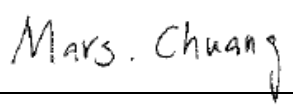
TEST REPORT

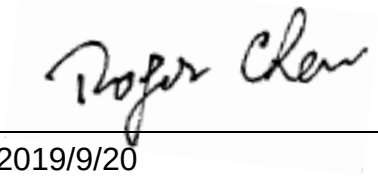
(Specification: TIA 968-B；B-1；B-2；B-3　March 2016)

Testing Laboratory
1288

Product	:	Call Blocker
Trade Name	:	DIGITONE COMMUNICATIONS
Model No.	:	Digitone ProSeries II
Applicant	:	DIGITONE COMMUNICATIONS
Applicant Address	:	10580 N. McCARRAN BLVD. SUITE 115-543 RENO, NV 89503 USA

Report Number	MLT1905P68001
Customer	DIGITONE COMMUNICATIONS
Product	Call Blocker
Sample Received Date	2019/5/30
SampleTested Date	2019/5/30 ～ 2019/9/12

Report Prepared By	Mars Chuang
Signature	
Date Prepared	2019/9/20

Report Authorised By	Roger Chen
Signature	
Date Authorised	2019/9/20

Test By

Max Light Technology Co., Ltd.
Room 5, 8F, No.125, Section 3 Roosevelt Road,
Taipei, Taiwan., R.O.C.
Office : Tel: 886-2-2363-2447 Fax: 886-2-2363-2597
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It shall not be reproduced except in full, without the written approval of our laboratory.
This test report not include the evaluation of MU.
The test results only relate to the submitted test sample specified above.

History of Test Report

Original Report Issue Date: 2019/9/20

■ No additional attachment

☐ Additional attachments were issued as in the following record:

Attachment No.	Issue Date	Description
MLT1905P68001	2019/9/20	Original report

Summary Of Tests

Test No.	Section		Test Description	Summary
1	4.1.1		Mechanical Shock (Unpackaged)	PASS
1	4.1.2		Telephone Line Surge **Type A**	PASS
1	4.1.3		Telephone Line Surge **Type B**	PASS
1	4.1.4		Power Line Surge	PASS
2	4.2		Leakage Current Limitations	PASS
3	4.3		Hazardous Voltage Limitations	PASS
4	4.4		Billing Protection	PASS
5	4.4.3		Signaling Interference	PASS
6	5.1.1	5.1.2.1	General analog voice band signal power limits	PASS
7	5.1.3.1		Limitations on signals intended for network control signaling (DTMF)	PASS
8	5.1.6.1		Signal Power in the 3995-4005Hz	PASS
9	5.1.8	5.1.8.1	Metallic Voltage 4KHz to 30MHz	PASS
10	5.1.7	5.1.8.3	Longitudinal Voltage 0.1kHz to 6MHz	PASS
11	5.1.10		Transverse Balance Limitations	PASS
12	5.1.11.2.1	5.1.11.2.2	ON-HOOK DC Resistance Limitations	PASS
13	5.1.12.2.3		DC Current During Ringing	PASS
14	5.1.11.2.4	5.1.11.2.5	Ringing Frequency Impedance	PASS
15	5.1.11.2.6		Ringer Equivalence Definition(REN)	PASS
16	5.1.11.4		Loop Current Requirements	PASS
17	68.316		Hearing Aid Compatibility (HAC**)**	N/A
18	68.317		Telephone Receive Volume Control	N/A

TEST EQUIPMENT UTILISED

Brand	Instrument	Model No.	Series No.	Calibrated Date	Next Cal. Date
TAS	Network Emulator	151	MS9610 1567	N/A	N/A
HP	Multimeter	34401A	3146A65646	2019/07/23	2020/07/23
HP	Multimeter	34401A	3146A07047	2018/11/15	2019/11/15
MLT	Longitudinal network	A-105	36987412	N/A	N/A
GW	Power Supply	6030D	5714221	N/A	N/A
EXTEC	Leakage Current Tester	7430	E090042	2019/07/26	2020/07/26
HP	Spectrum Analyzer	3585B	2904J02993	2018/11/11	2019/11/11
HP	S.G	8904A	2948A04894	2019/07/31	2020/07/31
SYSGRATION	Telephone Tester	1099	4010040002	2019/05/17	2020/05/17
KIKUSUI	Power Supply	PAD 500-1.2AD	AH000386	N/A	N/A
TEK	Scope	TDS 520D	B021579	2019/03/15	2020/03/15
Y&K	Surge Tester	1102	60P0319	2018/12/27	2019/12/27
Y&K	Surge Tester	1103	60Q2356	2018/12/27	2019/12/27
Agilent	Differential Probe AMP	1141A / 1142A	US34513714	N/A	N/A
ADVANTEST	FFT Analyzer	9211C	52020097	2019/01/11	2020/01/11
Sunlight	Telephone Analyzer	170A	A0390119AC	2019/07/26	2020/07/26
AI	CALL ID Analyzer	SN 120028	SN 120028	2018/06/26	2019/06/26
HP	LF Impedance Analyzer	4192A	LR53536C	2018/11/19	2019/11/19
Consultronics	AUTO-TIMS	AUTO-TIMS	AT0793F2321	2018/12/23	2019/12/23

MEASUREMENT UNCERTAINTY

ITEM	UNIT	M.U			
Loop Current	Voltage: % Current: %	Voltage: 0.014 %		Current: 0.069 %	
Ring impedance	Voltage: % Current: %	Voltage: 0.028 %		Current: 2.310 %	
ON-Hook impedance	%	0.008 %			
Transverse Balance	dB	OFF-Hook: 0.276 dB		ON-Hook: 0.276 dB	
Signal power	dB	0.276 dB			
Leakage Current	Voltage: V Current: mA	Voltage: 3.482 V		Current: 0.501 mA	
Billing Protection	dB	0.278 dB			
xDSL Power Spectral Density	Freq.: %, Level: dB	Frequency	1.40e-06	Level	0.597 dB
Outband signal power	Freq.: %, Level: dB	Frequency: 0.115 %		Level: 0.276 dB	
Control signaling (DTMF)	Freq.: %, Level: dB	Frequency: 2.60 %		Level: 0.01 dB	

Test No. 1 (Section 4.1) Environmental Simulation

4.1.1 Mechanical Shock **(Unpackaged)**

Hand Held Items Normally Used at Head Height: 18 random drops from a height of 1.5meters onto concrete covered with 3mm asphalt tile or similar surface. **N/A**

Table (Desk) - Top Equipment 0–5 kg: Six random drops from a height of 750 mm onto concrete covered with 3 mm asphalt tile or similar surface. **PASS**

4.1.2 Telephone Line Surge **Type A**

4.1.2.1 Metallic

Two metallic voltage surges (one of each polarity) shall be applied between any pair of connections on which lightning surges may occur.

The surge shall have an open circuit voltage waveform in accordance with figure 2 having a front time (tf) of 6 µs minimum to 10 µs maximum, and a decay time (td) of 560 µs minimum to 860 µs maximum. It shall have a short circuit current wave shape in accordance with figure 3 having a front time (tf) of 5 µs minimum to 10 µs maximum, and a decay time (td) of 560 µs minimum to 760 µs maximum. The peak voltage shall be 800 V minimum to 880 V maximum, and the peak short circuit current shall be 100 A minimum to 115 A maximum.

Test Condition	ON-HOOK		OFF-HOOK	
	Normal	Reverse	Normal	Reverse
Tip to Ring	PASS	PASS	PASS	PASS

4.1.2.2 Longitudinal

Two longitudinal voltage surges (one of each polarity) shall be applied to any pair of connections on which lightning surges may occur.

