No. : RadiAnt 2009-10

Date :2009. 03. 24

SPECIFICATION

Product Name	ANTENNA
Customer	DREAMTECH
Model Name	QL200
Customer Code.	
Provider	RadiAnt
Part Code.	RKD901-0000AA

Buyer	Submitted	Checked		Approved
RadiAnt	Submitted	Checked	Checked	Approved
				

– Table of Contents –

1. Product History

LIST					
NO	Data	Front	After	Change	REV
1	2009.03.24			Approval	0
2					
3					
4					
5					
6					
7					
8					
9					
10					
11					
12					
13					
14					
15					

2. Electrical Feature

2.1. Frequency Band

BAND	BLUETOOTH
FREQUENCY	2400MHz~2485MHz

2.2 Impedance

2.2.1 Input Impedance

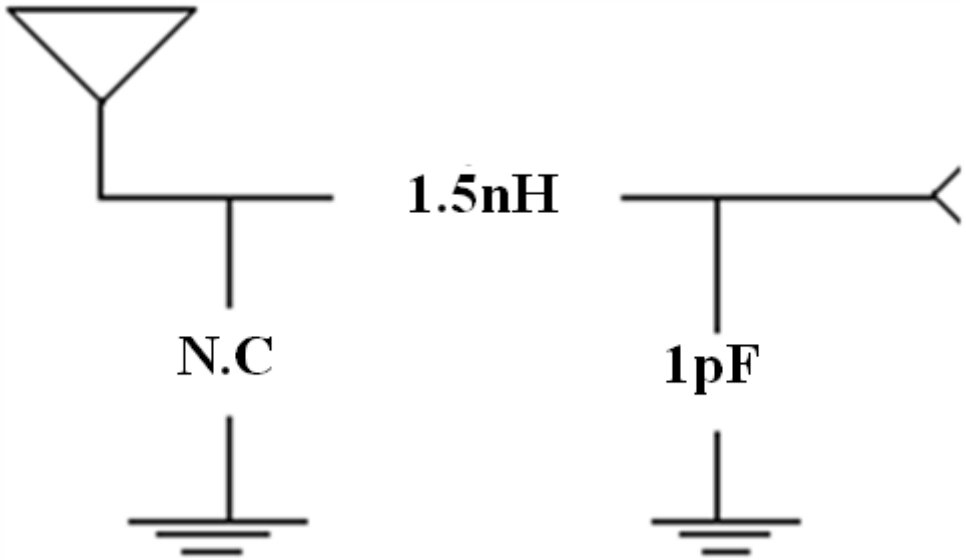
- R =50Ω

2.2.2 Measuring Method

By using Network Analyzer, connect the antenna installed MIC SMTX to the reflection point of Analyzer and measure the impedance value within the designated frequency band.

2.3 Matching circuit

Matching Circuit is composed in free space of 2.1 frequency band while satisfying customer's requirements.



<Figure 2.3.1 Matching circuit>

2.4 VSWR

Impedance Matching optimization is performed under the below mentioned environment.

.

2.4.1 Free Space Environment

BAND	**BLUETOOTH**	
FREQ	**2400 MHz**	**2485MHz**
VSWR	2.5 : 1	2.0 : 1

2.4.2 Measuring Method

Connect (soldering) 50Ω semi-rigid coaxial cable to the 50Ω spot in MIC SMTX. To minimize the loss of transmission, semi-rigid coaxial cable is used. Including PCB, the MIC SMTX shouldn't be different from the one, which will be used for mass production.

Specification should be the same for all frequency bands. Free Space means that MIC SMTX is put on the surface of no conducting plastic.

2.5 Directivity

Omni-directional (Horizontal)

FREQ.		**2400MHz**	**2485MHz**
GAIN	**Avg.**	-3.23 dBi	-2.64 dBi
	Peak	0.66 dBi	1.42 dBi

2.6 Maximum Power

- **P=2W Under**

3. Environment Test

3.1 Operating Temperature Test

3.1.1 Test Condition

Temperature = -30℃, +80℃

Duration time = 1 hour

3.1.2 Requirements

After the test, the antenna must not have an outer damage, and also it must pass requirement shown in 2.4.

3.1.3 Measuring Method

Antenna is kept at -30℃ for 1 hour and +80℃ for 1 hour and than passed test of 2.4

3.2 Temperature Cycling Test

3.2.1 Test Condition

- Low cycling Temperature TLC = -40℃
- High cycling Temperature THC = +80℃
- 1Cycle = 4 hours
- Test number = 10Cycle

3.2.2 Requirements

After the test, the antenna must not have an outer damage, and also it must pass requirement shown in 2.4.

