

DATE :Sep . 27 . 2003

CUSTOMER: First International Computer, INC.

APPROVAL SHEET

MODEL	MH47
DESCRIPTION	Dual Band PIFA Antenna For Wireless Antenna
SUPPLIER P/N	D05004001301
CUSTOMER P/N	21-92232-02
FILE P/N	

FAVORTRON			Customer	
Manager	Supervisor	Engineer		



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1. Antenna Spec. For WLAN

1. 802.11b Spec.

- a. Frequency range : 2.4 ~ 2.5GHz (Nominal)
- b. Impedance : 50Ω
- c. LCD Panel : Open (100°) / Close (0°).
- d. System Plane : XY plane
- e. VSWR : ≤ 2 (Main & Aux. Antenna)
- f. Return Loss : ≤ -10dB (Main & Aux. Antenna)
- g. Band Width : ≥ 130MHz (2450MHz±65MHz at least).
- h. Diversity Sum : ≥ -2.5dBi
- i. Any 30° angle range can't has null depth.
- j. Average gain & Peak gain

Antenna	Peak Gain (dBi)			Average Gain (dBi)		
	Frequency			Frequency		
	2.4GHz	2.45GHz	2.5GHz	2.4GHz	2.45GHz	2.5GHz
Main	≤ 3	≤ 3	≤ 3	≥ -4	≥ -4	≥ -4
Auxiliary	≤ 3	≤ 3	≤ 3	≥ -4.5	≥ -4.5	≥ -4.5

2. 802.11a Spec.

- a. Frequency range : 5.15 ~ 5.35GHz (Nominal)
- b. Impedance : 50Ω
- c. LCD Panel : Open (100°) / Close (0°).
- d. System Plane : XY plane
- e. VSWR : ≤ 2 (Main & Aux. Antenna)
- f. Return Loss : ≤ -10dB (Main & Aux. Antenna)
- g. Band Width : ≥ 250MHz (5250MHz±125MHz at least).
- h. Diversity Sum : ≥ -3.5dBi
- i. Any 30° angle range can't has null depth.
- j. Average gain & Peak gain

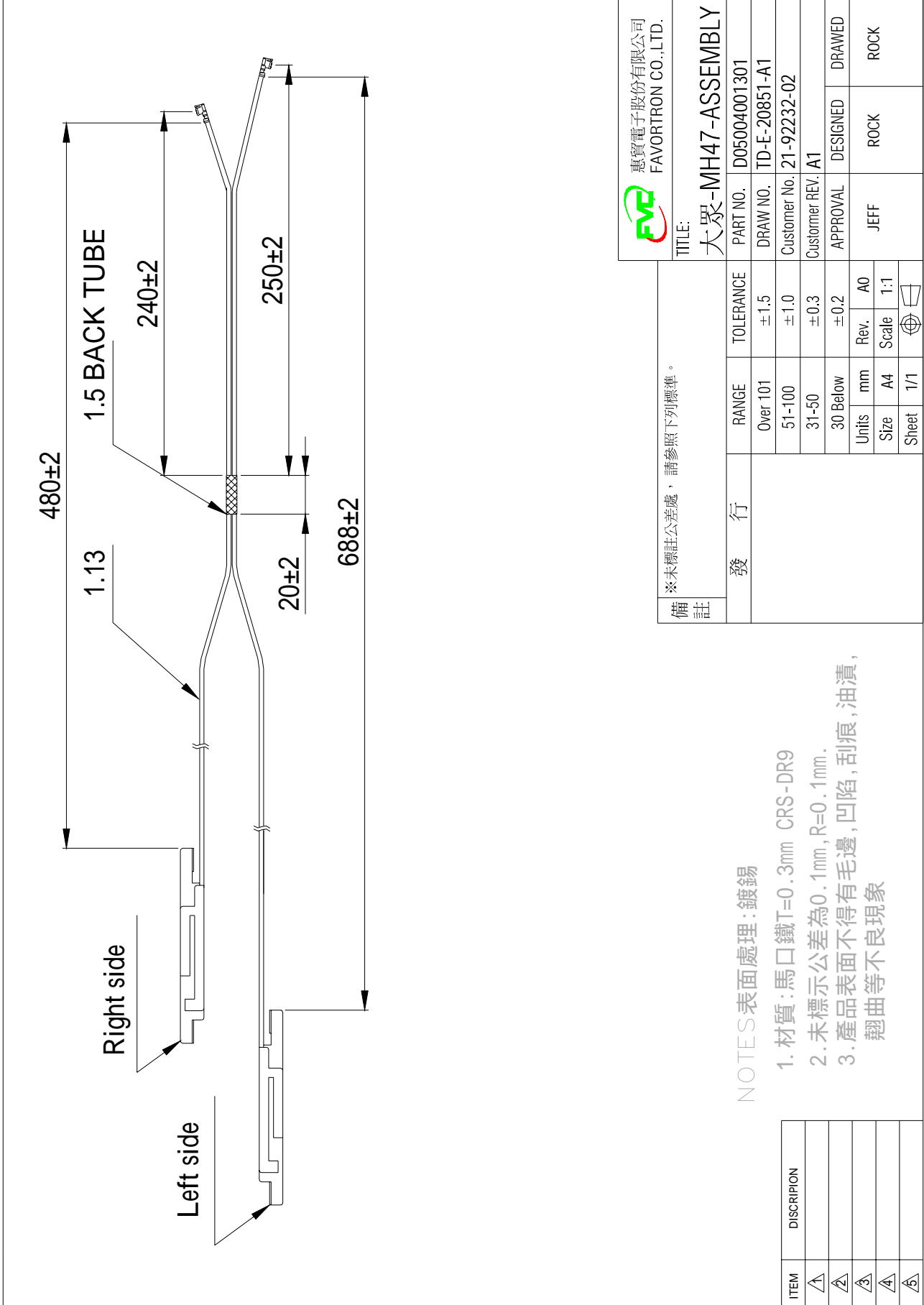
Antenna	Peak Gain (dBi)			Average Gain (dBi)		
	Frequency			Frequency		
	5.15GHz	5.25GHz	5.35GHz	5.15GHz	5.25GHz	5.35GHz
Main	≤ 6	≤ 6	≤ 6	≥ -4.8	≥ -4.8	≥ -4.8
Auxiliary	≤ 6	≤ 6	≤ 6	≥ -4.8	≥ -4.8	≥ -4.8


2. DESCRIPTION

- a. FIC Project Name & FIC P/N & Frequency : MH47 & 21-92232-02
Daul Band 2.4~2.5 & 5.15~5.35 GHz
- b. Vendor's antenna P/N : D05004001301
- c. Antenna P/N & type & material : G02007072001(L), G02007071001(R)
PIFA & Tinplate
- d. Coaxial cable length & diameter() & Cable P/N & Vendor : 688mm(Left,Gray) /
480mm(Right,Black) & 1.13
P/N:FWS5022 & Kurabe
- e. Connector model no. & vendor : P/N:20278-111R-13/1.13 & I-PEX

3. DRAWING

3.1 ASSEMBLY



 惠寶電子股份有限公司 FAVORITRON CO.,LTD.	
TITLE: 大眾-MH47-ASSEMBLY	
PART NO.	D05004001301
DRAW NO.	TD-E-20851-A1
Customer No.	21-92232-02
Customer REV.	A1
APPROVAL	DESIGNED
	DRAWN
	JEFF
	ROCK
	ROCK

備註		※未標註公差處，請參照下列標準。	
發	行	RANGE	TOLERANCE
		Over 101	±1.5
		51-100	±1.0
		31-50	±0.3
		30 Below	±0.2
Units	mm	Rev.	A0
Size	A4	Scale	1:1
Sheet	1/1		

NOTES 表面處理：鍍錫

1. 材質：馬口鐵T=0.3mm CRS-DR9
2. 未標示公差為0.1mm, R=0.1mm.
3. 產品表面不得有毛邊，凹陷，刮痕，刮漬，油漬，翹曲等不良現象

ITEM	DISCRIPION
△	
△	
△	
△	
△	

3.2 BOM

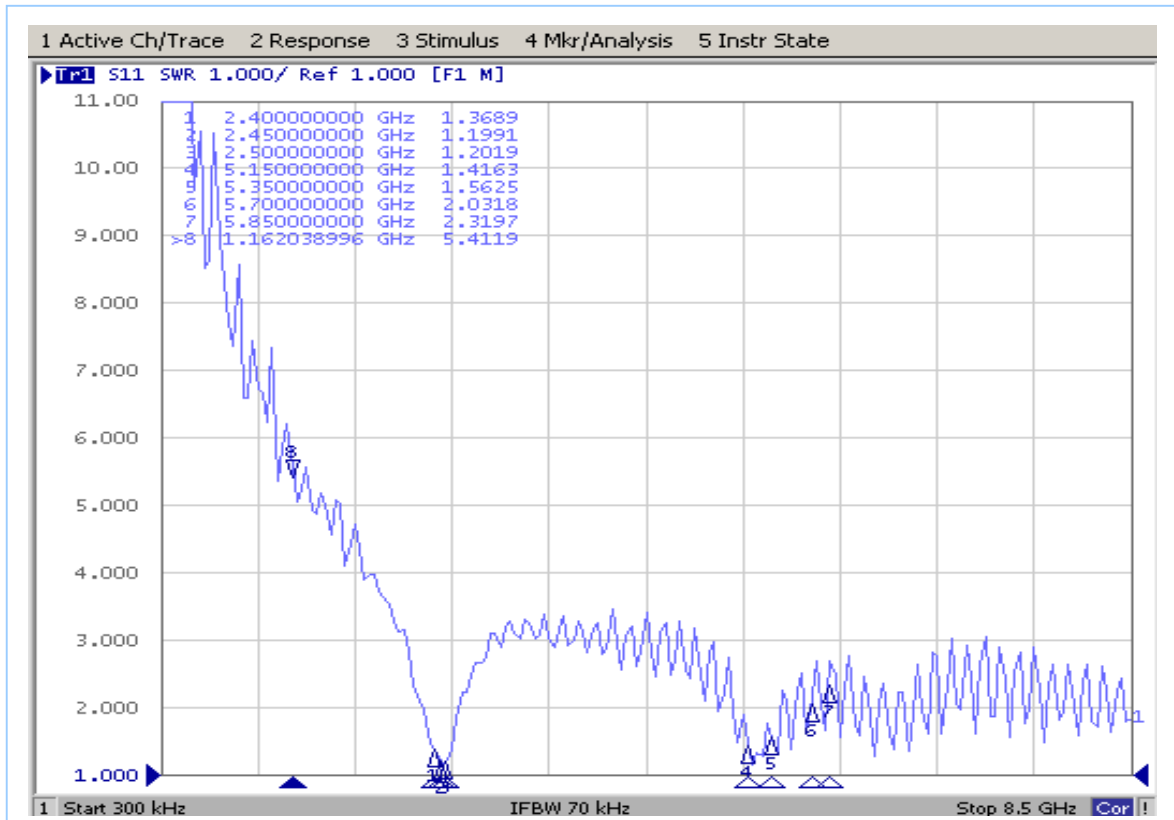
B O M					
ITEM	COMPONENT	Q'TY	DESCRIPTION	FVC P/N	VENDER
1	PIFA ANTENNA	1	MH47-PIFA-LEFT	G02007072001	
2	PIFA ANTENNA	1	MH47-PIFA-RIGHT	G02007071001	
3	同軸線	1	Kurabe 1.13 x 720mm單邊加 L-PEX Connector(灰色)	G04007182001	
4	同軸線	1	Kurabe 1.13 x 510mm單邊加 L-PEX Connector(黑色)	G04007183001	
5	SPONGE	2	4 x 2.5 x 3.7 mm	G01009043002	
6	熱縮套管	1	1.5 x 21 mm(黑色)	B02009259032	
7					
8					
9					
10					
11					
12					
13					
14					
15					
16					
17					
18					
19					
20					

 惠賢電子股份有限公司 FAVORTRON CO.,LTD	Title: 大眾MB06L
FVC Part No	D05004001301
FVC Draw NO.	TD-E-20851-A1
CUS. Part NO.	21-92232-02
Approval	Check
	Designed
JEFF	JERRY
	ROCK

