CATEGORY 5 - TELECOMMUNICATIONS AND "INFORMATION SECURITY"

Part 1 - TELECOMMUNICATIONS

Note 1: *The control status of components, "lasers", test and "production" equipment and "software" therefor which are specially designed for telecommunications equipment or systems is determined in Category 5, Part 1.*

Note 2: *"Digital computers", related equipment or "software", when essential for the operation and support of telecommunications equipment described in this Category, are regarded as specially designed components, provided they are the standard models customarily supplied by the manufacturer. This includes operation, administration, maintenance, engineering or billing computer systems.*

5A1 Systems, Equipment and Components

5A001 a. Any type of telecommunications equipment having any of the following characteristics, functions or features:

1. Specially designed to withstand transitory electronic effects or electromagnetic pulse effects, both arising from a nuclear explosion;
2. Specially hardened to withstand gamma, neutron or ion radiation; or
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 control equipment designed or modified for use on board satellites.*

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

1. Being underwater communications systems having any of the following characteristics:
   a. An acoustic carrier frequency outside the range from 20 kHz to 60 kHz;
   b. Using an electromagnetic carrier frequency below 30 kHz; or
   c. Using electronic beam steering techniques;

2. Being radio equipment operating in the 1.5 MHz to 87.5 MHz band and having all of the following characteristics:
   a. Automatically predicting and selecting frequencies and "total digital transfer rates" per channel to optimise the transmission; and
   b. 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;

3. Being radio equipment employing "spread spectrum" techniques, including "frequency hopping" techniques, not controlled in 5A001.b.4., having any of the following characteristics:
   a. User programmable spreading codes; or
   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 designed to operate at an output power of 1.0 Watt or less.*

4. Being radio equipment employing ultra-wideband modulation techniques, having user programmable channelising codes, scrambling codes or network identification codes, having any of the following characteristics:
   a. A bandwidth exceeding 500 MHz; or
   b. A "fractional bandwidth" of 20% or more;

5. Being digitally controlled radio receivers having all of the following:
   a. More than 1,000 channels;
   b. A "frequency switching time" of less than 1 ms;
   c. Automatic searching or scanning of a part of the electromagnetic spectrum; and
   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.*

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

c. Optical fibre communication cables, optical fibres and accessories, as follows:

   1. Optical fibres of more than 500 m in length, and 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 fibre 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.

   2. Optical fibre 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 therefor, see 8A002.a.3.*
      N.B. 2: *For fibre-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:
   1. "Instantaneous bandwidth" of 10 MHz or more; and
   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 telecommunications services, having any of the following characteristics, and specially designed components therefor:
   1. Simulating the functions of Radio Access Network (RAN) equipment; or
   2. Detecting and exploiting specific characteristics of the mobile telecommunications protocol employed (e.g., GSM).

   N.B.: *For GNSS jamming equipment see ML11.b.*

g. Passive Coherent Location systems or equipment specially designed for detecting and tracking moving objects by measuring reflections of ambient radio frequency emissions, supplied by non-radar transmitters.

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

   Note: *5A001.g. does not control:*
   a. Radio-astronomical equipment;
   b. Systems or equipment that require any radio transmission from the target.

5A101 Telemetering and telecontrol equipment, including ground equipment, designed or modified for 'missiles'.

Technical Note:
In 5A101 'missile' means complete rocket systems and unmanned aerial vehicle systems capable of a range exceeding 300 km.

Note: *5A101 does not control:*
a. Equipment designed or modified for manned aircraft or satellites;
b. Ground based equipment designed or modified for terrestrial or marine applications;
c. Equipment designed for commercial, civil or 'Safety of Life' (e.g. data integrity, flight safety) GNSS services;

5B1 Test, Inspection and Production Equipment

5B001 a. Equipment and specially designed components or accessories therefor, specially designed for the "development", "production" or "use" of equipment, functions or features specified in 5A001, 5B001, 5D001 or 5E001.