3.2.3 Measuring Method

Antenna is kept at low temperature -40℃ for 2 hours and increase the temperature up to +80℃ within 2 hour and kept for another 2 hours at the same temperature will be 1 cycle. As shown in Figure 3.2.1 repeat 10 cycle and kept for 2 hour in normal temperature.

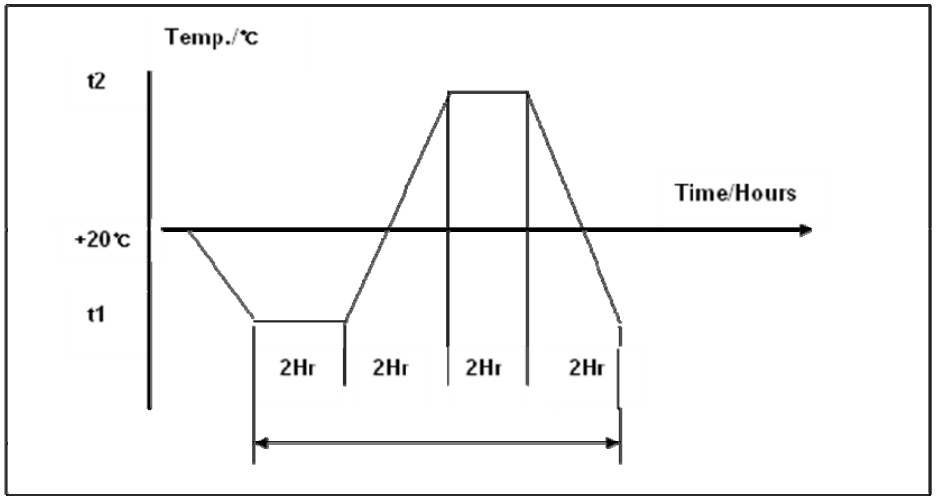


Figure 3.2.1 Temperature Cycling

3.3 Corrosion Resistance Test

3.3.1 Test Condition

- NaCl = 90%
- Water Temperature = 60℃
- Duration Time = 96 hours

3.3.2 Requirements

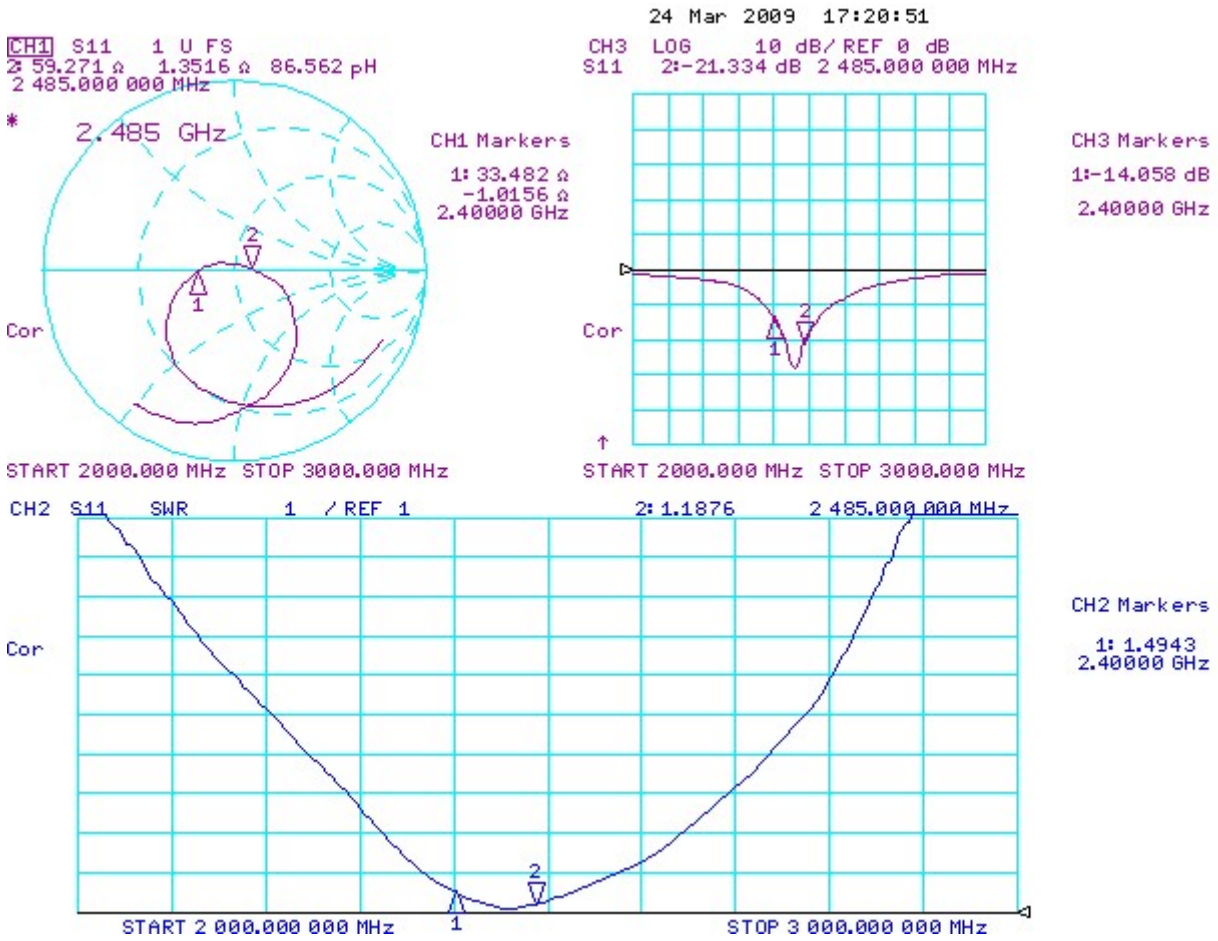
After the test, the antenna must not have an outer damage, and also it must pass requirement shown in 2.4.

