



Test Report

Product Name : Fingerprint System
Model No. : FG75
FCC ID. : KQHFG75

Applicant : STARTEK ENGINEERING INCORPORATED
Address : 3F, 54 Park Ave. II, Science-Based Industrial
Park, Hsinchu 300, Taiwan, R.O.C.

Date of Receipt : 2005/06/21
Issued Date : 2005/07/05
Report No. : 056H097-F-R02-T

The test results relate only to the samples tested.

The test report shall not be reproduced except in full without the written approval of QuiTek Corporation.
This report must not be used to claim product endorsement by NVLAP any agency of the U.S. Government

Test Report Certification

Issued Date : 2005/07/05
Report No. : 056H097-F-R02-T

Quietek

The test results relate only to the samples tested.

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Documented By : Demi Chang

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Tested By : Simon Lin

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Approved By : Janes C

(James Chang)

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1. GENERAL INFORMATION

1.1. EUT Description

Product Name	Fingerprint System
Trade Name	STARTEK
Model No.	FG75
FCC ID	KQHFG75
EUT Voltage	AC 120V / 60Hz
Frequency Range	13.56 MHz
Type of Modulation	FM
Antenna Type	Soldered on PCB (LOOP Antenna)
Channel Number	1
Channel Control	Non-Applied

Component	
Data Line	Non-Shielded, 0.2m
Power Adapter	AKI, A10P1-12MP Cable Out: Non-Shielded, 1.2m, one ferrite core bonded.

Frequency of Each Channel:

Channel	Frequency
Channel 1:	13.56 MHz

Note:

1. This device is a 13.56 MHz device included a 13.56 MHz receiving function, and 13.56 MHz transmitting function.
2. These tests were conducted on a sample of the equipment for the purpose of demonstrating compliance with Part 15 Subpart C Paragraph 15.209.
3. This device is a composite device in accordance with Part 15 regulations. The function receiving was measured and made a test report that the report number is 056H097-F-R01-R under Declaration of Conformity.

1.2. Operational Description

The EUT is a Fingerprint System. The operation frequency is 13.56 MHz with FM modulation. The system is to belong to transceiver. Only one selectable channel were built in the EUT. The signal will be via reaction card transmitted through 13.56 MHz FM RF signal from the soldered on PCB Loop antenna to receiver. DC 12V shall be provided for EUT operation.

1.3. Test Mode

QuiTek has verified the construction and function in typical operation. All the test modes were carried out with the EUT in normal operation, which was shown in this test report and defined as:

Pre-Test Mode	
TX	Mode1: Transmit
Final Test Mode	
TX	Mode1: Transmit

1.4. Tested System Details

The types for all equipment, plus descriptions of all cables used in the tested system (including inserted cards) are:

Product	Manufacturer	Model No.	Serial No.	FCC ID	Power Cord
1	N/A	N/A	N/A	N/A	N/A

1.5. Configuration of tested System

Test Mode	Mode1: Transmit
Connection Diagram	
	
Signal Cable Type	Signal cable Description
A	N/A

1.6. EUT Exercise Software

Test Mode	Mode 1: Transmit
1	Setup the EUT and simulators as shown on 1.5.
2	Enable RF signal and confirm EUT active.
3	Modulate output capacity of EUT up to specification.

1.7. Test Facility

Ambient conditions in the laboratory:

Items	Test Item	Required (IEC 68-1)	Actual
Temperature (°C)	ANSI.C63.4 CE	15 - 35	25
Humidity (%RH)		25 - 75	50
Barometric pressure (mbar)		860 - 1060	950-1000
Temperature (°C)	ANSI.C63.4 RE	15 -35	25
Humidity (%RH)		25 - 75	65
Barometric pressure (mbar)		860 - 1060	950-1000

Site Description:

January 24, 2005 File on
Federal Communications Commission
Laboratory Division
7435 Oakland Mills Road
Columbia, MD 21046
Registration Number: 365520



Accredited by CNLA
Accreditation Number: 1313
Effective through: September 27, 2007



Accredited by NVLAP
NVLAP Lab Code: 200347-0
Effective through: September 30 , 2005



Site Name: Quietek Corporation

Site Address: No.75-1, Wang-Yeh Valley, Yung-Hsing,
Chiung-Lin, Hsin-Chu County,
Taiwan, R.O.C.

TEL : 886-3-592-8858 / FAX : 886-3-592-8859
E-Mail : service@quietek.com

2. Conducted Emission

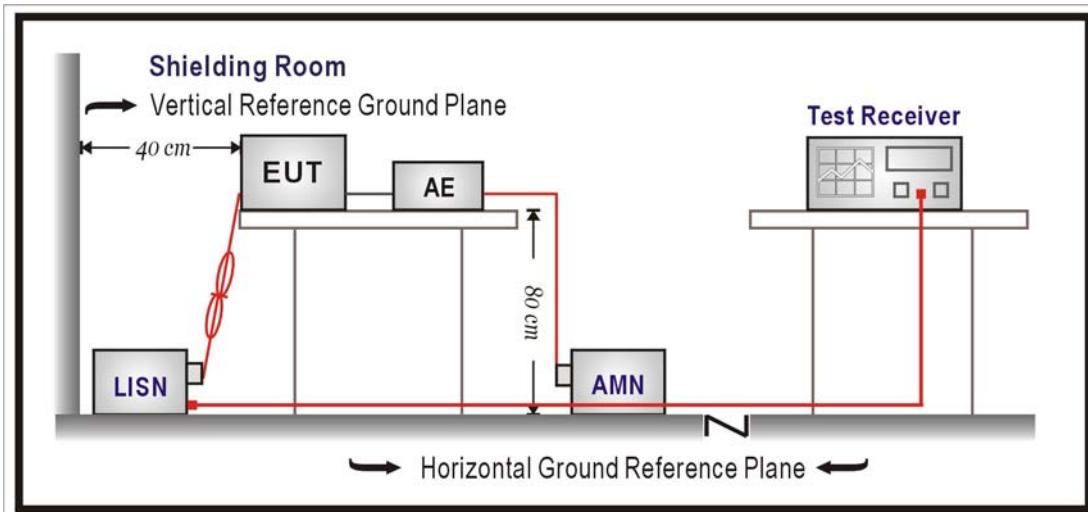
2.1. Test Equipment

The following test equipment are used during the test:

Item	Equipment	Manufacturer	Model No. / Serial No.	Last Cal.	Remark
1	Test Receiver	R & S	ESCS 30/825442/018	Sep., 2004	
2	Artificial Mains Network	R & S	ENV4200/848411/10	Feb., 2005	Peripheral
3	LISN	R & S	ESH3-Z5/825562/002	Feb., 2005	EUT
4	Pulse Limiter	R & S	ESH3-Z2/357.8810.52	Feb., 2005	
5	No.2 Shielded Room			N/A	

Note: All equipment upon which need to calibrated are with calibration period of 1 year.

2.2. Test Setup



2.3. Limits

FCC Part 15 Subpart C Paragraph 15.207 Limits (dBuV)		
Frequency MHz	QP	AV
0.15 - 0.50	66-56	56-46
0.50-5.0	56	46
5.0 - 30	60	50

Remarks : In the above table, the tighter limit applies at the band edges.

2.4. Test Procedure

The EUT and simulators are connected to the main power through a line impedance stabilization network (L.I.S.N.). This provides a 50 ohm /50uH coupling impedance for the measuring equipment. The peripheral devices are also connected to the main power through a LISN that provides a 50ohm/50uH coupling impedance with 50ohm termination. (Please refers to the block diagram of the test setup and photographs.)

Both sides of A.C. line are checked for maximum conducted interference. In order to find the maximum emission, the relative positions of equipment and all of the interface cables must be changed according to ANSI C63.4: 2003 on conducted measurement.

Conducted emissions were invested over the frequency range from 0.15MHz to 30MHz using a receiver bandwidth of 9kHz.

2.5. Test Specification

According to FCC Part 15 Subpart C Paragraph 15.207: 2003

2.6. Test Result

Product	Fingerprint System				
Test Item	Conducted Emission				
Test Mode	Mode1: Transmit				
Date of Test	2005/07/05		Test Site	No.2 Shield Room	

Frequency	Cable	LISN	Reading	Emission	Limits
	Loss	Factor	Level	Level	
MHz	dB	dB	dBuV	dBuV	dBuV
<hr/>					

Line 1**Quasi-Peak**

*	0.197	0.01	0.13	46.70	46.84	63.74
	0.388	0.05	0.19	32.72	32.96	58.10
	0.584	0.07	0.23	30.57	30.87	56.00
	1.560	0.13	0.32	26.86	27.31	56.00
	4.287	0.19	0.42	28.99	29.60	56.00
	13.560	0.31	0.53	35.20	36.04	60.00

Average

	0.197	0.01	0.13	37.50	37.64	53.74
	0.388	0.05	0.19	26.80	27.04	48.11
	0.584	0.07	0.23	24.80	25.10	46.00
	1.560	0.13	0.32	21.80	22.25	46.00
	4.287	0.19	0.42	25.40	26.01	46.00
*	13.560	0.31	0.53	34.30	35.14	50.00

Note:

1. All Reading Levels are Quasi-Peak and Average value.
2. “ * ”, means this data is the worst emission level.
3. Emission Level = Reading Level + LISN Factor + Cable Loss.

