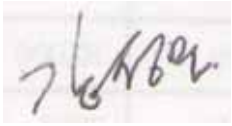
[LEAD FREE]

MSL Level 1

Approval Sheet

Product	Dielectric Chip Antenna		
Customer	㈜티바인텍		
Model	Bluetooth Headset		
Customer Code			
Supplier	MicroRF Co., LTD.		
Supplier Code	ADSBTM0802-A00		
Customer	Designed by	Checked by	Approved by
MicroRF	Designed by	By checked	By approved
			
	R&D	QC	R&D
	Myoungsoo,Kim	Sunmo,Kang	Seungyun,Kim

2008. 9. 17

MicroRF Co., Ltd.

TEL. 82-2-6406-5590

FAX. 82-2-6406-5591

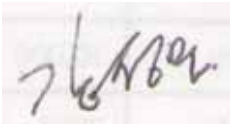
[LEAD FREE]

MSL Level 1

SPECIFICATION

Model : ADSBTM0802-A00

DIELECTRIC CHIP ANTENNA

Designed by	Approved by	Approved by
		
R&D	QC	R&D
Myungsoo,Kim	Sunmo,Kang	Seungyun,Kim
080917	080917	080917

2008. 9. 17

MicroRF Co., Ltd.

TEL. 82-02-6406-5590

FAX. 82-02-6406-5591

Contents

1. Revision History

Product	Dielectric Chip Antenna	Model	Bluetooth Headset
		CODE NO.	ADSBTM0802-A00

Rev No.	Date	Name	Page	Item	Revision Issue
1.0	080917	M.S.Kim			Issued

2. FEATURES AND APPLICATIONS

This ceramic chip antenna is applied to 2.4 GHz ISM band applications, i.e. wireless LAN, Bluetooth, Zigbee, etc..

3. CODE NO.

CODE NO. : ADSBTM0802-A00

CUSTOMER PART NO. :

