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Tehničke karakteristike minimalne ponude  
telekomunikacijskih vodova za  
iznajmljivanje prema ITU-T preporukama

# 1. Analogni telekomunikacijski vodovi standardne kvalitete

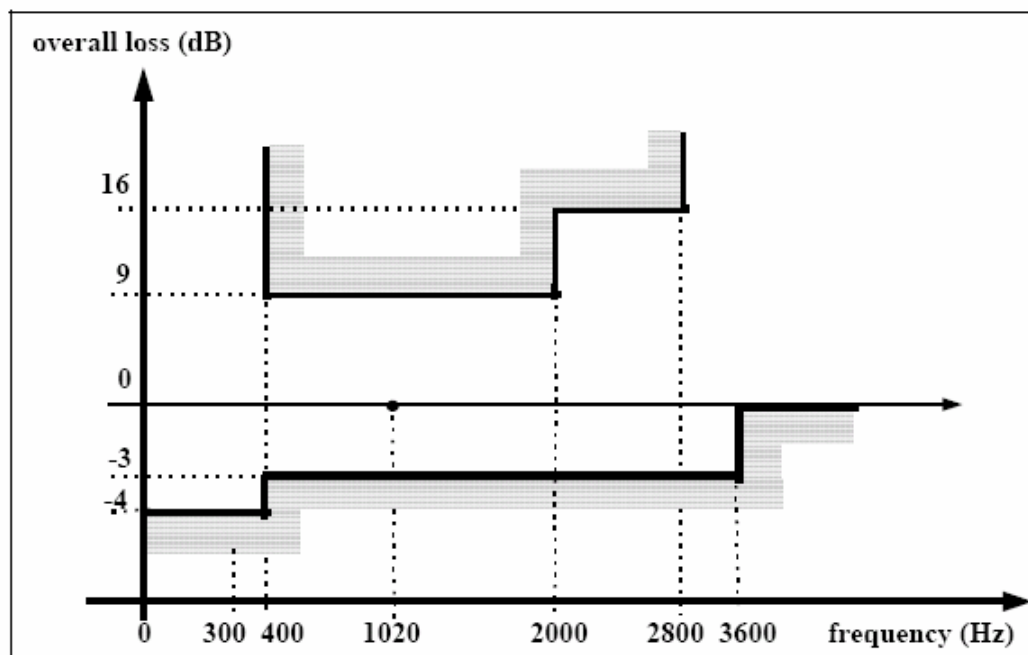
**Tablica 1.** Karakteristike prema preporuci ETSI EN 300 448 (2-žični analogni telekomunikacijski vodovi)

Description	Nature
Overall loss	0 < overall loss < 17 dB
Loss/frequency distortion	Slika 1.
Transmission signals <ul style="list-style-type: none"> <li>■ maximum mean input power</li> <li>■ maximum instantaneous power</li> <li>■ maximum power in a 10 Hz bandwidth</li> <li>■ maximum input power outside voice band</li> </ul>	-9dBm ± 4dBm no requirement no requirement
Transmission delay <ul style="list-style-type: none"> <li>■ terrestrial (for distance G in kilometers)</li> <li>■ via satellite</li> </ul>	< (15+ 0,01 G)ms < 350 ms
Variation of overall loss with time <ul style="list-style-type: none"> <li>■ amplitude hits</li> <li>■ other variations</li> </ul>	< 10 in a 15 minute period ± 4 dB of that at 1 020 Hz
Random circuit noise	< -41 dBm0p (see note)
Impulsive noise	< 18 peaks > -21 dBm0 in a 15 minute period (see note)
Phase jitter	< 10° peak to peak
Total distortion <ul style="list-style-type: none"> <li>■ quantizing distortion</li> <li>■ total distortion</li> </ul>	< 3 qdu; no ADPCM > 28 dB signal to distortion ratio
Single tone interference	< -44 dBm0 (see note)
Frequency error	< + 5Hz
Harmonic distortion	> 25 dB below fundamental
Echo and stability <ul style="list-style-type: none"> <li>■ Echo control devices</li> <li>■ Talker echo</li> <li>■ Listener echo</li> <li>■ Stability</li> </ul>	no echo control >10 dB >20 dB 0 to 4 kHz
Return loss	>6dB (300-3400)