Product	Fingerprint System				
Test Item	Conducted Emission				
Test Mode	Mode1: Transmit				
Date of Test	2005/07/05		Test Site	No.2 Shield Room	

Frequency	Cable	LISN	Reading	Emission	Limits
	Loss	Factor	Level	Level	
MHz	dB	dB	dBuV	dBuV	dBuV
<hr/>					

Line 2**Quasi-Peak**

*	0.193	0.01	0.12	47.81	47.95	63.91
	0.392	0.05	0.19	31.54	31.78	58.02
	0.779	0.09	0.26	23.59	23.93	56.00
	2.533	0.16	0.37	27.23	27.75	56.00
	4.287	0.19	0.42	27.50	28.11	56.00
	13.560	0.31	0.53	35.91	36.75	60.00

Average

	0.193	0.01	0.12	35.90	36.04	53.91
	0.392	0.05	0.19	22.60	22.84	48.02
	0.779	0.09	0.26	16.90	17.24	46.00
	2.533	0.16	0.37	21.20	21.72	46.00
	4.287	0.19	0.42	23.20	23.81	46.00
*	13.560	0.31	0.53	34.90	35.74	50.00

Note:

1. All Reading Levels are Quasi-Peak and Average value.
2. “ * ”, means this data is the worst emission level.
3. Emission Level = Reading Level + LISN Factor + Cable Loss.

2.7. Test Photo

Test Mode : Mode 1: Transmit

Description : Front View of Conducted Emission Test Setup



Test Mode : Mode 1: Transmit

Description : Back View of Conducted Emission Test Setup



3. Radiated Emission

3.1. Test Equipment

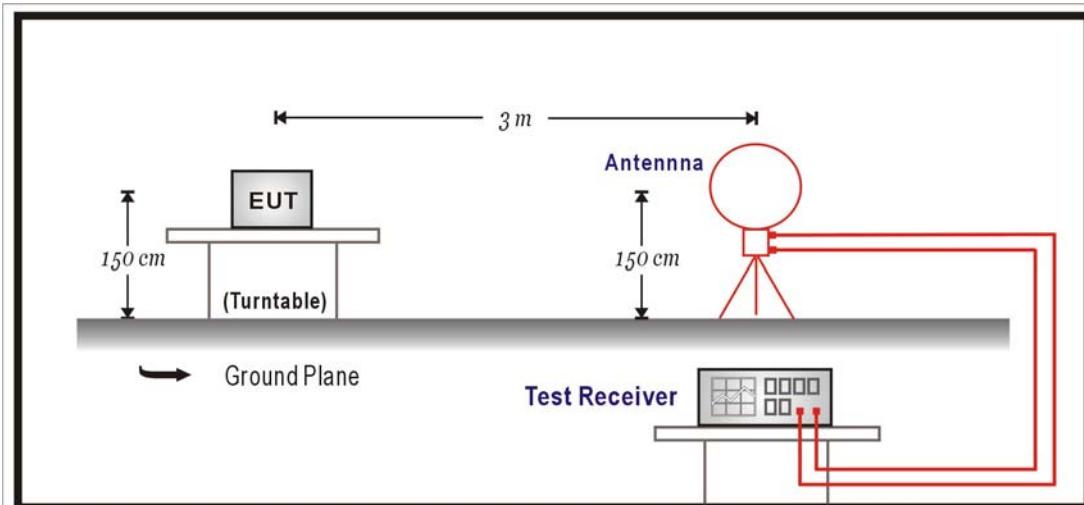
The following test equipment are used during the test:

Item	Equipment		Manufacturer	Model No. / Serial No.	Last Cal.
1	X	Test Receiver	R & S	ESCS 30 / 825442/017	Jan., 2005
2	X	Loop Antenna	R & S	HFH2-Z2 / 833799/004	Sep., 2004
3	X	Spectrum Analyzer	Advantest	R3261C / 81720266	N/A
4	X	Pre-Amplifier	HP	8447D / 2944A09276	N/A
5	X	Bilog Antenna	Chase	CBL6112B / 2455	Sep., 2004
6	No.1 OATS				Sep., 2004

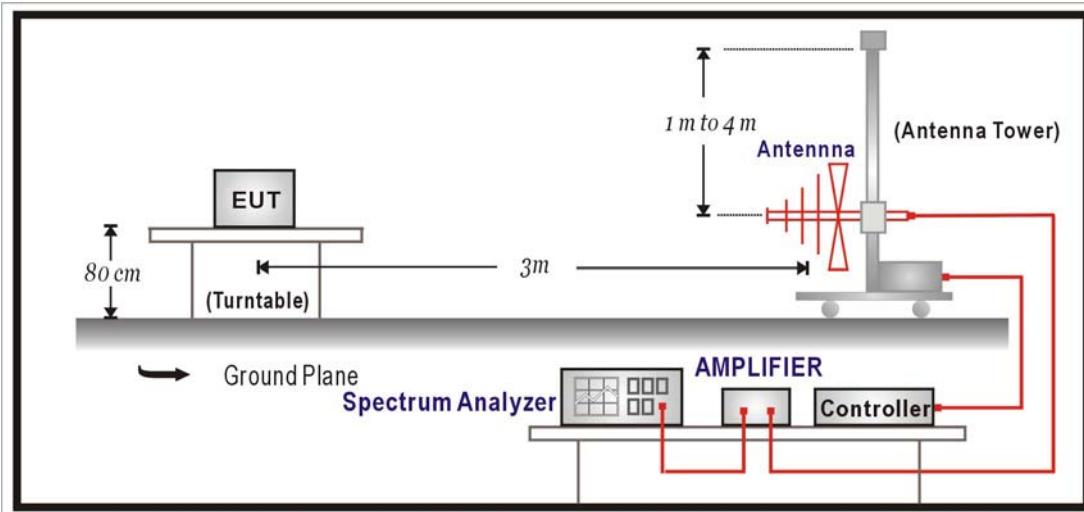
Note: 1. All equipments that need to calibrate are with calibration period of 1 year.
 2. Mark "X" test instruments are used to measure the final test results.

3.2. Test Setup

Under 30MHz Test Setup:



Under 1GHz Test Setup:



3.3. Limits

FCC Part 15 Subpart C Paragraph 15.209 Limits			
Frequency MHz	uV/m	dBuV/m	Measurement distance (meter)
0.009-0.490	2400/F(kHz)	See Remark ¹	300
0.490-1.705	24000/F(kHz)	See Remark ¹	30
1.705-30	30	29.54	30
30-88	100	40	3
88-216	150	43.5	3
216-960	200	46	3
Above 960	500	54	3

Remarks : 1. RF Voltage (dBuV) = 20 log RF Voltage (uV).

2. In the Above Table, the tighter limit applies at the band edges.
3. Distance refers to the distance in meters between the measuring instrument antenna and the closed point of any part of the device or system.
4. When the very low emission of EUT, the 3m measurement distance was performed. Regards to an inverse linear extrapolation 40dB/dec is adopted.

3.4. Test Procedure

Under 30MHz Test:

The EUT and its simulators are placed on a turn table which is 1.5 meter above ground. The turn table can rotate 360 degrees to determine the position of the maximum electric field strength. The EUT was positioned such that the distance from antenna to the EUT was 3 meters.

The antenna which is 1.5 meter above ground. All X-axis, Y-axis and Z-axis polarization of the antenna are set on measurement.

The emission limit shown in the above table are based on measurements employing a CISPR quasi-peak detector except for the frequency bands 9-90kHz, 110-490kHz and above 1000MHz. Radiated emission limit in these three bands are based on measurements employing an average detector.

Under 1GHz Test:

The EUT and its simulators are placed on a turn table which is 0.8 meter above ground. The turn table can rotate 360 degrees to determine the position of the maximum emission level. The antenna can move up and down between 1 meter and 4 meters to find out the maximum emission level. The EUT was positioned such that the distance from antenna to the EUT was 3 meters.

Both horizontal and vertical polarization of the antenna are set on measurement. In order to find the maximum emission, all of the interface cables must be manipulated according to ANSI C63.4:2003 on radiated measurement.

On any frequency the radiated limits shown are based upon the use of measurement instrumentation employing an average detector function. When average radiated emission measurement are included emission measurement below 1000 MHz, there also is a limit on the radio frequency emissions, as measured using instrumentation with a peak detector function, corresponding to 20 dB above the maximum permitted average limit.

