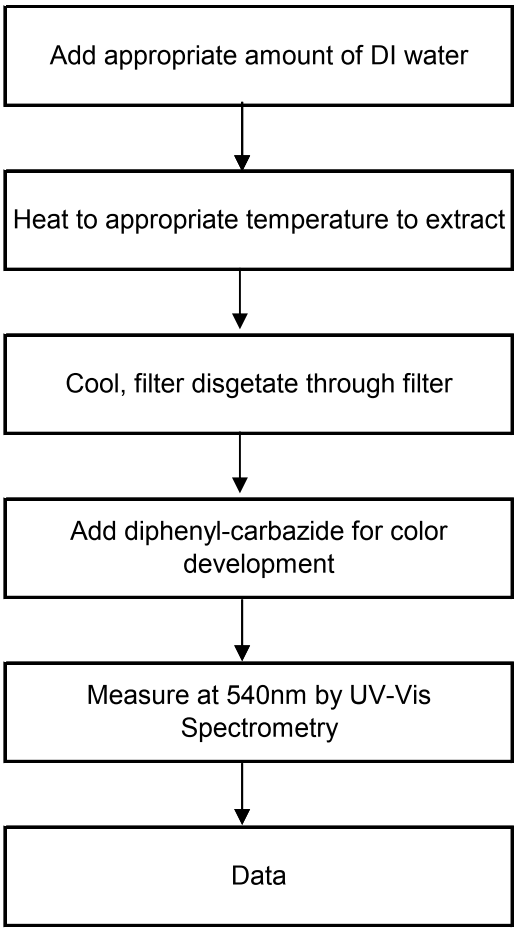
Process Flow of Cr(VI) by Boiling Water Extraction (IEC62321)



End of Report

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Test Report

SHAN DONG TIAN YUAN COPPER INDUSTRIAL CO.,LTD

DONG YING DISTRICT HUANG HE ROAD NO.36 DONG YING , SHAN DONG

The following sample(s) was/were submitted and identified on behalf of the clients as : PHOSPHOR BRONZE SUIP

SGS Job No. :	QP22-000227 - QD
Model No. :	C5210/QSN8-0.3
Date of Sample Received :	17 Jan 2022
Testing Period :	17 Jan 2022 - 20 Jan 2022
Test Requested :	Selected test(s) as requested by client.
Test Method :	Please refer to next page(s).
Test Results :	Please refer to next page(s).
Conclusion :	Based on the performed tests on submitted sample(s), the results of Lead, Mercury, Cadmium, Hexavalent chromium, Polybrominated biphenyls (PBBs), Polybrominated diphenyl ethers (PBDEs) and Phthalates such as Bis(2-ethylhexyl) phthalate (DEHP) , Butyl benzyl phthalate (BBP), Dibutyl phthalate (DBP) , and Diisobutyl phthalate (DIBP) comply with the limits as set by RoHS Directive (EU) 2015/863 amending Annex II to Directive 2011/65/EU.

Signed for and on behalf of
SGS-CSTC Standards Technical Services (Qingdao) Co., Ltd.

Wang Bo, Claire
Approved Signatory

scan to see the report

18297C0C

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Test Results :

Test Part Description :

Specimen No.	SGS Sample ID	Description
SN1	TAO22-002981.001	coppery metal board

Remarks :

(1) 1 mg/kg = 0.0001%
(2) MDL = Method Detection Limit
(3) ND = Not Detected (< MDL)
(4) "-" = Not Regulated

RoHS Directive (EU) 2015/863 amending Annex II to Directive 2011/65/EU

Test Method : With reference to IEC 62321-5:2013, IEC 62321-4:2013+AMD1:2017, IEC 62321-7-1:2015, IEC 62321-6:2015 and IEC62321-8:2017, analyzed by ICP-OES,AAS, UV-Vis and GC-MS.

Test Item(s)	Limit	Unit	MDL	*001*
Cadmium (Cd)	100	mg/kg	2	ND
Lead (Pb)	1000	mg/kg	2	ND
Mercury (Hg)	1000	mg/kg	2	ND
Hexavalent Chromium (Cr(VI))▾	-	µg/cm²	0.10	ND
Sum of PBBs	1000	mg/kg	-	ND
Monobromobiphenyl	-	mg/kg	5	ND
Dibromobiphenyl	-	mg/kg	5	ND
Tribromobiphenyl	-	mg/kg	5	ND
Tetrabromobiphenyl	-	mg/kg	5	ND
Pentabromobiphenyl	-	mg/kg	5	ND
Hexabromobiphenyl	-	mg/kg	5	ND
Heptabromobiphenyl	-	mg/kg	5	ND
Octabromobiphenyl	-	mg/kg	5	ND
Nonabromobiphenyl	-	mg/kg	5	ND
Decabromobiphenyl	-	mg/kg	5	ND
Sum of PBDEs	1000	mg/kg	-	ND
Monobromodiphenyl ether	-	mg/kg	5	ND
Dibromodiphenyl ether	-	mg/kg	5	ND
Tribromodiphenyl ether	-	mg/kg	5	ND
Tetrabromodiphenyl ether	-	mg/kg	5	ND
Pentabromodiphenyl ether	-	mg/kg	5	ND
Hexabromodiphenyl ether	-	mg/kg	5	ND

检验检测专用章 Inspection & Testing Services

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Test Item(s)	Limit	Unit	MDL	*001*
Heptabromodiphenyl ether	-	mg/kg	5	ND
Octabromodiphenyl ether	-	mg/kg	5	ND
Nonabromodiphenyl ether	-	mg/kg	5	ND
Decabromodiphenyl ether	-	mg/kg	5	ND
Dibutyl phthalate (DBP)	1000	mg/kg	50	ND
Butyl benzyl phthalate (BBP)	1000	mg/kg	50	ND
Bis (2-ethylhexyl) phthalate (DEHP)	1000	mg/kg	50	ND
Diisobutyl Phthalates (DIBP)	1000	mg/kg	50	ND

Notes :

(1) The maximum permissible limit is quoted from RoHS Directive (EU) 2015/863.

(2) IEC 62321 series is equivalent to EN 62321 series
https://www.cenelec.eu/dyn/www/f?p=104:30:1742232870351101::::FSP_ORG_ID,FSP_LANG_ID:1258637,25

(3) ▼= a. The sample is positive for CrVI if the CrVI concentration is greater than 0.13 μg/cm². The sample coating is considered to contain CrVI

b. The sample is negative for CrVI if CrVI is ND (concentration less than 0.10 μg/cm²). The coating is considered a non-CrVI based coating

c. The result between 0.10 μg/cm² and 0.13 μg/cm² is considered to be inconclusive - unavoidable coating variations may influence the determination

Information on storage conditions and production date of the tested sample is unavailable and thus Cr(VI) results represent status of the sample at the time of testing.

(4) The restriction of DEHP, BBP, DBP and DIBP shall apply to medical devices, including in vitro medical devices, and monitoring and control instruments, including industrial monitoring and control instruments, from 22 July 2021.

检验检测专用章 Inspection & Testing Services

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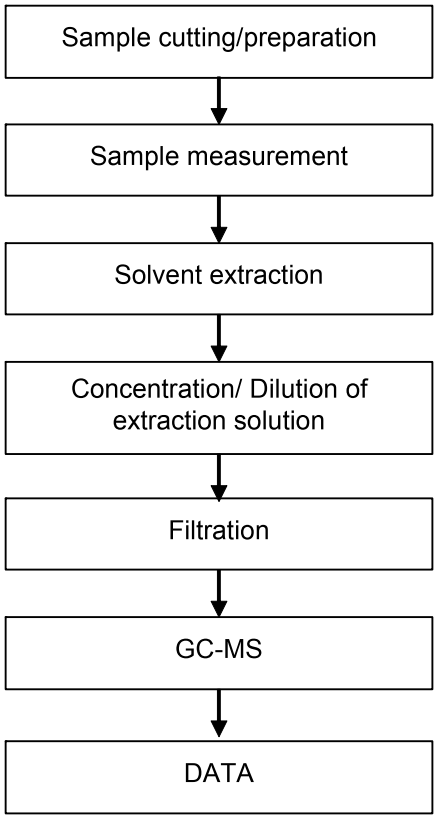
PBBs/PBDEs Testing Flow Chart



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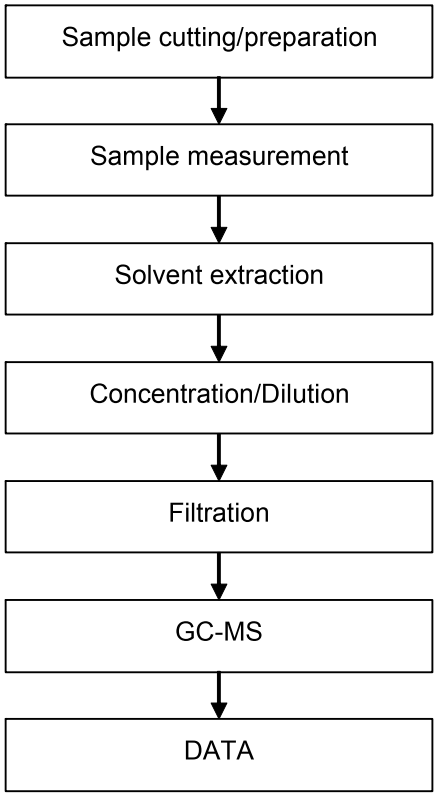
Phthalates Testing Flow Chart



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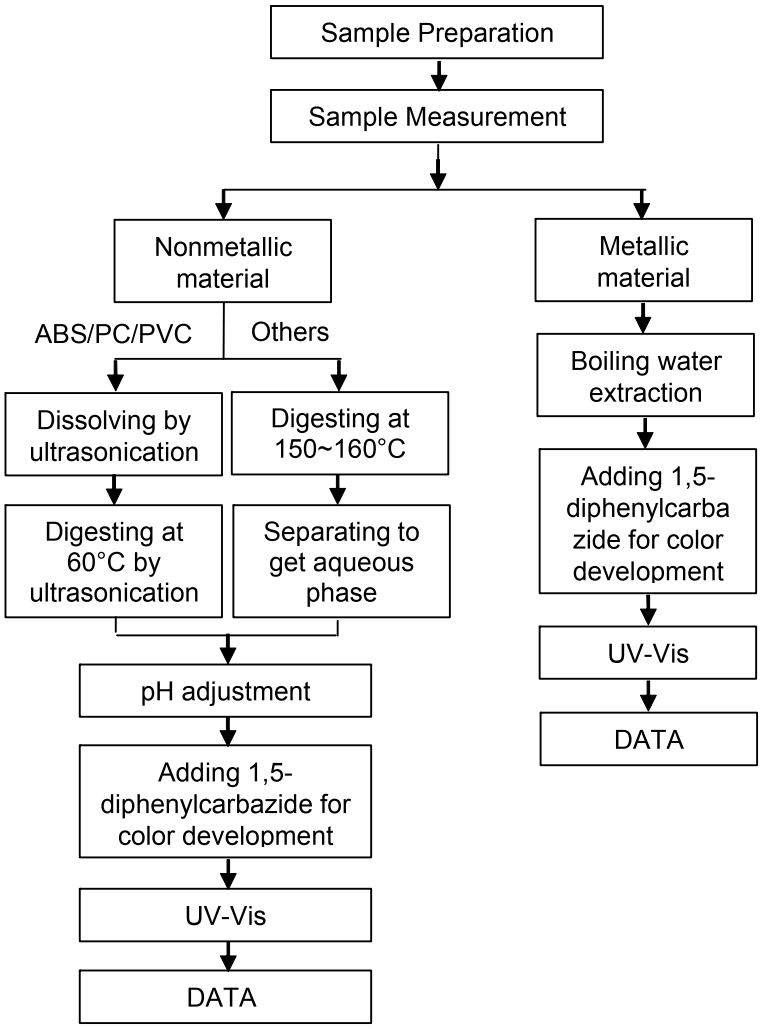
Hexavalent Chromium (Cr(VI)) Testing Flow Chart



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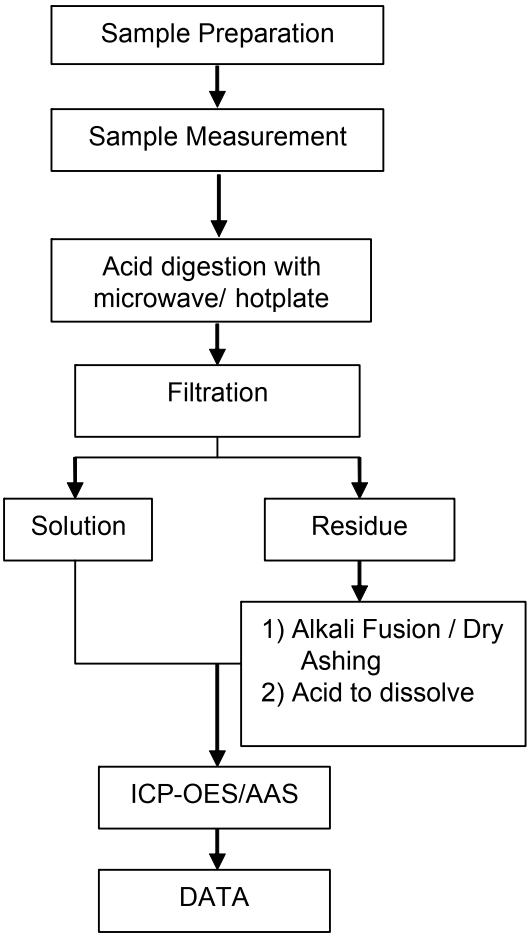
Elements (IEC62321) Testing Flow Chart

1) These samples were dissolved totally by pre-conditioning method according to below flow chart.



