

DEPARTMENT OF COMMERCE

Bureau of Industry and Security

15 CFR Parts 740, 742, 743, 772, and 774

[Docket No. 0908041218-91220-01]

RIN 0694 AE58

Wassenaar Arrangement 2008 Plenary Agreements Implementation: Categories 1, 2, 3, 4, 5 Parts I and II, 6, 7, 8 and 9 of the Commerce Control List, Definitions, Reports

AGENCY: Bureau of Industry and Security, Commerce.

ACTION: Final rule.

SUMMARY: The Bureau of Industry and Security (BIS) maintains the Commerce Control List (CCL), which identifies items subject to Department of Commerce export controls. This final rule revises the Export Administration Regulations (EAR) to implement changes made to the Wassenaar Arrangement's List of Dual Use Goods and Technologies (Wassenaar List)

maintained and agreed to by governments participating in the Wassenaar Arrangement on Export Controls for Conventional Arms and Dual Use Goods and Technologies (Wassenaar Arrangement, or WA). The Wassenaar Arrangement advocates implementation of effective export controls on strategic items with the objective of improving regional and international security and stability. To harmonize with the changes to the Wassenaar List, this rule revises the EAR by amending certain entries that are controlled for national security reasons in Categories 1, 2, 3, 4, 5 Part I (telecommunications), 5 Part II (information security), 6, 7, 8, and 9; adding new entries to the CCL, revising reporting requirements and adding and amending EAR Definitions.

The purpose of this final rule is to revise the CCL and definitions of terms used in the EAR to implement Wassenaar List revisions that were agreed upon in the December 2008 Wassenaar Arrangement Plenary Meeting.

This rule also adds or expands unilateral U.S. export controls and national security export controls on certain items to make them consistent with the amendments made to implement the Wassenaar Arrangement's decisions.

The Wassenaar Agreements that pertain to ECCNs 6A002, 6A003, and all related ECCNs will be implemented in a separate rule, because of the sensitivity of the items and complexity of procedures and controls for these items.

EFFECTIVE DATE: This rule is effective [INSERT DATE OF PUBLICATION].

FOR FURTHER INFORMATION CONTACT: For questions of a general nature contact Sharron Cook, Office of Exporter Services, Bureau of Industry and Security, U.S. Department of Commerce at (202) 482 2440 or E Mail: scook@bis.doc.gov.

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ADDRESSES: Comments regarding the collections of information associated with this rule, including suggestions for reducing the burden, should be sent to OMB Desk Officer, New Executive Office Building, Washington, DC 20503 Attention: Jasmeet Seehra, OMB Desk Officer, by e-mail at jseehra@omb.eop.gov or by fax to (202) 395-7285; and to the Office of

Administration, Bureau of Industry and Security, Department of Commerce, 14th and Pennsylvania Avenue, N.W., Room 6622, Washington, D.C. 20230.

SUPPLEMENTARY INFORMATION

Background

In July 1996, the United States and thirty-three other countries gave final approval to the establishment of a new multilateral export control arrangement called the Wassenaar Arrangement on Export Controls for Conventional Arms and Dual Use Goods and Technologies (Wassenaar Arrangement or WA). The Wassenaar Arrangement contributes to regional and international security and stability by promoting transparency and greater responsibility in transfers of conventional arms and dual use goods and technologies, thus preventing destabilizing accumulations of such items. Participating states committed to exchange information on exports of dual use goods and technologies to non-participating states for the purposes of enhancing transparency and assisting in developing a common understanding of the risks associated with the transfers of these items.

Expanded or New Export Controls

A detailed description may be found below of all revisions to Export Control Classification Numbers (ECCNs) that have expanded or new export controls.

This rule imposes new or expands National Security (NS) Column 1 controls. This rule imposes

a license requirement pursuant to section 742.4(a) of the EAR for exports and reexports to all destinations, except Canada, of certain commodities (and related software and technology) described in ECCN 5A002.a.7. This rule also imposes such a license requirement for certain software and technology controlled under ECCNs 5E001.c.6, .d, and .e, and 6D003.c. These destinations have an “X” in NS column 1 of the Commerce Country Chart of Supplement No. 1 to Part 738. The purpose of the controls is to ensure that these items do not make a contribution to the military potential of any other country or combination of countries that would prove detrimental to the national security of the United States. For designated terrorism supporting countries or embargoed countries, the applicable licensing policies are found in Parts 742 and 746 of the EAR, and in Supplement No. 1 to Part 736 of the EAR for Syria.

This rule imposes new or expands NS Column 2 controls. This rule imposes a license requirement under section 742.4(a) of the EAR for exports and reexports of commodities (and related software and technology) described in ECCNs 1A004.d, 1A008, 3A001.b.10 and .h, 5A001.h, 6A001.c, and 6A008.j.3 to destinations other than Country Group A:1, cooperating countries (see Supplement No. 1 to Part 740 of the EAR), Bulgaria, Czech Republic, Estonia, Hungary, Iceland, Latvia, Lithuania, Poland, Romania, Slovakia and Slovenia. This NS column 2 license requirement applies to destinations that have an “X” indicated in NS column 2 on the Commerce Country Chart of Supplement No. 1 to Part 738 of the EAR. The purpose of the control is to ensure that these items do not make a contribution to the military potential of countries in Country Group D:1 that would prove detrimental to the national security of the United States. For designated terrorism supporting countries or embargoed countries, the applicable licensing policies are found in Parts 742 and 746 of the EAR, and Supplement No. 1

to Part 736 of the EAR for Syria.

The licensing policy for national security controlled items exported or reexported to any country except a country in Country Group D:1 (see Supplement No. 1 to Part 740 of the EAR) is to approve license applications unless there is a significant risk that the items will be diverted to a country in Country Group D:1. The general policy for exports and reexports of items to Country Group D:1 is to approve license applications when BIS determines, on a case by case basis, that the items are for civilian use or would otherwise not make a significant contribution to the military potential of the country of destination that would prove detrimental to the national security of the United States.

This rule imposes new or expands anti-terrorism (AT) controls. This rule imposes a unilateral U.S. license requirement to export and reexport commodities (and related software and technology) controlled under ECCNs 1A004.d, 1A008, 3A001.b.10 and .h, 5A001.h, 5A002.a.7, 6A001.c, and 6A008.j.3 for AT reasons to Cuba, Iran, North Korea, Sudan and Syria, in addition to the national security controls imposed to implement the Wassenaar Arrangement's decisions. This rule also imposes such a license requirement for certain software and technology controlled under ECCNs 5E001.c.6, .d, and .e, and 6D003.c. These unilateral export controls are necessary because under Section 6(j) of the Export Administration Act of 1979 a license is required for items that could make a significant contribution to the military potential of such country or that could enhance the ability of such country to support acts of international terrorism. There is a general policy of denial for applications to export or reexport to terrorism supporting countries, as set forth in Part 742 of the EAR. In addition, certain of these countries are also subject to

embargoes, as set forth in Part 746 of the EAR and Supplement No. 1 to Part 736 of the EAR for Syria. A license is also required for the export and reexport of these items to specially designated terrorists and foreign terrorist organizations, as set forth in Part 744 of the EAR; license applications to these parties are reviewed under a general policy of denial.

All expanded foreign policy controls will be reflected in the Annual Foreign Policy report BIS sends to Congress.

Task Force on Editorial Issues (TFEI)

The Wassenaar Arrangement Task Force on Editorial Issues (TFEI) made revisions, editorial in nature, to clarify or correct control text or remove extraneous text. The TFEI revisions (over 2,000) were agreed upon by the WA in December 2007. This rule implements only those TFEI revisions that coincide with the revisions to ECCNs affected by the 2008 WA agreements and the 2007 WA agreements to Category 6. Other TFEI revisions will be implemented in a separate rule.

Revisions to the Commerce Control List

This rule revises a number of entries on the Commerce Control List (CCL) to implement the December 2008 agreed revisions to the Wassenaar List of Dual Use Goods and Technologies. This rule also revises language to provide a complete or more accurate description of controls in certain ECCNs. A description of the specific amendments to the CCL pursuant to the December 2008 Wassenaar Agreement is provided below. There is one newly added ECCN – 1A008, as

described below. As described below, the amendments apply to ECCNs 1A001, 1A002, 1A003, 1A004, 1A007, 1A008, 1B001, 1B003, 1C008 1C010, 1D003, 1E001, 1E002, 2A983, 3A001, 3A002, 3B001, 4D001, 4D003, 4E001, 5A001, 5B001, 5D001, 5E001, 5A002, 5B002, 5D002, 5E002, 6A001, 6A004, 6A005, 6A006, 6A008, 6A996, 6D003, 6E993, 7A003, 8A001, 8A002, and 9A012.

Category 1 Special Materials and Related Equipment, Chemicals, “Microorganisms,” and Toxins

This rule revises the name of the Category 1 from “Materials, Chemicals, “Microorganisms,” and Toxins” to read “Special Materials and Related Equipment, Chemicals, “Microorganisms,” and Toxins” to more clearly describe the scope of items within this category as it has evolved over recent years, (e.g., addition of explosive related items).

ECCN 1A001 is amended by:

- a. Adding two commas to 1A001.a and 1A001.b, as part of the TFEI revisions to clarify the meaning of these paragraphs; and
- b. Modifying the format of paragraph 1A001.c to clarify that the items must contain both criteria. This change was made as part of the TFEI changes.

ECCN 1A002 is amended as follows:

- a. Removing the redundant Note after 1A002.a, which also appeared after 1A002.b.2 to harmonize with the Wassenaar Arrangement’s List;
- b. Replacing the word “with” with the phrase “having all of the following” to clarify the

- meaning of 1A002.b.1. This change was made as part of the TFEI changes;
- c. Moving or adding three Notes after 1A002.b.2 to clarify that all three apply to the entire entry for ECCN 1A002. The modifications are: moving the existing Note concerning the repair of “civil aircraft” so that it appears as Note 1; moving the existing Note about civilian applications to Note 2; and adding Note 3 to release certain finished or semi-finished items from 1A002 control because these items do not have a direct influence on development, production or use on military relevant equipment; and
 - d. Removing Technical Notes 1 and 2 that provided definitions for ‘specific modulus’ and ‘specific tensile strength’ because these terms are global definitions used in multiple ECCNs and are found in Part 772 of the EAR.

ECCN 1A003 is amended by:

- a. Revising the Heading to correct the spelling of “polyimides” and to clarify that non-fusible aromatic polyimide products in film, sheet, tape or ribbon form with certain characteristics are appropriately controlled in ECCN 1A003, because a clarification Note was approved by Wassenaar in 2006 that identified the forms of non-fluorinated polymeric substances controlled by 1C008.a to include liquid or solids in the form of resin, powder, pellet, film, sheet, tape, or ribbon. It was not the intent, however, to override the existing Note in 1C008.a for non-fusible forms.
 - a.1. Deleting the word “characteristics” from the Heading as part of the TFEI revisions.
- b. Revising the Related Controls to add a reference to 1C008.a.3 for “fusible” aromatic polyimides in any form; and
- c. Replacing “With a” with “A” as a TFEI format change.

ECCN 1A004 is amended, as follows:

- a. Adding two commas to the Heading to clarify the meaning of the text, as part of the TFEI revisions.
- b. Revising the License Requirement section to add RS Column 2 controls for 1A004.d to keep the same controls that were in ECCN 2A983.b, which are necessary because of the military utility of these commodities.
 - b1. Adding single quotation marks around the term 'adapted for use in war' in related definitions and in 1A004.a, .b and .c and the term 'riot control agents' in the related definitions section and in 1A004.a.4.
 - b.2. Adding a greek alpha symbol in front of "Bromobenzeneacetonitrile" in 1A004.a.4.a and adding a greek omega symbol in front of "chloroacetophenone" in 1A004.a.4.c to conform to Wassenaar text.
- c. Adding a new paragraph 1A004.d to control electronic equipment designed for automatically detecting or identifying the presence of "explosives" (as listed in the annex at the end of Category 1) residues and utilizing 'trace detection' techniques (e.g., surface acoustic wave, ion mobility spectrometry, differential mobility spectrometry, mass spectrometry). These new controls are added for this equipment to prevent potential terrorists from discovering how to defeat the devices and ensure they are used by properly vetted organizations.
- d. Adding a new Technical Note to define 'trace detection'.
- e. Adding two new Notes to indicate that 1A004.d does not control equipment specially designed for laboratory use or non-contact walk-through security portals.
- f. Revising paragraph b of the existing decontrol Note to clarify that 1A004 does not

control equipment limited by design or function to protect against hazards specific to residential safety.

ECCN 1A007 is amended by:

- a. Removing the License Requirement Note in order to conform to the Wassenaar List;
and
- b. Removing the last sentence in Technical Note 2, because it is redundant to text already included in the Technical Note.

ECCN 1A008 is added to control (explosive) charges, devices and components for national security reasons. The addition is necessary to make these items controlled by all participating states of WA, because of their utility in conventional weapons. The United States and others have unilaterally controlled these items for several years and there is agreement by the WA to broaden control of terrorist related items, such as these. Most of these items were controlled under ECCN 1C018, as well as under the International Traffic in Arms Regulations (ITAR) by the Directorate of Defense Trade Control (DDTC) of the Department of State. Now these items will be controlled for NS:2 , AT:1, and UN (Iraq, North Korea and Rwanda) reasons under ECCN 1A008. Because of the creation of this new ECCN 1A008, this rule makes corresponding changes to ECCN 1C018 (deletion of 1C018.a, .b, and .i). A reference to ECCNs 1C018 and 1C992 is included in the Related Control paragraph of ECCN 1A008, and a reference to 1A008 is added to the Related Controls paragraph of 1C018. In addition, Related Control notes concerning State Department jurisdiction that were in 1C018 are also added to 1A008 when appropriate.

ECCN 1B001 is amended by revising the phrase “and/or” to read “or” in paragraph f.2 of the List of Items Controlled section, to clarify the meaning of the text, as part of the TFEI revisions.

ECCN 1B003 is amended by:

- a. Revising the Heading by replacing an “or” with a comma, and adding the phrase “any of the following” to clarify the text as part of the TFEI revisions; and
- b. Revising paragraph 1B003.c to be more specific about which structures (1B003.a) and engines (1B003.b) the specially designed components are controlled for, as part of the TFEI revisions.

ECCN 1C008 is amended by:

- a. Removing a comma in the Heading to clarify the text as part of the TFEI revisions;
- b. Revising Note 1 by revising the phrase “solid form” to read “solid fusible form” to make it clear that the intent was not to specify non-fusible forms;
- c. Replacing Note 2 with a Nota Bene to reference ECCN 1A003 for controls for non-“fusible” aromatic polyimides in film, sheet, tape, or ribbon form;
- d. Removing the redundant word “acids” from 1C008.b.2 as part of the TFEI revisions, because acid appears as a descriptor in each of the subparagraphs; and
- e. Adding single quotes around the term ‘glass transition temperature (Tg)’ in 1C008.f, and in the Technical Note that follows, because this term is defined in the Technical Note that follows this paragraph.

ECCN 1C010 is amended by:

- a. Adding a comma in the Heading to clarify the text as part of the TFEI revisions;
- b. Adding double quotes around the terms “specific modulus” and “specific tensile strength” in paragraphs 1C010.a.1., a.2, b.1, b.2, c.1, and Note 1 after c.2, because these terms are defined in Part 772 of the EAR;
- c. Adding a reference to “ISO 10618 (2004) 10.2.1 Method A” in the Technical Note following paragraph 1C010.b.2 and removing a reference to an example of a national equivalent tow test “such as Japanese Industrial Standard JIS-R-7601, Paragraph 6.6.2” to clarify how better to determine the properties for materials described in 1C010.b;
- d. Replacing the word “percent” with the percent symbol in the Note to 1C010.c;
- e. Re-indexing the sub-entries in the Note to 1C010.c. to conform to the WA text;
- f. Adding a comma and the phrase “having any of the following” in 1C010.d;
- g. Adding a comma after “as follows” and adding the phrase “having all of the following” in 1C010.e;
- h. Removing the word “With” in 1C010.e.2.a and e.2.b, because it was superfluous; and
- i. Adding single quotes around the term ‘glass transition temperature (Tg)’ in 1C010.e and Notes in multiple locations to indicate that this term is defined within this ECCN entry.

ECCN 1C018 is amended by:

- a. Adding a Related Control Note #8 to reference ECCN 1A008 for shaped charges, detonating cord, and cutters and severing tools, so the public will know to where these items were moved;

- b. Adding a Related Control Note #9 to read “See ECCN 1E001 for the “development” or “production” “technology” for the commodities controlled by ECCN 1C018, but not explosives or energetic materials that are under the jurisdiction of U.S. Department of State, Directorate of Defense Trade Controls.”
- c. Removing and reserving paragraphs 1C018.a and .i, because these items are now controlled under the newly created ECCN 1A008, as well as adding a reference to ECCN 1A008 in the Related Controls paragraph of the List of Items Controlled section;
- d. Revising paragraph 1C018.b to remove the words “Detonating cord or”, because this item was moved to ECCN1A008.

ECCN 1D003 is amended by adding a reference to the Heading for the newly added paragraph 1A004.d, to add controls over software specially designed or modified to enable electronic equipment designed for automatically detecting or identifying the presence of “explosives”. RS controls are also being added to this software, because of the utility in conventional weapons.

ECCN 1E001 is amended by:

- a. Revising the reference to 1A006 to read 1A006.b in the Heading and in the NS Column 1 control paragraph, to focus the technology control to the development or production of 'disruptors';
- b. Adding 1A008 to the Heading and to the NS Column 1 control paragraph, because 1E001 applies to all 1A ECCNs controlled for NS reasons;
- c. Removing 1C992 from the list of ECCNs not controlled by 1E001, because the technology used to develop and produce 1C018 is the same as that used to develop and

- produce 1C992 commodities;
- d. Adding “RS” to the Reasons for Control paragraph; and
- e. Adding RS Column 2 controls for technology for the development, production, or use of 1A004.d to maintain RS controls formerly imposed under ECCN 2E983;
- f. Adding 1A008 to the NS:1 controls;

ECCN 1E002 is amended by:

- a. Removing a comma in the Heading to correct the punctuation, as a TFEI revision;
- b. Removing the word “characteristics” from 1E002.c.1 because it was unnecessary, as part of the TFEI revisions;
- c. Revising paragraphs c.1.b, c.1.b.1, and c.1.b.2 to clarify the text as part of the TFEI revisions;
- d. Replacing the period with a semi-colon at the end of 1E002.f to fix the punctuation as part of the TFEI revisions;
- e. Adding single quotes around the term ‘libraries’ in paragraph 1E002.g because it is a term defined in the Technical Note that follows that paragraph;
- f. Adding a reference in 1E002.g to 1A004.d to control ‘libraries’ related to electronic equipment designed for automatically detecting or identifying the presence of “explosives”; and
- g. Removing the words “the term” in the Technical Note following paragraph 1E002.g, because these words were unnecessary in the sentence.

An Annex “List of Explosives (see ECCNs 1A004 and 1A008)” is added to the end of Category

1 in order to clarify the controls in ECCNs 1A004 and 1A008.

Category 2 – Materials Processing

ECCN 2A983 is amended by removing and reserving paragraph b in the Items paragraph of the List of Items Controlled, because this type of explosive detection equipment is now controlled for national security reasons under ECCN 1A004 and the technology is controlled for regional stability reasons under 1E001.d.

Category 3 – Electronics

Category 3 is amended by removing the last sentence in the Nota Bene which appears at the beginning of Category 3 and states “If the integrated circuit is a silicon-based “microcomputer microcircuit” or microcontroller microcircuit described in 3A001.a.3 having an operand (data) word length of 8 bit or less, the status of the integrated circuit is determined in 3A001.a.3”, because in 2005 the Wassenaar Arrangement removed microcircuits manufactured from a silicon based semiconductor from 3A001.a.3.

ECCN 3A001 is amended by:

- a. Revising the License Exception GBS eligibility paragraph to add newly controlled 3A001.b.10 (oscillators or oscillator assemblies) and 3A001.h (solid-state power semiconductor switches, diodes, or 'modules').
 - a.1. Adding dashes in front of each of the listed items in Note 2 after 3A001.a to be consistent with WA text.
- b. Revising the control parameters for ‘field programmable logic devices’ in 3A001.a.7,

by replacing 3A001.a.7.a through a.7.c with new paragraphs 3A001.a.7.a and 3A001.a.7.b. The parameters for field programmable logic devices were confusing, difficult to apply, and dated. The new control parameters are clearer and take into account advances in technology.

- c. Adding Technical Note 2 after 3A001.a.7.b to help people better understand the scope of this entry.
- d. Revising the parameters for 3A001.a.10 (Custom integrated circuits for which the function is unknown, or the control status of the equipment in which the integrated circuits will be used is unknown to the manufacturer) from more than “1,000 terminals” to “1,500 terminals” in 3A001.a.10.a, and from a typical “basic gate propagation delay time” of less than “0.1 ns” to “0.02 ns” in 3A001.a.10.b. The threshold for the number of terminals for custom integrated circuits is increased to 1,500, because integrated circuits with more than 1,000 terminals are losing controllability, and more terminals are needed for civil use integrated circuits.
- e. Revising the average output power density parameter for microwave power amplifiers in 3A001.b.8.b to read “average output power to mass ratio” in order to avoid any confusion with the parameter for antenna output, because, in the case of RF transmission, power density is normally expressed in terms of Watts per unit area (W/m²) and usually applies to antenna output.
 - e.1. Removing a comma after (MPM) to correct the punctuation in 3A001.b.9;
- f. Adding a new paragraph 3A001.b.10 to control oscillators or oscillator assemblies and a new Technical Note to clarify calculations involving operating frequency. This new control concerns the enhanced control of equipment for generating low phase noise

signals, i.e., synthesized frequency generators, stable oscillators and stable oscillator assemblies. Low phase noise performance is especially important for search radar systems, as it determines the ultimate capability of the radar to detect low radar cross-section platforms in the presence of clutter, which is especially useful for military applications. The stable oscillator sets the baseline noise performance of these systems. Commercial applications for low phase noise oscillators include digital radio using Quadrature Amplitude Modulation (QAM), low-jitter communications, photonic-based communications and low-cost reference oscillators for accurate phase measurements. Low phase noise test equipment is commonly used for the research development and evaluation of modern wireless communication applications including cellular phones, commercial satellites and local area networks (LANs).

