加利电子（无锡）有限公司

地址: 无锡高新技术产业开发区锡士路 1 号
电话: 86-510-88665500
传真: 86-510-88665511

零件承认书

SPECIFICATION FOR APPROVAL

P/N of **Galtronics**	P/N of **SerComm**
02102140-04149-1	**6172101PGN**
02102140-04149-2	**6172101QGN**
02102140-04149-3	**6172101RGN**

APPROVED BY	SIGNATURE	DATE
Engineering Department Manager		09-5-27
Mechanical Engineer		2009.5.27
RF Engineer		2009.5.27
Customer Approval		

目 录

REV NO.	DATE	DESCRIPTION
S1	09-02-02	Initial Draft
S2	09-03-26	Antenna gain updated
S3	09-03-28	Add Customer P/N on page 2 Update Page 8; 5.6.2 description : From Individual Antenna Peak Gain To Individual Antenna MAX Peak Gain; From Typical Peak Gain (dBi) To Typical MAX Peak Gain (dBi) . Update Page 9; 6.1 description :Add (Left Rear Antenna) behind 02102140-04149-1, (Right Front Antenna) behind 02102140-04149-2 and（Left Front Antenna）behind 02102140-04149-3
S4	09-04-27	5.6 Antenna gain updated

DISTRIBUTION LIST: 1. 2.	3.	
APPROVED BY	**SIGNATURE**	**DATE**
Engineering Department Manager		
Mechanical Engineer Gary Wannagot		
RF Engineer Marin Stoytchev		
Approved By Customer (as required):		

Design Specification

2.4 GHz and 5 GHz Compact Balanced Antennas For Linksys WAG320N Wireless N Router

Galtronics P/Ns:

02102140-04149-1
02102140-04149-2
02102140-04149-3

Sercomm P/Ns:

6172101PGN
6172101QGN
6172101RGN

ANTENNA SPECIFICATION

CONTENTS

1.0 PURPOSE AND SCOPE;

The purpose of this document is to establish a ***design*** specification for the antenna product that Galtronics is producing for Linksys. Any changes or additions to this specification can affect schedule and/or cost of the product and should be negotiated between Galtronics and Linksys before being incorporated into the specification. Upon agreement of this specification Galtronics will make no changes without written approval from Linksys. Any changes requested by Linksys will be given to Galtronics with sufficient time frame to evaluate the cost impact and react as required. The development of this product within Galtronics is conducted according to the Design Control Procedure SOP-006E.

2.0 RELATED DOCUMENTS:

SOP006E	Product Launch Procedure (Design Control)
EN006E	Reliability Guidelines
EIA-STD-556	Outer Shipping Container Bar Code Label Standard

3.0 ABBREVIATIONS AND DEFINITIONS

Ω	Ohm
°	Degree
°C	Celsius (degrees Centigrade)
cm	Centimetre
g	Grams
GHz	Gigahertz
Hz	Hertz
kg	Kilograms
MHz	Megahertz
M	Metre
mm	Millimetre
N	Newton
PCB	Printed Circuit Board
RH	Relative Humidity
W	Watt

Design Specification: A preliminary target specification to guide the design process.
Product Specification: A final specification for the qualified product.

4.0 DESCRIPTIONS AND PART NUMBER;

4.1 DESCRIPTION

These antennas are referred to as Galtronics' Compact Balanced Antennas. The patent-pending designs consist of single-piece high performance balanced antennas with coaxial cables. The cables are terminated with UFL-style connectors. Three antennas are installed per device. They will be denoted as Right Front antenna, Left Front antenna and Left Rear antenna. All three antennas are a dual-band single-feed design. The antennas have mounting features allowing for alignment and attachment to the plastic enclosure.

4.2 PART NUMBER

Galtronics P/N	Sercomm P/N	Frequency Band	Location in Wireless Router
02102140-04149-2	6172101QGN	2.4 - 2.5 GHz 5.15 - 5.825 GHz	Right Front
02102140-04149-3	6172101RGN	2.4 - 2.5 GHz 5.15 - 5.825 GHz	Left Front
02102140-04149-1	6172101PGN	2.4 - 2.5 GHz 5.15 - 5.825 GHz	Left Rear

5.0 ELECTRICAL SPECIFICATIONS

5.1 FREQUENCY BAND

Unlicensed ISM2400 Band: 2.4 – 2.5 GHz
Unlicensed ISM5400 Band: 5.15 – 5.825 GHz

5.2 IMPEDANCE - Nominal impedance: 50Ω

5.3 MATCHING REQUIREMENTS.

The compact balanced antennas do not require additional impedance matching circuitry.

5.4 VSWR REQUIREMENTS

5.4.1 VSWR Maximum

Maximum VSWR allowed is 2.0:1

5.4.2 TEST METHOD (ENGINEERING)

The antenna is tested while mounted in the wireless router. The router is positioned in free space. (Free space means the device is placed on a non-conductive surface away from any conductive objects.)

5.4.3 TEST METHOD (PRODUCTION)

In mass production it is not practical to use the device supplied by customer. Galtronics will designate reference antennas that meet VSWR requirements when installed in the wireless router. The reference antennas will then be measured in free space on production test equipment. Production antennas will be measured on the same production test equipment, and are thereby correlated to the reference antennas.

5.5 EFFICIENCY

5.5.1 MINIMUM VALUES OF ANTENNA EFFICIENCY

The efficiency of the antennas shall be a minimum of 60%.

5.5.2 TEST METHOD (ENGINEERING)

The antennas are tested while mounted inside the wireless router. The router is then tested in an anechoic chamber in free space. The efficiency of each antenna is measured at a minimum of three frequency points across the band of interest. The antennas shall meet the minimum efficiency requirements.

5.6 ANTENNA GAIN VALUES

5.6.1 MINIMUM PEAK AND AVERAGE GAIN VALUES

The antennas shall meet the following minimum peak and average gain values:

	Azimuth Cut					
	Right Front Antenna		Left Front Antenna		Left Rear Antenna	
Frequency (GHz)	Power Sum Peak (dBi)	Power Sum Avg (dBi)	Power Sum Peak (dBi)	Power Sum Avg (dBi)	Power Sum Peak (dBi)	Power Sum Avg (dBi)
2.4	2.0	-3.0	3.0	-3.0	-0.5	-1.5
2.45	2.5	-2.5	3.0	-3.0	0.0	-1.0
2.5	3.0	-2.5	3.0	-3.0	0.0	-1.0

	Elevation Cut 1 (Front to Back)					
	Right Front Antenna		Left Front Antenna		Left Rear Antenna	
Frequency (GHz)	Power Sum Peak (dBi)	Power Sum Avg (dBi)	Power Sum Peak (dBi)	Power Sum Avg (dBi)	Power Sum Peak (dBi)	Power Sum Avg (dBi)
2.4	0.5	-3.5	1.0	-2.5	0.0	-3.5
2.45	0.5	-3.0	1.0	-2.5	0.5	-3.0
2.5	0.5	-3.0	1.0	-2.5	0.5	-3.0

	Elevation Cut 2 (Side to Side)					
	Right Front Antenna		Left Front Antenna		Left Rear Antenna	
Frequency (GHz)	Power Sum Peak (dBi)	Power Sum Avg (dBi)	Power Sum Peak (dBi)	Power Sum Avg (dBi)	Power Sum Peak (dBi)	Power Sum Avg (dBi)
2.4	2.0	-1.0	3.0	-0.5	0.0	-3.5
2.45	2.5	-1.0	3.0	0.0	0.5	-3.5
2.5	3.0	-1.0	3.0	0.5	0.5	-3.5

	Azimuth Cut					
	Right Front Antenna		Left Front Antenna		Left Rear Antenna	
Frequency (GHz)	Power Sum Peak (dBi)	Power Sum Avg (dBi)	Power Sum Peak (dBi)	Power Sum Avg (dBi)	Power Sum Peak (dBi)	Power Sum Avg (dBi)
5.150	2.5	-3.0	3.5	-2.0	2.0	-0.5
5.250	3.0	-2.5	3.5	-2.0	2.0	-0.5
5.350	3.0	-2.5	3.5	-2.0	2.0	-0.5
5.725	1.5	-3.5	2.0	-3.0	2.5	-0.5
5.825	1.5	-3.5	2.0	-3.0	2.5	-0.5

	Elevation Cut 1 (Front to Back)					
	Right Front Antenna		Left Front Antenna		Left Rear Antenna	
Frequency (GHz)	Power Sum Peak (dBi)	Power Sum Avg (dBi)	Power Sum Peak (dBi)	Power Sum Avg (dBi)	Power Sum Peak (dBi)	Power Sum Avg (dBi)
5.150	-1.5	-5.0	0.5	-4.5	0.0	-3.5
5.250	-0.5	-4.0	1.5	-3.5	0.0	-3.5
5.350	0.0	-4.0	2.0	-3.0	0.5	-3.0
5.725	0.5	-3.5	1.0	-2.5	2.0	-2.5
5.825	0.5	-3.5	1.0	-2.5	2.0	-2.5

	Elevation Cut 2 (Side to Side)					
	Right Front Antenna		Left Front Antenna		Left Rear Antenna	
Frequency (GHz)	Power Sum Peak (dBi)	Power Sum Avg (dBi)	Power Sum Peak (dBi)	Power Sum Avg (dBi)	Power Sum Peak (dBi)	Power Sum Avg (dBi)
5.150	2.0	-2.0	3.5	-0.5	1.5	-2.0
5.250	2.5	-1.0	3.5	0.0	1.5	-2.0
5.350	2.5	-1.0	3.5	0.0	2.0	-2.0
5.725	1.5	-1.5	2.5	-0.5	2.0	-2.5
5.825	1.5	-1.5	2.5	-0.5	2.0	-2.5

5.6.2 INDIVIDUAL ANTENNA MAX PEAK GAIN

The peak gain of individual antennas is as follows:

Frequency Band (MHz)	Typical MAX Peak Gain (dBi)
2400 - 2500	
Peak Gain Right Front Antenna	4.0
Peak Gain Left Front Antenna	4.5
Peak Gain Left Rear Antenna	2.0
5150 - 5250	
Peak Gain Right Front Antenna	4.0
Peak Gain Left Front Antenna	4.6
Peak Gain Left Rear Antenna	3.6
5250 - 5350	
Peak Gain Right Front Antenna	4.0
Peak Gain Left Front Antenna	4.5
Peak Gain Left Rear Antenna	3.6
5725 - 5825	
Peak Gain Right Front Antenna	3.2
Peak Gain Left Front Antenna	4.6
Peak Gain Left Rear Antenna	4.6

5.6.3 TEST METHOD (ENGINEERING)

The wireless router with antennas installed is mounted in an anechoic chamber in free space.

The peak and average gain values are recorded for each antenna at the frequencies indicated.

The transmit composite gain is defined as the sum of the gain values of the TX antennas at each θ,ϕ-point in 3-D space. The maximum value of the resulting 3-D gain pattern provides the transmit composite peak gain.

6.0 MECHANICAL SPECIFICATIONS;

6.1 MECHANICAL CONFIGURATION

The appearances of the antennas are in accordance with drawings 02102140-04149-1(Left Rear Antenna), 02102140-04149-2(Right Front Antenna) and 02102140-04149-3（Left Front Antenna）.

6.2 CABLE PULL TEST

The antenna cable and solder joint shall withstand a 3 N axial pull force. The antenna element is fixed in an appropriate fixture and a 3 N axial force is slowly applied. The force is maintained for 10 seconds. There shall be no permanent damage to the antenna after the test.

7.0 ENVIRONMENTAL SPECIFICATIONS

7.1 OPERATING TEMPERATURE

Operating temperature range shall be 0° C to +60° C.

7.2 OPERATING HUMIDITY

Operating humidity range shall be 10% to 85%, non-condensing.

