SCHEDULE 1

PROHIBITED GOODS–MISCELLANEOUS CONTENTS

PART II

GROUP 3G

Electronic Equipment including Computers, Software and Telecommunications, and Photographic Equipment

IL1565	Electronic computers, related equipment, equipment or systems containing electronic computers, and technology therefor, the following: and specially designed components for such electronic computers and related equipment:
	(a) analogue computers and related equipment therefor, which are designed or modified for use in airborne vehicles, missiles or space vehicles and rated for continuous operation at temperatures from below 228K (−45°C) to

above 328K (+55°C) A

(b) A equipment or systems containing analogue computers specified in head (a) above

(c) analogue A computers and related equipment therefor, other than those specified in head (a) above

except–

(1) those which neither:

(A) are capable of containing more than 20 summers, integrators, multipliers or function generators;

nor

(B) have facilities for readily varying the interconnections of such components;

(2) those which have all the following characteristics:

(A) they use neither:

(a) optical computation devices; nor

(b) acoustic wave devices specified in entry IL1586 in Group 3G;

(B) the rated errors for summers, inverters and integrators are not less than:

(a) static : 0.01%;

(b) total at 1 kHz: 0.15%;

(C) the rated errors for multipliers are not less than:

(a) static : 0.025%;

(b) total at 1 kHz: 0.25%;

(D) the rated errors for fixed function generators (log and sine/cosine) are not less than: static: 0.1%;

(E) they have no more than 350 operational

amplifiers; and

(F) they have no more than four integrator time scales switchable during one programme;

Note

For the purposes of paragraph (2) above–

1.   the percentage in sub-paragraph (B)(a) applies to the actual output voltage; all the other percentages apply to full scale, that is, from maximum negative to maximum positive reference voltages;

2.   total errors at 1 kHz for sub-paragraphs (B)(b) and (C)(b) above are to be measured with those resistors incorporated in the inverter, summer or integrator which provide the least error;

3.   total error measurements include all errors of the unit resulting from, for example, tolerances of resistors and capacitors,

tolerances of input and output impedances of amplifiers, the effects of loading, the effects of phase shift or the generating of functions.

(d) hybrid computers and related equipment therefor, having all the following characteristics

A

(1) the analogue section is specified in head (c) above;

(2) the digital section has an internal fixed or alterable storage of more than 2,048 bit; and

(3) facilities are included for processing numerical data from the analogue section in the digital section or vice versa;

(e) digital computers or analogue computers

A

specified in head (c) above, containing equipment for interconnecting analogue computers with digital computers and whether or not contained in or associated with other equipment or systems

(f) digital computers and related equipment therefor, and having any of the following characteristics–

(1) designed or modified for use in airborne vehicles, missiles or space vehicles and rated for continuous operation at temperatures from below 228K (−45°C) to above 328K (+ 55°C) A

(2) designed W or modified to limit electromagnetic radiation to levels

much less than those required by government civil interference specifications	
(3) designed as ruggedised or radiation-hardened equipment and capable of meeting military specifications for ruggedised or radiation-hardened equipment	A
(4) modified for military use	W
(5) designed or modified for certifiable multi-level security or certifiable user isolation applicable to government classified material or to applications requiring an equivalent level of security	W
(g) equipment or systems containing digital computers	A

specified in head (f) above

(h) digital computers and related equipment therefor, other than those specified in head (e) or (f) above, whether or not contained in or associated with other equipment or systems including   W

(A) digital computers and related equipment therefor, designed or modified for–

(a) signal processing   W

(b) image enhancement   W

(c) local area networks   W

except data communication systems located within a single piece of equipment (e.g., television set, car);

(d) multi-data-stream processing	W

except digital computers and related equipment which:

(a) utilise staged (pipelined) instruction interpretation for conventional single instruction single data sequence processing; or

(b) have an arithmetical unit implemented with bit-slice microprocessor microcircuits.

(e) combined recognition, understanding and interpretation of image, continuous (connected) speech or connected work text other than signal processing or image enhancement	W

(f) real time processing of sensor	W

data having both the following characteristics

(1) concerning events occurring outside the computer using facility; and

(2) provided by equipment specified in entry IL1501, IL1502 or IL1510 in Group 3F;

(h) fault tolerance   W

except: digital computers and related equipment which utilise:

(a) error detection or correction algorithms in main storage;

(b) the interconnection of two digital computers so that if the active central processing unit fails an idling but mirroring central processing

unit can continue the system's functioning;

(c) the interconnection of two central processing units by data channels or by use of shared storage to permit one central processing unit to perform other work until the second central processing unit fails, at which time the first central processing unit takes over in order to continue the system's functioning; or

(d) the synchronisation of two central processing units by software so that one central processing unit recognises when the other central processing

unit fails and recovers tasks from the failing unit;

(j) user-accessible microprogrammability   W

except digital computers and related equipment whose user-accessible microprogrammability is limited to:–

(a) loading, reloading or inserting of microprogrammes provided by the supplier ; or

(b) simple loading of microprogrammes which may or may not be provided by the supplier but which are neither designed to be accessible to the user nor accompanied by training or software for user accessibility;

(m) wide area networks   W

(C) related equipment, the following–

(a) disk drives for rigid magnetic media (hard disks) or non-rigid magnetic media (floppy disks), including cartridge type magnetic disk media, exceeding any of the following limits–

(1) a gross capacity of 165 MByte	W
(2) maximum bit transfer rate:	
(A) for disk drives for rigid magnetic media (hard disks)–10.3 Mbit/s	W
(B) for disk drives for non-rigid magnetic media (floppy disks) or cartridge type magnetic disk drives– 16 Mbit/s	W

(3) an access rate of 56 accesses per second	W
(b) disk drives for optical media (write-once-read-multiple-times (WORM) disks) exceeding any of the following limits:–	
(1) a net capacity of 3.2 GByte	W
(2) maximum bit transfer rate of 8 Mbit/s	W
(3) an access rate of 15 accesses per second	W
(c) disk drives for erasable optical or magneto-optical media	W
(d) solid state storage equipment, other than main storage, (also known as solid state disks or RAM disks)	W

exceeding a net capacity of 2 MByte

(e) input/ output control units designed for use with disk drives or solid state storage equipment, with any of the following characteristics–

(1) designed for use with equipment specified in paragraph (h) (C)(a), (b), (c) or (d) above   W

(2) having more than one independent read/write channel   W

(3) having user-accessible programmability or user-accessible microprogrammability   W

or

(4) having a transfer rate exceeding 16 Mbit/s   W

(f) magnetic tape drives exceeding either of the following limits:

(1) a maximum bit packing density of 246 bit/mm	W
or	
(2) a maximum bit transfer rate of 10 Mbit/s	W
(g) streamer tape drives with a maximum bit transfer rate exceeding16 Mbit/s	W
(h) input/output control units designed for use with tape drives, with any of the following characteristics–	
(1) designed for use with tape drives specified in paragraph (h) (C)(f) or (g) above	W
(2) having more than two independent read/write channels	W
(3) having user-accessible programmability or user-accessible microprogrammability	W

or

(4) having a transfer rate exceeding 16 Mbit/s   W

(i) communication control units or directly connected data channel combinations, exceeding a total transfer rate of 3.6 Mbit/s   W

(j) communication control units or communication channel combinations, having a maximum data signalling rate for any communication channel exceeding 9,600 bit/s   W

(k) displays or monitors having more than 1,024 resolvable elements in the perpendicular dimension and 1,280 resolvable elements in the other dimension and, except in the case of direct driven video   W

17

monitors, with more than 256 colours or shades of grey

except–

1. displays or monitors not specially designed for electronic computers;

2. monochrome displays for systems specially designed for and limited to graphic arts, desktop publishing, document image publishing (e.g., printing, publishing) which have displays not exceeding 1,200 resolvable elements in the perpendicular dimension and 1,600 resolvable elements in the other dimension;

(l) graphic accelerators or graphic coprocessors

W

There shall be excluded from head (h)–

(C) digital computers (other than those specified in sub-heads (h)(A)(d) to (m) above) and related, equipment therefor, having all of the following characteristics–

(a) shipped as complete systems;

(b) designed and announced by the manufacturer for identifiable civil use;

(c) not specially designed for any equipment specified in this Schedule;

(d) total processing data rate not exceeding 275 Mbit/s;

(e) total connected net capacity of main storage not exceeding32 MByte;

(f) not including a microprocessor or microcomputer microcircuit with an external data bus width of more than 32 bit or an arithmetic logic unit with an access width of more than 32 bit;

(g) not including related equipment specified in sub-head (h) (C) above other than input/output control unit, magnetic disk drive (hard disk) combinations having all of the following characteristics:

(1) a total connected net capacity not exceeding 2 GByte;

(2) a maximum bit transfer rate of any disk drive not exceeding

20.6 Mbit/s; and

(3) no more than five independent disk drives exceeding a maximum bit transfer rate of 16 Mbit/s;

(h) except in the case of workstations designed for and limited to graphic arts (e.g., printing, publishing), not having both of the following characteristics–

(1) they are stand-alone graphics work stations designed or modified for the generation, transformation and display of twoor three-dimensional vectors; and

(2) they exceed either of the following limits:

(A) block move data rate of 3 million pixels per second; or

(B) maximum bit transfer rate of the channel for direct access to the main storage (Direct Memory Access (DMA) channel) of 15 Mbit/s; and

(i) not including equipment specified in sub-head (a) (2) of entry IL1519 in Group 3F or in entry IL1567 in this Group;

(D) graphic accelerators or graphic coprocessors not exceeding a block move data rate of 3 million pixels per second;