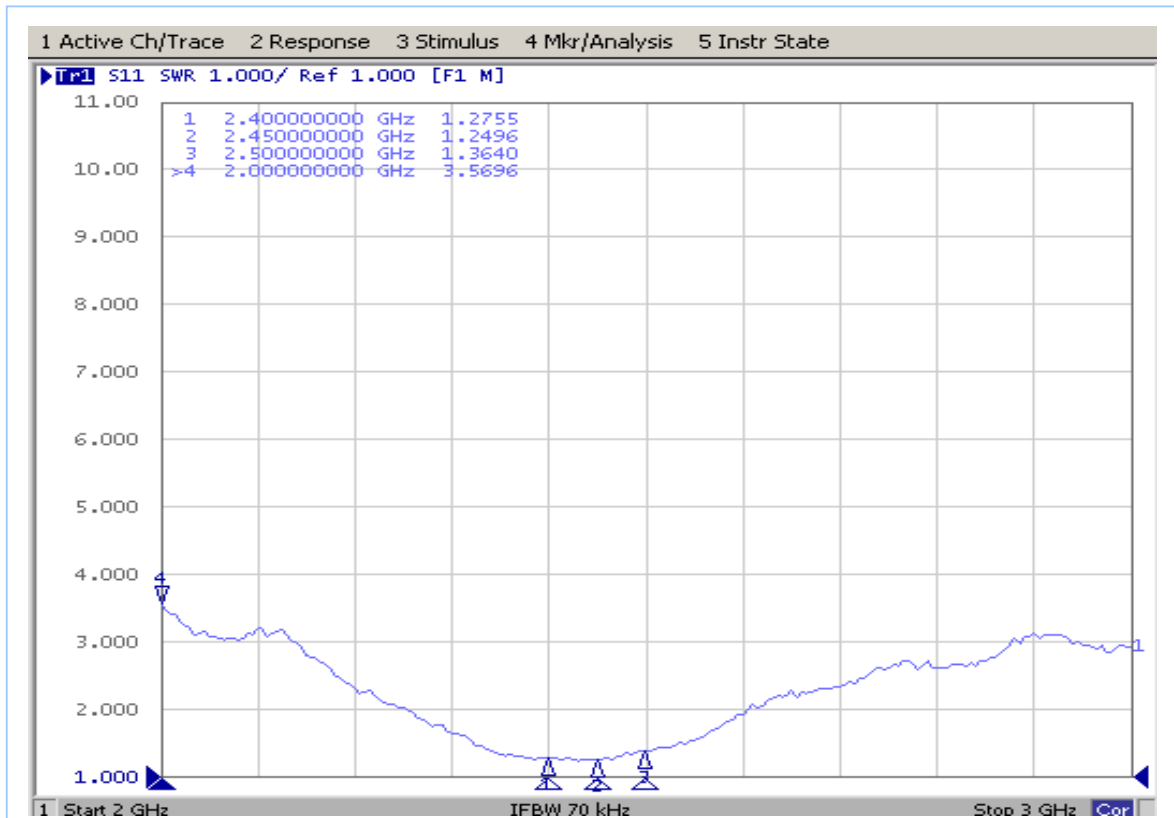
發 行	備 註	
Date	92/09/29	Sheet 1/1

4. PIFA W/L ANT. / LCD TOP Left / 688mm / I-PEX & Kurabe / Gray

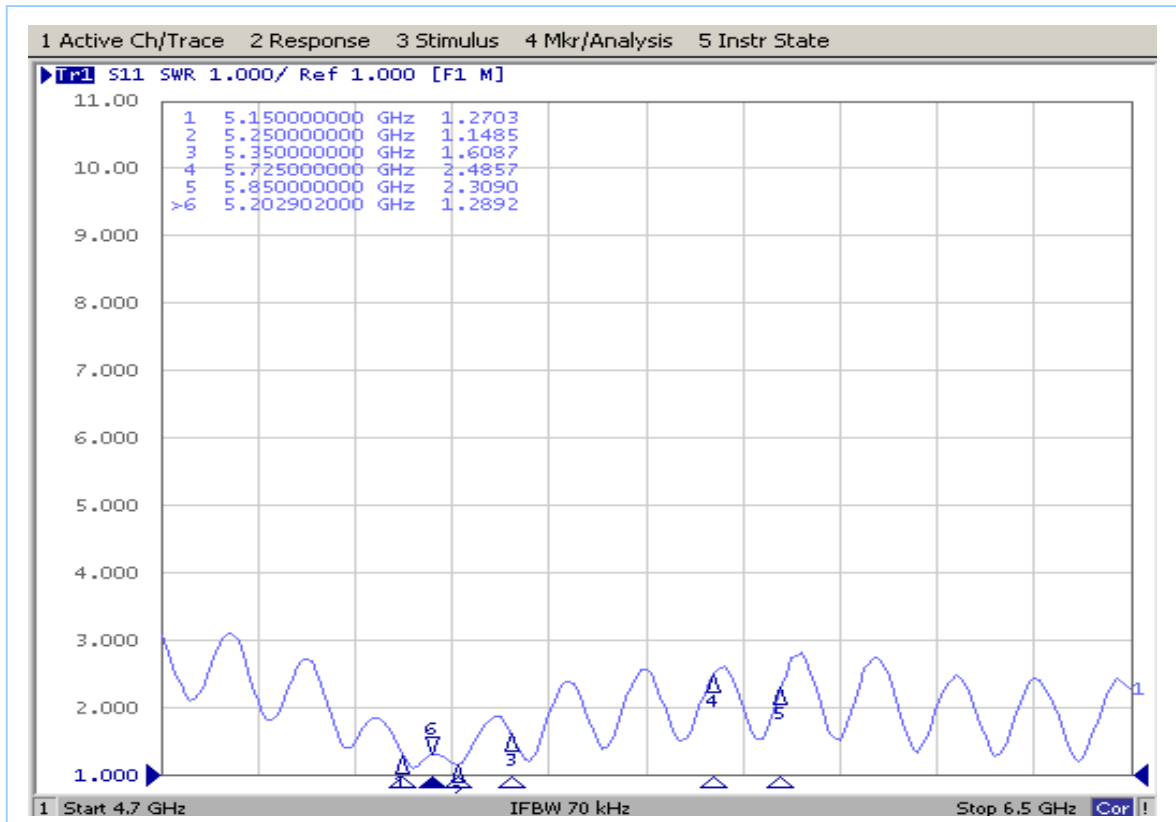
4.1 VSWR (2.4~ 2.5GHz & 5.15~ 5.35GHz)



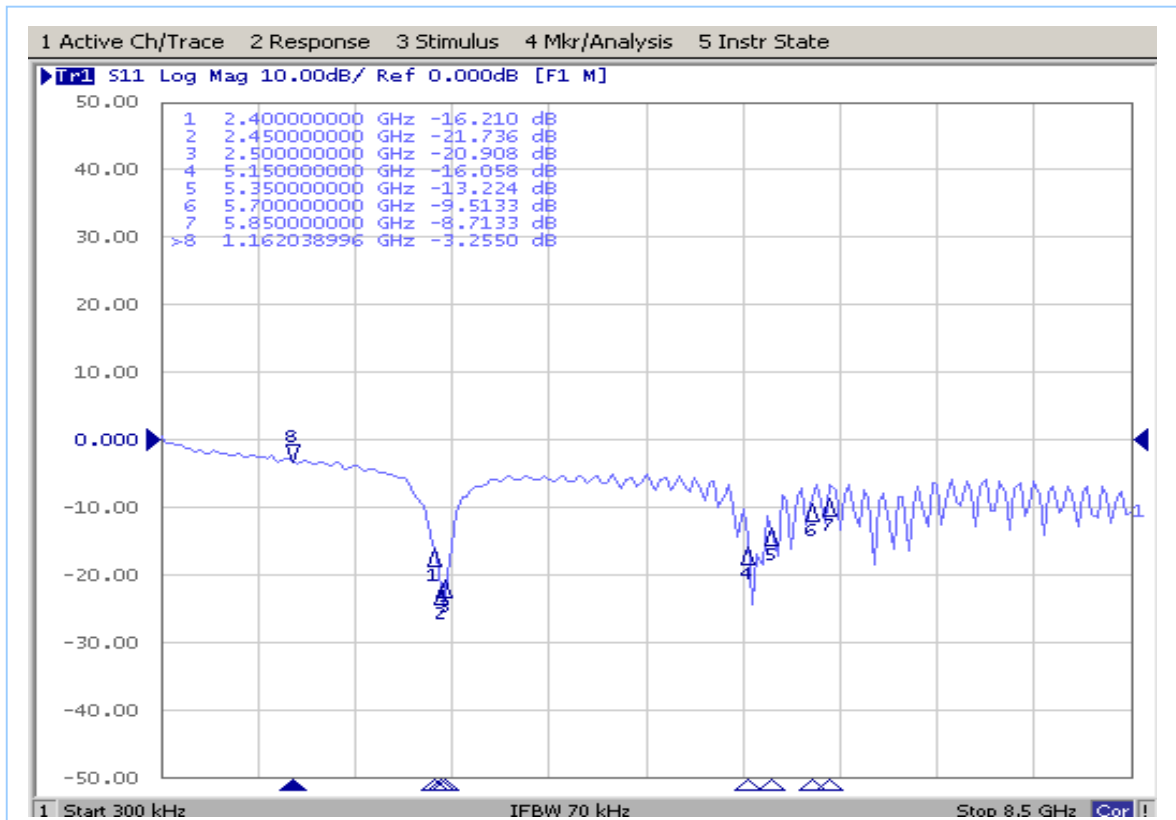
4.2 VSWR (2.4~ 2.5GHz)



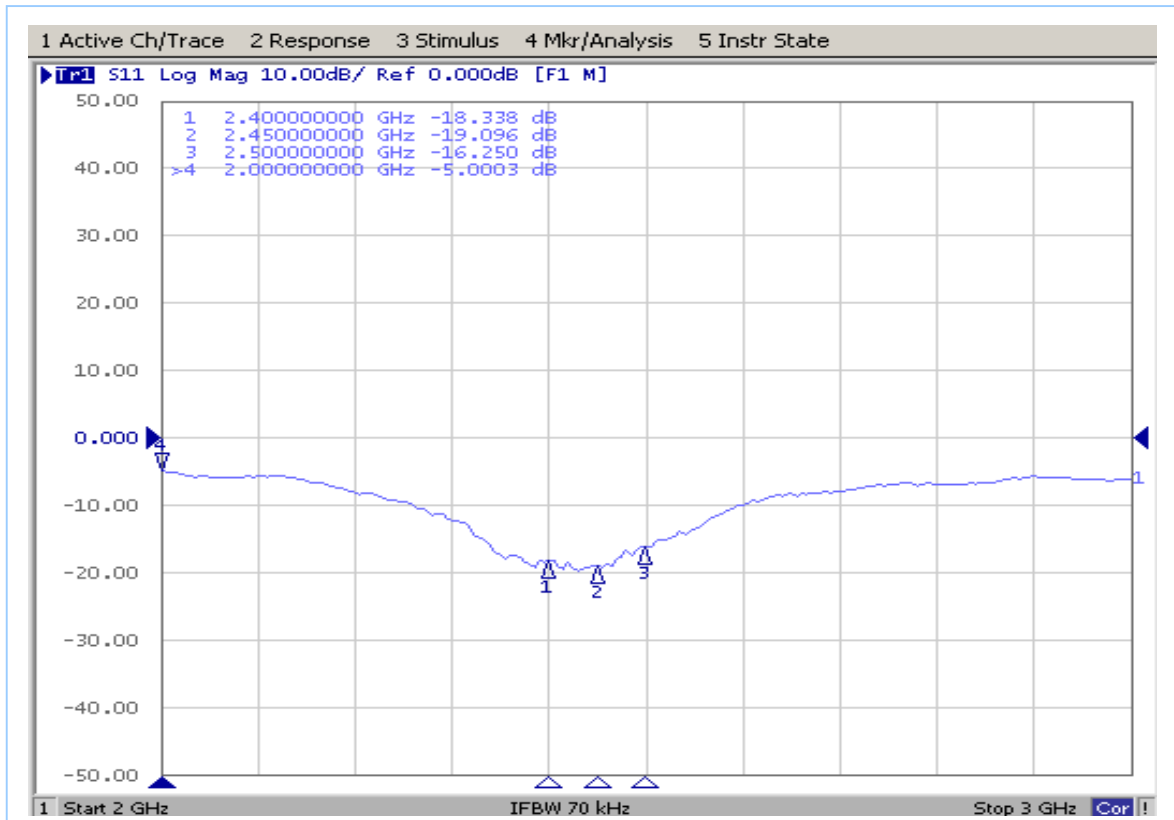
4.3 VSWR (5.15~ 5.35GHz)



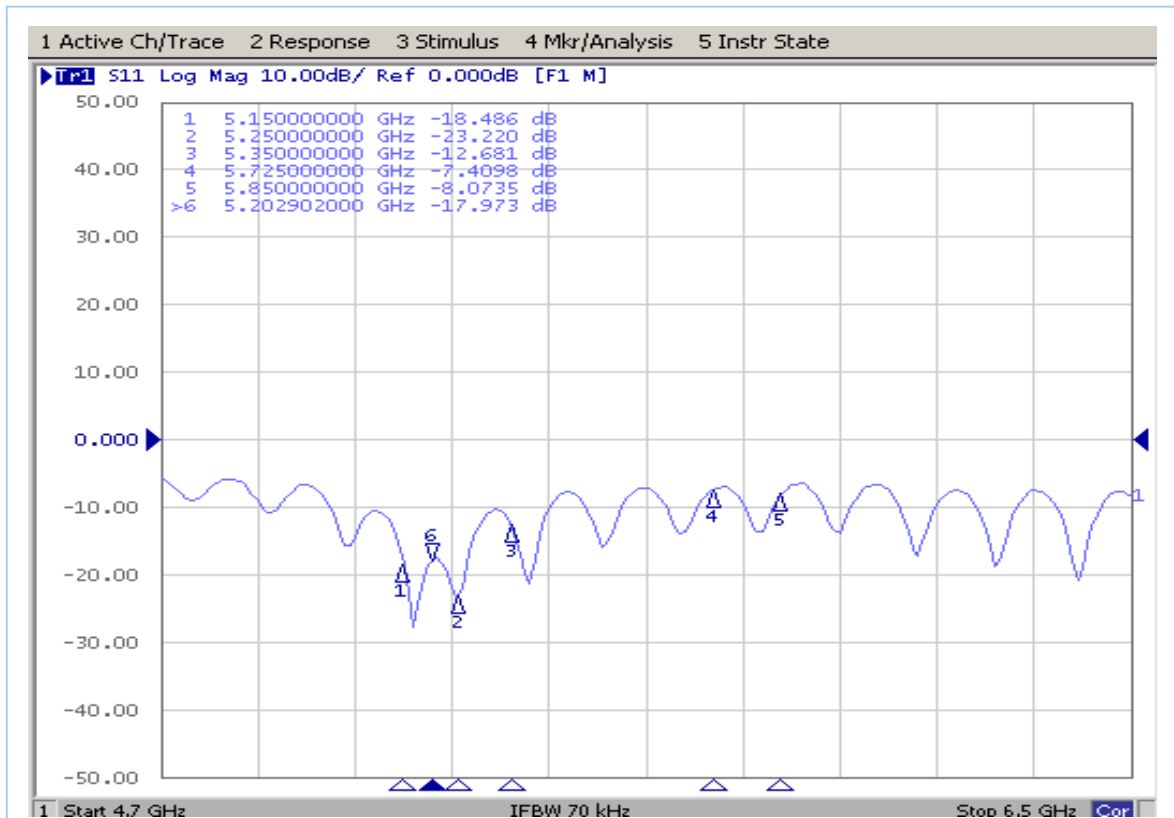
4.4 Return Loss (2.4~ 2.5GHz & 5.15~ 5.35GHz)



