

EBU – TECH 3253



# Sound Quality Assessment Material recordings for subjective tests

**Users' handbook for the EBU SQAM CD**

Geneva  
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**Warning:** The Compact Disk should be used with the utmost care to avoid destruction of amplifiers or loudspeakers due to overload.



## Users' handbook for the EBU SQAM CD

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**Keywords:** Sound Quality Assessment Material, Compact Disk, CD

### Introduction

Basic information for performing subjective assessments of sound quality is given in ITU-R Recommendation BS.1284<sup>1</sup>. This recommends the use of two grading scales: one for the subjective assessment of the quality and one for that of the impairment of sound. It also specifies the way of presenting the results. In addition, useful advice is appended on the selection of the listening panel, on the test procedure and duration, on the choice of programme sequences and reproduction device, on the sound level, and on the listening conditions.

One fundamental prerequisite for achieving comparable results in listening tests carried out at different places, is the use of identical test material. In this context, the EBU SQAM Compact Disk contains a set of audio programme signals that are recommended by the EBU for subjective test purposes.

This collection includes programme signals specially chosen to reveal to the listener impairments that have been observed in testing both analogue and digital audio systems. The variety of material gathered should enable appropriate test signals to be found for almost every task. Nevertheless, a system under test that does not reveal any deterioration when using these test signals may still be sensitive to other critical signals not included in this collection.

The test disk contains excerpts of Compact Disks and other recordings specially produced for test purposes. The short items are applicable to the A-B-A-B test procedure as recommended by the ITU-R, and the longer excerpts are intended for a more general assessment of the behaviour of audio systems.

The test signals are arranged in the following groups:

- alignment signals            tracks            1            and            2
- artificial signals            tracks            3            to            7
- single instruments            tracks            8            to            43
- Vocal                        tracks            44            to            48
- Speech                        tracks            49            to            54
- solo instruments            tracks            55            to            60
- vocal & orchestra            tracks            61            to            64
- Orchestra                    tracks            65            to            68
- pop music                    tracks            69            and            70

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<sup>1</sup> "Methods for the subjective assessment of sound quality - general requirements, ITU, Geneva, 1997

The Table that follows provides the following information for each item:

- track and index number
- duration
- content
- number of takes
- mono/stereo
- attenuation (only applicable to single instruments - see Note 4, page 10)
- references to notes (recording conditions, sources, etc.)
- suggested applications.

The "applications" column provides guidance for the selection of items that might be suitable for detecting a specific impairment that is caused by the system under test. The identified impairments are described in a general note on page 10 of the document

### Disk Content

(The abbreviations are explained on page 9)

Track information								Suggested Applications (see p. 12)								
Track number	Index Number	Duration	Contents	Number of Takes	Mono (M)/Stereo (S)	Attenuation (dB)	Notes (See Page 10)	A/D & D/A conversion	Aliasing distortion	Bit errors	Bit-rate reduction	Dynamic range	Frequency response	Overload after processing	Programme modulated noise	Stereophonic image

#### Alignment signals

01	01	034	Sine wave, 1 kHz	-20 dB	1	M	1	.	.	.	.	.	.	.	.	.
01	02	034	Sine wave, 1 kHz	-10 dB	1	M	1	.	.	.	.	.	.	.	.	.
01	03	034	Sine wave, 1 kHz	0 dB	1	M	1	.	.	.	.	.	.	.	.	.
02	01	049	Band-limited pink noise		1	S	0 2&3	.	.	.	.	.	.	.	.	.

#### Artificial signals

03	01	0:27	Electronic gong	100 Hz	4	M	1	X	.	.	X	.	.	.	.	.
04	01	0:27	Electronic gong	400 Hz	4	M	1	X	.	.	X	.	.	.	.	.
05	01	0:28	Electronic gong	5 kHz	4	M	1	X	.	.	X	.	.	X	.	.
06	01	0:23	Electronic gong	500 Hz, vibrato	4	M	1	X	.	.	X	.	.	X	X	.
07	01	0:35	Electronic tune (Frère Jacques)		4	M	2	X	.	.	X	.	.	.	X	.

#### Single instruments

08	01	0:29	Violin	arp.	2	S	21	4	.	.	.	.	.	.	.	.
08	02	0:42	Violin	m.p.	2	S	21	4	.	.	.	.	.	.	.	.
09	01	0:30	Viola	arp.	2	S	27	4	.	.	.	.	.	.	.	.
09	02	0:26	Viola	m.p.	2	S	27	4	.	.	.	.	.	.	.	.

