

承 認 書
SPECIFICATION FOR APPROVAL

客 戶
CUSTOMER

乙辰

日 期
DATE

2011/6/28

品 名
DESCRIPTION

WSL025 Mini 1.37 2.4GHz 4dBi Flying Lead
Antenna L140mm(I-POD White) ANTI-UV 6%

客 戶 料 號
CUSTOMER P/N

114020400002

成 品 編 號
Part NO.

RH1WFI0002B 02



萬旭電業股份有限公司

WANSHIH ELECTRONIC CO., LTD.

台北縣五股鄉五工六路 72 號 3 樓

3F 72 WU KONG 6TH RD., WU KU INDUSTRIAL DISTRICT

TAIPEI HSIEN, TAIWAN, R.O.C.

TEL : (02) 22988066 (5 LINE) FAX : (02)22981102

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SPECIFICATION

- | | |
|-------------------------------|-------------------------------|
| 1. Description | : WSL025 Flying Lead Antenna |
| 2. Customer | : 乙辰 |
| 3. Model No. | : WSL025 |
| 4. Part No. | : RH1WFI0002B 02 |
| 5. Standard | : IEEE 802.11b/g Wireless LAN |
| 6. Antenna Profile | : 167(150) mm (see Drawing) |
| 7. Color | : I-POD White |
| 8. Electrical Characteristics | |
| Operating Frequency | : 2.4~2.5GHz |
| Antenna Type | : Monopole |
| Polarization Type | : Linear |
| Type of Radiation | : Toroidal |
| Peak Gain | : 4.0 dBi Typical |
| Impedance | : 50 Ohm nominal |
| V.S.W.R. | : 2.0:1 Max. |
| 9. Mechanical Characteristics | |
| Swivel | : 90 degree |
| Lead Length | : 140mm length |
| Connector | : N/A |
| Core | : N/A |
| 10. Raw Material | |
| Coaxial Cable | : Mini 1.37 |
| Housing | : TPE |
| Hinge | : PC+ALLOY |

TOLERANCES:		Signature / Stamp	<input checked="" type="checkbox"/> Customer Approved <input type="checkbox"/> Unofficial Drawing	機構 (技術分類) : WFI		
X	±0.5			應用 (業務分類) : NW		
X.X	±0.3			材質 (生管分類) : RFEX		
X.XX	±0.1					
ANGULAR		±5.0°				

167±3.0

Ø6.0

140±5

Ø9.3

① ② ③ ⑨

150±3.0

A B

4±0.2

2±0.2





1±0.2


脫皮鍍錫尺寸
SCALE: 2/1

Revise Date: 2011/05/26		Edit Date: 2010/03/02		PART NUMBER		114020400002	
3rd VIEW	APPROVED	CONFIRM	CHECK	DRAWING	PART NAME		WSL025 Mini 1.37 2.4GHz 4dBi Flying Lead Antenna L140mm(I-POD White) ANTI-UV 6%
UNIT: mm	Jason	C.S.LIU	Emily	Mandy	CATEGORY		<input checked="" type="checkbox"/> A:Product <input type="checkbox"/> B:Semi-Production <input type="checkbox"/> C:Sample
SCALE:FREE					Engineering NO.		RH1WFI0002B
衛星廠成品編號 :					文件編號 : FMT-0513-H5		頁次: 1/2

TOLERANCES:	
X	±0.5
X.X	±0.3
X.XX	±0.1
ANGULAR	±5.0°

Ver	Date	Drawing	Engineering Change Description
B01	2011/03/17	Mandy	194000180000 => 114020400002
B02	2011/05/26	Mandy	1.13=>1.37 , Housing ANTI-UV , Heat Shrink Tube

9	 B02	Housing	√	WSS025 9.3 φ*130LHousing(I-POD White) ANTI-UV 6%	White		1	or Equivalent
8	 B02	Heat Shrink Tube	√	H-2(CB) φ 5.0	Black	40	1	or Equivalent
7	 B02	Heat Shrink Tube	√	H-2 φ 2.0	Black	10	1	or Equivalent
6		Spring	√	Spring<G>OD5.6 ID3.2_6TURNS	Golden		1	or Equivalent
5		Sleeve	√	5.2 φ*24L(26.5L) FOR RG-178 Sleeve	silver		1	or Equivalent
4		Rivet	√	028922001-8 3.80*1.90 φ Rivet	silver		2	or Equivalent
3		Hinge-Base	√	9.3 φ*24.7L Hinge-Base	White		1	or Equivalent
2		Hinge-Holder	√	9.5 φ*20.0L Hinge-Holder	White		1	or Equivalent
1	 B02	Mini 1.37 Coaxial Cable	√	Mini 1.37 CABLE GY-193	Gray	203	1	or Equivalent
NO		Material	GM	Description	Color	Dim	Qt'y	Remark

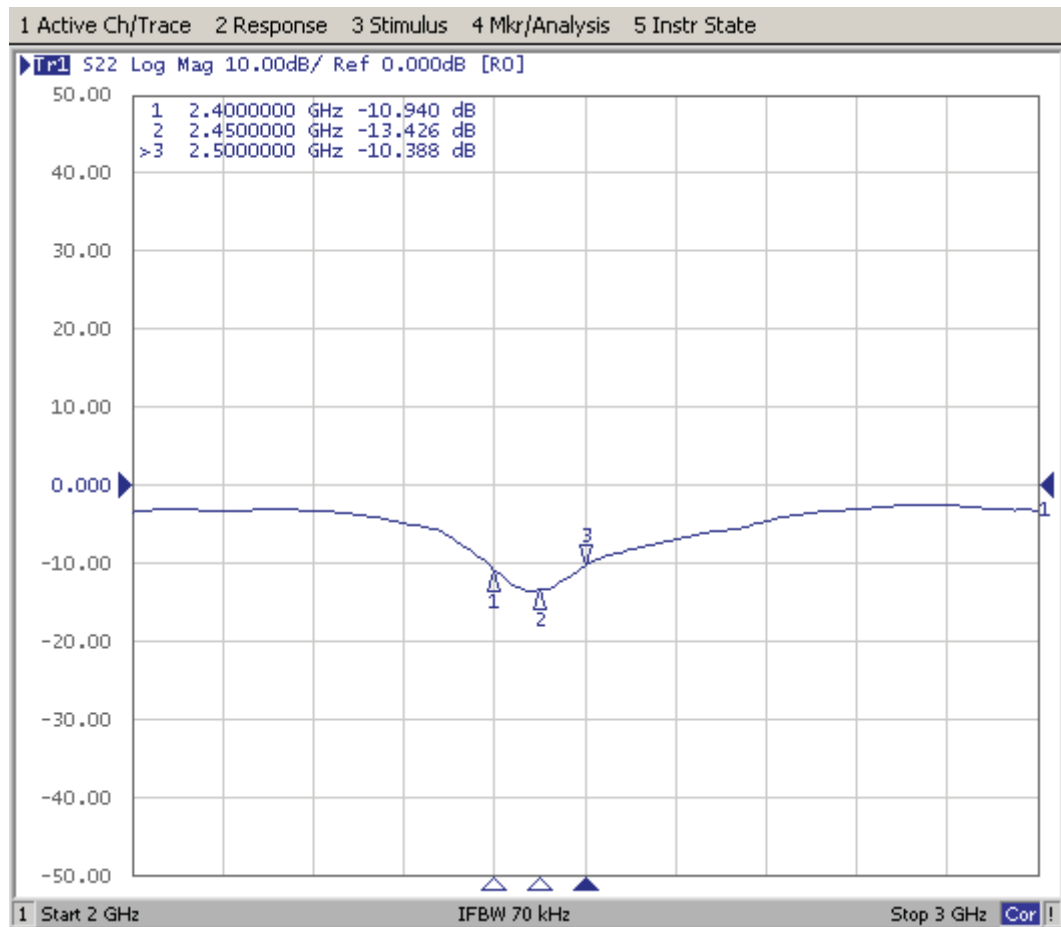
Revise Date: 2011/05/26		Edit Date: 2010/03/02			PART NUMBER	 114020400002	
3rd VIEW	APPROVED	CONFIRM	CHECK	DRAWING	PART NAME	BOM	
UNIT: mm	Jason	C.S.LIU	Emily	Mandy	CATEGORY	<input checked="" type="checkbox"/> A-Product <input type="checkbox"/> B-Semi-Production <input type="checkbox"/> C-Sample	
SCALE:FREE					Engineering NO.	RH1WFI0002B	
衛星廠成品編號 :					文件編號 : FMT-0513-H5		頁次: 2/2

WANSHIH ELECTRONIC CO., LTD.



