

Antennas characterization, Gain and Radiation pattern

Test Report INT_25-84-3_00

Issued on 2025-11-26

on	Model / Type	① ZBRRC
	Designation	① Harmony XB5R, 4 PNP, 2 buttons, 6 indicating LEDs, mono-stable, 24V DC
	Manufacturer	① Schneider Electric
	Region Of Interest [ROI]	① Product
	Assigned Ratings	① Gain



under Normative references :
Method Code - Revision :

Executive summary

Gain= 3 dBi compliant to FCC and IC requirements

Statement of conformity: **Measured**

Requested by
UGHADE Akshit ashok
C&S PROJECT MANAGER
Industrial Automation
L'ISLE D'ESPAGNAC
France

Managed by
EL AJMI Mohammed
Request ID:
25-84

Written by
EL AJMI Mohammed
Visa :

Validated by
EL AJMI Mohammed
Visa :

Disclaimer

This test report shall not be distributed and/or reproduced, except in full, without the written approval of our laboratory.

The laboratory is not responsible for the information provided by the Applicant/Customer. This data is marked with symbol ①.

This document is the result of a test performed on a specimen or sample of the product as received (i.e. the laboratory has not been responsible for the sampling stage and the sample has been provided by the Applicant/Customer). It does not provide an assessment of the conformity of all products manufactured from this Item Under Test (hereinafter referred to as "I.U.T.").

Some services reported are not covered by the laboratory accreditation. They are identified with the symbol *.

INT_25-84-3_00

Schneider Electric Industries SAS
L2A – Laboratoire Accrédité Angoulême
ZI n°3, Boulevard Salvador Allende
BP 660 – 16340 – L'ISLE D'ESPAGNAC – FRANCE
Tel. +33 (0)5 79 89 01 00

1

Item Under Test

1

1.1 I.U.T. Description

This table provides a detailed description of the Item Under Test (I.U.T.) and the specific area on which tests or analyses are focused - referred to as Region Of Interest (R.O.I.). It includes identification details, origin, technical specification, manufacturing, and delivery information. Any other relevant information is also specified (e.g. variants tested, influencing variables, sub-assemblies or accessories used).

Note:
The laboratory is not responsible for the information provided by the applicant. This data is marked with symbol ⓘ.

Item Reference	Qty	Item attributes	Attribute value
ZBRRC	1	Designation ⓘ	HarmonyXB5R, 4 PNP, 2 buttons, 6 indicating LEDs, monostable, 24V DC
		Picture ⓘ	
		Manufacturing [date] ⓘ	2025
		Manufacturing [place] ⓘ	3K - France
		Maturity [level] ⓘ	Preliminary production
		Delivery [date]	2025-11-17

1.2 Representative Sample

No specific information was provided by the Applicant/Customer regarding the representativeness of the tested reference in relation to other models or variants within the same product range or family. Therefore, no extrapolation of the results can be assumed without clarification of its scope or additional validation.