The surge shall have an open circuit voltage waveform in accordance with figure 2 with a front time (tf) of 6 µs minimum to 10 µs maximum, and a decay time (td) of 160 µs minimum to 260 µs maximum. It shall have a short circuit current wave shape in accordance with figure 3 having a front time (tf) of 5 µs minimum to 10 µs maximum, and a decay time (td) of 160 µs minimum to 210 µs maximum. The peak voltage shall be 1500 V minimum to 1650 V maximum, and the peak short circuit current shall be 200 A minimum to 230 A maximum.

Test Condition	ON-HOOK		OFF-HOOK	
	Normal	Reverse	Normal	Reverse
T+R to GND	PASS	PASS	PASS	PASS

4.1.3 Telephone Line Surge **Type B**

4.1.3.1 Metallic

Two metallic voltage surges (one of each polarity) shall be applied to equipment between any pair of connections on which lightning surges may occur.

The surge shall have an open circuit voltage waveform in accordance with figure 2 having a front time (tf) of 9 µs ± 2.7 µs and a decay time (td) of 720 µs ± 144 µs and shall have a short circuit current wave shape in accordance with figure 3 having a front time (tf) of 5 µs 1.5 µs and a decay time (td) of 320 µs ± 64 µs. The peak voltage shall be at least 1000 V minimum to 1100 V maximum, and the peak short circuit current shall be at least 25 A minimum to 27.5 A maximum.

Test Condition	ON-HOOK		OFF-HOOK	
	Normal	Reverse	Normal	Reverse
Tip to Ring	PASS	PASS	PASS A	PASS

4.1.3.2 Longitudinal

Two longitudinal voltage surges (one of each polarity) shall be applied to any pair of connections on which lightning surges may occur.

For each output lead of the surge generator, with the other lead open, the surge shall have an open circuit voltage waveform in accordance with figure 2 having a front time (tf) of 9 µs ± 2.7 µs and a decay time (td) of 720 µs ± 144 µs and shall have a short circuit current wave shape in accordance with figure 3 having a front time (tf) of 5 µs ± 1.5 µs and a decay time (td) of 320 µs ± 64 µs. The peak voltage shall be 1500 V minimum to 1650 V maximum, and the peak short circuit current shall be 37.5 A minimum to 41.3 A maximum.

Test Condition	ON-HOOK		OFF-HOOK	
	Normal	Reverse	Normal	Reverse
T+R to GND	PASS	PASS	PASS	PASS

4.1.4 Power Line Surge

Six power line surges (three of each polarity) shall be applied between the phase and neutral terminals of the AC power line while the equipment is being powered. The surge shall have an open circuit voltage waveform in accordance with figure 2 having a front time (tf) of 1 µs minimum to 2 µs maximum, and a decay time (td) of 10 µs minimum to 19 µs maximum, and shall have a short circuit current wave shape in accordance with figure 3 with a front time (tf) of 1 µs minimum to 2 µs maximum, and a decay time (td) of 10 µs minimum to 19 µs maximum. The peak voltage shall be 2500 V minimum to 2750 V maximum, and the peak short circuit current shall be 1000 A minimum to 1250 A maximum.

Test Condition	Normal	Reverse
Phase to Neutral	PASS	PASS

Test No. 2 (Section 4.2) Leakage Current Limitations

Approved terminal equipment and approved protective circuitry shall have a voltage applied to the combination of points listed in the table below. The test voltage shall be ac of 50 or 60 Hz rms.

Gradually increase the voltage from zero to the values listed in the Table over a 30-second time period, and then maintain the voltage for one minute. The current in the mesh formed by the voltage source and these points shall not exceed 10 mA peak at any time during this 90-second interval.

Equipment states necessary for compliance with the requirements of this section that cannot be achieved by normal means of power shall be achieved artificially by appropriate means.

a). All telephone connection
b). All power connection
c). All possible combinations of exposed conductive surface on the exterior of such equipment, excluding terminals for connection to other equipment.
d). All terminals for connection to approved protective circuitry approved equipment;
e). All auxiliary lead terminals
f). All E&M lead terminals, and
g). All PR, PC, CY1 and CY2 leads

Measurement (before E.S) : Limit < 10mA peak

Test Points	Voltage Applied	ON-Hook	OFF-Hook	Limit(mA) (Peak)
a and c	1000	0.012	0.012	10
b and c	1500	0.039	N/A	10
a and b	1500	0.016	N/A	10

Measurement (after E.S): Limit < 10mA peak

Test Result: No change

Comments: PASS

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Test No. 3 (Section 4.3) Hazardous Voltage Limitations

Under no condition of failure of approved terminal equipment or approved protective circuitry that 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 measured between the appropriate leads shall not exceed 70V peak after 1 second. 120Vrms, 60Hz voltage source is applied between the ground and the connection point of hazardous points tied together.

Measurement (before E.S) : Limit < 70Volt peak

Test Points	Results (V)	Limit(V) (Peak)
T-R	0.1	70
T-G	0.1	70
R-G	0.1	70

Measurement (after E.S): Limit < 70Volt peak

Test Result: No change

Comments: PASS

Test No. 4 (Section 4.4) Billing Protection

Approved protective circuitry connected to associated data equipment shall assure that the following signal power limitations are met for at least the first 2 seconds after the off-hook condition is presented to the telephone network in response to an incoming call:

The total power of signals that appear at the protective circuitry/telephone network interface for delivery to the telephone network, when measured with the appropriate loop simulator circuit or a 600 ohm termination shall be limited to -55 dBm within the voiceband.

Voice and data equipment on-hook signal requirements for equipment connected to the public switched network, or to tie trunks, or to private lines that access the public switched network. Approved protective circuitry and approved terminal equipment shall comply with the following:

The total 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 voiceband.

Measurement (before E.S) : Limit ≦ -55dBm

Test Condition		Limit (dBm)
ON-Hook	OFF-Hook	
-66.5	-67.7	-55

Measurement (after E.S) : Limit ≦ -55dBm

Test Result: No change

Comments: PASS

Test No. 5 (Section 4.4.3) Signaling Interference

The signal power delivered to the network interface by the approved terminal equipment and from signal sources internal to approved protective circuitry 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.

Measurement (before E.S) :

Freq (Hz)	20mA	56mA
800 - 2450	-63.9dBm	-66.3dBm
2450 - 2750	-74.8dBm	-77.7dBm

Measurement (after E.S) :

Test Result: No change

Comments: PASS

Test No. 6 (Section 5.1.1) General analog voice band signal power limits

The power of all signal energy other than live voice, in the 200–3995 Hz voiceband, delivered by approved terminal equipment or approved protective circuitry to the appropriate loop simulator — other than non-permissive data equipment or data protective circuitry shall not exceed -9 dBm when averaged over any 3-second interval.

The power of all signal energy other than live voice, in the 200–3995 Hz voiceband, than non-permissive data equipment or data protective circuitry shall not exceed -9 dBm when averaged over any 3-second interval.

Measurement (before E.S) : Limit ≦ -9dBm

Results		Limit
20mA	56mA	(dBm)
-63.7	-66.3	-9

Measurement (after E.S) : Limit ≦ -9dBm

Test Result: No change

Comments: PASS

Test No. 7 (Section 5.1.3.1) Limitations on signals intended for network control signaling (DTMF)

For all operating conditions of approved terminal equipment and approved protective circuitry, 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-second interval:
a) 0 dBm when used for network control (DTMF);
b) 0 dBm when DTMF is used for manual entry end-to-end signaling. When the device is used for this purpose it shall not generate more than 40 DTMF digits per manual key stroke;

Measurement (before E.S) : Limit < 0dBm

Keys No.	20mA	56mA	Limit (dBm)
1	-5.9	-5.9	0
2	-6.0	-6.0	0
3	-5.9	-5.9	0
4	-5.8	-5.8	0
5	-5.8	-5.8	0
6	-5.8	-5.8	0
7	-5.9	-5.9	0
8	-5.8	-5.9	0
9	-5.9	-5.9	0
0	-5.8	-5.9	0
*	N/A	N/A	0
#	N/A	N/A	0

Measurement (after E.S) : Limit < 0dBm

Test Result: No change

Comments: PASS

Test No. 8 (Section 5.1.6.1) Signal Power in the 3995-4005 Hz band

Power resulting from internal signal sources contained in approved protective circuitry and approved terminal equipment (voice and data), not intended for network control signaling: For all operating conditions of approved terminal equipment and approved protective circuitry that incorporate signal sources other than sources intended for network control signaling, the maximum power delivered by such sources in the 3995–4005 Hz band to an appropriate simulator circuit, shall be 18 dB below maximum permitted power specified in subclauses 5.1.2 and 5.1.3 for the voice band. For all appropriate simulator circuit shall not exceed -27dBm.

