

RF-EXPOSURE REPORT FCC 47 CFR Part 2.1091 Maximum permissible exposure	
Report Reference No	G0M-2405-2572-TFC091MP01-V01
Testing Laboratory	Eurofins Product Service GmbH
Address	Storkower Str. 38c 15526 Reichenwalde Germany
Accreditation	 A2LA Accredited Testing Laboratory, Certificate No.: 1983.01 FCC Test Firm Designation Number: DE0008 ISED Testing Laboratory site: 3470A
Applicant	Fabmatics GmbH
Address	Zur Steinhöhe 1 01099 Dresden GERMANY
Test Specification	According to FCC rules
Standard	FCC 47 CFR 2.1091
Non-Standard Test Method	None
Equipment under Test (EUT):	
Product Description	RFID Reader
Model(s)	HF-1356-CAN-M-V3.0
Additional Model(s)	None
Brand Name(s)	None
Hardware Version(s)	V3.0
Software Version(s)	V2.0.2
FCC-ID	YTV-HF1356CAN3
Test Result	PASSED

Possible test case verdicts:		
required by standard but not tested	N/T	
not required by standard	N/R	
test object does meet the requirement	P(PASS)	
test object does not meet the requirement	F(FAIL)	
Testing:		
Test Lab Temperature	20 °C - 30 °C	
Test Lab Humidity	25 % - 55 %	
Date of performance	2025-05-13	
Date of receipt of test item	See test sample identification table on page 7	
Report:		
Compiled by	Azamat Ibraimov	
Tested by (+ signature) (Responsible for Test)	Azamat Ibraimov	
Approved by (+ signature) (Senior Radio Expert)	Radwan Jaafar	
Date of Issue	2025-06-03	
Total number of pages	17	
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. The above equipment has been tested by Eurofins Product Service GmbH, and found compliance with the requirements of the above standards. The test record, data evaluation & Equipment Under Test (EUT) configurations represented herein are true and accurate accounts of the measurements of the sample's RF characteristics under the conditions specified in this report. Compliance of electromagnetic emission from electronic and electrical equipment with the basic restrictions usually is determined by measurements and, in some cases, calculation of the exposure level. If the electrical power used by or radiated by the equipment is sufficiently low, the electromagnetic fields emitted will be incapable of producing exposures that exceed the basic restrictions. Any relevant compliance assessment procedure which is consistent with the state of the art, reproducible and gives valid results can be used.		

For transmitters intended for use with more than one antenna configuration option, the combination of transmitter and antenna(s) which generates the highest available antenna power and/or average total radiated power shall be assessed.

Additional Comments:

None

VERSION HISTORY

Version History			
Version	Issue Date	Remarks	Revised By
01	2025-06-03	Initial Release	--

ABBREVIATIONS AND ACRONYMS

Acronyms	
Acronym	Description
EIRP	Equivalent Isotropic Radiated Power
EUT	Equipment Under Test
MPE	Maximum Permissible Exposure

