

Report No.:SEWA2303000034OA01

Rev.01

Page: 1 of 28

## ANTENNA PASSIVE TEST REPORT

A 12 42 NT.	GEWA 22020000240 A
Application No.	SEWA2303000034OA
Applicant	Bosch Automotive Products (Suzhou) Co., Ltd
Manufacturer	Bosch Automotive Products (Suzhou) Co., Ltd
Product Name	Vehicle Cockpit
Model No	Chery IDC
Standards	IEEE Std 149 ™ -2021
Date Initial Sample(s) Received	2023.03.10
<b>Testing Start Date</b>	2023.03.10
Testing Finish Date	2023.03.10
Report Issue Date	2023.03.24

Comments/ Conclusion: The configuration tested complied to the certification requirements specified in this report.

Leno Shi

Antenna Test Engineer

Caleb Gao

Caleb. Gao

Antenna Test Supervisor

Panta Sun

Panta Sun

Wireless Operation Manager

The manufacturer should ensure that all products in series production are in conformity with the product sample detailed in this report.

If the product in this report is used in any configuration other than that detailed in the report, the manufacturer must ensure the new system complies with all relevant standards. Any mention of SGS International Electrical Approvals or testing done by SGS International Electrical Approvals in connection with, distribution or use of the product described in this report must be approved by SGS International Electrical Approvals in writing.

The report must not be used by the client to claim product certification, approval, or endorsement by NVLAP, NIST, or any agency of the federal government. All test results in this report can be traceable to National or International Standards.



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Report No.:SEWA2303000034OA01

Rev.01

Page: 2 of 28

### **REVISION HISTORY**

Report No.	Version	Date	Memo
SEWA2303000034OA01	01	2023/03/24	The final version of report



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Report No.:SEWA2303000034OA01

Rev.01

Page: 3 of 28

#### **TABLE OF CONTENTS**

1. GENERAL INFORMATION	4
1.1 DETAILS OF CLIENT	4
1.2 TEST LOCATION	4
1.3 GENERAL DESCRIPTION OF EUT	5
1.4 TEST PROCEDURE	5
1.5 LABORATORY ENVIRONMENT	5
2. OTA MEASUREMENTS SYSTEM CONFIGURATION	6
2.1 TEST CONFIGURATION	6
2.2 TEST MEASUREMENT	6
3. TEST EQUIPMENT LIST	7
4. MEASUREMENT UNCERTAINTY	8
5. TEST RESULTS	9
5.1 WI-FI ANTENNA	9
5.2 BT ANTENNA	12
6. 3-D ANTENNA PATTERN	
6.1 WI-FI ANTENNA	15
6.2 BT ANTENNA	
7. EUT AND TEST CONFIGURATION	



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Report No.:SEWA2303000034OA01

Rev.01

Page: 4 of 28

### 1. General Information

#### 1.1 Details of Client

Applicant	Bosch Automotive Products (Suzhou) Co., Ltd	
Address:	No. 455, Xinglong Street, Suzhou Industrial Park, Jiangsu, China	
Manufacturer	Bosch Automotive Products (Suzhou) Co., Ltd	
Address:	No. 455, Xinglong Street, Suzhou Industrial Park, Jiangsu, China	

#### 1.2 Test Location

Company	SGS-CSTC Standards Technical Service (Suzhou) Co., Ltd.	
Address	South of No. 6 Plant, No. 1, Runsheng Road, Suzhou Industrial Park, Suzhou Area, China (Jiangsu) Pilot Free Trade Zone	
Post Code	215000	
Telephone	+86(0)512-62990300	
Fax	+86(0)512-62990300	



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Report No.:SEWA2303000034OA01

Rev.01

Page: 5 of 28

### 1.3 General Description of EUT

Device Description:	Vehicle Cockpit
Device Manufacturer:	Bosch Automotive Products (Suzhou) Co., Ltd
Device Model:	Chery IDC
Hardware Version:	N/A
Software Version:	N/A

#### 1.4 Test Procedure

Testing is performed according to the IEEE Std  $149 \, ^{\text{TM}} - 2021$ 

### 1.5 Laboratory Environment

Temperature	Min. =19°C, Max. = 25°C		
Relative humidity	Min. =40%, Max. =72%		
Shield effect	0.7-6GHz > 100dB		
Ground resistance	<0.5Ω		



