CEPT ECC
Electronic Communications Committee

CEPT Report 46

Report from CEPT to the European Commission in response to the Mandate on inclusion of information on rights of use for all uses of spectrum between 400 MHz and 6 GHz

Report approved on 8 March 2013 by the ECC

0 EXECUTIVE SUMMARY

Background:

The EC mandate on EFIS recognises the existing role of the ECO Frequency Information System (EFIS) and the potential to develop it in a way which would enable it to serve as a primary input to the spectrum inventory. The role and objectives of the spectrum inventory are set out in the present Radio Spectrum Policy Programme (RSPP, Decision 243/2012/EU [3], Art. 9). The mandate focuses on the part of the EC Decision on EFIS (2007/344/EC) [1] with regard to the practical modalities and uniform formats for the collection and provision of data by the Member States to the Commission.

A Commission Decision of 16 May 2007 (2007/344/EC) [1] and a Decision of the European Parliament and of the Council of 7 March 2002 (676/2002/EC) [2] on harmonised availability of information regarding spectrum use within the Community decided to use the ECO Frequency Information System (EFIS) for publication and access to spectrum information within the Community.

This framework has been established to improve transparency about the use of spectrum, and particularly for those who have an interest in access to the market across Europe.

The Mandate to CEPT on inclusion of information on rights of use for all uses of spectrum between 400 MHz and 6 GHz contains the following tasks:

1. *To confirm that it is technically possible for the EFIS system to accommodate comprehensive information regarding spectrum usage rights for the whole range from 400 MHz to 6 GHz without limit to the type of application, based on the current common formats in Annex II of Commission Decision 2007/344/EC* [1].

2. *To highlight any necessary change to the current common formats contained in Annexes I and II of Decision 2007/344/EC* [1] *by taking into account the data needed/relevant for the methodology under development according to Article 9 par.2 of Decision 243/2012/EU* [3]*. This might for example be necessary to differentiate current data collection in accordance with Annex II from data collection for types of use other than ECS in the range 400 MHz to 6 GHz. Any changes to current common formats should only deal with non-confidential information and allow an assessment of the time duration, geographical extent and deployed technology, while limiting the administrative burden on the Member States.*

3. *To assess the level, coherence and uniformity of information that is currently being provided by the Member States when providing information in accordance with Annexes I and II as well as when providing non-regulatory information being collected by EFIS which has relevance for the inventory.*

4. *To state the necessary additional operational details, if any, in particular the links and updating mechanisms between ECO and national administrations and assess the technical and administrative impacts on Member States, taking into consideration the need to minimise additional costs and manpower for national administrations with a clear distribution of responsibilities. In this context it should be investigated which Member States use direct automatic updates from national databases to EFIS and where national databases do not exist.*

5. *To assess the possibility and the benefits to update information provided by Member States pursuant to Article 3.2 of Decision 2007/344/EC [1] every three months, and drawing from experience, to estimate the increase in administrative and cost burden this could represent for Member States.*

The Mandate aims to extend the scope of the Decision regarding rights of use and possibly radio interface information in the spectrum range 400 MHz to 6 GHz as well as the means to keep the information as up-to-date as possible. The mandate was adopted by the Radio Spectrum Committee (RSC) in August 2012.

The present draft CEPT Report 46 addresses Tasks 1 – 3 and is subject to the CEPT public consultation procedure. It provides information regarding level, coherence and uniformity of information in EFIS and

follows the ECC Report 180 [4] that provides guidance to administrations when providing information in EFIS, in particular guidance on usage of the application terminology.

The principal conclusions of this Report are as follows:

1. The most valuable contribution which EFIS could make to the spectrum inventory requirement is to assimilate and present electronic questionnaires optimised to the band and applications under consideration for technical evaluation of spectrum usage. The use of CEPT electronic questionnaires is an efficient method to retrieve qualitative and quantitative information. Based on the information given in the questionnaires an analysis can be done in relation to the goals set out in the Radio Spectrum Policy Programme. This is an efficient, demand-oriented and cost-effective method to complete the information available in EFIS.
2. No amendments are proposed with regard to Annex I of Decision 2007/344/EC [1]. As a matter of fact, the current radio interface information in EFIS according to Annex I of the EC Decision is complementary information of a regulatory nature and provides the necessary visibility on requirements applicable to a given band;
3. Some amendments are proposed for Annex II of Decision 2007/344/EC [1]. These relate to duplex pairing arrangements as well as collection of RoU (Right of Use)/authorisation information by means of electronic questionnaires;
4. It is technically possible for the EFIS system to accommodate comprehensive information regarding spectrum usage rights/authorisations for the whole range from 400 MHz to 6 GHz without limit to the type of application, based on the current common formats in Annex 2 of Commission Decision 2007/344/EC [1].
5. Although the information provided by Member States is largely coherent for the purposes of regulatory information (used for aspiring market entrants), there are some differences in the level, and particularly the uniformity of that information. This is to a large extent due to variations in the mechanics of the licensing and authorisation regimes in the different countries, even if they follow common principles. There are also major differences in level and uniformity across different services. This is to be expected, and it tends to highlight the need for additional input information for spectrum inventory purposes.

Task 1 under the Mandate:

The EFIS system can already, or can easily be extended to accommodate:

- the estimated required number of records;
- the expanded frequency range;
- additional forms of data entry which are believed to be required, particularly electronic questionnaires in formats designed for the purposes of the inventory, and reference documents and tables with other qualitative and quantitative information.

No static common data format is suitable for assessment or evaluation of the efficient use of spectrum of a specific application. By comparison, spectrum efficiency investigations within CEPT usually require in-depth frequency band specific analysis and involve many stakeholders, very often including the use of CEPT questionnaires sent to administrations.

Electronic questionnaires are therefore intended to be introduced, so that data can be collected on a case-by-case basis and stored in a suitable data format in EFIS.

Task 2 and 3 under the Mandate: Annex I and II of the EC Decision 2007/344/EC [1]:

Radio interface information: This Report does not propose changes to Annex I of the EC Decision 2007/344/EC [1] as we do not consider that the information is generally relevant in the context of usage of spectrum / spectrum inventory, although some administrations use national radio interfaces as technical reference documents in their national regulations.

The RIS (Radio Interface Specifications) concept cannot be applied to deliver information about frequency bands used by government users which are primarily described in terms of ‘Allocations’ in National Table of Frequency Allocations (NTFA). Also, it must be emphasised that frequency assignments for radio

transmitters are not technical regulations, but simply describe the conditions for use of the public domain at specific locations.

The European Common Allocation Table (ECA Table) within EFIS seems to be a better source of information since it contains the harmonisation measures and the Harmonised European Standards. Where there is no harmonisation measure or standard, ECA also indicates where several countries have implemented an application in a frequency range.

Right of use information:

The way administrations interpret or legislate Rights of Use (RoUs) provided in EFIS is not harmonised due to various national authorisation regimes. An example: one RoU could be only for a specific frequency band (e.g. a land mobile network in a specific frequency band but with several transmitters operating) or it can be seen as one RoU per transmitter according to the respective national authorisation regime. The ECS concept is not limited to specific frequency bands. Some countries apply the ECS concept also in other frequency bands than those harmonised in Europe. Therefore, care should be taken when comparing or analysing RoU information.

Some amendments are proposed for Annex II of Decision 2007/344/EC [1]. These relate to duplex pairing arrangements as well as collection of RoU information by means of electronic questionnaires.

It is considered that further changes to the common RoU format are not useful or beneficial for spectrum inventory purposes. Instead it is proposed to use the electronic questionnaire concept.

It is preferable to distinguish between RoU for ECS bands and RoU/authorisation in other frequency bands. Applying the RoU concept in general to all other bands as seen in the context of the spectrum inventory does not provide a meaningful understanding of the actual spectrum use or the actual number of users in the band. Visibility on spectrum usage by non-ECS applications is provided by allocations and applications in EFIS. It is rather the application section in most cases in EFIS which provides visibility on the usage of a given frequency band. However, in some specific cases the RoU/authorisation in other frequency bands than RoU in ECS bands might be an option. General authorisations without individual right of use should be provided in EFIS, but are not required to use the common format on RoU.

Geographical coverage options should only be treated as relevant for those types of applications where additional geographical information in EFIS does provide benefits.

The text field “technology in use” has been implemented in EFIS in the RoU common format as an optional field.

It is not intended to duplicate the ITU-R BR IFIC (BR International Frequency information Circular) available information in EFIS to avoid unnecessary work with regards to the broadcast plans, maritime services and aeronautical services in the terrestrial field as well as existing space stations, earth stations and radio astronomy stations. The use of the RoU concept for these radio services seems to be unnecessary. The registration of “stations” or “frequency assignments”, whether at national level and/or ITU level, follows different purposes. BR IFIC is not meant to reflect actual use of the spectrum; its prime purpose is to grant international rights for protection.

Electronic questionnaires:

It is possible to collect on a case-by-case basis on “bands of interest” identified by either CEPT, the Commission or Radio Spectrum Policy Group (RSPG) comprehensive data for the frequency ranges and applications outside of the ECS bands through electronic CEPT questionnaires.

The format will be set each time a questionnaire is designed for a dedicated frequency band(s) and/or application(s). Information can be collected via electronic questionnaires and updated later as required. Electronic questionnaires can also be used upon request for information on a particular band and/or application.

This is more efficient, more demand-oriented and less costly than to request administrations to upload and maintain all RoU/authorisation information from 400 MHz to 6 GHz in EFIS on a continuous basis and several times a year.

Information collected via electronic questionnaires takes into account that both regulatory and non-regulatory information needs to be collected. Non-regulatory information can be for example number of users, demand trends, or other specific non-regulatory information in relation to the actual use of the spectrum in a given frequency band or for a specific application.

The electronic questionnaire concept is also proposed since it is considered difficult to transfer the RoU concept to some applications and frequency bands such as satellite services, governmental use, licence-exempt use or to some applications in some frequency bands that only need an authorisation, but do not require an RoU.

The use of questionnaires in CEPT as well as other organisations for spectrum inventory purposes is well proven.

The electronic questionnaire concept is well-suited to ensure that the data obtained is available for further analysis. This approach is in line with the request stipulated in the RSPG opinion (see annex 6) for a more developed version of EFIS that could become a key source depending on its future capability to illustrate actual availability and resources of Member States to provide such information. This will improve the information relating to actual use of spectrum in EFIS. Administrations can check and update the inventory data on a periodic basis.

The electronic questionnaire concept is also proposed for the following issues or purposes:

1. Inclusion of information in EFIS on unused or under-used frequencies or information on future spectrum re-farming actions on a case-by-case basis for frequency bands under study. This information should be made available in EFIS based on questionnaires to CEPT administrations;
2. EFIS already provides visibility on the results of sharing studies in the document section by including references to relevant ECC Reports. Specific sharing information can be collected by means of electronic questionnaires on an ad-hoc basis in order to support detailed analysis for dedicated frequency band;
3. Geographical coverage information is also seen for many applications and/or frequency bands as information that should be handled inside the electronic questionnaire concept, to complete information already provided through the Right of Use information in EFIS;
4. Collection of information on implementation/putting into operation by means of electronic questionnaires, where appropriate and on a case-by-case basis. This will improve the information relating to actual use of spectrum in EFIS, although it should be noted that the stability of this kind of information is to some extent limited.
5. EFIS can provide links to information available at the ITU-R for several applications. Additional information about specific frequency usages in the field of these applications can still be collected by means of electronic questionnaires, if necessary.

The collection of information via EFIS cannot totally be decoupled from evaluation models used later on in the spectrum inventory process. Dedicated electronic questionnaires would be better suited to target exactly the data needed for the respective spectrum inventory considerations than a common RoU format for all frequency bands and applications.

Given the proposal for using electronic CEPT questionnaires in this Report, we also propose that this be reflected in the Commission Implementing Act.

All these amendments together are intended to improve the quality of information in EFIS for spectrum inventory purposes and to make data available for analysis. It is also intended to provide an efficient mechanism to allow administrations to update and maintain such data in EFIS under a suitable framework. It will also be possible to generate subject specific reports “out-of-the-database” instead of conducting a fully manual creation of reports. This will increase the work efficiency for ECO, in its support to ECC, and also for national administrations.

Tasks 4 and 5:

A separate CEPT Report (CEPT Report 47) will address Tasks 4 and 5 of the Mandate. The work on Tasks 4 and 5 includes a CEPT questionnaire that has been sent out by the ECO to CEPT administrations. It is attached in Annex 4 of the present report for information.

TABLE OF CONTENTS

LIST OF ABBREVIATIONS

Abbreviation	Explanation
APP	Application software for specific purposes
CEPT	European Conference of Postal and Telecommunications Administrations
CRAF	Committee on Radio Astronomy Frequencies
CSV	Character Separated Values format
DA2GC	Direct Air to Ground Communications
DFS	Dynamic Frequency Selection
DTT	Digital Terrestrial Television
DVB-T	Digital Video Broadcasting (Terrestrial)
EBU	European Broadcasting Union
EC	European Commission
ECA	European Common Allocation
ECC	Electronic Communications Committee
ECO	European Communications Office
ECS	Electronic Communications Services
EESS	Earth Exploration Satellite Service
EFIS	ECO Frequency Information System
ESOA	European Satellite Operators Association
ESX	Software product (used for EFIS test systems) which allows several independent virtual servers to run on one physical server
ETSI	European Telecommunications Standards Institute
ETSI ERM	ETSI Technical Committee on Electromagnetic compatibility and Radio Spectrum Matters
EU	European Union
EUMETSAT	The European Organisation for the Exploitation of Meteorological Satellites
FS	Fixed Service
HEVC	High Efficiency Video Coding
ITU	International Telecommunication Union
LoU	Letter of Understanding
LTE	Long Term Evolution
M2M	Machine-to-Machine
NATO	North Atlantic Treaty Organisation
NTFA	National Table of Frequency Allocations
PAMR	Public Access Mobile Radio
PMR	Professional Mobile Radio, Private Mobile Radio
PMSE	Programme Making and Special Events
PPDR	Public Protection and Disaster Relief
RF	Radio Frequency
RFID	Radio Frequency Identification Devices
RIS	Radio Interface Specification
RoU	Right of Use

RSC	Radio Spectrum Committee
RSPG	Radio Spectrum Policy Group
RSPP	Radio Spectrum PolicyProgramme
R&TTE	Radio Equipment and Telecommunications Terminal Equipment
SAB/SAP	Services Ancillary to Broadcasting / Services Ancillary to Programme making (SAP)
SQL	Structured Query Language
SRD	Short Range Devices
SRDoc	ETSI System Reference Document
TCAM	Telecommunications Conformity Assessment and Market Surveillance Committee
TRA-ECS	Terrestrial Radio Applications Capable of Providing Electronic Communications
UIC	International Union for Railways
UHF	Ultra High Frequencies
UWB	Ultra WideBand
WARC	World Administrative Radio Conference
WAS/WLAN	Wireless Access Systems/ Wireless Local Area Networks
WG FM	Working Group Frequency Management
WRC	World Radio Conference
XML	Extensible Markup Language format

1 INTRODUCTION

The Report is structured as follows:

- Section 2: Task 1: Technical possibility for the EFIS system to accommodate comprehensive information regarding spectrum usage rights for the whole range from 400 MHz to 6 GHz without limit to the type of application
- Section 3: Tasks 2 and 3: Necessary change to the current common formats contained in Annexes I and II of the Decision 2007/344/EC (including part of Task 3 on level, coherence and uniformity of RIS and RoU information in EFIS)
- Section 4: Task 3: Regarding the provision of non-regulatory information being collected by EFIS.
- Section 5: Updating of information in EFIS
- Section 6: Conclusions and recommendations.

The annexes of this Report include supporting and background information:

- ANNEX 1: Data format currently used in EFIS regarding requirements of Annex II of the EC Decision
- ANNEX 2: Structure of data in EFIS – application terminology
- ANNEX 3: Mandate to CEPT
- ANNEX 4: WGFM questionnaire to Administrations in relation to Tasks 4 and 5
- ANNEX 5: Electronic questionnaires to collect spectrum inventory relevant information
- ANNEX 6: RSPG Opinion on Review of Spectrum Use
- ANNEX 7: List of references.

2 TASK 1: TECHNICAL POSSIBILITY FOR THE EFIS SYSTEM TO ACCOMMODATE COMPREHENSIVE INFORMATION REGARDING SPECTRUM USAGE RIGHTS FOR THE WHOLE RANGE FROM 400 MHz TO 6 GHz WITHOUT LIMIT TO THE TYPE OF APPLICATION

2.1 INTRODUCTION

Task 1 of the Mandate is to confirm that it is technically possible for the EFIS system to accommodate comprehensive information regarding spectrum usage rights for the whole range from 400 MHz to 6 GHz without limit to the type of application, based on the current common formats in Annex II of Commission Decision 2007/344/EC [1].

Currently, according to Annex 2 of the EC Decision 2007/344/EC [1], it is only mandatory to provide information on rights of use in frequency bands used for the provision of electronic communications services, which are tradable in accordance with Article 9.3 of Directive 2002/21/EC or which are granted through competitive or comparative selection procedures pursuant to Directive 2002/20/EC.

The inventory aims at different objectives to allow, e.g. the identification of frequency bands in which the efficiency of spectrum use can be improved, and to analyse the various types of use of spectrum by private and public users. Therefore, there is a need to consider how the EFIS database could evolve in order to accommodate the collection of additional information regarding spectrum usage for the whole spectrum range from 400 MHz to 6 GHz without limit to the type of application.

A preliminary estimate of the actual number of rights of use in the frequency ranges from 400 MHz to 6 GHz is in the rough order of magnitude of 1 million records on European basis. The actual number of transmitters under these licences again is much higher. For example, Austria indicated 190 000 transmitters under 30 000 authorisations.

Commission Decision 2007/344/EC [1] defines RoU as individual authorisations which are held by the right of use holder.

Table 1: RoU overview (approximate numbers)

Country	RoU now in EFIS (ECS bands and other bands where the ECS concept is applied)	RoU in 400 MHz to 6 GHz range	RoU – all frequency ranges
Austria	276		30000 (190000 transmitters)
Czech Republic	84	2900	28400
Denmark		8100	23000 (already available in EFIS)
Estonia	66	400	3000
Germany	169	70000 (mostly PMR)	200000
Latvia	200	Each base station of the GSM or IMT network has individually calculated assignments	14000

Country	RoU now in EFIS (ECS bands and other bands where the ECS concept is applied)	RoU in 400 MHz to 6 GHz range	RoU – all frequency ranges
Lithuania	58	10400	15100 (33000 transmitters)
Luxembourg	25	700	2250
Portugal	33	55 Additionally, there are other licence owners using applications such as PMR or fixed links which do not necessarily need RoU	446 Additionally, there are other licence owners using applications such as PMR or fixed links which do not necessarily need RoU
Slovakia	14 No of transmitters 10556	3816 No of transmitters 15016	13179 No of transmitters 29030
Sweden	3800	3800	45000
UK	11 (No of transmitters – not held but approx. 50 000)	230000 Each point-to-point fixed link is licensed. Although only around 2500 PMSE licences are issued, these contain 110000 assignments (for the 230000, this is only the number of licences)	250000

The differences in the way administrations interpret or legislate RoUs in their country are reflected in the differences in the number of RoU given in the table above. ECC Report 180 [4] recognises that the rights of use provided in EFIS can differ from one administration to another. One RoU can be only for a specific frequency band (e.g. a land mobile network in a specific frequency band, but with several transmitters operating) or it can be seen as one RoU per transmitter. Therefore care should be taken when comparing or analysing RoU. The different understanding and approaches at national level lead to different number of RoU records in EFIS.

The RoU concept is also proposed by the Mandate to be used in the frequency band 400-6000 MHz which includes non-ECS bands or bands which are not tradable or not granted through competitive or comparative selection procedures. A clear distinction should be made because in some countries, there is no need for an RoU information for these bands nor for certain type of applications (e.g. PMR). In Portugal for example, a radio licence does not necessarily require a right of use (RoU), but does require an authorisation from the administration; this authorisation contains the requirements to be applied to the stations (such as location, frequency, power, protection zones…), limited within a geographical area. Point-to-point links and private mobile networks are typical examples of services to which those types of licences apply. In such cases the information could only be collected in EFIS under a different interpretation of the scope of the “RoU concept”.

Some countries apply the ECS concept also in other frequency bands than those listed in Table 4 in section 3.2.2 of the present document (harmonised ECS frequency bands). The most common method of providing RoU information in EFIS is on a network basis, although some countries provide RoU also for individual assignments, i.e. for single transmitters of a network in accordance with the respective national authorisation regime. To understand this difference properly, one has to distinguish between two kind of licences: the right to provide a telecommunication service to a third party (public, private, …) in a defined area (country,

regional or service area of a single transmitter at a defined frequency) or the right to set up and operate a transmitting station at a defined frequency / some defined frequencies.

