FCC PART 15.225

EMI MEASUREMENT AND TEST REPORT

For

SHEN ZHEN RDM TAG MASTER CO.,LTD

Fangda Building 207,Keji 12th Road south,High-Tech Industrial Park,
NanShan ShenZhen

FCC ID: U7NRDM880

April 4,2007

This Report Concerns: Original Report	Equipment Type： RFID Module
Test Engineer:	Eric Li
Report No.:	F07040426B
Receive EUT Date/Test Date:	March 23,2007/ March 25-31,2007
Reviewed By:	Christina
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1. GENERAL INFORMATION

1.1. Report information

1.1.1. This report is not a certificate of quality; it only applies to the sample of the specific product/equipment given at the time of its testing. The results are not used to indicate or imply that they are application to the similar items. In addition, such results must not be used to indicate or imply that BEST approves recommends or endorses the manufacture, supplier or use of such product/equipment, or that BEST in any way guarantees the later performance of the product/equipment.

1.1.2. The sample/s mentioned in this report is/are supplied by Applicant, BEST therefore assumes no responsibility for the accuracy of information on the brand name, model number, origin of manufacture or any information supplied.

Additional copies of the report are available to the Applicant at an additional fee. No third part can obtain a copy of this report through BEST, unless the applicant has authorized BEST in writing to do so.

Test Facility -
The open area test site used to collect the radiated data is located on the address of Shenzhen Academy of Metrology & Quality Inspection (FCC Registered Test Site Number: 97379) on Longzhu Road, Nanshan, Shenzhen, Guangdong, China.
The Open Area Test Site is constructed and calibrated to meet the FCC requirements.

1.2. Measurement Uncertainty

Available upon request.

2. PRODUCT DESCRIPTION

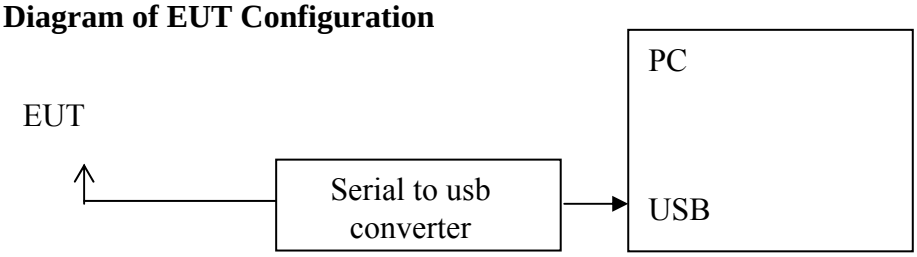
2.1. EUT Description

Description	:	**RFID Module**
Applicant	:	**SHEN ZHEN RDM TAG MASTER CO.,LTD.** Fangda Building 207,Keji 12th Road south,High-Tech Industrial Park,NanShan ShenZhen
Model Number	:	RDM880, RDM820, RDM830

Additonal Information

Frequency	:	13.56MHz
Power Supply	:	DC5V
Maximum Range	:	N/A
Transmitter Antenna	:	The transmitter has a built in antenna and solder on the PCB
Current Consumption		N/A

2.2. Block Diagram of EUT Configuration



2.3. Support Equipment List

1.	USB/Serial adapter	-----
2.	IBM Laptop	R60

2.4. Test Conditions

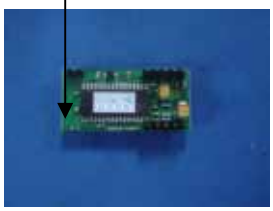
Temperature: 23~25℃
Relative Humidity: 55~63 %

3. FCC ID LABEL

FCC ID: U7NRDM880

Label Location on EUT

EUT Bottom View/ FCC ID Label Location



4. TEST RESULTS SUMMARY

FCC 15 Subpart C,Paragraph 15.225

Test Standards	Test Items	Test Results
FCC Part 15 Subpart C, Paragraph 15.225(a)	Field Strength in the 13.553-13.567 MHz band	Pass
FCC Part 15 Subpart C, Paragraph 15.225(d)	Fild strength of any emissions appearing outside of the 13.110-14.010 MHz band	Pass
FCC Part 15 Subpart C, Paragraph 15.225(e)	Frequency tolerance of the carrier signal	Pass
FCC Part 15,Paragraph 15.215(c)	20dB Bandwidth	Pass
FCC Part 15,Paragraph 15.207	Conducted Test	Pass

Remark: “N/A” means “Not applicable.”

Modifications

No modification was made.

