5i’

SECTION 8

TRANSMISSION QUALITY ABOVE 50 BAUDS

Recommendation R.120

TOLERABLE LIMITS FOR THE DEGREE OF ISOCHRONOUS DISTORTION OF CODE-INDEPENDENT TELEGRAPH CIRCUITS OPERATING AT MODULATION RATES OF

75, 100 AND 200 BAUDS

(Geneva, 1976; amended at Geneva, 1980)

The CCITT,

considering

(a) that, to facilitate the study of plans for the establishment of international telegraph circuits, it is convenient to set limits for the degree of isochronous distortion of telegraph circuits and channels;

(b) that, for whatever purposes normally used, these circuits should be capable of use with start-stop equipment;

(c) that, until detailed transmission planning standards are established for the trunk sections of international telegraph circuits operating at modulation rates of 75, 100 and 200 bauds, the distortion limits mentioned below should be regarded as provisional standards;

(d) that the limits laid down are those that should be evident in service conditions on telegraph circuits, excluding the local lines and terminal equipment,

unanimously declares the view

(1) that circuits (excluding local lines and terminal equipment) should be established and maintained in such a manner that the degree of isochronous distortion will not exceed the limits shown in Table 1/R.120, irrespective of whether any form of regeneration is provided in the circuit or not;

H.T. [T1.120]
TABLE 1/R.120

Modulation rate (bauds) Maximun degree of isochronous distortion permitted }	{
75 100 200	28 | 24 | 32 |

TABLE 1/R.120 (R.) [T1.120] p.182

(2) that the degree of isochronous distortion of each channel that may form part of a circuit should be as small as possible, and should not in any case exceed 10%.

Recommendation R.121

STANDARD LIMITS OF TRANSMISSION QUALITY FOR START-STOP USER CLASSES

OF SERVICE 1 AND 2 ON ANISOCHRONOUS DATA NETWORKS

(Geneva, 1976)

The CCITT,

considering

(a) that, to permit the sharing of responsibility for the maintenance of a high standard of transmission quality on switched connections between anisochronous data networks referred to in Recommendation X.1 [1], it is necessary to specify limiting values of distortion on signals leaving the international gateway centre of each network;

(b) that, on the other hand, to enable national switched networks to be interconnected, it is necessary to have a distribution plan of the telegraph distortion between national networks and the international junction circuits connecting the international gateway switching centres;

(c) that it is difficult to lay down standards applicable both to small and to large national networks;

(d) that it should be possible to fix limit values for large countries and they should apply to the great majority of user locations taking part in the international service,

unanimously declares the view

1 The following standards of transmission quality should be observed for the interconnection of national anisochronous data networks set up by means of transmission channels and start-stop terminal equipment in accordance with CCITT Recommendations to provide service for user classes of service 1 and 2 to Recommendation X.1 [1] (up to and including 300 bit/s).

1.1 The degree of gross start-stop distortion in service (i.e. including the effect of distortion due to the sending terminal equipment and the

switching centres) at the point of exit of the national network should provisionally not exceed 22%.

Note — The international gateway exchange of a country is considered as forming part of the national network of that country.

1.2 The degree of inherent start-stop distortion of the international junction circuit should provisionally not exceed 13%.

Note 1 — In establishing the provisional 13% limit for the degree of start-stop distortion in the international junction circuit account has been taken of the fact that in a global connection, the international junction circuit might consist of 2 channels in tandem. If the international junction circuit is established on a single channel, an 8% provisional limit would be applicable to that circuit.

Note 2 — No limit for distortion on the entry to an international gateway centre at the receiving end has been indicated in this Recommendation. The values mentioned in §§ 1.1 and 1.2 above are adequate for planning purposes.

2 The provisional limit values mentioned above are applicable to large countries that are directly interconnected without switching in a transit country. Where national networks are unable to satisfy § 1.1 above, signal regeneration will be required.

3 Small countries (defined as countries in which all user terminal equipment can be reached via not more than one carrier channel in the national network) will have to try to obtain values less than the maximum 22% distortion mentioned in § 1.1 above.

4 The provisional standard limits mentioned under § 1 above can also apply to private switched telegraph and anisochronous data networks.

Reference

[1] CCITT Recommendation *International user classes of service in public data networks* , Rec. X.1.

Recommendation R.122

SUMMARY OF TRANSMISSION PLANS FOR RATES UP TO 300 BAUDS

(Melbourne, 1988)

The CCITT,

considering

(a) that this Recommendation summarizes the distortion limits to be used in formulating transmission plans for connections working at rates up to 300 bauds;

(b) that User Classes of Services 1 and 2 in Recommendation X.1 should be taken into account;

(c) that the rates and codes given in Recommendation R.101 should be taken into account;

(d) that Recommendations R.20, R.50, R.57, R.58, R.120, R.121 and S.3 should be taken into account,

unanimously declares the view

In planning international point-to-point and switched telegraph communications, Administrations should use the following as a guide. The individual recommendations referred to should be taken into account.

Note 1 — Most of the figures given were derived using the laws of addition of distortion appropriate to analogue transmission equipment MCVFT, however were another law is known to apply TDM, then the appropriate law of addition should be used (see Recommendation R.11).

Note 2 — Most of the figures given relate to start-stop distortion but some, R.20, R.120 and R.58 for trunk distortion, relate to isochronous distortion. As a first approximation, isochronous and start-stop distortion may be considered to be equivalent for small values. However the individual Recommendations should be taken into account in each case.

In the following examples:

T is the customers terminal,

M is a modem to Recommendation R.20,

| (ra represents the transmit distortion from the given point,

| represents the margin at the given point,

| (<- | represents the distortion introduced between the given points.

Blanc

Figure T0900310-89, p. 2

Figure T0900320-89, p. 3

Figure T0900330-89, p. 4

Figure T0900340-89, p. 5

Figure T0900350-89, p. 6

Figure T0900360-89, p. 7

Figure T0900370-89, p. 8

Figure T0900380-89, p. 9

MONTAGE: PAGE PAIRE = PAGE BLANCHE

SECTION 9

DEFINITIONS

Recommendation R.140

DEFINITIONS OF ESSENTIAL TECHNICAL TERMS IN THE FIELD OF TELEGRAPH TRANSMISSION

(Geneva, 1980 amended at Malaga-Torremolinos, 1984

and Melbourne, 1988)

Note — Each term is designated by a number in the original CCITT numbering scheme and additionally by the nearest equivalent number in Chapter 721 of the IEV.

02 SERIES — GENERAL TRANSMISSION PROCESSES

02.081 **hypothetical reference connection (in telegraphy); hypothetical reference circuit** (deprecated)

F: communication fictive de référence (en télégraphie); circuit fictif de référence (terme déconseillé)

S: *conexión ficticia de referencia (en telegrafía); circuito ficticio de referencia* (desaconsejado)

Hypothetical connection made up for two terminals in the world telex network, or other telegraph network, corresponding in principle to the most onerous case in order to study the transmission and switching characteristics necessary to ensure satisfactory operation.
721.33.14

02.24 **subtelephone telegraphy**

F: *télégraphie infra-téléphonique*

S: *telegrafía infratelefónica; telegrafía infraacústica*

Telegraphy using a frequency band below that part of the audio range usually employed in telephone transmission.

02.25 **super-telephone telegraphy**

F: *télégraphie supra-téléphonique*

S: *telegrafía supratelefónica; telegrafía supraacústica*

Telegraphy using a frequency band above that part of the audio range usually employed in telephone transmission.

31 SERIES — GENERAL ALPHABETIC TELEGRAPHY

31.01 **code character**

F: *caractère (télégraphique)*

S: *carácter de código*

The set of conventional elements established by the code to enable the transmission of a written character (letter, figure, punctuation sign, arithmetical sign, etc.) or the control of a particular function (spacing, shift, line-feed, carriage return, phase correction, etc.); this set of elements being characterized by the variety, the duration and the relative position of the component elements (or by some of these features).

Note — The French and English terms are not equivalent.