7.3 STORAGE TEMPERATURE

Storage temperature range shall be -20° C to +60° C.

7.2 STORAGE HUMIDITY

Storage humidity range shall be 5% to 90%, non-condensing.

8.0 QUALIFICATION

The mechanical and environmental tests mentioned above are performed according to the flow chart shown in Figure 1 below. The entire testing procedure will be conducted according to EN006E.

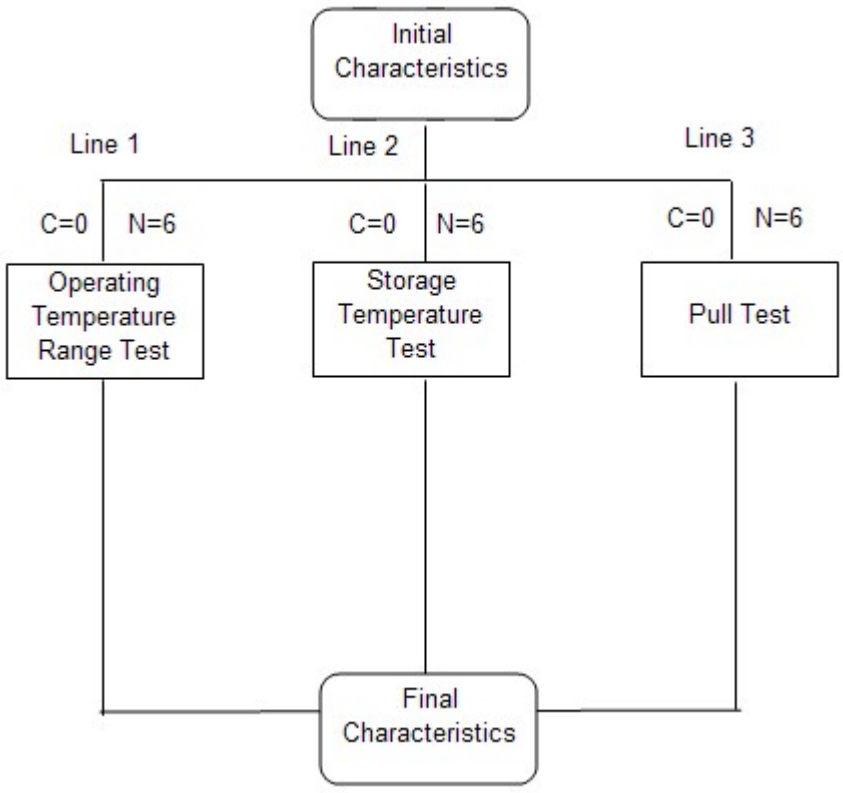

Figure 1. Property Verification Test Flow Chart

Note: n - sample size; c - allowable amount of critical failures

9.0 PACKAGING

02102140-04149-1will be packed by tray, 90 pcs antennas in one tray and 2340 pcs in one box.
02102140-04149-2will be packed by tray, 40 pcs antennas in one tray and 960 pcs in one box.
02102140-04149-3will be packed by tray, 72 pcs antennas in one tray and 1728 pcs in one box.

DWG No
02102140-04149-1

GALTRONICS

DRAWING COVER SHEET

REV	DATE	ECO #	DESCRIPTION
S1	2009-02-06		First Release
S2	2009-04-08		(B5)75.00±4.00 was 38.00±3.00

APPLICABLE SPEC'S:

INTERNAL DISTRIBUTION

- ☐ PROCESS
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- ☐ PRODUCTION
- ☐ PLASTICS
- ☐ QUALITY
- ☐ INCOMING INSPECTION
- ☐ FINAL INSPECTION
- ☐ MARKETING

SURFACE FINISH, MICROMETERS, CLA (UNLESS STATED) 0.8
TOLERANCES UNLESS OTHERWISE SPECIFIED:
NO PLACE (X)±1 TWO PLACE (X.XX)±0.1
ONE PLACE (X.X)±0.2 THREE PLACE (X.XXX)±0.05

METRIC SCREW THREAD TO ISO STANDARDS 724, 2861, 965-1 AND 965-2 INCHES SCREW THREAD TO ANSI/ASME B1.1. ALL ANGLES TO BE 90° UNLESS OTHERWISE STATED. TOLERANCE ON ANGLES ±1/4°. ALL TOLERANCES APPLY AFTER FINISHING. MACHINE CORNER RADS. 0.25 MAX., TO BE FREE FROM BURRS, SHARP EDGES AND ALL FOREIGN MATERIALS. FLASH ALLOWANCE FOR PLASTIC MOLDED PARTS TO BE 0.1mm UNLESS OTHERWISE STATED. DIAMETER MUST BE CONCENTRIC WITHIN 0.08 T.I.R. ENVIRONMENTAL REQUIREMENTS: COMPLIANCE WITH GALTRONICS STANDARD "SUPPLIER ENVIRONMENTAL DECLARATION PROCEDURE" (SOPG002E).

QUALITY ASSURANCE NOTES:

NO CHANGE SHALL BE ALLOWED ON PRODUCTION. MATERIAL WITHOUT PRIOR EXPLICIT WRITTEN APPROVAL BY GALTRONICS ENGINEERING AND PURCHASING DEPARTMENTS FOR SPECIAL REQUIREMENTS SEE FM149

☒ XR PROCESS CONTROL CHART REQUIRED WITH EACH SHIPMENT

☐ CRITICAL DIMENSION AFFECTS FORM FIT OR FUNCTION

SUFFIX#	DESCRIPTION

MATERIAL: SEE Page2.

FINISH: SEE Page2.

TITLE: VERTICAL ANTENNA DUAL .2.5-5.0 GHz

CHKD: [signature] 2009-4-8

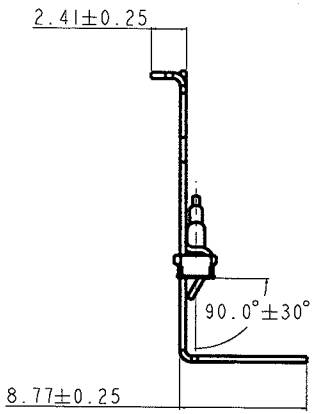
APRVD: [signature]

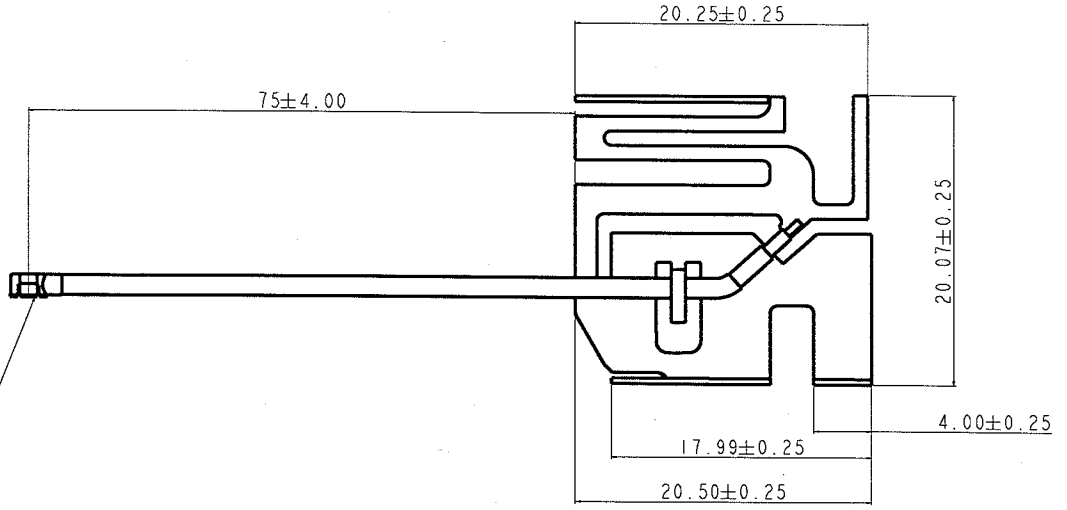
DATE: 2009-4-8

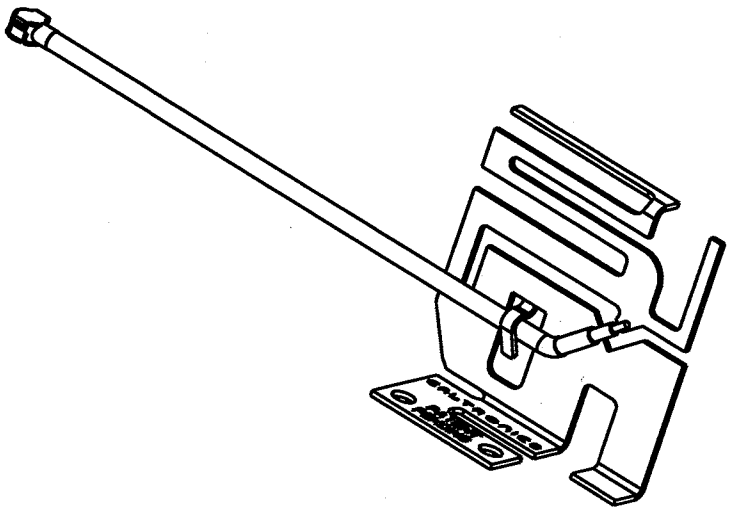
DWG. No. 02102140-04149-1

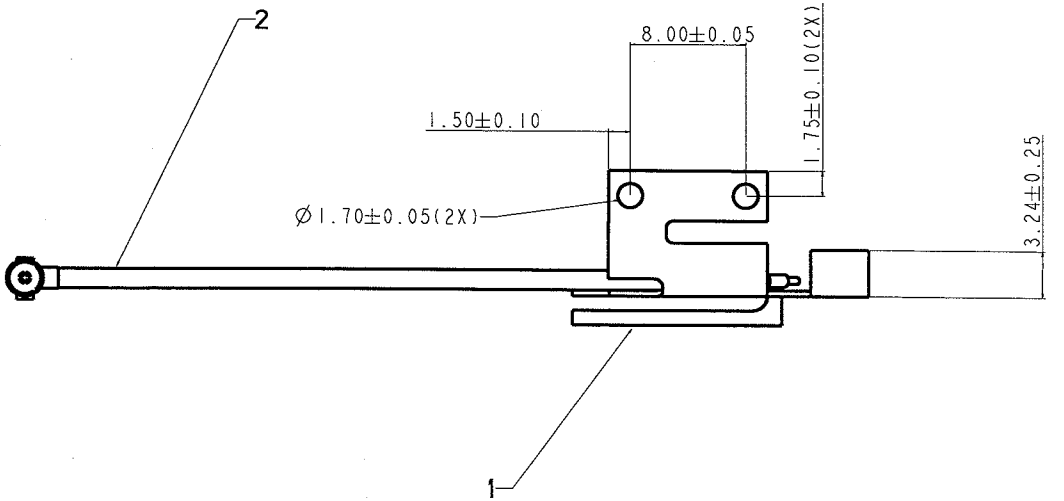
REV. S2

Antenna Type: PIFA









NO.	DESCRIPTION	MATERIAL	FINISH
2	CABLE COAX WITH I-PEX CONNECTOR	Ø1.37 COAX CABLE, COLOR BLACK 92mm OVERALL LENGTH	
1	ELECTRICAL ELEMENT	STAINLESS STEEL SS304 1/2 HARD THICKNESS 0.4MM	NICKEL PRE-PLATING

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ENGINEER		CHECKED	
DRAWN	Robert	APPROVED	
DATE	2-09-08	DATE	09-7-8

VERTICAL ANTENNA
DUAL .2.5-5.0 GHz

DWG. NO.: 02102140-04149-1
A1
S2

DWG No
02102140-04149-2

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DRAWING COVER SHEET

REV	DATE	ECO #	DESCRIPTION
S1	2009-02-06		First Release
S2	2009-05-27		D5 200±4 was 185.00±4.00

APPLICABLE SPEC'S:

INTERNAL DISTRIBUTION

- ☐ PROCESS
- ☐ PURCHASING
- ☐ PRODUCTION
- ☐ PLASTICS
- ☐ QUALITY
- ☐ INCOMING INSPECTION
- ☐ FINAL INSPECTION
- ☐ MARKETING

SURFACE FINISH, MICROMETERS, CLA (UNLESS STATED) 0.8

TOLERANCES UNLESS OTHERWISE SPECIFIED:

NO PLACE	(X)±1	TWO PLACE	(X.XX)±0.1
ONE PLACE	(X.X)±0.2	THREE PLACE	(X.XXX)±0.05

METRIC SCREW THREAD TO ISO STANDARDS 724, 2861, 965-1 AND 965-2 INCHES SCREW THREAD TO ANSI/ASME B1.1. ALL ANGLES TO BE 90° UNLESS OTHERWISE STATED. TOLERANCE ON ANGLES ±1/4°. ALL TOLERANCES APPLY AFTER FINISHING. MACHINE CORNER RADS, 0.25 MAX., TO BE FREE FROM BURRS, SHARP EDGES AND ALL FOREIGN MATERIALS. FLASH ALLOWANCE FOR PLASTIC MOLDED PARTS TO BE 0.1mm UNLESS OTHERWISE STATED. DIAMETER MUST BE CONCENTRIC WITHIN 0.08 T.I.R. ENVIRONMENTAL REQUIREMENTS: COMPLIANCE WITH GALTRONICS STANDARD "SUPPLIER ENVIRONMENTAL DECLARATION PROCEDURE" (SOPG002E).

