

Method	VLF	Q28.31
Principle	Measurement of dip angle and ellipticity of polarization ellipse and vertical field of the magnetic field of a remote radio transmitter	
Other information		
Devices		
Apparatus in use	Geonics EM16	EDA OMNI-PLUS
Measured components or/and quantities	Dip angle and ellipticity of polarization ellipse	In-phase and quadrature component of vertical field, strength of total field, dip angle of polarization ellipse, direction of primary field
Units	Degree (°), percent (%)	
Reading accuracy	1°, 1 %	0.1°, 0.1 %
Other information	Analogical, 1 frequency	Digital, 1-3 frequencies
Measurement		
General		
Measured quantities	Shape of polarization ellipse	Dip of polarization ellipse, strength and direction of secondary field
Measuring parameters	Dip angle of polarization ellipse and ratio of minor axis to major axis	Ratio of in-phase and quadrature component to total field, strength of total field, dip of polarization ellipse, direction of primary field
Quality requirement of reading accuracy	Standard error < 0.5 percentage units	Standard error < 0.1 percentage units
Maintenance of reading accuracy	Direction of the transmitter to be checked often enough. Daily visit at the check point. Annual visit at check profile	
Standard error of mean values of repeat measurements		
Positioning	Error of XY: (GPS) < 5 m, < 2 m (Focus-GPS), < 0.5 m (VRS-GPS) Z: not usually measured Typical mean error for station coordinate, 2 m (after correction) Typical mean error for line coordinate, 5 m (after correction)	
Repeat criteria	Measurements are repeated when lateral deviation is greater than half line interval or closure error is greater than point interval.	
Other information	Changes in transmitter schedules may restrict measurement. The schedules are predictable but require active monitoring.	