4.5 Return Loss (2.4~ 2.5GHz)

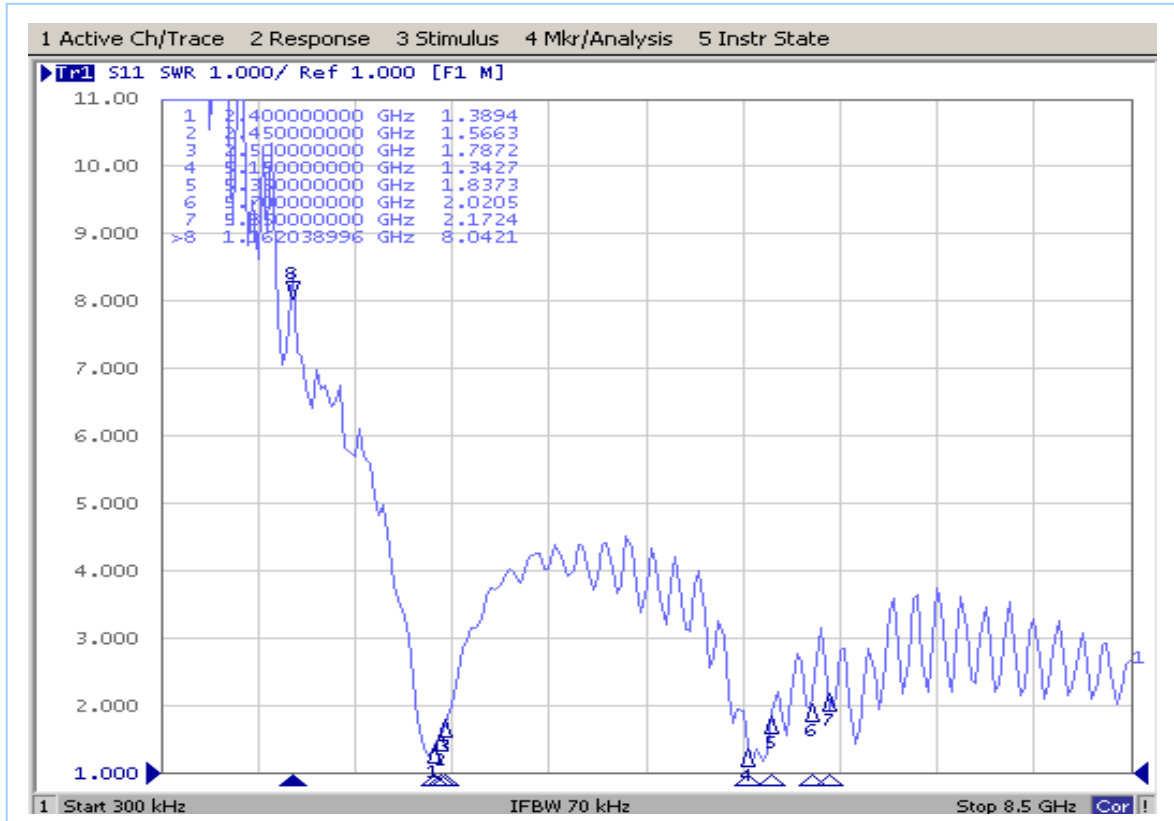


4.6 Return Loss (5.15~ 5.35GHz)

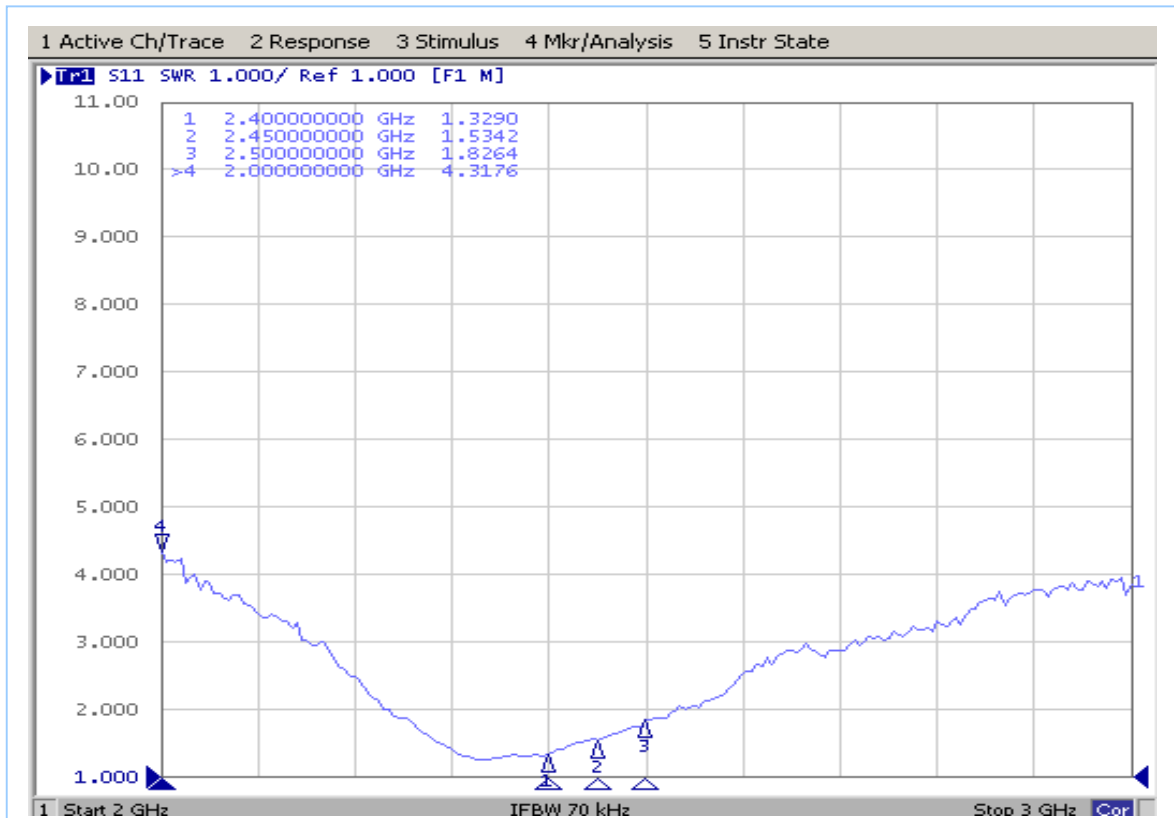


5. PIFA W/L ANT. / LCD TOP Right / 480mm / I-PEX & Kurabe / Black

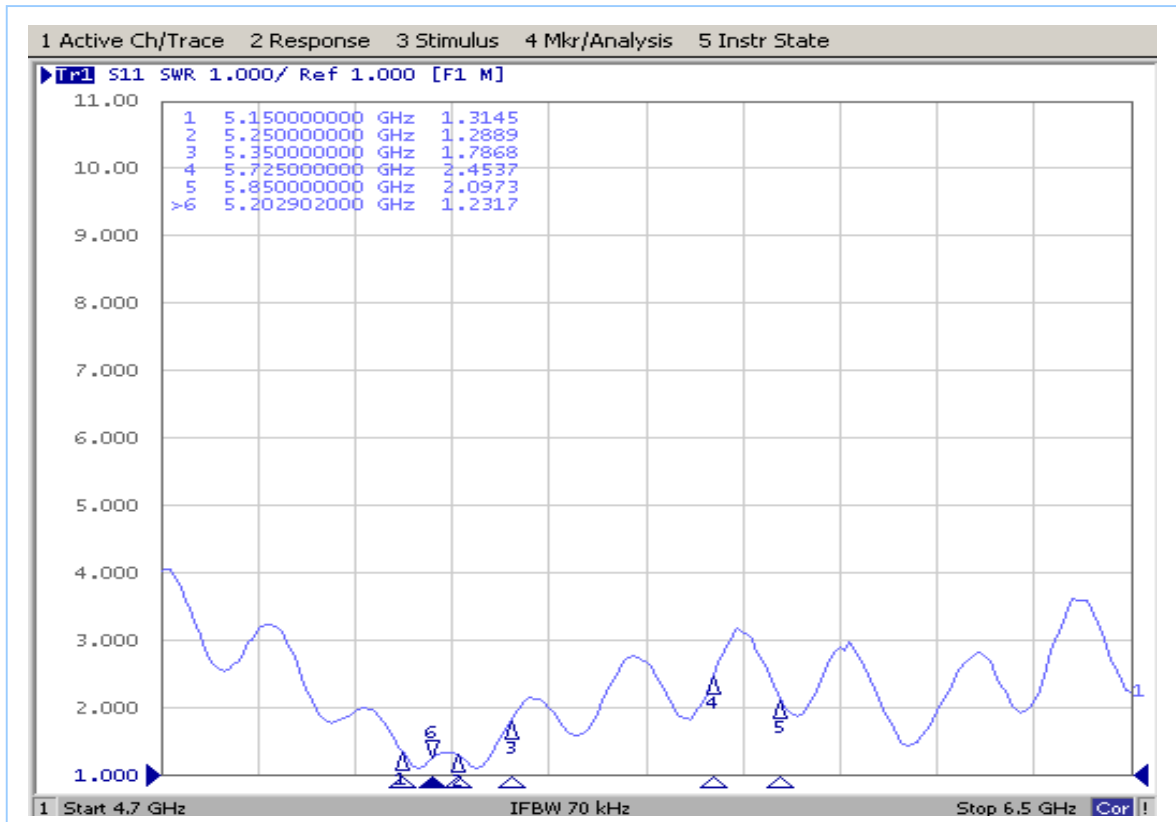
5.1 VSWR (2.4~ 2.5GHz & 5.15~ 5.35GHz)



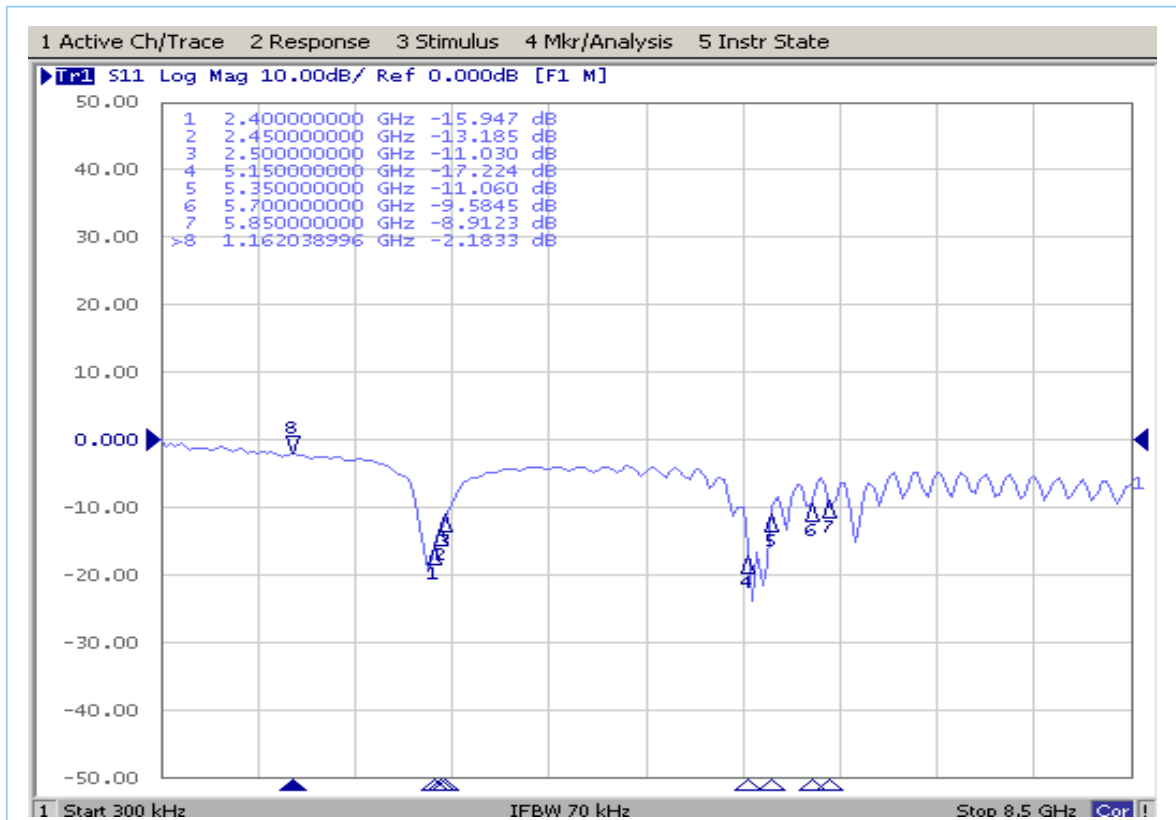
5.2 VSWR (2.4~ 2.5GHz)