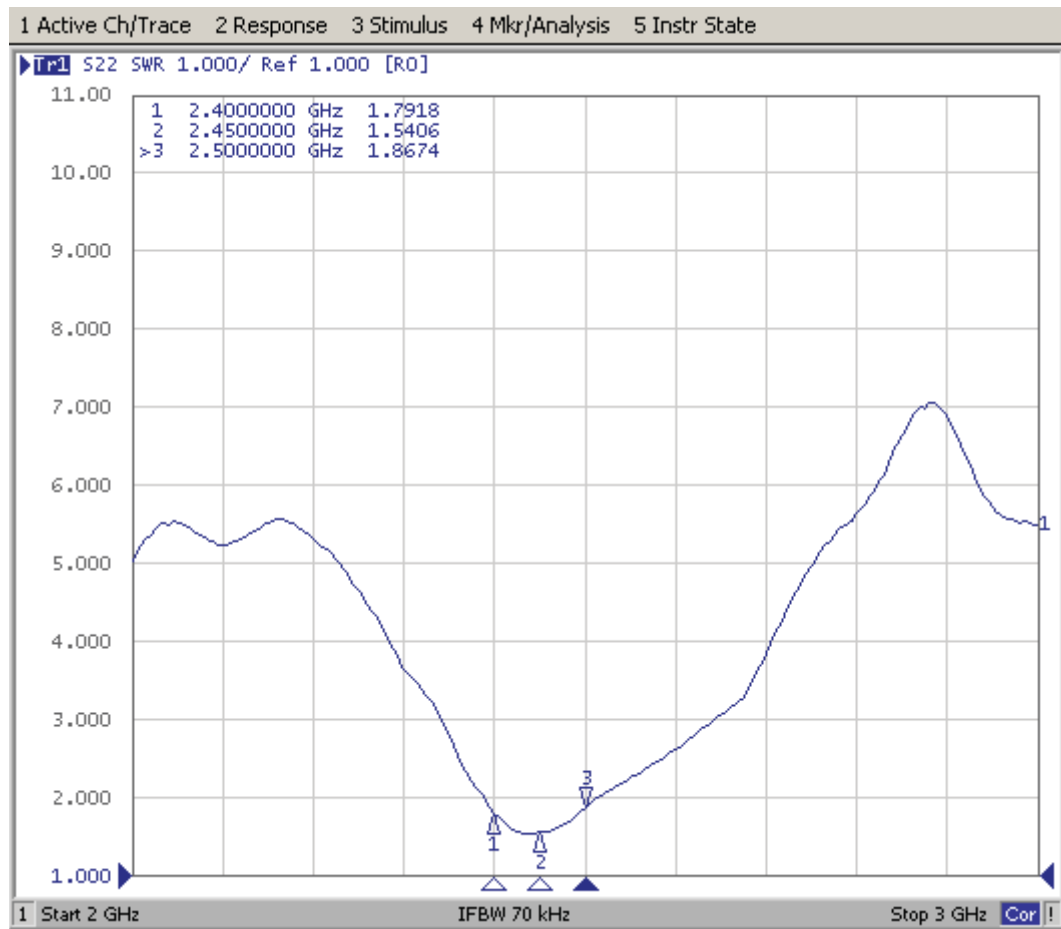
Electrical Properties

Return Loss



Electrical Properties

V.S.W.R



Electrical Properties

Radiation Pattern – H Plane

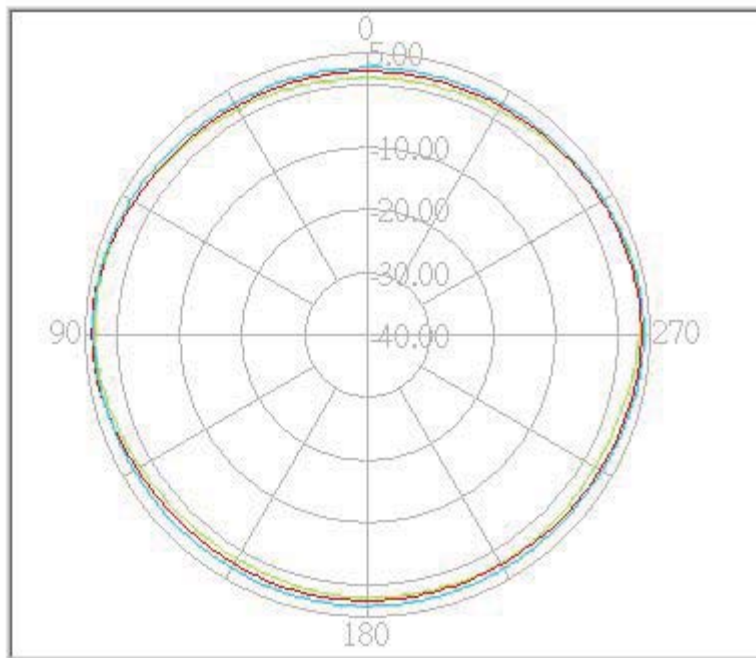


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Model No: 180

Antenna Position: Vertical

Test Mode: H-plan



Freq(MHz)	Peak(dBi)	Angle(o)	Avg(dBi)
2400.C	3.85	75.66	2.25
2450.C	3.94	273.36	2.72
2500.C	4.00	86.64	3.19

Electrical Properties

Radiation Pattern – E Plane

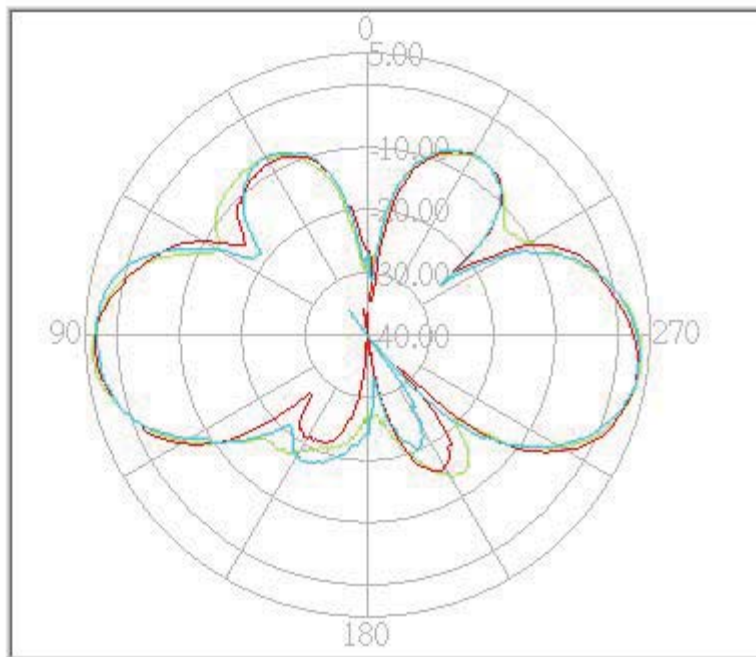


萬旭電業股份有限公司

Model No: 180

Antenna Position: Horizontal

Test Mode: E-plan



Freq(MHz)	Peak(dBi)	Angle(o)	Avg(dBi)
2400.C	3.84	267.25	-3.45
2450.C	3.41	266.03	-3.75
2500.C	3.50	95.19	-3.70

Material Data Sheet

Mini-1.37 Coaxial Cable

SPECIFICATION FOR APPROVAL

DOCUMENT: A3130SP002

STYLE : COAXIAL CABLE

SIZE: SP 7/0.102

RECOGNIZED: UL 1979



WONDERFUL HI-TECH CO.,LTD

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WU KU IND. DISTRICT
TAIPEI HSIEN,TAIWAN

FACTORY : 17 PEI YUAN ROAD,
CHUNG-LI IND. PARK
TAIWAN, R.O.C.

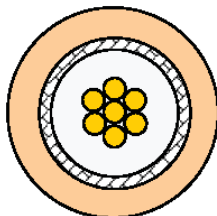
TEL : (02)22988033
FAX : (02)22988031-2

TEL : (03)4527777
FAX : (03)4517214



WONDERFUL HI-TECH CO., LTD

SPECIFICATION

STYLE	105°C 30V UL1979	DOCUMENT NO : A3130SP002
SIZE	30 AWG	ESTABLISHED DATE: 2008/01/08
STANDARD : MIL-C-17		
Conductor	Size	AWG 30
	Material	---- Silver-Coated Copper
	Conductors No.	---- 7
	Conductors Size	mm 0.102
	O.D.	mm 0.31
Insulation	Average Thickness	mm 0.29
	Diameter	mm 0.89 ±0.03
	Material	---- FEP
	Color	---- Clear
Braid	Material	---- Tinned Copper
	Construction	mm 16 / 6 / 0.05
	Coverage	% 97
Jacket	Average Thickness	mm 0.14
	Diameter	mm 1.37 ±0.05
	Material	---- FEP
	Color	---- ACCORDING TO CUSTOM
Marking		
Drawing		

AK001/210X297/1.0

PAGE : 1

EDITION : 1.2

MAKER : *H. C. KUO*

CONFIRM : *C. Y. Chen*

APPROVAL : *W. J. Wang*



WONDERFUL HI-TECH CO., LTD.