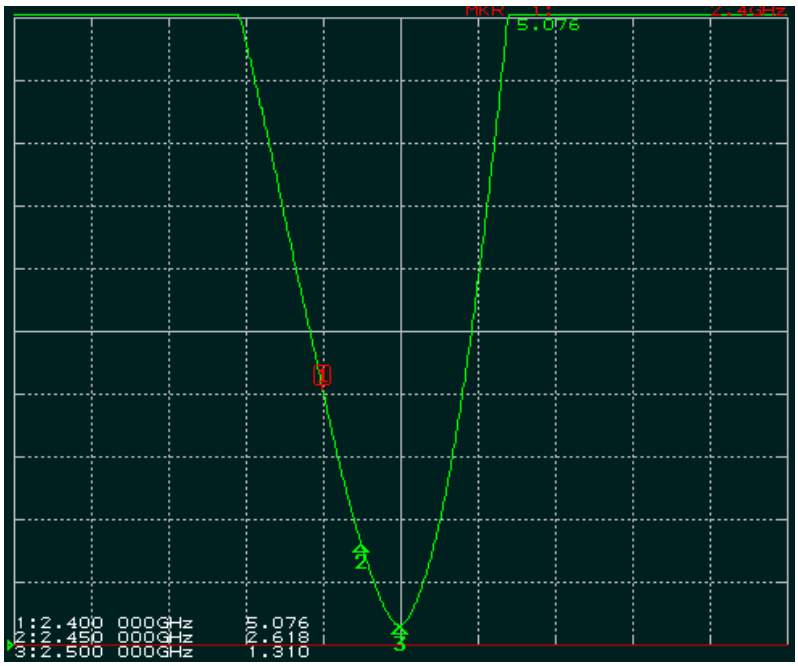
4. ELECTRICAL SPECIFICATIONS

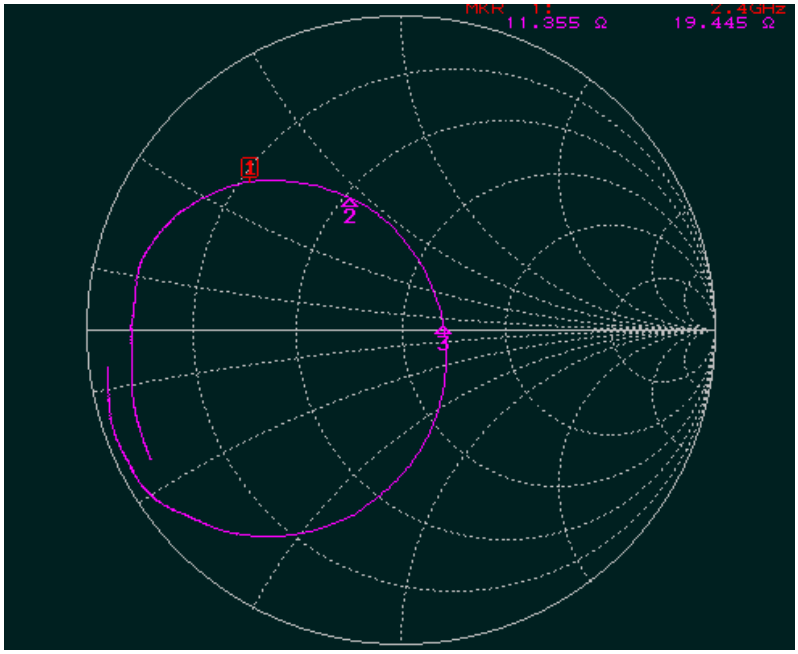
4-1.

* All items are measured in room temperature (25°C).
* All items are measured at customer set condition.

No.	ITEM	Specification	Typical Data
1	Frequency	2400 ~ 2500 MHz	2400 ~ 2484 MHz
2	VSWR	5.1 max	5.0 Max
3	Total Gain(Peak)	Peak Gain : -1.0dBi min	0.0 dBi
4	Impedance	50 Ω	50 Ω
5	Polarization	Linear	Linear

4-2 VSWR data (S11 of SET condition)