(E) related equipment for signal processing or image enhancement or both not exceeding an equivalent multiply rate of 6.5 million

operations per second;

(F) related equipment for local area networks, not exceeding a data signalling rate of 20 Mbit/s and having no inter-network gateways, or related equipment specially designed for connecting local area networks within a computer using facility;

(G) digital computers or related equipment therefor, provided that:

(a) they are for medical applications;

(b) they are substantialy restricted to medical applications by reason of their design and performance;

(c) they do not have user-

accessible programmability other than that allowing for insertion of the original or modified programmes supplied by the original manufacturer;

(d) in the case of computers or equipment for signal processing, image enhancement or multi-data-stream processing, it

(1) is essential for the medical application; and

(2) is designed or modified for the identifiable and dedicated medical application;

(e) in the case of any digital computer which is not designed or modified but is essential for the medical application, it does not

exceed a total processing data rate of 550 Mbit/s;

(H) digital computers or related equipment, contained in or associated with other equipment or systems where–

(a) the computer or related equipment is essential for the operation of that other equipment or systems; and

(b) the computer or related equipment is not a principal element of that other equipment or system;

(j) Technology, the following–

(1) technology applicable to the–

(A) D development, production or use (i.e., installation,

operation and maintenance) of electronic computers or related equipment, whether or not such electronic computers or related equipment are specified in this entry

except–

(a) technology which is unique to related equipment not specified in this Schedule;

(b) the minimum technical information necessary for the use of electronic computers or related equipment when shipped together with or solely for use with such electronic computers

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or related equipment; or

(c) the minimum technical information for the production of electronic computers and related equipment not specified in sub-head (h) (A) or related equipment excluded by exception (C) to head (h), being information relating to–

(1) assembling of prefabricated components or sub-assemblies;

(2) loading of basic diagnostic systems software;

(3) performing basic go/

no go testing of finished products; Note:

"assembling" means for the purpose of this exception, the testing, and integrating into finished products, of components and sub-assemblies, including mounting components on to printed circuit boards or into other assemblies.

(B)   D development, production or use of equipment or systems specified in head (b) or (g) of this entry

(2) technology for the integration of–

(A) electronic computers or related equipment specified in this Schedule into other equipment or systems, whether or not the other equipment or systems are specified in this entry   D

except– technology for the integration of computers or related equipment into other equipment or systems, which is unique to such the other equipment or systems provided that such other equipment or systems are not specified in this Schedule;

(B) electronic computers or related equipment not specified in this   D

Schedule, into equipment or systems specified in this entry

In this entry–
"access rate"–
(a) of an input/output control unit drum or disk drive combination (R_{ad}) means either the access rate of an input/output control unit (R_{ac}) or the sum of the individual access rates of all independent seek mechanisms (R_{as}), whichever is smaller;
Thus: R_{ad} = min (R_{ac}; SUM R_{as});
(b) of an input/output control unit (R_{ac})–
(1) with rotational position sensing (rps), means the sum of the individual access rates

Thus:

$$R_{as} = \frac{1}{t_{aa}} \; ;$$

For the purpose of this definition–
"average access time" of a seek mechanism (t_{aa}) means the sum of the average seek time (t_{sa}) and the latency time (t^1);
Thus: $t_{aa} = t_{sa} + t_1$;
"average seek time" (t_{sa}) means the sum of the maximum seek time (t_{smax}) and twice the minimum seek time (t_{smin}), divided by three;
Thus:

$$t_{sa} = \frac{t_{max} + 2t_{smin}}{3}$$

"maximum seek time" (t_{smax})
(1) for fixed head

30

of all independent seek mechanisms (R_{as}) connected to the control unit;

Thus:

$R_{ac} = $ SUM R_{as} (with rps);

(2) without rotational position sensing (rps), means the number (C) of independent read/write channels connected to the control unit divided by the least latency time (t_{1min}) of any connected independent seek mechanism;

Thus:

$$R_{ac} = \frac{C}{t_{1min}} \text{ (without rps)}$$

(c) of a seek mechanism (R_{as}), means the devices, is zero;

(2) for moving head or moving media devices, means the rated time to move between the two most widely separated tracks;

"minimum seek time" (t_{smin})

(1) for fixed head devices, is zero;

(2) for moving head or moving media devices, means the rated time to move from one track to an adjacent track.

"latency time" (t^1)

reciprocal of the average access time (t_{aa}) of the seek mechanism;	means the rotational period divided by twice the number of independent read/write heads per track;

"analogue computer" means equipment which can, in the form of one or more continuous variables:

(a) accept data;

(b) process data; and

(c) provide output of data;

"associated" with equipment or systems means:

(a) can feasibly be either:

> (1) removed from such equipment or systems; or
>
> (2) used for other purposes; and

(b) is not essential to the operation

of such equipment or systems; "block move data rate" means the maximum number of pixels which can be moved per second from one location to another in the storage which functions as the frame buffer; "computer using facility" means the end-user's contiguous and accessible facilities: (a) housing the computer operating area and those end-user functions which are supported by the electronic computer and its related equipment; and (b) not extending beyond 1,500 metres in any

direction from the centre of the computer operating area;

For the purpose of this definition–

"computer operating area" means the immediately contiguous and accessible area around the electronic computer, where the normal operating, support and service functions take place;

"data device" means equipment capable of transmitting or receiving sequences of digital information;

"data signalling rate" means that rate as defined in ITU Recommendation 53-36, taking into account that, for non-binary modulation, baud and bit per

tdmax), means the product of:

(1) the maximum number of binary digit (bit) positions per unformatted track; and

(2) the number of tracks which simultaneously can be read or written, divided by the rotational period;

(b) of a magnetic tape drive (R

ttmax), means the product of:

(1) the maximum bit packing density;

(2) the number of data bits per character (ANSI) or per row (ISO); and

(3) the maximum tape read/write speed;

"most immediate storage" means the portion of the main storage most directly accessible by the central processing unit:

(a) for single level main storage, this is the internal storage;

(b) for hierarchical main storage, this is:

(1) the cache storage;

second are not equal. Binary digits for coding, checking and synchronisation functions are included;

NB.: It is either the maximum one-way rate, i.e., the maximum rate in either transmission or reception, whichever is the greater;

"digital computer" means equipment which can, in the form of one or more discrete variables:

(a) accept data;

(b) store data or instructions in fixed or alterable (writable) storage devices;

(c) process data by means of a stored sequence of instructions which is modifiable; and

(2) the instruction stack; or

(3) the data stack;

"multi-data-stream processing" means the microprogramme or equipment architecture technique which permits processing two or more data sequences under the control of one or more instruction sequences by means such as:

(a) parallel processing;

(b) structured arrays of processing elements;

(c) Single Instruction Multiple Data (SIMD) operations; or

(d) Multiple Instruction Multiple Data (MIMD) operations;

"net capacity" of a drum, disk or cartridge-

(d) provide output of data;

NB: Modifications of a stored sequence of instructions include replacement of fixed storage devices, but not a physical change in wiring or interconnections;

"electronic computer" does not include related equipment which contains an electronic computer, but which lacks user-accessible programmability;

"equivalent multiply rate" means the maximum achievable number of multiplication operations which can be performed per second considering that, in the case of simultaneous multiplication operations, all multiplication

type streamer tape drive or a bubble memory, means the total capacity designed to be accessible to the digital computer excluding error control bits;

rates have to be summed in order to arrive at the equivalent multiply rate:

(a) assuming

(1) optimal operand locations in the most immediate storage; and

(2) operand lengths at least 16 bit, or more if this allows for faster operation; and

(b) ignoring

(1) set-up operations;

(2) pipeline filling operations;

(3) initialization;

(4) interrupts; and

(5) data reordering times;

NB: Simultaneous multiplication operations

can occur because of:

(a) multiple arithmetic units for operations such as complex multiplication, convolution or recursive filtering;

(b) parallel pipelining;

(c) more than one arithmetic unit in one data processing unit; or

(d) more than one data processing unit in one system.

"fault tolerance" means the ability to perform correctly without human intervention after failure of any assembly, so that there is no single

point in the system the failure of which could cause catastrophic failure of the system's functioning;

"gateway" means the function, realised by any combination of equipment and software, of carrying out the conversion of conventions for representing, processing or communicating information used in one system into the corresponding but different conventions used in another system;

"gross capacity" means the product of:

(a) the maximum number of binary digit (bit) positions per unformatted track; and

(b) the total number of tracks including spare tracks and tracks not accessible to the user;

"hybrid computer" means equipment which can:

(a) accept data;

(b) process data, in both analogue and digital representations; and

(c) provide output of data;

"image digitiser" means a device for directly converting an analogue representation of an image into a digital representation;

"image enhancement" means the processing of externally derived information-bearing images by algorithms such as time compression, filtering, extraction, selection, correlation,

convolution or transformations between domains (e.g., fast Fourier transform or Walsh transform). This does not include algorithms using only linear or rotational transformation of a single image, such as translation, feature extraction, registration or false coloration; "internetwork gateway" means a gateway for two systems which are themselves local area networks, wide area networks or both; "local area network" means a data communication system which: (a) allows any number of independent data devices to communicate directly

with each other; and

(b) is confined to a geographical area of moderate size (e.g., office building, plant, campus, warehouse);

"main storage" means the primary storage for data or instructions for rapid access by a central processing unit. It consists of the internal storage of a digital computer and any hierarchical extension thereto, such as cache storage or non-sequentially accessed extended storage;

NB: For the determination of the size of main storage the cache

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storage is excluded, provided that:
(a) its size does not exceed 6.25% (1/16th) of the size of main storageexcluding cache storage; and
(b) it is designed to contain only data already contained in mainstorage;

