SCHEDULE 13 Regulation 2

Quantum technologies

Interpretation

1. In this Schedule—

"quantum technology" means—

(a) quantum communications;

(b) quantum connectivity;

(c) quantum imaging, sensing, timing or navigation;

(d) quantum information processing, computing or simulation; or

(e) quantum resistant cryptography;

"quantum communications" means—

(a) the transmission of information, using the properties of quantum mechanics, specifically superposition, entanglement, single photon technology, the use of conjugate variable technologies or a combination of these;

(b) the use of a communication network (quantum or otherwise) to distribute quantum states or quantum state information; or

(c) the establishment of cryptographic keys or the generation of provably random numbers using a quantum physical process;

"quantum connectivity" means the ways in which quantum coherence, during processes such as transmission, propagation or amplification, is preserved;

"quantum imaging" means using the phase or amplitude properties of quantum mechanics, specifically superposition, entanglement, the use of sub-Poissonian sources or detectors of photons or a combination of these, to create images of objects;

"quantum information processing, computing or simulation" means—

(a) the simulation or realisation of systems that use certain properties of quantum mechanics, specifically superposition or entanglement, to acquire, encode, manipulate or process information, run algorithms or perform operations or measurements on data;

(b) algorithms, applications, software, error correction, noise reduction and operating systems that enable the functionality of the system;

(c) the capability of a classical computer to represent the internal state and operations of a quantum computer ("quantum emulation"); or

(d) the hosting or provision of third-party access of a quantum information processing, computing or simulation cloud-based service;

"quantum navigation" means using phase properties of quantum mechanics, specifically measurements of atoms or ions, or atom-ion interferometry, to establish the location or inertia of, and to guide, objects;

"quantum resistant cryptography" means methods of securing information or data being transmitted or stored, with a view to resisting attack by a quantum computing or simulation device;

"quantum sensing" means utilising the phase properties of quantum mechanics, specifically measurements of atoms or ions or atomic spin systems, to determine a property or rate of change in the property of an object, or the effect of an object on a measurable quantity;

"quantum timing" means using the phase properties of quantum mechanics, specifically measurements of atoms or ions or atomic gases, and the application of associated hardware including stable frequency mixers, optical or microwave sources, crystal oscillators and frequency combs, to provide a timing or synchronisation signal, or frequency reference.

Activity - quantum technology

2. A qualifying entity carrying on activities that consist of developing or producing quantum technology.