Measurement (before E.S) : Limit ≦ -27dBm

Results		Limit (dBm)
20mA	56mA	
-97.6	-104.1	-27

Measurement (after E.S) : Limit ≦ -27dBm

Test Result: No change

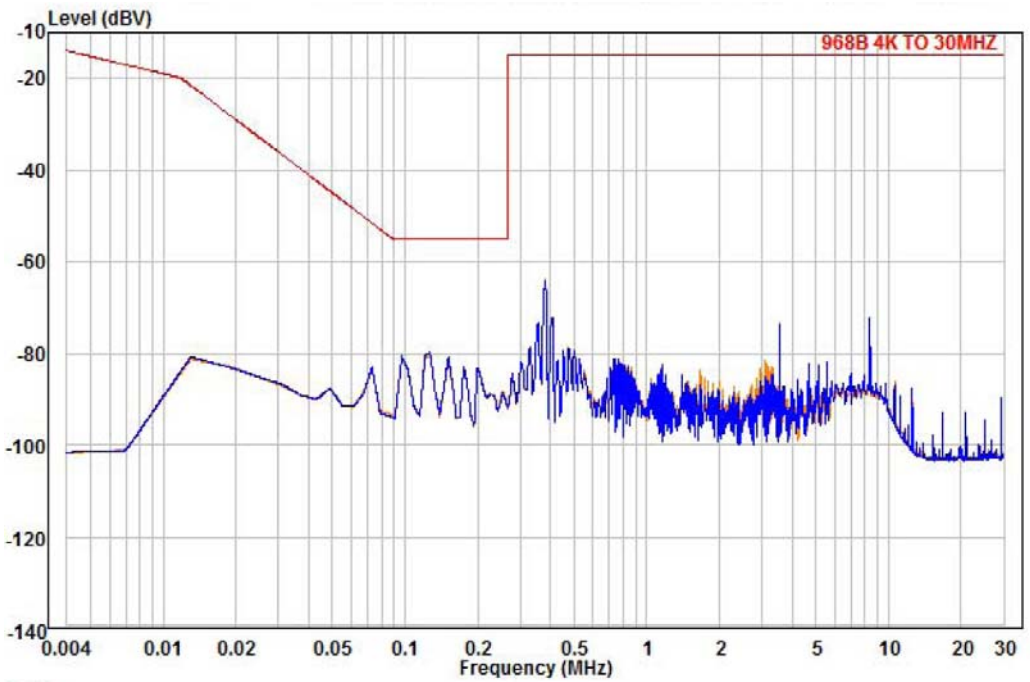
Comments: PASS

Test No. 9 (Section 5.1.8) Metallic Voltage in the 4 kHz to 30 MHz

Except as noted, rms voltage as averaged over 100 ms at the telephone connections of approved terminal equipment and approved protective circuitry in all of the possible 8 kHz bands within the indicated frequency range and under the conditions specified in 5.1.5.9 shall not exceed the maximum indicated below. For subclauses 5.1.8.1 and 5.1.8.3, ‘‘f’’ shall be the center frequency in kHz of each of the possible 8 kHz bands beginning at 8 kHz.

Center frequency (f) of 8-kHz band	Max voltage in all 8-kHz bands	Metallic terminating impedance
8 kHz to 12 kHz	-(6.4 + 12.6 log f) dBV	300 ohms
12 kHz to 90 kHz	(23 – 40 log f) dBV	135 ohms
90 kHz to 266 kHz	-55 dBV	135 ohms
266 kHz to 30MHz	-15 dBV	135 ohms

Measurement (before E.S) :



Loop current : 20mA ==== Blue
: max mA == Orange

Measurement (after E.S) :

Test Result: No change

Comments: PASS

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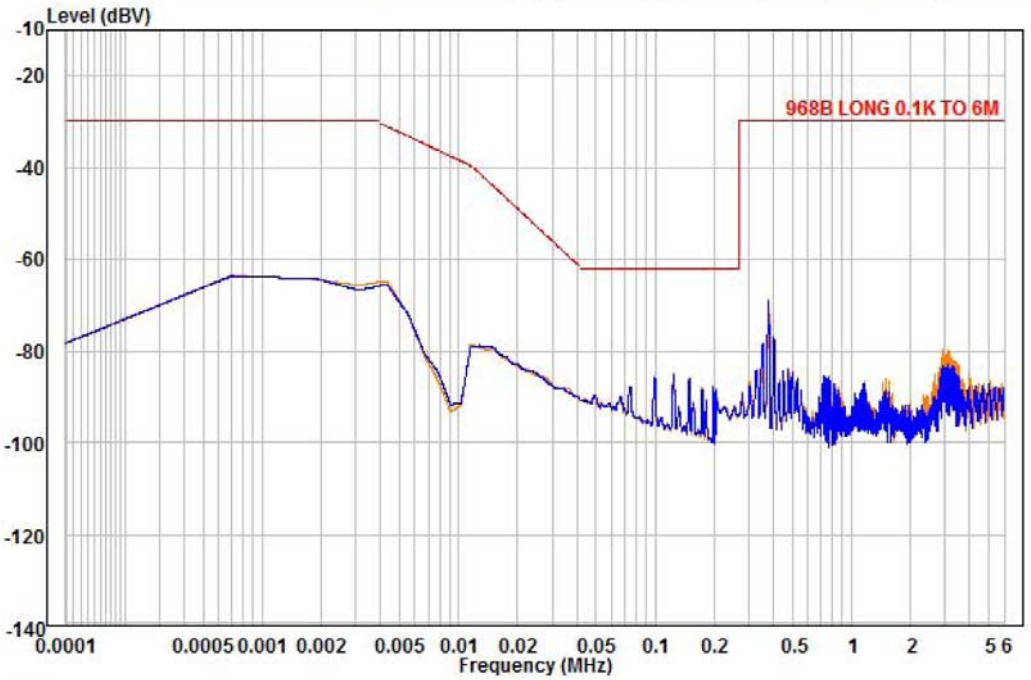
Test No. 10 (Section 5.1.7)Longitudinal Voltage - 0.1kHz to 4kHz
(Section 5.1.8.3)Longitudinal Voltage - 4kHz to 6MHz

The weighted rms voltage averaged over 100 ms that results from component longitudinal voltages in the 100 Hz to 4 kHz band after weighting according to the transfer function of f/4000 where f is the frequency in Hz, shall not exceed the maximum indicated under the conditions stated in subclause 5.1.9. During ringing, the maximum weighted rms voltage shall not exceed -20dBV for the frequency range 300 Hz to 4 kHz.

Longitudinal voltage, 270 kHz to 6 MHz: The rms value of the longitudinal voltage components, in the frequency range of 270 kHz to 6 MHz shall not exceed -30 dBV with a longitudinal termination having an impedance of 90 ohms.