Table 2: RoU overview in EFIS (as reported to RSC#41)

Frequency table	September 2011	12 December 2011	13 March 2012	29 June 2012	4 October 2012
Austria	272	272	272	272	276
Belgium	37	41	41	41	41
Bosnia and Herzegovina			53	53	53
Bulgaria	24	30	36	36	36
Croatia			27	27	27
Cyprus	36	52	52	52	52
Czech Republic	85	84	84	84	84
Denmark	25365	25365	22389	23039	23039
Estonia	42	66	66	66	66
Finland	42	42	44	124	42
France	0	151	151	151	151
Germany	100	169	169	169	528
Greece	25	25	25	25	25
Hungary	15	25	25	83	83
Iceland	0	40	40	40	40
Ireland	23	279	285	285	285
Italy	232	232	232	232	232
Latvia	200	200	194	200	200
Liechtenstein	0	0	0	0	0
Lithuania	57	57	57	58	58
Luxembourg	34	34	31	25	25
Malta	31	58	58	60	60
Moldova			0	0	0

Frequency table	September 2011	12 December 2011	13 March 2012	29 June 2012	4 October 2012
Netherlands	73	73	71	71	71
Norway	280	280	280	280	280
Poland	17	44	44	44	113
Portugal	434	446	446	446	446
Romania	48	48	48	48	48
Slovakia	181	244	253	253	311
Slovenia	45	43	43	43	43
Spain	30	39	2058	12802	12802
Sweden	2670	2670	3844	3844	3844
Switzerland	0	0	0	0	0
Turkey			15	15	15
United Kingdom	34	67	111	111	111

With a view to fostering more harmonised information on RoU from EU Member States, it is important to recognise that the existing requirement for information on RoU under the EFIS Decision (2007/344/EC) [1] applies to the Harmonised ECS bands as listed in Annex 1 of the RSPG Opinion on Review of Spectrum Use.

ECO confirms that the EFIS database can handle the preliminary, estimated amount of RoU/authorisation records with considerable margin.

2.2 STRUCTURE OF THE EFIS DATABASE

The EFIS database contains the following tables:

- **'Allocations'**: specifies the radio services authorised by an individual administration under their National Table of Frequency Allocations (NTFAs). The national allocations may differ from those in the RR. Many administrations also indicate in the comments field by which government body the frequency band is actually managed, e.g. defence, civil aviation authority, civil frequency management or broadcasting frequency management, etc.
- **'Applications'**: specifies, based on some national inventory, the "applications in use" within a country and using the 3 layers EFIS terminology as defined in Annex 2 of ECC Decision (01)03 [15].
- **'Documents'**: national documents relevant for spectrum management.
- **'Radio interfaces'**: the RIS information is typically provided for licence-exempt regulations.
- **'Right of use'**: RoU information is typically provided for ECS frequency bands and on an individual licence holder basis.

  RoU information is delivered in a synthetic manner, requires maintenance and cannot be "automatic".

The most relevant tables in the context of the spectrum inventory are likely to be 'Applications', 'Documents' and 'Right of Use'.

In addition to the above, the EFIS database can hold a considerable number of documents and links to sources of other comprehensive information on specific radio services and applications with regard to their actual use. This information consists of regulatory as well as non-regulatory information (see section 4.1). In future, it is planned to also have data from electronic questionnaires in EFIS (see section 4.2) on frequency bands subject to study. Especially, we consider that data collected via electronic CEPT questionnaires which are designed for a dedicated frequency band and/or application provide an excellent basis for the collection of comprehensive information about actual spectrum use, present as well as future planned use.

2.3 EFIS TECHNICAL SETUP

In basic terms, the EFIS setup consists of a database and a web server, with software applications enabling interaction between database (SQL database) and web server. The system is founded on leading standards within each individual area.

The complete EFIS environment has a production system and a test system with two virtual servers: one for ECO test purposes and one system for administrations (to test, for example, new national software applications/systems before using these in the live EFIS).

For project management purposes the management and bug/issue tracking system 'Trac' is used.

For details on the setup of EFIS see the figure below.

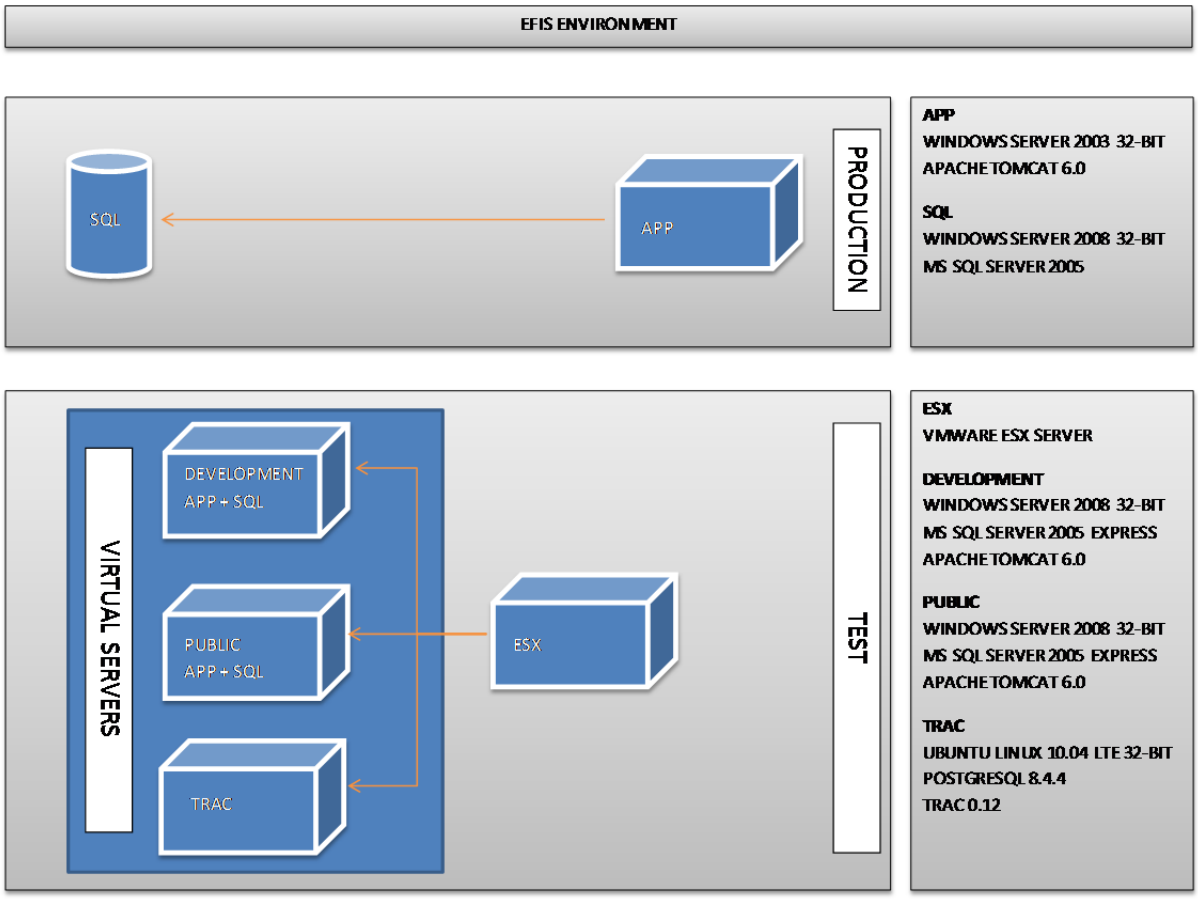

Figure 1: EFIS technical setup

2.4 COMPREHENSIVE AND IMPORTANT INFORMATION FOR SPECTRUM INVENTORY PURPOSES

EFIS should contain objective data that can help analysing at a strategic level various type of usage by both private and public users.

EFIS should contains objective data for the analysis of technology trends, future needs and demand for spectrum in European Union policy areas covered by the RSPP (Decision 243/2012/EU) [3], in particular for those services which could operate in the range from 400 MHz to 6 GHz, in order to identify developing and potential significant uses of spectrum:

The inventory shall serve the following objectives:

a. *to allow to identify spectrum bands where efficiency of existing spectrum uses could be improved;*

b. *to help to identify spectrum bands that could be suitable for re-allocation and spectrum sharing opportunities in order to support Union policies set out in this Decision, while taking into account future needs for spectrum based, inter alia, on consumers' and operators' demands, and of the possibility to meet such needs;*

c. *to help to analyse the various types of spectrum usage by both private and public users;*

d. to help to identify spectrum bands that could be allocated or re-allocated in order to improve their efficient use, promote innovation and enhance competition in the internal market, to explore new ways for spectrum sharing, to the benefit of both private and public users, while taking into account the potential positive and negative impact on existing users of such bands and of adjacent bands.

In particular, EFIS should contain objective data that can play a role in developing measures taking into account technical evaluation and investigations. Therefore, it needs to be considered how information can be structured already during the data collection phase to have it available in a suitable format for later analysis.

Following Task 1 of the Mandate, the question is whether a common format makes sense for the variety of different radio services and applications from 400 MHz to 6 GHz. The table below lists possible and indicative criteria concerning the use of the spectrum as well as possible parameters which might be used in a future analysis according to the objectives mentioned above.

Table 3: Possible/indicative parameters for different application types or frequency bands (examples, non-exhaustive list)

Examples of the type of application	Possible/indicative criteria for the technical evaluation of spectrum use	Availability of current information in EFIS
Dedicated Frequency bands	Depends on frequency range	Inventory information available via many CEPT questionnaires, see section 4.2
Terrestrial Broadcasting Services	Either no DTT or a number of allotments in a country (this is mostly equivalent with the number of DTT multiplexes, i.e. several multiplexed programmes are modulated and transmitted over one channel)	ITU Broadcast web / BR IFIC with a reference to this information available in EFIS. Some information available under the national data in EFIS
Mobile bands	Percentage of band in use. Status of the individual licence regarding implementation / putting into operation, demand tendency	Existing RoU information in EFIS. ECO Report 03 on licensing of 'Mobile bands' in CEPT. In addition, questionnaire information on case-by-case basis where the frequency band is subject to review (see 2 GHz unpaired bands)
Unlicensed applications (including ISM bands)	Number of equipment on the market (estimated existing population of devices) and growth tendency	Questionnaire results on unlicensed applications are available in EFIS. All information concerning unlicensed applications and related national implementation information available via the ECA Table and ERC/REC 70-03 [25] in EFIS. The ERC/REC 70-03 going to be included in data format in EFIS including the national implementation information. Many ETSI SRDocs and draft SRDocs (market demand and technical characteristics).

Examples of the type of application	Possible/indicative criteria for the technical evaluation of spectrum use	Availability of current information in EFIS
		Some Monitoring Campaign results are available in EFIS, where relevant
Fixed Links	Number of links per band / per million of population in a given country	Number of fixed link information in ECC Report 173 [14] available in the spectrum inventory section of EFIS. It is planned to make this data electronically available in EFIS in the future. Data will be updated using an electronic questionnaire
Radio astronomy	Number of stations per band. Geographical coordinates of RAS station/list of frequency bands used per station/quiet zone radios (km) around each station	CRAF handbook [17] available in spectrum inventory section of EFIS. Information is also available in the BR IFIC
PMSE	Number of individual licences (where available) or approximate number of users	Results of several PMSE related questionnaires and ETSI SRDocs available in EFIS
Radiolocation	Number of stations registered in the band in ITU-R master register	ITU master register with a reference to this information going to be available in EFIS. Information from CEPT questionnaires available in EFIS Information regarding some radar networks is available in EFIS. More information can be made available concerning civil radar stations (e.g. the meteorological or maritime radars).
Satellite services	Number of earth stations per band (information available in ITU-R Master register as well as some information at ECC page dealing with satellite regulatory information. Indication that the service is put into operation or that satellite is under construction. Approximate number of users.	Limited information available, no SRDocs or questionnaires in the recent past. Information available in BR IFIC Spectrum assignment to a satellite network, especially the space station, is typically done by one single administration (the notifying administration) following the completion of frequency coordination as stipulated in the Radio Regulations. Such assignments to a space station are likely to be entered in the national database. The entry in databases of the assignments made to earth stations associated with such satellite networks could be dependent upon the national licensing arrangements. For instance with licence exempt (or

Examples of the type of application	Possible/indicative criteria for the technical evaluation of spectrum use	Availability of current information in EFIS
		unlicensed) arrangements, the assignments to earth stations are unlikely to be recorded in national databases. Therefore a few CEPT countries which host satellite operators are most likely to maintain reasonably accurate databases while in the majority of countries are unlikely to maintain such accurate databases unless national assignments (to Earth stations) are diligently recorded.
Broadband Wireless Access	Number of stations per band. Indication that service is put into operation. Approximate number of users/stations (usage densities)	Questionnaire data available in EFIS
Aeronautical Radionavigation services	Number of Earth stations per band registered in master register ITU. Number of users	Existing ECC/CEPT studies. Information available in BR IFIC. Results of questionnaire on interference to aeronautical services available in EFIS

A comparison of the above elements with ongoing investigations at European or international level aiming to promote efficient use of the spectrum and innovative applications actually demonstrates that no simple figure allows identifying new opportunities through consulting a database. In particular, a basic level of information on spectrum usage as currently available in EFIS (allocation, applications, radio interfaces, right of use) is sufficient to provide visibility and understanding of the spectrum usage for policy makers. The quantification of spectrum supply i.e. the definition of bands of interests or key bands should be done either by RSPG, the Commission or CEPT.

This could be illustrated by many examples such as on-going investigations on new spectrum for:

- Terrestrial mobile broadband applications (ref. EU policy objectives, WRC-12 agenda items 1.1 and 1.2),
- Broadband Direct-Air-to-Ground Communications (DA2GC),
- Broadband public protection and disaster relief (PPDR),
- Telecommand operations of EESS satellite systems in the 7-8 GHz range in order to cope with congestion of the 2 GHz band (WRC-15 agenda item 1.11),
- Extension of EESS (active) worldwide allocation at 9 GHz to achieve greater resolution performance with space-borne radars (WRC-15 agenda item 1.12),
- SRD/RFID in UHF, UWB applications, etc.

For instance, possible new opportunities in the 700 MHz band would definitely not appear through any set of indicators on spectrum usage. However, the assessment of conditions for administrations to enable mobile applications (WRC-12 agenda item 1.2) obviously requires extensive analysis for understanding of the long

term spectrum need for broadcasting, conditions to introduce new technologies (DVB-T2, HEVC), cross-border coordination activity, etc. RSPG besides launched recently a detailed questionnaire on future usage of this band.

The case of the L-band studied is also particularly acute. This frequency band was identified since WARC-92 for terrestrial and satellite sound broadcasting but with relative little development. Late 2010, CEPT decided to undertake a review of the use of the 1452-1492 MHz band with the aim to change this situation and enable the use of those 40 MHz for new services and applications that could bring substantial social and economic benefits for Europe. To that end, CEPT developed ECC Report 188 [18] to determine the most appropriate future use of the 1452-1492 MHz band in CEPT. The conclusion of the Report, which is based on an impact analysis, is that the most appropriate regulatory framework for the future use of the 1452-1492 MHz band in CEPT is the harmonisation of this band for mobile broadband/mobile supplemental downlink, while allowing individual countries to adapt to specific national circumstances in part of the band for terrestrial broadcasting and other applications. In this case, one has to acknowledge that this achievement is only possible at a point in time when LTE release offers features allowing asymmetric carrier aggregation.

Identification of the relative technical efficiency of existing spectrum uses is the main concern of EFIS when collecting data for spectrum inventory purposes. Considering the examples in Table 3, the results show, however, that there are actually no common metrics and which important parameters may deviate from each other:

1. The metrics that relate to the application (which may operate in more than one band);

2. The metrics that relate to the band (which may support more than one application) and;

3. The metrics that relate to possible measures that might be taken to address inefficiencies in the band.

This means that no static common data format can allow assessment of spectrum efficiency for a specific category of applications. By comparison, investigation on spectrum efficiency carried out within CEPT usually necessitates in depth frequency band specific analysis and involves all stakeholders, very often through the use of CEPT questionnaires sent to administrations. In addition, the utmost consideration should be given to outputs of RSPG (reports, opinions) to develop any proposal for harmonisation measures in response of strategic objectives of the RSPP.

The use of electronic questionnaires, as recommended by this Report, will rather lead to a situation where evaluation criteria for a dedicated application in a frequency band will be established / identified when creating the format of the questionnaire. Table 3 also indicates the need for quantitative data in several cases such as number of transmitters and usage density, rather than a need for precise technical information of individual spectrum use.

For data that is available in EFIS, currently in the existing categories allocations, applications, RIS and RoU and documents, there is no reason why this data should not be maintained. However, data should also be available in a data format and not only as documents, to support analysis work. As can be seen, questionnaire results are currently only available in document format. Electronic questionnaires are therefore intended to be introduced, so that data on spectrum use can be collected and stored in a suitable data format in EFIS.

For some data, reference is made to the available information in the ITU-R (e.g. broadcast plans, maritime, aeronautical services and satellite related services). In this context, it should be noted that notification to ITU-R is made only in view of granting international protection rights. National databases on “frequency assignments” or “stations” can provide a more complete picture.

2.5 CONCLUSION

Overall conclusion to Task 1:

It is technically possible for the EFIS system to accommodate comprehensive information regarding spectrum usage rights for the whole range from 400 MHz to 6 GHz without limit to the type of application, based on the current common formats in Annex 2 of Commission Decision 2007/344/EC [1].

The system can already, or can easily be extended to, accommodate:

1. **the estimated required number of records;**
2. **the expanded frequency range;**
3. **additional forms of data entry which are believed to be required, particularly electronic questionnaires in formats designed for the purposes of the inventory, and reference documents and tables with other qualitative and quantitative information.**

Note that the current frequency limits in EFIS are the ones from the ECA Table, i.e. from 0 to 3000 GHz without limit to the type of application.

No static common data format can allow assessment of spectrum efficiency for a specific category of applications. By comparison, investigation on spectrum efficiency carried out within CEPT usually necessitates in-depth frequency band specific analysis and involves all stakeholders, very often through the use of CEPT questionnaires sent to administrations.

Electronic questionnaires are therefore intended to be introduced, so that data on spectrum use can be collected on a case-by-case basis and stored in a suitable data format in EFIS.

3 TASKS 2 AND 3: NECESSARY CHANGE TO THE CURRENT COMMON FORMATS CONTAINED IN ANNEXES I AND II OF DECISION 2007/344/EC (INCLUDING PART OF TASK 3 ON LEVEL, COHERENCE AND UNIFORMITY OF RIS AND ROU INFORMATION IN EFIS)

The subject of this section is to discuss the need, feasibility and possible proposals for changes in the common formats contained in Annexes I and II of the Decision 2007/344/EC [1] (Task 2 of the Mandate). In this section we consider at the same time the core elements of Task 3 of the Mandate concerning the level, coherence and uniformity of RIS and RoU information currently provided by Member States. We believe it is helpful to discuss both aspects together in order to derive the rationale for change proposals.

EFIS is today a tool aiming to deliver "harmonised availability of information regarding spectrum use within the Community". This was the intention when EFIS was designed originally.

Investigations on spectrum efficiency are de facto carried out by CEPT project teams on an ad-hoc basis and require in-depth analysis which is not "pre-formatted" and is often specific to the frequency band under consideration, in order to take account of a variety of relevant factors which vary from case to case, and, accordingly, apply an appropriate depth of investigation.

3.1 NATIONAL RADIO INTERFACES

3.1.1 National Radio Interface Specifications

The 98/34/EC Directive [1] sets up a procedure which imposes an obligation upon the Member States to notify to the Commission and to each other all the draft technical regulations concerning products and Information Society Services before they are adopted in national law. The prime objective is to prevent the creation of barriers to trade likely to affect economic activities within the EU market.

According to Article 4 of the R&TTE Directive, Member States shall notify the interfaces which they have regulated to the Commission insofar as the said interfaces have not been notified under the provisions of Directive 98/34/EC [19].

In the context of radio spectrum, these procedures thus target regulatory measures likely to affect technical characteristics of products intended to be placed on the internal market, noting that these may be justified only for reasons related to the effective and appropriate use of the radio spectrum, avoidance of harmful interference or matters relating to public health, according to Article 7.2 of the R&TTE Directive.

The consequence is that RIS information applies only to regulations that affect the manufacturing of radio products intended for the internal market, mainly for ECS / licence-exempt regulations (in particular SRDs).

The RIS concept cannot be applied to supply information about frequency bands used by government users which are primarily described in terms of 'Allocations' in National Tables of Frequency Allocations (NTFA). Also, it must be emphasised that frequency assignments for radio transmitters are not technical regulations, but simply describe the conditions for use of the public domain at specific locations.

For the EU Member States the Annex I of the EC Decision [1] defines normative requirements for the information on National Radio Interface Specifications.

The normative requirements for the information on National Radio Interface Specifications in Annex I of the EC Decision 2007/344/EC [1] are as follows:

Channelling;

Modulation/occupied bandwidth;

Direction/separation;

Transmit power/power density;

Channel access and occupation rules;

Authorisation regime;

Additional essential requirements according to Article 3(3) of R&TTE Directive 1999/5/EC0;

Frequency planning assumptions.

All other information provided is voluntary and purely informative.

The most efficient way to provide national radio interface data in the EFIS database is to make reference to the frequency harmonisation measures given in ECC and/or to EC deliverables, and to any applicable Harmonised European Standard. In the vast majority of cases, national frequency utilisation does not deviate from the requirements stipulated in these documents.

Following the recent merger of the ECA information into the EFIS database and the implementation of a new document category for EC Decisions, all relevant information is included in the EFIS database for such cases.

It is going to be possible to attach illustrations, e.g. a more descriptive document or figure, to a national radio interface, or a link to the national home page.

There are differences between CEPT administrations regarding the availability of national radio interfaces in EFIS due to different national organisation of spectrum management, and in the grouping and packaging of different user categories (e.g. in PMR) into an application or grouping of frequency bands in one and the same application. In addition, national radio interfaces are used by some administrations as technical reference documents in the national implementation regulation, but not by others.