SPECIFICATION

Electrical & Physical Properties							
Item				30 AWG			
Rating Temperature				-55°C ~ +200°C			
Conductor Resistance				335 OHM/KM/20°C MAX.			
Insulation Resistance				1000 MEGA OHM-KM MIN.			
Dielectric Strength				AC 1KV/Minute			
Spark Test				2 KV			
Insulation	Unaged	Tensile Strength	2500 PSI MIN.(1.76 Kg / m m ²)				
		Elongation	200% MIN.				
	Aged	Tensile Strength	UNAGED MIN 75%(168HRS×232°C)				
		Elongation	UNAGED MIN 75%(168HRS×232°C)				
Jacket	Unaged	Tensile Strength	2500 PSI MIN.(1.76 Kg / m m ²)				
		Elongation	200% MIN.				
	Aged	Tensile Strength	UNAGED MIN.75%(168HRS×232°C)				
		Elongation	UNAGED MIN.75%(168HRS×232°C)				
Nom. Impedance				50 Ohms			
Nom. Capacitance				95.8 pF/m			
Nom. Vel. of Prop.				69.5%			
VSWR (0 – 6 GHZ)				Max 1.3			
THERMAL SHOCK				Max 1mm at 232°C /1HR			
BEND RADIUS				Min 9mm			
Attenuation (dB/1M)	2.4GHZ	2.5GHZ	5.15GHZ	5.35GHZ	6.0GHZ		
	2.5	2.6	3.9	4.0	4.3		

Housing Material Data Sheet

- Housing(外套)- TPE



SEHNZHEN GAINSHINE TECHNOLOGY
CO., LTD

材 质 证 明

TPE SA1551A1 天线料

Product Data Sheet

产品特性

白色颗粒或本色颗粒，外拌白色色粉.适合注塑成型.

产品用途

各种用途注塑成型天线。

产品物性表

型号 Type				S1551A1
性能 Properties	单位	检测方法	测试条件	测试结果
硬度 Hardness	Shore A	ASTM D2240	—	100±2
密度 Density	g/cm ³	ASTM D792	—	0.96
拉伸强度 Tensile Strength	MPa	ASTM D638	100mm/min	6.9
断裂伸长率 Tensile Elongation	%	ASTM D638	100mm/min	≥780
熔融指数 Melt Flow Index	g/10min	ASTM D1238	210℃/2.16kg	12.6


사양승인원
WiFi Dipole Antenna


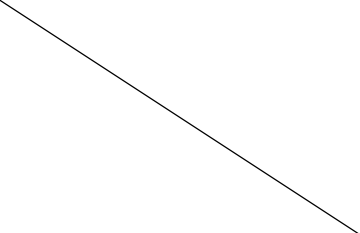

MODEL : W5E-WO-03

2009. 9. 8

(주) 위니젠




		제목	안테나 규격서(승인원)	
문서 번호	WAT - 0909 - EX387I		개 정	IR
모 델 명	W5E-WO-03		날 자	2009.9.8
사 양	Wireless LAN (IEEE 802.11 b/g/n)	고 객	(주)위즈넷	
참 고				
(주)위니젠 대전시 유성구 문지동 103-6 한국과학기술원 ICC 진리관 T205 Phone: 042-350-6570 Fax: 042-350-6571				

	Check	Check	Approval
WINiZEN			

	Check	Check	Check	Approval
Customer				

- 목차 -


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3. 기구 도면
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 - 4-2 시험 장비 Setting
 - 4-3 Calibration
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7. QC Process
8. 신뢰성 시험
9. 포장 사양

	Document No. WAT-0909-EX387I	Rev. No. IR	Model Name W5E-WO-03
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1. 승인원 이력 List


승인원 이력 List

NO	일자	변경전	변경후	사유	Rev
1	2009. 9. 8			승 인 용	IR
2					
3					
4					
5					
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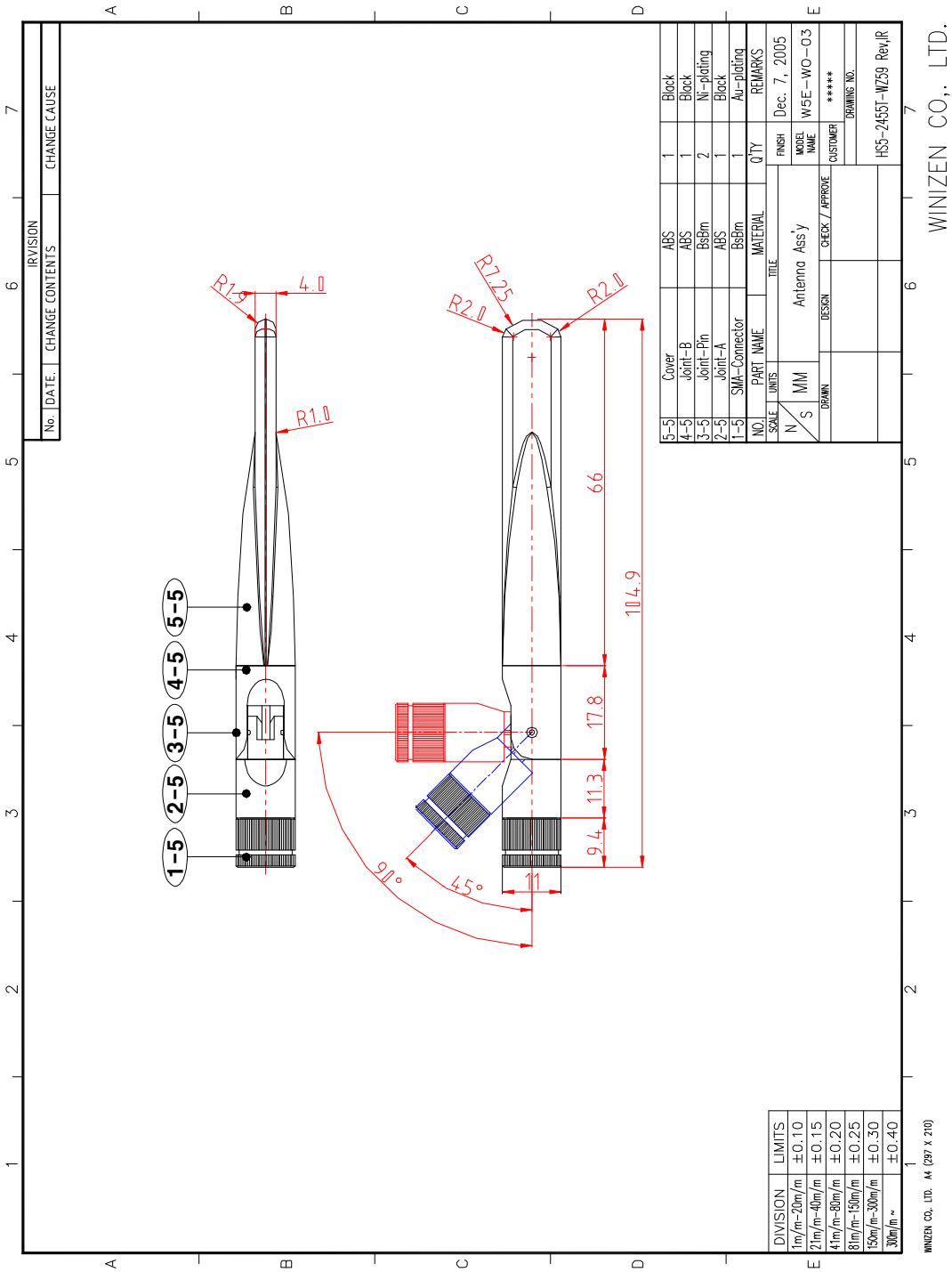
	Document No. WAT-0909-EX387I	Rev. No. IR	Model Name W5E-WO-03
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2. 규격

Electrical Specifications	
Frequency Range	2400 ~ 2483.5 MHz
Band Width	83.5 (MHz)
V.S.W.R (Min)	1.9 :1
Gain (Max)	2.5 ± 1 dBi
Input Impedance	50 (Ω)
Polarization	Linear
Mechanical Specifications	
Antenna Size	See drawing
Connector	SMA Male (left-handed)
Operation Temperature	-20 ~ 70 (℃)
Operation Humidity	10 ~ 90 (%)
Option	
Others	

	Document No. WAT-0909-EX387I	Rev. No. IR	Model Name W5E-WO-03
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3. 기구 도면



	Document No. WAT-0909-EX387I	Rev. No. IR	Model Name W5E-WO-03
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4. 측정 기준

4-1. 시험 장비

Network Analyzer	HP8753ES
Calibration Kit	HP85033D
High Resistance Meter	HP4277A
Withstanding Voltage Tester	TOS-8750
Adaptor	SMA Type Female ↔ SMA male
Measurement Cable	8120-4779 (Hewlett Packard)

4-2. 시험 장비 Setting

Display	Dual Channel : On
	Split Display : On
Menu	Number of Points : 201
	Power : 0 dBm
Measure	Channel 1 : S11
	Channel 2 : S21

4-3. Calibration

Calibration- Cal. Kit : 50 Ω
Calibration menu → Full-2 Port Reflection
Forward : Open → Short → Load
Reverse : Open → Short → Load
Done
Transmission
Do Both → FWD + REV
Done
Isolation
Omit Isolation
Done

5. 시험 절차

5-1. VSWR

Step 1.

