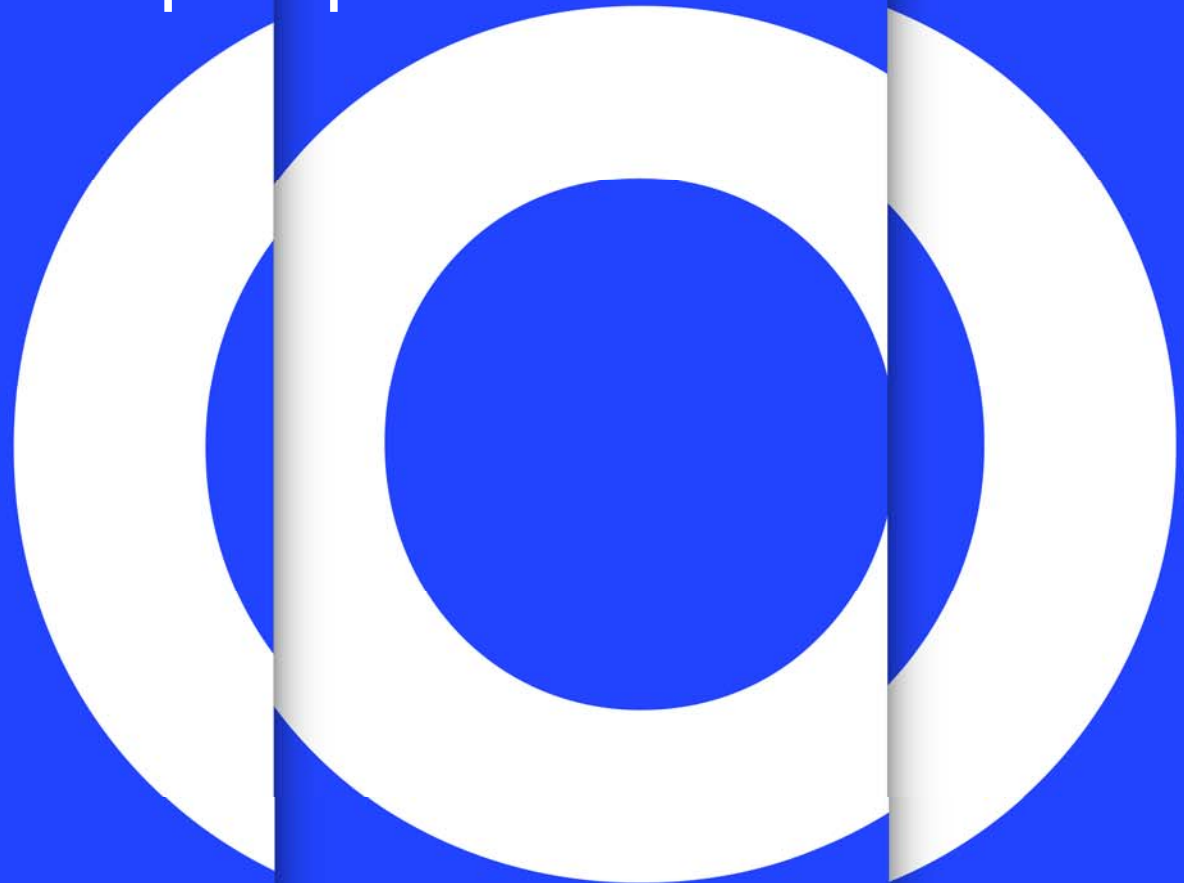


# EUR(O)VISION

## Challenges to Interference-Free Operations A service provider prospective



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## Who are we and what do we seek to achieve?

