ZL880SLVVP
VeriVoice™ Professional Advance Datasheet

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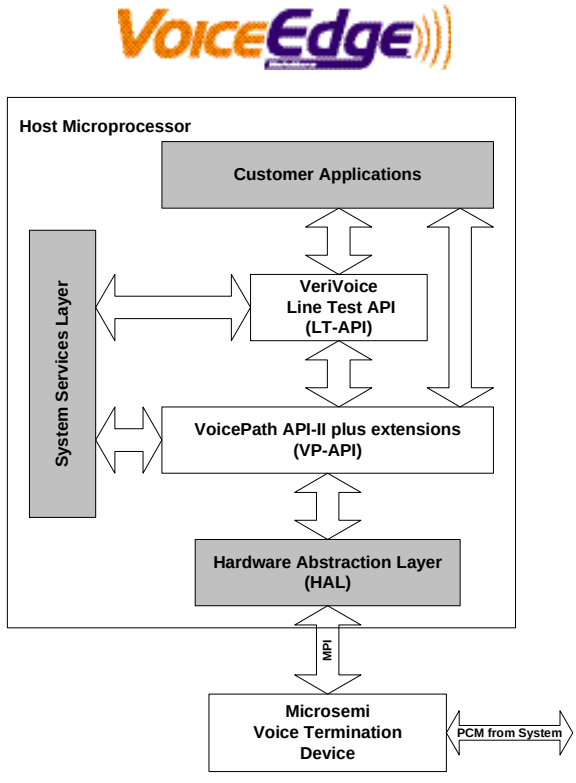
Features

- VeriVoice™ Professional Test Suite
  - Returns Pass/Fail and quantitative results with user defined thresholds to the limits specified by Telcordia GR-909-CORE, Section 12.4
  - Additional inward and outward tests including Line Capacitance and Master Socket detection
  - No Math Libraries required
  - Extension of established Microsemi VoicePath™ API-II line control software interface

Applications

- Line Testing for:
  - Fiber to the Premise/Home (FTTP/H)
  - Voice Enabled Cable Modems (EMTA)
  - Integrated Access Devices (IAD)
  - Residential VoIP Gateways and Routers
  - Wireless Local Loop (WLL), PBX
  - Set-Top Boxes

Figure 1. Block Diagram



Description

In combination with Microsemi's ZL880/VE960 Series products, Microsemi's VeriVoice™ Test Suite—a subscriber line test software package for VoIP equipment—provides the market's most cost-effective and reliable solution for VoIP line and self test, minimizing the cost of ownership for service providers.

VoIP service providers are expected to provide traditional carrier class voice quality and reliability to consumer equipment in a wide geographical distribution. The automated, remote testing capability of the VeriVoice™ Test Suite eliminates the need for costly truck rolls, which minimizes maintenance costs, improves reliability of service, and decreases the mean time to repairs. In addition, VeriVoice™ software removes any requirement to include expensive test equipment inside the low line count VoIP equipment.

The VeriVoice Professional package consists of both outward looking line tests and inward looking self tests. The outward looking tests, or drop tests, are intended to check the customer equipment and copper pair leading to it while the inward looking self tests check the VoIP equipment itself.

With Microsemi's VeriVoice Test Suite software, service providers can reduce their cost of ownership while improving the reliability of their network at the same time.

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1.0 PRODUCT DESCRIPTION

Microsemi's VeriVoice™ Test Suite is a C-language extension of the libraries provided in the VoicePath™ API-II (VP-API-II). The VeriVoice™ test libraries and the VP-API-II are typically compiled into the customer's application, all of which runs on a host processor controlling one or more Microsemi Voice Termination Devices (VTDs). Refer to the Block Diagram on page 1.

This VeriVoice Professional Test Library is available for the dual channel ZL880/VE960 VoicePort devices.

VeriVoice Professional is available upon purchase and signing a licence agreement. Access is then granted to Microsemi's software distribution system where the package may be downloaded.

1.1 VeriVoice Professional Test Library

The VeriVoice Professional Test Library returns Pass/Fail based on user defined thresholds and quantitative results with accuracies similar to what is required in the line test section of Telcordia GR-909-CORE, Section 12.4 for Locally Switched Services. The Professional library returns Pass/Fail results in accordance with the limits specified by GR-909-CORE, Section 12.4.2. The Professional package adds several more tests which also return quantitative results where appropriate.