3.3.3 Measuring Method

Antenna is soaked in sodium chloride solution at temperature +60℃ and 90%(NaCl) for 96 hours and dry out.

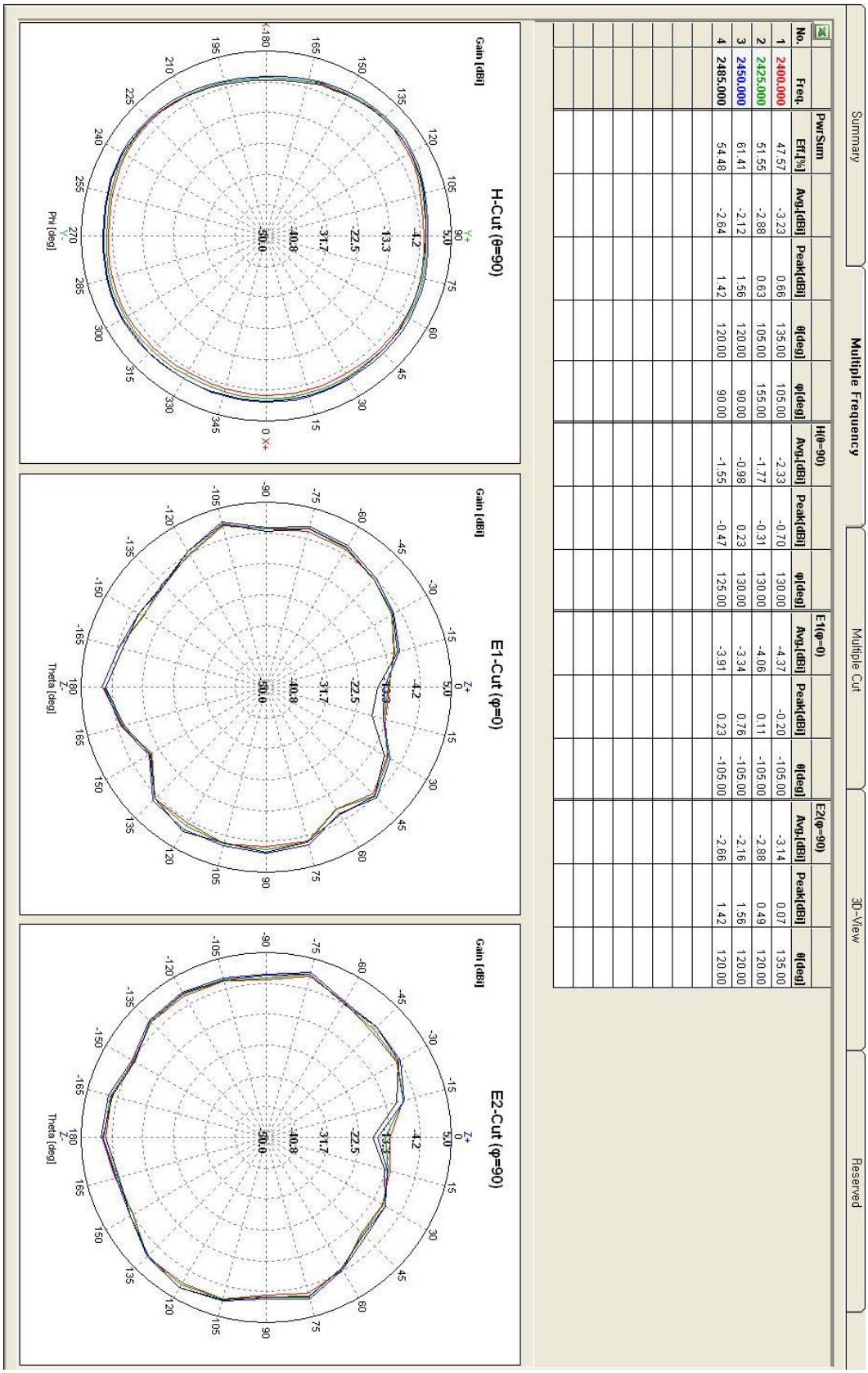
4. Electric Performance Data

4.1. Smith Chart & VSWR



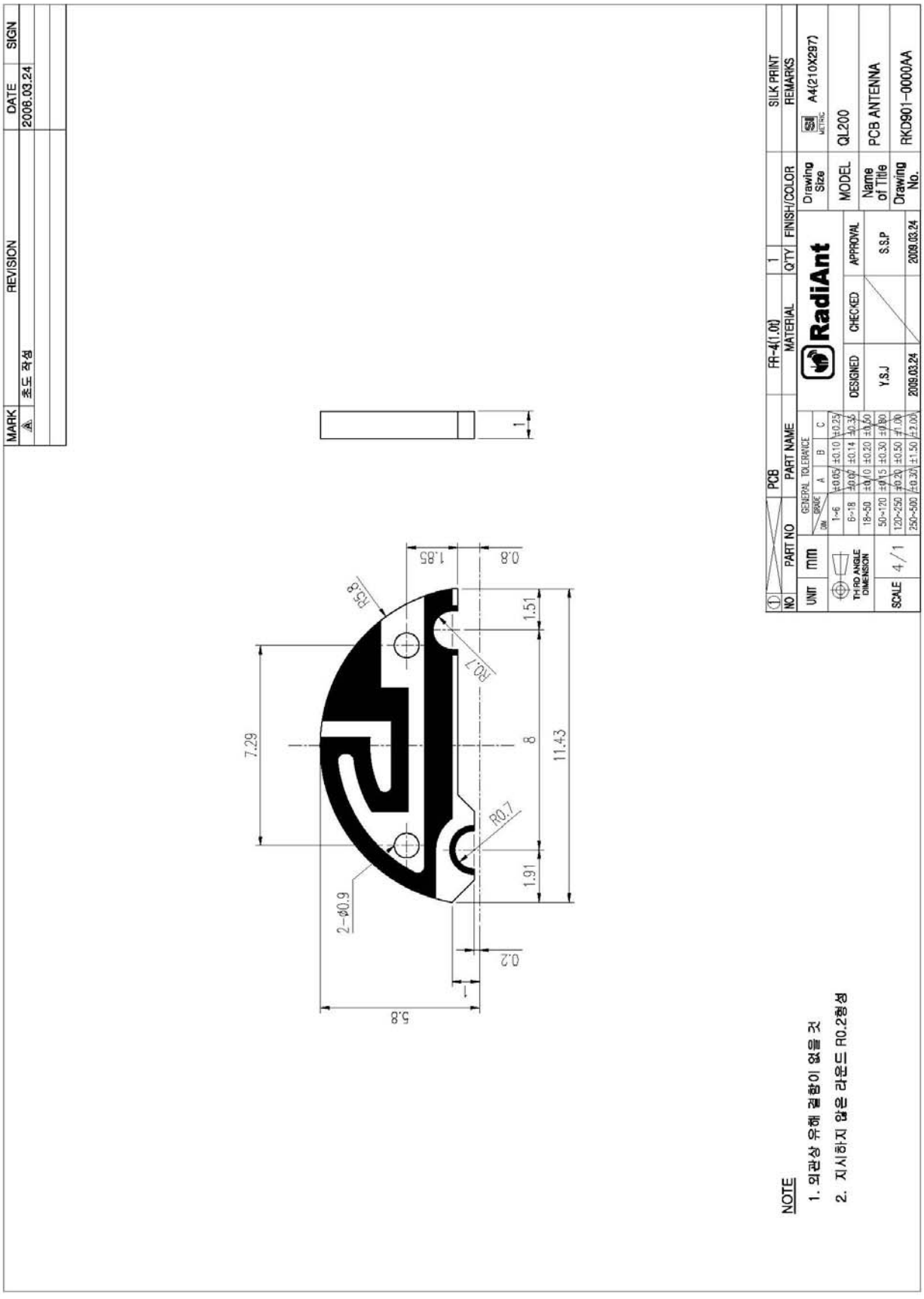
4.2. GAIN DATA

4.2. 3D-Gain Data

