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Report No.: SHEM111200167502
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MPE REPORT

According to
FCC Rules 47 CFR §2.1091 & FCC OET Bulletin 65 supplement C
For

ATMEL Semiconductor Technology (Shanghai), Ltd.

Application No.: SHEM111200167502
Address of Applicant: ATMEL Semiconductor Technology (Shanghai), Ltd.

Equipment Under Test (EUT):

NOTE: The following sample(s) submitted was/were identified on behalf of the client as

EUT Name: AT86RF231 Radio Board
Model No.: A09-1563
Standards: FCC OET Bulletin 65 supplement C: 2001
Date of Receipt: February. 13, 2012
Date of Test: February. 13, 2012 to February. 15, 2012
Date of Issue: February. 21, 2012

Test Result :	PASS*
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* In the configuration tested, the EUT complied with the standards specified above.

E&E Section Head
SGS-CSTC(Shanghai) Co., Ltd.

E&E EMC Engineer
SGS-CSTC(Shanghai) Co., Ltd.

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2 General Information

2.1 Client Information

Applicant: ATMEL Semiconductor Technology (Shanghai), Ltd.
 Address of Applicant: 18F, Block B, Hi-tech building, No.900 Yishan Rd, Shanghai, China
 Manufacturer: ATMEL Semiconductor Technology (Shanghai), Ltd.
 Address of Manufacturer: 18F, Block B, Hi-tech building, No.900 Yishan Rd, Shanghai, China

2.2 General Description of E.U.T.

EUT Name: AT86RF231 Radio Board
 Model No.: A09-1563
 Fundamental Frequency : 2405-2480 MHz

2.3 Details of E.U.T.

Hardware Version: N/A
 Software Version: N/A
 EUT Power Supply: DC 3.3V

2.4 Test Location

All tests were performed at SGS E&E EMC lab

SGS-CSTC EMC Laboratory, No.588 West Jindu Road,Songjiang District,Shanghai,China
 Tel:+86 21 6191 5666 Fax:+86 21 6191 5655

2.5 Test Equipment Information

Item	Test Equipment	Manufacturer	Model No.	Serial No.	Cal. Date	Cal. Due date
1	Spectrum Analyzer	Rohde & Schwarz	FSP-30	100324	2011-04-19	2012-04-18



2.6 Test Confident level

The test facility is recognized, certified, or accredited by the following organizations:

- **CNAS (No. CNAS L0599)**

CNAS has accredited SGS-CSTC Standards Technical Services (Shanghai) Co., Ltd. to ISO/IEC 17025:2005 General Requirements for the Competence of Testing and Calibration Laboratories (CNAS-CL01 Accreditation Criteria for the Competence of Testing and Calibration Laboratories) for the competence in the field of testing. Date of expiry: 2014-07-26.

- **FCC – Registration No.: 402683**

SGS-CSTC Standards Technical Services (Shanghai) Co., Ltd. has been registered and fully described in a report filed with the Federal Communications Commission (FCC). The acceptance letter from the FCC is maintained in our files. Registration No.: 402683, Expiry Date: 2015-02-22.

- **Industry Canada (IC) – IC Assigned Code: 8617A**

The 3m Semi-anechoic chamber of SGS-CSTC Standards Technical Services (Shanghai) Co., Ltd. has been registered by Certification and Engineering Bureau of Industry Canada for radio equipment testing with Registration No.: 8617A. Expiry Date: 2014-09-20.

- **VCCI (Member No.: 3061)**

The 3m Semi-anechoic chamber and Shielded Room of SGS-CSTC Standards Technical Services (Shanghai) Co., Ltd. has been registered in accordance with the Regulations for Voluntary Control Measures with Registration No.: R-3172 and C-3514 respectively. Date of Registration: 2009-11-30. Date of Expiry: 2012-03-17.

3 Test Standards and Limits

The Equipment under Test (EUT) has been tested at SGS's (own or subcontracted) laboratories.

The following table summarizes the specific reference documents such as harmonized standards or test specifications which were used for testing as SGS's (own or subcontracted) laboratories.

Identity	Document Title	Version
FCC Rules 47 CFR§2.1091	Radiofrequency radiation exposure evaluation:mobile devices	-
FCC OET Bulletin 65 supplement C	Evaluating Compliance with FCC Guidelines for Human Exposure to Radiofrequency Electromagnetic Fields	2001

In the configuration tested, the EUT complied with the standards specified above.

