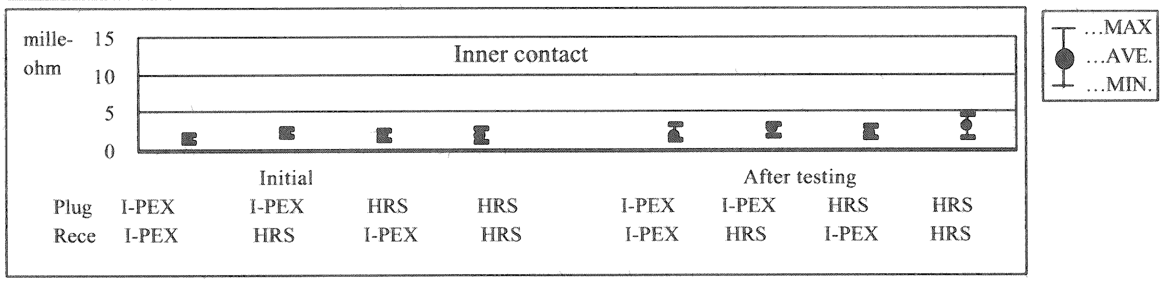
DOCUMENT CLASSIFICATION	TITLE	DOCUMENT No.
Qualification Test Report	Mechanical testing and environmental testing of I-PEX MHF and HIROSE U.FL connector	TR-1029

(4) Durability

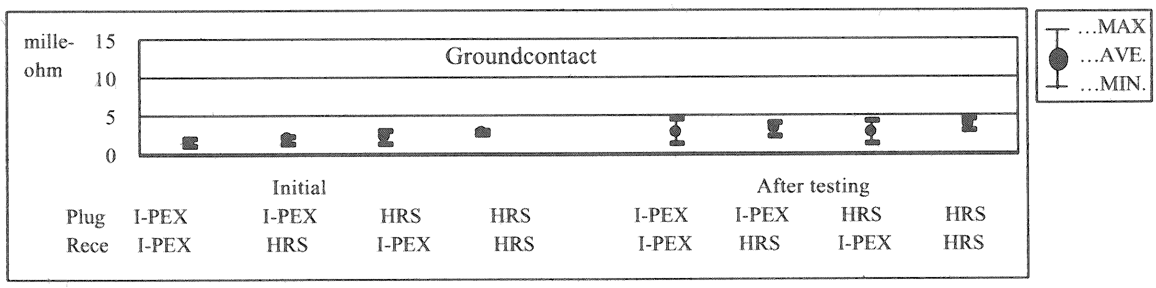
Contact resistance of inner contact

	Initial			
Plug	I-PEX	I-PEX	HIROSE	HIROSE
Receptacle	I-PEX	HIROSE	I-PEX	HIROSE
AVE.	1.42	2.21	1.80	2.06
MAX.	2.0	2.7	2.5	3.0
MIN.	0.9	1.7	1.2	1.4
S	0.36			
	After 30 cycles			
Plug	I-PEX	I-PEX	HIROSE	HIROSE
Receptacle	I-PEX	HIROSE	I-PEX	HIROSE
AVE.	1.80	2.68	2.06	3.06
MAX.	3.4	3.2	3.0	4.5
MIN.	1.2	1.9	1.4	1.4
S	0.68			
Units	mille-ohm	mille-ohm	mille-ohm	mille-ohm
Sample quantity	10pcs.	5pcs.	5pcs.	5pcs.

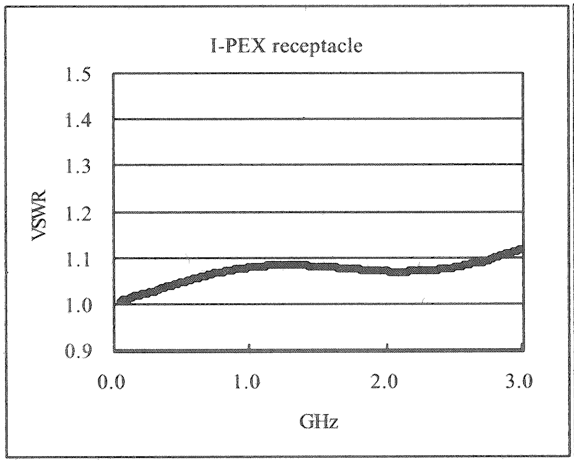


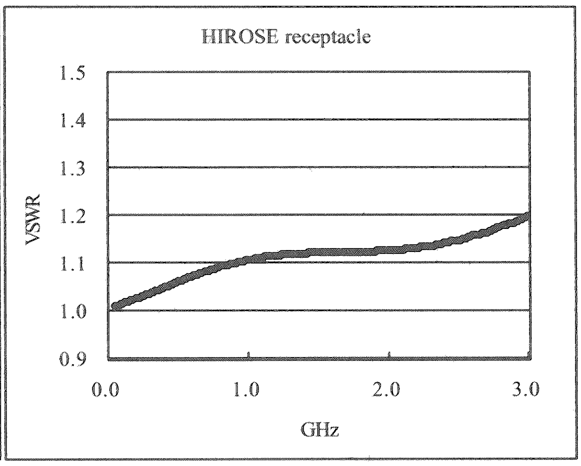
Contact resistance of ground contact

	Initial			
Plug	I-PEX	I-PEX	HIROSE	HIROSE
Receptacle	I-PEX	HIROSE	I-PEX	HIROSE
AVE.	1.54	1.95	2.32	2.76
MAX.	1.9	2.3	3.0	3.0
MIN.	1.0	1.3	1.2	2.6
S	0.31			
	After 30 cycles			
Plug	I-PEX	I-PEX	HIROSE	HIROSE
Receptacle	I-PEX	HIROSE	I-PEX	HIROSE
AVE.	2.74	3.16	2.78	3.74
MAX.	4.6	4.1	4.2	4.4
MIN.	1.3	2.3	1.3	3.1
S	1.07			
Units	mille-ohm	mille-ohm	mille-ohm	mille-ohm
Sample quantity	10pcs.	5pcs.	5pcs.	5pcs.



DOCUMENT CLASSIFICATION	TITLE	DOCUMENT No.
Qualification Test Report	Mechanical testing and environmental testing of I-PEX MHF and HIROSE U.FL connector	TR-1029





(3) Mating & unmating force

Total mating force	Initial		After 30 cycles	
Plug	I-PEX	I-PEX	I-PEX	I-PEX
Receptacle	I-PEX	HIROSE	I-PEX	HIROSE
AVE.	15.3	15.0	6.5	6.8
MAX.	16	16	7	7
MIN.	15	14	6	6
S	0.5		0.4	
Units	N	N	N	N
Sample quantity	10pcs.	5pcs.	10pcs.	5pcs.

Total unmating force	Initial		After 30 cycles	
Plug	I-PEX	I-PEX	I-PEX	I-PEX
Receptacle	I-PEX	HIROSE	I-PEX	HIROSE
AVE.	12.6	14.7	6.2	7.3
MAX.	14	16	7	8
MIN.	12	14	5	7
S	0.8		0.6	
Units	N	N	N	N
Sample quantity	10pcs.	5pcs.	10pcs.	5pcs.

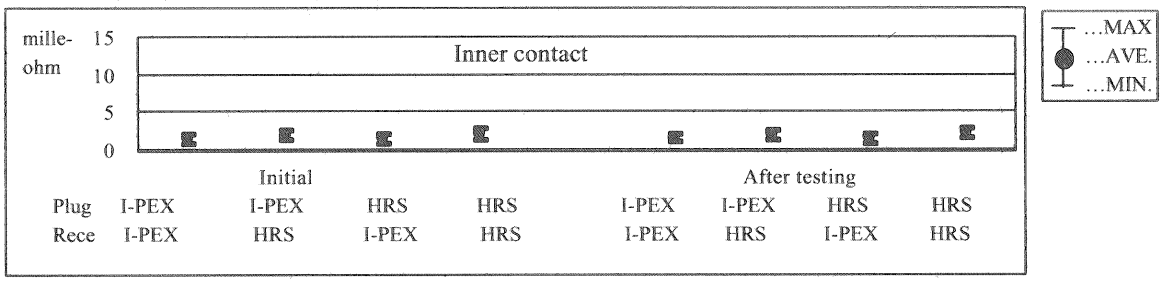
Unmating force of inner contact

	Initial		After 30 cycles	
Plug	I-PEX	I-PEX	I-PEX	I-PEX
Receptacle	I-PEX	HIROSE	I-PEX	HIROSE
AVE.	0.372	0.400	0.233	0.274
MAX.	0.39	0.43	0.25	0.32
MIN.	0.35	0.36	0.22	0.25
S	0.015		0.012	
Units	N	N	N	N
Sample quantity	10pcs.	5pcs.	10pcs.	5pcs.

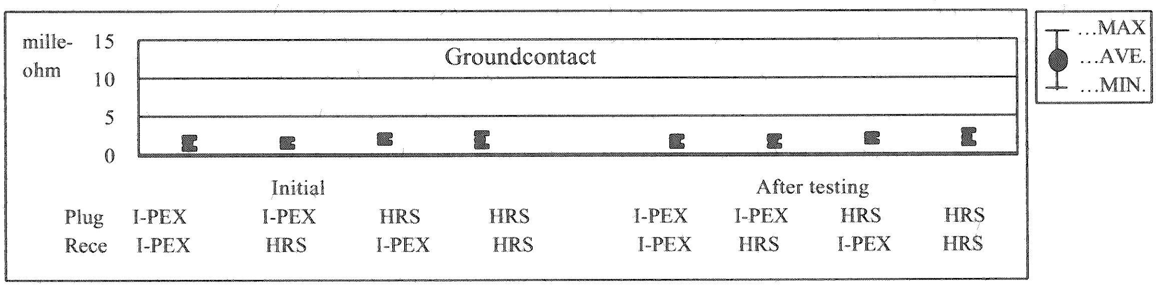
DOCUMENT CLASSIFICATION	TITLE	DOCUMENT No.
Qualification Test Report	Mechanical testing and environmental testing of I-PEX MHF and HIROSE U.FL connector	TR-1029

(5) Vibration Electrical discontinuity : no abnormality at all combinations.

Contact resistance of inner contact				
	Initial			
Plug	I-PEX	I-PEX	HIROSE	HIROSE
Receptacle	I-PEX	HIROSE	I-PEX	HIROSE
AVE.	1.53	1.88	1.42	1.98
MAX.	2.0	2.5	2.0	2.8
MIN.	0.8	1.2	0.8	1.3
S	0.42			
	After 30 cycles			
Plug	I-PEX	I-PEX	HIROSE	HIROSE
Receptacle	I-PEX	HIROSE	I-PEX	HIROSE
AVE.	1.61	1.94	1.57	2.18
MAX.	2.0	2.6	2.1	2.8
MIN.	0.9	1.2	0.8	1.6
S	0.38			
Units	mille-ohm	mille-ohm	mille-ohm	mille-ohm
Sample quantity	10pcs.	5pcs.	5pcs.	5pcs.



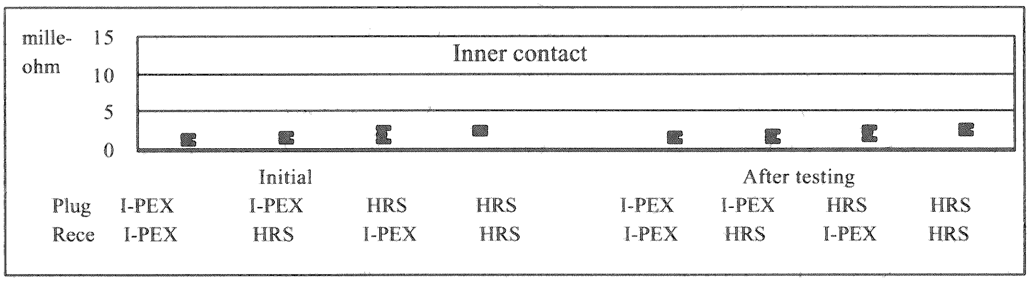
Contact resistance of ground contact				
	Initial			
Plug	I-PEX	I-PEX	HIROSE	HIROSE
Receptacle	I-PEX	HIROSE	I-PEX	HIROSE
AVE.	1.38	1.60	1.98	1.70
MAX.	2.2	2.0	2.5	2.8
MIN.	0.8	1.0	1.5	1.0
S	0.47			
	After testing			
Plug	I-PEX	I-PEX	HIROSE	HIROSE
Receptacle	I-PEX	HIROSE	I-PEX	HIROSE
AVE.	1.44	1.76	2.11	1.90
MAX.	2.3	2.2	2.6	3.1
MIN.	0.9	1.0	1.6	1.2
S	0.47			
Units	mille-ohm	mille-ohm	mille-ohm	mille-ohm
Sample quantity	10pcs.	5pcs.	5pcs.	5pcs.

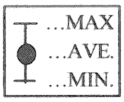


DOCUMENT CLASSIFICATION	TITLE	DOCUMENT No.
Qualification Test Report	Mechanical testing and environmental testing of I-PEX MHF and HIROSE U.FL connector	TR-1029

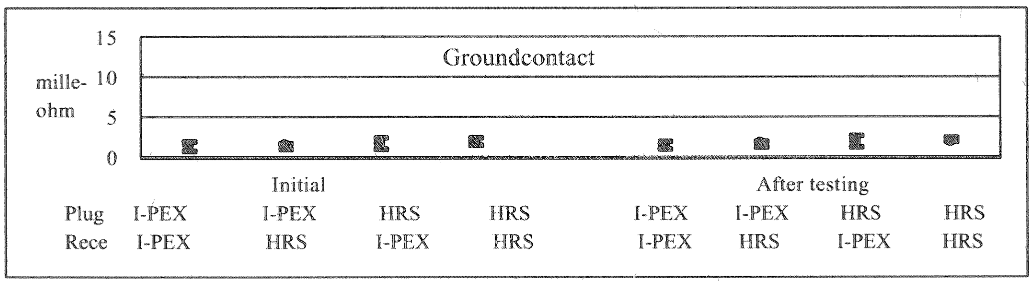
(6) Shock Electrical discontinuity : no abnormality at all combinations.

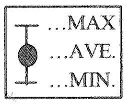
Contact resistance of inner contact				
	Initial			
Plug	I-PEX	I-PEX	HIROSE	HIROSE
Receptacle	I-PEX	HIROSE	I-PEX	HIROSE
AVE.	1.38	1.38	1.76	2.24
MAX.	1.9	2.0	2.7	2.7
MIN.	0.8	1.0	1.1	2.0
S	0.35			
	After testing			
Plug	I-PEX	I-PEX	HIROSE	HIROSE
Receptacle	I-PEX	HIROSE	I-PEX	HIROSE
AVE.	1.42	1.58	2.04	2.50
MAX.	2.0	2.3	2.8	3.0
MIN.	0.9	1.1	1.2	2.0
S	0.38			
Units	mille-ohm	mille-ohm	mille-ohm	mille-ohm
Sample quantity	10pcs.	5pcs.	5pcs.	5pcs.





Contact resistance of ground contact				
	Initial			
Plug	I-PEX	I-PEX	HIROSE	HIROSE
Receptacle	I-PEX	HIROSE	I-PEX	HIROSE
AVE.	1.40	1.38	1.58	1.80
MAX.	1.8	1.7	2.5	2.4
MIN.	0.8	1.0	1.0	1.4
S	0.32			
	After testing			
Plug	I-PEX	I-PEX	HIROSE	HIROSE
Receptacle	I-PEX	HIROSE	I-PEX	HIROSE
AVE.	1.51	1.64	1.80	2.02
MAX.	2.0	1.9	2.6	2.4
MIN.	0.9	1.3	1.1	1.8
S	0.34			
Units	mille-ohm	mille-ohm	mille-ohm	mille-ohm
Sample quantity	10pcs.	5pcs.	5pcs.	5pcs.

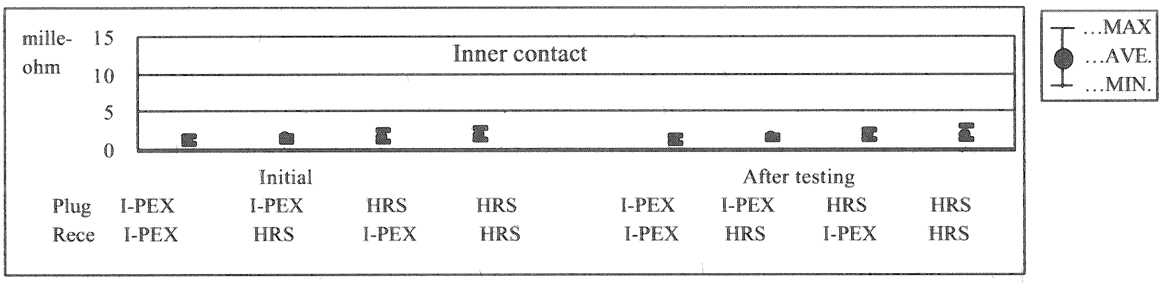




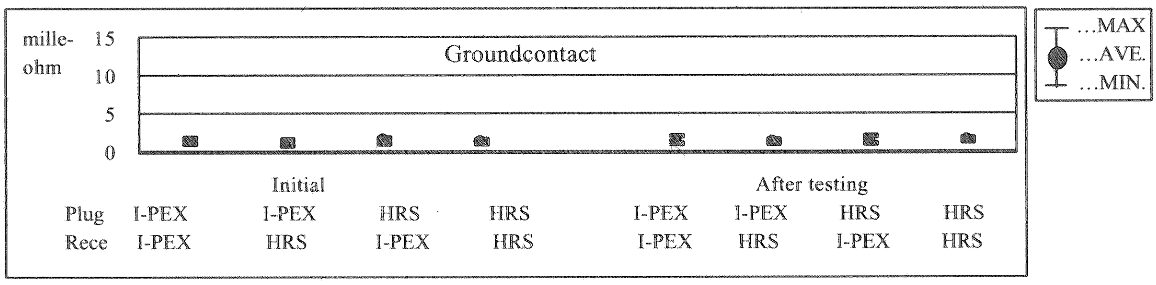
DOCUMENT CLASSIFICATION	TITLE	DOCUMENT No.
Qualification Test Report	Mechanical testing and environmental testing of I-PEX MHF and HIROSE U.FL connector	TR-1029

(7) Thermal shock

Contact resistance of inner contact				
	Initial			
Plug	I-PEX	I-PEX	HIROSE	HIROSE
Receptacle	I-PEX	HIROSE	I-PEX	HIROSE
AVE.	1.20	1.20	1.20	1.20
MAX.	1.8	1.8	1.8	1.8
MIN.	0.9	0.9	0.9	0.9
S	0.28			
	After testing			
Plug	I-PEX	I-PEX	HIROSE	HIROSE
Receptacle	I-PEX	HIROSE	I-PEX	HIROSE
AVE.	1.32	1.62	1.72	1.88
MAX.	1.9	1.9	2.6	3.0
MIN.	0.9	1.2	1.2	1.3
S	0.32			
Units	mille-ohm	mille-ohm	mille-ohm	mille-ohm
Sample quantity	10pcs.	5pcs.	5pcs.	5pcs.



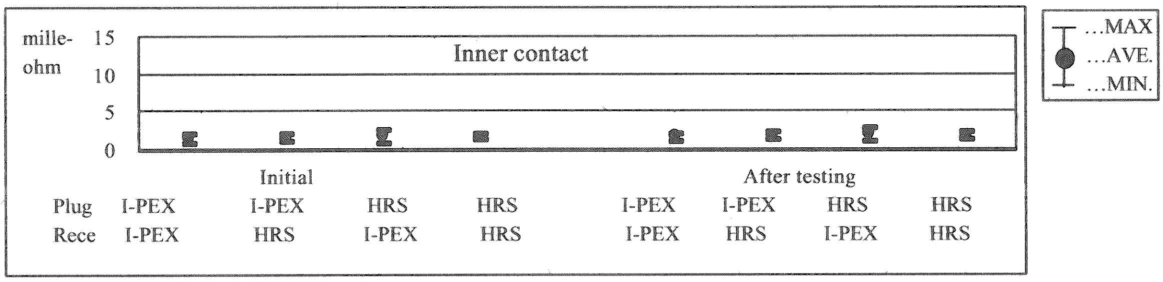
Contact resistance of ground contact				
	Initial			
Plug	I-PEX	I-PEX	HIROSE	HIROSE
Receptacle	I-PEX	HIROSE	I-PEX	HIROSE
AVE.	1.22	1.08	1.44	1.28
MAX.	1.8	1.4	1.7	1.6
MIN.	0.9	0.8	1.1	1.1
S	0.35			
	After testing			
Plug	I-PEX	I-PEX	HIROSE	HIROSE
Receptacle	I-PEX	HIROSE	I-PEX	HIROSE
AVE.	1.29	1.24	1.56	1.42
MAX.	2.0	1.5	1.9	1.7
MIN.	0.9	1.0	1.1	1.2
S	0.37			
Units	mille-ohm	mille-ohm	mille-ohm	mille-ohm
Sample quantity	10pcs.	5pcs.	5pcs.	5pcs.



