

FCC TEST REPORT

REPORT NO.: SE08FCI176R-1

MODEL NO.: HAC-UBee/s

LISTED MODELS: N/A

RECEIVED: Aug 19, 2008

TESTED: Aug 19, 2008 to Aug 21, 2008

APPLICANT: Shenzhen HAC Telecom Technology Co., Ltd.

ADDRESS: 1903, Tower A of Haisong Bldg, 9th Tairan Road, Chegongmiao, Futian,
Shenzhen, China.

ISSUED BY: SHENZHEN SETEK TECHNOLOGY CO., LTD.

LAB LOCATION: 2/F,A3 Bldg, East Industry Zone, Overseas Chinese Town,
Shenzhen,China

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SHENZHEN SETEK TECHNOLOGY CO., LTD.


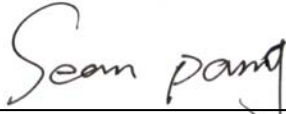
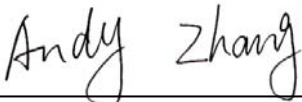
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Prepared for : Shenzhen HAC Telecom Technology Co., Ltd.
Address : 1903, Tower A of Haisong Bldg, 9th Tairan Road, Chegongmiao, Futian, Shenzhen, China.
Product : Zigbee module
Model No(s). : HAC-UBee/s
Trademark : N/A
Test Standard : FCC Part 15 Paragraph 15.249
Prepared by : SHENZHEN SETEK TECHNOLOGY CO., LTD.
Address : 2/F, A3 Bldg, East Industry Zone, Overseas Chinese Town, Shenzhen, China

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Prepared by : 
(Engineer)
Reviewer by : 
(Project Engineer)
Approved by : 
(Manager)

Report Number : SE08FCI176R-1
Date of Test : Aug 15, 2008 to Aug 21, 2008
Date of Report : Aug 22, 2008

The device described above is tested by SHENZHEN SETEK TECHNOLOGY CO., LTD. to determine the maximum emission levels emanating from the device and the severe levels of the device can endure and its performance criterion. This report applies to above tested sample only and shall not be reproduced in part without written approval of SHENZHEN SETEK TECHNOLOGY CO., LTD.

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1. GENERAL INFORMATION

1.1 Description of Device (EUT)

Applicant	: Shenzhen HAC Telecom Technology Co., Ltd.
Address	: 1903, Tower A of Haisong Bldg, 9 th Tairan Road, Chegongmiao, Futian, Shenzhen, China.
Manufacturer	: Shenzhen HAC Telecom Technology Co., Ltd.
Address	: 1903, Tower A of Haisong Bldg, 9 th Tairan Road, Chegongmiao, Futian, Shenzhen, China.
EUT	: Zigbee module
Model Number(s)	: HAC-UBee/s
Description of EUT	: Zigbee module
Description of Antenna	: HAC-Ubee/s (layout on pcb, gain:2.1dbi)
Power Supply	: DC 3.3 -6.0V from the test jig
Operation Frequency	: 2405 MHz ~ 2480 MHz
Number of Channels	: 16
Type of Modulation	: QPSK
Output Power Class	: Class 2
Received	: Aug 19, 2008
Date of Test	: Aug 19, 2008 to Aug 21, 2008

1.2. Test Summary

Test	Test Requirement	Test Method	Class / Severity	Result
Radiated Emission (30MHz to 25GHz)	FCC PART 15: 2003	ANSI C63.4: 2003	Class B	PASS
Conducted Emission (150KHz to 30MHz)	FCC PART 15: 2003	ANSI C63.4: 2003	Class B	PASS

1.3. Description of Support Device

The EUT has been tested as an independent unit.

1.4. Standards Applicable for Testing

The customer requested FCC tests for a Zigbee module. The standards used were FCC 15 Paragraph 15.249, Paragraph 15.207, Paragraph 15.209, Paragraph 15.31, Paragraph 15.33, Paragraph 15.35.

1.5. List of Measuring Equipments Used

Item	Equipment	Manufacturer	Model No.	Serial No.	Last Cal.	Cal. Interval
1.	Spectrum Analyzer	Agilent	E4408B	MY44210575	May 29,2008	1 Year
2.	Test Receiver	Rohde & Schwarz	ESIB26	100234	May 29,2008	1 Year
3.	Bilog Antenna	Schwarzbeck	VULB9163	142	May 29,2008	1 Year
4.	Loop Antenna	EMCO	6502	00042960	May 29,2008	1 Year
5.	50 Coaxial Switch	Anritsu Corp	MP59B	6100237248	May 29,2008	1 Year
6.	Cable	Schwarzbeck	AK9513(1m)	CR RX2	May 29,2008	1 Year
7.	Cable	Schwarzbeck	AK9513(10m)	AC RX1	May 29,2008	1 Year
8.	Cable	Rosenberger	N/A(6m)	CR RX1	May 29,2008	1 Year
9.	Cable	Rosenberger	N/A(10m)	FP2RX2	May 29,2008	1 Year
9.	DC Power Filter	MPE	23872C	N/A	May 29,2008	1 Year
10.	Single Phase Power Line Filter	MPE	23332C	N/A	May 29,2008	1 Year
11.	3 Phase Power Line Filter	MPE	23333C	N/A	May 29,2008	1 Year
12.	Signal Generator	HP	8648A	3625U00573	May 29,2008	1 Year
13.	Test Receiver	Rohde & Schwarz	ESCS30	100350	May 29,2008	1 Year
14.	L.I.S.N.	Rohde & Schwarz	ESH2-Z5	834549/005	May 29,2008	1 Year
15.	Pulse Limiter	Rohde & Schwarz	ESH3-Z2	100006	May 29,2008	1 Year
16.	RF Cable	FUJIKURA	RG-55/U	LISN Cable	May 29,2008	1 Year
17.	Spectrum Analyzer	Agilent	E4446A	MY43360126	May 29,2008	1 Year
18.	Spectrum Analyzer	Agilent	E7405A	US41160416	May 29,2008	1 Year

1.6. Test Facility

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

FCC – Registration No.: 966959

SHENZHEN SETEK TECHNOLOGY CO., LTD, the EMC Laboratory has been registered and fully described in a report filed with the (FCC) Federal Communications Commission.

1.7. Measurement Uncertainty

Radiation Uncertainty : $U_r = \pm 3.84\text{dB}$

Conduction Uncertainty : $U_c = \pm 2.72\text{dB}$

2 Conducted Emission Test

Product Name:	Zigbee module
Test Requirement:	FCC Part15 Paragraph 15.207
Test Method:	Based on FCC Part15 Paragraph 15.207
Test Date:	Aug 19, 2008
Frequency Range:	150 kHz to 30MHz
Class:	Class B
Detector:	Peak for pre-scan (9 kHz Resolution Bandwidth) Quasi-Peak & Average if maximised peak within 6dB of Average Limit

