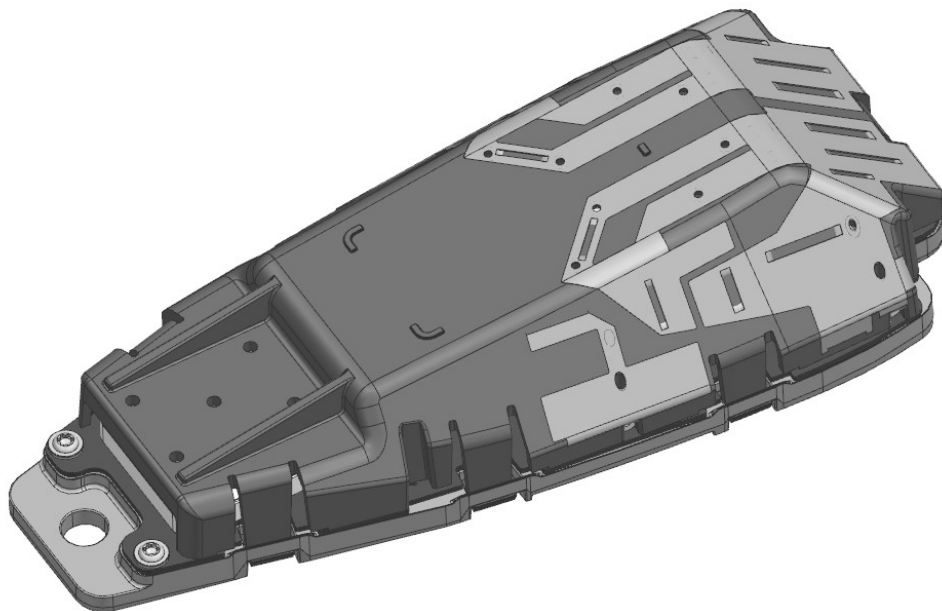


Product – Specification of the BMW ICON SF26 US roof antenna 5A7F527



Originator: Sven Schmidt (RF Eng.),
Vidyadhar Bhalchandra Kulkarni (Mech. Eng.)
Werner Pohlabein (RF Eng.)

Approver: Ahmed Ameri (Eng. Dir.)

Location: Molex CVS Hildesheim GmbH

Table of Content

1. Introduction	4
2. General Remarks	6
3. General Concept	7
3.1 Variants	8
4. Electrical properties 5A7F527	9
4.1 MIMO1 Peak Gain	9
4.1.1 Radiation Pattern for Gain @ frequency range 663-698MHz	10
4.1.2 Radiation Pattern for Gain @ frequency range 699-716MHz	10
4.1.3 Radiation Pattern for Gain @ frequency range 777-787MHz	11
4.1.4 Radiation Pattern for Gain @ frequency range 814-824MHz	11
4.1.5 Radiation Pattern for Gain @ frequency range 824-849MHz	12
4.1.6 Radiation Pattern for Gain @ frequency range 1710-1780MHz	12
4.1.7 Radiation Pattern for Gain @ frequency range 1850-1910MHz	13
4.1.8 Radiation Pattern for Gain @ frequency range 1850-1915MHz	13
4.1.9 Radiation Pattern for Gain @ frequency range 2496-2690MHz	14
4.1.10 Radiation Pattern for Gain @ frequency range 2500-2570MHz	14
4.1.11 Radiation Pattern for Gain @ frequency range 2500-2690MHz	15
4.1.12 Radiation Pattern for Gain @ frequency range 2570-2620MHz	15
4.1.13 Radiation Pattern for Gain @ frequency range 3300-4200MHz	16
4.1.14 Radiation Pattern for Gain @ frequency range 3450-3550MHz	16
4.1.15 Radiation Pattern for Gain @ frequency range 3450-3600MHz	17
4.1.16 Radiation Pattern for Gain @ frequency range 3450-3900MHz	17
4.1.17 Radiation Pattern for Gain @ frequency range 3550-3700MHz	18
4.1.18 Radiation Pattern for Gain @ frequency range 3700-3980MHz	18
4.1.19 Radiation Pattern for Gain @ frequency range 3900-3980MHz	19
4.1.20 Radiation Pattern for Gain @ frequency range 4400-5000MHz	19
4.2 MIMO2 Peak Gain	20
4.2.1 Radiation Pattern for Gain @ frequency range 663-698MHz	21
4.2.2 Radiation Pattern for Gain @ frequency range 699-716MHz	21
4.2.3 Radiation Pattern for Gain @ frequency range 777-787MHz	22
4.2.4 Radiation Pattern for Gain @ frequency range 814-824MHz	22
4.2.5 Radiation Pattern for Gain @ frequency range 824-849MHz	23
4.2.6 Radiation Pattern for Gain @ frequency range 1710-1780MHz	23
4.2.7 Radiation Pattern for Gain @ frequency range 1850-1910MHz	24
4.2.8 Radiation Pattern for Gain @ frequency range 1850-1915MHz	24
4.2.9 Radiation Pattern for Gain @ frequency range 2496-2690MHz	25
4.2.10 Radiation Pattern for Gain @ frequency range 2500-2570MHz	25
4.2.11 Radiation Pattern for Gain @ frequency range 2500-2690MHz	26
4.2.12 Radiation Pattern for Gain @ frequency range 2570-2620MHz	26

4.2.13	Radiation Pattern for Gain @ frequency range 3300-4200MHz.....	27
4.2.14	Radiation Pattern for Gain @ frequency range 3450-3550MHz.....	27
4.2.15	Radiation Pattern for Gain @ frequency range 3450-3600MHz.....	28
4.2.16	Radiation Pattern for Gain @ frequency range 3450-3900MHz.....	28
4.2.17	Radiation Pattern for Gain @ frequency range 3550-3700MHz.....	29
4.2.18	Radiation Pattern for Gain @ frequency range 3700-3980MHz.....	29
4.2.19	Radiation Pattern for Gain @ frequency range 3900-3980MHz.....	30
4.2.20	Radiation Pattern for Gain @ frequency range 4400-5000MHz.....	30
4.3	WiFi 1 2.4 & 5/6 GHz Peak Gain	31
4.3.1	Radiation Pattern for Gain @ frequency range 2402 MHz -2483,5 MHz.....	32
4.3.2	Radiation Pattern for Gain @ frequency range 5150 MHz -5250 MHz	32
4.3.3	Radiation Pattern for Gain @ frequency range 5250 MHz -5350 MHz	33
4.3.4	Radiation Pattern for Gain @ frequency range 5470 MHz -5725 MHz	33
4.3.5	Radiation Pattern for Gain @ frequency range 5725 MHz -5850 MHz	34
4.3.6	Radiation Pattern for Gain @ frequency range 5925 MHz -6425 MHz	34
4.3.7	Radiation Pattern for Gain @ frequency range 6425 MHz -6525 MHz	35
4.3.8	Radiation Pattern for Gain @ frequency range 6525 MHz -6875 MHz	35
4.3.9	Radiation Pattern for Gain @ frequency range 6875 MHz -7125 MHz	36
4.4	WiFi 2 2.4 & 5/6 GHz Peak Gain	37
4.4.1	Radiation Pattern for Gain @ frequency range 2402 MHz -2483,5 MHz.....	38
4.4.2	Radiation Pattern for Gain @ frequency range 5150 MHz -5250 MHz	38
4.4.3	Radiation Pattern for Gain @ frequency range 5250 MHz -5350 MHz	39
4.4.4	Radiation Pattern for Gain @ frequency range 5470 MHz -5725 MHz	39
4.4.5	Radiation Pattern for Gain @ frequency range 5725 MHz -5850 MHz	40
4.4.6	Radiation Pattern for Gain @ frequency range 5925 MHz -6425 MHz	40
4.4.7	Radiation Pattern for Gain @ frequency range 6425 MHz -6525 MHz	41
4.4.8	Radiation Pattern for Gain @ frequency range 6525 MHz -6875 MHz	41
4.4.9	Radiation Pattern for Gain @ frequency range 6875 MHz -7125 MHz	42

1. INTRODUCTION

This document defines the specification for the variant of the BMW ICON SF26 roof antenna 5A7F527

Molex CVS products are directly delivered to OEMs automotive. The OEM is responsible for the assembly process of this products to the car. The end-user does not have to do any installations or adjustments.

Company	Molex CVS Hildesheim GmbH
---------	---------------------------

Address	Daimlerring 31, D-31135 Hildesheim
Production site (address, country)	Molex CVS Shanghai, China

2. GENERAL REMARKS

For all specified values appearing in this document, the following definitions are valid:

Min.: Minimal limit, minimal adjustable value of respective parameter

Nom.: Nominal or typical value of respective parameter with tolerance range at room temperature (25°C).
This tolerance range does not include the temperature response.

Max.: Maximal limit, maximal adjustable value of respective parameter

Design-range: This range defines the limits for all component parameters that must not be exceeded.

The Nominal – value must be chosen from within the Design – range.

Frequency-range: In this case the Min. and Max. value stands for that frequency-range within which the parameters, stated in this document, need to be met.

3. GENERAL CONCEPT

US

Homologation Number: DG70DA1D

Model: RAN-201

Type: RAN-201a

3.1 Variants

Model	Type	Customer Part number	Molex Part number	Functions
RAN-201	RAN-201a	5A7F527	34120	GNSS L1 + L5; SDARS; 2x MIMO 5G; 2 x WiFi Dual 2.4 & 5/6 GHz;

4. ELECTRICAL PROPERTIES 5A7F527

Unless otherwise stated, all data in this document apply for nominal requirements at 25°C.

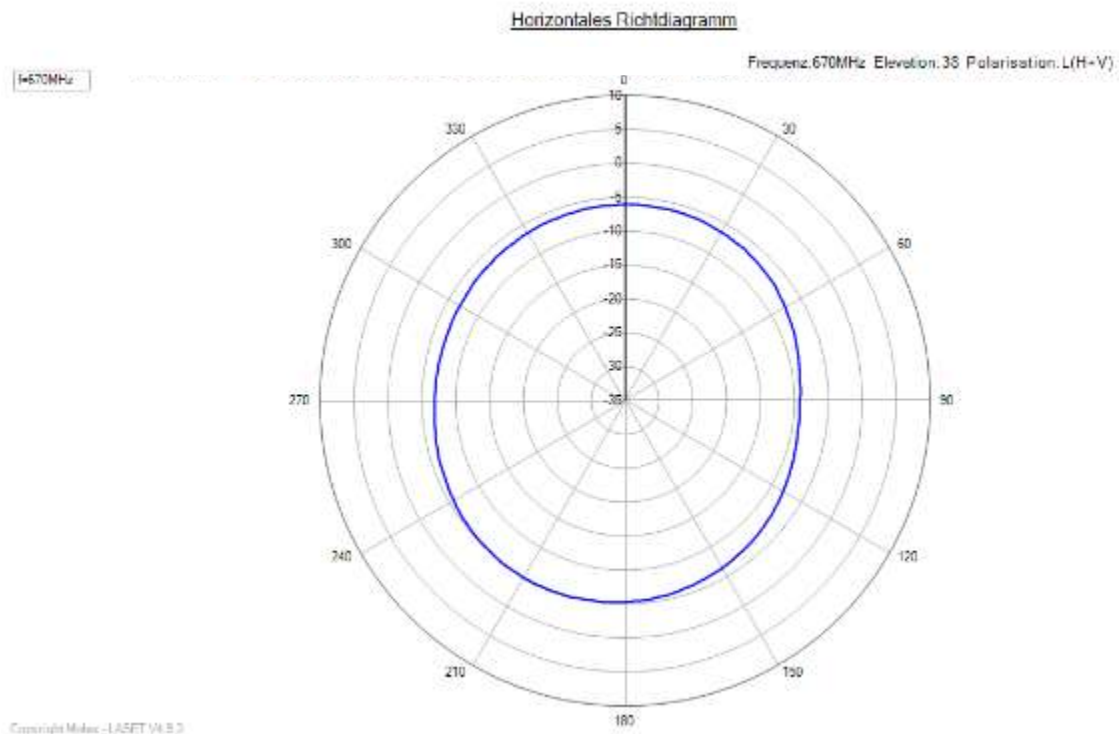
Radiated measurements were done mounted on 1m ground plane

LNA measurements were done without housing and with SMA connector at the LNA input

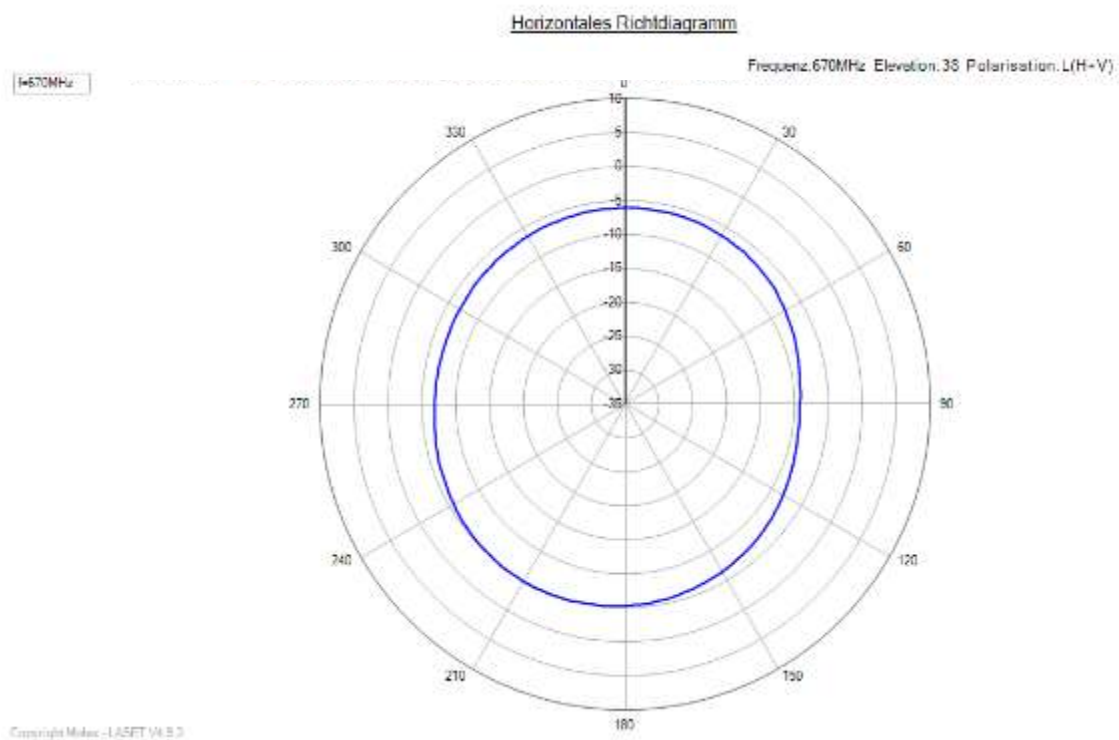
4.1 MIMO1 Peak Gain

Frequency band (MHz)	maximum gain
663-698	-4,9
699-716	-5,4
777-787	-2,9
814-824	-2,6
824-849	-2,6
1710-1780	3,3
1850-1910	1,9
1850-1915	1,9
2496-2690	2,0
2500-2570	2,0
2500-2690	2,0
2570-2620	1,2
3300-4200	6,7
3450-3550	5,1
3450-3600	6,1
3450-3900	6,7
3550-3700	6,7
3700-3980	6,0
3900-3980	5,8
4400-5000	5,3

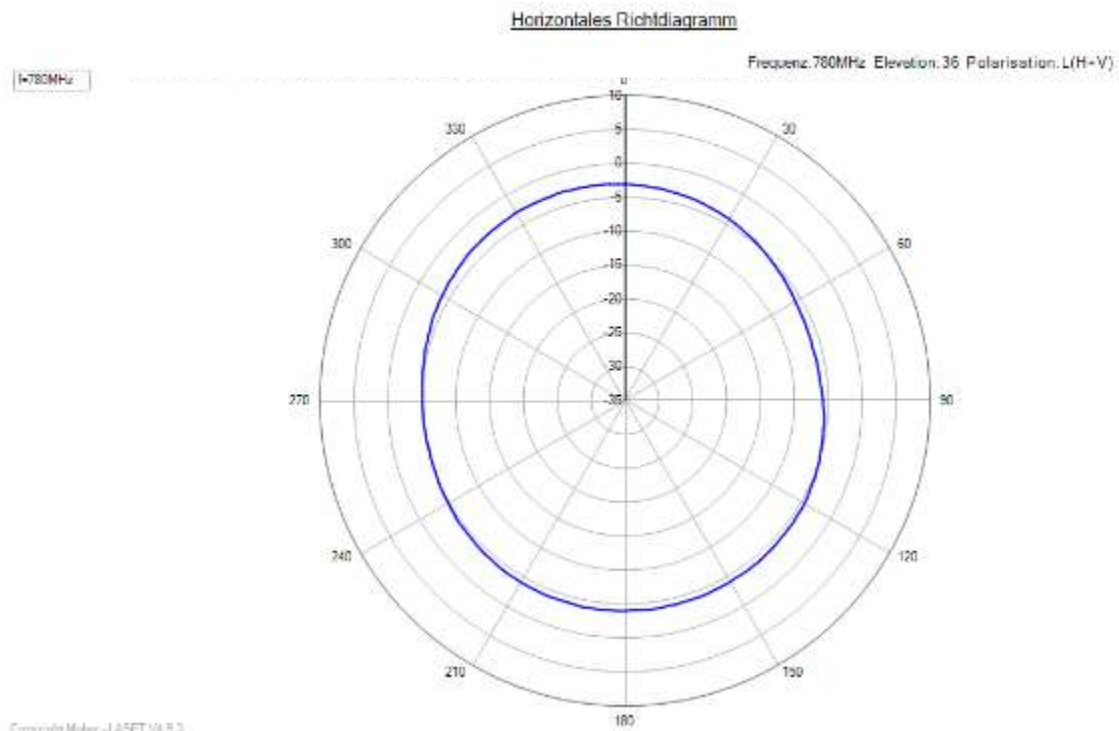
4.1.1 Radiation Pattern for Gain @ frequency range 663-698MHz



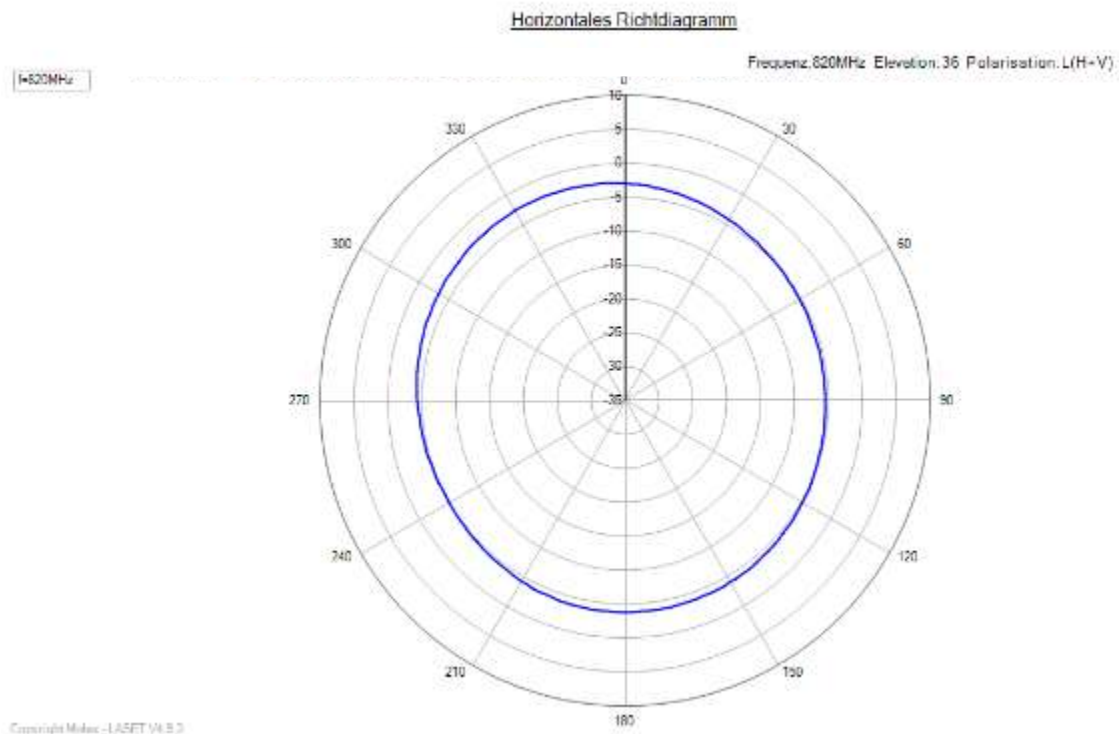
4.1.2 Radiation Pattern for Gain @ frequency range 699-716MHz



