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)

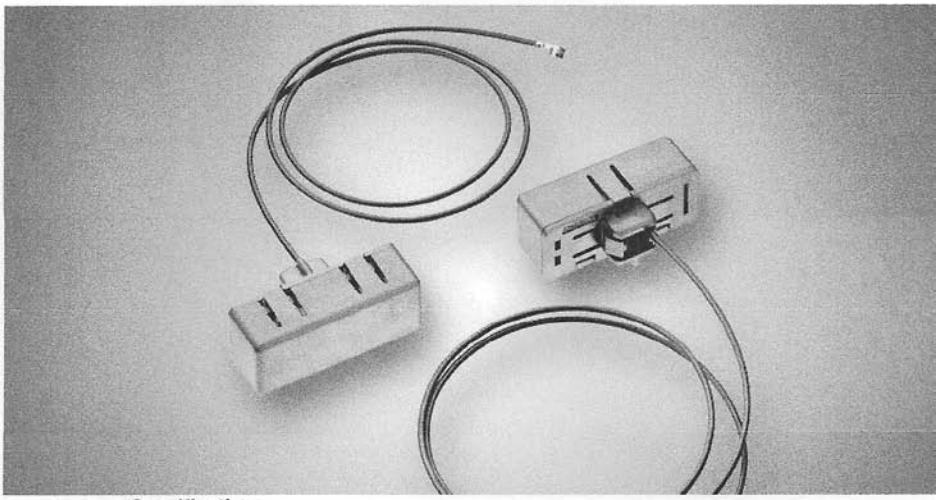
Part Number: 1513472-5

Product Facts

- Universal antenna module assembly.
- RoHS compliant

Recommendations

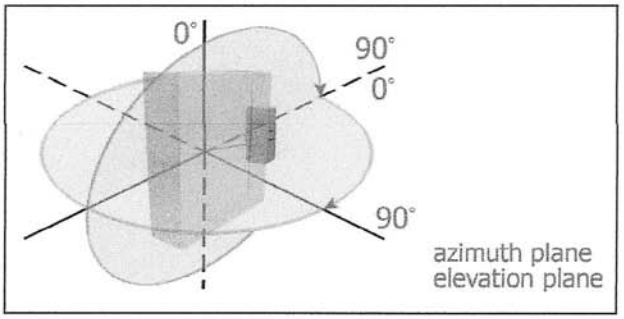
- Antenna is to be mounted on a metal chassis.
- Panel thickness must be between .8mm and 1mm.
- Performance and bandwidth is dependant on chassis size.



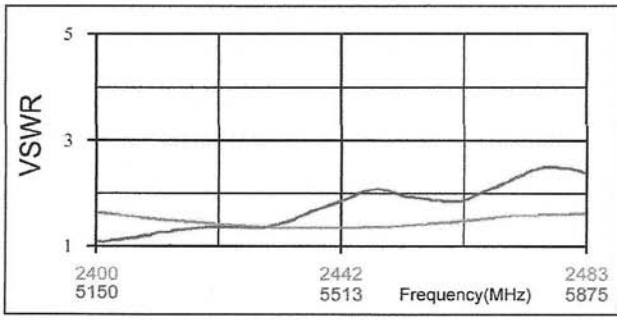
Specifications

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.FI connector
Note	Data shown was taken on a nominal size metal chassis