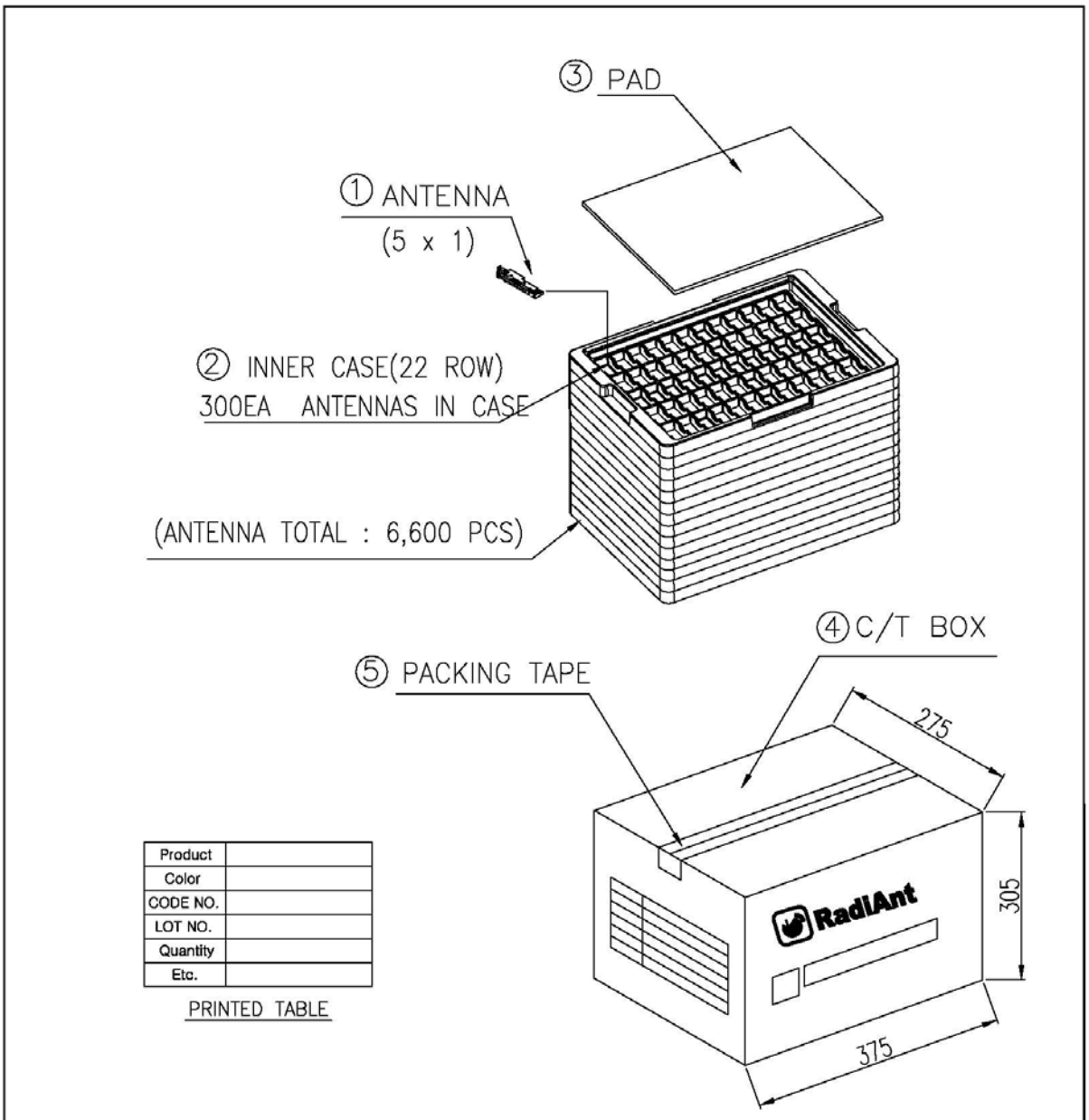


No.	Freq.	PwrSum				H(θ=90)			E1(φ=0)			E2(φ=90)		
		Eff.[%]	Avg.[dBi]	Peak[dBi]	θ[deg]	φ[deg]	Avg.[dBi]	Peak[dBi]	φ[deg]	Avg.[dBi]	Peak[dBi]	θ[deg]	Avg.[dBi]	Peak[dBi]	θ[deg]
1	2400.000	47.57	-3.23	0.66	135.00	105.00	-2.33	-0.70	130.00	-4.37	-0.20	-105.00	-3.14	0.07	135.00
2	2425.000	51.55	-2.88	0.63	105.00	155.00	-1.77	-0.31	130.00	-4.06	0.11	-105.00	-2.88	0.49	120.00
3	2450.000	61.41	-2.12	1.56	120.00	90.00	-0.98	0.23	130.00	-3.34	0.76	-105.00	-2.16	1.56	120.00
4	2485.000	54.48	-2.64	1.42	120.00	90.00	-1.55	-0.47	125.00	-3.91	0.23	-105.00	-2.66	1.42	120.00

