



Test Report

Product Name : Body Temperature Monitor

Model No. : Rio 101-04A

FCC ID. : SMZRIO101-04A

Applicant : RIO FLEXON TECHNOLOGY CO., LTD.

Address : 15F., No. 868-2, Jhongjheng Rd. Jhonghe City,

Taipei County 235, Taiwan (R.O.C)

Date of Receipt : 2005/07/12

Issued Date : 2005/09/23

Report No. : 057L037FI

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 : 2005/09/23
Report No. : 057L037FI

QuiTek

Accredited by NIST (NVLAP)
NVLAP Lab Code: 200533-0

Product Name : Body Temperature Monitor
Applicant : RIO FLEXON TECHNOLOGY CO., LTD.
Address : 15F., No. 868-2, Jhongjheng Rd. Jhonghe City, Taipei County
235, Taiwan (R.O.C)
Manufacturer : RIO FLEXON TECHNOLOGY CO., LTD.
Model No. : Rio 101-04A
FCC ID. : SMZRIO101-04A
Rated Voltage : DC 3V
EUT Voltage : DC 3V
Trade Name : Rio
Measurement Standard : FCC 15 Subpart C Section 15.231: 2003
Measurement Procedure : ANSI C63.4: 2003
Test Result : Complied

The test results relate only to the samples tested.

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Documented By : Grace Lin

(Grace Lin)

Tested By : Tom Hsieh

(Tom Hsieh)

Approved By : Gene Chang

(Gene Chang)

TABLE OF CONTENTS

Description	Page
1. General Information	4
1.1. EUT Description	4
1.2. Operation Description	5
1.3. Test Mode	6
1.4. Tested System Details.....	7
1.5. Configuration of tested System	7
1.6. EUT Exercise Software	8
1.7. Test Facility	9
2. Conducted Emission	10
2.1. Test Equipment	10
2.2. Test Setup	10
2.3. Limits.....	11
2.4. Test Procedure	11
2.5. Test Specification	11
2.6. Test Result	12
3. Radiated Emission	13
3.1. Test Equipment	13
3.2. Test Setup	13
3.3. Limits.....	14
3.4. Test Procedure	15
3.5. Test Specification	15
3.6. Test Result	16
3.7. Test Photo	22
4. Occupied Bandwidth	24
4.1. Test Equipment	24
4.2. Test Setup	24
4.3. Limits.....	24
4.4. Test Specification	24
4.5. Test Result	25
5. Duty Cycle	26
5.1. Test Equipment	26
5.2. Test Setup	26
5.3. Test Specification	26
5.4. Test Result	27
Attachment.....	31
EUT Photograph	31

1. General Information**1.1. EUT Description**

Product Name	Body Temperature Monitor
Trade Name	Rio
Model No.	Rio 101-04A
FCC ID	SMZRio101-04A
Frequency Range	433.92 MHz
Channel Number	1
Type of Modulation	ASK
Working Voltage	DC 3V
Channel Control	N/A
Antenna Type	Soldered on PCB

Working Frequency of Each Channel	
Channel	Frequency
001	433.92 MHz

Note:

1. The EUT is a Body Temperature Monitor and includes a transmitter and a receiver.
2. The transmission operates in 433.92MHz.
3. These tests are conducted on a sample for the purpose of demonstrating compliance with Part 15 Subpart C Paragraph 15.231.
4. This device is a composite device in accordance with Part 15 regulations.
 - (1) The transmitter is tested and produces a test report of which the report number is 057L037FI, certified under FCC ID: SMZRio101-04A.
 - (2) The receiver is tested and produces a test report of which the report number is 057L037F, certified under Declaration of Conformity.

1.2. Operation Description

The EUT is a Body Temperature Monitor and includes a transmitter and a receiver. The transmission operates in 433.92MHz. The data modulation is ASK. The transmitter includes a temperature detector which measures the body temperature every 12 seconds. The measured data is transmitted to and shown on the receiver.

1.3. Test Mode

QuieTek verified the construction and function in typical operation. All the test modes are performed in normal operation and are defined as:

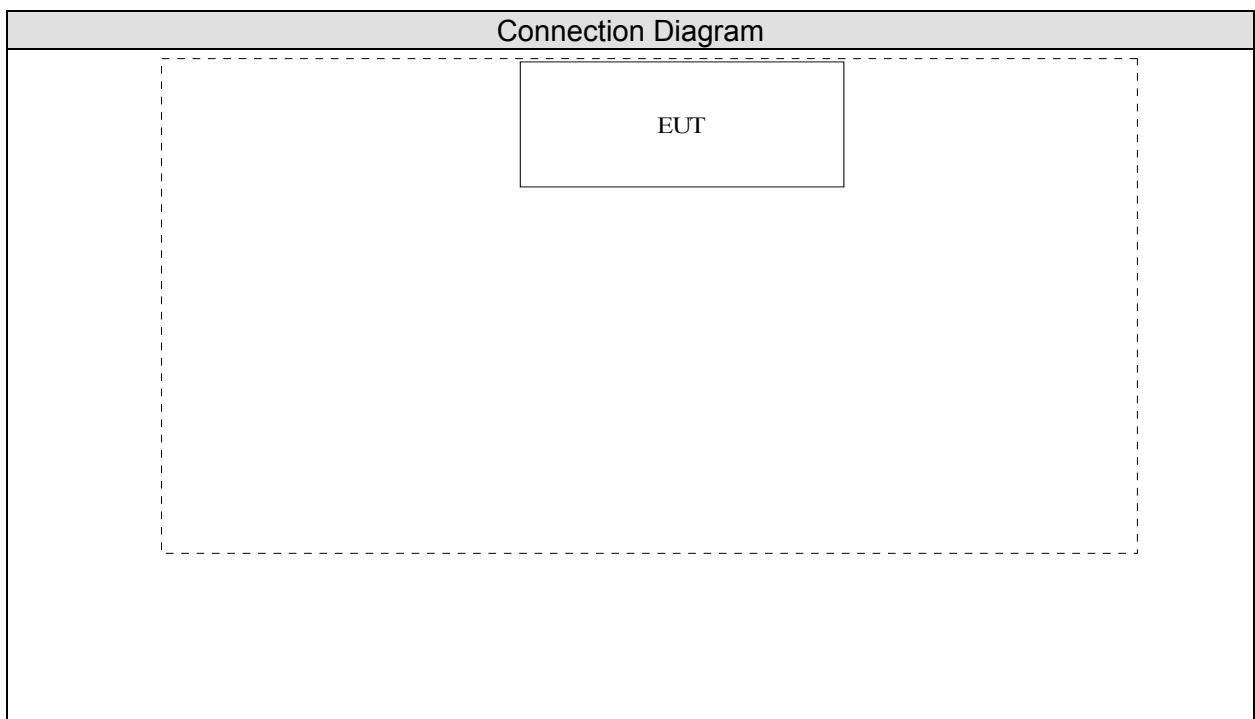
Pre-Test Mode	
TX	Mode 1: Transmit
Final Test Mode	
TX	Mode 1: Transmit

1.4. Tested System Details

The types for all equipments, 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	N/A

1.5. Configuration of tested System



1.6. EUT Exercise Software

1	Setup the EUT and/or test fixtures as shown in section 1.5.
2	Turn on the EUT.
3	Check the operation of the EUT is correct.
4	Check the radio is transmitting.