The bandwidth below 30MHz setting on the field strength meter is 9kHz and above 30MHz is 120kHz.

3.5. Test Specification

According to FCC Part 15 Subpart C Paragraph 15.209: 2003

3.6. Test Result

Product	Fingerprint System		
Test Item	Radiated Emission		
Test Mode	Mode1: Transmit		
Date of Test	2005/07/05	Test Site	No.1 OATS

Frequency MHz	Cable Loss dB	Reading Level dBuV	Emission Level dBuV/m	QP Limit dBuV/m
X-axis				
13.56	0.76	35.50	36.26	69.54
Y-axis				
13.56	0.76	45.40	46.16	69.54
Z-axis				
13.56	0.76	44.60	45.36	69.54

Note:

1. All Reading Levels are Quasi-Peak value; except for the frequency bands 9-90kHz and 110-490kHz are performed with peak and/or average measurements as necessary.
2. RF Voltage (dBuV/m) = 20 log RF Voltage (uV/m).
3. Emission Level = Reading Level + Cable Loss.
4. Peak Limit = Average Limit + 20dB.
5. The average measurement was not performed when the peak measured data under the limit of average detection. If the readings given are average, peak measurement should also be supplied.

Product	Fingerprint System		
Test Item	Radiated Emission		
Test Mode	Mode1: Transmit		
Date of Test	2005/07/05	Test Site	No.1 OATS

Frequency MHz	Cable Loss dB	Reading Level dBuV	Emission Level dBuV/m	QP Limit dBuV/m
Y-axis				
2.112	0.46	26.25	26.71	69.54
7.280	0.59	25.41	26.00	69.54
10.365	0.68	29.58	30.26	69.54
16.413	0.84	26.58	27.42	69.54
20.621	0.95	24.17	25.12	69.54
25.075	1.07	31.26	32.33	69.54

Note:

1. All Reading Levels are Quasi-Peak value; except for the frequency bands 9-90kHz and 110-490kHz are performed with peak and/or average measurements as necessary.
2. RF Voltage (dBuV/m) = 20 log RF Voltage (uV/m).
3. Emission Level = Reading Level + Cable Loss.
4. Peak Limit = Average Limit + 20dB.
5. The average measurement was not performed when the peak measured data under the limit of average detection. If the readings given are average, peak measurement should also be supplied.

Product	Fingerprint System						
Test Item	Radiated Emission						
Test Mode	Mode1: Transmit						
Date of Test	2005/07/05				Test Site	No.1 OATS	

Frequency	Cable	Probe	PreAMP	Reading	Emission	Margin	Limit	
	Loss	Factor		Level	Level			
MHz	dB	dB/m	dB	dBuV	dBuV/m	dB	dBuV/m	
78.000	0.40	8.88	22.60	35.63	22.31	17.69	40.00	
150.055	0.51	9.64	22.60	46.11	33.65	9.85	43.50	
252.025	0.66	12.10	22.60	43.73	33.89	12.11	46.00	
387.975	0.86	18.34	22.60	43.65	40.25	5.75	46.00	
500.000	1.03	20.95	22.60	36.12	35.49	10.51	46.00	
*	886.990	1.60	25.18	22.60	38.64	42.82	3.18	46.00

Horizontal (Y-axis):

78.000	0.40	8.88	22.60	35.63	22.31	17.69	40.00	
150.055	0.51	9.64	22.60	46.11	33.65	9.85	43.50	
252.025	0.66	12.10	22.60	43.73	33.89	12.11	46.00	
387.975	0.86	18.34	22.60	43.65	40.25	5.75	46.00	
500.000	1.03	20.95	22.60	36.12	35.49	10.51	46.00	
*	886.990	1.60	25.18	22.60	38.64	42.82	3.18	46.00

Note:

1. All Reading Levels are Quasi-Peak value.
2. “ * ”, means this data is the worst emission level.
3. Emission Level = Reading Level + Probe Factor + Cable Loss.

Product	Fingerprint System						
Test Item	Radiated Emission						
Test Mode	Mode1: Transmit						
Date of Test	2005/07/05				Test Site	No.1 OATS	

Frequency	Cable	Probe	PreAMP	Reading	Emission	Margin	Limit
	Loss	Factor		Level	Level		
MHz	dB	dB/m	dB	dBuV	dBuV/m	dB	dBuV/m
====	====	====	====	====	====	====	====

Vertical (Y-axis):

55.260	0.37	16.32	22.60	34.86	28.95	11.05	40.00	
81.000	0.41	16.48	22.60	32.28	26.56	13.44	40.00	
256.975	0.67	14.82	22.60	40.42	33.30	12.70	46.00	
505.630	1.03	20.36	22.60	37.85	36.65	9.35	46.00	
750.000	1.40	21.59	22.60	38.73	39.12	6.88	46.00	
*	923.075	1.66	23.49	22.60	40.01	42.56	3.44	46.00

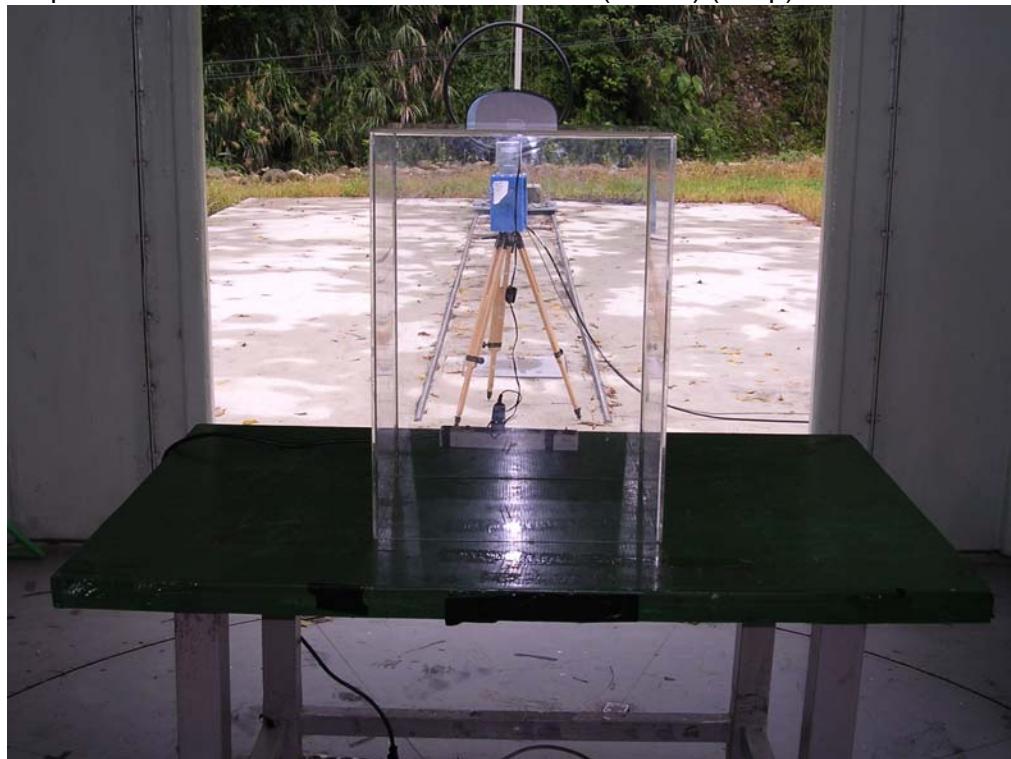
Note:

1. All Reading Levels are Quasi-Peak value.
2. “ * ”, means this data is the worst emission level.
3. Emission Level = Reading Level + Probe Factor + Cable Loss.