31.011 **telegraph signal**

F: *signal télégraphique*

S: *señal telegráfica*

A signal representing all or part of one or more telegraph messages.
721.31.03

31.02 **signal element**

F: *élément de signal*

S: *elemento de señal*

Each of the parts constituting a signal and distinguished from the others by one or more characteristics such as its nature, magnitude, duration and relative position.
721.21.06

31.021 **transition**

F: *transition*

S: *transición*

A transient phenomenon separating two successive signal elements having different significant conditions.
721.21.28

31.022 **change-over**

F: *mutation*

S: *cambio*

A change from one significant condition to another.
721.21.27

31.023 **character signal**

F: *signal de caract`ere*

S: *señal de car´acter*

A set of signal elements representing a character.
721.22.10

31.024 **character format**

F: *format de caract`ere*

S: *formato de car´acter*

A general description of a character signal, indicating for example the number of unit elements it contains.

31.025 **character length**

Number of unit intervals contained in a character signal.

31.05 **start signal**

F: signal de d´epart

S: señal de arranque

In start-stop transmission, a signal preceding each group of signal elements which prepares the receiving device for the reception of the elements of the group.
721.22.15

31.051 **start element**

F: ´el´ement de d´epart

S: elemento de arranque

A start signal limited to one signal element generally having the duration of a unit interval.
721.22.16

31.06 **stop signal**

F: signal d'arr | t

S: señal de parada

In start-stop transmission, a signal following each group of signal elements which prepares the receiving device for the reception of the subsequent start signal, or brings the device to rest.
721.22.17

31.061 **stop element**

F: ´el´ement d'arr | t

S: elemento de parada

A stop signal limited to one signal element having any duration equal to or greater than a specified minimum value.
721.22.18

31.07 **telegraph code**

F: code t´el´egraphique

S: c´odigo telegr´afico

A system of rules and conventions according to which a succession of significant conditions representing a message should be formed and translated in alaphabetic telegraphy.
721.31.05

31.08 **telegraph alphabet**

F: *alphabet t´el´egraphique*

S: *alfabeto telegr´afico*

A convention indicating correspondence between a set of characters and a set of groups of elements which represent them.
721.31.07

31.081 **n-unit code alphabet**

F: *alphabet d'un code à n moments*

S: *alfabeto de c´odigo de n unidades*

A telegraph alphabet indicating correspondence between a set of characters and a set of n-unit code combinations.

721.31.08

31.082 **international telegraph alphabet No. 1 (ITA1)**

F: alphabet t´el´egraphique international n (ATI n

S: alfabeto telegr´afico internacional N. (ATI N.

A telegraph alphabet using a two-condition five-unit code, used in Baudot synchronous telegraphy.

Note — This alphabet is specified by Article 16 of the Telegraph Regulations, Geneva 1958.
721.31.09

31.083 **international telegraph alphabet No. 2 (ITA2)**

F: alphabet t´el´egraphique international n (ATI n

S: alfabeto telegr´afico internacional N. (ATI N.

An alphabet using a two-condition five-unit code, used in start-stop telegraphy generally for teleprinters.

Note — This alphabet is specified in Recommendation S.1.
721.31.10

31.084 **international telegraph alphabet No. 3 (ITA3)**

F: alphabet t´el´egraphique international n (ATI n

S: alfabeto telegr´afico internacional N. (ATI N.

An alphabet using the two-condition seven-unit constant-ratio code.

Note — This alphabet is defined by CCIR Recommendation 342-2 or CCITT Recommendation S.13 (1972).
721.31.11

31.085 **international telegraph alphabet No. 4 (ITA4)**

F: alphabet t´el´egraphique international n (ATI n

S: alfabeto telegr´afico internacional N. (ATI N.

An alphabet using a two-condition six-unit code for the time division multiplex synchronous telegraphy, comprising in particular two code combinations corresponding to the permanent conditions A and Z, so that the multiplex channel can be operated in a switched network.

Note — This alphabet is defined in Recommendation R.44 (1968).
721.31.12

31.086 **international alphabet No. 5 (IA5)**

F: alphabet international n

S: alfabeto internacional N.

An alphabet using a two-condition eight-unit code with seven primary information elements and one parity check element, comprising in particular upper and lower case characters, diacritical signs and miscellaneous control functions.

Note — The character coding rules using the seven primary elements are the subject of Recommen dations T50 and V.4.
721.31.13

31.09 **character**

F: *caract`ere (d’´ecriture)*

S: *car´acter*

A member of a set of elements agreed upon to be used for organisation, representation or control of information.

Note — Characters may be letters, digits, punctuation marks or other symbols and, by extension, function controls such as space, shift, carriage return or line-feed contained in a message.

721.22.09

31.10 **equal-length code**

F: code à moments

S: c´odigo de igual longitud

A code, the character signals of which are composed of the same number of unit elements.
721.22.21

31.11 **n-unit code**

F: code à n moments; code à n ´el´ements (unitaires)

S: c´odigo de n unidades; c´odigo de n elementos unitarios

Equal-length code according to which the character signals are composed of n unit elements.
721.22.22

31.111 **code combination**

F: combinaison de code

S: combinaci´on de c´odigo

A combination of n-unit elements formed in accordance with an n-unit code which assigns a significant condition to each of the unit elements.
721.22.23

31.112 **code element**

F: ´el´ement de code

S: elemento de c´odigo

A unit element constituting part of a character signal from the arrangements of which a code combination is formed.

Note — Figure 1/R.140 shows an example of the use of this term.

Figure 1/R.140, p.

31.113 **redundant code**

F: code redondant

S: c´odigo redundante

A code using more signal elements than strictly necessary to represent the contents of the message.

For example:

1. A seven-unit code, such as International Telegraph Alphabet No. 3 which uses only character signals made of four unit elements of A condition and three unit elements of Z condition, is redundant.

2. A five-unit code, using all the characters of International Telegraph Alphabet No. 2, is not redundant.

721.27.23

31.12 **code conversion**

F: *conversion de code*

S: *conversión de código*

The conversion from a representation of coded information to another representation of the same information in accordance with another code.

Example: Conversion of character signals or groups of character signals in one telegraph code into corresponding signals or groups of signals in another code.
721.21.21

31.14 **semateme** (not used in English)

F: *sématème (à l'émission)*

S: *sematema*

Contiguous succession in time of significant conditions.
721.31.14

31.15 **restitution**

F: *restitution*

S: *restitución*

The formation of a succession in time of signifcant conditions resulting from a received signal.
721.31.15

31.211 **significant condition**

F: *état significatif*

S: *estado significativo; condición significativa*

Condition of a signal element defining the meaning of that signal element, in accordance with a code.

Note — This condition can be a function of the value of the signal element e.g. amplitude, frequency, phase or a combination of these.
721.21.22

31.22 **significant interval**

F: *intervalle significatif*

S: *intervalo significativo*

Time interval between two consecutive significant instants.
721.21.30

31.23 **theoretical duration of a significant interval**

F: *durée théorique d'un intervalle significatif*

S: *duraci´on te´orica de un intervalo significativo*

The exact duration prescribed for a significant interval.

Note — In determining this duration, the standardized and, where necessary, the mean modulation rate has to be taken into account.

721.21.31

31.24 **significant instant**

F: instant significatif

S: instante significativo

That instant at which a change-over occurs.

Note — The instant of change from one significant condition to another.
721.21.29

31.25 **restitution delay**

F: d´elai de restitution [retard à la restitution]

S: retardo de restituci´on; retardo en la restituci´on

Transfer time of a significant instant between a transmitter and the corresponding receiver.

31.26 **unit interval**

F: intervalle unitaire

S: intervalo unitario

The shortest theoretical duration of a significant interval.

Note — In telegraphy the unit interval is the same as the minimal interval.

31.27 **modulation rate**

F: rapidit´e de modulation

S: velocidad de modulaci´on

The reciprocal of the duration of the unit interval or of the shortest theoretical duration of signal element.
721.22.26

31.271 **character rate**

F: rapidit´e de transfert de caract`eres

S: velocidad de caracteres

The average number of characters transferred per unit time between two points.
721.22.29

31.272 **binary rate**

F: d´ebit binaire

S: velocidad binaria

The aggregate rate in a transmission path expressed in bits per second.