1.7. Test Facility

Ambient conditions in the laboratory:

Items	Test Item	Required (IEC 68-1)	Actual
Temperature (°C)	FCC PART 15 C 15.207 Conducted Emission	15 - 35	22
Humidity (%RH)		25 - 75	55
Barometric pressure (mbar)		860 - 1060	950-1000
Temperature (°C)	FCC PART 15 C 15.231 Duty Cycle	15 - 35	22
Humidity (%RH)		25 - 75	55
Barometric pressure (mbar)		860 - 1060	950-1000
Temperature (°C)	FCC PART 15 C 15.231 Occupied Bandwidth	15 - 35	22
Humidity (%RH)		25 - 75	55
Barometric pressure (mbar)		860 - 1060	950-1000
Temperature (°C)	FCC PART 15 C 15.231 Radiated Emission	15 - 35	22
Humidity (%RH)		25 - 75	55
Barometric pressure (mbar)		860 - 1060	950-1000

Site Description:

June 22, 2001 File on
Federal Communications Commission
FCC Engineering Laboratory
7435 Oakland Mills Road
Columbia, MD 21046
Reference 31040/SIT1300F2



0914

Accredited by CNLA
Accreditation Number: 0914
Effective through: October 31, 2005



Accredited by NVLAP
NVLAP Lab Code: 200533-0
Effective through: June 30, 2005

Site Name: Quietek Corporation

Site Address: No. 5, Ruei-Shu Valley, Ruei-Ping Tsuen,
Lin-Kou Shiang, Taipei,
Taiwan, R.O.C.
TEL : 886-2-8601-3788 / FAX : 886-2-8601-3789
E-Mail : service@quietek.com

2. Conducted Emission

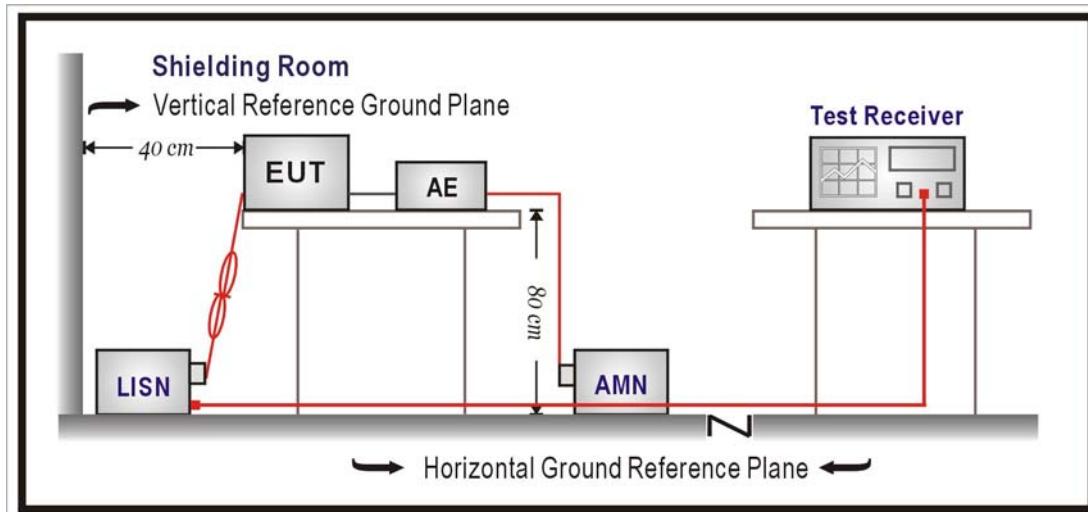
2.1. Test Equipment

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 30/838251/001	Jan., 2005	
2	L.I.S.N.	R & S	ESH3-Z5/836679/0023	May, 2005	Peripheral
3	L.I.S.N.	R & S	ENV	May, 2005	EUT
4	Pulse Limiter	R & S	ESH3-Z2	May, 2005	
5	No.1 Shielded Room			N/A	

Note: All instruments are calibrated every one 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: 2001 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

The EUT uses DC power. The test is not performed.

3. Radiated Emission

3.1. Test Equipment

The following test equipment are used during the test:

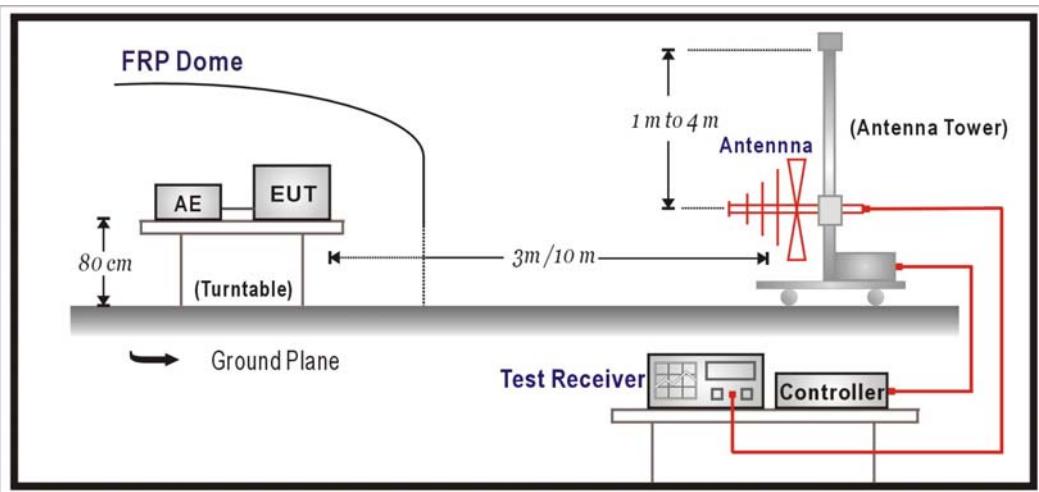
Test Site	Equipment	Manufacturer	Model No./Serial No.	Last Cal.
☒ OATS 3	Test Receiver	R & S	ESCS 30 / 100122	Feb., 2005
	Spectrum Analyzer	Advantest	R3162 / 120300652	Feb., 2005
	Pre-Amplifier	QTK	QTK-AMP-03 / 0003	May, 2005
	Bilog Antenna	SCHAFFNER	CBL6112B / 2697	May, 2005
	Horn Antenna	ETS	3115 / 0005-6160	July, 2005
	Pre-Amplifier	QTK	QTK-AMP-01 / 0001	July, 2005

Note: 1. All instruments are calibrated every one year.

