

HDTV Contribution in Europe

Didier Debellemanière
Head of Technical Development
EBU Eurovision Operations



HDTV Contribution in Europe

- The HDTV feed carries up to about five times the amount of information compared to SDTV but broadcasters may not want to pay five times more for the bandwidth
- Two standards will coexist in Europe: 720p/50 and 1080i/25, and therefore conversion will have to be achieved
- Distribution will be made using H264/AVC compression



Issues in the Choice of Transmission Parameters

- Modulation: use of DVB-S2 to improve efficiency
- Compression: MPEG2 is the only viable technology for contribution today. Effects of cascading with MPEG4 have to be considered
- Conversion 1080i/720p can be made before or after the contribution link



Eurovision DVB-S2 tests

- ↳ Measurements performed with full transponder configuration:

(Worst case operational condition with respect to transponder load, carrier intermodulation,...).

- ↳ Measurement equipment from Geneva EBU E/S was used.

(Confidence measurements, no academic precision).

Measurement Method

▶ Reference measurement in DVB-S

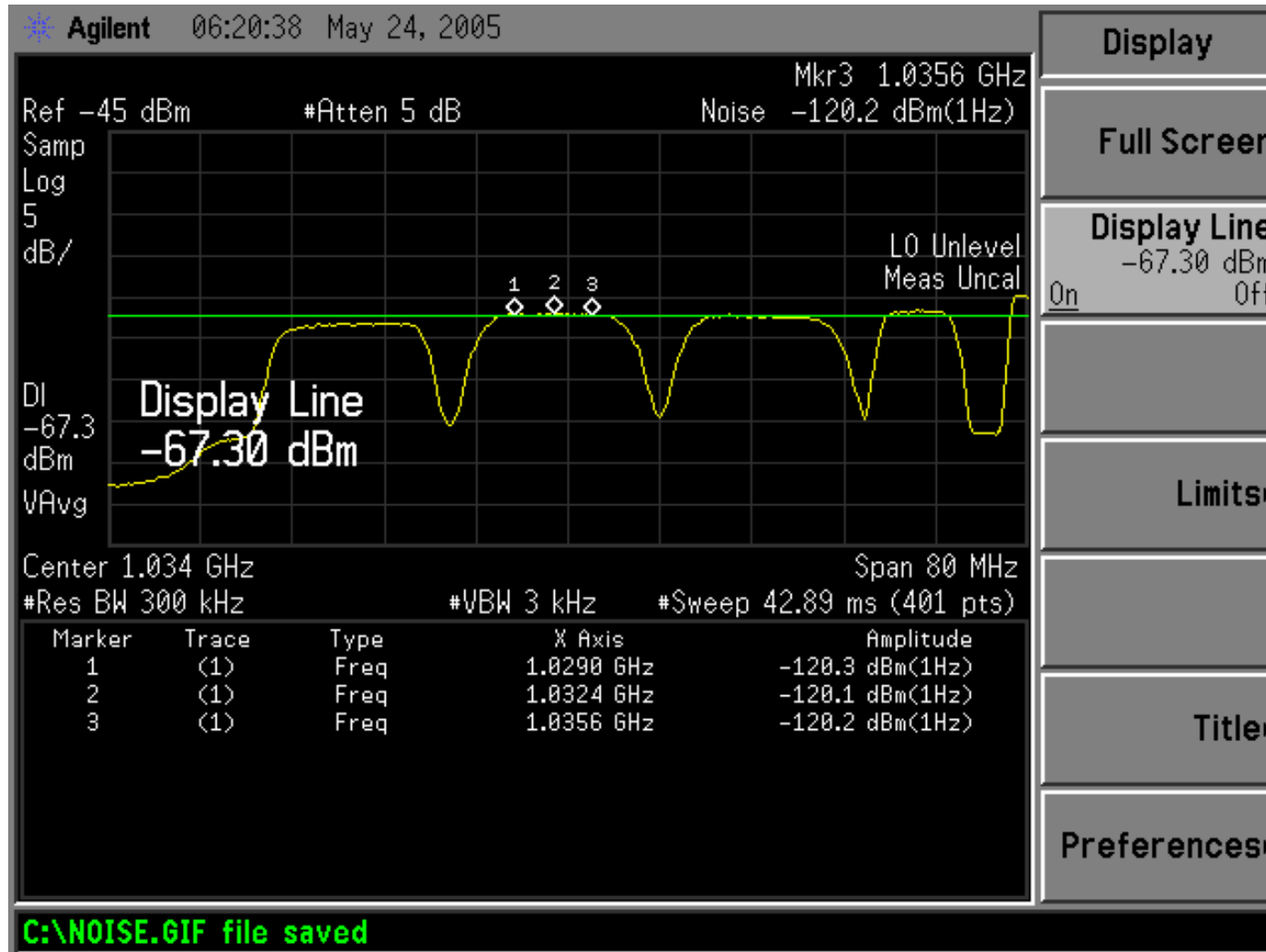
- ✓ Uplink of DVB-S carrier @ nominal level from Geneva E/S
- ✓ Fill-up remaining channels on same transponder (Stockholm and Brussels)
- ✓ Measure receive Es/no of nominal DVB-S carrier
- ✓ Reduce uplink power until QEF was reached (QEF was defined as one minute of error-free video transmission)
- ✓ Measure receive Es/no of DVB-S carrier at QEF
- ✓ Link margin = nominal Es/no – threshold Es/no

