

FCC EMC Test Report

For
Electromagnetic Interference
Of

Product : TimeLink Multi-touch Screen

Trade Name :  **TimeLink**TM
Vision of Fingers

Model Number : TW32, TW37, TW40, TW42, TW46, TW47,
TW48, TW50, TW52, TW55, TW57, TW58,
TW60, TW63, TW65, TW70, TW75, TW80,
TW82, TW84, TW100, TW103, TW120

Prepared for

TimeLink Technology Co.Ltd.
Room 310, Block C, Yingdali Digital Tech Park, Futian Bonded
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Prepared by

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TEST RESULT CERTIFICATION

Applicant's name : TimeLink Technology Co.Ltd.

Address : Room 310, Block C, Yingdali Digital Tech Park, Futian Bonded Area, Futian District, Shenzhen, Guangdong, China

Manufacture's Name : TimeLink Technology Co.Ltd.

Address : Room 310, Block C, Yingdali Digital Tech Park, Futian Bonded Area, Futian District, Shenzhen, Guangdong, China

Product description

Product name : TimeLink Multi-touch Screen

Model and/or type reference : TW32, TW37, TW40, TW42, TW46, TW47, TW48, TW50, TW52, TW55, TW57, TW58, TW60, TW63, TW65, TW70, TW75, TW80, TW82, TW84, TW100, TW103, TW120

Rating(s) : DC 5V, 250mA

Standards : FCC Part15B:2011
ANSI C63.4: 2009

This device described above has been tested by NTEK, and the test results show that the equipment under test (EUT) is in compliance with the 2004/108/EC requirements. And it is applicable only to the tested sample identified in the report.

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Date of Test :

Date (s) of performance of tests : 01 Feb. 2012 ~07 Feb. 2012

Date of Issue : 07 Feb. 2012

Test Result : **Pass**

Testing Engineer : Apple Huang
(Apple Huang)

Technical Manager : Jim He
(Jim He)

Authorized Signatory : Bovey Yang
(Bovey Yang)

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1. TEST SUMMARY

Test procedures according to the technical standards:

EMC Emission				
Standard	Test Item	Limit	Judgment	Remark
FCC Part15B:2011 ANSI C63.4: 2009	Conducted Emission	Class B	PASS	
	Radiated Emission	Class B	PASS	

NOTE:

(1) "N/A" denotes test is not applicable in this Test Report

(2) For client's request and manual description, the test will not be executed.

1.1 TEST FACILITY

NTEK Testing Technology Co., Ltd.

Add. : 1/F, Building E, Fenda Science Park, Sanwei Community, Xixiang Street, Bao'an District, Shenzhen P.R. China.

FCC FRN Registration Number:238937; IC Registration Number:9270A-1

1.2 MEASUREMENT UNCERTAINTY

The reported uncertainty of measurement $y \pm U$, where expended uncertainty U is based on a standard uncertainty multiplied by a coverage factor of $k=2$, providing a level of confidence of approximately **95 %**.

A. Conducted Measurement :

Test Site	Method	Measurement Frequency Range	U , (dB)	NOTE
NTEKC01	ANSI	150 KHz ~ 30MHz	3.2	

B. Radiated Measurement :

Test Site	Method	Measurement Frequency Range	U , (dB)	NOTE
NTEKA01	ANSI	30MHz ~ 1000MHz	4.7	
		1GHz ~6GHz	5.0	

2. GENERAL INFORMATION

2.1 GENERAL DESCRIPTION OF EUT

Equipment	TimeLink Multi-touch Screen	
Brand Name		
Model Name.	TW32, TW37, TW40, TW42, TW46, TW47, TW48, TW50, TW52, TW55, TW57, TW58, TW60, TW63, TW65, TW70, TW75, TW80, TW82, TW84, TW100, TW103, TW120	
Serial No	N/A	
Model Difference	All the model are identical except the model name.	
Product Description	The EUT is a TimeLink Multi-touch Screen..	
	Operating frequency:	OSC16MHz
	Connecting I/O port:	USB port
	Based on the application, features, or specification exhibited in User's Manual, the EUT is considered as an ITE/Computing Device. More details of EUT technical specification, please refer to the User's Manual.	
Power Source	DC Voltage	
Power Rating	DC 5V, 250mA	

2.2 DESCRIPTION OF TEST MODES

To investigate the maximum EMI emission characteristics generates from EUT, the test system was pre-scanning tested base on the consideration of following EUT operation mode or test configuration mode which possible have effect on EMI emission level. Each of these EUT operation mode(s) or test configuration mode(s) mentioned above was evaluated respectively.

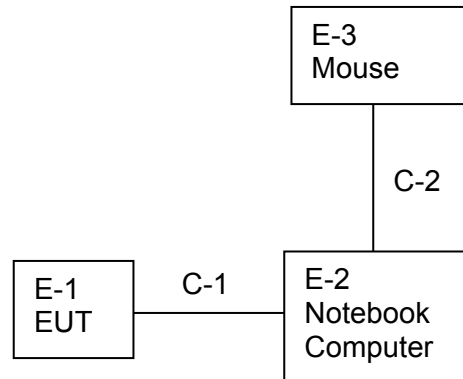
Pretest Mode	Description
Mode 1	Running

For Conducted Test	
Final Test Mode	Description
Mode 1	Running

For Radiated Test	
Final Test Mode	Description
Mode 1	Running

2.3 DESCRIPTION OF TEST SETUP

Mode 1:



2.4 DESCRIPTION TEST PERIPHERAL AND EUT PERIPHERAL

The EUT has been tested as an independent unit together with other necessary accessories or support units. The following support units or accessories were used to form a representative test configuration during the tests.

Item	Equipment	Mfr/Brand	Model/Type No.	Series No.	Note
E-1	TimeLink Multi-touch Screen		TW42	N/A	EUT
E-2	Notebook Computer	IBM	2366	N/A	
E-3	Mouse	HP	MS-SBF96	417441-002REV.OC	

Item	Shielded Type	Ferrite Core	Length	Note
C-1	NO	NO	100cm	
C-2	NO	Yes	180cm	

Note:

- (1) The support equipment was authorized by Declaration of Confirmation.
- (2) For detachable type I/O cable should be specified the length in cm in 『Length』 column.
- (3) “YES” is means “shielded” “with core”; “NO” is means “unshielded” “without core”.

