WLAN ADSL router with SIP voice port

Technical specifications
(2005-12-02)

Version: 2.3

Contents

1. GENERAL REQUIREMENTS

1.1. General Features

{I.1.1.1.} The following technical document will describe the requirements for a wireless broadband router with voice gateway using SIP protocol.

{M.1.1.2.} The device shall have 2 voice ports.

{M.1.1.3.} The connector type of the voice gateway interface shall be RJ11.

{M.1.1.4.} The device shall have 4 LAN ports.

{M.1.1.5.} The equipment must operate from 230 V nominal voltage, 50 Hz nominal frequency, one phase AC. The power supply interface of the equipment supplied with 230 V nominal AC must satisfy the following requirements stipulated in the Standard ETS 300 132-1.

1.2. Structural and fire proofing requirements

{Q.1.2.1.} The Bidder shall specify the environmental conditions of the offered device during operation.

1.3. Documentations, software

{M.1.3.1.} Detailed technical descriptions shall be attached for offered device and by Bidder.

{M.1.3.2.} Detailed hardware installation manual shall be attached for all offered device by Bidder.

{M.1.3.3.} Detailed software configuration manual shall be attached for all offered device by Bidder.

{M.1.3.4.} The Bidder shall provide the appropriate driver and utility to use the device with PCs running Windows 2000 and Windows XP. All these OSs shall be supported.

{R.1.3.5.} The Bidder shall provide the appropriate driver and utility to use the device with PCs running Windows 98SE, Windows NT 4.0, Windows Me. All these OSs shall be supported.

1.4. Other

{M.1.4.1.} The Bidder shall fill in the "Compliance statement" and "Reference in the documentation" columns at least in case of M(andatory) requirement with appropriate data.

{I.1.4.2.} Missing to fill the column mentioned in the above point or the information supplied is incorrect the device of the Bidder will be excluded from the tendering process.

{M.1.4.3.} The Bidder shall provide two pieces of the device offered if invited by the Purchasing Directorate to test its devices.

{M.1.4.4.} The Bidder accepts that one of the two devices introduced for testing will be given back to the Bidder, while the other will be kept on stock free of charge at Magyar Telekom Ltd. PKI-FI with all the appropriate drivers, utilities and all the official Hungarian documentation and original English documentation for the duration the device is manufactured and supplier support provided.

{M.1.4.5.} If the Bidder changes any software (firmware, driver or utility) or documentation part, the Bidder provide the changes on CD/DVD free of charge to Magyar Telekom Ltd. PKI-FI.

{Q.1.4.6.} Driver version of the device offered for testing.

{Q.1.4.7.} Firmware version of the device offered for testing.

{Q.1.4.8.} Hardware version of the device offered for testing.

2. VOICE GATEWAY REQUIREMENTS

2.1. Signaling

{M.2.1.1.} The SIP interface has to be use rfc 3261v2.

{M.2.1.2.} The device has to support STUN as Nat Traversal method.

{M.2.1.3.} The device has to be able to use outbound SIP proxy.

{M.2.1.4.} The device has to be able to handle voice with priority against other other packages.

{R.2.1.5.} The device shall use DNS SRV.

{R.2.1.6.} The device shall use 2 different SIP proxy.

{M.2.1.7.} The device has to be able to send DTMF signals at least with the following methods: inband, RFC2833 and SIP INFO.

2.2. Voice

{M.2.2.1.} In the device has to be implemented following voice codecs: G.711A, G.711u, G.729a

{M.2.2.2.} The priority of the voice codecs must be configurable.

{R.2.2.3.} The device shall support optional following voice codecs iLBC, GSM, G.723.1

{R.2.2.4.} The device shall support AEC (Acoustic Echo Canceller).

{R.2.2.5.} The device shall support VAD (Voice Activity Detection) and has to be able to generate CNG (Comfort Noise Generation).

{R.2.2.6.} The device shall support adaptive jitter buffer to reach better audio quality.

