



HARMONIZED SYSTEM
COMMITTEE

-
26th Session
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NC0296E1
(+ Annexes I to III)
O. Eng.

Brussels, 18 September 2000.

CLASSIFICATION OF CERTAIN REPEATERS USED IN LAN SYSTEMS

(Item VII.14 on Agenda)

Reference documents :

40.464 (HSC/18)	42.047 (HSC/21)
41.125 (HSC/19)	42.100, Annexes H/8 and IJ/17 (HSC/21 - Report)
41.100, Annex H/8 (HSC/19 - Report)	42.449 (HSC/22)
41.309 (HSC/20)	42.750, Annex G/25 (HSC/22 - Report)
41.684 (HSC/20)	NC0250E2, Annex H/3 (HSC/25 - Report)
41.600, Annex F/16 (HSC/20 - Report)	

I. BACKGROUND

1. At its 25th Session, the Harmonized System Committee continued its examination of the classification of repeaters used in LAN systems or in telephone line systems.
2. After some discussion, the Committee decided to postpone further discussion of this item until the 26th Session. At that time, it would examine three repeaters – the LE605A-R3, LE624A and LE628A models.
3. Subsequent to this, on 26 June 2000, the Secretariat received a letter from the EC requesting that the Secretariat add the BNC/single-Mode fibre LE 630A or LE 629A to the list of repeaters to be examined at the 26th Session, as these repeaters send data up to 10 kilometres. Consequently, the Secretariat, in a letter dated 6 July 2000, advised Contracting Parties that the model BNC/single-Mode fibre LE 630A repeater would be added to the list.
4. At the 25th Session one delegate indicated that the Committee should remember that the classification of these repeaters should be examined in the light of ADP network standards and that these repeaters were used only in a LAN environment, and that the distance at which repeaters could operate was not relevant. Another delegate expressed the view that one of the criteria for classification should be the distance over which repeaters could operate.

File No. 2629

II. SECRETARIAT COMMENTS

5. In order to acquire the additional technical information requested by the Committee, the Secretariat contacted the manufacturer. This information is presented in tabular format in Annex II to this document. The Secretariat would advise the Committee that the manufacturer indicated that all the information presented in the table was relevant to each of the four repeaters at issue.
6. The manufacturer confirmed information that was previously discussed by the Committee; that is, Local Area Network (LAN) repeaters are specifically designed to operate within a Local Area Network and use specific protocols and electrical characteristics unique to a LAN system and not acceptable in a telephonic line system. LAN repeaters transmit LAN data by regenerating and retiming the complete data signal. When a collision of signals is detected at either port of the repeater, LAN repeaters generate the signals (jam pattern) that are sent to inform the other workstations that they must not transmit data. In the event that a LAN repeater is used in a non-LAN-type application, the fuses would break, thereby causing an incomplete signal.
7. Regarding the length of the transmission of each of the repeaters at issue, the Secretariat was given the following information :

Local Repeater :	Remote Fibreoptic Multimode Repeater :	Remote Single-Mode Fibre Repeaters :
LE605A-R3 - 186 metres	LE628A – 2 kilometres	LE630A – up to 20 kilometres
LE624A – 186 metres		

8. The Secretariat has reproduced, in Annex I to this document, the description of the product (LE605A-R3) first provided in Doc. 42.449. The manufacturer confirmed that this description was applicable to all four models under consideration. Consequently, the Secretariat has included this description in Annex I to this document for each of the models being examined. In addition, for the convenience of the Committee, the Secretariat has reproduced, in Annex III to this document, the Secretariat’s comments on the classification of repeaters found in Doc. 42.449.

III. CONCLUSION

9. The Committee is invited to rule on the classification of Black Box repeater model Nos. LE605A-R3, LE624A, LE628A and LE630A, taking into account the Secretariat’s comments in paragraphs 5 to 8 and the additional information contained in Annexes I to III to this document.

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Product 1

Local Repeater (LE605A-R3) for All Ethernet Media Types.

