



# ECC Decision (05)09

The Free Circulation and Use of Earth Stations on Board Vessels operating in Fixed Satellite Service Networks in the Frequency Bands 5925-6425 MHz (Earth-to-space) and 3700-4200 MHz (space-to-Earth)

**Approved 24 June 2005**

**Amended 03 March 2017**

## EXPLANATORY MEMORANDUM

### 1 BACKGROUND

For many years, satellite communications for ships was limited to services provided by systems operating in the 1.5/1.6 GHz band. In the last decade however, operators have installed terminals on ships which operate in the fixed satellite service bands at 4/6 GHz, and at 11/12/14 GHz. These terminals are based on the design of conventional VSAT networks, but make use of highly accurate stabilised platforms to maintain the necessary antenna tracking of the GSO space station, even while the vessel is in motion. Within the ITU, such terminals are known as Earth Stations on board Vessels (ESVs).

ESVs are often the only solution for users who require high communications bandwidth which cannot be met by the other maritime systems, and can be the most cost effective solution for users who require a modest bandwidth but "always on" capability.

Example applications are:

- Large data transfer requirements for scientific research ships;
- Passenger telephone and internet service for ferries and cruise ships;
- Extension of the corporate LAN to the ship's bridge.

The 4/6 GHz FSS satellites provide "global" beam coverage and are therefore used by ESVs on vessels on long-distance ocean crossing routes. For other users, the area of operation can be limited to smaller regions (e.g. within the North Sea or Mediterranean) and hence use can be made of the "regional" beams typical of 11/14 GHz FSS networks.

A number of ITU-R Recommendations have been developed:

- S.1587 - Provisional technical characteristics of earth stations on board vessels operating in the frequency bands 5925-6425 MHz and 14-14.5 GHz which are allocated to the fixed-satellite service;
- SF.1585 - Example approach for determination of the composite area within which interference to fixed service stations from earth stations on board vessels when operating in motion near a coastline would need to be evaluated;
- SF.1648 - Use of frequencies by earth stations on board vessels transmitting in certain bands allocated to the fixed-satellite service;
- SF.1649 - Guidance for determination of interference from earth stations on vessels (ESVs) to stations in the fixed service when the ESV is within the minimum distance;
- SF.1650 - The minimum distance from the coastline beyond which in-motion earth stations located on board vessels would not cause unacceptable interference to the fixed service in the bands 5925-6425 MHz and 14-14.5 GHz.

At WRC-03, provisions relating to ESVs were agreed in Resolution 902 (WRC-03) and Recommendation 37 (WRC-03). The Resolution defines distances from the low-water mark as officially recognised by the coastal State within which permission from potentially affected administrations must be obtained. WRC-15 has modified ITU RR No. 5.457A allowing deployment of transmit antennas with minimum diameter of 1.2 m to operate in the band 5925-6425 MHz without prior agreement of any administration if located at least 330 km away from the low-water mark as officially recognised by the coastal State.

Although the regulatory provisions are a positive step towards the recognition and operation of ESVs, they give little guidance as to how administrations should handle ESV operations within the minimum distances from the low-water mark as officially recognised by the coastal State, and do not specifically address the licensing of ESVs.

## **2 REQUIREMENT FOR AN ECC DECISION**

### **2.1 Geographic Restrictions**

Some portions of the bands used by ESVs are also allocated to terrestrial services. The minimum distances from the low-water mark as officially recognised by the coastal State which have been agreed within the ITU (330 km/300 km depending on the minimum antenna diameter, at 6 GHz and 125 km for 14 GHz) are based on the protection of fixed service systems. Under the Radio Regulations, transmissions from ESVs within these distances shall be subject to the prior agreement of the relevant administrations where the bands are allocated to the fixed or mobile services.

Most ESVs may need, at times, to operate closer than the minimum distances from the low-water mark as officially recognised by the coastal State. The use of the 6 GHz band and parts of the 14 GHz band by the FS within Europe means that prior agreement could be required from several administrations, depending on the intended route of the ESV and frequency of operation. The ITU-R has developed Recommendations which could be used to perform the necessary interference analysis and determine acceptable/prohibited areas of operation. The mobile nature of the ESVs means that the process is more complex than traditional coordination between terrestrial services and permanent fixed earth stations. On the other hand, once an area of sea has been successfully cleared for ESV operation, it may be usable for any ESVs with similar technical characteristics.

