

ANTENNA TEST REPORT	
Antenna operating within the 2400.0 MHz - 2483.5 MHz band	
Report Reference No	G0M-2109-1013-TFCAUT-V01
Testing Laboratory	Eurofins Product Service GmbH
Address	Storkower Str. 38c 15526 Reichenwalde Germany
Applicant	wenglor sensoric GmbH
Address	wenglor Straße 3 88069 Tettnang DE
Equipment under Test (EUT):	
Product Description	Bluetooth module
Model(s)	DC1392
Additional Model(s)	None
Brand Name(s)	None
Hardware Version(s)	1.0
Software Version(s)	1.0
FCC ID	2A3OLDC1392

Testing:		
Test Lab Temperature	20 °C - 30 °C	
Test Lab Humidity	25 % - 55 %	
Date of receipt of test item	2022-12-19	
Report:		
Compiled by	Radwan Jaafar	
Tested by (+ signature) (Responsible for Test)	Radwan Jaafar	
Approved by (+ signature) (Test Lab Engineer)	Wilfried Treffke	
Date of Issue	2023-02-22	
Total number of pages	18	
General Remarks:		
The test results presented in this report relate only to the object tested. The results contained in this report reflect the results for this particular model and serial number. It is the responsibility of the manufacturer to ensure that all production models meet the intent of the requirements detailed within this report. This report shall not be reproduced, except in full, without the written approval of the Issuing testing laboratory.		
Additional Comments:		

VERSION HISTORY

Version History			
Version	Issue Date	Remarks	Revised By
01	2023-02-22	Initial Release	

ABBREVIATIONS AND ACRONYMS

Acronyms	
Acronym	Description
EUT	Equipment Under Test
FCC	Federal Communications Commission
V _{NOM}	Nominal supply voltage

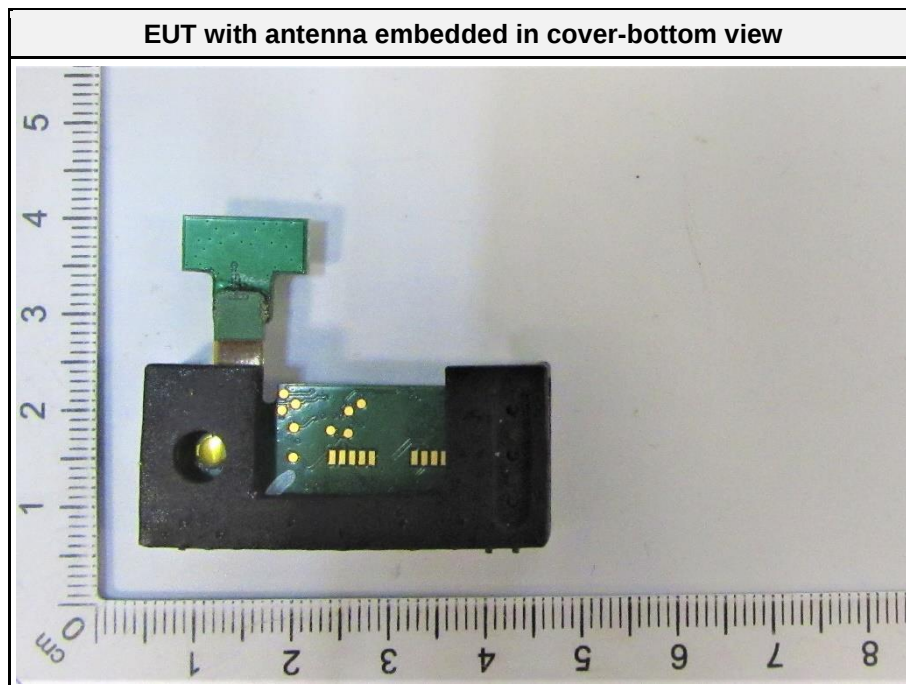
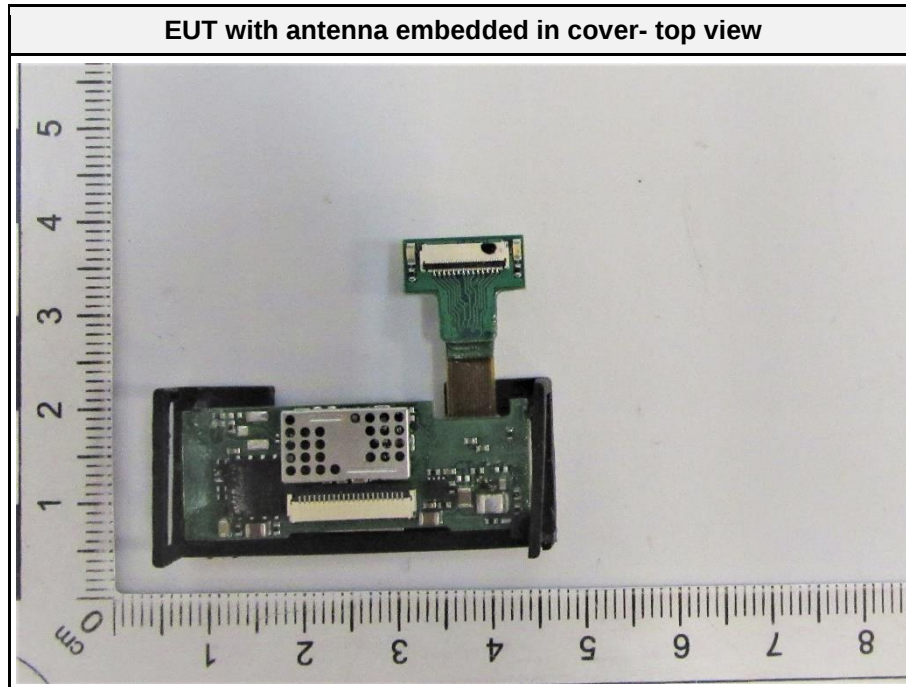
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1 Equipment (Test Item) Under Test