5. TEST EQUIPMENT USED

Equipment/Facilities	Manufacturer	Model #	Serial no.	Date of Cal.	Cal. Interval
Cable	Resenberger	N/A	NO.1	Mar 10，2007	1 Year
Cable	SCHWARZBECK	N/A	NO.2	Mar 10，2007	1 Year
Cable	SCHWARZBECK	N/A	NO.3	Mar 10，2007	1 Year
LISN	Rohde＆Schwarz	ESH3-Z5	100305	Mar 10，2007	1 Year
50Ω Coaxial Switch	ANRITSU CORP	MP59B	6200283933	Mar 10, 2007	1 Year
EMI Test Receiver	Rohde＆Schwarz	ESP13	100180	Oct.18,2006	1 Year
Spectrum Analyzer	Rohde＆Schwarz	FSP40	100273	Sep.10,2007	1 Year
3m Semi-Anechoic Chamber	Albatross Projects	9m×6m×6m	N/A	Feb.20,2007	1 Year
Signal Generator	FLUKE	PM5418 + Y/C	LO747012	Feb.20,2007	1 Year
Signal Generator	FLUKE	PM5418TX	LO738007	Feb.20,2007	1 Year
Loop Antenna	SCHWARZBECK	FMZB1516	113	Jan.30,2007	1 Year
Trilog-Super Broadband Antenna	SCHWARZBECK	VULB9161	9161-4079	Sep.22,2006	1 Year
Broad-Band Horn Antenna	SCHWARZBECK	BBHA9120D	9120D-564	Sep.22,2006	1 Year
Ultra Broadband Antenna	Rohde＆Schwarz	HL-562	100110	June.15,2006	1 Year
AMN	Rohde＆Schwarz	ESH3-Z5	100196	Oct.11,2006	1 Year
AMN	Rohde＆Schwarz	ESH3-Z5	100197	Oct.11,2006	1 Year
Pulse Limiter	Rohde＆Schwarz	ESH3-Z2	N/A	N/A	N/A
Power Meter	Rohde＆Schwarz	NRVD	100041	Feb.20,2007	1 Year
EMI Test Receiver	Rohde＆Schwarz	ESCS30	100003	Feb.20,2007	1 Year
Coaxial Cable with N-connectors	SCHWARZBECK	AK9515H	95549	Sep.22,2006	1 Year
Radio Communication Test Set	Rohde＆Schwarz	CMS 54	846621/024	Feb.20,2007	1 Year
Modulation Analyzer	Hewlett-Packard	8901B	2303A00362	Feb.20,2007	1 Year
Absorbing clamp	Rohde＆Schwarz	MDS-21	N/A	Oct.29,2006	1 Year

6. CONDUCTED POWER LINE TEST

6.1. Test Equipment

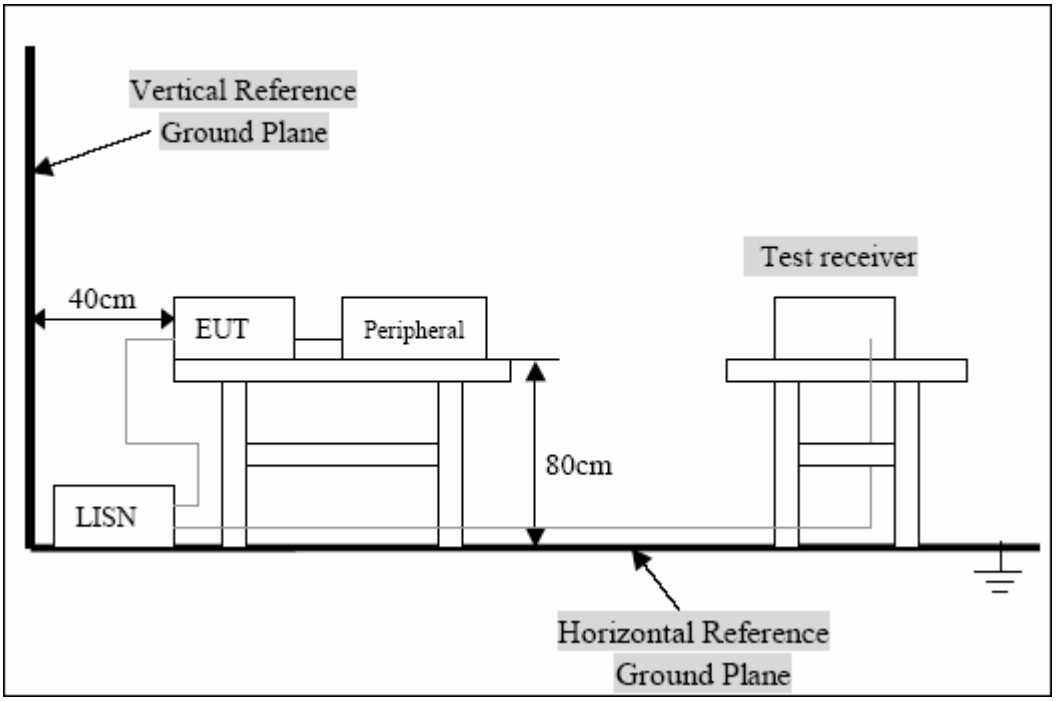
Please refer to section 4 this report.

6.2. 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 50ohm/50uh coupling inpedance for the measuring equipment.The peripheral devices are also connected to the main power through a LISN that provides a 50ohm/50uh coupling inpedance with 50ohm termination.

Both sides of A.C. Line are check for maximum conducted interference.In order to find the maximum emission,the relative positions of equipment and al of the interface cables must be changed according to ASIN C63.4:2003 on conducted measurement .Conducted emissions were invested over the frequency range from 0.15MHz to 30MH z using a receiver bandwidth of 9Khz.

6.3. Test Setup



For the actual test configuration,Please refer to the related items-Photos of testing

6.4. Configurating of the EUT

The EUT was configured according to ASIN C63.4:4-2003. EUT was used DC 5.0V (Power by laptop). The operation frequency is from 13.56MHZ. Enable the signal transmitted from the external antenna from EUT to receiver. All interface ports were connected to the appropriate peripherals. All peripherals and cables are listed below.

