PRELIMINARY MEASUREMENTS OF BARE SOIL AND WAVED WATER SURFACE MICROWAVE REFLECTION AND EMISSION ANGULAR DEPENDENCES AT 5,6GHZ

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In this paper preliminiry results of simultaneous and spatially collocated measurements of bare soil and experimental pool water surface microwave reflective (radar backscattering coefficient) and emissive (brightness temperature) characteristics angular dependences at 5,6GHz will be presented. For the measurements a C-band, dual polarization, combined scatterometer-radiometer system were used. The structure and operational features of the utilized system will be discussed in the paper too. The main characteristics of C-band, dual polarization, combined scatterometer-radiometer system are:

Central Frequency - ~5,6GHz;
Radar Pulse duration – ~25ns
Radar pulse power – 50mW – 1W
Polarization:
radar channel - "vv" and "vh" or "hh" and "hv"
radiometric channel - "v" and "h"
Radar receiver's bandwidth - ~40MHz;
Radiometer receivers bandwidth - ~600MHz;
Parabolic antenna with a beamwidth -5^0;
Radar receivers noise factor - ~2dB;
Radiometer receiver's noise factor - ~250K;
Radar channel's sensitivity at 1s- ~0.1dB;
Radiometer Channel's sensitivity at 1s- ~0.15K.

The principal peculiarities of the utilized device are its originality in spatio-temporally combining of functionality of microwave active-passive channels of observation under short range sensing application condition. The minimum operational range for the system's scatterometer is 5m, at a far zone condition of sensing. The system has as well middle (50-300m)

and long distance (150-1500m and more) application features. These features allow to use the system from a vessel and an aircraft.

The measurements of bare soil and experimental pool water waved surface microwave emissive and reflective characteristics were carried out in the ECOSERV ROC Company's experimental site, from a stationary, quarter-circle shaped measuring platform of 6.5m of radius, over the experimental pool water surface and over the experimental area of soil. This measuring complex allows to carry out angular measurements of the observed surfaces microwave active and passive characteristics under quasi-field, controlling laboratory conditions. The measuring platform allows simultaneously research angular dependences of microwave reflective and emissive characteristics of the same area of the observed surface, under various polarizations of scatterometer and radiometer signals. The measurements were curried out under various soil moisture and temperature, water and air temperatures, surface roughness and wave field's parameters, etc.

The methodology of experiments' performance and field calibration of the measuring system and the measured results will be discussed in this paper. Relationships between bare soil and experimental pool water waved surface radar backscattering coefficients, brightness temperatures and the observed surfaces parameters will be built, under various conditions of observation (angle of incident and polarization), moisture, surface and air temperatures, wind, wave and soil surface roughness parameters. As well as correlative properties between bare soil and waved water surface radar backscattering coefficients and brightness temperatures due to the change of observed surface moisture, surface and air temperatures, roughness and wave parameters will be represented.