



APPLICATION SPECIFICATION

TITLE

2IN1 (4G/GPS&BD) EXTERNAL ANTENNA

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REVISION: A	ECR/ECN INFORMATION: EC No: 610960 DATE: 2019/01/30	TITLE: 2IN1(4G/GPS&BD) EXTERNAL ANTENNA APPLICATION SPECIFICATION	SHEET No. 1 of 21
DOCUMENT NUMBER: AS-2112973000	CREATED / REVISED BY: Liu Hai 2019/01/14	CHECKED BY: Andy Zhang 2019/01/14	APPROVED BY: Chris Zhong 2019/01/14

2IN1 (4G/GPS&BD) EXTERNAL ANTENNA

1.0 SCOPE

This specification describes the antenna application. The information in this document is for reference and benchmark purposes only. The user is responsible for validating antenna RF performance based on user's actual implementation.

Antenna illustrations in this document are generic representations. They are not intended to be an image of any antenna listed in the scope.

2.0 PRODUCT DESCRIPTION

2.1 PRODUCT NAME AND SERIES NUMBER (S)

Product name: 2in1 (4G/GPS&BD)

Series Number: 2112973000

2.2 DESCRIPTION

211297 is 4G/GPS&BD 2in1 external antenna for use in Automotive Telematics, Transportation and remote monitoring applications.

2.3 PRODUCT STRUCTURE INFORMATION

Please refer to PS-2112973000 for full information.



FIGURE 2.3.1 DIMENSION OF THE 2IN1 (4G/GPS&BD)

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3.0 APPLICABLE DOCUMENTS

DOCUMENT	NUMBER	DESCRIPTION
Sale Drawing(SD)	SD-2112973000	Mechanical Dimension of the product
Product Specification (PS)	PS-2112973000	Product Specification
Packing Drawing(PK)	PK-2112973000	Product packaging specifications

4.0 ANTENNA PERFORMANCE

4.1 RF TEST CONDITIONS

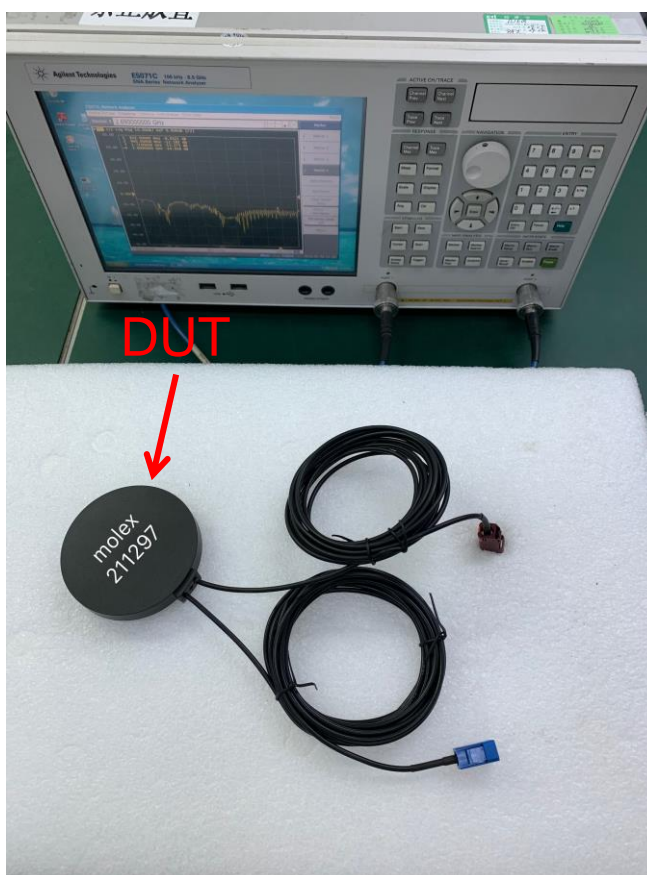


FIGURE4.1.1 ANTENNA TESTED WITH VNA E5071C

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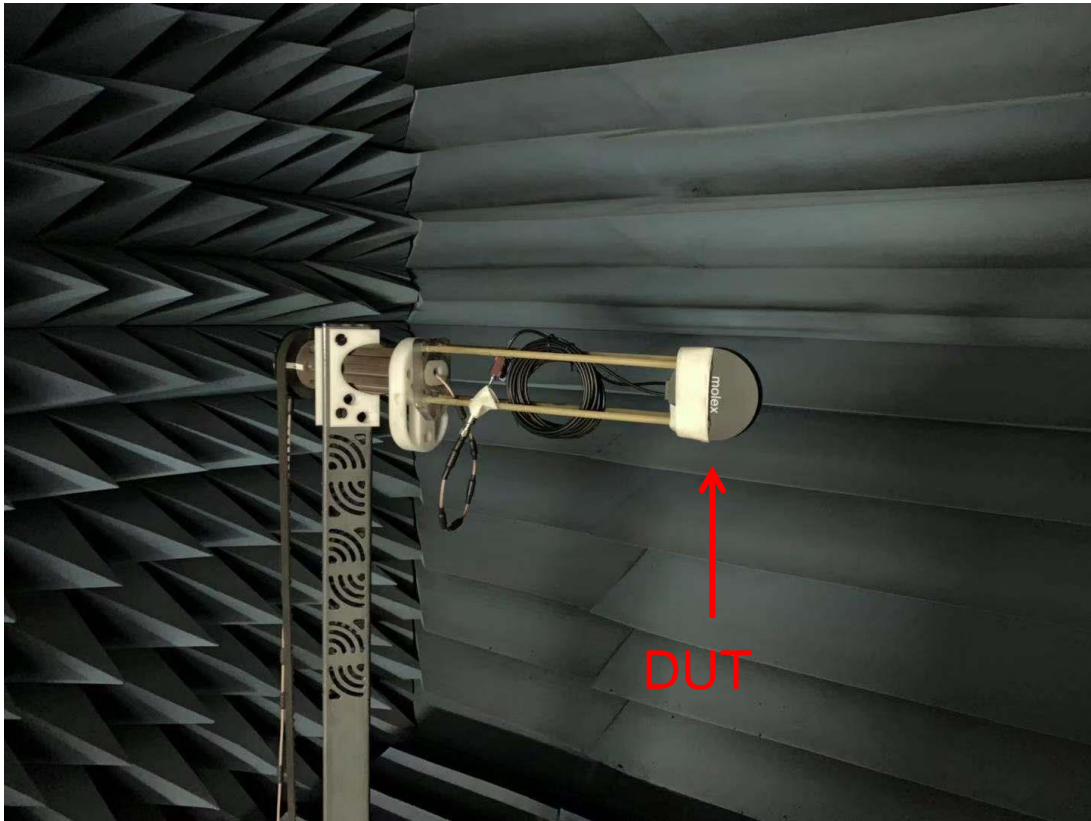


FIGURE4.1.2 ANTENNA TESTED WITH OTA CHAMBER

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4.2 ANTENNA PERFORMANCE

4.2.1 GPS ANTENNA

DESCRIPTION	EQUIPMENT	REQUIREMENT	
Frequency Range	VNA E5071C	1561.098±2.046 MHz	1575.42±1.023 MHz
VSWR	VNA E5071C	≤2	
Average Total Efficiency	OTA Chamber	22.3%	22.1%
Peak Gain (Max)	OTA Chamber	-2.1dBi	-2.1dBi
Polarization	OTA Chamber	RHCP	
Input Impedance	VNA E5071C	50 ohms	

4.2.2 GPS LNA

DESCRIPTION	EQUIPMENT	REQUIREMENT	
Frequency Range	VNA E5071C	1575.42±1.023 MHz	
DC Voltage	DC Supplier	3V	
Gain	VNA E5071C	25±3dB	
VSWR	VNA E5071C	≤2.0	
Noise Figure	VNA E5071C	≤1.5dB	
DC Current	DC Supplier	11±3m A (at 3.3V)	

4.2.3 4G ANTENNA

DESCRIPTION	EQUIPMENT	REQUIREMENT	
Frequency Range	VNA E5071C	824-960MHz	1710-2690MHz
Average Total Efficiency	OTA Chamber	33.6%	26.8%
Peak Gain (Max)	OTA Chamber	-0.8dBi type	0.4dBi type
Polarization	OTA Chamber	Linear	
VSWR	VNA E5071C	≤2.5	
Input Impedance	VNA E5071C	50 ohms	

REVISION:

ECR/ECN INFORMATION:

TITLE:

SHEET No.

