

FCC TEST REPORT

Product Name : RFID Tag
Trade Name : N/A
Model/Type reference : AFD-T4303
Serial Number : N/A
Ratings : DC 3V
FCC ID : SR8T4303
Report Number : EESZF04070019
Date : Apr. 25, 2013
Regulations : See below

Test Standards	Results
<input checked="" type="checkbox"/> 47 CFR FCC Part 15 Subpart C 15.231: 2012	PASS

Prepared for:
Anfudi Technology(Xiamen) Co., Ltd
4F, 598#, Jiahe Road, Huli District, Xiamen, Fujian, P.R.China

Prepared by:
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 Lab manager

Reviewed by: Chun Chen
 Date: Apr. 25, 2013



Check No.: 1631587760

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N/A means not applicable.

1. GENERAL INFORMATION

Applicant: Anfudi Technology (Xiamen) Co., Ltd
 4F, 598#, Jiahe Road, Huli District, Xiamen, Fujian, P.R.China

Manufacturer: Anfudi Technology (Xiamen) Co., Ltd
 4F, 598#, Jiahe Road, Huli District, Xiamen, Fujian, P.R.China

Equipment Authorization: Certification

FCC ID: SR8T4303

Product Name: RFID Tag

Trade Name: N/A

Model/Type reference: AFD-T4303

Serial Number: N/A

Report Number: EESZF04070019

Sample Received Date: Apr. 07, 2013

Sample tested Date: Apr. 07, 2013 to Apr. 25, 2013

The above equipment was tested by Centre Testing International for compliance with the requirements set forth in the FCC Rules and Regulations Part 15, Subpart C and the measurement procedure according to ANSI C63.4:2003.

2. TEST SUMMARY

Clause	Test Item	Rule	Result
1	20dB bandwidth	FCC Part15.231(c)	PASS
2	Time measurement	FCC Part15.231(e)	PASS
3	Radiated Emission	FCC Part15.231(e) & FCC Part15.209(a)	PASS
4	Antenna Requirements	FCC 15.203	PASS*

* Integral antenna used.

3. MEASUREMENT UNCERTAINTY

This uncertainty represents an expanded uncertainty expressed at approximately the 95% confidence level using a coverage factor of k=2.

Test item	Value (dB)
Radiated disturbance (30MHz to 1GHz)	4.5
Radiated disturbance (1GHz to 6GHz)	4.8

4. PRODUCT INFORMATION

Items	Description
Rating	DC 3V
Equipments Class	Security/Remote Control Transmitter
Modulation	GFSK
Frequency Range	437MHz
Channel Number	1

5. FACILITIES AND ACCREDITATIONS

5.1 TEST FACILITY

All test facilities used to collect the test data are located at Hongwei Industrial Zone, Bao'an 70 District, Shenzhen, Guangdong, China. The site and apparatus are constructed in conformance with the requirements of ANSI C63.4, CISPR 16-1-1 and other equivalent standards.

5.2 TEST EQUIPMENT LIST

Instrumentation: The following list contains equipments used at CTI for testing. The calibrations of the measuring instruments, including any accessories that may effect such calibration, are checked frequently to assure their accuracy. Adjustments are made and correction factors applied in accordance with instructions contained in the manual for the measuring instrument.

Equipment used during the tests:

3M Semi-anechoic Chamber - Radiated Emission Test				
Equipment	Manufacturer	Model	Serial No.	Due Date
3M Chamber & Accessory Equipment	ETS-LINDGREN	FACT-3	3510	07/09/2013
Spectrum Analyzer	Agilent	E4443A	MY45300910	01/18/2014
Receiver	R&S	ESCI	100435	07/19/2013
TRILOG Broadband Antenna	schwarzbeck	VULB 9163	401	07/21/2013
Multi device Controller	ETS-LINGREN	2090	00057230	N/A
Horn Antenna	ETS-LINGREN	3117	00057407	07/07/2015
Microwave Preamplifier	Agilent	8449B	3008A02425	07/19/2013

6. SYSTEM TEST CONFIGURATION

6.1 JUSTIFICATION

For emission testing, the equipment under test (Product) setup to transmit continuously to simplify the measurement methodology. Care was taken to ensure proper power supply voltages during testing. During testing, all cables were manipulated to produce worst case emissions. It was powered by 3 V DC of battery. Only the worst case data were recorded in this test report.

The signal is maximized through rotation and placement in the three orthogonal axes. The antenna height and polarization are varied during the search for maximum signal level. The antenna height is varied from 1 to 4 meters. Radiated emissions are taken at three meters unless the signal level is too low for measurement at that distance. If necessary, a pre-amplifier is used and/or the test is conducted at a closer distance.

All readings are extrapolated back to the equivalent three meter reading using inverse scaling with distance. Analyzer resolution is 200Hz from 9kHz to 150kHz, 9kHz from 150kHz to 30MHz and 100kHz or greater for frequencies between 30MHz to 1000 MHz. The resolution is 1 MHz or greater for frequencies above 1000 MHz. The spurious emissions more than 20 dB below the permissible value are not reported.

Radiated emission measurement were performed the lowest radio frequency signal generated in the device which is greater than 9 kHz to the tenth harmonic of the highest fundamental frequency or to 40 GHz, whichever is lower.

The unit was operated standalone and placed in the center of the turntable.

6.2 Product EXERCISING SOFTWARE

No Software was used during testing.

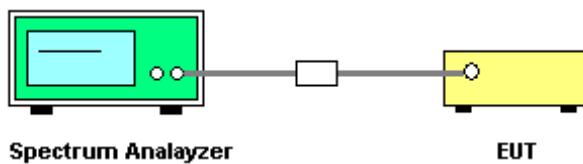
7. 20dB Bandwidth Measurement

7.1 LIMITS

The bandwidth of the emission shall be no wider than 0.25% of the center frequency for devices operating above 70 MHz and below 900 MHz. For devices operating above 900 MHz, 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.

As the center frequency for the device operating is 437.00MHz, thus, the 20dB bandwidth limit is 1.09MHz.