Note: *5B001.a. does not control optical fibre characterisation equipment.*

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

1. Equipment employing digital techniques designed to operate at a "total digital transfer rate" exceeding 15 Gbit/s;
   Technical Note:
   For switching equipment the "total digital transfer rate" is measured at the highest speed port or line.

2. Equipment employing a "laser" and having any of the following:
   a. A transmission wavelength exceeding 1750 nm;
   b. Performing "optical amplification";
   c. Employing coherent optical transmission or coherent optical detection techniques (also called optical heterodyne or homodyne techniques); or
   d. Employing analogue techniques and having a bandwidth exceeding 2.5 GHz;
      Note: *5B001.b.2.d. does not control equipment specially designed for the "development" of commercial TV systems.*

3. Equipment employing "optical switching";

4. Radio equipment employing quadrature-amplitude-modulation (QAM) techniques above level 256; or

5. Equipment employing "common channel signalling" operating in non-associated mode of operation.

5C1 Materials

None

5D1 Software

5D001 a. "Software" specially designed or modified for the "development", "production" or "use" of equipment, functions or features specified by 5A001 or 5B001;

b. "Software" specially designed or modified to support "technology" specified in 5E001;

c. Specific "software" specially designed or modified to provide characteristics, functions or features of equipment specified in 5A001 or 5B001;

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

1. Equipment employing digital techniques, including "Asynchronous Transfer Mode" ("ATM"), 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.

2. Equipment employing a "laser" and having any of the following:
   a. A transmission wavelength exceeding 1750 nm; or
   b. Employing analogue 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.*

3. Equipment employing "optical switching"; or

4. Radio equipment employing quadrature-amplitude-modulation (QAM) techniques above level 256.

5D101 "Software" specially designed or modified for the "use" of equipment specified in 5A101.

5E1 Technology

5E001 a. "Technology" according to the General Technology Note for the "development", "production" or "use" (excluding operation) of equipment, functions or features or "software" specified in 5A001, 5B001 or 5D001

b. Specific "technologies", as follows:

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

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

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

4. "Technology" for the "development" of "spread spectrum" techniques, including "frequency hopping" techniques.

c. "Technology" according to the General Technology Note for the "development" or "production" of any of the following telecommunication transmission or switching equipment, functions or features:

1. Equipment employing digital techniques designed to operate at a "total digital transfer rate" exceeding 15 Gbit/s;
Technical Note:
For switching equipment the "total digital transfer rate" is measured at the highest speed port or line.

2. Equipment employing a "laser" and having any of the following:
   a. A transmission wavelength exceeding 1750 nm;
   b. Performing "optical amplification" using praseodymium-doped fluoride fibre amplifiers (PDFFA);
   c. Employing coherent optical transmission or coherent optical detection techniques (also called optical heterodyne or homodyne techniques);
   d. Employing wavelength division multiplexing techniques exceeding 8 optical carriers in a single optical window; or
   e. Employing analogue techniques and having a bandwidth exceeding 2.5 GHz;
      Note: 5E001.c.2.e. does not control "technology" for the "development" or "production" of commercial TV systems.

5B001 c. continued

3. Equipment employing "optical switching";

4. Radio equipment having any of the following:
   a. Quadrature-amplitude-modulation (QAM) techniques above level 256;
   b. Operating at input or output frequencies exceeding31.8 GHz; or
      Note: *5E001.c.4.b. does not control "technology" for the "development" or "production" of equipment designed or modified for operation in any frequency band which is "allocated by the ITU" for radio-communications services, but not for radio-determination.*
   c. Operating in the 1.5 MHz to 87.5 MHz band and incorporating adaptive techniques providing more than 15 dB suppression of an interfering signal; or

5. Equipment employing "common channel signalling" operating in non-associated mode of operation.

5E101 "Technology" according to the General Technology Note for the "development", "production" or "use" of equipment specified in 5A101.

