

**Human Factors (HF);
European harmonization of network generated tones;
Part 2: Listing and analysis of European, World and
Standardized tones**



European Telecommunications Standards Institute

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Foreword

This Technical Report (TR) has been produced by the ETSI Technical Committee Human Factors (HF).

The present document is part 2 of a multipart TR covering the European harmonization of network generated information tones, as identified below:

Part 1: "A review and recommendations";

Part 2: "Listing and analysis of European, World and Standardized tones".

The intended users of the present document include:

Table 1: Intended users and potential benefits

| | User | TR used for | Potential benefit |
|---|---|---|--|
| 1 | Manufacturers, network operators, and other developers and providers of telecommunications networks and services. | Allocation and specification of network generated tones and their technical characteristics. | Improved usability through harmonized application of tones in networks. |
| 2 | Designers and users of networks and telecommunications services. | Ensuring conformance with meaning and characteristics for individual tones for existing and new services. | Improved usability through easier identification and verification of tones and their meaning. |
| 3 | ETSI Technical Committees End-users. | Development and upgrading of network services. | Improved usability of national and international services by ensuring consistency with user needs. |

1 Scope

The present document is the second part of a Technical Report (TR) that reports the results of a project carried out under the CEC Mandate [1] to study and investigate the potential harmonization of telephone information tones generated by public networks.

This second part provides detailed lists and analyses of reported current European and World network service tones, and compares them with existing international standards.

2 References

References may be made to:

- a) specific versions of publications (identified by date of publication, edition number, version number, etc.), in which case, subsequent revisions to the referenced document do not apply; or
- b) all versions up to and including the identified version (identified by "up to and including" before the version identity); or
- c) all versions subsequent to and including the identified version (identified by "onwards" following the version identity); or
- d) publications without mention of a specific version, in which case the latest version applies.

A non-specific reference to an ETS shall also be taken to refer to later versions published as an EN with the same number.

- [1] CEC Mandate BC-T-308 (02/94): "Specification of characteristics of a harmonized set of telephone tones generated by public networks".
- [2] BS 6305: (1992): "Specification for general requirements for apparatus for connection to public switched telephone networks run by certain public telecommunications operators" BSI, London.
- [3] CEPT Recommendation T/SF 23 (Vienna 1982): "Définitions et caractéristiques audibles des tonalités et des annonces parlées" (Definitions and audible characteristics of tones and spoken announcements).
- [4] CEPT Recommendation T/CS 20-15 (Innsbruck 1981): "Tones and announcements".
- [5] ETR 131 (1994): "Terminal Equipment (TE): An investigation into the need for standardization in stored voice services".
- [6] ETR 187 (1995): "Recommendation of characteristics of telephone service tone when locally generated in telephony terminals".
- [7] ETR 294 (1996): "Radio Equipment and Systems (RES); Trans-European Trunked RAdio (TETRA); Voice and Data (V+D) and Direct Mode Operation (DMO); Mobile Station (MS) Man Machine Interface (MMI)".
- [8] ETR 329 (1996): "Guidelines for procedures and announcements in Stored Voice Services (SVS) and Universal Personal Telecommunication (UPT)".
- [9] ETS 300 085 (1990): "Integrated Services Digital Network (ISDN); 3,1 kHz telephony teleservice, Attachment requirements for handset terminals (Candidate NET 33)".
- [10] ETS 300 245-7: "ISDN Technical characteristics of telephony terminals; Part 7: Locally generated information tones".
- [11] GSM 02.40: "European digital cellular telecommunications system (Phase 2); Procedures for call progress indications (also known as ETS 300 512)". Second edition, August 1995.

- [12] Gagliardi, D: "Report on the audible tones in the telephone service in the EC countries". Report from contract 48159, DGXIII, European Commission, Brussels, April 1993.
- [13] ISO/IEC 13714 (1995): "User Interface to Telephone-based Services: Voice Messaging Applications".
- [14] CCITT Recommendation E.180: "Technical characteristics of tones for the telephone service".
- [15] CCITT Recommendation E.182: "Application of tones and recorded announcements in telephone services".
- [16] ITU-T Recommendation E.180 Supplement 2 (Series E) (01/94): "Various tones used in national networks".
- [17] prETS 300 295 2nd final draft, July 1994: "Human Factors (HF); Specification of characteristics of telephone service tones when locally generated in telephony terminals" (prETS 300 295 [17] was rejected at the public vote. The reference is included for the record).
- [18] I-ETS 300 400: "Integrated Services Digital Network (ISDN); Telephony Service, Payphones".
- [19] prETS 300 738: "Minimum Man-Machine Interface (MMI) to public network based supplementary services".

3 Definitions, symbols and abbreviations

3.1 Definitions

For the purposes of the present document, the following definitions apply (in the case of tones, they are defined as in CCITT Recommendation E.182 [15], or source referenced):

acceptance tone: A tone reported by one or more non-European countries (no specific function description is reported).

announcement (also referred to as voice announcement): An audible indication in the form of speech, utilized for information, instructions and guidance in the telephone service (see also ETR 131 [5]).

audible indication: An audible indication is understood to be a sound composed of frequencies within the range 300-3 400 Hz which is used to inform the user about the state of a telephone call or supplementary service (from CCITT Recommendation E.182 [15]).

busy tone: A tone advising the caller that the telephone is busy (from CCITT Recommendation E.182 [15]).

cadence: The pattern of sound/silence in a tone which gives it a characteristic rhythm.

call waiting tone: A tone advising the user of the call waiting supplementary service who is engaged on a call that someone is attempting to call his number (from CCITT Recommendation E.182 [15]).

caller waiting tone: A tone advising a caller that a called station, though busy, has a call waiting service active (from CCITT Recommendation E.182 [15]).

comfort tone: A tone advising that the call is being processed and that the caller should wait (from CCITT Recommendation E.182 [15]).

conference tone: A short burst tone reported by Slovakia (no specific function description is reported but it may be used to signal the start of a conference service).

confirmation tone: A tone used in some exchanges in place of an announcement to indicate that an interrogated service is active (from BS 6305 [2]).

congestion tone: A tone advising the caller that the groups of lines or switching equipment necessary for the setting-up of the required call or for the use of a specific service are temporarily engaged (from CCITT Recommendation E.182 [15]).

connection tone: A tone reported by Slovakia and similar in characteristics and maybe similar in meaning to the French, Polish and Irish Route/Comfort tone.

dial tone: A tone advising that the exchange is ready to receive call information and inviting the user to start sending call information (from CCITT Recommendation E.182 [15]).

discriminability: The characteristics of a tone which allows a human user to recognize one tone from another, by for example, frequency or cadence.

end of three party service tone: A tone reported by one or more non-European countries (no specific function description is reported).

executive override tone: A tone reported by one or more non-European countries (no specific function description is reported).

facilities tone: A tone reported by one or more non-European countries (no specific function description is reported).

frequency: The characteristic of a telephone tone which determines its pitch, expressed in hertz.

function acknowledge tone: A tone reported by one or more non-European countries (no specific function description is reported).

holding tone: A tone assumed to have the same meaning as "tone on hold".

identification tone: A tone reported by one or more non-European countries (no specific function description is reported).

intercept tone: (Also known as intercept treatment tone). A tone indicating that the call cannot be completed by the switching system (c.f. number unobtainable tone).

intrusion tone: A tone during a call advising participants in the call that the privacy of the conversation has been breached, e.g. by intervention of an operator (from CCITT Recommendation E.182 [15]).

line lockout tone: A tone reported by one or more non-European countries (no specific function description is reported).

negative indication tone: A tone telling a subscriber that the request for service cannot be accepted (from CCITT Recommendation E.182 [15]).

nominal value: The stated target figure for a given parameter, may be expanded by a tolerance to include an envelope of values equally spread around the nominal value. The distribution of values should reflect a normal curve with high kurtosis.

notify tone: A tone reported by one or more non-European countries (no specific function description is reported).

number unobtainable tone: (Also known as connection not admitted indication). A tone indicating that the number dialled has not been recognized by the network as valid (ITU-T do not define a tone with this title, but their definition of "special information tone" includes the condition to be indicated, CCITT Recommendation E.182 [15]).

offering tone: A tone reported by Hungary and Slovakia (no specific function description is reported).

on/off ratio: The quotient of the total time a tone is on during one cadence pattern, divided by the total time of the intervening silences. A tone with a cadence of 0,5 s on and 0,5 s off (usually shown as **0,5** - 0,5) has an on/off ratio of 1. A tone with a cadence of **0,05** - 0,5 has an on/off ratio of 0,1. Therefore on/off ratios <1 are mostly silence with short bursts of tone, and on/off ratios >1 are mostly tone with short bursts of silence (in duty cycle terms - low vs. high duty cycle, as opposed to short vs. long which is equivalent to period).

operator intervening tone: See Warning tone - Operator Intervening and Intrusion tone.

pay tone: A tone advising users of a payphone that a payment is required (from CCITT Recommendation E.182 [15]).

payphone recognition tone: A tone advising a public exchange operator that the termination to or from which connection is sought is identified as a payphone (from CCITT Recommendation E.182 [15]).

period: The total length of time required to complete one cadence pattern.

permanent signal tone: A tone reported by one or more non-European countries (no specific function description is reported).

positive indication tone: A tone telling a subscriber controlling a supplementary service that a control procedure has been successfully completed and accepted (from CCITT Recommendation E.182 [15]).

pre-emption tone: The purpose of this tone is to tell the calling and called party that their call is being disconnected due to a higher priority call demanding the communication channel. This is a new tone that should be required by any multilevel precedence and pre-emption supplementary service.

queue tone: A tone indicating that the call has been put in a queue and is subject to charging (from CEPT Recommendation T/SF 23 [3]) also a tone reported by Finland (no specific function description is reported).

re-order tone: A tone reported by one or more non-European countries (see clause 5, no specific function description is reported).

recall dial tone: (Also known as stutter dial tone and transfer dial tone). A modified dial tone indicating that an operating feature is activated that requires presentation of a second dial tone (one having the same meaning as "special dial tone").

record tone: A tone generated by a voice messaging system or by automatic answering equipment to inform the calling user when to start talking in order to record a message (see also CCITT Recommendation E.182 [15] and ISO/IEC 13714 [13]).

refusal tone: A tone reported by one or more non-European countries (no specific function description is reported).

rhythm: The subjective effect, or perception, of cadence.

ringing tone: A tone advising the caller that a connection has been made and that a calling signal is being applied to a telephone number or service point (from CCITT Recommendation E.182 [15]).

route tone: A tone assumed to have the same meaning as "comfort tone".

search tone: A tone reported by one or more non-European countries (no specific function description is reported).

second dial tone: A tone advising the caller that the network has accepted the call information already sent and asking the caller to provide more information (from CCITT Recommendation E.182 [15]).

service activated tone: A tone reported by one or more non-European countries (no specific function description is reported) (similar to positive indication?).

special dial tone: A tone advising that the exchange is ready to receive call information and inviting the user to start sending call information, at the same time reminding the user that special conditions apply to the termination from which the call is being made (from CCITT Recommendation E.182 [15]).

Special Information Tone (SIT): A tone advising the caller that the called number cannot be reached for reasons other than "subscriber busy" or "congestion". The tone may also be used in conjunction with recorded announcements to signify that what the caller is about to hear is a recording. It should always be used to precede all call failure announcements. (from CCITT Recommendation E.182 [15]).

terminal: A device connected to a network providing the man machine interface to that network, through which a user makes use of telecommunications services.

test number tone: A tone reported by one or more non-European countries (no specific function description is reported).

tolerance: The acceptable variation or margin of error around a nominal value for a given parameter.

tone on hold: A tone used to reassure a calling user who has been placed on "hold" by a subscriber with the Hold supplementary service, PBX or other facilities (see CCITT Recommendation E.182 [15]).

tone: A tone is an audible indication comprising a small number of discrete frequencies, but excluding speech (from CCITT Recommendation E.182 [15]). Examples are dial tone or special announcement tone (see separate definition for each tone).

valid tone: Used in Greece on their radio paging network, it has the same characteristics as their positive indication tone.

warning tone (end of period): A tone reported by one or more non-European countries (no specific function description is reported).

warning tone (time limit barring): A tone used for the supplementary service "Time Limit Barring" to indicate end of call time reported by one European country (see clause 4).

warning tone - operator intervening: Wording used in ITU-T Recommendation E.180 Supplement 2 (Series E) [16], assumed to have the same meaning as "intrusion tone".

warning tone: A tone warning participants in a call that the privacy of a conversation cannot be ensured where a recording machine is being used (from CCITT Recommendation E.182 [15]).

3.2 Symbols

For the purposes of the present document, the following symbols apply:

| | |
|----|--|
| / | Used within the frequency descriptions in the tone tables to signify a sequence of frequencies e.g. 950/1 400/1 800 equates to a burst of 950 Hz followed by a burst of 1 400 Hz followed by a burst of 1 800 Hz. |
| // | Sometimes used within the frequency descriptions in the tone tables to signify an alternative frequency may be used on some exchanges, e.g. 400//450 equates to a tone of 400 Hz is used in some exchanges and of 450 Hz in other exchanges. |
| + | Used within the frequency descriptions in the tone tables to signify a combination of frequencies e.g. 375 + 450 equates to a dual frequency tone with both frequencies given simultaneously. |
| ± | Used within the frequency descriptions in the standards tone tables to signify a tolerance in relation to a nominal frequency, e.g. 425 ± 15 Hz (see tolerance in subclause 3.1). |
| × | Used within the frequency descriptions in the tone tables to signify that the first frequency is modulated by the second. |
| ? | Used within the tables to signify that the information is given as recorded in ITU-T Recommendation E.180 Supplement 2 (Series E) [16] but is thought possibly to be erroneous. |

3.3 Abbreviations

For the purposes of the present document, the following abbreviations apply:

| | |
|-------|--|
| ADSI | Analogue Display Services Interface |
| CEC | Commission of the European Communities |
| CCITT | Consultative Committee on International Telegraphy and Telephony |
| CCIR | Centre for Communications Interface Research (University of Edinburgh) |
| CEPT | Conférence des Administrations Européennes des Postes et Télécommunications |
| DG | Directorate General (or Director General) |
| DTMF | Dual Tone Multiple Frequency |
| EU | European Union |
| EPROM | Electrically Programmable Read Only Memory |
| GSM | Global System for Mobile communications |
| HF | Human Factors |
| IEC | International Electrotechnical Commission |
| ISDN | Integrated Services Digital Network |
| ISO | International Standards Organization |
| ITU-T | International Telecommunications Union - Telecommunications Standardization Sector |
| MMI | Man Machine Interface |
| ONP | Open Network Provision |
| PABX | Private Automatic Branch eXchange |
| PIN | Personal Identity Number |
| PSN | People with Special Needs |
| PSTN | Public Switched Telephone Network |
| PUI | Personal User Identity |

| | |
|-------|---|
| Qu. | Question (within an ITU-T Study period) |
| SIM | Subscriber Identification Module |
| SIT | Special Information Tone |
| SVS | Stored Voice Service |
| SWAT | Signal, Wait, Abort, Talk |
| TC-HF | Technical Committee Human Factors |
| TE | Terminal Equipment |
| TETRA | TErrestrial Trunked RAdio |
| UPT | Universal Personal Telecommunications |

4 Analysis of current European network service tones

4.1 Introduction

4.1.1 Data sources

This analysis is based on the ITU-T Recommendation E.180 Supplement 2 (Series E) [16]. The original data was collected in July 1991 and March 1992 in response to the CCITT Circular Letter No.98.

The list of European countries used for the tables in clause 4.3 is based on the ETSI list of National Standardization Organizations (NSO) to which ETSI relates. For some of the analysis this list has been subdivided to reflect those countries that are EU members.

Table 2: EU vs. Non EU Countries within ETSI

| European Union Countries | Non European Union Countries |
|--------------------------|------------------------------|
| Austria | Albania |
| Belgium | Bulgaria |
| Denmark | CI Jersey |
| Finland | Croatia |
| France | Cyprus |
| Germany | Czech Republic |
| Greece | Estonia |
| Ireland | Faroe Islands |
| Italy | Gibraltar |
| Luxembourg | Hungary |
| Netherlands | Iceland |
| Portugal | Lithuania |
| Spain | Malta |
| Sweden | Norway |
| United Kingdom | Poland |
| | Romania |
| | Russia |
| | Slovakia |
| | Slovenia |
| | Switzerland |
| | Turkey |
| | Yugoslavia |

See clause 5 for an analysis of the service tones reported used in the rest of the world (non-Europe). See clause 6 for a summary of the characteristics of service tones defined within International and European Standards.

The analysis is divided into three sets. Set 1 and 2 reflect the relative "preference for standardization" weighting given in the CEC Mandate [1] to ETSI. Set 3 lists the other reported tones used in the various countries. Where a country reports a number of different tone characteristics for the same basic tone function these are indicated in the tables as Country X1, Country X2, Country X3, etc. For example see Bulgaria 1 and 2 in table 4.1.

Where there are several operators in one country providing basic teleservices within the same network type (PSTN, ISDN, PLMN, etc.) no data was found which identified any differences in the function or characteristics of tones used by the different operators. However differences do exist between different networks. For example, between tones provided in GSM mobile terminals and the tones provided on the local PSTN network.

Set 1: Dial, Ring, Busy, Special Information (including Number Unobtainable), Call Waiting, Pay tones;

Set 2: Special Dial, Positive Indication, Congestion, Intrusion (including Warning Operator, Intervening) tones;

Set 3: Second Dial, Payphone Recognition, Negative Indication, Route, Offering, Recall Dial, Holding, Valid, Queue, Record, Confirmation, Intercept, Connection, Conference tones.

4.1.2 Sources of error in the reported tones used

4.1.2.1 Detectable errors

Where there was an omission or potential error detected in the ITU-T material, additional information was sought from specific network sources e.g. Norway, Sweden, UK, or direct from Gagliardi's report [12], or from ETS 300 085 [9] (re-locally generated tones). Where possible this additional material was used to verify the true situation. Where no alternative source is quoted the source used was the ITU document.

For example, the Dial tones reported for Portugal and Greece were:

Table 3: An example of some of the conflict found in the data sources

| | Cadence (s) | Frequency (Hz) |
|------------------------------|-------------------------------------|-----------------------|
| Portugal 1 (ITU) | Continuous | 400 or 425 |
| Portugal 2 (Gagliardi) | Continuous | 400 |
| Portugal 3 (ETS 300 085 [9]) | Continuous | 425 |
| Greece 1 (ITU) | 0,2 - 0,3 - 0,7 - 0,8 | 425 or 450 |
| Greece 2 (ETS 300 085 [9]) | 0,2 - 0,8 - 0,7 - 0,3 | 425 or 450 |

Clearly the reported frequency for Portugal requires further checking, both 400 Hz and 425 Hz may be in current use, 400 Hz may be in the process of being phased out. On the other hand, the reported cadences for Greece suggest that there may be two distinct Dial tones.

Unfortunately each of the individual sources used was shown to have some degree of error. It is hoped that by cross checking with individual network operators and between the source documents the errors in the tables presented in clause 4 have been minimized. Where the conflict has not been satisfactorily resolved, the conflicting sources are quoted. For example, see Ireland 1 and 2 in table 4.1.

4.1.2.2 Undetectable errors

The analysis of the tones reported to be used in each country is dependent on the interpretation given to the definition which applies to any tone. For the core set of tones (Dial, Ring, and Busy) most European countries appear to adhere to the ITU-T (formerly CCITT) Recommendations. However beyond these three there is an increased potential for confusion. Indeed, for any reported tone there may be three sources of error:

- the tones appear to be reported with respect to their perceived "official" name and function rather than with respect to their actual functional usage. That is for some tones the official definition does not reflect the actual telecommunications "function" the tone is used to convey; e.g. Special Information Tone (SIT) is defined to report network situations which prevent completion of the call, but in practice it is often used for a broad range of situations, both negative and positive. See also subclause 4.3 Intrusion tone;
- a single tone is used to inform the user of differing telecommunications "functions"; e.g. Busy tone is sometimes used to mean Subscriber Busy, Supplementary Service Negative tone, Network Congestion, etc;
- the basic characteristics of the tone, its frequency/ies and/or cadence, may vary within the normal tolerances, or may exceed these.

4.1.3 Comparison of European network service tones with the existing standards

Within the tables presented in clause 4.2 the opportunity is taken to show a comparison between the characteristics of the reported tone with the characteristics specified in the existing standards. Three comparisons are made:

- against CCITT Recommendation E.180 [14], shown by the grey scale in the left most column;
- against CEPT Recommendation T/SF 23 [3], shown by the grey scale in the cadence column;
- against recommendations included in ETR 187 [6], ETS 300 245-7 [10], and GSM 02.40 [11], shown by the grey scale in the period column.

Those reported tones that are in compliance with the standard i.e. meet all the required characteristics are shaded darkest (20 % shading). The lighter shading (5 %) is used to indicate two types of "near misses". These are:

- tones that are probably in compliance, but where the country may report they also use an alternative frequency (perhaps on some older exchanges);
- tones that are not strictly in compliance but which are very close and certainly within the stated tolerances limits, e.g. where a country reports a nominal frequency of 420 Hz when the specification states 425 Hz with a tolerance of 3,5 % (i.e. approx. ± 15 Hz). Where a country reports a nominal value on the limit of the stated tolerance this has been regarded as non-compliant.

4.2 European Set 1:

Dial, Ring, Busy, Special Information (including number unobtainable), Call Waiting and Pay tones.

