

FEATURES OF COMMUNICATION PROTOCOLS UNIVERSAL RADIORELAY-TROPOSPHERIC SYSTEMS

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Abstract – The results choose communication protocols of universal radiorelay-tropospheric communications system and preliminary open path testing this communication system are discussed. Makes practical recommendations to improve the characteristics quality of universal mobile radiorelay-tropospheric communications systems.

Keywords – tropospheric and radio relay communications systems, adaptive modulation, wireless interfaces and communications protocols.

Tropospheric communication systems used both for transport networks and radio relay direct lines. However, old these ones not oriented to work in modern multiservice networks with packet data, video, and speech. They characterized by considerable weight, grate dimensions and require extra powerful sources of supply. Therefore, our task was to create a universal portable radiorelay-troposphere communication system (RTS) on uniform modern technology platform with high protection from interferences. It should provide communication for open intervals up to 50 km in the radio relay mode and up to 100... 120 km in the troposphere mode with providing all modern services of data transmission [1, 2].

In justification for requirements to RTS, it was laid in the basis of analysis the energy balance in the most difficult conditions troposphere communication. It is shown that the case of typical receiver sensitivity in the 6 cm band to ensure the reliability of communications (95-98)% at a distance of 100 km and data rate to 2 Mb/s the equivalent isotropic radiated power should exceed 47... 56 dB. It is provided with a transmitter power amplifier output 50... 100 Watts and 30... 36 dB gain of parabolic antenna with diameter 90... 140 cm. Based on these requirements developed laboratory sample RTS (see. Figure 1 and Figure 2) using advanced wireless interfaces and protocol information Nvstream v.2 (Nv2) and Nstream-dual-slave one of the leading developers of telecommunications equipment Mikrotik. It provides adaptation options: choice of operating range, centre frequency and bandwidth; modulation schemes; the threshold SNR interval of periodic calibration signal; noise immunity; regime of frame protection; type of preamble and the guard interval values [3, 4].

The difference between the communication systems in tropospheric mode is to use additional powerful transmitter output stage and more resistant to

unsteady conditions tropospheric scattering communications protocol Nstream-dual-slave. For data rate optimization take place regulation of access time period in the range of 1... 10 ms. This provides the ability to transfer data at a distance of 200 km. The main advantages of this protocol are: absence of restrictions on the range; reduced compared with 802.11 protocol the amount packet header, thereby increasing the data rate; fast data rate does not depend on the distance; dynamic adjustment protocol depending on the type of data transferred and used resources; customer survey base station (polling). An important feature of this protocol is ability to work with two radio Karta. More powerful integrated radio Karta works on transmission and the other less powerful external installed in a special slot, running at reception. This allows almost in 2-times increase data rate.

In radiorelay mode it is using the fast protocol NV2 which is providing multiple access TDMA. NV2 is one of today's most advanced network protocols of digital transmission technology that uses multiple access with time division of channels where each client within a unique channel allocated time-slots. This technology allows access to the same radio frequency channel a large number of users. This access point NV2 is providing full control of the entire network, it divides time at uniform time-slots, and dynamically allocates them among clients.

The report also presents the results of preliminary field open path testing of laboratory example RTS. It have confirmed opportunity to provide on open intervals data rate up to 50 Mb/s in radio relay mode and to have - up to 2 Mb/s in tropospheric mode.

References

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