2.5 MEASUREMENT INSTRUMENTS LIST

2.5.1 CONDUCTED TEST SITE

Item	Kind of Equipment	Manufacturer	Type No.	Serial No.	Calibrated until
1	LISN	R&S	ENV216	101313	Jul. 06, 2012
2	LISN	EMCO	3816/2	00042990	Jul. 06, 2012
3	50Ω Switch	ANRITSU CORP	MP59B	6200983704	Jul. 06, 2012
4	Test Cable	N/A	C01	N/A	Jul. 06, 2012
5	Test Cable	N/A	C02	N/A	Jul. 06, 2012
6	Test Cable	N/A	C03	N/A	Jul. 06, 2012
7	EMI Test Receiver	R&S	ESCI	101160	Jul. 06, 2012
8	Passive Voltage Probe	ESH2-Z3	R&S	100196	Jul. 06, 2012
9	Triple-Loop Antenna	EVERFINE	LIA-2	11020003	Jul. 06, 2012
10	Absorbing Clamp	R&S	MDS-21	100423	Jul. 08, 2012

2.5.2 RADIATED TEST SITE

Item	Kind of Equipment	Manufacturer	Type No.	Serial No.	Calibrated until
1	Bilog Antenna	TESEQ	CBL6111D	31216	Jul. 06, 2012
2	Test Cable	N/A	R-01	N/A	Jul. 06, 2012
3	Test Cable	N/A	R-02	N/A	Jul. 06, 2012
4	EMI Test Receiver	R&S	ESCI-7	101318	Jul. 06, 2012
5	Antenna Mast	EM	SC100_1	N/A	N/A
6	Turn Table	EM	SC100	060531	N/A
7	50Ω Switch	Anritsu Corp	MP59B	6200983705	Jul. 06, 2012
8	Spectrum Analyzer	Aglient	E4407B	MY45108040	Jul. 06. 2012
9	Horn Antenna	EM	EM-AH-10180	2011071402	Jul. 06. 2012
10	Amplifier	EM	EM-30180	060538	Jul. 06. 2012

3. EMC EMISSION TEST

3.1 CONDUCTED EMISSION MEASUREMENT

3.1.1 POWER LINE CONDUCTED EMISSION (Frequency Range 150KHz-30MHz)

FREQUENCY (MHz)	Class A (dBuV)		Class B (dBuV)	
	Quasi-peak	Average	Quasi-peak	Average
0.15 -0.5	79.00	66.00	66 - 56 *	56 - 46 *
0.50 -5.0	73.00	60.00	56.00	46.00
5.0 -30.0	73.00	60.00	60.00	50.00

Note:

- (1) The tighter limit applies at the band edges.
- (2) The limit of " * " marked band means the limitation decreases linearly with the logarithm of the frequency in the range.

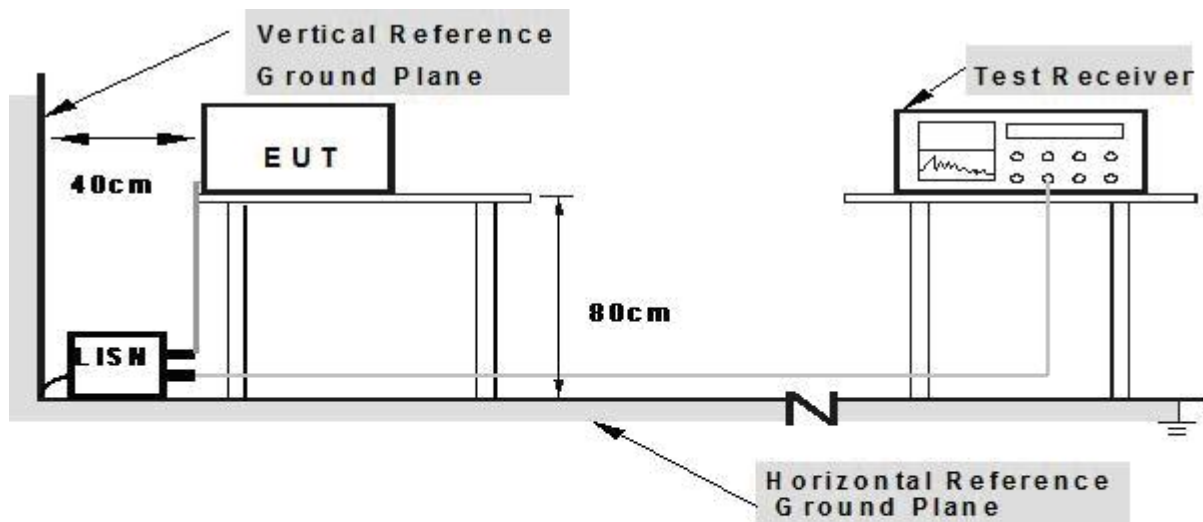
The following table is the setting of the receiver

Receiver Parameters	Setting
Attenuation	10 dB
Start Frequency	0.15 MHz
Stop Frequency	30 MHz
IF Bandwidth	9 kHz

3.1.2 TEST PROCEDURE

- a. The EUT was placed 0.4 meters from the horizontal ground plane with EUT being connected to the power mains through a line impedance stabilization network (LISN). All other support equipments powered from additional LISN(s). The LISN provide 50 Ohm/ 50uH of coupling impedance for the measuring instrument.
- b. Interconnecting cables that hang closer than 40 cm to the ground plane shall be folded back and forth in the center forming a bundle 30 to 40 cm long.
- c. I/O cables that are not connected to a peripheral shall be bundled in the center. The end of the cable may be terminated, if required, using the correct terminating impedance. The overall length shall not exceed 1 m.
- d. LISN at least 80 cm from nearest part of EUT chassis.
- e. For the actual test configuration, please refer to the related Item –EUT Test Photos.

3.1.3 TEST SETUP



Note: 1. Support units were connected to second LISN.

2. Both of LISNs (AMN) are 80 cm from EUT and at least 80 cm from other units and other metal planes

3.1.4 EUT OPERATING CONDITIONS

The EUT tested system was configured as the statements of 2.3 Unless otherwise a special operating condition is specified in the follows during the testing.

