
British Standard

**Apparatus with one or more particular functions
for connection to the British Telecommunications
public switched telephone network**

Part 2. Specification for apparatus with loudspeaking facilities

Appareils à une ou plusieurs fonctions particulières destinés à être reliés au réseau
téléphonique public commuté de British Telecommunications
Partie 2. Appareils munis de haut-parleurs — Spécifications

Apparate mit einer oder mehreren Sonderfunktionen zum Anschluß an das öffentliche
Fernsprechnetzz von British Telecommunications
Teil 2. Apparate mit Lautsprecher

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Foreword

This British Standard has been prepared under the direction of the Telecommunications Standards Committee. It forms one of a series of British Standards that are being produced following the commencement of liberalization in October 1981 of the supply of certain telecommunications apparatus within the United Kingdom.

This series of standards includes product specifications giving particular requirements for individual items of apparatus, together with standards covering general requirements for the connection of apparatus to the various networks of British Telecommunications. At the present time, these networks include the public switched telephone network, the telex network, the packet switching service, and private circuits leased from British Telecommunications.

The requirements specified in the standards are intended to ensure that apparatus complying with them, when connected to British Telecommunications networks, will neither adversely affect any network nor interfere with the service available to other users. The standards include safety requirements only for the protection of personnel operating the network and for the protection of users from hazards that may arise from the connection of the apparatus to the network.

The multi-part standard to which this Part belongs is intended to specify all the additional functions and facilities that require specifying for approval purposes and that may be added to apparatus submitted for approval for use in conjunction with simple telephones or modems on the British Telecommunications public switched telephone network. There are a large number of possible permutations in the choice of these facilities to form a particular configuration of apparatus. In order to present a coherent range of specifications that is appropriate to this variety of configurations, Part 1 of this standard is used as an essential initial specification and the remaining Parts each specify an additional facility. Part 1 of the standard requires the supplier to state which of these facilities is present on the apparatus submitted for approval so that it is clear which of the subsequent Parts are relevant.

This Part of this standard specifies requirements for the loudspeaking facility. It is for use only in conjunction with Part 1 of this standard. It is anticipated that approval of type B apparatus will cease to be valid after March 1985 unless a suitable power unit has become available and the information specified in 4.2.4 has been included in the instructions for use. It is intended to amend this Part of the standard in March 1985 by withdrawing the existing requirement of 4.1(j) and substituting the requirement that the supplier should state that a suitable power unit is available; and by requiring the information specified in 4.1(k), 4.2.4 and 6.1.2 to be applicable to type B apparatus without qualification relating to the availability

of the power unit. It is also intended to amend this Part of the standard in March 1985 by adding in 3.2 a requirement that, where the apparatus provides the capability of associated handset telephoning, full hands free operation should not be available when the associated telephone is not connected.

This standard is presented to the Secretary of State for approval under Section 16(1) of the British Telecommunications Act, 1981. It is government policy that, once the Secretary of State's approval has entered into force, apparatus within the scope of an approval standard may be connected to British Telecommunications networks only if it conforms to the technical requirements of that standard and any relevant product standard and if it has been approved by the Secretary of State, British Telecommunications or the British Approvals Board for Telecommunications. The Secretary of State will not normally entertain applications for approval of apparatus. Applications for approval of apparatus should be addressed in the first instance to The Director, British Approvals Board for Telecommunications (BABT), Mark House, The Green, 9-11 Queen's Road, Hersham, Walton-on-Thames, Surrey, KT12 5NA.

In approving this standard, the Secretary of State may, at his discretion, stipulate variations of, or additions to, the requirements of this standard and may also set conditions that have to be complied with as regards the apparatus, or its connection, or use. A copy of the Secretary of State's approval will be included, when available, with all copies of this standard. Any further information on details of approval of this standard may be obtained from the Department of Trade and Industry, Room 307, Ashdown House, 123 Victoria Street, London SW1E 6RB.

Some apparatus may incorporate facilities for which a mandatory standard is necessary, but for which no standard has yet been approved by the Secretary of State. Other apparatus may incorporate innovative features not foreseen when the relevant standard was written and approved and for which that standard is not fully appropriate. The BABT can sometimes deal with these cases by writing a 'Special investigation schedule' (SITS) which has the effect of stating requirements where there is no approved British Standard or of supplementing or varying the requirements in the application of the approved British Standard. Information on any relevant SITS may be obtained from the Director, BABT.