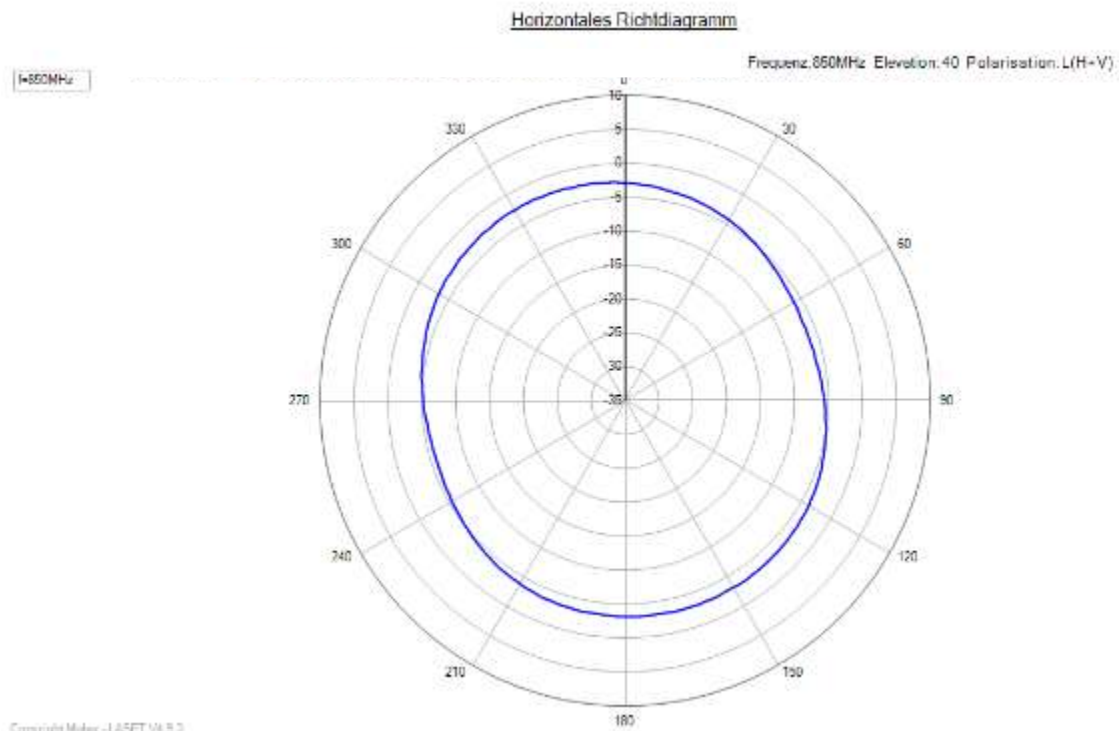
4.1.3 Radiation Pattern for Gain @ frequency range 777-787MHz



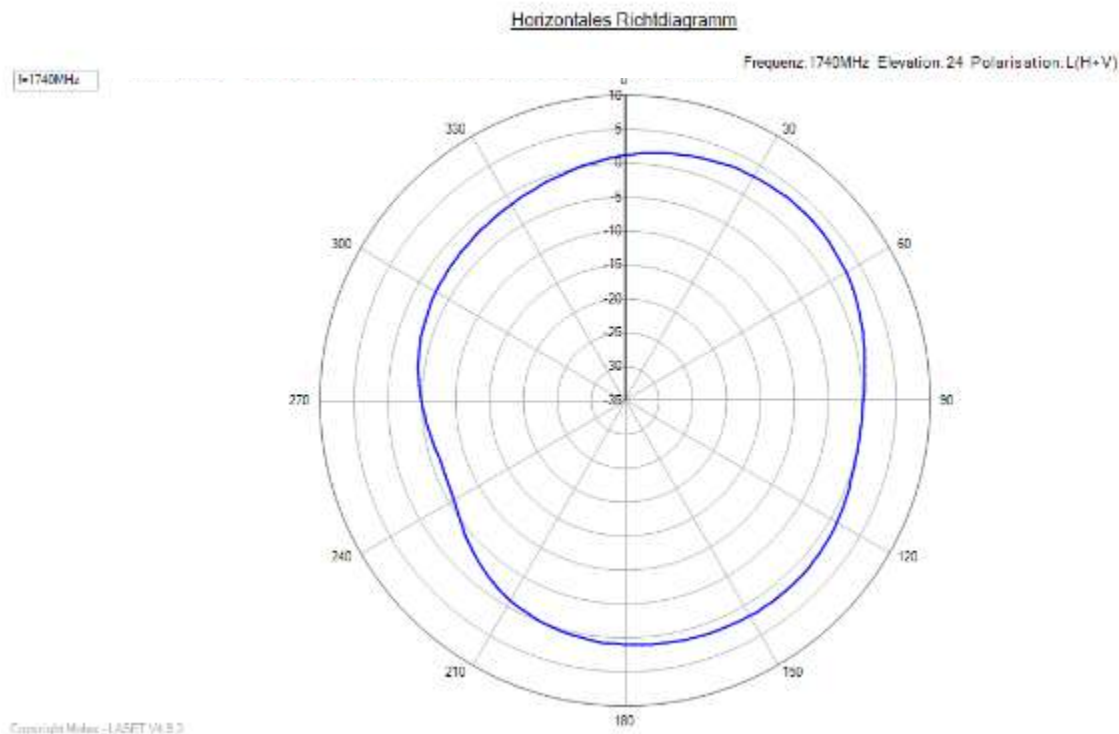
4.1.4 Radiation Pattern for Gain @ frequency range 814-824MHz



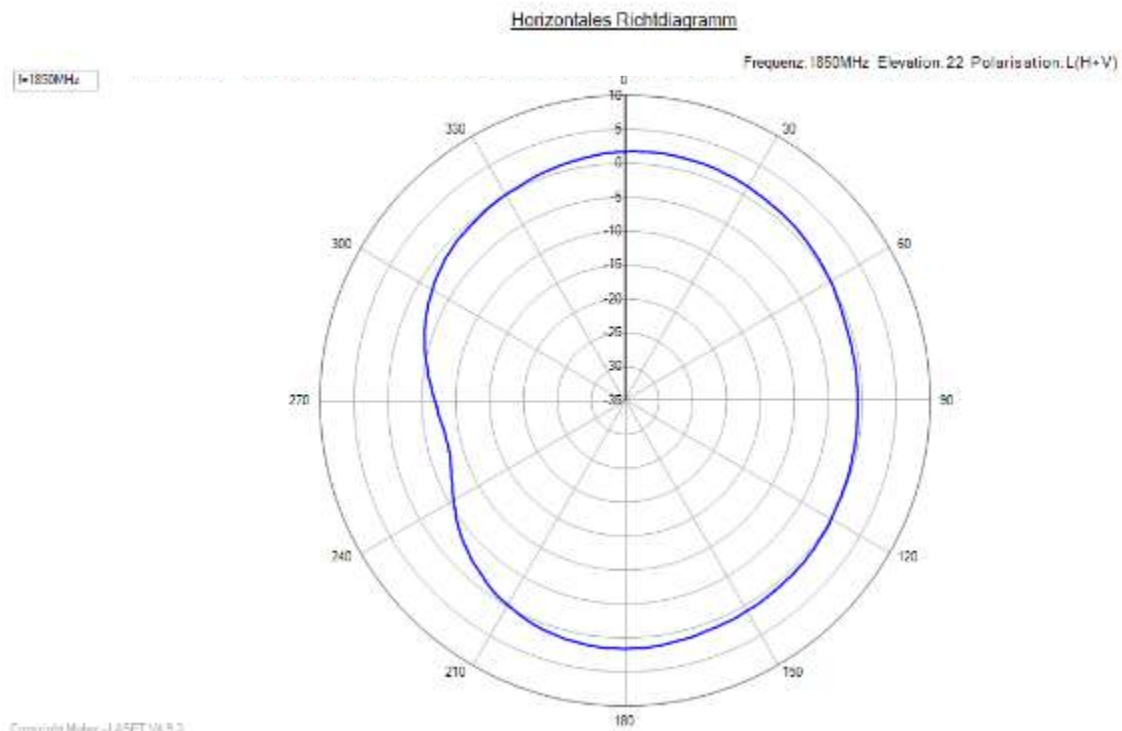
4.1.5 Radiation Pattern for Gain @ frequency range 824-849MHz



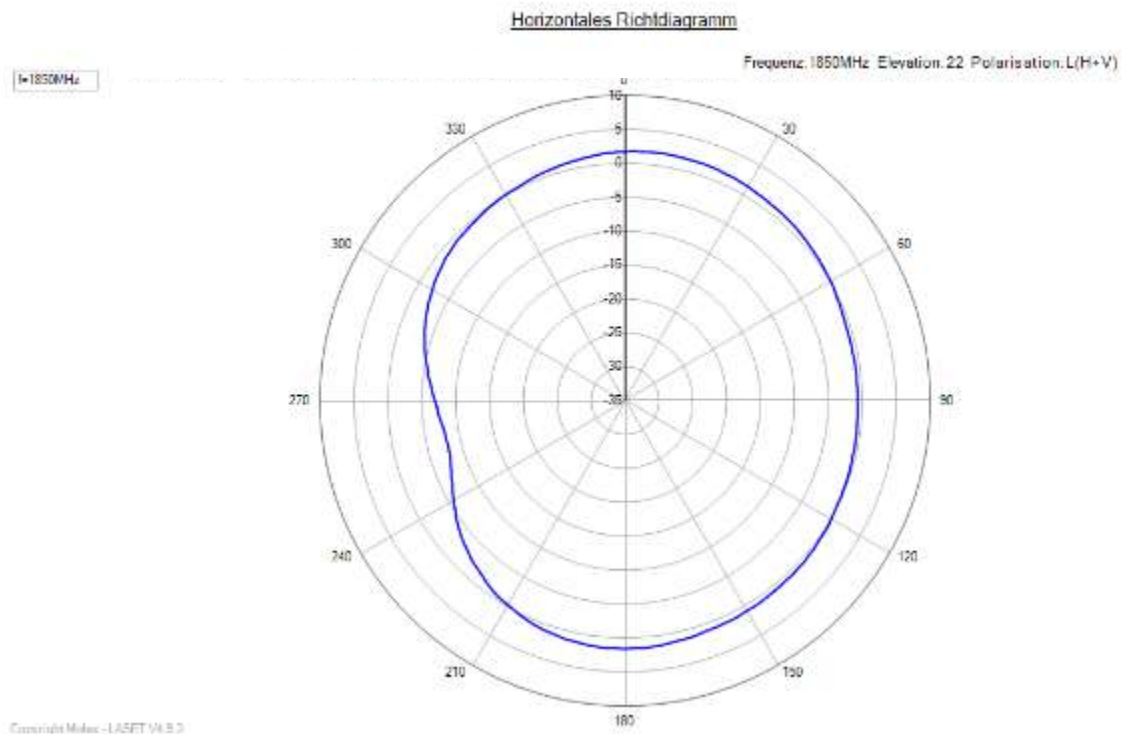
4.1.6 Radiation Pattern for Gain @ frequency range 1710-1780MHz



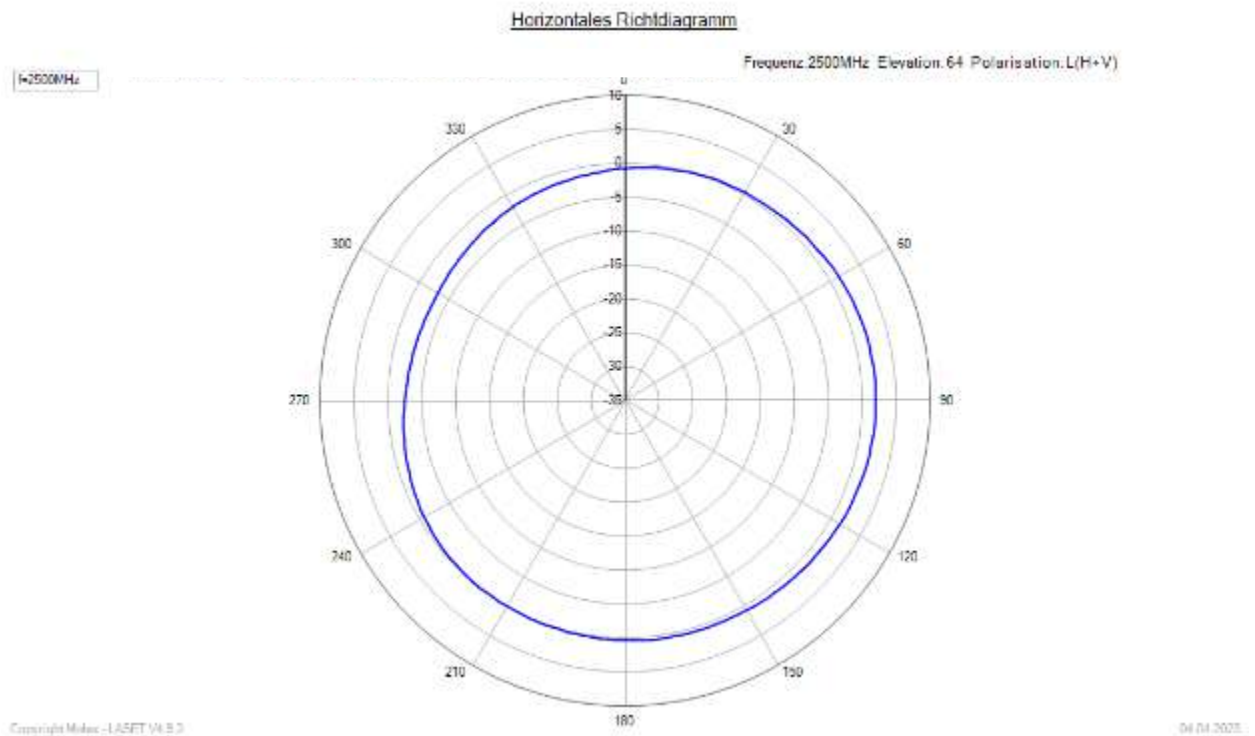
4.1.7 Radiation Pattern for Gain @ frequency range 1850-1910MHz



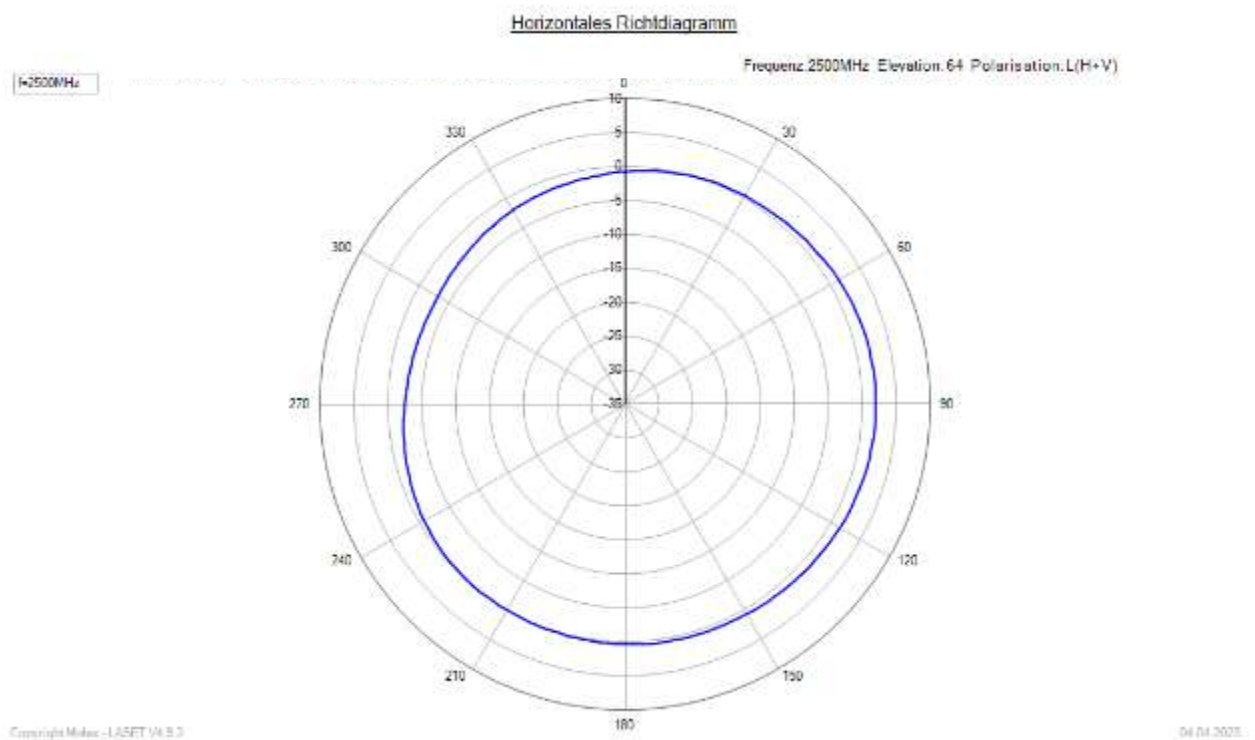
4.1.8 Radiation Pattern for Gain @ frequency range 1850-1915MHz



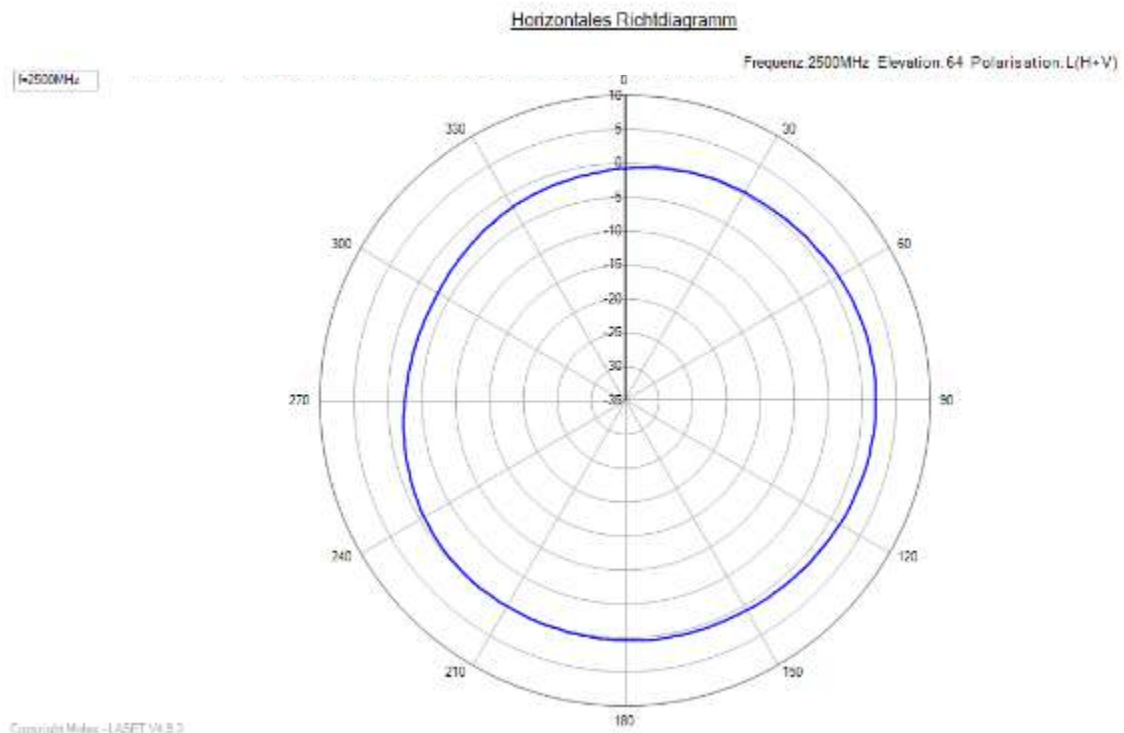
4.1.9 Radiation Pattern for Gain @ frequency range 2496-2690MHz