Part 2 - "INFORMATION SECURITY"

Note 1: *The control status of "information security" equipment, "software", systems, application specific "electronic assemblies", modules, integrated circuits, components or functions is determined in Category 5, Part 2 even if they are components or "electronic assemblies" of other equipment.*

Note 2: *Category 5 – Part 2 does not control products when accompanying their user for the user's personal use.*

Note 3: *Cryptography Note*

5A002 and 5D002 do not control goods that meet all of the following:

a. Generally available to the public by being sold, without restriction, from stock at retail selling points by means of any of the following:
1. Over-the-counter transactions;
2. Mail order transactions;
3. Electronic transactions; or
4. Telephone call transactions;

b. The cryptographic functionality cannot easily be changed by the user;

c. Designed for installation by the user without further substantial support by the supplier; and

d. When necessary, details of the goods are accessible and will be provided, upon request, to the competent authorities of the Member State in which the exporter is established in order to ascertain compliance with conditions described in paragraphs a. to c. above.

Technical Note:
In Category 5 - Part 2, parity bits are not included in the key length.

5A2 Systems, Equipment and Components

5A002 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 (i.e. GPS or GLONASS), see 7A005.*

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 unauthorised 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 analogue principles when implemented with digital techniques.

   a. A "symmetric algorithm" employing a key length in excess of 56 bits; or

   b. An "asymmetric algorithm" where the security of the algorithm is based on any of the following:
      1. Factorisation of integers in excess of 512 bits (e.g., RSA);
      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
      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);

2. Designed or modified to perform cryptanalytic functions;

3. Deleted;

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;

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;

6. Designed or modified to use cryptographic techniques to generate channelising codes, scrambling codes or network identification codes, for systems using ultra-wideband modulation techniques, having any of the following characteristics:
   a. A bandwidth exceeding 500 MHz; or

b. A "fractional bandwidth" of 20% or more.

7. Deleted;

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

9. Designed or modified to use "quantum cryptography".
Technical Note:
"Quantum cryptography" is also known as quantum key distribution (QKD).

Note: *5A002 does not control:*

a. "Personalised smart cards":
1. Where the cryptographic capability is restricted for use in equipment or systems excluded from control under entries b. to f. of this Note; or
1. 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 "personalised 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 programme-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) when the media is offered for sale in identical sets to the public;
3. Copying control of copyright protected audio/video data; or

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

d. Cryptographic equipment specially designed and limited for banking use or 'money transactions';
Technical Note:
'Money transactions' in 5A002 Note d. 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 radiocommunications 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 (i.e. a single, unrelayed hop between terminal and home base station) is less than 400 metres according to the manufacturer's specifications.

5B2 Test, Inspection and Production Equipment

5B002 a. Equipment specially designed for:

1. The "development" of equipment or functions specified in 5A002, 5B002, 5D002 or 5E002 including measuring or test equipment;
2. The "production" of equipment or functions specified in 5A002, 5B002, 5D002 or 5E002, including measuring, test, repair or production equipment;

b. Measuring equipment specially designed to evaluate and validate the "information security" functions specified in 5A002 or 5D002.

5C2 Materials

None.

5D2 Software

5D002 a. "Software" specially designed or modified for the "development", "production" or "use" of equipment or "software" specified in 5A002, 5B002 or 5D002;

b. "Software" specially designed or modified to support "technology" specified in 5E002;

c. Specific "software", as follows:
1. "Software" having the characteristics, or performing or simulating the functions of the equipment specified in 5A002 or 5B002;
2. "Software" to certify "software" specified in 5D002.c.1.

5D002 c. continued

Note: *5D002 does not control:*

a. "Software" required for the "use" of equipment excluded from control under the Note to 5A002;

b. "Software" providing any of the functions of equipment excluded from control under the Note to 5A002.

5E2 Technology

5E002 "Technology" according to the General Technology Note for the "development", "production" or "use" of equipment or "software" specified in 5A002, 5B002 or 5D002.