Description	Bluetooth module	
Model	DC1392C	
Additional Model(s)	None	
Brand Name(s)	None	
Serial Number(s)	0003246	
Test Sample Id(s)	41260	
Hardware Version(s)	1.0	
Software Version(s)	1.0	
FCC ID	2A3OLDC1392	
Equipment type	End Product	
Radio type	Transceiver	
Assigned frequency bands	2400.0 MHz - 2483.5 MHz	
Radio technology	Bluetooth LE 5.1	
Modulation	GFSK	
Number of antenna ports	1	
Antenna	Type	Embedded
	Model	Stamped Metal Antenna
	Manufacturer	wenglor sensoric GmbH
	Gain	1.98 dBi (by measurement)
Supply Voltage	V _{NOM}	5 VDC
Operating Temperature	T _{NOM}	25 °C
AC/DC-Adaptor	None	
Manufacturer	wenglor sensoric GmbH wenglor Straße 3 88069 Tettnang DE	

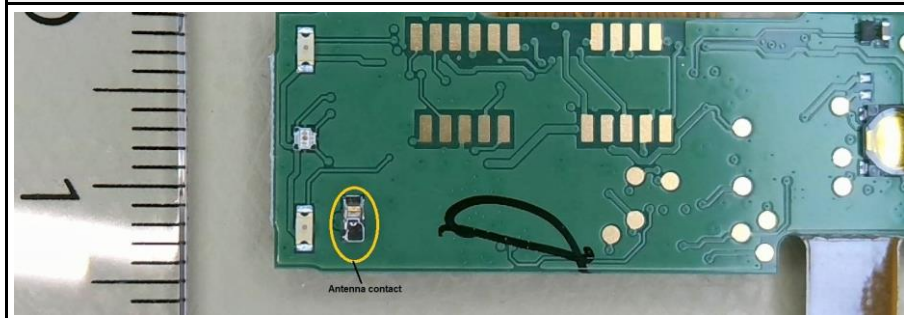
1.1 Photos



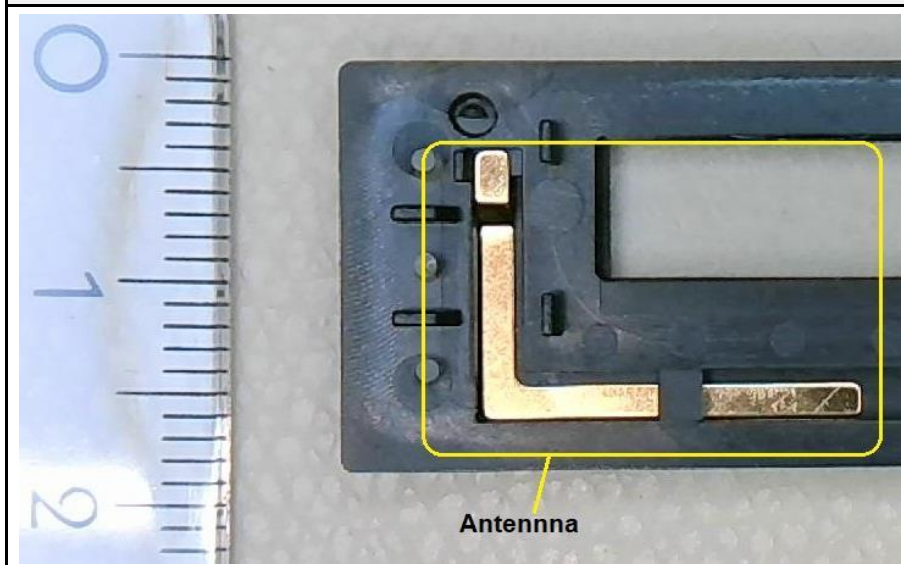
EUT without shield- front close view-



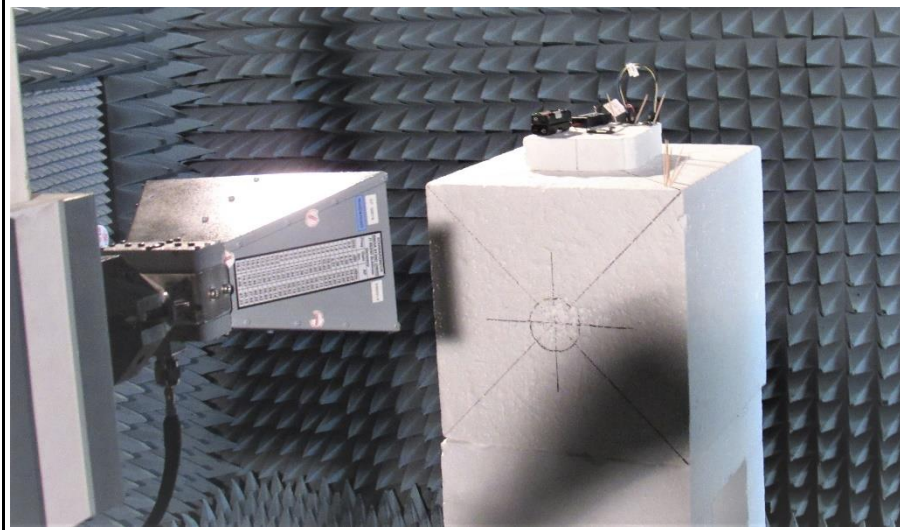
EUT without cover- bottom close view-



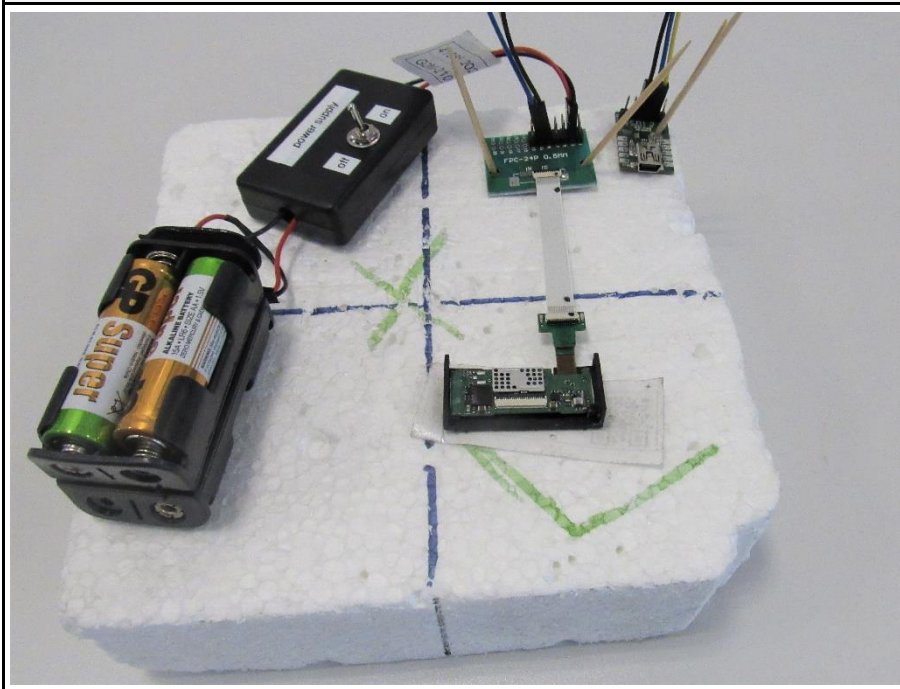
