

Marstech Limited

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Test Report

To

Industry Canada CS-03, Issue 9

For

ASCALADE TECHNOLOGIES INC.

Model VOIP321XY/ZZ

[Also covers Model CIT300]

Report No. 26045A/26046A

16 March 2006

Marstech Limited

11 Kelfield Street, Etobicoke, Ontario, Canada, M9W 5A1
 Telephone (416) 246-1116, Fax (416) 246-1020

TEST REPORT

REPORT DATE:	16 March 2006	REPORT NO.:	26045A/26046A
CONTENTS:	Equipment Description - Introduction & Summary - Index of Test Performed - Test Results - Accuracy Table - Schematic Drawing - Parts List - User's Manual and Customer Information - Photographs - Block Diagram - Equipment Label -	Page 2 Page 3 Pages 4 to 7 Pages 8 to 33 Page 34 Attachments 1 to 16 Refer to Schematic Drawing Attachments 17 to 20 Attachments 21 to 26 Refer to RSS-213 Report Refer to RSS-213 Report	
SUBMITTOR:	ASCALADE TECHNOLOGIES INC. 12051 Riverside Way Richmond, BC V6W 1K7		
SUBJECT:	Model No.:	VOIP321XY/ZZ [also covers Model CIT300]	
	Ringer Equivalence No. (REN):	0.0 [Note: Customer wants REN as 0.1]	
TEST SPECIFICATION:	Industry Canada CS-03, Issue 9 NOTE: Tests Conducted are "Type" Tests.		
DATE SAMPLE RECEIVED:	13 & 23 February 2006 [VOIP321XY/ZZ and CIT300]	DATE TESTED:	27 & 28 February 2006; 01 & 10 March 2006
RESULTS:	Equipment tested complies with referenced specification with the following modifications. Note: The terms "BS" and "AS" used in report imply "Before Stress" and "After Stress".		
MODIFICATIONS:	(1) R82 and R83 inductors were replaced with zero ohm SMT resistors. (2) Base pcb layout was changed to populate C101 and C102 capacitors.		
ENGINEER'S DECLARATION:	I hereby attest that the information contained in this report (listed above and on Page 2) is, to the best of my knowledge, complete and accurate. The equipment has been evaluated in all applicable conditions and complies with all the technical requirements of the referenced document(s).		
Tested by:	Gary Nova	Approved by:	Ed. Chang
	Ed. Chang		Robert G. Marshall, P. Eng.
Reviewed by:	Edward Chiang	Date:	20 March 2006
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Authorized by: Professional Engineer
 Engineering & Administrative
 Testing For FCC Submissions/Verifications
 Approved Test Facility

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EQUIPMENT DESCRIPTION

EQUIPMENT TYPE:	1.9GHz DECT USB Single-Line Cordless Telephone with Caller ID, Handset Speakerphone and Voice Over Internet Protocol (VoIP)	
MODEL NO:	VOIP321XY/ZZ [Also covers Model CIT300]	
TRADE NAME:	PHILIPS [for Model VOIP321XY/ZZ] LINKSYS [for Model CIT300]	
SERIAL NO:		
MANUFACTURER:	Dongguan Ascalade Electronics Co. Ltd. National Highway 107, Cuntou Cun Humen Town, Dongguan, Guangdong, CHINA	
TRANSMISSION RATE:		
TRANSMISSION TYPE:		
TRANSMISSION MODE:		
TRANSMIT FREQS:		
DUPLEX:		
DATA INTERFACE TYPE:		
POWER RATING:	<u>Model VOIP321XY/ZZ</u> Input: 120Vac, 60Hz, 8W Output: 9Vdc, 300mA Adapter	<u>Model CIT300</u> Input: 120Vac, 60Hz, 6W Output: 9Vdc, 300mA Adapter
ENGINEERING PROTOTYPE:		
PRODUCTION PROTOTYPE:		
PRODUCTION LINE UNIT:		
REMARKS:		

ACCESSORIES DESCRIPTION:

TYPE:	
MODEL NUMBER	
REMARKS:	

PLUGS, JACKS, ADAPTERS AND CORDS DESCRIPTION

MANUFACTURER:		
CONNECTOR TYPE:	RJ11	
MODEL:		
CORD DESCRIPTION/LENGTH:	Two conductor plastic cable 200 cm long	
REMOVABLE CORD/PLUG ASSEMBLY:	YES: x	NO:

INTRODUCTION

This report contains the results of the tests performed on the equipment described on page 2. The test methods and requirements given in the current issues of Industry Canada Certification Standard and Telecommunications Regulation Circular TRC-52 are considered to be an integral part of this report. The following summary describes the test results.

SUMMARY

All of the applicable Loop Start tests were conducted on Model VOIP321XY/ZZ [where "XY/ZZ" are alphanumeric characters for marketing purposes (i.e., "X" for number of handsets supplied, "Y" for colour and "ZZ" for country identifier)] as well as with Model CIT300, which is identical to Model VOIP321XY/ZZ except for model designation, handset and enclosure, to CS-03, Issue 9.

The Models VOIP321XY/ZZ and CIT300, with modifications, meet all of the technical requirements of CS-03, Issue 9.

MODIFICATIONS REQUIRED

- (1) R82 and R83 inductors were replaced with zero ohm SMT resistors.
- (2) Base pcb layout was changed to populate C101 and C102 capacitors.

PART I
TABLE A

TECHNICAL REQUIREMENTS FOR TERMINAL EQUIPMENT AND
PROTECTIVE CIRCUITRY TO BE CONNECTED TO ANALOGUE INTERFACES

REQUIREMENTS	LS	GS	RB	TTA	TTB	OPS	TEST #	PAGE #
2.0 MECHANICAL AND ELECTRICAL STRESSES								
2.1 MECHANICAL SHOCK	*	*	*	*	*	*	25	27
2.2 LONGITUDINAL STEADY STATE VOLTAGE STRESS	*	*	*	*	*	*	23	26
2.3 HAZARDOUS VOLTAGE LIMITATIONS								
2.3.1 General	*	*	*	*	*	*	26	28
2.3.2 Type I E&M Leads				*	*			
2.3.3 Type II E&M Leads				*	*			
2.3.4 Off Premises Station & DID Voltages			*			*	33	N/A
2.3.5 Ring Down Voice-band Private Line and Voice-band Metallic Channel Interface							40	N/A
2.3.6 Connection of Non-Certified Equipment to Certified TE or Certified Protective Circuitry	*	*	*	*	*	*	30	N/A
2.3.7 Non-hazardous Voltage Source	*	*	*	*	*	*	Information	
2.3.8 Ringing Sources						*	17	N/A
2.3.9 Hazards Due to Intentional Paths to Ground	*	*	*	*	*	*	24	N/A
2.4 SURGE VOLTAGE								
2.4.1 Metallic Voltage Surge	*	*	*	*	*	*	20	24
2.4.2 Longitudinal Voltage Surge	*	*	*	*	*	*	21	N/A
2.5 POWER LINE SURGE								
2.5.1 Phase to Neutral Leads Surge	*	*	*	*	*	*	22	25