Center frequency (f) of 8-kHz band	Max voltage in all 8-kHz bands	Metallic terminating impedance
8 kHz to 12 kHz	-(18.4 + 20 log f) dBV	500 ohms
12 kHz to 42 kHz	(3 – 40 log f) dBV	90 ohms
42 kHz to 266 kHz	-62 dBV	90 ohms
266 kHz to 6MHz	-30 dBV	90 ohms

Measurement (before E.S) :



Loop current : 20mA ==== Blue
: max mA == Orange

Test No. 10 (Section 5.1.7)Longitudinal Voltage - 0.1kHz to 4kHz
(Section 5.1.8.3)Longitudinal Voltage - 4kHz to 6MHz

Measurement (after E.S):

Test Result: No change

Comments: PASS

Test No. 11 (Section 5.1.10) Transverse Balance Limitations

All approved analog voiceband equipment shall be tested in the off-hook state. The minimum transverse balance requirement in the off-hook state shall be 40 dB, In the on-hook state 200Hz to 1kHz the minimum transverse balance requirement shall be 60 dB and 1kHz to 4kHz the minimum transverse balance requirement shall be 40 dB.

State	Frequency (Hz)	Limit (dB)
Off-hook	200 Hz <= f <= 4000 Hz	40
On-hook	200 Hz <= f <= 1000 Hz	60
On-hook	1000 Hz <= f <= 4000 Hz	40

Measurement (before E.S) :

Freq (Hz)	Before E.S.			Limit (dB)
	0 mA	20 mA	56.4 mA	
200	93.9	91.4	91.1	>=60
400	86.4	86.0	86.9	>=60
600	83.3	83.5	84.1	>=60
800	80.9	81.3	81.1	>=60
1000	79.5	73.4	73.3	>=40
2000	72.9	72.8	73.1	>=40
3000	69.2	68.9	69.6	>=40
4000	67.0	66.2	66.7	>=40

Measurement (after E.S) :

Test Result: No change

Comments: PASS

Test No. 12 (Section 5.1.11.2.1 and 5.1.11.2.2)ON-HOOK DC Resistance Limitations

On-hook resistance, metallic and longitudinal (up to 100 VDC): The on-hook DC resistance between the tip and ring conductors of a loop start interface, and between each of the tip and ring conductors and earth ground, shall be greater than 5 M ohms for all DC voltages up to and including 100 V. (100 to 200 VDC): The on-hook DC resistance between tip and ring conductors of a loop start interface, and between each of the tip and ring conductors and earth ground shall be greater than 30 k ohms for all DC voltages between 100 and 200 V.

Test No. 12 (Section 5.1.11.2.1 and 5.1.11.2.2) ON-HOOK DC Resistance Limitations

Measurement (before E.S) :

Tip-Ring

Vdc	uA (nor.)	uA (rev.)
10	1.696	1.695
20	3.522	3.517
30	5.374	5.364
40	7.234	7.232
50	9.114	9.114
60	11.050	11.040
70	12.930	12.930
80	14.820	14.820
90	16.760	16.770
100	18.710	18.670
150	28.660	28.680
200	38.960	38.910

Resistance (M ohm)

Normal	Reverse	Limit
5.9	5.9	5
5.7	5.7	5
5.6	5.6	5
5.5	5.5	5
5.5	5.5	5
5.4	5.4	5
5.4	5.4	5
5.4	5.4	5
5.4	5.4	5
5.3	5.4	5
5.2	5.2	0.03
5.1	5.1	0.03

Tip-Gnd

Resistance (M ohm)

Vdc	Normal	Reverse
10	769	4762
20	10000	4167
30	9091	4054
40	10811	3774
50	10417	3676
60	10909	3550
70	10606	3535
80	10811	3478
90	10112	3462
100	10309	3378
150	8721	3106
200	8130	2865

Ring-Gnd

Resistance (M ohm)

Normal	Reverse	Limit
6250	5882	5
10526	4082	5
8571	4110	5
11111	3540	5
9804	3731	5
11538	3448	5
10294	3627	5
11268	3463	5
9783	3502	5
10753	3378	5
8571	3138	0.03
8536	2865	0.03

Measurement (after E.S):

Test Result: No change

Comments: PASS

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Test No. 13 (Section 5.1.11.2.3) DC Current During Ringing

DC current during ringing: During the application of simulated ringing, as listed in table 6, to a loop start interface, the total DC current shall not exceed 3.0 mA.

Measurement (before E.S) : < 3mA

Freq (Hz)	Before (E.S)		Limit (mA)
	Normal	Reverse	
17	0.015	0.022	3.0
20	0.022	0.023	3.0
23	0.020	0.020	3.0
27	0.022	0.021	3.0
30	0.019	0.020	3.0
33	0.021	0.021	3.0

Measurement (after E.S) : Limit < 3mA

Test Result: No change

Comments: PASS

Test No. 14 (Section 5.1.11.2.4) Ringing Frequency Impedance (metallic)

Ringing frequency impedance (metallic): During the application of simulated ringing, as listed in table 6 to a loop start interface, the impedance between the tip and ring conductors (defined as the quotient of applied AC voltage divided by resulting true rms current) shall be greater than or equal to the value specified in table 6.

Measurement (before E.S) :

Tip-Ring **Impedance (k ohm)**

Freq (Hz)	Vac	mA (nor.)	mA (rev.)	Normal	Reverse	Limit
17	**130**	0.25	0.23	520.0	565.2	1.40
20	**130**	0.27	0.25	481.5	520.0	1.40
23	**130**	0.30	0.27	433.3	481.5	1.40
27	**130**	0.33	0.31	393.9	419.4	1.00
30	**130**	0.37	0.34	351.4	382.4	1.00
33	**130**	0.40	0.37	325.0	351.4	1.00

Tip-Gnd **Impedance (M ohm)**

Freq (Hz)	Vac	uA (nor.)	uA (rev.)	Normal	Reverse	Limit
17	**130**	5.42	3.93	23.99	33.08	>=0.1
20	**130**	5.74	3.83	22.65	33.94	>=0.1
23	**130**	5.85	3.98	22.22	32.66	>=0.1
27	**130**	6.18	4.06	21.04	32.02	>=0.1
30	**130**	6.43	4.12	20.22	31.55	>=0.1
33	**130**	6.69	4.18	19.43	31.10	>=0.1

Ring-Gnd **Impedance (M ohm)**

Freq (Hz)	Vac	uA (nor.)	uA (rev.)	Normal	Reverse	Limit
17	**130**	5.43	3.93	23.94	33.08	>=0.1
20	**130**	5.70	3.83	22.81	33.94	>=0.1
23	**130**	5.85	3.98	22.22	32.66	>=0.1
27	**130**	6.18	4.06	21.04	32.02	>=0.1
30	**130**	5.41	4.12	24.03	31.55	>=0.1
33	**130**	6.66	4.19	19.52	31.03	>=0.1

Test No. 14 (Section 5.1.11.2.4) Ringing Frequency Impedance (metallic)

Measurement (after E.S) :

Test Result: No change

Comments: PASS

Test No. 15 (Section 5.1.11.2.6) Ringer Equivalence Definition (REN)

Ringer equivalence definition: The ringer equivalence number shall be the value determined in 5.1.11.2.7 or 5.1.11.2.8, as appropriate, followed by the ringer type letter indicator representing the frequency range for which the number is valid. If ringer equivalence is to be stated for more than one ringing type, testing shall be performed at each frequency range to which ringer equivalence is to be determined in accordance with the above, and the largest resulting ringer equivalence number so determined shall be associated with each ringing type letter designation for which it is valid.

