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| **Report ITU-R BS.2217-2**  **(10/2016)** |
| **Compliance material for  Recommendation ITU-R BS.1770** |
| **BS Series**  **Broadcasting service (sound)** |

Foreword

The role of the Radiocommunication Sector is to ensure the rational, equitable, efficient and economical use of the radio-frequency spectrum by all radiocommunication services, including satellite services, and carry out studies without limit of frequency range on the basis of which Recommendations are adopted.

The regulatory and policy functions of the Radiocommunication Sector are performed by World and Regional Radiocommunication Conferences and Radiocommunication Assemblies supported by Study Groups.

# Policy on Intellectual Property Right (IPR)

ITU-R policy on IPR is described in the Common Patent Policy for ITU-T/ITU-R/ISO/IEC referenced in Resolution ITU‑R 1. Forms to be used for the submission of patent statements and licensing declarations by patent holders are available from <http://www.itu.int/ITU-R/go/patents/en> where the Guidelines for Implementation of the Common Patent Policy for ITU‑T/ITU‑R/ISO/IEC and the ITU-R patent information database can also be found.

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| Series of ITU-R Reports  (Also available online at <http://www.itu.int/publ/R-REP/en>) | |
| **Series** | Title |
| **BO** | Satellite delivery |
| **BR** | Recording for production, archival and play-out; film for television |
| **BS** | Broadcasting service (sound) |
| **BT** | Broadcasting service (television) |
| **F** | Fixed service |
| **M** | Mobile, radiodetermination, amateur and related satellite services |
| **P** | Radiowave propagation |
| **RA** | Radio astronomy |
| **RS** | Remote sensing systems |
| **S** | Fixed-satellite service |
| **SA** | Space applications and meteorology |
| **SF** | Frequency sharing and coordination between fixed-satellite and fixed service systems |
| **SM** | Spectrum management |

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| ***Note****: This ITU-R Report was approved in English by the Study Group under the procedure detailed in Resolution ITU-R 1.* |

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REPORT ITU-R BS.2217-2

Compliance material for Recommendation ITU-R [BS.1770](https://www.itu.int/rec/R-REC-BS.1770/en)

(Question ITU-R 2/6)

(2011-2012-2016)

Summary

This Report contains a table of compliance test files and related information for verifying that a meter meets the specifications within Recommendation ITU-R [BS.1770](https://www.itu.int/rec/R-REC-BS.1770/en).

Compliant meters will give the results indicated in the Table below to a tolerance of ±0.1 LKFS. The term *file-based measurement* indicates a meter that measures the test file exactly from the beginning of the file. The term *live* indicates a meter that does not necessarily begin at time zero, and thus different time-alignment of blocks used in processing relative to the programme content, could occur in the measure leading to a slightly different result, as indicated. [All the files](http://www.itu.int/dms_pub/itu-r/oth/11/02/R11020000010001ZIPM.zip) are 16‑bit PCM wav-files at a sampling rate of 48 kHz.

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# 1 Compliance material for Recommendation ITU-R [BS.1770](https://www.itu.int/rec/R-REC-BS.1770/en)