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REQUIREMENTS	LS	GS	RB	TTA	TTB	OPS	TEST #	PAGE #
3.0 NETWORK PROTECTION REQUIREMENTS								
3.1 GENERAL	*	*	*	*	*	*		
3.2 RESERVED FOR FUTURE USE								
3.3 EXTRANEOUS AC ENERGY								
3.3.1 Metallic AC Energy	*	*					02	11
3.3.2 Metallic AC Energy			*	*	*	*	02	N/A
3.3.3 Longitudinal AC Signals	*	*	*	*	*	*	03	12, 13
3.3.4 Metallic Channel Longitudinal Voltage in the Range of 100 Hz to 3 MHz								
3.4 TRANSMITTED SIGNAL POWER								
3.4.1 In-band Transmitted Signal Power - Metallic	*	*	*	*	*	*	04	N/A
3.4.2 In-Band Transmitted Signal Power (Metallic Channels)								
3.4.3 Limitations on Internal Signal Sources Primarily Intended for Signalling Contained in Voice & Data Equipment	*	*	*	*	*		27	29
3.4.4 Data Circuit Terminal Equipment	*	*	*	*	*	*	05	N/A
3.4.5 Through Transmission	*	*	*	*	*	*	12 13 14	N/A N/A N/A
3.4.6 Out-of-Band Transmitted Signal Power - Metallic	*	*	*	*	*	*	06	14, 15
3.4.7								
3.4.8 Audio Signal Limiting	*	*	*	*	*	*	Information	
3.5 BILLING PROTECTION								
3.5.1 Voice and Data Equipment Loop Current Requirements	*	*					11	21
3.5.2 Signalling Interference	*	*	*	*	*	*	07	16
3.5.3 Answer Supervision			*				16	N/A
3.6 TRANSVERSE BALANCE	*	*	*	*	*	*	28	30

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REQUIREMENTS	LS	GS	RB	TTA	TTB	OPS	TEST #	PAGE #
3.7 ON-HOOK TERMINAL IMPEDANCE								
3.7.1 Metallic & Longitudinal DC Resistance (Loop Start Interface)	*						10	19, 20
3.7.2 DC Current During Ringing	*	*					08	17
3.7.3 On-Hook Longitudinal Impedance	*						09	18
3.7.3.1 On-Hook Metallic AC Impedance	*						29	31
3.8 IDLE STATE TERMINAL IMPEDANCE (RETURN LOSS)				*	*			
3.9 AUTOMATIC DIALLING AND AUTOMATIC REDIALLING	*	*		*		*	15	N/A
3.10 TRANSITIONING TO THE OFF-HOOK STATE/MAKE-BUSY/STUTTERED DIAL TONE (IC, Provisional Document PROV-SDTD)							32	N/A

NOTE:

LS - Loop Start *

RB - Reverse Battery

TTB - Tie Trunk Type B

GS - Ground Start

TTA - Tie Trunk Type A

OPS - Off Premises Station

PART V

**REQUIREMENTS AND TEST METHODS FOR MAGNETIC OUTPUT FROM
HANDSET TELEPHONES FOR HEARING AID COUPLING**

REQUIREMENTS	LS	GS	RB	TTA	TTB	OPS	TEST #	PAGE #
4.0 HEARING AID COMPATIBILITY							18 19	22, 23 N/A
6.0 VOLUME CONTROL							45	32, 33

TEST 01

OPERATIONAL PERFORMANCE

Page 1 of 2

REFERENCE:

CS-03, Issue 9, Part I, Clause 1.7; Part II, Clause 2.2

CONDITIONS:

ON AND OFF HOOK

FEATURES TESTED (MODEL VOIP321XY/ZZ)

BEFORE STRESS		AFTER STRESS	BEFORE STRESS		AFTER STRESS
x	MUTE	x		MUSIC-ON HOLD	
	HOLD		x	HANDSET SPEAKERPHONE	x
x	TRANSMISSION	x		CONFERENCE	
x	RINGER DETECTION	x		ON-HOOK DIALLING	
x	REDIAL	x		AUTO-DIALLING	
	ANSWERING MACHINE			MODEM BAUD RATE BPS	
x	CALLER ID	x	x	VOICE CALL OVER THE INTERNET Unit tested with the following: (i) desk top PC Dell Dimensions 1100 (ii) monitor MAGDX700T (FCC ID: IAWV7T001) (iii) keyboard (FCC ID: AQ6-7D30)	x

REFERENCE:

*FCC Form 730 Item 17(c); *ACTA Guidelines & Procedures Item 12

*NETWORK SIGNALLING	
<input type="checkbox"/> DUAL-TONE MULTI-FREQUENCY ("DTMF") (T)	<input type="checkbox"/> PULSE (R)
<input checked="" type="checkbox"/> DTMF/PULSE (E)	<input type="checkbox"/> NO SIGNALLING (N)
NOTE:	
T - If the device performs dual-tone multi-frequency ("DTMF") signalling.	
R - If the device performs rotary (pulse) signalling.	
E - If the device performs either DTMF or pulse signalling (selectable).	
N - If the device does no signalling.	