The Professional package is specified to work with loop length up to 3 kft.

The VeriVoice Test Libraries offer the following key features:

- Convenient, single-function call implementation of line test
- One common line testing interface for different Microsemi devices
- ANSI C compliant source code
- Supports different line circuit topologies
- Automatic pass/fail determination
- Portable - can be ported to any operating system or a non-operating system platform

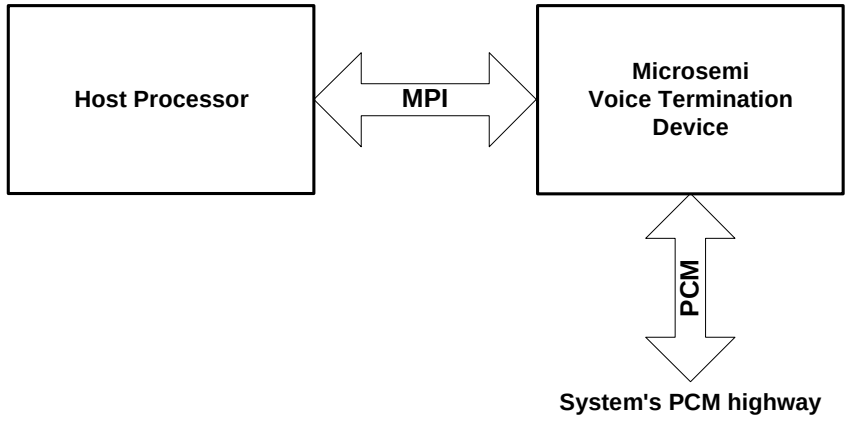
2.0 SYSTEM ARCHITECTURE

The VeriVoice Test Libraries are flexible to support a range of potential applications and enable the end user to select the most efficient means of data collection for the specific system architecture. The ZL880/VE960 VoicePort devices will measure test data and route it to the PCM highway or an MPI register.

2.1 Simple System Controller Architecture

In the configuration shown in Figure 1, the host processor acquires the test data from MicroProcessor Interface (MPI) reads (EZ Mode). The ZL880/VE960 VoicePort devices are configured to route data samples at a periodic rate to a register that can be read via MPI transactions. All data acquisition, storage and manipulation is done by the Host Processor.

Figure 1 - Simple System Controller Architecture



3.0 SOFTWARE ARCHITECTURE

Refer to Figure 1

3.1 Customer Applications

This block represents user's line management module that performs task such as system initialization, configuring lines, service events, line testing, and any other customer specific complex operations.

3.2 Operating System

This block represents the operating system running on the host microprocessor. The Microsemi software does not directly utilize any operating system resources. However, depending of the user's application the developer may wish to use operating system specific features. For more information, please see the VP-*API-II Reference Guide*.

3.3 System Services Layer

The System Services Layer abstracts platform-specific functions. This layer derives the functions required by the VP-API-II and the LT-API from the facilities provided by the underlying hardware or operating system. This layer is platform dependent and it is implemented by the customer. Microsemi provides implementation examples of this layer with the VeriVoice software package.

There are two functions specified as part of the System Services Layer to enable these tests.

Scratch pad memory allocation and release functions:

- **VpSysTestHeapAcquire ()**
- **VpSysTestHeapRelease ()**

See the *LT-API User's Guide* for details on the two additional System Service Layer functions.

3.3.1 Hardware Abstraction Layer

This layer is required by the VP-API-II which is a prerequisite to run the VeriVoice Test package. The Hardware Abstraction Layer (HAL) provides a means for the host processor to communicate with the Microsemi voice termination devices via the Micro Processor Interface (MPI). The HAL software is also platform dependent and must be implemented by the customer. Microsemi provides implementation examples of this layer with the VoicePath API-II software package.

3.3.2 Line Test Library and VoicePath API

The Line Test Library and the VP-API-II source codes are supplied by Microsemi, and should not be modified by the application developer. The customer application accesses the line testing resources through the LT-API. It also accesses the VP-API-II to implement call control and other line management functions.