4.2.1 European Dial tones

Functional definition

The auditory indication to be presented to a user to indicate that a network connection is available and ready to receive call information and inviting the user to start sending call or service related information (this definition is consistent with CCITT Recommendation E.182 [15]).

Table 4.1: European Dial tones

| | Cadence (s) | Period (s) | Frequency (Hz) | Country/ies |
|----|---|-------------------|-----------------------|--|
| | None reported | | | Malta |
| 1 | 0,33 - 0,33 - 0,66 - 0,66 | 1,98 | 425 | Czech Republic, Slovakia |
| 2 | 0,2 - 0,2 - 0,6 - 1,0 | 2 | 425 | Italy |
| 3 | 0,7 - 0,8 - 0,2 - 0,3 | 2 | 425 | Slovenia, Yugoslavia |
| 4 | 0,2 - 0,3 - 0,7 - 0,8 | 2 | 425 | Croatia |
| 5 | 0,2 - 0,3 - 0,7 - 0,8 | 2 | 425 or 450 | Greece 1 (ITU) |
| 6 | 0,2 - 0,8 - 0,7 - 0,3 | 2 | 425 or 450 | Greece 2 (ETS 300 085 [9]) |
| 7 | 0,25 - 0,3 - 0,7 - 0,8 | 2,05 | 425 | Bulgaria 1 |
| 8 | 0,25 - 0,75 - 0,75 - 1,0 | 2,75 | 425 | Bulgaria 2 |
| 9 | Continuous | | 350 + 400 | Gibraltar |
| 10 | Continuous | | 350 + 440 | United Kingdom |
| 11 | Continuous | | 350 + 450 | CI Jersey, Cyprus |
| 12 | Continuous | | 400 or 425 | Portugal 1 (ITU) |
| 13 | Continuous | | 400 | Portugal 2 (Gagliardi) |
| 14 | Continuous | | 400 or 425 or 450 | Ireland 1 (ITU) |
| 15 | Continuous | | 400 or 450 | Ireland 2 (Gagliardi) |
| 16 | Continuous | | 400 or 450 | Romania |
| 17 | Continuous | | 420 or 450 | Austria |
| 18 | Continuous | | 425 | Albania, Denmark, Estonia, Faroe Islands, Finland, Hungary, Iceland, Lithuania, Poland, Portugal 3 (ETS 300 085 [9]), Russia, Spain, Sweden , Switzerland, Norway |
| 19 | Continuous | | 425 or 450 | Belgium, Germany, Luxembourg, Netherlands |
| 20 | Continuous | | 440 | France |
| 21 | Continuous | | 450 | Turkey |

4.2.2 European Ringing tones

Functional definition

The auditory indication to be presented to a user to indicate that a connection has been made and that an alerting signal is being applied to the called terminal or service (this definition is consistent with CCITT Recommendation E.182 [15]).

Table 4.2: European Ringing tones

| | Cadence (s) | Period (s) | Frequency (Hz) | Country/ies |
|----|-------------------------------|-------------------|---|--|
| 1 | 0,4 - 0,2 - 0,4 - 2,0 | 3 | 400 or 450 or 425×25 | Ireland 1 |
| 2 | 0,4 - 0,2 - 0,4 - 2,0 | 3 | 400×25 | Cyprus 2 |
| 3 | 0,4 - 0,2 - 0,4 - 2,0 | 3 | $400 + 450$ | Gibraltar, CI Jersey |
| 4 | 0,4 - 0,2 - 0,4 - 2,0 | 3 | 400 + 450 or 450×25 or $425 \times 16^{2/3}$ | United Kingdom, Malta |
| 5 | 0,4 - 0,2 - 0,4 - 2,0 | 3 | 425 | Ireland 2 (Gagliardi) |
| 6 | 0,8 - 3,2 | 4 | 425 | Lithuania, Russia 1 |
| 7 | 1,0 - 3,0 | 4 | 400 or 450 | Norway 2 |
| 8 | 1,0 - 3,0 | 4 | 425 | Cyprus 1 |
| 9 | 1,0 - 3,0 | 4 | 425 or 450 | Belgium |
| 10 | 1,5 - 3,0 | 4,5 | 425 | Spain, |
| 11 | 1,83 - 3,0 | 4,83 | 425 | Bulgaria 3 |
| 12 | 1,2 - 3,7 | 4,9 | 425 | Hungary |
| 13 | 1,0 - 4,0 | 5 | 425 | Albania, Bulgaria 2, Croatia, Czech Republic, Denmark, Estonia, Faroe Islands, Finland, Italy, Luxembourg 1, Norway 1, Poland, Russia 2, Slovakia, Slovenia, Yugoslavia 2 |
| 14 | 1,0 - 4,0 | 5 | 425 or 450 | Germany 5 (Gagliardi), Greece, Netherlands |
| 15 | 1,0 - 4,0 | 5 | 425 or 500 | Switzerland |
| 16 | 1,0 - 4,0 | 5 | 450 | Luxembourg 2 (Gagliardi) |
| 17 | 1,5 - 3,5 | 5 | 440 | France |
| 18 | 1,2 - 4,7 | 5,9 | 425 | Iceland |
| 19 | 1,0 - 5,0 | 6 | 400 or 425 | Portugal |
| 20 | 1,0 - 5,0 | 6 | 420 or 450 | Austria |
| 21 | 1,0 - 5,0 | 6 | 425 | Sweden 1 |
| 22 | 1,0 - 5,0 | 6 | 425 or 450 | Germany 3 |
| 23 | 2,0 - 4,0 | 6 | 400×16 or 450×25 | Romania |
| 24 | 2,0 - 4,0 | 6 | 450 | Turkey |
| 25 | 0,25 - 4,0 - 1,0 - 4,0 | 9,25 | 425 or 450 | Germany 1 |
| 26 | 0,5 - 4,0 - 1,0 - 4,0 | 9,5 | 425 or 450 | Germany 2 |
| 27 | 1,0 - 9,0 | 10 | 400 | Sweden 2 |
| 28 | 1,0 - 9,0 | 10 | 425 | Bulgaria 1 |
| 29 | 1,0 - 9,0 | 10 | 450 | Germany 4 |
| 30 | 1,0 - 9,0 | 10 | 450×25 | Yugoslavia 1 |

4.2.3 European Busy tones

Functional definition

The auditory indication to be presented to a user to indicate that a connection has been made but that the called party is busy and inviting the user to abort the call or to invoke a supplementary service, e.g. Call Completion on Busy Subscriber (CCBS) (this definition is consistent with CCITT Recommendation E.182 [15]).

Table 4.3: European Busy tones

| | Cadence (s) | Period (s) | Frequency (Hz) | Country or Network |
|----|----------------------|-------------------|-----------------------|--|
| 1 | 0,15 - 0,20 | 0,35 | 133 or 425 | Romania |
| 2 | 0,2 - 0,2 | 0,4 | 425 | Spain |
| 3 | 0,25 - 0,25 | 0,5 | 425 | Bulgaria 1, Denmark 2 (ITU), Faroe Islands, Iceland, Sweden , Switzerland 2 |
| 4 | 0,25 - 0,25 | 0,5 | 425 or 450 | Netherlands 2 |
| 5 | 0,2 - 0,4 | 0,6 | 400 or 450 | Norway 2 |
| 6 | 0,2 - 0,4 | 0,6 | 425 | Yugoslavia 2 |
| 7 | 0,3 - 0,3 | 0,6 | 425 | Albania, Estonia, Finland, Hungary |
| 8 | 0,3 - 0,3 | 0,6 | 425 or 450 | Greece |
| 9 | 0,3 - 0,3 | 0,6 | 450 | Austria 2 |
| 10 | 0,15 - 0,475 | 0,625 | 425 or 450 | Germany 2 |
| 11 | 0,33 - 0,33 | 0,66 | 425 | Slovakia |
| 12 | 0,333 - 0,333 | 0,666 | 425 | Czech Republic |
| 13 | 0,2 - 0,5 | 0,7 | 425 | Bulgaria 3 |
| 14 | 0,375 - 0,375 | 0,75 | 400 | Gibraltar, Malta, United Kingdom, CI Jersey |
| 15 | 0,4 - 0,4 | 0,8 | 420 | Austria 1 |
| 16 | 0,4 - 0,4 | 0,8 | 425 | Lithuania, Russia |
| 17 | 0,45 - 0,45 | 0,9 | 425 | Denmark 1 (Gagliardi) |
| 18 | 0,48 - 0,48 | 0,96 | 425 | Luxembourg 1 (Gagliardi) |
| 19 | 0,48 - 0,48 | 0,96 | 425 or 450 | Germany 1 (Gagliardi) |
| 20 | 0,5 - 0,5 | 1 | 400 or 425 | Portugal |
| 21 | 0,5 - 0,5 | 1 | 425 | Bulgaria 2, Croatia, Cyprus, Ireland, Italy 1 (Gagliardi), Norway 1, Poland, Slovenia, Switzerland 1, Yugoslavia 1 |
| 22 | 0,5 - 0,5 | 1 | 425 or 450 | Belgium, Luxembourg 2, Netherlands 1 |
| 23 | 0,5 - 0,5 | 1 | 440 | France |
| 2 | 0,5 - 0,5 | 1 | 450 | Turkey |
| 25 | 0,5 - 0,5 | 1 | 500 | Switzerland 3 (Pabx) |

4.2.4 European Special Information Tones (SIT)

Functional definition

No functional definition is offered, as there is evidence of conflict within the functions assigned to Special Information Tone (SIT).

The "official" definition would read: The auditory indication to be presented to a user to indicate that a connection cannot be made for some reason other than subscriber busy or short term network congestion. The calling party is invited to abort the call and to seek further information with respect to the called party before trying again (this definition is consistent with CCITT Recommendation E.182 [15]).

This definition is coherent with the definition which may be applied for a Number Unobtainable tone.

CCITT Recommendation E.182 [15] also states that: "The tone may also be used in conjunction with recorded announcements, to signify that what the caller is about to hear is a recording. It should be used to precede all call failure announcements". This implies that the SIT may also be used to introduce announcements that are presented for reasons other than call failure.

Table 4.4: European Special Information Tones (SIT)

| | Cadence (s) | Period (s) | Frequency (Hz) | Country or Network |
|---|---|------------|------------------|--|
| | | | None reported | Albania, Cyprus, Gibraltar, Iceland, Lithuania, Malta, Romania |
| 1 | $3 \times (0,33 - 2 \times 0,03) - 0,0$ | 1,05 | 950/1 400/1 800 | United Kingdom 1 |
| 2 | $3 \times (0,05 - 0,2) - 0,6 - 0,2$ | 1,35 | 400 | Sweden 2 |
| 3 | $3 \times 0,33 - 1,0$ | 1,99 | 900/1 350/1 800 | Portugal |
| 4 | $3 \times 0,33 - 1,0$ | 1,99 | 950/1 380/1 860 | Belgium |
| 5 | $3 \times 0,333 - 1,0$ | 1,999 | 950/1 400/1 600? | Slovenia |
| 6 | $3 \times (0,33 - 2 \times 0,03) - 1,0$ | 2,05 | 950/1 400/1 800 | Czech Republic, France, Russia, Slovakia, Spain |
| 7 | $3 \times 0,333 - 1,0$ | 1,999 | 950/1 400/1 800 | Austria, Bulgaria, Croatia, Denmark, Estonia, Finland, Germany, Greece, Hungary, Ireland, Italy, Luxembourg, Netherlands, Norway, Poland, Switzerland, Turkey United Kingdom 2, Yugoslavia |
| 8 | $3 \times 0,33 - 1,0$ (+ announcement) | 1,999 | 950/1 400/1 800 | Sweden 1 |

Table 4.5: European Number Unobtainable tones

| | Cadence (s) | Period (s) | Frequency (Hz) | Country or Network |
|---|--|------------|-----------------------|---|
| | | | None reported | Albania, Belgium, Czech Republic, Finland, France, Germany, Hungary, Italy, Lithuania, Luxembourg, Netherlands, Norway, Poland, Russia, Slovakia, Slovenia, Switzerland, Yugoslavia |
| 1 | Continuous | | 400 | CI Jersey, Gibraltar, Malta, United Kingdom |
| 2 | Continuous | | 450 | Greece (radio paging) |
| 3 | | | Recorded Announcement | Iceland |
| 4 | 0,2 - 0,2 | 0,4 | 400 or 425 | Portugal |
| 5 | 0,2 - 0,2 | 0,4 | 450 | Turkey |
| 6 | $6 \times (0,033 - 0,03) - 0,1 - 0,03$ | 0,478 | 400 or 450 | Romania |
| 7 | 0,2 - 0,2 - 0,2 - 0,6 | 1,2 | 425 | Spain |
| 8 | $3 \times 0,33 - 1,0$ | 1,99 | 950/1 400/1 800 | Austria, Bulgaria, Croatia, Denmark, Faroe Islands |
| 9 | $3 \times 0,33 - 1,0$ (+ announcement) | 1,999 | 950/1 400/1 800 | Sweden |
| 10 | 2,5 - 0,5 | 3,0 | 425 | Cyprus |
| 11 | 6,0 - 1,0 | 7,0 | 400 or 425 | Ireland |
| NOTE: Only Austria, Bulgaria, Croatia, Denmark, Faroe Islands, and Sweden, report using SIT for their Number Unobtainable tone. | | | | |

4.2.5 European Call Waiting tones

Functional definition

The auditory indication to be presented to a user during a call to indicate that a new call is arriving and that call control options (e.g. put call 1 on hold and speak to call 2, reject call 2, etc.) should apply. The indication is presented when the supplementary service Call Waiting is active and a new call invokes the service (this definition is consistent with CCITT Recommendation E.182 [15]).

Clarification is clearly required between Call Waiting (the B-Party Indication) and Caller Waiting (the A-Party Indication).

Table 4.6: European Waiting tones - unreported Call or Caller, except where stated

| | Cadence (s) | Period (s) | Frequency (Hz) | Country/ies |
|----|---|------------|------------------|---|
| | | | None defined | Albania, Bulgaria, Ireland, Luxembourg, Malta, Romania, Slovenia, Switzerland, Yugoslavia |
| 1 | 0,3 - 0,3 | 0,6 | 425 + 450 | Hungary |
| 2 | 0,2 - 0,6 | 0,8 | 425 | Spain 1 |
| 3 | 0,8 (once only) | 0,8 | 821 | Denmark |
| 4 | 0,2 - 0,5 - 0,2 (only once) | 0,9 | 425 | Sweden (Call Waiting) |
| 5 | 0,5 - 0,5 - 0,25 to be verified 0,5 - 0,25 repeated? | 1,25 | 350 + 450 or 450 | Turkey |
| 6 | 0,04 - 1,95 | 1,99 | 420 | Austria |
| 7 | 3 × 0,333 - 1,0 | 1,999 | 950/1 400/1 800 | Estonia, Lithuania |
| 8 | 0,1 - 2 to 5 s | 2,1 - 7,1 | 400 | United Kingdom 1 |
| 9 | 0,1 - 2,5 - 0,1 | 2,7 | 400 | CI Jersey |
| 10 | 0,1 - 3,0 | 3,1 | 400 | Gibraltar |
| 11 | 0,175 - 0,175 - 0,175 - 3,5 | 7,175 | 425 | Spain 2 |
| 12 | 0,175 - 0,175 - 0,175 - 3,5 | 7,175 | 1 400 | Belgium (Call Waiting) |
| 13 | 0,15 - 0,15 - 0,15 - 4,0 | 4,45 | 425 | Poland |
| 14 | 1,0 - 0,17 - 0,33 - 3,5 | 5 | 425 | Czech Rep. (Caller Waiting), Slovakia (Caller Waiting) |
| 15 | 0,2 - 5,0 | 5,2 | 425 | Russia (Call and Caller Waiting) |
| 16 | 0,33 - 5,0 | 5,33 | 425 | Cyprus |
| 17 | 0,2 - 0,2 - 0,2 - 5,0 | 5,6 | 425 | Germany, Portugal |
| 18 | 0,2 - 0,6 - 0,2 - 5,0 | 6 | 425 | Iceland |
| 19 | 0,25 - 0,25 - 0,25 - 0,25 - 0,25 - 5,0 | 6,25 | 400 | United Kingdom 2 |
| 20 | 0,3 - 8,0 | 8,3 | 425 | Croatia |
| 21 | 0,15 - 0,15 - 0,15 - 8,0 | 8,45 | 425 | Finland |
| 22 | 0,33 - 9,0 | 9,33 | 425 | Czech Republic (Call Waiting), Slovakia (Call Waiting) |
| 23 | 0,5 - 9,5 | 10 | 425 or 450 | Netherlands |
| 24 | 0,3 - 10,0 0,3 | 10,6 | 440 | France (Call Waiting) |
| 25 | 0,2 - 0,6 - 0,2 - 10,0 | 11 | 425 | Norway |
| 26 | 0,4 - 0,1 - 0,25 - 0,1 - 0,15 - 15,0 | 16 | 425 | Italy (Call Waiting) |
| 27 | 0,3 - 10,0 - 0,3 - 10,0 | 20,6 | 425 | Greece |

4.2.6 European Pay tones

Functional definition

The auditory indication to be presented to a user of a payphone during a call to indicate that any existing credit is about to expire and that an additional payment is required (this definition is consistent with CCITT Recommendation E.182 [15]).

Table 4.7: European Pay tones

| | Cadence (s) | Period (s) | Frequency (Hz) | Country or Network |
|--|---|------------|-------------------|---|
| | | | None defined | Albania, Austria, Belgium, Bulgaria, Croatia, Cyprus, Czech Republic, Finland, France, Germany, Gibraltar, Greece, Hungary, Iceland, Lithuania, Luxembourg, Norway, Poland, Portugal, Romania, Slovakia, Slovenia, Spain, Switzerland, Turkey, Yugoslavia |
| 1 | 0,125 - 0,125 | 0,25 | 400 | United Kingdom, CI Jersey |
| 2 | 0,125 - 0,125 | 0,25 | 800 | Ireland |
| 3 | 0,15 - 0,15 | 0,3 | 400 | Malta |
| 4 | 0,2 - 0,2 - 0,2 - 3,6 (2 cycles) | 4,2 | 941 | Sweden |
| 5 | 0,2 - 0,2 - 0,2 - 3,6 (3 cycles) | 4,2 | 940 | Denmark 2 |
| 6 | 1,0 Single burst | 1,0 | 425 | Italy |
| 7 | 3 × 0,22 - 1,0 | 1,66 | 950/1 400/1 800 | Denmark 1 |
| 8 | A 1-2 s burst given 15-20 s before paid time expires | 2,0 | 770 or 850 or 950 | Netherlands |
| 9 | 1,0 - 1,0 - 1,0 - 1,0 - 1,0 (20 s before time expires) | 5,0 | 1 400 | Russia |
| NOTE: ITU-T and terminal standards do not define any characteristics for a Pay tone. | | | | |

4.3 European Set 2:

Special Dial, Positive Indication, Congestion, Intrusion (including Warning, Operator Intervening) tones.

4.3.1 European Special Dial tones

Functional definition

The auditory indication to be presented to a user to indicate that a network connection is available and ready to receive call information and inviting the user to start sending call or service related information, and at the same time reminding the user that special conditions apply (e.g. a Call Forwarding Supplementary Service is active) to the termination from which the call is being made (this definition is consistent with CCITT Recommendation E.182 [15]).

Table 4.8: European Special Dial tones

| | Cadence (s) | Period (s) | Frequency (Hz) | Country/ies |
|----|--|-------------|-----------------|--|
| | | | None reported | Albania, Bulgaria, Cyprus, Czech Republic, Gibraltar, Ireland, Lithuania Luxembourg, Malta, Poland, Romania, Russia, Slovenia, Switzerland, Yugoslavia |
| 1 | 0,12 - 0,12 (375) + Continuous (425) | | 375 + 425 | Denmark |
| 2 | Continuous | | 330 + 440 | France |
| 3 | Continuous | | 350 + 375 + 400 | Hungary |
| 4 | Continuous | | 380 + 420 | Austria |
| 5 | Continuous | | 400 + 425 | Germany |
| 6 | Continuous | | 425 | Italy |
| 7 | Continuous (440) with 0,75 - 0,75 (350) | | 440 + 350 | United Kingdom 2 |
| 8 | 0,32 - 0,02 | 0,34 | 425 | Sweden |
| 9 | 0,4 - 0,04 | 0,44 | 425 | Iceland |
| 10 | 0,5 - 0,05 | 0,55 | 425 or 450 | Netherlands |
| 11 | 0,65 - 0,025 | 0,675 | 425 | Finland |
| 12 | 0,2 - 0,3 - 0,7 - 0,8 | 0,7 | 400/425? | Greece 1 |
| 13 | 0,4 - 0,4 | 0,8 | 425 | Croatia |
| 14 | 0,4 - 0,4 | 0,8 | 470/425? | Norway |
| 15 | 1,0 - 0,1 | 1,1 | 425 | Spain |
| 16 | 1,0 - 0,2 | 1,2 | 425 | Portugal |
| 17 | 1,0 - 0,25 | 1,25 | 425 or 450 | Belgium |
| 18 | 1,0 - 0,25 | 1,25 | 450 | Turkey |
| 19 | 0,75 - 0,75 | 1,5 | 440 + 350 | United Kingdom 1 |
| 20 | 0,2 - 0,3 - 0,7 - 0,8 | 2,0 | 425/450? | Greece 2 |
| 21 | 3 × (0,165 - 0,165) - 0,660 - 0,660 | 2,31 | 425 | Czech Republic, Slovakia |

NOTE: ITU-T and terminal standards do not define any characteristics for a Special Dial tone.