3.1.2 RIS model

The EFIS database system is compatible with the RIS template skeleton / TCAM RIG II template for national radio interfaces.

In June 2010, the European Commission submitted to ECC a request to implement a radio interface model developed by TCAM and RSCOM (ECC(08)38)) [6]. ECC launched a trial period in order to develop relevant models using this radio interface model. The results of this trial period are contained in an internal ECC Report on implementation of the RIS template.

Information on radio interface implementation is complementary information in the regulatory area and provides visibility on requirements applicable in a given band. The RIS is only available in a few frequency bands. We do not consider that the information is generally relevant in the context of usage of spectrum/ spectrum inventory, although some administrations use national radio interfaces as technical reference documents in their national regulations.

The ECC develops RIS models where appropriate and relevant and in order to ensure that upload of information is made on a harmonised basis. A prime aim of developing RIS implementations within CEPT is precisely to facilitate the work of administrations when they declare into EFIS their new radio interfaces, by providing “ready to use” radio interfaces that administrations can easily adapt to update the EFIS database with comments and explanation. This also presents more meaningful information to users of EFIS who are seeking to review market opportunities on a pan-European basis.

The RIS models are available in EFIS under the document type 'RIS Models'.

The initial trial period for the implementation of RIS models ended in December 2011. Following the change of the ECC structure at the end of 2011, the work of validating the implementation provided by the ECC entities (responsible for the drafting of RIS model deliverables in relation with ECC Decision) was moved to the EFIS/MG (with the support of the entity which drafted the initial deliverable).

Should national administrations find it difficult to create certain national radio interfaces or have questions related to the subject, they can approach ECO or the EFIS/MG for assistance. It is also always a good idea to have a look in the EFIS database, to see how other administrations have solved the issue of filling the data fields with information.

Below is a screenshot showing the result of a search for RIS model documents in EFIS (these are uploaded by ECO and linked to the ECA Table).

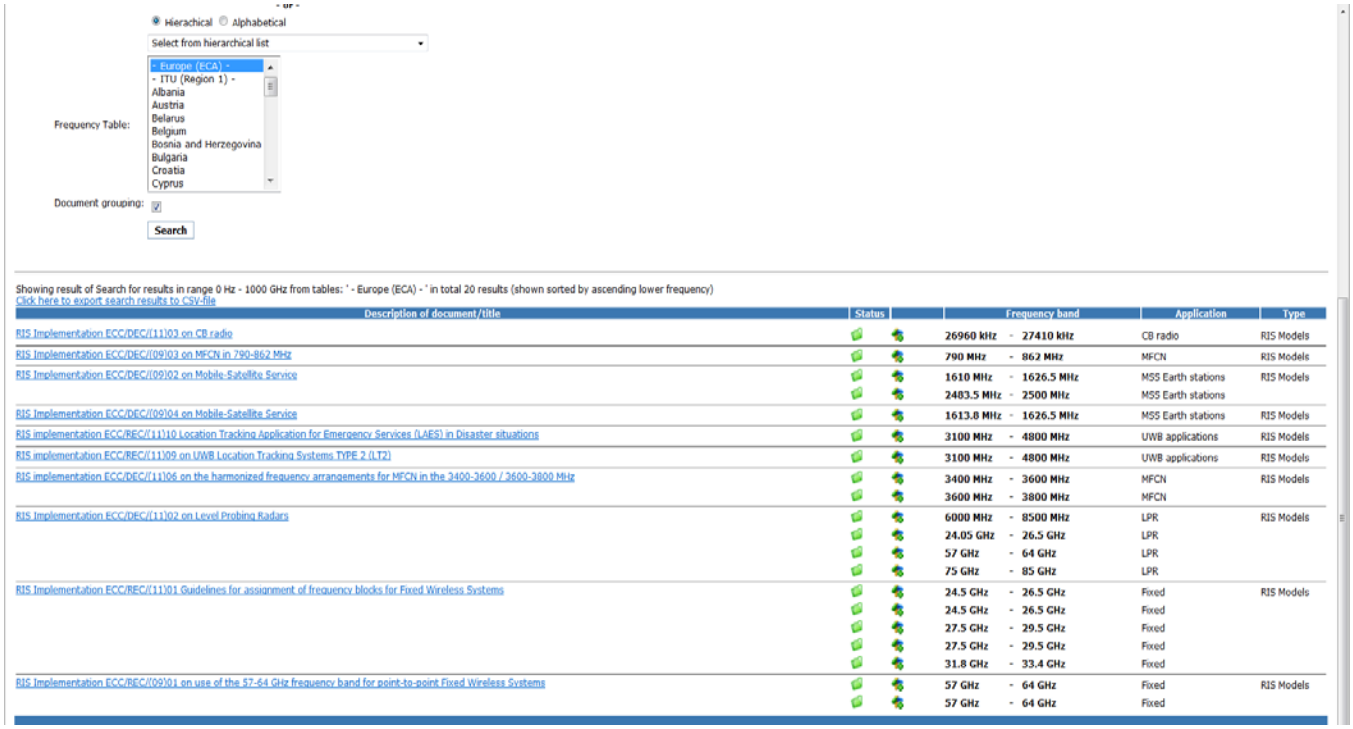

Figure 2: List of RIS Models

The RIS model format is identical with the format used in TCAM for the R&TTE Directive 1999/5/EC [5] Class1 equipment sub-classes. EFIS also provides the R&TTE Class 1 equipment information under document type "R&TTE subclass" in the RIS format, i.e. RIS models and Class 1 equipment subclasses are available in EFIS and can be searched for in the database according to frequency range and/or application.

National radio interface information in EFIS according to Annex I of the EC Decision is complementary information of a regulatory nature and provides visibility on requirements applicable to a given band. The format of the information follows the RIS format and would seem sufficient. So far RIS models are only implemented for a few frequency bands.

The information does not on its own appear to be relevant in the context of usage of spectrum/ spectrum inventory in general, although national radio interfaces are used by some administrations as technical reference documents for authorisations, especially in cases of exemptions from individual licences.

The European Common Allocation Table (ECA Table) within EFIS seems to be a better source of information since it contains the harmonisation measure, the Harmonised European Standards or indicates that several countries have implemented an application in a frequency range.

Therefore, in consideration of the above, this Report does not propose changes to Annex I of the EC Decision 2007/344/EC [1]. It is, however, going to be possible to attach illustrations, e.g. a more descriptive document or figure, to national radio interface information in EFIS or with a link to the national home page.

3.2 RIGHT OF USE (ROU) INFORMATION

The provision of RoU information according to Annex II of the EC Decision 2007/344/EC [1] is subject to a number of conditions which in practice limit the amount of national RoU information in EFIS (see text in italics below).

The intention of Annex II of the EC Decision is to focus on the bands of major economic interest or significance to which market mechanisms apply.

The normative requirements for the information on RoU as defined in the EC Decision 2007/344/EC [1] are as follows:

Information on rights of use may be limited to frequency bands used for the provision of electronic communications services which are tradable in accordance with Article 9.3 of Directive 2002/21/EC [8] or which are granted through competitive or comparative selection procedures pursuant to Directive 2002/20/EC [9].

For relevant frequency bands Member States shall provide in accordance with the requirements of Directive 95/46/EC [10] and Directive 2002/58/EC [11] and Community and national rules on business confidentiality, the following information:

Identity of the radio frequency right holder;

Expiry date of the right or, in the case where there is none, the expected duration;

Geographic validity of the right by at least providing the information whether the right is local (i.e. one station), regional or nation-wide;

An indication of whether or not the right is tradable.

All other information provided by the regulatory authority in EFIS is purely voluntary at the present time.

3.2.1 Differences amongst administrations regarding the RoU information in EFIS

Trading of the rights of use of radio spectrum is not harmonised in Europe except where mentioned in RSPP for specific bands for EU Member States. The authorisation regime depends also on the national approach. For example, some countries apply general authorisation for PMSE in UHF bands, others individual authorisations. As a result of this, the right of use information provided in EFIS can differ from one administration to another and the information in EFIS can be less detailed than the information held by the national administrations.

In addition to the ECS bands, some administrations have also made a number of other allocations tradable. In some cases these are high volume, but with lower economic value/interest than the ECS bands and covering technologies such as PMR and Fixed links. Given the volume and nature of these services two emerging examples of how to provide information on these services via EFIS are described below.

For bands outside ECS bands right of use information may also be provided in EFIS. Level and availability of information will depend of the type of usage (governmental, civil or shared) and on the organisation of

spectrum management at national level. For governmental use, not all details of the rights of use may be publicly available, and the usage may also not be limited to a specific duration. In some countries which do not distinguish between RoU for ECS or non-ECS bands, information is already provided in EFIS for example for terrestrial broadcasting.

Example 1: Right of Use information regarding all tradable spectrum in a country

From Denmark:

As of May 2011 Denmark has uploaded information about all individual licences. There are more than 23,000 licences provided in the EFIS system on a data set-by-data set basis, i.e. more than 23,000 entries.

From the United Kingdom:

Administrations can provide links to the national database in EFIS

The United Kingdom provides in EFIS all RoU awarded by competitive selection but in addition the link to the national Wireless Telegraphy Register (http://spectruminfo.ofcom.org.uk/spectrumInfo/licences) that contains information on the UK's 90,000 tradable licences. The advantage of this solution is that it provides more detailed information and functionality. For example, one could search after licence types (i.e. applications) or in a specific geographical area. In addition the database is updated daily.

Example 2: Right of Use information regarding spectrum granted through a comparative or competitive process

From Sweden:

Sweden provides information on all licences granted through a comparative or competitive process. The advantage of this solution is that it is easy to recognise in EFIS those licences that have significant economic value. These are typically the most interesting for spectrum trading.

These examples demonstrate how the requirements from ECC/DEC/(01)03 [15] and Annex 2 of the EC Decision 2007/344/EC [ref] could be interpreted in different ways.

A link to a national database may be a good source of supplementary information, but it cannot be considered on its own to be sufficient for the purposes of meeting the requirements of ECC/DEC/(01)03 [15] and Annex 2 of the EC Decision 2007/344/EC [1]. On the other side, the advantage of including links to the national database is often to make available detailed information with much higher granularity also through EFIS.

3.2.2 ECS condition

The bands that have been designated for harmonised ECS during the last two decades are the following:

Table 4: Harmonised ECS frequency bands

Frequency Band	CEPT & EC Decision references	Year of designation	Amount of spectrum
800 MHz	ECC/DEC/(09)03 Dec 2010/267/EU	2010/2015	2x30 MHz
900 MHz	Dir 87/372/CEE ERC/DEC/(94)01 ERC/DEC/(97)02 DEC/DEC/(06)13 Dir 2009/114/EC Dec 2009/766/EC	1987- 1994 - 1997	2x35 MHz

Frequency Band	CEPT & EC Decision references	Year of designation	Amount of spectrum
1800 MHz	ERC/DEC/(95)03 ECC/DEC/(06)13 Dec 2009/766/CE	1995	2x75 MHz
2100 MHz	ERC/DEC/(97)07 ERC/DEC/(99)25 ERC/DEC/(00)01 ECC/DEC/(06)01 Dec 2012/688/EU	1997 – 2000 – 2012/2014	155 MHz
2600 MHz	ECC/DEC/(02)06 ECC/DEC/(05)05 Dec 2008/477/EC	2002 - 2008	190 MHz
3600 MHz	ECC/DEC/(07)02 ECC/DEC/(11)06 Dec 2008/411/EC	2007 - 2008 2011	400MHz
		Total	**1025 MHz**

More information about the inclusion of information on ECS bands in EFIS can also be found in Annex 2, section A2.6 under TRA-ECS (Terrestrial radio applications capable of providing electronic communications services).

Extending the RoU concept to bands outside of ECS bands faces limitations or does not really provide any added value for the following reasons:

- Frequency bands under governmental use or shared civil/governmental use: in many countries, an RoU concept similar to the RoU for the ECS bands may be impossible to be applied. In addition, some information cannot be provided to EFIS due to confidentiality reasons,
- For some services, extensive utilisation information is already available, e.g. broadcast bands with detailed information available via the dedicated area at the ITU-R website or in broadcasters' own published information, or radio astronomy with the full information as in the CRAF handbook [17] already being available in EFIS,
- The number of RoU holders is not to be confused with the number of spectrum users in different radio services, or total number of spectrum users – e.g. one RoU can contain a number of assignments,
- General authorisations of spectrum usage cannot easily use the existing common format for the RoU (e.g. if the identity of the user is not defined, and implementation is within the terms of the more generic RoU rather than a more exact technical specification),
- Some other radio services are coordinated by the providers (e.g. FS block assignments, PAMR) and the administration has no detailed information about the actual usage.
- In some specific cases the RoU in other frequency bands than ECS bands might be an option. This is complementary to the usage of electronic questionnaires. Example: for individually authorised FSS stations in a frequency range, the RoU concept might be in some cases better suited to collect information. However, in some cases of individual authorised FSS stations, the electronic questionnaire might be the more efficient concept. In addition, for FSS stations under general authorisation or FSS stations in receive bands, the electronic questionnaire is seen as the only available tool (see previous RSCOM questionnaire in 3.4-3.8 GHz, C-Band).

- It may be possible in some other cases to apply the RoU concept also outside the European harmonised ECS bands, where appropriate. Such cases cannot be predefined but should be decided case-by-case.

It seems preferable to distinguish between RoU for ECS bands and RoU for other frequency bands. Applying the RoU concept in general to all other bands as seen in the context of the spectrum inventory will not provide a meaningful understanding of the actual spectrum use or the actual number of users in the relevant band. Visibility on spectrum usage by non-ECS applications is provided by allocations and applications in EFIS. In some specific cases, the RoU concept in other frequency bands than ECS-bands might be an option.

It is possible to collect on a case-by-case basis on "bands of interest" identified by either CEPT, the Commission or RSPG, comprehensive data for the frequency ranges and applications outside of the ECS bands through electronic CEPT questionnaires (see section 4).

The application section in EFIS provides visibility on the usage of a given frequency band.

3.2.3 Confidentiality

Loosely connected with RoU information are some aspects of confidentiality. These may depend on legal requirements which stem directly or indirectly from national laws and regulations concerning the individual licence issuing process (registration of an application, confirmation of the necessary payments, reception of the licence etc.). All these actions may include information which is confidential. Also, applicants may not want their application to be made public before licence awards. This may affect more detailed information such as the exact location of a transmitting station or identities of radio frequency right holders and their related affiliations, etc. It should furthermore be noted that the information provided by the administrations shall be in accordance with the requirements of Directive 95/46/EC [8] regarding the protection of individuals with regard to the processing of personal data and on the free movement of such data and Directive 2002/58/EC [9] on privacy and electronic communications.

It should be noted that the concept about non-public (= access-restricted) data in EFIS should not be confused with confidential information (e.g. about defence radio usage).

Important conclusions of these considerations in the ECC Working Group FM (WG FM) were that firstly, if an official document is to be protected (not publicly accessible) according to national legislation, an administration would not be able to upload the information into EFIS, even if the access to such information in EFIS was restricted. Secondly, if a national administration has access to information via EFIS, and any person (not only persons from within the administration) could request to read these documents on the basis of the principle of public access by any person, it could be difficult to refuse such a request. In addition, ECO may, in general, not be allowed to make inquiries into the reason for the request or the identity of a person making the request. Finally, to collect and provide information which cannot be used for any purpose due to legal reasons (e.g. ban on utilisation of specific information), would put an unnecessary burden on administrations.

In case of governmental usage of spectrum, the rights of use are limited to the rights described in the National Table of Frequency Allocations (NTFA). For example, in these cases no individual authorisations with limited duration are granted.

Further access to sensitive, confidential or secret information should be dealt with at the national level, and such information should not be collected via EFIS.

3.2.4 Point of contact information

It should be noted that the contact provided in EFIS for the RoU information can also be a contact point from the administration and the national contact point is indicated in EFIS to the public user who can use this contact point for inquiries.

So far, the EFIS database does not use a similar concept regarding the identity of the RoU holder as the one practiced in the USA by the FCC in the US Spectrum Dashboard [16]. A 'Common Name' is there defined as an entity that wholly owns or has majority interest in the RoU; is the general partner of the limited partnership

or manager of an entity that holds the RoU; or is the name under which the service provided via the licence is marketed to the public.

To incorporate such an alternative concept in EFIS has been discussed with regard to the benefits gained and efforts needed; notably, additional mandatory information would need to be provided by administration/Member States in EFIS, in the relevant RoU records; also, ownership filings would have to be made to ensure that the Common Name principle is used. This would allow a list of all licences held by a single company to be seen, even if the company holds licences under many different names. Legal requirements provide further challenges if such a concept is investigated to provide more information about contact and rights of use holder.

Some administrations (among others Germany, Sweden, Austria and Finland) have indicated that they would need to ask the right holder first before they could publish information in EFIS about the identity of the licence holder. With regard to right holders in some frequency bands such as the PMR bands in the 400 MHz range, it is obvious that such a requirement would make it a cumbersome burden for an administration to provide all RoU holder information in EFIS.

RoU information for ECS bands, however, is also shown in ECO Report 03 [7], originally collected via a questionnaire and regularly updated. The data in ECO Report 03 [7] is identical to the RoU information in EFIS for ECS bands and should therefore be considered as consistent, and no challenges exist regarding identification of the right holders.

In addition, the RoU holder identity information is not seen as important information to serve any of the objectives of the spectrum inventory as mentioned in section 2.4. While the details of the licence holder may therefore not be necessary for this purpose, there may be fewer problems with listing the locations of the sites used (see section 3.2.10).

It is proposed not to change the information format in EFIS regarding the identity of the radio frequency right holder.

The requirements to provide information about right holders outside of the ECS bands can lead to the challenge that some administrations have to ask the right holders before they can publish information. This would be highly impractical where there are many right holders, and costly for administrations. There is furthermore no justification to deliver such detailed information in the context of an inventory aiming to analyse various types of usage at strategic level.

3.2.5 Unused or underused frequency bands

EFIS does not provide information on spectrum available for future licensing (except for some documentation uploaded from individual administrations in line with paragraph 3b of the 2007/344/EC [1]) in one or more radio services, either where there is a planned transition to a new band plan or where there may be channels not included in current licences.

We believe that the best way to provide such information is via collection of information by dedicated questionnaires on bands of interests (bands under study). These questionnaires focus on a particular frequency band and on the existing use of the band including actual implementation information as well as information about plans for the future. Recent questionnaire exercises in the CEPT have demonstrated that this is the most suitable way of acquiring spectrum inventory information. This approach basically allows adjusting the queries to the issues at stake and therefore to deliver usable information.

It is proposed to include information in EFIS on unused or under-used frequencies or information on future spectrum re-farming actions on a case-by-case basis for frequency bands under study. This information should be made available in EFIS based on questionnaires to CEPT administrations.

3.2.6 Tradable rights

The information on radio spectrum RoU that may be tradable constitutes complementary information on the regulatory status. This information is not relevant in the context of existing relevant usage of spectrum, i.e. in the spectrum inventory context.

Trading of the RoU of radio spectrum is not harmonised in Europe except where mentioned in the RSPP for specific bands for EU Member States. The authorisation regime depends also on the national approach: For example, some countries apply general authorisation for PMSE in UHF bands, others individual authorisations. As a result of this, the RoU information provided in EFIS can differ from one administration to another and the information in EFIS can be less detailed than the information held by the national administrations. Again, precise information on how exactly the authorisation regime works can be collected via a questionnaire when dealing with a dedicated spectrum band review.

However, information on tradability of a band and linked to an application may be interesting (e.g. PMR in the 400 MHz frequency ranges), rather than the tradability of an individual RoU.

"Tradable" is not relevant in the spectrum inventory context and should be considered as optional information in the RoU common format as it is in EFIS.

3.2.7 Sharing information related to an individual RoU

Based on the results of sharing studies, sharing mechanisms can be identified on an ad hoc basis. Those sharing mechanisms could be mentioned as appropriate for a given frequency band. Sharing possibilities might be noted as existing or new concepts of sharing the same frequency resource such as:

1. New sharing concepts could be interesting information if they are explicitly allowed under a RoU;

2. Indication that sharing under this RoU is explicitly allowed, and if yes, indication of what type of sharing;

3. Geographic sharing could for example be used by fixed installed secondary applications without protection based on geo-location database information exchange;

4. Some applications do not use frequency opportunities during the night time (e.g. voice-based communications are very limited between 24:00h and 06:00h local time) and other applications such as some sensor or M2M networks could use some of these frequency opportunities during these off-times. This would be an example of time sharing.

The addition of a new sharing term should only be conducted based on agreed and defined terminology in CEPT (new terms might have very different content depending on the interpretation of the applicable definition and it may be too early to include such terms at an early stage in EFIS). Specific sharing information can be collected by means of electronic questionnaires on an ad-hoc basis for dedicated frequency bands.

EFIS already provides visibility on the results of sharing studies in the document section by including references to relevant ECC Reports. In addition, sharing information is up to now most commonly to be linked to the frequency range and the applications sharing this frequency range but not linked to individual RoU.

To which extent sharing between two or more applications is already implemented in a specific frequency band, can be seen from the ECA Table and also the national frequency utilisation tables under applications in EFIS. In addition, the adding of utilisation and demand trend indication information as indicated in section 4.3 of the present report will provide a more comprehensive picture of the actual utilisations.

