

## **LEGISLATIVE COUNCIL BRIEF**

Import and Export Ordinance  
(Chapter 60)

### **IMPORT AND EXPORT (STRATEGIC COMMODITIES) REGULATIONS (AMENDMENT OF SCHEDULE 1) ORDER 2008**

#### **INTRODUCTION**

The Director-General of Trade and Industry (DGTI) has made the Import and Export (Strategic Commodities) Regulations (Amendment of Schedule 1) Order 2008 (“the Order”) to amend Schedule 1 to the Import and Export (Strategic Commodities) Regulations (Cap. 60 Sub. Leg. G) (“the Regulations”) to reflect the latest changes adopted by various international non-proliferation regimes in their control lists of strategic commodities. The Order is at Annex A.

#### **JUSTIFICATIONS**

2. The Regulations enable Hong Kong to impose licensing control on the import, export, transshipment, and in some cases, transit of strategic commodities. The licensing system is administered by the Trade and Industry Department (TID) and enforced by the Customs and Excise Department.

3. Schedule 1 to the Regulations sets out the strategic commodities under control, which include materials, equipment, software and technology capable of being used for both industrial and military purposes. The Schedule has been drawn up on the basis of the control lists adopted by various international non-proliferation regimes and convention, i.e., the Wassenaar Arrangement (WA), the Australia Group (AG), the Missile Technology Control Regime (MTCR), the Nuclear Suppliers Group (NSG), and the Chemical Weapons Convention (CWC).

The Administration follows closely developments in the international scene with regard to the control over strategic commodities. The Schedule is under constant review and, where appropriate, is amended to take into account the most up-to-date control lists adopted by relevant international regimes and convention. Schedule 1 to the Regulations was last amended in mid 2006.

4. Under section 6B of the Import and Export Ordinance (Cap. 60), DGTI may, by order published in the Gazette, replace the Schedules to the Regulations or amend them to add or remove any articles to or from the Schedules to the Regulations.

### **THE ORDER**

5. The Order amends Schedule 1 to the Regulations to reflect the revisions adopted by WA, AG, NSG and MTCR to their respective control lists up to end 2007. The major changes are set out below-

- (a) the WA (which governs controls over dual-use industrial goods and conventional weapons) has revised its control over a number of items. The changes include relaxation of control over analogue-to-digital converter integrated circuits with resolution of 12 bits or more (usable in a broad range of commercial applications such as cellular systems, broadband systems, digital radio systems, etc.) and certain portable or mobile radiotelephones and similar client wireless devices with cryptographic function (including Portable Digital Assistant (PDA) device and pocket Personal Computer (PC) for professional uses e.g. health care); removal of control on polyarylene ether ketones; imposition of control on equipment for handling improvised explosive devices, certain microwave power modules, certain high-standard imaging cameras, etc.; and clarification of control criteria for certain thermoplastic liquid crystal copolymers, specified types of lasers, etc.;
- (b) the AG (which maintains controls over chemical and biological weapons agents and precursors as well as their production equipment and technology) has imposed control on additional

biological agents, in particular some types of fungi, that may produce toxic substances;

- (c) the NSG (which implements controls over nuclear-related materials and equipment) has revised its control on specified types of machine tools usable in nuclear facilities; and
- (d) the MTCR (which focuses on controls of transfer of missile technology and equipment) has expanded its control over certain engines (e.g. turbojet and turbofan engines) and other related systems which are instrumental in missile technology.

6. We also take the opportunity to make textual and editorial revisions to improve the language of the Schedule. These changes do not affect the substance of the control list.

## **LEGISLATIVE TIMETABLE**

7. The Order will be gazetted on 5 December 2008 and tabled at the Legislative Council on 10 December 2008.

## **IMPLICATIONS OF THE PROPOSAL**

8. The Order has economic implications as set out in Annex B. The Order is in conformity with the Basic Law, including the provisions concerning human rights. It will not affect the binding effect of the Regulations. It has no financial, civil service, productivity, environmental or sustainability implications.

## **PUBLIC CONSULTATION**

9. The amendments made by the Order are technical in nature. Public consultation is considered not necessary.

## **PUBLICITY**

10. A press release will be issued on the day when the Order is published in the Gazette on 5 December 2008. TID will announce the

revised control list through trade circulars, general advisory service and its web portal on the day of gazettal. A spokesman will be available for answering media enquiries.

## **ENQUIRIES**

11. For any enquiries on this brief, please contact Mr. Billy AU, Principal Trade Officer of the TID, at 2398 5554.

Trade and Industry Department  
3 December 2008

**IMPORT AND EXPORT  
(STRATEGIC COMMODITIES) REGULATIONS  
(AMENDMENT OF SCHEDULE 1) ORDER 2008**

A copy of the captioned order is attached.

Drafter: Ms. Francoise Lam  
File ref: LDT/226/04/2 VIII

**IMPORT AND EXPORT (STRATEGIC COMMODITIES)  
REGULATIONS (AMENDMENT OF SCHEDULE 1)  
ORDER 2008**

DRAFTING HISTORY TABLE

**IMPORT AND EXPORT (STRATEGIC COMMODITIES)  
REGULATIONS (AMENDMENT OF SCHEDULE 1)  
ORDER 2008**

(Made by the Director-General of Trade and Industry  
under section 6B of the Import and  
Export Ordinance (Cap. 60))

**1. Commencement**

Subject to section 6B of the Ordinance, this Order shall come into operation on a day to be appointed by the Director-General of Trade and Industry by notice published in the Gazette.

**2. Strategic commodities**

Schedule 1 to the Import and Export (Strategic Commodities) Regulations (Cap. 60 sub. leg. G) is amended –

- (a) in Note 1, in the Chinese text, by repealing ““詞語定義”” and substituting ““詞語定義””;
- (b) in the Munitions List, in ML2 –
  - (i) by repealing ML2(a) and substituting –
    - “(a) Guns, howitzers, cannon, mortars, anti-tank weapons, projectile launchers, military flame throwers, rifles, recoilless rifles, smooth-bore weapons and signature reduction devices for those articles;

*Notes:*

- 1. ML2(a) includes injectors, metering devices, storage tanks and other specially designed components for use with liquid propelling charges for any of the equipment specified in ML2(a).

2. ML2(a) does not include:
  - (a) Muskets, rifles and carbines manufactured earlier than 1938; *and*
  - (b) Reproductions of muskets, rifles and carbines the originals of which were manufactured earlier than 1890.”;
- (ii) in ML2(b), in the Note, by repealing “control” and substituting “include”;
- (c) in the Munitions List, in ML4 –
  - (i) in the N.B., by repealing “For guidance and navigation equipment, see Note 7 to ML11.” and substituting –
    - “1. For guidance and navigation equipment, see ML11.
    2. For Aircraft Missile Protection Systems (AMPS), see ML4(c).”;
  - (ii) in ML4(a), by adding “specially designed for military use” after “items)”;
  - (iii) by repealing ML4(b) and substituting –
    - “(b) Equipment having all of the following characteristics:
      - (1) Specially designed for military use;
      - (2) Specially designed for the handling, controlling, activating, powering with one-time operational output, launching, laying, sweeping, discharging, decoying, jamming,



detonating, disrupting, disposing or detecting of any of the following:

- (a) Items specified in ML4(a);
- (b) Improvised Explosive Devices (IEDs);

*Notes:*

1. ML4(b) includes:

- (a) Mobile gas liquefying equipment capable of producing 1 000 kg or more per day of gas in liquid form;  
*and*
- (b) Buoyant electric conducting cable suitable for sweeping magnetic mines.

2. ML4(b) does not include hand-held devices limited by design solely to the detection of metal objects and incapable of distinguishing between mines and other metal objects.”;

(iv) by adding –

“(c) Aircraft Missile Protection Systems (AMPS);

*Note:*

ML4(c) does not include AMPS that:

- (a) Contain any of the following missile warning sensors:
  - (1) Passive sensors having peak response between 100 nm and 400 nm;

- (2) Active pulsed Doppler missile warning sensors;
- (b) Contain countermeasures dispensing systems;
- (c) Contain flares, which exhibit both a visible signature and an infrared signature, for decoying surface-to-air missiles; *and*
- (d) are installed on “civil aircraft” and having all of the following characteristics:
  - (1) The AMPS is only operable in the specific “civil aircraft” in which the specific AMPS is installed and for which any of the following has been issued:
    - (a) A civil Type Certificate;
    - (b) An equivalent document recognized by the International Civil Aviation Organisation (ICAO);
  - (2) The AMPS employs protection to prevent unauthorized access to “software”;
  - (3) The AMPS incorporates an active mechanism that forces the system not to function when it is removed from the

“civil aircraft” in which it was installed.”;

(d) in the Munitions List, in ML7(g), in the Note, in the Chinese text, by repealing “幅射” and substituting “輻射”;

(e) in the Munitions List, in ML8 –

(i) in ML8(a)(4), by repealing “Hexanitrohexaazaisowurtzitane” and substituting “2,4,6,8,10,12-Hexanitrohexaazaisowurtzitane”;

(ii) in ML8(d)(8), by adding at the end –

*“Technical Note:*

Alternate names are hydrazine mononitrate or hydrazine dinitrate.”;

(iii) in ML8(e)(5), in the Chinese text, by repealing “酸脂” and substituting “酸酯”;

(iv) in ML8(f)(17) –

(A) by repealing “(BITA or butylene imine trimesamide)” and substituting “(BITA (HX-868 1,1’,1”-trimesoyl-tris(2-ethylaziridine) (CAS 7722-73-8)) or butylene imine trimesamide)”;

(B) by adding at the end –

*“Note:*

ML8(f)(17) includes:

1. 1,1’-Isophthaloyl-bis(2-methylaziridene) (HX-752) (CAS 7652-64-4);
2. 2,4,6-tris(2-ethyl-1-aziridiny)-1,3,5-triazine (HX-874) (CAS 18924-91-9);

*and*

3. 1,1'-trimethyladipoylbis(2-ethylaziridine) (HX-877) (CAS 71463-62-2).";
- (v) in ML8(f)(20), by adding "(HX-879)" after "TEPAN";
- (vi) in ML8(f)(21), by adding "(HX-878)" after "TEPANOL";
- (vii) in Note 6(u), by adding "(CAS 111-22-8)" after "(TEGDN)";
- (f) in the Munitions List, in ML9 –
  - (i) in the N.B., by repealing "Note 7 to";
  - (ii) by repealing ML9(b) and substituting –
    - "(b) Engines and propulsion systems, as follows:
      - (1) Diesel engines specially designed for submarines, having:
        - (a) Power output of 1.12 MW (1 500 hp.) or more; *and*
        - (b) Rotary speed of 700 rpm or more;
      - (2) Electric motors specially designed for submarines, having all of the following characteristics:
        - (a) Power output of more than 0.75 MW (1 000 hp.);
        - (b) Quick reversing;
        - (c) Liquid cooled;
        - (d) Totally enclosed;
      - (3) Non-magnetic diesel engines specially designed for military use

having a power output of 37.3 kW (50 hp.) or more and a non-magnetic content in excess of 75% of total mass; *and*

- (4) ‘Air Independent Propulsion’ (AIP) systems specially designed for submarines;

*Technical Note:*

‘Air Independent Propulsion’ (AIP) allows a submerged submarine to operate its propulsion system, without access to atmospheric oxygen, for a longer time than the batteries would have otherwise allowed. For the purposes of ML9(b)(4), AIP does not include nuclear power.”;

- (iii) in ML9(f), in the Note, by repealing “It does not include ordinary propulsive shaft and hydrodynamic control-rod hull penetrators.” and substituting “ML9(f) does not include ordinary propulsive shaft and hydrodynamic control-rod hull penetrators.”;
- (g) in the Munitions List, in ML10 –
- (i) in ML10(h)(3), by repealing “bodies,” and substituting “bodies”;
- (ii) in ML10(h)(4), in the Chinese text, by repealing “阻力傘” and substituting “減速傘”;
- (h) in the Munitions List, in ML11(a) –

- (i) in Note 7, by repealing the full stop at the end and substituting a semicolon;
- (ii) in the Note, by adding –
  - “8. Digital troposcatter-radio communications transmission equipment; *and*
  - 9. Digital demodulators specially designed for signals intelligence.”;
- (i) in the Munitions List, in ML12, in Note 1(a), in the Chinese text, by repealing “連還” and substituting “連環”;
- (j) in the Munitions List, in ML13 –
  - (i) by repealing ML13(c) and substituting –
    - “(c) Helmets manufactured according to military standards or specifications, or comparable national standards, and specially designed components for those helmets (i.e., helmet shell, liner and comfort pads);”;
  - (ii) in ML13(d), by repealing the N.B.;
  - (iii) by repealing the Notes and substituting –
    - “Notes:
    - 1. ML13(b) includes materials specially designed to form explosive reactive armour or to construct military shelters.
    - 2. ML13(c) does not include conventional steel helmets neither modified or designed to accept nor equipped with any type of accessory device.
    - 3. ML13(c) and (d) does not include helmets, body armour or protective garments, when

accompanying their user for the user's own personal protection.

4. In so far as helmets specially designed for bomb disposal personnel are concerned, only those specially designed for military use are included in ML13.”;

(iv) by repealing the N.B. and substituting –

“N.B.:

1. See also 1A005 of the Dual-use Goods List.
2. For “fibrous or filamentary materials” used in the manufacture of body armour and helmets, see 1C010 of the Dual-use Goods List.”;

(k) in the Munitions List, in ML18 –

- (i) in Note 1(d), in the Chinese text, by repealing “軍用爆藥” and substituting “軍用炸藥”;
- (ii) in Note 1(j), by repealing the semicolon and substituting a full stop;
- (iii) by repealing Notes 2 and 3;

(l) in the Munitions List, in ML19, by repealing ML19(e) and substituting –

“(e) Physical test models for the systems, equipment and components, specified in ML19;”;

(m) in the Munitions List, in ML21 –

(i) by repealing ML21(a) and (b) and substituting –

“(a) “Software” specially designed or modified for the “development”, “production” or “use” of equipment, materials or “software” specified in the Munitions List;

- (b) Specific “software”, other than that specified in ML21(a), as follows:
  - (1) “Software” specially designed for military use and specially designed for modelling, simulating or evaluating military weapon systems;
  - (2) “Software” specially designed for military use and specially designed for modelling or simulating military operational scenarios;
  - (3) “Software” for determining the effects of conventional, nuclear, chemical or biological weapons; *and*
  - (4) “Software” specially designed for Command, Communications, Control and Intelligence (C<sup>3</sup>I) or Command, Communications, Control, Computer and Intelligence (C<sup>4</sup>I) applications;”;
- (ii) by adding –
  - “(c) “Software”, not specified in ML21(a) or (b), specially designed or modified to enable equipment not specified in the Munitions List to perform the military functions of equipment specified in the Munitions List;”;
- (n) in the Munitions List, in ML22, in Note 2(c), in the Chinese text, by repealing “~~術~~” and substituting “~~術~~”;



- (o) in the Dual-use Goods List, in the General Software Note, in entry (1)(b), in the Chinese text, by repealing “充份” and substituting “充分”;
- (p) in the Dual-use Goods List, in Category 0, in sub-category 0A, in 0A001(h), in the Chinese text, by repealing ““核反應堆’使用而特別設計或預備的“核反應堆內部零件”” and substituting ““核反應堆”使用而特別設計或預備的‘核反應堆內部零件’”;
- (q) in the Dual-use Goods List, in Category 0, in sub-category 0B –
  - (i) in 0B001(b)(7), in the Chinese text, by repealing “有極部份” and substituting “有極部分”;
  - (ii) in 0B001(b), by adding –
    - “(14) Bellows valves made of or protected by “materials resistant to corrosion by UF<sub>6</sub>”, with a diameter of 10 mm to 160 mm;”;
- (r) in the Dual-use Goods List, in Category 1, in sub-category 1A –
  - (i) in 1A001(c), in the Note, by repealing “air” and substituting “aerial”;
  - (ii) in 1A002, by repealing everything after “See also 1A202, 9A010 and 9A110.” and substituting –
    - “(a) An organic “matrix” and materials specified in 1C010(c), 1C010(d) or 1C010(e);
    - (b) A metal or carbon “matrix”, and any of the following:
      - (1) Carbon “fibrous or filamentary materials” having:

(a) A “specific modulus”  
exceeding  $10.15 \times 10^6$  m;  
*and*

(b) A “specific tensile strength”  
exceeding  $17.7 \times 10^4$  m;

(2) Materials specified in 1C010(c);

*Notes:*

1. 1A002 does not include composite structures or laminates, made from epoxy resin impregnated carbon “fibrous or filamentary materials”, for the repair of “civil aircraft” structures or laminates, provided the size does not exceed 100 cm x 100 cm.