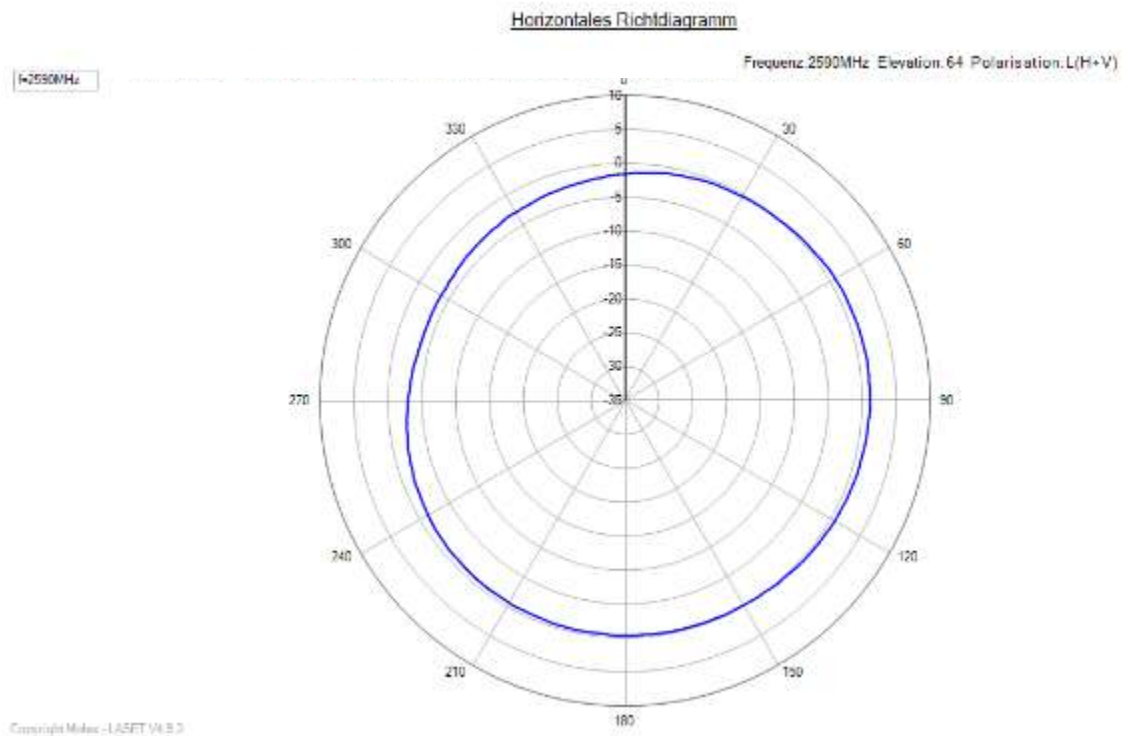
4.1.10 Radiation Pattern for Gain @ frequency range 2500-2570MHz



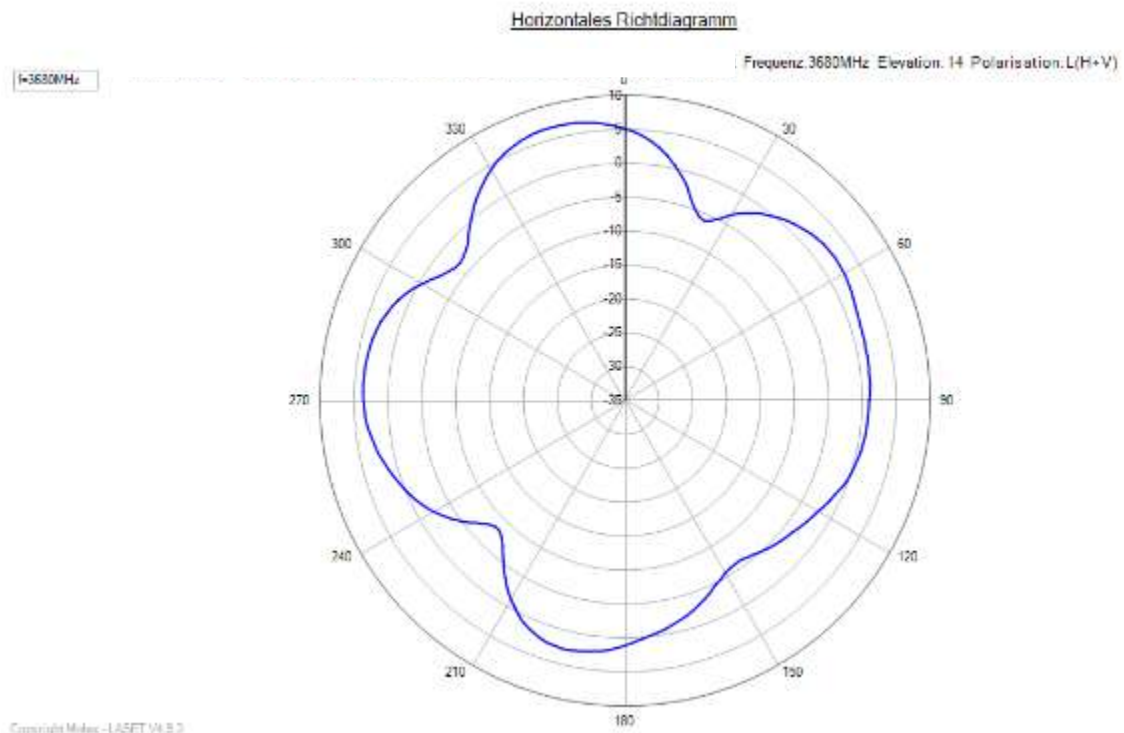
4.1.11 Radiation Pattern for Gain @ frequency range 2500-2690MHz



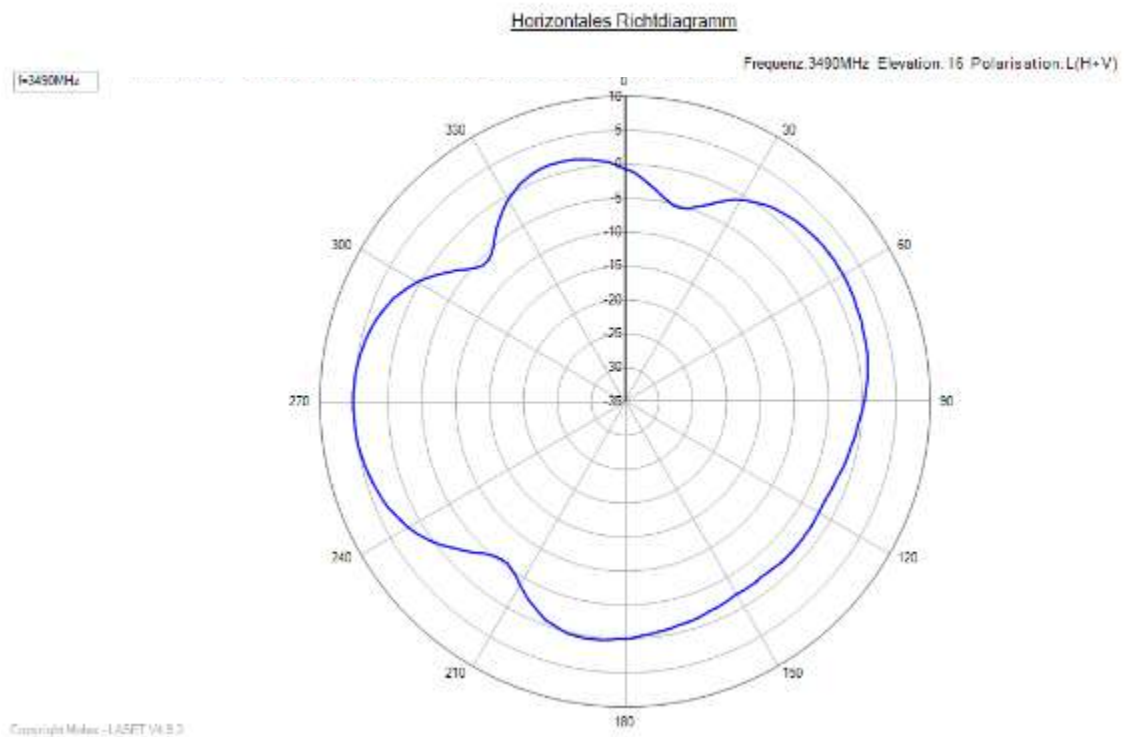
4.1.12 Radiation Pattern for Gain @ frequency range 2570-2620MHz



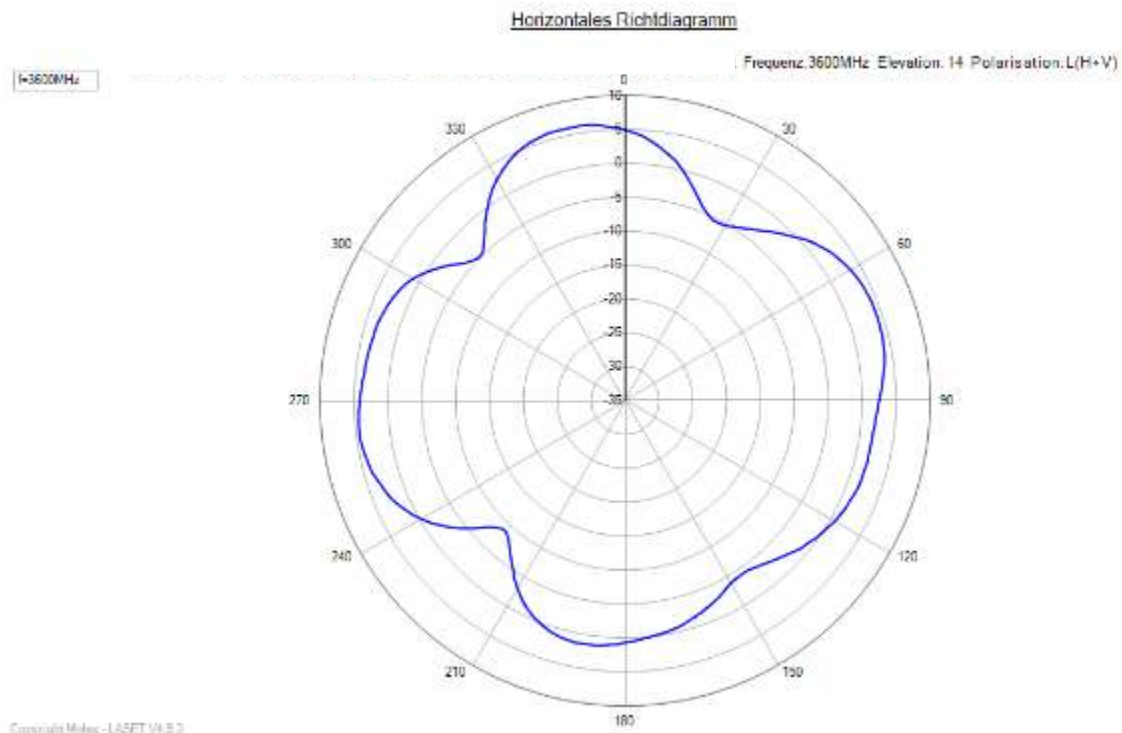
4.1.13 Radiation Pattern for Gain @ frequency range 3300-4200MHz



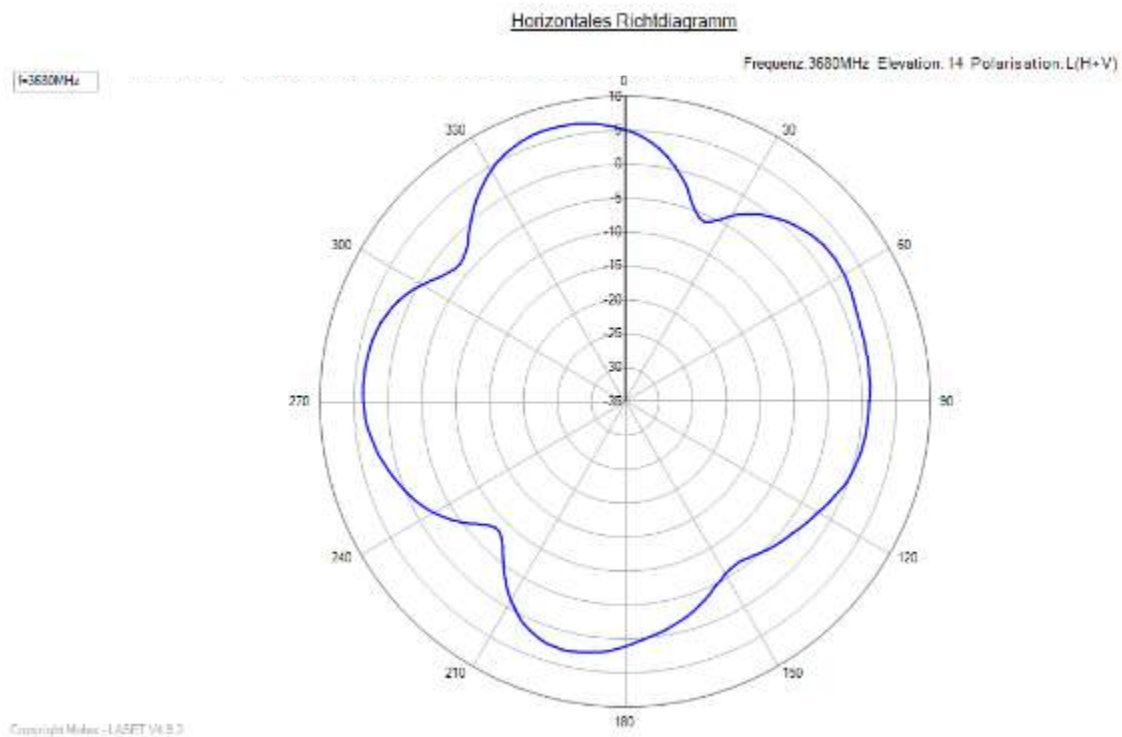
4.1.14 Radiation Pattern for Gain @ frequency range 3450-3550MHz



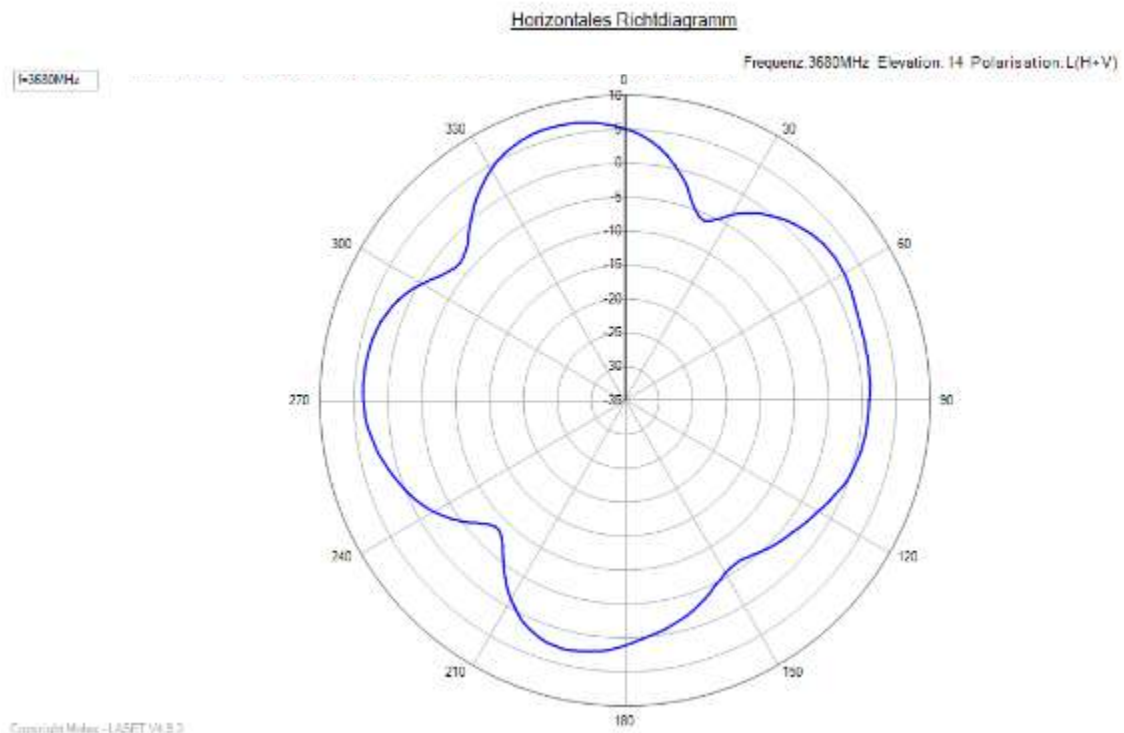
4.1.15 Radiation Pattern for Gain @ frequency range 3450-3600MHz



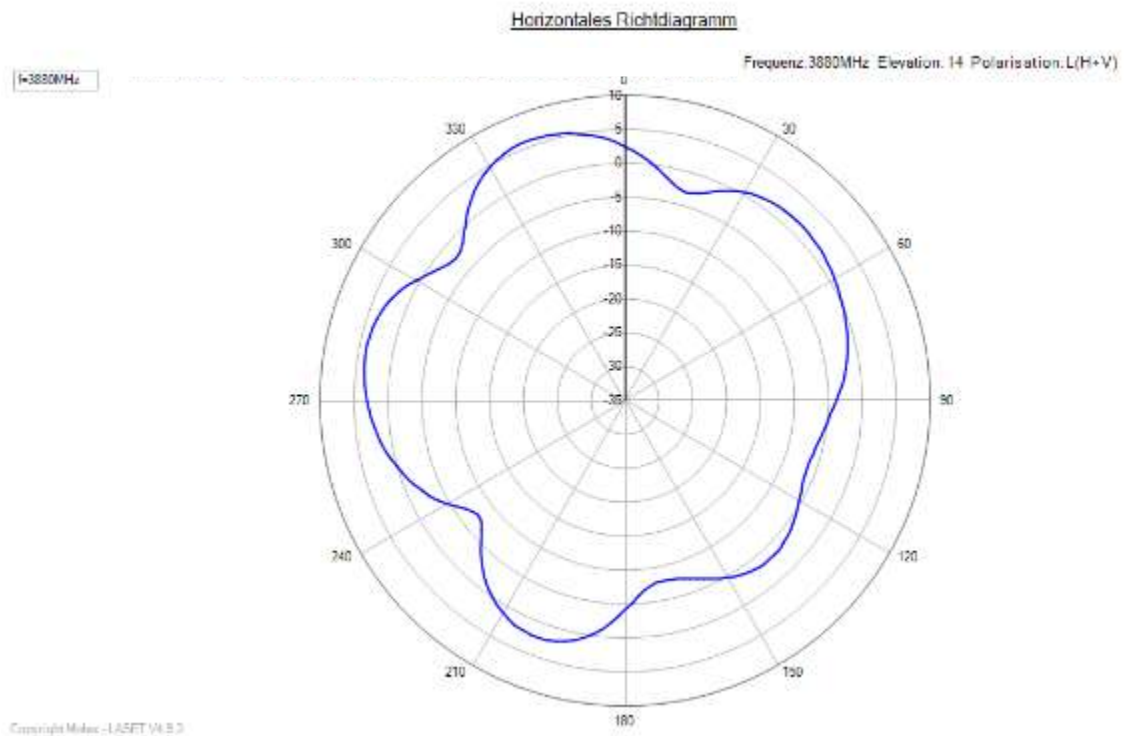
4.1.16 Radiation Pattern for Gain @ frequency range 3450-3900MHz



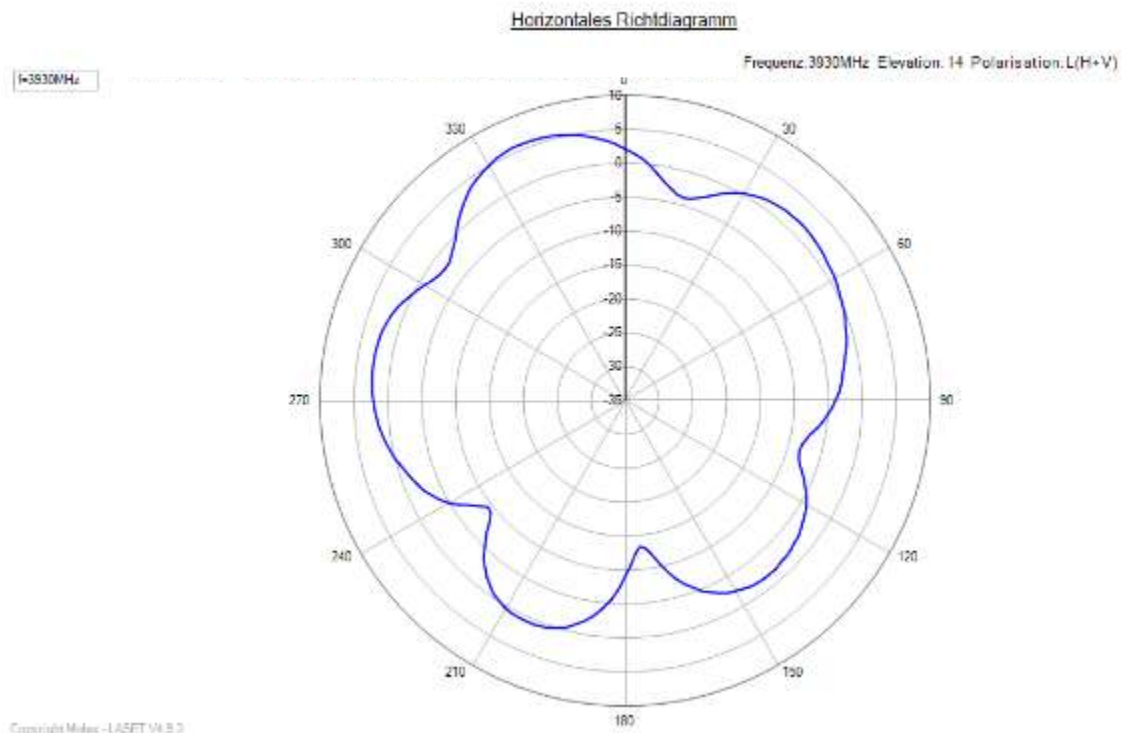
4.1.17 Radiation Pattern for Gain @ frequency range 3550-3700MHz



