DEPARTMENT OF COMMERCE

Bureau of Industry and Security

15 CFR Parts 740, 743, 772 and 774

[Docket No. 060807211–6211–01]

RIN 0694–AD 73

December 2005 Wassenaar Arrangement Plenary Agreement Implementation: Categories 1, 2, 3, 5 Part I (Telecommunications), 5 Part II (Information Security), 6, 8, and 9 of the Commerce Control List; Wassenaar Reporting Requirements; Definitions; and Certain New or Expanded Export Controls

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), and Statements of Understanding 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 accommodate 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, 5 Part I (Telecommunications), 5 Part II (Information Security), 6, 8, and 9, and by amending the EAR Definitions.

The purpose of this final rule is to make the necessary changes to the CCL, definitions of terms used in the EAR, and Wassenaar reporting requirements to implement Wassenaar List revisions that were agreed upon in the December 2005 Wassenaar Arrangement Plenary Meeting. In addition, this rule adds Croatia, Estonia, Latvia, Lithuania, South Africa, and Malta to the list of Wassenaar participating states in the EAR, which brings the total number of participating states to 40.

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

DATES: *Effective Date:* This rule is effective September 7, 2006.

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.*

For questions of a technical nature contact:

Category 1: Bob Teer 202–482–4749.

Category 2: George Loh 202–482–3570.

Category 3: Brian Baker 202–482–5534.

Category 5 Part 1: Joe Young 202–482–4197.

Category 5 Part 2: Joe Young 202–482–4197.

Category 6: Chris Costanzo 202–482–0718.

Categories 7 and 8: Dan Squire 202–482–3710.

Categories 8 and 9: Gene Christensen 202–482–2984.

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: David Rostker; and to the Office of Administration, Bureau of Industry and Security, Department of Commerce, 14th and Pennsylvania Avenue, NW., Room 6883, Washington, DC 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 have 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 common understandings of the risks associated with the transfers of these items.

Addition of Croatia, Estonia, Latvia, Lithuania, Malta, and South Africa

In April–June 2005, consultations resulted in decisions to admit Croatia, Estonia, Latvia, Lithuania and Malta to the Wassenaar Arrangement as new Participating States, and in December 2005 at the Plenary meeting, South Africa was added as a new Participating State. To reflect this change, this rule adds Croatia, Estonia, Latvia, Lithuania, Malta, and South Africa to the list of Wassenaar Arrangement Participating States in Supplement No. 1 to Part 743 of the EAR.

Expansion or New Export Controls

New or expanded anti-terrorism (AT) controls imposed by this rule. This rule imposes a unilateral U.S. license requirement to export and reexport commodities (and related software and technology) controlled under ECCNs 1E998, 2B006.b.1.d, 2D001, 2E001, 2E002, 2E201, 5A001.f, 5A002.a.9, 5D001, 5D002 , 5E001, 5E002, 6A006.b, 6D003.f, 6E003.f, 9A012.b, 9B010, 9E001, 9E003.a.11 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, 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 could enhance the ability of such country to support acts of international terrorism. There is a general policy of denial for applications 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.

New or expanded significant items (SI) controls imposed by this rule. Through the adoption of revisions by WA, this rule imposes foreign policy controls pursuant to section 6 of the Export Administration Act of 1979, as amended to export and reexport technology required for the development, production or overhaul of commercial aircraft engines controlled under ECCN 9E003.a.11 for SI reasons to all countries, except Canada, in addition to the national security controls imposed to implement the Wassenaar

Arrangement's decisions. Applications to export and reexport this technology will be reviewed on a case-by-case basis to determine whether the export or reexport is consistent with U.S. national security and foreign policy interests. 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.

New or expanded NS Column 2 controls imposed by this rule. 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 2B006.b.1.d, 5A001.f, 6A006.b, to destinations that are not Country Group A:1 destinations, or that are not cooperating countries (see Supplement No. 1 to Part 740 of the EAR). These destinations 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 controls is to ensure that these items do not make a contribution to the military potential of such destination 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 Supplement No. 1 to Part 736 of the EAR for Syria.

New or expanded NS Column 1 controls imposed by this rule. This rule imposes a license requirement under section 742.4(a) of the EAR for exports and reexports to all destinations, except Canada, of commodities (and related software and technology) described in ECCNs 2D001, 2E001, 2E002, 5A002.a.9, 5D002, 5E002, 6D003.f, 6E003.f, 9A012.b, 9B010, 9D001 and 9D002 (only software for the development and production of equipment classified under ECCN 9B010), 9E001 (only technology for the development of equipment under ECCNs 9A012 and 9B010), and 9E003.a.11. These destinations have an ''X'' indicated in NS column 1 on 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 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 reexport 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.

Revisions to the Commerce Control List

This rule revises a number of entries on the Commerce Control List (CCL) to implement the December 2005 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. A description of the specific amendments to the CCL pursuant to the December 2005 Wassenaar Agreement is provided below. The ECCNS affected, as described below, are 1C008, 1C998, 1E001, 1E998, 2B002, 2B006, 2E201, 3A001, 3B001, 3B991, 3E001, 5A001, 5A002, 5A991, 5D001, 5D991, 6A006, 6D003, 6E003, 8A002, 9A001, 9A012, 9B010 (New), 9D001, 9D002, 9D004, 9E001, 9E002, and 9E003.

Category 1—Materials, Chemicals, ''Microorganisms,'' and Toxins

ECCN 1C008 is amended by removing and reserving 1C008.c.1, because foreign availability has been proven, and continued national security control cannot be justified any longer.

ECCN 1C998 is added to continue antiterrorism (AT) controls on polyether ether ketone (PEEK), which was removed from 1C008.c.1. Therefore, the materials no longer controlled under ECCN 1C008 continue to be controlled for AT reasons under ECCN 1C998 for exports and reexports to designated terrorism-supporting countries, as set forth in Parts 742 and 746 of the EAR, and as indicated in AT Column 1 of the Commerce Country Chart in Supplement No. 1 to Part 738 of the EAR.

ECCN 1E001 is amended by revising the heading to exclude control of development and production technology for ECCNs 1B999, 1C995, 1C996, 1C997, 1C998, and 1C999, because none of these technologies are controlled on the Wassenaar List of Dual-Use Goods and Technologies.

Note: This rule adds technology for commodities controlled by ECCNs 1B999, 1C995, 1C996, 1C997, and 1C999 to ECCN 1E998, which is controlled for antiterrorism reasons (AT:1).

ECCN 1E998 is added to maintain AT controls on technology for the development or production of materials that were controlled under 1C008.c.1 and are now controlled by ECCN 1C998. In addition, references to ECCNs 1B999, 1C995, 1C996, 1C997, and 1C999 have been moved from ECCN 1E001 to ECCN 1E998 to maintain AT controls on technology for the development or production of processing equipment and materials described in these ECCNs.

Category 2—Materials Processing

ECCN 2B002 is amended by adding to the heading ''(see List of Items Controlled),'' and adding parameters for control of numerically controlled machine tools using a Magnetorheological finishing (MRF) process.

Note: MRF tools are mostly used for optical components; therefore optical parameters were selected to describe the capability of the machines. One set of such parameters are form and finish; form referring to the shape of the optic and finish to the surface roughness. A form value describes how close the actual shape of the optic is to the design and finish value describes how smooth the surface is. MRF tools, such as interferometers and profilers are typically used to measure form, while profilometers and scatterometers are used to measure finish.

ECCN 2B006 is amended by:

a. Revising the NP paragraph in the License Requirements section, to except 2B006.b.1.d from NP controls because electronic assemblies do not appear under the Nuclear Suppliers Group Annex item 1.B.3;

b. Adding paragraph 2B006.b.1.d to control electronic assemblies specially designed to provide feedback capability in systems controlled by 2B006.b.1.c; and

c. Revising the Note to 2B006.b.1.

Note: The combination of control and decontrol lead to the possibility of an ineffective control. These revisions together will enhance the effectiveness of control by explicitly controlling certain specially designed components. Equipment under 2B006 is controlled for national security reasons (NS:2), nuclear nonproliferation reasons (NP:1), and antiterrorism reasons (AT:1); Related software for the development, production, or use of 2B006 commodities is controlled for national security reasons (NS:1) and antiterrorism reasons (AT:1) under ECCN 2D001; related technology for the development or production of 2B006

commodities is controlled for national security reasons (NS:1) and antiterrorism reasons (AT:1) under ECCNs 2E001 and 2E002 respectively; related technology for the use of 2B006 commodities is controlled for nuclear proliferation reasons (NP:1) and antiterrorism reasons (AT:1) under ECCN 2E201.

ECCN 2E201 is amended by:

a. Revising the heading to remove ECCN 2B008, because no international export control regime has controlled ''use'' technology for this ECCN;

b. Adding to the end of the heading the phrase ''for NP reasons'' to assure that ECCN 2E201 only controls use technology for NP controlled portions of the ECCNs listed in the heading; and

c. Revising the NP paragraph in the License Requirements section to remove the reference to 2B008.

Category 3—Electronics

ECCN 3A001 is amended by:

a. Revising the CIV paragraph in the License Exception section by replacing reference to 3A001.a.3.b with 3A001.a.3, because this rule moves 3A001.a.3.b to 3A001.a.3; and removing the reference to 3A001.a.3.c, because this rule deletes this paragraph.

b. Removing 3A001.a.3.c (interconnects), because they cannot be effectively controlled, as they are now integrated into mass market products.

c. Incorporating 3A001.a.3.b into 3A001.a.3 to revise the format of 3A001.a.3.

d. Revising the Note 2 to 3A001.b.2 to avoid incorrect interpretation that it is only relevant if the device spans more than one entire range.

e. Adding the word ''Discrete'' before 3A001.b.3, which reads ''Microwave transistors having any of the following:'' to add clarification.

f. Revising the Note to 3A001.b.3 (Microwave transistors) to add clarification and avoid misinterpretation.

g. Revising the operation frequency for microwave sold state amplifiers and microwave assemblies/modules containing microwave amplifiers from ''3 GHz'' to ''3.2 GHz'' in 3A001.b.4.f. This change was made for consistency with the parameter in 3A001.b.2.a (MMIC amplifiers), 3A001.b.3.a (transistors) and 3A001.b.4.a (solid state amplifiers).

h. Revising Note 2 to 3A001.b.4 to avoid incorrect interpretation that it is only relevant if the device spans more than one entire range.

i. Adding a Technical Note to 3A001.b.4.f.3 to eliminate ambiguity in the case of amplifiers having performance both above and below the frequency threshold.

ECCN 3A991 is amended by:

a. Revising 3A991.c, because the rule entitled, ''December 2004 Wassenaar Arrangement Plenary Agreement Implementation: Categories 1, 2, 3, 4, 5 Part I (telecommunications), 6, 7, 8, and 9 of the Commerce Control List; Wassenaar Reporting Requirements; Definitions; and Certain New or Expanded Export Controls'' that was published in the **Federal Register** on July 15, 2005 (70 FR 41094) modified the 3A001.a.5 entry for analog-to-digital converters by revising the total conversion time in ns to output rate in million words per second, however, the 3A991.c entry was not appropriately adjusted to conform with this revision. Therefore, this rule revises the output rate to millions of words per second in 3A991.c.

b. Removing 3A991.j.2 (rechargeable cells and batteries) because it was erroneously created, and is a duplicate entry to 3A001.e.1.b. Because of this removal, paragraph 3A991.j.1 will become 3A991.j to conform with the structure format of the CCL.

ECCN 3B001 is amended by:

a. Removing 3B001.a.1.a, because certain EPI tools are not a critical technology in the semiconductor manufacturing process and are not a key enabler in the production of semiconductors.

b. Revising the formula for minimum resolvable feature size in the technical note following 3B001.f.1.b by replacing the ''Fm'' with ''nm'' to conform with the corresponding entry in the Wassenaar Arrangement's List of Dual-Use Goods and Technologies.

Note: For equipment no longer controlled under ECCN 3B001.a.1.a, related software controlled under 3D001 and 3D002, and related technology controlled under 3E001, there remains a license requirement under ECCNs 3B991.b.1.d.1, 3D991, and 3E991, respectively, for exports and reexports to designated terrorism-supporting countries, as set forth in Parts 742 and 746 of the EAR and as indicated in AT Column 1 of the Commerce Country Chart.

ECCN 3B991 is amended by:

a. Revising the ''unit'' paragraph in the List of Items Controlled section to provide instructions to input dollar value in the unit block on a license application for components and accessories;

b. Redesignating paragraphs 3B991.b.1.d.1 and 3B991.b.1.d.2 as 3B991.b.1.d.2 and 3B991.b.1.d.3 respectively;

c. Adding a new paragraph 3B991.b.1.d.1 to maintain AT controls for stored program controlled equipment for epitaxial growth capable of producing a silicon layer with a thickness uniform to less than 2.5% across a distance of 200 mm or more (previously controlled under ECCN 3B001.a.1.a).

ECCN 3E001 is amended by:

a. Removing the text in the CIV paragraph of the License Exception section and replacing it with ''N/A'', as it is no longer necessary because of the agreed upon deletions in 3A001 by the Wassenaar Arrangement; and

b. Revising the heading to add exceptions from this technology control over commodities in ECCN 3C992, because this technology is not controlled on the Wassenaar List of Dual-Use Goods and Technologies.

Note: This rule adds ECCN 3C992 to the heading of ECCN 3E991 to maintain antiterrorism (AT:1) controls on the technology for the development , production or use of commodities described in ECCN 3C992.

Note: The equipment no longer controlled under ECCNs 3A001.a.3.c and 3B001.a.1.a, related software under ECCNs 3D001 and 3D002, and related technology under ECCNs 3E001 continues to be controlled for antiterrorism reasons under ECCNs 3A991.a.3, 3B991.b.1.d.1, 3D991, and 3E991 respectively, for exports and reexports to designated terrorism-supporting countries, as set forth in Parts 742 and 746 of the EAR and as indicated in AT Column 1 of the Commerce Country Chart. Also note, that technology for the development and production of microprocessor microcircuits, micro computer microcircuits and microcontroller microcircuits having a composite theoretical performance (CTP) of 530 MTOPS or more and an arithmetic logic unit with an access width of 32 bits or more continue to be controlled for national security reasons under ECCN 3E002.

ECCN 3E991 is amended by revising the heading to add technology controls for development, production, or use of specific processing equipment described in 3A991, and materials controlled by 3C992 (positive resists designed for semiconductor lithography * * *), because this technology warrants anti-terrorism (AT) controls.

Category 5—Part I—Telecommunications

ECCN 5A001 is amended by:

a. Adding the phrase '', as follows (see List of Items Controlled)'' to the heading.

b. Revising the License Requirements section to reflect that there is a license requirement for jamming equipment described in newly added paragraph 5A001.f to countries that have an ''X'' in NS Column 2 of the Commerce Country Chart in Supplement No.1 of Part 738.

Note: 5A001.f is eligible for License Exceptions LVS, GBS, and CIV, if the criteria

in Part 740 of the EAR for the license exception authorizing the export or reexport has been met and none of the license exception restrictions of § 740.2 apply to the transaction.

Note: Related software for the development, production, or use of this equipment is controlled for national security reasons (NS:1) and antiterrorism reasons (AT:1) under ECCN 5D001, and related technology for the development, production, or use of this equipment is controlled for national security reasons (NS:1) and antiterrorism reasons (AT:1) under ECCN 5E001.

c. Adding ''or antennae'' to the Unit paragraph of the List of Items Controlled section.

d. Revising the second note following 5A001.a.3 to add the phrase ''designed or modified for use'' to conform with the corresponding entry in the Wassenaar Arrangement's List of Dual-Use Goods and Technologies.

e. Adding the phrase ''not controlled in 5A001.b.4'' to 5A001.b.3 to avoid overlapping controls with the new parameters in 5A001.b.4.

f. Revising 5A001.b.4 (radio equipment employing ultra-wideband modulation techniques) so that it would be independent of the modulation technique employed in ultra-wideband (UWB) (i.e., not limited to ''time modulation'' (TM)). Today, in addition to TM–UWB, Direct Sequence-Spread Spectrum (DS–SS) and Multi-Band Orthogonal Frequency Division Multiplex (MB–OFDM) have appeared as different modulation techniques for UWB. Because of the emergence of DS–SS and MB–OFDM, the previously standing text of 5A001.b.4 and 5A002.a.6, were limited to TM–UWB, which created a loophole.

g. Adding a Technical Note 2 for 5A001.b.6, because the bandwidth of audio-coding (20–22,000 Hz) overlaps the bandwidth of voice-coding (300–3,400 Hz), and the scope of control in the context of 5A001.b.6 is only adopted to ''voice coding.'' It is necessary to clearly indicate that ''voice coding'' controlled in 5A001.b.6 is a voice-coding technique that uses voice-coding algorithms that are based on peculiar human voice characteristics.

h. Adding a descriptor ''Radio'' to make it ''Radio direction finding equipment'' in 5A001.e; changing the ''Instantaneous bandwidth'' from ''1 MHz or more'' to ''10 MHz or more'' in 5A001.e.1; and replacing the parallel processing parameter with the capability to find a line of bearing (LOB) to non-cooperating radio transmitters with a signal duration of less than 1 ms in 5A001.e.3.

