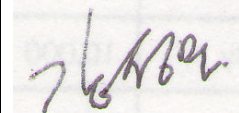
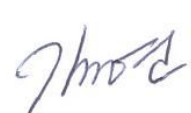


Approval Sheet

Product	DIELECTRIC CHIP ANTENNA		
Customer	MOVON CORPORATION		
Model	MC-710		
Customer Code			
Supplier	MicroRF Co., LTD.		
Supplier Code	ADSBTF0702-A05		
Customer	Designed by	Checked by	Approved by
MicroRF	Designed by	By checked	By approved
			
	R&D	QC	R&D
	Hyunjoo.Park	Sunmo,Kang	Seungyun,Kim

2010. 10. 11

MicroRF Co., Ltd.

TEL. 82-2-6406-5590

FAX. 82-2-6406-5591

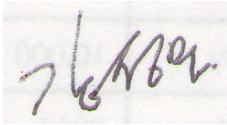
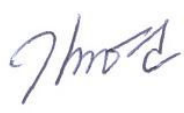
[LEAD FREE]

MSL Level 1

SPECIFICATION

Model : ADSBTF0702-A05

DIELECTRIC CHIP ANTENNA

Designed by	Approved by	Approved by
		
R&D	QC	R&D
Hyunjoo.Park	Sunmo,Kang	Seungyun,Kim
101011	101011	101011

2010. 10. 11

MicroRF Co., Ltd.

TEL. 82-02-6406-5590

FAX. 82-02-6406-5591

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Product	Dielectric Chip Antenna	Model	MC-710
		CODE NO.	ADSBTF0702-A05

Rev No.	Date	Name	Page	Item	Revision Issue
1.0	101011	HJ.Park			Issued

2. Feature 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. : ADSBTF0702-A05

CUSTOMER PART NO. :

