RECOMMENDATION ITU-R SM.1048

DESIGN GUIDELINES FOR A BASIC AUTOMATED SPECTRUM MANAGEMENT SYSTEM (BASMS)

(Question ITU-R 68/1)

(1994)

The ITU Radiocommunication Assembly,

considering

a) that the creation of a spectrum management system would support and facilitate national spectrum management and monitoring, coordination among administrations and notification to the Radiocommunication Bureau (BR);

b) that basic data elements used in national spectrum management have been reflected in the Preface to the International Frequency List and Recommendation ITU-R SM.667;

c) that administrations should maintain spectrum management data with an automated database management system;

d) that many administrations have been successful in implementing automated database management system (DBMS) in the development and maintenance of their national spectrum management data;

e) that computer programs which accomplish engineering analysis are described in the ITU Catalogue of Software for Radio Spectrum Management;

f) that an automated spectrum management system for developing countries also needs to be developed to effectively manage the frequency assignment and other spectrum management data in these countries according to recommended standards,

recommends

1. that computer software for a basic automated spectrum management system (BASMS) should be developed and maintained;

2. that existing automated spectrum management systems should be examined with the ultimate objective of using them or portions thereof to accelerate the development of a BASMS in the shortest possible time;

3. that the user interface of the system will be in English with an option to convert to other languages; output documents intended for the general population (e.g. licences) should, to the extent practicable, be available in the national language;

4. that the BASMS be designed to support a single user (no sharing of data, etc.), keeping in mind that, in the future, an advanced spectrum management system (ASMS), based on the BASMS functional requirements, should be developed to include increased flexibility and networking facilities in a multi-user environment;

5. that the introduction of the BASMS should include the necessary training;

6. that the following software and hardware functional requirements should be used to develop a BASMS.

6.1 Functional requirements

This section describes the spectrum management activities and procedures to be supported by the BASMS. The BASMS should have the following functional requirements.

6.1.1 Record keeping

Support a database containing frequency assignment data and information for individual licence holders. Technical data specified in Recommendation ITU-R SM.667 for fixed, land mobile and broadcasting services should be included.

6.1.2 Frequency assignment

Automatically identify interference-free frequencies for an applicant if such a frequency is available; if not, identify the acceptable interference case. Such automatic techniques will be included where practicable. The process is to use appropriate calculations in conformity with commonly used interference assessment methods, frequency-distance functions or tables which allow for the user specification of minimum acceptable distance separations for co- and adjacent channels for each service in each band. It should also be possible to analyse a specific proposed frequency assignment using the same models to determine its interference potential.

6.1.3 Border coordination

Identify licence applications requiring border coordination and automatically create a coordination document to be used for coordination with bordering countries. The ITU Digitized World Map (IDWM) could be used for this purpose.

6.1.4 Notification to the Radiocommunication Bureau

Automatically identify applications requiring BR notification and create appropriate notification forms suitable for submission to the BR. Create appropriate entries in the BASMS for tracking notification progress.

6.1.5 Licensing fees and fee collection

Provide for recording fee payments and payment status associated with licensing functions. Only rudimentary facilities will be included for recording fees and identifying payment status since methods of calculating fees and requirements for billing vary from administration to administration. The programmes should be open for modification by the administration in this area so that they can be adapted to the particular local circumstances.

6.1.6 Monitoring

Provide spectrum management data to assist the monitoring stations.

6.1.7 Equipment approval process (optional)

Provide for authorization, certification, type acceptance, type approval.

6.1.8 Reports generation

6.1.8.1 Licence printing

Print licences at the spectrum manager's request. Licence printing should follow a standard format. Fixed and variable text should be under the control of the user. A data item for "Remarks" should be included which will be printed on the licence. Other documents of this type such as import permits or construction certificates, should be provided in a similar manner, if practicable.

6.1.8.2 Record summary

Provide one-line summary data from each of the records selected by the user.

6.1.8.3 Record detail

Provide a full listing of all data contained in selected records.

6.1.8.4 Transaction activity reports

Provide periodic reports of transaction activity at the spectrum manager's request; such reports to include, but not necessarily be limited to:

– number of applications in process (total, by service, by band),

– total number of applications.

6.1.8.5 Expiration and renewal notice

Automatically create a list of applications due to expire at some user-specified future date. Optionally generate hard-copy expiration notices.

