RECOMMENDATION ITU-R M.1041

FUTURE AMATEUR RADIO SYSTEMS (FARS)

(Question ITU-R 48/8)

(1994)

The ITU Radiocommunication Assembly,

considering

a) Question ITU-R 48-3/8;

b) that different future systems are under study;

c) that system compatibility is necessary for international operation;

d) the need for flexible systems capable of adapting to new developments and natural disasters;

e) that the amateur and amateur-satellite bands below 3 GHz are heavily used, and there is a need to reduce interference within these services;

f) that the bands above 3 GHz will be subject to increasing use;

g) that to communicate at distances beyond line of sight, propagation characteristics of the bands above 144 MHz usually require use of terrestrial or satellite radio-relays;

h) that there is increasing need for data and image communications;

j) that commonality of hardware, software and protocols is desirable in order to achieve economies of scale and reduce the cost of systems,

recommends

that future systems in the amateur and amateur-satellite services should incorporate the following objectives and characteristics, and take into account the following frequency band considerations:

1. Objectives

General objectives for future systems in the amateur and amateur-satellite services should:

1.1 General

1.1.1 Promote design of robust systems capable of providing communication during natural disasters.

1.1.2 Accommodate the needs of amateur operators in urban, rural and remote areas, including those in developing countries.

1.1.3 Make systems widely available to amateur operators at an acceptable cost, recognizing that amateur operators fund their own stations.

1.1.4 Develop compatible and interoperable terrestrial and satellite systems.

1.1.5 Provide a flexible architecture that will facilitate introduction of technology advancements.

1.1.6 Minimize radiated power.

1.2 Technical

1.2.1 Promote increased spectrum efficiency, e.g., through use of automatic power control, automatic link establishment (ALE), adaptive antennas, diversity reception, digital signal processing, and access techniques such as TDMA and CDMA.

1.2.2 Ensure information integrity through error control techniques.

1.2.3 Encourage the development of common interfaces for the interconnection of equipment.

1.3 Operational

1.3.1 Provide for operational flexibility and self-organization.

1.3.2 Support international roaming within the amateur services.

1.3.3 Permit amateur stations to gain access to particular services made possible by advances in technology, e.g., automatic language translation, data bases, etc.

1.4 Services

Support, among others, the following:

1.4.1 Morse code

In accordance with ITU-T Recommendation F.1 Division B.

1.4.2 Narrow-band direct-printing

International Telegraph Alphabet No. 2, as defined in ITU-T Recommendation F.1 Division C, and Recommendation ITU-R M.625 except for modified station identification.

1.4.3 Telephony

Telephony of commercial quality.

1.4.4 Facsimile

In accordance with appropriate ITU-T Recommendations, subject to radio environments.

1.4.5 Data transmission

Synchronous and asynchronous in accordance with appropriate ITU-T Recommendations, consistent with bandwidth limitations.

1.4.6 Television

Slow and fast scan television using appropriate regional standards.

1.4.7 New transmission modes

Experimentation and development of new modes of transmission in order to advance the state of the art.

2. Technical characteristics

Amateur and amateur-satellite systems should have technical characteristics that provide worldwide interoperability, and allow origination, relay and termination of communications independent of other radio services. Design emphasis should be placed on reliability, robustness and flexibility of reconfiguration for efficient emergency communications. Multiple access techniques (e.g., frequency, time and code division) and modulation techniques should be selected for optimum spectrum efficiency, frequency reuse, resistance to interference and immunity to adverse propagation conditions.

3. Operational characteristics

Systems should be capable of operation in urban, residential and rural areas, and should be suitable for use in fixed and/or mobile applications. Mobile systems should include personal pocket terminals and systems suitable for operation in vehicles. Small, inexpensive systems capable of being upgraded should be available for new users and those in developing countries. Satellite systems should be designed to serve both industrialized and developing countries. Systems should facilitate education of operators and technicians.

4. Frequency band considerations

4.1 Spectrum requirements

Worldwide common frequency bands to facilitate international working, international roaming and commonality of equipment.

4.2 Spectrum utilization

Frequency bands should be chosen for operations to carry out the desired communication with minimum power, maximum frequency reuse and sharing, minimum interference to other services, and spectrum efficiency. More consideration should be given to using bands above 3 GHz.

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