Note 1 — The transmission rate is given by:

f Ii =*m*
Σ
i =1
[Unable to Convert Formula]
2 | fIn *i*

where

m is the number of parallel transmission channels,

T_i is the shortest theoretical duration of signal element for the *i* th channel expressed in seconds, and

n_i is the number of significant conditions of the modulation in the *i* th channel.

For a single channel (serial transmission) it reduces to:

[Unable to Convert Formula]

with two-condition modulation ($n = 2$), it is $1/T$.

For a parallel transmission with equal minimum intervals and equal number of significant conditions on each channel, it is:

m
[Unable to Convert Formula]

with two-condition modulation it reduces to m/T .

Note 2 — The symbol of the unit of binary rate is bit/s. 721.22.30

31.273 **effective character rate**

F: cadence utile de transfert

S: velocidad efectiva de caracteres

The average number of binary digits, characters or blocks transferred per unit time between two points and accepted as valid at the reception.
721.22.31

31.274 **full character rate**

In synchronous telegraphy, the maximum number of character signals per unit time achievable in a given synchronous channel.

31.275 **half [quarter] character rate**

Character rate reduced to one half [one quarter] of the full characrer rate by using half [quarter] of the available time in the full rate channel.

31.28 **baud (Bd)**

F: baud (Bd)

S: baudio (Bd)

The unit of modulation rate; the number of bauds is equal to the reciprocal of the duration in seconds of the shortest signal element or of the unit interval in such signal.

Note — For example, if the duration of the unit interval is 20 ms, the modulation rate is 50 bauds.
721.22.27

31.29 **isochronous**

F: isochrone

S: is´ocrono

Pertaining to a signal or a time-varying phenomenon characterized by significant instants separated by time intervals having a duration theoretically equal to the duration of a unit interval or to an integral multiple of this duration.
721.22.01

31.291 **anisochronous**

F: *anisochrone*

S: *anis´ocrono*

Pertaining to a signal or a time-varying phenomenon characterized by significant instants separated by time intervals having durations not constrained to be all equal to the duration of a unit interval or to an integral multiple of this duration.

721.22.02

31.30 **start-stop telegraph signal**

F: *signal t´el´egraphique arythmique*

S: *señal telegr´afica arr´ıtmica*

A telegraph signal containing sequences of unit elements, each sequence being of equal duration and corresponding to a transmitted character and preceded by a start element and followed by a period of condition Z, the duration of which is not fixed.
721.22.03

31.35 **number of significant conditions**

F: *valence*

S: *valencia (n´umero de estados significativos)*

Number of different significant conditions that a signal element can assume in accordance with a code.
721.21.23

31.351 **two condition [three condition] [four condition]**

F: *bivalent [etc.]*

S: bivalente [trivalente] [tetravalente]; de dos estados, etc.

A qualifying term indicating that the number of significant conditions used is two [three] [four].
721.21.24-26

31.37

(For the countries of English language. The English and French terminologies do not correspond.)

marking; spacing (see also Definition 31.38)

mark; space

F: *travail; repos*

S: *trabajo, reposo*

Designation of the two significant conditions of a binary modulation (or restitution).

The English term ‘‘marking’’ or ‘‘mark’’ French term

1. In Morse, corresponds to those portions of dot and dash signals that, **1. Travail**

for example, when actuating a Morse inker, will cause the inker

to mark the paper.

2. In printing telegraphy, corresponds to the significant condition that **2. Repos** or **travail**

results in an active selecting operation in a receiving apparatus. according to the

system

Note 1 — In start-stop automatic transmission, the term corresponds to the perforation of a hole in the tape. idem

Note 2 — In standardized start-stop telegraphy the term corresponds to the ''stop'' element. **Repos**

3. In isochronous systems, the term that is arbitrarily assigned to one or the other of the two signalling conditions. **3. Repos** or **travail** according to the system

The English term ''spacing'' or ''space''

1. In Morse, corresponds to the spaces separating marking signals and **1. Repos**
to the spaces separating complete characters.

2. In printing telegraphy, corresponds to the significant condition that **2. Travail** or **repos**
results in a passive selecting operation in a receiving apparatus. according to
the system

French term

Note 1 — In start-stop automatic transmission the term corresponds **Travail** or **repos**
to the absence of perforation in the tape. according to
the system

Note 2 — In standardized start-stop telegraphy the term corresponds **Travail**
to the ''start'' element.

3. In isochronous systems, the term that is assigned to the non-marking **3. Travail** or **repos**
signalling condition. according to
the system

The CCITT has recommended that those terms should not be used in telegraph circuit diagrams, but that the letters A and Z should be used to represent the two significant conditions of a binary modulation (see Definition 31.38).

The French term ''travail''

applies to the significant condition that: *English term*

1. In Morse corresponds to the recording of an impression on the paper; **1. Mark**
2. In International Telegraph Alphabet No. 2, corresponds to the ''start'' **2. Space**
element of a start-stop signal and to the absence of perforation
in the tape in start-stop automatic transmission.

The French term ''repos''

applies to the significant condition that:

1. In Morse corresponds to spaces; **1. Space**
2. In International Telegraph Alphabet No. 2, corresponds to the ''stop'' **2. Mark**
element of a start-stop signal and to the perforation of the tape in start-stop
automatic transmission.

31.38 **position A, position Z**

F: *position A, position Z*

S: *posici´on A, posici´on Z*

Representation of the positions occupied by the moving parts (for example, relay armatures) in a circuit diagram.

1 In a diagram representing a complete telegraph connection, operated by binary modulation, the positions that all the moving parts in the connection should simultaneously occupy, so that the electro-magnet of the receiver shall be in a given position (A or Z), should be designated in the same way as this position.

2 Position A is that which corresponds to the start signal of a standardized start-stop apparatus: position Z is that which then corresponds to the stop signal.

3 In the case of a point-to-point start-stop circuit, the moving parts should all be shown in position Z.

4 In the case of a diagram of a switched connection, the moving parts should all be shown in the position corresponding to the free condition of the circuits. Thus, for example, in the standardized international telex system, the position in question is A.

31.381 **A (Z) condition**

F: *´etat A (Z)*

S: *estado A (o estado Z)*

The significant condition of a start element (stop element) in start-stop transmission.

Note — For other representations see the table of equivalence in Recommendation V.1.
721.22.19

31.3811 **A (Z) element**

F: *moment A (Z)*

S: *elemento A (o elemento Z)*

In a code combination, a unit element to which is assigned the A (Z) condition.

721.22.24-25

31.3812 **idle circuit condition**

F: état de repos (d'un circuit)

S: estado de circuito en reposo

The characteristic state of the circuit in an established connection when it is transmitting neither character signals nor supervisory signals.
721.33.56

31.39 **unit element**

F: élément unitaire

S: elemento unitario

A signal element having a duration equal to the unit interval.
721.21.33

31.40 **reversals**

Uninterrupted sequence of signal elements of a two condition signal with alternating significant conditions all of the same duration and equal to that of the unit interval.

31.401 **1 | | reversals**

Periodical signals in which every significant interval is equal to the unit interval.

31.41 **m | | pattern**

An uninterrupted sequence of binary signal elements of which the significant conditions alternate between m and n unit interval durations.

31.42 **Morse code**

F: code Morse

S: código Morse

A two-condition telegraph code in which characters are represented by groups of dots and dashes, these groups being separated by spaces.
721.31.25

31.43 **dot** (in Morse code)

F: point (en code Morse)

S: punto (en código Morse)

A signal element of mark condition and of duration of one unit interval followed by a signal element of space condition having a nominal duration of one unit interval.
721.31.28

31.44 **dash** (in Morse code)

F: *trait* (en code Morse)

S: *raya* (en código Morse)

A signal element of mark condition and of a duration of three unit intervals followed by a signal element of space condition having a nominal duration of one unit intervals.
721.31.29

31.45 **space** (between characters and words in Morse code)

F: *espace* (entre deux caractères, deux mots en code Morse)

S: *espacio* (entre caracteres y entre palabras, en código Morse)

A signal element of space condition and nominal duration of two unit intervals between characters and six unit intervals between words.