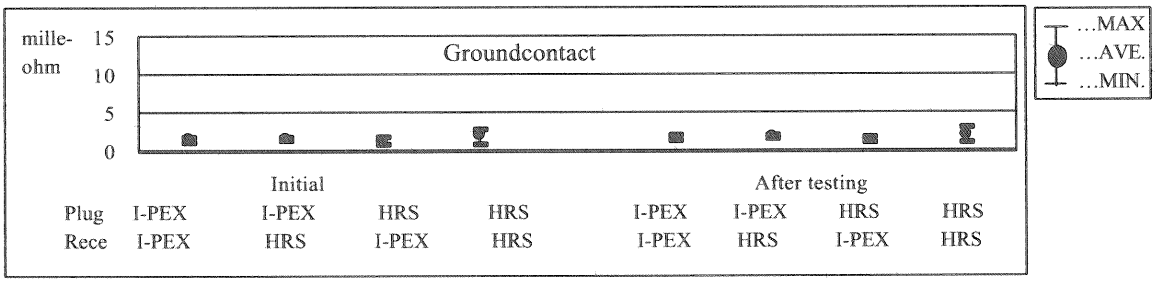
DOCUMENT CLASSIFICATION	TITLE	DOCUMENT No.
Qualification Test Report	Mechanical testing and environmental testing of I-PEX MHF and HIROSE U.FL connector	TR-1029

(8) Humidity

Contact resistance of inner contact				
	Initial			
Plug	I-PEX	I-PEX	HIROSE	HIROSE
Receptacle	I-PEX	HIROSE	I-PEX	HIROSE
AVE.	1.51	1.60	1.84	1.46
MAX.	2.1	2.1	2.6	2.1
MIN.	0.8	1.1	0.8	1.2
S	0.41			
	After testing			
Plug	I-PEX	I-PEX	HIROSE	HIROSE
Receptacle	I-PEX	HIROSE	I-PEX	HIROSE
AVE.	1.66	1.74	1.96	1.56
MAX.	2.1	2.2	2.9	2.4
MIN.	1.1	1.3	0.9	1.2
S	0.34			
Units	mille-ohm	mille-ohm	mille-ohm	mille-ohm
Sample quantity	10pcs.	5pcs.	5pcs.	5pcs.



Contact resistance of ground contact				
	Initial			
Plug	I-PEX	I-PEX	HIROSE	HIROSE
Receptacle	I-PEX	HIROSE	I-PEX	HIROSE
AVE.	1.44	1.52	1.20	1.96
MAX.	1.8	1.7	1.7	2.8
MIN.	1.0	1.3	0.8	0.7
S	0.25			
	After testing			
Plug	I-PEX	I-PEX	HIROSE	HIROSE
Receptacle	I-PEX	HIROSE	I-PEX	HIROSE
AVE.	1.55	1.66	1.30	2.06
MAX.	1.9	2.0	1.8	2.9
MIN.	1.2	1.4	0.9	1.0
S	0.25			
Units	mille-ohm	mille-ohm	mille-ohm	mille-ohm
Sample quantity	10pcs.	5pcs.	5pcs.	5pcs.



Patent of MHF series micro coaxial connector

No. IER-001-00572

FORMAL
'01.8.30
I-PEX
ENG.DEPT.

					Prepared by	Reviewed by	Approved by
1	R1111	K.O	AUG/30/01	[signature]	K.Ohbayashi	E.Kawabe	K.Katabuchi
0	R1063	K.O	JUL/05/01		JUL / 05 / 01	JUL / 06 / 01	JUL / 09 / 01
REV.	ECN	BY	DATE	APP.			
REVISION RECORD							

DOCUMENT CLASSIFICATION	TITLE	No.
Technical Report	Patent of MHF series micro coaxial connector	IER－001－00572

1. Name, part No. :MHF series micro coaxial connector , 20278-001R-**,20279-001E-01

2. Contents

Our MHF series micro coaxial connector does not conflict with Hirose's patent under our research of patent issues at this moment.

弊社ＭＨＦシリーズ超小型同軸コネクタは、弊社調査結果においてはヒロセ電機の特許に抵触していない事を報告します。

Date :

Our Spec. No. WS03-M051

MESSRS.

SPECIFICATION

FOR

HIGH FREQUENCY COAXIAL CABLE

" KHCX - 32AWG - SB - TA "

SHOWA ELECTRIC WIRE & CABLE CO., LTD.

TORANOMON

TOKYO JAPAN

T. Mori

T. Mori
Manager, Engineering Section
Engineering Dept.
Electronic Wire Business Unit

James Huang

LANTERRA INDUSTRIAL CO., LTD

1．適用(SCOPE)

本仕様書は電子機器などの内部配線に使用される細径同軸“KHCX-32AWG-SB-TA”の構造と特性について定める。

This specification covers the construction and characteristics of coaxial cable "KHCX-32AWG-SB-TA" for internal wiring of electronic equipment.

2．ケーブル型名の説明（EXPLANATION OF CABLE TYPE）

KHCX－32AWG－SB－TA
（1）　（2）　（3）

（1）ケーブル略称（Cable Abbreviation）
（2）導体サイズ（Conductor Size）
（3）外部導体タイプ（Outer Conductor Type）

3．構造(CONSTRUCTION)

項目 Item		要求特性 Requirement
内部導体 Inner conductor	材質 Material	銀めっき軟銅線 Silver coated annealed copper wire
	構成 Stranding	7/0.08mm
	外径 Diameter	標準 0.24mm Nom. 0.24mm
絶縁体 Insulation	材質 Material	FEP
	色別 Color	自然色 Natural
	厚さ Thickness	標準 0.22mm Nom. 0.22mm
	外径 Diameter	標準 0.68mm Nom. 0.68mm
外部導体 Outer conductor	材質 Material	錫めっき軟銅線 Tinned annealed copper wire braid shield
	構成 Stranding	16/4/0.05 mm
シース Sheath	材質 Material	FEP
	色別 Color	灰・白・黒 Gray・White・Black
	厚さ Thickness	標準 0.10mm Nom. 0.10mm
仕上外径 Overall diameter		標準 1.13mm Nom. 1.13mm
概算質量 Approximate mass		3 kg/km

4．電気特性(２０℃)　(ELECTRICAL CHARACTERISTICS at 20 degree)

項目 Item	単位 Unit	要求特性 Requirements
導体抵抗 Conductor Resistance	Ω/km	520 以下 Max. 520
絶縁抵抗 Insulation Resistance	MΩkm	1,500 以上（DC 500V 1 分間充電後） Min. 1,500 (After charge DC 500V for 1 min.)
耐電圧 Dielectric Strength	V/1min.	AC 1,000
静電容量 Capacitance	pF/m	標準 97 (at 1kHz) Nom. 97 (at 1kHz)
特性インピーダンス Characteristic Impedance	Ω	標準 50 (TDR にて測定) Nom. 50 (at TDR)

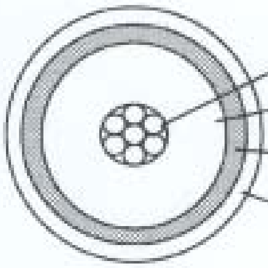


図１.ケーブル構造図

Fig.1. Cable Cross-Section

5．梱包及び荷札の表示（PACKING AND MARKING ON TAG）

完成品は運送中及び保管中に損傷を生じぬ荷造りをする。

また、荷札の表示は以下の通りとする。

The completed cables shall be coiled and packing in such a manner as to be adequately protected from damage during packing, shipping, and normal handling.

The following items shall be marked in the Tag which is attached to the products.

1) 品名（Type of Cable）
2) 導体サイズ（Conductor size）
3) 条長（Length）
4) 製造者名または略称（Manufacturer's name or trade mark）
5) 製造年月（The year and month of manufacture）

なお、完成品にはジョイントを有する場合がある。その場合は条長明細を記載する。

Note : The spool may contain joints. In that case, the detail of length is indicated.

21-Apr-03
SHOWA ELECTRICAL WIRE & CABLE CO.,LTD
Engineering Section Engineering Dept.
Electronic Wire Business Unit

KHCX-32AWG-SB-TA Test Report

1. Test cable

Inner conductor	Silver coated annealed copper wire 7 /0.08mm
Insulation	FEP Nom. 0.68 mm φ
Outer conductor	Tinned annealed copper braid 16/4/0.05mm
Sheath	FEP Nom. 1.13 mm φ

2. Test item and test result

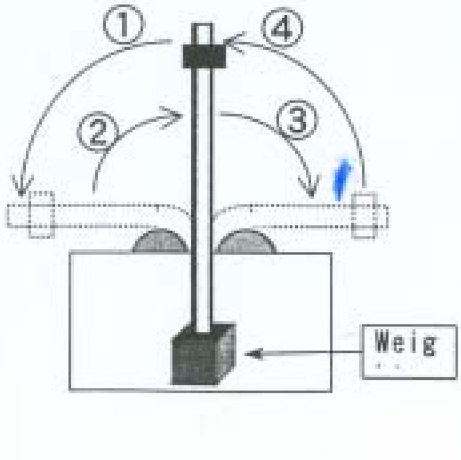
(1)Bending test	Radius.	Ave.	Min.	Max.		
	R=2mm	22,350	19,406	24,061		
	R=5mm	40,978	34,061	46,605		
	R=10mm	247,524	206,690	298,616		
(2)Twisting test		Not break until 300000 times				
(3)Tensile strength of cable	Unit: N	Ave.	Min.	Max.		
		36.5	35.7	41.1		
(4)Heat shrink test of insulation		0(not shrink)				
(5)Attenuation		1GHz	2GHz	3GHz	4GHz	5GHz	6GHz
		-1.88	-2.75	-3.54	-4.12	-4.70	-5.22

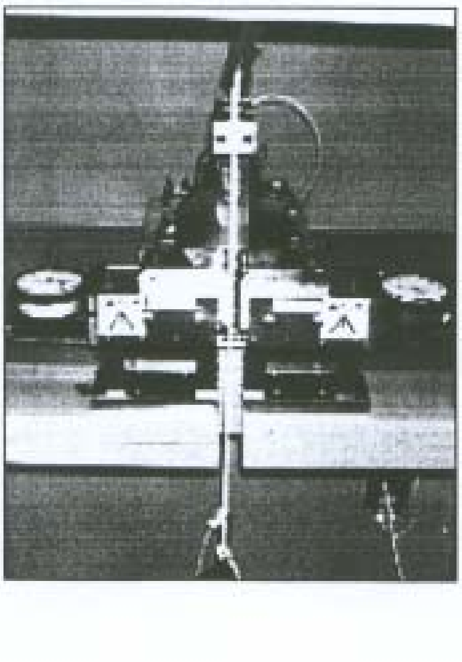
Radius.
R=2mm
R=5mm
R=10mm

2-(1) Bending test

Radius.	Number of bending times until conducter break			Ave.	Min.	Max.
R=2mm	19,406	23,582	24,061	22,350	19,406	24,061
R=5mm	34,061	42,268	46,605	40,978	34,061	46,605
R=10mm	206,690	298,616	237,268	247,524	206,690	298,616

Test condition.
Radius: 2mm、5mm、10mm
Weight: 100g
Speed: 30 times/minutes.

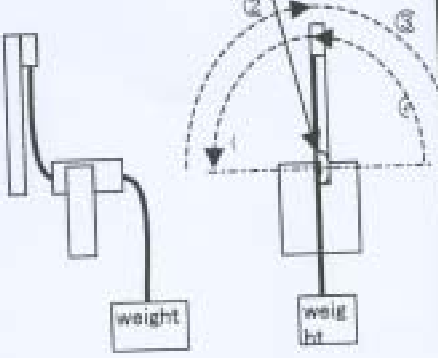


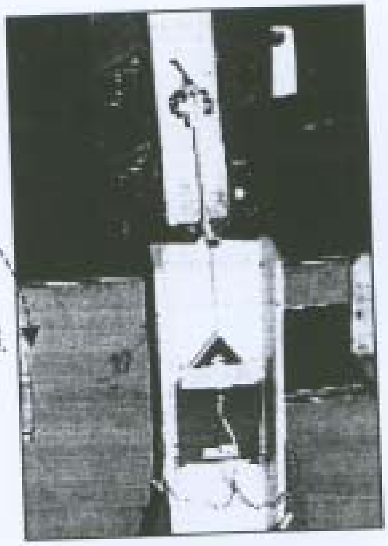


2−(2) Twisting test

Number of times		
300000 (Not break)	300000 (Not break)	300000 (Not break)

Test condition.
Pipe size : the inside diameter 4mm, length 30mm.
Weight: 60g
Speed: 30 times/minutes.





2-(3) Tensile strength of cable

Tensile strength at breaking cable (N)					Ave.	Min.	Max.
36.8	38.0	41.0	39.8	35.2	38.2	35.2	41.0

Test method

Measurement of tensil strength are to be made on a power-driven machine provided with a device that indicates the actual maximum load at which a specimen(cable) breaks.

2-(4)Heat shrink test of insulation

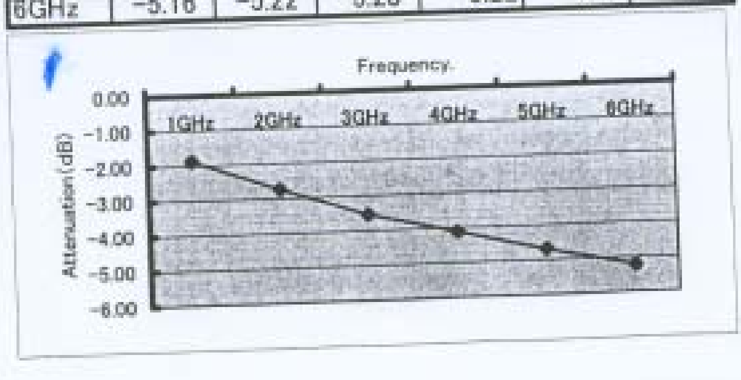
Shrinking length (mm)				
0mm	0mm	0mm	0mm	0mm

Insulation of 5 specimen were not srinked.

Test condition.
Temperature of solder bath: 230℃
Time: 5sec.
Shrink length: Max. 0.5mm

2-(5)Attenuation

Freq.	Attenuation (dB)			Ave.	Min.	Max.
1GHz	−1.85	−1.88	−1.90	−1.88	−1.90	−1.85
2GHz	−2.70	−2.76	−2.78	−2.75	−2.78	−2.70
3GHz	−3.49	−3.53	−3.59	−3.54	−3.59	−3.49
4GHz	−4.06	−4.12	−4.17	−4.12	−4.17	−4.06
5GHz	−4.63	−4.70	−4.76	−4.70	−4.76	−4.63
6GHz	−5.16	−5.22	−5.28	−5.22	−5.28	−5.16



MSX
CLAL
11, rue du Ménillet
BORNEL - 60541 MERU CEDEX
Tél 03 44 08 25 25 - Fax 03 44 08 49 11

AFAQ

Quality control certificate n°
R1266451C1/11019

ORIGINAL

RCF 1103
NF EN 10204 3.1B

Customer order n° :	01-070	Customer : Livraison :	FAR EAST ALLOY CORPORATION
Work order :	R1266451C1	Address :	N 3 LANE 562 FU CHIN STREET
Heat :	11929516		TAPEI TAIWAN
Commercial order :	CC4845		
Internal order :	IC483903	Delivery :	15703
Standard :	L9923671	Date :	23/07/01 Weight (kg) : 1183
Item :	0320LR.150H1300 /		BANDE ROULEAUX NICLAL 180 0.15 x 360 MM H13

Physical characteristics

Characteristics	Units	Conditions	Criterions			Results
Width	mm		0	360	0.3	CONFORMING TO SPEC.
Thickness	mm		-0.01	0.15	0.01	CONFORMING TO SPEC.
Hardness	VICKERS	Hv 2 kg	-10	180	10	176

Chemical characteristics

Elements	Specifications	Results	Elements	Specifications	Results
Cu	60.00<61.00<63.00	61.735	S	<	0.000
Ni	17.00<18.00<19.00	17.540	Co	<<	0.016
Zn	<SOLDE<	20.345	B	<	0.000
Pb	<<0.010	0.000	Al	<<	0.000
P	<<	0.000	Zr	<<	0.000
Sn	<<0.030	0.000	C	<<	0.002
Fe	<<0.25	0.043	Mg	<<	0.000
Mn	0.15<0.30<0.50	0.318	Ti	<<	0.000
Si	<<	0.001	Cr	<	0.001

Concession request :

For CLAL-MSX: M/Mme CHARABOUSKA Florent

Quality: F. CHARABOUSKA

Informatic document valid without signature

Technical Data Sheet

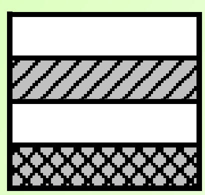
High-strength high-performance both-sided adhesive tape

G4000

Advantages

- ☐ Both-sided adhesive tape containing base material with stronger adhesion than conventional tape
- ☐ Superior initial adhesiveness
- ☐ This is the next generation of adhesive tape, whose impact on the global environment is small, because, unlike conventional tape, organic solvents are not used at coating.

Basic structure



	Name	Thickness
←——	Acryl adhesive	(About 55 μm)
←——	Nonwoven fabric	(About 40 μm)
←——	Acryl adhesive	(About 55 μm)
←——	Release film	(About 120 μm)

Specifications

Main component of the adhesive	Acrylic resin	Adhesive thickness (incl. base material)	0.15 mm
Color	Transparent and colorless	Shape	Stamped products
Base material	Nonwoven fabric		Rolled products

Technical Data Sheet

Characteristics

1. Peeling strength (180° peeling)
   - Tape width: 20 mm
   - Bonding condition: One stroke with 2 kg roller
   - Leave the specimen for one day at room temperature.
   - Atmosphere for measurement: 23°C ± 5°C, 65% ± 10%
   - Peeling speed: 300 mm/min.
   - Backing material: 25 μm PET

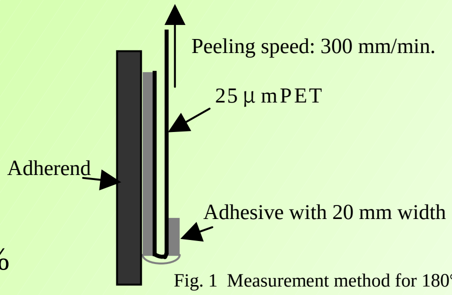
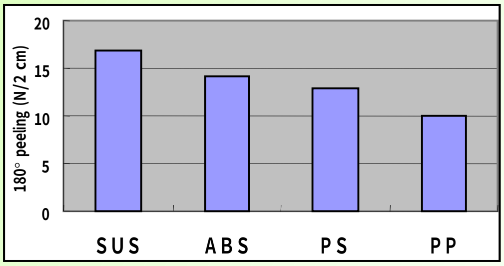


Fig. 1 Measurement method for 180° peeling

(N/2cm)

Adherend	SUS	ABS	PS	PP
Peeling strength	16.8	14.1	13.0	9.93



2. Tenacity
   - The area of tape attached: 25 × 25 mm
   - Adherend: SUS304
   - Bonding condition: One stroke with 2 kg roller
   - Load: 1 kg
   - Measure the gap (mm) after one hour.

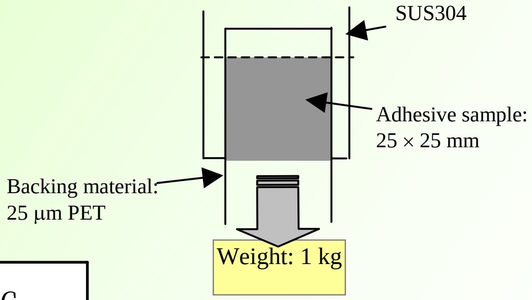


Fig. 2 Measurement method of tenacity

Measurement temperature	40℃	60℃	80℃
Gap (mm)	0.3	0.4	0.6

3. Ball Tack (J. Dow method)

Ball Tack (Ball No.)	7 to 8

Note: This report is based on our reliable experiments. However, it does not mean that the performance described in this report is guaranteed. Use the products under your responsibility after sufficiently studying the intended use and service condition of the products.

Underwriters Laboratories Inc.

PGGU2.MH15431
Marking and Labeling System Materials Component

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Marking and Labeling System Materials Component

Guide Information

SONY CHEMICALS CORP MH15431
KANUMA FACTORY
18 SATSUKI-CHO
KANUMA-SHI
TOCHIGI-KEN 322-8501, JAPAN

Pressure sensitive laminating adhesives:NP203, NP203W. For bonding aluminum (thickness.007 to 0.020 in), polycarbonate (thickness.019 to.079 in) and acrylic (thickness.019 to.079 in) to acrylonitrile butadiene styrene (ABS) plastic, maximum surface temperature 80 C (176 F), minimum temperature -40 C (-40 F). Suitable where exposed indoors to high humidity and occasional exposure to water.

NP303, NP303W. For bonding aluminum (thickness.007 to 0.020 in), polycarbonate (thickness.019 to.079 in) and acrylic (thickness.019 to.079 in) to acrylonitrile butadiene styrene (ABS) plastic, maximum surface temperature 80 C (176 F), minimum temperature -40 C (-40 F). Suitable where exposed indoors to high humidity and occasional exposure to water.

G4000, G9303S, T3500, T3500S, T3500SW, T3500W. For bonding aluminum (thickness.007 to 0.020 in), polycarbonate (thickness.019 to.079 in) and acrylic (thickness.019 to.079 in) to acrylonitrile butadiene styrene (ABS) plastic, maximum surface temperature 80 C (176 F), minimum temperature -40 C (-40 F). Suitable where exposed indoors to high humidity and occasional exposure to water.

T4000, T4000W. For bonding aluminum (thickness.007 to 0.020 in), polycarbonate (thickness.019 to.079 in) and acrylic (thickness.019 to.079 in) to acrylonitrile butadiene styrene (ABS) plastic, maximum surface temperature 80 C (176 F), minimum temperature -40 C (-40 F). Suitable where exposed indoors to high humidity and occasional exposure to water.

T4000B, T4000BW. For bonding aluminum (thickness.007 to 0.020 in), polycarbonate (thickness.019 to.079 in) and acrylic (thickness.019 to.079 in) to acrylonitrile butadiene styrene (ABS) plastic, maximum surface temperature 80 C (176 F), minimum temperature -40 C (-40 F). Suitable where exposed indoors to high humidity and occasional exposure to water.

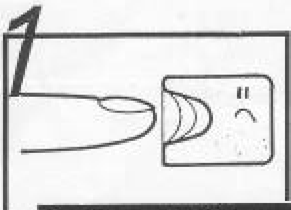
T4500B, T4500BW. For bonding aluminum (thickness.007 to 0.020 in), polycarbonate (thickness.019 to.079 in) and acrylic (thickness.019 to.079 in) to acrylonitrile butadiene styrene (ABS) plastic, maximum surface temperature 80 C (176 F), minimum temperature -40 C (-40 F).