Note: In 2004, the Wassenaar Expert's Group determined that ECCN 7A007 was not navigation or avionics equipment and belonged instead in Category 5 Part 1; it was determined that the equipment controlled by that ECCN should be placed in a revised paragraph 5A001.e. In the course of the discussion, it was also found that the level of the ECCN 7A007 control was set so high as to not control systems of potential concern. In addition, the ECCN 7A007 control text is technology-specific.

Previously, the text in 5A001.e was found to only control one specific, highly-advanced system. The revised text of ECCN 5A001.e is written in an effort to set forth provisions that control systems of concern and support a level playing field in the global marketplace. Advanced DF systems, which can direction-find against short-duration signals and frequency-hopping radios are of particular concern because they can be used by military forces of countries of concern to locate and target advanced tactical communications equipment.

Because the system accuracy of a direction finder is directly related to the antenna geometry of the direction finder, and thus does not imply a high degree of know-how, this revision is based on the control parameter ''Instantaneous bandwidth'', which is the decisive factor for direction finding against frequency-hopping radios and signals of the short duration type.

i. Adding paragraph 5A001.f to control sophisticated cellular phone jamming equipment. Equipment of this type is capable of selectively jamming cellular phone communications, which can pose a national security threat.

ECCN 5A991 is amended by:

a. Adding the definition of 'Asynchronous transfer mode' ('ATM') to the related definitions paragraph of the List of Items Controlled section; and

b. Replacing the double quotes with single quotes around the term 'Asynchronous transfer mode' ('ATM') in paragraph 5A991.c.12, to signify that the definition is found in the related definitions section of 5A991 and no longer in Part 772 of the EAR.

ECCN 5D001 is amended by:

a. Moving 5D001.c.1 into 5D001.c;

b. Deleting the reserved paragraph 5D001.c.2; and

c. Removing 5D001.c.3, because consensus was reached to delete 5D001c3 controlling the source code specially designed for dynamic adaptive routing. This technology has become widely available due to the recent expansion of packet telecommunication networks, such as the internet.

Note: The software removed from ECCN 5D001.c.3, and related technology under ECCN 5E001 continue to be controlled for antiterrorism (AT:1) reasons under ECCNs 5D991 and 5E991 respectively, for exports and reexports to designated terrorism-supporting countries, as set forth in Parts 742 and 746 of the EAR and as indicated in AT Column 1 of the Commerce Country Chart.

ECCN 5D991 is amended by revising the heading and the ''items'' paragraph in the List of Items Controlled section to add reference to the software removed from 5D001.c.3 (''Software'', other than in machine-executable form, specially designed for ''dynamic adaptive routing'').

Category 5—Part 2—Information Security

ECCN 5A002 is amended by:

a. Adding a sentence to the ''Related Controls'' paragraph of the List of Items Controlled section to note that 5A002 does not control commodities eligible for the Cryptography Note (Category 5 Part 2 Note 3).

b. Adding the phrase ''not controlled in 5A002.a.6.'' to 5A002.a.5 to avoid overlapping controls with the new parameters in 5A002.a.6.

c. Adding new control parameters to 5A002.a.6, including adding networked identification code to the type of codes that could be generated using cryptographic techniques. Also adding control characteristics for systems using ultra-wideband modulation techniques, *i.e.*, A bandwidth exceeding 500 MHz; or a ''fractional bandwidth'' of 20% or more.

Note: Following WA agreement reached on revised text for 5A001.b.3 and 5A001.b.4 in Category 5 Part 1, to control new ultra wideband techniques that had appeared on the market, agreement was reached by WA on consequential changes in 5A002.a.5 & 5A002.a.6.in Category 5 Part 2.

d. Adding paragraph 5A002.a.9 to add controls for quantum cryptography because it represents advancement in cryptography that can improve information security in two important ways: (1) It may be used in conjunction with digital cryptography to securely distribute shared keys for a digital symmetric algorithm and (2) it may make for a fast and highly secure ''one-time-pad'' cipher. A Technical Note that describes quantum cryptography is also added to this paragraph.

Note: This equipment under ECCN 5A002.a.9 is controlled for encryption items (EI) reasons, national security reasons (NS:1) and antiterrorism reasons (AT:1). Related software for the development, production, and use of this equipment is controlled for encryption items (EI) reasons, national security reasons (NS:1), and antiterrorism reasons (AT:1) under ECCN 5D002; related technology for the development, production, and use of this equipment is controlled for encryption items (EI) reasons, national security reasons (NS:1), and antiterrorism reasons (AT:1) under ECCN 5E002.

e. Adding a new paragraph c.4 to the Note at the top of the items paragraph in the List of Items Controlled section of

5A002 to clarify that model-based simulation software that is specially designed and limited to protect libraries, design attributes, or associated data for the design of semiconductor devices or integrated circuits, is not controlled under the corresponding software entry ECCN 5D002. The Note describes software for which the underlying encryption functionality is for specific purposes such as protection of intellectual property, and the underlying encryption functionality (including the protected libraries, design attributes or associated data) is not directly accessible to the end-user.

f. Moving an existing nota bene (''NB'') so that it immediately follows the text of Note d to ECCN 5A002, to conform with the corresponding entry in the Wassenaar Arrangement's List of Dual-Use Goods and Technologies.

Category 6—Sensors

ECCN 6A006 is amended by:

a. Revising the heading to add newly controlled ''underwater electric field sensors;''

b. Revising ''6A006.c'' to read ''6A006.d'' in the LVS paragraph in the License Exceptions section, because magnetic compensation systems, as well as compensation systems for underwater electric field sensors are now controlled under 6A006.d;

c. Revising the ''Related Controls'' paragraph in the List of Items Controlled section to add an exemption from control for instruments controlled by 6A006 that are used for ''fishery applications,'' such as research on fish reproduction.

d. Redesignating 6A006.b (magnetic gradiometers) as 6A006.c;

e. Adding a new paragraph 6A006.b to control Underwater Electric Field Sensors, because they now have civil applications, such as underwater exploration, salvage, and biological and medical sciences, and no longer are strictly used in military applications, such as detection of submarines and underwater mines.

ECCN 6D003 is amended by:

a. Revising 6D003.f from reading ''Magnetometers.'' to read ''Magnetic and Electric Field Sensors'' in conformance with new paragraph 6A006.b.

b. Revising 6D003.f.1 and 6D003.f.2 by adding ''and electric field'' in conformance with new paragraph 6A006.b.

ECCN 6E003 is amended by revising the title of 6E003.f from ''Magnetometers'' to read ''Magnetic and Electric Field Sensors.''

Note: Equipment under 6A006 is controlled for national security reasons (NS:2) and antiterrorism reasons (AT:1); Related software for magnetic and electric field sensors is controlled for national security reasons (NS:1) and antiterrorism reasons (AT:1) under ECCN 6D003; and related technology for magnetic and electric field sensors is controlled for national security reasons (NS:1) and antiterrorism reasons (AT:1) under ECCN 6E003.

Category 8—Marine

ECCN 8A002 is amended by adding a decontrol note in 8A002.f for digital cameras specially designed for consumer purposes, other than those employing electronic image multiplication techniques. This note was added because of the foreign availability of digital cameras.

Category 9—Propulsion Systems, Space Vehicles and Related Equipment

ECCN 9A001 is amended by:

a. Revising the ''unit'' paragraph in the List of Items Controlled section to read ''number'' instead of ''Equipment in number; parts and accessories in $ value.''

b. Revising paragraph 2 in the Note to 9A001.a, because it was discovered that the International Civil Aviation Organization (ICAO) issues a document equivalent to a civil Type Certificate that the participating members of Wassenaar found acceptable for export control purposes. Reference to that document has been added to paragraph 2.a within the Note to 9A001.a. The approval of the design of certain types of aircraft, engines and propellers is signified by the issue of a Type Certificate. In general there will be a Type Certificate Data Sheet (TCDS) associated with each Type Certificate issued. The TCDS records the basis of certification, the designation of each approved variant and general information concerning the design.

ECCN 9A012 is amended by:

a. Revising the heading to add double quotes around the term ''unmanned aerial vehicles'' to indicate that this is a term now defined in Part 772. Also, adding the abbreviation ''UAV'' to the heading.

b. Revising the heading to add associated systems, equipment, and components, because Wassenaar has agreed to expand this ECCN entry. It was determined that it would be prudent for the control of conventional arms to place export controls on the associated systems, equipment, and components used for remote controlling or guidance of the UAV or to convert a manned aircraft to an UAV.

c. Revising the Related Controls paragraph of the List of Items Controlled section to add a reference to section 744.3 ''Restrictions on Certain Rocket Systems (including ballistic missile systems and space launch vehicles and sounding rockets) and Unmanned Air Vehicles (including cruise missile systems, target drones and reconnaissance drones) End-Uses.''

d. Redesignating paragraphs 9A012.a and 9A012.b as 9A012.a.1 and 9A012.a.2.

e. Adding a new paragraph 9A012.b for associated systems, equipment and components.

Note: Related software for the development and production of equipment controlled under ECCN 9A012 is controlled for national security reasons (NS:1) and antiterrorism reasons (AT:1) under ECCN 9D001 and 9D002 respectively; software specially designed or modified for the ''use'' of full authority digital electronic engine controls (FADEC) for propulsion systems controlled by 9A012 is controlled for antiterrorism reasons (AT:1) under ECCN 9D003; and related technology for the development of this equipment is controlled for national security reasons (NS:1) and antiterrorism reasons (AT:1) under ECCN 9E001.

ECCN 9B010 is added to control ''equipment specially designed for the production of ''UAVs'' and associated systems, equipment and components controlled by 9A012.''

The Participating States of the Wassenaar Arrangement agreed to control equipment, software and technology for the conversion of aircraft for UAV operation, because of attempts by countries of concern to acquire such conversion capability for conventional arms and terrorism purposes.

Note: Equipment under 9B010 is controlled for national security reasons (NS:1) and antiterrorism reasons (AT:1); Related software for the development and production of this equipment is controlled for national security reasons (NS:1) and antiterrorism reasons (AT:1) under ECCN 9D001 and 9D002 respectively; software specially designed or modified for the ''use'' of full authority digital electronic engine controls (FADEC) for propulsion systems controlled by 9B010 is controlled for antiterrorism reasons (AT:1) under ECCN 9D003; and related technology for the development and production of this equipment is controlled for national security reasons (NS:1) and antiterrorism reasons (AT:1) under ECCN 9E001 and 9E002 respectively.

ECCNs 9D001 and 9D002 have been amended by revising the License Requirement section in each to add ECCN 9B010 to the NS paragraph.

ECCN 9D004 is amended by adding a new paragraph 9D004.e to control ''software'' specially designed or modified for the ''use'' of ''UAVs'' and associated systems, equipment and components controlled by 9A012.

ECCN 9E001 has been amended by:

a. Revising the heading to include 9A012; and

b. Adding 9A012 and 9B010 to the NS paragraph in the License Requirement section.

ECCN 9E002 is amended by removing the License Requirement Note that refers to Wassenaar reporting requirements in section 743.1 of the EAR, because this ECCN is not eligible for License Exceptions GBS, CIV, TSR, LVS, CTP, or GOV and therefore does not require Wassenaar reporting.

ECCN 9E003 is amended by revising 9E003.a.11 to remove the qualifiers, (*i.e.*, ''wide chord'' and ''without part-span support''), so that ''technology'' ''required'' for the ''development'' or ''production'' of all types of hollow fan blades for gas turbine engines are controlled for NS:1, SI, and AT:1 reasons. The advantage of using this type of blade is weight saving, stress reduction and an element of foreign object damage protection.

Section 740.11 and Supplement No. 1 to Section 740.11—License Exception GOV

This rule amends section 740.11 (a)(2)(vi)(G) to add 9A011 as it relates to ECCN 9D001 software, and to add a new paragraph (a)(2)(vi)(H) to cover software controlled by ECCN 9D002, specially designed or modified for the ''production'' of equipment controlled by ECCN 9A011. These items may not be exported or reexported for official international safeguard use by the International Atomic Energy Agency (IAEA) and the European Atomic Energy Community (EURATOM) under License Exception GOV to destinations other than Austria, Belgium, Canada, Denmark, Finland, France, Germany, Greece, Ireland, Italy, Luxembourg, the Netherlands, Portugal, Spain, Sweden, and the United Kingdom.

Supplement No. 1 to section 740.11 is amended to:

a. Add 6D001 (specially designed for the ''production'' or ''development'' of equipment in 6A008.1.3 or 6B008) and 6D003.a to paragraphs (a)(1)(vii)(D) and (b)(1)(vii)(D), which relate to 6E001 technology;

b. Add ECCN 9A011 to (a)(1)(vi)(G) that relates to 9D001 software;

c. Add a new paragraph (a)(1)(vi)(H) to cover software controlled by ECCN 9D002, specially designed or modified for the ''production'' of equipment controlled by ECCN 9A011;

d. Add to paragraph (a)(1)(vii)(G) 9A011, 9D001 and 9D002 as they relate to the development and production of 9A011, and as they relate to ECCN 9E001; and

e. Add a new paragraph (a)(1)(vii)(H) to cover technology controlled by ECCN 9E002 for the production of equipment in 9A011.

Therefore, 6E001 technology for the development of software in ECCNs 6D001 (specially designed for the ''production'' or ''development'' of equipment in 6A008.1.3 or 6B008) and 6D003; 9D001 for the development of equipment controlled by 9A011; 9D002 specially designed or modified for the production of equipment controlled by 9A011, 9D001 or 9D002 for the development or production of 9A011; and 9E002 for the production of equipment in 9A011, which are listed on the Wassenaar Arrangement's Very Sensitive List, are no longer eligible for License Exception GOV when consigned to and for the official use of any agency of a cooperating government within the territory of any cooperating government, or when consigned to and for the official use of a diplomatic or consular mission of a cooperating government located in any country in Country Group B of Supplement No. 1 to Part 740 of the EAR.

Section 740.17 ''License Exception ENC''

This rule amends the introductory paragraph and paragraphs (a), (b)(1), and (b)(2) to state that newly controlled quantum cryptography items described in 5A002.a.9 of the Commerce Control List (CCL) in Supplement No. 1 to Part 774 of the EAR are eligible for License Exception ENC. Paragraph (a) of Section 740.17 of the EAR authorizes certain exports, reexports, and technical assistance to countries listed in Supplement No. 3 to Part 740 of the EAR under License Exception ENC. The countries in Supplement No. 3 to Part 740 represent the European Union's ''license-free zone'' and include: Austria, Australia, Belgium, Cyprus, Czech Republic, Denmark, Estonia, Finland, France, Germany, Greece, Hungary, Ireland, Italy, Japan, Latvia, Lithuania, Luxembourg, Malta, Netherlands, New Zealand, Norway, Poland, Portugal, Slovakia, Slovenia, Spain, Sweden, Switzerland, and the United Kingdom. Paragraph (b) of Section 740.17 of the EAR authorizes exports and reexports destined to U.S. subsidiaries under License Exception ENC and, for other end-users, exports and reexports to countries not listed in Supplement No. 3 to Part 740 of the EAR. (This rule renames this Paragraph (b) to make clear the scope of this paragraph.) Paragraph (b)(1) of Section 740.17 of the EAR authorizes exports and reexports of encryption items for U.S. subsidiaries. Paragraph (b)(2) of Section 740.17 of the EAR authorizes exports and reexports of encryption commodities and software to non-government end-users in countries not listed in Supplement No. 3 to Part 740 of the EAR under License Exception ENC. Quantum cryptography items are not eligible for export or reexport to ''government end-users'' under License Exception ENC outside the countries listed in Supplement No. 3 to Part 740 of the EAR, because of the provisions of § 740.17(b)(3)(i)(B) and § 740.17(b)(2)(iii)(E) of the EAR. To receive written authorization from the Bureau of Industry and Security (BIS) to export your encryption items under License Exception ENC, you must submit an encryption review request to BIS and the ENC Encryption Request Coordinator. For guidance on applying for authorization under License Exception ENC go to BIS's Web page *http://www.bis.doc.gov/encryption/enc.htm.*

Section 743.1 ''Wassenaar Arrangement''

§ 743.1 is amended by:

- Deleting ECCN 2B003 from the Note to paragraph (c)(1)(ii) to conform to the Wassenaar Sensitive List. This relates to Wassenaar reporting requirements for ECCNS 2D001, 2E001, and 2E002.
- Removing 5A001.b.5 from paragraph (c)(1)(v), because BIS does not need to require reporting for commodities that are not eligible for License Exceptions GBS, CIV, TSR, LVS, CTP, or GOV. BIS can get the necessary information to fulfill U.S. obligations for reporting to the Wassenaar Arrangement from license application data.
- Adding 5A001.b.5 under the 5B001.a in paragraph (c)(1)(v), because 5B001.a is specially designed for 5A001.b.5, is eligible for license exception and is on the Wassenaar Arrangement's Sensitive List.
- Adding 5D001.a entry in paragraph (c)(1)(v), because software for the development or production of equipment, components, or accessories classified under 5B001.a is on the Wassenaar Arrangement's Sensitive List and is eligible for License Exceptions CIV and TSR. This addition is necessary in order for the United States to fulfill its reporting obligations to the Wassenaar Arrangement.
- Adding 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.c, 6A002.e; 6A003.b.3, 6A003.b.4, and 6A006.a to paragraph (c)(1)(vi), because these commodities are on the Wassenaar Arrangement's Sensitive List and are eligible for license exception under the EAR. This addition is necessary in order for the United

States to fulfill its reporting obligations to the Wassenaar Arrangement.