7.2 BLOCK DIAGRAM OF TEST SETUP

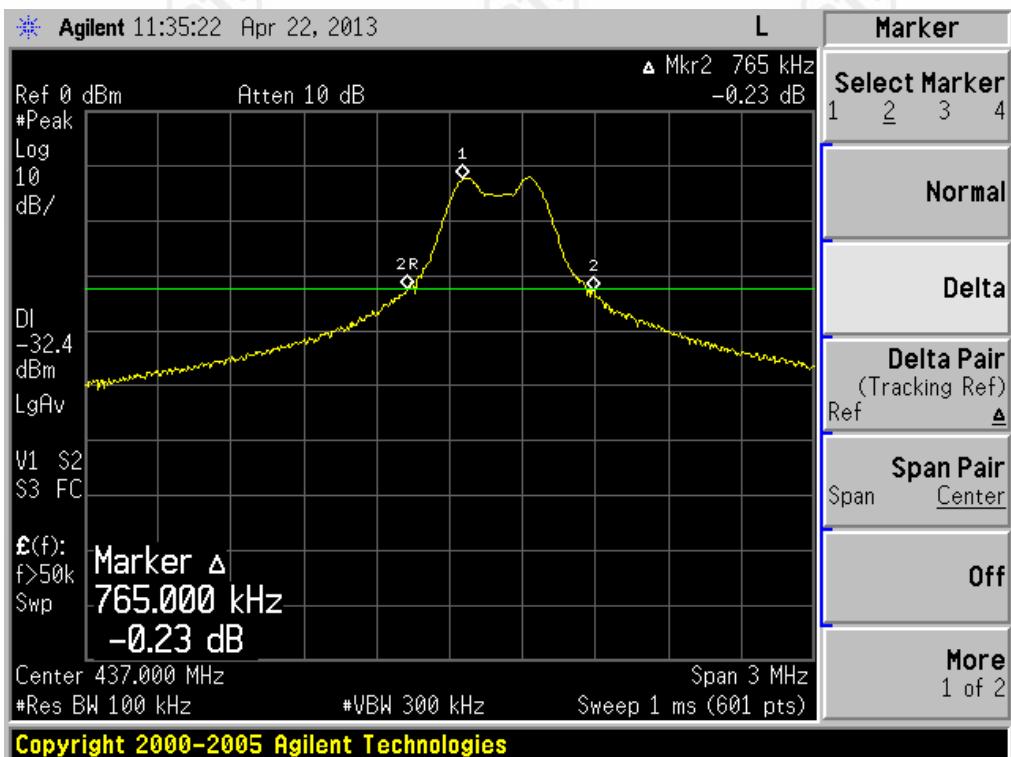


7.3 TEST PROCEDURE

1. The transmitter output (antenna port) was connected to the spectrum analyzer.
2. Set spectrum analyzer's RBW and VBW to applicable value with Peak in Max Hold.
3. A PEAK output reading and 20B BW function in spectrum analyzer were taken.

7.4 TEST RESULT

Frequency (MHz)	20dB BW (MHz)	Limit (MHz)	Result (Pass / Fail)
437.00	0.765	1.09	Pass

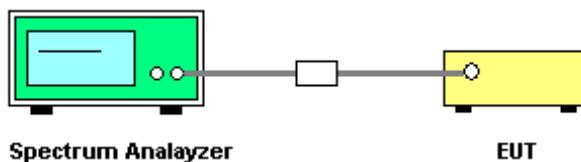


8. Time measurement

8.1 LIMITS

Devices operated under the provisions of this paragraph shall be provided with a means for automatically limiting operation so that the duration of each transmission shall not be greater than one second and the silent period between transmissions shall be at least 30 times the duration of the transmission but in no case less than 10 seconds.

8.2 BLOCK DIAGRAM OF TEST SETUP



8.3 TEST PROCEDURE

1. The transmitter output (antenna port) was connected to the spectrum analyzer.
2. Set the center frequency is 437.00MHz and set the Span is 0Hz.
3. Set spectrum analyzer's RBW and VBW to applicable value with Peak.
4. Read the transmission time and silent time from the spectrum analyzer directly.

8.4 TEST RESULT

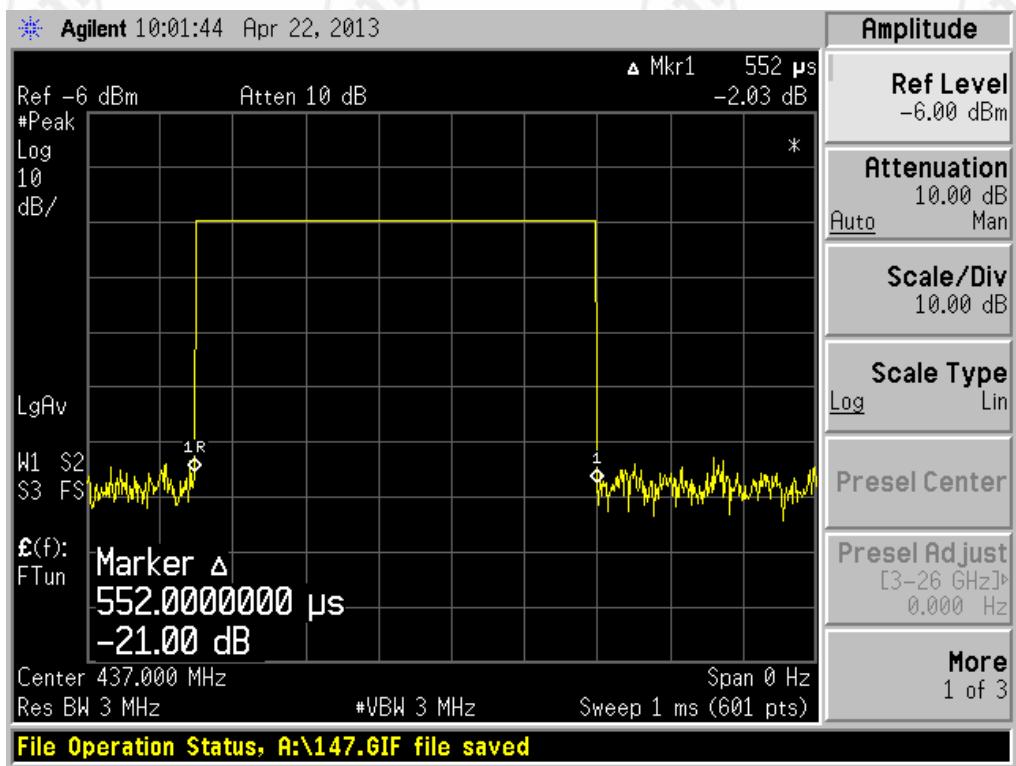
Transmission Time:

Frequency (MHz)	Transmission (Turn on) (s)	Limit (s)	Result (Pass / Fail)
437.00	0.000552	1	Pass

