FCC and ISED Test Report

Safran Electronics & Defense Beacon SAS ELT-DT, Model: KANNAD ULTIMA-DT-05

In accordance with FCC 47 CFR Part 15B and ICES-003

Prepared for: Safran Electronics & Defense Beacon SAS
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FCC ID: VIQ-ULTIMADT IC: 1159A-ULTIMADT

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Document 75958513-01 Issue 02

SIGNATURE			
A.J. Lawson			
NAME	**JOB TITLE**	**RESPONSIBLE FOR**	**ISSUE DATE**
Andrew Lawson	Chief Engineer, EMC	Authorised Signatory	29 June 2023

Signatures in this approval box have checked this document in line with the requirements of TÜV SÜD document control rules.

ENGINEERING STATEMENT

The measurements shown in this report were made in accordance with the procedures described on test pages. All reported testing was carried out on a sample equipment to demonstrate limited compliance FCC 47 CFR Part 15B and ICES-003. The sample tested was found to comply with the requirements defined in the applied rules.

RESPONSIBLE FOR	NAME	DATE	SIGNATURE
Testing	Callum Pennells	29 June 2023	C Pennells

EXECUTIVE SUMMARY

A sample of this product was tested and found to be compliant with FCC 47 CFR Part 15B and ICES-003: 2021 and Issue 7: 2020 for the tests detailed in section 1.3.

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Contents

1 Report Summary

1.1 Report Modification Record

Alterations and additions to this report will be issued to the holders of each copy in the form of a complete document.

Issue	Description of Change	Date of Issue
01	First Issue	21-June-2023
02	Second Issue to update IC ID number	29-June-2023

Table 1

1.2 Introduction

Applicant	Safran Electronics & Defense Beacon SAS
Manufacturer	Safran Electronics & Defense Beacon SAS
Model Number(s)	KANNAD ULTIMA-DT-05
Serial Number(s)	KA0000000048
Hardware Version(s)	S1855501
Software Version(s)	YLS1820A
Number of Samples Tested	1
Test Specification/Issue/Date	FCC 47 CFR Part 15B and ICES-003: 2021 and Issue 7: 2020
Order Number	55317
Date	02-May-2023
Date of Receipt of EUT	12-May-2023
Start of Test	15-May-2023
Finish of Test	15-May-2023
Name of Engineer(s)	Callum Pennells
Related Document(s)	ANSI C63.4: 2014

1.3 Brief Summary of Results

A brief summary of the tests carried out in accordance with FCC 47 CFR Part 15B and ICES-003 is shown below.

Section	Specification Clause	Test Description	Result	Comments/Base Standard
Configuration and Mode: Battery Powered - Idle (ARM) Mode				
2.1	15.109 and 3.2	Radiated Disturbance	Pass	ANSI C63.4: 2014

Table 2

1.4 Customer Supplied Form

MAIN EUT	
MANUFACTURING DESCRIPTION	EMERGENCY LOCATOR TRANSMITTER DISTRESS TRACKING (ELT-DT)
MANUFACTURER	SAFRAN ELECTRONICS & DEFENSE BEACONS SAS
MODEL	KANNAD ULTIMA-DT-05
PART NUMBER	S1865501-05
HARDWARE VERSION	S1865601-01
SOFTWARE VERSION	YLS1820A
PSU VOLTAGE/FREQUENCY/CURRENT	28 V DC
HIGHEST INTERNALLY GENERATED FREQUENCY	406 MHz
FCC ID (if applicable)	VIQ-ULTIMADT
INDUSTRY CANADA ID (if applicable)	1159A-ULTIMADT
TECHNICAL DESCRIPTION (a brief technical description of the intended use and operation)	Distress beacon with autonomous distress tracking functionality
COUNTRY OF ORIGIN	FRANCE
RF CHARACTERISTICS (if applicable)	
TRANSMITTER FREQUENCY OPERATING RANGE (MHz)	121.5 MHz, 406 MHz
RECEIVER FREQUENCY OPERATING RANGE (MHz)	1575.42 MHz
INTERMEDIATE FREQUENCIES	
EMISSION DESIGNATOR(S): https://fccid.io/Emissions-Designator/	16K0G1D (406 MHz) 3K20A3A (121.5 MHz)
MODULATION TYPES: (i.e. GMSK, QPSK)	BPSK (406 MHz) AM (121.5 MHz)
OUTPUT POWER (W or dBm)	21.5 dBm @ 121.5 MHz, 37 dBm @ 406 MHz
SEPARATE BATTERY/POWER SUPPLY (if applicable)	
MODULES (if applicable)	
ANCILLARIES (if applicable)	

Table 3

I hereby declare that the information supplied is correct and complete.