• Revising 6A006.g to 6A006.d in paragraph (c)(1)(vi), because this paragraph has moved under ECCN 6A006.

• Removing 6D003.a from paragraph (c)(1)(vi), because that ECCN is not eligible for License Exceptions LVS, GBS, CIV, APP, TSR, or GOV.

• Removing 6A006.h from paragraph (c)(1)(vi), because this paragraph has been removed from 6A006 by agreement of the Wassenaar Arrangement.

• Adding a note to paragraph (c)(1)(vi) to clarify the reporting requirement for 6A002.a.3.

• Redesignating paragraphs (c)(1)(vii) and (c)(1)(viii) as paragraphs (c)(1)(viii) and (c)(1)(ix), in order to add a new paragraph (c)(1)(vii) to cover Category 7: 7D002; 7D003.c, d.1 to d.4, and d.7; 7E001; and 7E002, because these commodities are on the Wassenaar Arrangement's Sensitive List and are eligible for license exception under the EAR. This addition is necessary in order for the United States to fulfill its reporting obligations to the Wassenaar Arrangement.

• Adding 9D001 (for 9B001.b and 9E003 as described in this paragraph), 9D002 (for 9B001.b), 9D004.a, 9D004.c, 9E001 for technology controlled for NS reasons, 9E002, 9E003.a.2, a.3.b, a.3.c, a.4, a.5, a.8, and a.9 to newly designated paragraph (c)(1)(ix), because these commodities are on the Wassenaar Arrangement's Sensitive List and are eligible for license exception under the EAR. This addition is necessary in order for the United States to fulfill its reporting obligations to the Wassenaar Arrangement.

This rule revises the title to Supplement No. 1 to Part 743 of the EAR from ''Wassenaar Arrangement Member Countries'' to ''Wassenaar Arrangement Participating States,'' because this is the term used by the Wassenaar Arrangement to address its members.

In addition, this rule adds Croatia, Estonia, Latvia, Lithuania, Malta, and South Africa to the list of Wassenaar Arrangement Participating States in Supplement No. 1 to Part 743 of the EAR, because they were recently admitted to the Wassenaar Arrangement.

Definitions in Part 772

This rule removes the definition for ''Asynchronous transfer mode'' (''ATM'') from section 772.1 of the EAR, and moves it to the related definitions paragraph in the List of Items Controlled section of ECCN 5A991, because the term is only referred to in 5A991.c.12.

This rule adds a reference to Category 2 in the definition for ''Electronic assembly,'' because of the addition of controls on electronic assemblies in 2B006.b.1.

This rule removes the definition for ''time-modulated ultra-wideband,'' because the Wassenaar Arrangement agreed to remove it from 5A001.b.4 and 5A002.a.6, and instead use the undefined term ''ultra-wideband modulation techniques.''

This rule adds the definition for ''unmanned aerial vehicle'' (''UAV'') to section 772.1, which is used in ECCNs 9A012 and newly added ECCN 9B010. In addition, UAVs are addressed in section 744.3 of the EAR.

Although the Export Administration Act expired on August 20, 2001, the President, through Executive Order 13222 of August 17, 2001, 3 CFR, 2001 Comp., p. 783 (2002), as extended by the Notice of August 3, 2006, 71 FR 44551 (August 7, 2006), has continued the Export Administration Regulations in effect under the International Emergency Economic Powers Act.

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 September 7, 2006, 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 October 10, 2006. Any such items not actually exported before midnight, on October 10, 2006, require a license in accordance with this regulation.

Rulemaking Requirements

1. This final rule has been determined to be not significant for purposes of E.O. 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 the Office of Administration , Bureau of Industry and Security, Department of Commerce, 14th and Pennsylvania Avenue, NW., Room 6883, Washington, DC 20230.

3. This rule does not contain policies with Federalism implications as that term is defined under E.O. 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, P.O. Box 273, Washington, DC 20044.

List of Subjects

15 CFR Part 740

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

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, 743, 772 and 774 of the Export Administration Regulations (15 CFR Parts 730–799) are amended as follows:

PART 740—[AMENDED]

■ 1. The authority citation for Part 740 continues to read as follows:

Authority: 50 U.S.C. app. 2401 *et seq.*; 50 U.S.C. 1701 *et seq.*; Sec. 901–911, Pub. L. 106–387; 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 3, 2006, 71 FR 44551 (August 7, 2006).

■ 2. Section 740.11 is amended by revising (a)(2)(vi)(G) and adding a paragraph (a)(2)(vi)(H) to read as follows:

§ 740.11 Governments, International Organizations, and International Inspections Under the Chemical Weapons Convention (GOV).

* * * * *

(a) * * *

(2) * * *

(vi) * * *

(G) Controlled by 9D001, specially designed or modified for the ''development'' of equipment or ''technology'' controlled by 9A011, 9E003.a.1, or 9E003.a.3.a; and

(H) Controlled by 9D002, specially designed or modified for the ''production'' of equipment controlled by 9A011.

* * * * *

■ 3. Supplement No. 1 to 740.11 is amended by:

■ a. Revising paragraphs (a)(1)(vi)(F) and (a)(1)(vi)(G), as set forth below;

■ b. Adding paragraphs (a)(1)(vi)(H) and (b)(1)(vi)(H), as set forth below; and

■ c. Revising paragraphs (a)(1)(vii)(D), (a)(1)(vii)(G), (a)(1)(vii)(H), (b)(1)(vi)(F), (b)(1)(vi)(G), (b)(1)(vii)(D), and (b)(1)(vii)(H) to read as follows:

Supplement No. 1 to Section 740.11—Additional Restrictions on Use of License Exception GOV

(a) * * *

(1) * * *

(vi) * * *

(F) Controlled by 8D001, specially designed for the ''development'' or ''production'' of equipment controlled by 8A001.b, 8A001.d, or 8A002.o.3.b;

(G) Controlled by 9D001, specially designed or modified for the ''development'' of equipment or ''technology'' controlled by 9A011, 9E003.a.1, or 9E003.a.3.a; and

(H) Controlled by 9D002,specially designed or modified for the ''production'' of equipment controlled by 9A011;

(vii) * * *

(D) Controlled by 6E001 for the ''development'' of equipment or ''software'' in 6A001.a.1.b.1, 6A001.a.2.a.1, 6A001.a.2.a.2, 6A001.a.2.a.3, 6A001.a.2.a.5, 6A001.a.2.a.6, 6A001.a.2.b, 6A001.a.2.c, 6A001.a.2.e, 6A001.a.2.f, 6A002.a.1.c, 6A008.1.3, 6B008, 6D001 (specially designed for the ''production'' or ''development'' of equipment in 6A008.1.3 or 6B008), or 6D003.a as described in paragraph (a)(1) of this Supplement; and

* * * * *

(G) Controlled by 9E001 for the ''development'' of equipment or ''software'' in 9A011, 9D001 for the ''development'' of 9A011, or 9D002 for the ''production'' of 9A011; and

(H) Controlled by 9E002 for the ''production'' of equipment in 9A011; and

* * * * *

(b) * * *

(1) * * *

(vi) * * *

(F) Controlled by 8D001, specially designed for the ''development'' or ''production'' of equipment controlled by 8A001.b, 8A001.d, or 8A002.o.3.b;

(G) Controlled by 9D001, specially designed or modified for the ''development'' of equipment or ''technology'' controlled by 9A011, 9E003.a.1, or 9E003.a.3.a; and

(H) Controlled by 9D002, specially designed or modified for the ''production'' of equipment controlled by 9A011;

(vii) * * *

(D) Controlled by 6E001 for the ''development'' of equipment or ''software'' in 6A001.a.1.b.1, 6A001.a.2.a.1, 6A001.a.2.a.2, 6A001.a.2.a.3, 6A001.a.2.a.5, 6A001.a.2.a.6, 6A001.a.2.b, 6A001.a.2.c, 6A001.a.2.e, 6A001.a.2.f, 6A002.a.1.c, 6A008.1.3, 6B008, 6D001 (specially designed for the ''production'' or ''development'' of equipment in 6A008.1.3 or 6B008), or 6D003.a as described in paragraph (a)(1) of this Supplement; and

* * * * *

(H) Controlled by 9E002 for the production of 9A011; and

* * * * *

■ 4. Section 740.17 is amended by:

■ a. Revising the phrase ''by ECCNs 5A002.a.1, .a.2, .a.5, and .a.6, 5B002, and 5D002'' to read ''by ECCNs 5A002.a.1, .a.2, .a.5, .a.6, and .a.9, 5B002, and 5D002'' in the introductory paragraph;

■ b. Revising the heading of paragraph (b) to read as set forth below; and

■ c. Revising the phrase ''ECCNs 5A002.a.1, .a.2, .a.5, or .a.6,'' to read ''ECCNs 5A002.a.1, .a.2, .a.5, .a.6, or .a.9,'' in paragraphs (a) introductory text, (b)(1) introductory text, and (b)(2) introductory text.

§ 740.17 Encryption Commodities and Software (ENC).

* * * * *

(b) *Exports and reexports for U.S. subsidiaries and to countries not listed in Supplement No. 3 to this part.*

* * * * *

PART 743—[AMENDED]

■ 5. The authority citation for Part 743 is revised to read as follows:

Authority: 50 U.S.C. app. 2401 *et seq.*; Pub. L. 106–508; 50 U.S.C. 1701 *et seq.*; Notice of August 3, 2006, 71 FR 44551 (August 7, 2006).

■ 6. Section 743.1 is amended by:

■ a. Revising the note to paragraph (c)(1)(ii), as set forth below;

■ b. Revising paragraphs (c)(1)(v), and (c)(1)(vi), as set forth below;

■ c. Redesignating paragraphs (c)(1)(vii) and (viii) as (viii) and (ix);

■ d. Adding a new paragraph (c)(1)(vii) as set forth below; and

■ e. Revising newly designated paragraphs (c)(1)(viii) and (c)(1)(ix) to read as follows:

§ 743.1 Wassenaar Arrangement.

* * * * *

(c) * * *

(1) * * *

(ii) * * *

Note to paragraph (c)(1)(ii): *Reports for 2D001,* are for ''software'', other than that controlled by 2D002, specially designed for the ''development'' or ''production'' of the equipment in 2B001.a or .b (changing 6μm to 5.1μm in 2B001.a.1 and 2B001.b.1.a; and adding ''a positioning accuracy with ''all compensations available'' equal to or less (better) than 5.1μm along any linear axis'' to the existing text for 2B001.b.2) of the Commerce Control List (CCL).

Reports for 2E001, are for ''technology'' according to the General Technology Note for ''development'' of ''software'' as described in this paragraph for 2D001, or for the equipment in 2B001.a or .b (changing 6μm to 5.1μm in 2B001.a.1 and 2B001.b.1.a; and adding ''a positioning accuracy with ''all compensations available'' equal to or less (better) than 5.1μm along any linear axis'' to the existing text for 2B001.b.2) of the CCL.

Reports for 2E002, are for ''technology'' according to the General Technology Note for ''production'' of the equipment in 2B001.a or .b (changing 6μm to 5.1μm in 2B001.a.1 and 2B001.b.1.a; and adding ''a positioning accuracy with ''all compensations available'' equal to or less (better) than 5.1μm along any linear axis'' to the existing text for 2B001.b.2) of the CCL.

* * * * *

(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 or 5B001.a as described in this paragraph) 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, function, features, or ''software'' in 5A001.b.3,

5B001.a, 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 5 kHz to 10 kHz inclusive'' to the existing text in 6A001.a.1.b.1) , and .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, 6A002.e; 6A003.b.3, 6A003.b.4; 6A004.c and .d; 6A006.a, 6A006.d (excluding compensators which provide only absolute values of the earth's magnetic field as output (i.e., the frequency bandwidth of the output extends from DC to at least 0.8 Hz); 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);

Note to paragraph (c)(1)(vi): The reporting requirement for 6A002.a.3 excludes the following ''focal plane arrays'':

a. Platinum Silicide having less than 10,000 elements;

b. Iridium Silicide;

c. Indium Antimonide or Lead Selenide having less than 256 elements;

d. Indium Arsenide;

e. Lead Sulphide;

f. Indium Gallium Arsenide;

g. Mercury Cadmium Telluride, as follows:

1. 'Scanning Arrays' having any of the following:

a. 30 elements or less; or

b. Incorporating time delay-and-integration within the element and having 2 elements or less;

2. 'Staring Arrays' less than 256 elements;

Technical Notes:

'Scanning Arrays' are defined as ''focal plane arrays'' designed for use with a scanning optical system that images a scene in a sequential manner to produce an image.

'Staring Arrays' are defined as ''focal plane arrays'' designed for use with a non-scanning optical system that images a scene.

h. Gallium Arsenide or Gallium Aluminum Arsenide quantum well having less than 256 elements;

(vii) *Category 7:* 7D002; 7D003.c, d.1 to d.4, and d.7; 7E001; and 7E002;

(viii) *Category 8:* 8A001.c; 8A002.b (for 8A001.b, .c, .d), .h, .j, .o.3, and .p; 8D001 (for commodities listed in this paragraph); 8D002; 8E001 (for commodities listed in this paragraph); and 8E002.a; and

(ix) *Category 9:* 9B001.b, 9D001 (for 9B001.b and 9E003 as described in this paragraph), 9D002 (for 9B001.b), 9D004.a, 9D004.c, 9E001 for technology controlled for NS reasons, 9E002, 9E003.a.2, a.3.b, a.3.c, a.4, a.5, a.8, and a.9.

* * * * *

■ 7. Supplement No. 1 to Part 743 is amended by:

■ a. Revising the heading of the Supplement to read as set forth below; and

■ b. Adding Croatia, Estonia, Latvia, Lithuania, Malta, and South Africa in alphabetical order.

Supplement No. 1 to Part 743—Wassenaar Arrangement Participating States

* * * * *

PART 772—[AMENDED]

■ 8. The authority citation for Part 772 continues 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 3, 2006, 71 FR 44551 (August 7, 2006).

■ 9. Section 772.1 is amended as follows:

■ a. By removing the definition ''Asynchronous transfer mode'' (''ATM'') and the separate entry for the acronym ''ATM.''

■ b. By revising the phrase ''(Cat 3, 4, and 5)'' to read ''(Cat 2, 3, 4, and 5) in the definition ''Electronic assembly.''

■ c. By removing the definition ''time-modulated ultra-wideband.''

■ d. By adding the definition ''unmanned aerial vehicles'' (''UAVs'') in alphabetic order after the definition for ''United States airline,'' to read as follows:

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

* * * * *

Unmanned aerial vehicle (''UAV''). (Cat 9) Any ''aircraft'' capable of initiating flight and sustaining controlled flight and navigation without any human presence on board. In addition, according to section 744.3 of the EAR, unmanned air vehicles, which are the same as ''unmanned aerial vehicles,'' include, but are not limited to, cruise missile systems, target drones and reconnaissance drones.

* * * * *

PART 774—[AMENDED]

■ 10. The authority citation for Part 774 continues 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); 18 U.S.C. 2510 *et seq.*; 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; Sec. 901–911, Pub. L. 106–387; Sec. 221, Pub. L. 107–56; 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 3, 2006, 71 FR 44551 (August 7, 2006).