3.4 Supported Hardware Configurations

Table 1 - LT-API Supported Devices

Device, VP-API Name	Supported Line Termination Types	Supported Devices
VP_DEV_886_SERIES	*VP_TERM_FXS_GENERIC* *VP_TERM_FXS_LOW_PWR*	ZL880/VE960 Series • ZL88601/2 • ZL88701/2 • ZL88801 • Le9672 • Le9662

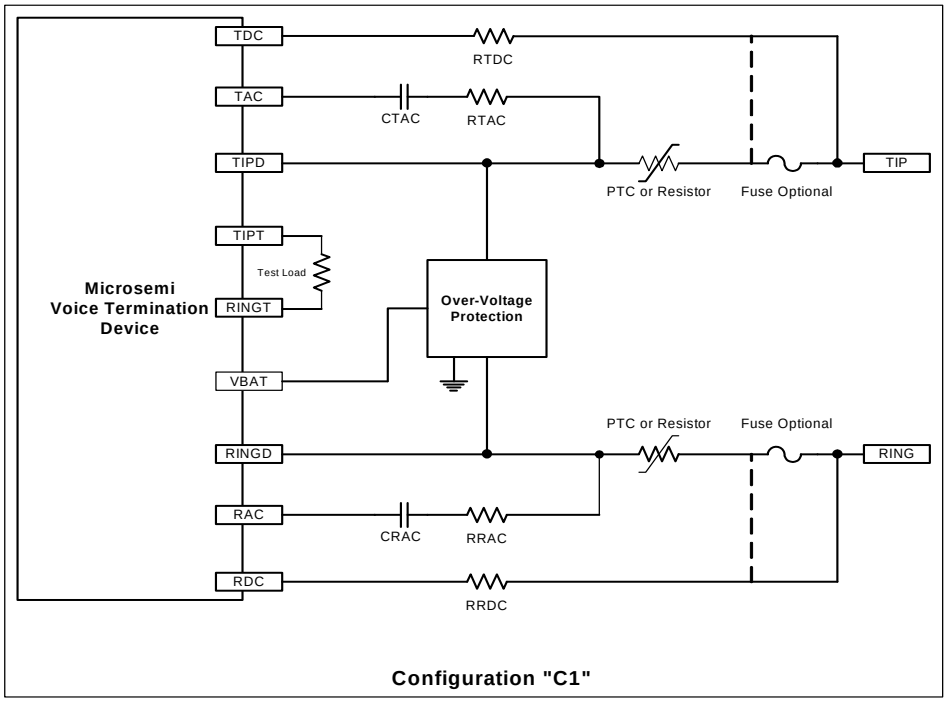
The following hardware configuration is supported (refer to Figure 2):

3.4.1 Circuit Configuration "C1" PTC Isolation

API termination types –
VP_TERM_FXS_GENERIC, VP_TERM_FXS_LOW_PWR

The advantage of this configuration is low cost and good performance within the battery voltage range. The disadvantages are that the subscriber loop is never fully isolated from the SLIC drivers and the over voltage protection. For a fault that is significantly out of the battery range, the PTC will go to a high impedance state, at which point a voltage measurement can be made at the TIP and RING terminals. The measurement made at the TIp/Ring interface depends on the relative impedances of the foreign voltage source and the activated PTC.

Figure 2 - Configuration C1



Note: VE886 series device offer internal test termination but no external test load.

4.0 VERIVOICE™ SOFTWARE PACKAGE

The package contains the following:

- The Line Test Library source code,
- VP-API-II test extension source code.
- The *Line Test API Reference Guide defining the interfaces*