Measurement (before E.S) :

a.On-Hook Resistance (Section 4.7.2.1)

Rdc1 : minimum dc resistance (100Vdc) = 5.3 M ohm

Rdc2 : minimum dc resistance (200Vdc) = 5.1 M ohm

b.On-Hook Ringing Current (Section 4.7.2.3)

Idc : maximum dc ringing current = 23 uA

c.On-Hook AC Impedance (Section 4.7.2.4)

Rac1:minimum on-hook ac impedance(lowest freq.) = 520.0 k ohm

Rac2:minimum on-hook ac impedance(highest freq.)= 325.0 k ohm

Calculation:

1.renRdc1= 25 / Rdc1, Mohm = 4.68

2.renRdc2= 150 / Rdc2, Kohm = 0.03

3.renIdc = Idc / (3/5), mA = 0.038

4.renRac1= (1.4*5) / Rac1,Kohm = 0.01

5.renRac2= (1.0*5) / Rac2,Kohm = 0.02

Results:

AC REN (max4/5) = 0.1 (A)

DC REN (max 1/2) = 4.68

Measurement (after E.S) :

Test Result: No change

Comments: PASS

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Test No. 16 (Section 5.1.11.4) Loop Current Requirements

Voice and data equipment loop current requirements for equipment connected to the public switched network: The loop current through approved terminal equipment or approved protective circuitry, when connected to a two-wire or four-wire loop simulator circuit with the 600 ohm resistor and 500 µF capacitor of the two-wire loop simulator circuit or both pairs of the four-wire loop simulator circuit disconnected shall, for at least 5 seconds after the equipment goes to the off-hook state or hold state that would occur when answering an incoming call:

a) Be at least as great as the current obtained in the same loop simulator circuit with minimum battery voltage and a maximum loop resistance when a 200 ohm resistance is connected across the tip and ring of the two-wire loop simulator circuit or connected across the tip/ring and tip-1/ring-1 conductors (tip and ring connected together and tip-1 and ring-1 connected together) of the four-wire loop simulator circuit in place of the approved terminal equipment or approved protective circuitry; or

b) Not decrease by more than 25% 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.

Test No. 16 (Section 5.1.11.4) Loop Current Requirements

Measurement (before E.S) :

Current (mA)	Normal		Reverse	
	Volt (V)	Res(Ω)	Volt (V)	Res(Ω)
20	14.41	720.5	14.41	720.5
30	20.70	690.0	20.70	690.0
40	27.07	676.8	27.07	676.8
50	33.65	673.0	33.66	673.2
60	38.13	635.5	38.16	636.0
56.5	10.10	178.8	10.10	178.8
80	10.85	135.6	10.85	135.6
90	11.64	129.3	11.64	129.3
100	12.42	124.2	12.44	124.4

Variation Of The Loop Current : < 25%

Normal				Reverse			
Volt (V)	Current (mA)	Res (Ω)	Deviation (%)	Volt (V)	Current (mA)	Res (Ω)	Deviation (%)
38.14	56.39	676.4	0.0	38.15	56.41	676.3	0.0
38.14	56.39	676.4	0.0	38.15	56.41	676.3	0.0
38.14	56.39	676.4	0.0	38.15	56.41	676.3	0.0
38.14	56.39	676.4	0.0	38.15	56.41	676.3	0.0
38.14	56.39	676.4	0.0	38.15	56.41	676.3	0.0

Measurement (after E.S) :

Test Result: No change

Comments: PASS

Test Configuration

4.1.2 & 4.1.3 Telephone Line Surge

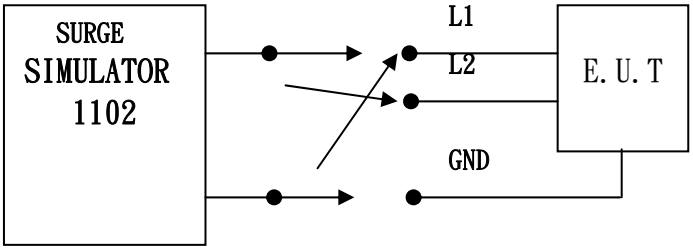


圖 5-1

4.1.4 Power Line Surge

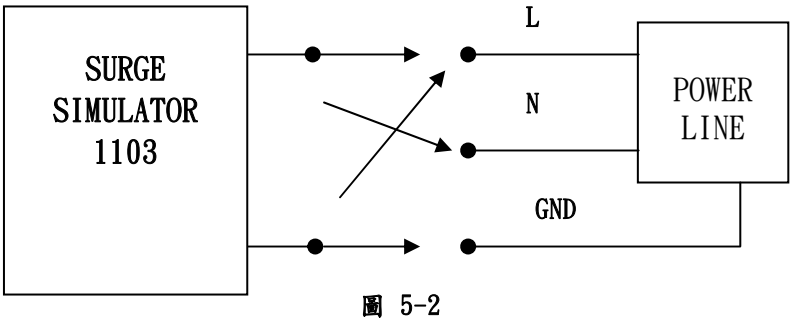
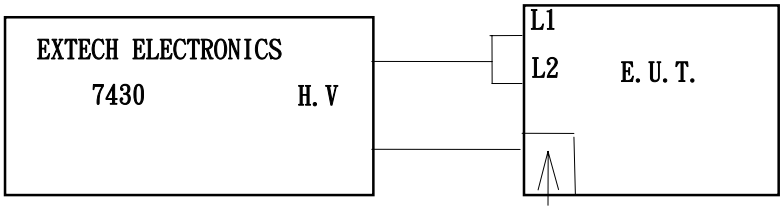