Supplement No. 1 to Part 774 [Amended]

■ 11. In Supplement No. 1 to Part 774 (the Commerce Control List), Category 1—Materials, Chemicals, Microorganisms, and Toxins, Export Control Classification Number (ECCN) 1C008 is amended by revising the ''items'' paragraph in 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

Unit: * * *

Related Controls: * * *

Related Definitions: * * *

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 does not control non-fusible compression molding powders or molded forms.

b. Thermoplastic liquid crystal copolymers having a heat distortion temperature exceeding 523 K (250 °C) measured according to ISO 75–3 (2004), or national equivalents, with a load of 1.82 N/mm^2 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 acids:

b.2.a. Terephthalic acid;

b.2.b. 6-hydroxy-2 naphthoic acid; *or*

b.2.c. 4-hydroxybenzoic acid;

c. Polyarylene ether ketones, as follows:

c.1. [RESERVED]

c.2. Polyether ketone ketone (PEKK);

c.3. Polyether ketone (PEK);

c.4. Polyether ketone ether ketone ketone (PEKEKK)

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.

■ 12. In Supplement No. 1 to Part 774 (the Commerce Control List), Category 1—Materials, Chemicals, Microorganisms, and Toxins, is amended by adding Export Control Classification Number (ECCN) 1C998 after ECCN 1C997 and before ECCN 1C999, to read as follows:

1C998 Non-fluorinated polymeric substances, not controlled by 1C008, as follows (see List of Items Controlled).

License Requirements

Reason for Control: AT

Control(s)	Country chart
AT applies to entire entry	AT Column 1.

License Exceptions

LVS: N/A
GBS: N/A
CIV: N/A

List of Items Controlled

Unit: Kilograms
Related Controls: N/A
Related Definitions: N/A
Items:
a. Polyether ether ketone (PEEK);
b. [RESERVED].

■ 13. In Supplement No. 1 to Part 774 (the Commerce Control List), Category 1—Materials, Chemicals, Microorganisms, and Toxins, Export Control Classification Number (ECCN) 1E001 is amended by revising the heading, 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, 1A101, 1B (except 1B999), or 1C (except 1C355, 1C980 to 1C984, 1C988, 1C990, 1C991, 1C992, 1C995 to 1C999).

* * * * *

■ 14. In Supplement No. 1 to Part 774 (the Commerce Control List), Category 1—Materials, Chemicals, Microorganisms, and Toxins, Export Control Classification Number (ECCN) 1E998 is added after 1E994, to read as follows:

1E998 ''Technology'' for the ''development'' or ''production'' of processing equipment controlled by 1B999, and materials controlled by 1C995, 1C996, 1C997, 1C998, and 1C999.

License Requirements

Reason for Control: AT

Control(s)	Country chart
AT applies to entire entry	AT Column 1.

License Exceptions

CIV: N/A
TSR: N/A

List of Items Controlled

Unit: N/A
Related Controls: N/A
Related Definitions: N/A
Items:
The list of items controlled is contained in the ECCN heading.

■ 15. Supplement No. 1 to Part 774 (the Commerce Control List), Category 2—Materials Processing, Export Control Classification Number (ECCN) 2B002 is amended by revising the heading and the ''items'' paragraph in the List of Items Controlled section to read as follows:

2B002 Numerically controlled machine tools using a magnetorheological finishing (MRF) process equipped to produce non-spherical surfaces and having any of the following characteristics (See List of Items Controlled).

* * * * *

List of Items Controlled

Unit: * * *
Related Controls: * * *
Related Definitions: * * *
Items:
a. Finishing the form to less (better) than 1.0 μm; *or*
b. Finishing to a roughness less (better) than 100 nm rms.

■ 16. Supplement No. 1 to Part 774 (the Commerce Control List), Category 2—Materials Processing, Export Control Classification Number (ECCN) 2B006 is amended by revising the heading, the License Requirement section, and the ''unit'' and the ''items'' paragraphs in the List of Items Controlled section to read as follows:

2B006 Dimensional inspection or measuring systems, equipment, and ''electronic assemblies'', as follows (see List of Items Controlled).

License Requirements

Reason for Control: NS, NP, AT

Control(s)	Country chart
NS applies to entire entry ...	NS Column 2.
NP applies to 2B006.a and .b, except 2B006.b.1.d.	NP Column 1.
AT applies to entire entry	AT Column 1.

* * * * *

List of Items Controlled

Unit: Equipment in number, electronic assemblies in $ value
Related Controls: * * *
Related Definitions: * * *
Items:
a. Computer controlled or ''numerically controlled'' co-ordinate measuring machines (CMM), having a three dimensional length (volumetric) maximum permissible error of indication (MPEE) at any point within the operating range of the machine (i.e., within the length of axes) equal to or less (better) than (1.7 + L/1,000) μm (L is the measured length in mm) tested according to ISO 10360–2 (2001);
b. Linear and angular displacement measuring instruments, as follows:
b.1. Linear displacement measuring instruments having any of the following:

Technical Note: For the purpose of 2B006.b.1 ''linear displacement'' means the change of distance between the measuring probe and the measured object.

b.1.a. Non-contact type measuring systems with a ''resolution'' equal to or less (better) than 0.2 μm within a measuring range up to 0.2 mm;
b.1.b. Linear voltage differential transformer systems having all of the following characteristics:
b.1.b.1. ''Linearity'' equal to or less (better) than 0.1% within a measuring range up to 5 mm; *and*
b.1.b.2. Drift equal to or less (better) than 0.1% per day at a standard ambient test room temperature ±1 K; *or*
b.1.c. Measuring systems having all of the following:
b.1.c.1. Containing a ''laser''; *and*
b.1.c.2. Maintaining, for at least 12 hours, over a temperature range of ±1 K around a standard temperature and at a standard pressure, all of the following:
b.1.c.2.a. A ''resolution'' over their full scale of 0.1 μm or less (better); *and*
b.1.c.2.b. A ''measurement uncertainty'' equal to or less (better) than (0.2 + L/2,000) μm (L is the measured length in mm);
b.1.d. ''Electronic assemblies'' specially designed to provide feedback capability in systems controlled by 2B006.b.1.c.

Note: 2B006.b.1 does not control measuring interferometer systems, with an automatic control system that is designed to use no feedback techniques, containing a ''laser'' to measure slide movement errors of machine-tools, dimensional inspection machines or similar equipment.

b.2. Angular displacement measuring instruments having an ''angular position deviation'' equal to or less (better) than 0.00025 °;

Note: 2B006.b.2 does not control optical instruments, such as autocollimators, using collimated light (*e.g.,* laser light) to detect angular displacement of a mirror.

c. Equipment for measuring surface irregularities, by measuring optical scatter as a function of angle, with a sensitivity of 0.5 nm or less (better).

■ 17. Supplement No. 1 to Part 774 (the Commerce Control List), Category 2—Materials Processing, Export Control Classification Number (ECCN) 2E201 is amended by revising the heading and the License Requirement section to read as follows:

2E201 ''Technology'' according to the General Technology Note for the ''use'' of equipment or ''software'' controlled by 2A225, 2A226, 2B001, 2B006, 2B007.b, 2B007.c, 2B201, 2B204, 2B206, 2B207, 2B209, 2B225 to 2B232, 2D002, 2D201 or 2D202 for NP reasons.

License Requirements

Reason for Control: NP, CB, AT

Control(s)	*Country chart*
NP applies to entire entry ...	NP Column 1.
CB applies to ''technology'' for valves controlled by 2A226 that meet or exceed the technical parameters in 2B350.g.	CB Column 2.
AT applies to entire entry	AT Column 1.

* * * * *

■ 18. In Supplement No. 1 to Part 774 (the Commerce Control List), Category 3—Electronics, Export Control Classification Number (ECCN) 3A001 is amended revising the ''CIV'' paragraph in the License Exceptions section, and the ''items'' paragraph in the List of Items Controlled section, to read as follows:

3A001 Electronic components, as follows (see List of Items Controlled).

* * * * *

License Exceptions

LVS: * * *

GBS: * * *

CIV: Yes for 3A001.a.3, a.4, a.7, and a.11.

List of Items Controlled

Unit: * * *

Related Controls: * * *

Related Definitions: * * *

Items:

a. General purpose integrated circuits, as follows:

Note 1: The control status of wafers (finished or unfinished), in which the function has been determined, is to be evaluated against the parameters of 3A001.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.1. Integrated circuits, designed or rated as radiation hardened to withstand any of the following:

a.1.a. A total dose of 5×10^3 Gy (Si), or higher;

a.1.b. A dose rate upset of 5×10^6 Gy (Si)/s, or higher; *or*

a.1.c. A fluence (integrated flux) of neutrons (1 MeV equivalent) of 5×10^{13} n/cm^2 or higher on silicon, or its equivalent for other materials;

Note: 3A001.a.1.c does not apply to Metal Insulator Semiconductors (MIS).

a.2. ''Microprocessor microcircuits'', ''microcomputer microcircuits'', microcontroller microcircuits, storage integrated circuits manufactured from a compound semiconductor, analog-to-digital converters, digital-to-analog converters, electro-optical or ''optical integrated circuits'' designed for ''signal processing'', field programmable logic devices, neural network integrated circuits, custom integrated circuits for which either the function is unknown or the control status of the equipment in which the integrated circuit will be used in unknown, Fast Fourier Transform (FFT) processors, electrical erasable programmable read-only memories (EEPROMs), flash memories or static random-access memories (SRAMs), having any of the following:

a.2.a. Rated for operation at an ambient temperature above 398 K (125 °C);

a.2.b. Rated for operation at an ambient temperature below 218 K (−55 °C); *or*

a.2.c. Rated for operation over the entire ambient temperature range from 218 K (−55 °C) to 398 K (125 °C);

Note: 3A001.a.2 does not apply to integrated circuits for civil automobile or railway train applications.

a.3. ''Microprocessor microcircuits'', ''micro-computer microcircuits'' and microcontroller microcircuits, manufactured from a compound semiconductor and operating at a clock frequency exceeding 40 MHz;

Note: 3A001.a.3 includes digital signal processors, digital array processors and digital coprocessors.

a.4. Storage integrated circuits manufactured from a compound semiconductor;

a.5. Analog-to-digital and digital-to-analog converter integrated circuits, as follows:

a.5.a. Analog-to-digital converters having any of the following:

a.5.a.1. A resolution of 8 bit or more, but less than 10 bit, an output rate greater than 500 million words per second;

a.5.a.2 A resolution of 10 bit or more, but less than 12 bit, with an output rate greater than 200 million words per second;

a.5.a.3. A resolution of 12 bit with an output rate greater than 50 million words per second;

a.5.a.4. A resolution of more than 12 bit but equal to or less than 14 bit with an output rate greater than 5 million words per second; *or*

a.5.a.5. A resolution of more than 14 bit with an output rate greater than 1 million words per second.

a.5.b. Digital-to-analog converters with a resolution of 12 bit or more, and a ''settling time'' of less than 10 ns;

Technical Notes:

1. A resolution of n bit corresponds to a quantization of 2n levels.

2. The number of bits in the output word is equal to the resolution of the analogue-to-digital converter.

3. The output rate is the maximum output rate of the converter, regardless of architecture or oversampling. Vendors may also refer to the output rate as sampling rate, conversion rate or throughput rate. It is often specified in megahertz (MHz) or mega samples per second (MSPS).

4. For the purpose of measuring output rate, one output word per second is equivalent to one Hertz or one sample per second.

a.6. Electro-optical and ''optical integrated circuits'' designed for ''signal processing'' having all of the following:

a.6.a. One or more than one internal ''laser'' diode;

a.6.b. One or more than one internal light detecting element; *and*

a.6.c. Optical waveguides;

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

a.7.a. An equivalent usable gate count of more than 30,000 (2 input gates);

a.7.b. A typical ''basic gate propagation delay time'' of less than 0.1 ns; *or*

a.7.c. A toggle frequency exceeding 133 MHz;

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).

N.B.: Field programmable logic devices are also known as field programmable gate or field programmable logic arrays.

a.8. [RESERVED]

a.9. Neural network integrated circuits;

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 1,000 terminals;

a.10.b. A typical ''basic gate propagation delay time'' of less than 0.1 ns; *or*

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

a.11. Digital integrated circuits, other than those described in 3A001.a.3 to 3A001.a.10 and 3A001.a.12, based upon any compound semiconductor and having any of the following:

a.11.a. An equivalent gate count of more than 3,000 (2 input gates); *or*

a.11.b. A toggle frequency exceeding 1.2 GHz;

a.12. Fast Fourier Transform (FFT) processors having a rated execution time for an N-point complex FFT of less than (N log2 N)/20,480 ms, where N is the number of points;

Technical Note: When N is equal to 1,024 points, the formula in 3A001.a.12 gives an execution time of 500 μs.

b. Microwave or millimeter wave components, as follows:

b.1. Electronic vacuum tubes and cathodes, as follows:

Note 1: 3A001.b.1 does not control tubes designed or rated for operation in any frequency band which meets all of the following characteristics:

(a) Does not exceed 31.8 GHz; and

(b) Is ''allocated by the ITU'' for radiocommunications services, but not for radiodetermination.

Note 2: 3A001.b.1 does not control non-''space-qualified'' tubes which meet all the following characteristics:

(a) An average output power equal to or less than 50 W; and

(b) Designed or rated for operation in any frequency band which meets all of the following characteristics:

(1) Exceeds 31.8 GHz but does not exceed 43.5 GHz; and

(2) Is ''allocated by the ITU'' for radio-communications services, but not for radio-determination.

b.1.a. Traveling wave tubes, pulsed or continuous wave, as follows:

b.1.a.1. Operating at frequencies exceeding 31.8 GHz;

b.1.a.2. Having a cathode heater element with a turn on time to rated RF power of less than 3 seconds;

b.1.a.3. Coupled cavity tubes, or derivatives thereof, with a ''fractional bandwidth'' of more than 7% or a peak power exceeding 2.5 kW;

b.1.a.4. Helix tubes, or derivatives thereof, with any of the following characteristics:

b.1.a.4.a. An ''instantaneous bandwidth'' of more than one octave, and average power (expressed in kW) times frequency (expressed in GHz) of more than 0.5;

b.1.a.4.b. An ''instantaneous bandwidth'' of one octave or less, and average power (expressed in kW) times frequency (expressed in GHz) of more than 1; *or*

b.1.a.4.c. Being ''space qualified'';

b.1.b. Crossed-field amplifier tubes with a gain of more than 17 dB;

b.1.c. Impregnated cathodes designed for electronic tubes producing a continuous emission current density at rated operating conditions exceeding 5 A/cm^2;

b.2. Microwave monolithic integrated circuits (MMIC) power amplifiers having any of the following:

b.2.a. Rated for operation at frequencies exceeding 3.2 GHz up to and including 6 GHz and with an average output power greater than 4W (36 dBm) with a ''fractional bandwidth'' greater than 15%;

b.2.b. Rated for operation at frequencies exceeding 6 GHz up to and including 16 GHz and with an average output power greater than 1W (30 dBm) with a ''fractional bandwidth'' greater than 10%;

b.2.c. Rated for operation at frequencies exceeding 16 GHz up to and including 31.8 GHz and with an average output power greater than 0.8W (29 dBm) with a ''fractional bandwidth'' greater than 10%;

b.2.d. Rated for operation at frequencies exceeding 31.8 GHz up to and including 37.5 GHz;

b.2.e. Rated for operation at frequencies exceeding 37.5 GHz up to and including 43.5 GHz and with an average output power greater than 0.25W (24 dBm) with a ''fractional bandwidth'' greater than 10%; *or*

b.2.f. Rated for operation at frequencies exceeding 43.5 GHz.

Note 1: 3A001.b.2 does not control broadcast satellite equipment designed or rated to operate in the frequency range of 40.5 to 42.5 GHz.

Note 2: The control status of the MMIC whose rated operating frequency includes frequencies listed in more than one frequency range, as defined by 3A001.b.2.a through 3A001.b.2.f, is determined by the lowest average output power control threshold.

Note 3: Notes 1 and 2 following the Category 3 heading for A. Systems, Equipment, and Components mean that 3A001.b.2. does not control MMICs if they are specially designed for other applications, e.g., telecommunications, radar, automobiles.

b.3. Discrete microwave transistors having any of the following:

b.3.a. Rated for operation at frequencies exceeding 3.2 GHz up to and including 6 GHz and having an average output power greater than 60W (47.8 dBm);

b.3.b. Rated for operation at frequencies exceeding 6 GHz up to and including 31.8 GHz and having an average output power greater than 20W (43 dBm);

b.3.c. Rated for operation at frequencies exceeding 31.8 GHz up to and including 37.5 GHz and having an average output power greater than 0.5W (27 dBm);

b.3.d. Rated for operation at frequencies exceeding 37.5 GHz up to and including 43.5 GHz and having an average output power greater than 1W (30 dBm); *or*

b.3.e. Rated for operation at frequencies exceeding 43.5 GHz.