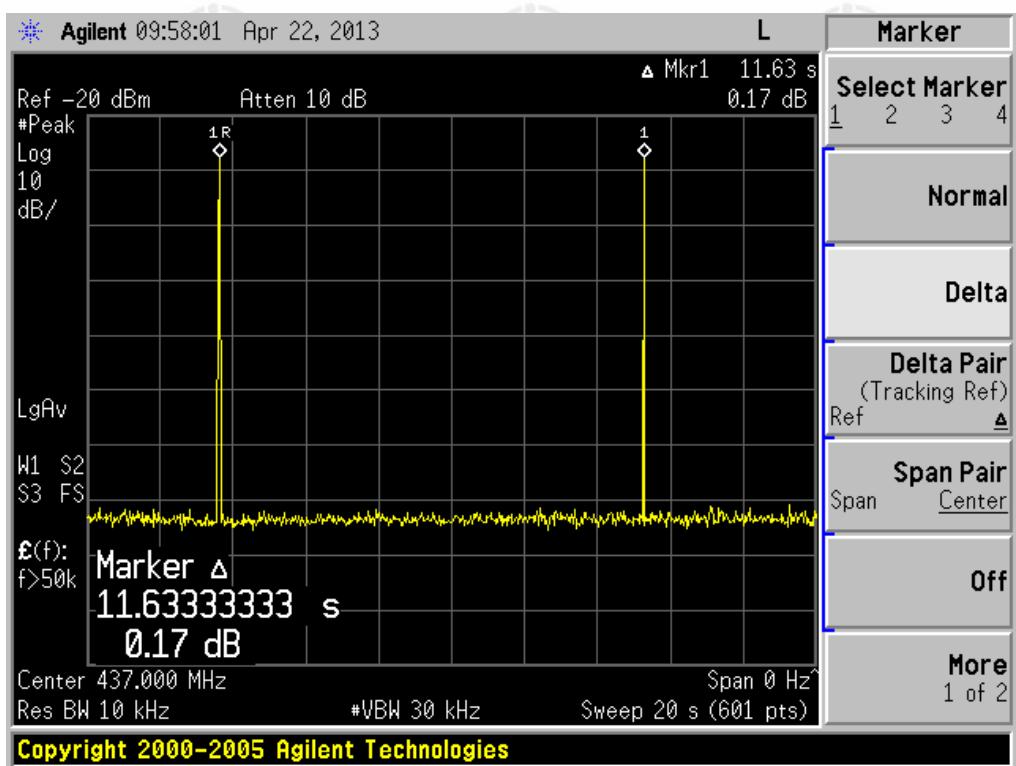
Silent Time:

Frequency (MHz)	Transmission (Turn off) (s)	Limit (s)	Result (Pass / Fail)
437.00	11.63	> Turn on * 30 Times & > 10s	Pass

Transmission Time:



Silent Time:



9. Radiated Emissions Measurement

9.1 LIMITS

FCC Part 15.209(a):

Frequency (MHz)	Field Strength (microvolts/meter)	Measurement Distance (meter)
0.009-0.490	2400/F(kHz)	300
0.490-1.705	24000/F(kHz)	30
1.705-30.0	30	30
30-88	100	3
88-216	150	3
216-960	200	3
Above 960	500	3

FCC Part 15.231(e):

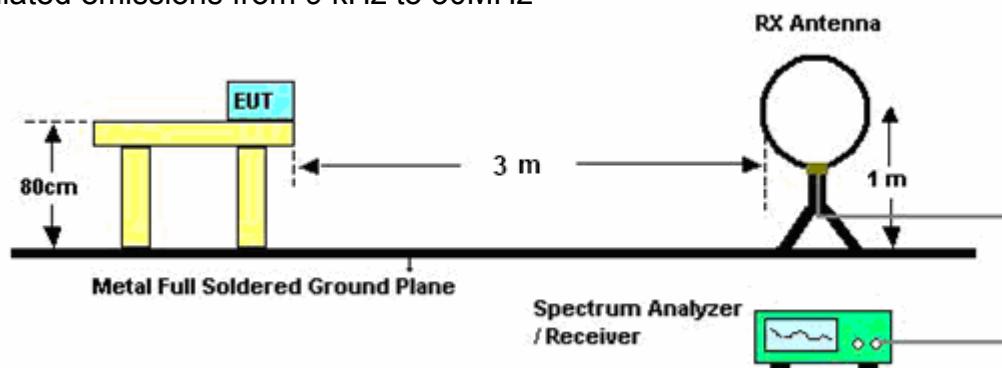
Fundamental Frequency (MHz)	Field Strength of Fundamental microvolts/m at 3 metres, (watts, e.i.r.p.)	Field Strength of Unwanted Emissions microvolts/m at 3 metres
260-470	1500 to 5000*	150 to 500

Note 1: Linear interpolation in frequency band 260-470 MHz.

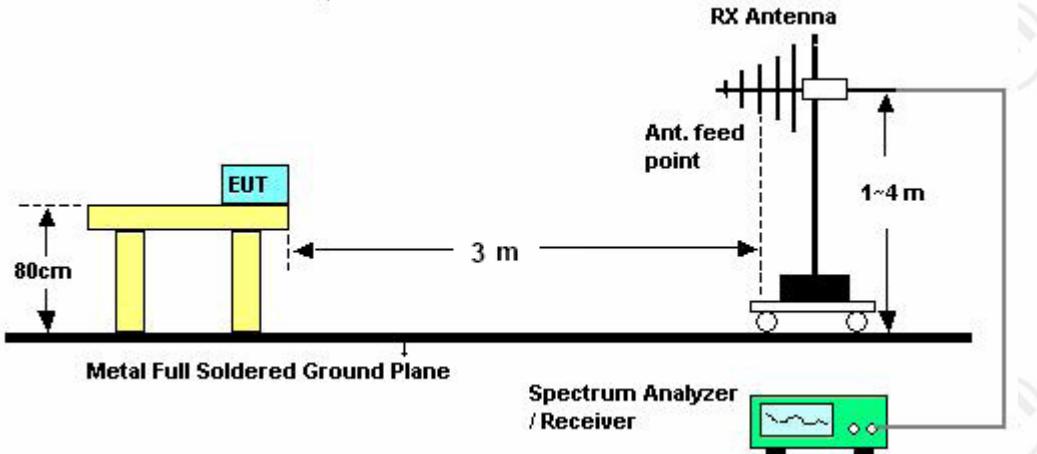
2: The above field strength limits are specified at a distance of 3 meters.