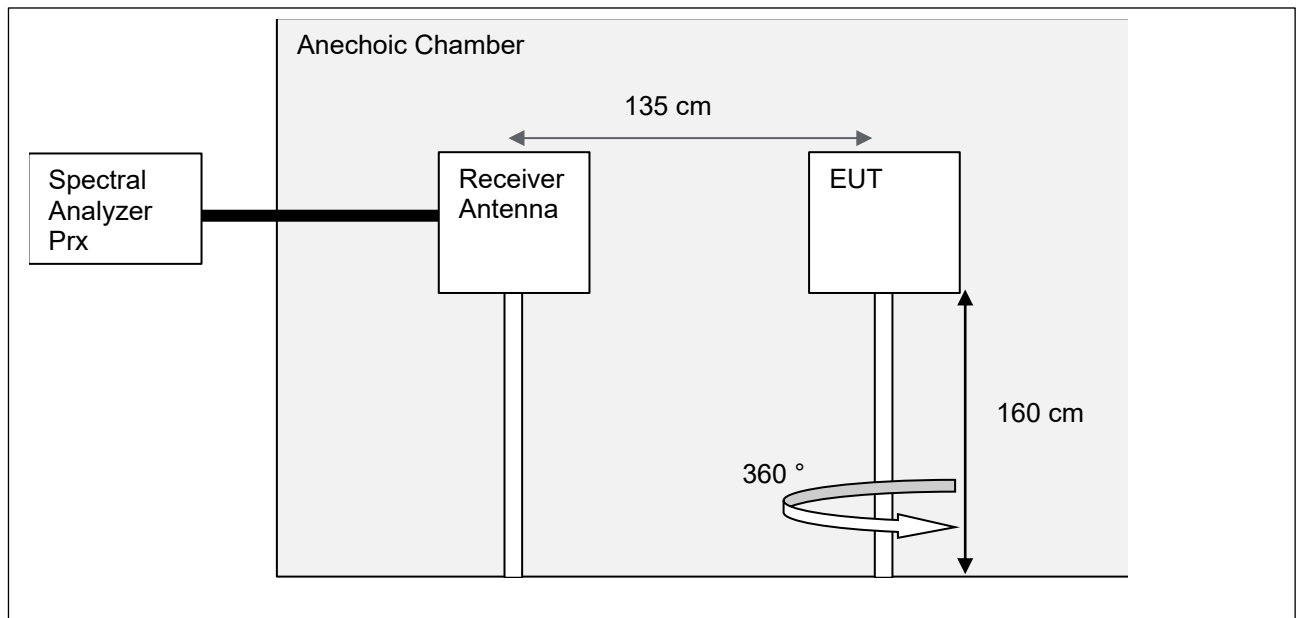
1.3 I.U.T. Setup

This section describes how the I.U.T. was installed or prepared prior to and during the test execution. It includes details on the physical configuration of the item, any pre-conditioning steps, the integration of sub-assemblies or accessories.

Note:

This section focuses exclusively on the preparation, modifications, or specific configuration applied to the Item Under Test (I.U.T.) by the laboratory.

- Test Set-up
 - Using EUT transmitter at desired channel and mounted on a 360 ° turntable
 - Maturo
 - Using a fixed antenna as receiver
 - Distance between Antennas : 135 cm
 - Height Antennas : 160 cm
 - The Gain is measured in anechoic chamber
 - Prx : Received RF power
 - Ptx : Transmitted RF power



