



APPENDIX I

: ANTENNA SPECIFICATION

APPROVAL SHEET

품명	WIFI Antenna
Maker P/no	1513472-5
Customer P/no	N/A

2400 –2483.5 & 5150 –5875 MHz Dual Band Antenna
(802.11 a/b/g/n, includes frequencies of Bluetooth, ZigBee, and Wi-Fi products)

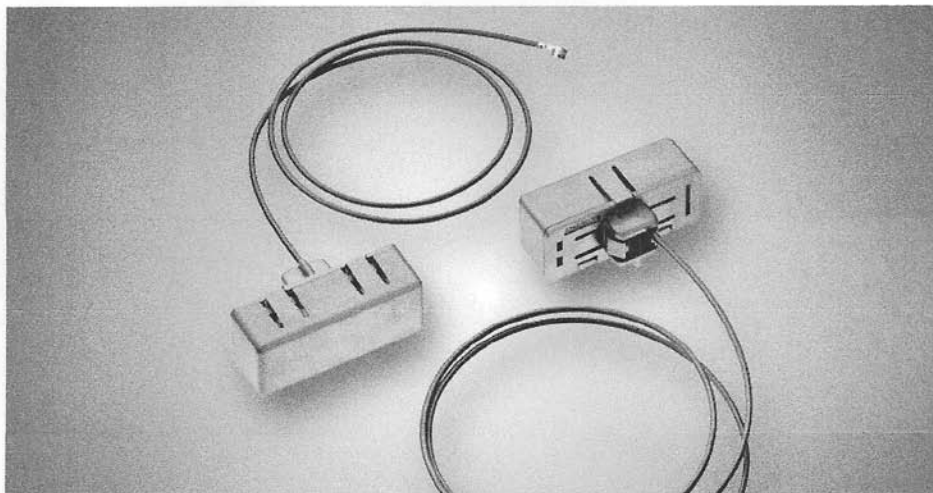
Part Number: 1513472-5

Product Facts

- Universal antenna module assembly.
- RoHS compliant

Recommendations

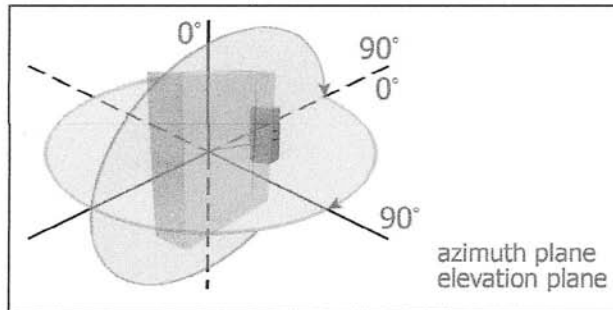
- Antenna is to be mounted on a metal chassis.
- Panel thickness must be between .8mm and 1mm.
- Performance and bandwidth is dependant on chassis size.



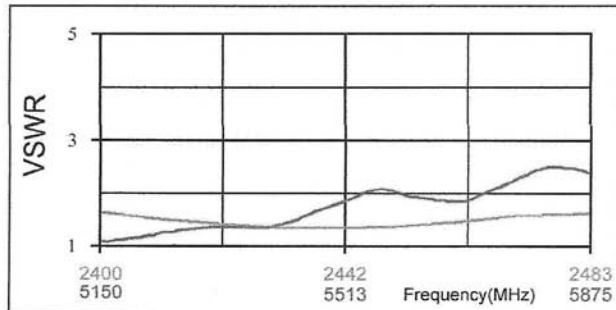
Specifications

Frequency Range (MHz)	2400 –2483.5; 5150 –5875
Peak Gain	3 dBi
VSWR	<3.0:1
Polarization	Linear
Power Handling	10 Watt cw
Feed Point Impedance	50 Ohms unbalanced
Size	29.00 mm x 12.00 mm x 10.00mm
Weight	< 5.5 g.
Mounting	Universal Antenna Module
Keep Out Area	See diagram on page 2
Cable / Connector	360 mm length. 1.13 mm dia. with U.F.I connector
Note	Data shown was taken on a nominal size metal chassis