▶ DVB-S2 measurement

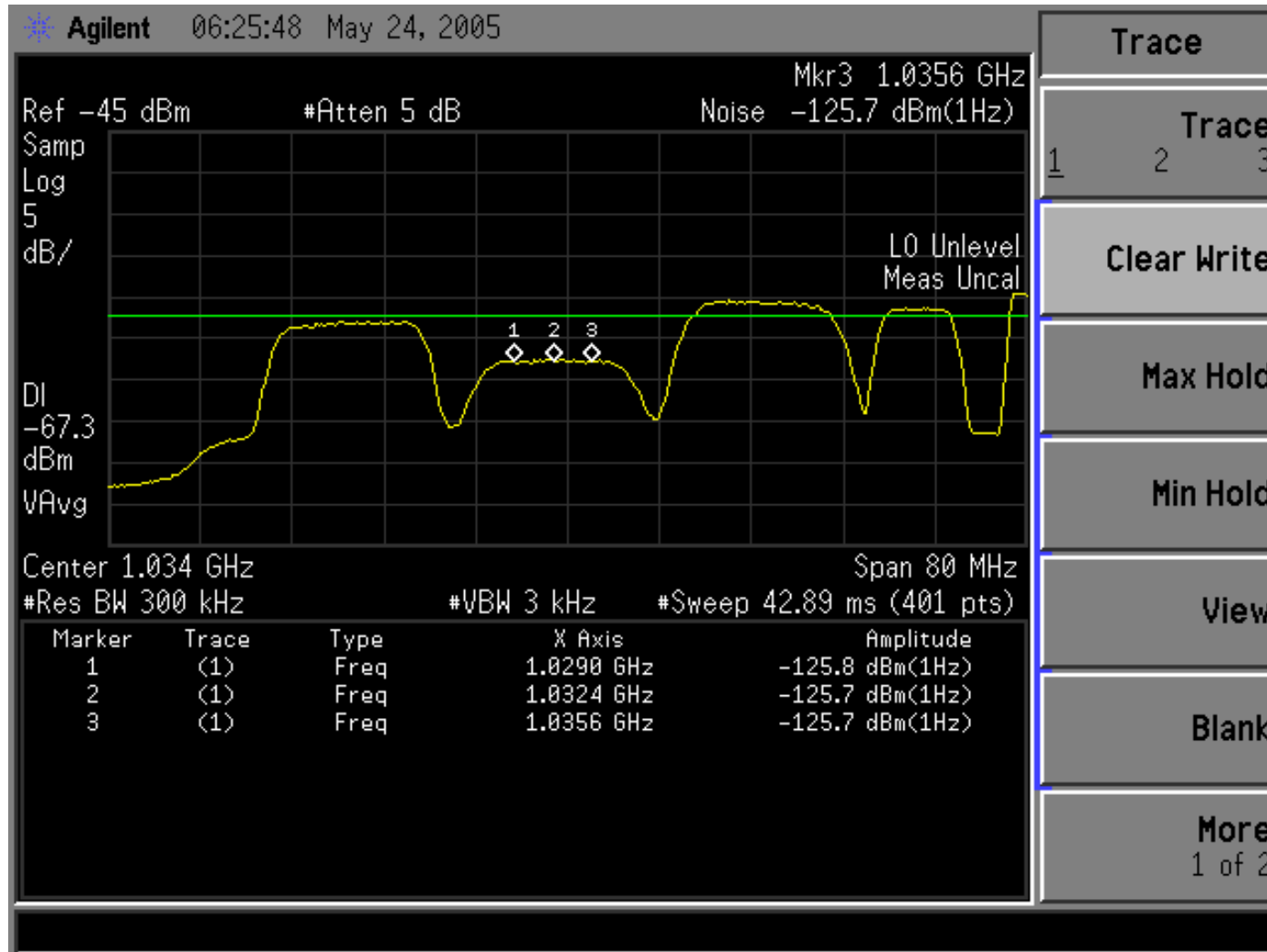
- ✓ Same steps as for a DVB-S carrier for different DVB-S2 parameters
- ✓ Link margin compared with the DVB-S link margin