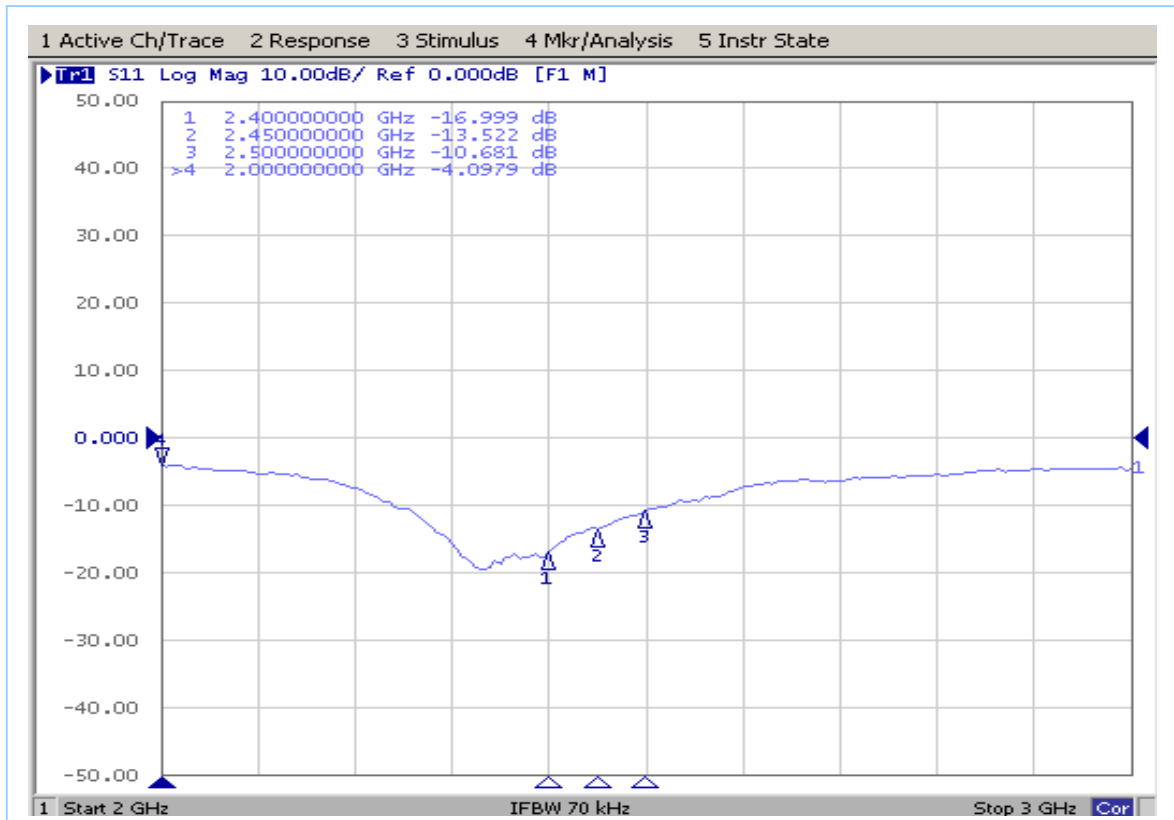
5.3 VSWR (5.15~ 5.35GHz)



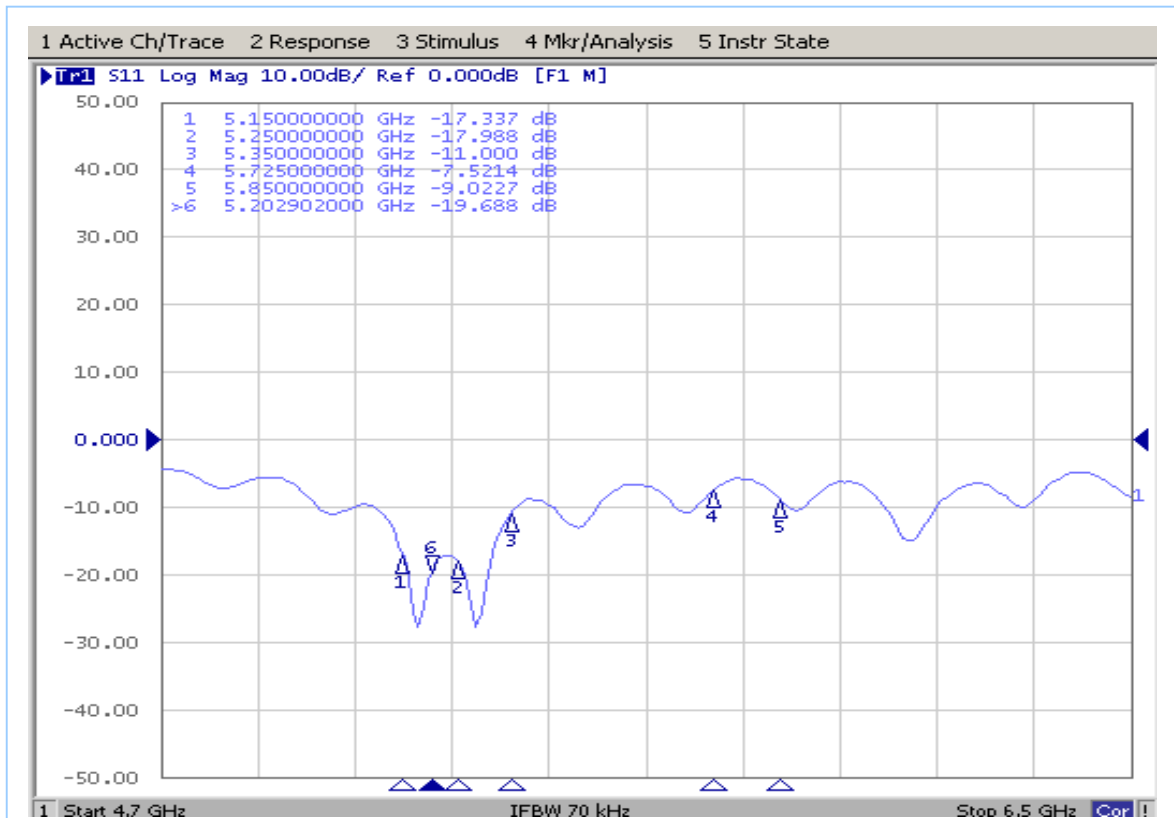
5.4 Return Loss (2.4~ 2.5GHz & 5.15~ 5.35GHz)



5.5 Return Loss (2.4~ 2.5GHz)

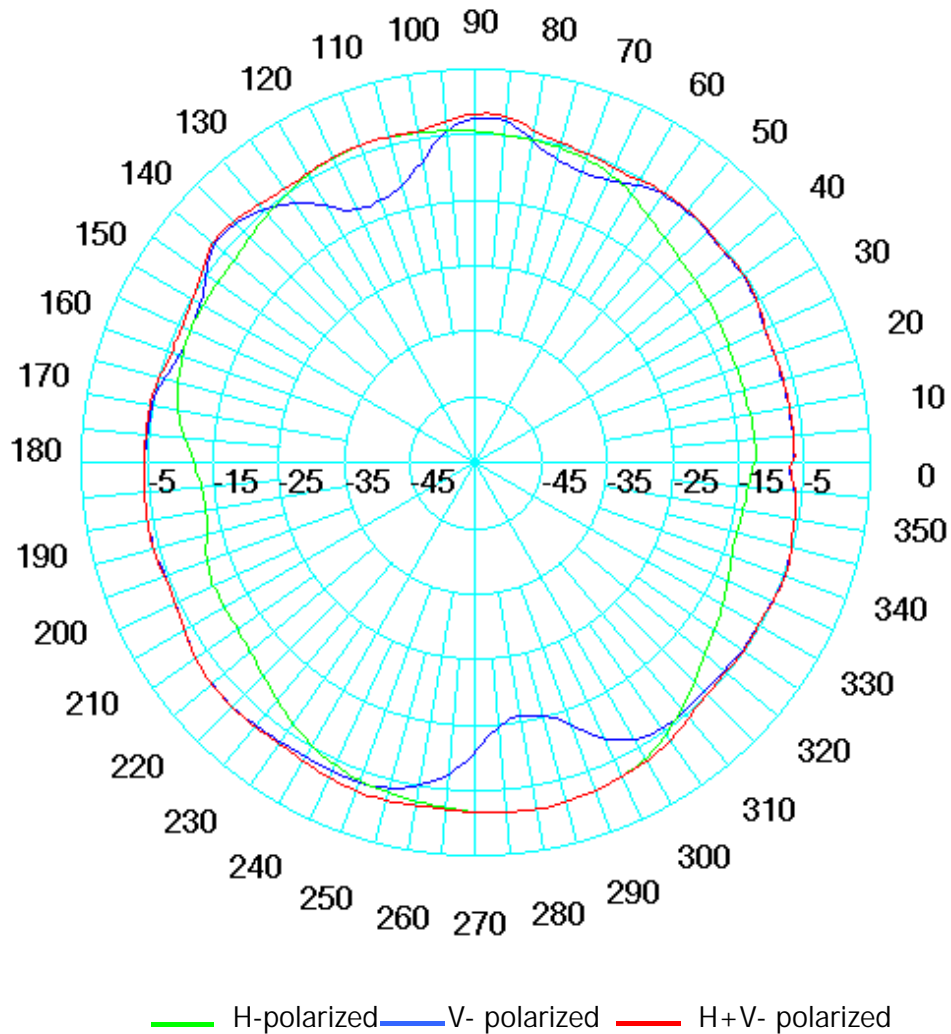


5.6 Return Loss (5.15~ 5.35GHz)



6. Gain & Pattern – W/L / PIFA ANT. For MH47

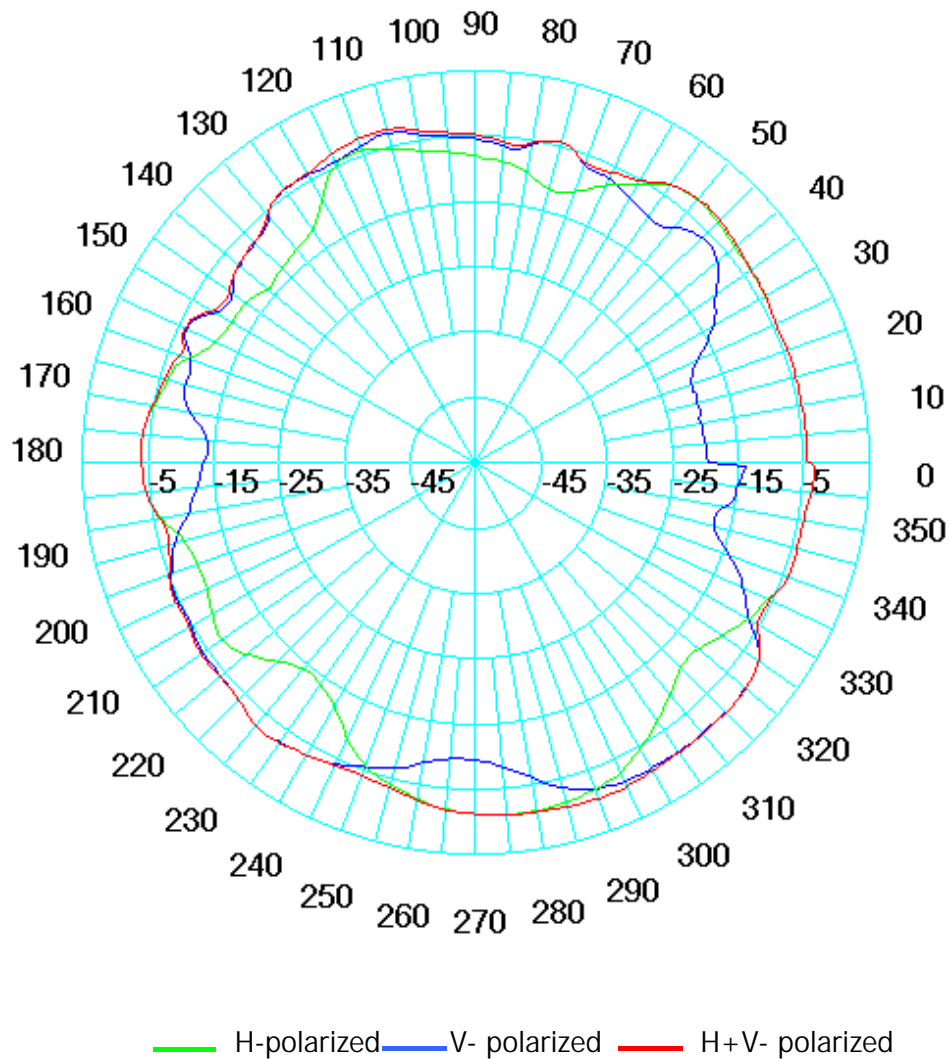
6.1 LCD Top Left / 688mm / 2.4~2.5GHz



Gain data

Antenna	Gain of XY Plane(Azimuth)-Open		
	Frequency	2.45GHz	
PIFA	H	Peak	-1.37
		Avg.	-7.82
	V	Peak	-2.29
		Avg.	-6.11
	H + V	Peak	-1.37
		Avg.	-4.01
		%> -5dBi	68.98%

