



APPLICATION SPECIFICATION

TITLE

Molex Multi-hub Antenna 5-in-1

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DOCUMENT NUMBER: AS-2165891000	CREATED / REVISED BY: Liu Hai 2021/04/14	CHECKED BY: Andy Zhang 2021/04/14	APPROVED BY: Chris Zhong 2021/04/14



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MOLEX MULTI-HUB ANTENNA 5-IN-1

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: Molex Multi-hub Antenna 5-in-1
Series Number: 216589

2.2 DESCRIPTION

Series 216589**** is Molex multi-hub 5 in 1 external antenna including 2x 5G/LTE, 2 x Wi-Fi and 1x GNSS. It provides 5G MIMO and Wi-Fi MIMO antenna system within compact antenna box and use in automotive telematics, transportation and remote monitoring applications.

2.3 PRODUCT STRUCTURE INFORMATION

Please refer to PS-2165891000 for full information.

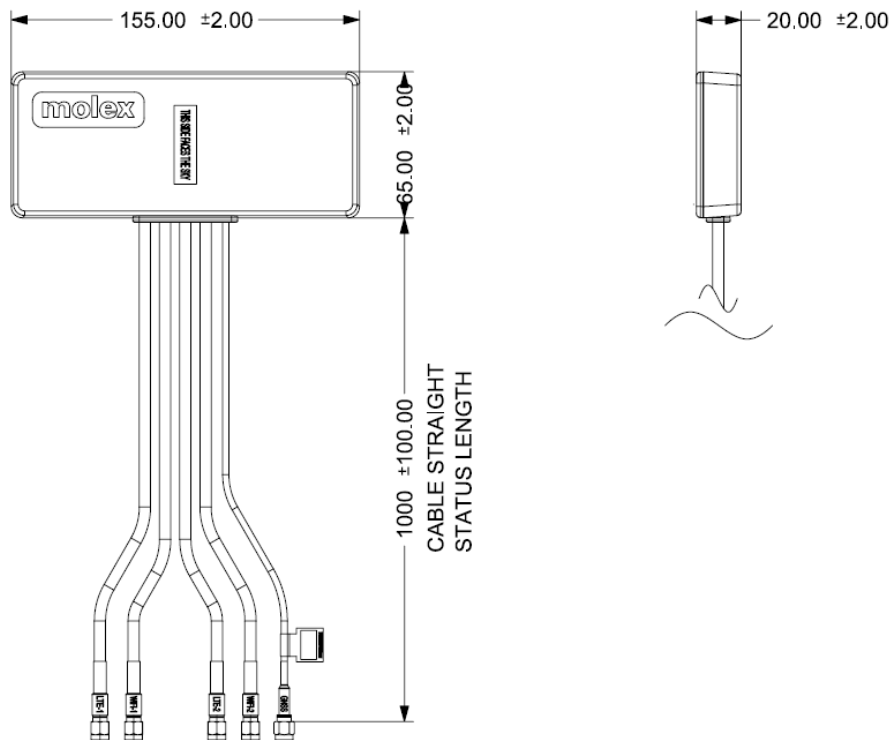


FIGURE 2.3.1 OVERVIEW OF THE MOLEX MULTI-HUB ANTENNA 5-IN-1

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3.0 APPLICABLE DOCUMENTS

DOCUMENT	NUMBER	DESCRIPTION
Sale Drawing (SD)	SD-265891000	Mechanical Dimension of the product
Product Specification (PS)	PS-2165891000	Product Specification
Packing Drawing (PK)	PK-2165891000	Product packaging specifications

4.0 ANTENNA PERFORMANCE

4.1 RF TEST CONDITIONS

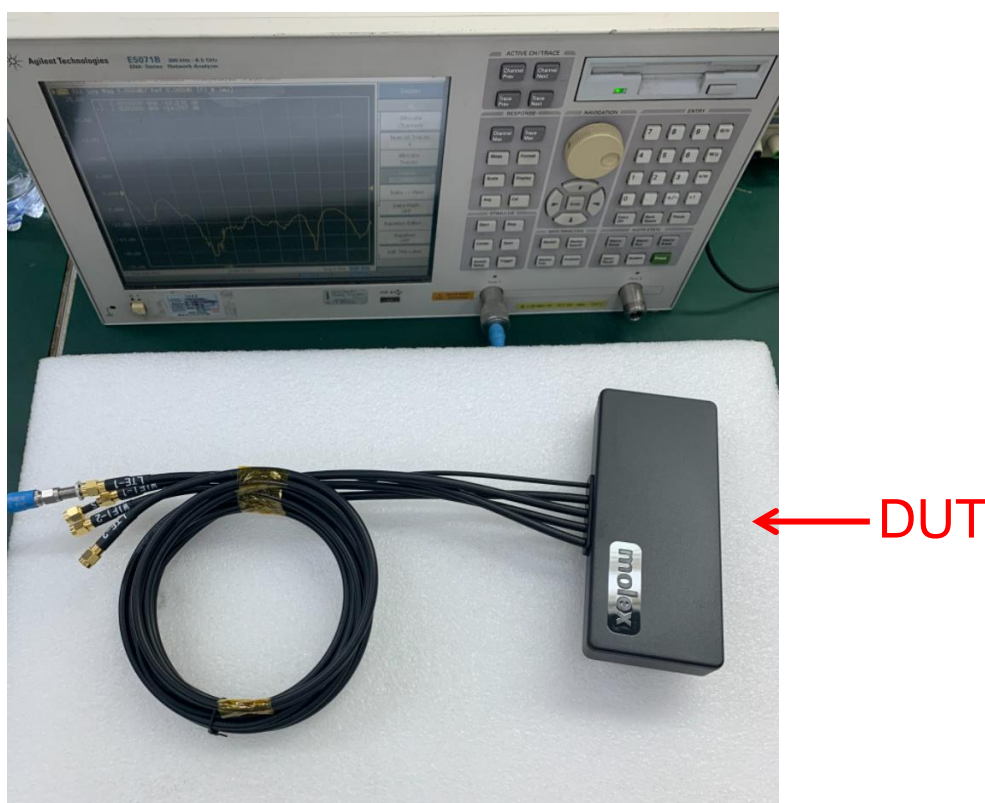


FIGURE4.1.1 ANTENNA TESTED WITH VNA E5071C

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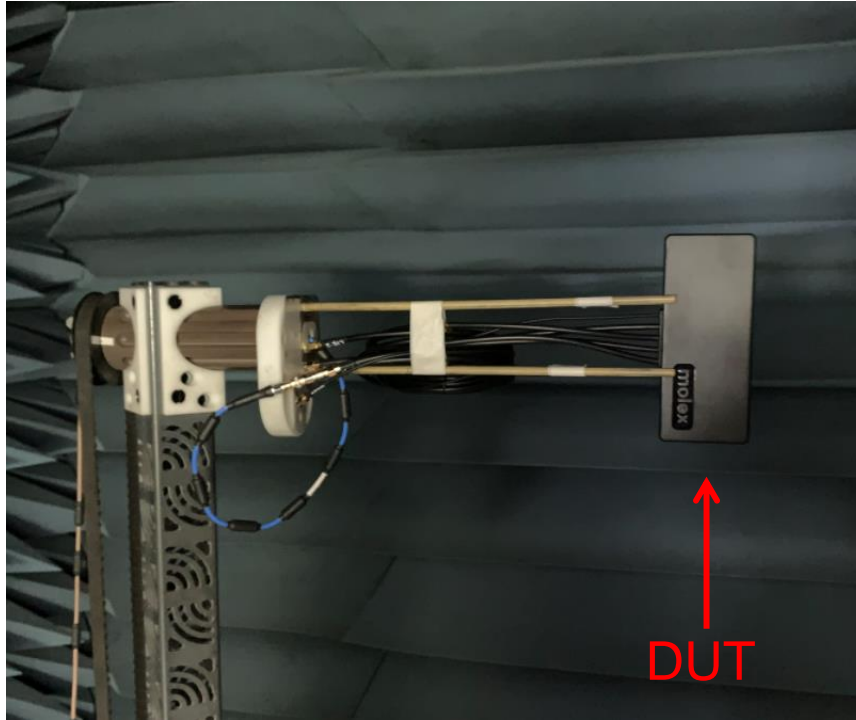


FIGURE 4.1.2 5G/LTE,WIFI ANTENNA TESTED WITH OTA CHAMBER

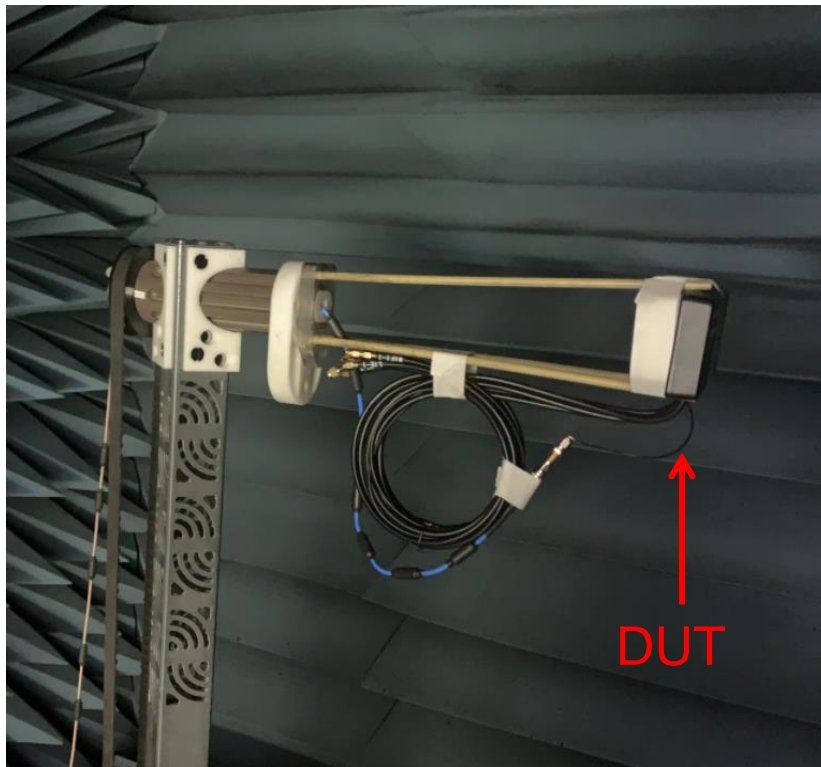


FIGURE 4.1.3 GNSS ANTENNA TESTED WITH OTA CHAMBER

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4.2 ANTENNA PERFORMANCE

4.2.1 GNSS Patch ANTENNA

DESCRIPTION	EQUIPMENT	REQUIREMENT		
Frequency Range	VNA E5071C	1561.098±2.046 MHz	1575.42±1.023 MHz	1602±4 MHz
Return Loss	VNA E5071C	<-6dB		
Average Total Efficiency (without cable loss)	OTA Chamber	>55%	>40%	>50%
Peak Gain (Typ.)	OTA Chamber	2.52dBi	0.46dBi	2.28dBi
Polarization	OTA Chamber	RHCP		
Input Impedance	VNA E5071C	50 ohms		

4.2.2 GNSS LNA

DESCRIPTION	EQUIPMENT	REQUIREMENT		
Frequency Range	VNA E5071C	1561.098±2.046 MHz	1575.42±1.023 MHz	1602±4 MHz
DC Voltage	DC Supplier	3-5.5V		
Gain	VNA E5071C	28dB ± 3dB		
VSWR	VNA E5071C	≤2.0		
Noise Figure	VNA E5071C	≤2.5dB		
DC Current	DC Supplier	9±3m A (at 3.0V)		

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4.2.3 5G/LTE 1 ANTENNA

DESCRIPTION	EQUIPMENT	REQUIREMENT				
Frequency Range	VNA E5071C	698-960MHz	1500-1700MHz	1710-2690MHz	3300-4400MHz	4400-5000MHz
Return Loss	VNA E5071C	<-5dB				
Average Total Efficiency	OTA Chamber	>60%	>40%	>55%	>50%	>50%
Peak Gain (Typ.)	OTA Chamber	3.17dBi	4.09dBi	3.89dBi	3.85dBi	4.03dBi
Polarization	OTA Chamber	Linear				
Input Impedance	VNA E5071C	50 ohms				

4.2.4 5G/LTE 2 ANTENNA

DESCRIPTION	EQUIPMENT	REQUIREMENT				
Frequency Range	VNA E5071C	698-960MHz	1500-1700MHz	1710-2690MHz	3300-4400MHz	4400-5000MHz
Return Loss	VNA E5071C	<-5dB				
Average Total Efficiency	OTA Chamber	>50%	>45%	>45%	>45%	>50%
Peak Gain (Typ.)	OTA Chamber	3.68dBi	4.05dBi	5.81dBi	2.79dBi	3.76dBi
Polarization	OTA Chamber	Linear				
Input Impedance	VNA E5071C	50 ohms				

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4.2.5 WIFI 1 ANTENNA

DESCRIPTION	EQUIPMENT	REQUIREMENT	
Frequency Range	VNA E5071C	2400-2500MHz	5000-6000MHz
Return Loss	VNA E5071C	<-10dB	<-10dB
Average Total Efficiency	OTA Chamber	>55%	>50%
Peak Gain (Typ.)	OTA Chamber	3.98dBi	3.46dBi
Polarization	OTA Chamber	Linear	
Input Impedance	VNA E5071C	50 ohms	

4.2.6 WIFI 2 ANTENNA

DESCRIPTION	EQUIPMENT	REQUIREMENT	
Frequency Range	VNA E5071C	2400-2500MHz	5000-6000MHz
Return Loss	VNA E5071C	<-10dB	<-8dB
Average Total Efficiency	OTA Chamber	>50%	>45%
Peak Gain (Typ.)	OTA Chamber	3.22dBi	3.01dBi
Polarization	OTA Chamber	Linear	
Input Impedance	VNA E5071C	50 ohms	

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4.3 RETURN LOSS PLOT

All measurements in this document are done with cable length of 1000mm

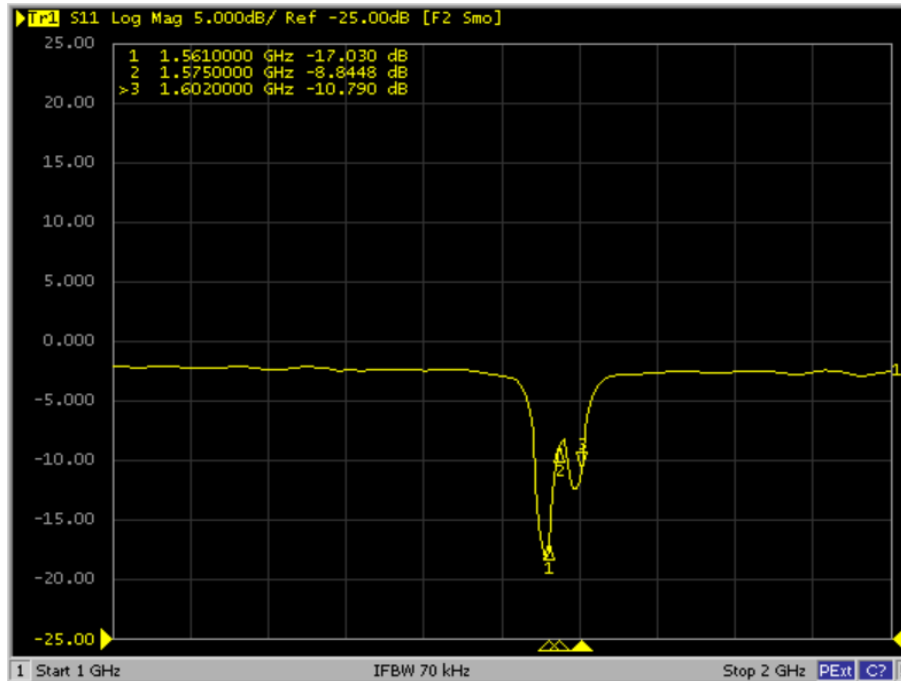


FIGURE 4.3.1 RETURN LOSS OF GPS ANTENNA IN FREE SPACE

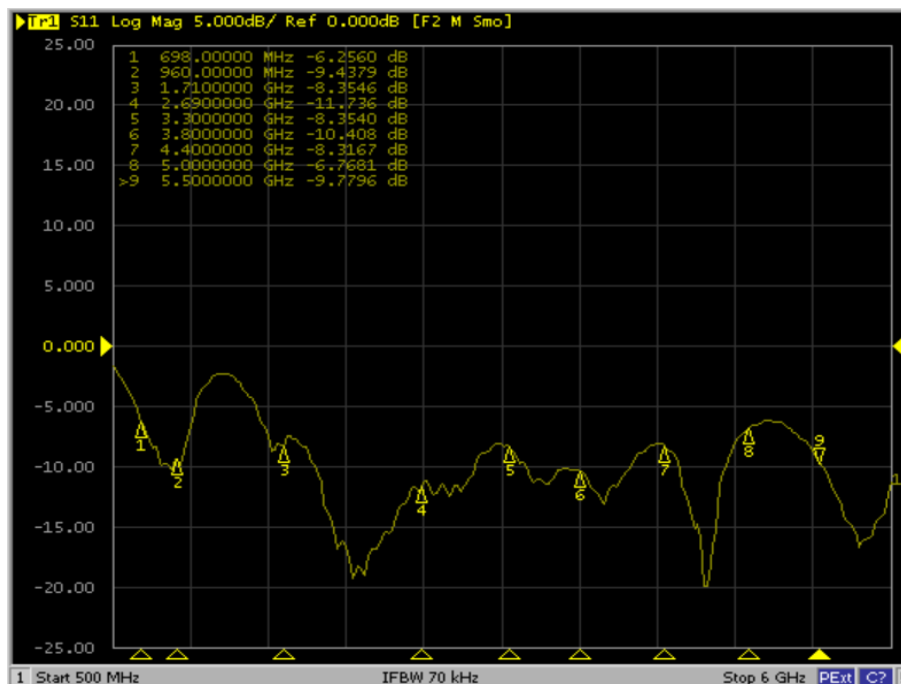


FIGURE 4.3.2 RETURN LOSS OF 5G/LTE 1 ANTENNA IN FREE SPACE

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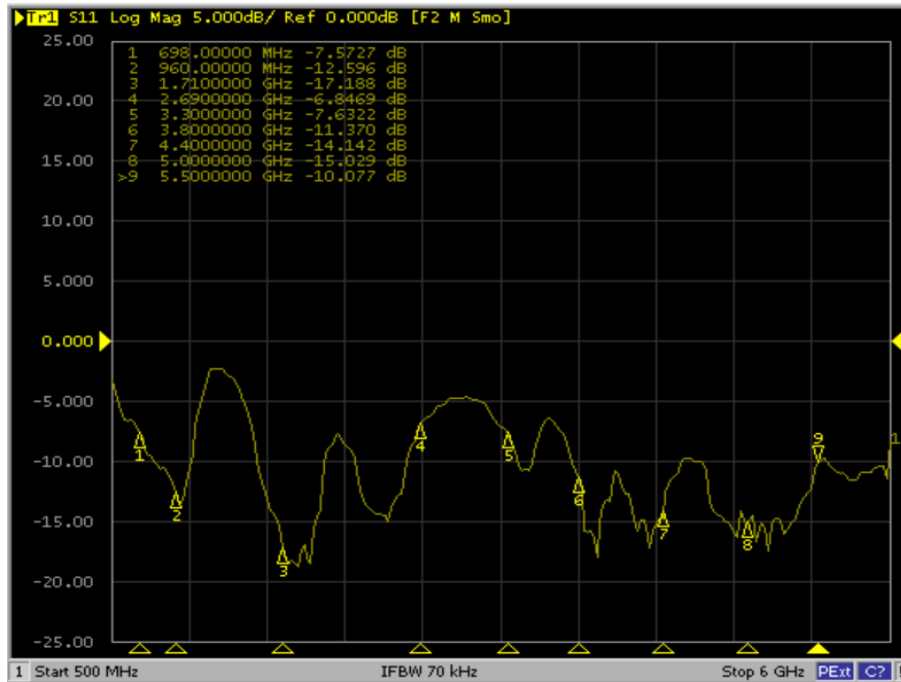


FIGURE 4.3.3 RETURN LOSS OF 5G/LTE 2 ANTENNA IN FREE SPACE

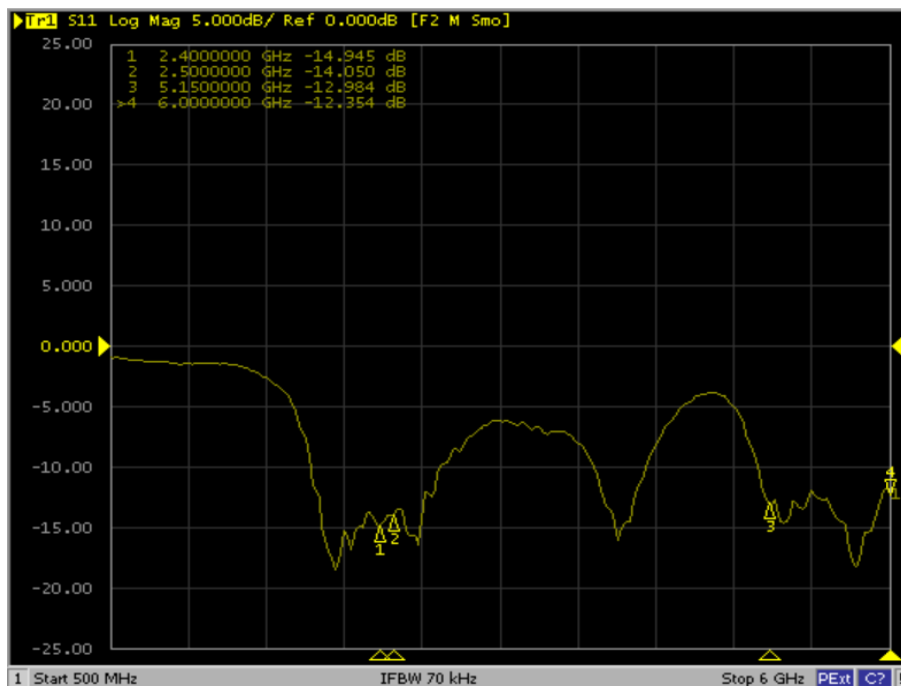


FIGURE 4.3.4 RETURN LOSS OF WIFI 1 ANTENNA IN FREE SPACE

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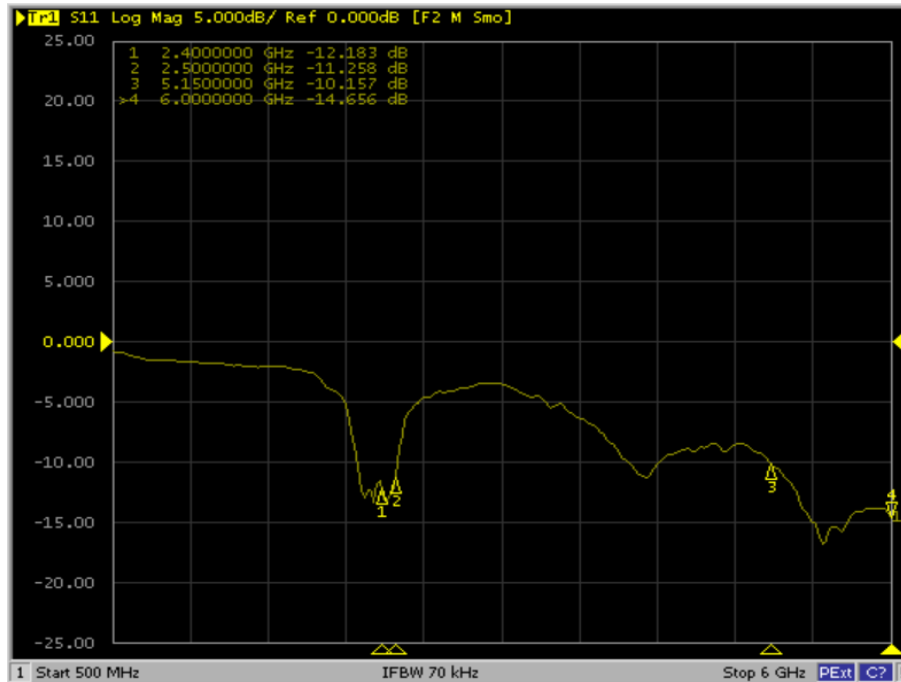
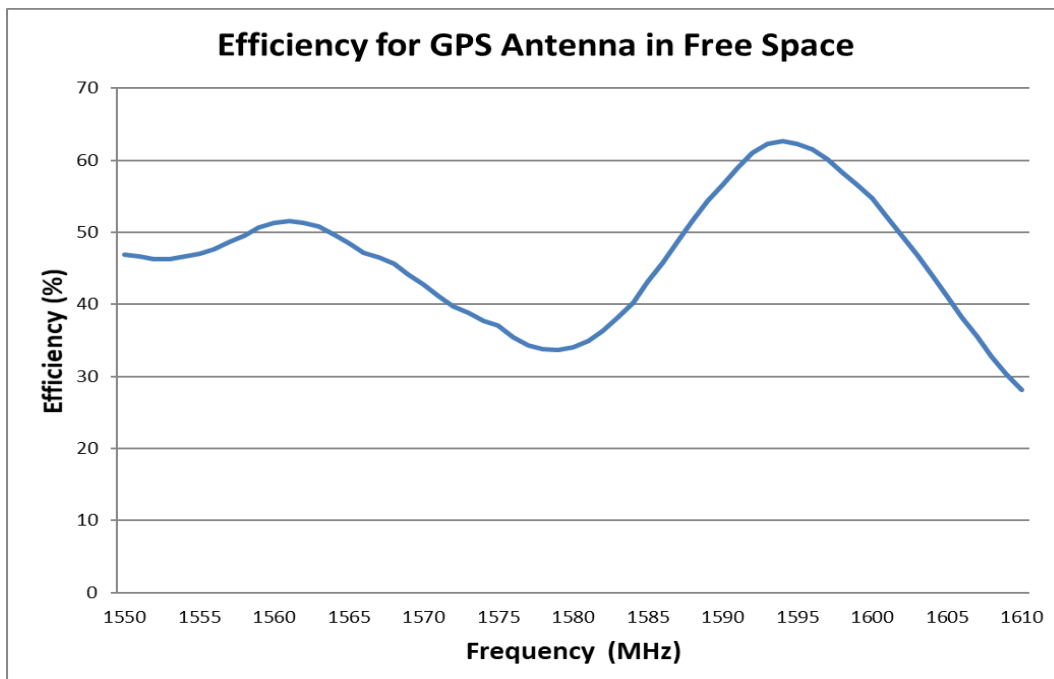


FIGURE 4.3.5 RETURN LOSS OF WIFI 2 ANTENNA IN FREE SPACE

4.4 EFFICIENCY PLOT

All measurements in this document are done with cable length of 1000mm

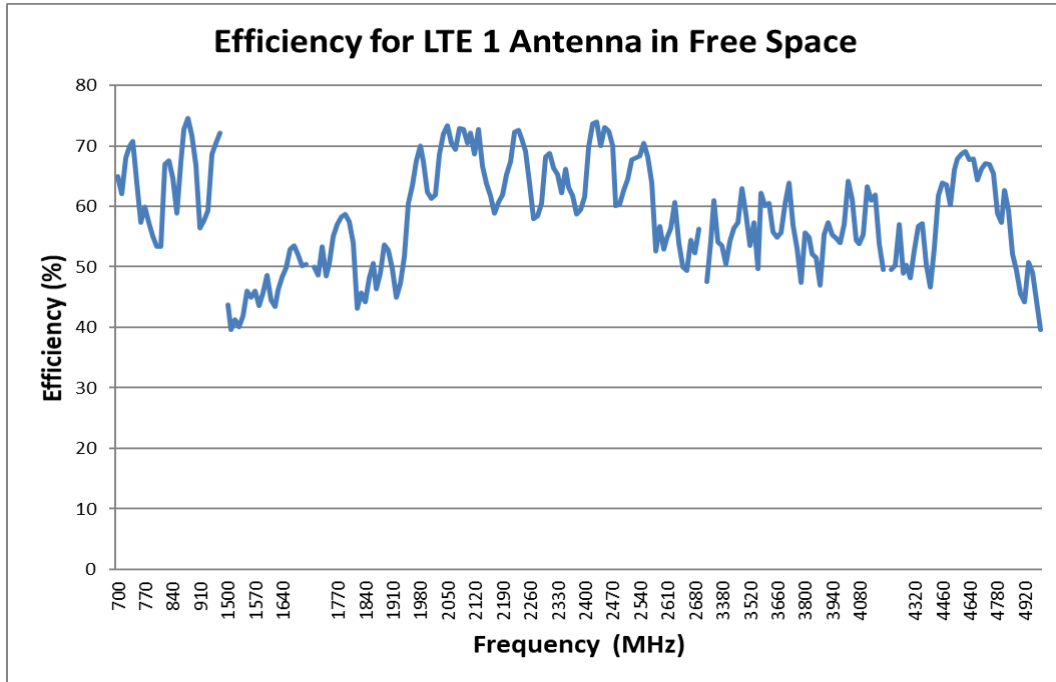


4.4.1 EFFICIENCY OF GPS ANTENNA IN FREE SPACE

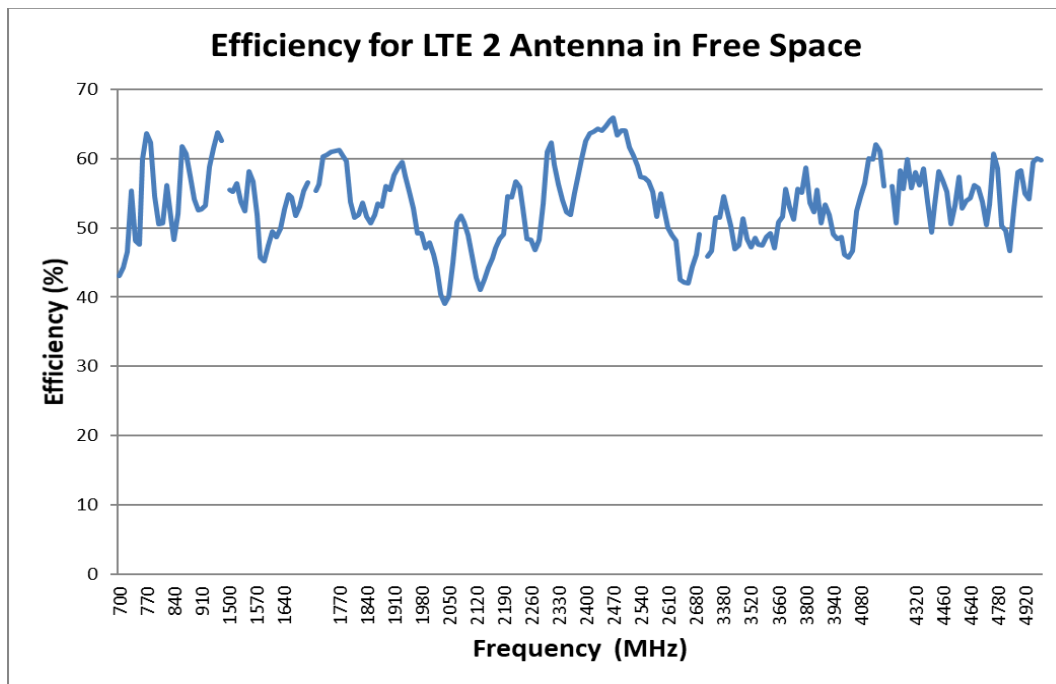
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4.4.2 EFFICIENCY OF 5G/LTE 1 ANTENNA IN FREE SPACE

