RECOMMENDATION ITU-R S.1656

Outline of a software specification for automating the examination of satellite network filings for compliance with Article 5 of the Radio Regulations

(Question ITU-R 230/4)

(2003)

The ITU Radiocommunication Assembly,

considering

a) that the problem of the backlog in the Radiocommunication Bureau's (Bureau) processing of satellite network filings was first discussed at the Plenipotentiary Conference (Kyoto, 1994), resulting first in the adoption of Resolution 18 (Kyoto, 1994) and then in decisions at WRC-97 that provided a partial solution to this problem;

b) that Council-98 provided additional resources to the Bureau to address this problem, but the unused funds remaining at the end of the 1998-1999 budget period could not be carried over to the 2000-2001 budget period, and this problem remains unresolved;

c) that in January 2000 a correspondence group was established by the Director of the Bureau to identify approaches for addressing this problem which could be considered at WRC-2000, but that Conference adopted only a few of the approaches identified;

d) that, at Council-2000, the Director established a Software Experts Group to identify approaches for improving the software used in processing satellite network filings, but the work of that group has not yet resolved any significant portion of this problem;

e) that the backlog in the Bureau's processing of satellite network filings continues to be a very significant factor affecting administrations' and operators' ability to comply with the time-frames specified in various provisions of the Radio Regulations (RR);

f) that the backlog in the Bureau's processing of satellite network filings is having an adverse impact on the Bureau's ability to continue providing other services to administrations, including those services provided to developing countries;

g) that the annual reports to the Council submitted by the Director of the Bureau described the continually increasing growth of the backlog in the Bureau's processing of satellite network filings;

h) that the reports to the Council submitted by the Director of the Bureau, which specifically respond to Resolution 74 (Minneapolis, 1998) describe possible approaches for resolving this problem;

j) that the report from the Working Group on Reform concludes that the backlog in the Bureau's processing of satellite network filings has been a critical problem for the Union, and that the elimination of this problem will require the systematic development and implementation of an action plan for addressing numerous contributing factors;

k) that at the 13-14 November 2000 meeting of the Informal Software Expert Group, it was identified that in the processing of satellite network filings many manual functions and manual interfaces were required for the regulatory examinations and some of these manual tasks were done at the validation stage as well;

l) that examination for compliance with the Table of Frequency Allocations is a manual process;

m) that automation of these manual checks could reduce the time required by the Bureau in processing satellite network filings, and may assist administrations to check the compliance of their own satellite network filings with the provisions of RR Article 5 before submitting them to the Bureau,

recommends

1 that Annex 1 to this Recommendation, comprising a software requirements outline, should be used in the development of software to automate the examination of satellite network filings for compliance with the Table of Frequency Allocations (RR Article 5) and associated footnotes,

invites

1 the Bureau to assure that software developed on the basis of this Recommendation and offered for use by the Bureau accurately reflects the provisions of RR Article 5 and is efficiently integrated into the satellite network filing processing procedures,

2 the Bureau to identify what additional manual checks may still be necessary and which of those can be automated to assure that satellite network filings are completely checked for compliance with RR Article 5 and the Rules of Procedure.

NOTE 1 – For the purpose of commercial development of software, a more detailed specification, based on the outline in Annex 1, needs to be prepared.

NOTE 2 – The software to be developed on the basis of this Recommendation should be designed to ensure easy integration with existing Bureau software and software tools used by administrations.

Annex 1

General software requirements to examine the compliance of satellite network filings with RR Article 5

1 Reasons for developing a software requirement

This requirements Recommendation outlines a procedure and the parameters used for the automated checking against the provisions of RR Article 5 of radio-frequency notices drawn up in accordance with RR Appendix 4, in the interests of enhancing the efficiency with which notices are examined by the Bureau and reducing the number of errors made by administrations when completing them. This involves the development of an RR Article 5 database and software for the automated examination of notices.

2 Anticipated users and significance of the checking software

It is anticipated that the software may be used by the Bureau in checking satellite network filings for compliance with the provisions of RR Article 5. In addition, such software may be used by administrations in checking their satellite network filings before submission to the Bureau. Furthermore, the RR Article 5 relational database could be used as a reference system for the rapid retrieval of information on frequency band allocations.

3 Input file

The input for the examination of a satellite network filing shall be in the electronic format defined by the Bureau for the electronic space notification described in the Circular Letter CR/58 and subsequent amendments published on the Space Radiocommunications Stations on CD-ROM (SRS-on-CD-ROM) (see also Resolution 55 (WRC-2000)). The input database may contain one or more networks distinguished by the notice identification number ("ntc_id" as currently defining the field name within a table).

The current implementation of the satellite network filing maintains, to some extent, a hierarchical structure, some information relates to the complete network, some to a specific beam and some to a particular group of frequency assignments.

In addition, data might have been provided in graphical format and stored in the Graphical Interference Management System (GIMS) database, outside the alphanumerical database. In most cases, the process of automated examination must begin with the identification of the service areas, since this is usually provided in the form of graphical data for each beam. If the service area table associated with a filing is not populated, then it may be possible to use the GIMS software tool to extract a list of territories within a given service area.