2. 1A002 does not include finished or semi-finished items, specially designed for purely civilian applications as follows:

(a) Sporting goods;

(b) Automotive industry;

(c) Machine tool industry; *and*

(d) Medical applications.”;

(iii) by repealing 1A004 and substituting –

“1A004 Protective and detection equipment and components, not specially designed for military use, as follows:

*N.B.:*

See also 2B351 and 2B352.

(a) Gas masks, filter canisters and decontamination equipment for gas masks and filter canisters, designed or

modified for defence against any of the following, and specially designed components for those gas masks, filter canisters and decontamination equipment:

- (1) Biological agents “adapted for use in war”;
- (2) Radioactive materials “adapted for use in war”;
- (3) Chemical warfare (CW) agents;
- (4) “Riot control agents”, including:
  - (a)  $\alpha$ -Bromobenzeneacetonitrile, (Bromobenzyl cyanide) (CA) (CAS 5798-79-8);
  - (b) (2-chlorophenyl) methylene propanedinitrile, (o-Chlorobenzylidenemalononitrile) (CS) (CAS 2698-41-1);
  - (c) 2-Chloro-1-phenylethanone, Phenylacetyl chloride ( $\omega$ -chloroacetophenone) (CN) (CAS 532-27-4);
  - (d) Dibenz-(b,f)-1,4-oxazephine, (CR) (CAS 257-07-8);
  - (e) 10-Chloro-5,10-dihydrophenarsazine, (Phenarsazine chloride), (Adamsite), (DM) (CAS 578-94-9); *and*

- (f) N-Nonanoylmorpholine, (MPA)  
(CAS 5299-64-9);
- (b) Protective suits, gloves and shoes specially designed or modified for defence against any of the following:
  - (1) Biological agents “adapted for use in war”;
  - (2) Radioactive materials “adapted for use in war”;
  - (3) Chemical warfare (CW) agents; *and*
- (c) Nuclear, biological and chemical (NBC) detection systems specially designed or modified for detection or identification of any of the following, and specially designed components for those systems:
  - (1) Biological agents “adapted for use in war”;
  - (2) Radioactive materials “adapted for use in war”;
  - (3) Chemical warfare (CW) agents;

*Note:*

1A004 does not include:

- (a) Personal radiation monitoring dosimeters;  
*and*
- (b) Equipment limited by design or function to protect against hazards specific to civil industries, such as mining, quarrying, agriculture, pharmaceuticals, medical, veterinary, environmental, waste management, or to the food industry.

*Technical Notes:*

1. 1A004 includes equipment and components that have been identified, successfully tested to national standards or otherwise proven effective, for the detection of or defence against radioactive materials “adapted for use in war”, biological agents “adapted for use in war”, chemical warfare agents, ‘simulants’ or “riot control agents”, even if such equipment or components are used in civil industries, such as mining, quarrying, agriculture, pharmaceuticals, medical, veterinary, environmental, waste management, or in the food industry.
2. ‘Simulant’: a substance or material that is used in place of toxic agent (chemical or biological) in training, research, testing or evaluation.”;

(iv) by adding –

“1A006 Equipment, specially designed or modified for the disposal of improvised explosive devices, as follows, and

specially designed components and accessories for those equipment:

- (a) Remotely operated vehicles; *and*
- (b) ‘Disruptors’;

*Technical Note:*

‘Disruptors’: devices specially designed for the purpose of preventing the operation of an explosive device by projecting a liquid, solid or frangible projectile.

*N.B.:*

For equipment specially designed for military use for the disposal of improvised explosive devices, see also ML4.

*Note:*

1A006 does not include equipment when accompanying its operator.

1A007 Equipment and devices, specially designed to initiate charges, and devices containing energetic materials, by electrical means, as follows:

- (a) Explosive detonator firing sets designed to drive explosive detonators specified in 1A007(b); *and*
- (b) Electrically driven explosive detonators, as follows:
  - (1) Exploding bridge (EB);

- (2) Exploding bridge wire (EBW);
- (3) Slapper; *and*
- (4) Exploding foil initiators (EFI);

*Technical Notes:*

1. The word initiator or igniter is sometimes used in place of the word detonator.
2. For the purpose of 1A007(b) the detonators of concern all utilize a small electrical conductor (bridge, bridge wire, or foil) that explosively vaporizes when a fast, high-current electrical pulse is passed through it. In non-slapper types, the exploding conductor starts a chemical detonation in a contacting high explosive material such as PETN (pentaerythritoltetranitrate). In slapper detonators, the explosive vaporization of the electrical conductor drives a flyer or slapper across a gap, and the impact of the slapper on an explosive starts a chemical detonation. The slapper in some designs is driven by magnetic

force. The term exploding foil detonator may refer to either an EB or a slapper-type detonator. Also, the word initiator is sometimes used in place of the word detonator.

*N.B.:*

For equipment and devices specially designed for military use, see the Munitions List.”;

- (s) in the Dual-use Goods List, in Category 1, in sub-category 1B –
  - (i) in 1B001(b), in the Note, by repealing “air” and substituting “aerial”;
  - (ii) by repealing 1B001(f) and substituting –
    - “(f) Non-destructive inspection equipment specially designed for “composite” materials, as follows:
      - (1) X-ray tomography systems for three dimensional defect inspection; *and*
      - (2) Numerically controlled ultrasonic testing machines of which the motions for positioning transmitters or receivers or both are simultaneously coordinated and programmed in four or more axes to follow the three dimensional contours of the component under inspection;”;



- (iii) in 1B001, in the Chinese text, by repealing “預浸材料” and substituting “預浸材料”;
- (t) in the Dual-use Goods List, in Category 1, in sub-category 1C –
  - (i) by repealing 1C005 and substituting –
    - “1C005 “Superconductive” “composite”  
conductors in lengths exceeding 100 m  
or with a mass exceeding 100 g, as  
follows:
      - (a) “Superconductive” “composite”  
conductors containing one or  
more niobium-titanium  
‘filaments’, having all of the  
following characteristics:
        - (1) Embedded in a “matrix”  
other than a copper or  
copper-based mixed  
“matrix”;
        - (2) Having a cross-section area  
less than  $0.28 \times 10^{-4} \text{ mm}^2$   
(6  $\mu\text{m}$  in diameter for  
circular ‘filaments’);
      - (b) “Superconductive” “composite”  
conductors consisting of one or  
more “superconductive”  
‘filaments’ other than niobium-  
titanium, having all of the  
following characteristics:
        - (1) A “critical temperature” at

zero magnetic induction exceeding 9.85 K (-263.31°C);

- (2) Remaining in the “superconductive” state at a temperature of 4.2 K (-268.96°C) when exposed to a magnetic field oriented in any direction perpendicular to the longitudinal axis of conductor and corresponding to a magnetic induction of 12 T with critical current density exceeding 1 750 A/mm<sup>2</sup> on overall cross-section of the conductor; *and*

- (c) “Superconductive” “composite” conductors consisting of one or more “superconductive” ‘filaments’ which remain “superconductive” above 115 K (-158.16°C);

*Technical Note:*

For the purpose of 1C005, ‘filaments’ may be in wire, cylinder, film, tape or ribbon form.”;

- (ii) in 1C008 –

- (A) in 1C008(a), by repealing the Note and substituting –
- “Notes:*
1. 1C008(a) includes the substances in liquid or solid form, such as resin, powder, pellet, film, sheet, tape or ribbon.
  2. 1C008(a) does not include non-fusible compression moulding powders or moulded forms.”;
- (B) in 1C008(b), by repealing “ISO 75-3 (2004)” and substituting “ISO 75-2(2004), method A”;
- (C) in 1C008(b), by repealing “1.82 N/mm<sup>2</sup>” and substituting “1.80 N/mm<sup>2</sup>”;
- (D) by repealing 1C008(c);
- (E) in 1C008(f), in the Chinese text, by repealing “”超” and substituting “超”;
- (iii) in 1C010 –
- (A) in the N.B., by repealing “See also 1C210.” and substituting “See also 1C210 and 9C110.”;
- (B) in 1C010(b), by repealing the Note and substituting –
- “Note:*
- 1C010(b) does not include fabric made from “fibrous or filamentary materials” for the repair of “civil aircraft” structures or laminates, in which the size of individual sheets does not exceed 100 cm x 100 cm.”;

- (C) in 1C010(e), in the Note, by repealing “control” and substituting “include”;
- (D) in 1C010(e), by repealing Note 1 and substituting –
  - “1. Epoxy resin “matrix” impregnated carbon “fibrous or filamentary materials” (prepregs) for the repair of “civil aircraft” structures or laminates, in which the size of individual sheets of prepreg does not exceed 100 cm x 100 cm; *and*”;
- (iv) in 1C012, in the Chinese text, by repealing “~~註~~  
~~譯~~” where it twice appears and substituting “~~註~~  
~~釋~~”;
- (v) in 1C107 –
  - (A) by repealing 1C107(b), (c) and (d) and substituting –
    - “(b) Pyrolytic or fibrous reinforced graphites, usable for rocket nozzles and reentry vehicle nose tips usable in “missiles”, space launch vehicles specified in 9A004 or sounding rockets specified in 9A104;  
*N.B.:*  
See also 0C004.
    - (c) Ceramic composite materials (dielectric constant less than 6 at any frequency from 100 MHz to 100 GHz)

for use in radomes usable in “missiles”, space launch vehicles specified in 9A004 or sounding rockets specified in 9A104;

(d) Bulk machinable silicon-carbide reinforced unfired ceramic, usable for nose tips usable in “missiles”, space launch vehicles specified in 9A004 or sounding rockets specified in 9A104;”;

(B) by adding –

“(e) Reinforced silicon-carbide ceramic composites, usable for nose tips, reentry vehicles and nozzle flaps usable in “missiles”, space launch vehicles specified in 9A004 or sounding rockets specified in 9A104;”;

(vi) in 1C111 –

(A) in 1C111(a)(3), by repealing “Liquid oxidizers, the following:” and substituting “Oxidizer substances usable in liquid propellant rocket engines as follows:”;

(B) in 1C111(a)(3)(a), by adding “(CAS 10544-73-7)” before the semicolon;

(C) in 1C111(a)(3)(b), by repealing “dioxide/dinitrogen tetroxide” and substituting “dioxide (CAS 10102-44-0)/dinitrogen tetroxide (CAS 10544-72-6)”;

- (D) in 1C111(a)(3)(c), by adding “(CAS 10102-03-1)” before the semicolon;
- (E) by repealing 1C111(a)(4) and substituting –
- “(4) Hydrazine derivatives as follows:
- (a) Trimethylhydrazine;
  - (b) Tetramethylhydrazine;
  - (c) N,N diallylhydrazine;
  - (d) Allylhydrazine;
  - (e) Ethylene dihydrazine;
  - (f) Monomethylhydrazine dinitrate;
  - (g) Unsymmetrical dimethylhydrazine nitrate;
  - (h) Hydrazinium azide;
  - (i) Dimethylhydrazinium azide;
  - (j) See the Munitions List for Hydrazinium nitrate;
  - (k) Diimido oxalic acid dihydrazine;
  - (l) 2-hydroxyethylhydrazine nitrate (HEHN);
  - (m) See the Munitions List for Hydrazinium perchlorate;
  - (n) Hydrazinium diperchlorate;
  - (o) Methylhydrazine nitrate (MHN);
  - (p) Diethylhydrazine nitrate (DEHN); *and*
  - (q) 3,6-dihydrazino tetrazine nitrate (DHTN);

*Technical Note:*

3,6-dihydrazino tetrazine  
nitrate (DHTN) is also referred  
to as 1,4-dihydrazine nitrate.”;

- (F) in 1C111(b)(1), by adding “(including carboxyl-terminated polybutadiene)” after “Carboxy-terminated polybutadiene”;
- (G) in 1C111(b)(2), by adding “(including hydroxyl-terminated polybutadiene)” after “Hydroxy-terminated polybutadiene”;
- (H) in 1C111(b), by adding –  
“(5) Polytetrahydrofuran polyethylene glycol (TPEG);

*Technical Note:*

Polytetrahydrofuran polyethylene glycol (TPEG) is a block co-polymer of poly 1,4-Butanediol and polyethylene glycol (PEG).”;

- (I) in 1C111(c)(2), by adding “(CAS 111-22-8)” before the semicolon;
- (J) in 1C111(c)(3), by adding “(CAS 119-75-5)” before the semicolon;
- (K) in 1C111(c)(4), by adding “(CAS 3032-55-1)” before the semicolon;
- (L) in 1C111(c)(5), by adding “(CAS 693-21-0)” before the semicolon;
- (M) in 1C111(c)(6)(c), by adding “(CAS 1273-89-8)” before the semicolon;
- (N) in 1C111(c)(6)(e), by adding “(CAS 1274-00-6)” before the semicolon;

- (O) in 1C111(c)(6)(f), by adding “(CAS 20773-28-8)” before the semicolon;
- (P) in 1C111(c)(6)(j), by adding “(CAS 1274-08-4)” before the semicolon;
- (Q) in 1C111(c)(6)(k), by adding “(CAS 93894-59-8) before the semicolon;
- (vii) in 1C116, by adding at the end –  
*“Technical Note:*  
 Maraging steels are iron alloys generally characterized by high nickel, very low carbon content and use substitutional elements or precipitates to produce strengthening and age-hardening of the alloy.”;
- (viii) in 1C117, by adding “usable in “missiles”, space launch vehicles specified in 9A004 or sounding rockets specified in 9A104” after “rocket motor components”;
- (ix) in 1C216, by repealing the Technical Note and substituting –  
*“Technical Notes:*  
 1. The phrase maraging steel ‘capable of’ encompasses maraging steel before or after heat treatment.  
 2. Maraging steels are iron alloys generally characterized by high nickel, very low carbon content and use substitutional elements or precipitates to produce strengthening and age-hardening of the alloy.”;
- (x) in 1C350 –