RESULTS:

OPERATES ACCORDING TO THE OPERATOR'S MANUAL

TECHNICIAN:

Gary Nova

DATE:

28 February 2006

TEST 01

OPERATIONAL PERFORMANCE

Page 2 of 2

REFERENCE: CS-03, Issue 9, Part I, Clause 1.7; Part II, Clause 2.2

CONDITIONS: ON AND OFF HOOK

FEATURES TESTED (MODEL CIT300)

BEFORE STRESS		AFTER STRESS	BEFORE STRESS		AFTER STRESS
x	MUTE	x		MUSIC-ON HOLD	
	HOLD		x	HANDSET SPEAKERPHONE	x
x	TRANSMISSION	x		CONFERENCE	
x	RINGER DETECTION	x		ON-HOOK DIALLING	
x	REDIAL	x		AUTO-DIALLING	
	ANSWERING MACHINE			MODEM BAUD RATE BPS	
x	CALLER ID	x	x	VOICE CALL OVER THE INTERNET Unit tested with the following: (i) desk top PC Dell Dimensions 1100 (ii) monitor MAGDX700T (FCC ID: IAWV7T001) (iii) keyboard (FCC ID: AQ6-7D30)	x

REFERENCE: *FCC Form 730 Item 17(c); *ACTA Guidelines & Procedures Item 12

*NETWORK SIGNALLING	
<input type="checkbox"/> DUAL-TONE MULTI-FREQUENCY ("DTMF") (T)	<input type="checkbox"/> PULSE (R)
<input checked="" type="checkbox"/> DTMF/PULSE (E)	<input type="checkbox"/> NO SIGNALLING (N)
NOTE: T - If the device performs dual-tone multi-frequency ("DTMF") signalling. R - If the device performs rotary (pulse) signalling. E - If the device performs either DTMF or pulse signalling (selectable). N - If the device does no signalling.	

RESULTS: OPERATES ACCORDING TO THE OPERATOR'S MANUAL

TECHNICIAN: Gary Nova

DATE: 01 March 2006

MARSTECH LIMITED

TEST 02

METALLIC AC ENERGY/ON-HOOK SIGNAL LEVEL

REFERENCE: CS-03, Issue 9, Part I, Clause 3.3.1/3.3.2; Part II, Clause 3.6.2; Part VII,
Clause 3.2.6 TIA-968-A, Clause 4.8.2

CONDI- TION	FREQUENCY BAND	SPECIFICATION	MEASURED VALUES	
			BEFORE STRESS	AFTER STRESS
T-R	200-3995 Hz	-55 dBm (CO Lines & Trunks)	-73 dBm	-73 dBm
T-R	200-3995 Hz	-55 dBm (Channels & Reverse Battery)		

RESULTS: MEETS THE REFERENCED TECHNICAL REQUIREMENT

TECHNICIAN: Gary Nova **DATE:** 28 February 2006

TEST 03

LONGITUDINAL AC SIGNALS

Page 1 of 2

REFERENCE: CS-03, Issue 9, Clause 3.3.3.1 (1)

A. LONGITUDINAL VOLTAGE F/4000 TRANSFER FUNCTION (100-4KHz, 500Ω)
TIA-968-A, Clause 4.5.4

MAX SPECIFICATION	MEASURED VALUES (dBV)	
	BEFORE STRESS	AFTER STRESS
ON-HOOK, -30dBV	-74	-74
OFF-HOOK, 20.7 mA -30dBV	-74	-74
OFF-HOOK, 70 mA -30dBV	-74	-74

B. LONGITUDINAL VOLTAGE (4KHz to 6MHz)
TIA-968-A, Clause 4.5.5.2

FREQ. RANGE (KHz)	SPEC (dBV)	MEASURED VALUES (dBV)					
		ON HOOK		OFF HOOK 20.7 mA		OFF HOOK 70 mA	
		Before Surge	After Surge	Before Surge	After Surge	Before Surge	After Surge
4 - 12	-36	-70	-70	-70	-70	-70	-70
12 - 42	-60	-87	-87	-84	-84	-84	-84
42 - 270	-62	-87	-87	-84	-84	-84	-84
270 - 6000	-30	-66	-66	-67	-67	-67	-67

RESULTS: MEETS THE REFERENCED TECHNICAL REQUIREMENT

TECHNICIAN: Gary Nova

DATE: 28 February 2006

TEST 06

OUT OF BAND TRANSMITTED SIGNAL POWER

REFERENCE: CS-03, Issue 9, Cl. 3.4.6 (1), (2), and (3); 3.4.8

(With VOIP Connected)

- A. The Signal Power in the frequency band from 3995-4005 Hz shall be 18 dB below the maximum permitted power of -9dBm for the Voice Band Signal.**
TIA-968-A, Clause 4.5.3.1

FREQ. RANGE (Hz)	SPEC	MEASURED VALUES (dBm)							
		Telephone		Application Voice		Pre-Recorded Outgoing Messages		Signals on Hold	
		B. S.	A. S.	B. S.	A. S.	B. S.	A. S.	B. S.	A. S.
3995-4005	-27dBm Data/Voice	-80	-80						

- B. METALLIC VOLTAGE**
TIA-968-A, Clause 4.5.5.1

CENTRE FREQ. OF 8KHz BAND (KHz)	SPEC (dBV)	MEASURED VALUES (dBV)					
		ON HOOK		OFF-HOOK 20.7 mA		OFF-HOOK 70 mA	
		B. S.	A. S.	B. S.	A. S.	B. S.	A. S.
4 - 12	-18	-74	-74	-75	-75	-75	-75
12 - 90	-55	-90	-90	-90	-90	-90	-90
90 - 270	-55	-89	-89	-90	-90	-90	-90
270 - 30000	-15	-66	-66	-62	-62	-62	-62

RESULTS: MEETS THE REFERENCED TECHNICAL REQUIREMENT

TECHNICIAN: Gary Nova

DATE: 10 March 2006

MARSTECH LIMITED

TEST 07 **SINGLE FREQUENCY RESTRICTION**

REFERENCE: CS-03, Issue 9, Part I, Cl. 3.5.2, 3.4.8; Part II, Cl. 3.6.4; Part VI, Cl.3.5.4 and
Part VII, Cl.3.2.5; TIA-968-A, Clause 4.8.4

CONDITION: OFF-HOOK

CRITERIA: The energy in the 2450-2750 Hz band shall not exceed the energy in the 800-2450 Hz band.