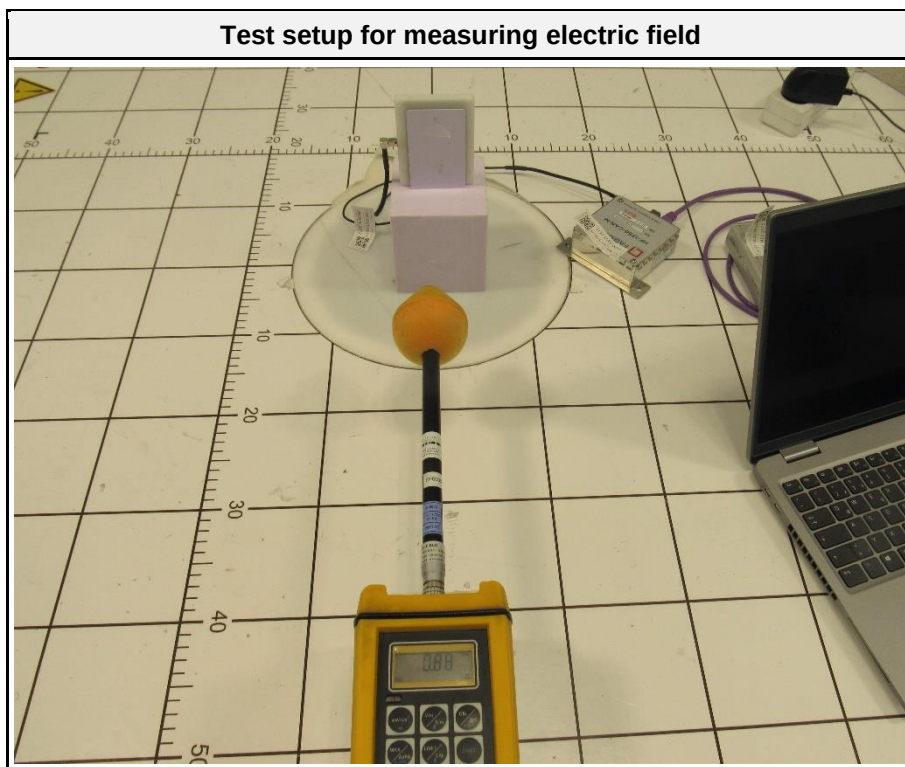
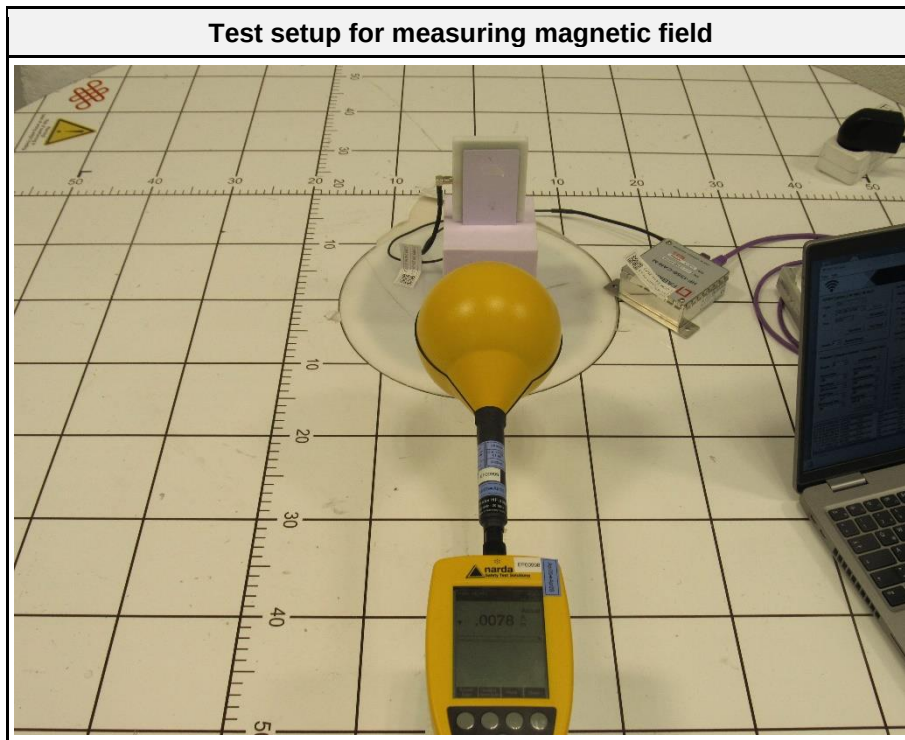
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1 Equipment (Test Item) Under Test

Description	RFID Reader			
Model	HF-1356-CAN-M-V3.0			
Additional Model(s)	None			
Brand Name(s)	None			
Sample Identification	EUT #	Sample-ID	Serial Number	Date of receipt
	EUT 1	See reference documents	See reference documents	See reference documents
Hardware Version(s)	V3.0			
Software Version(s)	V2.0.2			
FCC ID	YTV-HF1356CAN3			
Equipment type	End Product			
Number of antenna ports	1			
Number of radios	1			
Antenna	Type	External inductive loop coil		
	Model	RFID-ANT-HF-SQU-9673-SMA-V1.0		
	Manufacturer	Fabmatics GmbH		
	Gain	Unspecified		
Supply Voltage	V _{NOM}	24 V DC via external AC/DC adaptor		
Dedicated AC/DC-Adaptor	Model	SYS1308-2424-W2E		
	Vendor	Sunny technologies s.r.o.		
	Input	100-240V		
	Output	24V		
Environment	General public			

1.1 Photos – Setup



1.2 Reference Documents

Document Type	Document No.	Issued by	Date
Test Report	G0M-2405-2572-TFC225RI01-V01	Eurofins Product Service GmbH	2025-06-03

1.3 Power density radiation sources

None

1.4 Field strength radiation sources

Mode	Operating Frequency [MHz]	Maximum electric field strength [V/m]	Maximum magnetic field strength [A/m]	Measurement distance [m]
RFID 13.56 MHz	13.56	1.26	0.0207	0.2
Comment: --				