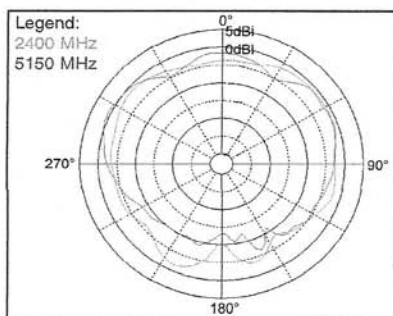
Test Orientation in Free Space



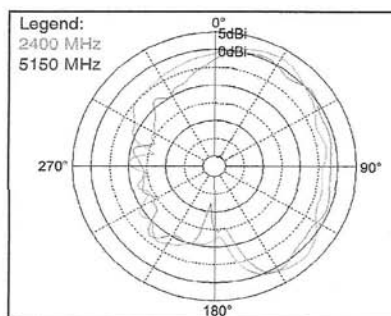
VSWR



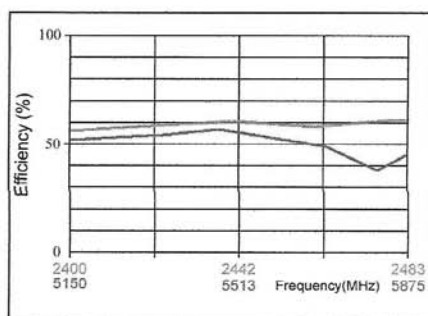
Azimuth



Elevation



Efficiency

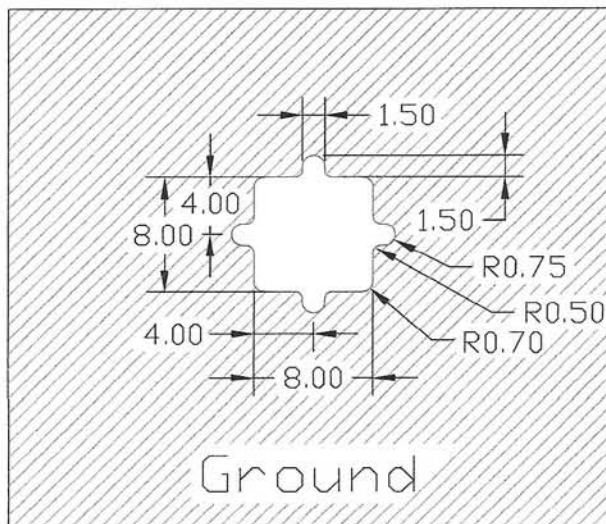


2400 –2483.5 & 5150 –5875 MHz Dual Band Antenna
(802.11 a/b/g/n, includes frequencies of Bluetooth, ZigBee, and Wi-Fi products)

Part Number: 1513472-5

Mounting Guide

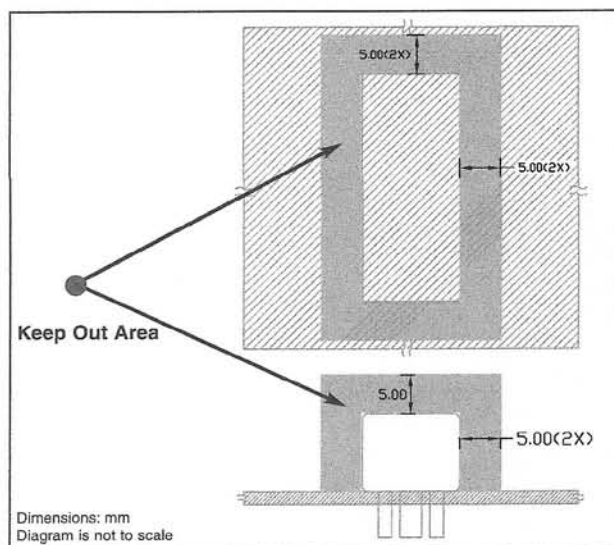
NOTE:
Panel thickness must be between
0.8 mm and 1 mm.



- NOTES:**
1. Antenna must be mounted on a metal chassis.
 2. For more information please call TE.