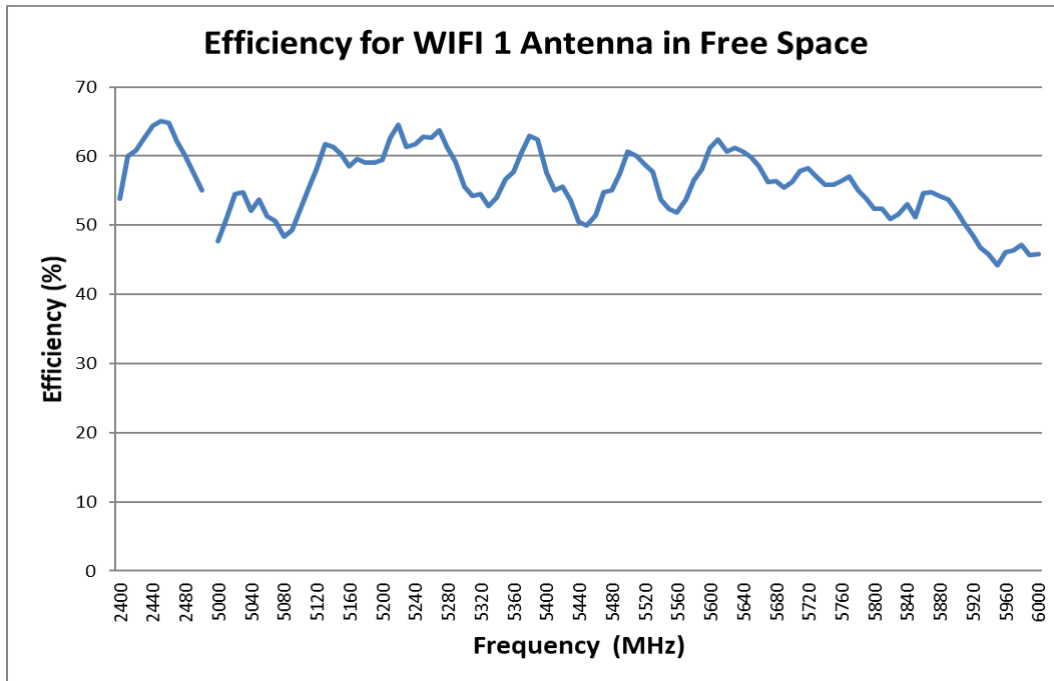


4.4.3 EFFICIENCY OF 5G/LTE 2 ANTENNA IN FREE SPACE

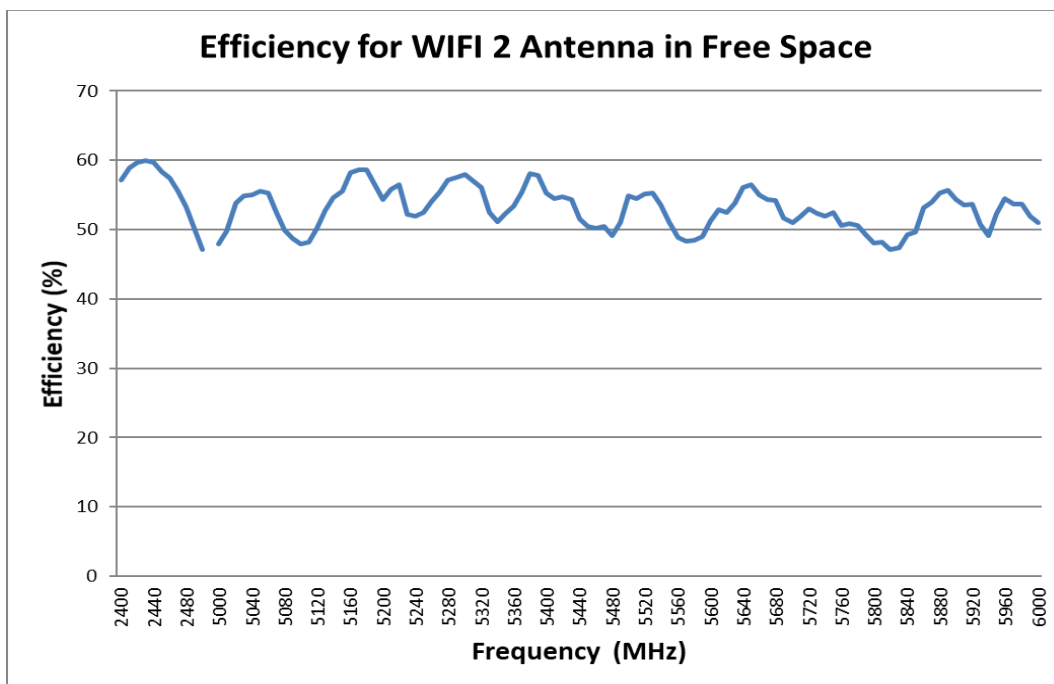
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4.4.4 EFFICIENCY OF WIFI 1 ANTENNA IN FREE SPACE



4.4.5 EFFICIENCY OF WIFI 2 ANTENNA IN FREE SPACE

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4.5 2D RADIATION PATTERN

All measurements in this document are done with cable length of 1000mm

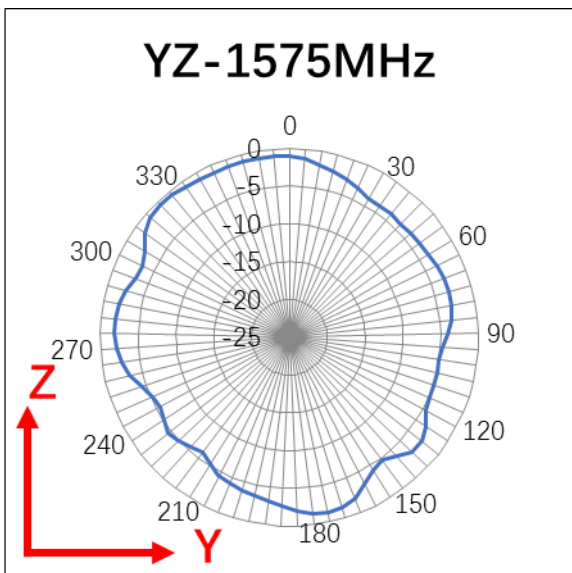
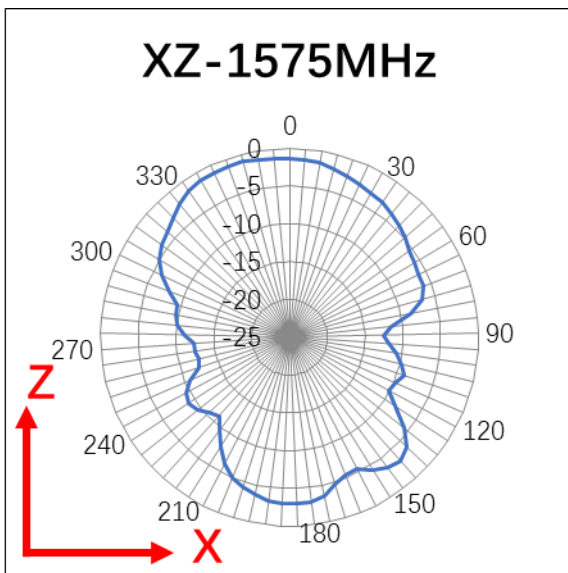
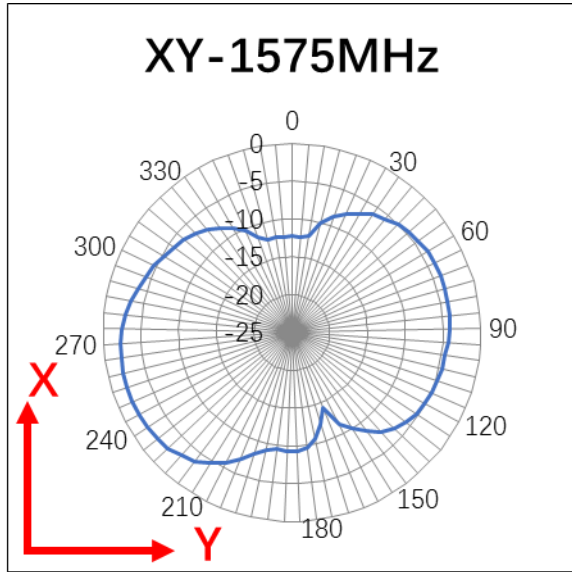


FIGURE 4.5.1 2D RADIATION PATTERN OF GNSS ANTENNA AT 1575MHZ IN FREE SPACE

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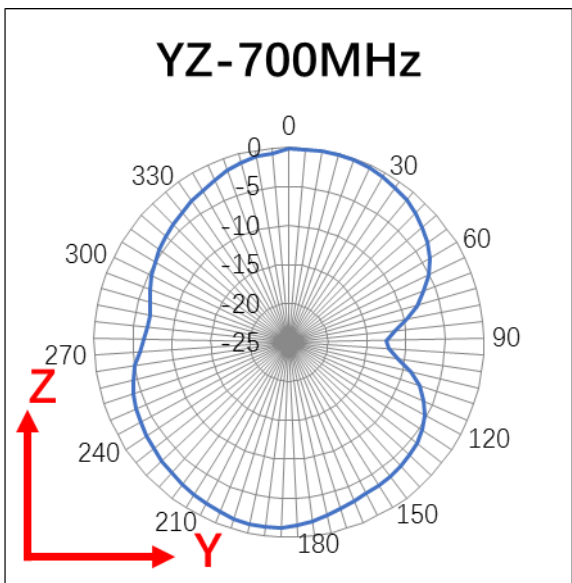
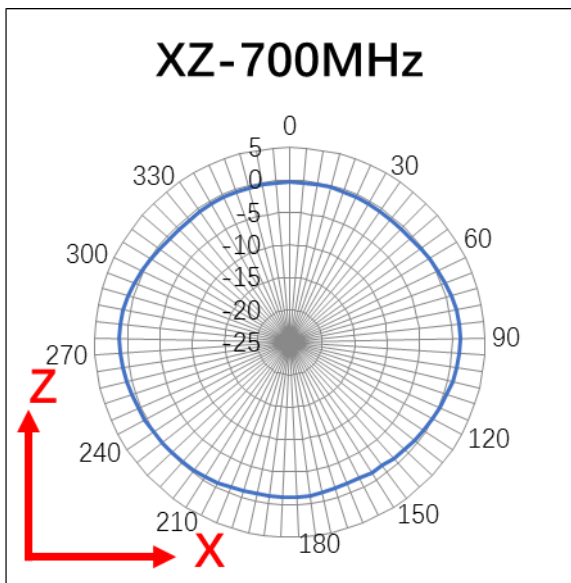
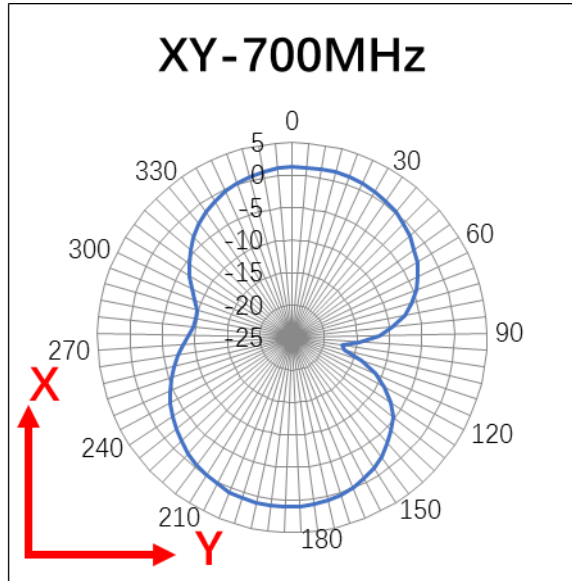
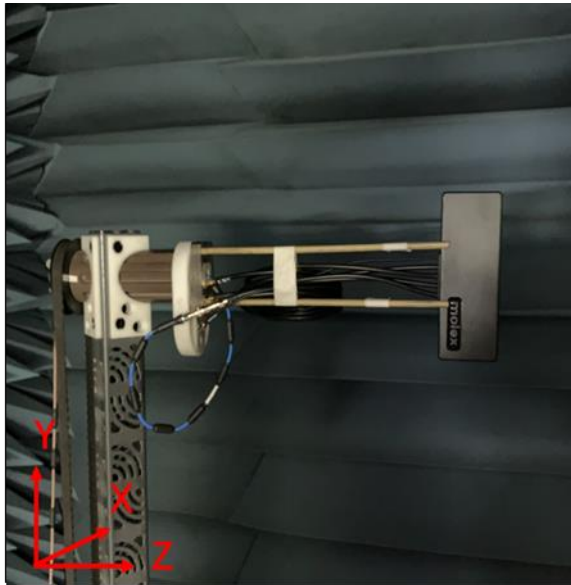


FIGURE 4.5.2 2D RADIATION PATTERN OF 5G/LTE 1 ANTENNA AT 700MHZ IN FREE SPACE

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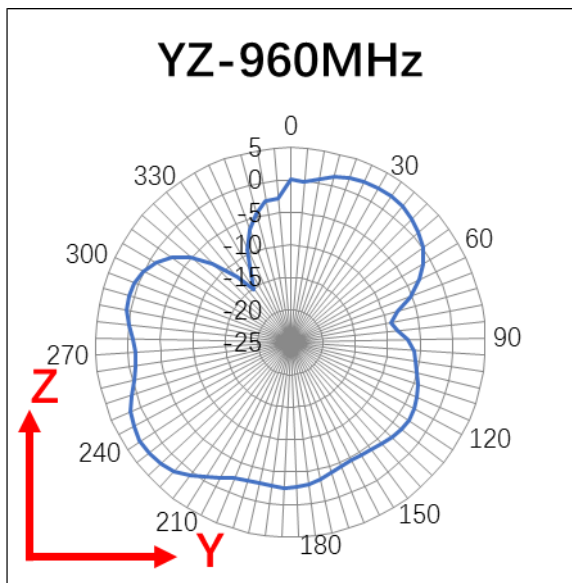
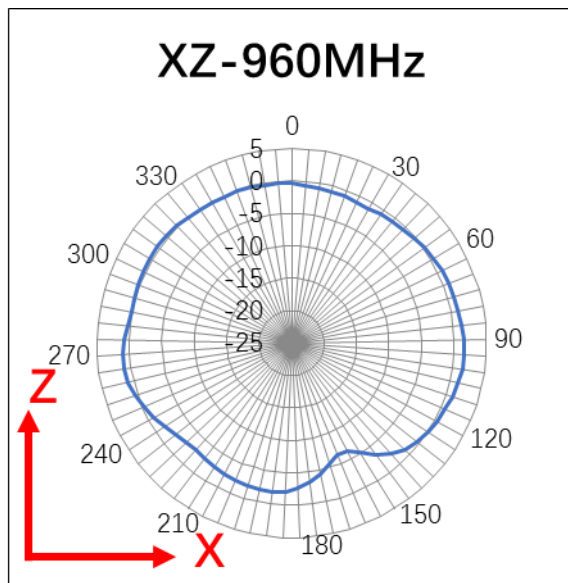
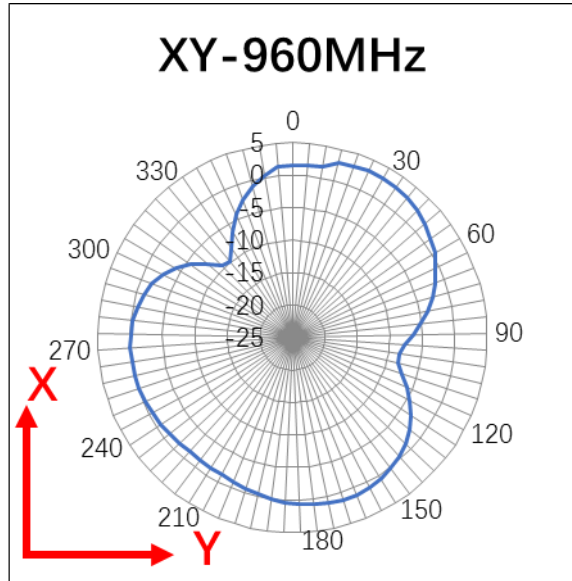
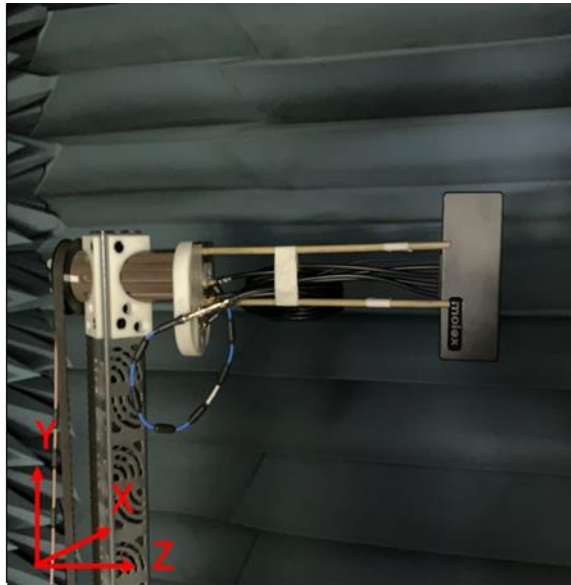


FIGURE 4.5.3 2D RADIATION PATTERN OF 5G/ LTE 1 ANTENNA AT 960MHZ IN FREE SPACE

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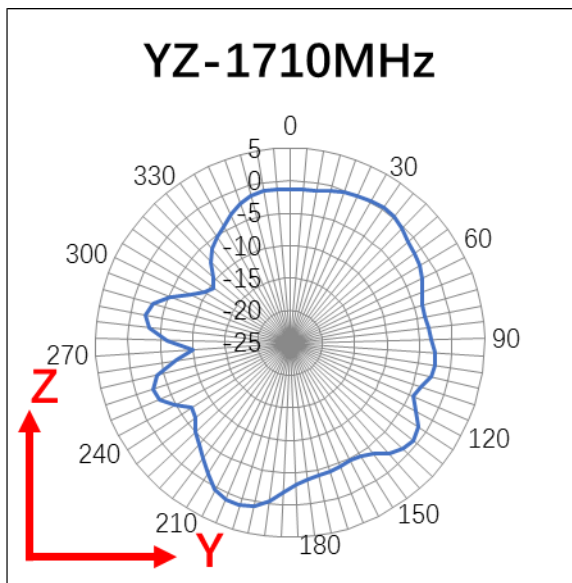
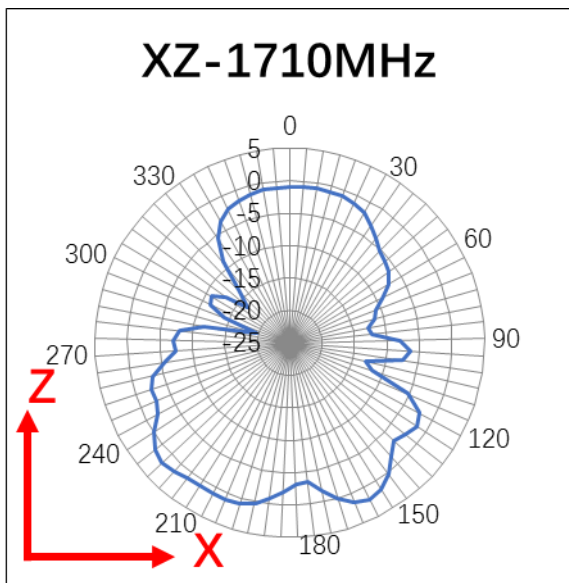
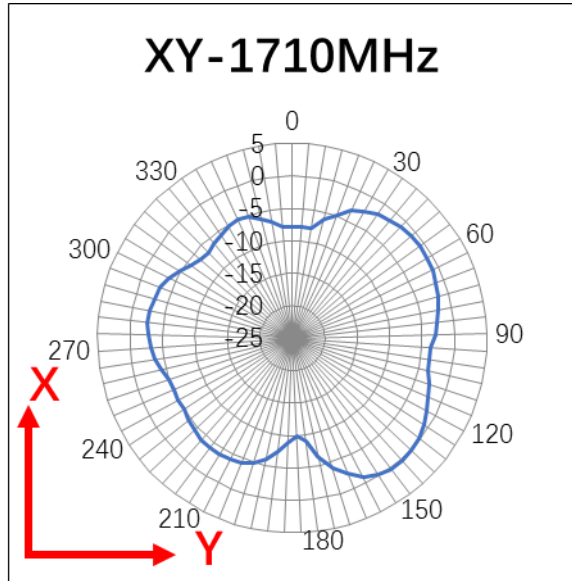
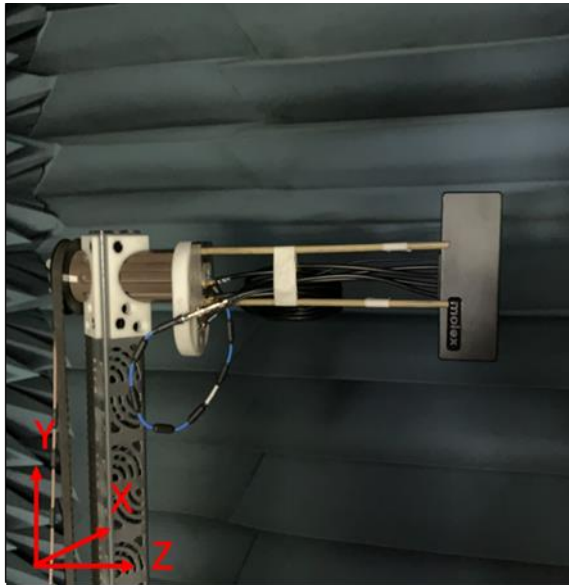


FIGURE 4.5.4 2D RADIATION PATTERN OF 5G/LTE 1 ANTENNA AT 1710MHZ IN FREE SPACE

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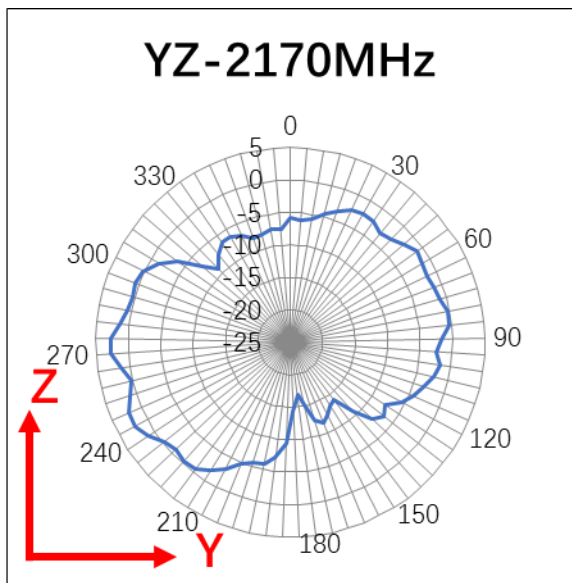
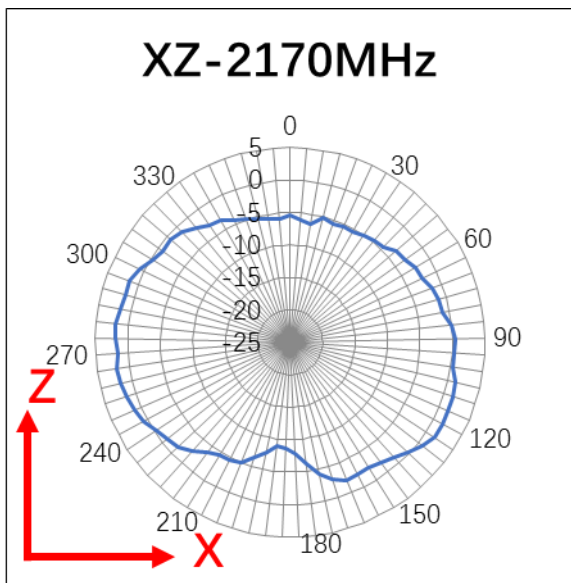
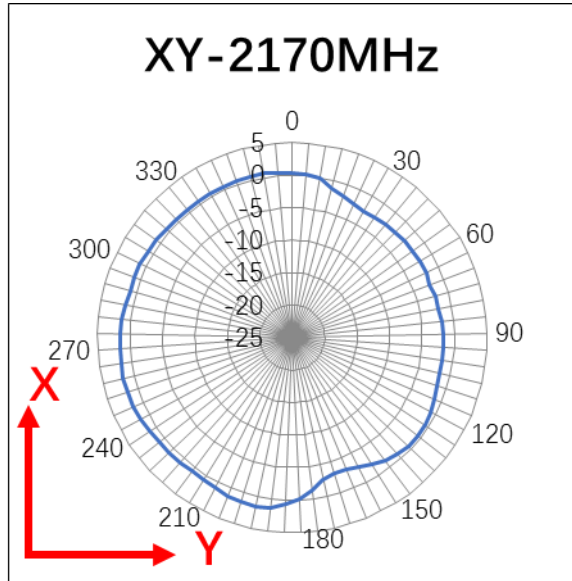
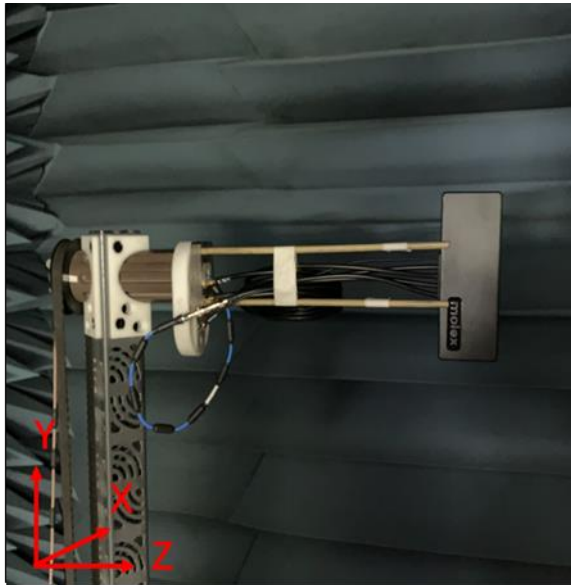


FIGURE 4.5.5 2D RADIATION PATTERN OF 5G/LTE 1 ANTENNA AT 2170MHZ IN FREE SPACE

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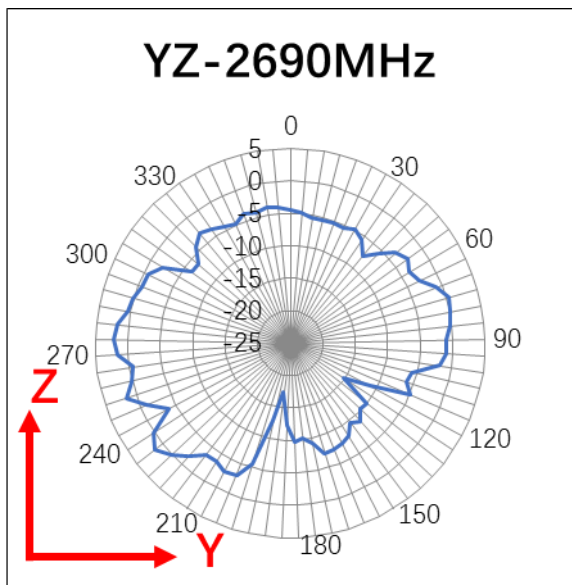
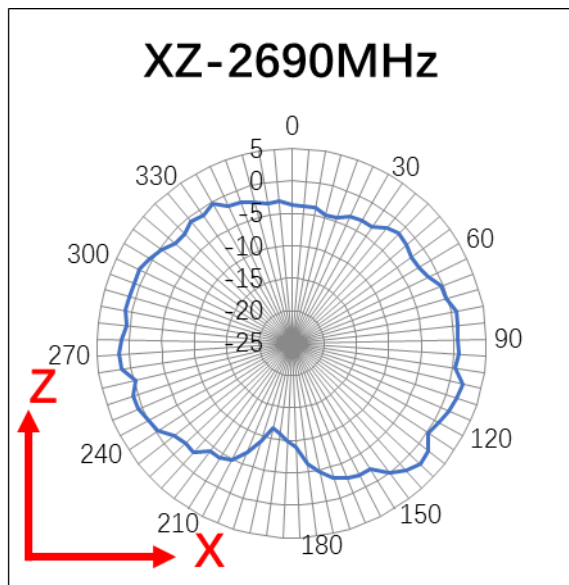
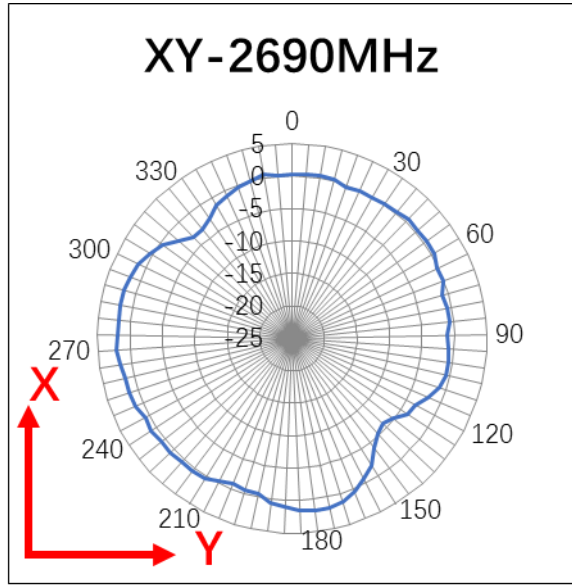
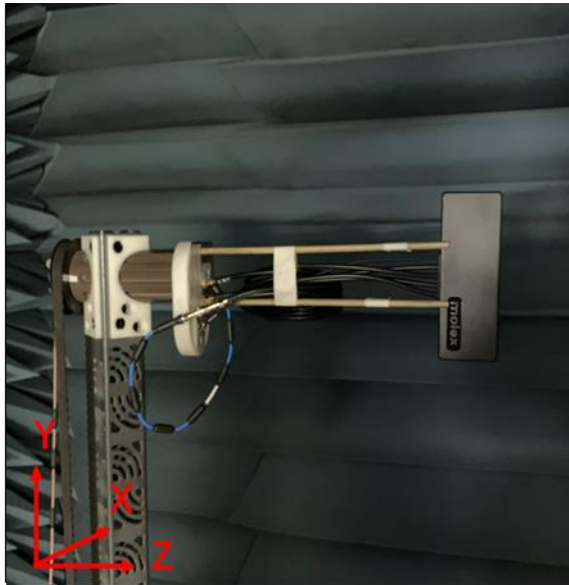