A.EUT

Device	Manufacturer	Model #	FCC ID
RFID Module	SHEN ZHEN RDM TAG MASTER CO.,LTD.	RDM880	U7NRDM880

B.Internal Devices

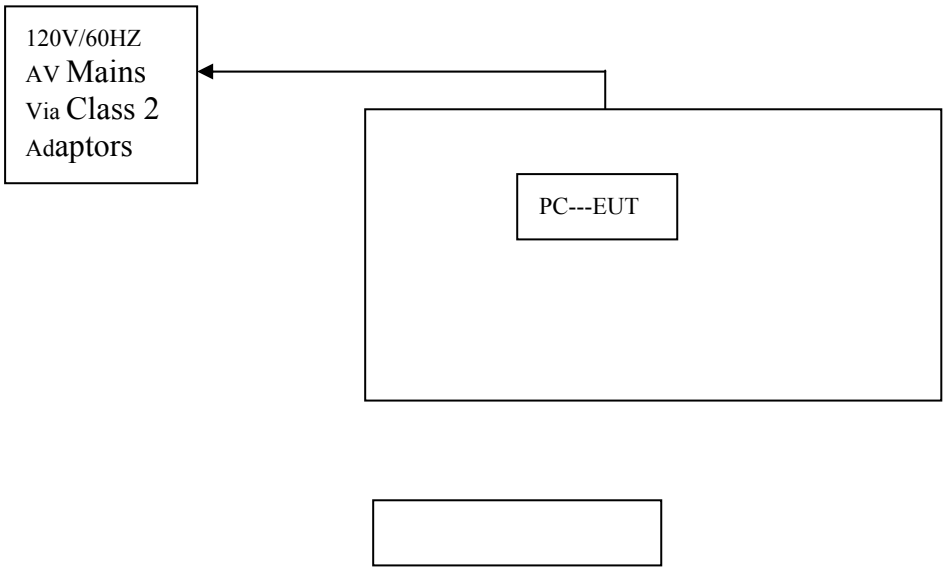
Device	Manufacturer	Model #	FCC ID
N/A			

C.Peripherals

Device	Manufacturer	Model # Serial #	FCC ID/ Doc	Cable
N/A				

6.5. EUT Operating Condition

Operating condition is according to ANSI C63.4-2003.
Setup the EUT and simulators as shown on follow.
Enable RF signal and confirm EUT active.
Modulate output capacity of EUT up to specification.



6.6. Conducted Power line Emission Limits

FCC Part 15 Paragraph 15.207 (dBuv)		
Frequency Range (MHZ)	Class A QP/AV	Class B QP/AV
0.15-0.5	79/66	65-56/56-46
0.5-5.0	73/60	56-46
5.0-3.0	73/60	60-50

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

6.7. Conducted Power Line Test Result

Refer to APPENDIX I Test Curves

7. FIELD STRENGTH IN THE 13.553-13.567 MHZ BAND

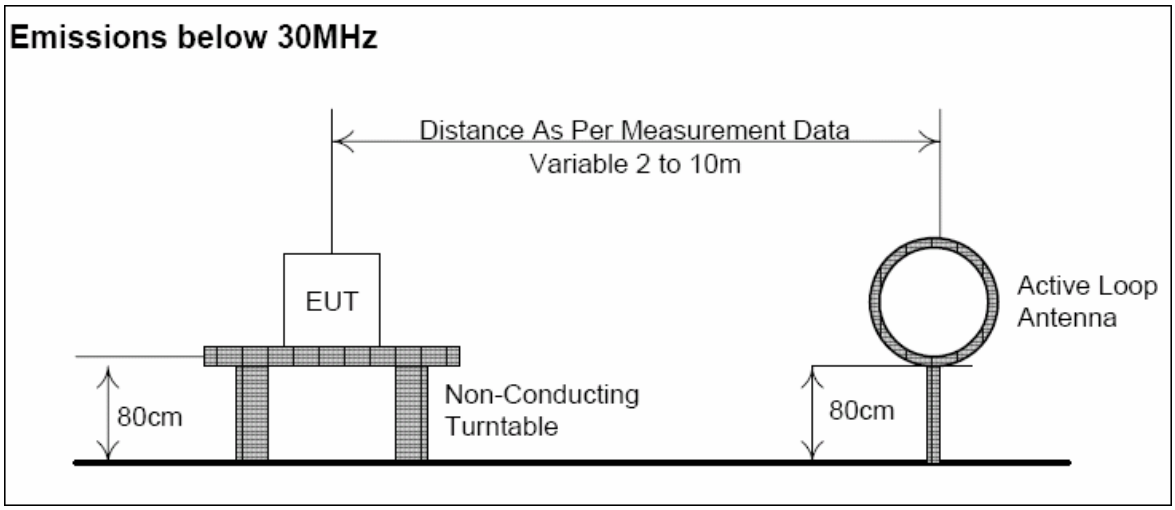
7.1. Test Equipment

Please refer to section 4 this report.

7.2. Test Procedure

The field strength of radiated emissions tests were performed in the 3-meter chamber test site, using the setup accordance with the ANSI C63.4-2003. The specification used was the FCC Part Subpart C limits.

7.3. Radiated Test Setup



7.4. Configuration of the EUT

Same as section 6.4 of this report

7.5. EUT Operating Condition

Same as section 6.5 of this report.

7.6. Radiated Emission Limit

The field strength of any emissions within the band within the band 13.553-13.567 MHZ shall not exceed 15.848 microvolts/meter at 30 meters.

7.7. Radiated Emission Test Result

Product:	RFID Module	Temperature:	25℃
Test Voltage:	DC5.0V	Humidity:	56%RH
Test Result:	PASS		

Freq. (MHz)	Emission(dBuV/m) (Measured at 3m)	Emission(dBuV/m) (at 30m)	Limits(dBuV/m)	Margin (dB)
13.56	75.2	35.2	84	-48.8