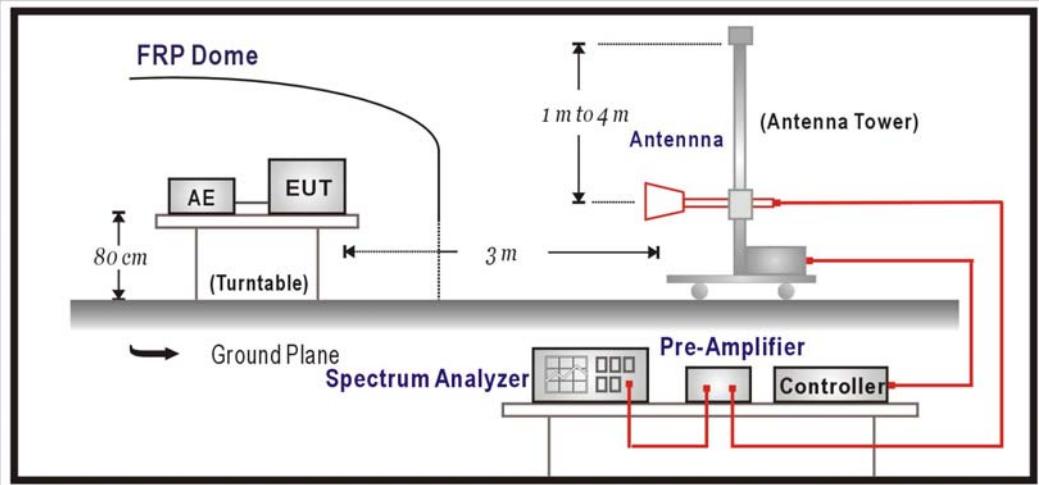
2. The test instruments marked by "X" are used to measure the final test results.

3.2. Test Setup

Under 1GHz Test Setup:



Above 1GHz Test Setup:



3.3. Limits

➤ Fundamental and Harmonics Emission Limits

FCC Part 15 Subpart C Paragraph 15.231 Limits				
Fundamental Frequency MHz	Field Strength of Fundamental		Field Strength of Harmonics	
	uV/m	dBuV/m	uV/m	dBuV/m
40.66-40.70	2250	67.0	225	47.0
70-130	1250	62.0	125	42.0
130-174	1250-3750	62.0-71.5	125-375	42.0-51.5
174-260	3750	71.5	375	51.5
260-470	3750-12500	71.5-82.00	375-1250	51.5-62.0
above 470	12500	82.00	1250	62.0

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

2. Distance refers to the distance in meters between the measuring instrument antenna and the closed point of any part of the device or system.
3. The emission limit in this paragraph is based on measurement instrumentation employing an average detector.

➤ Spurious electric field strength 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	29.5	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.

3.4. Test Procedure

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.

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 the field strength of fundamental and harmonics, the limits shown are based on measuring equipment employing a average detector function. As an alternative, compliance with the limits may be based on the use of measurement instrumentation with a CISPR quasi-peak detector.

On the field strength of spurious electric, on any frequency or frequencies below or equal to 1000 MHz, the limits shown are based on measuring equipment employing a quasi-peak detector function and on any frequency or frequencies above 1000 MHz 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 1GHz setting on the field strength meter is 120 kHz and above 1GHz is 1MHz.

3.5. Test Specification

According to FCC Part 15 Subpart C Paragraph 15.231: 2003

3.6. Test Result

Product	Body Temperature Monitor				
Test Item	Radiated Emission				
Test Mode	Mode 1: Transmit				
Date of Test	2005/09/20	Test Site		No.3 OATS	

Frequency MHz	Correct Factor	Reading Level dB	Measurement Level dBuV/m	Margin dB	Limit dBuV/m
Fundamental Radiated Emission					
Horizontal					
Peak					
433.964	19.141	44.130	63.271	29.597	92.868

Peak = 63.271dBuV/m, Duty Cycle = -1.83

Average = Peak + Duty Cycle = 61.441 dBuV/m

Average Limit = 72.868 dBuV/m

Peak Limit = 72.868 + 20 = 92.868 dBuV/m

Note:

1. All Readings Levels are performed with peak and/or average measurements as necessary.
2. Measurement Level = Reading Level +Correct Factor.
3. 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	Body Temperature Monitor				
Test Item	Radiated Emission				
Test Mode	Mode 1: Transmit				
Date of Test	2005/09/20	Test Site		No.3 OATS	

Frequency	Correct Factor	Reading Level	Measurement Level	Margin	Limit
MHz	dB	dBuV	dBuV/m	dB	dBuV/m

Fundamental Radiated Emission
Vertical
Peak

433.964	20.677	36.120	56.797	36.071	92.868
---------	--------	--------	--------	--------	--------

Peak = 78.78 dBuV/m, Duty Cycle = -1.83

Average = Peak + Duty Cycle = 54.976dBuV/m

Average Limit = 72.868 dBuV/m

Peak Limit = 72.868 + 20 = 92.868 dBuV/m

Note:

1. All Readings Levels are performed with peak and/or average measurements as necessary.
2. Measurement Level = Reading Level +Correct Factor.
3. 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	Body Temperature Monitor				
Test Item	Radiated Emission				
Test Mode	Mode 1: Transmit				
Date of Test	2005/09/21		Test Site	No.3 OATS	

Frequency MHz	Correct Factor dB	Reading Level dBuV	Measurement Level dBuV/m	Margin dB	Limit dBuV/m
Horizontal					
Peak					
1301.910	26.577	49.016	43.050	-30.950	74.000
1736.030	26.918	45.737	40.347	-33.653	74.000
2169.950	28.694	40.132	36.730	-37.270	74.000
2603.870	30.206	40.733	39.037	-34.963	74.000
3037.790	30.977	39.572	38.819	-35.181	74.000
3471.710	31.421	39.882	39.594	-34.406	74.000
3905.630	32.653	40.009	40.972	-33.028	74.000
4339.550	33.701	38.211	40.488	-33.512	74.000

Note:

1. All Readings are performed with peak and/or average measurements as necessary.
2. Receiver setting (Peak Detector) : RBW: 100kHz (under 1GHz), 1MHz (above 1 GHz); VBW:1MHz, Span:100MHz.
3. Receiver setting (AVG Detector) : RBW:1MHz; VBW:30Hz; Span:20MHz.
4. Measurement Level = Reading Level + Correct Factor.
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	Body Temperature Monitor				
Test Item	Radiated Emission				
Test Mode	Mode 1: Transmit				
Date of Test	2005/09/21		Test Site	No.3 OATS	

