**DEKRA Testing and Certification, S.A.U.**
Parque Tecnológico de Andalucía,
c/ Severo Ochoa nº 2 · 29590 Campanillas · Málaga · España
C.I.F. A29 507 456

Test report No:
NIE: 66865RAN.002

# Assessment report
## RF EXPOSURE REPORT ACCORDING TO
## FCC 47 CFR Part 2.1091

| | |
|---|---|
| (*) Identification of item under evaluation | Door zone sensor for lift car positioning |
| (*) Trademark | KONE |
| (*) Model and /or type reference | KCEDZS |
| (*) Other identification of the product | Kone Reference Number: 51793177D12<br>HW version: KM1362305G22 rev1.03, KM1362305G30 rev1.02<br>SW version: G22 with SW 3.0.2.0, G30 with SW 4.0.0.0 |
| (*) Features | RFID |
| (*) Manufacturer | KONE CORPORATION<br>Keilasatama 3, 02150 Espoo, Finland |
| Test method requested, standard | FCC 47 CFR Part 2.1091 Radiofrequency radiation exposure evaluation: mobile devices. |
| Summary | IN COMPLIANCE |
| Approved by (name / position & signature) | Rafael López<br>EMC Consumer & RF Lab. Manager<br>2021.06.11 11:33:23 +02'00' |
| Date of issue | 2021-06-11 |
| Report template No | FAN36_02<br>(*) "Data provided by the client" |

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# Competences and guarantees

In order to assure the traceability to other national and international laboratories, DEKRA Testing and Certification, S.A.U. has a calibration and maintenance program for its measurement equipment.

DEKRA Testing and Certification, S.A.U. guarantees the reliability of the data presented in this report, which is the result of the measurements and the tests performed to the item under test on the date and under the conditions stated on the report and, it is based on the knowledge and technical facilities available at DEKRA Testing and Certification, S.A.U. at the time of performance of the test.

DEKRA Testing and Certification, S.A.U. is liable to the client for the maintenance of the confidentiality of all information related to the item under test and the results of the test.

The results presented in this Assessment Report apply only to the particular item under test established in this document.



# General conditions

1. This report is only referred to the item that has undergone the assessment.
2. This report does not constitute or imply on its own an approval of the product by the Certification Bodies or competent Authorities.
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# Data provided by the client

The following data has been provided by the client:

1. Information relating to the description of the sample ("Identification of the item under evaluation", "Trademark", "Model and/or type reference", “General description of the device” and "Other identification of the device").
2. Use distance information.
3. The sample of the model KCEDZS is a Radio product designed for lift application, installed in the car and providing the lift car positioning. This product has two different variants:
   - KM1362305G22
   - KM1362305G30

   whose only difference is the size and material of the outer shell.

DEKRA Testing and Certification, S.A.U. declines any responsibility with respect to the information provided by the client and that may affect the validity of results.

# Identification of the client

KONE Oyj

Myllykatu 3 05801, Finland

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# Document history

| Report number | Date | Description |
|---|---|---|
| 66865RAN.002 | 2021-06-11 | First release |

# **Appendix A:** FCC RF Exposure assessment result

# General description of the device under evaluation

The device under evaluation consists of a Radio product designed for lift application, installed in the car and providing the lift car positioning.

According to the manufacturer, during its normal use, the separation distance between the radiating structures of the device and nearby users will be greater than 20 cm.

As stated into DEKRA Testing and Certification, S.A.U. test report num. 66865RRF.002, the maximum measured output power levels for NFC technology are:

| Technology / Mode | Band | Frequency (MHz) | Maximum measured E field strength (dbuV/m) | Maximum E.I.R.P. (dBm) | Maximum E.I.R.P. (mW) |
|---|---|---|---|---|---|
| NFC | 13.56 | 13.56 | 64.04 | -31.19 | 0.001 |

**Table 1:** Equipment specifications

# RF Exposure Assessment result and verdict

Limits for Maximum Permissible Exposure (MPE) to comply with FCC 47 CFR § 2.1091 are defined in "§1.1310 Radiation Exposure limits, paragraph (e)":

| Technology / Mode | Band | Frequency (MHz) | Distance (cm) | Power density ($mW/cm^2$) | FCC General Population Limit ($mW/cm^2$) | Verdict |
|---|---|---|---|---|---|---|
| NFC | 13.56 | 13.56 | 20.00 | 0.0000002 | 0.98 | **Pass** |

**Table 2:** Assessment result and verdict

# **Appendix B:** FCC RF Exposure information

# RF Exposure evaluation

Devices operating in standalone mobile device exposure conditions may contain a single transmitter or multiple transmitters that do not transmit simultaneously. A minimum test separation distance ≥ 20 cm is required between the antenna and radiating structures of the device and nearby persons to apply mobile device exposure limits. The distance must be at least 20 cm and fully supported by the operating and installation configurations of the transmitter and its antenna(s), according to the source-based time-averaged maximum power requirements of § 2.1091(d)(2). In cases where cable losses or other attenuations are applied to determine compliance, the most conservative operating configurations and exposure conditions must be evaluated. The minimum test separation distance required for a device to comply with mobile device exposure conditions must be clearly identified in the installation and operating instructions, for all installation and exposure conditions, to enable users and installers to comply with RF exposure requirements. For mobile devices that have the potential to operate in portable device exposure conditions, similar to the configurations described in § 2.1091(d)(4), a KDB inquiry is required to determine the SAR test requirements for demonstrating compliance.