721.31.30

31.451 **space condition (in Morse code only)**

F: *repos* (en code Morse)

S: *reposo (en código Morse)*

Designation given to one of the two significant conditions in Morse code, the other condition being designated ‘‘mark’’.
721.31.27

31.452 **mark condition (in Morse code only)**

F: *travail* (en code Morse)

S: *trabajo (en código Morse)*

Designation given to one of the two significant conditions in Morse code.
721.31.26

32 SERIES — TELEGRAPH CHANNELS

32.01 **telegraph channel**

F: *voie de transmission télégraphique*

S: *canal telegráfico*

A means of transmission of telegraph signals in one direction between two points.

Note 1 — A telegraph channel may be characterized by the number of significant conditions, by the nominal modulation rate and by the code format it is designed to admit.

Example: A 50 baud channel for two-condition modulation.

Note 2 — Several telegraph channels may share a common path; for example each channel is allocated a particular frequency band or particular time slot.
721.33.01

32.011 **complete telegraph channel**

F: *voie télégraphique complète*

S: *canal telegráfico completo*

A telegraph channel between two terminal sets.

Note — A retransmitter with storage of signals is considered as a terminal set and terminates a complete channel.
721.33.03

32.012 **sub-channel**

F: *sous-voie*

S: *subcanal*

A tributary channel which is allocated a proportion of a standard channel rate.

Example: A transmission channel obtained by time-division and which is allocated a submultiple of an actual character transfer rate of a standard channel.
721.33.51

32.014 **multiple channel**

F: *multivoie*

S: *multicanal*

Pertaining to or designating a telegraph transmission system in which two or more channels are used for transmission of a character signal propagating in the same direction between the same two points.

721.33.21

32.015 **transmit channel**

F: *voie d'´emission*

S: *canal de emisi´on*

The designation at a terminal or other equipment, of a channel used for transmitting.
721.33.09

32.016 **receive channel**

F: *voie de r´eception*

S: *canal de recepci´on*

The designation at a terminal or other equipment, of a channel used for receiving.
721.33.10

32.017 **serial transmission**

F: *transmission s´erie*

S: *transmisi´on serie*

Transmission of the signal elements of a telegraph signal at successive time intervals, either contiguous or not.
721.33.16

32.018 **parallel transmission**

F: *transmission parall`ele*

S: *transmisi´on paralelo*

The simultaneous transmission of the signal elements of a telegraph character signal on separate channels.
721.33.17

32.019 **start-stop transmission**

F: *transmission arythmique*

S: *transmisi´on arr´itmica*

A transmission process using start-stop signals.
721.22.07

32.0110 **synchronous transmission**

F: *transmission synchrone*

S: *transmisi´on s´incrona*

Transmission using isochronous signals in which the sending and receiving instruments are operating continuously in a constant time difference between corresponding significant instants.
721.22.05

32.0111 **synchronous system**

F: *t´el´egraphie synchrone*

S: *sistema s´incrono*

A system of alphabetic telegraphy using synchronous transmission.

721.31.17

32.0112 **element synchronism**

F: synchronisme ´el´ementaire

S: sincronismo de los elementos

In synchronous transmission, the condition in which the rate of the local timing coincides completely with the rate of the received signal elements.
721.33.43

32.0113 **element synchronization**

F: synchronisation ´el´ementaire

S: sincronizaci´on de los elementos

The action of adjustment of element synchronism.
721.33.44

32.0114 **code independent channel**

F: voie ind´ependante du code

S: canal independiente del c´odigo

Telegraph channel capable of transmitting telegraph signals irrespective of the code used.
721.51.31

32.0115 **code dependent channel**

F: voie d´ependante du code

S: canal dependiente del c´odigo

A telegraph channel capable of transmitting telegraph signals only in a specified n-unit code format.

32.0115*bis* **|** fBsubchannel

In synchronous telegraphy a channel having a sub-multiple of the full character rate.

32.0116 **transparency**

F: transparence

S: transparencia

Possibility to transmit any telegraph signal with the only condition that a specified modulation rate cannot be exceeded.

32.02 **telegraph circuit**

F: circuit t´el´egraphique

S: *circuito telegr´afico*

A pair of associated telegraph channels permitting transmission in both directions between two points.
721.33.04

32.06 **telegraph repeater**

F: *translation (t´el´egraphique)*

S: *repetidor (traslator) telegr´afico*

A device which can receive telegraph signals and immediately retransmit them with the same meaning on the next line section.

721.33.11

32.071 **modulation converter**

F: *translation convertisseuse de modulation*

S: *convertidor de modulaci´on*

A telegraph repeater in which the input and output signals are represented with the same code, but use different types of modulation.
721.33.13

32.08 **code converter**

F: *convertisseur de code*

S: *convertidor de c´odigo*

Telegraph repeater which can accomplish a code conversion.
721.34.52

32.081 **speed conversion**

F: *conversion de rapidit´e*

S: *conversi´on de velocidad*

The conversion of the modulation rate of the received signal to a different modulation rate suitable for the subsequent equipment.
721.22.28

32.09 **broadcast repeater**

F: *translation pour diffusion*

S: *repetidor de difusi´on*

A repeater connecting several channels, one incoming and the other outgoing.

32.10 **conference repeater**

F: *translation pour conf´erence*

S: *repetidor para conferencias*

A telegraph repeater connecting several circuits, which receives signals from any one of the circuits and automatically retransmits them over all the others.

32.11 **telegraph regenerative repeater**

F: *r´eg´en´erateur (t´el´egraphique)*

S: *repetidor regenerativo telegr´afico*

A telegraph repeater designed to retransmit signals free from telegraph distortion.
721.33.12

32.12 **direct current transmission**

F: *transmission par courant continu*

S: *transmisi´on en corriente continua*

A form of transmission of telegraph signals where significant conditions are effected by the direct application of voltages supplied from direct current sources.

721.24.01

32.13 **single current transmission**

F: transmission par simple courant

S: transmisi´on a simple polaridad (por corriente simple)

Direct current transmission effected by applying voltages of the same polarity, producing currents of the same direction.
721.24.02

32.131 **on-off transmission**

F: transmission par tout ou rien

S: transmisi´on cerrado-abierto

A two-condition single current transmission where one significant condition is represented by applied zero voltage and no current in the circuit.
721.24.04

32.14 **double current transmission**

F: transmission par double courant

S: transmisi´on a doble polaridad (por corriente doble)

A form of two-condition direct current transmission effected by applying to a wire two voltages of opposite polarity, producing currents of opposite directions.
721.24.03

32.15 **closed-circuit working**

F: transmission par fermeture de circuit ou par envoi de courant

S: funcionamiento en circuito cerrado

Single-current transmission in which a current flows in the circuit while the transmitting device is at rest.

32.16 **open-circuit working**

F: transmission par ouverture (rupture) de circuit ou par interruption de courant (par batterie centrale)

S: funcionamiento en circuito abierto

Single-current transmission in which no current flows in the circuit while the transmitting device is at rest.

32.17 **simplex; half duplex** (deprecated)

F: simplex; à l'alternat; semi-duplex (d´econseill´e dans ce sens)

S: s´implex; semid´uplex (desaconsejado)

Designating or pertaining to a mode of operation or the equipment concerned, by which information can be transmitted in either direction but not simultaneously, between two points.
721.23.15

32.18 **duplex; full duplex** (deprecated)

F: *duplex; bilat´eral simultan´e*

S: *d´uplex; d´uplex completo* (desaconsejado)

Designating or pertaining to a mode of operation or the equipment concerned, by which information can be transmitted in both directions simultaneously between two points.

