

INDUSTRY CANADA CS-03 (ISSUE 8)
AND FCC PART 68 (10/1/98 Edition)
TEST REPORT
FOR TERMINAL EQUIPMENT

SOCKET MODEM (INTERNAL)
TRADE NAME: CONEXANT
MODEL: SC56H0 (P/N: SC90-D300-011)

Prepared for
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CAB # US0126

Test Location
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NVLAP[®]
Lab Code: 200436-0

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Measurement Uncertainty: The estimated uncertainty of measurement in this test report is as follows: For dB, dBm or dBV ± 2 dB, for the voltage/current/time $\pm 5\%$ & for frequency ± 5 ppm.

Calibration Vendor: This report contains data which were produced by Test & Measurement equipment Calibrated by ISO 9002 approved Vendor but Not Accredited by NVLAP.

Additional EUT Information:

- (1) Firmware Version: ATi3 = P2109-V90.
- (2) PCB # SC90-D105-003, S/N: 63389.
- (3) Ati6 = RCV56DPF-PLL L8773A Rev. 14.00/34.00
- (4) Tested with Conexant ISA CARD Base Board TE28-D420-; S/N: 000577; PCB# TE28-D425-003.

List of modification to the EUT during the testing:

- (1) None.

Test Result Summary: The EUT meets the FCC Part 68 & IC CS-03 test requirements.

1.6 CONNECTING ARRANGEMENTS:

The TE connects to the PSTN using the following method.

Connection Method	RJ11
--------------------------	------

1.7 OPERATIONAL CHECK:

The TE was checked for its operation before and after the exposure.

	Results
Before Exposure	Fully Functional
After Exposure	Fully Functional

1.8 [68.312(d)(1)] RINGER EQUIVALENCE NUMBERS:

The TE was checked for its operation before and after the exposure.

Ringer Type	Formula	REN
A	5X1400/min. AC Impedance for 20 Hz	0.1
A	5X1000/min. AC Impedance for 30 Hz	0.1
B	5X1600/min. AC Impedance for 15 – 68 Hz	0.1

AC REN to be shown on the label (1) IC CS-03 0.1 (2) FCC Part 68 0.1B

2.0 ELECTRICAL AND MECHANICAL STRESSES:
2.1 [68.302(a)] MECHANICAL SHOCK:

- (1) Hand - Held items Normally Used at Head Height: Performed 18 random drops of unpacked TE from a height of 1.5 m onto concrete covered with 3 mm asphalt or similar surface.
- (2) Table (Desk) Top Equipment 0-5 Kilograms: Performed six random drops of unpacked TE from a height of 750 mm onto concrete covered with 3 mm asphalt or similar surface. One face drops on each normal or designated rest face. One drop on all other faces. One corner drops on each corner.

Type of unit	Drop height	No. of drops	Results
Hand-held	1.5 m	18 Random	N/A
Table top (0-5kg.)	750 mm	6 Random	N/A

2.2 [68.304] DIELECTRIC STRENGTH:

The voltage source was connected between the applicable leads on the TE and the voltage was increased to 1000 or 1500 volts over a period of 30 seconds and held for 60 seconds. The reading shown in the table is the highest of on-hook and off-hook states. The TE has the following leads:

- (a) All telephone connections
- (b) All power connections
- (c) Exposed conductive surfaces
- (d) Connections to non-registered equipment (computers)
- (e) All auxiliary leads

Points	Test Voltage Vac	Max. Current Limit (mA)	BE Leakage Current (mA)	AE Leakage Current (mA)
(a) to (c), (d) & (e)	1000	10	0.88	0.88
(b) to (c), (d) & (e)	1500	10	N/A	N/A

Comments: _____

Result: The EUT meets the requirements.

2.3 [68.306] HAZARDOUS VOLTAGE LIMITATIONS:

2.3.1 [68.306(a)] REQUIREMENT: Under no failure of Terminal Equipment which can be conceived to occur in the handling, operation or repair of such equipment or circuitry, shall the open circuit voltage on telephone connections exceed 70 V peak after one second, except for voltages for network control signaling, alerting and supervision.