8. FIELD STRENGTH OF ANY EMISSIONS APPEARING OUTSIDE OF THE 13.110-14.010 MHZ BAND

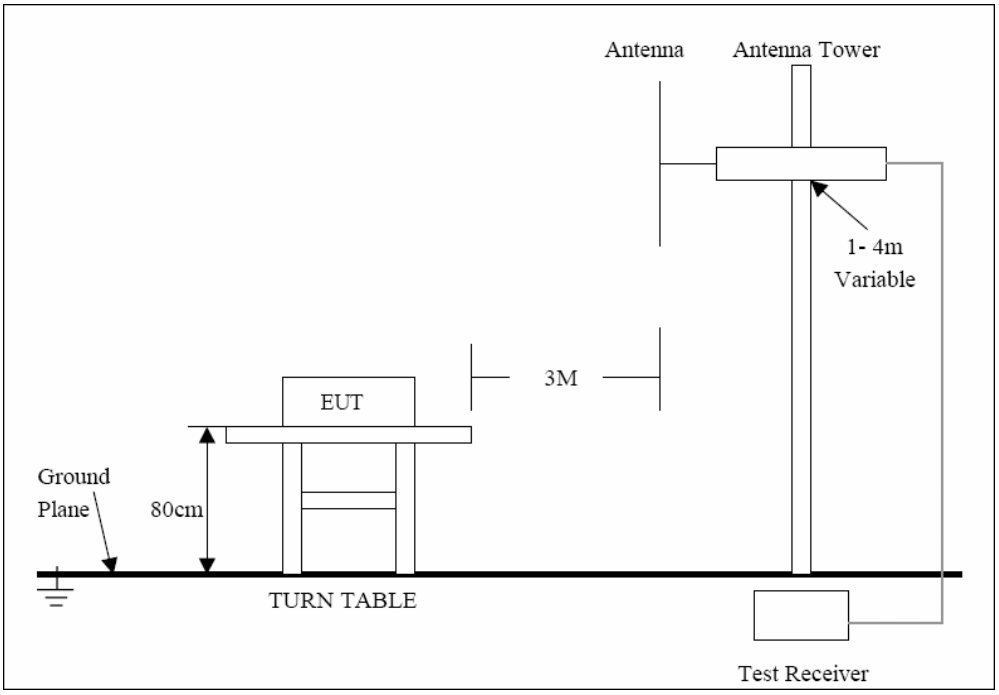
8.1. Test Equipment

Please refer to section 4 this report.

8.2. Test Procedure

The out of band emission tests were performed in the 3-meter chamber test site, using the setup accordance with the ANSI C63.4-2003. The specification used was the FCC Part Subpart C limits.

8.3. Radiated Test Setup



Setup below 3mMHz,refer to 7.3;For the accrual test configuration,pleas refer to the related items-photos of Testing.

8.4. Configuration of the EUT

Same as section 6.4 of this report

8.5. EUT Operating Condition

Same as section 6.5 of this report.

8.6. Radiated Emission Limit

The field strength of any emissions appearing outside the 13.110-14.010 MHz band shall not exceed the general radiated emission limits in §15.209

15.209(a) Except as provided elsewhere in this subpart ,the emissions from an intentional radiator shall not exceed the field strength levels specified in the following table:

Frequency (MHZ)	Distance (m)	Field Strength (microvolts/m)
0.009-0.490	300	2400/F(kHz)
0.490-1.705	30	24000/F(kHz)
1.705-30.0	30	30
30-88	3	100
88-216	3	150
216-960	3	200
ABOVE 960	3	500

8.7. Radiated Emission Test Result

Product:	RFID Module	Temperature :	25℃
Test Voltage:	DC5.0V	Humidity:	56%RH
Test Result:	PASS		

FREQ. (MHZ)	POL V/H	RCVD SIGNAL (DBμV)	ANT. FACTOR (DB)	CABLE LOSS (DB)	LEVEL (DBμV)	LIMIT (DBμV)	MARGIN (DB)
27.12	-	25.9	-	-	-12.9*	29.5	42.4
40.6825	V	22.1	11.4	1.3	34.8	40.0	5.2
40.6825	H	15.1	11.5	1.3	27.9	40.0	12.1
54.2445	V	13.7	9.7	1.5	24.9	40.0	15.1
54.2445	H	8.8	9.9	1.5	20.2	40.0	19.8
81.3645	V	20.7	8.4	1.7	30.8	40.0	9.2
81.3645	H	15.1	7.3	1.7	24.1	40.0	15.9
108.4890	V	21.7	11.4	1.8	34.9	43.5	8.7
108.4890	H	13.7	10.3	1.8	25.8	43.5	17.8
135.6107	V	13.7	13.0	1.9	28.5	43.5	15.0
135.6107	H	6.4	12.6	1.9	20.9	43.5	22.7

Note: (1) The Spectrum was searched from 9kHz to the 1GHz,All readings below 1 GHZ are Quasi-peak,above are performed with peak and/or average measurements as necessary.
(2) Emission Level=Reading Level+Probe Factor+Cable Loss.
(3) measurement has been corrected to 30m using correction from 3m to 30m of 40dB.

9. FREQUENCY TOLERANCE OF THE CARRIER SIGNAL

9.1. Test Equipment

Please refer to Section 4 this report.

9.2. Test Procedure

Frequency Stability vs. Temperature: The equipment under test was connected to an external DC power supply and the RF output was connected to a f Spectrum Analyzer via feed-through attenuators. The EUT was placed inside the temperature chamber. The DC leads and RF output cable exited the chamber through an opening made for the purpose.
After the temperature stabilized for approximately 20 minutes, the frequency output was recorded from the Spectrum Analyzer.
Frequency Stability vs. Voltage: An external variable DC power supply Source. The voltage was set to 115% of the nominal value and was then decreased until the transmitter light no longer illuminated; i.e., the end point. The output frequency was recorded for each voltage.

9.3. Configuration of The EUT

Same as section 6.4 of this report

9.4. EUT Operating Condition

Same as section 6.5 of this report

9.5. Frequency tolerance FCC 15.225(e) Limit

The frequency tolerance of the carrier signal shall be maintained within +/-0.01% of the operating frequency over a temperature variation of-20 degrees to +50 degrees C at normal supply voltage,and for a variation in the primary supply voltage from 85% to 115% of the rated supply voltage at a temperature of 20 degreesC. For battery operated equipment,the equipment tests shall be performed using a new battery.