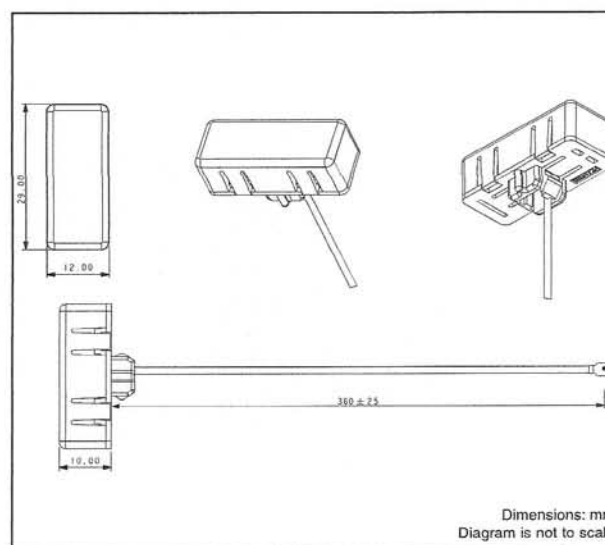
Dimensions: mm
Diagram is not to scale

Keep Out Area



Dimensions: mm
Diagram is not to scale

Approx. Dimensions



Dimensions: mm
Diagram is not to scale

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4-1773459-0-CIS-PDF-03-11

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Bluetooth is a trademark of Bluetooth SIG, Inc.

"Wi-Fi" is a trademark of Wi-Fi Alliance.

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Consult TE for the latest dimensions and design specifications.

9565 Soquel Driv
Aptos, CA 9500
(+ 831) 662-117
<http://www.antenna.te.cor>

[Product Features]

Product Type Features:

- Mount = Universal Antenna Module
- Polarization = Linear

Electrical Characteristics:

- Antenna Type = Stamped
- Operating Frequency (MHz) = 2,400 - 2,483.5, 5,150 - 5,875
- [Gain, Max. \(dB\)](#) = + 3
- Impedance (Ω) = 50

Dimensions:

- [Height \(mm \[in\]\)](#) = 10.00 [0.394]

Body Features:

- [Length \(mm \[in\]\)](#) = 29.00 [1.142]
- [Width \(mm \[in\]\)](#) = 12.00 [0.472]

Housing Features:

- VSWR, Max. = <3.0:1

Configuration Features:

- Antenna Style = External Antenna

Industry Standards:

- [RoHS/ELV Compliance](#) = RoHS compliant, ELV compliant
- [Lead Free Solder Processes](#) = Not relevant for lead free process
- RoHS/ELV Compliance History = Always was RoHS compliant