The data submitted are all listed in RR Appendix 4:

– The date of bringing into use (A2).

– The assigned frequency (or frequencies) and bandwidth (C2, C3, C7).

– The class(es) of station (C4).

– The direction of the signal (B2).

– Whether GSO or non-GSO (indicator for B3 or B4).

– The service area or areas (C11).

– The power characteristics of the transmission (C8) might also be required for further examinations due to e.i.r.p. or pfd limitations given in footnotes.

– (Additional data might be required for some services, for example for services that can be either active or passive services, deep space, etc. or for particular cases where the date of receipt by the Bureau might be of importance.)

NOTE 1 – When this Recommendation is revised, further parameters may be added.

4 RR Article 5 reference database

The software will use a database of RR Article 5 that represents the allocations and constraints contained in the RR. This database contains a number of interrelated tables describing the allocations in terms of radiocommunication services, frequency bands, regions (or subregions), date of entry-into-force and associated footnotes. The format of the database is shown in Appendix 1.

Also included in the database is a set of tables representing the footnotes to the RR Article 5 Table of Frequency Allocations, broken down into their individual components. These components include, for example, additional allocations, constraints and regional variations. The format of this Table of the database is shown in Appendix 2.

5 Examination for compliance with the Table of Frequency Allocations and footnotes

The conformity software will check a particular notice through a sequence of steps that will depend on the structure of the notice itself and the complexity of the allocation as given in the Table of Frequency Allocations of RR Article 5 and the applicable footnotes within this or these allocation(s). This sequence might require a number of iterations:

– *Frequency band identified under C2a*: This will be checked against the frequency range given for each allocation in the Table of Frequency Allocations, until the proper range is identified. In some cases, (e.g. radio astronomy service) it might be necessary to use other related parameters, C2b and C3. If the allocation is worldwide (i.e. global), the identification of the radiocommunication service will take place.

– *Allocated service*: The correlation between the classes of station identified under C4, for each group and each beam of the notice and the radiocommunication service(s) of the Table of Frequency Allocations will be checked using a reference table that provides this correlation.

– *Direction of transmission*: The direction of the signal (identified by item B2) will have to correspond to the direction that might restrict the use of the allocation.

– *Regional allocation*: If it is a regional allocation, it will be necessary first to identify the territories intended to be served by the space network, in other words, the service area identified under C11. Since a service area could be defined in various ways, it might require accessing the graphical data and in this case perform a surfaces overlap between the graphical service area and the close contour that defined the radiocommunication Region examined. A simple case is a list of territories defining the service area that will have to be inside the close contour of the Region. Footnotes usually identify a list of territories. The correlation between classes of station and services will take place again, followed by other service-related checks (direction, GSO, etc.).

  Once the allowed radiocommunication service is identified, the protection status is identified: either the service is primary, secondary, or “undefined” (no harmful interference; no protection).

– *Date of bringing into use*: This will be checked against the period of applicability of the Table of Frequency Allocations of RR Article 5. This date is actually defined for each group, regardless of its location in RR Appendix 4. The same date is checked when a footnote specifies dates (until, after) or a period of validity.

Of course, optimization will need to be implemented while doing the navigation within and between the two databases (RR Article 5 and satellite network filing(s)). If an allocation has a service footnote attached, it is necessary to perform checks against the footnote before the examination is completed.

An allocation to a particular radiocommunication service may extend over a number of adjacent sub-bands of the Table of Frequency Allocations. In such a case, the allocation should be treated as a contiguous allocation for this service.

An example of an algorithm to check compliance is shown in Appendix 3.

Note that the filing contains a "class of station" for each assignment, and this must be mapped to the appropriate radiocommunication service(s) for comparison with the entry in the Table of Frequency Allocations – these Tables are part of the RR Article 5 database, and are shown in Appendix 4.

The software will examine the input file for compliance with applicable footnotes for each assignment. These may be advisory footnotes, or other footnotes that do not require an examination to be carried out by the Bureau. In most cases, however, the footnotes modify an allocation shown in the Table, or add additional constraints to its use. A list of the main examinations to check compliance with the footnotes is shown in Appendix 5.

6 Output information

The software will generate a data table that contains the results of each examination. The table will contain the following fields for each frequency range in the assignment:

– the network identity (**ntc_id**);

– group identity (**grp_id)**;

– assigned frequency;

– compliance with service check (positive/negative);

– indication of allocation status (secondary/primary);

– compliance with permitted direction of transmission (positive/negative);

– compliance with permitted service area (positive/negative);

– compliance with permitted date of application (positive/negative);

– a list of applicable footnotes;

– indication of any applicable footnote that could not be automatically examined.

An example of the format of the output report is shown in Appendix 6.

This data table may be used by other processes (such as other automated examinations), or may be displayed directly to the user. For clarity, however, a user report should contain only those entries from the notice for which inconsistencies with RR Article 5 (the Table or footnotes thereto) were detected, or for which it was not possible, in automatic mode, to determine conformity with RR Article 5.