- g. Removing the parenthetical phrase “(i.e., ‘signal processing’ devices employing elastic waves in materials)” from 3A001.c.1 and c.2, because this example caused more confusion than clarity.
- h. Adding single quotes around the term ‘frequency side-lobe rejection’ in 3A001.c.1.b.1 and c.1.c.3 to indicate that this is a defined term in the entry and adding a Technical Note below 3A001.c.1.c.3 to define the term.
- i. Revising the ‘frequency side-lobe rejection’ parameter from “55 dB” to “65 dB” in 3A001.c.1.b.1 and c.1.c.3 because of technological advances.
- j. Revising the frequency parameter for bulk (volume) acoustic wave devices in 3A001.c.2 from “2.5 GHz” to “6 GHz” because of technological advances.
- k. Adding a Note after 3A001.c.3 to exclude acoustic wave devices that are limited to a single band pass, low pass, high pass or notch filtering, or resonating function from

3A001.c control;

- l. Revise the text “‘Cells’ and photovoltaic arrays as follows:” to read “‘Cells’ as follows:” in 3A001.e.1 to correct an error in the rule published on October 14, 2008 (73 FR 60910) when photovoltaic arrays were removed from this paragraph;
 - l.1. Adding single quotes around the term ‘secondary cells’ to indicate that this term is defined in this entry.
- m. Replacing the period with a semi-colon in 3A001.e.4 to correct the punctuation as part of the TFEI revisions.
- n. Revising the parameters for rotary input type absolute position encoders in 3A001.f by removing the two subparagraphs 3A001.f.1 and f.2 and replacing the accuracy of “better than ± 2.5 seconds of arc” with “equal to or less (i.e., better) than ± 1.0 second of arc” because of technological advances.
 - n.1. Replacing a period with a semi-colon after 3A001.g.2.b to correct punctuation for the addition of 3A001.h.
- o. Adding a new paragraph 3A001.h to control solid-state power semiconductor switches, diodes, and 'modules', as well as a Technical Note to define ‘modules’. Several Notes are also added: Note 1 to explain repetitive peak off-state voltage; Note 2 to provide the scope (parameters) of 3A001.h; and Note 3 to explain that 3A001.h does not apply to switches, diodes, or 'modules' incorporated into equipment designed for civil automobile, civil railway, or "civil aircraft" applications. This new control for solid-state power semiconductor switches is added, because for military applications such as combat vehicles, even a small improvement in the maximum junction temperature of switches can have a big impact on reducing heat exchanger volume and weight--thus

permitting the power converter to operate at a higher frequency, resulting in reduced power converter volume.

ECCN 3A002 is amended by:

- a. Removing a comma in 3A002.a.6 to correct the punctuation;
- a.1. Making a technical correction to the switching time control from "10 ns" to "312 ps" to correlate this control to the carrier frequency points and bandwidths referenced in 3A002.d.3; and
- b. Adding a minimum synthesized frequency parameter of 3.2 GHz for synthesized signal generators in 3A002.d.4, as well as increasing (i.e., tightening) the phase noise control threshold in frequency regimes of greatest concern to the military, while leaving most commercial instruments uncontrolled. Also, by adding a Technical Note for 3A002.d.4 to explain what the "F" is in the parameter.

3B001 is amended by:

- a. Adding a new Note after 3B001.a.1 to explain that 3B001.a.1 includes atomic layer epitaxy equipment; and
- b. Replacing the word "and" with a comma to correct the grammar in 3B001.f.3.

Category 4 Computers

ECCN 4D001 is amended by:

- a. Revising the Heading to harmonize with the Wassenaar Arrangement list;
- b. Revising the Adjusted Peak Performance (APP) parameter in the License Exception

TSR paragraph from 0.1 Weighted TeraFLOPS (WT) to 0.5 WT to harmonize with the increase in the APP control threshold and in consideration of technological advances;

- c. Adding the phrase “equipment as follows” to the end of 4D001.b to clarify this sentence, as part of the TFEI revisions; and
- d. Revising the APP parameter from “0.04 WT” to “0.10 WT” in 4D001.b.1, because processor technology is expected to continue to advance while transistors continue to shrink in size. The control level for software and technology is adjusted to 0.10 WT in consideration of the processors that are available in 2009.

ECCN 4D003 is amended by:

- a. Revising the Heading by making the former 4D003.c the Heading, because 4D003.c is the only paragraph left in the entry;
- b. Revising the License Exception TSR paragraph to replace the existing text “Yes, except 4D003.c” with “N/A”, because 4D003.c is now the Heading;
- c. Revising the Related Controls paragraph to direct the reader to Category 5, Part 2, regarding the treatment of information security;
- d. Deleting 4D003.a (Operating system “software”, “software” development tools and compilers specially designed for “multi-data-stream processing” equipment, in “source code”), because nearly all hardware now includes support for “multi-data-stream processing” and a huge array of software available in “source code” is readily available throughout the world and on the internet; and
- e. Removing paragraph 4D003.c and moving this control parameter to the Heading, because it’s the only paragraph left in this entry.

WA agreed to remove the definition for “multi-data stream processing” from the WA definitions, because WA agreed to remove 4D003.a which was the only place where the term was used on the WA list. However, the term is still used on the CCL in ECCN 4E993, a unilateral entry, and therefore, this rule does not remove the term “multi-data-stream processing” from Part 772 of the EAR.

ECCN 4E001 is amended by:

- a. Revising the Heading by making editorial revisions as part of the TFEI revisions;
- b. Revising the License Exception TSR paragraph by revising the APP threshold from “0.1 WT” to “0.5 WT” to harmonize with the increase in the APP control threshold and in consideration of technological advances;
- c. Adding the phrase “equipment as follows” to the end of 4E001.b to clarify this sentence, as part of the TFEI revisions; and
- d. Revising the APP parameter from “0.04 WT” to “0.10 WT” in 4E001.b.1, because processor technology is expected to continue to advance while transistors continue to shrink in size. The control level for software and technology is adjusted to 0.10 WT in consideration of the processors currently available.

Category 5, Part I Telecommunications

ECCN 5A001 is amended by:

- a. Revising the NS Column 2 control paragraph to add 5A001.h, which is a newly added control for electronic equipment designed or modified to prematurely activate or

- prevent the initiation of Radio Controlled Improvised Explosive Devices (RCIED);
- b. Revising the License Exception LVS paragraph to add eligibility for 5A001.h at the \$5,000 limit to accommodate low value shipments to countries listed in Country Group B;
 - c. Revising 5A001.f, f.1, and f.2 by making editorial revisions as part of the TFEI revisions;
 - d. Adding a new parameter paragraph 5A001.f.3, regarding jamming equipment, to ensure that telephony systems cannot be disrupted by undesirable elements and organizations;
 - e. Replacing the reference to the “Munitions List” with the equivalent U.S. regulations “International Traffic in Arms Regulations (ITAR) (22 CFR Parts 120-130)” in the Nota Bene following 5A001.f.3;
 - f. Removing a period from “5A001.g.” to read “5A001.g” in the Note after 5A001.g to correct the punctuation; and
 - g. Adding a new control paragraph 5A001.h to control electronic equipment designed or modified to prematurely activate or prevent the initiation of Radio Controlled Improvised Explosive Devices as part of the multilateral effort to stem terrorist activities.
 - h. Adding a Nota Bene after paragraph 5A001.h to reference the ITAR, because some specific equipment classified under 5A001.h may be under the jurisdiction of the Directorate of Defense Trade Control, Department of State.

ECCN 5B001 is amended by:

- a. Revising the Heading to add clarifying text to more accurately describe the scope of this

entry as part of the TFEI revisions.

- b. Removing reference to ECCNs 5D001 and 5E001 from 5B001.a to remove the ambiguity of the reference.
- c. Adding a comma to 5B001.a to clarify the text as part of the TFEI revisions;
- d. Removing a period from “5B001.a.” to read “5B001.a” in the Note after 5B001.a to correct the punctuation.
- e. Adding text that limits the scope of parameter in 5B001.b.2.b to clarify that this paragraph does not control equipment for development of optical amplification using praseodymium -doped fibers, and that this control is limited to equipment for development of praseodymium-doped fibers. The control language of 5B001.b.2 is nearly identical to that of 5E001.c.2, which indicates that these two sections were intended to be harmonized. Nevertheless, the scope of control of optical amplification in 5B001.b.2.b (all optical amplification) is much broader than the corresponding scope of control in 5E001.c.2.b (limited to optical amplification using praseodymium-doped fluoride fiber amplifiers (PDFFA)).
- f. Capitalizing the words “Quadrature-Amplitude-Modulation” in 5B001.b.4 because it is followed by an acronym, as part of the TFEI revisions.

ECCN 5D001 is amended by;

- a. Revising the Heading to make editorial revisions as part of the TFEI revisions;
- b. Adding a comma after “equipment” and removing a comma and replacing the period with a semi-colon in 5D001.a to correct the punctuation as part of the TFEI revisions;
- c. Removing the reference to 5B001 in 5D001.a because the intent was to refer to 5A001

only;

- d. Replacing a period with a semi-colon in 5D001.b and .c to correct the punctuation, as part of the TFEI revisions;
- e. Adding a comma to the number 1750 in 5D001.d.2.a to correct the punctuation, as part of the TFEI revisions; and
- f. Capitalizing Quadrature-Amplitude-Modulation in 5D001.d.4 because it is followed by an acronym, as part of the TFEI revisions.

ECCN 5E001 is amended by:

- a. Removing a comma in the Heading to correct the punctuation as part of the TFEI revisions.
- b. Making editorial revisions in 5E001.a, including removing the reference to ECCN 5B001 and revising the reference to 5D001 to read 5D001.a, to focus the ECCN on control, as part of the TFEI revisions.
- c. Revising “technologies” to read “technology” and removing a comma in 5E001.b to correct the sentence as part of the TFEI revisions.
- d. Replacing the period with a semi-colon in 5E001.b.4 to correct the punctuation as part of the TFEI revisions.
- e. Removed the phrase “telecommunication transmission or switching equipment, functions or features” in 5E001.c because it was unnecessary, as part of the TFEI revisions.
- f. Capitalized “Praseodymium-Doped Fluoride Fiber Amplifiers” in 5E001.c.2.b, because it is followed by an acronym, as part of the TFEI revisions.

- g. Replacing the control parameter “exceeding 8 optical carriers in a single optical window” with “of optical carriers at less than 100 GHz spacing” for equipment employing a “laser” in 5E001.c.2.d. “The number of optical carriers in a single window” is not technically adequate in specifying such equipment because the size of “a single window” (equal to the range of wavelength) is not always the same. Therefore, “spacing” in GHz was adopted as the parameter for defining this technology.
- h. Adding a Nota Bene to reference Product Group E of Category 6 for "technology" for the "development" or "production" of non-telecommunications equipment employing a "laser".
- i. Capitalizing the words “Amplitude-Modulation” in 5E001.c.4.a because it is followed by an acronym, as part of the TFEI revisions.
- j. Making minor changes to 5E001.c.4.c (removing the word “or” from the end of that clause) and c.5 (inserting the word “or” at the end of that clause), as a result of adding a new paragraph 5E001.c.6 to control “technology” according to the General Technology Note for the “development” or “production” of mobile equipment. Until recently, component technology and related communications technology have been the major obstacles in developing practical, wideband UV communications systems. However, component technology has recently advanced. Ultraviolet communications systems technology provides a means of highly covert, non-line-of-sight (NLOS) communications and Ethernet-speed wireless digital communications which are of strategic interest and concern.
- k. Adding two new paragraphs 5E001.d and .e to control “technology” according to the General Technology Note for the "development" or "production" of Microwave

Monolithic Integrated Circuit (MMIC) power amplifiers specially designed for telecommunications, and electronic devices and circuits containing components manufactured from "superconductive" materials, specially designed for telecommunications. The aim of these new controls is to clarify the status of technology for the development or production of two classes of components, MMIC power amplifiers and superconductor devices. If the devices are not specially designed for telecommunications and specified in Category 3, the corresponding technology for their development or production is controlled by reference in Category 3, Group E. Category 5, Part 1 did not specify MMIC power amplifiers or superconductor devices (such as high-Q superconductor filter, used in wireless systems). As such, the controllability of the technologies was in question even where the technologies exceeded Category 3 control thresholds and were the same technologies for the more generally designed Category 3 devices. Adding the new control paragraphs to 5E001 clarifies the control status of these technologies when specially designed for telecommunications devices.

Category 5, Part 2 “Information Security”

ECCN 5A002 is amended by:

- a. Making editorial changes to the Note at the beginning of the Items paragraph of the List of Items Controlled section by removing the parenthesis around paragraph letters ‘a’ through ‘g’ to make the entry consistent with other ECCN entries as part of the TFEI revisions.
- b. Revising the Note at the beginning of the Items paragraph of the List of Items

Controlled section by adding a new paragraph 'h' to release from 5A002 control equipment specially designed for the servicing of portable or mobile radiotelephones and similar client wireless devices that meet all the provisions of the Cryptography Note, as well as other listed parameters. The mass-marketed mobile devices include several kinds of product security features, both in hardware and "software". The product security features require service equipment capable of having a coded signal with the mobile devices being serviced. The equipment to be decontrolled includes test devices, "software" update devices and related accessories.

c. Revising the Note at the beginning of the Items paragraph of the List of Items

Controlled section by adding a new paragraph 'i' to exclude from control certain short-range wireless products (i.e., for personal area networks) with an operating range not exceeding 30 meters. The rationale for adding a new Note 'i' is that wireless personal area networking products are not of strategic concern due to their distance limitation and predominant civil use in applications such as home entertainment systems, peripherals for laptops and personal computers, cell phone headsets, iPod headphones and home/business/industrial automation. A limitation of 30 meters is the typical range of such equipment according to the manufacturers' specifications. This equipment is manufactured worldwide. The key element of this proposal is that wireless personal area networking equipment and components are based on limited short-range wireless technologies. The primary examples currently are Bluetooth (IEEE 802.15.1), Wibree (ultra low power Bluetooth) and ZigBee (IEEE 802.15.4). This new Note 'i' does not decontrol wireless local area networks, such as those based on the WiFi standard (IEEE 802.11), which operate over greater distances and encrypt data for transmission across

networks such as the Internet.

- d. Adding a new paragraph 5A002.a.7 to control non-cryptographic information and communications technology (ICT) security systems and devices meeting certain criteria. Highly secure ICT systems and devices are used in various military, government and commercial businesses, especially for connecting and/or segregating networks with different levels of information sensitivity. The recent improvements to high assurance technology (e.g., development of secure kernels) means that it is now very easy to build high assurance ICT security products without ‘military-grade’ security components.

ECCN 5B002 is amended by:

- a. Revising the Heading by making editorial changes, as part of the TFEI revisions; and
- b. Revising 5B002.a and .b to remove circular references.

ECCN 5D002 is amended by:

- a. Revising the Heading to make clarifying changes as part of the TFEI revisions;
- b. Revising 5D002.a and c.1 to remove circular references and focus the ECCN on the control.
- c. Replacing periods with semi-colons in 5D002.a and b as part of the TFEI revisions.

ECCN 5E002 is amended by revising the reference “5D002” to read “5D002.a or 5D002.c” in the Heading, as well as the EI control paragraph and the License Requirement Note of the License Requirement section, to focus the ECCN on control.

Category 6 Sensors

ECCN 6A001 is amended by:

- a. Revising the License Exception LVS eligibility paragraph to add eligibility for 6A001.c (Diver deterrent acoustic systems) at a \$5,000 limit.
- b. Revising the License Exception GBS and CIV eligibility paragraphs to add eligibility for 6A001.c, because this is basically an anti-terrorism device and the concern here is in regards to the export or reexport of the device to E:1 countries;
 - b.1. In the Note that follows 6A001.a.1, adding the phrase “equipment as follows” to conform to the WA text;
- c. Replacing the period with a semi-colon at the end of 6A001.b, because of the addition of paragraph 6A001.c; and
- d. Adding a new paragraph 6A001.c and two Notes to control diver deterrent acoustic systems to reduce the threat of attacks on ports, harbors, offshore platforms, shipping and coastal facilities.

ECCN 6A004 is amended by:

- a. Revising the Heading to better represent the scope of this entry, as part of the TFEI revisions;
- b. Removing a comma from 6A004.a to correct the punctuation, as part of the TFEI revisions;
- c. Replacing the word “lambda” with the scientific symbol for lambda “ λ ” in two places in 6A004.a.4, as part of the TFEI revisions;

- d. Replacing the period with a semi-colon in 6A004.b.2, c.4, and d.4 to correct the punctuation, as part of the TFEI revisions;
- e. Adding the word “components” to 6A004.c.1 and c.4 to add consistency to the list of components in 6A004.c, as part of the TFEI revisions;
- e.1. Adding the word “raw” to the beginning of 6A004.c.2 and adding the word “processed” in front of the second “substrates” to conform with Wassenaar text;
- e.2. Removing a superfluous comma in 6A004.d to correct the punctuation;
- f. Adding the word “equipment” to 6A004.d.1 and d.2 to add consistency to the list of equipment in 6A004.d, as part of the TFEI revisions;
- g. Removing the word “characteristics” from 6A004.e because it was unnecessary, as part of the TFEI revisions;
- h. Removing unnecessary words from 6A004.e.1, e.2, and e.3 to make the parameters more concise, as part of the TFEI revisions;
- i. Replacing the semi-colon with a period to correct the punctuation in 6A004.e.3 as this is the last subparagraph of 6A004, as part of the TFEI revisions;
- j. Adding single quotes around ‘aspheric optical elements’ in the Note for 6A004.e, as part of the TFEI revisions;
- k. Removing unnecessary words from the Note for 6A004.e to make the Note more concise, as part of the TFEI revisions.

ECCN 6A005 is amended by:

- a. Replacing the word “in” with “by” to correct the preposition in Note 2 at the beginning of the Items paragraph and in 6A005.d, as part of the TFEI revisions;

- b. Replacing the words “the following” with “as follows” for consistency in text typically used in the Wassenaar List, as part of the TFEI revisions;
- c. Removing a comma in 6A005.a, b, b.6.b, c, d, d.1, d.1.a, d.1.a.2, d.1.b, d.1.b.2, d.1.c, d.4, d.5, d.5.c, e, f, to correct the punctuation, as part of the TFEI revisions;
- d. Removing unnecessary words, such as “A”, “An”, “having”, “having an”, or “with an” in nearly every paragraph in the Items paragraph of the List of Items Controlled section, and in some cases replacing the words “having an” with the word “and”;
- e. Replacing the double quotes with single quotes around the term ‘Wall-plug efficiency’ in 6A005.a.6.a.1 and a.6.b.1, because the term is defined in the Related Definition section of 6A005;
- f. Replacing the period with a semi-colon in 6A005.a.8, d.1.b.3, d.1.c.3, and d.1.d to correct the punctuation, as part of the TFEI revisions;
- g. Adding the words “equal to or” in 6A005.b.6.b to correct a minor oversight in the established controls, leading to a loophole for a certain type of laser with a pulse duration of 1 ns;
- h. Adding commas to 6A005.c.2., d.1.c.1, d.1.c.2, d.1.c.3, e.2 and f.3, to correct the punctuation and clarify the paragraphs, as part of the TFEI revisions;
- i. Adding single quotes around the terms ‘array’ and ‘array stacks’ in 6A005.d.1.d and in the Technical Note following this paragraph to indicate that the terms are defined in the Technical Note below paragraph 6A004.d.1.d, as well as removing the phrase “that is” and replacing the word “under” with “by” to conform to the WA text;
- j. Replacing double quotes with single quotes around the term ‘non-repetitive pulsed’ in 6A005.d.6 and the Note following 6A005.d.6.b to indicate that the term is defined in

this Note, as part of the TFEI revisions;

- k. Adding single quotes around the term 'active cooling' in 6A005.e.1 and the Technical Note following this paragraph to indicate that the term is defined in this Technical Note;
- l. Replacing the word "lambda" with the scientific symbol " λ ", in 6A005.f.3 as part of the TFEI revisions.

ECCN 6A006 is amended by:

- a. Deleting the extra "and" in the Heading to correct the sentence, as part of the TFEI revisions;
- b. Replacing the term "noise level (sensitivity)" with the term 'sensitivity' in the License Exception LVS eligibility paragraph, and in the following subparagraphs 6A006.a.1.a, a.1.b, a.2, a.3, a.4, a.5, b, c.2., and c.3 because this term was condensed and defined in the Technical Note after 6A006.d as a term more commonly used by manufacturers;
- c. Adding double quotes around the term "Magnetometers" in 6A006.a.1, a.2, a.3, because this term is defined in Part 772 of the EAR;
- d. Removing the word "characteristics" from 6A006.a.1 because it is unnecessary, as part of the TFEI revisions;
- e. Adding the modifier "at a frequency of 1 Hz" to 6A006.a.2 to clarify the parameter;
- f. Replacing the period with a semi-colon in 6A006.b to correct the punctuation, as part of the TFEI revisions;
- g. Replacing the capitalization with lower case letters in "underwater electric field sensors" of 6A006.d to correct the grammar, as part of the TFEI revisions;

- h. Adding a Technical Note after 6A006.d to define the term ‘sensitivity’, because this term is used throughout 6A006 and is a more common term used by manufacturers than “noise level”.
- i. Adding parentheses around “rms” wherever it appears in 6A006 to conform to WA text.

ECCN 6A008 is amended by:

- a. Removing the unnecessary word “characteristics” from the Heading to make it more concise, as part of the TFEI revisions;
- b. Replacing the alphabetic bullets with dashes to simplify the list in the Note at the beginning of the items paragraph, as part of the TFEI revisions;
- c. Removing the words “Having a” from 6A008.b to remove the redundant wording that also appears in the Heading, as part of the TFEI revisions;
- d. Adding the word “and” to correct the grammar and clarify the sentence in 6A008.h, as part of the TFEI revisions;
- e. Replacing the phrase “provided that all the following conditions are met” with the more commonly used “and having all of the following” in 6A008.i, Note b to bring consistency and clarity, as part of the TFEI revisions;
- f. Removing unnecessary words from the Note following 6A008.i to provide more concise wording, as part of the TFEI revisions;
- g. Replacing a comma with “and” in 6A008.j to correct the grammar, as part of the TFEI revisions;
- h. Moving the “or” from 6A008.j.1 to 6A008.j.2 because of the addition of new paragraph 6A008.j.3;

- i. Adding a new paragraph 6A008.j.3 and 3 new Notes to control “laser” radar or Light Detection and Ranging equipment for airborne bathymetric littoral surveys (surveys of shores for troop deployment); and
- j. Replacing the word “with” with “and having” in 6A008.k and .l to clarify the sentence and use more commonly used text, as part of the TFEI revisions.

ECCN 6A996 is amended by:

- a. Replacing the words “noise level (sensitivity)” with ‘sensitivity’ in 6A996.a, because it is the more commonly used term to describe this parameter.
- b. Adding a Technical Note after paragraph 6A996.a to define the term ‘sensitivity’.
- c. Adding parentheses around the term “rms” in 6A996.a.