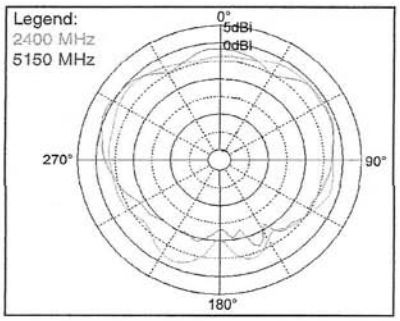
Test Orientation in Free Space



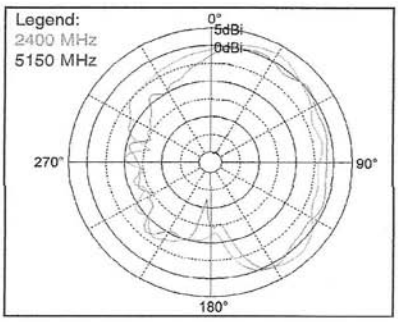
VSWR



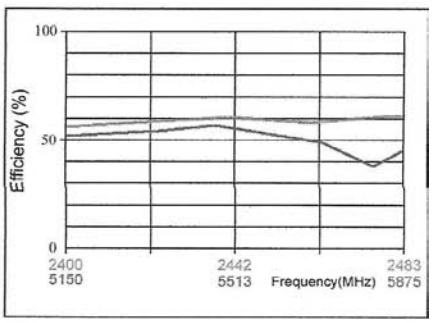
Azimuth



Elevation



Efficiency



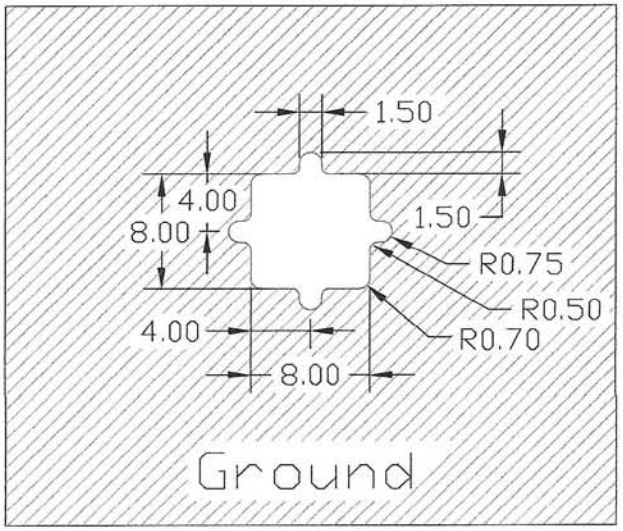
2400 –2483.5 & 5150 –5875 MHz Dual Band Antenna

(802.11 a/b/g/n, includes frequencies of Bluetooth, ZigBee, and Wi-Fi products)