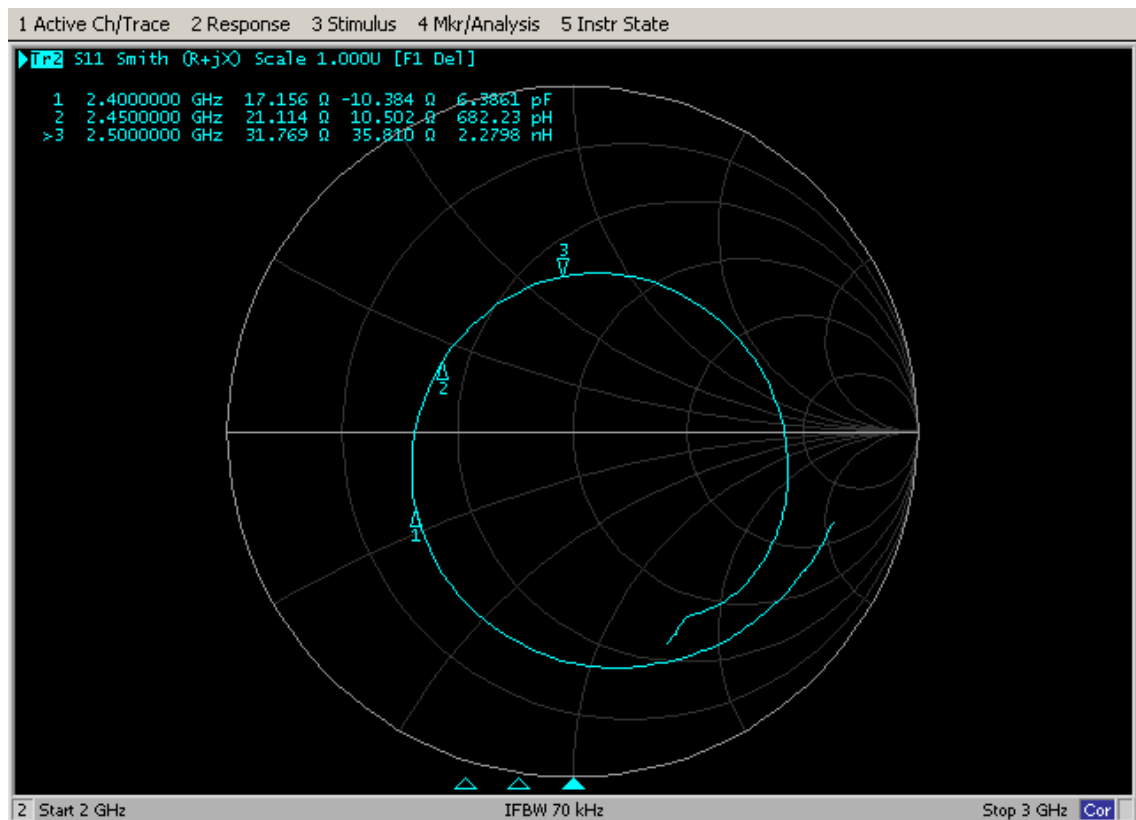
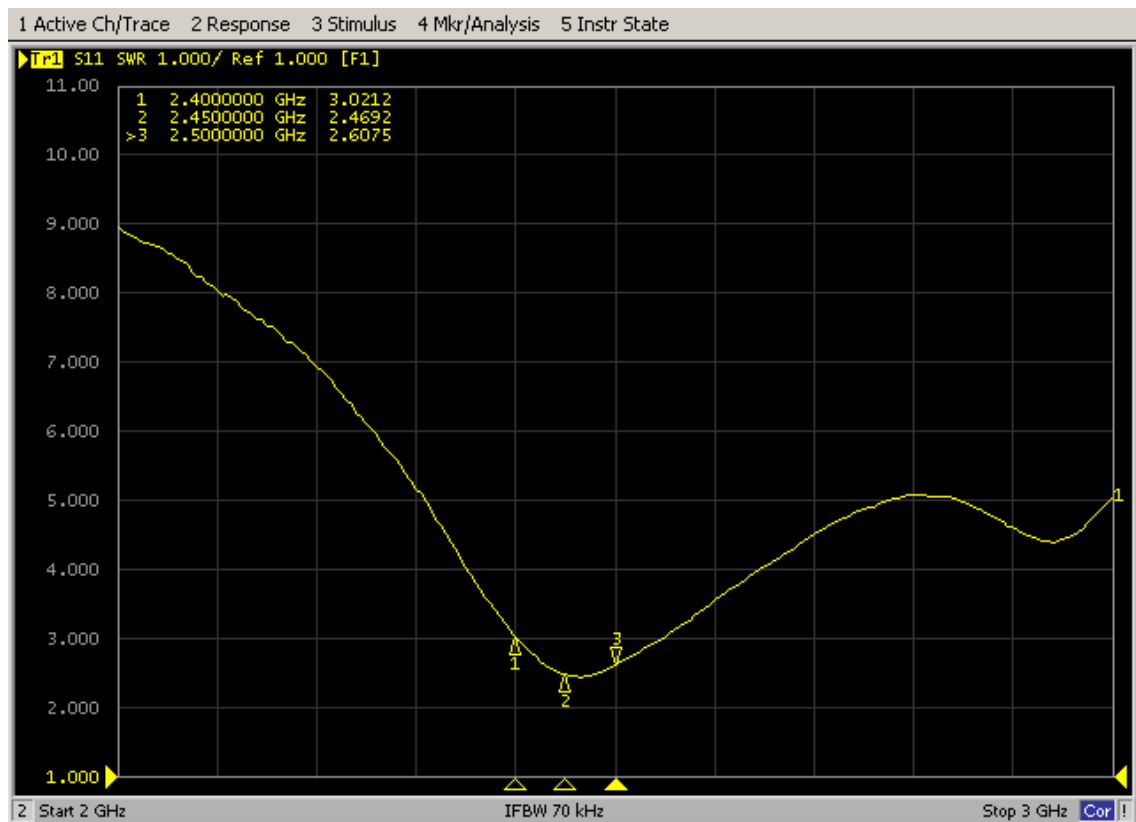
4. Electrical Specifications

4-1.

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

No.	ITEM	Specification	Typical Data
1	Frequency	2400 ~ 2500 MHz	2400 ~ 2484 MHz
2	VSWR	4.5 max	3.5 Max
3	Total Gain(Peak)	Peak Gain : 1.0 dBi min	2.0 dBi
4	Impedance	50 Ω	50 Ω
5	Polarization	Linear	Linear

4-2 VSWR data (S11 of SET condition)