ECCN 6D003 is amended by:

- a. Deleting a comma in the Heading to correct the punctuation.
- b. Making RS controls applicable to paragraph ‘c’ in the Reasons for Control paragraph under the License Requirements section.
- c. Adding section headings, such as “Acoustics”, throughout the Items paragraph to assist the reader.
- d. Replacing a period with a semi-colon to correct the punctuation in 6D003.a.4, as part of the TFEI revisions.
- e. Adding a new paragraph 6D003.c to control software designed or modified for cameras incorporating "focal plane arrays" specified by 6A002.a.3.f and designed or modified to remove a frame rate restriction and allow the camera to exceed the frame rate specified

in 6A003.b.4 Note 3.a. With the addition of this paragraph, a license is now required to export or reexport the software that would give an uncontrolled camera the capability of a controlled camera.

- f. Removing a comma to correct the punctuation of 6D003.f and .h as part of the TFEI revisions.
- g. Adding the acronym “ATC” after “Air Traffic Control” in paragraph 6D003.h.1, as part of the TFEI revisions.
- h. Replacing the word “which” with “and having all of the following” in 6D003.h.2 to use the more commonly used text to introduce a list of parameters, as part of the TFEI revisions.
- i. Removing superfluous words from 6D003.h.2.a, as part of the TFEI revisions; and
- j. Replacing double quotes with single quotes around the term ‘average side lobe level’ in 6A008.h.2.b and in the Technical Note that follows, as part of the TFEI revisions, to indicate that the term is defined in the entry.

ECCN 6E993 is amended by:

- a. Replacing the word “with” with “having all of the following” in 6E993.a for consistency;
- b. Removing superfluous words from 6E993.a.1 and a.2 to be more concise;
 - b.1. Replacing the word “lambda” with the scientific symbol and adding parentheses around the term “rms” in 6E993.a.2 to harmonize with WA text.
 - b.2. Replacing the phrase “of less” with “lower (better)” and adding parentheses around the term “rms” to harmonize with Wassenaar text in 6E993.d.1 and d.2.

- c. Replacing the term “noise level” with ‘sensitivity’ in 6E993.d.1 and d.2 to use a more common manufacturing term;
- d. Adding a Technical Note after 6E993 d.2 to define ‘sensitivity’.

Category 7 Navigation and Avionics

ECCN 7A003 is amended by:

- a. Correcting the capitalization and replacing the word “therefore” with “as follows” in the Heading to be consistent with typically used text, as part of the TFEI revisions;
- b. Deleting a comma and adding a comma to correct the punctuation, and removing the superfluous word “characteristics” in 7A003.a, as part of the TFEI revisions;
- c. Replacing a comma with the word “and” in 7A003.a and .b to correct sentence structure and to clarify the sentence, as part of the TFEI revisions;
- d. Correcting the capitalization, removing the superfluous word “characteristics” from 7A003.c, and adding the word “and” to 7A003.c as part of the TFEI revisions;
- e. Adding parenthesis and removing an extraneous space to add clarity to 7A003.c.1, as part of the TFEI revisions;
- f. Removing a hyphen in 7A003.c.2 to conform with WA text; and
- g. Replacing the word “that” with “which” in Note 2 to 7A003 to conform with WA text.

Category 8 Marine

ECCN 8A001 is amended by:

- a. Removing a comma in 8A001.b to correct the punctuation;
- b. Adding single quotes around the term ‘operate autonomously’ in 8A001.b.1 to indicate

the term is defined in the Technical Note following 8A001.b.3.b, as part of the TFEI revisions;

- c. Removing 8A001.b.3.a and b.3.d and redesignating 8A001.b.3.b and 8A001.b.3.c as 8A001.b.3.a and 8A001.b.3.b respectively, as well as adding the word “continuously” in the new 8A001.b.3.a to meet new technological and market developments;
- d. Removing superfluous words in the new 8A001.b.3.b, and the word “and”
- e. Replacing the double quotes with single quotes around the term ‘operate autonomously’ in Technical Note 1 and 2 that follows 8A001.b.3.b, as part of the TFEI revisions;
- f. Replacing the double quotes with single quotes around the term ‘range’ in Technical Note 2 that follows 8A001.b.3.b, as part of the TFEI revisions, as well as replacing the word “cover” with ‘operate autonomously’;
- g. Replacing a comma with an “and” in 8A001.c to fix the grammar and add clarity, as part of the TFEI revisions;
- h. Removing superfluous words from 8A001.c.2, d.2, d.3, f.1, f.2, f.3, i.1, i.2 to be more concise, as part of the TFEI revisions;
- i. Adding an “and” to clarify the sentence in 8A001.e.2, as part of the TFEI revisions;
- j. Removing the superfluous word “characteristics” in 8A001.f, as part of the TFEI revisions;
- k. Replacing the word “tons” with “tonnes” in 8A001.i.1 and i.2, because WA meant metric tonnes, which differs from American tons in weight and to conform with WA text;
- l. Adding single quotes around the term ‘small waterplane area vessel’ in 8A001.i.2 and in the Technical Note that follows, to indicate that this is a defined term in this entry, as

part of the TFEI revisions; and

- m. Replacing the word “draught” with “draft” in the Technical Note after 8A001.i.2, to conform to the WA text.

ECCN 8A002 is amended by:

- a. Adding the word “Marine” to the Heading to be more descriptive, as part of the TFEI revisions;
- b. Adding “and” to 8A002.a to add clarity as part of the TFEI revisions;
- c. Replacing the word “in” with “by” and a period with a semi-colon in 8A002.a.4, as part of the TFEI revisions;
- d. Replacing the words “The object of this control” with “The objective of 8A002.a.4” in the Technical Note that follows 8A002.a.4 to be more precise, as part of the TFEI revisions;
- e. Adding single quotes around the term ‘syntactic foam’ in the Technical Note after 8A002.a.4. to indicate that the term is defined in the entry, as part of the TFEI revisions;
- f. Adding commas around the clause “using navigation data”, removing the word “and”, and adding the phrase “and having any of the following” to 8A002.b for clarity, as part of the TFEI revisions;
- g. Deleting a comma to correct the punctuation in 8A002.d as part of the TFEI revisions;
- h. Adding single quotes around the term ‘limiting resolution’ in 8A002.d.1.a and d.1.b to indicate that the term is defined in the Technical Note that follows 8A002.d.1.c.2, as part of the TFEI revisions, as well as removing the phrase “in television” to conform

with WA text;

- i. Replacing the word “containing” with “and having” to clarify the sentence, as part of the TFEI revisions;
- j. Deleting a comma and replacing a comma with “and” in 8A002.d.2 to clarify the sentence, as part of the TFEI revisions;
- k. Replacing the word “having” with “with” and removing a superfluous comma in 8A002.e to clarify the sentence, as part of the TFEI revisions;
- l. Moving the phrase “as follows” to the end of 8A002.g to clarify the sentence, as part of the TFEI revisions;
- m. Replacing the comma with “and” in 8A002.h,i, o.1.e, o.2.d, and o.3.a to clarify the sentence, as part of the TFEI revisions;
- n. Moving the word “composite” in 8A002.h.2 to clarify the sentence, as part of the TFEI revisions;
- o. Removing a comma in 8A002.i.2 to correct the punctuation, as well as adding single quotes around the term ‘freedom of movement’ to indicate that this term is defined in the Technical Note that follows 8A002.i.2;
- p. Replacing the word “Note” with “Technical Note” to properly identify the note that follows 8A002.i.2;
- q. Removing the comma in 8A002.j, j.2, j.4, o.1.e, o.2.c, and o.2.d to correct the punctuation, as part of the TFEI revisions;
- r. Adding a comma in 8A002.j.1.a, j.1.c, j.2.a, j.2.c, j.3.a, j.4.a, m, n, o.1.a, o1.c, o.2, and o.2.a to correct the punctuation, as part of the TFEI revisions;
- s. Replacing the words “specially designed” with “having all of the following” in

- 8A002.j.1.d and j.3.b to clarify the sentence, as part of the TFEI revisions;
- t. Adding the words “specially designed” in 8A002.j.1.d.1, j.1.d.2, j.1.d.3, j.3.b.1, j.3.b.2, and j.3.b.3 to clarify the sentences, as part of the TFEI revisions;
 - u. Adding the word “and” in 8A002.j.3 to .1 to clarify the sentence, as part of the TFEI revisions;
 - v. Moving the phrase “as follows” within 8A002.o.1 to clarify the sentence, as part of the TFEI revisions;
 - w. Replacing the word “tons” with “tonnes” in 8A002.o.3 to clarify that American tons differ from metric tonnes and to conform to WA text; and
 - x. Replacing a period with a semi-colon in 8A002.p to correct the punctuation, as part of the TFEI revisions.

Category 9 Propulsion Systems, Space Vehicles and Related Equipment

ECCN 9A012 is amended by:

- a. Moving the period in the Heading from before the parenthetical phrase “see List of Items Controlled” to after the parenthetical phrase;
- b. Revising 9A012.b.2 to reflect the original intent to control the “associated systems” that allow UAVs to achieve the characteristics described in 9A012.a (i.e., remote-controlled flight beyond visual range and autonomous flight capability); and
- c. Adding a comma to 9A012.b.3 to correct the punctuation.

Part 740.17 “License Exception ENC”

Section 740.17 “License Exception ENC” is amended by removing wireless “personal area network” (PAN) items from paragraph (b)(4) to harmonize with the addition of wireless PAN equipment to the decontrol Note in ECCN 5A002. These wireless PAN commodities and “software” are now classified under ECCNs 5A992 and 5D992, respectively, without any requirement for review or qualification as ‘mass market’ products.

Part 742 Control Policy: CCL-Based Controls

Regional Stability Controls

This rule revises section 742.6 “Regional Stability” by amending the paragraphs that list the ECCNs that are controlled for RS Column 1 (RS:1) and RS Column 2 (RS:2) to coincide with changes to regional stability controls made by this rule. This rule revises §742.6(a)(1) to add 6D003.c, because this software is related to commodities that are controlled for RS reasons.

ECCN 1A004.d, 1D003 (software to enable equipment to perform the functions of equipment controlled by 1A004.d), 1E001 (technology for the development, production, or use of 1A004.d) are added to §742.6(a)(4)(i) in order to maintain the RS:2 controls that were applied to this equipment when it was listed under ECCNs 2A983.b, 2D983, and 2E983.

“Encryption Items”

Section 742.15, regarding “Encryption Items”, is amended by removing wireless “personal area network (PAN)” equipment from paragraphs (b)(3)(i) and the entire entry for (b)(3)(ii) to harmonize with the addition of wireless PAN equipment to the decontrol Note in ECCN 5A002. These wireless PAN commodities and “software” are now classified under ECCNs 5A992 and

5D992, respectively, without any requirement for review or qualification as ‘mass market’ products.

Part 743 Special Reporting

3A002.g.2 is revised in three places to read 3A002.g.1 in paragraph 743.1(c)(1)(iii) of the EAR, because in 2007 the WA moved the space qualified parameter for atomic frequency standards from paragraph 3A002.g.2 to 3A002.g.1 and in 2008 the WA harmonized the Sensitive List with the change made in 2007.

WA reporting requirements for 5B001.a, regarding software and technology specially designed for the development or production of equipment, function, or features of equipment, are removed by this rule. The WA agreed to remove this software and technology from the Wassenaar Sensitive List, because, while the WA intended to control technology and software for 5A001 equipment, the WA did not intend to have ECCN 5B001 on the Wassenaar Sensitive List.

WA reporting requirements are added for 6A006.c.1, magnetic gradiometers using multiple magnetometers specified by 6A006.a.1 or 6A006.a.2 (with a sensitivity lower (or better) than 2pT rms per square root Hz).

This rule amends Note 2 of the Notes to paragraph 743.1(c)(1)(vi) to harmonize the text in the Note with revisions made to 6A006.

Definitions in Part 772

Section 772.1 is amended by:

- a. Adding a reference to Category 5, Part 1, to the following terms: “electronically steerable phased array antenna”, and “local area network;”
- b. Removing the reference to Category 5 from the following terms: “Program” and “source code;”
- c. Revising the definitions for the following terms: “Bias (accelerometer)” and “Personalized smart card;”
- d. Removing the term “Noise Level;” and
- e. Adding the terms “Explosives”, “Fusible”, and “personal area network.”

Since August 21, 2001, the Act has been in lapse. However, the President, through Executive Order 13222 of August 17, 2001 (3 C.F.R., 2001 Comp. 783 (2002)), which has been extended by successive Presidential Notices, the most recent being that of August 13, 2009 (74 Fed. Reg. 41325 (August 14, 2009)), has continued the Regulations in effect under the International Emergency Economic Powers Act (50 U.S.C. §§ 1701-1707).

Saving Clause

Shipments of items removed from license exception eligibility or eligibility for export without a license as a result of this regulatory action that were on dock for loading, on lighter, laden aboard an exporting carrier, or en route aboard a carrier to a port of export, on [INSERT DATE OF

PUBLICATION], pursuant to actual orders for export to a foreign destination, may proceed to that destination under the previous license exception eligibility or without a license so long as they have been exported from the United States before [INSERT DATE 60 DAYS AFTER PUBLICATION]. Any such items not actually exported before midnight, on [INSERT DATE 60 DAYS AFTER PUBLICATION], require a license in accordance with this regulation.

Rulemaking Requirements

1. This final rule has been determined to be not significant for purposes of Executive Order 12866.
2. Notwithstanding any other provision of law, no person is required to respond to, nor shall any person be subject to a penalty for failure to comply with a collection of information subject to the requirements of the Paperwork Reduction Act of 1995 (44 U.S.C. 3501 et seq.) (PRA), unless that collection of information displays a currently valid Office of Management and Budget (OMB) Control Number. This rule involves two collections of information subject to the PRA. One of the collections has been approved by OMB under control number 0694 0088, “Multi Purpose Application,” and carries a burden hour estimate of 58 minutes for a manual or electronic submission. The other of the collections has been approved by OMB under control number 0694 0106, “Reporting and Recordkeeping Requirements under the Wassenaar Arrangement,” and carries a burden hour estimate of 21 minutes for a manual or electronic submission. Send comments regarding these burden estimates or any other aspect of these collections of information, including suggestions for reducing the burden, to OMB Desk Officer,

New Executive Office Building, Washington, DC 20503; and to Jasmeet Sehra, OMB Desk Officer, by e-mail at jsehra@omb.eop.gov or by fax to (202) 395-7285; and to the Office of Administration, Bureau of Industry and Security, Department of Commerce, 14th and Pennsylvania Avenue, N.W., Room 6622, Washington, D.C. 20230.

3. This rule does not contain policies with Federalism implications as that term is defined under Executive Order 13132.

4. The provisions of the Administrative Procedure Act (5 U.S.C. 553) requiring notice of proposed rulemaking, the opportunity for public participation, and a delay in effective date, are inapplicable because this regulation involves a military and foreign affairs function of the United States (5 U.S.C. 553(a)(1)). Further, no other law requires that a notice of proposed rulemaking and an opportunity for public comment be given for this final rule. Because a notice of proposed rulemaking and an opportunity for public comment are not required to be given for this rule under the Administrative Procedure Act or by any other law, the analytical requirements of the Regulatory Flexibility Act (5 U.S.C. 601 et seq.) are not applicable. Therefore, this regulation is issued in final form. Although there is no formal comment period, public comments on this regulation are welcome on a continuing basis. Comments should be submitted to Sharron Cook, Office of Exporter Services, Bureau of Industry and Security, Department of Commerce, 14th and Pennsylvania Ave., N.W., Room 2705, Washington, D.C. 20230.

List of Subjects

15 CFR Part 740

Administrative practice and procedure, Exports, Reporting and recordkeeping requirements.

15 CFR Part 742

Exports, Terrorism.

15 CFR Part 743

Administrative practice and procedure, Reporting and recordkeeping requirements.

15 CFR Part 772

Exports.

15 CFR Part 774

Exports, Reporting and recordkeeping requirements.

Accordingly, Parts 740, 742, 743, 772 and 774 of the Export Administration Regulations (15 CFR Parts 730-774) are amended as follows:

PART 740 [AMENDED]

1. The authority citations for Part 740 continue to read as follows:

Authority: 50 U.S.C. app. 2401 et seq.; 50 U.S.C. 1701 et seq.; 22 U.S.C. 7201 et seq.;
E.O. 13026, 61 FR 58767, 3 CFR, 1996 Comp., p. 228; E.O. 13222, 66 FR 44025, 3 CFR, 2001
Comp., p. 783; Notice of August 13, 2009, 74 Fed. Reg. 41325 (August 14, 2009).

2. Section 740.17 is amended by:
 - a. Revising the last sentence in paragraph (b)(4)(i) to read as set forth below; and
 - b. Removing and reserving paragraph (b)(4)(iii).

§740.17 Encryption Commodities, Software and Technology (ENC).

(b) * * *

(4) * * *

(i) * * * Certain items excluded from review by this paragraph may also be excluded from review under paragraph (b)(4)(iv) of this section (commodities and software that provide "ancillary cryptography").

* * * * *

PART 742 [AMENDED]

3. The authority citations for Part 742 continue to read as follows:

Authority: 50 U.S.C. app. 2401 et seq.; 50 U.S.C. 1701 et seq.; 22 U.S.C. 3201 et seq.; 42 U.S.C. 2139a; 22 U.S.C. 7201 et seq.; 22 U.S.C. 7210; Sec 1503, Pub. L. 108-11, 117 Stat. 559; E.O. 12058, 43 FR 20947, 3 CFR, 1978 Comp., p. 179; E.O. 12851, 58 FR 33181, 3 CFR, 1993 Comp., p. 608; E.O. 12938, 59 FR 59099, 3 CFR, 1994 Comp., p. 950; E.O. 13026, 61 FR 58767, 3 CFR, 1996 Comp., p. 228; E.O. 13222, 66 FR 44025, 3 CFR, 2001 Comp., p. 783; Presidential Determination 2003-23 of May 7, 2003, 68 FR 26459, May 16, 2003; Notice of July 23, 2008, 73 FR 43603 (July 25, 2008); Notice of November 10, 2008, 73 FR 67097 (November 12, 2008).

4. Section 742.6 is amended by:

- a. Adding “6D003.c” in numerical order to paragraph (a)(1); and
- b. Revising paragraph (a)(4)(i) to read as follows:

§742.6 Regional Stability.

(a) * * *

(4) * * *

(i) License Requirements Applicable to Most RS Column 2 Items. As indicated in the CCL and in RS Column 2 of the Commerce Country Chart (see Supplement No. 1 to Part 738 of the EAR), a license is required to any destination except Australia, Japan, New Zealand, and countries in the North Atlantic Treaty Organization (NATO) for items described on the CCL under ECCNs 0A918, 0E918, 1A004.d, 1D003 (software to enable equipment to perform the functions of equipment controlled by 1A004.d), 1E001 (technology for the development, production, or use of 1A004.d), 2A983, 2D983, 2E983, 8A918, and for military vehicles and certain commodities (specially designed) used to manufacture military equipment, described on the CCL in ECCNs 0A018.c, 1B018.a, 2B018, 9A018.a and .b, 9D018 (only software for the “use” of commodities in ECCN 9A018.a and .b), and 9E018 (only technology for the “development”, “production”, or “use” of commodities in 9A018.a and .b).

* * * * *

5. Section 742.15 is amended by:

- a. Revising the last sentence in paragraph (b)(3)(i) to read as set forth below; and
- b. Removing and reserving paragraph (b)(3)(ii).

742.15 Encryption items.

* * * * *

(b) * * *

(3) * * *

(i) * * * Certain items excluded from review by this paragraph may also be excluded from review under paragraph (b)(3)(iii) of this section (commodities and software that provide “ancillary cryptography”).

* * * * *

PART 743 [AMENDED]

6. The authority citations for Part 743 continue to read as follows:

Authority: 50 U.S.C. app. 2401 et seq; Pub. L. 106-508; 50 U.S.C. 1701 et seq; E.O. 13222, 66 FR 44025, 3 CFR, 2001 Comp., p. 783; Notice of August 13, 2009 (74 Fed. Reg. 41325 (August 14, 2009))

7. Section 743.1 is amended by revising paragraphs (c)(1)(iii), (c)(1)(v), (c)(1)(vi) introductory text, and Note 2 of the Notes to (c)(1)(vi), to read as follows:

§743.1 Wassenaar Arrangement.

* * * * *

(c) * * *

(1) * * *

(iii) *Category 3*: 3A002.g.1, 3B001.a.2, 3D001 for “development” or “production” of 3A002.g.1 or 3B001.a.2, and 3E001 for “development” or “production” of 3A002.g.1 or 3B001.a.2;

* * * * *

(v) *Category 5*: 5A001.b.3; 5B001.a (items specially designed for 5A001.b.3 and b.5); 5D001.a (specially designed for the “development” or “production” of equipment, function, or features in 5A001.b.3) and 5D001.b (specially designed or modified to support “technology” under 5E001.a as described in this paragraph); and 5E001.a (for the “development” or “production” of equipment, functions or features specified by 5A001.b.3 or “software” in 5D001.a or 5D001.b as described in this paragraph);

(vi) *Category 6*: 6A001.a.1.b (changing 10 kHz to 5 kHz and adding the text “or a sound pressure level exceeding 224 dB (reference 1 μPa at 1 m) for equipment with an operating frequency in the band from 5kHz to 10 kHz inclusive” to the existing text in 6A001.a.1.b.1), and 6A001.a.2.d; 6A002.a.1.a, 6A002.a.1.b, 6A002.a.2.a (changing 350 uA/Im to 700 uA/Im in 6A002.a.2.a.3.a), 6A002.a.3, 6A002.b, 6A002.c (incorporating 6A002.a.2.a or 6A002.a.3 having characteristics described in this paragraph), 6A002.e; 6A003.b.3 (incorporating 6A002.a.2.a having characteristics described in this paragraph), 6A003.b.4 (incorporating 6A002.a.3 having characteristics described in this paragraph); 6A004.c and d; 6A006.a.1, 6A006.a.2 (having a “noise level” (sensitivity) lower (better) than 2pT rms per square root Hz), 6A006.c.1, 6A006.d

(certain items only; see Note to this paragraph); 6A008.d, .h, and .k; 6D001 (for 6A004.c and .d and 6A008.d, .h, and .k); 6E001 (for equipment and software listed in this paragraph); and 6E002 (for equipment listed in this paragraph);

Notes to paragraph (c)(1)(vi):

* * * * *

Note 2: *Reports for 6A006.d*, are for “compensation systems” for the following:

- a. Magnetic sensors controlled in 6A006.a.2 using optically pumped or nuclear precession (proton/Overhauser) “technology” that will permit these sensors to realize a ‘sensitivity’ lower (better) than 2 pT rms per square root Hz.
- b. Underwater electric field sensors controlled in 6A006.b.
- c. Magnetic gradiometers controlled in 6A006.c that will permit these sensors to realize a ‘sensitivity’ lower (better) than 3 pT/m rms per square root Hz.