Antenna in cover embedded



Test setup

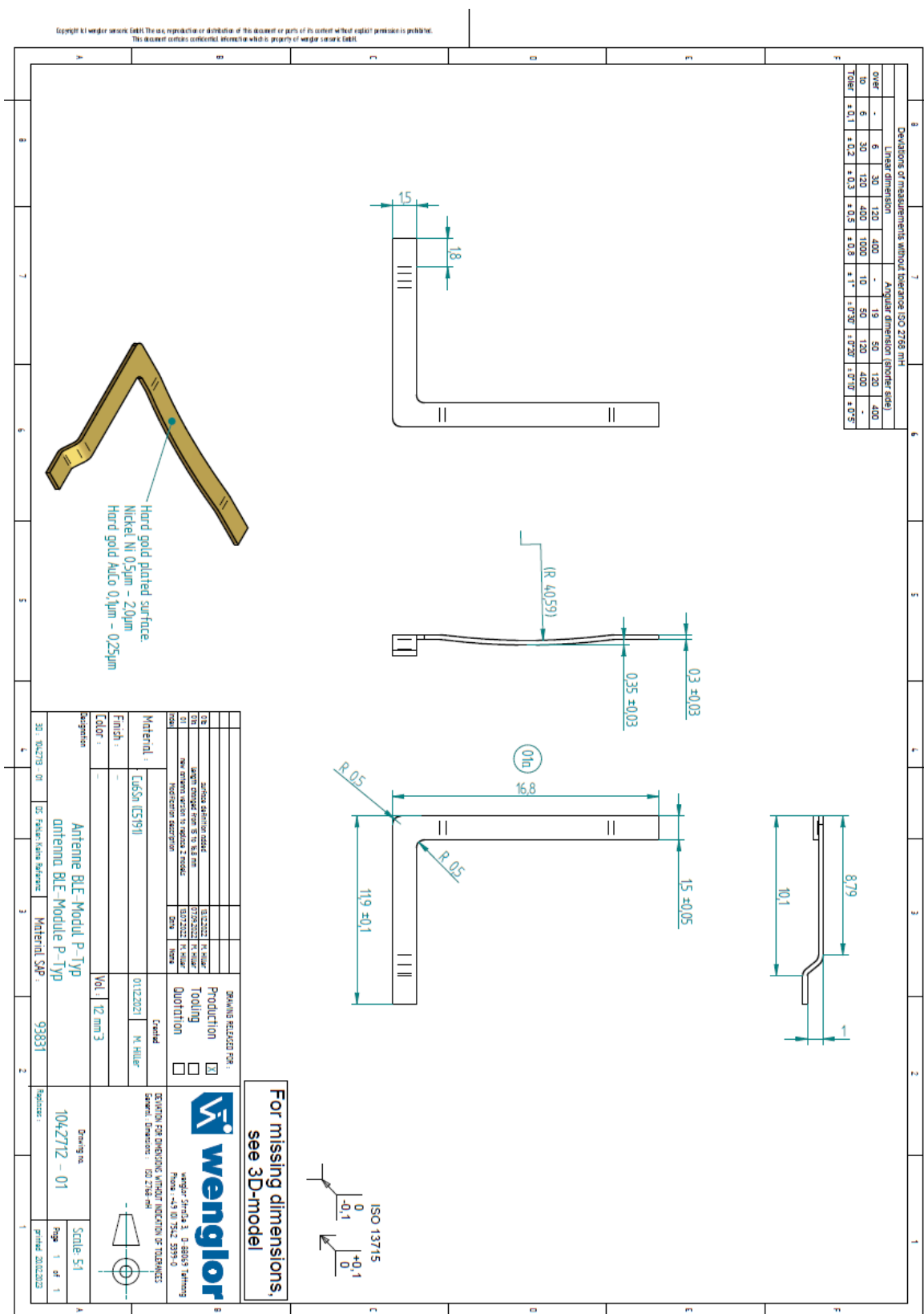


Test setup- close view



1.2 Mechanical Properties

See drawing below



1.3 Support Equipment

Product Type	Device	Manufacturer	Model	Comment
AE	Notebook	Lenovo	T450	To run configuration tool
CBL	USB to UART	-	-	-
SFT	Bluetooth LE DTM over UART	-	-	for configuring test modes
Description:				
AE	Auxiliary Equipment			
SIM	Simulator			
CBL	Connecting Cable			
SFT	Software			
Comment:				