721.23.16

32.26 **unidirectional**

F: *unilatéral*

S: *unidireccional*

Pertaining to a link where the transfer of the user’s information can occur in one preassigned direction only.
721.23.21

32.28 **carrier transmission**

F: *transmission par courants porteurs*

S: *transmisión por portadoras*

A transmission in which the telegraph signals from a transmitter modulate an alternating current.
721.25.01

32.29 **amplitude modulation**

F: *modulation d’amplitude*

S: *modulación de amplitud*

In telegraphy, modulation in which the significant conditions are represented by alternating currents of different amplitude.
721.25.05

32.30 **frequency modulation**

F: *modulation de fréquence (ou modulation en fréquence)*

S: *modulación de frecuencia*

In telegraphy, modulation in which the significant conditions are represented by alternating currents of different frequency.

Note — The representative function of the modulation signal may be continuous or discontinuous at the significant instants.

32.301 **characteristic frequency**

Frequency corresponding to a significant condition.

32.302 **mean dynamic frequency**

In a FMVFT system the mean frequency at the modulator output when reversals are applied to its input.

32.303 **mean static frequency**

In a FMVFT channel the mean value of the actual characteristic frequencies of that channel.

32.304 **compensation for frequency drift**

Elimination of the effect of frequency drift on inherent telegraph distortion.

32.31 **frequency shift keying (FSK); frequency shift modulation**

F: modulation par d´eplacement de fr´equence; (MDF)

S: modulaci´on por desplazamiento de frecuencia (MDF)

Phase continuous frequency modulation in which the frequency of a periodic sinusoidal oscillation is varied between a set of discrete values, each value representing a significant condition of a modulating telegraph signal.

721.25.06

32.311 **telegraph discriminator**

F: discriminateur télégraphique

S: discriminador telegráfico

A device for converting frequency shift telegraphy signals into direct current transmission signals.
721.34.55

32.312 **phase shift keying (PSK); phase shift modulation**

F: modulation par déplacement de phase (MDP)

S: modulación por desplazamiento de fase

Telegraph transmission by phase modulation in which each change from one significant condition to another is characterized in steady-state by specified changes of phase of the oscillatory source or of the sinusoidal wave.
721.25.07

32.32 **frequency-exchange modulation; two tone modulation**

F: modulation par mutation de fréquences

S: modulación por cambios opuestos de frecuencia; modulación de dos frecuencias

A frequency modulation method in which the change from one frequency to another is not necessarily phase continuous.

32.34 **multiplex**

F: multiplex

S: múltiplex

Designating or pertaining to an installation in which a common transmission channel is divided into several separate channels each capable of transmitting signals independently in the same direction.
721.23.04

32.341 **multiplexing**

F: multiplexage

S: multiplexación; multiplexión

A process for combining signals from several separate tributary channels for transmission in the same direction over a common bearer channel.
721.23.05

32.3410 **tributary channel**

F: voie affluente

S: canal afluente

An individual input channel to a multiplexer.

32.3411 **branch line multiplex**

A multiplex whose capacity is a submultiple of that of a main multiplex and which gives the possibility to group a certain number of channels of the latter in order to extend or divert them into a specific direction with the aim, for example, to connect a small group of subscribers.

32.3412 **bearer**

Common means of transmission e.g. common channel or bit stream used for a multiplexer.

32.3413 **submultiplex**

A multiplex whose bearer is part of a higher-order multiplex.

32.3414 **equipped channel**

A channel having all the necessary equipment to enable usage in case of need.

32.3415 **allocated channel**

A channel used in forming a subscriber line, a link or a circuit.

32.3416 **hybrid multiplex**

A multiplex providing simultaneously transparent and non-transparent (code-and-speed independent and dependent) channels.

32.342 **demultiplexing**

F: d´emultiplexage

S: demultiplexaci´on; demultiplexi´on

A process applied to a multiplex signal for recovering signals combined within it and for restoring the distinct individual channels of these signals.
721.23.06

32.343 **multiplexer**

F: multiplexeur

S: multiplexor

An equipment which combines a number of tributary channels onto a fewer number of aggregate bearer channels, the relationship between the tributary and aggregate channels being fixed.
721.23.07

32.344 **demultiplexer**

F: d´emultiplexeur

S: demultiplexor

An equipment for effecting demultiplexing.
721.23.08

32.345 **muldex**

F: muldex

S: m´uldex

An equipment which combines/separates a number of tributary circuits onto/from a fewer number of aggregate bearer circuits, the relationship between the tributary and aggregate circuits being fixed.
721.23.09

32.3451 **muldex/concentrator**

A muldex with the line concentrating function ensuring that tributary channels are only allocated time slots in the aggregate bit stream for the duration of their seizure.

32.346 **homogeneous multiplex**

F: multiplex homog`ene

S: m´ultiplex homog´eneo

A multiplex in which all the individual channels are for the same modulation rate.

Note — In addition to the modulation rate it is sometimes necessary to define conditions for all channels such as the character length.

721.23.13

32.347 **heterogeneous multiplex**

F: multiplex h´et´erog`ene

S: m´ultiplex heterog´eneo

A multiplex in which all the individual channels are not for the same modulation rate or character rate, etc.

Note — For the signalling rate condition we can add additional conditions.
721.23.14

32.348 **homogeneous structure**

F: structure homog`ene

S: estructura homog´enea

Pertaining to a group of individual channels in a multiplex system all of which have the same properties, e.g. modulation rate, character format, inherent telegraph distortion.

32.349 **aggregate signal**

F: signal composite

S: señal global; señal compuesta; señal multiplexada

Signal transmitted over the common multiplex channel.
721.23.10

32.3491 **filling bit**

Bit with no specific meaning used to fill a time of communication during which there are no significant bits to be transmitted.

32.35 **time division multiplexing (TDM)**

F: multiplexage par r´epartition dans le temps (MRT); multiplexage temporel

S: multiplexaci´on por divisi´on en el tiempo (MDT); multiplexaci´on temporal; multiplexi´on temporal

Multiplexing in which a separate periodic time interval is allocated to each tributary channel in the common channel.
721.23.11

32.3502 **element [character] interleaving**

In a multichannel system with time division, the forming of a cycle containing one element [character] from each channel.

32.351 **frame**

F: trame

S: trama

A repetitive set of consecutive timeslots constituting a complete cycle of a signal in which the relative position of each timeslot in the cycle can be identified.

Example: In a time division multiplex system with a binary aggregate signal a frame is the smallest periodically repeated bit group containing bits from all individual channels together with bits carrying auxiliary information.
721.25.21

32.3511 **frame slot**

An elementary time interval generally allocated to tributary channel.

32.3512 **frame structure**

General rule of the establishment of a frame with allocation of each bit to a determined channel.

32.352 **subframe**

F: sous-trame

S: subtrama

A fixed number of time slots within a frame, which comply with the definition of a frame, but constitute a shorter cycle than the original frame.
721.25.22

32.353 **frame alignment**

F: verrouillage de trame

S: alineaci´on de trama

The state in which the frame generated by the receiving equipment has a desired constant phase relationship with the frame of the received signal, so that the individual timeslots in each frame can be uniquely identified.
721.25.23

32.354 **frame resynchronization**

F: resynchronisation de trame

S: resincronizaci´on de trama

The act of re-establishing lost frame alignment.

32.355 **synchronization bit**

F: bit de synchronisation

S: bit de sincronizaci´on; bit de sincronismo

A binary digit which is used for frame synchronization.
721.33.45

32.3551 **synchronization word**

Sequence of bits allocated to synchronization and appearing periodically in one or a fixed number of consecutive fundamental frames.

32.3552 **synchronization frame**

Sequence of a fixed number of consecutive fundamental frames containing one synchronization word.

32.356 **character-interleaved transmission**

F: *transmission multiplex à caract`eres entrelac´es*

S: *transmisi´on con entrelazado de caracteres*

Time-division multiplex telegraphy in which characters are transmitted sequentially on a common channel, the characters coming from each independent channel in turn without separation of the unit elements of each character.
721.33.27

32.357 **bit-interleaved transmission**

F: *transmission multiplex à moments entrelac´es*

S: *transmisi´on con entrelazado de bits*

Time-division multiplex telegraphy in which the signal elements of each character signal are transmitted on the common channel separated by signal elements belonging to other characters coming from different channels.