Microcellular materials

PORON®

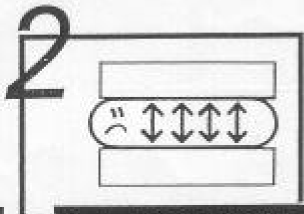
PORON materials are high density microcellular foams produced by Rogers Inoue Corporation (RIC), a joint-venture company of INOUE MTP CO., LTD. (JAPAN) and Rogers Corporation (USA), utilizing unique polymer technology.

Features



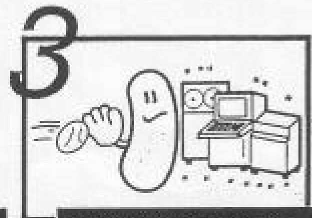
Low Compression Set

With low compression set, PORON materials provide long, useful life.



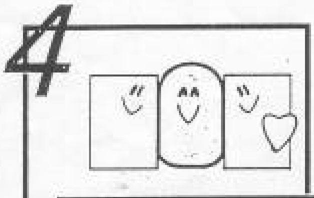
Excellent Sealing Properties

With strong compression force deflection, PORON materials have excellent sealing properties.



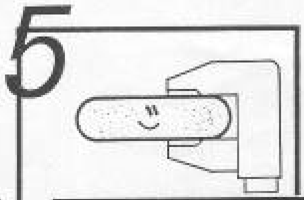
Excellent Shock Absorption

With excellent shock absorption, PORON materials are suitable for product protection applications.



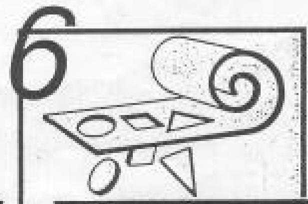
Safe in use

Containing no Plasticizer, PORON does not affect the other materials such as contamination, hardening, deterioration in physical properties, etc.



Dimensional Stability

PORON materials maintain their size, shape, and heat resistance,up to 120℃.



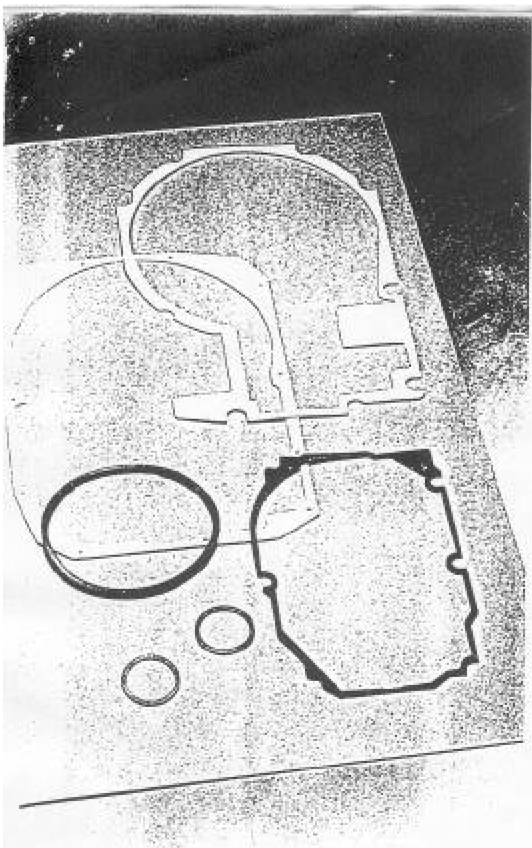
Excellent processing

Cuts and slits very easily. Long sheet size provides high part yield.

Availability

◎ Standard product ○ Available product

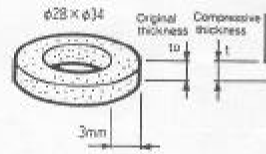
Type	L		H			U	LE	HH	#4000
Grade / Thickness × Width × Length	L-24	L-32	H-24	H-32	H-48	U-32	LE-32	HH-48	
0.8mm × 500mm × 50M					◎				
1mm × 500mm × 50M					◎			◎	
1.2mm × 500mm × 50M					◎			○	
1.5mm × 500mm × 50M		◎		◎	○	◎	◎	○	
2mm × 500mm × 50M		◎		◎	◎	○	○	◎	○
3mm × 500mm × 50M	◎	◎	◎	◎	○	◎	○	◎	◎
4mm × 500mm × 40M	○	○	○	○	○	○	○	◎	○
5mm × 500mm × 30M	◎	◎	◎	◎		○			○
6mm × 500mm × 25M	○	○	○	○		○			○
8mm × 500mm × 20M	○		○						
10mm × 500mm × 15M	◎		○						
12mm × 500mm × 10M	○		○						
15mm × 500mm × 10M	○								
Color	Black	Black	Black	Black	Black	Natural	Black	Black	Blue Brown etc

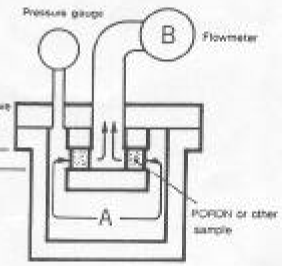


Sealing Properties

●Experiment method

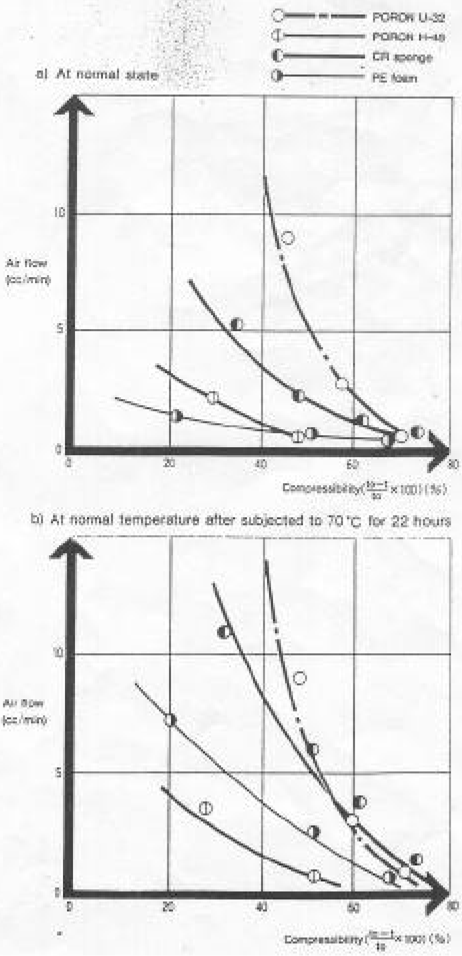
1. Sample shape



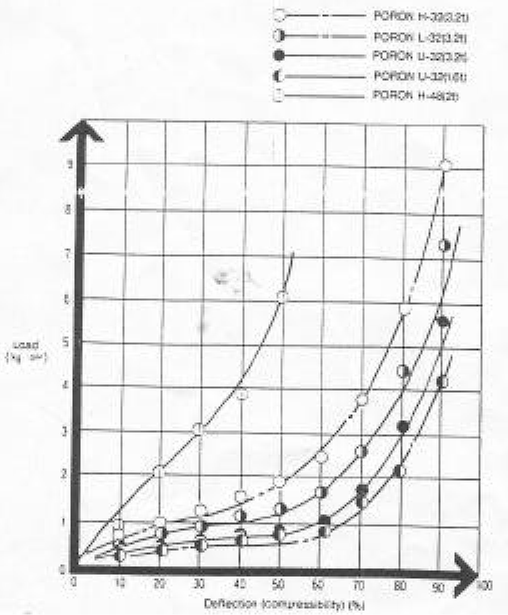


2. Method

Put the sample into the jig as shown in the above figure. Set the compressive thickness. Apply pressure in A area and measure the flow rate at B side.



Compressive deflection curve



Characteristics

General physical properties

PORON materials are available in types differing in hardness, strength, etc., to fit easily into many applications. The physical properties comply with JIS K-6301. The main PORON items are listed in the chart at the right. CR Sponge and PE foam are listed for comparison purposes only.

Type \ Item	Density	Tensile strength	Elongation	Tear strength	25% compressive load
Unit	g/cm³	kg/cm²	%	kg/cm	kg/cm²
L-24	0.24	5.5	115	1.8	0.4
L-32	0.32	7.9	150	2.4	0.8
H-32	0.32	14.7	155	3.4	1.4
H-48	0.48	17.4	106	4.1	2.2
U-32	0.32	4.0	115	1.5	0.5
LE-32	0.32	7.6	300	1.4	0.3
HH-48	0.48	27.0	140	7.5	3.0
$4000	0.27	10.2	120	2.5	0.9
CR sponge	0.19	5.0	150	2.2	0.6
PE foam	0.04	3.2	180	2.1	0.4
Test method		Danbel No.1	Danbel No.1	Danbel B-type	[illegible]

The figures all indicate representative values.

Compression Set

The outstanding features of PORON materials, namely the long-lasting sealing and cushioning properties, are achieved by means of its low compression set shown in the table at the right.

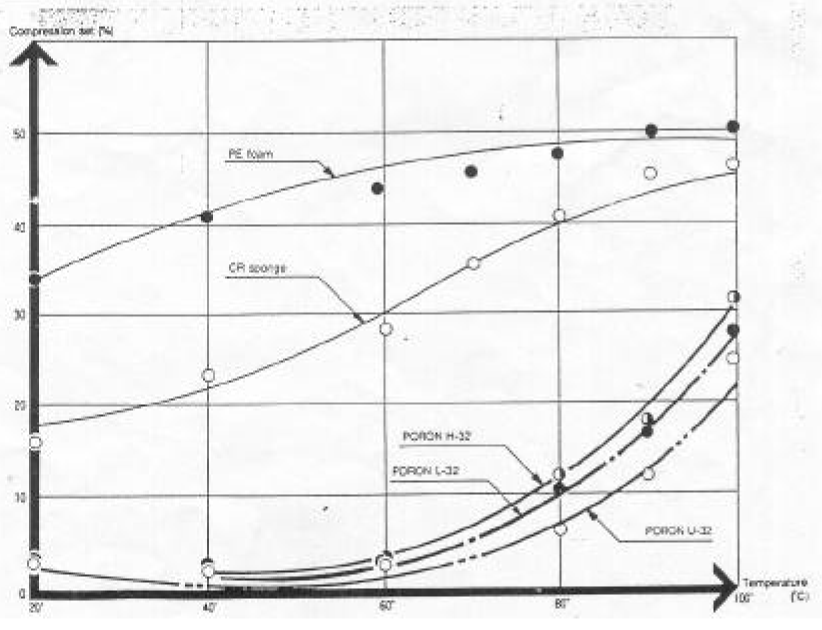
Conditions: According to JIS K-6401, the PORON sample is compressed 50% and left at 72°C for 22 hours. The compression is then released and the material is allowed to recover for 30 minutes.

	PORON					CR	PE
	L-24	L-32	H-32	H-48	U-32	sponge	foam
Compression set (%)	2.7	3.4	3.1	3.9	4.6	35	45

The figures all indicate representative values.

Compression Set versus Temperature

Compared with CR sponge and PE foam, the compression set of PORON materials are less affected by temperature.



QMFZ2.E96146
Plastics - Component

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Questions?

Plastics - Component

Guide Information

ROGERS INOAC CORP E96146
INOAC BLDG
2-4-14 GINZA
CHUO-KU
TOKYO 104-0061, JAPAN

									H	D	
		Min.		H	H	R T I			V	4	C
		Thk	Flame	W	A	Elec	Mech		T	9	T
Material Dsg	Color	mm	Class	I	I		Imp	Str	R	5	I
Polyurethane (PUR), furnished as pellets.											
MH-32 (c)	BK	1.5	HBF			50	50	50			
	BK	3.0	HBF			50	50	50			
MS-32 (d)	BK	1.5	HBF			50	50	50			
	BK	3.0	HBF			50	50	50			
Polyurethane (PUR), furnished as sheets.											
MH-24 (i)	BK	4.0	HBF			50	50	50			
	BK	6.0	HBF			50	50	50			
ML-24 (g)	BK	4.0	HBF			50	50	50			
	BK	6.0	HBF			50	50	50			
MS-24 (h)	BK	4.0	HBF			50	50	50			

	BK	6.0	HBF			50	50	50			
MX-48 (f)	BK	1.4	HBF			50	50	50			
	BK	2.0	HBF			50	50	50			
Polyurethane (PUR), furnished as sheets or rolls.											
MH-48 (f)	BK	1.3	HBF			50	50	50			
	BK	3.0	HBF			50	50	50			
Polyurethane (PUR), Foam, furnished as pellets.											
ML-32 (d)	BK	1.5	HBF			50	50	50			
	BK	3.0	HBF			50	50	50			
Polyurethane (PUR), Foam, furnished as sheets.											
MS-40 (e)	BK	1.5	HBF			50	50	50			
	BK	3.0	HBF			50	50	50			
Polyurethane (PUR), foam, designated "PORON" furnished as sheets.											
MO-48 (a)	BK	1.5	HBF								
		4.0	HBF								
U-32 (b)	NC, YL, BK	1.3	HBF								
		6.8	HBF								

(a)-Density range: 0.46-0.51 g/cc.

(b)-Density range: 0.28-0.36 g/cc.

(c)-Density range: 0.29-0.35 g/cc

(d)-Density range: 0.29-0.34 g/cc

(e)-Density range: 0.32-0.43 g/cc

(f)-Density Range: 0.44-0.55 g/cc.

(g)-Density Range: 0.20-0.29 g/cc.

(h)-Density Range: 0.21-0.27 g/cc.

(i)-Density Range: 0.21-0.29 g/cc.

Marking: Company name or trademark and material designation on container, wrapper or finished part.

03/07/3009:30 AM

CATERON CORPORATION

7F,NO.94, SHI-WEI STREET, SAN CHUNG CITY,.
TAIPEI HSIEN., TAIWAN, R.O.C.
TEL：886 -02-2287 –4187   FAX：886 -02-2287 –4173

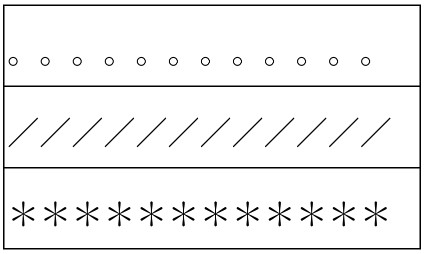
ELECTRICALLY CONDUCTIVE FABRIC TAPE NO.85773 SERIES.

1.PREFACE

CATERON 85773 series products are made of our metallized fabric,(POLYESTER Ni/Cu) CATERON F-773, coated with a pressure sensitive adhesive.

These products can be used as EMI/RFI shielding and grounding tape, which would meet market requirements.

2.COMPOSITION OF PRODUCT



Conductive layer (CATERON F-773)

Adhesive layer (Acrylic conductive pressure sensitive adhesive)

Release paper

3.CHARACTERISTICS OF CATERON 85773

Surface resistivity: ≦ 0.04 ohms/□
Far-field shielding effectiveness, (Typical)

AT	100	MHZ	dB	88
AT	1	GHZ	dB	77

Thickness 0.13mm ± 0.02mm (without release paper)
Peeling strength ≧ 1.1 kg/25mm
Tensile strength ≧ 15 kg/25mm
Electrical resistance through adhesive ≦ 0.04 ohms/sq in

4.PACKAGE

Material code: 85773-W-L
W: Width dimension by customer spec. (Max: 100cm)
L: Standard length 20M

02/11/05 06:40 PM

CATERON CORPORATION

7F,NO.94, SHI-WEI STREET, SAN CHUNG CITY,.
TAIPEI HSIEN., TAIWAN, R.O.C.
TEL : 886 -02-2287 -4187 FAX : 886 -02-2287 -4173

85773

1.Characteristic features 85773

2.Dimensional properties of 85773

Table I	
Width x Length	100 cm x 50 m
Weight(finished)	85 g/m²
Thickness	112 μm

4.Physical properties of 85773

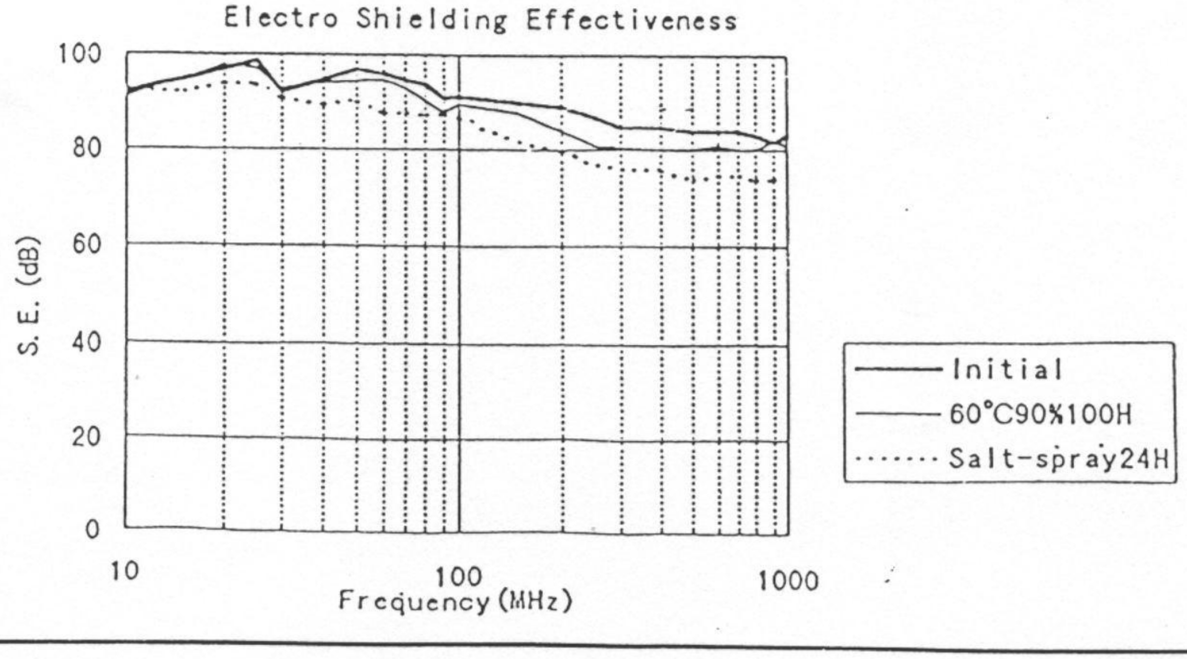
Table III	warp/weft
Tensile strength	15 / 10 (kg/inch)
Tearing strength	0.14 / 0.14 (kg)
Elongation	20 / 30 (%)

3.Environmental resistivity of 85773

Table II	
Surface resistivity (Ω/sq)	
First stage	0.018 / 0.018
After wet-Heating test	0.019 / 0.02 (JIS C 7022)
After salt-Spraying test	0.021 / 0.023 (JIS E 2371)

5.Physical resistivity of 85773

Table IV	warp/weft
Surface resistivity (Ω)	
First stage	0.12 / 0.08
After bending Test (1000strokes)	0.14 / 0.09 (JIS P 8115)
After rubbing Test (1000strokes)	0.13 / 0.09 (JIS L 8049)



SUMITOMO ELECTRIC FINE POLYMER, INC.

910, Oaza Nodo, Kumatori-cho, Sennan-gun, Osaka, 590-0451 JAPAN

Date : Dec. 24, 1999

No. : RE4-0180C

Messrs : SUMIPAC CORPORATION

SPECIFICATION

FOR

SUMITUBE A

Authorized by

J. Kishimoto

Senior Engineer,

Irradiated Products Group

Engineering Department

Prepared by

C. Sasaki

Engineer,

Irradiated Products Group

Engineering Department

RE4-0180C

SUMITUBE A SPECIFICATION

1. Scope
This specification covers SUMITUBE A.

2. Feature
This product is irradiated cross-linked, thermally-stabilized, flexible polyolefin heat-shrinkable tubing.

3. Colors
Black, Brown, Red, Orange, Yellow, Green, Blue, Gray, White and Clear
Colors conform to SUMITOMO's standard.

4. Sizes
Sizes are specified in Table 1.

5. Properties
Properties are specified in Table 2.

6. Test method
6-1. Inside diameter
Inside diameter shall be measured by using a gage rod or a taper gage.

In case of using a gage rod---- Read the value of the maximum gage rod which passes freely into the tubing without expanding the wall of tubing.

In case of using a taper gage-- Read the value on the gage when tubing isn't expanded by insertion and there is no visible space between the end of tubing and the taper gage.

6-2. Wall thickness
Wall thickness shall be measured by a pin-dialgage or a micrometer at several points.

6-3. Shrinkable condition
Tubing shall be fully recovered at 125°C for 1 minute in an oil bath.

RE4-0180C

6-4. Longitudinal change

Tubing shall be cut into about 100 mm lengths and measured. After full recovery, the length shall be remeasured and the longitudinal change shall be calculated from the following formula:

$$\text{Longitudinal change}(\%) = \frac{\text{Length after full recovery} - \text{Initial length}}{\text{Initial length}} \times 100$$

6-5. Properties

Test methods conform to JIS-C-2133.