4.3.2 European Positive Indication tones

Functional definition

The auditory indication intended to be presented to a user to indicate that a control procedure, controlling a supplementary service, has been successfully completed and accepted. For example, in response to a Call Forwarding activation command (this definition is consistent with CCITT Recommendation E.182 [15]).

NOTE: prETS 300 738 [19] implies that a positive indication tone is not adequate feedback for most supplementary services. For example a Call Forwarding activation should give an announcement, confirming that Call Forwarding is now switched on and stating the number to which calls will now be forwarded.

Table 4.9: European Positive Indication tones

| | Cadence (s) | Period (s) | Frequency (Hz) | Country/ies |
|---|--------------------------|------------|-----------------|---|
| | | | None reported | Albania, Bulgaria, Cyprus, Czech Republic, Denmark, Finland, Germany, Gibraltar, Iceland, Ireland, Italy, Lithuania, Luxembourg, Malta, Poland, Portugal, Romania, Slovakia, Slovenia, Spain, Sweden, Switzerland, Turkey, United Kingdom, Yugoslavia |
| 1 | 0,04 - 0,04 | 0,08 | 425 or 450 | Belgium |
| 2 | 0,1 - 0,1 - 0,1 - 0,7 | 1,0 | 450 | Greece |
| 3 | 1,0 - 0,2 + announcement | 1,2 | 300 + 420 | Hungary |
| 4 | 3 × 0,333 - 1,0 | 1,999 | 950/1 400/1 800 | Norway |
| 5 | 1,0 - 5,0 | 6,0 | 380 + 420 | Austria |
| 6 | Continuous | | 425 | Croatia, Russia |
| 7 | Continuous | | 425 or 450 | Netherlands |
| 8 | Continuous | | 440 | France |
| NOTE: There were no ITU, CEPT or ETSI recommendations for the characteristics of a positive indication tone, see also the note above re prETS 300 738 [19]. | | | | |

4.3.3 European Congestion tones

Functional definition

The auditory indication to be presented to a user to indicate that some part of the network required for the successful setting up of the requested call or for the use of a specific service is temporarily engaged, and inviting the user to abort the call (this definition is consistent with CCITT Recommendation E.182 [15]).

Table 4.10: European Congestion tones

| | Cadence (s) | Period (s) | Frequency (Hz) | Country or Network |
|----|--|------------|----------------|--|
| | | | None reported | France, Hungary, Ireland, Lithuania, Romania, Yugoslavia |
| 1 | 0,2 | 0,2 | 400 | United Kingdom 2 (Special) |
| 2 | 0,15 - 0,15 | 0,3 | 425 | Albania, Greece |
| 3 | 0,3 | 0,3 | 1 004 | United Kingdom 3 (Special) |
| 4 | 0,165 - 0,165 | 0,33 | 425 | Czech Republic, Slovakia |
| 5 | 0,167 - 0,167 | 0,334 | 425 or 450 | Belgium |
| 6 | 0,2 - 0,2 | 0,4 | 400 | Portugal 1 |
| 7 | 0,2 - 0,2 | 0,4 | 420 | Austria 1 |
| 8 | 0,2 - 0,2 | 0,4 | 425 | Estonia, Finland, Italy, Norway 2, Portugal 2, Russia, Slovenia, Switzerland |
| 9 | 0,24 - 0,24 | 0,48 | 425 | Luxembourg 1, Germany 1 |
| 10 | 0,25 - 0,25 | 0,5 | 425 | Bulgaria 1, Croatia, Cyprus, Denmark, Faroe Islands, Iceland, Norway 1 |
| 11 | 0,25 - 0,25 | 0,5 | 425 or 450 | Luxembourg 2, Netherlands |
| 12 | 0,3 - 0,3 | 0,6 | 450 | Austria 2 |
| 13 | 0,15 - 0,475 | 0,625 | 425 or 450 | Germany 2 |
| 14 | 0,2 - 0,5 | 0,7 | 425 | Bulgaria 3 |
| 15 | 0,25 - 0,75 | 1,0 | 425 | Sweden |
| 16 | 0,5 - 0,5 | 1,0 | 425 | Bulgaria 2, Poland |
| 17 | 0,4 - 0,35 - 0,225 - 0,525 | 1,5 | 400 | Gibraltar, Malta, United Kingdom 1, CI Jersey |
| 18 | 0,2 - 0,2 - 0,2 - 0,2 - 0,2 - 0,6 | 1,6 | 425 | Spain |
| 19 | 3 × (0,2 - 0,2) - 0,6 - 0,2 | 2,0 | 450 | Turkey |

4.3.4 European Intrusion tones

Functional definition

The auditory indication to be presented to a user during a call to indicate that the privacy of the conversation can no longer be assured. For example, because of intervention of the operator (this definition is consistent with CCITT Recommendation E.182 [15]).

NOTE 1: Intrusion tone should not be confused with Warning tone or Conference tone. Warning tone should indicate that the call is being recorded; Conference tone should confirm a conferee has joined the conversation within a conference call.

Table 4.11: European Intrusion tones reported as Intrusion tone

| | Cadence (s) | Period (s) | Frequency (Hz) | Country/ies |
|---|---|------------|---------------------|---|
| | | | None reported | Albania, Austria, Belgium, Bulgaria, Croatia, Cyprus, Czech Republic, Finland, France, Germany, Gibraltar, Hungary, Iceland, Ireland, Lithuania, Malta, Poland, Portugal, Romania, Slovakia, Slovenia, Spain, Sweden , Switzerland, Turkey, United Kingdom, Yugoslavia |
| 1 | 0,05 - 0,5 | 0,55 | 150 | Denmark |
| 2 | 4 × (0,2) - 0,0 | 0,8 | 1 250/900/800/1 000 | Netherlands |
| 3 | 0,15 - 0,25 - 0,15 - 1,45 | 2,0 | 425 or 450 | Greece |
| 4 | 0,15 - 0,25 - 0,15 - 1,45 | 2,0 | 450 | Luxembourg |
| 5 | 0,2 - 0,2 - 0,2 - 1,4 | 2,0 | 425 | Italy |
| 6 | 0,25 - 0,25 - 0,25 - 1,25 | 2,0 | 425 | Russia |
| 7 | 2,0 | 2,0 | 1 400 ± 50 | Norway |

NOTE: ITU-T and terminal standards do not define any characteristics for a Intrusion tone.

Table 4.12: European Intrusion tones reported as - Warning, Operator Intervening tone

| | Cadence (s) | Period (s) | Frequency (Hz) | Country/ies |
|----|---|------------|----------------|---|
| | | | None reported | Albania, Belgium, France, Gibraltar, Greece, Iceland, Ireland, Italy, Lithuania, Malta, Netherlands, Norway, Poland, Portugal, Romania, Russia, Slovakia, Slovenia, Switzerland, United Kingdom, Yugoslavia |
| 1 | 0,05 - 0,5 | 0,55 | 150 | Denmark |
| 2 | 0,2 - 0,2 - 0,6 - 0,2 | 1,2 | 450 | Turkey |
| 3 | 0,1 - 1,5 | 1,6 | 1 400 | Sweden |
| 4 | 0,15 - 0,25 - 0,15 - 1,15 | 1,7 | 425 | Bulgaria 1 |
| 5 | 0,2 - 0,3 - 0,2 - 1,3 | 2,0 | 425 | Estonia, Finland |
| 6 | 0,2 - 0,3 - 0,7 - 0,8 | 2,0 | 425 | Croatia |
| 7 | 0,24 - 0,24 - 0,24 - 1,28 | 2,0 | 425 or 450 | Germany |
| 8 | 0,25 - 0,25 - 0,25 - 1,25 | 2,0 | 425 or 450 | Luxembourg |
| 9 | 0,2 - 0,3 - 0,2 - 1,5 | 2,2 | 425 | Bulgaria 2 |
| 10 | 0,3 - 0,3 - 0,3 - 1,5 | 2,4 | 425 | Hungary |
| 11 | 0,33 - 0,33 - 0,33 - 1,5 | 2,49 | 425 | Czech Republic |
| 12 | 0,15 - 0,15 - 0,15 - 1,95 | 2,4 | 420 or 450 | Austria |
| 13 | 0,4 - 5,0 | 5,4 | 1 400 | Spain |
| 14 | 0,5 - 14,0 | 14,5 | 1 400 | Cyprus |

NOTE: ITU-T and terminal standards do not define any characteristics for a Intrusion tone.

NOTE 2: Only Denmark appears to use the same tone for the "two definitions" of Intrusion tone, i.e. is the same in tables 4.11 and 4.12.

4.4 European Set 3:

Other tones reported.

4.4.1 European Payphone Recognition tones

Functional definition

The auditory indication to be presented to a network operator to indicate that the terminal, to or from which a connection is sought, is a payphone (this definition is consistent with CCITT Recommendation E.182 [15]).

NOTE: As network operation and service provision become more distinctly separate entities, there may be additional pressures for harmonization of tones indicating network oriented information like Payphone Recognition tone.

Table 4.13: European Payphone Recognition tones

| | Cadence (s) | Period (s) | Frequency (Hz) | Country/ies |
|----|--|------------|----------------------------|---|
| | | | | Albania, Belgium, Bulgaria, Czech Republic, Finland, France, Gibraltar, Greece, Italy, Lithuania, Malta, Netherlands, Poland, Romania, Russia, Slovakia, Slovenia, Yugoslavia |
| 1 | $3 \times (0,068 - 0,068)$ | 0,34 | 1 638/1 206/943 | Cyprus |
| 2 | 0,05 - 1,28 | 1,33 | 1 600 | Spain 1 |
| 3 | 0,05 - 0,05 - 0,05 - 1,55 | 1,7 | 1 600 | Spain 2 |
| 4 | 0,05 - 0,05 - 0,05 - 0,05 - 0,05 - 1,55 | 1,8 | 1 600 | Spain 3 |
| 5 | 0,2 - 0,2 - 0,2 - 2,0 | 2,6 | 800/1 200 | Switzerland 1 |
| 6 | 0,2 - 0,2 - 0,2 - 2,0 | 2,6 | 1 100 + 1 750/750 + 1 450 | Ireland, Luxembourg, Switzerland 2 |
| 7 | 0,2 - 0,2 - 0,2 - 2,0 | 2,6 | 1 100/750 | Hungary |
| 8 | 0,2 - 0,2 - 0,2 - 2,0 | 2,6 | 1 200/800 | United Kingdom |
| 9 | 0,2 - 0,2 - 0,2 - 2,0 (4 cycles) | 2,6 | 1 206/850 | Croatia |
| 10 | 0,2 - 0,2 - 0,2 - 2,0 | 2,6 | 1 336/1 633 | Austria |
| 11 | 0,2 - 0,2 - 0,2 - 2,0 | 2,6 | 1 477 + 941/1 400 + 950 | Denmark |
| 12 | 0,2 - 0,2 - 0,2 - 2,0 (4 cycles) | 2,6 | 1 477/941 | Norway |
| 13 | 0,2 - 0,2 - 0,2 - 2,0 | 2,6 | 1 477/941 | Portugal |
| 14 | 0,2 - 0,2 - 0,2 - 2,0 | 2,6 | 1 633/1 209 | Iceland |
| 15 | 0,2 - 0,2 - 0,2 - 2,0 (5 cycles) | 2,6 | 1 633/1 336 | Germany 1 |
| 16 | 0,2 - 0,2 - 0,2 - 2,0 (5 cycles) | 2,6 | 1 645 + 857/1 215 + 935 | Germany 4 |
| 17 | 0,2 - 0,2 - 0,2 - 2,0 (11 cycles) | 2,6 | 1 477/941 | Sweden |
| 18 | 0,25 - 0,25 - 0,25 - 2,0 | 2,75 | 1 000/1 200 or 1 000/1 330 | Turkey |
| 19 | 2,2 - 0,2 - 0,2 - 0,2 (6 cycles) | 2,8 | 1 336/1 024 | Germany 3 |
| 20 | 0,2 - 0,2 - 0,2 - 2,2 (5 cycles) | 2,8 | 1 366/1 024 | Germany 2 |

4.4.2 European Negative Indication tones

Functional definition

The auditory indication intended to be presented to a user to indicate that a request for service cannot be accepted (this definition is consistent with CCITT Recommendation E.182 [15]).

In practice it is also used to indicate that a control procedure, controlling a supplementary service, has NOT been successfully completed, i.e. the converse to Positive Indication tone. For example, in response to a call forwarding activation command, to signify that the call forwarding command failed and that call will not be forwarded.

NOTE: prETS 300 738 [19] implies that a Negative Indication tone is not adequate feedback for most supplementary services. For example, when a Call Forwarding activation fails it would be helpful to the user to know why, e.g. the command had the wrong syntax, the target number was unrecognized, etc.

Table 4.14: European Negative Indication tones

| | Cadence (s) | Period (s) | Frequency (Hz) | Country/ies |
|---|------------------------------------|-------------------|-----------------------|--------------------|
| 1 | 0,0625 - 0,0625 | 0,125 | 425 or 450 | Netherlands |
| 2 | 0,2 - 0,2 + announcement | 0,4 | 300 + 420 | Hungary |
| 3 | 0,25 - 0,25 | 0,5 | 425 | Croatia |
| 4 | 0,4 - 0,4 | 0,8 | 380 + 420 | Austria |
| 5 | (3 × 0,33 - 2 × 0,03) - 1,0 | 2,05 | 950/1 400/1 800 | Russia |

4.4.3 European Second Dial tones

Functional definition

The auditory indication to be presented to a user to indicate that a network has accepted the call information already sent and is inviting the user to start sending more call or service related information (this definition is consistent with CCITT Recommendation E.182 [15]).

Table 4.15: European Second Dial tones

| | Cadence (s) | Period (s) | Frequency (Hz) | Country/ies |
|---|--------------------|-------------------|-----------------------|------------------------------------|
| 1 | 3 × 0,333 | 0,999 | 900/1 020/1 140 | Belgium |
| 2 | Continuous | | 330 + 440 | France |
| 3 | Continuous | | 425 | Sweden |
| 4 | Continuous | | 425 or 450 | Netherlands |
| 5 | Continuous | | 425 + 350 | Poland |
| 6 | Continuous | | 600 | Spain (International) |
| 7 | Continuous | | 1 111 | United Kingdom (access to Mercury) |

Table 4.16: European Other Dial tones

| | Cadence (s) | Period (s) | Frequency (Hz) | Country/ies |
|--|-----------------------------|-------------------|-----------------------|---|
| | 2 × (0,2 - 0,3) - 0,2 - 0,8 | 2? | 425 | Finland (Pabx) |
| | Continuous | | 425 | Czech Republic (Centrex), Slovakia (Centrex) |
| | Continuous | | 500 | Switzerland (Pabx) |

4.4.4 European infrequently reported tones

Table 4.17: European Route tones

| | Cadence (s) | Period (s) | Frequency (Hz) | Country/ies |
|---|--------------------|-------------------|-----------------------|--------------------|
| 1 | 0,05 - 0,05 | 1,0 | 425 | Poland |
| 2 | 0,05 - 0,05 | 1,0 | 440 | France (see note) |
| 3 | 0,06 - 0,06 | 1,2 | 425 | Ireland |

NOTE: France, at least, discontinued using this tone during 4th quarter 1996.

Table 4.18: European Offering tones

| | Cadence (s) | Period (s) | Frequency (Hz) | Country/ies |
|---|--|-------------------|-----------------------|--------------------|
| 1 | 0,3 - 0,3 - 0,3 - 1,5 | 2,4 | 425 | Hungary |
| 2 | 0,33 - 0,33 - 0,33 - 1,5 | 2,49 | 425 | Slovakia |

NOTE: May be the same as Route tone.

Table 4.19: European Warning tones

| | Cadence (s) | Period (s) | Frequency (Hz) | Country/ies |
|--|---|-------------------|-----------------------|--------------------|
| 1 | 0,24 - 0,24 - 0,24 - 1,28 | 2,0 | 425 or 450 | Germany |
| 2 | 0,4 - 5,0 | 5,4 | 1 400 | Spain |
| 3 | 0,4 - 15,0 | 15,4 | 1 400 | Russia |
| NOTE: Assumed to be used to indicate that a call is being recorded, i.e. coherent with the ITU-T definition of Warning tone. | | | | |

Table 4.20: European Recall Dial tone

| | Cadence (s) | Period (s) | Frequency (Hz) | Country/ies |
|---|--------------------|-------------------|-----------------------|--------------------|
| | Continuous | | 420 | Austria |
| NOTE: Assumed to have the same meaning as Special Dial tone | | | | |

Table 4.21: European Holding tone

| | Cadence (s) | Period (s) | Frequency (Hz) | Country/ies |
|--|--------------------|-------------------|-----------------------|--------------------|
| | 0,5 - 0,5 | 1,0 | 900 | Greece |
| NOTE: Assumed to have the same meaning as ITU-T definition for tone on Hold. | | | | |

Table 4.22: European Valid tone

| | Cadence (s) | Period (s) | Frequency (Hz) | Country/ies |
|--|-------------------------------------|-------------------|-----------------------|-----------------------|
| | 0,1 - 0,1 - 0,1 - 0,7 | 1,0 | 450 | Greece (Radio paging) |
| NOTE: Assumed to have the same meaning as Positive Indication tone, but within a Paging context. | | | | |

Table 4.23: European Queue tone

| | Cadence (s) | Period (s) | Frequency (Hz) | Country/ies |
|--|--|-------------------|-----------------------|--------------------|
| | 0,65 - 0,325 - 0,325 - 0,3 - 1,3 - 2,6 | 5,5 | 950/950/1 400 | Finland |
| NOTE: Assumed to have a similar meaning as ITU-T definition for Caller Waiting tone. | | | | |

Table 4.24: European reported as Record tone

| | Cadence (s) | Period (s) | Frequency (Hz) | Country/ies |
|--|--------------------|-------------------|-----------------------|--------------------|
| | 0,45 - 15,0 | 15,45 | 1 400 | Switzerland |
| NOTE: May be Record tone as defined by ITU-T and ISO/IEC, but because of the repetition in the cadence may more accurately be a Warning tone (i.e. recording in progress). | | | | |

Table 4.25: European Confirmation tone

| | Cadence (s) | Period (s) | Frequency (Hz) | Country/ies |
|---|--------------------|-------------------|-----------------------|--------------------|
| | 0,04 - 0,04 | 0,08 | 450 | Turkey |
| NOTE: Assumed to have the same meaning as Positive Indication tone. | | | | |

Table 4.26: European Intercept tone

| | Cadence (s) | Period (s) | Frequency (Hz) | Country/ies |
|--|---|-------------------|-----------------------|--------------------|
| | 0,25 - 0,25 (No repetition) | 0,5 | 1 190/1 280 | Luxembourg |
| NOTE: No additional information on this tones use. | | | | |

Table 4.27: European Connection tone

| | Cadence (s) | Period (s) | Frequency (Hz) | Country/ies |
|---|--------------------|-------------------|-----------------------|--|
| | 0,05 - 0,05 | 0,1 | 1 400 | Czech Republic (called Switching tone), Slovakia |
| NOTE: Assumed to be used when a call is being put through to a third party. | | | | |

Table 4.28: European Conference tone

| | Cadence (s) | Period (s) | Frequency (Hz) | Country/ies |
|--|--------------------|-------------------|-----------------------|--------------------------|
| | 0,66 | 0,66 | 425 | Czech Republic, Slovakia |
| NOTE: Assumed to mean a new Conferee is or has joined. | | | | |

Table 4.29: European Incomplete Conference tone

| | Cadence (s) | Period (s) | Frequency (Hz) | Country/ies |
|---|-------------------------------|-------------------|-----------------------|--------------------|
| | 0,3~1,5 (single burst) | | 425 | Russia |
| NOTE: Conferee fails to join at beginning or leaves before end of conference. | | | | |

Table 4.30: European Message Waiting Dial tone

| | Cadence (s) | Period (s) | Frequency (Hz) | Country/ies |
|--|------------------------------------|-------------------|-----------------------|--------------------|
| | 0,1 - 0,1 - 0,1 - 0,1 - 0,5 | 1,0 | 425 | Italy |
| NOTE: This is a new tone introduced to support Voice Mail and similar messaging services. It is a special case of Special Dial tone. | | | | |

Table 4.31: European Warning tone - at time limit barring

| | Cadence (s) | Period (s) | Frequency (Hz) | Country/ies |
|---|-------------------------------|-------------------|-----------------------|--------------------|
| | 2,0 - 5,0 - Continuous | 7,0 | 425 | Sweden |
| NOTE: Used for the supplementary service "Time Limit Barring" to indicate end of call time. | | | | |

Table 4.32: European Warning tone - three party conference

| | Cadence (s) | Period (s) | Frequency (Hz) | Country/ies |
|--|--------------------|-------------------|-----------------------|--------------------|
| | 0,35 - 15,0 | 15,35 | 1 400 | Sweden |
| NOTE: Used for the supplementary service "3-Party Conference" as a reminder that this is a conference call (Similar in meaning to ITU-T's Intrusion tone). | | | | |

4.5 Comparison of tone characteristics and coding dimensions used in European tones

Spreadsheet analysis of the complete set of tones reported in use in Europe enabled some basic graphical analysis of the use of a tones characteristics as a coding dimension. For example, in the simplest terms, CCITT Recommendation E.180 [14] recommends that the difference between busy and congestion should be the speed of the cadence. Congestion tones should have a faster rhythm than busy tones. In this case the speed of the cadence is being used to code the information telling the user why the call attempt has to be aborted.

