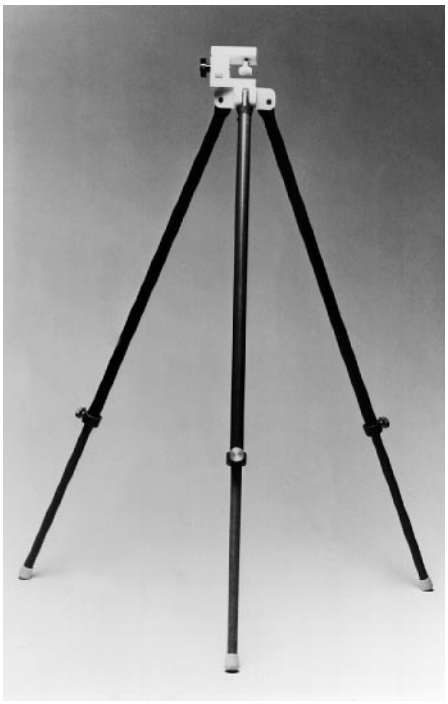
HP 11945A Close Field Probe Set

The HP 11945A close field probe set includes both the 11940A and 11941A probes to provide full coverage from 9 kHz to 1 GHz. This set provides a powerful measurement tool for electrical and mechanical designers who want to search for and eliminate sources of interference from their products early in the design process. Option E51 adds the HP 8447F Option H64 dual preamplifier, a 36 inch (914 mm) Type-N cable and a carrying bag to store and protect the entire set of probes, preamplifier, and cables.



Tripods

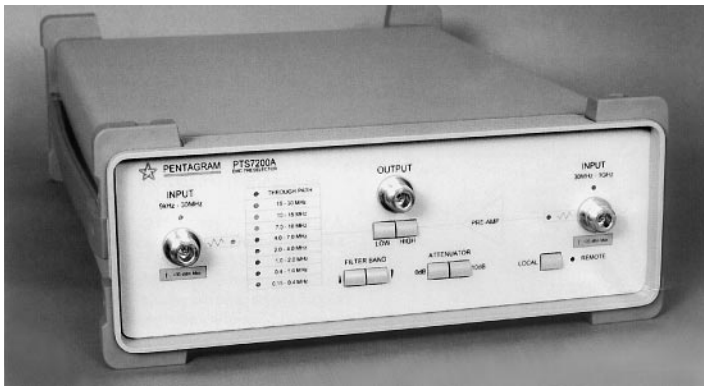
HP 11968C Antenna Tripod
The HP 11968C is a non-metallic tripod made of linen phenolic and delrin to minimize unwanted reflections in the test environment.



Misc. EMC Accessories

HP 11960A EMC Preselector

Reduces RF overload from broadband and out-of-band signals. Perform near compliant conductor emissions measurements. Improve radiated emission measurement sensitivity. The HP 11960A has a 30 dB gain amplifier built-in.



HP 85685A RF Preselector

The HP 85685A RF preselector is designed to operate with the HP 8566B and 8568B spectrum analyzers. The RF preselector adds tracking filters to reduce overloading from out-of-band signal and preamplifiers for improved system sensitivity over the 20 Hz to 2 GHz frequency range. The HP 85685A RF preselector has two inputs, 20 Hz to 50 MHz and 20 MHz to 2 GHz. There is also a bypass mode which is DC to 18 GHz. Input 1 has a built-in transient limiter for protection from transients generated by line impedence stabilization networks (LISN).

The RF preselector is fully programmable over the HP-IB (IEEE-488).

Input Specifications

	Input 1	Input 2
Frequency Range	20 Hz - 50 MHz Bypass	20 MHz - 2 GHz DC to 18 GHz
Connector Type	BNC (50 Ω)	Type-N (50 Ω)
Fuse Blow Time	< 0.1 sec for > + 35 dBm	NA
Maximum Save Input Power		
Average	+ 30 dBm (1 W)	
Impulsive Signals	100 W peak for 10μ sec pulse	
DC Voltage	0 V	
Standing Wave Ratio		
> 10 dB RFP Atten	< 1.5 : 1	< 1 .5 : 1
0 dB Atten	< 1.5 : 1 nominal	< 2.0 : 1 nominal
RFP Anen Range	0 - 50 dB (10 dB steps)	
Preamp Gain	20 dB for 0 dB RFP atten	
	Output	
Comb Generator		
Line Spacing	100 kHz, 500 kHz, 1 MHz, 5 MHz (nominal)	
Line Amplitude	- 40 to - 60 dBm	

Preselector Filters

Start Frequency (MHz)	Stop Frequency (MHz)	Filter Type
0.0	0.0655	Fixed tuned
0.101	0.0756	Fixed tuned
0.074	0.2051	Fixed tuned
0.1975	0.5252	Fixed tuned
0.525	1.0493	Fixed tuned
1.025	2.0736	Fixed tuned
1.96	5.8922	Variable
5.83	17.3643	Variable
17.33	28.8643	Variable
28.73	51.7987	Variable
51.73	97.8673	Variable
97.83	152.356	Variable
152.33	219.4389	Variable
216.33	333.7705	Variable

Misc. EMC Accessories

HP 85650A Quasi-Peak Adapter

The HP 85650A quasi-peak adapter is an accessory used with the HP 8566B or 8568B spectrum analyzers for performing quasi-peak measurements as recommended by CISPR. These include the correct 6 dB band- widths (200 Hz, 9 kHz, 120 kHz) and the specified detector charge and discharge time constants.

The bypass mode returns the spectrum analyzer back to standard operation unaffected by the quasi-peak adapter. In the normal mode the three CISPR bandwidths are available and the quasi-peak detector can be turned on and off.