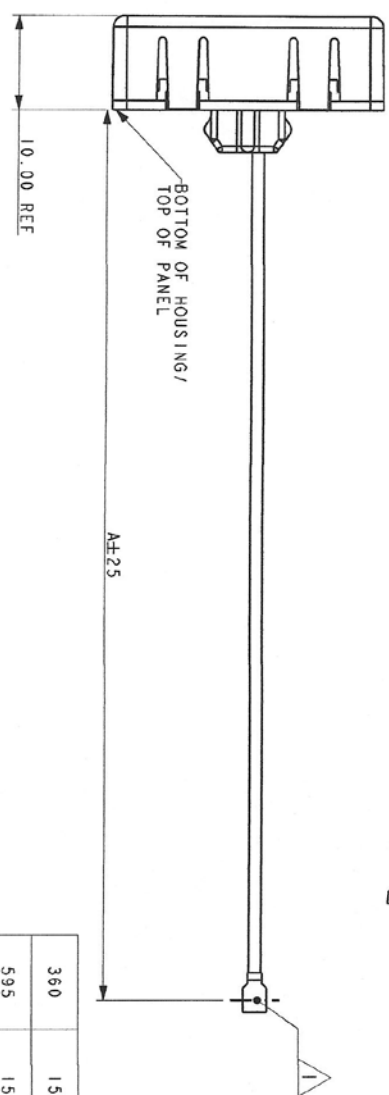
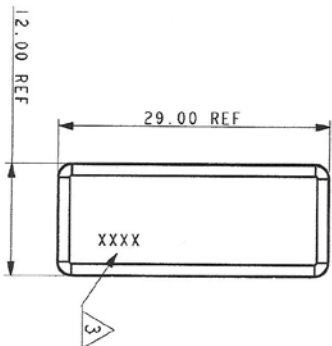
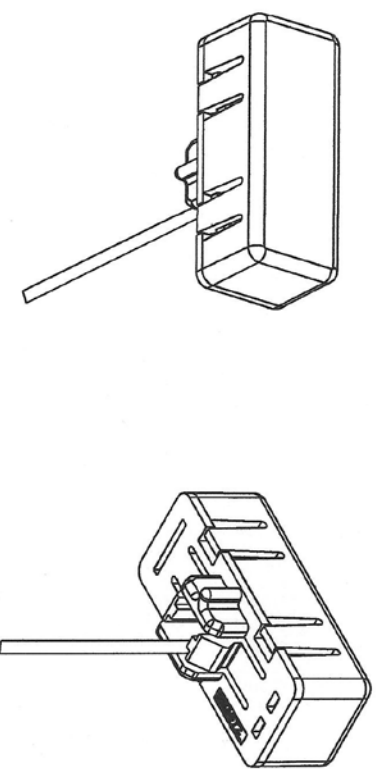
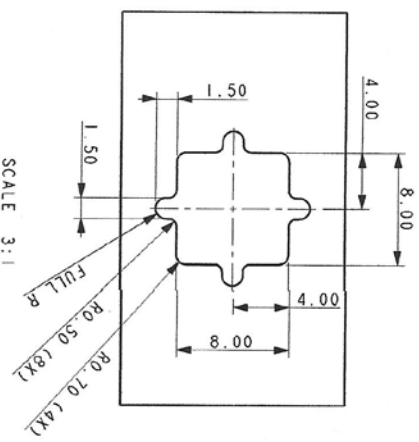
Operation/Application:

- Application = 802.11 a/b/g/n, Bluetooth & ZigBee

Other:

- Brand = Tyco Electronics

PANEL CUTOUT DIMENSIONS (Tolerances .XX ±0.10)



NOTES: UNLESS OTHERWISE SPECIFIED.

1. MINI COAX CABLE DIAMETER 1.13 mm TERMINATED WITH U.FL CONNECTOR.
2. COMPONENTS AND ASSEMBLY ARE COMPLIANT TO ROHS STANDARDS.
3. 4 DIGIT DATE CODE
4. FOR DESIGNS UTILIZING 1513472-1 OR 1513472-5 PLEASE SEE TYCO ELECTRONICS DS1513472-1 OR DS1513472-5 RESPECTIVELY

LOC	DIST	REV	DESCRIPTION	DATE	OWN	APVD
HQ	00	B	REV PER ECO 10-022420	02NOV2010	DW	GG

REV	DESCRIPTION	DATE	OWN	APVD
B	REV PER ECO 10-022420	02NOV2010	DW	GG

TYPICAL DIMENSIONS		TOLERANCES UNLESS OTHERWISE SPECIFIED:	
MM	0 P.L.C.	±.0	±.0
	1 P.L.C.	±.0	±.0
	2 P.L.C.	±.0	±.0
	3 P.L.C.	±.0	±.0
	4 P.L.C.	±.0	±.0
FINISH		±.0	
MATERIAL		±.0	
DATE		25FEB2009	
CHK		APV	
PRODUCT SPEC		APPLICATION SPEC	
WEIGHT		SCALE	
CUSTOMER DRAWING		PART NUMBER	
UNIVERSAL ANTENNA MODULE (UAM)		WLAN	
TYCO ELECTRONICS		ROCHESTER, NY 14623	
SIZE		CAGE CODE	
A300779		C-1513472	
DRAWING NO		RESTRICTED TO	
SCALE		SHEET	
2.1		OF	
REV		B	