A

EC No: 610960

DATE: 2019/01/30

**2IN1(4G/GPS&BD) EXTERNAL ANTENNA
APPLICATION SPECIFICATION**

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DOCUMENT NUMBER:

AS-2112973000

CREATED / REVISED BY:

Liu Hai 2019/01/14

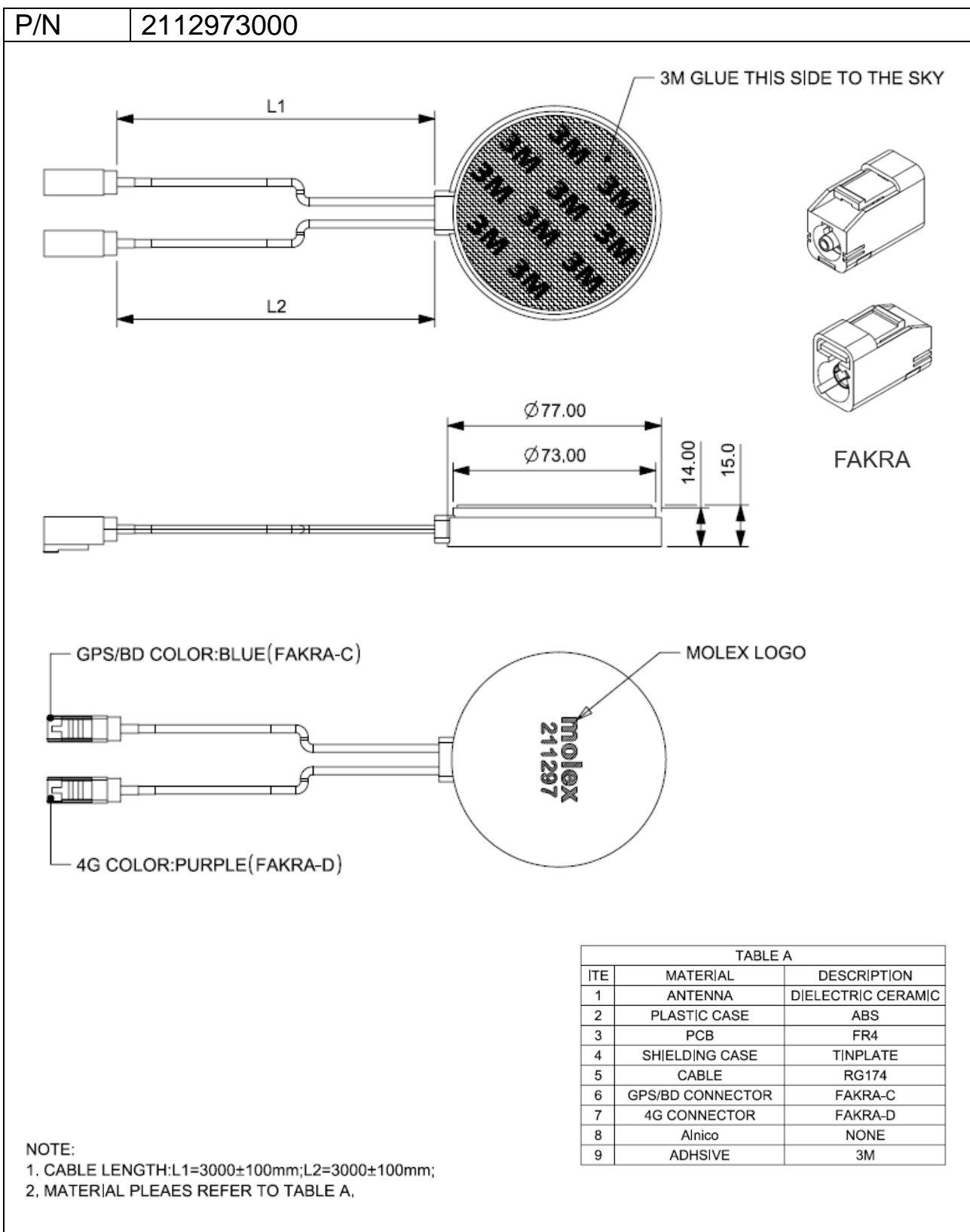
CHECKED BY:

Andy Zhang 2019/01/14

APPROVED BY:

Chris Zhong 2019/01/14

5.0 PRODUCT STRUCTURE INFORMATION



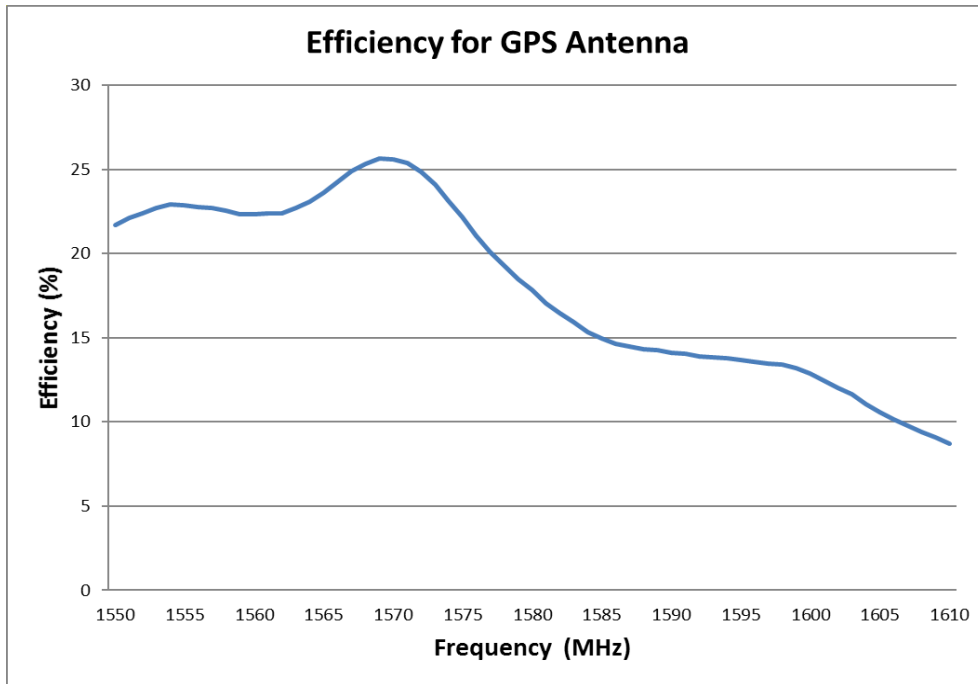
Mechanical Structure Information for 2112973000

REVISION:	ECR/ECN INFORMATION:	TITLE:	SHEET No.
A	EC No: 610960 DATE: 2019/01/30	2IN1(4G/GPS&BD) EXTERNAL ANTENNA APPLICATION SPECIFICATION	6 of 21
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AS-2112973000	Liu Hai 2019/01/14	Andy Zhang 2019/01/14	Chris Zhong 2019/01/14