Note: The control status of a transistor whose rated operating frequency includes frequencies listed in more than one frequency range, as defined by 3A001.b.3.a through 3A001.b.3.e, is determined by the lowest average output power control threshold.

b.4. Microwave solid state amplifiers and microwave assemblies/modules containing microwave amplifiers having any of the following:

b.4.a. Rated for operation at frequencies exceeding 3.2 GHz up to and including 6 GHz and with an average output power greater than 60W (47.8 dBm) with a ''fractional bandwidth'' greater than 15%;

b.4.b. Rated for operation at frequencies exceeding 6 GHz up to and including 31.8 GHz and with an average output power greater than 15W (42 dBm) with a ''fractional bandwidth'' greater than 10%;

b.4.c. Rated for operation at frequencies exceeding 31.8 GHz up to and including 37.5 GHz;

b.4.d. Rated for operation at frequencies exceeding 37.5 GHz up to and including 43.5 GHz and with an average output power greater than 1W (30 dBm) with a ''fractional bandwidth'' greater than 10%;

b.4.e. Rated for operation at frequencies exceeding 43.5 GHz; *or*

b.4.f. Rated for operation at frequencies above 3.2 GHz and all of the following:

b.4.f.1. An average output power (in watts), P, greater than 150 divided by the maximum operating frequency (in GHz) squared [P > 150 W*GHz ^{2} f_{GHz}^2];

b.4.f.2. A fractional bandwidth of 5% or greater; *and*

b.4.f.3. Any two sides perpendicular to one another with length d (in cm) equal to or less than 15 divided by the lowest operating frequency in GHz [d ≤15 cm*GHz / f_{GHz}].

Technical Note: 3.2 GHz should be used as the lowest operating frequency (f_{GHz}) in the formula in 3A001.b.4.f.3., for amplifiers that have a rated operation range extending downward to 3.2 GHz and below [d ≤15cm*GHz/3.2 f_{GHz}].

N.B.: MMIC power amplifiers should be evaluated against the criteria in 3A001.b.2.

Note 1: 3A001.b.4. does not control broadcast satellite equipment designed or rated to operate in the frequency range of 40.5 to 42.5 GHz.

Note 2: The control status of an item whose rated operating frequency includes frequencies listed in more than one frequency range, as defined by 3A001.b.4.a through 3A001.b.4.e, is determined by the lowest average output power control threshold.

b.5. Electronically or magnetically tunable band-pass or band-stop filters having more than 5 tunable resonators capable of tuning across a 1.5:1 frequency band (f_{max}/f_{min}) in less than 10 μs having any of the following:

b.5.a. A band-pass bandwidth of more than 0.5% of center frequency; *or*

b.5.b. A band-stop bandwidth of less than 0.5% of center frequency;

b.6. [RESERVED]

b.7. Mixers and converters designed to extend the frequency range of equipment described in 3A002.c, 3A002.e or 3A002.f beyond the limits stated therein;

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

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

b.8.b. An average output power density exceeding 80 W/kg; *and*

b.8.c. A volume of less than 400 cm^3;

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.

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

c.1. Surface acoustic wave and surface skimming (shallow bulk) acoustic wave devices (*i.e.,* ''signal processing'' devices employing elastic waves in materials), having any of the following:

c.1.a. A carrier frequency exceeding 2.5 GHz;

c.1.b. A carrier frequency exceeding 1 GHz, but not exceeding 2.5 GHz, and having any of the following:

c.1.b.1. A frequency side-lobe rejection exceeding 55 dB;

c.1.b.2. A product of the maximum delay time and the bandwidth (time in μs and bandwidth in MHz) of more than 100;

c.1.b.3. A bandwidth greater than 250 MHz; *or*

c.1.b.4. A dispersive delay of more than 10 μs; *or*

c.1.c. A carrier frequency of 1 GHz or less, having any of the following:

c.1.c.1. A product of the maximum delay time and the bandwidth (time in μs and bandwidth in MHz) of more than 100;

c.1.c.2. A dispersive delay of more than 10 μs; *or*

c.1.c.3. A frequency side-lobe rejection exceeding 55 dB and a bandwidth greater than 50 MHz;

c.2. Bulk (volume) acoustic wave devices (*i.e.,* ''signal processing'' devices employing elastic waves) that permit the direct processing of signals at frequencies exceeding 1 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;

d. Electronic devices and circuits containing components, manufactured from ''superconductive'' materials specially designed for operation at temperatures below the ''critical temperature'' of at least one of the ''superconductive'' constituents, with any of the following:

d.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*

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

e. High energy devices, as follows:

e.1. Batteries and photovoltaic arrays, as follows:

Note: 3A001.e.1 does not control batteries with volumes equal to or less than 27 cm^3 (*e.g.,* standard C-cells or R14 batteries).

e.1.a. Primary cells and batteries having an energy density exceeding 480 Wh/kg and rated for operation in the temperature range from below 243 K (−30 °C) to above 343 K (70 °C);

e.1.b. Rechargeable cells and batteries having an energy density exceeding 150 Wh/kg after 75 charge/discharge cycles at a discharge current equal to C/5 hours (C being the nominal capacity in ampere hours) when operating in the temperature range from below 253 K (−20 °C) to above 333 K (60 °C);

Technical Note: Energy density is obtained by multiplying the average power in watts (average voltage in volts times average current in amperes) by the duration of the discharge in hours to 75% of the open circuit voltage divided by the total mass of the cell (or battery) in kg.

e.1.c. ''Space qualified'' and radiation hardened photovoltaic arrays with a specific power exceeding 160 W/m^2 at an operating temperature of 301 K (28 °C) under a tungsten illumination of 1 kW/m^2 at 2,800 K (2,527 °C);

e.2. High energy storage capacitors, as follows:

e.2.a. Capacitors with a repetition rate of less than 10 Hz (single shot capacitors) having all of the following:

e.2.a.1. A voltage rating equal to or more than 5 kV;

e.2.a.2. An energy density equal to or more than 250 J/kg; *and*

e.2.a.3. A total energy equal to or more than 25 kJ;

e.2.b. Capacitors with a repetition rate of 10 Hz or more (repetition rated capacitors) having all of the following:

e.2.b.1. A voltage rating equal to or more than 5 kV;

e.2.b.2. An energy density equal to or more than 50 J/kg;

e.2.b.3. A total energy equal to or more than 100 J; *and*

e.2.b.4. A charge/discharge cycle life equal to or more than 10,000;

e.3. ''Superconductive'' electromagnets and solenoids specially designed to be fully charged or discharged in less than one second, having all of the following:

Note: 3A001.e.3 does not control ''superconductive'' electromagnets or solenoids specially designed for Magnetic Resonance Imaging (MRI) medical equipment.

e.3.a. Energy delivered during the discharge exceeding 10 kJ in the first second;

e.3.b. Inner diameter of the current carrying windings of more than 250 mm; *and*

e.3.c. Rated for a magnetic induction of more than 8 T or ''overall current density'' in the winding of more than 300 A/mm^2;

f. Rotary input type shaft absolute position encoders having any of the following:

f.1. A resolution of better than 1 part in 265,000 (18 bit resolution) of full scale; *or*

f.2. An accuracy better than ±2.5 seconds of arc.

■ 19. In Supplement No. 1 to Part 774 (the Commerce Control List), Category 3—Electronics, Export Control Classification Number (ECCN) 3A991 is amended revising the ''items'' paragraph in the List of Items Controlled section, to read as follows:

3A991 Electronic devices and components not controlled by 3A001.

* * * * *

List of Items Controlled

Unit: * * *

Related Controls: * * *

Related Definitions: * * *

Items:

a. ''Microprocessor microcircuits'', ''microcomputer microcircuits'', and microcontroller microcircuits having any of the following:

a.1. A ''composite theoretical performance'' (''CTP'') of 6,500 million theoretical operations per second (MTOPS) or more and an arithmetic logic unit with an access width of 32 bit or more;

a.2. A clock frequency rate exceeding 25 MHz; *or*

a.3. More than one data or instruction bus or serial communication port that provides a direct external interconnection between parallel ''microprocessor microcircuits'' with a transfer rate of 2.5 Mbyte/s.

b. Storage integrated circuits, as follows:

b.1. Electrical erasable programmable read-only memories (EEPROMs) with a storage capacity;

b.1.a. Exceeding 16 Mbits per package for flash memory types; *or*

b.1.b. Exceeding either of the following limits for all other EEPROM types:

b.1.b.1. Exceeding 1 Mbit per package; *or*

b.1.b.2. Exceeding 256 kbit per package and a maximum access time of less than 80 ns;

b.2. Static random access memories (SRAMs) with a storage capacity:

b.2.a. Exceeding 1 Mbit per package; *or*

b.2.b. Exceeding 256 kbit per package and a maximum access time of less than 25 ns;

c. Analog-to-digital converters having any of the following:

c.1. A resolution of 8 bit or more, but less than 12 bit, with an output rate greater than 100 million words per second;

c.2. A resolution of 12 bit with an output rate greater than 5 million words per second;

c.3. A resolution of more than 12 bit but equal to or less than 14 bit with an output rate greater than 500 thousand words per second; *or*

c.4. A resolution of more than 14 bit with an output rate greater than 500 thousand words per second.

d. Field programmable logic devices having either of the following:

d.1. An equivalent gate count of more than 5000 (2 input gates); *or*

d.2. A toggle frequency exceeding 100 MHz;

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

f. Custom integrated circuits for which either 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:

f.1. More than 144 terminals; *or*

f.2. A typical ''basic propagation delay time'' of less than 0.4 ns.

g. Traveling wave tubes, pulsed or continuous wave, as follows:

g.1. Coupled cavity tubes, or derivatives thereof;

g.2. Helix tubes, or derivatives thereof, with any of the following:

g.2.a. An ''instantaneous bandwidth'' of half an octave or more; *and*

g.2.b. The product of the rated average output power (expressed in kW) and the maximum operating frequency (expressed in GHz) of more than 0.2;

g.2.c. An ''instantaneous bandwidth'' of less than half an octave; *and*

g.2.d. The product of the rated average output power (expressed in kW) and the maximum operating frequency (expressed in GHz) of more than 0.4;

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

i. Surface acoustic wave and surface skimming (shallow bulk) acoustic wave devices (*i.e.*, ''signal processing'' devices employing elastic waves in materials), having either of the following:

i.1. A carrier frequency exceeding 1 GHz; *or*

i.2. A carrier frequency of 1 GHz or less; *and*

i.2.a. A frequency side-lobe rejection exceeding 55 Db;

i.2.b. A product of the maximum delay time and bandwidth (time in microseconds and bandwidth in MHz) of more than 100; *or*

i.2.c. A dispersive delay of more than 10 microseconds.

j. Primary cells and batteries having an energy density exceeding 350 Wh/kg and rated for operation in the temperature range from below 243 K (−30 °C) to above 343 K (70 °C);

Note: 3A991 .j does not control batteries with volumes equal to or less than 27 cm^3 (*e.g.*, standard C-cells or UM–2 batteries).

Technical Note: Energy density is obtained by multiplying the average power in watts (average voltage in volts times average current in amperes) by the duration of the discharge in hours to 75 percent of the open circuit voltage divided by the total mass of the cell (or battery) in kg.

k. ''Superconductive'' electromagnets or solenoids specially designed to be fully charged or discharged in less than one minute, having all of the following:

Note: 3A991.k does not control ''superconductive'' electromagnets or solenoids designed for Magnetic Resonance Imaging (MRI) medical equipment.

k.1. Maximum energy delivered during the discharge divided by the duration of the discharge of more than 500 kJ per minute;

k.2. Inner diameter of the current carrying windings of more than 250 mm; *and*

k.3. Rated for a magnetic induction of more than 8T or ''overall current density'' in the winding of more than 300 A/mm^2.

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

l.1. Resonant operating frequencies exceeding 1 MHz;

l.2. A stored energy density of 1 MJ/M^3 or more; *and*

l.3. A discharge time of less than 1 ms;

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

n. Digital integrated circuits based on any compound semiconductor having an equivalent gate count of more than 300 (2 input gates).

■ 20. In Supplement No. 1 to Part 774 (the Commerce Control List), Category 3—Electronics, Export Control Classification Number (ECCN) 3B001 is amended revising the ''items'' paragraph in 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

Unit: * * *

Related Controls: * * *

Related Definitions: * * *

Items:

a. Equipment designed for epitaxial growth, as follows:

a.1. Equipment capable of producing a layer of any material other than silicon with a thickness uniform to less than ±2.5% across a distance of 75 mm or more;

a.2. Metal organic chemical vapor deposition (MOCVD) reactors specially designed for compound semiconductor crystal growth by the chemical reaction between materials controlled by 3C003 or 3C004;

a.3. Molecular beam epitaxial growth equipment using gas or solid sources;

b. Equipment designed for ion implantation, having any of the following:

b.1. A beam energy (accelerating voltage) exceeding 1 MeV;

b.2. Being specially designed and optimized to operate at a beam energy (accelerating voltage of less than 2 keV);

b.3. Direct write capability; *or*

b.4. A beam energy of 65 keV or more and a beam current of 45 mA or more for high energy oxygen implant into a heated semiconductor material ''substrate'';

c. Anisotropic plasma dry etching equipment, as follows:

c.1. Equipment with cassette-to-cassette operation and load-locks, and having any of the following:

c.1.a. Designed or optimized to produce critical dimensions of 180 nm or less with ±5% 3 sigma precision; *or*

c.1.b. Designed for generating less than 0.04 particles/cm^2 with a measurable particle size greater than 0.1μm in diameter;

c.2. Equipment specially designed for equipment controlled by 3B001.e. and having any of the following:

c.2.a. Designed or optimized to produce critical dimensions of 180 nm or less with ±5% 3 sigma precision; *or*

c.2.b. Designed for generating less than 0.04 particles/cm^2 with a measurable particle size greater than 0.1 μm in diameter;

d. Plasma enhanced CVD equipment, as follows:

d.1. Equipment with cassette-to-cassette operation and load-locks, and designed according to the manufacturer's specifications or optimized for use in the production of semiconductor devices with critical dimensions of 180 nm or less;

d.2. Equipment specially designed for equipment controlled by 3B001.e. and designed according to the manufacturer's specifications or optimized for use in the production of semiconductor devices with critical dimensions of 180 nm or less;

e. Automatic loading multi-chamber central wafer handling systems, having all of the following:

e.1. Interfaces for wafer input and output, to which more than two pieces of semiconductor processing equipment are to be connected; *and*

e.2. Designed to form an integrated system in a vacuum environment for sequential multiple wafer processing;

Note: 3B001.e. does not control automatic robotic wafer handling systems not designed to operate in a vacuum environment.

f. Lithography equipment, as follows:

f.1. Align and expose step and repeat (direct step on wafer) or step and scan (scanner) equipment for wafer processing using photo-optical or X-ray methods, having any of the following:

f.1.a. A light source wavelength shorter than 245 nm; *or*

f.1.b. Capable of producing a pattern with a minimum resolvable feature size of 180 nm or less;

Technical Note: The minimum resolvable feature size is calculated by the following formula:

$$MRF = \frac{(\text{an exposure light source wavelength in nm})}{\text{numerical aperture}} \times (\text{K factor})$$

Where the K factor = 0.45

MRF = minimum resolvable feature size.

f.2. Equipment specially designed for mask making or semiconductor device processing using deflected focused electron beam, ion beam or ''laser'' beam, having any of the following:

f.2.a. A spot size smaller than 0.2 μm;

f.2.b. Being capable of producing a pattern with a feature size of less than 1 μm; *or*

f.2.c. An overlay accuracy of better than ±0.20 μm (3 sigma);

g. Masks and reticles designed for integrated circuits controlled by 3A001;

h. Multi-layer masks with a phase shift layer.

Note: 3B001.h. does not control multi-layer masks with a phase shift layer designed for the fabrication of memory devices not controlled by 3A001.

■ 21. In Supplement No. 1 to Part 774 (the Commerce Control List), Category 3—Electronics, Export Control Classification Number (ECCN) 3B991 is amended revising the ''units'' and ''items'' paragraphs in the List of Items Controlled section, to read as follows:

3B991 Equipment not controlled by 3B001 for the manufacture of electronic components and materials, and specially designed components and accessories therefor.