The voltage on the network interface leads does not exceed 70 volts peak for more than one second.

Comments: _____

Result: The EUT meets the requirements.

2.3.6 [68.306(b)] CONNECTION OF NON-CERTIFIED EQUIPMENT TO CERTIFIED TERMINAL EQUIPMENT OR PROTECTIVE CIRCUITRY:
2.3.6.1 CONDUCTING PATHS TO TELEPHONE CONNECTIONS, AUXILIARY LEADS AND E&M LEADS:

Leads for connection to the network are adequately separated from power leads and from leads to non-certified terminal equipment with hazardous voltages.

Leads for connection to the network are not routed in the same cable and does not use the same connector as power leads or leads to non-certified terminal equipment with hazardous voltages.

Leads for connection to the telephone network are in the same connector with leads to non-certified terminal equipment with hazardous voltages, but they are not on adjacent pins.

Comments: _____

Result: The EUT meets the requirements. _____

2.3.7 [68.306(c)] NON-HAZARDOUS VOLTAGE SOURCE:

REQUIREMENT: A voltage source is considered a non-hazardous voltage source if it conforms with the requirements of Section 2.2 and either 2.4 or 2.5 of this document with all connections to the source other than primary power connections treated as "telephone connections", and if such source supplies voltages no greater than the following under all modes of operation and of failure:

- (1) ac voltages less than 42.4 V peak;
- (2) dc voltages less than 60 V; and
- (3) combined ac and dc voltages less than 42.4 V peak when the absolute value of the dc component is less than 21.2 V and less than $(32.8 + 0.454 \times V_{dc})$ when the absolute value of the dc component is between 21.2 and 60 V.

Points	Reading BE	Reading AE	Limits
Tip - Ring	0.3 mV	0.5 mV	70 V peak
Tip - Ground	144.5 mV	154.5 mV	70 V peak
Ring - Ground	144.5 mV	154.8 mV	70 V peak

Comments: _____

Result: The EUT meets the requirements. _____

2.3.9 [68.306(e)] HAZARDS DUE TO INTENTIONAL PATHS TO GROUND:
2.3.9.1 CONNECTIONS WITH OPERATIONAL PATHS TO GROUND:

Terminal equipment having an intentional DC conducting path to earth ground at operational voltages that was excluded during the Dielectric Strength test of 2.2 shall have a DC current source derived from a low voltage current source not exceeding 12 V applied between the following points:

- (1) Telephone connections, including tip, ring, tip 1, ring 1, E&M leads and auxiliary leads; and
- (2) Earth grounding connections.

For each test point, gradually increase the current from zero to 1 A, then maintain the current for one minute. The voltage between (1) and (2) shall not exceed 0.1 V at any time.

Points	Before Exposure		After Exposure	
	Max. ΔV Limit (Volt)	Reading ΔV	Max. ΔV Limit (Volt)	Reading ΔV
T - E Gnd.	0.1	N/A	0.1	N/A
R - E Gnd.	0.1	N/A	0.1	N/A
T1 - E Gnd.	0.1	N/A	0.1	N/A
R1- E Gnd.	0.1	N/A	0.1	N/A

2.3.9.2 CONNECTIONS WITH PROTECTION PATHS TO GROUND:

Terminal equipment having an intentional DC conducting path to earth ground for protection purposes at the leakage current test voltage that was removed during the longitudinal steady state voltage test of 2.3.1 shall have a 60 Hz voltage source applied between the following points:

- (1) Simplex telephone connections, including tip and ring, tip 1 and ring 1, E&M leads and auxiliary leads; and
- (2) Earth grounding connections.

Gradually increase the voltage from zero to 120 V for terminal equipment, or 300 V for protective circuitry, then maintain the voltage for one minute. The current between (1) and (2) shall not exceed 10-mA peak at any time.

Points	Before Exposure		After Exposure	
	Max. Limit (mA)	Reading mA	Max. Limit (mA)	Reading mA
T - E Gnd.	10	N/A	10	N/A
R - E Gnd.	10	N/A	10	N/A
T1 - E Gnd.	10	N/A	10	N/A
R1- E Gnd.	10	N/A	10	N/A

Comments: _____

Result: Not applicable _____

2.4 [68.302(b) Type A] SURGE VOLTAGE:

NOTE (For FCC Part 68 only): Before doing TYPE A surge, perform the TYPE B surge tests.