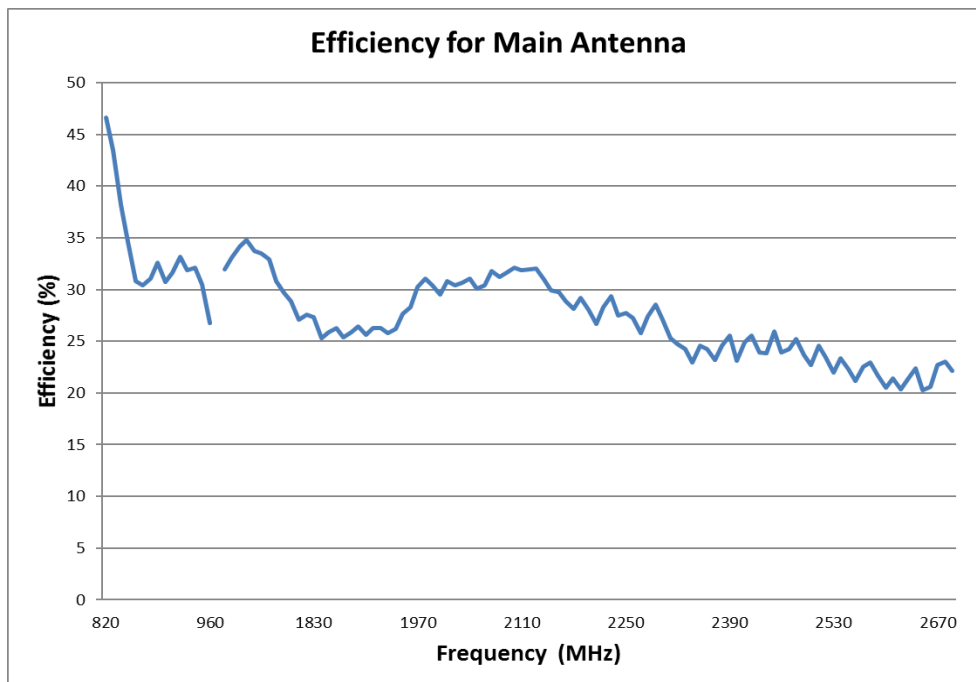


APPLICATION SPECIFICATION

6.0 ANTENNA EFFICIENCY



6.1 ANTENNA PASSIVE EFFICIENCY AT GPS BAND IN FREE SPACE



6.2 ANTENNA PASSIVE EFFICIENCY AT 4G BAND IN FREE SPACE

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7.0 RADIATION PATTERN

7.1 GPS ANTENNA 2D RADIATION PATTERN

All measurements in this document are done with cable length of 3000mm

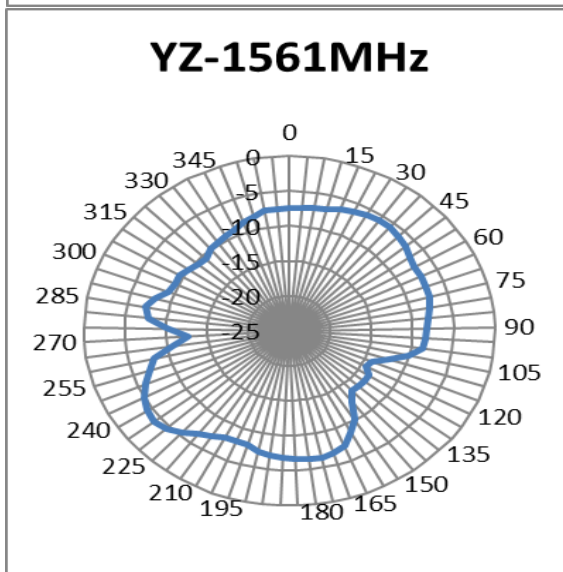
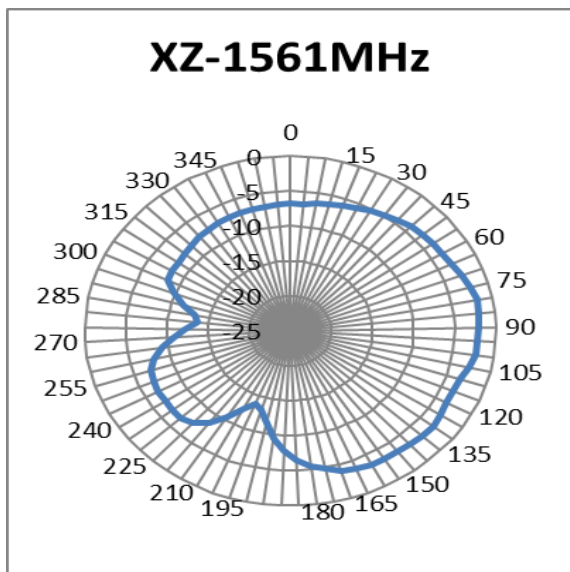
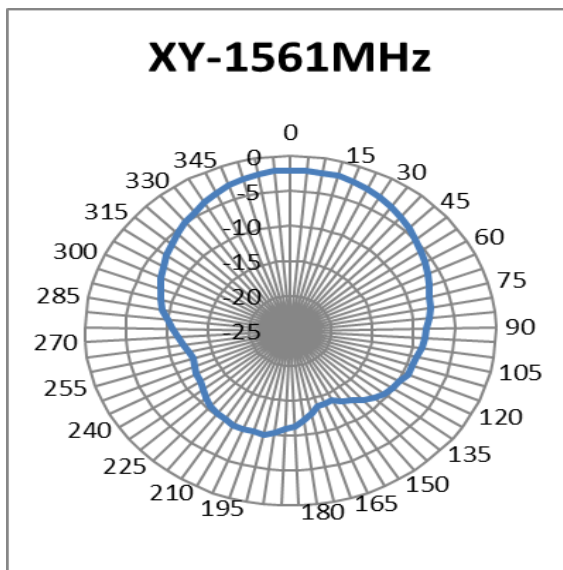
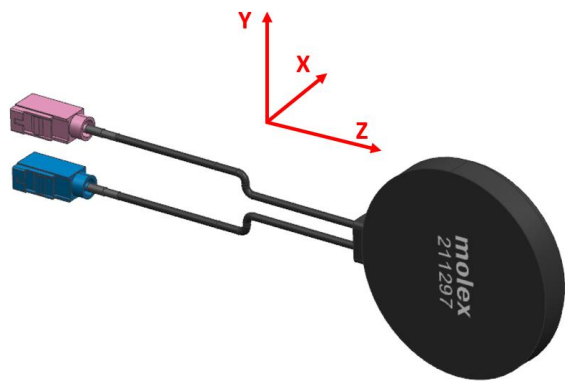
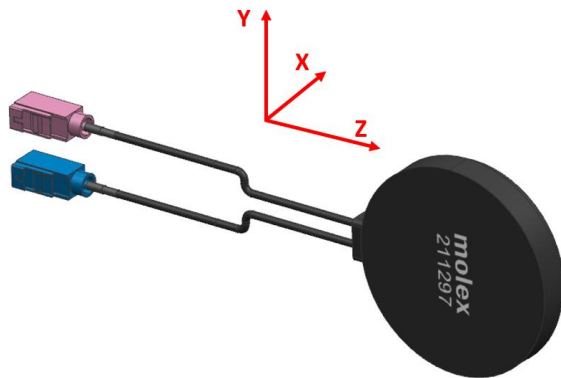
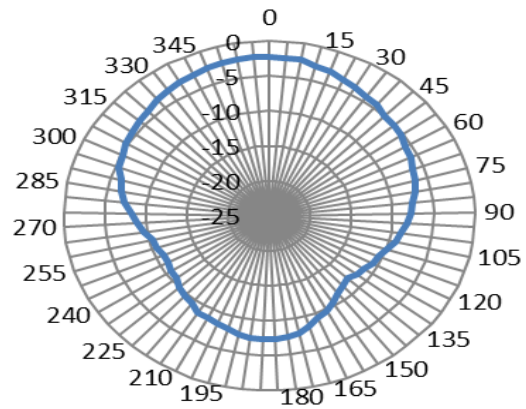


FIGURE 7.1.1 2D RADIATION PATTERN OF ANTENNA AT 1561MHZ IN FREE SPACE

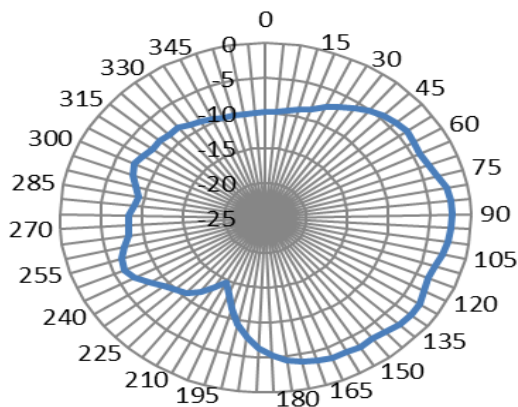
REVISION: A	ECR/ECN INFORMATION: EC No: 610960 DATE: 2019/01/30	TITLE: 2IN1(4G/GPS&BD) EXTERNAL ANTENNA APPLICATION SPECIFICATION	SHEET No. 8 of 21
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XY-1575MHz



XZ-1575MHz



YZ-1575MHz

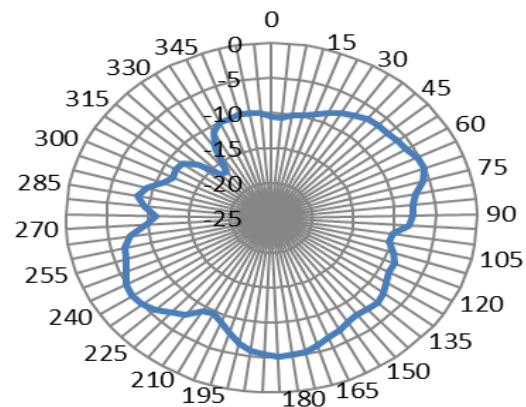


FIGURE 7.1.2 2D RADIATION PATTERN OF ANTENNA AT 1575MHZ IN FREE SPACE

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7.2 GPS ANTENNA 3D RADIATION PATTERN