Antenna를 Adaptor 가 포함된 Cable로 Network Analyzer의 Port1에 연결한다.

Step 2.

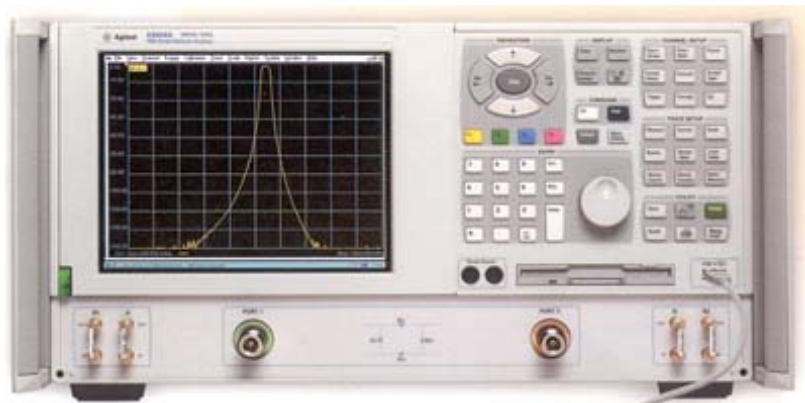
해당 주파수 대역의 Marker Point를 Network Analyzer위에 표시한다.

Step 3.

VSWR이 1.9 이하임을 확인한다.

Step 4.

Data를 측정한다.



5-2. 이득 및 방사패턴 측정

Step 1

Chamber와 주파수대역의 시스템을 Calibration과 동시에 Chamber의 제어를 위한 소프트웨어를 확인한다

Step 2.

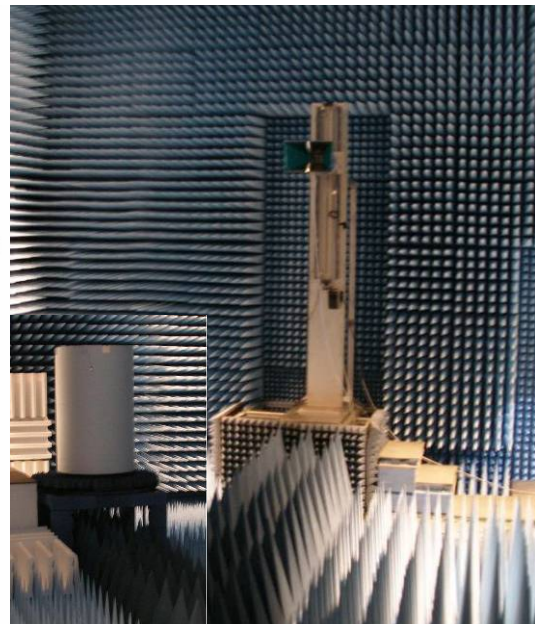
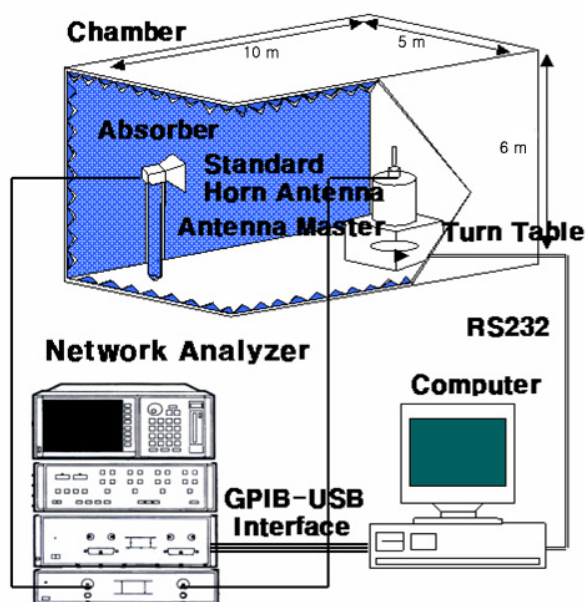
측정할 Antenna를 Chamber 내부의 측정할 위치에 놓는다.


Step 3.

Chamber의 제어 Program을 작동하여 측정을 시작한다

Step 4.

Data를 측정한다.



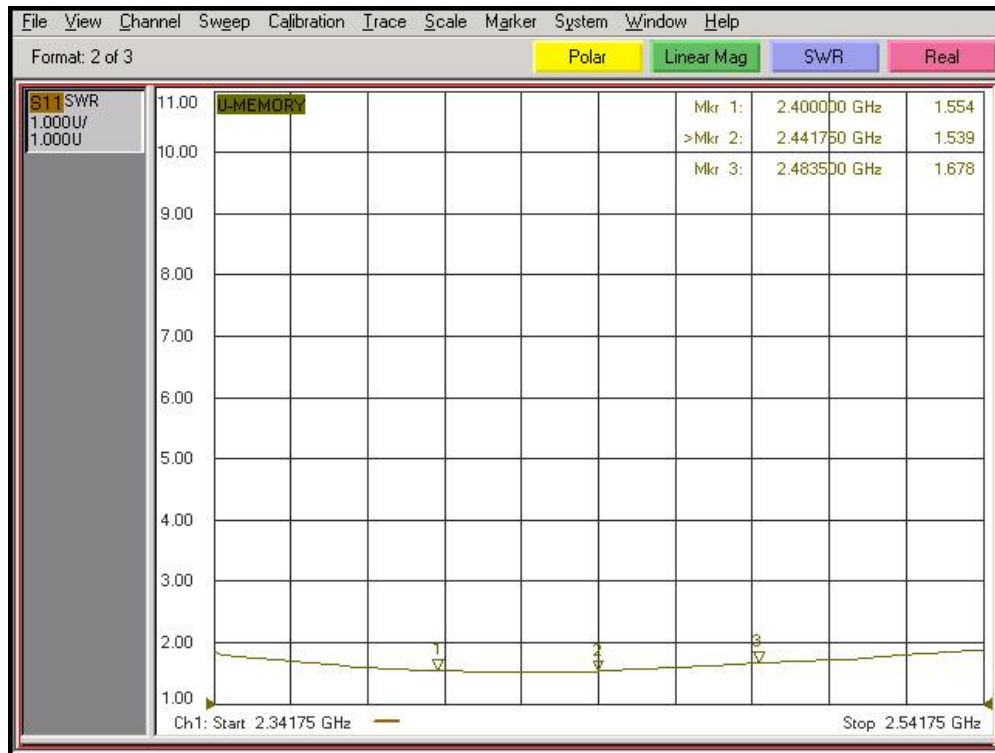
	Document No. WAT-0909-EX387I	Rev. No. IR	Model Name W5E-WO-03
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6. 측정 Data

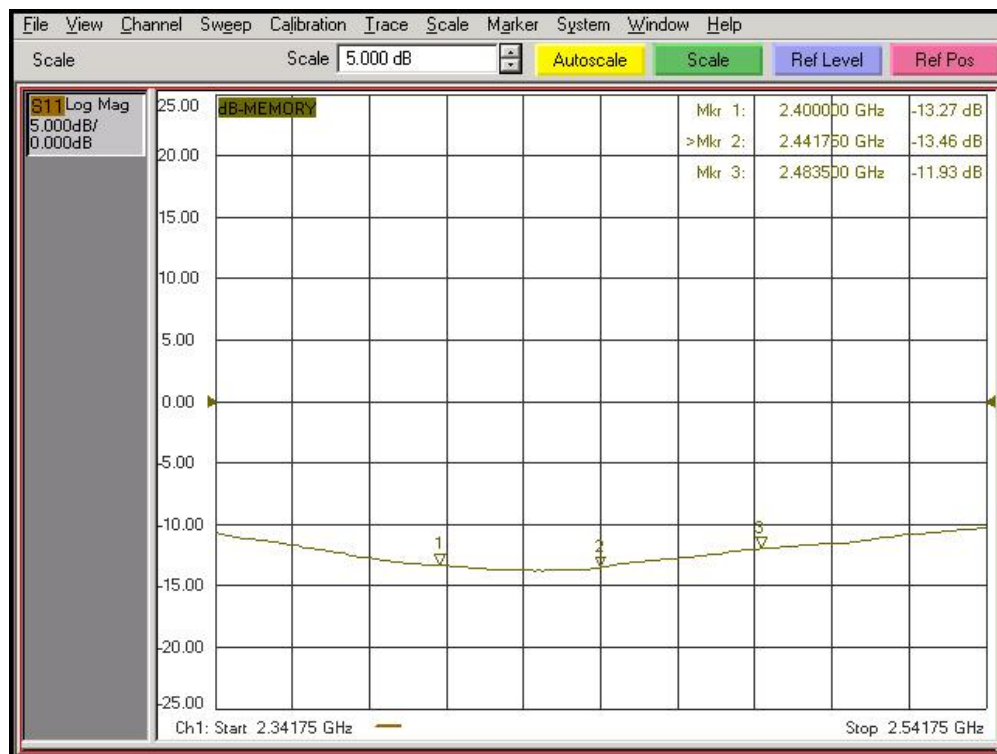
모델명	W5E-WO-03		
회로담당자	곽 원 일		
장 비	(주)위니젠 연구소 Chamber 및 측정 장비		
안테나	WLAN External Antenna		
주파수	2400 MHz ~ 2483.5 MHz		