Working from the Human Factors model proposed in part 1 (see figure 8, part 1), it seemed appropriate to consider whether European tones already have a tendency to use certain characteristics for segregating the tone groups. If such a tendency did exist it should be possible to see similarities between tone in the same SWAT group, i.e. Signal tones, should be different to **Wait**, **Abort** or **Talk** tones.

4.5.1 Frequency

Looking first at the use a frequency as a coding dimension, the arbitrary decision was taken that tones below 500 Hz could be considered low and tones above this threshold as high. Figure 1 compares the high and low tones against each of the SWAT categories. Clearly there is little difference between the categories, which is not so surprising as most of the reported tones are based on 400 - 450 Hz. Where higher frequency tones are used these tend to be for either the abort (especially for SIT) or talk category (probably Pay tone).

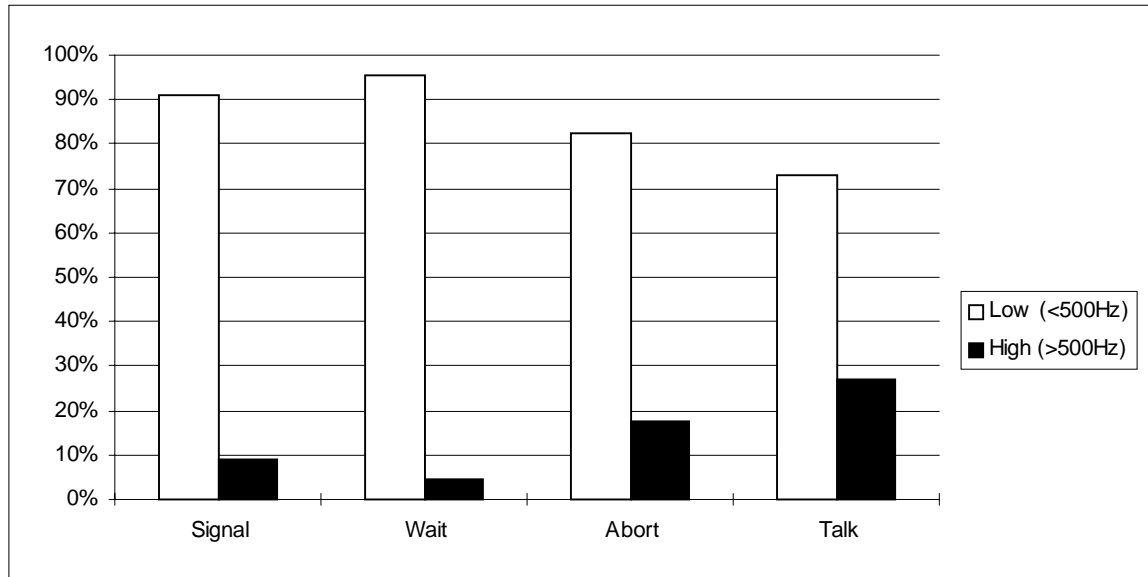


Figure 1: Use of high and low frequency as a coding dimension

4.5.1 Period, or length of cadence

The next simple comparison was the length of a single cadence, i.e. the period of the tone pattern. Again some arbitrary decisions were made for grouping these into: short (less than 1,1 s), medium (1,2 - 2,9 s), long (3,0 - 20,0 s) and continuous. Clearly there is a bias shown in figure 2. Continuous tones are used predominantly for the signal category of tones, the tone continues until signalling is initiated. Even more clearly short cadences are used within the abort category, these tend to imply urgency, and this again is not unexpected. Interestingly, though is the fact that longer cadences are used in both the wait and talk categories. However this is quickly accounted for when it is realized that a long period includes, short bursts of tones and long silences, as well as medium bursts of tone followed by medium silences. The data is not telling the whole story.

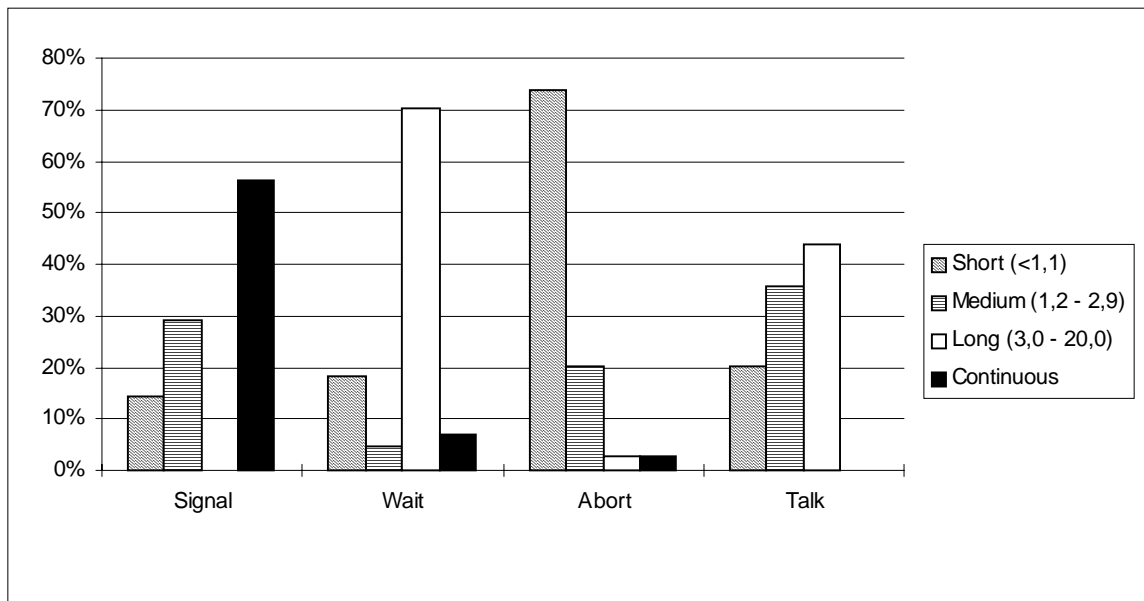


Figure 2: Use of cadence period length as a coding dimension

4.5.3 Complexity of cadence

The third area of interest was the degree of complexity in the tone. The arbitrary decision was made that tones could be categorized as simple (a single on and a single off within the cadence, typically with the on/off of equal length) or complex (more than one burst of tone in a cadence, or varying lengths of tones and silences within a cadence) or continuous (as its name suggests). Figure 3 shows that simple tones are used frequently in the signal, wait and abort categories. Whereas continuous tones are used almost exclusively in the signal category, and complex tones are used most in the talk category. But again this is not the whole story, as simple or complex tones may have long or short periods and may be high or low frequency.

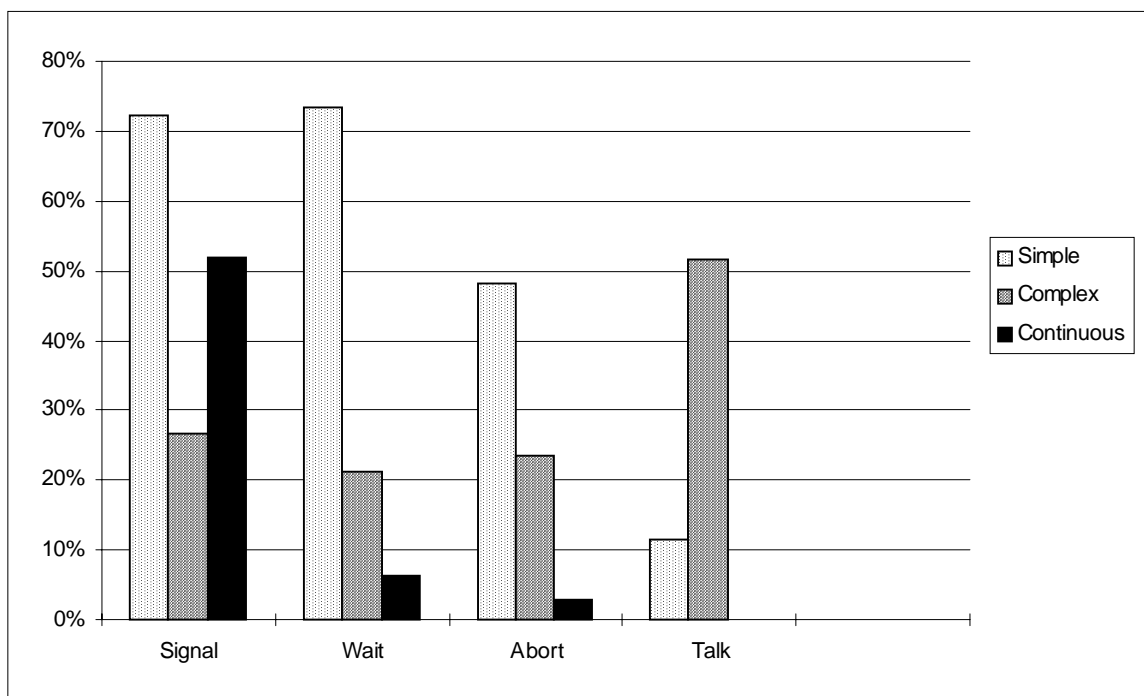


Figure 3: Use of cadence pattern complexity as a coding dimension

4.5.4 On/off ratios

The final tone characteristic to be explored was the on/off ratio. This was calculated from the total time a tone was sounding, divided by the total time of the silence, during a single cadence. Thus the typical busy tone of 0,5 on and 0,5 off would have an on/off ratio of 1; and the typical Dial tone of 1,0 on 4,0 off would have an on/off ratio of 0,25. From a visual inspection of the resulting data it was decided to subdivide these into nine groupings:

single burst;

<0,1;

0,1 - 0,19;

0,2 - 0,29;

0,3 - 0,49;

0,5 - 0,999;

1;

>1;

continuous.

Figure 4 shows the results, and there are almost four clear peaks, one for each category. For the signal category the peak is caused by the continuous tones, with a reasonable proportion of on/off ratios above 0,5, and almost nothing below except the odd single burst tone. For the abort category, the peak is clearly on/off ratios of 1. Whereas for the talk category not unexpectedly the peak on/off ratios are very short typically <0,1 (i.e. very short burst of tone with long silences, to minimize the interruption of the speech). The least well defined category is the wait category. There is a clear peak between on/off ratios 0,2 - 0,49, but there is a spread also from 0,1 - 1,0.

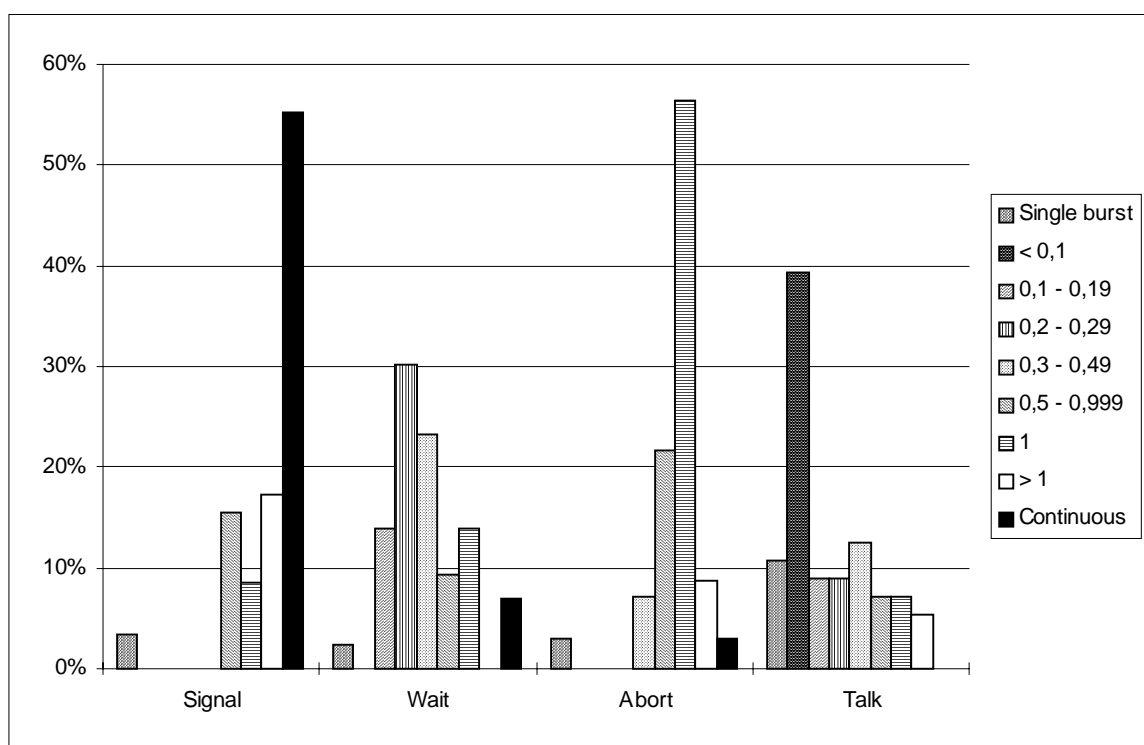


Figure 4: Use of on/off ratio as a coding dimension

The same data can be perhaps more dramatically represented in three dimensions, where the peaks show the clear differences between the categories, in figure 5.

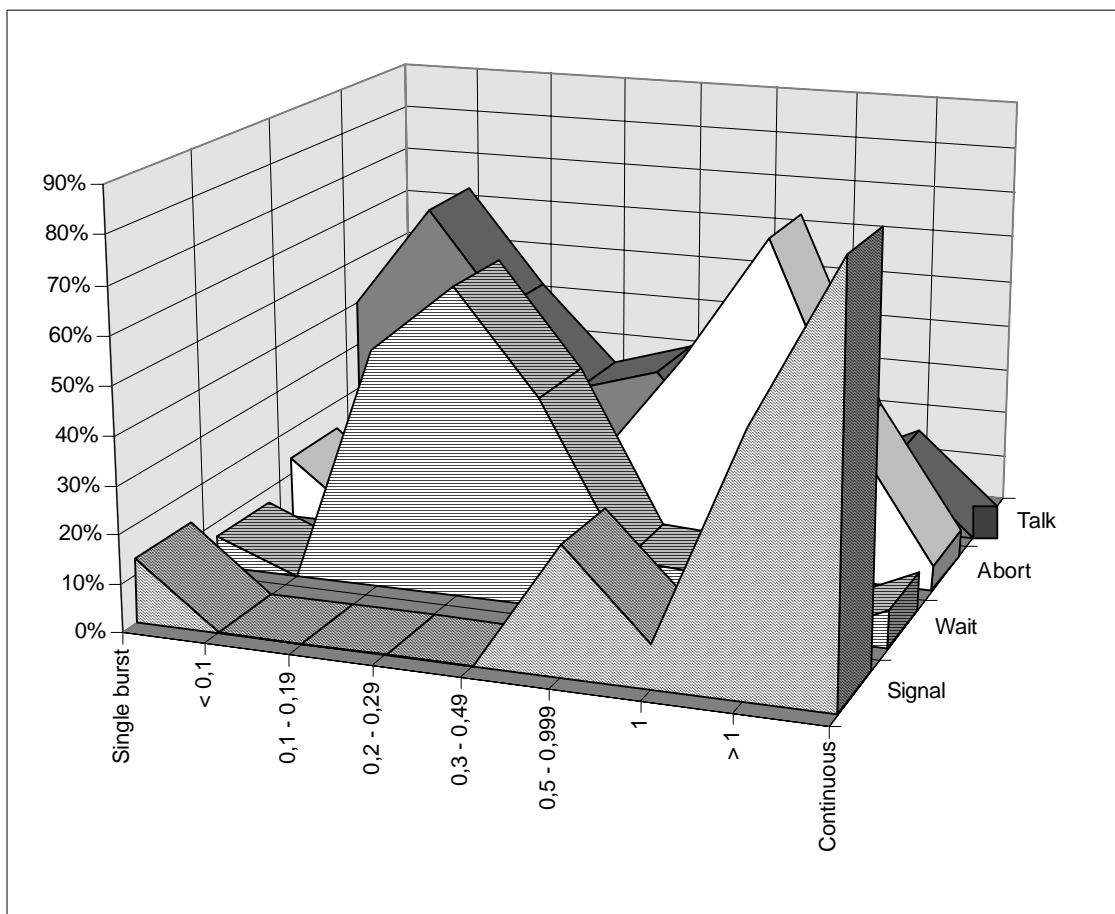


Figure 5: Looking at on/off ratio as a coding dimension from another angle

These five figures have been used to explore how far the European tones reported can be said to reflect the SWAT categories, and to consider which characteristics of the tones are being used (if any) for coding tones into these categories. Obviously if there are coding dimensions already in use, then any development of the model should build on these, if at all possible.

This brief analysis has shown that there are coding dimensions in use and that these are predominantly, but not exclusively, based on the on/off ratio. However it also demonstrates that there are clear opportunities for exploring other coding dimensions, most notably the use of higher frequencies, and more complex cadences. This point is also developed in part 1 clause 7.

5 Analysis of reported rest of World tones (non-European)

5.1 Introduction

This analysis is based solely on the ITU-T Recommendation E.180 Supplement 2 (Series E) (01/94) [16]. The original data was collected in July 1991 and March 1992 in response to the CCITT Circular Letter No.98.

The analysis is divided into the same three sets used in clause 4. Sets 1 and 2 reflect the relative "preference for standardization" weighting given in the CEC's mandate to ETSI [1]. Set 3 presents the other tones listed. In detail these are:

- Set 1:** Dial, Ring, Busy, Special Information, Call Waiting, Pay tones;
- Set 2:** Special Dial, Positive Indication, Congestion, Intrusion tones;
- Set 3:** Acceptance tone, Comfort tone, Confirmation tone, End of Three Party Service tone, Executive Override tone, Facilities tone, Function Acknowledge tone, Holding tone, Identification tone, Intercept tone, Line Lockout tone, Negative Indication tone, Notify tone, Number Unobtainable tone, Offering tone, Payphone Recognition tone, Permanent Signal tone, Pre-emption tone, Re-order tone, Recall Dial tone, Record tone, Refusal tone, Route tone, Search tone, Second Dial tone, Service Activated tone (Positive Indication?), Test Number tone, Warning tone (end of period), Warning tone (Operator Intervening).

5.2 The rest of World tone tables

5.2.1 World Set 1:

Dial, Ringing, Busy, Special Information, Call Waiting, Pay tones.

5.2.1.1 World Dial tones

Table 5.1: Dial tone

| | Cadence (s) | Period (s) | Frequency (Hz) | Country/ies |
|----|---|------------|---------------------------------|---|
| | | | None defined | Algeria, Bahamas, Belarus, Benin, Egypt, Grenada, Guinea, Iraq, Kyrgyzstan, Lebanon, Madagascar, Moldova, Mozambique, Pakistan, Paraguay, Puerto Rico, Tajikistan |
| 1 | 0,0166 - 0,0166 | 0,033 | 33 | Dominica Rep. 2 |
| 2 | 0,2 - 0,2 | 0,4 | 400 | Philippines 2 |
| 3 | 0,25 - 0,25 | 0,5 | 400 | Japan 2 (Pabx) |
| 4 | 0,4 - 0,04 | 0,44 | 425 | Tunisia 2 |
| 5 | 0,6 - 1,0 - 0,2 - 0,2 | 2,0 | 425 | San Marino |
| 6 | 0,7 - 0,8 - 0,2 - 0,3 | 2,0 | 450 | Uruguay 2 |
| 7 | 0,75 - 0,75 - 0,25 - 0,25 | 2,0 | 425 | Cuba 2 |
| 8 | 0,975 - 0,05 | 1,025 | 425 | Brazil 2 (Pabx) |
| 9 | 1,3 - 0,3 - 0,2 - 0,5 | 2,3 | 360/400 | Guyana |
| 10 | 15,0 (Continuous for 15 s?) | | 425 | Ecuador |
| 11 | 15,0 (Continuous for 15 s?) | | 440 | Gabon 1 |
| 12 | Continuous | | 154 | Australia 2 (Pabx) |
| 13 | Continuous | | 33 | Nauru 2 (Pabx) |
| 14 | Continuous | | 33 1/3 | Fiji 2 (Pabx) |
| 15 | Continuous | | 33 or 50 | Fiji 1 |
| 16 | Continuous | | 33 or 50 | Uganda |
| 17 | Continuous | | 33 or 50 or 400 × 25 | India |
| 18 | Continuous | | 330 × 440? | Bahrain |
| 19 | Continuous | | 350 + 440 | Anguilla, Barbados, Bermuda, Botswana, British Virgin Islands, Dominica (Commonwealth of), Falkland Island, Hong Kong, Jamaica, Korea (Rep. of), Montserrat, Qatar, S. Helena, S. Vincent and the Grenadines, S.-Kitts-and-Nevis, Seychelles, Trinidad and Tobago, Turks and Caicos Islands, United Arab Emirates |
| 20 | Continuous | | 350 + 440 (reported as 350/440) | Antigua and Barbuda, Diego Garcia, Ascension |
| 21 | Continuous | | 350 + 440 or 600 × 120 | Canada, United States of America |
| 22 | Continuous | | 350/450? | Burkina Faso 2 |
| 23 | Continuous | | 400 | Angola, Chile, Ghana, Japan 1, Nauru 1, New Zealand, Solomon, Zimbabwe |
| 24 | Continuous | | 400 +25 | Bhutan |
| 25 | Continuous | | 400 or 425 or 440 | Israel |
| 26 | Continuous | | 400 or 425 or 450 | Nigeria |