Should it become necessary in the future, the possibility to register sharing possibilities related to a frequency band based on information collected by electronic questionnaires could be introduced.

Sharing and co-ordination agreements among satellite operators can be of a commercially confidential nature. Data in EFIS in such cases may relate to frequency bands used by satellite applications in general instead of individual spectrum use information.

EFIS provides visibility on the results of sharing studies in the document section by including references to relevant ECC Reports.

It should be emphasised that sharing studies are not related to RoU but rather necessitate a set of assumptions in terms e.g. of technical requirements, deployment scenarios, propagation models. Spectrum sharing conditions defined in CEPT harmonisation measures have to be respected in ETSI harmonised standards to allow market deployment and efficient use of the spectrum.

Specific sharing information can be collected by means of electronic questionnaires on an ad-hoc basis in order to support detailed analysis for dedicated frequency band.

3.2.8 Granularity of information

It is of great benefit to all users of EFIS, in the case of RoU information most notably industry, that the information available in EFIS is as detailed and complete (and up-to-date) as possible. It is therefore of importance that administrations do their utmost to ensure that EFIS contains the relevant data as available to them. In this context administrations are strongly encouraged to actually upload as extensive and relevant information as possible in EFIS.

The effort of each single administration depends on how the information is available. If the information is only available in paper form it requires a lot of manpower, financial expenditure and time to convert this information into a useful electronic format. Germany, for example, for its approximately 150,000 frequency licences, has estimated 1.5 million Euro for new software and software modifications and more than 6,300 man-days to convert them all into electronic form (only for the “RoU” information in the EFIS format).

Although EFIS provides information on RoU, some national databases provide additional information on rights of use/authorisations than that which is mandated by the EC Decision. This includes information such as channel modulation, frequency type, channel bandwidth, antenna height, transmission power, antenna type and gain and polarisation (normally provided in the radio interface section). However, it should be noted that due to issues of privacy, confidentiality and security legislation this information is sometimes only partly or not at all available in some countries. Moreover, such detailed information is not relevant when considering the objective of EFIS, and there is no invitation or obligation to provide such detail. However, the information may be useful in the context of a spectrum sharing study.

Another question in this context is whether the benefits of accurate and detailed information on RoU has been demonstrated for all the different application cases. A worst case could be to consider the PMR usage in the 400 MHz frequency range. The understanding is that an inventory at the European level is not about delivering exhaustive information about frequency assignment and all individual RoU/authorisations, nor about details about private mobile networks. The challenge should be about finding harmonised ways on a case-by-case basis to deliver consolidated quantitative data in relation to ‘applications’. The emphasis on RoU implied by the Mandate can be misleading as it remains mainly relevant for ECS bands. Otherwise, there are examples such as the 400 MHz PMR case where the burden on administrations is high and the benefit for the internal market from providing a considerable number of RoU/authorisations entries, mostly on narrowband RoU, is limited.

3.2.9 Complementary licensing information

National administrations are also encouraged to provide licensing related information of interest to spectrum users and industry under the document type “Licensing info”. This document type in EFIS is complementary to the RoU information.

Examples are:

- Application forms for licensing purposes (where applicable);
- General authorisation, licence-exempt rulings;
- General/Master/Framework documentation on licensing (e.g. PMR or FS frequencies);
- Information related to licensing for short term/temporary/occasional usage of spectrum.

Licensing information may differ from one sector to another. In case of governmental services, only information on the rights granted according to the National Frequency Allocation Table may be available.

Since the licensing information document type (under regulatory document types) and national radio interfaces are already availablein EFIS, it is considered that no addition is necessary under the RoU information from this perspective. General authorisations without individual right of use should be provided in EFIS, but are not required to use the common format on RoU.

3.2.10 Geographical Coverage

The existing categories include national, regional or single transmitter/site:

National coverage: equivalent of a fully covered country;

Regional coverage: it might be interesting to know the percentage of the country where the spectrum is not used (i.e. the coverage area would be defined). This case is the 'partially covered' case and can be defined. 'Unused case' describes coverage below 1%.This is of course only an approximate indicator of efficiency, as issues such as frequency reuse potential are important; nevertheless, it is a useful first-level indicator.

Single transmitter: the service coverage could be defined (omnidirectional or directional antenna and service coverage maximum distance). Currently, there is an option to provide the location information of the transmitter in terms of coordinates. It is difficult to think that an investigation into technically efficient use of the spectrum can always make a rational analysis of that information to draw conclusions about technical spectrum use efficiency. On the other hand there is generally a positive correlation between the use of directional antennas and efficient use of spectrum.

There are no mapping facilities in EFIS at the present time. Implementation of such a mapping system may be complex and costly. However, for many administrations legal conditions prohibit the publication of detailed geographical data or make the proliferation impractical (e.g. in cases where the operator has to be consulted before publication). It should also be emphasised that EFIS is an advanced data collection and database tool, but not a spectrum planning or coordinationtool. The display of transmitter location with radiation pattern characteristics on a map would not serve the general objectives under EFIS. This level of technical detail shall be left to spectrum planning tools managing frequency assignments and enabling interference calculations.

Geographical coverage is, however, seen as a possibility to address the relative technical efficiency of the use in a frequency band and also to indicate possibilities for geographical frequency opportunity sharing in a limited number of application cases. A solution could be to provide a consolidated view of the geographical coverage of regional or single transmitter RoU's in each band. This would provide, where available:

1. description by means of text the regional or single transmitter coverage (e.g. city, or region), this is already available in EFIS as an optional field; or
2. single transmitter: provision of the coordinates, indication of use of an omnidirectional or directional antenna and the service coverage maximum distance from the transmitter, or
3. regional coverage: inclusion of a number of transmitters (or stations) and their respective coordinates, or
4. single transmitter/regional coverage: indication of the percentage of the population covered.

Within a nationwide or regional RoU there can be set up a number of single transmitters, with individual single operating licences, depending on the business model of the operator and the licence conditions (e.g. 95 % of area, 85 % of population …) which has to be fulfilled by the operator.

For a single transmitter, the area which has to be served is identical to the area which is supplied by a defined minimum field strength required. This is the case for quite a number of Member States.

It should be mentioned that area coverage and population coverage are both relevant, although this Report tends to focus on geographical coverage. This issue illustrates just how complex it is to make a spectrum efficiency assessment of any significant value. Furthermore the relevant information might change on a daily basis.

Very often, it is the number of transmitters and usage density within a defined geographical zone (e.g. in urban, suburban or rural scenario) which is more important than the actual individual RoU geographical information from the frequency management and spectrum engineering perspective. This can also be seen from Table 3 in section 2.4. Such information could be collected more efficiently by using electronic questionnaires.

For other applications, additional geographical information in EFIS does not provide merits. This matter is critical for administrations and policy makers, as modifying the RoU format in this regard without clear understanding of the benefits to be anticipated for users of EFIS could lead to significant time and effort waste.

In view of strategic objectives behind the spectrum inventory, and when considering for instance the various frequency bands under study for identification of additional spectrum for terrestrial mobile broadband applications, there is actually no example where the notion of “coverage” could be implemented simply so as to help identifying new sharing opportunities. This notion under no circumstances allows simply deriving the area where alternative usage could be deployed.

The case of the 2.3 GHz frequency band, currently harmonised and used within CEPT for aeronautical telemetry (ERC/REC 62-02) [22] and SAB/SAP (ERC/REC 25-10 [21]) and also used at a national level for various applications, provides some illustration. The identification of the 2.3 GHz band for IMT at WRC-07 has basically triggered its use in other part of the world for broadband mobile applications and equipment are available, thus attracting interest from several European administrations and leading to new activities in CEPT (see compatibility studies with respect to the potential use of the band 2300-2400 MHz by broadband wireless systems in ECC Report 172 [20]).

There should also be the possibility to indicate publication restrictions with regard to geographical coverage data in EFIS for the individual administrations.

So far, we are not aware of any cases where geographical coverage aspects have been applied or have identified spectrum utilisation opportunities in CEPT.

Geographical coverage options should only be treated as relevant for those types of applications where additional geographical information in EFIS does provide benefits.

Geographical coverage information is also seen for many applications and/or frequency bands as information that should be handled inside the electronic questionnaire concept, to complete information already provided through the Right of Use information in EFIS.

3.2.11 Pairing of Frequency bands/ Duplex usage

The existing Annex II of the EC Decision does not identify any part of pairing of the frequency bands for which RoU information is provided in EFIS. However, most of the ECS frequency bands and related rights of use are for duplex-paired frequency ranges.

This is a major difference compared with the licensing information provided in ECO Report 03 [7] as can be seen in the figure below:

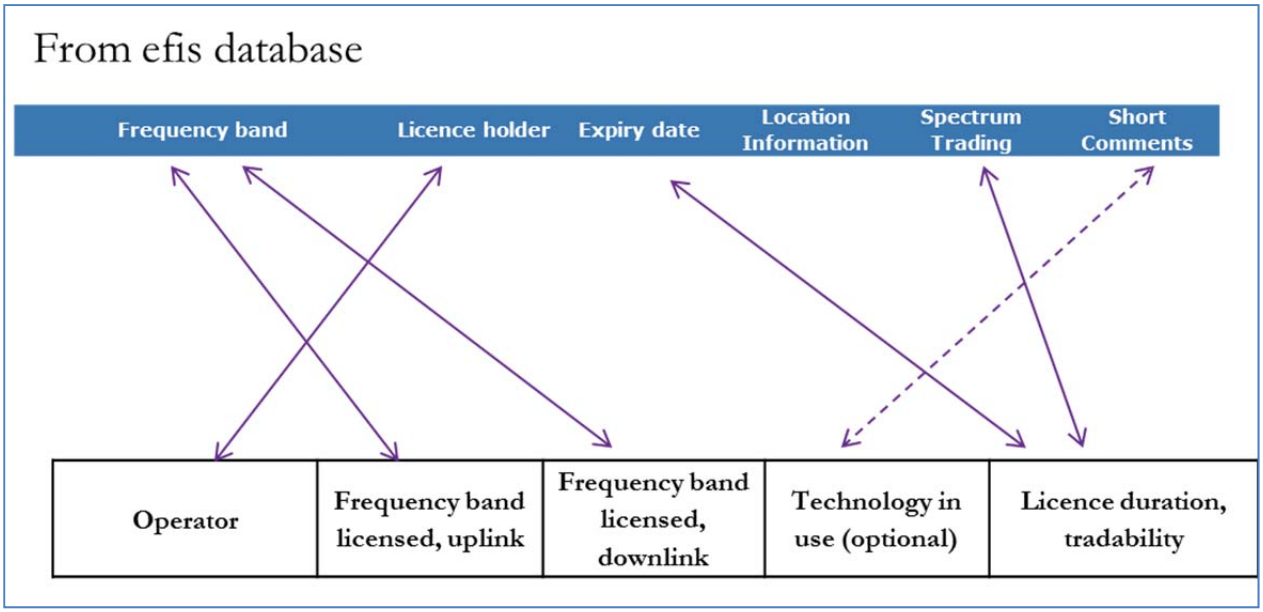

Figure 3: From ECO Report 03 [7]

ECO has therefore introduced in the EFIS database the possibility to indicate the duplex pairing as an optional feature. This has the advantage that administrations will not have to provide the same information several times for the collection of RoU information for ECO Report 03 [7] and in EFIS; additionally, a full ECO Report 03 [7] can be generated from the EFIS database.

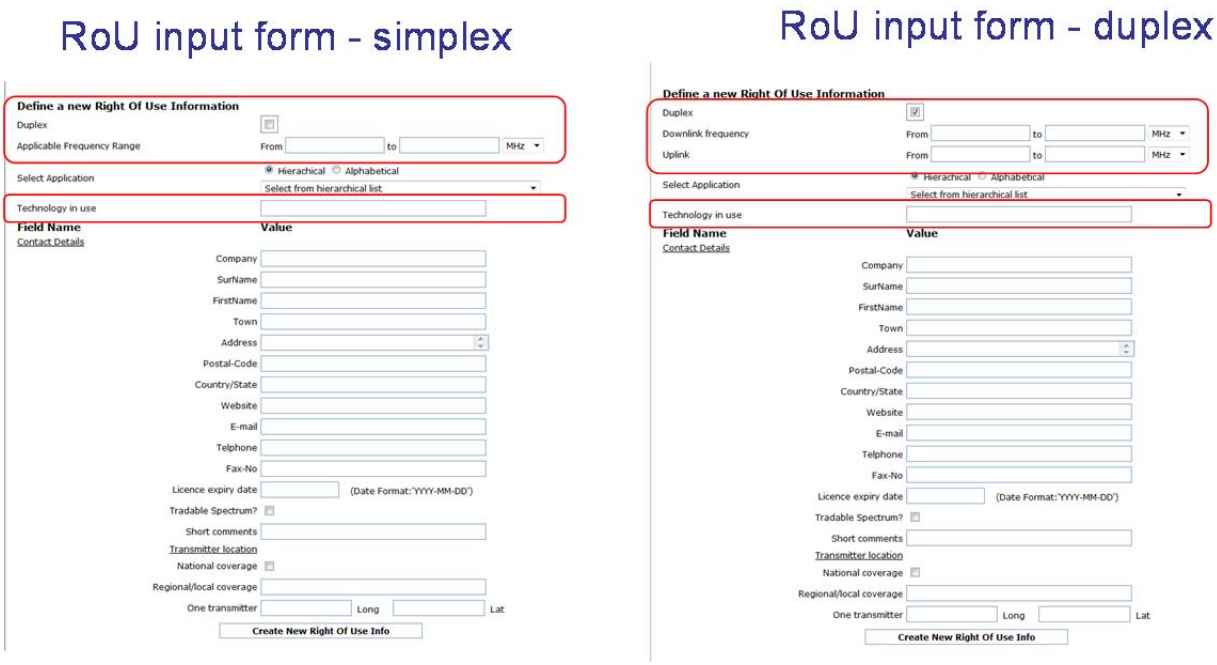

Figure 4: Example of input form interfaces for paired (duplex) bands

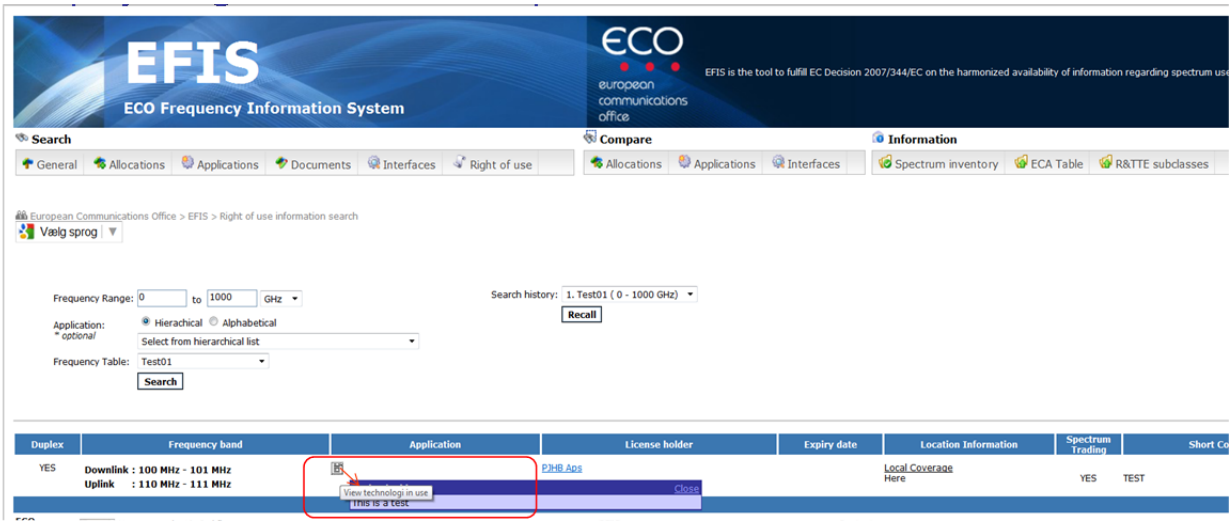

Figure 5: Display of RoU info – duplex

A feature allowing the entry of duplex pairing information for paired frequency bands, if available, has been implemented EFIS.

3.2.12 Technology in use

A new field (free text) has been introduced in EFIS to allow 'technology in use' for an RoU to be specified. A separate text field exists in ECO Report 03 [7] for this purpose, making it possible to separate information on the technology in use from other notes.

It is expected that administrations will provide via the "application" field in the RoU entry information about the technology in use, or do so when providing information through spectrum inventory questionnaire

actions. Therefore, it is proposed that this additional text field to indicate the technology in use should be an optional field.

The text field "technology in use" has been implemented in EFIS as an optional field.

Details of specific technology variants deployed should especially be provided in cellular mobile and terrestrial broadcast bands. This information is already available for cellular mobile usage in ECO Report 03. However, in bands where the technology neutrality approach has been introduced, it could be difficult for administrations to provide this kind of information with a high level of detail.

After the merger of the ECA Table into EFIS, information about applicable harmonised European standards is already available in EFIS (Harmonised European Standards are included in the ECA Table in one column). The usage of standards is more linked to the application in a frequency band as a whole than to an individual RoU.

In addition, all the legacy standards are considered to follow the technical requirements stipulated in the more technical neutral harmonized European standards which provide for the so-called presumption of conformity with the article 3.2 of the essential requirements under the R&TTE Directive. Since this information is already found in the ECA for each frequency band and application, where the individual harmonized European standards are included in one column, the added value of the addition of legacy standards seems negligible.

The particular version number of harmonised European Standards (not included in the ECA), on which basis equipment actually has demonstrated compliance with the essential requirements, is only important for frequency management in certain specific cases such as demonstrated in 2012 by the CEPT questionnaire on the subject of 5 GHz WAS/RLAN usage concerning the DFS mechanism. It is proposed to deal with such specific issues in the future also by means of questionnaires.

It is proposed not to add information about the adoption of legacy standards in the application section of EFIS and to consider the already available information in the ECA which can be exported in data format.

3.2.13 Implementation/Putting into operation of RoU

Assessment of spectrum efficiency as part of the inventory process is likely to require additional data beyond that which currently exists in EFIS, in particular relating to the actual deployment or implementation of applications identified in EFIS.

The status of the issued RoU could be categorised since this is also important information about the actual utilisation as well as new frequency opportunities. However, it is nearly impossible to effectively supply such information for an administration in relation to RoU in the EFIS database for all different frequency ranges and taking into account all possible situations. Sometimes, the administration would need to request such information from the operator/RoU holder. A pre-formatted implementation/putting into operation common format under RoU is therefore considered sub-optimal. Experience shows that such information is much more likely to be collected by means of questionnaires for a dedicated frequency band situation. In addition, if collected via a common format, it is also considered that there would be a lot of uncertainty in connection to the given information, to an extent, that uncertainty might lead to the entire information not being useful. There may also be situations which may prove contentious with the RoU holder.

The following categories could be used in electronic questionnaires and administrations would select one of these four possibilities and describe the situation by providing additional information.

1. Not in use;
2. Licences issued, but not put into operation;
3. Services put into operation in part of band;
4. Services put into operation in entire band.

The information seems rather to be linked to the application in a specific frequency band.

In some cases, individual administrations may abstain from sharing deployment information in EFIS due to competition law considerations. An option should also be provided in an electronic questionnaire to indicate this situation.

It is proposed to collect information on implementation/putting into operation by means of electronic questionnaires, where appropriate and on a case-by-case basis. This will improve the information relating to actual use of spectrum in EFIS, although it should be noted that the stability of this kind of information is to some extent limited.

3.3 EFIS APPLICATION TERMINOLOGY

3.3.1 Application terminology and useful search and comparison in EFIS

Level, coherence and uniformity of RIS and RoU information in EFIS is strongly linked to the application of a common radio application terminology in EFIS. For the export of data, useful search and compare functions are needed to select information, while at the same time no data should be overlooked.

The objective of the application section in EFIS is to provide visibility on the usage of a given frequency band. Various applications could share the same frequency band.

CEPT administrations upload relevant usage information in accordance to the applications structured in Layers 1, 2 and 3 of the Annex 2 of the ECC Decision (01)03 [15].

This 3-layers approach is introduced in order to give Administrations a possibility of depth of information about applications used in a frequency band and give the search a structure for finding all applications used within frequency bands.

The idea behind this is that the administrations have the possibility, where no detailed information is available or there are existing national restrictions (e.g. military frequency applications) for detailed information, to decide themselves about the level of detail at which they will publish application information (Layer 1, 2 or 3) in the EFIS system.

Where such information is available, administrations should always try to provide application information at Layer 3 level of details in EFIS. Layer 1 applications and definitions are broad in scope, and Layers 2 and 3 narrow down the scope to be used for searches and comparisons. For example, the Layer 1 application “Land Mobile” does not differentiate between public cellular services and private mobile radio, which tend to use spectrum in a very different way and are generally subject to quite different licensing processes. On the other hand, adopting the Layer 2 application definitions would result in over 80 separate categories, making analysis of the data difficult, particularly with regard to comparing utilisation across different bands with similar applications.

Layer 2 provides most commonly used terms that are also used in ECC deliverables and act often as ‘umbrella terms’ or major categories for a lot of similar applications. Typical examples are PPDR, PMSE, PMR/PAMR.

Layer 3 provides better visibility on the application which is authorised in a given band. Various applications could share the same frequency band.