5.0 TEST COVERAGE

Table 2 - Test Coverage for the ZL880 Professional Package

Test Procedures	VeriVoice™ Professional ZL880SLVVP	Description
OUTWARD TESTS		
Line Voltage	Pass/Fail with measured results	Checks for hazardous and foreign AC and DC voltages on the drop
Receiver Off-Hook	Pass/Fail with measured results	Tests for longitudinal fault, off hook resistive fault and receiver off hook.
Ringer Equivalence Number (Regular)	Measures REN impedance Pass/Fail with measured results T-R, R-G and T-G	Tests the impedance of the line and returns a fail if the T-R REN is too low or high.
Ringer Equivalence Number (Electronic)	Measures ringer capacitance Pass/Fail with measured results T-R, R-G and T-G	Tests the capacitance of the line and returns a fail if the T-R REN is too low or high.
Resistive Fault Test	Pass/Fail with measured results	Measures three element resistance
Capacitance Test	Measured results	Measures three element capacitance
Master Socket Test	Pass/Fail	Detect master socket terminations
Cross Connect Test	Pass/Fail	Detect cross connected FXS
All GR-909 Tests	Pass/Fail with measured results	Performs all GR-909 outward tests in the correct sequence.
INWARD TESTS		
Loopback	Pass/Fail	Enables Receive to Transmit signal loopback. Assumes test signal is applied on the Receive PCM highway from an outside source.
Read Loop Conditions	Measured results	Measures Battery, T-R, R-G and T-G voltage and metallic and longitudinal current
Read Battery Conditions	Pass/Fail with measured results	Reads the battery voltages connected to the line circuit.
DC Voltage Self-Test	Pass/Fail with measured results	Verifies that the line circuit has the ability to drive the voltage ranges required for the normal operation of the line circuit.
DC Feed Self-Test *	Pass/Fail with measured results	Measures the voltage and current across a known test termination using the DC feed profile that has been programmed.
Ringing Self-Test *	Pass/Fail with measured results	Verifies ring signal generation, drive capability, and ring trip.
On/Off Hook Self-Test *	Pass/Fail	Creates on-hook and off-hook conditions on the line using the test termination and verifies that they are properly reported.

6.0 SPECIFICATIONS

6.1 Test Range and Accuracy

The VeriVoice™ Professional Test Suite returns Pass/Fail and quantitative results with user-defined thresholds

Test Description/Test ID Used	Range		Unit	Accuracy	Note
Line Voltage Test - LT_TID_LINE_V	-240	-6	Vdc	±10 %	1., 2.
	-6	+6	Vdc	±0.6 V	
	+6	+240	Vdc	±10 %	
	0	10	Vrms	1 Vrms	1., 3.
	10	165	Vrms	±10 %	
	165	250	Vrms	±15 %	
Receiver Off-Hook Test - LT_TID_ROH LT_ROHM_OFF_HOOK loop range	0	1300	Ω	PASS / FAIL	4, 5
LT_ROHM_RES_LOOP	0	1500	Ω	±15 %	
Ringer Equivalence Number Test LT_TID_RINGERS (REGULAR) Tip to Ring	0.0	0.175	REN	0.0175	6
	0.175	6.0	REN	±10 %	
Ringer Equivalence Number Test LT_TID_RINGERS (REGULAR) Tip or Ring to Ground	0.0	0.5	REN	0.05	6
	0.5	6.0	REN	±10 %	
Ringer Equivalence Number Test LT_TID_RINGERS (ELECTRONIC) Tip to Ring	0.0	0.5	REN	±0.050	6
	0.5	6.0	REN	±10 %	
Ringer Equivalence Number Test LT_TID_RINGERS (ELECTRONIC) Tip or Ring to Ground	0.0	0.5	REN	0.05	6
	0.5	6.0	REN	±10 %	
Resistive Faults Test - LT_TID_RES_FLT Tip to Ring	0.1	150	KΩ	±10 %	7
	150	500	KΩ	±20 %	
	500	1000	KΩ	±40 %	
Resistive Faults Test - LT_TID_RES_FLT Tip or Ring to Ground	0.1	20	KΩ	±10 %	7
	20	40	KΩ	±20 %	
	40	150	KΩ	±10 %	
	150	500	KΩ	±20 %	
	500	1000	KΩ	±40 %	
Capacitance Test - LT_TID_CAP Tip to Ring	0	1200	nF	±3 nF & +/-10%	8
Capacitance Test - LT_TID_CAP Tip or Ring to Ground	0	1200	nF	±3.5 nF & +/-10%	9, 10 11
All GR-909 Tests - LT_TID_ALL_GR_909	All outward tests are performed to above limits				5
Read Loop Conditions - LT_TID_RD_LOOP_COND Voltage measurements, vab, vag, vbg, vbatx	-100	-10	Vdc	±10 %	
	-10	+10	Vdc	±1.0 V	
	+10	+100	Vdc	±10 %	
Read Loop Conditions - LT_TID_RD_LOOP_COND Current measurements, imt, ilg	-20	+20	mA	+/-2 mA	
	-40	+40	mA	+/-10 %	

