

Messrs. SAMSUNG Electronics

Certification Requirement Form

Item	2.4GHz W-LAN Antenna	Certifier	Charge	Reviewer	Certifier
Specification					
Model	ET-APLS02				
Code No.					
Certification No.					
	1	Certification			New
Condition	2				Renewal
	3				ETC
Charge			Date.		

* Above items are certified.

Presenter	☐	R & D
	☐	Production
	☐	Quality Assurance
	☐	Procurement
	☐	Supplier

Supplier	Charge	Review	Cerification

Messrs. SAMSUNG Electronics

Electronic	Charge	Review	Confirm	Certification
	/	/	/	/
Equipment	Charge	Review	Confirm	Certification
	/	/	/	/

Specification Certification Requirement Form

Item : 2.4GHz Band Wireless Antenna

Model : ET-APLS02

Supplier Code :

We present 2.4 GHz Band Wireless transmitter antenna's
specification certification requirement form. After reviewing
this presentation certify this specification certification requirement form.

2003. 10.

Address : 1487 Kayang 3-dong Kangsu-ku Seoul
(Suite 206 Kayang Techno Town)

Tel. : 02-3665-8114

Fax. : 02-3663-5143

Company : EMC Tech Corp.

CEO : Lee Ki Chun (signature)

Contents

1. Concepts
2. 2.4GHz Band Wireless Transmitter Antenna Composition
3. Characteristics
4. Test Procedure
5. Test Results
6. Quality Assurance
7. Packing

1. Concept

This item consists of 2.4 GHz band dipole antenna and can be consists of many antennas. This antenna is vertical dipole type antenna which can be used for 2.4GHz band wireless lan, wireless security guard, wireless A/V transmission, bluetooth etc. This item is optimized vertical dipole type antenna.

1) Antenna Use Condition

☐ Portable ☒ Fix ☐ Mobile ☐ Outdoor ☒ Indoor ☐ ETC

2) Scope

This specification certification requirement form stipulate wireless lan or RF transmission system antenna which system is manufactured and developed by your company.

3) Condition

- 3-1. All materials which are used to this item should be stable equipment and good quality to satisfy electric and circuit characteristics.
- 3-2. All elements which are used to this item should secure reliability & security and should be good quality satisfying high grade for the industry use.
- 3-3. All parts of this item should not give bad effect on operation of system in which antenna is embedded due to antenna's breakdown and should not give bad impact to other parts and circuits of systems.

4) Processing & Assembly

- 4-1. Antenna's processing and assembly must be in exact configuration and connector should not be detached from antenna.
- 4-2. Unspecified measurements, which are not clearly instructed in specification, are accepted if that does not hinder the operation of system's function.

5) Test

5-1. External Test

- Check component's state in order to keep away from omission, wrong input and no input etc.
- Check whether there is different substances which have nothing to do with antenna.
- Confirm unity between parts' direction, measurements & drawing's specification.
- Confirm parts' position and check whether there is absence of components.

5-2. Function Test

After assembly, run COMPUTER Test in order to inspect circuit's OPEN and Short state.

5-3. Special Test

Additional inspection is needed periodically to confirm antenna's characteristics.

2. Antenna (Dipole Antenna) Composition

NO.	Item	MODEL	Q'ty	Remarks
1	Antenna element (Radiation)	ET-APLS02	1	
2	Connector + Cable			
3	FERRITE CORE	OP9.5-14	1	

3. Characteristics

■ Electrical Specifications

MODEL	ET-APLS02
Frequency Range (MHz)	2400 ~ 2500
Bandwidth (MHz)	100 ($\pm 10\%$ @Center Frequency)
VSWR (Max)	1.5 : 1 (Typ.)
Polarization	Linear (Vertical)
Gain (dBi)	2.0 (Typ.)
Cross-Polarization	20.0dB
Beam-width	Omni Directional
Impedance (Ω)	50
Temperature	-30°C ~ 60°C
Relative Humidity	0 to 95% RH

