

## Commission Decision 2008/411/EC

# Impact on Fixed-Satellite Services (FSS) & Proposals for Change

Presented on behalf of ESOA, SAP REG, GVF  
and the ESA SMAG

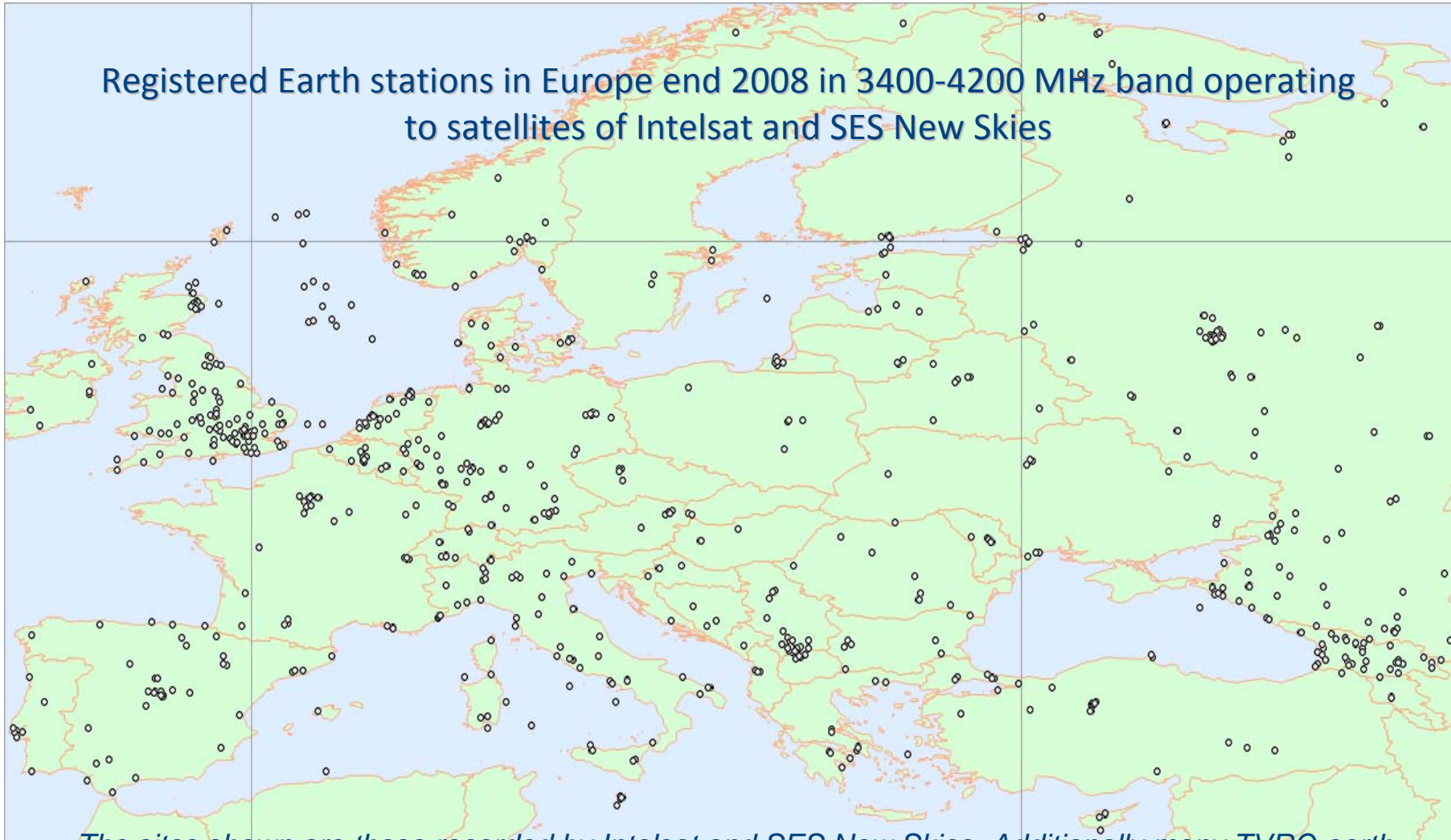
## Satellite use of 3400-4200 MHz band in Europe

- Use has grown steadily for four decades
- Today satellites operating in the band > 160, 25 of which cover Europe
- > €4.5 billion spent to date on provision of C-band satellite services to Europe. €1 billion invested in Europe in the 3400-3800 MHz band alone
- C-band is to be used for Galileo, including in 3600-3800 MHz
- In addition to links for public and private telecoms services and TV distribution (e.g. Eurovision), C-band satellites support critical applications such as disaster relief, B2B, and is used for intercontinental links and for links within Europe
- Main operators currently: Intelsat, SES New Skies, Inmarsat