RE4-0180C

Table 1. Sizes

Trade Size [mm]	As supplied [mm] Inside diameter	As supplied [mm] Wall thickness (Nom.)	After recovered [mm] Inside diameter (Max.)	After recovered [mm] Wall thickness	Standard length [m] (Min.) Cuts	Standard length [m] (Min.) Spool
1.5 × 0.2	2.10±0.30	0.2	0.8	0.4 ± 0.1	1	200
2 × 0.2	2.60±0.30	0.2	1.3	0.4 ± 0.1	1	200
2.5 × 0.2	3.10±0.30	0.2	1.5	0.4 ± 0.1	1	200
3 × 0.2	3.60±0.30	0.2	1.8	0.4 ± 0.1	1	200
3.5 × 0.2	4.10±0.30	0.2	2.0	0.4 ± 0.1	1	100
4 × 0.2	4.60±0.30	0.2	2.3	0.4 ± 0.1	1	100
5 × 0.2	5.60±0.30	0.2	2.9	0.4 ± 0.1	1	50
6 × 0.25	6.5 ±0.3	0.25	3.5	0.5 ± 0.1	1	50
7 × 0.25	7.5 ±0.3	0.25	4.2	0.5 ± 0.1	1	50
8 × 0.25	8.5 ±0.3	0.25	4.7	0.5 ± 0.1	1	50
9 × 0.25	9.5 ±0.3	0.25	5.4	0.5 ± 0.1	1	50
10 × 0.25	10.5 ±0.4	0.25	6.0	0.5 ± 0.1	1	50
11 × 0.25	11.5 ±0.4	0.25	7.0	0.5 ± 0.1	1	50
12 × 0.3	12.4 ±0.3	0.3	7.6	0.6 ± 0.1	1	50
13 × 0.3	13.4 ±0.3	0.3	8.0	0.6 ± 0.1	1	50
14 × 0.3	14.4 ±0.3	0.3	9.0	0.6 ± 0.1	1	50
15 × 0.3	15.4 ±0.3	0.3	10.0	0.6 ± 0.1	1	50
16 × 0.3	16.4 ±0.3	0.3	10.5	0.6 ± 0.1	1	50
18 × 0.3	18.4 ±0.3	0.3	11.5	0.6 ± 0.1	1	50
20 × 0.3	20.4 ±0.3	0.3	13.0	0.6 ± 0.1	1	50
22 × 0.3	22.4 ±0.4	0.3	14.0	0.6 ± 0.1	1	50
25 × 0.3	25.5 ±0.5	0.3	15.0	0.6 ± 0.1	1	50

◎ Longitudinal change : -15% min.

RE4-0180C

Table. 2 Properties

Properties	Unit	Requirement
Operation Temperature range	℃	$-55 \sim 105$
Shrinkage Beginning temperature	℃	75
Shrinkage Finishing temperature	℃	115
Longitudinal change	%	-15 , MIN.
Dielectric Voltage Withstand	V	No break down (A.C. 2.5kV × 1 minute)
Volume resistivity	Ω·cm	10^{14} , MIN.
Tensile strength	MPa(kg/mm²)	10.3(1.05) , MIN.
Ultimate elongation	%	200 , MIN.

HIGH-TEK HARNESS ENTERPRISE

Antenna Testing Report

Y41

	Prepared by	Approved by
	JAMES	

General Information

- ***Measurement Resume***

Date	Engineer	2.4~2.5 GHz	5.15~5.35 GHz	5.47~5.725 GHz	5.725~5,825 GHz
2006/04/07	JAMES	V	V	V	V

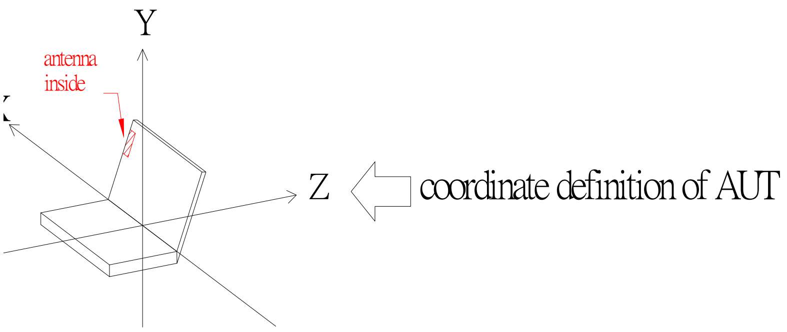
- ***Antenna specifications:*** *maximum size, unit: mm*

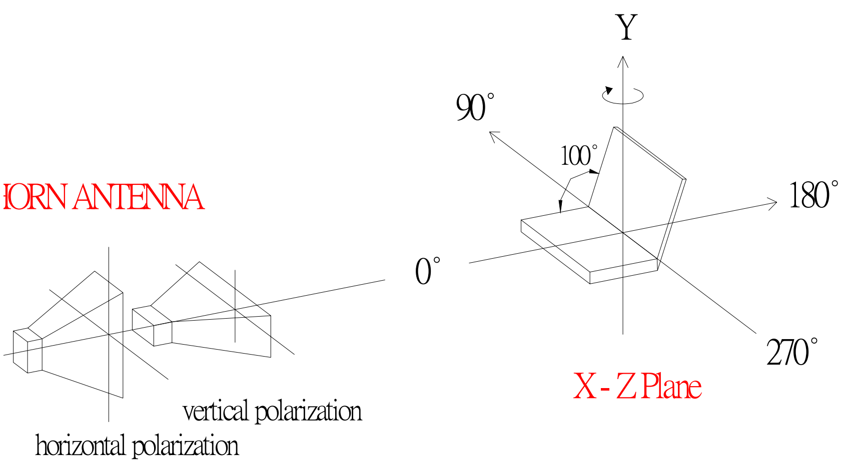
PIFA Type	Length	Width	Height	Cable length
MAIN				565
AUX				740

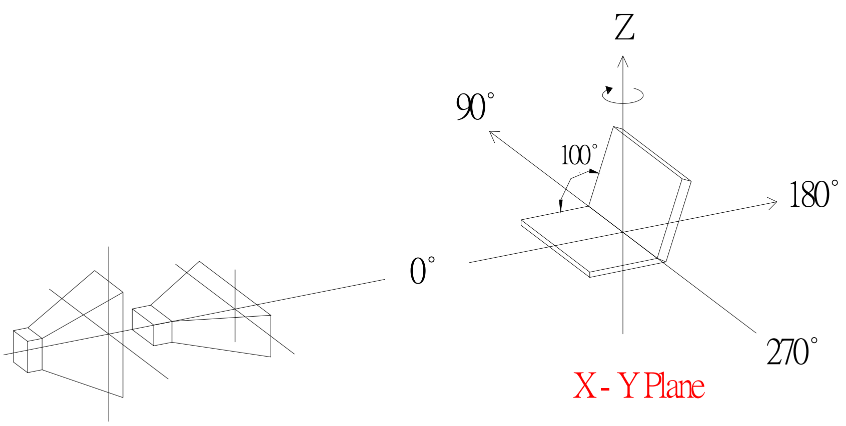
- ***Measurement Setup & Environment***

Temp.	Humidity	Instrument	System	Entry
20℃	50%	VNA HP8753ES, 7x4x4 m anechoic chamber	NSI antenna measurement system	VSWR, Return, Radiation pattern

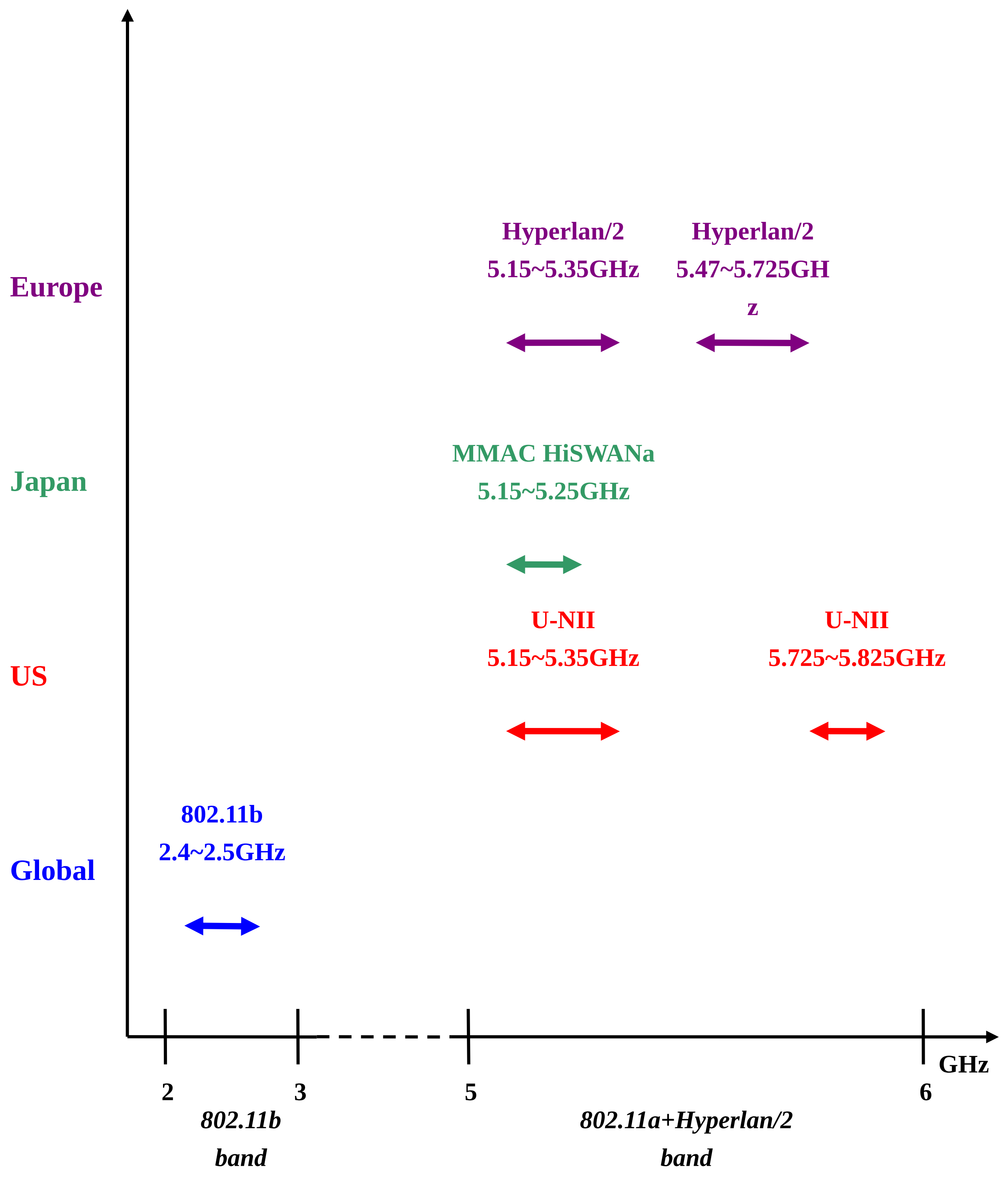
Coordinate Definition





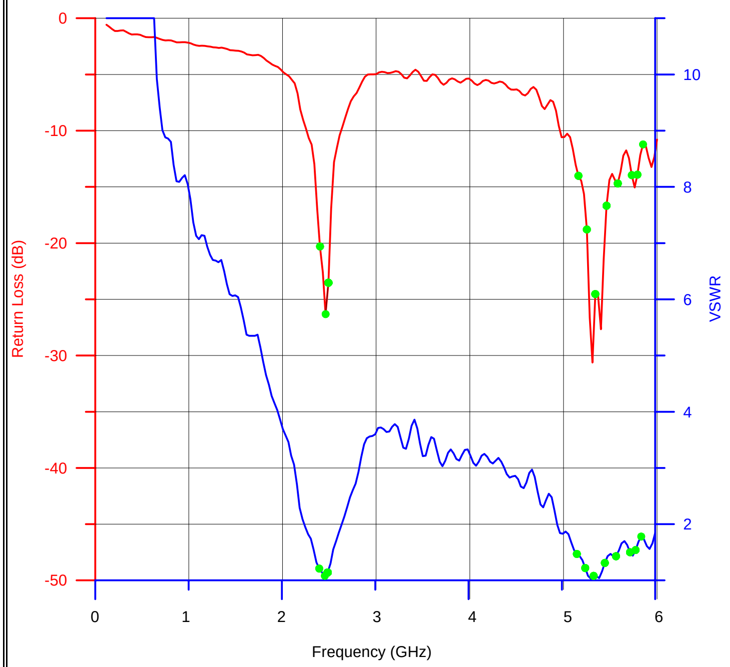


Spectrum Allocation in worldwide WLAN



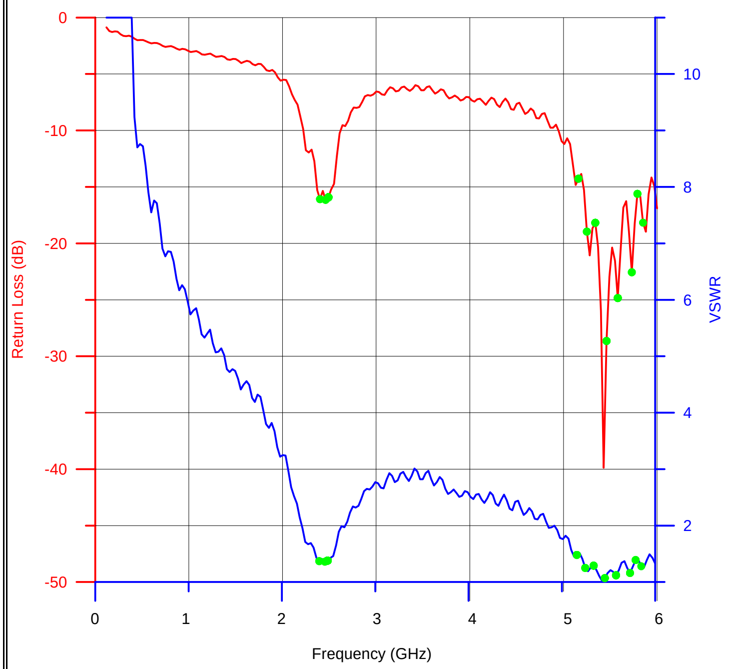
Return Loss & VSWR

Main-Antenna



2.4~2.5 GHz Center freq. @MHz		2450 5850
Beam Width @MHz		150
freq.	Return Loss(dB)	VSWR
2.40 GHz	-20.30	1.21
2.45 GHz	-26.32	1.08
2.50 GHz	-23.52	1.14
5.15 GHz	-14.02	1.47
5.25 GHz	-18.79	1.22
5.35 GHz	-24.53	1.08
5.47 GHz	-16.68	1.31
5.59 GHz	-14.70	1.43
5.72 GHz	-13.95	1.50
5.78 GHz	-13.91	1.54
5.85 GHz	-11.22	1.78

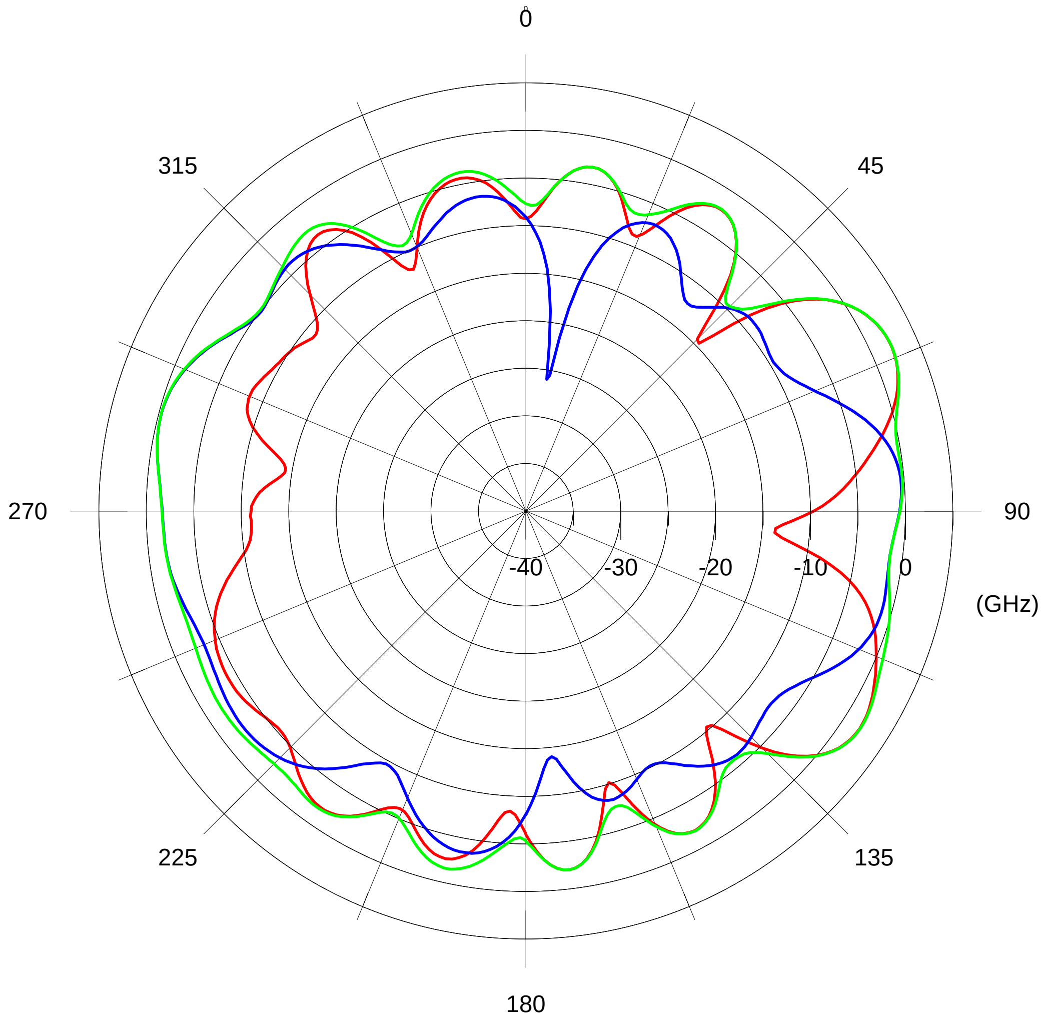
Aux-Antenna



2.4~2.5 GHz Center freq. @MHz		2450 5850
Beam Width @MHz		200
freq.	Return Loss(dB)	VSWR
2.40 GHz	-16.09	1.37
2.45 GHz	-16.15	1.36
2.50 GHz	-15.92	1.38
5.15 GHz	-14.27	1.48
5.25 GHz	-18.96	1.25
5.35 GHz	-18.18	1.29
5.47 GHz	-28.65	1.07
5.59 GHz	-24.84	1.12
5.72 GHz	-22.56	1.16
5.78 GHz	-15.61	1.39
5.85 GHz	-18.17	1.28

Note: the three green points represent the main data we want(i.e. 2.4, 2.45 and 2.5 GHz) both at each curve.

Main antenna: 2400 MHz

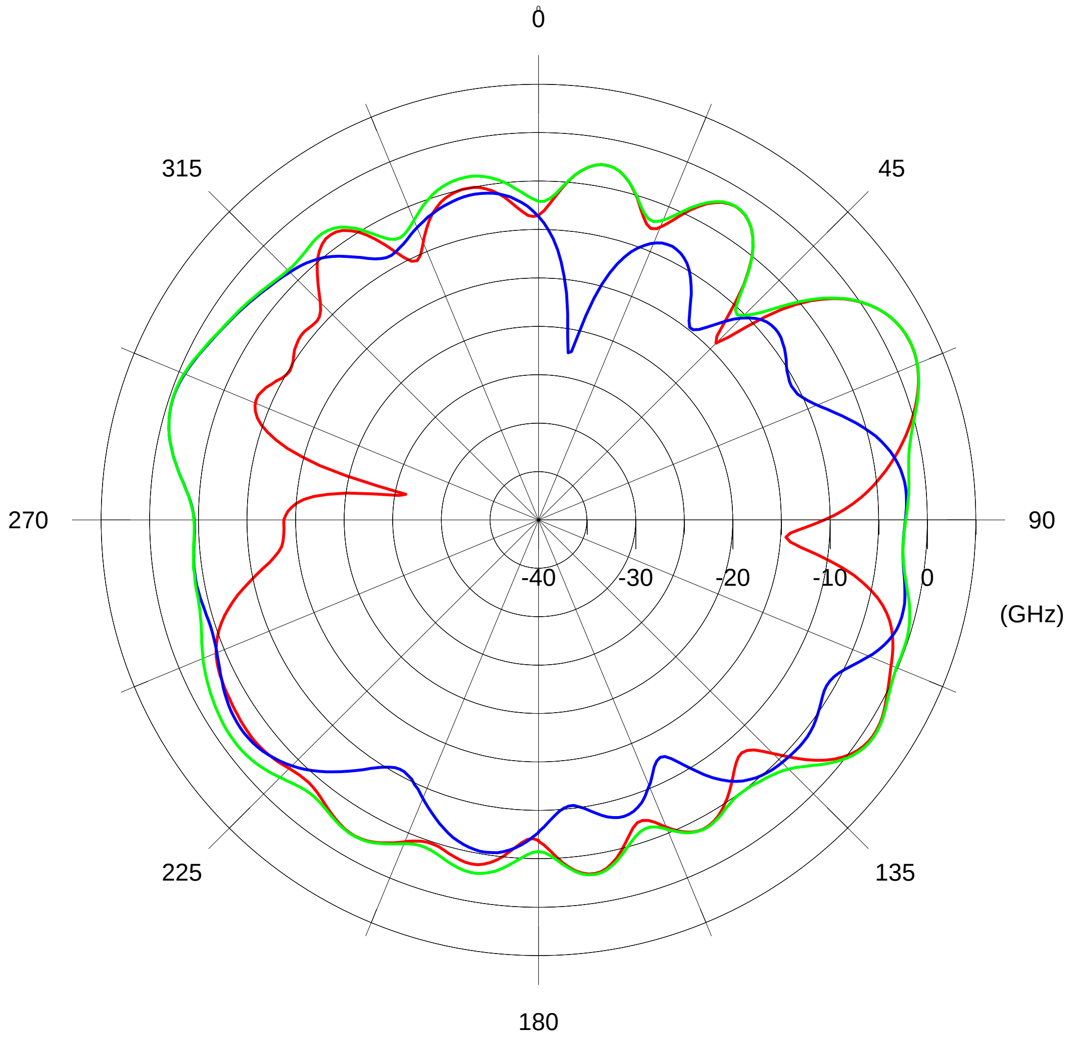


Average Gain And Peak Gain (On Azimuth Plane)