2.3. Fax

{R.2.3.1.} The device shall detect voice, and in case of a fax call the device has to be able to switch on G.711a codec (fax pass through).

2.4. Programing

{M.2.4.1.} The SIP proxy address has to be configurable with IP Address and with FDQN.

{M.2.4.2.} The SIP proxy port number has to be configurable.

{M.2.4.3.} The RTP port range has to be configurable.

{M.2.4.4.} The SIP username field can optional characters.

{M.2.4.5.} The SIP username field length has to be at least 25 characters.

{M.2.4.6.} The SIP password field shall contain arbitrary ASCII characters

{M.2.4.7.} The length of the password field shall be at least 25 characters.

{R.2.4.8.} The device shall be able to make a configuration backup in a file.

{R.2.4.9.} The device shall support to generate a unique dial plan.

{M. 2.4.10.} The SIP registration expiration time parameter has to be configurable.

2.5. Requirements of analogue port

2.5.1. Physical Parameters of Line Interface

{M.2.5.1.1.} The analogue line interface shall have 2-wire connection. The type of the connector socket shall be RJ11, with „a”-wire on contact point no. 3 and „b”-wire on contact point no. 4.

{M.2.5.1.2.} Characteristics of the connecting subscriber loop:

- min. loop resistance range (including terminal equipment): 0 – 600 ohm
- permitted leak resistance between any leads or any lead and ground: 50 kohm
- permitted capacitance between the leads withouth terminal connected: 0,1 µF

{M.2.5.1.3.} Loop current range in case of closed loop: 20 - 40 mA.

{M.2.5.1.4.} The subscriber loop shall be considered to be opened if the line current is: ≤ 5 mA.

{M.2.5.1.5.} The subscriber loop shall be considered to be closed if the line current is: ≥ 16 mA.

{M.2.5.1.6.} The subscriber line interface unit shall be balanced. The asymmetry of the feeding bridge must be less than 1 % .

2.5.2. Subscriber line signalling

{M.2.5.2.1.} If the line loop being in idle state is closed for a time period longer than 250 ms, it shall be considered as a call initiation.

{M.2.5.2.2.} A loop interruption longer than 250 ms is to be considered as a non-hook state signal.

{M.2.5.2.3.} In conversation state short interruptions of the loop up to 40 ms must not cause any malfunction int he operation.

{M.2.5.2.4.} In call initiation state the device shall be capable to receive digits sent by DTMF signals with the following parameters:

- Nominal frequency of DTMF signals: az ITU-T Q.23 ajánlása szerint
- frequency tolerance: ±1.5 % ±2 Hz
- level range of composing signals: -4 dBm ,,,-21 dBm
- maximal difference between the levels of the two groups: ±4 dB
- minimum signal duration: 40 ms
- minimum pause duration: 40 ms

{R.2.5.2.5.} In call initiation state the device shall be capable to receive digits sent by dial pulses with the following parameters:

- break/make ratio: 1,7:1 - 2,3:1
- pulse length: 60 – 120 ms
- minimum interdigit pause 350 ms
- the number of break pulses of each series transmitted shall correspond to the value of the digits 1 to 9 and 10 for the digit „0".

{M.2.5.2.6.} In conversation state the loop interruption of 90 ms ± 40 ms shall be detected and considered as a Flash signal.

{M.2.5.2.7.} Paremeters of the ringing signal:

- ringing frequency: 25 Hz ± 5 %
- level (measured on 600 ohm + 3 µF): ≥ 40 Vrms
- non-linear distortion: ≤ 20%

{R.2.5.2.8.} Cadence of ringing signal

- signal duration: 1250 ms ± 10%
- pause duration: 3750 ms ± 10%

{R.2.5.2.9.} Ringing cadence for Waiting calls

- signal duration: 400 ms ± 10%
- pause duration: 200 ms ± 10%

{M.2.5.2.10.} Ringing signal trip delay: ≤150 ms

{M.2.5.2.11.} The analoque line interface shall provide Calling Line Presentation (CLIP) service specified in CCS2011 1/ 2 MATÁV specification based on ETSI standard EN 300 659-1/-2.