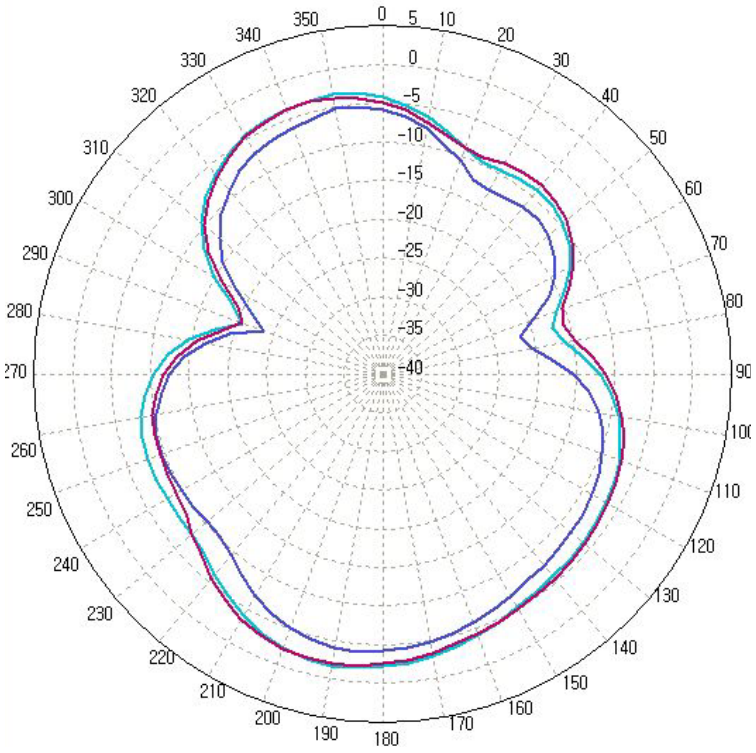


4-3 Radiation Patterns

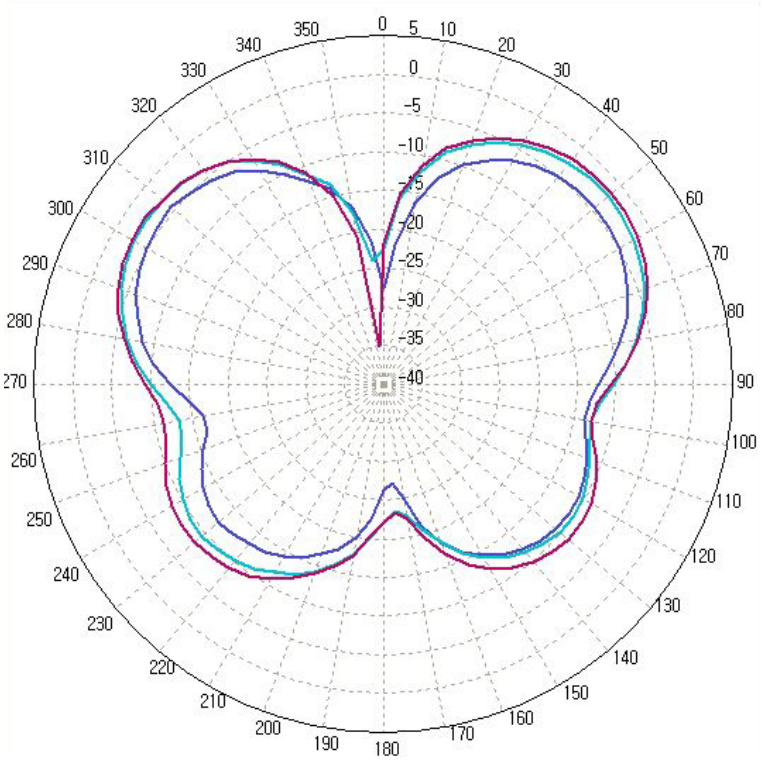
Peak Value(Beam Peak :dB)

	Azimuth Plane	Elevation 1	Elevation 2
2.4 GHz	-3.821	-4.144	-1.644
2.45 GHz	-1.571	-2.005	0.085
2.5 GHz	-1.791	-1.419	0.335

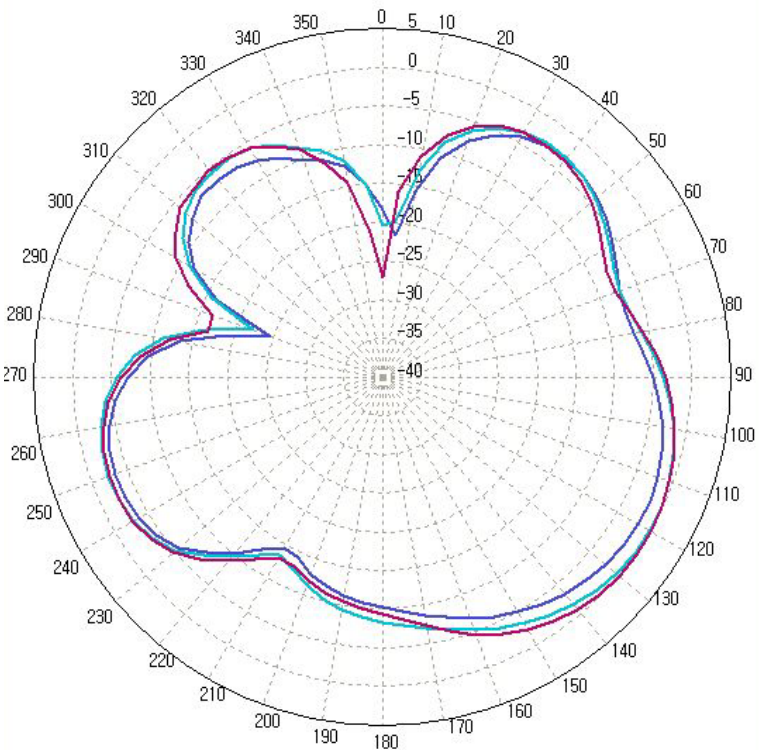
(a) Azimuth Plane (XY) – Vertical Polarization