721.33.28

32.358 **character cycle**

F: cycle de caract`ere

S: ciclo de car´acter

The period in which each tributory channel of a time-division multiplex has completed one character in the common channel.
721.33.42

32.36 **frequency division multiplexing (FDM)**

F: multiplexage par r´epartition en fr´equence (MRF)

S: multiplexaci´on por divisi´on de frecuencia (MDF); multiplexi´on por divisi´on de frecuencia

Multiplexing in which a separate frequency band is allocated to each tributary channel in common channel.
721.23.12

32.37 **voice frequency telegraphy (VFT)**

F: t´el´egraphie harmonique; t´el´egraphie à fr´equences vocales

S: telegraf´ia arm´onica (TA)

Carrier telegraphy in which the frequency band of the modulated alternating current lies in the telephone frequency band.
721.33.22

32.371 **multi-channel voice-frequency telegraphy (MCVFT)**

F: t´el´egraphie harmonique

S: telegraf´ia arm´onica multicanal (TAMC)

A telegraph transmission within a telephone type channel using frequency-division multiplexing.
721.33.22

32.372 **single channel voice frequency telegraphy (SCVFT)**

F: t´el´egraphie harmonique à une voie

S: telegraf´ia arm´onica monocanal

Voice frequency telegraphy providing a single telegraph channel in a telephone type channel.

Note — The term SCVF is usually applied to a telegraph circuit (32.02) rather than to a telegraph channel (32.01).

32.373 **telephone-type channel**

F: voie de type t´el´ephonique

S: canal de tipo telef´onico

A transmission channel of characteristics suitable for the transmission of speech but which is used for the transmission of other signals.
721.23.01

32.374 **telephone-type circuit**

F: circuit de type téléphonique

S: circuito de tipo telefónico

A pair of associated telephone-type channels permitting transmission in both directions between two points.

721.23.02

32.38 **voice frequency multiplex aggregate**

F: *faisceau de t´el´egraphie harmonique*

S: *haz de circuitos de telegraf´ia arm´onica*

The set of voice-frequency multiplex telegraph circuits simultaneously accommodated in a telephone type channel.
721.33.23

32.49 **phantom circuit**

F: *circuit fant | me*

S: *circuito fantasma*

An additional circuit derived from the conductors of two metallic circuits, with the two conductors of each metallic circuit effectively being used in parallel.

Example: A telegraph circuit superposed on two telephone circuits.
721.24.06

32.50 **earth-return phantom circuit**

F: circuit appropri´e; circuit t´el´egraphique fant | me avec retour par la terre

S: *circuito fantasma con vuelta por tierra*

An additional circuit derived from the conductors of a metallic circuit, with these two conductors effectively being used in parallel, and with return through the earth or the sea between the end points.

Example: A telegraph circuit superposed on a telephone circuit, with earth-return.
721.24.07

32.51 **earth-return double phantom circuit**

F: (circuit) appropri´e de fant | me; (circuit) appropri´e de combin´e; circuit t´el´egraphique superfant | me avec retour par la terre

S: *circuito superfantasma con vuelta por tierra*

An additional earth-return circuit derived from two pairs of metallic conductors used in parallel.
721.24.08

32.52 **double phantom circuit**

F: *circuit superfant | me*

S: *circuito superfantasma*

An additional circuit derived from the conductors of two phantom circuits, with the four conductors of each phantom circuit effectively being used in parallel.
721.24.09

32.55 **interband telegraphy**

F: t´el´egraphie interbandes

S: telegraf´ia interbanda

A form of carrier transmission in which the telegraph channel is situated in a narrow band between two telephone channels.

721.25.14

32.56 **intraband transmission**

F: télégraphie intrabande

S: telegrafía intrabanda

A carrier telegraphy in a narrow band of frequencies appropriated inside the frequency band of a telephone channel to permit simultaneously a telephone transmission and a transmission by a discretely-timed signal.
721.25.15

32.57 **speech plus simplex (S + S) equipment**

F: équipement univocal

S: equipo telefonía más símplex; equipo T + S

Equipment for intraband telegraphy providing a simplex telegraph circuit by the use of a single telegraph carrier frequency.
721.25.16

32.58 **speech plus duplex (S + D) equipment**

F: équipement bivocal

S: equipo telefonía más dúplex; equipo T + D

Equipment for intraband telegraphy providing a duplex telegraph circuit by the use of two telegraph carrier frequencies.
721.25.17

32.61 **nominated reserved circuit**

F: circuit de secours (pour la télégraphie harmonique)

S: circuito de reserva especializado

A circuit, normally available for telephone traffic, which is allocated for the operation of a multi-channel telegraph system when the main, or primary, circuit becomes faulty.
721.33.15

32.631 **Baudot telegraphy**

F: télégraphie Baudot

S: telegrafía Baudot

Synchronous telegraphy, generally character interleaved telegraphy, using the International Telegraph Alphabet No. 1.
721.33.29

32.632 **Van Duuren radiotelegraph system; teleprinting over radio circuits (TOR)**

F: radiotélégraphie Van Duuren; TOR (teleprinting over radio circuits)

S: sistema de radiotelegrafía Van Duuren

A radiotelegraphy system with correction by repetition, in general time-division multiplex in two or four channels and using the Van Duuren code.

Note — The main characteristics are defined in Recommendation 342-2 of CCIR, Geneva 1982.

721.33.30

32.633 **signal repetition**

F: signal de r´ep´etition

S: señal de repetici´on

A function signal which is used in an error detecting and feedback system to request a repetition or to precede a retransmission.

Note — In the International Telegraph Alphabet No. 3 this signal corresponds to the code combination AZZAZAA.
721.27.35

32.634 **repetition cycle**

F: cycle de r´ep´etition

S: ciclo de repetici´on

A sequence of characters, the minimum number of which is determined by the loop time-delay of an error detecting and feed-back system. This delay is necessary to provide automatic repetition of information.
721.27.36

32.635 **RQ cycle; request cycle**

F: cycle RQ; cycle de demande

S: ciclo RQ; ciclo de petici´on

The repetition cycle requested in an error detecting and feedback system when a multilation is detected.

Note — See CCIR Recommendation 342-2.
721.27.37

32.636 **BQ cycle; response cycle**

F: cycle BQ; cycle de r´eponse

S: ciclo BQ; ciclo de respuesta

The repetition cycle transmitted in an error detecting and feedback system when signal repetition is received.

Note — See CCIR Recommendation 342-2.
721.27.38

32.637 **non-print cycle**

F: cycle sans impression

S: ciclo sin impresi´on

The operating time of a receiver in an error detecting and feedback system, initiated by the detection of a mutilation or by a signal repetition that has the same duration as a repetition cycle and during which all signals received are prevented from producing printing.

Note — See CCIR Recommendation 342-2.
721.27.39

32.638 **gated RQ**

F: pointage de RQ

S: punteado de RQ

A procedure in which a check is made for the presence of a signal repetition during the non-print cycle.

Note — See CCIR Recommendation 342-2.

721.27.40

32.639 **tested RQ**

F: *contr | le de RQ*

S: *control de RQ; prueba de RQ*

A procedure in which a check is made for the presence of a signal repetition and for the ratio of the number of elements A to the number of elements Z in each of the characters received after the signal repetition within the non-print cycle.

Note — See CCIR Recommendation 342-2.
721.27.41

32.640 **testing repetition cycle**

F: *cycle de r´ep´etition contr | l̆e*

S: *ciclo de repetici´on controlado*

A non-print cycle in which a check is made for the presence of a signal repetition and for the correct ratio of the number of elements A to the number of elements Z in all the characters received.