3.7. Test Photo

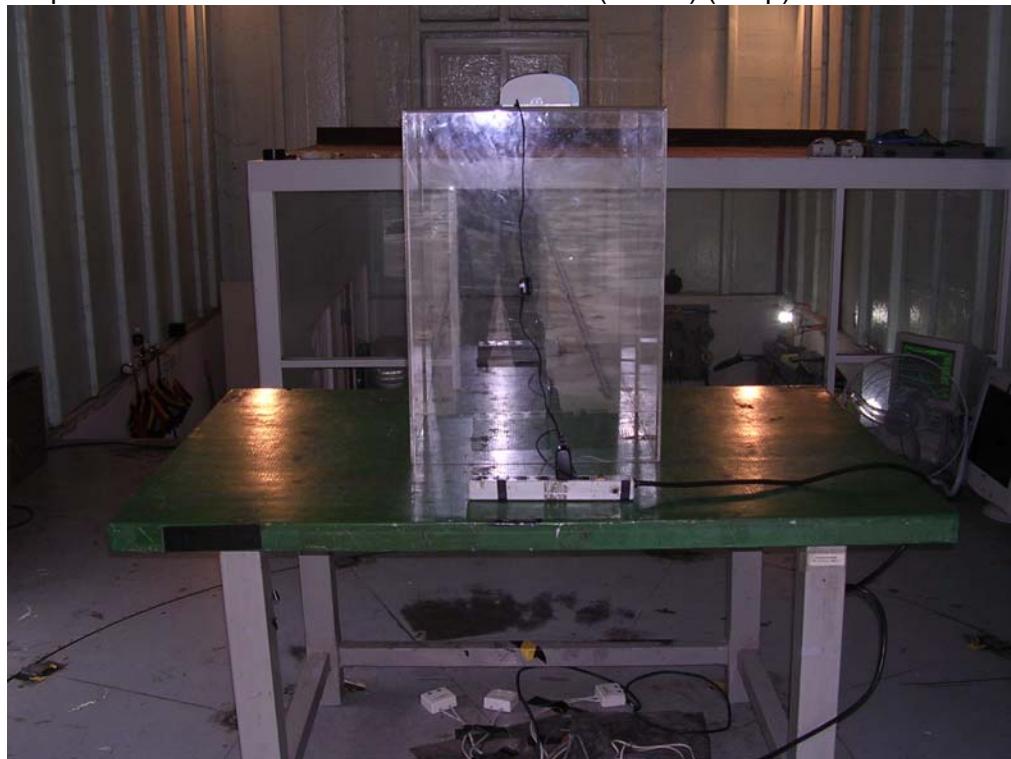
Test Mode : Mode1: Transmit

Description : Front View of Radiated Emission (X-axis) (Loop)



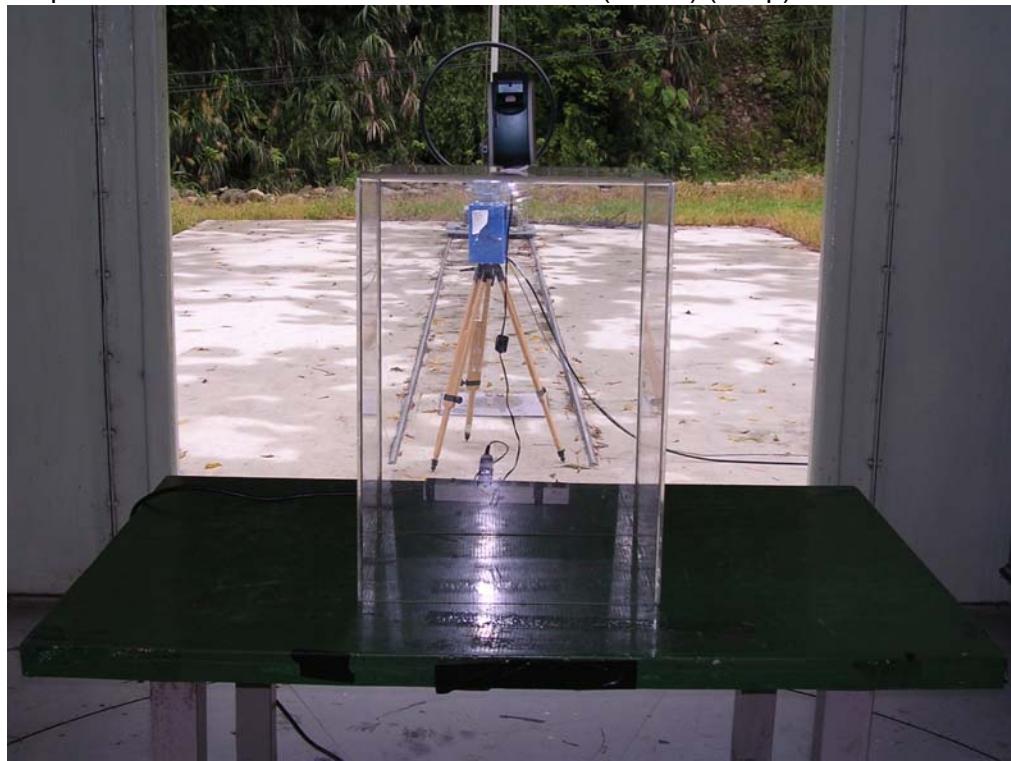
Test Mode : Mode1: Transmit

Description : Back View of Radiated Emission (X-axis) (Loop)



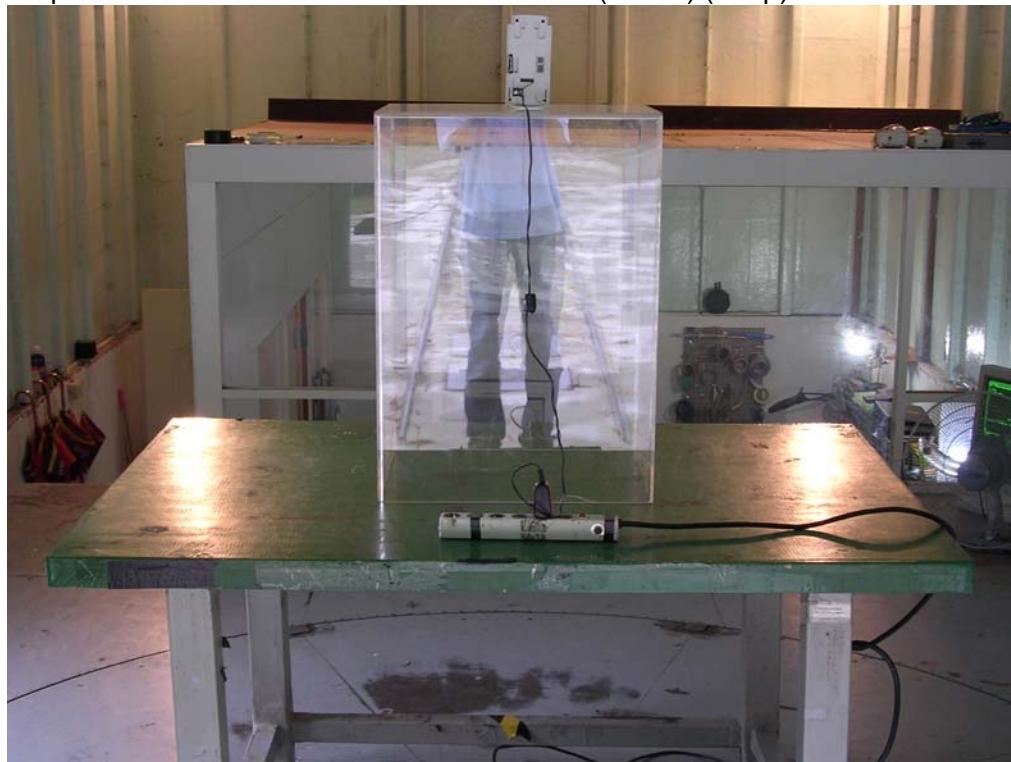
Test Mode : Mode1: Transmit

Description : Front View of Radiated Emission (Y-axis) (Loop)



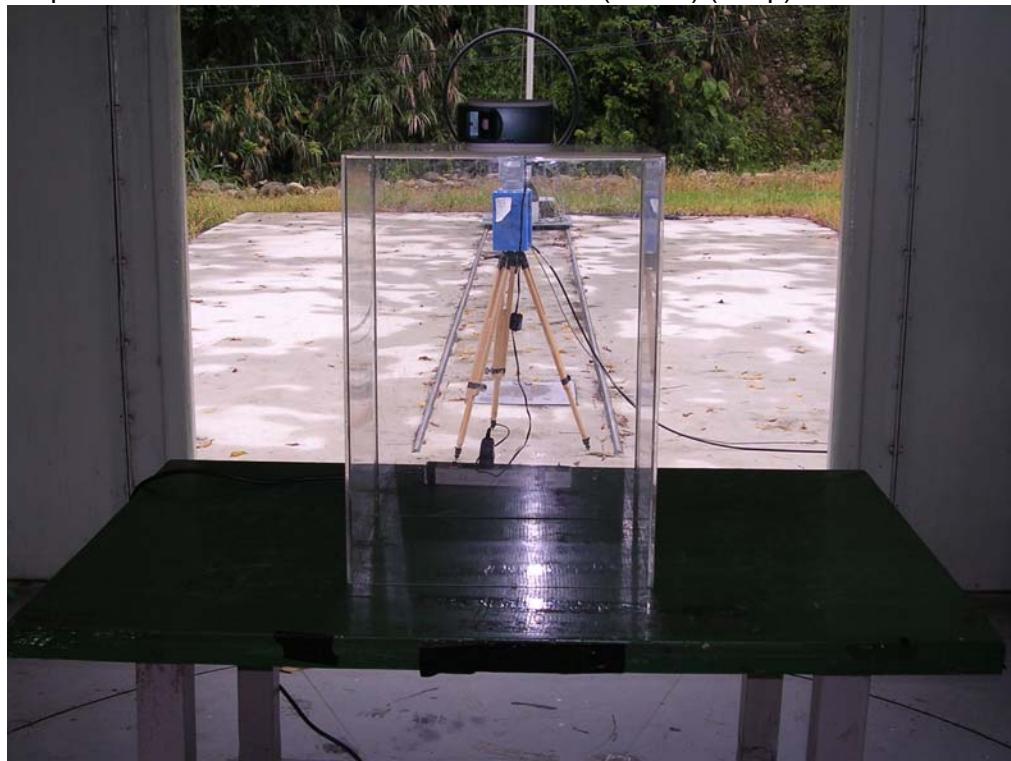
Test Mode : Mode1: Transmit

Description : Back View of Radiated Emission (Y-axis) (Loop)