9.6. Frequency tolerance Test Result

Product:	RFID Module	Temperature:	
Test Voltage:	-	Humidity:	56%RH
Test Result:	PASS		

Temp(℃)	Voltage	Freq(Hz)	Freq Delta	Freq tolerance(%)	Limit(+/-%)
-20	Nominal	13561118	90	0.00066	0.01
-10	Nominal	13561129	101	0.00074	0.01
0	Nominal	13561166	138	0.00101	0.01
10	Nominal	13561156	128	0.00094	0.01
20	+15%	13561033	5	0.00003	0.01
20	Nominal	13561028	0	0	0.01
20	-15%	13561018	-10	-0.00007	0.01
30	Nominal	13561073	45	0.00033	0.01
40	Nominal	13561038	10	0.00007	0.01
50	Nominal	13561006	-22	-0.00016	0.01

10. 20B BANDWIDTH

10.1. Test Equipment

Please refer to Section 4 this report.

10.2.Test Procedure

1. The EUT was tested according C63.4-2003.The radiated test was performed at FCC Registration laboratory .
2. The measurement was performed in the antenna height to gain the maximum of electric field strength.

10.3.Configuration of The EUT

Same as section 6.4 of this report

10.4.EUT Operating Condition

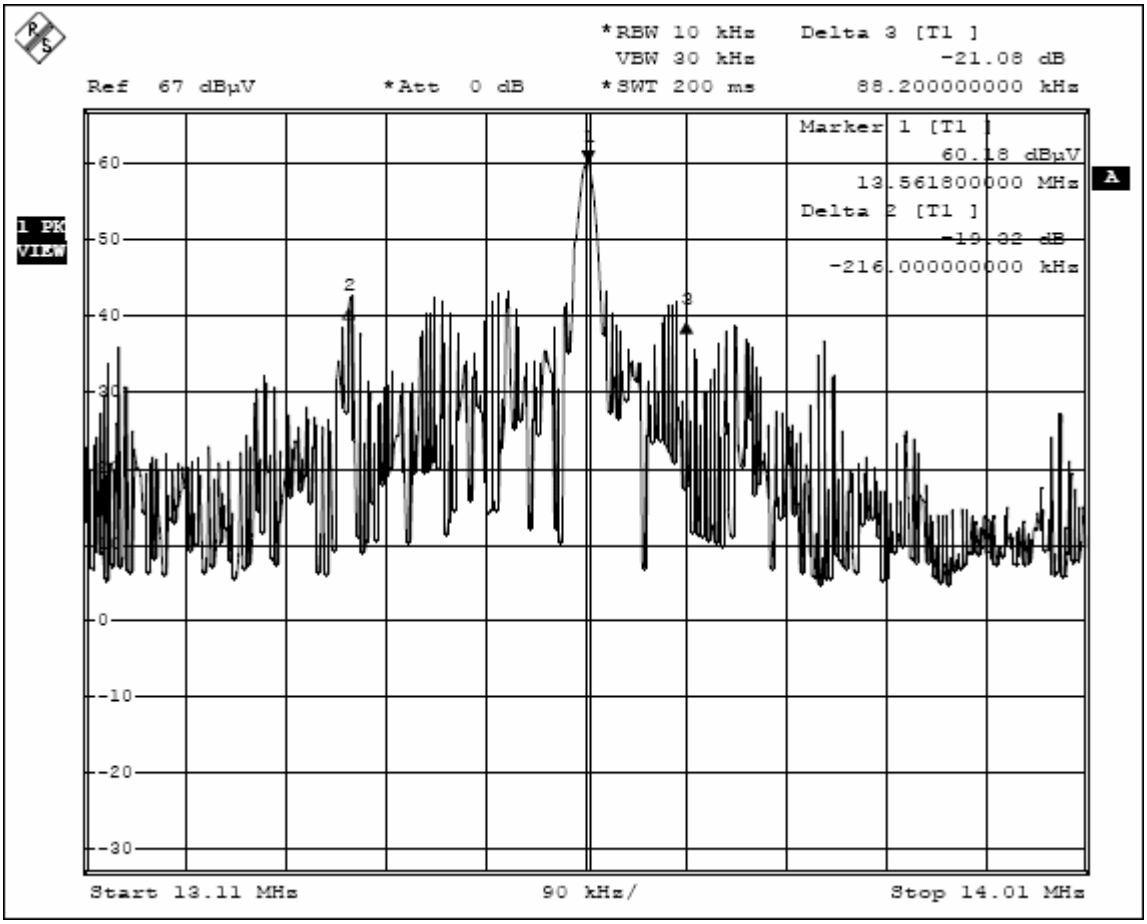
Same as section 6.5 of this report

10.5.FCC 15.215(c) 20B Bandwidth Limit

Intentional radiators operating under the alternative provisions to the geneql emission limits,as contained in §§15.217 through 15.257 and in Subpart Eof this part,must be designed to ensure that the 20 dB bandwidth of the emissionxor whatever bandwidth may otherwise be specified in the specific rule section under which the equipment os operated.The requirement to contain the designated bandwidth of the emission within the specified frequency band includes the effects from frequency sweeping,frequency hopping and other modulation techniques that may be employed as well as the frequency stability of the transmitter over expected variations in temperature and supply voltage.If a frequency stability is not secified in the regulqations,it is recommended that the fundamental emission be lept within at least the central 80% of the ermitted band in order to minimize the possibility of out-of-band operation.

