

## CATEGORY 5-TELECOMMUNICATIONS AND "INFORMATION SECURITY"

### Part 1-Telecommunications

*Notes:*

1. The status of components, test and "production" equipment and "software" therefor which are specially designed for telecommunications equipment or systems is determined in Category 5, Part 1. (L.N. 45 of 2010)

*N.B.:*

For "lasers" specially designed for telecommunications equipment or systems, see 6A005. (L.N. 45 of 2010)

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<sup>0</sup>C) to 397 K (124<sup>0</sup>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) Telecommunications systems and equipment, and specially designed components and accessories therefor, having any of the following characteristics, functions or features: (36 of 2000 s. 28; L.N. 254 of 2008)

(1) Being underwater untethered communications systems having any of the following characteristics:

- (a) An acoustic carrier frequency outside the range from 20 kHz to 60 kHz;
- (b) Using an electromagnetic carrier frequency below 30 kHz;
- (c) Using electronic beam steering techniques;
- (d) Using "lasers" or light-emitting diodes (LEDs) with an output wavelength greater than 400 nm and less than 700 nm, in a "local area network"; (L.N. 254 of 2008)

(2) Being radio equipment operating in the 1.5 MHz to 87.5 MHz band and having all of the following characteristics: (L.N. 254 of 2008)

- (a) Automatically predicting and selecting frequencies and "total digital transfer rates" per channel to optimize the transmission; (L.N. 254 of 2008)
- (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; (L.N. 65 of 2004; L.N. 254 of 2008)

(3) Being radio equipment employing "spread spectrum" techniques, including "frequency hopping" techniques, not controlled by 5A001(b)(4), and having any of the following characteristics: (L.N. 132 of 2001; L.N. 95 of 2006)

- (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 radiocommunications systems. (L.N. 132 of 2001)

*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 channelizing codes, scrambling codes or network identification codes, and having any of the following characteristics:

- (a) A bandwidth exceeding 500 MHz; or
- (b) A "fractional bandwidth" of 20% or more; (L.N. 95 of 2006; L.N. 226 of 2009)

(5) Being digitally controlled radio receivers having all of the following: (L.N. 65 of 2004)

- (a) More than 1000 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;

5A001(b)(5) does not control radio equipment specially designed for use with civil cellular radiocommunications systems. (L.N. 132 of 2001; L.N. 65 of 2004)

(6) Employing functions of digital "signal processing" to provide 'voice coding' output at rates of less than 2400 bit/s; (L.N. 65 of 2004; L.N. 95 of 2006)

*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 into a digital signal, taking into account specific characteristics of human speech. (L.N. 95 of 2006)

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

(1) Optical fibres of more than 500 m in length, specified by the manufacturer as being capable of withstanding a proof test tensile stress of  $2 \times 10^9$  N/m<sup>2</sup> 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 and relative humidity 40%. Equivalent national standards may be used for executing the proof test. (L.N. 132 of 2001)

(2) Optical fibre cables and accessories designed for underwater use;

*Note:*

5A001(c)(2) does not control standard civil telecommunications cables and accessories. (36 of 2000 s. 28)

*N.B.:*

1. For underwater umbilical cables, and connectors therefor, see 8A002(a)(3).
2. For fibre optic hull penetrators or connectors, see 8A002(c).

(d) "Electronically steerable phased array antennae" operating above 31.8 GHz; (L.N. 95 of 2006)

*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; (L.N. 95 of 2006)

(f) Jamming equipment specially designed or modified to intentionally and selectively interfere with, deny, inhibit, degrade or seduce mobile telecommunications services, and to perform any of the following functions, and specially designed components therefor: (L.N. 254 of 2008; L.N. 226 of 2009)

- (1) Simulating the functions of Radio Access Network (RAN) equipment; (L.N. 226 of 2009)
- (2) Detecting and exploiting specific characteristics of the mobile telecommunications protocol employed (e.g., GSM);
- (3) Exploiting specific characteristics of the mobile telecommunications protocol employed (e.g. GSM); (L.N. 226 of 2009)

*N.B.:*

For GNSS jamming equipment, see the Munitions List. (L.N. 95 of 2006)

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

*Technical Note:*

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

*Note:*

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

- (a) Radio-astronomical equipment;
- (b) Systems or equipment, that require any radio transmission from the target. (L.N. 254 of 2008)

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

*N.B.:*

See also the Munitions List. (L.N. 226 of 2009)

5A101 Telemetry and telecontrol equipment, including ground equipment, designed or modified for 'missiles';

*Technical Note:*

In 5A101, 'missiles' 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.

(L.N. 95 of 2006)

## 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; (L.N. 226 of 2009)

*Note:*

5B001(a) does not control optical fibre characterization equipment.