It is unlikely that administrations will want to entertain requests for agreement from numerous ESVs or ESV service providers, and for each trip made by an individual ESV within the minimum distance of that administration. Hence it appears beneficial to all concerned to define the necessary geographic restrictions in a harmonised manner that can be applied generally by administrations and the ESV industry in Europe.

### **2.2 Licensing Issues**

There may be a few cases where an ESV operates entirely within the territorial waters of a single administration, but in general, an ESV will travel between the ports of more than one country. Thus time will be spent within the territorial waters of several different administrations and within international waters. This situation could introduce a number of uncertainties and difficulties to the licensing process. A lack of harmonised rules and conditions applied by administrations would mean that it would be impractical for an ESV to be licensed for operation within all the territorial waters on its route. This may be contrasted with the situation for other radio equipment on a ship, which is generally licensed by a single administration, but the licence is recognised by other administrations.

Due to the international nature of ESV operations, a harmonised approach would benefit ESV users, service providers and administrations.

### **2.3 Summary of Requirements**

As a consequence of the geographical and licensing issues regarding the operation of ESVs, there is a need for an ECC Decision to allow for harmonised operation of ESV in the frequency bands 4/6 GHz.

ESV operation in the 11/12/14 GHz bands is covered by a separate Decision.

## **3 ECC APPROACH TO AUTHORISATION OF ESV OPERATIONS**

The ECC has developed a process of authorisation which takes into account the requirements of both CEPT administrations and ESV operators, and the international obligations defined in the ITU Radio Regulations. The process is put into place through this Decision.

With regard to the geographic areas within which restrictions may apply to ESVs, it is necessary to make the information available to all ESV operators. Administrations should make available the information which defines the restricted or excluded areas to The Office. This information is then made available to ESV operators through the facilities of the Office web site. ESV operators which operate within the scope of this Decision are required to comply with the restrictions defined by the administrations and provided to the

Office. ESV operators are required to register their networks with the Office and to provide certain technical and operational information about their networks.

In return for complying with the requirements of this Decision, ESVs are granted free circulation and use, and ESV operators are exempted from the requirement to obtain licences from CEPT administrations. However, most CEPT administrations license radio equipment on board ships which are registered in their country and some may also require ESVs which are installed on ships registered in their country to be licensed. This Decision retains the right of administrations to require individual ESV terminals to be licensed or exempted from individual licensing.

**ECC DECISION OF 24 JUNE 2005 ON THE FREE CIRCULATION AND USE OF EARTH STATIONS ON BOARD VESSELS OPERATING IN FIXED SATELLITE SERVICE NETWORKS IN THE FREQUENCY BANDS 5925-6425 MHz (EARTH-TO-SPACE) AND 3700-4200 MHz (SPACE-TO-EARTH) (ECC/DEC/(05)09) AMENDED 03 MARCH 2017**

“The European Conference of Postal and Telecommunications Administrations,

*considering*

- a) that the band 5925-6425 MHz is allocated to the Fixed Satellite Service (FSS) (Earth-to-space) on a primary basis in the ITU Radio Regulations (ITU RR);
- b) that, by the provisions of ITU RR No. 5.457A Earth Stations on board Vessels (ESV) may communicate with space stations of the FSS in the band 5925-6425 MHz;
- c) that the band 5925-6425 MHz is allocated to the Fixed Service (FS) on a primary basis in the ITU RR;
- d) that Resolution 902 (WRC-03) provides the provisions relating to ESVs which operate in FSS networks in the band 5925-6425 MHz;
- e) that ESV terminals may be licensed or exempted from individual licensing by the country in which the vessel is registered;
- f) that Recommendation 37 (WRC-03) states that concerned administrations (as identified in Clause 5, Annex 1 Res. 902 (WRC-03)) are encouraged to cooperate with administrations which license ESVs;
- g) that, for the purpose of resolving potential interference issues with terrestrial services in the band 5925-6425 MHz, some CEPT administrations may require that operators of ESVs operating in this band obtain frequency authorisation due to specific national requirements, while other CEPT administrations may require some form of notification from the ESV operator, or exempt the ESV network operator from either of these requirements;
- h) that ESV operations in the band 5925-6425 MHz within the territorial sea and internal waters, as defined in the United Nations Convention on the Law of the Sea (UNCLOS 1982), or close to national off-shore installations and structures shall remain subject to regulations issued by national authorities;
- i) that administrations may request from ESV operators details regarding the vessels equipped with ESV terminals under this Decision;
- j) that this Decision shall not impede European Economic Area (EEA) member countries from fulfilling their obligations according to Community law.