3.3.2 Terminologies of applications listed in Layers 1, 2 and 3

The applications terminology originates from ECC deliverables where the application terms are used. The same terms are also used in the ECA Table. The definitions are therefore found in the different ECC deliverables, and these deliverables are indicated in the list of searchable applications (Annex 2 of the ECC/DEC/(01)03 [15], and also in the EFIS editor’s manual). Administrations are encouraged to follow the terminology which is also used in the ECA Table to the maximum extent possible in order to avoid any ambiguity for administrations which have uploaded information in the database, but also for any external

users of the database. It should be noted that the application terms in ECA are used in the RIS templates too, which are also to be found in the EFIS database.

3.3.3 Search & comparison

Users of the database can select a term for searches and comparisons from each of the layers, either from a flat selection panel or from structured windows selection through the layer 1, 2, or 3. Selection of an application term in Layer 1 will include in the search results also the information for a Layer 2 or 3 application under this term.

3.4 OTHER AVAILABLE INFORMATION

3.4.1 Databases and services existing in ITU-R

BR International Frequency information Circular (BR IFIC) is published in two parts dealing with Terrestrial Services and Space Services.

The BR IFIC (**Terrestrial Services**) represents a reference publication which contains information relevant for frequency management purposes. The part dealing with the Terrestrial services contains the following information:

- The international Frequency List (IFL) (including all the frequencies prescribed for common use);
- The complete and up-to-date versions of terrestrial frequency assignments/allotment Plans;
- Particulars of notices under treatment in accordance with RR Article 11 for updating of the Master Register;
- Particulars of notices under treatment pursuant to regional Agreements for updating of the Plans;
- The Special Sections associated with the Regulatory procedures applicable to Terrestrial Services.

The Circular (BR IFIC) has been published once every two weeks since 1999**.**

1. The Radiocommunication Bureau in accordance with RR13.11 maintains the Terrestrial Plans. They contain information relating to frequency assignment and allotment Plans established at Regional Administrative Conferences and subsequently updated through the application of the prescribed procedures. These Plans are annexed to the following Regional Agreements:
2. The Regional Agreement for the European Broadcasting Area (Stockholm, 1961), as amended by the Regional Radiocommunication Conference for the revision of the Stockholm 1961 Agreement (RRC-06-Rev.ST61);
3. The Regional Agreement on LF/MF Broadcasting (Regions 1 and 3), Geneva, 1975 (GE75);
4. The Regional Agreement on MF Broadcasting, (Region 2), Rio de Janeiro, 1981 (RJ81);
5. The Regional Agreement concerning FM Sound Broadcasting Stations (Region 1 and part of Region 3), Geneva, 1984 (GE84);
6. The Regional Agreement relating to the planning of VHF/UHF television broadcasting in the African Broadcasting Area and neighbouring countries (Geneva, 1989), as revised by RRC-06-Rev.GE89;
7. The Regional Agreement for MF Maritime Mobile and Aeronautical Radionavigation Services (Region 1), Geneva, 1985, (GE85-M-1);
8. The Regional Agreement concerning the planning of the Maritime Radionavigation Service (Radiobeacons) in the European Maritime Area, Geneva, 1985 (GE85-EMA) ; and

9. The Regional Agreement which governs the use of the frequency bands 174-230 MHz and 470-862 MHz by the broadcasting service and primary terrestrial services other than broadcasting in Region 1.

The format of the information contained in these Plans is the same as that for the IFL.

The BR IFIC **Space Services** is published every two weeks by the Radiocommunication Bureau in accordance with provision Nos. 20.1 to 20.6 and No. 20.15 of the Radio Regulations. It contains information on the frequency assignments to space stations, earth stations or radioastronomy stations submitted by administrations to the Radiocommunication Bureau for recording in the Master International Frequency Register, as well as those that are submitted under the relevant provisions of the Radio Regulations or which are subject to the Appendices 30, 30A and 30B Plans. The information published corresponds to the recorded assignments as well as the notifications still being processed.

Space Network List (SNL)

The Space Network List (SNL) is a list of basic information concerning planned or existing space stations, earth stations and radio astronomy stations. It includes sections on Advanced Publication Information, coordination requests, notifications, Plans information and their related processing backlog.

SNL Part A gives information on the use of the frequency spectrum, the occupancy of the geostationary orbit and non-geostationary orbit.

SNL Part B gives information on all reference publications (special sections and PARTs) related to the space services.

SNL Part C gives information on pending networks - received but not yet published by the Bureau.

To obtain more detail information on a network, please consult SNS-online:

Special Query System

Special queries to extract information on frequency slots, beams, frequencies, bands and classes of station for a satellite, or list of beams ,frequencies, bands and date of bringing into use of a satellite, etc. Which Query?

QUERY	DESCRIPTION		SAMPLE
Notice special query			
network analysis	matrix representation of frequencies and beams of a network	more ...	sample
quick transaction summary	summary information of a network/earth station	more ...	sample
list of earth stations	associated with a given satellite beam	more ...	sample
network/associated earth stations/testpoints	all associated earth stations/testpoints of a network	more ...	sample
list of satellites / with earth stations	covering a country and/or a service area defined by coordinates	more ...	sample
list of satellite networks/earth stations	*class of station information* for given frequency range	more ...	sample
list of space/earth stations	operating in a given frequency range (frequency slots)	more ...	sample
frequency range (space)	beams, frequencies, bands for all *classes of station*	more ...	sample
frequency slots (space)	frequency distribution by frequency range and longitude range	more ...	sample
PLAN reference situation	reference situation for an assignment in the Planned Bands	more ...	sample
date of bringing into use	information based on frequency ranges for specified geostationary / non-geostationary satellites	more ...	sample
Publication special query			
space stations	sorted by orbital positions and publication date	more ...	sample
administrative due diligence (Res.49)	list of satellites, administrations and *date of bringing into use*: notices submitted to the BR under Resolution 49	more ...	sample
space BR IFIC/WIC publications	published by BR in a given period	more ...	sample
Miscellaneous queries			
group summary	summary information of a group/transaction	more ...	sample
11.44.1 queries	Coordination not covered by notification exceeding regulatory limit	more ...	sample
RES 609 (WRC-03)	RNSS ITU publication reference for the frequency band 1164 - 1215 MHz	more ...	sample

Figure 6: Detailed information on BR IFIC Space Services

Example: User is requesting for example a list of geostationary satellites from Satellite BR IFIC in the frequency range 400 MHz and 60000 MHz with all classes of stations.

Total number of stations shown is 7913 (notification) and for advanced publication is 3399 on 1 October 2012.

It is not intended to duplicate the ITU-R BR IFIC available information in EFIS to avoid unnecessary work with regard to the broadcast plans, maritime services and aeronautical services in the terrestrial field as well as existing space stations, earth stations and radio astronomy stations. The use of the RoU concept for these radio services seems to be unnecessary.

The registration of "stations" or "frequency assignments", whether at national level and/or ITU level, follows different purposes. BR IFIC is not meant to reflect actual use of the spectrum; its prime purpose is to grant international rights for protection.

EFIS can provide links to information available at the ITU-R for several applications. Additional information about specific frequency usages in the field of these applications can still be collected by means of electronic questionnaires, if necessary.

3.4.2 European Common Allocation Table merged into EFIS

In order to develop European common positions and proposals for use in the framework of international and regional bodies, and to forward plan and harmonise within Europe the efficient use of the radio spectrum and satellite orbits so as to satisfy the requirements of users and industry, the CEPT endorsed in 2002 the principle of adopting a harmonised European Table of Frequency Allocations and Applications to establish a strategic framework for the utilisation of the radio spectrum in Europe. After a detailed review in 2010 of the key principles defining the ECA Table, WG FM concluded at its meeting in February 2011 that the Table should essentially deliver information on the current situation, although some future-oriented information could still be maintained for some specific frequency bands.

The task of developing and maintaining the ECA Table is the responsibility of the Working Group Frequency Management (WG FM). Much of this work is carried out by the European Communications Office (ECO) on behalf of WG FM.

The ECA includes the frequency range 9 kHz to 3000 GHz (the 'ECA Table') and is provided in EFIS. It is included in the ERC Report 25 [23].

The ECA Table in EFIS also contains European footnotes and ITU Radio Regulations footnotes for Region 1.

In addition to the actual ECA Table of Allocations and Publications, a wealth of additional information is uploaded to the ECA Table in EFIS in the form of documents: ECC Decision and Recommendations, RIS models, EC Decisions, Class 1 sub-class information and Harmonised Standards. In the special Spectrum Inventory section, and linked to the ECA Table, non-regulatory information on spectrum inventory and the evolution of spectrum use can be found in the form of documents such as ECC and CEPT Reports, ETSI SRDocs and Draft SRDocs.

In 2011, the content of the ECA database was transferred to the EFIS database, ensuring that the same application terminology is now used in ECA and EFIS. The ECA Table includes a lot of information on applicable documentation for each frequency band, and these documents are therefore available in EFIS and can now be searched for according to frequency and/or application.

ECO will update the information on ECC/ERC deliverables and on harmonised standards in the ECA Table when it becomes available (expected three updates a year).

Information on "Applications" should in general be seen as of factual nature and should primarily be specified for corresponding ECC/ERC Decisions and Recommendations. Information on applications for which at least 10 CEPT administrations have made available a relevant frequency band according to EFIS is also considered to be of factual nature.

The ECA is maintained by ECO according to rules identified by WG FM.

3.4.3 Determination of the geographical and frequency distribution of the spectrum utilisation factor for frequency planning purposes

There is not one model that fits all frequency bands and/or applications situations, so it could be envisaged that dedicated electronic questionnaires would be better suited to target exactly the data needed for the respective spectrum inventory considerations after data collection. Quantitative data as needed when more sophisticated models are utilised. Such quantitative data is better to be collected by means of electronic questionnaires than indicators which can be attached to a common RoU format. Usage and trend indicators

can, at most, point to areas of information where more data needs to be collected by means of electronic questionnaires.

The collection of information via EFIS cannot be totally decoupled from evaluation models which may be used later on in the spectrum inventory process. Therefore, there is a need for a minimum common understanding about the model(s) used for analysis of spectrum utilisation with respect to technical evaluations and investigations. Therefore, this is not EFIS-specific, but needed to explain that an evaluation model should preferably be taken into account even at the early stage of collecting information. This can be done more effectively when collecting information by means of dedicated electronic questionnaires than a common RoU format.

Theoretical indicators for technical evaluations and assessments over several frequency bands are not considered useful.

The collection of information via EFIS cannot totally be decoupled from evaluation models used later in the spectrum inventory process. Dedicated electronic questionnaires would be better suited to target exactly the data needed for the respective spectrum inventory considerations than a common RoU format for all frequency bands and applications.

It is proposed to study this item further to provide a reasonable technical framework for inventory investigations.

4 TASK 3: REGARDING THE PROVISION OF NON-REGULATORY INFORMATION BEING COLLECTED BY EFIS

This section takes forward the analysis of the previous section concerning the uniformity of information, and what constitutes a relevant data set, included in EFIS. The previous section repeatedly identifies the benefits of a questionnaire-based approach to information gathering, which in the process of attempting to answer the questions in the Mandate itself to an extent goes beyond them. Therefore some further information and considerations are set out below.

Comprehensive information about the actual usage of frequency bands is already available in EFIS in the spectrum inventory section. It is planned to extend this section also to accommodate data collected via electronic questionnaires. Data on actual usage will be needed for spectrum inventory analysis, not just on allocations, applications, radio interfaces and RoU. Most of this information is rather of non-regulatory nature and best to be collected via electronic CEPT questionnaires.

4.1 NON-REGULATORY INFORMATION FOR SPECTRUM INVENTORY PURPOSES IN EFIS

EFIS provides non-regulatory information for spectrum inventory purposes and the evolution of spectrum use. Any non-regulatory data that can be collected differs from band to band and application to application.

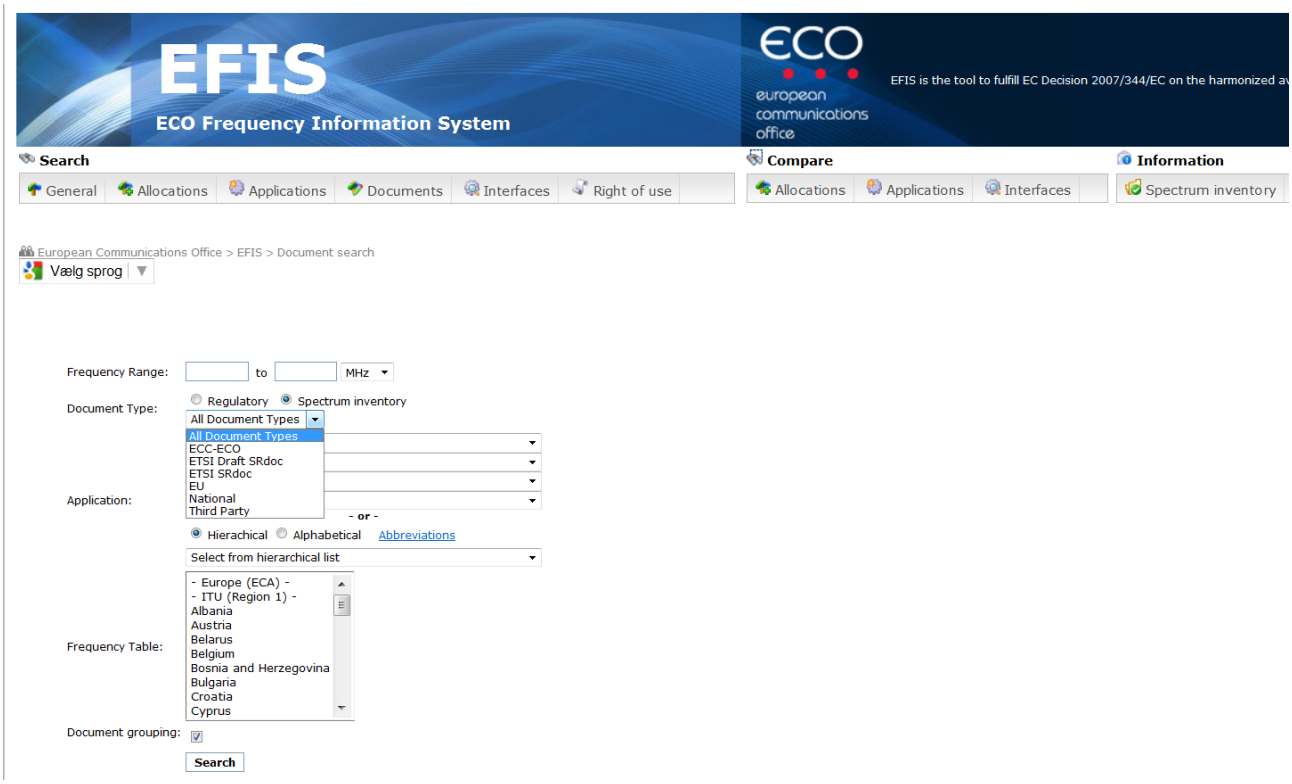

Figure 7: Non-regulatory information in EFIS

Spectrum inventory documentation in EFIS includes the following documentation types:

1. "ECC-ECO"

This document type includes ECC or ECO documents with relevant information about current usage of one or several frequency bands, or expected future usage. The information is contained in documents such as CEPT questionnaire summaries and assessments, dedicated frequency band reviews, official ECC or ECO

deliverables or external/public domain ECC/ECO documentation. Other information about application usage scenarios and usage densities may also be found in published ECC Reports.

2. ETSI System Reference Documents("ETSI SRDoc"s and "Draft ETSI SRDoc"s)

A Memorandum of Understanding (MoU) for co-operation exists between ETSI and the CEPT Electronic Communications Committee (ECC). One purpose of the MoU is to ensure that ECC and ETSI deliverables do not contradict each other. ETSI produces System Reference documents (ETSI SRDocs), ECC carries out sharing studies.

Results of these sharing studies should be implemented consistently by both parties in ECC deliverables and ETSI Harmonised European Standards.

A 'System Reference document' (SRDoc) is usually produced in support of any new system, service or application, in particular when a change of the present frequency designation/utilisation within the EU or the CEPT or a change in the present regulatory framework for the proposed band(s) regarding either wanted or unwanted emissions is needed. It has the form of an ETSI Technical Report.

SRDocs can also be prepared in order to help users to understand the concepts relating to a particular standard, even in cases where an SRDoc would not be required for frequency coordination purposes.

The System Reference document is drafted by an ETSI member or by an ETSI Technical Committee using the guidance for drafting an SRDoc in EG 201 788 [13]. Once approved by the ETSI committee responsible for such matters (currently Technical Committee ERM), the document is published as the co-ordinated views of ETSI (not only of the originators). This means that the committee has the responsibility of ensuring that all interests within ETSI are consulted and that a co-ordinated view is indeed achieved.

When the System Reference Document is used for frequency coordination purposes, it contains:

- a basic description of the radio application, and a simple technical description. Any ETSI standards which apply, or are being drafted, are indicated;
- an indication of the spectrum required by the radio application (for example, how much bandwidth and power are necessary, if specific frequency bands are preferred, if particular licensing conditions are needed). Almost all radio frequencies are in use by some application, and the System Reference document should indicate how compatibility with existing services can be ensured;
- market forecasts: National administrations have the responsibility to ensure that the radio spectrum is used efficiently, with a maximum economic and social benefit. The System Reference document should give sufficient material of this nature to the CEPT administrations to justify an allocation of spectrum.

After the completion of the frequency negotiations, the System Reference document may be updated to become a companion document for the Harmonized Standard.

The ETSI Draft SRDocs type in EFIS includes ETSI SRDocs which are not yet published but exist as adopted ETSI ERM Work Items or draft SRDocs. Stage 1 means that the status of the draft is that it has not yet been subjected to the ETSI internal consultation. Stage 2 means that the draft SRDoc has already been through the ETSI internal consultation conducted by ETSI ERM.

3. "National"

Feedback from national inventory processes not already provided in other sections of EFIS, and other relevant non-regulatory information

ECC-ECO, ETSI SRDoc, EU and Third Party document types are uploaded by ECO, whereas national non-regulatory spectrum usage information (in doc type 'National') is uploaded by the national regulatory authorities.

National administrations may have information of a non-regulatory nature on the possible evolution of spectrum use under study in their country. Such information can be uploaded in this national spectrum

inventory document type. Examples are results of national consultations, spectrum reviews, reports or re-farming activities which provide information about the current usage (market) or evolution of spectrum usage (e.g. forecasts, growth or decline). The document can be provided either directly or as a link to a publicly available website of the national regulatory authority. Where possible, it should be linked to one or more frequency ranges and applications applicable in ECA, but administrations are free to select frequency sub-ranges and/or other EFIS applications.

Documents can be provided in the national language and should be accompanied by a title and short introduction (comments field, up to 300 characters) in the English language. This introduction as well as the title in English may include such information as whether the document describes the current use of spectrum (the word <<inventory>> should be used) and/or is also related to changes in the future or forecasted use of spectrum (the word <<demand>> should be used).

Existing application terms should be used as a general rule. Where it is not possible to even use a broad Layer 1 term, the comment field should be used to describe a future application.

In certain cases, it is more appropriate to provide documentation without a link to specific frequency ranges and/or applications. This could be a valid approach for:

- Non-technical information such as framework information on spectrum policy, allocation or trading of frequencies;
- Technical information related to the efficient use of spectrum or e.g. general information about medium access/ mitigation techniques.

  This section is planned to be enhanced to enable also future information collection processes such as dedicated questionnaires or spectrum review processes. In a first step, a contact list with the responsible contact persons for spectrum inventory persons and information in EFIS needs to be established. This document type may also be used for future surveys on spectrum use if requested by the ECC.

Another feature recently implemented is validity date fields for documents. It is possible to indicate the publication date of the relevant information in the ‘valid from’ field, and to insert an expiry date. This is to enable the EFIS system to also show whether information is still relevant and to provide a document history, where applicable.

4. “EU”

This document type includes information collected by means of EC questionnaire or EC commissioned tasks or projects related to spectrum use which has subsequently become publicly available.

It is planned to enhance this section to include also information provided by Member States in response to EC questionnaires in a given band.

5. Third parties

The “third party” document category is under establishment. This will first of all address spectrum inventory relevant information from e.g. MoU/LoU partners of the ECC. For some radio services, institutions such as CRAF (radio astronomy) or EUMETSAT (EESS) may provide relevant information for spectrum inventory purposes at their own level in a context of harmonised approach. The basic rule will be that the third party can propose a document, and it will be uploaded by ECO. The list of third party documentation will be provided to the WGFM. This document type is already in use, but the amount of information given here will increase. The NATO Civil/Military Capability Panel Spectrum Management (CaP3) has already decided in military session to provide information to the EFIS database on the military use of spectrum including EFIS application layer 2 as a harmonised approach, except where national laws do not allow.

ESOA indicated that it is essential for industry to be able to provide information on the actual and planned use of the spectrum in a given band or for a given satellite application. Particularly for information on licence exempt use or for information that is mainly present with a few managing administrations, this would be a way forward to ensure consistency and veracity of information.

The practical modalities to ensure this input need to be discussed, and ESOA indicated to would like to enter into a dialogue with ECC on the best ways to guarantee that relevant and accurate information on satellite services are inserted in EFIS. As satellite services are to a large extent offered in internationally harmonised bands and follow CEPT harmonisation measures, which are already reflected in the European Common Allocation Table, objective measures exist to base any scrutiny on.

Applications grouping in the spectrum inventory section of EFIS :

The complete application terminology used in EFIS encompasses about 200 terms.