Track information								Suggested Applications (see p. 12)									
Track number	Index Number	Duration	Contents		Number of Takes	Mono (M)/Stereo (S)	Attenuation (dB)	Notes (See Page 10)	A/D & D/A conversion	Aliasing distortion	Bit errors	Bit-rate reduction	Dynamic range	Frequency response	Overload after processing	Programme modulated noise	Stereophonic image

10	01	0:37	Violoncello	arp.	2	S	15	4	.	.	.	.	.	.	.	.	.
10	02	0:37	Violoncello	m.p.	2	S	15	4	.	.	.	.	.	.	.	.	.
11	01	0:31	Double-bass	arp.	2	S	21	4	.	.	.	.	.	.	.	X	.
11	02	0:35	Double-bass	m.p.	2	S	21	4	.	.	.	.	.	.	.	X	.
12	01	0:27	Piccolo	m.p.	2	S	15	4	.	.	.	.	.	.	.	.	.
13	01	0:17	Flute	arp.	2	S	21	4	.	.	.	.	.	.	.	.	.
13	02	0:29	Flute	m.p.	2	S	21	4	.	.	.	.	.	.	.	.	.
14	01	0:24	Oboe	arp.	2	S	21	4	.	.	.	.	.	.	.	.	.
14	02	0:25	Oboe	m.p.	2	S	21	4	.	.	.	.	.	.	.	.	.
15	01	0:24	Cor anglais	arp.	2	S	21	4	.	.	.	.	.	.	.	.	.
16	01	0:19	Clarinet	arp.	2	S	21	4	.	X	.	.	.	.	.	.	.
16	02	0:20	Clarinet	m.p.	2	S	21	4	.	X	.	.	.	.	.	.	.
17	01	0:23	Bass-clarinet	arp.	2	S	21	4	.	.	.	.	.	.	.	.	.
18	01	0:19	Bassoon	arp.	2	S	21	4	.	.	.	.	.	.	.	.	.
18	02	0:19	Bassoon	m.p.	2	S	21	4	.	.	.	.	.	.	.	.	.
19	01	0:22	Contra-bassoon	arp.	2	S	21	4	.	.	.	.	.	.	.	.	.
20	01	0:15	Saxophone	arp.	2	S	12	4	.	.	.	.	.	.	.	.	.
20	02	0:24	Saxophone	m.p.	2	S	12	4	.	.	.	.	.	.	.	.	.
21	01	0:13	Trumpet	arp.	2	S	6	4	.	X	.	.	.	.	.	.	.
21	02	0:23	Trumpet	m.p.	2	S	6	4	.	X	.	.	.	.	.	.	.
22	01	0:17	Trombone	arp.	2	S	9	4	.	.	.	.	.	.	.	.	.
22	02	0:23	Trombone	m.p.	2	S	9	4	.	.	.	.	.	.	.	.	.
23	01	0:13	Horn	arp.	2	S	12	4	.	.	.	.	.	.	.	.	.
23	02	0:31	Horn	m.p.	2	S	12	4	.	.	.	.	.	.	.	.	.
24	01	0:26	Tuba	arp.	2	S	12	4	.	.	.	.	.	.	.	.	.
24	02	0:23	Tuba	m.p.	2	S	12	4	.	.	.	.	.	.	.	.	.
25	01	0:34	Harp	arp.	2	S	21	4	.	.	.	.	.	.	.	.	.
25	02	0:34	Harp	m.p.	2	S	21	4	.	.	.	.	.	.	.	.	.
26	01	0:18	Claves	s.t.	2	S	6	4	.	.	.	.	.	.	.	.	.
26	02	0:21	Claves	s.t., rhythm	2	S	6	4	.	.	.	.	.	.	.	X	.
27	01	0:20	Castanets	s.t., rhythm	2	S	6	4	.	.	.	.	.	.	.	.	.
28	01	0:18	Side drum	s.t.	2	S	6	4	.	.	.	.	.	.	.	.	.
28	02	0:19	Without snares	roll	2	S	6	4	.	.	.	.	.	.	.	.	.
28	03	0:17	Side drum	s.t.	2	S	6	4	.	.	.	.	.	.	.	.	.
28	04	0:22	With snares	roll	2	S	6	4	.	.	.	.	.	.	.	.	.
29	01	0:24	Bass drum	s.t.	2	S	0	4	.	.	.	.	.	.	.	.	.
30	01	0:26	Kettle-drums	s.t.	2	S	0	4	.	.	.	.	.	.	.	.	.
31	01	0:34	Cymbal-soft stick	s.t.	2	S	9	4	.	.	.	.	.	.	.	X	.
31	02	0:33	Cymbal-hard stick	s.t.	2	S	9	4	.	.	.	.	.	.	.	X	.
31	03	0:35	Cymbal-soft stick	roll	2	S	9	4	.	.	.	.	.	.	.	X	.

