

REPORT 1176*

INTERWORKING BETWEEN THE MOBILE SATELLITE SYSTEMS
AND THE TERRESTRIAL NETWORKS FOR DATA TRANSMISSION SERVICES

(Question 89/8)

(1990)

1. Introduction

Question 89/8 addresses the topic of "compatibility for interworking between the mobile-satellite systems and terrestrial networks including ISDN". This Report takes into account the relevant CCITT studies, in considering appropriate technical characteristics for future mobile-satellite systems.

The INMARSAT (International Maritime Satellite Organization), operating the global maritime satellite communication system, will provide several new services in the near future. In addition to this, several national/regional mobile satellite communication systems have been planned in various countries, and are expected to be commercially available in the near future. Some planned mobile satellite communication systems are going to employ advanced digital technologies. The INMARSAT new standards such as Standard-B, C and M, and the INMARSAT aeronautical mobile systems are also being digitalized.

In digital satellite communication systems, data can be directly transmitted through the digital channel, and be connected more efficiently with the terrestrial data network, including at a later stage, through the ISDN.

For the data transmission services, CCITT has been drafting many recommendations which are mainly applicable to the terrestrial data networks. CCITT SG XVIII is studying the integration of the mobile services into the ISDN.

2. CCITT Activities

Besides Recommendations for the telephone and telex services of the INMARSAT Standard-A system, the data transmission services are already specified in the Recommendations X.350 series, which give guidance for the connection of the data channel through the INMARSAT Standard-A voice channel with the terrestrial PSPDN (Packet Switched Data Network).

* The Director, CCIR, is requested to bring this Report to the attention of the CCITT.

Recommendations for the interface and interworking conditions of the future INMARSAT digital satellite communication systems, such as Standard-B and aeronautical systems, with the terrestrial PSTN/ISDN are also provided as CCITT Q.1100 series.

With regard to the ISDN, CCITT has produced many recommendations, and the general concept of the ISDN-based basic interface (2B+D) has been developed. Question S/XVIII dealing with the integration of mobile services into the ISDN was adopted in 1988. The interworking and interfacing between the mobile system and the ISDN are being studied by CCITT SG XI.

3. Data Transmission

Data transmission in the mobile satellite network is categorized into two cases; one is data transmission through the analogue voice channel by using the voice-band modem, and the other is direct data transmission through the digital channel. However, there will remain a need for voice band data services for some time. In future mobile satellite communication systems, it is expected that digital transmission technologies will be widely employed not only for the effective use of the space segment but also for harmonization with the terrestrial data network.

Figure 1 shows typical data transmission models, which are classified from the viewpoint of the interworking between the satellite systems and the terrestrial networks such as PSTN, PSPDN, CSPDN (Circuit Switched Data Network) and ISDN, taking account of the future evolution of the satellite system and the terrestrial network toward ISDN.

- MODEL-1: The data is transmitted through the analogue telephone channel of the mobile satellite system and the PSTN by using a voice-band modem.
- MODEL-2: The digital data channel is provided in the mobile satellite system. However, the land earth station does not provide the capability of direct access to public data network, and thus the satellite data channel is connected with the terrestrial data network via PSTN.
- MODEL-3: The digital data channel is provided in the mobile satellite system, and the land earth station provides the capability of direct access to public data network. In this case, the complete end-to-end data channel is established.

MODEL-4: The ISDN is assumed to be used as the terrestrial data network. In this case, two scenarios can be envisaged. One scenario is that the mobile satellite systems do not provide any particular ISDN capability. In this case, the Non-ISDN mobile satellite systems must be connected with the terrestrial ISDN by using the conventional Non-ISDN interface condition. The other scenario is that the mobile satellite system does provide ISDN. In this case, the full/partial ISDN services will be provided for mobile users.

4. Signalling Protocols
(To be developed)

Annex I discusses the development of signalling protocols for the Future Public Land/Aeronautical Mobile Telecommunications Systems (FPL/AMTS).

5. Interface Point and Conditions
(To be developed)

6. Channel Quality
(To be developed)

7. Channel Rate
(To be developed)

8. Conclusion

Efficient interworking between mobile satellite systems and terrestrial data networks involves the consideration of various technical parameters. Four models of end-to-end data transmission systems are considered above.

It should be noted that requirements on signal quality and transmission rate may depend on the type of services such as message and facsimile.