All measurements in this document are done with cable length of 3000mm

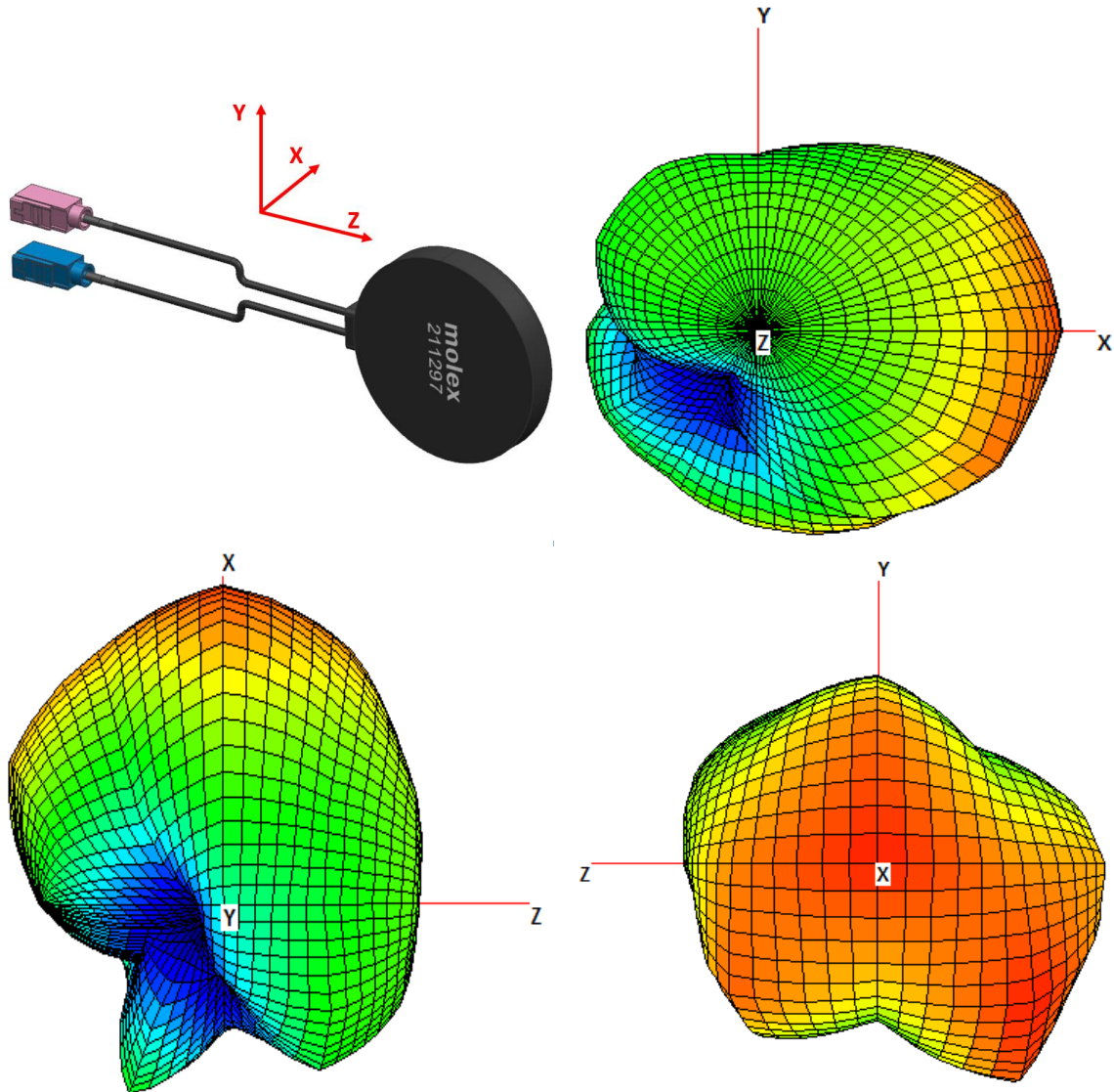


FIGURE 7.2.1 3D RADIATION PATTERN OF ANTENNA AT 1561MHZ IN FREE SPACE

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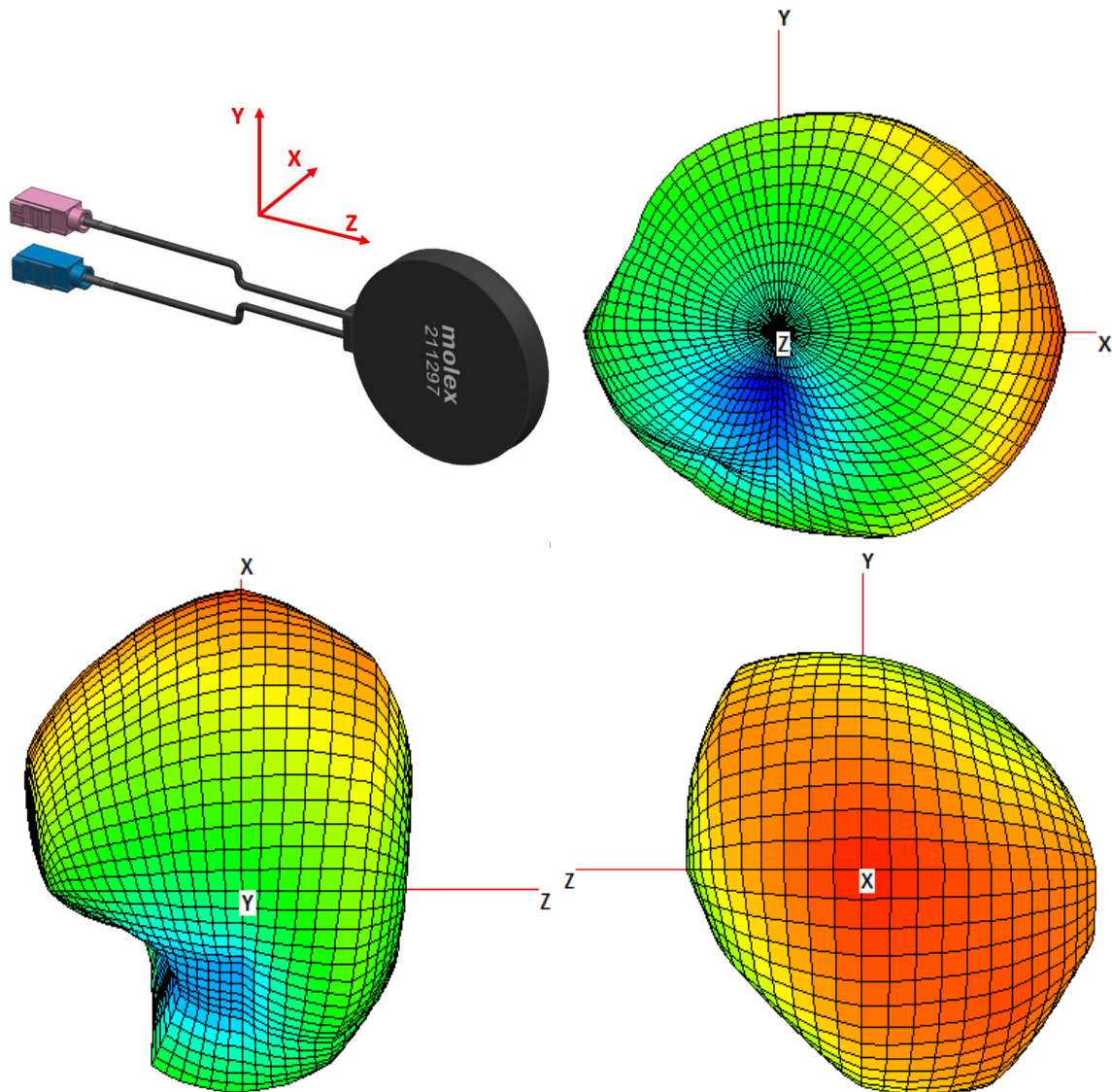


FIGURE 7.2.2 3D RADIATION PATTERN OF ANTENNA AT 1575MHZ IN FREE SPACE

REVISION: A	ECR/ECN INFORMATION: EC No: 610960 DATE: 2019/01/30	TITLE: 2IN1(4G/GPS&BD) EXTERNAL ANTENNA APPLICATION SPECIFICATION	SHEET No. 11 of 21
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7.3 MAIN ANTENNA 2D RADIATION PATTERN

All measurements in this document are done with cable length of 3000mm

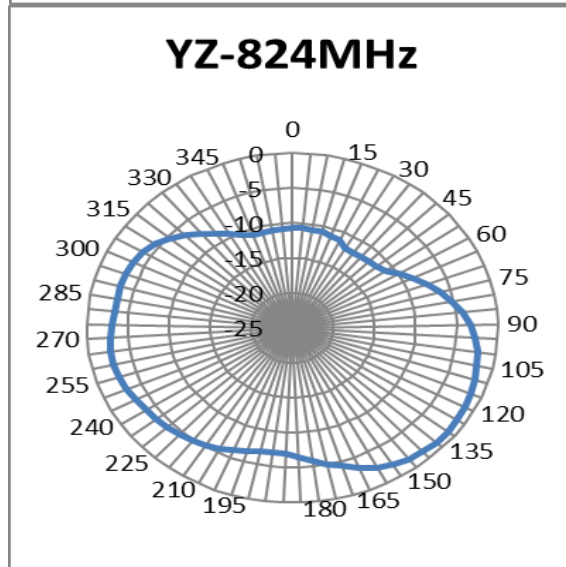
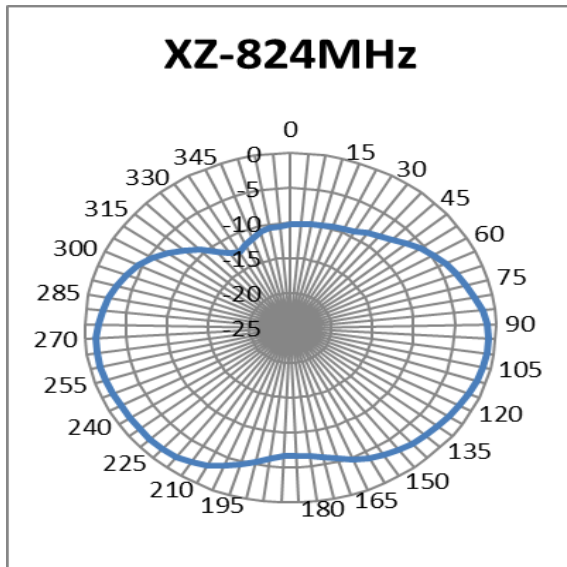
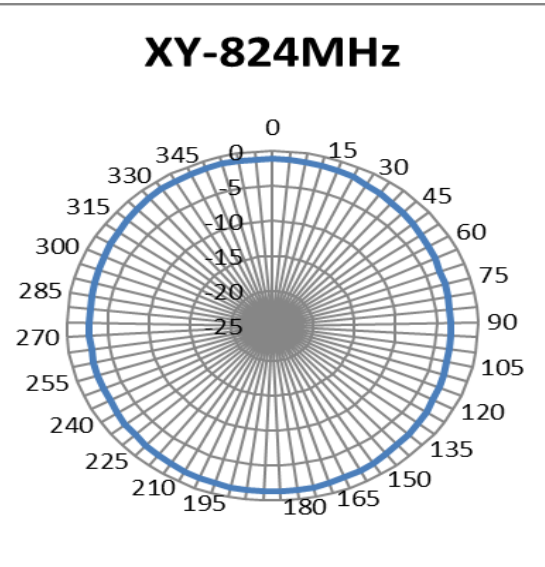
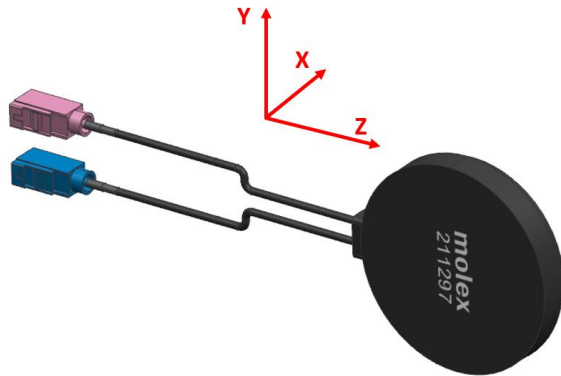