FIGURE 4.5.6 2D RADIATION PATTERN OF 5G/LTE 1 ANTENNA AT 2690MHZ IN FREE SPACE

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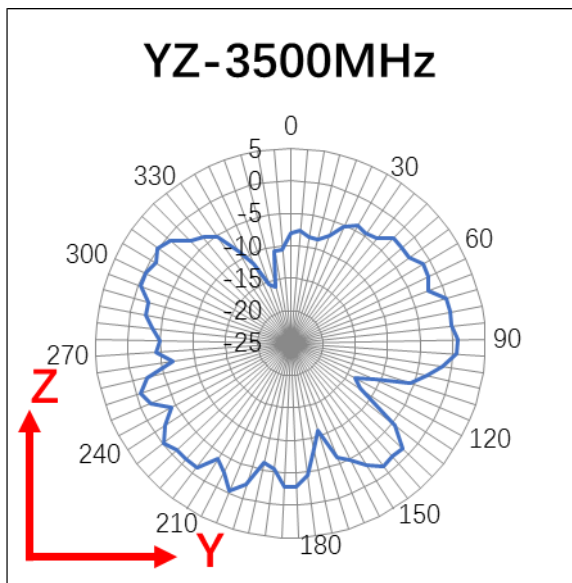
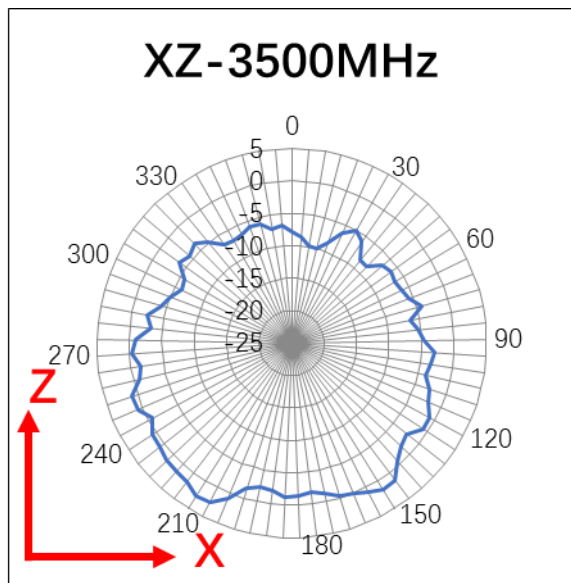
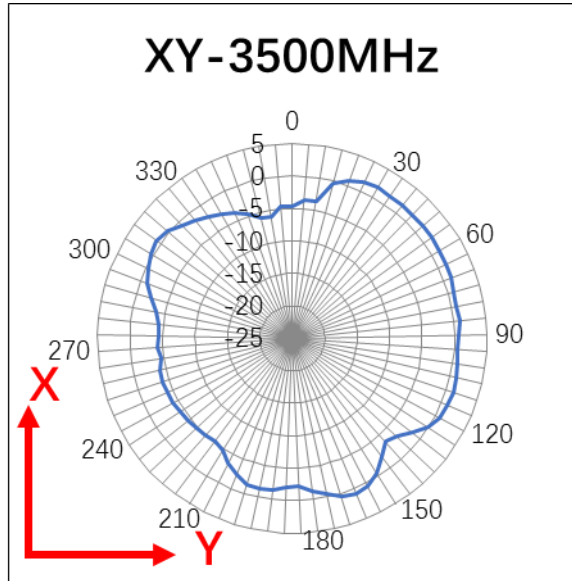
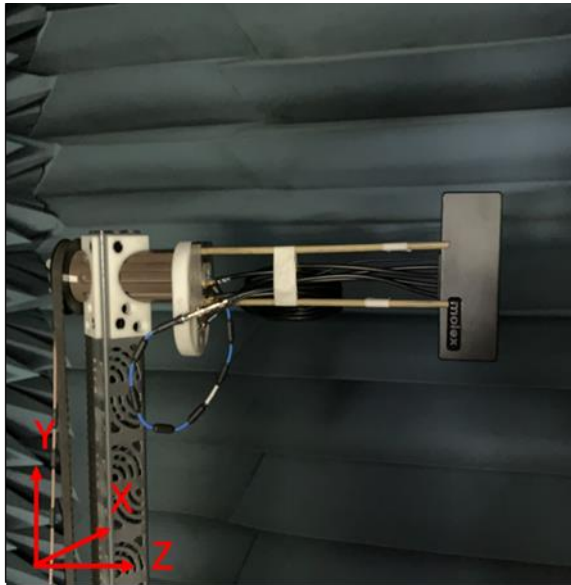


FIGURE 4.5.7 2D RADIATION PATTERN OF 5G/LTE 1 ANTENNA AT 3500MHZ IN FREE SPACE

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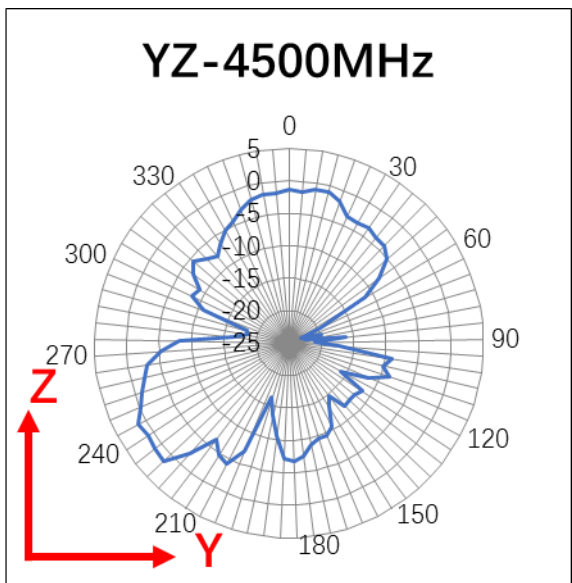
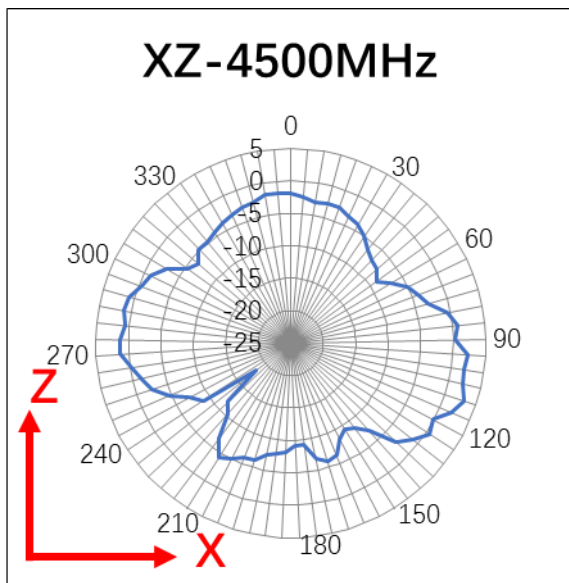
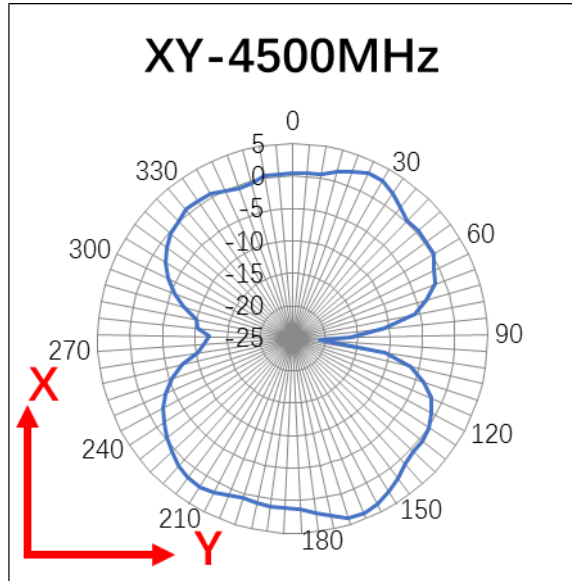
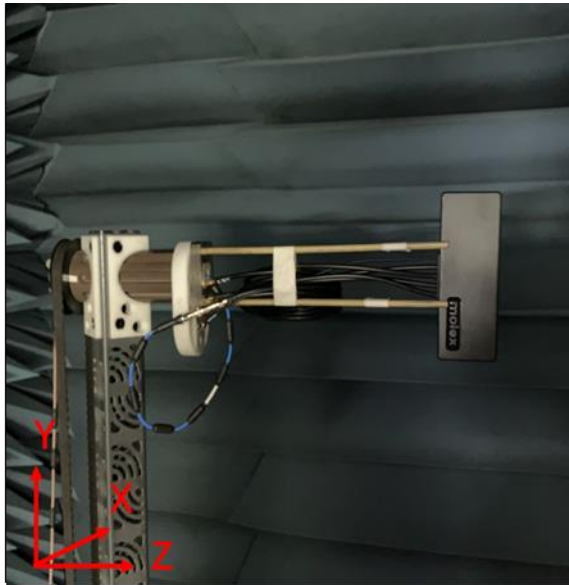


FIGURE 4.5.8 2D RADIATION PATTERN OF 5G/LTE 1 ANTENNA AT 4500MHZ IN FREE SPACE

REVISION: B	ECR/ECN INFORMATION: EC No: 659188 DATE: 2021/04/14	TITLE: Molex Multi-hub Antenna 5-in-1 Application Specification	SHEET No. 20 of 58
DOCUMENT NUMBER: AS-2165891000	CREATED / REVISED BY: Liu Hai 2021/04/14	CHECKED BY: Andy Zhang 2021/04/14	APPROVED BY: Chris Zhong 2021/04/14

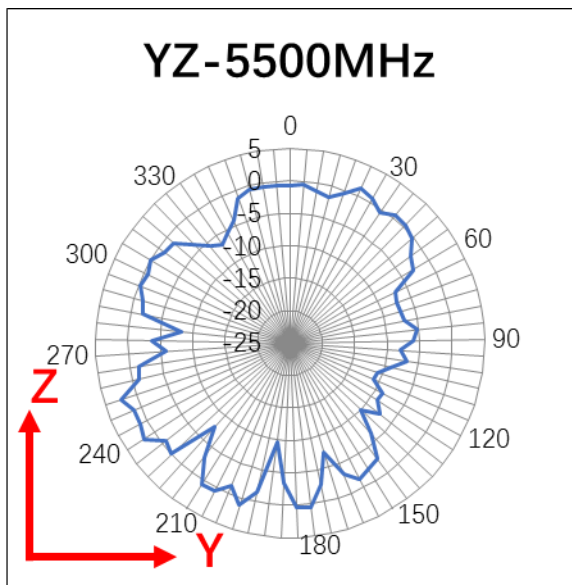
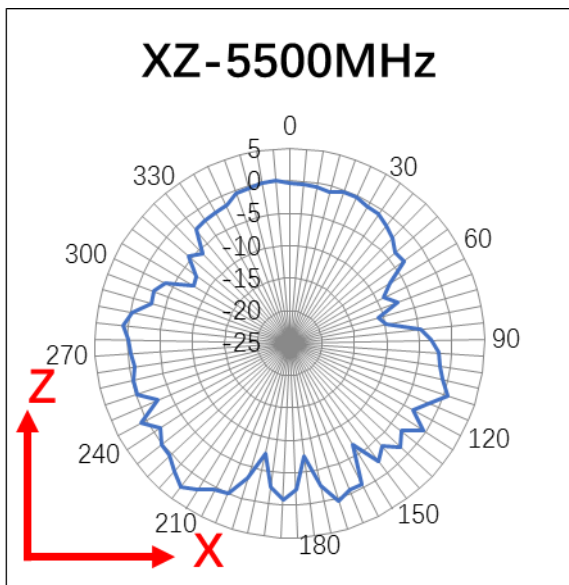
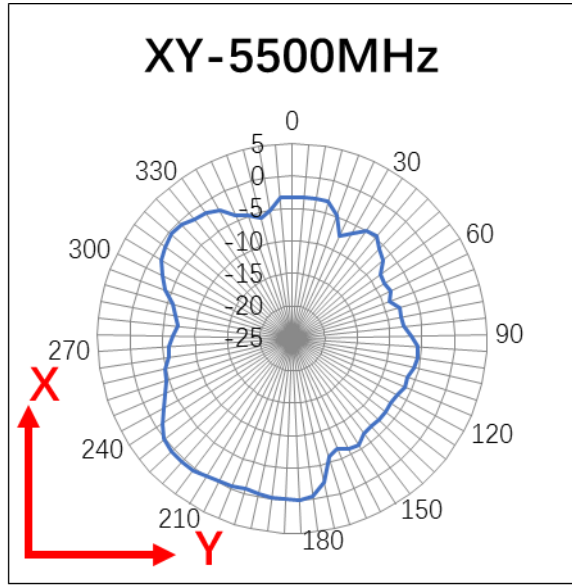
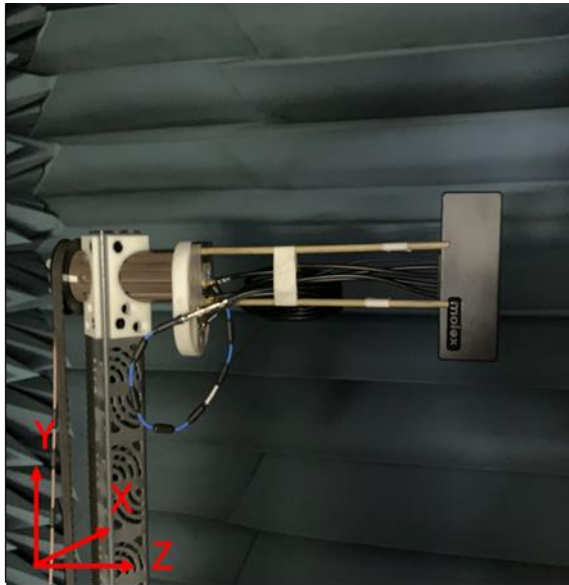


FIGURE 4.5.9 2D RADIATION PATTERN OF 5G/LTE 1 ANTENNA AT 5500MHZ IN FREE SPACE

REVISION: B	ECR/ECN INFORMATION: EC No: 659188 DATE: 2021/04/14	TITLE: Molex Multi-hub Antenna 5-in-1 Application Specification	SHEET No. 21 of 58
DOCUMENT NUMBER: AS-2165891000	CREATED / REVISED BY: Liu Hai 2021/04/14	CHECKED BY: Andy Zhang 2021/04/14	APPROVED BY: Chris Zhong 2021/04/14

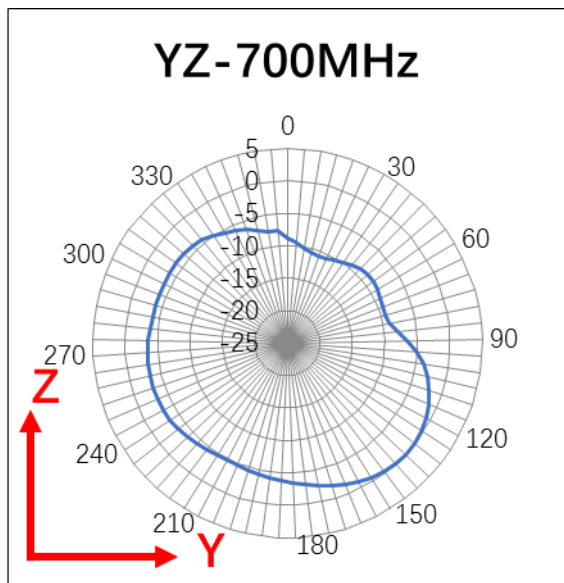
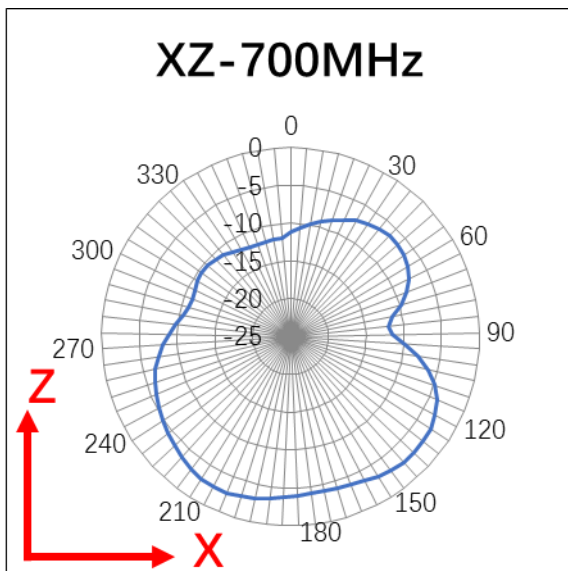
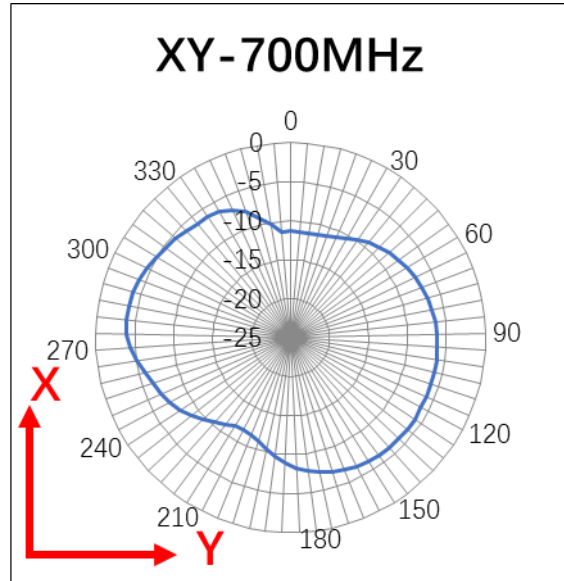
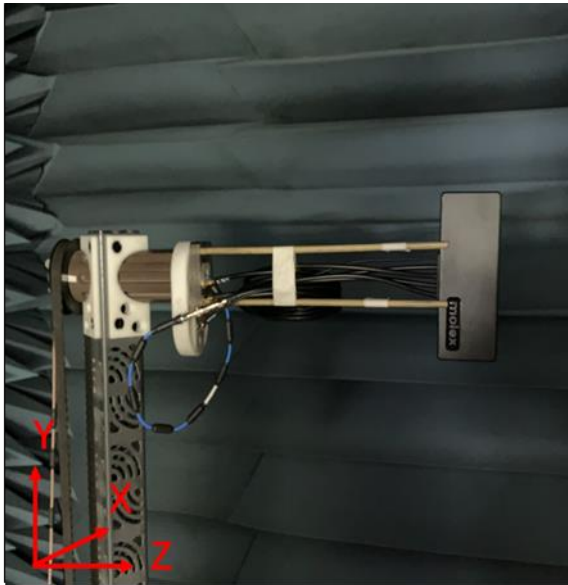


FIGURE 4.5.10 2D RADIATION PATTERN OF 5G/LTE 2 ANTENNA AT 700MHZ IN FREE SPACE

REVISION: B	ECR/ECN INFORMATION: EC No: 659188 DATE: 2021/04/14	TITLE: Molex Multi-hub Antenna 5-in-1 Application Specification	SHEET No. 22 of 58
DOCUMENT NUMBER: AS-2165891000	CREATED / REVISED BY: Liu Hai 2021/04/14	CHECKED BY: Andy Zhang 2021/04/14	APPROVED BY: Chris Zhong 2021/04/14

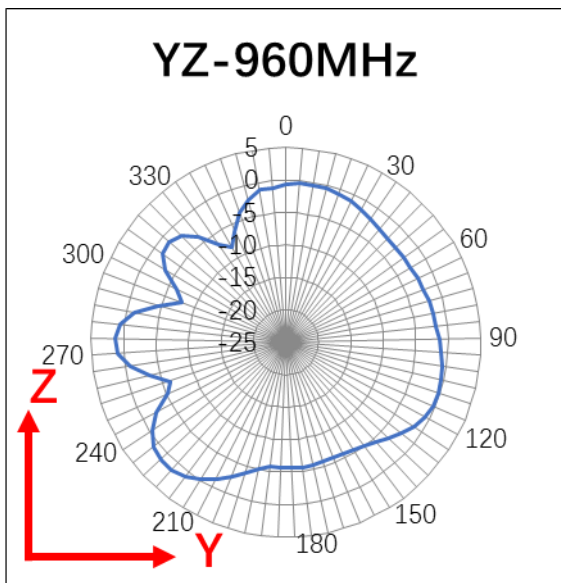
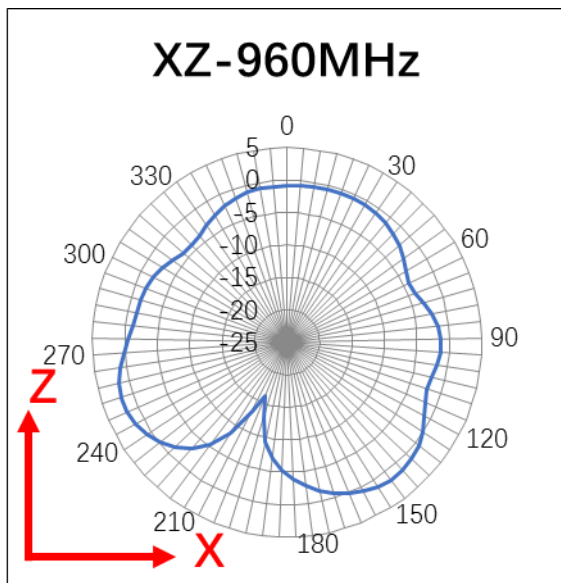
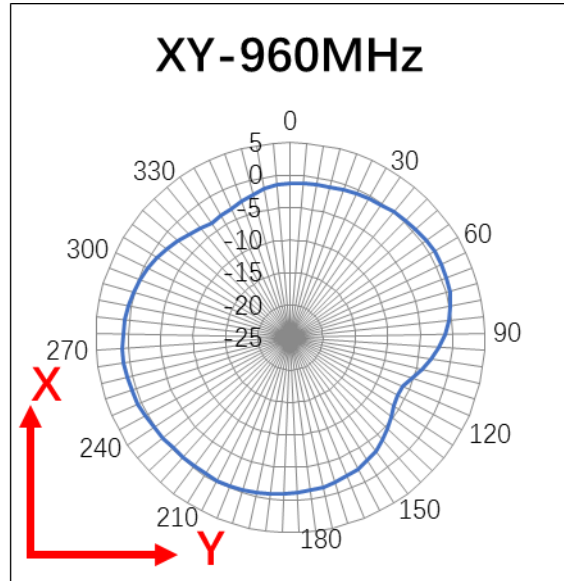
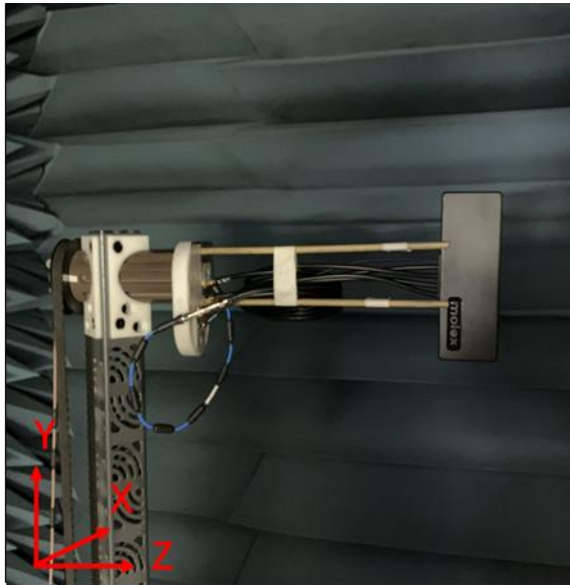


FIGURE 4.5.11 2D RADIATION PATTERN OF 5G/LTE 2 ANTENNA AT 960MHZ IN FREE SPACE

REVISION: B	ECR/ECN INFORMATION: EC No: 659188 DATE: 2021/04/14	TITLE: Molex Multi-hub Antenna 5-in-1 Application Specification	SHEET No. 23 of 58
DOCUMENT NUMBER: AS-2165891000	CREATED / REVISED BY: Liu Hai 2021/04/14	CHECKED BY: Andy Zhang 2021/04/14	APPROVED BY: Chris Zhong 2021/04/14

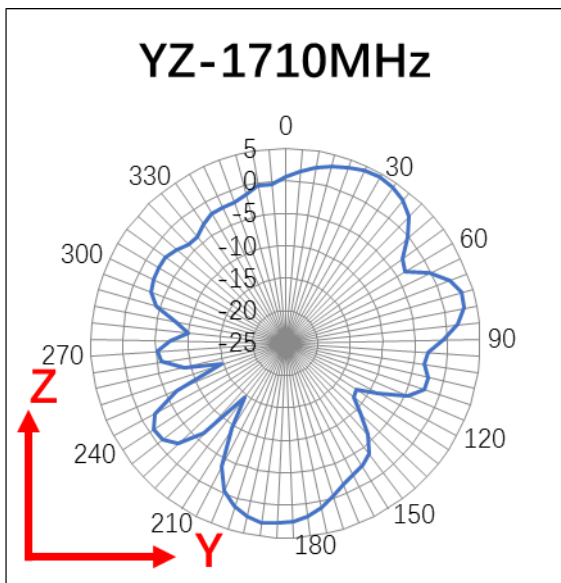
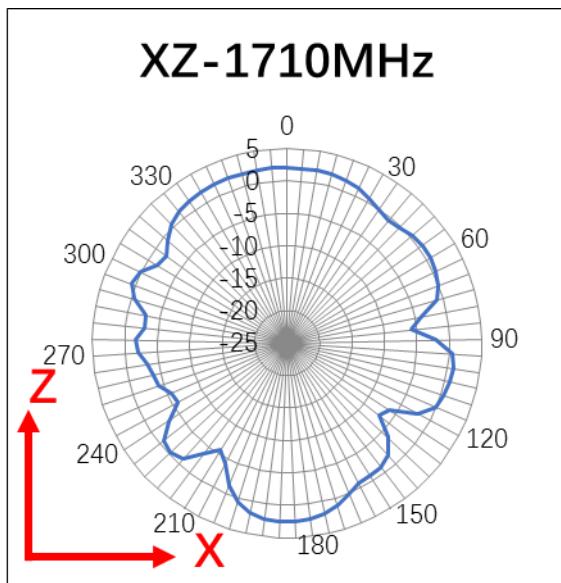
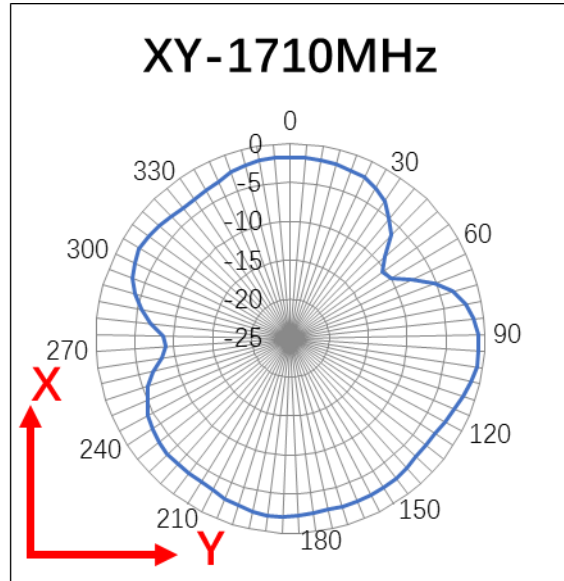
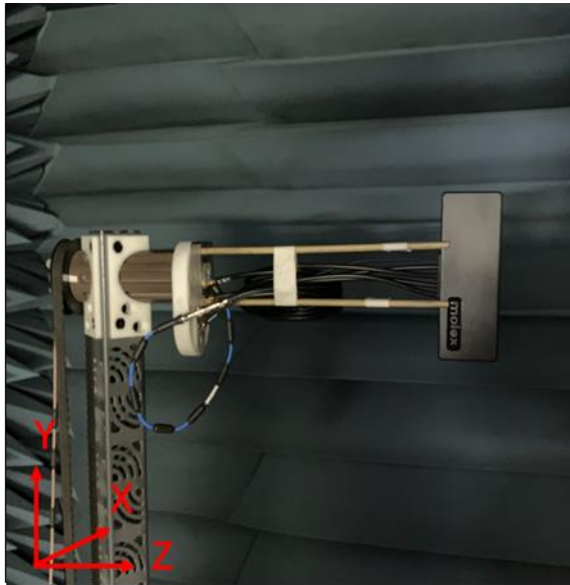


FIGURE 4.5.12 2D RADIATION PATTERN OF 5G/LTE 2 ANTENNA AT 1710MHZ IN FREE SPACE

REVISION: B	ECR/ECN INFORMATION: EC No: 659188 DATE: 2021/04/14	TITLE: Molex Multi-hub Antenna 5-in-1 Application Specification	SHEET No. 24 of 58
DOCUMENT NUMBER: AS-2165891000	CREATED / REVISED BY: Liu Hai 2021/04/14	CHECKED BY: Andy Zhang 2021/04/14	APPROVED BY: Chris Zhong 2021/04/14