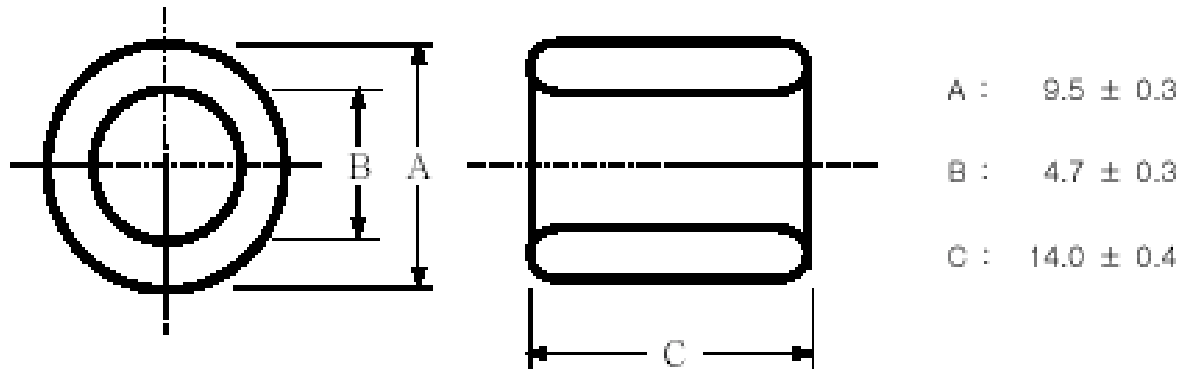
■ Mechanical Specifications

Dimension (W / H / D) (mm)	h-330 $\pm$ 3mm+Antenna
Radiating Element Material	RG-178 COAX CABLE
Wind-load (km/h)	for indoor
Termination	MMCX(M) + RG178(330mm)

■ FERRITE CORE Specifications

1.Type & Material : OP9.5-14, K-150.

2. Shape & Core Dimension(mm)

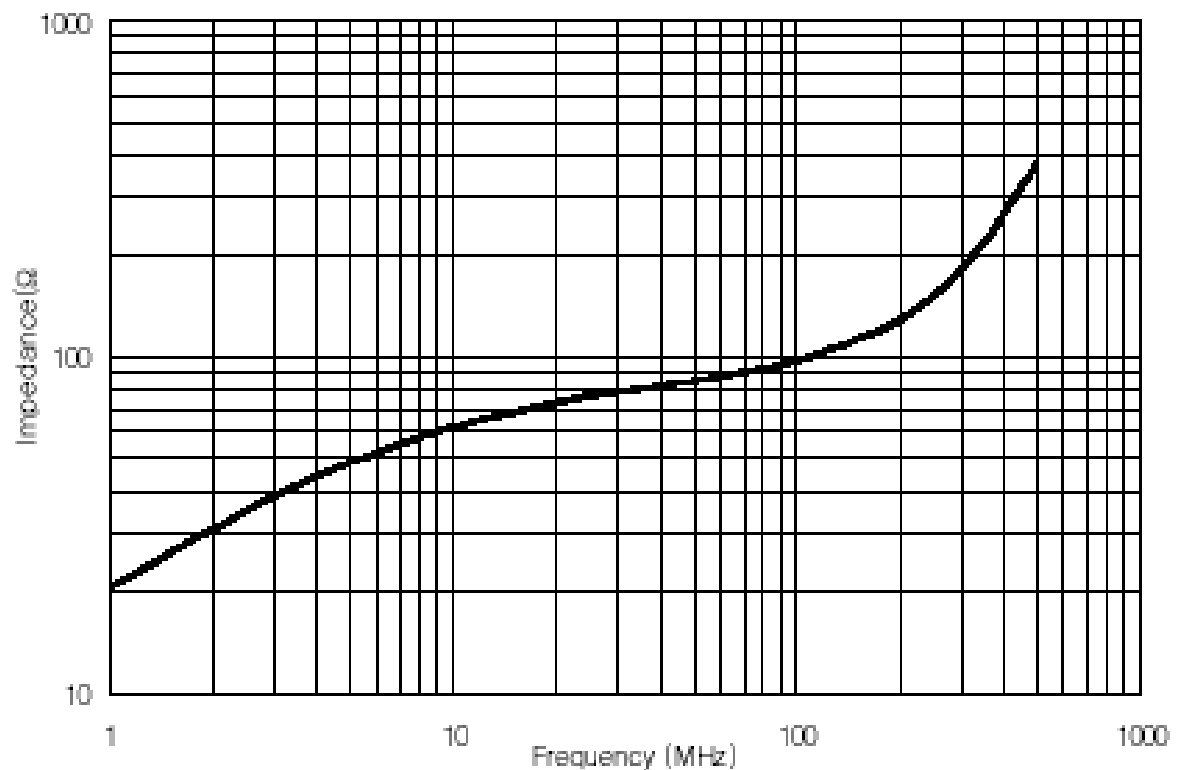


3.Electrical Characteristic

Impedance	50 Ω Min.	1)Frequency : 10MHz. 2)Turns : 0.6 ϕ Wire, 1Turn. 3)Instrument : HP4192A or Equivalent.
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4. Impedance vs. Frequency (Impedance indicate a typical value of measured ones)

Test wire : 0.6mm ϕ wire 70mm 1turn, HP4191A.