There is a built-in speaker and phone jack for monitoring signals.

The HP 85650A provides nine form C (SPDT) auxilliary switches can be used with external power supplies to switch coax relays, DUT power, or your individual switching needs. Six switches are multiplexed such that when one is on five are off.

All functions are controlled over the HP-IB (IEEE 488) except volume and line.

Frequency Band (MHz)	Bandwidth at 6 dB	Charge TC (ms)	Discharge TC (ms)
0.01 - 0.15	200 Hz	45	500
0.15 - 30	9 kHz	1	160
30 - 1000	120 kHz	1	550

Quasi-peak Response to CISPR Pulse (dBµV)

PRF (Hz)	10 to 150 kHz	0.15 to 30 MHz	30 to 1000 MHz
1000	---	64.5 ± 2.5	68.0 ± 2.5
100	64.0 ± 2.5	60.0 ± 1.5	60.0 ± 1.5
60	63.0 ± 2.5	---	---
25	60.0 ± 1.5	---	---
20	---	53.5 ± 2.5	51.0 ± 2.5
10	56.~± 2.5	50.0 ± 3.0	46.0 ± 3.0
5	52.5 ± 3.0	---	---
2	47.0 ± 3.5	39.5 ± 3.5	34.0 ± 3.5
1	43.0 ± 3.5	37.5 ± 3.5	31.5 ± 3.5
Isolated Pulse	41.0 ± 3.5	36.5 ± 3.5	28.5 ± 35

Ordering Information

Listed by Hewlett-Packard Model Number

Model Number	Description
HP 11500A	Six foot RG-214U Cable with Type-N Connector
HP 11500F	150 cm Cable (APC 3.5 Male Connectors)
HP 11940A	Close Field Probe 30 MHz to 1 GHz
HP 11941A	Close Field Probe 9 KHz to 30 MHz
HP 11945A	Close Field Probe Set
HP 11947A	Transient Limiter
HP 11955A	Biconical Antenna
HP 11956A	Log Periodic Antenna
HP 11960A	EMC Preselector
HP 11961A	EMI Measurement Software
HP 11966A	Active Magnetic Loop Antenna
HP 11966A K12	Passive Loop Set
HP 11966A K24	Biconical Antenna 20 MHz to 300 MHz (2000 Watts)
HP 11966A K30	Passive Rod Antenna
HP 11966A K38	Biconical Antenna 30 MHz to 300 MHz (300 Watts)
HP 11966A K40	Royce Field Site Source
HP 11966A K47	Five Meter Cable (APC 3.5 Male Connector)
HP 11966A K48	Ten Meter Cable (APC 3.5 Male Connector)
HP 11966B	Active Monopole Antenna
HP 11966C	Biconical Antenna 30 MHz to 300 MHz
HP 11966D	Log-Periodic Antenna 200 MHz to 1 GHz
HP 11966E	Double-Ridged Waveguide Horn Antenna 1 to 18 GHz
HP 11966F	Conical Log Spiral Antenna 200 MHz to 1 GHz
HP 11966G	Conical Log Spiral Antenna 1 GHz to 10 GHz
HP 11966H	Dipole Antenna Set 28 MHz to 1000 MHz
HP 11966I	Horn Antenna 200 MHz to 2 GHz
HP 11966J	Horn Antenna 18 GHz to 40 GHz
HP 11966K	Magnetic Field Pickup Coil 20 Hz to 50 kHz
HP 11966L	Coaxial Cable 10 Meter Type-N
HP 11966M	Coaxial Cable 10 Meter BNC
HP 11966N	Log Periodic Antenna 200 MHz to 5 GHz
HP 11966P	Broadband Antenna
HP 11967A K05	Absorbing Clamp
HP 11967A K06	Cavity Rejection Network
HP 11967A K23	Bridged-T Rejection Networks
HP 11967A	Current Probe 15 kHz to 50 MHz
HP 11967B	Current Probe 20 Hz to 2 MHz
HP 11967D	10 Amp Line Impedance Stabilization Network
HP 11967E	25 Amp Line Impedance Stabilization Network
HP 11968A K07	Shielded Room Kit
HP 11968B	Manual Antenna Positioning Mast
HP 11968C	Antenna Tripod
HP 11968E	Manual Equipment Test Turntable
HP 8447F H64	Dual Preamplifier 0.1 to 1300 MHz
HP 8449B	Microwave Preamplifier 1 GHz to 26.5 GHz
HP 85650A	Quasi-Peak Adapter
HP 85685A	RF Preselector
HP 85876A	Commercial Radiated EMI Software
HP 85878A	EMI Report Generator
0160-6683	10 µF Capacitor
8120-1840	122 Centimeter Coaxial Cable
11729-60014	Low Noise Preamplifier

For more information about Hewlett-Packard test and measurement products, applications and services, and for a current sales office listing, visit our Web site, http://www.hp.com/go/tmdir. You can also contact one of the following centers and ask for a test and measurement sales representative.

United States:
Hewlett-Packard Company
Test and Measurement Call Center
P.O. Box 4026
Englewood, CO 80155-4026
1 800 452 4844

Canada:
Hewlett-Packard Canada Ltd.
5150 Spectrum Way
Mississauga, Ontario L4W 5G1
(905) 206 4725

Europe:
Hewlett-Packard
European Marketing Centre
P.O. Box 999
1180 AZ Amstelveen
The Netherlands
(31 20) 547 9900

Japan:
Hewlett-Packard Japan Ltd.
Measurement Assistance Center
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Tokyo 192, Japan
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