2.1. Test Equipment

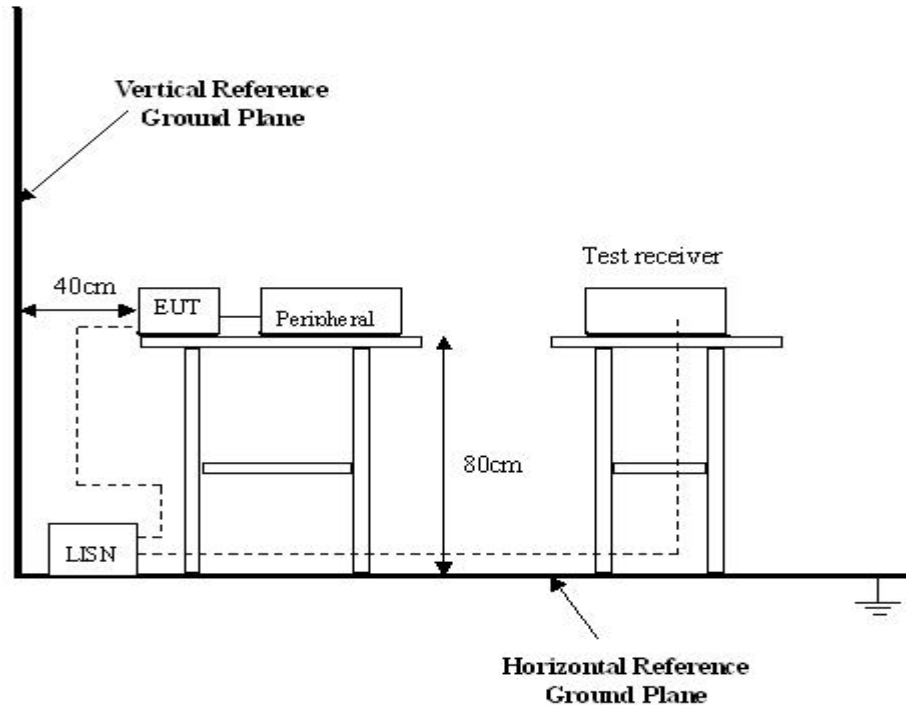
Please refer to Section 1.5. this report.

2.2. Test Procedure

1. The EUT was tested according to ANSI C63.4: 2003. The frequency spectrum from 150kHz to 30MHz was investigated.
2. The maximised peak emissions from the EUT was scanned and measured for both the Live and Neutral Lines. Quasi-peak & average measurements were performed if peak emissions were within 6dB of the average limit line.

2.3. Conducted Test Setup

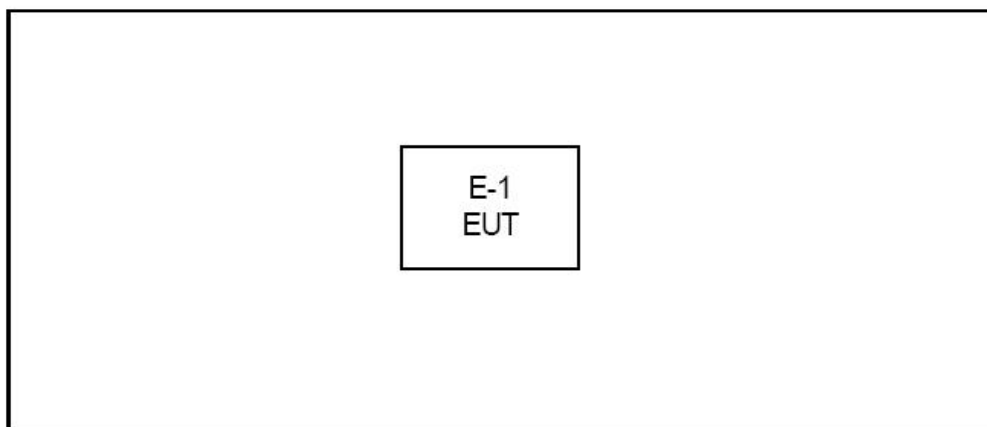
The conducted emission tests were performed using the setup accordance with the ANSI C63.4:2003, The specification used in this report was the FCC Part15 Paragraph 15.207 limits.



2.4. EUT Operating Condition

Operating condition is according to ANSI C63.4: 2003.

- A. Setup the EUT and simulators as shown on follow.
- B. Enable RF signal and confirm EUT active.
- C. Modulate output capacity of EUT up to specification.



2.5. Conducted Emission Limits

66-56 dBuV/m between 0.15MHz & 0.5MHz

56 dBuV/m between 0.5MHz & 5MHz

60 dBuV/m between 5MHz & 30MHz

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

2.6. Test Result

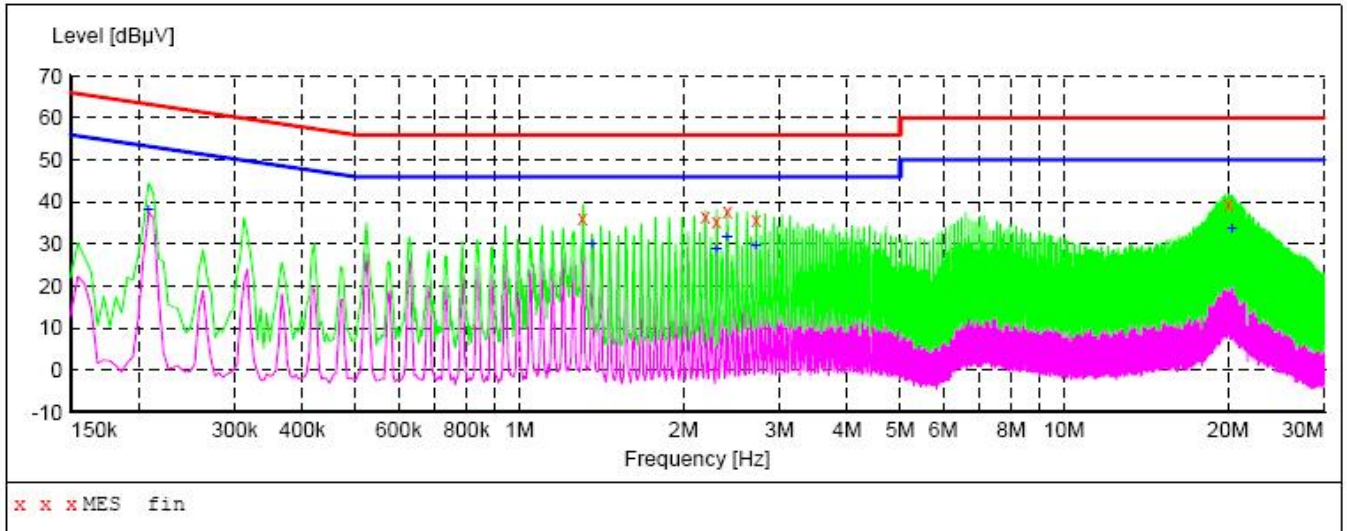
See the following pages

Voltage Mains Test FCC PART15 B

EUT: Zigbee module M/N:HAC-UBee/s
 Manufacturer: Shenzhen HAC Telecom Technology Co.,Ltd.
 Operating Condition: NORMAL WORKING
 Test Site: SHIELDED ROOM
 Operator: SAM
 Test Specification: AC 120V/60Hz
 Comment:
 Start of Test:

SCAN TABLE: "Voltage (9K-30M)FIN"

Short Description: 150K-30M Voltage

**MEASUREMENT RESULT:**

Frequency MHz	Level dBμV	Transd dB	Limit dBμV	Margin dB	Detector	Line	PE
1.306500	36.00	10.2	56	20.0	QP	L1	GND
2.197500	36.40	10.2	56	19.6	QP	L1	GND
2.301000	35.50	10.2	56	20.5	QP	L1	GND
2.409000	37.60	10.2	56	18.4	QP	L1	GND
2.719500	35.70	10.2	56	20.3	QP	L1	GND
20.040000	39.40	11.1	60	20.6	QP	L1	GND

MEASUREMENT RESULT:

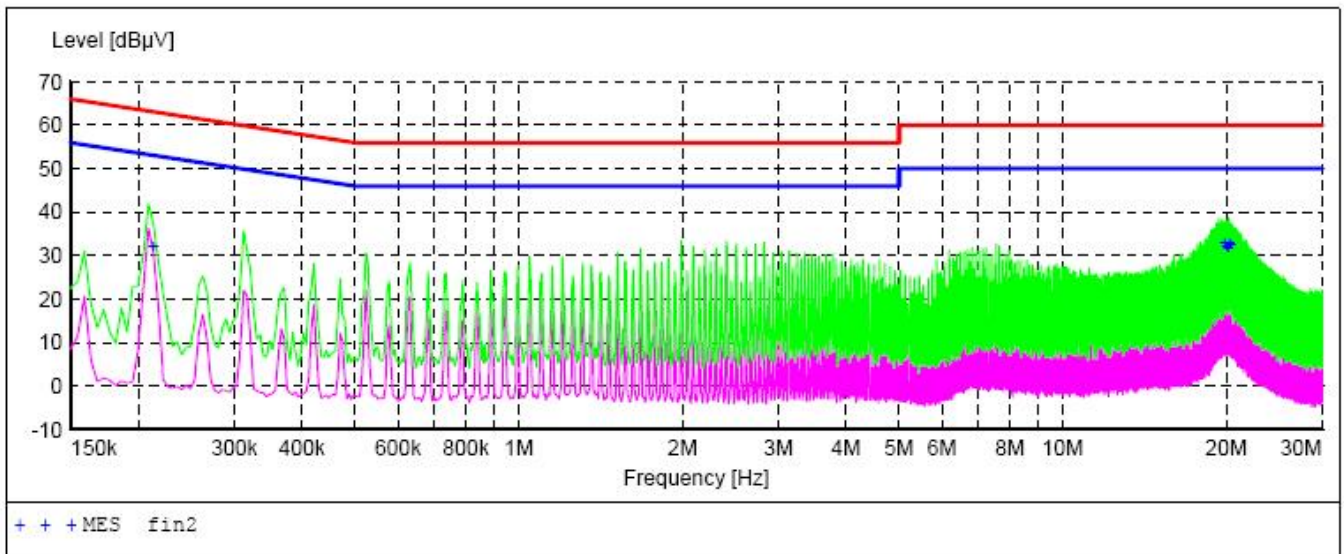
Frequency MHz	Level dBμV	Transd dB	Limit dBμV	Margin dB	Detector	Line	PE
0.208500	38.30	10.1	53	15.0	AV	L1	GND
1.360500	30.00	10.2	46	16.0	AV	L1	GND
2.301000	29.00	10.2	46	17.0	AV	L1	GND
2.409000	31.50	10.2	46	14.5	AV	L1	GND
2.719500	29.60	10.2	46	16.4	AV	L1	GND
20.359500	33.50	11.1	50	16.5	AV	L1	GND

Voltage Mains Test FCC PART15 B

EUT: Zigbee module M/N:HAC-UBee/s
 Manufacturer: Shenzhen HAC Telecom Technology Co.,Ltd.
 Operating Condition: NORMAL WORKING
 Test Site: SHIELDED ROOM
 Operator: SAM
 Test Specification: AC 120V/60Hz
 Comment:
 Start of Test:

SCAN TABLE: "Voltage (9K-30M)FIN"

Short Description: 150K-30M Voltage

**MEASUREMENT RESULT:**

Frequency MHz	Level dBμV	Transd dB	Limit dBμV	Margin dB	Detector	Line	PE
0.213000	32.10	10.1	53	21.0	AV	N	GND
19.846500	33.00	11.1	50	17.0	AV	N	GND
20.053500	32.20	11.1	50	17.8	AV	N	GND
20.157000	31.70	11.1	50	18.3	AV	N	GND
20.265000	33.00	11.1	50	17.0	AV	N	GND
20.368500	32.30	11.1	50	17.7	AV	N	GND

3 Radiation Emission Test

Product Name:	Zigbee module
Test Requirement:	FCC Part15 Paragraph 15.249
Test Method:	Based on FCC Part15 Paragraph 15.31 and Paragraph 15.33
Test Date:	Aug 20, 2008
Frequency Range:	30MHz to 25GHz
Measurement Distance:	3m
Detector:	Peak for pre-scan (120kHz resolution bandwidth) Quasi-Peak if maximised peak within 6dB of limit

3.1. Test Equipment

Please refer to Section 1.5. this report.

3.2. Measurement Uncertainty

All measurements involve certain levels of uncertainties, especially in the field of EMC. The factors contributing to uncertainties are spectrum analyzer, cable loss, antenna factor calibration, antenna directivity, antenna factor variation with height, antenna phase centre variation, antenna factor frequency interpolation, measurement distance variation, site imperfections, mismatch (average), and system repeatability.

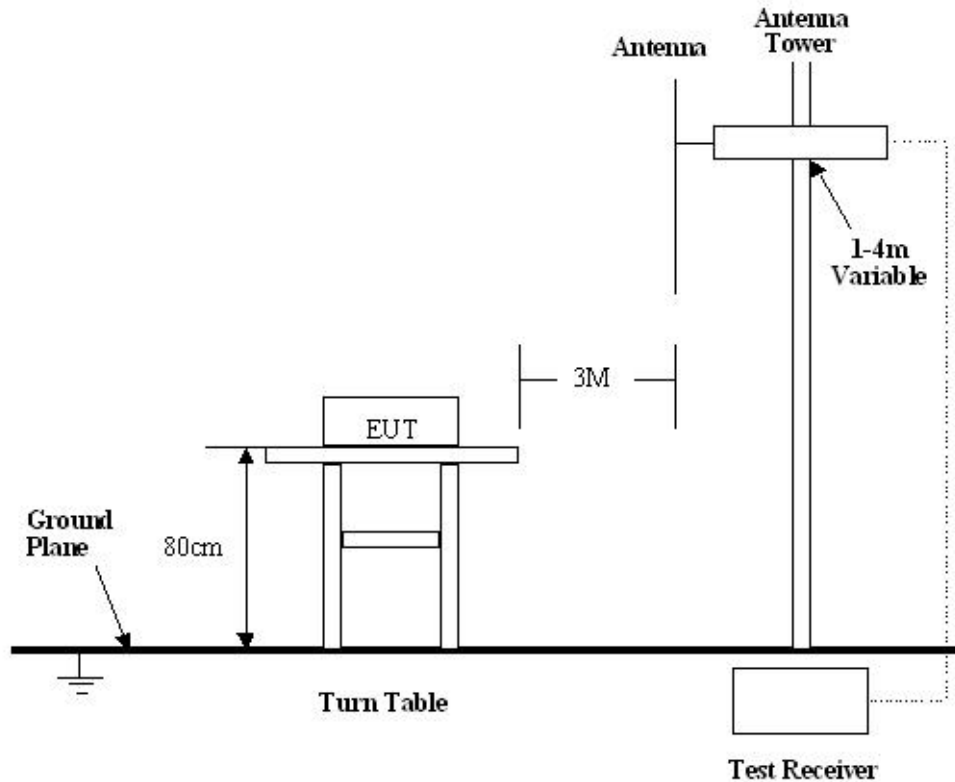
Based on ANSI C63.4: 2003, The Treatment of Uncertainty in EMC Measurements, the best estimate of the uncertainty of a radiation emissions measurement at EMC Lab is ± 3.84 dB.

3.3. Test Procedure

1. Maximizing procedure was performed on the six (6) highest emissions to ensure EUT is compliant with all installation combinations.
2. All data was recorded in the peak detection mode.
3. The EUT was under normal mode during the final qualification test and the configuration was used to represent the worst case results.
4. According to the FCC Part 15 Paragraph 15.203, an intentional radiator shall be designed to ensure that no antenna other than that furnished by the responsible party shall be used with the device. The use of a permanently attached antenna to the intentional radiator shall be considered sufficient to comply with the provisions of this section. This product has a permanent antenna, fulfill the requirement of this section.