X-Y Plane

V Peak Gain (dBi)	***-0.23***
V Avg Gain (dBi)	***-4.52***
H Peak Gain (dBi)	***2.23***
H Avg Gain (dBi)	***-3.87***
Total Avg. Gain (dBi)	***-2.10***
Avg Peak Gain (dBi)	***2.26***

Main antenna: 2450 MHz

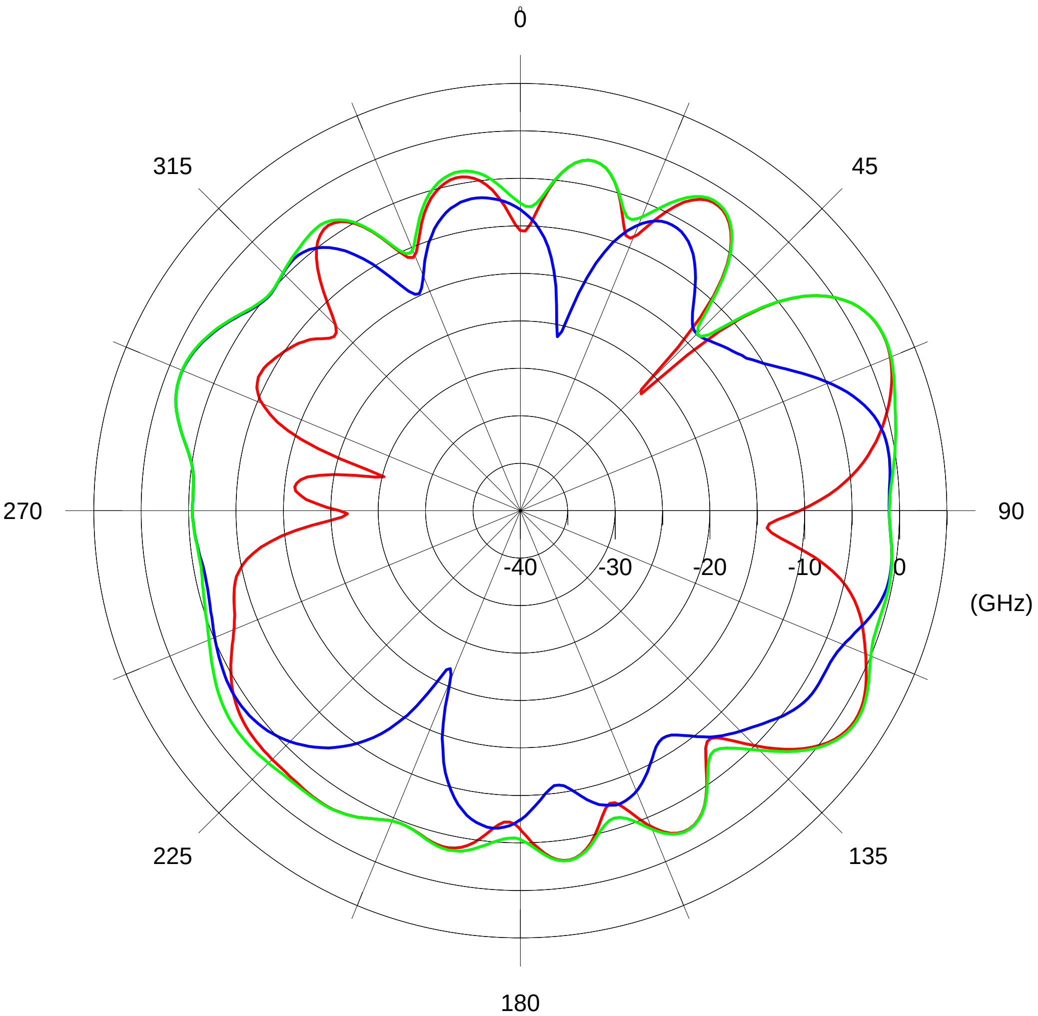


Average Gain And Peak Gain (On Azimuth Plane)

X-Y Plane

V Peak Gain (dBi)	-0.36
V Avg Gain (dBi)	-5.09
H Peak Gain (dBi)	2.41
H Avg Gain (dBi)	-3.97
Total Avg. Gain (dBi)	-2.41
Avg Peak Gain (dBi)	2.42

Main antenna: 2500 MHz

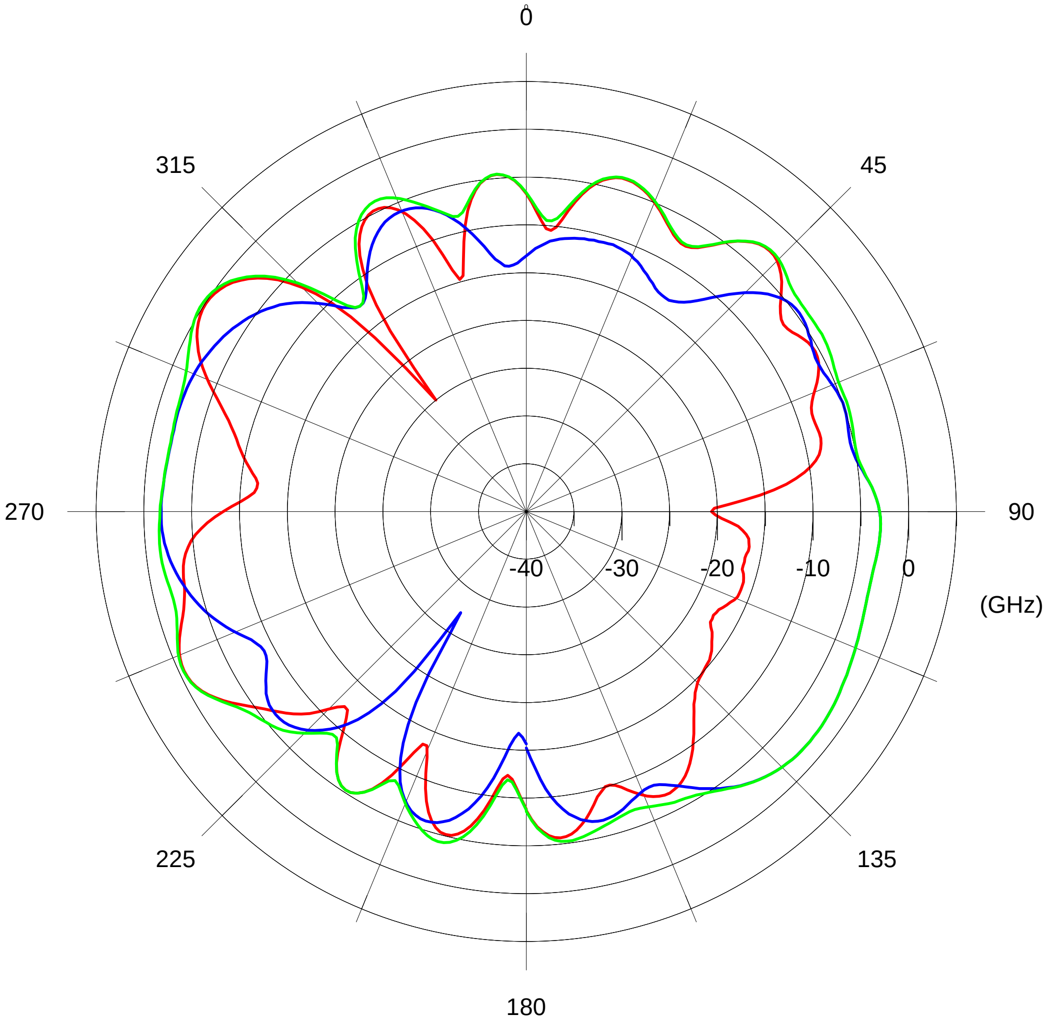


Average Gain And Peak Gain (On Azimuth Plane)

X-Y Plane

V Peak Gain (dBi)	***-0.43***
V Avg Gain (dBi)	***-5.42***
H Peak Gain (dBi)	***2.51***
H Avg Gain (dBi)	***-3.97***
Total Avg. Gain (dBi)	***-2.54***
Avg Peak Gain (dBi)	***2.54***

Aux antenna: 2400 MHz



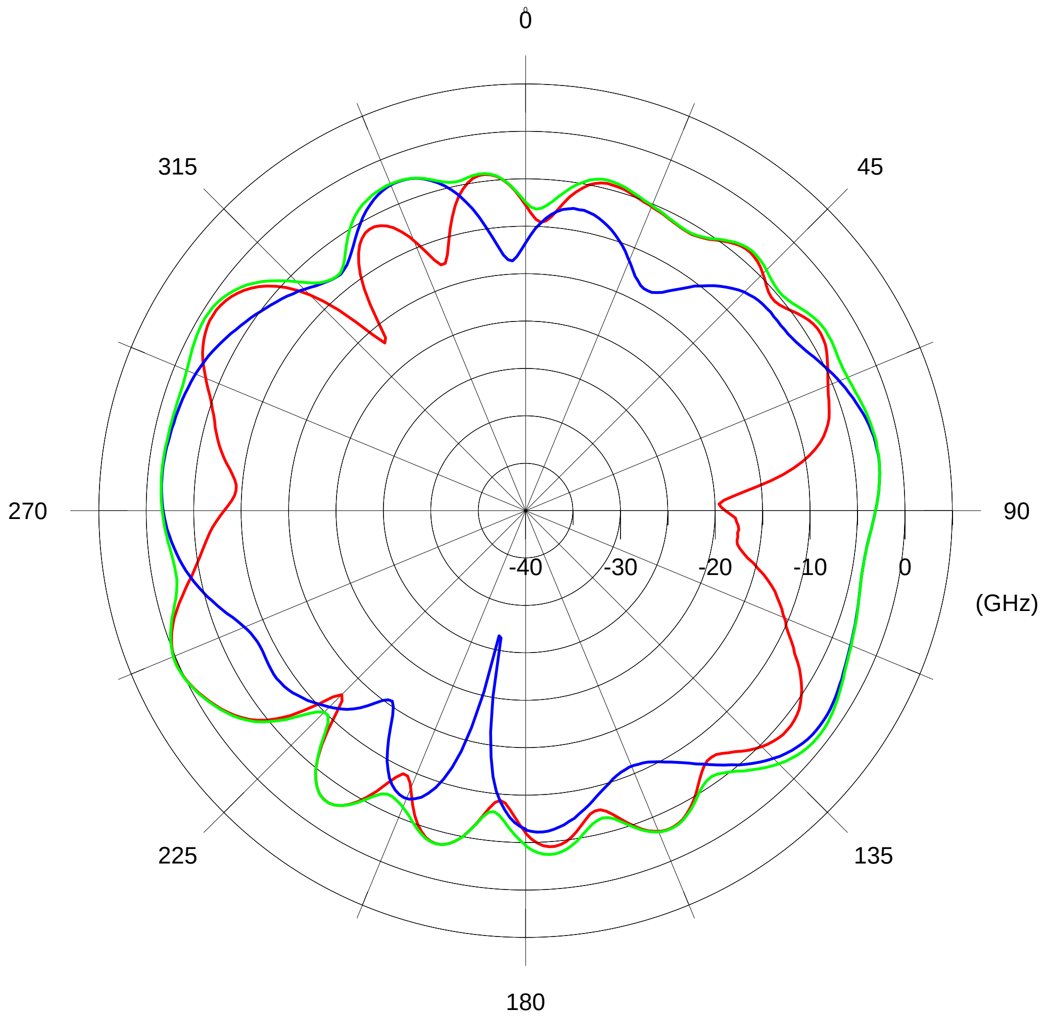
Note: horizontal polarization plots in the red line and vertical polarization in the blue one
The green line means the average gain of vertical and horizontal polarization

Average Gain And Peak Gain (On Azimuth Plane)

X-Y Plane

V Peak Gain (dBi)	***-1.78***
V Avg Gain (dBi)	***-5.53***
H Peak Gain (dBi)	***-0.04***
H Avg Gain (dBi)	***-6.65***
Total Avg. Gain (dBi)	***-3.79***
Avg Peak Gain (dBi)	***0.28***

Aux antenna: 2450 MHz

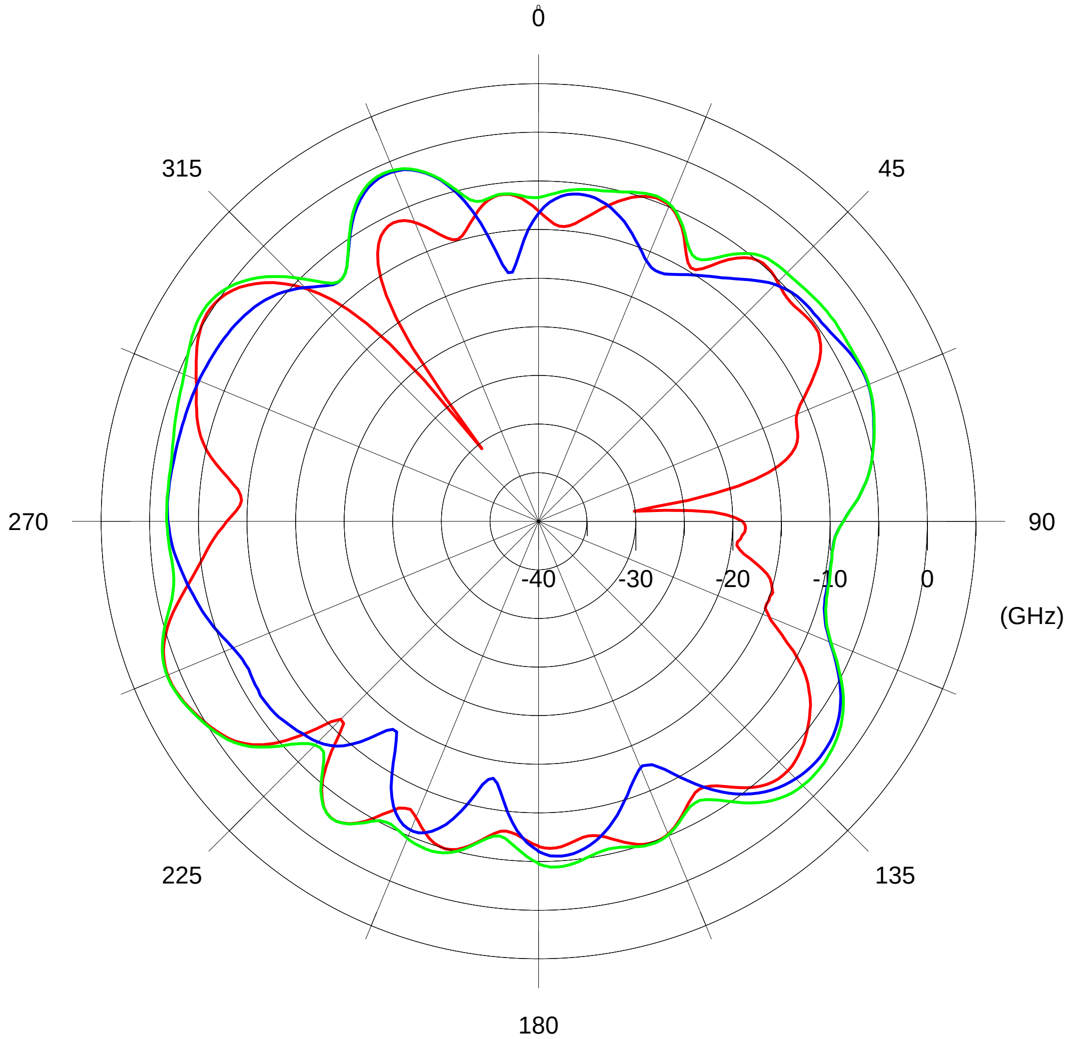


Average Gain And Peak Gain (On Azimuth Plane)

X-Y Plane

V Peak Gain (dBi)	*-1.47*
V Avg Gain (dBi)	*-5.32*
H Peak Gain (dBi)	*0.21*
H Avg Gain (dBi)	*-5.28*
Total Avg. Gain (dBi)	*-3.30*
Avg Peak Gain (dBi)	*0.25*

Aux antenna: 2500 MHz

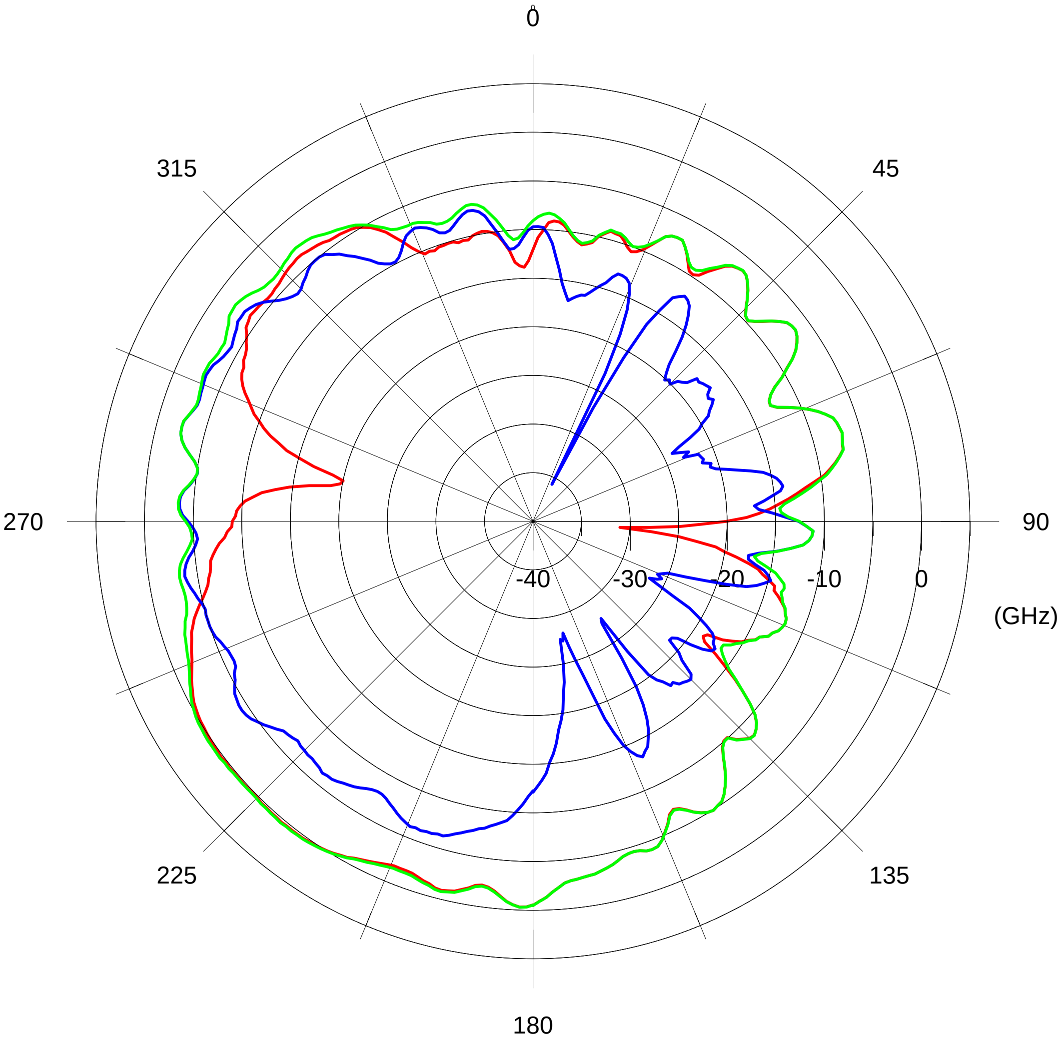


Average Gain And Peak Gain (On Azimuth Plane)

X-Y Plane

V Peak Gain (dBi)	***-1.03***
V Avg Gain (dBi)	***-5.25***
H Peak Gain (dBi)	***1.30***
H Avg Gain (dBi)	***-5.18***
Total Avg. Gain (dBi)	***-3.32***
Avg Peak Gain (dBi)	***1.38***

Main antenna: 5150 MHz

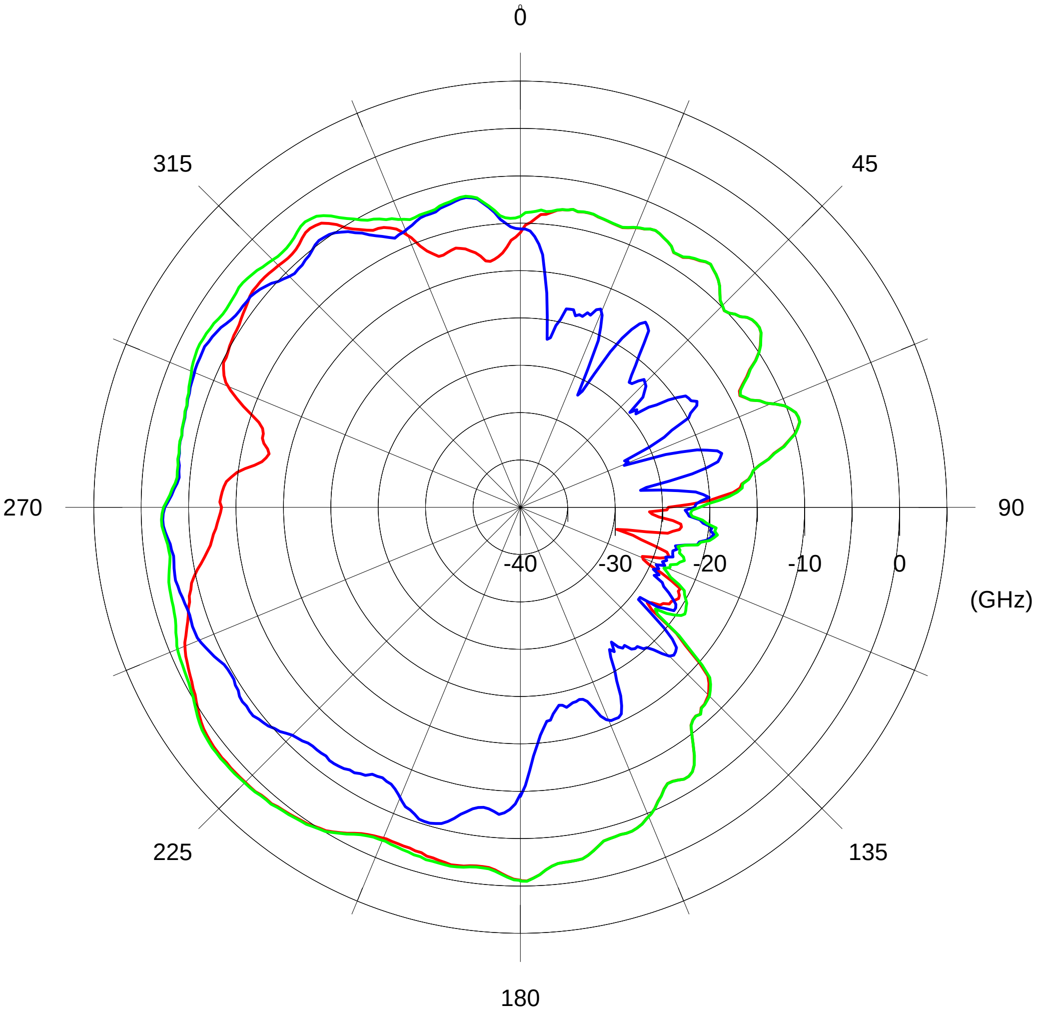


Average Gain And Peak Gain (On Azimuth Plane)