Frequency	Correct Factor	Reading Level	Measurement Level	Margin	Limit
MHz	dB	dBuV	dBuV/m	dB	dBuV/m
Vertical					
Peak					
1302.110	26.578	47.096	41.131	-32.869	74.00
1736.030	26.918	46.198	40.808	-33.192	74.00
2169.950	28.694	40.230	36.828	-37.172	74.00
2603.870	30.206	39.810	38.114	-35.886	74.00
3037.790	30.977	39.001	38.248	-35.752	74.00
2471.710	31.420	39.145	38.857	-35.143	74.00
3905.630	32.653	39.811	40.774	-33.226	74.00
4339.550	33.701	38.937	41.214	-32.786	74.00

Note:

1. All Readings are performed with peak and/or average measurements as necessary.
2. Receiver setting (Peak Detector) : RBW: 100kHz (under 1GHz), 1MHz (above 1 GHz); VBW:1MHz, Span:100MHz.
3. Receiver setting (AVG Detector) : RBW:1MHz; VBW:30Hz; Span:20MHz.
4. Measurement Level = Reading Level + Correct Factor.
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	Body Temperature Monitor				
Test Item	Radiated Emission				
Test Mode	Mode 1: Transmit				
Date of Test	2005/07/17		Test Site	No.3 OATS	

Frequency MHz	Correct Factor dB	Reading Level dBuV	Measurement Level dBuV/m	Margin dB	Limit dBuV/m
Horizontal					
Quasi-Peak					
312.300	14.995	2.510	17.505	-28.515	46.020
312.500	15.015	3.100	18.115	-27.905	46.020
*867.930	24.052	11.340	35.392	-10.628	46.020
878.518	24.227	1.760	25.987	-20.033	46.020
939.388	25.055	6.510	31.565	-14.455	46.020
943.388	25.140	1.510	26.650	-19.370	46.020

Note:

1. All Readings for restricted bands are Quasi-Peak, other are performed with peak and/or average measurements as necessary.
2. “ * ” means this data is the worst emission level.
3. Measurement Level = Reading Level + Correct Factor.
4. 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	Body Temperature Monitor				
Test Item	Radiated Emission				
Test Mode	Mode 1: Transmit				
Date of Test	2005/07/17		Test Site	No.3 OATS	

Frequency MHz	Correct Factor dB	Reading Level dBuV	Measurement Level dBuV/m	Margin dB	Limit dBuV/m
Vertical					
Quasi-Peak					
482.723	20.060	-2.510	17.550	-28.470	46.020
*485.936	20.079	17.460	37.539	-8.481	46.020
546.000	22.505	4.530	27.035	-18.985	46.020
867.937	24.281	2.870	27.151	-18.869	46.020
878.800	24.877	3.100	27.977	-18.043	46.020
943.388	26.176	2.290	28.466	-17.554	46.020

Note:

1. All Readings for restricted bands are Quasi-Peak, other are performed with peak and/or average measurements as necessary.
2. “ * ” means this data is the worst emission level.
3. Measurement Level = Reading Level + Correct Factor.
4. 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.

3.7. Test Photo

Test Mode : Mode 1: Transmit

Description : Front View of Radiated Emission Test Setup



Test Mode : Mode 1: Transmit

Description : Back View of Radiated Emission Test Setup



Test Mode : Mode 1: Transmit

Description : Front View of Radiated Emission Test Setup (Horn)



4. Occupied Bandwidth

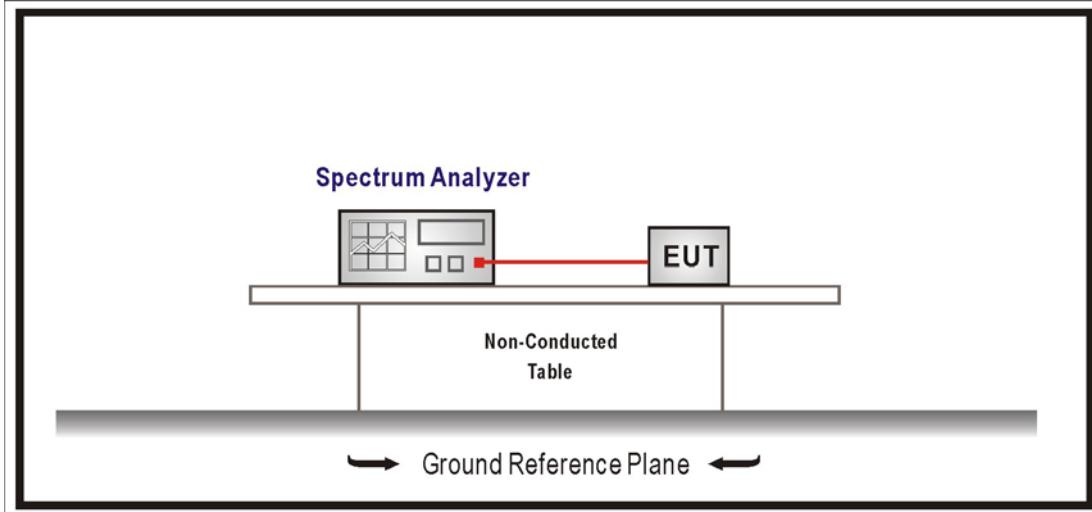
4.1. Test Equipment

The following test equipment are used during the test:

Item	Equipment	Manufacturer	Model No. / Serial No.	Last Cal.
1	Spectrum Analyzer	Advantest	R3272 / 72421194	May, 2005

Note: 1. All instruments are calibrated every one year.

4.2. Test Setup



4.3. Limits

The bandwidth of the emission shall be no wider than 0.25% of the center frequency for devices operating above 70MHz and below 900MHz. For devices operating above 900MHz, the emission shall be no wider than 0.5% of the center frequency. Bandwidth is determined at the points 20 dB down from the modulated carrier.