3.4. Radiated Test Setup

The radiated emission tests were performed in the 3m Semi- Anechoic Chamber test site, using the setup accordance with the ANSI C63.4: 2003, The specification used in this report was the FCC Part15 Paragraph 15.249 and Paragraph 15.209 limits.



3.5. Spectrum Analyzer Setup

According to FCC Part15 Paragraph 15.249 Rules, the system was tested to 25000 MHz.

Start Frequency.....	30 MHz
Stop Frequency.....	25000 MHz
Sweep Speed	Auto
IF Bandwidth.....	100 kHz
Video Bandwidth.....	1 MHz
Quasi-Peak Adapter Bandwidth	120 kHz
Quasi-Peak Adapter Mode	Normal
Resolution Bandwidth	1MHz

3.6. Corrected Amplitude & Margin Calculation

The Corrected Amplitude is calculated by adding the Antenna Factor and Cable Factor, and subtracting the Amplifier Gain from the Amplitude reading. The basic equation is as follows:

$$\text{Corr. Ampl.} = \text{Indicated Reading} + \text{Antenna Factor} + \text{Cable Factor} - \text{Amplifier Gain}$$

The “**Margin**” column of the following data tables indicates the degree of compliance with the applicable limit. For example, a margin of -7dBuV means the emission is 7dBuV below the maximum limit for Class B. The equation for margin calculation is as follows:

$$\text{Margin} = \text{Corr. Ampl.} - \text{Class B Limit}$$

3.7. Summary of Test Results

According to the data in section 7.10, the EUT complied with the FCC Part15 Paragraph 15.249 standards.

3.8. EUT Operating Condition

Same as section 6.4 of this report.

3.9. Radiated Emissions Limit

A. FCC Part 15 subpart C Paragraph 15.249 Limit

Fundamental Frequency	Field Strength of Fundamental		Field Strength of Harmonics	
	mV/m	dBuV/m	uV/m	dBuV/m
902-928MHz	50	94	500	54
2400-2483.5 MHz	50	94	500	54
5725-5875 MHz	50	94	500	54
24.0-24.25GHz	250	108	2500	68

- Note:**
- (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 instrumentaion employing an average detector. Measurement using instrumentation with a peak detector function, corresponding to 20dB above the maximum permitted average limit.
 - (4) Limit fundamental is 94dBuV/m@3m(AV)and114dBuV/m@3m(PK)
Limit field strength of harmonics: 54 dBuV/m@3m(AV)and74dBuV/m@3m(PK)

B. Frequencies in restricted band are complied to limit on Paragraph 15.209

Frequency(MHZ)	Distance(m)	Field strength(dBuV/m)
30-88	3	40.0
88-216	3	43.5
216-960	3	46.0
Above 960	3	54.0

Note: (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.

3.10. Radiated Emissions Test Result

Formula of conversion factors: the field strength at 3m was established by adding The meter reading of the spectrum analyzer (which is set to read in units of dBuV) To the antenna correction factor supplied by the antenna manufacturer. The antenna Correction factors are stored in terms of dB. The gain of the pressletor was accounted For in the spectrum analyser meter reading.

Example:

Freq(MHz) Meter Reading +ACF=FS

33 20dBuV+10.36dB=30.36dBuV/m @3m

Radiated Emission Test Data

Test Voltage: DC 3.3V by the test jig

Test Mode: TX On

Temperature: 24 °C

Humidity: 52%RH

Test Result: PASS

Remarks: No further spurious emission found between lowest internal generated/used frequency to 30 MHz

30-1000MHz radiation test no significant emissions above the equipment noise floor were detected.

Frequency (MHz)	Detector	Antenna Polarization	Emission Level (dBuV/m)	FCC 15 Subpart C Limit (dBuV/m)	Margin (dB)	Antenna Height (m)	Turntable Angle ($^{\circ}$)
Low frequency							
2405.0	AV	Vertical	82.15	94.00	11.85	1.5	120
4810.0	AV	Vertical	43.20	54.00	10.80	1.0	60
7215.0	AV	Vertical	41.26	54.00	12.74	1.3	45
9620.0	AV	Vertical	43.59	54.00	11.41	1.0	90
12025.0	AV	Vertical	42.70	54.00	11.30	1.5	60
14430.0	AV	Vertical	43.27	54.00	10.73	1.2	100
16835.0	AV	Vertical	42.12	54.00	11.88	1.8	120
19240.0	AV	Vertical	41.38	54.00	12.62	1.2	60
21645.0	AV	Vertical	42.52	54.00	11.48	1.5	90
24050.0	AV	Vertical	41.20	54.00	12.80	1.0	120
2405.0	AV	Horizontal	79.61	94.00	14.39	1.5	270
4810.0	AV	Horizontal	43.59	54.00	10.41	1.6	180
7215.0	AV	Horizontal	44.22	54.00	9.78	1.5	120
9620.0	AV	Horizontal	43.62	54.00	10.38	1.6	200
12025.0	AV	Horizontal	43.46	54.00	10.54	1.5	100
14430.0	AV	Horizontal	44.57	54.00	9.43	1.2	270
16835.0	AV	Horizontal	43.20	54.00	10.80	1.8	180
19240.0	AV	Horizontal	44.22	54.00	9.78	1.0	90
21645.0	AV	Horizontal	43.77	54.00	10.23	1.5	60
24050.0	AV	Horizontal	43.10	54.00	10.90	1.2	100
2405.0	PK	Vertical	82.40	114.00	31.60	1.5	45
4810.0	PK	Vertical	47.88	74.00	26.12	1.5	120
7215.0	PK	Vertical	48.90	74.00	25.10	1.8	60
9620.0	PK	Vertical	47.11	74.00	26.89	1.0	270
12025.0	PK	Vertical	48.54	74.00	25.46	1.2	180
14430.0	PK	Vertical	48.62	74.00	25.38	1.5	60
16835.0	PK	Vertical	47.60	74.00	26.40	1.8	100
19240.0	PK	Vertical	50.83	74.00	23.17	1.2	120
21645.0	PK	Vertical	48.50	74.00	25.50	1.8	100
24050.0	PK	Vertical	50.65	74.00	23.35	1.0	90
2405.0	PK	Horizontal	86.30	114.00	27.70	1.5	120
4810.0	PK	Horizontal	46.72	74.00	27.28	1.6	180
7215.0	PK	Horizontal	47.85	74.00	26.15	1.5	120
9620.0	PK	Horizontal	48.03	74.00	25.97	1.6	90

