

QUESTION ITU-R 218-1/4

Compatibility between on-board processing satellites in the fixed-satellite service and terrestrial networks

(1993-1995)

The ITU Radiocommunication Assembly,

considering

- a) that satellite systems in the fixed-satellite service (FSS) utilizing various degrees of digital baseband on-board processing (OBP) have been launched and are under development by a number of administrations, both for GSO and non-GSO (e.g. LEO) operation;
- b) that such systems are intended to carry both synchronous and asynchronous digital information streams of various rates;
- c) that such information streams could consist of various types of traffic, extending from relatively low-bit rate traffic (e.g. for VSATs) up to high-bit rate traffic composed of ISDN, B-ISDN, synchronized digital hierarchy (SDH), Frame Relay and other agreed-upon and evolving international protocols and transmission techniques wherein the satellite subnetwork will be embedded in a larger PSN;
- d) that such protocols and techniques may be highly sensitive to the use of OBP and that satellite/terrestrial compatibility with respect to various interworking and interconnection scenarios may be adversely affected by certain on-board processing functions;
- e) that global system(s) consisting a large number of OBP satellites in low-Earth orbit (LEO) and using intersatellite links (ISLs) are under development for the fixed-satellite service, and that such system(s) raise new and fundamentally unexplored system and networking issues concerning PSN compatibility, performance and availability, latency, routing and delay (both fixed and variable) timing, and synchronization, and congestion control;
- f) that these new system(s) could operate above the primary rate and could utilize frequencies above 15 GHz;
- g) that digital performance at and above the primary rate is characterized in ITU-T Recommendation G.826 and in Recommendation ITU-R S.1062, but only for systems operating at frequencies below 15 GHz;
- h) that OBP can provide enhanced performance, flexibility, services and spectrum efficiency,

decides that the following Question should be studied

- 1** What specific network and traffic parameters are potentially uniquely affected by the use of digital baseband OBP?
- 2** What specific network and traffic parameters are potentially uniquely affected by digital traffic routing through a potentially large number of LEO satellites using both OBP and ISLs and operating at FSS frequencies in the neighbourhood of 30 and 20 GHz?
- 3** What general OBP system characteristics might result in incompatibilities at the satellite subnetwork interface (such as signalling, queuing and processing delays, synchronization, routing, reliability and performance)?

4 What are the specific OBP system functional characteristics required to assure conformance with relevant ITU performance requirements, and to achieve an efficient utilization of satellite radio frequency assignments and orbital locations?

5 Are the existing performance objectives specified in Recommendation ITU-R S.1062 valid for systems operating in the neighbourhood of 30 and 20 GHz, and if they are not, how must the performance requirements be specified to make them applicable at these frequencies?

6 What existing and developmental ITU Recommendations might limit or otherwise impair the use of OBP systems in the FSS?

further decides

1 that the results of these studies should lead to the formulation of appropriate Recommendations by 2006.