Track information							Suggested Applications (see p. 12)										
Track number	Index Number	Duration	Contents		Number of Takes	Mono (M)/Stereo (S)	Attenuation (dB)	Notes (See Page 10)	A/D & D/A conversion	Aliasing distortion	Bit errors	Bit-rate reduction	Dynamic range	Frequency response	Overload after processing	Programme modulated noise	Stereophonic image

31	04	0:22	Cymbal.	s.t.	2	S	3	4	.	.	.	.	.	.	.	X	.
32	01	0:43	Triangles	s.t.	2	S	18		.	X	X	X	.	.	.	.	.
32	02	0:31	Triangle	roll	2	S	15	4	.	X	X	X	.	.	.	.	.
33	01	1:46	Gong	s.t. (forte)	2	S	6	4	.	.	.	.	.	.	.	X	.
33	02	1:42	Gong	s.t. (piano)	2	S	30	4	.	.	.	.	.	.	.	X	.
33	03	0:58	Gong	roll	2	S	6	4	.	.	.	.	.	.	.	.	.
34	01	0:27	Tubular bells	m.p.	2	S	15	4	.	.	.	.	.	.	.	.	.
35	01	0:35	Glockenspiel	arp.	2	S	15	4	.	.	.	X	.	.	.	.	.
35	02	0:24	Glockenspiel	m.p.	2	S	15	4	.	.	.	X	.	.	.	.	.
36	01	0:26	Xylophone	s.t	2	S	9	4	.	.	.	.	.	.	.	.	.
36	02	0:24	Xylophone	m.p.	2	S	9	4	.	.	.	.	.	.	.	.	.
37	01	0:15	Vibraphone	arp.	2	S	18	4	.	.	.	.	.	.	.	.	.
38	01	0:21	Marimba	s.t.	2	S	6	4	.	.	.	.	.	.	.	.	.
39	01	0:20	Grand piano	arp.	2	S	15	4	.	.	.	.	.	.	.	.	.
39	02	0:42	Grand piano	s.t. (mezzoforte)	2	S	15	4	X	.	.	X	.	.	.	X	.
39	03	0:48	Grand piano	s.t. (fortissimo)	2	S	15	4	X	.	.	X	.	.	.	X	.
39	04	0:27	Grand piano	m.p.	2	S	15	4	.	.	.	X	.	.	.	X	.
40	01	0:23	Harpsichord	arp.	2	S	21	4	.	.	.	X	.	.	.	X	.
40	02	0:30	Harpsichord	m.p.	2	S	21	4	.	.	.	.	.	.	.	.	.
41	01	0:16	Celesta	arp.	2	S	21	4	.	.	.	.	.	.	.	.	.
41	02	0:28	Celesta	s.t.	2	S	21	4.	.	.	.	.	.	.	.	.	.
41	03	0:22	Celesta	m.p.	2	S	21	4	.	.	.	.	.	.	.	.	.
42	01	0:22	Accordion	m.p.	2	S	15	4	.	.	.	.	.	.	.	.	.
43	01	0:26	Organ	arp.	2	S	18	4	.	.	.	.	.	.	.	.	.
43	02	0:26	Organ	m.p.	2	S	18	4	.	.	.	.	.	.	.	.	.
43	03	0:36	Organ	m.p. (full organ)	2	S	12	4	.	.	.	.	.	.	.	.	.

Vocal

44	01	0:28	Soprano		2	S	21	4	.	.	.	.	.	.	.	.	.
45	01	0:30	Alto		2	S	21	4	.	.	.	.	.	.	.	.	.
46	01	0:29	Tenor		2	S	21	4	.	.	.	.	.	.	.	.	.
47	01	0:30	Bass		2	S	21	4	.	.	.	.	.	.	.	.	.
48	01	0:28	Quartet		2	S	21	4	.	.	.	.	.	.	.	.	.