- Receiver antenna : P8S-2400S (Mobilemark)
 - 2.4-2485 GHz
 - Gain=8 dBi

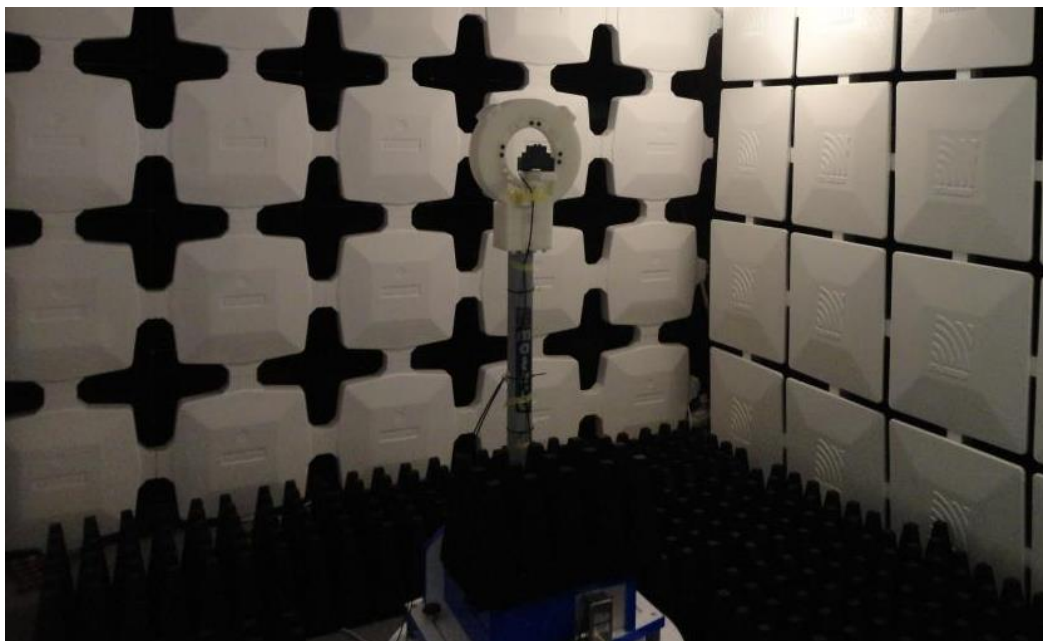


INT_25-84-3_00

Schneider Electric Industries SAS
L2A – Laboratoire Accrédité Angoulême
ZI n°3, Boulevard Salvador Allende
BP 660 – 16340 – L'ISLE D'ESPAGNAC – FRANCE
Tel. +33 (0)5 79 89 01 00

SV_07-Rapport d'essai INTERNE_EN ied12.docx - PRO_07-001_FR

Figure 1
Set up



INT_25-84-3_00

Schneider Electric Industries SAS
L2A – Laboratoire Accrédité Angoulême
ZI n°3, Boulevard Salvador Allende
BP 660 – 16340 – L'ISLE D'ESPAGNAC – FRANCE
Tel. +33 (0)5 79 89 01 00

SV_07-Rapport d'essai INTERNE_EN ied12.docx - PRO_07-001_FR

Life Is On

Schneider
Electric

2 Test Conditions

2

2.1 Test Configuration

This section outlines the overall test configuration and contextual conditions under which the test was conducted. It includes an overview of the test setup and all necessary connections, supported by figures, diagrams, and/or photographs. The objective is to document the precise circumstances that define the test environment and ensure reproducibility.

Note:

Connections includes, but not limited to :

- Electrical connections: power supply, grounding, signal input/output, shielding.
- Mechanical connections: mounting brackets, fasteners, vibration isolation systems.
- Data or communication interfaces: USB, Ethernet, CAN bus, RS-232, wireless modules.

All connections are made in accordance with the test method, manufacturer specifications, or Applicant/Customer requirements.

Measuring Radiation pattern and Antenna Gain of Zigbee channel

- Channel 19 : 2445 MHz (medium channel)

2.2 Test Equipment and Settings

The following table lists the equipment used during the test, along with their identification numbers, calibration or verification validity period and their settings (related to parameters controlled).

Where applicable, the Region of Interest [R.O.I.], the Lower Specification Limit (LSL) and Upper Specification Limit (USL) are also indicated.

The equipment settings are configured to ensure that measurements fall within the required assigned values range. These settings may include input values, multi-function and/or multi-range instruments, operating modes, or any other relevant test variables.

Note:

Equipment includes, but not limited to, measuring instruments, software, measurement standards, reference materials, reference data, reagents, consumables, or auxiliary apparatus.

[R.O.I.] Indicates the specific location, context, or component to which the assigned/setting value applies.

LSL and USL limits define the acceptable range of values for a given parameter and are established based on the applicable test method, standard, or Applicant/Customer requirements.

All functions and ranges used are calibrated without restriction use.

Where applicable, "Accredited Calibration" is understood to mean the test equipment identified are calibrated by a Calibration Laboratory that is accredited to ISO/IEC 17025 by an Accreditation Body.

Equipment			Assigned values			Tested values
ID	Designation - Parameters	Unit	Description [R.O.I.]	LSL	USL	Settings [R.O.I.]
05.00.01 Antennas caracterization, Gain and Radiation pattern						2025-11-17 - 2025-11-21
> Stage: Testing						2025-11-17 - 2025-11-21
0000810	Software BAT-EMC			2025-10-22	2027-10-22	2025-11-17 - 2025-11-21
0001311	Tape measure			2025-04-08	2026-04-08	2025-11-17 - 2025-11-21
9806484	Anechoic chamber			2021-12-07	2026-12-07	2025-11-17 - 2025-11-21
0000858	Signal & spectrum analyzer			2025-01-08	2030-01-08	2025-11-17 - 2025-11-21
0001407	MCU controller			2016-11-01		2025-11-17 - 2025-11-21

INT_25-84-3_00

Schneider Electric Industries SAS
L2A – Laboratoire Accrédité Angoulême
ZI n°3, Boulevard Salvador Allende
BP 660 – 16340 – L'ISLE D'ESPAGNAC – FRANCE
Tel. +33 (0)5 79 89 01 00

SV_07-Rapport d'essai INTERNE_EN ied12.docx - PRO_07-001_FR

2.3 Verifications and/or measurements checks

This section details the checks and/or measurements performed before, during, and after testing to ensure the validity and consistency of the test conditions and results.