***DECIDES***

1. to designate the frequency bands 5925-6425 MHz (Earth-to-space) and 3700-4200 MHz (space-to-Earth), for the use, inter alia, of ESVs operating in the FSS;
2. that those ESVs referred to in Decides 1 shall comply with footnote ITU RR No. 5.457A (WRC-15) and Resolution 902 (WRC-03);
3. that this Decision applies only to ESVs covered by the Decides above and fulfilling the following conditions:
  - a) complying with the relevant European Telecommunication Standard which may be demonstrated by compliance with equivalent technical specifications (in the sense of art. 3(2) of the RE Directive);
  - b) operating under the control of a network control facility;

- c) operating under a satellite network where the ESV network operator or other organisation with control over ESV transmissions has notified the Office that those ESVs operating within their system or under their control comply with all the requirements of this Decision, including any conditions notified to the Office by administrations under Decides 5) and 6), and has provided the required contact and technical information;
4. that CEPT administrations shall: allow free circulation and use of ESVs, subject to the provisions of this Decision;
5. that with regard to ESV operations in the band 5925-6425 MHz, within the minimal distance of 300 km (antenna diameter  $\geq 2.4$  m) or 330 km ( $1.2 \text{ m} \leq$  antenna diameter  $< 2.4$  m) from the low-water mark as officially recognised by the coastal State or within the territorial seas or internal waters, the concerned administrations shall inform the Office, as specified in the ANNEX 1:, about any limitations (or changes to these), such as the areas where constraints are imposed, including areas where ESV operation is permitted or not permitted;
6. that CEPT administrations shall notify to the Office their requirements related to *considerings* e), g) and h) above, if any, using the procedure in ANNEX 2:;
7. that, as a consequence of Decides 3c) and 6), and without prejudice to *considering* e) and g), other than the notification (ANNEX 3:) from ESV operators, CEPT administrations shall not require ESV network operators to obtain additional authorisations for the operation of their ESVs;
8. that this Decision **enters into force** on 03 March 2017;
9. that the preferred **date for implementation** of this Decision shall be 03 September 2017;
10. that CEPT administrations shall communicate the **national measures** implementing this Decision to the ECC Chairman and the Office when this ECC Decision is nationally implemented.”

*Note:*

Please check the Office documentation database <http://www.ecodocdb.dk> for the up to date position on the implementation of this and other ECC Decisions.

## ANNEX 1: PARAMETERS TO BE SUBMITTED BY CONCERNED ADMINISTRATIONS UNDER DECIDES 5

A concerned Administration, as defined in considering f), permitting or limiting ESV emission within the 300 km/330 km (depending on the minimum antenna diameter) distance from the coast or within the territorial seas or internal waters in the band 5925-6425 MHz, shall submit to the Office the following information. Options which concerned administrations could consider when determining information requested in Table 1: to Table 5: are listed below in this Annex.

The latest version of the [ECC Report 069](#) on ESV Contours provides guidance on the formats in which administrations should present this information. The data files containing the values of the parameters shall be text files (.txt). Other documents shall be text files, rich text files (.rtf), Word files (.doc) or Portable Document Format file (.pdf).

**Table 1: Administration details**

Administration
Administration address
Contact name
Contact telephone number
Contact e-mail address

The following are example tables of the list of contours and the associated table of conditions and contour definitions.