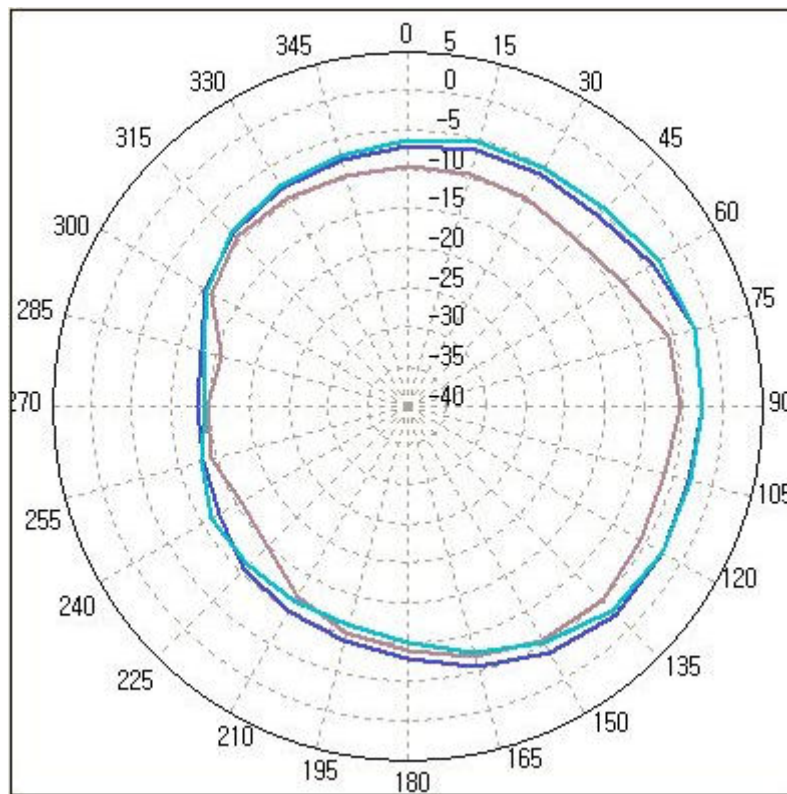


4-3 Radiation Patterns

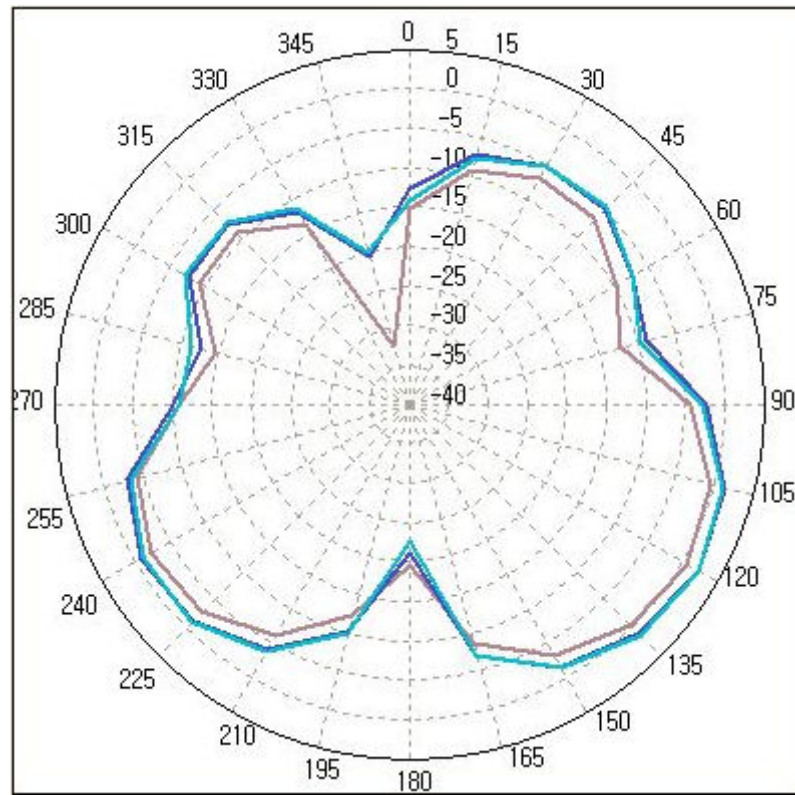
Peak Value(Beam Peak :dB)

	Azimuth Plane	Elevation 1	Elevation 2
2.4 GHz	-4.974	0.707	-1.234
2.45 GHz	-2.323	2.379	-0.407
2.5 GHz	-2.184	2.380	0.202

