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TERMS OF REFERENCE
to construct LTE network at the Kumtor Mine

Item No.	List of Key Data and Requirements	Key Data and Requirements
1	Place of work	Issyk-Kul Region, Jety-Oguz District, Kumtor Gold Mine
2	Client	Kumtor Gold Company CJSC
3	Requirements and Scope of Work	Kumtor Gold Company CJSC requires the construction of LTE Network and the transition of VHF analog radio communication and the pit wi-fi network into this LTE network. The Client has licenses of the KR State Communications Agency for: Band 38 LTE band, width **30 MHz**, frequency: **2,590-2,620 Mhz**. The VHF frequencies are **145-175 MHz**. The LTE network will be designed to: • transmit IP data between pit equipment and automated monitoring/dispatch systems. • replace the existing VHF PTT (Push to Talk) analog network at the Kumtor mine site, including wearable, automotive and stationary radios, for PTT over LTE/WiFi. *NOTE: The Client intends to leave the VHF coverage outside the mine territory, this will require the integration of an analog VHF network into the mine's PTT system, as well as the availability of analog VHF functionality on wearable and automotive PTT devices.* **LTE Core** The Kumtor Mine site is a remote mountainous location where it is not uncommon for the main fibre optic line to break. In case of the optical line failures, the entire Kumtor mine site will be left without the possibility of communicating with the outside world for an extended period. To ensure the continuity of production processes and independence from external communication lines, all critical IT management systems are located on the mine territory. Monitoring, dispatching and PTT communication systems are critical, therefore LTE Core systems shall be physically located on the Kumtor Mine territory and have the necessary backup systems to ensure uninterrupted operation (if necessary, it is possible to consider the geographical separation of backup elements between the server and the residential camp).

		Client devices The internal LTE network of the Kumtor mine involves the following types of client devices: 1. Wearable PTT (800 units in total): Wearable Push-To-Talk devices designed to receive/transmit voice data between 2 or more users/groups of users. 2. Fixed PTT (30 units in total): Push-To-Talk devices are installed at fixed locations within the mine site, designed to receive/transmit voice data between 2 or more users/groups of users. 3. Automotive PTT (300 units in total): Push-To-Talk devices are installed on light vehicles and heavy-duty equipment and designed to receive/transmit voice data between 2 or more users/groups of users. 4. Automotive Ue (300 units total): LTE client devices (Ue) are installed on light vehicles and heavy-duty equipment; Automotive Ue provide IP communication to periphery devices installed on pit equipment, including the automotive PTT terminal. **Data/PTT devices for heavy-duty pit equipment** Pit equipment (light and heavy-duty) requires not only a channel for voice messaging (via PTT devices), but also channel(s) for IP data exchange between peripheral devices (on the equipment) and automated dispatching/monitoring systems. It is preferable to have only one LTE client device (Ue) on each mining equipment unit, which would provide both the vehicle PTT terminal voice data exchange and the receipt/IP packages transmission of peripheral devices, with all peripheral devices connected to their Ue via the on-board Ethernet network.
4	Provision of Guarantee	A warranty period of at least 12 months shall be provided for basic and subscriber equipment.
5	Documentation provided by the Client	The design documentation of the system shall be prepared in accordance with the current design standards of the Kyrgyz Republic.