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Sample photo:

TAO22-002981.001

SGS authenticate the photo on original report only

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www.sgs.com.tw

Test Report

No.: ETR22801117 Date: 10-Aug-2022

I-PEX INC.
1-33-10 MORINO, MACHIDA-CITY, TOKYO 194-0022,JAPAN

The following sample(s) was/were submitted and identified by the applicant as:

Sample Submitted By	:	I-PEX INC.
Sample Name	:	PLASTIC (1844-013-01)
Style/Item No.	:	DURANEX 310NF

==========

Sample Receiving Date	:	04-Aug-2022
Testing Period	:	04-Aug-2022 to 10-Aug-2022

Test Requested :
(1) As specified by client, with reference to RoHS 2011/65/EU Annex II and amending Directive (EU) 2015/863 to determine Cadmium, Lead, Mercury, Cr(VI), PBBs, PBDEs, DBP, BBP, DEHP, DIBP contents in the submitted sample(s).
(2) Please refer to next pages for the other item(s).

Test Results : Please refer to following pages.

Conclusion :
(1) Based on the performed tests on submitted sample(s), the test results of Cadmium, Lead, Mercury, Cr(VI), PBBs, PBDEs, DBP, BBP, DEHP, DIBP comply with the limits as set by RoHS Directive (EU) 2015/863 amending Annex II to Directive 2011/65/EU.

Troy Chang / Department Manager
Signed for and on behalf of
SGS TAIWAN LTD.
Chemical Laboratory - Taipei

CHECK REPORT
PIN CODE: E0455481

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I-PEX INC.
1-33-10 MORINO, MACHIDA-CITY, TOKYO 194-0022,JAPAN

Test Part Description

No.1 : WHITE PLASTIC PELLETS

Test Result(s)

Test Item(s)	Method	Unit	MDL	Result	Limit
				No.1	
Cadmium (Cd) (CAS No.: 7440-43-9)	With reference to IEC 62321-5: 2013, analysis was performed by ICP-OES.	mg/kg	2	n.d.	100
Lead (Pb) (CAS No.: 7439-92-1)	With reference to IEC 62321-5: 2013, analysis was performed by ICP-OES.	mg/kg	2	n.d.	1000
Mercury (Hg) (CAS No.: 7439-97-6)	With reference to IEC 62321-4: 2013+ AMD1: 2017, analysis was performed by ICP-OES.	mg/kg	2	n.d.	1000
Hexavalent Chromium Cr(VI) (CAS No.: 18540-29-9)	With reference to IEC 62321-7-2: 2017, analysis was performed by UV-VIS.	mg/kg	8	n.d.	1000
Monobromobiphenyl	With reference to IEC 62321-6: 2015, analysis was performed by GC/MS.	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 PBBs		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.	-
Sum of PBDEs		mg/kg	-	n.d.	1000

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I-PEX INC.
1-33-10 MORINO, MACHIDA-CITY, TOKYO 194-0022,JAPAN

Test Item(s)	Method	Unit	MDL	Result	Limit
				No.1	
Butyl benzyl phthalate (BBP) (CAS No.: 85-68-7)	With reference to IEC 62321-8: 2017, analysis was performed by GC/MS.	mg/kg	50	n.d.	1000
Dibutyl phthalate (DBP) (CAS No.: 84-74-2)	With reference to IEC 62321-8: 2017, analysis was performed by GC/MS.	mg/kg	50	n.d.	1000
Di-(2-ethylhexyl) phthalate (DEHP) (CAS No.: 117-81-7)	With reference to IEC 62321-8: 2017, analysis was performed by GC/MS.	mg/kg	50	n.d.	1000
Diisobutyl phthalate (DIBP) (CAS No.: 84-69-5)	With reference to IEC 62321-8: 2017, analysis was performed by GC/MS.	mg/kg	50	n.d.	1000
Chlorine (Cl) (CAS No.: 22537-15-1)	With reference to BS EN 14582: 2016, analysis was performed by IC.	mg/kg	50	n.d.	-
Bromine (Br) (CAS No.: 10097-32-2)	With reference to BS EN 14582: 2016, analysis was performed by IC.	mg/kg	50	n.d.	-
Phosphorus (P) (CAS No.: 7723-14-0)	With reference to US EPA 3052: 1996, analysis was performed by ICP-OES.	mg/kg	2	24600	-

Note :

1. mg/kg = ppm ; 0.1wt% = 0.1% = 1000ppm
2. MDL = Method Detection Limit
3. n.d. = Not Detected (Less than MDL)
4. "-" = Not Regulated
5. Unless otherwise stated , the decision rule for conformity reporting is based on Binary Statement for Simple Acceptance Rule (w=0) stated in ILAC-G8:09/2019. According to this rule, the judgement of conformity is based on the comparing test results with limits.

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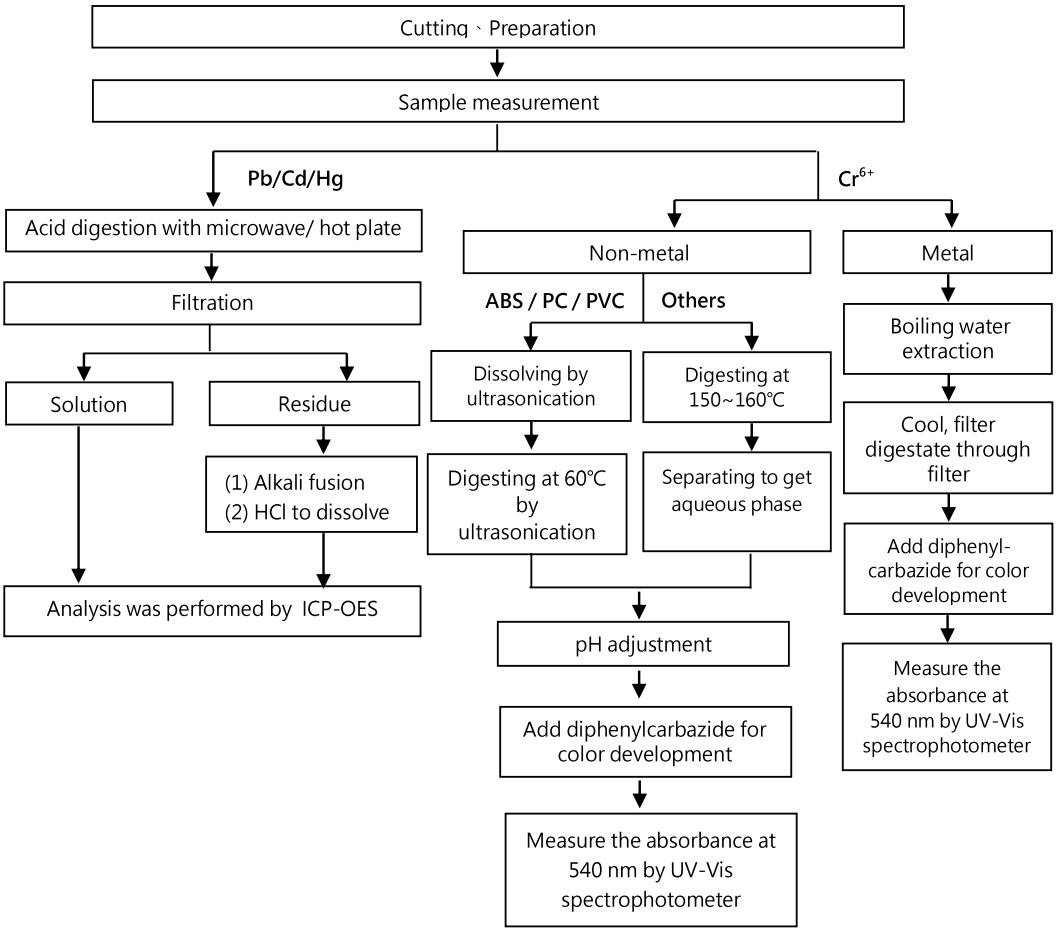
I-PEX INC.
1-33-10 MORINO, MACHIDA-CITY, TOKYO 194-0022,JAPAN

Analytical flow chart of heavy metal

These samples were dissolved totally by pre-conditioning method according to below flow chart.

(Cr^{6+} test method excluded)



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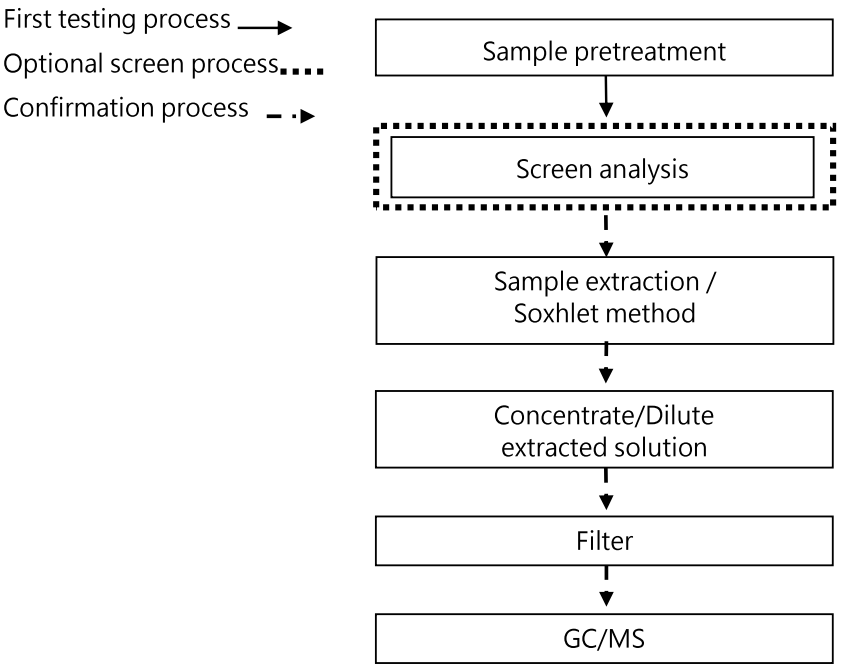
I-PEX INC.
1-33-10 MORINO, MACHIDA-CITY, TOKYO 194-0022,JAPAN

Analytical flow chart – PBBs / PBDEs



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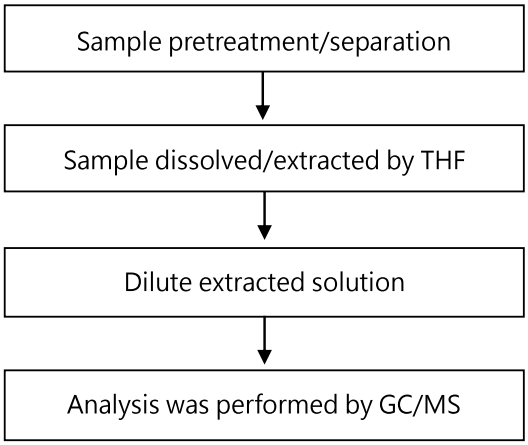
I-PEX INC.
1-33-10 MORINO, MACHIDA-CITY, TOKYO 194-0022,JAPAN

Analytical flow chart - Phthalate

【Test method: IEC 62321-8】



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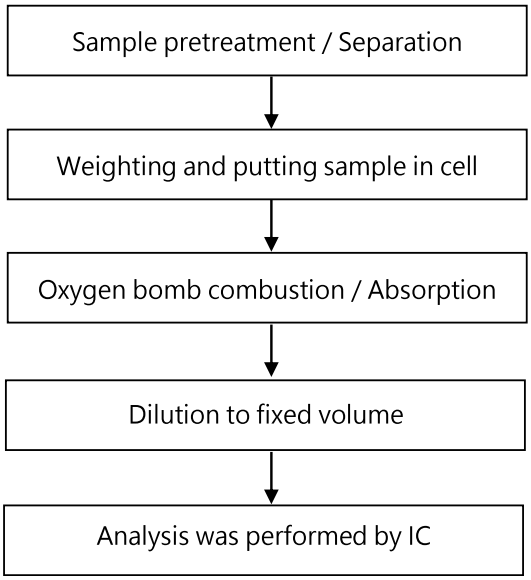
I-PEX INC.
1-33-10 MORINO, MACHIDA-CITY, TOKYO 194-0022,JAPAN