1.4 Test Modes

Mode	Description
GFSK 1 Mbit/s	Mode = Transmit Modulation = GFSK Spreading = None Packet Type = PRBS9 Packet Length = 193 Bytes Duty cycle = 87% Power = +6 dBm (Software Setting)
Comment:	

1.5 Test Frequencies

Designator	Mode	Channel	Frequency [MHz]
F1	Tx	19	2440

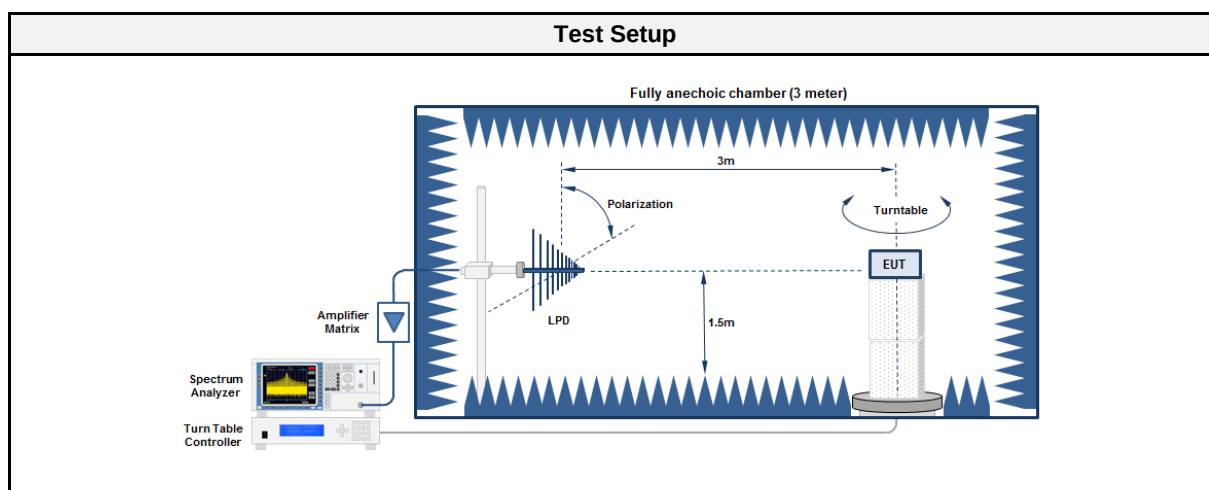
2 Test Conditions and Results

2.1 Test Conditions and Results – Antenna pattern

2.1.1 Information

Test Information	
Operator	Radwan Jaafar
Date	2022-10-17

2.1.2 Setup



2.1.3 Equipment

Test Software			
Description	Manufacturer	Name	Version
Antenna pattern software	Eurofins Product Service GmbH	Eurofins Antenna Pattern	1.9

Test Equipment					
Description	Manufacturer	Model	Identifier	Cal. Date	Cal. Due
Anechoic chamber	Frankonia	AC 4	EF00200	---	---
Spectrum analyzer	R&S	FSU26	EF01407	2022-07	2023-07
Antenna	Schwarzbeck	BBHA 9120D	EF00019	2020-11	2023-11

2.1.4 Procedure

Test Procedure
1. EUT is placed on a non conducting support at the center of a turn table 1.5 m above the ground 2. EUT set to the test mode here the highest conducted output power has been measured 3. The receiver is set to peak detection with max hold 4. The EUT is rotated through 360° in horizontal plane 5. The measurement procedure is repeated for all possible EUT positions.