Where this course is not possible, BT may nevertheless approve apparatus for connection to its networks and should be consulted directly as to its requirements.

Compliance with a British Standard does not of itself confer immunity from legal obligations.

British Standard

Apparatus with one or more particular functions for connection to the British Telecommunications public switched telephone network

Part 2. Specification for apparatus with loudspeaking facilities

Section one. General

1. Scope

This Part of BS 6789 specifies requirements for loudspeaking facilities incorporated in extension apparatus for connection to a single exchange line of the British Telecommunications public switched telephone network.

This Part does not apply to apparatus for connection to shared service lines or 1 + 1 carrier systems. This Part does not specify requirements for apparatus for connection as terminating stations on any form of PBX.

This Part applies only where the apparatus containing the loudspeaking facility also provides either integral handset telephony or the capability of associated handset telephony.

This Part applies in conjunction with Part 1 of this standard, and the requirements of this Part are additional to those of Part 1 : 1984 of this standard. In particular, clause 6 of Part 1 : 1984 of this standard is applicable, which states that the requirements of BS 6317 apply except where otherwise specified. This Part does not apply to apparatus with control of or switching of other voice circuits.

This Part applies to apparatus for household, office and similar general indoor use.

The tests described in this Part are type tests as defined in BS 4778 : 1979.

NOTE 1. This Part does not exclude the simultaneous use of the loudspeaking and simple telephone facilities. This Part does not exclude apparatus making use of adaptive techniques, but see A.10.

NOTE 2. The titles of the publications referred to in this Part are listed on the inside back cover.

2. Abbreviations, definitions and notation

For the purposes of this Part of BS 6789, in addition to the abbreviations and definitions given in BS 6317 : 1982, the following abbreviation, definitions and notation apply.

2.1 Abbreviation. LST. Loudspeaking telephone.

2.2 Definitions

2.2.1 pink noise. Noise whose sound pressure spectral density is inversely proportional to frequency.

2.2.2 spectral density. Limit, as the bandwidth approaches zero, of the mean square value of a field quantity divided by bandwidth.

NOTE. When the term spectral density is used, the kind of field quantity is stated, for example, as sound pressure.

2.2.3 mean receiving crosstalk sensation level. The equivalent mean sensation level ($\bar{Z}$) giving equal loudness to that of a continuous spectrum sound.

2.2.4 loudspeaking facility. A facility in an apparatus where one or more of the transducers used to provide the

speech communication path is not closely coupled to the user's mouth or ear.

NOTE. This definition includes three different modes of user operation as defined in 2.2.4.1, 2.2.4.2 and 2.2.4.3.

2.2.4.1 call progress monitor. A mode of operation of apparatus where the apparatus is capable of receiving with the integral or associated handset inoperative, and where the apparatus reverts to normal handset operation when the integral or associated handset is operative.

NOTE. A call progress monitor may also be capable of signalling when the integral or associated handset is inoperative.

2.2.4.2 full monitor (group listening). A mode of operation of apparatus where the apparatus is capable of amplifying received signals through an additional transducer (for example, a loudspeaker) simultaneously with the normal telephone handset operation.

NOTE. This apparatus may also be used in the call progress monitor mode.

2.2.4.3 full hands free operation. A mode of operation of apparatus where the apparatus is capable of both speech reception and transmission with the integral or associated handset inoperative, and where the apparatus reverts to normal handset operation when the integral or associated handset is operative.

2.2.5 integral handset telephony. A configuration of apparatus where both a loudspeaking facility and a simple telephone facility are provided as part of the apparatus.

NOTE. Integral handset telephony includes apparatus where the simple telephone facility is contained or partly contained in a separate module that is connected to the apparatus by means other than a plug that meets the requirements of BS 6312 : 1982 and a socket that is compatible with it.

2.2.6 associated handset telephony. A configuration of apparatus where a simple telephone facility is not integral but where a simple extension telephone meeting the requirements of BS 6317 : 1982 is capable of being plugged into a compatible socket that is part of the apparatus.

2.2.7 apparatus making use of adaptive techniques.

Apparatus whose circuit parameters are automatically adjusted to the room conditions or line conditions that exist for each connection.