Analytical flow chart - Halogen



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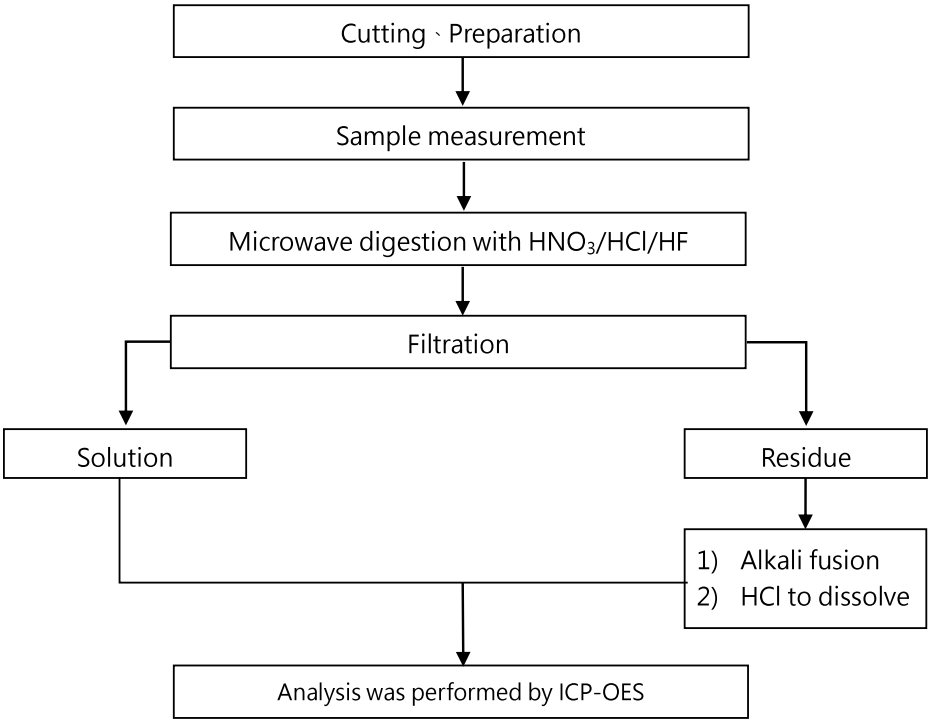
I-PEX INC.
1-33-10 MORINO, MACHIDA-CITY, TOKYO 194-0022,JAPAN

Analytical flow chart of elements (Heavy metal included)

These samples were dissolved totally by pre-conditioning method according to below flow chart.

【Reference method：US EPA 3051A、US EPA 3052】



* US EPA 3051A method does not add HF.

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I-PEX INC.
1-33-10 MORINO, MACHIDA-CITY, TOKYO 194-0022,JAPAN

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

ETR22801117

** End of Report **

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Test Report

No.: ETR22101691 Date: 13-Jan-2022

DEXERIALS CORPORATION
1724 SHIMOTSUBOYAMA, SHIMOTSUKE-SHI, TOCHIGI 323-0194, JAPAN

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

Sample Name	:	ADHESIVE
Style/Item No.	:	G9000 SERIES (G9000, G9000 C, G9000-SY, G9000W, G9010, G9011)
Lot No.	:	0L02
The Testing Sample	:	G9000-SY

==========

Sample Receiving Date	:	06-Jan-2022
Testing Period	:	06-Jan-2022 to 13-Jan-2022

Test Requested :
(1) As specified by client, with reference to RoHS Directive 2011/65/EU Annex II to determine Cadmium, Lead, Mercury, Cr(VI), PBBs, PBDEs contents in the submitted sample(s).
(2) As specified by client, to test Halogen-Fluorine, Chlorine, Bromine, Iodine in the submitted sample.

Test Results : Please refer to following pages.

Troy Chang / Manager - Tech
Signed for and on behalf of
SGS TAIWAN LTD.
Chemical Laboratory - Taipei

PIN CODE: D2C6BBD9

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DEXERIALS CORPORATION
1724 SHIMOTSUBOYAMA, SHIMOTSUKE-SHI, TOCHIGI 323-0194, JAPAN

Test Part Description

No.1 : TRANSPARENT DOUBLE SIDED ADHESIVE (EXCLUDING THE RELEASE LINER)

Test Result(s)

Test Item(s)	Method	Unit	MDL	Result
				No.1
Cadmium (Cd) (CAS No.: 7440-43-9)	With reference to IEC 62321-5: 2013, analysis was performed by ICP-OES.	mg/kg	2	n.d.
Lead (Pb) (CAS No.: 7439-92-1)		mg/kg	2	n.d.
Mercury (Hg) (CAS No.: 7439-97-6)	With reference to IEC 62321-4: 2013+ AMD1: 2017, analysis was performed by ICP-OES.	mg/kg	2	n.d.
Hexavalent Chromium Cr(VI) (CAS No.: 18540-29-9)	With reference to IEC 62321-7-2: 2017, analysis was performed by UV-VIS.	mg/kg	8	n.d.
Monobromobiphenyl	With reference to IEC 62321-6: 2015, analysis was performed by GC/MS.	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 PBBs		mg/kg	-	n.d.
Monobromodiphenyl ether	With reference to IEC 62321-6: 2015, analysis was performed by GC/MS.	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.
Sum of PBDEs		mg/kg	-	n.d.

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DEXERIALS CORPORATION
1724 SHIMOTSUBOYAMA, SHIMOTSUKE-SHI, TOCHIGI 323-0194, JAPAN

Test Item(s)	Method	Unit	MDL	Result
				No.1
Fluorine (F) (CAS No.: 14762-94-8)	With reference to BS EN 14582: 2016, analysis was performed by IC.	mg/kg	50	n.d.
Chlorine (Cl) (CAS No.: 22537-15-1)	With reference to BS EN 14582: 2016, analysis was performed by IC.	mg/kg	50	n.d.
Bromine (Br) (CAS No.: 10097-32-2)	With reference to BS EN 14582: 2016, analysis was performed by IC.	mg/kg	50	n.d.
Iodine (I) (CAS No.: 14362-44-8)	With reference to BS EN 14582: 2016, analysis was performed by IC.	mg/kg	50	n.d.

Note：

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

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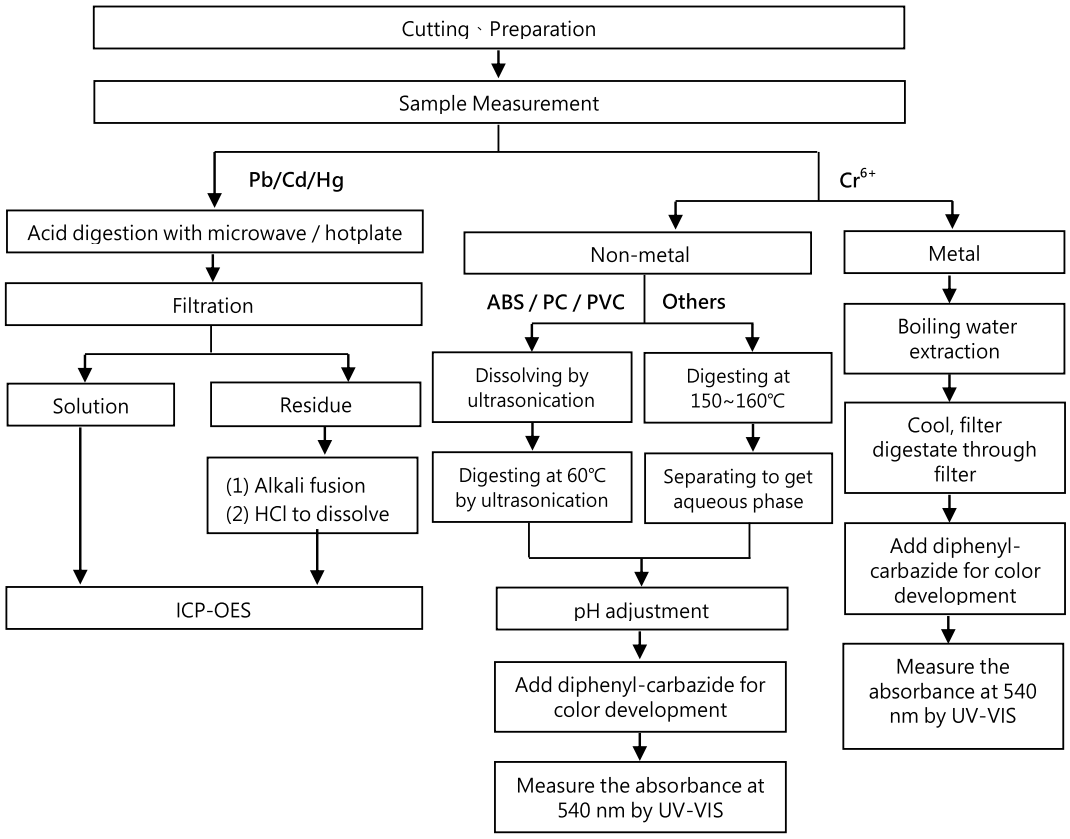
DEXERIALS CORPORATION
1724 SHIMOTSUBOYAMA, SHIMOTSUKE-SHI, TOCHIGI 323-0194, JAPAN

Analytical flow chart of Heavy Metal

These samples were dissolved totally by pre-conditioning method according to below flow chart.
(Cr^{6+} test method excluded)



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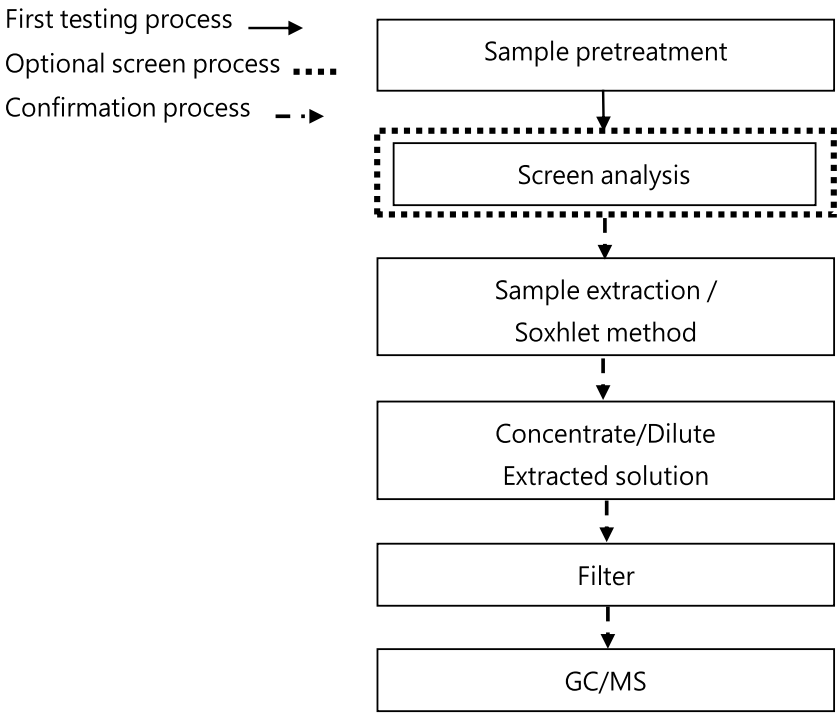
DEXERIALS CORPORATION
1724 SHIMOTSUBOYAMA, SHIMOTSUKE-SHI, TOCHIGI 323-0194, JAPAN

Analytical flow chart – PBBs / PBDEs



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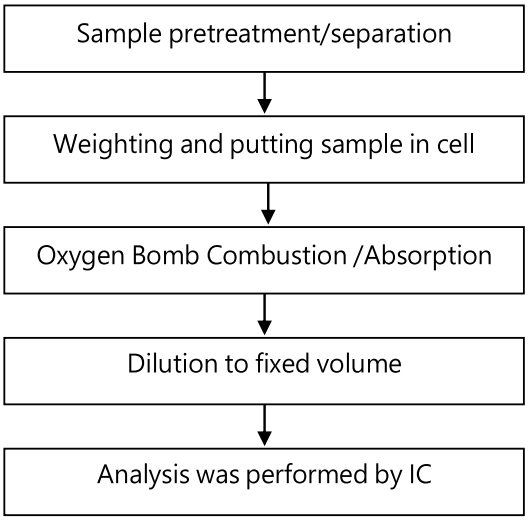
DEXERIALS CORPORATION
1724 SHIMOTSUBOYAMA, SHIMOTSUKE-SHI, TOCHIGI 323-0194, JAPAN

Analytical flow chart of Halogen



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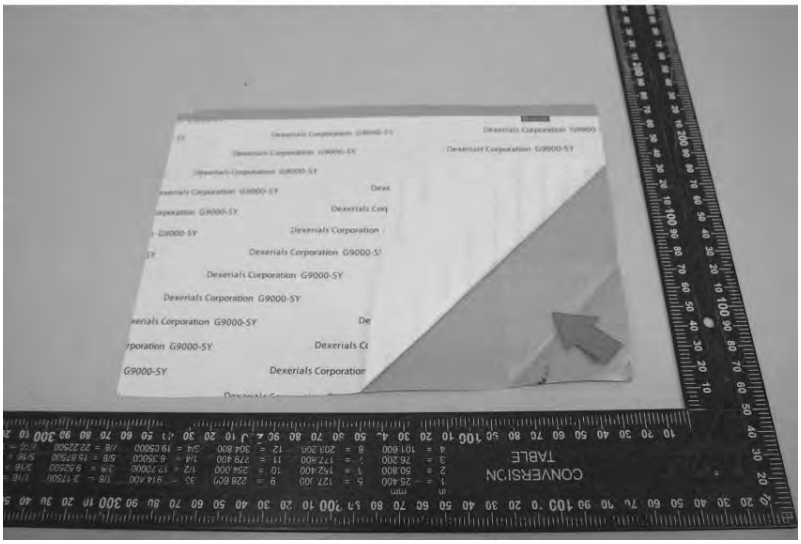
DEXERIALS CORPORATION
1724 SHIMOTSUBOYAMA, SHIMOTSUKE-SHI, TOCHIGI 323-0194, JAPAN

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

ETR22101691



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WIESON TECHNOLOGIES CO., LTD.