X-Y Plane

V Peak Gain (dBi)	***-2.54***
V Avg Gain (dBi)	***-8.33***
H Peak Gain (dBi)	***0.36***
H Avg Gain (dBi)	***-4.98***
Total Avg. Gain (dBi)	***-4.19***
Avg Peak Gain (dBi)	***0.46***

Main antenna: 5250 MHz

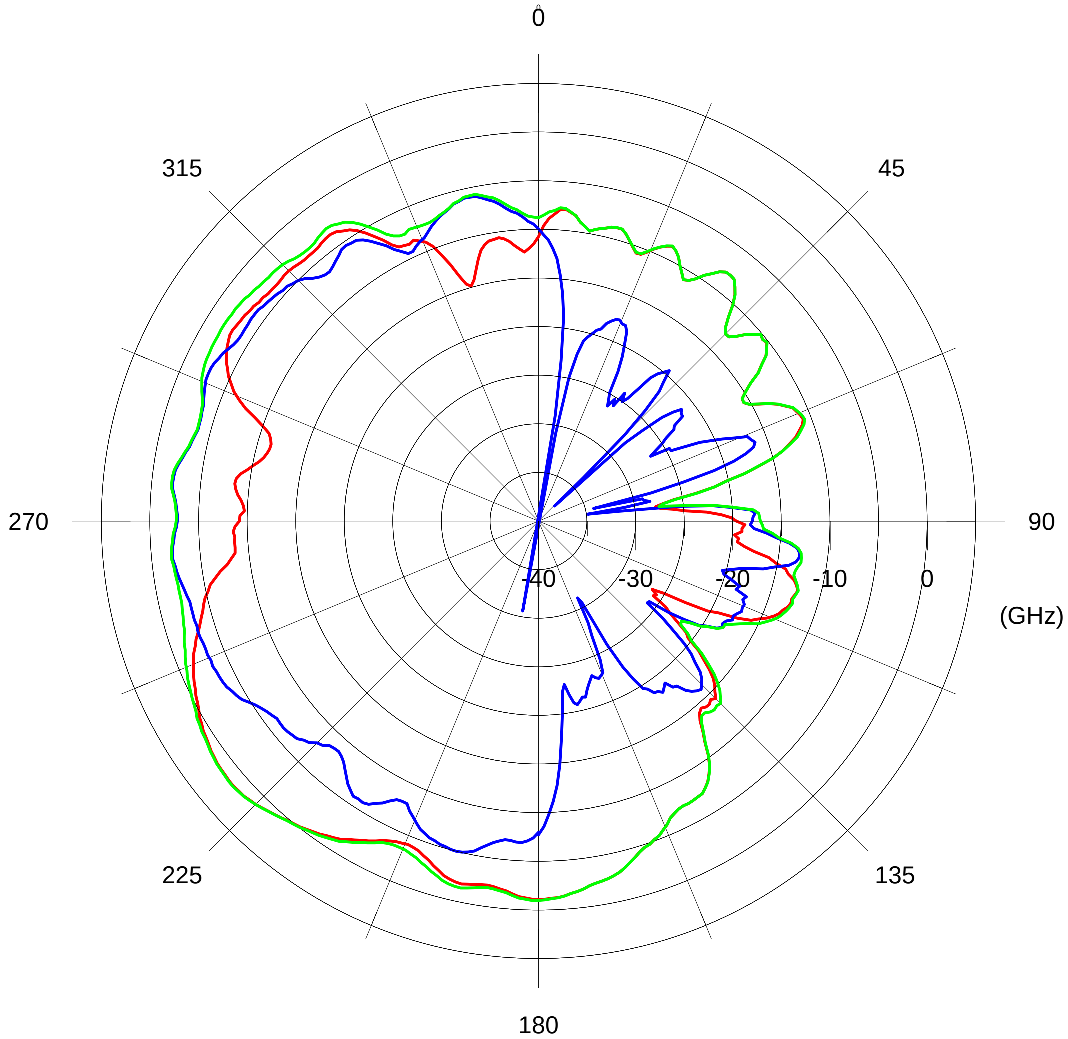


Average Gain And Peak Gain (On Azimuth Plane)

X-Y Plane

V Peak Gain (dBi)	*-2.25*
V Avg Gain (dBi)	*-7.70*
H Peak Gain (dBi)	*1.12*
H Avg Gain (dBi)	*-4.94*
Total Avg. Gain (dBi)	*-4.01*
Avg Peak Gain (dBi)	*1.27*

Main antenna: 5350 MHz

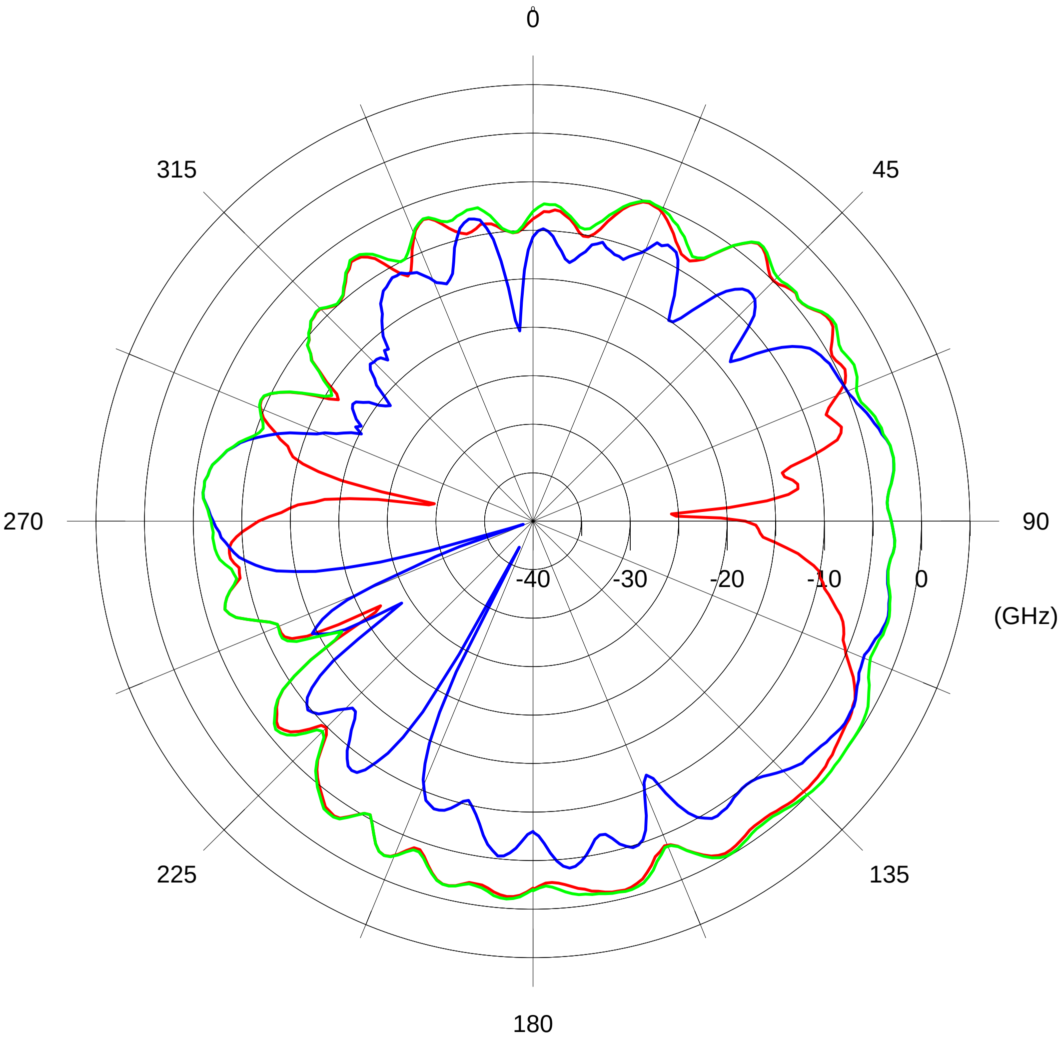


Average Gain And Peak Gain (On Azimuth Plane)

X-Y Plane

V Peak Gain (dBi)	*-2.14*
V Avg Gain (dBi)	*-7.66*
H Peak Gain (dBi)	*1.58*
H Avg Gain (dBi)	*-5.17*
Total Avg. Gain (dBi)	*-4.16*
Avg Peak Gain (dBi)	*1.64*

Aux antenna: 5150 MHz

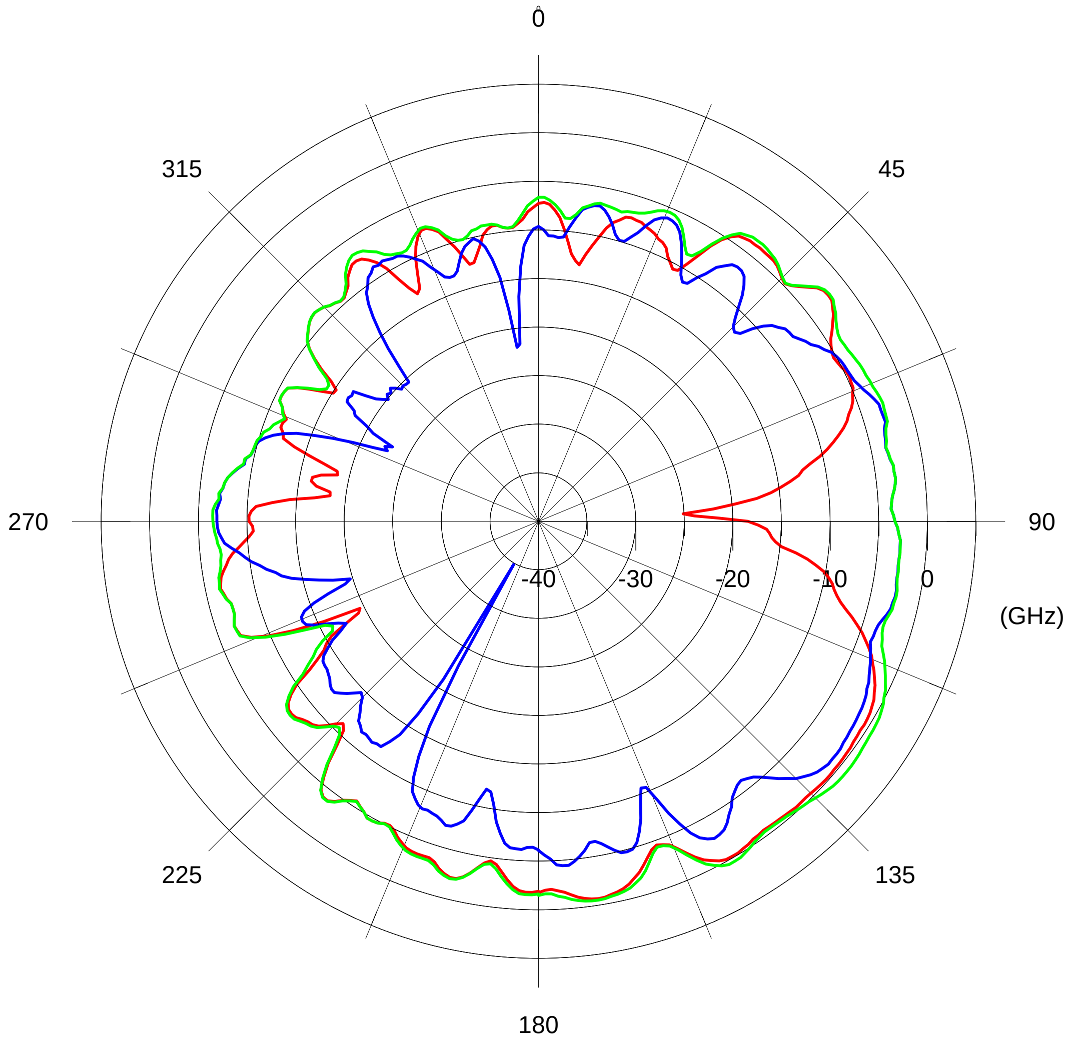


Average Gain And Peak Gain (On Azimuth Plane)

X-Y Plane

V Peak Gain (dBi)	***-1.72***
V Avg Gain (dBi)	***-7.03***
H Peak Gain (dBi)	***-0.43***
H Avg Gain (dBi)	***-5.26***
Total Avg. Gain (dBi)	***-4.06***
Avg Peak Gain (dBi)	***0.11***

Aux antenna: 5250 MHz

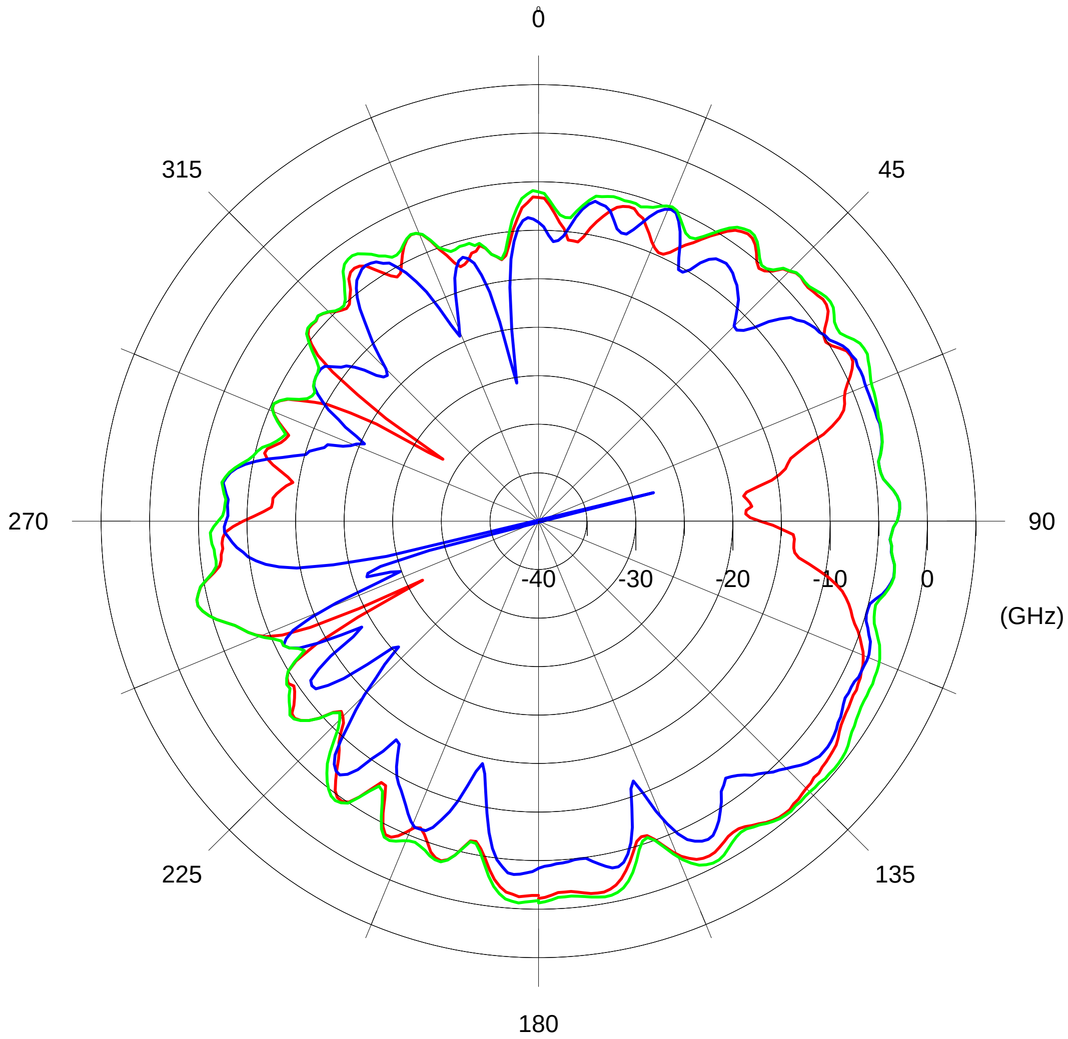


Average Gain And Peak Gain (On Azimuth Plane)

X-Y Plane

V Peak Gain (dBi)	***-1.08***
V Avg Gain (dBi)	***-6.68***
H Peak Gain (dBi)	***-0.15***
H Avg Gain (dBi)	***-5.19***
Total Avg. Gain (dBi)	***-3.96***
Avg Peak Gain (dBi)	***0.86***

Aux antenna: 5350 MHz

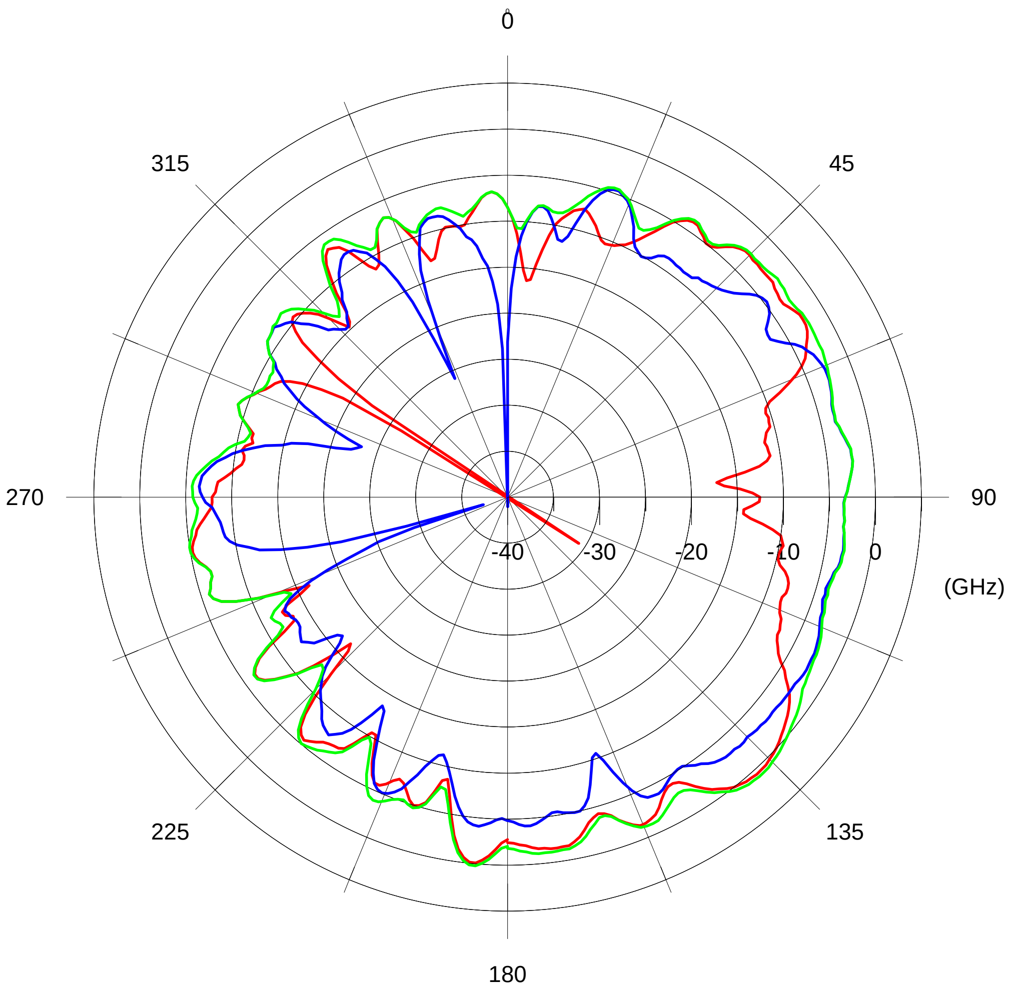


Average Gain And Peak Gain (On Azimuth Plane)

X-Y Plane

V Peak Gain (dBi)	***-2.22***
V Avg Gain (dBi)	***-6.78***
H Peak Gain (dBi)	***-0.60***
H Avg Gain (dBi)	***-5.63***
Total Avg. Gain (dBi)	***-4.32***
Avg Peak Gain (dBi)	***-0.29***