4. Test Procedure

4-1. Test Equipment Picture.



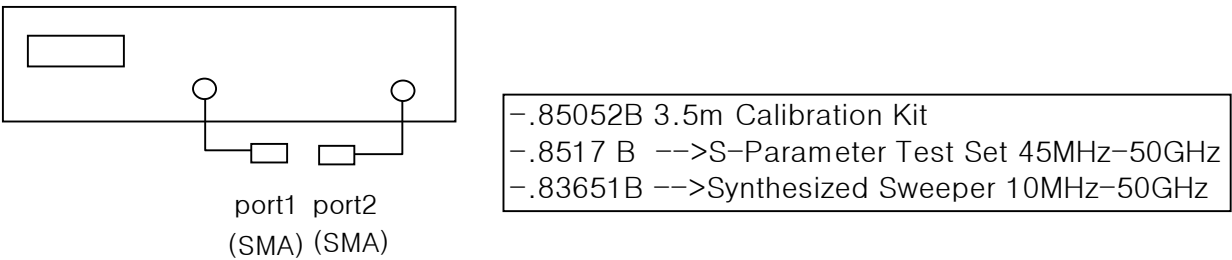
4-1-1. Test Equipment

No.	Item	Model	Quantity	Specification
1	Network Analyzer	Agilant 85107B	1	45MHz~50GHz
		Agilant 8753ES	1	30KHz~ 6GHz
2	Cal. Kit	Agilant 85032B	1	SMA , N-Type
3	Termination	SMA(M,F) , N(M)	1	VSWR ≤ 1.1:1

4-1-2. Other Equipment

No.	Item	Model	Quantity	Specification
1	Spectrum Analyzer	Prolink 3c +	1	5MHz~2150MHz
2	Spectrum Analyzer	R3131 (Advantest)	1	9KHz~3GHz
3	Noise Figure Analyzer	Agilant N8973A	1	10MHz~3GHz
4	Noise Source	Agilant N4000A	1	10MHz~18GHz

4-2. Calibration , Equipment Connectivity Diagram

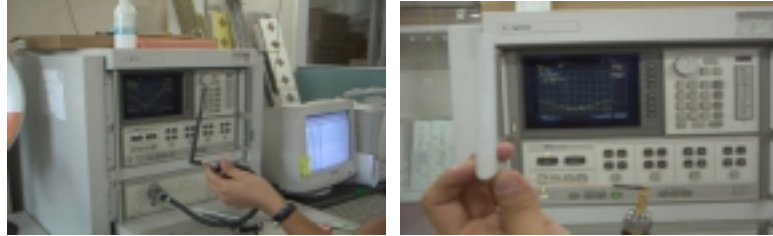


4-2-1. Calibration Measurement

Confirm Calibration and Calibration results according to Agilant 85107B Calibration rules.
Run Calibration according to Calibration procedure and check whether there are problems or not and measure after checking it.
(terminate port which is not used)

4-3. Test Procedure

4-3-1. Network Measurement



4-3-2. No Reflection Chamber Measurement



5. Test Results

5-1. Test Specification(Antenna + Housing)

Buyer	SAMSUNG Electronics		
Item	2.4GHz W-LAN Antenna		
Specification	ET-APLS02		
External Test	Test Category	Specification	Remarks
Equipment Test	assembly drawing test	see assembly drawing specification	
	processing,coating state		
	assembly state		
Unit Test	Test Category	Specification	Remarks
Antenna	Frequency Range(MHz)	2400-2500	
	Bandwidth(MHz)	100(±10%@Center Freq.)	
	V.S.W.R(Max)	1 : 1.5	
	Beam-width	Omni Directional	
	Polarization	Linear(Vertical)	
	Gain	3.5 (Typ.)	
	Impedance	50Ω(±5 @Center Frequency)	
	Cross-Polarization	Min. 20.0dB	
	Temperature	-30℃ ~ 60℃	
	Relative Humidity	0 to 95% RH	
	Dimension (W/H/D)	h-330(mm)+Antenna	
	Radiating Element Mat'l	RG-178 COAX CABLE	
	Wind-load (km/h)	for indoor	
	Termination	MMCX(M) + RG178(330mm)	