## Growth in C-band earth stations in Europe

- 13% growth per year in C-band earth station terminals registered in Europe between mid-2006 and end-2008
- Based on the Intelsat and SES New Skies satellite capacity in Europe, the breakdown of usage by European earth stations can be approximated as:
  - 2% operating in the band 3400-3600 MHz
  - 26% operating in the band 3600-3800 MHz
  - 36% operating in the band 3800-4000 MHz
  - 36% operating in the band 4000-4200 MHz
- Saturation in the higher frequency parts of C-band implies increased demand & faster growth in 3400-3800 MHz
- Today, the number of registered C-band terminals in Europe is > 1400
- In addition *receive-only* terminals are often license-free and unregistered, so their number & locations are not recorded
- A number of transponders in each of 18 Intelsat and 4 SES New Skies satellites include several direct-to-home TV carriers in a C-band down-link beam covering Europe: likely to be received by numerous TVRO earth stations

Registered Earth stations in Europe end 2008 in 3400-4200 MHz band operating to satellites of Intelsat and SES New Skies



*The sites shown are those recorded by Intelsat and SES New Skies. Additionally many TVRO earth stations exist but are unrecorded and thus unable to be shown here. Furthermore the map does not show earth stations served in this band by other satellite operators.*

## Planned launches of satellites with C-band capacity covering Europe

- Eutelsat W2A in 2009 - 10 transponders in 3625-4200 MHz band
- SES New Skies NSS-12 in 2009 - 40 transponders in 3625-4200 MHz band
- SES New Skies NSS-14 in 2010 - 52 transponders in 3625-4200 MHz band
- SIRIUS 5 in 2011 - 24 transponders in 3650-4200 MHz band
- ALPHASAT (ESA & Inmarsat) in 2011 - 6 transponders (equivalent) in 3550-3700 MHz band

## New Measurement Studies I: Recent Long-Duration Measurement studies

- Long-duration measurements being conducted over a 12 month period on an example path between Amsterdam and Burum in the Netherlands, to assess the effect of short-term anomalous propagation conditions
- First 4 months: some anomalous propagation events have occurred during which a BWA base station in Amsterdam would cause harmful interference to an earth station in Burum
- Also, on the 137 km path short instances of propagation conditions were experienced in which BWA interference would be high enough to degrade the reception of an FSS carrier to below the availability threshold

## New Measurement Studies II: Recent short-duration measurements assessing steady-state interference under clear-air conditions

(A)

- Measurements conducted on interference from a vehicle-borne BWA base station simulator to an earth station with a 7m antenna at Leeheim in Germany receiving several types of carrier near 3.8 GHz from an Intelsat satellite
- Interference over five paths ranging from 2.7 km to 28.3 km substantially exceeded the relevant long-term FSS protection level, and in some cases exceeded the availability threshold

(B)

- Other measurements carried out using an actual BWA network in Amsterdam as the interference source, and a carrier received from an NSS satellite by a transportable earth station at six different locations
- The results showed that interference degraded the received satellite carrier to below the availability threshold at a distance of 34 km, and exceeded the long-term protection threshold at a distance of 44 km

## BWA Use of C-Band

### BWA Roll-Out in the EU

- Number of deployments to date limited to FWA, falls short of expectations
- Many licences have been issued, but according to data from the MARAVEDIS database, no EU country had more than 35000 BWA subscribers by end 2008
- June 2008: ARCEP stated that roll-outs fell well short of licence-holder commitments

### Alternative bands for BWA

- 3400-3800 MHz requires more BWA base stations than 2500-2690 MHz which has better propagation characteristics
- Little use of 2.5 GHz band by other services
- 2.5 GHz band available for BWA in the US which presents better prospects for international harmonisation
- UHF spectrum will become available with the analogue switch-off
- Satellites can provide complementary services to BWA only if in separate band

## NRAs authorisation of BWA (I)

### BWA Licence Conditions

- FSS & BWA co-existence - internationally or nationally - in the same frequency band, requires mandatory coordination between the parties
- Several EU countries have included coordination in their BWA licence conditions, but many EU countries have not yet done so
- International coordination procedures for BWA in band 3400-3600 MHz with respect to the FSS are defined in ITU Radio Regulations. In the band 3600-3800 MHz mobile BWA is secondary with respect to earth stations in neighbouring countries.