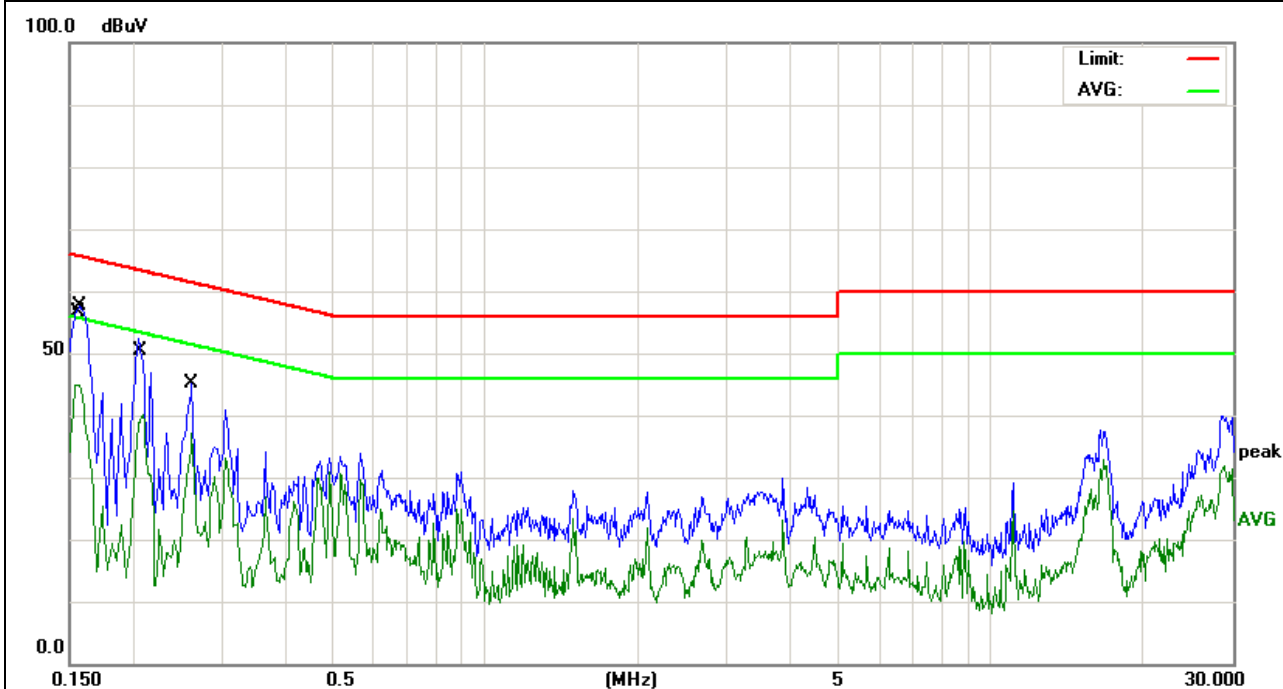
3.1.5 TEST RESULTS

EUT :	TimeLink Multi-touch Screen	Model Name. :	TW42
Temperature :	26 °C	Relative Humidity :	54%
Pressure :	1010hPa	Test Date :	2012-02-05
Test Mode :	Running	Phase :	L
Test Voltage :	DC 5V from PC		

Frequency	Meter Reading	Factor	Emission Level	Limits	Margin	Detector Type
(MHz)	(dBμV)	(dB)	(dBμV)	(dBμV)	(dB)	
0.1539	33.77	11.17	44.94	55.78	-10.84	AVG
0.158	47.02	10.69	57.71	65.56	-7.85	QP
0.21	29.73	10.44	40.17	53.2	-13.03	AVG
0.262	34.72	10.43	45.15	61.36	-16.21	QP

Remark:

1. All readings are Quasi-Peak and Average values.
2. Factor = Insertion Loss + Cable Loss.



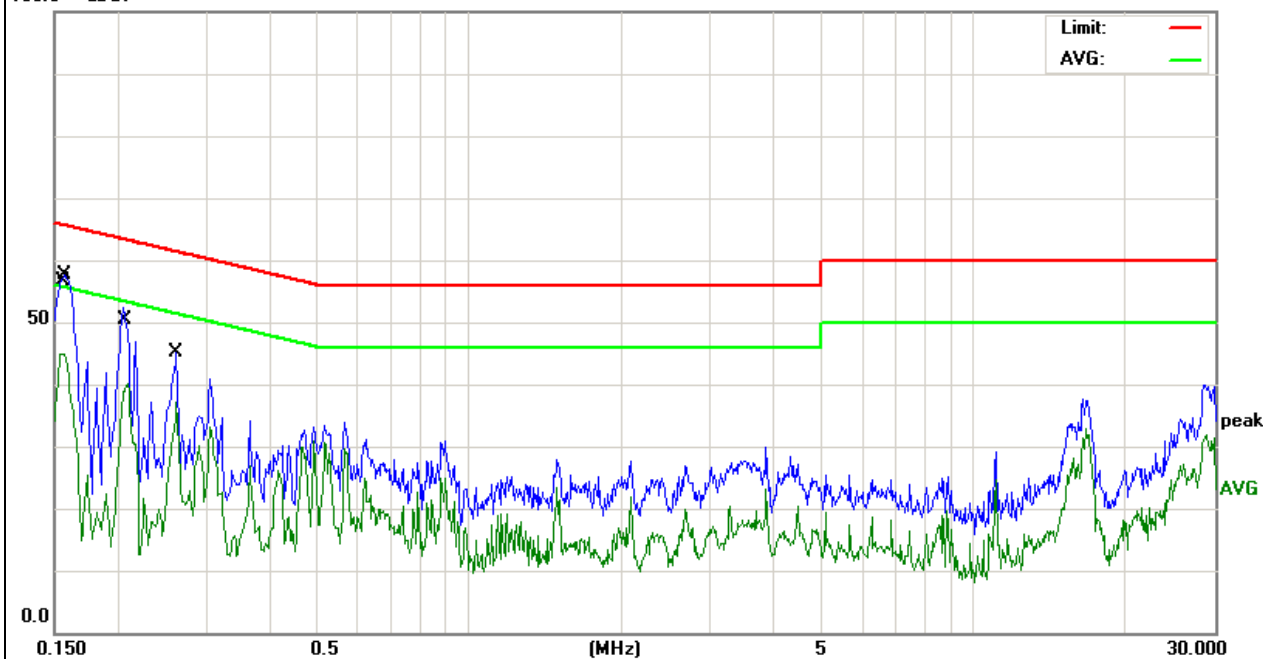
EUT :	TimeLink Multi-touch Screen	Model Name. :	TW42
Temperature :	26 °C	Relative Humidity :	54%
Pressure :	1010hPa	Test Date :	2012-02-05
Test Mode :	Running	Phase :	N
Test Voltage :	DC 5V from PC		

Frequency	Meter Reading	Factor	Emission Level	Limits	Margin	Detector Type
(MHz)	(dBμV)	(dB)	(dBμV)	(dBμV)	(dB)	
0.158	47.72	10.56	58.28	65.56	-7.28	QP
0.158	37.19	10.56	47.75	55.56	-7.81	AVG
0.202	37.32	10.43	47.75	63.52	-15.77	QP
0.2099	25.95	10.43	36.38	53.21	-16.83	AVG

Remark:

1. All readings are Quasi-Peak and Average values.
2. Factor = Insertion Loss + Cable Loss.

100.0 dBμV



3.2 RADIATED EMISSION MEASUREMENT

3.2.1 LIMITS OF RADIATED EMISSION MEASUREMENT

FREQUENCY (MHz)	Class A (at 10m)	Class B (at 3m)
	dBuV/m	dBuV/m
30 ~ 88	39.0	40.0
88 ~ 216	43.5	43.5
216 ~ 960	46.5	46.0
Above 960	49.5	54.0

Notes:

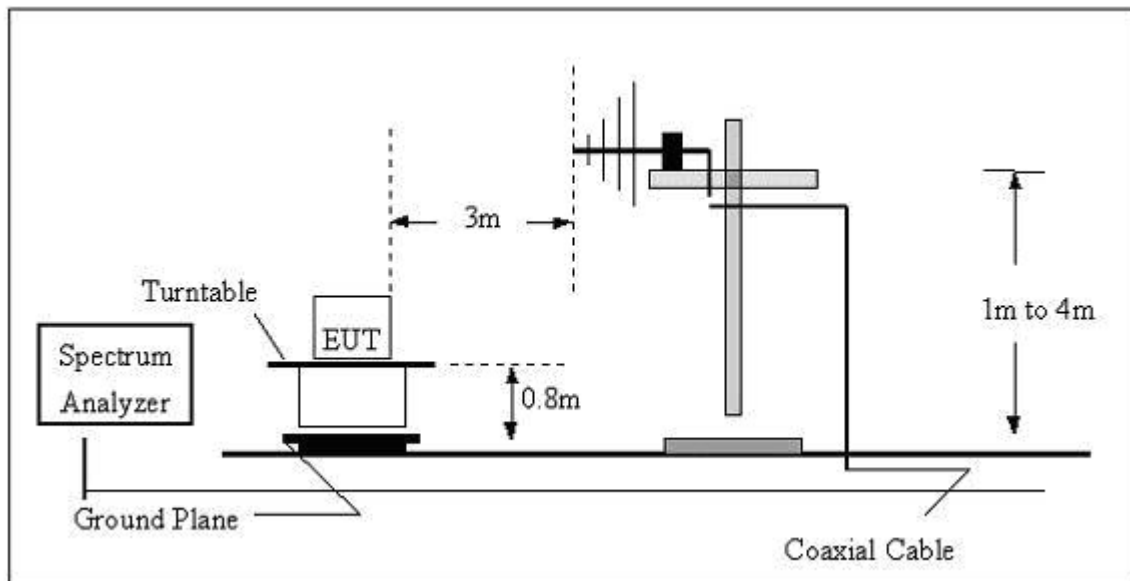
- (1) The limit for radiated test was performed according to as following:
FCC PART 15B /ICES-003.
- (2) The tighter limit applies at the band edges.
- (3) Emission level (dBuV/m)=20log Emission level (uV/m).

3.2.2 TEST PROCEDURE

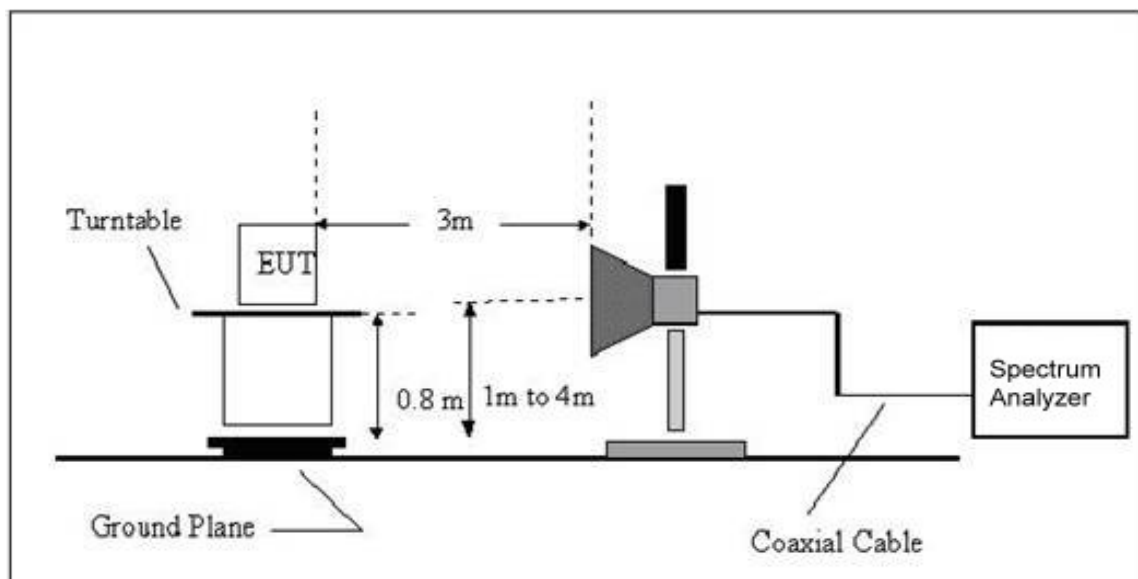
- a. The measuring distance of at 10 m shall be used for measurements at frequency up to 1GHz. For frequencies above 1GHz, any suitable measuring distance may be used.
- b. The EUT was placed on the top of a rotating table 0.8 meters above the ground at a 10 meter open area test site. The table was rotated 360 degrees to determine the position of the highest radiation.
- c. The height of the equipment or of the substitution antenna shall be 0.8 m; the height of the test antenna shall vary between 1 m to 4 m. Both horizontal and vertical polarizations of the antenna are set to make the measurement.
- d. The initial step in collecting conducted emission data is a spectrum analyzer peak detector mode pre-scanning the measurement frequency range. Significant peaks are then marked and then Quasi Peak detector mode re-measured, above 1G Average detector mode will be instead.
- e. If the Peak Mode measured value compliance with and lower than Quasi Peak Mode Limit, the EUT shall be deemed to meet QP(AV) Limits and then no additional QP Mode measurement performed.
- f. For the actual test configuration, please refer to the related Item –EUT Test Photos.

3.2.3 TEST SETUP

(A) Radiated Emission Test Set-Up Frequency Below 1 GHz



(B) Radiated Emission Test Set-Up Frequency Above 1GHz



3.2.4 EUT OPERATING CONDITIONS

The EUT tested system was configured as the statements of **2.3** Unless otherwise a special operating condition is specified in the follows during the testing.

3.2.5 TEST RESULTS(Blow 30MHZ)

EUT :	TimeLink Multi-touch Screen	Model Name :	TW42
Temperature :	24 °C	Relative Humidity :	54%
Pressure :	1010 hPa	Test Date :	2012-02-05
Test Mode :	Running	Polarization :	--

Freq.	Reading	Limit	Margin	State
(MHz)	(dBuV/m)	(dBuV/m)	(dB)	P/F
--	--	--	--	PASS
--	--	--	--	PASS

NOTE:

The amplitude of spurious emissions which are attenuated by more than 20dB below the permissible value has no need to be reported.

Distance extrapolation factor = $20 \log (\text{specific distance}/\text{test distance})(\text{dB})$;

Limit line = specific limits(dBuV) + distance extrapolation factor.