In line with the layer search rules in the regulatory sections of EFIS, one can still use the full terminology available to provide as detailed information as possible.. The application terminology needs to be maintained in the future, e.g. withdrawal or adding of application terms in EFIS.

An application grouping in EFIS may reduce visibility on information available in EFIS system and the understanding how the radio frequency spectrum is used. It is therefore not used in EFIS and is currently outside the EFIS Decision.

The possibility to employ an application/grouping mapping is only a question of importing information from EFIS. Hence, at the present time, there is no need to change the EC Decision for EFIS with regard to the possible usage of such a mapping look-up table. One disadvantage of using a mapping table is of course the risk of discrepancies in the overall data collection and analysis process. On the other side, it might be beneficial to ask Member States not to provide information at a detailed level that is later on not needed in the analysis process. Again, the electronic questionnaire concept makes such considerations obsolete to a great extent since a format will each time be set up when a questionnaire is generated. Also from this perspective it is therefore too early to finally decide on such categories and it is considered better to wait until experience is gained during the initial inventory work and based on first experience and examples.

National Regulatory Authorities (NRAs) have invested significantly in tools to maintain and update their portions of the EFIS database, primarily using an update process based on XML files.

Technically reliable data supporting subsequent evaluations is the main concern of EFIS when collecting data. For data that is available in EFIS there is no reason why this data should not be maintained. However, data should also be available in data format and not only as a document type in order to support the analysis in the electronic part of a spectrum inventory action.

EFIS provides data to the spectrum inventory facility by using csv-based (comma-separated values based) data extraction. The electronic inventory facility (including both data management and analysis tools) would draw on EFIS data, but might also draw on other data sources in parallel, bearing in mind that the latter case could lead to the additional administrative burden to crosscheck the validity and correctness of the data provided by third parties.

In addition, based on a remote log-in account, it will be possible to extract data by using XML-based data extraction. Information collected via electronic questionnaires will always have the heading information concerning frequency band(s) and application(s). In addition, to indicate specific information categories, the EFIS database may also provide tags to find and use such information in a convenient manner (e.g. for a specific application in a specific frequency band or for a specific country).

4.2 CEPT QUESTIONNAIRE

There is a lot of experience in the CEPT with collection of data from administrations on the present as well as future planned use of spectrum. This information is collected from administrations and also in some cases from industry/third parties such as in the 863-870 MHz survey (ECC Report 182 [12]) where administrations do not have all relevant information, e.g. in frequency bands which are used partly or overall under general authorisations.

Questionnaires are developed within the framework of ECC working groups and project teams. The ECC use them to gather information from administrations to improve the development of ECC deliverables. ECO is

most of the time acting as a contact point in order to collect the replies from the administrations and to provide those to the relevant groups.

The replies received from the administrations and third parties are entered into inputs which have been distributed to the relevant ECC groups.

Many of the questionnaires are spectrum inventory relevant. A list of such questionnaires in the timeframe 2010-2012 is in the table below:

Table 5: List of spectrum relevant questionnaires within the 2010-2012 timeframe

Year	Questionnaire
2010	Aeronautical radio interference 863-870 MHz survey 2GHz unpaired bands Mobile Broadband (August) Mobile Broadband (December) PLB update PPDR Radars operating below 1400-1427MHz Generic inventory of candidate applications for the 1452-1492 MHz band ECO Information document on the use of mobile bands (converted in 2010 into ECO Report 03 [7]) – updated on an annual basis by means of a circular letter
2011	Collection of information about the usage of the frequency band 169.4-169.8125. Collection of information on the national implementation of the ECC/DEC/(06)08 [26] (GPR/WPR). FS use of the 28.8365-28.9485 GHz. Narrowband or wideband PMR/PAMR/PPDR equipment. Protection of PMSE in UHF with WSD. RF interference to aeronautical radio services. Collection of usage information of all FS usage in the CEPT (led to ECC Report 173[14])
2012	Possible use of Short Range Devices (SRD) in the frequency band 862-863 MHz CEPT administrations on the current and future usage of the frequency bands 870-876 MHz and 915-921 MHz Implementation of BFWA in the frequency band 5725-5875 MHz according to ECC/REC/(06)04 [24]

Year	Questionnaire
	Questionnaire on the regulatory procedures used by administrations in granting access to spectrum for PMSE (implementation of frequencies for PMSE usage in Europe) WGFM questionnaire on the current status of DFS (Dynamic Frequency Selection) in the 5 GHz frequency range WGFM questionnaire on the current and future usage of frequency band 2300-2400 MHz

All of the responses received to these questionnaires are consolidated and distributed to the relevant ECC groups for consideration and detailed analysis.

When using electronic questionnaires in the future, the presentation of the results in EFIS will be shown under:

1. National accounts: answers received from administrations;
2. Third parties: answers received from involved market players;
3. ECO-ECC: ECO summary / ECC assessment of the results of the questionnaire.

The questionnaire information as shown in Table 4 is already in EFIS available under the spectrum inventory document type ECO-ECC.

Experience with questionnaires also shows that it is easier to get the actual implementation information: whether or not a service licence was not only awarded, but also put into operation. Sometimes the RoU holder is still indicated in the database, but the RoU holder does not exist anymore in practice except for the right-holding affiliated entity. Such differences could be difficult to indicate in the current EFIS section since the RoU information there is considered as regulatory information. Questionnaires seem, however, well suited to find these differences about actual spectrum use.

The data set structure of an electronic questionnaire does not follow a fixed format, but will be defined when the questionnaire is designed. Once the data is available in EFIS it can be updated regularly or on demand. For example, ECO Report 03 [7] on the licensing of 'mobile bands in CEPT or ECC Report 173 [14] containing the Fixed Service usage can be updated electronically, and continuously, through the EFIS database. The structure of each report defines the data set structure on these specific issues. For mobile bands, it is identical with the RoU common format. For FS information, it is identical with the data contained in the ECC Report 173 [14].

The consistency of the data when received through questionnaires is also better than that obtained via RoU in EFIS, where the data is uploaded by many sources without a “sanity check” or expert overview. The utilisation data varies dramatically depending on the application, e.g. number of installations, licences, base stations, mobile terminals, broadcast multiplexes and/or transmitting stations, or for PMSE applications, an indication of how frequently deployments are used (e.g. number of annual deployments).

Finally, there is also the need for some stability concerning changes of data fields in EFIS. A pre-defined RoU common format cannot be changed all the time when new needs arise to collect certain information. It will be burdensome for administrations to follow a “rolling target”. Alternatively, electronic CEPT questionnaires provide more flexibility in this respect since the format will be decided case by case.

In addition, national database systems are based on the regulations now in force. The systems have been built to match the EFIS requirements as they are stated at the time the system is designed. This means for example that changes to the RoU common format are most likely not included in currently running systems. It is of the utmost importance that common formats do not change repeatedly. The usage of electronic questionnaires, from this perspective, also seems a much more elegant way to collect the required information (including quantitative information) than by applying a common format across all frequency

bands and applications. Quantitative data is needed and this varies according to the application and the frequency band. Electronic questionnaires can better focus on this sort of data than a common RoU format.

Therefore it is of utmost importance that the current format without duplex pairing is still possible to use. There are differences in the optimum approach suitable for different administrations with regard to upload of data, publication of data etc. This has to be taken into account when implementing new features, e.g. incorporating new data fields in EFIS, by giving administrations the opportunity to NOT answer a particular question by supplying data they cannot supply, but to provide information as to why the question cannot be answered, in a way that does not cause undue problems. This is of course also the case when designing questionnaires.

On a case-by-case basis on frequency bands subject to study, it is possible to collect information (including RoU) from Member States for dedicated frequency bands by means of electronic questionnaires.

The format will be set each time a questionnaire is designed for a dedicated frequency band(s) and/or application(s). Information can be collected via electronic questionnaires and updated later as required. Electronic questionnaires can also be used upon request for information on a particular band and/or application.

This is more efficient, more demand-oriented and less costly than to request administrations to upload and maintain all RoU/authorisation information from 400 MHz to 6 GHz in EFIS on a continuous basis and several times a year.

Information collected via electronic questionnaire takes into account that both regulatory and non-regulatory information needs to be collected. Non-regulatory information can be for example number of users, demand trends, or other specific non-regulatory information in relation to the actual use of the spectrum in a given frequency band or for a specific application.

It is considered difficult to transfer the RoU concept to some applications and frequency bands such as satellite services, governmental use, licence-exempt use or to some applications in some frequency bands that only need an authorisation but do not require an RoU. The questionnaire concept is put forward since the use of questionnaires in CEPT as well as other organisations for spectrum inventory purposes is well proven.

The use of CEPT electronic questionnaires is an efficient method to retrieve qualitative and quantitative information. Based on the information given in the questionnaires an analysis can be done in relation to the goals set out in the Radio Spectrum Policy Programme. This is an efficient, demand-oriented and cost-effective method to complete the information available in EFIS.

The electronic questionnaire concept is well-suited to ensure that the data obtained is available for further analysis. This approach is in line with the request stipulated in the RSPG opinion (see annex 6) for a more developed version of EFIS that could become a key source depending on its future capability to illustrate actual availability and resources of Member States to provide such information. This will improve the information relating to actual use of spectrum in EFIS. Administrations can check and update the inventory data on a periodic basis.

4.3 UTILISATION AND DEMAND TREND INDICATION

Another important aspect of addressing the relative use of a frequency band is the utilisation and the demand trend indication.

When developing a questionnaire on an ad hoc basis, the following four categories could be used for the utilisation indication:

1. Not used;
2. Lightly used;
3. Moderately use;
4. Heavily used.

This information seems best to be added in the applications section of EFIS, on case-by-case basis, since the utilisation indication is linked more to the application in a band than to an individual RoU/authorisation. In addition, the information should be provided about when the band was made available for this application in a country.

In addition, important information is about the demand trend indication. According to the methodology adopted under study, the following four categories could be used for the demand trend indication:

1. Demand declining;
2. Demand stable;
3. Low or moderate demand growth;
4. High demand growth.

The same concept may be used in electronic questionnaires in order to allow for a more consistent analysis of data on a frequency band specific situation. For the implementation/putting-into-operation information in the RoU information, see section 3.2.13. A more sophisticated concept describing an utilisation factor in a frequency band may be needed on a case-by-case basis.

Guidance on the usage of these four categories can be established by the relevant definitions and explanations in a dedicated electronic questionnaire. This is also needed since otherwise the indicator information may not be sufficiently robust. It is proposed, alternatively, to first recognise that the ECA Table in EFIS allows displaying “applications” of significance to several administrations. A criterion of minimum 10 administrations has besides been agreed as a condition to display an application which is not covered by a European harmonisation measure.

The column ‘Note’ in the ECA Table would allow providing additional information as a result of adequate spectrum review/questionnaire data. The evolution of the ECA Table “application” may be analysed year by year if needed to assess the particular trend or interest in a given frequency band. This could be done on case-by-case basis.

CEPT should continue to rely on its close connection with ETSI in order to asses market demand. The concept of ETSI SRDoc, whose references are now available in the document section of EFIS, remains the key solution and the least costly solution. It is furthermore common practice for CEPT to invite ETSI to deliver a new SRDoc, when evidence appears on the need for consolidated industry view on specific demand trend. Moreover, contributions from administrations or industry, directly submitted to CEPT, for a concrete demand for spectrum access for a given application should be recorded. For example, a contribution from a CEPT country invited CEPT to consider the issues of Mobile broadband on board vessels. The results of the relevant questionnaire are available, raising the level of demand and possible options to be considered, including the launch of various work items.

It should be noted that monitoring campaigns can only achieve limited information in the context of spectrum inventory and are costly, especially when being repeated to indicate usage trends.

In some cases spectrum monitoring can give an insight into usage trends for specific applications in dedicated bands. Administrations that have collected quantitative or qualitative information related to the

monitoring of spectrum can provide this by specifying the exact frequency band and applications affected. Such information could include geographic information, the technologies in use or the specific application usage over time.

In order to have comparable information among CEPT administrations, monitoring campaigns are organised in the CEPT. Reporting of the results of such campaigns can use a specific format and the concept of electronic questionnaires can be re-used for this purpose to agree and define a specific format for the frequency band and applications under consideration.

If a monitoring campaign is repeated, this format could be re-used and information updated in EFIS. This would normally be the case to show trends rather than focusing on absolute figures. The monitoring information collected in this way and provided in EFIS could be used as background information in dedicated cases, where considered appropriate.

On a case-by-case basis, in relation to electronic questionnaires, it is proposed to add utilisation and demand trend information to the application section in EFIS to indicate the extent of usage of an application in a frequency band. This will improve considerably the level of information relating to the actual use of spectrum in EFIS, in a simple and straightforward manner. However, this does not replace the utilisation of analytical concepts, where appropriate.

5 UPDATING OF THE INFORMATION IN EFIS

The subject of updating of the information in EFIS becomes part of the following CEPT Report 47 under this Mandate. The subject is strongly linked to Task 4, and results from the questionnaire are expected to deliver applicable information such as:

1. Updating mechanisms (e.g. automatic updates);
2. Updating cycle;
3. Possibilities for minimising the costs for administrations;
4. Link to national databases.

The ECO will update the information on Harmonised European Standards in the ECA Table in EFIS when it becomes available in the OJEU.

Changes to the information uploaded to EFIS and related proposals in this CEPT Report already have a cost impact on administrations. In general, there is a need for stability in the requirements regarding EFIS. Without that stability, over time the task to update more automatically will become very difficult. CEPT Report 47 will go into this in more detail.

In addition, there is a necessity to reduce (or at least not increase) the administrative burden/cost for the administrations. The recently published ECC Report 180 [4] contains some guidance to achieve a higher level of uniformity of the information in EFIS uploaded by administrations. Electronic questionnaires as stipulated in this CEPT Report are also considered a good tool to achieve a more uniform information basis.

The electronic questionnaire concept will also provide for an implementation approach, step by step, on basis of a priority list for frequency bands and/or applications, to have additional spectrum inventory related information available in EFIS.

6 CONCLUSIONS AND RECOMMENDATIONS

The principal conclusions of this Report are as follows:

1. The most valuable contribution which EFIS could make to the spectrum inventory requirement is to assimilate and present electronic questionnaires optimised to the band and applications under consideration for technical evaluation of spectrum usage. The use of CEPT electronic questionnaires is an efficient method to retrieve qualitative and quantitative information. Based on the information given in the questionnaires an analysis can be done in relation to the goals set out in the Radio Spectrum Policy Programme. This is an efficient, demand-oriented and cost-effective method to complete the information available in EFIS.

2. No amendments are proposed with regard to Annex I of Decision 2007/344/EC. As a matter of fact, the current radio interface information in EFIS according to Annex I of the EC Decision is complementary information of a regulatory nature and provides the necessary visibility on requirements applicable to a given band;

3. Some amendments are proposed for Annex II of Decision 2007/344/EC [1]. These relate to duplex pairing arrangements as well as collection of RoU/authorisation information by means of electronic questionnaires;

4. It is technically possible for the EFIS system to accommodate comprehensive information regarding spectrum usage rights/authorisations for the whole range from 400 MHz to 6 GHz without limit to the type of application, based on the current common formats in Annex 2 of Commission Decision 2007/344/EC [1].

5. Although the information provided by Member States is largely coherent for the purposes of regulatory information (used for aspiring market entrants), there are some differences in the level, and particularly the uniformity of that information. This is to a large extent due to variations in the mechanics of the licensing and authorisation regimes in the different countries, even if they follow common principles. There are also major differences in level and uniformity across different services. This is to be expected, and it tends to highlight the need for additional input information for spectrum inventory purposes.

Task 1 under the Mandate:

The EFIS system can already, or can easily be extended to, accommodate:

- The estimated required number of records;
- The expanded frequency range;
- Additional forms of data entry which are believed to be required, particularly electronic questionnaires in formats designed for the purposes of the inventory, and reference documents and tables with other qualitative and quantitative information.

No static common data format is suitable for assessment or evaluation of the efficient use of spectrum of a specific application. By comparison, spectrum efficiency investigations within CEPT usually require in-depth frequency band specific analysis and involve many stakeholders, very often including the use of CEPT questionnaires sent to administrations.

Electronic questionnaires are therefore intended to be introduced, so that data can be collected on a case-by-case basis and stored in a suitable data format in EFIS.

Task 2 and 3 under the Mandate: Annex I and II of the EC Decision 2007/344/EC [1]:

Radio interface information:

This Report does not propose changes to Annex I of the EC Decision 2007/344/EC [1] as we do not consider that the information is generally relevant in the context of usage of spectrum/spectrum inventory, although some administrations use national radio interfaces as technical reference documents in their national regulations.

The RIS concept cannot be applied to deliver information about frequency bands used by government users which are primarily described in terms of 'Allocations' in National Table of Frequency Allocations (NTFA). Also, it must be emphasized that frequency assignments for radio transmitters are not technical regulations, but simply describe the conditions for use of the public domain at specific locations.

The European Common Allocation Table (ECA Table) within EFIS seems to be a better source of information since it contains the harmonisation measures and the Harmonised European Standards. Where there is no harmonisation measure or standard, ECA also indicates where several countries have implemented an application in a frequency range.

Right of use information:

The way administrations interpret or legislate RoUs provided in EFIS is not harmonised due to various national authorisation regimes in place. As example, one RoU could be only for a specific frequency band (e.g. a land mobile network in a specific frequency band, but with several transmitters operating) or it can be seen as one RoU per transmitter according to the respective national authorisation regime. The ECS concept is not limited to specific frequency bands. Some countries apply the ECS concept also in other frequency bands than those harmonised in Europe. Therefore, care should be taken when comparing or analysing RoU information.

Some amendments are proposed for Annex II of Decision 2007/344/EC [1]. These relate to duplex pairing arrangements as well as collection of RoU information by means of electronic questionnaires.

We consider that further changes to the common RoU format are not useful or beneficial for spectrum inventory purposes. Instead we propose to use the electronic questionnaire concept.

It is preferable to distinguish between RoU for ECS bands and RoU/authorisation in other frequency bands. Applying the RoU concept in general to all other bands as seen in the context of the spectrum inventory does not provide a meaningful understanding of the actual spectrum use or the actual number of users in the band. Visibility on spectrum usage by non ECS applications is provided by allocations and applications in EFIS. It is rather the application section in most cases in EFIS which provides visibility on the usage of a given frequency band. However, in some specific cases the RoU/authorisation in other frequency bands than RoU in ECS bands might be an option.

General authorisations without individual right of use should be provided in EFIS but are not required to use the common format on RoU.

Geographical coverage options should only be treated as relevant for those types of applications where additional geographical information in EFIS does provide benefits.

The text field "technology in use" has been implemented in EFIS in the RoU common format as an optional field.

It is not intended to duplicate the ITU-R BR IFIC available information in EFIS to avoid unnecessary work with regards to the broadcast plans, maritime services and aeronautical services in the terrestrial field as well as existing space stations, earth stations and radio astronomy stations. The use of the RoU concept for these radio services seems to be unnecessary.

The registration of "stations" or "frequency assignments", whether at national level and/or ITU level, follows different purposes. BR IFIC is not meant to reflect actual use of the spectrum; its prime purpose is to grant international rights for protection.

Electronic questionnaires:

It is possible to collect on a case-by-case basis on “bands of interest” identified by either CEPT, the Commission or RSPG comprehensive data for the frequency ranges and applications outside of the ECS bands through electronic CEPT questionnaires.

The format will be set each time a questionnaire is designed for a dedicated frequency band(s) and/or application(s). Information can be collected via electronic questionnaires and updated later as required. Electronic questionnaires can also be used upon request for information on a particular band and/or application.

This is more efficient, more demand-oriented and less costly than to request administrations to upload and maintain all RoU/authorisation information from 400 MHz to 6 GHz in EFIS on a continuous basis and several times a year.

Information collected via electronic questionnaire takes into account that both regulatory and non-regulatory information needs to be collected. Non-regulatory information can be for example number of users, demand trends, or other specific non-regulatory information in relation to the actual use of the spectrum in a given frequency band or for a specific application.

The electronic questionnaire concept is also proposed since it is considered difficult to transfer the RoU concept to some applications and frequency bands such as satellite services, governmental use, licence-exempt use or to some applications in some frequency bands that only need an authorisation but do not require an RoU.

The use of questionnaires in CEPT as well as other organisations for spectrum inventory purposes is well proven.

The electronic questionnaire concept is well-suited to ensure that the data obtained is available for further analysis. This approach is in line with the request stipulated in the RSPG opinion (see annex 6) for a more developed version of EFIS that could become a key source depending on its future capability to illustrate actual availability and resources of Member States to provide such information. This will improve the information relating to actual use of spectrum in EFIS. Administrations can check and update the inventory data on a periodic basis.

The electronic questionnaire concept is also proposed for the following issues or purposes:

1. Inclusion of information in EFIS on unused or under-used frequencies or information on future spectrum re-farming actions on a case-by-case basis for frequency bands under study. This information should be made available in EFIS based on questionnaires to CEPT administrations;

2. EFIS provides visibility on the results of sharing studies in the document section by including references to relevant ECC Reports. Specific sharing information can be collected by means of electronic questionnaires on an ad-hoc basis in order to support detailed analysis for dedicated frequency band;

3. Geographical coverage information is also seen for many applications and/or frequency bands as information that should be handled inside the electronic questionnaire concept, to complete information already provided through the Right of Use information in EFIS;

4. Collection of information on implementation/ putting into operation by means of electronic questionnaires, where appropriate and on a case-by-case basis. This will improve the information relating to actual use of spectrum in EFIS, although it should be noted that the stability of this kind of information is to some extent limited;;

5. EFIS can provide links to information available at the ITU-R for several applications. Additional information about specific frequency usages in the field of these applications can still be collected by means of electronic questionnaires, if necessary.

