

- 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 their 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 if the "total digital transfer rate" exceeds 8.5 Mbit/s;
 - b. Employing quadrature-amplitude-modulation (QAM) techniques above level 16 if the "total digital transfer rate" is equal to or less than 8.5 Mbit/s; *or*
 - c. 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 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;
 - 1051. c. 8. Being packet switches, circuit switches and routers with ports or lines exceeding either:
 - a. A "data signalling rate" of 64,000 bit/s per channel for a "communications channel controller"; *or*

NOTE:
1051.c.8.a. does not preclude the multiplexing over a composite link of communications channels not embargoed by 1051.c.8.a.

 - b. A "digital transfer rate" of 33 Mbit/s for a "network access controller" and related common medium;
 - 1051. c. 9. "Optical switching";
 - 1051. c. 10. Employing "Asynchronous Transfer Mode" (ATM) techniques;
 - 1051. c. 11. Containing "stored programme controlled" digital cross-connect equipment with a "digital transfer rate" exceeding 8.5 Mbit/s per port;
 - 1051. d. Centralized network control having both of the following characteristics:
 1. Receives data from the nodes; *and*
 2. Processes these data in order to provide control of traffic not requiring operator decisions, thereby performing "dynamic adaptive routing";

NOTE:
1051.d. does not preclude control of traffic as a function of predictable statistical traffic conditions.