WIESON 3D CHAMBER TEST REPORT

WIESON

Customer:	**hitron**
Project Name:	**P90602**
WIESON P/N:	**GY196HC112-020**
Antenna Type:	**Dipole**
Version No. :	**01**

Contact Information:
Tel:02-2647-1896

PM: **Paul Lin**
paul_lin @wieson.com
Ext.6636

Engineer: Emily
emily_chang@wieson.com
Ext.6802

WIESON TECHNOLOGIES CO., LTD.

INDEX.

Revision History

Revision	Date	Engineer	Description
01	2023/02/21	Wade	NEW RELEASE

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I. ELECTRONIC CHARACTERISTICS

WiFi Dual Band Antenna

A3

Item	Specification	Specification
Operating Frequency(GHz)	2.4-2.5	5.15-5.85
Bandwidth	100 MHz (Min.)	700MHz (Min.)
Return Loss	10 dB (Typ)	10 dB (Typ)
Polarization	Linear	Linear
Azimuth Bandwidth	Omni-directional	Omni-directional
Peak Gain	1.96dBi (Max)	1.96dBi (Max)
Impedance	50Ω	50Ω
Material	PCB	PCB
Maximum Power	1W	1W
V.S.W.R	2 : 1(Typ)	2 : 1(Typ)
Radiation	Omni directional	Omni directional
Efficiency	>58%	>52%
Connector	MHF	MHF
Cable type	OD:1.37	OD:1.37
Operating Temperature	-10~60℃	-10~60℃
Storage temp	-10~70℃	-10~70℃

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Ⅱ. Summary：

This report to account for the measurement setup and result of the Antenna.
The measurement setup includes s-parameter, pattern, and gain measurement.
The measured data for Antenna are presented and analysis.

Ⅲ. S-Parameter Measurement：

A. Reflection coefficient :

(a) Instrument：Network Analyzer.

(b) Setup：

(1) Calibrate the Network Analyzer by one port calibration using O.S.L. calibration kits.
(2) Connect the antenna under test to the Network Analyzer.
(3) Measure the S11(reflection coefficient) shown in Fig. 1.
(4) Generally, the S11 is less than –10dB to ensure the 90% power into antenna and only less than 10% power back to system.

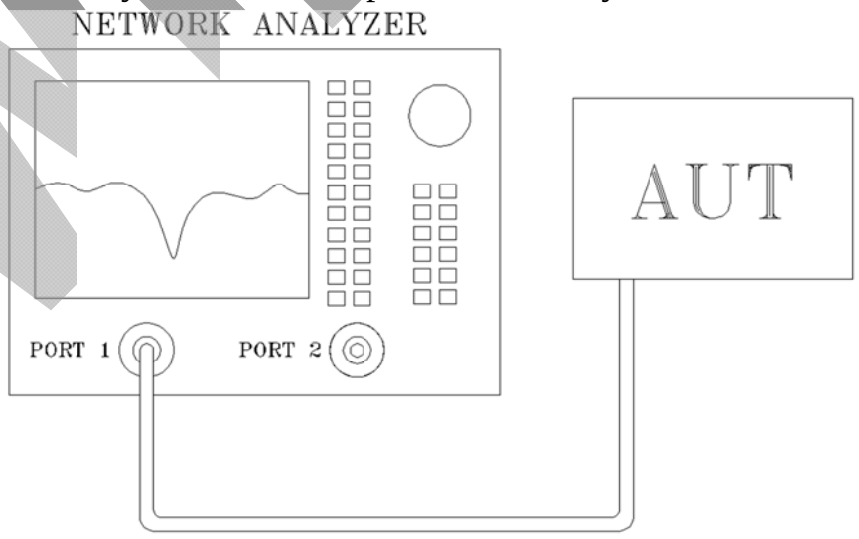
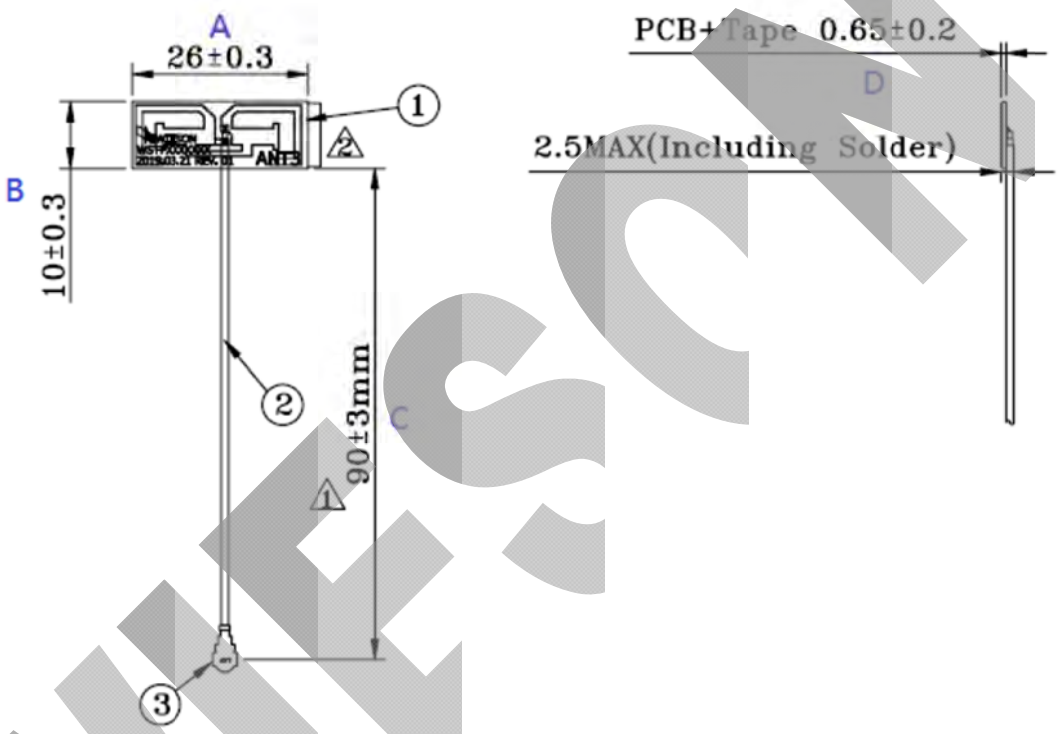


Fig.1 Antenna measured in Network Analyzer

WIESON

IV. Measure the physical dimension and value to see if it meets Hitron's specification：



Test Item	A	B	C	D
Value(mm)	26±0.3	10±0.3	90±3	0.65±0.2
Max	26.3	10.3	93	0.85
Min	25.7	9.7	87	0.45
1	26.05	10.04	90.33	0.65
2	26.05	10.10	89.49	0.65
3	26.06	10.07	90.74	0.66
4	26.00	10.03	89.68	0.67
5	26.05	10.07	90.16	0.65
Result	Pass	Pass	Pass	Pass

WIESON

VII. S-Parameter Measurement Result：

Dual Band Antenna

A3

Return Loss

Frequency (MHz)	2400	2450	2500	5150	5250	5350	5470	5600	5725	5785	5850
S11(dB)	-10.18	-18.26	-12.52	-12.06	-13.06	-13.00	-14.74	-15.76	-12.91	-14.24	-17.03

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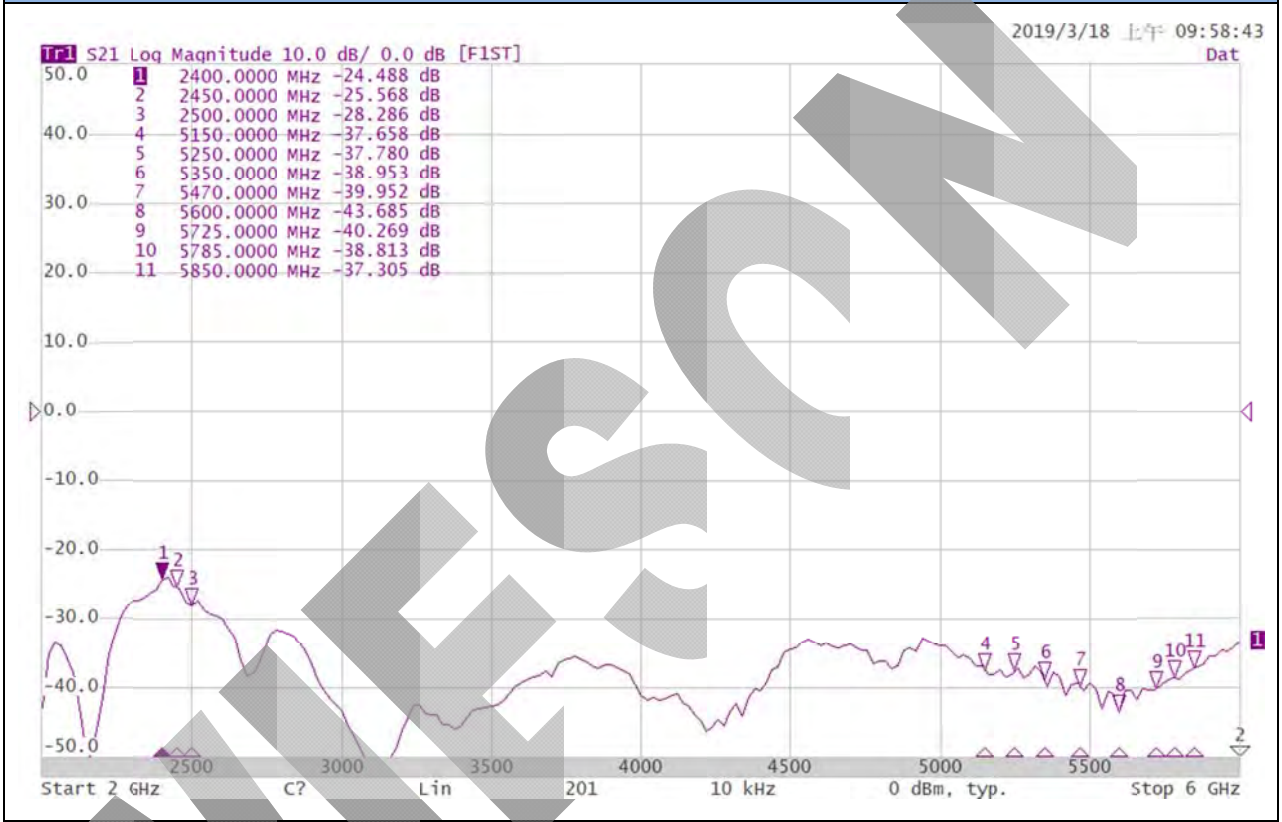
A1&A3

Isolation



Frequency (MHz)	2400	2450	2500	5150	5250	5350	5470	5600	5725	5785	5850
S11(dB)	-24.48	-25.56	-28.28	-37.65	-37.78	-38.95	-39.95	-43.68	-40.26	-38.81	-37.30

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A2&A3

Isolation

Frequency (MHz)	2400	2450	2500	5150	5250	5350	5470	5600	5725	5785	5850
S11(dB)	-28.27	-28.16	-31.65	-55.06	-39.13	-34.18	-33.61	-38.37	-41.52	-40.52	-36.66