Name: Samuel Davenel
Position held: Project Manager
Date: 15 June 2023

1.5 Product Information

1.5.1 Technical Description

The equipment under test (EUT) was a Safran Electronics & Defense Beacon SAS crash survivable EMERGENCY LOCATING TRANSMITTER with DISTRESS TRACKING (ELT-DT) with built-in 406 MHz Cospas-Sarsat transmitter and 121.5 MHz Homer, Model: KANNAD ULTIMA-DT-05.

The EUT is designed for fixed wing aircraft to be autonomously activated prior to crash and to function in compliance with the ICAO GADSS autonomous distress tracking requirements for the location of an aircraft in distress.

1.5.2 EUT Port/Cable Identification

Port	Max Cable Length Specified	Usage	Type	Screened
19-pin socket	10 m	Connects the EUT to: - host 1 of the ARINC429 bus - 28V DC power - remote-control panel - horn or external buzzer	Power Supply and Data Communication	Yes
7-pin socket	10 m	Connects the EUT to: - host 2 of the ARINC429 bus	Data Communication	Yes
TNC Antenna socket	1.5 m	Connection to: - the external ELT-DT/GNSS antenna through a coaxial cable	Radio Frequency Coaxial Cable	Yes
DIN 12 socket	AIM dongle connected on port	Connection to: - the AIM - the ELT-DT ADT Inhibition Dongle (AID) - the ELT-DT Flight Test Dongle (FTD) - programming, diagnostic or maintenance equipment (PR600, ELT View)	Programmable Dongle	Yes

Table 4

1.5.3 Test Configuration

Configuration	Description
Battery Powered	The EUT was ready to be powered from its own internal battery and connected to an external 28 V DC Power Supply.

Table 5

1.5.4 Mode(s) of Operation

Mode	Description
Idle	The EUT position switch was in the armed position.

Table 6

1.6 Deviations from the Standard

No deviations from the applicable test standard were made during testing.

1.7 EUT Modification Record

The table below details modifications made to the EUT during the test programme.

The modifications incorporated during each test are recorded on the appropriate test pages.

Modification State	Description of Modification still fitted to EUT	Modification Fitted By	Date Modification Fitted
Model: KANNAD ULTIMA-DT-05, Serial Number: KA0000000048			
0	As supplied by the customer	Not Applicable	Not Applicable

Table 7

1.8 Test Location

TÜV SÜD conducted the following tests at our Octagon House Test Laboratory.

Test Name	Name of Engineer(s)	Accreditation
Configuration and Mode: Battery Powered - Idle (ARM) Mode		
Radiated Disturbance	Callum Pennells	UKAS

Table 8

Office Address:

TÜV SÜD, Octagon House,
Concorde Way,
Fareham,
Hampshire,
PO15 5RL,
United Kingdom

2 Test Details

2.1 Radiated Disturbance

2.1.1 Specification Reference

FCC 47 CFR Part 15B and ICES-003, Clause 15.109 and 3.2

2.1.2 Equipment Under Test and Modification State

KANNAD ULTIMA-DT-05, S/N: KA0000000048 - Modification State 0

2.1.3 Date of Test

15-May-2023

2.1.4 Test Method

The EUT was set up on a non-conductive table 0.8 m above a reference ground plane within a semi-anechoic chamber on a remotely controlled turntable.

A pre-scan of the EUT emissions profile using a peak detector was made at a 3 m antenna distance whilst varying the antenna-to-EUT azimuth and polarisation.

For an EUT which could reasonable be used in multiple planes, pre-scans were performed with the EUT orientated in X, Y and Z planes with reference to the ground plane.

Using a list of the highest emissions detected during the pre-scan along with their bearing and associated antenna polarisation, the EUT was then formally measured using a Quasi-Peak, Peak or CISPR Average detector as appropriate.

The readings were maximised by adjusting the antenna height, polarisation and turntable azimuth, in accordance with the specification.