Items	Spec.	Test Result
Frequency	2400 ~ 2483.5 MHz	OK
VSWR (Min)	< 1.9	OK
Gain (Max)	2.5 ± 1 dBi	OK

6-1 VSWR

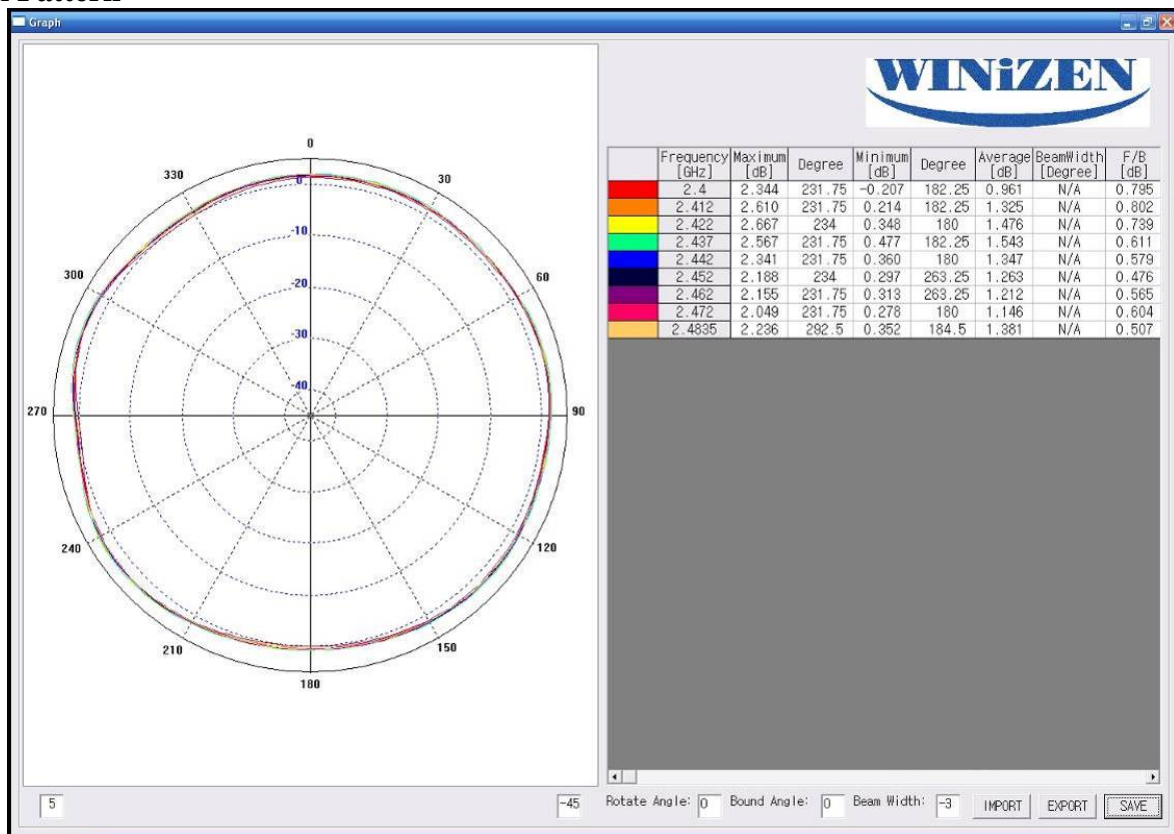


6-2 Return Loss

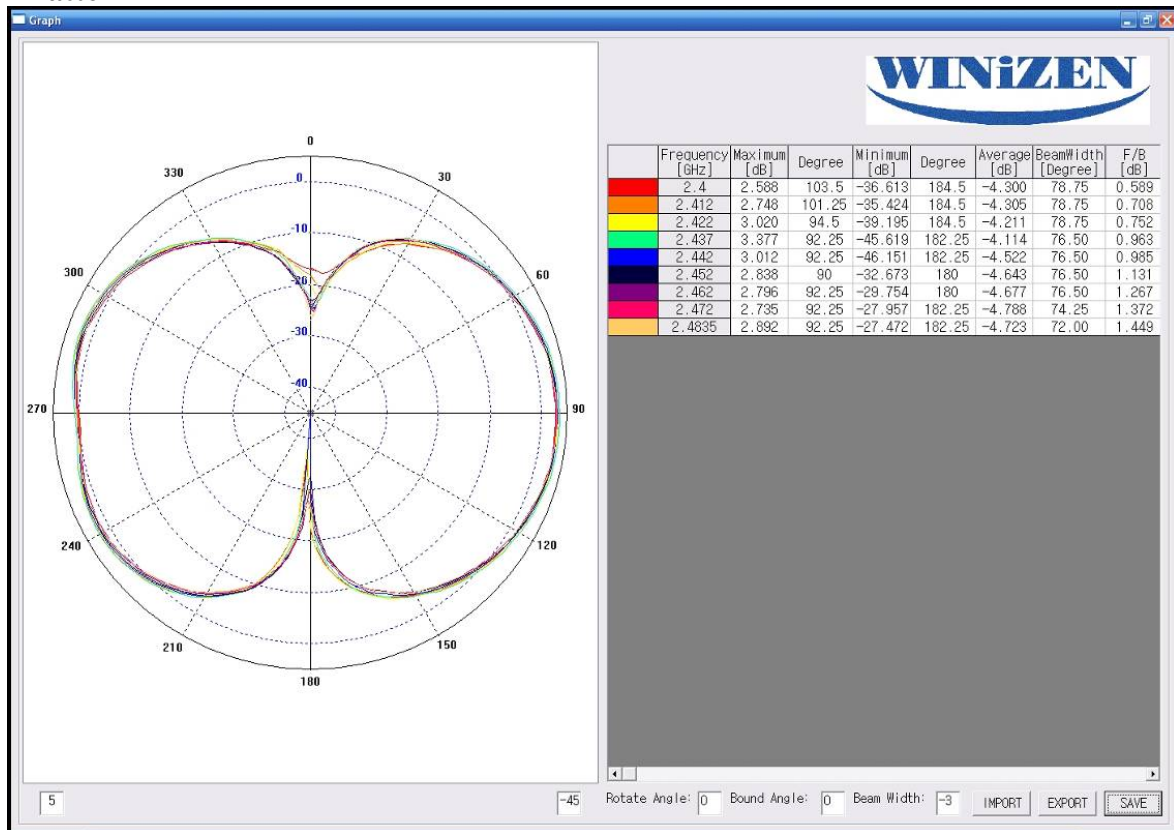


6-3 Radiation Pattern

a. Azimuth Pattern




c. Elevation Pattern



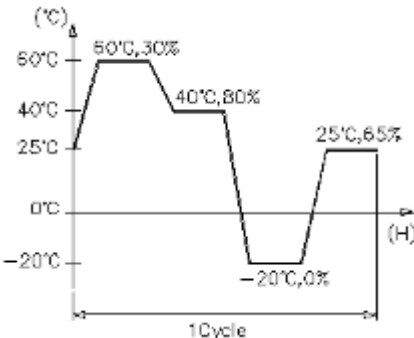
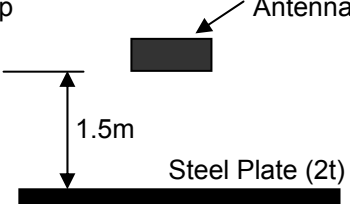
7. QC Process