9.2 BLOCK DIAGRAM OF TEST SETUP

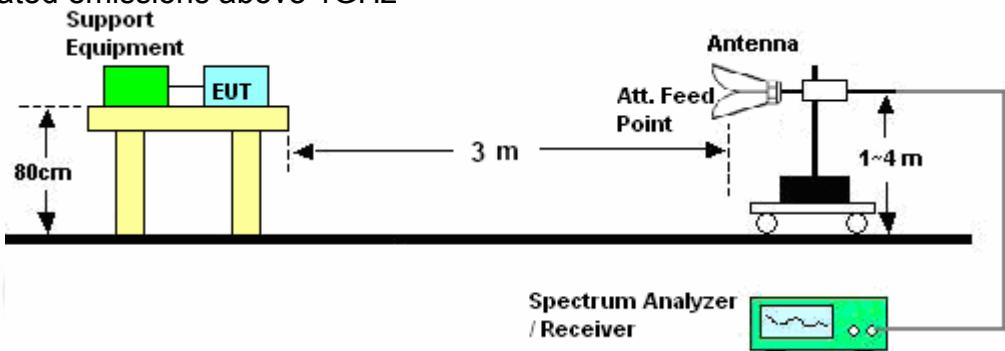
For radiated emissions from 9 kHz to 30MHz



For radiated emissions from 30 - 1000MHz



For radiated emissions above 1GHz



9.3 TEST PROCEDURE

A. 30 - 1000MHz

a. The Product was placed on the top of a turntable 0.8 meters above the ground in the chamber, 3 meters away from the antenna (wideband antenna), which was mounted on the top of a variable-height antenna tower. The maximum values of the field strength are recorded by adjusting the polarizations of the test antenna and rotating the turntable.

b. For each suspected emission, the Product was arranged to its worst case and then the antenna was tuned to heights from 1 meter to 4 meters and the turn table was turned from 0 degrees to 360 degrees to find the maximum reading.

c. The test frequency analyzer system was set to Peak Detect Function and Specified Bandwidth with Maximum Hold Mode.

B. Below 30MHz and Above 1GHz

a. The Product is placed on a turntable 0.8 meters above the ground in the chamber, 3 meters away from the antenna. The maximum values of the field strength are recorded by adjusting the polarizations of the test antenna and rotating the turntable.

b. For each suspected emission, the Product was arranged to its worst case and then turn table was turned from 0 degrees to 360 degrees to find the maximum reading.

c. The test frequency analyzer system was set to Peak Detect Function and Specified Bandwidth with Maximum Hold Mode.

9.4 TEST RESULT

Frequency (MHZ)	Polarization (H/V)	Final Emission _PK (dB μ V/m)	AV factor (dB)	Final Emission _AV (dB μ V/m)	AV Limit (dB μ V/m)	Result (Pass / Fail)
437.00	V	86.56	-45.2	41.36	72.96	Pass

Note 1: The above table only shows the frequencies which peak emission exceed the average limit. The peak data of other frequencies are all below the average limit (please refer to the test graph in following pages), so the average data of other frequencies are deemed to fulfill the average limits and not reported.

Note 2: The emissions below 30MHz are not reported for they are much lower than the limits.

Note 3: Below 1GHz: The total factor = cable loss+ antenna factor.

Above 1GHz: The total factor = cable loss+ antenna factor -amplifier factor.

Final Emission _PK = Reading Level _PK+ total factor.

Final Emission _AV = Final Emission _PK + AV factor.

Note 4: The duty cycle is simply the on-time divided by the period:

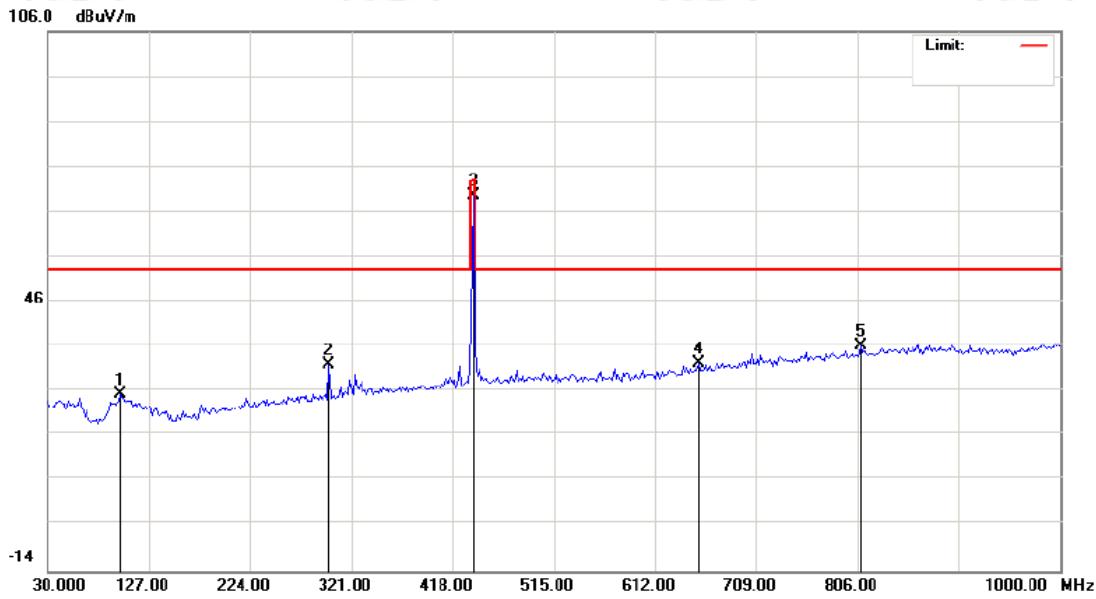
The duration of one cycle = 100ms

Effective period of the cycle = 0.552ms

$$DC = 0.552ms / 100ms = 0.00552$$

Therefore, the averaging factor is found by $20 \log_{10} 0.00552 = -45.2\text{dB}$

Test graph of radiated emission



Site site #1
Limit: FCC 15.231(e)