{R.2.5.2.12.} The analoque line interface shall provide CLIP on Call Waiting service specified in CCS2011 1/ 2 MATÁV specification based on ETSI standard EN 300 659-1/-2.

{R.2.5.2.13.} The analoque line interface shall provide Message Waiting Indication service specified in CCS2011 1/ 2 MATÁV specification based on ETSI standard EN 300 659-1/-2.

2.5.3. Tones

{R.2.5.3.1.} Dial Tone

- frequency: 425 Hz ± 5 Hz
- level: -10 dBm ± 2 dB
- non-linear distortion: < 5 %
- cadence: continuous
- 1st digit delay time: 15 s – 20 s

{R.2.5.3.2.} Ringing Tone

- frequency: 425 Hz ± 5 Hz
- level: -10 dBm ± 2 dB
- non-linear distortion: < 5 %
- cadence (signal / pause): 1250 ms / 3750 ms ± 10 %

{R.2.5.3.3.} Busy / Congestion Tone

- frequency: 425 Hz ± 5 Hz
- level: -10 dBm ± 2 dB
- non-linear distortion: < 5 %
- cadence (signal / pause): 300 ms / 300 ms ± 10 %

{R.2.5.3.4.} „Network unavailable" Tone

- definition: indicates, that the IP network is unavailable.
- - frequency: 425 Hz ± 5 Hz
- - level: -10 dBm ± 2 dB
- - non-linear distortion: < 5 %
- - cadence (signal / pause): 200 ms / 200 ms ± 20 %

{R.2.5.3.5.} „Call Wating" Tone

- frequency: 425 Hz ± 5 Hz
- level: -10 dBm ± 2 dB
- non-linear distortion: < 5 %
- cadence (signal / pause): 40 ms / 1960 ms ± 20 %

{R.2.5.3.6.} Special Dial Tone

- frequency: f1+f2+f3
- where f1 = 350 Hz ± 5 Hz

	f2 = f1 + (25 Hz ± 2 Hz) f3 = f1 + (50 Hz ± 2 Hz)
▪ level (for each components):	-15 dBm ± 2 dB
▪ cadence :	continuous
▪ duration:	15 s – 20 s

2.5.4. Transmission Characteristics

{R.2.5.4.1.} Relative leve lat the subscriber's side

▪ transmit level:	0 dBr
▪ receiving level:	-7 dBr

{R.2.5.4.2.} Nominal input impedance for the analouge interface: 600 ohm

{R.2.5.4.3.} Nominal impedance of the balance network: 600 ohm

{R.2.5.4.4.} The specification for the voice frequency characteristics shall correspond to ITU-T G.712 (11/2001) Recommendation.

2.6. Status report

{M. 2.6.1.} The device has to be able to show real-time the SIP registration status of the voice gw. (registered/not registered.)

3. WLAN + DSL ROUTER

3.1. Introduction

{I. 3.1.1.} The scope of this document is to specify the main requirements against the device described below in detail.

{I. 3.1.2.} The WLAN system has two main components, the Access Point and the Stations.

{I. 3.1.3.} The Access Point shall translate data transmitted between wireless and wired media and physically connected to a wired network. The data consist of Ethernet frames. The Access Point provides one (central) end of the radio connection.

{I. 3.1.4.} The Station is located in or connected to a mobile device, such as notebook, PDA, Internet Camera, etc. The Station provides the other (client) end of the radio connection.

{I. 3.1.5.} The subject of the specification is a DSL router which automatically logs into the ADSL service and makes possible to use the WAN connection for several users simultaneously on its LAN interfaces involving an embedded IEEE 802.11b and IEEE 802.11g compliant Access Point, referred as device in this document. The device refers to the Access Point part in the Wireless section and to the other parts in the wired section.