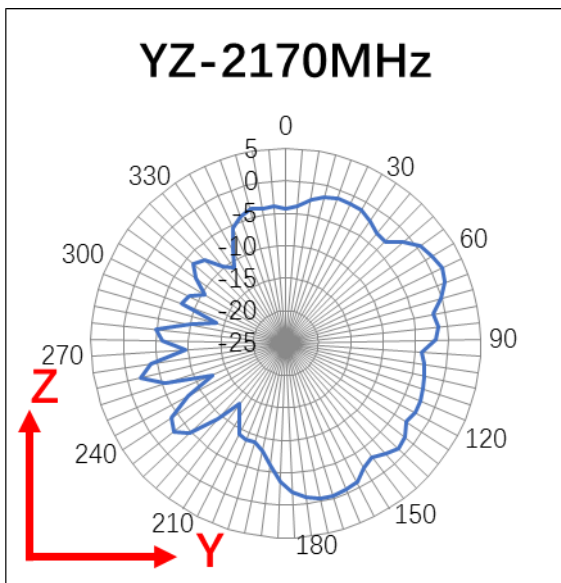
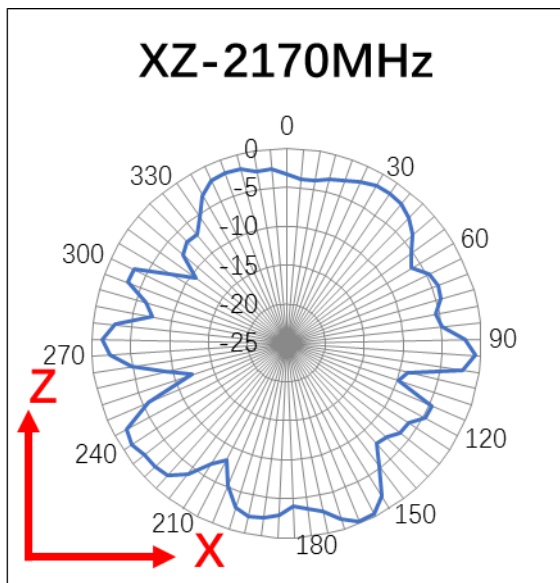
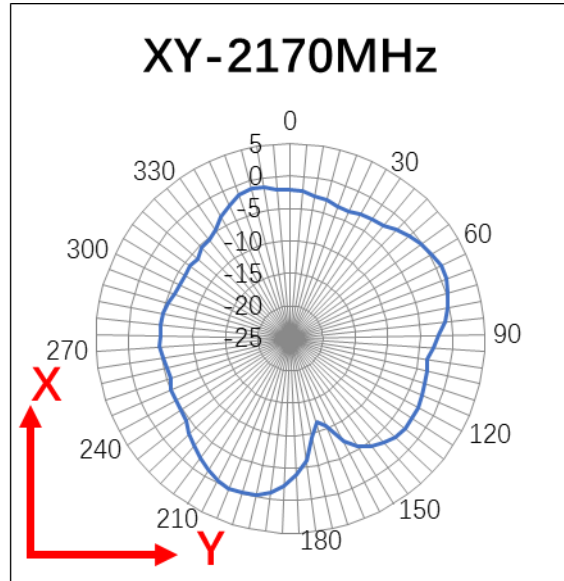
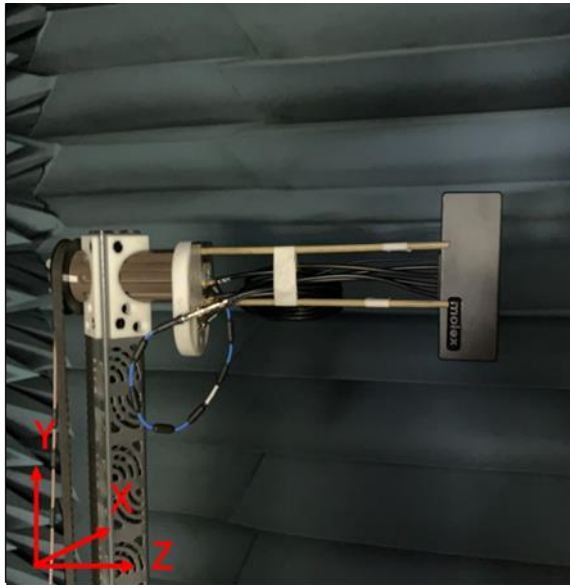


FIGURE 4.5.13 2D RADIATION PATTERN OF 5G/LTE 2 ANTENNA AT 2170MHZ IN FREE SPACE

REVISION: B	ECR/ECN INFORMATION: EC No: 659188 DATE: 2021/04/14	TITLE: Molex Multi-hub Antenna 5-in-1 Application Specification	SHEET No. 25 of 58
DOCUMENT NUMBER: AS-2165891000	CREATED / REVISED BY: Liu Hai 2021/04/14	CHECKED BY: Andy Zhang 2021/04/14	APPROVED BY: Chris Zhong 2021/04/14

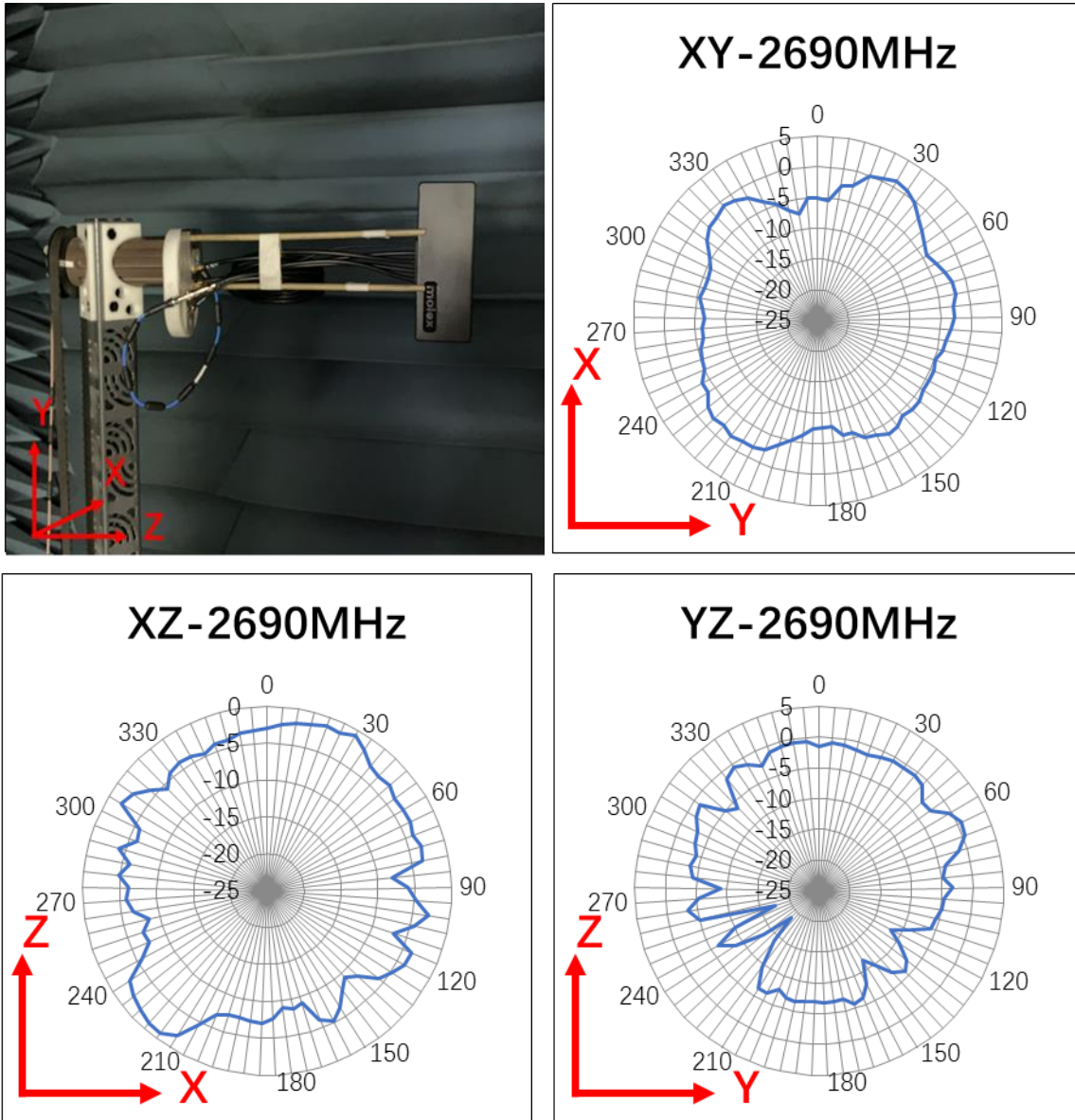


FIGURE 4.5.14 2D RADIATION PATTERN OF 5G/LTE 2 ANTENNA AT 2690MHZ IN FREE SPACE

REVISION: B	ECR/ECN INFORMATION: EC No: 659188 DATE: 2021/04/14	TITLE: Molex Multi-hub Antenna 5-in-1 Application Specification	SHEET No. 26 of 58
DOCUMENT NUMBER: AS-2165891000	CREATED / REVISED BY: Liu Hai 2021/04/14	CHECKED BY: Andy Zhang 2021/04/14	APPROVED BY: Chris Zhong 2021/04/14

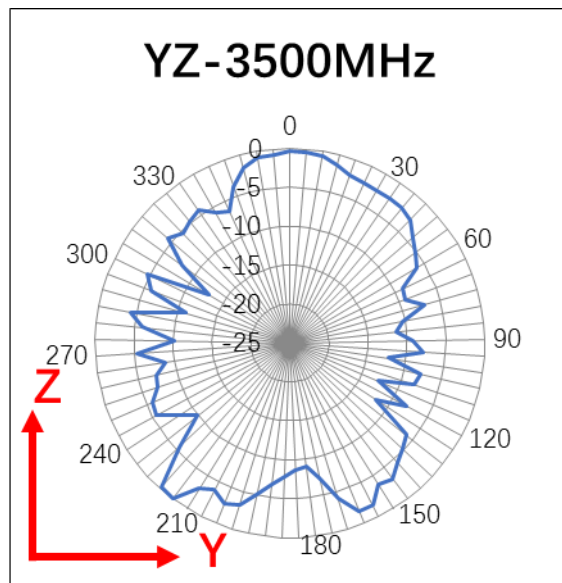
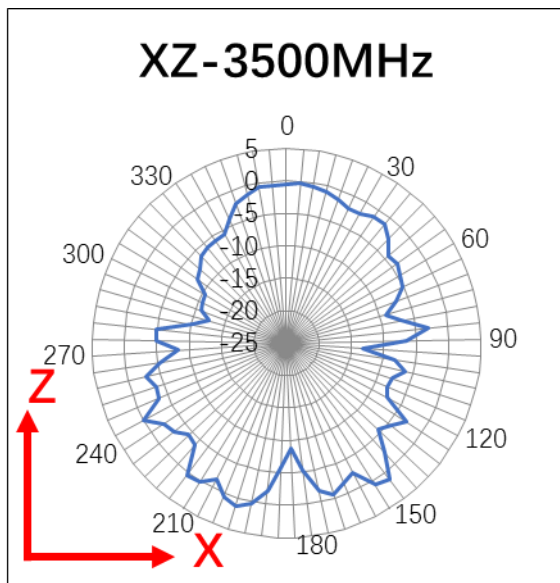
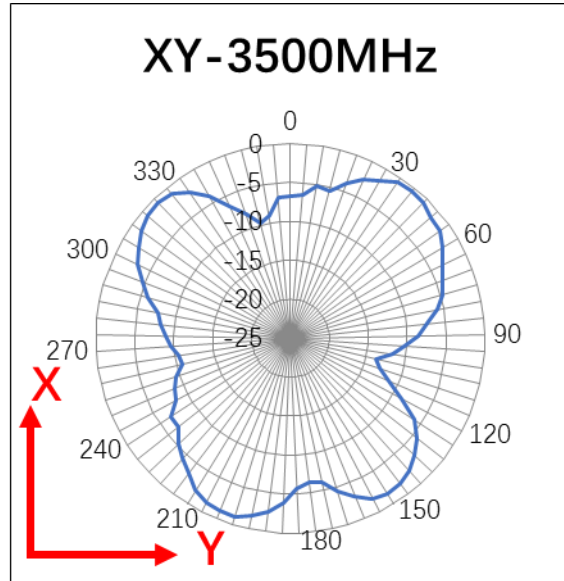
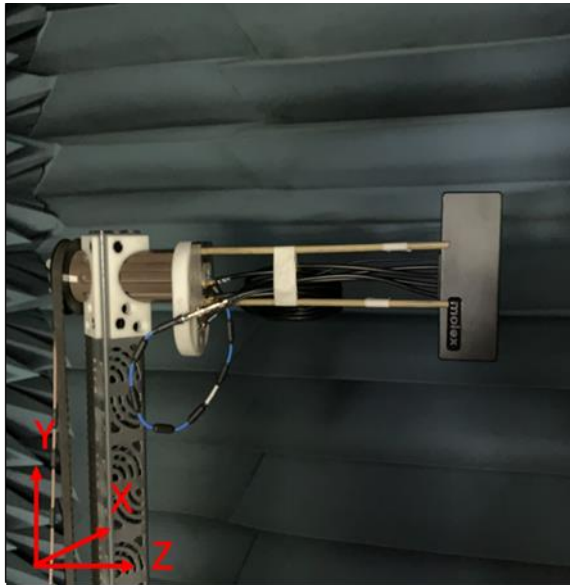


FIGURE 4.5.15 2D RADIATION PATTERN OF 5G/LTE 2 ANTENNA AT 3500MHZ IN FREE SPACE

REVISION: B	ECR/ECN INFORMATION: EC No: 659188 DATE: 2021/04/14	TITLE: Molex Multi-hub Antenna 5-in-1 Application Specification	SHEET No. 27 of 58
DOCUMENT NUMBER: AS-2165891000	CREATED / REVISED BY: Liu Hai 2021/04/14	CHECKED BY: Andy Zhang 2021/04/14	APPROVED BY: Chris Zhong 2021/04/14

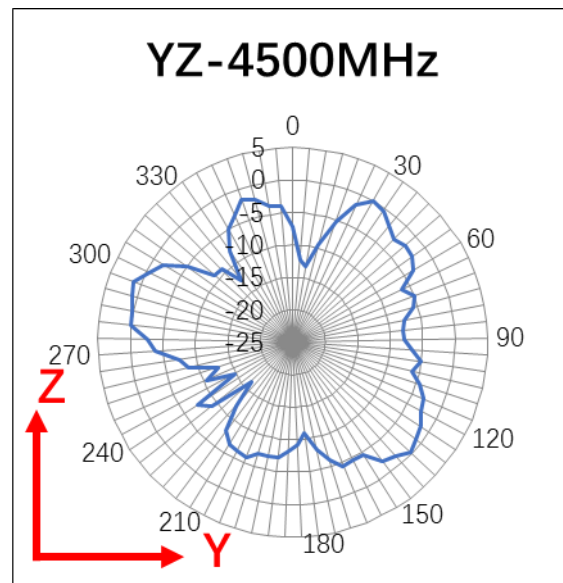
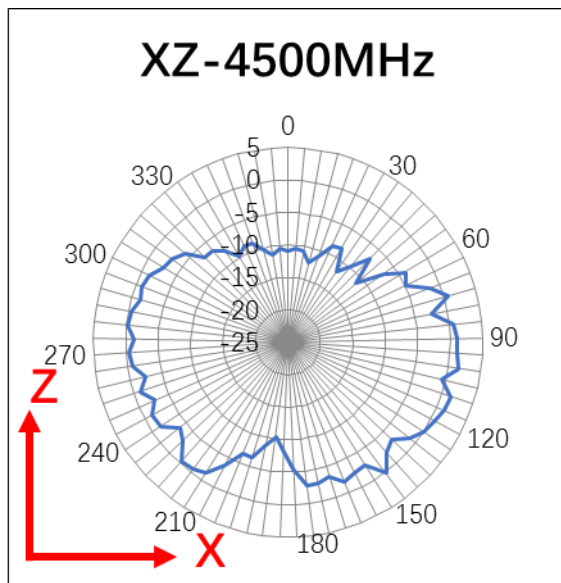
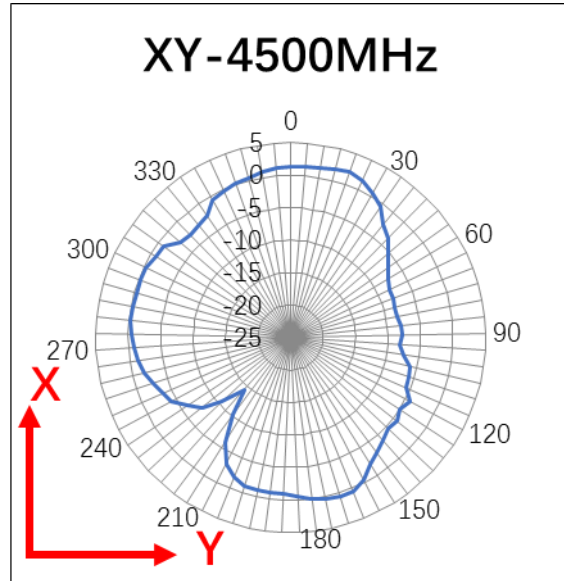
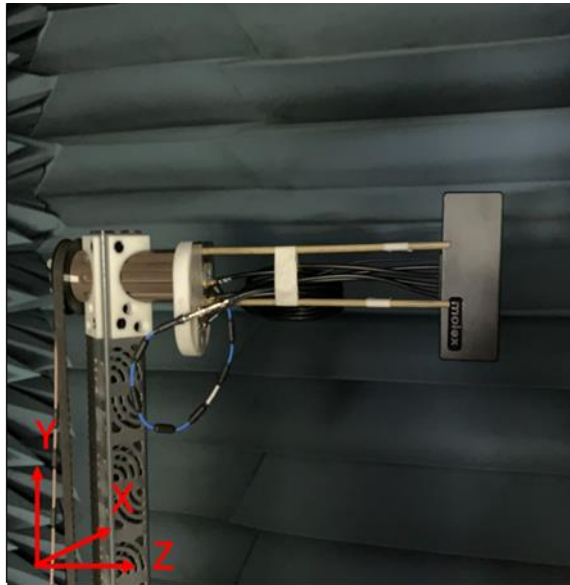


FIGURE 4.5.16 2D RADIATION PATTERN OF 5G/LTE 2 ANTENNA AT 4500MHZ IN FREE SPACE

REVISION: B	ECR/ECN INFORMATION: EC No: 659188 DATE: 2021/04/14	TITLE: Molex Multi-hub Antenna 5-in-1 Application Specification	SHEET No. 28 of 58
DOCUMENT NUMBER: AS-2165891000	CREATED / REVISED BY: Liu Hai 2021/04/14	CHECKED BY: Andy Zhang 2021/04/14	APPROVED BY: Chris Zhong 2021/04/14

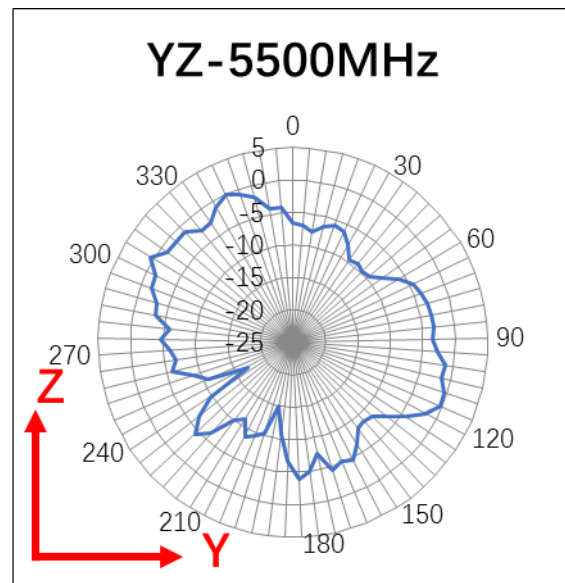
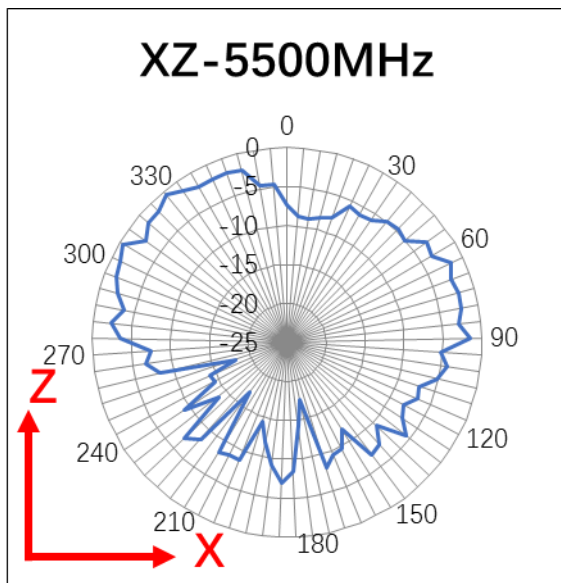
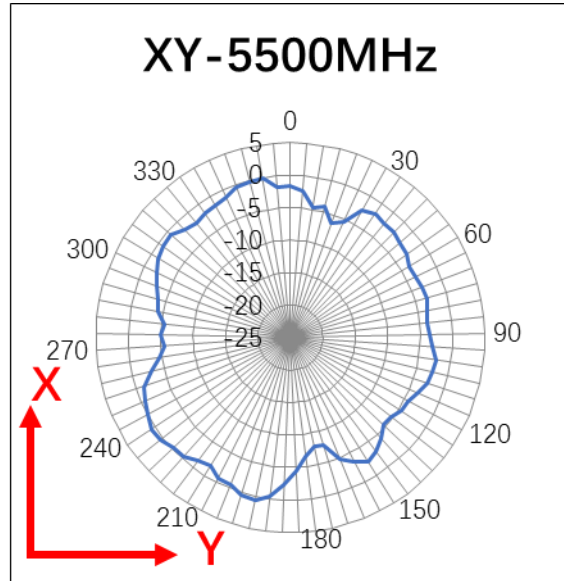
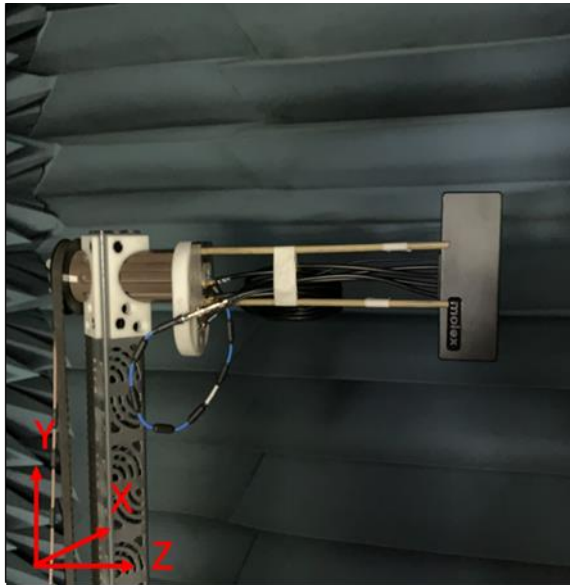


FIGURE 4.5.17 2D RADIATION PATTERN OF 5G/LTE 2 ANTENNA AT 5500MHZ IN FREE SPACE

REVISION: B	ECR/ECN INFORMATION: EC No: 659188 DATE: 2021/04/14	TITLE: Molex Multi-hub Antenna 5-in-1 Application Specification	SHEET No. 29 of 58
DOCUMENT NUMBER: AS-2165891000	CREATED / REVISED BY: Liu Hai 2021/04/14	CHECKED BY: Andy Zhang 2021/04/14	APPROVED BY: Chris Zhong 2021/04/14

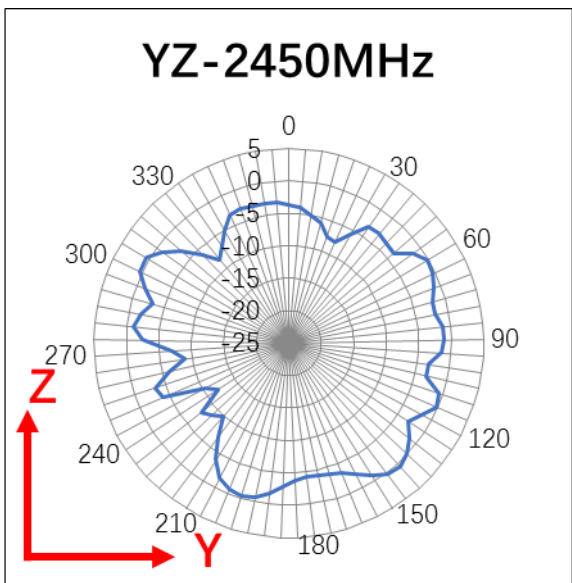
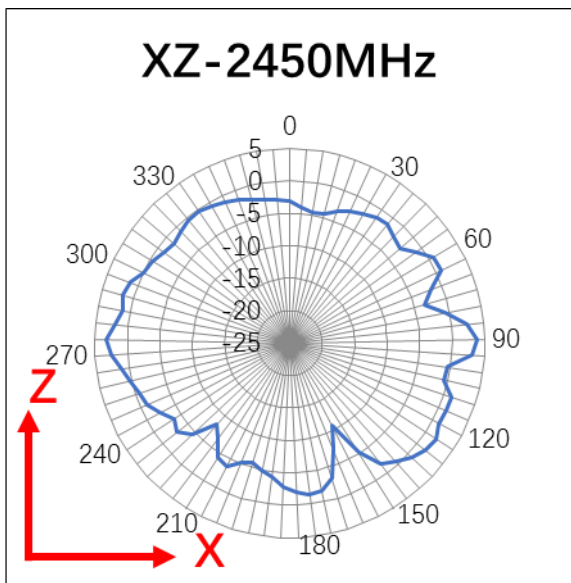
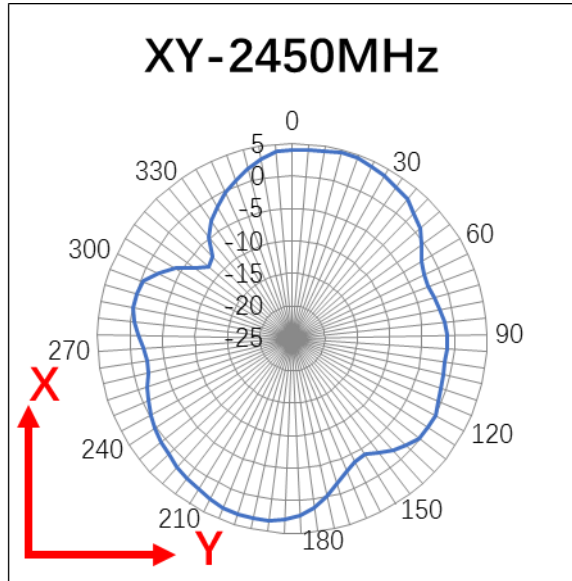
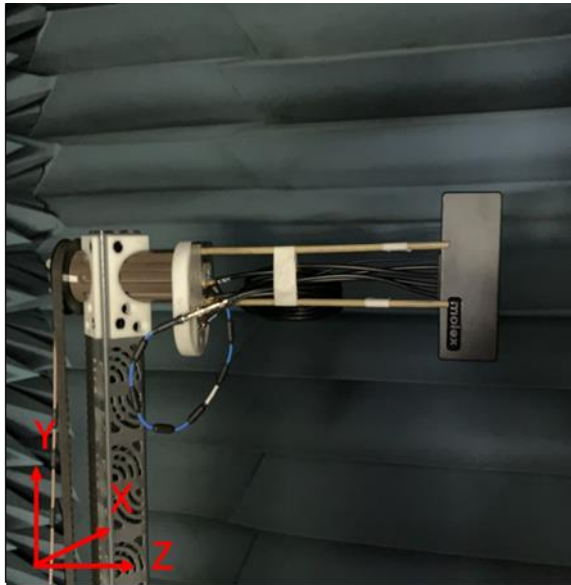


FIGURE 4.5.18 2D RADIATION PATTERN OF WIFI 1 ANTENNA AT 2450MHZ IN FREE SPACE

REVISION: B	ECR/ECN INFORMATION: EC No: 659188 DATE: 2021/04/14	TITLE: Molex Multi-hub Antenna 5-in-1 Application Specification	SHEET No. 30 of 58
DOCUMENT NUMBER: AS-2165891000	CREATED / REVISED BY: Liu Hai 2021/04/14	CHECKED BY: Andy Zhang 2021/04/14	APPROVED BY: Chris Zhong 2021/04/14

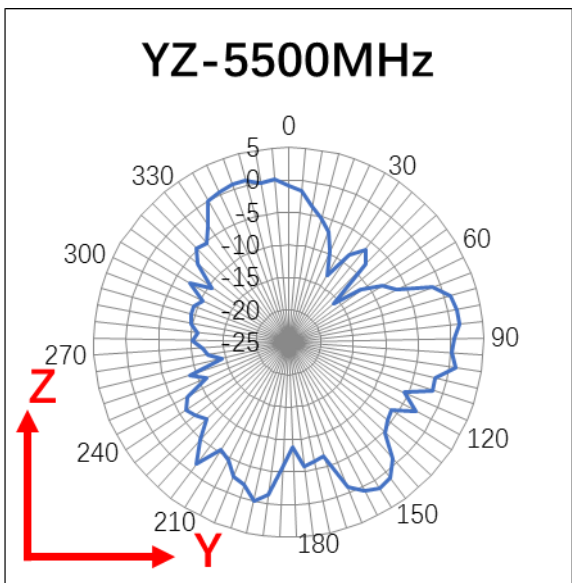
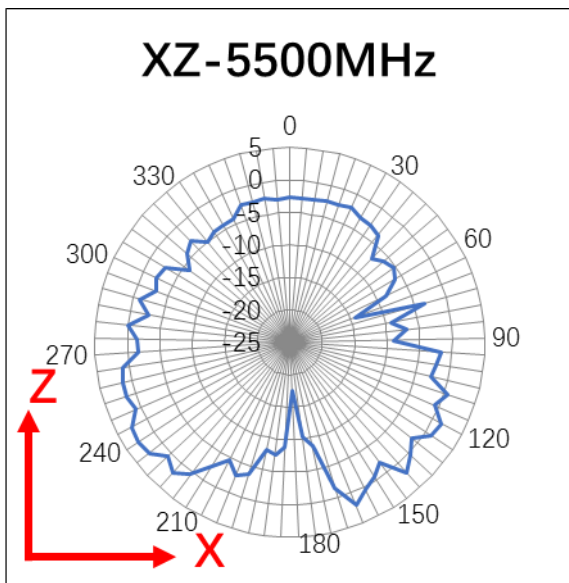
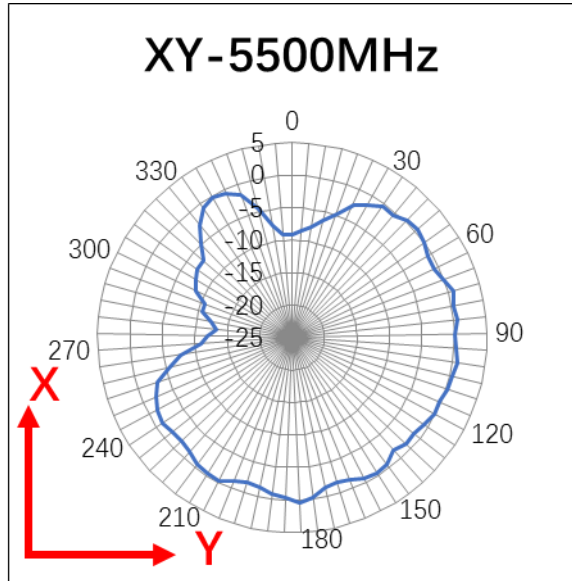
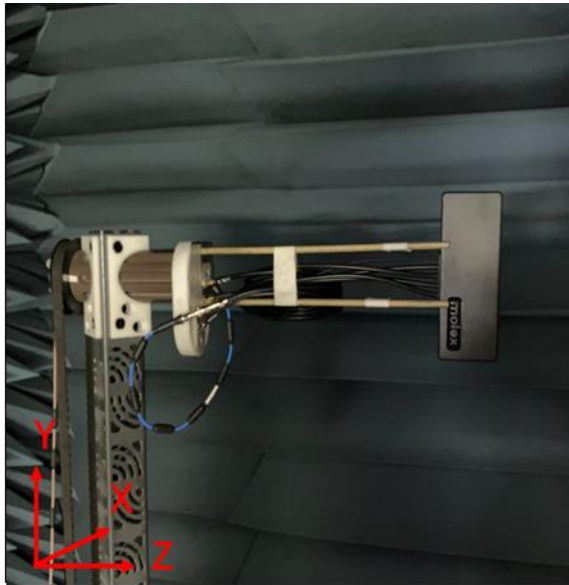