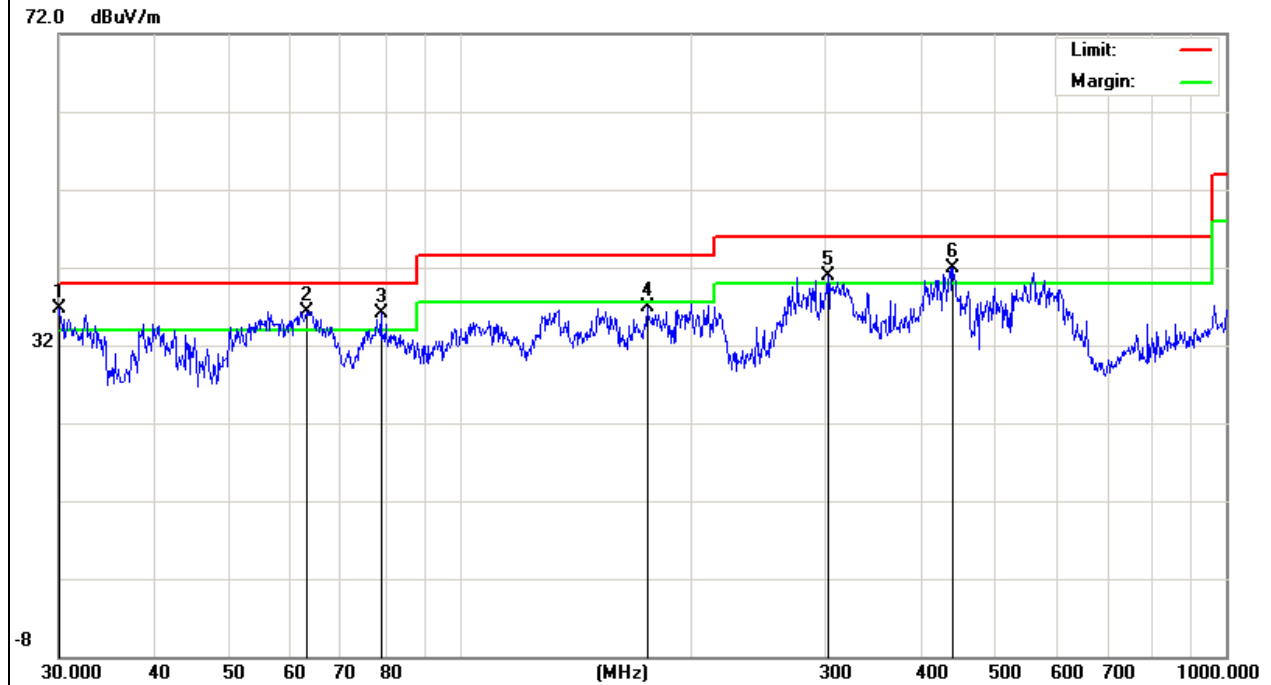
3.2.6 TEST RESULTS(30MHz-1GHz)

EUT :	TimeLink Multi-touch Screen	Model Name :	TW42
Temperature :	24 °C	Relative Humidity :	54%
Pressure :	1010 hPa	Test Date :	2012-02-05
Test Mode :	Running	Polarization :	Horizontal
Test Power :	DC 5V from PC		

Freq. (MHz)	Reading (dBuV)	Factor (dBuV)	Measurement (dBuV)	Limit (dBuV)	Over (dB)	Detector
30	18.37	18.33	36.7	40	-3.3	QP
63.0915	31.15	5.25	36.4	40	-3.6	QP
78.9651	28.56	7.54	36.1	40	-3.9	QP
175.6516	27.21	9.69	36.9	43.5	-6.6	QP
302.4812	26.33	14.57	40.9	46	-5.1	QP
440.1963	24.05	17.89	41.94	46	-4.06	QP

Remark:

1. All readings are Quasi-Peak and Average values.
2. Factor = Antenna Factor + Cable Loss.
3. N/A means All Data have pass Limit

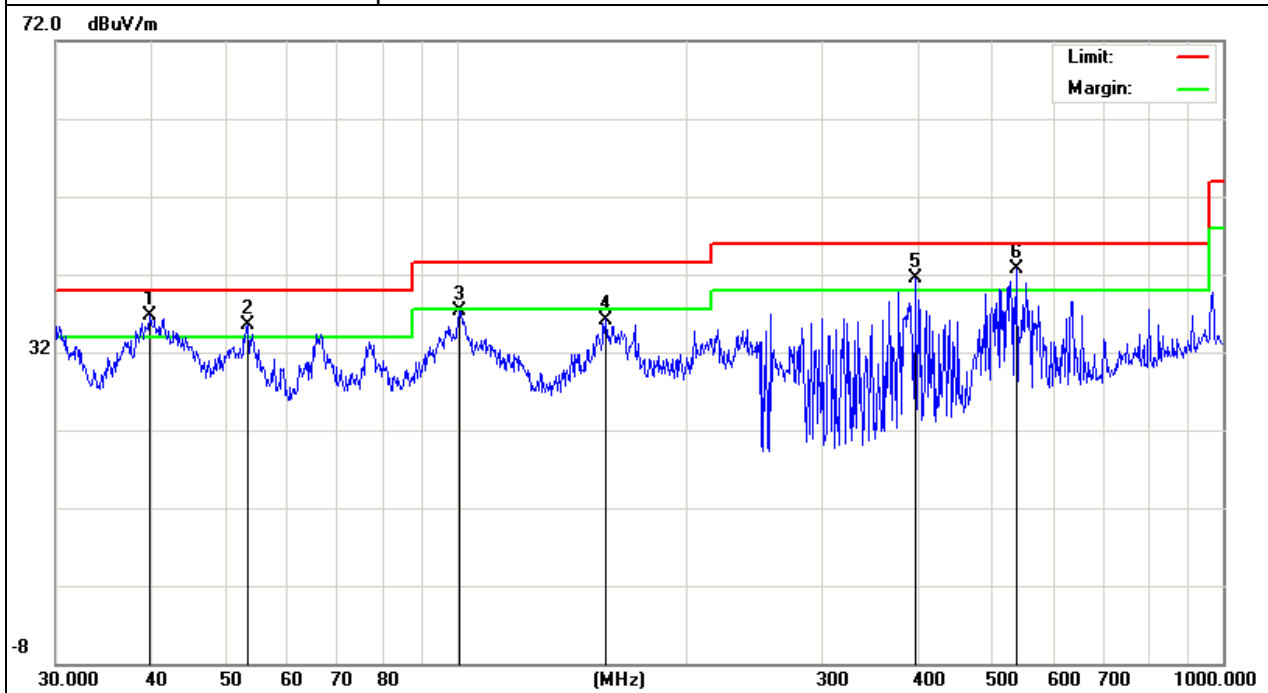


EUT :	TimeLink Multi-touch Screen	Model Name :	TW42
Temperature :	24 °C	Relative Humidity :	54%
Pressure :	1010 hPa	Test Date :	2012-02-05
Test Mode :	Running	Polarization :	Vertical
Test Power :	DC 5V from PC		