FCC LIMITS FOR MAXIMUM PERMISSIBLE EXPOSURE (MPE)

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(B) Limits for General Population/Uncontrolled Exposure

Frequency Range (MHz)	Electric Field Strength (E) (V/m)	Magnetic Field Strength (H) (A/m)	Power Density (S) (mW/cm ²)	Averaging Time E ² , H ² or S (minutes)
0.3-1.34	614	1.63	(100)*	30
1.34-30	824/f	2.19/f	(180/f ²)*	30
30-300	27.5	0.073	0.2	30
300-1500	--	--	f/1500	30
1500-100,000	--	--	1.0	30

f = frequency in MHz *Plane-wave equivalent power density

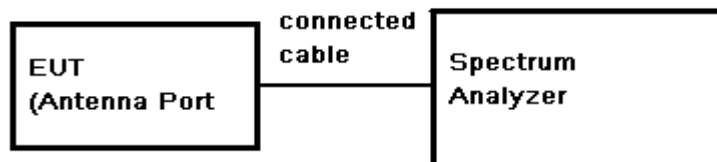
4 Summary of Results

Frequency Band	Limit (mW/cm ²)	Result (mW/cm ²)	Verdict
2405-2480MHz	1.0	0.15	Pass

5 Measurement and Calculation

5.1 Maximum transmit power

Test Date: Feb 13, 2012
 EUT Operation:: Test in fixing frequency operating mode at lowest, middle and highest frequency.
 Test Configuration:



Test Results

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Tx frequency (MHz)	Temp. (°C)	Voltage (V)	A level (dBm)		P(power) e.i.r.p. (dBm)	Max Out Power (mW)
			Cable Loss (dB)	Read level (dBm)		
2405	22	3.30	0.5	2.33	2.83	1.92
2440	22	3.30	0.5	2.13	2.63	1.83
2480	22	3.30	0.5	1.48	1.98	1.58

5.2 SAR Calculation

Test Results: MPE Limit Calculation: the EUT's operating frequencies 2405MHz to 2480MHz; the highest power is Low channel(2405MHz). The Measured maximum radiated power is 21.91 dBm(1.92mW).with maximum peak gain is 0.0dBi. Duty factor is 100%

Equation from page 19 of OET 65, Edition 97-01

$$S = PG * \text{Duty factor} / 4\pi R^2$$

P =Power Input to antenna (1.92mWatts)

G =Antenna Gain (1.0numeric)

R = distance to the center of radiation of antenna (in meter) = 1cm

$$S = (1.92 * 1 * 1) / (4\pi * 1^2) = 0.15\text{mW/cm}^2$$

$$\text{MPE limit} = 1.0\text{mW/cm}^2$$

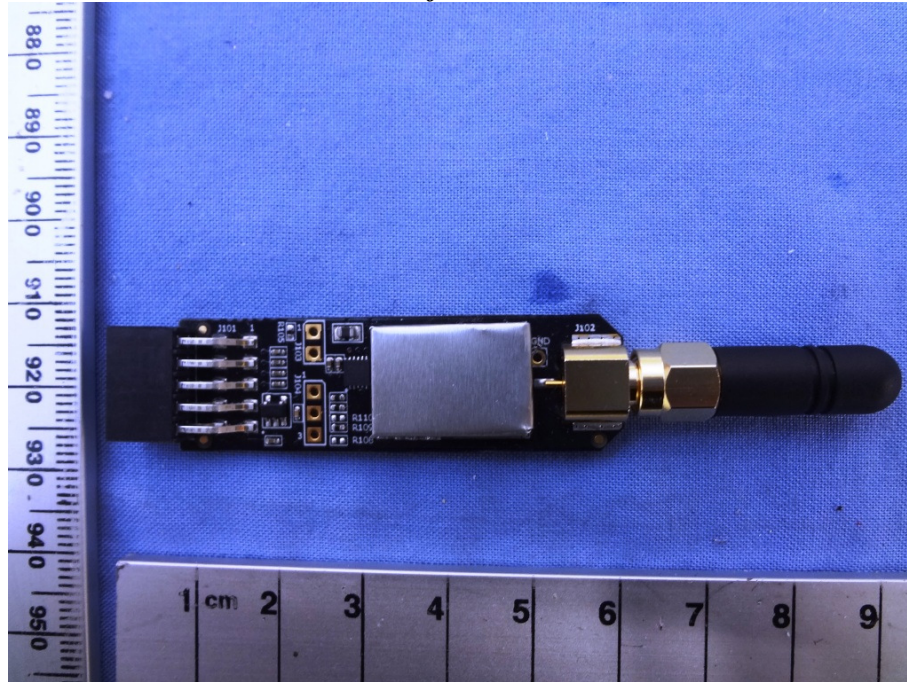
Note:

$$1) P (\text{Watts}) = 10^{\frac{\text{dBm}}{10}} / 1000$$

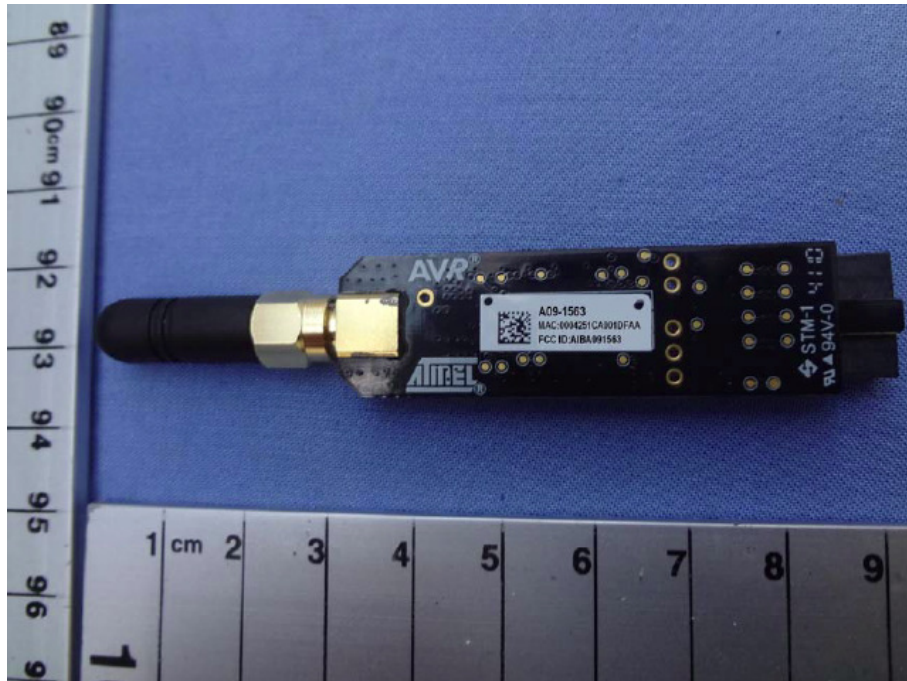
$$2) G (\text{Antenna gain in numeric}) = 10^{\frac{\text{Antenna gain in dBi}}{10}}$$