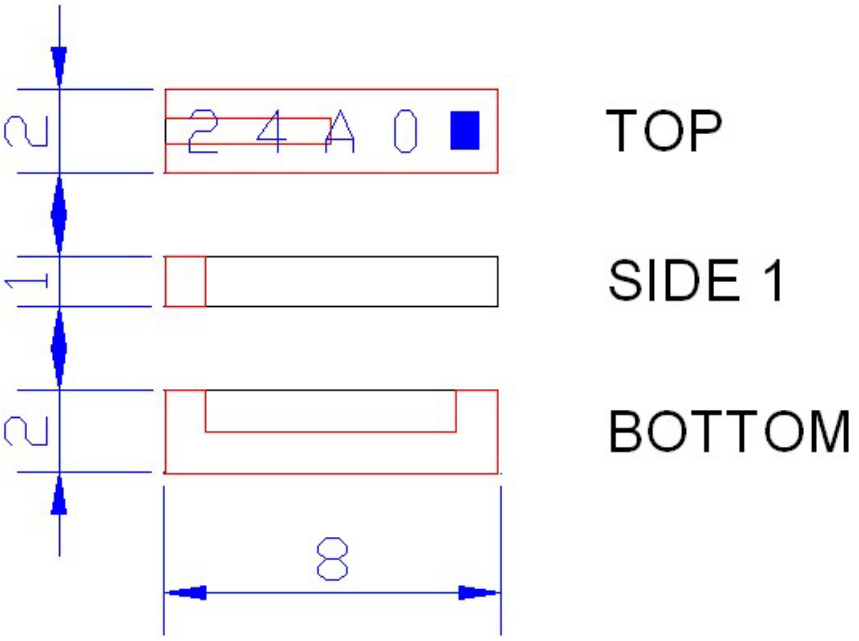
(b) Elevation1 Plane (ZX) – Horizontal Polarization



(c) Elevation2 Plane (YZ) – Horizontal Polarization (Folder Close)



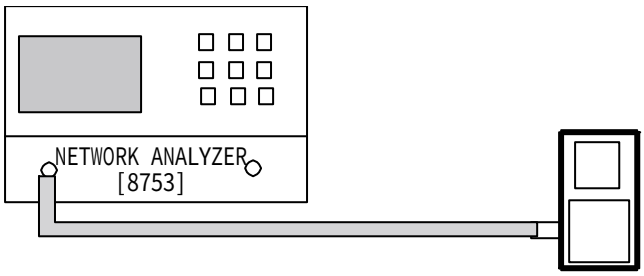
5. MECHANICAL DIMENSIONS



6. Measurement Method and Conditions

The measurement of antenna performance is measurement of gain, radiation pattern using ORBIT/FR apparatus in Anechoic chamber and measurement of VSWR using Network analyzer.

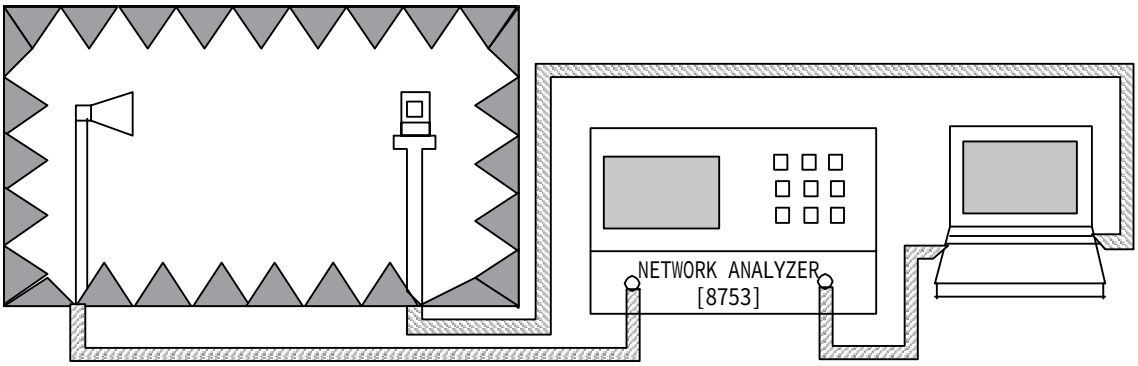
6-1. The measurement of Frequency and VSWR



<Measurement Method>

1) As seen the above, network analyzer is set up for S11 measurement.
2) The measurement frequency range is to set up from 2 GHz to 3 GHz.
3) Perform S11 one port full calibration.
4) Measure the VSRW of three points of Bluetooth frequency range such as 2400 MHz, 2450 MHz, and 2500 MHz.