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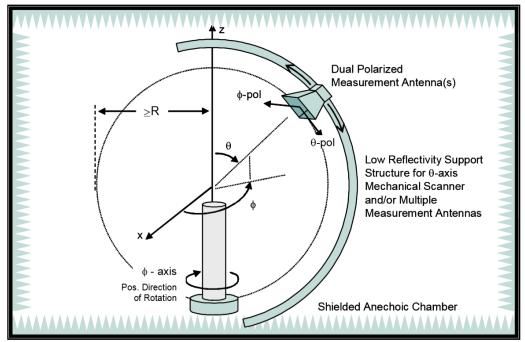
Rev.01

Page: 6 of 28

## 2. OTA Measurements System Configuration

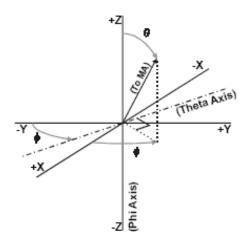
### 2.1 Test Configuration

Conical-Cut method is used to measure the antenna 3D GAIN of EUT in OTA qualified anechoic chamber. Equipment Under Test (EUT) geometry centre vertical projection at the centre of platform, the distance from EUT to measurement antenna is 1.5m



#### 2.2 Test Measurement

Spherical coordinate system





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Report No.:SEWA2303000034OA01

Rev.01

Page: 7 of 28

## 3. Test Equipment List

Type of Equipment	Model Number	Manufacture	Calibration Date	Valid Period
Network Analyzer	ZNB8 S/N 103535	R&S	2023-02-06	2024-02-05
Switch Control System	OSP 130 S/N 100358	R&S	N/A	N/A
MAPS Controller	2090 S/N 114576	ETS-Lindgren L.P.	N/A	N/A
Test Software	EMQuest™ REV 1.14 Build 31654	ETS-Lindgren L.P	N/A	N/A
Full Anechoic Wireless Test chamber	ETS-Lindgren AMS- 8923 CT000596-1149	ETS-Lindgren L.P	N/A	N/A



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Report No.:SEWA2303000034OA01

Rev.01

Page: 8 of 28

## 4. Measurement Uncertainty

Item	617- 698MHz (dB)	699- 798MHz (dB)	814- 894MHz (dB)	1695- 1780MHz (dB)	1850- 2020MHz (dB)	2300- 2800MHz (dB)	3300- 3800MHz (dB)	5150- 5925MHz (dB)
Gain	0.75	0.9	0.74	0.84	0.83	0.9	0.84	0.86
Efficiency	0.75	0.9	0.74	0.84	0.83	0.9	0.84	0.86

Measurement Uncertainty (95% CONFIDENCE INTERVAL) K=2



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Report No.:SEWA2303000034OA01

Rev.01

Page: 9 of 28

### 5. Test Results

#### 5.1 Wi-Fi Antenna

Frequency (MHz)	Gain(dBi)	Efficiency(dB)	Efficiency(%)
2400	1.79	-4.01	39.72
2410	2.54	-3.53	44.32
2420	2.79	-3.35	46.19
2430	2.79	-3.38	45.93
2440	2.72	-3.14	48.50
2450	2.39	-3.02	49.84
2460	2.41	-2.73	53.36
2470	2.06	-2.88	51.58
2480	1.36	-3.25	47.31
2490	1.18	-3.61	43.53
2500	0.99	-4.01	39.69
5150	3.05	-2.01	62.98
5160	3.10	-2.07	62.12
5170	2.97	-2.17	60.67
5180	3.11	-2.10	61.61
5190	3.04	-2.06	62.24
5200	3.41	-1.95	63.86
5210	3.26	-2.02	62.86
5220	3.49	-2.01	62.99
5230	3.18	-2.07	62.12
5240	3.27	-2.05	62.40
5250	3.26	-1.97	63.56
5260	3.18	-2.05	62.35
5270	3.04	-2.39	57.68
5280	2.61	-2.69	53.77
5290	2.65	-2.69	53.89
5300	3.65	-1.95	63.89



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Report No.:SEWA2303000034OA01