The collection of information via EFIS cannot totally be decoupled from evaluation models used later on in the spectrum inventory process. Dedicated electronic questionnaires would be better suited to target exactly the data needed for the respective spectrum inventory considerations than a common RoU format for all frequency bands and applications.

Given the proposal for using electronic CEPT questionnaires in this Report, we also propose that this be reflected in the Commission Implementing Act regarding the methodology in the RSPP article 9(2)b.

All these amendments together are intended to improve the quality of information in EFIS for spectrum inventory purposes and to make data available for analysis. It is also intended to provide an efficient mechanism to allow administrations to update and maintain such data in EFIS under a suitable framework. It will also be possible to generate subject specific reports “out-of-the-database” instead of conducting a fully manual creation of reports. This will increase the work efficiency for ECO, in its support to ECC, and also for national administrations.

ANNEX 1: DATA FORMAT CURRENTLY USED IN EFIS REGARDING REQUIREMENTS OF ANNEX II OF THE EC DECISION

Based on the analysis in this Report, the following changes (highlighted in red colour) are proposed with regard to the format for information on RoU:

1. the identity of the radio frequency right holder;
2. the expiry date of the right or, in the case where there is none, the expected duration;
3. the geographic validity of the right by at least providing the information whether the right is local (i.e. one station), regional or nation-wide;
4. an indication of whether or not the right is tradable;
5. an indication on whether or not the right applies to a paired (duplex) frequency range.

Note: Information on rights of use may also be collected via electronic questionnaires from Member States. The common format of the respective electronic questionnaire will be set each time a questionnaire is designed for a dedicated frequency band(s) and/or application(s). Data collected by means of an electronic questionnaire shall be exportable to other electronic spectrum inventory facilities.

ANNEX 2: STRUCTURE OF DATA IN EFIS – APPLICATION TERMINOLOGY

This annex relates to level, coherence and uniformity of information in EFIS.

The objective of the application section is to provide visibility on the usage of a given frequency band. Various applications could share the same frequency band.

CEPT administrations upload relevant usage information in accordance to the applications structured in Layers 1, 2 and 3 of the Annex 2 of the ECC/DEC/(01)03 [15].

This 3 - layers approach is to give administrations a possibility of to provide depth of information about applications used in a frequency band and give the search a structure for finding all applications used within frequency bands.

The idea behind it is that the administrations have the possibility, where no detailed information is available or there are existing national restrictions (e.g. military frequency applications) for detailed information, to decide themselves about the detailed depth of application information (Layer 1, 2 or 3) they will publish in the EFIS system.

Where such information is available, administrations should always try to provide application information at Layer 3 level of detail in EFIS. Layer 1 applications and definitions are broad in scope, and Layers 2 and 3 narrow down the scope to be used for searches and comparisons. For example, the Layer 1 application “Land Mobile” does not differentiate between public cellular services and private mobile radio, which tend to use spectrum in a very different way and are generally subject to quite different licensing processes. On the other hand, adopting the Layer 2 application definitions would result in over 80 separate categories, making analysis of the data difficult, particularly with regard to comparing utilisation across different bands with similar applications.

Layer 2 provides most commonly used terms that are also used in ECC deliverables and act often as ‘umbrella terms’ or major categories for a lot of similar applications. Typical examples are PPDR, PMSE, PMR/PAMR.

Layer 3 provides better visibility on the application which is authorised in a given band. Various applications could share the same frequency band.

A2.1 TERMINOLOGIES OF APPLICATIONS LISTED IN LAYERS 1, 2 AND 3

The applications terminology originates from ECC deliverables where the application terms are used. The same terms are also used in the ECA Table. The definitions are therefore found in the applicable relevant ECC deliverables, and these deliverables are indicated in the list of searchable applications (Annex 2 of the ECC/DEC/(01)03 [15] and also in the EFIS editor’s manual). Administrations are encouraged to follow the terminology which is also used in the ECA Table to the maximum extent possible in order to avoid any ambiguity, for administrations with uploaded information in the database, but also for any external users of the database. It should be noted that the application terms in ECA are used in the RIS templates too, which are also found in the EFIS database.

A2.2 SEARCH & COMPARISON

Users of the database can select a term for searches and comparisons from each of the layers, either from a flat selection panel or from a structured window making step-by-step selection through the layers possible. Selection of an application term in Layer 1 will include in the results also the information for which a Layer 2 or 3 applications under this term is used.

Some Layer 2 and Layer 3 terms are included under more than one Layer 1 term.

Administrations have the freedom to include information about PMSE for example under the Broadcasting or the Land mobile application. This takes into account that some administrations have PMSE in some frequency ranges under the Broadcasting service allocation, and some have categorised PMSE applications under the Land mobile application for frequency ranges where both service radio allocations are given. It is also the case, that such PMSE applications are used by broadcasting services for generating programmes as well as other users. Therefore, this approach gives administrations full flexibility in such cases of having a term in several upper layer categories. Searches after PMSE in EFIS will however show all the results, so that no information will be overlooked.

However, in some cases, in particular for military, securities and enforcement agencies, it may not always be possible to use Layer 3 and administrations may need to use Layer 1 or 2 information. In these cases Layer 3 is not used and stays empty. Some guidance on where this might be appropriate is listed below.

A2.3 REASONS OF NATIONAL SECURITY

Certain information relating to the use of frequencies used for military, security services and enforcement agencies may not be available due to national security or other confidential considerations. In these cases administrations should look towards providing information containing Layer 1 or 2 terms where this is already publicly available.

A2.4 INFORMATION NOT HELD BY THE ADMINISTRATION

EFIS should be based on the non-confidential information that the CEPT administrations have in their records. For some administrations spectrum has been allocated to applications on a Layer 2 basis and rights holders can use any Layer 3 service under the provision of their licence. In these instances, it is therefore appropriate only to use the Layer 2 application as the administration has no accurate information on what Layer 3 applications are in use.

A2.5 USE OF ANY OR ALL LAYERS

The use of any or all layers is not problematic for the EFIS system and does not lead to malfunction of the system. The EFIS system is able to generate information independent of its availability in one single layer or in all layers combined.

The example in the figure below shows the result of a comparison of national tables in EFIS (and ECA) for the Layer 3 terms ‘Medical implants’. It can be seen from the results that Denmark has used the Layer 3 term, whereas Croatia and Austria have not supplied the same level of detail; they have used parent terms, Layer 2 (Active medical implants) and Layer 3 (Short Range Devices) respectively. EFIS, however, displays occurrences of the immediate parent term of the term specified where there is no Layer 3 information, and of the Layer 1 term, where there is no Layer 2 term specified.

Figure 8: Comparison of national application entries

A2.6 TRA-ECS

TRA-ECS (Terrestrial radio applications capable of providing electronic communications services) describes a regulatory status. It can be applied in principle to all terrestrial applications in a given frequency band.

TRA-ECS is relative to particular rights granted in a given frequency band. The comment field should be used to provide the typical application that is currently used, planned to be used or mainly used in the respective frequency band when available and as far as possible. When using TRA-ECS as application, administrations should provide information in the “comments” field, as otherwise the usage of this frequency band is not identified. The EFIS application terms should be used in the “comments” field in order to facilitate search. The TRA-ECS term should always be used in combination with one ECA or national frequency range. A broad application of the term TRA-ECS over several consecutive frequency ranges should not be done.

The related studies in the ECC and resulting documentation can also be indicated in the comment field to describe the real application in the band.

However, it is to be noted that

- The usage use of the comments field is not mandatory in the EFIS system. Nevertheless, without usage information in the comments field there is no visibility on the usage of the band and the mapping to the spectrum inventory category remains also unclear.
- Information on usage of relevant frequency band is not available in the context of general authorisation regimes.

Consequently the search for applications in the EFIS system will be extended to the comment field to find all applications used.

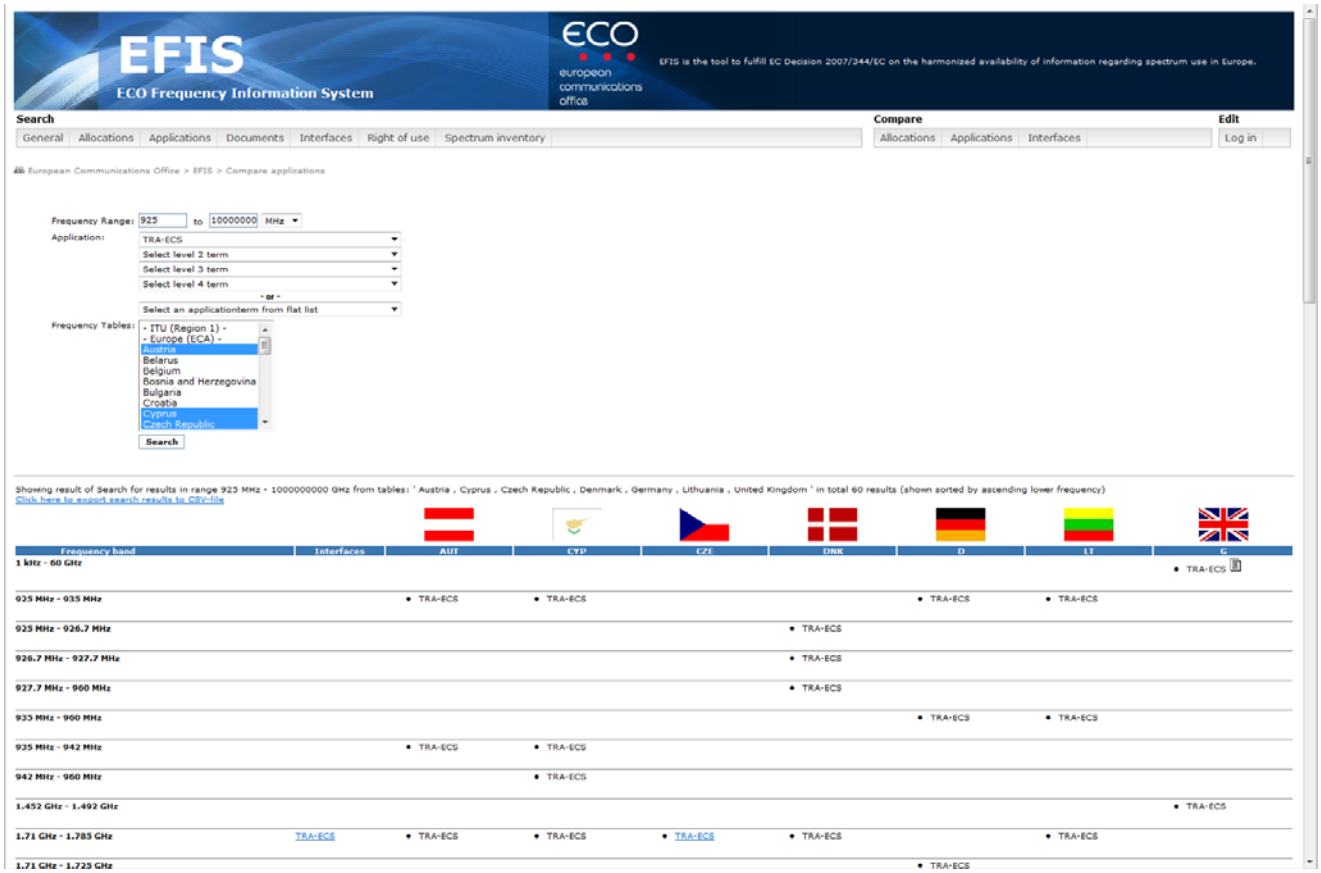

Figure 9: TRA-ECS

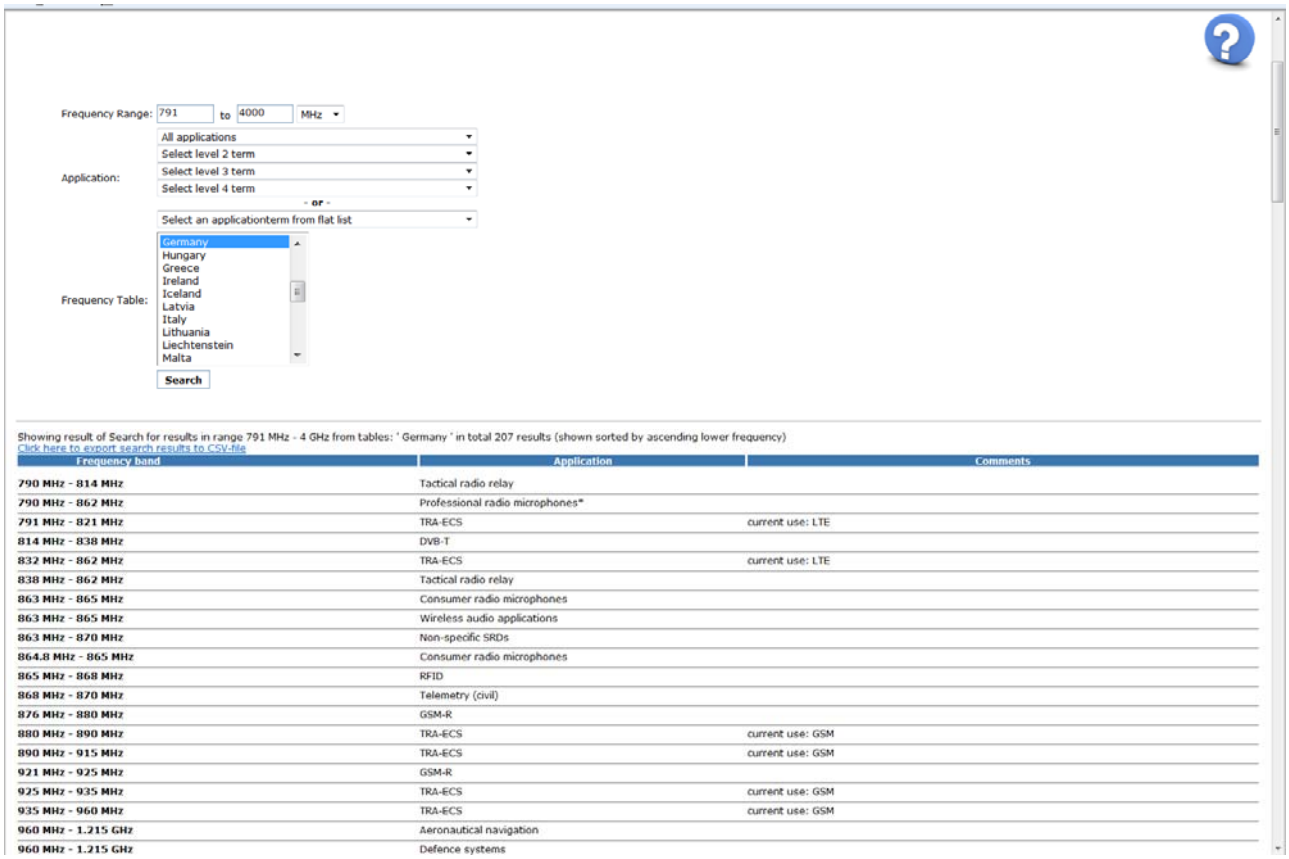

Figure 10: Usage of the comments field to describe TRA-ECS application

Comments for applications can contain:

- Current use: *application term1, application term2,* …(term2 if used by various apps)
- Main use: *application term1, application term2,* …
- Planned use: *application term1, application term2,* …
- Text “application term in the future”
- Text “application term will be phased out”.

A comparison of the actual usage of the application terminology reveals that the administrations in the great majority of cases provide Layer 3 terms. As an example, one can select and compare all countries for a specific maritime or SRD application, and the result in general shows that the Layer 3 terms are used in the vast majority of cases. Sometimes, however, the ‘umbrella’ terms are used, i.e. in these cases the Layer 1 or 2 terminologies. In many of these individual cases, this will not lead to “in availability” of information because the related documentation in the EFIS database (EC, CEPT, ECC/ERC deliverables, standards, RIS models and R&TTE equipment subclasses, but also spectrum inventory information) will normally include sufficient information to explain the usage of the frequency band.

ANNEX 3: MANDATE FOR CEPT

EUROPEAN COMMISSION
Directorate-General for Communications Networks, Content and Technology
Electronic Communications Networks and Services
Spectrum

Brussels, 31 August 2012
DG CNECT/B4

RSCOM12-22rev3

ADOPTED

RADIO SPECTRUM COMMITTEE

Working Document

Opinion of the RSC pursuant to Advisory Procedure under Article 4 of Regulation 182/2011/EU and Article 4.2 of Radio Spectrum Decision 676/2002/EC

Subject: **Draft Mandate to CEPT – Review of Decision 2007/344/EC**

This is a Committee working document which does not necessarily reflect the official position of the Commission. No inferences should be drawn from this document as to the precise form or content of future measures to be submitted by the Commission. The Commission accepts no responsibility or liability whatsoever with regard to any information or data referred to in this document

MANDATE TO CEPT
ON INCLUSION IN EFIS OF INFORMATION ON RIGHTS OF USE FOR ALL USES OF SPECTRUM BETWEEN 400 MHZ AND 6 GHZ.

1. PURPOSE

The purpose of this mandate is to modify the Commission Decision 2007/344/EC of 16 May 2007 on harmonised availability of information regarding spectrum use with the EC, so as to enable EFIS to be integrated into the inventory, which has been created by the Radio Spectrum Policy Programme adopted by EP and Council Decision 243/2012/EU of 14 March 2012 (RSPP Decision).

The inventory aims in particular to allow the identification of frequency bands in which the efficiency of spectrum use can be improved, to identify bands which could be suitable for reallocation and spectrum-sharing to support Union policies, to analyse the various types of use of spectrum by private and public users and to identify bands that could be allocated or reallocated to improve their efficient use, promote innovation and enhance competition in the internal market and to explore new ways for sharing spectrum.

To do so, the Commission must take implementing measures by 1 July 2013 to develop practical arrangements and uniform formats for the collection and provision of data by the Member States to the Commission on the existing uses of spectrum. In that context, the administrative burden on the Member States should be minimised and business confidentiality must be preserved where there are obligations to provide specific information under the Radio Spectrum Decision 676/2002/EC.

The EFIS database could evolve to become an integrated part of the inventory if comprehensive data on rights of use is collected, while avoiding any duplicate effort for the Member States.

2. JUSTIFICATION

Pursuant to Article 4 of the Radio Spectrum Decision[1] the Commission may issue mandates to the CEPT for the development of technical implementing measures with a view to ensuring harmonised conditions for the availability and efficient use of radio spectrum; such mandates shall set the task to be performed and the timetable therefore.

When Decision 2007/344/EC was adopted, it was decided as a first step, to limit the requirement of Member States to providing information on the rights of use to what was considered at that time as spectrum with a high economic interest, i.e. bands used for the provision of electronic communications services which have been made tradable or which are granted through competitive or comparative selection procedures. Moreover, RoU information provided to EFIS was to be updated every six months by Member States.

The inventory created by the RSPP will now focus on spectrum ranging from 400 MHz to 6 GHz. Considering the exhaustive character of the inventory and the need to analyse technology trends, future needs and demand for spectrum in all policy areas for the whole range from 400 MHz to 6 GHz as well as the need to identify bands in which the efficiency of existing spectrum uses can be improved, precise information will be necessary with regard to all rights of use for the whole range covered by the inventory and requires the withdrawal of the limitation set by the 2007 Decision. As the accuracy of the inventory depends on the availability of up-to-date information, it would be

[1] Decision 676/2002/EC of the European Parliament and of the Council of 7 March 2002 on a regulatory framework for radio spectrum policy in the European Community, OJL 108 of 24.4.2002.

appropriate that the information be updated by Member States every three months rather than six months.

Furthermore, the RSPG Opinion on the Review of Spectrum Use (RSPG12-408) recommends that "measures be undertaken to continue the development of the EFIS database resource supported by the appropriate regulatory framework (RSPP and EC Decision 676/2002) with the aim of providing comprehensive information on spectrum usage rights".

There is therefore a need to revise the Commission Decision of 16 May 2007 on harmonised availability of information regarding spectrum use within the Community, in order to extend the scope of its Annex II regarding the format for information on rights of use, and to modify the rhythm of information updates.

It appears from a presentation made to the Radio Spectrum Committee on 20 March 2012 by ECO that the EFIS system could be easily adapted to accommodate the collection of additional information regarding spectrum usage rights for the whole spectrum range from 400 MHz to 6 GHz without limit to the type of application. Moreover, a few Member States have apparently already broadened the collection of information to bands as low as 30 MHz or as high as 10 GHz as well as to bands used for local coverage (3.4 GHz for BWA).

3. MAIN EU POLICY OBJECTIVES

The Commission intends to modify its Decision 2007/344/EC of 16 May 2007 on harmonised availability of information regarding spectrum use within the Community to broaden the scope of Annex II thereof to the whole spectrum from 400 MHz to 6 GHz and to cover all services and applications and to provide as up-to-date information as possible.

This modification will allow for EFIS to be integrated into the inventory which has been created by the 2012 Radio Spectrum Policy Programme and will supplement other practical arrangements which the Commission intends to adopt pursuant to Article 9 par.2 of the RSPP Decision for the collection and provision of data by the Member States and for the development of a methodology for the analysis of technology trends, future needs and demand for spectrum in the EU policy areas covered by the RSPP.