2.2.8 type A apparatus. Apparatus that, in the configuration in which the apparatus is supplied to the user, when the apparatus is in the loudspeaking mode and when powering arrangements forming part of the apparatus, if any, are connected and energized, is designed to meet the requirements of 9.1 of BS 6317 : 1982.

NOTE. 'Supplied to the user' implies that the whole of the apparatus necessary to satisfy the above definition forms a single package, even if the apparatus itself comprises more than one module.

2.2.9 type B apparatus. Apparatus that, in the configuration in which the apparatus is supplied to the user, when the apparatus is in the loudspeaking mode, is not designed to meet the requirements of 9.1 of BS 6317 : 1982.

NOTE. This definition embraces apparatus that is essentially line powered and works under certain line conditions, but that would require an additional power unit (not supplied as part of the apparatus) to enable it to meet the requirements of 9.1 of BS 6317 : 1982 and so to ensure operation under all line conditions.

2.3 Notation. $\bar{Z}$. Mean sensation level.

3. General requirements and test conditions

3.1 General. The requirements of Part 1 : 1984 of this standard apply (see clause 1).

3.2 Modes of operation. The apparatus shall provide a loudspeaking facility with one or more of the following modes of operation:

- (a) call progress monitor;
- (b) full monitor (group listening);
- (c) full hands free operation.

NOTE 1. For definitions of the terms used for these modes of operation, see clause 2. The supplier is required to state which modes of operation are available on the apparatus, see clause 4.

NOTE 2. Attention is drawn to the information given in the foreword concerning a forthcoming amendment to these requirements.

Where the simple telephone facility is provided by an associated telephone, the apparatus shall be provided with a socket that is compatible with a plug that meets the requirements of BS 6312 : 1982. The allocation of socket pins shall be as given in table 1 of BS 6317 : 1982.

Where the apparatus consists of more than one module, the modules shall be interconnected by a means other than a plug that meets the requirements of BS 6312 : 1982 and a socket that is compatible with it.

The apparatus shall provide a mode of operation in which the simple telephone facility is capable of being used alone. In this mode, the following requirements apply.

(a) *Integral handset telephony.* Where the apparatus provides integral handset telephony, when the apparatus is in the simple telephone mode the requirements of BS 6317 : 1982 apply.

(b) *Associated handset telephony.* Where the simple telephone facility is provided by an associated telephone, when the apparatus is in the simple telephone mode the requirements of BS 6317 : 1982 do not apply and instead, the apparatus shall meet the requirements of Part 6 of this standard.

NOTE 3. Tests are not made on a simple telephone that meets the requirements of BS 6317 : 1982 and is associated with the apparatus for test purposes (see A.1).

Compliance with requirements in this subclause that are not specified by reference to other standards shall be checked by inspection.

3.3 Power source. The requirements of 3.1 of BS 6317 : 1982 do not apply.

Where the LST utilizes an external power source, a telephone facility capable of making 999 calls and meeting the requirements of BS 6317 : 1982 shall be available both with and without the power source connected.

3.4 Test conditions. The general conditions for the tests, both in the main text and in appendix B, shall be as described in appendix A.

NOTE 1. The requirements of clause 11 of Part 1 : 1984 and thereby of A.1 of BS 6305 : 1982, also continue to apply. The test conditions described in appendix A of BS 6317 : 1982 also continue to apply where appropriate.

NOTE 2. For associated handset telephony, the suitability for use of the apparatus is not limited to use only with the particular model of associated telephone used during its tests for compliance with this Part of this standard (see A.1).

3.5 Independence of line polarity. The requirements of section two of this Part of this standard shall be met independently of line polarity.

Compliance shall be checked by reversal of the d.c. voltage appearing between the A and B terminals of the apparatus under test between individual tests as appropriate.

3.6 Volume controls. For apparatus fitted with user-controlled volume controls, unless otherwise stated in this Part of this standard, the requirements of this Part of this standard shall be met for all positions of the controls.

4. Information to be provided by the supplier

4.1 Information required for testing purposes. Where the apparatus incorporates integral handset telephony, the requirements of 5.1 of BS 6317 : 1982 apply, for use when the apparatus is in the simple telephone mode.