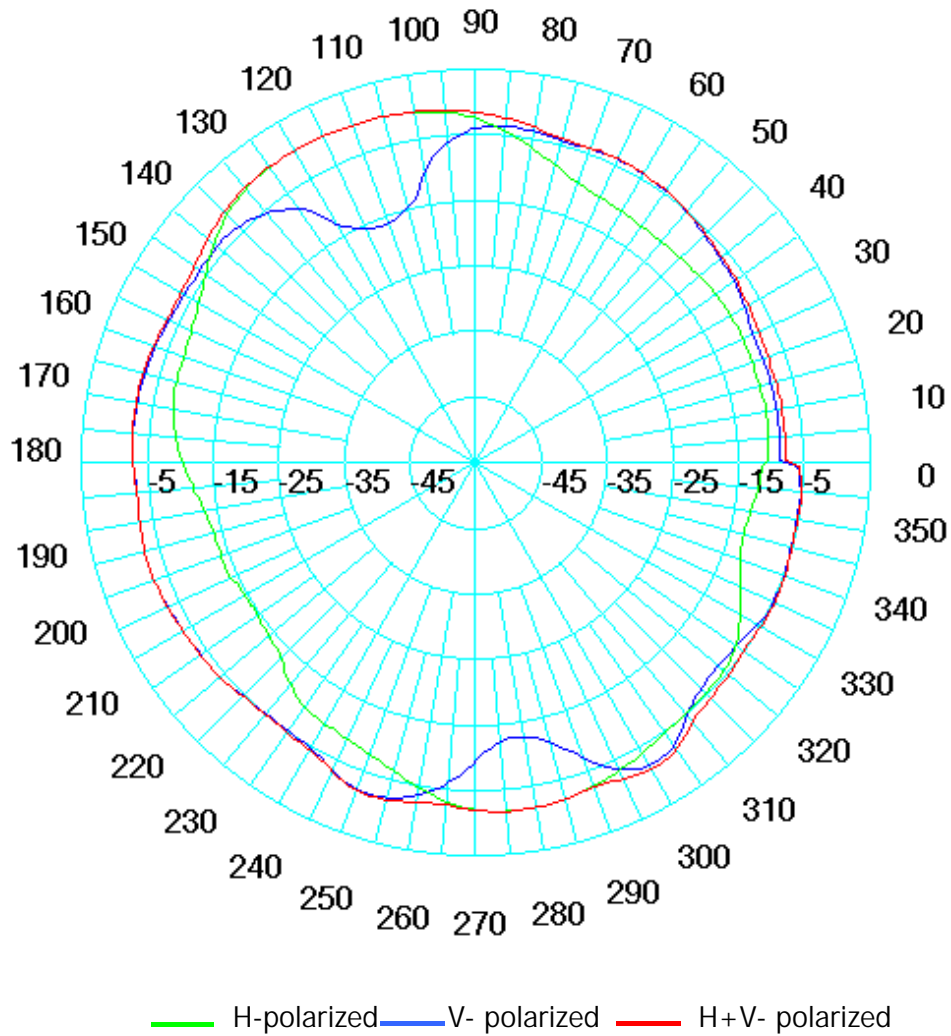
6.2 LCD Top Left / 688mm / 5.15~ 5.35GHz



Gain data

Antenna	Gain of XY Plane(Azimuth)-Open		
	Frequency	5.25GHz	
PIFA	H	Peak	-0.88
		Avg.	-6.71
	V	Peak	-0.91
		Avg.	-7.74
	H + V	Peak	-0.22
		Avg.	-3.84
		%> -5dBi	76.73%

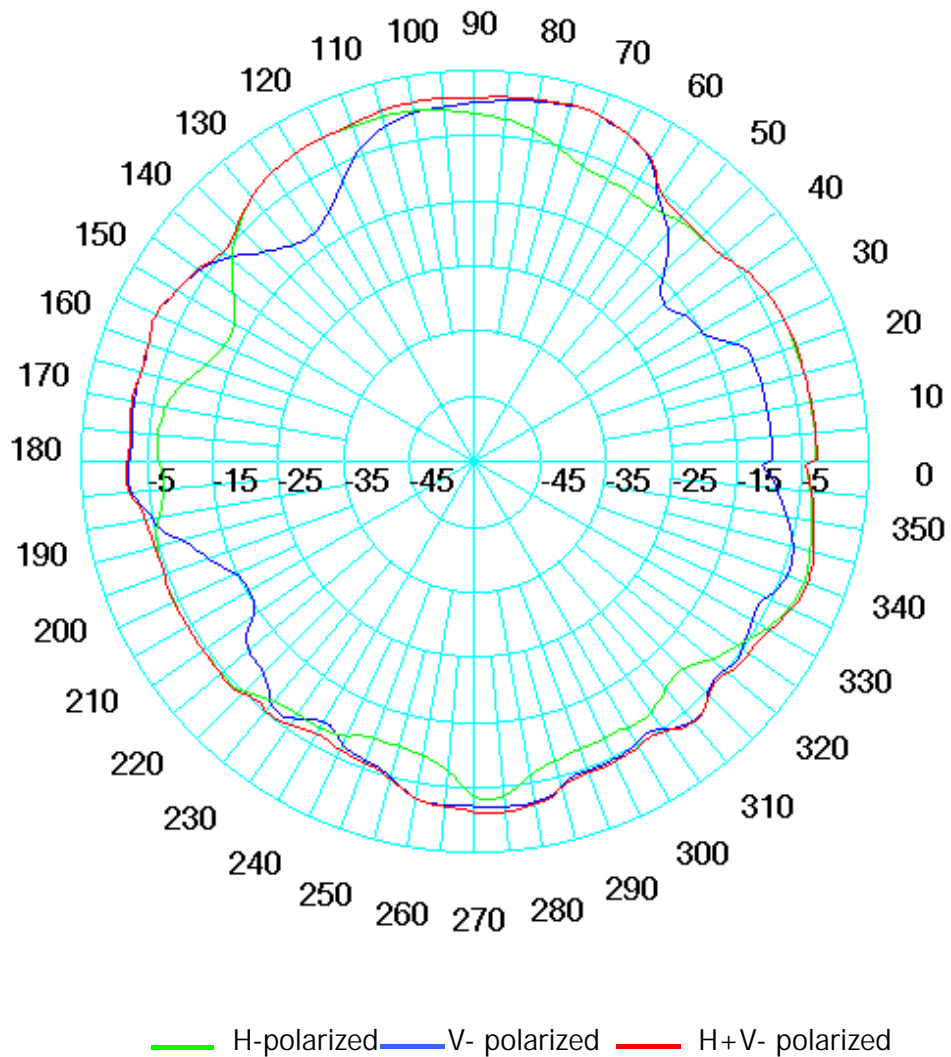
6.3 LCD Top Right / 480mm / 2.4~ 2.5GHz



Gain data

Antenna	Gain of XY Plane(Azimuth)-Open		
	Frequency	2.45GHz	
PIFA	H	Peak	0.07
		Avg.	-7.51
	V	Peak	-1.76
		Avg.	-5.72
	H + V	Peak	0.07
		Avg.	-3.45
		%> -5dBi	80.06%

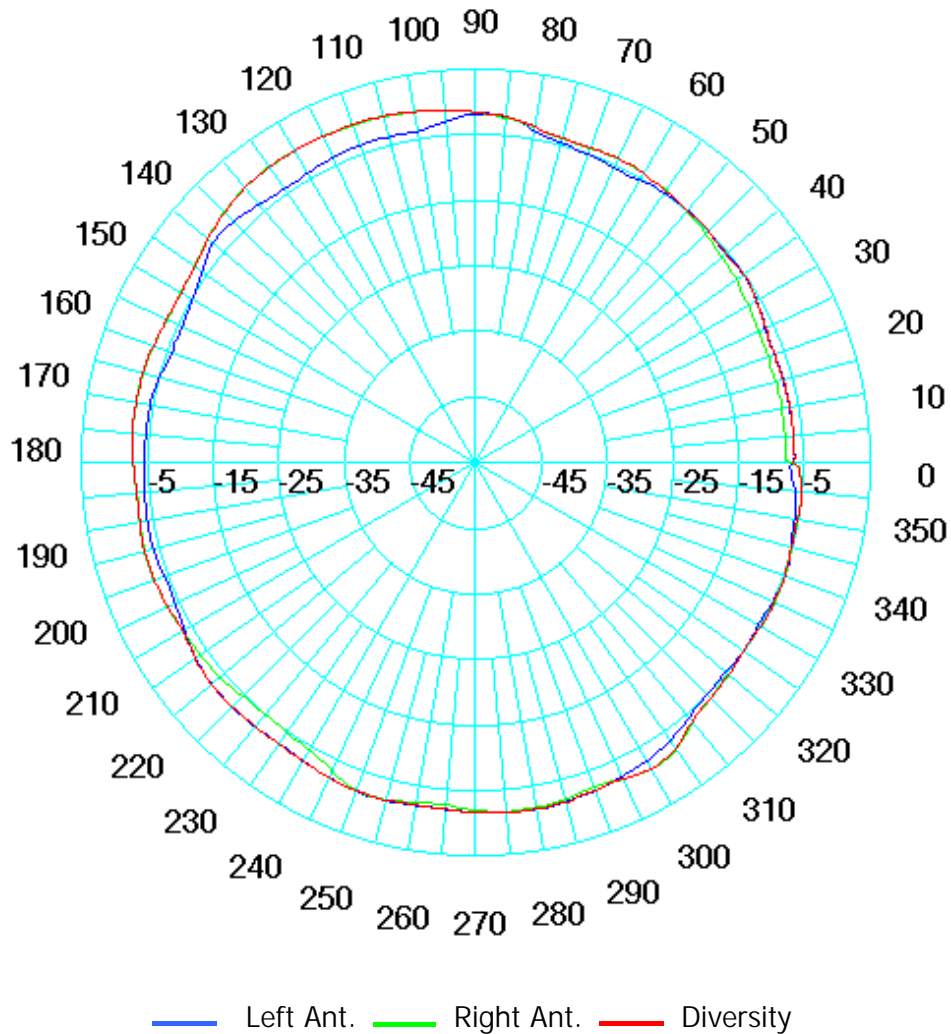
6.4 LCD Top Right / 480mm / 5.15~ 5.35GHz



Gain data

Antenna	Gain of XY Plane(Azimuth)-Open		
	Frequency	5.25GHz	
PIFA	H	Peak	-0.11
		Avg.	-5.43
	V	Peak	1.68
		Avg.	-6.04
	H + V	Peak	1.76
		Avg.	-2.75
		%> -5dBi	86.43%

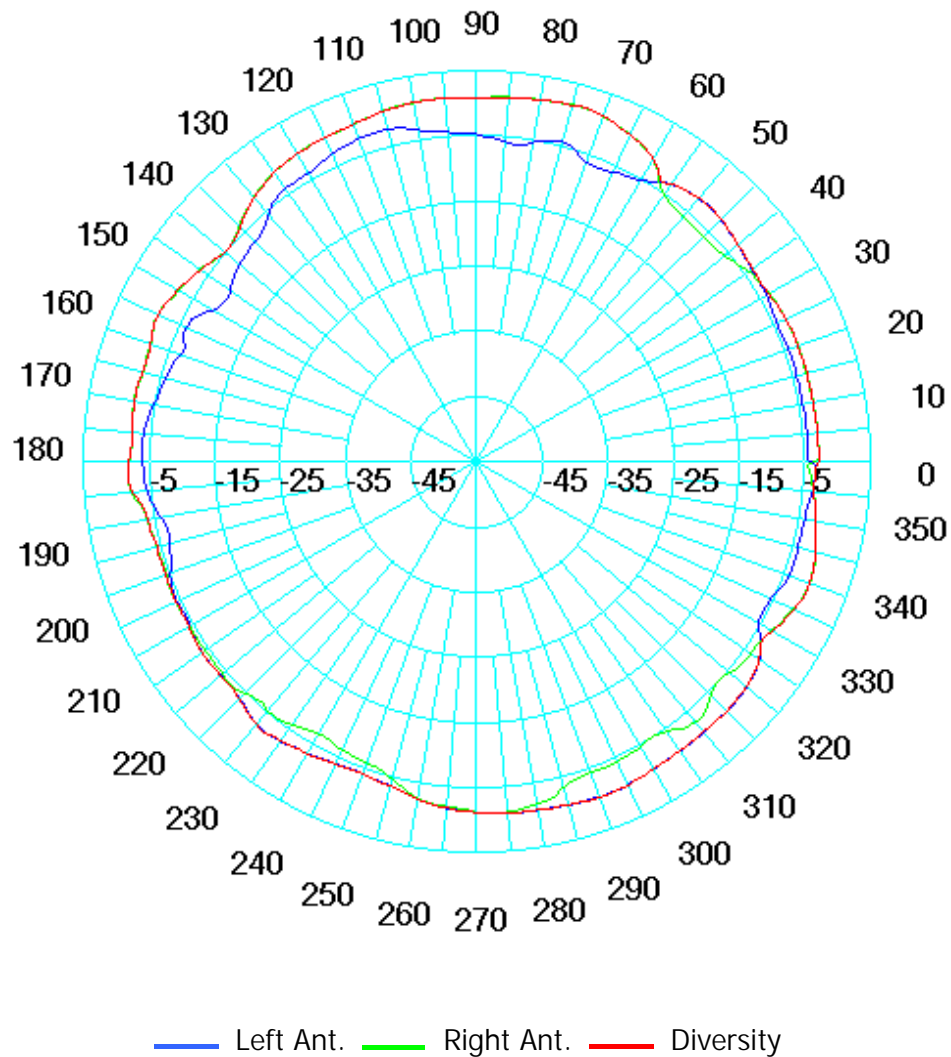
6.5 Diversity (2.4~ 2.5GHz)



Gain data

Antenna	Gain of XY Plane(Azimuth)-Open		
	Frequency		2.45GHz
PIFA	Left	Peak	-1.37
		Avg.	-4.01
	Right	Peak	0.07
		Avg.	-3.45
	Diversity	Peak	0.39
		Avg.(Sum)	-2.07
		% -2.5dBi	64.27%