2.4.1 [68.302(b)(1) METALLIC VOLTAGE SURGE (800V, 10/560 µS):

Applied two 800 V peak metallic voltage surges (one of each polarity) to equipment between any pair of connections on which lightning surges may occur; this includes (1) tip to ring, (2) tip 1 to ring 1 and, (3) for a 4-wire connection which uses simplex pairs for signalling, tip to ring 1, and ring to tip 1.

Leads	On-Hook		Off-Hook	
	Pos. Pol.	Neg. Pol.	Pos. Pol.	Neg. Pol.
T-R	X	X	X	X
T1-R1	N/A	N/A	N/A	N/A
T-R1	N/A	N/A	N/A	N/A
R-T1	N/A	N/A	N/A	N/A

Comments: No damage.

Result: The EUT meets the requirements.

2.4.2 [68.302(b)(2) LONGITUDINAL VOLTAGE SURGE (1500V, 10/160 µS):

Applied two longitudinal voltage surges (one of each polarity) to equipment from any pair of connections on which lightning surges may occur, this includes the tip-ring pair and the tip 1-ring 1 pair, to each of the following:

- (1) Earth grounding connections; and
- (2) All leads intended for connection to non-certified equipment, connected together.

Leads	On-Hook		Off-Hook	
	Pos. Pol.	Neg. Pol.	Pos. Pol.	Neg. Pol.
T/R-Gnd.	X	X	X	X
T/R-NR Leads	N/A	N/A	N/A	N/A
T1/R1- Gnd.	N/A	N/A	N/A	N/A
T1/R1- NR Leads	N/A	N/A	N/A	N/A

Comments: No damage.

Result: The EUT meets the requirements.

68.302(c) SURGE VOLTAGE: - Type B

NOTE (For FCC Part 68 only): Before doing TYPE A surge, perform the TYPE B surge tests.

68.302(c)(1) METALLIC VOLTAGE SURGE (1000V, 9/720 mS):

Applied two 1000 V peak metallic voltage surges (one of each polarity) to equipment between any pair of connections on which lightning surges may occur; this includes (1) tip to ring, (2) tip 1 to ring 1 and, (3) for a 4-wire connection which uses simplex pairs for signalling, tip to ring 1, and ring to tip 1.

Leads	On-Hook		Off-Hook	
	Pos. Pol.	Neg. Pol.	Pos. Pol.	Neg. Pol.
T-R	X	X	X	X
T1-R1	N/A	N/A	N/A	N/A
T-R1	N/A	N/A	N/A	N/A
R-T1	N/A	N/A	N/A	N/A

Comments: No damage.

Result: The EUT meets the requirements.

68.302(c)(2) LONGITUDINAL VOLTAGE SURGE (1500V, 9/720 mS):

Applied two longitudinal voltage surges (one of each polarity) to equipment from any pair of connections on which lightning surges may occur, this includes the tip-ring pair and the tip 1-ring 1 pair, to each of the following:

- (1) Earth grounding connections; and
- (2) All leads intended for connection to non-certified equipment, connected together.

Leads	On-Hook		Off-Hook	
	Pos. Pol.	Neg. Pol.	Pos. Pol.	Neg. Pol.
T/R-Gnd.	X	X	X	X
T/R-NR Leads	N/A	N/A	N/A	N/A
T1/R1-Gnd.	N/A	N/A	N/A	N/A
T1/R1- NR Leads	N/A	N/A	N/A	N/A

Comments: No damage.

Result: The EUT meets the requirements.

2.5 [68.302(d)] POWER LINE SURGE (2500V, 2/10 μ S):

Applied six-power line surges (three of each polarity) to equipment between the phase and neutral terminals of the ac power line while the equipment is being powered.

Leads	On-Hook		Off-Hook	
	Pos. Pol.	Neg. Pol.	Pos. Pol.	Neg. Pol.
AC High-AC Low	N/A	N/A	N/A	N/A

Comments: Not Applicable.