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- ☒ XR PROCESS CONTROL CHART REQUIRED WITH EACH SHIPMENT
- ☐ CRITICAL DIMENSION AFFECTS FORM FIT OR FUNCTION

SUFFIX#	DESCRIPTION

MATERIAL: See Page2

FINISH: See Page2

TITLE:

ANTENNA,HORIZONTAL DUAL 2.5-5.0GHz

CHKD: Mark 2009-5-27

APRVD:

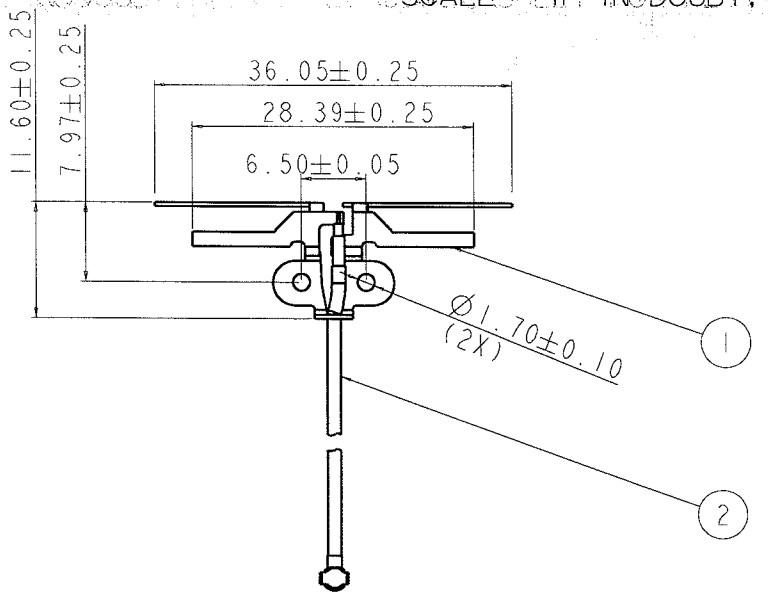
DATE: 09-5-27

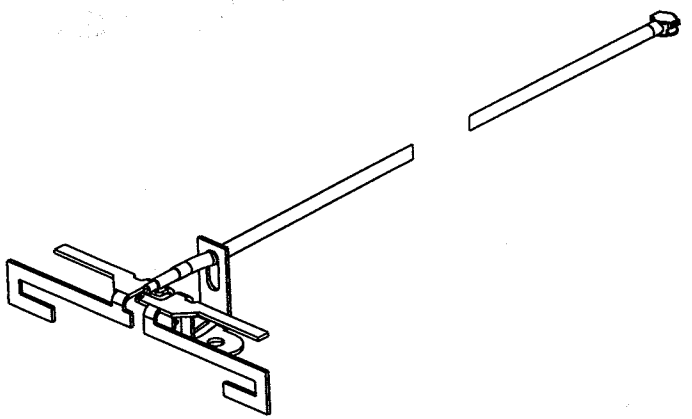
DWG. No. **02102140-04149-2**

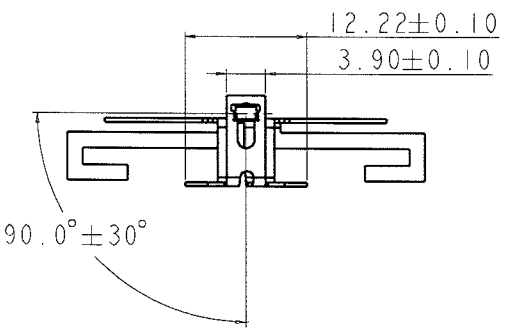
REV. S2

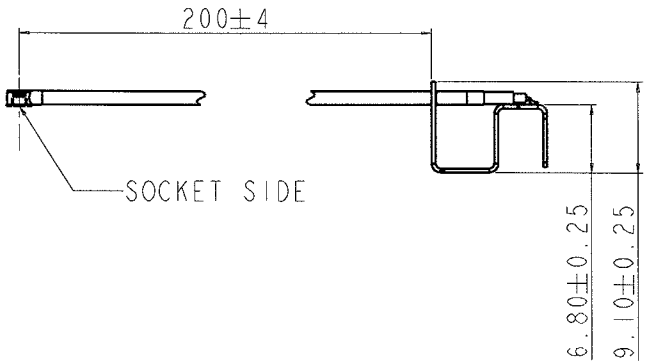
DWG. NO.: A3
02102140-04149-2

ALL DIMENSIONS IN MILLIMETERS UNLESS OTHERWISE STATED. DO NOT SCALE. IF IN DOUBT, ASK!! SEE COVER SHEET FOR PERTINENT INFORMATION









NO	DESCRIPTION	MATERIAL	FINISH
2	CABLE, COAX W/ IPEX CONNECTOR	Ø1.37 O.D., COLOR BLACK, 211 MM OVERALL LENGTH	
1	ELECTRICAL ELEMENT	STAINLESS STEEL SS304 THICKNESS 0.4 mm	NICKEL PLATING

CAD FILE: 02102140-04149-2

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ENGINEER	Gary	CHECKED	
DRAWN	Robert	APPVD.	
DATE	2009.5.2	DATE	09-5-27

ANTENNA, HORIZONTAL

DUAL 2.5 - 5.0 GHz

DWG. NO.: A3 **02102140-04149-2**

REV. S2

DWG No
02102140-04149-3

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DRAWING COVER SHEET

REV	DATE	ECO#	DESCRIPTION
S1	2009.2.6		FIRST RELEASE

APPLICABLE SPEC'S:

SURFACE FINISH, MICROMETERS, CLA (UNLESS STADED) 0.8

TOLERANCES UNLESS OTHERWISE SPECIFIED:
NO PLACE (X)? TWO PLACE (X.XX)?.1
ONE PLACE (X.X)?.2 THREE PLACE (X.XXX)?.05

INTERNAL DISTRIBUTION

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METRIC SCREW THREAD TO ISO STANDARDS 724, 2861, 965-1 AND 965-2 INCHES SCREW THREAD TO ANSI/ASME B1.1. ALL ANGLES TO BE 90?UNLESS OTHERWISE STATED: TOLERANCE ON ANGLES ?/4? ALL TOLERANCES APPLY AFTER FINISHING. MACHINE CORNER RADS, 0.25 MAX., TO BE FREE FROM BURRS , SHARP EDGES AND ALL FOREIGN MATERIALS. FLASH ALLOWANCE FOR PLASTIC MOLDED PARTS TO BE 0.1mm UNLESS OTHERWISE STATED. DIAMETER MUST BE CONCENTRIC WITHIN 0.08 T.I.R..ENVIRONMENTAL REQUIREMENT:COMPLIANCE WITH GALTRONICS STANDARD' SUPPLIER ENVIRONMENTAL DECLARATION PROCEDURE"(SOP002E)

QUALITY ASSURANCE NOTES:

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- ☒ XR PROCESS CONTROL CHART REQUIRED WITH EACH SHIPMENT)
- ☐ CRITICAL DIMENSION AFFECTS FORM FIT OR FUNCTION

MATERIAL

FINISH

TITLE:

ANTENNA, HORIZONTAL

DUAL 2.5 - 5.0 GHz

CHKD: Mark 2-6

APRVD: Quarte

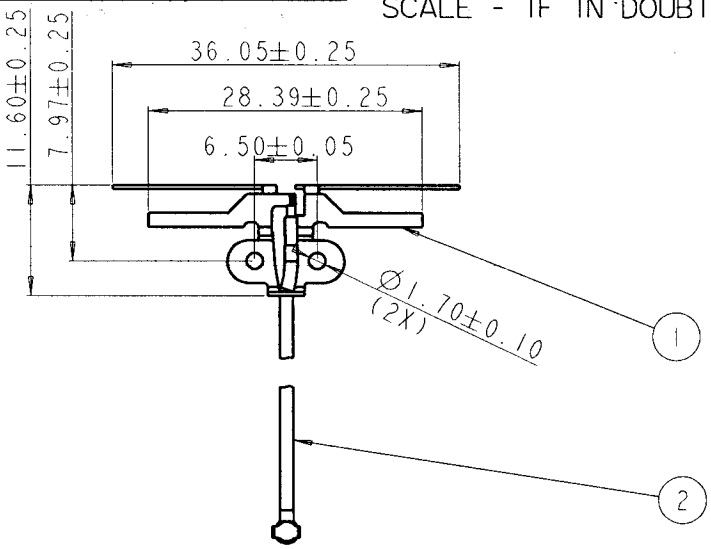
DATE: 2009-2-6

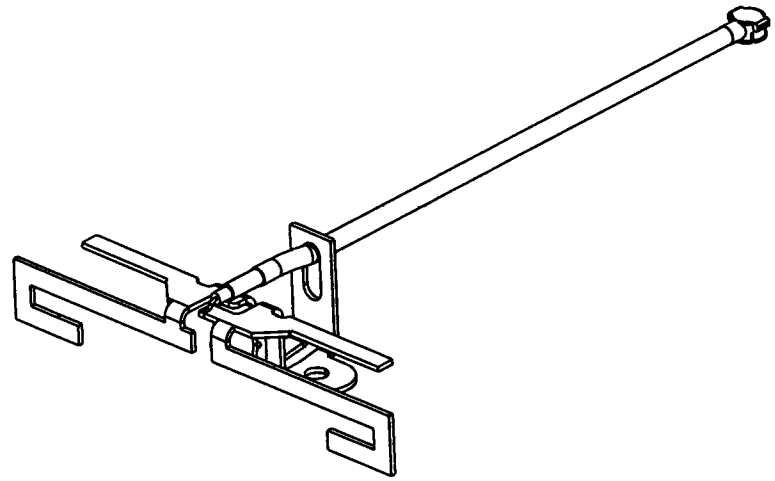
DWG. No.
02102140-04149-3

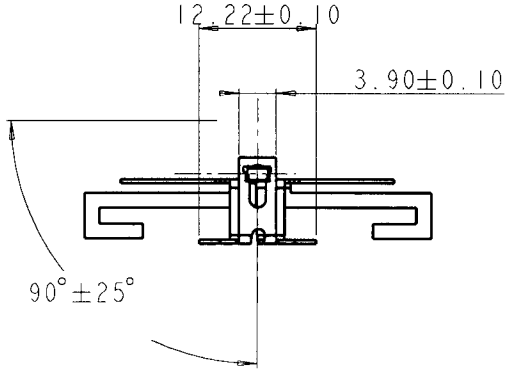
REV. **S1**

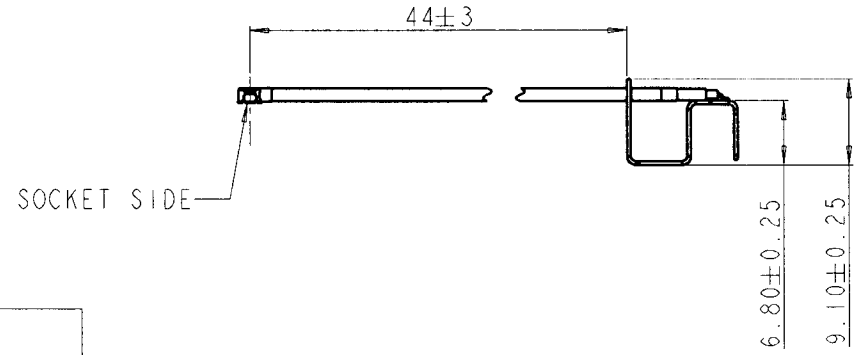
DWG. NO.: A3
02102140-04149-3

ALL DIMENSIONS IN MILLIMETERS UNLESS OTHERWISE STATED. DO NOT SCALE - IF IN DOUBT, ASK!! SEE COVER SHEET FOR PERTINENT INFORMATION