圖 5-2

4.2 Leakage Current Limitations



GND or Exposed conductive surface

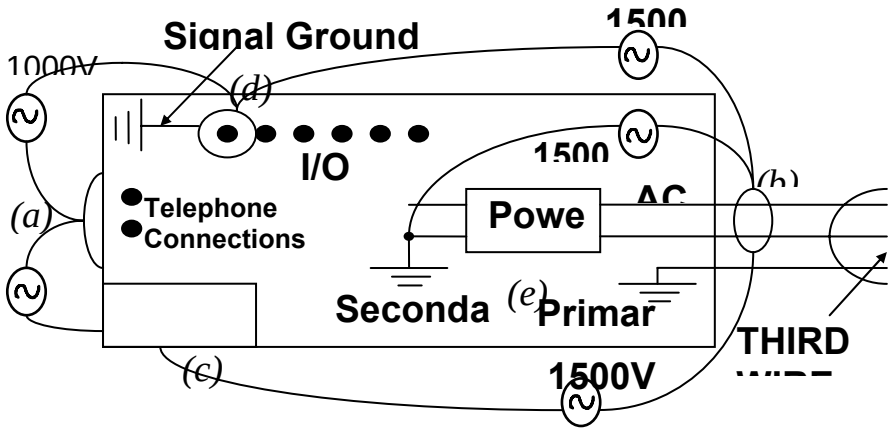


圖 6-1

4.3 Hazardous Voltage Limitations

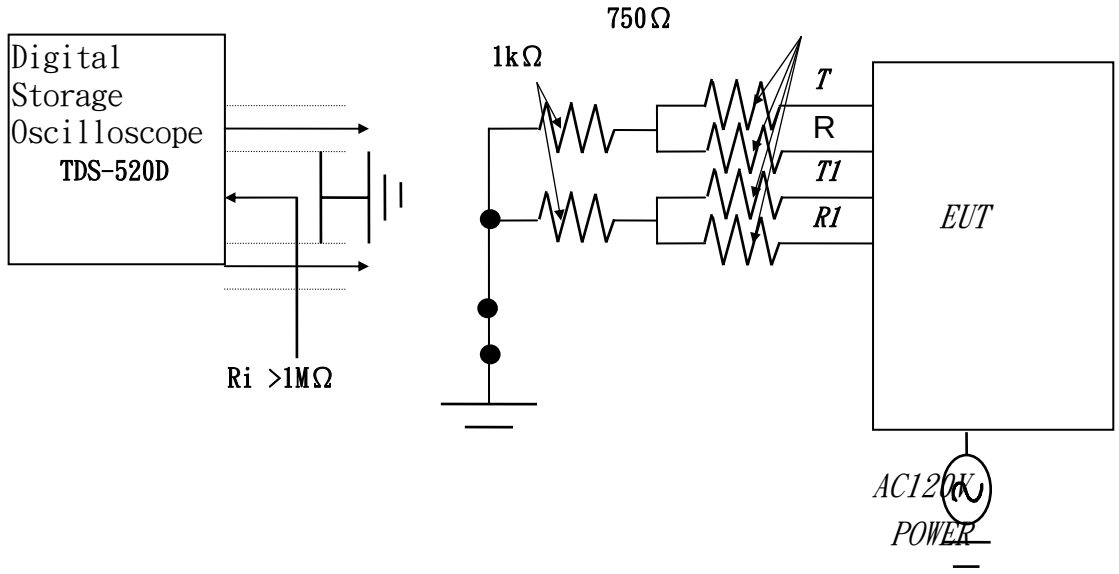
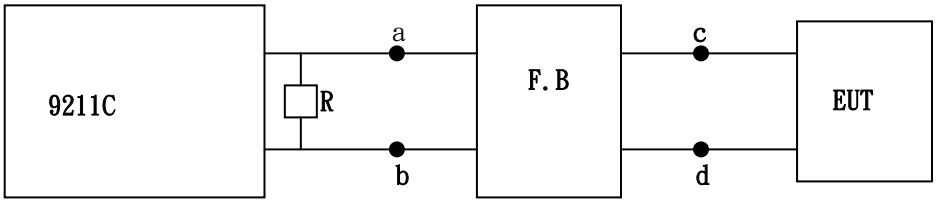


圖 7-1

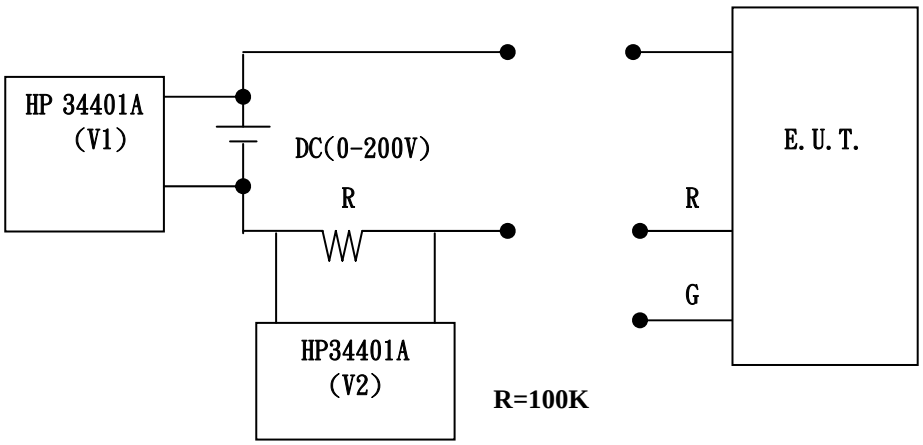
4.4 & 4.4.3 & 5.1.1 & 5.1.2.1 & 5.1.3.1 & 5.1.6.1 & 5.1.8 & 5.1.7.1 & 5.1.8.1 & 5.1.8.3 Billing Protection & DTMF & Voice band power & Signal Power in the 3995-4005Hz & Metallic Voltage 4KHz to 30MHz & Longitudinal Voltage 0.1kHz to 6MHz