2.1.5 Example Calculation

Below 1 GHz:

Quasi-Peak level (dBµV/m) = Receiver level (dBµV) + Correction Factor (dB/m)
Margin (dB) = Quasi-Peak level (dBµV/m) - Limit (dBµV/m)

Above 1 GHz:

CISPR Average level (dBµV/m) = Receiver level (dBµV) + Correction Factor (dB/m)
Margin (dB) = CISPR Average level (dBµV/m) - Limit (dBµV/m)

Peak level (dBµV/m) = Receiver level (dBµV) + Correction Factor (dB/m)
Margin (dB) = Peak level (dBµV/m) - Limit (dBµV/m)

2.1.6 Example Test Setup Diagram

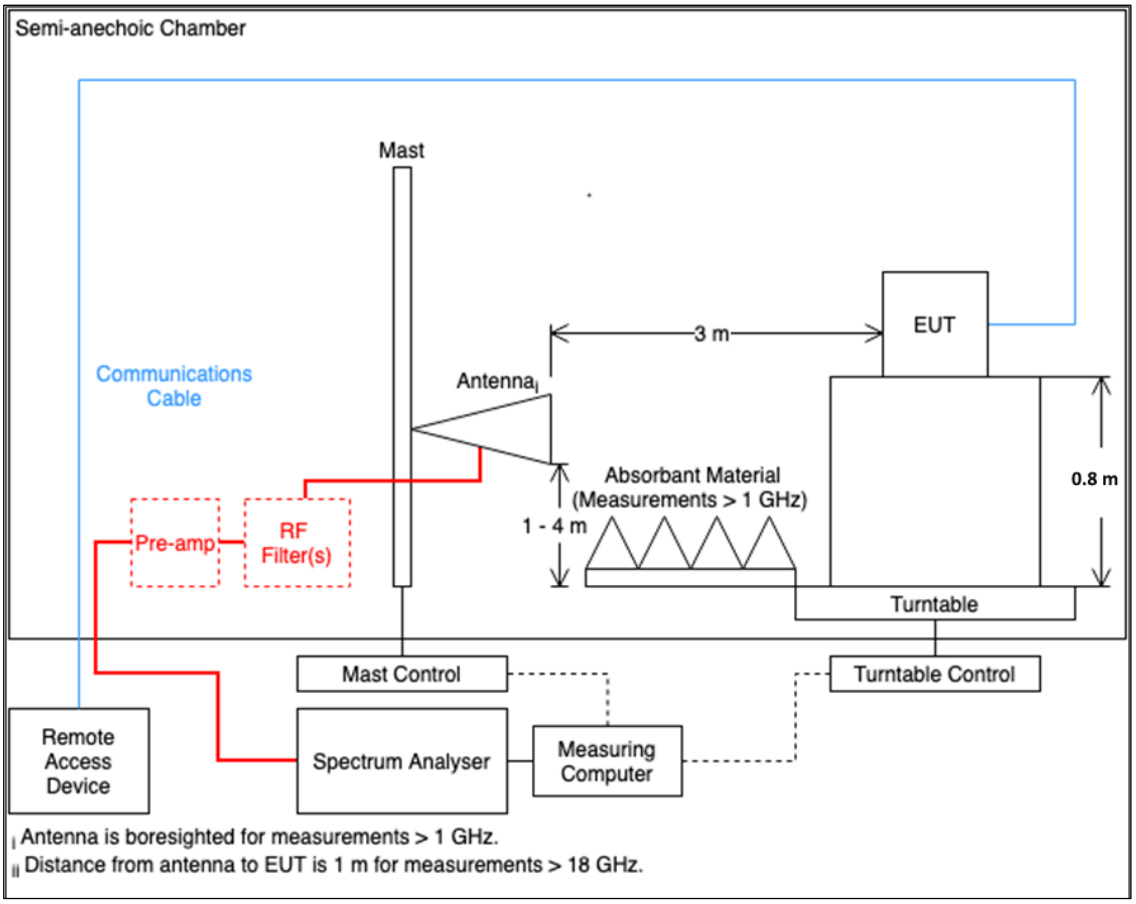

Figure 1 - Radiated Disturbance Example Test Setup

2.1.7 Environmental Conditions

Ambient Temperature	20.9 °C
Relative Humidity	45.0 %
Atmospheric Pressure	1018.2 mbar

2.1.8 Specification Limits

Required Specification Limits, Field Strength - Class A Test Limit at a 10 m Measurement Distance		
Frequency Range (MHz)	Test Limit (µV/m)	Test Limit (dBµV/m)
30 to 88	90	39.1
88 to 216	150	43.5
216 to 960	210	46.4
Above 960	300	49.5
Supplementary information: Note 1. A Quasi-Peak detector is to be used for measurements below 1 GHz. Note 2. A CISPR Average detector is to be used for measurements above 1 GHz. Note 3. The Peak test limit above 1 GHz is 20 dB higher than the CISPR Average test limit.		