Test Mode : Mode1: Transmit

Description : Front View of Radiated Emission (Z-axis) (Loop)



Test Mode : Mode1: Transmit

Description : Back View of Radiated Emission (Z-axis) (Loop)



Test Mode : Mode1: Transmit

Description : Front View of View of Radiated Emission (Y-axis)



Test Mode : Mode1: Transmit

Description : Back of View of Radiated Emission (Y-axis)



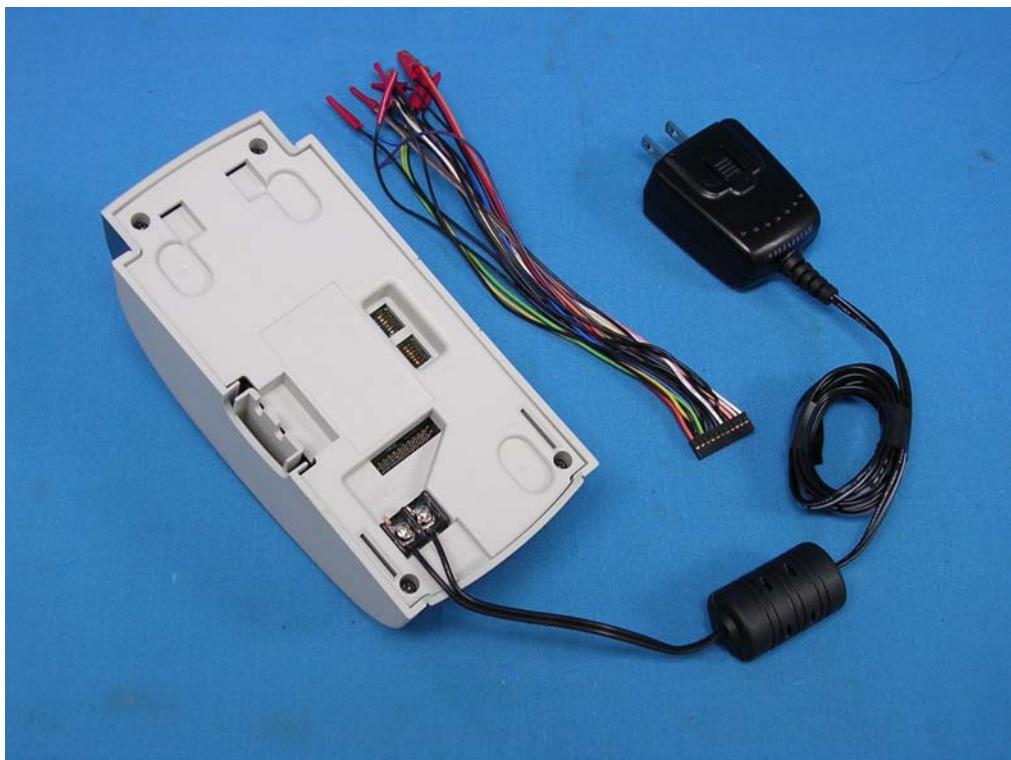
Attachement

➤ EUT Photograph

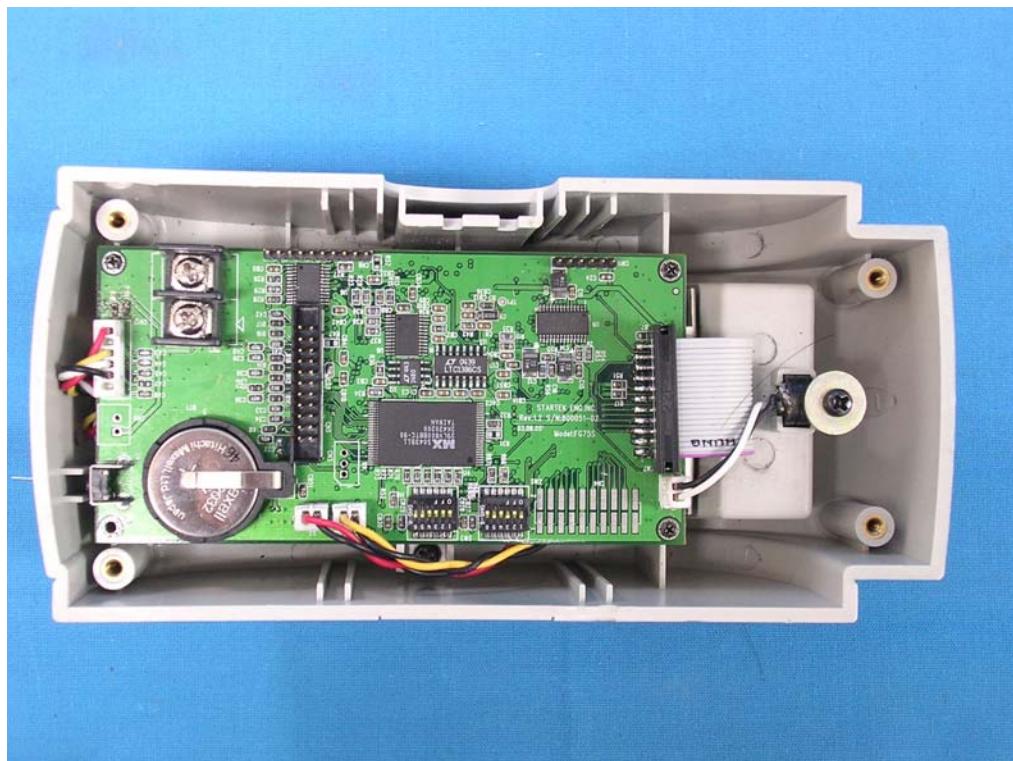
(1) EUT Photo



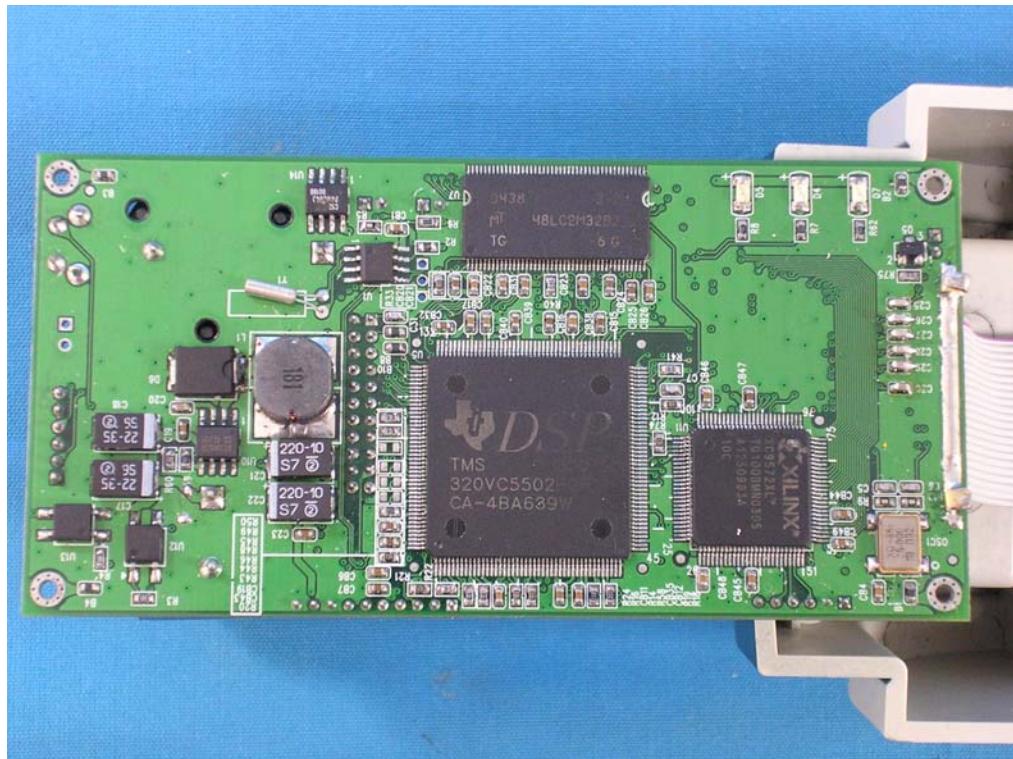
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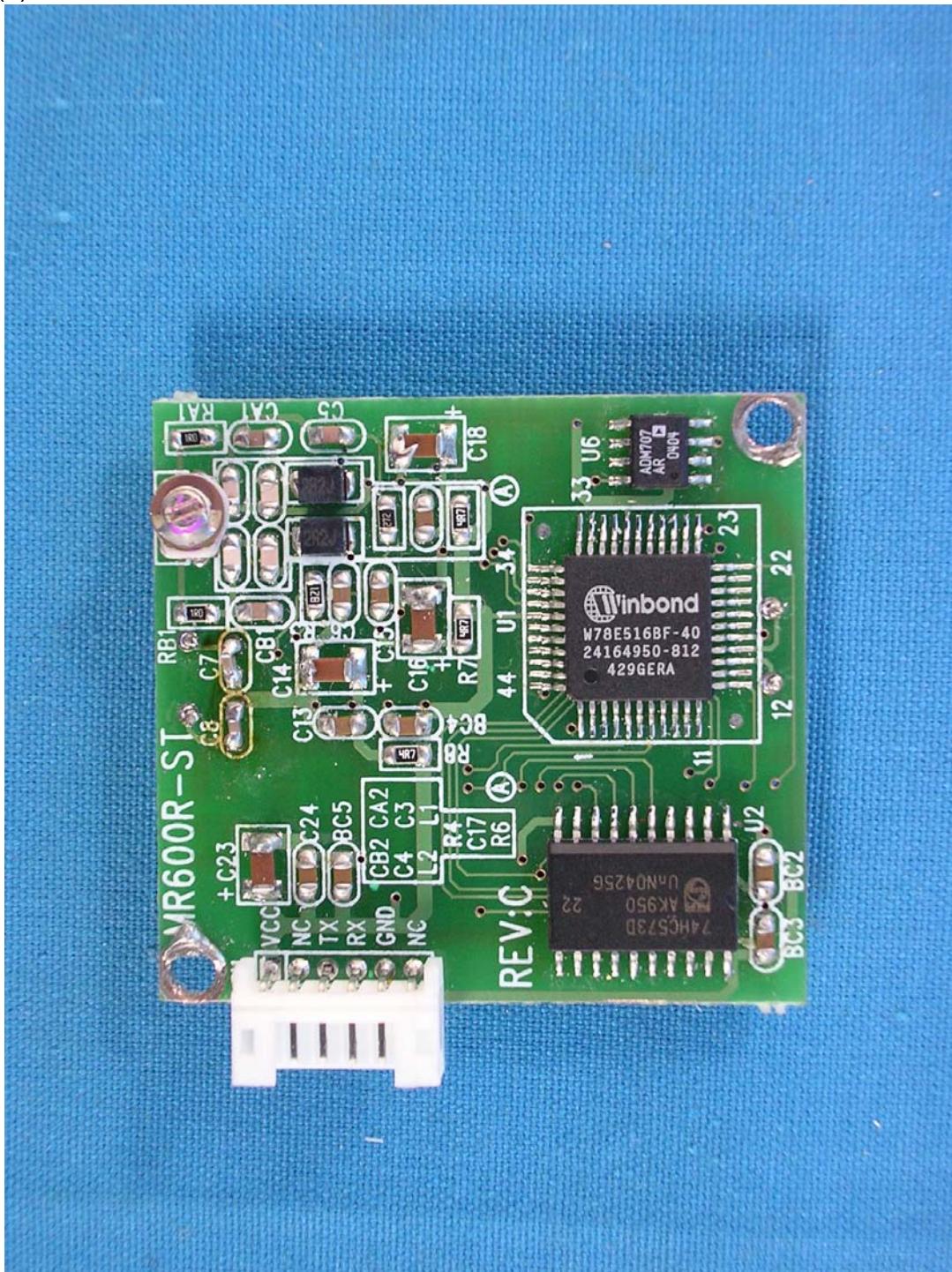
(3) EUT Photo