FIGURE 7.3.1 2D RADIATION PATTERN OF ANTENNA AT 824MHZ IN FREE SPACE

REVISION: A	ECR/ECN INFORMATION: EC No: 610960 DATE: 2019/01/30	TITLE: 2IN1(4G/GPS&BD) EXTERNAL ANTENNA APPLICATION SPECIFICATION	SHEET No. 12 of 21
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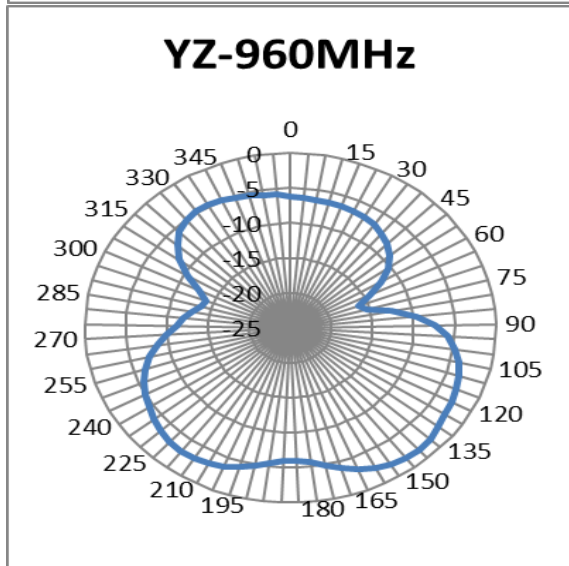
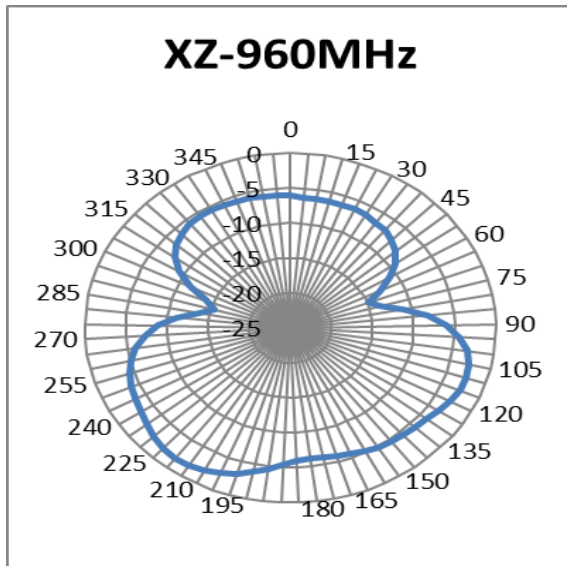
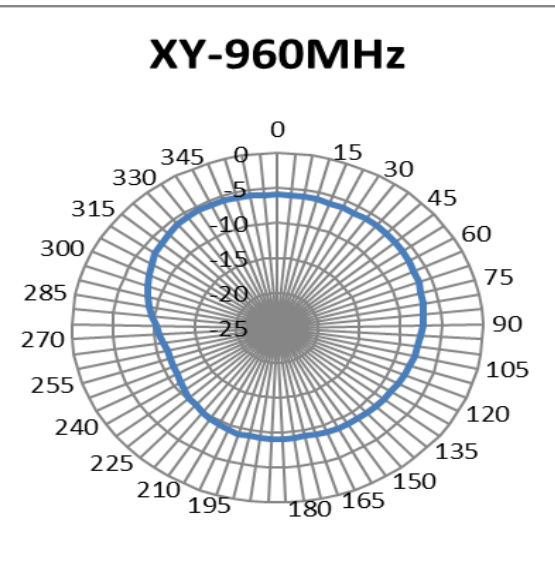
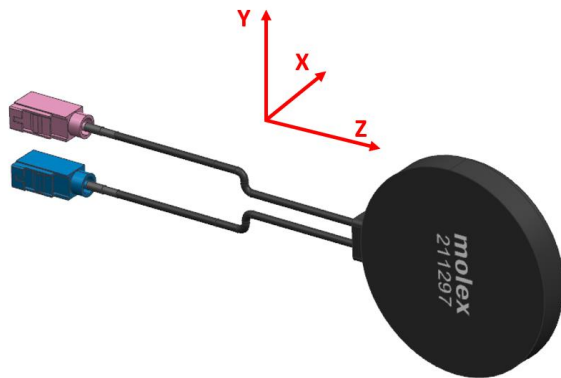
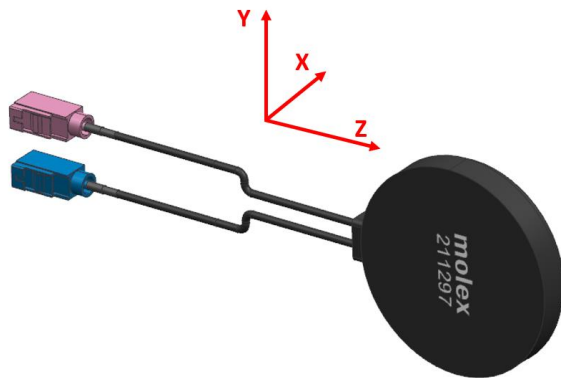
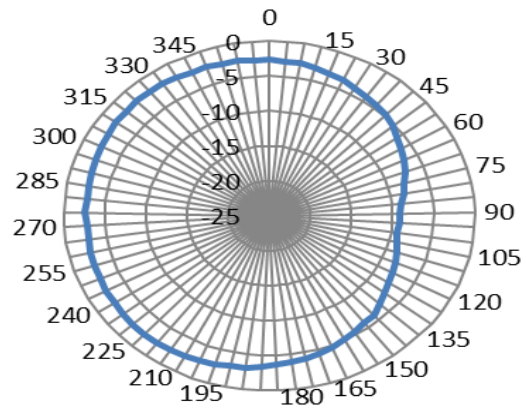


FIGURE 7.3.2 2D RADIATION PATTERN OF ANTENNA AT 960MHZ IN FREE SPACE

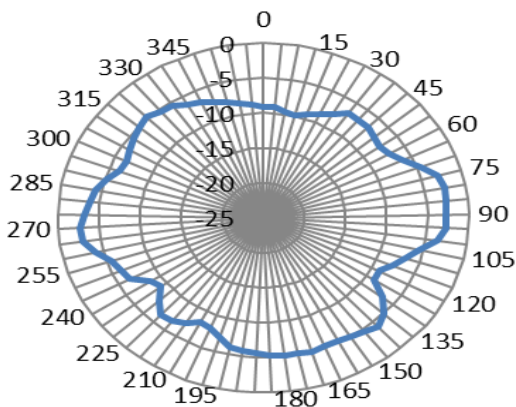
REVISION: A	ECR/ECN INFORMATION: EC No: 610960 DATE: 2019/01/30	TITLE: 2IN1(4G/GPS&BD) EXTERNAL ANTENNA APPLICATION SPECIFICATION	SHEET No. 13 of 21
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XY-1880MHz