The I.U.T. is systematically subjected to a visual and tactile inspection prior to testing.

Note:

This includes checking for visible damage, abnormal wear, loose components, or any irregularities that could affect the test outcome. Any observations are recorded and, if necessary, communicated to the Applicant/Customer before proceeding.

For this test, no verifications and/or measurements checks was required and/or performed by the laboratory.

2.4 Decision rule

In accordance with the requirements of the Applicant/Customer and/or the applicable documentation, no conformity statement is required. The results are therefore provided for information purposes only.

INT_25-84-3_00

Schneider Electric Industries SAS
L2A – Laboratoire Accrédité Angoulême
ZI n°3, Boulevard Salvador Allende
BP 660 – 16340 – L'ISLE D'ESPAGNAC – FRANCE
Tel. +33 (0)5 79 89 01 00

SV_07-Rapport d'essai INTERNE_EN ied12.docx - PRO_07-001_FR

Life Is On

Schneider
Electric

3 Reporting of results

3

3.1 Evaluation of measurement uncertainty

This subsection presents how the evaluation of measurement uncertainty associated with the test results is considered when applicable (in accordance with document IA_07-004).

At the Customer's request, the uncertainty associated with the result was not taken into account when declaring compliance.

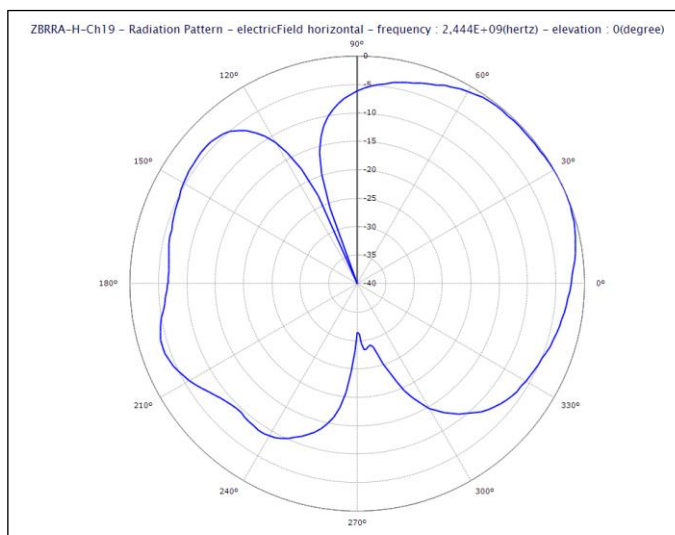
3.2 Test results

The results obtained during testing are presented here, including units, applicable tolerances, and any relevant contextual information.

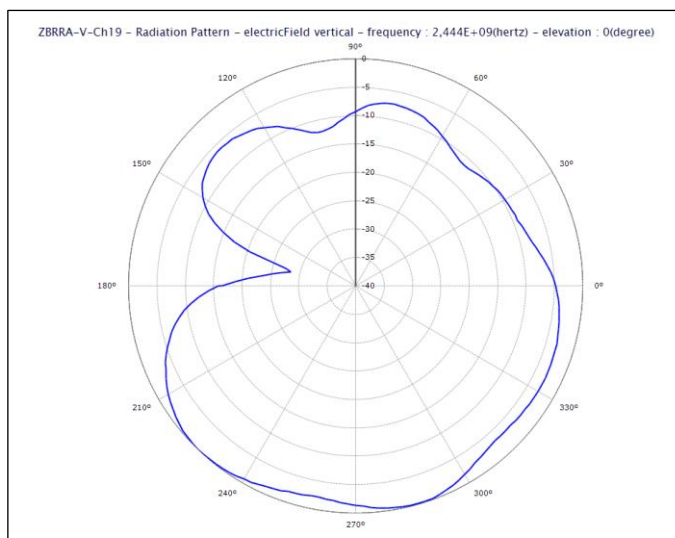
Note:

Where applicable, further details including pictures and charts can be found in the Annex / Appendices.