제조 및 QC 공정도

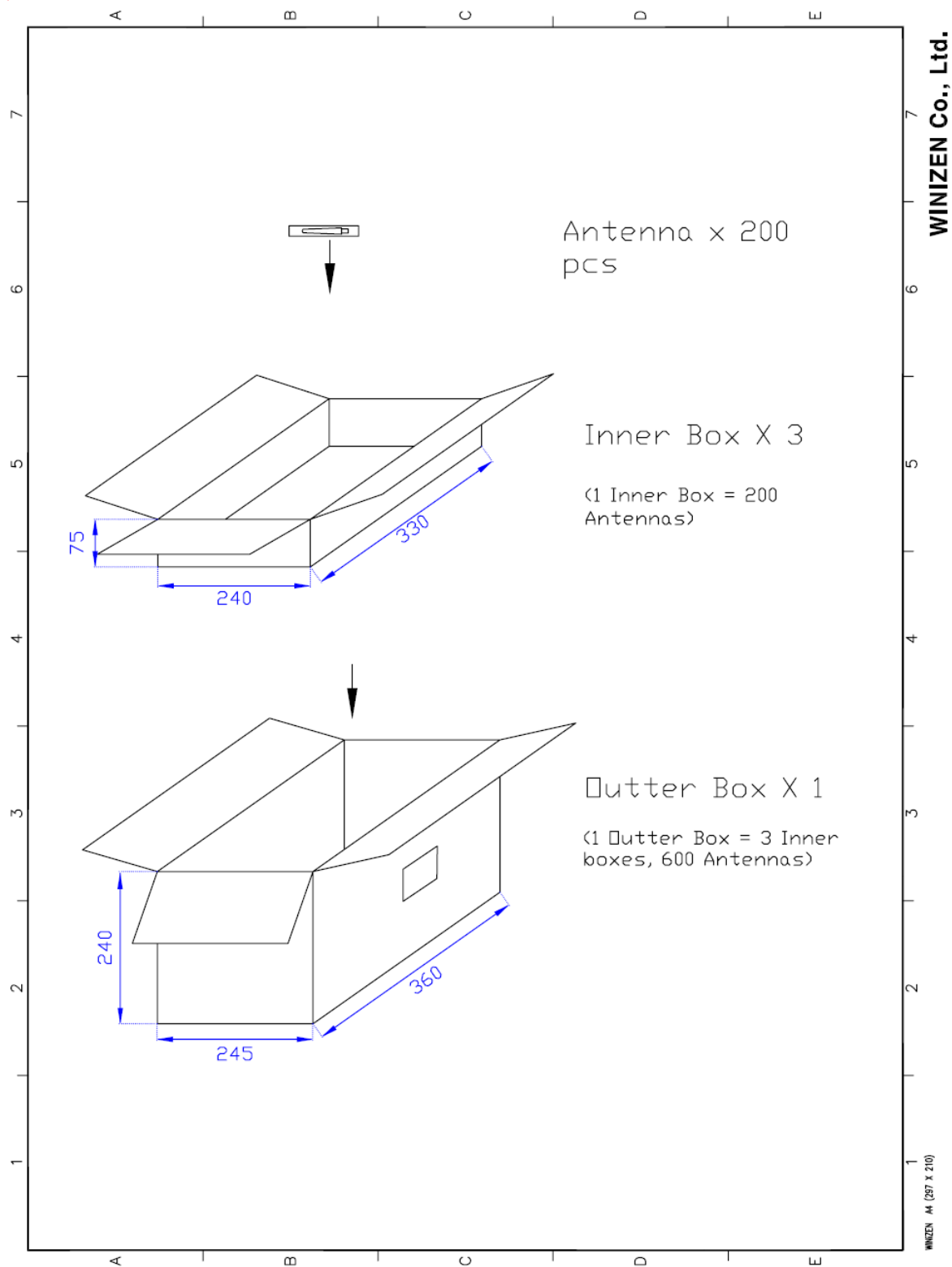
제품/모델	Wireless B/G Antenna, W5E-WO-03				도	번	J011-24260-010-0	문서번호	WSQP-003	제정일	2005.12.5
번	공정	공정명	작업 내용	사용설비/ 계측기	관리항목(방법)	품질기준			주기	비고	
						검사항목	검사기준				
1		자재	• Vendor 확인 • 검사의뢰	• 도면	• Lot 구분(FIFO)						
2		수입검사	• 부품 외관/특성 검사	• Network Analyzer, 버니어캘리퍼스 • 육안		• 외관 • 치수/특성 • Spec.과 일치할 것			Lot		
3		자재	• Item별 출출 (사출물, 커넥터, Cable 등)		• Lot 구분(FIFO)						
4		조립	• 커넥터 어셈블리와 케이블 조립 • 케이블 및 파이프 조립 • 사출물간 조립	• 조립 jig	• 원장조립						
5		외관검사	• Assy 상태를 육안으로 확인	• 육안	• 외관 (사출물, Connector) • 본딩, 조립 상태	• 외관 • 조립 상태 • 들어지지 않을 것, 흠 • 점이 없을 것 • 조립 상태가 견고하고 양호할 것.			전수		
6		특성검사	• 제품특성 시험	• Network Analyzer	• 특성치	• 경재파비 (VSWR) (1.9:1 이하)			전수	중장관리항 목 (CTO)	
7		포장	• 비닐백과 박스에 제품을 포장		• 포장 상태, 수량	• 외관 • 양호할 것 • 포장 상태가 견고하고 파손이 없을 것.			전수		
8		출하검사	• 제품 특성 및 외관, 포장 상태를 확인 • 버니어캘리퍼스	• Network Analyzer, • 육안	• 외관 검사 • 특성 검사	• 외관 • 특성 • Spec. 만족할 것 • 양호할 것, 수량이 일치할 것			Sampling		
9		출하	• 제품 창고에 입고	• Hand car	• Lot 구분 • 적재상태	• 포장					
반영	개정일	개정 내용	개정자	확인	번호	개정일	개정 내용	개정자	확인		

	Document No. WAT-0909-EX387I	Rev. No. IR	Model Name W5E-WO-03
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8. 신뢰성 시험

Item	Specifications	Conditions	Test Result
Salt-water Resistance	No change of material characteristic	Temperature of 35℃, Concentration of 5%, Let stand for 48 hours	OK
Humidity Resistance	Changeable range of V.S.WR value ± 0.5 No change of material characteristic	Temperature of 40℃, Humidity of 95%, Let stand for 96 hours	OK
Temperature Test Temperature(°C)  <p>The graph shows a temperature cycle over 10 hours. The y-axis represents temperature in °C, ranging from -20 to 60. The x-axis represents time in hours (H). The cycle consists of: 1. Heating from 25°C to 60°C (30% humidity) in 10 minutes. 2. Soaking at 60°C, 30% humidity for 35 minutes. 3. Cooling from 60°C to 40°C (80% humidity) in 20 minutes. 4. Soaking at 40°C, 80% humidity for 8 hours. 5. Cooling from 40°C to -20°C (0% humidity) in 60 minutes. 6. Soaking at -20°C, 0% humidity for 4 hours. 7. Heating from -20°C to 25°C (65% humidity) in 45 minutes. 8. Soaking at 25°C, 65% humidity for 3 hours. The total cycle time is 118 hours and 20 minutes.</p>	Changeable range of V.S.WR value ± 0.5 No change of material characteristic	Increasing from +25℃, 65% to +60℃, 30%; 35min / Keeping on +60℃, 30% for 6hour / Decreasing from +60℃, 30% to +40℃, 80%; 20min / Keeping on +40℃, 80% for 8hour / Decreasing from +40℃, 80% to -20℃, 0%; 60min / Keeping on -20℃, 0% for 4hour / Increasing from -20℃, 0% to 25℃, 65%; 45min / Keeping on 25℃ for 3hour / 5Cycle time = 118hour and 20min	OK
Drop  <p>The diagram shows an antenna being dropped from a height of 1.5m onto a steel plate (2t). The antenna is represented by a black rectangle, and the steel plate is a thicker black rectangle at the bottom. A vertical double-headed arrow indicates the 1.5m drop height.</p>	No disconnection No crack or damage	Drop the antenna at 1.5m height to the steel plate (2t) of ground	OK

9. 포장 사양





Specifications Sheet

Object	Internal Antenna	Page	1 of 6
Customer		Date	February 19, 2010
System	WLAN/ Bluetooth/ Zigbee	Rev.	A
Model Name	W5I-BO-07-F245	Written by	W. I. KWAK

Electrical Specifications

Frequency Range (MHz)	2400 ~ 2483.5
Band Width (MHz)	83.5
V.S.W.R (Min)	1.9 : 1
Gain (Max)	2.5 ± 1 (dBi)
Input Impedance	50 (Ω)
Polarization	Linear

Mechanical Specifications

Antenna Size (Length x Width x Height)	48 × 8 × 1 mm
Weight	N / A
Connector	I-PEX MHF
Cable Length	245 mm
Radiator Material	Copper
Operation Temperature	- 30 ~ 70 ($^{\circ}\text{C}$)
Operation Humidity	10 ~ 90 (%)

Option	
Remarks	Data measured at free-space.

WINiZEN Co., Ltd.