**Table 2: List of contours**

	Version Number	Distance(s) from coast (km) or contour <sup>1</sup> , or reference to a location	Table of conditions	Date of publication by the administration	Date of entry into force	Notes
Contour number (e.g. No.1)	...	xyz	Reference to a particular table of conditions	...	...	Free text field. Possibly a link to administration's website
...	...	...	...	...	...	...

**Table 3: Table of conditions**

Contour designator	List of Parameters <sup>2</sup>	Parameters Value	Parameters Units	Notes
Contour number (e.g. No.1)	Parameter 1 Parameter 2 Parameter N	xyz ... ...	... ... ...	Free text field. Possibly a link to administration's website
...	...	...	...	...

<sup>1</sup> See example of contour in Table 4.

<sup>2</sup> See list of possible contour parameters in Table 5.

**Table 4: Example of UK contour definition**

Longitude	Latitude
1.00000	48.00000
0.99833	47.99306
0.99722	47.98583
0.99694	47.97861
0.99722	47.97139
0.99806	47.96444
...	...

Concerned administrations may file as many contours as they wish.

The contour parameter list is limited to the following parameters:

**Table 5: List of possible contour parameters**

Frequency range, see note below:
Maximum ESV e.i.r.p. spectral density (per MHz) toward the horizon, possibly azimuth and distance dependent
Maximum ESV e.i.r.p. towards the horizon, possibly azimuth and distance dependent
Maximum ESV e.i.r.p. per vessel
Maximum off-axis e.i.r.p. density limitations, possibly azimuth and distance dependent
Any antenna pointing restrictions
Operational management procedures

**Note:** In each contour, administrations may require that either the occupied bandwidth or the nominated bandwidth as defined in the applicable EN do not overlap the frequency bands within which the ESV are not authorised to transmit. This nominated bandwidth is the nominated bandwidth of the ESV declared for compliance with the applicable EN.

**Procedures for reporting parameter values:**

1. Frequency range (lower frequency limit and upper frequency limit) and the value should be reported in MHz;
2. e.i.r.p. values should be reported in dBW with an accuracy of one decimal place;
3. Distances should be reported in nautical miles or kilometres with a clear indication of the unit used;
4. Longitude and latitude should be given in decimal degrees or grades (gr), preferably in degrees, within the WGS84 coordinate system.



**A1.1 OPTIONS WHICH CONCERNED ADMINISTRATIONS COULD CONSIDER WHEN DETERMINING INFORMATION REQUESTED IN TABLES 2, 3, 4 AND 5 OF ANNEX 1:**

- They may consider the risk of ESV interference to be sufficiently small such that ESVs can operate without geographic constraints;
- They may consider it appropriate to apply a single distance from the low-water mark as officially recognised by the coastal State, but with a distance smaller than 300 km. The distance could be different for different segments of the band;
- They may be willing to allow ESVs to transmit when closer to their shores than 300 km by a distance commensurate with either (a) an offered reduction in maximum e.i.r.p. or e.i.r.p. density in the horizontal plane to maintain the interference pfd at the coast, (b) an accepted increase in the interference pfd at the coast, or (c) an agreed combination of (a) and (b).
- They may be prepared to coordinate ESVs for operation within the minimum distance. This could, for example, be limited to specific ports or for a limited range of frequencies. The ITU-R Recommendations SF.1585 and SF.1649 provide guidance in this regard;
- They may treat the 300 km distance from the low-water mark as officially recognised by the coastal State as an exclusion zone and prohibit ESV operation within this zone in the band 5925-6425 MHz.
- This information may be frequency specific. It is noted that the following frequency ranges are guardbands in a majority of fixed-service channelling arrangements: 5925-5930 MHz, 6167.6-6182.4 MHz and 6420-6425 MHz.

## **ANNEX 2: NOTIFICATION TO BE SUBMITTED BY ADMINISTRATIONS UNDER DECIDES 6**

Under Decides 6 and due to considerations e), g) and h) national administrations may submit the following notification.

