

Chapter 8: Electrical Specifications

AC Power Input

Voltage	TLS-5A/5C: 115 VAC $\pm 15\%$ TLS-5B/D: 230 VAC $\pm 10\%$
Frequency	49 to 61 Hz
Current	TLS-5A/5C: 0.2 A maximum (nominal line voltage) TLS-5B/5D: 0.1 A maximum (nominal line voltage)
Fusing	0.25 A 5 x 20 mm slo blow
Unit dissipation	20 Watts maximum

Telephone Line Circuit (Loop Start)

On-hook voltage	-48 ± 5 Volts (Tip positive referenced to Ring)
Short circuit loop current	< 30 milliamps
Minimum loop current	18 milliamps with a 500-ohm loop

Transmission Specifications

Nominal impedance	900 ohms
Insertion loss	Switchable between 3.4 dB and 16 dB ± 2 dB @ 1 kHz when two lines are connected

Ring Source

Ring voltage	78 VAC $\pm 10\%$ AC @ 20 HZ sine wave
Square wave	72 $\pm 10\%$ VRMS @ 1 REN, 20 Hz
Ring frequency	Selectable 20, 25, 30, 60 $\pm 5\%$ Hz
Drive capacity	Up to 5 ringer equivalents (5 REN) total @ 20 HZ sine wave
Ring termination on answer	Within 250 ms
Ring waveform	Selectable step approximated sine or square wave

DTMF Detection

Frequency accept	$\pm (1.5\% + 2 \text{ Hz})$
Frequency reject	$\pm 3.5\%$
Tone-on time	40 ms minimum
Tone-off time	40 ms minimum
Amplitude	+4 to -18 dBm per frequency
Twist	6 dB or less

Rotary Dialing Detection

Rate	8 to 22 PPS
Percent break range	40% to 80% (LSSGR 6.3.4.6)
Break time	18 ms minimum, 100 ms maximum
Make time	9 ms minimum, 75 ms maximum
Interdigit time	300 ms minimum
End-of-digit detection	100 ms minimum

Loop Current Detect

Minimum off-hook current	15 mA
Maximum on-hook current	10 mA
Off-hook detect time	100 ms max
On-hook detect time	>Flash
Hook flash detect time	300 - 1100 ms (must detect) <280 ms > 1120 must not detect

Ringling Cadence

Ring programming increment	100 ms
Rings per cycle	1 to 3 (programmable)
Ring "on" time	0 to 3 seconds
Ring "off" time	0 to 6.3 seconds
Reminder Ring	500 ms of power ring issued to a line

Call Progress Tone Characteristics (Tone levels referenced to 900 ohms)

Dial tone	350 Hz $\pm 0.5\%$ and 440 Hz $\pm 0.5\%$ at -19 dBm ± 3 dB per tone
Busy and reorder tone	480 Hz $\pm 0.5\%$ and 620 Hz $\pm 0.5\%$ at -19 dBm ± 3 dB per tone
Audible ring back tone	440 Hz $\pm 0.5\%$ and 480 Hz $\pm 0.5\%$ at -19 dBm ± 3 dB per tone
Call Waiting Tone (aka SAS)	440 Hz issued for 300 ms, repeated once after 10 seconds
Distinctive Ring/Call Waiting	440Hz issued for 100 ms on/ 100 ms off / 100 ms on, repeated after 10 seconds (indicates dialed number is greater than 7 digits in length)
CAS Tone & timing	2750 Hz + 2130 Hz for 80 ms @ -23 dBm nominal (900 ohm)
Confirmation Dial Tone	Same as 3 burst Stutter Dial Tone
Recall Dial Tone	Same as 3 burst Stutter Dial Tone
3 burst Stutter Dial Tone	3 sequences of 100 ms on / 100 ms off of 350 Hz/440Hz, then continuous
10 burst Stutter Dial Tone	10 sequences of 100 ms on / 100 ms off of 350 Hz/440Hz, then continuous
Continuous Stutter Dial Tone	350 Hz/440Hz at a rate of 150 ms on and 150 ms off

Audio Input/Output Jack

Audio In impedance	10 k ohms
Audio gain (jack to Tip/Ring)	~ -10.5 dB (-10 dBm out with 1 V in)
Audio Out impedance	600 ohms
Audio gain (Tip/Ring to jack)	~ 0 dB
Relay contact rating	1 Form A contact, 100 Volt maximum, 1 A maximum, 30 volt-amps maximum
Connector pinout	Pin 1: relay contact Pin 2: ground Pin 3: relay contact Pin 4: audio in to TLS-5 Pin 5: audio out from TLS-5 Shell ground: ground

Caller ID

FSK Output Level	-26dBm \pm 2dB
TR-NWT-000031M, Bellcore Publication, CLASS Feature: Calling Number Delivery (CND), Issue 4, 12/92	
TR-NWT-001188, Bellcore Publication, CLASS Calling Name Delivery (CNAM), Issue 1, 12/91	

Mechanical Specifications

Dimensions	2.3" H x 8.5" W x 10.0" D (58 x 22 x 254 mm)
Weight	4 lb. 5 oz. (unit only)

Environmental Specifications

Storage temperature:	
Short-term storage	-40 to +55 degrees C
Long-term storage	-20 to +50 degrees C
Operating temperature	0 to 45 degrees C
Humidity	85% noncondensing, maximum

TLS-5 Reference Manual

Regulatory Compliance

Safety

United States	UL 1459
Canada	CSA C22.2 No. 225-M90

EMC

United States	FCC Part 15, Class A
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