- (A) in 1C350(10), in the Chinese text, by repealing “已” and substituting “己”;
  - (B) in 1C350(18), in the Chinese text, by repealing “磷” and substituting “磷”;
  - (C) in 1C350(29), by repealing “o-Ethyl-2-di-isopropylaminoethyl” and substituting “O-Ethyl-2-di-isopropylaminoethyl”;
  - (D) in 1C350(43), (44), (45) and (50), in the Chinese text, by repealing “納” and substituting “鈉”;
- (xi) in 1C351 –
- (A) in 1C351(d)(9), by adding “and shiga-like ribosome inactivating proteins” after “Verotoxin”;
  - (B) by adding –
    - “(e) Fungi, whether natural, enhanced or modified, either in the form of “isolated live cultures” or as material including living material which has been deliberately inoculated or contaminated with such cultures, as follows:
      - (1) *Coccidioides immitis*; *and*
      - (2) *Coccidioides posadasii*.”;
- (xii) in 1C352(b) –
- (A) by repealing “*Mycoplasma mycoides*, whether natural,” and substituting “*Mycoplasma*, whether natural,”;

- (B) by repealing “with such *Mycoplasma mycoides*,” and substituting –  
 “with such cultures, as follows:
- (1) *Mycoplasma mycoides* subspecies *mycoides* SC (small colony); *and*
  - (2) *Mycoplasma capricolum* subspecies *capripneumoniae*”;
- (xiii) by repealing 1C353 and substituting –  
 “1C353 Genetic elements and genetically modified organisms, as follows:
- (a) Genetically modified organisms or genetic elements that contain nucleic acid sequences associated with the pathogenicity of organisms specified in 1C351(a), 1C351(b), 1C351(c), 1C351(e), 1C352 or 1C354; *and*
  - (b) Genetically modified organisms or genetic elements that contain nucleic acid sequences coding for any of the “toxins” specified in 1C351(d) or “sub-units of toxins” of those “toxins”;

*Technical Notes:*

1. Genetic elements include, inter alia, chromosomes, genomes, plasmids, transposons and vectors whether genetically modified or unmodified.

2. Nucleic acid sequences associated with the pathogenicity of any of the “microorganisms” specified in 1C351(a), 1C351(b), 1C351(c), 1C351(e), 1C352 or 1C354 means any sequence specific to the specified “microorganism” that:

- (a) In itself or through its transcribed or translated products represents a significant hazard to human, animal or plant health; *or*
- (b) Is known to enhance the ability of a specified “microorganism”, or any other organism into which it may be inserted or otherwise integrated, to cause serious harm to human, animal or plant health.

*Note:*

1C353 does not include nucleic acid sequences associated with the pathogenicity of enterohaemorrhagic *Escherichia coli*, serotype O157 and other verotoxin producing strains, other

than those coding for the verotoxin, or for its sub-units.”;

- (xiv) in 1C450 –
  - (A) in 1C450(a)(1), in the Chinese text, by repealing “鉸”;
  - (B) in the Chinese text, by repealing 1C450(a)(3) and substituting –
    - “(3) 二苯羥乙酸 3-喹寧環酯(6581-06-2);  
注意：並參閱軍需物品清單。”;
  - (C) in 1C450(b)(4), (5) and (6), in the Chinese text, by repealing “鉸” wherever it appears;
- (u) in the Dual-use Goods List, in Category 1, in sub-category 1D, by adding –
  - “1D003 “Software” specially designed or modified to enable equipment to perform the functions of equipment specified in 1A004(c);”;
- (v) in the Dual-use Goods List, in Category 1, in sub-category 1E –
  - (i) in 1E002(c)(2), in the Note, in the Chinese text, by repealing “研磨村” and substituting “研磨材”;
  - (ii) in 1E002, by adding –
    - “(g) ‘Libraries’ (parametric technical databases) specially designed or modified to enable equipment to perform the functions of equipment specified in 1A004(c);

*Technical Note:*

For the purpose of 1E002(g), the term ‘Libraries’ (parametric technical databases) means a collection of technical

- information, reference to which may enhance the performance of relevant equipment or systems.”;
- (w) in the Dual-use Goods List, in Category 2, in sub-category 2B –
- (i) in Technical Note 5 to this sub-category –
- (A) by repealing “Stated positioning accuracy levels” and substituting “‘Stated positioning accuracy’ levels”;
- (B) by repealing “instead of individual machine tests. Stated positioning accuracy” and substituting “as an alternative to individual machine tests. ‘Stated positioning accuracy’”;
- (C) by repealing “the accuracy of a machine model” and substituting “the accuracy of a specific machine model”;
- (D) by repealing “Stated Values” and substituting “‘Stated positioning accuracy’”;
- (ii) in 2B001 –
- (A) in the N.B., by adding “For optical finishing machines, see 2B002.” after “2B201.”;
- (B) in 2B001(a), by repealing the Note and substituting –
- “*Note:*
- 2B001(a) does not include turning machines specially designed for producing contact lenses, having all of the following characteristics:

- (a) Machine controller limited to using ophthalmic based software for part programming data input;
- (b) No vacuum chucking.”;
- (iii) by repealing 2B002 and substituting –
  - “2B002 Numerically controlled optical finishing machine tools equipped for selective material removal to produce non-spherical optical surfaces having all of the following characteristics:
    - (a) Finishing the form to less (better) than 1.0  $\mu\text{m}$ ;
    - (b) Finishing to a roughness less (better) than 100 nm rms;
    - (c) Four or more axes which can be coordinated simultaneously for “contouring control”;
    - (d) Using any of the following processes:
      - (1) ‘Magnetorheological finishing (MRF)’;
      - (2) ‘Electrorheological finishing (ERF)’;
      - (3) ‘Energetic particle beam finishing’;
      - (4) ‘Inflatable membrane tool finishing’;
      - (5) ‘Fluid jet finishing’;

*Technical Note:*

For the purposes of 2B002:

- (a) ‘MRF’ is a material removal process using an abrasive magnetic fluid whose viscosity is controlled by a magnetic field;
  - (b) ‘ERF’ is a removal process using an abrasive fluid whose viscosity is controlled by an electric field;
  - (c) ‘Energetic particle beam finishing’ uses Reactive Atom Plasmas (RAP) or ion-beams to selectively remove material;
  - (d) ‘Inflatable membrane tool finishing’ is a process that uses a pressurized membrane that deforms to contact the workpiece over a small area;
  - (e) ‘Fluid jet finishing’ makes use of a fluid stream for material removal.”;
- (iv) in 2B006 –
- (A) by repealing 2B006(b)(1)(c)(2) and substituting –
- “(2) Maintaining, for at least 12 hours, at a temperature of  $20\pm 1^{\circ}\text{C}$ :
- (a) A “resolution” over their full scale of  $0.1\ \mu\text{m}$  or less (better);  
*and*

- (b) Capable of achieving a “measurement uncertainty”, when compensated for the refractive index of air, equal to or less (better) than  $(0.2 + L/2\ 000)\ \mu\text{m}$  (L is the measured length in mm);”;
- (B) in 2B006(b)(1), in the Note, by repealing “does not control” and substituting “does not include”;
- (v) by repealing 2B007(b) and substituting –
  - “(b) Specially designed to comply with national safety standards applicable to potentially explosive munitions environments;  
*Note:*  
2B007(b) does not include “robots” specially designed for paint-spraying booths.”;
- (vi) in 2B008 –
  - (A) in 2B008(a), in the N.B., by repealing “Note to 2B006(b)(1)” and substituting “2B006(b)(1)(c) and (d)”;
  - (B) in 2B008(b), in the N.B., by repealing “Note to 2B006(b)(1)” and substituting “2B006(b)(2)”;
- (vii) in 2B116 –
  - (A) in 2B116(a), by repealing “and imparting forces” and substituting “while imparting forces”;



- (B) in the Note, in the Chinese text, by repealing “(bare table)”;
- (viii) in 2B120(c)(3), by repealing “better” and substituting “less (better)”;
- (ix) in 2B121(b), by repealing “better” and substituting “less (better)”;
- (x) in 2B201 –
  - (A) by adding “and any combination of those machine tools” after “as follows,”;
  - (B) in 2B201(a)(1), by repealing “or”;
  - (C) in 2B201(a), by adding before the Note –
    - “(3) Five or more axes, which can be coordinated simultaneously for “contouring control”;;”;
  - (D) in 2B201(b)(1), by repealing “or”;
  - (E) in 2B201(b), by adding before the Note –
    - “(3) Five or more axes, which can be coordinated simultaneously for “contouring control”;;”;
  - (F) in 2B201(b), by repealing the Note and substituting –
    - “*Note:*
    - 2B201(b) does not include grinding machines as follows:
    - 1. Cylindrical external, internal, and external-internal grinding machines having all of the following characteristics:
      - (a) Limited to a maximum workpiece capacity of 150

mm outside diameter or length;

(b) Axes limited to x, z and c;  
*and*

2. Jig grinders that do not have a z-axis or a w-axis with an overall positioning accuracy less (better) than 4 microns. Positioning accuracy is according to ISO 230/2 (1988).”;

(G) by adding at the end –

“Notes:

1. 2B201 does not include special purpose machine tools limited to the manufacture of gears. For such machine tools, see 2B003.
2. 2B201 does not include special purpose machine tools limited to the manufacture of any of the following parts:
  - (a) Crank shafts or cam shafts;
  - (b) Tools or cutters;
  - (c) Extruder worms;
  - (d) Engraved or faceted jewellery parts.
3. A machine tool having at least two of the three turning, milling or grinding capabilities (e.g., a turning machine with milling capability), must be evaluated against each

applicable entry of 2B001(a) or 2B201(a) or (b).”;

- (xi) in 2B350 –
  - (A) in 2B350(a)(6), by repealing “*or*”;
  - (B) in 2B350(a), by adding –
    - “(8) Niobium (columbium) or niobium alloys;”;
  - (C) in 2B350(b)(6), by repealing “*or*”;
  - (D) in 2B350(b), by adding –
    - “(8) Niobium (columbium) or niobium alloys;”;
  - (E) in 2B350(c)(6), by repealing “*or*”;
  - (F) in 2B350(c), by adding –
    - “(8) Niobium (columbium) or niobium alloys;”;
  - (G) in 2B350(d)(9), by repealing “*or*”;
  - (H) in 2B350(d), by adding –
    - “(11) Niobium (columbium) or niobium alloys;”;
  - (I) in 2B350(e)(7), by repealing “*or*”;
  - (J) in 2B350(e), by adding –
    - “(9) Niobium (columbium) or niobium alloys;”;
  - (K) in 2B350(g)(6), by repealing “*or*”;
  - (L) in 2B350(g), by adding –
    - “(8) Niobium (columbium) or niobium alloys;”;
  - (M) in 2B350(h)(7), by repealing “*or*”;
  - (N) in 2B350(h), by adding –

- “(9) Niobium (columbium) or niobium alloys;”;
- (O) in 2B350(i)(9), by repealing “*or*”;
- (P) in 2B350(i), by adding –
  - “(11) Niobium (columbium) or niobium alloys;”;
- (xii) in 2B352 –
  - (A) in 2B352(a), in the Technical Note, by repealing “(2<sup>nd</sup> edition, Geneva, 1993)” and substituting “(3<sup>rd</sup> edition, Geneva, 2004)”;
  - (B) in 2B352(c), in the Chinese text, by repealing “技術註譯” and substituting “技術註釋”;
- (x) in the Dual-use Goods List, in Category 2, in sub-category 2E –
  - (i) in 2E003(f), in the N.B., in the Chinese text, by repealing ““基體”” and substituting ““基材””;
  - (ii) in the table of “DEPOSITION TECHNIQUES”, in column 2, in the Chinese text, by repealing ““基體”” wherever it appears and substituting ““基材””;
  - (iii) under the heading “TABLE – DEPOSITION TECHNIQUES – STATEMENT OF UNDERSTANDING”, in paragraph 1(b), in the Chinese text, by repealing “部份” and substituting “部分”;
- (y) in the Dual-use Goods List, in Category 3, in sub-category 3A –
  - (i) in 3A001 –

- (A) in 3A001(a)(2), by repealing “neural network integrated circuits,”;
- (B) in 3A001(a)(5)(a)(3), by repealing “50 million” and substituting “105 million”;
- (C) in 3A001(a)(5)(a)(4), by repealing “5 million” and substituting “10 million”;
- (D) in 3A001(a)(5)(a)(5), by repealing “1 million” and substituting “2.5 million”;
- (E) in 3A001(b)(1)(a)(4)(b), in the English text, by repealing “express in” and substituting “expressed in”;
- (F) in 3A001(b)(4), by repealing “microwave amplifiers” and substituting “microwave solid state amplifiers”;
- (G) by repealing 3A001(b)(7) and substituting –
  - “(7) Converters and harmonic mixers, designed to extend the frequency range of equipment described in 3A002(c), 3A002(d), 3A002(e) or 3A002(f) beyond the limits respectively stated in those sub-items;”;
- (H) in 3A001(b)(8), by repealing “controlled by 3A001(b)” and substituting “specified in 3A001(b)(1)”;
- (I) in 3A001(b)(8), in the Note, by repealing “control” and substituting “include”;
- (J) in 3A001(b), by adding –

“(9) Microwave power modules (MPM) consisting of, at least, a travelling wave tube, a microwave “monolithic integrated circuit” and an integrated electronic power conditioner and having all of the following characteristics:

- (a) A ‘turn-on time’ from off to fully operational in less than 10 seconds;
- (b) A volume less than the maximum rated power in watts multiplied by  $10 \text{ cm}^3/\text{W}$ ;
- (c) An “instantaneous bandwidth” greater than 1 octave ( $f_{\text{max}} > 2f_{\text{min}}$ ) and having any of the following characteristics:
  - (1) For frequencies equal to or less than 18 GHz, an RF output power greater than 100 W;
  - (2) A frequency greater than 18 GHz;

*Technical Notes:*

1. The ‘turn-on time’ in 3A001(b)(9)(a) refers to the time from fully-off to fully operational, i.e., it includes the warm-up time of the MPM.

