



P 3.7.6

Directional characteristic of dipole radiation

- P 3.7.6.1 Directional characteristic of a helical antenna – manual recording
- P 3.7.6.2 Directional characteristic of a Yagi antenna – manual recording
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- P 3.7.6.4 Directional characteristic of a Yagi antenna – recording with a computer

Directional characteristic of a helical antenna – manual recording (P 3.7.6.1)

Cat. No.	Description	P 3.7.6.1	P 3.7.6.2	P 3.7.6.3	P 3.7.6.4
737 01	Gunn oscillator	1	1	1	1
737 020	Gunn power supply	1	1		
737 03	Coax detector	1		1	
737 05	PIN modulator			1*	1*
737 06	Isolator			1*	1*
737 15	Support for waveguide components			1	
737 21	Large horn antenna	1	1	1	1
737 390	Set of absorbers	1	1	1	1
737 405	Rotating antenna platform			1	1
737 407	Antenna stand with amplifier	1	1		
737 412	Dipole antenna kit		1		1
737 432	Yagi antenna kit			1	1
737 440	Helical antenna kit	1		1	
531 120	Voltmeter, DC, $U \leq 10$ V, e. g. Multimeter LDanalog 20	1	1		
301 21	Stand base MF			2	2
300 11	Saddle base	1	1		
501 02	BNC cable, 1 m long			1	
501 022	BNC cable, 2 m long	1	1		
575 24	Screened cable BNC/4 mm	1	1		
501 461	Pair of cables, 1 m, black	2	2		
	<i>additionally required:</i>				
	PC with Windows 95/NT or higher			1	1
309 06 578	Stand rod 245 mm, with thread	2	2		

*additionally recommended

Directional antennas radiate the greater part of their electromagnetic energy in a particular direction and/or are most sensitive to reception from this direction. All directional antennas require dimensions which are equivalent to multiple wavelengths. In the microwave range, this requirement can be fulfilled with an extremely modest amount of cost and effort. Thus, microwaves are particularly suitable for experiments on the directional characteristics of antennas.

In the first experiment, the directional characteristic of a helical antenna is recorded. As the microwave signal is excited with a linearly polarizing horn antenna, the rotational orientation of the helical antenna (clockwise or counterclockwise) is irrelevant. The measurement results are represented in the form of a polar diagram, from which the unmistakable directional characteristic of the helical antenna can be clearly seen.

In the second experiment, a dipole antenna is expanded using parasitic elements to create a Yagi antenna, to improve the directional properties of the dipole arrangement. Here, a total of four shorter elements are placed in front of the dipole as directors, and a slightly longer element placed behind the dipole serves as a reflector. The directional factor of this arrangement is determined from the polar diagram.

In the third and fourth experiment, the antennas are placed on a turntable which is driven by an electric motor; the angular turntable position is transmitted to a computer. The antennas receive the amplitude-modulated microwave signals, and frequency-selective and phase-selective detection are applied to suppress noise. The received signals are preamplified in the turntable. After filtering and amplification, they are passed on to the computer. For each measurement, the included software displays the receiving power logarithmically in a polar diagram.