12025.0	PK	Horizontal	47.44	74.00	26.56	1.8	180
14430.0	PK	Horizontal	49.59	74.00	24.41	1.2	120
16835.0	PK	Horizontal	49.17	74.00	24.83	1.5	100
19240.0	PK	Horizontal	50.33	74.00	23.67	1.0	45
21645.0	PK	Horizontal	51.26	74.00	22.74	1.5	60
24050.0	PK	Horizontal	50.40	74.00	23.60	1.0	90
Middle frequency							
2440.00	AV	Vertical	80.50	94.00	13.50	1.5	60
4880.00	AV	Vertical	44.41	54.00	9.59	1.5	45
7320.00	AV	Vertical	44.73	54.00	9.27	1.6	90
9760.00	AV	Vertical	45.15	54.00	8.85	1.5	180
12200.00	AV	Vertical	45.65	54.00	8.35	1.2	120
14640.00	AV	Vertical	46.12	54.00	7.88	1.0	100
17080.00	AV	Vertical	46.75	54.00	7.25	1.5	90
19520.00	AV	Vertical	46.81	54.00	7.19	1.8	45
21960.00	AV	Vertical	46.10	54.00	7.90	1.2	60
24400.00	AV	Vertical	45.60	54.00	8.40	1.6	120
2440.00	AV	Horizontal	71.76	94.00	22.24	1.5	60
4880.00	AV	Horizontal	44.11	54.00	6.89	1.5	180
7320.00	AV	Horizontal	44.23	54.00	9.89	1.8	120
9760.00	AV	Horizontal	45.06	54.00	8.94	1.2	90
12200.00	AV	Horizontal	45.57	54.00	8.43	1.5	60
14640.00	AV	Horizontal	45.59	54.00	8.41	1.0	100
17080.00	AV	Horizontal	46.44	54.00	7.56	1.5	90
19520.00	AV	Horizontal	46.70	54.00	7.30	1.8	120
21960.00	AV	Horizontal	47.66	54.00	6.34	1.5	180
24400.00	AV	Horizontal	47.71	54.00	6.29	1.8	270
2440.00	PK	Vertical	86.67	114.00	27.33	1.5	90
4880.00	PK	Vertical	50.51	74.00	22.49	1.5	60
7320.00	PK	Vertical	50.77	74.00	23.23	1.5	120
9760.00	PK	Vertical	51.32	74.00	22.68	1.2	270
12200.00	PK	Vertical	51.46	74.00	22.54	1.8	100
14640.00	PK	Vertical	52.25	74.00	21.75	1.5	180
17080.00	PK	Vertical	52.77	74.00	21.23	1.2	90
19520.00	PK	Vertical	52.98	74.00	21.02	1.8	45
21960.00	PK	Vertical	53.26	74.00	20.74	1.2	100
24400.00	PK	Vertical	53.44	74.00	20.56	1.0	90

2440.00	PK	Horizontal	87.45	114.00	26.55	1.5	180
4880.00	PK	Horizontal	48.8	74.00	25.2	1.8	90
7320.00	PK	Horizontal	50.52	74.00	23.48	1.5	120
9760.00	PK	Horizontal	51.17	74.00	22.83	1.5	100
12200.00	PK	Horizontal	51.22	74.00	22.78	1.8	45
14640.00	PK	Horizontal	50.10	74.00	23.90	1.5	90
17080.00	PK	Horizontal	51.59	74.00	22.41	1.5	180
19520.00	PK	Horizontal	52.15	74.00	21.85	1.6	120
21960.00	PK	Horizontal	51.13	74.00	22.87	1.2	270
24400.00	PK	Horizontal	50.40	74.00	23.60	1.0	180

High frequency							
2480.00	AV	Vertical	80.47	94.00	13.53	1.5	120
4960.00	AV	Vertical	44.23	54.00	9.77	1.5	90
7440.00	AV	Vertical	44.49	54.00	9.51	1.5	45
9920.00	AV	Vertical	45.23	54.00	8.77	1.5	100
12400.00	AV	Vertical	45.65	54.00	8.35	1.2	180
14880.00	AV	Vertical	46.18	54.00	7.82	1.6	120
17360.00	AV	Vertical	46.65	54.00	7.35	1.8	45
19840.00	AV	Vertical	46.88	54.00	7.12	1.2	60
22320.00	AV	Vertical	45.20	54.00	8.80	1.5	90
24800.00	AV	Vertical	45.40	54.00	8.60	1.8	100
2480.00	AV	Horizontal	80.66	94.00	13.34	1.5	180
4960.00	AV	Horizontal	44.11	54.00	9.89	1.5	60
7440.00	AV	Horizontal	44.26	54.00	9.74	1.5	120
9920.00	AV	Horizontal	45.19	54.00	8.81	1.8	270
12400.00	AV	Horizontal	45.42	54.00	8.58	1.2	180
14880.00	AV	Horizontal	45.88	54.00	8.12	1.6	90
17360.00	AV	Horizontal	46.41	54.00	7.59	1.8	120
19840.00	AV	Horizontal	46.57	54.00	7.43	1.5	100
22320.00	AV	Horizontal	46.18	54.00	7.82	1.2	45
24800.00	AV	Horizontal	47.52	54.00	6.48	1.6	90
2480.00	PK	Vertical	83.21	114.00	30.79	1.5	180
4960.00	PK	Vertical	48.59	74.00	25.41	1.3	190
7440.00	PK	Vertical	50.11	74.00	23.89	1.5	45
9920.00	PK	Vertical	50.27	74.00	23.73	1.2	90
12400.00	PK	Vertical	50.85	74.00	23.15	1.6	180
14880.00	PK	Vertical	51.12	74.00	22.88	1.8	60

17360.00	PK	Vertical	51.26	74.00	22.74	1.5	90
19840.00	PK	Vertical	52.10	74.00	21.90	1.2	180
22320.00	PK	Vertical	50.77	74.00	23.23	1.0	270
24800.00	PK	Vertical	51.10	74.00	22.90	1.2	90
2480.00	PK	Horizontal	86.72	114.00	27.28	1.5	60
4960.00	PK	Horizontal	49.42	74.00	24.58	1.5	120
7440.00	PK	Horizontal	50.03	74.00	23.97	1.5	180
9920.00	PK	Horizontal	50.21	74.00	23.79	1.2	90
12400.00	PK	Horizontal	50.42	74.00	23.58	1.0	270
14880.00	PK	Horizontal	50.10	74.00	23.90	1.2	120
17360.00	PK	Horizontal	50.35	74.00	23.65	1.5	90
19840.00	PK	Horizontal	51.50	74.00	22.50	1.8	60
22320.00	PK	Horizontal	50.68	74.00	23.32	1.3	180
24800.00	PK	Horizontal	51.75	74.00	22.25	1.6	100

Note: Above 1GHz,do a Peak and Average measurements for all emissions:
Limit fundamental is 94dBuV/m@3m(AV)and114dBuV/m@3m(PK)
Limit field strength of harmonics: 54 dBuV/m@3m(AV)and74dBuV/m@3m(PK)

4 Band Edge

4.1. Test Equipment

Please refer to Section 1.5. this report.