(b) Equipment and specially designed components or accessories therefor, specially designed for the "development" of any of the following telecommunications transmission or switching equipment: (36 of 2000 s. 28; L.N. 65 of 2004)

(1) (Repealed L.N. 45 of 2010)

(2) Equipment employing a "laser" and having any of the following:

- (a) A transmission wavelength exceeding 1750 nm;

- (b) Performing "optical amplification" using praseodymiumdoped fluoride fibre amplifiers (PDFFA); (L.N. 226 of 2009)
- (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) (Repealed L.N. 45 of 2010)
- (4) Radio equipment employing quadrature-amplitude-modulation (QAM) techniques above level 256; or (L.N. 132 of 2001)
- (5) Equipment employing "common channel signalling" operating in non-associated mode of operation;  
(L.N. 65 of 2004)

## 5C1 MATERIALS

None;

## 5D1 SOFTWARE

5D001 (a) "Software" specially designed or modified for the "development", "production" or "use" of equipment, functions or features, specified in 5A001; (L.N. 226 of 2009)

- (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; (L.N. 95 of 2005)
- (d) "Software" specially designed or modified for the "development" of any of the following telecommunications

transmission or switching equipment: (36 of 2000 s. 28; L.N. 65 of 2004)

(1) (Repealed L.N. 45 of 2010)

(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; or (L.N. 45 of 2010)

*Note:*

5D001(d)(2)(b) does not control "software" specially designed for the "development" of commercial TV systems. (L.N. 132 of 2001)

(3) (Repealed L.N. 45 of 2010)

(4) Radio equipment employing quadrature-amplitude-modulation (QAM) techniques above level 256; (L.N. 132 of 2001; L.N. 65 of 2004)

5D101 "Software" specially designed or modified for the "use" of equipment controlled by 5A101;

(L.N. 65 of 2004; L.N. 95 of 2006)

## 5E1 TECHNOLOGY

5E001 (a) "Technology" according to the General Technology Note for the "development", "production" or "use" (excluding operation) of equipment, functions or features specified in 5A001 or "software" specified in 5D001(a); (L.N. 226 of 2009)

(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"; (L.N. 65 of 2004)

(4) "Technology" for the "development" of "spread spectrum" techniques, including "frequency hopping" techniques; (L.N. 132 of 2001)

(c) "Technology" according to the General Technology Note for the "development" or "production" of any of the following telecommunications transmission or switching equipment, functions or features: (36 of 2000 s. 28; L.N. 65 of 2004)

(1) Equipment employing digital techniques designed to operate at a "total digital transfer rate" exceeding 50 Gbit/s; (L.N. 65 of 2004; L.N. 45 of 2010)

*Technical Note:*

For telecommunications switching equipment, the "total digital transfer rate" is the unidirectional speed of a single interface, measured at the highest speed port or line. (L.N. 45 of 2010)

(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 of optical carriers at less than 100 GHz spacing; or (L.N. 226 of 2009)

(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. (L.N. 132 of 2001)

*N.B.:*

For "technology" for the "development" or "production" of non-telecommunications equipment employing a laser, see 6E. (L.N. 226 of 2009)

(3) Equipment employing "optical switching" and having a switching time less than 1 ms; (L.N. 45 of 2010)

(4) Radio equipment having any of the following:

(a) Quadrature-amplitude-modulation (QAM) techniques above level 256; (L.N. 65 of 2004; L.N. 254 of 2008)

(b) Operating at input or output frequencies exceeding 31.8 GHz; (L.N. 65 of 2004)

*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 radiocommunications services, but not for radio-determination. (L.N. 132 of 2001)

(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; (L.N. 254 of 2008)

(5) Equipment employing "common channel signalling" operating in non-associated mode of operation; (L.N. 65 of 2004)

(6) Mobile equipment, as follows:

(a) Operating at an optical wavelength greater than or equal to 200 nm and less than or equal to 400 nm; *and*

(b) Operating as a "local area network"; (L.N. 226 of 2009)

(d) "Technology" according to the General Technology Note for the "development" or "production" of Microwave Monolithic Integrated Circuit (MMIC) power amplifiers specially designed for telecommunications and having any of the following:

- (1) Rated for operation at frequencies exceeding 3.2 GHz up to and including 6 GHz and with an average output power greater than 4 W (36 dBm) with a "fractional bandwidth" greater than 15%;
- (2) Rated for operation at frequencies exceeding 6 GHz up to and including 16 GHz and with an average output power greater than 1 W (30 dBm) with a "fractional bandwidth" greater than 10%;
- (3) Rated for operation at frequencies exceeding 16 GHz up to and including 31.8 GHz and with an average output power greater than 0.8 W (29 dBm) with a "fractional bandwidth" greater than 10%;
- (4) Rated for operation at frequencies exceeding 31.8 GHz up to and including 37.5 GHz;
- (5) Rated for operation at frequencies exceeding 37.5 GHz up to and including 43.5 GHz and with an average output power greater than 0.25 W (24 dBm) with a "fractional bandwidth" greater than 10%;
- (6) Rated for operation at frequencies exceeding 43.5 GHz; (L.N. 226 of 2009)

(e) "Technology" according to the General Technology Note for the "development" or "production" of electronic devices and circuits, specially designed for telecommunications and containing components manufactured from "superconductive" materials, specially designed for operation at temperatures below the "critical temperature" of at least one of the "superconductive" constituents, and having any of the following:

- (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;
- (2) Frequency selection at all frequencies using resonant

circuits with Q-values exceeding 10000; (L.N. 226 of 2009)

5E101 "Technology" according to the General Technology Note for the "development", "production" or "use" of equipment controlled by 5A101;