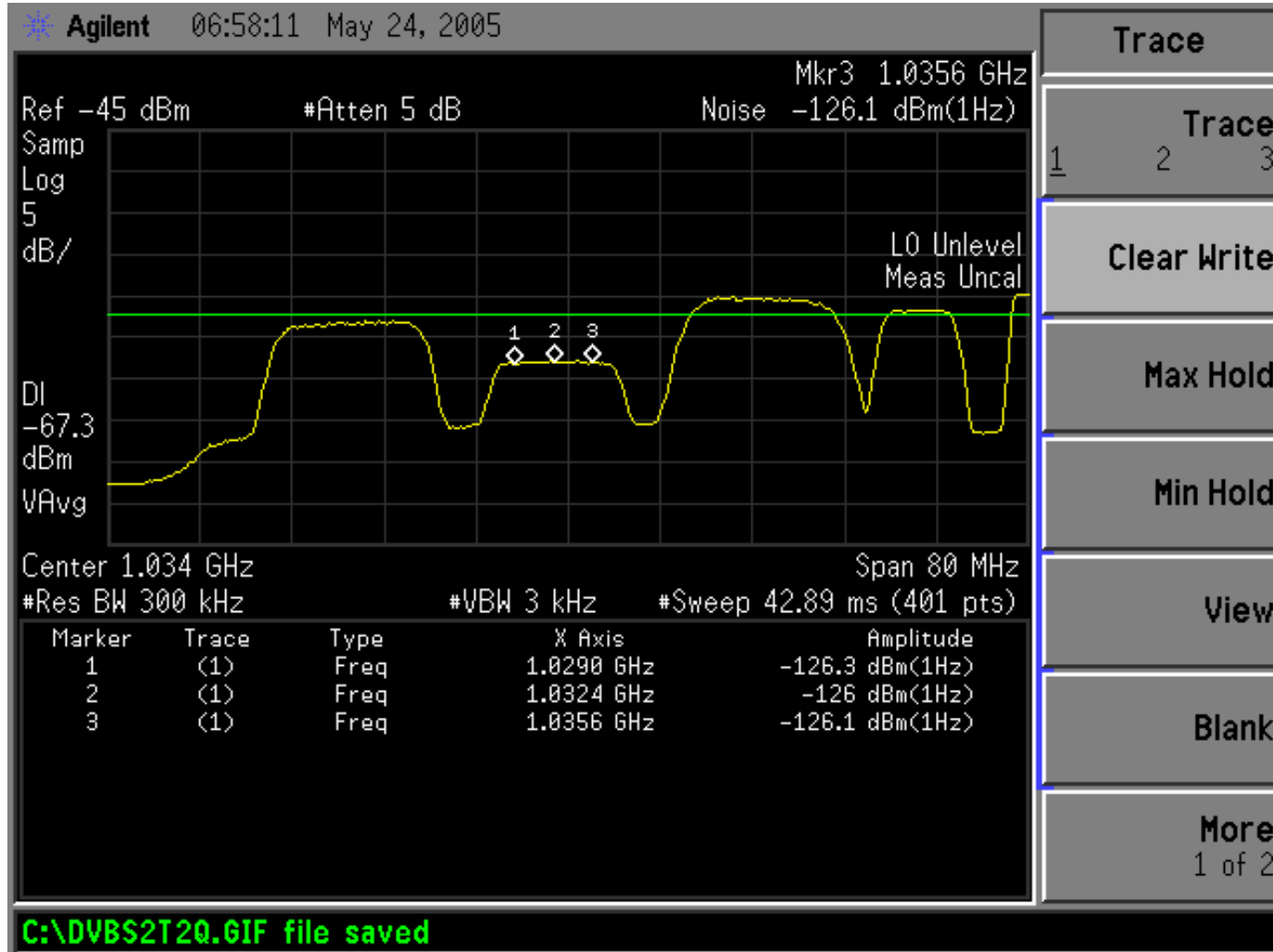
DVB-S Nominal



DVB-S QEF (QPSK 7/8)



DVB-S2 QEF (8PSK 2/3)



DVB-S2 Testing: Conclusion

Measurement offered two valid DVB-S2 candidates:

▼ **8PSK 2/3**

Link Margin 0,5dB better than QPSK 7/8 in DVB-S
Spectral Efficiency is 20% better than DVB-S

▼ **8PSK 3/4**

Link Margin 0,7dB worse than QPSK 7/8 in DVB-S
Spectral Efficiency is 35% better than DVB-S



DVB-S2 Testing: Conclusion/2

- ✦ DVB-S2 offers the possibility to reduce the bandwidth with 25% and offers a small increase in link margin
- ✦ Even higher bandwidth reduction can be obtained at the cost of 0,7dB link margin
- ✦ Satellite tests confirm ETSI simulations
- ✦ 60 Mbit/s payload can be transported in 36 MHz on W3A



Eurovision compression tests

- ✦ Eurovision will organize tests beginning of December 2005, to check parameters to be used during soccer world cup 2006 in Germany
- ✦ Tests are organized in contact with N/HD-NET group and Technical Department
- ✦ Two objectives:
 - Test cascade of MPEG2 and H264/AVC at various bit rates
 - Test quality of 1080i to 720p conversion, before and after contribution link



Test setup