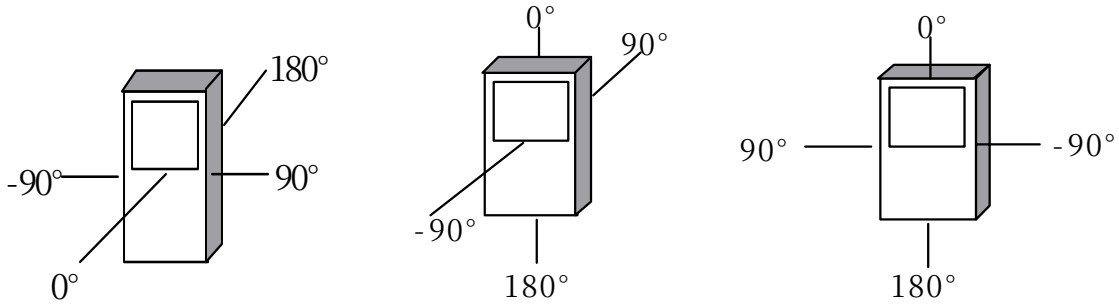
6-2. The measurement of Gain and Radiation Patterns



<Measurement Method>

1) As seen the above, network analyzer is to set up in Anechoic chamber.

2)As seen the beneath, for the measurement planes as Azimuth, Elevation1, and Elevation2, measure Gain data of vertical polarization and horizontal polarization for each plane.



(AZIMUTH PLANE) (ELEVATION1 PLANE) (ELEVATION2 PLANE)

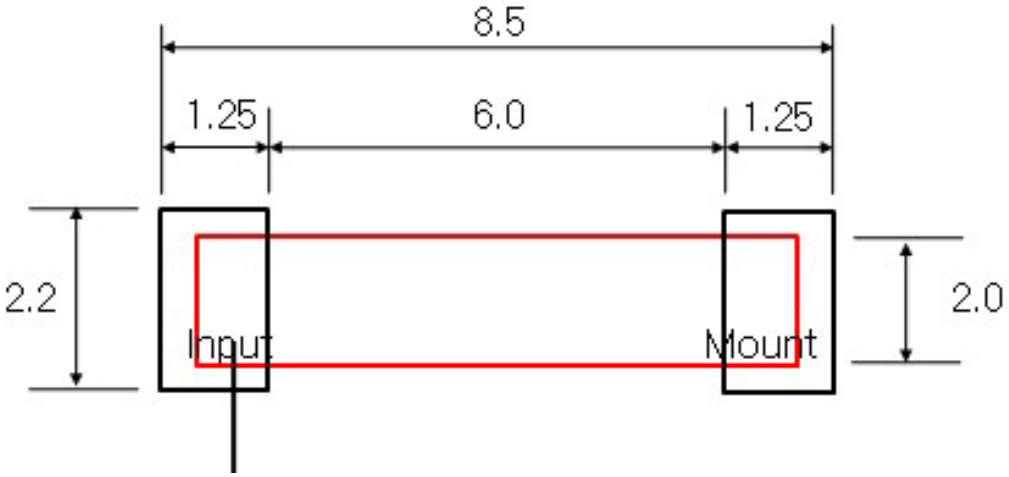
7. ENVIRONMENTAL SPECIFICATIONS

No.	Items	Specifications
1	Material	Pb-free system
2	Operating Temperature Range	-30 ~ +85 ℃
3	Operating Humidity Range	45 ~ 85 % RH

8. ENVIRONMENTAL TESTS

No.	Item	Test Conditions
1	High Temperature Storage	Leave for 72±2 hours in a test bath retaining 85±2°C. After then, leave on the test conditions for 1.5 hours.
2	Low Temperature Storage	Leave for 72±2 hours in a test bath retaining -30±2°C. After then, leave on the test condition for 1.5 hours.
3	Static Humidity	Leave for 24±2 hours in a test bath retaining 90~95% RH / 50±3°C. After then, leave in the test condition for 1.5 hours.
4	Thermal Shock	Cool from 25°C down to -30±2°C and leave for 30 minutes. After that, heat up to +85±2°C and leave for 30 minutes. After then, cool down to 25°C. Repeat the cycle 15 times and leave on the test conditions for 1.5 hours.
5	Drop Shock	Drop 150g weight onto steel floor from the height of 152cm, 19 times and 120cm, 12 times.
6	Vibration	With 5g of the whole acceleration at 20 to 2000 Hz, apply a vibration for 2 hours for each of 3 directions.
7	Solder Proof	No reaching after reflow for 5±1 sec at 260°C.
8	Soldering Conditions	230±5°C / 5±1 sec for Sn/Pb soldering system 245±5°C / 2±1 sec for Pb-free soldering system

