

EBU Technical Recommendation R73-1999

Alignment of record flux levels on the longitudinal audio tracks of Betacam SP recordings, to facilitate programme exchange

<i>EBU Committee</i>	<i>First issued</i>	<i>Revised</i>	<i>Re-issued</i>
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The EBU has taken into consideration:

- the many enquiries from outside organisations on the level of audio recording on the longitudinal tracks of Betacam SP tapes;
- the benefits from the uniformity of recordings for programme exchange or contribution to EBU Members;
- that historically, some EBU Members have adopted different flux levels for the longitudinal audio tracks of Betacam SP tapes for internal use.

The EBU *recommends*, where no other practice has been agreed between the exchanging organisations, that the following operational alignment procedure should be used for Betacam SP equipment used to record programmes intended for exchange or contribution to EBU Members.

1. Alignment procedure

There are many stages to the maintenance alignment of television recorders and the following operational procedure should only be carried out after the detailed alignment procedure given in the maintenance handbook supplied by the recorder manufacturer has been completed.

1.1. Reference flux level

Audio playback level adjustments should be set using the reference flux level supplied on the Sony alignment cassette CR8-1BPS. Details of this tape are given in EBU document Tech. 3219-Part 1 [1].

1.2. Playback adjustment

Dolby noise reduction circuits should be switched OFF for the following playback adjustments.

Using the reference level section of the Sony alignment cassette, the playback gain of each channel should be adjusted to indicate, on the meter monitoring the output level, the level corresponding to the "Alignment level" (see Section 3.1).

1.3. Record adjustment

The alignment cassette should be replaced by a cassette of the type normally used for programme recording.

A 1 kHz signal at alignment level should be connected to the input of each audio channel.

Dolby noise reduction circuits should be switched ON.

The record gain of each channel should be adjusted to achieve a recording which will play back at the same level as the alignment tape (without re-adjusting the playback gains).

2. Operational practices

2.1. Dolby noise reduction

The Dolby C noise reduction circuits should be switched ON for programme use.

2.2. Alignment leader

Programme recordings should be preceded by an alignment leader of the type described in EBU Recommendation R49 [2] which should contain a reference tone conforming to the Alignment Level (see Section 3.1).

3. Further information

3.1. Terms used to describe signal levels

The Alignment Level, AL, mentioned above (defined in ITU-R Recommendation BS 645-2 [3]) is the level of a steady 1 kHz tone which is 9 dB below the Permitted Maximum Level, PML, of the programme signal.

The Permitted Maximum Level is the level whose peak amplitude should only be rarely exceeded by the peak amplitude of the programme signal.

Recording at this level will provide noise and distortion levels similar to those quoted by the equipment manufacturers.

3.2. Programme meter readings

When monitored on a peak programme meter (PPM), the peaks of a correctly controlled programme signal will read between 6 and 9 dB above the alignment level. The difference depends on the time constant of the meter, the duration of the peak signals and the type of programme material.

When monitored on a Volume unit meter (VU), the level of a correctly controlled programme signal will read about 2 dB below the alignment level. However, the level indicated for a programme signal will depend on the type of programme material.

3.3. Other EBU official texts

Further information on the audio quality achieved using Betacam SP can be found in EBU Information I17-1991 [4].

Audio tracks on Betacam SP tapes should be allocated in accordance with EBU Recommendation R38-1992 [5].

Bibliography

- [1] [EBU document Tech. 3219: **Measurements and operational alignment of television tape-recorders for broadcasting – Part 1 (1990): Alignment and calibration tapes**
 - [2] EBU Technical Recommendation R49-1999: **Tape alignment leader for the exchange of television programmes**
 - [3] ITU-R Recommendation BS.645-2: **Test signals and metering to be used on international sound-programme connections**
 - [4] EBU Technical Information I17-1995: **Audio performance of Betacam SP VTRs**
 - [5] EBU Technical Recommendation R38-1998: **Allocation of audio channels in analogue tape recording formats for international exchange of programmes**
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