3.2. General requirements

3.2.1. Wireless system of the device

3.2.1.1. General requirements of the device

{I. 3.2.1.1.1.} Wi-Fi Certification assures tested and proven interoperability among wireless computer equipment; this certification gives consumers and business buyers confidence that wireless LAN products bearing the Wi-Fi logo have passed rigorous interoperability certification requirements. Such Wi-Fi products include PCMCIA Cards for notebooks, PCI Cards for desktops, USB modules, embedded Stations in different electronic equipment and wireless base stations like access points and gateways. Wi-Fi CERTIFIED products support a maximum data rate of either 11 Mb/s (802.11b), 54 Mb/s (802.11a) or 54 Mb/s (802.11g).

{M. 3.2.1.1.2.} The device shall have Wi-Fi certification and the Bidder shall submit a copy of the certification.

3.2.1.2. Data rate

{R. 3.2.1.2.1.} The device shall provide the ability to set radio data rate to operate at. Data rates available shall be according to IEEE 802.11b and IEEE 802.11g.

3.2.1.3. Performance

{M.3.2.1.3.1.} Access Point shall provide ability to manually set the channel to operate.

{R.3.2.1.3.2.} Access Point shall provide ability to automatically select channel to operate.

{M.3.2.1.3.3.} The device's radio module's operating frequency range and number of operating channels shall conform to IEEE 802.11b standard with regard to the ETSI regulatory domain specific requirements.

{M.3.2.1.3.4.} The device's radio module's operating frequency range and number of operating channels shall conform to IEEE 802.11g standard with regard to the ETSI regulatory domain specific requirements.

{Q.3.2.1.3.5.} The Bidder shall specify the receiver sensitivity for each data rate of the device tested by 3rd party organisation.

{Q.3.2.1.3.6.} The Bidder shall specify the maximum output power of the device tested by 3rd party organization.

{M.3.2.1.3.7.} The maximum effective isotrop radiated power (EIRP) of the radio system of the device (including antenna cable, and antenna if included) shall comply with ETS 300-328,

{Q.3.2.1.3.8.} The Bidder shall provide a the receiver sensitivity for the corresponding BER value for each data rate.

3.2.1.4. Network interfaces

{M.3.2.1.4.1.} The physical layer (layer 1) parameters shall conform to IEEE 802.11 (Local and Metropolitan Area Network Standard, 802.11 Wireless LAN Medium Access Control (MAC) and Physical Layer (PHY) Specifications, ANSI/IEEE Standard, 1999) standard.

{M.3.2.1.4.2.} The physical layer (layer 1) parameters shall conform to IEEE 802.11b (Local and Metropolitan Area Network Standard, Higher speed Physical Layer (PHY) extension in the 2.4 GHz band, ANSI/IEEE Standard, 1999) standard.

{M.3.2.1.4.3.} The physical layer (layer 1) parameters shall conform to IEEE 802.11g radio module is offered the module's operating frequency range and number of operating channels shall conform to IEEE 802.11g (Local and Metropolitan Area Network Standard, 802.11 Wireless LAN Medium Access Control (MAC) and Physical Layer (PHY) Specifications: Amendment 4: Further Higher Data Rate Extension in the 2.4 GHz Band, IEEE Standard, 2003) standard.

{M.3.2.1.4.4.} The data link layer (layer 2) parameters shall conform to IEEE 802.2 (IEEE 802.2. Local Area Networks Standard, 802.2 Logical Link Control. ANSI/IEEE Standard, October 1985) and IEEE 802.3 (Local Area Networks Standard, 802.3 Carrier Sense Multiple Access with Collision Detection. ANSI/IEEE Standard, October 1985) standards.

3.2.1.5. Wireless security

{M.3.2.1.5.1.} The device shall provide capability to modify its SSID.

{I.3.2.1.5.2.} An Access Point works in open system mode, when it broadcast its SSID to collect Stations. An Access Point works in closed system mode, when it does not broadcast its SSID, but receives Association requests from Stations having the right SSID.

{M.3.2.1.5.3.} The device shall provide setting to open system mode operation.

{R.3.2.1.5.4.} The device shall provide setting to closed system mode operation.

