Maximum Permissible Exposure

RS500
Relay Sensor

FCC ID: NCM-RS500
IC: 2734A-RS500

Test Report Reference: MDE_OPTION_2009_MPEd

To whom it may concern,

please find our Maximum Permissible Exposure calculations for LoRa Sensor.

Best Regards

i.A.

Abdellah Ahakki

Administrative Data:

Testing Laboratory

Company Name: 7layers GmbH

Address: Borsigstr. 11
                               40880 Ratingen
                               Germany

Project Data

Responsible for report: Mr. Abdellah Ahakki

Date of Report: 2021-07-01

Testing Period: 2021-05-27 to 2021-06-29

Applicant Data

Company Name: Option (Crescent NV)

Address: Gaston Geenslaan 14
                               3001 Leuven
                               Belgium

Contact Person: Jasna Papuga

Manufacturer Data

Company Name: please see Applicant data

Address: -
                               -
                               -

Contact Person: -

Test object Data

General Description of Radio Device

Kind of Device product description	LoRa Relay Sensor
Product name	Relay Sensor
Type	RS500
Declared EUT data by the supplier	
Voltage Type	DC
Voltage Level	5 V
Antenna / Gain	Integral / -2 dBi
Tested Modulation Type	FSK
General product description	The EUT is a Relay sensor with LoRa technology
Specific product description for the EUT	The EUT is a LoRaWAN transceiver in the 900 MHz band. Relevant for this report is the 125 kHz hopping mode which is implemented as FHSS for link setup and as hybrid with 8 channels during established communication.
EUT ports (connected cables during testing):	Enclosure Switch port (2x) unshielded two wire cable Sensor port (2x) unshielded two wire cable DC port unshielded two wire
Tested datarates	Data rate settings LS5 to 12 are supported by the test software, the worst case of the modes was tested for each test case (worst case determination was performed with LoRa Sensor WT500 that according to the applicant uses the same transmitter hardware).
Special software used for testing	The local TX test modes were set using "LoraNode" software provided by applicant (non-hopping mode tests). Tera Term was used to send commands for hopping mode tests. Tera Term together with Macros and prepared templates in the Option CloudGate LORA gateway, which were provided by the applicant, were used for dwell time tests.

According to the RSS-102, issue 5 Standard and to FCC §15.247(b)(4) and §1.1307(b)(1), systems operation under the provisions of this section shall be operated in a manner that ensures that the public is not exposed to radio frequency energy level in excess of the Commission's guidelines.

MPE Prediction

Frequency range (MHz)	Power density (mW/cm²)
400 – 1500	f/1500
1500 - 100000	1 mW/cm²

Equation for calculation

$$S = P*G / (4\pi R^2)$$

Where: S – Power density
P – Power input to antenna
G – Antenna gain relative to isotropic radiator
R – Distance to antenna

Maximum peak output power at antenna terminal: 20.2 dBm (104.71 mW)
Antenna gain: -2 dBi
Prediction distance: 20cm
MPE limit for General Population/Uncontrolled Exposure: 1 mW/cm²

Calculation's results:

Power density at 20cm distance: **0.0131 mW/cm²**