

Contents

	Foreword
	Introduction
1	Scope
2	Normative references
3	Terms and definitions
4	Fundamentals of heterodyne Doppler lidar
4.1	Overview
4.2	Heterodyne detection
4.3	Spectral analysis
4.3.1	Signal processing for CW lidar
4.3.2	An example of a wind speed estimation process
4.4	Target variables
4.5	Sources of noise and uncertainties
4.5.1	Local oscillator shot noise
4.5.2	Detector noise
4.5.3	Relative intensity noise
4.5.4	Speckles
4.5.5	Laser frequency
4.6	Range assignment
4.7	Known limitations
5	System specifications and tests
5.1	System specifications
5.1.1	Laser wavelength
5.1.2	Transmitter/receiver characteristics
5.1.3	Pointing system characteristics
5.2	Figures of merit
5.3	Precision and availability of measurements
5.3.1	Radial velocity measurement accuracy
5.3.2	Data availability
5.3.3	Maximum operational range
5.4	Testing procedures
5.4.1	General
5.4.2	Hard target return
5.4.3	Assessment of accuracy by intercomparison with other instrumentation
5.4.3.1	Sonic anemometer test
5.4.3.2	Performance test against masts
5.4.3.3	Comparison with Doppler weather radars
5.4.3.4	Comparison with radar wind profilers
5.4.4	Maximum operational range validation
6	Measurement planning and installation instructions
6.1	Site requirements
6.2	Limiting conditions for general operation
6.3	Maintenance and operational test
6.3.1	General
6.3.2	Maintenance
6.3.3	Operational test
6.3.4	Uncertainty