"maximum bit packing density" means the density of recording specified in accordance with the appropriate ANSI or ISO Standard (egANSI X3.14–1979, ISO 1863–1975; ANSI X3.22–1973, ISO 1873–1976; ANSI X3.39–

1973, ISO
3788–
1976; ANSI
X3.48–
1977, ISO
3407–
1976; ANSI
X3.56–
1977, ISO
4057–
1979; ANSI
X3.54–
1976);
"maximum
bit transfer
rate"
(a) of a
drum or
disk drive
(R

an element is
a "principal
element" when its
replacement value
is more than 35%
of the total value
of the system of
which it is an
element. Element
value is the cost
of the element for
the manufacturer
of the system,
or by the system
integrator.
Total value
is the normal
international
selling price to
unrelated parties
at the point of
manufacture or
consolidation of
shipment;
"real time
processing"
means
processing
of data
by an
electronic
computer in

response to an external event according to time requirements imposed by the external event;

"related equipment" means the following equipment, contained in or associated with an electronic computer:

(a) equipment for interconnecting analogue computers with digital computers;

(b) equipment for interconnecting digital computers;

(c) equipment for interfacing electronic computers to local area networks or to wide area networks;

(d) communication control units;

(e) other input/output control units;

(f) recording or reproducing equipment; or

(g) displays;

"signal processing" means the processing of externally derived information-bearing signals by algorithms such as time compression, filtering, extraction, selection, correlation, convolution or transformations between domains(eg, fast Fourier transform or fast Walsh transform).

"total processing data rate"–

(a) of a single central processing unit, is its processing data rate;

(b) of multiple central processing units which do not share direct access to a common main storage,

is the individual processing data rate of each central processing unit, ie, each unit is separately treated as a single central processing unit as in (a) above;

(c) of multiple central processing units which partially or fully share direct access to a common main storage at any level, is the sum of:

(1) the highest of the individual processing data rates of all central processing units; and

(2) 0.75 times the processing data rate of each remaining central processing unit,

sharing the same main storage;

assuming the configuration of equipment which would maximize this sum of rates.

For the purpose of this definition–

"processing data rate" is the maximum of the floating point processing data rate (R_f) or the fixed point processing data rate (R_x).

NB: The processing data rate of a central processing unit implemented with two or more microprocessor microcircuits, not including any dedicated microprocessor microcircuit used solely for display, keyboard

or input/ output control, is the sum of the individual processing data rates of all these microprocessor microcircuits.

"floating point processing data rate" (R_f) is the sum of:

(1) 0.85 times the number of bits in a fixed point instruction (n_{ix}) or 0.85 times the number of bits in a floating point instruction (n_{if}), if no fixed point instructions are implemented;

(2) 0.15 times the number

of bits in a floating point instruction (n_{if}); (3) 0.40 times the number of bits in a fixed point operand (n_{ox}) or 0.40 times the number of bits in a floating point operand (n_{of}), if no fixed point instructions are implemented; and (4) 0.15 times the number of bits in a floating point operand (n_{of}); divided by the sum of: (1) 0.85 times

the execution time for a fixed point addition (t_{ax}) or for a floating point addition (t_{af}), if no fixed point instructions are implemented;

(2) 0.09 times the execution time for a floating point addition (t_{af}); and

(3) 0.06 times the execution time for a floating point multiplication (t_{mf}) or for the fastest available subroutine (t_{msub}) to simulate a floating

point
multiplication
instruction,
if no
floating
point
multiplication
instructions
are
implemented;

Thus:

$$R_f = \frac{(0.85)n_{ix} + (0.15)n_{il} + (0.40)n_{ax} + (0.15)n_{af}}{(0.85)t_{ax} + (0.09)t_{af} + (0.06)t_{mf}}$$

or if no
fixed point
instructions
are
implemented,
then:

$$R_f = \frac{(1.00)n_{af} + (0.55)n_{af}}{(0.94)t_{af} + (0.06)t_{mf}}$$

or if no
floating
point
multiplication
instructions
are
implemented
($t_{mf} = t_{msub}$)
then:

$$R_f = \frac{(0.85)n_{ix} + (0.15)n_{im} + (0.40)n_{ax} + (0.15)n_{af}}{(0.85)t_{ax} + (0.09)t_{af} + (0.06)t_{msub}}$$

NB: If
a digital
computer
has neither
floating
point
addition
nor floating
point
multiplication
instructions,
then its
floating
point
processing
data rate

is equal to
zero;
"fixed point
processing
data
rate" (Rx) is
the sum of:

(1)
0.85
times
the
number
of bits
in a
fixed
point
addition
instruction
(n_{ia}x);

(2)
0.15
times
the
number
of bits
in a
fixed
point
multiplication
instruction
(n_{imx});
and

(3)
0.55
times
the
number
of bits
in a
fixed
point
operand
(n_{ox});

divided by
the sum of:

(1)
0.85
times
the
execution
time
for a
fixed

point addition (t_{ax}); and

(2) 0.15 times the execution time for a fixed point multiplication (t_{mx}) or for the fastest available subroutine (t_{msub}) to simulate a fixed point multiplication instruction if no fixed point multiplication instructions are implemented;

Thus:

$$Rx = \frac{(0\cdot85)n_{ax} + (0\cdot15)n_{mx} - (0\cdot55)n_{ox}}{(0\cdot85)t_{ax} - 0\cdot15)t_{mx}}$$

or if no fixed point multiplication instructions are implemented ($t_{mx} = t_{msub}$), then:

$$Rx = \frac{(0\cdot85)n_{ax} + (0\cdot15)n_{mx} + (0\cdot55)n_{ox}}{(0\cdot85)t_{ax} - 0\cdot15)t_{msub}}$$

NB: If a digital computer has neither

fixed point addition nor fixed point multiplication instructions, then its fixed point processing data rate is equal to zero.

"number of bits" in a:

fixed point addition instruction (n_{iax})–

fixed point multiplication instruction (n_{imx})–

floating point addition instruction (n_{iaf})

floating point multiplication instruction (n_{imf})–

means the number of bits in the appropriate shortest single fixed or floating point instruction length which permits full direct addressing of the main storage;

NB:1. When multiple instructions

are
required
to
simulate
an
appropriate
single
instruction,
the
number
of bits
in the
above
instructions
is 16
bit
plus
the
number
of bits
(b_{iax},
b_{imx},
b_{iaf},
b_{imf})
which
permits
full
direct
addressing
of the
main
storage.

Thus: $n_{iax} =$
$16 + b_{iax}$;
$n_{im}x = 16 +$
b_{imx}
$n_{ia}f = 16 +$
b_{iaf}
$n_{im}f = 16 +$
b_{imf}

NB:2.
If the
addressing
capability
of an
instruction
is
expanded
by
using
a base
register,

then the number of bits in an instruction, fixed or floating point, addition or multiplication, is the number of bits in the instruction with the standard address length including the number of bits necessary to use the base register.

"number of bits in a fixed point operand" (n_{ox}) is

(a) the shortest fixed point operand length; or

(b) 16 bit;

whichever number is higher;

"number of bits in a floating point operand" (n_{of}) is

(a) the shortest floating point operand length; or
(b) 30 bit; whichever number is higher; and for the purpose of these definitions "execution time" is
(a) the time certified or openly published by the manufacturer for the execution of the fastest appropriate instruction under the following conditions:

(1) no indexing or indirect operations are included;
(2) the instruction is in the most immediate storage;
(3) one operand is in the accumulator or in a location of the

most immediate storage which is acting as the accumulator;

(4) the second operand is in the most immediate storage; and

(5) the result is left in the accumulator or the same location in the most immediate storage which is acting as the accumulator;

(b) if only the maximum and minimum execution times of the instructions are published, the sum of:

(1) the maximum execution time of an instruction (t_{max}); and

(2) twice the minimum exception time of this instruction (t_{mi}n); divided by three; Thus:

$$t = \frac{t_{max} + 2t_{min}}{3}$$

(t stands for any of the values t_{ax}, t_{af}, t_{mx} or t_{mf});

(c) for central processing units which simultaneously fetch more than one instruction from one storage location, the average of the execution times when executing instructions fetched from all possible locations within the stored word;

(d) if the longest fixed point operand length is smaller than 16-bit, the time required for the fastest

available
subroutine
to ssimulate
a 16 bit
fixed point
operation;

Note:1.
If the
addressing
capability
of an
instruction
is
expanded
by
using
a base
register,
then
the
execution
time
shall
include
the
time
for
adding
the
content
of the
base
register
to the
address
part
of the
instruction.
2.
When
calculating
processing
data
rate
for
computers
with
cache
sizes
smaller
than
64
kbytes,

the execution time of the appropriate instructions shall be calculated as follows: (cache hit rate) × (execution time when both instruction and operand are in cache storage) + (1 − cache hit rate) × (execution time when neither instruction nor operand are in cache storage),

the "cache hit rate" being: 1.00 for cache size of 64 kbyte or more

0.95
"
"32"
"
0.90
"
"16"
"
0.85
"
"8"
"
0.75
"
"4"
"
0.65
"
"2"
"
0.50
"
"1"
"

The cache hit rate for computers with cache sizes smaller than 1 kbyte shall be treated as zero.