Consideration should be given to providing user-interfaces in multiple languages.

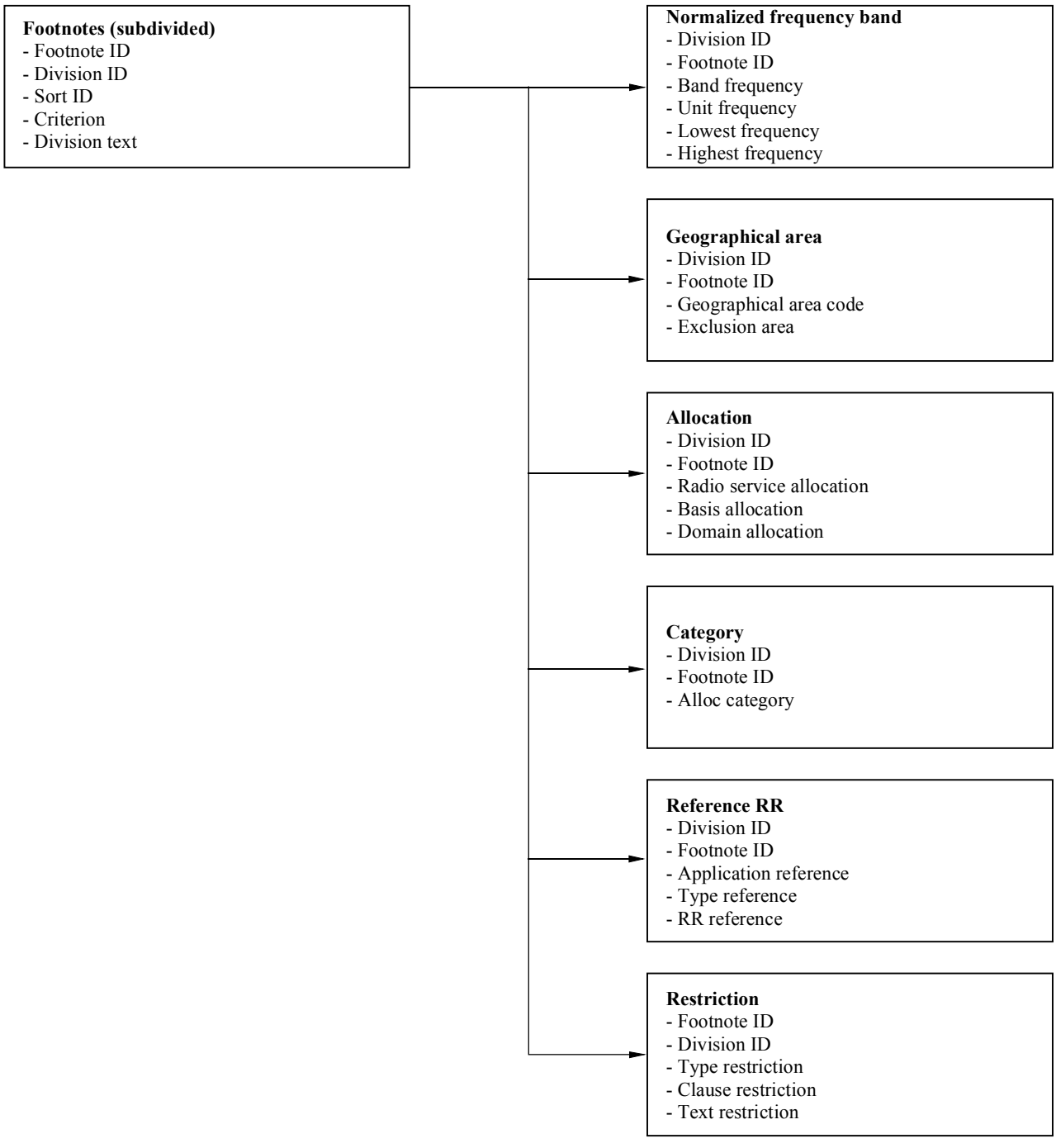
Appendix 1
to Annex 1

Format of RR Article 5 reference database

Frequency band				Region	Footnote	Radiocommunication service	Service footnote	WRC	Decision
FREQ_L		FREQ_U			FootNoteID (GENERAL)	SERVICE	FootNoteID (SERVICE)		
1930	-	1970	MHz	XR1					
						FIXED		2000	MOD
						MOBILE	5.388A	2000	MOD
					5.388			2000	MOD
1930	-	1970	MHz	XR2					
						FIXED		2000	MOD
						MOBILE	5.388A	2000	MOD
						Mobile-satellite (Earth-to-space)		2000	MOD
					5.388			2000	MOD
1930	-	1970	MHz	XR3					
						FIXED		2000	MOD
						MOBILE	5.388A	2000	MOD
					5.388			2000	MOD