This apparatus is specially designed for Local Area Network (LAN) systems. It transmits LAN data by regenerating and retiming the complete data signal (full-signal). It has port connections for two Ethernet segments, which conform to the Standard for Ethernet LAN (IEEE 802.3) specifications for length and number of workstations connected to the LAN (nodes). It also generates the signals (jam pattern) that are sent to inform the other workstations that they must not transmit data, when a collision of signals is detected at either port of the repeater.

Product 2

Local Repeater (LE624A) for All Ethernet Media Types.

This apparatus is specially designed for Local Area Network (LAN) systems. It transmits LAN data by regenerating and retiming the complete data signal (full-signal). It has port connections for two Ethernet segments, which conform to the Standard for Ethernet LAN (IEEE 802.3) specifications for length and number of workstations connected to the LAN (nodes). It also generates the signals (jam pattern) that are sent to inform the other workstations that they must not transmit data, when a collision of signals is detected at either port of the repeater.

Product 3

Remote Fibreoptic Multimode Repeater (LE628A) for All Ethernet Media Types.

This apparatus is specially designed for Local Area Network (LAN) systems. It transmits LAN data by regenerating and retiming the complete data signal (full-signal). It has port connections for two Ethernet segments, which conform to the Standard for Ethernet LAN (IEEE 802.3) specifications for length and number of workstations connected to the LAN (nodes). It also generates the signals (jam pattern) that are sent to inform the other workstations that they must not transmit data, when a collision of signals is detected at either port of the repeater.

Product 4

Remote Single-mode Fibre Repeater (LE630A) for All Ethernet Media Types.

This apparatus is specially designed for Local Area Network (LAN) systems. It transmits LAN data by regenerating and retiming the complete data signal (full-signal). It has port connections for two Ethernet segments, which conform to the Standard for Ethernet LAN (IEEE 802.3) specifications for length and number of workstations connected to the LAN (nodes). It also generates the signals (jam pattern) that are sent to inform the other workstations that they must not transmit data, when a collision of signals is detected at either port of the repeater.

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TECHNICAL CHARACTERISTICS
FOR LAN AND TELEPHONIC LINE REPEATERS

LAN REPEATERS	TELEPHONIC LINE REPEATERS
Electrical Pulse	Electrical Pulse
Digital	Analog - Typical application
	Digital - If using an ISDN (Integrated Services Digital Network) line
Requires a modem, Transmit Service Unit (TSU) or Data Service Unit (DSU) to go outside the LAN system	Outside the LAN system
5 volts maximum	50 volts (Belgacom)
Frequency - 22,000 - 44,000 hertz	Frequency - 11,000 Hertz
Impedance 100 ohm	Impedance 500 to 600 ohm
Electric current	Electric current
Bandwidth 10 megabits	Bandwidth 64 Kbytes
Signal regeneration and retiming. No amplification	Signal amplification and regeneration
Connectors - uses common telephone connectors, e.g., RJ-45 (8-lines) but system operates at maximum 5 volts. It has 4 transmit/receive wires (part of the IEEE specs)	Connectors - Common telephone connectors, system runs at 50 volts (Belgacom). It has 1 transmit/receive wire.
Distributed computing system (many to one or one to many end points)	Point to point connection (one to one end points)
Private network - limited to site, building, campus	Public network - Public Switched Telephone Network (PSTN)
PEPT (a Belgian regulatory body) approval not required	PEPT (a Belgian regulatory body) approval compulsory
Packetized data	Continuous signal string
4 transmit/receive wires	1 transmit/receive wire

* Information supplied by Black Box Network Services, manufacturer of the four repeaters being examined by the Committee. Black Box is located in Brussels, Belgium.