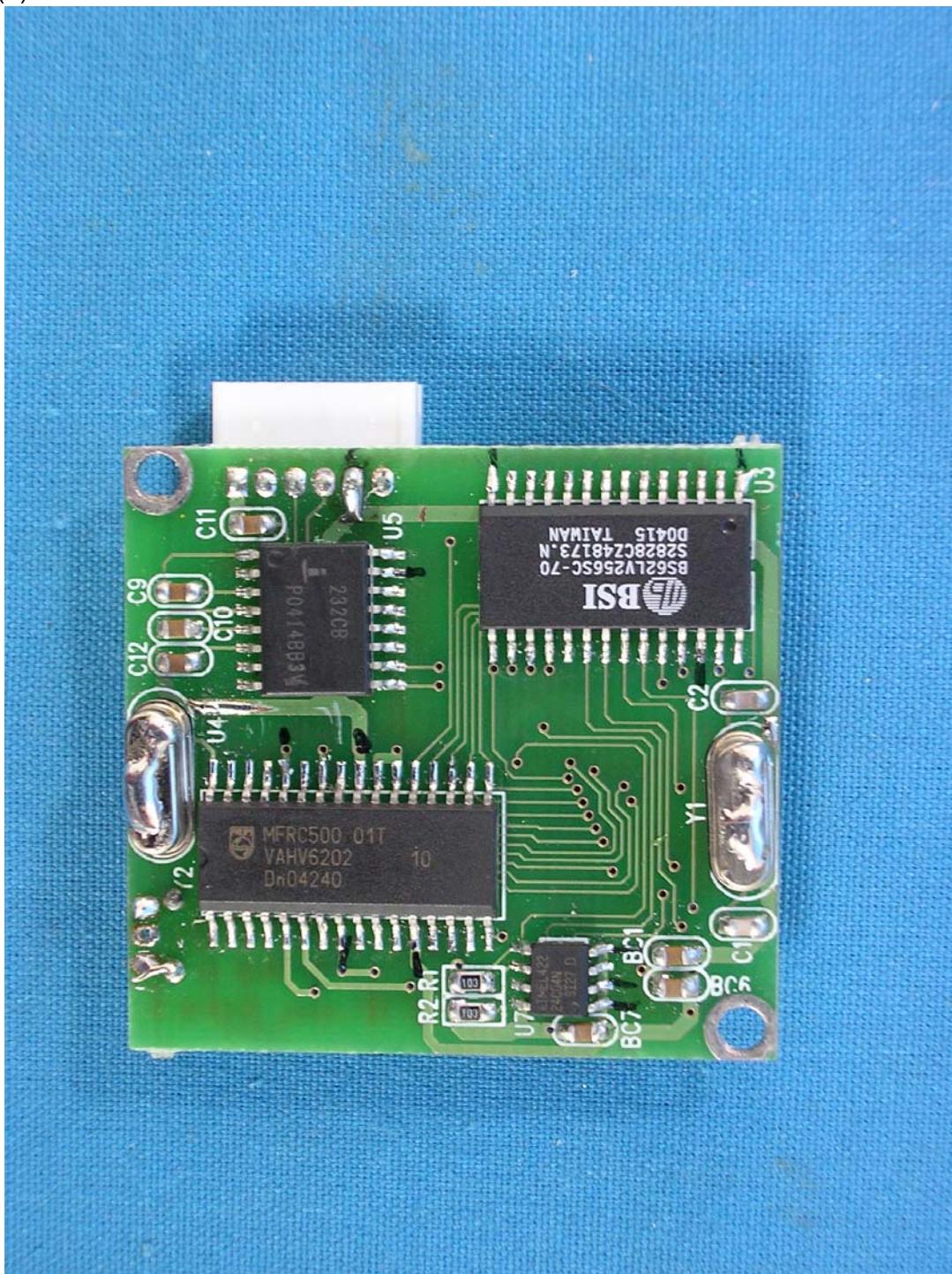
(4) EUT Photo



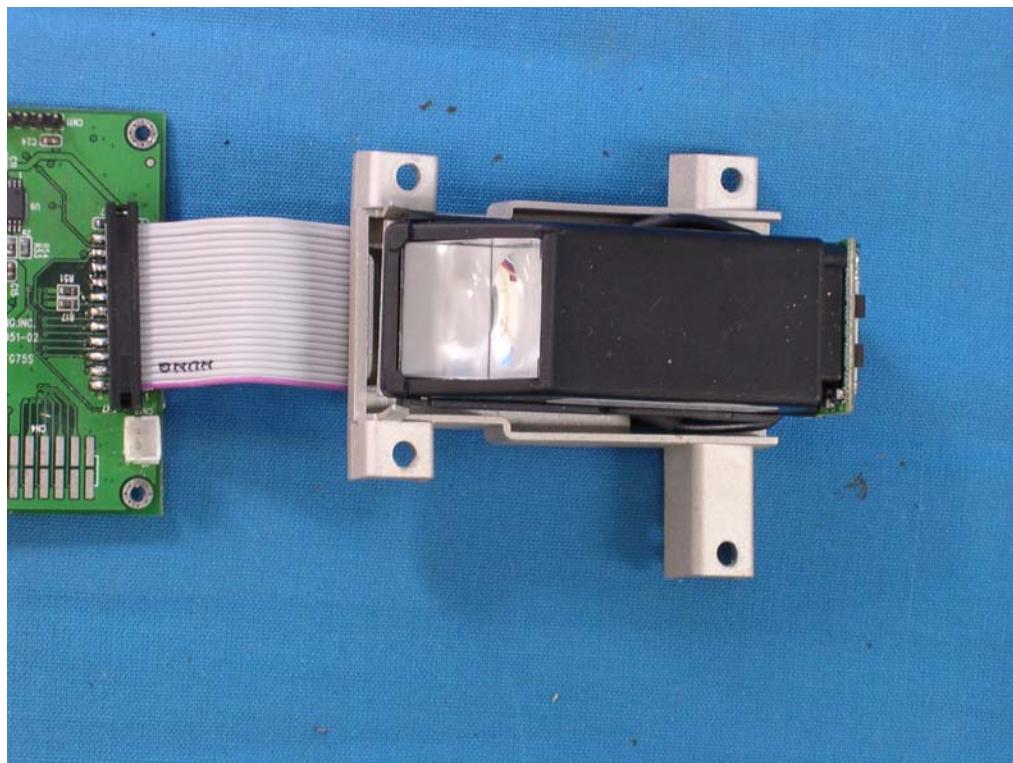
(5) EUT Photo



(6) EUT Photo



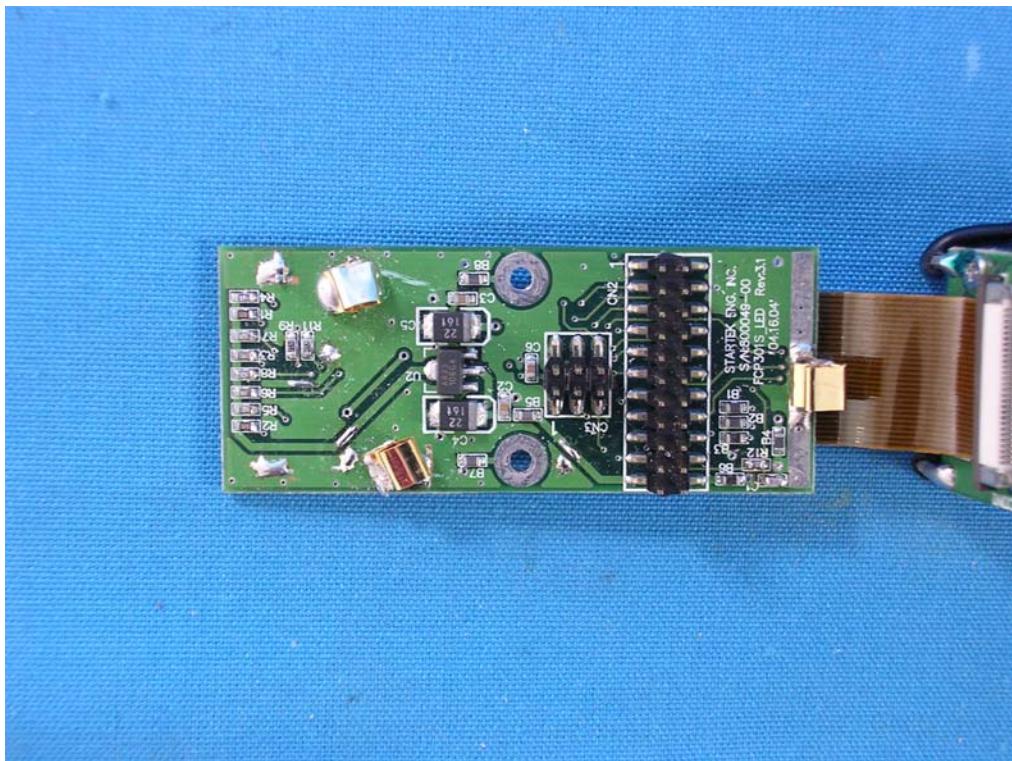
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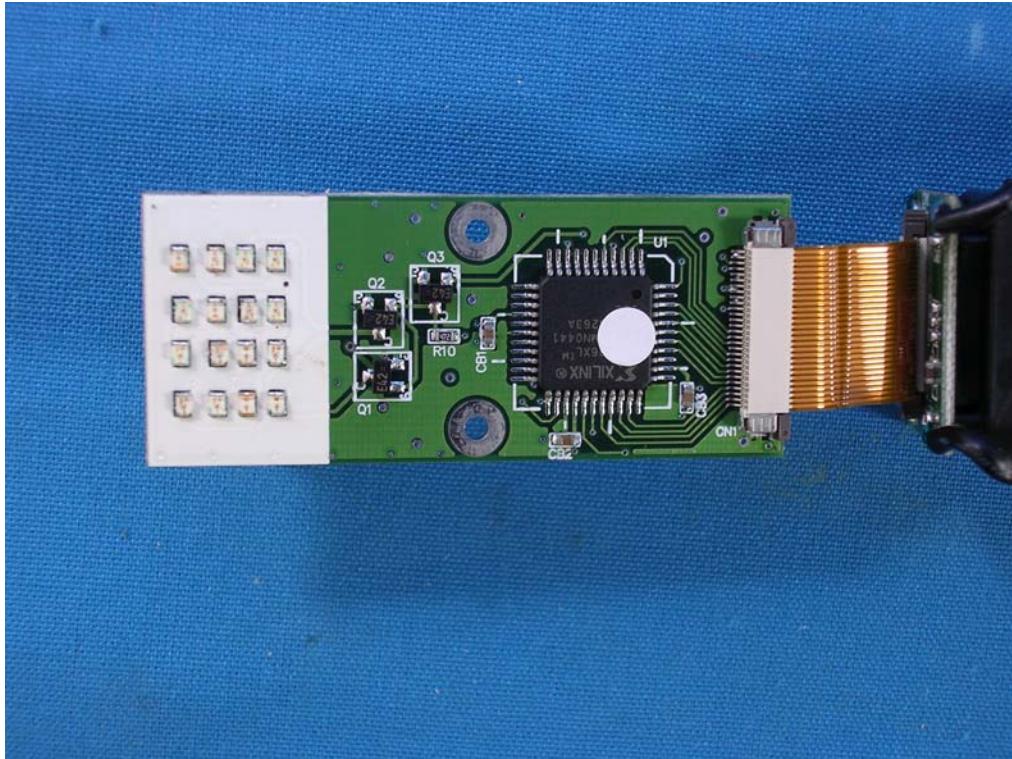