Appendix 2
to Annex 1

Format of RR Article 5 footnote table



Appendix 3
to Annex 1

Example algorithm to check compliance with RR Table of Frequency Allocations

while (**grp_id** $_X \leq$ **grp_id** $_{MAX}$) do *! For each group within a network filing*

  while (**seq_no** $_Y \leq$ **seq_no** $_{MAX}$) do *! For each sequence within a group*

    while (**stn_cls** $_{X,Z} \leq$ **stn_cls** $_{X,MAX}$) do *! For each station class within a group*

! Check frequency and service

    if (**freq_min** $_Y \geq$ **FREQ_L** and **freq_max** $_Y \leq$ **FREQ_U** and **stn_cls** $_{X,Z}$ = **SERVICE**[1]) then

      [**freq** $_Y$: service = OK] *! If yes, then denote in output file*

      if (**ALLOC_TYPE** = "secondary") then *! Check secondary status*

        [**freq** $_Y$: secondary = OK] *! If yes, then denote*

      end-if

    else

      [**freq** $_Y$: service = NOK] *! If allocation or service mismatch, then denote*

    end-if

! Check direction of transmission

    if (**emi_rcp** $_X$ = "E" and (**DXN** = "s-E" or **DXN** = "s-s")) or (**emi_rcp** $_X$ = "R" and (**DXN** = "E-s" or **DXN** = "s-s")) then

      [**freq** $_Y$: direction = OK] *! If correct, then denote*

    else

      [**freq** $_Y$: direction = NOK] *! If incorrect, then denote*

    end-if

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[1] Noting the definition of the space operations service, assignments filed for this service may be permitted in bands allocated to other services. Therefore the following checks may be involved:

If the space operations service assignment does not use a space operations allocation then either:

a) check automatically that the space operations frequency is in a frequency band allocated to the main service in which the space station is operating (e.g. FSS); or

b) flag that the allocation must be checked, and carry out the above check manually.

```
            if (REGION = "MW") or (ctry Y = REGION) then     ! Check if global or regional allocation
              [freq Y : service_area = OK]                   ! If service area correct, then denote
            else
              [freq Y : service_area = NOK]                  ! If service area incorrect, then denote
            end-if

            if (d_rcv Y ≥ EFF_FROM) then                     ! Check date of receipt against RR
              [freq Y : date-of-application = OK]            ! If allocation in force, then denote
            else
              [freq Y : date-of-application = NOK]           ! If allocation not in force, then denote
            end-if
        end-while
end-while
```

Appendix 4
to Annex 1

Mapping of class of station with radiocommunication service

Class of station/AP5 Code

Class of station code	Station indicator	Related classes of station code	Class of station description	AP5	AP5 Rev code
EA	Space station	TA	Space station in the amateur-satellite service		ASS
EB	Space station	UB	Space station in the broadcasting-satellite service (sound broadcasting)	BSS	BSS
EC	Space station	TC	Space station in the fixed-satellite service	FSS	FSS
ED	Space station	TD,UD	Space telecommand space station in the space operation service		SOSS
EE	Space station	UE,UY	Space station in the standard frequency and time signal-satellite service		SFTSS
EF	Space station	TF,TL	Space station in the radiodetermination-satellite service	RDSS	RDSS
EG	Space station	TG,TI	Space station in the maritime mobile-satellite service	MMSS	MMSS
EH	Space station	TH,UH	Space station in the space research service		SRSS
EI	Space station	TE,VA	Space station in the mobile-satellite service	MSS	MSS
EJ	Space station	TB,TJ	Space station in the aeronautical mobile-satellite service	AMSS	AMSS
EK	Space station	TK,UK	Space tracking space station in the space operation service		SOSS
EM	Space station	TM,UM	Space station in the meteorological-satellite service		MTSS
EN	Space station	TN,UN	Space station in the radionavigation-satellite service		RDNSS
EO	Space station	TO,TZ	Space station in the aeronautical radionavigation-satellite service		ARDNSS
EQ	Space station	TQ,TX	Space station in the maritime radionavigation-satellite service		MRDNSS
ER	Space station	TR,UR	Space telemetering space station in the space operation service		SOSS
ES	Space station	--	Space station in the inter-satellite service		ISS
ET	Space station	TT,UT	Space station in the space operation service		SOSS
EU	Space station	TU,TY	Space station in the land mobile-satellite service	LMSS	LMSS

Class of station/AP5 Code (*continued*)