Part Number: 1513472-5

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

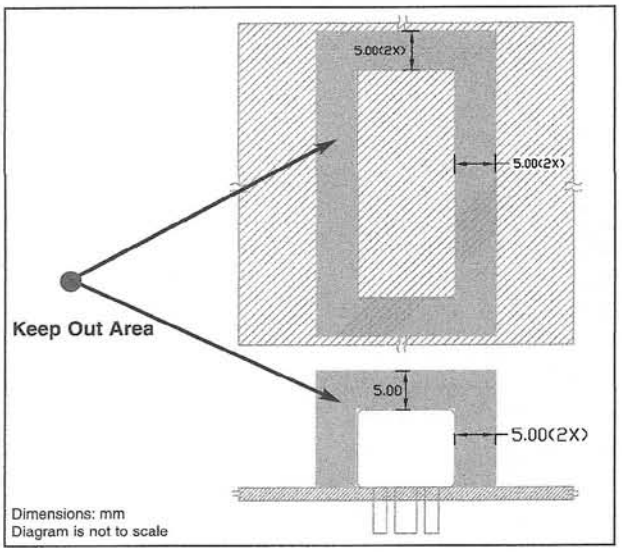
Mounting Guide



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

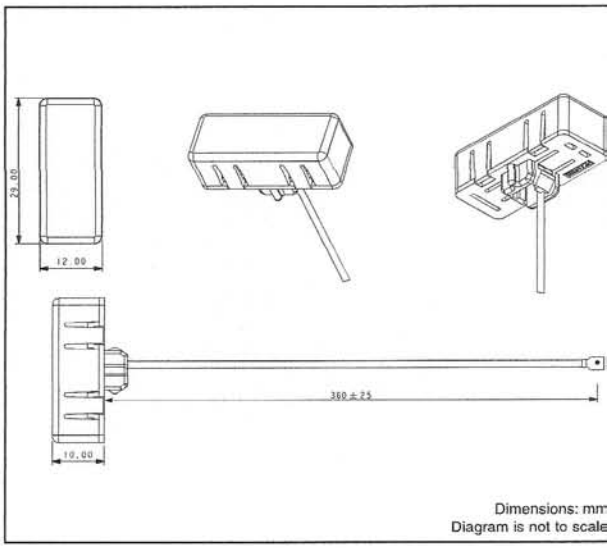
Dimensions: m
Diagram is not to sca

Keep Out Area



Dimensions: mm
Diagram is not to scale

Approx. Dimensions



Dimensions: mm
Diagram is not to scale

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

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

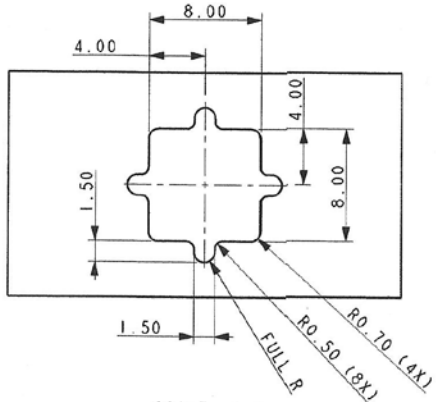
LOC	DIST
HQ	00

REVISIONS

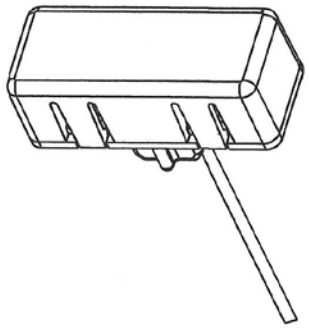
P	LTR	DESCRIPTION	DATE	DWN	APVD
	B	REV PER ECO 10-022420	02NOV2010	DW	GG

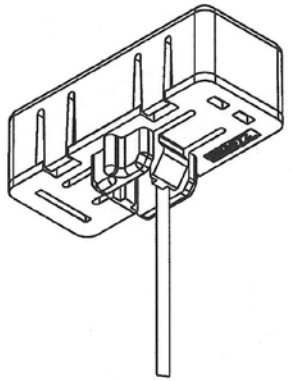
PANEL CUTOUT DIMENSIONS

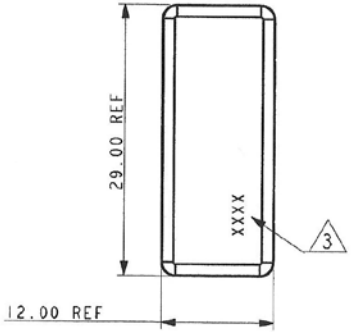
(Tolerances .XX ±0.10)

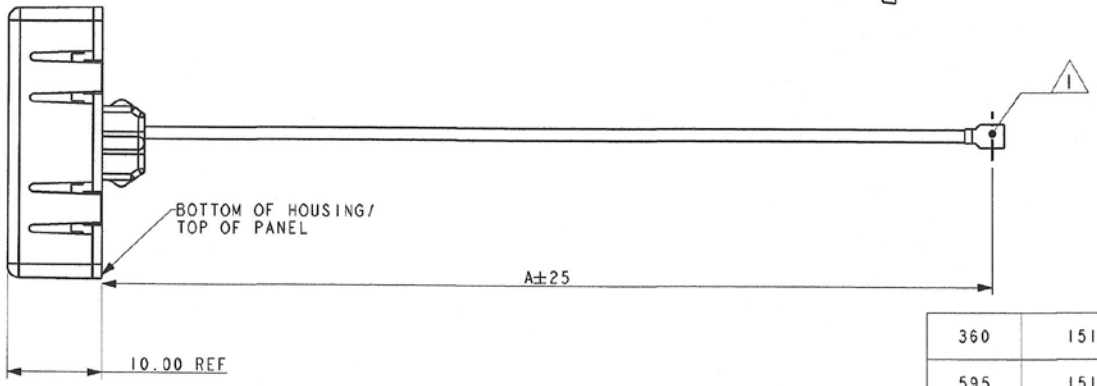


SCALE 3:1









360	1513472-5
595	1513472-1
A	PART NUMBER

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

THIS DRAWING IS A CONTROLLED DOCUMENT FOR TYCO ELECTRONICS CORPORATION IT IS SUBJECT TO CHANGE AND ITS CONTROLLING ENGINEERING ORGANIZATION SHOULD BE CONTACTED FOR THE LATEST REVISION