- **Core business:** To bring premium news, sports and music events to the widest possible audiences through radio, TV and other media
  
- **Delivery platform:** The Eurovision network
  - > Largest network in the world directly connected to broadcasters
  - > Combines satellite and fibre in a global network
  - > Primarily a B2B network
  - > Constantly evolving, leading-edge technology



EUROVISION

## Eurovision Network Services

Servicing the broadcast community, the sports federations and the news organisations worldwide

Content  
Production

Broadcast Services

Content distribution

Permanent Circuits

## EUROVISION

# International contribution for major sporting events and news activities

Olympics Games, FIFA World Cup™, UEFA Champions' League and UEFA European Championship™, European national football leagues, Grand Slam Tennis, USPGA, NBA, Formula 1, America's Cup... and many more.



## Network – Key Statistics



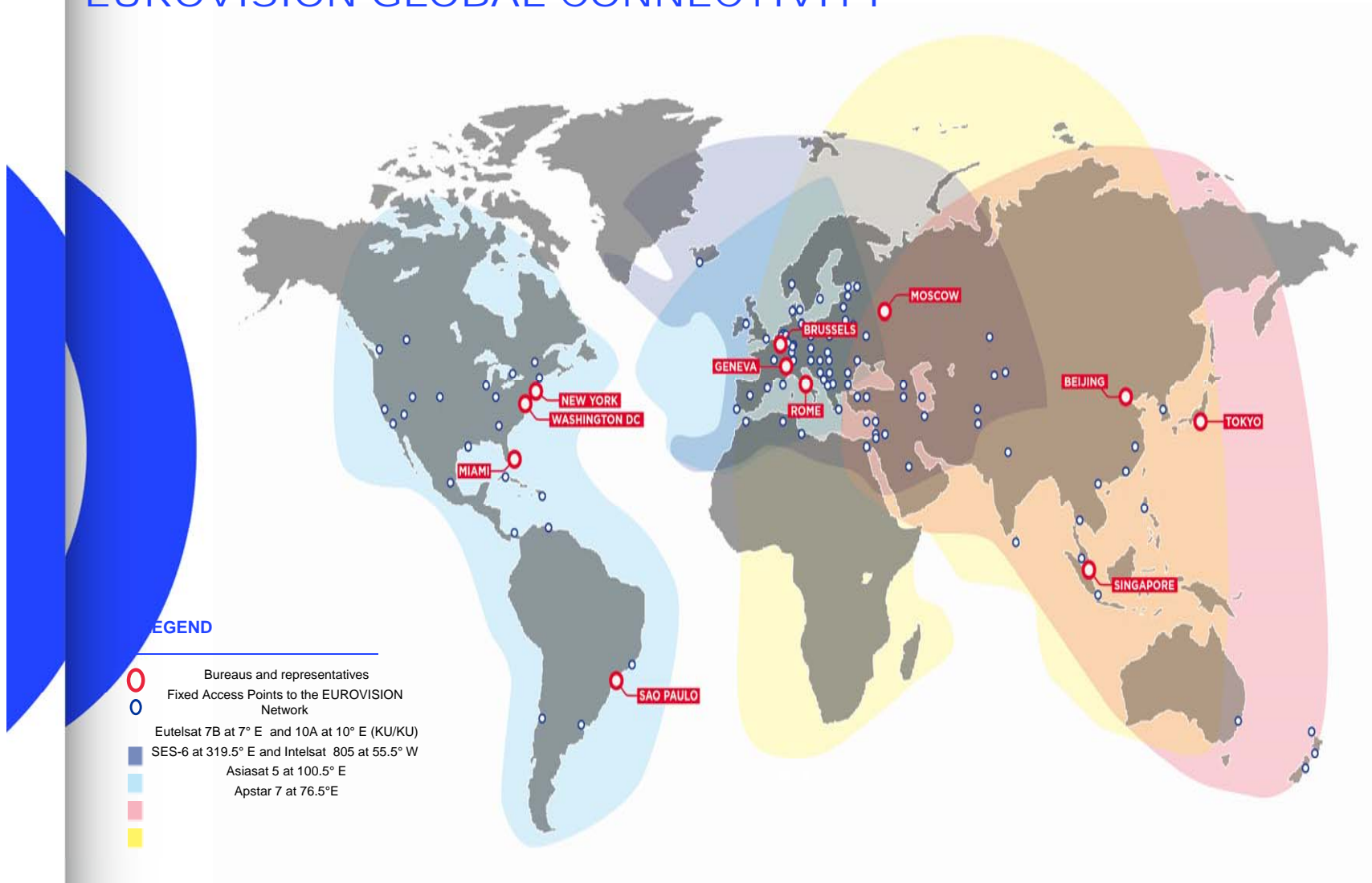
**68,910**  
Transmissions



**97,003**  
Hours transmitted

**94%**  
Sports transmissions in HD

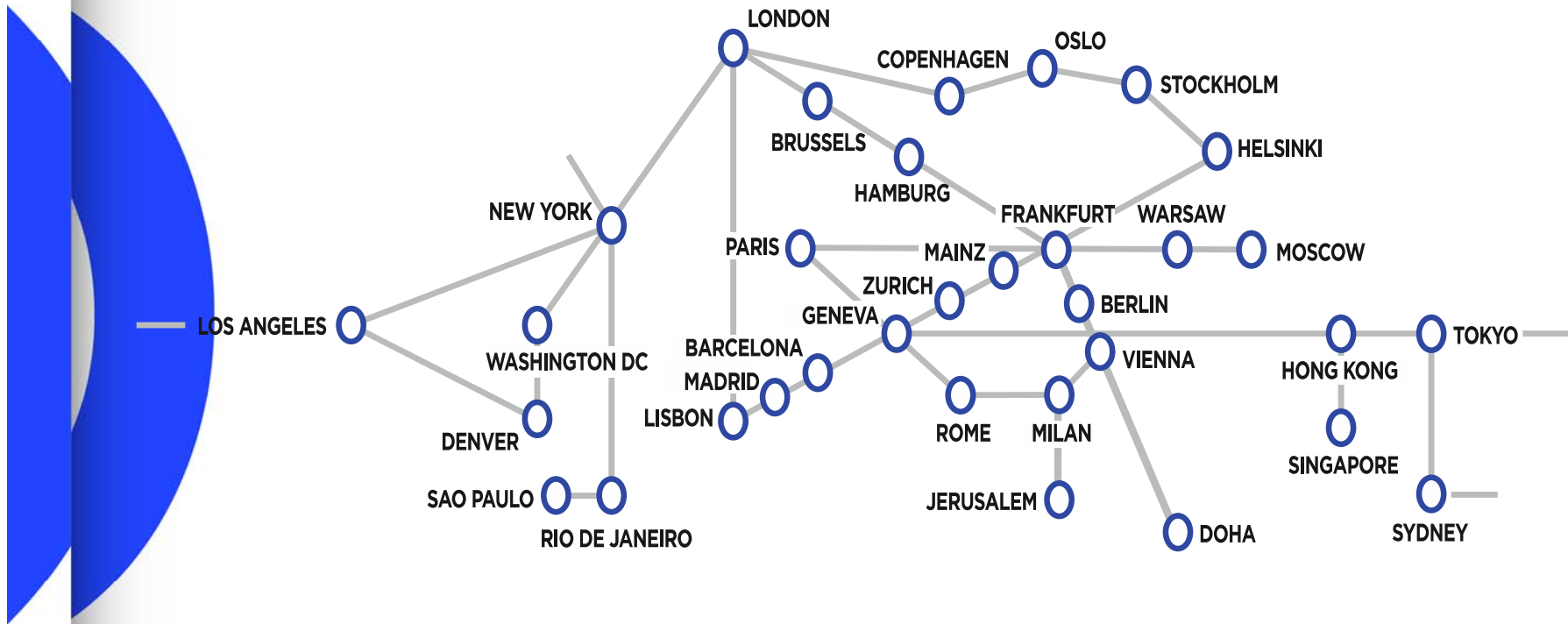
# EUROVISION EUROVISION GLOBAL CONNECTIVITY