When a device qualifies for the categorical exclusion provision of § 2.1091(c), the minimum test separation distance may be estimated, when applicable, by simple calculations according to plane-wave equivalent conditions, to ensure the transmitter and its antenna(s) can operate in manners that meet or exceed the estimated distance. The source-based time-averaged maximum radiated power, according to the maximum antenna gain, must be applied to calculate the field strength and power density required to establish the minimum test separation distance. When the estimated test separation distance becomes overly conservative and does not support compliance, MPE measurement or computational modeling may be used to determine the required minimum separation distance.

According to §1.1310 Radiofrequency radiation exposure limits, paragraph (e), the limits for Maximum Permissible Exposure (MPE) to radiofrequency electromagnetic fields are:

TABLE 1—LIMITS FOR MAXIMUM PERMISSIBLE EXPOSURE (MPE)

| Frequency range (MHz) | Electric field strength (V/m) | Magnetic field strength (A/m) | Power density ($mW/cm^2$) | Averaging time (minutes) |
|---|---|---|---|---|
| **(A) Limits for Occupational/Controlled Exposure** | | | | |
| 0.3–3.0 | 614 | 1.63 | *100 | 6 |
| 3.0–30 | 1842/f | 4.89/f | $*900/f^2$ | 6 |
| 30–300 | 61.4 | 0.163 | 1.0 | 6 |
| 300–1,500 | ..... | ..... | f/300 | 6 |
| 1,500–100,000 | ..... | ..... | 5 | 6 |
| **(B) Limits for General Population/Uncontrolled Exposure** | | | | |
| 0.3–1.34 | 614 | 1.63 | *100 | 30 |
| 1.34–30 | 824/f | 2.19/f | $*180/f^2$ | 30 |
| 30–300 | 27.5 | 0.073 | 0.2 | 30 |
| 300–1,500 | ..... | ..... | f/1500 | 30 |
| 1,500–100,000 | ..... | ..... | 1.0 | 30 |

f = frequency in MHz * = Plane-wave equivalent power density

# MPE Evaluation

Each supported transmission technology will be evaluated to determine if it is in compliance with limits for Maximum Permissible Exposure (MPE) to radiofrequency electromagnetic fields.

In order to perform the assessment, the following equations have been used for the calculations; these equations are accurate in the far-field of an antenna and will over-predict power density in the near field, where they could be used for making a "worst-case" or conservative prediction:

Power density: $S[mW/cm^2] = \frac{P_{E.I.R.P.}[mW]}{4\Pi R[cm]^2}$

Where:

$S$ = power density

$P_{E.I.R.P.}$ = Equivalent isotropically radiated power

$R$ = distance to the center of radiation of the antenna (evaluation distance)

$P_{E.I.R.P.}$ = $P_T$ + $G_T$ - $L_C$

Where:

$P_T$= transmitter output power (including tune-up tolerance)

$G_T$= gain of the transmitting antenna

$L_C$ = signal attenuation in the connecting cable between the transmitter and the antenna if applicable

**Multiple frequencies assessment**

When multiple sources are introduced into an environment, it becomes necessary to address the sources interdependently, since each source will contribute some percentage of the maximum exposure towards the total exposure at a fixed location. The sum of the ratios of the exposure from each source to the corresponding maximum exposure for the frequency of each source must be evaluated.

The exposure complies with the maximum permissible exposure if the sum of the ratios is less than unity:

$$\sum_{i=1}^{n} \frac{S_i}{Lim_i}$$

Where

$S_i$ is the applicable contribution of each source (e.g. power flux density).

$Lim_i$ is the limit for the applicable contribution of each source (e.g. MPE power flux density basic restriction).

## NFC output power calculation

As stated into DEKRA Testing and Certification, S.A.U. test report num. 66865RRF.002, the maximum measured field strength value for each technology at the operating frequency is:

| Operation Mode | Frequency (MHz) | Maximum E-field strength (dBµV/m) measured at 3 m |
|---|---|---|
| NFC | 13.561 | 64.04 |

**Table 3:** Measurement Results

Using Field Strength Approach formula (linear terms):

$E.I.R.P = P_t \times G_t = (E \times d)^2/30$

Where:

$P_t$ = transmitter output power in watts

$G_t$ = numeric gain of the transmitting antenna (unitless)

$E$ = electric field strength in V/m = $10^{((dB\mu V/m)/20)}/10^6$.

$d$ = measurement distance in meters (m) = 3

So $P_t = (E \times d)^2/(30 \times G_t)$ = -31.19 dBm