Freq. (MHz)	Reading (dBuV)	Factor (dBuV)	Measurement (dBuV)	Limit (dBuV)	Over (dB)	Detector
39.7146	23.32	13.48	36.8	40	-3.2	QP
53.5052	28.89	6.61	35.5	40	-4.5	QP
100.9338	26.69	10.71	37.4	43.5	-6.1	QP
156.4576	25.08	11.12	36.2	43.5	-7.3	QP
397.6333	24.31	17.12	41.43	46	-4.57	QP
537.5891	22.49	20.25	42.74	46	-3.26	QP

Remark:

1. All readings are Quasi-Peak and Average values.
2. Factor = Antenna Factor + Cable Loss.
3. N/A means All Data have pass Limit



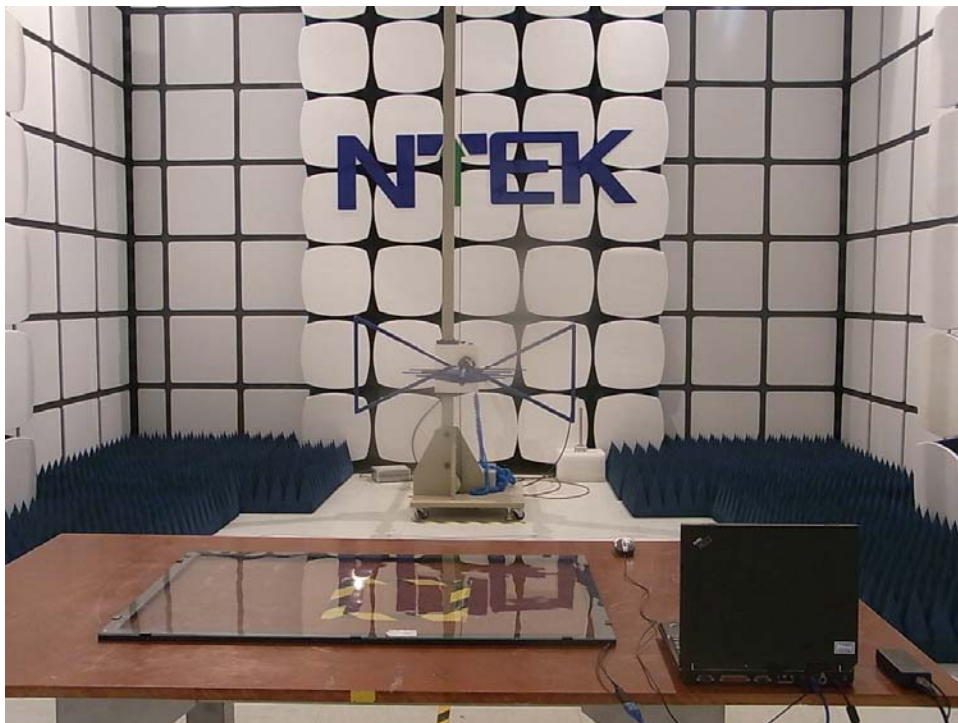
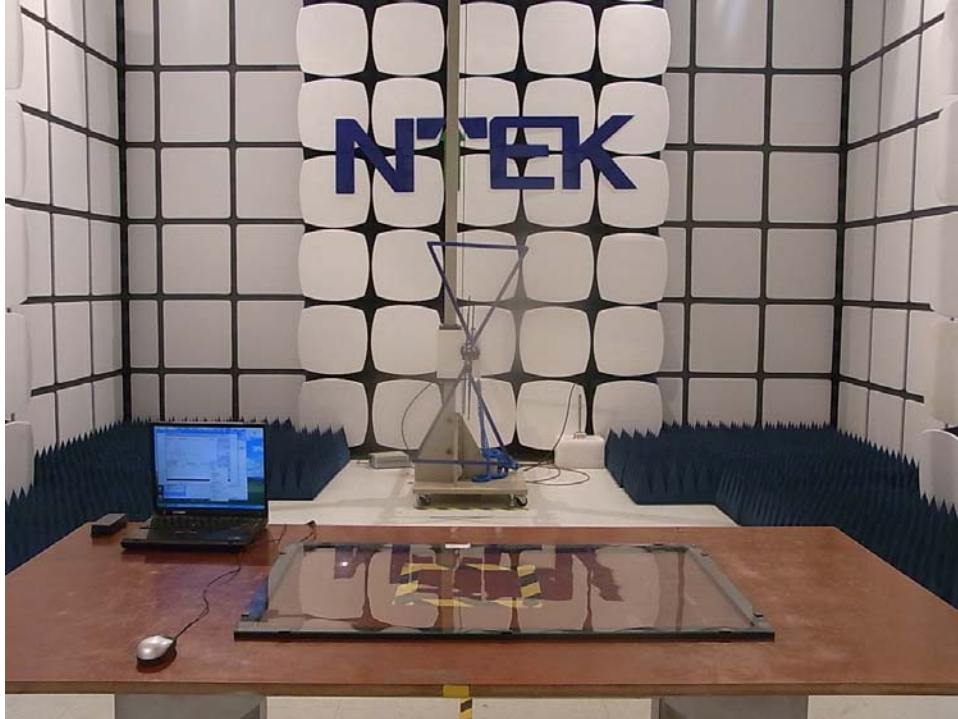
3.2.7 TEST RESULTS(Above 1GHz)

EUT :	TimeLink Multi-touch Screen	Model Name :	TW42
Temperature :	24 °C	Relative Humidity :	54%
Pressure :	1010 hPa	Test Date :	N/A
Test Mode :	N/A	Polarization :	N/A
Test Power :	N/A		

Note: The operating frequency is 16MHz(osc), radiated emission above 1GHz don't need test.