6.6. Diversity (5.15~ 5.35GHz)



Gain data

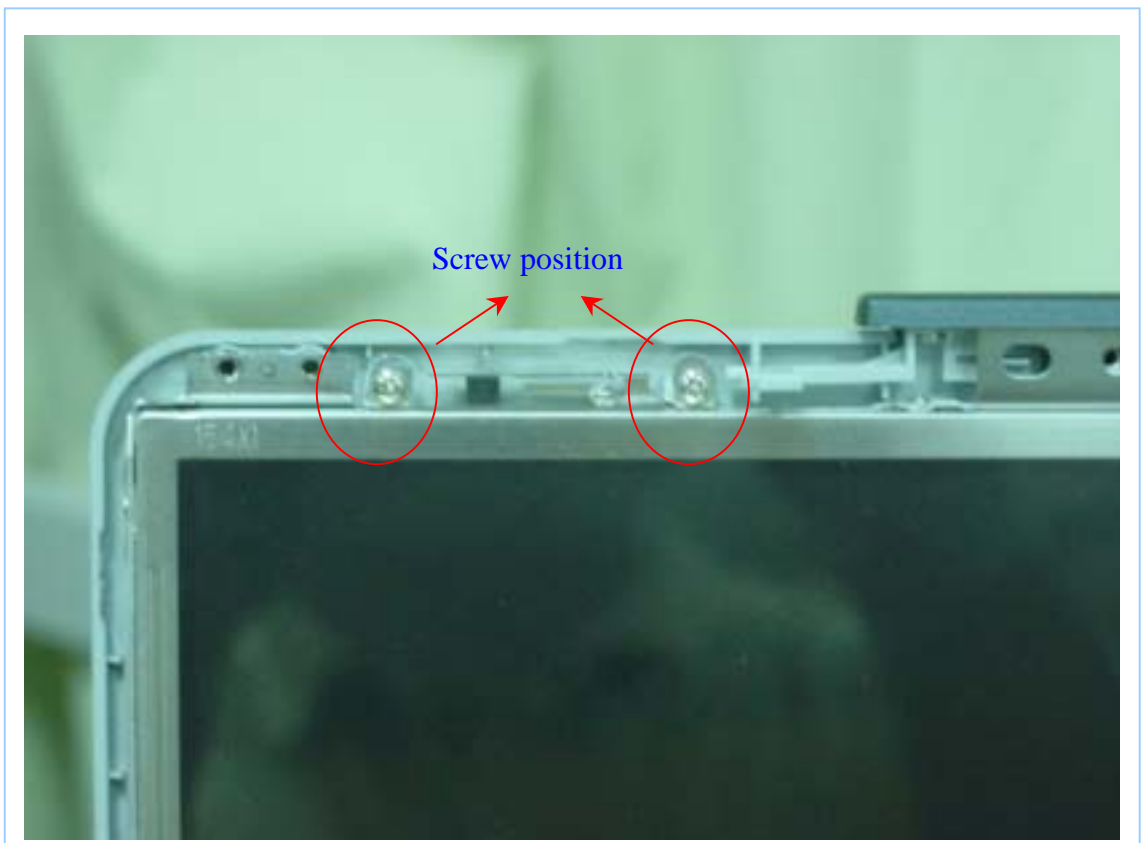
Antenna	Gain of XY Plane(Azimuth)-Open		
	Frequency		5.25GHz
PIFA	Left	Peak	-0.22
		Avg.	-3.84
	Right	Peak	1.76
		Avg.	-2.75
	Diversity	Peak	1.88
		Avg.(Sum)	-1.27
		% -3.5dBi	95.29%

7. MH47 W/L ANT. Photo In Notebook

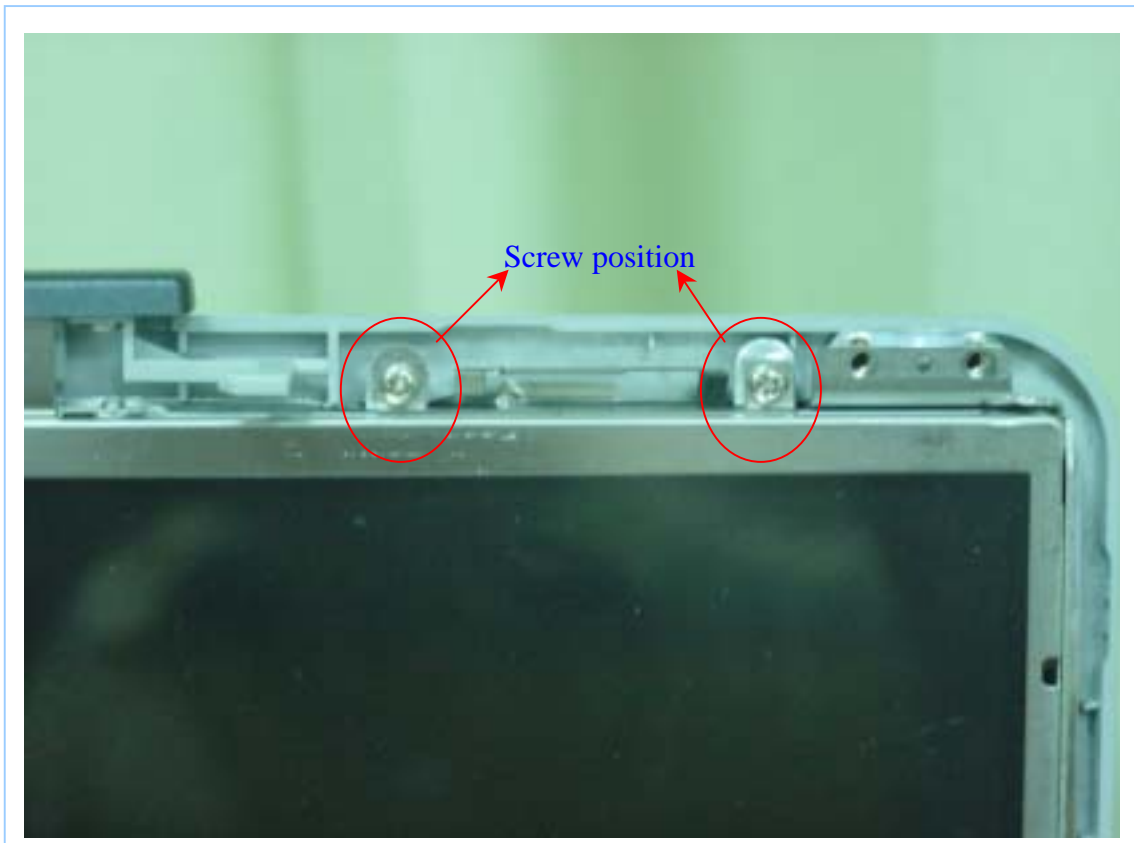
7.1. Zoom out



7.2 Lock manner(Left Top)



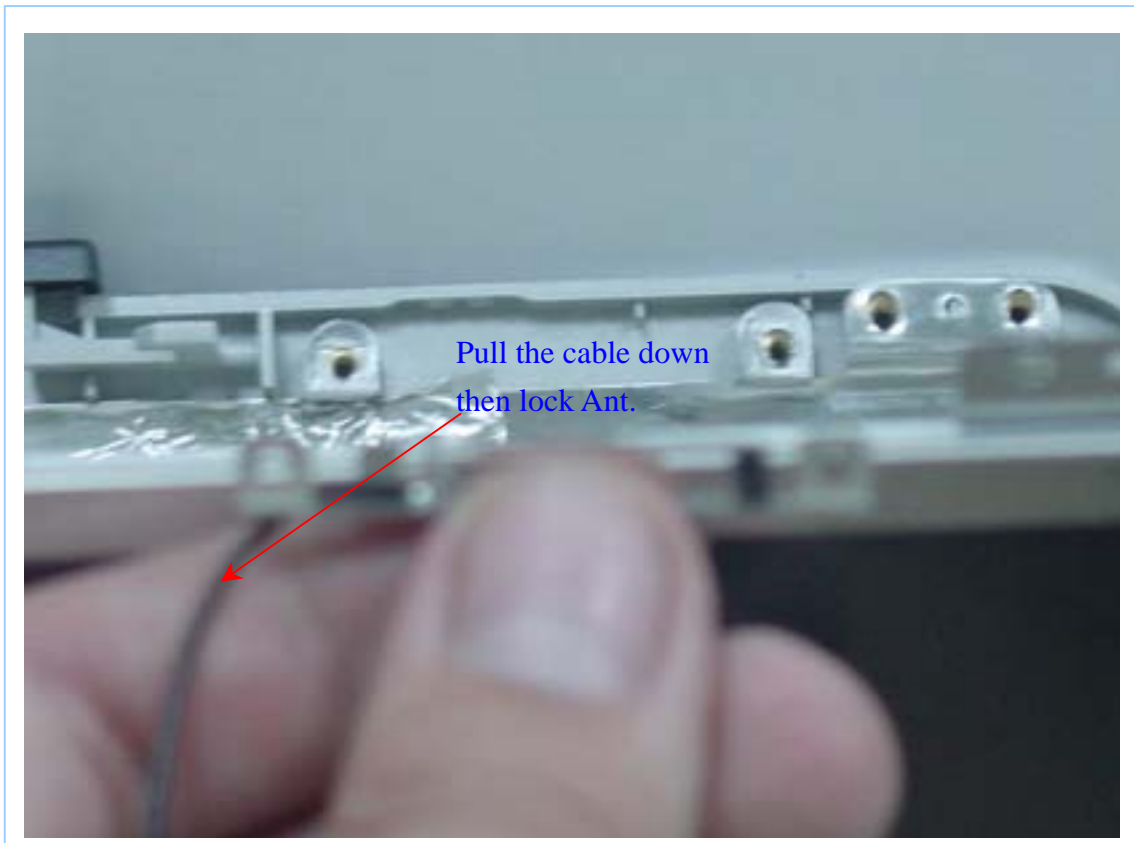
7.3 Lock manner(Right Top)



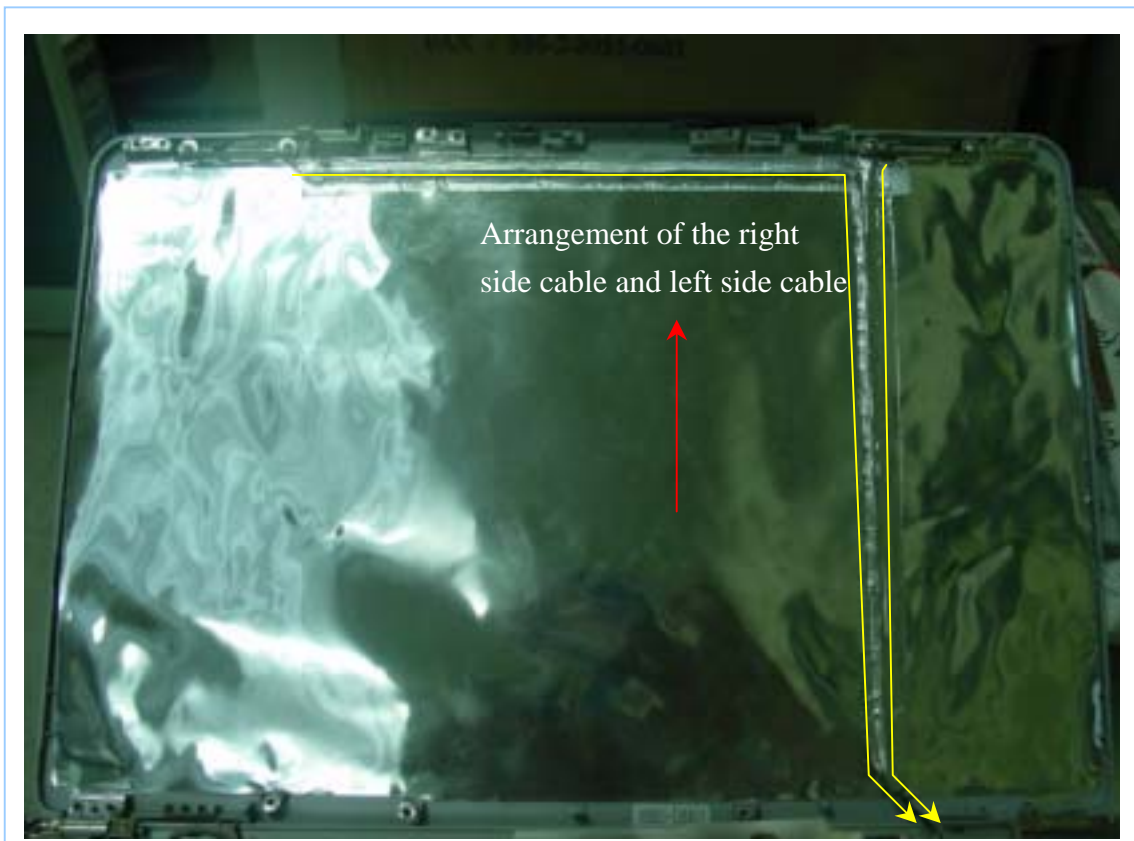
7.4 Install Antenna (Left Side)



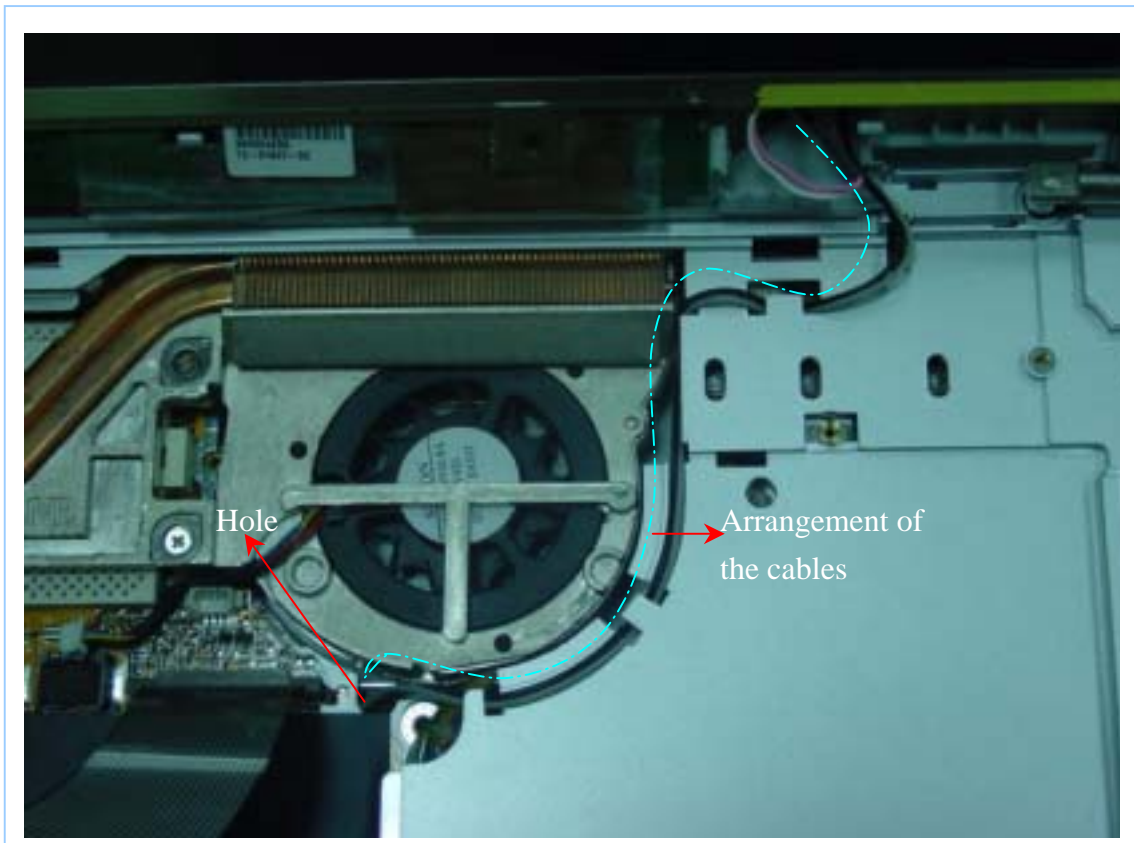
7.5 Install Antenna (Right Side)