Main antenna: 5470 MHz

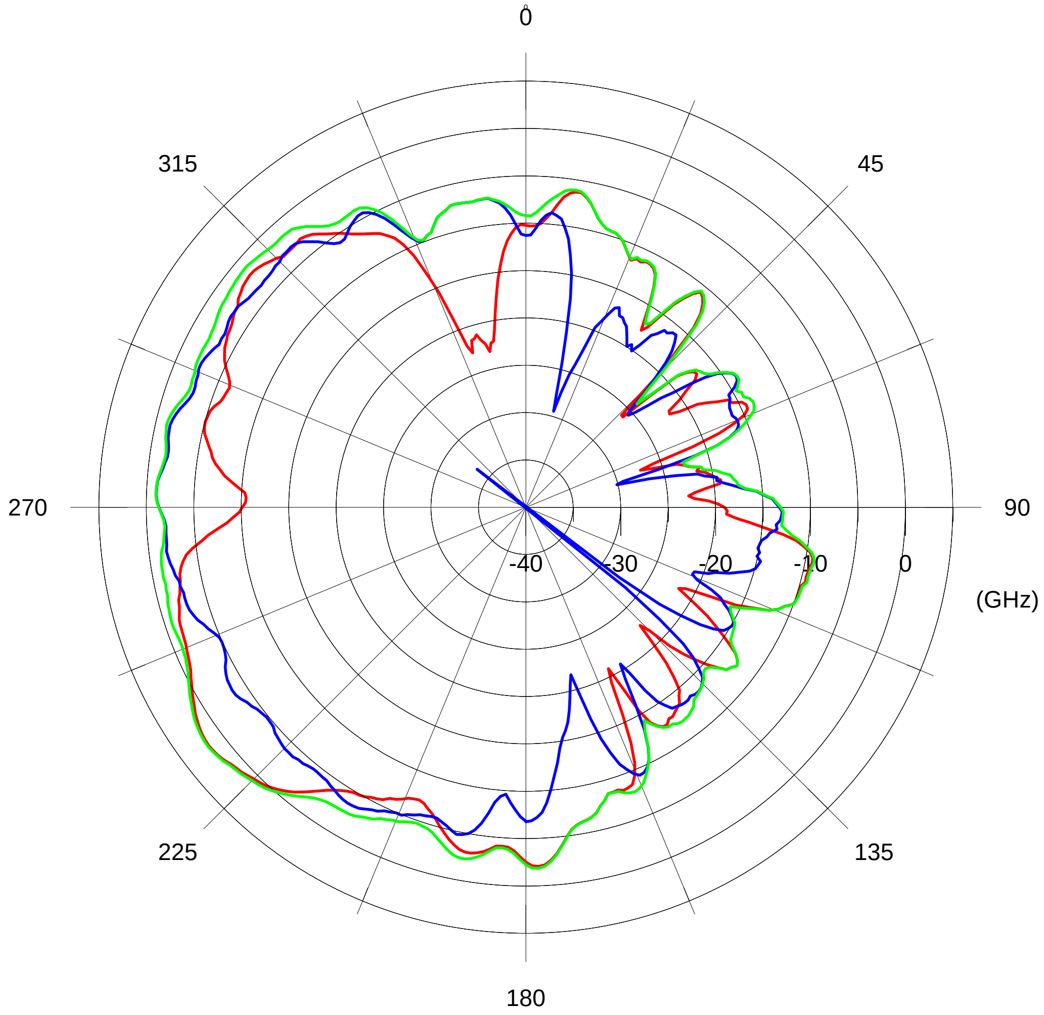


Average Gain And Peak Gain (On Azimuth Plane)

X-Y Plane

V Peak Gain (dBi)	***-1.22***
V Avg Gain (dBi)	***-6.72***
H Peak Gain (dBi)	***1.47***
H Avg Gain (dBi)	***-5.61***
Total Avg. Gain (dBi)	***-4.20***
Avg Peak Gain (dBi)	***1.57***

Main antenna: 5590 MHz

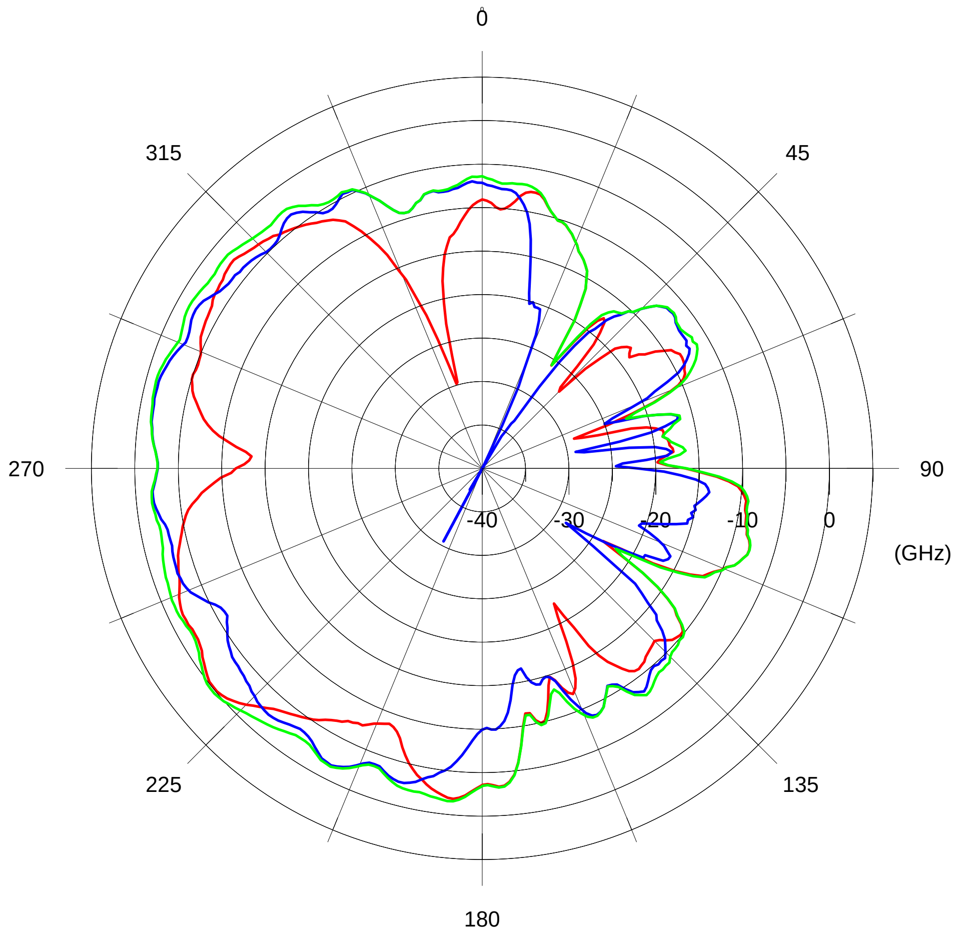


Average Gain And Peak Gain (On Azimuth Plane)

X-Y Plane

V Peak Gain (dBi)	*-1.00*
V Avg Gain (dBi)	*-6.63*
H Peak Gain (dBi)	*1.84*
H Avg Gain (dBi)	*-5.73*
Total Avg. Gain (dBi)	*-4.30*
Avg Peak Gain (dBi)	*1.96*

Main antenna: 5725 MHz

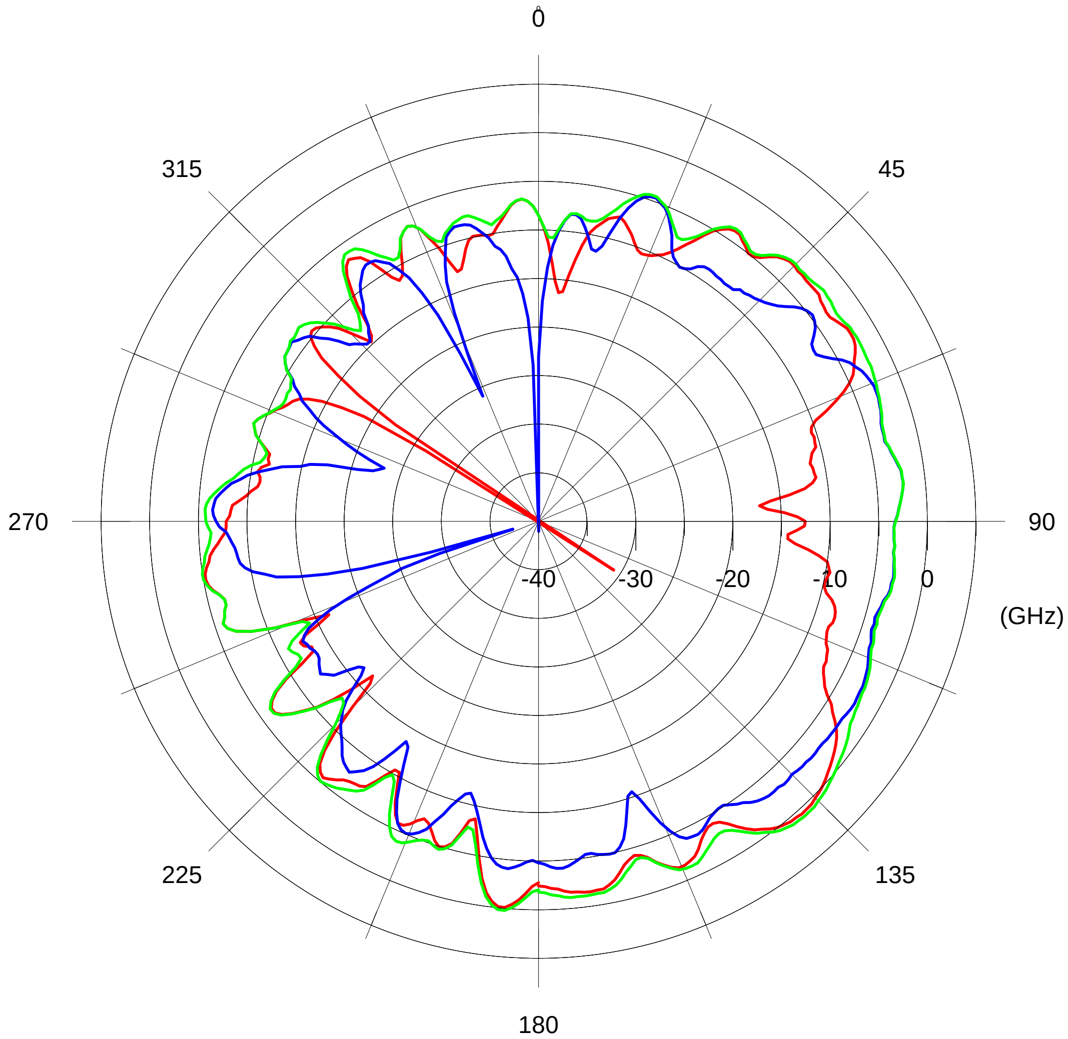


Average Gain And Peak Gain (On Azimuth Plane)

X-Y Plane

V Peak Gain (dBi)	*-1.40*
V Avg Gain (dBi)	*-6.22*
H Peak Gain (dBi)	*-0.12*
H Avg Gain (dBi)	*-6.81*
Total Avg. Gain (dBi)	*-4.67*
Avg Peak Gain (dBi)	*0.26*

Aux antenna: 5470 MHz

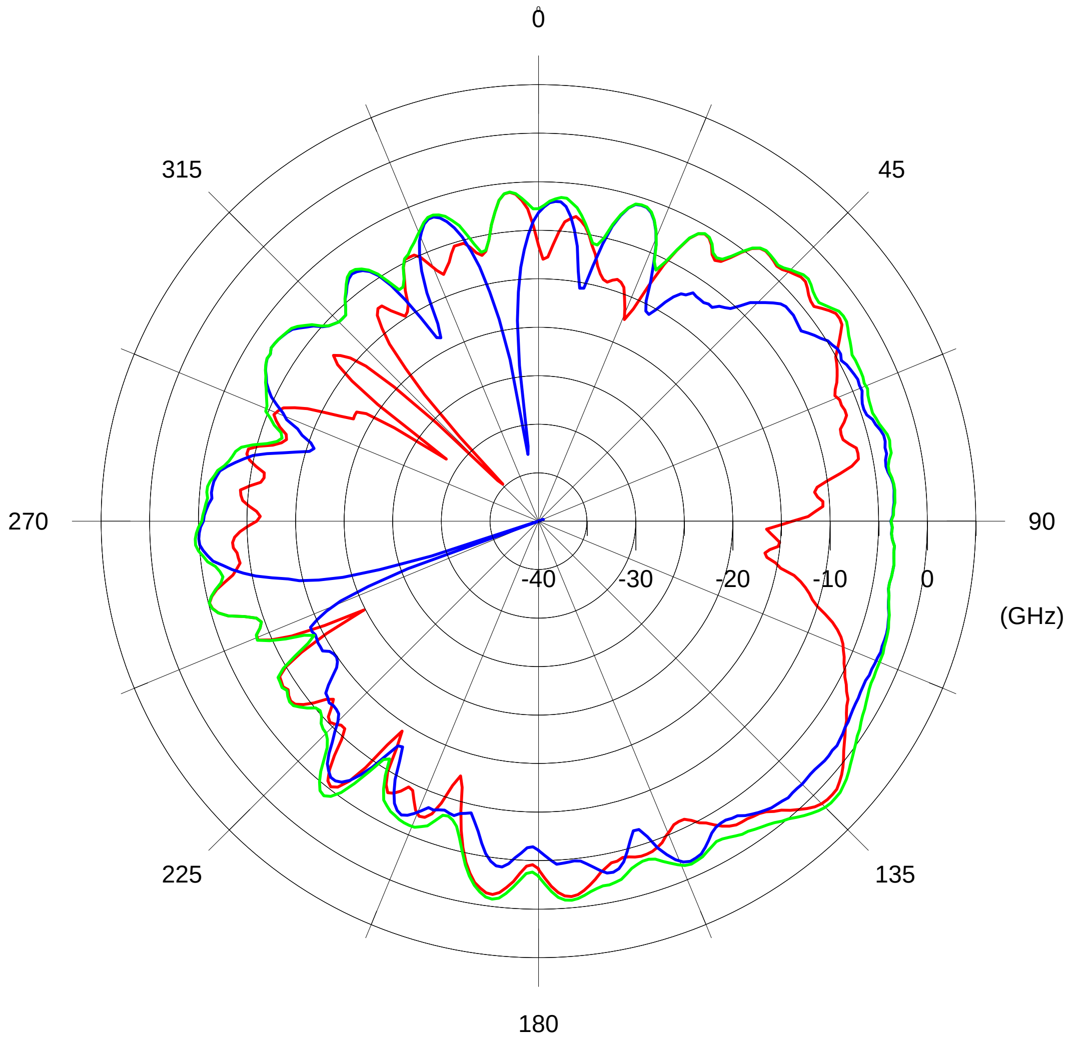


Average Gain And Peak Gain (On Azimuth Plane)

X-Y Plane

V Peak Gain (dBi)	***-2.27***
V Avg Gain (dBi)	***-6.49***
H Peak Gain (dBi)	***0.51***
H Avg Gain (dBi)	***-5.69***
Total Avg. Gain (dBi)	***-4.19***
Avg Peak Gain (dBi)	***0.88***

Aux antenna: 5590 MHz

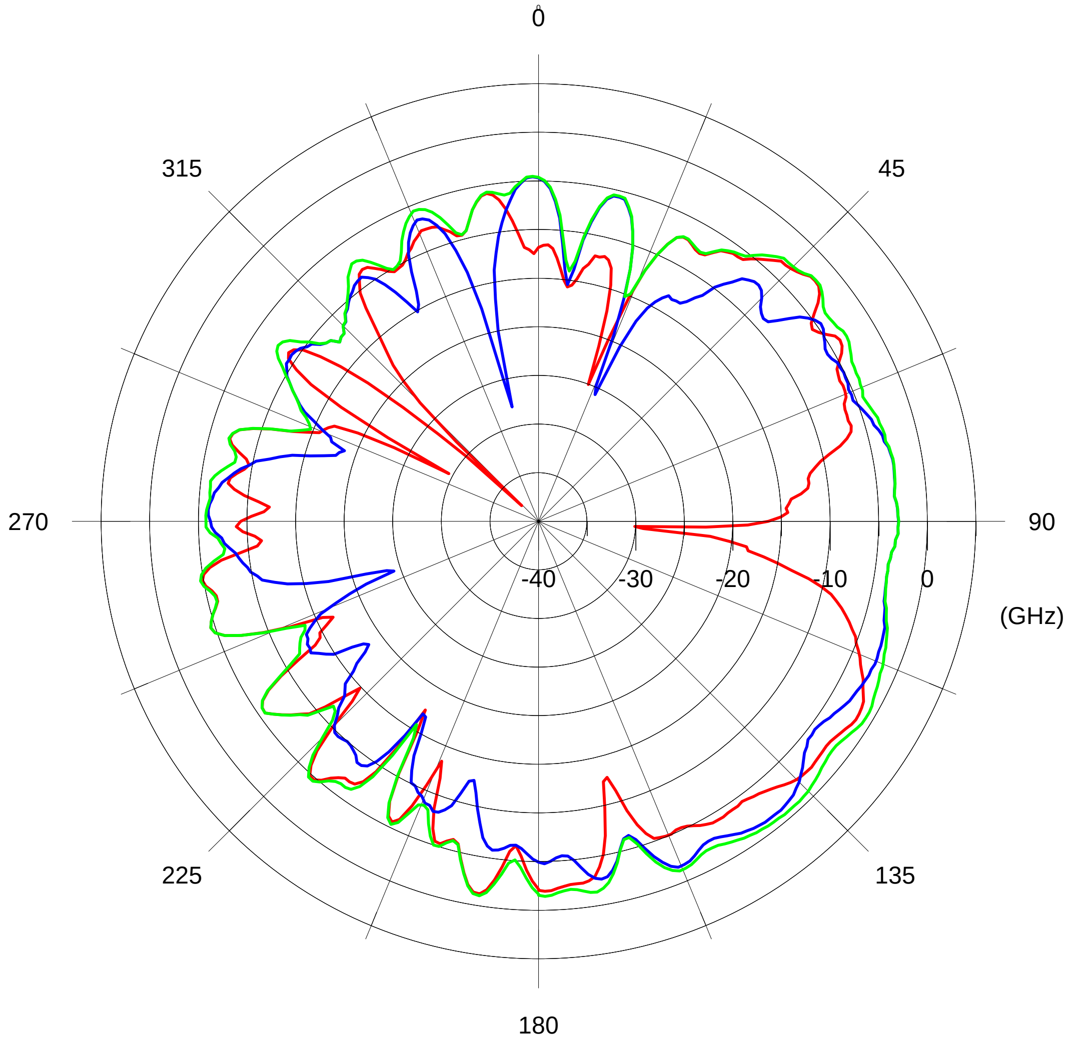


Average Gain And Peak Gain (On Azimuth Plane)

X-Y Plane

V Peak Gain (dBi)	***-1.55***
V Avg Gain (dBi)	***-5.98***
H Peak Gain (dBi)	***1.31***
H Avg Gain (dBi)	***-6.20***
Total Avg. Gain (dBi)	***-4.25***
Avg Peak Gain (dBi)	***1.80***

Aux antenna: 5725 MHz

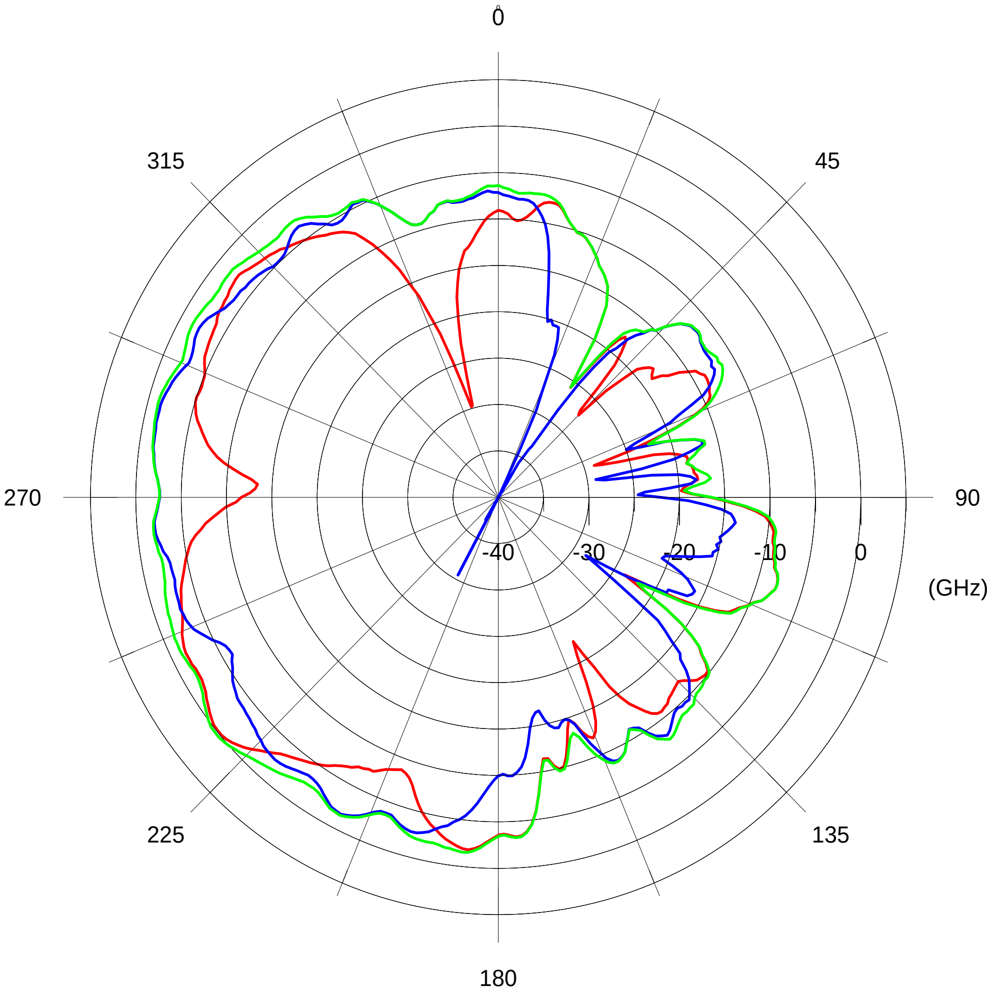


Average Gain And Peak Gain (On Azimuth Plane)