Class of station code	Station indicator	Related classes of station code	Class of station description	AP5	AP5 Rev code
EV	Space station	UV	Space station in the broadcasting-satellite service (television)	BSS	BSS
EW	Space station	TW,UW	Space station in the Earth exploration-satellite service		EESS
EY	Space station	UE,UY	Space station in the standard frequency and time signal-satellite service		SFTSS
RA	Earth station	--	Radio astronomy station		RA
TA	Earth station	EA	Space operation earth station in the amateur-satellite service		ATSS
TB	Earth station	EJ	Aeronautical earth station, providing a feeder link for the aeronautical mobile-satellite service	AMSS	AMSS
TC	Earth station	EC	Earth station in the fixed-satellite service	FSS	FSS
TD	Earth station	ED	Space telecommand earth station in the space operation service		SOSS
TE	Earth station	EI	Mobile earth station, i.e. earth station in the mobile-satellite service the emissions of which are intended to facilitate search and rescue operations (satellite EPIRB)	MSS	MSS
TF	Earth station	EF	Fixed earth station in the radiodetermination-satellite service	RDSS	RDSS
TG	Earth station	EG	Ship earth station, i.e. mobile earth station in the maritime mobile-satellite service	MMSS	MMSS
TH	Earth station	EH	Earth station in the space research service		SRSS
TI	Earth station	EG	Coast earth station, providing a feeder link for the maritime mobile-satellite service	MMSS	MMSS
TJ	Earth station	EJ	Aircraft earth station, i.e. mobile earth station (aircraft) in the aeronautical mobile-satellite service	AMSS	AMSS
TK	Earth station	EK	Space tracking earth station in the space operation service		SOSS
TL	Earth station	EF	Mobile earth station in the radiodetermination-satellite service	RDSS	RDSS
TM	Earth station	EM	Earth station in the meteorological-satellite service		MTSS
TN	Earth station	EN	Fixed earth station in the radionavigation-satellite service		RNSS
TO	Earth station	EO	Mobile earth station in the aeronautical radionavigation-satellite service		ARNSS

Class of station/AP5 Code (*end*)

Class of station code	Station indicator	Related classes of station code	Class of station description	AP5	AP5 Rev code
TQ	Earth station	EQ	Mobile earth station in the maritime radionavigation-satellite service		MRNSS
TR	Earth station	ER	Space telemetering earth station in the space operation service		SOSS
TT	Earth station	ET	Earth station in the space operation service		SOSS
TU	Earth station	EU	Land mobile earth station, i.e. mobile earth station in the land mobile-satellite service	LMSS	LMSS
TW	Earth station	EW	Earth station in the Earth exploration-satellite service		EESS
TX	Earth station	EQ	Fixed earth station in the maritime radionavigation-satellite service		MRNSS
TY	Earth station	EU	Base earth station, providing a feeder link for the land mobile-satellite service	LMSS	LMSS
TZ	Earth station	EO	Fixed earth station in the aeronautical radionavigation-satellite service		ARNSS
UA	Earth station	EI	Mobile earth station, i.e. earth station in the mobile-satellite service intended to be used while in motion or during halts at unspecified points	MSS	MSS
UB	Earth station	EB	Earth station in the broadcasting-satellite service (sound broadcasting)	BSS	BSS
UD	Earth station	ED	Space telecommand mobile earth station in the space operation service		SOSS
UE	Earth station	EE	Earth station in the standard frequency-satellite service		TMSS
UH	Earth station	EH	Mobile earth station in the space research service		SRSS
UK	Earth station	EK	Space tracking mobile earth station in the space operation service		SOSS
UM	Earth station	EM	Mobile earth station in the meteorological-satellite service		MTSS
UN	Earth station	EN	Mobile earth station in the radionavigation-satellite service		RNSS
UR	Earth station	ER	Space telemetering mobile earth station in the space operation service		SOSS
UT	Earth station	ET	Mobile earth station in the space operation service		SOSS
UV	Earth Station	EV	Earth station in the broadcasting-satellite service (television)	BSS	BSS
UW	Earth station	EW	Mobile earth station in the Earth exploration-satellite service		EESS
UY	Earth station	EY	Earth station in the time signal-satellite service		SFTSS
VA	Earth station	EI	Land earth station, providing a feeder link for the mobile-satellite service	MSS	MSS

AP5 Code/Radiocommunication service

Ap5 Rev code	Radiocommunication service	Direction	Allocation basis	Domain	Rec. ITU-R SM.1413	Ap5
NA	(Not allocated)		Not allocated	Not allocated		
AMTS	AERONAUTICAL MOBILE		Primary basis	Terrestrial services	MA	
AMTS	Aeronautical Mobile		Secondary basis	Terrestrial services	MA	
AOMTS	AERONAUTICAL MOBILE (OR)		Primary basis	Terrestrial services	MAO	
ARMTS	AERONAUTICAL MOBILE (R)		Primary basis	Terrestrial services	MAR	
ARMSS	AERONAUTICAL MOBILE-SATELLITE (R) (Earth-to-space)	(Earth-to-space)	Primary basis	Space services	SMAR	
ARMSS	AERONAUTICAL MOBILE-SATELLITE (R) (space-to-Earth)	(space-to-Earth)	Primary basis	Space services	SMAR	
ARDNTS	AERONAUTICAL RADIONAVIGATION		Primary basis	Terrestrial services	DNA	
ARDNTS	Aeronautical Radionavigation		Secondary basis	Terrestrial services	DNA	
ATS	AMATEUR		Primary basis	Terrestrial services	Z	
ATS	Amateur		Secondary basis	Terrestrial services	Z	
ASS	AMATEUR-SATELLITE		Primary basis	Space services	SZ	
ASS	Amateur-Satellite		Secondary basis	Space services	SZ	
ASS	Amateur-Satellite (space-to-Earth)	(space-to-Earth)	Secondary basis	Space services	SZ	
BTS	BROADCASTING		Primary basis	Terrestrial services	B	
BSS	BROADCASTING-SATELLITE		Primary basis	Space services	SB	BSS
EESS	EARTH EXPLORATION-SATELLITE		Primary basis	Space services	SX	
EESS	Earth Exploration-Satellite		Secondary basis	Space services	SX	
EEASS	Earth Exploration-Satellite (active)		Secondary basis	Space services	SX	
EESS	EARTH EXPLORATION-SATELLITE (Earth-to-space)	(Earth-to-space)	Primary basis	Space services	SX	
EESS	Earth Exploration-Satellite (Earth-to-space)	(Earth-to-space)	Secondary basis	Space services	SX	
EESS	EARTH EXPLORATION-SATELLITE (Earth-to-space) (space-to-space)	(Earth-to-space) (space-to-space)	Primary basis	Space services	SX	
EEPSS	EARTH EXPLORATION-SATELLITE (passive)		Primary basis	Space services	SX	
EEPSS	Earth Exploration-Satellite (passive)		Secondary basis	Space services	SX	
EESS	EARTH EXPLORATION-SATELLITE (space-to-Earth)	(space-to-Earth)	Primary basis	Space services	SX	

