Interference Analysis

An extensive compatibility and sharing study has been conducted in Europe under the responsibility of the European Conference of Postal and Telecommunications Administrations ("CEPT") (https://www.cept.org/) and the Electronic Communications Committee ("ECC"). This compatibility and sharing study considered the Level Probing Radars ("LPR") and Tank Level Probing Radars ("TLPR") VEGA Grieshaber KG ("VEGA") proposes in this application and their interactions with incumbent services similar to those found in the U.S. The study concluded and found that they would not cause harmful interference to other services, so long as certain requirements are met. VEGA's proposed operations would satisfy each of these requirements. The results and the outcome of this study were published in January 2022. ECC Report 334 is available under the following link (https://docdb.cept.org/document/26187).

Vega will comply with the following requirements, as specified in ECC Report 334 for LPR devices operating in the 167–182 GHz or 231.5–250 GHz range:

- Operation of LPR sensors shall be for industrial purposes only;
- Installation and maintenance of LPR equipment shall be performed by professionally trained individuals only;
- LPR equipment shall not be marketed directly to private end customers;
- LPRs will be installed only in permanent fixed positions pointing downwards towards the ground. The equipment shall not operate while being moved, or while inside a moving container;
- Installers will ensure that there are no unwanted obstacles in the main beam of the antenna in order to minimize unintentional reflections and scattering;
- LPR devices will not be installed within 13 km of radioastronomy sites;
- Users and installers of LPR equipment will be informed of the installation requirements and the additional special mounting instructions;
- The peak EIRP for elevations above 0° shall be limited to 0 dBm; and
- For LPR devices using an antenna gain smaller than 20 dBi, the maximum conducted peak output power shall be limited to 15 dBm;
- Technical limitations:
  - Maximum duty cycle of 5%;
  - Maximum mean EIRP spectral density of -6.0 dBm/MHz;
  - Maximum peak EIRP of 37 dBm; and
  - Minimum unwanted emissions attenuation of 20 dB.

In addition, for TLPRs:

- TLPRs shall be installed at a permanent fixed position at a closed metallic tank or concrete tank, or a similar enclosure structure made of comparable attenuating material;
- Flanges and attachments of the TLPR equipment shall provide the necessary microwave sealing by design;

- Sight glasses shall be coated with a microwave-proof coating when necessary (i.e., electrically conductive or microwave absorbing coating);
- Manholes or connection flanges attached to the tank shall be closed while the TLPR equipment is in operation to ensure a low-level leakage of the signal into the free space outside the tank;
- The provider is required to inform the users and installers of TLPR equipment about the installation requirements and the additional special mounting instructions;
- For TLPR devices using an antenna gain smaller than 20 dBi, the maximum conducted peak output power shall be limited to 15 dBm;
- Technical limitations:
    - Maximum duty cycle of 100%;
    - Maximum mean EIRP spectral density of 12 dBm/MHz;
    - Maximum peak EIRP of 42 dBm; and
    - Minimum unwanted emissions attenuation of 20 dB.