6 EUT Constructional Photos

EUT front view



EUT Back view

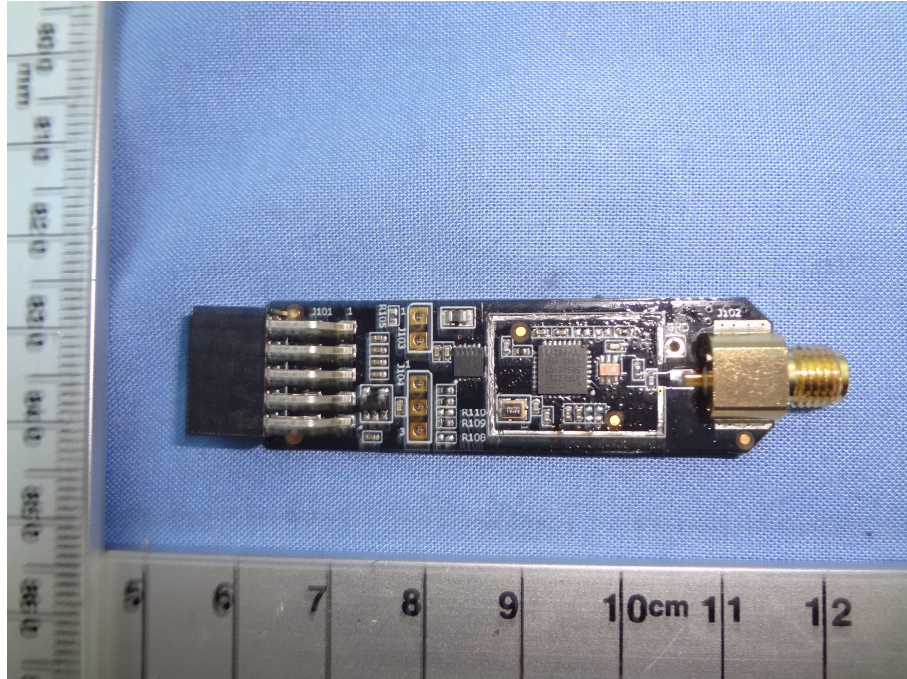


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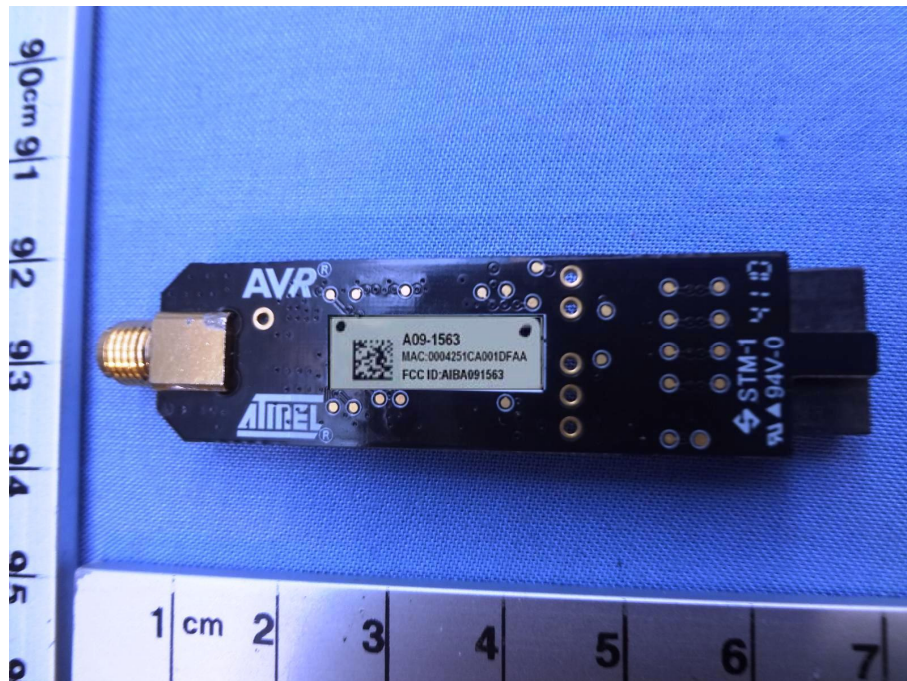
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Internal of PCB Front View



Internal of PCB Back View

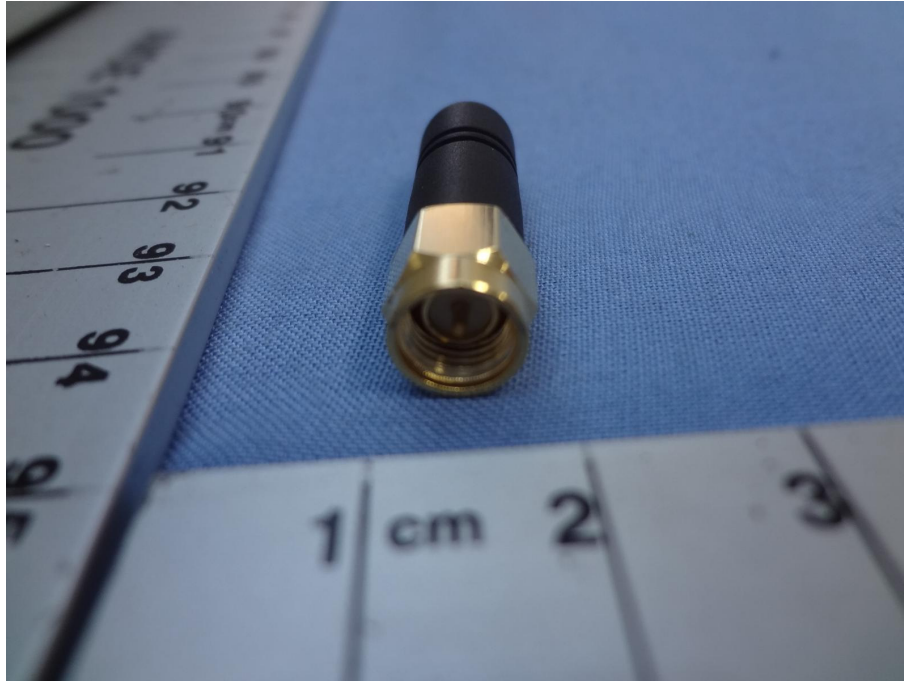


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Antenna



THE END OF REPORT

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