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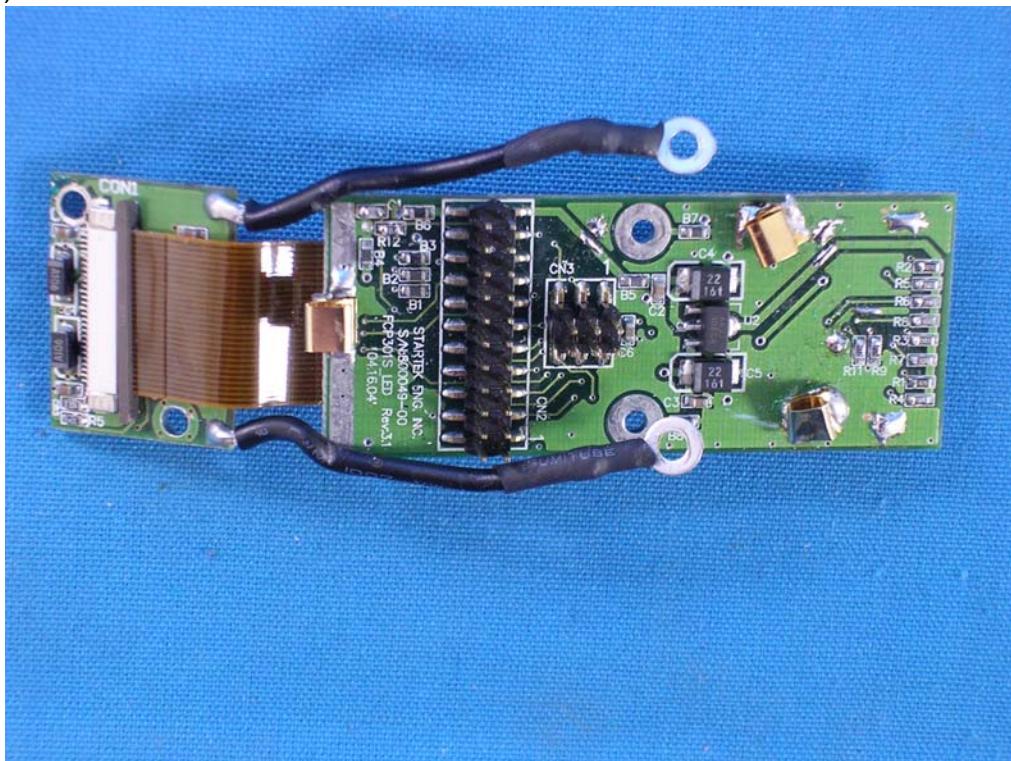
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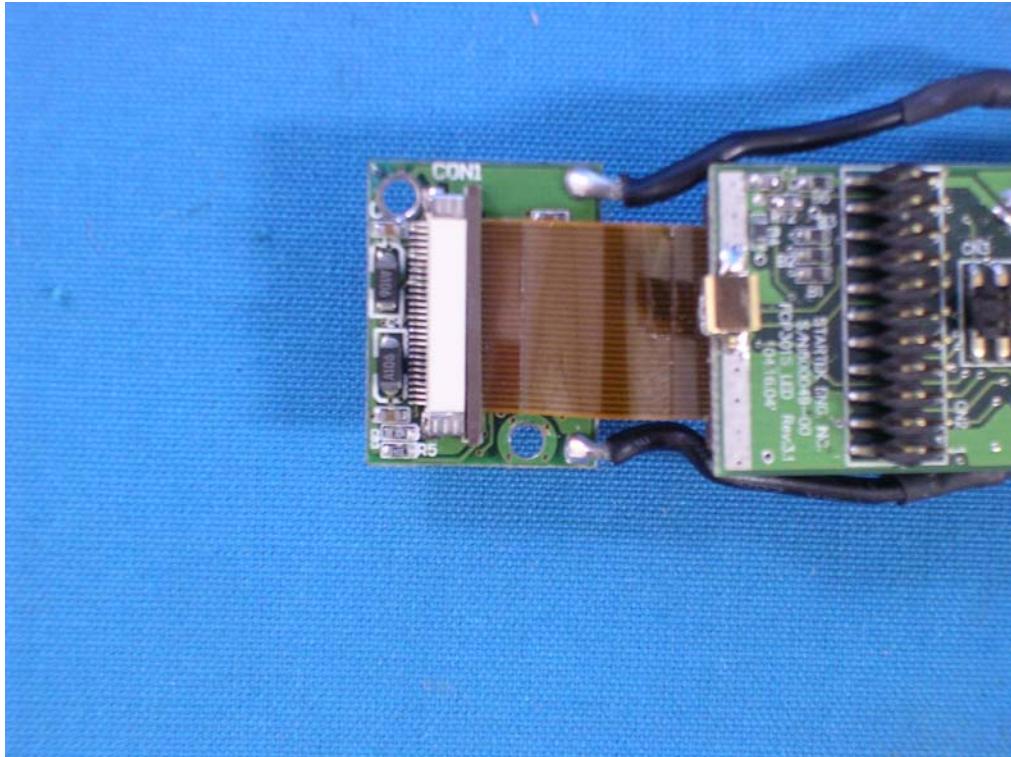
(10) EUT Photo