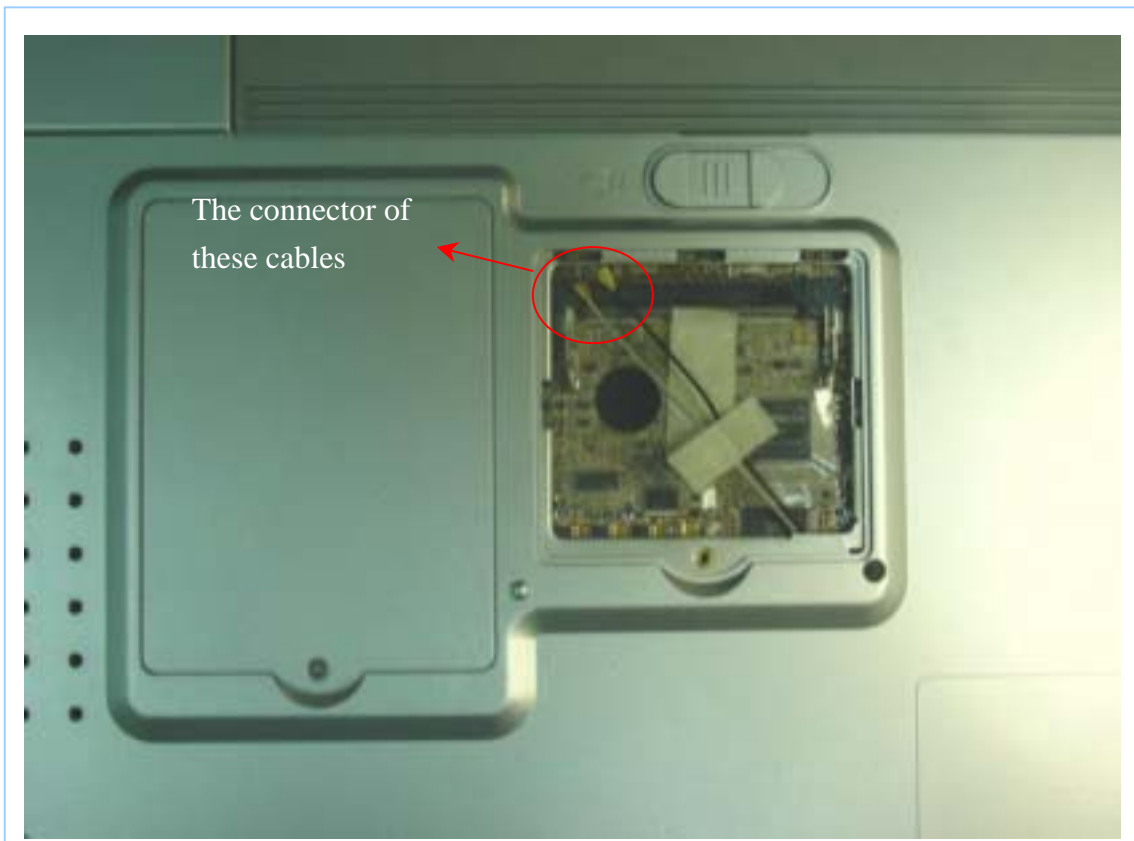
7.6 Direction of cable



7.7 Direction of cable



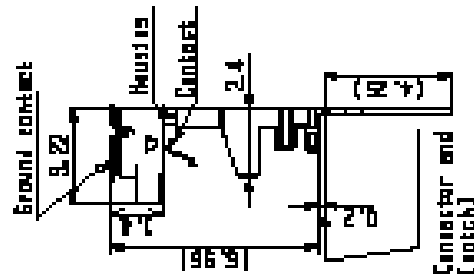
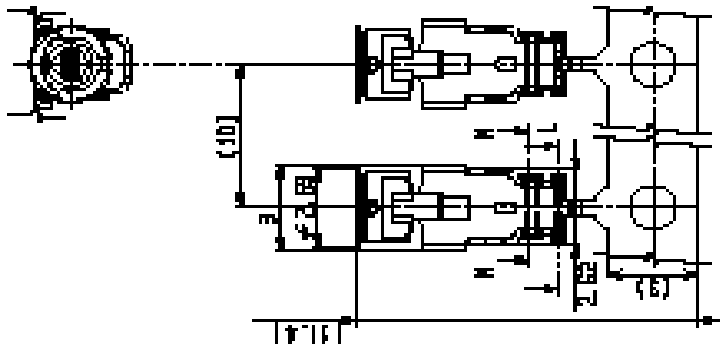
7.8 Photo of the connector



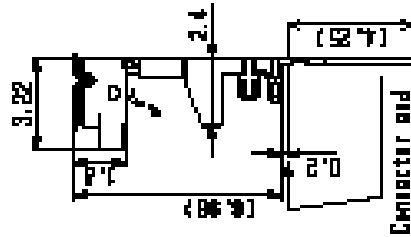
8. Document

8.1 Connector : I-PEX

PART No.
20278-01R-00



Part No. 20278-01R-00
For hand tool
(with notch)



Part No. 20278-01R-00
For sand auto
termination machine
(without notch)

REVISION		DATE	APPROVED	DATE	REVISION	DATE	APPROVED	DATE
4	2018.01.01	2018.01.01	K.K.	2018.01.01	1	2018.01.01	K.K.	2018.01.01
3	2018.01.01	2018.01.01	K.K.	2018.01.01	2	2018.01.01	K.K.	2018.01.01
2	2018.01.01	2018.01.01	K.K.	2018.01.01	3	2018.01.01	K.K.	2018.01.01
1	2018.01.01	2018.01.01	K.K.	2018.01.01	4	2018.01.01	K.K.	2018.01.01
0	2018.01.01	2018.01.01	K.K.	2018.01.01	5	2018.01.01	K.K.	2018.01.01
REWORK	BY	DATE	APP	REWORK	BY	DATE	APP	REWORK
50	2018.01.01	2018.01.01	K.K.	50	2018.01.01	2018.01.01	K.K.	50
REWORK	BY	DATE	APP	REWORK	BY	DATE	APP	REWORK
10	2018.01.01	2018.01.01	K.K.	10	2018.01.01	2018.01.01	K.K.	10

I-PEX Connector and Housing Schematics
PART No. 20278-01R-00

DATE: 2018.01.01
TIME: 10:00 AM

REVISION: 4
DATE: 2018.01.01
APPROVED: K.K.

REVISION: 1
DATE: 2018.01.01
APPROVED: K.K.

REVISION: 2
DATE: 2018.01.01
APPROVED: K.K.

REVISION: 3
DATE: 2018.01.01
APPROVED: K.K.

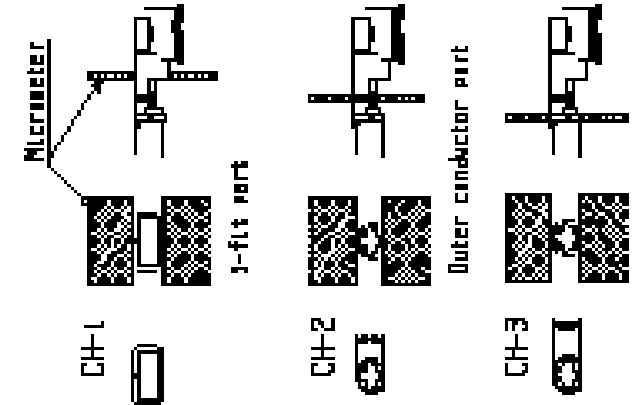
REVISION: 4
DATE: 2018.01.01
APPROVED: K.K.

REVISION: 5
DATE: 2018.01.01
APPROVED: K.K.

GENERAL TOLERANCE	UNIT
± 0.2	mm
± 0.5	mm
± 0.5	mm
± 0.5	mm
± 0.5	mm
± 0.5	mm

FORM REV. 4

Part No.	2027-111R-01 2027-111R-01	2027-111R-03 2027-111R-03	2027-111R-02 2027-111R-02	2027-111R-04 2027-111R-04
Applicable cable nominal diameter	2.00±0.1 1.55±0.1 1.50±0.1	1.55±0.1 1.50±0.1 1.45±0.1	2.00±0.1 1.55±0.1 1.50±0.1	2.00±0.1 1.55±0.1 1.50±0.1
Material shield of Outer conductor	Single / 100%	Single / 100%	Double / 200%	Single / 100%
P/N of Hand Tool	Single / 100%	902BT-013 90213-013	Single / 100%	Single / 100%
Sect. M-M	Under developing	Under developing	Under developing	Under developing
Sect. L-L	Under developing	Under developing	Under developing	Under developing
Crimp Height	Under developing	Under developing	Under developing	Under developing



Crimp Height

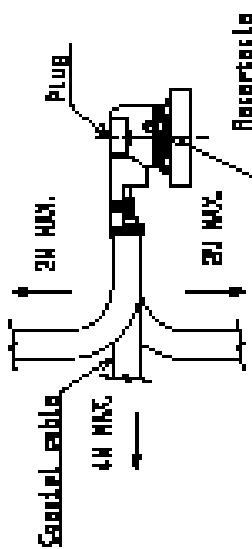
		Approved and Tested to Standards MIL-DTL-8838, MIL-STD-883C	
TITLE P/N 90213-013 CONDUCTOR PLUG VERTICAL	DATE 20278	DRAWN BY 20278	CHECK BY 278
GENERAL TOLERANCE R MAX. ±0.2 R OVER MAX. 30 ±0.3 30 OVER MAX. 350 ±0.5 HOLE ±0.1		FORM REV. 4	

Notes

1. Material
 (1) Housing : PBT, UL94V-0, black
 (2) Contact
 phosphor bronze
 gold plating
 (3) Binding contact
 phosphor bronze, gold plating
2. Packings : res
3. Mating partner part No.
 : 20279-001E-01

1. 材料
 (1) ハウジング: PBT, UL94V-0, 黒色
 (2) コネクタ
 黄銅
 ゴールドメッキ
 (3) プラグ
 黄銅
 ゴールドメッキ
2. パッキン: レジン
3. マチングパートナー部材番号
 : 20279-001E-01

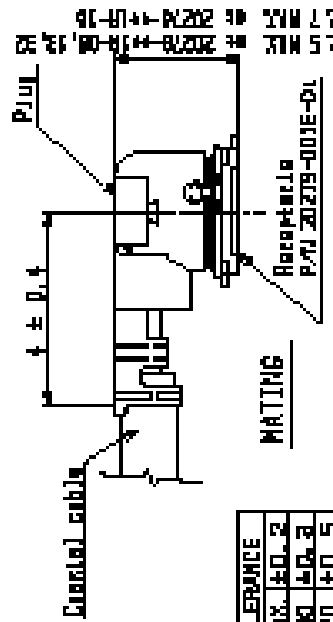
4. Permissible lead of cable at mating コネクタから合装体上のプラグまでの長さ



5. Specifications for mating & unmating operation.

5-1 Mating.
 Please mate the connector strictly to vertical direction as much as possible, adjusting the mating axis of plug and receptacle, as excessive slant angle mating may break the connector. Please don't do it.

5-1 コネクタの挿入時
 Plugは正確に垂直方向に挿入して下さい。プラグと受取体の軸を調整して下さい。過度の傾斜角での挿入はコネクタの破損の原因となり得ますので、絶対に行わないで下さい。

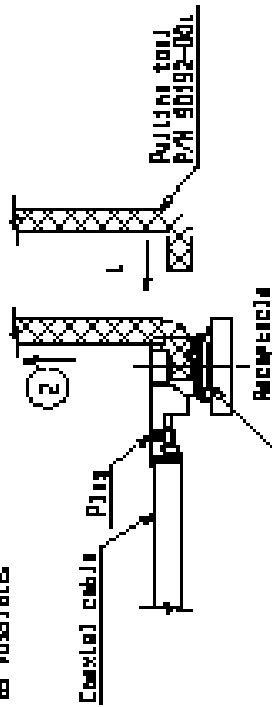


GENERAL TOLERANCE	
± MAX.	±0.2
± OVER DIM.	±0.3
± OVER MAX. DIM.	±0.5

FORN PEY. 4

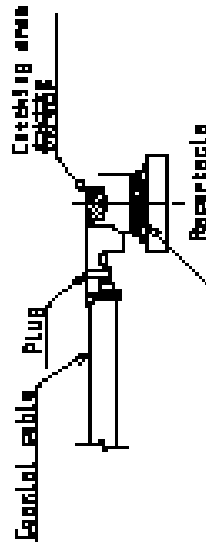
5-2 Unmating.

(1) In case of unmaking by pulling tool,
 Please use the pulling tool as the following drawing, and please pull plug to vertical direction as directly as possible.



(2) In case of unmaking directly by hand
 Please catch the catching area of plug, and please pull plug to vertical direction as directly as possible.