DIMENSIONS: mm

TOLERANCES UNLESS OTHERWISE SPECIFIED:
0 PLC ±-
1 PLC ±-
2 PLC ±-
3 PLC ±-
4 PLC ±-
ANGLES ±-

MATERIAL -
FINISH -

DWN APV 25FEB2009
CHK -
APVD -
PRODUCT SPEC -
APPLICATION SPEC -
WEIGHT -

Tyco Electronics
Rochester, NY 14623

NAME UNIVERSAL ANTENNA MODULE (UAM) WLAN

SIZE	CAGE CODE	DRAWING NO	RESTRICTED TO
A3	00779	C-1513472	-

CUSTOMER DRAWING | SCALE 2:1 | SHEET 1 OF 1 | REV B

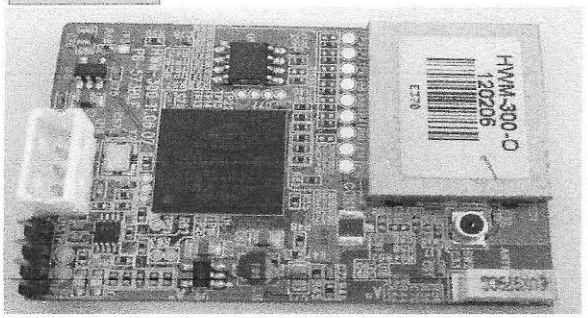
TEST REPORT

Date : 2012-08-14

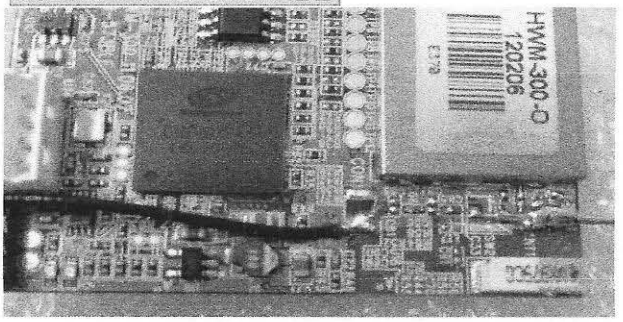
Tester : LEE. CHANG HYUN

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

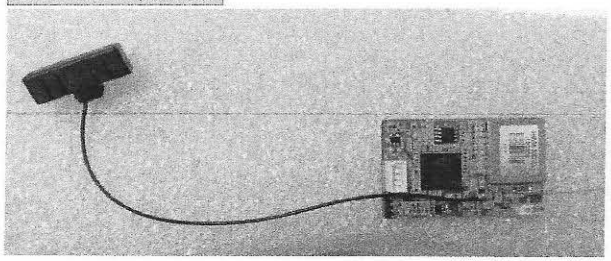
MODULE 사진



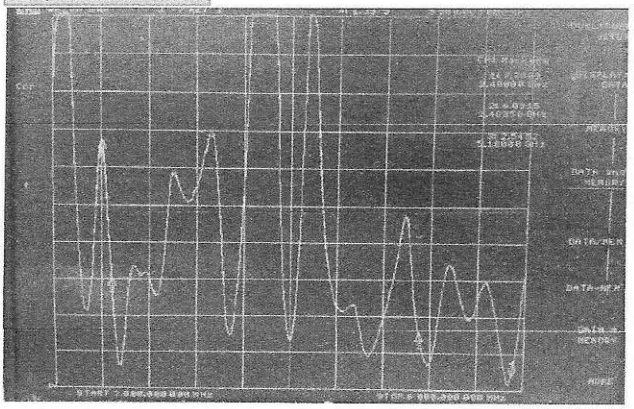
MODULE + CABLE DIRECT 연결



CHAMBER 측정 사진



안테나 VSWR DATA



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

CABLE 연결 PASSIVE GAIN

	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15
Frequency(MHz)	2300	2350	2400	2450	2500	2600	2700	5150	5250	5350	5470	5600	5725	5785	5850
Efficiency(dB)	-6.65	-7.52	-6.40	-5.48	-3.41	-2.97	-5.50	-3.60	-3.16	-5.15	-3.68	-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	30.56	42.81	29.64	34.13	35.01	36.58
TRG(dB)	-6.65	-7.52	-6.40	-5.48	-3.41	-2.97	-5.50	-3.60	-3.16	-5.15	-3.68	-5.28	-4.67	-4.56	-4.37