* * * * *

List of Items Controlled

Unit: Equipment in number, and components and accessories in $ value

Related Controls: * * *

Related Definitions: * * *

Items:

a. Equipment specially designed for the manufacture of electron tubes, optical elements and specially designed components therefor controlled by 3A001 or 3A991;

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

Note: 3B991.b also controls equipment used or modified for use in the manufacture of other devices, such as imaging devices, electro-optical devices, acoustic-wave devices.

b.1. Equipment for the processing of materials for the manufacture of devices and components as specified in the heading of 3B991.b, as follows:

Note: 3B991 does not control quartz furnace tubes, furnace liners, paddles, boats (except specially designed caged boats), bubblers, cassettes or crucibles specially designed for the processing equipment controlled by 3B991.b.1.

b.1.a. Equipment for producing polycrystalline silicon and materials controlled by 3C001;

b.1.b. Equipment specially designed for purifying or processing III/V and II/VI semiconductor materials controlled by 3C001, 3C002, 3C003, or 3C004, except crystal pullers, for which see 3B991.b.1.c below;

b.1.c. Crystal pullers and furnaces, as follows:

Note: 3B991.b.1.c does not control diffusion and oxidation furnaces.

b.1.c.1. Annealing or recrystallizing equipment other than constant temperature furnaces employing high rates of energy transfer capable of processing wafers at a rate exceeding 0.005 m^2 per minute;

b.1.c.2. ''Stored program controlled'' crystal pullers having any of the following characteristics:

b.1.c.2.a. Rechargeable without replacing the crucible container;

b.1.c.2.b. Capable of operation at pressures above 2.5×10^5 Pa; *or*

b.1.c.2.c. Capable of pulling crystals of a diameter exceeding 100 mm;

b.1.d. ''Stored program controlled'' equipment for epitaxial growth having any of the following characteristics:

b.1.d.1. Capable of producing a silicon layer with a thickness uniform to less than ±2.5% across a distance of 200 mm or more;

b.1.d.2. Capable of producing a layer of any material other than silicon with a thickness uniformity across the wafer of equal to or better than ±3.5%; *or*

b.1.d.3. Rotation of individual wafers during processing;

b.1.e. Molecular beam epitaxial growth equipment;

b.1.f. Magnetically enhanced 'sputtering' equipment with specially designed integral load locks capable of transferring wafers in an isolated vacuum environment;

b.1.g. Equipment specially designed for ion implantation, ion-enhanced or photo-enhanced diffusion, having any of the following characteristics:

b.1.g.1. Patterning capability;

b.1.g.2. Beam energy (accelerating voltage) exceeding 200 keV;

b.1.g.3 Optimized to operate at a beam energy (accelerating voltage) of less than 10 keV; *or*

b.1.g.4. Capable of high energy oxygen implant into a heated ''substrate'';

b.1.h. ''Stored program controlled'' equipment for the selective removal (etching) by means of anisotropic dry methods (*e.g.*, plasma), as follows:

b.1.h.1. Batch types having either of the following:

b.1.h.1.a. End-point detection, other than optical emission spectroscopy types; *or*

b.1.h.1.b. Reactor operational (etching) pressure of 26.66 Pa or less;

b.1.h.2. Single wafer types having any of the following:

b.1.h.2.a. End-point detection, other than optical emission spectroscopy types;

b.1.h.2.b. Reactor operational (etching) pressure of 26.66 Pa or less; *or*

b.1.h.2.c. Cassette-to-cassette and load locks wafer handling;

Notes: 1. ''Batch types'' refers to machines not specially designed for production processing of single wafers. Such machines can process two or more wafers simultaneously with common process parameters, *e.g.*, RF power, temperature, etch gas species, flow rates.

2. ''Single wafer types'' refers to machines specially designed for production processing of single wafers. These machines may use automatic wafer handling techniques to load a single wafer into the equipment for processing. The definition includes equipment that can load and process several wafers but where the etching parameters, *e.g.*, RF power or end point, can be independently determined for each individual wafer.

b.1.i. ''Chemical vapor deposition'' (CVD) equipment, *e.g.*, plasma-enhanced CVD (PECVD) or photo-enhanced CVD, for semiconductor device manufacturing, having either of the following capabilities, for deposition of oxides, nitrides, metals or polysilicon:

b.1.i.1. ''Chemical vapor deposition'' equipment operating below 10^5 Pa; or

b.1.i.2. PECVD equipment operating either below 60 Pa (450 millitorr) or having automatic cassette-to-cassette and load lock wafer handling;

Note: 3B991.b.1.i does not control low pressure ''chemical vapor deposition'' (LPCVD) systems or reactive ''sputtering'' equipment.

b.1.j. Electron beam systems specially designed or modified for mask making or semiconductor device processing having any of the following characteristics:

b.1.j.1. Electrostatic beam deflection;

b.1.j.2. Shaped, non-Gaussian beam profile;

b.1.j.3. Digital-to-analog conversion rate exceeding 3 MHz;

b.1.j.4. Digital-to-analog conversion accuracy exceeding 12 bit; *or*

b.1.j.5. Target-to-beam position feedback control precision of 1 micrometer or finer;

Note: 3B991.b.1.j does not control electron beam deposition systems or general purpose scanning electron microscopes.

b.1.k. Surface finishing equipment for the processing of semiconductor wafers as follows:

b.1.k.1. Specially designed equipment for backside processing of wafers thinner than 100 micrometer and the subsequent separation thereof; *or*

b.1.k.2. Specially designed equipment for achieving a surface roughness of the active surface of a processed wafer with a two-sigma value of 2 micrometer or less, total indicator reading (TIR);

Note: 3B991.b.1.k does not control single-side lapping and polishing equipment for wafer surface finishing.

b.1.l. Interconnection equipment which includes common single or multiple vacuum chambers specially designed to permit the integration of any equipment controlled by 3B991 into a complete system;

b.1.m. ''Stored program controlled'' equipment using ''lasers'' for the repair or trimming of ''monolithic integrated circuits'' with either of the following characteristics:

b.1.m.1. Positioning accuracy less than ±1 micrometer; *or*

b.1.m.2. Spot size (kerf width) less than 3 micrometer.

b.2. Masks, mask ''substrates'', mask-making equipment and image transfer equipment for the manufacture of devices and components as specified in the heading of 3B991, as follows:

Note: The term ''masks'' refers to those used in electron beam lithography, X-ray lithography, and ultraviolet lithography, as well as the usual ultraviolet and visible photo-lithography.

b.2.a. Finished masks, reticles and designs therefor, except:

b.2.a.1. Finished masks or reticles for the production of unembargoed integrated circuits; *or*

b.2.a.2. Masks or reticles, having both of the following characteristics:

b.2.a.2.a. Their design is based on geometries of 2.5 micrometer or more; *and*

b.2.a.2.b. The design does not include special features to alter the intended use by means of production equipment or ''software'';

b.2.b. Mask ''substrates'' as follows:

b.2.b.1. Hard surface (*e.g.*, chromium, silicon, molybdenum) coated ''substrates'' (*e.g.*, glass, quartz, sapphire) for the preparation of masks having dimensions exceeding 125 mm × 125 mm; *or*

b.2.b.2. ''Substrates'' specially designed for X-ray masks;

b.2.c. Equipment, other than general purpose computers, specially designed for computer aided design (CAD) of semiconductor devices or integrated circuits;

b.2.d. Equipment or machines, as follows, for mask or reticle fabrication:

b.2.d.1. Photo-optical step and repeat cameras capable of producing arrays larger than 100 mm × 100 mm, or capable of producing a single exposure larger than 6 mm × 6 mm in the image (*i.e.*, focal) plane, or capable of producing line widths of less than 2.5 micrometer in the photoresist on the ''substrate';

b.2.d.2. Mask or reticle fabrication equipment using ion or ''laser'' beam lithography capable of producing line widths of less than 2.5 micrometer; *or*

b.2.d.3. Equipment or holders for altering masks or reticles or adding pellicles to remove defects;

Note: 3B991.b.2.d.1 and b.2.d.2 do not control mask fabrication equipment using photo-optical methods which was either commercially available before the 1st January, 1980, or has a performance no better than such equipment.

b.2.e. ''Stored program controlled'' equipment for the inspection of masks, reticles or pellicles with:

b.2.e.1. A resolution of 0.25 micrometer or finer; *and*

b.2.e.2. A precision of 0.75 micrometer or finer over a distance in one or two coordinates of 63.5 mm or more;

Note: 3B991.b.2.e does not control general purpose scanning electron microscopes

except when specially designed and instrumented for automatic pattern inspection.

b.2.f. Align and expose equipment for wafer production using photo-optical or X-ray methods, *e.g.*, lithography equipment, including both projection image transfer equipment and step and repeat (direct step on wafer) or step and scan (scanner) equipment, capable of performing any of the following functions:

Note: 3B991.b.2.f does not control photo-optical contact and proximity mask align and expose equipment or contact image transfer equipment.

b.2.f.1. Production of a pattern size of less than 2.5 micrometer;

b.2.f.2. Alignment with a precision finer than ±0.25 micrometer (3 sigma);

b.2.f.3. Machine-to-machine overlay no better than ±0.3 micrometer; or

b.2.f.4. A light source wavelength shorter than 400 nm;

b.2.g. Electron beam, ion beam or X-ray equipment for projection image transfer capable of producing patterns less than 2.5 micrometer;

Note: For focused, deflected-beam systems (direct write systems), see 3B991.b.1.j or b.10.

b.2.h. Equipment using ''lasers'' for direct write on wafers capable of producing patterns less than 2.5 micrometer.

b.3. Equipment for the assembly of integrated circuits, as follows:

b.3.a. ''Stored program controlled'' die bonders having all of the following characteristics:

b.3.a.1. Specially designed for ''hybrid integrated circuits';

b.3.a.2. X-Y stage positioning travel exceeding 37.5 × 37.5 mm; and

b.3.a.3. Placement accuracy in the X-Y plane of finer than ±10 micrometer;

b.3.b. ''Stored program controlled'' equipment for producing multiple bonds in a single operation (*e.g.*, beam lead bonders, chip carrier bonders, tape bonders);

b.3.c. Semi-automatic or automatic hot cap sealers, in which the cap is heated locally to a higher temperature than the body of the package, specially designed for ceramic microcircuit packages controlled by 3A001 and that have a throughput equal to or more than one package per minute.

Note: 3B991.b.3 does not control general purpose resistance type spot welders.

b.4. Filters for clean rooms capable of providing an air environment of 10 or less particles of 0.3 micrometer or smaller per 0.02832 m^3 and filter materials therefor.

■ 22. In Supplement No. 1 to Part 774 (the Commerce Control List), Category 3—Electronics, Export Control Classification Number (ECCN) 3E001 is amended revising the heading and CIV paragraph in the License Exceptions section, to read as follows:

3E001 ''Technology'' according to the General Technology Note for the ''development'' or ''production'' of equipment or materials controlled by 3A (except 3A292, 3A980, 3A981, 3A991 or 3A992), 3B (except 3B991 or 3B992) or 3C (except 3C992).

* * * * *

License Exceptions

CIV: N/A

TSR: * * *

* * * * *

■ 23. In Supplement No. 1 to Part 774 (the Commerce Control List), Category 3—Electronics, Export Control Classification Number (ECCN) 3E991 is amended revising the heading, to read as follows:

3E991 ''Technology'' for the ''development'', ''production'', or ''use'' of electronic devices or components controlled by 3A991, general purpose electronic equipment controlled by 3A992, or manufacturing and test equipment controlled by 3B991 or 3B992, or materials controlled by 3C992.

* * * * *

■ 24. In Supplement No. 1 to Part 774 (the Commerce Control List), Category 5—Telecommunications and ''Information Security'', Part I—Telecommunications, Export Control Classification Number (ECCN) 5A001 is amended by revising the Heading, the License Requirements section and the ''items'' paragraph in the List of Items Controlled section, to read as follows:

5A001 Telecommunications systems, equipment, and components, 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, and .f.	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.

* * * * *

List of Items Controlled

Unit: Equipment or antennae in number; cable and fiber in meters/feet, components and accessories in $ value

Related Controls: * * *

Related Definitions: * * *

Items:

a. Any type of telecommunications equipment having any of the following characteristics, functions or features:

a.1. Specially designed to withstand transitory electronic effects or electromagnetic pulse effects, both arising from a nuclear explosion;

a.2. Specially hardened to withstand gamma, neutron or ion radiation; *or*

a.3. Specially designed to operate outside the temperature range from 218 K (−55 °C) to 397 K (124 °C).

Note: 5A001.a.3 applies only to electronic equipment.

Note: 5A001.a.2 and 5A001.a.3 do not apply to equipment designed or modified for use on board satellites.

b. Telecommunication transmission equipment and systems, and specially designed components and accessories therefor, having any of the following characteristics, functions or features:

b.1 Being underwater communications systems having any of the following characteristics:

b.1.a. An acoustic carrier frequency outside the range from 20 kHz to 60 kHz;

b.1.b. Using an electromagnetic carrier frequency below 30 kHz; *or*

b.1.c. Using electronic beam steering techniques;

b.2. Being radio equipment operating in the 1.5 MHz to 87.5 MHz band and having any of the following characteristics:

b.2.a. Incorporating adaptive techniques providing more than 15 dB suppression of an interfering signal; *or*

b.2.b. Having all of the following:

b.2.b.1. Automatically predicting and selecting frequencies and ''total digital transfer rates'' per channel to optimize the transmission; *and*

b.2.b.2. Incorporating a linear power amplifier configuration having a capability to support multiple signals simultaneously at an output power of 1 kW or more in the frequency range of 1.5 MHz or more but less than 30 MHz, or 250 W or more in the frequency range of 30 MHz or more but not exceeding 87.5 MHz, over an ''instantaneous bandwidth'' of one octave or more and with an output harmonic and distortion content of better than −80 dB;

b.3. Being radio equipment employing ''spread spectrum'' techniques, including ''frequency hopping'' techniques, not controlled in 5A001.b.4., having any of the following characteristics:

b.3.a. User programmable spreading codes; *or*

b.3.b. A total transmitted bandwidth which is 100 or more times the bandwidth of any one information channel and in excess of 50 kHz;

Note: 5A001.b.3.b does not control radio equipment specially designed for use with civil cellular radio-communications systems.

Note: 5A001.b.3 does not control equipment operating at an output power of 1.0 Watt or less.

b.4. Being radio equipment employing ultra-wideband modulation techniques, having user programmable channelizing codes, scrambling codes, or network identification codes, having any of the following characteristics:

b.4.a.A bandwidth exceeding 500 MHz; *or*

b.4.b.A ''fractional bandwidth'' of 20% or more;

b.5. Being digitally controlled radio receivers having all of the following:

b.5.a. More than 1,000 channels;

b.5.b. A ''frequency switching time'' of less than 1 ms;

b.5.c. Automatic searching or scanning of a part of the electromagnetic spectrum; *and*

b.5.d. Identification of the received signals or the type of transmitter; *or*

Note: 5A001.b.5 does not control radio equipment specially designed for use with civil cellular radio-communications systems.

b.6. Employing functions of digital ''signal processing'' to provide voice coding output at rates of less than 2,400 bit/s.

Technical Notes: 1. For variable rate voice coding, 5A001.b.6 applies to the voice coding output of continuous speech.

2. For the purpose of 5A001.b.6, ''voice coding'' is defined as the technique to take samples of human voice and then convert these samples of human voice and then convert these samples into a digital signal taking into account specific characteristics of human speech.

c. Optical fiber communication cables, optical fibers and accessories, as follows:

c.1. Optical fibers of more than 500 m in length specified by the manufacturer as being capable of withstanding a proof test tensile stress of 2×10^9 N/m^2 or more;

Technical Note: Proof Test: on-line or off-line production screen testing that dynamically applies a prescribed tensile stress over a 0.5 to 3 m length of fiber at a running rate of 2 to 5 m/s while passing between capstans approximately 150 mm in diameter. The ambient temperature is a nominal 293 K (20 °C) and relative humidity 40%. Equivalent national standards may be used for executing the proof test.

c.2. Optical fiber cables and accessories designed for underwater use.

Note: 5A001.c.2 does not control standard civil telecommunication cables and accessories.

N.B. 1: For underwater umbilical cables, and connectors thereof, see 8A002.a.3.

N.B. 2: For fiber-optic hull penetrators or connectors, see 8A002.c.

d. ''Electronically steerable phased array antennae'' operating above 31.8 GHz.

Note: 5A001.d does not control ''electronically steerable phased array antennae'' for landing systems with instruments meeting ICAO standards covering microwave landing systems (MLS).

e. Radio direction finding equipment operating at frequencies above 30 MHz and having all of the following characteristics, and specially designed components therefor:

e.1. ''Instantaneous bandwidth'' of 10 MHz or more; and

e.2. Capable of finding a line of bearing (LOB) to non-cooperating radio transmitters with a signal duration of less than 1 ms.