* * * * *

PART 772 [AMENDED]

8. The authority citations for Part 772 continue to read as follows:

Authority: 50 U.S.C. app. 2401 et seq.; 50 U.S.C. 1701 et seq.; E.O. 13222, 66 FR 44025, 3 CFR, 2001 Comp., p. 783; Notice of August 13, 2009 (74 Fed. Reg. 41325 (August 14, 2009)).

Section 772.1 [Amended]

9. Section 772.1 is amended by:

- a. Removing the phrase “(Cat 6)” and adding in its place “(Cat 6 and 5 Part 1)” in the term “Electronically steerable phased array antenna”;
- b. Removing the phrase “(Cat 4)” and adding in its place “(Cat 4 and 5 Part 1)” in the term “local area network”;
- c. Removing the phrase “(Cat 2, 4, 5, and 6)” and adding in its place “(Cat 2, 4, and 6)” in the term “Program”;
- d. Removing the phrase “(Cat 4, 5, 6, 7, and 9)” and adding in its place “(Cat 4, 6, 7, and 9)” in the term “Source code”;
- e. Revising the definitions for “ “Bias” (accelerometer)”, "Personal area network", and “Personalized smart card”;
- f. Adding the terms “Explosives”, “Fusible”, to read as follows; and
- g. Removing the term “Noise Level”.

§772.1 Definitions of Terms as Used in the Export Administration Regulations (EAR).

* * * * *

“*Bias*”. (accelerometer) (Cat 7)--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 g or in meters per second² (g or m/s²) (IEEE Std 528-2001) (Micro g equals 1x10⁻⁶ g).

* * * * *

“Explosives”. (Cat 1) – see Annex “List of Explosives” located at the end of Category 1 of Supplement No. 1 to Part 774 “Commerce Control List”.

* * * * *

"Fusible". (Cat 1) -- Capable of being cross-linked or polymerized further (cured) by the use of heat, radiation, catalysts, etc., or that can be melted without pyrolysis (charring).

* * * * *

"Personal area network" (Cat 5 Part 2) -- A data communication system having all of the following characteristics:

- a. Allows an arbitrary number of independent or interconnected 'data devices' to communicate directly with each other; and
- b. Is confined to the communication between devices within the immediate vicinity of an individual person or device controller (e.g., single room, office, or automobile).

Technical Note: 'Data device' means equipment capable of transmitting or receiving sequences of digital information.

* * * * *

"Personalized smart card." (Cat 5 Part 2) A smart card or an electronically readable personal document (e.g., e-passport), containing a microcircuit which has been programmed for a specific application and cannot be reprogrammed for any other application by the user.

* * * * *

PART 774 [AMENDED]

10. The authority citations for Part 774 continue to read as follows:

Authority: 50 U.S.C. app. 2401 et seq.; 50 U.S.C. 1701 et seq.; 10 U.S.C. 7420; 10 U.S.C. 7430(e); 22 U.S.C. 287c, 22 U.S.C. 3201 et seq., 22 U.S.C. 6004; 30 U.S.C. 185(s), 185(u); 42 U.S.C. 2139a; 42 U.S.C. 6212; 43 U.S.C. 1354; 46 U.S.C. app. 466c; 50 U.S.C. app. 5; 22 U.S.C. 7201 et seq.; 22 U.S.C. 7210; E.O. 13026, 61 FR 58767, 3 CFR, 1996 Comp., p. 228; E.O. 13222, 66 FR 44025, 3 CFR, 2001 Comp., p. 783; Notice of August 13, 2009, 74 FR 41325 (August 14, 2009).

Supplement No. 1 to Part 774 - Commerce Control List [Amended]

11. Supplement No. 1 to Part 774 (the Commerce Control List) is amended by revising the

Heading of Category 1 to read as follows:

* * * * *

**Category 1—Special Materials and Related Equipment, Chemicals, “Microorganisms,”
and “Toxins”**

* * * * *

12. Supplement No. 1 to Part 774 (the Commerce Control List), Category 1, ECCN 1A001 is

amended by revising the items paragraph in the List of Items Controlled section, to read as follows:

**1A001 Components made from fluorinated compounds, as follows (see List of Items
Controlled).**

* * * * *

List of Items Controlled

* * * * *

Items:

a. Seals, gaskets, sealants or fuel bladders, specially designed for “aircraft” or aerospace use, made from more than 50% by weight of any of the materials controlled by 1C009.b or 1C009.c;

b. Piezoelectric polymers and copolymers, made from vinylidene fluoride materials, controlled by 1C009.a:

b.1. In sheet or film form; *and*

b.2. With a thickness exceeding 200 µm;

c. Seals, gaskets, valve seats, bladders or diaphragms, having all of the following:

c.1. Made from fluoroelastomers containing at least one vinyl ether group as a constitutional unit; and

c.2. Specially designed for “aircraft”, aerospace or missile use.

13. In Supplement No. 1 to Part 774 (the Commerce Control List), Category 1, ECCN 1A002 is amended by revising the items paragraph in the List of Items Controlled section, to read as follows:

1A002 “Composite” structures or laminates, having any of the following (see List of Items Controlled).

* * * * *

List of Items Controlled

* * * * *

Items:

a. Consisting of an organic “matrix” and materials controlled by 1C010.c 1C010.d, or 1C010.e

or

b. Consisting of a metal or carbon “matrix”, and any of the following:

b.1. Carbon “fibrous or filamentary materials” having all of the following:

b.1.a. A “specific modulus” exceeding 10.15×10^6 m; *and*

b.1.b. A “specific tensile strength” exceeding 17.7×10^4 m; *or*

b.2. Materials controlled by 1C010.c.

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

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

- a. Sporting goods;*
- b. Automotive industry;*
- c. Machine tool industry;*
- d. Medical applications.*

Note 3: 1A002.b.1 does not apply to finished or semi-finished items containing a maximum of two dimensions of interwoven filaments and specially designed for applications as follows:

- a. Metal heat-treatment furnaces for tempering metals;*
- b. Silicon boule production equipment.*

* * * * *

14. In Supplement No. 1 to Part 774 (the Commerce Control List), Category 1, ECCN 1A003 is amended by revising the Heading, and the Related Controls and Items paragraphs in the List of Items Controlled section, to read as follows:

1A003 Manufactures of non-“fusible” aromatic polyimides in film, sheet, tape or ribbon form having any of the following (see List of Items Controlled).

* * * * *

List of Items Controlled

Unit: * * *

Related Controls: This entry does not control manufactures when coated or laminated with copper and designed for the production of electronic printed circuit boards. For "fusible" aromatic polyimides in any form, see 1C008.a.3.

Related Definitions: * * *

Items:

- a. A thickness exceeding 0.254 mm; *or*
- b. Coated or laminated with carbon, graphite, metals or magnetic substances.

* * * * *

15. In Supplement No. 1 to Part 774 (the Commerce Control List), Category 1, ECCN 1A004 is amended by revising the Heading, the License Requirement section, and the Related Definitions and Items paragraphs in the List of Items Controlled section, to read as follows:
- 1A004 Protective and detection equipment and components, not specially designed for military use, as follows (see List of Items Controlled).**

License Requirements

Reason for Control: NS, CB, RS, AT

Control(s)	Country chart
NS applies to entire entry CB applies to chemical detection systems and dedicated detectors therefor, in 1A004.c, that also have the technical characteristics described in 2B351.a RS apply to 1A004.d AT applies to entire entry	NS Column 2 CB Column 2 RS Column 2 AT Column 1

* * * * *

List of Items Controlled

* * * * *

Related Definitions: 1) ‘Adapted for use in war’ means: Any modification or selection (such as altering purity, shelf life, virulence, dissemination characteristics, or resistance to UV radiation) designed to increase the effectiveness in producing casualties in humans or animals, degrading equipment or damaging crops or the environment. 2) ‘Riot control agents’ are substances which, under the expected conditions of use for riot control purposes, produce rapidly in humans sensory irritation or disabling physical effects which disappear within a short time following termination of exposure. (Tear gases are a subset of ‘riot control agents’.)

Items:

- a. Gas masks, filter canisters and decontamination equipment therefor, designed or modified for

defense against any of the following, and specially designed components therefor:

- a.1. Biological agents 'adapted for use in war';
- a.2. Radioactive materials 'adapted for use in war';
- a.3. Chemical warfare (CW) agents; *or*
- a.4. 'Riot control agents', as follows:
 - a.4.a. •-Bromobenzeneacetonitrile, (Bromobenzyl cyanide) (CA) (CAS 5798-79-8);
 - a.4.b. [(2-chlorophenyl) methylene] propanedinitrile, (o-Chlorobenzylidenemalononitrile) (CS) (CAS 2698-41-1);
 - a.4.c. 2-Chloro-1-phenylethanone, Phenylacetyl chloride (•-chloroacetophenone) (CN) (CAS 532-27-4);
 - a.4.d. Dibenz-(b,f)-1,4-oxazepine, (CR) (CAS 257-07-8);
 - a.4.e. 10-Chloro-5,10-dihydrophenarsazine, (Phenarsazine chloride), (Adamsite), (DM) (CAS 578-94-9);

- a.4.f. N-Nonanoylmorpholine, (MPA) (CAS 5299-64-9);

- b. Protective suits, gloves and shoes, specially designed or modified for defense against any of the following:
 - b.1. Biological agents 'adapted for use in war';

 - b.2. Radioactive materials 'adapted for use in war'; *or*

 - b.3. Chemical warfare (CW) agents;

- 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 therefor:
 - c.1. Biological agents 'adapted for use in war';

 - c.2. Radioactive materials 'adapted for use in war'; *or*

 - c.3. Chemical warfare (CW) agents;

- d. Electronic equipment designed for automatically detecting or identifying the presence of “explosives” (as listed in the annex at the end of Category 1) residues and utilizing 'trace detection' techniques (*e.g.*, surface acoustic wave, ion mobility spectrometry, differential mobility spectrometry, mass spectrometry).

Technical Note

'Trace detection' is defined as the capability to detect less than 1 ppm vapor, or 1 mg solid or

liquid.

Note 1: *1A004.d. does not apply to equipment specially designed for laboratory use.*

Note 2: *1A004.d. does not apply to non-contact walk-through security portals.*

Note: *1A004 does not control:*

a. Personal radiation monitoring dosimeters;

b. Equipment limited by design or function to protect against hazards specific to residential safety and civil industries, such as mining, quarrying, agriculture, pharmaceuticals, medical, veterinary, environmental, waste management, or to the food industry.

* * * * *

16. In Supplement No. 1 to Part 774 (the Commerce Control List), Category 1, ECCN 1A007 is amended by removing the License Requirement Note and the last sentence in Technical Note 2.

17. In Supplement No. 1 to Part 774 (the Commerce Control List), Category 1, ECCN 1A008 is added to read as follows:

1A008 Charges, devices and components, as follows (see List of Items Controlled).

License Requirements

Reason for Control: NS, AT, UN

Control(s)	Country chart
NS applies to entire entry	NS Column 2
AT applies to entire entry	AT Column 1
UN applies to entire entry	Iraq, North Korea, and Rwanda

License Exceptions

LVS: \$3,000 for .a through .c, except N/A for Rwanda

\$6,000 for .d, except N/A for Rwanda

GBS: N/A

CIV: N/A

List of Items Controlled

Unit: \$ value

Related Controls: (1) All of the following are subject to the export licensing jurisdiction of the Department of State, Directorate of Defense Trade Controls (see 22 CFR part 121):

- a. High explosives and related equipment specially designed for military use;
- b. Explosive devices or charges in this entry that utilize USML controlled energetic materials (See 22 CFR 121.1 Category V), if they have been specifically designed, developed, configured, adapted, or modified for a military application;

- c. Shaped charges that have all of the following a uniform shaped conical liner with an included angle of 90 degrees or less, more than 2.0 kg of controlled materials, and a diameter exceeding 4.5 inches;
- d. Detonating cord containing greater than 0.1 kg per meter (470 grains per foot) of controlled materials;
- e. Cutters and severing tools containing greater than 10 kg of controlled materials;
- f. With the exception of cutters and severing tools, devices or charges controlled by this entry where the USML controlled materials can be easily extracted without destroying the device or charge; and
- g. Individual USML controlled energetic materials in this entry, even when compounded with other materials, when not incorporated into explosive devices or charges controlled by this entry or 1C992.

(2) See also ECCNs 1C011, 1C018, 1C111, and 1C239 for additional controlled energetic materials. See ECCN1E001 for the “development” or “production” “technology” for the commodities controlled by ECCN 1A008, but not for explosives or commodities that are under the jurisdiction of U.S. Department of State, Directorate of Defense Trade Controls.

Related Definitions: N/A

Items:

- a. 'Shaped charges' having all of the following:
 - a.1. Net Explosive Quantity (NEQ) greater than 90 g; and
 - a.2. Outer casing diameter equal to or greater than 75 mm;

b. Linear shaped cutting charges having all of the following, and specially designed components therefor:

b.1. An explosive load greater than 40 g/m; and

b.2. A width of 10 mm or more;

c. Detonating cord with explosive core load greater than 64 g/m;

d. Cutters, other than those specified by 1A008.b, and severing tools, having a NEQ greater than 3.5 kg.

Technical Note: *'Shaped charges' are explosive charges shaped to focus the effects of the explosive blast.*

Note: *The only charges and devices specified in 1A008 are those containing "explosives" (see list of explosives in the Annex at the end of Category 1) and mixtures thereof.*

* * * * *

18. In Supplement No. 1 to Part 774 (the Commerce Control List), Category 1, ECCN 1B001 is amended by removing the phrase "and/or" and adding in its place "or" in paragraph f.2 in the Items paragraph of the List of Items Controlled section.

19. In Supplement No. 1 to Part 774 (the Commerce Control List), Category 1, ECCN 1B003 is amended by revising the Heading, and paragraph c. in the Items paragraph of the List of Items Controlled section, to read as follows:

1B003 Tools, dies, molds or fixtures, for “superplastic forming” or “diffusion bonding” titanium, aluminum or their alloys, specially designed for the manufacture of any of the following (see List of Items Controlled).

* * * * *

List of Items Controlled

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Items:

* * * * *

c. Specially designed components for structures specified by 1B003.a or for engines specified by 1B003.b.

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20. In Supplement No. 1 to Part 774 (the Commerce Control List), Category 1, ECCN 1C008 is amended by revising the Heading and the Items paragraph of the List of Items Controlled section, to read as follows:

1C008 Non-fluorinated polymeric substances as follows (see List of Items Controlled).

* * * * *

List of Items Controlled

* * * * *

Items:

a. Non-fluorinated polymeric substances, as follows:

a.1. Bismaleimides;

a.2. Aromatic polyamide-imides;

a.3. Aromatic polyimides;

a.4. Aromatic polyetherimides having a 'glass transition temperature (Tg)' exceeding 513K (240° C).

Note: 1C008.a controls the substances in liquid or solid "fusible" form, including resin, powder, pellet, film, sheet, tape, or ribbon.

N.B. For non-"fusible" aromatic polyimides in film, sheet, tape, or ribbon form, see ECCN 1A003.

b. Thermoplastic liquid crystal copolymers having a heat distortion temperature exceeding 523 K (250°C) measured according to ISO 75-2 (2004), method A, or national equivalents, with a load of 1.80 N/mm² and composed of:

b.1. Any of the following:

- b.1.a. Phenylene, biphenylene or naphthalene; or
 - b.1.b. Methyl, tertiary-butyl or phenyl substituted phenylene, biphenylene or naphthalene;
- and
- b.2. Any of the following:
 - b.2.a. Terephthalic acid;
 - b.2.b. 6-hydroxy-2 naphthoic acid; or
 - b.2.c. 4-hydroxybenzoic acid;
- c. [RESERVED]
- d. Polyarylene ketones;
 - e. Polyarylene sulphides, where the arylene group is biphenylene, triphenylene or combinations thereof;
 - f. Polybiphenylenethersulphone having a 'glass transition temperature (Tg)' exceeding 513 K (240°C).

Technical Note: The 'glass transition temperature (Tg)' for 1C008 materials is determined using the method described in ISO 11357-2 (1999) or national equivalents.

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21. In Supplement No. 1 to Part 774 (the Commerce Control List), Category 1, ECCN 1C010 is amended by revising the Heading and the Items paragraph in the List of Items Controlled section, to read as follows:

1C010 “Fibrous or filamentary materials”, which may be used in organic “matrix”, metallic “matrix” or carbon “matrix” “composite” structures or laminates, as follows (see List of Items Controlled).

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List of Items Controlled

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Items:

a. Organic “fibrous or filamentary materials”, having all of the following:

a.1. A “specific modulus” exceeding 12.7×10^6 m; *and*

a.2. A “specific tensile strength” exceeding 23.5×10^4 m;

Note: 1C010.a does not control polyethylene.

b. Carbon “fibrous or filamentary materials”, having all of the following:

b.1. A “specific modulus” exceeding 12.7×10^6 m; *and*

b.2. A “specific tensile strength” exceeding 23.5×10^4 m;

Technical Note: *Properties for materials described in 1C010.b should be determined using SACMA recommended methods SRM 12 to 17, ISO 10618 (2004) 10.2.1 Method A or national equivalent tow tests, and based on lot average.*

Note: *1C010.b does not control 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. Inorganic “fibrous or filamentary materials”, having all of the following:

c.1. A “specific modulus” exceeding 2.54×10^6 m; *and*

c.2. A melting, softening, decomposition or sublimation point exceeding 1,922 K (1,649 °C) in an inert environment;

Note: 1C010.c does not control:

a. Discontinuous, multiphase, polycrystalline alumina fibers in chopped fiber or random mat form, containing 3% by weight or more silica, with a “specific modulus” of less than 10×10^6 m;

b. Molybdenum and molybdenum alloy fibers;

c. Boron fibers;

d. Discontinuous ceramic fibers with a melting, softening, decomposition or sublimation point lower than 2,043 K (1,770 °C) in an inert environment.

d. “Fibrous or filamentary materials”, having any of the following:

d.1. Composed of any of the following:

d.1.a. Polyetherimides controlled by 1C008.a; *or*

d.1.b. Materials controlled by 1C008.b to 1C008.f; *or*

d.2. Composed of materials controlled by 1C010.d.1.a or 1C010.d.1.b and “commingled” with other fibers controlled by 1C010.a, 1C010.b or 1C010.c;

e. Resin-impregnated or pitch-impregnated fibers (prepregs), metal or carbon-coated fibers

(preforms) or “carbon fiber preforms”, as follows:

e.1. Made from “fibrous or filamentary materials” controlled by 1C010.a, 1C010.b or 1C010.c;

e.2. Made from organic or carbon “fibrous or filamentary materials”, having all the following:

e.2.a. A “specific tensile strength” exceeding 17.7×10^4 m;

e.2.b. A “specific modulus” exceeding 10.15×10^6 m;

e.2.c. Not controlled by 1C010.a or 1C010.b; *and*

e.2.d. When impregnated with materials controlled by 1C008 or 1C009.b, having a ‘glass transition temperature (T_g)’ exceeding 383 K (110 °C) or with phenolic or epoxy resins, having a ‘glass transition temperature (T_g)’ equal to or exceeding 418 K (145 °C).

Notes: 1C010.e does not control:

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 100cm;

2. Prepregs when impregnated with phenolic or epoxy resins having a 'glass transition temperature (T_g)' less than 433 K (160 °C) and a cure temperature lower than the 'glass transition temperature'.

Technical Note: The 'glass transition temperature (T_g)' for 1C010.e materials is determined using the method described in ASTM D 3418 using the dry method. The 'glass transition temperature' for phenolic and epoxy resins is determined using the method described in ASTM D 4065 at a frequency of 1 Hz and a heating rate of 2 K (2°C) per minute using the dry method.

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22. In Supplement No. 1 to Part 774 (the Commerce Control List), Category 1, ECCN 1C018 is amended by revising the Related Controls and Items paragraph in the List of Items Controlled section, to read as follows:

1C018 Commercial Charges and Devices Containing Energetic Materials on the Wassenaar Arrangement Munitions List and Certain Chemicals as Follows (See List of Items Controlled).

* * * * *

List of Items Controlled

Unit: * * *

Related Controls: (1) Explosive devices or charges in paragraphs .c through .k of this entry that utilize USML controlled energetic materials (See 22 CFR 121.1 Category V) are subject

to the licensing authority of the U.S. Department of State, Directorate of Defense Trade Controls if they have been specifically designed, developed, configured, adapted, or modified for a military application. (2) With the exception of slurries if the USML controlled materials utilized in devices and charges controlled by paragraphs .c through .k of this entry can be easily extracted without destroying the device or charge, then they are subject to the export licensing authority of the U.S. Department of State, Directorate of Defense Trade Controls. (3) Commercial prefabricated slurries and emulsions containing greater than 35% of USML controlled energetic materials are subject to the export licensing authority of the U.S. Department of State, Directorate of Defense Trade Controls. (4) The individual USML controlled energetic materials in paragraphs .c through .k of this entry, even when compounded with other materials, remain subject to the export licensing authority of the Department of State when not incorporated into explosive devices or charges controlled by this entry or 1C992. (5) The chemicals in paragraphs .l and .m of this entry, when incorporated into items listed on the United States Munitions List, become subject to the licensing jurisdiction of the U.S. Department of State, Directorate of Defense Trade Controls. (6) See also ECCNs 1C011, 1C111, and 1C239 for additional controlled energetic materials. (7) See ECCN 1C238 for additional controls on chlorine trifluoride (ClF₃). (8) See ECCN 1A008 for shaped charges, detonating cord, and cutters and severing tools. (9) See ECCN 1E001 for the “development” or “production” “technology” for the commodities controlled by ECCN 1C018, but not explosives or energetic materials that are under the jurisdiction of U.S. Department of State, Directorate of Defense Trade Controls.