10.6. Test Result

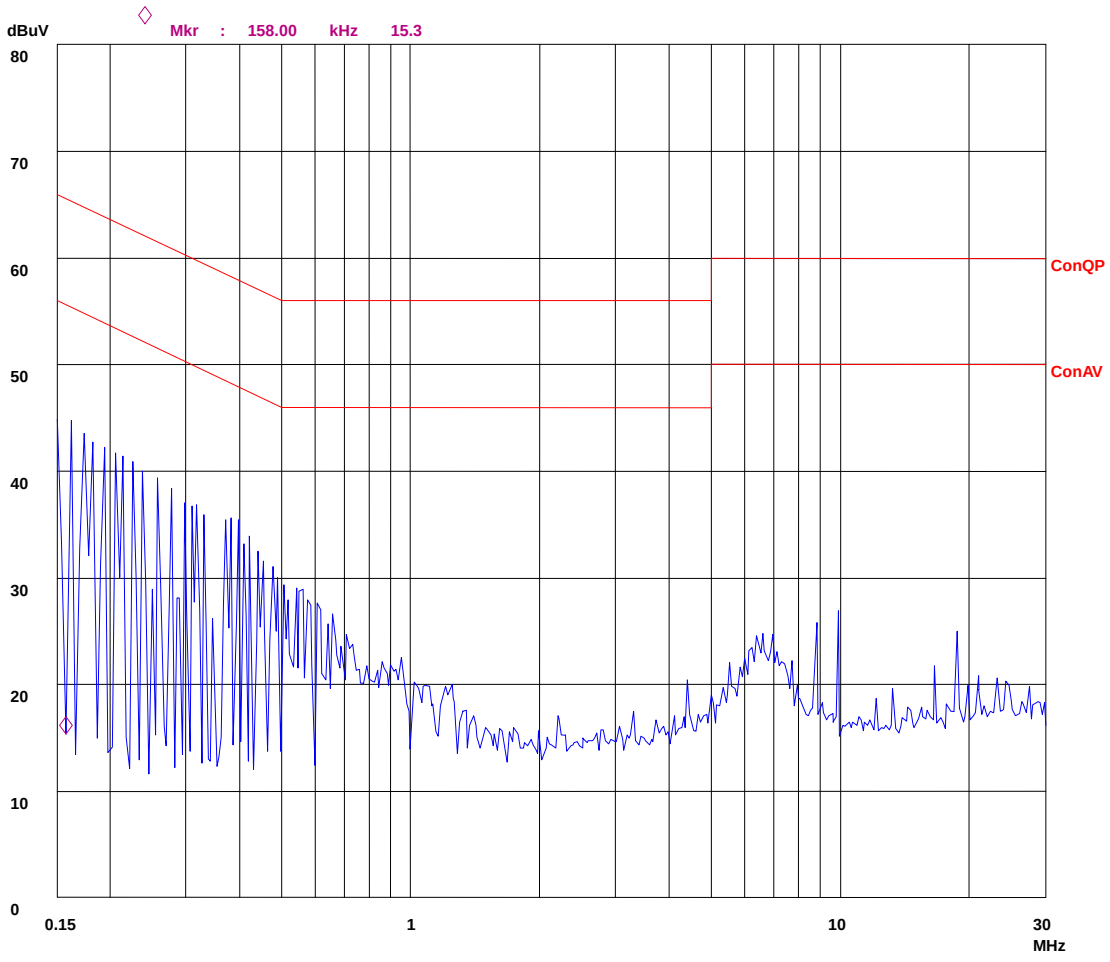
Product:	RFID Module	Temperature:	25℃
Test Voltage:	DC5.0V	Humidity:	56%RH
Test Result:	PASS		


*RBW 10 kHz
VBW 30 kHz
*SWT 200 ms
Delta 3 [T1]
-21.08 dB
88.200000000 kHz
Ref 67 dBµV
*Att 0 dB
Marker 1 [T1]
60.18 dBµV
13.561800000 MHz
Delta 2 [T1]
-19.02 dB
-216.000000000 kHz
1 PK
VIEW
A
60
50
40
30
0
-10
-20
-30
Start 13.11 MHz
90 kHz/
Stop 14.01 MHz