<u>MODE</u>	<u>SPECIFICATION</u> (RATIO X/Y)	<u>MEASURED VALUE</u> (RATIO X/Y)	
		<u>BEFORE</u> <u>STRESS</u>	<u>AFTER</u> <u>STRESS</u>
Telephone	<1.0	<0.1	<0.1
Application Voice	<1.0		
Pre-Recorded Outgoing Messages	<1.0		
	<1.0		
	<1.0		
	<1.0		
X = Energy in 2450-2750 Hz Band Y = Energy in 800-2450 Hz Band			

RESULTS: MEETS THE REFERENCED TECHNICAL REQUIREMENT

TECHNICIAN: Gary Nova **DATE:** 28 February 2006

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TEST 09 ON-HOOK IMPEDANCE

REFERENCE: CS-03, Issue 9, Clause 3.7.3.1 (2); TIA-968-A, Clause 4.7.2.5

CRITERIA: The AC Impedance from tip to ground and ring to ground during simulated ringing shall be greater than 100K Ω

CRITERIA (K Ω)	SPECIFICATION		CURRENT (μ A) (DC + AC RMS)		IMPEDANCE (K Ω)	
	VOLTAGE/ FREQ (Hz)	RINGER TYPE	BEFORE STRESS	AFTER STRESS	BEFORE STRESS	AFTER STRESS

TIP TO GROUND AC MEASUREMENT:

> 100	130/15	B	0	0	∞	∞
> 100	130/20	A&B	0	0	∞	∞
> 100	130/30	A&B	0	0	∞	∞
> 100	130/35	B	0	0	∞	∞
> 100	130/40	B	0	0	∞	∞
> 100	130/45	B	0	0	∞	∞
> 100	150/50	B	0	0	∞	∞
> 100	150/55	B	0	0	∞	∞
> 100	150/60	B	0	0	∞	∞
> 100	150/64	B	0	0	∞	∞
> 100	150/68	B	0	0	∞	∞

RING TO GROUND AC MEASUREMENT:

> 100	130/15	B	0	0	∞	∞
> 100	130/20	A&B	0	0	∞	∞
> 100	130/30	A&B	0	0	∞	∞
> 100	130/35	B	0	0	∞	∞
> 100	130/40	B	0	0	∞	∞
> 100	130/45	B	0	0	∞	∞
> 100	150/50	B	0	0	∞	∞
> 100	150/55	B	0	0	∞	∞
> 100	150/60	B	0	0	∞	∞
> 100	150/64	B	0	0	∞	∞
> 100	150/68	B	0	0	∞	∞

Ringer Equivalence: Sensitivity of reading is limited to 1000K Ω

RESULTS: MEETS THE REFERENCED TECHNICAL REQUIREMENT

TECHNICIAN: Gary Nova **DATE:** 28 February 2006

MARSTECH LIMITED

TEST 10

ON-HOOK DC RESISTANCE

REFERENCE:

CS-03, Issue 9, Clause 3.7.1; TIA-968-A, Clause 4.7.2.1 and 4.7.2.2

CRITERIA:

The DC Resistance Tip to Ring, Tip to Ground, Ring to Ground shall be greater than 5MΩ from 1-100 Volts and greater than 30KΩ from 100-200 Volts.

SPECIFICATION		DC CURRENT (μA)		DC RESISTANCE V/I (MΩ)	
		BEFORE STRESS	AFTER STRESS	BEFORE STRESS	AFTER STRESS
MINIMUM RESISTANCE	DC VOLTAGE APPLIED				

TIP TO RING

5MΩ	+1 V	0	0	∞	∞
5MΩ	-1 V	0	0	∞	∞
5MΩ	+5 V	0	0	∞	∞
5MΩ	-5 V	0	0	∞	∞
5MΩ	+10 V	0	0	∞	∞
5MΩ	-10 V	0	0	∞	∞
5MΩ	+20 V	0	0	∞	∞
5MΩ	-20 V	0	0	∞	∞
5MΩ	+30 V	0	0	∞	∞
5MΩ	-30 V	0	0	∞	∞
5MΩ	+40 V	0	0	∞	∞
5MΩ	-40 V	0	0	∞	∞
5MΩ	+50 V	0	0	∞	∞
5MΩ	-50 V	0	0	∞	∞
5MΩ	+60 V	0	0	∞	∞
5MΩ	-60 V	0	0	∞	∞
5MΩ	+70 V	0	0	∞	∞
5MΩ	-70 V	0	0	∞	∞
5MΩ	+80 V	0	0	∞	∞
5MΩ	-80 V	0	0	∞	∞
5MΩ	+90 V	0	0	∞	∞
5MΩ	-90 V	0	0	∞	∞
5MΩ	+100V	0	0	∞	∞
5MΩ	-100V	0	0	∞	∞
30KΩ	+150V	0	0	∞	∞
30KΩ	-150V	0	0	∞	∞
30KΩ	+200V	0.1	0.1	2000.00	2000.00
30KΩ	-200V	-0.1	-0.1	2000.00	2000.00

TEST 18

HEARING AID COMPATIBILITY TEST

REFERENCE:

CS-03, Issue 9, Part V Clause 4

FCC, Part 68, Clause 68.316

CONDITION:

SPEAKER Kan Tsang SD157BH-C1 (MODEL VOIP321XY/ZZ)

CRITERIA:

- 1. AXIAL > -19 dB
- 2. RADIAL > -27 dB
- 3. FREQUENCY RESPONSE WITHIN LIMITS ON GRAPH

INPUT: 1KHz AT -10 dBV

READING: dB RELATIVE TO 1A/m

- 1. AXIAL : -5.5 dB
- 2. RADIAL: 0 DEG.: -14.5 dB 90 DEG.: -16 dB
 180 DEG.: -14.5 dB 270 DEG.: -16 dB

- 3. FREQUENCY RESPONSE:

LOW VOLUME

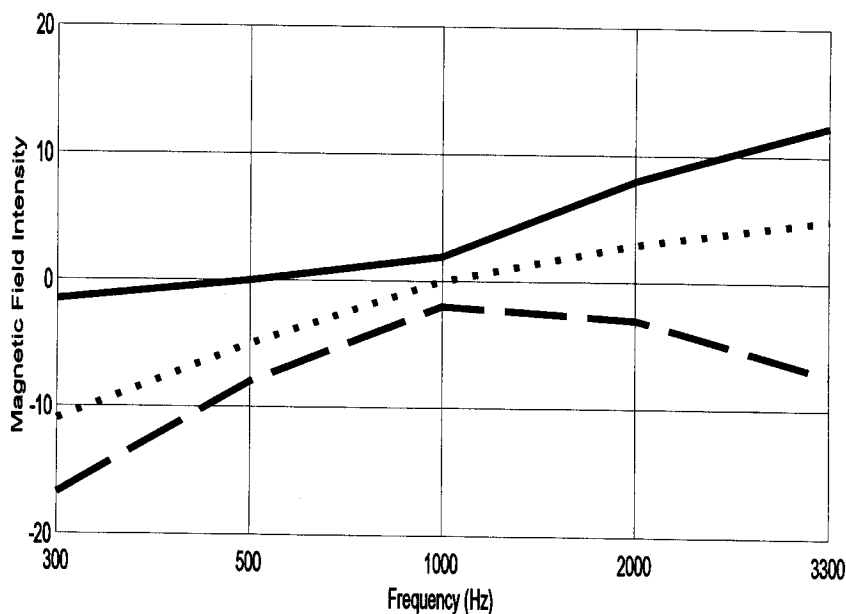


Figure 4.2

Magnetic Field Intensity Frequency Response for Receivers with an Axial Field that Exceeds -19dB Relative to 1 A/m Without Using an Integrator (See Section 4.4 and Figure 2).

RESULTS:

MEETS THE REFERENCED TECHNICAL REQUIREMENT

TECHNICIAN:

Gary Nova

DATE:

28 February 2006

TEST 18

HEARING AID COMPATIBILITY TEST

REFERENCE:

CS-03, Issue 9, Part V Clause 4

FCC, Part 68, Clause 68.316

CONDITION:

SPEAKER Kan Tsang SD157BH-2 (MODEL CIT300)

CRITERIA:

- 1. AXIAL > -19 dB
- 2. RADIAL > -27 dB
- 3. FREQUENCY RESPONSE WITHIN LIMITS ON GRAPH

INPUT: 1KHz AT -10 dBV

READING: dB RELATIVE TO 1A/m

- 1. AXIAL : -7.5 dB
- 2. RADIAL: 0 DEG.: -18.5 dB 90 DEG.: -19 dB
 180 DEG.: -19.5 dB 270 DEG.: -19 dB

- 3. FREQUENCY RESPONSE:

LOW VOLUME

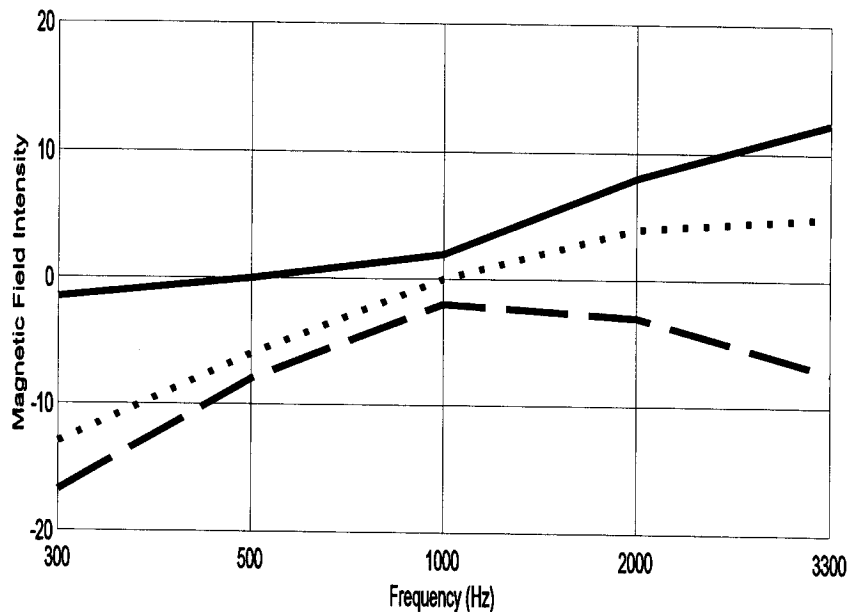


Figure 4.2

Magnetic Field Intensity Frequency Response for Receivers with an Axial Field that Exceeds -19dB Relative to 1 A/m Without Using an Integrator (See Section 4.4 and Figure 2).

RESULTS:

MEETS THE REFERENCED TECHNICAL REQUIREMENT

TECHNICIAN:

Gary Nova

DATE:

01 March 2006

MARSTECH LIMITED

TEST 22 LONGITUDINAL VOLTAGE/POWER LINE SURGE

REFERENCE: CS-03, Issue 9, Clause 2.5; TIA-968-A, Clause 4.2.4

CRITERIA: **The unit shall not cause harm to the Network after the Longitudinal Voltage/Power Line Surges.**

TEST	CONDITION	APPLIED TO	RESULT
+2500V (2 x 10)	ON-HOOK	PHASE TO NEUTRAL	Satisfactory
+2500V (2 x 10)	ON-HOOK	PHASE TO NEUTRAL	Satisfactory
+2500V (2 x 10)	ON-HOOK	PHASE TO NEUTRAL	Satisfactory
-2500V (2 x 10)	ON-HOOK	PHASE TO NEUTRAL	Satisfactory
-2500V (2 x 10)	ON-HOOK	PHASE TO NEUTRAL	Satisfactory
-2500V (2 x 10)	ON-HOOK	PHASE TO NEUTRAL	Satisfactory

RESULTS: **MEETS THE REFERENCED TECHNICAL REQUIREMENT**

TECHNICIAN: Gary Nova **DATE:** 28 February 2006

TEST 25 **MECHANICAL SHOCK**

REFERENCE: CS-03, Issue 9, Clause 2.1; TIA-968-A, Clause 4.2.1

CRITERIA: **The unit shall not cause harm to the Network after the Drop Shock Stresses**

EQUIPMENT WEIGHT: Unpackaged (lb): 1.6

EQUIPMENT	TEST	DAMAGE
UNPACKAGED	(All drops onto concrete covered with 3 mm asphalt tile.)	
Handheld	18 random 1.5 m drops.	None
Desk Top (0-5 kg)	One 750 mm drop on each normal or designated rest face.	None
	One 750 mm drop on other faces and corners.	None
	One 750 mm drop on each corner.	None
	One 750 mm edgewise and corner-wise drop on each edge and corner adjacent to rest face.	None