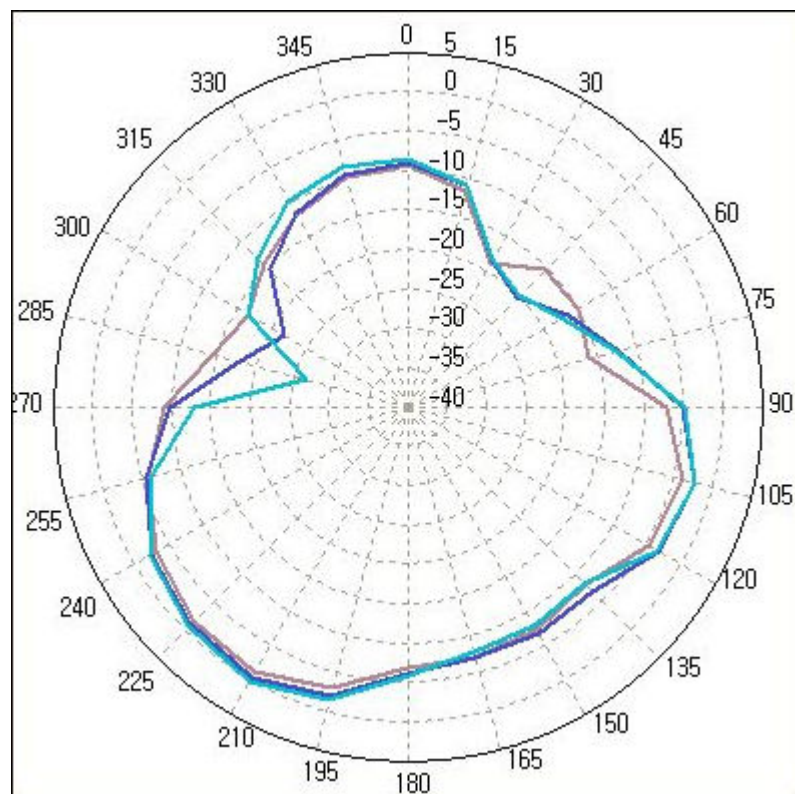
(a) Azimuth Plane (XY) – Horizontal Polarization



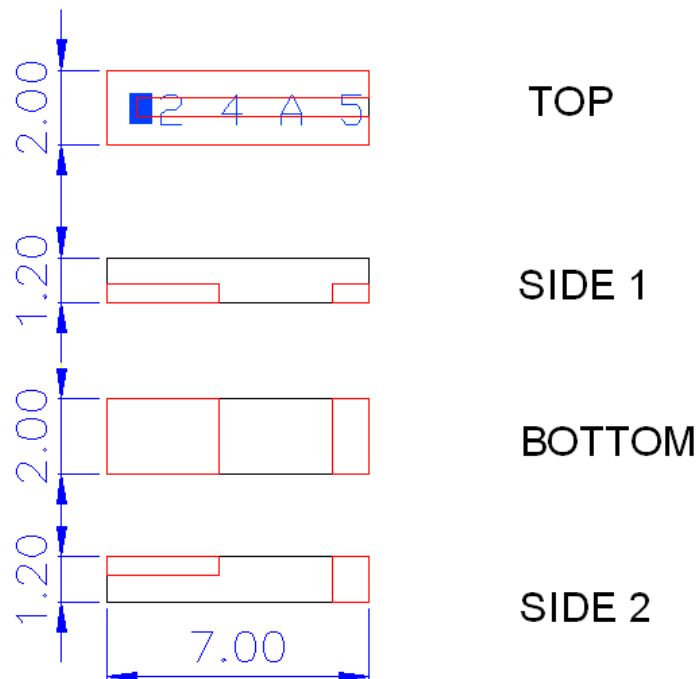
(b) Elevation1 Plane (ZX) – Vertical Polarization



(c) Elevation2 Plane (YZ) – Vertical Polarization



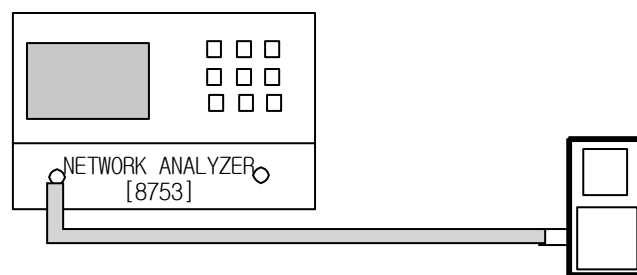
5. Mechanical Dimensions



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.