5-2. Test Results(Antenna + Housing)

Buyer	SAMSUNG Electronics		
Item	2.4GHz W-LAN Antenna		
Specification	ET-APLS02		
External Test	Test Category	Specification	Remarks
Equipment Test	assembly drawing test	see assembly drawing specification	
	processing,coating state		
	assembly state		
Unit Test	Test Category	Specification	Remarks
Antenna	Frequency Range(MHz)	Good	
	Bandwidth(MHz)	Good	
	V.S.W.R(Max)	Good	
	Beam-width	Good	
	Polarization	Good	
	Gain	Good	
	Impedance	Good	
	Cross-Polarization	Good	
	Dimension	Good	
	Termination	Good	

5-3. Test Specification(Antenna)

Buyer	SAMSUNG Electronics		
Item	2.4GHz W-LAN Antenna		
Specification	ET-APLS02		
External Test	Test Category	Specification	Remarks
Equipment Test	assembly drawing test	see assembly drawing specification	
	processing,coating state		
	assembly state		
Unit Test	Test Category	Specification	Remarks
Antenna	Frequency Range(MHz)	2400-2500	
	Bandwidth(MHz)	100($\pm 10\%$ @Center Freq.)	
	V.S.W.R(Max)	1 : 2.5 (Typ.)	
	Beam-width	Omni Directional	
	Polarization	Linear(Vertical)	
	Gain	2 (Typ.)	
	Impedance	50 Ω (± 5 @Center Frequency)	
	Cross-Polarization	Min. 20.0dB	
	Temperature	-30℃ ~ 60℃	
	Relative Humidity	0 to 95% RH	
	Dimension (W/H/D)	h-330(mm)+Antenna part	
	Radiating Element Mat'l	RG-178 COAX CABLE	
	Wind-load (km/h)	for indoor	
	Termination	MMCX(M) + RG178(330mm)	

5-4. Test Results(Antenna)

Buyer	SAMSUNG Electronics		
Item	2.4GHz W-LAN Antenna		
Specification	ET-APSS02		
External Test	Test Category	Specification	Remarks
Equipment Test	assembly drawing test	see assembly drawing specification	
	processing,coating state		
	assembly state		
Unit Test	Test Category	Specification	Remarks
Antenna	Frequency Range(MHz)	Good	
	Bandwidth(MHz)	Good	
	V.S.W.R(Max)	Good	
	Beam-width	Good	
	Polarization	Good	
	Gain	Good	
	Impedance	Good	
	Cross-Polarization	Good	
	Dimension	Good	
	Termination	Good	

5-5. Reliability Test Results(Antenna+Housing)

CUSTOMER NAME: SAMSUNG Electronics DATE: 2003.09.18

MODEL NAME: ET-APLS02 LOT Quantity: 20 EA

INSPECTOR: Lee Kyu Chang Test Quantity: 20 EA

	Charge	Review	Certifier
Signature			K.C.Lee
			09/18

Category	Check Point	X1	X2	X3	Results
1. Twist	If connector is twisted by 3kgfmm power it has to be alright electrically and instrumentally	OK	OK	OK	OK
2. Connectivity	check problems when assmbling to set	OK	OK	OK	OK
3. Dimension	h-330±3mm	331.48	332.13	329.9	OK
4. V.S.W.R.	MAX 1:1.5	1.32	1.28	1.25	OK

*REMARK					Results
					Pass

5-6. Reliability Test Results(Antenna)

CUSTOMER NAME: SAMSUNG Electronics DATE: 2003.09.18

MODEL NAME: ET-APLS02 LOT Quantity: 20 EA

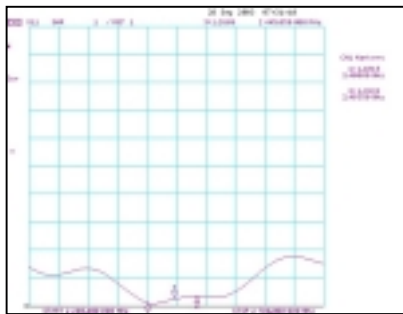
INSPECTOR: Lee Kyu Chang Test Quantity: 20 EA