RESULTS: **MEETS THE REFERENCED TECHNICAL REQUIREMENT**

TECHNICIAN: Gary Nova **DATE:** 28 February 2006

MARSTECH LIMITED

TEST 27 NETWORK CONTROL SIGNALLING

REFERENCE: CS-03, Issue 9, Clause 3.4.3; TIA-968-A, Clause 4.5.2.2

CRITERIA: **Limitation on Signal Sources Primarily Intended for Network Signalling in Voice and Data Equipment.**

Handset Earpiece/Speakerphone

SPECIFICATION				SIGNAL LEVEL IN dBm MEASURED WITH VARIOUS LOOP CURRENTS					
				BEFORE STRESS (dBm)			AFTER STRESS (dBm)		
BUTTON DESIGNATION	LIMIT (dBm)			20 mA	40 mA	70 mA	20 mA	40 mA	70 mA
	DTMF	TIE TRUNK	OTHER						
"0"	0	-4	-9	-8	-8	-8	-8	-8	-8
"1"	0	-4	-9	-8	-8	-8	-8	-8	-8
"2"	0	-4	-9	-8	-8	-8	-8	-8	-8
"3"	0	-4	-9	-8	-8	-8	-8	-8	-8
"4"	0	-4	-9	-8	-8	-8	-8	-8	-8
"5"	0	-4	-9	-8	-8	-8	-8	-8	-8
"6"	0	-4	-9	-8	-8	-8	-8	-8	-8
"7"	0	-4	-9	-8	-8	-8	-8	-8	-8
"8"	0	-4	-9	-8	-8	-8	-8	-8	-8
"9"	0	-4	-9	-8	-8	-8	-8	-8	-8
"*"	0	-4	-9	-8	-8	-8	-8	-8	-8
"#"	0	-4	-9	-8	-8	-8	-8	-8	-8

RESULTS: MEETS THE REFERENCED TECHNICAL REQUIREMENT

TECHNICIAN: Gary Nova **DATE:** 28 February 2006

MARSTECH LIMITED

TEST 28 TRANSVERSE BALANCE

REFERENCE: CS-03, Issue 9, Clause 3.6; TIA-968-A, Clause 4.6

CRITERIA: Transverse Balance Shall not be less than minimum values specified below.

SPECIFICATION		dB BALANCE							
		ON-HOOK		OFF-HOOK					
		BEFORE STRESS	AFTER STRESS	BEFORE STRESS			AFTER STRESS		
FREQ. (Hz)	MINIMUM BALANCE REQUIREMENT			LOOP CURRENT (mA)			LOOP CURRENT (mA)		
				20	45	70	20	45	70
200	60 On Hook (40 Off Hook and Data)	> 90	> 90	> 90	> 90	> 90	> 90	> 90	> 90
400	60 On Hook (40 Off Hook and Data)	> 90	> 90	> 90	> 90	> 90	> 90	> 90	> 90
600	60 On Hook (40 Off Hook and Data)	> 90	> 90	> 90	> 90	> 90	> 90	> 90	> 90
800	60 On Hook (40 Off Hook and Data)	> 90	> 90	> 90	> 90	> 90	> 90	> 90	> 90
1000	60 On Hook (40 Off Hook and Data)	> 90	> 90	> 90	> 90	> 90	> 90	> 90	> 90
2000	40	> 90	> 90	> 90	> 90	> 90	> 90	> 90	> 90
3000	40	90	90	> 90	> 90	> 90	> 90	> 90	> 90
4000	40	90	90	> 90	> 90	> 90	> 90	> 90	> 90

RESULTS: MEETS THE REFERENCED TECHNICAL REQUIREMENT

TECHNICIAN: Gary Nova **DATE:** 28 February 2006

MARSTECH LIMITED

TEST 29

METALLIC AC IMPEDANCE DURING RINGING

REFERENCE: CS-03, Issue 9, Clause 3.7.3.1 (1); TIA-968-A, Clause 4.7.2.4

CRITERIA: During Ringing Voltage application AC Impedance shall exceed 1400Ω @ 20Hz or 1000Ω @ 30Hz (1600Ω from 15Hz - 68Hz depending on Ringer Type - FCC only).

SPECIFICATION			AC CURRENT (μA)		IMPEDANCE (KΩ)	
FREQ. (Hz)	VOLTAGE (VAC)	RINGER TYPE	BEFORE STRESS	AFTER STRESS	BEFORE STRESS	AFTER STRESS
15	40	B	2.00	2.00	20000.00	20000.00
15	130	B	11.00	11.00	11818.18	11818.18
20	40	A&B	3.00	3.00	13333.33	13333.33
20	130	A&B	16.00	16.00	8125.00	8125.00
30	40	A&B	5.00	5.00	8000.00	8000.00
30	130	A&B	26.00	26.00	5000.00	5000.00
35	62	B	12.00	12.00	5166.67	5166.67
35	130	B	30.00	30.00	4333.33	4333.33
40	62	B	14.00	14.00	4428.57	4428.57
40	130	B	36.00	36.00	3611.11	3611.11
45	62	B	16.00	16.00	3875.00	3875.00
45	130	B	40.00	40.00	3250.00	3250.00
50	62	B	17.00	17.00	3647.06	3647.06
50	150	B	50.00	50.00	3000.00	3000.00
55	62	B	19.00	19.00	3263.16	3263.16
55	150	B	56.00	56.00	2678.57	2678.57
60	62	B	21.00	21.00	2952.38	2952.38
60	150	B	64.00	64.00	2343.75	2343.75
64	62	B	23.00	23.00	2695.65	2695.65
64	150	B	70.00	70.00	2142.86	2142.86
68	62	B	25.00	25.00	2480.00	2480.00
68	150	B	76.00	76.00	1973.68	1973.68

FCC RINGER TYPE: B

RESULTS: MEETS THE REFERENCED TECHNICAL REQUIREMENT

TECHNICIAN: Gary Nova **DATE:** 28 February 2006

TEST 45 HEARING AID COMPATABILITY - VOLUME CONTROL

REFERENCE: CS-03, Issue 9, Part V, Clause 6. FCC Part 68, Clause 68.317

CONDITION: SPEAKER: Kan Tsang SD157BH-C1 (MODEL VOIP321XY/ZZ)