NO	DESCRIPTION	MATERIAL	FINISH
2	CABLE, COAX W/ IPEX CONNECTOR	Ø1.37 O.D., COLOR BLACK, 55MM OVERALL LENGTH	
1	ELECTRICAL ELEMENT	STAINLESS STEEL SS304 THICKNESS 0.4 mm	NICKEL PLATING

CAD FILE: 02102140-04149-3

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ENGINEER	Gary	CHECKED		2.6 ANTENNA, HORIZONTAL	DWG. NO.: A3
DRAWN	Robert	APPVD.		DUAL 2.5 - 5.0 GHz	02102140-04149-3
DATE	2009.2.6	DATE	09-2-6		REV. S1

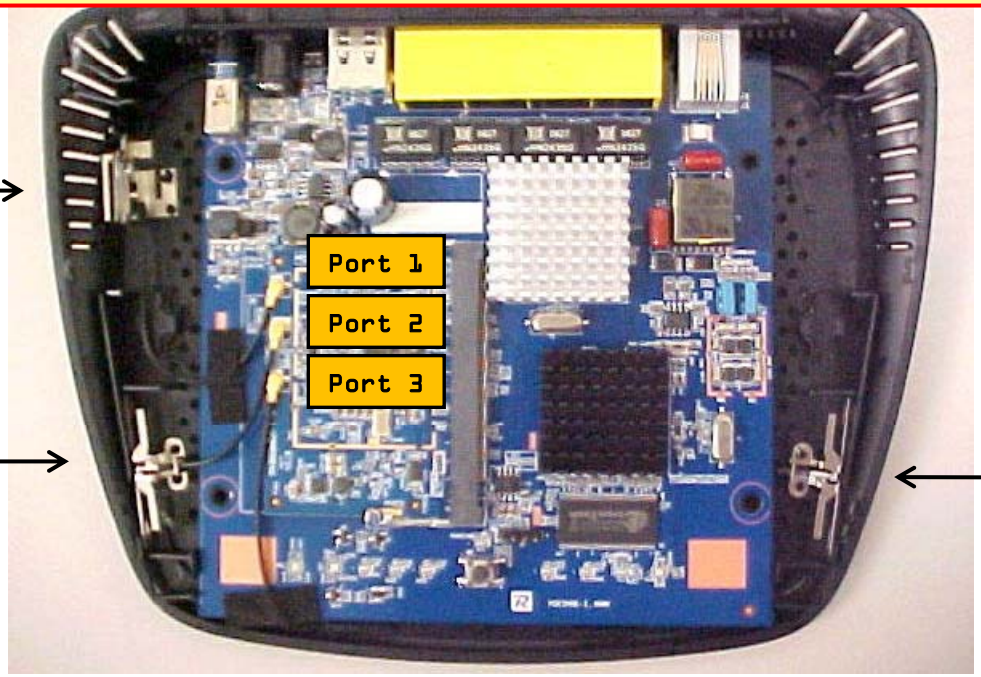
Linksys Wireless N-Router WAG320N
Antenna Performance Report

Galtronics Project # 4149

Prepared by Marin Stoytchev
April 25, 2009

Galtronics Antenna Solution for WAG320N

Galtronics Proprietary Antenna Design - Patent Pending



- Galtronics solution provides three dual-band antennas denoted as **Right Front**, **Left Front** and **Left Rear** antennas
- Antennas are tested in final product (shown in picture)

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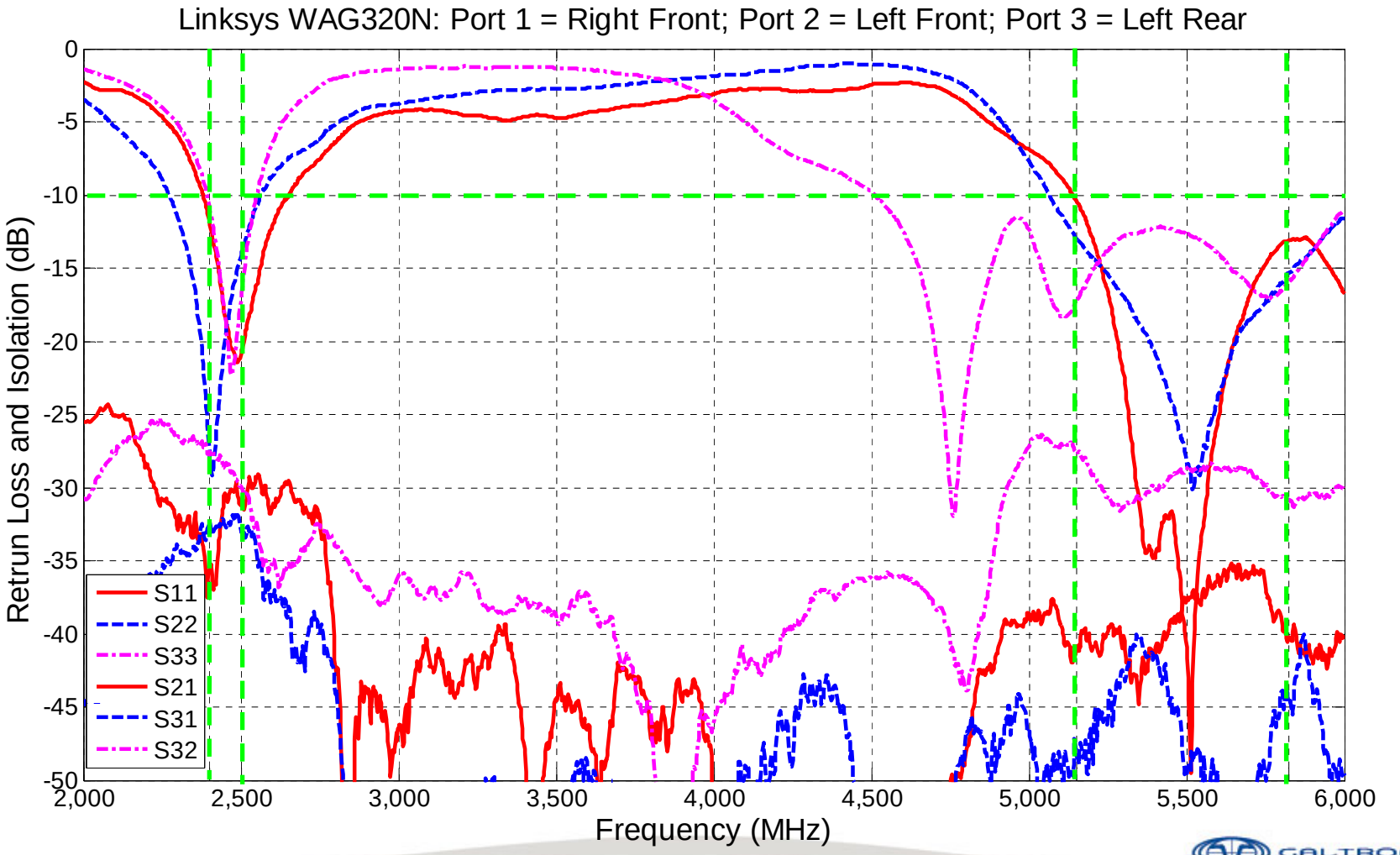
Return Loss and Isolation



Antenna Efficiency

Low Band

Right Front Antenna

Frequency (GHz)	Directivity	Peak Gain	S11	Terminal Efficiency
2.400	5.09	3.11	-11.05	63.43%
2.450	5.11	3.61	-17.53	70.75%
2.500	5.29	3.96	-43.30	73.76%
AVERAGE				**69.31%**

Left Front Antenna

Frequency (GHz)	Directivity	Peak Gain	S11	Terminal Efficiency
2.400	5.07	3.87	-14.31	75.86%
2.450	5.37	4.42	-20.57	80.23%
2.500	5.10	4.07	-16.10	78.89%
AVERAGE				**78.33%**

Left Rear Antenna

Frequency (GHz)	Directivity	Peak Gain	S11	Terminal Efficiency
2.400	3.33	1.18	-11.54	60.93%
2.450	3.33	1.69	-20.18	68.56%
2.500	3.62	1.98	-17.98	68.54%
AVERAGE				**66.01%**

High Band

Right Front Antenna

Frequency (GHz)	Directivity	Peak Gain	S11	Terminal Efficiency
5.150	5.43	3.50	-10.98	64.05%
5.250	5.18	3.90	-22.83	74.45%
5.350	5.30	4.05	-20.36	74.94%
5.725	4.74	3.22	-12.82	70.38%
5.825	4.76	3.20	-10.91	69.83%
AVERAGE				**70.73%**

Left Front Antenna

Frequency (GHz)	Directivity	Peak Gain	S11	Terminal Efficiency
5.150	5.82	4.58	-12.68	75.27%
5.250	5.32	4.52	-20.26	83.09%
5.350	5.12	4.46	-29.94	85.83%
5.725	5.18	4.57	-16.30	86.88%
5.825	5.06	4.37	-15.57	85.29%
AVERAGE				**83.27%**

Left Rear Antenna

Frequency (GHz)	Directivity	Peak Gain	S11	Terminal Efficiency
5.150	4.47	3.44	-18.67	78.96%
5.250	4.61	3.59	-14.19	79.01%
5.350	4.52	3.56	-11.87	80.12%
5.725	5.12	4.18	-14.03	80.57%
5.825	5.43	4.56	-14.80	81.81%
AVERAGE				**80.09%**