2. To calculate the volume in 3A001(b)(9)(b), the following example is provided: for a maximum rated power of 20 W, the volume would be:  $20 \text{ W} \times 10 \text{ cm}^3/\text{W} = 200 \text{ cm}^3$ .”;

- (K) in 3A001(c)(1)(a), by repealing “2.5 GHz” and substituting “6 GHz”;
- (L) in 3A001(c)(1)(b), by repealing “2.5 GHz” and substituting “6 GHz”;
- (M) in 3A001(c)(1)(c)(3), by repealing “50 MHz” and substituting “100 MHz”;
- (N) in 3A001(c)(2), by repealing “1 GHz” and substituting “2.5 GHz”;
- (O) by repealing 3A001(e)(1) and substituting –

“(1) ‘Cells’ as follows:

- (a) ‘Primary cells’ having an ‘energy density’ exceeding 550 Wh/kg at 20°C;
- (b) ‘Secondary cells’ having an ‘energy density’ exceeding 250 Wh/kg at 20°C;

*Technical Notes:*

- 1. For the purpose of 3A001(e)(1), ‘energy density’ (Wh/kg) is calculated from the nominal voltage multiplied by the nominal capacity in ampere-hours (Ah) divided by

the mass in kilograms. If the nominal capacity is not stated, energy density is calculated from the nominal voltage squared, then multiplied by the discharge duration in hours divided by the discharge load in ohms and the mass in kilograms.

2. For the purpose of 3A001(e)(1), a ‘cell’ is an electrochemical device, which has positive and negative electrodes, an electrolyte, and is a source of electrical energy. It is the basic building block of a battery.
3. For the purpose of 3A001(e)(1)(a), a ‘primary cell’ is a ‘cell’ that is not designed to be charged by any other source.
4. For the purpose of 3A001(e)(1)(b), a ‘secondary cell’ is a ‘cell’ that is designed to be charged by an external electrical source.

*Note:*

3A001(e)(1) does not include single cell batteries or any other batteries.”;



(P) in 3A001(e), by adding –

“(4) Solar cells, cell-interconnect-coverglass (CIC) assemblies, solar panels, and solar arrays, which are “space qualified”, having a minimum average efficiency exceeding 20% at an operating temperature of 301 K (28°C) under simulated ‘AM0’ illumination with an irradiance of 1 367 Watts per square metre (W/m<sup>2</sup>);

*Technical Note:*

‘AM0’, or ‘Air Mass Zero’, refers to the spectral irradiance of sun light in the earth’s outer atmosphere when the distance between the earth and sun is one astronomical unit (AU).”;

(Q) in 3A001, by adding –

“(g) Solid-state pulsed power switching thyristor devices and ‘thyristor modules’, using either electrically, optically, or electron radiation controlled switch methods and having any of the following characteristics:

(1) A maximum turn-on current rate of rise (di/dt) greater than 30 000 A/μs and off-state voltage greater than 1 100 V;

(2) A maximum turn-on current rate of rise (di/dt) greater than

2 000 A/ $\mu$ s and having all of the following characteristics:

- (a) An off-state peak voltage equal to or greater than 3 000 V;
- (b) A peak (surge) current equal to or greater than 3 000 A;

*Notes:*

1. 3A001(g) includes:
  - Silicon Controlled Rectifiers (SCRs)
  - Electrical Triggering Thyristors (ETTs)
  - Light Triggering Thyristors (LTTs)
  - Integrated Gate Commutated Thyristors (IGCTs)
  - Gate Turn-off Thyristors (GTOs)
  - MOS Controlled Thyristors (MCTs)
  - Solidtrons
2. 3A001(g) does not include thyristor devices and ‘thyristor modules’ incorporated into equipment designed for civil railway or “civil aircraft” applications.

*Technical Note:*

For the purposes of 3A001(g), a ‘thyristor module’ contains one or more thyristor devices.”;

- (ii) in 3A002 –
  - (A) in 3A002(b), by adding at the end –
    - “*Note:*  
The status of “signal analysers”, signal generators, network analysers and microwave test receivers as stand-alone instruments is determined by 3A002(c), 3A002(d), 3A002(e) and 3A002(f) respectively.”;
  - (B) in 3A002(d), by repealing “internal master frequency,” and substituting “internal master reference oscillator”;
  - (C) in 3A002(d)(1), by repealing “pulse duration” and substituting ““pulse duration””;
  - (D) by repealing 3A002(d)(3) and substituting –
    - “(3) A “frequency switching time” from one selected frequency to another as specified below:
      - (a) Less than 10 ns;
      - (b) Less than 100  $\mu$ s for any frequency change exceeding 1.6 GHz within the synthesised frequency range

- exceeding 3.2 GHz but not exceeding 10.6 GHz;
- (c) Less than 250  $\mu$ s for any frequency change exceeding 550 MHz within the synthesised frequency range exceeding 10.6 GHz but not exceeding 31.8 GHz;
  - (d) Less than 500  $\mu$ s for any frequency change exceeding 550 MHz within the synthesised frequency range exceeding 31.8 GHz but not exceeding 43.5 GHz; *or*
  - (e) Less than 1 ms within the synthesised frequency range exceeding 43.5 GHz;”;

(E) in 3A002(d), by repealing the Technical Note and the Note and substituting –

*“Notes:*

1. For the purpose of 3A002(d), frequency synthesised signal generators include arbitrary waveform and function generators.
2. 3A002(d) does not include equipment in which the output frequency is either produced by the addition or subtraction of two or more crystal oscillator frequencies, or by an

addition or subtraction followed by a multiplication of the result.

*Technical Notes:*

1. Arbitrary waveform and function generators are normally specified by sample rate (e.g., GSample/s), which is converted to the RF domain by the Nyquist factor of two. Thus, a 1 GSample/s arbitrary waveform has a direct output capability of 500 MHz. Or, when oversampling is used, the maximum direct output capability is proportionately lower.
  2. For the purposes of 3A002(d)(1), ‘pulse duration’ means the time interval between the leading edge of the pulse achieving 90% of the peak and the trailing edge of the pulse achieving 10% of the peak.”;
- (F) by repealing 3A002(g) and substituting –
- “(g) Atomic frequency standards being any of the following:
- (1) “Space qualified”;
  - (2) Non-rubidium and having a long-term stability less (better) than  $1 \times 10^{-11}$  /month;
  - (3) Non-“space qualified” and having all of the following characteristics:

- (a) Being a rubidium standard;
    - (b) Long-term stability less (better) than  $1 \times 10^{-11}$  /month;
    - (c) Total power consumption of less than 1 Watt;”;
  - (iii) in 3A101 –
    - (A) in 3A101(b), by adding “, usable for ‘missiles’ and their subsystems” before the semicolon;
    - (B) in 3A101(b), by adding at the end –
 

*Technical Note:*

In 3A101(b), ‘missiles’ means complete rocket systems and unmanned aerial vehicle systems capable of a range exceeding 300 km.”;
- (iv) by adding –
 

“3A102 ‘Thermal batteries’ designed or modified for ‘missiles’;

*Technical Notes:*

  1. In 3A102, ‘thermal batteries’ are single use batteries that contain a solid non-conducting inorganic salt as the electrolyte. These batteries incorporate a pyrolytic material that, when ignited, melts the electrolyte and activates the battery.

2. In 3A102, ‘missiles’ means complete rocket systems and unmanned aerial vehicle systems capable of a range exceeding 300 km.”;
- (v) in 3A228(c), by adding “, other than those specified in 3A001(g),” after “function”;
- (z) in the Dual-use Goods List, in Category 3, in sub-category 3B –
- (i) in 3B001(f)(1)(b), in the Technical Note, in the Chinese text, by repealing “特徵尺寸” where it twice appears and substituting “特徵尺寸”;
  - (ii) by repealing 3B001(f)(2) and substituting –
    - “(2) Imprint lithography equipment capable of producing features of 180 nm or less;

*Note:*

3B001(f)(2) includes:

    - (a) Micro contact printing tools;
    - (b) Hot embossing tools;
    - (c) Nano-imprint lithography tools; *and*
    - (d) Step and flash imprint lithography (S-FIL) tools.”;
  - (iii) in 3B001(f), by adding –
    - “(3) Equipment specially designed for mask making or semiconductor device processing using direct writing methods, having all of the following characteristics:
      - (a) Using deflected focussed electron beam, ion beam or “laser” beam;

- (b) Having any of the following characteristics:
    - (1) A spot size smaller than 0.2  $\mu\text{m}$ ;
    - (2) Being capable of producing a pattern with a feature size of less than 1  $\mu\text{m}$ ;
    - (3) An overlay accuracy of better than  $\pm 0.20 \mu\text{m}$  (3 sigma);”;
  - (iv) in 3B001, by adding –
    - “(i) Imprint lithography templates designed for integrated circuits specified in 3A001;”;
- (za) in the Dual-use Goods List, in Category 3, in sub-category 3C –
  - (i) in 3C002 –
    - (A) by repealing “controlled” and substituting “the following”;
    - (B) in 3C002(a), by repealing “350 nm” and substituting “245 nm”;
    - (C) by adding before the Technical Note –
      - “(e) All resists designed or optimized for use with imprint lithography equipment specified in 3B001(f)(2) that use either a thermal or photo-curable process;”;
  - (ii) by adding –
    - “3C005 Silicon carbide (SiC), gallium nitride (GaN), aluminium nitride (AlN) or aluminium gallium nitride (AlGaN)



“substrate”, or ingots, boules, or other preforms of those materials, having resistivities greater than 10 000 ohm-cm at 20°C;

3C006 “Substrate” specified in 3C005 with at least one epitaxial layer of silicon carbide, gallium nitride, aluminium nitride or aluminium gallium nitride;”;

(zb) in the Dual-use Goods List, in Category 3, in sub-category 3E –

(i) by repealing 3E001 and substituting –

“3E001 “Technology” according to the General Technology Note for the “development” or “production” of equipment or materials specified in 3A, 3B or 3C;

*Notes:*

1. 3E001 does not include “technology” for the “production” of equipment or components specified in 3A003.
2. 3E001 does not include “technology” for the “development” or “production” of integrated circuits specified in 3A001(a)(3) to (12), having all of the following characteristics:
  - (a) Using “technology” of 0.5 µm or more;
  - (b) Not incorporating multi-

layer structures.

*Technical Note:*

Multi-layer structures in Note 2(b) above do not include devices incorporating a maximum of three metal layers and three polysilicon layers.”;

- (ii) by repealing 3E002 and substituting –
- “3E002 “Technology” according to the General Technology Note other than that specified in 3E001 for the “development” or “production” of a “microprocessor microcircuit”, “microcomputer microcircuit” or microcontroller microcircuit core, having an arithmetic logic unit with an access width of 32 bits or more and any of the following features or characteristics:

- (a) A ‘vector processor unit’ designed to perform more than two calculations on floating-point vectors (one-dimensional arrays of 32-bit or larger numbers) simultaneously;

*Technical Note:*

A ‘vector processor unit’ is a processor element with built-in instructions that perform

multiple calculations on floating-point vectors (one-dimensional arrays of 32-bit or larger numbers) simultaneously, having at least one vector arithmetic logic unit.

- (b) Designed to perform more than two 64-bit or larger floating-point operation results per cycle;
- (c) Designed to perform more than four 16-bit fixed-point multiply-accumulate results per cycle (e.g., digital manipulation of analogue information that has been previously converted into digital form, also known as digital “signal processing”);

*Note:*

3E002(c) does not include “technology” for multimedia extensions.

*Notes:*

1. 3E002 does not include “technology” for the “development” or “production” of microprocessor cores, having all of the following characteristics:
  - (a) Using “technology” at or above 0.130  $\mu\text{m}$ ;

- (b) Incorporating multi-layer structures with five or fewer metal layers.
- 2. 3E002 includes “technology” for digital signal processors and digital array processors.”;
- (iii) in 3E101, by repealing “controlled by 3A001(a)(1) or (2), 3A101 or 3D101” and substituting “specified in 3A001(a)(1) or (2), 3A101, 3A102 or 3D101”;
- (iv) in 3E201, by repealing “controlled by 3A001(e)(2), 3A001(e)(3), 3A201, 3A225 to 3A233” and substituting “specified in 3A001(e)(2), 3A001(e)(3), 3A001(g), 3A201, 3A225 to 3A233”;
- (zc) in the Dual-use Goods List, in Category 4, in sub-category 4E –
  - (i) in 4E001(b), in the Chinese text, by repealing ““技術” and substituting ““技術””;
  - (ii) by repealing everything after “4E001(b)(1);” and before “TECHNICAL NOTE ON “ADJUSTED PEAK PERFORMANCE” (“APP”)”;
- (zd) in the Dual-use Goods List, in Category 5, in Part 1, in sub-category 5A1 –
  - (i) in 5A001(b), by repealing “Telecommunications transmission equipment and systems” and substituting “Telecommunications systems and equipment”;
  - (ii) by repealing 5A001(b)(1) and substituting –

- “(1) Being underwater untethered communications systems having any of the following characteristics:
  - (a) An acoustic carrier frequency outside the range from 20 kHz to 60 kHz;
  - (b) Using an electromagnetic carrier frequency below 30 kHz;
  - (c) Using electronic beam steering techniques;
  - (d) Using “lasers” or light-emitting diodes (LEDs) with an output wavelength greater than 400 nm and less than 700 nm, in a “local area network”.”;
- (iii) in 5A001(b)(2), by repealing “having any of the following characteristics” and substituting “having all of the following characteristics”;
- (iv) by repealing 5A001(b)(2)(a);
- (v) in 5A001(b)(2), by repealing –
  - “(b) Having all of the following:
    - (1) Automatically predicting and selecting frequencies and “total digital transfer rates” per channel to optimize the transmission; *and*
    - (2) Incorporating”
 and substituting –
  - “(a) Automatically predicting and selecting frequencies and “total digital transfer

rates” per channel to optimize the transmission;

- (b) Incorporating”;
- (vi) in 5A001(f), by repealing “cellular”;
- (vii) in 5A001, by adding –
  - “(g) Passive Coherent Location (PCL) systems or equipment, specially designed for detecting and tracking moving objects by measuring reflections of ambient radio frequency emissions, supplied by non-radar transmitters;

*Technical Note:*

Non-radar transmitters may include commercial radio, television or cellular telecommunications base stations.