- Pattern radiation, Horizontal polarization



- Pattern radiation, Vertical polarization



INT_25-84-3_00

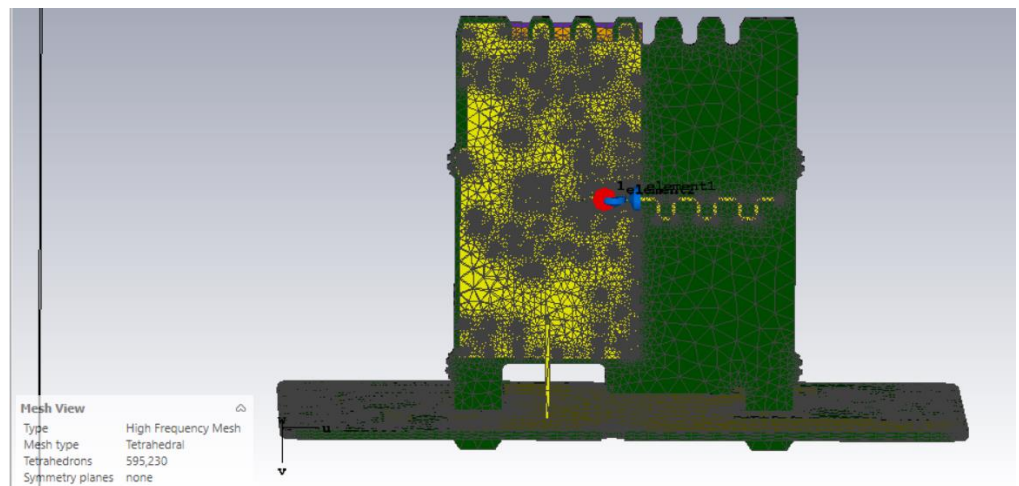
Schneider Electric Industries SAS
L2A – Laboratoire Accrédité Angoulême
ZI n°3, Boulevard Salvador Allende
BP 660 – 16340 – L'ISLE D'ESPAGNAC – FRANCE
Tel. +33 (0)5 79 89 01 00

SV_07-Rapport d'essai INTERNE_EN ied12.docx - PRO_07-001_FR

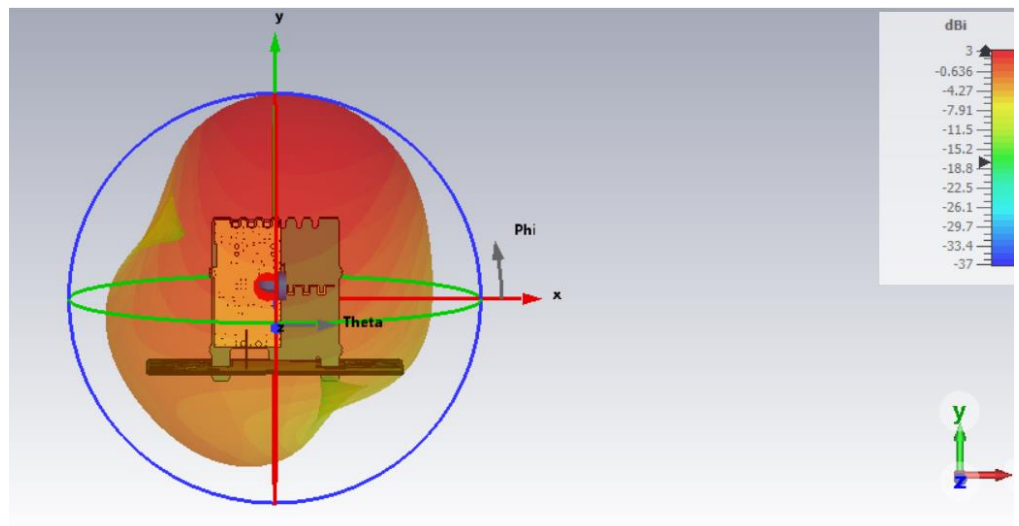
Channel	2445 MHz	Specification	Sanction
Gain, dBi	3	> 0	Compliant
3dB angular, degree	134	> 90	Compliant

- **Radiation Pattern simulation**

- Meshing using 3D simulator CST Studio
- Release Version 2025.04 - Apr 11 2025



- 3 D radiation pattern



3.3 Observations

No observation has been made by the laboratory in the context of this report.