TRG_{Theta}(dB)	-11.70	-11.86	-10.18	-8.77	-6.53	-5.54	-7.86	-7.08	-6.43	-8.15	-6.22	-7.42	-6.61	-6.23	-6.06
TRG_{Phi}(dB)	-8.27	-9.51	-8.76	-8.23	-6.32	-6.47	-9.27	-6.18	-5.83	-8.17	-7.23	-9.38	-9.10	-9.52	-9.27
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(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	53.84	53.84	51.85
H-Plane	-11.64	-12.41	-11.68	-10.34	-7.83	-6.63	-8.11	-7.57	-6.09	-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	-7.56	-10.69	-7.65	-7.99	-11.12	-8.76	-10.29	-8.85	-7.73	-7.95
E2-Plane, AVG(dB)	-11.27	-11.73	-10.24	-9.27	-7.05	-6.04	-7.85	-5.71	-4.94	-6.48	-4.38	-5.77	-4.91	-4.81	-4.54
Peak Gain(dB)	-1.99	-2.80	-1.61	-0.77	1.34	1.22	-0.53	1.58	2.86	1.12	2.20	0.38	0.61	0.22	0.82

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
59-1 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 2011/65/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 2011/65/EU Annex II; recasting 2002/95/EC.

Ray Chang

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

SGS TAIWAN LTD SGS TAIWAN

Test Report

No. : KA/2011/C1904 Date : 2012/01/02

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.	-

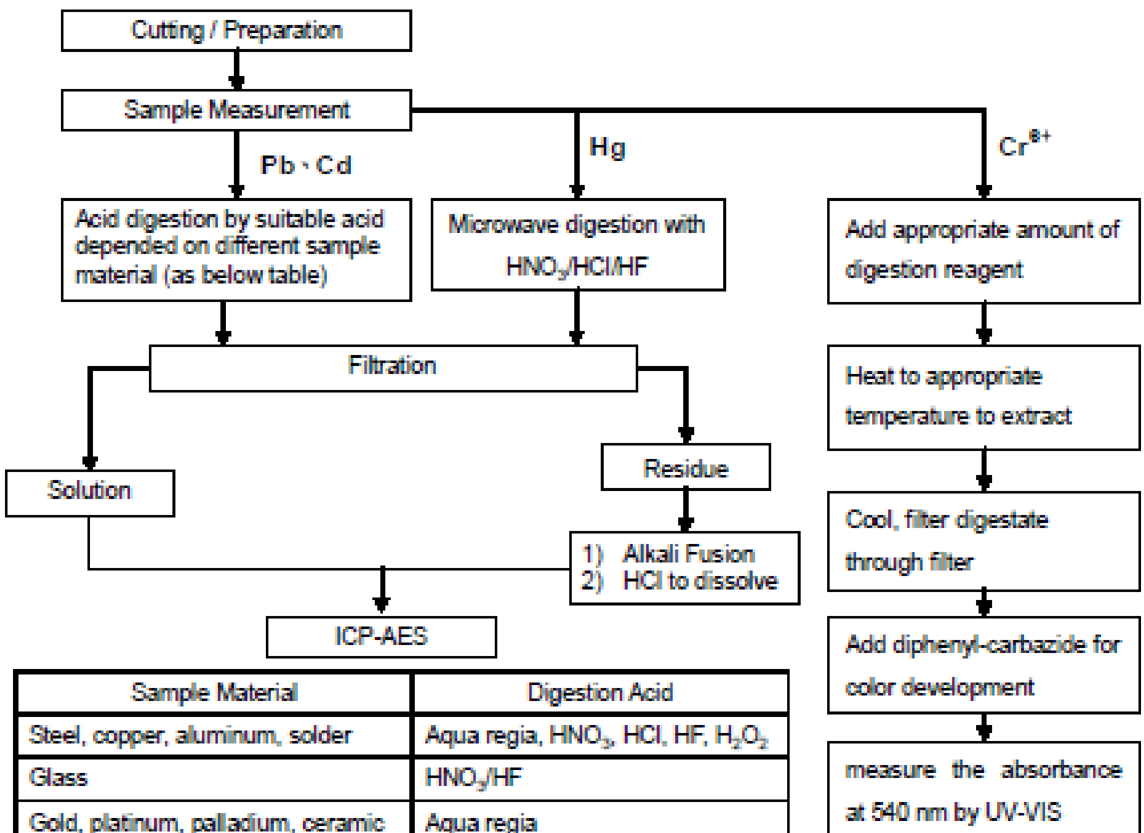
CHI MEI CORPORATION
59-1 SAN CHIA, JEN TE, TAINAN CITY 71702, TAIWAN