X-Y Plane

V Peak Gain (dBi)	***-1.22***
V Avg Gain (dBi)	***-6.27***
H Peak Gain (dBi)	***-1.23***
H Avg Gain (dBi)	***-6.53***
Total Avg. Gain (dBi)	***-4.52***
Avg Peak Gain (dBi)	***-0.64***

Main antenna: 5725 MHz

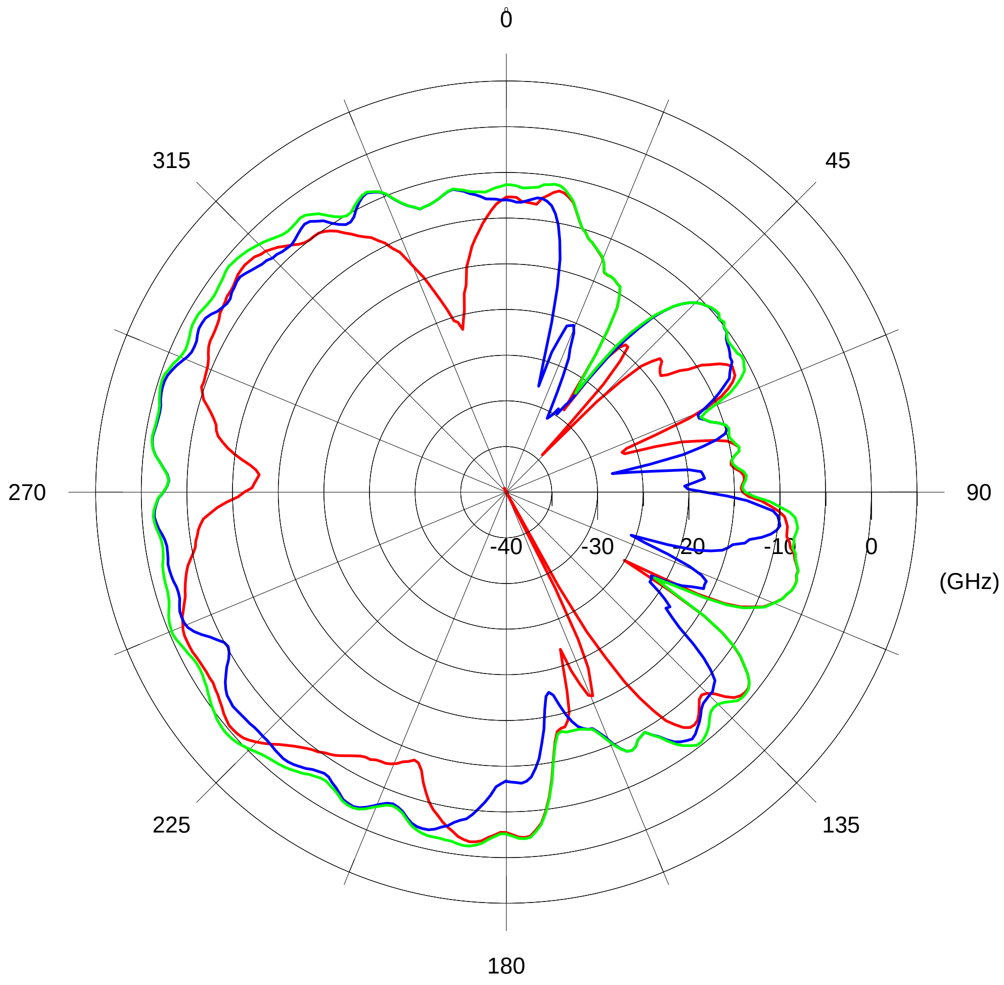


Average Gain And Peak Gain (On Azimuth Plane)

X-Y Plane

V Peak Gain (dBi)	***-1.40***
V Avg Gain (dBi)	***-6.22***
H Peak Gain (dBi)	***-0.12***
H Avg Gain (dBi)	***-6.81***
Total Avg. Gain (dBi)	***-4.67***
Avg Peak Gain (dBi)	***0.26***

Main antenna: 5785 MHz

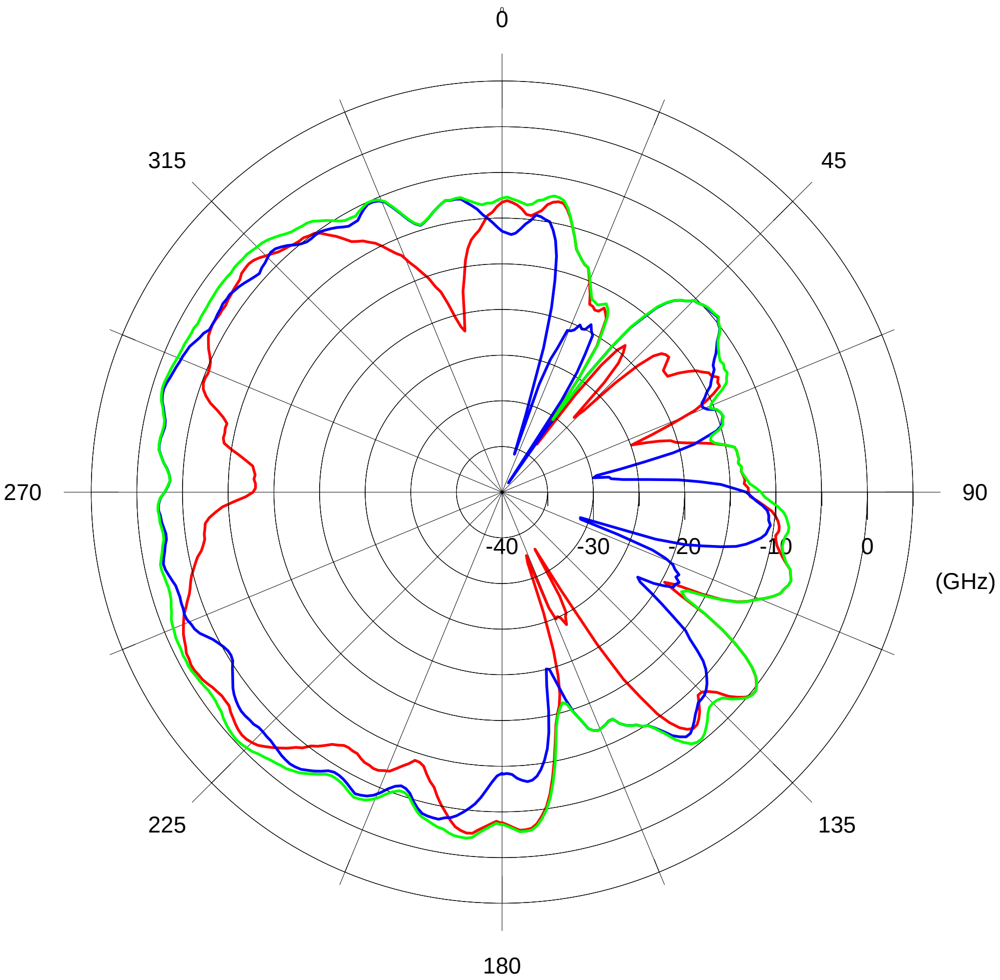


Average Gain And Peak Gain (On Azimuth Plane)

X-Y Plane

V Peak Gain (dBi)	*-0.61*
V Avg Gain (dBi)	*-5.47*
H Peak Gain (dBi)	*-0.33*
H Avg Gain (dBi)	*-6.41*
Total Avg. Gain (dBi)	*-4.09*
Avg Peak Gain (dBi)	*0.46*

Main antenna: 5850 MHz

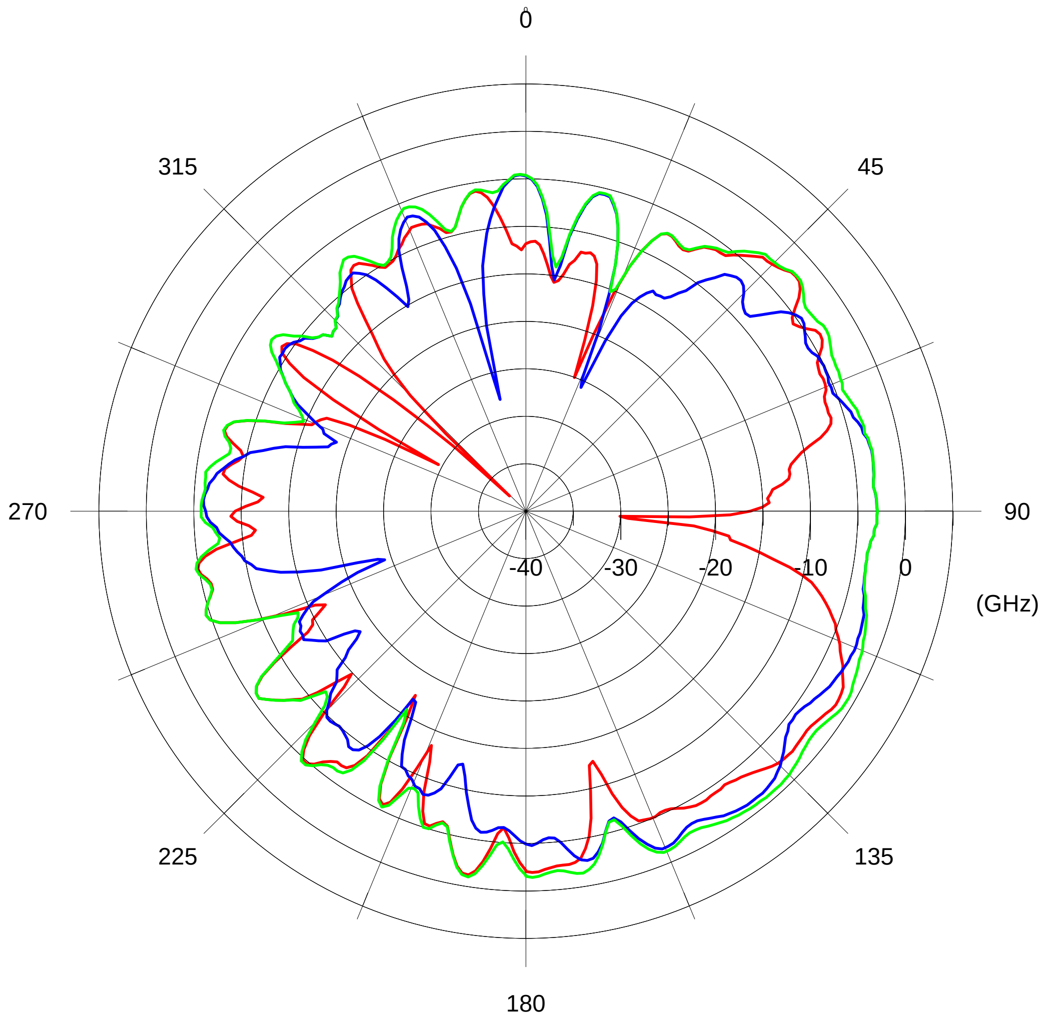


Average Gain And Peak Gain (On Azimuth Plane)

X-Y Plane

V Peak Gain (dBi)	***-1.25***
V Avg Gain (dBi)	***-6.29***
H Peak Gain (dBi)	***-1.03***
H Avg Gain (dBi)	***-6.92***
Total Avg. Gain (dBi)	***-4.77***
Avg Peak Gain (dBi)	***-0.24***

Aux antenna: 5725 MHz

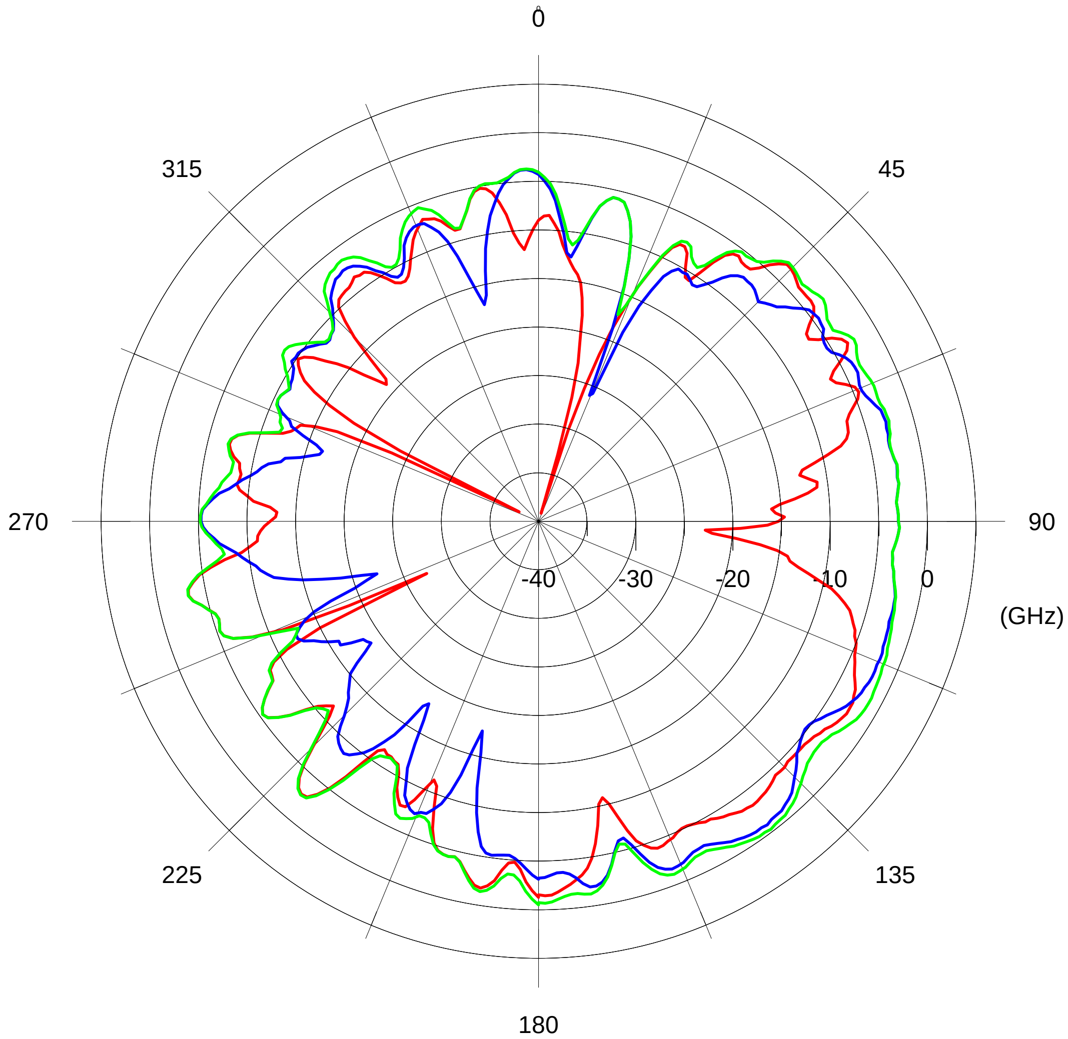


Average Gain And Peak Gain (On Azimuth Plane)

X-Y Plane

V Peak Gain (dBi)	*-1.22*
V Avg Gain (dBi)	*-6.27*
H Peak Gain (dBi)	*-1.23*
H Avg Gain (dBi)	*-6.53*
Total Avg. Gain (dBi)	*-4.52*
Avg Peak Gain (dBi)	*-0.64*

Aux antenna: 5785 MHz

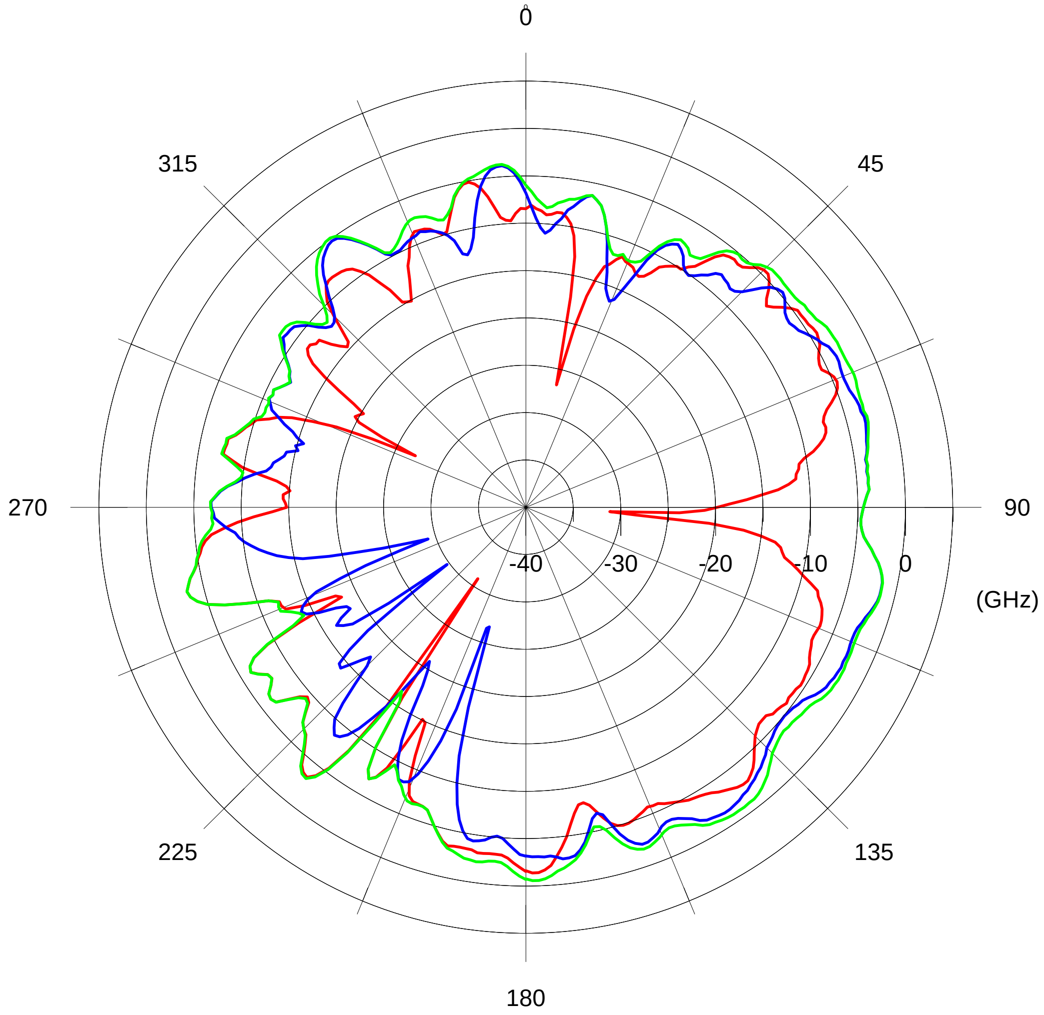


Average Gain And Peak Gain (On Azimuth Plane)

X-Y Plane

V Peak Gain (dBi)	***-0.88***
V Avg Gain (dBi)	***-5.80***
H Peak Gain (dBi)	***-1.29***
H Avg Gain (dBi)	***-6.60***
Total Avg. Gain (dBi)	***-4.31***
Avg Peak Gain (dBi)	***-0.29***

Aux antenna: 5850 MHz



Average Gain And Peak Gain (On Azimuth Plane)

X-Y Plane

V Peak Gain (dBi)	*-1.53*
V Avg Gain (dBi)	*-6.13*
H Peak Gain (dBi)	*-1.38*
H Avg Gain (dBi)	*-7.04*
Total Avg. Gain (dBi)	*-4.69*
Avg Peak Gain (dBi)	*-0.57*

Appendix

VSWR : *Voltage standing wave ratio on a transmission line in an antenna system. The ratio of the forward to reflected voltage on the line, and not a power ratio. A VSWR of 1:1 occurs when all parts of the antenna system are matched correctly.*

Return Loss : *When the load is mismatched, then, not all of the available power From the generator is delivered to the load. This 'loss 'is called Return loss (RL).*

Radiation pattern : *The radiation characteristics of an antenna as a function of spatial Coordinates. Normally, the pattern is measured in the far-field Region and is represented graphically.*

Polarization : *The sense of the wave radiated by an antenna. This can be horizontal, vertical, elliptical, or circular (left or right hand circularity), depending on the design and application. The polarization of the antenna is based on the orientation of the electric or E field component. The polarization must be matched between two antennas to receive the maximum field intensity. Dependent on the antenna type, it is possible to radiate linear, elliptical and circular polarizations.*

Gain value : *The increase in effective radiated power in the desired direction of the major lobe.*

Peak gain : *The highest gain value in 360 degrees, which means the antenna efficiency at this angle is the best.*

Cable loss : *When RF signal transmitting in the coaxial cable, due to the material of the cable, the power may dissipate into to the air in the form of heat. So when we try to measure the gain of an antenna, we have to offset the cable loss. The power loss of coaxial cable (Φ=1.13 mm) at 2.4~2.5 GHz is 3dB per 1000 mm and 5dB per 1000 mm at 5.15~5.35 GHz. In this case, the cable length of the main antenna is about 315, so the cable loss when RF signal transmitting at 2.4~2.5 GHz is about 2.30 dB. For the same reason , the cable length of the left antenna is about 175 mm , so the cable loss when RF signal transmitting at 2.4~2.5 GHz is about 1.70 dB. Which means we have to offset the cable loss to the gain value that we measure from the radiation pattern and that is the true antenna gain (G_a) we want.*