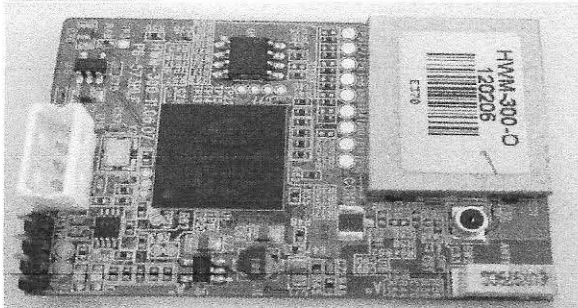
360	1513472-5
595	1513472-1
A	PART NUMBER

TEST REPORT

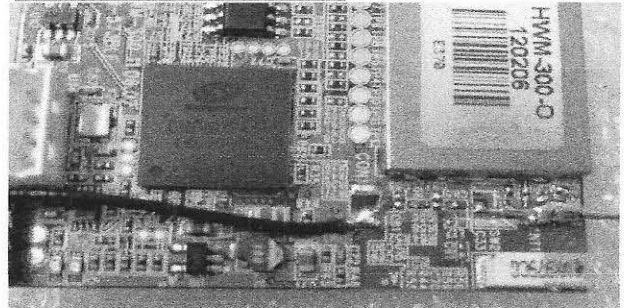
Date : 2012-08-14
Tester : LEE, CHANG HYUN

Project Name : WIFI ANTENNA
of Testing : LG창원 전기오븐 안테나 TEST
Test Description : Passive test
Customer : LG