R：600Ω or Longitudinal terminating impedance 500Ω or 600Ω or 300Ω or 135Ω or 90Ω

圖 8-1

5.1.11.2.1 & 5.1.11.2.2 ON-HOOK DC Resistance Limitations



5.1.12.2.3 DC Current During Ringing

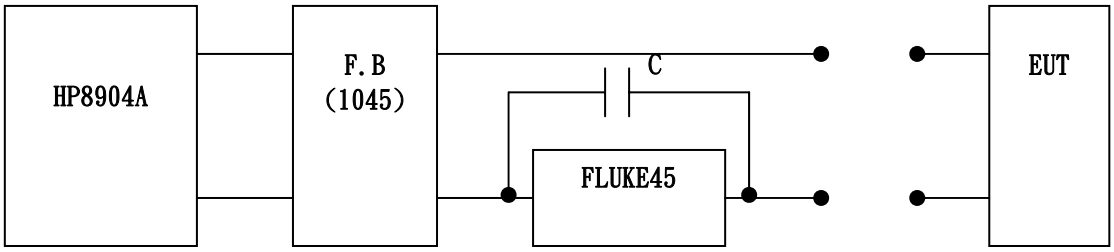


圖 10-2

5.1.11.2.4 & 5.1.11.2.5 Ringing Frequency Impedance

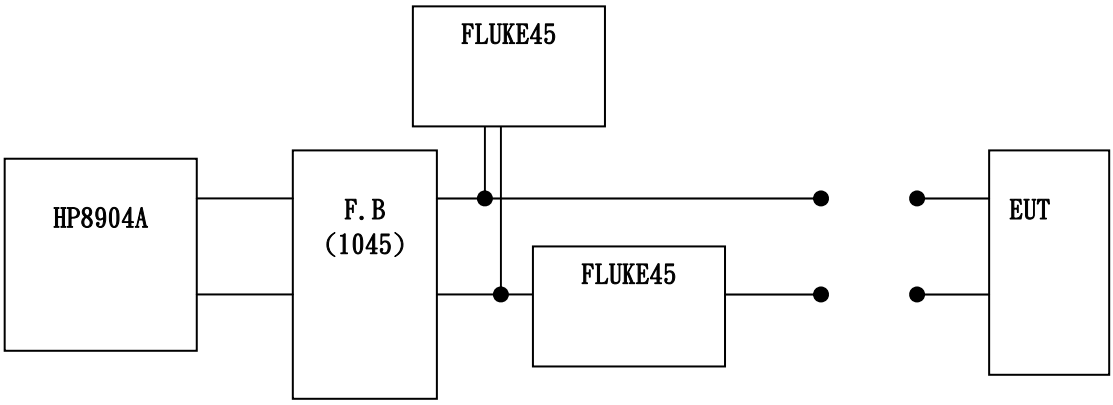


圖 10-3

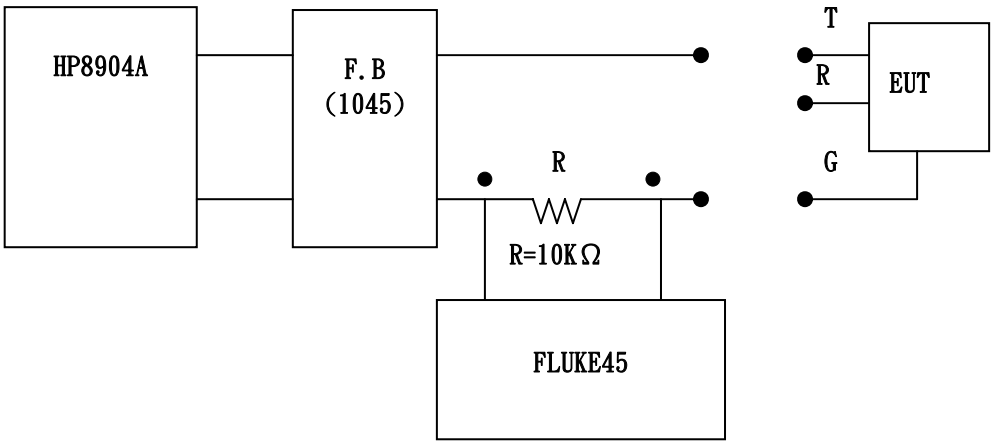
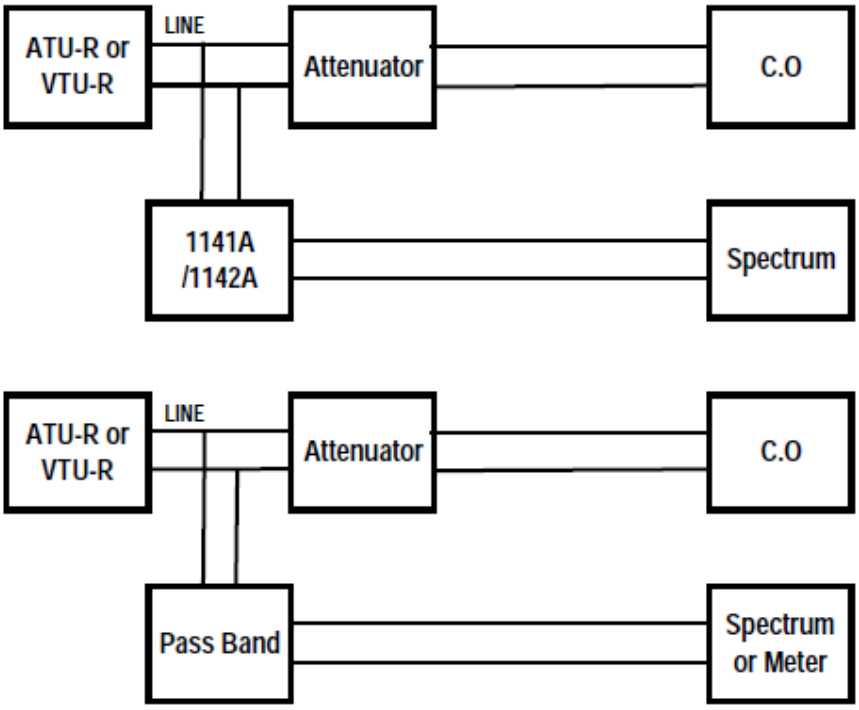
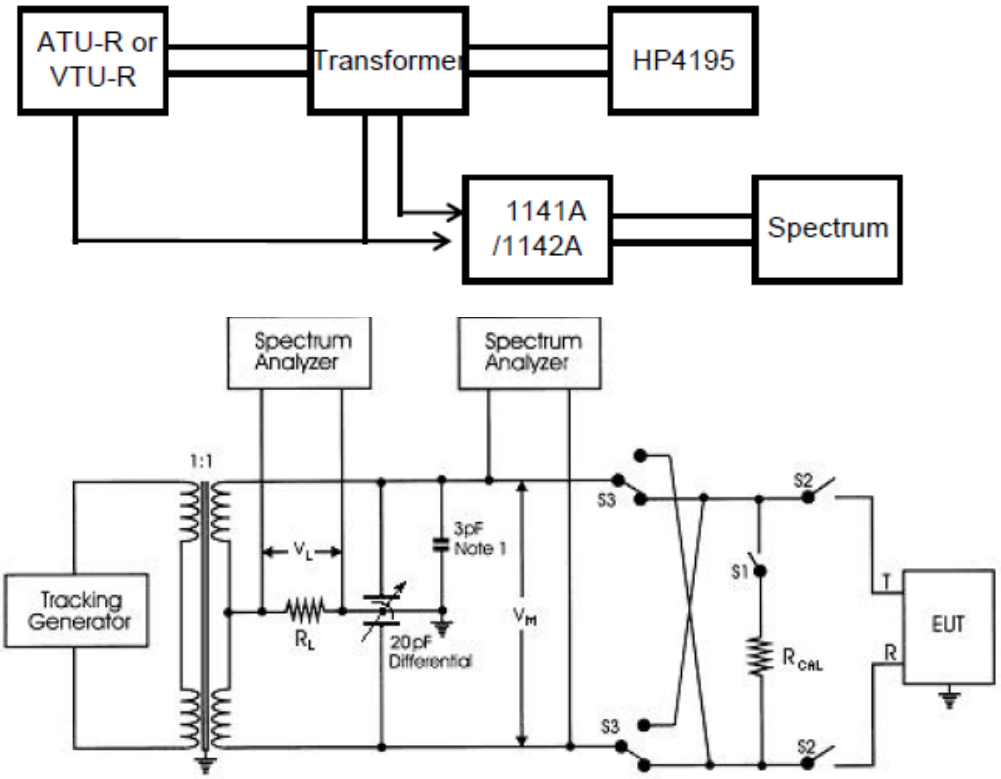


圖10-4

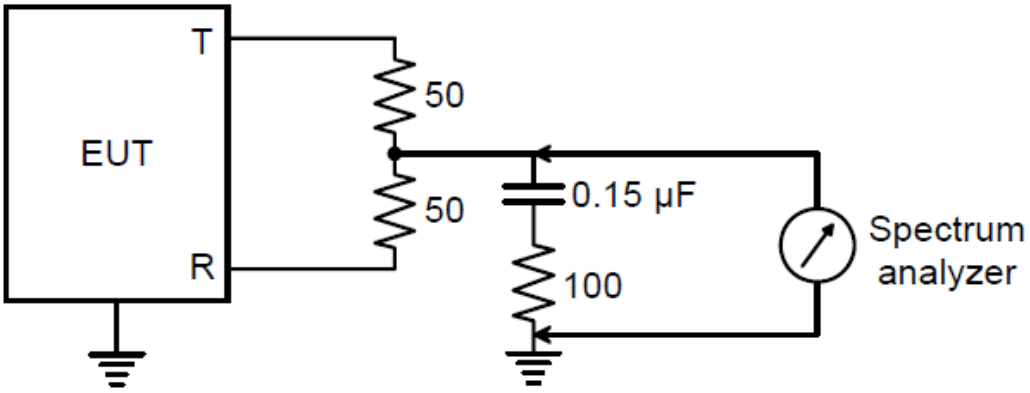
5.3.2.1.1 & 5.3.2.1.2 & 5.3.2.1.3 & 5.3.2.1.4 & 5.3.8.1.1 & 5.8.3.1.4 xDSL Band PSD and Total Power



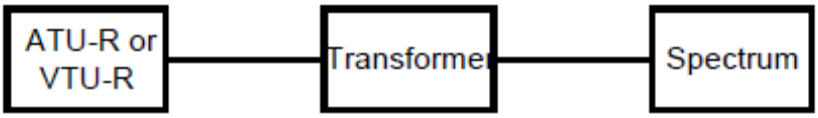
5.1.10 & 5.3.2. 2 & 5.3.8.2 Transverse Balance Limitations



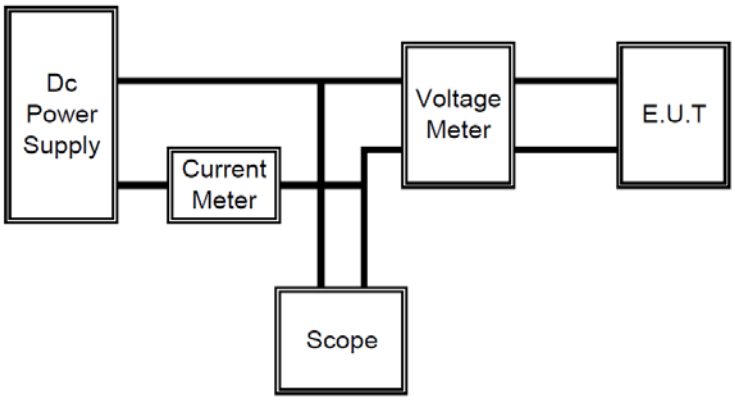
5.3.2.3 & 5.3.8.3 Longitudinal Output Voltage (ADSL & (VDSL)