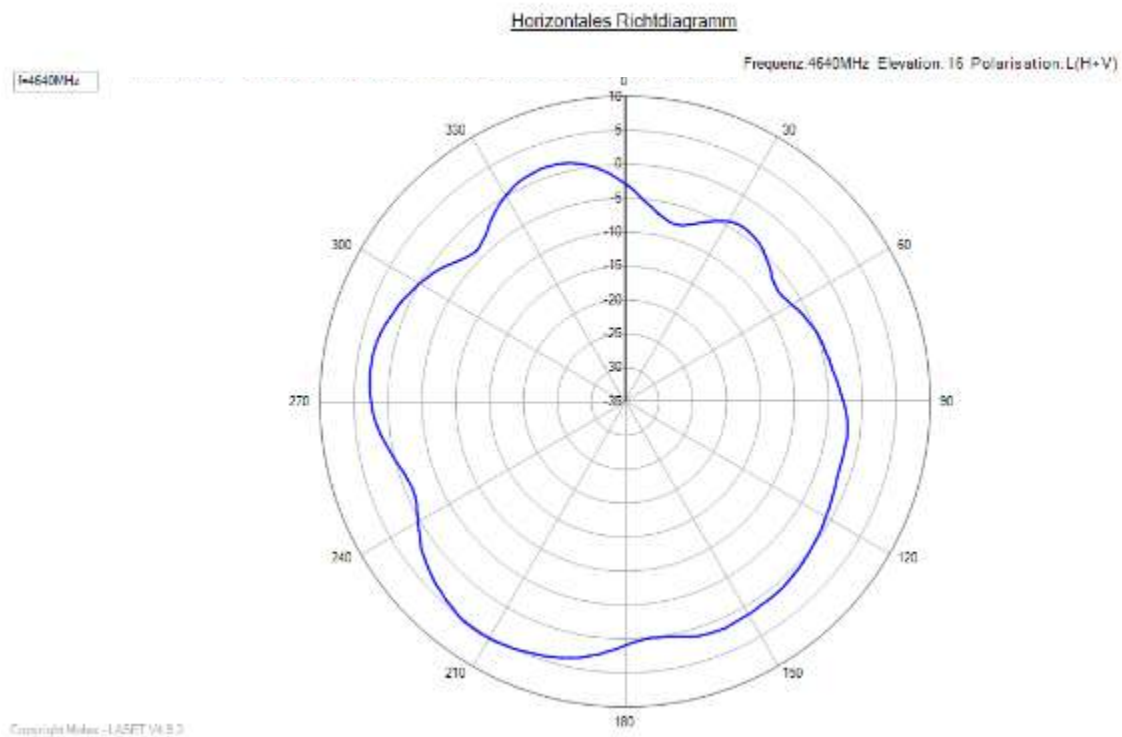
4.1.18 Radiation Pattern for Gain @ frequency range 3700-3980MHz



4.1.19 Radiation Pattern for Gain @ frequency range 3900-3980MHz



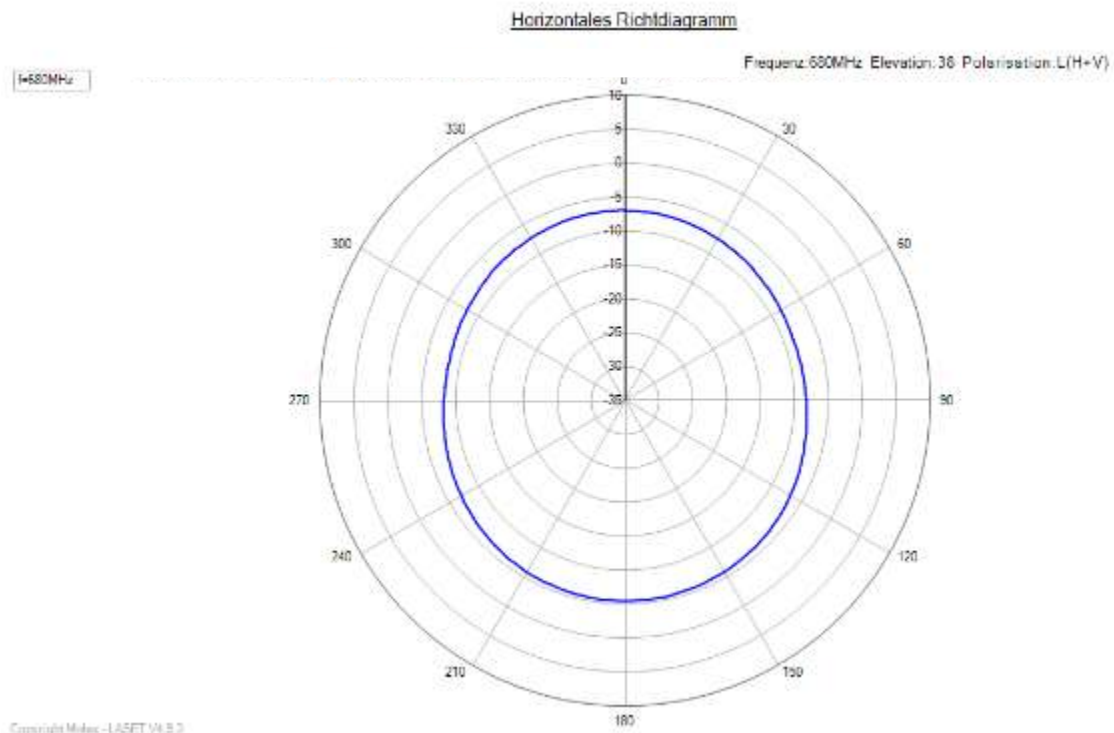
4.1.20 Radiation Pattern for Gain @ frequency range 4400-5000MHz



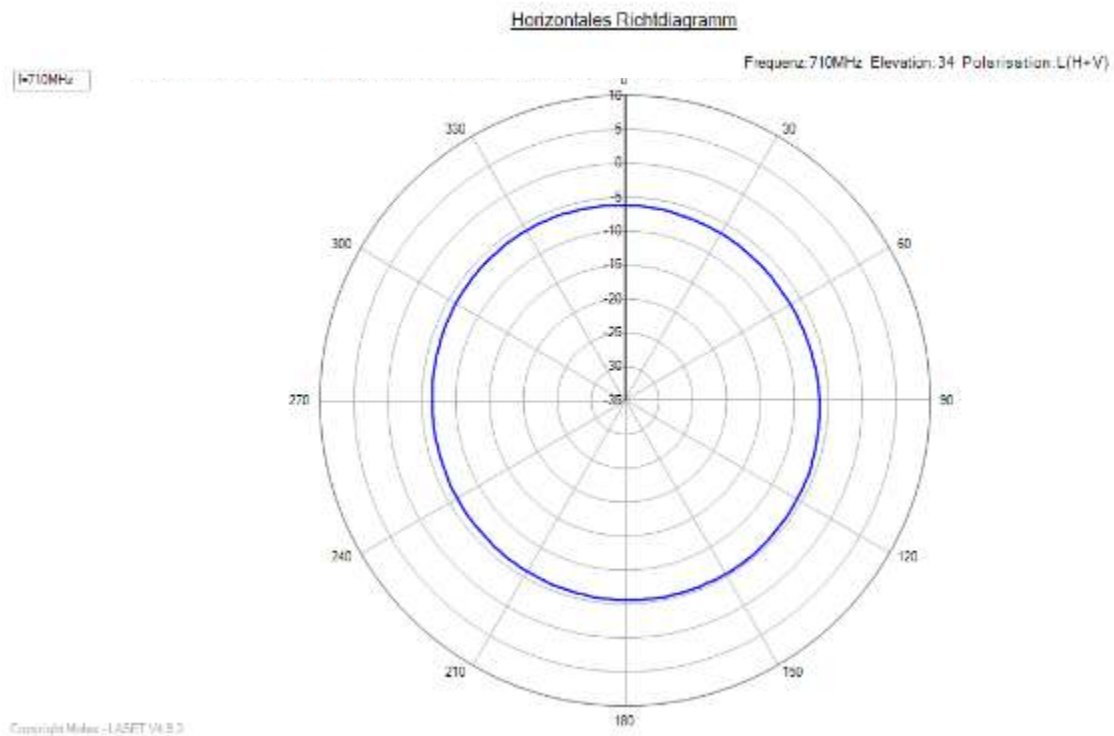
4.2 MIMO2 Peak Gain

Frequency band (MHz)	maximum gain
663-698	-5,4
699-716	-5,3
777-787	-3,4
814-824	-3,1
824-849	-2,8
1710-1780	3,0
1850-1910	1,9
1850-1915	1,9
2496-2690	3,2
2500-2570	3,1
2500-2690	3,1
2570-2620	1,9
3300-4200	7,5
3450-3550	5,9
3450-3600	5,9
3450-3900	7,2
3550-3700	5,9
3700-3980	7,4
3900-3980	7,4
4400-5000	4,7

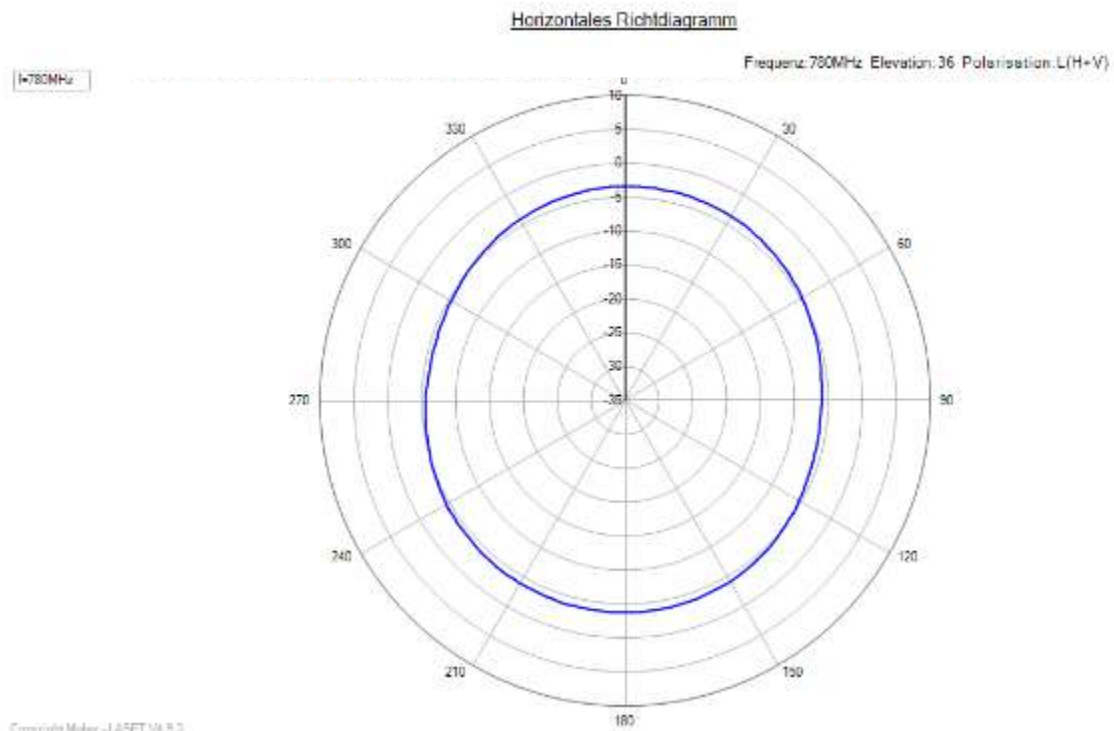
4.2.1 Radiation Pattern for Gain @ frequency range 663-698MHz



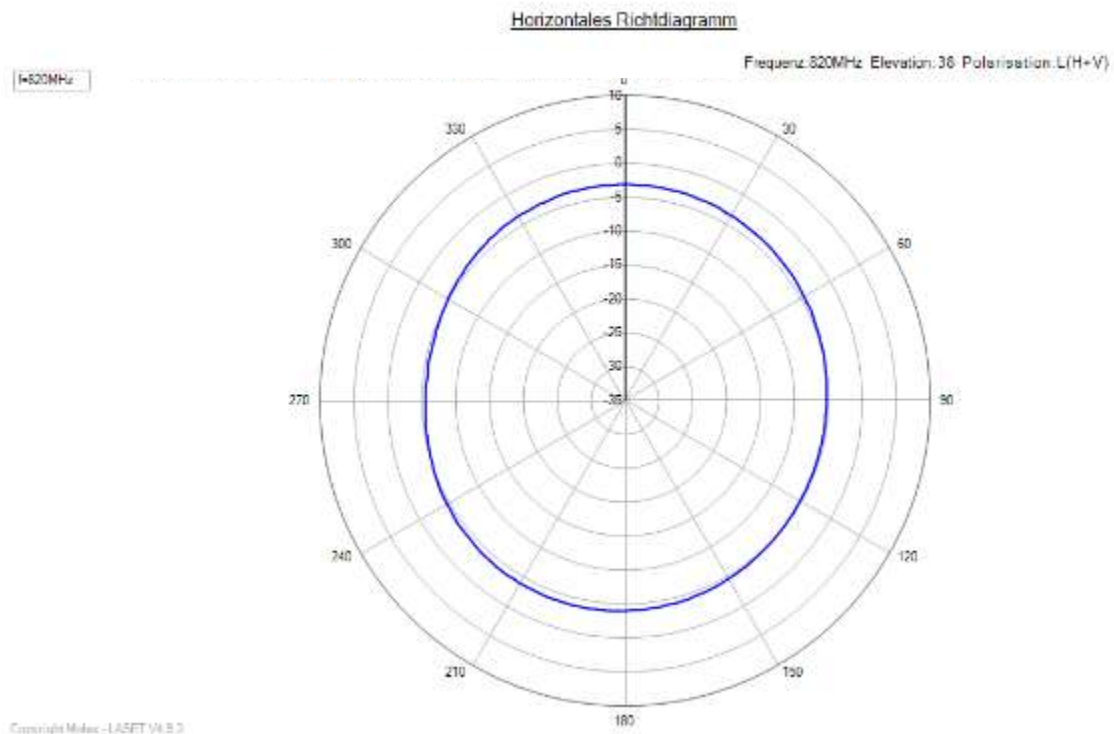
4.2.2 Radiation Pattern for Gain @ frequency range 699-716MHz



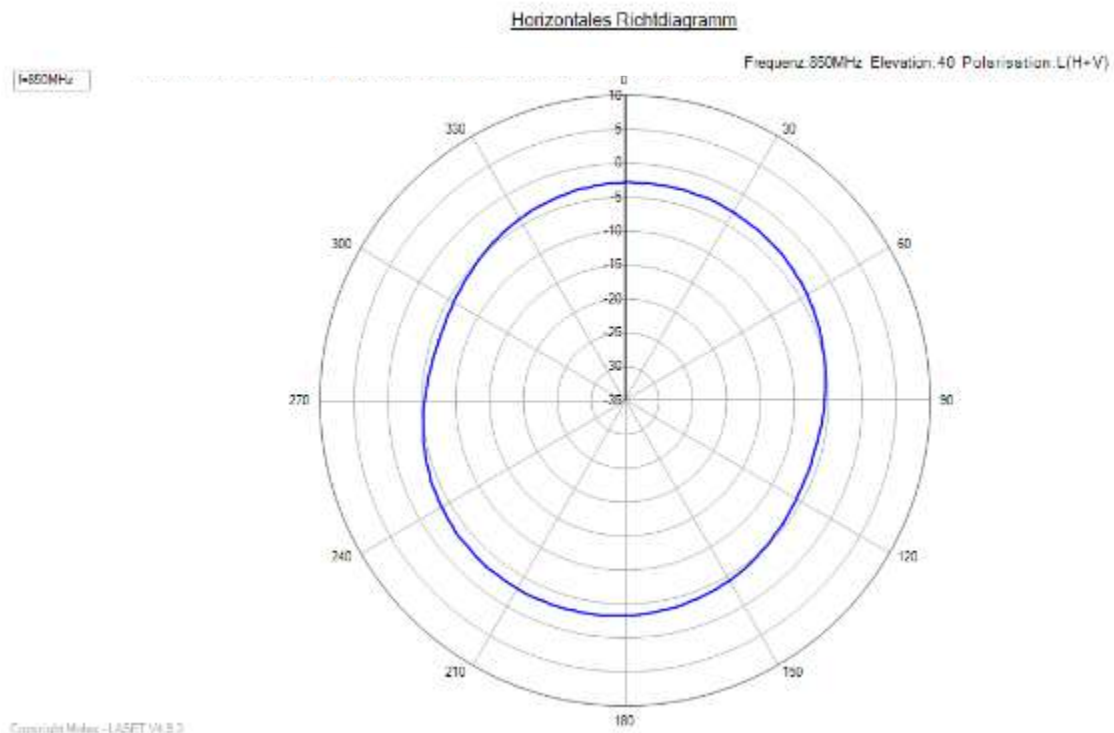
4.2.3 Radiation Pattern for Gain @ frequency range 777-787MHz



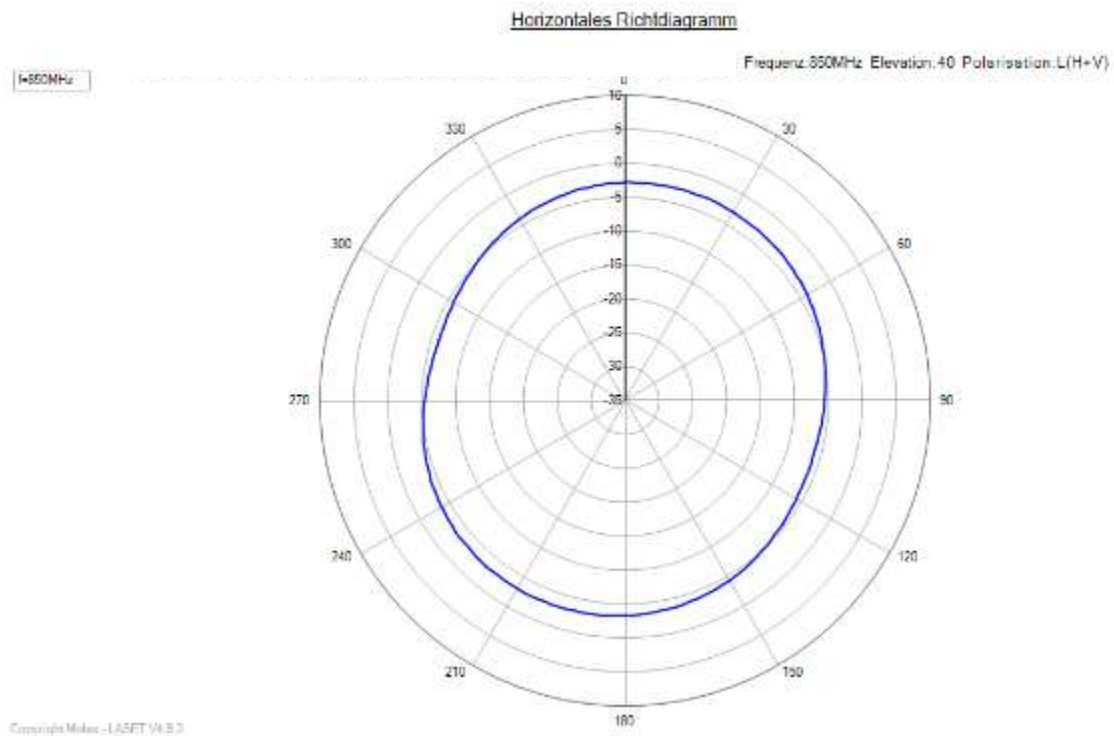
4.2.4 Radiation Pattern for Gain @ frequency range 814-824MHz