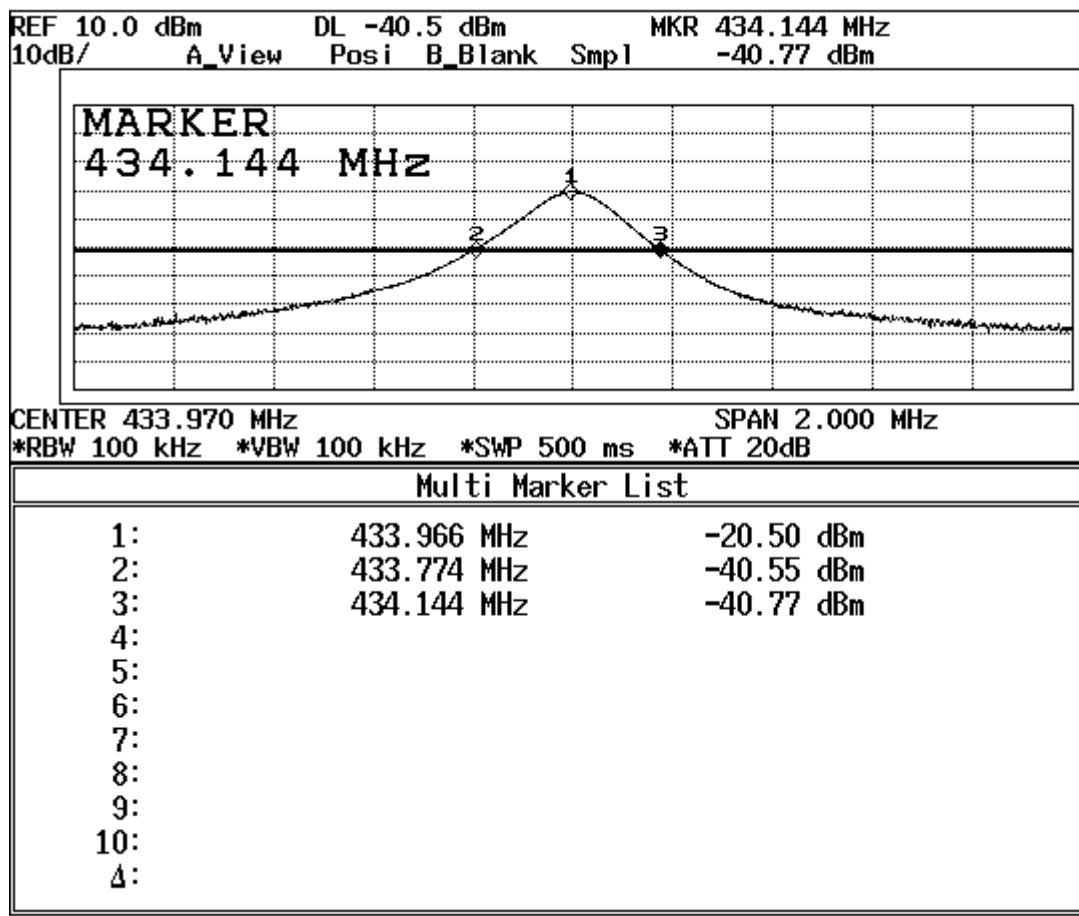
4.4. Test Specification

According to FCC Part 15 Subpart C Paragraph 15.231: 2003

4.5. Test Result

Product	Body Temperature Monitor		
Test Item	Occupied Bandwidth		
Test Mode	Mode 1: Transmit		
Date of Test	2005/07/17	Test Site	No.3 OATS

Center Frequency	433.966 MHz
Allowable Bandwidth (70-900 MHz:0.25%, Above 900MHz: 0.5%)	1.085 MHz
Bandwidth at 20dB down (Max)	370 kHz
Result	PASS



5. Duty Cycle

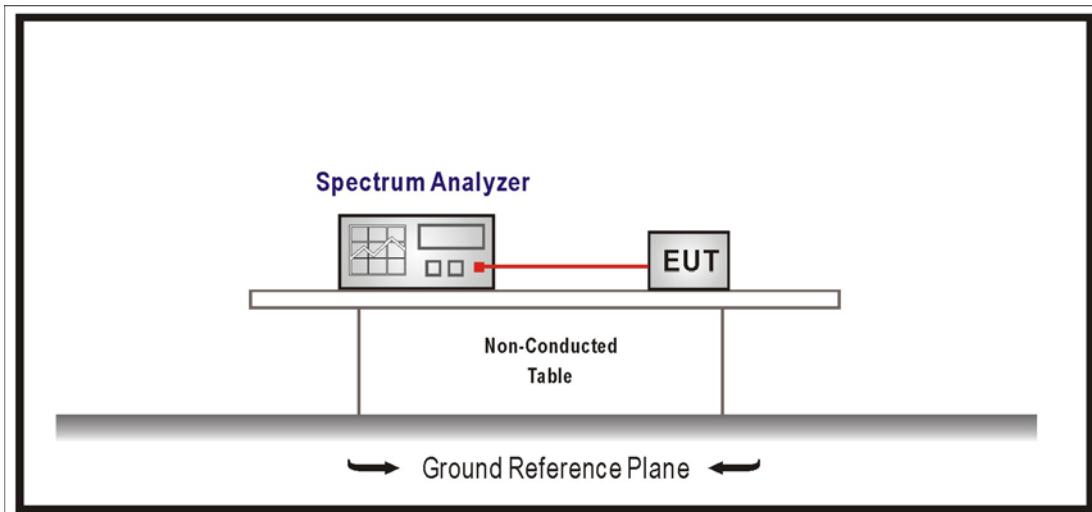
5.1. Test Equipment

The following test equipment are used during the test:

Item	Equipment	Manufacturer	Model No. / Serial No.	Last Cal.
1	Spectrum Analyzer	R & S	FSP / 100561	March, 2005
2	No.3 OATS			

Note: 1. All instruments are calibrated every one year.

5.2. Test Setup



5.3. Test Specification

According to FCC Part 15 Subpart C Paragraph 15.231: 2003

5.4. Test Result

Product	Body Temperature Monitor		
Test Item	Duty Cycle		
Test Mode	Mode 1: Transmit		
Date of Test	2005/08/23	Test Site	No.3 OATS

Each packet period = 147.6ms

Period of a pulse = 2.9ms

Maximum transmit time of a pulse = 1.8ms

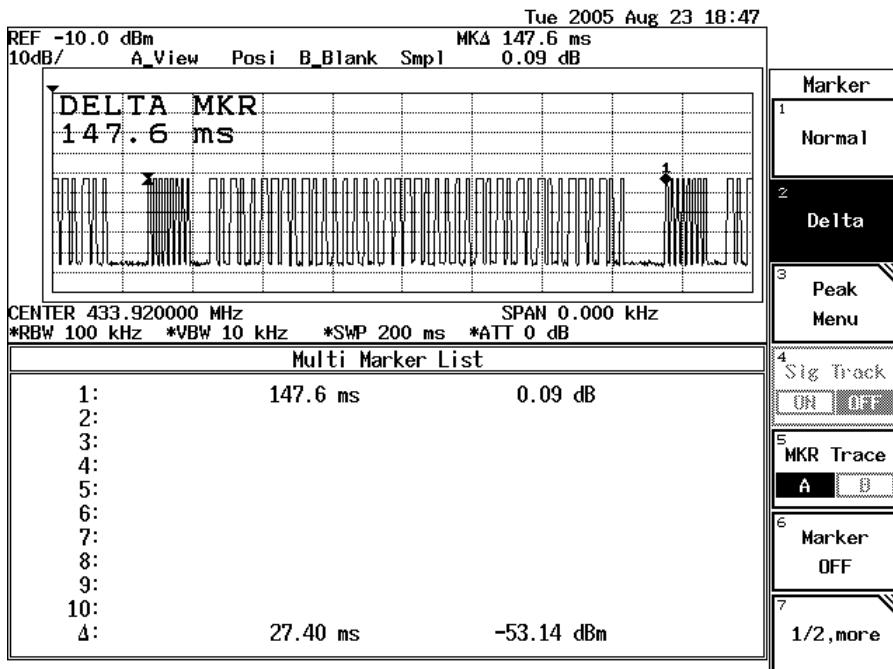
$$T_{ON} = (12/2.9 + 118.4/2.9) * 1.8 = 81\text{ms}$$

