***Electronic devices and components.***

a. "Microprocessor microcircuits", "microcomputer microcircuits", and microcontroller microcircuits

b. Storage integrated circuits

- Electrically erasable programmable read-only memories (EEPROMs) with a storage capacity;
- Static random access memories (SRAMs)

c. Analogue-to-digital converters

d. Field programmable logic devices having a maximum number of single-ended digital input/outputs between 200 and 700;

e. Fast Fourier Transform (FFT) processors having a rated execution time for a 1 024 point complex FFT of less than 1 ms;

f. Custom integrated circuits for which the function is unknown, or the control status of the equipment in which the integrated circuits will be used is unknown to the manufacturer

g. Traveling-wave "vacuum electronic devices", pulsed or continuous wave

- Coupled cavity devices, or derivatives thereof;
- Devices based on helix, folded waveguide, or serpentine waveguide circuits, or derivatives thereof,

h. Flexible waveguides designed for use at frequencies exceeding 40 GHz;

i. Surface acoustic wave and surface skimming (shallow bulk) acoustic wave devices

j. "Cells" as follows:

- "Primary cells" having an "energy density" of 550 Wh/kg or less at 293 K (20 °C);
- "Secondary cells" having an "energy density" of 350 Wh/kg or less at 293 K (20 °C);

k. "Superconductive" electromagnets or solenoids specially designed to be fully charged or discharged in less than one minute,

l. Circuits or systems for electromagnetic energy storage, containing components manufactured from "superconductive" materials specially designed for operation at temperatures below the "critical temperature" of at least one of their "superconductive" constituents,

m. Hydrogen/hydrogen-isotope thyratrons of ceramic-metal construction and rate for a peak current of 500 A or more;

n. Solar cells, cell-interconnect-coverglass (CIC) assemblies, solar panels, and solar arrays, which are "space qualified" and not controlled by 3A001.e.41.

***General purpose "electronic assemblies", modules and equipment***

a. Electronic test equipment, other than those specified in the CML or in Regulation (EU) 2021/821;

b. Digital instrumentation magnetic tape data recorders

c. Equipment, with a maximum digital interface transfer rate exceeding 60 Mbit/s, designed to convert digital video magnetic tape recorders for use as digital instrumentation data recorders;

d. Non-modular analogue oscilloscopes having a bandwidth of 1 GHz or greater;

e. Modular analogue oscilloscope systems

f. Analogue sampling oscilloscopes for the analysis of recurring phenomena with an effective bandwidth greater than 4 GHz;

g. Digital oscilloscopes and transient recorders, using analogue-to-digital conversion techniques, capable of storing transients by sequentially sampling single-shot inputs at successive intervals of less than 1 ns (greater than 1 Giga Samples per Second (GSPS)), digitizing to 8 bits or greater resolution and storing 256 or more samples.

***Specific processing equipment***

a. Frequency changers and their specially designed components, other than those specified in the CML or in Regulation (EU) 2021/821;

b. Mass spectrometers, other than those specified in the CML or in Regulation (EU) 2021/821;

c. All flash X-ray machines, or components of pulsed power systems designed thereof, including Marx generators, high power pulse shaping networks, high voltage capacitors, and triggers;

d. Pulse amplifiers, other than those specified in the CML or in Regulation (EU) 2021/821;

e. Electronic equipment for time delay generation or time interval measurement

f. Chromatography and spectrometry analytical instruments.

***Equipment for the manufacture of electronic components or materials, as follows and specially designed components and accessories therefor:***

a. Equipment specially designed for the manufacture of electron tubes, optical elements and specially designed components therefor controlled by 3A0011 or X.A.I.001;1

b. Equipment specially designed for the manufacture of semiconductor devices, integrated circuits and "electronic assemblies", as follows, and systems incorporating or having the characteristics of such equipment:

- Equipment for the processing of materials for the manufacture of devices and components

c. Crystal pullers and furnaces

d. "Stored program controlled" equipment for epitaxial growth

e. Molecular beam epitaxial growth equipment;

f. Magnetically enhanced "sputtering" equipment with specially designed integral load locks capable of transferring wafers in an isolated vacuum environment;

g. Equipment specially designed for ion implantation, ion-enhanced or photo-enhanced diffusion,

h. "Stored program controlled" equipment for the selective removal (etching) by means of anisotropic dry methods (e.g., plasma), as follows:

- "Batch types"
- "Single wafer types"

i. Chemical vapour deposition (CVD) equipment, e.g., plasma-enhanced CVD (PECVD) or photo-enhanced CVD, for semiconductor device manufacturing, having either of the following capabilities, for deposition of oxides, nitrides, metals or polysilicon

j. Electron beam systems specially designed or modified for mask making or semiconductor device processing.

k. Surface finishing equipment for the processing of semiconductor wafers

l. Interconnection equipment which includes common single or multiple vacuum chambers specially designed to permit the integration of any equipment controlled by X.B.I.001 into a complete system;
m. "Stored program controlled" equipment using "lasers" for the repair or trimming of "monolithic integrated circuits"

***Masks, mask substrates, mask-making equipment and image transfer equipment for the manufacture of devices and components***

a. Finished masks, reticles and designs
b. Mask substrates as follows:

- Hard surface (e.g., chromium, silicon, molybdenum) coated "substrates" (e.g., glass, quartz, sapphire) for the preparation of masks having dimensions exceeding 125 mm x 125 mm; or
- Substrates specially designed for X-ray masks;

c. Equipment, other than general purpose computers, specially designed for computer aided design (CAD) of semiconductor devices or integrated circuits;
d. Equipment or machines, as follows, for mask or reticle fabrication:
e. "Stored program controlled" equipment for the inspection of masks,
f. Align and expose equipment for wafer production using photo-optical or X-ray methods, e.g., lithography equipment, including both projection image transfer equipment and step and repeat (direct step on wafer) or step and scan (scanner) equipment
g. Electron beam, ion beam or X-ray equipment for projection image transfer capable of producing patterns less than 2,5 µm;
h. Equipment using "lasers" for direct write on wafers capable of producing patterns less than 2,5 µm.

***Equipment for the assembly of integrated circuits***

a. "Stored program controlled" die bonders
b. "Stored program controlled" equipment for producing multiple bonds in a single operation (e.g., beam lead bonders, chip carrier bonders, tape bonders);
c. Semi-automatic or automatic hot cap sealers, in which the cap is heated locally to a higher temperature than the body of the package, specially designed for ceramic microcircuit packages controlled by 3A0011 and that have a throughput equal to or more than one package per minute

***Equipment for the inspection or testing of electronic components and materials, and specially designed components and accessories therefor***

a. Equipment specially designed for the inspection or testing of electron tubes, optical elements and specially designed components therefor controlled by 3A0011 or X.A.I.001;
b. Equipment specially designed for the inspection or testing of semiconductor devices, integrated circuits and "electronic assemblies", as follows, and systems incorporating or having the characteristics of such equipment:

c. Equipment specially designed for determining the performance of focal-plane arrays at wavelengths of more than 1 200 nm, using "stored program controlled" measurements or computer aided evaluation.