"total transfer rate"–
(a) of input/ output control unit drum, disk or cartridge- type streamer tape drive

combinations (R_{td}tot), is the sum of the individual transfer rates of all input/output control unit drum, disk or cartridge-type streamer tape drive combinations (R_{td}) provided with the system which can be sustained simultaneously, assuming the configuration of equipment which would maximise this sum of rates;Thus: R_{tdtot} = SUM R_{td}

(b)   of input/ output control unit magnetic tape drive combinations (R_{tt}tot) including cartridge tape streamer tape drive combinations, means

the sum of the individual transfer rates of all input/output control unit magnetic tape drive combinations (R_{tt}) provided with the system which can be sustained simultaneously, assuming the configuration of equipment which would maximize this sum of rates; Thus: $R_{tttot} =$ SUM R_{tt}.

(c) of input/output or communication control unit directly connected data channel combinations, means the sum of the individual transfer rates of all data

channels provided with the system which can be sustained simultaneously, assuming the configuration of equipment which would maximize this sum of rates.

For the purpose of this definition, "transfer rate"–

(1) of an input/output control unit drum or disk drive combination (R_{td}) other than a cartridge-type streamer tape drive combination, is the smaller of either:

(A) the input/output control unit transfer rate

(R$_{tc}$);
or
(B)
the
sum
of
the
individual
transfer
rates
of
all
independent
seek
mechanisms
(R$_{ts}$);
Thus:
R$_{td}$
=min
(R$_{tc}$;
Sum
R$_{ts}$)
(2) of an
input/output
control unit
(R$_{tc}$)
(A)
with
rotational
position
sensing
(rps),
is the
product
of:
(a)
the
number
of
independent
read/
write
channels
(C);
and
(b)
the
highest
maximum
bit
transfer
rate

$(R_{tsmaxmax})$
of
all
independent
seek
mechanisms;
or

(B)
without
rotational
position
sensing
(rps),
is two
thirds
of this
product;

Thus: R_{tc} =
C.$R_{tsmaxmax}$ (with
rps);

$$R_{tc} = \frac{2C.R_{tsmaxmax}}{3} \quad \text{(without rps)}$$

(without rps)

(3) of an
independent
seek
mechanism
(R_{ts}), is the
product of:

(A)
the
maximum
bit
transfer
rate
(R_{tsmax});
and

(B)
the
rotational
period
(t_r);
divided
by the
sum
of:

(A)
the
rotational
period
(t_r);

(B)
the
minimum
seek
time
(t_{smin});
and
(C)
the
latency
time
(t^1);

Thus:

$$R_{ri} = \frac{R_{kmax} \times t_r}{t_r - t_{smin} + t_l}$$

(4) of an
input/output
control unit
cartridge-
type
streamer or
magnetic
tape drive
combination
(R_{tt}), is the
product of:
(1) the
number
of
independent
read/
write
channels
(C);
and
(2) the
highest
maximum
bit
transfer
rate
($R_{ttmaxmax}$)
of all
tape
drives;

Thus: $R_{tt} =$
$C.R_{ttmaxmax}$
"minimum seek
time" (t_{smin})–

(1) for fixed head devices, is zero; or
(2) for moving head or moving media devices, is the rated time to move from one track to an adjacent track;
"latency, time" (t^1) is the rotational period divided by twice the number of independent read/write heads per track;
"user-accessible microprogrammability" means the facility allowing a user to insert, modify or replace microprogrammes;
"user-accessible programmability" means the facility allowing a user to insert, modify or replace programmes by means other than:

(a) a physical change in wiring or interconnections; or
(b) the setting of function controls including entry of parameters;
"wide area network" means a data communication system which:
(a) allows an arbitrary number of independent data devices to communicate with each other;
(b) may include local area networks; and
(c) is designed to interconnect geographically dispersed facilities.

Any term used in this entry shall bear the meaning it has in entry IL1566 in this Group.

IL1566	Software and technology therefor, the following:

Note: Software for equipment described in entry IL1565 is dealt with in this entry. Specially designed ODMA software for equipment described in other entries in this Schedule except entry IL1565, is dealt with in the appropriate entry.

(a) Software, the following:

(1) software designed or modified for any computer that is part of a computer series designed and produced in any country specified in Schedule 2 to this Order   W

except application software designed for and limited to:

(A) accounting, general ledger, inventory

control, payroll, accounts receivable, personnel records, wages calculation or invoice control;

(B) data and text manipulation such as sort/merge, text editing, data entry or word processing;

(C) data retrieval from established data files for purposes of report generation or inquiry for the functions described in (A) or (B) above; or

(D) the non-real time processing of pollution sensor data at fixed sites or in civil vehicles for civil environmental monitoring purposes;

(2) software A designed or modified for the design, development or

production of items specified in this Schedule

(3) software designed or modified for:

(A) hybrid computers specified in entry IL1565 in this Group	A
(B) one or more of the functions referred to in paragraphs (A)(a) to (m) of head (h) of entry IL1565 or for digital computers or related equipment designed or modified for such functions	W

except

(a) specially designed software in machine executable form for digital computers and related equipment therefor which are

excluded
by
exception
(G) or
(H) to
head
(h) of
entry
IL1565;
(b)
software
for
equipment
specified
in
paragraph (A)
(c) or
(m) of
head
(h) of
entry
IL1565
unless
the
software
performs:

(1) multi-
data-stream
processing
or load
sharing
functions;
or

(2)
datagram or
fast select
functions
as defined
in level III
of CCITT
X.25 or
equivalent;

(4) software   W
for
computer-
aided
design,
manufacture,
inspection
or testing
of items

specified in this Schedule

(5) software designed or modified to provide certifiable multi-level security or certifiable user-isolation applicable to government-classified material or to applications requiring an equivalent level of security, or software to certify such software

W

(6) software specially designed for computer aided design (CAD) of patterned substrates, having any of the following characteristics:–

(A) automatically transforming schematic functional descriptions into pattern layouts

W

(B) simulation of the performance

W

of the circuit layout

(C)   W automatic generation of test string lists (i.e., test vectors) for substrates having more than two layers (including the ground plane) of interconnections

(D)   W automatic placement or routing which is designed for performingimpedance matching or crosstalk analysis and crosstalk matching

except automatic software for the generation of test string lists for continuity testing of substrates.

(7) software specially designed for the computer aided design of semiconductor devices or integrated circuits

having any of the following characteristics–

(A) automatic transformation of schematic diagrams, functional block descriptions or logic diagrams into physical layouts   W

(B) circuit verification rules   W

(C) automatic routing for physical layout   W

(D) automatic placement for physical layout   W

(E) automatic generation of test vectors;   W

or (F) simulation of the physically laid out circuits   W

(b) Software, the following:

(1) development

systems, the following:

(A) development systems employing high-level language and designed for or containing programmes or databases special to the development or production of:

(a) specially designed software specified elsewhere in this Schedule	W
(b) software specified in sub-head (a)(2) or (a)(3) of this entry, including any subset designed or modified for use as part of such a development system	W

(B) development systems employing high-level language and designed for or containing the software

tools and databases for the development or production of software or any subset designed or modified for use as part of a development system such as, or equivalent to:

(a) Ada Programming Support Environment (APSE)	W
(b) any subset of APSE, the following:	
(1) Kernel APSE	W
(2) Minimal APSE	W
(3) Ada compilers specially designed as an integrated subset of APSE	W
or	
(4) any other subset of APSE	W
(c) any superset of APSE	W
or	W

(d) any derivative of APSE

(2) programming systems, the following:

(A) cross-hosted compilers and cross-hosted assemblers	W
(B) compilers or interpreters designed or modified for use as part of a development system specified in sub-head (1) above	W
(C) disassemblers, decompilers or other software which converts programmes in object or assembly language into a higher level language	W

except simple debugging application software, such as mapping, tracing, check-point/restart, breakpoint,

dumping and the display of the storage contents or their assembly language equivalent;

(3)   W diagnostic systems or maintenance systems, designed or modified for use as part of a development system specified in sub-head (1) above

(4) operating systems, the following:

(A) operating systems designed or modified for digital computers or related equipment, exceeding any of the following limits;

(1) central processing unit storage combinations–

(a) total processing data rate of 1,000 Mbit/s;

(b) total connected capacity of main storage of 128 MByte   W

(2) input/ output control unit, drum or disk drive combinations–

(a) total connected net capacity of 12 GByte;

(b) maximum bit transfer rate of any drum or disk drive of 25 Mbit/s   W

(B) operating systems providing on-line transaction data processing which permits integrated teleprocessing and on-line updating of databases   W

(5) application software, the following:

(A) software for cryptologic or   W

cryptoanalytic applications

(B) artificial intelligence software, including expert system software, which enables a digital computer to perform functions that are normally associated with human perception and reasoning or learning   W

(C) database management systems which are designed to handle distributed databases for:

(a) fault tolerance by using techniques such as maintenance of duplicated databases   W

or

(b) integrating data at a single site from independent remote databases   W

(D)   W software designed to adapt software resident on one digital computer for use on another digital computer

except software to adapt between two digital computers not specified in entry IL1565.

(E) software   W to provide adaptive control and having both the following characteristics

(a) for flexible manufacuring units (FMUs) which include equipment described in (b)(1) and (b)(2) of the definition of flexible manufacturing unit below; and (b) capable of generating or modifying, in real time processing, programmes or data by

using the signals obtained simultaneously by means of at least two detection techniques, such as:
(1) machine vision (optical ranging);
(2) infrared imaging;
(3) acoustical imaging (acoustical ranging);
(4) tactile measurement;
(5) inertial positioning;
(6) force measurement;
(7) torque measurement;
except software which only provides rescheduling of functionally identical equipment within flexible manufacturing units using pre-stored part programmes and a pre-stored strategy for the distribution of the part programmes.