5. Drawing


MARK
REVISION
DATE
SIGN
A
초도 작성
2008.03.24
PCB
FR-4(1.0t)
1
SILK PRINT
NO
PART NO
PART NAME
MATERIAL
Q'TY
FINISH/COLOR
REMARKS
RadiAnt
Drawing Size
A4(210X297)
MODEL
QL200
Name of Title
PCB ANTENNA
Drawing No.
RKD901-0000/AA
UNIT
mm
SCALE
4/1
TH-RD ANGLE DIMENSION
DESIGNED
Y.S.J
CHECKED
APPROVAL
S.S.P
2009.03.24
GENERAL TOLERANCE
DIM
BRAKE
A
B
C
1.85
0.8
1.51
R5.8
R0.7
7.29
8
11.43
R0.7
1.91
2-ø0.9
0.2
1
5.8
1
NOTE
1. 외관상 유해 결함이 없을 것
2. 지시하지 않은 라운드 R0.2형성

6. Packing



Product	
Color	
CODE NO.	
LOT NO.	
Quantity	
Etc.	

PRINTED TABLE

NO	PART NAME	MATERIAL	Q'TY	FINISH//COLOR	REMARKS
⑤	PACKING TAPE	–	–		
④	C/T BOX	SW2	1		
③	PAD	SW1	1		
②	INNER CASE	P.S	22		
①	ANTENNA	–	6,600		

UNIT	mm	GENERAL TOLERANCE			
		DIM \ GRADE	A	B	C
		1~6	±0.05	±0.10	±0.25
		6~18	±0.07	±0.14	±0.35
		18~50	±0.10	±0.20	±0.50
		50~120	±0.15	±0.30	±0.80
		120~250	±0.20	±0.50	±1.00
		250~500	±0.30	±1.50	±2.00

THIRD ANGLE DIMENSION

SCALE 1/2

RadiAnt

DESIGNED	CHECKED	APPROVAL
		PARK.S.S

Drawing Size	SI METRIC A4(210X297)
MODEL	PACKING
Name of Title	BOX
Drawing No.	–

7.Certification of RoHS

7-1 PCB

7-1-1 PCB

SGS

SGS Testing Korea Co., Ltd.
#18-34, Sanbon-dong, Gunpo-city, Kyunggi-do, Korea 435-040
Tel : 031) 428-5765~6, Fax: 031) 427-2374, InterNet>http://www.sgslab.co.kr

Test Report No. F690501/LF-CTS051155 Date : May 13, 2005 Page 1 of 3

DOOSAN CORPORATION ELECTRO-MATERIALS BG
39-3, Sungbok-dong, Yongin-city,
Kyunggi-do, Korea

The following merchandise was submitted and identified by the client as : -

Type of Product	:	DS-7405
SGS File No.	:	G-49/2005-2111/7
Buyer	:	SONY
Materials	:	CCL
Sample Receiving Date	:	May. 06, 2005
Test Performing Date	:	May. 09, 2005
Test Performed	:	SGS Testing Korea tested the sample which was selected by applicant with following result.
Test Results	:	For further details, please refer to following page.

SGS Testing Korea Co., Ltd.

Jae S. Han

KHJ/hjp

Jason Han / Director

SGS Testing Korea Co., Ltd.
18-34, Sanbon-dong, Gunpo, Gyeonggi-do, Korea 435-040 t +82 (0)31 428 5765~6 t +82 (0)31 427 2374 www.sgstesting.co.kr
1002-2, Hwasan-ri, Onsan-eub, Ulju-gun, Ulsan, Korea 689-890 t +82 (0)52 239 6908~10 t +82 (0)52 239 6913
Member of SGS Group (Societe Generale de Surveillance)

001

SGS Testing Korea Co., Ltd.
#18-34, Sanbon-dong, Gunpo-city, Kyunggi-do, Korea 435-040
Tel : 031) 428-5765~6, Fax: 031) 427-2374, InterNet>http://www.sgslab.co.kr

Test Report

No. F690501/LF-CTS051155 Date : May 13, 2005 Page 2 of 3

Heavy Metal

Test Items	Unit	Test Method	MDL	Results
Cadmium (Cd)	mg/kg	USEPA 3050B, ICP-AES	0.5	n. d.
Lead (Pb)	mg/kg	USEPA 3050B, ICP-AES	5	n. d.
Mercury (Hg)	mg/kg	USEPA 3052, ICP-AES	2	n. d.
Hexavalent Chromium (Cr VI)	mg/kg	USEPA 3060A, UV-vis	1	n. d.