Speech

49	01	0:23	Female speech	English	1	M	25	5	.	.	.	.	.	.	.	.	.
50	01	0:22	Male speech	English	1	M	25	5	.	.	.	.	.	.	.	.	.
51	01	0:21	Female speech	French	1	M	25	6	.	.	.	.	.	.	.	.	.
52	01	0:24	Male speech	French	1	M	25	6	.	.	.	.	.	.	.	.	.



Track information								Suggested Applications (see p. 12)									
Track number	Index Number	Duration	Contents		Number of Takes	Mono (M)/Stereo (S)	Attenuation (dB)	Notes (See Page 10)	A/D & D/A conversion	Aliasing distortion	Bit errors	Bit-rate reduction	Dynamic range	Frequency response	Overload after processing	Programme modulated noise	Stereophonic image
53	01	0:21	Female speech	German	1	M	25	7	.	.	.	.	.	.	.	.	.
54	01	0:21	Male speech	German	1	M	25	7	.	.	.	.	.	.	.	.	.

**Solo instruments**

55	01	0:32	Trumpet	Haydn	1	S		9	.	.	X	.	.	.	.	.	.
56.	01	0:34	Organ	Handel	1	S		10	.	.	.	.	.	.	.	.	.
57	01	0:20	Organ	Bach	1	S		11	.	X	.	.	.	.	.	.	.
58	01	0:16	Guitar	Sarasate	1	S		12	.	X	.	.	.	.	X	X	.
59	01	0:29	Violin	Ravel	1	S		13	.	.	.	.	.	.	.	.	.
60	01	1:32	Piano	Schubert	1	S	9	4	X	.	X	X	X	.	.	X	.

**Vocal & Orchestra**

61	01	2:59	Soprano	Mozart	1	S		14	.	.	.	.	.	X	X	.	.
62	01	0:31	Soprano	Spiritual	1	S		15	.	.	.	.	.	.	.	.	.
63	01	0:57	Soloists	Verdi	1	S		16	.	.	.	.	.	X	.	.	X
64	01	0:31	Choir	Orff	1	S		17	.	.	.	.	.	X	.	.	.

**Orchestra**

62	01	1:52	Orchestra	R. Strauss	1	S		18	.	.	.	X	X	X	.	.	.
66	01	0:18	Wind ensemble	Stravinsky	1	S		19	.	X	.	X	.	X	.	.	.
67	01	1:22	Wind ensemble	Mozart	1	S		20	.	.	.	.	.	.	.	.	.
68	01	2:44	Orchestra	Baird	1	S		2&8	.	.	.	.	X	.	.	.	.

**Pop Music**

69	01	0:33	ABBA		1	S		21	.	.	.	X	.	.	.	.	X
70	01	0:21	Eddie Rabbitt		1	S		22	.	.	.	.	.	.	X	X	.

**Abbreviations:**

- arp. : arpeggio
- m.p. : melodious phrase
- s.t. : single tone
- M : mono
- S : stereo

**Notes**

1. Computed source material.
2. Analogue source material.
3. The pink noise on this track occupies a frequency band from 200Hz to 15kHz; noise signals in the left and right channels are not correlated.

The signal may be reproduced via the loudspeakers in the listening-area used for subjective tests, and the sound pressure level measured at the listening position(s) and noted. The gain of the reproducing system should be the same for this measurement as for the reproduction of the test item (or items). If different gain settings are used for different items, the changes in gain should also be noted. This information should enable other users to reproduce the same listening levels in their own listening areas, if required.

Because the excerpts from the Compact Disks have been copied directly, with no level modifications, the listening levels established for these excerpts and measured using the pink noise recorded on this Disk will also be relevant for setting listening levels when the original Disks are being used for tests. No change in the gain of the reproducing equipment is to be made under these circumstances and both the excerpts and the original Compact Disk will be reproduced at the same level.

The pink noise recording may be used, additionally, to set the same listening levels in different listening rooms for reproduction of the same Compact Disks (which need not be the Compact Disks used for this Disk). The sound levels from these Compact Disks will not necessarily be the same as those from this EBU Disk.