(c)   D

Technology applicable to the development, production or use (i.e. installation, operation and maintenance) of software, whether or not the software is specified in this entry

except–

(1) technical data in the public domain;

(2) the minimum technical information necessary for the use of software not specified in this entry.

There shall be excluded from this entry–

1. software not exceeding 5,000 statements in source language, excluding data, provided that:

      (a) the software is neither

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designed nor modified for use as a module of a larger software module or system which in total exceeds this limit; and

(b) the software is not specified in sub-head (b)(5) above;

2. software initially exported to a country specified in Schedule 2 to this Order prior to 1st January, 1984, provided that:

(a) the software is identical to and in the same language form (source or object) as that initially

exported, allowing minor updates for the correction of errors which do not modify the initially exported functions;

(b) the accompanying documentation does not exceed the level of the initial export; and

(c) the software is exported to the same destination as the initial export;

3. the minimum technical information for the use (i.e. installation, operation and maintenance) of software licensed for export, when shipped together

with or
solely
for use
with such
software; 5.
5. software
which is
either:

     (a)
     standard
     commercially
     available
     software:

          (1)
          designed
          for
          installation
          by
          the
          user
          without
          further
          support
          by
          the
          supplier;
          and
          (2)
          designed
          for
          use
          on
          digital
          computers
          and
          related
          equipment
          therefor
          which
          are
          excepted
          by
          paragraph (C)
          to
          head
          (h)
          of
          entry
          IL1565
          in
          this
          Group;
          and

(3) generally available to the public; or

(b) software in the public domain.

In this entry:

"adaptive control" means a control system that adjusts the response from conditions detected during the operation;

"application software" means software other than development systems, diagnostic systems, maintenance systems, operating systems and programming systems not falling within any of the other defined categories of software;

"cross-hosted programming systems" means programming

systems which produce programmes for a model of electronic computer different from that used to run the programming system, that is, they have code generators for equipment different from the host computer; "database" means a collection of data for one or more particular applications, which is physically located and maintained in one or more electronic computers or related equipment; "database management systems" means application software to manage and maintain a database in one or more prescribed logical structures for use

by other application software independent of the specific methods used to store or retrieve the database; "data device" means equipment capable of transmitting or receiving sequences of digital information; "development systems" means software to develop or produce software, including software to manage those activities. Examples of a development system are programming support environments, software development environments and programmer-productivity aids; "diagnostic systems" means software to isolate or detect

software or equipment malfunctions; "distributed database" means a database which is physically located and maintained in part or as a whole in two or more interconnected electronic computers or related equipment, so that inquiries from one location can involve database access in other interconnected electronic computers or related equipment; "flexible manufacturing unit" (FMU), (sometimes also referred to as flexible manufacturing system (FMS) or flexible manufacturing cell (FMC)) means a combination of at least:

(a) a digital computer including its

own main storage and its own related equipment; and

(b) two or more of the following:

(1) a machine tool for removing, cutting or spark eroding metals, ceramics or composites;

(2) a computer controlled or numerically controlled dimensional inspection machine or a digitally controlled measuring machine specified in head (c) of entry IL1099 in Group 3A;

(3) a robot specified in entry IL1391 in Group 3D;

(4) digitally controlled equipment specified in entry IL1080, IL1081, IL1086 or IL1088 in Group 3A;

(5) stored-programme-controlled equipment specified in head (b) of entry IL1355 in Group 3D;

(6) digitally controlled equipment specified in entry IL1357 inGroup 3D;

(7) digitally controlled

electronic equipment specified in entry IL1529 in Group 3F;

"generally available to the public" means

(a) available at retail selling points, other than those specializing in selling electronic computers to the general public in model series which are not excepted by paragraph (C) to head (h) of entry IL1565 in this Group; and

(b) sold from stock by means of:

(1) over-the-counter transactions;

(2) mail order transactions;

(3) telephone call transactions;

"high-level language" means a programming language that does not reflect the structure of any one given electronic computer or that of any one given class of electronic computers;

"maintenance systems" means software to:

(a) modify software or its associated documentation in order to correct faults, or for other updating purposes; or

(b) maintain equipment;

"on-line updating" means processing in which the contents of a database can be amended within a period of time useful to interact with an external request;

"operating systems" means software to control:

(a) the operation of a digital computer or of related equipment; or

(b) the loading or execution of programmes;

"programming systems" means software to convert a convenient expression of one or more processes (source code or source language) into equipment executable

form (object code or object language); "self-hosted software for programming systems" means software to produce programmes for the same model of electronic computer as that used to run the programming system, ie, they only have code generators for the host computer; "standard commercially available" means for software that which is:

(a) commonly supplied to general purchasers or users of equipment in countries specified in Schedule 2 to this Order, but not precluding the

personalization of certain parameters for individual customers wherever located; (b) designed and produced for civil applications; (c) not designed or modified for any digital computer which is part of a digital computer series designed and produced in a country specified in Schedule 2; and (d) supplied in a commonly distributed form.

Any term used in this entry shall bear the meaning it has in entry IL1565 in this Group.

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IL1567	Stored-programme-controlled, communication switching equipment or systems and technology therefor, the following: and specially designed components therefor and specially designed ODMA software for the use of such equipment or systems–	W
	(a) Communication equipment or systems for data (message) switching (including those for local area networks or for wide area networks)	
	except data (message) switching equipment or systems, provided that–	W
	(1) the equipment or systems are designed for fixed civil use according	

to the requirements of either:

(A) CCITT Recommendations F.1 to F.79 for store-and-forward systems (Volume II–Fascicle II.4, VIIth plenary assembly,10th–21st November 1980); or

(B) ICAO Recommendations for store-and-forward civil aviation communication networks (Annex 10 to the Convention on International Civil Aviation, including all amendments agreed up to and

including 14th December 1981, published by ICAO);

(3) the maximum data signalling rate of any circuit does not exceed 9,600 bit/s;

(4) the equipment or systems do not contain digital computers or related equipment specified in–

(A) head (f) of entry IL1565 in this Group; or

(B) paragraphs (a), (b) or (d) to (j) (inclusive) of sub-

head (h) (A) of entry IL1565;

(5) the software supplied:

(A) is limited to the minimum specially designed operating systems, diagnostic systems, maintenance systems or application software necessary for the installation, operation and maintenance of the equipment and systems and is in machine executable form; and

(B) does not include software–

(a) specified in

entry IL1527 in Group 3F, in sub-head (a) (5) in entry IL1566 in this Group or in entry ML11 in Group 1, or

(b) that permits user-modification of generic software or its associated documentation; and

(6) the equipment or systems are designed for installation by the user without support from the supplier;

(b) Communication equipment or systems for stored-programme-controlled circuit switching

except–   D

(1) key telephone systems, provided that–

(A) access to an external connection is obtained by pressing a special button (key) on a telephone, rather than by dial or key-pad as on a PABX;

(B) they are not designed to be upgraded

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for
use
as
PABXs;
(C)
the
software
supplied:
(a)
is
limited
to
the
minimum
specially
designed
operating
systems,
diagnostic
systems,
maintenance
systems
or
application
software
necessary
for
the
installation,
operation
and
maintenance
of
the
equipment
or
systems,
and
is
in
machine-
executable
form;
and
(b)
does
not
include
software:
(1)
specified
in
entry

IL1527 in Group 3F, in sub-head (a) (5) in entry IL1566 in this Group or in entry ML11 in Group 1, or

(2) that permits user-modification of generic software or its associated documentation; and

(D) the equipment or systems are designed for installation by the user without support from the supplier;

(2) stored-programme-controlled circuit switching equipment or systems, provided that–

(A) the equipment or systems are designed for fixed civil use in stored-programme-controlled telegraph circuit switching for data;

(C) the equipment or systems do not contain digital computers or related equipment specified in head (f) of entry IL1565 or in

paragraphs
(a)
to
(j)
inclusive
or
paragraph (m)
of
sub-
head
(h)
(A)
of
entry
IL1565;
(D)
the
equipment
or
systems
do
not
have
either
of
the
following
characteristics:
(a)
multi-
level
call
pre-
emption
(including
over-
riding
or
seizing
of
busy
subscriber
lines,
trunk
circuits
or
switches),
other
than
for
single-
level
call

111

pre-
emption
(such
as
executive
override);
or
(b)
common
channel
signalling;
(E)
the
maximum
internal
bit
rate
per
channel
does
not
exceed
9,600
bit/
s;
(F)
the
telegraph
circuits
(whether
or
not
operating
as
telephone
circuits)
are
capable
of
carrying
any
type
of
telegraph
or
telex
signal
compatible
with
a
voice
channel
bandwidth

of
3,100
Hz;
(G)
the
software
supplied:
(a)
is
limited
to
the
minimum
specially
designed
operating
systems,
diagnostic
systems,
maintenance
systems
or
application
software
necessary
for
the
installation,
operation
and
maintenance
of
the
equipment
or
systems
and
is
in
machine-
executable
form;
and
(b)
does
not
include
software:
(1)
specified
in
entry
IL1527

in
Group
3F
or
in
sub-
head
(a)
(5)
in
entry
IL1566
in
this
Group
or
in
entry
ML11
in
Group
1;
(2)
that
permits
user-
modification
of
generic
software
or
its
associated
documentation;
(H)
the
equipment
or
systems
are
designed
for
installation
by
the
user
without
support
from
the
supplier;
(3)
stored-

programme-controlled telephone circuit switching equipment or systems, provided that–

(A) the equipment or systems are designed for fixed civil use as space-division analogue exchanges or time-division analogue exchanges which are PABXs;

(B) the equipment or systems do not contain digital computers or related equipment specified in head (f) of entry