Signature	charge	review	Certifier
			K.C.Lee
			09/18

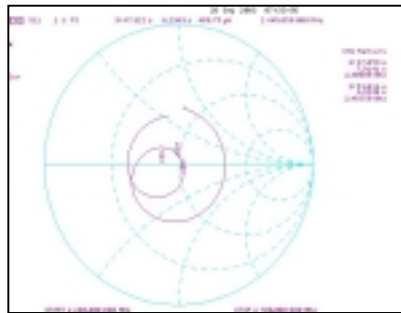
Category	Check Point	X1	X2	X3	Results
1. Twist	If connector is twisted by 3kgfmm power it has to be alright electrically and instrumentally	OK	OK	OK	OK
2. Connectivity	check problems when assmbling to set	OK	OK	OK	OK
3. Dimension	h-330±3mm	331.48	332.13	329.9	OK
4. V.S.W.R.	MAX 1:2.5	2.32	2.28	2.25	OK
*REMARK					Results
					Pass

5-7. Measurement Data(Antenna + Housing)

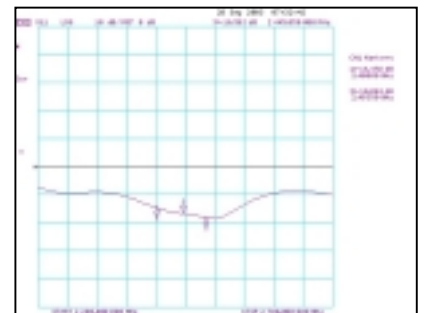
1) V.S.W.R



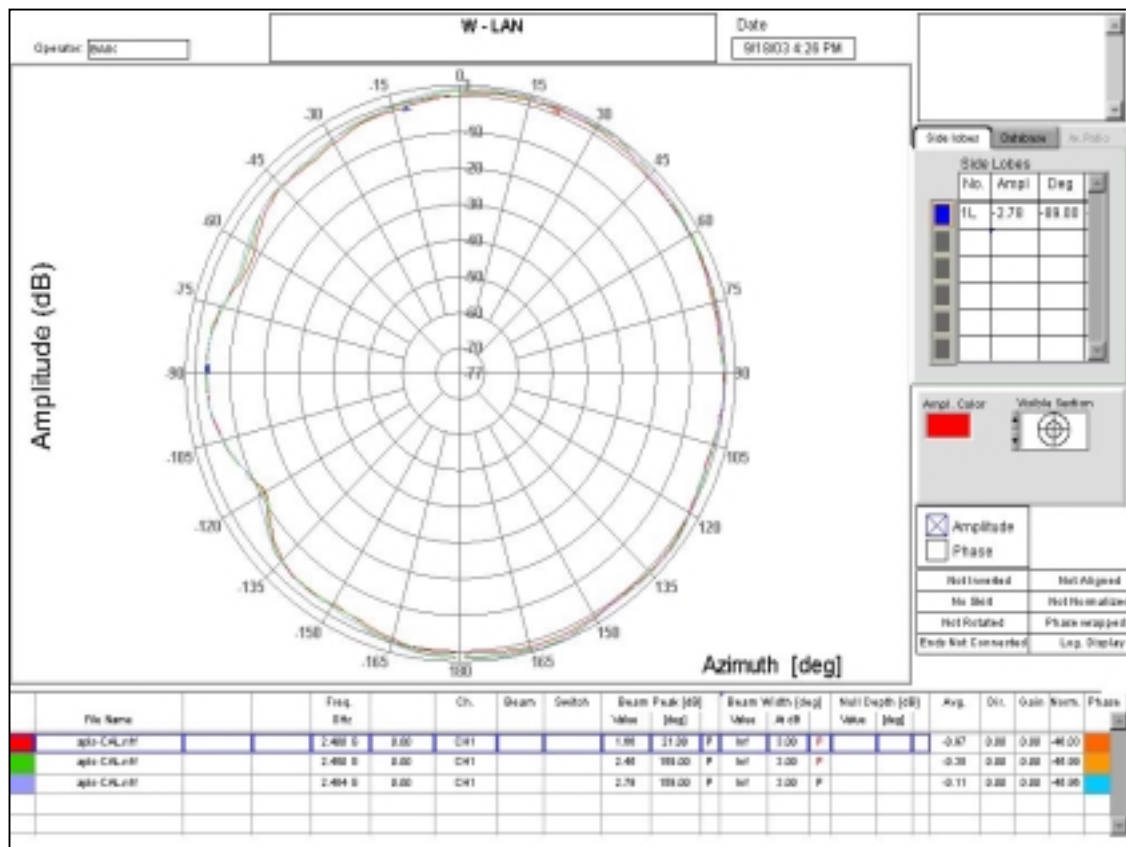
2) Smith Chart



3) Log Mag

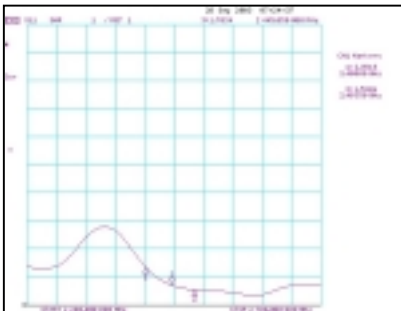


4) Beam Pattern

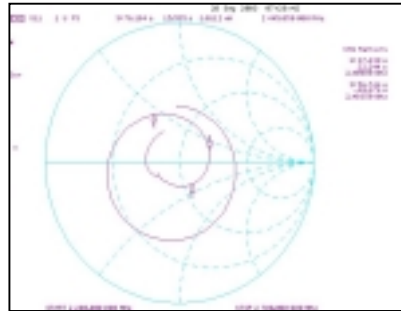


5-8. Measurement Data(Antenna)