Fig 1. Return Loss (Agilent E8357A 300KHz~6GHz PNA Series Network Analyzer)

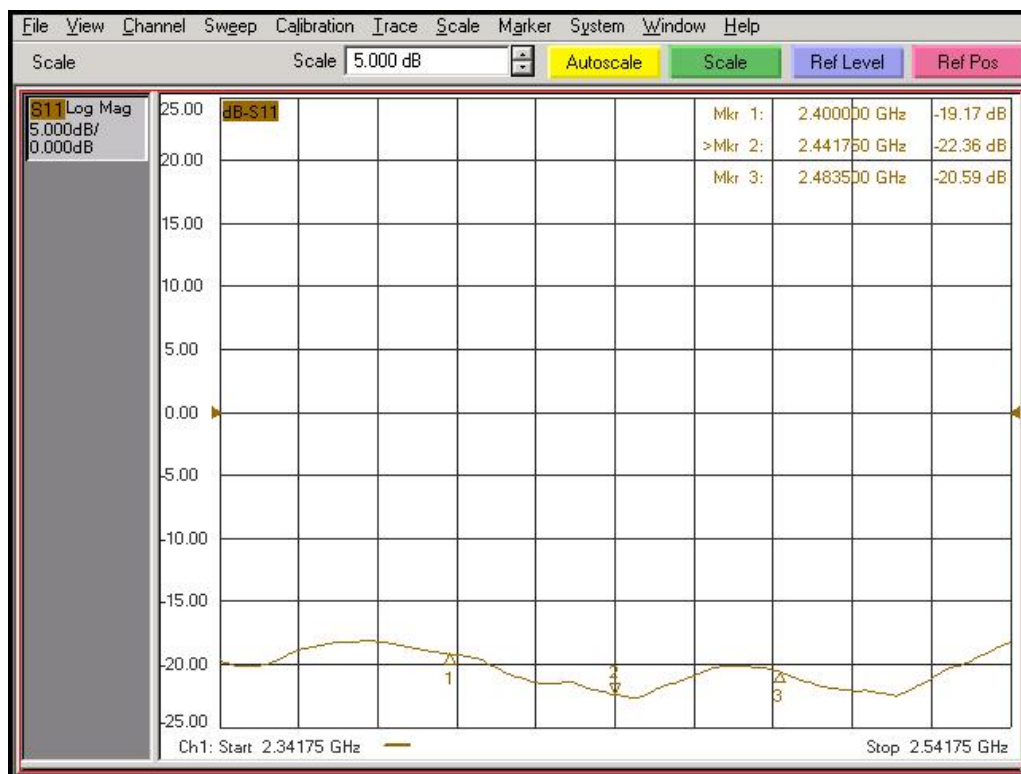


Fig 2. V.S.W.R (Agilent E8357A 300KHz~6GHz PNA Series Network Analyzer)

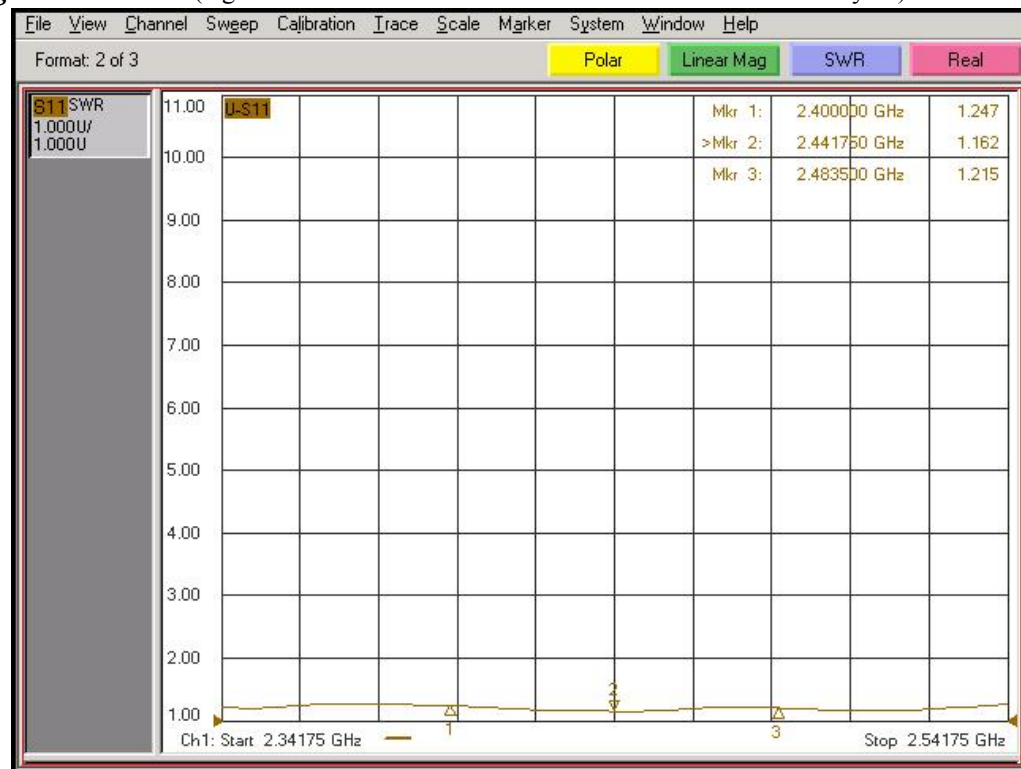


Fig 3. Smith Chart (Agilent E8357A 300KHz~6GHz PNA Series Network Analyzer)