2.1.5 Results

Test Result – EUT horizontal			
Channel [MHz]	Antenna polarization	Max. rad. Power [dBm e.i.r.p]	Max. antenna gain [dBi]
2440	vertical	0.11	1.11
2440	horizontal	0.62	1.62

Test Result – EUT vertical			
Channel [MHz]	Antenna polarization	Max. rad. Power [dBm e.i.r.p]	Max. antenna gain [dBi]
2440	vertical	0.98	1.98
2440	horizontal	0.32	1.32

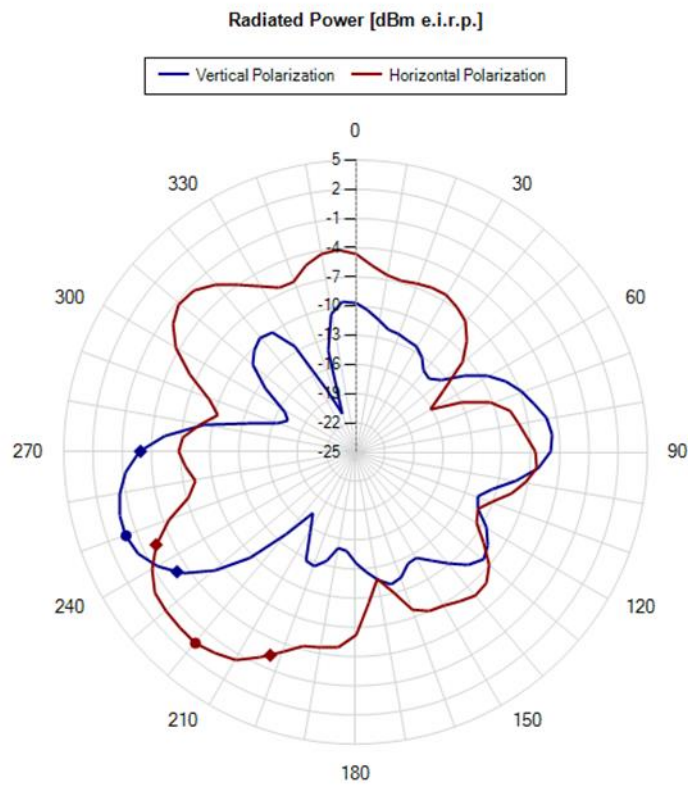
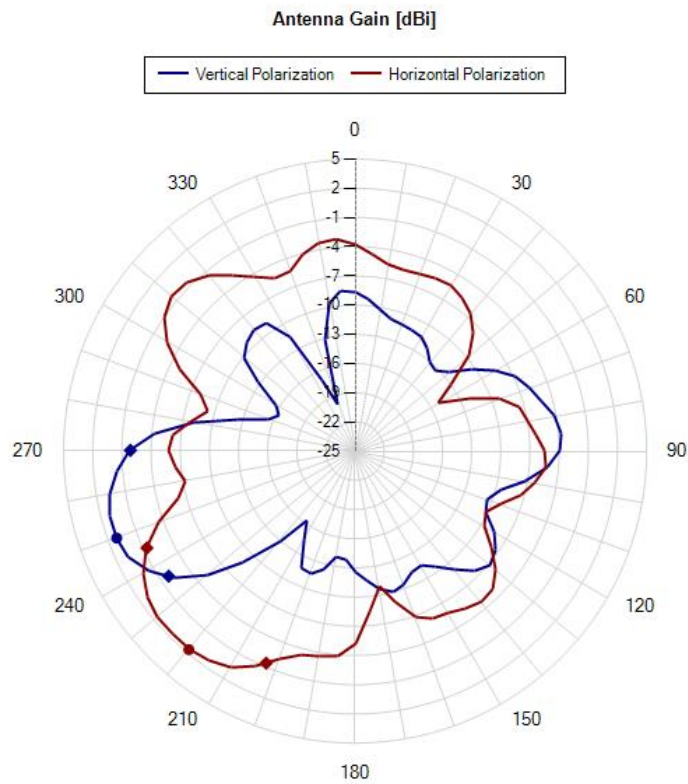
ANNEX A Antenna patterns

Antenna Pattern

Project Number: G0M-2109-1013
 Product: Bluetooth module
 Model: DC1392C
 Sample ID: 41260
 EUT Position: Horizontal
 EUT Antenna: Integrated
 Operating Conditions: Tnom / Vnom
 Operating Frequency: 2440 MHz
 Detector: Peak
 RBW: 1 MHz
 VBW: 3 MHz
 Sweep Time: 5 ms
 Conducted Power: -1.003 dBm
 Operator: Radwan Jaafar
 Date: 2022-10-17