Flame Retardants

Test Items	Unit	Test Method	MDL	Results
Polybrominated Biphenyls (PBBs)	-	-	-	-
Bromobiphenyl	mg/kg	With reference to USEPA 3540C. Analysis was performed by GC/MS..	5	n. d.
Dibromobiphenyl	mg/kg		5	n. d.
Tribromobiphenyl	mg/kg		5	n. d.
Tetrabromobiphenyl	mg/kg		5	n. d.
Pentabromobiphenyl	mg/kg		5	n. d.
Hexabromobiphenyl	mg/kg		5	n. d.
Heptabromobiphenyl	mg/kg		5	n. d.
Octabromobiphenyl	mg/kg		5	n. d.
Nonabromobiphenyl	mg/kg		5	n. d.
Decabromobiphenyl	mg/kg		5	n. d.
Polybrominated Diphenyl Ethers (PBDEs)	-	-	-	-
Bromodiphenyl ether	mg/kg	With reference to USEPA 3540C. Analysis was performed by GC/MS.	5	n. d.
Dibromodiphenyl ether	mg/kg		5	n. d.
Tribromodiphenyl ether	mg/kg		5	n. d.
Tetrabromodiphenyl ether	mg/kg		5	n. d.
Pentabromodiphenyl ether	mg/kg		5	n. d.
Hexabromodiphenyl ether	mg/kg		5	n. d.
Heptabromodiphenyl ether	mg/kg		5	n. d.
Octabromodiphenyl ether	mg/kg		5	n. d.
Nonabromodiphenyl ether	mg/kg		5	n. d.
Decabromodiphenyl ether	mg/kg		5	n. d.

Note : n. d. = Not detected
MDL = Method Detection Limit

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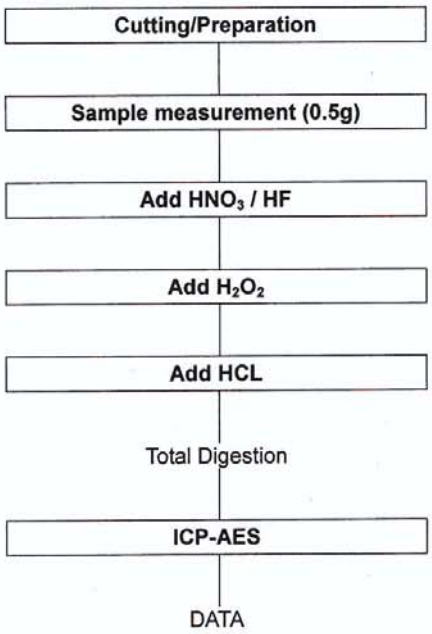
Test Report No. F690501/LF-CTS051155 Date : May 13, 2005 Page 3 of 3

Flow Chart Of Digestion

(EPA 3050B for Cd, Pb)



The samples were dissolved totally by pre-conditioning method according to above flow chart.

Operator Lauren Kim

Section Chief Jeff Jang

********** End **********

SGS Testing Korea Co., Ltd. 18-34, Sanbon-dong, Gunpo, Gyeonggi-do, Korea 435-040 t +82 (0)31 428 5765~6 t +82 (0)31 427 2374 www.sgstesting.co.kr
1002-2, Hwasan-ri, Onsan-eub, Ulju-gun, Ulsan, Korea 689-890 t +82 (0)52 239 6908~10 t +82 (0)52 239 6913
Member of SGS Group (Société Générale de Surveillance)

3 001

7-1-2 ISM INK (PCB)

Intertek

TEST REPORT

Applicant : DOZENTECH CORPORATION
Address : 955-1, DOHWA-DONG, NAM-GU,
INCHEON, KOREA

Page: 1 of 3

Report No. RT07R-7237 Date: Dec. 17, 2007

Sample Description	: The following submitted sample(s) said to be:-
Name/Type of Product	: LPISM INK
Sample ID No.	: RT07R-7237
Item No.	: DPR-700G/DHD-700
Manufacturer/Vender	: DOZENTECH CORPORATION
Name of Buyer	: LG PHILPS
Sample received	: Dec. 12, 2007
Testing Date	: Dec. 12, 2007 ~ Dec. 17, 2007
Testing Laboratory	: Intertek Testing Center
Testing Environment	: Temperature : (22 ~ 26) ℃ Relative Humidity: (55 ~ 65) %
Test Method(s)	: Please see the following page(s).
Test Result(s)	: Please see the following page(s).