## LEGEND

- Bureaus and representatives
- Fixed Access Points to the EUROVISION Network
- Eutelsat 7B at 7° E and 10A at 10° E (KU/KU)
- SES-6 at 319.5° E and Intelsat 805 at 55.5° W
- Asiasat 5 at 100.5° E
- Apstar 7 at 76.5° E

# EUROVISION EUROVISION'S FINE NETWORK



 FINE EUROVISION Fibre Network

EUROVISION SATELLITE TRANSPONDERS FULL-TIME LEASES

TOTAL: 1'110 MHZ

Europe/Middle East/North Africa Total of 792 MHz all Ku Band

+ Eutelsat 7A at 7° East 5 x 72 = 360 MHz

+ Eutelsat 10A at 10° East 2 x 72 +1 x 36 MHz = 180 MHz

+ ABS3A at 3 West 2x72Mhz +1 x36 MHz + 1 x 72 MHz on  
Mena = 252 MHz

Africa 12 MHz over Eutelsat 5A at 5 West

Asia-Australia/NZ Total of 162 MHz all C band

+ Asiasat 5 at 100.5° East 1 x 72 + 1 x 36 + 1x18 = 116 MHz

+ APT Apstar 7 at 76.5° East 1 x 36 MHz

Americas (North, Central,

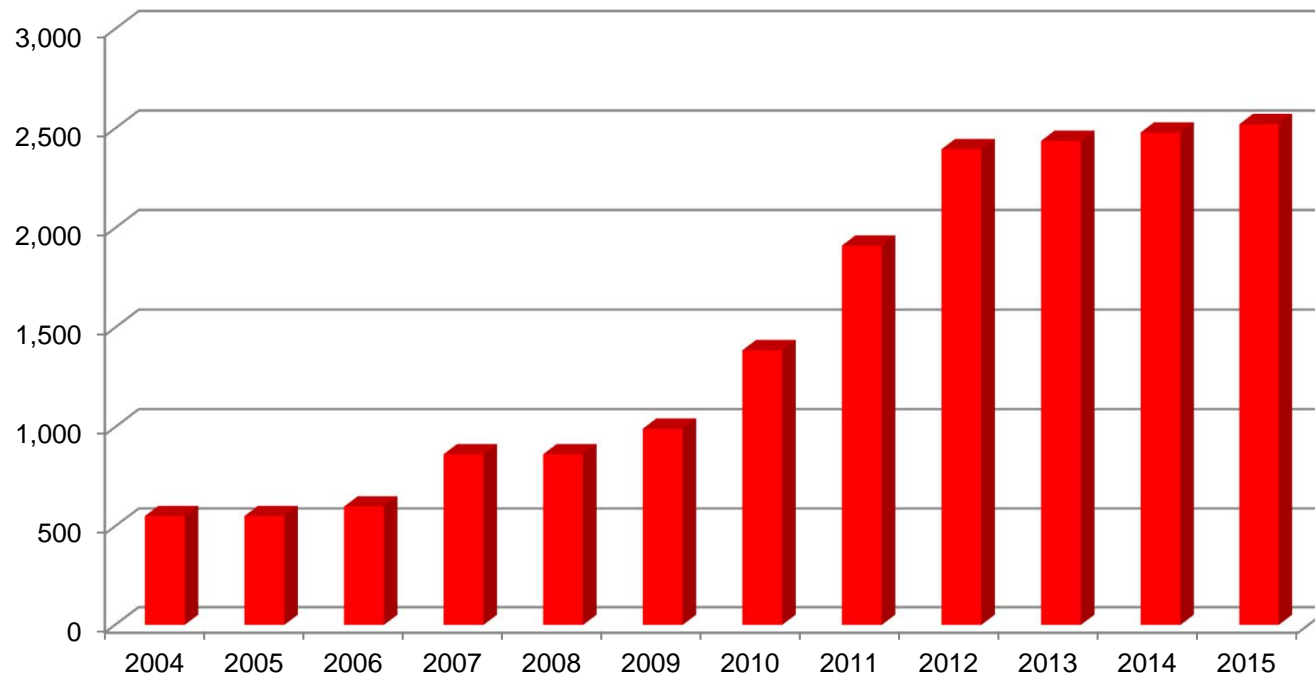
South & Caribbean region)

