Recommendation T/SF 42 (Odense 1986)

SERVICES AND FACILITIES ASPECTS OF 2ND GENERATION CORDLESS TELEPHONES

Recommendation proposed by Working Group T/WG 7 "Services and facilities" (SF)

Text of the Recommendation adopted by Commission "Telecommunications":

"The European Conference of Posts and Telecommunications Administrations,

considering

— cordless telephones (CT-1) developed in accordance with Recommendations T/R 24-03 [1], T/SF 30 [1] and T/CS 34-18 [3] are solutions for the short and medium term only,

— there remains a requirement for high quality equipement at a reasonable cost giving better signalling security and speech privacy,

— the spectrum allocated for CT-1 devices will be required for cellular mobile radio systems before the mid 1990's,

— the inherent capacity of CT-1 is 350 cordless telephones per square kilometre and market studies have indicated a probable user density of up to 5,000 cordless telephones per square kilometre in urban areas,

recommends

that therefore 2nd Generation Cordless Telephones should be developed on the basis of the user requirements and operational characteristics given in Annex A."

Annex A

1. DEFINITION

The second generation cordless telephone CT-2 consists of a portable part (PCT-2) and a fixed part (FCT-2).

The PCT-2 provides the same services and facilities as a fixed telephone, or a mobile radio telephone, within a limited operational area from the FCT-2.

The FCT-2 enables the PCT-2 to operate remotely and is either directly or indirectly connected to the national telephone network (PSTN). It may be separated or integrated with other telecommunication equipment.

2. SERVICE REQUIREMENTS

The basic requirements for CT-2 are given below in part (a), items i), ii) and iii). These must be provided at minimum cost. The remaining services outlined below are envisaged as possibilities for the future. These could be offered separately or combined in one equipment.

(a) *CT-2 linked to a private telephone line*

This CT-2 provides remote operation of a single telephone line, which may be a direct exchange line (DEL) and an extension to a DEL, or small business system, or PBX.

This allows the following applications:

i) residential;
ii) small business with telephone extensions schemes;
iii) large PBXs with a relatively small proportion of cordless extensions;
iv) rapid, but temporary, installations of telephone networks in new buildings, prior to cabling, within the capacity of the spectrum available and the particular system;
v) temporary installations at exhibitions, sporting-arena events, etc., within the capacity of the spectrum available and the particular system.

(b) *CT-2 linked to a public telephone line ("Telepoint")*

This provides remote operation of public telephones lines. (These could be DELs and extension from DELs or small business systems, or PBXs.)

This is via an FCT-2, like a payphone, which would be attached to a public telephone line to provide a public service. Access is now via personal PCT-2 equipment, rather than public corded handsets, and is provided when in range of a public (Telepoint) FCT-2. Such Telepoints can be provided in a number of suitable locations to give an appropriate national service.

Billing can be via coin-boxes or card readers attached to the FCT-2, like the payphone service. It can also be made via the PCT-2 by attaching card readers or injecting stored credit or by using both PCT-2 and user identification, as with credit cards. This latter case requires identity information to be sent by both the PCT-2 and the user when accessing this service.

One could also envisage a procedure allowing the PCT-2 to receive calls via such a public FCT-2 (telepoint).

(c) *CT-2 linked to vehicle-mounted mobile radio telephones*

Here CT-2 could provide the service described in paragraph 2.(a) in connection with mobile stations of public land mobile networks. CT-2 could also provide the service described in paragraph 2.(b) in connection with mobile stations on board land vehicles, ships and aircraft. (Note the requirement of 3.4.)

(d) *Incorporation of a wide area paging receiver*

Incorporation of such a device into the PCT-2 would enable a subscriber out of range of his base station to be alerted when somebody wants to call him.

(e) *Wireless PBX*

The CT-2 may also be incorporated into a wireless PBX. Here, the CT-2 would enable its user to remain permanently linked to the PBX while moving around its service area.

However, a definition of a wireless PBX is required. Also, a large demand is anticipated for cordless extensions to PBXs and, given the high densities of extensions likely to occur and radio spectrum limitations, an alternative system solution may prove necessary to that envisaged above. This question requires further study.