APPENDIX I TEST CURVES

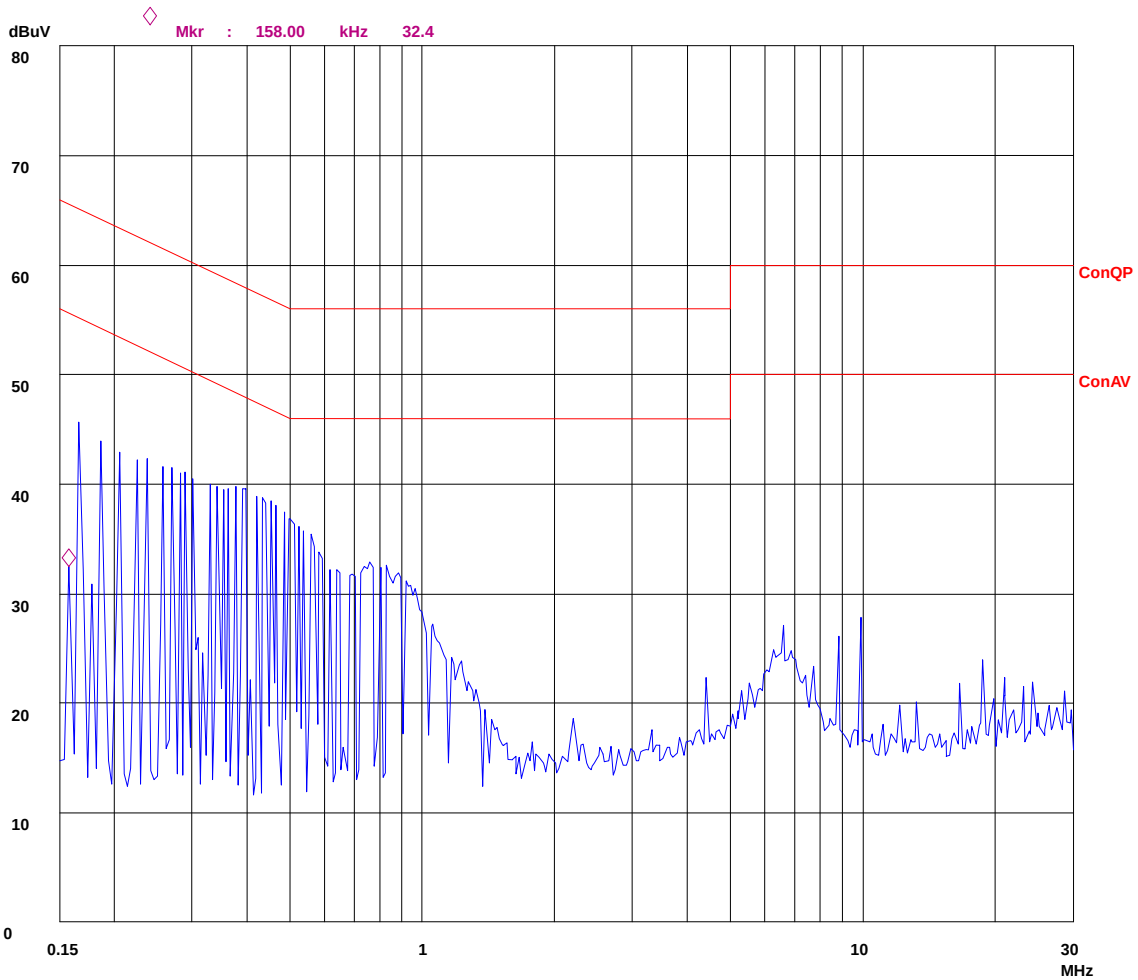
Conducted Disturbance

EUT:
Op Cond: TX
Test Spec: L
Comment: AC 120V/60Hz



Conducted Disturbance

EUT: **M/N:**
Op Cond: **TX**
Test Spec: **N**
Comment: **AC 120V/60Hz**



APPENDIX II TEST PICTURE

Photo 1 Conducted Disturbance Test

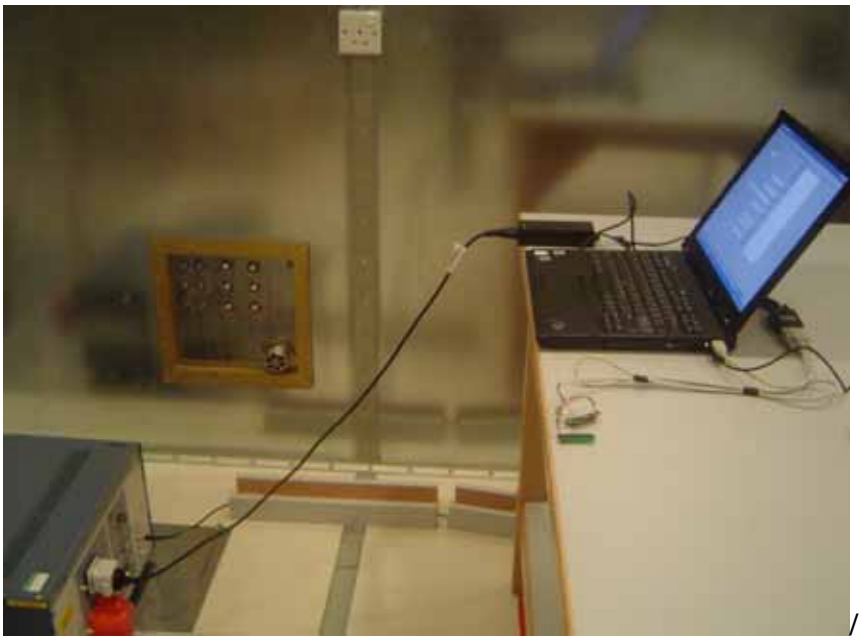