Result: _____

3.0 NETWORK PROTECTION REQUIREMENTS:
3.1 GENERAL:
3.1.1 LABORATORY ENVIRONMENT:

All tests to determine conformance with this specification were conducted in a laboratory environment at normal room temperature and humidity.

3.3 EXTRANEous AC ENERGY:
3.3.1 [68.314(b)(1)] METALLIC AC ENERGY (CO LINES AND TRUNKS):

The power delivered into a 2-wire loop simulator circuit or into the transmit and receive pairs of a 4-wire loop simulator or into a 600 Ohm termination (where appropriate) in the on-hook state, by loop-start or ground-start equipment shall not exceed -55 dBm within the frequency band from 200-3995 Hz. Network protective circuitry shall also assure that for any input level up to 10 dB above the overload point, the power to a 2-wire loop simulator circuit or the transmit and receive pairs of a 4-wire loop simulator circuit or into a 600 ohm termination (where appropriate) does not exceed the above limits.

Freq. Band Hz	Term. Ohms	Reading dBm		Max. Limit
		BE	AE	
200-3995	600	-76.6	-76.2	-55 dBm

Comments: _____

Result: The EUT meets the requirements.

3.3.3 LONGITUDINAL AC SIGNALS:

3.3.3.1-3 [68.308(d-e2)] LONGITUDINAL VOLTAGE IN 100 Hz TO 6 MHz RANGE:

The weighted RMS voltage averaged over 100 ms resultant of all of the component longitudinal voltages in the specified frequency band after weighting according to the transfer function of F/4000, where F is the frequency in Hertz, shall not exceed the indicated in the following table.

Freq. Band Hz	Ter. Ohms	Corr. Factor	Reading DBV		Max. Limit (dBV)
			BE	AE	
100 - 4000	500	+1.4	-77.4	-77.3	-30
4K - 12K	500	+1.4	-77.5	-77.4	-30.4 to -40
12K - 42K	90	+4.0	-74.5	-74.6	-40.2 to -62
42K - 266K	90	+4.0	-74.5	-74.4	-62
270K - 6M	90	+4.0	-50.6	-50.4	-30

Comments: Above readings are the maximum of on-hook, off-hook, min. and max. current conditions.

Result: The EUT meets the requirements.

3.4 TRANSMITTED SIGNAL POWER:

3.4.1 [68.308(b)(1)] IN-BAND TRANSMITTED SIGNAL POWER - METALLIC:

The power of all signal energy, in the frequency band from 200 to 3995 Hz, delivered by the terminal equipment or network protection device to the appropriate simulator (other than non-permissive data equipment or data protective circuitry) shall not exceed -9 dBm when averaged over any 3 second interval.

Freq. Band Hz	Termination Ohms	Reading dBm		Max. Limit
		BE	AE	
200-3995	600	-11.1	-11.1	-9 dBm

Comments: _____

Result: The EUT meets the requirements.

3.4.1 [68.308(b)(1)] IN-BAND TRANSMITTED SIGNAL POWER - Recorded Voice:

The power of all signal energy, in the frequency band from 200 to 3995 Hz, delivered by the terminal equipment or network protection device to the appropriate simulator (other than non-permissive data equipment or data protective circuitry) shall not exceed -9 dBm when averaged over any 3 second interval.

Recorded From	Level Recorded (dBm)	Level Playback (dBm) BE & AE	Max. Limit (dBm)
Pre-Recorded	N/A	N/A	-9.0
Microphone	94 dB SPL	N/A	-9.0
Line	94 dB SPL	N/A	-9.0

Comments: Not Applicable.

Result: _____

3.4.3 [68.308(b)(2)] LIMITATIONS ON INTERNAL SIGNAL SOURCES PRIMARILY INTENDED FOR NETWORK CONTROL SIGNALLING, CONTAINED IN VOICE AND DATA EQUIPMENT:

(1) For all operating conditions of the TE, the maximum power in the frequency band below 3995 Hz delivered to a loop simulator circuit shall not exceed the following when averaged over any 3-s interval:

- 0 dBm when DTMF is used for network control;
- 0 dBm when DTMF is used for end-to-end signalling via manual entry of a keypad or repertory dialer. The term "repertory dialer" does not accommodate devices capable of generating more than 40 DTMF digits per manual keystroke;
- 9 dBm in all other cases.