Total of 144 MHz all C band

+ SES 806 at 44 West 1 x 72 MHz

+ Intelsat 805 at 304.5 East 1 x 72 MHz

## Satellite Capacity Throughput in Mbit/s



**Satellite is a vital and ever increasing part of the network**

# Interference - a challenge for Eurovision Contribution network (1)

In Europe Ku Band operation is the only frequency band used

In the Asian, African and Americas regions C band is predominantly used

Terrestrial interference is a major consideration in transponder selection

- ❑ Especially for C band transponders in LATAM, Africa and South Asia
- ❑ This is due to shared/co-primary status of satellite and fixed/mobile or related applications can be a major issue: very large coordination distances can be required and site shielding (with a large receive community) can be impossible to achieve

## Interference – a challenge for Eurovision Contribution network (2)

Unintentional interference is a common feature in satellite transmissions:

- ❑ Satellite is primarily uplinked from SNGs.- typical interference is generated in the line-up phase – it can be destructive in SCPC operations
- ❑ VSATs networks are often a source of destructive interference for SCPC broadcast operations: some earth stations get mispointed or power levels are uncontrolled
- ❑ Military usage of commercial transponders sometimes is source of sudden and destructive interference; can be large powerful carriers
- ❑ Civil and military terrestrial radars can create destructive interference

## Interference – a challenge for Eurovision Contribution network (3)

Intentional interference to the Eurovision services does occasionally occur, in the context of highly visible events and/or political conflicts.

As it is generated deliberately to destroy carriers, it is particularly dangerous and fatal for transmissions.

- ❑ Difficult/often impossible and very time consuming to find the source for short term (event based). Sat operators and regulators are completely unable to identify and intervene timely and effectively.
- ❑ No clear sanctions are foreseen for wrong-doers; nor applications of existing sanctions are really enforced. It is essentially a «jungle» where the only way to protect our transmissions is to do it by ourselves with appropriate technologies.

# EBU reaction given the operational context to ensure Interference resilience (1)

## Satellite Transponder

**SCPC**



**Multiplex**



- Ku and C band receive antennas typically in the 3.7 – 4.5m range  
Low C/N ( $E_b/N_0$ ) reception with 3-4dB typical margin
- When possible, EBU operates at transponder saturation with multiplexes which provide inherent immunity to jamming and interference, being larger and more powerful carriers. This is particularly effective for wide-band transponders carriers.
- When on SCPC operations, EBU is obliged to duplicate transmissions over multiple satellites to ensure protection; this obviously generates high costs

## EBU reaction given the operational context to ensure Interference resilience (2)

- Advanced modulation schemes: in the Eurovision network we operate DVB-S2 but also, when applicable NS3, a proprietary solution which provides, inter alia a larger choice of mod-codes as well as improved roll-off figures. This ultimately delivers higher efficiency and more resilience to interference.
- At experimental/test level, EBU is considering «dynamic» modulation schemes which could be «adaptive» to the interference environment and improve link budget margins.