4.2. Test Procedure

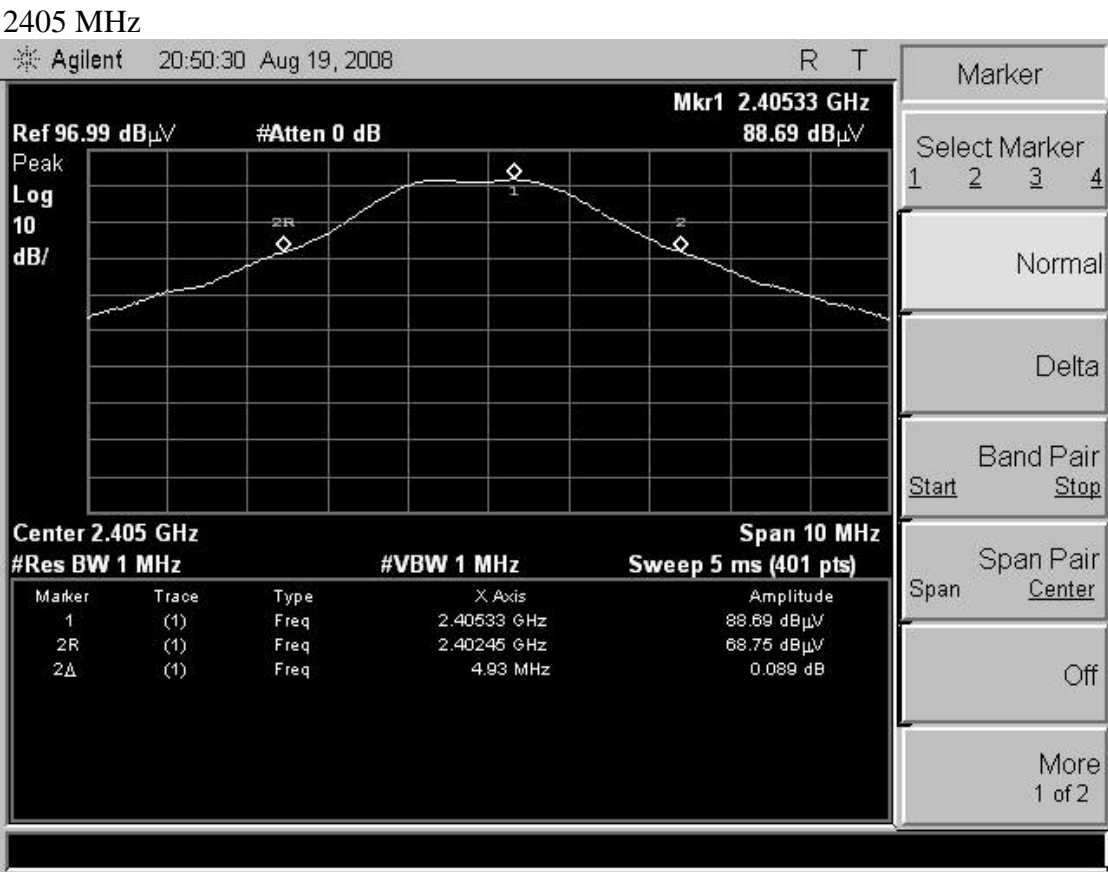
1. The EUT was directly connected to the spectrum analyzer and antenna output port as show in the block diagram below:



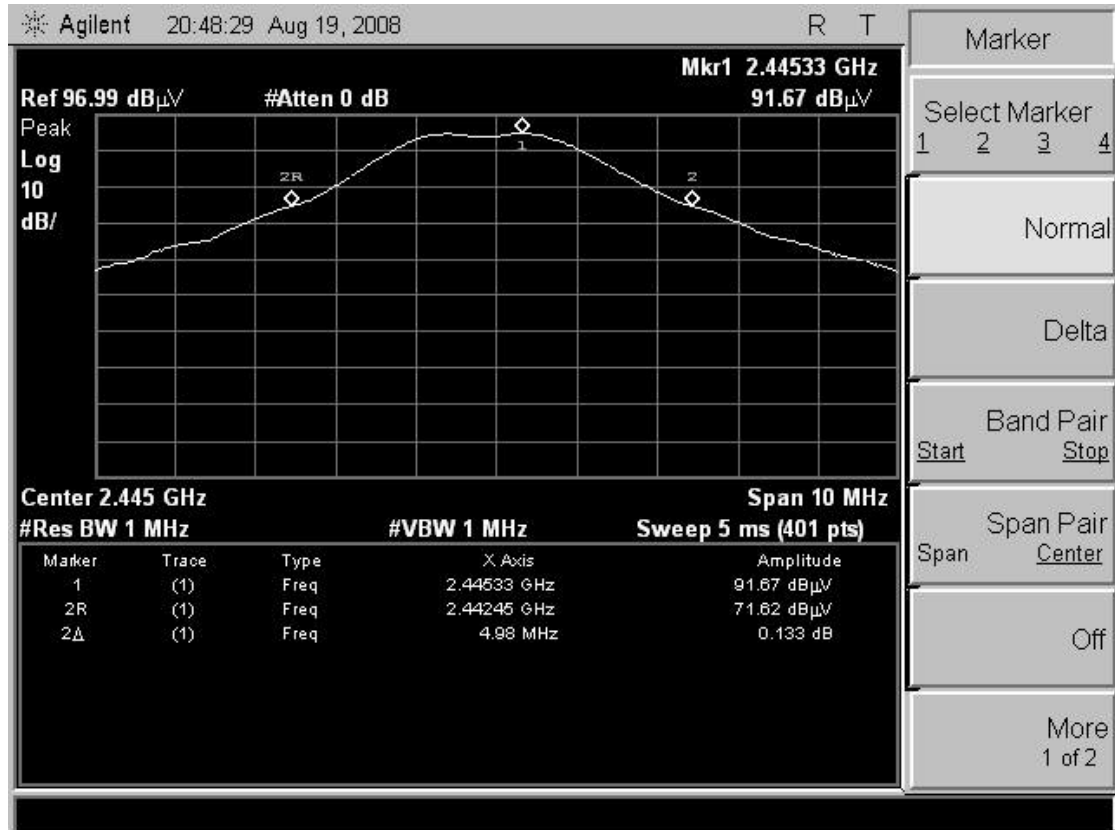
2. The bandwidth of the fundamental frequency was measure by spectrum analyser with 1MHz RBW and 1MHz VBW. The 20dB bandwidth is defined as the total spectrum the power of which is higher than peak power 20dB.

4.3. 20db Bandwidth Test Result

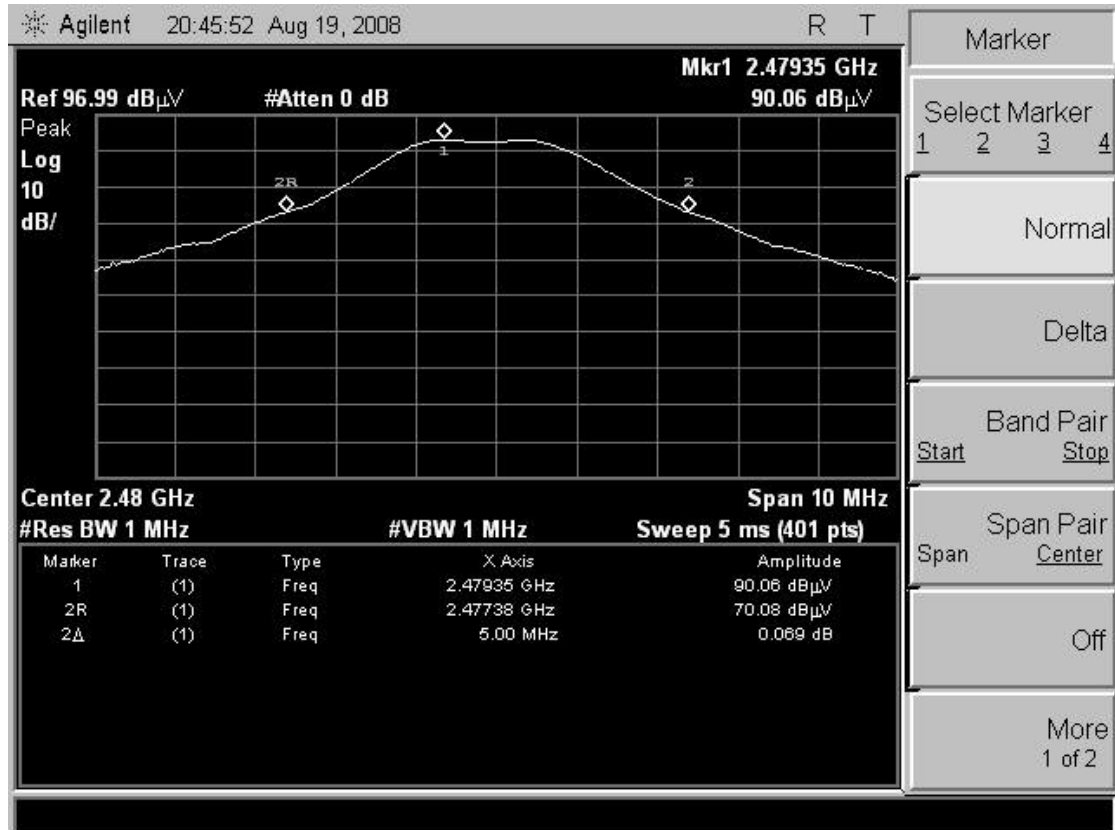
Product Name: Zigbee module
Test Item: 20db Band Edge Test
Test Voltage: DC 3.3V by the test jig
Mode: TX On
Temperature: 24 °C
Humidity: 52%RH