1.5 Concurrent Sources

No concurrent radiation sources

2 Result Summary

FCC MPE Evaluation - Single radiation sources					
Product Standard Reference	Requirement	Reference Method	Mode	Distance [m]	Verdict
47 CFR 2.1091	Maximum permissible exposure	FCC KDB 447498	RFID 13.56 MHz	0.20	PASS
Comment: --					

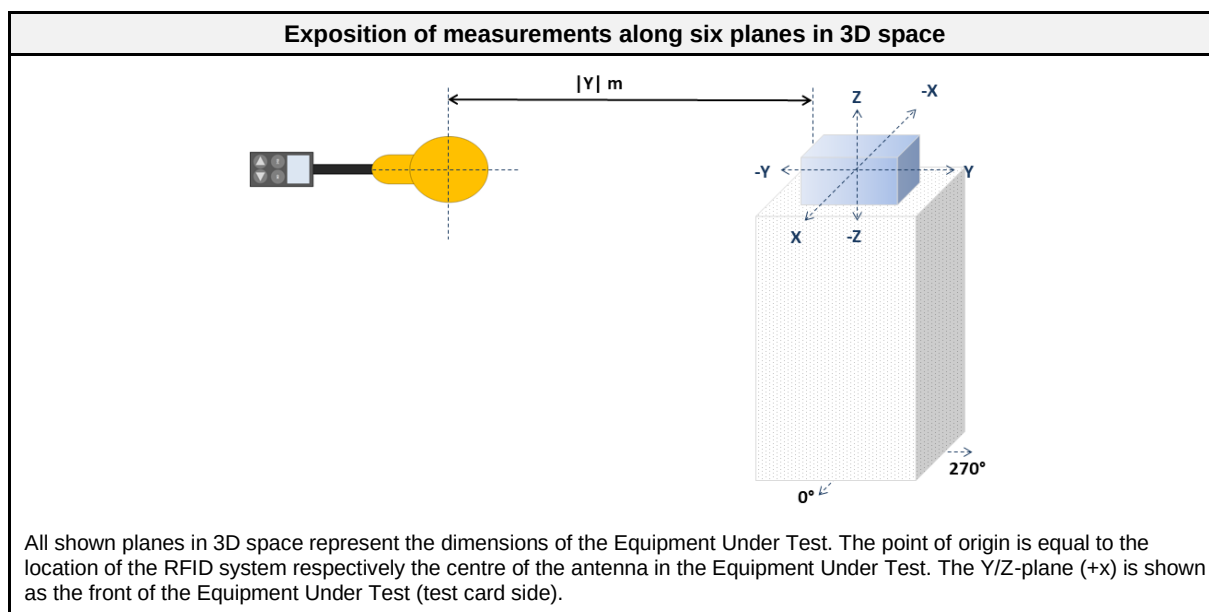
3 Radiated Field Measurement

3.1 Test Conditions and Results – Electric and magnetic field strength

3.1.1 Information

Test Information	
Measurement Method	Radiated only
Measurement Uncertainty	2.277 dB
Operator	Azamat Ibraimov
Date	2025-05-13

3.1.2 Setup



3.1.3 Equipment

Test Equipment					
Description	Manufacturer	Model	Identifier	Cal. Date	Cal. Due
Anechoic chamber	Frankonia	AC2	EF01616	2025-02	2026-02
Broadband Field Meter NBM-550	Narda Safety Test Solutions	2401/01B	EF00998	2025-02	2028-02
Magnetic field probe HF3061	Narda Safety Test Solutions	2402/05B	EF00999	2025-02	2028-02
EM Radiation Monitor	Narda Safety Test Solutions	EMR-20	EF00058	2024-01	2026-01

3.1.4 Procedure

Test Procedure
1. EUT transmitter is activated in test mode under normal conditions. 2. The perimeter of the EUT is scanned with an electric and magnetic field probe at a fixed distance. 3. The electric and magnetic field strength is measured. 4. The maximum field strength values are recorded.

3.1.5 Results

Test Results			
Measurement position	Distance x or y or z [m]	Max. electric field strength [V/m]	Max. magnetic field strength [A/m]
Y/Z plane +x	0.2	1.26	0.0207
Y/Z plane -x	0.2	0.89	0.0192
X/Z plane +y	0.2	0.56	0.0069
X/Z plane -y	0.2	0.42	0.0090
X/Y plane +z	0.2	0.62	0.0102
X/Y plane -z	0.2	0.78	0.0089

4 RF-Exposure classification

RF-Exposure Categories	
Fixed	A fixed device is defined as a device physically secured at one fixed location and cannot be easily re-located.
Mobile	A mobile device is defined as a transmitting device designed to be used in other than fixed locations and to generally be used in such a way that a separation distance of at least 20 centimeters is normally maintained between the transmitter's radiating structure(s) and the body of the user or nearby persons.
Portable	A portable device is defined as a transmitting device designed to be used so that the radiating structure(s) of the device is/are within 20 centimeters of the body of the user.