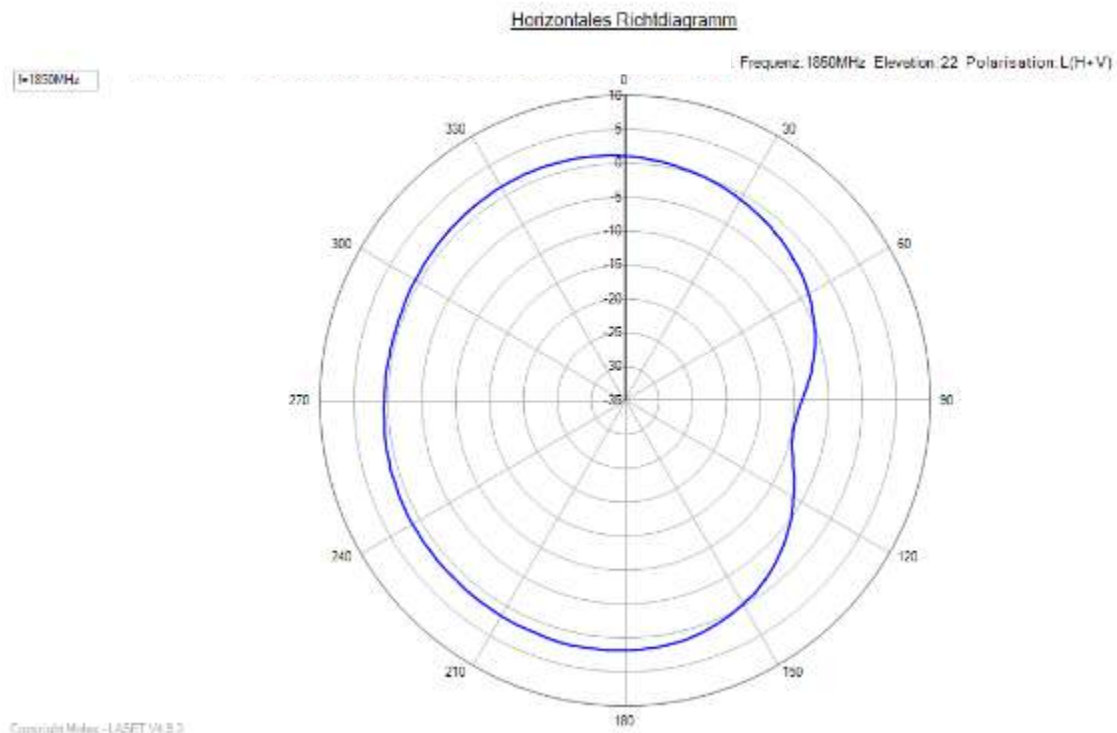
4.2.5 Radiation Pattern for Gain @ frequency range 824-849MHz



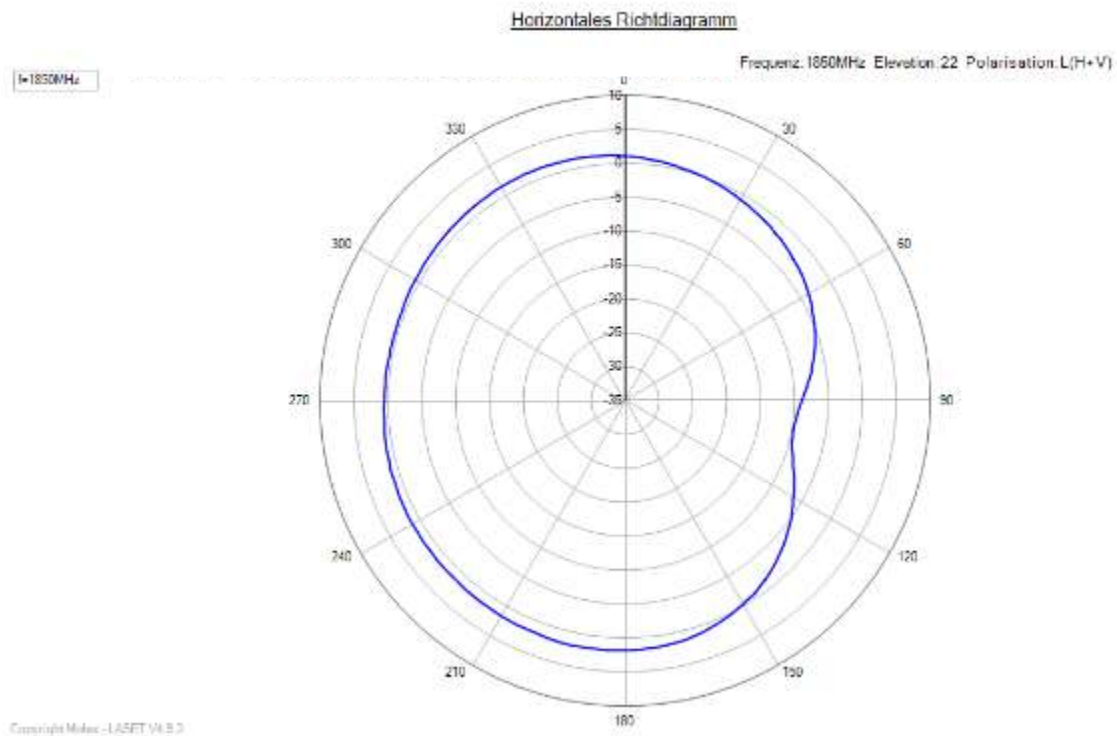
4.2.6 Radiation Pattern for Gain @ frequency range 1710-1780MHz



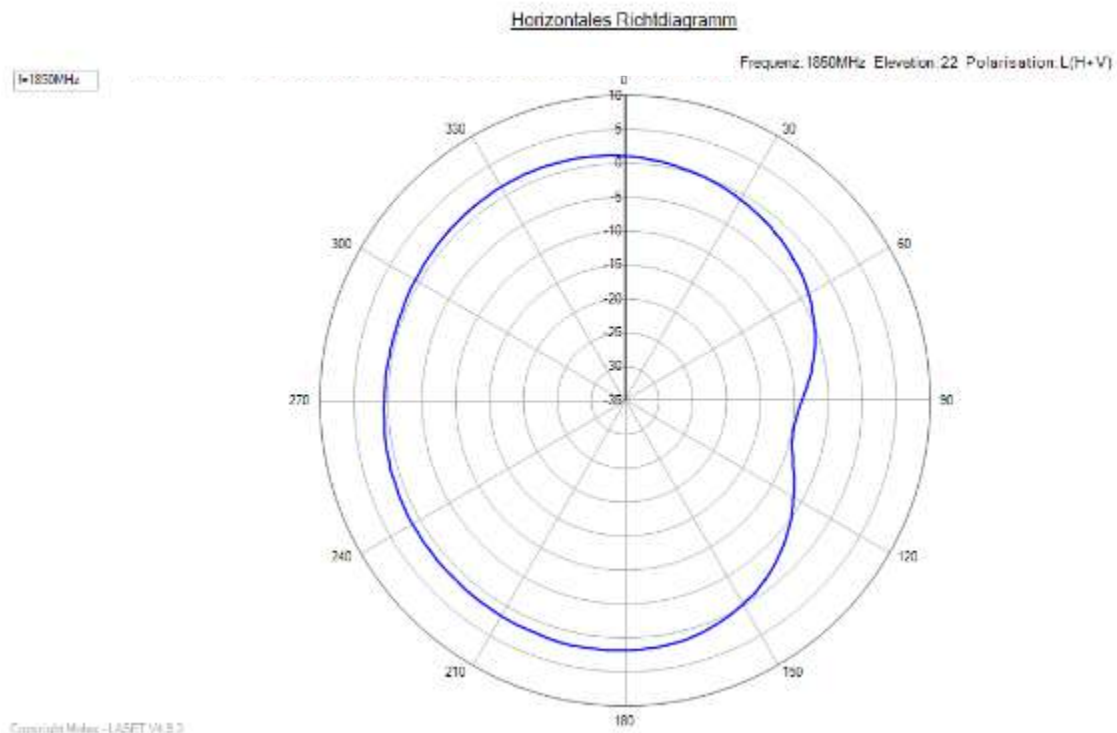
4.2.7 Radiation Pattern for Gain @ frequency range 1850-1910MHz



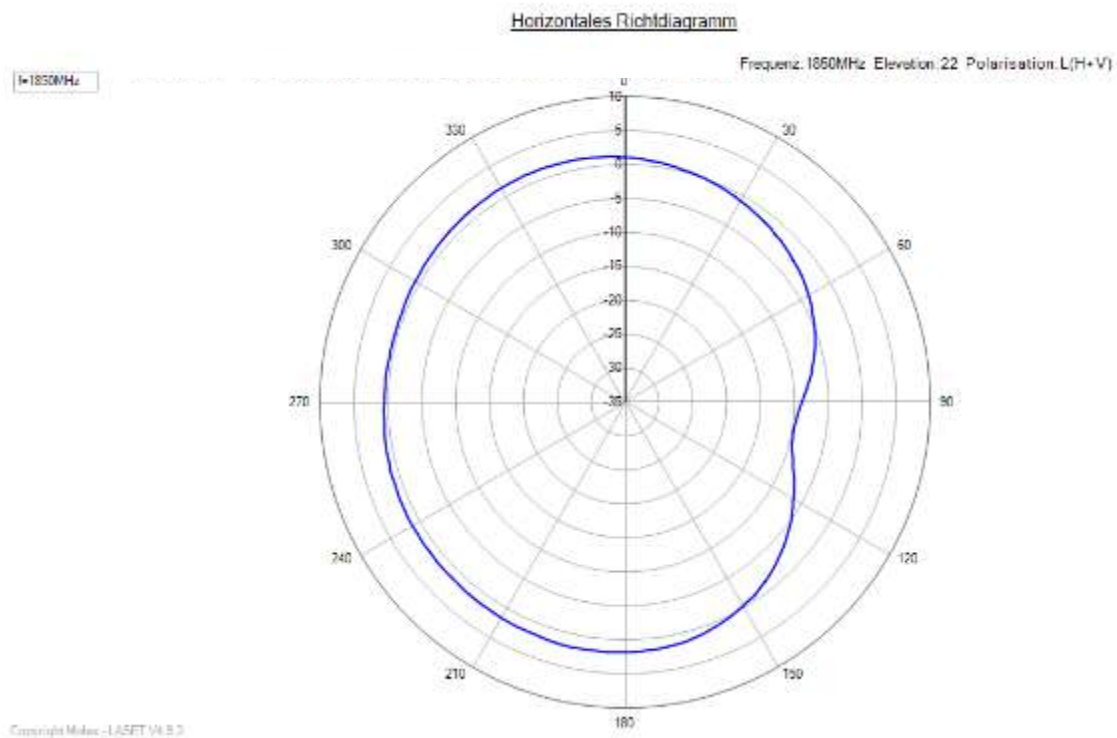
4.2.8 Radiation Pattern for Gain @ frequency range 1850-1915MHz



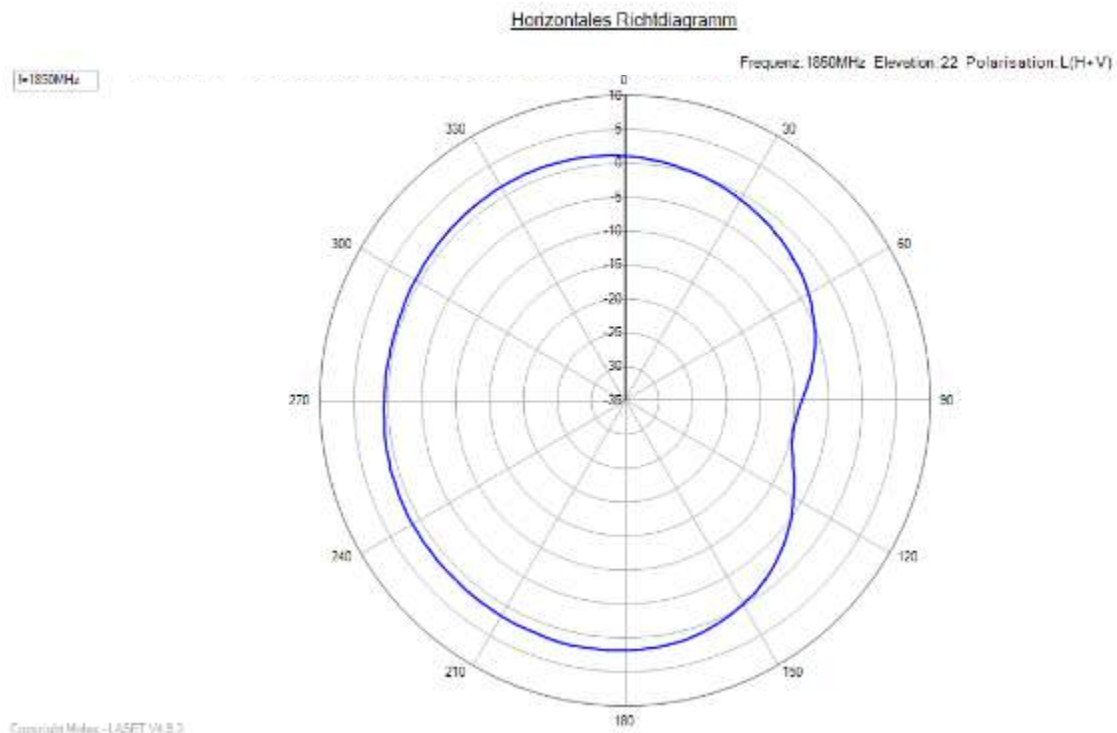
4.2.9 Radiation Pattern for Gain @ frequency range 2496-2690MHz



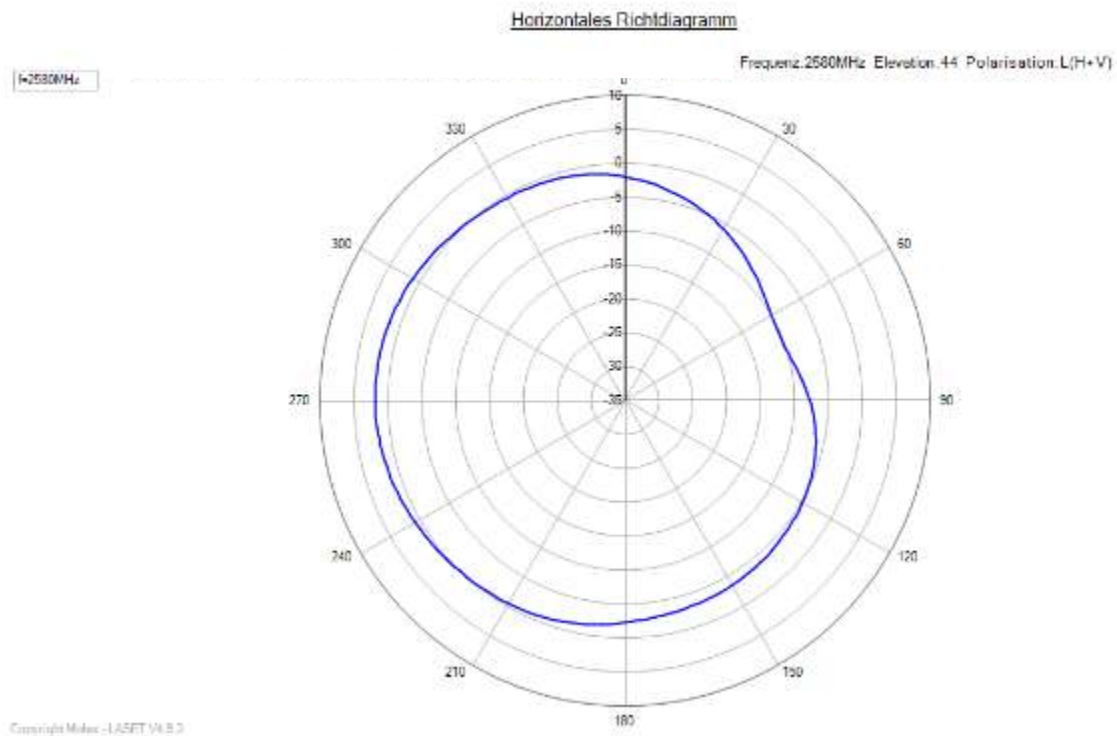
4.2.10 Radiation Pattern for Gain @ frequency range 2500-2570MHz



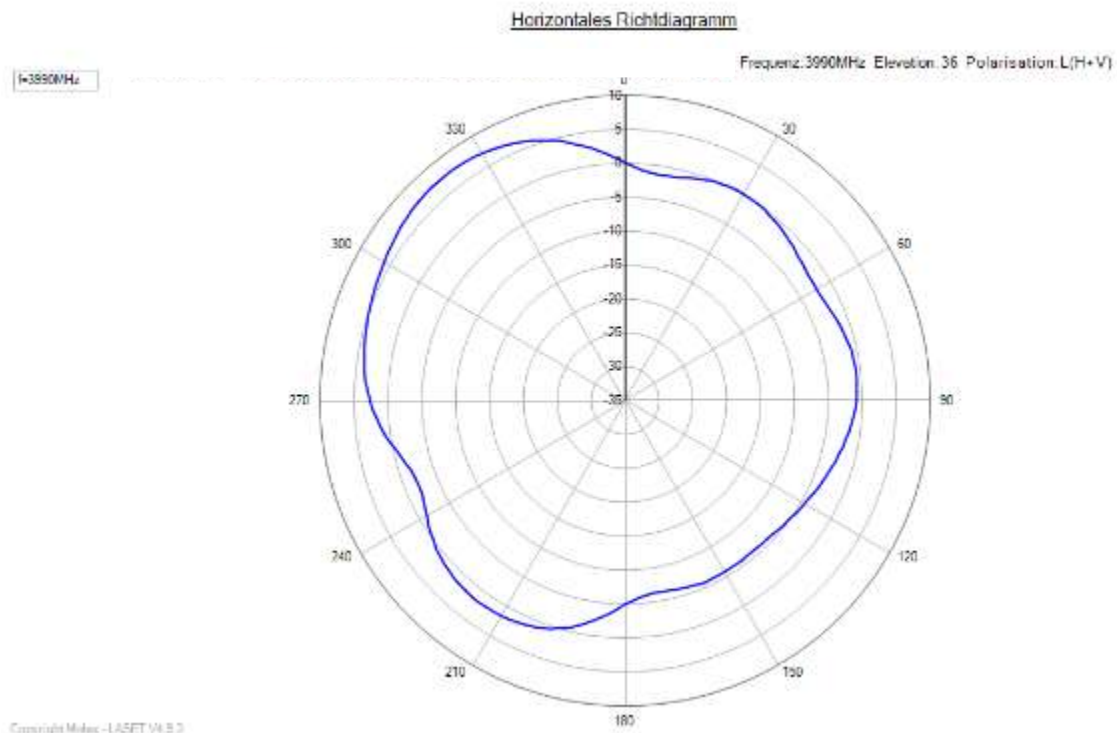
4.2.11 Radiation Pattern for Gain @ frequency range 2500-2690MHz