LEFT

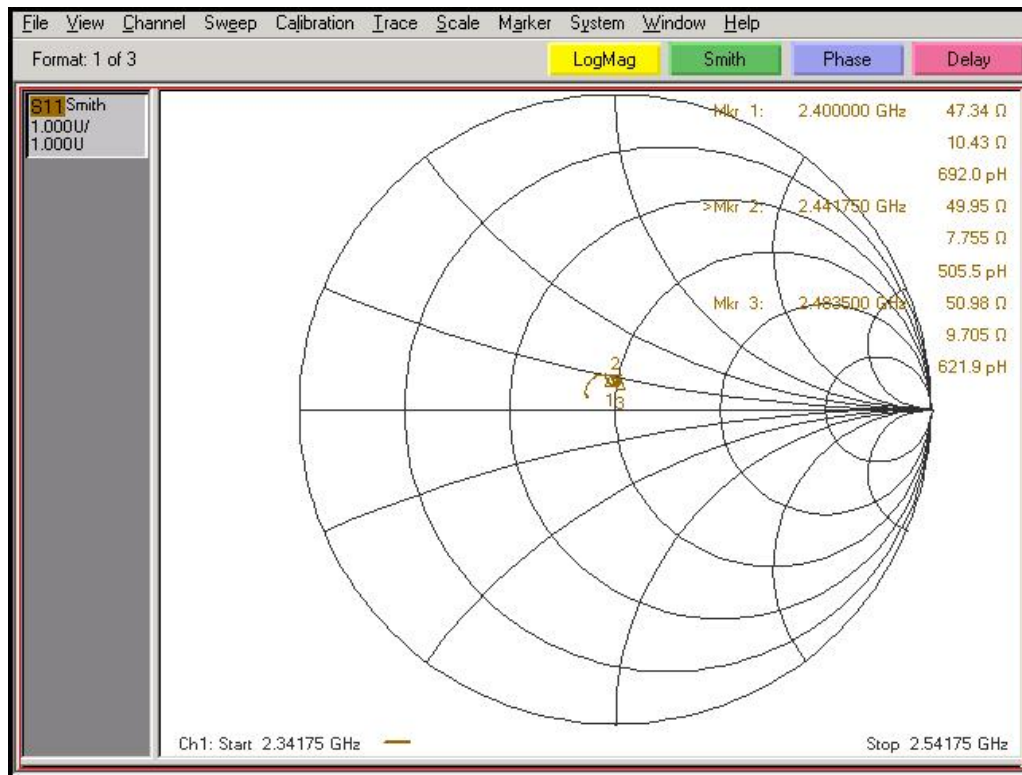


Fig 4. Measurement Configuration

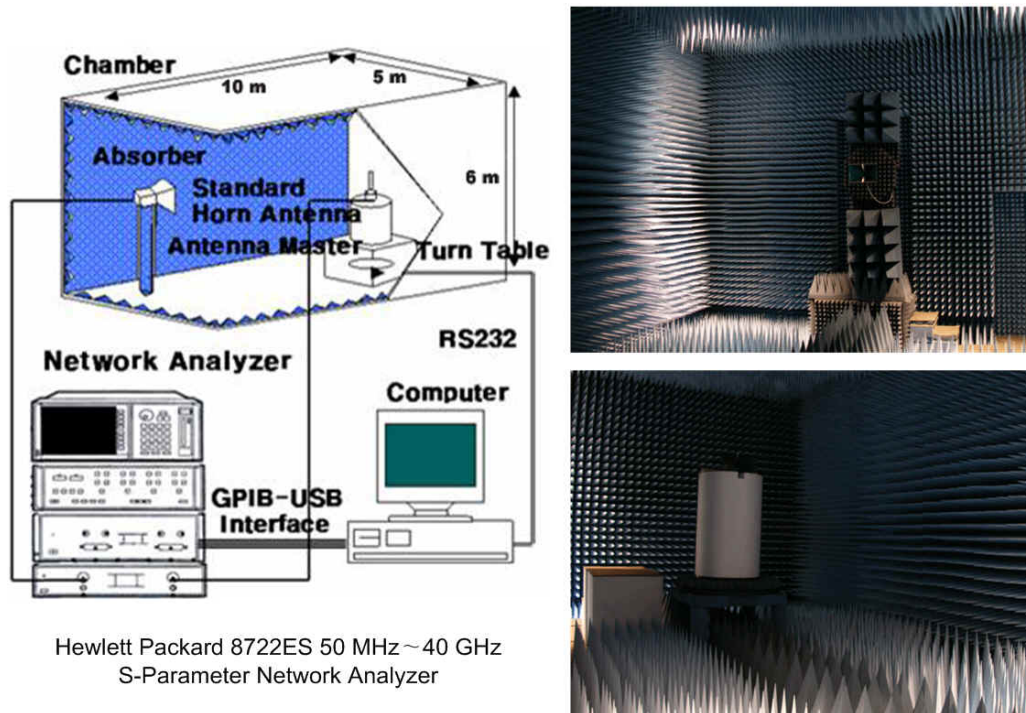
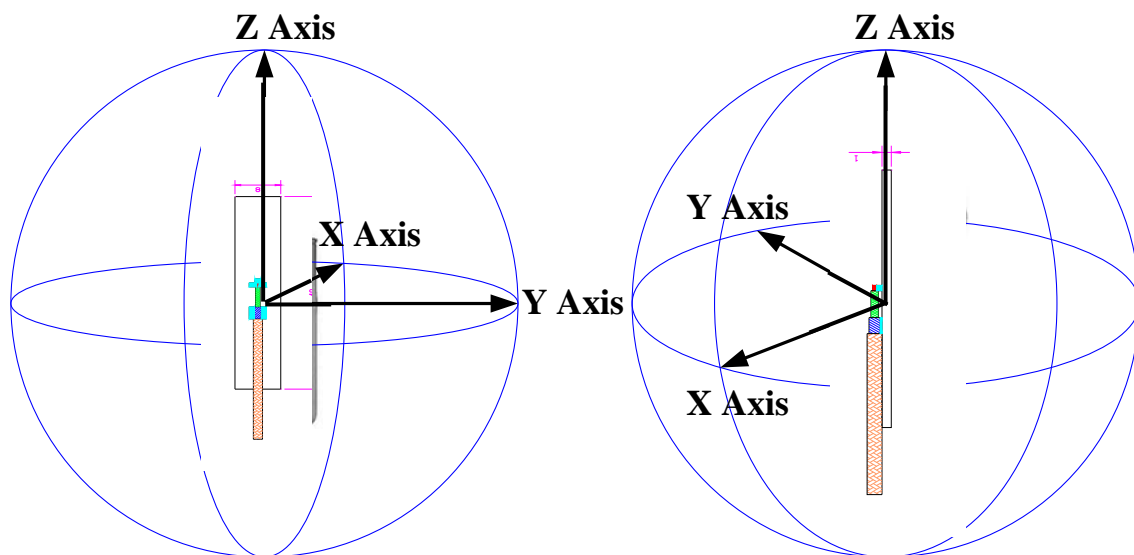


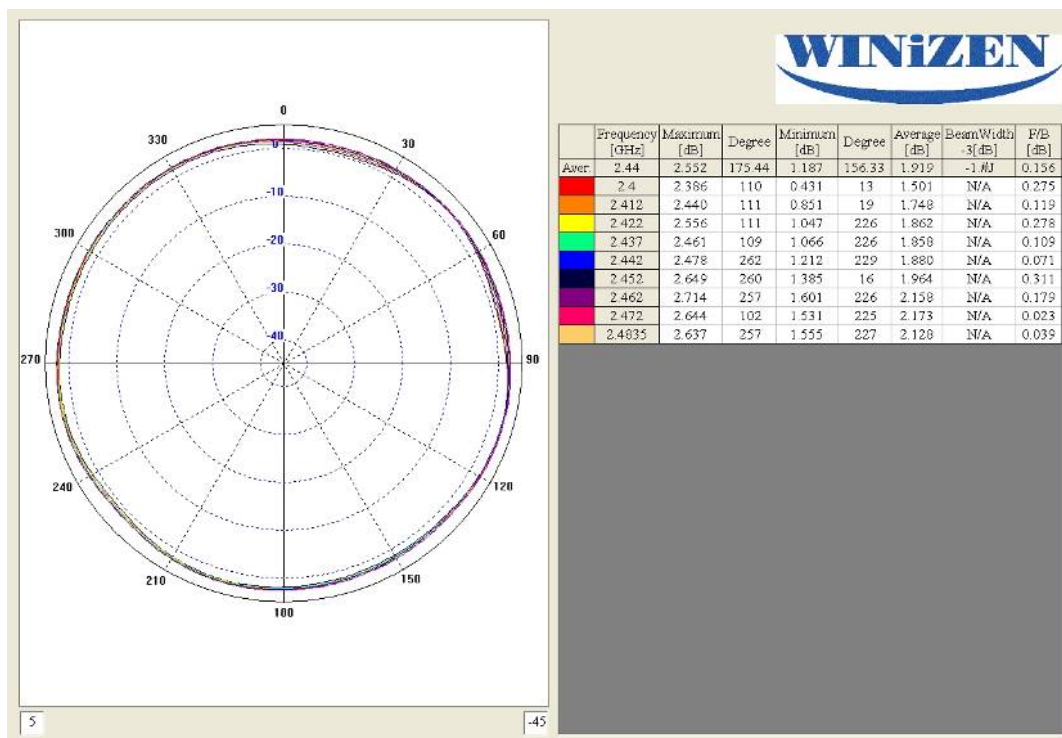
Fig 5. Axis Definitions (Antenna Center)



- a. Azimuth Pattern (Co-pol) : XY Plane ; Horn Antenna Polarization : Vertical
- b. Elevation Pattern (Co-pol) : XZ Plane ; Horn Antenna Polarization : Horizontal
- c. Elevation Side Pattern (Co-pol) : YZ Plane ; Horn Antenna Polarization : Horizontal

Fig 6. Gain Patterns

a. Azimuth Pattern



b. Elevation Pattern

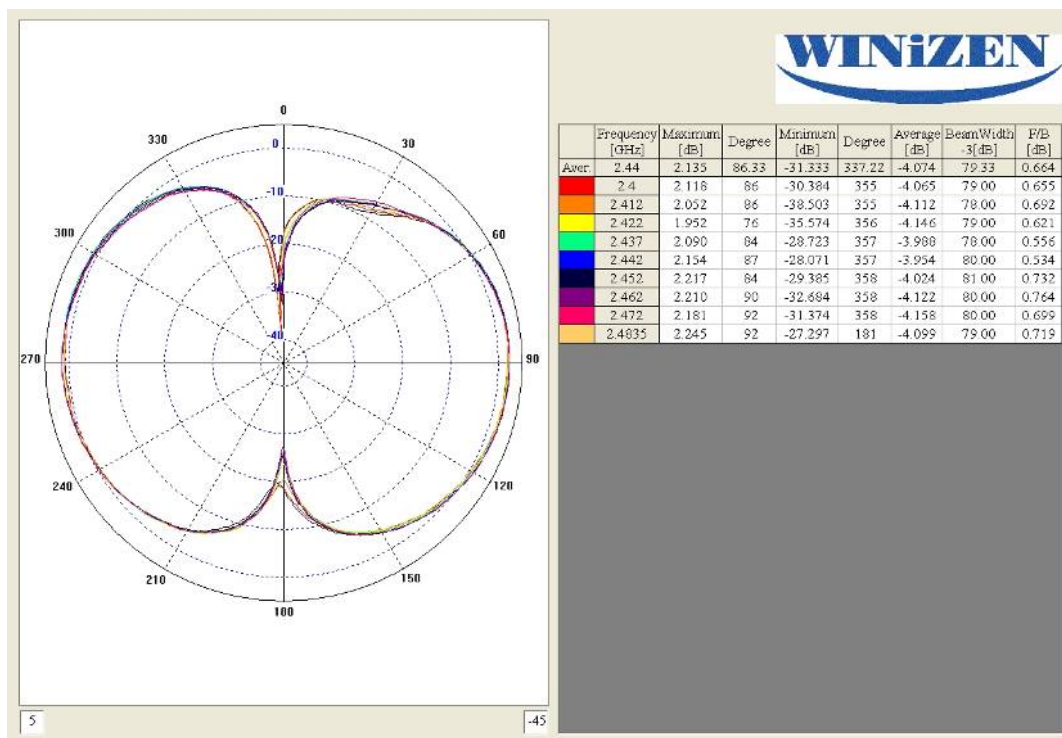




Fig 7. Antenna Mechanical