XZ-1880MHz



YZ-1880MHz

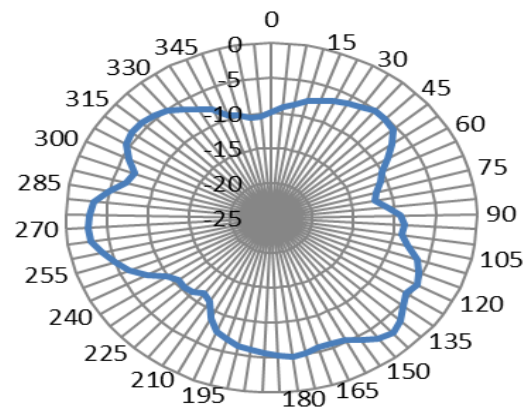
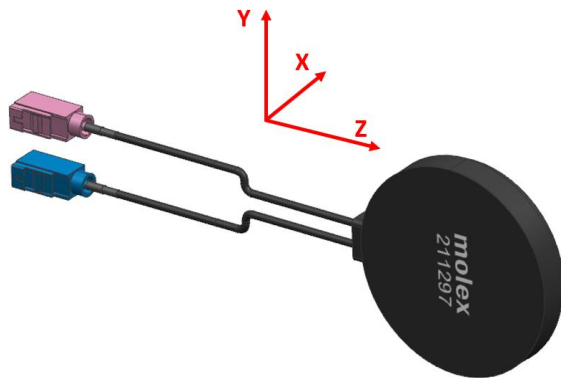
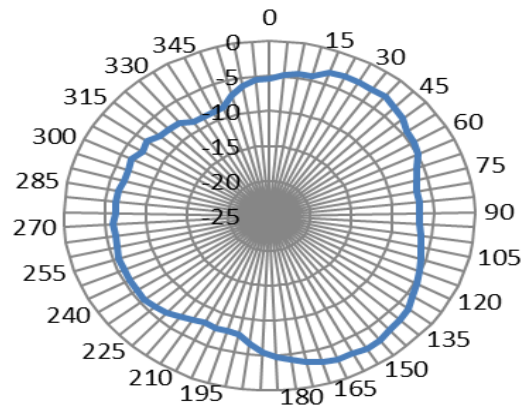


FIGURE 7.3.3 2D RADIATION PATTERN OF ANTENNA AT 1880MHZ IN FREE SPACE

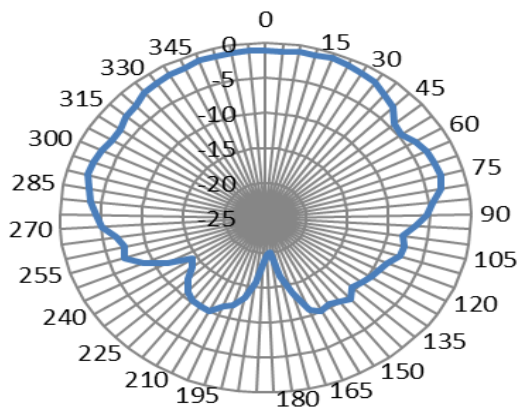
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XY-2170MHz



XZ-2170MHz



YZ-2170MHz

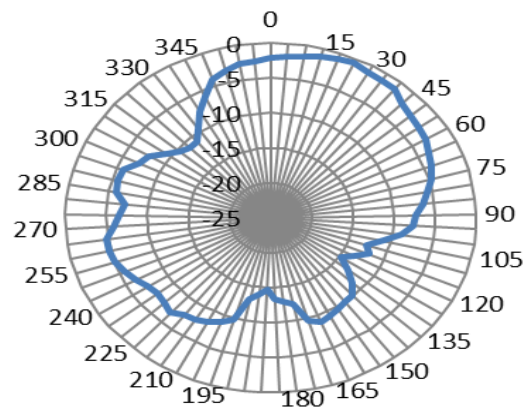
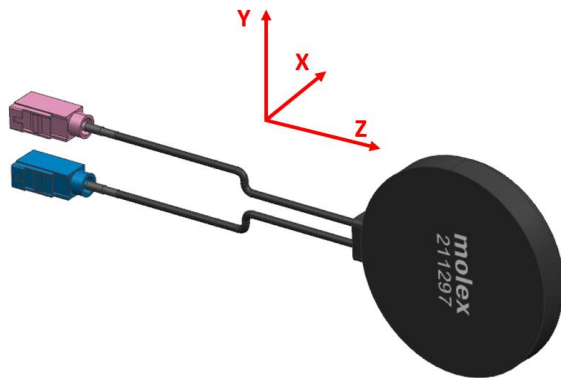
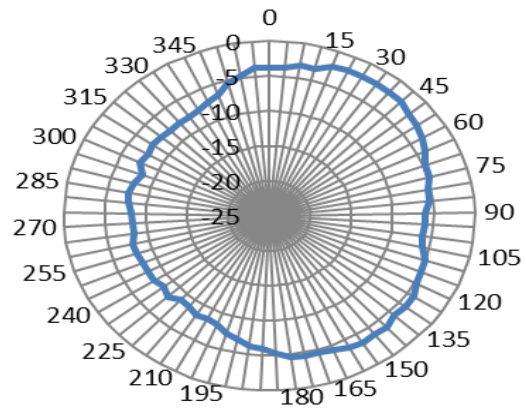


FIGURE 7.3.4 2D RADIATION PATTERN OF ANTENNA AT 2170MHZ IN FREE SPACE

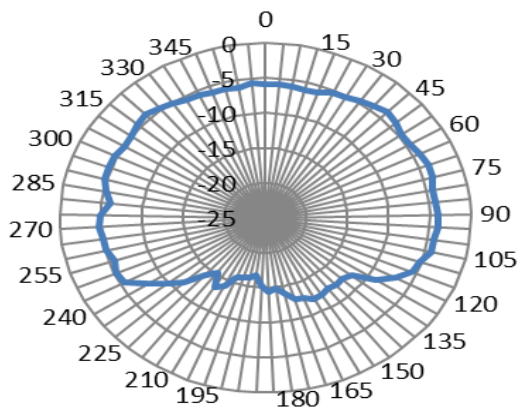
REVISION: A	ECR/ECN INFORMATION: EC No: 610960 DATE: 2019/01/30	TITLE: 2IN1(4G/GPS&BD) EXTERNAL ANTENNA APPLICATION SPECIFICATION	SHEET No. 15 of 21
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XY-2550MHz



XZ-2550MHz



YZ-2550MHz

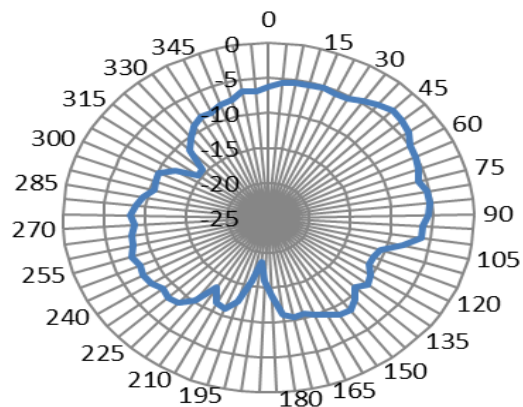


FIGURE 7.3.5 2D RADIATION PATTERN OF ANTENNA AT 2550MHz IN FREE SPACE

REVISION: A	ECR/ECN INFORMATION: EC No: 610960 DATE: 2019/01/30	TITLE: 2IN1(4G/GPS&BD) EXTERNAL ANTENNA APPLICATION SPECIFICATION	SHEET No. 16 of 21
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7.4 MAIN ANTENNA 3D RADIATION PATTERN