{M.3.2.1.5.5.} The device shall have the ability to use static 40 bit WEP key.

{M.3.2.1.5.6.} The device shall have the ability to use static 128 bit WEP key.

{M.3.2.1.5.7.} The device shall have the capability to set 4 different WEP key for 64 bit (40 bit long key to submit) and 128 bit (104 bit long key to submit) settings.

{R.3.2.1.5.8.} The device shall provide capability to operate as Authenticator according to IEEE 802.1x ((Local and Metropolitan Area Network Standard, Port-Based Network Access Control, IEEE Standard, 2001)) standard.

{Q.3.2.1.5.9.} The Bidder shall specify all the supported security features of the offered device not required in this specification.

3.2.2. the Wired system of the device

3.2.2.1. Network Interfaces

3.2.2.1.1. Ethernet interface

{M.3.2.2.1.1.1.} The device shall support Ethernet interface towards the LAN and WAN network.

{R.3.2.2.1.1.2.} The device shall support Fast Ethernet interface towards the LAN and WAN network.

3.2.2.1.2. Ethernet (10BaseT) and/or Fast Ethernet (100BaseTX) interface

{M. 3.2.2.1.2.1.} The physical layer (layer 1) parameters of each port shall conform to IEEE 802.3 (Local Area Networks Standard, 802.3 Carrier Sense Multiple Access with Collision Detection. ANSI/IEEE Standard, October 1985) standard.

{M. 3.2.2.1.2.2.} The data link layer (layer 2) parameters of each port shall conform to IEEE 802.2 (IEEE 802.2 Local Area Networks Standard, 802.2 Logical Link Control. ANSI/IEEE Standard, October 1985) and IEEE 802.3 (Local Area Networks Standard, 802.3 Carrier Sense Multiple Access with Collision Detection. ANSI/IEEE Standard, October 1985) standards.

3.2.2.1.3. Mode and speed of operation

{M.3.2.2.1.3.1.} The half or full duplex operation of each port shall be supported acccording to to IEEE 802.3 (Local Area The half or full duplex operation shall be supported acccording to to IEEE 802.3 (Local Area Networks Standard, 802.3 Carrier Sense Multiple Access with Collision Detection. ANSI/IEEE Standard, October 1985) standard.

{M.3.2.2.1.3.2.} The mode of operation of each port shall be manually set and Auto-Negotiated conforming to IEEE 802.3 (Local Area Networks Standard, 802.3 Carrier Sense Multiple Access with Collision Detection. ANSI/IEEE Standard, October 1985) standard.

3.2.2.2. Connectors

{M.3.2.2.2.1.} The connector must be RJ45 female and shall conform to MSZ EN 60603-7:2000 (Nyomtatott áramköri csatlakozók 3 MHz alatti frekvenciákra. 7. rész:Ellenőrzött minőségű, 8 sarkú, közös csatlakozási jellegű, helyhez kötött és függő csatlakozók termékelőírása /IEC 603-7:1990/) standard.

{I.3.2.2.2.2.} The wired port of the Access Points connected to the embedded hub/switch is handled in this document as one internal (i.e. not external) LAN port.

{M.3.2.2.2.3.} The device shall have a WAN port to connect to the ADSL NT.

3.2.3. IP level settings

{M.3.2.3.1.} The device shall have default static IP address on its LAN interface.

{M.3.2.3.2.} The device shall have the functionality to PPPoE dial in and to get IP address on its WAN interface.

{R.3.2.3.3.} The device shall have the functionality to store user name and password used for PPPoE dial in.

{R.3.2.3.4.} The device shall have the functionality to set static IP address on its WAN interface.

{M.3.2.3.5.} The device shall have the functionality to get dynamic IP address (from DHCP) on its LAN (including WLAN) interface.

{M.3.2.3.6.} The device shall provide functionality to specify DHCP pool to allocate IP address from.

{R.3.2.3.7.} The device shall provide functionality to define static IP address on devices located on the LAN ports

{R.3.2.3.8.} The device shall provide means to enable the usage of VPN pass through for IPSec usage through its WAN and (W)LAN interfaces.