4. EUT TEST PHOTO

Radiated Measurement Photos



Conducted Measurement Photos



ATTACHMENT PHOTOGRAPHS OF EUT

Photo 1



Photo 2



Photo 3



Photo 4

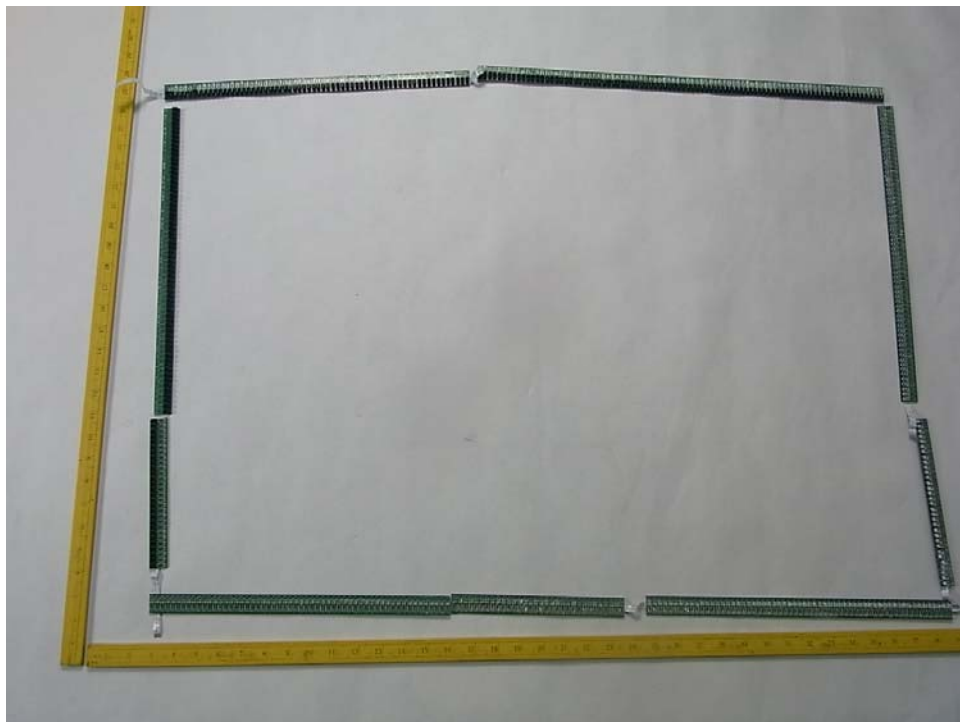


Photo 5

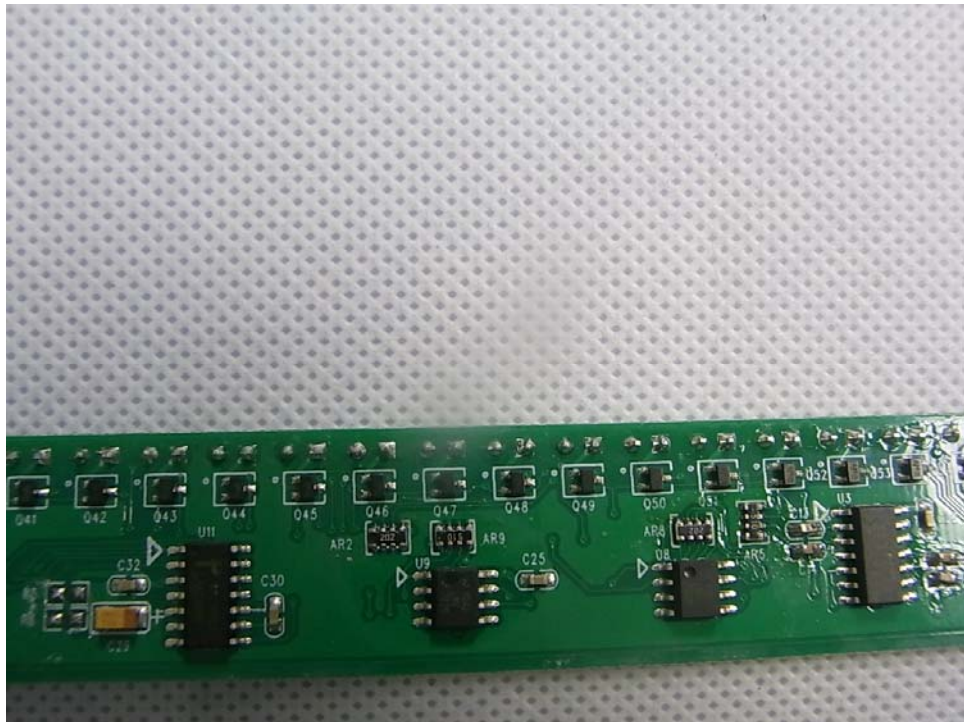
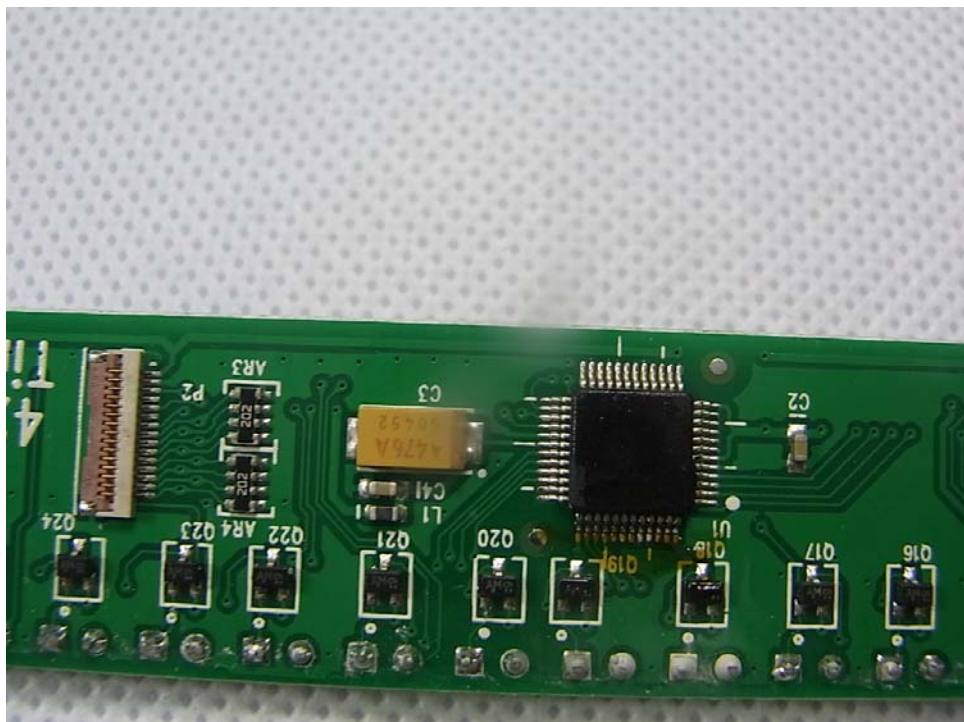


Photo 6



A green printed circuit board (PCB) for a TL-PCB-T-V3.2. The board is populated with various electronic components. On the left side, there are several capacitors labeled C1 through C6, including two large yellow electrolytic capacitors (C3 and C4). There are also resistors labeled R1, R2, and R4, and a small inductor labeled L1. A central component is a black integrated circuit (IC) labeled U2, which is the T/moLink chip. To its right is another black IC labeled U3. The PCB features a T/moLink logo and the text "Technology Plans Ltd." and "TM". The date code "2011/12/06" and the model number "TL-PCB-T-V3.2" are printed on the board. The board is shown against a white background with a grid pattern.

