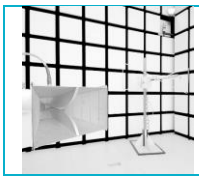
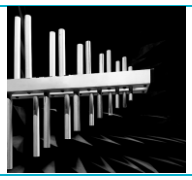
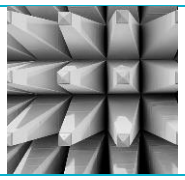

CTC advanced
member of RWTÜV group

Bundesnetzagentur

BNetzA-CAB-02/21-102

DAkkS Deutsche Akkreditierungsstelle D-PL-12076-01-03

Maximum Permissible Exposure (MPE) & Exposure evaluation

Report identification number: 1-6484/18-01-05 MPE (FCC_ISED)

Certification numbers and labeling requirements	
FCC ID	U3Z-ARF8133
ISED number	7016A-ARF8133
HVIN (Hardware Version Identification Number)	ARF8133A
PMN (Product Marketing Name)	LoRA Module US 902-928, AU915,AS923
FVIN (Firmware Version Identification Number)	V01.07.01
HMN (Host Marketing Name)	IOT Products adeunis : FTD, DRY CONTACTS, TEMP, ANALOG, ANALOG PWR, PULSE, MODBUS

B: ISM band 902 MHz – 928 MHz

This report is electronically signed and valid without handwriting signature. For verification of the electronic signatures, the public keys can be requested at the testing laboratory.

Document authorised:

cn=Alexander Hnatovskiy, o=CTC advanced GmbH, ou=HNA-161129, email=Alexander.Hnatovskiy@ctcadvanced.com, c=DE
2020.03.30 15:35:06 +02'00'

Alexander Hnatovskiy
Lab Manager
Radio Communications & EMC

cn=Marco Scigliano, o=CTC advanced GmbH, ou=SCI-161125, email=marco.scigliano@ctcadvanced.com, c=DE
2020.03.30 15:31:42 +02'00'

Marco Scigliano
Testing Manager
Radio Communications & EMC

EUT technologies:

Technologies:	Max. power [dBm]		Antenna gain max.: [dBi]	Declared by customer	#
	conducted	EIRP			
ISM band 902 MHz – 928 MHz	meas. 16.49	meas. 21.35	ext. Dipole +5.19 int. PCB < +4.16	22 dBm +/-1 dB	1

Details and origins of the measurements shown in the table above:

#	Results from:	Additional information
1	1-6484/18-04-02-B/C CTC Advanced GmbH	Max. measured antenna gains, page 19 Max conducted output power, page 19 Max measured EIRP, page 19

Prediction of MPE limit at given distance - FCC

Equation from page 18 of OET Bulletin 65, Edition 97-01

$S = PG / 4\pi R^2$

where: S = Power density
P = Power input to the antenna
G = Antenna gain
R = Distance to the center of radiation of the antenna
PG = Output Power including antenna gain

The table below is excerpted from Table 1B of 47 CFR 1.1310 titled “Limits for Maximum Permissible Exposure (MPE), Limits for General Population/Uncontrolled Exposure”

Frequency Range (MHz)	Power Density (mW/cm^2)	Averaging Time (minutes)
300 -1500	f/1500	30
1500 - 100000	1.0	30

where f = Frequency (MHz)

Prediction: worst case

	Technologies:	Lora	
	Frequency (MHz)	900	
PG	Declared max power (EIRP)	23	dBm
R	Distance	20	cm
S	MPE limit for uncontrolled exposure	0.6	mW/cm^2
	Calculated Power density:	0.0397	mW/cm^2
	Calculated percentage of Limit:	6.62%	

This prediction demonstrates the following:

The power density levels for FCC at a distance of 20 cm are below the maximum levels allowed by regulations.

Prediction of MPE limit at given distance - ISED

RSS-102, Issue 5, 2.5.2

RF exposure evaluation is required if the separation distance between the user and/or bystander and the device's radiating element is greater than 20 cm, except when the device operates as follows:

- below 20 MHz and the source-based, time-averaged maximum e.i.r.p. of the device is equal to or less than 1 W (adjusted for tune-up tolerance);
- at or above 20 MHz and below 48 MHz and the source-based, time-averaged maximum e.i.r.p. of the device is equal to or less than $4.49/f^{0.5}$W (adjusted for tune-up tolerance), where f is in MHz;
- at or above 48 MHz and below 300 MHz and the source-based, time-averaged maximum e.i.r.p. of the device is equal to or less than 0.6 W (adjusted for tune-up tolerance);
- at or above 300 MHz and below 6 GHz and the source-based, time-averaged maximum e.i.r.p. of the device is equal to or less than $1.31 \times 10^{-2}\ f^{0.6834}$ W (adjusted for tune-up tolerance), where f is in MHz;
- at or above 6 GHz and the source-based, time-averaged maximum e.i.r.p. of the device is equal to or less than 5 W (adjusted for tune-up tolerance).

Prediction: worst case

		Lora	
	Frequency	2450	MHz
R	Distance	20	cm
PG	Maximum EIRP	23	dBm
PG	**Maximum EIRP**	199.5	mW
	Exclusion Limit from above:	2.71	W
	Calculated percentage of Limit:	7.35%	

Conclusion: RF exposure evaluation is not required.