Note:

5A001(g) does not include any of the following:

- (a) Radio-astronomical equipment;
  - (b) Systems or equipment, that require any radio transmission from the target.”;
- (ze) in the Dual-use Goods List, in Category 5, in Part 1, in sub-category 5E1 –
    - (i) in 5E001(c)(4)(a), by repealing “or”;
    - (ii) in 5E001(c)(4), by adding –
      - “(c) Operating in the 1.5 MHz to 87.5 MHz band and incorporating adaptive techniques providing more than 15 dB suppression of an interfering signal;”;

- (zf) in the Dual-use Goods List, in Category 5, in Part 2, in Note 3(c), in the Chinese text, by repealing “充份” and substituting “充分”;
- (zg) in the Dual-use Goods List, in Category 5, in Part 2, in sub-category 5A2 –
  - (i) in 5A002(a), in the Note, by repealing “5A002 does not control:” and substituting “5A002 does not include any of the following:”;
  - (ii) in 5A002(a), in Note (a)(1), by repealing “control under 5A002 Notes (b) to (f)” and substituting “5A002 Notes (b) to (g)”;
  - (iii) in 5A002(a), by repealing Note (e) and substituting –
    - “(e) Portable or mobile radiotelephones for civil use (e.g., for use with commercial civil cellular radiocommunications systems) that are not capable of transmitting encrypted data directly to another radiotelephone or equipment (other than Radio Access Network (RAN) equipment), nor of passing encrypted data through RAN equipment (e.g., Radio Network Controller (RNC) or Base Station Controller (BSC));”;
  - (iv) in 5A002(a), in Note (f), by repealing the full stop at the end and substituting a semicolon;
  - (v) in 5A002(a), by adding after Note (f) –
    - “(g) Portable or mobile radiotelephones and similar client wireless devices for civil use,

that implement only published or commercial cryptographic standards (except for anti-piracy functions, which may be non-published) and also meet the provisions of paragraphs (b) to (e) of the Cryptography Note (Note 3 in Category 5, Part 2), that have been customized for a specific civil industry application with features that do not affect the cryptographic functionality of these original non-customized devices.”;

- (zh) in the Dual-use Goods List, in Category 5, in Part 2, in sub-category 5D2, in 5D002, in the Chinese text, by repealing “注意：” and substituting “註釋：”;
- (zi) in the Dual-use Goods List, in Category 6, in sub-category 6A –
  - (i) in 6A001 –
    - (A) in 6A001(a)(2)(b), in the Technical Note, in the Chinese text, by repealing “(Able to be modified)”;
    - (B) by repealing 6A001(a)(2)(b)(6);
    - (C) by repealing 6A001(b) and substituting –
      - “(b) Correlation-velocity and Doppler-velocity sonar log equipment, designed to measure the horizontal speed of the equipment carrier relative to the sea bed, as follows:
        - (1) Correlation-velocity sonar log equipment having any of the following characteristics:



- (a) Designed to operate at distances between the carrier and the sea bed exceeding 500 m;
- (b) Having speed accuracy better than 1% of speed;
- and*
- (2) Doppler-velocity sonar log equipment having speed accuracy better than 1% of speed;

*Notes:*

- 1. 6A001(b) does not include depth sounders the function of which is limited to:
  - (a) Measuring the depth of water;
  - (b) Measuring the distance of submerged or buried objects; *or*
  - (c) Fish finding.
- 2. 6A001(b) does not include equipment specially designed for installation on surface vessels.”;

(ii) in 6A002 –

(A) by repealing 6A002(a) and substituting –

“(a) Optical detectors as follows:

- (1) “Space qualified” solid-state detectors as follows:

- (a) “Space qualified” solid-state detectors having all of the following characteristics:
  - (1) A peak response in the wavelength range exceeding 10 nm but not exceeding 300 nm;
  - (2) A response of less than 0.1% relative to the peak response at a wavelength exceeding 400 nm;
- (b) “Space qualified” solid-state detectors having all of the following characteristics:
  - (1) A peak response in the wavelength range exceeding 900 nm but not exceeding 1 200 nm;
  - (2) A response “time constant” of 95 ns or less; *and*
- (c) “Space qualified” solid-state detectors having a peak response in the wavelength range

exceeding 1 200 nm but  
not exceeding 30 000 nm;

- (2) Image intensifier tubes and specially designed components for image intensifier tubes, as follows:

*Note:*

6A002(a)(2) does not include non-imaging photomultiplier tubes having an electron sensing device in the vacuum space limited solely to:

- (a) A single metal anode; *or*
  - (b) Metal anodes with a centre to centre spacing greater than 500  $\mu\text{m}$ .
- (a) Image intensifier tubes having all of the following characteristics:
- (1) A peak response in the wavelength range exceeding 400 nm but not exceeding 1 050 nm;
  - (2) Electron image amplification using:
    - (a) A microchannel plate with a hole

pitch (centre-to-centre spacing) of 12  $\mu\text{m}$  or less; *or*

(b) An electron sensing device with a non-binned pixel pitch of 500  $\mu\text{m}$  or less, specially designed or modified to achieve 'charge multiplication' other than by a microchannel plate;

(3) Any of the following photocathodes:

(a) S-20, S-25 or multialkali photocathodes with a luminous sensitivity exceeding 350  $\mu\text{A}/\text{lm}$ ;

(b) GaAs or GaInAs photocathodes;

(c) Other "III/V compound"

semiconductor  
photocathodes;

*Note:*

6A002(a)(2)(a)

(3)(c) does not  
include

compound

semiconductor

photocathodes

with a maximum

radiant sensitivity

of 10 mA/W or

less.

(b) Image intensifier tubes  
having all of the  
following characteristics:

(1) A peak response in  
the wavelength range  
exceeding 1 050 nm  
but not exceeding  
1 800 nm;

(2) Electron image  
amplification using:

(a) A microchannel  
plate with a hole  
pitch (centre-to-  
centre spacing) of  
12  $\mu\text{m}$  or less; *or*

(b) An electron  
sensing device

with a non-binned pixel pitch of 500  $\mu\text{m}$  or less, specially designed or modified to achieve ‘charge multiplication’ other than by a microchannel plate;

- (3) “III/V compound” semiconductor (e.g., GaAs or GaInAs) photocathodes and transferred electron photocathodes; *and*

*Note:*

6A002(a)(2)(b)(3)

does not include compound semiconductor photocathodes with a maximum radiant sensitivity of 15 mA/W or less.

- (c) Specially designed components as follows:
- (1) Microchannel plates having a hole pitch

(centre-to-centre spacing) of 12  $\mu\text{m}$  or less;

- (2) An electron sensing device with a non-binned pixel pitch of 500  $\mu\text{m}$  or less, specially designed or modified to achieve ‘charge multiplication’ other than by a microchannel plate; *and*

- (3) “III/V compound” semiconductor (e.g., GaAs or GaInAs) photocathodes and transferred electron photocathodes; *and*

*Note:*

6A002(a)(2)(c)(3)

does not include compound

semiconductor

photocathodes

designed to achieve a

maximum radiant

sensitivity of:

- (a) 10 mA/W or less

at the peak response in the wavelength range exceeding 400 nm but not exceeding 1 050 nm; *or*

(b) 15 mA/W or less at the peak response in the wavelength range exceeding 1 050 nm but not exceeding 1 800 nm.

(3) Non-“space qualified” “focal plane arrays” as follows:

*N.B.:*

‘Microbolometer’ non-“space-qualified” “focal plane arrays” are only specified in 6A002(a)(3)(f).

*Technical Note:*

Linear or two-dimensional multi-element detector arrays are referred to as “focal plane arrays”.



*Notes:*

1. 6A002(a)(3) includes photoconductive arrays and photovoltaic arrays.
2. 6A002(a)(3) does not include:
  - (a) Multi-element (not to exceed 16 elements) encapsulated photoconductive cells using either lead sulphide or lead selenide;
  - (b) Pyroelectric detectors using:
    - (1) Triglycine sulphate and variants;
    - (2) Lead-lanthanum-zirconium titanate and variants;
    - (3) Lithium tantalate;
    - (4) Polyvinylidene fluoride and variants; *or*
    - (5) Strontium barium niobate and variants; *and*

(c) “Focal plane arrays” specially designed or modified to achieve ‘charge multiplication’ and limited by design to have a maximum radiant sensitivity of 10 mA/W or less for wavelengths exceeding 760 nm, having all of the following characteristics:

(1) Incorporating a response limiting mechanism designed not to be removed or modified;

(2) Any of the following characteristics:

(a) The response limiting mechanism is integral to or combined with the

detector

element;

- (b) The “focal plane array” is only operable with the response limiting mechanism in place.

*Technical Note:*

A response limiting mechanism integral to the detector element is designed not to be removed or modified without rendering the detector inoperable.

- (a) Non-“space qualified” “focal plane arrays” having all of the following characteristics:
- (1) Having individual elements with a peak response in the wavelength range exceeding 900 nm but not exceeding 1 050 nm;

(2) Any of the following characteristics:

(a) A response “time constant” of less than 0.5 ns;

(b) Specially designed or modified to achieve ‘charge multiplication’ and having a maximum radiant sensitivity exceeding 10 mA/W;

(b) Non-“space qualified” “focal plane arrays” having all of the following characteristics:

(1) Having individual elements with a peak response in the wavelength range exceeding 1 050 nm but not exceeding 1 200 nm;

(2) Any of the following characteristics:

(a) A response “time constant” of 95

ns or less;

(b) Specially

designed or  
modified to  
achieve ‘charge  
multiplication’  
and having a  
maximum radiant  
sensitivity  
exceeding 10  
mA/W;

(c) Non-“space-qualified”

non-linear (2-  
dimensional) “focal  
plane arrays” having  
individual elements with  
a peak response in the  
wavelength range  
exceeding 1 200 nm but  
not exceeding 30 000 nm;

*N.B.:*

Silicon and other  
material based  
‘microbolometer’ non-  
“space-qualified” “focal  
plane arrays” are only  
specified in  
6A002(a)(3)(f).

(d) Non-“space-qualified”

linear (1-dimensional)

“focal plane arrays”  
having all of the  
following:

- (1) Individual elements  
with a peak response  
in the wavelength  
range exceeding  
1 200 nm but not  
exceeding 3 000 nm;
- (2) Any of the following:
  - (a) A ratio of ‘scan  
direction’  
dimension of the  
detector element  
to the ‘cross-scan  
direction’  
dimension of the  
detector element  
of less than 3.8;
  - (b) Signal processing  
in the element  
(SPRITE);

*Note:*

6A002(a)(3)(d) does not  
include “focal plane  
arrays” (not to exceed 32  
elements) having  
detector elements limited  
solely to germanium  
material.

*Technical Note:*

For the purposes of 6A002(a)(3)(d), ‘cross-scan direction’ means the axis parallel to the linear array of detector elements and ‘scan direction’ means the axis perpendicular to the linear array of detector elements.

- (e) Non-“space-qualified” linear (1-dimensional) “focal plane arrays” having individual elements with a peak response in the wavelength range exceeding 3 000 nm but not exceeding 30 000 nm;
- (f) Non-“space-qualified” non-linear (2-dimensional) infrared “focal plane arrays” based on ‘microbolometer’ material having individual elements with an unfiltered response in the wavelength range

equal to or exceeding 8 000 nm but not exceeding 14 000 nm;

*Technical Note:*

For the purposes of 6A002(a)(3)(f),

‘microbolometer’ means a thermal imaging detector that, as a result of a temperature change in the detector caused by the absorption of infrared radiation, is used to generate any usable signal.

- (g) Non-“space-qualified” “focal plane arrays” having all of the following characteristics:
- (1) Having individual detector elements with a peak response in the wavelength range exceeding 400 nm but not exceeding 900 nm;
  - (2) Specially designed or modified to achieve ‘charge multiplication’ and



having a maximum  
radiant sensitivity  
exceeding 10 mA/W  
for wavelengths  
exceeding 760 nm;

- (3) Greater than 32  
elements;

*Technical Note:*

In 6A002(a), ‘charge multiplication’ is a form of electronic image amplification, and means the generation of charge carriers as a result of an impact ionization gain process. ‘Charge multiplication’ sensors may take the form of an image intensifier tube, solid-state detector or “focal plane array”.”;

- (B) in 6A002(c), by repealing “Direct view imaging equipment operating in the visible or infrared spectrum, incorporating any of the following:” and substituting “‘Direct view’ imaging equipment incorporating:”;
- (C) in 6A002(c)(1), by repealing “in 6A002(a)(2)(a); *or*” and substituting “in 6A002(a)(2)(a) or 6A002(a)(2)(b);”;
- (D) in 6A002(c)(2), by repealing “in 6A002(a)(3);” and substituting “in 6A002(a)(3) or 6A002(e); *or*”;
- (E) in 6A002(c), by adding before the

Technical Note –

- “(3) Solid-state detectors specified in 6A002(a)(1);”;
- (F) in 6A002(e), in the Chinese text, by repealing “每陳列” and substituting “每陣列”;
- (G) in 6A002(e), in the Chinese text, by repealing “焦平面陳列” and substituting “聚焦平面陣列”;
- (iii) in 6A003 –
- (A) by repealing 6A003(b)(3) and substituting –
- “(3) Imaging cameras incorporating image intensifier tubes having the characteristics listed in 6A002(a)(2)(a) or 6A002(a)(2)(b);”;
- (B) in 6A003(b)(4), by repealing “arrays” having any of the following” and substituting “arrays” having any of the following characteristics”;
- (C) in 6A003(b)(4)(a), by repealing “controlled by 6A002(a)(3)(a) to 6A002(a)(3)(e); *or*” and substituting “specified in 6A002(a)(3)(a) to 6A002(a)(3)(e);”;
- (D) in 6A003(b)(4)(b), by repealing “controlled by” and substituting “specified in”;
- (E) in 6A003(b)(4), by adding before the Notes –
- “(c) Incorporating “focal plane arrays” specified in 6A002(a)(3)(g);

- (d) Incorporating “focal plane arrays” specified in 6A002(e);”;
- (F) in 6A003(b)(4), in Note 1, in the Chinese text, by repealing “照相機” and substituting “攝影機”;
- (G) in 6A003(b)(4), in Note 2, in the Chinese text, by repealing “照相機” and substituting “攝影機”;
- (H) in 6A003(b)(4), in Note 3, in the Chinese text, by repealing “性的影像照相” and substituting “性的影像攝影”;
- (I) in 6A003(b)(4), in Note 3(b)(3), in the Technical Note, in the Chinese text, by repealing “照相機” and substituting “攝影機”;
- (J) in 6A003(b)(4), in Note 3(b)(4)(b), in the Chinese text, by repealing “照相機” and substituting “攝影機”;
- (K) in 6A003(b)(4), by renumbering Note 3(b)(4)(c) as Note 3(c);
- (L) in 6A003(b)(4), in Note 3(c), by repealing “Where the camera is specially designed for installation into a civilian passenger land vehicle of less than three tonnes (gross vehicle weight) and having all of the following” and substituting “The camera is specially designed for installation into a civilian passenger land vehicle of less than

- three tonnes (gross vehicle weight) and having all of the following characteristics”;
- (M) in 6A003(b)(4), in Note 3(c)(1), in the English text, by repealing “any of the following”;
- (N) in 6A003(b)(4), in Note 3(c)(1)(a), in the Chinese text, by repealing “照相機所擬適用的民用客運地面” and substituting “攝影機所擬適用的民用客運陸上”;
- (O) in 6A003(b)(4), in Note 3(c)(1)(b), by repealing “and”;
- (P) in 6A003(b)(4), in Note 3(c)(2), in the Chinese text, by repealing “照相機被移離其所擬適用的載具時，該機制強使該照相機” and substituting “攝影機被移離其所擬適用的載具時，該機制逼使該攝影機”;
- (Q) in 6A003(b)(4), in the Notes, by adding –
- “4. 6A003(b)(4)(c) does not include imaging cameras having any of the following characteristics:
- (a) Having all of the following characteristics:
- (1) Where the camera is specially designed for installation as an integrated component into indoor and wall-plug-operated systems

or equipment, limited by design for a single kind of application, as follows:

- (a) Industrial process monitoring, quality control, or analysis of the properties of materials;
  - (b) Laboratory equipment specially designed for scientific research;
  - (c) Medical equipment; *and*
  - (d) Financial fraud detection equipment;
- (2) Is only operable when installed in:
- (a) The system or equipment for which it was intended; *or*
  - (b) A specially designed, authorized maintenance test

facility;

- (3) Incorporates an active mechanism that forces the camera not to function when it is removed from the system or equipment for which it was intended;
- (b) The camera is specially designed for installation into a civilian passenger land vehicle of less than three tonnes (gross vehicle weight), or passenger and vehicle ferries having a length overall (LOA) 65 m or greater, and having all of the following characteristics:
- (1) Is only operable when installed in:
    - (a) The civilian passenger land vehicle or passenger and vehicle ferry for which it was intended; *or*
    - (b) A specially designed, authorized

maintenance test facility;

- (2) Incorporates an active mechanism that forces the camera not to function when it is removed from the vehicle for which it was intended;
- (c) Limited by design to have a maximum radiant sensitivity of 10 mA/W or less for wavelengths exceeding 760 nm, having all of the following characteristics:
- (1) Incorporating a response limiting mechanism designed not to be removed or modified;
  - (2) Incorporates an active mechanism that forces the camera not to function when the response limiting mechanism is removed;
- (d) Having all of the following characteristics:
- (1) Not incorporating a 'direct view' or

electronic image display;

- (2) Has no facility to output a viewable image of the detected field of view;
- (3) The “focal plane array” is only operable when installed in the camera for which it was intended;
- (4) The “focal plane array” incorporates an active mechanism that forces it to be permanently inoperable when removed from the camera for which it was intended.”;

(R) in 6A003(b), by adding after 6A003(b)(4) –  
 “(5) Imaging cameras incorporating solid-state detectors specified in 6A002(a)(1);”;

(S) in 6A003(b), in the Chinese text, by repealing “以下的影像照相” and substituting “以下的影像攝影”;

(iv) in 6A004 –

(A) by repealing “Optics” and substituting “Optical equipment and components”;



(B) in 6A004(a), by adding at the end –

*N.B.:*

For optical mirrors specially designed for lithography equipment, see 3B001.”;

(v) by repealing 6A005 and substituting –

“6A005 “Lasers”, other than those specified in 0B001(g)(5) or 0B001(h)(6), components and optical equipment, as follows:

*N.B.:*

See also 6A205.