Continued

Table 5.1 (concluded): Dial tone

| | Cadence (s) | Period (s) | Frequency (Hz) | Country/ies |
|----|-------------|------------|------------------------------|--|
| 27 | Continuous | | 400 × 33 | South Africa |
| 28 | Continuous | | 400 × 50 | Brunei Darussalam |
| 29 | Continuous | | 400 × 50 or 400 | Thailand |
| 30 | Continuous | | 400/50 | Maldives |
| 31 | Continuous | | 420 × 40 or 400 + 440 | Jordan |
| 32 | Continuous | | 425 | Argentina, Aruba, Brazil 1, Burkina Faso 1, Burundi, Cayman Islands, Central African Republic, Comoros, Costa Rica, Côte D'Ivoire, Djibouti, El Salvador, Ethiopia, Gambia, Indonesia, Iran, Kiribati, Kuwait, Lao P.D.R., Liberia, Macau, Malawi, Malaysia, Mali, Mauritania, Mauritius, Mexico, Morocco, Nepal, Oman, Panama, S. Lucia, Sao Tome and Principe, Saudi Arabia, Singapore, Sri Lanka, Suriname, Tunisia 1, Turkmenistan, Uruguay 1, Vanuatu, Western Samoa, Gabon 2 |
| 33 | Continuous | | 425 or 400 × 25 or 350 + 440 | Papua New Guinea |
| 34 | Continuous | | 425 or 450 | Sierra Leone |
| 35 | Continuous | | 425 or 50 | Kenya, Zambia |
| 36 | Continuous | | 425 × 25 | Australia 1 |
| 37 | Continuous | | 440 | Cameroon, Honduras, Niger, Rwanda, Senegal |
| 38 | Continuous | | 440 or 330 + 440 | French Polynesia, Guadeloupe (French Dep.), Guiana (French Dep.), Martinique (French Dep.), Mayotte, New Caledonia, Reunion (French Dep.), S. Pierre and Miquelon, Wallis and Futuna |
| 39 | Continuous | | 440 × 33 | Nambia |
| 40 | Continuous | | 445 or 425 | Greenland |
| 41 | Continuous | | 450 | China, Syria |
| 42 | Continuous | | 50 | Dominica Rep. 1, Swaziland, Tanzania |
| 43 | Continuous | | 600 × 120 or 425 | Cuba 1, Philippines 1 |

5.2.1.2 World Ringing tones

Table 5.2: Ringing tone

| | Cadence (s) | Period (s) | Frequency (Hz) | Country/ies |
|----|--|------------|-----------------------------------|--------------------------------------|
| 1 | 0,2 - 0,2 | 0,4 | 440/480? | Burkina Faso 2 |
| 2 | 0,2 - 0,4 | 0,6 | 400 + 450 | S. Vincent and the Grenadines |
| 3 | 0,25 - 0,5 - 0,25 - 2,0 | 3,0 | 133 + 17 or 400 + 17 or 400 + 450 | Uganda |
| 4 | 0,375 - 0,25 - 0,375 - 2,0 | 3,0 | 425 | S. Lucia |
| 5 | 0,375 - 0,25 - 0,375 - 2,0 | 3,0 | 425 × 25 | Western Samoa |
| 6 | 0,4 - 0,2 | 0,6 | 400 + 450 | Falkland Islands, S. Helena, Solomon |
| 7 | 0,4 - 0,2 | 0,6 | 425 | Sri Lanka |
| 8 | 0,4 - 0,2 | 0,6 | 450 | Guinea |
| 9 | 0,4 - 0,2 - 0,4 - 2,0 | 3,0 | 133 or 400 × 25 | India 2 |
| 10 | 0,4 - 0,2 - 0,4 - 2,0 | 3,0 | 133 × 16 2/3 or 400 × 25 | Fiji 1 |

Continued

Table 5.2 (continued): Ringing tone

| | Cadence (s) | Period (s) | Frequency (Hz) | Country/ies |
|----|-------------------------------------|------------|--|---|
| 11 | 0,4 - 0,2 - 0,4 - 2,0 | 3,0 | 400 | Maldives |
| 12 | 0,4 - 0,2 - 0,4 - 2,0 | 3,0 | 400 or 133 | Jamaica 4, Malawi 2 |
| 13 | 0,4 - 0,2 - 0,4 - 2,0 | 3,0 | 400 or 450 | Botswana |
| 14 | 0,4 - 0,2 - 0,4 - 2,0 | 3,0 | 400 × 17 | Australia |
| 15 | 0,4 - 0,2 - 0,4 - 2,0 | 3,0 | 400 × 33 | Nambia, South Africa |
| 16 | 0,4 - 0,2 - 0,4 - 2,0 | 3,0 | 400 × 450? or 133 × 16 2/3 | Vanuatu 2 |
| 17 | 0,4 - 0,2 - 0,4 - 2,0 | 3,0 | 400 × 450? or 400 × 33 | Zimbabwe |
| 18 | 0,4 - 0,2 - 0,4 - 2,0 | 3,0 | 400 + 16 2/3 | Jordan 2, Pakistan 2 |
| 19 | 0,4 - 0,2 - 0,4 - 2,0 | 3,0 | 400 + 450 | New Zealand, Qatar 2 |
| 20 | 0,4 - 0,2 - 0,4 - 2,0 | 3,0 | 400 + 450 or 425 | United Arab Emirates |
| 21 | 0,4 - 0,2 - 0,4 - 2,0 | 3,0 | 425 | Kiribati, Malaysia, Oman, Seychelles |
| 22 | 0,4 - 0,2 - 0,4 - 2,0 | 3,0 | 425 or 400 × 25 or 400 × 16 2/3 or 400 + 450 or 410 × 20 | Papua New Guinea |
| 23 | 0,4 - 0,2 - 0,4 - 2,0 | 3,0 | 425 × 24 | Singapore |
| 24 | 0,4 - 0,2 - 0,4 - 2,0 | 3,0 | 425 × 25 | Nauru 2 (Pabx) |
| 25 | 0,4 - 0,2 - 0,4 - 2,0 | 3,0 | 440 or 450 | Bahrain |
| 26 | 0,4 - 0,2 - 0,4 - 2,2 | 3,2 | 400 or 450 | Dominican Rep. |
| 27 | 0,4 - 0,2 - 0,4 - 2,2 | 3,2 | 400 + 450 | Qatar 1 |
| 28 | 0,4 - 0,2 - 0,4 - 2,6 | 3,6 | 400 × 25 | India 1 |
| 29 | 0,4 - 0,2 - 0,4 - 2,6 | 3,6 | 400 + 25 | Bhutan |
| 30 | 0,4 - 0,2 - 0,4 - 3,0 | 4,0 | 440 + 480 | Hong Kong |
| 31 | 0,4 - 0,2 - 0,4 - 4,0 | 5,0 | 400 | Swaziland |
| 32 | 0,4 - 0,2 - 0,4 - 2,0 | 3,0 | 400 × 16 2/3 | Fiji 2 (Pabx) |
| 33 | 0,4 - 0,3 - 0,4 - 2,0 | 3,1 | 400 + 450 | Brunei Darussalam |
| 34 | 0,4 - 4,0 | 4,4 | 25 | Turkmenistan |
| 35 | 0,5 - 4,0 - 2,0 - 4,0 | 10,5 | 440 | Honduras |
| 36 | 0,8 - 3,2 | 4,0 | 425 | Belarus, Kyrgyzstan, Moldova, Tajikistan |
| 37 | 1,0 - 10,0 | 11,0 | 450 | Philippines 1 |
| 38 | 1,0 - 2,0 | 3,0 | 400 | Tanzania 2 |
| 39 | 1,0 - 2,0 | 3,0 | 400 × 16 | Japan 1 |
| 40 | 1,0 - 2,0 | 3,0 | 400 × 20 | Japan 2 (Pabx) |
| 41 | 1,0 - 2,0 | 3,0 | 420 × 40 | Cuba 3 |
| 42 | 1,0 - 2,0 | 3,0 | 440 + 480 | Korea (Rep. of) |
| 43 | 1,0 - 3,0 | 4,0 | 400 | Chile, Kuwait 2 |
| 44 | 1,0 - 3,0 | 4,0 | 400 or 425 or 440 | Israel |
| 45 | 1,0 - 3,0 | 4,0 | 440 + 480 | Canada 2 (Pabx), United States of America 3 (Pabx) |
| 46 | 1,0 - 3,0 | 4,0 | 440 + 480 | |
| 47 | 1,0 - 3,0 | 4,0 | 440/480? | Ascension, Diego Garcia |
| 48 | 1,0 - 3,0 | 4,0 | 450 or 50 | Syria 2 |
| 49 | 1,0 - 4,0 | 5,0 | 400 | Ghana, Nauru 1, Thailand |
| 50 | 1,0 - 4,0 | 5,0 | 425 | Argentina, Aruba, Brazil, Burkina Faso 1, Cayman Islands, Cuba 2, Ethiopia, Gambia, Indonesia, Iran, Kuwait 1, Lao P.D.R., Macau, Malawi 1, Mauritius, Mexico, Paraguay, San Marino, Uruguay, Vanuatu 1, Zambia |
| 51 | 1,0 - 4,0 | 5,0 | 425 or 450 | Liberia, Sierra Leone |
| 52 | 1,0 - 4,0 | 5,0 | 425 or 475 | Syria 1 |
| 53 | 1,0 - 4,0 | 5,0 | 425 + 480 | Philippines 2 |
| 54 | 1,0 - 4,0 | 5,0 | 440 + 480 | Jamaica 3 |
| 55 | 1,0 - 4,0 | 5,0 | 445 or 425 | Greenland |

Continued

Table 5.2 (concluded): Ringing tone

| | Cadence (s) | Period (s) | Frequency (Hz) | Country/ies |
|----|---|------------|-------------------------------------|---|
| 56 | 1,0 - 4,0 | 5,0 | 450 | China, Pakistan 1 |
| 57 | 1,0 - 4,0 - 1,0 - 2,0 - 1,0 - 5,0 - 0,4 - 0,2 | 14,6 | 425 | Kenya |
| 58 | 1,0 - 5,0 | 6,0 | 25 | Angola |
| 59 | 1,0 - 5,0 | 6,0 | 400 | Mozambique |
| 60 | 1,0 - 5,0 | 6,0 | 425 | Sao Tome and Principe |
| 61 | 1,1 - 3,1 | 4,2 | 425 | Nepal |
| 62 | 1,2 - 4,4 | 5,6 | 435 | Lebanon |
| 63 | 1,2 - 4,6 | 5,8 | 425 | Costa Rica, Saudi Arabia, Tunisia |
| 64 | 1,2 - 4,65 | 5,85 | 425 | Ecuador |
| 65 | 1,2 - 4,8 | 6,0 | 420 × 40 or 440 + 400 | Jordan 1 |
| 66 | 1,2 - 5,0 | 6,2 | 425 | El Salvador |
| 67 | 1,20 - 4,65 | 5,85 | 425 | Panama |
| 68 | 1,5 - 3,0 | 4,5 | 440 | Gabon 1 |
| 69 | 1,5 - 3,5 | 5,0 | 25 or 50 | Algeria |
| 70 | 1,5 - 3,5 | 5,0 | 425 | Djibouti, Gabon 2, Mauritania |
| 71 | 1,5 - 3,5 | 5,0 | 440 | Benin, French Polynesia, Guadeloupe (French Dep.), Guiana (French Dep.), Martinique (French Dep.), Mayotte, New Caledonia, Reunion (French Dep.), S. Pierre and Miquelon, Wallis and Futuna |
| 72 | 1,5 - 4,5 | 6,0 | 440 + 480 | Jamaica 2 |
| 73 | 1,66 - 3,33 | 4,99 | 25 | Madagascar |
| 74 | 1,66 - 3,33 | 4,99 | 425 | Morocco |
| 75 | 1,66 - 3,33 | 4,99 | 50 or 425 × 50 | Côte D'Ivoire |
| 76 | 1,7 - 3,3 | 5,0 | 400 | Senegal |
| 77 | 1,7 - 3,3 | 5,0 | 425 | Burundi, Central African Republic, Mali |
| 78 | 1,7 - 3,3 | 5,0 | 440 | Cameroon, Niger, Rwanda |
| 79 | 1,71 - 3,31 | 5,02 | 425 | Comoros |
| 80 | 1,75 - 3,25 | 5,0 | 425 | Guyana |
| 81 | 15,0 - 0,5 | 15,5 | 425 | Suriname |
| 82 | 2,0 - 1,0 | 3,0 | 425 × 50 | Egypt |
| 83 | 2,0 - 4,0 | 6,0 | 400 or 425 or 450 | Nigeria |
| 84 | 2,0 - 4,0 | 6,0 | 420 × 40 | United States of America 2 (Old) |
| 85 | 2,0 - 4,0 | 6,0 | 440 × 480? | Jamaica 1 |
| 86 | 2,0 - 4,0 | 6,0 | 440 + 480 | Anguilla, Barbados, Bermuda, British Virgin Islands, Canada 1, Dominica (Commonwealth of), Grenada, Montserrat, S.-Kitts-and-Nevis, Trinidad and Tobago, Turks and Caicos Islands, United States of America 1 |
| 87 | 2,0 - 4,0 | 6,0 | 440 + 480 or 440 + 620 or 480 + 620 | Cuba 1 |
| 88 | 2,0 - 4,0 | 6,0 | 440/480? | Antigua and Barbuda |
| 89 | 2,0 - 4,0 | 6,0 | 440/480? or 420/20 or 400 | Bahamas |
| 90 | Continuous | | 400 | Iraq, Tanzania 1 |

5.2.1.3 World Busy tones

Table 5.3: Busy tone

| | Cadence (s) | Period (s) | Frequency (Hz) | Country/ies |
|----|---|------------|-----------------------|---|
| 1 | | | None defined | Benin |
| 2 | 0,2 - 0,2 | 0,4 | 425 | San Marino |
| 3 | 0,2 - 0,2 | 0,4 | 450 | Guinea |
| 4 | 0,25 - 0,25 | 0,5 | 400 | Ghana, Namibia 3 |
| 5 | 0,25 - 0,25 | 0,5 | 425 | Brazil, Mexico, Nepal, Tunisia 1 |
| 6 | 0,25 - 0,25 | 0,5 | 445 or 425 | Greenland |
| 7 | 0,25 - 0,25 | 0,5 | 450 | Burundi |
| 8 | 0,3 - 0,2 | 0,5 | 425 | Argentina |
| 9 | 0,3 - 0,3 | 0,6 | 425 | Costa Rica |
| 10 | 0,32 - 4,65 | 4,97 | 425 | Panama |
| 11 | 0,33 - 0,33 | 0,66 | 425 | Ecuador |
| 12 | 0,333 - 0,333 | 0,666 | 425 | El Salvador |
| 13 | 0,333 - 0,333 | 0,666 | 450 | Thailand 2 |
| 14 | 0,35 - 0,35 | 0,7 | 450 | China |
| 15 | 0,375 - 0,375 | 0,75 | 400 | Australia, Bahrain, Botswana, Brunei Darussalam, Dominican Rep. 2, Falkland Islands, Fiji 2 (Pabx), Qatar 2, S. Helena, S. Vincent and the Grenadines, Tanzania 2, Uganda 2, Vantuatou 3, Zimbabwe |
| 16 | 0,375 - 0,375 | 0,75 | 400 or 425 | United Arab Emirates |
| 17 | 0,375 - 0,375 | 0,75 | 425 | Seychelles, Nauru 2 (Pabx) |
| 18 | 0,375 - 0,375 | 0,75 | 425 or 400 | Papua New Guinea |
| 19 | 0,4 - 0,2 | 0,6 | 435 | Lebanon |
| 20 | 0,4 - 0,2 | 0,6 | 450 | Philippines 2 |
| 21 | 0,4 - 0,333 | 0,733 | 400 | Malawi 3 |
| 22 | 0,4 - 0,4 | 0,8 | 400 | Swaziland 2 |
| 23 | 0,4 - 0,4 | 0,8 | 425 | Belarus, Ethiopia, Kyrgyzstan, Moldova, Tajikistan, Turkmenistan |
| 24 | 0,4 - 0,675 - 0,13 - 0,17 | 1,375 | 450 | Pakistan 2 |
| 25 | 0,44 - 0,49 | 0,93 | 450 | Syria 2 |
| 26 | 0,5 - 0,5 | 1,0 | 400 | Angola, Chile, Japan, Maldives, Mozambique, Namibia 2, Nauru 1, New Zealand, Nigeria, Solomon, South Africa, Swaziland 1, Thailand 1 |
| 27 | 0,5 - 0,5 | 1,0 | 400 or 425 or 440 | Israel |
| 28 | 0,5 - 0,5 | 1,0 | 420 × 40 or 440 + 400 | Jordan 2 |
| 29 | 0,5 - 0,5 | 1,0 | 425 | Aruba, Burkina Faso 1, Cayman Islands, Central African Republic, Comoros, Côte D'Ivoire, Djibouti, Gabon 2, Gambia, Guyana, Indonesia, Iran, Kiribati, Kuwait, Liberia, Macau, Malaysia, Mali, Mauritania, Morocco, Oman, S. Lucia, Sao Tome and Principe, Saudi Arabia, Suriname, Uruguay, Vantuatou 2, Zambia |

Continued

Table 5.3 (concluded): Busy tone

| | Cadence (s) | Period (s) | Frequency (Hz) | Country/ies |
|----|-----------------------|------------|-------------------------------|---|
| 30 | 0,5 - 0,5 | 1,0 | 425 or 450 | Sierra Leone |
| 31 | 0,5 - 0,5 | 1,0 | 440 | Cameroon, French Polynesia, Gabon 1, Guadeloupe (French Dep.), Guiana (French Dep.), Honduras, Martinique (French Dep.), Mayotte, New Caledonia, Niger, Reunion (French Dep.), Rwanda, S. Pierre and Miquelon, Senegal, Wallis and Futuna |
| 32 | 0,5 - 0,5 | 1,0 | 450 | Algeria, Madagascar, Syria 1 |
| 33 | 0,5 - 0,5 | 1,0 | 460 + 620 | Grenada |
| 34 | 0,5 - 0,5 | 1,0 | 480 + 620 | Anguilla, Barbados, Bermuda, British Virgin Islands, Canada, Dominica (Commonwealth of), Hong Kong, Jamaica 2, Korea (Rep. of), Montserrat, S.-Kitts-and-Nevis, Trinidad and Tobago, Turks and Caicos Islands, United States of America 1 |
| 35 | 0,5 - 0,5 | 1,0 | 480/620? | Burkina Faso 2 |
| 36 | 0,5 - 0,5 | 1,0 | 480/620? | Antigua and Barbuda, Ascension |
| 37 | 0,5 - 0,5 | 1,0 | 480/620/420? or 400 | Bahamas |
| 38 | 0,5 - 0,5 | 1,0 | 525 | Malawi 2 |
| 39 | 0,5 - 0,5 | 1,0 | 600 × 120 | United States of America 2 |
| 40 | 0,5 - 0,5 | 1,0 | 600 × 120 or 425 | Philippines 1 |
| 41 | 0,5 - 0,5 | 1,0 | 600 × 120 or 620 + 480 or 425 | Cuba |
| 42 | 0,5 - 0,5 - 0,4 - 0,2 | 1,6 | 425 | Kenya |
| 43 | 0,6 - 0,6 | 1,2 | 400 | Bhutan, India 2 |
| 44 | 0,75 - 0,75 | 1,5 | 400 | Fiji 1, India 1, Jamaica 1, Jordan 1, Malawi 1, Namibia 1, Pakistan 1, Tanzania 1, Uganda 1, Vantuatou 1 |
| 45 | 0,75 - 0,75 | 1,5 | 425 | Mauritius, Singapore, Sri Lanka |
| 46 | 0,8 - 0,8 | 1,6 | 400 | Dominican Rep. 1 |
| 47 | 0,8 - 0,8 | 1,6 | 400 or 450 | Qatar 1 |
| 48 | 1,0 - 1,0 | 2,0 | 400 | Iraq |
| 49 | 1,0 - 1,0 | 2,0 | 425 | Lao P.D.R., Paraguay |
| 50 | 1,0 - 4,0 | 5,0 | 425 × 50 | Egypt |
| 51 | Continuous | | 950 | Tunisia 2 (special) |
| 52 | Interrupted at 60 ipm | | 480/620? | Diego Garcia |

5.2.1.4 World Special Information and Number Unobtainable tones

Table 5.4: Special Information Tone (SIT)

| | Cadence (s) | Period (s) | Frequency (Hz) | Country/ies |
|----|---|------------|-----------------|--|
| 1 | 0,1 - 0,1 | 0,2 | 400 | Japan |
| 2 | 0,33 - 0,03 | 0,36 | 950/1 400/1 800 | Vanuatu |
| 3 | 0,33 - 0,33 - 0,33 - 0,33 - 0,33 - 0,33 | 1,98 | 950/1 400/1 800 | Egypt |
| 4 | 0,35 - 0,30 - 0,35 - 1,0 | 2,0 | 900/1 380/1 860 | Gabon |
| 5 | 0,4 - 0,04 | 0,44 | 425 | Panama |
| 6 | 0,4 - 0,04 | 0,44 | 450 | China 1 |
| 7 | 0,4 - 10,0 | 10,4 | 950 | China 2 |
| 8 | 0,5 - 0,5 | 1,0 | 150/450 | Burundi |
| 9 | 0,2 - 1,5 | 1,7 | 400 or 33 | Nigeria |
| 10 | (3 × 0,3 - 2 × 0,03) - 1,0 | 1,99 | 950/1 400/1 800 | French Polynesia, Guadeloupe (French Dep.), Guiana (French Dep.), Martinique (French Dep.), Mayotte, New Caledonia, Reunion (French Dep.), S. Pierre and Miquelon, Wallis and Futuna |
| 11 | 3 × 0,33 | 0,99 | 950/1 400/1 800 | United States of America |
| 12 | (3 × 0,33 - 0,05 - 0,03) - 1,0 | 2,07 | 900/1 400/1 800 | Mali |
| 13 | 3 × 0,33 - 1,0 | 1,99 | 950/1 400/1 800 | Anguilla, Aruba, British Virgin Islands, Dominica (Commonwealth of), Falkland Islands, Iran, Montserrat, S.-Kitts-and-Nevis, Suriname, Turks and Caicos Islands |
| 14 | 3 × 0,33 - 1,01 | 2,0 | 950/1 400/1 800 | Papua New Guinea |
| 15 | (3 × 0,33 - 2 × 0,03) - 1,0 | 2,05 | 950/1 400/1 800 | Cuba, Indonesia, Syria |
| 16 | 3 × 0,333 - 1,0 | 1,999 | 950/1 400/1 800 | Chile, Ethiopia, Rwanda, South Africa, Uruguay, Zambia |
| 17 | 3 × 0,333 - 1,0 + announcement | 1,999 | 975/1 400/1 800 | Israel |
| 18 | 3 × 1,0 - 1,0 | 4,0 | 900/1 400/1 800 | Malaysia |
| 19 | Continuous | | 425 + 330 | S. Lucia |