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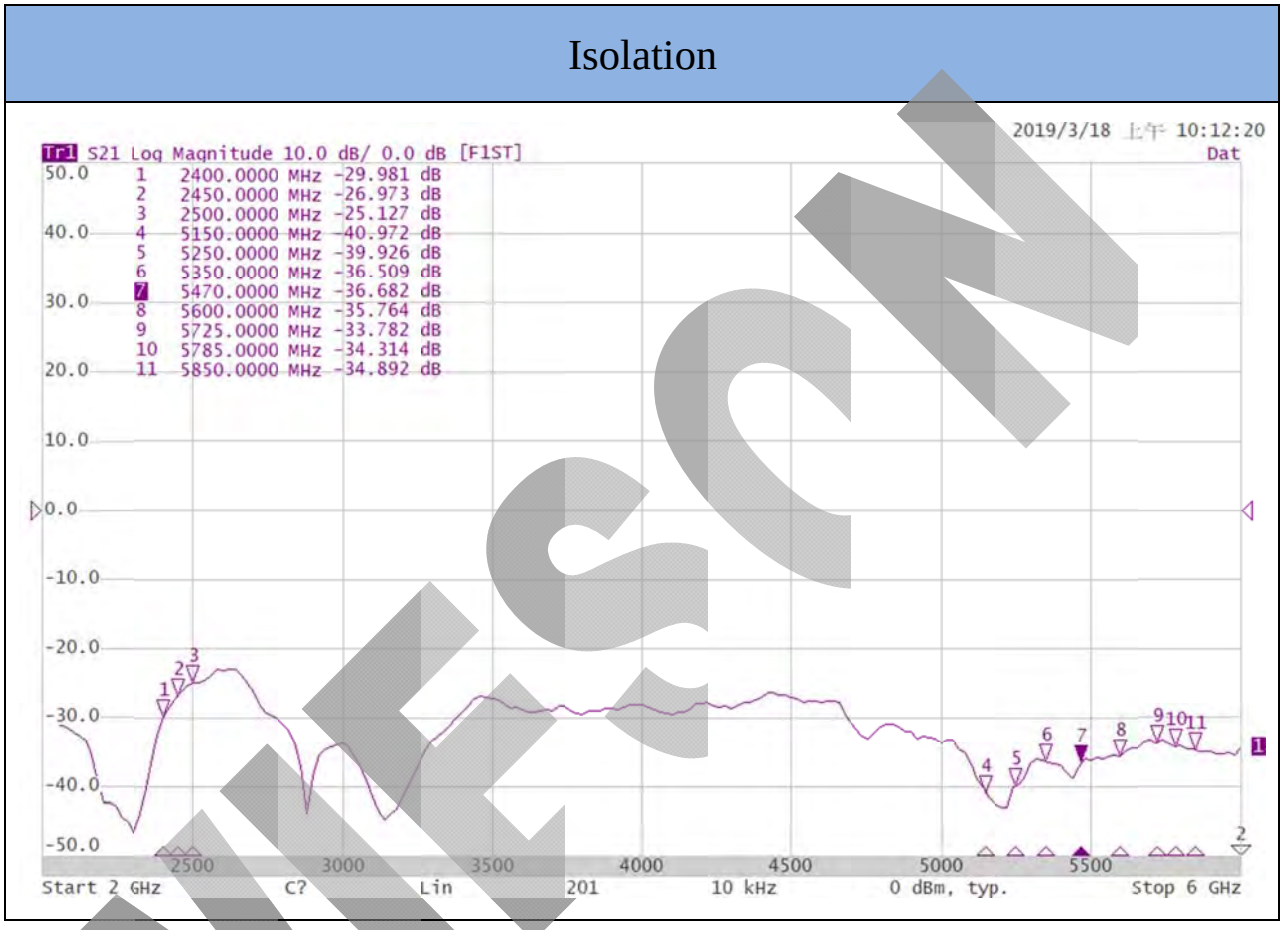
A3&A4

Isolation



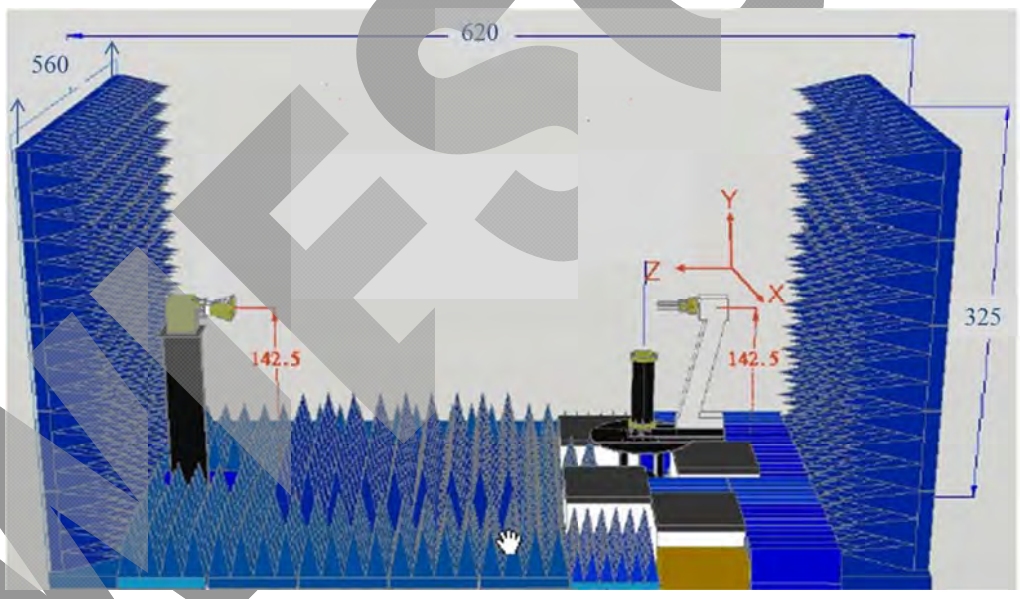
Frequency (MHz)	2400	2450	2500	5150	5250	5350	5470	5600	5725	5785	5850
S11(dB)	-29.98	-26.97	-25.12	-40.97	-39.92	-36.50	-36.68	-35.76	-33.78	-34.31	-34.89

WIESON

VIII. The Test Information Anechoic Chamber

A. Scope

This statement of work defines the requirements of a far-field antenna measurement range, which includes
(1) One 560 cm (W) x 325 cm (H) x 620 cm (L) Antenna Measurement Anechoic Chamber, detailed requirements refer section B .
(2) One Far-field Antenna Measurement System with spinning linear CP measurement capabilities, detailed requirement refer section E & F .
(3) One broad-band transmitted antenna, detailed requirements refer section G .



B. Antenna Measurement Anechoic Chamber

Fully anechoic chamber with dimension 560 cm in width, 325 cm in height and 620 cm in length. The quiet zone of this Chamber shall be greater than

WIESON

60 cm @ 400MHz~900MHz, 43 cm @2.4 GHz, 31 cm @5.8 GHz,. Contractor should be aware of this anechoic chamber is going to be used for performing far-filed antenna measurement.

C. Electrical specifications

Frequency Range: 400 MHz to 7.125 GHz,
Quiet zone size: >60 cm @ 400MHz~900MHz, >43 cm @2.4 GHz, >31 cm @5.8 GHz.
Quiet zone ripple: < +/- 1.5 dB @500(400)MHz~800MHz, < +/- 0.75 dB @800MHz~1.5GHz, < +/- 0.5 dB @1.5GHz~7.125GHz

Field Probing Frequency	**Peak-to-Peak Amplitude Taper (Within specified Quiet Zone Area)**	**Quiet Zone Size (cm)**	**Compliant**
0.9 GHz	< 0.75 dB	60	Yes
1.575 GHz	< 0.5 dB	43	Yes
1.8 GHz	< 0.5 dB	43	Yes
2.4 GHz	< 0.5 dB	43	Yes
5.8 GHz	< 0.5 dB	31	Yes

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D. Absorbers

We shall design and install proper absorbers on the inner walls of the chamber to guarantee the electrical specifications. However, the absorbers height shall be no less than 24" which enables the space in the chamber to be around 438 cm (W) x 203 cm (H) x 513 cm (L). All the absorber used shall meet NRL-8093 fire retardant regulations

E. Far-field Antenna Measurement System

We shall supply all the hardware and software which are capable of characterizing antenna radiation patterns from 30 KHz to 6 GHz using the existed Agilent 5230A PNA-L or Agilent 8753ES Vector Network Analyzer. The system shall be able to automatically measure and plot single axis amplitude and phase antenna patterns in either Cartesian or polar formats.

F. Far-field measurement software

The software consists of the control or data acquisition software and the data plotting software.

(1) The data acquisition software shall at least be capable of the following functions:
*measuring single frequency per cut - single axis (azimuth); system can automatically switch frequency at the end of a scan.
*measuring data in Uni-direction or bi-direction
*measuring data at least with azimuth 360 degrees. (+/- 180 degrees or 0-360 degrees)
*real time plot in Cartesian or polar format
*screen shows real time angle position

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*system automatically calculates S/N ratio level based on measured signal fluctuation
*function to set positioner zero position
*operator can set data taking velocity and data sampling interval
*entry to allow positioner offset to any angle

(2) The data plotting software shall at least be capable of the following functions:
*Editing plot data
*plotting data in Cartesian, Polar or delimited ASCII output with header information
*plotting data in linear or dB scales
*normalizing data to peak (dB), standard gain reference (dBi), or no normalization
*overlaying data, (drag and drop capability is preferable)
*outputting data to any Windows supported printers

G. Broadband Transmitted antenna

We shall provide a linear-polarized broadband antenna with the specifications better than those listed hereafter in this article,
Frequency: 0.5-6 GHz, Gain: >12 dBi @10 GHz, VSWR:<2,0:1, Front to Back Ration > 20 dB

H. Equipment list

Device	Ttype/Model	Serial#	Manufacturer	Cal. Date	Cal. Due Date
Anechoic Chamber	SpaceSacer 26H	3100508-182-00007	ETS-Lindgren	30-Jun-22	30-Jun-23
Dual Polarized Diagonal Horn A	3164	3164-03	ETS-Lindgren	30-Jun-22	30-Jun-23
Spectrum Analyzer(SA)	FSV、FSP	3100505-19-00011	RCHDE&SCHWARZ	24-Mar-20	24-Sep-23
Network Analyzer(NA)	ZNB4	-	RCHDE&SCHWARZ	24-Mar-20	24-Sep-23
Network Analyzer(NA)	R3767CG	130101611	ADVANTEST	24-Mar-20	24-Sep-23
Network Analyzer(NA)	C4209	3100505-53-00006	TS RF Instruments Co., Ltd.	24-Mar-20	24-Sep-23
universal radio communication t	CMW500、CMU200	101548/102977	RCHDE&SCHWARZ	28-May-20	28-Nov-23
Turn table Controller	EMCO 2090	23525	ETS(EMCO)	N/A	N/A
Slot Switch(SW)	Agilent 3499B	3100508-041-00001	Agilent	N/A	N/A
Power Amplifier(PA)	ZVE-8G+	SN427201705	PLANAR MONOLITHICS IN	28-May-20	28-Nov-23
Low-noise Amplifier(LNA)	ZFL-500	3100504-27-00014	MInI-Clrcuits	28-May-20	28-Nov-23

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X. Antenna Measurement Result(excluding cable)

Dual Band Antenna

A3

Freq(GHz)	Peak Gain(dBi)	3D-avg Gain(dBi)	Efficiency(%)
2.4	1.55	-2.36	58
2.45	1.96	-2.08	62
2.5	1.57	-2.40	58
5.15	1.51	-2.53	56
5.25	1.73	-2.18	60
5.35	1.92	-1.95	64
5.47	1.50	-2.31	59
5.6	1.21	-2.79	53
5.725	1.29	-2.81	52
5.785	1.31	-2.47	57
5.85	1.96	-2.42	57