Rev.01

Page: 10 of 28

Frequency (MHz)	Gain(dBi)	Efficiency(dB)	Efficiency(%)
5310	4.03	-1.72	67.31
5320	3.69	-1.98	63.34
5330	2.87	-2.66	54.16
5340	2.40	-2.98	50.40
5350	2.79	-2.76	52.95
5360	3.47	-2.10	61.70
5370	3.56	-2.15	60.95
5380	3.26	-2.23	59.90
5390	2.73	-2.79	52.58
5400	2.74	-2.62	54.73
5410	2.97	-2.55	55.55
5420	2.90	-2.47	56.57
5430	2.67	-2.46	56.81
5440	2.39	-2.65	54.27
5450	2.46	-2.65	54.34
5460	2.47	-2.68	53.90
5470	2.66	-2.48	56.53
5480	2.61	-2.67	54.04
5490	2.88	-2.64	54.51
5500	2.84	-2.66	54.22
5510	2.78	-2.75	53.07
5520	2.89	-2.66	54.24
5530	2.76	-2.74	53.19
5540	3.24	-2.44	57.08
5550	3.26	-2.30	58.87
5560	3.13	-2.39	57.67
5570	2.91	-2.39	57.67
5580	2.53	-2.78	52.68



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Rev.01

Page: 11 of 28

Frequency (MHz)	Gain(dBi)	Efficiency(dB)	Efficiency(%)
5590	2.18	-2.91	51.21
5600	2.34	-2.86	51.78
5610	2.53	-2.78	52.67
5620	2.34	-2.99	50.29
5630	2.47	-2.94	50.81
5640	1.95	-3.08	49.15
5650	2.27	-2.86	51.72
5660	2.27	-2.88	51.55
5670	2.34	-2.96	50.59
5680	1.84	-3.43	45.39
5690	1.54	-3.61	43.53
5700	1.55	-3.46	45.05
5710	1.34	-3.44	45.24
5720	1.47	-3.50	44.64
5730	0.86	-3.70	42.70
5740	0.94	-3.90	40.70
5750	0.37	-4.15	38.46
5760	0.28	-4.23	37.72
5770	0.27	-4.38	36.47
5780	0.08	-4.53	35.22
5790	-0.08	-4.64	34.35
5800	1.04	-4.28	37.29
5810	1.09	-4.41	36.23
5820	0.38	-4.56	34.99
5830	0.66	-4.55	35.11
5840	0.53	-4.69	33.98
5850	0.43	-4.87	32.61



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Report No.:SEWA2303000034OA01

Rev.01

Page: 12 of 28

#### 5.2 BT Antenna

Frequency (MHz)	Gain(dBi)	Efficiency(dB)	Efficiency(%)
2400	0.98	-4.95	31.95
2410	1.71	-4.47	35.72
2420	1.66	-4.30	37.13
2430	1.19	-4.36	36.68
2440	1.38	-4.14	38.53
2450	1.51	-4.11	38.84
2460	1.51	-4.00	39.77
2470	1.27	-4.30	37.13
2480	0.70	-4.81	33.02
2490	-0.04	-5.33	29.29
2500	-0.61	-5.81	26.25
5150	0.45	-4.44	35.99
5160	0.53	-4.45	35.85
5170	0.26	-4.53	35.26
5180	0.55	-4.45	35.87
5190	0.60	-4.39	36.42
5200	0.93	-4.26	37.48
5210	0.67	-4.39	36.36
5220	0.57	-4.34	36.77
5230	0.40	-4.42	36.12
5240	0.20	-4.40	36.30
5250	0.53	-4.33	36.87
5260	0.34	-4.52	35.32
5270	0.09	-4.91	32.30
5280	-0.54	-5.34	29.27
5290	-0.30	-5.28	29.63
5300	0.31	-4.73	33.68



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Report No.:SEWA2303000034OA01