Table 5.5: Number Unobtainable

| | Cadence (s) | Period (s) | Frequency (Hz) | Country/ies |
|----|---|------------|----------------|----------------------------|
| 1 | 0,075 - 0,1 | | 400 | Solomon |
| 2 | 0,075 - 0,1 - 0,075 - 0,1 - 0,075 - 0,4 | | 400 | Ghana |
| 3 | 0,2 - 0,1 - 0,2 - 1,5 | | 450 | Korea (Rep. of) |
| 4 | 0,2 - 0,2 | | 400 | Angola |
| 5 | 0,2 - 0,2 | | 400 | Mozambique |
| 6 | 0,2 - 0,2 | | 425 | Sao Tome and Principe |
| 7 | 0,2 - 0,3 | | 425 | Oman |
| 8 | 0,25 - 0,25 | | 480 + 620 | Anguilla |
| 9 | 0,25 - 0,25 | | 480/620 | Ascension |
| 10 | 0,25 - 0,25 | | 480 + 620 | British Virgin Islands |
| 11 | 0,25 - 0,25 | | 425 | Cayman Islands |
| 12 | 0,25 - 0,25 | | 480 + 620 | Dominica (Commonwealth of) |
| 13 | 0,25 - 0,25 | | 425 | Kiribati |
| 14 | 0,25 - 0,25 | | 480 + 620 | Montserrat |
| 15 | 0,25 - 0,25 | | 600 × 120 | Philippines |

Continued

Table 5.5 (continued): Number Unobtainable

| | Cadence (s) | Period (s) | Frequency (Hz) | Country/ies |
|----|---|------------|------------------------|--------------------------|
| 16 | 0,25 - 0,25 | | 480 + 620 | S.-Kitts-and-Nevis |
| 17 | 0,25 - 0,25 | | 480 + 620 | Turks and Caicos Islands |
| 18 | 0,25 - 0,5 | | 425 | Nepal |
| 19 | 0,33 - 0,03 | | 950 or 450/150 | Sierra Leone |
| 20 | 0,4 - 0,12 - 2 × (0,12 - 0,12) | | 520 | Cuba |
| 21 | 0,4 - 0,4 | | 425 | Kyrgyzstan |
| 22 | 0,5 (for six seconds) | | 200 or 400 | Bermuda |
| 23 | 0,5 - 0,5 | | 425 | Central African Rep. |
| 24 | 0,6 - 0,2 - 3 × (0,2 - 0,2) | | 425 | Liberia |
| 25 | 0,75 - 0,25 - 0,25 - 0,25 | | 425 | Brazil |
| 26 | 0,75 - 0,25 - 0,25 - 0,25 | | 400 | Nauru |
| 27 | 0,8 - 4,0 | | 425 | Turkmenistan |
| 28 | 0,9 - 0,2 - 2 × (0,25 - 0,2) | | 450 | Syria |
| 29 | 2,0 - 0,5 | | 425 | Indonesia |
| 30 | 2,0 - 0,5 | | 425 | Paraguay |
| 31 | 2,5 - 0,5 | | 400 | Australia |
| 32 | 2,5 - 0,5 | | 400 | Fiji 1 |
| | 2,5 - 0,5 | | 400 | Fiji 2(Pabx) |
| 33 | 2,5 - 0,5 | | 600 × 120 or 540 + 660 | Jordan |
| 34 | 2,5 - 0,5 | | 425 | Lao P.D.R. |
| 35 | 2,5 - 0,5 | | 400 | Malawi |
| 36 | 2,5 - 0,5 | | 425 | Malaysia |
| 37 | 2,5 - 0,5 | | 400 | Namibia |
| 38 | 2,5 - 0,5 | | 425 or 400 | Papua New Guinea |
| 39 | 2,5 - 0,5 | | 425 | Singapore |
| 40 | 2,5 - 0,5 | | 400 | South Africa |
| 41 | 2,5 - 0,5 | | 400 | Tanzania |
| 42 | 2,5 - 0,5 | | 400 | Zimbabwe |
| 43 | 3 × (0,1 - 0,1) - 0,4 - 0,4 | | 450 | China |
| 44 | 3 × (0,75 - 0,1) - 0,75 - 0,4 | | 400 | New Zealand |
| 45 | 3 × 0,33 - 1,0 | | 950/1 400/1 800 | Aruba |
| 46 | 3 × 0,33 - 1,0 | | 950/1 400/1 800 | Greenland 1 |
| | 0,25 - 0,25 | | 425 | Greenland 2 |
| 47 | 3 × 0,33 - 1,0 Continuous | | 950/140/1 800 400 | Kenya 1 Kenya 2 |
| 48 | 3 × 0,33 - 1,0 | | 950/1 400/1 800 | Zambia |
| 49 | 3 × 0,333 - 1,0 + announcement | | 975/1 400/1 800 | Israel |
| 50 | 3,0 - 0,5 | | 400 | Jamaica |
| 51 | 4,8 - 0,2 | | 400 | Swaziland |
| 52 | 5,5 - 0,5 | | 450 | Nigeria |
| 53 | 6 × (0,1 - 0,9) - 0,3 - 0,7 | | 400 | Thailand |
| 54 | Continuous | | 400 | Bahrain |
| 55 | Continuous | | 400 | Bhutan |
| 56 | Continuous | | 400 | Botswana |
| 57 | Continuous | | 400 | Brunei Darussalam |
| 58 | Continuous | | 400 | Dominican Rep. |
| 59 | Continuous | | 400 | Falkland Islands |
| 60 | Continuous | | 480 + 620 | Hong Kong |
| 61 | Continuous | | 400 | India 1 |
| | 2,5 - 0,5 | | 400 | India 2 |
| 62 | Continuous | | 400 | Kuwait |
| 63 | Continuous | | 400 | Maldives |
| 64 | Continuous | | 400 | Qatar |
| 65 | Continuous | | 400 | S. Helena |

Continued

Table 5.5 (concluded): Number Unobtainable

| | Cadence (s) | Period (s) | Frequency (Hz) | Country/ies |
|----|-------------------------|------------|----------------|----------------------|
| 66 | Continuous | | 425 | Seychelles |
| 67 | Continuous | | 400 | Sri Lanka |
| 68 | Continuous 2,5 - 0,5 | | 400 400 | Uganda 1 Uganda 2 |
| 69 | Continuous | | 400 or 425 | United Arab Emirates |
| 70 | Continuous | | 400 | Vanuatu |
| 71 | Interrupted at 120 ipm | | 480/620? | Diego Garcia |
| 72 | Recorded announcement | | | Antigua and Barbuda |
| 73 | Recorded announcement | | | Panama |
| 74 | Recorded announcement | | | S. Lucia |
| 75 | Recorded announcement | | | Western Samoa |

5.2.1.5 World Call and Caller Waiting tones

Table 5.6: Waiting tone - undefined Call or Caller, except where stated

| | Cadence (s) | Period (s) | Frequency (Hz) | Country/ies |
|----|--|------------|----------------|--|
| 1 | 0,04 - 10,0 - 0,04 - 20,0 - 0,04 - 20,0 | 50,12 | 425 | Papua New Guinea |
| 2 | 0,05 - 1,0 | 1,05 | 425 | Brazil |
| 3 | 0,1 - 0,1 - 0,1 - 1,0 | 1,3 | 440 | Japan - Waiting I |
| 4 | 0,1 - 0,1 - 0,1 - 4,7 | 5,0 | 425/525 | Australia |
| 5 | 0,125 - 0,125 | 0,25 | 450 | Madagascar |
| 6 | 0,15 - 0,25 - 0,15 - 1,45 | 2,0 | 400 | Nigeria - Operator intervening |
| 7 | 0,15 - 10,0 - 0,15 (once only) | 10,3 | 400 or 440 | Israel - Waiting |
| 8 | 0,2 - 0,2 | 0,4 | 425 | S. Lucia |
| 9 | 0,2 - 0,2 - 0,2 - 10,0 | 10,6 | 425 | Iran |
| 10 | 0,2 - 0,2 - 0,2 - 4,4 | 5,0 | 425 | Aruba, Uruguay |
| 11 | 0,2 - 0,2 - 0,2 - 4,5 | 5,1 | 425 | Sri Lanka |
| 12 | 0,2 - 0,6 | 0,8 | 425 | Ecuador, Ethiopia, Macau |
| 13 | 0,2 - 0,6 - 0,2 - 4,0 | 5,0 | 425 | Saudi Arabia |
| 14 | 0,2 - 1,0 | 1,2 | 425 | Botswana |
| 15 | 0,25 - 0,25 - 0,25 - 3,25 | 4,0 | 350 + 440 | Korea (Rep. of) |
| 16 | 0,25 - 0,25 - 0,25 - 3,25 | 4,0 | 400 | New Zealand 2 |
| 17 | 0,3 - 0,2 - 0,3 - 3,2 | 4,0 | 425 | Singapore |
| 18 | 0,3 - 1,0 | 1,3 | 425 | Oman |
| 19 | 0,3 - 10,0 | 10,3 | 425 | Argentina - Call Waiting, Vanuatu |
| 20 | 0,3 - 10,0 | 10,3 | 440 | Trinidad and Tobago, United States of America (Pabx) |
| 21 | 0,4 - 0,2 - 0,4 - 2,0 | 3,0 | 425 | Kiribati |
| 22 | 0,4 - 0,2 - 0,4 - 4,0 | 5,0 | 425 | Argentina - Waiting |
| 23 | 0,4 - 0,4 | 0,8 | 425 | Lao P.D.R. |
| 24 | 0,4 - 4,0 | 4,4 | 450 | China |
| 25 | 0,5 | 0,5 | 400 × 25 | Brunei Darussalam |
| 26 | 0,5 | 0,5 | 400 + 450 | New Zealand 1 |
| 27 | 0,5 - 0,0~4,0 - 0,05 - 0,45 - 0,05 - 3,45 - 0,05 - 0,45 - 0,05 - 3,45 | 8,5 ~ 12,5 | 400 × 16/400 | Japan - Call Waiting |
| 28 | 0,5 - 0,25 | 0,75 | 400 | Bhutan |
| 29 | 0,5 - 0,3 - 0,2 - 0,3 - 0,2 - 3,0 | 4,5 | 400 | Ghana |

Continued

Table 5.6 (concluded): Waiting tone - undefined Call or Caller, except where stated

| | Cadence (s) | Period (s) | Frequency (Hz) | Country/ies |
|----|---|-------------------|-----------------------|--|
| 30 | 0,5 - 0,5 | 1,0 | 400 + 450/400? | Solomon |
| 31 | 0,5 - 0,5 | 1,0 | 900 + 1 300 | Chile |
| 32 | 0,5 - 0,5 - 0,2 - 2,7 | 3,9 | 440 | Honduras |
| 33 | 0,5 - 0,5 - 0,5 - 2,5 | 4,0 | 400 × 16/400 | Japan - Waiting II |
| 34 | 0,5 - 10,0 - 0,5 (once only) | 11,0 | 480 | Antigua and Barbuda |
| 35 | 0,5 - 18,0 | 18,5 | 480 | Guyana |
| 36 | 0,5 - 2 × (0,3 - 0,2) - 3,0 | 4,5 | 420 × 40 or 400 + 440 | Jordan |
| 37 | 0,65 - 0,325 - 0,125 - 1,3 - 2,6 | 5,0 | 950/950/1 400 | Paraguay |
| 38 | 1 × (0,5 - 10,0 - 0,5) | 11,0 | 440 | Anguilla, British Virgin Islands, Dominica (Commonwealth of), Montserrat, S.-Kitts-and-Nevis, Turks and Caicos Islands |
| 39 | 1,0 (one burst) | 1,0 | 425 | Sierra Leone |
| 40 | 1,0 - 10,0 | 11,0 | 400 | Maldives |
| 41 | 1,0 - 10,0 - 0,5 - 0,25 - 0,5 - 10,0 - 0,5 - 0,25 | 23,0 | 425 | Malaysia |
| 42 | 1,0 - 5,0 | 6,0 | 400 | Angola |
| 43 | 1,5 - 1,5 | 3,0 | 523/659 | Zimbabwe |
| 44 | 2 bursts 10,0 s apart | 11,0? | 440 | Bermuda |
| 45 | 2 × (0,1 - 0,1) - 0,6 - 3,0 | 4,0 | 400 or 440 | Israel - Call Waiting |
| 46 | 2,0 - 4,0 | 6,0 | 425 | Nigeria - Waiting |
| 47 | 3 × (0,2 - 3,0) - 0,2 | 9,8 | 523/659 | New Zealand 3 |
| 48 | 3 × (0,25 - 0,25) - 0,25 - 7,25 | 9,0 | 400 × 33 1/3 | South Africa |
| 49 | 3 × (0,5 - 0,5) - 8,0 | 9,5 | 440 | Hong Kong |
| 50 | 3 × 0,333 - 1,0 | 1,999 | 950/1 400/1 800 | Tajikistan |
| 51 | Continuous | | 425 | Kenya |

5.2.1.6 World Pay tones

Table 5.7: Pay tone

| | Cadence (s) | Period (s) | Frequency (Hz) | Country/ies |
|----|--|-------------------|-----------------------|-------------------------------------|
| 1 | 0,1 - 0,1 - 0,1 - 0,1 - 0,1 (only once) | 0,5 | 900 | Malaysia |
| 2 | 0,125 - 0,125 | 0,25 | 400 | Namibia, S. Helena |
| 3 | 0,15 - 0,15 | 0,3 | 12 000? | Central African Republic |
| 4 | 0,2 - 1,8 | 2,0 | 900 | South Africa |
| 5 | 0,2 - 2,0 | 2,2 | 852 | Solomon |
| 6 | 0,25 - 0,25 | 0,5 | 900 | Brunei Darussalam 1 (pip tone?) |
| 7 | 0,25 - 0,25 | 0,5 | 900 | Swaziland |
| 8 | 0,5 | 0,5 | 250 | Japan 2 |
| 9 | 0,624 - 4,376 | 5,0 | 400 | Brunei Darussalam 2 (end of period) |
| 10 | 0,75 | 0,75 | 300 | Brazil |
| 11 | 1,0 | 1,0 | 250 | Japan 1 |
| 12 | 3 × 0,22 - 1,0 | 1,66 | 950/1 400/1 800 | Greenland |
| 13 | Continuous | | 12 000? | Sao Tome and Principe |

5.2.2 World Set 2:

Special Dial, Positive Indication, Congestion, Intrusion tones.

5.2.2.1 World Special Dial tones

Table 5.8: Special Dial tone

| | Cadence (s) | Period (s) | Frequency (Hz) | Country/ies |
|---|--|-------------------|-----------------------|---|
| 1 | 0,25 - 0,25 - 0,25 - 0,25 - 2,0 | 3,0 | 425 | Malaysia |
| 2 | 0,4 - 0,04 | 0,44 | 425 | Kuwait, Lao P.D.R., Mali, Papua New Guinea, Vanuatu |
| 3 | 1,0 - 0,25 | 1,25 | 400 | Israel |
| 4 | 1,8 - 0,2 | 2,0 | 425 | Macau |
| 5 | 4 × (0,25 - 0,25) - Continuous | 2,0 - Cont. | 400 × 33 1/3 | South Africa |
| 6 | Continuous | | 400 + 425 | Philippines |
| 7 | Continuous | | 1 000 | Brunei Darussalam - transmission |

5.2.2.2 World Positive Indication tones

Table 5.9: Positive Indication tone

| | Cadence (s) | Period (s) | Frequency (Hz) | Country/ies |
|---|---|-------------------|-----------------------|--------------------|
| 1 | 0,125 - 0,125 - 0,125 - 0,625 | 1,0 | 400 | Japan |
| 2 | 0,25 - 0,25 - 0,25 - 0,25 | 1,0 | 700/1 100 | South Africa |
| 3 | 2 × (0,1 - 0,2) - 0,1 - 1,3 | 2,0 | 425 | Uruguay |
| 4 | 3 × 0,333 - 1,0 | 1,999 | 950/1 400/1 800 | Paraguay |

5.2.2.3 World Congestion tones

Table 5.10: Congestion tone

| | Cadence (s) | Period (s) | Frequency (Hz) | Country/ies |
|----|---|-------------------|-----------------------|--|
| 1 | 0,1 - 0,1 | 0,2 | 400 | Solomon |
| 2 | 0,167 - 0,167 | 0,34 | 425 | Tunisia |
| 3 | 0,175 - 0,175 | 0,35 | 425 | Nepal |
| 4 | 0,2 - 0,2 | 0,4 | 400 | Chile |
| 5 | 0,2 - 0,2 | 0,4 | 425 | Sierra Leone |
| 6 | 0,2 - 0,2 - 0,4 - 0,35 - 0,225 - 0,525 | 1,9 | 425 | Kenya |
| 7 | 0,2 - 0,3 | 0,5 | 480 + 620 | Jamaica 2 |
| 8 | 0,25 - 0,25 | 0,5 | 400 | Maldives |
| 9 | 0,25 - 0,25 | 0,5 | 400 | Namibia, Nigeria, South Africa, New Zealand 2 |
| 10 | 0,25 - 0,25 | 0,5 | 400 + 440 | Jordan 2 |
| 11 | 0,25 - 0,25 | 0,5 | 425 | Aruba, Botswana, Cayman Islands, Indonesia, Iran, Macau, Malaysia, Mexico, S. Lucia, Singapore, Sri Lanka, Suriname, Uruguay, Zambia |
| 12 | 0,25 - 0,25 | 0,5 | 440 | Honduras |
| 13 | 0,25 - 0,25 | 0,5 | 445 or 425 | Greenland |

Continued

Table 5.10 (concluded): Congestion tone

| | Cadence (s) | Period (s) | Frequency (Hz) | Country/ies |
|----|--|------------|------------------------|--|
| 14 | 0,25 - 0,25 | 0,5 | 480 + 620 | Anguilla, Barbados, Bermuda, British Virgin Islands, Canada, Dominica (Commonwealth of), Hong Kong, Montserrat, S.-Kitts-and-Nevis, Turks and Caicos Islands, United States of America 1 |
| 15 | 0,25 - 0,25 | 0,5 | 480/620? | Antigua and Barbuda |
| 16 | 0,25 - 0,25 | 0,5 | 600 × 120 | Cuba, United States of America 2 |
| 17 | 0,25 - 0,25 | 0,5 | 600 × 120 or 480 + 620 | Philippines |
| 18 | 0,3 - 0,2 | 0,5 | 480 + 620 | Jamaica 1, Korea (Rep. of) |
| 19 | 0,3 - 0,4 | 0,7 | 425 | Argentina |
| 20 | 0,32 - 4,65 | 4,97 | 425 | Panama |
| 21 | 0,33 - 0,33 | 0,66 | 425 | Ecuador |
| 22 | 0,375 - 0,375 | 0,75 | 400 | Australia, Bahrain 2, Brunei Darussalam, Dominican Rep. 2 |
| 23 | 0,375 - 0,375 | 0,75 | 425 | Lao P.D.R., Nauru (Pabx) |
| 24 | 0,375 - 0,375 | 0,75 | 425 or 400 | Papua New Guinea |
| 25 | 0,4 - 0,35 | 0,75 | 400 | S. Helena |
| 26 | 0,4 - 0,35 - 0,225 - 0,525 | 1,5 | 400 | Bahrain 1, Qatar, Falkland Islands, S. Vincent and the Grenadines |
| 27 | 0,4 - 0,35 - 0,225 - 0,525 | 1,5 | 400 or 425 | United Arab Emirates |
| 28 | 0,4 - 0,35 - 0,225 - 0,525 | 1,5 | 425 | Seychelles |
| 29 | 0,4 - 0,4 | 0,8 | 425 | Kyrgyzstan, Moldova, Turkmenistan |
| 30 | 0,5 - 0,5 | 1,0 | 400 | Angola, Ghana, Japan |
| 31 | 0,5 - 0,5 | 1,0 | 420 × 40 | Jordan 1 |
| 32 | 0,5 - 0,5 | 1,0 | 425 | Central African Rep., Guyana, Kiribati, Kuwait, Oman |
| 33 | 0,5 - 0,5 | 1,0 | 440 | Niger |
| 34 | 0,5 - 0,5 | 1,0 | 450 | Egypt |
| 35 | 0,5 - 0,5 | 1,0 | 900 | New Zealand 1 |
| 36 | 0,7 - 0,7 | 1,4 | 450 | China |
| 37 | 0,8 - 0,8 | 1,6 | 400 | Dominican Rep. 1 |
| 38 | 2 × (0,2 - 0,23) - 0,2 - 0,92 | 1,98 | 450 | Syria |
| 39 | 2,4 - 2,4 | 4,8 | 480/620? | Burkina Faso |
| 40 | recorded announcement | | | Grenada, Western Samoa |

5.2.2.4 World Intrusion tones

Including those reported as warning - operator intervening.