*Notes:*

1. Pulsed “lasers” include those that run in a continuous wave (CW) mode with pulses superimposed.
2. Excimer, semiconductor, chemical, CO, CO<sub>2</sub>, and non-repetitive pulsed Nd:glass “lasers” are only specified in 6A005(d).
3. 6A005 includes fibre “lasers”.
4. The status of “lasers” incorporating frequency conversion (i.e. wavelength change) by means other than one “laser” pumping another “laser” is determined by applying the specified parameters for both the output of the source “laser” and

the frequency-converted optical output.

5. 6A005 does not include the following “lasers”:

(a) Ruby with output energy below 20 J;

(b) Nitrogen; *and*

(c) Krypton.

(a) Non-“tunable” continuous wave “(CW) lasers” having any of the following characteristics:

(1) Output wavelength less than 150 nm and output power exceeding 1 W;

(2) Output wavelength of 150 nm or more but not exceeding 520 nm and output power exceeding 30 W;

*Note:*

6A005(a)(2) does not include Argon “lasers” having an output power equal to or less than 50 W.

(3) Output wavelength exceeding 520 nm but not exceeding 540 nm and having:

(a) Single-transverse mode output and

- output power exceeding 50 W; *or*
- (b) Multiple-transverse mode output and output power exceeding 150 W;
- (4) Output wavelength exceeding 540 nm but not exceeding 800 nm and output power exceeding 30 W;
- (5) Output wavelength exceeding 800 nm but not exceeding 975 nm and having:
- (a) Single-transverse mode output and output power exceeding 50 W; *or*
- (b) Multiple-transverse mode output and output power exceeding 80 W;
- (6) Output wavelength exceeding 975 nm but not exceeding 1 150 nm and having:
- (a) Single-transverse mode output and having:

- (1) ‘Wall-plug efficiency’ exceeding 12% and output power exceeding 100 W; *or*
  - (2) Output power exceeding 150 W; *or*
- (b) Multiple-transverse mode output and having:
- (1) ‘Wall-plug efficiency’ exceeding 18% and output power exceeding 500 W; *or*
  - (2) Output power exceeding 2 kW;

*Note:*

6A005(a)(6)(b) does not include multiple-transverse mode, industrial “lasers” with output power exceeding 2 kW and not exceeding 6 kW

with a total mass greater than 1 200 kg. For the purpose of this Note, total mass includes all components required to operate the “laser”, e.g., “laser”, power supply, heat exchanger, but excludes external optics for beam conditioning or delivery or both.

- (7) Output wavelength exceeding 1 150 nm but not exceeding 1 555 nm and having:
  - (a) Single-transverse mode output and output power exceeding 50 W; *or*
  - (b) Multiple-transverse mode output and output power exceeding 80 W;
- (8) Output wavelength exceeding 1 555 nm and output power exceeding 1 W;

- (b) Non-“tunable” “pulsed lasers” having any of the following characteristics:
- (1) Output wavelength less than 150 nm and having:
    - (a) Output energy exceeding 50 mJ per pulse and “peak power” exceeding 1 W; *or*
    - (b) “Average output power” exceeding 1 W;
  - (2) Output wavelength of 150 nm or more but not exceeding 520 nm and having:
    - (a) Output energy exceeding 1.5 J per pulse and “peak power” exceeding 30 W; *or*
    - (b) “Average output power” exceeding 30 W;

*Note:*

6A005(b)(2)(b) does not include Argon “lasers” having an “average output

power” equal to or less than 50 W.

(3) Output wavelength exceeding 520 nm but not exceeding 540 nm and having:

(a) Single-transverse mode output and having:

(1) Output energy exceeding 1.5 J per pulse and “peak power” exceeding 50 W;

*or*

(2) “Average output power” exceeding 50 W;

*or*

(b) Multiple-transverse mode output and having:

(1) Output energy exceeding 1.5 J per pulse and “peak power” exceeding 150 W; *or*

(2) “Average output power”

- exceeding 150 W;
- (4) Output wavelength exceeding 540 nm but not exceeding 800 nm and having:
- (a) Output energy exceeding 1.5 J per pulse and “peak power” exceeding 30 W; *or*
- (b) “Average output power” exceeding 30 W;
- (5) Output wavelength exceeding 800 nm but not exceeding 975 nm and having:
- (a) “Pulse duration” not exceeding 1  $\mu$ s and having:
- (1) Output energy exceeding 0.5 J per pulse and “peak power” exceeding 50 W;
- (2) Single-transverse mode output and “average output



power”

exceeding 20 W;

*or*

- (3) Multiple-transverse mode output and “average output power”

exceeding 50 W;

*or*

- (b) “Pulse duration” exceeding 1  $\mu$ s and having:

- (1) Output energy exceeding 2 J per pulse and “peak power” exceeding 50 W;

- (2) Single-transverse mode output and “average output power”

exceeding 50 W;

*or*

- (3) Multiple-transverse mode output and “average output

- power”  
 exceeding 80 W;
- (6) Output wavelength exceeding 975 nm but not exceeding 1 150 nm and having:
- (a) “Pulse duration” of less than 1 ns and having:
- (1) Output “peak power” exceeding 5 GW per pulse;
- (2) “Average output power” exceeding 10 W;  
*or*
- (3) Output energy exceeding 0.1 J per pulse;
- (b) “Pulse duration” exceeding 1 ns but not exceeding 1  $\mu$ s and having:
- (1) Single-transverse mode output and having:
- (a) “Peak power”

- exceeding  
100 MW;
- (b) “Average  
output  
power”  
exceeding  
20 W  
limited by  
design to a  
maximum  
pulse  
repetition  
frequency  
less than  
or equal to  
1 kHz;
- (c) ‘Wall-plug  
efficiency’  
exceeding  
12%,  
“average  
output  
power”  
exceeding  
100 W and  
capable of  
operating  
at a pulse  
repetition  
frequency

- greater  
than 1 kHz;
- (d) “Average  
output  
power”  
exceeding  
150 W and  
capable of  
operating  
at a pulse  
repetition  
frequency  
greater  
than 1 kHz;  
*or*
- (e) Output  
energy  
exceeding  
2 J per  
pulse; *or*
- (2) Multiple-  
transverse mode  
output and  
having:
- (a) “Peak  
power”  
exceeding  
400 MW;
- (b) ‘Wall-plug  
efficiency’

- exceeding  
18% and  
“average  
output  
power”  
exceeding  
500 W;
- (c) “Average  
output  
power”  
exceeding  
2 kW; *or*
- (d) Output  
energy  
exceeding  
4 J per  
pulse; *or*
- (c) “Pulse duration”  
exceeding 1  $\mu\text{s}$  and  
having:
- (1) Single-  
transverse mode  
output and  
having:
- (a) “Peak  
power”  
exceeding  
500 kW;
- (b) ‘Wall-plug  
efficiency’

exceeding  
12% and  
“average  
output  
power”

exceeding  
100 W; *or*

(c) “Average  
output  
power”

exceeding  
150 W; *or*

(2) Multiple-  
transverse mode  
output and  
having:

(a) “Peak  
power”  
exceeding  
1 MW;

(b) “Wall-plug  
efficiency”  
exceeding  
18% and  
“average  
output  
power”  
exceeding  
500 W; *or*

- (c) “Average output power” exceeding 2 kW;
- (7) Output wavelength exceeding 1 150 nm but not exceeding 1 555 nm and having:
- (a) “Pulse duration” not exceeding 1  $\mu$ s and having:
    - (1) Output energy exceeding 0.5 J per pulse and “peak power” exceeding 50 W;
    - (2) Single-transverse mode output and “average output power” exceeding 20 W;  
*or*
    - (3) Multiple-transverse mode output and “average output power”

exceeding 50 W;

*or*

(b) “Pulse duration”  
exceeding 1  $\mu$ s and  
having:

(1) Output energy  
exceeding 2 J  
per pulse and  
“peak power”  
exceeding 50 W;

(2) Single-  
transverse mode  
output and  
“average output  
power”  
exceeding 50 W;

*or*

(3) Multiple-  
transverse mode  
output and  
“average output  
power”  
exceeding 80 W;

(8) Output wavelength  
exceeding 1 555 nm and  
having:

(a) Output energy  
exceeding 100 mJ per  
pulse and “peak



power” exceeding 1  
W; *or*

(b) “Average output  
power” exceeding  
1 W;

(c) “Tunable” “lasers” having any  
of the following characteristics:

*Note:*

6A005(c) includes titanium-  
sapphire (Ti: Al<sub>2</sub>O<sub>3</sub>), thulium-  
YAG (Tm: YAG), thulium-  
YSGG (Tm: YSGG),  
alexandrite (Cr: BeAl<sub>2</sub>O<sub>4</sub>),  
colour centre “lasers”, dye  
“lasers” and liquid “lasers”.

(1) Output wavelength less  
than 600 nm and having:

(a) Output energy  
exceeding 50 mJ per  
pulse and “peak  
power” exceeding  
1 W; *or*

(b) Average or CW  
output power  
exceeding 1 W;

(2) Output wavelength of  
600 nm or more but not  
exceeding 1 400 nm and  
having:

- (a) Output energy exceeding 1 J per pulse and “peak power” exceeding 20 W; *or*
  - (b) Average or CW output power exceeding 20 W;
- (3) Output wavelength exceeding 1 400 nm and having:
- (a) Output energy exceeding 50 mJ per pulse and “peak power” exceeding 1 W; *or*
  - (b) Average or CW output power exceeding 1 W;
- (d) Other “lasers”, not specified in 6A005(a), 6A005(b) or 6A005(c), as follows:
- (1) Semiconductor “lasers” as follows:
 

*Notes:*

    1. 6A005(d)(1) includes semiconductor “lasers” having optical output

connectors (e.g. fibre optic pigtails).

2. The status of semiconductor “lasers” specially designed for other equipment is determined by the status of the other equipment.

(a) Individual single-transverse mode semiconductor “lasers” having:

(1) Wavelength equal to or less than 1 510 nm and average or CW output power exceeding 1.5 W;  
*or*

(2) Wavelength greater than 1 510 nm and average or CW output power exceeding 500 mW;

(b) Individual multiple-transverse mode semiconductor

“lasers” having:

(1) Wavelength of less than 1 400 nm and average or CW output power

exceeding 10 W;

(2) Wavelength equal to or greater than 1 400 nm and less than 1 900 nm and average or CW output power

exceeding 2.5 W;

*or*

(3) Wavelength equal to or greater than 1 900 nm and average or CW output power exceeding 1 W;

(c) Individual semiconductor

“laser” ‘arrays’

having:

- (1) Wavelength of less than 1 400 nm and average or CW output power exceeding 80 W;
  - (2) Wavelength equal to or greater than 1 400 nm and less than 1 900 nm and average or CW output power exceeding 25 W;  
*or*
  - (3) Wavelength equal to or greater than 1 900 nm and average or CW output power exceeding 10 W;  
*and*
- (d) ‘Array stacks’ of semiconductor “lasers” containing at least one ‘array’

specified in  
6A005(d)(1)(c);

*Technical Notes:*

1. Semiconductor  
“lasers” are  
commonly called  
“laser” diodes.
  2. An ‘array’ consists of  
multiple  
semiconductor  
“laser” emitters  
fabricated as a single  
chip so that the  
centres of the emitted  
light beams are on  
parallel paths.
  3. An ‘array stack’ is  
fabricated by stacking,  
or otherwise  
assembling, ‘arrays’  
so that the centres of  
the emitted light  
beams are on parallel  
paths.
- (2) Carbon monoxide (CO)  
“lasers” having:
- (a) Output energy  
exceeding 2 J per  
pulse and “peak

- power” exceeding  
5 kW; *or*
- (b) Average or CW  
output power  
exceeding 5 kW;
- (3) Carbon dioxide (CO<sub>2</sub>)  
“lasers” having:
- (a) CW output power  
exceeding 15 kW;
- (b) Pulsed output with a  
“pulse duration”  
exceeding 10 μs and  
having:
- (1) “Average output  
power”  
exceeding  
10 kW; *or*
- (2) “Peak power”  
exceeding  
100 kW; *or*
- (c) Pulsed output with a  
“pulse duration”  
equal to or less than  
10 μs and having:
- (1) Pulse energy  
exceeding 5 J  
per pulse; *or*
- (2) “Average output  
power”

- exceeding  
2.5 kW;
- (4) Excimer “lasers” having:
- (a) Output wavelength  
not exceeding  
150 nm and having:
- (1) Output energy  
exceeding 50 mJ  
per pulse; *or*
- (2) “Average output  
power”  
exceeding 1 W;
- (b) Output wavelength  
exceeding 150 nm  
but not exceeding  
190 nm and having:
- (1) Output energy  
exceeding 1.5 J  
per pulse; *or*
- (2) “Average output  
power”  
exceeding  
120 W;
- (c) Output wavelength  
exceeding 190 nm  
but not exceeding  
360 nm and having:
- (1) Output energy  
exceeding 10 J  
per pulse; *or*



(2) “Average output power”

exceeding

500 W; *or*

(d) Output wavelength exceeding 360 nm and having:

(1) Output energy exceeding 1.5 J per pulse; *or*

(2) “Average output power”

exceeding 30 W;

*N.B.:*

For excimer “lasers” specially designed for lithography equipment, see 3B001.

