

The problem of coordination of satellite network "Lybid" and its solving

Svitlana Trubina

Abstract – The article presents possible ways of achieving international coordination for the Ukrainian satellite "Lybid".

Keywords – Coordination, satellite, GSO, EMC, BRIFIC.

I. INTRODUCTION

Within of the National Space Program it is planned to build National satellite communication system "Lybid", where provided launching geostationary satellite to the orbital position $38,2^\circ$ E, which management will be carried from the territory of Ukraine in 2011. The satellite will provide work in two frequency ranges – Ku and Ka [1].

It is necessary to complete the process of international coordination for launching satellite, because the Ukrainian network may interfere with satellite networks belonging to other countries.

II. INTERNATIONAL COORDINATION

Ukraine declared network UKRSAT-BSS-38.2EGI, which has 4 beams: 2 uplink – R01, R02 (polarization CR, CL; work in 2 - 20 channels, which total bandwidth 17333.16000 - 17705.40000 MHz) and 2 downlink – E01, E02 (polarization CR, CL; work in 2 - 20 channels, which total bandwidth 11733.16000 - 12067.40000 MHz). Service areas and beam directional patterns are shown in Fig. 1.

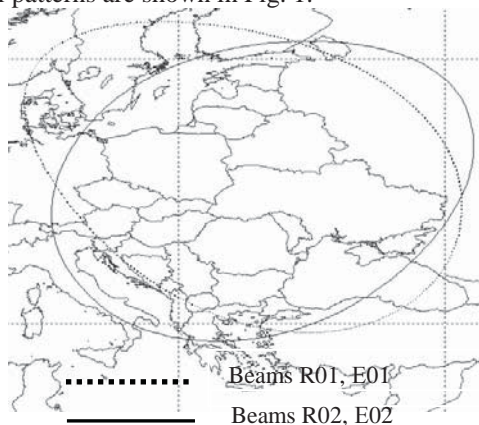


Fig.1 Service areas and directional patterns of beams R01, R02, E01, E02

According to [2] it is necessary to implement the procedure of coordination of Ukrainian satellite, i.e. mutually agreeing the parameters between the concerned countries, which given in Table 1. It could be significantly altered the parameters of the declared network as well as some parameters of existing satellites in the process of coordination.

There are such ways to achieve the coordination that can be used in its implementation for the Ukrainian satellite:

1. Scaling up the diameter of the earth station antennas.

Angular width of the antenna beam is inversely proportional to its diameter, so the larger the diameter of the antenna, the more narrow its beam. Scaling up the diameter of the earth station antenna provides gain in reducing the required angular separation between satellites, makes possible to reduce transmitters power, what can lead to the fulfillment of EMC conditions [3]. But increases the cost of the antennas, what can be economically inefficient.

TABLE 1

LIST OF THE NETWORKS BELONGING TO COUNTRIES, WHICH IT SHOULD BE REALIZED COORDINATION WITH

Name of the network	GSO position	Country
Space - Earth AP30/E/474		
EUTELSAT B-36E	36	France
RST-1A	36	Russia
BLR06200	37.8	Belarus
PAKSAT 1R-BSS-38EA	38	Pakistan
HOL21300	38.2	Netherlands
GRC15002	39	Greece
EUTELSAT B-40E	40	France
TURKSAT-BSS	42	Turkey
Earth – Space AP30A/E/474		
EUTELSAT B-36E	36	France
BLR06200	37.8	Belarus
PAKSAT 1R-BSS-38EA	38	Pakistan
TJK06900	38	Tajikistan
HOL21300	38.2	Netherlands
GRC15002	39	Greece
EUTELSAT B-40E	40	France

2. Division of signals by polarization.

If the signals of satellites, that are coordinating, at the orthogonal polarizations, they do not create mutual interference. However, cancellation of one of the polarizations leads to a reduction of information that is transmitted simultaneously.

3. Division of frequency bands.

If frequency bands of satellites, that are subjects of coordination, matches and can create mutual interference, it is could make sense to divide this band between satellites. This way solves the problem of interference, but the frequency resource is losing.

III. CONCLUSION

In this paper the ways of achieving the coordination, each of which has its advantages and disadvantages, are given. It is necessary to analyze separately for each country, which it should be made coordination with, which of these ways will be the best for technical realization and the most profitable.

REFERENCES

- [1] NKAU [Electronic resource] – <http://www.nkau.gov.ua/>
- [2] BR IFIC - Space Services (Edition of 2009)
- [3] RECOMMENDATION ITU-R S.738

Svitlana Trubina – NTUU "KPI", Industrialnyi Lane, 2, Kyiv, 03056, UKRAINE
E-mail: svitlana.trubina@gmail.com