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

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

f.2. Detecting and exploiting specific characteristics of the mobile telecommunications protocol employed (*e.g.*, GSM).

N.B.: For GNSS jamming equipment see the Munitions List.

■ 25. In Supplement No. 1 to Part 774 (the Commerce Control List), Category 5—Telecommunications and ''Information Security'', Part I—Telecommunications, Export Control Classification Number (ECCN) 5A991 is amended by revising the ''related definitions'' and the ''items'' paragraphs in the List of Items Controlled section, to read as follows:

5A991 Telecommunication equipment, not controlled by 5A001.

* * * * *

List of Items Controlled

Unit: * * *

Related Controls: * * *

Related Definitions: (1) ''Asynchronous transfer mode'' (''ATM'') is a transfer mode in which the information is organized into cells; it is asynchronous in the sense that the recurrence of cells depends on the required or instantaneous bit rate. (2) ''Bandwidth of one voice channel'' is data communication equipment designed to operate in one voice channel of 3,100 Hz, as defined in CCITT Recommendation G.151. (3) ''Communications channel controller'' is the physical interface that controls the flow of synchronous or asynchronous digital information. It is an assembly that can be integrated into computer or telecommunications equipment to provide communications access. (4) ''Datagram'' is a self-contained, independent entity of data carrying sufficient information to be routed from the source to the destination data terminal equipment without reliance on earlier exchanges between this source and destination data terminal equipment and the transporting network. (5) ''Fast select'' is a facility applicable to virtual calls that allows data terminal equipment to expand the possibility to transmit data in call set-up and clearing ''packets'' beyond the basic capabilities of a virtual call. (6) ''Gateway'' is the function, realized by any combination of equipment and ''software'', to carry out the conversion of conventions for representing, processing or communicating information used on one system into the corresponding, but different conventions used in another system. (7) ''Integrated Services Digital Network'' (ISDN) is a unified end-to-end digital network, in which data originating from all types of communication (*e.g.*, voice, text, data, still and moving pictures) are transmitted from one port (terminal) in the exchange (switch) over one access line to and from the subscriber. (8) ''Packet'' is a group of binary digits including data and call control signals that is switched as a composite whole. The data, call control signals, and possible error control information are arranged in a specified format.

Items:

a. Any type of telecommunications equipment, not controlled by 5A001.a, specially designed to operate outside the temperature range from 219 K (−54 °C) to 397 K (124 °C).

b. Telecommunication transmission equipment and systems, and specially designed components and accessories therefor, having any of the following characteristics, functions or features:

Note: Telecommunication transmission equipment:

a. Categorized as follows, or combinations thereof:

1. Radio equipment (*e.g.*, transmitters, receivers and transceivers);

2. Line terminating equipment;

3. Intermediate amplifier equipment;

4. Repeater equipment;

5. Regenerator equipment;

6. Translation encoders (transcoders);

7. Multiplex equipment (statistical mutiplex included);

8. Modulators/demodulators (modems);

9. Transmultiplex equipment (see CCITT Rec. G701);

10. ''Stored program controlled'' digital crossconnection equipment;

11. ''Gateways'' and bridges;

12. ''Media access units''; *and*

b. Designed for use in single or multi-channel communication via any of the following:

1. Wire (line);

2. Coaxial cable;

3. Optical fiber cable;

4. Electromagnetic radiation; or

5. Underwater acoustic wave propagation.

b.1. Employing digital techniques, including digital processing of analog signals, and designed to operate at a ''digital transfer rate'' at the highest multiplex level exceeding 45 Mbit/s or a ''total digital transfer rate'' exceeding 90 Mbit/s;

Note: 5A991.b.1 does not control equipment specially designed to be integrated and operated in any satellite system for civil use.

b.2. Modems using the ''bandwidth of one voice channel'' with a ''data signaling rate'' exceeding 9,600 bits per second;

b.3. Being ''stored program controlled'' digital cross connect equipment with ''digital transfer rate'' exceeding 8.5 Mbit/s per port.

b.4. Being equipment containing any of the following:

b.4.a. ''Network access controllers'' and their related common medium having a ''digital transfer rate'' exceeding 33 Mbit/s; *or*

b.4.b. ''Communication channel controllers'' with a digital output having a ''data signaling rate'' exceeding 64,000 bit/s per channel;

Note: If any uncontrolled equipment contains a ''network access controller'', it cannot have any type of telecommunications interface, except those described in, but not controlled by 5A991.b.4.

b.5. Employing a ''laser'' and having any of the following characteristics:

b.5.a. A transmission wavelength exceeding 1,000 nm; *or*

b.5.b. Employing analog techniques and having a bandwidth exceeding 45 MHz;

Note: 5A991.b.5.b does not control commercial TV systems.

b.5.c. Employing coherent optical transmission or coherent optical detection

techniques (also called optical heterodyne or homodyne techniques);

b.5.d. Employing wavelength division multiplexing techniques; *or*

b.5.e. Performing ''optical amplification'';

b.6. Radio equipment operating at input or output frequencies exceeding:

b.6.a. 31 GHz for satellite-earth station applications; *or*

b.6.b. 26.5 GHz for other applications;

Note: 5A991.b.6. does not control equipment for civil use when conforming with an International Telecommunications Union (ITU) allocated band between 26.5 GHz and 31 GHz.

b.7. Being radio equipment employing any of the following:

b.7.a. Quadrature-amplitude-modulation (QAM) techniques above level 4 if the ''total digital transfer rate'' exceeds 8.5 Mbit/s;

b.7.b. QAM techniques above level 16 if the ''total digital transfer rate'' is equal to or less than 8.5 Mbit/s; *or*

b.7.c. Other digital modulation techniques and having a ''spectral efficiency'' exceeding 3 bit/s/Hz;

Notes: 1. 5A991.b.7 does not control equipment specially designed to be integrated and operated in any satellite system for civil use.

2. 5A991.b.7 does not control radio relay equipment for operation in an ITU allocated band:

a. Having any of the following:

a.1. Not exceeding 960 MHz; *or*

a.2. With a ''total digital transfer rate'' not exceeding 8.5 Mbit/s; *and*

b. Having a ''spectral efficiency'' not exceeding 4 bit/s/Hz.

b.8. Providing functions of digital ''signal processing'' as follows:

b.8.a. Voice coding at rates less than 2,400 bit/s;

b.8.b. Employing circuitry that incorporates ''user-accessible programmability'' of digital ''signal processing'' circuits exceeding the limits of 4A003.b.

c. ''Stored program controlled'' switching equipment and related signaling systems, having any of the following characteristics, functions or features, and specially designed components and accessories therefor:

Note: Statistical multiplexers with digital input and digital output which provide switching are treated as ''stored program controlled'' switches.

c.1. ''Data (message) switching'' equipment or systems designed for ''packet-mode operation'' and assemblies and components therefor, n.e.s.

c.2. Containing ''Integrated Services Digital Network'' (ISDN) functions and having any of the following:

c.2.a. Switch-terminal (*e.g.*, subscriber line) interfaces with a ''digital transfer rate'' at the highest multiplex level exceeding 192,000 bit/s, including the associated signaling channel (*e.g.*, 2B+D); *or*

c.2.b. The capability that a signaling message received by a switch on a given channel that is related to a communication on another channel may be passed through to another switch.

Note: 5A991.c does not preclude the evaluation and appropriate actions taken by the receiving switch or unrelated user message traffic on a D channel of ISDN.

c.3. Routing or switching of ''datagram'' packets;

c.4. Routing or switching of ''fast select'' packets;

Note: The restrictions in 5A991.c.3 and c.4 do not apply to networks restricted to using only ''network access controllers'' or to ''network access controllers'' themselves.

c.5. Multi-level priority and pre-emption for circuit switching;

Note: 5A991.c.5 does not control single-level call preemption.

c.6. Designed for automatic hand-off of cellular radio calls to other cellular switches or automatic connection to a centralized subscriber data base common to more than one switch;

c.7. Containing ''stored program controlled'' digital cross connect equipment with ''digital transfer rate'' exceeding 8.5 Mbit/s per port.

c.8. ''Common channel signaling'' operating in either non-associated or quasi-associated mode of operation;

c.9. ''Dynamic adaptive routing'';

Note: 5A991.c.10 does not control packet switches or routers with ports or lines not exceeding the limits in 5A991.c.10.

c.10. Being packet switches, circuit switches and routers with ports or lines exceeding any of the following:

c.10.a. A ''data signaling rate'' of 64,000 bit/s per channel for a ''communications channel controller''; *or*

Note: 5A991.c.10.a does not control multiplex composite links composed only of communication channels not individually controlled by 5A991.b.1.

c.10.b. A ''digital transfer rate'' of 33 Mbit/s for a ''network access controller'' and related common media;

c.11. ''Optical switching'';

c.12. Employing ''Asynchronous Transfer Mode'' (''ATM'') techniques.

d. Optical fibers and optical fiber cables of more than 50 m in length designed for single mode operation;

e. Centralized network control having all of the following characteristics:

e.1. Receives data from the nodes; *and*

e.2. Process these data in order to provide control of traffic not requiring operator decisions, and thereby performing ''dynamic adaptive routing'';

Note: 5A991.e does not preclude control of traffic as a function of predictable statistical traffic conditions.

f. Phased array antennae, operating above 10.5 GHz, containing active elements and distributed components, and designed to permit electronic control of beam shaping and pointing, except for landing systems with instruments meeting International Civil Aviation Organization (ICAO) standards (microwave landing systems (MLS)).

g. Mobile communications equipment, n.e.s., and assemblies and components therefor; or

h. Radio relay communications equipment designed for use at frequencies equal to or exceeding 19.7 GHz and assemblies and components therefor, n.e.s.

■ 26. In Supplement No. 1 to Part 774 (the Commerce Control List), Category 5—Telecommunications and ''Information Security'', Part I—Telecommunications, Export Control Classification Number (ECCN) 5D001 is amended by revising the ''items'' paragraph in the List of Items Controlled section, to read as follows:

5D001 ''Software'', as described in the List of Items Controlled.

* * * * *

List of Items Controlled

Unit: * * *

Related Controls: * * *

Related Definitions: * * *

Items:

a. ''Software'' specially designed or modified for the ''development'', ''production'' or ''use'' of equipment, functions or features controlled by 5A001 or 5B001.

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 1750 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.

■ 27. In Supplement No. 1 to Part 774 (the Commerce Control List), Category 5—Telecommunications and ''Information Security'', Part I—Telecommunications, Export Control Classification Number (ECCN) 5D991 is amended by revising the heading and ''items'' paragraph in the List of Items Controlled section, to read as follows:

5D991 ''Software'' specially designed or modified for the ''development'', ''production'' or ''use'' of equipment controlled by 5A991 and 5B991, and

dynamic adaptive routing software as described in the List of Items Controlled.

* * * * *

List of Items Controlled

Unit: * * *

Related Controls: * * *

Related Definitions: * * *

Items:

a. ''Software'', other than in machine-executable form, specially designed for ''dynamic adaptive routing''.

b. [RESERVED]

■ 28. In Supplement No. 1 to Part 774 (the Commerce Control List), Category 5—Telecommunications and ''Information Security'', Part 2—Information Security, Export Control Classification Number (ECCN) 5A002 is amended by revising the ''related controls'' and the ''items'' paragraphs in the List of Items Controlled section, to read as follows:

5A002 Systems, equipment, application specific ''electronic assemblies'', modules and integrated circuits for ''information security'', as follows (see List of Items Controlled), and other specially designed components therefor.

* * * * *

List of Items Controlled

Unit: * * *

Related Controls: 5A002 does not control the items listed in paragraphs (a) through (f) in the Note in the items paragraph of this entry. These items are instead controlled under ECCN 5A992. 5A002 does not control commodities eligible for the Cryptography Note (Category 5 Part 2 Note 3).

Related Definitions: * * *

Items:

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

(a) ''Personalized smart cards'':

(1) Where the cryptographic capability is restricted for use in equipment or systems excluded from control paragraphs (b) through (f) 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 control 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;

N.B.: 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 communications systems) that are not capable of end-to-end encryption.

(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 basestation) is less than 400 meters according to the manufacturer's specifications.

Technical Note: Parity bits are not included in the key length.

a. Systems, equipment, application specific ''electronic assemblies'', modules and integrated circuits for ''information security'', as follows, and other specially designed components therefor:

N.B.: For the control of global navigation satellite systems receiving equipment containing or employing decryption (*e.g.*, GPS or GLONASS) see 7A005.

a.1. Designed or modified to use ''cryptography'' employing digital techniques performing any cryptographic function other than authentication or digital signature having any of the following:

Technical Notes:

1. Authentication and digital signature functions include their associated key management function.

2. Authentication includes all aspects of access control where there is no encryption of files or text except as directly related to the protection of passwords, Personal Identification Numbers (PINs) or similar data to prevent unauthorized access.

3. ''Cryptography'' does not include ''fixed'' data compression or coding techniques.

Note: 5A002.a.1 includes equipment designed or modified to use ''cryptography'' employing analog principles when implemented with digital techniques.

a.1.a. A ''symmetric algorithm'' employing a key length in excess of 56-bits; *or*

a.1.b. An ''asymmetric algorithm'' where the security of the algorithm is based on any of the following:

a.1.b.1. Factorization of integers in excess of 512 bits (*e.g.*, RSA);

a.1.b.2. Computation of discrete logarithms in a multiplicative group of a finite field of size greater than 512 bits (*e.g.*, Diffie-Hellman over Z/pZ); *or*

a.1.b.3. Discrete logarithms in a group other than mentioned in 5A002.a.1.b.2 in excess of 112 bits (*e.g.*, Diffie-Hellman over an elliptic curve);

a.2. Designed or modified to perform cryptanalytic functions;

a.3. [RESERVED]

a.4. Specially designed or modified to reduce the compromising emanations of information-bearing signals beyond what is necessary for health, safety or electromagnetic interference standards;

a.5. Designed or modified to use cryptographic techniques to generate the spreading code for ''spread spectrum'' systems, not controlled in 5A002.a.6., including the hopping code for ''frequency hopping'' systems;

a.6. Designed or modified to use cryptographic techniques to generate channelizing codes, scrambling codes or network identification codes, for systems using ultra-wideband modulation techniques, having any of the following characteristics:

a.6.a. A bandwidth exceeding 500 MHz; *or*

a.6.b. A ''fractional bandwidth'' of 20% or more;

a.7. [RESERVED]

a.8. Communications cable systems designed or modified using mechanical, electrical or electronic means to detect surreptitious intrusion;

a.9. Designed or modified to use ''quantum cryptography.''

Technical Notes:

1. 'Quantum cryptography' A family of techniques for the establishment of a shared key for ''cryptography'' by measuring the quantum-mechanical properties of a physical system (including those physical properties explicitly governed by quantum optics, quantum field theory, or quantum electrodynamics).

2. ''Quantum cryptography'' is also known as quantum key distribution (QKD).

■ 29. In Supplement No. 1 to Part 774 (the Commerce Control List), Category 6—Sensors, Export Control Classification Number (ECCN) 6A006 is amended by revising the heading, the ''LVS'' paragraph in the License Exceptions section, and the ''related controls'' and ''items'' paragraphs in the List of Items Controlled section, to read as follows:

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

* * * * *

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 ''noise level'' (sensitivity) lower (better) than 2 pT rms per square root Hz; and 6A006.d.

GBS: * * *

CIV: * * *

List of Items Controlled

*Unit:** * *

Related Controls: See also 6A996. This entry does not control instruments specially designed for fishery applications or

biomagnetic measurements for medical diagnostics.

Related Definitions: * * *

Items:

a. ''Magnetometers'' and subsystems, as follows:

a.1. Using ''superconductive'' (SQUID) ''technology'' and having any of the following characteristics:

a.1.a. SQUID systems designed for stationary operation, without specially designed subsystems designed to reduce in-motion noise, and having a ''noise level'' (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 ''noise level'' (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. Using optically pumped or nuclear precession (proton/Overhauser) ''technology'' having a ''noise level'' (sensitivity) lower (better) than 20 pT (rms) per square root Hz;

a.3. Using fluxgate ''technology'' having a ''noise level'' (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 ''noise level'' (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 ''noise level'' (sensitivity) lower (better) than 1 nT rms per square root Hz;

b. Underwater electric field sensors having a ''noise level'' (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 ''noise level'' (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 ''noise level'' (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.

■ 30. In Supplement No. 1 to Part 774 (the Commerce Control List), Category 6—Sensors, Export Control Classification Number (ECCN) 6D003 is amended by revising the ''items'' paragraph in the List of Items Controlled section, to read as follows:

6D003 Other ''software'', as follows (see List of Items Controlled).