5.3.10.1.1 & 5.3.10.1.2 G.FAST upstream PSD mask and Total Power



5.1.11.4 Loop Current Requirements



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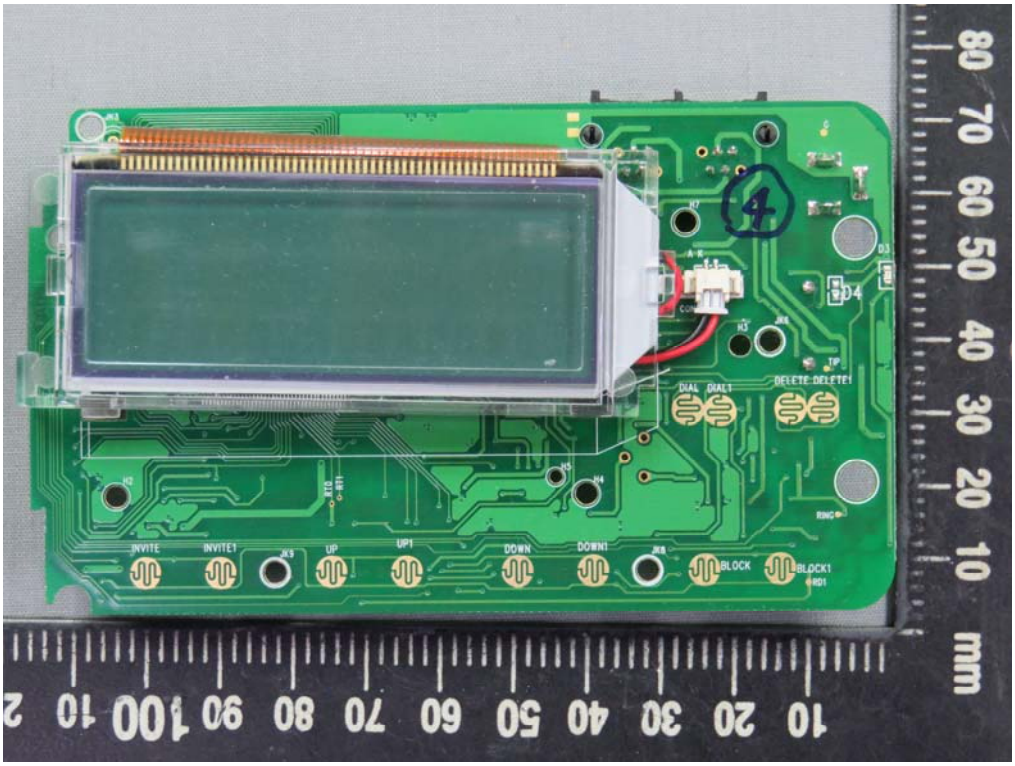
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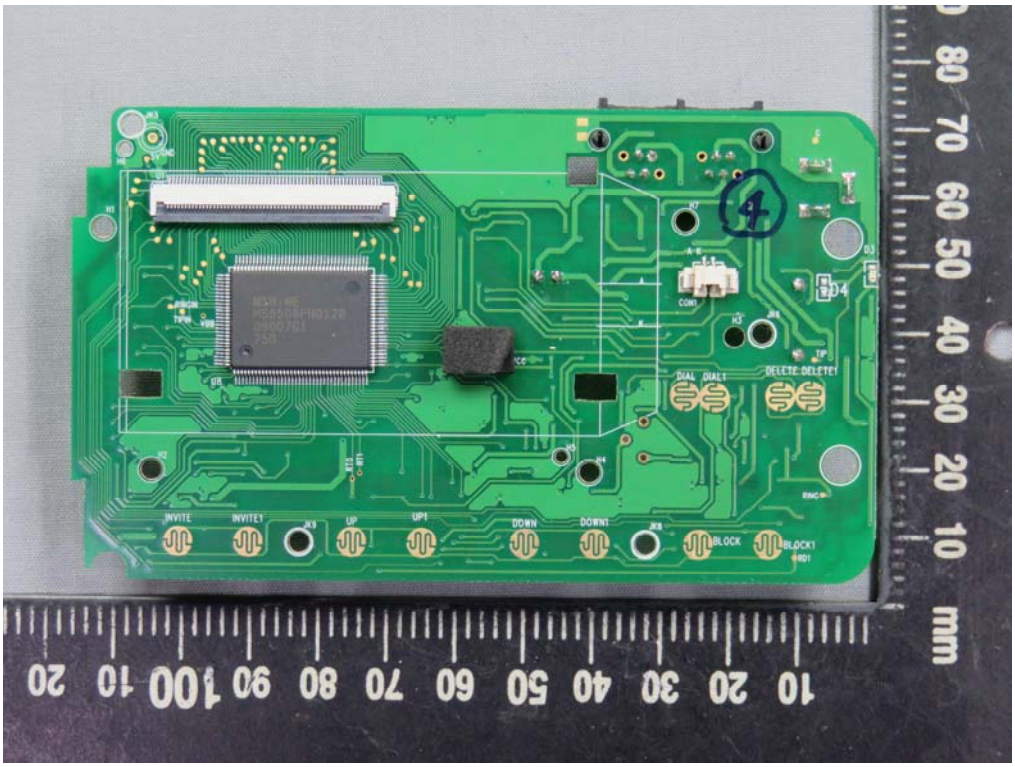
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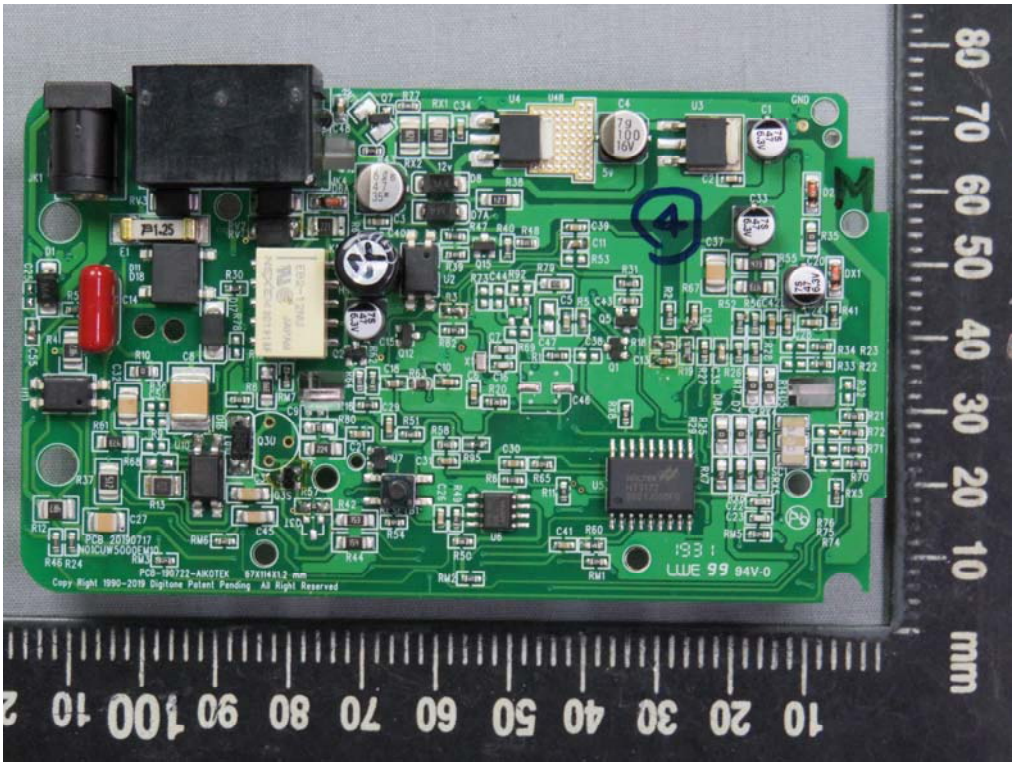




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