Development and confirmatin of the wide band radar

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A broad band radar using the wide bandwidth for transmitting was developed and tested for meteorological targets. In this radar, an arbitary waveform generator is used for creating the signal for transmitting and for the modulation. The created signal is up converted to the 15.75 GHz in central frequency and emitted to the air. The received signal is down converted to the IF band which has the bandwidth of 100MHz, and directly digitized at the rate of 400 MHz with 12 bits. The Hilbert transformation is applied to the received signal to make the I/Q signal. To use the pulse compression technique, the Fourier transformation is applied both for the received and reference signals and then invert Fourier transformation is used to convert the time domain. Thus, the processed signal shows the vertical profile of radar reflectivity factor with the resolution of several meters up to about 1km in height. The result is compared with the radar reflectivity factor calculated from the data by the impact type disdrometer. The correlation analysis shows the 0.98 correlation coefficients showing that the developed broad band radar is capable of observing meteorological targets with high resolution.