4. TASK ORDER AND SCHEDULE

Through this mandate, the CEPT is requested:

(1) To confirm, as indicated by ECO earlier, that it is technically possible for the EFIS system to accommodate comprehensive information regarding spectrum usage rights for the whole range from 400 MHz to 6 GHz without limit to the type of application, based on the current common formats in Annex II of Commission Decision 2007/344/EC.

(2) To highlight any necessary change to the current common formats contained in Annexes I and II of Decision 2007/344/EC by taking into account the data needed/relevant for the methodology under development according to Article 9 par.2 of Decision 243/2012/EU. This might for example be necessary to differentiate current data collection in accordance with Annex II from data collection for types of use other than ECS in the range 400 MHz to 6 GHz. Any changes to current

common formats should only deal with non-confidential information[2] and, on that basis, allow an assessment of the time duration, geographical extent and deployed technology[3], while limiting the administrative burden on the Member States.

(3) To assess the level and the coherence of information that is currently being provided by the Member States when providing information in accordance with Annexes I and II as well as when providing non-regulatory information being collected by EFIS which has a relevance for the inventory.

(4) To state the necessary additional operational details, if any, in particular the links and updating mechanisms between ECO and national Administrations and assess the technical and administrative impacts on Member States, taking into consideration the need to minimise additional costs and manpower for national Administrations, with a clear distribution of responsibilities. In this context it should be investigated which Member States use direct automatic updates from national databases to EFIS and where national databases do not exist.

(5) To assess the possibility and the benefits to update information provided by Member States pursuant to Article 3.2 of Decision 2007/344/EC every three months, and drawing from experience, to estimate the increase in administrative and cost burden this could represent for Member States.

The Commission may provide CEPT with further guidance on this mandate.

CEPT is mandated to provide deliverables according to the following schedule:

Delivery date	**Deliverable**
15 November 2012	Draft final report on tasks 1, 2, and 3 with the necessity for a public consultation to be decided by CEPT.
10 March 2013	Final report on tasks 1, 2, and 3. Draft final report on tasks 4 and 5 with the necessity for a public consultation to be decided by CEPT.

In implementing this mandate, the CEPT shall, where relevant, take the utmost account of Community law applicable and support the principles of technological neutrality, non-discrimination and proportionality insofar as technically possible.

The Commission, with the assistance of the Radio Spectrum Committee pursuant to the Radio Spectrum decision, may consider applying the results of this mandate in the EU, pursuant to Article 4 of the Radio Spectrum Decision.

This mandate is without prejudice to the provisions of the Radio Spectrum Policy Programme regarding the inventory and the possibility to make any changes to the EFIS Decision by implementing measures adopted pursuant to the RSPP.

***

[2] Sensitive information, e.g. on governmental use, is not intended for collection in EFIS and will be exchanged if necessary and possible between the Commission and the individual Member States by other means.

[3] By taking into account, among others, the application terms used in the EFIS layer 3.

ANNEX 4: WGFM QUESTIONNARE TO ADMINISTRATIONS IN RELATION TO TASKS 4 AND 5

Note: this questionnaire is still under discussions and planned for adoption at WGFM#75

WGFM QUESTIONNAIRE TO CEPT ADMINISTRATIONS

Ref Tasks Nos 4 and 5 of the Mandate to CEPT
"MANDATE TO CEPT ON INCLUSION IN EFIS OF INFORMATION ON RIGHTS OF USE FOR ALL USES OF SPECTRUM BETWEEN 400 MHZ AND 6 GHZ"- Decision 2007/344/EC

Information to be provided in the cover of the questionnaire

Responding organisation	[responding organisation]
Country	[country of the responding organisation]
Address / e-mail address	[mail address of the responding organisation]
Contact name	[contact name within the responding organisation]

CEPT Administrations[4] are kindly requested to return the completed questionnaire before 15 November 2012 to the European Communications Office (ECO)

To	Thomas Weber
preferably by e-mail	thomas.weber@eco.cept.org
or by fax:	+45 33896330

Introduction
The Radio Spectrum Committee of the European Commission at its meeting on 5 July 2012 discussed a Draft Mandate to CEPT: "MANDATE TO CEPT ON INCLUSION IN EFIS OF INFORMATION ON RIGHTS OF USE FOR ALL USES OF SPECTRUM BETWEEN 400 MHz AND 6 GHz". The Mandate has now been issued. Noting the content and the deadline and that the ECO is managing EFIS it was decided to allocate the Mandate to the ECO and to develop the response in consultation with our members for consideration at the next ECC meeting (first three tasks).

The purpose of the Mandate is to modify the Commission Decision 2007/344/EC [1] of 16 May 2007 on harmonised availability of information regarding spectrum use with the EC, so as to enable EFIS to be integrated into the inventory, which has been created by the Radio Spectrum Policy Programme adopted by EP and Council Decision 243/2012/EU [3] of 14 March 2012 (RSPP Decision).
The tasks requested from CEPT through the Mandate are given below in an abbreviated form. Tasks Nos 1, 2 and 3 are dealt with in CEPT Report 46, and tasks Nos 4 and 5, to which this questionnaire applies, in CEPT Report 47.

Tasks
Through the Mandate, CEPT is requested[5]:

1. *To confirm, as indicated by ECO earlier, that it is technically possible for the EFIS system to accommodate comprehensive information regarding spectrum usage rights for the whole range from 400 MHz to 6 GHz without limit to the type of application, based on the current common formats in Annex 2 of Commission Decision 2007/344/EC [1].*
2. *To highlight any necessary change to the current common formats contained in Annexes I and II of Decision 2007/344/EC [1] by taking into account the data needed/relevant for the methodology under*

[4]CEPT Administrations from non-EU and non-EFTA countries are kindly requested to answer this questionnaire on a purely voluntary basis.

[5]The text of the tasks is abbreviated. For the full text of the Mandate, see Annex 3 of the present Report

development according to Article 9 par.2 of Decision 243/2012/EU. Any changes to current common formats should only deal with non-confidential information[6] and allow an assessment of the time duration, geographical extent and deployed technology[7], while limiting the administrative burden on the Member States.

3. *To assess the level, coherence and uniformity of information that is currently being provided by the Member States when providing information in accordance with Annexes I and II as well as when providing non-regulatory information being collected by EFIS which has a relevance for the inventory.*
4. *To state the necessary additional operational details, if any, in particular the links and updating mechanisms between ECO and national administrations and assess the technical and administrative impacts on Member States, taking into consideration the need to minimise additional costs and manpower for national administrations, with a clear distribution of responsibilities. In this context it should be investigated which Member States use direct automatic updates from national databases to EFIS and where national databases do not exist.*

5. *To assess the possibility and the benefits to update information provided by Member States pursuant to Article 3.2 of Decision 2007/344/EC every three months, and drawing from experience, to estimate the increase in administrative and cost burden this could represent for Member States.*

The questionnaire deals with data covered by the Decision 2007/344/EC Annex I and II, i.e. radio interface specifications and rights of use, respectively.

The questions are equally relevant to both data categories. Please write replies to the questions for both radio interfaces specifications and rights of use. Some questions also refer to allocation and application data since task no. 5 refers in general to all data (art.3.2 of Decision 2007/344/EC) For ease of reference, the following abbreviations are used:

Radio interface specifications: RIS
Rights of use: RoU

It is acceptable for administrations to submit two copies of the questionnaire, one containing answers for radio interfaces, one for rights of use, should this be more convenient.

Note: the requirement on RoU in the existing EC Decision on EFIS applies primarily to authorisations for ECS which are granted through competitive or comparative selection procedures. When investigating the applicability of the RoU concept on a broader basis, the nature of applications in use should be carefully considered.

Please indicate your answer clearly, either by writing YES/NO answers
in capital letters or by highlighting them.

[6] Sensitive information, e.g. on governmental use, is not intended for collection in EFIS and will be exchanged if necessary and possible between the Commission and the individual Member States by other means.

[7] By taking into account, among others, the application terms used in the EFIS layer 3.

Questionnaire

Question 1

How is your national RIS and RoU data stored ? (multiple answers possible) 1 Database 2 Spreadsheet (e.g. Excel) 3 Word 4 Other (e.g. old "paper" records)	RIS:	RoU:	Comments:

Question 2

A. If you do not have a national database for spectrum information, are you planning to have one? *B. If yes, when?* C. *Will the database be capable of generating EFIS-compatible files (i.e. XML format)?*	RIS:	RoU:	Comments

Question 3

How is the national data exported to EFIS? 1 Fully automatic upload (interface with login info incorporated) 2 "Semi-automatic" (XML file generated by national database, uploaded after manual log in) 3 Manual upload	RIS:	RoU:	Comments

Question 4

How often is your data in EFIS updated (if new data is available)? (the current requirement in the EC Decision is to update data twice a year) 1 Every three months 2 Every six months 3 On an ad hoc basis 4 Other Note: please describe sufficiently what you are actually doing.	RIS: RoU: Allocations: Applications:	Comments:

Question 5

A. Are you planning to update (and upload to EFIS) more frequently? *B. If yes, when?* *C. And how often?* 1 Every three months 2 Twice a year 3 On an ad hoc basis 4 Other	RIS: RoU: Allocations: Applications:	Comments

Question 6

A. Would (further) assistance from ECO help you update your national data more frequently or make it possible to do so? 1 Yes 2 No ***B.*** *If yes, what kind of assistance?*	**Answer:**

Question 7

The Mandate foresees/mentions update of data every three months (or four times a year). Note: the delay of showing new RIS or RoU is meant to not exceed three months. This question ONLY refers to the existing RoU, i.e. those in the ECS bands and not to the whole range from 400 MHz to 6 000 MHz. *If you are not already updating at this rate, please indicate whether it will be possible for you to do so, taking into account* 1 Cost (in terms of software etc) 2 Manpower needed Please indicate (estimated values) for 1 and 2, if possible Note: It is understood that this question only applies to RIS and RoU since allocation and application information is not updated so frequently.	RIS:	RoU:	Comments:

Question 8

How do you consider update every three months as compared to twice a year Indicate why. *Note: This question ONLY refers to the existing RoU, i.e. those in the ECS bands and not to the whole range from 400 MHz to 6 000 MHz.* 1 Of considerable benefit to users 2 Of some benefit 3 Not sufficiently beneficial to warrant extra cost/manpower Other	Answer

Question 9

Does your national RoU data already cover the whole spectrum range 400 MHz – 6 GHz? 1 Yes 2 No 3 Partly Please describe your national situation when considering the application of the RoU concept currently applied in EFIS for ECS bands to all uses in the whole frequency range 400 MHz to 6 GHz.	Answer:

Question 10

How do you consider the benefits of providing national RoU data covering the whole spectrum range (400 MHz – 6 GHz)? 1 Of considerable benefit to users 2 Of some benefit 3 Not sufficiently beneficial to warrant extra cost/manpower 4 Other	Answer:

Question 11

For which frequency bands and/or services/applications is your national RoU/authorisation data not publicly available? *Please state the reasons why.* *Possible reasons could be that* • *authorisations are not existent or needed for certain services,* • *specific authorisations are not bound to frequencies or specific applications,* • *or the information is not publicly available,* • *or any other constraint/national condition.* *Please describe your national situation when considering the application of the RoU concept currently applied in EFIS for ECS bands to all uses in the whole frequency range 400 MHz to 6 GHz.* *Note: it may be helpful to differentiate amongst the types of use, i.e. services/applications.*	Answer:

Question 12

What are the administrative and technical impacts, if any, that the proposal to provide all rights of use between 400 MHz – 6 GHz would cause your Administration? 1 Additional cost (in terms of software etc) 2 Additional manpower needed 3 Other – e.g. requirement to change national legislation or licence terms, conditions or restrictions on publication of information, organisational/split of responsibility aspects Please indicate (estimated values) for 1, 2 and 3, if possible.	Answer:

Question 13

Please indicate also other ideas/ways to ensure that the relevant information is available in EFIS, taking into account the data needed relevant to Article 9 par.2 of the RSPP on spectrum inventory, and also drawing from experience. *Note: It may in this context also be relevant to differentiate between RoU for ECS and other types of use.*	Answer:

Question 14

What are the administrative and technical impacts, if any, should additional information be required to provide in EFIS for RoU about • *the geographical extent of RoU (e.g. precise definition of regional or local RoU geographical area/extent),* • *the technology deployed* *Please indicate if national conditions/restrictions apply with regard to making geographical information available in EFIS.* 1 Additional cost (in terms of software etc) 2 Additional manpower needed 3 Other – e.g. requirement to change national legislation or licence terms, conditions or restrictions on publication of information, organisational/split of responsibility aspects Please indicate (estimated values) for 1, 2 and 3, if possible.	Answer:

ANNEX 5: ELECTRONIC QUESTIONNAIRES TO COLLECT SPECTRUM INVENTORY RELEVANT INFORMATION

A further feature is going to be implemented in EFIS to collect information in a different form from the present, namely via documents. Documents (actual documents or links to a website) are currently the standard way of presenting information. Concerning frequency bands under study, it should also be possible to create “online questionnaires”, i.e. to create input masks which can be filled in by respondents. The information can then be transposed to a defined report format. Examples of report formats are ERC Report 25 [15] or ECO Report 03 [7]. The difference when using online questionnaires is that the available information will then already be present in EFIS as metadata (meta content) within pre-defined data fields, i.e. in data sets.

This development is proposed to be developed by the EFIS/MG. ECO Report 03 [7] is a good example because RoU information for the ECS frequency bands is already in EFIS. In addition, the full ECA Table is also in EFIS after the merger of ECA into EFIS. The concept also holds promises to provide a more effective way of creating reports on certain subjects than is the case with purely manual handling of data (or export by csv format). From the example of ECO Report 03 [7], one can see that it must be possible to indicate that frequency bands are paired in duplex arrangements. This feature has recently been added in the RoU section of the EFIS database. Information in response to questionnaires may come from administrations, but in some cases (e.g. for licence-exempt bands) also from industry, trade associations and users (also called third parties, e.g. CRAF, EBU, UIC, EUMETSAT, ETSI, ESOA/satellite operators). Administrations can upload their information directly by themselves, whereas ECO will upload information from other, external sources. This means that there is an element of control to avoid inappropriate data being uploaded to the EFIS database.

It is possible to filter the data, e.g. limit extraction of data to EC Member States only. It is also possible to handle both individual responses and the summary of the data collection process.

In general, the process of extracting data from EFIS and delivering it to the EC should typically be a task performed by ECO. It is also possible to directly export the data in xml format.

1. Regarding the presentation of answers in EFIS, the structure is using the existing categories in the spectrum inventory section in EFIS:
2. National (i.e. administrations)
3. Third party (i.e. any other organisation or entity, e.g. industry)
4. ECC/ECO (the ECO summary or the summary with the assessments of the responsible ECC group will be presented under this category).

The data can also be updated whenever needed. (e.g. FS data as in ECC Report 173 [14] on an annual basis). It is also possible to provide an answer after the questionnaire deadline or to change the deadline and give an extension.

It would be desirable to have the possibility to, ready for the import to EFIS. If a ready tool provides different formats (e.g. Excel), we may consider this for the EFIS import tool, although this option is seen as unlikely). The easiest way is to have also the possibility to directly save answers in other databases such as EFIS for EFIS relevant questionnaires.

Online questionnaires can be created or existing questionnaires changed. Also, answers can be published easily from the questionnaire tool including:

1. Simple report generation (from EFIS DB)
2. Extraction of the results for plotting.

Security:

No special needs apart from SPAM protection. Respondents are logged in. There have been no problems in CEPT throughout the years with the authentication of respondents to questionnaires.

The questionnaire tool in EFIS will also provide first initial analysis support (e.g. counting answers or numeric answers), create tables of text answers, pie charts and other charts.

ANNEX 6: RSPG OPINION ON REVIEW OF SPECTRUM USE

Excerpt from the RSPG opinion (to see the whole RSPG opinion click here)

The RSPG considers that:

1. *a spectrum review should contain sufficient information to allow conclusions about future availability of spectrum to be drawn. Furthermore, information on supply of spectrum should be collected in a format consistent with EFIS to facilitate analysis and to limit the burden for the entities involved;*
2. *key sources of information are currently national databases and national entities managing spectrum. A more developed version of EFIS could become a key source depending on its future capability to illustrate actual availability and resources and capabilities of Member States to provide such information. Studies contracted by the European Commission could also be a key contribution and help to spread the administrative burden;*
3. *a common format needs to be agreed at EU level on the amount and detail of information to be provided by the Member States in order to provide accurate and exploitable information at EU level;*
4. *a mechanism for treating confidential and/or sensitive information should be employed in accordance with national rules to ensure that such requirements are taken into account;*
5. *trends in development of technology and applications impacting on spectrum use should be assessed;*
6. *in order to carry out an effective review, trends in technology, applications and the associated spectrum demands should be classified into short-, medium- and long-term;*
7. *assessing the most efficient use of spectrum is a complex task involving not just the relative technical efficiency of applications but also other factors including functional, social value and economic efficiency;*
8. *proposed changes to spectrum use or sharing methods on spectrum use should take into account the economic and social value of each scenario at national and EU level as well as any refarming costs. In the latter case questions of timing for refarming and national financing issues should be considered; and*
9. *in reviewing the use of the radio spectrum, full account must be taken of the international radio regulatory regime pertaining to the frequency bands in question, including proposals for and outcomes from international or regional radio regulatory conferences.*

The RSPG notes that:

1. *the Member States already possess within their national databases and other sources information required to assess spectrum supply;*
2. *information from national databases is uploaded twice yearly to the EFIS database;*
3. *although the EFIS database can be considered as a starting point from which to*
4. *undertake a spectrum review, as it already contains valuable information in a relevant format, the level and the nature of information within EFIS should be improved; and*
5. *quantifying the supply of spectrum imposes a significant burden on Member States.*

The RSPG recommends that:

1. *as noted above, measures be undertaken to continue the development of the EFIS database resource supported by the appropriate regulatory framework (RSPP and EC Decision 676/2002) with the aim of providing comprehensive information on spectrum usage rights;*
2. *Member States should use the full range of terminology available in EFIS appropriate to the level of confidentiality;*
3. *access and use of confidential information should be treated at the national level under the national rules of each country, and those who are authorised to deal with such confidential information should only provide to the Commission either data which does not include confidential information or aggregated data using generic wording which does not include information of a confidential nature, as is currently done within EFIS;*

ANNEX 7: LIST OF REFERENCES

[1] Commission Decision 2007/344/EC on harmonised availability of information regarding spectrum use within the Community

[2] Decision 676/2002/EC of the European Parliament and of the Council of 7 March 2002 on a regulatory framework for radio spectrum policy in the European Community(Radio Spectrum Decision) (Radio Spectrum Decision)

[3] Commission Decision No 243/2012/EU of the European Parliament and of the Council of 14 March 2012 establishing a multi-annual radio spectrum policy programme (RSPP)

[4] ECC Report 180 on Guidance on the interpretation of the requirements of ECC/DEC/(01)03 on EFIS

[5] R&TTE Directive 1999/5/EC on radio equipment and telecommunications terminal equipment and the mutual recognition of their conformity

[6] TCAM and RSCOM (ECC(08)38): Radio Interface Specification Model

[7] ECO Report 03: The licensing of 'Mobile bands' in CEPT

[8] Directive 2002/21/EC of the European Parliament and of the Council on a common regulatory framework for electronic communications networks and services

[9] Directive 2002/20/EC of the European Parliament and of the Council on theauthorisation of electronic communications networks and services

[10] Directive 95/46/EC of the European Parliament and of the Council of 24 October 1995 on the protection of individuals with regard to the processing of personal data and on the free movement of such data

[11] Directive 2002/58/EC of the European Parliament and of the Council of 12 July 2002 concerning the processing of personal data and the protection of privacy in the electronic communications sector (Directive on privacy and electronic communications)

[12] ECC Report 182 on survey about the use of the frequency band 863-870 MHz

[13] ETSI EG 201 788: Guidance for drafting an System Reference Document

[14] ECC Report 173 on Fixed Service in Europe; current use and future trends

[15] ECC Decision (01)03: ERO Frequency Information System (EFIS)

[16] FCC Spectrum Dashboard: http://reboot.fcc.gov/reform/systems/spectrum-dashboard

[17] CRAF Handbook for Radio Astronomy, latest edition available under www.craf.eu

[18] ECC Report 188 on future harmonised use of 1452-1492 MHz in CEPT

[19] Directive 98/34/EC of the European Parliament and the Council of 22 June 1998 laying down a procedure for the provision of information in the field of technical standards and regulations and of rules on Information Society services

[20] ECC Report 172 on Broadband Wireless Systems Usage in 2300-2400 MHz

[21] ERC Recommendation 25-10 on frequency ranges for the use of temporary terrestrial audio and video SAP/SAB links (incl. ENG/OB)

[22] ERC Recommendation 62-02 on harmonised frequency band for Civil and Military Airborne Telemetry applications

[23] ERC Report 25: European Common Allocation Table

[24] ECC Recommendation (06)04 on the harmonised conditions for devices using Ultra-Wideband (UWB) technology in bands below 10.6 GHz

[25] ERC Recommendation 70-03 on the use of Short Range Devices

[26] ECC Decision (06)08 on the conditions for use of the radio spectrum by Ground- and Wall- Probing Radar (GPR/WPR) imaging systems