Related Definitions: * * *

Items:

- a. [RESERVED]
- b. Shock tubes containing greater than 0.064 kg per meter (300 grains per foot), but not more than 0.1 kg per meter (470 grains per foot) of controlled materials;
- c. Cartridge power devices containing greater than 0.70 kg, but not more than 1.0 kg of controlled materials;
- d. Detonators (electric or nonelectric) and assemblies thereof containing greater than 0.01 kg, but not more than 0.1 kg of controlled materials;
- e. Igniters containing greater than 0.01 kg, but not more than 0.1 kg of controlled materials;
- f. Oil well cartridges containing greater than 0.015 kg, but not more than 0.1 kg of controlled materials;
- g. Commercial cast or pressed boosters containing greater than 1.0 kg, but not more than 5.0 kg of controlled materials;
- h. Commercial prefabricated slurries and emulsions containing greater than 10 kg and less than or equal to thirty-five percent by weight of USML controlled materials;

i. [RESERVED]

j. Pyrotechnic devices when designed exclusively for commercial purposes (e.g., theatrical stages, motion picture special effects, and fireworks displays), and containing greater than 3.0 kg, but not more than 5.0 kg of controlled materials; or

k. Other commercial explosive devices and charges, not controlled by 1C018.c through .g above, when used for commercial applications and containing greater than 1.0 kg, but not more than 5.0 kg of controlled materials.

l. Propyleneimine (2-methylaziridine) (CAS 75-55-8); or

m. Any oxidizer or mixture thereof that is a compound composed of fluorine and one or more of the following – other halogens, oxygen, or nitrogen.

Note: Nitrogen trifluoride (NF₃) in a gaseous state is controlled by ECCN 1C992 and not by 1C018.

Note: National security is not a reason for control for chlorine trifluoride.

Note: If a chemical in paragraphs .l or .m of 1C018 is incorporated into a commercial charge or device described in paragraphs .c through .k of ECCN 1C018 or in 1C992, the classification of the commercial charge or device applies to the item.

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23. In Supplement No. 1 to Part 774 (the Commerce Control List), Category 1, ECCN 1D003

is amended by:

- a. Revising the Heading;
- b. Adding “RS” after “NS” to the Reason for Control paragraph in the License Requirements section;
- c. Adding an RS Column 2 paragraph after the NS Column 2 paragraph in the License Requirements section, to read as follows:

1D003 “Software” specially designed or modified to enable equipment to perform the functions of equipment controlled under 1A004.c or 1A004.d.

License Requirements

Reason for Control: NS, RS, AT

Control(s)	Country chart
NS applies to entire entry	NS Column 2
RS applies to software for equipment controlled by 1A004.d	RS Column 2
AT applies to entire entry	AT Column 1

* * * * *

24. In Supplement No. 1 to Part 774 (the Commerce Control List), Category 1, ECCN 1E001 is amended by:

- a. Revising the Heading;
- b. Adding “RS” after CB in the Reason for Control paragraph of the License Requirements section;
- c. Revising the NS Column 1 paragraph in the License Requirements section; and
- d. Adding a new RS Column 2 paragraph after the CB Column 2 paragraph in the License Requirements section; and
- e. Revising the Related Controls paragraph, to read as follows:

1E001 “Technology” according to the General Technology Note for the “development” or “production” of items controlled by 1A001.b, 1A001.c, 1A002, 1A003, 1A004, 1A005, 1A006.b, 1A007, 1A008, 1A101, 1B (except 1B999), or 1C (except 1C355, 1C980 to 1C984, 1C988, 1C990, 1C991, 1C995 to 1C999).

License Requirements

Reason for Control: NS, MT, NP, CB, RS, AT

Control(s)	Country chart
NS applies to “technology” for items controlled by 1A001.b and .c, 1A002, 1A003, 1A005, 1A006.b, 1A007, 1A008, 1B001 to 1B003, 1B018, 1C001 to 1C011, or 1C018	NS Column 1

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RS applies to technology for equipment controlled in 1A004.d.	RS Column 2
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Control(s) *Country Chart*

NS applies to “technology” NS Column 1

for items controlled by 1A001.b

and .c, 1A002, 1A003, 1A005,

1A006.b, 1A007, 1A008,

1B001 to 1B003,

1B018, 1C001 to 1C011,

or 1C018

* * * * *

RS applies to technology RS Column 2

for equipment controlled

in 1A004.d.

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List of Items Controlled

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Related Controls: (1) Also see ECCNs 1E101, 1E201, and 1E202. (2) See ECCN 1E002.g for control libraries (parametric technical databases) specially designed or modified to enable equipment to perform the functions of equipment controlled under 1A004.c (Nuclear, biological and chemical (NBC) detection systems). (3) “Technology” for lithium isotope separation (see related ECCN 1B233) and “technology” for items described in ECCN 1C012 are subject to the export licensing authority of the Nuclear Regulatory Commission (see 10 CFR part 110). (4) “Technology” for items described in ECCN 1A102 is subject to the export licensing authority of the U.S. Department of State, Directorate of Defense Trade Controls (see 22 CFR part 121).

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25. In Supplement No. 1 to Part 774 (the Commerce Control List), Category 1, ECCN 1E002 is amended by revising the Heading and the Items paragraph in the List of Items Controlled section, to read as follows:

1E002 Other “technology” as follows (see List of Items Controlled).

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List of Items Controlled

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Items:

- a. “Technology” for the “development” or “production” of polybenzothiazoles or polybenzoxazoles;

- b. “Technology” for the “development” or “production” of fluoroelastomer compounds containing at least one vinyl ether monomer;

- c. “Technology” for the design or “production” of the following base materials or non-“composite” ceramic materials:
 - c.1. Base materials having all of the following:
 - c.1.a. Any of the following compositions:
 - c.1.a.1. Single or complex oxides of zirconium and complex oxides of silicon or aluminum;

 - c.1.a.2. Single nitrides of boron (cubic crystalline forms);

 - c.1.a.3. Single or complex carbides of silicon or boron; *or*

 - c.1.a.4. Single or complex nitrides of silicon;

c.1.b. Any of the following total metallic impurities (excluding intentional additions):

c.1.b.1. Less than 1,000 ppm for single oxides or carbides; *or*

c.1.b.2. Less than 5,000 ppm for complex compounds or single nitrides; *and*

c.1.c. Being any of the following:

c.1.c.1. Zirconia with an average particle size equal to or less than 1 μm and no more than 10% of the particles larger than 5 μm ;

c.1.c.2. Other base materials with an average particle size equal to or less than 5 μm and no more than 10% of the particles larger than 10 μm ; *or*

c.1.c.3. Having all of the following:

c.1.c.3.a. Platelets with a length to thickness ratio exceeding 5;

c.1.c.3.b. Whiskers with a length to diameter ratio exceeding 10 for diameters less than 2 μm ; *and*

c.1.c.3.c. Continuous or chopped fibers less than 10 μm in diameter;

c.2. Non-“composite” ceramic materials composed of the materials described in 1E002.c.1;

Note: 1E002.c.2 does not control technology for the design or production of abrasives.

d. “Technology” for the “production” of aromatic polyamide fibers;

e. “Technology” for the installation, maintenance or repair of materials controlled by 1C001;

f. “Technology” for the repair of “composite” structures, laminates or materials controlled by 1A002, 1C007.c or 1C007.d;

Note: 1E002.f does not control “technology” for the repair of “civil aircraft” structures using carbon “fibrous or filamentary materials” and epoxy resins, contained in aircraft manufacturers’ manuals.

g. ‘Libraries’ (parametric technical databases) specially designed or modified to enable equipment to perform the functions of equipment controlled under 1A004.c or 1A004.d.

Technical Note: *For the purpose of 1E002.g, ‘library’ (parametric technical database) means a collection of technical information, reference to which may enhance the performance of relevant equipment or systems.*

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26. In Supplement No. 1 to Part 774 (the Commerce Control List), Category 1 is amended by adding to the end of this category an annex that lists explosives to read as follows:

ANNEX to CATEGORY 1

List of Explosives (See ECCNs 1A004 and 1A008)

1. ADNBF (aminodinitrobenzofuroxan or 7-amino-4,6-dinitrobenzofurazane-1-oxide)
(CAS 97096-78-1);
2. BNCP (cis-bis (5-nitrotetrazolato) tetra amine-cobalt (III) perchlorate) (CAS 117412-28-9);
3. CL-14 (diamino dinitrobenzofuroxan or 5,7-diamino-4,6-dinitrobenzofurazane-1-oxide)
(CAS 117907-74-1);
4. CL-20 (HNIW or Hexanitrohexaazaisowurtzitane)
(CAS 135285-90-4); chlathrates of CL-20;
5. CP (2-(5-cyanotetrazolato) penta amine-cobalt (III) perchlorate)
(CAS 70247-32-4);
6. DADE (1,1-diamino-2,2-dinitroethylene, FOX7);
7. DATB (diaminotrinitrobenzene) (CAS 1630-08-6);
8. DDFP (1,4-dinitrodifurazanopiperazine);
9. DDPO (2,6-diamino-3,5-dinitropyrazine-1-oxide, PZO)
(CAS 194486-77-6);
10. DIPAM (3,3'-diamino-2,2',4,4',6,6'-hexanitrobiphenyl or dipicramide) (CAS 17215-

44-0);

11. DNGU (DINGU or dinitroglycoluril) (CAS 55510-04-8);
12. Furazans as follows:
 - a. DAAOF (diaminoazoxyfuran);
 - b. DAAzF (diaminoazofuran) (CAS 78644-90-3);
13. HMX and derivatives, as follows:
 - a. HMX (Cyclotetramethylenetetranitramine, octahydro-1,3,5,7-tetranitro-1,3,5,7-tetrazine, 1,3,5,7-tetranitro-1,3,5,7-tetraza-cyclooctane, octogen or octogene) (CAS 2691-41-0);
 - b. difluoroaminated analogs of HMX;
 - c. K-55 (2,4,6,8-tetranitro-2,4,6,8-tetraazabicyclo [3,3,0]-octanone-3, tetranitrosemiglycouril or keto-bicyclic HMX) (CAS 130256-72-3);
14. HNAD (hexanitroadamantane) (CAS 143850-71-9);
15. HNS (hexanitrostilbene) (CAS 20062-22-0);
16. Imidazoles as follows:
 - a. BNNII (Octahydro-2,5-bis(nitroimino)imidazo [4,5-d]imidazole);
 - b. DNI (2,4-dinitroimidazole) (CAS 5213-49-0);
 - c. FDIA (1-fluoro-2,4-dinitroimidazole);
 - d. NTDNIA (N-(2-nitrotriazolo)-2,4-dinitroimidazole);
 - e. PTIA (1-picryl-2,4,5-trinitroimidazole);
17. NTNMH (1-(2-nitrotriazolo)-2-dinitromethylene hydrazine);
18. NTO (ONTA or 3-nitro-1,2,4-triazol-5-one) (CAS 932-64-9);
19. Polynitrocubanes with more than four nitro groups;
20. PYX (2,6-Bis(picrylamino)-3,5-dinitropyridine) (CAS 38082-89-2);

21. RDX and derivatives, as follows:
 - a. RDX (cyclotrimethylenetrinitramine, cyclonite, T4, hexahydro-1,3,5-trinitro-1,3,5-triazine, 1,3,5-trinitro-1,3,5-triaza-cyclohexane, hexogen or hexogene) (CAS 121-82-4);
 - b. Keto-RDX (K-6 or 2,4,6-trinitro-2,4,6-triazacyclohexanone)
(CAS 115029-35-1);
22. TAGN (triaminoguanidinenitrate) (CAS 4000-16-2);
23. TATB (triaminotrinitrobenzene) (CAS 3058-38-6);
24. TEDDZ (3,3,7,7-tetrakis(difluoroamine) octahydro-1,5-dinitro-1,5-diazocine);
25. Tetrazoles as follows:
 - a. NTAT (nitrotriazol aminotetrazole);
 - b. NTNT (1-N-(2-nitrotriazolo)-4-nitrotetrazole);
26. Tetryl (trinitrophenylmethylnitramine) (CAS 479-45-8);
27. TNAD (1,4,5,8-tetranitro-1,4,5,8-tetraazadecalin) (CAS 135877-16-6);
28. TNAZ (1,3,3-trinitroazetidine) (CAS 97645-24-4);
29. TNGU (SORGUYL or tetranitroglycoluril) (CAS 55510-03-7);
30. TNP (1,4,5,8-tetranitro-pyridazino[4,5-d]pyridazine) (CAS 229176-04-9);
31. Triazines as follows:
 - a. DNAM (2-oxy-4,6-dinitroamino-s-triazine)
(CAS 19899-80-0);
 - b. NNHT (2-nitroimino-5-nitro-hexahydro-1,3,5-triazine)
(CAS 130400-13-4);
32. Triazoles as follows:
 - a. 5-azido-2-nitrotriazole;

- b. ADHTDN (4-amino-3,5-dihydrazino-1,2,4-triazole dinitramide) (CAS 1614-08-0);
 - c. ADNT (1-amino-3,5-dinitro-1,2,4-triazole);
 - d. BDNTA ([bis-dinitrotriazole]amine);
 - e. DBT (3,3'-dinitro-5,5-bi-1,2,4-triazole) (CAS 30003-46-4);
 - f. DNBT (dinitrobistriazole) (CAS 70890-46-9);
 - g. NTDNA (2-nitrotriazole 5-dinitramide) (CAS 75393-84-9);
 - h. NTDNT (1-N-(2-nitrotriazolo) 3,5-dinitrotriazole);
 - i. PDNT (1-picryl-3,5-dinitrotriazole);
 - j. TACOT (tetranitrobenzotriazolobenzotriazole) (CAS 25243-36-1);
33. "Explosives" not listed elsewhere in this list having a detonation velocity exceeding 8,700 m/s, at maximum density, or a detonation pressure exceeding 34 GPa (340 kbar);
34. Organic "explosives" not listed elsewhere in this list yielding detonation pressures of 25 GPa (250 kbar) or more that will remain stable at temperatures of 523K (250°C) or higher, for periods of 5 minutes or longer;
- 35. Nitrocellulose (containing more than 12.5% nitrogen);
 - 36. Nitroglycol;
 - 37. Pentaerythritol tetranitrate (PETN);
 - 38. Picryl chloride;
 - 39. 2,4,6-Trinitrotoluene (TNT);
 - 40. Nitroglycerine (NG);
 - 41. Triacetone Triperoxide (TATP);
 - 42. Guanidine nitrate;
 - 43. Nitroguanidine (NQ) (CAS 556-88-7).

27. In Supplement No. 1 to Part 774 (the Commerce Control List), Category 2, ECCN 2A983 is amended by removing and reserving paragraph b in the Items paragraph of the List of Items Controlled.
28. In Supplement No. 1 to Part 774 (the Commerce Control List), Category 3 is amended by removing the last sentence in the Nota Bene (“N.B.”).
29. In Supplement No. 1 to Part 774 (the Commerce Control List), Category 3. Electronics, Export Control Classification Number (ECCN) 3A001 is amended by:
- a. Revising the GBS paragraph of the License Exception section; and
 - b. In the Items paragraph of the List of Items Controlled section:
 1. Revising Note 2 in paragraph a;
 2. Revising paragraphs a.7, a.10, b.8, introductory text of b.9, b.10, introductory text of c, c.1, c.1.a, c.1.b.1, c.1.c.3, c.2, c.3, e.1 introductory text, e.1.b, e.4 introductory text, f introductory text, and g.2.b introductory text; and
 3. Adding paragraphs b.10 and h.

The revisions and additions read as follows:

3A001 Electronic components and specially designed components therefor, as follows (see List of Items Controlled).

* * * * *

License Exceptions

* * * * *

GBS: Yes for 3A001.a.1.b, a.2 to a.12 (except .a.5.a when controlled for MT), b.2, b.8 except for TWTAs exceeding 18 GHz), b.9., b.10, .g, and .h.

* * * * *

List of Items Controlled

* * * * *

Items:

a. * * *

Note 2: Integrated circuits include the following types:

-“Monolithic integrated circuits”;

-“Hybrid integrated circuits”;

-“Multichip integrated circuits”;

-“Film type integrated circuits”, including silicon-on-sapphire integrated circuits;

-“Optical integrated circuits”.

* * * * *

a.7. 'Field programmable logic devices' having any of the following:

a.7.a. A maximum number of digital input/outputs greater than 200; or

a.7.b. A system gate count of greater than 230,000;

Note: 3A001.a.7 includes:

- *Simple Programmable Logic Devices (SPLDs),*
- *Complex Programmable Logic Devices (CPLDs),*
- *Field Programmable Gate Arrays (FPGAs),*
- *Field Programmable Logic Arrays (FPLAs), and*
- *Field Programmable Interconnects (FPICs).*

Technical Notes:

1. *'Field programmable logic devices' are also known as field programmable gate or field programmable logic arrays.*

2. *Maximum number of digital input/outputs in 3A001.a.7.a is also referred to as maximum user input/outputs or maximum available input/ outputs, whether the integrated circuit is packaged or bare die.*

* * * * *

a.10. Custom integrated circuits for which the function is unknown, or the control status of the equipment in which the integrated circuits will be used is unknown to the manufacturer, having any of the following:

a.10.a. More than 1,500 terminals;

a.10.b. A typical “basic gate propagation delay time” of less than 0.02 ns; *or*

a.10.c. An operating frequency exceeding 3 GHz;

* * * * *

b. * * *

b.8. Microwave power amplifiers containing tubes controlled by 3A001.b.1 and having all of the following:

b.8.a. Operating frequencies above 3 GHz;

b.8.b. An average output power to mass ratio exceeding 80 W/kg; *and*

b.8.c. A volume of less than 400 cm³;

***Note:** 3A001.b.8 does not control equipment designed or rated for operation in any frequency band which is “allocated by the ITU” for radio-communications services, but not for radio-determination.*

* * * * *

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

* * * * *

b.10. Oscillators or oscillator assemblies, designed to operate with all of the following:

b.10.a. A single sideband (SSB) phase noise, in dBc/Hz, better than $-(126+20 \log_{10}F-20 \log_{10}f)$ for $10 \text{ Hz} < F < 10 \text{ kHz}$; and

b.10.b. A single sideband (SSB) phase noise, in dBc/Hz, better than $-(114+20 \log_{10}F-20 \log_{10}f)$ for $10 \text{ kHz} \leq F < 500 \text{ kHz}$;

Technical Note: *In 3A001.b.10, F is the offset from the operating frequency in Hz and f is the operating frequency in MHz.*

c. Acoustic wave devices as follows and specially designed components therefor:

c.1. Surface acoustic wave and surface skimming (shallow bulk) acoustic wave devices, having any of the following:

c.1.a. A carrier frequency exceeding 6 GHz;

c.1.b. A carrier frequency exceeding 1 GHz, but not exceeding 6 GHz and having any of the following:

c.1.b.1. A ‘frequency side-lobe rejection’ exceeding 65 dB;

* * * * *

c.1.c. * * *

c.1.c.3. A ‘frequency side-lobe rejection’ exceeding 65 dB and a bandwidth greater than 100 MHz;

Technical Note: *‘Frequency side-lobe rejection’ is the maximum rejection value specified in data sheet.*

c.2. Bulk (volume) acoustic wave devices that permit the direct processing of signals at frequencies exceeding 6 GHz;

c.3. Acoustic-optic “signal processing” devices employing interaction between acoustic waves (bulk wave or surface wave) and light waves that permit the direct processing of signals or images, including spectral analysis, correlation or convolution;

Note: *3A001.c does not control acoustic wave devices that are limited to a single band pass, low pass, high pass or notch filtering, or resonating function.*

* * * * *

e. * * *

e.1. 'Cells' as follows:

* * * * *

e.1.b. 'Secondary cells' having an 'energy density' exceeding 250 Wh/kg at 293 K (20 °C);

* * * * *

e.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 meter (W/m²);

* * * * *

f. Rotary input type absolute position encoders having an accuracy equal to or less (better) than ± 1.0 second of arc;

g. * * *

g.2. * * *

g.2.b. A peak (surge) current equal to or greater than 3,000 A;

* * * * *

h. Solid-state power semiconductor switches, diodes, or 'modules', having all of the following:

h.1. Rated for a maximum operating junction temperature greater than 488 K (215°C);

h.2. Repetitive peak off-state voltage (blocking voltage) exceeding 300 V; and

h.3. Continuous current greater than 1 A.

Technical Note: For the purposes of 3A001.h, 'modules' contain one or more solid-state power semiconductor switches or diodes.

Note 1: Repetitive peak off-state voltage in 3A001.h includes drain to source voltage, collector to emitter voltage, repetitive peak reverse voltage and peak repetitive off-state blocking voltage.

Note 2: 3A001.h. includes:

- Junction Field Effect Transistors (JFETs)
- Vertical Junction Field Effect Transistors (VJFETs)
- Metal Oxide Semiconductor Field Effect Transistors (MOSFETs)
- Double Diffused Metal Oxide Semiconductor Field Effect Transistor (DMOSFET)
- Insulated Gate Bipolar Transistor (IGBT)
- High Electron Mobility Transistors (HEMTs)
- Bipolar Junction Transistors (BJTs)

- *Thyristors and Silicon Controlled Rectifiers (SCRs)*
- *Gate Turn-Off Thyristors (GTOs)*
- *Emitter Turn-Off Thyristors (ETOs)*
- *PiN Diodes*
- *Schottky Diodes*

Note 3: *3A001.h. does not apply to switches, diodes, or 'modules' incorporated into equipment designed for civil automobile, civil railway, or "civil aircraft" applications.*

* * * * *

30. In Supplement No. 1 to Part 774 (the Commerce Control List), Category 3, ECCN 3A002 is amended by revising paragraphs a.6, d.3.a, and d.4 in the Items paragraph of the List of Items Controlled section to read as follows:

3A002 General purpose electronic equipment and accessories therefor, as follows (see List of Items Controlled).

* * * * *

List of Items Controlled

* * * * *

Items:

* * * * *

a.6. Digital instrumentation data recorders using magnetic disk storage technique and

having all of the following:

* * * * *

d. * * *

d.3. * * *

d.3.a. Less than 312 ps;

* * * * *

d.4. A maximum synthesized frequency exceeding 3.2 GHz and having all of the following:

d.4.a. A single sideband (SSB) phase noise, in dBc/Hz, better than $-(126+20 \log_{10}F-20$

$\log_{10}f)$ for $10 \text{ Hz} < F < 10 \text{ kHz}$; and

d.4.b. A single sideband (SSB) phase noise, in dBc/Hz, better than $-(114+20 \log_{10}F-20$

$\log_{10}f)$ for $10 \text{ kHz} \leq F < 500 \text{ kHz}$;

Technical Note: In 3A002.d.4, F is the offset from the operating frequency in Hz and f is the operating frequency in MHz.

* * * * *

31. In Supplement No. 1 to Part 774 (the Commerce Control List), Category 3, ECCN 3B001 is amended by adding a new note to paragraph a.1 and revising paragraph f.3 introductory text in the Items paragraph of the List of Items Controlled section to read as follows:

3B001 Equipment for the manufacturing of semiconductor devices or materials, as follows (see List of Items Controlled) and specially designed components and accessories therefor.