| File (1) | File-based measurement | “Live” measurement | Description | No. of channels |
| --- | --- | --- | --- | --- |
| [1770Comp-2\_RelGateTest.wav](http://www.itu.int/dms_pub/itu-r/oth/11/02/R11020000010030ZIPM.zip) | −10.0 LKFS | −10.0 to −10.2 LKFS | Relative gate test (Note this item will give a measurement value of approximately −8.0 LKFS if a −8 LU relative gate is used.)  1 kHz tone at levels of ~−90, −20 and −7 dBFS | 2 (L/R) |
| [1770Comp-2\_AbsGateTest.wav](http://www.itu.int/dms_pub/itu-r/oth/11/02/R11020000010029ZIPM.zip) | −69.5 LKFS | −69.4 to −69.8 LKFS | Test for −70 LKFS absolute gate. If no absolute gate is implemented the measurement result will be −73 LKFS  1 kHz tone at levels of ~−90 dBFS and −69 dBFS | 2 (L/R) |
| [1770Comp-2\_24LKFS\_25Hz\_2ch.wav](http://www.itu.int/dms_pub/itu-r/oth/11/02/R11020000010016ZIPM.zip) | −24.0 LKFS | −24.0 LKFS | 25 Hz sine wave @ ~−13 dBFS | 2 (L/R) |
| [1770Comp-2\_24LKFS\_100Hz\_2ch.wav](http://www.itu.int/dms_pub/itu-r/oth/11/02/R11020000010017ZIPM.zip) | −24.0 LKFS | −24.0 LKFS | 100 Hz sine wave @ ~−22 dBFS | 2 (L/R) |
| [1770Comp-2\_24LKFS\_500Hz\_2ch.wav](http://www.itu.int/dms_pub/itu-r/oth/11/02/R11020000010018ZIPM.zip) | −24.0 LKFS | −24.0 LKFS | 500 Hz sine wave @ ~−23 dBFS | 2 (L/R) |
| [1770Comp-2\_24LKFS\_1000Hz\_2ch.wav](http://www.itu.int/dms_pub/itu-r/oth/11/02/R11020000010019ZIPM.zip) | −24.0 LKFS | −24.0 LKFS | 1 kHz sine wave @ ~−24 dBFS | 2 (L/R) |
| [1770Comp-2\_24LKFS\_2000Hz\_2ch.wav](http://www.itu.int/dms_pub/itu-r/oth/11/02/R11020000010020ZIPM.zip) | −24.0 LKFS | −24.0 LKFS | 2 kHz sine wave @ ~−26 dBFS | 2 (L/R) |
| [1770Comp-2\_24LKFS\_10000Hz\_2ch.wav](http://www.itu.int/dms_pub/itu-r/oth/11/02/R11020000010021ZIPM.zip) | −24.0 LKFS | −24.0 LKFS | 10 kHz sine wave @ ~−27 dBFS | 2 (L/R) |
| [1770Comp-2\_23LKFS\_25Hz\_2ch.wav](http://www.itu.int/dms_pub/itu-r/oth/11/02/R11020000010003ZIPM.zip) | −23.0 LKFS | −23.0 LKFS | 25 Hz sine wave @ ~−12 dBFS | 2 (L/R) |
| [1770Comp-2\_23LKFS\_100Hz\_2ch.wav](http://www.itu.int/dms_pub/itu-r/oth/11/02/R11020000010004ZIPM.zip) | −23.0 LKFS | −23.0 LKFS | 100 Hz sine wave @ ~−21 dBFS | 2 (L/R) |
| [1770Comp-2\_23LKFS\_500Hz\_2ch.wav](http://www.itu.int/dms_pub/itu-r/oth/11/02/R11020000010005ZIPM.zip) | −23.0 LKFS | −23.0 LKFS | 500 Hz sine wave @ ~−22 dBFS | 2 (L/R) |
| [1770Comp-2\_23LKFS\_1000Hz\_2ch.wav](http://www.itu.int/dms_pub/itu-r/oth/11/02/R11020000010006ZIPM.zip) | −23.0 LKFS | −23.0 LKFS | 1 kHz sine wave @ ~−23 dBFS | 2 (L/R) |