IL1565
in
this
Group,
or
in
paragraphs
(a)
to
(j)
inclusive
or
paragraph (m)
of
sub-
head
(h)
(A)
of
entry
IL1565;
(C)
any
communication
channels
or
terminal
devices
used
for
administrative
and
control
purposes:
(a)
can
only
be
used
for
those
purposes;
and
(b)
do
not
exceed
a
maximum
data
signalling
rate
of

9,600 bits;

(D) voice channels are limited to 3,100 Hz;

(F) the equipment or systems do not have:

(a) multi-level call pre-emption (including over-riding or seizing of busy subscriber lines, trunk circuits or switches) other than for single-level call pre-emption (such as executive override); or

(b) common

channel signalling;

(G) the software supplied:

(a) is limited to the minimum specially designed operating systems, diagnostic systems, maintenance systems or application software necessary for the installation, operation and maintenance of the equipment or systems; and is in machine-executable form; and

(b) does not include software:

(1) specified in entry IL1527 in

Group 3F, or in sub-head (a) (5) in entry IL1566 in this Group or in entry ML11 inGroup 1; or (2) that permits user-modification of generic software or its associated documentation; and (H) the equipment or systems are designed for installation by the user without support from the supplier;

(4) stored-

programme-controlled, telephone circuit switching equipment or systems, provided that–

(A) the equipment or systems are designed for fixed civil use as space-division digital exchanges or time-division digital exchanges, which are PABXs;

(B) the equipment or systems do not have more than 512 ports;

(C) the equipment or systems do not

support
any
form
of
Integrated
Services
Digital
Networks;
(D)
the
equipment
or
systems
do
not
contain
digital
computers
or
related
equipment
specified
in
head
(f)
of
entry
IL1565
in
this
Group
or
in
paragraphs
(a)
to
(j)
inclusive
or
paragraph (m)
of
sub-
head
(h)
(A)
of
entry
IL1565;
(E)
the
PABXs
do
not

have
any
of
the
following
characteristics:
(a)
multi-
level
call
pre-
emption
(including
over-
riding
or
seizing
of
busy
subscriber
lines,
trunk
circuits
or
switches)
other
than
single-
level
call
pre-
emption
(such
as
executive
over-
ride);
(b)
common
channel
signalling;
(c)
dynamic
adaptive
routing;
(d)
digital
synchronisation
circuitry
which
uses
equipment
specified

in
head
(d)
of
entry
IL1529
in
Group
3F;
(f)
centralised
network
control
which
is:
(A)
based
on
network
management
protocol;
and
(B)
capable
of
receiving
data
from
the
nodes
and
processing
such
data
to
control
traffic
and
directionalise
paths;
(F)
any
communication
channels
or
terminal
devices
used
for
administrative
and
control
purposes:

(a) can only be used for those purposes; and

(b) do not exceed 9,600 bit/s;

(G) the software supplied–

(a) is limited to the minimum specially designed operating systems, diagnostic systems, maintenance systems or application software necessary for the installation, operation and maintenance of the equipment or systems and is in machine-

executable
form;
(b)
does
not
include
software:
(1)
specified
in
entry
IL1527
in
Group
3F,
or
in
sub-
head
(a)
(5)
in
entry
IL1566
in
this
Group
or
in
entry
ML11
inGroup
1,
or
(2)
that
permits
user-
modification
of
generic
software
or
its
associated
documentation;
and
(H)
the
equipment
or
systems
are

designed for installation by the user without support from the supplier;

(c) Technology applicable to the development, production, installation, operation or maintenance of stored-programme-controlled, communication switching equipment or systems (including equipment or systems referred to in the exceptions to heads (a) and (b) above, if the technology exceeds the minimum technical information necessary for the installation, operation and maintenance of such equipment or systems)

In this entry–

"affiliated equipment" means the following equipment:

(a) input/output (I/O) control units;

(b) recording or reproducing equipment;

(c) displays; or

(d) other peripheral equipment;

"common channel signalling" means a signalling method in which a single channel between exchanges conveys, by means of labelled messages, signalling information relating to a multiplicity of circuits or calls and other information such as that used for network management;

"communication channel" means the

transmission path or circuit including the terminating transmission and receiving equipment (modems) for transferring digital information between distant locations; "data device" means equipment capable of transmitting or receiving sequences of digital information; "data (message) switching" means a technique, including store-and-forward or packet switching, for:

(a) accepting data groups (including messages, packets or other digital or telegraphic information groups

which are transmitted as a composite whole);
(b) storing (buffering) data groups as necessary;
(c) processing part or all of the data groups, as necessary, for the purpose of:

(1) control (routing, priority, formating, code conversion, error control, retransmission or journaling);
(2) transmission; or
(3) multiplexing; and

(d) retransmitting processed data groups when transmission or receiving facilities

are
available;
"data-
signalling
rate"
means the
maximum
rate in either
transmission
or reception,
taking into
account
that, for
non-binary
modulation,
baud and
bit per
second are
not equal;
(binary
digits for
coding,
checking,
and
synchronization
functions
are
included);
"digital
computer"
means
equipment
which can,
in the form
of one
or more
discrete
variables:

(a)
accept
data;
(b)
store
data or
instructions
in
fixed
or
alterable
storage
devices;
(c)
process

data by means of a stored sequence of instructions which is modifiable; and

(d) provide output of data;

"fast select" means a facility applicable to virtual calls, which allows data terminal equipment to expand the possibility of transmitting data in call set-up and clearing packets beyond the basic capabilities of a virtual call;

"local area network" means a data communication system which:

(a) allows any number of independent

data devices to communicate directly with each other; and

(b) is confined to a geographical area of moderate size (such as an office building, a plant, a campus, or a warehouse);

"PABX" (private automatic branch exchange) means an automatic telephone exchange (whether or not incorporating a position for an attendant) designed to provide access to the public network and serving extensions within an institution;

"packet" means a group of binary digits

(including call control signals and data) which is switched as a composite whole, the call control signals, data and if present error control information being arranged in a specified format; "packet-mode operation" means the transmission of data by means of addressed packets, whereby a transmission channel is occupied for the duration of the packet only and the channel is then available for use by packets being transferred between different data terminal equipments; (in certain data communication networks the data may be

formated into a packet or divided and then formated into a number of packets, either by the data terminal equipment or by equipment within the network, for transmission and multiplexing purposes); "space-division analogue exchange" means a space-division exchange, which uses an analogue (including sampled analogue) signal within the switching matrix, and which can route digital signals, subject to the bandwidth limitations of the equipment; (such exchanges in public networks commonly pass digital

data rates of several kilobit per second per voice channel of 3,100 Hz); "space-division digital exchange" means a space-division exchange, which accommodates the transmission through the switching matrix of digital signals requiring a bandwidth wider than a voice channel of 3,100 Hz; "space-division exchange" means an exchange in which different streams of data or voice signals are routed through the switching matrix along physically different paths; (the signal being routed through the matrix may

be analogue, such as conventional amplitude-modulation, or pulse amplitude-modulation, or digital, such as pulse code modulation, delta modulations or data); "stored-programme-controlled circuit switching" means a technique

(a) for establishing, on demand and until released, a direct (space-division switching) or logical (time-division switching) connection between circuits, and

(b) which is based on switching control information derived from

any source or circuit and processed according to the stored programme by one or more electronic computers;

"stored-programme-controlled telegraph circuit switching" means techniques essentially identical to those for stored-programme-controlled telephone circuit switching, for establishing connections between telegraph (for example telex) circuits based solely on a subscriber type of signalling information;

"stored-programme-controlled telephone circuit switching"

means a technique

(a) for establishing within an exchange, on demand and until released, an exclusive direct (space-division switching) or logical (time-division switching) connection between calling and called telephone circuits;

(b) based solely on a subscriber type of telephone signalling information derived from the calling circuit; and

(c) processed according to the stored programmes by

one or more electronic computers; for this purpose the telephone circuits may carry any type of signal (including telephone or telex), comparable with a voice channel bandwidth of 3,100 Hz or less; "terminal device" means a data device which:

(a) does not include process control sensing and actuating devices; and

(b) is capable of:

(1) accepting or producing a physical record;

(2) accepting a manual input; or

(3) producing a visual output; for the purpose of this definition a combination of such equipment (such as a combination of printer and paper tape punch or reader) which is connected to a single data channel or communications channel, constitutes a single terminal device; "terminal exchange" means an exchange which performs the function of one or more of the following–

(a) a local exchange used for terminating subscribers' lines;

(b) a remote switching unit which performs

some functions of a local exchange and operates under a measure of control from the parent exchange; or

(c) a local exchange which is used as a switching point for traffic between subordinate local exchanges (and which is generally 2-wire but may also provide 4-wire connections to and from the national long-distance network);

"time-division analogue exchange"

means a time-division exchange in which the parameter associated with an individual segment of a stream of data or voice signals varies continuously; "time-division digital exchange" means a time-division exchange in which the parameter associated with an individual segment of a stream of data or voice signals is one of the finite number of digitally coded values; "time-division exchange" means an exchange in which segments of different streams of data or voice are interleaved in time

and routed through the switching matrix along a common physical path; (the matrix may also include one or more stages of space-division switching; and the signal being routed though the matrix may be analogue (such as pulse amplitude modulation) or digital (such as pulse code modulation, delta modulation or data); "total data signalling rate" means the sum of the individual data signalling rates of all communication channels which have been provided with the system and can be sustained simultaneously, assuming a configuration

of
equipment
that would
maximize
this sum of
rates;
"transit
exchange"
means an
exchange
that
performs
the function
of a
terminal
exchange
or one or
both of the
following:

(a) a
switching
point
for
traffic
between
other
exchanges
in the
national
network
(otherwise
known
as a
"trunk
exchange"
and
generally
4-
wire);
or
(b) a
4-wire
exchange
serving
outgoing,
incoming
or
transit
international
calls;
"trunk
circuit"
means a

circuit with associated equipment terminating in two exchanges.