9. RECOMMENDED SOLDERING PATTERNS



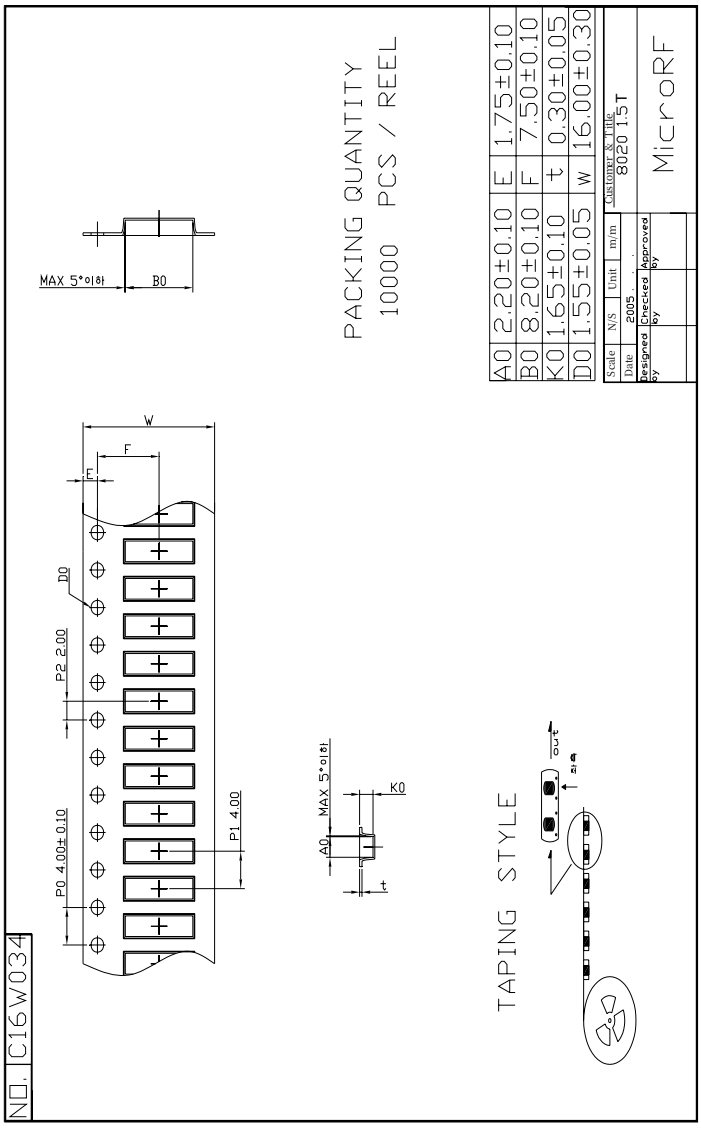
10. PACKAGING

10-1. Reel Taping Quantity

10,000 pcs / 1 reel

10-2. Reel Dimensions

: Reel Hall Direction should be same as Input Dot Direction of Antenna.



11. USAGE AND CAUTIONS

- Safe-keeping conditions: 3 months in 20±15℃ and less than 60% RH

12 .RoHS Data

Report No. : RoHS-07-08356

Testing Report

RoHS TESTING REPORT

Client : MICRO RF CO..LTD.
Name : KIM SEUNG YUN
Address : #709, Business Incubating Center, Suwon University, Bongdam-eup, Hwaseong-si, Gyeonggi-do, KOREA
Tel. : +82-31- 226-6845 Fax : +82-31- 220-2699

Name of Product : Bluetooth Chip Antenna
Model / Ref. No : ADSBTXXXXX-XXX
Remark : The above set of complex sample (Bluetooth Chip Antenna) is completely ground and mixed up by a request of client. This analytical report is only based on the completely ground and mixed complex sample, not homogeneous one.

Date of Application : 10 August. 2007
Test Period : 4 days
Date of Issue : 16 August, 2007

Test Result : For further details, please refer to the following page.

Tested by : Nayeon Lee
Approved by : Bongjin Jung (Technical Director, Ph.D./Prof.)