INT_25-84-3_00

Schneider Electric Industries SAS
L2A – Laboratoire Accrédité Angoulême
ZI n°3, Boulevard Salvador Allende
BP 660 – 16340 – L'ISLE D'ESPAGNAC – FRANCE
Tel. +33 (0)5 79 89 01 00

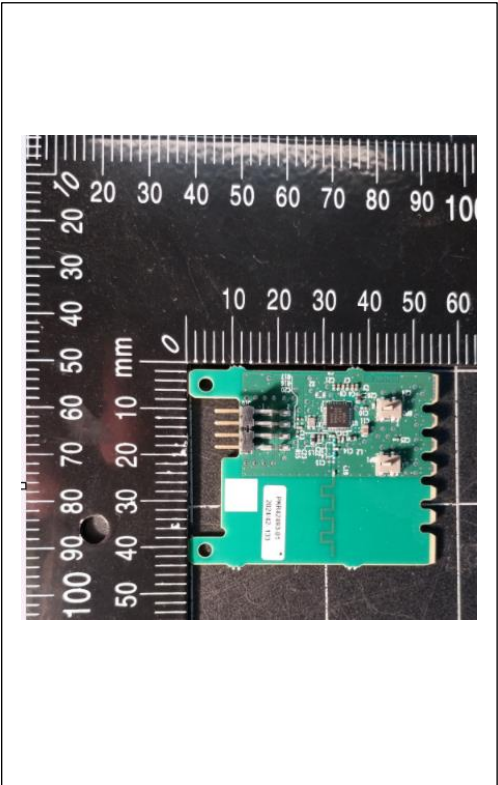
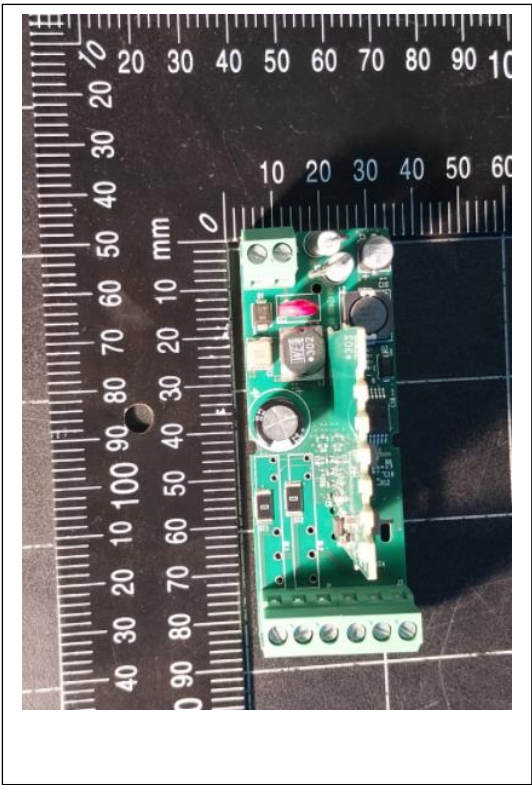
SV_07-Rapport d'essai INTERNE_EN ied12.docx - PRO_07-001_FR

4 Document

Control and Appendices

4.1 Annexes / Appendices

- EUT photo



4.2 Revision history

The revision history of this report is recorded here, including version numbers, dates, and a brief description of the changes.

Note:
Corrigendum and/or Amendment to this document are listed in the table below and are identified in the body of the report by a vertical line in the left margin next to the modified content.

Revision ID	Revision Date	Brief description of the changes
00	2025-11-26	Creation

- End of Report -

INT_25-84-3_00

Schneider Electric Industries SAS
L2A – Laboratoire Accrédité Angoulême
ZI n°3, Boulevard Salvador Allende
BP 660 – 16340 – L'ISLE D'ESPAGNAC – FRANCE
Tel. +33 (0)5 79 89 01 00

SV_07-Rapport d'essai INTERNE_EN ied12.docx - PRO_07-001_FR