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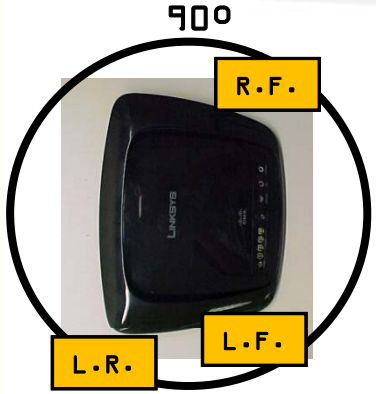
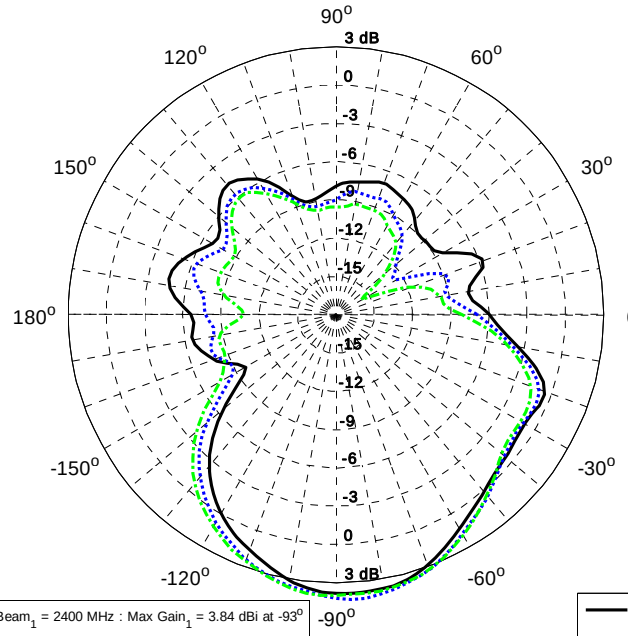
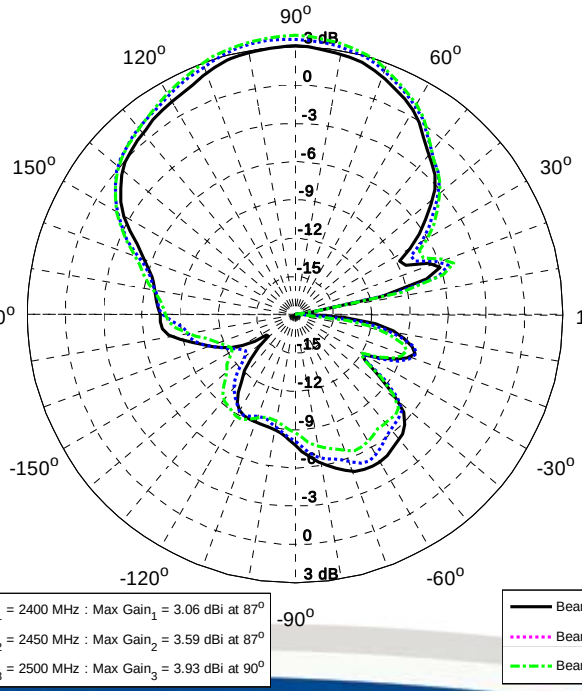
Antenna Patterns: Azimuth Cut – Low Band



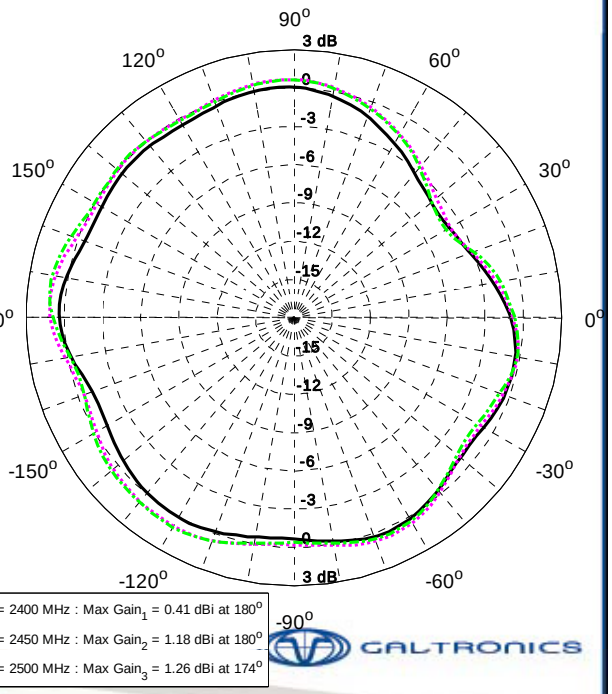
Left Front



Right Front



Left Rear



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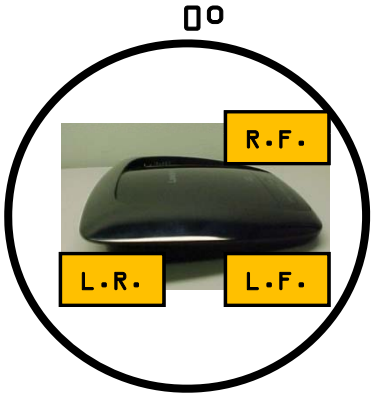
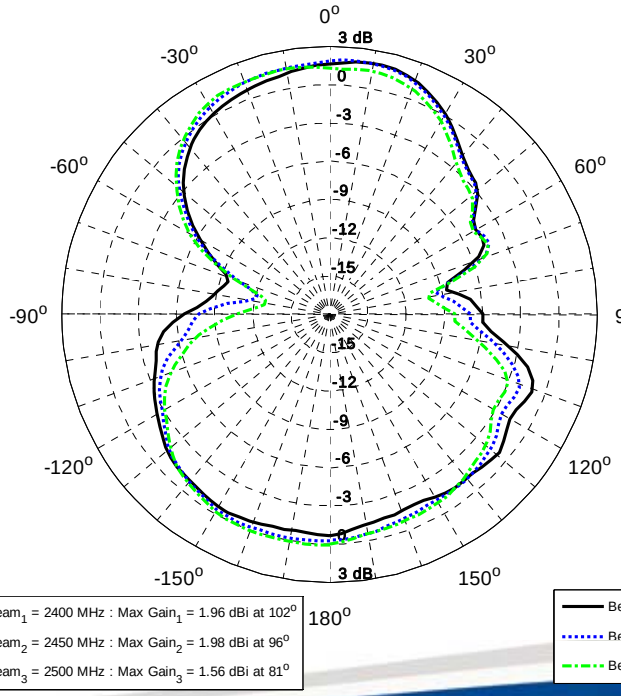
Antenna Patterns: Elevation Cut 1 (Front-to-Back) – Low Band

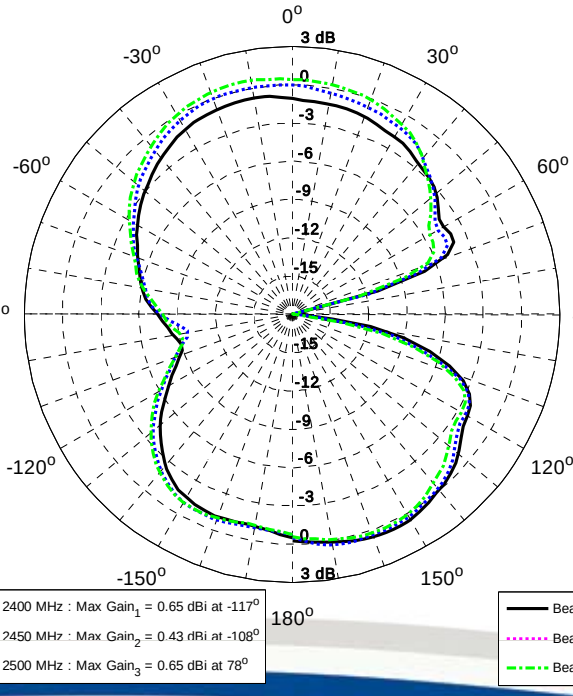


Left Front



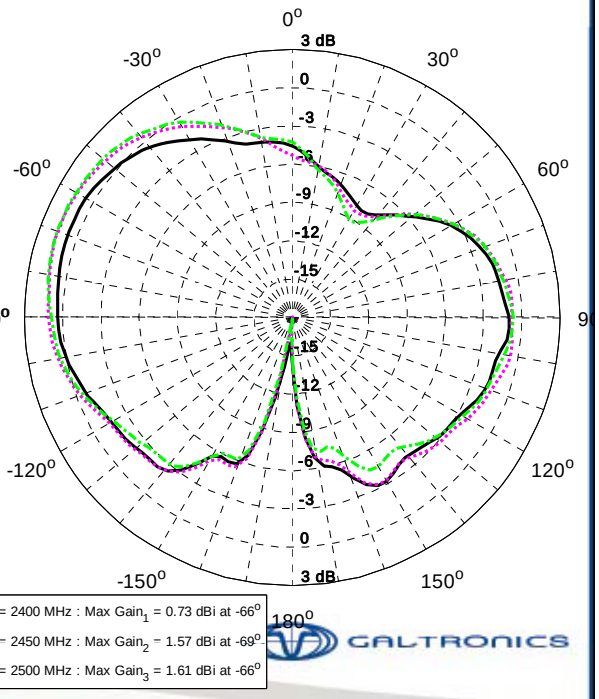
Beam$_1$ = 2400 MHz : Max Gain$_1$ = 1.96 dBi at 102°
Beam$_2$ = 2450 MHz : Max Gain$_2$ = 1.98 dBi at 96°
Beam$_3$ = 2500 MHz : Max Gain$_3$ = 1.56 dBi at 81°

Right Front



Beam$_1$ = 2400 MHz : Max Gain$_1$ = 0.65 dBi at -117°
Beam$_2$ = 2450 MHz : Max Gain$_2$ = 0.43 dBi at -108°
Beam$_3$ = 2500 MHz : Max Gain$_3$ = 0.65 dBi at 78°

Left Rear



Beam$_1$ = 2400 MHz : Max Gain$_1$ = 0.73 dBi at -66°
Beam$_2$ = 2450 MHz : Max Gain$_2$ = 1.57 dBi at -69°
Beam$_3$ = 2500 MHz : Max Gain$_3$ = 1.61 dBi at -66°

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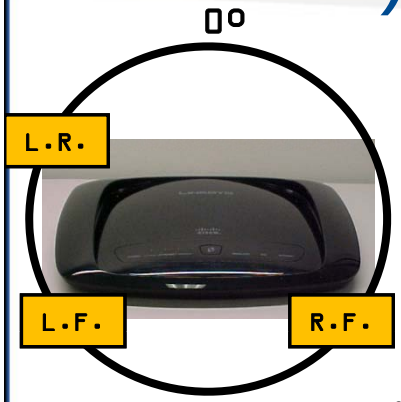
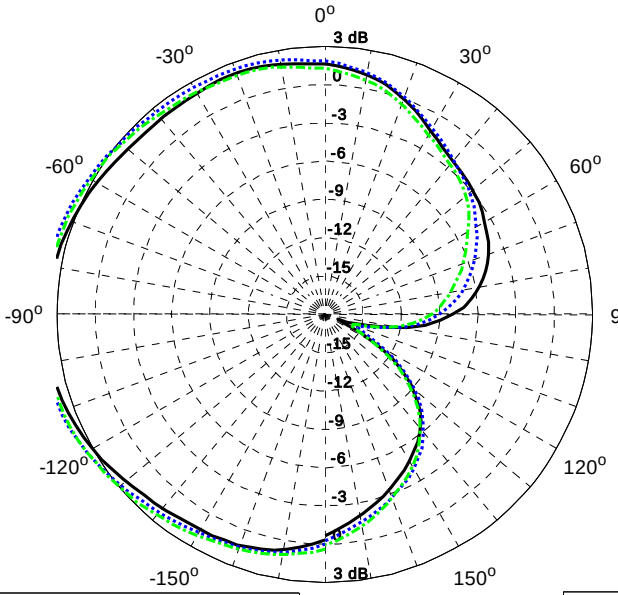
Antenna Patterns: Elevation Cut 2 (Side-to-Side) – Low Band