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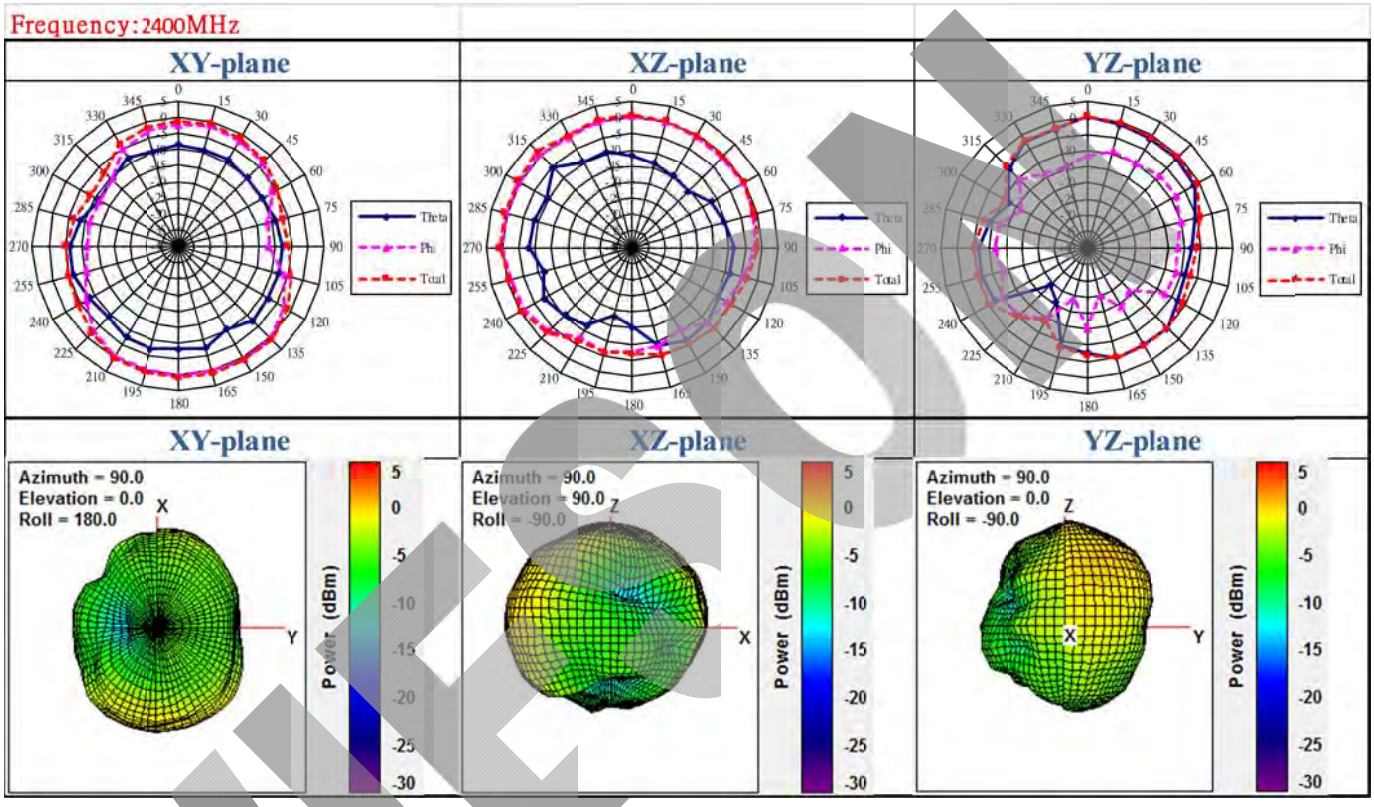
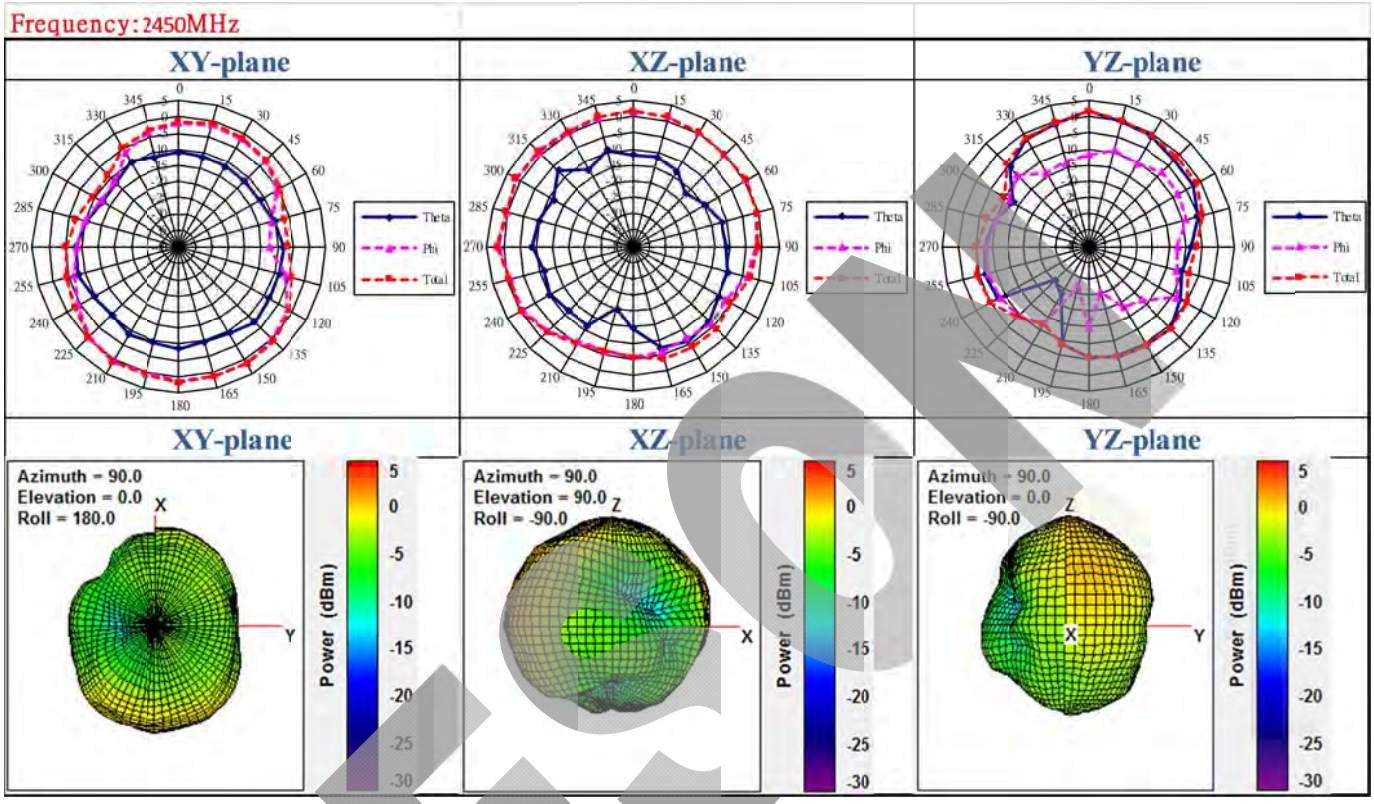
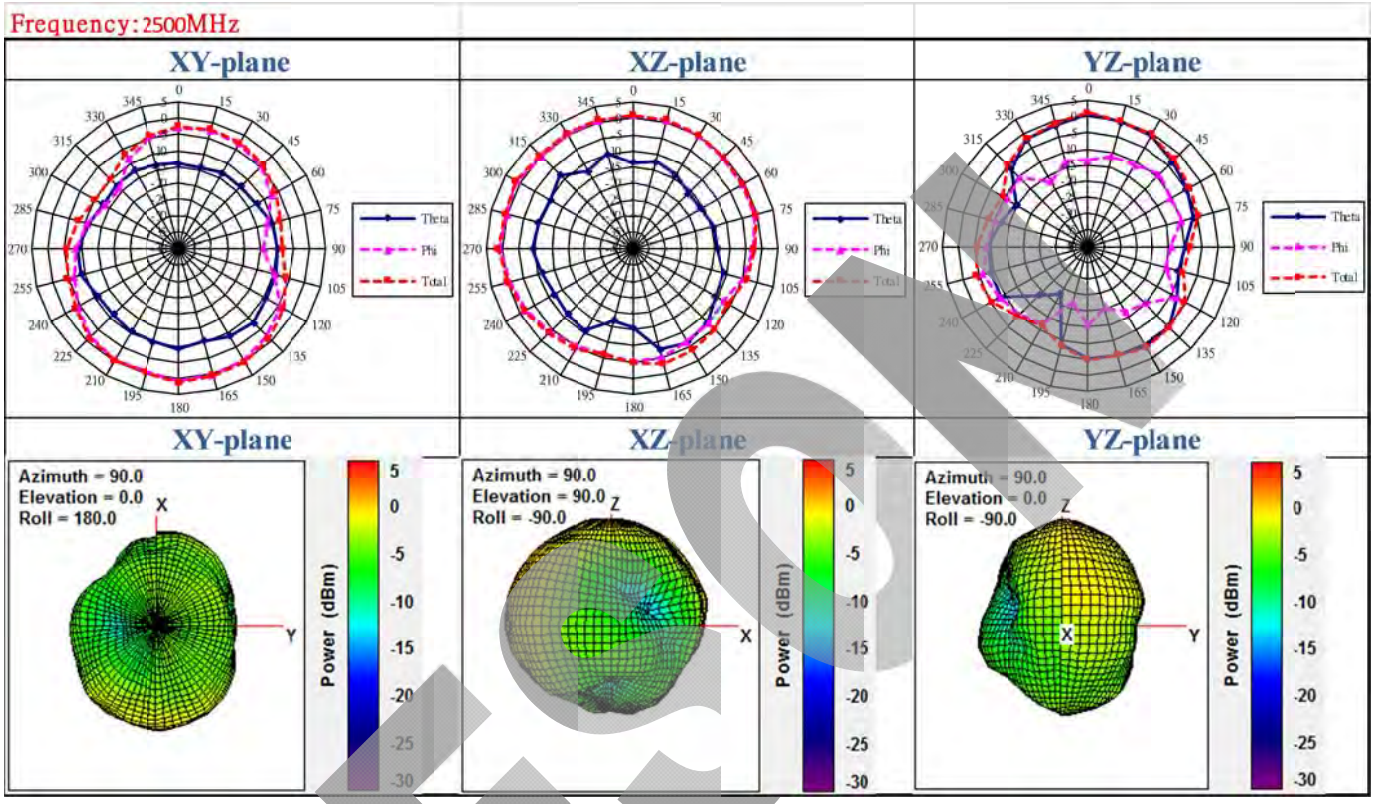
3D Radiation Pattern of Antenna

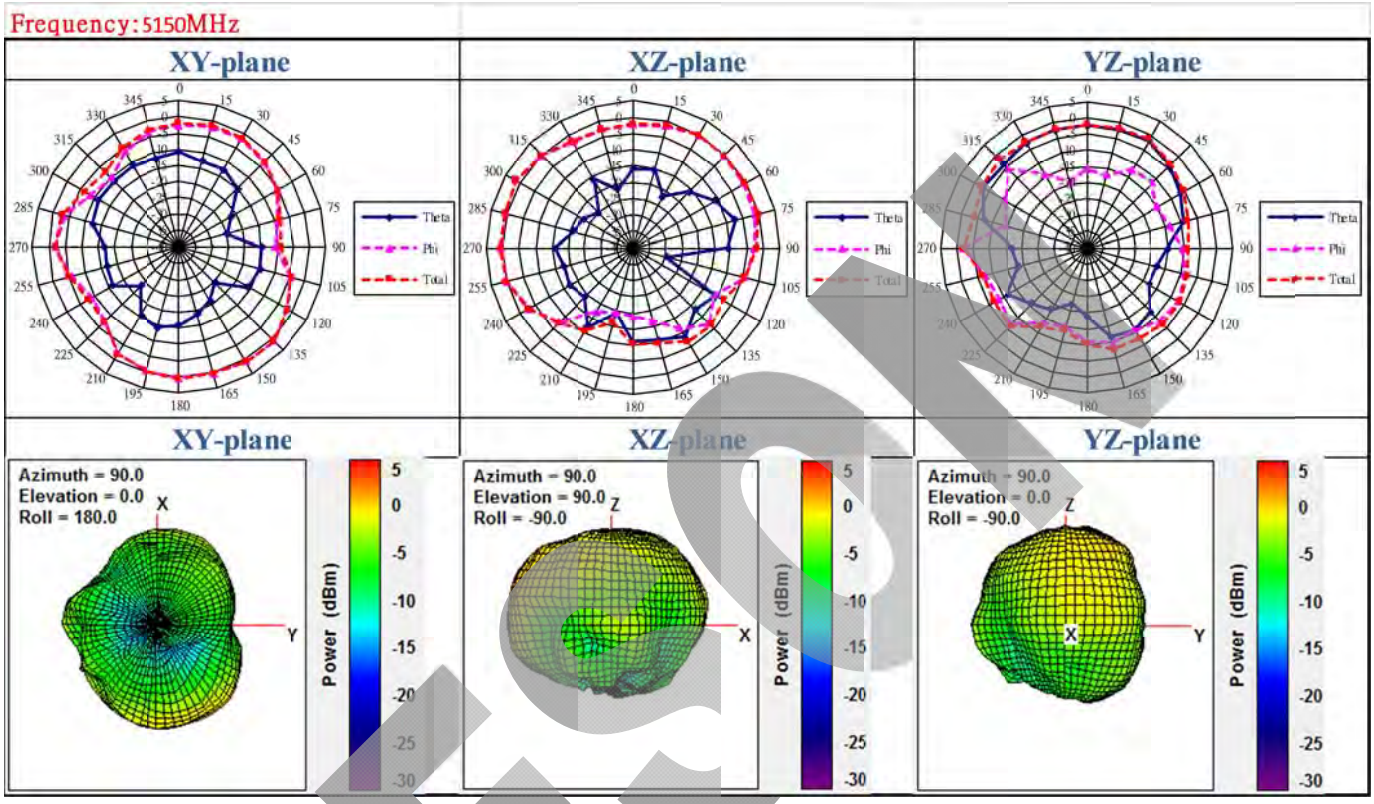



Frequency: 2450MHz
XY-plane
XZ-plane
YZ-plane
Theta
Phi
Total
XY-plane
Azimuth = 90.0
Elevation = 0.0
Roll = 180.0
XZ-plane
Azimuth = 90.0
Elevation = 90.0
Roll = -90.0
YZ-plane
Azimuth = 90.0
Elevation = 0.0
Roll = -90.0
Power (dBm)
5
0
-5
-10
-15
-20
-25
-30