(2) 手で直接抜く場合
 プラグのつかみ手部分に指を掛けて垂直方向に直接引き抜いて下さい。



DATE		DATE		DATE	
REVISION	REV. NO.	DATE	BY	DATE	BY
CUSTOMER COPY				20279	
			TITLE: MIF surface mount connector plug vertical DRAWING NO.: 20279-001E-01 DATE: 9.19.88		

WAS T

8.2 Coaxial Cable : KURABE

FROM : FADDY

PHONE NO. : 886 2 26427237

DEC. 19 2002 10:45AM P1

70-高周波用
FWS-保阻高周波

KURABE INDUSTRIAL CO., LTD

SP3830M-X	FEP INSULATED HIGH-FREQUENCY COAXIAL CABLE (FWS 5022) UL 1979	PAGE	
PRODUCT STANDARD		ISSUED	11-12-2001
		REVISED	18-9-2002

1. SCOPE

This standard covers "FEP insulated High-Frequency coaxial cable".

These cable are approved by UL as Style 1979 AWM (File E-46702)

[UL1979:105°C, 30V]

Use: Internal wiring of Class 2 Circuits of Electronic Equipment.

2. CONSTRUCTION

Construction and dimensions of the cable are shown in Figure.1 and Table 1.

3. PERFORMANCE

Performance of the finished cable is shown in Table 2. The test methods are in accordance with applicable test methods described in JIS C 3005.

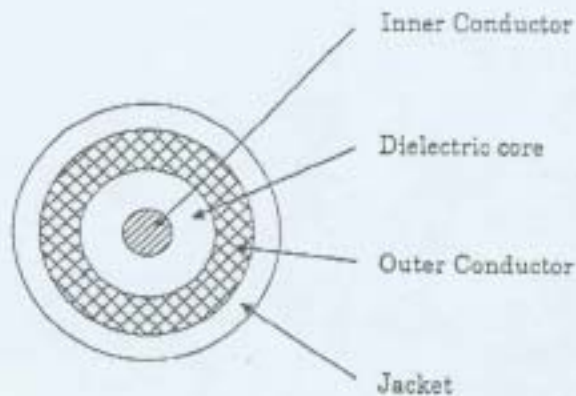


Figure 1.

NOTE:	MADE BY	<i>J. Aki</i>
	APPROVALS	<i>J. Horai</i>

KURABE INDUSTRIAL CO., LTD

SP3830M-X	FEP INSULATED HIGH-FREQUENCY COAXIAL CABLE (FWS 5022) UL 1979	PAGE	
PRODUCT STANDARD		ISSUED	11-12-2001
		REVISED	18-3-2002

Table 1. Construction

Item	Unit	Specified Value
Inner Conductor	Material	Silver coated annealed copper wire
	Stranding	No./mm
	Dis.(approx.)	7/0.08
Dielectric Core	Material	FEP
	Thick.(nom.)	mm
	Dis.	mm
	Color	Natural
Outer Conductor	Material	Silver coated annealed copper wire
	Type	Braid (16/4/0.05)
	Dis.(approx.)	mm
Jacket	Material	FEP
	Thick.(nom.)	mm
	Dis.	mm
	Color	Standard colors are white,black,blue,brown,and gray.

Table 2. Performance

Item	Unit	Specified Value	Note
Appearance	—	Faultless in visible	—
Inner conductor resistance	Ω /km	Max.597	at 20°C
Insulation resistance	$M\Omega$ ·km	Min.1500	at 20°C
Dielectric strength	—	Dielectric core: No breakdown at AC1.5kV for 0.15sec.	Spark test
		Jacket: No breakdown at AC1.5kV for 0.15sec.	Spark test
		No breakdown at AC500V for 1min.	Outer conductor to inner conductor
Heat resistance for solder	—	Shrink or expansion of dielectric core are not more than 0.5mm	※
Capacitance	pF/m	nom. 98	at 1kHz
Characteristic impedance	Ω	50±2	TDR method
Attenuation (nom.)	dB/m	2.0	1.0GHz
		2.9	2.0GHz
		3.6	3.0GHz
		4.2	4.0GHz
		4.7	5.0GHz
5.2	6.0GHz		

※ After immersion of dielectric core, 10mm into soldering pot which is 255°C ± 5°C for 5 seconds, shrinkage or expansion of the dielectric core must not exceed 0.5mm.

NOTE:

MADE BY

APPROVALS

T. Saito
T. Hozumi

8.3 PIFA Antenna (Tin Plate)

계약 번호 : KFFJ2BZA
주 문 번호 : 573-9907000
품명 : TIN PLATE COIL
제 품 규 격 : JISG3303 SPTS-H633
증명서
MILL TEST CERTIFICATE
중명사 번호 : SEANGYONG CORPORATION
CUSTOMER : SEANG TRADING CO. LTD.
주 문 자
SUPPLIER : SEANGYONG CORPORATION
증명서 번호 : 991223-CE-010-001
발행 일자 : DEC. 23. 1999

구분 ITEM	수량 QTY	중량 WEIGHT (KG)	변경 CHANGE NO	제품번호 PRODUCT NO	인장시험 TENSILE TEST		코팅 COATING		화학성분 CHEMICAL COMPOSITION (%)	비율 RATIO	
					YP	TS	EN	EN			C
0.25X52EXC	1	4,100	68809	3YFL0274	0		3.24	3.21	22	131.2	XX
"	1	4,310	"	3YFL0275			"	"	"	"	XX
"	1	3,930	"	3YFL0276			"	"	"	"	XX
"	1	4,560	"	3YFL0277			"	"	"	"	XX
"	1	4,310	68814	3YFL0278	0		3.07	3.11	23	131.1	XX
"	1	4,200	"	3YFL0279			"	"	"	"	XX
*** SUB TOTAL (020) *	6	4,170	70187	3YFL0336	0	25,280 (KG)	3.17	3.34	5	23.15	XX
0.30X50EXC	1	3,420	"	3YFL0337			"	"	"	"	XX
"	1	4,660	"	3YFL0338			"	"	"	"	XX
"	1	4,310	"	3YFL0339			"	"	"	"	XX
"	1	4,110	"	3YFL0340			3.08	3.26	"	"	XX
"	1	4,170	"	3YFL0341			"	"	"	"	XX
"	1	4,270	"	3YFL0342			"	"	"	"	XX
"	1	4,060	"	3YFL0343			"	"	"	"	XX
"	1	4,170	"	3YFL0344			3.18	3.31	"	"	XX
"	1	4,270	"	3YFL0345			"	"	"	"	XX
"	1	4,230	"	3YFL0346			"	"	"	"	XX
"	1	3,850	"	3YFL0347			"	"	"	"	XX
*** SUB TOTAL (030) *	12	45,690				45,690 (KG)					
*** GRAND TOTAL ***	18	74,890				74,890 (KG)					

WE HEREBY CERTIFY THAT THE MATERIAL HEREIN HAS BEEN MADE BY THE BASIC
 OUTPUT PROCESS AND TESTED IN ACCORDANCE WITH THE ABOVE SPECIFICATION
 AND ALSO WITH THE REQUIREMENTS CALLED FOR BY THE ABOVE ORDER.
 SIGNED: *Promit*
 OFFICE OF PRODUCT INSPECTION SECTION

8.4 TUBE : RAYCHEM

885-2-22183183 FAUCRTRON CO. LTD.

219 P01 SEP 28 '03 09:5

Raychem

- Low recovery temperature
- Environmentally friendly
- Highly flame-retardant
- Very flexible
- General purpose

Raychem's Versafit heat-shrinkable tubing is a cost-effective, environmentally friendly choice for many commercial applications. Versafit tubing is made from a specially formulated, crosslinked polyolefin with low recovery temperature, excellent flexibility, and high flame-retardance (VW-1).

Unlike other typical flame-retardant tubings, new Versafit tubing is free of polybrominated biphenyls (PBBs) and polybrominated biphenyl oxides (PBBOs). In Europe, these chemicals are classified as environmentally hazardous substances.

Compared to noncrosslinked materials, Versafit tubing has a higher temperature rating and exhibits better thermal stability and resistance to physical abuse.

Versafit tubing performs a variety of functions in commercial applications:

- Electrically insulates and protects in-line components, disconnect terminals, and splices.
- Bundles wires for very flexible light-duty harnesses.
- Strain-relieves electrical wire connections for long-term reliability.
- Identifies or color-codes wires, cables, terminals, and components.

Thermofit Versafit Metric-sized heat-shrinkable tubing



Versafit tubing offers a faster, easier, more reliable replacement for molding in place, dip coating, and tape wrapping.

Versafit products are UL Recognized and CSA Certified at 125°C, 600 V, with UL VW-1 and CSA OFT flame-retardancy ratings.

Temperature rating

Full-recovery temperature	90°C
Continuous operating temperature	-45°C to 125°C

Specifications

Type	Raychem	UL	CSA
Versafit	RT-1138	E35588 VW-1	LR31929 OFT

Note: When ordering, always specify latest issue.

Dimensions (millimeters)



Size	As supplied		After shrinkage	
	Inside diameter	Wall thickness (nominal)	Inside diameter (max.)	Wall thickness (min.)
1.0/0.5	1.6 ±0.2	0.2	0.5	0.33
1.5/0.75	2.1 ±0.2	0.2	0.75	0.35
2.0/1.0	2.6 ±0.2	0.25	1.0	0.43
2.5/1.25	3.1 ±0.2	0.25	1.25	0.43
3.0/1.5	3.6 ±0.2	0.25	1.5	0.43
3.5/1.75	4.1 ±0.3	0.25	1.75	0.43
4.0/2.0	4.6 ±0.3	0.25	2.0	0.43
5.0/2.5	5.8 ±0.3	0.3	2.5	0.56
6.0/3.0	6.8 ±0.3	0.3	3.0	0.56
7.0/3.5	7.6 ±0.3	0.3	3.5	0.56
8.0/4.0	8.8 ±0.3	0.3	4.0	0.56
9.0/4.5	9.8 ±0.3	0.3	4.5	0.56
10.0/5.0	10.4 ±0.3	0.3	5.0	0.56

Size	As supplied		After shrinkage	
	Inside diameter	Wall thickness (nominal)	Inside diameter (max.)	Wall thickness (min.)
11.0/5.5	11.4 ±0.3	0.3	5.5	0.56
12.0/6.0	12.9 ±0.3	0.3	6.0	0.56
13.0/6.5	13.5 ±0.3	0.35	6.5	0.66
14.0/7.0	14.4 ±0.4	0.35	7.0	0.68
15.0/7.5	15.7 ±0.4	0.35	7.5	0.68
16.0/8.0	16.9 ±0.4	0.35	8.0	0.68
18.0/9.0	19.0 ±0.4	0.4	9.0	0.76
20.0/10.0	21.4 ±0.4	0.4	10.0	0.76
22.0/11.0	23.2 ±0.4	0.45	11.0	0.89
25.0/12.5	26.8 ±0.4	0.45	12.5	0.89
27.0/12.5	28.2 ±0.5	0.45	12.5	0.89
28.0/14.0	30.0 ±0.5	0.45	14.0	0.89
30.0/15.0	32.1 ±0.5	0.45	15.0	0.89

Ordering information	
Colors	Standard Black Nonstandard Red, blue, yellow, green, white, orange, brown, violet, gray
Size selection	Always order the largest size that will shrink snugly over the component being covered. A variety of special order sizes are available.
Standard packaging	On spools
Marking	Marked with UL/CSA legends.
Ordering description	Specify product name, size, and color; for example, Versafit-2.0/1.0-0 (0=black)

Raychem specification values

Property	Unit	Requirement	Method of test
Physical			
Dimensions	mm	See reverse	ASTM D 2671
Longitudinal change:			
ASTM D 2671	percent	+1, -5	ASTM D 2671
UL 224	percent	+3, -3	UL 224
Eccentricity	percent	30 maximum	ASTM D 2671
Tensile strength	psi (MPa)	1500 (10.3) minimum	ASTM D 2671
Ultimate elongation	percent	200 minimum	ASTM D 2671
Secant modulus (as supplied)	psi (MPa)	1.5 x 10 ⁴ (103) maximum	ASTM D 2671
Deformation at 125°C (257°F)	percent	80 maximum	UL 224
Low-temperature flexibility (1 hour at -45°C/-22°F)		No cracking	UL 224
Heat shock (1 hour at 136°C/277°F)		No cracking	UL 224
Heat aging (7 days at 158°C/316°F)			UL 224
Followed by tests for:			
Tensile strength	psi (MPa)	70% minimum of original	UL 224
Ultimate elongation	percent	100 minimum	UL 224
Flexibility		No cracking	UL 224
Dielectric withstand at 2500 V	seconds	60 minimum	ASTM D 2671
Dielectric breakdown	volts	50% min. of unaged specimens	ASTM D 2671
Dielectric strength	volts/mil (kV/mm)	500 (19.7) minimum	ASTM D 2671
Restricted shrinkage		Pass	UL 224
Electrical			
Dielectric withstand at 2500 V	seconds	60 minimum	ASTM D 2671
Dielectric strength	volts/mil (kV/mm)	500 (19.7) minimum	ASTM D 2671
Volume resistivity	ohm-cm	10 ¹⁴ minimum	ASTM D 2671
Chemical			
Corrosive effect (7 days at 158°C/316°F)		No corrosion	ASTM D 2671 Procedure B
Copper stability (7 days at 158°C/316°F)		No brittleness, glazing, cracking, or severe discoloration of tubing. No pitting or blackening of copper.	ASTM D 2671 Procedure B
Followed by test for:			
Ultimate elongation	percent	100 minimum	ASTM D 2671
Flammability		Pass	UL 224, VW-1

Note: Consult RT-1135, Issue 7 for specific details about test procedures and full list of properties.

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Raychem Corporation
Thermofit Systems Division
300 Constitution Drive
Menlo Park, California 94025-1100
415/321-1000

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