Polarization: *Horizontal*

Temperature: 23

EUT: RFID Tag

Power: DC 3V

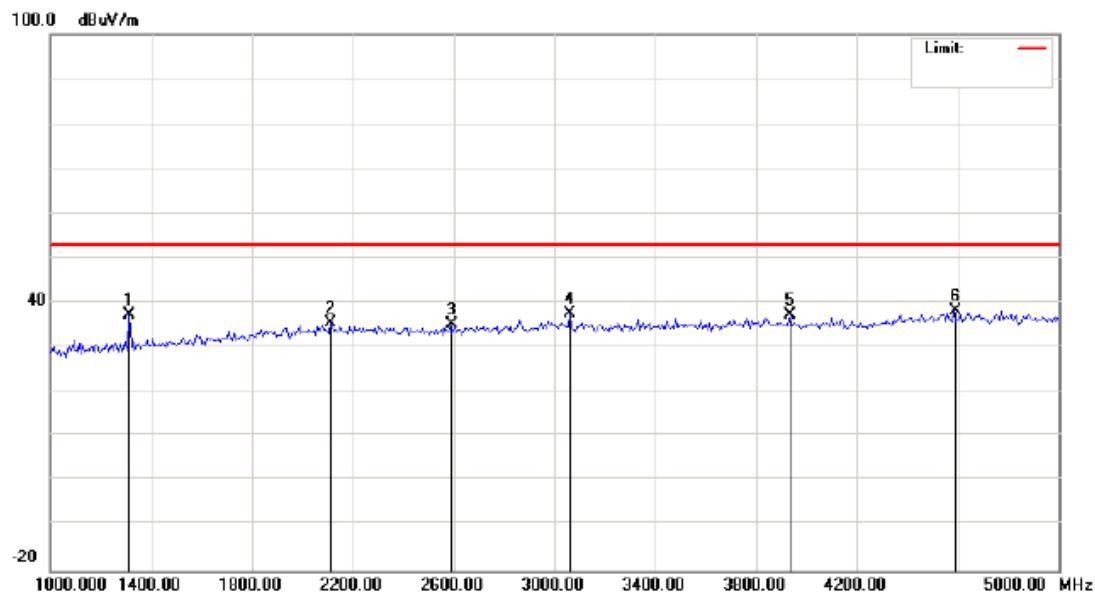
Humidity: 57 %

M/N: AFD-T4303

Mode: TX

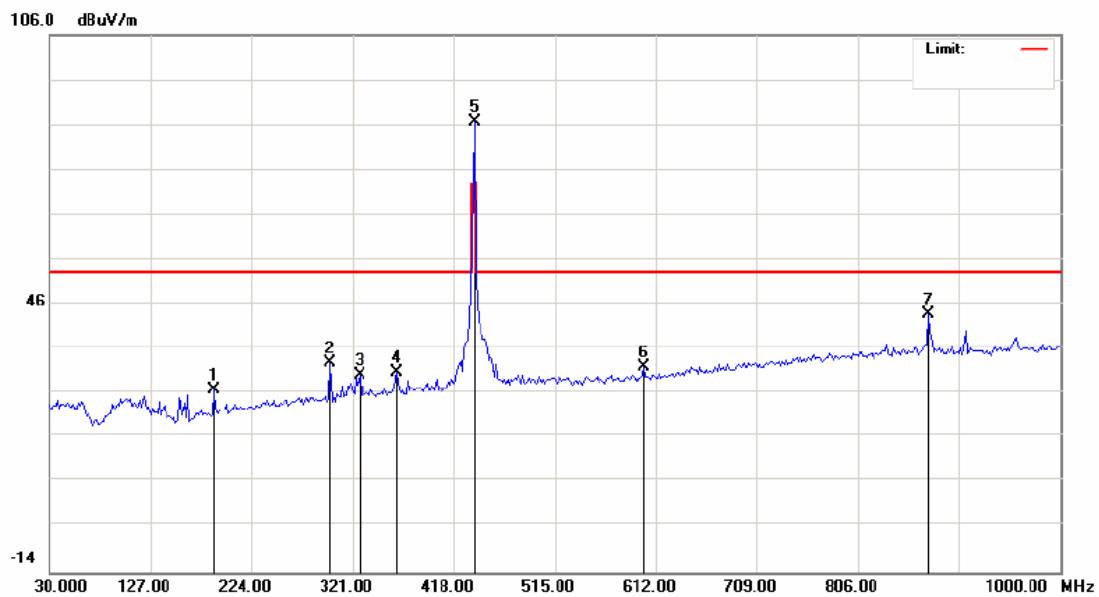
Note:

No.	Freq.	Reading_Level (dBuV)			Correct Factor			Measurement (dBuV/m)			Limit (dBuV/m)			Margin (dB)	
		MHz	Peak	QP	Avg	dB	peak	QP	Avg	QP	Avg	QP	Avg	P/F	Comment
1	99.5167	9.48				15.87	25.35			52.96		-27.61		P	
2	299.9833	16.23				15.87	32.10			52.96		-20.86		P	
3	437.4000	50.45				19.01	69.46			72.96		-3.50		P	
4	654.0333	10.71				21.75	32.46			52.96		-20.50		P	
5	809.2333	10.86				25.25	36.11			52.96		-16.85		P	



Site site #1 Polarization: **Horizontal** Temperature: 23
Limit: FCC 15.231(e) Power: DC 3V Humidity: 57 %
EUT: RFID Tag
M/N: AFD-T4303
Mode: TX
Note:

No.	Freq.	Reading_Level (dBuV)			Correct Factor		Measurement (dBuV/m)			Limit (dBuV/m)		Margin (dB)		
		MHz	Peak	QP	AVG	dB	peak	QP	AVG	QP	AVG	QP	AVG	P/F
1	1313.333	42.62				-5.31	37.31			52.96		-15.65		P
2	2113.333	36.19				-0.42	35.77			52.96		-17.19		P
3	2586.667	34.99				0.30	35.29			52.96		-17.67		P
4	3060.000	36.66				1.06	37.72			52.96		-15.24		P
5	3933.333	34.22				3.14	37.36			52.96		-15.60		P
6	4586.667	33.58				4.63	38.21			52.96		-14.75		P



Site site #1

Polarization: **Vertical**

Temperature: 23

Limit: FCC 15.231(e)