3. CHARACTERISTICS OF THE LINK BETWEEN PCT-2 AND FCT-2

3.1. Digital transmission is required to maximise capacity and accommodate the telecommunication needs of the future.

3.2. CT-2 must offer duplex voice communication of a quality comparable to that offered by a wired link.

3.3. The level of privacy obtained by the use of a CT-2 must be comparable, if possible, to that which would be obtained from a normal telephone.

3.4. A CT-2 must not cause harmful interference to other CT-2s, or other radio services.

3.5. The operating range of CT-2 will be limited by the user of low radiated power and will depend on the transmission conditions, but typically will be between 50 m and 200 m.
In the case of a wireless PBX the operating range should correspond to the area served by the PBX.

3.6. The loss probability (blocking) caused by the link should be planned to not exceed 10%, at a range of 50 m with a density of 5,000 users per sq. km.

3.7. The setting up of the connection between PCT-2 and FCT-2 necessitates transmitting an inaudible identification signal between both, primarily to ensure authorised access to the FCT-2. This identification signal must also be regularly transmitted during the call to ensure the continued security of the connection.

3.8. In the case of the call to a telepoint this identification could include information about the account which is to be billed for the call. The billing information on a radio channel must be protected against fraudulent use.

3.9. The CT-2 must use a dynamic channel allocation procedure to allow access to all available radio channels within about 5 seconds, both from initiating an outgoing call and also from receipt of an incoming call.

3.10. The PCT-2 should not communicate with each other directly by use of the radio frequencies allocated to the service. PCT-2s may communicate with each other via the FCT-2 and PCT-2s may intercommunicate directly with the FCT-2. During such intercommunication an indication of call arrival from the PSTN should be maintained. Also, such intercommunication may be time limited.

4. CHARACTERISTICS OF CT-2

4.1. Essential characteristics

4.1.1. The ability to call, and to be called by, a PSTN subscriber or another extension, provided the PCT-2 is within range of its FCT-2.

4.1.2. Automatic operation.

4.1.3. Duplex operation with voice quality comparable to that of a wired telephone; provided the PCT-2 is within range of its FCT-2.

4.1.4. All the features of a standard wired telephone.

4.1.5. Speech privacy comparable to a standard wired telephone.

4.1.6. Signalling security.

4.1.7. The cost of the basic CT-2 must be minimised.

4.1.8. Low power consumption, long battery life and recharge intervals.

4.1.9. Compact physical size; readily portable format.

4.1.10. The ability to function out of doors in normal climatic conditions.

4.2. Desirable characteristics

4.2.1. A means of indicating to the user that the PCT-2 is within the operating range of a FCT-2, only when initiating call set-up and for the duration of the call.
When during a communication the PCT-2 moves out of range of the FCT-2, then the user is warned and the communication is terminated after 10 seconds if the PCT-2 does not move back into range of the FCT-2.

4.2.2. That certain equipment models can accommodate any possible telephone service including non-voice services.

4.2.3. That certain PCT-2s possess a socket for connection to a data transmission terminal (with possible use of a modem). Although some form of restriction on data use will be necessary to ensure that the radio channels do not become overloaded.

4.2.4. That certain equipement models, especially those which allow y access to a Telepoint, can promise an integral radio paging receiver.

4.2.5. The identification characters of a PCT-2 should be inviolably incorporated into the equipment. Alternatively they could be permanently inserted by the user from the key pad upon purchase of the equipment. The FCT-2 may be programmable to match the PCT-2s via a secure procedure.

4.2.6. Certain FCT-2s may control more than one PCT-2.

4.2.7. Some countries may wish to send a warning tone, after the speech connection has been made, in order to indicate that the privacy of the call is limited.

5. ESSENTIAL REQUIREMENTS RELATED TO THE SIZE OF THE MARKET

The system should allow

— a number of CTs that corresponds to 7% of the existing telephone instruments in a country;
— an average density of 200 CTs per sq. km;
— a maximum density of 5,000 CTs per sq. km;
— average traffic volumes of 35 mE per CT;
— traffic volumes up to 200 mE per CT.

REFERENCES

[1] Recommendation T/R 24-03. *Characteristics of cordless telephones.*
[2] Recommendation T/SF 30. *Services and facilities aspects of cordless telephones.*
[3] Recommendation T/CS 34-18. *Cordless telephone technical aspects.*