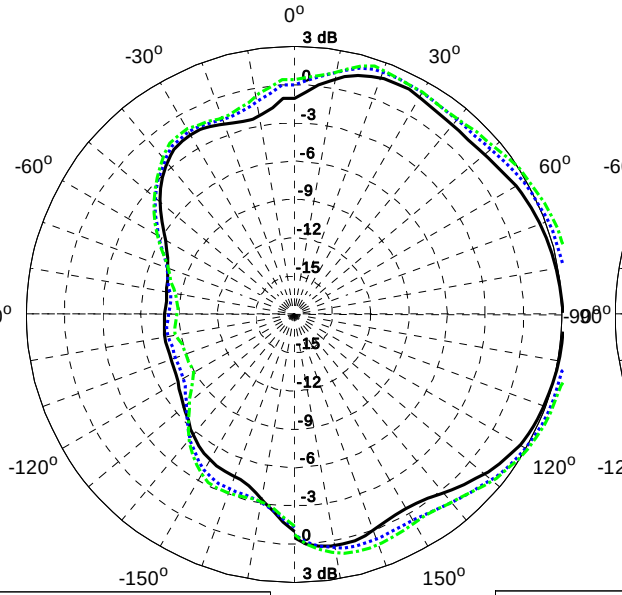


Left Front



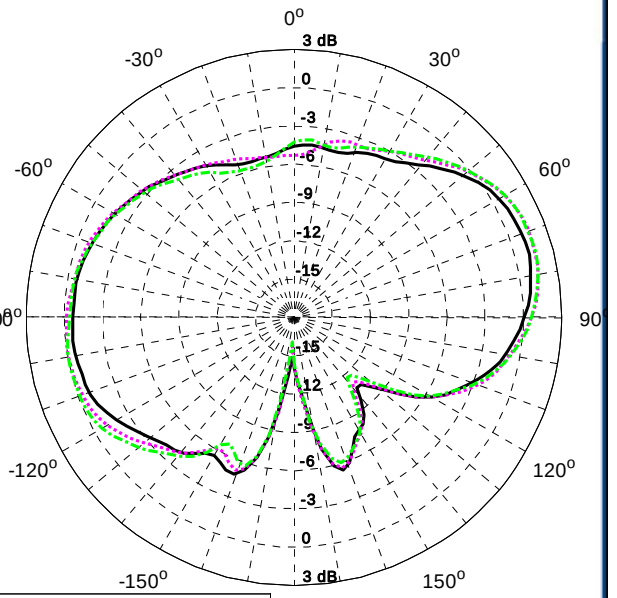
Beam$_1$ = 2400 MHz : Max Gain$_1$ = 3.85 dBi at 84°
Beam$_2$ = 2450 MHz : Max Gain$_2$ = 4.23 dBi at 87°
Beam$_3$ = 2500 MHz : Max Gain$_3$ = 3.99 dBi at 81°

Right Front



Beam$_1$ = 2400 MHz : Max Gain$_1$ = 3.1 dBi at -87°
Beam$_2$ = 2450 MHz : Max Gain$_2$ = 3.58 dBi at -90°
Beam$_3$ = 2500 MHz : Max Gain$_3$ = 3.93 dBi at -90°

Left Rear



Beam$_1$ = 2400 MHz : Max Gain$_1$ = 1.1 dBi at 72°
Beam$_2$ = 2450 MHz : Max Gain$_2$ = 1.6 dBi at 72°
Beam$_3$ = 2500 MHz : Max Gain$_3$ = 1.63 dBi at 72°

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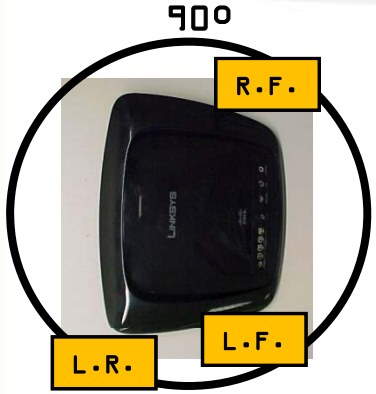
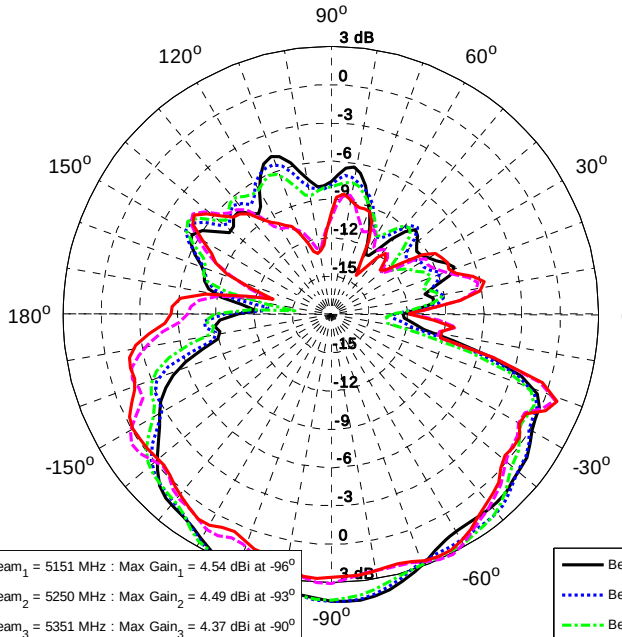
Antenna Patterns: Azimuth Cut – High Band

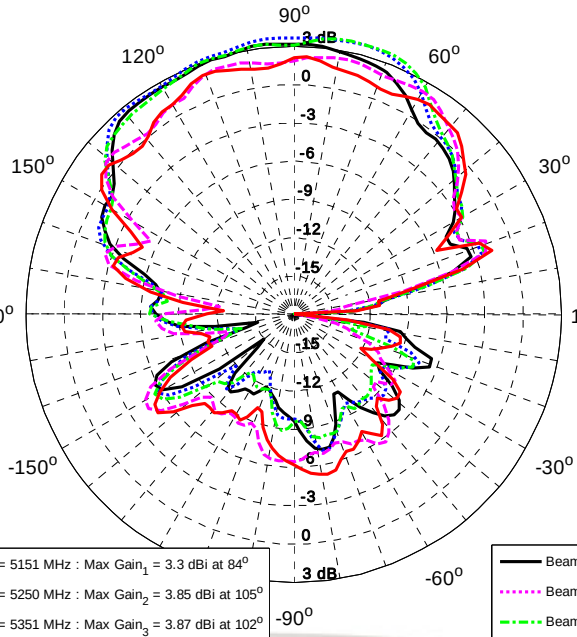


Left Front



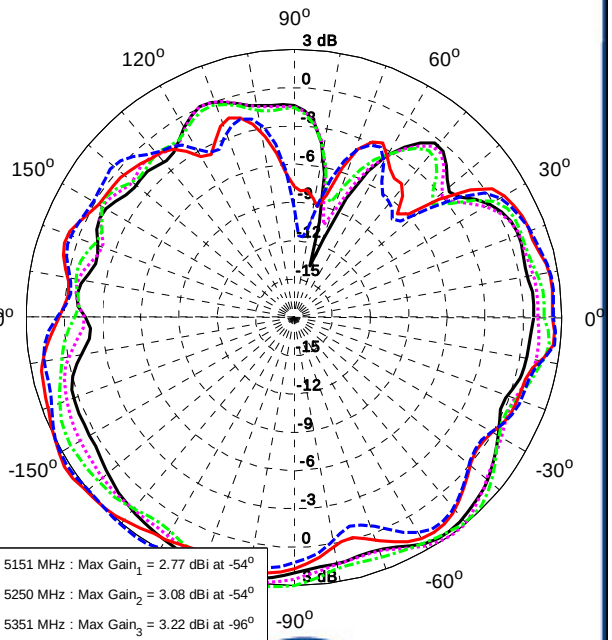
Beam$_1$ = 5151 MHz : Max Gain$_1$ = 4.54 dBi at -96°
Beam$_2$ = 5250 MHz : Max Gain$_2$ = 4.49 dBi at -93°
Beam$_3$ = 5351 MHz : Max Gain$_3$ = 4.37 dBi at -90°
Beam$_4$ = 5726 MHz : Max Gain$_4$ = 3.1 dBi at -117°
Beam$_5$ = 5825 MHz : Max Gain$_5$ = 2.8 dBi at -114°

Right Front



Beam$_1$ = 5151 MHz : Max Gain$_1$ = 3.3 dBi at 84°
Beam$_2$ = 5250 MHz : Max Gain$_2$ = 3.85 dBi at 105°
Beam$_3$ = 5351 MHz : Max Gain$_3$ = 3.87 dBi at 102°
Beam$_4$ = 5726 MHz : Max Gain$_4$ = 2.42 dBi at 102°
Beam$_5$ = 5825 MHz : Max Gain$_5$ = 2.26 dBi at 93°

Left Rear



Beam$_1$ = 5151 MHz : Max Gain$_1$ = 2.77 dBi at -54°
Beam$_2$ = 5250 MHz : Max Gain$_2$ = 3.08 dBi at -54°
Beam$_3$ = 5351 MHz : Max Gain$_3$ = 3.22 dBi at -96°
Beam$_4$ = 5726 MHz : Max Gain$_4$ = 3.44 dBi at -147°
Beam$_5$ = 5825 MHz : Max Gain$_5$ = 3.26 dBi at -147°

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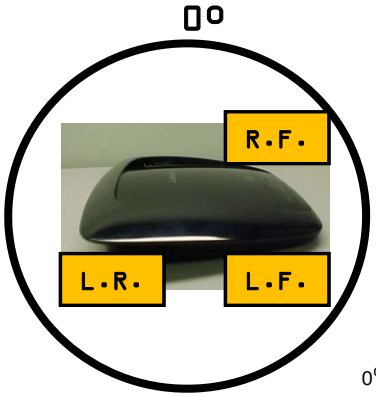
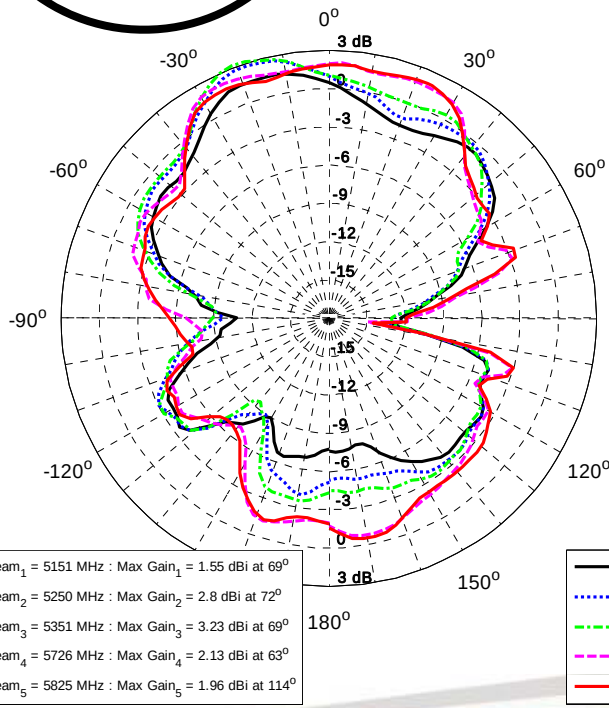
Antenna Patterns: Elevation Cut 1 (Front-to-Back) – High Band