Power: DC 3V

Humidity: 57 %

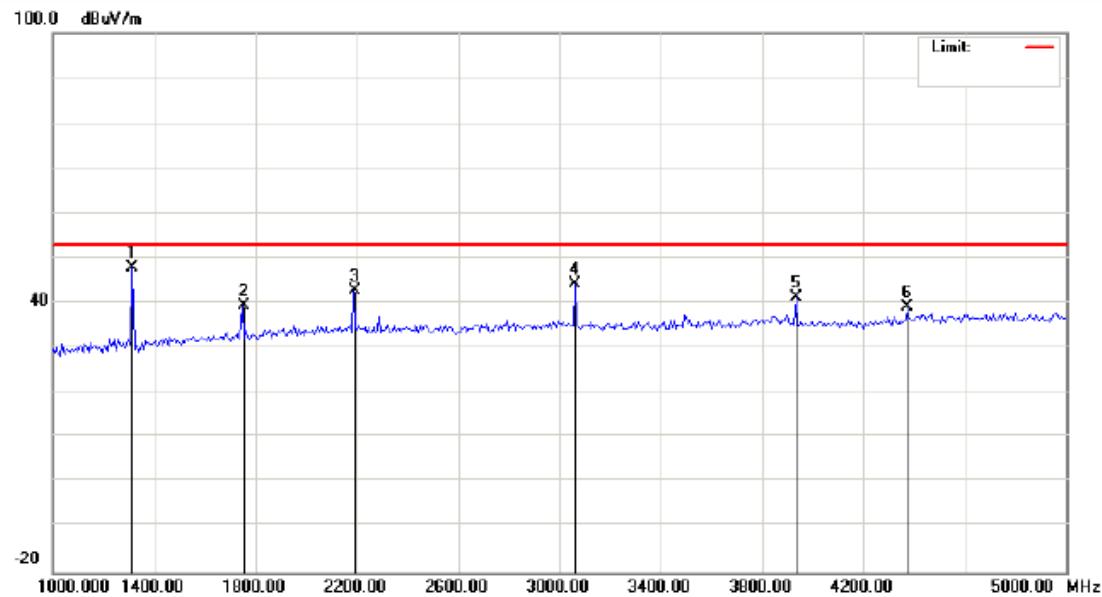
EUT: RFID Tag

M/N: AFD-T4303

Mode: TX

Note:

No.	Freq.	Reading_Level (dBuV)			Correct Factor			Measurement (dBuV/m)			Limit (dBuV/m)			Margin (dB)	
		MHz	Peak	QP	Avg	dB	peak	QP	Avg	QP	Avg	QP	Avg	P/F	Comment
1	188.4333	13.93				12.96	26.89			52.96		-26.07		P	
2	299.9833	16.98				15.87	32.85			52.96		-20.11		P	
3	327.4667	13.44				16.68	30.12			52.96		-22.84		P	
4	363.0333	13.30				17.57	30.87			52.96		-22.09		P	
5	437.4000	67.55				19.01	86.56			72.96		13.60			
6	600.6833	11.71				20.37	32.08			52.96		-20.88		P	
7	873.9000	17.94				25.93	43.87			52.96		-9.09		P	



Site site #1 Polarization: **Vertical** Temperature: 23

Limit: FCC 15.231(e)

Power: DC 3V

Humidity: 57 %

EUT: RFID Tag

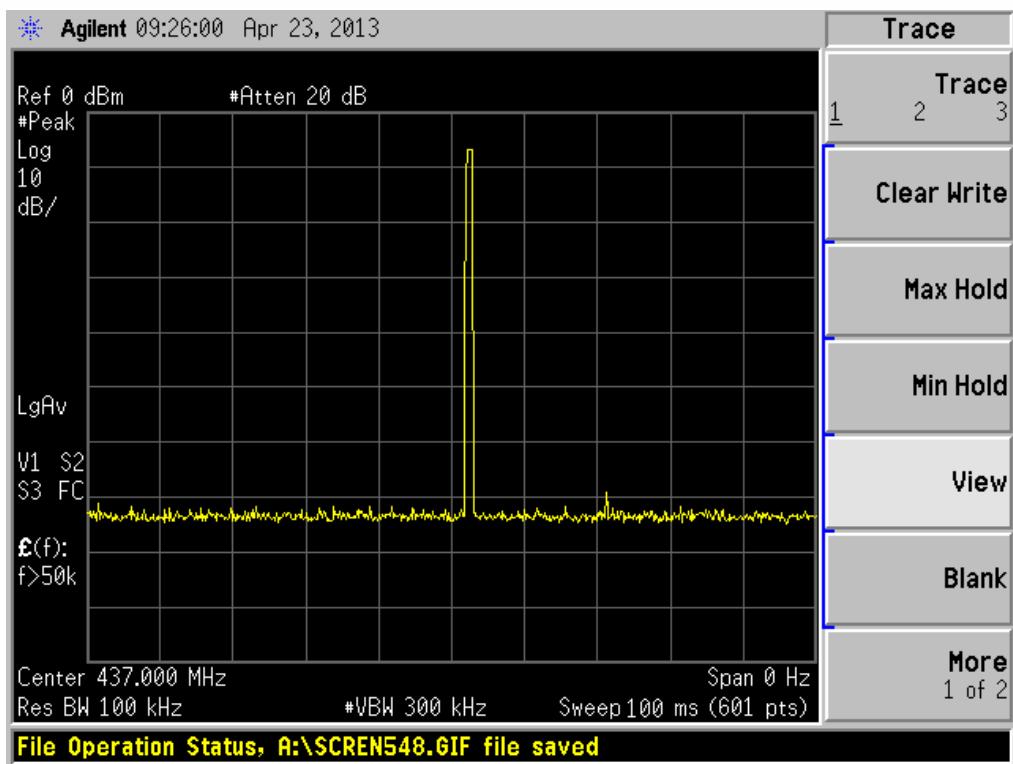
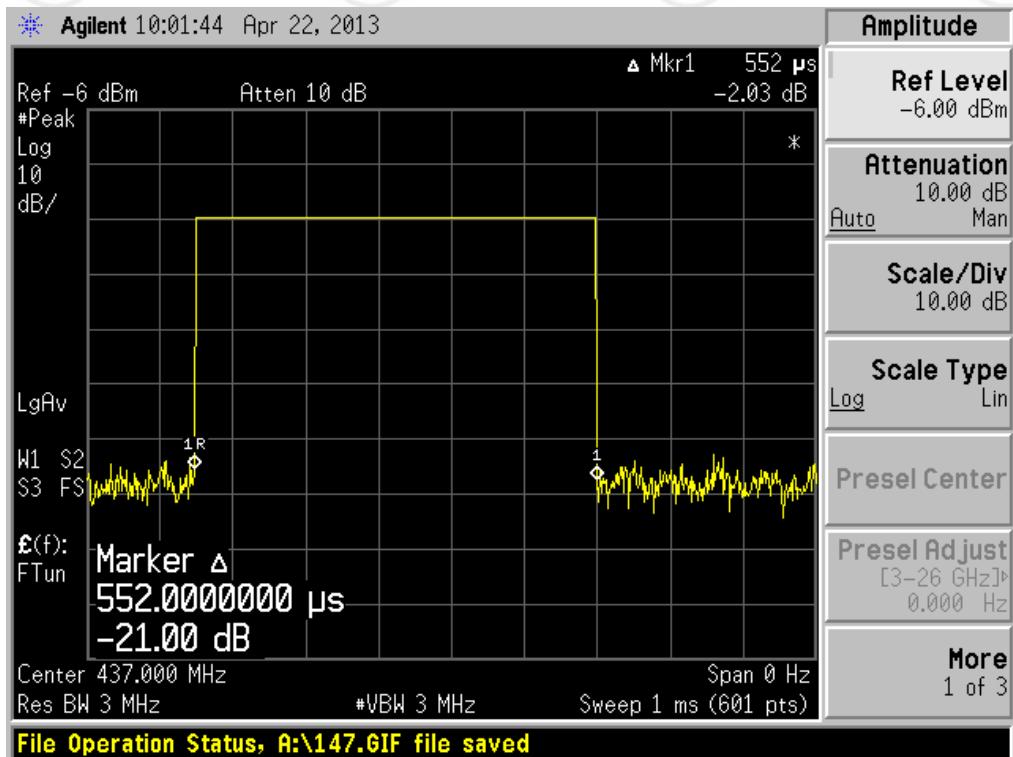
M/N: AFD-T4303