**Tablica 2.** Karakteristike prema preporuci ETSI EN 300 451 (4-žični analogni telekomunikacijski vodovi)

Description	Nature
Overall loss	0 < overall loss < 17 dB
Loss/frequency distortion	Slika 1.
Transmission signals <ul style="list-style-type: none"> <li>■ maximum mean input power</li> <li>■ maximum instantaneous power</li> <li>■ maximum power in a 10 Hz bandwidth</li> <li>■ maximum input power outside voice band</li> </ul>	-9dBm ± 4dBm no requirement no requirement
Transmission delay <ul style="list-style-type: none"> <li>■ terrestrial (for distance G in kilometers)</li> <li>■ via satellite</li> </ul>	< (15+ 0,01 G)ms < 350 ms
Variation of overall loss with time <ul style="list-style-type: none"> <li>■ amplitude hits</li> <li>■ other variations</li> </ul>	< 10 in a 15 minute period ± 4 dB of that at 1 020 Hz
Random circuit noise	< -41 dBm0p (see note)
Impulsive noise	< 18 peaks > -21 dBm0 in a 15 minute period (see note)
Phase jitter	< 10° peak to peak
Total distortion <ul style="list-style-type: none"> <li>■ quantizing distortion</li> <li>■ total distortion</li> </ul>	< 3 qdu; no ADPCM > 28 dB signal to distortion ratio
Single tone interference	< -44 dBm0 (see note)
Frequency error	< + 5Hz
Harmonic distortion	> 25 dB below fundamental
Echo and stability <ul style="list-style-type: none"> <li>■ Echo control devices</li> <li>■ Talker echo</li> <li>■ Listener echo</li> <li>■ Stability</li> </ul>	no echo control >10 dB >20 dB 0 to 4 kHz
Return loss	>6dB (300-3400)

**Slika 1.** Gubitak / frekvencijsko izobličenje



## 2. Analogni telekomunikacijski vodovi poboljšane kvalitete

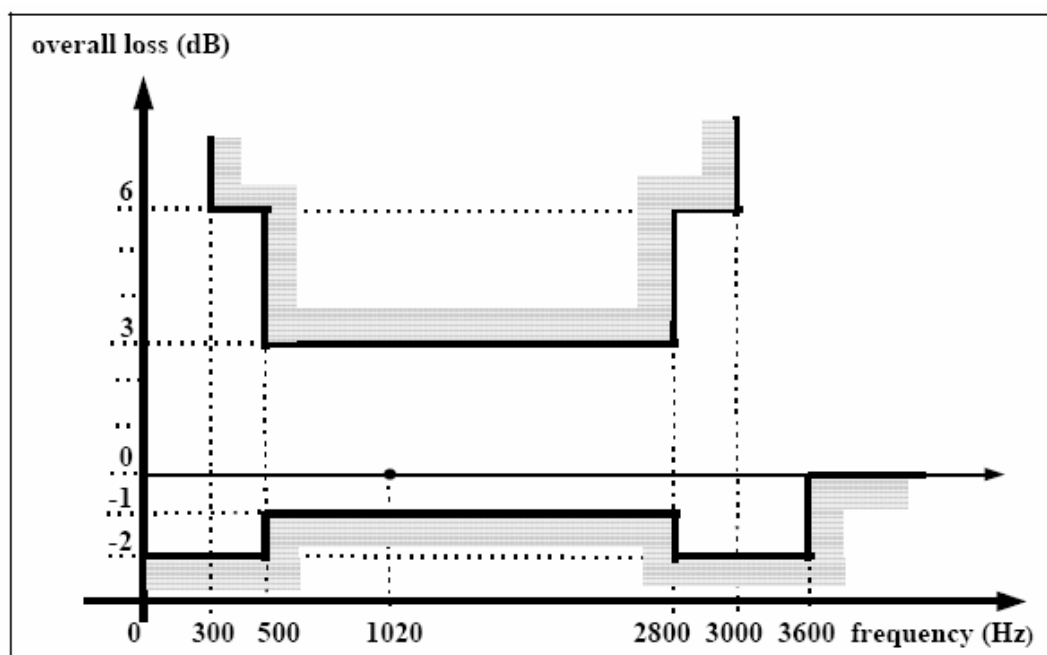
**Tablica 3.** Karakteristike prema preporuci ETSI EN 300 449 (2-žični analogni telekomunikacijski vodovi)