Rev.01

Page: 13 of 28

Frequency (MHz)	Gain(dBi)	Efficiency(dB)	Efficiency(%)
5310	0.57	-4.62	34.53
5320	0.37	-4.97	31.82
5330	-0.94	-5.65	27.20
5340	-0.63	-5.97	25.28
5350	-1.22	-5.80	26.31
5360	0.29	-5.20	30.18
5370	-0.62	-5.38	28.98
5380	-0.35	-5.40	28.83
5390	-1.10	-6.01	25.08
5400	-0.68	-5.96	25.35
5410	-0.73	-5.96	25.35
5420	-0.81	-6.01	25.05
5430	-1.01	-5.94	25.46
5440	-1.31	-6.26	23.67
5450	-0.95	-6.29	23.52
5460	-0.94	-6.40	22.89
5470	-0.73	-6.32	23.36
5480	-1.13	-6.54	22.20
5490	-0.96	-6.46	22.57
5500	-1.01	-6.51	22.35
5510	-1.26	-6.64	21.67
5520	-1.14	-6.50	22.41
5530	-1.21	-6.57	22.02
5540	-0.83	-6.27	23.62
5550	-0.80	-6.05	24.83
5560	-0.80	-6.13	24.41
5570	-0.82	-6.10	24.56
5580	-1.11	-6.32	23.33



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Report No.:SEWA2303000034OA01

Rev.01

Page: 14 of 28

Frequency (MHz)	Gain(dBi)	Efficiency(dB)	Efficiency(%)
5590	-1.18	-6.38	23.03
5600	-1.15	-6.31	23.37
5610	-0.69	-6.19	24.02
5620	-0.40	-6.28	23.53
5630	-0.36	-6.14	24.31
5640	-0.66	-6.18	24.09
5650	-0.49	-5.88	25.80
5660	-0.09	-5.90	25.73
5670	-0.05	-5.86	25.92
5680	-0.33	-6.19	24.05
5690	-0.63	-6.21	23.93
5700	-0.46	-5.98	25.22
5710	-0.48	-5.82	26.17
5720	-0.32	-5.78	26.42
5730	-0.89	-5.79	26.36
5740	-0.94	-5.88	25.80
5750	-1.17	-5.99	25.18
5760	-1.21	-6.01	25.04
5770	-1.17	-6.00	25.11
5780	-0.89	-6.07	24.69
5790	-1.17	-6.16	24.19
5800	-0.62	-5.76	26.52
5810	-0.64	-5.84	26.05
5820	-0.75	-5.85	26.02
5830	-0.94	-5.99	25.17
5840	-0.56	-5.93	25.51
5850	-1.37	-6.32	23.33



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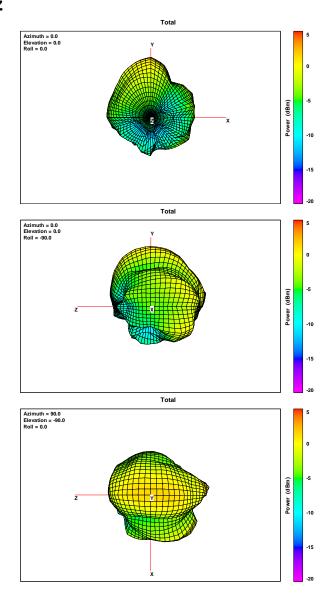
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Page: 15 of 28

#### 6. 3-D Antenna Pattern

### 6.1 Wi-Fi Antenna

#### 6.1.1 2400MHz





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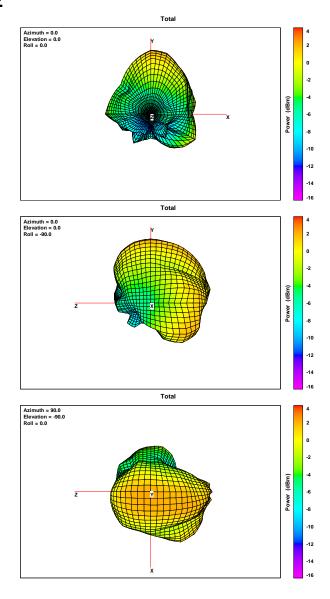


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Page: 16 of 28

#### 6.1.2 2450MHz





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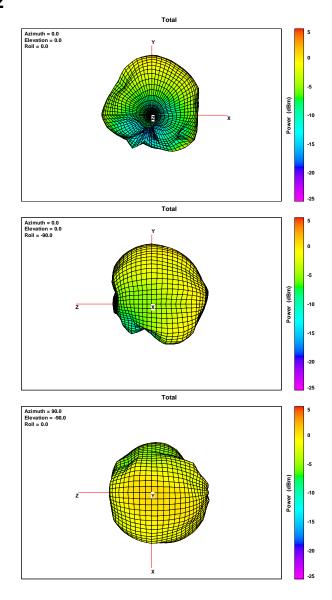