2445 MHz



2480 MHz

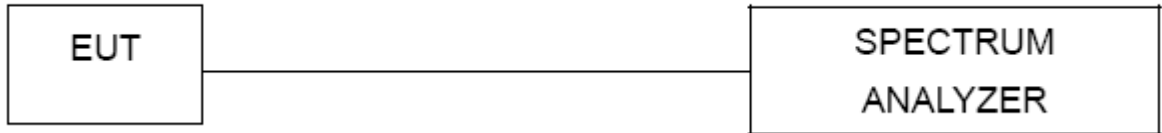


4.4. Test Equipment

Please refer to Section 1.5. this report.

4.5. Test Procedure

1. The EUT was directly connected to the spectrum analyzer and antenna output port as show in the block diagram below:



2. Emissions radiated outside of the specified frequency bands was measure by spectrum analyser with 100KHz RBW and 100KHz VBW..

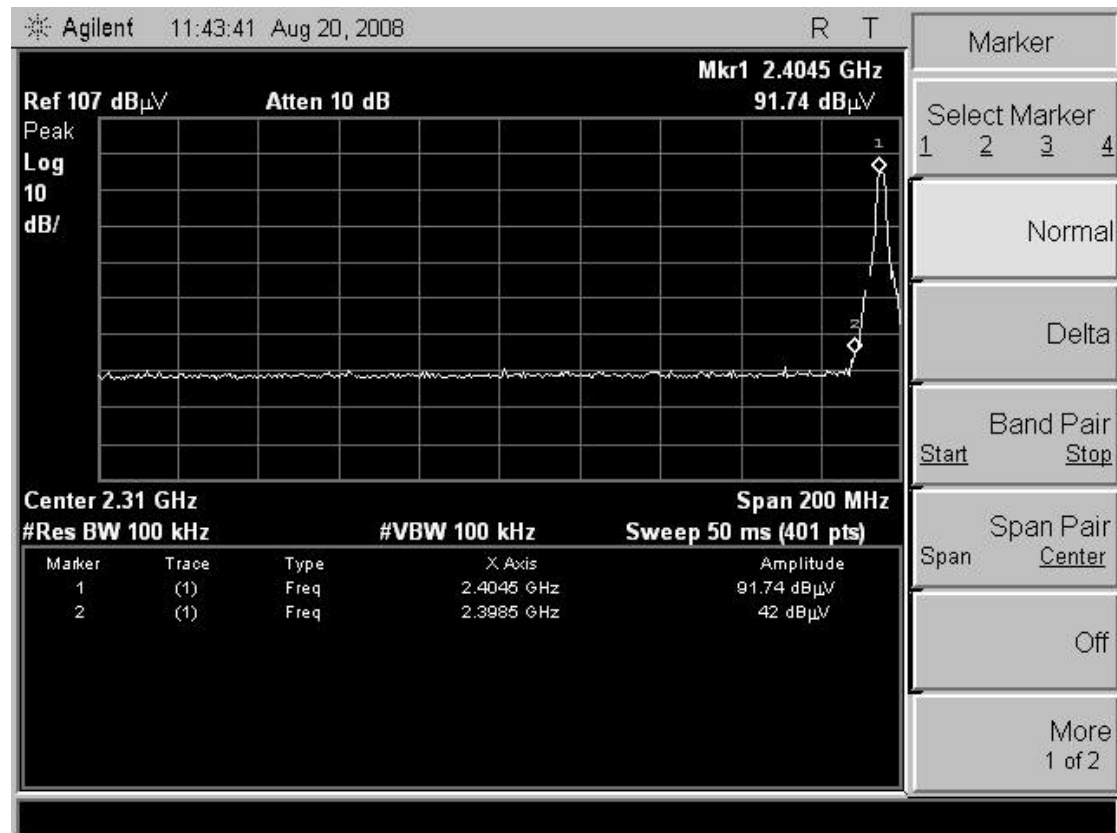
4.6. Applied Procedures/Limit

Requirements: FCC 15.249(d), the emission power at the START and STOP frequencies shall be at least 50dB below the level of the fundamental or to the general radiated emission limits in FCC 15.209.

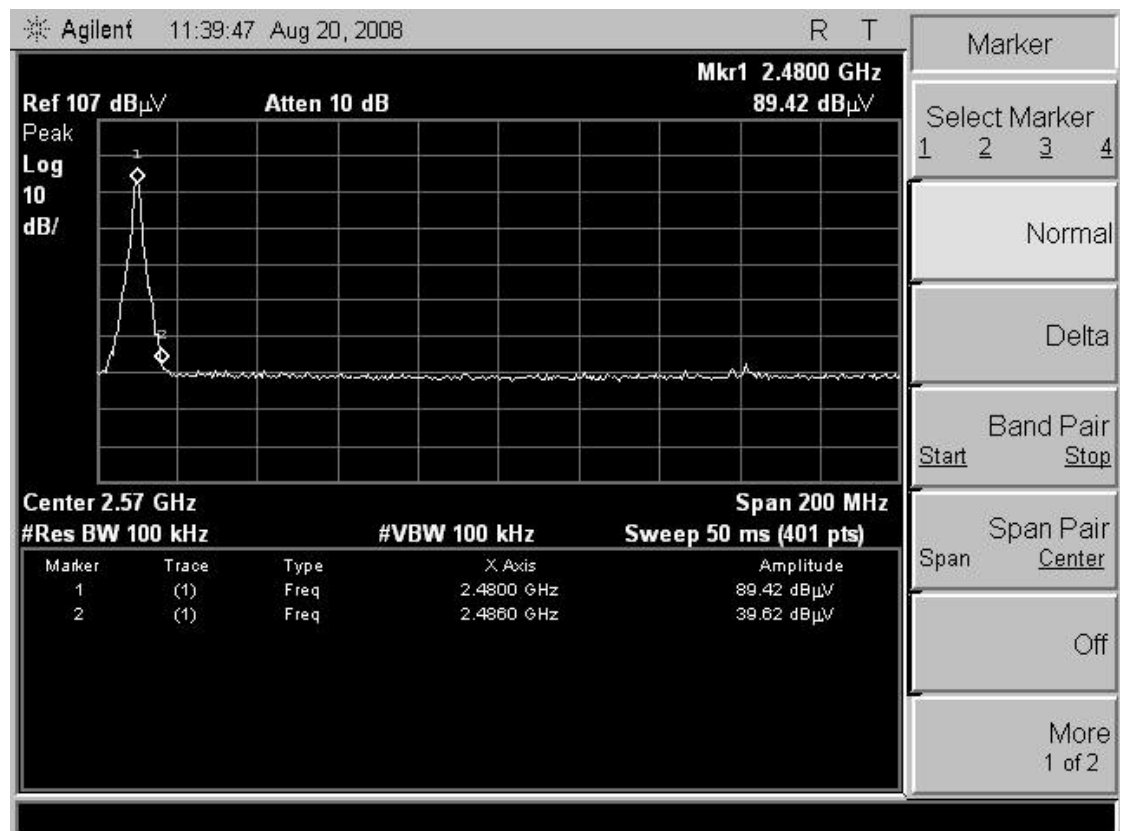
4.7. Band Edge Test Result

Product Name:	Zigbee module
Test Item:	Emissions radiated outside of the specified frequency bands
Test Voltage:	DC 3.3V by the Test jig
Test Mode:	TX On
Temperature:	24 °C
Humidity:	52%RH