AP5 Code/Radiocommunication service (*continued*)

Ap5 Rev code	Radiocommunication service	Direction	Allocation basis	Domain	Rec. ITU-R SM.1413	Ap5
EESS	Earth Exploration-Satellite (space-to-Earth)	(space-to-Earth)	Secondary basis	Space services	SX	
EESS	EARTH EXPLORATION-SATELLITE (space-to-Earth) (space-to-space)	(space-to-Earth) (space-to-space)	Primary basis	Space services	SX	
FTS	FIXED		Primary basis	Terrestrial services	F	
FTS	Fixed		Secondary basis	Terrestrial services	F	
FSS	FIXED-SATELLITE (Earth-to-space)	(Earth-to-space)	Primary basis	Space services	SF	FSS
FSS	FIXED-SATELLITE (Earth-to-space) (space-to-Earth)		Primary basis	Space services	SF	FSS
FSS	FIXED-SATELLITE (space-to-Earth)	(space-to-Earth)	Primary basis	Space services	SF	FSS
FSS	FIXED-SATELLITE (space-to-Earth) (Earth-to-space)		Primary basis	Space services	SF	FSS
ISS	INTER-SATELLITE		Primary basis	Space services	SI	
LMTS	LAND MOBILE		Primary basis	Terrestrial services	MT	
LMTS	Land Mobile		Secondary basis	Terrestrial services	MT	
LMSS	LAND MOBILE-SATELLITE (Earth-to-space)	(Earth-to-space)	Primary basis	Space services	SMT	LMSS
LMSS	Land Mobile-Satellite (Earth-to-space)	(Earth-to-space)	Secondary basis	Space services	SMT	LMSS
LMSS	LAND MOBILE-SATELLITE (space-to-Earth)	(space-to-Earth)	Primary basis	Space services	SMT	LMSS
LMSS	Land Mobile-Satellite (space-to-Earth)	(space-to-Earth)	Secondary basis	Space services	SMT	LMSS
MMTS	MARITIME MOBILE		Primary basis	Terrestrial services	MM	
MMTS	Maritime Mobile		Secondary basis	Terrestrial services	MM	
MMDTS	MARITIME MOBILE (distress and calling)		Primary basis	Terrestrial services	MM	
MMSS	MARITIME MOBILE-SATELLITE (Earth-to-space)	(Earth-to-space)	Primary basis	Space services	SMM	MMSS
MMSS	MARITIME MOBILE-SATELLITE (space-to-Earth)	(space-to-Earth)	Primary basis	Space services	SMM	MMSS
MRDN	MARITIME RADIONAVIGATION		Primary basis	Terrestrial services	MM	
MRDN	MARITIME RADIONAVIGATION (radio beacons)		Primary basis	Terrestrial services	MM	
MRDN	Maritime Radionavigation (radio beacons)		Secondary basis	Terrestrial services	MM	
MTTS	METEOROLOGICAL AIDS		Primary basis	Terrestrial services	W	
MTTS	Meteorological Aids		Secondary basis	Terrestrial services	W	

AP5 Code/Radiocommunication service (*continued*)