Where the simple telephone facility is provided by an associated telephone, the requirements of clause 5 of Part 6 of this standard apply, for use when the apparatus is in the simple telephone mode. In addition the following requirements apply, for use when the apparatus is in a loudspeaking mode.

(a) The supplier shall state which of the modes of user operation of the apparatus, listed in 3.2, are available.

(b) The supplier shall state the impedance classification of the apparatus as given in table 6 of BS 6305 : 1982, but with the reference to 4.3.2.1 of BS 6305 : 1982 being taken to mean a reference to the requirements of that subclause when modified by 6.2 of this Part of this standard.

(c) The supplier shall state the classification of the d.c. characteristics of the apparatus as given in table 2 of BS 6317 : 1982.

(d) Where the effects of the test signals on the performance of the apparatus do not differ from each other, the supplier shall determine which of the test signals (a), (b) or (c) described in A.7 and A.8 should be used. In the absence of a statement, test signal (b) shall be adopted.

NOTE 1. The supplier should state which test signal should be used, but provision is made for an appropriate test signal to be used where no such statement is available.

Where the effect of test signal (a) on the performance of the apparatus differs from the effect of test signals (b) or (c), the supplier shall state that this is so, and shall state which of the test signals (b) or (c) should be used.

NOTE 2. An example of apparatus where the type of test signal affects the performance is an apparatus that automatically compensates for the presence of room noise.

Where test signal (c) is chosen, in each instance the supplier shall state the duration for which the signal is switched on, and the duration for which it is switched off. The stated duration of the 'on' time in each instance shall be not less than 100 ms.

(e) The supplier shall state whether or not the apparatus has an earth connection and, if so, the position of the earth reference point in the apparatus.

NOTE 3. This information is useful because some requirements are relevant only where the apparatus has an earth connection. References to these requirements are listed in paragraph (a) of the note to clause 5 of Part 1 : 1984 of this standard.

(f) The supplier shall declare that the sound output from the loudspeaker is limited by the power output capability of the loudspeaker drive amplifier (see 7.5).

(g) The supplier shall state whether or not the apparatus makes use of adaptive techniques (see A.10).

(h) The supplier shall state whether the apparatus is type A or type B.

(j) For type B apparatus, the supplier shall state whether or not a suitable power unit is available.

NOTE 4. Attention is drawn to the information given in the foreword concerning a forthcoming amendment to this requirement.

(k) For type B apparatus, where the supplier states that a suitable power unit is available (see 4.1(j)), the supplier shall provide such information or means as is necessary to enable the apparatus to be tested in conjunction with the power unit.

4.2 Instructions for use

4.2.1 Where a socket is provided for associated handset telephony, the instructions for use shall state that apparatus connected to that socket has to be approved for direct connection to the British Telecommunications public switched telephone network, and has to include a handset telephone.

4.2.2 For type A apparatus with a power supply, the instructions for use shall state that the power has to be properly connected and switched on.

NOTE. This requirement applies whether the power supply is built-in or separate.

4.2.3 For type B apparatus the instructions for use shall state that operation in the loudspeaking mode may not be possible on some PSTN lines, and shall include the following information:

- (a) an explanation that the apparatus may require more power than the PSTN line is designed to provide;
- (b) an explanation that while operation may be possible initially, normal changes to the PSTN line or reconnection of the apparatus to a different line may result in the apparatus requiring more power than the line is designed to provide;
- (c) a warning that operation of the apparatus with another telephone in use on the same line at the same time may not be possible;
- (d) advice that if operation is not satisfactory, the user should contact the supplier.

4.2.4 For type B apparatus, where the supplier states that a suitable power unit is available (see 4.1(j)), the instructions for use shall include the following information:

- (a) a description of the type of power unit needed if operation is not satisfactory;
- (b) identification of a suitable model of power unit;
- (c) a statement of how such a model may be obtained and an assurance to the user that supply is normally available within 28 days.

- (d) an explanation of how the power unit is connected;
- (e) a warning that only an approved type of power unit should be used.

5. Electrical network connection methods

NOTE. For physical network connection methods, see B.1 and B.2 of BS 6305 : 1982.

