

Experimental Adjustment of High-Speed Information Transfer Complexes for Earth Remote Sensing Spacecraft

A. N. Ershov, *nkpor@spacecorp.ru*

Joint Stock Company "Russian Space Systems", Moscow, Russian Federation

V. V. Berezkin, *Cand. Sci. (Engineering)*, *petrov_sv@spacecorp.ru*

Joint Stock Company "Russian Space Systems", Moscow, Russian Federation

S. V. Petrov, *petrov_sv@spacecorp.ru*

Joint Stock Company "Russian Space Systems", Moscow, Russian Federation

A. V. Petrov, *petrov_sv@spacecorp.ru*

Joint Stock Company "Russian Space Systems", Moscow, Russian Federation

D. A. Pochivalin, *nkpor@spacecorp.ru*

Joint Stock Company "Russian Space Systems", Moscow, Russian Federation

D. A. Smirnov, *nkpor@spacecorp.ru*

Joint Stock Company "Russian Space Systems", Moscow, Russian Federation

S. V. Kovalev, *nkpor@spacecorp.ru*

Joint Stock Company "Russian Space Systems", Moscow, Russian Federation

Abstract. The paper describes methods of tests and measurements which were used when debugging onboard and ground complexes of radio links of high-speed information transfer slated for operation in the systems of Earth remote sensing (ERS). Features of application of high-speed signal and code designs with the types of modulation of a high order and coding methods with high code speeds are presented.

Block diagrams of ground complexes of radio links of Ka- and X-bands are given.

The main types of the errors arising by transfer of wideband (several hundreds of MHz) signals are analyzed.

It is shown that in radio links in which the output error probability considerably depends on the quality of performance of the components (determining the level of intersymbol distortions (ISD), phase noise, etc.) to evaluate the integrated operation quality of an information transfer system, it is very effectively to use the Error Vector Magnitude (EVM) parameter.

By results of the tests the conclusion is drawn, that the equipment of onboard and ground complexes developed in Joint Stock Company "Russian Space Systems" provides information transfer with the rate up to 900 Mbit/s with the modulation type 8PSK up to 1.2 Gbit/s with the modulation type 16APSK and up to 1.5 Gbit/s with the modulation type 32APSK in X- and Ka-bands.

Keywords: radio link, communication channel, frequency-power resources, Earth remote sensing, high order modulation, correction coding, constellation diagram