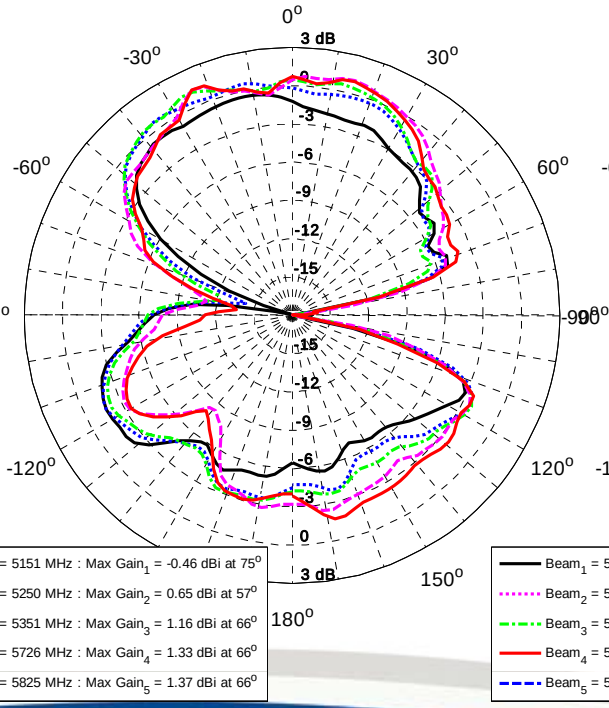


Left Front



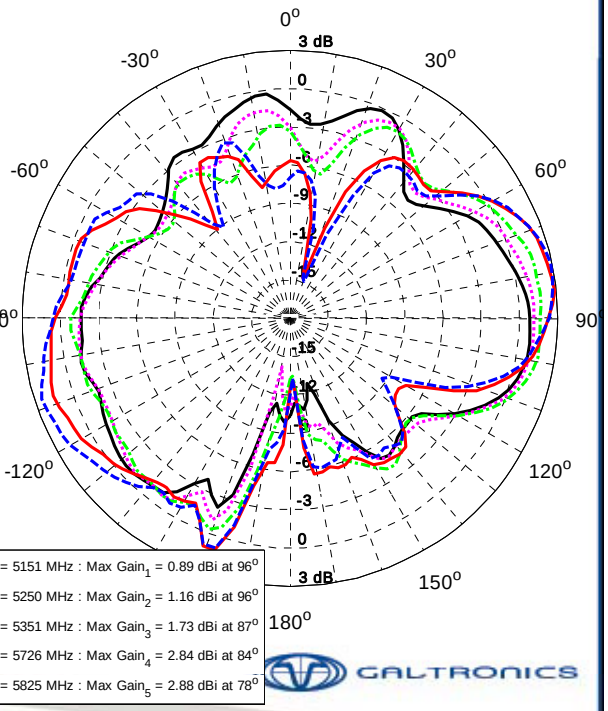
Beam$_1$ = 5151 MHz : Max Gain$_1$ = 1.55 dBi at 69°
Beam$_2$ = 5250 MHz : Max Gain$_2$ = 2.8 dBi at 72°
Beam$_3$ = 5351 MHz : Max Gain$_3$ = 3.23 dBi at 69°
Beam$_4$ = 5726 MHz : Max Gain$_4$ = 2.13 dBi at 63°
Beam$_5$ = 5825 MHz : Max Gain$_5$ = 1.96 dBi at 114°

Right Front



Beam$_1$ = 5151 MHz : Max Gain$_1$ = -0.46 dBi at 75°
Beam$_2$ = 5250 MHz : Max Gain$_2$ = 0.65 dBi at 57°
Beam$_3$ = 5351 MHz : Max Gain$_3$ = 1.16 dBi at 66°
Beam$_4$ = 5726 MHz : Max Gain$_4$ = 1.33 dBi at 66°
Beam$_5$ = 5825 MHz : Max Gain$_5$ = 1.37 dBi at 66°

Left Rear



Beam$_1$ = 5151 MHz : Max Gain$_1$ = 0.89 dBi at 96°
Beam$_2$ = 5250 MHz : Max Gain$_2$ = 1.16 dBi at 96°
Beam$_3$ = 5351 MHz : Max Gain$_3$ = 1.73 dBi at 87°
Beam$_4$ = 5726 MHz : Max Gain$_4$ = 2.84 dBi at 84°
Beam$_5$ = 5825 MHz : Max Gain$_5$ = 2.88 dBi at 78°

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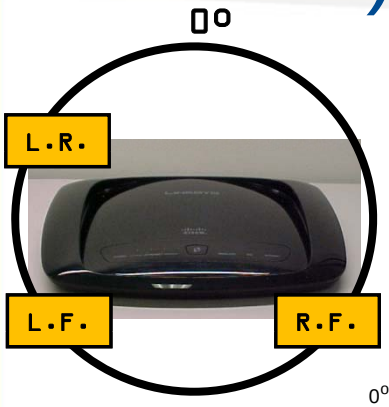
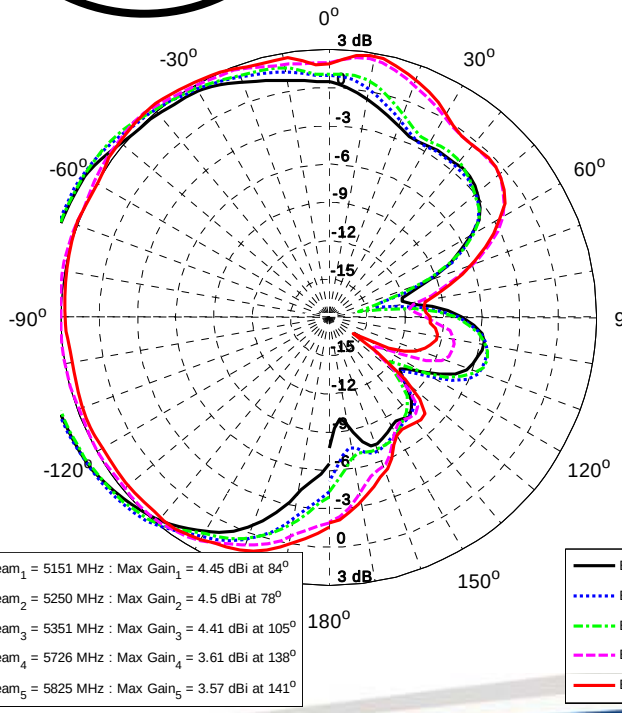
Antenna Patterns: Elevation Cut 2 (Side-to-Side) – High Band

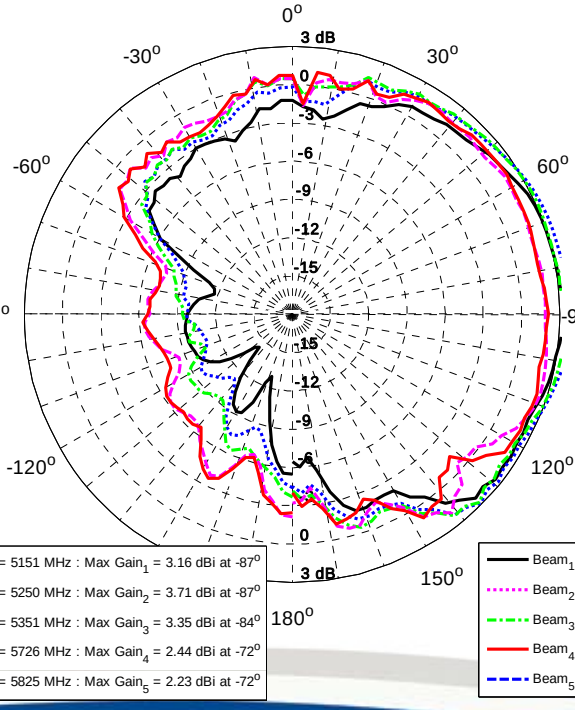


Left Front



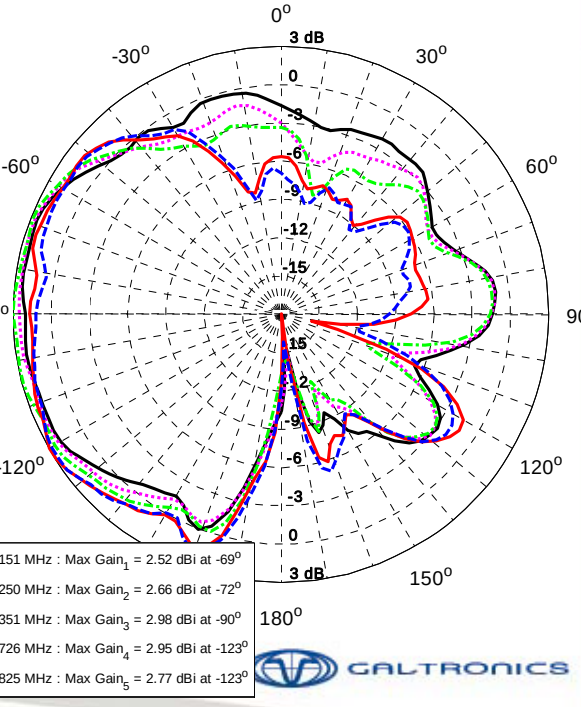
Beam$_1$ = 5151 MHz : Max Gain$_1$ = 4.45 dBi at 84°
Beam$_2$ = 5250 MHz : Max Gain$_2$ = 4.5 dBi at 78°
Beam$_3$ = 5351 MHz : Max Gain$_3$ = 4.41 dBi at 105°
Beam$_4$ = 5726 MHz : Max Gain$_4$ = 3.61 dBi at 138°
Beam$_5$ = 5825 MHz : Max Gain$_5$ = 3.57 dBi at 141°

Right Front



Beam$_1$ = 5151 MHz : Max Gain$_1$ = 3.16 dBi at -87°
Beam$_2$ = 5250 MHz : Max Gain$_2$ = 3.71 dBi at -87°
Beam$_3$ = 5351 MHz : Max Gain$_3$ = 3.35 dBi at -84°
Beam$_4$ = 5726 MHz : Max Gain$_4$ = 2.44 dBi at -72°
Beam$_5$ = 5825 MHz : Max Gain$_5$ = 2.23 dBi at -72°

Left Rear



Beam$_1$ = 5151 MHz : Max Gain$_1$ = 2.52 dBi at -69°
Beam$_2$ = 5250 MHz : Max Gain$_2$ = 2.66 dBi at -72°
Beam$_3$ = 5351 MHz : Max Gain$_3$ = 2.98 dBi at -90°
Beam$_4$ = 5726 MHz : Max Gain$_4$ = 2.95 dBi at -123°
Beam$_5$ = 5825 MHz : Max Gain$_5$ = 2.77 dBi at -123°

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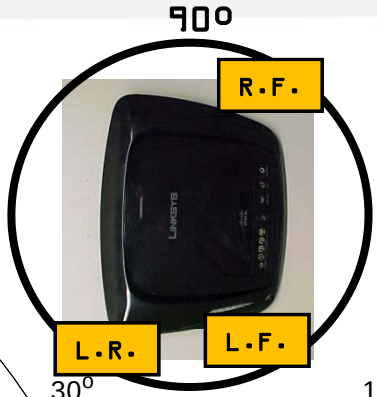
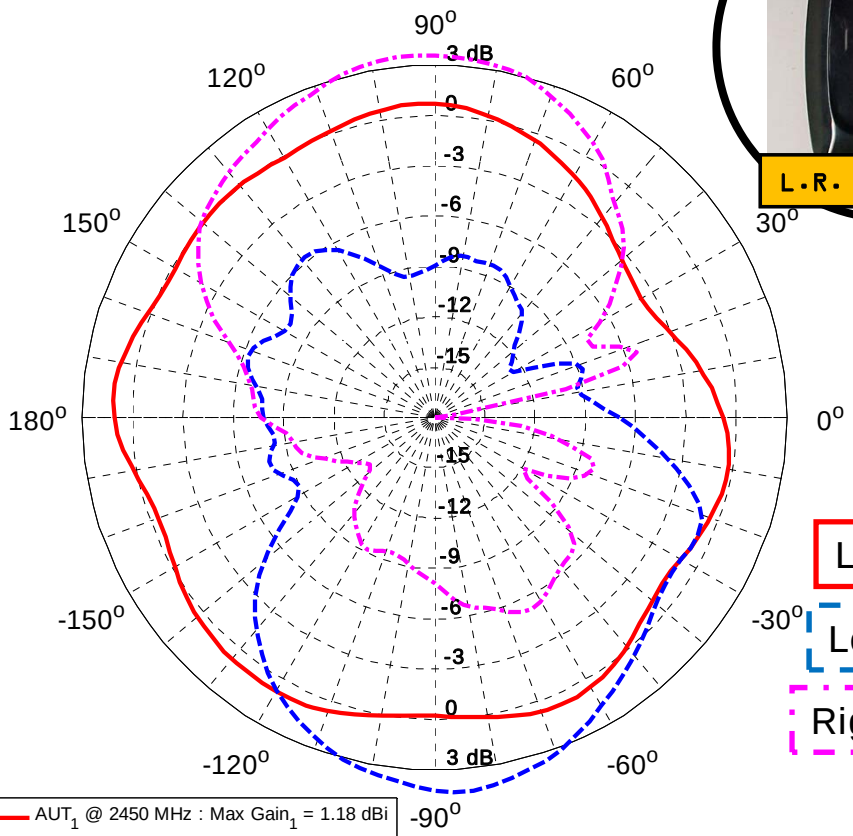
System Coverage : Azimuth Cut