Ap5 Rev code	Radiocommunication service	Direction	Allocation basis	Domain	Rec. ITU-R SM.1413	Ap5
MTSS	METEOROLOGICAL-SATELLITE (Earth-to-space)	(Earth-to-space)	Primary basis	Space services	SW	
MTSS	Meteorological-Satellite (Earth-to-space)	(Earth-to-space)	Secondary basis	Space services	SW	
MTSS	METEOROLOGICAL-SATELLITE (space-to-Earth)	(space-to-Earth)	Primary basis	Space services	SW	
MTSS	Meteorological-Satellite (space-to-Earth)	(space-to-Earth)	Secondary basis	Space services	SW	
MTS	MOBILE		Primary basis	Terrestrial services	M	
MTS	Mobile		Secondary basis	Terrestrial services	M	
MDTS	MOBILE (distress and calling)		Primary basis	Terrestrial services	M	
XAMTS	MOBILE except aeronautical mobile		Primary basis	Terrestrial services	MX	
XAMTS	Mobile except aeronautical mobile		Secondary basis	Terrestrial services	MX	
XARMTS	MOBILE except aeronautical mobile (R)		Primary basis	Terrestrial services	MXR	
XARMTS	Mobile except aeronautical mobile (R)		Secondary basis	Terrestrial services	MXR	
MSS	MOBILE-SATELLITE		Primary basis	Space services	SM	MSS
MSS	MOBILE-SATELLITE (Earth-to-space)	(Earth-to-space)	Primary basis	Space services	SM	MSS
MSS	Mobile-Satellite (Earth-to-space)	(Earth-to-space)	Secondary basis	Space services	SM	MSS
MSS	MOBILE-SATELLITE (space-to-Earth)	(space-to-Earth)	Primary basis	Space services	SM	MSS
MSS	Mobile-Satellite (space-to-Earth)	(space-to-Earth)	Secondary basis	Space services	SM	MSS
XAMSS	Mobile-Satellite except Aeronautical mobile-satellite (Earth-to-space)	(Earth-to-space)	Secondary basis	Space services	SMX	
RA	RADIO ASTRONOMY		Primary basis	Radio astronomy service	SA	RA
RA	Radio Astronomy		Secondary basis	Radio astronomy service	SA	RA
RDSS	RADIODETERMINATION-SATELLITE (Earth-to-space)	(Earth-to-space)	Primary basis	Space services	SD	RDSS
RDSS	Radiodetermination-Satellite (Earth-to-space)	(Earth-to-space)	Secondary basis	Space services	SD	RDSS
RDSS	RADIODETERMINATION-SATELLITE (space-to-Earth)	(space-to-Earth)	Primary basis	Space services	SD	RDSS
RDSS	Radiodetermination-Satellite (space-to-Earth)	(space-to-Earth)	Secondary basis	Space services	SD	RDSS

AP5 Code/Radiocommunication service (*continued*)

Ap5 Rev code	Radiocommunication service	Direction	Allocation basis	Domain	Rec. ITU-R SM.1413	Ap5
RDLTS	RADIOLOCATION		Primary basis	Terrestrial services	DL	
RDLTS	Radiolocation		Secondary basis	Terrestrial services	DL	
RDLSS	RADIOLOCATION-SATELLITE (Earth-to-space)	(Earth-to-space)	Primary basis	Space services	SDL	
RDNTS	RADIONAVIGATION		Primary basis	Terrestrial services	DN	
RDNSS	RADIONAVIGATION-SATELLITE		Primary basis	Space services	SDN	
RDNSS	Radionavigation-Satellite		Secondary basis	Space services	SDN	
RDNSS	RADIONAVIGATION-SATELLITE (space-to-Earth)	(space-to-Earth)	Primary basis	Space services	SDN	
SOSS	SPACE OPERATION (Earth-to-space)	(Earth-to-space)	Primary basis	Space services	SO	
SOSS	SPACE OPERATION (Earth-to-space) (space-to-space)	(Earth-to-space) (space-to-space)	Primary basis	Space services	SO	
SOISS	SPACE OPERATION (satellite identification)		Primary basis	Space services	SO	
SOSS	SPACE OPERATION (space-to-Earth)	(space-to-Earth)	Primary basis	Space services	SO	
SOSS	Space Operation (space-to-Earth)	(space-to-Earth)	Secondary basis	Space services	SO	
SOSS	SPACE OPERATION (space-to-Earth) (space-to-space)	(space-to-Earth) (space-to-space)	Primary basis	Space services	SO	
SRSS	SPACE RESEARCH		Primary basis	Space services	SR	
SRSS	Space Research		Secondary basis	Space services	SR	
SRASS	Space Research (active)		Secondary basis	Space services	SR	
SRSS	Space Research (deep space)	(deep space)	Secondary basis	Space services	SR	
SRSS	SPACE RESEARCH (deep space) (Earth-to-space)	(deep space) (Earth-to-space)	Primary basis	Space services	SR	
SRSS	Space Research (deep space) (Earth-to-space)	(deep space) (Earth-to-space)	Secondary basis	Space services	SR	
SRSS	SPACE RESEARCH (deep space) (space-to-Earth)	(deep space) (space-to-Earth)	Primary basis	Space services	SR	
SRSS	Space Research (deep space) (space-to-Earth)	(deep space) (space-to-Earth)	Secondary basis	Space services	SR	
SRSS	SPACE RESEARCH (Earth-to-space)	(Earth-to-space)	Primary basis	Space services	SR	

AP5 Code/Radiocommunication service (*end*)