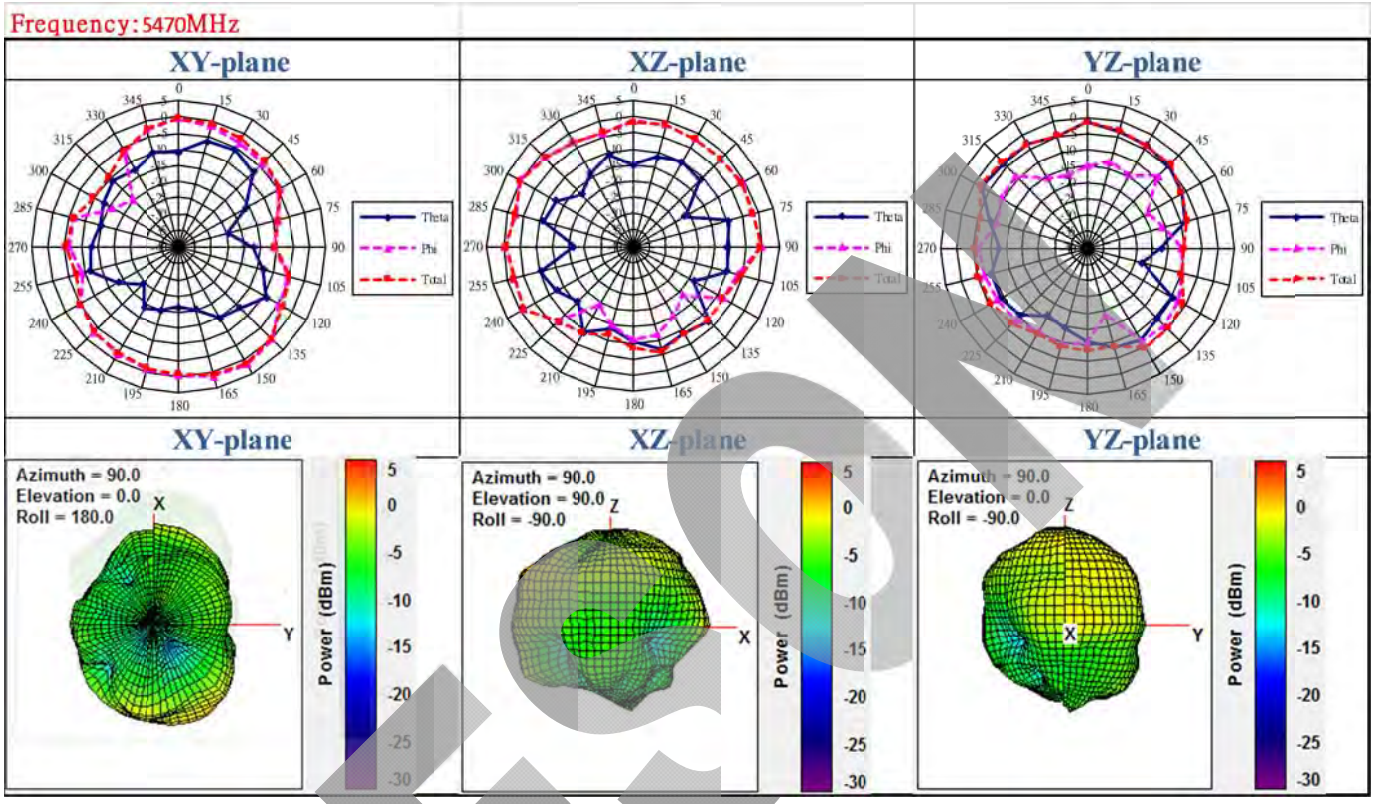
WIESON


Frequency: 2500MHz
XY-plane
XZ-plane
YZ-plane
Theta
Phi
Total
XY-plane
Azimuth = 90.0
Elevation = 0.0
Roll = 180.0
XZ-plane
Azimuth = 90.0
Elevation = 90.0
Roll = -90.0
YZ-plane
Azimuth = 90.0
Elevation = 0.0
Roll = -90.0
Power (dBm)
5
0
-5
-10
-15
-20
-25
-30

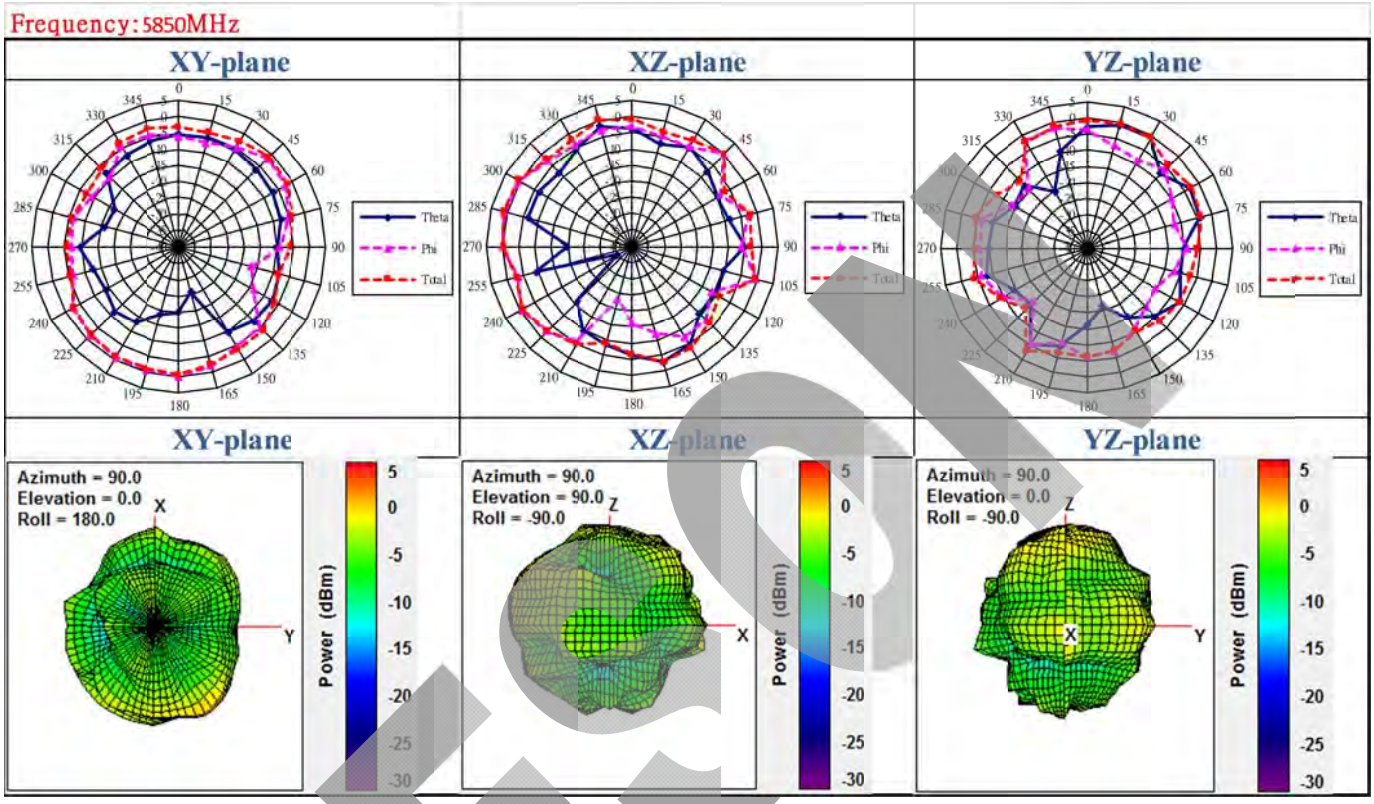
WIESON


Frequency:5150MHz
XY-plane
XZ-plane
YZ-plane
Theta
Phi
Total
XY-plane
Azimuth = 90.0
Elevation = 0.0
Roll = 180.0
XZ-plane
Azimuth = 90.0
Elevation = 90.0
Roll = -90.0
YZ-plane
Azimuth = 90.0
Elevation = 0.0
Roll = -90.0
Power (dBm)
5
0
-5
-10
-15
-20
-25
-30

WIESON


Frequency: 5470MHz
XY-plane
XZ-plane
YZ-plane
Theta
Phi
Total
XY-plane
XZ-plane
YZ-plane
Azimuth = 90.0
Elevation = 0.0
Roll = 180.0
Azimuth = 90.0
Elevation = 90.0
Roll = -90.0
Azimuth = 90.0
Elevation = 0.0
Roll = -90.0
Power (dBm)
5
0
-5
-10
-15
-20
-25
-30

WIESON


Frequency: 5850MHz
XY-plane
XZ-plane
YZ-plane
Theta
Phi
Total
XY-plane
Azimuth = 90.0
Elevation = 0.0
Roll = 180.0
XZ-plane
Azimuth = 90.0
Elevation = 90.0
Roll = -90.0
YZ-plane
Azimuth = 90.0
Elevation = 0.0
Roll = -90.0
Power (dBm)
5
0
-5
-10
-15
-20
-25
-30

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TEST REPORT

Report No.	:WSC-19T-78
Applicant	:CS4000
Commodity	:
Model No.	:GY196HC112-018/019/020/021
Quantity	:20pcs.
Date of Testing	:OCT.07,2019~OCT.10,2019
Measure Environment	:Temp. : 23±3℃, R.H.: 35%~75%
Test Item	:Refer to paragraph 1, Test Group.

Note: 1. The results of the testing report relate only to the items tested.

2. The testing report shall not be reproduced except in full, without the written approval of WIESON.

Checked by:	Tested by:
Fan Shigang	***Li Yuxiang***

WIESON ELECTRONIC CO., LTD.

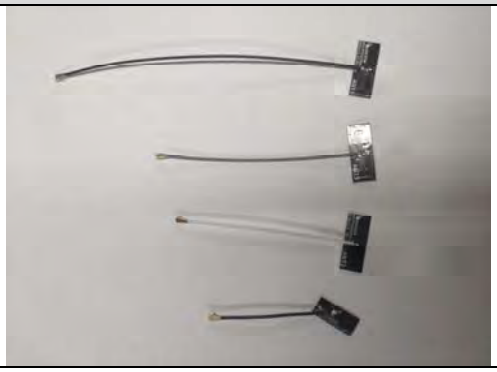
ADDRESS : Huan Gang,Hou Jie Town,Dong Guan City,Guang Dong,China

TEL : 86-769-85597201 FAX :86-769-85598311 Wed:http://www.wieson.com

Test Items:

No.	Test Description
1	Humidity
2	Thermal Shock
3	Low Temperature
4	Salt Spray

Test Product:

GY1196HC112-018/019/020/021


Test Group process:

Test Description Sequence	Test Group			
	1	2	3	4
Examination of product	1.3	1.3	1.3	1.3
V.S.W.R(Before)				
Humidity	2			
Thermal Shock		2		
Low Temperature			2	
Salt Spray				2
V.S.W.R(After)				
Sample Size per Test Group	3	3	3	3

Note: Test specimen(s) shall be prepared in accordance with approval sheets and shall be selected at random.

1.V.S.W.R TEST(Before)

WIESON NO.	Test Item	2.5085 GHz	5.3580 GHz
GY196HC112-018	V.S.W.R	1.46	1.51
		1.48	1.48
		1.51	1.48

WIESON NO.	Test Item	2.4361 GHz	5.4666 GHz
GY196HC112-019	V.S.W.R	1.69	1.45
		1.65	1.42
		1.55	1.42

WIESON NO.	Test Item	2.4361 GHz	5.3098 GHz
GY196HC112-020	V.S.W.R	1.56	1.25
		1.55	1.25
		1.54	1.22

WIESON NO.	Test Item	5.1977 GHz
GY196HC112-021	V.S.W.R	1.21
		1.20
		1.19

1.1 Test Result:

Comment	PASS

2. Test Group 1[Humidity]:

2.1 Test item & Test method:

	Test Item	Test Method
1	Humidity	According to method EIA 364-31B

2.2 Test condition:

2.2.1 Humidity:

Temperature: 70℃.

Relative Humidity: 75%.

Duration: 48 hours.

2.3 Test request:

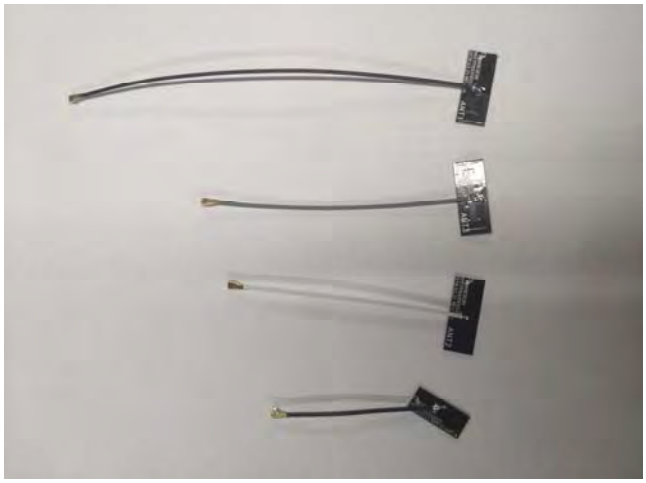
2.3.1 Humidity:

a. No evidence of damage.

2.4 Test value:

	Sample 1	Sample 2
Visual Inspection	OK	OK
Humidity	48H	48H
Visual Inspection	OK	OK

2.5 Test picture.

Humidity	
	

2.6 Test result:

Comment	PASS

3. Test Group2[Thermal Shock]:

3.1 Test Item & Test method:

	Test Item	Test Method
1	Thermal Shock	According to method EIA 364-32

3.2 Test condition:

Thermal Shock :a. -40 ~ +85°C.

b. 20Cycles.

c. Exposure time at temperature extremes: 0.5hour.