Any term used in this entry shall bear the meaning it has in entry IL1565 or entry IL1566 in this Group.

IL1568	Analogue-to-digital and digital-to-analogue converters, position encoders and transducers, the following: and specially designed components and test equipment therefor–	
	(a) Electrical input type analogue-to-digital converters having any of the following characteristics–	
	(1) a conversion rate of more than 200,000 complete conversions per second at rated accuracy	C
	(2) an accuracy in excess of 1 part in more	C

than 10,000 of full scale over the specified operating temperature range

or

(3) a figure of merit of 1×10^8 or more (being the number of complete conversions per second divided by the accuracy)   C

(b) Electrical input type digital-to-analogue converter equipment having either of the following characteristics–

(1) A resolution of 12 bits with a maximum settling time to rated linearity of less than–

(A) 25 ns for current output type converter equipment   C

or

(B) 200 ns for voltage output type   C

converter equipment

or

(2) A resolution of more than 12 bits with a maximum settling time to rated linearity of less than–

(A) 1 microsecond for current output type converter equipment

C

or

(B) 3 microseconds for voltage output type converter equipment

C

(c) Solid-state synchro-to-digital or digital-to-synchro converters and resolver-to-digital or digital-to-resolver converters (including multipole resolvers) having a resolution of better than ± 1 part in 5,000 per full synchro revolution

C

for single speed synchro systems or ± 1 part in 40,000 for dual speed systems

(d) Mechanical input type position encoders and transducers, excluding complex servo-follower systems, the following–

(1) rotary types having–

(i) a resolution of better than 1 part in 265,000 of full scale; or	C
(ii) an accuracy better than ±2.5 arc-seconds	C
(2) linear displacement types having a resolution of better than5 micrometres	C
(e) Any equipment specified in heads (a) to (d) above (inclusive)	C

which is designed to operate below 218 K (−55°C) or above 398 K (+ 125°C)

In this entry–

"settling-time" means the time required for the output to come within one half bit of the final value when switching between any two levels of the converters.

PL7038	Electrical input type analogue-to-digital converter printed circuit boards or modules, having all the following characteristics	A

(a) a resolution of 8 bits or more;

(b) rated for operation in the temperature range from below −45°C to above + 55°C;

(c) containing integrated microcircuits specified in PL7039.

IL1571 Magnetometers, magnetometer systems and related equipment, the following: and specially designed components therefor–

    (a) C Magnetometers and magnetometer systems having or capable of having a sensitivity better than ± 1.0 gamma (± 10^{-5} oersteds), except magnetometers having sensitivities not better than ± 0.1 gamma (± 10^{-6} oersteds) where the reading rate capability is no faster than once per half-second

    (b) C Magnetometer test facilities able to control magnetic field values to an accuracy of 1.0 gamma (10^{-5}

oersteds) or less

(c)   C
Magnetic compensation systems utilizing digital computers, non-magnetic platforms and calibration systems

In this entry–

"sensitivity" means the visually recognized minimum sinusoidal signal in the frequency range of 0.025 Hz to 1.5 Hz when signal-to-noise ratio is higher than 1;

"secially designed components" includes non-magnetic pumping lamps and heating coils, cryogenic magnetic componentry, enhanced resonance gases, and any form of dynamic signal-

processing gradient compensation provided as part of, or designed for use with, magnetometers specified in this entry. Enhanced resonance gases are gases of isotopes of cesium, rubidium and other metals which exhibit very sharp bands of response to pumping frequencies in optically pumped magnetometers;

"magnetometer systems" use magnetic sensors, including those designed to operate at cryogenic temperatures, compensation systems, displays, recorders and associated electronics for signal processing, target parameter detection, gradient

	compensation and dynamic range control.	
IL1572	Recording or reproducing equipment, recording media and technology, the following: and specially designed components, accessories and software therefor–	C
	(a) Recording or reproducing equipment using magnetic techniques	
	except– (i) equipment specially designed for–	C
	(1) audio programmes on tape or disk; (2) analogue recording or reproducing of video programmes on tape or disk, save magnetic heads mounted	

on servo-mechanisms which include piezoelectric transducers and have a gap width less than0.75 micrometre; or
(3) digital reproducing (ie play-back only) of video programmes from tape or disk;
(ii) equipment specially designed to use magnetic card, tag, label or bank cheque recording media with a magnetic surface area not exceeding85 cm^2 ;
(iii) analogue magnetic tape recorders, including equipment permitting the

recording of digital signals (eg using a high density digital recording (HDDR) module), having all of the following characteristics–

(a) bandwidth at maximum speed not exceeding 300 kHz per track;

(b) recording density not exceeding 2,000 magnetic flux sine waves per linear cm per track;

(c) not including recording or reproducing heads designed for use in equipment with characteristics superior to those

defined
in
paragraph (a)
or (b)
above;
(d)
tape
speed
not
exceeding
155
cm/s;
(e)
number
of
recording
tracks,
excluding
audio
voice
track,
not
exceeding
28;
(f)
start-
stop
time
not
less
than
25 ms;
(g)
equipped
with
tape-
derived
(off-
tape)
servo
speed
control
and
with
a time
displacement
(base)
error,
measured
in
accordance
with
applicable

IRIG or EIA documents, of no less than ±1 microsecond;

(h) using only direct or FM recording;

(i) not ruggedized for military use;

(j) not rated for continuous operation in ambient temperatures from below 233K to above 328K (from below −40°C to above + 55°C); and

(k) not specially designed for underwater use;

(iv) digital recording or reproducing equipment having all of the

following characteristics–

(a) cassette/cartridge tape drives or magnetic tape drives which do not exceed;

(1) a maximum bit packing density of 131 bit per mm per track; or

(2) a maximum bit transfer rate of 2.66 Mbit/s;

(b) not ruggedized for military use;

(c) not specially designed for underwater use; and

(d) not rated for

continuous operation in ambient temperatures from below 233K to above 328K (from below −40°C to above + 55°C).

(b) Recording or reproducing equipment using laser beams which produce patterns or images directly on the recording surface or reproduce from such surfaces

except– C

(i) equipment specially designed for the production of audio or video disk masters for the replication or entertainmentor education-type disks;

(ii) facsimile equipment such as used for commercial weather imagery and commercial wire photos and text;

(iii) consumer-type reproducers for audio or video disks employing non-erasable media;

(iv) equipment specially designed for gravure (printing plate) manufacturing.

(c) Graphics instruments capable of continuous direct recording of sine waves at frequencies exceeding 20 kHz

(d) Recording media used in equipment specified in head (a) or (b) above   C

except–   D

(i) magnetic tape having all of the

following characteristics–

(a) specially designed for television recording and reproduction or for instrumentation;

(b) being a standard commercial product;

(c) not designed for use in satellite applications;

(d) been in use in quantity for at least two years;

(e) a tape width not exceeding 25.4 mm;

(ee) a tape length not exceeding 6,000 m;

(f) a magnetic coating thickness not

less than;

(1) 2.0 micrometres (0.079 mil) if the tape length does not exceed 1,450 m; or

(2) 5.0 micrometres (0.1975 mil) if the tape length does not exceed 6,000 m;

(g) a magnetic coating material consisting of doped or undoped gamma-ferric oxide or chromium dioxide;

(h) a base material consisting only of polyester;

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(i) a rated intrinsic coercivity not exceeding 64 kA/m (804 oersted); and

(j) a retentivity not exceeding 0.16 T (1,600 gauss);

(ii) magnetic tape having all of the following characteristics–

(a) specially designed for television recording and reproduction or for instrumentation;

(b) being a standard commercial product;

(c) having either of the following sets of characteristics–

(1)
(A) a tape width not

exceeding
50.8
mm;
(B)
not
designed
for
use
in
satellite
applications;
(C)
a
magnetic
coating
material
consisting
of
doped
or
undoped
gamma-
ferric
oxide
or
chromium
dioxide;
(D)
a
rated
intrinsic
coercivity
not
exceeding
64
kA/
m
(804
oersted);
and
(E)
a
tape
length
not
exceeding
1,096
m;
or
(2)
(A)
a
tape

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width not exceeding 25.4 mm;

(B) a magnetic coating material consisting of chromium dioxide;

(C) a base material consisting only of polyester; and

(D) a rated intrinsic coercivity not exceeding 60 kA/m (750 oersted);

(iii) video or audio magnetic tape having either of the following sets of characteristics–

(a)

(1) being contained in a cassette;

(2) specially designed

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for
television
or
audio
recording
and
reproduction;
(3)
being
a
standard
commercial
product;
(4)
a
rated
intrinsic
coercivity
not
exceeding
128
kA/
m
(1,600
oersted);
(5)
a
retentivity
not
exceeding
0.30
T
(3,000
gauss);
(6)
a
tape
length
not
exceeding
650
m;
and
(7)
a
magnetic
coating
thickness
not
less
than
2.0
micrometres;

or

(b)

(1) a magnetic coating material consisting of undoped gamma-ferric oxide;

(2) a rated intrinsic coercivity not exceeding 28 kA/m (350 oersted);

(3) a tape width not exceeding 50.8 mm; and

(4) a base material consisting only of polyester;

(iv) computer magnetic tape having all of the following characteristics–

(a) designed for digital

recording
and
reproduction;
(b) a
magnetic
coating
certified
for a
maximum
packing
density
of
2,460
bit per
cm or
3,560
flux
changes
per cm
along
the
length
of the
tape;
(c) a
magnetic
coating
thickness
not
less
than
3.6
micrometre;
(d) a
tape
width
not
exceeding
25.4
mm;
(e) a
tape
length
not
exceeding
1,100
m; and
(f) a
base
material
consisting
only

of polyester;
(v) computer flexible disk cartridges having both of the following characteristics–
(a) designed for digital recording and reproduction; and
(b) not exceeding a gross capacity of 33 million bit;
(vi) rigid magnetic disk recording media having all of the following characteristics–
(a) being a standard commercial product;
(b) non servo-written;
(c) a packing density not exceeding 866

bit per cm;

(d) not exceeding 80 tracks per cm; and

(e) conforming to any of the following specifications:

(1) unrecorded single disk cartridges (front loading (2315-type)) designed to meet ANSI X3.52–1976;

(2) unrecorded single disk cartridges (top loading (5440-type)) designed to meet International Standard ISO 3562–1976;

(3) unrecorded six-disk packs (2311

type) designed to meet ANSI X3.46–1974 or International Standard ISO 2864–1974(E); or

(4) unrecorded eleven-disk packs (2316 type) designed to meet ANSI X3.58–1977 or International Standard ISO 3564–1976.