* * * * *

List of Items Controlled

* * * * *

Items:

a. * * *

a.1. * * *

Note: 3B001.a.1 includes atomic layer epitaxy (ALE) equipment.

* * * * *

f.3. Equipment specially designed for mask making or semiconductor device processing using direct writing methods, having all of the following:

* * * * *

32. In Supplement No. 1 to Part 774 (the Commerce Control List), Category 4, ECCN 4D001 is amended by revising the Heading, the License Exception section, and the Items paragraph of the List of Items Controlled section to read as follows:

4D001 “Software” as follows (, see List of Items Controlled).

* * * * *

License Exceptions

CIV: N/A

TSR: Yes, except for “software” for the “development” or “production” of commodities with an “Adjusted Peak Performance” (“APP”) exceeding 0.5 WT.

APP: Yes to specific countries (see §740.7 of the EAR for eligibility criteria)

List of Items Controlled

* * * * *

Items:

a. “Software” specially designed or modified for the “development”, “production” or “use” of equipment or “software” controlled by 4A001 to 4A004, or 4D (except 4D980, 4D993 or 4D994).

b. “Software”, other than that controlled by 4D001.a, specially designed or modified for the “development” or “production” of equipment as follows:

b.1. “Digital computers” having an “Adjusted Peak Performance” (“APP”) exceeding 0.1 Weighted TeraFLOPS (WT);

b.2. “Electronic assemblies” specially designed or modified for enhancing performance by aggregation of processors so that the “APP” of the aggregation exceeds the limit in 4D001.b.1.

* * * * *

33. In Supplement No. 1 to Part 774 (the Commerce Control List), Category 4, ECCN 4D003 is amended by revising the Heading, the TSR paragraph of the License Exception section, and the Related Controls and Items paragraphs of the List of Items Controlled section to read as follows:

4D003 "Software" having characteristics or performing functions exceeding the limits in Category 5, Part 2 ("Information Security").

* * * * *

License Exceptions

CIV: * * *

TSR: N/A

List of Items Controlled

Unit: * * *

Related Controls: See Category 5, Part 2 for the control status of “software” in this entry.
See also 4D993.

Related Definitions: * * *

Items:

The list of items controlled is contained in the ECCN heading.

* * * * *

34. In Supplement No. 1 to Part 774 (the Commerce Control List), Category 4, ECCN 4E001 is amended by revising the Heading, the TSR paragraph of the License Exception section, and the Items paragraph of the List of Items Controlled section to read as follows:

4E001 “Technology” as follows (see List of Items Controlled).

* * * * *

License Exceptions

CIV: * * *

TSR: Yes, except for “technology” for the “development” or “production” of commodities with an “Adjusted Peak Performance” (“APP”) exceeding 0.5 WT.

APP: * * *

List of Items Controlled

* * * * *

Items:

a. “Technology” according to the General Technology Note, for the “development”, “production”, or “use” of equipment or “software” controlled by 4A (except 4A980 or 4A994) or 4D (except 4D980, 4D993, 4D994).

b. “Technology”, other than that controlled by 4E001.a, specially designed or modified for the “development” or “production” of equipment as follows:

b.1. “Digital computers” having an “Adjusted Peak Performance” (“APP”) exceeding 0.1 Weighted TeraFLOPS (WT);

b.2. “Electronic assemblies” specially designed or modified for enhancing performance by aggregation of processors so that the “APP” of the aggregation exceeds the limit in 4E001.b.1.

* * * * *

35. In Supplement No. 1 to Part 774 (the Commerce Control List), Category 5, Part 1, ECCN 5A001 is amended by

- a. Revising the License Requirement section;
- b. Revising the License Exception section;
- c. Revising paragraphs f and g in the Items paragraph of the of the List of Items Controlled section, as set forth below;

d. Adding a new paragraph h to the Items paragraph of the List of Items Controlled section, to read as follows:

5A001 Telecommunications systems, equipment, components and accessories, as follows (see List of Items Controlled).

License Requirements

Reason for Control: NS, AT

Control(s)

Country Chart

NS applies to 5A001.a,
and .e

NS Column 1

NS applies to 5A001.b, .c,
.d, .f, .g, .h

NS Column 2

AT applies to entire entry AT Column 1

License Requirement Notes: See §743.1 of the EAR for reporting requirements for exports under License Exceptions.

License Exceptions

LVS: N/A for 5A001.a, b.5, .e

\$5000 for 5A001b.1, b.2, b.3, b.6, and .d through .h

\$3000 for 5A001.c

* * * * *

List of Items Controlled

* * * * *

Items:

* * * * *

f. Jamming equipment specially designed or modified to intentionally and selectively interfere with, deny, inhibit, degrade or seduce mobile telecommunication services and perform any of the following, and specially designed components therefore:

f.1. Simulate the functions of Radio Access Network (RAN) equipment;

f.2. Detect and exploit specific characteristics of the mobile telecommunications protocol employed (e.g., GSM); or

f.3. Exploit specific characteristics of the mobile telecommunications protocol employed (e.g., GSM);

***N.B.:** For GNSS jamming equipment see the International Traffic in Arms Regulations (ITAR) (22 CFR Parts 120-130).*

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 control:*

a. Radio-astronomical equipment; or

b. Systems or equipment, that require any radio transmission from the target.

h. Electronic equipment designed or modified to prematurely activate or prevent the initiation of Radio Controlled Improvised Explosive Devices (RCIED).

N.B.: See also Category XI of the International Traffic in Arms Regulations (ITAR) (22 CFR

Parts 120-130).

* * * * *

36. In Supplement No. 1 to Part 774 (the Commerce Control List), Category 5, Part I, ECCN 5B001 is amended by revising the Heading and the Items paragraph of the List of Items Controlled section to read as follows:

5B001 Telecommunication test, inspection and production equipment, components and accessories, as follows (See List of Items Controlled).

* * * * *

List of Items Controlled

* * * * *

Items:

a. Equipment and specially designed components or accessories therefor, specially designed for the “development”, “production” or “use” of equipment, functions or features, controlled by 5A001;.

Note: 5B001.a does not control optical fiber characterization equipment.

b. Equipment and specially designed components or accessories therefor, specially designed for the “development” of any of the following telecommunication transmission or switching equipment:

b.1. Equipment employing digital techniques designed to operate at a “total digital transfer rate” exceeding 15 Gbit/s;

Technical Note: For switching equipment the “total digital transfer rate” is measured at the highest speed port or line.

b.2. Equipment employing a “laser” and having any of the following:

b.2.a. A transmission wavelength exceeding 1750 nm;

b.2.b. Performing “optical amplification” using praseodymium-doped fluoride fiber amplifiers (PDFFA);

b.2.c. Employing coherent optical transmission or coherent optical detection techniques (also called optical heterodyne or homodyne techniques); *or*

b.2.d. Employing analog techniques and having a bandwidth exceeding 2.5 GHz;

Note: 5B001.b.2.d. does not include equipment specially designed for the “development” of commercial TV systems.

b.3. Equipment employing “optical switching”;

b.4. Radio equipment employing Quadrature-Amplitude-Modulation (QAM) techniques above level 256; *or*

b.5. Equipment employing “common channel signaling” operating in non-associated mode of operation.

* * * * *

37. In Supplement No. 1 to Part 774 (the Commerce Control List), Category 5, Part I, ECCN 5D001 is amended by revising the Heading and the Items paragraph of the List of Items Controlled section to read as follows:

5D001 “Software” as follows (see List of Items Controlled).

* * * * *

List of Items Controlled

* * * * *

Items:

a. “Software” specially designed or modified for the “development”, “production” or “use” of equipment, functions or features, controlled by 5A001;

b. “Software” specially designed or modified to support “technology” controlled by 5E001;

c. Specific “software” specially designed or modified to provide characteristics, functions or features of equipment, controlled by 5A001 or 5B001;

d. “Software” specially designed or modified for the “development” of any of the following telecommunication transmission or switching equipment:

d.1. Equipment employing digital techniques, including designed to operate at a “total digital transfer rate” exceeding 15 Gbit/s;

Technical Note: For switching equipment the “total digital transfer rate” is measured at the highest speed port or line.

d.2. Equipment employing a “laser” and having any of the following:

d.2.a. A transmission wavelength exceeding 1,750 nm; *or*

d.2.b. Employing analog techniques and having a bandwidth exceeding 2.5 GHz;

Note: 5D001.d.2.b. does not control “software” specially designed or modified for the “development” of commercial TV systems.

d.3. Equipment employing “optical switching”; *or*

d.4. Radio equipment employing Quadrature-Amplitude-Modulation (QAM) techniques above level 256.

* * * * *

38. In Supplement No. 1 to Part 774 (the Commerce Control List), Category 5, Part I, ECCN 5E001 is amended by revising the Heading and the Items paragraph of the List of Items Controlled section to read as follows:

5E001 “Technology” as follows (see List of Items Controlled).

* * * * *

List of Items Controlled

* * * * *

Items:

a. “Technology” according to the General Technology Note for the “development”, “production” or “use” (excluding operation) of equipment, functions or features, controlled by 5A001 or “software” controlled by 5D001.a.

b. Specific “technology” as follows:

b.1. “Required” “technology” for the “development” or “production” of telecommunications equipment specially designed to be used on board satellites;

b.2. “Technology” for the “development” or “use” of “laser” communication techniques with the capability of automatically acquiring and tracking signals and maintaining communications through exoatmosphere or sub-surface (water) media;

b.3. “Technology” for the “development” of digital cellular radio base station receiving equipment whose reception capabilities that allow multi-band, multi-channel, multi-mode, multi-coding algorithm or multi-protocol operation can be modified by changes in “software”;

b.4. “Technology” for the “development” of “spread spectrum” techniques, including “frequency hopping” techniques;

c. “Technology” according the General Technology Note for the “development” or “production” of any of the following:

c.1. Equipment employing digital techniques designed to operate at a “total digital transfer rate” exceeding 15 Gbit/s;

Technical Note: For switching equipment the “total digital transfer rate” is measured at the highest speed port or line.

c.2. Equipment employing a “laser” and having any of the following:

c.2.a. A transmission wavelength exceeding 1,750 nm;

c.2.b. Performing “optical amplification” using Praseodymium-Doped Fluoride Fiber Amplifiers (PDFFA);

c.2.c. Employing coherent optical transmission or coherent optical detection techniques (also called optical heterodyne or homodyne techniques);

c.2.d. Employing wavelength division multiplexing techniques of optical carriers at less than 100 GHz spacing; *or*

c.2.e. Employing analog techniques and having a bandwidth exceeding 2.5 GHz;

Note: 5E001.c.2.e. does not control “technology” for the “development” or “production” of

commercial TV systems.

N.B.: *For "technology" for the "development" or "production" of non-telecommunications equipment employing a "laser", see Product Group E of Category 6, e.g., 6E00x*

c.3. Equipment employing "optical switching"; *or*

c.4. Radio equipment having any of the following:

c.4.a. Quadrature-Amplitude-Modulation (QAM) techniques above level 256; *or*

c.4.b. Operating at input or output frequencies exceeding 31.8 GHz; *or*

Note: *5E001.c.4.b. does not control "technology" for the "development" or "production" of equipment designed or modified for operation in any frequency band which is "allocated by the ITU" for radio-communications services, but not for radio-determination.*

c.4.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;

c.5. Equipment employing "common channel signaling" operating in non-associated mode of operation; *or*

c.6. Mobile equipment having all of the following:

c.6.a. Operating at an optical wavelength greater than or equal to 200 nm and less than or equal to 400 nm; and

- c.6.b. Operating as a "local area network";

- d. "Technology" according to the General Technology Note for the "development" or "production" of Microwave Monolithic Integrated Circuit (MMIC) power amplifiers specially designed for telecommunications and having any of the following:
 - d.1. Rated for operation at frequencies exceeding 3.2 GHz up to and including 6 GHz and with an average output power greater than 4 W (36 dBm) with a "fractional bandwidth" greater than 15%;
 - d.2. Rated for operation at frequencies exceeding 6 GHz up to and including 16 GHz and with an average output power greater than 1 W (30 dBm) with a "fractional bandwidth" greater than 10%;
 - d.3. Rated for operation at frequencies exceeding 16 GHz up to and including 31.8 GHz and with an average output power greater than 0.8 W (29 dBm) with a "fractional bandwidth" greater than 10%;
 - d.4. Rated for operation at frequencies exceeding 31.8 GHz up to and including 37.5 GHz;
 - d.5. Rated for operation at frequencies exceeding 37.5 GHz up to and including 43.5 GHz and with an average output power greater than 0.25 W (24 dBm) with a "fractional bandwidth" greater than 10%; or
 - d.6. Rated for operation at frequencies exceeding 43.5 GHz;

- e. "Technology" according to the General Technology Note for the "development" or "production" of electronic devices and circuits, specially designed for telecommunications

and containing components manufactured from "superconductive" materials, specially designed for operation at temperatures below the "critical temperature" of at least one of the "superconductive" constituents and having any of the following:

e.1. Current switching for digital circuits using "superconductive" gates with a product of delay time per gate (in seconds) and power dissipation per gate (in watts) of less than 10^{-14} J; or

e.2. Frequency selection at all frequencies using resonant circuits with Q-values exceeding 10,000.

* * * * *

39. In Supplement No. 1 to Part 774 (the Commerce Control List), Category 5, Part II, ECCN 5A002 is amended by:

a. Revising the Note at the beginning of the Items paragraph of the List of Items

Controlled section;

b. Revising paragraph a.7 in the Items paragraph in the List of Items Controlled section to read as follows:

5A002 "Information security" systems, equipment and components therefor, as follows (see List of Items Controlled).

* * * * *

List of Items Controlled

* * * * *

Items:

Note: 5A002 does not control any of the following. However, these items are instead controlled under 5A992:

a. "Personalized smart cards" having any of the following:

1. Where the cryptographic capability is restricted for use in equipment or systems excluded from entries (b) through (g) of this Note; or

2. For general public-use applications where the cryptographic capability is not user-accessible and it is specially designed and limited to allow protection of personal data stored within;

N.B.: If a "personalized smart card" has multiple functions, the status of each function is assessed individually.

b. Receiving equipment for radio broadcast, pay television or similar restricted audience broadcast of the consumer type, without digital encryption except that exclusively used for sending the billing or program-related information back to the broadcast providers;

c. Equipment where the cryptographic capability is not user-accessible and which is specially designed and limited to allow any of the following:

1. Execution of copy-protected “software”;

2. Access to any of the following:

a. Copy-protected contents stored on read-only media; or

b. Information stored in encrypted form on media (e.g., in connection with the protection of intellectual property rights) where the media is offered for sale in identical sets to the public;

3. Copying control of copyright protected audio/video data; or

4. Encryption and/or decryption for protection of libraries, design attributes, or associated data for the design of semiconductor devices or integrated circuits;

d. Cryptographic equipment specially designed and limited for banking use or 'money transactions';

Technical Note: *The term ‘money transactions’ includes the collection and settlement of fares or credit functions.*

e. Portable or mobile radiotelephones for civil use (e.g., for use with commercial civil cellular radio communication 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));

f. Cordless telephone equipment not capable of end-to-end encryption where the maximum effective range of unboosted cordless operation (e.g., a single, unrelayed hop between terminal and home base station) is less than 400 meters according to the manufacturer's specifications;

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 d. 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;

h. Equipment specially designed for the servicing of portable or mobile radiotelephones and similar client wireless devices that meet all the provisions of the Cryptography Note (Note 3 in Category 5, Part 2), where the servicing equipment meets all of the following:

1. The cryptographic functionality of the servicing equipment cannot easily be changed by the user of the equipment;

2. The servicing equipment is designed for installation without further substantial support by the supplier; and

3. The servicing equipment cannot change the cryptographic functionality of the device being serviced; or

i. Wireless "personal area network" equipment that implement only published or commercial

cryptographic standards and where the cryptographic capability is limited to a nominal operating range not exceeding 30 metres according to the manufacturer's specifications.

a. * * *

a.7. Non-cryptographic information and communications technology (ICT) security systems and devices evaluated to an assurance level exceeding class EAL-6 (evaluation assurance level) of the Common Criteria (CC) or equivalent;

* * * * *

40. In Supplement No. 1 to Part 774 (the Commerce Control List), Category 5, Part II, ECCN 5B002 is amended by revising the Heading and the Items paragraph of the List of Items Controlled section, to read as follows:

5B002 “Information Security” test, inspection and “production” equipment, as follows (see List of Items Controlled).

* * * * *

List of Items Controlled

* * * * *

Items:

a. Equipment specially designed for the “development” or “production” of equipment controlled by 5A002 or 5B002.b;

b. Measuring equipment specially designed to evaluate and validate the “information security” functions of equipment controlled by 5A002 or “software” controlled by 5D002.a or 5D002.c.

* * * * *

41. In Supplement No. 1 to Part 774 (the Commerce Control List), Category 5, Part II, ECCN 5D002 is amended by revising the Heading and the Items paragraph of the List of Items Controlled section, to read as follows:

5D002 “Software” as follows (see List of Items Controlled).

* * * * *

List of Items Controlled

* * * * *

Items:

a. “Software” specially designed or modified for the “development”, “production” or “use” of equipment controlled by 5A002 or “software” controlled by 5D002.c;

b. “Software” specially designed or modified to support “technology” controlled by 5E002;

c. Specific “software” as follows:

c.1. “Software” having the characteristics, or performing or simulating the functions of the equipment, controlled by 5A002;

c.2. “Software” to certify “software” controlled by 5D002.c.1.

* * * * *

42. In Supplement No. 1 to Part 774 (the Commerce Control List), Category 5, Part II, ECCN 5E002 is amended by revising the Heading, the EI paragraph and the License Requirement Note in the License Requirements section, to read as follows:

5E002 “Technology” according to the General Technology Note for the “development”,

**“production” or “use” of equipment controlled by 5A002 or 5B002 or “software”
controlled by 5D002.a or 5D002.c.**

License Requirements

* * * * *

EI applies to “technology” for the “development,” “production,” or “use” of commodities or “software” controlled for EI reasons in ECCNs 5A002 or 5D002.a or 5D002.c. Refer to § 742.15 of the EAR.

License Requirement Note: When a person performs or provides technical assistance that incorporates, or otherwise draws upon, “technology” that was either obtained in the United States or is of US-origin, then a release of the “technology” takes place. Such technical assistance, when rendered with the intent to aid in the “development” or “production” of encryption commodities or software that would be controlled for “EI” reasons under ECCN 5A002 or 5D002.a or 5D002.c, may require authorization under the EAR even if the underlying encryption algorithm to be implemented is from the public domain or is not of U.S. origin.

* * * * *

43. In Supplement No. 1 to Part 774 (the Commerce Control List), Category 6, ECCN 6A001 is amended by:

- a. Revising the License Exception section;
- b. Revising paragraph b.2 in the Items paragraph of the List of Items Controlled section;

and

- c. Adding a new paragraph c to read as follows:

6A001 Acoustic systems, equipment and components, as follows (see List of Items Controlled).

* * * * *

License Exceptions

LVS: \$3000; N/A for 6A001.a.1.b.1 object detection and location systems having a transmitting frequency below 5 kHz or a sound pressure level exceeding 210 dB (reference 1 μ Pa at 1 m) for equipment with an operating frequency in the band from 30 kHz to 2 kHz inclusive; 6A001.a.2.a.1, a.2.a.2, 6A001.a.2.a.3, a.2.a.5, a.2.a.6, 6A001.a.2.b; processing equipment controlled by 6A001.a.2.c, and specially designed for real time application with towed acoustic hydrophone arrays; a.2.e.1, a.2.e.2; and bottom or bay cable systems controlled by 6A001.a.2.f and having processing equipment specially designed for real time application with bottom or bay cable systems.

\$5,000: 6A001.c

GBS: Yes for 6A001.a.1.b.4 and .c

CIV: Yes for 6A001.a.1.b.4 and .c

List of Items Controlled

* * * * *

Items:

* * * * *

Note: 6A001.a.1 does not control equipment as follows: * * *

b. * * *

b.2. Doppler-velocity sonar log equipment having speed accuracy better than 1% of speed;

Note 1: 6A001.b does not apply to depth sounders limited to any of the following:

a. *Measuring the depth of water;*

b. *Measuring the distance of submerged or buried objects; or*

c. *Fish finding.*

Note 2: *6A001.b. does not apply to equipment specially designed for installation on surface vessels.*

c. Diver deterrent acoustic systems specially designed or modified to disrupt divers and having a sound pressure level equal to or exceeding 190 dB (reference 1 μ Pa at 1 m) at frequencies of 200Hz and below.

Note 1: *6A001.c does not apply to diver deterrent systems based on underwater explosive devices, air guns or combustible sources.*

Note 2: *6A001.c includes diver deterrent acoustic systems that use spark gap sources, also known as plasma sound sources.*

* * * * *

44. In Supplement No. 1 to Part 774 (the Commerce Control List), Category 6, ECCN 6A004 is amended by revising the Heading and the Items paragraph of the List of Items Controlled section, to read as follows:

6A004 Optical equipment and components, as follows (see List of Items Controlled).

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List of Items Controlled

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Items:

a. Optical mirrors (reflectors) as follows:

a.1. “Deformable mirrors” having either continuous or multi-element surfaces, and specially designed components therefor, capable of dynamically repositioning portions of the surface of the mirror at rates exceeding 100 Hz;

a.2. Lightweight monolithic mirrors having an average “equivalent density” of less than 30 kg/m² and a total mass exceeding 10 kg;

a.3. Lightweight “composite” or foam mirror structures having an average “equivalent density” of less than 30 kg/m² and a total mass exceeding 2 kg;

a.4. Beam steering mirrors more than 100 mm in diameter or length of major axis, that maintain a flatness of $\lambda/2$ or better (λ is equal to 633 nm) having a control bandwidth exceeding 100 Hz;

b. Optical components made from zinc selenide (ZnSe) or zinc sulphide (ZnS) with transmission

in the wavelength range exceeding 3,000 nm but not exceeding 25,000 nm and having any of the following:

b.1. Exceeding 100 cm^3 in volume; *or*

b.2. Exceeding 80 mm in diameter or length of major axis and 20 mm in thickness (depth);

c. "Space-qualified" components for optical systems, as follows:

c.1. Components lightweighted to less than 20% "equivalent density" compared with a solid blank of the same aperture and thickness;

c.2. Raw substrates, processed substrates having surface coatings (single-layer or multi-layer, metallic or dielectric, conducting, semiconducting or insulating) or having protective films;

c.3. Segments or assemblies of mirrors designed to be assembled in space into an optical system with a collecting aperture equivalent to or larger than a single optic 1 m in diameter;

c.4. Components manufactured from "composite" materials having a coefficient of linear thermal expansion equal to or less than 5×10^{-6} in any coordinate direction;

d. Optical control equipment as follows:

d.1. Equipment specially designed to maintain the surface figure or orientation of the “space-qualified” components controlled by 6A004.c.1 or 6A004.c.3;

d.2. Equipment having steering, tracking, stabilization or resonator alignment bandwidths equal to or more than 100 Hz and an accuracy of 10 μ rad (microradians) or less;

d.3. Gimbals having all of the following:

d.3.a. A maximum slew exceeding 5°;

d.3.b. A bandwidth of 100 Hz or more;

d.3.c. Angular pointing errors of 200 μ rad (microradians) or less; *and*

d.3.d. Having any of the following:

d.3.d.1. Exceeding 0.15 m but not exceeding 1 m in diameter or major axis length and capable of angular accelerations exceeding 2 rad (radians)/s²; *or*

d.3.d.2. Exceeding 1 m in diameter or major axis length and capable of angular accelerations exceeding 0.5 rad (radians)/s²;

d.4. Specially designed to maintain the alignment of phased array or phased segment mirror systems consisting of mirrors with a segment diameter or major axis length of 1 m or more;

e. 'Aspheric optical elements' having all of the following:

e.1. Largest dimension of the optical-aperture greater than 400 mm;

e.2. Surface roughness less than 1 nm (rms) for sampling lengths equal to or greater than 1 mm; *and*

e.3. Coefficient of linear thermal expansion's absolute magnitude less than $3 \times 10^{-6}/\text{K}$ at 25°C.