The VeriVoice™ Professional Test Suite returns Pass/Fail and quantitative results with user-defined thresholds

Test Description/Test ID Used	Range		Unit	Accuracy	Note
Read Loop Conditions - LT_TID_RD_LOOP_COND Resistance measurement, rloop	0	100	Ω	+/-25 Ω	
	0.1	25	kΩ	+/-25 %	
LT_TID_RD_BAT_COND - Read Battery Conditions	-150	-25	V	±10 %	
LT_TID_DC_VOLTAGE DC Voltage Self-Test	-140	-6	V	±10 %	12
	-6	+6	Vdc	±0.6 V	
	+6	+140	V	±10 %	
LT_TID_DC_FEED_ST DC Feed Self-Test - external test load resistance	1	1	KΩ	±15%	
DC Feed Self-Test - Internal test termination current Accuracy relative to programmed ILA	20	45	mA	±10%	
LT_TID_RINGING_ST - Ringing Self-Test				Pass/Fail	
Ringing Frequency	14	55	Hz	±10%	
Ringing Voltage	6	50	Vrms	±10%	13
External Test Load Resistance	1	1	KΩ	±15%	
Ringing Current	5	60	mArms	±10%	14
LT_TID_ON_OFF_HOOK_ST On/Off Hook Self-Test				Pass/Fail	
LT_TID_LOOPBACK - Loopback Test	0.0	16.0	s	Pass/Fail	
LT_TID_MSOCKET - Master Socket Detection				Pass/Fail	15
LT_TID_XCONNECT - Detection of PSTN Cross Connection				Pass/Fail	

Note:

1. *Protection devices in Configuration C1 will limit the range of measurement if the foreign voltage has a high impedance, and the test results might not represent the actual source voltage.*
2. *Configuration C1 will read in the range of a few hundred millivolts due to the positive voltage protection diode.*
3. *AC foreign voltage measurements assume a sinusoidal signal at a frequency of either 50 or 60 Hz.*
4. *For off hook loops beyond the specified ranges, the test may not be able to determine if there is an off hook phone. These conditions will be reported with an LT_ROHM_OUT_OF_RANGE_LOOP fault mask.*
5. *In the presence of longitudinal currents that would compromise the measurement, the test will return LT_ROHM_MSRMNT_STATUS with EXCESSIVE_ILG error.*
6. *The regular REN test measures the AC impedance at 20 Hz and uses 2408 Ω + 1.21 μF as 1 REN by default. The electronic REN test measures ringer capacitance and assumes 1 REN = 1.21 μF. These values are derived from the requirements for a REN load specified in FCC part 68. Use of input conditions other than the default values may degrade measurement accuracy.*
   When performing 3 element tests, up to 1% of the value measured on one lead may add to the value returned on the other two leads
7. *When a resistive fault below the pass criteria is measured, only the lowest value lead is reported, The other leads are reported as "impedance not measured". Resistance to ground measured below 500 Ω is reported as a short circuit.*
8. *For Tip to Ring capacitance, an additional error term of +/-0.5 % of the measured Tip or Ring to ground capacitance can be present.*
9. *For Tip or Ring to ground capacitance, the accuracy defined assumes that the contribution of the on board capacitance to ground due to the SLIC and EMI capacitors are calibrated out of the result. This can be achieved by obtaining open circuit tip and ring to ground measurements during production and applying these values to subsequent tests. If this calibration is not performed, the EMI capacitance (nominally 22 nF)*

and SLIC capacitance (typically 10 nF, but can vary with device type) will be part of the result, and accuracy will be reduced directly proportional to the EMI capacitor tolerance and SLIC capacitance variance (+/-2 nF).

