



Radiocommunication Bureau
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Administrative Circular
CA/99

27 June 2001

To Administrations of Member States of the ITU and Radiocommunication Sector Members

Subject: Request for Administrations and Sector Members to supply data on the technical and operational characteristics of Tracking, Telemetry and Command systems being utilized by FSS networks

1 Introduction

Resolution 800 (WRC-2000) placed on the agenda for the WRC-03 the examination of the spectrum requirements in the Fixed Satellite Service bands below 17 GHz for telemetry, tracking and telecommand (TT&C) of FSS networks operating with service links in the frequency bands above 17 GHz.

At its meeting in April 2001, Working Parties 4A and 4B received contributions which identified the technical and operational characteristics of TT&C systems currently being used by FSS networks.

WP 4A and WP 4B decided it would be desirable to obtain further information on the TT&C characteristics of FSS networks currently in operation, or expected to be in use, in order to obtain reference information concerning the performance and availability objectives for the TT&C systems.

This letter extends an invitation to Administrations of Member States and Sector Members to supply data on the current or expected use of TT&C in their FSS networks.

2 Data on the technical and operational characteristics of FSS TT&C systems

Administrations of Member States and Sector Members are requested to supply information regarding the following TT&C characteristics of their FSS networks:

- the TT&C link performance and availability objectives for their FSS networks;
- the TT&C network reliability objectives;
- the TT&C frequencies used by their present and planned FSS networks including networks which comprises both geostationary and non-geostationary satellite;

- the TT&C frequencies used by their planned non-GSO FSS systems;
- the guard bands, if any, at the edges of their operational bands;

Annex 1 gives a tabular format that can be used for the submission of this data.

3 Submission of contributions

Administrations of Member States and Sector Members are urged to submit the information requested at the latest by 31 August 2001. The information received by 31 August will be put on the ITU website by 2 September 2001 at <http://www.itu.int/ITU-R/study-groups/sg/sg4/info/index.html>

Contributions should be sent, preferably by electronic means, to Mr. Jinxing Li (Counsellor Study Group 4, Radiocommunication Bureau who will liaise with Mr. Brian Mitani (INTELSAT).

Mr. Li's address is:

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Annex: 1

Distribution:

- Administrations of Member States of the ITU
- Radiocommunication Sector Members
- Chairmen and Vice-Chairmen of Radiocommunication Study Groups and the Special Committee on Regulatory/Procedural Matters
- Chairman and Vice-Chairmen of the Radiocommunication Advisory Group
- Chairman and Vice-Chairmen of the Conference Preparatory Meeting
- Members of the Radio Regulations Board
- Secretary-General of the ITU, Director of the Telecommunication Standardization Bureau, Director of the Telecommunication Development Bureau

ANNEX 1

**Input data requested from administrations and Sector Members
regarding technical and operational characteristics of FSS TT&C systems**

Command Link Budgets¹

SPACECRAFT COMMAND DATA		
Spacecraft/Constellation Name or ID		
Spacecraft Orbital Location (°E) if GSO		
If non-GSO No of planes		
No. of satellites/plane		
Inclination		
Altitude		
Spacecraft Operational Mode (Normal / Emergency)		
SPACECRAFT COMMAND SYSTEM DATA		
Command Frequency (MHz)		
Receive Antenna Pattern Type (Global / non-Global)		
Command PFD Threshold Ref'd to TX E/S (dBW/m ²)		
COMMAND EARTH STATION DATA		
Earth Station ID		
Earth Station Latitude (°N) (optional)		
Earth Station Longitude (°E) (optional)		
Earth Station Elevation Angle (degrees above horizon)		
Earth Station Altitude Above Mean Sea Level (m)		
Rain Rate for the Location for 0.01% of an average year (mm/h)		
Antenna Diameter (m)		
Peak Antenna Gain (dBi)		
Maximum Available Station EIRP (dBW)		
EIRP Toward Spacecraft (dBW)		
COMMAND LINK BUDGET		
Earth Station EIRP (dBW)		
Earth Station Elevation Angle (degrees above horizon)		
Distance between Earth Station and Satellite (km)		
Spreading Loss (dB)		
Loss due to atmospheric effects excluding rain (dB)		
Additional System Losses (dB)		
Uplink Power Flux Density (dBW/m ²)		
Spacecraft Command Threshold PFD (dBW/m ²)		
Margin		
Availability (%)		

¹ These link budget s were based on GSO FSS networks and some revisions to these tables may be required for non-GSO FSS systems.