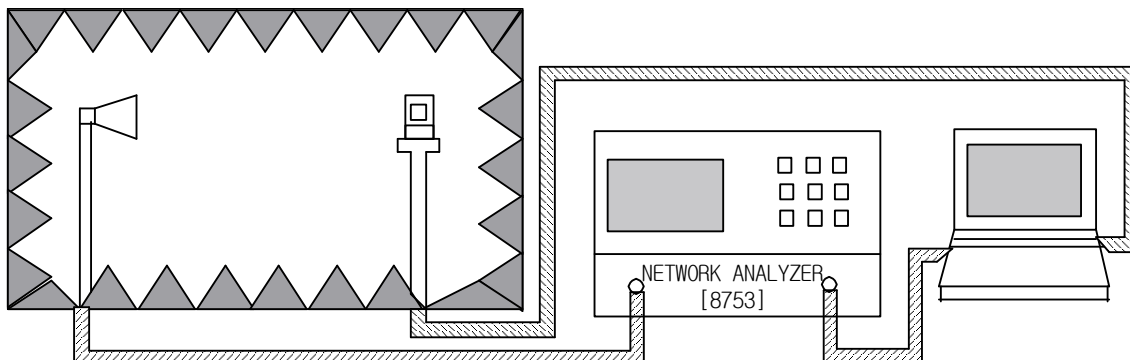
6-1. The measurement of Frequency and VSWR



<Measurement Method>

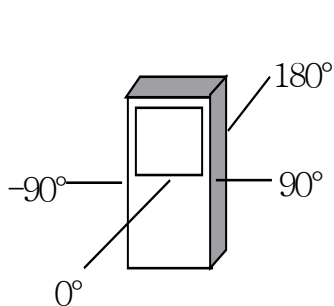
- 1) As seen the above, network analyzer is set up for S11 measurement.
- 2) The measurement frequency range is to set up from 2 GHz to 3 GHz.
- 3) Perform S11 one port full calibration.
- 4) Measure the VSRW of three points of Bluetooth frequency range such as 2400 MHz, 2450 MHz, and 2500 MHz.

6-2. The measurement of Gain and Radiation Patterns

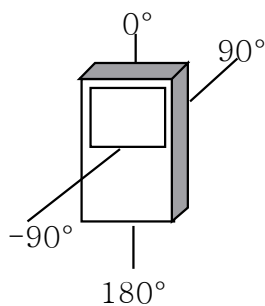


<Measurement Method>

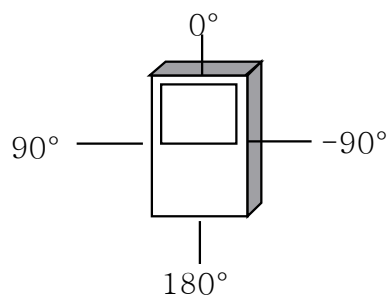
- 1) As seen the above, network analyzer is to set up in Anechoic chamber.
- 2) As seen the beneath, for the measurement planes as Azimuth, Elevation1, and Elevation2, measure Gain data of vertical polarization and horizontal polarization for each plane.



(AZIMUTH PLANE)



(ELEVATION1 PLANE)



(ELEVATION2 PLANE)