4. For this recording, two omnidirectional microphones (type Bruel and Kjaer 4006 spaced 35cm apart) were used, without any spot microphones.

This technique ensures an accurate bass response and an adequate stereophonic image. Each of the two microphone signals, either left or right, represents an optimum monophonic signal. It is not advisable to add the left and the right signal for monophonic reproduction.

The distance from the microphone to the instrument was in the range from 1 to 2m. The recording was made in a studio having a volume of 1000 m<sup>3</sup> and with a reverberation time of 1.6s. The microphone signals were amplified with a Neumann PMV 70 microphone amplifier and directly recorded on a Sony PCM 1630 / U-matic VO 5850 machine.

No mixing desk was used. The recordings were monitored with studio headphones (STAX SR A professional and SRM monitor amplifier with diffuse-field equaliser). Editing was done with Sony DAE-I100 / U-Matic DMR 4000 equipment. The recordings were made with the kind assistance of the musicians and sound engineer Martin Wöhr of the Bayerischer Rundfunk.

During recording, the level has been adjusted to give the maximum signal-to-noise ratio for each instrument. The level settings have been carefully noted, and the correct relative level for the different instruments may be restored by employing an attenuator after the output of the Compact Disk player, with the attenuation set to the values shown.

If the sound pressure level at a listening position is set to 60 dBA when reproducing the pink noise track (track 2), the sound pressure level reproduced at the listening position, after the recommended attenuator values have been set, will be 4 dB below the sound pressure level at the microphones during recording. It is suggested that this is likely to be a satisfactory level for listening to the single instruments.

5. Both of the English speech items were recorded by the BBC in Maida Vale Studio 7, a drama studio with a mid-band reverberation time of approximately 0.3s. The studio noise level was below NR5. The monophonic recording was made using a single AKG C414-ULS microphone, with the cardioid polar response selected, and the speakers were approximately 65cm from the microphone.
6. Both of the French speech items were monophonic recordings made at Radio France; the speakers were approximately 40cm from the microphone.
7. The two German speech items were recorded in an anechoic chamber of a volume of 194m<sup>3</sup>. These monophonic recordings were made by using cardioid pattern microphone (NEUMANN KM 84) at a distance of approximately 45cm.
8. Artificial head recording.
9. Hlaken Hardenberger - Haydn; Concerto for Trumpet and Orchestra (Allegro)  
CD Philips 420 203-2, Track 12, 0:39 ... 1:00  
© 1987, Phonogram International B.V.
10. Walther R. Schuster: - Handel: Tochter Zion (Atrium)  
CD Polydor No. 823497-2, Track 1, 1:57 ... 2:27  
© 1984, Polydor International GmbH - Hamburg
11. Walther R. Schuster - Bach: In Dulci Jubilo  
CD Polydor No. 823497-2, Track 2, 1:47 ... 2:00  
© 1984, Polydor International GmbH - Hamburg
12. Larry Coryell - Sarasate: Zapateado  
CD Philips No, 810 027-2, Track 6, 1:39 ... 1:51  
© 1981, Nippon Phonogram, Tokyo
13. Kantorow/Zigeunerweisen - Ravel: Tzigane (for violin and orchestra)  
CD Denon No. C37-7005, Track 4, 2:23 ... 2:48  
© 1982.10, Nippon Columbia
14. Sir Cohn Davis - Mozart: Die Zauberflöte (Nr. 14 Arie: Der Hölle Rache kocht in meinem Herzen)  
CD Philips No.411 461-2, Track II, 0:00... 2:51  
© 1984, Phonogram International B.V.
15. Jessie Norman - Sacred Songs (Sweet Little Jesus Boy)  
CD Philips No.400 019-2, Track 10, 3:00... 3:30  
© 1981, Phonogram International B.V.
16. Sir Georg Solti - Verdi; Un Ballo in Maschera  
CD Decca No. 410 210-2, Track 10, 0:15 ... 1:08  
© 1985, The Decca Record Company Limited, London
17. Ricardo Muti - C, Orff: Carmina Burana (O Fortuna)  
CD EMI No. CDC 7 47100 2, Track 25, 0:14 ... 0:25  
© 1980, EMI Records Limited
18. Seiji Ozawa - Strauss: Also sprach Zarathustra  
CD Philips No. 400 072-2, Track 1, 0:00... 1:45  
© 1982, Phonogram International B.V.
19. Charles Dutoit - Stravinsky: Le Sacre du Printemps / Symphony of Wind Instruments  
CD Decca No. 414 202-2, Track 3, 5:20 ... 5:32  
© 1984, The Decca Record Company Limited, London