Photo 2 Radiated disturbances

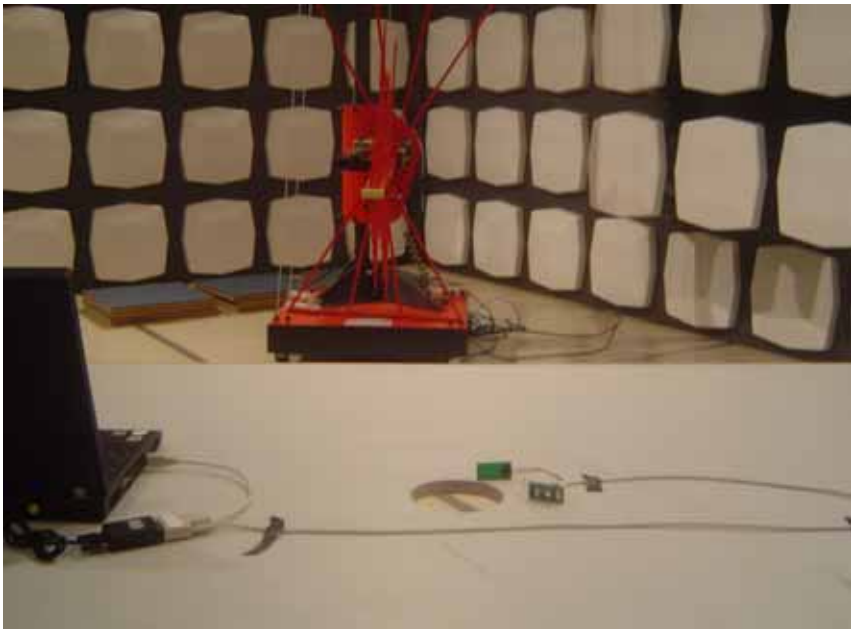


Photo 3 General Appearance of the EUT

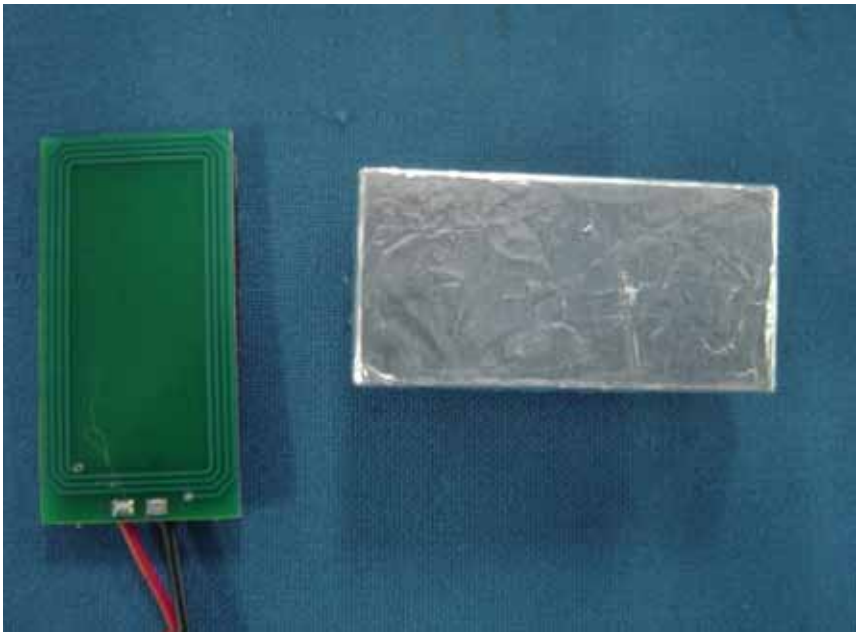


Photo 4 General Appearance of the EUT(without shielding)

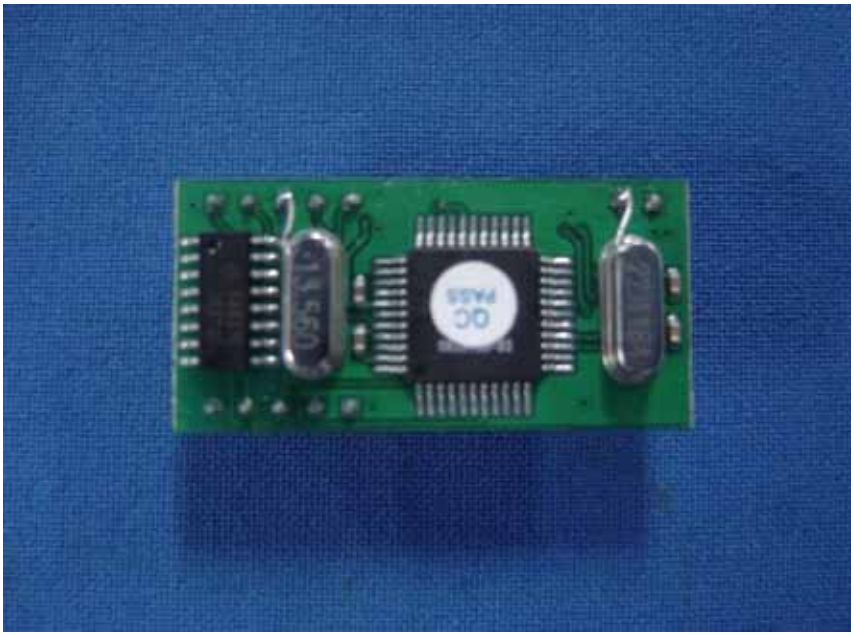


Photo 5 General Appearance of the EUT

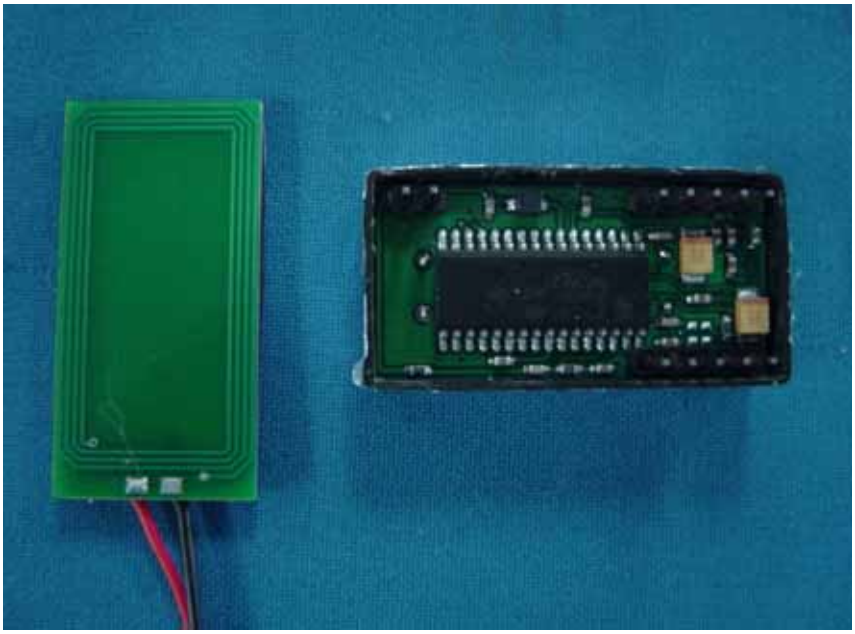


Photo 6 General Appearance of the EUT