Description	Nature
Overall loss	0 < overall loss < 17 dB
Loss/frequency distortion	Slika 2.
Transmission signals <ul style="list-style-type: none"> <li>■ maximum mean input power</li> <li>■ maximum instantaneous power</li> <li>■ maximum power in a 10 Hz bandwidth</li> <li>■ maximum input power outside voice band</li> </ul>	-9dBm ± 4dBm no requirement no requirement
Transmission delay <ul style="list-style-type: none"> <li>■ terrestrial (for distance G in kilometers)</li> <li>■ via satellite</li> </ul>	< (15+ 0,01 G)ms < 350 ms
Variation of overall loss with time <ul style="list-style-type: none"> <li>■ amplitude hits</li> <li>■ other variations</li> </ul>	< 10 in a 15 minute period ± 4 dB of that at 1 020 Hz
Random circuit noise	< -41 dBm0p (see note)
Impulsive noise	< 18 peaks > -21 dBm0 in a 15 minute period (see note)
Phase jitter	< 10° peak to peak
Total distortion <ul style="list-style-type: none"> <li>■ quantizing distortion</li> <li>■ total distortion</li> </ul>	< 3 qdu; no ADPCM > 28 dB signal to distortion ratio
Single tone interference	< -44 dBm0 (see note)
Frequency error	< + 5Hz
Harmonic distortion	> 25 dB below fundamental
Echo and stability <ul style="list-style-type: none"> <li>■ Echo control devices</li> <li>■ Talker echo</li> <li>■ Listener echo</li> <li>■ Stability</li> </ul>	no echo control >10 dB >20 dB 0 to 4 kHz
Return loss	>6dB (300-3400)

**Tablica 4.** Karakteristike prema preporuci ETSI EN 300 452 (4-žični analogni telekomunikacijski vodovi)

Description	Nature
Overall loss	0 < overall loss < 17 dB
Loss/frequency distortion	Slika 2.
Transmission signals <ul style="list-style-type: none"> <li>■ maximum mean input power</li> <li>■ maximum instantaneous power</li> <li>■ maximum power in a 10 Hz bandwidth</li> <li>■ maximum input power outside voice band</li> </ul>	-9dBm ± 4dBm no requirement no requirement
Transmission delay <ul style="list-style-type: none"> <li>■ terrestrial (for distance G in kilometers)</li> <li>■ via satellite</li> </ul>	< (15+ 0,01 G)ms < 350 ms
Variation of overall loss with time <ul style="list-style-type: none"> <li>■ amplitude hits</li> <li>■ other variations</li> </ul>	< 10 in a 15 minute period ± 4 dB of that at 1 020 Hz
Random circuit noise	< -41 dBm0p (see note)
Impulsive noise	< 18 peaks > -21 dBm0 in a 15 minute period (see note)
Phase jitter	< 10° peak to peak
Total distortion <ul style="list-style-type: none"> <li>■ quantizing distortion</li> <li>■ total distortion</li> </ul>	< 3 qdu; no ADPCM > 28 dB signal to distortion ratio
Single tone interference	< -44 dBm0 (see note)
Frequency error	< + 5Hz
Harmonic distortion	> 25 dB below fundamental
Echo and stability <ul style="list-style-type: none"> <li>■ Echo control devices</li> <li>■ Talker echo</li> <li>■ Listener echo</li> <li>■ Stability</li> </ul>	no echo control >10 dB >20 dB 0 to 4 kHz
Return loss	>6dB (300-3400)

**Slika 2.** Gubitak / frekvencijsko izobličenje



### 3. Digitalni telekomunikacijski vod brzine 64 kbit/s

Tablica 5. Karakteristike prema preporuci ETS 300 289

Connection type attributes	
Description	Nature
Information transfer rate	64 kbit/s
Information transfer susceptance	Unrestricted digital
Structure	Octet integrity
Establishment of communication	Without user intervention
Symmetry	Symmetrical in both directions
Communication configuration	Point to point
Network performance sub-attributes	
Connection type attributes	
Description	Nature
Transmission delay	Terrestrial and satellite options
Jitter	Input and output ports
Octet slip	5 per 24 hour period
Error parameters	
Time interval with errored blocks	
Description	Nature
Errored seconds	5 324 per 24 hour period
Severely errored seconds	105 per 24 hour period

Tablica 6. Karakteristike prema preporuci ETS 300 288

Physical characteristics	
Description	Nature
Hardwired connection	Ø 0,4mm do 0,6mm
Socket specification	There is no constraint.
Shield connection point	Existence
Electrical characteristics	
Output port	
Description	Nature
Signal coding	G.703
Waveform shape	G.703
Output timing	Network timing
Output timing under failure conditions	64 kbit / s ± 100 ppm
Output return loss	No requirements
Impedance towards ground	<19,2 mV rms 10Hz – 1MHz
Longitudinal conversion loss	Greater then or equal, Table2
Output signal balance	No requirements
Input port	
Description	Nature
Signal coding	Subclause A.2.4
Input timing and jitter tolerance	EN 300 289
Input return loss	G.703
Input loss tolerance	Subclause A.2.4
Immunity against reflections	Subclause A.2.4
Impedance towards ground	<19,2 mV rms 10 Hz – 1 MHz
Longitudinal conversion loss	Greater then or equal, Table 5