* Note 1 : The test results presented in this report relate only to the object tested.
* Note 2 : This report shall not be reproduced except in full without the written approval of the testing laboratory.
* Note 3 : The item no. is assigned by client and indicated according to their requirement and guarantee letter.

Tested by,

E.Y.Lee / Chemist

Authorized by,

H.W.Yoo / Lab Manager

Intertek Testing Center

Seoul Office : Tel : 02-2109-1250 Fax : 02-2109-1259 Gumi Office : Tel : 054-462-7647 Fax : 054-462-7657 Web Site : www.Intertek.co.kr
Seoul Lab. : #709, 7Fl, Ace Techno Tower V, 197-22, Guro-3Dong, Guro-Gu, Seoul 152-766 Korea Tel : 02-2109-1260 Fax : 02-2109-1258
Ulsan Lab. : #340-2, Yongam-Ri, Chongryang-Myun, Ulju-Gun, Ulsan 689-865 Korea Tel : 052-257-6754 Fax : 052-276-6792

Intertek

TEST REPORT

Report No. RT07R-7237 Date: Dec. 17, 2007

Sample ID No. : RT07R-7237
Sample Description : LPISM INK

Test Items	Unit	Test Method	MDL	Results
Cadmium (Cd)	mg/kg	With reference to US EPA 3052, by acid digestion and determined by ICP-OES	0.5	N.D.
Lead (Pb)	mg/kg	With reference to US EPA 3052, by acid digestion and determined by ICP-OES	5	N.D.
Mercury (Hg)	mg/kg	With reference to US EPA 3052, by acid digestion and determined by ICP-OES	2	N.D.
Hexavalent Chromium (Cr^{6+})	mg/kg	US EPA 3060A and determined by UV-VIS	1	N.D.
Polybrominated Biphenyl (PBBs)				
Monobromobiphenyl	mg/kg	With reference to US EPA 3540C, by solvent extraction and determined by GC/MS	5	N.D.
Dibromobiphenyl	mg/kg		5	N.D.
Tribromobiphenyl	mg/kg		5	N.D.
Tetrabromobiphenyl	mg/kg		5	N.D.
Pentabromobiphenyl	mg/kg		5	N.D.
Hexabromobiphenyl	mg/kg		5	N.D.
Heptabromobiphenyl	mg/kg		5	N.D.
Octabromobiphenyl	mg/kg		5	N.D.
Nonabromobiphenyl	mg/kg		5	N.D.
Decabromobiphenyl	mg/kg		5	N.D.
Polybrominated Diphenyl Ether (PBDEs)				
Monobromodiphenyl ether	mg/kg	With reference to US EPA 3540C, by solvent extraction and determined by GC/MS	5	N.D.
Dibromodiphenyl ether	mg/kg		5	N.D.
Tribromodiphenyl ether	mg/kg		5	N.D.
Tetrabromodiphenyl ether	mg/kg		5	N.D.
Pentabromodiphenyl ether	mg/kg		5	N.D.
Hexabromodiphenyl ether	mg/kg		5	N.D.
Heptabromodiphenyl ether	mg/kg		5	N.D.
Octabromodiphenyl ether	mg/kg		5	N.D.
Nonabromodiphenyl ether	mg/kg		5	N.D.
Decabromodiphenyl ether	mg/kg		5	N.D.

Notes : mg/kg = ppm = parts per million
< = Less than
N.D. = Not detected (<MDL)
MDL = Method detection limit

Intertek Testing Center

Seoul Office : Tel : 02-2109-1250 Fax : 02-2109-1259 Gumi Office : Tel : 054-462-7647 Fax : 054-462-7657 Web Site : www.Intertek.co.kr
Seoul Lab. : #709, 7Fl, Ace Techno Tower V, 197-22, Guro-3Dong, Guro-Gu, Seoul 152-766 Korea Tel : 02-2109-1260 Fax : 02-2109-1258
Ulsan Lab. : #340-2, Yongam-Ri, Chongryang-Myun, Ulju-Gun, Ulsan 689-865 Korea Tel : 052-257-6754 Fax : 052-276-6792

Intertek

TEST REPORT

Report No. RT07R-7237 Date: Dec. 17, 2007

Sample ID No. : RT07R-7237
Sample Description : LPISM INK

* View of sample as received;-

***** End of Report *****

Intertek Testing Center

Seoul Office : Tel : 02-2109-1250 Fax : 02-2109-1259 Gumi Office : Tel : 054-462-7647 Fax : 054-462-7657 Web Site : www.Intertek.co.kr
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