Ap5 Rev code	Radiocommunication service	Direction	Allocation basis	Domain	Rec. ITU-R SM.1413	Ap5
SRSS	SPACE RESEARCH (Earth-to-space) (space-to-space)	(Earth-to-space) (space-to-space)	Primary basis	Space services	SR	
SRSS	SPACE RESEARCH (passive)		Primary basis	Space services	SR	
SRSS	Space Research (passive)		Secondary basis	Space services	SR	
SRSS	SPACE RESEARCH (space-to-Earth)	(space-to-Earth)	Primary basis	Space services	SR	
SRSS	Space Research (space-to-Earth)		Secondary basis	Space services	SR	
SRSS	SPACE RESEARCH (space-to-Earth) (space-to-space)	(space-to-Earth) (space-to-space)	Primary basis	Space services	SR	
SRSS	Space Research (space-to-space)	(space-to-space)	Secondary basis	Space services	SR	
SFTTS	STANDARD FREQUENCY AND TIME SIGNAL		Primary basis	Terrestrial services	H	
SFTTS	STANDARD FREQUENCY AND TIME SIGNAL (10 000 kHz)		Primary basis	Terrestrial services	H	
SFTTS	STANDARD FREQUENCY AND TIME SIGNAL (15 000 kHz)		Primary basis	Terrestrial services	H	
SFTTS	STANDARD FREQUENCY AND TIME SIGNAL (2 500 kHz)		Primary basis	Terrestrial services	H	
SFTTS	STANDARD FREQUENCY AND TIME SIGNAL (20 000 kHz)		Primary basis	Terrestrial services	H	
SFTTS	STANDARD FREQUENCY AND TIME SIGNAL (20 kHz)		Primary basis	Terrestrial services	H	
SFTTS	STANDARD FREQUENCY AND TIME SIGNAL (25 000 kHz)		Primary basis	Terrestrial services	H	
SFTTS	STANDARD FREQUENCY AND TIME SIGNAL (5 000 kHz)		Primary basis	Terrestrial services	H	
SFTSS	Standard Frequency and Time Signal-Satellite (space-to-Earth)	(space-to-Earth)	Secondary basis	Space services	SH	
SFTSS	STANDARD FREQUENCY AND TIME SIGNAL-SATELLITE (400.1 MHz)		Primary basis	Space services	SH	
SFTSS	Standard Frequency and Time Signal-Satellite (Earth-to-space)	(Earth-to-space)	Secondary basis	Space services	SH	
SFTSS	Standard Frequency and Time Signal-Satellite (space-to-Earth)	(space-to-Earth)	Secondary basis	Space services	SH	
EEASS	EARTH EXPLORATION-SATELLITE (active)		Primary basis	Space services	SX	
SRASS	SPACE RESEARCH (active)		Primary basis	Space services	SR	

Appendix 5
to Annex 1

A list of main examinations to check compliance with RR footnotes

Footnote constraint type	Examination	Footnote sub-tables
Allocation	Does assignment comply with corresponding footnote allocation?	Footnotes (sub-divided) Normalized frequency band Allocation Category
Service area	Does service area of beam comply with corresponding footnote service area restriction?	Footnotes (sub-divided) Normalized frequency band Geographical area
Coordination	(Advisory, denote in output file against assignment)	Footnotes (sub-divided) Normalized frequency band Reference RR Restriction
Protection	(Advisory, denote in output file against assignment)	Footnotes (sub-divided) Normalized frequency band Restriction
Class of station/service	Does the associated earth station comply with corresponding footnote restriction on service type?	Footnotes (sub-divided) Normalized frequency band Allocation Restriction
Date	Does the date of use of the assignment comply with corresponding footnote restriction on date?	Footnotes (sub-divided) Normalized frequency band Restriction
Power/pfd limit	(Flag limit and possibly link to pfd and power examination software)	Footnotes (sub-divided) Normalized frequency band Restriction
Antenna size	(Advisory, denote in output file against assignment)	Footnotes (sub-divided) Normalized frequency band Restriction

Appendix 6
to Annex 1

Example of output data required

Network	Group	Assigned frequency	Service	Category of service	Direction	Service area	Date of application	Additional allocation	Footnote	Additional footnote fields	
ntc_id $_1$	**grp_id $_1$**	**freq $_1$**	OK		OK	OK	OK	OK	5.XXX 5.XYX	… …	
.	.	…	OK	OK	OK	OK	OK			…	
.	.	…	OK	OK	NOK	OK	OK			…	(1)
.	.	…	OK	OK	OK	OK	OK	OK	5.XXY	…	
.	**grp_id $_1$**	**freq $_N$**	OK	OK	OK	NOK	OK			…	
.	**grp_id $_2$**	**freq $_1$**	OK	OK	OK	OK	OK	OK	5.XYX	…	
.	…	…	OK	OK	OK	OK	OK		5.XYZ	…	
.	…	…	OK	OK	NOK	OK	OK			…	
.	**grp_id $_{MAX}$**	**freq $_{MAX}$**	OK	OK	OK	OK	OK			…	

(1) Example: Space allocation exists for this band (Service OK), allocation is compliant (CoS OK), direction of transmission is incorrect (Direction NOK), service area is compliant (Service area OK), and the date-of-receipt is compliant (Date of Application OK).