For incoming call detection the requirements of 6.4 of BS 6317 : 1982 apply with the following exceptions. When the apparatus is in the loudspeaking mode, in 6.4.3 of BS 6317 : 1982, where alternative (b) is adopted, that is, where disabling of the ringing detector is by means other than series disconnection of the ringing circuit, in item (2) of alternative (b) the impedance shall continue to meet the requirements of 6.2 of this Part of this standard in place of 4.1.3 of BS 6305 : 1982, and in item (4) of alternative (b), the speech transmission characteristics shall continue to meet the requirements of clause 7 of this Part of this standard in place of clause 13 of BS 6317 : 1982.

Section two. Electrical characteristics of apparatus

NOTE 1. Except where otherwise specified in this section, the characteristics specified in this section refer to a single loudspeaking telephone apparatus connected to the network.

NOTE 2. For guidance on the electrical characteristics of the network, see appendix C of BS 6305 : 1982.

NOTE 3. During multi-frequency tone signalling transmission a 'confidence tone' may occur in the loudspeaker.

6. Apparatus on-line (non-signalling state)

6.1 D.C. characteristics

6.1.1 For type A apparatus, when powering arrangements forming part of the apparatus, if any, are connected and energized, the apparatus shall meet the requirements of 9.1 of BS 6317 : 1982.

NOTE. No tests are made without power connected.

6.1.2 For type B apparatus, where the supplier states that a suitable power unit is available (see 4.1(j)), when a power unit of the model and type described in the instructions for use is connected and energized, the apparatus shall meet the requirements of 9.1 of BS 6317 : 1982.

NOTE 1. An effect of this requirement is that the supplier has to provide a power unit, of the model and type described in the instructions for use, for the approval authority to use in testing the apparatus.

For type B apparatus, where the supplier states that a power unit is available (see 4.1(j)), when a power unit is not connected, the apparatus shall meet the requirements of 9.1 of BS 6317 : 1982, except that the requirement for the steady state voltage to be not greater than the upper limit as given in table 3 and shown in figure 2 of BS 6317 : 1982 does not apply and instead the steady state voltage shall be not greater than the upper limit as given in table 1 and shown in figure 1 of this Part of this standard.

For type B apparatus, where the supplier states that a power unit is not available (see 4.1(j)), the apparatus shall meet the requirements of 9.1 of BS 6317 : 1982 except that the requirement for the steady state voltage to be not greater than the upper limit as given in table 3 and shown in figure 2 of BS 6317 : 1982 does not apply and instead the steady state voltage shall be not greater than the upper limit as given in table 1 and shown in figure 1 of this Part of this standard.

The limit curve shall be determined by straight lines joining successive coordinates given in table 1.

NOTE 2. Attention is drawn to the information given in the foreword concerning a forthcoming amendment to the requirements of this subclause.

Table 1. Coordinates of voltage limit curves for d.c. characteristics

Limit curve	Current	Voltage
Upper limit	mA	V
	0	9
	3.6	9
	5	12.5
	42	12.5
	45	32
	100	10
	104	8.4

6.2 Impedance. The requirements of 9.2 of BS 6317 : 1982, and thereby of 4.3.2.1 of BS 6305 : 1982, apply with the following exceptions. When the apparatus is in the loudspeaking mode, in the test for compliance described in A.4 of BS 6305 : 1982, the a.c. source of e.m.f. shall be -20 ± 1 dBV, and the general conditions of test apply as described in appendix A of this Part of this standard.

6.3 Signal balance about earth. The requirements of 9.4 of BS 6317 : 1982, and thereby of 4.3.4 of BS 6305 : 1982, apply with the following exceptions. When the apparatus is in the loudspeaking mode, during compliance checking the microphone of the apparatus shall be energized by means of the artificial mouth using a sinusoidal signal of 1 kHz at -20 dBPa at the reference point shown in figure 2. The sinusoidal signal shall be of the form (a), (b) or (c) described in A.7.

NOTE. Selection of the appropriate signal (a), (b) or (c) described in A.7, and where (c) is selected the duration of the on and off signalling conditions, is determined by the supplier in accordance with the requirements of 4.1(d).

7. Speech transmission process

7.1 General. When the apparatus is in a loudspeaking mode, the requirements of clause 13 of BS 6317 : 1982 do not apply, and the requirements of this clause 7 apply instead.

NOTE. Requirements determining the applicability of clause 13 of BS 6317 : 1982 when the apparatus is in the simple telephone mode, are specified in 3.2.