Table 5.11: Intrusion tone

| | Cadence (s) | Period (s) | Frequency (Hz) | Country/ies |
|---|-------------------------------------|------------|----------------|--------------|
| 1 | 0,1 - 4,9 | 5,0 | 425 | Zambia |
| 2 | 0,2 - 0,2 - 0,2 - 0,6 | 1,2 | 450 | China |
| 3 | 0,5 - 0,2 | 0,7 | 425 | Ethiopia |
| 4 | 0,5 - 0,2 - 0,2 - 0,2 | 1,1 | 425 | Kuwait |
| 5 | 0,5 - 0,2 - 0,2 - 0,2 | 1,1 | 425 | Saudi Arabia |
| 6 | 0,5 - 0,5 | 1,0 | 450 | Egypt |

Table 5.12: Warning tone (Operator intervening?)

| | Cadence (s) | Period (s) | Frequency (Hz) | Country/ies |
|----|--|-------------------|-----------------------|---|
| 1 | 0,2 - 0,2 - 0,65 - 0,2 | | 450 | Anguilla |
| 2 | 5 × 0,1 - 1,9 | | 1 400 | Argentina |
| 3 | 0,8 - 6,0 - 0,2 - 6,0 - 0,2 | | 440 | Ascension |
| 4 | 1,0 - 15,0 - 0,36 - 15,0 | | 425 or 525 | Australia |
| 5 | 0,16 - 2,0 | | 425 | Botswana |
| 6 | 0,2 - 0,2 - 0,65 - 0,2 | | 450 | British Virgin Islands |
| 7 | 0,25 - 2,0 | | 400 | Brunei Darussalam |
| 8 | 0,5 - 15,0 | | 1 400 | Chile |
| 9 | 0,2 - 0,2 - 0,65 - 0,2 | | 450 | Dominica (Commonwealth of) |
| 10 | 0,1 - 0,1 | | 1 000 | Falkland Islands |
| 11 | 0,5 - 0,17 - 0,17 - 0,17 | | 400 | Fiji |
| 12 | 0,2 - 0,2 - 0,2 - 1,4 | | 425 | Kenya |
| 13 | 2 × (0,5 - 0,5 - 1,5) | | 392/494/587 | Korea (Rep. of) |
| 14 | 1,0 - 1,5 - 0,4 - 1,5 | | 425 | Kuwait |
| 15 | 0,5 - 0,2 - 0,2 - 0,2 | | 425 | Malaysia |
| 16 | 0,5 - 0,17 - 0,17 - 0,17 | | 425 | Mexico |
| 17 | 0,2 - 0,2 - 0,65 - 0,2 | | 450 | Montserrat |
| 18 | 0,5 - 0,17 - 0,17 - 0,17 | | 425 | Oman |
| 19 | 0,18 - 0,18 - 0,5 - 0,18 | | 425 | Panama |
| 20 | 0,5 - 11,5 | | 1 400 | Papua New Guinea |
| 21 | 0,15 - 0,25 - 0,15 - 1,45 | | 425 | Paraguay |
| 22 | 0,2 - 0,2 - 0,65 - 0,2 | | 450 | S.-Kitts-and-Nevis |
| 23 | 0,1 - 4,9 | | 425 | S. Lucia |
| 24 | 0,125 - 0,125 | | 425 | Singapore |
| 25 | 0,15 - 0,25 - 0,15 - 1,45 | | 400 | South Africa |
| 26 | 1,0 | | 800 | Thailand |
| 27 | 0,2 - 0,2 - 0,65 - 0,2 | | 450 | Turks and Caicos Islands |
| 28 | 2,0 - 10,0 - 0,5 - 10,0 1,5 - 8,0 - 0,5 - 8,0 | | 440 440 | United States of America United States of America 2 (Pabx) |
| 29 | 0,15 - 0,25 - 0,15 - 1,45 | | 425 | Uruguay |

5.2.3 World Set 3:

Other tones are reported used. These include:

Acceptance tone, see table 5.13

Comfort tone, see table 5.14

Confirmation tone, see table 5.15

End of Three Party Service tone, see table 5.16

Executive Override tone, see table 5.17

Facilities tone, see table 5.18

Function Acknowledge tone, see table 5.19

Holding tone, see table 5.20

Identification tone, see table 5.21

Intercept tone, see table 5.22

Line Lockout tone, see table 5.23

Negative Indication tone, see table 5.24

Notify tone, see table 5.25

Offering tone, see table 5.26

Payphone Recognition tone, see table 5.27

Permanent Signal tone, see table 5.28

Pre-emption tone, see table 5.29

Recall Dial tone, see table 5.30

Record tone, see table 5.31

Refusal tone, see table 5.32

Re-order tone, see table 5.33

Route tone, see table 5.34

Search tone, see table 5.35

Second Dial tone, see table 5.36

Service Activated tone (Positive Indication?), see table 5.37

Test Number tone, see table 5.38

Warning tone (end of period), see table 5.39

Table 5.13: Acceptance tone

| | Cadence (s) | Period (s) | Frequency (Hz) | Country/ies |
|---|--------------------|-------------------|-----------------------|--------------------|
| 1 | Continuous | | 425 | Kuwait |
| 2 | Continuous | | 950 | Mali |
| 3 | Continuous | | 425 | Saudi Arabia |
| 4 | Continuous | | 950 | Vanuatu |

Table 5.14: Comfort tone

| | Cadence (s) | Period (s) | Frequency (Hz) | Country/ies |
|---|---|-------------------|-----------------------|--------------------|
| 1 | 0,65 - 0,325 - 0,325 - 1,3 - 2,6 | | 950/950/1 400 | South Africa |

Table 5.15: Confirmation tone

| | Cadence (s) | Period (s) | Frequency (Hz) | Country/ies |
|---|---|-------------------|-----------------------|---------------------------------|
| 1 | 0,1 - 0,1 - 0,3 - 0,3 | | 400 × 24 | Brunei Darussalam |
| 2 | 0,15 - 0,15 - 0,3 (only once) 0,04 - 0,04 | | 400 or 440 400 | Israel 1 Israel 2 |
| 3 | 20 × (0,125 - 0,125) - Continuous | | 400 | Jordan |
| 4 | 3 × 0,1 - 2 × 0,1 | | 350 + 440 | Canada (Pabx) |
| 5 | 3 × 0,1 - 2 × 0,1 | | 350 + 440 | United States of America (Pabx) |
| 6 | Continuous | | 950 | Lao P.D.R. |

Table 5.16: End of Three Party Service tone

| | Cadence (s) | Period (s) | Frequency (Hz) | Country/ies |
|---|--------------------------------|-------------------|-----------------------|--------------------|
| 1 | 3 × 0,33 (single burst) | 0,99 | 950/1 400/1 800 | Argentina |

Table 5.17: Executive Override tone

| | Cadence (s) | Period (s) | Frequency (Hz) | Country/ies |
|---|-------------------|------------|----------------|---------------------------------|
| 1 | 0,02 - 1,0 | | 750 | Brazil |
| 2 | 3,0 | | 440 | Canada (Pabx) |
| 3 | 3,0 | | 440 | United States of America (Pabx) |

Table 5.18: Facilities tone

| | Cadence (s) | Period (s) | Frequency (Hz) | Country/ies |
|---|-------------|------------|----------------|-------------|
| 1 | Continuous | | 425 | Australia |

Table 5.19: Function Acknowledge tone

| | Cadence (s) | Period (s) | Frequency (Hz) | Country/ies |
|---|-------------------------------------|------------|----------------|-------------|
| 1 | 0,1 - 0,1 - 0,1 - 2,0 | | 425 | Brazil |
| 2 | 2,0 - 0,4 - 0,2 - 0,4 | | 440 + 450 | New Zealand |

Table 5.20: Holding tone

| | Cadence (s) | Period (s) | Frequency (Hz) | Country/ies |
|---|--|------------|-----------------------|-------------------|
| 1 | 0,05 - 2,0 | | 400 | Israel |
| 2 | 0,5 - 0,5 - 0,5 - 0,25 | | 400 | Ghana |
| 3 | 0,5 - 0,5 - 0,5 - 0,25 | | 420 × 40 or 400 + 440 | Jordan |
| 4 | 0,5 - 0,5 - 0,5 - 0,25 | | 400/400 + 450 | New Zealand |
| 5 | 0,5 - 2,5 | | 400 × 24 | Brunei Darussalam |
| 6 | 0,65 - 0,325 - 0,325 - 1,3 - 2,6 | | 950/950/1 400 | Iran |
| 7 | 0,65 - 0,325 - 0,325 - 1,3 - 2,6 | | 950/950/1 400 | Nigeria |

Table 5.21: Identification tone

| | Cadence (s) | Period (s) | Frequency (Hz) | Country/ies |
|---|-------------------------------------|------------|----------------|-------------|
| 1 | 0,6 - 2,0 - 0,6 - 2,0 | | 800/1 200 | Chile |

Table 5.22: Intercept tone

| | Cadence (s) | Period (s) | Frequency (Hz) | Country/ies |
|---|--|------------|------------------|--------------------------|
| 1 | 0,05 - 0,05 | | 450 or 425 + 475 | Bahrain |
| 2 | 0,125 - 0,25 - 0,125 - 1,5 | | 350 + 440 | Korea (Rep. of) |
| 3 | 0,25 - 0,25 | | 440/620 | Canada (Pabx) |
| 4 | 0,25 - 0,25 | | 440/620 | United States of America |
| 5 | 0,25 - 2,0 | | 425 | Singapore |
| 6 | 3 × 0,333 - 1,0 | | 950/1 400/1 800 | Kuwait |
| 7 | 3, × 0,333 - 1,0 | | 950/1 400/1 800 | Macau |

Table 5.23: Line Lockout tone

| | Cadence (s) | Period (s) | Frequency (Hz) | Country/ies |
|---|--------------------|------------|----------------|-------------|
| 1 | 0,48 - 0,48 | | 425 | Oman |
| 2 | 0,5 - 0,5 | | 425 | Kuwait |
| 3 | 0,5 - 0,5 | | 425 | Malaysia |

Table 5.24: Negative Indication tone

| | Cadence (s) | Period (s) | Frequency (Hz) | Country/ies |
|---|-------------|------------|----------------|-------------|
| 1 | 0,5 - 0,5 | | 425 | Uruguay |

Table 5.25: Notify tone

| | Cadence (s) | Period (s) | Frequency (Hz) | Country/ies |
|---|-------------------|------------|----------------|--------------|
| 1 | 3 × 0,2 - 2 × 0,2 | | 900 | South Africa |

Table 5.26: Offering tone

| | Cadence (s) | Period (s) | Frequency (Hz) | Country/ies |
|---|---------------------------------|------------|----------------|-------------|
| 1 | 0,1 - 0,1 | | 526 | Australia |
| 2 | 0,15 - 0,25 - 0,15 - 1,45 | | 425 | Iran |
| 3 | 0,2 - 0,2 - 0,2 - 0,6 | | 450 | Bhutan |
| 4 | 0,5 - 0,5 - 0,5 - 1,0 | | 425 | Indonesia |
| 5 | 2 × (0,17 - 0,83) - 0,51 - 0,49 | | 400 | Thailand |

Table 5.27: Payphone Recognition tone

| | Cadence (s) | Period (s) | Frequency (Hz) | Country/ies |
|----|---|------------|---------------------------------------|--|
| 1 | 0,2 - 0,2 - 0,2 - 2,0 | | 1 600/1 143 | Anguilla |
| 2 | 0,075 - 0,15 - 0,075 - 2,7 | | 1 100 + 1 750/750 + 1 450 | Australia |
| 3 | 0,125 - 1,5 | | 816/1 209 | Bahrain |
| 4 | 0,2 - 0,2 - 0,2 - 2,0 | | 1 100 + 1 750/750 + 1 450 | Benin |
| 5 | 0,07 - 2,0 | | 1 600 | Botswana |
| 6 | 0,2 - 0,2 - 0,2 - 2,0 | | 1 600/1 143 | British Virgin Islands |
| 7 | 0,2 - 0,2 - 0,2 - 2,0 | | 1 100 + 1 750/750 + 1 450 | Chile |
| 8 | 0,2 - 0,2 - 0,2 - 2,0 | | 1 600/1 143 | Dominica (Commonwealth of) |
| 9 | 0,2 - 0,2 - 0,2 - 2,0 | | 1 100 + 1 750/750 + 1 450 | Egypt |
| 10 | 0,2 - 0,2 - 0,2 - 2,0 | | 1 200/800 | Indonesia |
| 11 | 0,2 - 0,2 - 0,2 - 2,0 | | 1 209/452 | Israel |
| 12 | 0,2 - 0,2 - 0,2 - 2,0 | | 1 100 + 1 750/750 + 1 450 | Macau |
| 13 | 0,2 - 0,2 - 0,2 - 2,0 | | 1 600/1 143 | Montserrat |
| 14 | 0,125 - 1,5 | | 770/1 209 | Namibia |
| 15 | 0,2 - 0,2 - 0,2 - 2,0 | | 1 100 + 1 750/750 + 1 450 | New Zealand |
| 16 | 0,2 - 0,2 - 0,2 - 2,0 (four cycles) 0,2 - 0,2 - 0,2 - 2,0 (two cycles) 0,075 - 0,15 - 0,075 - 2,7 (two cycles) | | 1 209/852 1 336/941 900 | Papua New Guinea 1 Papua New Guinea 2 Papua New Guinea 3 |
| 17 | 0,2 - 0,2 - 0,2 - 2,0 | | 1 100 + 1 750/750 + 1 450 | Puerto Rico |
| 18 | 0,2 - 0,2 - 0,2 - 2,0 | | 1 600/1 143 | S.-Kitts-and-Nevis |
| 19 | 0,2 - 0,2 - 0,2 - 2,0 | | 1 600/1 200 | Saudi Arabia |
| 20 | 0,2 - 0,2 - 0,2 - 2,0 | | 1 206/832d | Singapore |
| 21 | 0,125 - 1,5 | | 770/1 209 | South Africa |
| 22 | 2,0 - 2,0 0,2 - 0,2 - 0,2 - 2,0 | | 1 100 + 1 750/750 + 1 450 | Swaziland 1 Swaziland 2 |
| 23 | 0,2 - 0,2 - 0,2 - 2,0 | | 1 600/1 143 | Turks and Caicos Islands |
| 24 | 0,2 - 0,2 - 0,2 - 2,0 | | 1 100 + 1 750/750 + 1 450 | Zambia |
| 25 | 0,2 - 0,2 - 0,2 - 2,0 | | 1 100 + 1 750/750 + 1 450 | Zimbabwe |

Table 5.28: Permanent Signal tone

| | Cadence (s) | Period (s) | Frequency (Hz) | Country/ies |
|---|-------------|------------|----------------|-------------|
| 1 | Continuous | | 1 400 | Iran |

Table 5.29: Pre-emption tone

| | Cadence (s) | Period (s) | Frequency (Hz) | Country/ies |
|---|--------------------------|------------|----------------|-------------|
| 1 | 0,1 - 0,1 (three bursts) | | 1 400 | Iran |

Table 5.30: Recall Dial tone

| | Cadence (s) | Period (s) | Frequency (Hz) | Country/ies |
|----|------------------------------|------------|--------------------------|--|
| 1 | 3 × (0,1 - 0,1) - Continuous | | 350 + 440 | Anguilla |
| 2 | Continuous | | 350/440 | Antigua and Barbuda |
| 3 | 3 × (0,1 - 0,1) - Continuous | | 350 + 440 | Barbados |
| 4 | 3 × (0,1 - 0,1) - Continuous | | 350 + 440 | British Virgin Islands |
| 5 | 0,1 - 0,1 | | 350 + 440 | Canada (Pabx) |
| 6 | 3 × (0,1 - 0,1) - Continuous | | 350 + 440 | Dominica (Commonwealth of) |
| 7 | 3 × (0,1 - 0,1) + Continuous | | 350 + 440 | Hong Kong |
| 8 | Continuous | | 425 | Iran |
| 9 | 0,4 - 0,2 - 0,4 - 1,5 | | 133 | Iraq |
| 10 | 3 × (0,1 - 0,1) + Continuous | | 400 or 440 | Israel |
| 11 | Continuous | | 350 + 440 | Japan |
| 12 | 1,0 - 4,0 1,0 - 2,0 | | 400 or 450 400 or 450 | Korea (Rep. of) 1 Korea (Rep. of) 2 |
| 13 | 3 × (0,1 - 0,1) - Continuous | | 350 + 440 | Montserrat |
| 14 | Continuous | | 33 | Nauru (Pabx) |
| 15 | Continuous | | 400 or 425 | Nigeria |
| 16 | 3 × (0,1 - 0,1) - Continuous | | 350 + 440 | S.-Kitts-and-Nevis |
| 17 | Continuous | | 425 | Saudi Arabia |
| 18 | Continuous | | 450 | Syria |
| 19 | 3 × (0,1 - 0,1) - Continuous | | 350 + 440 | Turks and Caicos Islands |
| 20 | 3 × (0,1 - 0,1) - Continuous | | 350 + 440 | United States of America |

Table 5.31: Record tone

| | Cadence (s) | Period (s) | Frequency (Hz) | Country/ies |
|---|----------------|------------|----------------|--------------------------|
| 1 | 0,425 - 14,525 | | 1 400 | Australia |
| 2 | 0,25 - 0,25 | | 480 + 620 | Jamaica |
| 3 | 0,5 - 15,0 | | 1 400 | United States of America |

Table 5.32: Refusal tone

| | Cadence (s) | Period (s) | Frequency (Hz) | Country/ies |
|---|-------------|------------|----------------|--------------|
| 1 | 0,6 - 0,6 | | 425 | Kuwait |
| 2 | 0,6 - 0,6 | | 425 | Saudi Arabia |

Table 5.33: Re-order tone

| | Cadence (s) | Period (s) | Frequency (Hz) | Country/ies |
|---|------------------------|------------|------------------------|--|
| 1 | 0,3 - 0,2 0,2 - 0,3 | | 480 + 620 480 + 620 | Trinidad and Tobago 1 Trinidad and Tobago 2 |

Table 5.34: Route tone

| | Cadence (s) | Period (s) | Frequency (Hz) | Country/ies |
|----|-------------|------------|----------------|--------------------------|
| 1 | 0,06 - 0,06 | | 425 | Bahrain |
| 2 | 0,05 - 0,05 | | 425 | Burkina Faso 1 |
| | 0,04 - 0,04 | | 425 | Burkina Faso 2 |
| 3 | 0,5 - 0,5 | | 425 | Burundi |
| 4 | 0,05 - 0,05 | | 440 | Cameroon |
| 5 | 0,05 - 0,05 | | 425 | Central African Rep. |
| 6 | 0,05 - 0,05 | | 425 | Comoros |
| 7 | 0,05 - 0,05 | | 425 | Cote D'Ivoire |
| 8 | 0,05 - 0,05 | | 425 | Djibouti |
| 9 | 0,05 - 0,05 | | 440 | French Polynesia |
| 10 | 0,05 - 0,05 | | 440 | Gabon 1 |
| | 0,05 - 0,05 | | 425 | Gabon 2 |
| 11 | 0,05 - 0,05 | | 440 | Guadeloupe (French Dep.) |
| 12 | 0,05 - 0,05 | | 440 | Guiana (French Dep.) |
| 13 | 0,05 - 0,04 | | 425 | Mali |
| 14 | 0,05 - 0,05 | | 440 | Martinique (French Dep.) |
| 15 | 0,05 - 0,05 | | 425 | Mauritania |
| 16 | 0,05 - 0,05 | | 425 | Mauritius |
| 17 | 0,05 - 0,05 | | 440 | Mayotte |
| 18 | 0,05 - 0,05 | | 425 | Morocco |
| 19 | 0,05 - 0,05 | | 440 | New Caledonia |
| 20 | 0,05 - 0,05 | | 440 | Niger |
| 21 | 0,05 - 0,05 | | 440 | Reunion (French Dep.) |
| 22 | 0,05 - 0,05 | | 440 | Rwanda |
| 23 | 0,05 - 0,05 | | 425 | S. Lucia |
| 24 | 0,05 - 0,05 | | 440 | S. Pierre and Miquelon |
| 25 | 0,05 - 0,05 | | 440 | Senegal |
| 26 | 0,05 - 0,05 | | 425 | Sri Lanka |
| 27 | 0,4 - 0,4 | | 25 | Turkmenistan |
| 28 | 0,05 - 0,05 | | 425 | Vanuatu |
| 29 | 0,05 - 0,05 | | 440 | Wallis and Futuna |

Table 5.35: Search tone

| | Cadence (s) | Period (s) | Frequency (Hz) | Country/ies |
|---|-------------|------------|----------------|-------------|
| 1 | 0,01 - 1,0 | | 1 004 | Israel |

Table 5.36: Second Dial tone

| | Cadence (s) | Period (s) | Frequency (Hz) | Country/ies |
|----|---|------------|------------------------|-------------------------------|
| 1 | Continuous | | 350/440? | Antigua and Barbuda |
| 2 | $2 \times (1,0 - 1,0)$ - Continuous | | 350 + 440 | Barbados |
| 3 | Continuous | | 330 or 440 | Cameroon |
| 4 | Continuous | | 425 + 330 | Central African Rep. |
| 5 | Continuous | | 330 + 440 | Chile |
| 6 | Continuous | | 450 | China |
| 7 | Continuous | | 850 | Comoros |
| 8 | Continuous Continuous | | 425 + 330 1 050 | Cuba 1 Cuba 2 |
| 9 | 7,0 | | 440 + 330 | Gabon |
| 10 | Continuous | | 445 or 425 | Greenland |
| 11 | 0,135 - 0,135 | | 440 | Honduras |
| 12 | Continuous | | 400/425? | Iran |
| 13 | $3 \times (0,1 - 0,1)$ + Continuous | | 400 or 440 | Israel |
| 14 | 0,125 - 0,125 0,125 - 0,125 0,15 - 0,15 | | 400 440 400 | Japan 1 Japan 2 Japan 3 |
| 15 | 1,0 - 0,2 - 0,75 - 0,75 | | 425 | Kenya |
| 16 | Continuous | | 425 | Malaysia |
| 17 | Continuous | | 425 + 330 | Mali |
| 18 | 0,5 - 0,5 - 0,5 - 0,3 - 0,2 | | 660/440/590/740 | Morocco |
| 19 | Continuous | | 330 or 440 | Niger |
| 20 | Continuous | | 425 | Nigeria |
| 21 | Continuous | | 425 | Oman |
| 22 | Continuous | | 340 | Rwanda |
| 23 | Continuous | | 425 | S. Lucia |
| 24 | Continuous | | 440 + 330 | Senegal |
| 25 | 0,65 - 0,03 | | 425 | Sri Lanka |
| 26 | Continuous | | 425 | Turkmenistan |
| 27 | Continuous | | 400 × 450? or 400 × 33 | Zimbabwe |

Table 5.37: Service Activated tone

| | Cadence (s) | Period (s) | Frequency (Hz) | Country/ies |
|---|-------------|------------|----------------|-------------|
| 1 | 1,0 - 0,25 | | 425 | Argentina |

Table 5.38: Test Number tone

| | Cadence (s) | Period (s) | Frequency (Hz) | Country/ies |
|---|-------------|------------|----------------|---------------------|
| 1 | Continuous | | 1 004 | Antigua and Barbuda |

Table 5.39: Warning tone (end of period)

| | Cadence (s) | Period (s) | Frequency (Hz) | Country/ies |
|---|-------------|------------|----------------|-------------|
| 1 | 2,0 | | 800 | Chile |

6 Comparison of Standardized tones

6.1 Introduction

A comparison is made between the characteristics of telecommunications service tones defined in International and European Standards. These include ITU-T (formerly CCITT) Recommendations, ETSI Standards and Technical Reports, GSM Standards, the proposed TETRA Standards and CEPT Recommendations.