San2-2, Wau-ri, Bongdam-eup
Hwaseong-si, Gyeonggi-do
445-743, Korea
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Tel. : +82-31-220-2620
Fax : +82-31-220-2621

Certificated by

Signed by Director of CECT
Chan-Kyo, Chung

Center for Environmental & Clean Technologies
The University of Suwon

cect

Report No. : RoHS-07-08356

1. Testing Condition(Lab.) : 22±2℃, 55% R.H below
2. Testing Specification : Heavy Metals & Flame Retardants
3. Testing Result

1) Heavy Metals

Test Item	Test Method	Unit	MDL	Analytical Instrument	Result
Pb	KS M 1061 : 2007	mg/kg	5	ICP-AES	N.D.
Cd	KS M 1061 : 2007	mg/kg	0.5	ICP-AES	N.D.
Hg	KS M 1061 : 2007	mg/kg	2	ICP-AES	N.D.
Cr^{6+}	KS M 1061 : 2007	mg/kg	1	UV-VIS	N.D.

Note> 1. N.D. : Not Detected 2. MDL : Method Detection Limit 3. mg/kg = ppm

2) Flame Retardants

Test Item	Test Method	Unit	MDL	Analytical Instrument	Result
Total PBBs	KS M 1061 : 2007	mg/kg	5	GC/MS	N.D.
Mono-BB	KS M 1061 : 2007	mg/kg	5	GC/MS	N.D.
Di-BB	KS M 1061 : 2007	mg/kg	5	GC/MS	N.D.
Tri-BB	KS M 1061 : 2007	mg/kg	5	GC/MS	N.D.
Tetra-BB	KS M 1061 : 2007	mg/kg	5	GC/MS	N.D.
Penta-BB	KS M 1061 : 2007	mg/kg	5	GC/MS	N.D.
Hexa-BB	KS M 1061 : 2007	mg/kg	5	GC/MS	N.D.
Hepta-BB	KS M 1061 : 2007	mg/kg	5	GC/MS	N.D.
Octa-BB	KS M 1061 : 2007	mg/kg	5	GC/MS	N.D.
Nona-BB	KS M 1061 : 2007	mg/kg	5	GC/MS	N.D.
Deca-BB	KS M 1061 : 2007	mg/kg	5	GC/MS	N.D.

Test Item	Test Method	Unit	MDL	Analytical Instrument	Result
Total PBDEs	KS M 1061 : 2007	mg/kg	5	GC/MS	N.D.
Mono-BDE	KS M 1061 : 2007	mg/kg	5	GC/MS	N.D.
Di-BDE	KS M 1061 : 2007	mg/kg	5	GC/MS	N.D.
Tri-BDE	KS M 1061 : 2007	mg/kg	5	GC/MS	N.D.
Tetra-BDE	KS M 1061 : 2007	mg/kg	5	GC/MS	N.D.
Penta-BDE	KS M 1061 : 2007	mg/kg	5	GC/MS	N.D.
Hexa-BDE	KS M 1061 : 2007	mg/kg	5	GC/MS	N.D.
Hepta-BDE	KS M 1061 : 2007	mg/kg	5	GC/MS	N.D.
Octa-BDE	KS M 1061 : 2007	mg/kg	5	GC/MS	N.D.
Nona-BDE	KS M 1061 : 2007	mg/kg	5	GC/MS	N.D.
Deca-BDE	KS M 1061 : 2007	mg/kg	5	GC/MS	N.D.

1. PBBs : Polybrominated biphenyls, PBDEs : Polybrominated diphenyl ethers

1. The above results are for the samples that the client has offered, and all sample names are obtained from the client.
2. Analysis results are effective limited to the above samples, and they are not allowed to be corrected or reissued without the approval of the Director of Center for Environmental & Clean Technologies, The University of Suwon.

Center for Environmental & Clean Technologies
The University of Suwon

Report No. : RoHS-07-08356

Received Sample

Name of Product : Bluetooth Chip Antenna

Model / Ref. No : ADSBTXXXXX-XXX

Remark : The above set of complex sample (Bluetooth Chip Antenna) is completely ground and mixed up by a request of client. This analytical report is only based on the completely ground and mixed complex sample, not homogeneous one.

Center for Environmental & Clean Technologies
The University of Suwon