Note — See CCIR Recommendation 342-2.
721.27.42

33 SERIES — QUALITY OF TELEGRAPH TRANSMISSION

33.01 **perfect signal**

F: *signal parfait*

S: *señal perfecta*

A telegraph signal such that all the significant intervals are associated with correct significant conditions and conform accurately to their theoretical durations.
721.26.01

33.02 **ideal instant**

F: *instants id´eals*

S: *instante ideal*

The instant with which the significant instant (if existing) would coincide in certain conditions to be specified for each particular case.

Note — It will be necessary to indicate, in each particular case, how these ideal instants are determined.

a) *Start-stop signal*

The ideal instant associated with the start element is the instant at which this element begins. The ideal instant associated with each of the other elements is n times the theoretical unit interval later than the ideal instant of the start element of the same signal, n being the rank of this element in the signal.

The standardized unit interval should be taken as the theoretical unit interval. The interval corresponding to the real mean modulation rate can also be taken, provided that it is specified.

The instant corresponding to the beginning of the start element of a signal should be known as the reference ideal instant for this signal.

b) *Isochronous signal*

An ideal reference instant can be chosen arbitrarily. All the others are deduced from it by intervals equal to the corresponding theoretical significant intervals.

In the absence of any other deciding reason, the reference ideal instant shall be chosen so that the mean value of the deviations with respect to it is equal to zero.

721.26.02

33.03 **incorrect signal**

F: signal incorrect

S: señal incorrecta

A telegraph signal in which the significant conditions of one or more elements differ from the kind prescribed by the code.
721.26.04

33.04 **telegraph distortion; time distortion**

F: distorsion t´el´egraphique

S: distorsi´on telegr´afica

The undesired effect on a telegraph signal, when the significant instants do not coincide with the corresponding ideal instant.

Note — A telegraph signal suffers from telegraph distortion when the significant intervals have not all exactly their theoretical durations.
721.26.03

33.041 **transmitter distortion**

F: distorsion à l'´emission

S: distorsi´on en la emisi´on; distorsi´on en el emisor

The telegraph distorsion of a transmitter measured at the output under specified standard conditions.
721.26.19

33.06 **degree of individual distortion (of a particular significant instant)**

F: degr´e de distorsion individuelle (d'un instant significatif)

S: grado de distorsi´on individual (de un instante significativo determinado)

The ratio of the algebraic value of the displacement in time of a given significant instant from the corresponding ideal instant, to a specified unit interval.

Note 1 — By convention the displacement is considered positive when the significant instant occurs after the ideal instant, and conversely it is considered negative when it occurs before.

Note 2 — The degree of individual distortion is usually expressed as a percentage.
721.26.05

33.061 **early distortion**

Telegraph distortion characterized by the fact that a significant instant appears earlier than the corresponding ideal instant.

33.062 **late distortion**

Telegraph distortion characterized by the fact that a significant instant appears later than the corresponding ideal instant.

33.07 **degree of isochronous distortion**

F: *degr´e de distorsion isochrone*

S: *grado de distorsi´on is´ocrona*

1) Ratio of the maximum measured difference, irrespective of sign, between the actual and the theoretical intervals separating any two significant instants, these instants not necessarily being consecutive, to the mean unit interval.

2) The algebraic difference between the highest and the lowest value of the degree of individual distortion referred to the mean duration of the unit interval for the significant instants of an isochronous signal.

The degree of distortion is expressed as a percentage.

Note — The result of the measurement should be completed by an indication of the period, usually limited, of the observation. For a prolonged modulation (or restitution) it will be appropriate to consider the probability that an assigned value of the degree of distortion will be exceeded.
721.26.06

33.08 **degree of start-stop distortion**

F: degr´e de distorsion arythmique

S: grado de distorsi´on arr´itmica

1 In start-stop transmission the ratio of the maximum measured difference, irrespective of sign, between the actual and theoretical intervals separating any significant instant from the significant instant of the start element immediately preceding it, to the unit interval.

2 The highest absolute value of the degrees of individual distortion of the significant instants of a start-stop signal which is reached within a specified time interval.

The degree of distortion of a start-stop modulation, restitution or signal is usually expressed as a percentage.

Note 1 — The result of the measurement should be completed by an indication of the period, usually limited, of the observation. For a prolonged modulation (or restitution) it will be appropriate to consider the probability that an assigned value of the degree of distortion will be exceeded.

Note 2 — By convention the start-stop distortion may be considered positive when the significant instant occurs after the ideal instant and conversely, negative when it occurs before.
721.26.07

33.09 **degree of gross start-stop distortion**

F: degr´e de distorsion arythmique global

S: grado de distorsi´on arr´itmica global

The degree of start-stop distortion determined when the assumed unit interval is exactly that appropriate to the nominal modulation rate.

Note — By convention the gross start-stop distortion may be considered positive when the significant instant occurs after the ideal instant and conversely, negative when it occurs before.
721.26.08

33.10 **degree of synchronous start-stop distortion; degree of start-stop distortion at the actual mean modulation rate**

F: degr´e de distorsion arythmique au synchronisme ; *degr´e de distorsion arythmique à la rapidit´e r´eelle moyenne*

S: grado de distorsi´on arr´itmica en el sincronismo ; *grado de distorsi´on en el sincronismo a la velocidad media real de modulaci´on*

The degree of start-stop distortion determined when the assumed unit interval is that appropriate to the actual mean modulation rate.

Note 1 — In practice the degree of synchronous start-stop distortion is measured by adjusting the scanning rate of the distortion measuring set.

Note 2 — As for Definition No. 33.07.

Note 3 — For the determination of the actual mean modulation rate, account is only taken of those significant instants of modulation (or restitution) that correspond to a change of condition in the same sense as that occurring at the beginning of the start element.
721.26.09

33.12 **degree of standardized test distortion**

F: degr´e de distorsion d'essai normalis´e

S: grado de distorsi´on normalizado de prueba

The degree of individual distortion of the received signal measured during a specified period of time when the signal at the sending end is perfect and corresponds to a specified text.

721.26.10

33.13 **inherent distortion (of a transmission channel)**

F: *distorsion propre*

S: *distorsi´on propia (de un canal de transmisi´on)*

The telegraph distortion of a received signal at the output of a transmission channel when the signal at the input is a perfect signal.

Note 1 — The inherent distortion includes all the distortions produced in the channel such as bias distortion, characteristic distortion and fortuitous distortion.

Note 2 — The concept of inherent distortion can be extended to the constituents such as a telegraph relay, telegraph repeater or exchange.
721.26.11

33.14 **conventional degree of distortion**

F: *degr´e conventionnel de distorsion*

S: *grado convencional de distorsi´on*

The degree of individual distortion which has a very small assigned probability of being exceeded over a prolonged period of time.
721.26.17

33.15 **characteristic distortion**

F: *distorsion caract´eristique*

S: *distorsi´on caracter´istica*

The telegraph distortion caused by transients which are produced by the transmission of the signal in a transmission channel of specific characteristics.

Note — Characteristic distortion is a function of the form of the input signal.
721.26.14

33.151 **characteristic distortion compensation**

Suppression of characteristic distortion on signal restitution by shifting the decision level of this restitution in accordance with the preceeding sampling result.

33.16 **fortuitous distortion**

F: distorsion fortuite; [distorsion irr´eguli`ere]; [distorsion accidentelle]

S: *distorsi´on fortuita*

The telegraph distortion resulting from random events affecting the channel or equipments and such that the degree of individual distortion of any significant instant is unpredictable.
721.26.15

33.17 **bias distortion**

F: *distorsion biaise*

S: *distorsi´on asim´etrica*

The telegraph distortion effecting a two-condition telegraph signal when the mean degrees of individual distortion are different from the two directions of change-over.
721.26.12

33.18 **cyclic distortion**

F: *distorsion cyclique*

S: *distorsi´on c´iclica*

A telegraph distortion which is due to events having a periodic character such that the degrees of individual distortion themselves show a periodic character in the sequence of the significant instants.

721.26.16

33.181 **distortion metter**

Equipment for measuring telegraph distortion.

33.182 **distortion analyser**

Distortion meter for statistical measurements of the degree of individual distortion.