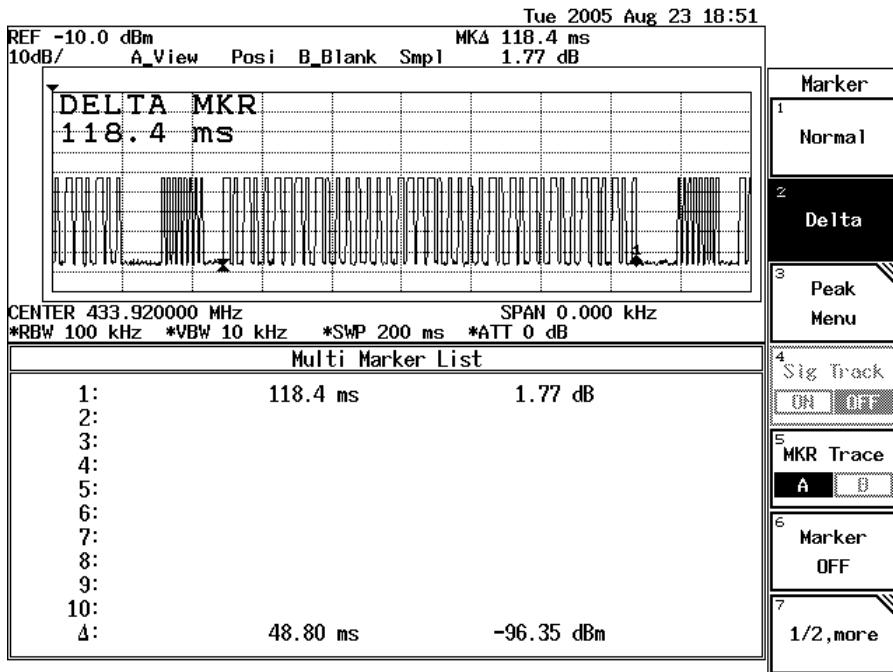
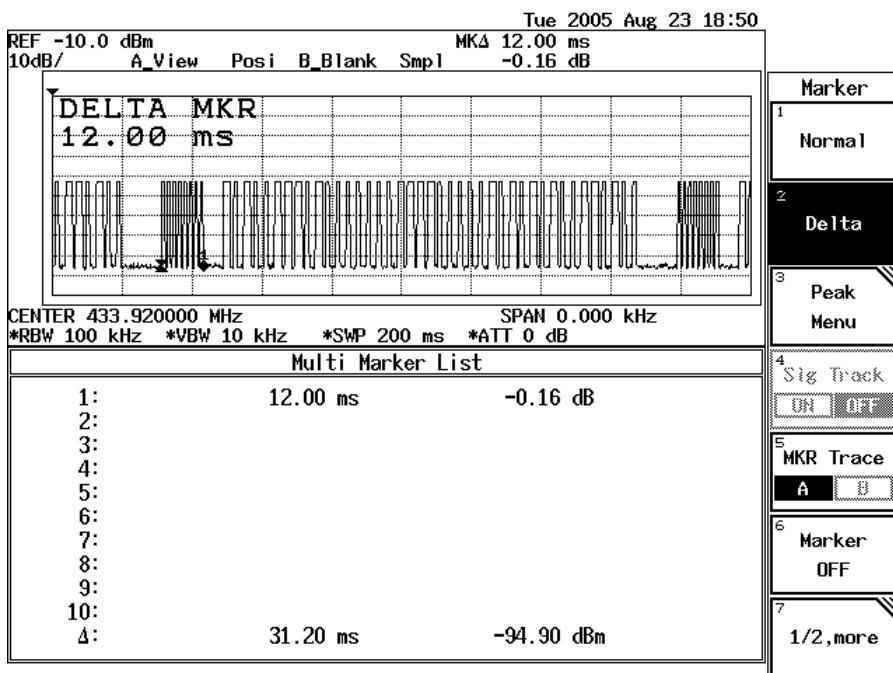
$$\text{Duty cycle} = 81/100 = 0.81$$

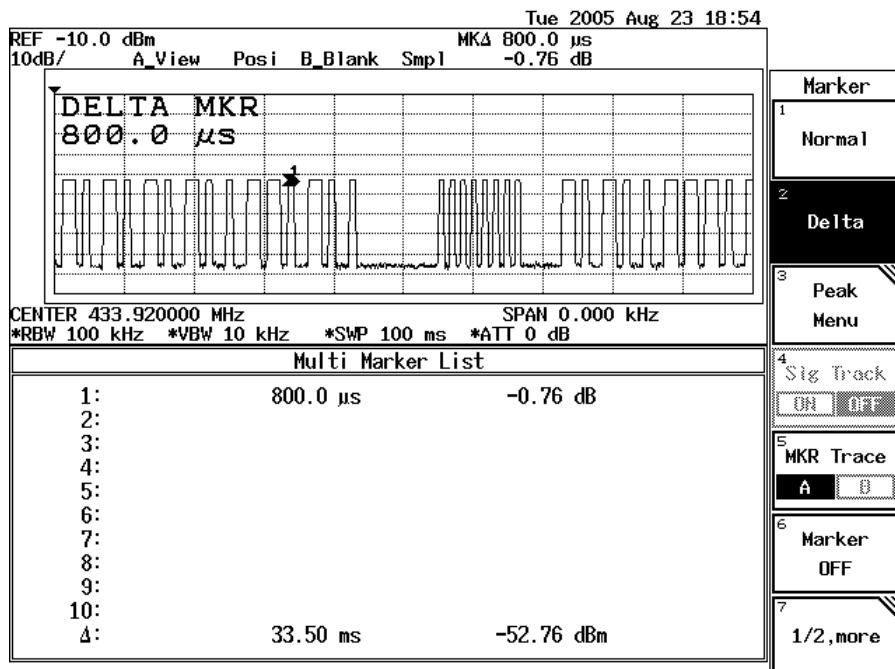
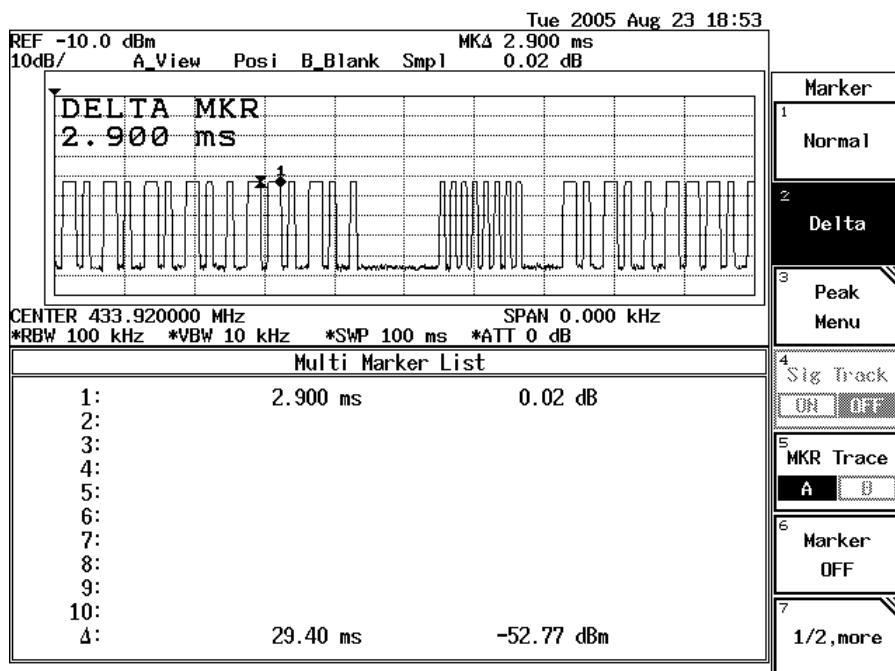
$$\text{Duty cycle correction factor} = 20\log(0.81) = -1.83 \text{ dB}$$

