

10. "Stored programme controlled" digital cross-connection equipment;
11. "Gateways" and bridges;
12. "Media access units; and
- b. Designed for use in single or multi-channel communication via:
1. Wire (line);
  2. Coaxial cable;
  3. Optical fibre cable;
  4. Electromagnetic radiation.
1051. b. 1. Employing digital techniques, including digital processing of analogue 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:**  
1051.b.1. does not embargo equipment specially designed to be integrated and operated in any satellite system for civil use.
1051. b. 2. Being "stored programme controlled" digital cross connect equipment with a "digital transfer rate" exceeding 8.5 Mbit/s per port;
1051. b. 3. Being equipment containing:
- a. Modems using the "bandwidth of one voice channel" with a "data signalling rate" exceeding 9,600 bit/s;
  - b. "Communication channel controllers" with a digital output having a "data signalling rate" exceeding 64,000 bit/s per channel; *or*
  - c. "Network access controllers" and related common medium having a "digital transfer rate" exceeding 33 Mbit/s;
- NOTE:**  
If any unembargoed equipment contains a "network access controller", it cannot have any type of telecommunications interface except those described in, but not embargoed by, 1051.b.3.
1051. b. 4. Employing a "laser" and having any of the following characteristics:
- a. A transmission wavelength exceeding 1,000 nm;
  - b. Employing analogue techniques and having a bandwidth exceeding 45 MHz;
  - c. Employing coherent optical transmission or coherent optical detection techniques (also called optical heterodyne or homodyne techniques);
  - d. Employing wavelength division multiplexing techniques; *or*
  - e. Performing "optical amplification";
1051. b. 5. Being radio equipment operating at input or output frequencies exceeding:
- a. 31 GHz for satellite-earth station applications;
  - b. 26.5 GHz for other applications;
- NOTE:**  
1051.b.5.b. does not embargo equipment for civil use conforming with an ITU allocated band between 26.5 and 31 GHz.
1051. b. 6. Being radio equipment:
- a. Employing quadrature-amplitude-modulation (QAM) techniques above level 4; *or*
  - b. Employing other digital modulation techniques and having a "spectral efficiency" exceeding 3 bit/sec/Hz;
- NOTE:**  
1051.b.6.b. does not embargo equipment specially designed to be integrated and operated in any satellite system for civil use.
1051. b. 7. Being radio transmitting equipment operating in the 1.5 to 87.5 MHz band and having either of the following characteristics:
- a. 1. Automatically predicting and selecting frequencies and "total digital transfer rates" per channel to optimize the transmission; *and*
  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 1.5 to 30 MHz frequency range or 250 W or more in the 30 to 87.5 MHz frequency range, over an "instantaneous bandwidth" of one octave or more and with an output harmonic and distortion content of better than -80 dB; *or*
- b. Incorporating adaptive techniques providing more than 15 dB suppression of an interfering signal;
1051. b. 8. Being radio equipment employing "spread spectrum" or "frequency agility" (frequency hopping) techniques having either 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;
1051. b. 9. Being digitally controlled radio receivers having more than 1,000 channels, which:
- a. Search or scan automatically a part of the electromagnetic spectrum;
  - b. Identify the received signals or the type of transmitter; *and*
  - c. Have a "frequency switching time" of less than 1 ms;
1051. b. 10. Providing functions of digital "signal processing" as follows:
- a. Voice coding at rates of less than 2,400 bit/s;
  - b. Employing circuitry which incorporates "user-accessible programmability" of digital "signal processing" circuits exceeding the limits of 1041.3.g.;
1051. b. 11. Being underwater communications systems having any of the following characteristics:
- a. An acoustic carrier frequency outside the range from 20 to 60 kHz;
  - b. Using an electromagnetic carrier frequency below 30 kHz; *or*
  - c. Using electronic beam steering techniques;
1051. c. "Stored programme controlled" switching equipment and related signalling 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 programme controlled" switches.
1051. c. 1. "Common channel signalling";
- NOTE:**  
Signalling systems in which the signalling channel is carried in and refers to no more than 32 multiplexed channels forming a trunk line of no more than 2.1 Mbit/s, and in which the signalling information is carried in a fixed, time division multiplexed channel without the use of labelled messages, are not considered to be "common channel signalling" systems.
1051. c. 2. Containing "Integrated Services Digital Network" (ISDN) functions and having either of the following:
- 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 signalling channel (e.g., 2B+D); *or*
  - b. The capability that a signalling 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:**  
1051.c.2. does not preclude:
1. The evaluation and appropriate actions taken by the receiving switch;
  2. Unrelated user message traffic on a D channel of ISDN.
1051. c. 3. Multi-level priority and pre-emption for circuit switching;
- NOTE:**  
1051.c.3. does not embargo single-level call pre-emption.
1051. c. 4. "Dynamic adaptive routing";
1051. c. 5. Routing or switching of "datagram" packets;
1051. c. 6. Routing or switching of "fast select" packets;
- NOTE:**  
The restrictions in 1051.c.5. and 6. do not apply to networks using only "network access controllers" or to "network access controllers" themselves.
1051. c. 7. Designed for automatic hand-off of cellular radio calls to other cellular switches or for automatic connection to a centralized subscriber data base common to more than one switch;