(5) “Chemical lasers” as follows:

(a) Hydrogen Fluoride (HF) “lasers”;

(b) Deuterium Fluoride (DF) “lasers”; *and*

(c) “Transfer lasers” as follows:

(1) Oxygen Iodine (O<sub>2</sub>-I) “lasers”;  
*and*

- (2) Deuterium  
Fluoride-Carbon  
dioxide (DF-  
CO<sub>2</sub>) “lasers”;  
*and*

(6) ‘Non-repetitive pulsed’ Nd:  
glass “lasers” having:

- (a) “Pulse duration” not  
exceeding 1  $\mu$ s and  
output energy  
exceeding 50 J per  
pulse; *or*
- (b) “Pulse duration”  
exceeding 1  $\mu$ s and  
output energy  
exceeding 100 J per  
pulse;

*Note:*

‘Non-repetitive pulsed’  
refers to “lasers” that  
produce either a single  
output pulse or that have a  
time interval between  
pulses exceeding one  
minute.

- (e) Components as follows:
- (1) Mirrors cooled either by  
‘active cooling’ or by heat  
pipe cooling; *and*

*Technical Note:*

‘Active cooling’ is a cooling technique for optical components using flowing fluids within the subsurface (nominally less than 1 mm below the optical surface) of the optical component to remove heat from the optic.

- (2) Optical mirrors or transmissive or partially transmissive optical or electro-optical components, specially designed for use with specified “lasers”;  
*and*

- (f) Optical equipment as follows:

*N.B.:*

For shared aperture optical elements, capable of operating in “Super High Power Laser” (“SHPL”) applications, see Note 2(d) to ML19.

- (1) Dynamic wavefront (phase) measuring equipment capable of mapping at least 50 positions on a beam wavefront and having:

- (a) Frame rates equal to or more than 100 Hz and phase discrimination of at least 5% of the beam's wavelength;  
*or*
  - (b) Frame rates equal to or more than 1 000 Hz and phase discrimination of at least 20% of the beam's wavelength;
- (2) "Laser" diagnostic equipment capable of measuring "SHPL" system angular beam steering errors of equal to or less than 10  $\mu$ rad;
- (3) Optical equipment and components, specially designed for a phased-array "SHPL" system for coherent beam combination to an accuracy of  $\lambda /10$  at the designed wavelength, or 0.1  $\mu$ m, whichever is the smaller;  
*and*
- (4) Projection telescopes

specially designed for use  
with “SHPL” systems;

*Technical Note:*

In 6A005, ‘wall-plug efficiency’ means the ratio of “laser” output power (or “average output power”) to total electrical input power required to operate the “laser”, including the power supply/conditioning and thermal conditioning/heat exchanger. ”;

- (vi) in 6A006 –
  - (A) by repealing “and compensation systems” and substituting “and “compensation systems””;
  - (B) in 6A006(d), by repealing “Compensation systems” and substituting ““Compensation systems””;
- (vii) in 6A008 –
  - (A) in the Note, by repealing “6A008 does not control:” and substituting “6A008 does not include:”;
  - (B) in Note (b), by repealing “Car radar designed for collision prevention” and substituting “Civil Automotive Radar”;
  - (C) by repealing 6A008(a) and substituting –
    - “(a) Operating at frequencies from 40 GHz to 230 GHz and having:
      - (1) An average output power exceeding 100 mW; *or*

- (2) Locating accuracy of 1 m or less (better) in range and 0.2 degree or less (better) in azimuth;”;
- (D) in 6A008(g), in the Chinese text, by repealing “訊號處理” and substituting ““訊號處理””;
- (viii) in 6A108(b)(2)(a), by repealing “(0.5 mils)”;
- (ix) in 6A203(c), in the Technical Note, in the Chinese text, by repealing “幅射” and substituting “輻射”;
- (x) by repealing 6A205(f) and substituting –
  - “(f) Neodymium-doped (other than glass) “lasers” with an output wavelength between 1 000 nm and 1 100 nm, having any of the following characteristics:
    - (1) Pulse-excited and Q-switched with a pulse duration equal to or more than 1 ns, and having:
      - (a) A single-transverse mode output with an average output power greater than 40 W; *or*
      - (b) A multiple-transverse mode output with an average output power greater than 50 W;
    - (2) Incorporating frequency doubling to give an output wavelength between 500 nm and 550 nm with

an average output power greater than 40 W;”;

- (zj) in the Dual-use Goods List, in Category 6, in sub-category 6B –
- (i) in 6B004, in the Note, in the Chinese text, by repealing “貯目” and substituting “項目”;
- (ii) in 6B108 –
- (A) by repealing ““missiles” and other subsystems” and substituting ““missiles’ and their subsystems”;
- (B) by adding at the end –
- Technical Note:*  
In 6B108, ‘missiles’ means complete rocket systems and unmanned aerial vehicle systems capable of a range exceeding 300 km.”;
- (zk) in the Dual-use Goods List, in Category 6, in sub-category 6E, in 6E201, by repealing “controlled by 6A003, 6A005(a)(1)(c), 6A005(a)(2)(a), 6A005(c)(1)(b), 6A005(c)(2)(c)(2), 6A005(c)(2)(d)(2)(b)” and substituting “specified in 6A003, 6A005(a)(2), 6A005(b)(2), 6A005(b)(3), 6A005(b)(4), 6A005(b)(6), 6A005(c)(2), 6A005(d)(3)(c), 6A005(d)(4)(c)”;
- (zl) in the Dual-use Goods List, in Category 7, in sub-category 7A –
- (i) by repealing 7A001 and substituting –
- “7A001 Accelerometers as follows and specially designed components for accelerometers:  
*N.B.:*

For angular or rotational accelerometers, see 7A001(b). See also 7A101.

(a) Linear accelerometers having any of the following characteristics:

(1) Specified to function at linear acceleration levels less than or equal to 15 g and having:

(a) A “bias” “stability” of less (better) than 130 micro g with respect to a fixed calibration value over a period of one year;  
*or*

(b) A “scale factor” “stability” of less (better) than 130 ppm with respect to a fixed calibration value over a period of one year;

(2) Specified to function at linear acceleration levels exceeding 15 g and having:

(a) A “bias” “repeatability” of less (better) than 5 000



micro g over a period  
of one year; *and*

- (b) A “scale factor”  
“repeatability” of less  
(better) than 2 500  
ppm over a period of  
one year;

- (3) Designed for use in inertial  
navigation or guidance  
systems and specified to  
function at linear  
acceleration levels  
exceeding 100 g; *and*

- (b) Angular or rotational  
accelerometers, specified to  
function at linear acceleration  
levels exceeding 100 g;”;

- (ii) by repealing 7A002 and substituting –

“7A002 Gyros or angular rate sensors, having  
any of the following characteristics and  
specially designed components for  
gyros or angular rate sensors:

*N.B.:*

See also 7A102. For angular or  
rotational accelerometers, see  
7A001(b).

- (a) A “bias” “stability”, when  
measured in a 1 g environment  
over a period of one month, and  
with respect to a fixed

calibration value of less (better) than 0.5 degree per hour when specified to function at linear acceleration levels up to and including 100 g;

- (b) An “angle random walk” of less (better) than or equal to 0.0035 degree per square root hour;

*Note:*

7A002(b) does not include ‘spinning mass gyros’.

*Technical Note:*

‘Spinning mass gyros’ are gyros which use a continually rotating mass to sense angular motion.

- (c) A rate range greater than or equal to 500 degrees per second and having:

(1) A “bias” “stability”, when measured in a 1 g environment over a period of three minutes, and with respect to a fixed calibration value of less (better) than 40 degrees per hour; *or*

(2) An “angle random walk” of less (better) than or equal to 0.2 degree per square root hour;

- (d) Specified to function at linear acceleration levels exceeding 100 g;”;
- (iii) by repealing 7A003 and substituting –
- “7A003 Inertial systems and specially designed components, as follows:
- N.B.:*
- See also 7A103.
- (a) Inertial Navigation Systems (INS) (gimballed or strapdown) and inertial equipment, designed for “aircraft”, land vehicles, vessels (surface or underwater) or “spacecraft”, for navigation, attitude, guidance or control and having any of the following characteristics and specially designed components for those INS and inertial equipment:
    - (1) Navigation error (free inertial) subsequent to normal alignment of 0.8 nautical mile per hour (nm/h) ‘Circular Error Probable’ (‘CEP’) or less (better);
    - (2) Specified to function at linear acceleration levels exceeding 10 g;

- (b) Hybrid Inertial Navigation Systems embedded with Global Navigation Satellite System(s) (GNSS) or with “Data-Based Referenced Navigation” (“DBRN”) System(s) for navigation, attitude, guidance or control, subsequent to normal alignment and having an INS navigation position accuracy, after loss of GNSS or “DBRN” for a period of up to 4 minutes, of less (better) than 10 metres ‘CEP’;
- (c) Inertial Measurement equipment for heading, or True North determination and having any of the following characteristics and specially designed components for those Inertial Measurement equipment:
  - (1) Designed to have heading, or True North determination accuracy equal to or less (better) than 0.07 deg sec(Lat) equivalent to 6 arc minutes rms at 45 degrees latitude;
  - (2) Designed to have a non-operating shock level of

900 g or greater at a duration of 1 msec or greater; *and*

- (d) Inertial Measurement equipment including Inertial Measurement Units (IMU) and Inertial Reference Systems (IRS), incorporating accelerometers or gyros specified in 7A001 or 7A002, and specially designed components for those Inertial Measurement equipment;

*Notes:*

1. The parameters of 7A003(a) and 7A003(b) are applicable with any of the following environmental conditions:
  - (a) Input random vibration with an overall magnitude of 7.7 g rms in the first 0.5 hour and a total test duration of 1.5 hours per axis in each of the 3 perpendicular axes, when the random vibration meets all of the following:
    - (1) A constant power spectral density (PSD) value of  $0.04 \text{ g}^2/\text{Hz}$  over a frequency

- interval of 15 to 1 000 Hz;
- (2) The PSD attenuates with frequency from 0.04  $\text{g}^2/\text{Hz}$  to 0.01  $\text{g}^2/\text{Hz}$  over a frequency interval from 1 000 to 2 000 Hz;
- (b) An angular rate capability about one or more axes of equal to or more than +2.62 rad/s (150 deg/s);
- (c) According to national standards equivalent to Note 1(a) or (b) above.
2. 7A003 does not include inertial navigation systems which are certified for use on “civil aircraft” by civil authorities of a participating state.
3. 7A003(c)(1) does not include theodolite systems incorporating inertial equipment specially designed for civil surveying purposes.

*Technical Notes:*

1. 7A003(b) refers to systems in which an INS and other independent navigation aids are

built into a single unit (embedded) in order to achieve improved performance.

2. ‘Circular Error Probable’ (‘CEP’) – In a circular normal distribution, the radius of the circle containing 50% of the individual measurements being made, or the radius of the circle within which there is a 50% probability of being located.”;

(iv) by adding –

“7A008 Underwater sonar navigation systems using Doppler-velocity or correlation-velocity logs integrated with a heading source and having a positioning accuracy of equal to or less (better) than 3% of distance travelled ‘Circular Error Probable’ (‘CEP’) and specially designed components for those systems;

*Note:*

7A008 does not include systems specially designed for installation on surface vessels or systems requiring acoustic beacons or buoys to provide positioning data.

*N.B.:*

See 6A001(a) for acoustic systems, and 6A001(b) for correlation-velocity and Doppler-velocity sonar log equipment.

See 8A002 for other marine systems.”;

- (v) in 7A101(a) –
  - (A) by repealing Technical Note (2);
  - (B) by renumbering Technical Note (3) as Technical Note (2);
  - (C) by repealing Technical Note (4);
  - (D) in the Chinese text, by repealing “技術註譯” and substituting “技術註釋”;
- (vi) in 7A102 –
  - (A) by repealing ““drift rate” “stability”” and substituting “drift rate ‘stability’”;
  - (B) by repealing the Technical Note and substituting –
 

“*Technical Notes:*

    1. In 7A102, ‘missiles’ means complete rocket systems and “unmanned aerial vehicle” systems capable of a range exceeding 300 km.
    2. In 7A102, ‘stability’ means a measure of the ability of a specific mechanism or performance coefficient to remain invariant when continuously exposed to a fixed operating condition (IEEE STD 528-2001 paragraph 2.247).”;
- (vii) in 7A103 –
  - (A) in 7A103(b), by repealing “space launch vehicles controlled by 9A004, “unmanned



aerial vehicles” controlled by 9A012 or sounding rockets controlled by 9A104” and substituting ““missiles””;

- (B) in 7A103(c), by repealing the Technical Note and substituting –

*“Technical Note:*

An ‘integrated navigation system’ typically incorporates the following components:

- (a) An inertial measurement device (e.g. an attitude and heading reference system, inertial reference unit, or inertial navigation system);
- (b) One or more external sensors used to update the position or velocity or both, either periodically or continuously throughout the flight (e.g. satellite navigation receiver, radar altimeter, or Doppler radar);  
*and*
- (c) Integration hardware and software.”;

- (C) by adding after 7A103(c) –

“(d) Three axis magnetic heading sensors, designed or modified to be integrated with flight control and navigation systems, having all of the following characteristics, and specially designed components for those sensors:

- (1) Internal tilt compensation in pitch ( $\pm 90$  degrees) and roll ( $\pm 180$  degrees) axes;
- (2) Capable of providing azimuthal accuracy better (less) than 0.5 degrees rms at latitude of  $\pm 80$  degrees, reference to local magnetic field;

*Note:*

Flight control and navigation systems in 7A103(d) include gyrostabilizers, automatic pilots and inertial navigation systems.”;

(D) by adding after 7A103(d) –

*“Technical Note:*

In 7A103, ‘missiles’ means complete rocket systems and unmanned aerial vehicle systems capable of a range exceeding 300 km.”;

(zm) in the Dual-use Goods List, in Category 7, in sub-category 7B –

- (i) in 7B003, by repealing “controlled by 7A” and substituting “specified in 7A”;
- (ii) in 7B003, in Note (f), by repealing the full stop and substituting “; *and*”;
- (iii) in 7B003, in the Note, by adding –

“(g) Fibre optic gyro coil winding machines.”;