Signal Type	Term. Ohms	Before Exposure Reading (dBm)	After Exposure Reading (dBm)	Max. Limit
a	600	-3.0	-3.0	0 dBm
b	600	N/A	N/A	0 dBm
c	600	N/A	N/A	-9 dBm

Comments: _____

Result: The EUT meets the requirements.

3.4.6 [68.308(c)(1), (e)(1)] OUT-OF-BAND TRANSMITTED SIGNAL POWER - METALLIC:

Freq. Band kHz	Term. Ohms	Reading dBV		Max. Limit
		BE	AE	
3995-4005	600	-78.1 dBm	-78.2 dBm	-27 dBm
4 - 12	300	-36.1	-36.0	-14 to -20 dBV
12 - 90	135	-58.4	-58.3	-20.2 to -55.2 dBV
90 - 266	135	-75.0	-75.1	-55 dBV
270 - 6000	135	-40.8	-40.6	-15 dBV

Comments: _____

Result: The EUT meets the requirements.

3.5 [68.314] BILLING PROTECTION:
[68.314(a)(2)] Billing Delay: FCC Part 68 only

Registered terminal equipment for data applications shall assure that, when an incoming telephone call is answered, the answering terminal equipment prevents both transmission and reception of data for at least 2 seconds after the answering terminal equipment transfers to the off-hook condition.

BE Reading (Seconds)	AE Reading (Seconds)	Min. Limit
2.8	2.8	2 Seconds

Comments: _____

Result: The EUT meets the requirements.

3.5.1 [68.314(c)(2)] VOICE AND DATA EQUIPMENT:

(2) The loop current through the TE shall not decrease by more than 25 percent from its maximum value attained during this 5-second interval; unless the equipment is returned to the on-hook state during the above 5-second interval.

		Reading (mA)						
DC Volts	Loop Res.	(BE)		(AE)		% Change		Max.
		Max.	Min.	Max.	Min.	(BE)	(AE)	Limit
52.5	Min.	87.0	86.0	87.0	86.0	<10	<10	25%

Comments: _____

Result: The EUT meets the requirements.

3.5.2 [68.314(d)] SIGNALLING INTERFERENCE:

The signal power delivered to the network interface by the terminal equipment and from signal sources internal to network protection devices in the 2450 Hz to 2750 Hz band shall be less than or equal to the power present simultaneously in the 800 Hz to 2450 Hz band for the first 2 seconds after going to the off-hook state.

Frequency Band	BE Reading dBm	AE Reading dBm
2450 - 2750 Hz	-76.6	-76.6
800 - 2450 Hz	-76.6	-76.5

Comments: _____

Result: The EUT meets the requirements.

3.6 [68.310] TRANSVERSE BALANCE:

$$\text{Balance M/L (dB)} = V_M (\text{dBV}) - V_L (\text{dBV})$$

On Hook

Freq. Hz	Min. Limit dB	Before Exposure		After Exposure		Balance (dB)	
		V _M (dBV)	V _L (dBV)	V _M (dBV)	V _L (dBV)	BE	AE
200	60	-10.2	-107.0	-10.2	-108.2	96.8	98.0
500	60	-9.8	-100.0	-9.8	-101.2	90.2	91.4
1000	60	-9.6	-94.3	-9.6	-96.1	84.7	86.5
2000	40	-9.4	-89.4	-9.4	-90.7	80.0	81.3
3000	40	-9.3	-86.2	-9.3	-87.5	76.9	78.2
4000	40	-9.3	-83.8	-9.3	-85.2	74.5	75.9

Off Hook

Freq. Hz	Min. Limit dB	Before Exposure		After Exposure		Balance (dB)	
		V _M (dBV)	V _L (dBV)	V _M (dBV)	V _L (dBV)	BE	AE
200	40	-14.7	-112.6	-14.7	-115.0	97.9	100.3
500	40	-14.4	-105.4	-14.4	-107.9	91.0	93.5
1000	40	-14.3	-99.3	-14.3	-101.4	85.0	87.3
2000	40	-14.2	-93.6	-14.2	-95.7	79.4	81.5
3000	40	-14.1	-90.2	-14.1	-92.1	76.1	78.0
4000	40	-14.1	-88.0	-14.1	-90.2	73.9	76.1