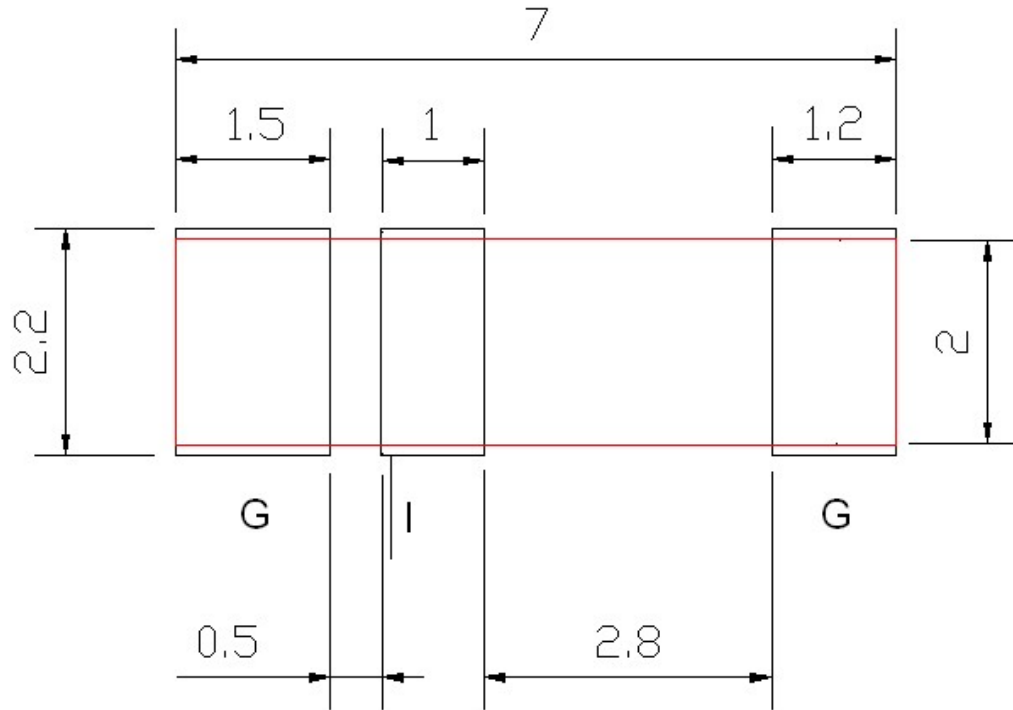
7. Environmental Specifications

No.	Items	Specifications
1	Material	Pb-free system
2	Operating Temperature Range	-30 ~ +85 °C
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 $85 \pm 2^\circ\text{C}$. 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 $-30 \pm 2^\circ\text{C}$. 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 / $50 \pm 3^\circ\text{C}$. After then, leave in the test condition for 1.5 hours.
4	Thermal Shock	Cool from 25°C down to $-30 \pm 2^\circ\text{C}$ and leave for 30 minutes. After that, heat up to $+85 \pm 2^\circ\text{C}$ 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.
	Solder Proof	No reaching after reflow for 5 ± 1 sec at 260°C .
8	Soldering Conditions	$230 \pm 5^\circ\text{C}$ / 5 ± 1 sec for Sn/Pb soldering system $245 \pm 5^\circ\text{C}$ / 2 ± 1 sec for Pb-free soldering system