Table 9

2.1.9 Test Results

Results for Configuration and Mode: Battery Powered - Idle (ARM) Mode.

This test was performed to the requirements of the Class A limits.

Performance assessment of the EUT made during this test: Pass.

Detailed results are shown below.

Highest frequency generated or used within the EUT: 406.031 MHz
Which necessitates an upper frequency test limit of: 2 GHz

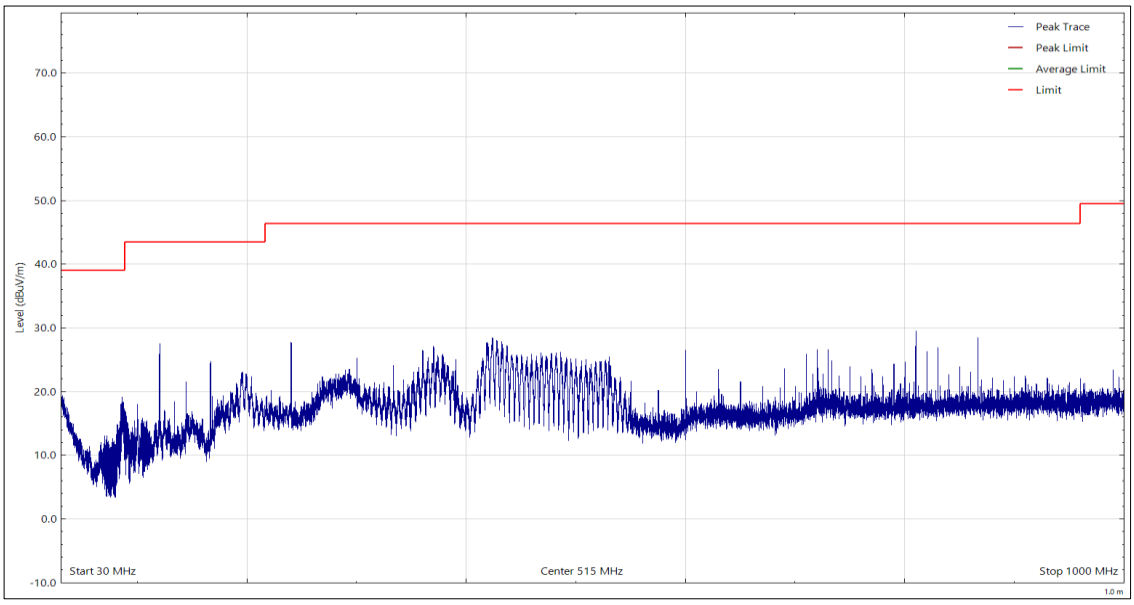

Figure 2 - 30 MHz to 1 GHz, Quasi-Peak, Horizontal

Frequency (MHz)	Level (dBµV/m)	Limit (dBµV/m)	Margin (dB)	Detector	Angle (°)	Height (cm)	Polarisation
*							

Table 10

*No final measurements were made as all other peak emissions seen above the measurement system noise floor during the pre-scan were greater than 10 dB below the test limit.