Technical Notes:

1. *[See Related Definitions section of this ECCN]*

2. *Manufacturers are not required to measure the surface roughness listed in 6A004.e.2 unless the optical element was designed or manufactured with the intent to meet, or exceed, the control parameter.*

Note: *6A004.e does not control 'aspheric optical elements' having any of the following:*

a. *Largest optical-aperture dimension less than 1 m and focal length to aperture ratio equal*

to or greater than 4.5:1;

b. Largest optical-aperture dimension equal to or greater than 1 m and focal length to aperture ratio equal to or greater than 7:1;

c. Designed as Fresnel, flyeye, stripe, prism or diffractive optical elements;

d. Fabricated from borosilicate glass having a coefficient of linear thermal expansion greater than $2.5 \times 10^{-6}/K$ at 25° C; or

e. An x-ray optical element having inner mirror capabilities (e.g., tube-type mirrors).

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45. In Supplement No. 1 to Part 774 (the Commerce Control List), Category 6, ECCN 6A005 is amended by revising the Items paragraph of the List of Items Controlled section, to read as follows:

6A005 “Lasers” (other than those described in 0B001.g.5 or .h.6), components and optical equipment, as follows (see List of Items Controlled).

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List of Items Controlled

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Items:

Notes:

1. Pulsed “lasers” include those that run in a continuous wave (CW) mode with pulses superimposed.
2. Eximer, semiconductor, chemical, CO, CO₂, and non-repetitive pulsed Nd:glass “lasers” are only specified by 6A005.d.
3. 6A005 includes fiber “lasers”.
4. The control status of “lasers” incorporating frequency conversion (i.e., wavelength change) by means other than one “laser” pumping another “laser” is determined by applying the control parameters for both the output of the source “laser” and the frequency-converted optical output.
5. 6A005 does not control “lasers” as follows:
 - a. Ruby with output energy below 20 J;
 - b. Nitrogen;
 - c. Krypton.

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

a.1. Output wavelength less than 150 nm and output power exceeding 1 W;

a.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 control Argon “lasers” having an output power equal to or less than 50 W.

a.3. Output wavelength exceeding 520 nm but not exceeding 540 nm and any of the following:

a.3.a. Single transverse mode output and output power exceeding 50 W; *or*

a.3.b. Multiple transverse mode output and output power exceeding 150 W;

a.4. Output wavelength exceeding 540 nm but not exceeding 800 nm and output power exceeding 30 W;

a.5. Output wavelength exceeding 800 nm but not exceeding 975 nm and any of the following:

a.5.a. Single transverse mode output and output power exceeding 50 W; *or*

a.5.b. Multiple transverse mode output and output power exceeding 80 W;

a.6. Output wavelength exceeding 975 nm but not exceeding 1,150 nm and any of the following;

a.6.a. Single transverse mode output and any of the following:

a.6.a.1. 'Wall-plug efficiency' exceeding 12% and output power exceeding 100 W; *or*

a.6.a.2. Output power exceeding 150 W; *or*

a.6.b. Multiple transverse mode output and any of the following:

a.6.b.1. 'Wall-plug efficiency' exceeding 18% and output power exceeding 500 W;

or

a.6.b.2. Output power exceeding 2 kW;

Note: 6A005.a.6.b does not control multiple transverse mode, industrial "lasers" with output power exceeding 2kW 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

and/or delivery.

a.7. Output wavelength exceeding 1,150 nm but not exceeding 1,555 nm and any of the following:

a.7.a. Single transverse mode and output power exceeding 50 W; *or*

a.7.b. Multiple transverse mode and output power exceeding 80 W; *or*

a.8. Output wavelength exceeding 1,555 nm and output power exceeding 1 W;

b. Non-“tunable” “pulsed lasers” having any of the following;

b.1. Output wavelength less than 150 nm and any of the following:

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

b.1.b. “Average output power” exceeding 1 W;

b.2. Output wavelength of 150 nm or more but not exceeding 520 nm and any of the following:

b.2.a. Output energy exceeding 1.5 J per pulse and “peak power” exceeding 30 W; *or*

b.2.b. “Average output power” exceeding 30 W;

Note: 6A005.b.2.b does not control Argon “lasers” having an “average output power” equal to or less than 50 W.

b.3. Output wavelength exceeding 520 nm, but not exceeding 540 nm and any of the following:

b.3.a. Single transverse mode output and any of the following:

b.3.a.1. Output energy exceeding 1.5 J per pulse and “peak power” exceeding 50 W;

or

b.3.a.2. “Average output power” exceeding 50 W; *or*

b.3.b. Multiple transverse mode output and any of the following:

b.3.b.1. Output energy exceeding 1.5 J per pulse and “peak power” exceeding 150 W;

or

b.3.b.2. “Average output power” exceeding 150 W;

b.4. Output wavelength exceeding 540 nm but not exceeding 800 nm and any of the following:

b.4.a. Output energy exceeding 1.5 J per pulse and “peak power” exceeding 30 W; *or*

b.4.b. “Average output power” exceeding 30 W;

b.5. Output wavelength exceeding 800 nm but not exceeding 975 nm and any of the following:

b.5.a. “Pulse duration” not exceeding 1 μs and any of the following:

b.5.a.1. Output energy exceeding 0.5 J per pulse and “peak power” exceeding 50 W;

b.5.a.2. Single transverse mode output and “average output power” exceeding 20 W;

or

b.5.a.3. Multiple transverse mode output and “average output power” exceeding 50

W; *or*

b.5.b. “Pulse duration” exceeding 1 μs and any of the following:

b.5.b.1. Output energy exceeding 2 J per pulse and “peak power” exceeding 50 W;

b.5.b.2. Single transverse mode output and “average output power” exceeding 50 W; *or*

b.5.b.3. Multiple transverse mode output and “average output power” exceeding 80 W.

b.6. Output wavelength exceeding 975 nm but not exceeding 1,150 nm and any of the following:

b.6.a. “Pulse duration” of less than 1 ns and any of the following:

b.6.a.1. Output “peak power” exceeding 5 GW per pulse;

b.6.a.2. “Average output power” exceeding 10 W; *or*

b.6.a.3. Output energy exceeding 0.1 J per pulse;

b.6.b. “Pulse duration” equal to or exceeding 1 ns but not exceeding 1 μ s and any of the following:

b.6.b.1. Single transverse mode output and any of the following:

b.6.b.1.a. “Peak power” exceeding 100 MW;

b.6.b.1.b. “Average output power” exceeding 20 W limited by design to a maximum pulse repetition frequency less than or equal to 1 kHz;

b.6.b.1.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;

b.6.b.1.d. “Average output power” exceeding 150 W and capable of operating at a pulse repetition frequency greater than 1 kHz; *or*

b.6.b.1.e. Output energy exceeding 2 J per pulse; *or*

b.6.b.2. Multiple transverse mode output and any of the following:

b.6.b.2.a. “Peak power” exceeding 400 MW;

b.6.b.2.b. ‘Wall-plug efficiency’ exceeding 18% and “average output power” exceeding 500 W;

b.6.b.2.c. “Average output power” exceeding 2 kW; *or*

b.6.b.2.d. Output energy exceeding 4 J per pulse; *or*

b.6.c. “Pulse duration” exceeding 1 μs and any of the following:

b.6.c.1. Single transverse mode output and any of the following:

b.6.c.1.a. “Peak power” exceeding 500 kW;

b.6.c.1.b. ‘Wall-plug efficiency’ exceeding 12% and “average output power” exceeding 100 W; *or*

b.6.c.1.c. “Average output power” exceeding 150 W; *or*

b.6.c.2. Multiple transverse mode output and any of the following:

b.6.c.2.a. “Peak power” exceeding 1 MW;

b.6.c.2.b. ‘Wall-plug efficiency’ exceeding 18% and “average output power” exceeding 500 W; *or*

b.6.c.2.c. “Average output power” exceeding 2 kW;

b.7. Output wavelength exceeding 1,150 nm but not exceeding 1,555 nm and any of the following:

b.7.a. “Pulse duration” not exceeding 1 μs and any of the following:

b.7.a.1. Output energy exceeding 0.5 J per pulse and “peak power” exceeding 50 W;

b.7.a.2. Single transverse mode output and “average output power” exceeding 20 W;

or

b.7.a.3. Multiple transverse mode output and “average output power” exceeding 50

W; *or*

b.7.b. “Pulse duration” exceeding 1 μs and any of the following:

b.7.b.1. Output energy exceeding 2 J per pulse and “peak power” exceeding 50 W;

b.7.b.2. Single transverse mode output and “average output power” exceeding 50

W; *or*

b.7.b.3. Multiple transverse mode output and “average output power” exceeding

80 W; *or*

b.8. Output wavelength exceeding 1,555 nm and any of the following:

b.8.a. Output energy exceeding 100 mJ per pulse and “peak power” exceeding 1 W; *or*

b.8.b. “Average output power” exceeding 1 W;

c. “Tunable” lasers having any of the following:

Note: 6A005.c includes titanium-sapphire (Ti: Al₂O₃), thulium-YAG (Tm: YAG), thulium-YSGG (Tm:YSGG), alexandrite (Cr:BeAl₂O₄), color center “lasers”, dye “lasers”, and liquid “lasers”.

c.1. Output wavelength less than 600 nm and any of the following:

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

c.1.b. Average or CW output power exceeding 1W;

c.2. Output wavelength of 600 nm or more but not exceeding 1,400 nm, and any of the following:

c.2.a. Output energy exceeding 1 J per pulse and “peak power” exceeding 20 W; *or*

c.2.b. Average or CW output power exceeding 20 W; *or*

c.3. Output wavelength exceeding 1,400 nm and any of the following:

c.3.a. Output energy exceeding 50 mJ per pulse and “peak power” exceeding 1 W; *or*

c.3.b. Average or CW output power exceeding 1 W;

d. Other “lasers”, not controlled by 6A005.a., 6A005.b, or 6A005.c as follows:

d.1. Semiconductor “lasers” as follows:

Notes:

1. 6A005.d.1 includes semiconductor “lasers” having optical output connectors (e.g., fiber optic pigtails).

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

d.1.a. Individual single-transverse mode semiconductor “lasers” having any of the following:

d.1.a.1. Wavelength equal to or less than 1,510 nm and average or CW output power, exceeding 1.5 W; *or*

d.1.a.2. Wavelength greater than 1,510 nm and average or CW output power, exceeding 500 mW;

d.1.b. Individual, multiple-transverse mode semiconductor “lasers” having any of the following:

d.1.b.1. Wavelength of less than 1,400 nm and average or CW output power, exceeding 10W;

d.1.b.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*

d.1.b.3. Wavelength equal to or greater than 1,900 nm and average or CW output power, exceeding 1 W;

d.1.c. Individual semiconductor “laser” ‘arrays’ having any of the following:

d.1.c.1. Wavelength of less than 1,400 nm and average or CW output power, exceeding 80 W;

d.1.c.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*

d.1.c.3. Wavelength equal to or greater than 1,900 nm and average or CW output power, exceeding 10 W;

d.1.d. 'Array stacks' of semiconductor "lasers" containing at least one 'array' controlled by 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 centers of the emitted light beams are on parallel paths.*
- 3. An 'array stack' is fabricated by stacking, or otherwise assembling, 'arrays' so that the centers of the emitted light beams are on parallel paths.*

d.2. Carbon monoxide (CO) "lasers" having any of the following:

d.2.a. Output energy exceeding 2 J per pulse and "peak power" exceeding 5 kW; *or*

d.2.b. Average or CW output power, exceeding 5 kW;

d.3. Carbon dioxide (CO₂) “lasers” having any of the following:

d.3.a. CW output power exceeding 15 kW;

d.3.b. Pulsed output with “pulse duration” exceeding 10 μ s and any of the following:

d.3.b.1. “Average output power” exceeding 10 kW; *or*

d.3.b.2. “Peak power” exceeding 100 kW; *or*

d.3.c. Pulsed output with a “pulse duration” equal to or less than 10 μ s and any of the following:

d.3.c.1. Pulse energy exceeding 5 J per pulse; *or*

d.3.c.2. “Average output power” exceeding 2.5 kW;

d.4. Excimer “lasers” having any of the following:

d.4.a. Output wavelength not exceeding 150 nm and any of the following:

d.4.a.1. Output energy exceeding 50 mJ per pulse; *or*

d.4.a.2. “Average output power” exceeding 1 W;

d.4.b. Output wavelength exceeding 150 nm but not exceeding 190 nm and any of the following:

d.4.b.1. Output energy exceeding 1.5 J per pulse; *or*

d.4.b.2. “Average output power” exceeding 120 W;

d.4.c. Output wavelength exceeding 190 nm but not exceeding 360 nm and any of the following:

d.4.c.1. Output energy exceeding 10 J per pulse; *or*

d.4.c.2. “Average output power” exceeding 500 W; *or*

d.4.d. Output wavelength exceeding 360 nm and any of the following:

d.4.d.1. Output energy exceeding 1.5 J per pulse; *or*

d.4.d.2. “Average output power” exceeding 30 W;

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

d.5. “Chemical lasers” as follows:

d.5.a. Hydrogen Fluoride (HF) “lasers”;

d.5.b. Deuterium Fluoride (DF) “lasers”;

d.5.c. “Transfer lasers” as follows:

d.5.c.1. Oxygen Iodine (O₂-I) “lasers”;

d.5.c.2. Deuterium Fluoride-Carbon dioxide (DF-CO₂) “lasers”;

d.6. ‘Non-repetitive pulsed’ Neodymium (Nd) glass “lasers” having any of the following:

d.6.a. “Pulse duration” not exceeding 1 μs and output energy exceeding 50 J per pulse;

or

d.6.b. “Pulse duration” exceeding 1 μs 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:

e.1. Mirrors cooled either by ‘active cooling’ or by heat pipe cooling;

***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.*

e.2. Optical mirrors or transmissive or partially transmissive optical or electro-optical components, specially designed for use with controlled “lasers”;

f. Optical equipment as follows:

***N.B.:** For shared aperture optical elements, capable of operating in “Super-High Power Laser” (“SHPL”) applications, see the U.S. Munitions List (22 CFR part 121).*

f.1. Dynamic wavefront (phase) measuring equipment capable of mapping at least 50 positions on a beam wavefront and any the following:

f.1.a. Frame rates equal to or more than 100 Hz and phase discrimination of at least 5% of the beam's wavelength; *or*

f.1.b. Frame rates equal to or more than 1,000 Hz and phase discrimination of at least 20% of the beam's wavelength;

f.2. "Laser" diagnostic equipment capable of measuring "SHPL" system angular beam steering errors of equal to or less than 10 μ rad;

f.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 μ m, whichever is the smaller;

f.4. Projection telescopes specially designed for use with "SHPL" systems.

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46. In Supplement No. 1 to Part 774 (the Commerce Control List), Category 6, ECCN 6A006 is amended by:

- a. Revising the Heading;
- b. Revising the LVS paragraph of the License Exception section; and
- c. Revising the Items paragraph of the List of Items Controlled section, to read as

follows:

**6A006 “Magnetometers”, “magnetic gradiometers”, “intrinsic magnetic gradiometers”,
underwater electric field sensors, “compensation systems”, and specially designed
components therefor, as follows (see List of Items Controlled).**

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License Exceptions

LVS: \$1500, N/A for 6A006.a.1; “Magnetometers” and subsystems defined in 6A006.a.2
using optically pumped or nuclear precession (proton/Overhauser) having a
‘sensitivity’ lower (better) than 2 pT (rms) per square root Hz; and 6A006.d.

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List of Items Controlled

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Items:

a. “Magnetometers” and subsystems, as follows:

a.1. “Magnetometers” using “superconductive” (SQUID) “technology” and having any of the
following:

a.1.a. SQUID systems designed for stationary operation, without specially designed

subsystems designed to reduce in-motion noise, and having a 'sensitivity' equal to or lower (better) than 50 fT (rms) per square root Hz at a frequency of 1 Hz; *or*

a.1.b. SQUID systems having an in-motion-magnetometer 'sensitivity' lower (better) than 20 pT (rms) per square root Hz at a frequency of 1 Hz and specially designed to reduce in-motion noise;

a.2. "Magnetometers" using optically pumped or nuclear precession (proton/Overhauser) "technology" having a 'sensitivity' lower (better) than 20 pT (rms) per square root Hz at a frequency of 1 Hz;

a.3. "Magnetometers" using fluxgate "technology" having a 'sensitivity' equal to or lower (better) than 10 pT (rms) per square root Hz at a frequency of 1 Hz;

a.4. Induction coil "magnetometers" having a 'sensitivity' lower (better) than any of the following:

a.4.a. 0.05 nT (rms)/square root Hz at frequencies of less than 1 Hz;

a.4.b. 1×10^{-3} nT (rms)/square root Hz at frequencies of 1 Hz or more but not exceeding 10 Hz; *or*

- a.4.c. 1×10^{-4} nT (rms)/square root Hz at frequencies exceeding 10 Hz;

- a.5. Fiber optic “magnetometers” having a ‘sensitivity’ lower (better) than 1 nT (rms) per square root Hz;

- b. Underwater electric field sensors having a ‘sensitivity’ lower (better) than 8 nanovolt per meter per square root Hz when measured at 1 Hz;

- c. “Magnetic gradiometers” as follows:
 - c.1. “Magnetic gradiometers” using multiple “magnetometers” controlled by 6A006.a;

 - c.2. Fiber optic “intrinsic magnetic gradiometers” having a magnetic gradient field ‘sensitivity’ lower (better) than 0.3 nT/m (rms) per square root Hz;

 - c.3. “Intrinsic magnetic gradiometers”, using “technology” other than fiber-optic “technology”, having a magnetic gradient field ‘sensitivity’ lower (better) than 0.015 nT/m (rms) per square root Hz; *and*

- d. “Compensation systems” for magnetic and underwater electric field sensors resulting in a performance equal to or better than the control parameters of 6A006.a, 6A006.b, and 6A006.c.

Technical Note: For the purposes of 6A006, 'sensitivity' (noise level) is the root mean square of the device-limited noise floor which is the lowest signal that can be measured.

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47. In Supplement No. 1 to Part 774 (the Commerce Control List), Category 6, ECCN 6A008 is amended by revising the Heading and the Items paragraph of the List of Items Controlled section, to read as follows:

6A008 Radar systems, equipment and assemblies, having any of the following (see List of Items Controlled), and specially designed components therefor.

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List of Items Controlled

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Items:

Note: 6A008 does not control:

- Secondary surveillance radar (SSR);
- Civil Automotive Radar;
- Displays or monitors used for air traffic control (ATC) having no more than 12 resolvable elements per mm;
- Meteorological (weather) radar.

a. Operating at frequencies from 40 GHz to 230 GHz and having any of the following:

a.1. An “average output power” exceeding 100 mW; or

a.2. Locating accuracy of 1 m or less (better) in range and 0.2 degree or less (better) in azimuth;

b. A tunable bandwidth exceeding $\pm 6.25\%$ of the ‘center operating frequency’;

Technical Note: The ‘center operating frequency’ equals one half of the sum of the highest plus the lowest specified operating frequencies.

c. Capable of operating simultaneously on more than two carrier frequencies;

d. Capable of operating in synthetic aperture (SAR), inverse synthetic aperture (ISAR) radar mode, or sidelooking airborne (SLAR) radar mode;

e. Incorporating “electronically steerable phased array antennae”;

f. Capable of heightfinding non-cooperative targets;

Note: 6A008.f does not control precision approach radar (PAR) equipment conforming to ICAO standards.

g. Specially designed for airborne (balloon or airframe mounted) operation and having Doppler “signal processing” for the detection of moving targets;

h. Employing processing of radar signals and using any of the following:

h.1. “Radar spread spectrum” techniques; *or*

h.2. “Radar frequency agility” techniques;

i. Providing ground-based operation with a maximum “instrumented range” exceeding 185 km;

Note: 6A008.i does not control:

a. Fishing ground surveillance radar;

b. Ground radar equipment specially designed for en route air traffic control, and having all of the following:

1. A maximum “instrumented range” of 500 km or less;

2. *Configured so that radar target data can be transmitted only one way from the radar site to one or more civil ATC centers;*

3. *Contains no provisions for remote control of the radar scan rate from the en route ATC center; and*

4. *Permanently installed;*

c. Weather balloon tracking radars.

j. Being “laser” radar or Light Detection and Ranging (LIDAR) equipment and having any of the following:

j.1. “Space-qualified”;

j.2. Employing coherent heterodyne or homodyne detection techniques and having an angular resolution of less (better) than 20 μ rad (microradians); or

j.3. Designed for carrying out airborne bathymetric littoral surveys to International Hydrographic Organization (IHO) Order 1a Standard (5th Edition February 2008) for Hydrographic Surveys or better, and using one or more lasers with a wavelength exceeding 400 nm but not exceeding 600 nm;

Note 1: LIDAR equipment specially designed for surveying is only specified by 6A008.j.3.

Note 2: 6A008.j does not apply to LIDAR equipment specially designed for meteorological observation.

Note 3: Parameters in the IHO Order 1a Standard 5th Edition February 2008 are summarized as follows:

Horizontal Accuracy (95% Confidence Level) = 5 m + 5% of depth.