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Excerpt from Doc. 42.449

III. SECRETARIAT COMMENTS

7. The "Dictionary of Information Technology and Computer Science" defines repeaters as follows : "A piece of equipment used to continue or extend a transmission line. It reconstructs and amplifies signals received from one part of the line, removing noise and distortion, then retransmits them on the other part. Repeaters are used at intervals in long-distance telephone lines, and can also be used to extend the length of a local area network or to increase the number of devices that can be connected to it. In terms of the OSI reference model, repeaters operate at level 1, the physical layer." (See paragraph 4, Doc. 41.684)
8. For the classification of the apparatus at issue, it appears that two headings merit consideration, namely headings 84.71 and 85.17 (or, if not, 85.43).
9. Since the apparatus at issue is used for a LAN System, it can be connected to a central processing unit and can accept or deliver data in a form which can be used by the system : therefore, it meets the conditions set out in Note 5 (B) to Chapter 84. Consequently, the apparatus is classifiable in heading 84.71 provided that it is not excluded from that heading by virtue of Part (E) of that Note.
10. According to Note 5 (E) to Chapter 84, apparatus which have a specific function other than data processing are to be classified in the headings appropriate to their functions or, failing that, in residual headings. Therefore, the question is whether the repeater at issue performs a specific function other than data processing.
11. In the Explanatory Note to heading 84.71, page 1402, Part (I), first paragraph, data processing is described as follows : "Data processing consists in handling information of all kinds, in pre-established logical sequences and for a specific purpose or purposes". The function of the repeater is to receive and retransmit LAN data for extending the LAN or increasing the number of devices that can be connected to it. This function, performed by regenerating and retiming the complete data signal (full-signal), is designed to conform to the Standard for Ethernet LANs (IEEE 802.3). As the repeater undoubtedly incorporates a processor and has a pre-established logical sequence (programme) for the purposes of regenerating and retiming the received signals, attenuated and distorted under transmission, to their original form, it would appear that the function performed by the repeater can be regarded as data processing.
12. On the other hand, it could also be argued that data processing only covers operations in which original data are transformed into new data, which would mean that the contents of original data and new data should not be the same. In other words, the repeater, which simply regenerates attenuated and distorted signals into their original forms and does not create new data, should not be regarded as performing the function of data processing but the function of the transmission and reception of data (i.e., communication). If the Committee takes this view, the repeater would have to be excluded from heading 84.71. In this case, its classification should be either in heading 85.17 if this heading can be taken to cover not only telecommunication apparatus used in telephone or telegraph line systems but also those used in LAN or, otherwise, in heading 85.43. It should be noted, however, that

the legal texts and the Explanatory Notes (e.g., page 1402, Part (I), first paragraph) do not clearly support this narrow interpretation of the term “data processing” (see the first sentence of this paragraph).

13. It could also be argued that the generating of a jam pattern constitutes an electric function which is neither that of repeaters used in line telephony telecommunication systems (i.e., amplifying) nor that of units of automatic data processing machines (i.e., data processing). Classification of the repeater in heading 85.43 could then be considered. It should be noted, however, that since this generating of a jam pattern cannot be regarded as the principal function of the repeater (cf. Note 3 to Section XVI), it does not seem to affect the classification of the repeater discussed in the preceding two paragraphs.
14. In order to facilitate the correct understanding of this issue, it might prove useful to compare the repeater with printers which are classified in heading 84.71 by virtue of Note 5 (B) and (D) to Chapter 84.
15. For obvious reasons printers of heading 84.71 incorporate a processor and have a programme for the purposes of printing characters, etc. If the central processing unit transmits the numerical data which are in binary codes (e.g., 0101) to the printer, the printer prints out the data in decimal code (i.e., “5”, which corresponds to “0101”). In this process, the form of data is changed from binary code to decimal code but the content of the data is the same. According to Note 5 (D) to Chapter 84, printers are classifiable in heading 84.71 if they satisfy the conditions of Note 5 (B) (b) and (c) to Chapter 84; therefore, the processing described above must be regarded as the data processing within the meaning of heading 84.71. This idea also applies similarly to storage units, display units, etc. Those output, input or storage units themselves do not change the content of data or do not create new data but nevertheless perform part of the data processing function of the ADP system. Given that the processing performed by the printers, etc. do not change the content of the data but perform part of the data processing function of ADP systems, the function performed by repeaters should, by way of analogy, be considered similar to that of printers, etc. and should therefore be regarded as performing part of the data processing function of ADP systems. If the Committee agrees with this view, classification of the repeater at issue in heading 84.71 would be justified.
16. In addition, the very fact that the repeater at issue is used as part of an ADP system configured in a LAN system would also support its classification in heading 84.71.