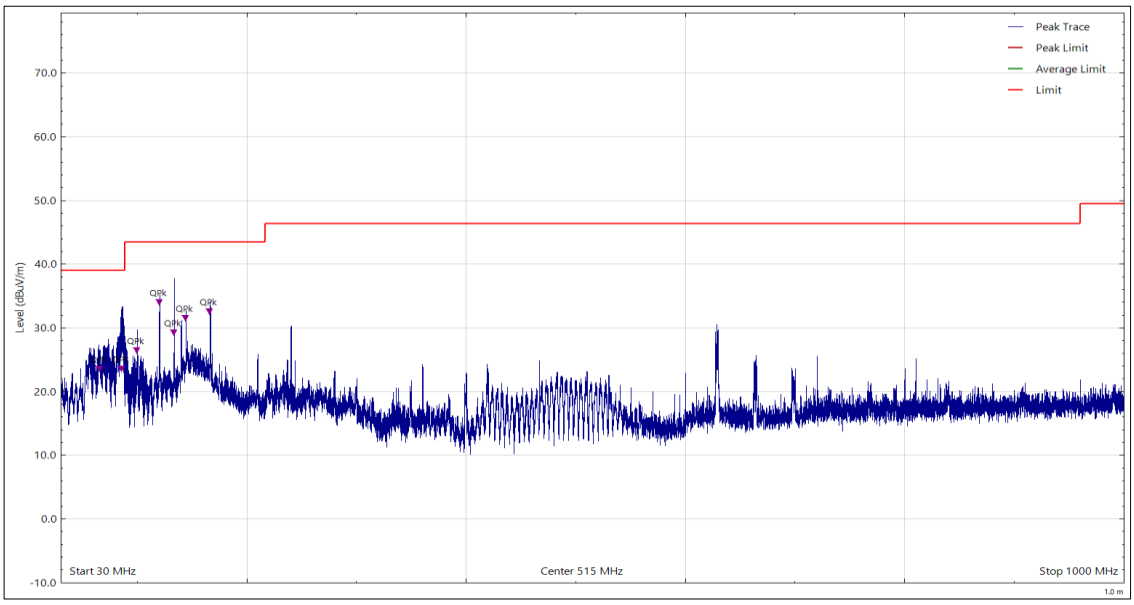

Figure 3 - 30 MHz to 1 GHz, Quasi-Peak, Vertical

Frequency (MHz)	Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Detector	Angle (°)	Height (cm)	Polarisation
65.507	32.87	39.10	-6.23	Q-Peak	54	100	Vertical
85.206	32.81	39.10	-6.29	Q-Peak	1	100	Vertical
99.576	35.80	43.50	-7.70	Q-Peak	87	102	Vertical
119.991	43.34	43.50	-0.16	Q-Peak	177	102	Vertical
133.407	38.51	43.50	-4.99	Q-Peak	9	100	Vertical
144.005	40.81	43.50	-2.69	Q-Peak	18	101	Vertical
165.980	41.87	43.50	-1.63	Q-Peak	126	100	Vertical

Table 11

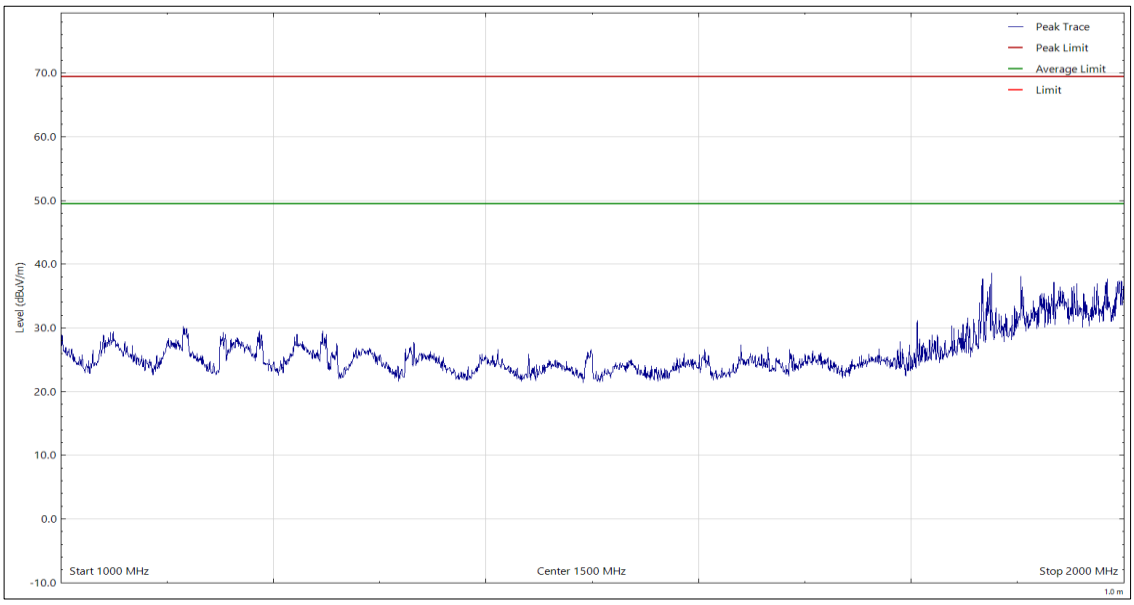

Figure 4 - 1 GHz to 2 GHz, Peak and CISPR Average, Horizontal

Frequency (MHz)	Level (dBµV/m)	Limit (dBµV/m)	Margin (dB)	Detector	Angle (°)	Height (cm)	Polarisation
*							

Table 12

*No final measurements were made as all other peak emissions seen above the measurement system noise floor during the pre-scan were greater than 10 dB below the test limit.