| [1770Comp-2\_23LKFS\_2000Hz\_2ch.wav](http://www.itu.int/dms_pub/itu-r/oth/11/02/R11020000010007ZIPM.zip) | −23.0 LKFS | −23.0 LKFS | 2 kHz sine wave @ ~−25 dBFS | 2 (L/R) |
| [1770Comp-2\_23LKFS\_10000Hz\_2ch.wav](http://www.itu.int/dms_pub/itu-r/oth/11/02/R11020000010008ZIPM.zip) | −23.0 LKFS | −23.0 LKFS | 10 kHz sine wave @ ~−26 dBFS | 2 (L/R) |
| [1770Comp-2\_18LKFS\_FrequencySweep.wav](http://www.itu.int/dms_pub/itu-r/oth/11/02/R11020000010002ZIPM.zip) | −18.0 LKFS | −18.0 LKFS | Loudness level is constant, at –18 LKFS, throughout the file. A gain error in the K weighting filter of 1 dB in a 1/3rd octave band will give approximately 0.5 LU deflection using a 3s integration time live meter | 1 (L, R or C) |
| [1770Comp-2\_24LKFS\_SummingTest.wav](http://www.itu.int/dms_pub/itu-r/oth/11/02/R11020000010028ZIPM.zip) | −24.0 LKFS | −24.0 LKFS | Test channel gains and summing[[1]](#footnote-1) | 6 channels (L/R/C/LFE/Ls/Rs) |
| [1770Comp-2\_23LKFS\_SummingTest.wav](http://www.itu.int/dms_pub/itu-r/oth/11/02/R11020000010015ZIPM.zip) | −23.0 LKFS | −23.0 LKFS | Test channel gains and summing1 | 6 channels (L/R/C/LFE/Ls/Rs) |
| [1770Comp-2\_24LKFS\_ChannelCheckLeft.wav](http://www.itu.int/dms_pub/itu-r/oth/11/02/R11020000010023ZIPM.zip) | −24.0 LKFS | −24.0 LKFS | Left channel gain check. 1 kHz sine wave @ ~−21 dBFS in left channel | 6 channels (L/R/C/LFE/Ls/Rs) |
| [1770Comp-2\_24LKFS\_ChannelCheckRight.wav](http://www.itu.int/dms_pub/itu-r/oth/11/02/R11020000010026ZIPM.zip) | −24.0 LKFS | −24.0 LKFS | Right channel gain check. 1 kHz sine wave @ ~−21 dBFS in right channel | 6 channels (L/R/C/LFE/Ls/Rs) |
| [1770Comp-2\_24LKFS\_ChannelCheckCentre.wav](http://www.itu.int/dms_pub/itu-r/oth/11/02/R11020000010022ZIPM.zip) | −24.0 LKFS | −24.0 LKFS | Centre channel gain check. 1 kHz sine wave @ ~−21 dBFS in centre channel | 6 channels (L/R/C/LFE/Ls/Rs) |
| [1770Comp-2\_24LKFS\_ChannelCheckLFE.wav](http://www.itu.int/dms_pub/itu-r/oth/11/02/R11020000010024ZIPM.zip) | -inf LKFS | -inf LKFS | LFE channel check. 100 Hz @ ~−19 dBFS. Since the LFE channel is not included in a Rec. [BS.1770](https://www.itu.int/rec/R-REC-BS.1770/en) measurement, a compliant meter shall indicate the lowest resolvable value, or -infinity. | 6 channels (L/R/C/LFE/Ls/Rs) |
| [1770Comp-2\_24LKFS\_ChannelCheckLs.wav](http://www.itu.int/dms_pub/itu-r/oth/11/02/R11020000010025ZIPM.zip) | −24.0 LKFS | −24.0 LKFS | Left surround channel gain check. 1 kHz sine wave @ ~−22.5 dBFS in Ls channel | 6 channels (L/R/C/LFE/Ls/Rs) |

