

TODAY'S SITUATION & ONGOING TRENDS IN THE FIXED-SATELLITE SERVICE (FSS) GLOBAL MARKET ESOA PICTURE

The ITU Radio Regulations defines the fixed-satellite service as a radiocommunication service between sites located on the surface of the Earth when one or more satellites are used. The stations located in these sites are called earth stations of the FSS. A given site can be a specified fixed point or any fixed point located in specified areas.

Fixed-satellite service (FSS) systems constitute suitable solutions to provide electronic services of communications in an alternative way to terrestrial technologies.

Thus, fixed-satellite service systems are used to provide electronic services of communications, such as telephone service or data transmission services (e.g. VSAT, Very Small Aperture Terminal, for business communications) or broadband Internet access services – together with Standard or High Definition TV broadcasting.

1. **All sorts of different applications are made available by the FSS in the world**, one-way or two-way, streaming or unicast, TV or Internet-like, whether for communications to the general public or corporate / closed networks, as reflected by the variety of members within ESOA. The most important markets are Direct-To-Home (DTH) one-way services, feeder links to cable networks for IP services and the transfer of video / audio files in two-way.
2. Consequently, there are different FSS markets for different applications, depending on the operator that is considered and the spectrum band that is used.
3. **These different services are not substitutable to each other** and fit into markets that are distinct.
4. In terms of spectrum / applications, satellite operators undertake FSS uplinks and downlinks all over the world in the following frequency bands:
 - **C-band 3,400 – 4,200 MHz**
 - i. Fixed-satellite service operators use these frequencies to serve customers requiring a high degree of reliability. Among other things, these customers use these frequency bands for program distribution to cable head-ends and radio/TV broadcast stations, broadband communications, commercial weather data distribution to airlines and pilots, and position location and status for trucking fleets.
 - ii. **Worldwide, there are currently more than 160 geostationary satellites operating globally in this frequency band**, considering the Geostationary arc. Nearly two out of three commercial satellites under construction will use the FSS allocation in this part of the spectrum. In addition, there are many satellites operating in other frequency bands but having their telemetry operations (Telemetry, Tracking and Ranging) in 3,400-4,200 MHz.

iii. **All around the world, there is a large number of earth stations** (many thousands) including VSAT networks, used for domestic and international telephony and other applications such as internet/broadband, TV and data broadcasting, satellite news gathering etc.

Military, government and maritime users are the primary customers in C band and constitute a major part of future developments in this band, but often they do not make available the locations of their earth stations.

iv. Amongst C-band earth stations that are operated around the world, based on information available to our respective members and registered towards national administrations (e.g. licenses), **hundreds of thousands of C-band earth station locations can be identified.**

There are **many other earth stations** for which the locations are not known to ESOA or SAP REG members. Receive only earth stations in the band 3.4-4.2 GHz are in use, and in many countries they are exempted from licensing (e.g. in Europe in accordance with CEPT texts¹). Hence their locations will be unavailable.

v. The SES Group itself, as the biggest satellite operator based in Europe, currently has **27 satellites utilising C-band, including 4 over Europe only**, to provide connectivity to/from continents as well as intra-continental services.

Most operations use the band 3,600-4,200 MHz (and the corresponding uplink), which is the most important part of this spectrum for satellite operators.

vi. In Europe, the band 3,400-3,600 MHz is used on-board existing spacecrafts and will be on other future European spacecrafts. Specific traffic planning in this sub-band would have to be implemented to co-exist with foreseen BWA applications, which would seriously limit the flexibility of using the payloads.

vii. The band 3,500-3,700 MHz is also used for feederlinks to MSS systems, including **UK based Inmarsat Ltd.** There has been steady increase in the demand for MSS services for many years. In the case of the MSS service links, increasing demand is partly met by better re-use of the same frequencies. In the case of the C-band MSS feeder links however, increasing demand can only be met by the use of larger frequency bandwidths. Hence there is a constant increase in demand for FSS spectrum for MSS feederlinks.

viii. Consequently, because of the inter-regional coverage aspects of satellites in C-band, **any position to promote the use of these bands for mobile terrestrial services would seriously endanger all of the satellite operations and services in any region of the world.**

Notably, any increase in the level of interference can potentially jeopardize these services. Extensive amount of capital investments has been made in both space segment and installed earth station bases in both urban and rural settings.

¹ [Decision ERC/DEC\(99\)26 of 29 November 1999](#)

- **Ku-band**

Ku-band is also extensively used in all various regions more specifically to provide the following services usually associated with broadcasting services:

- i. Radio and television via satellite. Hundreds of million households are receiving radio and television via satellite in Ku frequencies, either through direct or collective reception.
- ii. Feeder links to cable and TV over DSL head-ends. Thousands of cable and DSL-TV head-ends rely on satellite transmissions.
- iii. Satellite News Gathering and Occasional Use. Satellite is used by television organisations and news agencies to provide instant access to news events.
- iv. Contribution and distribution. Broadcasters and news programmers use contribution links for segments of news, sports and entertainment for finished program integration.

Ku is also used in some regions to provide two-way broadband connectivity to businesses and the general public, as well as for one-way data distribution or two-way audio-video applications.

- **Ka-band**

This band is increasingly used for broadband and other services, **particularly in North America** where approximately one hundred transponders are already today in operation, notably for Internet services and HDTV; and even more capacity will be made available with the next spacecraft launches.

This trend is likely to take place also in Europe, and **several operators have satellites in orbit and under construction with Ka-band payloads** (e.g. the SES Group) - together with current usage in uplinks for communications towards outside Europe. It is notably to be noted that UK-based Avanti Communications Ltd. is planning a Ka-band Hylas satellite being built by ESA/EADS to cover European wide services.

As a conclusion, all sorts of different applications are made available by satellite in Europe in different FSS spectrum bands for different services that are not substitutable to each other. More than 160 geostationary satellites operate globally in C-band; Ku-band is extensively used in various regions of the world for all sorts of services; and Ka-band is under development with already 20 satellites having capacity in these frequencies today in operation worldwide.