**Tablica 7.** Output port longitudinal conversion loss

Frequency	Longitudinal conversion loss
3,4 kHz	40 dB
3,4 kHz to 34 kHz	decreasing 20 dB/decade from 40 dB to 20 dB
34 kHz to 256 kHz	20 dB

**Tablica 8.** Input port longitudinal conversion loss

Frequency	Longitudinal conversion loss
3,4 kHz	40 dB
3,4 kHz to 34 kHz	decreasing 20 dB/decade from 40 dB to 20 dB
34 kHz to 256 kHz	20 dB

## 4. Digitalni iznajmljeni vod brzine 2048 kbit/s (E1, nestrukturirano i strukturirano)

Tablica 9. Karakteristike prema preporuci ETSI EN 300 418

Physical characteristics	
Description	Nature
Hardwired connection	Ř 0,4mm do 0,6mm
Socket specification	There is no constraint.
Shield connection point	Existence
Electrical characteristics	
Output port	
Description	Nature
Signal coding	G.703
Waveform shape	G.703
Output timing under failure conditions	64 kbit / s $\pm$ 100 ppm
Impedance towards ground	<19,2 mV rms 10hZ – 1MhZ
Output return loss	No requirements
Output signal balance	No requirements
Output timing and jitter	EN 300 419
Input port	
Description	Nature
Signal coding	Subclause A.2.5
Input return loss	G.703
Input loss tolerance	Subclause A.2.4
Immunity against reflections	Subclause A.2.4
Tolerable longitudinal voltages	2Vrms 10Hz – 30MhZ A2.5
Impedance towards ground	<19,2 mV rms 10hZ – 1MhZ A.2.6
Input timing and jitter tolerance	EN 300 419

Tablica 10. Karakteristike prema preporuci ETSI EN 300 247 (E1 – nestrukturirani)

Connection type attributes	Value
Description	Nature
Information transfert rate	2 048 $\pm$ 50 ppm kbit/s
Information transfer susceptance	Unrestricted digital
Structure	Unstructured
Establishment of communication	Without user intervention
Symmetry	Symmetrical in both directions
Communication configuration	Point-to-point
Network performance sub-attributes	
Connection type attributes	Value
Description	Nature
Transmission delay	Terrestrial and satellite options
Jitter	Jitter tolerance at the network input port Maximum jitter at the network output port
Slip	5 per 24 hour period
Error parameters	
Time interval with errored blocks	Value
Description	Nature
Errored seconds	2 889 per 24 hour period
Severely errored seconds	117 per 24 hour period
Background block errors	22 395 per 24 hour period

**Tablica 11.** Karakteristike prema preporuci ETSI 300 419 (E1 – strukturirani)

<b>Connection type attributes</b>	
<b>Description</b>	<b>Nature</b>
Transfer rate Leased line timing Information transfer rate	2 048 kbit/s 1 984 kbit/s
Information transfer susceptance	No restriction on binary content
Structure	Frame integrity CRC-4 Use of the E-bits Frame synchronization Multiframe alignment Use of the A-bit Use of the Sa bits
Establishment of connection	Without user intervention
Symmetry	Symmetrical in both directions
Connection configuration	Point-to-point
<b>Connection type attributes</b>	
<b>Description</b>	<b>Nature</b>
Transmission delay	Terrestrial and satellite options
Jitter	Jitter tolerance at the network input port Maximum jitter at the network output port
Slip (controlled slip)	< 5 per 24 hour period
Error parameters (see 4.1.7.4)	Terrestrial
End-to-end performance objectives <ul style="list-style-type: none"> <li>■ Errored Seconds (ES) ratio</li> <li>■ Severely Errored Seconds (SES) ratio</li> <li>■ Background Block Errors (BBE) ratio</li> </ul>	< 2,000 % < 0,100% < 0,015%
Performance level over 24 hour period (24 hour test limit) <ul style="list-style-type: none"> <li>■ Errored Seconds (ES)</li> <li>■ Severely Errored Seconds (SES)</li> <li>■ Background Block Errors (BBE)</li> </ul>	<1 645 <68 < 12 732