- (zn) in the Dual-use Goods List, in Category 7, in sub-category 7D –
  - (i) in 7D003(a), by repealing “7A003 or 7A004” and substituting “7A003, 7A004 or 7A008”;
  - (ii) in 7D003(b), by repealing “level specified in 7A003 by continuously combining inertial data” and substituting “levels specified in 7A003 or 7A008 by continuously combining heading data”;
  - (iii) by repealing 7D003(b)(1) and substituting –
    - “(1) Doppler radar or sonar velocity data;”;
- (zo) in the Dual-use Goods List, in Category 7, in sub-category 7E –
  - (i) in 7E002, in the Chinese text, by repealing “的技術” and substituting “的“技術””;
  - (ii) in 7E004(a), by adding –
    - “(7) “Data-Based Referenced Navigation” (“DBRN”) Systems designed to navigate underwater, using sonar or gravity databases, that provide a positioning accuracy equal to or less (better) than 0.4 nautical miles;”;
- (zp) in the Dual-use Goods List, in Category 8, in sub-category 8A –
  - (i) in 8A001 –
    - (A) in 8A001(b)(1), in the Chinese text, by repealing ““自主操作”” and substituting ““自主操作””;
    - (B) in 8A001(i)(1), in the Chinese text, by repealing “超像” and substituting “超過”;

- (ii) in 8A002 –
  - (A) by repealing “Systems and equipment, as follows:” and substituting “Marine systems, equipment and components, as follows:”;
  - (B) by repealing –
    - “*Note:*  
For underwater”
    - and substituting –
    - “*N.B.:*  
For underwater”;
  - (C) in 8A002(a), by repealing “Systems and equipment, specially designed or modified for submersible vehicles, designed” and substituting “Systems, equipment and components, specially designed or modified for submersible vehicles and designed”;
  - (D) in 8A002(a), by adding –
    - “(4) Components manufactured from material specified in 8C001;  
*Technical Note:*  
The objective of 8A002(a)(4) is not to be defeated by the export of ‘syntactic foam’ specified in 8C001 when an intermediate stage of manufacture has been performed and it is not yet in its final component form.”;
- (zq) in the Dual-use Goods List, in Category 8, in sub-category 8C, in 8C001, by adding at the end –

“N.B.:

See also 8A002(a)(4).”;

- (zr) in the Dual-use Goods List, in Category 9, by repealing “CATEGORY 9 – PROPULSION SYSTEMS, SPACE VEHICLES AND RELATED EQUIPMENT” and substituting “CATEGORY 9 – AEROSPACE AND PROPULSION”;
- (zs) in the Dual-use Goods List, in Category 9, in sub-category 9A –
- (i) in 9A007, in the N.B., by repealing “See also 9A119.” and substituting “See also 9A107 and 9A119.”;
  - (ii) in 9A008(a), in the Technical Note, in the Chinese text, by repealing “項而言” and substituting “而言”;
  - (iii) in 9A010 –
    - (A) in 9A010(a), in the Chinese text, by repealing “金屬“基體”“複合材料”、有機“複合材料”、陶瓷“基體”” and substituting “金屬“基材”、“複合物”、有機“複合物”、陶瓷“基材””;
    - (B) in 9A010(b), in the Chinese text, by repealing “金屬基體、複合材料、有機複合材料、陶瓷基體” and substituting “金屬“基材”、“複合物”、有機“複合物”、陶瓷“基材””;
  - (iv) in 9A012 –
    - (A) in 9A012(b), by adding –

- “(4) Air breathing reciprocating or rotary internal combustion type engines, specially designed or modified to propel “UAVs” at altitudes above 50 000 feet (15 240 metres);”;
- (B) in the Note, by repealing “control” and substituting “include”;
- (v) in 9A101 –
- (A) by repealing “Lightweight turbojet” and substituting “Turbojet”;
- (B) in 9A101(a)(2), in the English text, by repealing “0.15 kg/N/hr” and substituting “0.15 kg/N/h”;
- (C) in 9A101(b), by adding “or in ‘missiles’ regardless of thrust or specific fuel consumption” after ““missiles””;
- (D) in 9A101(b), by adding at the end –
- “*Technical Note:*  
In 9A101(b), ‘missiles’ means complete rocket systems and unmanned aerial vehicle systems capable of a range exceeding 300 km.”;
- (vi) by adding –
- “9A102 ‘Turboprop engine systems’ specially designed for “Unmanned Aerial Vehicles”, and specially designed components for those systems, having a maximum power greater than 10 kW (achieved uninstalled at sea level

standard conditions), excluding civil certified engines;

*Technical Note:*

For the purposes of 9A102, a ‘turboprop engine system’ incorporates all of the following:

- (a) Turboshaft engine;
  - (b) Power transmission system to transfer the power to a propeller.”;
- (vii) in 9A105(b), in the Chinese text, by repealing “完備火箭” and substituting “完整火箭”;
  - (viii) in 9A106 –
    - (A) by adding “or sounding rockets specified in 9A104” after ““missiles””;
    - (B) by repealing 9A106(e);
  - (ix) in 9A107, in the Chinese text, by repealing “完備火箭” and substituting “完整火箭”;
  - (x) in 9A108, by adding “or sounding rockets specified in 9A104” after ““missiles””;
  - (xi) in 9A111, by repealing “usable in “missiles”,” and substituting “usable in “missiles” or “Unmanned Aerial Vehicles” specified in 9A012,”;
  - (xii) by repealing 9A118 and substituting –
    - “9A118 Devices to regulate combustion usable in engines, which are usable in “missiles” or “Unmanned Aerial Vehicles” specified in 9A012, specified in 9A011 or 9A111;”;

(xiii) in 9A119, in the Chinese text, by repealing “完備火箭” and substituting “完整火箭”;

(xiv) by adding –

“9A120 Liquid propellant tanks, other than those specified in 9A006, specially designed for propellants specified in 1C111 or ‘other liquid propellants’, used in rocket systems capable of delivering at least a 500 kg payload to a range of at least 300 km;

*Note:*

In 9A120, ‘other liquid propellants’ includes, but is not limited to, propellants specified in the Munitions List.”;

(zt) in the Dual-use Goods List, in Category 9, in sub-category 9B –

(i) in 9B004, in the Chinese text, by repealing “9A003(a)(6)” and substituting “9E003(a)(6)”;

(ii) in 9B105 –

(A) by repealing ““missiles”” and substituting ““missiles””;

(B) by adding at the end –

*Technical Note:*

In 9B105, ‘missiles’ means complete rocket systems and unmanned aerial vehicle systems capable of a range exceeding 300 km.”;

(iii) in 9B106 –



- (A) by repealing 9B106(a) and substituting –
- “(a) Environmental chambers capable of simulating the following flight conditions:
- (1) Having any of the following:
    - (a) Altitude equal to or greater than 15 km;
    - (b) Temperature range from below 223 K (-50°C) to above 398 K (+125°C); *and*
  - (2) Incorporating, or designed or modified to incorporate, a shaker unit or other vibration test equipment to produce vibration environments equal to or greater than 10 g rms, measured ‘bare table’, between 20 Hz and 2 kHz imparting forces equal to or greater than 5 kN;

*Technical Notes:*

1. 9B106(a) describes systems that are capable of generating a vibration environment with a single wave (e.g. a sine wave) and systems capable of generating a broadband random vibration (i.e. power spectrum).

2. In 9B106(a), designed or modified means the environmental chamber provides appropriate interfaces (e.g. sealing devices) to incorporate a shaker unit or other vibration test equipment as specified in 2B116.”;
- (B) by repealing 9B106(b)(3) and substituting –
    - “(3) Temperature range from below 223 K (-50°C) to above 398 K (+125°C);”;
  - (iv) in 9B115 –
    - (A) by adding “9A102,” after “9A101,”;
    - (B) by repealing “9A119” and substituting “9A120”;
  - (v) in 9B116 –
    - (A) by adding “9A102,” after “9A101,”;
    - (B) by repealing “9A119” and substituting “9A120”;
  - (vi) by repealing 9B117 and substituting –

“9B117 Test benches and test stands for solid or liquid propellant rockets or rocket motors, usable for ‘missiles’ and their subsystems, having any of the following characteristics:

    - (a) The capacity to handle more than 68 kN of thrust;

- (b) Capable of simultaneously measuring the three axial thrust components;

*Technical Note:*

In 9B117, ‘missiles’ means complete rocket systems and unmanned aerial vehicle systems capable of a range exceeding 300 km.”;

- (zu) in the Dual-use Goods List, in Category 9, in sub-category 9D –

- (i) in 9D004, by adding –

“(f) “Software” specially designed to design the internal cooling passages of aero gas turbine engine blades, vanes and tip-shrouds;

- (g) “Software” having all of the following characteristics:

- (1) Specially designed to predict aero thermal, aeromechanical and combustion conditions in aero gas turbine engines;

- (2) Theoretical modelling predictions of the aero thermal, aeromechanical and combustion conditions, which have been validated with actual aero gas turbine engine (experimental or production) performance data;”;

- (ii) in 9D104, by adding “9A102,” after “9A101,”;

- (zv) in the Dual-use Goods List, in Category 9, in sub-category 9E –

- (i) in 9E001, by repealing “controlled by 9A001(c), 9A004 to 9A012” and substituting “specified in 9A001(b), 9A004 to 9A012, 9A350”;
- (ii) in 9E002, by repealing “controlled by 9A001(c), 9A004 to 9A011” and substituting “specified in 9A001(b), 9A004 to 9A011, 9A350”;
- (iii) in 9E003 –
  - (A) by repealing 9E003(a)(4) and (5) and substituting –
    - “(4) Uncooled turbine blades, vanes, tip-shrouds or other components designed to operate at gas path total (stagnation) temperatures of 1 323 K (1 050°C) or more at sea-level static take-off (ISA) in a ‘steady state mode’ of engine operation;
    - (5) Cooled turbine blades, vanes, tip-shrouds other than those described in 9E003(a)(1), exposed to gas path total (stagnation) temperatures of 1 643 K (1 370°C) or more at sea-level static take-off (ISA) in a ‘steady state mode’ of engine operation;”;
  - (B) in 9E003(a), by adding at the end –

“*Technical Note:*  
The term ‘steady state mode’ defines engine operation conditions, where the engine parameters, such as thrust/power,

rpm and others, have no appreciable fluctuations, when the ambient air temperature and pressure at the engine inlet are constant.”;

- (iv) in 9E101, by repealing “controlled by 9A101” and substituting “specified in 9A101, 9A102”;
- (v) in 9E102, by repealing “controlled by 9A004, “unmanned aerial vehicles” controlled by 9A012 or goods controlled by 9A005 to 9A011, 9A101” and substituting “specified in 9A004 or goods specified in 9A005 to 9A011, 9A101, 9A102”;
- (zw) in the Definitions of Terms –
  - (i) by repealing the definition of ““Bias” (accelerometer)” and substituting –
 

“7 “Bias” (accelerometer) (原偏置) (加速度計)

The average over a specified time of accelerometer output measured at specified operating conditions that has no correlation with input acceleration or rotation. “Bias” is expressed in  $[m/s^2, g]$  (IEEE STD 528-2001) (micro g equals  $1 \times 10^{-6}$  g).”;
  - (ii) by repealing the definition of ““Drift rate” (gyro)”;
  - (iii) in the definition of “FADEC”, by repealing “see “Full authority digital engine control”” and substituting “– see “Full authority digital engine control””;
  - (iv) in the definition of “Missiles”, by repealing “air” and substituting “aerial”;

- (v) by repealing the definition of “Peak power” and substituting –
- “6 “Peak power” (峰值功率)
- The highest level of power attained in the “laser duration”.”;
- (vi) in the Chinese text, in the definition of ““原始碼” (或源語言)”, by repealing “源語言” and substituting “原始語言”;
- (vii) in the Chinese text, in the definition of “測量精度誤差”, by repealing “隙” and substituting “隙”;
- (viii) in the Chinese text, in the definition of “熔態抽取”, by repealing ““熔態抽取” (Melt extraction)” and substituting –
- “1 “熔態抽取” (Melt extraction)”;
- (ix) in the Chinese text, in the definition of “飛行控制光感測器陣列”, by repealing ““飛行控制光感測器陣列” (Flight control optical sensor array)” and substituting –
- “7 “飛行控制光感測器陣列” (Flight control optical sensor array)”;
- (x) in the Chinese text, in the definition of “迅速地凝固化” –
- (A) by repealing “化”;
- (B) by repealing “1 000K/sec” and substituting “開氏1 000度/秒”;

- (xi) in the Chinese text, in the definition of “濃縮同位素 235 或 233 的鈾”, by repealing “百份比” and substituting “百分比”;
- (xii) in the Chinese text, in the definition of “焰火訊號彈”, by repealing “幅射” and substituting “輻射”;
- (xiii) in the Chinese text, in the definition of “特別可裂變物料”, by repealing –  
 “O “特別可裂變物料” (Special fissile material)”  
 and substituting –  
 “0 “特別可裂變物料” (Special fissile material)”;
- (xiv) by adding –  
 “3 6 “III/V compounds” (III/V 化合物)  
 Polycrystalline or binary or complex monocrystalline products consisting of elements of groups IIIA and VA of Mendeleev’s periodic classification table (e.g., gallium arsenide, gallium-aluminium arsenide, indium phosphide).  
 7 “Angle random walk” (角度隨機遊走)  
 The angular error build-up with time that is due to white noise in angular rate (IEEE STD 528-2001).  
 6 “Average output power” (平均輸出功率)  
 The total “laser” output energy in joules divided by the “laser duration” in seconds.

7 “Bias” (gyro) (原偏置) (陀螺儀)

The average over a specified time of gyro output measured at specified operating conditions that has no correlation with input rotation or acceleration. “Bias” is typically expressed in degrees per hour (deg/h) (IEEE STD 528-2001).

6 “Compensation systems” (補償系統)

Consist of the primary scalar sensor, one or more reference sensors (e.g. vector magnetometers) together with software that permit reduction of rigid body rotation noise of the platform.

6 “(CW) Laser” ((連續波)雷射器)

A “laser” that produces a nominally constant output energy for greater than 0.25 seconds.

6 “Laser duration” (雷射寬度)

The time over which a “laser” emits “laser” radiation, which for “pulsed lasers” corresponds to the time over which a single pulse or series of consecutive pulses is emitted.

6 “Pulsed laser” (脈衝式雷射器)

A “laser” having a “pulse duration” that is less than or equal to 0.25 seconds.

7 “Repeatability” (重複性)



The closeness of agreement among repeated measurements of the same variable under the same operating conditions when changes in conditions or non-operating periods occur between measurements (Reference: IEEE STD 528-2001 (one sigma standard deviation)).”.



Director-General of Trade and Industry

*1 December 2008*

#### **Explanatory Note**

This Order revises Schedule 1 to the Import and Export (Strategic Commodities) Regulations (Cap. 60 sub. leg. G) to reflect the latest changes in the control lists of strategic commodities adopted by various international non-proliferation regimes. The Order also rectifies certain textual errors in the Schedule.

## **ECONOMIC IMPLICATIONS**

The Order will facilitate the trade without compromising the integrity of our control system as the amendments reflect the latest control lists adopted by relevant international non-proliferation regimes. In particular, the relaxation of control over analogue-to-digital converter integrated circuits with resolution of 12 bits or more and certain portable or mobile radiotelephones and similar client wireless devices with cryptographic function will relieve relevant traders from the burden of applying for import and export licences for trading such products. This will help raise operational efficiency and indirectly lower the cost of operation. On the other hand, the imposition of new control over items concerned should not have significant effects on the import/export trade as these items are not commonly traded in Hong Kong.