10. *An additional error term of +/-2 % of the measured Tip to Ring capacitance can be present on either leg to ground.*
11. *Up to 0.5 % of the capacitance measured on one lead can appear as an error term on the other lead to ground.*
12. *The maximum voltage that can be generated is limited by the programmed ringing voltage in fixed ringing applications.*
13. *To avoid ringing the telephone, a low voltage ring profile with DC offset should be used.*
14. *Ringing current measured depends on the load, test voltage and ringing current limit. When using the internal test termination, the expected current is calculated from this data and used as a pass/fail condition instead of the external test load resistance.*
15. *Master Socket Test (LT_TID_MSOCKET) is capable of detecting Type 1 (470 kΩ + diode) and Type 2 (470 kΩ + 1.8 υF capacitor) M-Sockets. Valid detection is possible when the total leakage (Rtr || Rtg || Rrg) resistance is >= 150 kΩ as shown in Figure 3 and Figure 4.*
The test passes if the specified master socket is identified, and in the case of Type 1, is in the correct polarity. Type 1 master socket has additional fault mask values including not present, reversed, and two networks in parallel,

Figure 3 - M-Socket (Type 1)

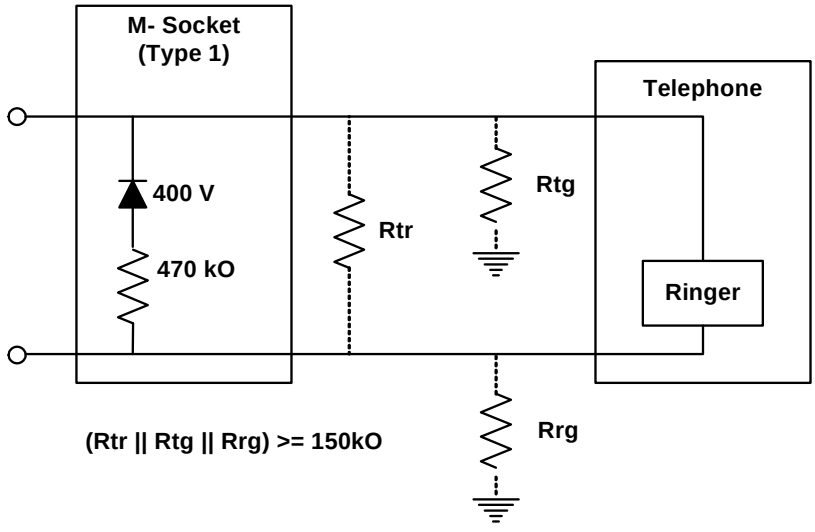
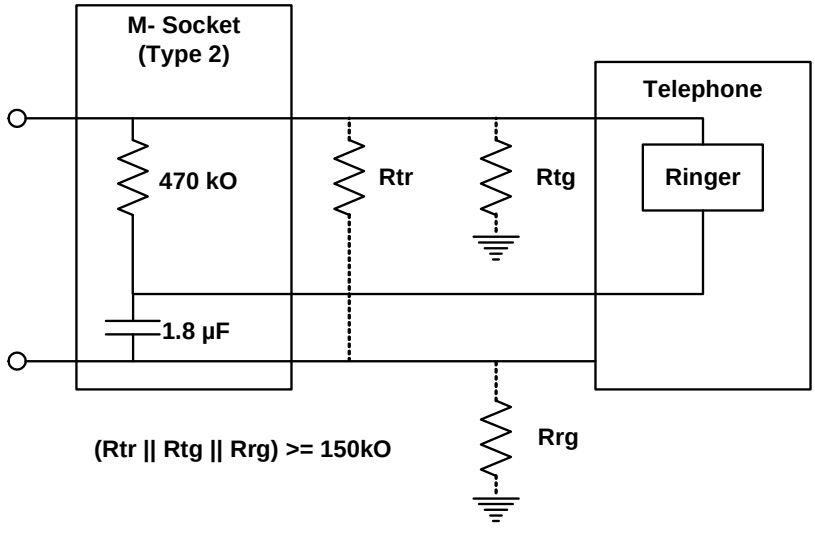


Figure 4 - M-Socket (Type 2)



16. *Cross connect test verifies the absence of a cross connection to another FXS line. If a cross connection is detected, the test fails and returns the polarity of the cross connection.*

6.2 Default Pass/Fail Criteria and Accuracy

For tests with programmable pass fail criteria.