33.19 **element [character] error rate**

Ratio of the number of elements [characters] incorrectly received to the total number of elements [characters] correctly emmitted.

Note — In determining the quality of transmission it is possible to consider the probability of exceeding a given error rate.

33.23 **efficiency factor in time (of a transmission with automatic repetition for the correction of errors)**

F: facteur d'efficacit´e dans le temps (d'une transmission avec correction d'erreurs par r´ep´etition)

S: factor de eficacia (o eficacia) en el tiempo (de una transmisi´on con correcci´on de errores por repetici´on autom´atica)

Ratio of the time necessary to transmit a text automatically without repetition, at a specified modulation rate, to the time actually taken to receive the same text with error control by repetition for a given error rate.

Note — The actual conditions in which the measurement is made should be specified, in particular the duration of the measurement.
721.27.34

33.24 **mutilation**

F: mutilation

S: mutilaci´on

A defect such that a signal element becomes changed from one significant condition to another.
721.27.01

33.25 **regeneration**

Elimination of telegraph distortion.

33.251 **inherent regeneration**

Regeneration resulting from the method of switching or transmission.

33.252 **transfer delay**

Duration between the beginning of transmission and complete reception of a signal.

33.26 **controlling station (on a circuit)**

F: *station directrice (sur un circuit)*

S: *estaci´on directora (de un circuito)*

A station located on the circuit and having the responsibility for the quality of transmission on the circuit.

33.261 **system control station**

F: *station directrice (dans un syst`eme)*

S: *estaci´on directora de sistema*

A terminal station of a multichannel system which is responsible for maintenance and clearance of faults on the system.

721.52.56

33.27 **sub-control station**

F: station sous-directrice

S: estaci´on subdirectora

A station, located on the circuit, responsible to the controlling testing station, and having responsibility for the quality of transmission on the section of the circuit within its territory.

33.29 **test section**

F: section d'essais

S: secci´on de pruebas

The section of a channel that is contained between two stations having measuring equipment enabling tests of telegraph transmission to be made.

33.30 **loopback**

Connection of the forward channel with the corresponding backward channel to enable the observation on the backward channel of signals which have been emitted on the forward channel in order to check the quality of transmission.

33.31 **error correction by detection and repetition (ARQ)**

F: correction d'erreurs par d´etection et r´ep´etition (ARQ)

S: correcci´on de errores por detecci´on y repetici´on

Error correction using an error detecting code in which every mutilation discovered at the receiving end causes the sending to the transmitting end, over the return channel, of a function signal which orders the repetition of a fixed sequence of the last signals sent.
721.27.21

33.32 **precorrection**

F: pr´ecorrection

S: precorrecci´on

Application of an artificial telegraph distortion to signals at the sending end of a channel, in order to completely or partly compensate for the effect of the characteristic distortion of this channel.
721.27.43

33.33 **error detecting code**

F: code d´etecteur d'erreurs

S: c´odigo detector de errores

A redundant code in which the rules of construction are such that any error causing departures from this construction can be automatically detected.
721.27.27

33.35 **error correcting code**

F: *code de correction des erreurs*

S: *c´odigo corrector de errores*

An error detecting code which also permits the automatic correction of a proportion of the detected errors without using a backward channel.

721.27.28

33.57 **transmission plan**

In a telegraph network a set of limiting values of telegraph distortion and receiver margin compatible with the satisfactory transmission quality of the network.

SECTION 10

AVAILABILITY AND RELIABILITY OF INTERNATIONAL TELEGRAPH CIRCUITS

Recommendation R.150

AUTOMATIC PROTECTION SWITCHING OF DUAL DIVERSITY BEARERS

(Malaga-Torremolinos, 1984; amended at Melbourne, 1988)

The CCITT,

considering

(a) that Recommendation R.54 lays down a character error rate objective for telegraph communication;

(b) Recommendation M.201 concerning transmission path restoration for service protection;

(c) that the availability and reliability of international telegraph transmission may be improved by providing automatic protection switching of dual, diversely routed bearers to carry TDM aggregates conforming to Recommendation R.101;

(d) that the principle of automatic switching between dual diversity routed bearers may also apply to other telegraph channel multiplexers such as TDM systems conforming to Recommendation R.111 or frequency-modulated voice frequency telegraph (FMVFT) systems conforming to Recommendation R.35, etc.,

unanimously declares the following view

1 It may be desirable to take measures to protect the quality and availability of derived international telegraph channels against bearer breaks or degradation, for example:

i) where the bearer is prone to relatively frequent interruptions (for example, long-haul bearers in intercontinental relations), such that the provisions of Recommendation R.54 may not be met for a significant proportion of the time;

ii) where the number of derived telegraph channels carried on a given telephone-type circuit or other bearer becomes considerable (e.g. in excess of 50).

2 An effective method of counteracting bearer faults is the use of automatic protection switching between dual diversely routed bearers. In this technique, a pair of bearers with geographically diverse paths is selected (e.g. one cable, one satellite), ensuring a low probability of simultaneous outages of both bearers. At the sending end for each direction, the multiplexer aggregate or aggregates are connected to both bearers continuously. At the receiving end for each direction, facilities are provided to select automatically either of the two incoming aggregate signals, using as criteria loss of sync or frame alignment from the TDM or loss of line signal (FMVFT or TDM).

3 Annex A shows methods of implementing protection switching of telegraph bearers.

ANNEX A

(to Recommendation R.150)

Protection switching methods for telegraph aggregates

A.1 *System configurations*

A.1.1 Figures A-1/R.150 and A-2/R.150 illustrate simple applications of automatic protection switching between dual, diversely routed telegraph bearers. The aggregate output at each end is transmitted on both bearers continuously. At each end a Bearer Switchover Unit (BSU) automatically (and independently of action at the distant end) selects one of the incoming aggregates from the two bearers and feeds it to the multiplexer (TDM or FMVFT).

Figure A-1/R.150, p.

Figure A-2/R.150, p.

A.1.2 Two of the many further possible configurations using higher order digital multiplexers are shown in block form in Figures A-3/R.150 and A-4/R.150.

Figure A-3/R.150, p.

FIGURE A-4/R.150, p.

A.2 *Bearer routing*

For protection switching to be effective, every effort should be made to diversify the routing of the two bearers. On the international portion, one bearer might be carried by cable and the other by satellite for example. Common equipment needs to be avoided in both the international transmission systems and any relevant national extensions to them.

A.3 *Bearer switchover unit*

A.3.1 The BSU splits the multiplexer send path for simultaneous transmission on both bearers. In the case of TDM, the split will be made before or after the modems as required, i.e. the aggregate signal is split in either its digital or its analogue form.

A.3.2 The BSU monitors the appropriate circuit and equipment parameters on the receive path of both bearers. It switches the multiplexer aggregate input from one bearer to the other as follows:

The shortening of this delay for Recommendation R.111 TDM aggregates is for further study.

a) after a continuous period of between one and two seconds when there is:

— insufficient signal (where the BSU is in the analogue path) or loss of keying (where the BSU is in the digital path) on the currently selected bearer; and/or

— loss of local sync (Recommendation R.101) or frame alignment (Recommendation R.111) within the associated TDM;

Note — An optional third condition ‘‘the other bearer (the bearer not currently in use) has not been detected as faulty within the previous two seconds’’ is left for further study.

b) once a switchover has occurred, a further switchover due to bearer failure on the newly selected path shall be inhibited for a period of either 8 or 12 seconds and an alarm signal given.

A.3.3 When TDM systems are used, the BSU switches the received aggregate signal either in its digital or analogue form.

When switching the TDM aggregate in digital form, the following circuits must also be switched:

— received line signal detector (e.g. Recommendation V.24 circuit 109) if required by the TDM;

— receiver signal element timing (e.g. Recommendation V.24 circuit 115).

A.3.4 The logic controlling the above functions shall be designed to be secure, minimizing the risk of a BSU fault that could affect both bearer paths.

Advice from the distant TDM that it has lost sync or frame alignment will not of itself cause the BSU to switch over.