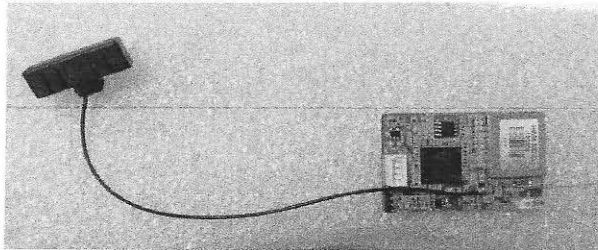
MODULE 사진



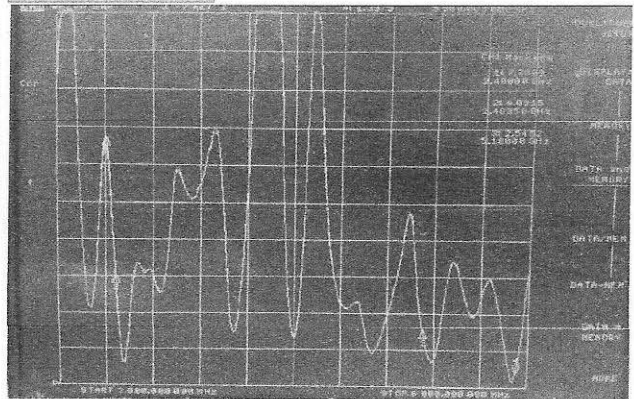
MODULE + CABLE DIRECT 연결



CHAMBER 측정 사진



안테나 VSWR DATA



CABLE 연결 PASSIVE GAIN

Frequency(MHz)	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15
	2300	2350	2400	2450	2500	2600	2700	5150	5250	5350	5470	5600	5725	5775	5850
Efficiency(dB)	-6.65	-7.52	-6.40	-5.48	-3.41	-2.87	-5.60	-3.80	-3.15	-5.15	-3.88	-5.28	-4.67	-4.56	-4.37
Efficiency(%)	21.65	17.71	22.91	28.30	45.57	50.47	28.19	43.67	48.35	38.56	42.81	29.64	34.13	35.01	36.58
TRG(dB)	-6.65	-7.52	-6.40	-5.48	-3.41	-2.87	-5.60	-3.80	-3.15	-5.15	-3.88	-5.28	-4.67	-4.56	-4.37
TRG _{meas} (dB)	-11.70	-11.8E	-10.18	-8.77	-6.53	-5.54	-7.8E	-7.08	-8.43	-8.15	-8.22	-7.42	-6.61	-6.23	-3.06
TRG _{ref} (dB)	-8.27	-5.51	-8.76	-8.23	-6.32	-6.47	-9.27	-6.18	-5.83	-8.17	-7.23	-9.38	-9.10	-9.52	-3.27
UHRG(dB)	-10.16	-11.22	-10.16	-9.22	-7.20	-6.61	-9.53	-6.89	-6.55	-8.42	-6.54	-7.98	-7.36	-7.25	-7.22
UHRG _{ref} (TRG(%))	44.53	42.67	42.04	42.29	41.78	41.28	39.56	46.91	45.76	47.12	51.77	53.74	55.84	53.84	51.85
H-Plane	-11.64	-12.41	-11.68	-10.34	-7.83	-6.63	-8.11	-7.57	-6.03	-7.02	-5.23	-6.13	-5.06	-4.48	-4.40
E1-Plane, AVG(dB)	-13.79	-13.84	-11.84	-10.25	-7.98	-7.58	-10.69	-7.65	-7.93	-11.12	-8.76	-10.29	-8.65	-7.73	-7.95
E2-Plane, AVG(dB)	-11.27	-11.72	-10.24	-9.2	-7.05	-6.04	-7.05	-5.71	-4.94	-6.48	-4.98	-5.77	-4.91	-4.81	-4.54
Peak Gain(dB)	-1.99	-2.80	-1.81	-0.7	1.34	1.22	-0.53	1.58	2.86	1.12	2.20	0.38	0.81	0.22	0.82

WIFI 2G 대역: (Efficiency(%) AVG : 32.2%
WIFI 5G 대역 : (Efficiency(%) AVG : 37.5%

위 Report는 WIFI 안테나의 Cable 길이 조정/단자작업/PCB Soldering 작업 적용 시의 참고용 test report임.

Statement of Compliance

Requested Part

14 August 2012

1513472-5

(Part 1 of 1)

UAM Assembly 360mm cable

Status: Active

EU RoHS/ELV Code: Always EU RoHS/ELV Compliant

Solder Process Capability Code: Not applicable for solder process capability

China RoHS:  No Restricted Materials Above Threshold

Exemptions: No Substance>Threshold

REACH Oct 2008 SvHC Compliance: Contains no REACH October 2008 SvHC(s)

REACH Jan/Mar 2010 SvHC Compliance: Contains no REACH Jan/Mar 2010 SvHC(s)

REACH June 2010 SvHC Compliance: Contains no REACH June 2010 SvHC(s)

REACH Dec 2010 SvHC Compliance: Contains no REACH December 2010 SvHC(s)

REACH June 2011 SvHC Compliance: Contains no REACH June 2011 SvHC(s)

REACH December 2011 SvHC Compliance: Contains no REACH December 2011 SvHC(s)

REACH June 2012 SvHC Compliance: Not reviewed for REACH June 2012 SvHC(s)

Halogen Content: Not Yet Reviewed for halogen content



David R. Bender

Director, Product Compliance

The part numbers that TE has identified as EU RoHS compliant have a maximum concentration of 0.1% by weight in homogenous materials for lead, hex chrome, mercury, PBB, PBDE, and 0.01% for cadmium, or qualify for an exemption to above limits as defined in the Annex of the EU RoHS Directive. Note that any exemptions taken in this case would not include application specific exemptions (e.g. lead in solder for servers) as TE cannot determine where component products will be used.

Additionally, the part numbers that are identified as 5 of 6 compliant meet the material limits described above, except that these products have lead in the solderable interface only. These products may be suitable for use in an application that has an exemption for the use of lead in solder (e.g. servers, network infrastructure, etc).

This information is provided based on reasonable inquiry of our suppliers and represents our current actual knowledge based on the information provided by our suppliers. This information is subject to change.

Test Report

No. : KA/2011/C1904

Date : 2012/01/02

CHI MEI CORPORATION

50-1 SAN CHIA, JEN TE, TAINAN CITY 71702, TAIWAN

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

Sample Description : ACRYLONITRILE-BUTADIENE-STYRENE COPOLYMER
 Style/Item No. : POLYLAC® PA-765B
 Sample Receiving Date : 2011/12/26
 Testing Period : 2011/12/26 TO 2012/01/02
 Sample Submitted By : CHI MEI CORPORATION

Test Requested : In accordance with the RoHS Directive 2011/85/EU Annex II

Test Result(s) : Please refer to next page(s).