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#### 6.1.3 2500MHz





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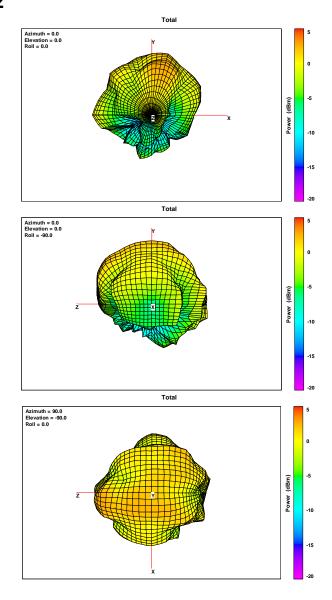


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Rev.01

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#### 6.1.4 5150MHz





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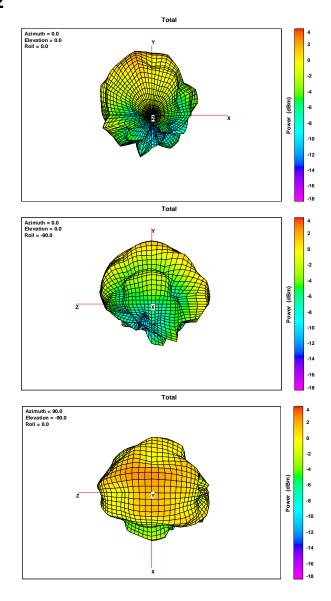


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Rev.01

Page: 19 of 28

#### 6.1.5 5500MHz





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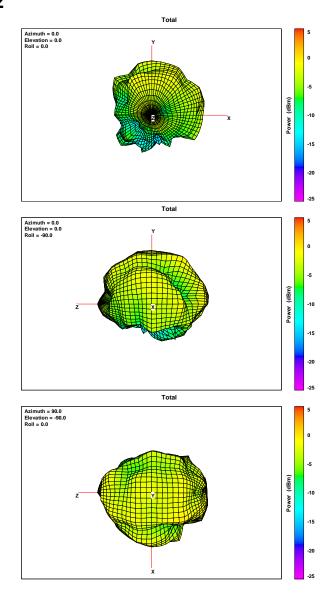


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Rev.01

Page: 20 of 28

#### 6.1.6 5850MHz





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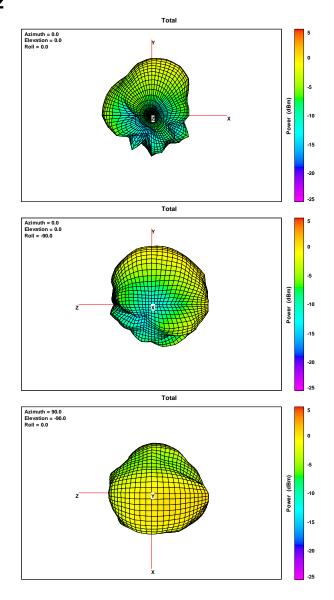
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Rev.01

Page: 21 of 28

### 6.2 BT Antenna

#### 6.2.1 2400MHz





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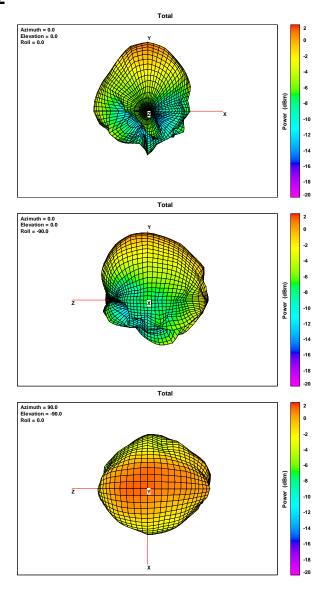


Report No.:SEWA2303000034OA01

Rev.01

Page: 22 of 28

#### 6.2. 2 2450MHz





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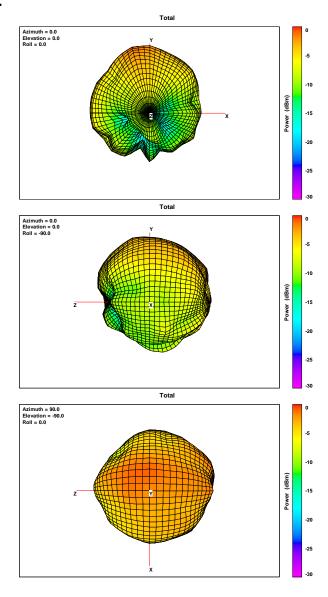