Comments: _____

Result: The EUT meets the requirements. _____

3.7 [68.312] ON-HOOK TERMINAL RESISTANCE AND IMPEDANCE:

3.7.1 [68.312(b)] METALLIC AND LONGITUDINAL DC RESISTANCE (LS):

(1) [i] On-hook resistance, metallic and longitudinal (up to 100 V dc).

Measurement Points	Min. Limit (M Ω)	Reading (μA)		Cal. Res.(M Ω)	
		(BE)	(AE)	(BE)	(AE)
TIP – Ring	5	14.6	14.6	6.85	6.85
TIP – Gnd.	5	0.0	0.0	>100	>100
Ring – Gnd.	5	0.0	0.0	>100	>100

(2) [ii] On-hook resistance, metallic and longitudinal (100 V to 200 V dc).

Measurement Point	Min. Limit (K Ω)	Reading (μA)		Cal. Res.(M Ω)	
		(BE)	(AE)	(BE)	(AE)
Tip - Ring	30	29.5	29.5	6.78	6.78
Tip – Gnd.	30	0.0	0.0	>100	>100
Ring – Gnd.	30	0.0	0.0	>100	>100

Comments: _____

Result: The EUT meets the requirements.

3.7.2 [iii] DC CURRENT DURING RINGING:

During the application of simulated ringing, to a loop start and ground start interfaces, the total dc current shall not exceed 3.0 mA.

Ringer Type	Ringing Signal	DC Current BE (mA)	DC Current BE (mA)	Max. Limit
A	20 - 30 Hz, 40 - 130 Vac	0.1	0.1	3 mA
B	15.3 - 34 Hz, 40 - 130 Vac	0.1	0.1	3 mA
B	34.1 - 49 Hz, 62 - 130 Vac	0.1	0.1	3 mA
B	49.1 - 68 Hz, 62 - 150 Vac	0.1	0.1	3 mA

Comments: _____

Result: The EUT meets the requirements.

3.7.3 [68.312(b)] METALLIC AND LONGITUDINAL IMPEDANCE DURING RINGING (LOOP START AND GROUND START INTERFACES):

(1) *[iv]* During the application of simulated ringing, to a loop start or ground start interface, the impedance between the Tip and Ring conductors shall be greater than the value specified in Table.

Ringer Type	Freq. Hz	AC Volts	Before Exposure		After Exposure		Min. Imp. Limit KΩ
			AC mA	KΩ	AC mA	KΩ	
A	20	40	0.1	>100	0.1	>100	1.4
	20	130	0.1	>100	0.1	>100	1.4
	30	40	0.1	>100	0.1	>100	1.0
	30	130	0.1	>100	0.1	>100	1.0
B	15.3 - 34	40	0.1	>100	0.1	>100	1.6
	15.3 - 34	130	0.1	>100	0.1	>100	1.6
	34.1 - 49	62	0.1	>100	0.1	>100	1.6
	34.1 - 49	130	0.1	>100	0.1	>100	1.6
	49.1 - 68	62	0.1	>100	0.1	>100	1.6
	49.1 - 68	150	0.2	>100	0.2	>100	1.6

(2) *[v]* During the application of simulated ringing, to a loop start interface, the impedance between each of the Tip and Ring conductors and ground shall be greater than 100 KOhms.

Ringer Type	Freq. Hz	(BE)		(AE)		Min. Imp. Limit
		AC μA	KΩ	AC μA	KΩ	
A	Tip to Ground	56.0	>100	57.8	>100	100 KΩ
	Ring to Ground	56.0	>100	57.8	>100	100 KΩ
B	Tip to Ground	128.6	>100	133.5	>100	100 KΩ
	Ring to Ground	128.3	>100	133.6	>100	100 KΩ

Comments: _____

Result: The EUT meets the requirements. _____