Conclusion : Based on the performed tests on submitted samples, the test results of Cadmium, Lead, Mercury, Hexavalent Chromium Cr(VI), PBBs and PBDEs comply with the limits as set by RoHS Directive 2011/85/EU Annex II; recasting 2002/95/EC.

Ray Chang

Ray Chang / Asst. Manager
 Signed for and on behalf of
 SGS Taiwan Limited



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Test Report

No. : KA/2011/C1904

Date : 2012/01/02

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CHI MEI CORPORATION
59-1 SAN CHIA, JEN TE, TAINAN CITY 71702, TAIWAN

Test Result(s)

PART NAME No.1 : NATURE AYLONITRILE-BUTADIENE-STYRENE COPOLYMER

Test Item (s):	Unit	Method	MDL	Result No.1	Limit
Cadmium (Cd)	mg/kg	With reference to IEC 62321: 2008 and performed by ICP-AES.	2	n.d.	100
Lead (Pb)	mg/kg	With reference to IEC 62321: 2008 and performed by ICP-AES.	2	n.d.	1000
Mercury (Hg)	mg/kg	With reference to IEC 62321: 2008 and performed by ICP-AES.	2	n.d.	1000
Hexavalent Chromium Cr(VI)	mg/kg	With reference to IEC 62321: 2008 and performed by UV-VIS.	2	n.d.	1000
Sum of PBBs	mg/kg	With reference to IEC 62321: 2008 and performed by GC/MS.	-	n.d.	1000
Monobromobiphenyl	mg/kg		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.	-
Sum of PBDEs	mg/kg		-	n.d.	1000
Monobromodiphenyl ether	mg/kg		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.	-

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Test Report

No. : KA/2011/C1904

Date : 2012/01/02

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CHI MEI CORPORATION

59-1 SAN CHIA, JEN TE, TAINAN CITY 71702, TAIWAN

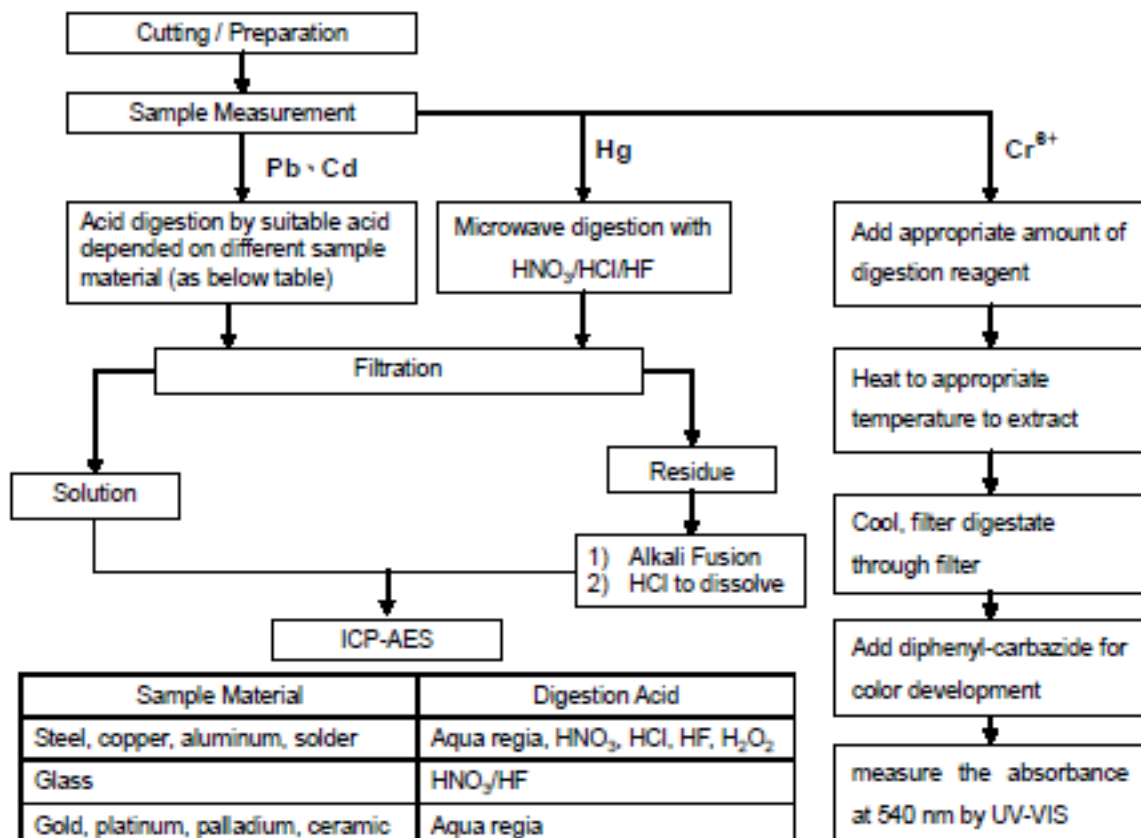
Note :