1. Statement if the ESV equipment is exempt or not from individual licensing when installed on board ships registered in their country;
2. If the case is that a “radio station license” is required, a statement shall be submitted on what are the requirements needed for ESV equipment to be installed on board a ship registered in their country. Also, the Administration shall provide details on point of contact (name, address, telephone number, fax, e-mail) where application for ESV forms can be retrieved;
3. Statement if the ESV equipment installed on board ships registered in a foreign country (CEPT or non-CEPT), which may land at their national ports, should require to have a “radio station license” or not; Statement on national regulations for ESVs in the band 5925-6425 MHz when navigating in national and internal waters<sup>3</sup>, or near national off-shore platforms, or when at ports;
4. Statement on other national requirement for frequency authorisation for ESV operators for the purpose of resolving potential interference issues to terrestrial services in the band 5925-6425 MHz.

The latest version of the [ECC Report 69](#) on ESV Contours provides guidance on the format in which administrations should present this information. Documents shall be text files, rich text files (.rtf), Word files (.doc) or Portable Document Format file (.pdf).

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<sup>3</sup> [ECC Report 66](#) is considering the protection of aircraft from satellite earth stations operating on the ground in the vicinity of airfields

### ANNEX 3: PARAMETERS THAT NEED TO BE SUBMITTED BY ESV NETWORK OPERATORS

An ESV network operator is required to submit to the Office the following parameters together with a declaration that their systems comply with the requirements of the Decision including any restrictions notified to the Office by CEPT administrations under Decides 5 and 6 of this Decision.

**Table 6: Network operator details**

Network operator name	
Network operator address	
Contact name	
Contact telephone number	
Contact e-mail address	
Network Control Facility (NCF) designated point of contact	
NCF Contact name	
NCF Contact telephone number	
NCF Contact e-mail address	

#### 1. Technical Specification(s) of ESV type(s) used in the network

ESV Antenna  
 Antenna type  
 Antenna size  
 Transmit frequency bands  
 Transmit peak gain  
 Max e.i.r.p. per carrier  
 Min. operating elevation  
 Pointing accuracy

##### Waveform definition

Number(s) of carriers per ESV  
 Maximum occupied bandwidth(s) per carrier  
 Modulation  
 Multiple access scheme.

#### 2. Operating details of each satellite

ITU Filing satellite name  
 Satellite operator name  
 GEO longitude  
 Satellite service area (text description and/or a figure of the area)

##### Forward Channel details (Satellite to ESV)

Transponder downlink centre frequency  
 Transponder downlink bandwidth

##### Return Channel details (ESV to satellite)

Transponder uplink centre frequency  
 Transponder uplink bandwidth

#### **ANNEX 4: THE OFFICE WEBSITE**

The Office will make publicly available information submitted by administrations on its website.

It shall be possible for an ESV network operator to collect the relevant information from the Office website including the latest information and to identify any modification since the latest access.

A simple method (e.g. automatic email) needs to be established in order for the ESV network operators to be informed by the Office of any changes in the requirements that are imposed by the administrations.

From time to time, an Administration may need to update the conditions notified using ANNEX 1: and ANNEX 2:. If the requirements are non-safety related, the ESV network operator or other organisation with control over ESV transmissions will need sufficient time to comply with new conditions. In general, such changes or new conditions should be implemented within a time period of 90 days for change of data, and 180 days for change of software.

In cases of safety related issues the ESV network operators might be required to implement the changes in a shorter time period.

The information provided by the network operators shall be accessible only by all CEPT administrations, apart from network operator contact information, which is publicly available. Other parts of this information may be kept confidential insofar as other ESV network operators are concerned (i.e. multiple layers of passwords may be required).

## ANNEX 5: LIST OF REFERENCE

This annex contains the list of relevant reference documents.

- [1] Resolution 902 (WRC-03) Provisions relating to earth stations located on board vessels which operate in fixed-satellite service networks in the uplink bands 5 925-6 425 MHz and 14-14.5 GHz;
- [2] Recommendation 37 (WRC-03) Operational procedures for earth stations on board vessels (ESVs) use;
- [3] ECC Report 066 'Protection of aircraft avionics from VSATs';
- [4] ECC Report 069 'Operation of Earth stations aboard vessels within the separation distances identified in ITU RR Resolution 902'.