

RF-EXPOSURE REPORT FCC 47 CFR Part 2.1091 Maximum permissible exposure	
Report Reference No	G0M-2605-3688-TFC091MP01-V01
Testing Laboratory	Eurofins Product Service GmbH
Address	Storkower Str. 38c 15526 Reichenwalde Germany
Accreditation	  DAkkS - Deutsche Akkreditierungsstelle D-PL-12092-01-00 DAkkS - Registration number : D-PL-12092-01-00 FCC Filed Test Laboratory, Reg.-No.: 96970
Applicant	deZem GmbH
Address	Wilmsdorfer Straße 60 10627 Berlin GERMANY
Test Specification	According to FCC rules
Standard	FCC 47 CFR 2.1091
Non-Standard Test Method	None
Equipment under Test (EUT):	
Product Description	Self-powered LoRaWAN IoT sensor with four inputs for versatile monitoring in electrical supply networks
Model(s)	Harvy2
Brand Name(s)	Harvy2
Hardware Version(s)	1.0 D
Software Version(s)	1.4.0
FCC ID	2BUTG-HARVY2A
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	2026-06-22	
Date of receipt of test item	See test sample identification table on page 7	
Report:		
Compiled by	Md Abu Bakar Siddique	
Tested by (+ signature) (Responsible for Test)	Md Abu Bakar Siddique	
Approved by (+ signature) (Test Lab Engineer)	Radwan Jaafar	
Date of Issue	2026-09-23	
Total number of pages	16	
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:

RF-Exposure calculation is based on measurement results from reference documents.

VERSION HISTORY

Version History			
Version	Issue Date	Remarks	Revised By
01	2026-09-23	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	Self-powered LoRaWAN IoT sensor with four inputs for versatile monitoring in electrical supply networks			
Model	Harvy2			
Brand Name(s)	Harvy2			
Sample Identification	EUT #	Sample-ID	Serial Number	Date of receipt
	EUT 1	See reference documents	See reference documents	See reference documents
Hardware Version(s)	1.0 D			
Software Version(s)	1.4.0			
FCC ID	2BUTG-HARVY2A			
Equipment type	End Product			
Number of antenna ports	1			
Number of radios	1			
Radio Module	Type	LoRaWAN module		
	Model	Harvy2		
	Manufacturer	deZem GmbH		
	HW Version	1.0D		
	SW Version	Test 1.0		
	FCC-ID	Not Specified		
	IC	Not Specified		
Antenna	Type	External antenna		
	Model	Delta 22B		
	Manufacturer	Siretta		
	Gain	5.22 dBi (antenna datasheet)		
Supply Voltage	V _{NOM}	12 V AC via inductive coupling directly from an AC power line.		
Dedicated AC/DC-Adaptor	None			
Environment	General public			

1.1 Photos – Equipment External

Please refer to the following document for photos „G0M-2605-3688-EUTPhotos“

1.2 Photos – Equipment Internal

Please refer to the following document for photos „G0M-2605-3688-EUTPhotos“

1.3 Reference Documents

Document Type	Document No.	Issued by	Date
Test Report	G0M-2605-3688-TFC247DT01-V01	Eurofins Product Service GmbH	2026-09-23

1.4 Power density radiation sources

Mode	Operating Frequency [MHz]	Maximum conducted power [dBm]	Maximum radiated power [dBm EIRP]	Maximum duty cycle [%]	Tune-up tolerance [dB]	Maximum antenna gain [dBi]	Maximum antenna diameter [cm]
SRD 915 MHz	903	2.051	7.271	100	2.0	5.22	11.7
Comment: All conducted and radiated power values in this and all further tables are adjusted by given tune-up tolerance. The higher value of conducted and radiated power is chosen for evaluation.							

1.5 Field strength radiation sources

None

1.6 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	SRD 915 MHz	0.20	PASS
Comment: --					

3 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.

4 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

5 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.

6 Single Source Evaluation Results - FCC

SRD 915 MHz	
Transmission Mode	
Transmission Frequency (f) [MHz]	903
Antenna far-field distance	
Maximum antenna diameter (D) [m]	0.12
Transmission wavelength (λ) [m]	0.33
Antenna far-field distance (R_{FF}) [m]	0.08
Source average power	
Peak radiated power (PR) [dBm EIRP]	7.271
Maximum transmission duty cycle (DC)	1.00
Duty cycle correction (DCC) [dB]	0.00
Average radiated power (PRAVG) [dBm EIRP]	7.27
Power density	
Compliance power density limit [W/m ²]	6.020
Power density (S) @ Antenna far-field distance [W/m ²]	0.063
Power density (S) @ 0.20 m [W/m ²]	0.011
Power density ratio @ 0.20 m	0.00
Distance for compliance power density (S=SL) [m]	0.008
Compliance	
Verdict	PASS
Comment: --	

=== End of test report ===