1. mg/kg = ppm : 0.1wt% = 1000ppm
2. n.d. = Not Detected
3. MDL = Method Detection Limit
4. " - " = Not Regulated

CHI MEI CORPORATION

59-1 SAN CHIA, JEN TE, TAINAN CITY 71702, TAIWAN

- 1) These samples were dissolved totally by pre-conditioning method according to below flow chart.
(Cr⁶⁺ test method excluded)
- 2) Name of the person who made measurement: Alex Chang
- 3) Name of the person in charge of measurement: Ray Chang

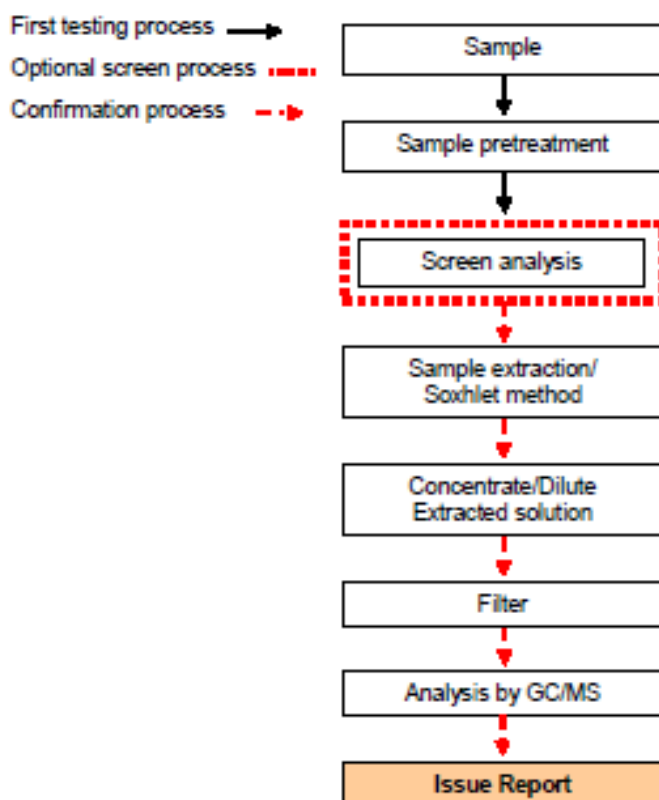


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CHI MEI CORPORATION
59-1 SAN CHIA, JEN TE, TAINAN CITY 71702, TAIWAN

PBB/PBDE analytical FLOW CHART

- Name of the person who made measurement: Anson Tsao
- Name of the person in charge of measurement: Ray Chang



Test Report

No. : KA/2011/C1904

Date : 2012/01/02

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CHI MEI CORPORATION
59-1 SAN CHIA, JEN TE, TAINAN CITY 71702, TAIWAN

* The tested sample / part is marked by an arrow if it's shown on the photo. *

KA/2011/C1904



** End of Report **

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