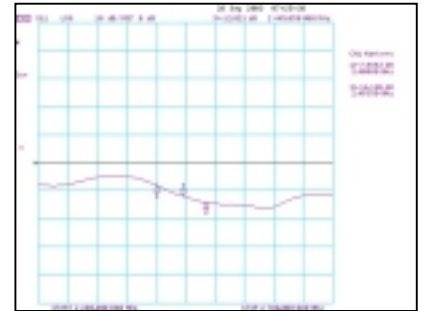
1) V.S.W.R



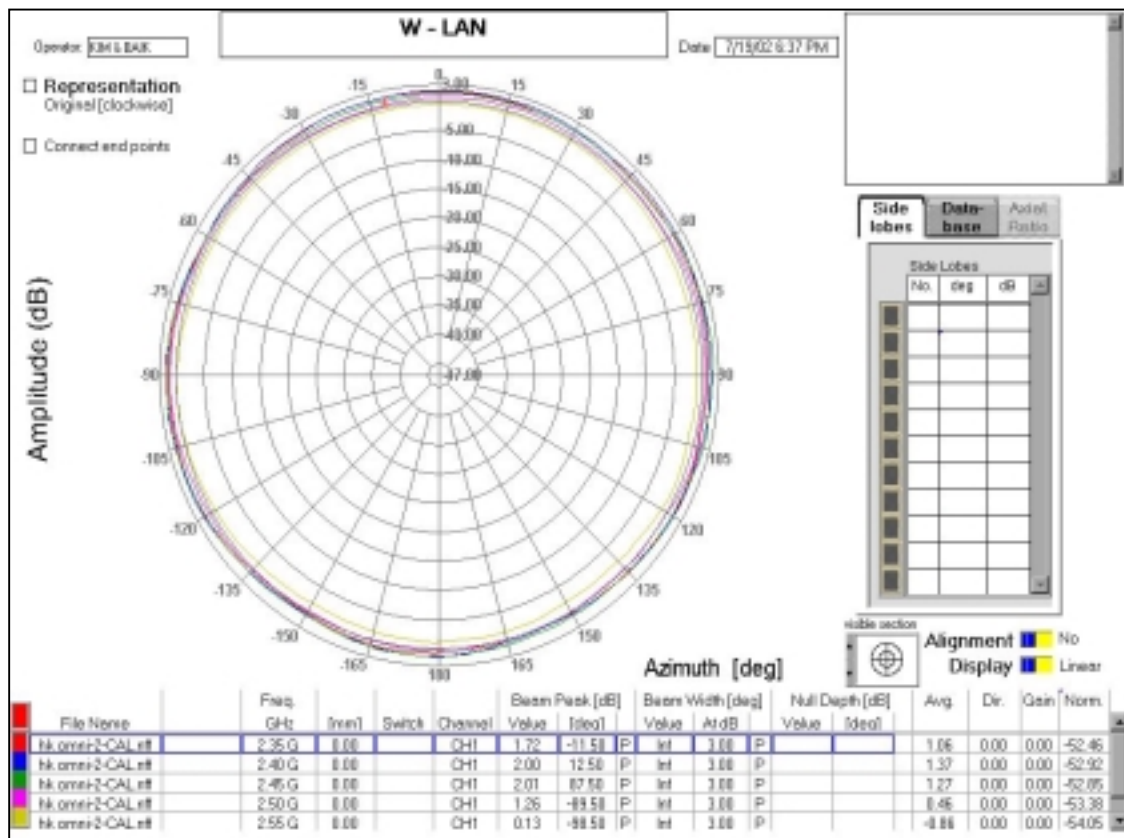
2) Smith Chart



3) Log Mag



4) Beam Pattern



6. Quality assurance and Warranty.

- 6-1. In addition to the confirmation inspection procedure which is specified in this form, other inspections are possible in order to confirm product's quality if it is needed
- 6-2. If it is guaranteed that change of test process is needed due to technology improvement, it is permitted to modify test procedure which is stipulated in this form.
- 6-3. It is guaranteed that form and materials can be changed after confirmation from your company if reliability, interoperability and performance are not influenced by that change of form and materials.