Mode: TX

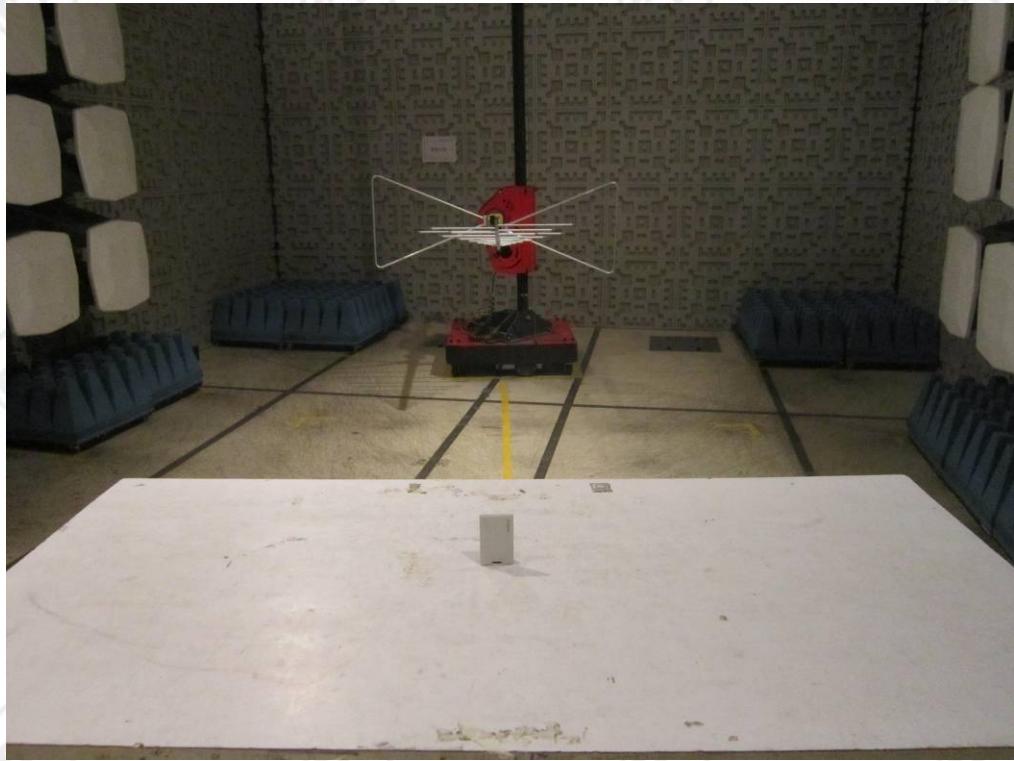
Note:

No.	Freq.	Reading_Level (dBuV)			Correct Factor	Measurement (dBuV/m)			Limit (dBuV/m)		Margin (dB)	
		MHz	Peak	QP	Avg	Peak	QP	Avg	QP	Avg	P/F	Comment
1	1313.333	53.16				-5.31	47.85		52.96		-5.11	P
2	1746.667	41.75				-2.33	39.42		52.96		-13.54	P
3	2186.667	43.10				-0.31	42.79		52.96		-10.17	P
4	3060.000	43.28				1.06	44.34		52.96		-8.62	P
5	3933.333	38.36				3.14	41.50		52.96		-11.46	P
6	4373.333	35.11				4.15	39.26		52.96		-13.70	P

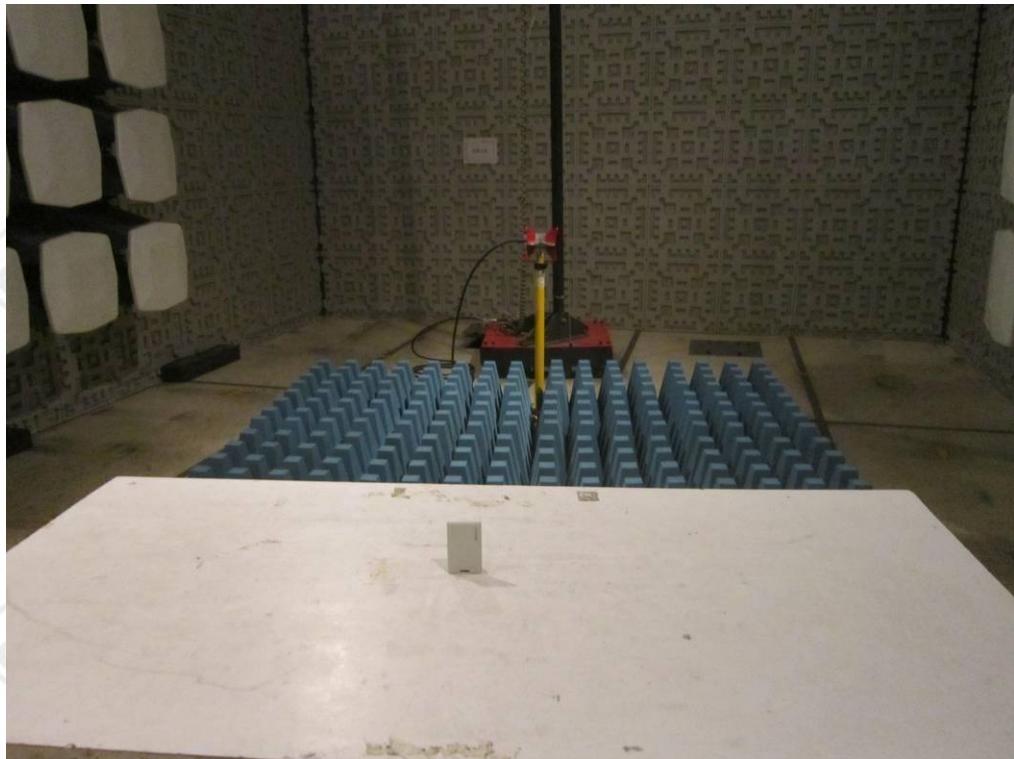
The plots of duty cycle:



APPENDIX 1 PHOTOGRAPHS OF TEST SETUP



TEST SETUP OF RADIATED EMISSION(30MHz-1000MHz)



TEST SETUP OF RADIATED EMISSION(1GHz-5GHz)

APPENDIX 2 EXTERNAL PHOTOGRAPHS OF PRODUCT

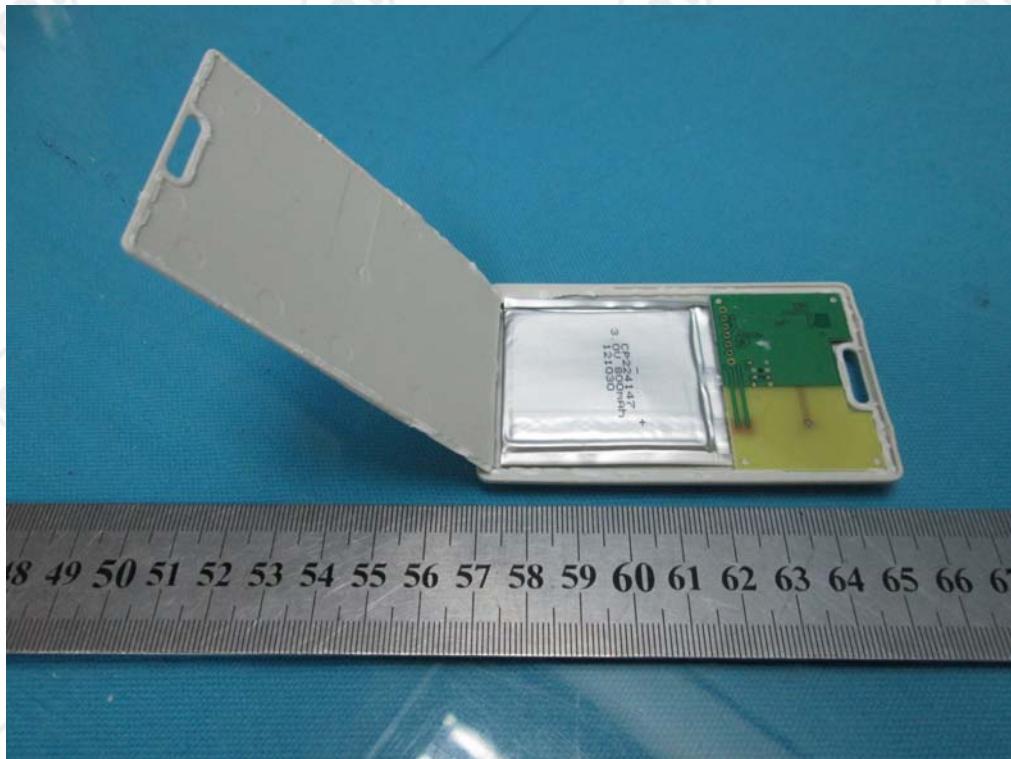


Front View of Product

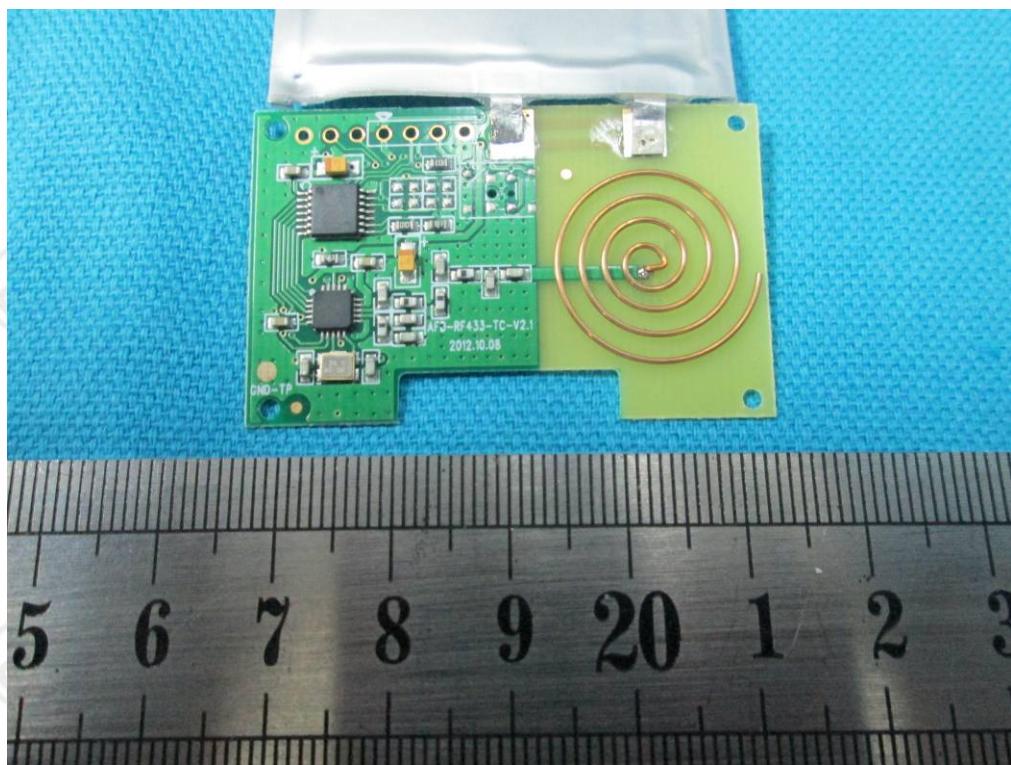


Rear View of Product

APPENDIX 3 INTERNAL PHOTOGRAPHS OF PRODUCT



Internal View of Product



Front View of PCB



Rear View of PCB

*** End of report ***

The test report is effective only with both signature and specialized stamp, The result(s) shown in this report refer only to the sample(s) tested. Without written approval of CTI, this report can't be reproduced except in full.