FIGURE 4.5.19 2D RADIATION PATTERN OF WIFI 1 ANTENNA AT 5500MHZ IN FREE SPACE

REVISION: B	ECR/ECN INFORMATION: EC No: 659188 DATE: 2021/04/14	TITLE: Molex Multi-hub Antenna 5-in-1 Application Specification	SHEET No. 31 of 58
DOCUMENT NUMBER: AS-2165891000	CREATED / REVISED BY: Liu Hai 2021/04/14	CHECKED BY: Andy Zhang 2021/04/14	APPROVED BY: Chris Zhong 2021/04/14

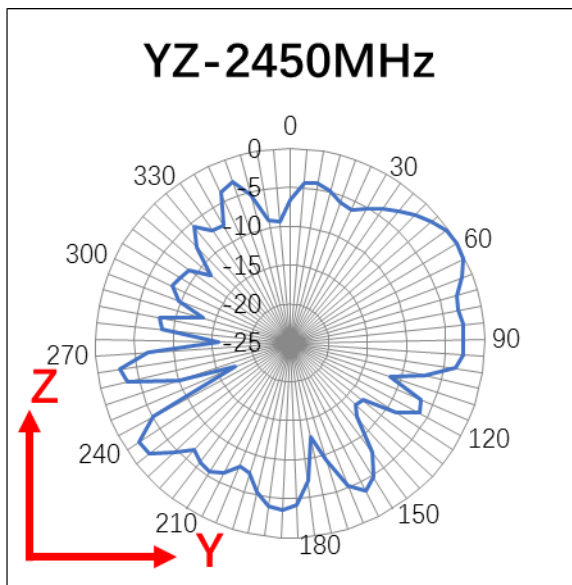
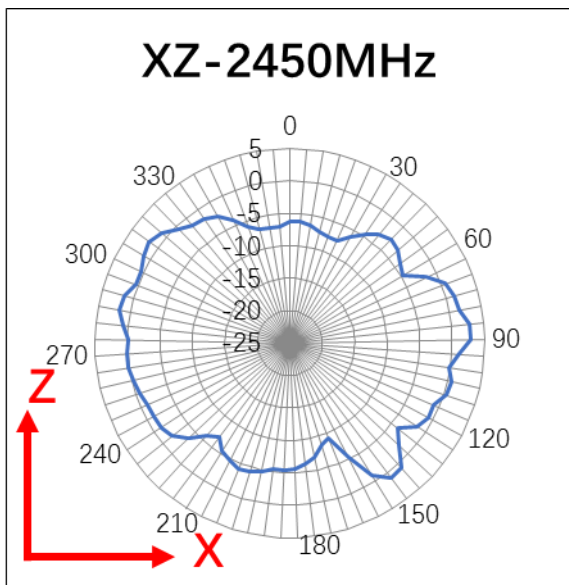
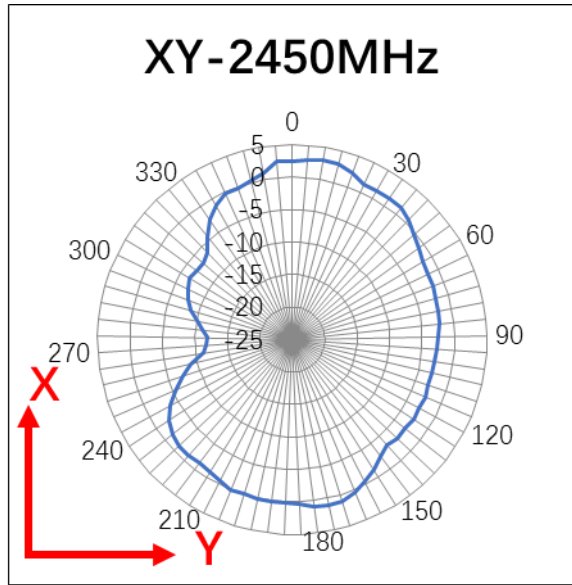
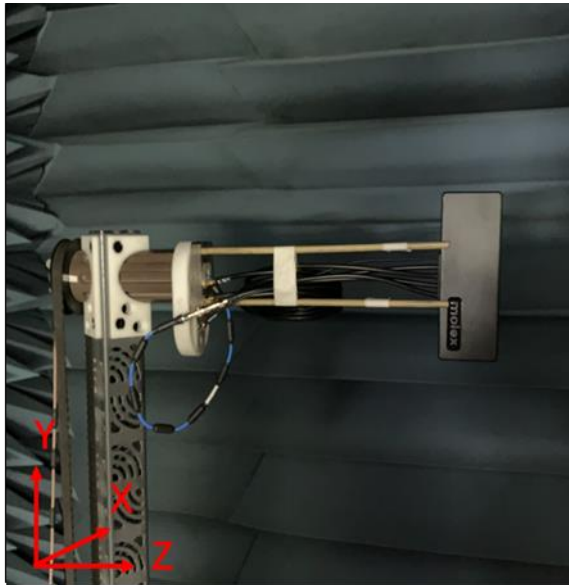


FIGURE 4.5.20 2D RADIATION PATTERN OF WIFI 2 ANTENNA AT 2450MHZ IN FREE SPACE

REVISION: B	ECR/ECN INFORMATION: EC No: 659188 DATE: 2021/04/14	TITLE: Molex Multi-hub Antenna 5-in-1 Application Specification	SHEET No. 32 of 58
DOCUMENT NUMBER: AS-2165891000	CREATED / REVISED BY: Liu Hai 2021/04/14	CHECKED BY: Andy Zhang 2021/04/14	APPROVED BY: Chris Zhong 2021/04/14

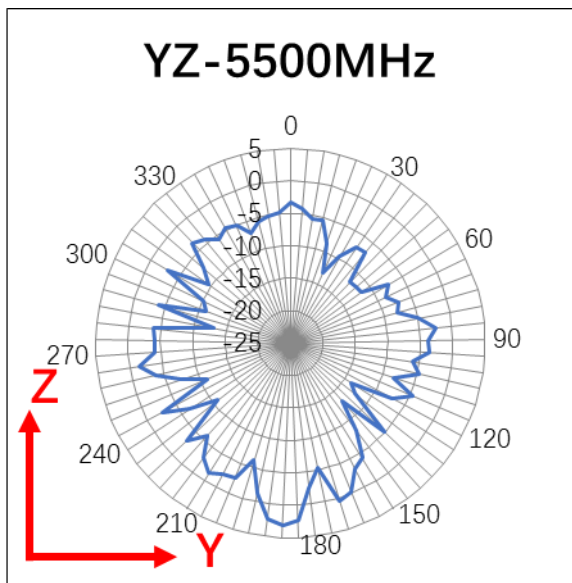
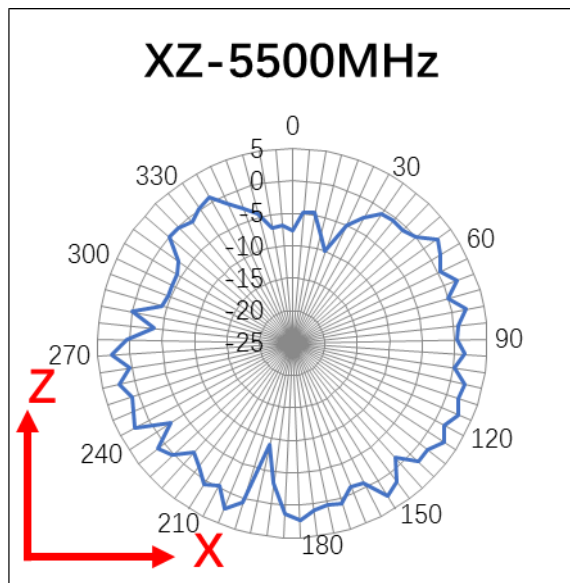
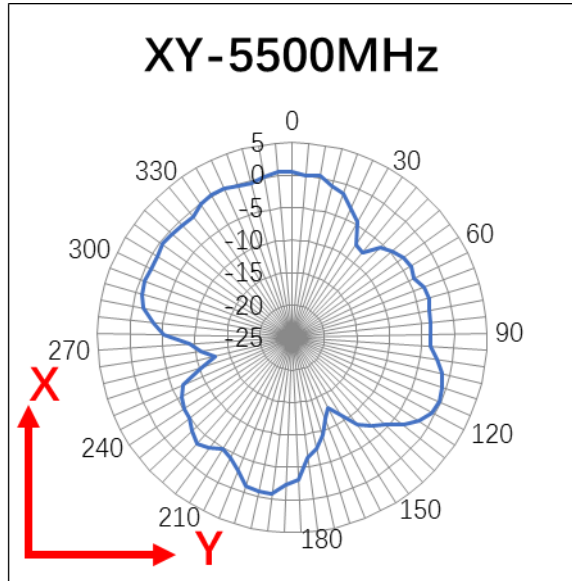
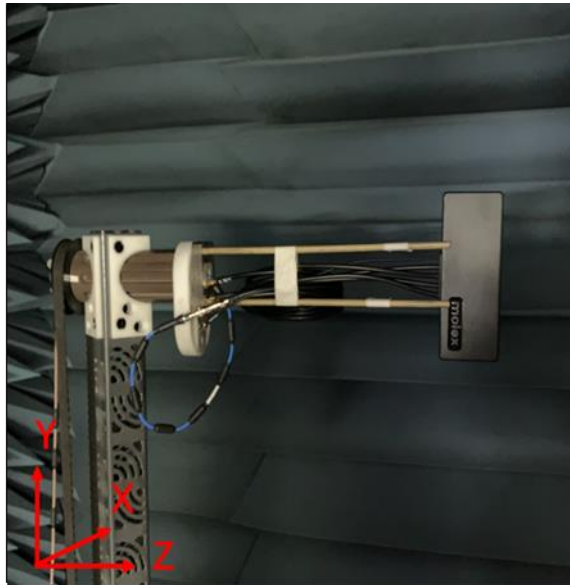


FIGURE 4.5.21 2D RADIATION PATTERN OF WIFI 2 ANTENNA AT 5500MHZ IN FREE SPACE

REVISION: B	ECR/ECN INFORMATION: EC No: 659188 DATE: 2021/04/14	TITLE: Molex Multi-hub Antenna 5-in-1 Application Specification	SHEET No. 33 of 58
DOCUMENT NUMBER: AS-2165891000	CREATED / REVISED BY: Liu Hai 2021/04/14	CHECKED BY: Andy Zhang 2021/04/14	APPROVED BY: Chris Zhong 2021/04/14

4.6 3D RADIATION PATTERN

All measurements in this document are done with cable length of 1000mm

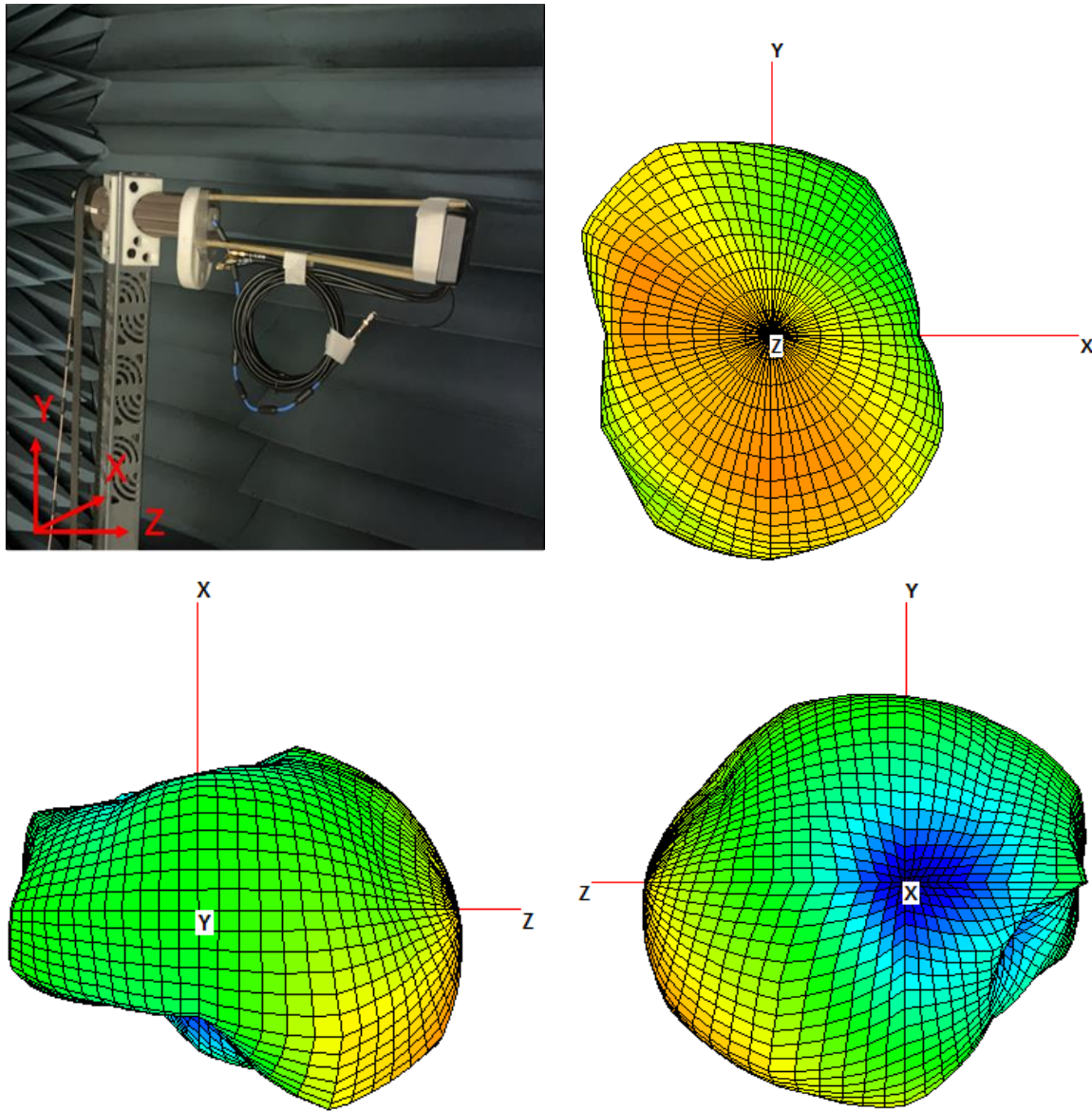


FIGURE 4.6.1 3D RADIATION PATTERN OF GPS ANTENNA AT 1575MHZ IN FREE SPACE

REVISION: B	ECR/ECN INFORMATION: EC No: 659188 DATE: 2021/04/14	TITLE: Molex Multi-hub Antenna 5-in-1 Application Specification	SHEET No. 34 of 58
DOCUMENT NUMBER: AS-2165891000	CREATED / REVISED BY: Liu Hai 2021/04/14	CHECKED BY: Andy Zhang 2021/04/14	APPROVED BY: Chris Zhong 2021/04/14

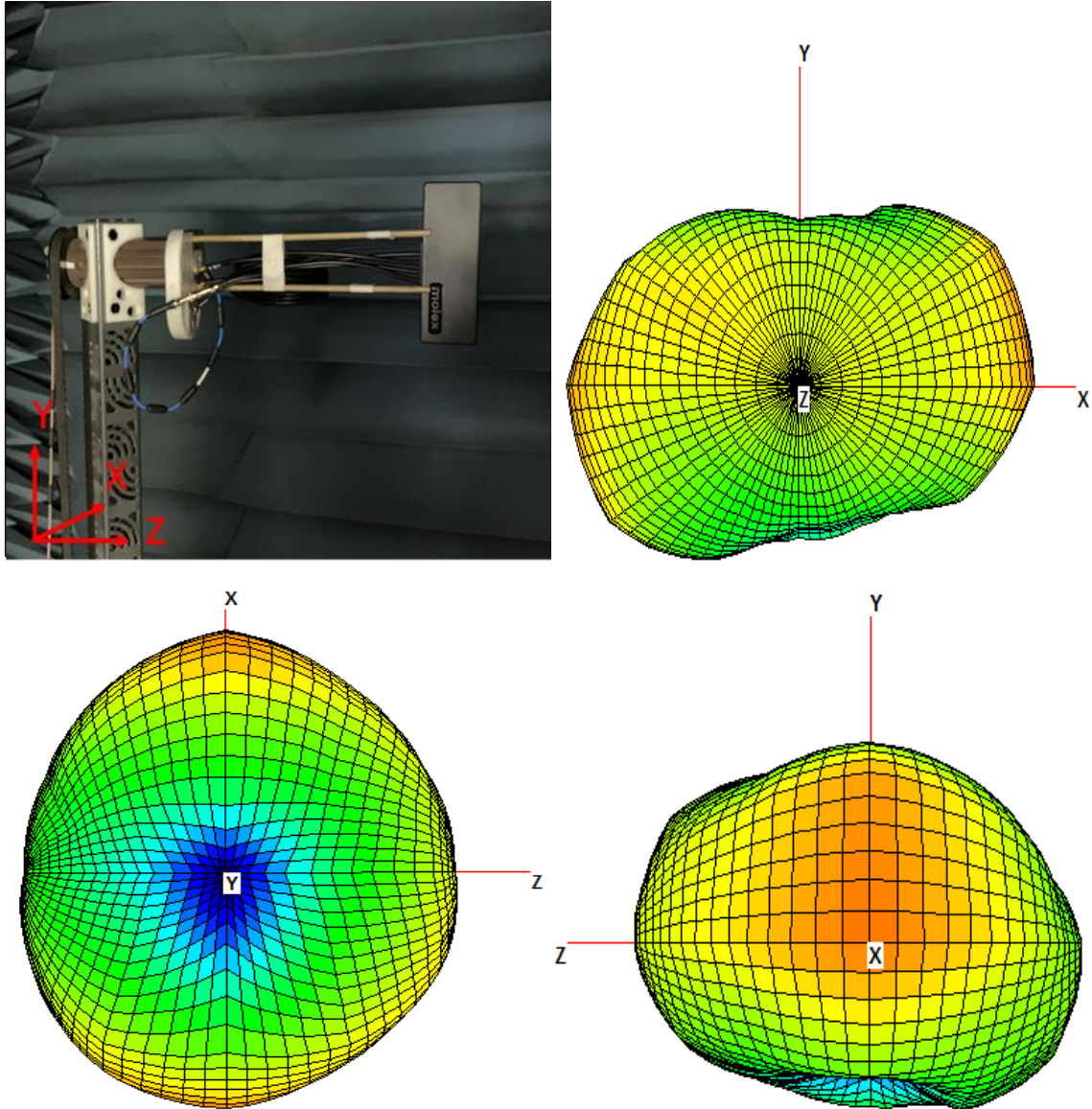


FIGURE 4.6.2 3D RADIATION PATTERN OF 5G/LTE 1 ANTENNA AT 700MHZ IN FREE SPACE

REVISION: B	ECR/ECN INFORMATION: EC No: 659188 DATE: 2021/04/14	TITLE: Molex Multi-hub Antenna 5-in-1 Application Specification		SHEET No. 35 of 58
DOCUMENT NUMBER: AS-2165891000		CREATED / REVISED BY: Liu Hai 2021/04/14	CHECKED BY: Andy Zhang 2021/04/14	APPROVED BY: Chris Zhong 2021/04/14

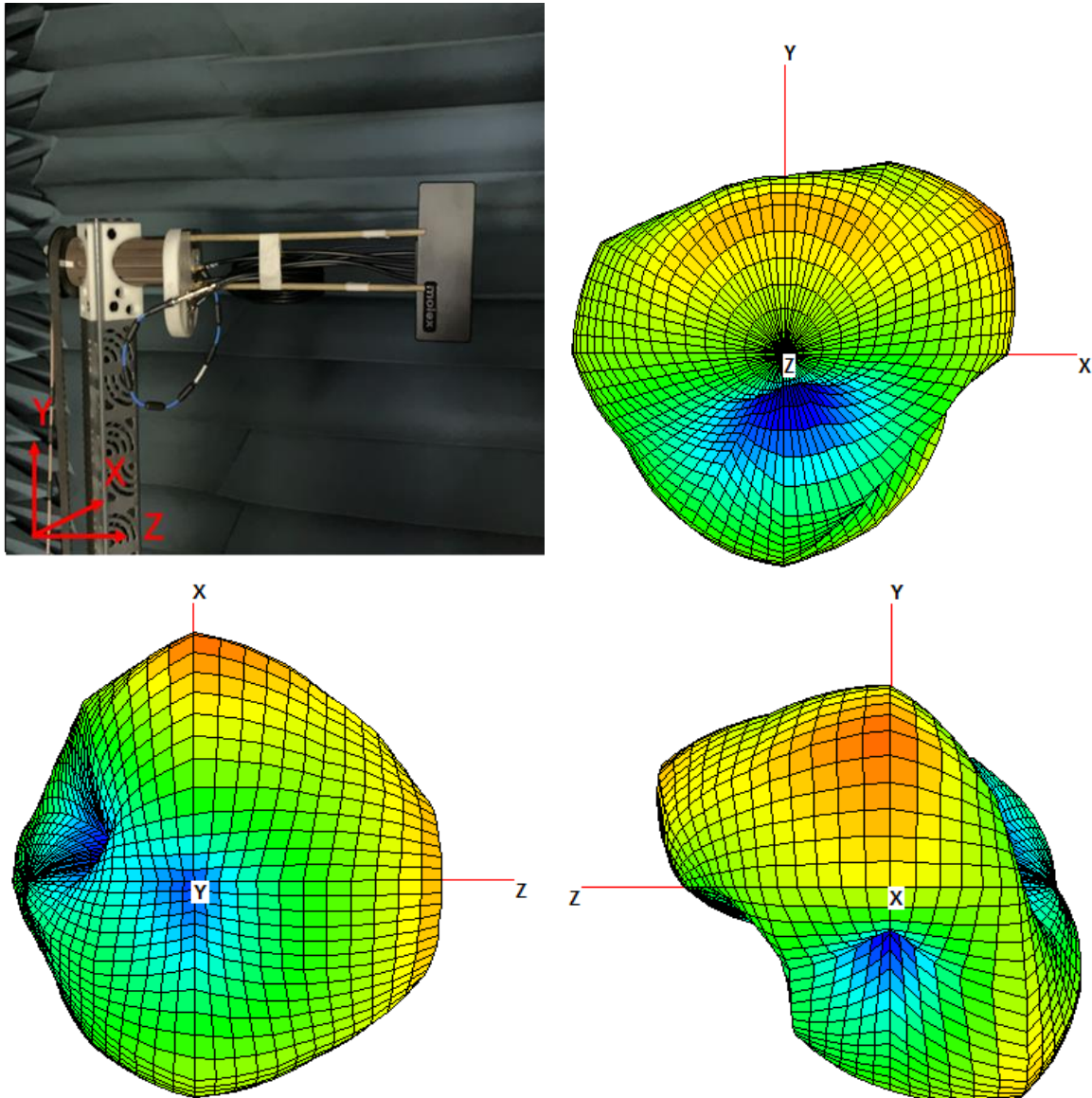


FIGURE 4.6.3 3D RADIATION PATTERN OF 5G/LTE 1 ANTENNA AT 960MHZ IN FREE SPACE

REVISION: B	ECR/ECN INFORMATION: EC No: 659188 DATE: 2021/04/14	TITLE: Molex Multi-hub Antenna 5-in-1 Application Specification	SHEET No. 36 of 58
DOCUMENT NUMBER: AS-2165891000	CREATED / REVISED BY: Liu Hai 2021/04/14	CHECKED BY: Andy Zhang 2021/04/14	APPROVED BY: Chris Zhong 2021/04/14

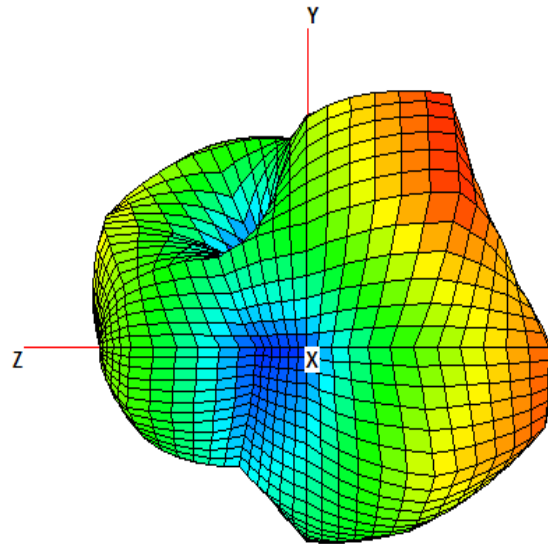
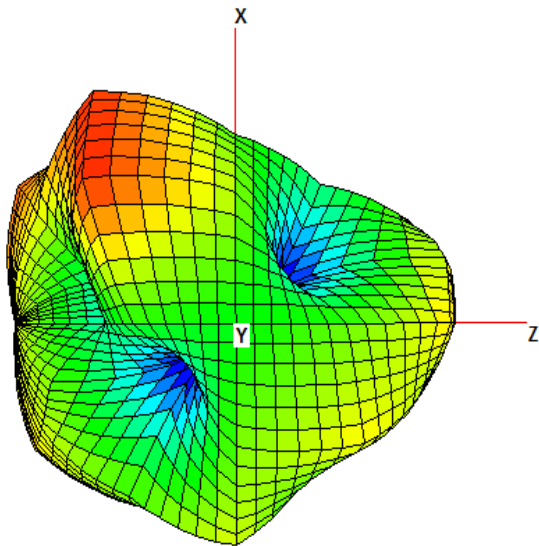
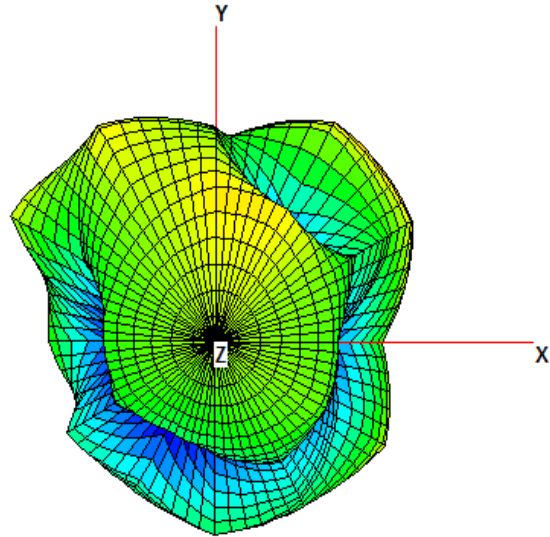
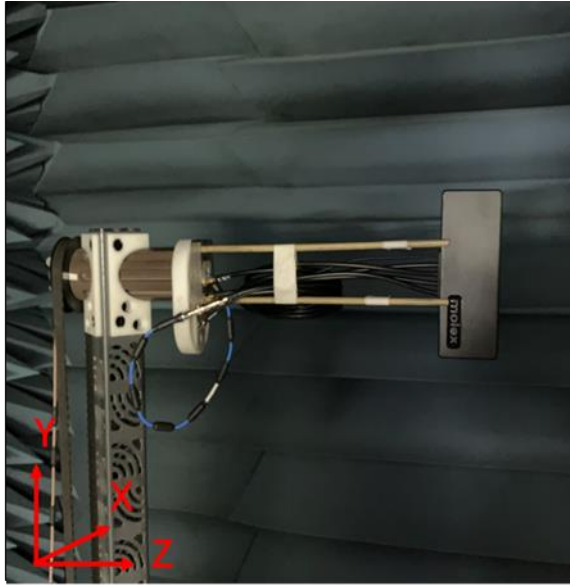


FIGURE 4.6.4 3D RADIATION PATTERN OF 5G/LTE 1 ANTENNA AT 1710MHZ IN FREE SPACE

REVISION: B	ECR/ECN INFORMATION: EC No: 659188 DATE: 2021/04/14	TITLE: Molex Multi-hub Antenna 5-in-1 Application Specification	SHEET No. 37 of 58
DOCUMENT NUMBER: AS-2165891000	CREATED / REVISED BY: Liu Hai 2021/04/14	CHECKED BY: Andy Zhang 2021/04/14	APPROVED BY: Chris Zhong 2021/04/14