Photo 9

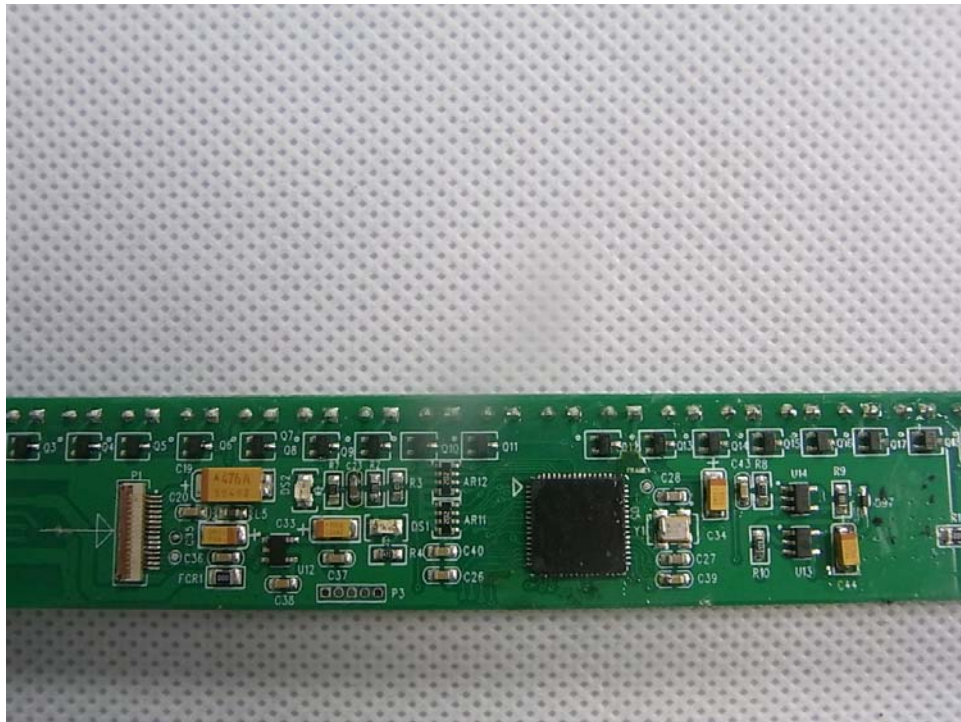


Photo 10

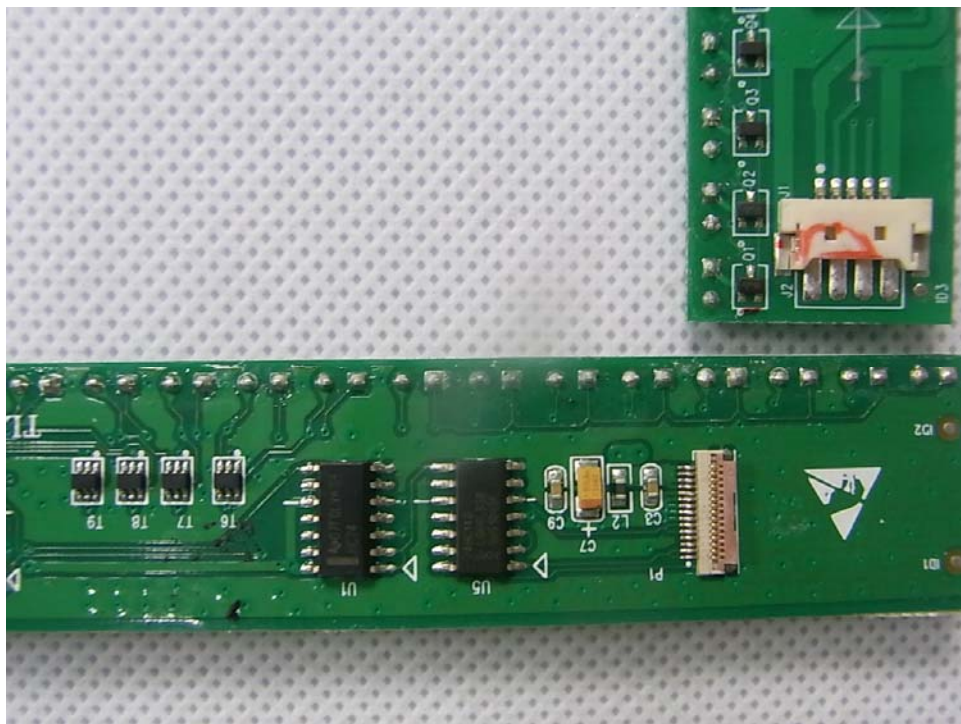


Photo 11

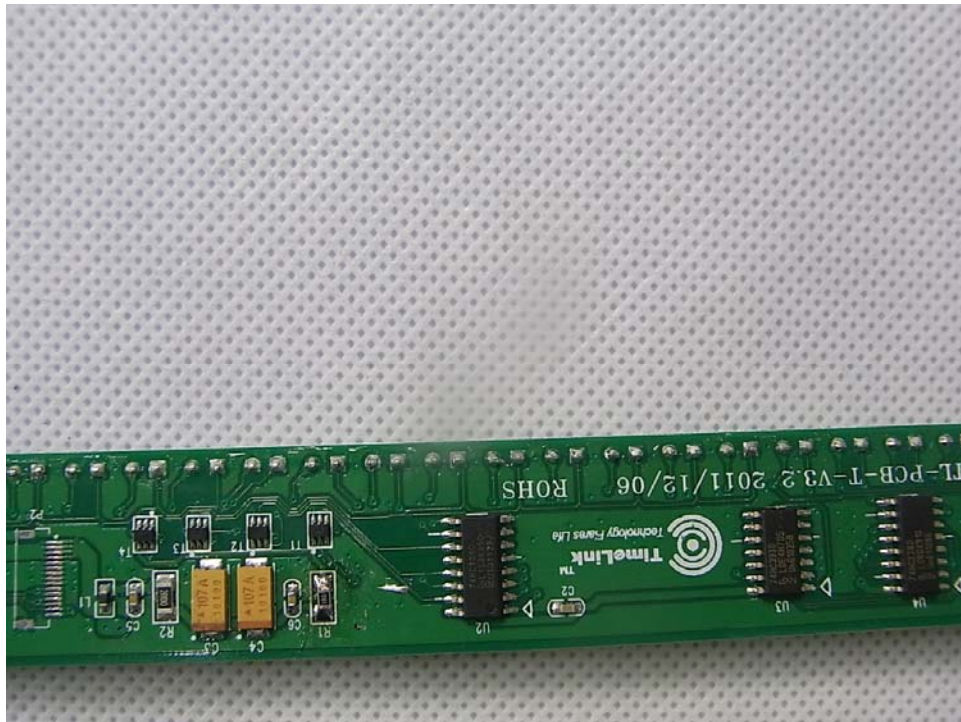


Photo 12