*Depth Accuracy for Reduced Depths (95 % confidence level) = $\pm\sqrt{a^2 + (b*d)^2}$ where:*

a = 0.5 m = constant depth error, i.e. the sum of all constant depth errors

b = 0.013 = factor of depth dependant error

*b*d = depth dependant error, i.e. the sum of all depth dependant errors*

d = depth

Feature Detection = Cubic features > 2 m in depths up to 40 m; 10% of depth beyond 40 m.

k. Having “signal processing” sub-systems using “pulse compression” and having any of the following:

k.1. A “pulse compression” ratio exceeding 150; *or*

k.2. A pulse width of less than 200 ns; *or*

1. Having data processing sub-systems and having any of the following:

1.1. “Automatic target tracking” providing, at any antenna rotation, the predicted target position beyond the time of the next antenna beam passage;

Note: 6A008.1.1 does not control conflict alert capability in ATC systems, or marine or harbor radar.

1.2. Calculation of target velocity from primary radar having non-periodic (variable) scanning rates;

1.3. Processing for automatic pattern recognition (feature extraction) and comparison with target characteristic data bases (waveforms or imagery) to identify or classify targets; *or*

1.4. Superposition and correlation, or fusion, of target data from two or more “geographically dispersed” and “interconnected radar sensors” to enhance and discriminate targets.

Note: 6A008.1.4 does not control systems, equipment and assemblies designed for marine traffic control.

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48. In Supplement No. 1 to Part 774 (the Commerce Control List), Category 6, ECCN 6A996

is amended by revising the Items paragraph of the List of Items Controlled section, to read as follows:

6A996 “Magnetometers” not controlled by ECCN 6A006, “Superconductive” electromagnetic sensors, and specially designed components therefor, as follows (see List of Items Controlled).

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List of Items Controlled

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Items:

a. “Magnetometers”, n.e.s., having a ‘sensitivity’ lower (better) than 1.0 nT (rms) per square root Hz.

Technical Note: For the purposes of 6A996, 'sensitivity' (noise level) is the root mean square of the device-limited noise floor which is the lowest signal that can be measured.

b. “Superconductive” electromagnetic sensors, components manufactured from “superconductive” materials:

b.1. Designed for operation at temperatures below the “critical temperature” of at least one of

their “superconductive” constituents (including Josephson effect devices or “superconductive” quantum interference devices (SQUIDS));

b.2. Designed for sensing electromagnetic field variations at frequencies of 1 KHz or less;
and

b.3. Having any of the following characteristics:

b.3.a. Incorporating thin-film SQUIDS with a minimum feature size of less than 2 μm and with associated input and output coupling circuits;

b.3.b. Designed to operate with a magnetic field slew rate exceeding 1×10^6 magnetic flux quanta per second;

b.3.c. Designed to function without magnetic shielding in the earth’s ambient magnetic field; or

b.3.d. Having a temperature coefficient less (smaller) than 0.1 magnetic flux quantum/K.

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49. In Supplement No. 1 to Part 774 (the Commerce Control List), Category 6, ECCN 6D003 is amended by revising the Heading, adding RS to the Reason for Control section,

revising the RS paragraph of the License Requirements section, and revising the Items paragraph of the List of Items Controlled section, to read as follows:

6D003 Other “software” as follows (see List of Items Controlled).

License Requirements

Reason for Control: NS, RS, AT

<i>Control(s)</i>	<i>Country Chart</i>
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RS applies to paragraph c	RS Column 1
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List of Items Controlled

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Items:

ACOUSTICS

a. “Software” as follows:

a.1. "Software" specially designed for acoustic beam forming for the "real time processing" of acoustic data for passive reception using towed hydrophone arrays;

a.2. "Source code" for the "real time processing" of acoustic data for passive reception using towed hydrophone arrays;

a.3. "Software" specially designed for acoustic beam forming for the "real time processing" of acoustic data for passive reception using bottom or bay cable systems;

a.4. "Source code" for the "real time processing" of acoustic data for passive reception using bottom or bay cable systems;

b. Optical sensors. None.

CAMERAS

c. "Software" designed or modified for cameras incorporating "focal plane arrays" specified by 6A002.a.3.f and designed or modified to remove a frame rate restriction and allow the camera to exceed the frame rate specified in 6A003.b.4 Note 3.a;

d. Optics. None.

e. Lasers. None

MAGNETIC AND ELECTRIC FIELD SENSORS

f. “Software” as follows:

f.1. “Software” specially designed for magnetic and electric field “compensation systems” for magnetic sensors designed to operate on mobile platforms;

f.2. “Software” specially designed for magnetic and electric field anomaly detection on mobile platforms;

GRAVIMETERS

g. “Software” specially designed to correct motional influences of gravity meters or gravity gradiometers;

RADAR

h. “Software” as follows:

h.1. Air Traffic Control (ATC) “software” application “programs” hosted on general purpose computers located at Air Traffic Control centers and capable of any of the following:

h.1.a. Processing and displaying more than 150 simultaneous “system tracks”; *or*

h.1.b. Accepting radar target data from more than four primary radars;

h.2. “Software” for the design or “production” of radomes and having all of the following:

h.2.a. Specially designed to protect the “electronically steerable phased array antennae” controlled by 6A008.e.; *and*

h.2.b. Resulting in an antenna pattern having an ‘average side lobe level’ more than 40 dB below the peak of the main beam level.

Technical Note: ‘Average side lobe level’ in 6D003.h.2.b is measured over the entire array excluding the angular extent of the main beam and the first two side lobes on either side of the main beam.

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50. In Supplement No. 1 to Part 774 (the Commerce Control List), Category 6, ECCN 6E993 is amended by revising the Items paragraph of the List of Items Controlled section, to read as follows:

6E993 Other “technology”, not controlled by 6E003, as follows (see List of Items Controlled).

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List of Items Controlled

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Items:

a. Optical fabrication technologies for serially producing optical components at a rate exceeding 10 m² of surface area per year on any single spindle and having all of the following:

a.1. Area exceeding 1 m²; *and*

a.2. Surface figure exceeding $\lambda/10$ (rms) at the designed wavelength;

b. “Technology” for optical filters with a bandwidth equal to or less than 10 nm, a field of view (FOV) exceeding 40° and a resolution exceeding 0.75 line pairs per milliradian;

c. “Technology” for the “development” or “production” of cameras controlled by 6A993;

d. “Technology” “required” for the “development” or “production” of non-triaxial fluxgate “magnetometers” or non-triaxial fluxgate “magnetometer” systems, having any of the following:

d.1. ‘Sensitivity’ lower (better) than 0.05 nT (rms) per square root Hz at frequencies of less than 1 Hz; *or*

d.2. ‘Sensitivity’ lower (better) than 1×10^{-3} nT (rms) per square root Hz at frequencies of 1 Hz or more.

Technical Note: *For the purposes of 6E993, 'sensitivity' (or noise level) is the root mean square of the device-limited noise floor which is the lowest signal that can be measured.*

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51. In Supplement No. 1 to Part 774 (the Commerce Control List), Category 7, ECCN 7A003 is amended by revising the Heading and the Items paragraph in the List of Items Controlled section, to read as follows:

7A003 Inertial systems and specially designed components, as follows.

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List of Items Controlled

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Items:

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 and specially designed components therefor:

a.1. Navigation error (free inertial) subsequent to normal alignment of 0.8 nautical mile per

hour (nm/hr) “Circular Error Probable” (“CEP”) or less (better); *or*

a.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 meters “Circular Error Probable” (“CEP”);

c. Inertial measurement equipment for heading or True North determination and having any of the following, and specially designed components therefor:

c.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); *or*

c.2. Designed to have a non-operating shock level of 900 g or greater at a duration of 1 msec, or greater;

d. Inertial measurement equipment including Inertial Measurement Units (IMU) and Inertial Reference Systems (IRS), incorporating accelerometers or gyros controlled by 7A001 or 7A002, and specially designed components therefor.

Note 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 hour 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; and

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 $+2.62 \text{ rad/s}$ (150 deg/s); or

c. According to national standards equivalent to a. or b. of this note.

Note 2: *7A003 does not control inertial navigation systems which are certified for use on “civil aircraft” by civil authorities of a Wassenaar Arrangement Participating State, see Supplement No. 1 to Part 743 for a list of these countries.*

Note 3: 7A003.c.1 does not control theodolite systems incorporating inertial equipment specially designed for civil surveying purposes.

Technical Note: 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.

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52. In Supplement No. 1 to Part 774 (the Commerce Control List), Category 8, ECCN 8A001 is amended by revising the Items paragraph in the List of Items Controlled section, to read as follows:

8A001 Submersible vehicles and surface vessels, as follows (see List of Items Controlled).

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List of Items Controlled

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Items:

- a. Manned, tethered submersible vehicles designed to operate at depths exceeding 1,000 m;

- b. Manned, untethered submersible vehicles having any of the following:
 - b.1. Designed to ‘operate autonomously’ and having a lifting capacity of all the following:
 - b.1.a. 10% or more of their weight in air; *and*

 - b.1.b. 15 kN or more;

 - b.2. Designed to operate at depths exceeding 1,000 m; *or*

 - b.3. Having all of the following:
 - b.3.a. Designed to continuously ‘operate autonomously’ for 10 hours or more; and

 - b.3.b. ‘Range’ of 25 nautical miles or more;

Technical Notes:

1. *For the purposes of 8A001.b, ‘operate autonomously’ means fully submerged, without snorkel, all systems working and cruising at minimum speed at which the submersible can safely*

control its depth dynamically by using its depth planes only, with no need for a support vessel or support base on the surface, sea-bed or shore, and containing a propulsion system for submerged or surface use.

2. For the purposes of 8A001.b, 'range' means half the maximum distance a submersible vehicle can 'operate autonomously'.

c. Unmanned, tethered submersible vehicles designed to operate at depths exceeding 1,000 m and having any of the following:

c.1. Designed for self-propelled maneuver using propulsion motors or thrusters controlled by 8A002.a.2; *or*

c.2. Fiber optic data link;

d. Unmanned, untethered submersible vehicles having any of the following:

d.1. Designed for deciding a course relative to any geographical reference without real-time human assistance;

d.2. Acoustic data or command link; *or*

d.3. Fiber optic data or command link exceeding 1,000 m;

e. Ocean salvage systems with a lifting capacity exceeding 5 MN for salvaging objects from depths exceeding 250 m and having any of the following:

e.1. Dynamic positioning systems capable of position keeping within 20 m of a given point provided by the navigation system; *or*

e.2. Seafloor navigation and navigation integration systems, for depths exceeding 1,000 m and with positioning accuracies to within 10 m of a predetermined point;

f. Surface-effect vehicles (fully skirted variety) having all of the following:

f.1. Maximum design speed, fully loaded, exceeding 30 knots in a significant wave height of 1.25 m (Sea State 3) or more;

f.2. Cushion pressure exceeding 3,830 Pa; *and*

f.3. Light-ship-to-full-load displacement ratio of less than 0.70;

g. Surface-effect vehicles (rigid sidewalls) with a maximum design speed, fully loaded, exceeding 40 knots in a significant wave height of 3.25 m (Sea State 5) or more;

h. Hydrofoil vessels with active systems for automatically controlling foil systems, with a

maximum design speed, fully loaded, of 40 knots or more in a significant wave height of 3.25 m (Sea State 5) or more;

i. 'Small waterplane area vessels' having any of the following:

i.1. Full load displacement exceeding 500 tonnes with a maximum design speed, fully loaded, exceeding 35 knots in a significant wave height of 3.25 m (Sea State 5) or more; *or*

i.2. Full load displacement exceeding 1,500 tonnes with a maximum design speed, fully loaded, exceeding 25 knots in a significant wave height of 4 m (Sea State 6) or more.

Technical Note: A 'small waterplane area vessel' is defined by the following formula:
waterplane area at an operational design draft less than 2 x (displaced volume at the operational design draft)^{2/3}.

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53. In Supplement No. 1 to Part 774 (the Commerce Control List), Category 8, ECCN 8A002 is amended by revising the Heading and the Items paragraph in the List of Items Controlled section, to read as follows:

8A002 Marine systems, equipment and components, as follows (see List of Items

Controlled).

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List of Items Controlled

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Items:

a. Systems, equipment and components, specially designed or modified for submersible vehicles and designed to operate at depths exceeding 1,000 m, as follows:

a.1. Pressure housings or pressure hulls with a maximum inside chamber diameter exceeding 1.5 m;

a.2. Direct current propulsion motors or thrusters;

a.3. Umbilical cables, and connectors therefor, using optical fiber and having synthetic strength members;

a.4. Components manufactured from material specified by ECCN 8C001;

Technical Note: *The objective of 8A002.a.4 should not be defeated by the export of 'syntactic foam' controlled by 8C001 when an intermediate stage of manufacture has been performed and it is not yet in its final component form.*

b. Systems specially designed or modified for the automated control of the motion of submersible vehicles controlled by 8A001, using navigation data, having closed loop servo-controls and having any of the following:

b.1. Enabling a vehicle to move within 10 m of a predetermined point in the water column;

b.2. Maintaining the position of the vehicle within 10 m of a predetermined point in the water column; *or*

b.3. Maintaining the position of the vehicle within 10 m while following a cable on or under the seabed;

c. Fiber optic hull penetrators or connectors;

d. Underwater vision systems as follows:

d.1. Television systems and television cameras, as follows:

d.1.a. Television systems (comprising camera, monitoring and signal transmission

equipment) having a 'limiting resolution' when measured in air of more than 800 lines and specially designed or modified for remote operation with a submersible vehicle;

d.1.b. Underwater television cameras having a 'limiting resolution' when measured in air of more than 1,100 lines;

d.1.c. Low light level television cameras specially designed or modified for underwater use and having all of the following:

d.1.c.1. Image intensifier tubes controlled by 6A002.a.2.a; *and*

d.1.c.2. More than 150,000 "active pixels" per solid state area array;

Technical Note: 'Limiting resolution' is a measure of horizontal resolution usually expressed in terms of the maximum number of lines per picture height discriminated on a test chart, using IEEE Standard 208/1960 or any equivalent standard.

d.2. Systems specially designed or modified for remote operation with an underwater vehicle, employing techniques to minimize the effects of back scatter and including range-gated illuminators or "laser" systems;

e. Photographic still cameras specially designed or modified for underwater use below 150 m, with a film format of 35 mm or larger and having any of the following:

e.1. Annotation of the film with data provided by a source external to the camera;

e.2. Automatic back focal distance correction; *or*

e.3. Automatic compensation control specially designed to permit an underwater camera housing to be usable at depths exceeding 1,000 m;

f. Electronic imaging systems, specially designed or modified for underwater use, capable of storing digitally more than 50 exposed images;

Note: 8A002.f does not control digital cameras specially designed for consumer purposes, other than those employing electronic image multiplication techniques.

g. Light systems specially designed or modified for underwater use, as follows:

g.1. Stroboscopic light systems capable of a light output energy of more than 300 J per flash and a flash rate of more than 5 flashes per second;

g.2. Argon arc light systems specially designed for use below 1,000 m;

h. "Robots" specially designed for underwater use, controlled by using a dedicated computer and having any of the following:

h.1. Systems that control the “robot” using information from sensors which measure force or torque applied to an external object, distance to an external object, or tactile sense between the “robot” and an external object; *or*

h.2. The ability to exert a force of 250 N or more or a torque of 250 Nm or more and using titanium based alloys or “composite” “fibrous or filamentary materials” in their structural members;

i. Remotely controlled articulated manipulators specially designed or modified for use with submersible vehicles and having any of the following:

i.1. Systems which control the manipulator using the information from sensors which measure the torque or force applied to an external object, or tactile sense between the manipulator and an external object; *or*

i.2. Controlled by proportional master-slave techniques or by using a dedicated computer and having 5 degrees of ‘freedom of movement’ or more;

Technical Note: *Only functions having proportional control using positional feedback or by using a dedicated computer are counted when determining the number of degrees of ‘freedom of movement’.*

j. Air independent power systems specially designed for underwater use, as follows:

j.1. Brayton or Rankine cycle engine air independent power systems having any of the following:

j.1.a. Chemical scrubber or absorber systems, specially designed to remove carbon dioxide, carbon monoxide and particulates from recirculated engine exhaust;

j.1.b. Systems specially designed to use a monoatomic gas;

j.1.c. Devices or enclosures, specially designed for underwater noise reduction in frequencies below 10 kHz, or special mounting devices for shock mitigation; *or*

j.1.d. Systems having all of the following:

j.1.d.1. Specially designed to pressurize the products of reaction or for fuel reformation;

j.1.d.2. Specially designed to store the products of the reaction; *and*

j.1.d.3. Specially designed to discharge the products of the reaction against a pressure of 100 kPa or more;

j.2. Diesel cycle engine air independent systems having all of the following:

j.2.a. Chemical scrubber or absorber systems, specially designed to remove carbon dioxide, carbon monoxide and particulates from recirculated engine exhaust;

j.2.b. Systems specially designed to use a monoatomic gas;

j.2.c. Devices or enclosures, specially designed for underwater noise reduction in frequencies below 10 kHz, or special mounting devices for shock mitigation; *and*

j.2.d. Specially designed exhaust systems that do not exhaust continuously the products of combustion;

j.3. Fuel cell air independent power systems with an output exceeding 2 kW and having any of the following:

j.3.a. Devices or enclosures, specially designed for underwater noise reduction in frequencies below 10 kHz, or special mounting devices for shock mitigation; *or*

j.3.b. Systems having all of the following:

j.3.b.1. Specially designed to pressurize the products of reaction or for fuel

reformation;

j.3.b.2. Specially designed to store the products of the reaction; *and*

j.3.b.3. Specially designed to discharge the products of the reaction against a pressure of 100 kPa or more;

j.4. Stirling cycle engine air independent power systems having all of the following:

j.4.a. Devices or enclosures, specially designed for underwater noise reduction in frequencies below 10 kHz, or special mounting devices for shock mitigation; *and*

j.4.b. Specially designed exhaust systems which discharge the products of combustion against a pressure of 100 kPa or more;

k. Skirts, seals and fingers, having any of the following:

k.1. Designed for cushion pressures of 3,830 Pa or more, operating in a significant wave height of 1.25 m (Sea State 3) or more and specially designed for surface effect vehicles (fully skirted variety) controlled by 8A001.f; *or*

k.2. Designed for cushion pressures of 6,224 Pa or more, operating in a significant wave

height of 3.25 m (Sea State 5) or more and specially designed for surface effect vehicles (rigid sidewalls) controlled by 8A001.g;

l. Lift fans rated at more than 400 kW and specially designed for surface effect vehicles controlled by 8A001.f or 8A001.g;

m. Fully submerged subcavitating or supercavitating hydrofoils, specially designed for vessels controlled by 8A001.h;

n. Active systems specially designed or modified to control automatically the sea-induced motion of vehicles or vessels, controlled by 8A001.f, 8A001.g, 8A001.h or 8A001.i;

o. Propellers, power transmission systems, power generation systems and noise reduction systems, as follows:

o.1. Water-screw propeller or power transmission systems, specially designed for surface effect vehicles (fully skirted or rigid sidewall variety), hydrofoils or 'small waterplane area vessels' controlled by 8A001.f, 8A001.g, 8A001.h or 8A001.i, as follows:

o.1.a. Supercavitating, super-ventilated, partially-submerged or surface piercing propellers, rated at more than 7.5 MW;

- o.1.b. Contrarotating propeller systems rated at more than 15 MW;
- o.1.c. Systems employing pre-swirl or post-swirl techniques, for smoothing the flow into a propeller;
- o.1.d. Light-weight, high capacity (K factor exceeding 300) reduction gearing;
- o.1.e. Power transmission shaft systems incorporating “composite” material components and capable of transmitting more than 1 MW;
- o.2. Water-screw propeller, power generation systems or transmission systems, designed for use on vessels, as follows:
 - o.2.a. Controllable-pitch propellers and hub assemblies, rated at more than 30 MW;
 - o.2.b. Internally liquid-cooled electric propulsion engines with a power output exceeding 2.5 MW;
 - o.2.c. “Superconductive” propulsion engines or permanent magnet electric propulsion engines, with a power output exceeding 0.1 MW;
 - o.2.d. Power transmission shaft systems incorporating “composite” material components and capable of transmitting more than 2 MW;

o.2.e. Ventilated or base-ventilated propeller systems, rated at more than 2.5 MW;

o.3. Noise reduction systems designed for use on vessels of 1,000 tonnes displacement or more, as follows:

o.3.a. Systems that attenuate underwater noise at frequencies below 500 Hz and consist of compound acoustic mounts for the acoustic isolation of diesel engines, diesel generator sets, gas turbines, gas turbine generator sets, propulsion motors or propulsion reduction gears, specially designed for sound or vibration isolation and having an intermediate mass exceeding 30% of the equipment to be mounted;

o.3.b. Active noise reduction or cancellation systems, or magnetic bearings, specially designed for power transmission systems, and incorporating electronic control systems capable of actively reducing equipment vibration by the generation of anti-noise or anti-vibration signals directly to the source;

p. Pumpjet propulsion systems having a power output exceeding 2.5 MW using divergent nozzle and flow conditioning vane techniques to improve propulsive efficiency or reduce propulsion-generated underwater-radiated noise;

q. Self-contained, closed or semi-closed circuit (rebreathing) diving and underwater swimming

apparatus.

Note: 8A002.q does not control an individual apparatus for personal use when accompanying its user.

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54. In Supplement No. 1 to Part 774 (the Commerce Control List), Category 9, ECCN 9A012 is amended by revising the Heading and the Items paragraph in the List of Items Controlled section, to read as follows:

9A012 Non-military “unmanned aerial vehicles,” (“UAVs”), associated systems, equipment and components, as follows (see List of Items Controlled).

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List of Items Controlled

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Items:

a. “UAVs” having any of the following:

a.1. An autonomous flight control and navigation capability (*e.g.*, an autopilot with an Inertial Navigation System); *or*

a.2. Capability of controlled flight out of the direct visual range involving a human operator (*e.g.*, televisual remote control);

b. Associated systems, equipment and components, as follows:

b.1. Equipment specially designed for remotely controlling the “UAVs” controlled by 9A012.a.;

b.2. Systems for navigation, attitude, guidance or control, other than those controlled in Category 7 and specially designed to provide autonomous flight control or navigation capability to “UAVs” controlled by 9A012.a.;

b.3. Equipment and components, specially designed to convert a manned “aircraft” to a “UAV” controlled by 9A012.a.;

b.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 meters).

Note: 9A012 does not control model aircraft.

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DATED: November 25, 2009

Matthew S. Borman

Deputy Assistant Secretary

for Export Administration

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