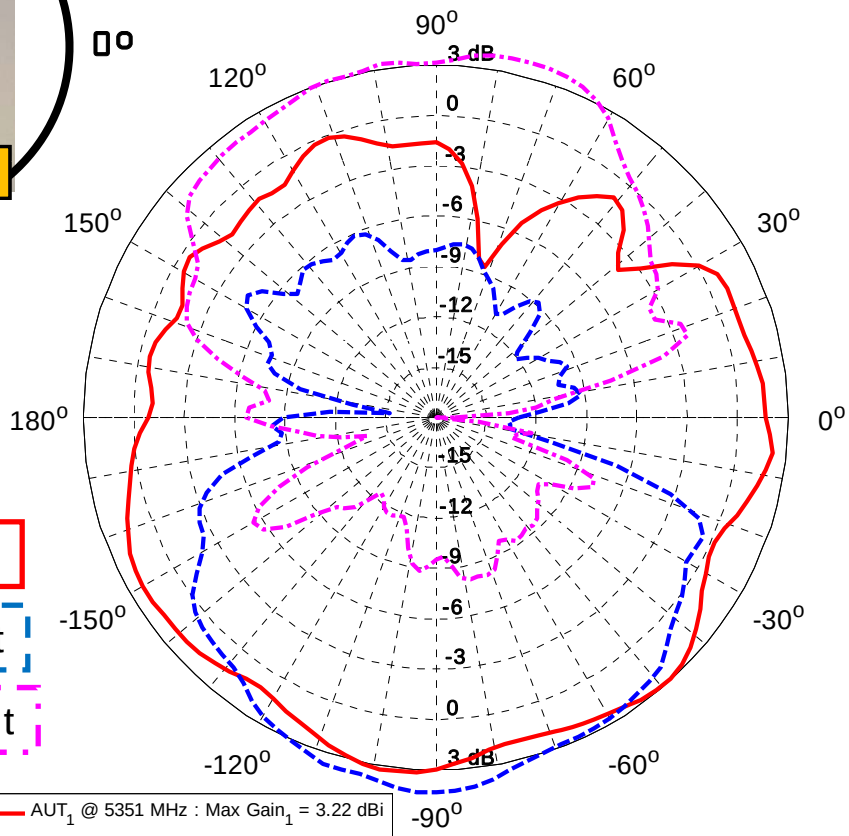
Low Band



AUT$_1$ @ 2450 MHz : Max Gain$_1$ = 1.18 dBi
AUT$_2$ @ 2450 MHz : Max Gain$_2$ = 4.36 dBi
AUT$_3$ @ 2450 MHz : Max Gain$_3$ = 3.59 dBi

Left Rear
Left Front
Right Front

High Band



AUT$_1$ @ 5351 MHz : Max Gain$_1$ = 3.22 dBi
AUT$_2$ @ 5351 MHz : Max Gain$_2$ = 4.37 dBi
AUT$_3$ @ 5351 MHz : Max Gain$_3$ = 3.87 dBi

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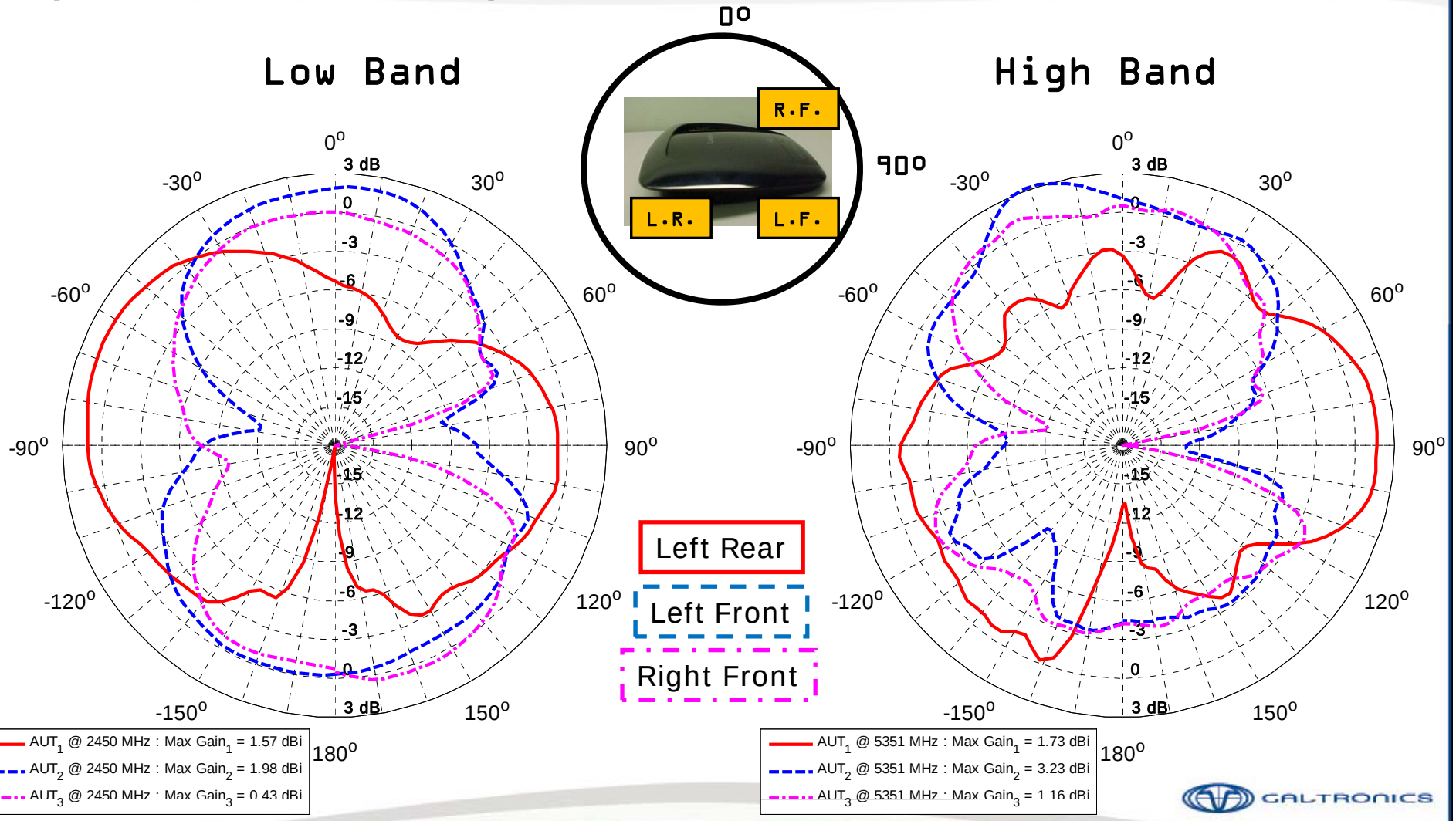
System Coverage : Elevation Cut 1 (Front-to-Back)



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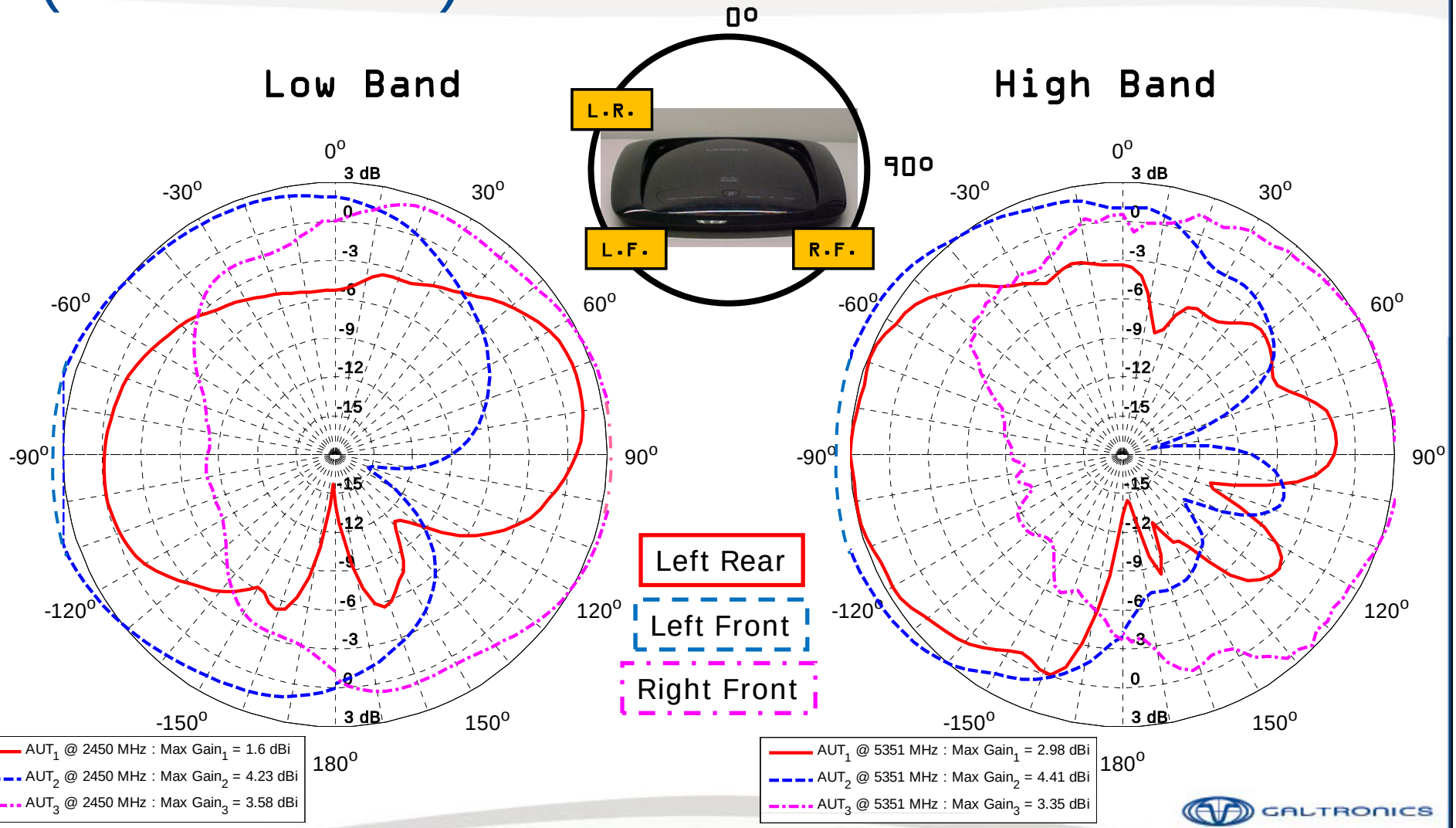
System Coverage : Elevation Cut 2 (Side-to-Side)



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Summary

Galtronics antenna solution for Linksys WAG320N has been tested in production sample and antennas show the following characteristics

- Return Loss
  - Good for all antennas in both bands
- Isolation
  - Excellent for all antennas in both bands
- Efficiency
  - Excellent for all antennas in both bands
- Antenna Patterns
  - Excellent 3-D coverage and pattern diversity
  - Polarization diversity

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