2405 MHz



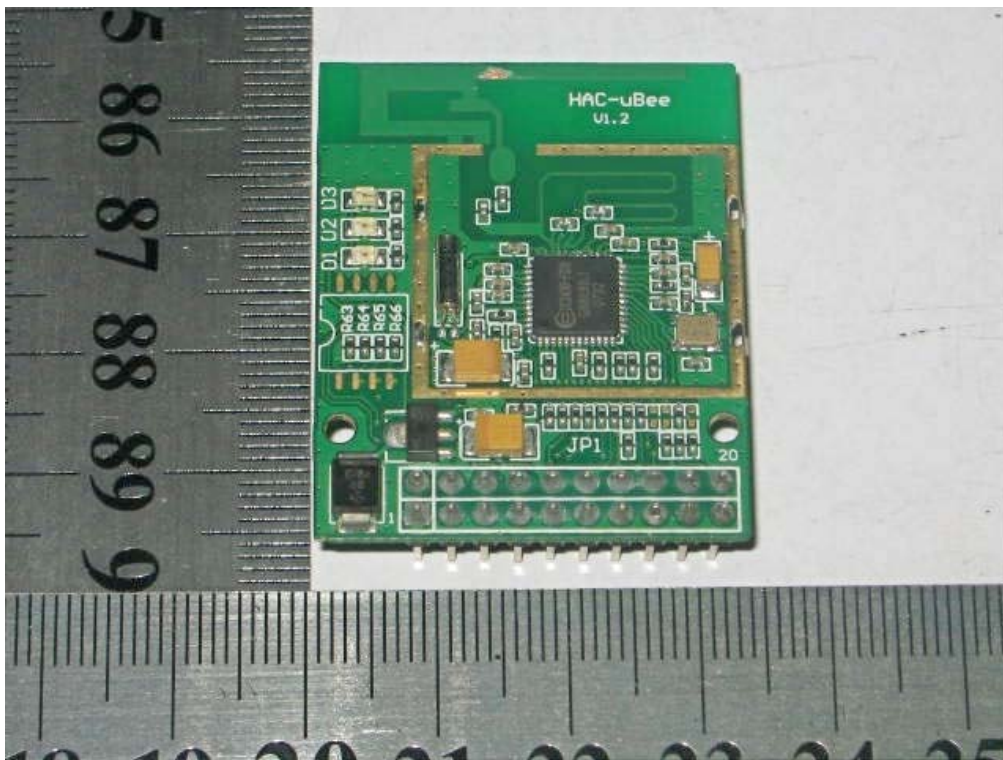
2480 MHz

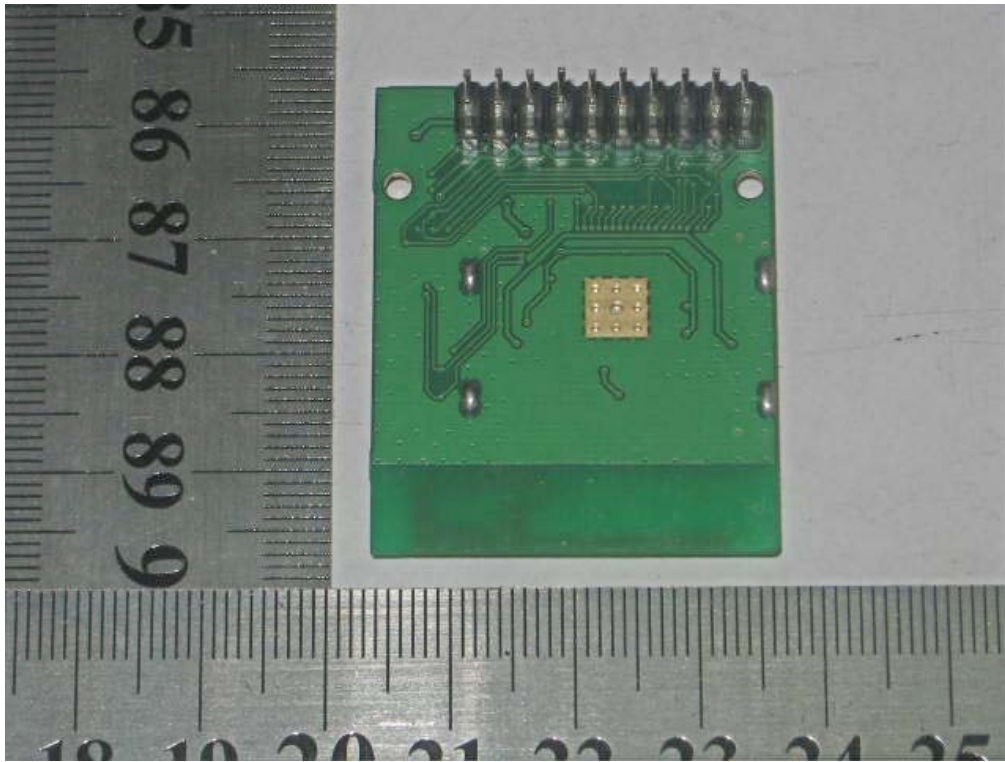


5 Photographs of Test setup



6 Photographs of EUT

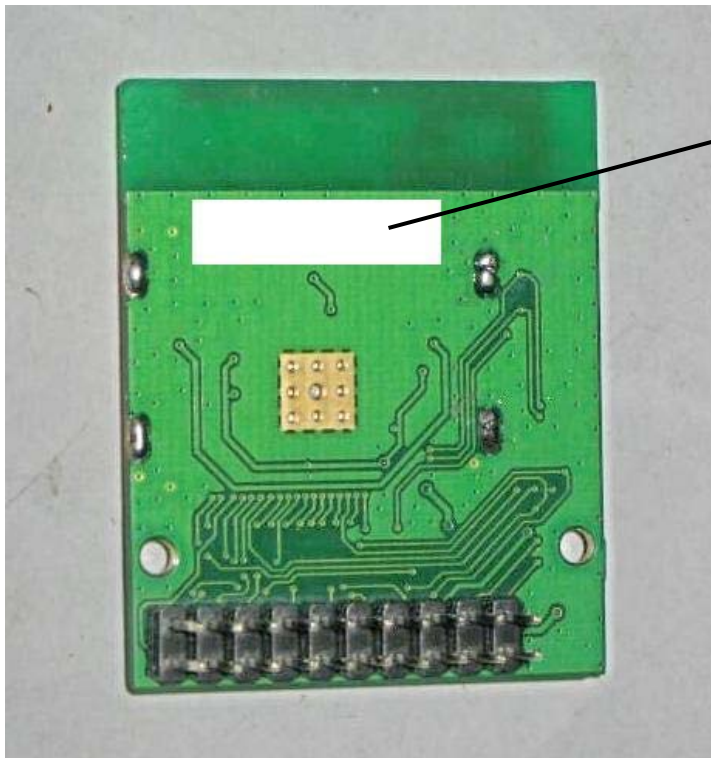




7 FCC ID Label

This device complies with Part 15 of the FCC Rules. Operation is subject to the following two conditions:(1)this device may not cause harmful interference, and (2) this device must accept any interference received, including interference that may cause undesired operation.

The Label must not be a stick-on paper. The Label on these products must be permanently affixed to the product and readily visible at the time of purchase and must last the expected lifetime of the equipment not be readily detachable.



FCC ID Label Location

END of Report