## NRAs authorisation of BWA (2)

### Protection of TVROs

- Licence-free TVROs imply their whereabouts are generally unrecorded & they are thus difficult to protect from interference
- Therefore few EU countries offer protection for TVROs
- The satellite industry believes there should be a procedure for registering TVROs and for ensuring their protection

### Undesirability of freezing FSS deployments in C-band

- Some EU States froze earth station deployment in all or parts of 3.4-3.8 GHz band
- This is contrary to the intent of the EC Decision
- The burden of difficult sharing conditions should lie with the new service rather than the existing one

## Conclusions

- Extensive existing use of C-band in Europe by satellite services, and a healthy growth rate. All of 3400-4200 MHz is required for FSS.
- Geographic separation must be maintained between BWA and FSS. Coordination measures are therefore required. Actual interference cases support the need to consider adjacent frequency operations, as well as co-frequency operations.
- Application of necessary coordination measures is neither constant nor consistent.
- Some NRAs are freezing the band for new earth stations, contrary to the intent of the Decision.
- 400 MHz in the C-band is not needed for BWA at this time.

## Impact of EC Decision (1)

### The Increased Risk of Interference

- Satellite increasingly uses C Band in Europe, including in 3400-3800 MHz
- 3400-3800 MHz band remains necessary for FSS earth stations: for communications within Europe, but also between Europe & the rest of the World
- The Galileo Data Dissemination Network (GDDN) is subject to very stringent performance requirements (continuity & reliability of communications for Safety of Life) which makes the protection of satellite transmissions in C-band 3600-3800 MHz highly critical
- The EC Decision recognises the need to protect existing services without setting out how the protection should be ensured. Thus FSS earth stations are at risk of severe interference from BWA especially in view of deploying mobile, high-density terrestrial systems in this band

## Impact of EC Decision (2)

### Creating Uncertainty & Stopping Satellite Access to C-band

- Large up-front investments and the impossibility to modify characteristics post-launch imply satellites rely on regulatory certainty throughout their 15-20 year operational lives
- The EC Decision introduced regulatory uncertainty in the 3400-3800 MHz band, which is damaging the business case for future FSS systems in this band, regardless of the limited roll-out of BWA.
- NRAs that have frozen FSS access to parts of C-band are acknowledging the sharing problems and cutting short long-standing and growing use in favour of speculative usage
- Extensive BWA roll-out will imply the band 3400-3800 MHz may eventually be unusable by the FSS in large parts of Europe or in entire EU countries

## Satellite Industry Proposal 1

- PROPOSAL 1

Those NRAs having national allocations to FSS in 3400-3600 MHz and/or 3600-3800 MHz should be required to authorise, on request, licences for FSS earth stations.

- JUSTIFICATION

Both bands 3400-3600 MHz and 3600-3800 MHz should continue to be available for new FSS earth stations. There is no justification to freeze FSS operations in these bands, and this was never the intention of the Decision.

- THE DETAIL

We would expect such earth stations to be required to coordinate with any pre-existing BWA or point-to-point FS systems to avoid receiving interference. However, after being licensed, any new FSS earth station should enjoy the right to be protected from interference (i.e. the first come-first served approach).

## Satellite Industry Proposal 2

- PROPOSAL 2

Licensing of BWA in member states should include mandatory protection of existing satellite earth stations in the whole of C-band.

- JUSTIFICATION

Adequate interference protection procedures are not always being applied by NRAs, placing FSS earth stations at unnecessary risk of interference. This was never the intention of the Decision.

- THE DETAIL

The Commission should mandate the CEPT to develop guidelines for National Regulatory Authorities in licensing systems in C-band. This should include requirements for BWA operators and system providers, prior to deployment, to reach agreement with Earth station operators on how the necessary protection will be provided, and might also address regulatory provisions for protection of receive only earth stations. The EC Decision should be revised so as to provide direct reference to the guidelines, for example in a new annex.

## Satellite Industry Proposal 3

- PROPOSAL 3

The EU should reconsider the harmonised opening of 3600-3800 MHz to BWA based on a thorough market analysis before 2012, including assessment of the actual use of alternative spectrum bands allocated to BWA

- JUSTIFICATION

The market demand for an EU harmonised deployment of high density BWA in C-band is doubtful. Placing a requirement on MSs to make available the band 3600-3800 MHz for BWA by 2012 leads to regulatory uncertainty for FSS systems

- THE DETAIL

The evolution of the BWA & Satellite markets should be evaluated carefully until 2012: the EC decision should be made subject to a progress report reflecting the actual growth of and demand for BWA in 3600-3800 MHz within the EU. It is expected that this at least might lead to a removal of the 2012 deadline for a mandatory requirement for authorisation of BWA in 3600-3800 MHz.