

RECOMMENDATION ITU-R BR.714-1

**INTERNATIONAL EXCHANGE OF PROGRAMMES ELECTRONICALLY PRODUCED
BY MEANS OF HIGH-DEFINITION TELEVISION**

(Question ITU-R 108/11)

(1990-1994)

The ITU Radiocommunication Assembly,

considering

- a) that there will be a need to exchange programmes produced in high-definition television among broadcasters;
- b) that the programmes produced in high-definition television and stored on videotape can be converted to 35 mm film at 24/25 frame/s but with some loss of spatial and significant loss of temporal resolution capability;
- c) that the conversion from film to high-definition television may also result in additional loss of spatial resolution,

recommends

that when programmes produced in high-definition television are exchanged between broadcasters, in order to preserve the best quality, they should be exchanged in video form, e.g. live or videotape (see Annex 1).

ANNEX 1

**International exchange of programmes produced electronically
by means of high-definition television****1. Introduction**

This Annex concerns the international exchange of HDTV programmes on film and tape.

Such exchanges consist of the delivery of programmes available in HDTV to broadcasters who wish to use them for emission in HDTV or for emission in conventional television systems.

2. International exchanges

When the HDTV programmes are produced electronically and the broadcasters wish to use them for HDTV emission, the delivery could conceivably be effected:

- by means of a video representation such as a tape copy of the edited master videotape in HDTV followed by any required standards conversion; or,
- by means of 35 mm cinematographic film (24 or 25 frame/s) transferred from the edited master videotape.

When the HDTV programmes are produced electronically and the broadcasters wish to use them for conventional television emission, the delivery could conceivably be effected:

- by means of a video representation such as a tape copy of the edited master videotape in HDTV made after the required standards conversion; or,
- by means of 35 mm cinematographic film (24 or 25 frame/s) transferred from the edited HDTV master videotape.

For electronically produced programmes, tape distribution can be expected to provide better picture quality by avoiding the double transfer of the electronic source to and from film.

Reference can be made to Report ITU-R BR.1229 for a description of two systems currently available to transfer HDTV programmes onto 35 mm film.

From the viewpoint of movement portrayal, the use of 35 mm film transfers at 24 or 25 frame/s for exchange of electronically generated HDTV programmes between broadcasters would cause a significant loss of temporal information on all programmes, even those that were shot with that constraint in mind. The result would be that programmes with fast movement, such as sports, could exhibit an annoying judder if exchanged by means of film transfers. By contrast, the use of tape recordings for programme exchange would not cause additional impairments to movement portrayal.

High-definition television interchanged on videotape can provide excellent resolution of picture details. If the programme exchange does not require standard conversion, then a tape copy will deliver all the original picture resolution to the receiving organization. Even if standards conversion is required, spatial filtering in the conversion process will be optimized to deliver to the output the highest possible resolution compatible with the output television system.

By contrast, if 35 mm film is used as the exchange medium, the double passage from the electronic to the optical domain (in the film recorder) and back (in the telecine) is certainly bound to affect picture resolution to a certain degree.

Tape must be preferred to film as the exchange medium in this respect.

Similar considerations may apply, to a lesser degree of importance, when consideration is given to colour fidelity and grey scale linearity.

3. Conclusions

For international exchange of HDTV-produced programmes between broadcasters, technical considerations suggest that clear preference should be given to an all-electronic process, i.e. to the exchange of videotape copies of the HDTV edited master videotape, with or without standards conversion, as the circumstances may dictate.

An electronic solution remains the only possible one when live international exchange is required.

4. Future considerations

It has been demonstrated that the origination of major productions electronically produced in HDTV is suitable for application in cinemas using electronic displays.

Those programmes can also be distributed to conventional film cinemas using 35 mm prints obtained by transfer of HDTV videotape masters to film.

A study on the applications of these technologies will be appropriate; cooperation with other international bodies on this matter is desirable.