9. Recommended Soldering Patterns



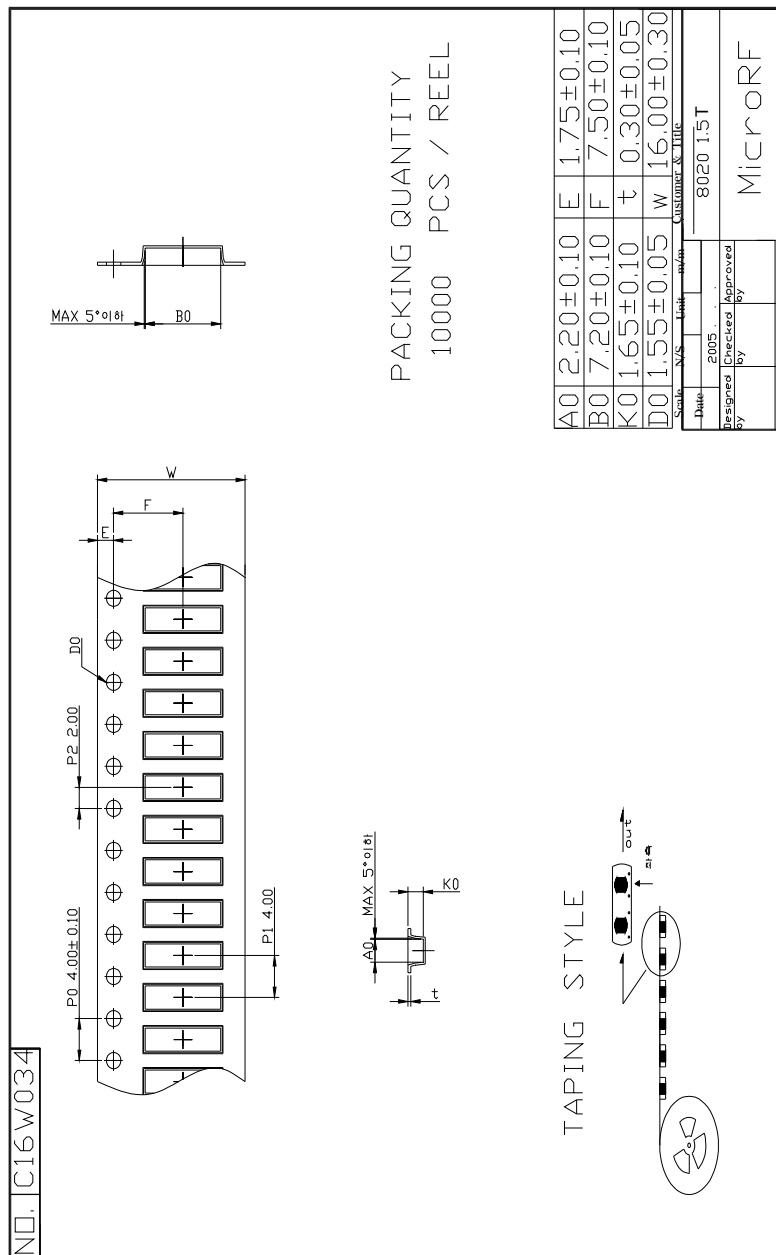
10. PACKAGING

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

TEST REPORT

1. Applicant

Name : MICRO RF CO.,LTD
Address : #810~811,Venture Incubating Center,
Suwon University,San 2-2,Wau-ri,Bongdam-eup,
Hwaseong-si,Gyeonggi-do,Korea.

2. Products

Name : Chip Antenna - P/N:ADS ***** - ***
Model/Type : * * *
Manufacturer : This merchandise was submitted and identified
by the client.

3. Test Standard/Method : Refer to the attached sheet.

4. Test Results : Refer to the attached sheet.

5. Use of Report : Q.C.

6. Date of Application : AUG. 24. 2010.

7. Date of Issue : AUG. 31. 2010.

The test results contained apply only to the test sample(s) supplied by the applicant, and this test report shall not be reproduced in full or in part without approval of the KTL in advance.

Tested by

Approved by

Kyung-Mee Lee
Material Testing Center

Jin-Sook Lee
Technical Supervisor

Korea Testing Laboratory

222-19, Guro3-Dong Guro-Gu Seoul 152-718, Korea.
<http://www.ktl.re.kr>

Tel : +82-2-860-1573
Fax : +82-2-860-1589

FP2004-03-02

TEST RESULT

1. Test Conditions : (22 ± 2)°C, less than 55 % R.H.

2. Quantitative Analysis Results

1) Analysis of Heavy Metals

(Unit : mg/kg)

Element	Test Method	MDL ¹⁾	Result
Pb	Refer to IEC 62321:2008	6.0	Not detected
Cd	Refer to IEC 62321:2008	7.0	Not detected
Hg	Refer to EPA 7473	0.5	Not detected
Cr ⁶⁺	Refer to IEC 62321:2008	0.2	Not detected

¹⁾ MDL : Method detection limit.

2) Analysis of Brominated Flame Retardants

(Unit : mg/kg)

Element	Test Method	MDL ¹⁾	Result
Total PBBs	Refer to IEC 62321:2008	-	Not detected
Mono-BB	"	4	"
Di-BB	"	5	"
Tri-BB	"	"	"
Tetra-BB	"	"	"
Penta-BB	"	"	"
Hexa-BB	"	"	"
Deca-BB	"	16	"

FP204-04-01

(Unit : mg/kg)

Element	Test Method	MDL ¹⁾	Result
Total PBDEs	Refer to IEC 62321:2008	—	Not detected
Mono-BDE	"	4	"
Di-BDE	"	5	"
Tri-BDE	"	"	"
Tetra-BDE	"	"	"
Penta-BDE	"	"	"
Hexa-BDE	"	"	"
Hepta-BDE	"	"	"
Octa-BDE	"	"	"
Nona-BDE	"	"	"
Deca-BDE	"	20	"

¹⁾ MDL : Method detection limit.

3) Analysis of Halogen

(Unit : mg/kg)

Element	Test Method	Result
T-Br	Refer to ASTM 7359:2008	Not detected

3. Test Instruments

Instrument	Maker	Model
ICP-OES	PERKIN ELMER	OPTIMA 4300
Mercury Analyzer	MILESTONE	DMA-80
UV/Vis Spectrophotometer	VARIAN	CARY 300
IC/AQF-100	DIONEX/MITSUBISHI CHEMICAL Co.	ICS-2000/AQF-100
GC-MS	Agilent Technologies	6890N GC/5973N MSD

THE END.

FP204-04-01