SEALING RING: Yes

FREQ.	0 KM						2.7 KM						4.6 KM					
	MIN. VOLUME (ROLR 41-51dB)			MAXIMUM VOLUME			MIN. VOLUME (ROLR 43-53dB)			MAXIMUM VOLUME			MIN. VOLUME (ROLR 45-55dB)			MAXIMUM VOLUME		
	dBS PL	dBPa	Calculations	dBSPL	dBPa	Calculations	dBS PL	dBPa	Calculations	dBS PL	dBPa	Calculations	dBS PL	dBPa	Calculations	dBS PL	dBPa	Calculations
300 Hz	71.0	-16.0		98.0	5.0		77.0	-16.0		98.0	5.0		75.5	-17.5		98.5	3.5	
	300			300			300			300			300			300		
400 Hz	83.0	-12.0	0.4835 0.0604	102.5	8.5	0.1249 1.4296 0.1786	82.5	-12.5	0.1249 0.4764 0.0595	103.5	8.5	1.4296 0.1786	80.5	-14.5	0.1249 0.4342 0.0542	101.0	6.0	0.1249 1.2849 0.1605
	400			400			400			400			400			400		
500 Hz	87.0	-8.0	0.0969 0.5958 0.0377	107.0	12.0	0.0969 1.7170 0.1664	86.5	-8.5	0.0969 0.5804 0.0562	106.5	11.5	1.6928 0.1640	84.0	-11.0	0.0969 0.5153 0.0499	104.0	9.0	0.0969 1.4852 0.1439
	500			500			500			500			500			500		
600 Hz	90.0	-4.5	0.0792 0.7241 0.0573	109.0	14.5	0.0792 2.0448 0.1588	89.0	-5.5	0.0792 0.6954 0.0551	108.0	13.5	1.9261 0.1525	87.0	-7.5	0.0792 0.6189 0.0490	105.5	11.0	0.0792 1.6899 0.1338
	600			600			600			600			600			600		
700 Hz	91.5	-2.0	0.0669 0.8454 0.0566	110.5	16.0	0.0669 2.2229 0.1487	91.5	-3.0	0.0669 0.8023 0.0537	109.0	14.5	2.0813 0.1392	89.0	-5.5	0.0669 0.7126 0.0477	106.5	12.0	0.0669 1.8250 0.1222
	700			700			700			700			700			700		
1000 Hz	97.0	3.0	0.1349 1.0353 0.1004	111.0	17.0	0.1349 3.3722 0.3675	95.5	1.5	0.1349 0.9682 0.1090	109.5	15.5	2.1931 0.3397	92.5	-1.5	0.1349 0.8372 0.1207	106.5	12.5	0.1349 1.8987 0.2941
	1K			1K			1K			1K			1K			1K		
1500 Hz	96.0	2.0	0.1761 1.4021 0.2008	109.5	15.5	0.1761 2.3424 0.4125	94.0	0.0	0.1761 1.0608 0.1833	107.5	13.5	1.7161 0.3766	90.0	-4.0	0.1761 0.8678 0.1528	103.5	9.5	0.1761 1.7838 0.3141
	1.5K			1.5K			1.5K			1.5K			1.5K			1.5K		
2000 Hz	94.0	-2.0	0.1249 1.0655 0.1256	108.0	12.0	0.1249 2.6621 0.2576	91.5	-4.5	0.1249 0.8951 0.1118	107.5	9.5	1.8354 0.2292	87.0	-9.0	0.1249 0.7178 0.0897	100.5	4.5	0.1249 1.4548 0.1817
	2K			2K			2K			2K			2K			2K		
2300 Hz	93.5	-4.0	0.0607 0.8559 0.0520	107.0	9.5	0.0607 1.7589 0.1068	91.0	-6.5	0.0607 0.7509 0.0456	104.5	7.0	1.4822 0.0957	86.0	-11.5	0.0607 0.5861 0.0356	99.0	1.5	0.0607 1.1736 0.0712
	2.3K			2.3K			2.3K			2.3K			2.3K			2.3K		
2700 Hz	93.0	-6.0	0.0696 0.7708 0.0536	106.5	7.5	0.0696 1.5623 0.1087	90.0	-9.0	0.0696 0.6680 0.0465	103.0	4.0	1.3376 0.0931	84.5	-14.5	0.0696 0.5880 0.0354	97.5	-1.5	0.0696 1.0021 0.0698
	2.7K			2.7K			2.7K			2.7K			2.7K			2.7K		
3000 Hz	93.0	-6.5	0.0448 0.7111 0.0330	106.0	6.5	0.0448 1.4429 0.0661	89.5	-10.0	0.0448 0.6085 0.0279	102.5	3.0	1.2014 0.0450	83.5	-16.0	0.0448 0.4506 0.0206	94.5	-3.0	0.0448 0.8896 0.0407
	3K			3K			3K			3K			3K			3K		
3300 Hz	93.0	-6.5	0.0414 0.7117 0.0295	106.5	7.0	0.0414 1.4238 0.0589	89.0	-10.5	0.0414 0.5849 0.0242	102.5	3.0	1.1700 0.0484	83.0	-16.5	0.0414 0.4273 0.0177	96.0	-3.5	0.0414 0.8437 0.0349
	3.3K			3.3K			3.3K			3.3K			3.3K			3.3K		
SE		0.7024			4.3453			0.5813			3.6249			0.3945			2.4566	
ROLR:		47.04			31.21			48.69			32.79			52.05			36.17	
GAIN: (12-18dB)					15.83						15.90						15.88	