Result Summary

Antenna Polarization	Turn table Angle [°]	Max. rad. power [dBm e.i.r.p.]	Max. antenna gain [dBi]
Vertical	250	0.11	1.11
Horizontal	220	0.62	1.62

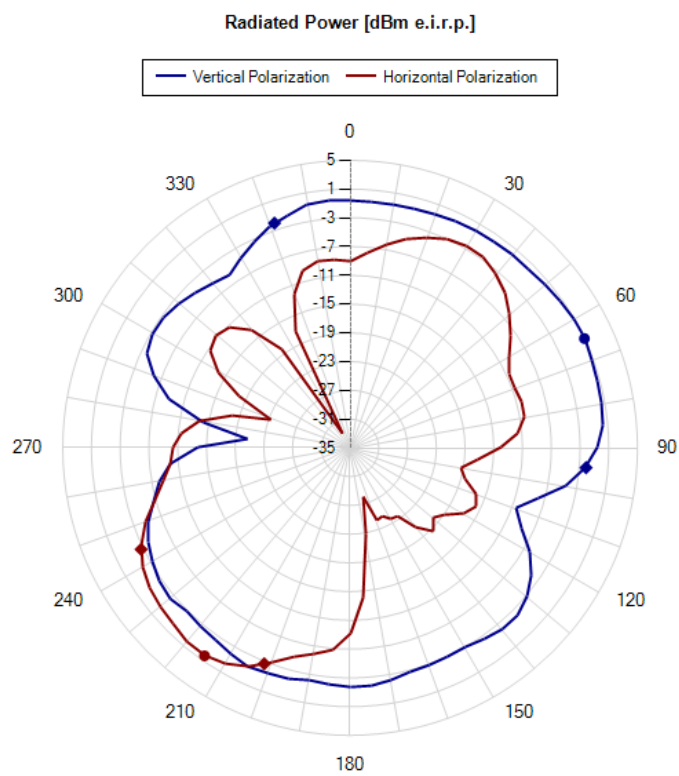
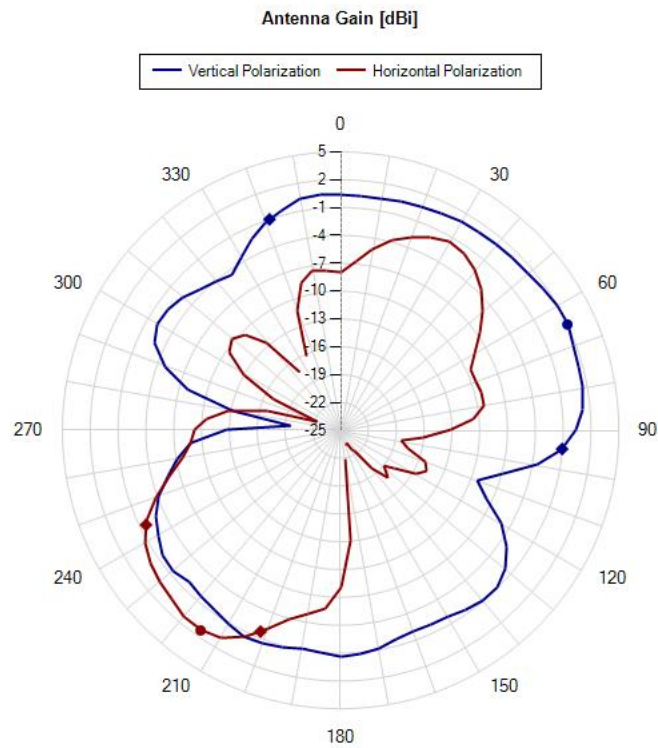


Antenna Pattern

Project Number: G0M-2109-1013
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 Detector: Peak
 RBW: 1 MHz
 VBW: 3 MHz
 Sweep Time: 5 ms
 Conducted Power: -1.003 dBm
 Operator: Radwan Jaafar
 Date: 2022-10-17

Result Summary

Antenna Polarization	Turn table Angle [°]	Max. rad. power [dBm e.i.r.p.]	Max. antenna gain [dBi]
Vertical	65	0.98	1.98
Horizontal	215	0.32	1.32



== = END OF TEST REPORT == =