## Conclusions

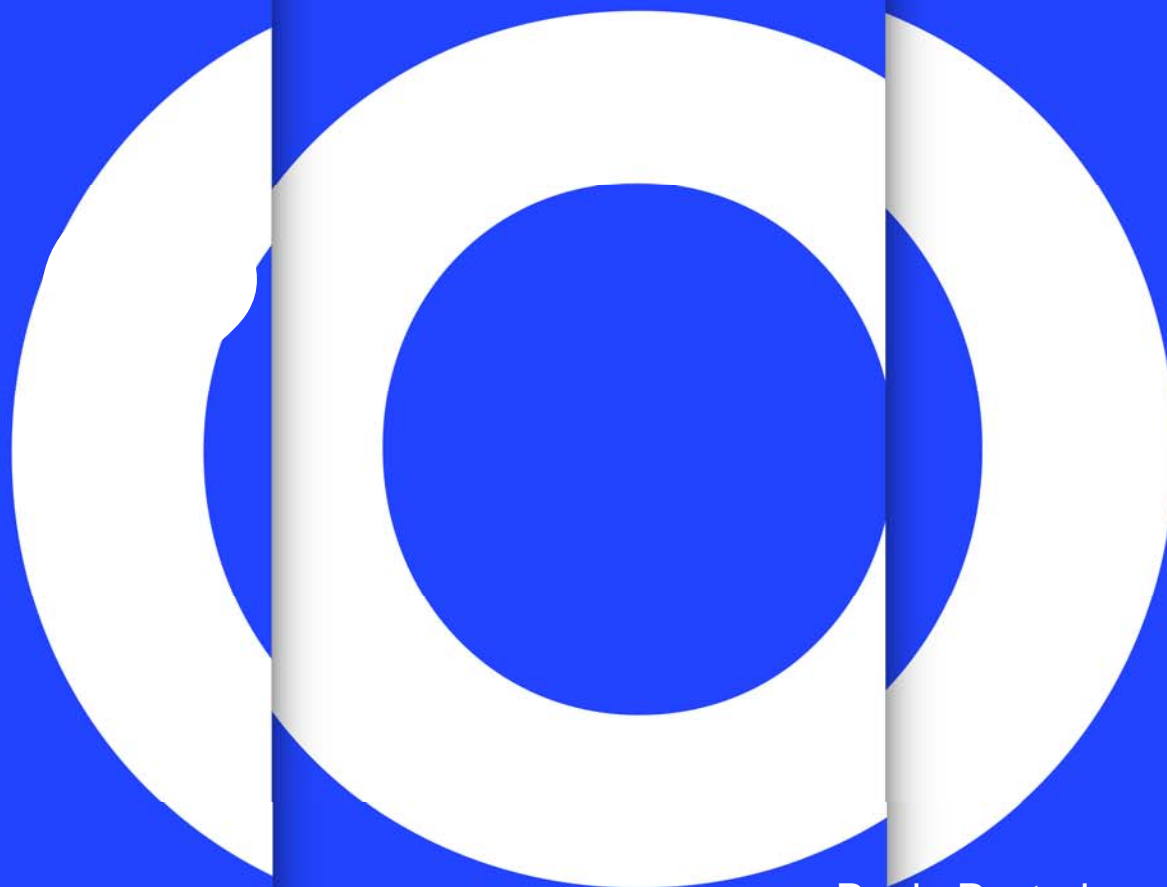
1. For the EBU's video broadcast contributions and distributions interference is a major issue that has been affecting increasingly the Eurovision transmissions, notably in relation to major sporting events. Local interference (at receiving sites) due to frequency sharing, malpractices in the uplink line-ups as well as deliberate interference with uplink facilities are the key issues.
2. Carrier ID is certainly a necessity, but will not solve the problem; sat operators and/or regulators must equip themselves with surveillance capabilities and new technologies to identify and single out wrong-doers. Sanctions must be enforced and fully applied.
3. Advanced modulation schemes coupled with multiplexing over wide transponders (72 MHz) as well as duplication of Transmissions are the only possibilities currently for the EBU to protect its transmissions. It comes at an exorbitant cost.
4. New generation satellites with dynamically modifiable footprints notably with respect to EIRP and G/T re-allocation will provide mechanisms to reduce interference in the contribution links.

## Conclusions(2)

**However actions are required by the regulators and the industry community to improve the current situation which is degrading day by day.**

# EUR(O)VISION

THANK YOU



OPERATED BY EBU

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