Standards for network generated tones:

CCITT Recommendation E.180 [14] - Applies principally to network tones - PSTN and ISDN.

CEPT Recommendation T/SF 23 [3] - Applies to networks, public and private, analogue or digital. CEPT Definitions reflect/replicate ITU-T definitions.

CEPT Recommendation T/CS 20-15 [4] - Slightly refines the earlier CEPT T/SF recommendations.

Standards for Terminally Generated Tones:

ETS 300 245-7 [10] - Applies specifically to tones generated by ISDN terminals in response to network signals. It includes the tones presented in ETR 187 [6].

ETR 187 [6] - Recommends the same set of tones as prETS 300 245-7 with one minor change to call waiting.

GSM 02.40 [11] - Applies specifically to phase 1 and 2 GSM terminals.

ETR 294 - TETRA [7] - Intended to apply to the proposed phase 1 Tetra terminals.

NOTE 1: Definitions for GSM tones are cross referenced to CEPT Recommendation T/CS 20-15 [4] and CEPT Recommendation T/SF 23 [3]. These are given in French in T/SF 23, but are principally the same as the ITU-T definitions.

NOTE 2: The duration (number of cycles) of GSM tones given by the Mobile Station (MS) is an implementation option. However, in all cases when an MS tone is being generated the MS should still accept new inputs, and be able to return immediately to the idle state and be available to originate/receive calls, i.e. the tones can be over-ridden.

Standards for Service Generated tones:

ISO/IEC 13174 [13] - Includes a recommended chime (two or more sequential frequencies) as a prompting Record tone specifically for Voice Mail applications.

6.2 The standards tone tables

6.2.1 Standards Set 1:

Dial, Ringing, Busy, Special Information, Call Waiting, and Pay tones.

6.2.1.1 Standard Dial tones

Table 6.1: International standards for network generated Dial tones

| Network generated tones | | | |
|------------------------------------|--------------------|---|---|
| Source | Cadence (s) | Frequency (Hz) | Preference for any update of equipment |
| CCITT Recommendation E.180 [14] | Continuous | Single f, range 400 - 450 Combined, up to 3f (1f range 340-425, 2f range 400-450) | Continuous cadence at single frequency of 425 ± 15 Hz |
| CEPT Recommendation T/SF 23 [3] | Continuous | 400-450 | |
| CEPT Recommendation T/CS 20-15 [4] | Continuous | 425 ± 15 | |

Table 6.2: International standards for terminal generated Dial tones

| Terminal generated tones | | |
|--|---------------------------------|--------------------------|
| Source | Cadence (s) | Frequency (Hz) |
| ETS 300 245-7 [10] (ISDN Terminals) | Continuous or National tones | 425 or National tones |
| ETR 187 (General) [6] | Continuous | 425 |
| GSM 02.40 (Dial tone is not normally required, but if it is provided) [11] | N/A Continuous | N/A 425 ± 15 |
| ETR 294 (TETRA - no characteristics defined) [7] | N/A | N/A |

6.2.1.2 Standard Ringing tones

Table 6.3: International standards for network generated Ringing tones

| Network generated tones | | | |
|------------------------------------|---|---|---|
| Source | Cadence (s) | Frequency (Hz) | Preference for any update of equipment |
| CCITT Recommendation E.180 [14] | Slow period (tone<silence) tone range 0,67-1,5 silence range 3,0 - 5,0 1st tone starts a.s.a.p. | prefer 425 rec. range 400-450 accept range 340-500 avoid 450-500 | Cadence 1,0 - 4,0 at single frequency of 425 ± 15 Hz |
| CEPT Recommendation T/SF 23 [3] | (0,75-1,25) - (4,0-5,0) | 400-450 | |
| CEPT Recommendation T/CS 20-15 [4] | 1,0 - 4,0 | 425 ± 15 | |

Table 6.4: International standards for terminal generated Ringing tones

| Terminal generated tones | | |
|---|---------------------------------------|----------------------------|
| Source | Cadence (s) | Frequency (Hz) |
| ETS 300 245-7 [10] (ISDN Terminals) | 1,0 - 4,0 or National tones | 425 or National tones |
| ETR 187 (General) [6] | 1,0 - 4,0 | 425 |
| GSM 02.40 (Ringing tone is not normally required, mobile station presents network tone, but if it is provided) [11] | N/A 1,0 - 4,0 | N/A 425±15 |
| ETR 294 (TETRA - name and function defined) [7] | No characteristics defined | No characteristics defined |

6.2.1.3 Busy tone

Table 6.5: International standards for network generated Busy tones

| Network generated tones | | | |
|------------------------------------|---|--|---|
| Source | Cadence (s) | Frequency (Hz) | Preference for any update of equipment |
| CCITT Recommendation E.180 [14] | Quick period (tone=silence) total period 0,3-1,1 ratio tone/silence 0,67-1,5 tone > 0,1 Slower than Congestion | Single f, prefer 425 rec. range 400-450 accept range 340-500 avoid 450-500 | Use 425 for Busy and Congestion and keep to recommended cadence ranges |
| CEPT Recommendation T/SF 23 [3] | (0,4-0,5) - (0,4-0,5) | 400-450 | |
| CEPT Recommendation T/CS 20-15 [4] | 0,5 - 0,5 | 425 ± 15 | |

Table 6.6: International standards for terminal generated Busy tones

| Terminal generated tones | | |
|--|--------------------------------|----------------------------|
| Source | Cadence (s) | Frequency (Hz) |
| ETS 300 245-7 [10] (ISDN Terminals) | 0,5 - 0,5 or National tones | 425 or National tones |
| ETR 187 (General) [6] | 0,5 - 0,5 | 425 |
| GSM 02.40 [11] | 0,5 - 0,5 | 425±15 |
| ETR 294 (TETRA - tone and function defined (renamed Called Number Busy) [7] | No characteristics defined | No characteristics defined |

6.2.1.4 Standard Special Information Tones (SIT)

This tone is also intended to be used to indicate Number Unobtainable.

Table 6.7: International standards for network generated SIT

| Network generated tones | | | |
|------------------------------------|----------------------------|-----------------------------------|--|
| Source | Cadence (s) | Frequency (Hz) | Preference for any update of equipment |
| CCITT Recommendation E.180 [14] | 3 × 0,33 ± 70 - 1,0 ± 0,25 | 950 ± 50/1 400 ± 50/1 800 ± 50 | Keep to recommended range |
| CEPT Recommendation T/SF 23 [3] | 3 × (0,26-0,4) - 1,0 | 900-1 000/1 350-1 450/1 750-1 850 | |
| CEPT Recommendation T/CS 20-15 [4] | 3 × 0,333 - 1 | 950/1 400/1 800 | |

Table 6.8: International standards for terminal generated SIT

| Terminal generated tones | | |
|---|---------------|-----------------|
| Source | Cadence (s) | Frequency (Hz) |
| ETS 300 245-7 [10] (ISDN Terminals) | 3 × 0,333 - 1 | 950/1 400/1 800 |
| ETR 187 (General) [6] | 3 × 0,333 - 1 | 950/1 400/1 800 |
| GSM 02.40 [11] Also used to indicate Error, Number Unobtainable & Authentication Failure | 3 × 0,333 - 1 | 950/1 400/1 800 |
| ETR 294 TETRA [7] | None given | None given |

6.2.1.5 Standard Call Waiting tones

Table 6.9: International standards for network generated Call Waiting tones

| Network generated tones | | | |
|------------------------------------|--|----------------|--|
| Source | Cadence (s) | Frequency (Hz) | Preference for any update of equipment |
| CCITT Recommendation E.180 [14] | (0,3-0,5) - (8,0-10,0) or (0,1-0,2) - (0,1-0,2) - (0,1-0,2) - (8,0-10,0) repeated, cycles cease at time-out | range 400-450 | None given |
| CEPT Recommendation T/SF 23 [3] | (0,1-0,25) - (0,1-0,25) - (0,1-0,25) - (2,0-5,0) | 400-450 | None given |
| CEPT Recommendation T/CS 20-15 [4] | None given | None given | None given |

Table 6.10: International standards for terminal generated Call Waiting tones

| Terminal generated tones | | |
|--|---|----------------|
| Source | Cadence (s) | Frequency (Hz) |
| ETS 300 245-7 [10] | 0,2 - 0,6 - 0,2 - 3,0 (repeated once, i.e. 2 cycles only) | 425 |
| ETR 187 [6] | 0,2 - 0,6 - 0,2 - 3,0 (may be repeated once only) | 425 |
| GSM 02.40 [11] | 0,2 - 0,6 - 0,2 - 3,0 - 0,2 - 0,6 - 0,2 (1 cycle, alternative tones are acceptable but not preferred) | 425±15 |
| ETR 294 (TETRA) [7] | None given | None given |
| NOTE: TETRA systems may well require a Call Waiting tone and one may be defined in due course. | | |

6.2.1.6 Standard Pay tones

Table 6.11: International standards for network generated Pay tones

| Network generated tones | | | |
|------------------------------------|---|---------------------------|--|
| Source | Cadence (s) | Frequency (Hz) | Preference for any update of equipment |
| CCITT Recommendation E.180 [14] | None given | None given | None given |
| CEPT Recommendation T/SF 23 [3] | (0,1-0,5) - (0,1-0,5) (0,1-0,5) - (0,1-0,5) - (0,1-0,5) - (3,0-4,5) | 900-1 100 or 900-1 100 | None given |
| CEPT Recommendation T/CS 20-15 [4] | None given | None given | None given |

Table 6.12: International standards for terminal generated Pay tones

| Terminal generated tones | | |
|--|-------------|----------------|
| Source | Cadence (s) | Frequency (Hz) |
| ETS 300 245-7 [10] (ISDN Terminals) | None given | None given |
| ETR 187 (General) [6] | None given | None given |
| GSM 02.40 [11] | None given | None given |
| ETR 294 (TETRA) [7] | N/A | N/A |
| NOTE: ETS 300 400 [18] for ISDN payphones does not define a pay tone but does give loudness values and testing requirements for any tones presented. | | |

6.2.2 Standards Set 2:

Special Dial, Positive Indication, Congestion and Intrusion tones.

6.2.2.1 Standard Special Dial tones

Table 6.13: International standards for network generated Special Dial tones

| Network generated tones | | | |
|------------------------------------|--------------------------|---------------------|--|
| Source | Cadence (s) | Frequency (Hz) | Preference for any update of equipment |
| CCITT Recommendation E.180 [14] | None given | None given | None given |
| CEPT Recommendation T/SF 23 [3] | Continuous + 0,75 - 0,75 | (437-452)+(348-352) | |
| CEPT Recommendation T/CS 20-15 [4] | None given | None given | None given |

Table 6.14: International standards for terminal generated Special Dial tones

| Terminal generated tones | | |
|--|-------------|----------------|
| Source | Cadence (s) | Frequency (Hz) |
| ETS 300 245-7 [10] (ISDN Terminals) | None given | None given |
| ETR 187 (General) [6] | None given | None given |
| GSM 02.40 [11] | None given | None given |
| ETR 294 (TETRA) [7] | N/A | N/A |

6.2.2.2 Standard Positive Indication tones

ITU-T, CEPT nor ETSI did not define the characteristics for a positive indication tone. CCITT Recommendation E.182 [15] and ETR 294 (TETRA) [7] both define the tone and its function. ETR 294 renames the tone "Acceptance tone".

Supplementary service providers should be aware that prETS 300 738 [19] implies that a single tone is insufficient feedback for most supplementary service commands.

6.2.2.3 Standard Congestion tones

Table 6.15: International standards for network generated Congestion tones

| Network generated tones | | | |
|------------------------------------|---|---|--|
| Source | Cadence (s) | Frequency (Hz) | Preference for any update of equipment |
| CCITT Recommendation E.180 [14] | Quick period (tone=silence) total period 0,3-1,1 ratio tone/silence 0,67-1,5 tone > 0,1 Faster than Busy | prefer 425 rec. range 400-450 accept range 340-500 avoid 450-500 | Use 425 for Busy and Congestion and keep to recommended cadence ranges |
| CEPT Recommendation T/SF 23 [3] | (0,2-0,25) - (0,2-0,25) | 400-450 | |
| CEPT Recommendation T/CS 20-15 [4] | 0,2 - 0,2 | 425 ± 15 | |

Table 6.16: International standards for terminal generated Congestion tones

| Terminal generated tones | | |
|--|----------------------------|----------------------------|
| Source | Cadence (s) | Frequency (Hz) |
| ETS 300 245-7 [10] (ISDN Terminals) | 0,2 - 0,2 | 425 |
| ETR 187 (General) [6] | 0,2 - 0,2 | 425 |
| GSM 02.40 [11] | 0,2 - 0,2 | 425 ± 15 |
| ETR 294 (TETRA) tone and function defined (renamed Network Busy tone) [7] | No characteristics defined | No characteristics defined |

6.2.2.4 Standard Intrusion tones

Table 6.17: International standards for network generated Intrusion tones

| Network generated tones | | | |
|------------------------------------|---|---------------------------|--|
| Source | Cadence (s) | Frequency (Hz) | Preference for any update of equipment |
| CCITT Recommendation E.180 [14] | None given | None given | |
| CEPT Recommendation T/SF 23 [3] | (0,1-0,2) - (1,0-2,0) (0,2-0,3) - (0,2-0,3) - (0,2-0,3) - (1,2-1,4) | 1 350-1 450 or 400-450 | |
| CEPT Recommendation T/CS 20-15 [4] | None given | None given | |

Table 6.18: International standards for terminal generated Intrusion tones

| Terminal generated tones | | |
|-------------------------------------|-------------|----------------|
| Source | Cadence (s) | Frequency (Hz) |
| ETS 300 245-7 (ISDN Terminals) [10] | None given | None given |
| ETR 187 (General) [6] | None given | None given |
| GSM 02.40 [11] | None given | None given |
| ETR 294 (TETRA) [7] | None given | None given |

6.2.3 Standards Set 3:

Other Standardized tones: Caller Waiting, Negative Indication, Routeing, Warning, Radio Path Acknowledgement, Radio Path Not Available, Error/Authentication Failure, Record tones.

6.2.3.1 Standard Caller Waiting tones

Table 6.19: International standards for network generated Caller Waiting tones

| Network generated tones | | | |
|------------------------------------|---|----------------|--|
| Source | Cadence (s) | Frequency (Hz) | Preference for any update of equipment |
| CCITT Recommendation E.180 [14] | Ring tone followed after a short silence (0-0,2 s) by call waiting tone, either: a) tone 0,3-0,5 silence 8,0-10,0 or b) tone 0,1-0,2 - silence 0,1-0,2 - tone 0,1-0,2 - silence 8,0-10,0 c) another call waiting tone | 400 - 450 | |
| CEPT Recommendation T/SF 23 [3] | None given | None given | |
| CEPT Recommendation T/CS 20-15 [4] | None given | None given | |

Table 6.20: International standards for terminal generated Caller Waiting tones

| Terminal generated tones | | |
|--|---|----------------------------|
| Source | Cadence (s) | Frequency (Hz) |
| ETS 300 245-7 [10] (ISDN Terminals) | None given | None given |
| ETR 187 (General) [6] | Ring cadence (1,0 - 4,0) until time-out then Busy (0,5 - 0,5) | 425 |
| GSM 02.40 [11] | None given | None given |
| ETR 294 (TETRA) tone and function defined (renamed Call Queuing tone) [7] | No characteristics defined | No characteristics defined |

6.2.3.2 Standard Negative Indication tones

ITU-T, CEPT nor ETSI did not define the characteristics for a negative indication tone. CCITT Recommendation E.182 [15] and ETR 294 (TETRA) [7] both define the tone and its function. ETR 294 renames the tone "Rejection tone".

Supplementary service providers should be aware that prETS 300 738 [19] implies that a single tone is insufficient feedback for most supplementary service commands.

6.2.3.3 Standard Routeing tones

ITU-T, CEPT nor ETSI did not define the characteristics for a routeing tone. CCITT Recommendation E.182 [15] and ETR 294 (TETRA) [7] both define the tone and its function. ETR 294 renames the tone "Call Progressing tone". However, as major networks are now reconsidering the value of the tone, it may be appropriate for Tetra to re-evaluate its requirement.

6.2.3.4 Standard Warning tones

This tone is intended to indicate that a user's privacy may be compromised because recording is in progress. This tone is not intended to follow a record tone which is intended as a distinct prompt to the user to leave (i.e. record) a message.

Table 6.21: International standards for network generated Warning tones

| Network generated tones | | | |
|------------------------------------|--|----------------|--|
| Source | Cadence (s) | Frequency (Hz) | Preference for any update of equipment |
| CCITT Recommendation E.180 [14] | tone range 0,35-0,5 repeated every 15,0 ± 3,0 s of recording time | 1 400 ± 1,5 % | |
| CEPT Recommendation T/SF 23 [3] | (0,35-0,5) - (12,0-18,0) | 1 350-1 450 | |
| CEPT Recommendation T/CS 20-15 [4] | 0,4 - 15,0 | 1 400 ± 50 | |

Table 6.22: International standards for terminal generated Warning tones

| Terminal generated tones | | |
|-------------------------------------|-------------|----------------|
| Source | Cadence (s) | Frequency (Hz) |
| ETS 300 245-7 (ISDN Terminals) [10] | 0,5 - 15,0 | 1 400 |
| ETR 187 (General) [6] | 0,5 - 15,0 | 1 400 |
| GSM 02.40 [11] | | |
| ETR 294 (TETRA) [7] | | |

6.2.3.5 Three GSM standard Specific tones

Table 6.23: International standards for terminal generated Radio Path Acknowledgement tone

| Standard | Frequency (Hz) | Cadence (s) |
|----------------|----------------|--------------------|
| GSM 02.40 [11] | 425 ± 15 | 0,2 (single burst) |
| | | |

Table 6.24: International standards for terminal generated Radio Path Not Available tone

| Standard | Frequency (Hz) | Cadence (s) |
|----------|----------------|----------------------|
| GSM | 425 ± 15 | 0,2 - 0,2 (3 cycles) |
| | | |

Table 6.25: International standards for terminal generated Error/Authentication Failure tone

| Standard | Frequency (Hz) | Cadence (s) |
|----------------|-----------------|--------------------------|
| GSM 02.40 [11] | 950/1 400/1 800 | 0,33 - 0,33 - 0,33 - 1,0 |
| | | |

6.2.3.6 One standard Service Specific tone

Table 6.26: International standards for "service" Generated Record tone

| Standard | Frequency (Hz) | Cadence (s) |
|---------------------------------|----------------|---------------------|
| ISO/IEC 13174 "Voice Mail" [13] | 500/620 | 0,15 - 0,075 -,0,15 |
| | | |

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