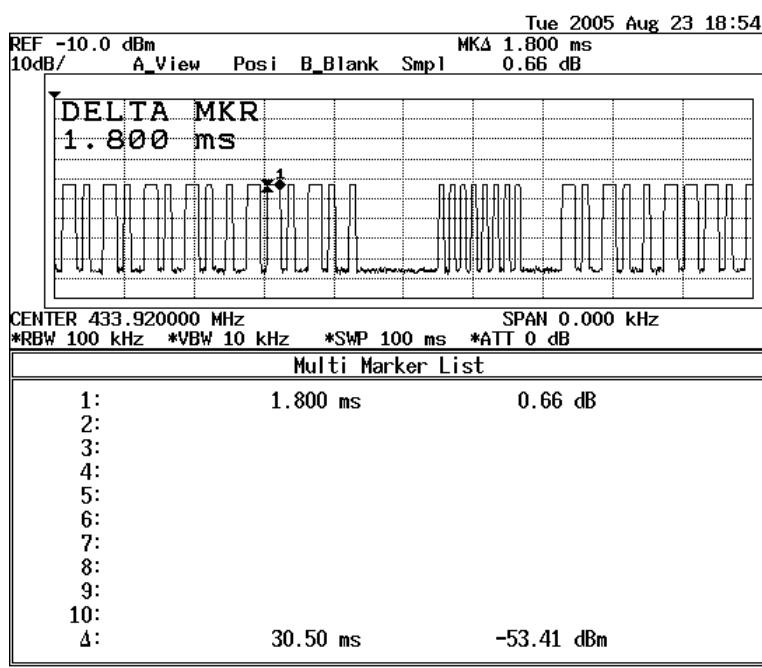
Result

Duty Cycle = -1.83 dB









Marker

- 1 Normal
- 2 Delta
- 3 Peak Menu
- 4 Sig Track ON OFF
- 5 MKR Trace A B
- 6 Marker OFF
- 7 1/2, more