20. Orpheus Chamber Orchestra - Mozart: Divertimento in B flat major, K.270 (Allegro molto)  
CD DG No. 415 669-2, Track 7, 0:00 ... 1:16  
© 1986, Polydor International GmbH, Hamburg
21. ABBA - The Visitors (Head Over Heels)  
CD Polydor No. 800 011-2, Track 2, 0:00 ... 0:27  
© 1981, Polar Music International A.B., Stockholm
22. Eddie Rabbitt - Early in the morning  
Philips CD No. 810 027 - 2, Track 5, 1:57 ... 2:11  
© 1981, Eddie Rabbitt, USA

## **Suggested applications**

Under the heading 'suggested applications', a list of nine different system aspects is given to provide guidance for using the recordings in applications for which the test material has been found useful. It should be noted that other applications might be found. The specific impairments related to those system aspects are described below:

### ***A/D and D/A linearity***

Errors in the conversion of audio signals between the analogue and digital forms can cause noise, granular distortion (a "gritty" effect) and other unpleasant sounds which are not normally encountered in analogue systems.

Of particular interest, when testing converters, is the effect of these distortions at low signal levels. In this context, it is important to listen to the decay of musical notes and chords.

### ***Aliasing distortion***

If high audio frequencies (i.e. frequencies close to one-half of the sampling frequency of a digital system) are present in the analogue-to-digital converter, spurious audible products can be formed by interaction between these frequencies and the sampling frequency. These high audio frequencies should be attenuated, prior to conversion of the signal into digital form, by a low-pass filter. It will be appreciated that, because the sampling frequency of the Compact Disk is 44.1 kHz, and the highest audio frequencies recorded are in the region of 20 kHz, the signals will not be of use for testing systems with sampling frequencies higher than 44.1 kHz.

The most useful signals are those which have high energy at the higher audio frequencies, but which give minimal masking of the alias products.

### ***Bit errors***

The effects of bit errors in a digital system can be a subtle background disturbance, a very loud disturbance that virtually destroys the signal or an effect intermediate between these extremes. Furthermore, the characteristics of different digital systems can affect the nature of the disturbance. For example, some systems respond differently to random errors and bursts of errors, depending upon their error-correction and concealment capability. Some systems such as near-instantaneous digital companders, introduce programme modulated effects.

***Bit-rate reduction***

Bit-rate reduction techniques for digital systems vary widely and the material presented is intended for a wide range of different systems (e.g. companding, sub-band coding, transform coding, predictive differential PCM). Some of these systems are limited in their slew-rate response and some of the test items are intended to test this characteristic.

***Dynamic range***

Programme material with a wide dynamic range (i.e. material which contains both extremely quiet and extremely loud sounds) is useful for testing the audible effects of amplitude-controlling devices, such as audio limiters and compressors.

***Frequency response***

Programme material with a wide range of frequencies is necessary for testing Systems which may have a limited bandwidth, or irregularities in the amplitude/frequency or phase/frequency response (resulting in coloration of the sound).

***Overload after processing***

Some signals, which may be Well-controlled in level, may be subject to overloading after processing. Examples of processes that can cause overloading are pre-emphasis (which boosts high frequencies) and low-pass filtering (which can cause signal peaks to form as a result of dispersion). Both analogue and digital processes can cause such overloading.

Processes such as pre-emphasis and filtering are often associated with limiters and analogue/digital converters, and other effects such as apparently irrelevant level variations or clipping of signals may result.

***Programme-modulated noise***

All companding (i.e. compression - expansion) systems introduce programme-modulated noise. This applies both to analogue and digital companders.

The test material is chosen so that masking of the programme-modulated noise by the signal itself is minimal. However, because different companders produce somewhat different programme-modulated noise effects (e.g. sometimes the noise is modified by pre-emphasis), different test passages may be appropriate for different types of compander.

***Stereophonic image***

The test material has been chosen to give clear identification and location of the sound sources. This type of sound is useful in testing systems which may make sound source location indistinct or incorrect. Examples are systems with amplitude/frequency or amplitude/phase response differences between channels, and systems in which substitution of left signals for right (or vice versa) is used to conceal the effects of muting.