Test Description	Pass Criteria	Accuracy of Pass/ Fail Threshold	Note
Line Voltage Test LT_TID_LINE_V Hazardous EMF	|V(T-G)| < 135 VDC	± 10 %	1., 2.
	|V(R-G)| < 135 VDC	± 10 %	
	|V(T-R)| < 135 VDC	± 10 %	
	V(T-G) < 50 Vrms	± 10 %	1., 2., 2.
	V(R-G) < 50 Vrms	± 10 %	
	V(T-R) < 50 Vrms	± 10 %	
Line Voltage Test LT_TID_LINE_V Foreign EMF	V(T-G) < 10 Vrms	± 10 %	1., 2.
	V(R-G) < 10 Vrms	± 10 %	
	V(T-R) < 10 Vrms	± 10 %	
	|V(T-G)| < 6 VDC	± 10 %	1., 2.
	|V(R-G)| < 6 VDC	± 10 %	
	|V(T-R)| < 6 VDC	± 10 %	
Receiver Off-Hook Test - LT_TID_ROH LT_ROHM_OFF_HOOK loop range	<300 Ω	PASS / FAIL	
LT_ROHM_RES_LOOP	< 600 Ω	PASS / FAIL	
Ringer Equivalence Number Test LT_TID_RINGERS (REGULAR) - Tip to Ring	0.175 < REN(T-R) < 5.0	± 10 %	3
Ringer Equivalence Number Test LT_TID_RINGERS (ELECTONIC) - Tip to RING	0.175 < REN(T-R) < 5.0	Greater of +/- 0.05 REN or ± 10 %	3
Resistive Faults Test LT_TID_RES_FLT	R(T-G) > 150 KΩ	± 10 %	
	R(R-G) > 150 KΩ	± 10 %	
	R(T-R) > 150 KΩ	± 10 %	
DC Voltage Self-Test - LT_TID_DC_VOLTAGE	56 V	± 10 %	4
All GR 909	All tests are performed		5

Note:

1. *Protection devices in Configuration C1 will limit the range of measurement if the foreign voltage has a high impedance, and the test results might not represent the actual source voltage.*
2. *Any type of foreign voltage failure will leave the line circuit in the Disconnect state at the end of the test.*
3. *The regular REN test measures the AC impedance at 20 Hz and uses 2408 Ω + 1.21 μF as 1 REN by default. The electronic REN test measures ringer capacitance and assumes 1 REN = 1.21 μF. These values are derived from the requirements for a REN load specified in FCC part 68. Use of input conditions other than the default values may degrade measurement accuracy.*
   When performing 3 element tests, up to 1 % of the value measured on one lead may add to the value returned on the other two leads
4. *For the pass/fail threshold, the generated voltage requested is assumed to have up to an additional ±3.6 V offset.*
5. *All outward tests except capacitance are performed to individual test limits.*

6.3 VeriVoice™ Professional Outward Test Suite Typical Timings

Test Description	Test Time (ms)	Line Condition	Note:
Line Voltage AC, DC, EMF	1100	Open Circuit	1.
Receiver Off-Hook or Resistive Loop:	241	Open Circuit	
Receiver Off-Hook or Resistive Loop:	1200	On-Hook Phone	
Ringer Equivalence (Regular)	560	On-Hook Phone	
Ringer Equivalence (Regular, 3 Element)	1600	On-Hook Phone	
Ringer Equivalence (Electronic)	910	On-Hook Phone	
Ringer Equivalence (Electronic, 3 Element)	1800	On-Hook Phone	
Resistive fault - High Resistance:	2800	On-Hook Phone	1.
Resistive fault - Low Resistance:	900	Off-Hook Phone	1.
All GR 909:	2750	Open Circuit	
All GR 909:	5700	On-Hook Phone	
Capacitance	950	On-Hook Phone	
Master Socket Detection, Type 1:	1330	Type 1 Present	
Master Socket Detection, Type 1:		Open Circuit	
Master Socket Detection, Type 2:	6000	Type 2 Present	
Master Socket Detection, Type 2:	2100	Open Circuit	
Cross Connect Detection:	530	Cross Connected Line	
Cross Connect Detection:		Open Circuit	

Note:

1. *Test time is determined by the resistive and capacitive load applied to tip-ring. Small or large resistances in conjunction with larger capacitive loads will take longer to settle and auto range to the appropriate gain settings. High resistance means test ran only using low gain range. Low resistance means test used the high gain range to obtain a result. For resistive faults, a 5 REN load as specified in note 3. can increase test time up to 8 seconds. With a 5 REN load as described in GR909 (1396 Ω + 40 μF) the test time can be further increased to 10 seconds, and accuracy can be degraded for high resistance loads.*