{M.3.2.3.9.} The device shall be able to be configured as a virtual server so that from WAN side accessing the device for HTTP services via its WAN IP address can be automatically edirected to local server running HTTP server in the LAN. (eg. for accessing the camera)

3.2.4. Firewall

{M.3.2.4.1.} The device shall provide capability to apply filtering between WAN and LAN interfaces based on the MAC address of the clients on the LAN side for at least the WLAN stations connected.

{R.3.2.4.2.} The device shall provide capability to apply filtering between WAN and LAN interfaces to data traffic based on protocols.

{R.3.2.4.3.} The device shall provide capability to apply filtering for clients accessing via WLAN interface.

{R.3.2.4.4.} The device shall provide control for LAN clients to access outside (WAN) IP addresses, IP ports.

{R.3.2.4.5.} The device shall provide capability to apply filtering based on URL requested by the LAN clients.

{R.3.2.4.6.} The device shall have setting to enable the discard of ping response on WAN side.

{R.3.2.4.7.} The device shall have DMZ capability.

3.2.5. Router functions

{R.3.2.5.1.} The device shall have static routing capabilities.

{R.3.2.5.2.} The device shall have RIPv1 dynamic routing capabilities.

{R.3.2.5.3.} The device shall have RIPv2 dynamic routing capabilities.

3.2.6. Management

{M.3.2.6.1.} The device shall have functionality to manage its configuration through standard web browser.

{M.3.2.6.2.} The device shall provide means to check the credentials before allowing access to its configuration area.

{R.3.2.6.3.} The device shall have functionality to manage its configuration through standard web browser using SSL certificate to increase security.

{R.3.2.6.4.} The device shall have functionality to save and load its configuration to/from a storage media.

{R.3.2.6.5.} The device shall have functionality to upgrade its firmware both by loading a single file and via the standard TFTP protocol.

{M.3.2.6.6.} The device shall have means to query its dynamically allocated address on the uplink interface.

{M.3.2.6.7.} The device shall provide status infromation about the network connection

{R.3.2.6.8.} The device shall be able to generate syslog information to a configured server.

4. ENVIRONMENTAL REQUIREMENTS

4.1. Environmental Features

{I.4.1.1.} The classification of the groups and their strictness of environmental features shall be IEC 721-3, where their domesticated versions are the Standard serials MSZ IEC 721-3 and the MSZ EN 60721-3.

4.2. Storage

{R.4.2.1.} The storage is envisaged in weather protected location, however, neither temperature nor humidity control will be provided.
The equipment shall comply with the standard MSZ ETS 300 019-1-1:1996 Class 1.2. (Weather protected, not temperature-controlled storage location). This specification is a combination of classes 1K4/1Z2/1Z3/1Z5/1B2/1C2/1S3/1M2 in MSZ IEC Publication 721-3-1 .
Temperature range: -25....+55 °C
Relative humidity: 10...100 %

4.3. Transportation

{R.4.3.1.} The transportation is considered to be normal public transportation, where no special precautions have been taken.
The equipment shall comply with the standard MSZ ETS 300 019-1-2 Class 2.3. (Public transportation)
This specification is a combination of classes 2K4/2B2/2C2/2S2/2M2(2M3) in MSZ IEC Publication 721-3-2.
Temperature range: -40...+70 °C
Relative humidity: 10...100 % (combined with rapid changes in the temperature)

4.4. Operation

4.4.1. Operation of equipment

{R.4.4.1.1.} The equipment are supposed to be indoor equipment which are placed at the subscribers. There is no risk of biological attacks and the equipment are exposed to normal urban air pollution and insignificant vibration and shock.
The indoor equipment shall comply with the standard MSZ ETS 300 019-1-3, Class 3.2. (Partly temperature controlled location) which is a combination of classes 3K5/3Z2/3Z4/3B2/3C2(3C1)/3S3/3M2 of the Standard MSZ EN 60721-3-3.
Specified temperature limits: -5....+45 °C
Relative humidity: 5....95 %

4.4.2. Test conditions

{R.4.4.2.1.} The environmental resistance tests shall be carried out in accordance with the relevant parts of MSZ ETS 300 019-2.