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. (Cr^{6+} test method excluded)
2) Name of the person who made measurement: Alex Chang
3) Name of the person in charge of measurement: Ray Chang

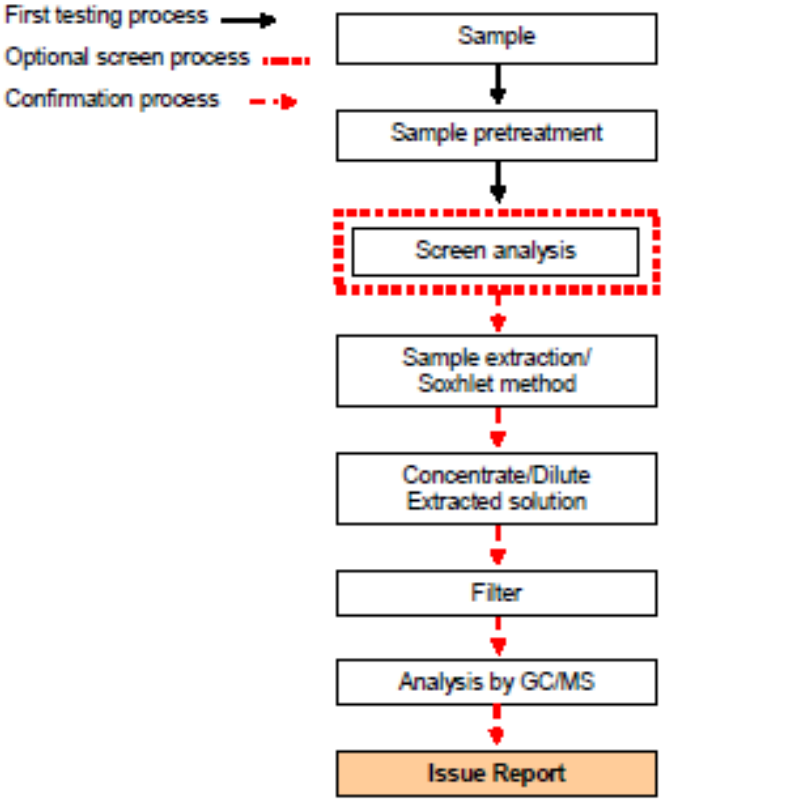


Sample Material	Digestion Acid
Steel, copper, aluminum, solder	Aqua regia, HNO_3, HCl, HF, H_2O_2
Glass	HNO_3/HF
Gold, platinum, palladium, ceramic	Aqua regia
Silver	HNO_3
Plastic	H_2SO_4, H_2O_2, HNO_3, HCl
Others	Any acid to total digestion

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



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 **

SGS Taiwan Ltd.
台灣檢驗科技股份有限公司
No. 85, Kaiyi Road, Nanzih Export Processing Zone, Kaohsiung, Taiwan / 高雄市楠梓加工出口區開發路85號
t + 886 (07)301 2121 f + 886 (07)3012687 www.sgs.tw
Member of the SGS Group