6.4 VeriVoice™ Professional Inward Test Suite Typical Timings

Test Description	Test Time	Note:
DC Feed Self-Test	550	2
DC Voltage Self-Test (48V)	1400	3
Loopback test	20	4
On/Off Hook Self-Test	350	2
Read Battery Conditions	110	
Read Loop Conditions	260	5
Ringing Self-Test	1500	2

1. *The Timing in the above table is based on 10 ms API tick rate. On-hook tests initiated from the Standby system state, using internal test termination where necessary.*
2. *Ringing, DC Feed and On/Off Hook self-tests use an internal test termination*
3. *Duration dependent on input voltage parameter.*
4. *Time is the test setup overhead. Need to add the user programmable wait time and loopback time, each of which can be up to 8 s, and be in an active state (OHT, Active or Talk). Four loopback types can be enabled, TIMESLOT, BFILTER, CODEC and ANALOG.*
5. *Test time depends on the system state and the number of parameters measured.*

6.5 Programmable Threshold

The VeriVoice Professional Test software allows the customer to set the Pass/Fail thresholds for the applicable tests. It also allows other programmable test parameters.

Programmable Threshold Parameters

Parameter	Variable Name	Entered as	Default Value
Hazardous Voltage	dcHemf acHemf	mVdc Vrms	135000 mVdc 50 Vrms
Foreign Voltage	dcFemf acFemf	MVdc Vrms	6000 mVdc 10 Vrms
Ringer Equivalence	renHigh renLow	milliRen	5000 mRen 175 mRen
Resistive Fault	resFltLowLimit	Kohm	150 Kohm
DC Feed Self-Test Load Measurement Tolerance	rLoadErr	Percent	15%
DC Voltage Test	voltageErr	Percent	10%
Ringing Self-Test	openVoltageErr freqErr rLoadErr	Percent Percent Percent	10% 10% 15%

7.0 ORDERING INFORMATION

Device	Package
ZL880SLVVP	VeriVoice Professional Test Software Library

8.0 RELATED LITERATURE

- **081535 VeriVoice™ Test Suite Software Product Preview**
- **143271 ZL880 VoicePath™ API-II Reference Guide**
- **081470 Line Test Application Programming Interface**
- **141606 Dual Channel Tracking Battery Wideband VoicePort Device Data Sheet ZL880 Series**
- **141956 Dual Channel Wideband Auto Battery Switching (ABS) VoicePort Device Data Sheet ZL880 Series**
- **146161 Dual Channel Shared Tracking Battery Wideband VoicePort Device ZL880 Series**

9.0 SYSTEM REQUIREMENTS

- Two contiguous PCM highway timeslots for 16-bit linear data per channel under test
- Channel under test must be in linear mode
- 32-bit fixed point arithmetic implementation
  - Floating point libraries are not required
- Battery Voltage Requirements - tracking devices
  - Ringing Battery must be at least 75 V
- Battery Voltage Requirements - ABS devices
  - VBL must be between -20 V and -40 V
  - VBH must be more negative than -75 V
- Code memory size approximately 205 kB
  - As compiled by GCC 3.4.5 for an ARM 920T
  - Includes base API-II Lite plus test extensions (172 kB) and LT-API interface (43 kB)

- Data memory requirements
  - An additional 200 bytes to each existing API device object
  - 312 bytes for each LT-API object

10.0 REVISION HISTORY

10.1 Version 1

- Advance Datasheet Release

10.2 Version 2

- Added ZL88801 device
- Updated sizeof LT-API Code memory size from 42 kB to 43 kB

10.3 Version 3

- Filled in typical timings tables.
- Added miSLIC device.
- Updated sizeof VP-API code memory size from 163 kB to 172 kB.
- Updated "Resistive Faults Test - LT_TID_RES_FLT Tip or Ring to Ground" element in the *Test Range and Accuracy,* on page 7 from 500 Ohms to 100 Ohms.

For more information about all Microsemi products visit our website at www.microsemi.com

TECHNICAL DOCUMENTATION – NOT FOR RESALE

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