Attachement➤ **EUT Photograph**

(1) EUT Photo



(2) EUT Photo



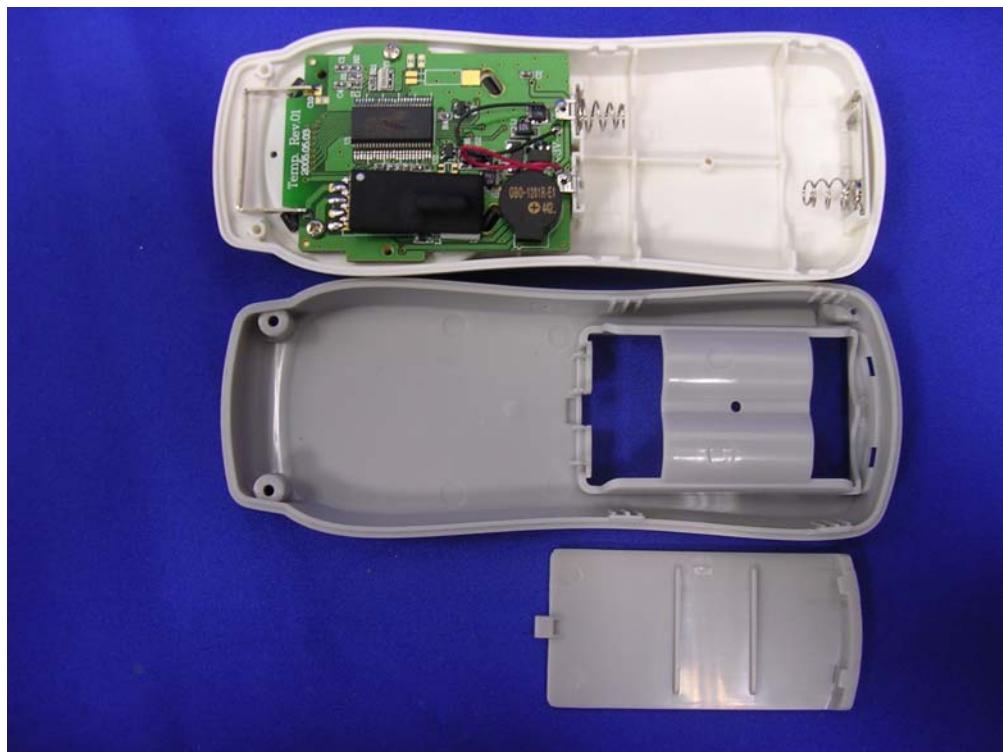
(3) EUT Photo



(4) EUT Photo



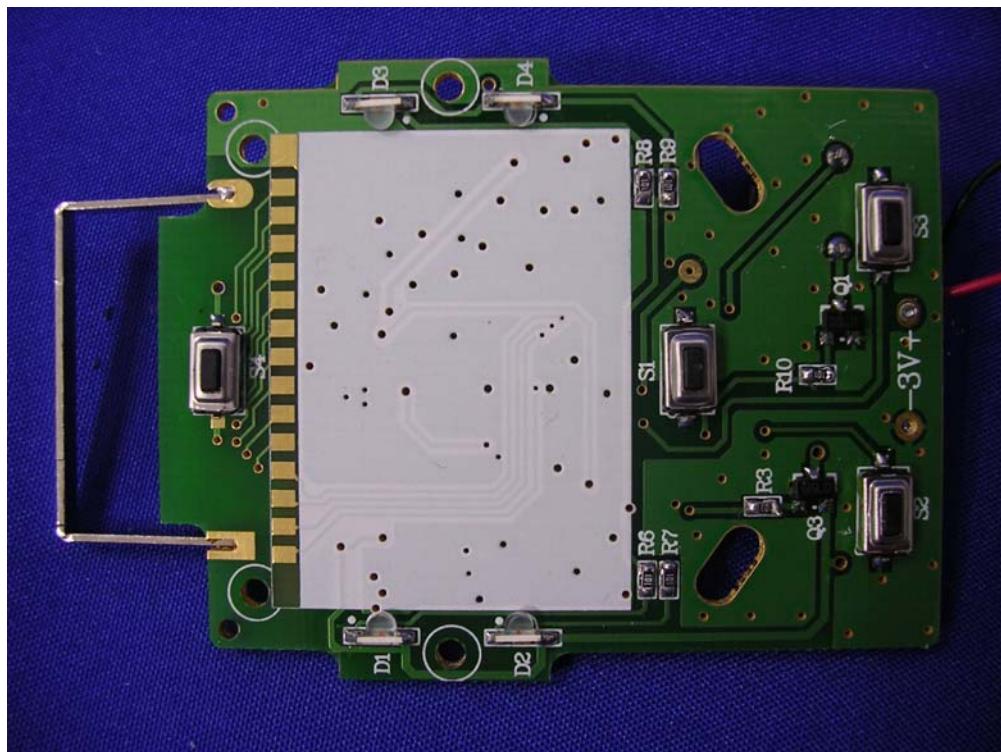
(5) EUT Photo



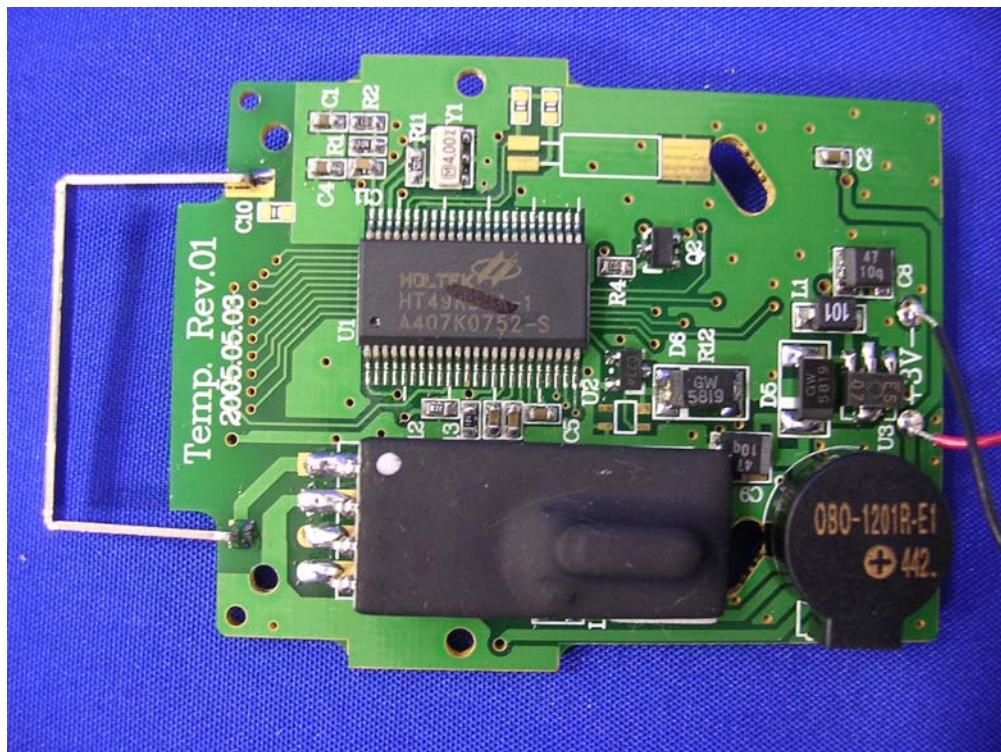
(6) EUT Photo



(7) EUT Photo



(8) EUT Photo



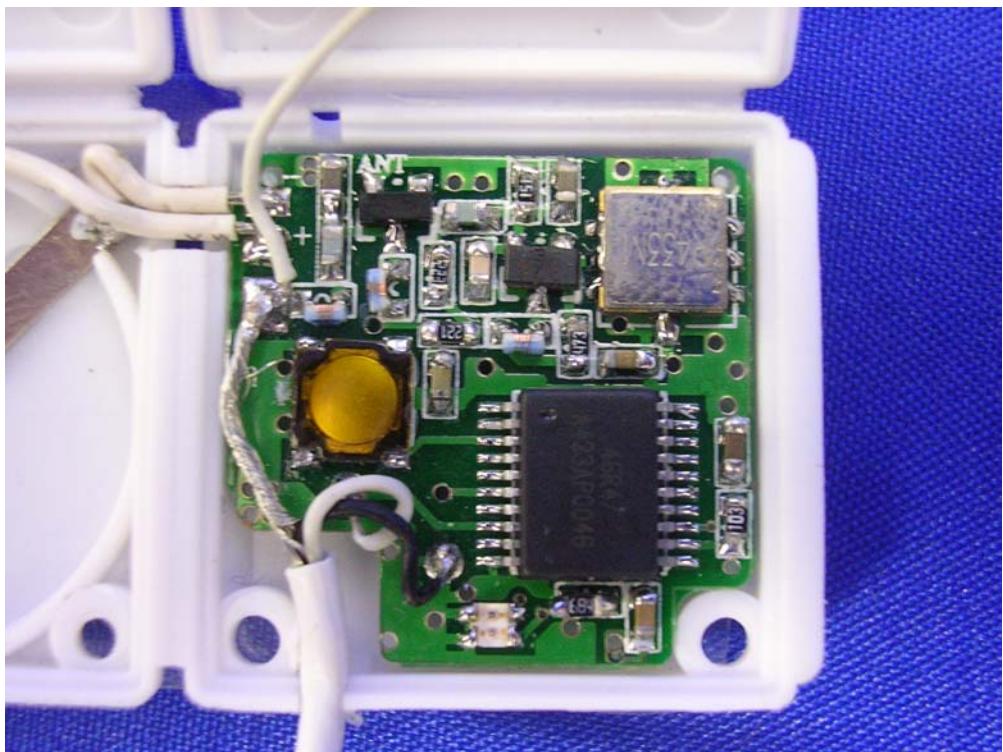
(9) EUT Photo



(10) EUT Photo



(11) EUT Photo



(12) EUT Photo