Report No.:SEWA2303000034OA01

Rev.01

Page: 23 of 28

#### 6.2.3 2500MHz





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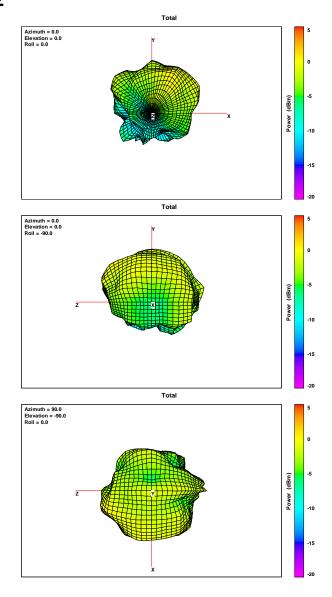


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Rev.01

Page: 24 of 28

#### 6.2.4 5150MHz





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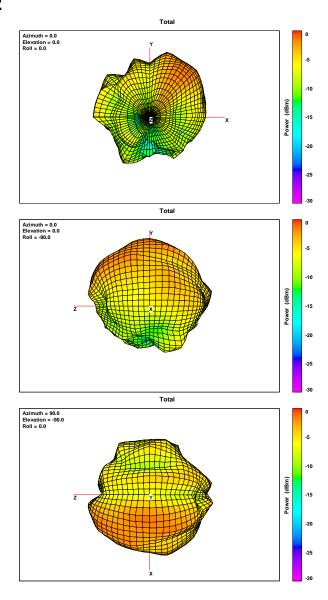


Report No.:SEWA2303000034OA01

Rev.01

Page: 25 of 28

#### 6.2.6 5500MHz





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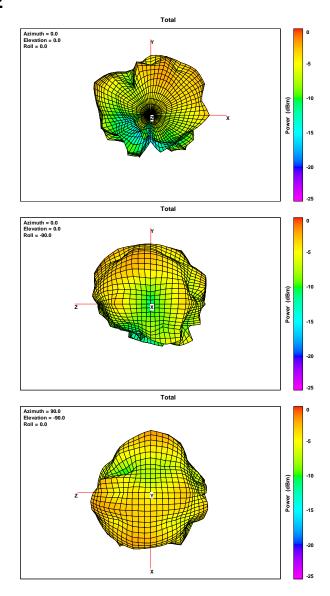


Report No.:SEWA2303000034OA01

Rev.01

Page: 26 of 28

#### 6.2.7 5850MHz





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Report No.:SEWA2303000034OA01

Rev.01

Page: 27 of 28

### 7. EUT and Test Configuration

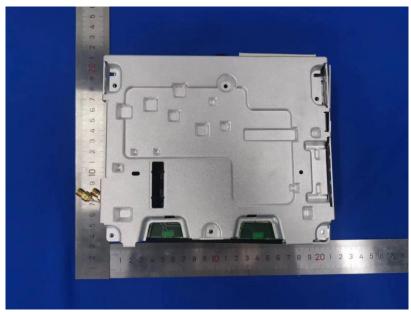


Photo of EUT

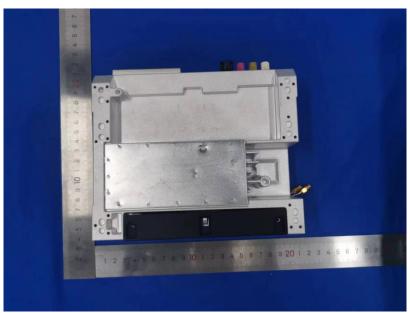


Photo of EUT



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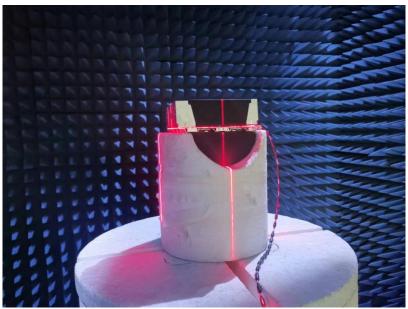
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Rev.01

Page: 28 of 28



Free Space View of EUT

#### **END REPORT**

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