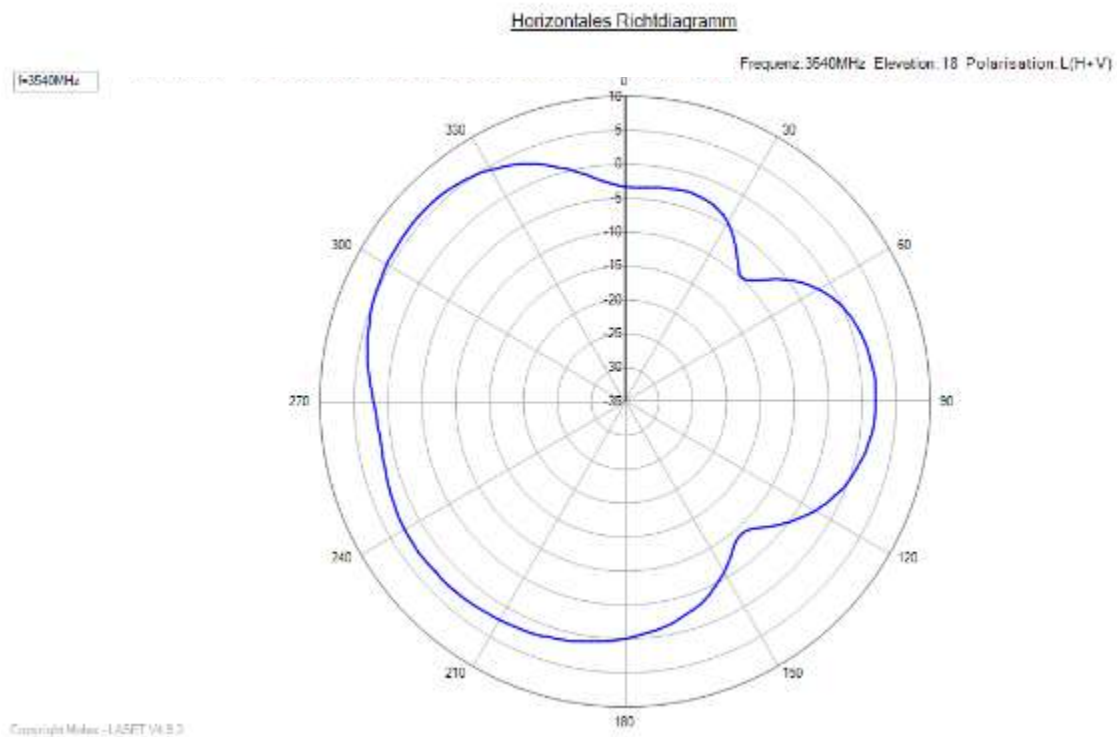
4.2.12 Radiation Pattern for Gain @ frequency range 2570-2620MHz



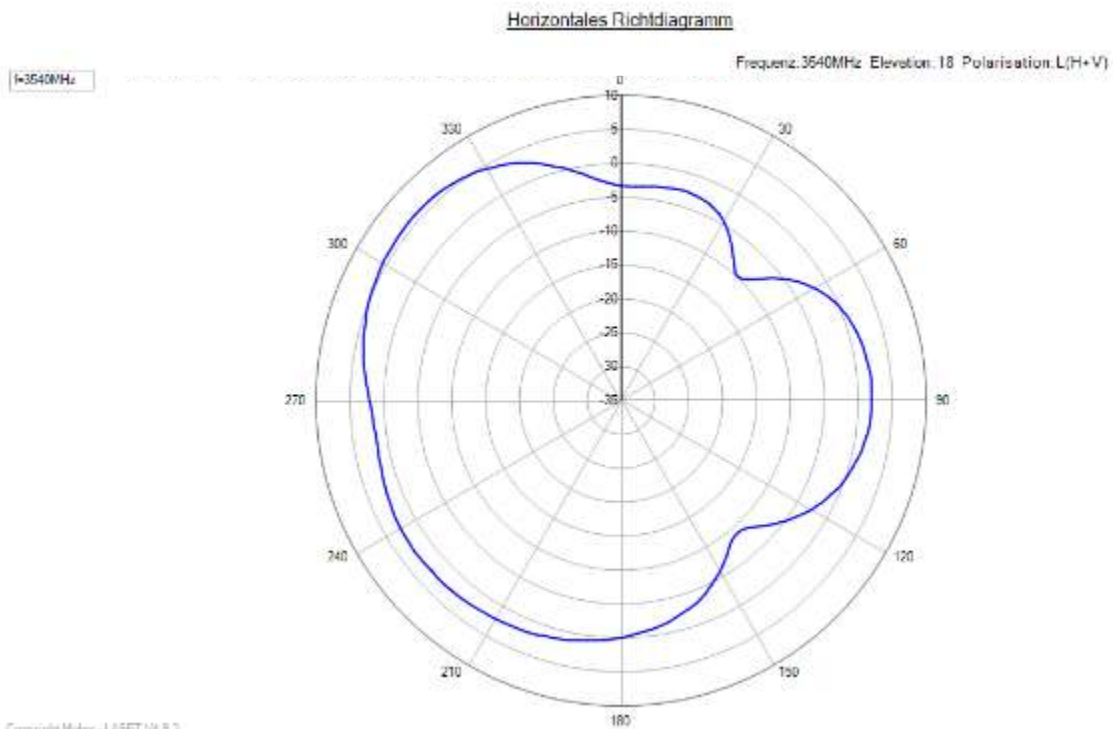
4.2.13 Radiation Pattern for Gain @ frequency range 3300-4200MHz



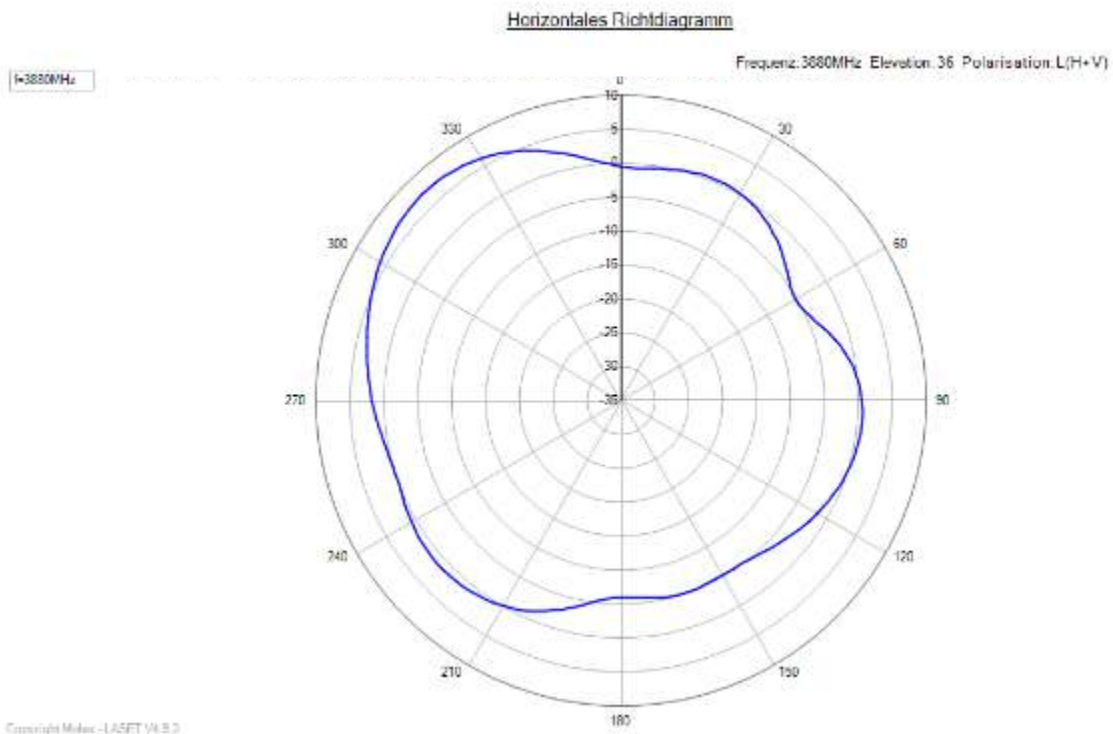
4.2.14 Radiation Pattern for Gain @ frequency range 3450-3550MHz



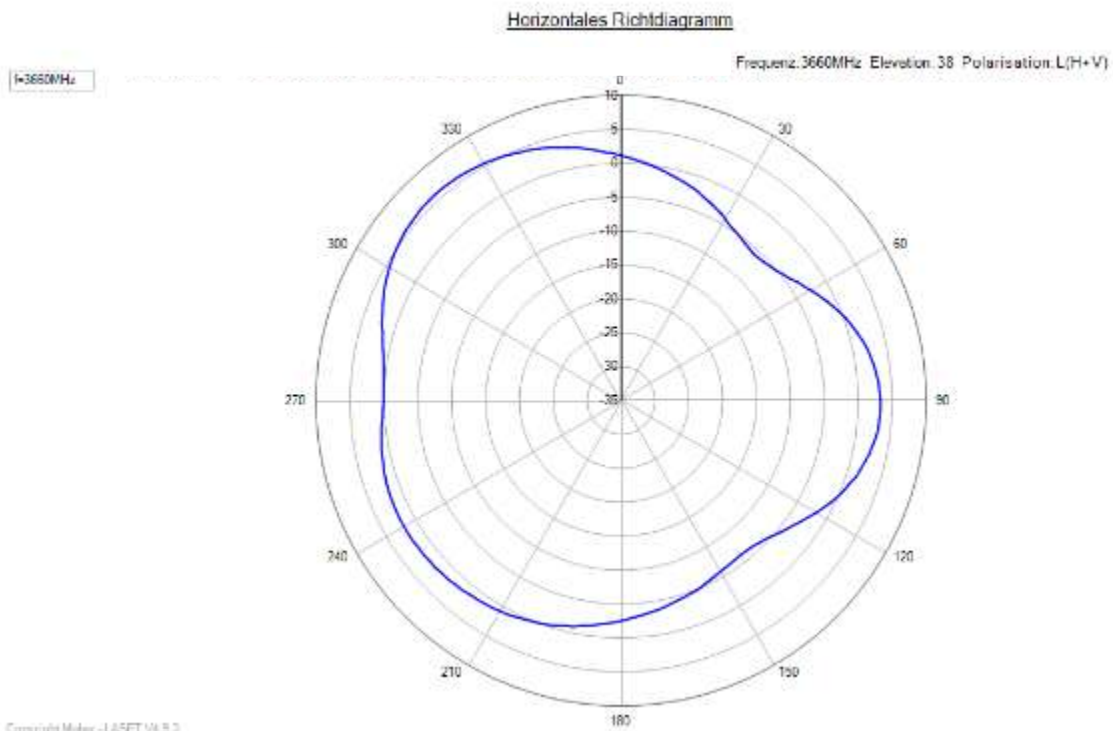
4.2.15 Radiation Pattern for Gain @ frequency range 3450-3600MHz



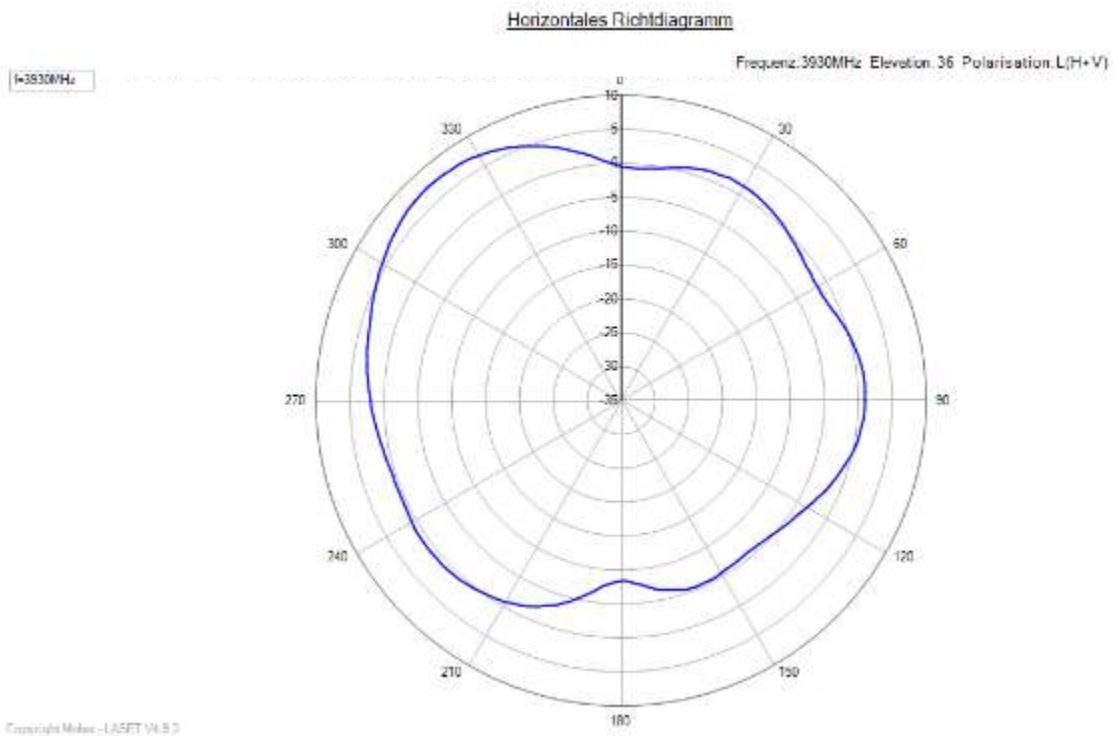
4.2.16 Radiation Pattern for Gain @ frequency range 3450-3900MHz



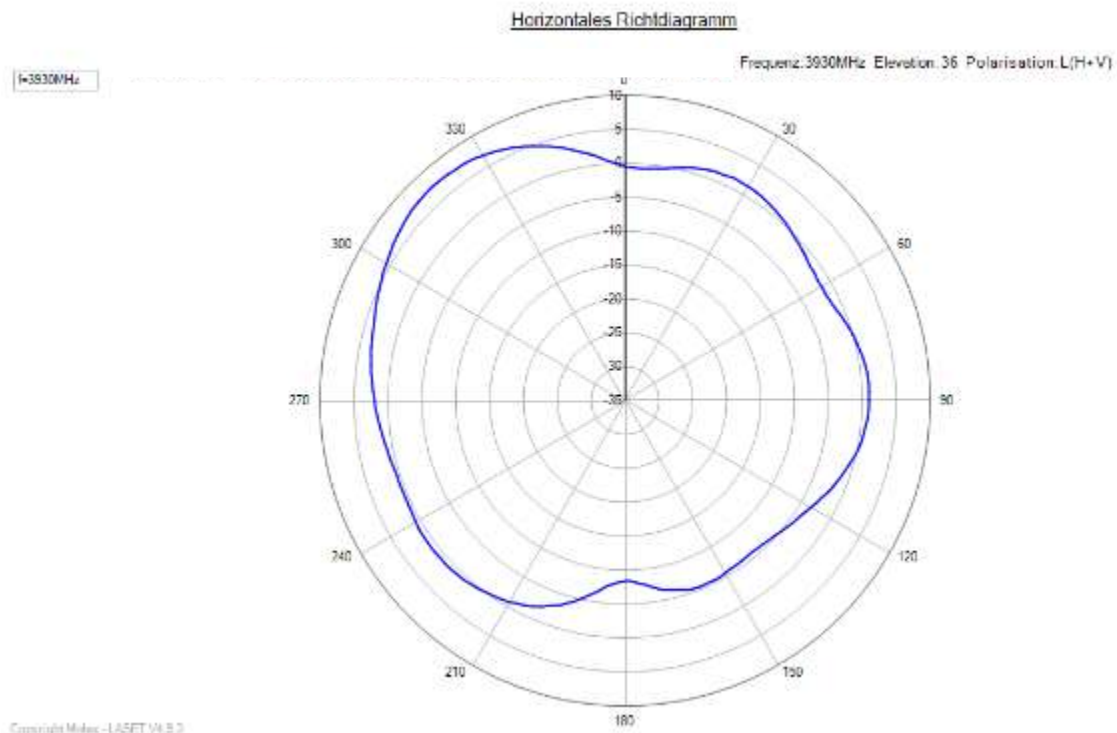
4.2.17 Radiation Pattern for Gain @ frequency range 3550-3700MHz



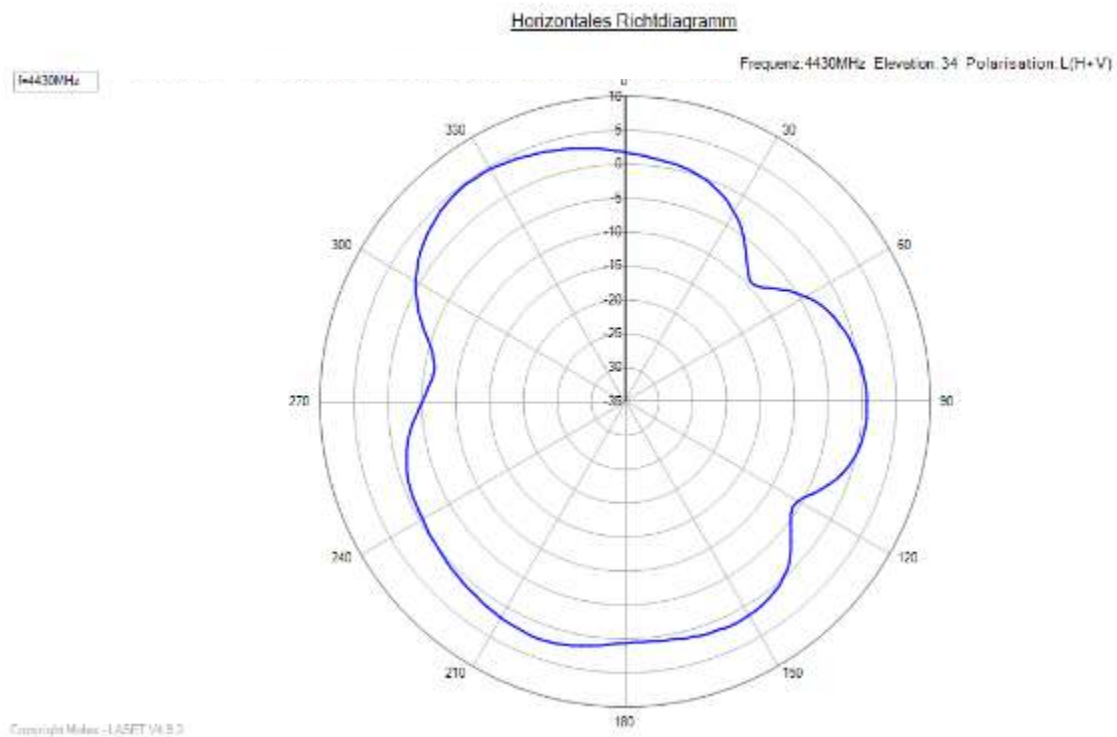
4.2.18 Radiation Pattern for Gain @ frequency range 3700-3980MHz



4.2.19 Radiation Pattern for Gain @ frequency range 3900-3980MHz



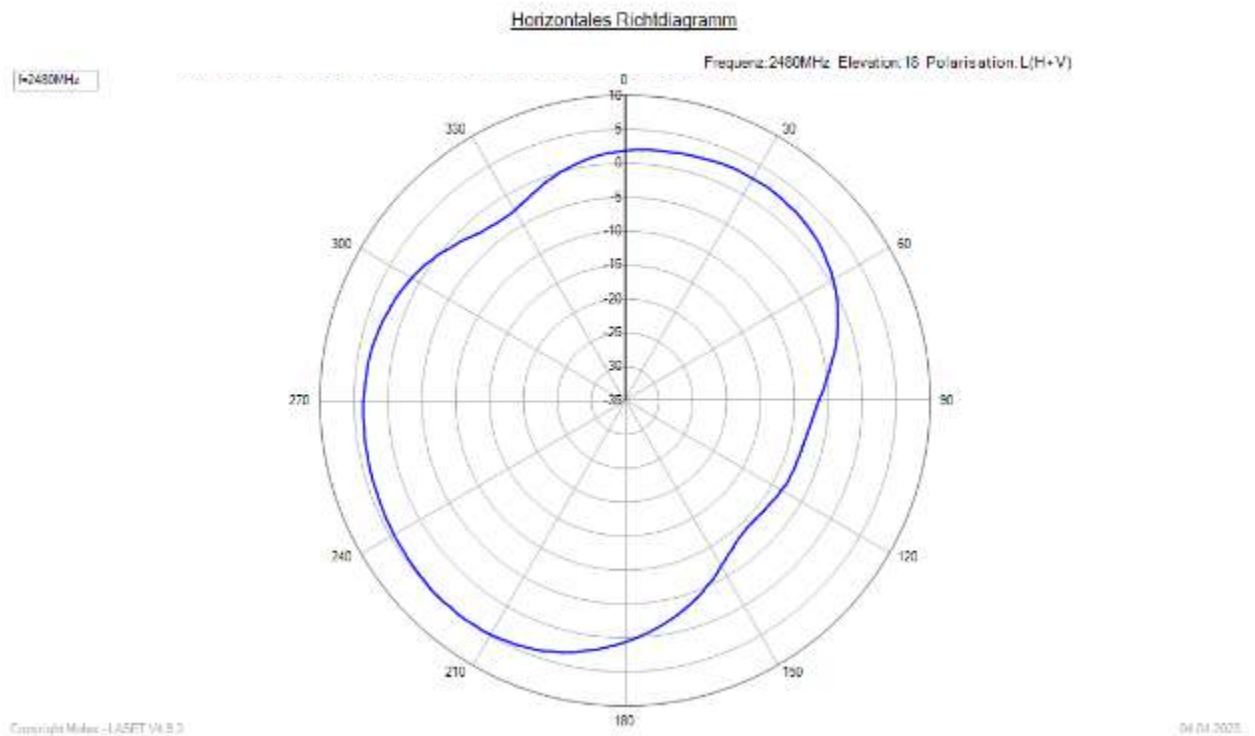
4.2.20 Radiation Pattern for Gain @ frequency range 4400-5000MHz