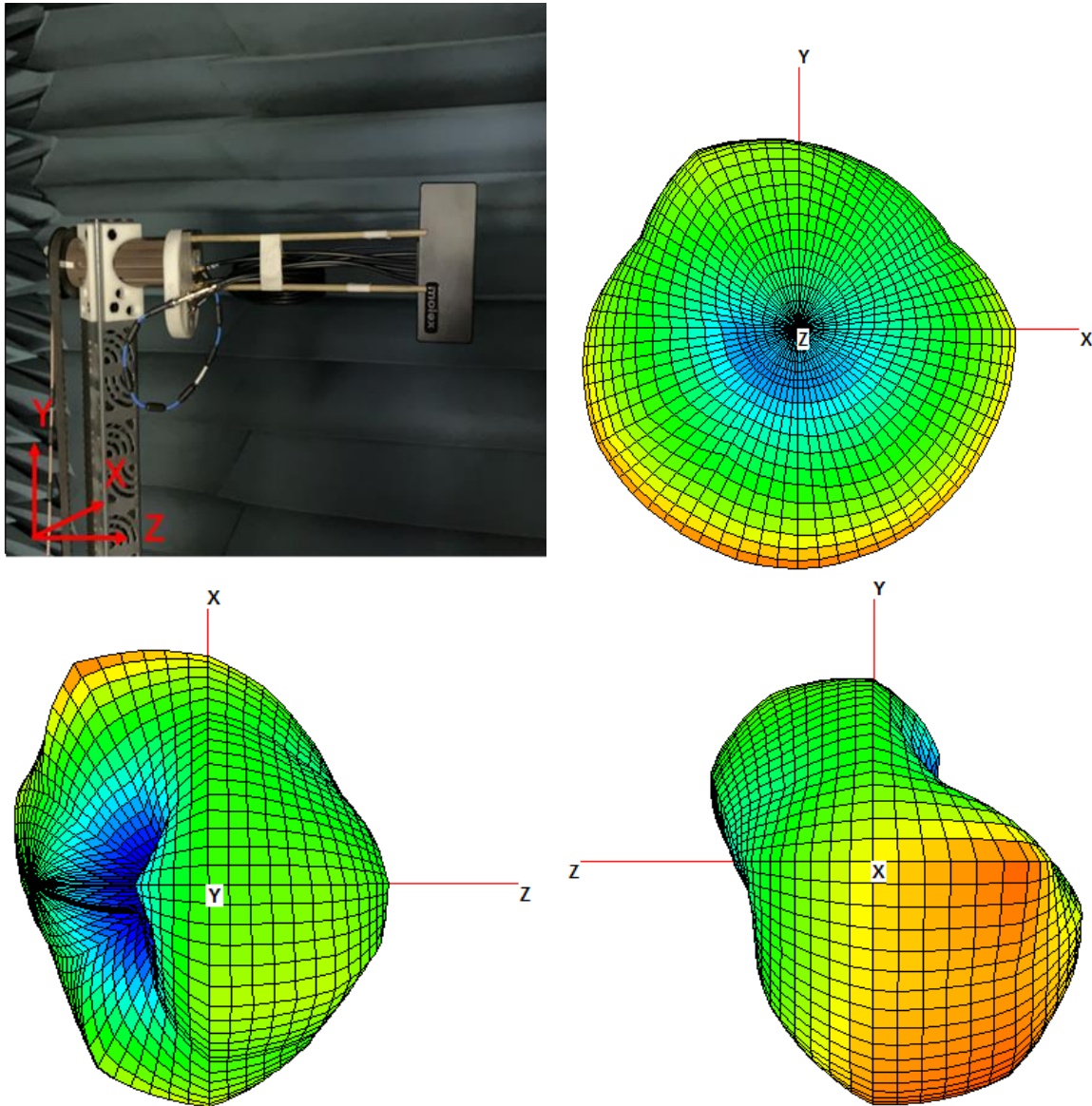


FIGURE 4.6.5 3D RADIATION PATTERN OF 5G/LTE 1 ANTENNA AT 2170MHZ IN FREE SPACE

REVISION: B	ECR/ECN INFORMATION: EC No: 659188 DATE: 2021/04/14	TITLE: Molex Multi-hub Antenna 5-in-1 Application Specification	SHEET No. 38 of 58
DOCUMENT NUMBER: AS-2165891000	CREATED / REVISED BY: Liu Hai 2021/04/14	CHECKED BY: Andy Zhang 2021/04/14	APPROVED BY: Chris Zhong 2021/04/14

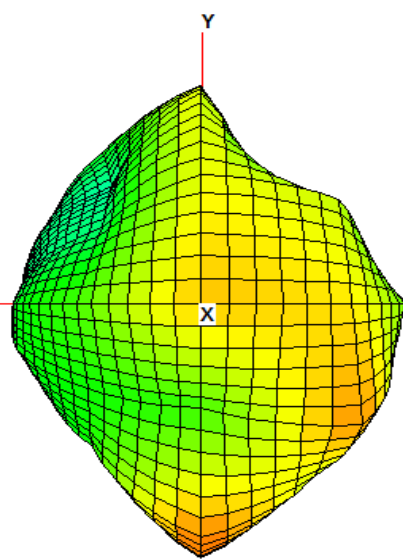
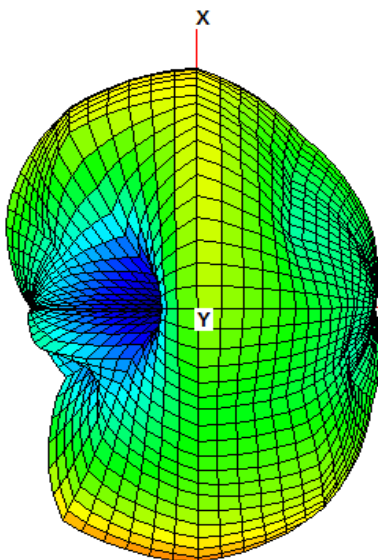
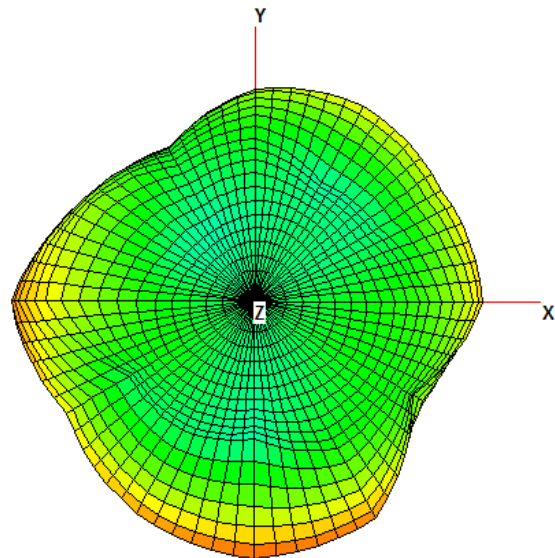
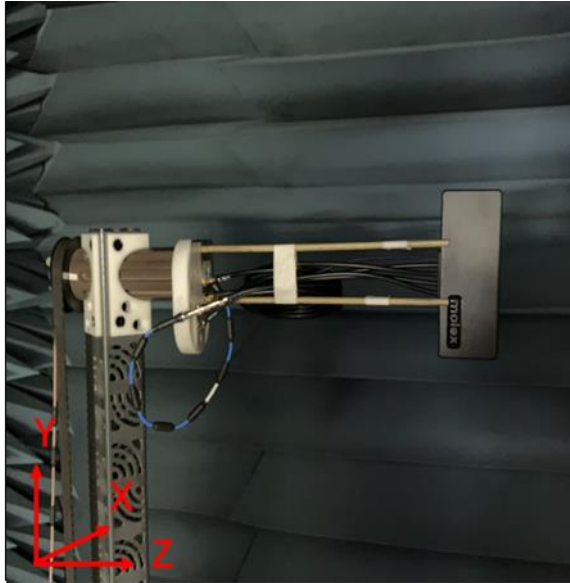


FIGURE 4.6.6 3D RADIATION PATTERN OF 5G/LTE 1 ANTENNA AT 2690MHZ IN FREE SPACE

REVISION: B	ECR/ECN INFORMATION: EC No: 659188 DATE: 2021/04/14	TITLE: Molex Multi-hub Antenna 5-in-1 Application Specification			SHEET No. 39 of 58
DOCUMENT NUMBER: AS-2165891000		CREATED / REVISED BY: Liu Hai 2021/04/14	CHECKED BY: Andy Zhang 2021/04/14	APPROVED BY: Chris Zhong 2021/04/14	

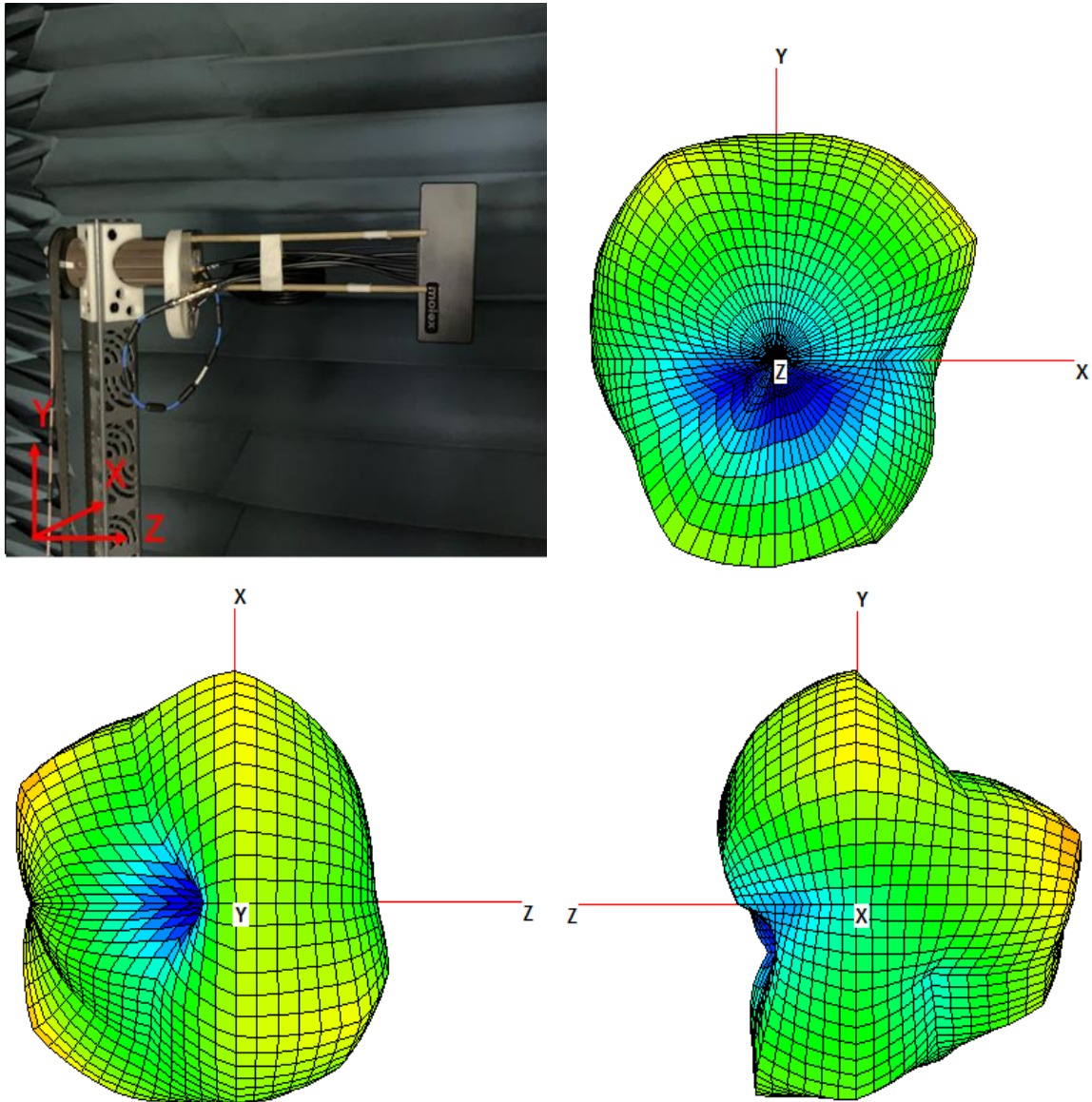


FIGURE 4.6.7 3D RADIATION PATTERN OF 5G/LTE 1 ANTENNA AT 3500MHZ IN FREE SPACE

REVISION: B	ECR/ECN INFORMATION: EC No: 659188 DATE: 2021/04/14	TITLE: Molex Multi-hub Antenna 5-in-1 Application Specification		SHEET No. 40 of 58
DOCUMENT NUMBER: AS-2165891000		CREATED / REVISED BY: Liu Hai 2021/04/14	CHECKED BY: Andy Zhang 2021/04/14	APPROVED BY: Chris Zhong 2021/04/14

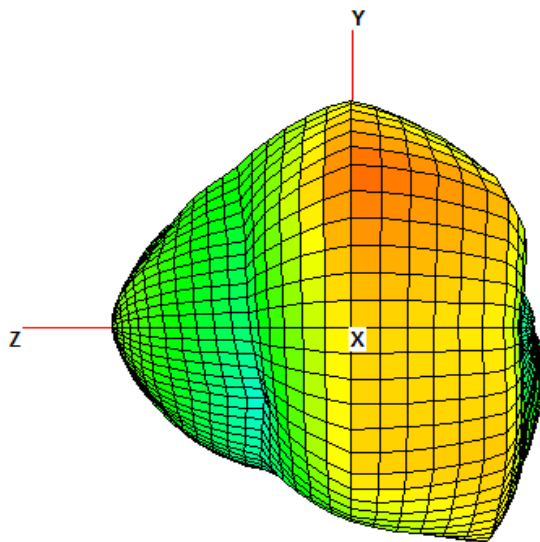
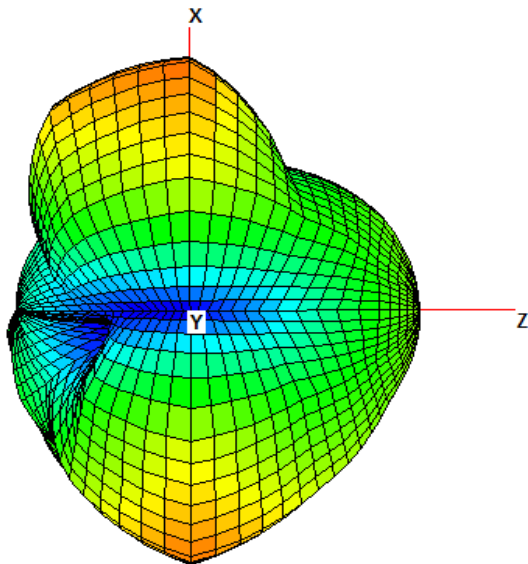
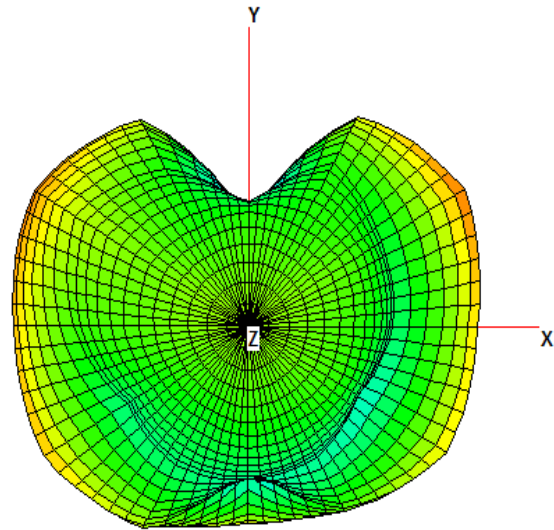
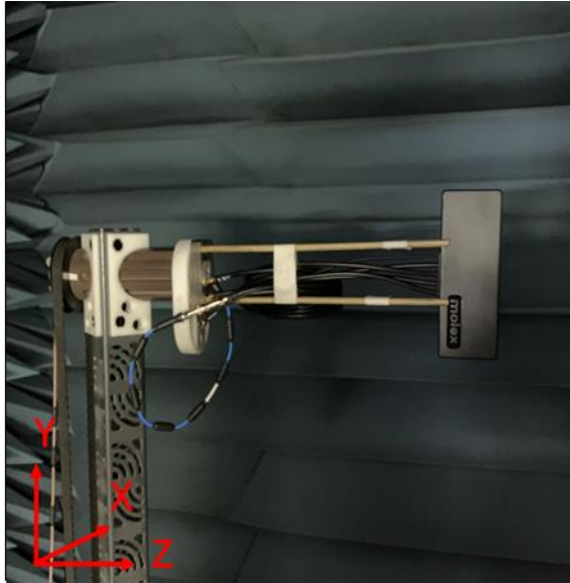


FIGURE 4.6.8 3D RADIATION PATTERN OF 5G/LTE 1 ANTENNA AT 4500MHZ IN FREE SPACE

REVISION: B	ECR/ECN INFORMATION: EC No: 659188 DATE: 2021/04/14	TITLE: Molex Multi-hub Antenna 5-in-1 Application Specification	SHEET No. 41 of 58
DOCUMENT NUMBER: AS-2165891000	CREATED / REVISED BY: Liu Hai 2021/04/14	CHECKED BY: Andy Zhang 2021/04/14	APPROVED BY: Chris Zhong 2021/04/14

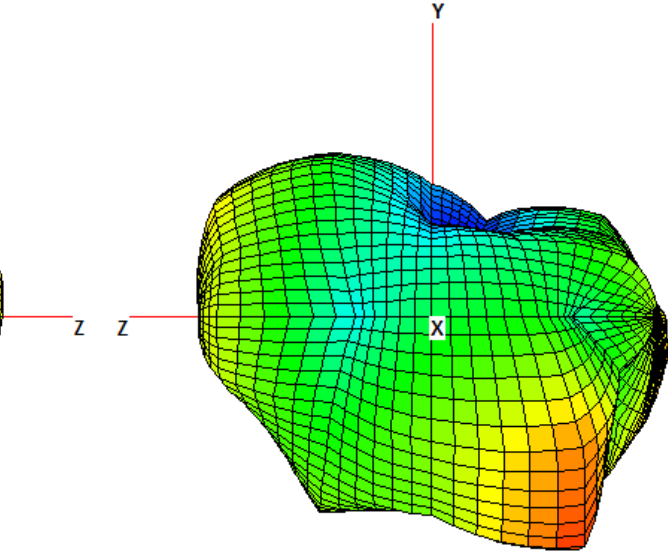
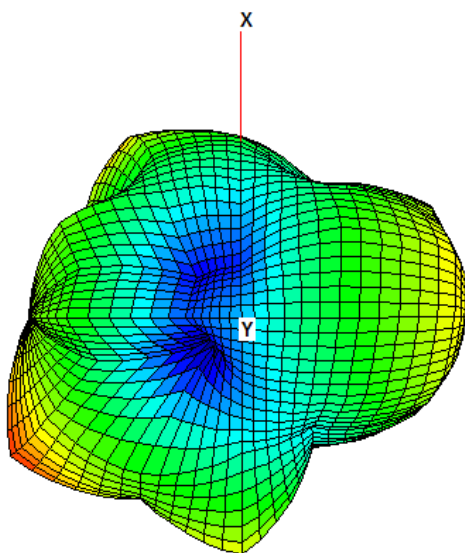
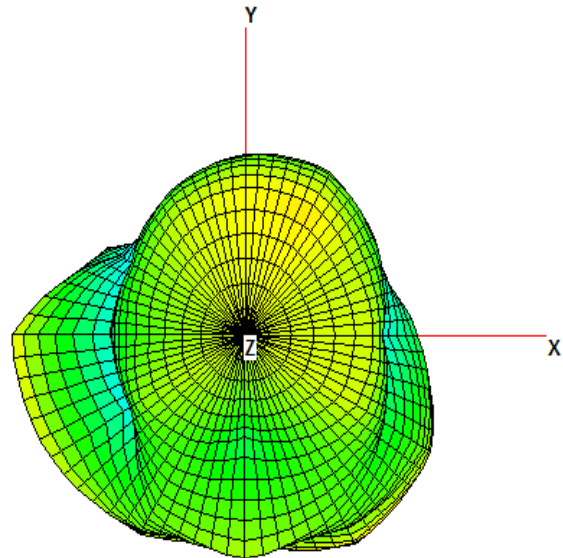
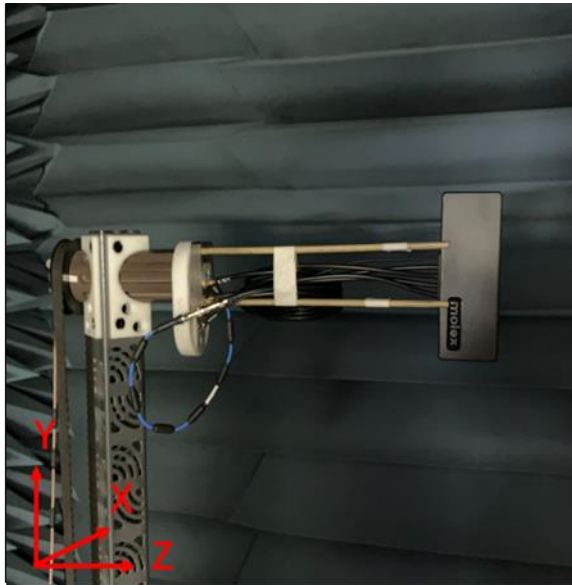


FIGURE 4.6.9 3D RADIATION PATTERN OF 5G/LTE 1 ANTENNA AT 5500MHZ IN FREE SPACE

REVISION: B	ECR/ECN INFORMATION: EC No: 659188 DATE: 2021/04/14	TITLE: Molex Multi-hub Antenna 5-in-1 Application Specification		SHEET No. 42 of 58
DOCUMENT NUMBER: AS-2165891000		CREATED / REVISED BY: Liu Hai 2021/04/14	CHECKED BY: Andy Zhang 2021/04/14	APPROVED BY: Chris Zhong 2021/04/14

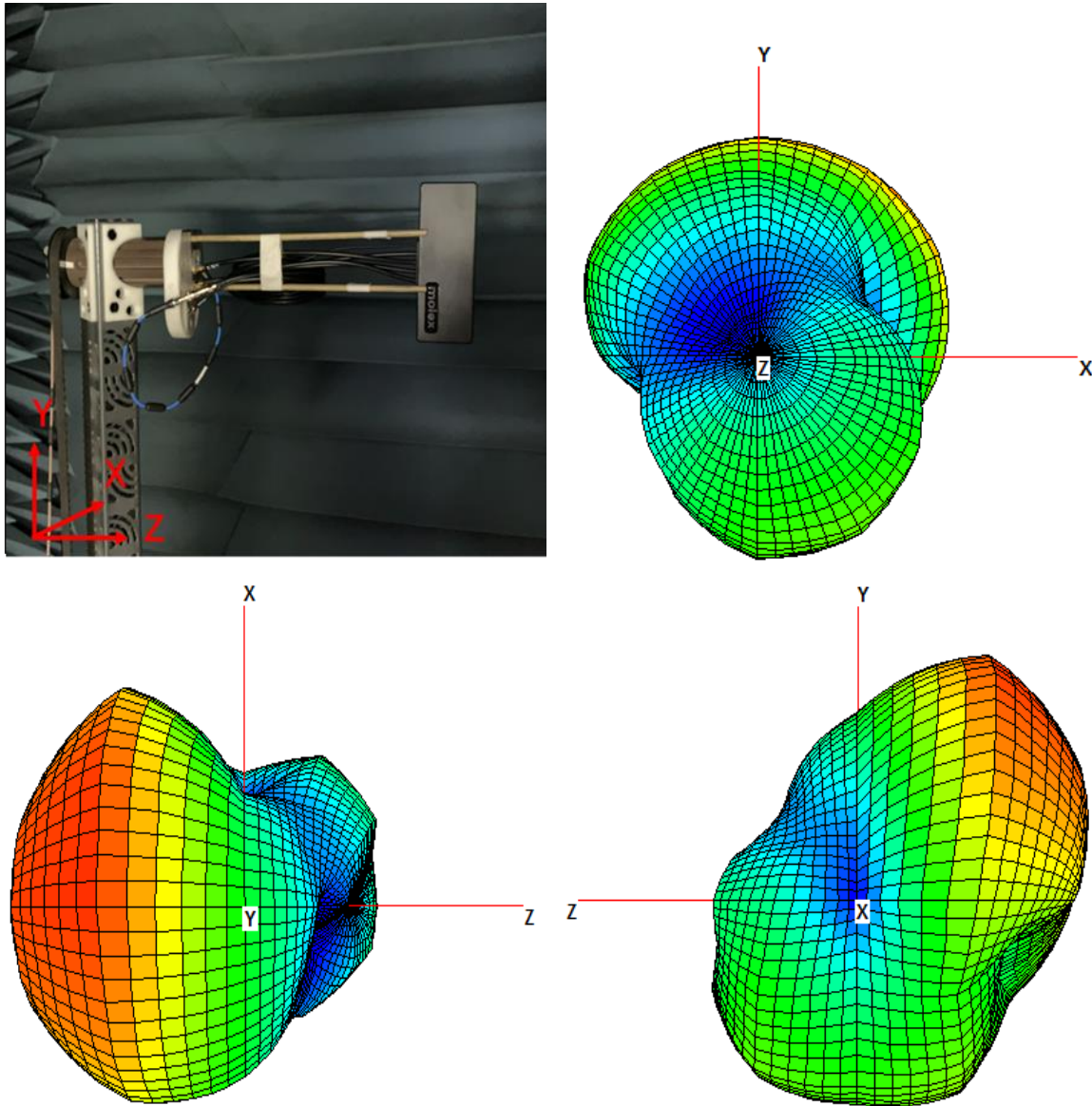


FIGURE 4.6.10 3D RADIATION PATTERN OF 5G/LTE 2 ANTENNA AT 700MHZ IN FREE SPACE

REVISION: B	ECR/ECN INFORMATION: EC No: 659188 DATE: 2021/04/14	TITLE: Molex Multi-hub Antenna 5-in-1 Application Specification	SHEET No. 43 of 58
DOCUMENT NUMBER: AS-2165891000	CREATED / REVISED BY: Liu Hai 2021/04/14	CHECKED BY: Andy Zhang 2021/04/14	APPROVED BY: Chris Zhong 2021/04/14

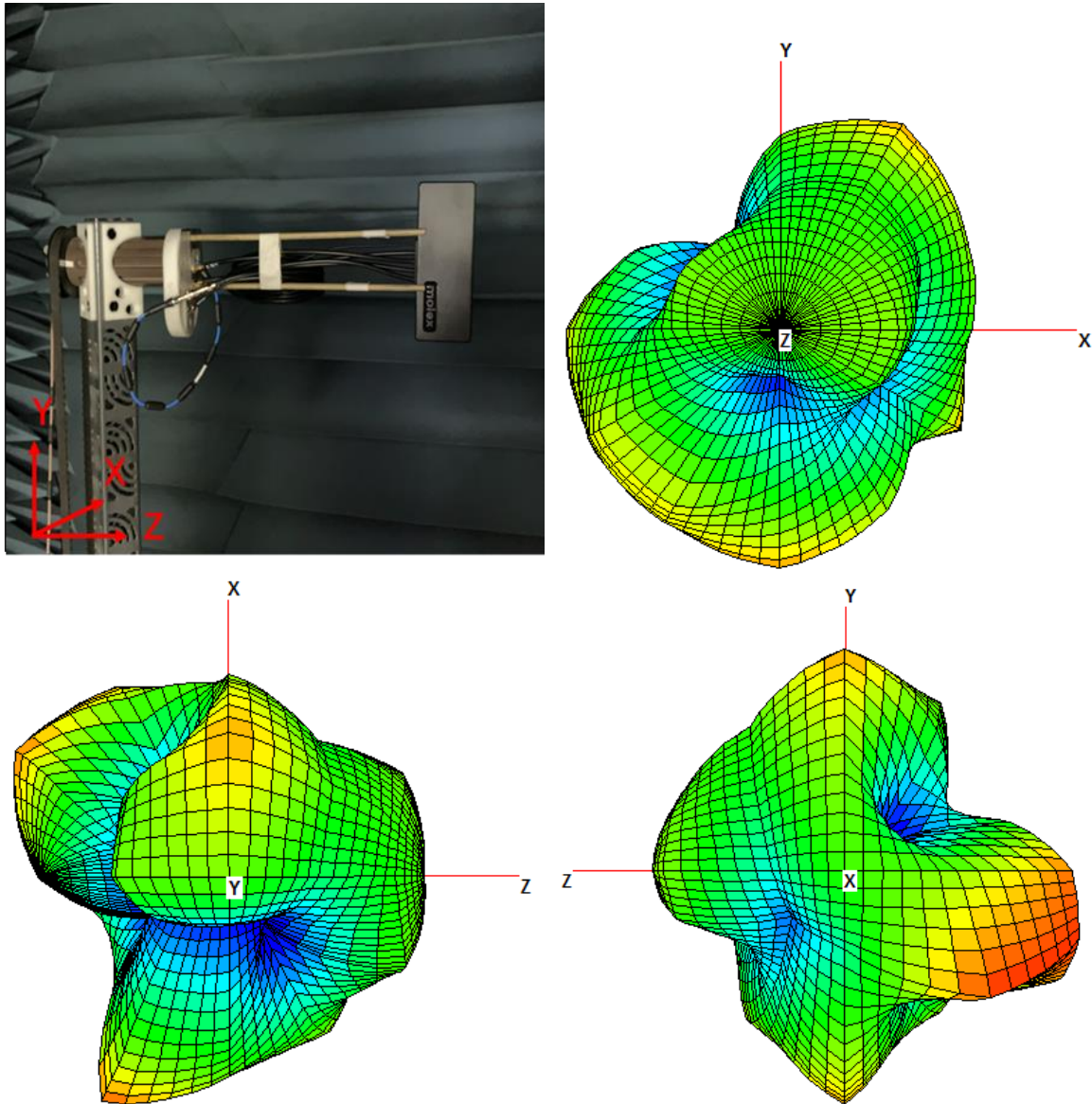


FIGURE 4.6.11 3D RADIATION PATTERN OF 5G/LTE 2 ANTENNA AT 960MHZ IN FREE SPACE

REVISION: B	ECR/ECN INFORMATION: EC No: 659188 DATE: 2021/04/14	TITLE: Molex Multi-hub Antenna 5-in-1 Application Specification		SHEET No. 44 of 58
DOCUMENT NUMBER: AS-2165891000		CREATED / REVISED BY: Liu Hai 2021/04/14	CHECKED BY: Andy Zhang 2021/04/14	APPROVED BY: Chris Zhong 2021/04/14