6.1.8.6 Summary status reports

Provide summary statistics and specific record summaries for records in each processing status category.

6.1.8.7 Status reports

Provide a list of all records in any user-designated status category (such as pending, incomplete, etc.).

6.1.9 User interface

User interfaces will be available in English with an option to convert to other languages. The user interface should be windows-like with extensive use of help features, menus, etc. Such features will facilitate the evolution to an advanced system.

6.2 Radiocommunication service propagation and protection ratio requirements

The BASMS should support interference calculations above 30 MHz, based on the appropriate ITU Recommendations where practicable, for the following radiocommunication services:

– land mobile services,

– point-to-point radio-relay links of fixed service,

– broadcasting services.

6.3 Software requirements

The BASMS should be written using one of the popular database management languages, chosen for its suitability to the specific spectrum management requirements. The BASMS program should be designed to support the following.

6.3.1 Standard data transactions

– record creation,

– record editing/modification,

– record deletion.

6.3.2 Data entry

Provisions should be made to make data entry as simple as possible, including the use of logical full-screen editing and data entry validation and logical, user-changeable defaults. Data entry should be optimized for input data validation and, to the extent practicable, should be consistent with BR data forms.

6.3.3 Data modification

Changes to records should be made using the same screen-editing specified for new data entry wherever possible.

6.3.4 Data back-up and archiving

Standard features should be included that support routine back-up for data loss protection. Archiving should be provided for any deleted records identified by the spectrum manager for archive retention. Records should be identified singly and by class attributes (which should be specified in a user changeable data table).

6.3.5 Database inquiry

Records of interest should be easily identified and extracted. Primary selection is to use a set of standard selection screens incorporating standard selection criteria. The BASMS is also to support selection using Query by Example and Extended Query techniques.

Inquiries will include, *inter alia*:

– selection by frequency range,

– selection by frequency range and bandwidth,

– a designated frequency or channel,

– selection by unique record identifier,

– selection by geographic area,

– selection by service,

– selection by user,

– selection by call sign or station identifier.

Outputs from all data inquiries should be ordered according to fields specified by the user.

6.3.6 Validation

Validation is the process whereby data entered into the BASMS is tested to see that it is permissible or appropriate. The BASMS should include validation on every input field using information in user-controllable validation tables.

6.3.7 Record status

Information in the BASMS data files will be subject to continual change. For planning purposes, the BASMS recognize multiple record status categories (although records will not necessarily be kept in different files matching these categories). Provision should be made to assign and track record status. Status attributes should be user assignable, but will typically identify processing status like preliminary processing, hold for data correction, hold for coordination, approved, etc.

6.3.8 Program parameters modification

The program should be as simple as possible to maintain and modify. Modifications that are allowed should be minimal.

6.3.9 Compatibility with other database files

The issue of compatibility should be considered.

6.3.10 Data content

Recommendation ITU-R SM.667 presents specifications for data items to be included in a spectrum management database. The BASMS should optionally provide for the import and export of data in the specified formats. For internal use, such data should be stored in that format most efficient for the specific applications. For efficiency consider total data storage requirements, data precision requirements, and needs for processing speed. In general, data should be stored in compact, internal format until required for some external application. Display formats should be chosen as appropriate to individual output forms.

The standard group of data elements in Recommendation ITU-R SM.667 should be used as guidelines for the selection and definition of data items to be included in the BASMS database. Data elements should include those required for BR notification.

The BASMS should provide facilities to import data from the International Frequency List on CD-ROM and from the Radiocommunication Information Circular/Local Frequency List.

6.4 Documentation

A complete user's manual should be supplied. The manual should include a description of all operating features of the program sufficient to allow a user untrained in the use of the program:

– to specify the computer required for the use of this program,

– to install this program on the computer,

– to explain the procedure used to arrive at a frequency assignment,

– to train others in the proper use of the program,

– to change the parameters which control the operation of the program through the use of user changeable data tables,

– to back up and archive data as required to ensure data security.

6.5 Hardware/software environment

The BASMS should be designed to run on minimally configured MS-DOS computers with at least 6 Mbyte of random access memory. Windows could optionally be used since it is likely that future ITU software will be developed for this environment. Typical computer systems for this application are expected to meet at least the following specifications:

– 80386 processor,

– 120 Mbyte hard disk,

– VGA colour monitor,

– printer,

– co-processor (option).