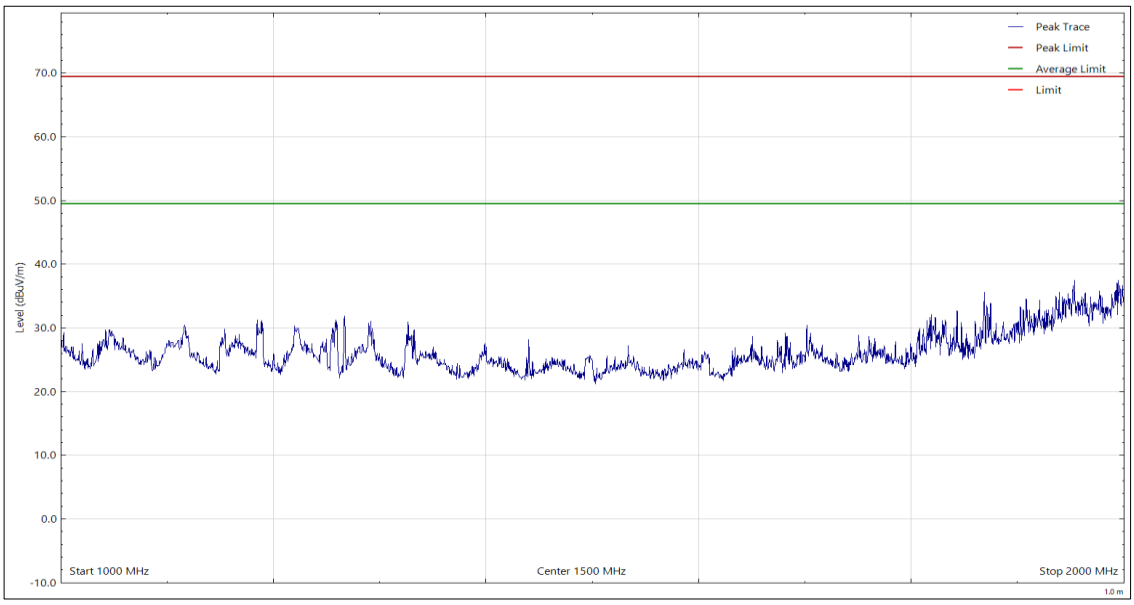

Figure 5 - 1 GHz to 2 GHz, Peak and CISPR Average, Vertical

Frequency (MHz)	Level (dBµV/m)	Limit (dBµV/m)	Margin (dB)	Detector	Angle (°)	Height (cm)	Polarisation
*							

Table 13

*No final measurements were made as all other peak emissions seen above the measurement system noise floor during the pre-scan were greater than 10 dB below the test limit.