Ranging Link Budget¹

SPACECRAFT RANGING DATA		
Spacecraft / Constellation Name or ID		
Spacecraft Orbital Location (°E) if GSO		
If non-GSO No of planes		
No of satellites / plane		
Inclination		
Altitude		
Spacecraft Operational Mode (Normal / Emergency)		
Spacecraft G/T in the direction of the E/S (dBK)		
RANGING EARTH STATION DATA		
Earth Station ID		
Earth Station Latitude (°N) (optional)		
Earth Station Longitude (°E) (optional)		
Earth Station Elevation Angle (degrees above horizon)		
Earth Station Altitude above mean sea level (m)		
Rain rate for the location for 0.01% of an average year (mm/h)		
Uplink : Antenna Diameter (m)		
Uplink : Peak Antenna Gain (dBi)		
Uplink: Maximum Available Station EIRP (dBW)		
Uplink: EIRP Toward Spacecraft (dBW)		
Downlink: Antenna Diameter (m)		
Downlink: Peak Antenna Gain (dBi)		
Downlink: Earth Station G/T in the direction of satellite (dBK)		
Required C/No (dB)		
UP-LINK BUDGET		
Earth Station EIRP (dBW)		
Earth Station Elevation Angle (degrees above horizon)		
Distance between Earth Station and Satellite (km)		
Path Loss (dB)		
Loss due to atmospheric effects excluding rain (dB)		
Additional System Losses		
Spacecraft G/T – Clear Sky (dBK)		
Boltzman Constant (dB)		
C/No _{up} (dB)		
DOWNLINK BUDGET		
Spacecraft EIRP (dBW)		
Earth Station Elevation Angle (degrees above horizon)		
Distance between Earth Station and Satellite (km)		
Path Loss (dB)		
Loss due to atmospheric effects excluding rain (dB)		
Additional System Losses		
Earth Station G/T – Clear Sky (dBK)		

Earth Station G/T Degradation due to rain (dB)		
Earth Station G/T – Rain (dB-K)		
Boltzman Constant (dB)		
C/N _{o down} (dB)		
Total link C/No clear sky (dB)		
Required C/No (dB)		
Uplink Availability		
Downlink Availability		
Total link Availability		
RANGING AVAILABILITY		
Availability of Command Channel (%)		
Availability of Telemetry Channel (%)		
Availability of Ranging Channel (%)		

Telemetry Link Budgets ¹

SPACECRAFT TELEMETRY DATA		
Spacecraft/Constellation Name or ID		
Spacecraft Orbital Location (°E) (if GSO)		
If non-GSO No of planes		
No of satellites/plane		
Inclination		
Altitude		
Spacecraft Operational Mode (Normal / Emergency)		
SPACECRAFT TELEMETRY SYSTEM DATA		
Telemetry Frequency (MHz)		
Telemetry Type (Normal / Dwell)		
Transmit Antenna Pattern Type (Global / non-Global)		
EIRP Toward receive Earth Station (dBW)		
TELEMETRY LINK BUDGET		
Spacecraft EIRP (dBW)		
Earth Station Elevation Angle (degrees above horizon)		
Distance between earth station and satellite (km)		
Path loss (dB)		
Loss due to atmospheric effects excluding rain (dB)		
Additional System Losses (dB)		
Earth Station G/T – Clear Sky (dB-k)		
Earth Station G/T Degradation due to rain (dB)		
Earth Station G/T – Rain (dB-K)		
Boltzman Constant (dB)		
C/N _o (dB)		
Required C/No (dB)		
Margin (dB)		
Availability (%)		

Guard Bands used by the Satellite Network

GUARD BANDS USED BY THE SATELLITE NETWORK	Lower Frequency	Upper Frequency
Guard band at the lower edge of the operational band (MHz)		
Guard band at the upper edge of the operational band (MHz)		
Other guard bands if used (MHz)		