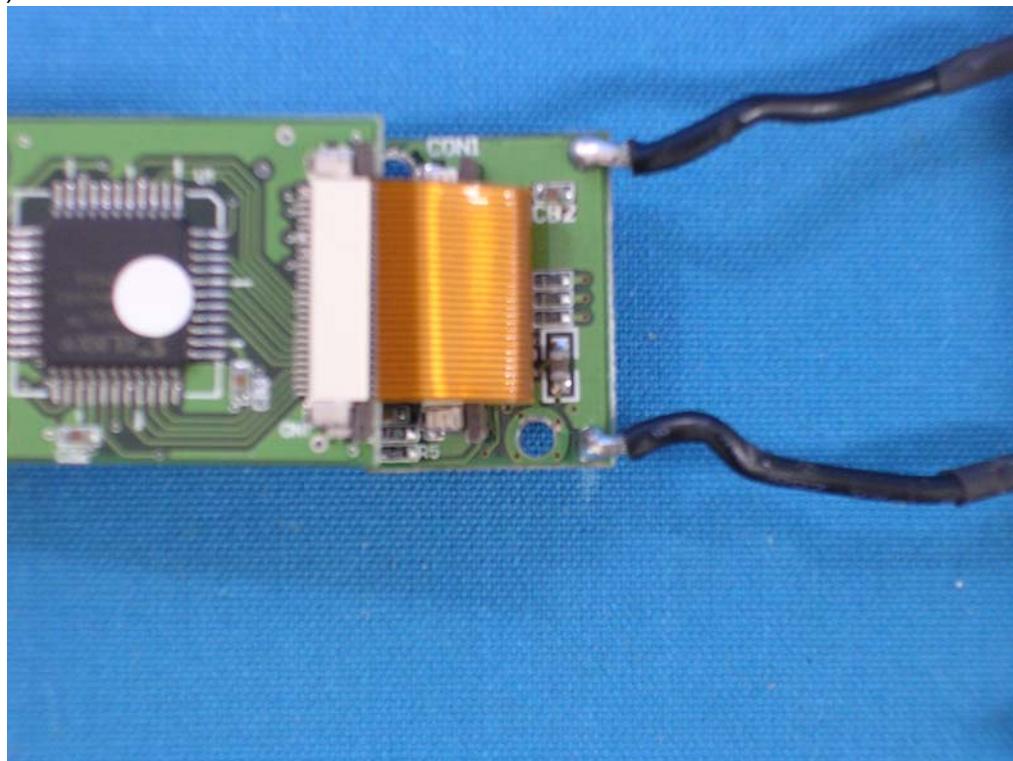
(11) EUT Photo



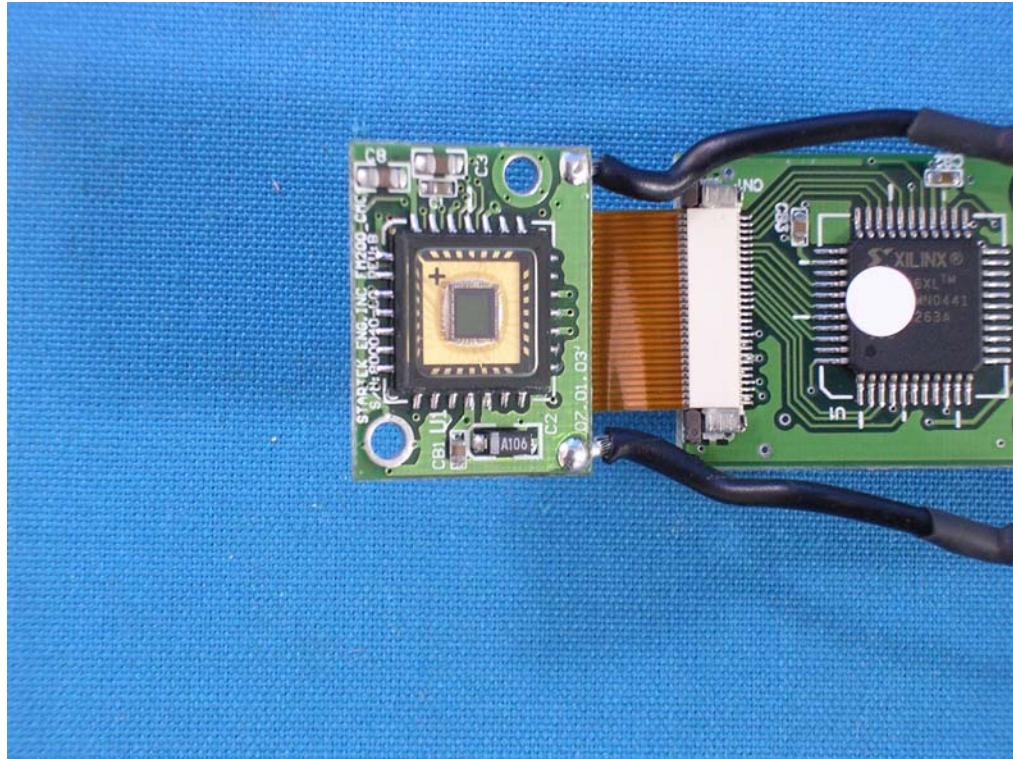
(12) EUT Photo



(13) EUT Photo



(14) EUT Photo



(15) EUT Photo