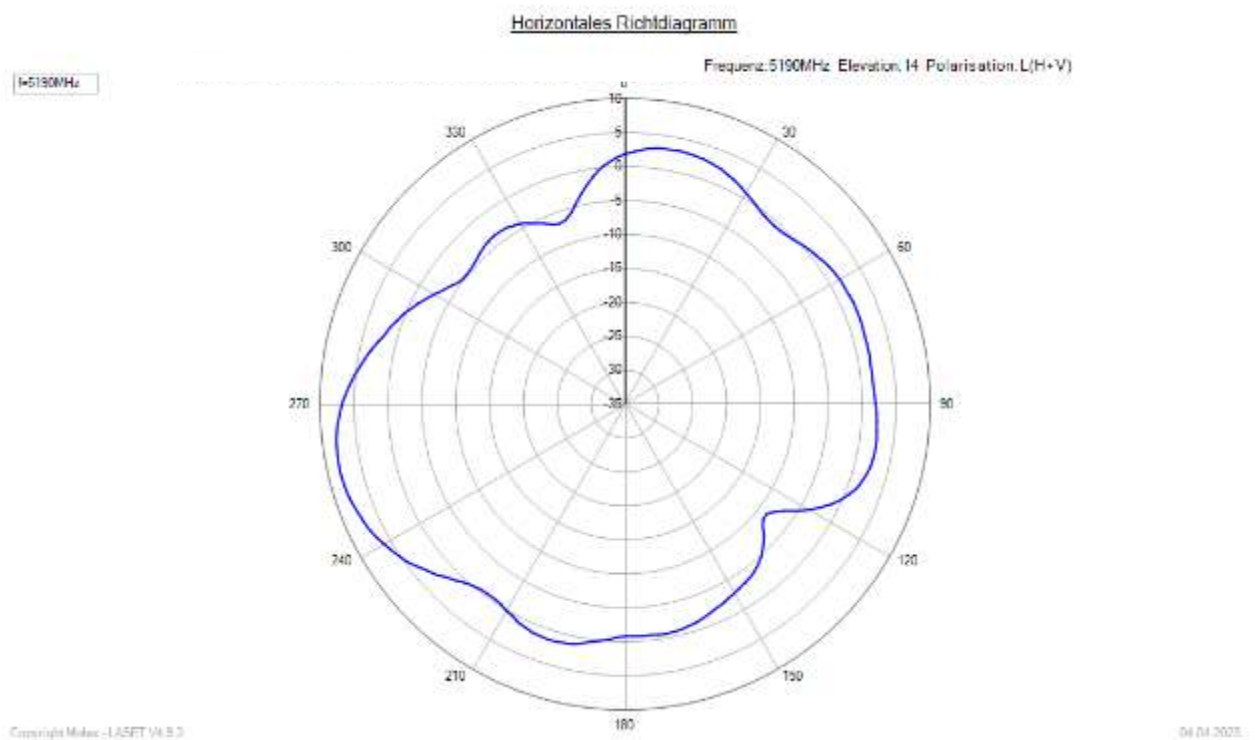
4.3 WiFi 1 2.4 & 5/6 GHz Peak Gain

Band	frequency band in MHz		maximum gain
	begin	end	in freq. band in dBi
2,4 GHz	2402	2483,5	4,99
U-NII-1	5150	5250	8,18
U-NII-2A	5250	5350	6,78
U-NII-2C	5470	5725	7,82
U-NII-3	5725	5850	8,67
U-NII-5	5925	6425	9,04
U-NII-6	6425	6525	8,80
U-NII-7	6525	6875	10,04
U-NII-8	6875	7125	8,42

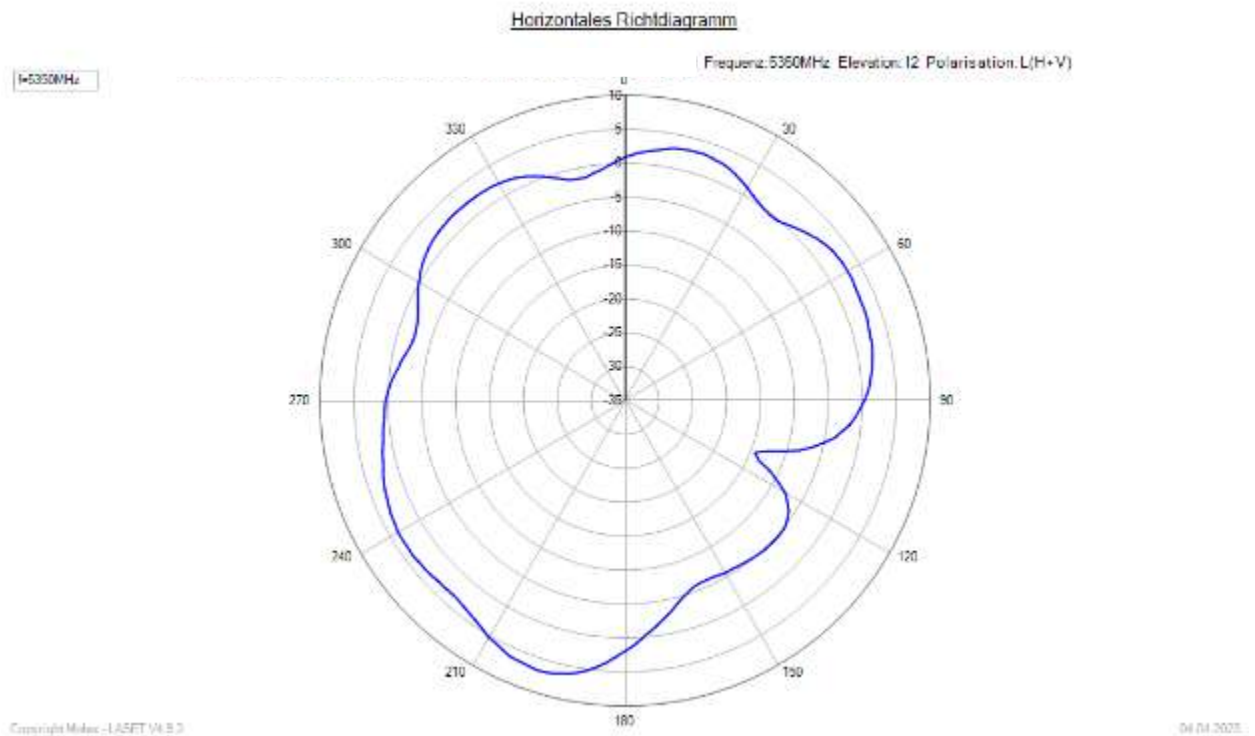
4.3.1 Radiation Pattern for Gain @ frequency range 2402 MHz -2483,5 MHz



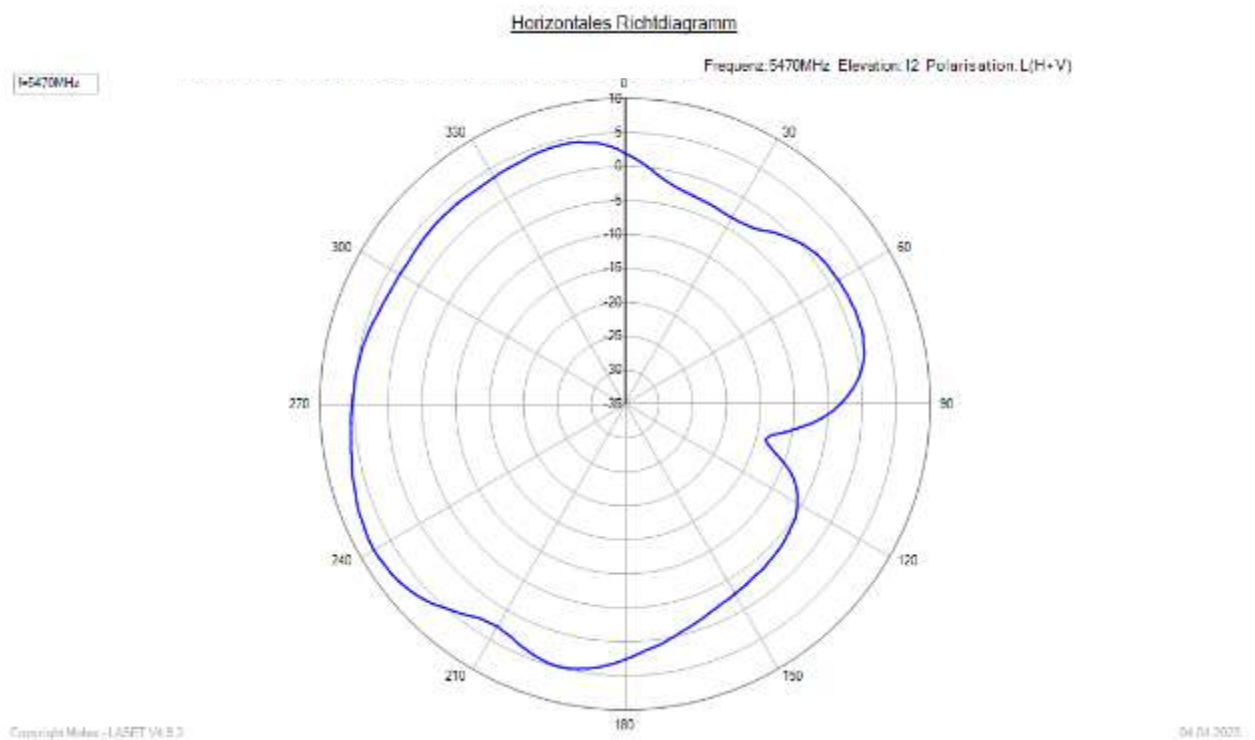
4.3.2 Radiation Pattern for Gain @ frequency range 5150 MHz -5250 MHz



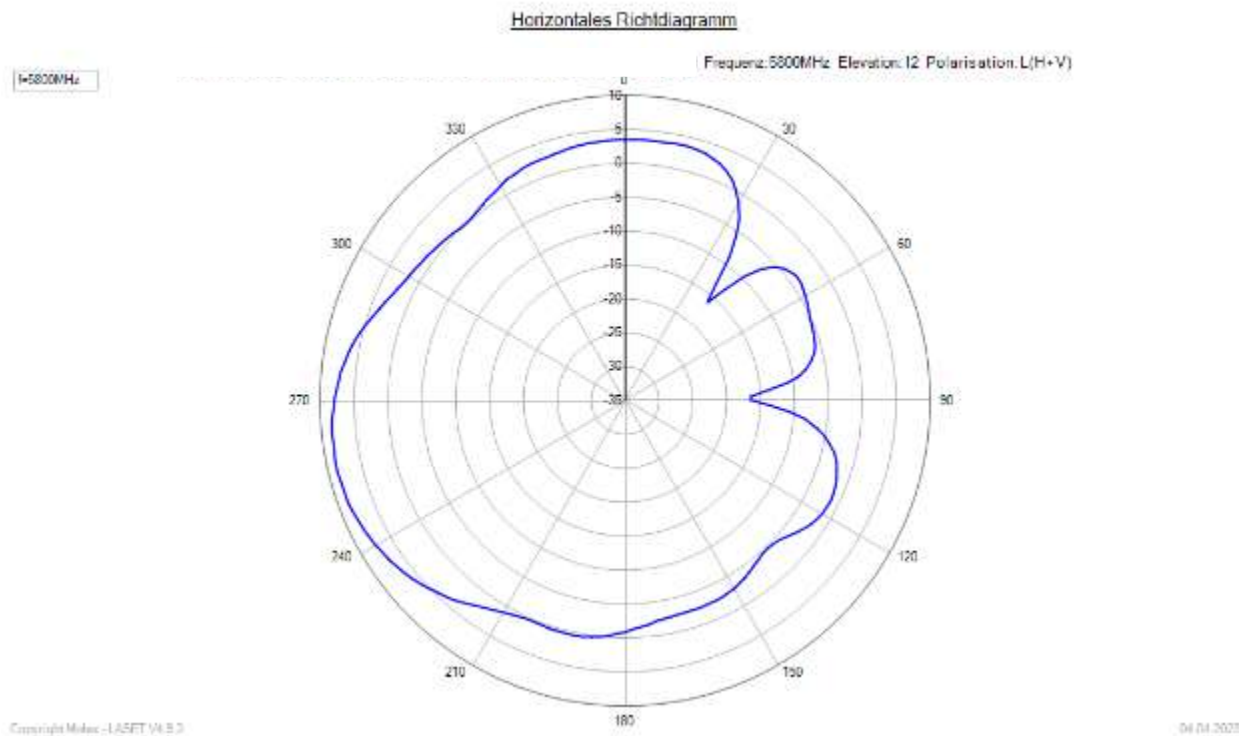
4.3.3 Radiation Pattern for Gain @ frequency range 5250 MHz -5350 MHz



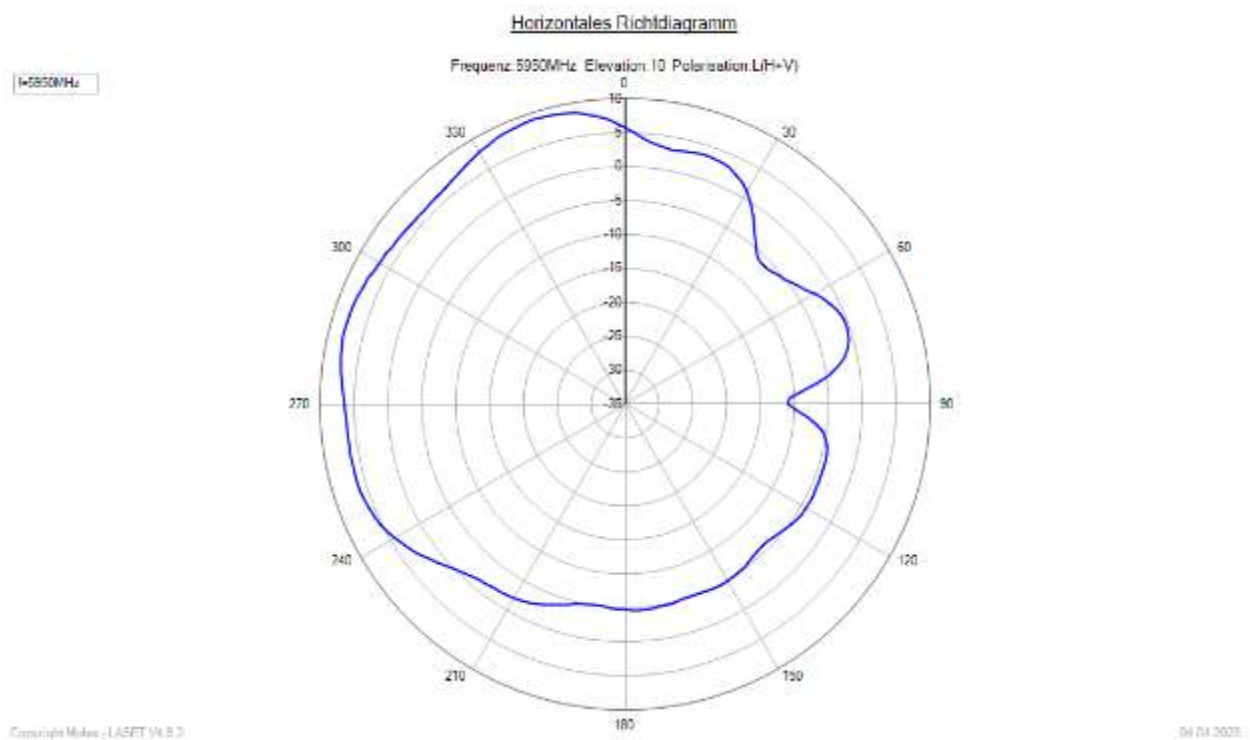
4.3.4 Radiation Pattern for Gain @ frequency range 5470 MHz -5725 MHz



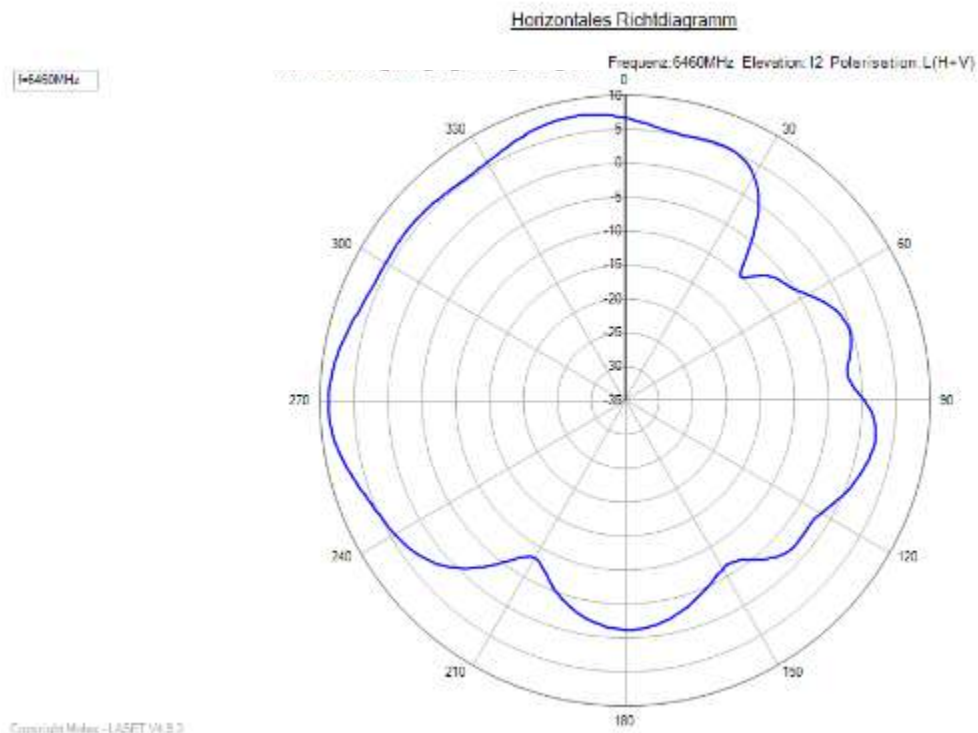
4.3.5 Radiation Pattern for Gain @ frequency range 5725 MHz -5850 MHz



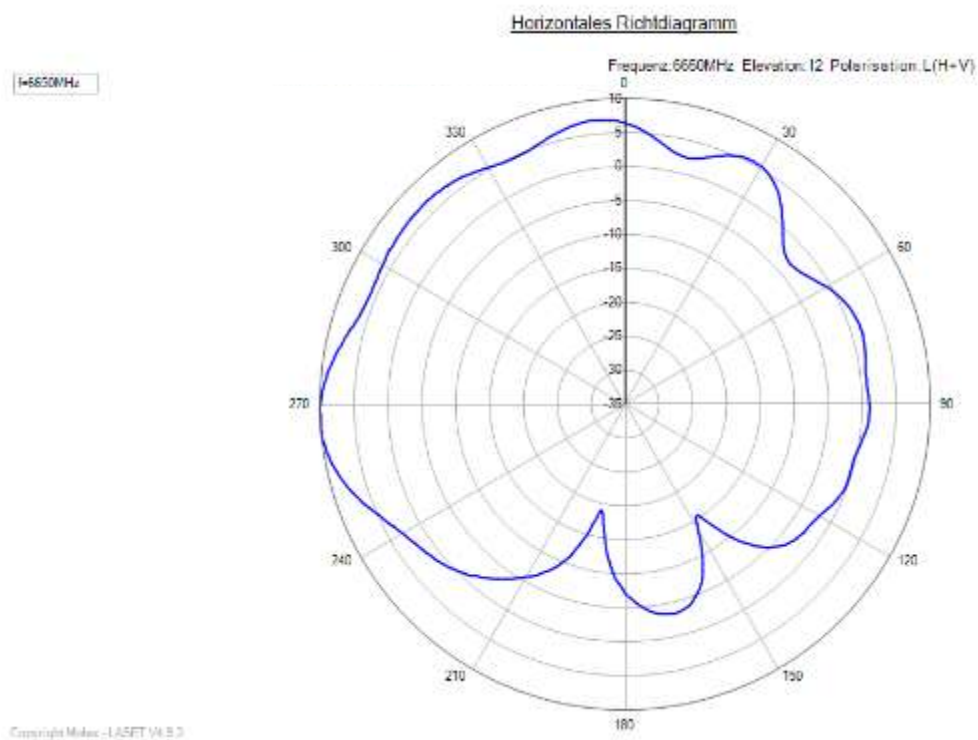
4.3.6 Radiation Pattern for Gain @ frequency range 5925 MHz -6425 MHz