All measurements in this document are done with cable length of 3000mm

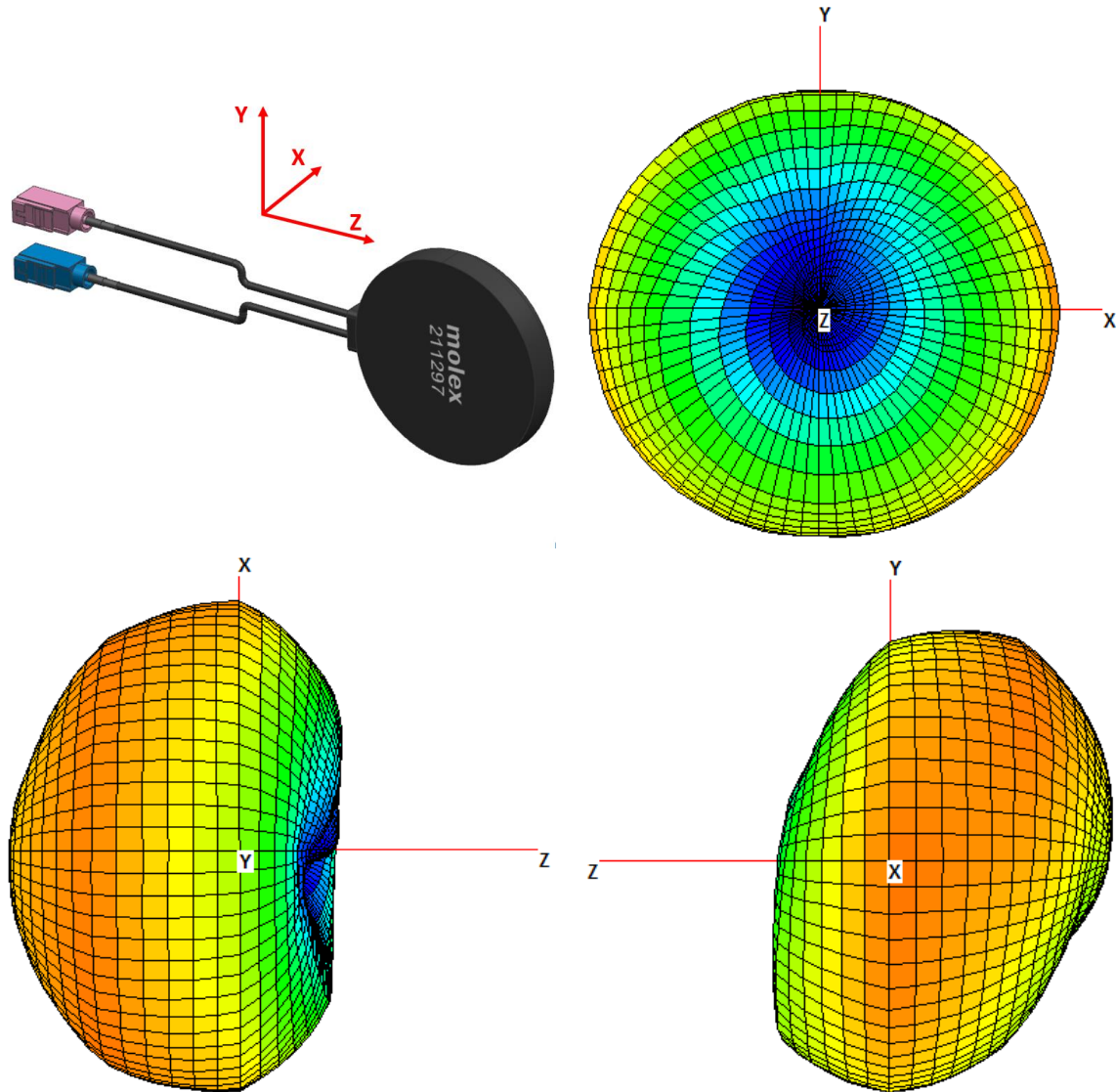


FIGURE 7.4.1 3D RADIATION PATTERN OF ANTENNA AT 824MHZ IN FREE SPACE

REVISION: A	ECR/ECN INFORMATION: EC No: 610960 DATE: 2019/01/30	TITLE: 2IN1(4G/GPS&BD) EXTERNAL ANTENNA APPLICATION SPECIFICATION	SHEET No. 17 of 21
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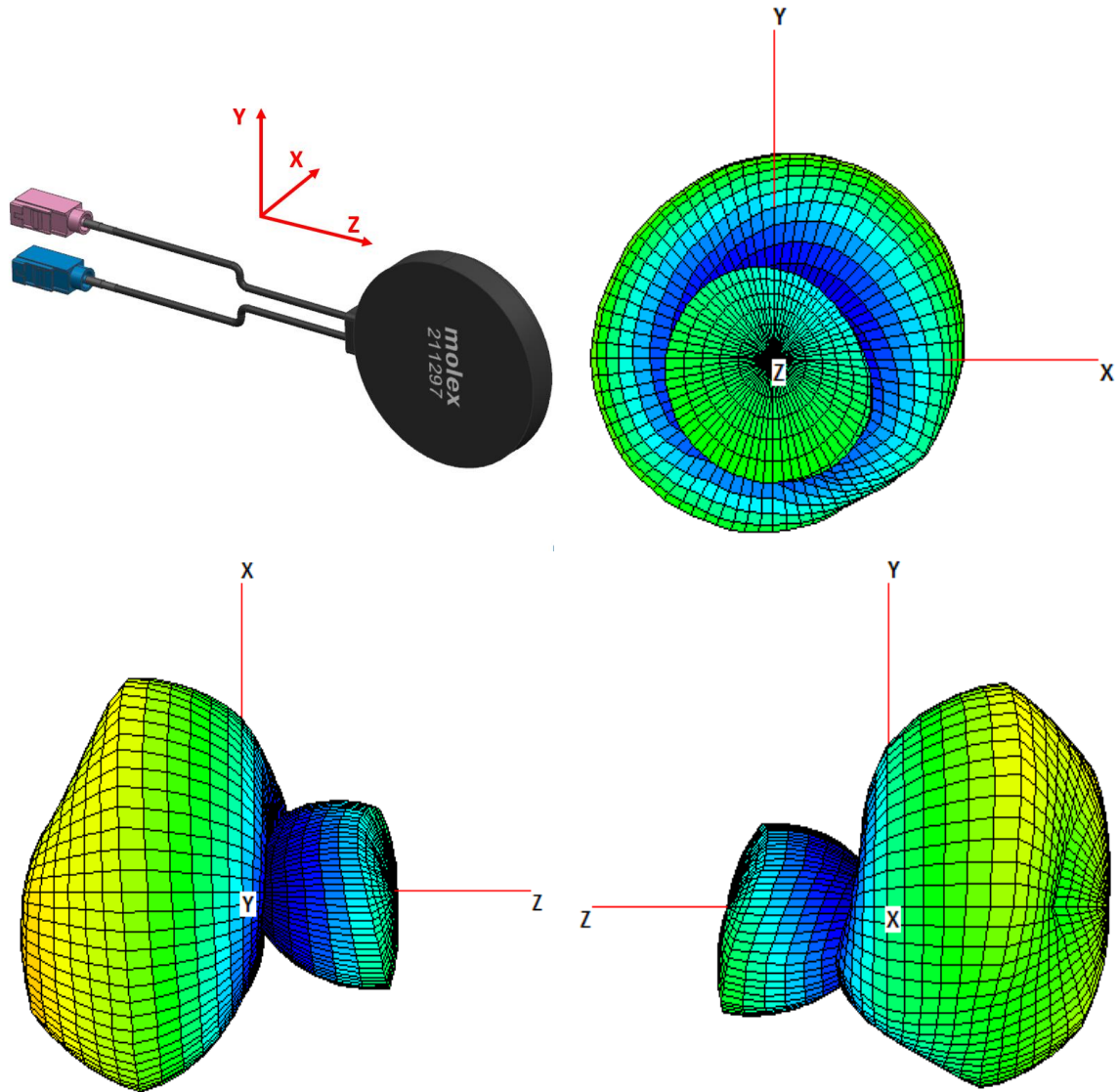


FIGURE 7.4.2 3D RADIATION PATTERN OF ANTENNA AT 960MHZ IN FREE SPACE

REVISION: A	ECR/ECN INFORMATION: EC No: 610960 DATE: 2019/01/30	TITLE: 2IN1(4G/GPS&BD) EXTERNAL ANTENNA APPLICATION SPECIFICATION	SHEET No. 18 of 21
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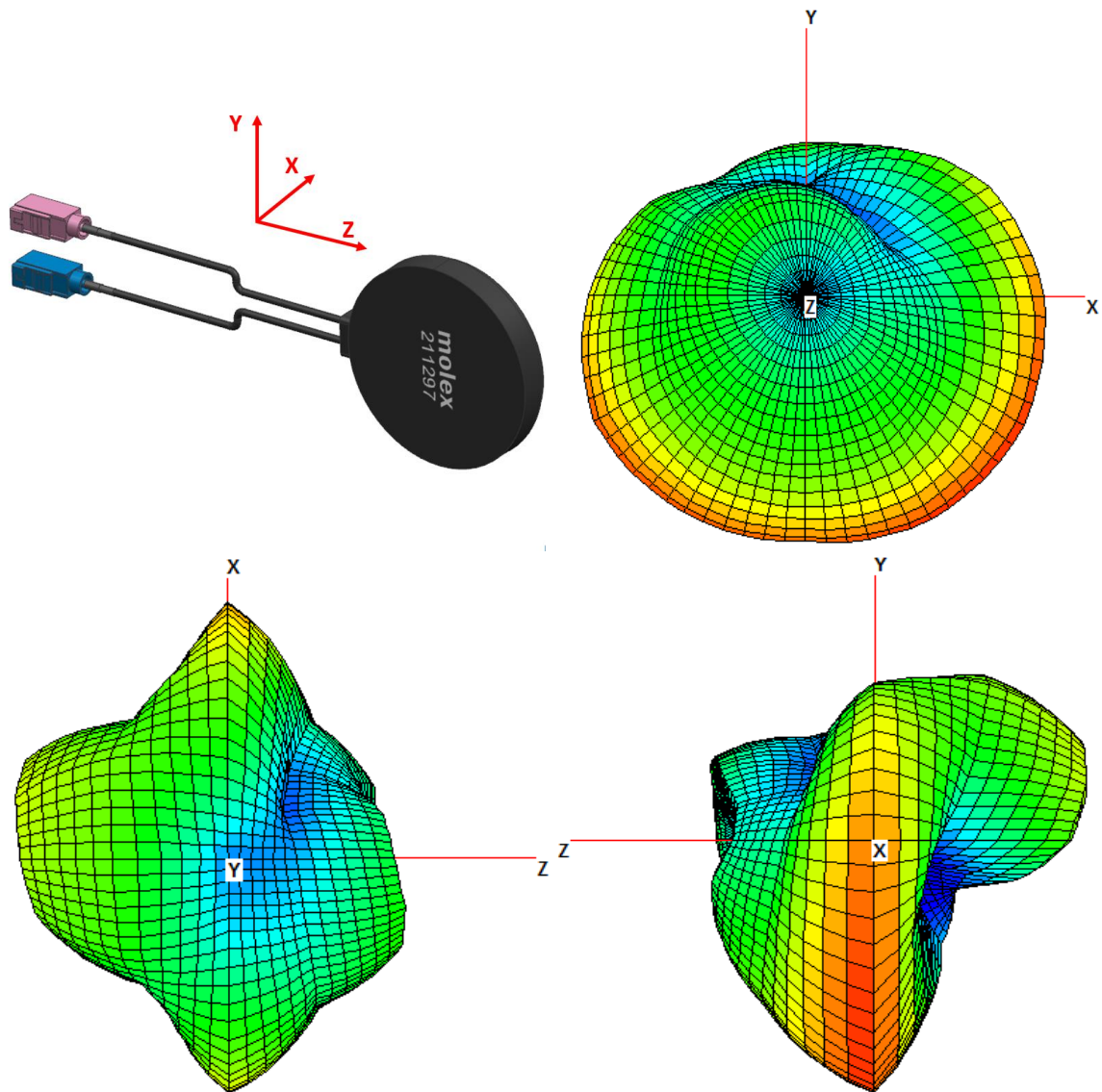


