Contribution submitted by Don Ballard, Coherent regarding indium phosphide

1a. Indium phosphide (InP) is a semiconductor material that is used as the gain medium of generating infrared light, typically in relatively longer wavelengths in the near infrared, due to its physical property, in particular, the bandgap energy that allows for semiconductor lasers in this wavelength range possible. InP may be present in some Coherent EEE products, typically in millimeter sized chips. Substitution of InP is possible if the wavelength requirement can be relaxed, for example, Gallium Arsenide (GaAs) is an alternative, which typically produces light in shorter wavelengths than InP.

1b. Not aware.

1c. InP is typically used as the gain medium of semiconductor lasers. If used as the gain medium, it is nearly 100% InP, typically in millimeter sizes. One or a few InP chips may be present in a final laser product (cubic inch or cubic yard sizes).

2a. Due to the small size of the InP semiconductor chip, the quantity of InP used in Coherent EEE products is far less than 1 ton per annum.

2b. Only a small portion of Coherent EEE products contain InP. This is mainly related to the emission wavelength of the laser or laser component.

2c. Cannot comment

3a. Cannot comment

3b. Cannot comment

4a. Substitution of InP by other semiconductor materials in some wavelength range could be physically impossible because the difference in the physical property, in particular, the bandgap energy. At some wavelengths, substitution of InP by other semiconductor material is possible, but associated with reduced performance, higher production cost, unknown reliability, etc. Gallium arsenide can be an alternative for InP in some applications that is not sensitive to the emission wavelength of the laser.

5. Cannot comment

Additional comments: In this case, we are using InP in longer wavelengths chips. Either from Santa Clara, where we recently made nice devices at around 1.5µm. And we also buy chips from external sources. The longer wavelength are interesting in medical applications, in plastic welding in some cases in science and they could even play a role in future eye safe lidar. So this is of importance for us.