- 6-4. If defects are found during warranty terms after delivery due to manufacturer's responsibility, maintenance charge and reimbursement of items is given on free.
- 6-5. The warranty terms is 1 year and after that terms terminated maintenance is not free of charge.

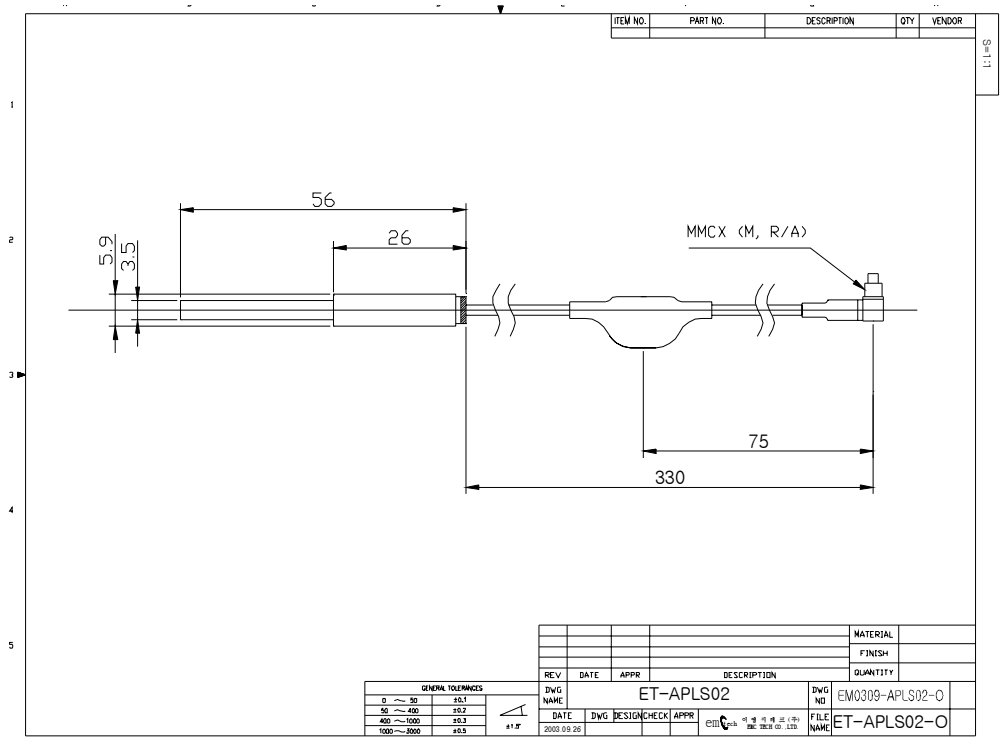
7. Packing

- 7-1. Write buyer and manufacturer's name and cooperate with each other.
- 7-2. Supply items with model, quantity information.

* Validity

This specification certification requirement form is valid after your confirmation of certification on 2003.10.

* 첨부 도면 1



* 첨부 도면 2