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| File (1) | File-based measurement | “Live” measurement | Description | No. of channels |
| [1770Comp-2\_24LKFS\_ChannelCheckRs.wav](http://www.itu.int/dms_pub/itu-r/oth/11/02/R11020000010027ZIPM.zip) | −24.0 LKFS | −24.0 LKFS | Right surround channel gain check. 1 kHz sine wave @ ~−22.5 dBFS in Rs channel | 6 channels (L/R/C/LFE/Ls/Rs) |
| [1770Comp-2\_23LKFS\_ChannelCheckLeft.wav](http://www.itu.int/dms_pub/itu-r/oth/11/02/R11020000010010ZIPM.zip) | −23.0 LKFS | −23.0 LKFS | Left channel gain check. 1 kHz sine wave @ ~−20 dBFS in left channel | 6 channels (L/R/C/LFE/Ls/Rs) |
| [1770Comp-2\_23LKFS\_ChannelCheckRight.wav](http://www.itu.int/dms_pub/itu-r/oth/11/02/R11020000010013ZIPM.zip) | −23.0 LKFS | −23.0 LKFS | Right channel gain check. 1 kHz sine wave @ ~−20 dBFS in right channel | 6 channels (L/R/C/LFE/Ls/Rs) |
| [1770Comp-2\_23LFKS\_ChannelCheckCentre.wav](http://www.itu.int/dms_pub/itu-r/oth/11/02/R11020000010009ZIPM.zip) | −23.0 LKFS | −23.0 LKFS | Centre channel gain check. 1 kHz sine wave @ ~−20 dBFS in centre channel | 6 channels (L/R/C/LFE/Ls/Rs) |
| [1770Comp-2\_23LKFS\_ChannelCheckLFE.wav](http://www.itu.int/dms_pub/itu-r/oth/11/02/R11020000010011ZIPM.zip) | -inf LKFS | -inf LKFS | LFE channel check. 100 Hz @~−18 dBFS. Since the LFE channel is not included in a Rec. [BS.1770](https://www.itu.int/rec/R-REC-BS.1770/en) measurement, a compliant meter shall indicate the lowest resolvable value, or ‑infinity. | 6 channels (L/R/C/LFE/Ls/Rs) |
| [1770Comp-2\_23LKFS\_ChannelCheckLs.wav](http://www.itu.int/dms_pub/itu-r/oth/11/02/R11020000010012ZIPM.zip) | −23.0 LKFS | −23.0 LKFS | Left surround channel gain check. 1 kHz sine wave @ ~−21.5 dBFS in Ls channel | 6 channels (L/R/C/LFE/Ls/Rs) |
| [1770Comp-2\_23LKFS\_ChannelCheckRs.wav](http://www.itu.int/dms_pub/itu-r/oth/11/02/R11020000010014ZIPM.zip) | −23.0 LKFS | −23.0 LKFS | Right surround channel gain check. 1 kHz sine wave @ ~−21.5 dBFS in Rs channel | 6 channels (L/R/C/LFE/Ls/Rs) |
| [1770-2 Conf 6ch VinCntr-24LKFS.wav](http://www.itu.int/dms_pub/itu-r/oth/11/02/R11020000010032ZIPM.zip) | −24.0 LKFS | −24.0 LKFS | Music with speech only in centre channel | 6 channels (L/R/C/LFE/Ls/Rs) |
| [1770-2 Conf 6ch VinL+R-24LKFS.wav](http://www.itu.int/dms_pub/itu-r/oth/11/02/R11020000010034ZIPM.zip) | −24.0 LKFS | −24.0 LKFS | Music with speech in left and right channels | 6 channels (L/R/C/LFE/Ls/Rs) |
| [1770-2 Conf 6ch VinL-R-C-24LKFS.wav](http://www.itu.int/dms_pub/itu-r/oth/11/02/R11020000010036ZIPM.zip) | −24.0 LKFS | −24.0 LKFS | Music with speech in centre, left and right channels | 6 channels (L/R/C/LFE/Ls/Rs) |
| [1770-2 Conf Stereo VinL+R-24LKFS.wav](http://www.itu.int/dms_pub/itu-r/oth/11/02/R11020000010040ZIPM.zip) | −24.0 LKFS | −24.0 LKFS | Music and speech in both channels | 2 (L/R) |