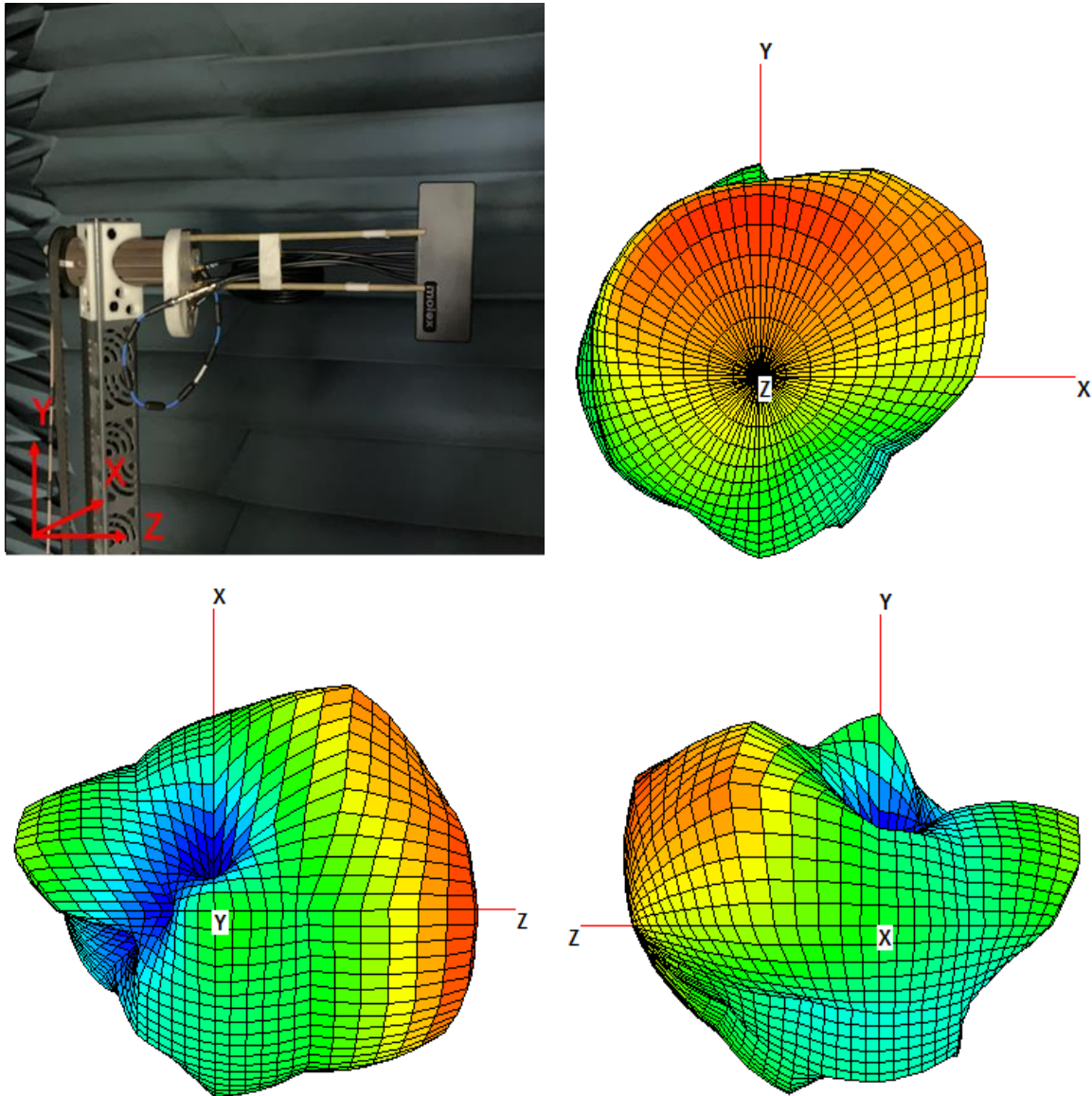


FIGURE 4.6.12 3D RADIATION PATTERN OF 5G/LTE 2 ANTENNA AT 1710MHZ IN FREE SPACE

REVISION: B	ECR/ECN INFORMATION: EC No: 659188 DATE: 2021/04/14	TITLE: Molex Multi-hub Antenna 5-in-1 Application Specification		SHEET No. 45 of 58
DOCUMENT NUMBER: AS-2165891000		CREATED / REVISED BY: Liu Hai 2021/04/14	CHECKED BY: Andy Zhang 2021/04/14	APPROVED BY: Chris Zhong 2021/04/14

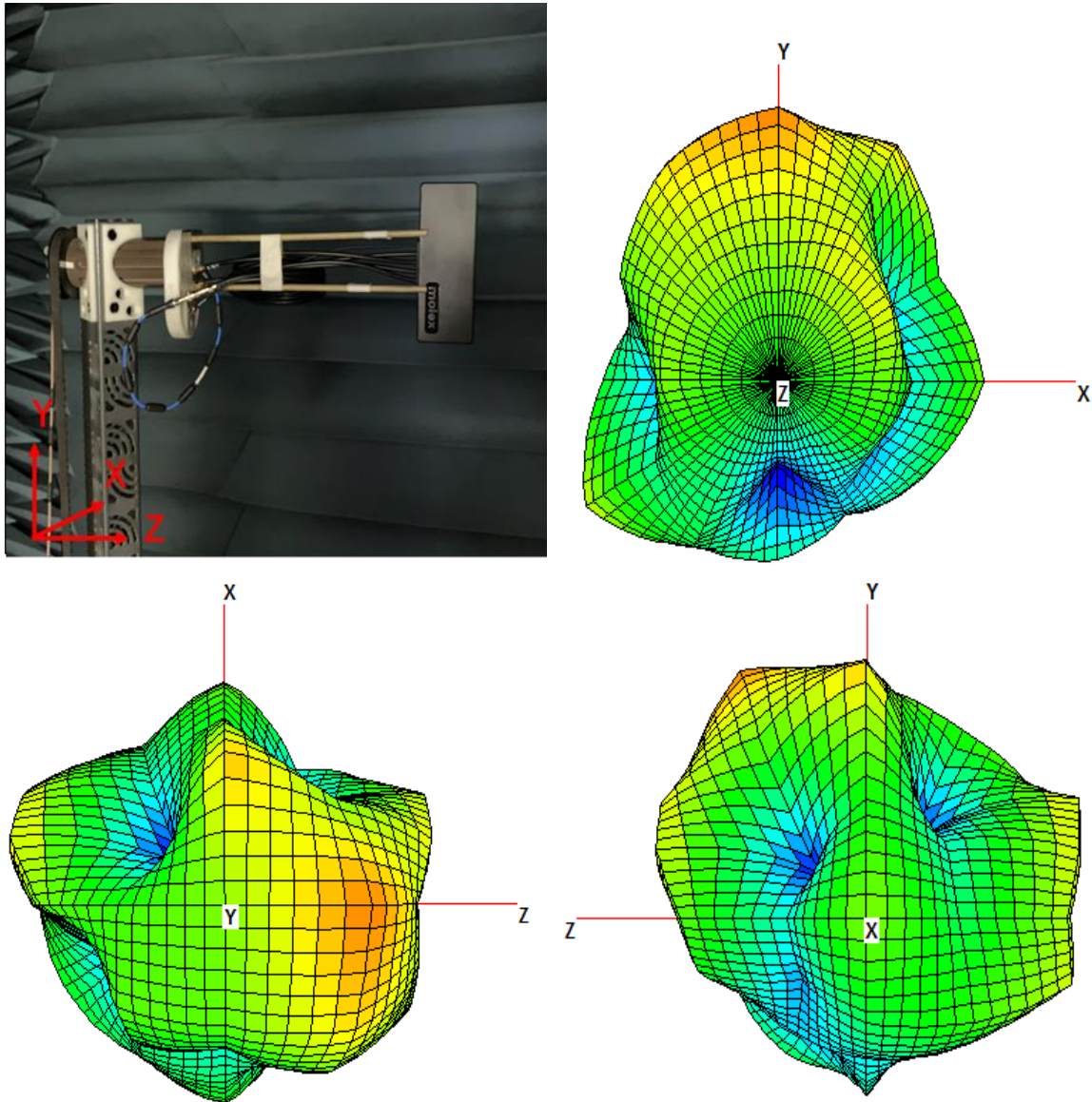


FIGURE 4.6.13 3D RADIATION PATTERN OF 5G/LTE 2 ANTENNA AT 2170MHZ IN FREE SPACE

REVISION: B	ECR/ECN INFORMATION: EC No: 659188 DATE: 2021/04/14	TITLE: Molex Multi-hub Antenna 5-in-1 Application Specification		SHEET No. 46 of 58
DOCUMENT NUMBER: AS-2165891000		CREATED / REVISED BY: Liu Hai 2021/04/14	CHECKED BY: Andy Zhang 2021/04/14	APPROVED BY: Chris Zhong 2021/04/14

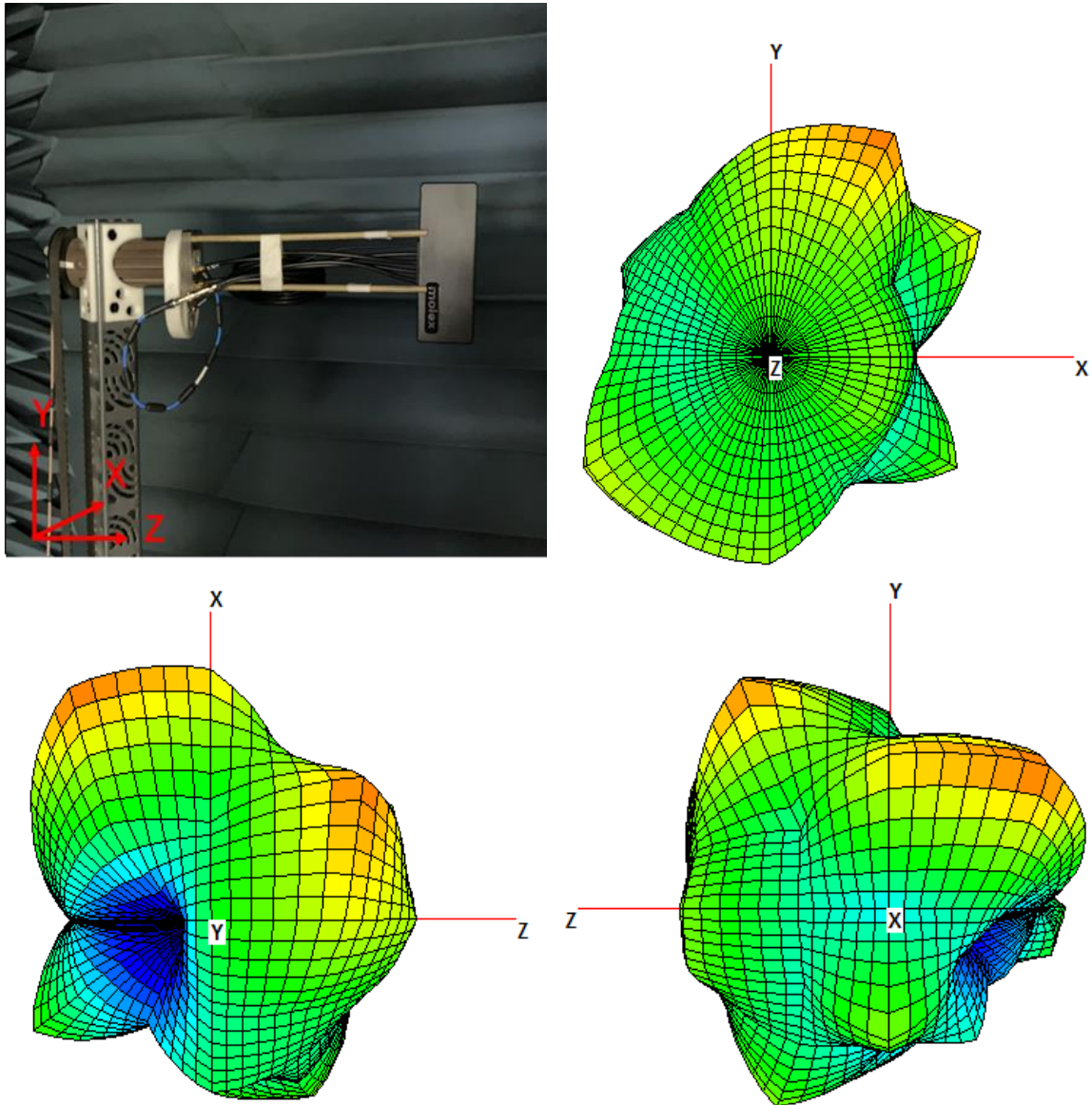


FIGURE 4.6.14 3D RADIATION PATTERN OF 5G/LTE 2 ANTENNA AT 2690MHZ IN FREE SPACE

REVISION: B	ECR/ECN INFORMATION: EC No: 659188 DATE: 2021/04/14	TITLE: <p style="text-align: center;">Molex Multi-hub Antenna 5-in-1 Application Specification</p>		SHEET No. 47 of 58
DOCUMENT NUMBER: AS-2165891000		CREATED / REVISED BY: Liu Hai 2021/04/14	CHECKED BY: Andy Zhang 2021/04/14	APPROVED BY: Chris Zhong 2021/04/14

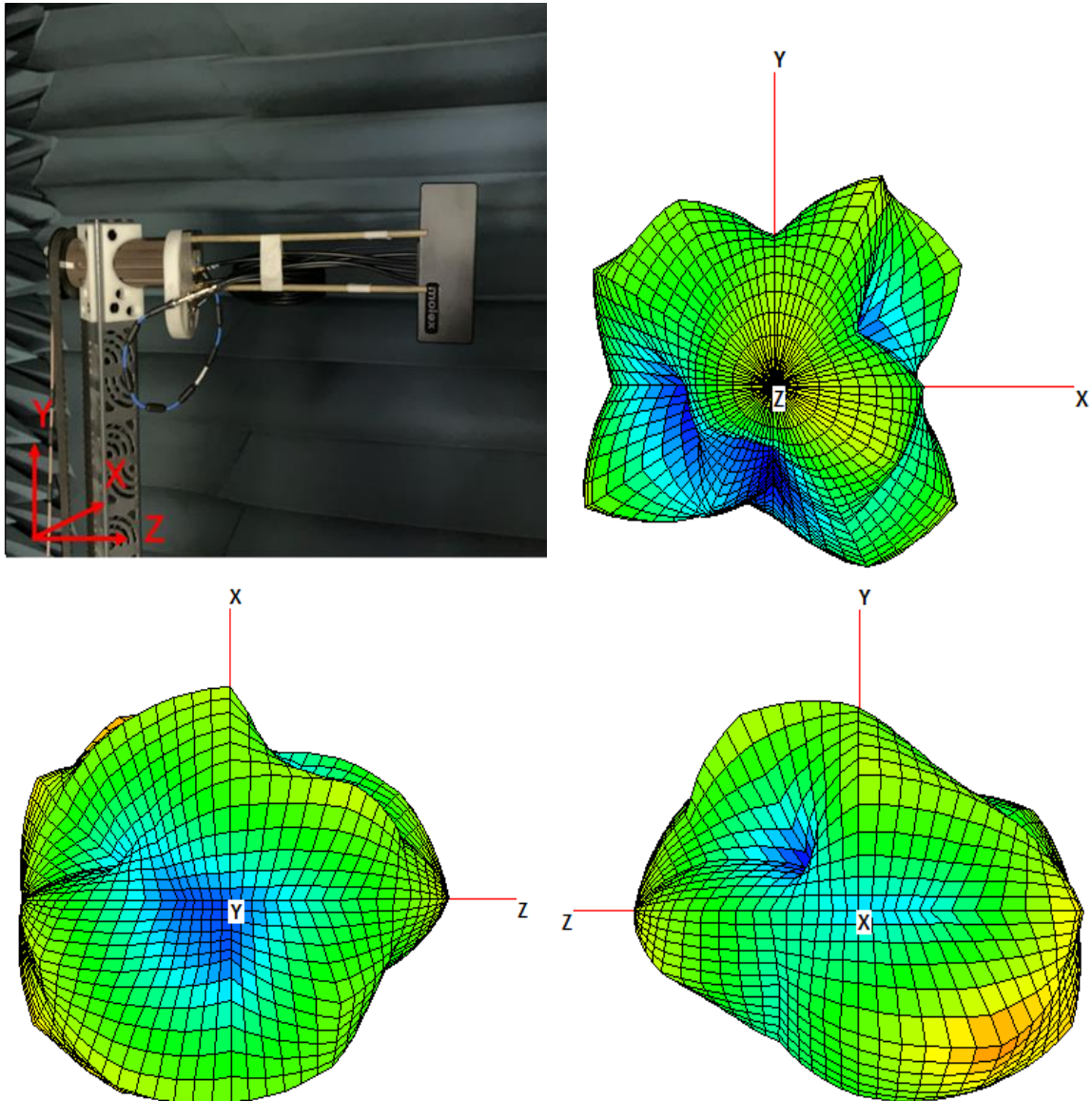


FIGURE 4.6.15 3D RADIATION PATTERN OF 5G/LTE 2 ANTENNA AT 3500MHZ IN FREE SPACE

REVISION: B	ECR/ECN INFORMATION: EC No: 659188 DATE: 2021/04/14	TITLE: Molex Multi-hub Antenna 5-in-1 Application Specification	SHEET No. 48 of 58
DOCUMENT NUMBER: AS-2165891000	CREATED / REVISED BY: Liu Hai 2021/04/14	CHECKED BY: Andy Zhang 2021/04/14	APPROVED BY: Chris Zhong 2021/04/14

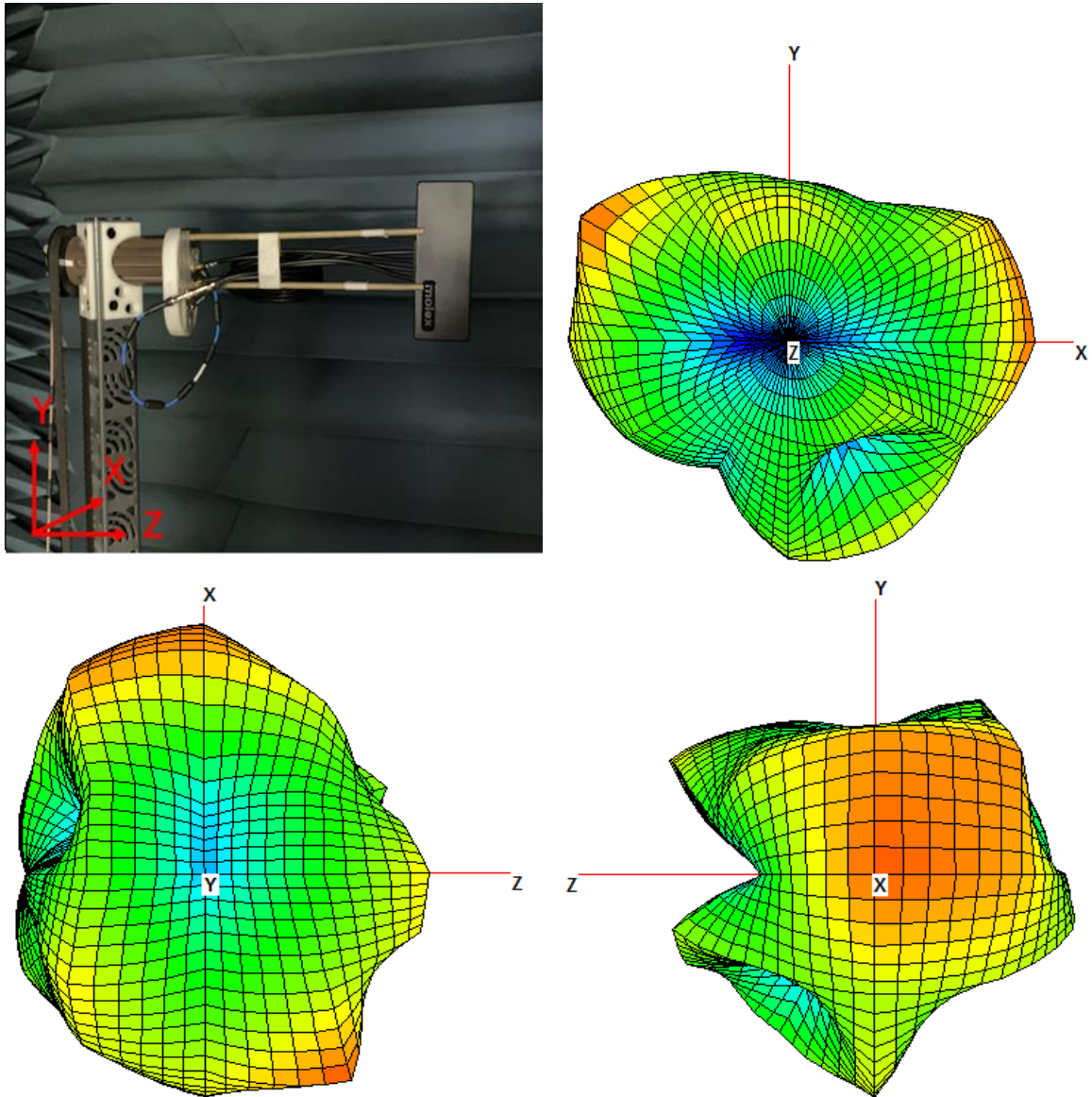


FIGURE 4.6.16 3D RADIATION PATTERN OF 5G/LTE 2 ANTENNA AT 4500MHZ IN FREE SPACE

REVISION: B	ECR/ECN INFORMATION: EC No: 659188 DATE: 2021/04/14	TITLE: Molex Multi-hub Antenna 5-in-1 Application Specification		SHEET No. 49 of 58
DOCUMENT NUMBER: AS-2165891000		CREATED / REVISED BY: Liu Hai 2021/04/14	CHECKED BY: Andy Zhang 2021/04/14	APPROVED BY: Chris Zhong 2021/04/14

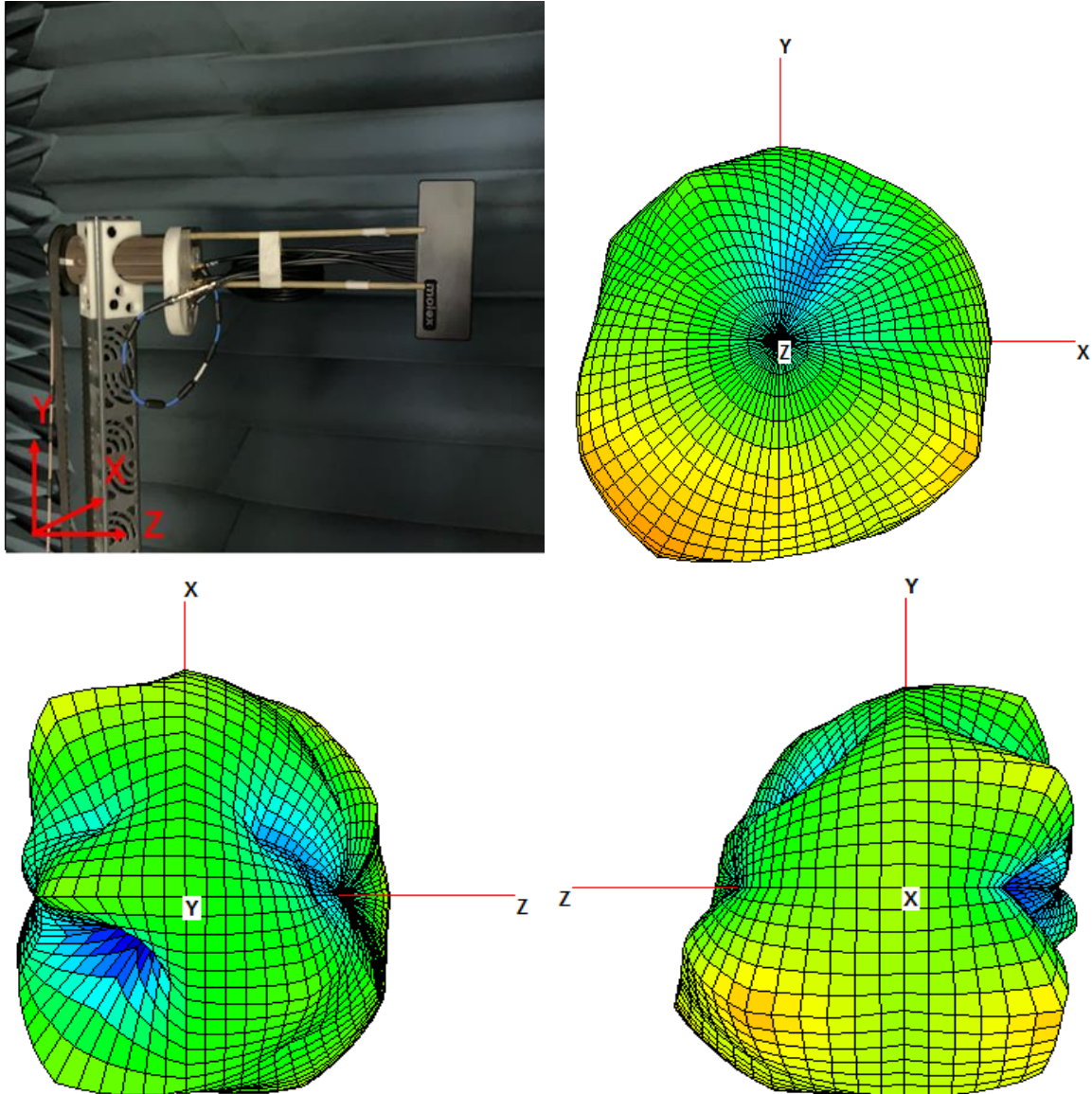


FIGURE 4.6.17 3D RADIATION PATTERN OF 5G/LTE 2 ANTENNA AT 5500MHZ IN FREE SPACE

REVISION: B	ECR/ECN INFORMATION: EC No: 659188 DATE: 2021/04/14	TITLE: Molex Multi-hub Antenna 5-in-1 Application Specification	SHEET No. 50 of 58
DOCUMENT NUMBER: AS-2165891000	CREATED / REVISED BY: Liu Hai 2021/04/14	CHECKED BY: Andy Zhang 2021/04/14	APPROVED BY: Chris Zhong 2021/04/14

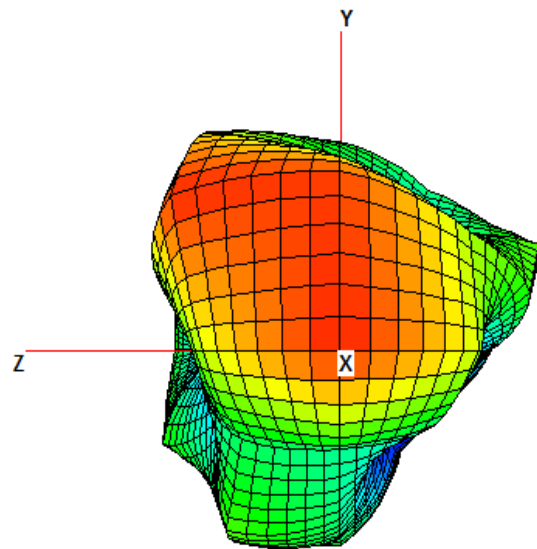
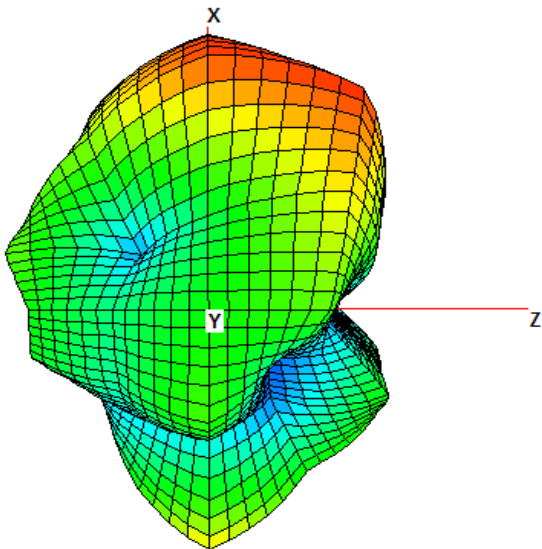
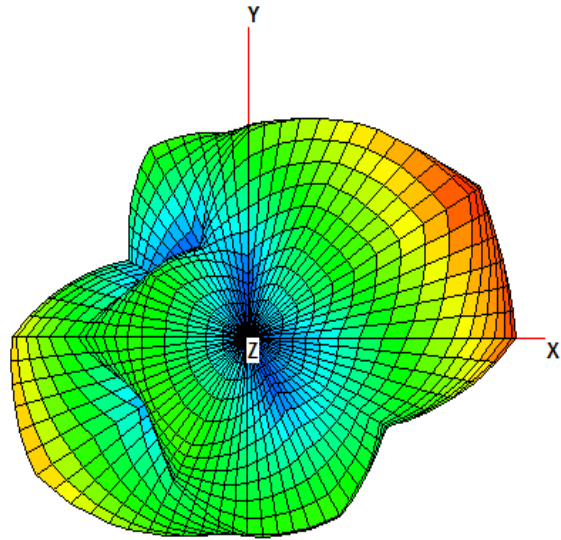
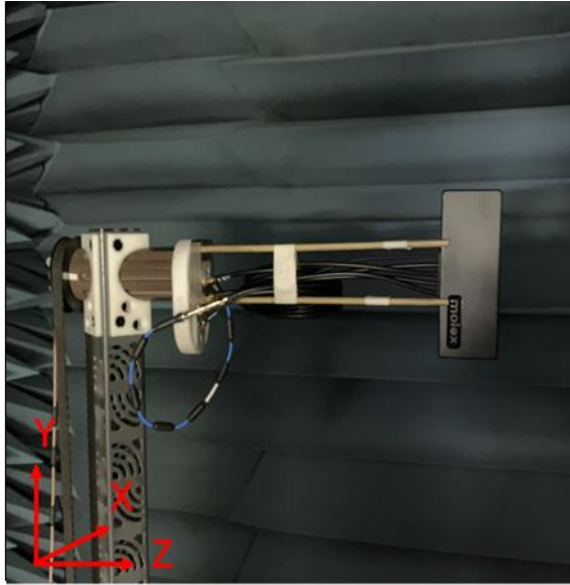


FIGURE 4.6.18 3D RADIATION PATTERN OF WIFI 1 ANTENNA AT 2450MHZ IN FREE SPACE

REVISION: B	ECR/ECN INFORMATION: EC No: 659188 DATE: 2021/04/14	TITLE: Molex Multi-hub Antenna 5-in-1 Application Specification			SHEET No. 51 of 58
DOCUMENT NUMBER: AS-2165891000		CREATED / REVISED BY: Liu Hai 2021/04/14	CHECKED BY: Andy Zhang 2021/04/14	APPROVED BY: Chris Zhong 2021/04/14	