7.2 Sending characteristics. The following limits of sending sensitivity apply.

(a) When the apparatus is in a loudspeaking mode, for line lengths up to and including 3 km, the sending sensitivity, when plotted against frequency, shall be not greater than the limits given in table 2 and shown in figure 4.

(b) When the apparatus is in a loudspeaking mode, for line lengths in the range over 3 km to 7.5 km, the sending sensitivity, when plotted against frequency, shall be not greater than the limits given in table 3 and shown in figure 5, where the values of sensitivity given in table 3 are relative to a value of the absolute

sensitivity at 1 kHz, this value being dependent on line length and determined by the formula:

$$\gamma = -1.5x + 23$$

where

x is the line length (in km);

γ is the absolute sensitivity at 1 kHz (in dBV/Pa).

Table 2. Limits of sending sensitivity for line lengths up to and including 3 km

Centre frequency of $\frac{1}{3}$ octave band	$\frac{1}{3}$ octave band sending sensitivity limit
Hz	dBV/Pa
200	13
250	13.8
315	14.6
400	15.4
500	16.2
630	17
800	17.8
1000	18.6
1250	22.6
1600	24.0
2000	25.2
2500	25.2
3150	25.2
4000	19.2
5000	15.4
6300	11.5
8000	7.3

Table 3. Limits of sending sensitivity for line lengths in the range over 3 km to 7.5 km

Centre frequency of $\frac{1}{3}$ octave band	$\frac{1}{3}$ octave band sending sensitivity limit (relative to arbitrary level)
Hz	dB
200	-2.8
250	-2.4
315	-2
400	-1.6
500	-1.2
630	-0.8
800	-0.4
1000	0
1250	3.7
1600	4.5
2000	5.3
2500	4.3
3150	3.3
4000	-2.7
5000	-6.3
6300	-10.6
8000	-14.3

Compliance shall be checked by the test of **B.1**. The sending sensitivity (in dBV/Pa) shall be determined by the expression:

$$20 \log_{10} \frac{V_1}{P_1}$$

where

V_1 is the potential difference across a 600 Ω termination of the local telephone system shown in figure 10, in each $1/3$ octave band;

P_1 is the free field sound pressure measured at 500 mm from the lip plane of the artificial mouth (see figure 2) in each $1/3$ octave band.

7.3 Receiving characteristics. When the apparatus is in a loudspeaking mode, for line lengths up to 7.5 km, the mean receiving crosstalk sensation level ($\bar{Z}$) shall be not greater than -9 dB.

Compliance shall be checked by the test of **B.2**.

7.4 Noise sent to line. When the apparatus is in a loudspeaking mode, the noise level developed across a non-reactive impedance of 600 Ω shall be not greater than -63 dBmp.

Compliance shall be checked by the test of **B.3**.

7.5 Acoustic shock. The sound output from the loudspeaker shall be limited by the power output capability of the loudspeaker drive amplifier to give a sound pressure at the receiving reference point (see figure 6) not greater than 20 dBPa (unweighted r.m.s.).

The requirement shall be met for currents from 25 mA to a value equal to the current obtained when the apparatus is connected to a voltage source of 50 V d.c. in series with a 400 Ω resistor.

Compliance shall be checked by the test of **B.4**.

7.6 Limits of signals sent to line. When the apparatus is in a loudspeaking mode, the signal generated by the apparatus as a result of any acoustic stimulus shall be not greater than +10 dBV r.m.s. across a 600 Ω termination.

The requirement shall be met for currents from 25 mA to a value equal to the current obtained when the apparatus is connected to a voltage source of 50 V d.c. in series with a 400 Ω resistor.

Compliance shall be checked by the test of **B.5**.

7.7 Sending out-of-band products

NOTE. The expression 'sending out-of-band products' relates to unwanted signals, arising from distortion, being transmitted to line.

When the apparatus is in a loudspeaking mode, for line lengths up to 7.5 km, the out-of-band products developed across a non-reactive impedance of 600 Ω shall be not greater than -45 dBV in each of the $1/3$ octave frequency bands centred on the preferred frequencies specified in BS 3593 : 1963 at $1/3$ octave intervals in the range 5 kHz to 10 kHz.

Compliance shall be checked by the test of **B.6**.