5. ENVIRONMENTAL PROTECTION REQUIREMENTS

{M.5.1.} Offered equipment shall not contain components, materials and fittings that cause negative environmental impact during transportation, storage or operation.

{M.5.2.} The equipment should be provided in accordance with the Directive 2002/95/EC of the European Parliament and of the Council on the restriction of the use of certain hazardous substances in electrical and electronic equipment.

{R.5.3.} If the Bidder has a recycling technology for equipment the method shall be described in the Bid.

{R.5.4.} If the equipment has any environmental-friendly label, its type shall be indicated in the Bid.

{R.5.5.} In case if the manufacturer of the equipment has a certificate of MSZ EN ISO 14001 or other environmental management system, a copy of the certificate shall be attached to the Bid.

APPENDIX

Statements of Compliance with technical specifications

Instructions on filling in the table
„Statements of Compliance with technical specifications”

The Bidder shall fill in those lines of the table containing the letters I, M, R, O, Q in the column Type.

The following answers are permitted in the column **Answer** for the paragraphs classified in various groups:

- information {**I**}:
  m.e. = megértve és elfogadva
  (**u.& a.** = understood and accepted)
- mandatory requirements {**M**}:
  t.m. = teljes mértékben megfelelt
  (**f.c. =** fully compliant)
- preferred requirements {**R**}:
  t.m. = teljes mértékben megfelelt
  (**f.c. =** fully compliant)
  r.m. = részben megfelelt
  (**p.c.** = partially compliant)
  n.m. = nem megfelelő
  (**n.c.** = non-compliant)
- questions {**Q**}:
  a. = alkalmazható
  (**a.** = applicable)
  n.a. = nem alkalmazható
  (**n.a.** = non-applicable)
- options {**O**}:
  a. = alkalmazható
  (**a.** = applicable)
  n.a. = nem alkalmazható
  (**n.a.** = non-applicable)

The column **Reference** shall contain any references to other materials (containing a detailed answer to the paragraph in question) so that the correctness of the answer can be checked. The reference shall contain all important data (the name of the material, number of paragraphs and pages).

In the column **Explanations**, a brief explanation shall be given as to why the answer is “f.c. = fully compliant” if so. If the answer is “p.c. = partially compliant” or “n.c. = non-compliant”, then the essence and extent of the difference shall be specified and the reason of non-compliance.

Chapter No.	Title of chapter / paragraph No.	Type	Answer	Reference	Explanations	Parameter value [unit]
1.	GENERAL REQUIREMENTS					
1.1.	General Features					
	{I.1.1.1.}	I				
	{M.1.1.2.}	M				
	{M.1.1.3.}	M				
	{M.1.1.4.}	M				
	{M.1.1.5.}	M				
1.2.	Structural and fire proofing requirements					
	{Q.1.2.1.}	Q				
1.3.	Documentations, software					
	{M.1.3.1.}	M				
	{M.1.3.2.}	M				
	{M.1.3.3.}	M				
	{M.1.3.4.}	M				
	{R.1.3.5.}	R				
1.4.	Other					
	{M.1.4.1.}	M				
	{I.1.4.2.}	I				
	{M.1.4.3.}	M				
	{M.1.4.4.}	M				
	{M.1.4.5.}	M				
	{Q.1.4.6.}	Q				
	{Q.1.4.7.}	Q				
	{Q.1.4.8.}	Q				
2.	VOICE GATEWAY REQUIREMENTS					
2.1.	Signaling					
	{M.2.1.1.}	M				
	{M.2.1.2.}	M				
	{M.2.1.3.}	M				
	{M.2.1.4.}	M				
	{R.2.1.5.}	R				
	{R.2.1.6.}	R				
	{M.2.1.7.}	M				
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