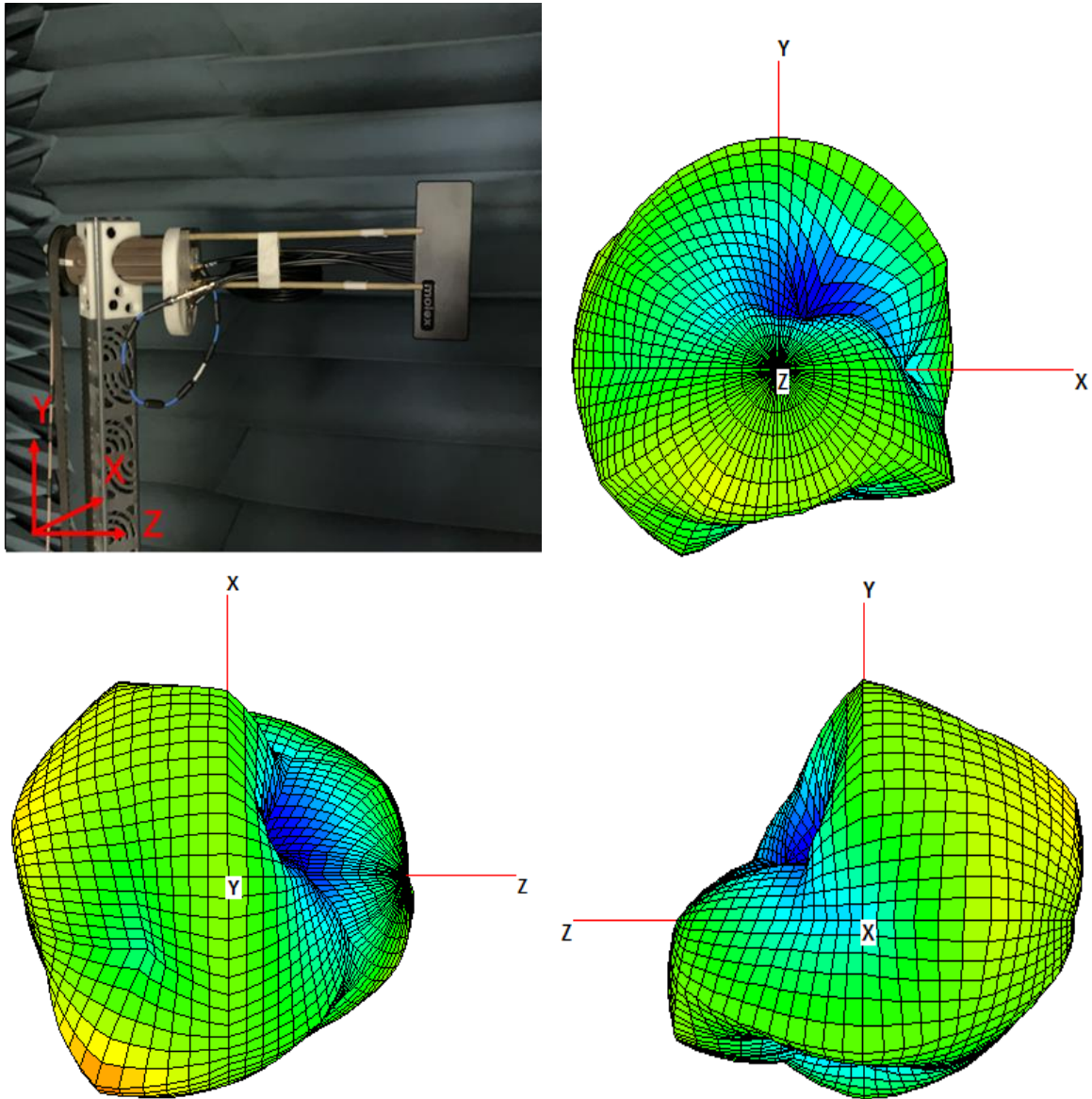


FIGURE 4.6.19 3D RADIATION PATTERN OF WIFI 1 ANTENNA AT 5500MHZ IN FREE SPACE

REVISION: B	ECR/ECN INFORMATION: EC No: 659188 DATE: 2021/04/14	TITLE: Molex Multi-hub Antenna 5-in-1 Application Specification		SHEET No. 52 of 58
DOCUMENT NUMBER: AS-2165891000		CREATED / REVISED BY: Liu Hai 2021/04/14	CHECKED BY: Andy Zhang 2021/04/14	APPROVED BY: Chris Zhong 2021/04/14

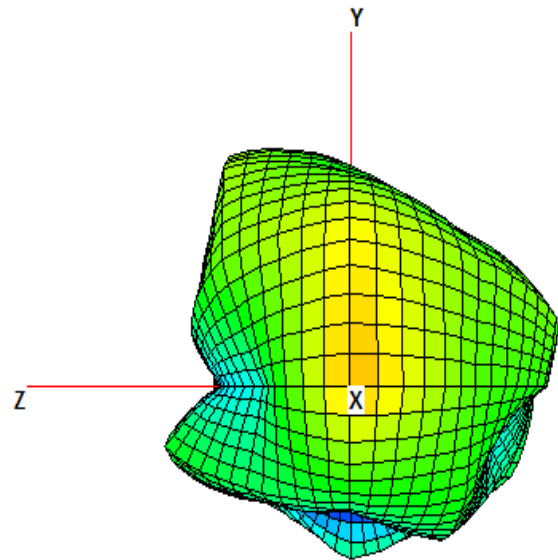
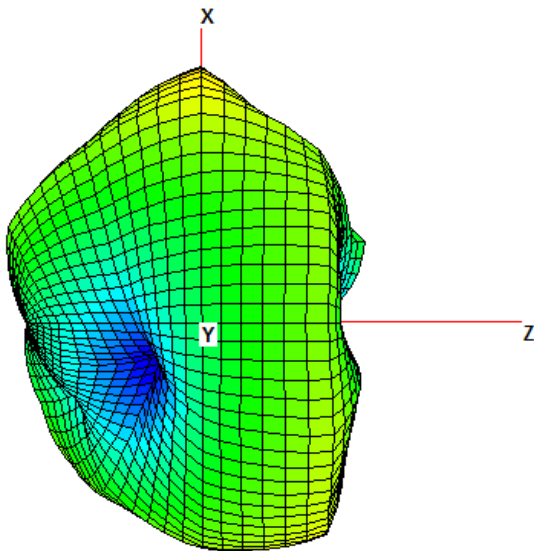
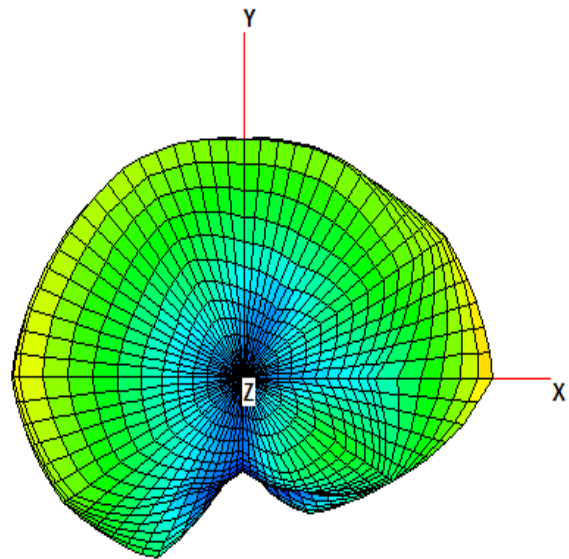
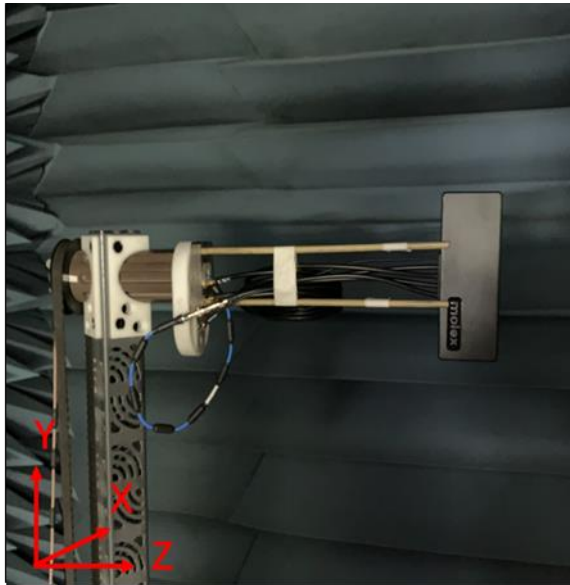


FIGURE 4.6.20 3D RADIATION PATTERN OF WIFI 2 ANTENNA AT 2450MHZ IN FREE SPACE

REVISION: B	ECR/ECN INFORMATION: EC No: 659188 DATE: 2021/04/14	TITLE: Molex Multi-hub Antenna 5-in-1 Application Specification		SHEET No. 53 of 58
DOCUMENT NUMBER: AS-2165891000		CREATED / REVISED BY: Liu Hai 2021/04/14	CHECKED BY: Andy Zhang 2021/04/14	APPROVED BY: Chris Zhong 2021/04/14

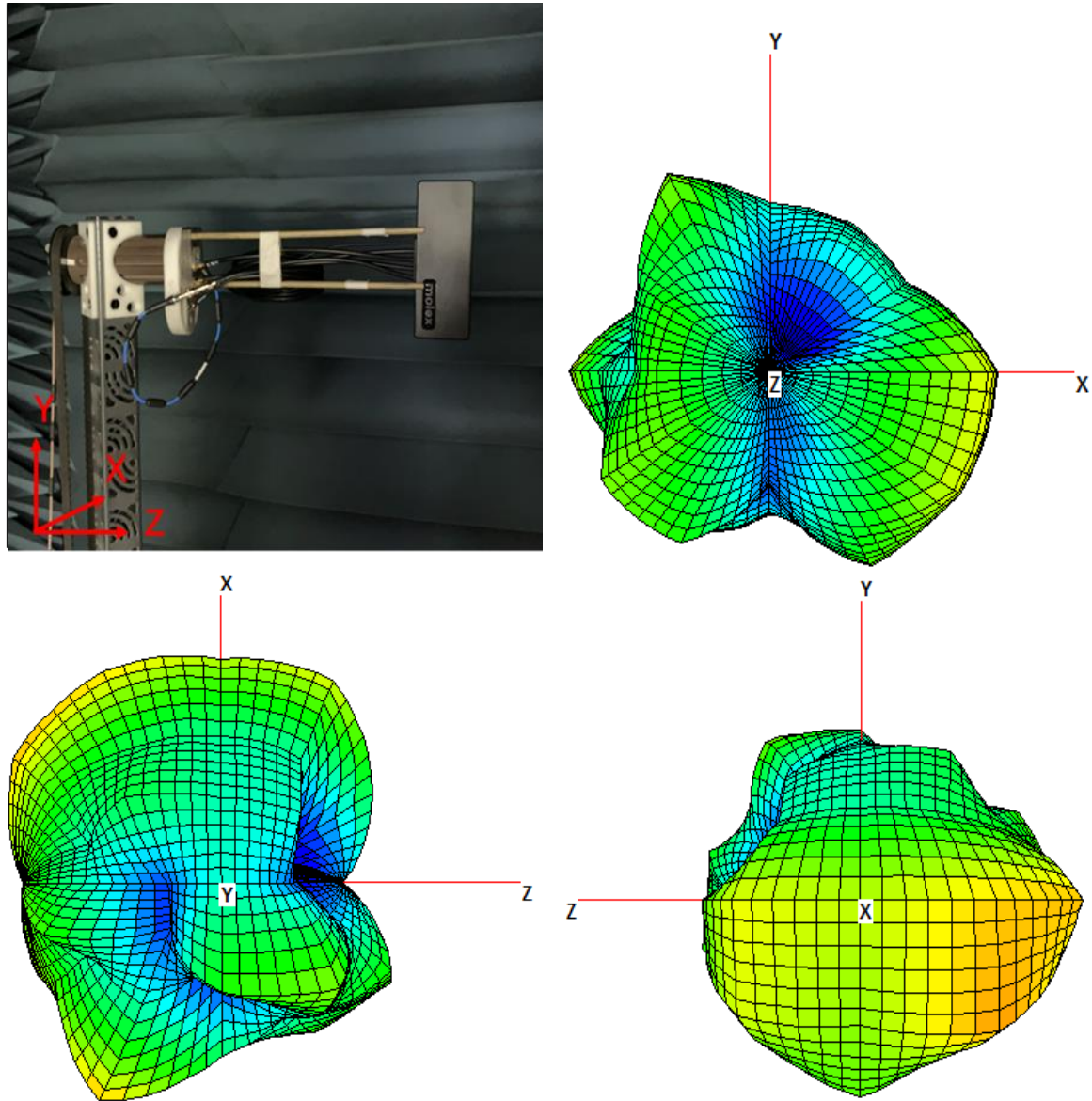
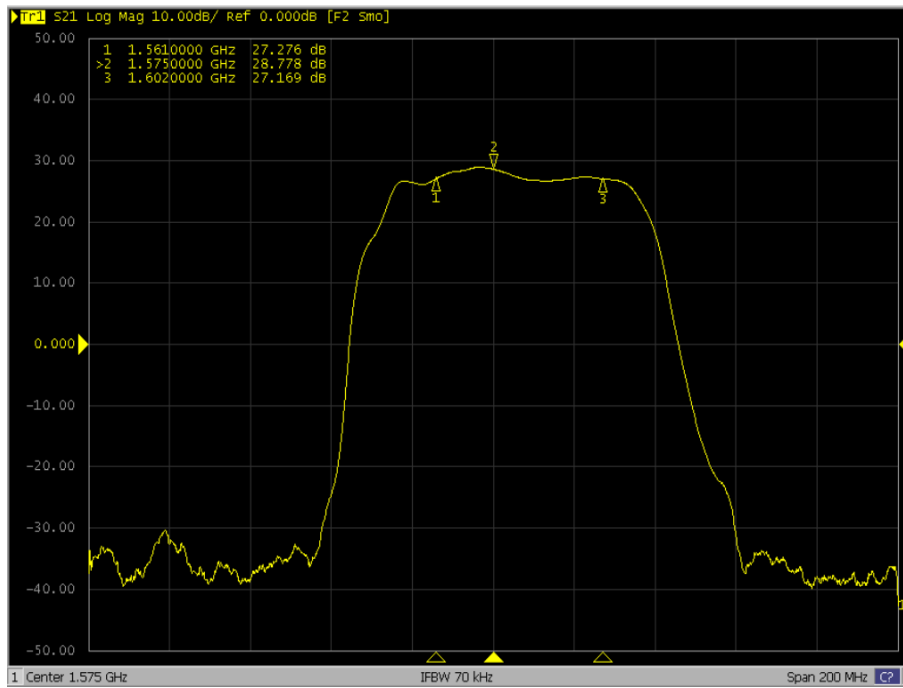


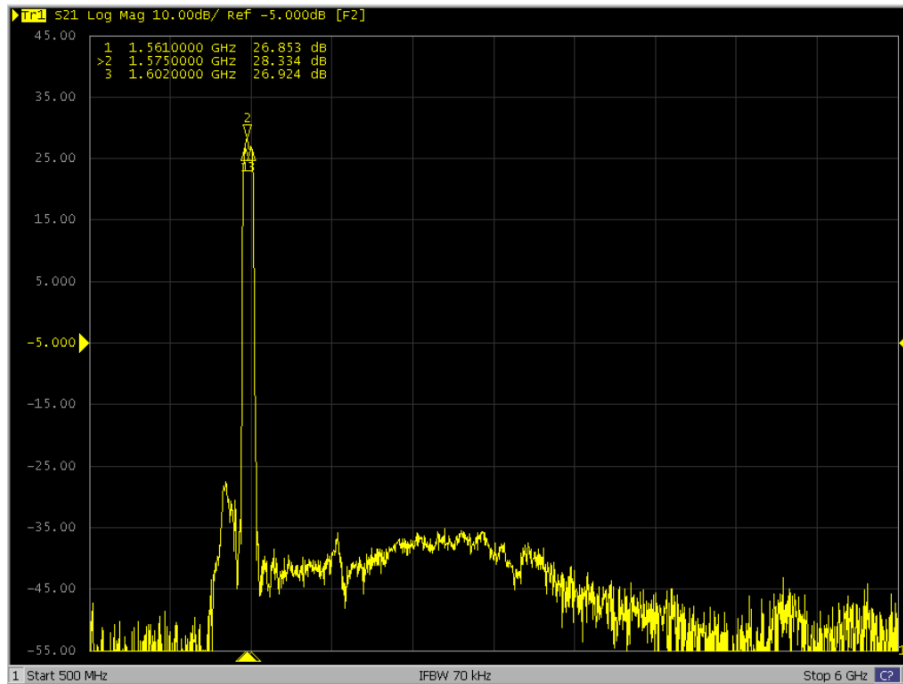
FIGURE 4.6.21 3D RADIATION PATTERN OF WIFI 2 ANTENNA AT 5500MHZ IN FREE SPACE

REVISION: B	ECR/ECN INFORMATION: EC No: 659188 DATE: 2021/04/14	TITLE: Molex Multi-hub Antenna 5-in-1 Application Specification	SHEET No. 54 of 58
DOCUMENT NUMBER: AS-2165891000	CREATED / REVISED BY: Liu Hai 2021/04/14	CHECKED BY: Andy Zhang 2021/04/14	APPROVED BY: Chris Zhong 2021/04/14

4.7 GNSS LNA GAIN



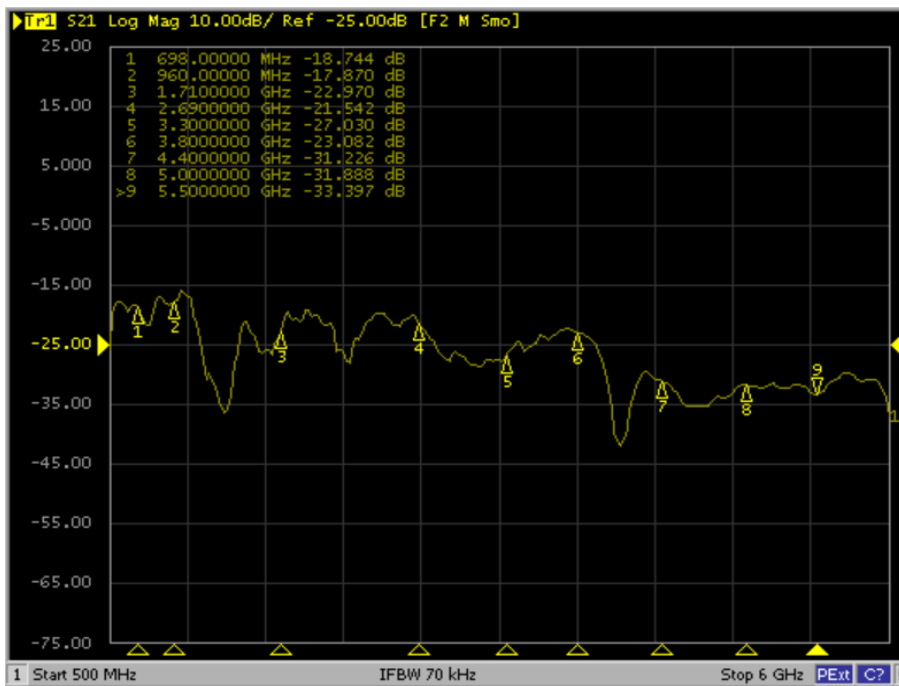
4.7.1 LNA GAIN OF GNSS ANTENNA IN FREE SPACE



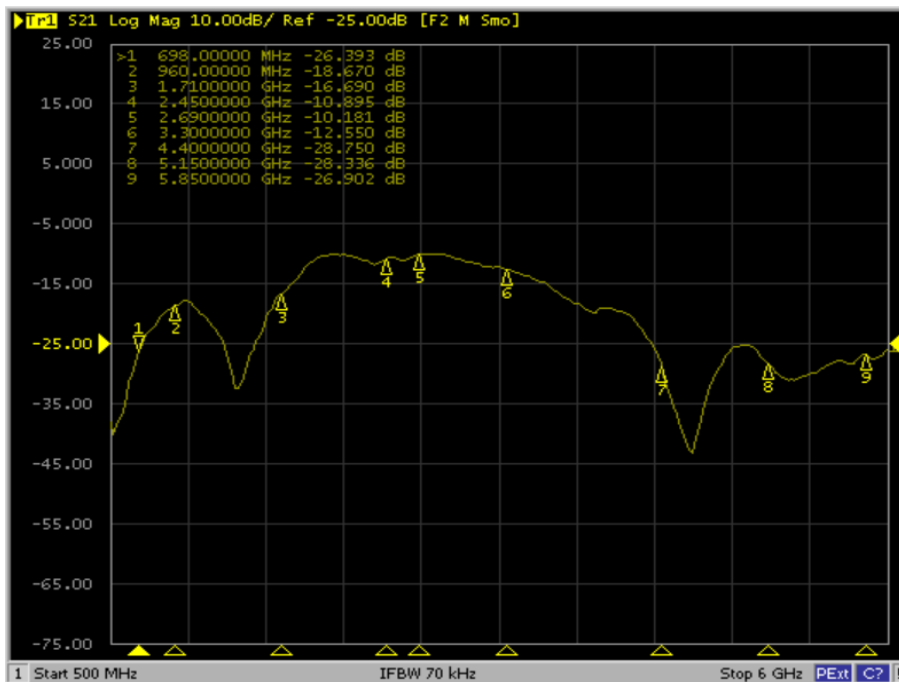
4.7.2 LNA OUT-BAND REJECTION OF GNSS ANTENNA IN FREE SPACE

REVISION: B	ECR/ECN INFORMATION: EC No: 659188 DATE: 2021/04/14	TITLE: Molex Multi-hub Antenna 5-in-1 Application Specification	SHEET No. 55 of 58
DOCUMENT NUMBER: AS-2165891000	CREATED / REVISED BY: Liu Hai 2021/04/14	CHECKED BY: Andy Zhang 2021/04/14	APPROVED BY: Chris Zhong 2021/04/14

4.8 ISOLATION

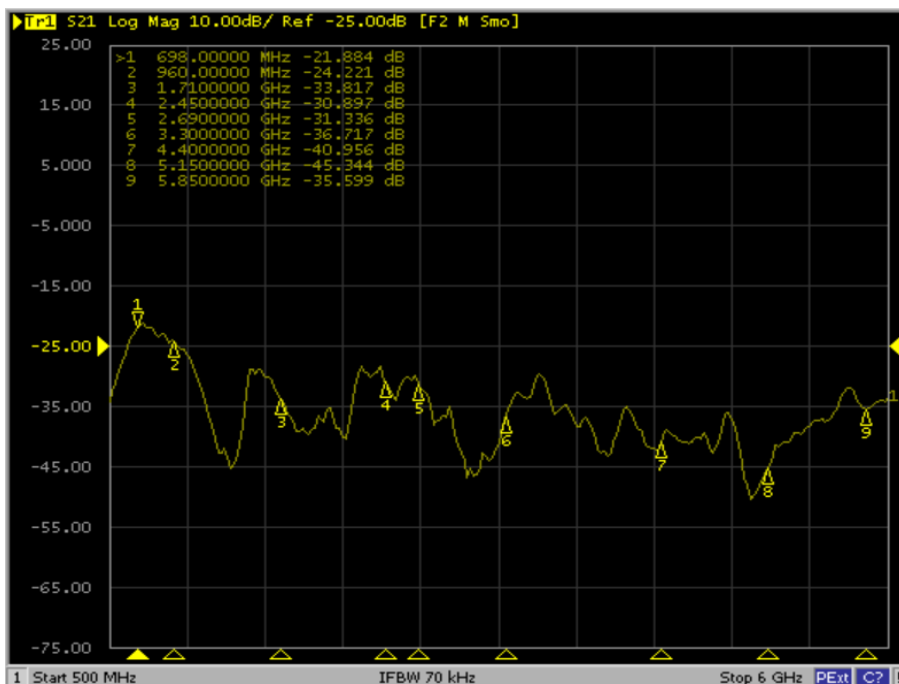


4.8.1 ISOLATION OF LTE 1 ANTENNA AND LTE 2 ANTENNA

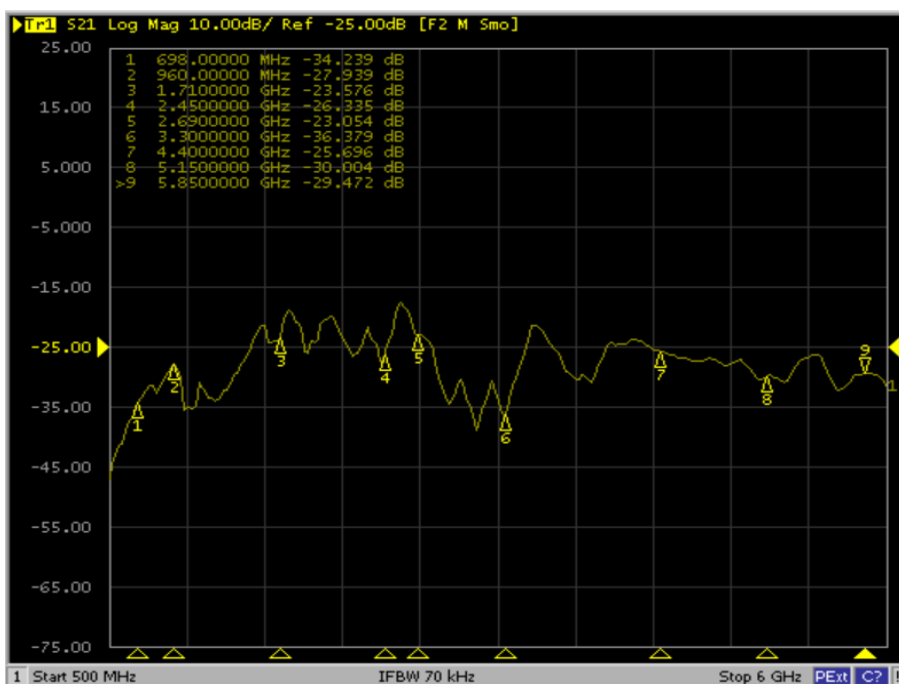


4.8.2 ISOLATION OF LTE 1 ANTENNA AND WIFI 1 ANTENNA

REVISION: B	ECR/ECN INFORMATION: EC No: 659188 DATE: 2021/04/14	TITLE: Molex Multi-hub Antenna 5-in-1 Application Specification	SHEET No. 56 of 58
DOCUMENT NUMBER: AS-2165891000	CREATED / REVISED BY: Liu Hai 2021/04/14	CHECKED BY: Andy Zhang 2021/04/14	APPROVED BY: Chris Zhong 2021/04/14

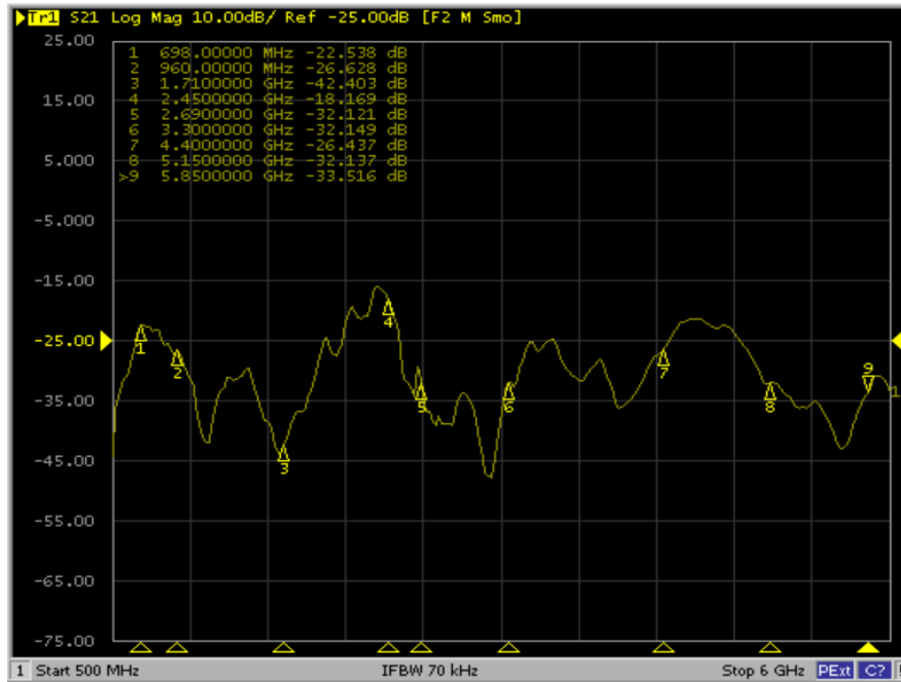


4.8.3 ISOLATION OF LTE 1 ANTENNA AND WIFI 2 ANTENNA

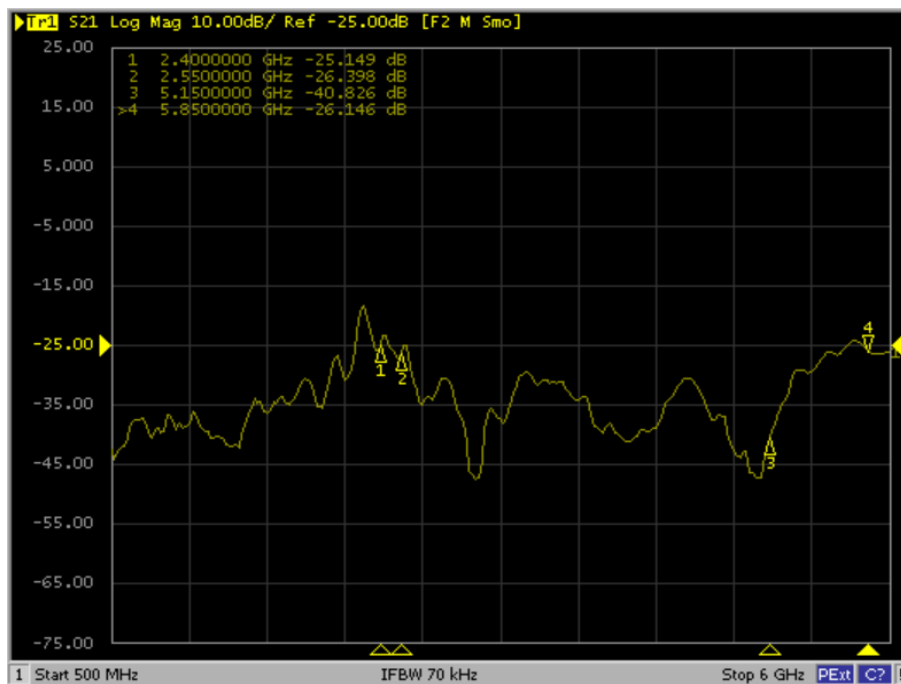


4.8.4 ISOLATION OF LTE 2 ANTENNA AND WIFI 1 ANTENNA

REVISION: B	ECR/ECN INFORMATION: EC No: 659188 DATE: 2021/04/14	TITLE: Molex Multi-hub Antenna 5-in-1 Application Specification	SHEET No. 57 of 58
DOCUMENT NUMBER: AS-2165891000	CREATED / REVISED BY: Liu Hai 2021/04/14	CHECKED BY: Andy Zhang 2021/04/14	APPROVED BY: Chris Zhong 2021/04/14



4.8.5 ISOLATION OF LTE 2 ANTENNA AND WIFI 2 ANTENNA



4.8.6 ISOLATION OF WIFI 1 ANTENNA AND WIFI 2 ANTENNA

REVISION: B	ECR/ECN INFORMATION: EC No: 659188 DATE: 2021/04/14	TITLE: Molex Multi-hub Antenna 5-in-1 Application Specification	SHEET No. 58 of 58
DOCUMENT NUMBER: AS-2165891000	CREATED / REVISED BY: Liu Hai 2021/04/14	CHECKED BY: Andy Zhang 2021/04/14	APPROVED BY: Chris Zhong 2021/04/14