Figure 6 - Test Setup - 30 MHz to 1 GHz

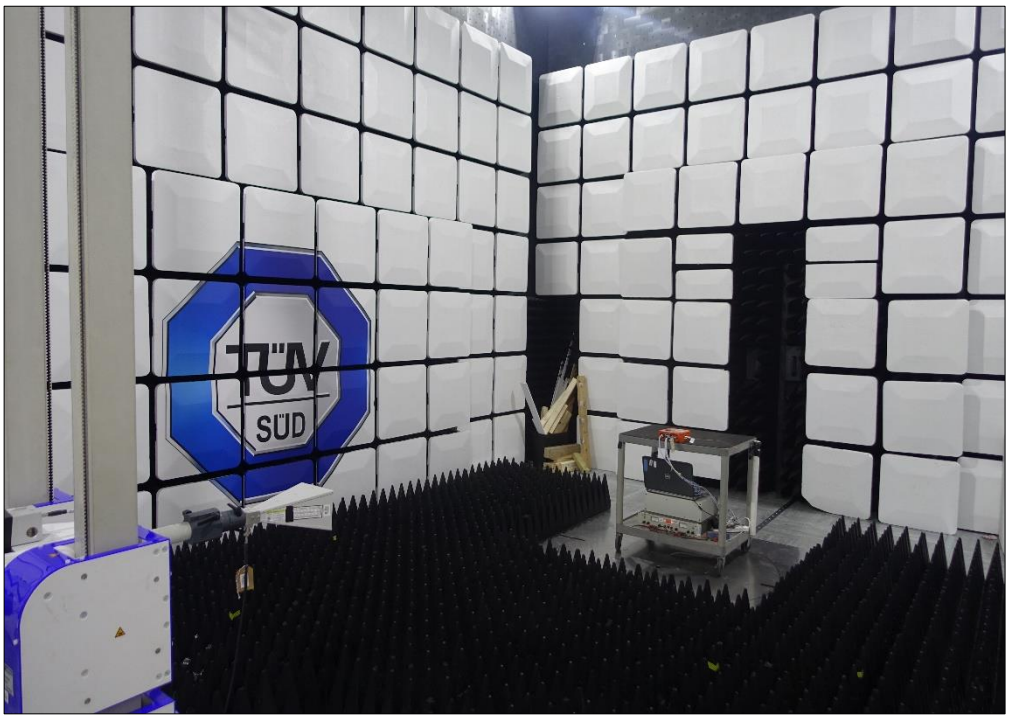

Figure 7 - Test Setup - 1 GHz to 2 GHz

2.1.10 Test Location and Test Equipment Used

This test was carried out in EMC Chamber 12.

Instrument	Manufacturer	Type No.	TE No.	Calibration Period (months)	Calibration Expiry Date
Screened Room (12)	MVG	EMC-3	5621	36	11-Aug-2023
Emissions Software	TUV SUD	EmX V3.1.11	5125	-	N/A Software
Test Receiver	Rohde & Schwarz	ESU40	3506	12	30-Mar-2024
Turntable & Mast Controller	Maturo Gmbh	NCD/498/2799.01	5612	-	TU
Tilt Antenna Mast	Maturo Gmbh	TAM 4.0-P	5613	-	TU
Cable (SMA to N-Type, 2 m)	Junkosha	MWX241/B	5817	6	04-Aug-2023
Cable (N to N 8m)	Junkosha	MWX221-08000NMSNMS/B	6321	12	04-Feb-2024
Cable (K-Type to K-Type, 2 m)	Junkosha	MWX241-02000KMSKMS/A	5524	12	24-Oct-2023
Pre-Amplifier (1 GHz to 18 GHz)	Schwarzbeck	BBV 9718 C	5350	12	20-Oct-2023
Antenna (Bilog with attenuator, 30 MHz to 3 GHz)	Schaffner	CBL6143	287	24	02-Dec-2024
Antenna (DRG, 1 GHz to 10.5 GHz)	Schwarzbeck	BBHA9120B	5611	12	16-Oct-2023

Table 14

TU – Traceability Unscheduled

3 Test Equipment Information

3.1 General Test Equipment Used

Instrument	Manufacturer	Type No	TE No	Calibration Period (months)	Calibration Expires
Thermo-Hygro-Barometer	PCE Instruments	PCE-THB-40	5472	12	20-Apr-2024

Table 15

4 Incident Reports

No incidents reports were raised.

5 Measurement Uncertainty

For a 95% confidence level, the measurement uncertainties for defined systems are:

Test Name	Measurement Uncertainty
Conducted Disturbance at Mains Terminals	150 kHz to 30 MHz, LISN, ±3.7 dB
Radiated Disturbance	30 MHz to 1 GHz, Bilog Antenna, ±5.2 dB 1 GHz to 40 GHz, Horn Antenna, ±6.3 dB

Table 16

Worst case error for both Time and Frequency measurement 12 parts in 10^6.

Measurement Uncertainty Decision Rule

Determination of conformity with the specification limits is based on the decision rule according to IEC Guide 115:2021, Clause 4.4.3 (Procedure 2). The measurement results are directly compared with the test limit to determine conformance with the requirements of the standard.

Risk: The uncertainty of measurement about the measured result is negligible with regard to the final pass/fail decision. The measurement result can be directly compared with the test limit to determine conformance with the requirement (compare IEC Guide 115). The level of risk to falsely accept and falsely reject items is further described in ILAC-G8.