* * * * *

List of Items Controlled

Unit: * * *

Related Controls: * * *

Related Definitions: * * *

Items:

a. Acoustics ''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.

c. Cameras. None.

d. Optics. None.

e. Lasers. None

f. Magnetic and Electric Field Sensors ''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;

g. Gravimeters. ''Software'' specially designed to correct motional influences of gravity meters or gravity gradiometers;

h. Radar ''software'', as follows:

h.1. Air Traffic Control ''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 which:

h.2.a. Are specially designed to protect the ''electronically steerable phased array antennae'' controlled by 6A008.e.; *and*

h.2.b. Result 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.

■ 31. In Supplement No. 1 to Part 774 (the Commerce Control List), Category 6—Sensors, Export Control Classification Number (ECCN) 6E003 is amended by revising the ''items'' paragraph in the List of Items Controlled section, to read as follows:

6E003 Other ''technology'', as follows (see List of Items Controlled).

* * * * *

List of Items Controlled

Unit: * * *

Related Controls: * * *

Related Definitions: * * *

Items:

a. Acoustics. None.

b. Optical sensors. None.

c. Cameras. None.

d. Optics, ''technology'', as follows:

d.1. Optical surface coating and treatment ''technology'' ''required'' to achieve uniformity of 99.5% or better for optical coatings 500 mm or more in diameter or major axis length and with a total loss (absorption and scatter) of less than 5×10^{-3};

N.B.: See also 2E003.f.

d.2. Optical fabrication ''technology'' using single point diamond turning techniques to produce surface finish accuracies of better than 10 nm rms on non-planar surfaces exceeding 0.5 m^2;

e. Lasers. ''Technology'' ''required'' for the ''development'', ''production'' or ''use'' of specially designed diagnostic instruments or targets in test facilities for ''SHPL'' testing or testing or evaluation of materials irradiated by ''SHPL'' beams;

f. Magnetic and Electric Field Sensors. None.

g. Gravimeters. None.

h. Radar. None.

■ 32. In Supplement No. 1 to Part 774 (the Commerce Control List), Category 8—Marine, Export Control Classification Number (ECCN) 8A002 is amended by revising the ''items'' paragraph in the List of Items Controlled section, to read as follows:

8A002 Systems and equipment, as follows (see List of Items Controlled).

* * * * *

List of Items Controlled

Unit: * * *

Related Controls: * * *

Related Definitions: * * *

Items:

a. Systems and equipment, specially designed or modified for submersible vehicles, 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;

b. Systems specially designed or modified for the automated control of the motion of submersible vehicles controlled by 8A001 using navigation data and having closed loop servo-controls:

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 containing 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 in television 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, including range-gated illuminators or ''laser'' systems;

e. Photographic still cameras specially designed or modified for underwater use below 150 m having 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, as follows, specially designed or modified for underwater use:

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, 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 ''fibrous or filamentary'' ''composite'' materials in their structural members;

i. Remotely controlled articulated manipulators specially designed or modified for use with submersible vehicles, 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;

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 specially designed:

j.1.d.1. To pressurize the products of reaction or for fuel reformation;

j.1.d.2. To store the products of the reaction; *and*

j.1.d.3. 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 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 specially designed:

j.3.b.1. To pressurize the products of reaction or for fuel reformation;

j.3.b.2. To store the products of the reaction; *and*

j.3.b.3. 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 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, as follows, 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:

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, 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, 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 tons 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, 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.

■ 33. In Supplement No. 1 to Part 774 (the Commerce Control List), Category 9—Propulsion Systems, Space Vehicles and Related Equipment, Export Control Classification Number (ECCN) 9A001 is amended by revising the ''unit'' and ''items'' paragraphs in the List of Items Controlled section, to read as follows:

9A001 Aero gas turbine engines incorporating any of the ''technologies'' controlled by 9E003.a, as follows (see List of Items Controlled).

* * * * *

List of Items Controlled

Unit: Number

Related Controls: * * *

Related Definitions: * * *

Items:

a. Incorporating any of the technologies controlled by 9E003.a.; *or*

Note: 9A001.a. does not control aero gas turbine engines which meet all of the following:

1. Certified by the civil aviation authority in a country listed in Supplement No. 1 to Part 743; *and*

2. Intended to power non-military manned aircraft for which one of the following has been issued by a Participating State listed in Supplement No. 1 to Part 743 for the aircraft with this specific engine type.

a. A civil Type Certificate; *or*

b. An equivalent document recognized by the International Civil Aviation Organization (ICAO).

b. Designed to power an aircraft designed to cruise at Mach 1 or higher for more than 30 minutes.

■ 34. In Supplement No. 1 to Part 774 (the Commerce Control List), Category 9—Propulsion Systems, Space Vehicles and Related Equipment, Export Control Classification Number (ECCN) 9A012 is amended by revising the ''heading;'' and the ''related controls'' and the ''items'' paragraphs 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).

* * * * *

List of Items Controlled

Unit: * * *

Related Controls: See the U.S. Munitions List Category VIII (22 CFR Part 121). Also see section 744.3 of the EAR.

Related Definitions: * * *

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. Guidance or control systems, other than those controlled in Category 7, specially designed for integration into ''UAVs'' controlled by 9A012.a.;

b.3. Equipment and components specially designed to convert a manned ''aircraft'' to a ''UAV'' controlled by 9A012.a.

Note: 9A012 does not control model aircraft.

■ 35. In Supplement No. 1 to Part 774 (the Commerce Control List), Category 9—Propulsion Systems, Space Vehicles and Related Equipment, Export Control Classification Number (ECCN) 9B010 is added following ECCN 9B009, to read as follows:

9B010 Equipment specially designed for the production of ''UAVs'' and associated systems, equipment and components controlled by 9A012.

License Requirements

Reason for Control: NS, AT

Control(s)	*Country chart*
NS applies to entire entry ...	NS Column 1.
AT applies to entire entry	AT Column 1.

License Exceptions

LVS: N/A

GBS: N/A

CIV: N/A

List of Items Controlled

Unit: Equipment in number; parts and accessories in $ value

Related Controls: N/A

Related Definitions: N/A

Items:

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

■ 36. In Supplement No. 1 to Part 774 (the Commerce Control List), Category 9—Propulsion Systems, Space Vehicles and Related Equipment, Export Control Classification Number (ECCN) 9D001 is amended by revising the License Requirement section, to read as follows:

9D001 ''Software'' specially designed or modified for the ''development'' of equipment or ''technology'' controlled by 9A (except 9A018, 9A990 or 9A991), 9B (except 9B990 or 9B991) or 9E003.

License Requirements

Reason for Control: NS, MT, AT

Control(s)	*Country chart*
NS applies to ''software'' for items controlled by 9A001 to 9A003, 9A012, 9B001 to 9B010, 9E003.	NS Column 1.
MT applies to ''software'' for equipment controlled by 9A106.a and .b, or 9B116 for MT reasons.	MT Column 1.
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.

* * * * *

■ 37. In Supplement No. 1 to Part 774 (the Commerce Control List), Category 9—Propulsion Systems, Space Vehicles and Related Equipment, Export Control Classification Number (ECCN) 9D002 is amended by revising the License Requirement section, to read as follows:

9D002 ''Software'' specially designed or modified for the ''production'' of equipment controlled by 9A (except 9A018, 9A990, or 9A991) or 9B (except 9B990 or 9B991).

License Requirements

Reason for Control: NS, MT, AT

Control(s)	*Country chart*
NS applies to ''software'' for equipment controlled by 9A001 to 9A003, 9A012, 9B001 to 9B010, or 9E003.	NS Column 1.
MT applies to ''software'' for equipment controlled by 9B116 for MT reasons.	MT Column 1.
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.

* * * * *

■ 38. In Supplement No. 1 to Part 774 (the Commerce Control List), Category 9—Propulsion Systems, Space Vehicles and Related Equipment, Export Control Classification Number (ECCN) 9D004 is amended by revising the ''items'' paragraph in the List of Items Controlled section, to read as follows:

9D004 Other ''software'', as follows (see List of Items Controlled).

* * * * *

List of Items Controlled

Unit: * * *

Related Controls: * * *

Related Definitions: * * *

Items:

a. 2D or 3D viscous ''software'' validated with wind tunnel or flight test data required for detailed engine flow modelling;

b. ''Software'' for testing aero gas turbine engines, assemblies or components, specially designed to collect, reduce and analyze data in real time, and capable of feedback control, including the dynamic adjustment of test articles or test conditions, as the test is in progress;

c. ''Software'' specially designed to control directional solidification or single crystal casting;

d. ''Software'' in ''source code'', ''object code'' or machine code required for the ''use'' of active compensating systems for rotor blade tip clearance control.

Note: 9D004.d does not control ''software'' embedded in uncontrolled equipment or required for maintenance activities associated with the calibration or repair or updates to the active compensating clearance control system.

e. ''Software'' specially designed or modified for the ''use'' of ''UAVs'' and associated systems, equipment and components controlled by 9A012.

■ 39. In Supplement No. 1 to Part 774 (the Commerce Control List), Category 9—Propulsion Systems, Space Vehicles and Related Equipment, Export Control Classification Number (ECCN) 9E001 is amended by revising the Heading and the License Requirement section, to read as follows:

9E001 ''Technology'' according to the General Technology Note for the ''development'' of equipment or ''software'' controlled by 9A001.c, 9A004 to 9A012, 9B (except 9B990 or 9B991), or 9D (except 9D990 or 9D991).

License Requirements

Reason for Control: NS, MT, AT

Control(s)	*Country chart*
NS applies to ''technology'' for items controlled by 9A001.c, 9A012, 9B001 to 9B010, 9D001 to 9D004 for NS reasons.	NS Column 1.
MT applies to ''technology'' for items controlled by 9B001, 9B002, 9B003, 9B004, 9B005, 9B007, 9B105, 9B106, 9B116, 9B117, 9D001, 9D002, 9D003, and 9D004 for MT reasons.	MT Column 1.
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.

* * * * *

■ 40. In Supplement No. 1 to Part 774 (the Commerce Control List), Category 9—Propulsion Systems, Space Vehicles and Related Equipment, Export Control Classification Number (ECCN) 9E003 is amended by revising the items paragraph of the List of Items Controlled section, to read as follows:

9E003 Other ''technology'', as follows (see List of Items Controlled).

* * * * *

List of Items Controlled

Unit: * * *

Related Controls: * * *

Related Definitions: * * *

Items:

a. ''Technology'' ''required'' for the ''development'', ''production'' of any of the following gas turbine engine components or systems:

a.1. Gas turbine blades, vanes or tip shrouds made from directionally solidified (DS) or single crystal (SC) alloys having (in the 001 Miller Index Direction) a stress-rupture life exceeding 400 hours at 1,273 K (1,000 °C) at a stress of 200 MPa, based on the average property values;

a.2. Multiple domed combustors operating at average burner outlet temperatures exceeding 1,813 K (1,540 °C) or combustors incorporating thermally decoupled combustion liners, non-metallic liners or non-metallic shells;

a.3. Components manufactured from any of the following:

a.3.a. Organic ''composite'' materials designed to operate above 588 K (315 °C);

a.3.b. Metal ''matrix'' ''composite'', ceramic ''matrix'', intermetallic or intermetallic reinforced materials controlled by 1C007; *or*

a.3.c. ''Composite'' material controlled by 1C010 and manufactured with resins controlled by 1C008.

a.4. Uncooled turbine blades, vanes, tip-shrouds or other components designed to operate at gas path temperatures of 1,323 K (1,050 °C) or more;

a.5. Cooled turbine blades, vanes or tip-shrouds, other than those described in 9E003.a.1, exposed to gas path temperatures of 1,643 K (1,370 °C) or more;

a.6. Airfoil-to-disk blade combinations using solid state joining;

a.7. Gas turbine engine components using ''diffusion bonding'' ''technology'' controlled by 2E003.b;

a.8. Damage tolerant gas turbine engine rotating components using powder metallurgy materials controlled by 1C002.b;

a.9. Full authority digital electronic engine control (FADEC) for gas turbine and combined cycle engines and their related diagnostic components, sensors and specially designed components;

a.10. Adjustable flow path geometry and associated control systems for:

a.10.a. Gas generator turbines;

a.10.b. Fan or power turbines;

a.10.c. Propelling nozzles; *or*

Note 1: Adjustable flow path geometry and associated control systems in 9E003.a.10 do not include inlet guide vanes, variable pitch fans, variable stators or bleed valves for compressors.

Note 2: 9E003.a.10 does not control ''development'' or ''production'' ''technology'' for adjustable flow path geometry for reverse thrust.

a.11. Hollow fan blades;

b. ''Technology'' ''required'' for the ''development'' or ''production'' of any of the following:

b.1. Wind tunnel aero-models equipped with non-intrusive sensors capable of transmitting data from the sensors to the data acquisition system; *or*

b.2. ''Composite'' propeller blades or propfans capable of absorbing more than 2,000 kW at flight speeds exceeding Mach 0.55;

c. ''Technology'' ''required'' for the ''development'' or ''production'' of gas turbine engine components using ''laser'', water jet, ECM or EDM hole drilling processes to produce holes having any of the following sets of characteristics:

c.1. All of the following:

c.1.a. Depths more than four times their diameter;

c.1.b. Diameters less than 0.76 mm; *and*

c.1.c. Incidence angles equal to or less than 25 °; *or*

c.2. All of the following:

c.2.a. Depths more than five times their diameter;

c.2.b. Diameters less than 0.4 mm; *and*

c.2.c. Incidence angles of more than 25 °;

Technical Note: For the purposes of 9E003.c, incidence angle is measured from a plane tangential to the airfoil surface at the point where the hole axis enters the airfoil surface.

d. ''Technology'' ''required'' for the ''development'' or ''production'' of helicopter power transfer systems or tilt rotor or tilt wing ''aircraft'' power transfer systems;

e. ''Technology'' for the ''development'' or ''production'' of reciprocating diesel engine ground vehicle propulsion systems having all of the following:

e.1. A box volume of 1.2 m^3 or less;

e.2. An overall power output of more than 750 kW based on 80/1269/EEC, ISO 2534 or national equivalents; *and*

e.3. A power density of more than 700 kW/m^3 of box volume;

Technical Note: Box volume: the product of three perpendicular dimensions measured in the following way:

Length: The length of the crankshaft from front flange to flywheel face;

Width: The widest of the following:

a. The outside dimension from valve cover to valve cover;

b. The dimensions of the outside edges of the cylinder heads; or

c. The diameter of the flywheel housing.

Height: The largest of the following:

a. The dimension of the crankshaft center-line to the top plane of the valve cover (or cylinder head) plus twice the stroke; or

b. The diameter of the flywheel housing.

f. ''Technology'' ''required'' for the ''production'' of specially designed components, as follows, for high output diesel engines:

f.1. ''Technology'' ''required'' for the ''production'' of engine systems having all of the following components employing ceramics materials controlled by 1C007:

f.1.a Cylinder liners;

f.1.b. Pistons;

f.1.c. Cylinder heads; *and*

f.1.d. One or more other components (including exhaust ports, turbochargers, valve guides, valve assemblies or insulated fuel injectors);

f.2. ''Technology'' ''required'' for the ''production'' of turbocharger systems, with single-stage compressors having all of the following:

f.2.a. Operating at pressure ratios of 4:1 or higher;

f.2.b. A mass flow in the range from 30 to 130 kg per minute; *and*

f.2.c. Variable flow area capability within the compressor or turbine sections;

f.3. ''Technology'' ''required'' for the ''production'' of fuel injection systems with a specially designed multifuel (e.g., diesel or jet fuel) capability covering a viscosity range from diesel fuel (2.5 cSt at 310.8 K (37.8 °C)) down to gasoline fuel (0.5 cSt at 310.8 K (37.8 °C)), having both of the following:

f.3.a. Injection amount in excess of 230 mm^3 per injection per cylinder; *and*

f.3.b. Specially designed electronic control features for switching governor characteristics automatically depending on fuel property to provide the same torque characteristics by using the appropriate sensors;

g. ''Technology'' ''required'' for the development'' or ''production'' of high output diesel engines for solid, gas phase or liquid film (or combinations thereof) cylinder wall lubrication, permitting operation to temperatures exceeding 723 K (450 °C), measured on the cylinder wall at the top limit of travel of the top ring of the piston.

h. ''Technology'' not otherwise controlled in 9E003.a.1 through a.10 and currently used in the ''development'', ''production'', or overhaul of hot section parts and components of civil derivatives of military engines controlled on the U.S. Munitions List.

Dated: August 28, 2006.

Matthew S. Borman,

Deputy Assistant Secretary for Export Administration.

[FR Doc. 06–7385 Filed 9–6–06 8:45 am]

BILLING CODE 3510–33–P