RECOMMENDATION ITU-R M.1230

PERFORMANCE OBJECTIVES FOR SPACE-TO-EARTH LINKS OPERATING IN THE MOBILE-SATELLITE SERVICE WITH NON-GEOSTATIONARY SATELLITES IN THE 137-138 MHz BAND

(Question ITU-R 83/8)

(1997)

Summary

The performance objectives for downlinks of FDMA non-geostationary-satellite orbit (GSO) mobile-satellite service (MSS) networks and spread spectrum multiple access (SSMA) non-GSO MSS networks are stipulated in this Recommendation.

The ITU Radiocommunication Assembly,

considering

a) that performance objectives for mobile-satellite service (MSS) networks may be determined using a methodology similar to that described in Recommendation ITU-R SA.1021;

b) that performance objectives for representative systems are intended to provide guidelines for the development of actual systems that must operate in a frequency sharing environment;

c) that performance objectives for these transmissions must be consistent with the associated functional requirements and with the performance limitations associated with the systems and frequency bands in which the requirements will be fulfilled;

d) that performance objectives are a prerequisite for the determination of interference criteria;

e) that two general types of modulations are to be considered for non-geostationary (non-GSO) MSS operating in the 137-138 MHz band, which are: narrow-band modulation with frequency division multiple access (FDMA), and wideband modulation with direct sequence spread spectrum multiple access (DS-SSMA),

recommends

1 that MSS (space-to-Earth) systems using non-GSO satellites have the performance objectives specified in Table 1;

2 that the objectives defined in Table 1 are used as a basis for deriving the permissible levels of interference that are the minimum levels of interference to be accepted by specific systems.

TABLE 1

Performance objectives for space-to-Earth links in the MSS in the 137-138 MHz band

Function, and earth station platform and antenna	Modulation and bandwidth	Applicable elevation angles (degrees)	Minimum E_b/N_0 (dB)	Percentage of time
Data downlink to gateway (15 dBi horn antenna)	OQPSK 44 kHz narrow-band modulation with FDMA	5.0 and 20	10.6	99
Data downlink to subscriber terminal (0 dBi monopole antenna with a $\cos^2$ pattern)	BPSK 19.2 kHz narrow-band modulation with FDMA	5.0 and 20	10.3	99
Data downlink to gateway (16 dBi antenna)	MSK/DS-SSMA 885 kHz wideband modulation with DS-SSMA	5.0 and 20	3.7	99

NOTE 1 – Performance objectives for specific systems may differ from the objectives presented in this Recommendation.

NOTE 2 – It is assumed that an availability of 99% is appropriate (short-term interference criteria is not exceeded for more than 1% of the message time). This value was deemed appropriate given the error protocol being used in proposed satellite systems, namely the use of cyclic redundancy check (CRC) codes for error detection and retransmission of erroneous data.

NOTE 3 – For wideband transmissions, reception by mobile terminals is not contemplated at the moment.