| File (1) | File-based measurement | “Live” measurement | Description | No. of channels |
| [1770-2 Conf Mono Voice+Music-24LKFS.wav](http://www.itu.int/dms_pub/itu-r/oth/11/02/R11020000010038ZIPM.zip) | −24.0 LKFS | −24.0 LKFS | Music and speech | 1 |
| [1770-2 Conf 6ch VinCntr-23LKFS.wav](http://www.itu.int/dms_pub/itu-r/oth/11/02/R11020000010031ZIPM.zip) | −23.0 LKFS | −23.0 LKFS | Music with speech only in centre channel | 6 channels (L/R/C/LFE/Ls/Rs) |
| [1770-2 Conf 6ch VinL+R-23LKFS.wav](http://www.itu.int/dms_pub/itu-r/oth/11/02/R11020000010033ZIPM.zip) | −23.0 LKFS | −23.0 LKFS | Music with speech in left and right channels | 6 channels (L/R/C/LFE/Ls/Rs) |
| [1770-2 Conf 6ch VinL-R-C-23LKFS.wav](http://www.itu.int/dms_pub/itu-r/oth/11/02/R11020000010035ZIPM.zip) | −23.0 LKFS | −23.0 LKFS | Music with speech in centre, left and right channels | 6 channels (L/R/C/LFE/Ls/Rs) |
| [1770-2 Conf Stereo VinL+R-23LKFS.wav](http://www.itu.int/dms_pub/itu-r/oth/11/02/R11020000010039ZIPM.zip) | −23.0 LKFS | −23.0 LKFS | Music and speech in both channels | 2 (L/R) |
| [1770-2 Conf Mono Voice+Music-23LKFS.wav](http://www.itu.int/dms_pub/itu-r/oth/11/02/R11020000010037ZIPM.zip) | −23.0 LKFS | −23.0 LKFS | Music and speech | 1 |
| [1770Conf-8channels-24LKFS.wav](http://www.itu.int/dms_pub/itu-r/oth/11/02/R11020000010041ZIPM.zip) | −24.0 LKFS | −24.0 LKFS | Channel gain check for 8 channels. 1 kHz sine wave @ −24 LKFS in total 8 channels. | 8 channels (0+7+0)  (L/R/C/LFE/Lss/Rss/Lrs/Rrs) |
| [1770Conf-8channels-23LKFS.wav](http://www.itu.int/dms_pub/itu-r/oth/11/02/R11020000010042ZIPM.zip) | −23.0 LKFS | −23.0 LKFS | Channel gain check for 8 channels. 1 kHz sine wave @ −23 LKFS in total 8 channels. | 8 channels (0+7+0) |
| [1770Conf-10channels-24LKFS.wav](http://www.itu.int/dms_pub/itu-r/oth/11/02/R11020000010043ZIPM.zip) | −24.0 LKFS | −24.0 LKFS | Channel gain check for 10 channels. 1 kHz sine wave @ −24 LKFS in total 10 channels. | 10 channels (4+5+0)  (L/R/C/LFE/Ls/Rs/Tfl/Tfr/Tbl/Tbr) |
| [1770Conf-10channels-23LKFS.wav](http://www.itu.int/dms_pub/itu-r/oth/11/02/R11020000010044ZIPM.zip) | −23.0 LKFS | −23.0 LKFS | Channel gain check for 10 channels. 1 kHz sine wave @ −23 LKFS in total 10 channels. | 10 channels (4+5+0) |
| [1770Conf-12channels-24LKFS.wav](http://www.itu.int/dms_pub/itu-r/oth/11/02/R11020000010045ZIPM.zip) | −24.0 LKFS | −24.0 LKFS | Channel gain check for 12 channels. 1 kHz sine wave @ −24 LKFS in total 12 channels. | 12 channels (4+7+0)  (L/R/C/LFE/Lss/Rss/Lrs/Rrs/Tfl/Tfr/Tbl/Tbr) |
| [1770Conf-12channels-23LKFS.wav](http://www.itu.int/dms_pub/itu-r/oth/11/02/R11020000010046ZIPM.zip) | −23.0 LKFS | −23.0 LKFS | Channel gain check for 12 channels. 1 kHz sine wave @ −23 LKFS in total 12 channels. | 12 channels (4+7+0) |