RF-Exposure Categories	
Occupational / Controlled	Limits apply in situations in which persons are exposed as a consequence of their employment provided those persons are fully aware of the potential for exposure and can exercise control over their exposure. Limits for occupational/controlled exposure also apply in situations when an individual is transient through a location where occupational/controlled limits apply provided he or she is made aware of the potential for exposure.
General population / Uncontrolled	Exposures apply in situations in which the general public may be exposed, or in which persons that are exposed as a consequence of their employment may not be fully aware of the potential for exposure or cannot exercise control over their exposure.

5 RF-Exposure limits

FCC Limits – General Population / Uncontrolled Exposure				
Frequency range [MHz]	Electric field strength [V/M]	Magnetic field strength [A/M]	Power density [W/m ²]	Averaging time [min]
0.3 – 1.34	614	1.63	1000	30
1.34 – 30	824/f	2.19/f	1800/f ²	30
30 – 300	27.5	0.073	2	30
300 – 1500	-	-	f/150	30
1500 – 100000	-	-	10.0	30

FCC Limits – Occupational / Controlled Exposure				
Frequency range [MHz]	Electric field strength [V/M]	Magnetic field strength [A/M]	Power density [W/m ²]	Averaging time [min]
0.3 – 3.0	614	1.63	1000	6
3.0 – 30	1842/f	4.89/f	9000/f ²	6
30 – 300	61.4	0.163	10.0	6
300 – 1500	-	-	f/30	6
1500 – 100000	-	-	50	6

6 RF-Exposure Evaluation

Evaluation Relations
$\lambda[m] = \frac{c \left[\frac{m}{s} \right]}{f[Hz]} ; R_{FF}[m] \geq \frac{2 \cdot D[m]^2}{\lambda[m]}$ $S[W/m^2] = \frac{P_{E.I.R.P.}[W]}{4\pi R[m]^2} ; R[m] = \sqrt{\frac{P_{E.I.R.P.}[W]}{4\pi S[W/m^2]}}$ $DCC [dB] = 10 \cdot \log_{10} \left(\frac{DC[\%]}{100} \right)$ $\sum_{i=1}^N \frac{S_i \left[\frac{W}{m^2} \right]}{S_{Li} \left[\frac{W}{m^2} \right]} + \sum_{j=1}^M \left(\frac{E_j \left[\frac{V}{m} \right]}{E_{Lj} \left[\frac{V}{m} \right]} \right)^2 + \sum_{k=1}^O \left(\frac{H_k \left[\frac{A}{m} \right]}{H_{Lk} \left[\frac{A}{m} \right]} \right)^2 < 1$

Evaluation Procedure
<u>Standalone operation evaluation:</u> For each radio and frequency band the worst case transmission mode with the highest peak conducted or radiated power is evaluated at the frequency that results in the most restrictive rf-exposure limit. From the peak power values, antenna gains and duty cycles taken from the reference documents, the source average radiated power values are calculated. From the average radiated power the power densities at antenna far-field distance is calculated. The distance from the radiation source for compliance power density is calculated. If the separation distance is lower than the far-field distance, the far-field distance is given as compliance separation distance because the plane wave power density assessment is only valid in the far-field of the radiation source. For radiation sources for which the average electric and magnetic fields are measured using field probes, the measured field strength values are compared to the reference limits. For those sources no calculations are performed. Compliance with the reference values is determined with the near field measurements. <u>Concurrent operation evaluation:</u> First the evaluation distance is set to an appropriate value. For all radiation sources for which power densities are calculated, the power densities at the evaluation distance are calculated and for all other sources the electric or magnetic field strengths are measured using field probes. Finally the ratios of the power densities and/or field strength values and the corresponding limits are calculated and summed and the sum is compared to the maximum of 1.

7 Single Source Evaluation Results - FCC

RFID 13.56 MHz	
Evaluation distance [m]	0.20
Transmission Mode	
Transmission Frequency (f) [MHz]	13.56
Electric field strength	
Compliance field strength limit [V/m]	60.77
Measured field strength [V/m]	1.26
Squared field strength ratio	0.00
Magnetic field strength	
Compliance field strength limit [A/m]	0.16
Measured field strength [A/m]	0.02
Squared field strength ratio	0.02
Compliance	
Verdict	PASS
Comment: --	

=== End of test report ===