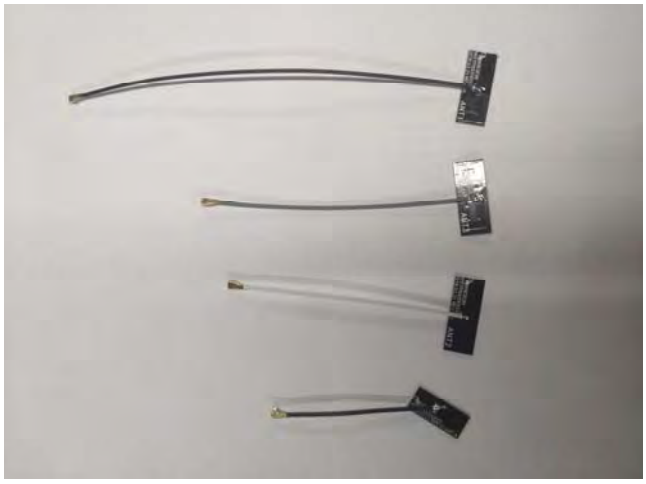
3.3 Test Request:

Thermal Shock: a.No physical damage.

3.4 Test Value:

	Sample 1	Sample 2
Visual Inspect.	OK	OK
Thermal Shock	OK	OK
Visual Inspect.	OK	OK

3.5 Test picture.

Thermal Shock	
	

3.6 Test Result:

Comment	PASS

4. Test Group 3 [Low Temperature]:

4.1 Test Item & Test method:

	Test Item	Test Method
1	Low Temperature	According to EIA 364 20

4.2 Test condition:

3.2.1Low Temperature: Temperature: -10°C, Time: 48 hours.

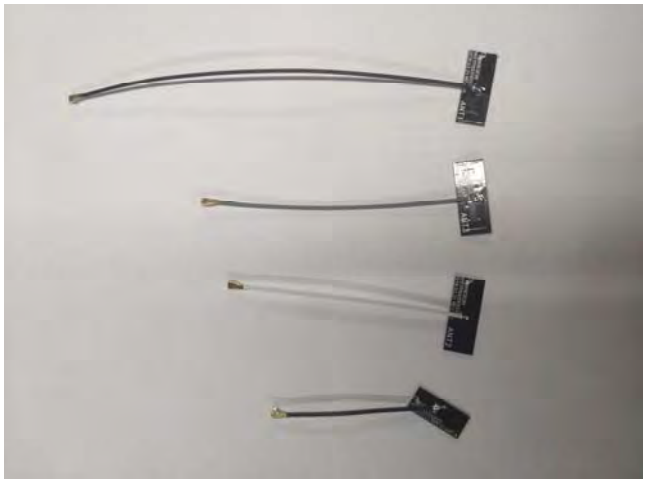
4.3 Test Request:

3.3.1 No evidence of damage.

4.4 Test Value:

	Sample 1	Sample 2
Visual Inspect	OK	OK
Low Temperature	48H	48H
Visual Inspect	OK	OK

4.5 Test picture.

Low Temperature	
	

4.6Test Result:

Comment	PASS

5. Test Group 4[Salt Spray]:

5.1 Test Item & Test method:

	Test Item	Test Method
1	Insulation Resistance	According to method EIA-364-21C
2	DWV	According to method EIA-364-20C
3	Salt Spray	According to method EIA 364-26B

5.2 Test condition:

5.2.1 Salt Spray: Temp : 35±2℃, solution: 5%, PH value: 6.5 ~ 7.2,
Humidity: 95 ~ 98 %(R.H.), Duration: 48hours.

5.3 Test Request:

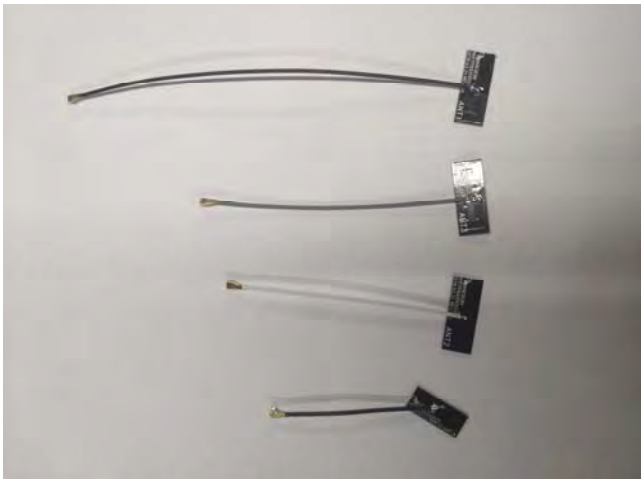
5.3.1 Salt Spray:

a.No physical damage.

5.4 Test Value:

	Sample 1	Sample 2
Visual Inspection	OK	OK
Salt Spray	48H	48H
Visual Inspection	OK	OK

5.5 Test picture:

Salt Spray	
	

5.6 Test Result:

Comment	PASS

6.V.S.W.R TEST(After)

WIESON NO.	Test Item	2.5085 GHz	5.3580 GHz
GY196HC112-018	V.S.W.R	1.48	1.50
		1.50	1.48
		1.51	1.52

WIESON NO.	Test Item	2.4361 GHz	5.4666 GHz
GY196HC112-019	V.S.W.R	1.71	1.50
		1.64	1.52
		1.72	1.55

WIESON NO.	Test Item	2.4361 GHz	5.3098 GHz
GY196HC112-020	V.S.W.R	1.62	1.31
		1.62	1.28
		1.65	1.30

WIESON NO.	Test Item	5.1977 GHz
GY196HC112-021	V.S.W.R	1.25
		1.28
		1.29

6.1 Test Result:

Comment	PASS

Testing Equipment:

Instrument	Model
Vision Measurement Inspection System	PAO-I / QC-2000
Thermal Shock Tester	TERCHY／TS-72D
Humidity Chamber	KSON／THS-A7L+-150
Salt Spray Tester	TIEH MU JEN / HT-8052

UNDER BLANK

COMPONENT (Cpk) DATA SHEET

PART NO.:GY196HC112-020		PREPARED BY:	
Date:		CHECKED BY:	

VSWR

Item	2.4361 GHz	5.3098 GHz				
1	1.56	1.25				
2	1.55	1.25				
3	1.54	1.22				
4	1.48	1.23				
5	1.56	1.26				
6	1.59	1.28				
7	1.56	1.20				
8	1.55	1.19				
9	1.54	1.25				
10	1.55	1.31				
11	1.58	1.32				
12	1.56	1.32				
13	1.49	1.30				
14	1.52	1.30				
15	1.52	1.28				
16	1.53	1.25				
17	1.50	1.26				
18	1.55	1.28				
19	1.49	1.21				
20	1.49	1.28				
21	1.48	1.20				
22	1.50	1.19				
23	1.46	1.26				
24	1.50	1.26				
25	1.55	1.30				
26	1.55	1.30				
27	1.55	1.25				
28	1.56	1.25				
29	1.56	1.25				
30	1.55	1.25				
31	1.52	1.28				
32	1.53	1.28				
Min.	1.46	1.19				
Max.	1.59	1.32				
Xbar	1.53	1.26				
S	0.03	0.04				
USL	2.00	2.00				
LSL	1.00	1.00				
Ca	0.06	0.48				
Cp	5.15	4.57				
CPU	4.82	6.76				
CPL	5.48	2.37				
Cpk	4.82	2.37				

型号 Type	RF-1.37/50	料号 P/N	SY137/50-042(Gray)
结构图 Structure drawing			

结构特性 Structure characteristics

结构 Structure	项目 Item	标准值 Standard value
①内导体 Inner conductor	材料 Material	镀锡铜线 Tinned copper wire
	组成:总根数/单根外径(mm) Makeup:total / O.D. of every wire(mm)	7/0.102
	(绞合)标称外径(mm) (Intertwist)NOM.O.D.(mm)	0.306±0.02
②绝缘层 Insulation	材料 Material	聚全氟乙丙烯 FEP
	颜色 Color	透明 Clarity
	标称外径(mm) NOM.O.D.(mm)	0.9±0.03
③外导体 Outer conductor	材料 Material	镀锡铜线 Tinned copper wire
	组成:总根数/单根外径(mm) Makeup:total / O.D. of every wire(mm)	5/0.05
	标称外径(mm) NOM.O.D.(mm)	1.13±0.05
	覆盖率(%) Coverage ratio(%)	90±5
④护套层 Jacket	材料 Material	聚全氟乙丙烯 FEP
	颜色 Color	灰 Gray
	标称外径(mm) NOM.O.D.(mm)	1.37±0.05

电性能特性 Electrical characteristics

项目 Item	标准值 Standard value	项目 Item	频率 Frequency	标准值 Standard value 单位 Unit:dB/m
电容(pF/m) Capacitance(pF/m)	96	衰减 Attenuation	1GHz	≤1.82
速率(%) Velocity(%)	70		2GHz	≤2.67
阻抗(Ω) Impedance(Ω)	50±2		3GHz	≤3.21
驻波比 Standing wave ratio	≤1.3@0~6GHz		4GHz	≤3.74
最大工作电压(V) Max.operating voltage(V)	1000		5GHz	≤4.27
最大工作频率(GHz) Max.operating frequency(GHz)	6		6GHz	≤4.80

可靠性 Dependability

项目 Item	单位 Unit	标准值 Standard value
最小弯曲半径(一次) Min.bending radius static	mm	5
最小弯曲半径(重复) Min.bending radius repeated	mm	—
工作温度范围 Operating temperature	℃	-55~+150

包装 Packing

项目 Item	单位 Unit	标准值 Standard value
包装方式 Packing mode	/	纸盘 Papery plate
每盘长度 The length of each plate	m	500
每盘接头数 Each connector plate number	/	≤3
每段最短长度 The shortest length of each root	m	≥10

使用提示 Use tips

存储环境 Storage environment	温度：30℃以下；湿度：20%~65%
最佳保存周期 The best save cycle	2个月；2个月以上作业性下降，如上锡效果变差,但电性能不受影响。夏季高温高湿环境开剥后需尽快流转
加工温度 Processing temperature	260℃的极限情况下，可短时间承受；300℃以上分子通常带有的等端基会分解；400℃以上发生显著的热分解
铁氟龙收缩 Teflon Shrink	固有材料特性。绝缘：0.2mm以下；护套：0.3mm以下
护套窜动 Jacket traverse	加工长度（护套残留长度）低于5cm易发生

其他 Other

特殊加工工艺，请与供方协商后使用

环境可靠性测试/Environmental Performance

1.保持力(1.13MHF)

测试项目/ Test project	保持力	测试编号/ Test No	
产品料号/ Part No:	GY196HC112系列	试验数量/ Number of test	6PCS
产品规格/ specification	MHF TO PCB ANTENNA		
测试条件： Testing Conditions	1. 将待测物进行机械固定测试 2. 固定连接器与线材 3. 使用一定的力将连接器与线材与相关方向破环性拉开		
测试结果/ Test result	■ 合格/OK □ 不合格/NG		

测试数据/Test data

Test number	Sample-1	Sample-2	Sample-3	Sample-4	Sample-5	Sample-6
Test data	1.29	1.28	1.31	1.32	1.31	1.32

备注说明/ Remark

MHF 端子与 1.13 线材拉力 1.0Kg

MHF terminal and 1.13 C able pull 1.0Kg.

测试/ Test	胡洲	审核/Check	徐宏奇	批准/Approve	姚作芳

保持力(1.37MHF)

测试项目/ Test project	保持力	测试编号/ Test No	
产品料号/ Part No:	GY196HC112系列	试验数量/ Number of test	6PCS
产品规格/ specification	MHF TO PBC ANTENNA		
测试条件： Testing Conditions	1. 将待测物进行机械固定测试 2. 固定连接器与线材 3. 使用一定的力将连接器与线材与相关方向破环性拉开		
测试结果/ Test result	■ 合格/OK □ 不合格/NG		

测试数据/Test data

Test number	Sample-1	Sample-2	Sample-3	Sample-4	Sample-5	Sample-6
Test data	2.91	2.93	2.95	2.92	3.11	3.15

备注说明/ Remark

MHF 端子与 1.37 线材拉力 2.5Kg

MHF terminal and 1.37 C able pull 2.50Kg.

测试/ Test	胡洲	审核/Check	徐宏奇	批准/Approve	姚作芳

Certificat

Certificate

N° 2016/70254.3

AFNOR Certification certifies that the management system implemented by:
AFNOR Certification certifie que le système de management mis en place par :

WIESON TECHNOLOGIES (DONG GUAN) CO., LTD.
东莞骅国电子有限公司

Unified Social Credit Code / *Code Crédit Social Unifié* / 统一社会信用代码 : 914419006181620014

for the following activities:
pour les activités suivantes :

DESIGN, MANUFACTURING AND SALES OF ELECTRONIC AND AUTOMOTIVE CONNECTORS, CABLES, WIRE HARNESSES, RF (RADIO FREQUENCY) AND ANTENNA PRODUCTS, PLASTIC INJECTION, STAMPING PARTS, PLASTIC & HARDWARE MOLDS
电子和车用连接器、连接线、线束、无线射频天线产品、注塑成型部件、冲压部件，塑胶五金模具的设计、生产和销售

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