(e) Technology for the development, production or use of recording or reproducing equipment specified in this entry

except–
(i) technology, which is unique to equipment excluded by any

exception (i)(1), (i) (2) or (ii) or head (a), or excluded from heads (b) or (c) of this entry, other than technology for the design or production of–

      (a) cylindrical structures used to record or reproduce video signals in a helical scan system recorder or reproducer; or

      (b) recorded alignment tapes used in the production of recording or reproducing equipment;

(ii) the minimum technology necessary for the use of equipment which is excluded

under this entry.

(f) Technology for continuous coating of magnetic tape, whether the tape is specified in this entry or not, the following–

(1) technology for the formulation of coating material	D
(2) technology for the application of coating material to the backing	D

(g) Technology for the manufacture of flexible disk recording media, whether the media is specified in this entry or not, the following–

(1) technology for the formulation of coating material	D
(2) technology	D

for the application of coating material to the flexible backing

(h)   D Technology for the development or production of rigid disk recording media, whether the media is specified in this entry or not

In this entry–

"recording media" means all types and forms of specialised media used in recording techniques, including but not limited to tapes, drums, disks and matrices;

"recording density" for direct recorders means the recording bandwidth divided by the tape speed;

"recording density" for FM

	recorders means the sum of the carrier frequency and the deviation divided by the tape speed;		
	"packing density" for digital recorders means the number of bits per second per track divided by the tape speed.		
IL1573	Superconductive electromagnets and solenoids, the following: except when specially designed for magnetic resonance imaging (MRI) medical equipment–		
	(a) Those which have a non-uniform distribution of current-carrying windings, measured along the axis of symmetry, when specially designed for gyrotron application	C	

except those rated for both–

> (1) magnetic induction of less than 1 tesla; and

> (2) overall current density in the windings of less than 10,000 A/cm^2 ;

> (b) Those which are specially designed to be fully charged or discharged in less than one minute, provided that

C

> (1) the maximum energy delivered during discharge divided by the duration of the discharge is more than 500 kJ per minute;

> (2) the inner diameter of the current-carrying windings is more than 6 cm; and

> (3) they are rated for magnetic

induction of more than 8 tesla or overall current density in the windings of more than 10,000 A/cm^2 .

In this entry "overall current density" means the total number of ampere-turns in the coil (ie the sum of the number of turns multiplied by the maximum current carried by each turn) divided by the total cross-section of the coil (comprising the superconducting filaments, the metallic matrix in which the superconducting filaments are embedded, the encapsulating material, any cooling channels, etc.).

IL1574	Electronic devices, circuits and systems containing components manufactured from superconductive materials, and specially designed for operation at temperatures below the critical temperature of at	C

least one of their superconductive constituents performing functions such as the following–

(1) electromagnetic sensing and amplification;
(2) current switching;
(3) frequency selection;
(4) electromagnetic energy storage at resonant frequencies above 1 MHz.

There shall be excluded from this entry equipment specially designed for civil research on materials characterisation which contain superconducting quantum interference devices (SQUIDS), and which have all of the following characteristics–

(a) The equipment is of at least 16,400 mm^3 volume, and the SQUID is attached in such a manner that any attempt

to remove or modify the SQUID for use elsewhere would destroy it;

(b) The energy sensitivity is not better than 10^{-28} J per Hz; and

(c) Magnetic shielding is required for insensitivity to magnetic field fluctuations external to the equipment, and the removal of this shielding would prevent the superconducting magnetic sensing circuitry from functioning.

Note:

This entry includes Josephson-effect devices and superconducting quantum interference devices (SQUIDS).

In this entry–

the "critical temperature" (sometimes

referred to as the transition temperature) of a specific superconductive material means the temperature at which the material loses all resistance to the flow of direct current;

"superconductive" refers to materials (ie metals, alloys or compounds) which can lose all electrical resistance (ie which can attain infinite electrical conductivity and carry very large electrical currents without Joule heating). The superconductive state of a material is individually characterised by a critical temperature, a critical magnetic field, which is a function of temperature, and a critical current density,

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which is a function of both magnetic field and temperature.

IL1585 Cameras, components and photographic recording media therefor, the following–

(a) High speed cinema recording cameras and equipment, the following–

(1) Cameras in which the film is continuously advanced throughout the recording period, and which are capable of recording at framing rates exceeding 13,150 frames per second, using any camera and film combination from the standard 8 mm to the 90 mm size inclusive   C

(2) Special optical or electronic devices   C

which supplement, replace or are interchangeable with standard camera components for the purpose of increasing the number of frames per second above the limit in sub-head (a) (1) above

(b) C
Mechanical high speed cameras in which the film does not move, and which are capable of recording at rates exceeding 1,000,000 frames per second for the full framing height of standard 35 mm wide photographic film, or at proportionately higher rates for lesser frame heights, or at proportionately lower rates for greater frame heights

(c) Cameras incorporating electron tubes specified in entry IL1555 in Group 3F, except television or video cameras specially designed for television broadcasting use   C

(d) Mechanical or electronic streak cameras having writing speeds of 10 mm/microsecond and above   C

(e) Electronic framing cameras having a speed exceeding 10^6 frames per second   C

(f) Video cameras incorporating solid state sensors, having any of the following characteristics–

(1) more than 4×10^6 active pixels per   C

solid state array for monochrome (black and white) cameras

(2) more than 4×10^6 active pixels per solid state array for colour cameras incorporating three solid state arrays | C

(3) more than 12×10^6 active pixels for solid state array colour cameras incorporating one solid state array | C

(g) Electronic cameras having both of the following characteristics | C

(1) an electronic shutter speed (gating capability) of less than 10 microseconds per full frame;

(2) a read out time allowing a frame rate of more than 125

full frames per second;

(h) Camera shutters with speeds of 50 ns or less per operation, and specialised parts and accessories therefor   C

i) Films, the following–

(1) having a speed of ISO 10,000 (or its equivalent) or better   C

(2) colour film having a spectral sensitivity extending beyond 7,200 Angstroms or below 2,000 Angstroms   C

(j) Cameras incorporating linear detector arrays exceeding a size of 4,096 elements per array and mechanical scanning in one direction   C

In this entry–

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"active pixel" is a minimum element of the solid state array (sensor) which has a photoelectric transfer function and which is exposed to the light.

IL1586 Acoustic wave devices, the following: and specially designed components therefor–

(a) Surface acoustic wave and surface skimming (shallow bulk) acoustic wave devices which permit direct processing of signals, (including convolvers, correlators (fixed, programmable and memory), oscillators, bandpass filters, delay lines (fixed and tapped) and non-linear devices) having

either of the following characteristics–

(1) a carrier   C
frequency
of greater
than 400
MHz

(2) a carrier
frequency
of 400 MHz
or less,
(except
those
specially
designed
for home
electronics
and
entertainment
type
applications)
having
any of the
following
characteristics–

(i) a side-   C
lobe
rejection of
greater than
45 dB

(ii) a   C
product
of the
maximum
delay time
and the
bandwidth
(time in
microseconds
and
bandwidth
in MHz)
greater than
100

(iii) a   C
dispersive
delay of
greater

than 10 microseconds	
(iv) an insertion loss of less than 10 dB	C
(b) Bulk (volume) acoustic wave devices which permit direct processing of signals at frequencies over 1 GHz, including fixed delay lines, non-linear and pulse compression devices	C
(c) Acousto-optic signal-processing devices employing an interaction between acoustic waves (bulk wave or surface wave) and light waves which permit the direct processing of signals or images, including spectral analysis, correlation and convolution	C

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In this entry "acoustic wave devices" means signal processing devices employing elastic waves in materials such as lithium niobate, lithium tantalate, bismuth germanium oxide, silicon, quartz, zinc oxide, aluminium oxide (sapphire), gallium arsenide and alpha-aluminium phosphate (berlinite).

| IL1595 | Gravity meters (gravimeters), gravity gradiometers and specially designed components therefor | A |

except–

(a) Gravity meters for land use having either of the following characteristics–

(1) static accuracies of not less than 100 microgal; or

(2) being of the Worden type;

(b) Marine gravimetric systems having either of the

following characteristics–

(1) static accuracy of 1 milligal or more; or

(2) an in-service (operational) accuracy of 1 milligal or more with a time to steady state registration of two minutes or greater under any combination of attendant corrective compensations and motional influences.