RESULTS: MEETS THE REFERENCED TECHNICAL REQUIREMENT

TECHNICIAN: Gary Nova

DATE: 28 February 2006

TEST 45 HEARING AID COMPATABILITY - VOLUME CONTROL

REFERENCE: CS-03, Issue 9, Part V, Clause 6. FCC Part 68, Clause 68.317

CONDITION: SPEAKER: **Kan Tsang** (MODEL CIT300)
SEALING RING: **Yes**

FREQ.	0 KM						2.7 KM						4.6 KM					
	MIN. VOLUME (ROLR 41-51dB)			MAXIMUM VOLUME			MIN. VOLUME (ROLR 43-53dB)			MAXIMUM VOLUME			MIN. VOLUME (ROLR 45-55dB)			MAXIMUM VOLUME		
	dBS PL	dBPa	Calculations	dB SPL	dBPa	Calculations	dBS PL	dBPa	Calculations	dBS PL	dBPa	Calculations	dBS PL	dBPa	Calculations	dBS PL	dBPa	Calculations
300 Hz	89.0	-4.0		104.0	11.0		86.5	-7.5		104.0	11.0		85.5	-9.5		102.0	9.0	
	300			300			300			300			300			300		
400 Hz	92.5	-2.5	0.8442	107.0	12.0	1.8260 0.2281	92.0	-3.0	0.1249 0.7630 0.0955	107.0	12.0	1.8260 0.2281	90.0	-5.0	0.1249 0.6890 0.0861	104.5	9.5	0.1249 1.6228 0.2027
	400			400			400			400			400			400		
500 Hz	93.0	-2.0	0.8990 0.0061	107.5	12.5	1.8987 0.1840	92.5	-2.5	0.0969 0.8660 0.0839	107.0	12.0	1.8738 0.1816	90.0	-5.0	0.0969 0.7698 0.0746	104.5	9.5	0.0969 1.6440 0.1593
	500			500			500			500			500			500		
600 Hz	92.5	-2.0	0.8990 0.0061	107.5	12.5	1.8987 0.1840	92.5	-2.5	0.0969 0.8660 0.0839	107.0	12.0	1.8738 0.1816	90.0	-5.0	0.0969 0.7698 0.0746	104.5	9.5	0.0969 1.6440 0.1593
	600			600			600			600			600			600		
700 Hz	92.0	-2.5	0.8669 0.8890 0.0595	106.5	12.0	1.8987 0.1270	91.0	-3.5	0.0669 0.8350 0.0572	105.5	11.0	1.8019 0.1205	88.5	-6.0	0.0669 0.7402 0.0495	102.5	8.0	0.0669 1.5607 0.1044
	700			700			700			700			700			700		
1000 Hz	91.5	-2.5	0.1549 0.8774 0.1359	105.5	11.5	1.8496 0.2865	90.0	-4.0	0.1549 0.8219 0.1273	104.0	10.0	1.7329 0.2684	87.0	-7.0	0.1549 0.7119 0.1103	101.0	7.0	0.1549 1.4812 0.2294
	1K			1K			1K			1K			1K			1K		
1500 Hz	91.0	-3.0	0.1761 0.8660 0.1525	105.0	11.0	1.8019 0.3173	89.0	-5.0	0.1761 0.7905 0.1392	103.0	9.0	1.6446 0.2896	85.0	-9.0	0.1761 0.6588 0.1160	99.0	5.0	0.1761 1.2707 0.2414
	1.5K			1.5K			1.5K			1.5K			1.5K			1.5K		
2000 Hz	91.0	-5.0	0.1249 0.8122 0.1014	105.5	9.5	1.7112 0.2137	88.5	-7.5	0.1249 0.7236 0.0903	103.0	7.0	1.5220 0.1901	84.0	-12.0	0.1249 0.5790 0.0723	98.0	2.0	0.1249 1.2047 0.1505
	2K			2K			2K			2K			2K			2K		
2300 Hz	86.5	-7.0	0.0607 0.7315 0.0444	104.5	7.0	1.5432 0.0937	86.0	-9.5	0.0607 0.6418 0.0390	102.0	4.5	1.3440 0.0822	83.0	-14.5	0.0607 0.5009 0.0304	97.0	-0.5	0.0607 1.0423 0.0833
	2.3K			2.3K			2.3K			2.3K			2.3K			2.3K		
2700 Hz	86.5	-9.0	0.0606 0.6588 0.0409	104.0	5.0	1.3707 0.0954	86.5	-12.5	0.0606 0.5641 0.0393	101.0	2.0	1.1879 0.0837	81.0	-18.0	0.0606 0.4290 0.0299	95.0	-4.0	0.0606 0.8927 0.0621
	2.7K			2.7K			2.7K			2.7K			2.7K			2.7K		
3000 Hz	89.5	-10.0	0.0458 0.6085 0.0279	103.5	4.0	1.2660 0.0580	86.0	-13.5	0.0458 0.5066 0.0232	100.0	0.5	1.0684 0.0489	80.0	-19.5	0.0458 0.3751 0.0172	94.0	-5.5	0.0458 0.7805 0.0357
	3K			3K			3K			3K			3K			3K		
3300 Hz	90.0	-9.5	0.0414 0.6004 0.0249	104.0	4.5	1.2492 0.0517	86.0	-13.5	0.0414 0.4934 0.0204	100.0	0.5	1.0414 0.0425	79.5	-20.0	0.0414 0.3558 0.0147	93.5	-6.0	0.0414 0.7402 0.0306
	3.3K			3.3K			3.3K			3.3K			3.3K			3.3K		
SE	0.6483						0.5367						0.3681					
ROLR:	47.74						49.38						52.65					
GAIN: (12-18dB)	14.31						14.56						14.44					

RESULTS: MEETS THE REFERENCED TECHNICAL REQUIREMENT

TECHNICIAN: Gary Nova DATE: 01 March 2006

MARSTECH LIMITED

A C C U R A C Y - P A R T I		
Electrical Stress		± 5%
Extraneous DC Energy		± .5%
Metallic AC Energy	2 - 100 Hz	± 1 dB
	C Message	± 1 dB
Longitudinal AC Energy	F/4000 Hz	± 1 dB
	4 kHz - 1 MHz	± 3 dB
	1.6 MHz - 1.8 MHz	± 3 dB
Transmitted Signal Power	.002 - 4 kHz	± 1 dB
	3.995 - 4.005 kHz	± 1 dB
	4 kHz - 12 kHz	± 1 dB
	12 kHz - 1 MHz	± 3 dB
	1.6 MHz - 1.8 MHz	± 3 dB
Single Frequency Restriction		± 10%
Longitudinal Balance		± 1 dB
On-Hook Terminal Impedance		± 5%
Off-Hook Metallic Impedance		± 1.2dB
On-Hook Terminal Resistance		± .5%
Off-Hook Terminal Resistance		± .5%
Through Transmission Path		± 1 dB
Auto Diallers Signal Timing		+ 2 m sec

A C C U R A C Y - P A R T V		
Hearing Aid Compatibility		± 2 dB
Hearing Aid Compatibility Volume Control		± 2 dB