FIGURE 7.4.3 3D RADIATION PATTERN OF ANTENNA AT 1880MHZ IN FREE SPACE

REVISION: A	ECR/ECN INFORMATION: EC No: 610960 DATE: 2019/01/30	TITLE: 2IN1(4G/GPS&BD) EXTERNAL ANTENNA APPLICATION SPECIFICATION	SHEET No. 19 of 21
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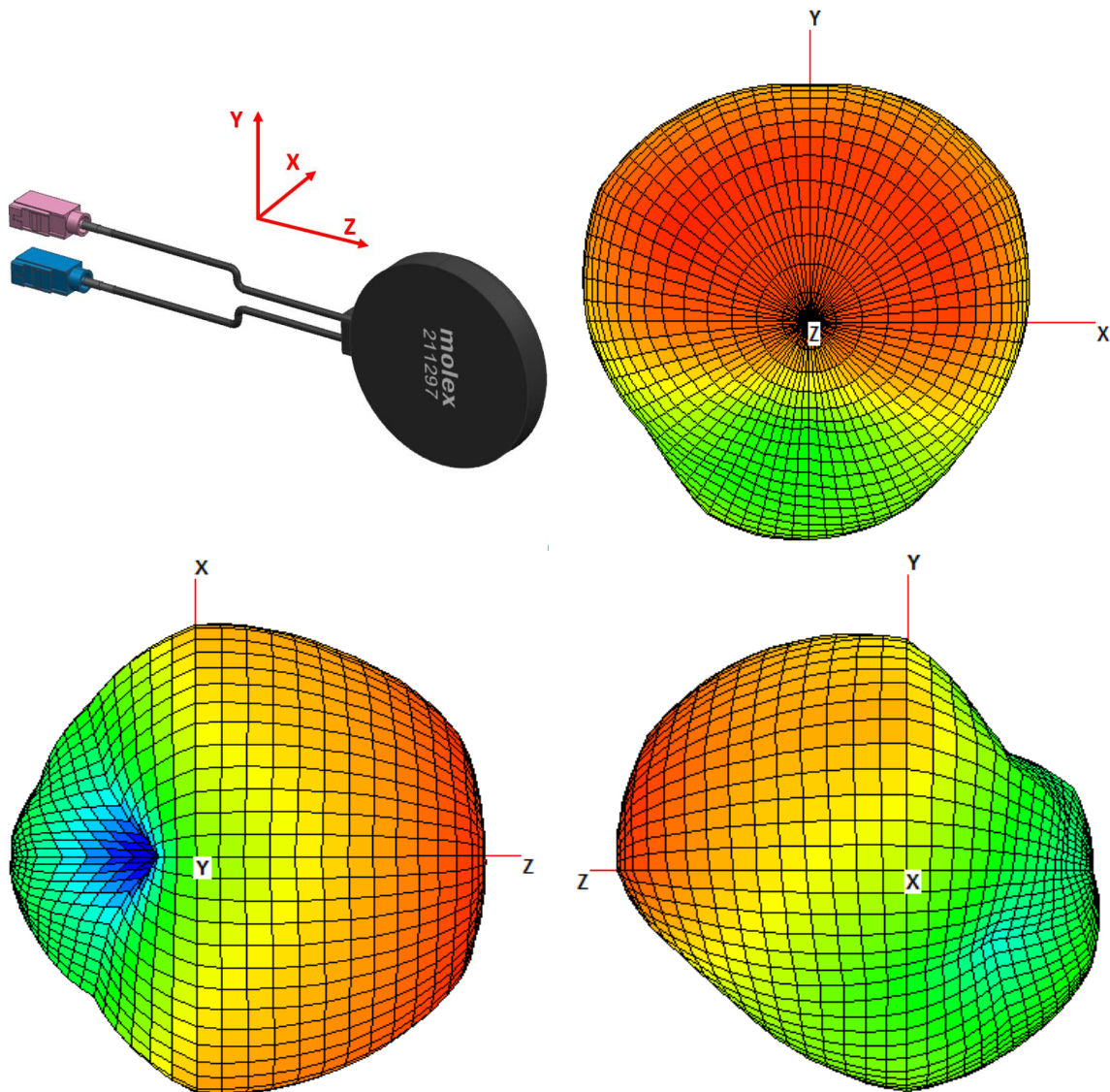


FIGURE 7.4.4 3D RADIATION PATTERN OF ANTENNA AT 2170MHZ IN FREE SPACE

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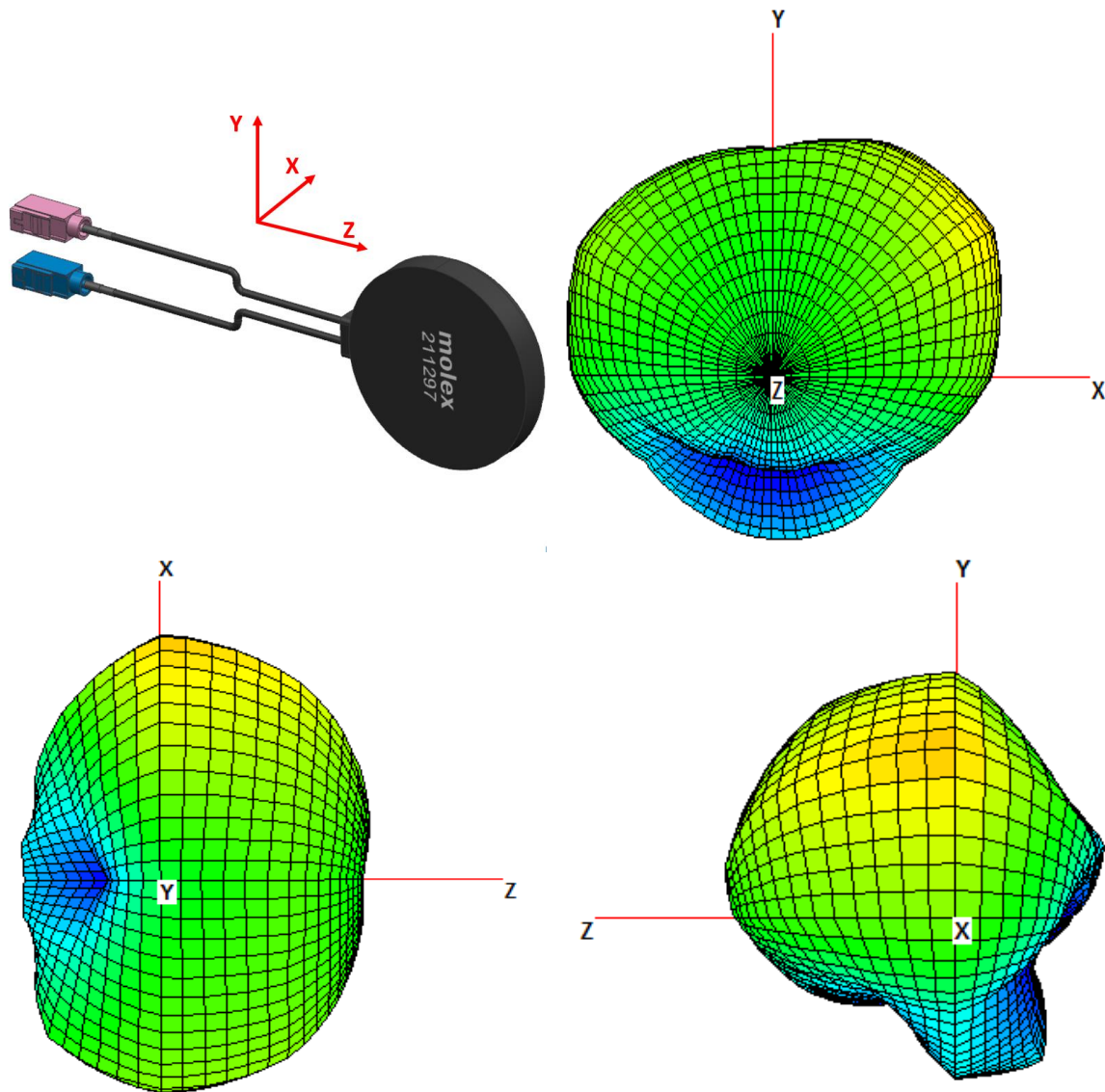


FIGURE 7.4.5 3D RADIATION PATTERN OF ANTENNA AT 2550MHZ IN FREE SPACE

REVISION: A	ECR/ECN INFORMATION: EC No: 610960 DATE: 2019/01/30	TITLE: 2IN1(4G/GPS&BD) EXTERNAL ANTENNA APPLICATION SPECIFICATION	SHEET No. 21 of 21
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