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| File (1) | File-based measurement | “Live” measurement | Description | No. of channels |
| [1770Conf-24channels-24LKFS.wav](http://www.itu.int/dms_pub/itu-r/oth/11/02/R11020000010047ZIPM.zip) | −24.0 LKFS | −24.0 LKFS | Channel gain check for 24 channels. 1 kHz sine wave @ −24 LKFS in total 24 channels. | 24 channels (9+10+3)  (FL/FR/FC/LFE1/BL/BR/FLc/FRc/BC/LFE2/SiL/SiR/TpFL/TpFR/TpFC/TpC/TpBL/TpBR/TpSiL/TpSiR/TpBC/BtFC/BtFL/BtFR) |
| [1770Conf-24channels-23LKFS.wav](http://www.itu.int/dms_pub/itu-r/oth/11/02/R11020000010048ZIPM.zip) | −23.0 LKFS | −23.0 LKFS | Channel gain check for 24 channels. 1 kHz sine wave @ -23 LKFS in total 24 channels. | 24 channels (9+10+3) |
| (1) All the files are available in the following link: <https://www.itu.int/oth/R1102000001/en> | | | | |

Channel ordering and channel weighting of compliance material

| No. of Channels | | Channel ordering and channel weighting | | | | | |
| --- | --- | --- | --- | --- | --- | --- | --- |
| 1 channel (0+1+0) | Channel ID, Label | 1  (Mono) |  | | | | |
| Weighting | 1.00  (±0.0 dB) |
| 2 channels (0+2+0) | Channel ID, Label | 1  L | 2  R |  | | | |
| Weighting | 1.00  (±0.0 dB) | 1.00  (±0.0 dB) |
| 6 channels (0+5+0) | Channel ID, Label | 1  L | 2  R | 3  C | 4  LFE | 5  Ls | 6  Rs |
| Weighting | 1.00  (±0.0 dB) | 1.00  (±0.0 dB) | 1.00  (±0.0 dB) | N/A\* | 1.41  (+1.5 dB) | 1.41  (+1.5 dB) |
| 8 channels (0+7+0) | Channel ID, Label | 1  L | 2  R | 3  C | 4  LFE | 5  Lss | 6  Rss |
| Weighting | 1.00  (±0.0 dB) | 1.00  (±0.0 dB) | 1.00  (±0.0 dB) | N/A\* | 1.41  (+1.5 dB) | 1.41  (+1.5 dB) |
| Channel ID, Label | 7  Lrs | 8  Rrs |  | | | |
| Weighting | 1.00  (±0.0 dB) | 1.00  (±0.0 dB) |
| 10 channels (4+5+0) | Channel ID, Label | 1  L | 2  R | 3  C | 4  LFE | 5  Ls | 6  Rs |
| Weighting | 1.00  (±0.0 dB) | 1.00  (±0.0 dB) | 1.00  (±0.0 dB) | N/A\* | 1.41  (+1.5 dB) | 1.41  (+1.5 dB) |
| Channel ID, Label | 7  Tfl | 8  Tfr | 9  Tbr | 10  Tbr |  |  |
| Weighting | 1.00  (±0.0 dB) | 1.00  (±0.0 dB) | 1.00  (±0.0 dB) | 1.00  (±0.0 dB) |  |  |
| 12 channels (4+7+0) | Channel ID, Label | 1  L | 2  R | 3  C | 4  LFE | 5  Lss | 6  Rss |
| Weighting | 1.00  (±0.0 dB) | 1.00  (±0.0 dB) | 1.00  (±0.0 dB) | N/A\* | 1.41  (+1.5 dB) | 1.41  (+1.5 dB) |
| Channel ID, Label | 7  Lrs | 8  Rrs | 9  Tfl | 10  Tfr | 11  Tbr | 12  Tbr |
| Weighting | 1.00  (±0.0 dB) | 1.00  (±0.0 dB) | 1.00  (±0.0 dB) | 1.00  (±0.0 dB) | 1.00  (±0.0 dB) | 1.00  (±0.0 dB) |
| 24 channels (9+10+3) | Channel ID, Label | 1  FL | 2  FR | 3  FC | 4  LFE1 | 5  BL | 6  BR |
| Weighting | 1.41  (+1.5 dB) | 1.41  (+1.5 dB) | 1.00  (±0.0 dB) | N/A\* | 1.00  (±0.0 dB) | 1.00  (±0.0 dB) |
| Channel ID, Label | 7  FLc | 8  FRc | 9  BC | 10  LFE2 | 11  SiL | 12  SiR |
| Weighting | 1.00  (±0.0 dB) | 1.00  (±0.0 dB) | 1.00  (±0.0 dB) | N/A\* | 1.41  (+1.5 dB) | 1.41  (+1.5 dB) |
| Channel ID, Label | 13  TpFL | 14  TpFR | 15  TpFC | 16  TpC | 17  TpBL | 18  TpBR |
| Weighting | 1.00  (±0.0 dB) | 1.00  (±0.0 dB) | 1.00  (±0.0 dB) | 1.00  (±0.0 dB) | 1.00  (±0.0 dB) | 1.00  (±0.0 dB) |
| Channel ID, Label | 19  TpSiL | 20  TpSiR | 21  TpBC | 22  BtFC | 23  BtFL | 24  BtFR |
| Weighting | 1.00  (±0.0 dB) | 1.00  (±0.0 dB) | 1.00  (±0.0 dB) | 1.00  (±0.0 dB) | 1.00  (±0.0 dB) | 1.00  (±0.0 dB) |
| \* The LFE channels are not included in a Recommendation ITU-R [BS.1770](https://www.itu.int/rec/R-REC-BS.1770/en) measurement. | | | | | | | |

1. The LFE should not be included in a meter according to Recommendation ITU-R [BS.1770-2](https://www.itu.int/rec/R-REC-BS.1770-2-201103-S/en). The actual reading will depend on the way in which the LFE channel has been incorporated into the measurement. [↑](#footnote-ref-1)