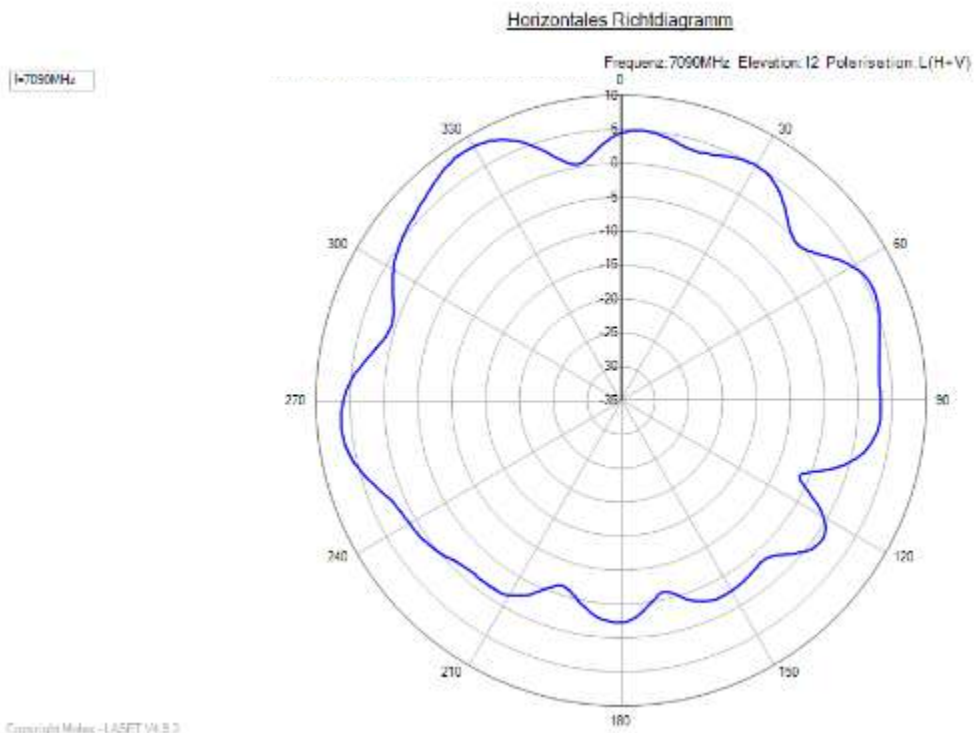
4.3.7 Radiation Pattern for Gain @ frequency range 6425 MHz -6525 MHz



4.3.8 Radiation Pattern for Gain @ frequency range 6525 MHz -6875 MHz



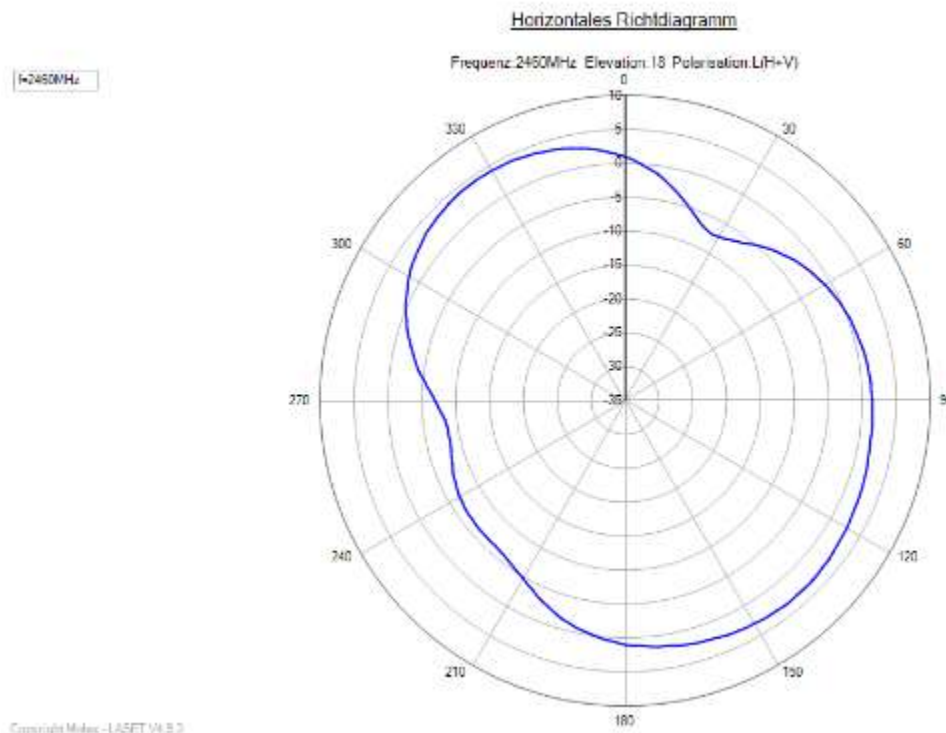
4.3.9 Radiation Pattern for Gain @ frequency range 6875 MHz -7125 MHz



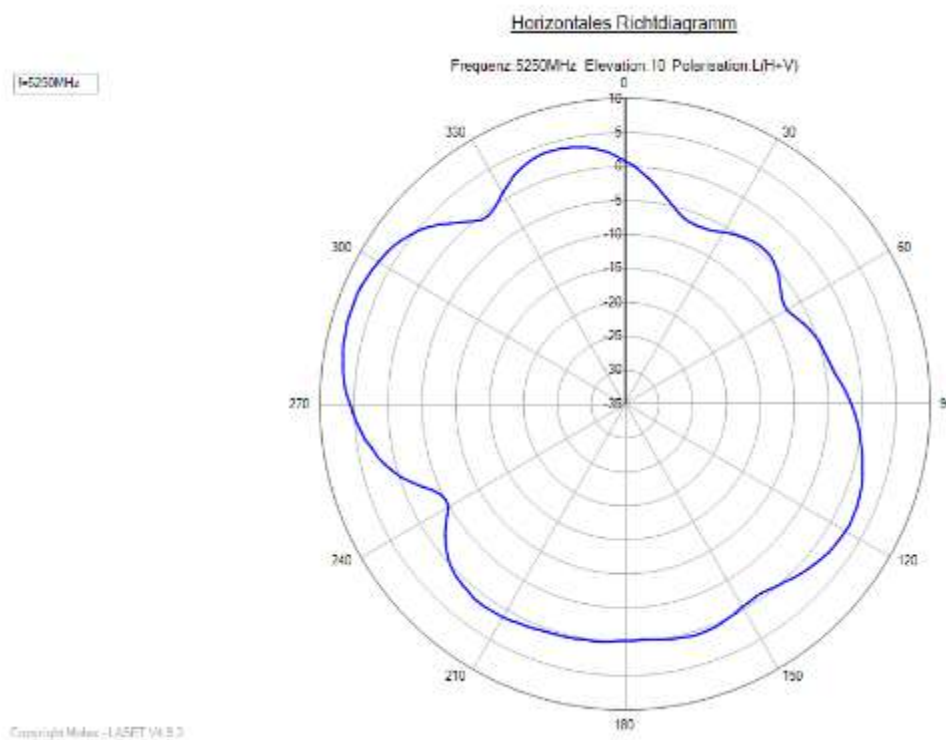
4.4 WiFi 2 2.4 & 5/6 GHz Peak Gain

Band	frequency band in MHz		maximum gain
	begin	end	in freq. band in dBi
2,4 GHz	2402	2483,5	4,23
U-NII-1	5150	5250	7,73
U-NII-2A	5250	5350	7,95
U-NII-2C	5470	5725	5,40
U-NII-3	5725	5850	6,15
U-NII-5	5925	6425	9,01
U-NII-6	6425	6525	8,60
U-NII-7	6525	6875	9,34
U-NII-8	6875	7125	8,22

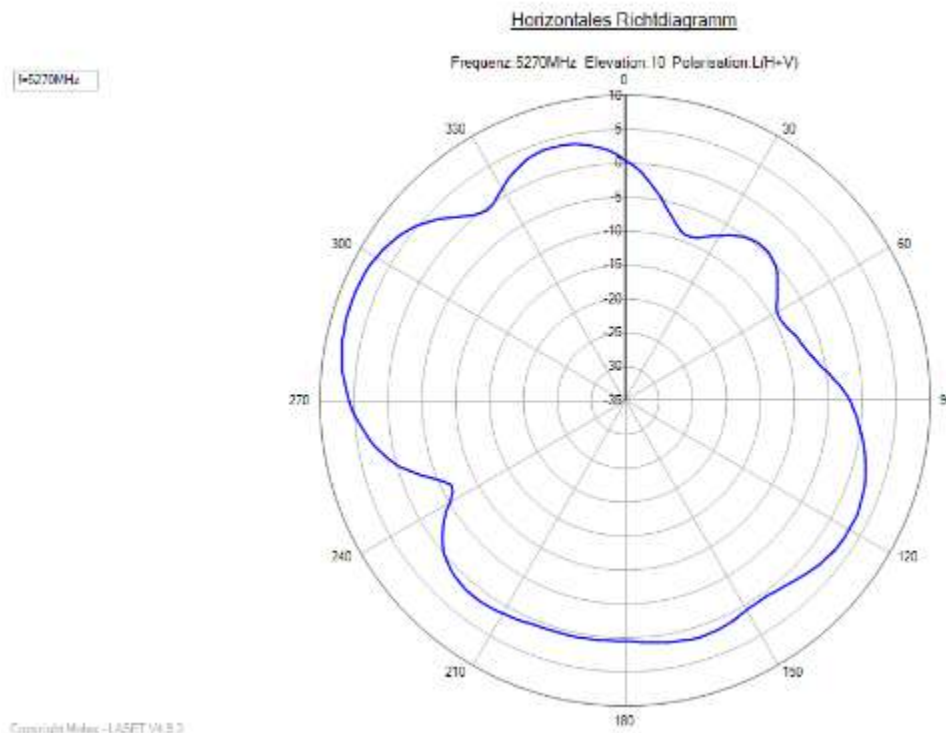
4.4.1 Radiation Pattern for Gain @ frequency range 2402 MHz -2483,5 MHz



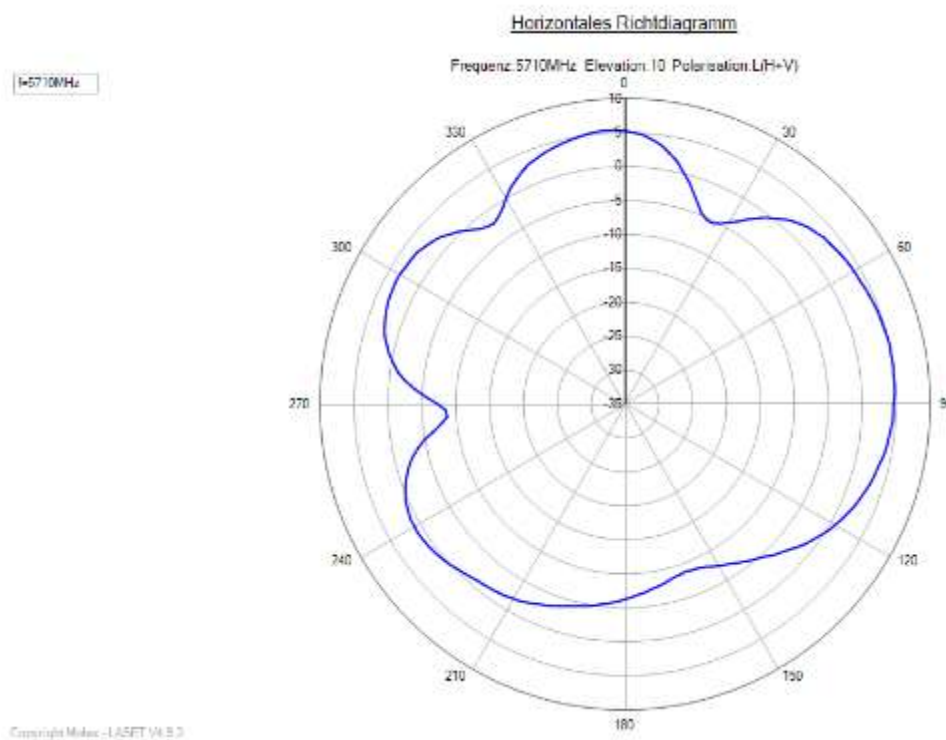
4.4.2 Radiation Pattern for Gain @ frequency range 5150 MHz -5250 MHz



4.4.3 Radiation Pattern for Gain @ frequency range 5250 MHz -5350 MHz



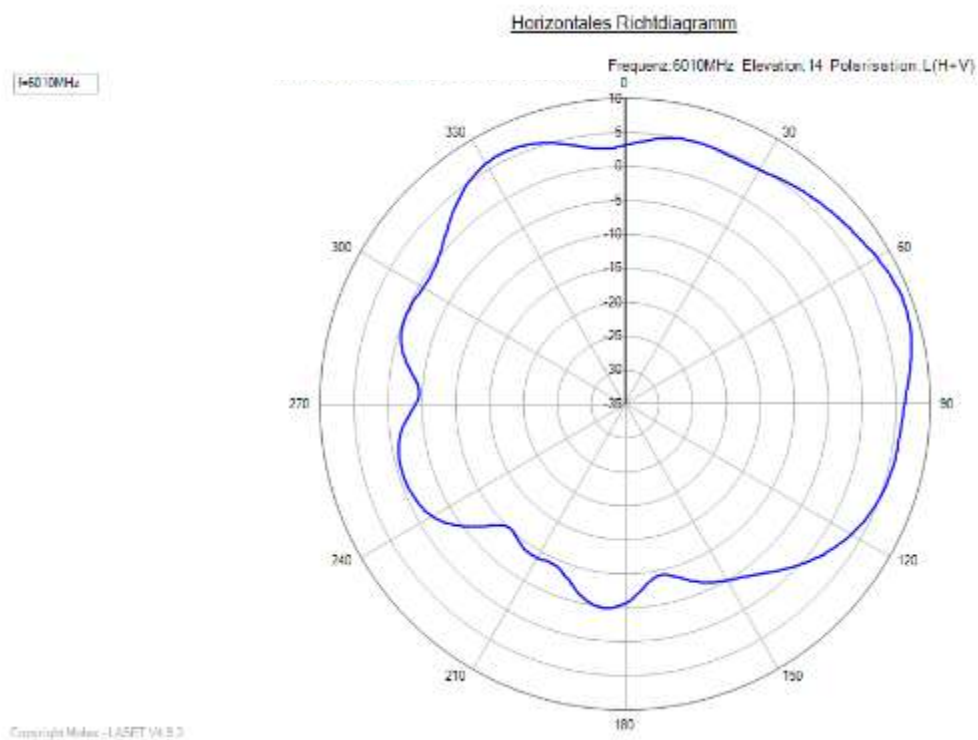
4.4.4 Radiation Pattern for Gain @ frequency range 5470 MHz -5725 MHz



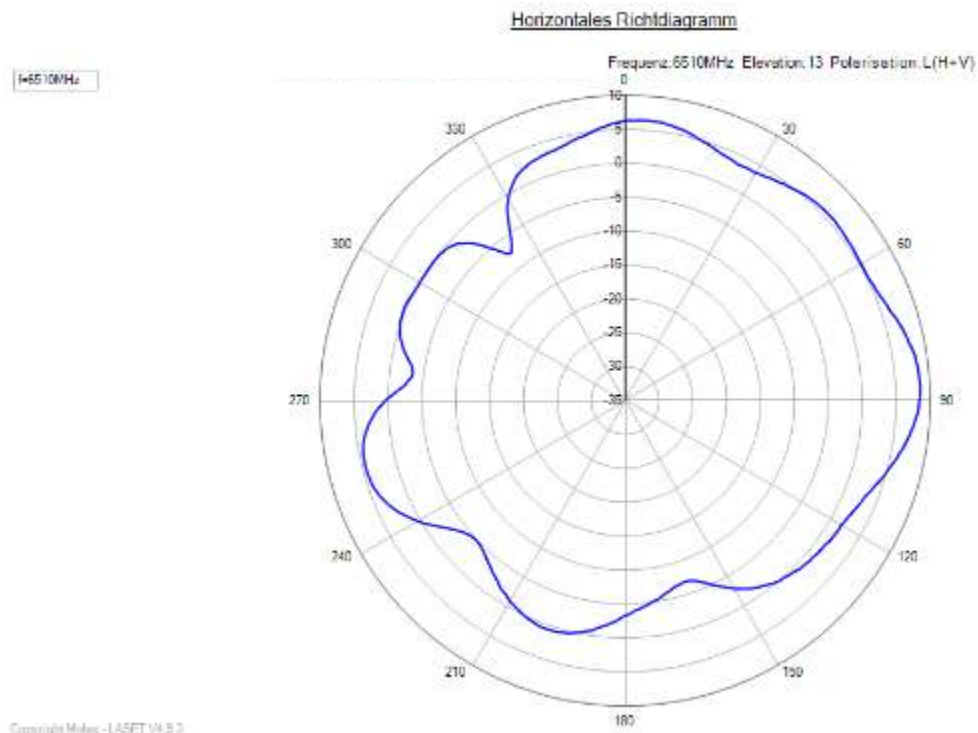
4.4.5 Radiation Pattern for Gain @ frequency range 5725 MHz -5850 MHz



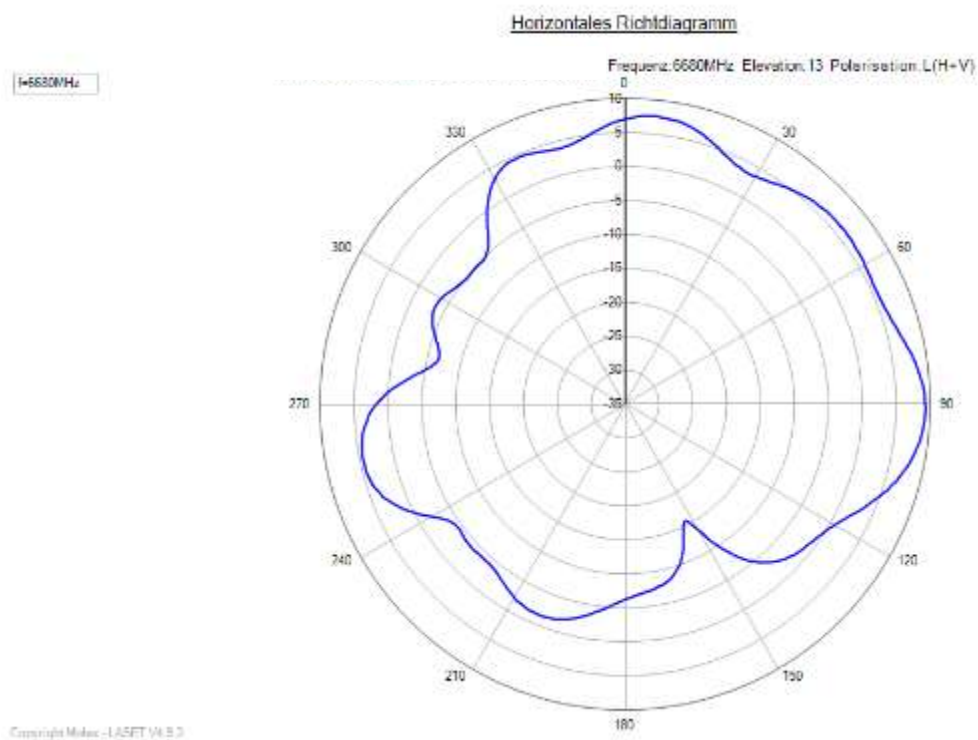
4.4.6 Radiation Pattern for Gain @ frequency range 5925 MHz -6425 MHz



4.4.7 Radiation Pattern for Gain @ frequency range 6425 MHz -6525 MHz



4.4.8 Radiation Pattern for Gain @ frequency range 6525 MHz -6875 MHz



4.4.9 Radiation Pattern for Gain @ frequency range 6875 MHz -7125 MHz

