CEs which perform different types of arithmetic operations in a single machine cycle are to be treated as multiple separate CEs performing simultaneously (e.g., a CE performing an addition and a multiplication in one cycle is to be treated as two CEs, the first performing an addition in one cycle and the second performing a multiplication in one cycle).

If a single CE has both scalar function and vector function, use larger value.

Note Y: If no FP add or FP multiply are implemented, but the CE performs FP divide: $R_{fp} = \frac{1}{t_{fp\ divide}}$;

If the divide is not implemented, the fp reciprocal should be used.

If none of the specified instructions is implemented, the effective FP rate is 0.

Note Z: In simple logic operations, a single instruction performs a single logic manipulation of no more than two operands of given lengths.

In complex logic operations, a single instruction performs multiple logic manipulations to produce one or more results from two or more operands.

Rates should be calculated for all supported operand lengths, using the fastest executing instruction for each operand length based on:

1. Register-to-register. Exclude extraordinarily short execution times generated for operations on a predetermined operand or operands (for example, multiplication by 0 or 1). If no register-register operations are implemented, continue with (2).
2. The faster of register-to-memory or memory-to-register operations; if these also do not exist, then continue with (3).
3. Memory-to-memory.

In each case above, use the shortest execution time certified by the manufacturer.

TP for each supported operand length WL

Adjust the effective rate R (or R') by the word length adjustment L as follows:

$$TP = R * L,$$
where $L = (1/3 + WL/96)$

Note: The word length WL used in these calculations is the operand length in bits. (If an operation uses operands of different lengths, select the largest word length.)

This adjustment is not applied to specialized logic processors which do not use XOR instructions. In this case TP = R.

SELECT THE MAXIMUM RESULTING VALUE OF TP FOR:

Each XP-only CE (R_{xp});

Each FP-only CE (R_{fp});

Each combined FP and XP CE (R);

Each simple logic processor not implementing any of the specified arithmetic operations; *and*

Each special logic processor not using any of the specified arithmetic or logic operations.

CTP FOR CPUs and aggregations of CEs

For a CPU with a single CE,

CTP = TP

(for CEs performing both fixed and floating point operations

TP = max (TP_{fp}, TP_{xp}))

For aggregations of multiple CEs operating simultaneously:

Note 1: For configurations which do not allow all of the CEs to run simultaneously, the configuration of permissible CEs that provides the largest CTP should be used. The TP of each contributing CE is to be calculated at its maximum value theoretically possible before the CTP of the combination is derived.

Note 2: A single integrated circuit chip or board assembly may contain multiple CEs.

Note 3: Simultaneous operations are assumed to exist when the computer manufacturer claims concurrent, parallel or simultaneous operation or execution in a manual or brochure for the computer.

$CTP = TP_1 + C_2 * TP_2 + ... + C_n * TP_n$,

where TP_1 is the highest of the TPs, and C_i is a coefficient determined by the strength of the interconnection between CEs, as follows:

For multiple CEs sharing memory:

$C_2 = C_3 = C_4 = ... = C_n = 0.75$

Note: CEs share memory if they access a common segment of solid state memory. This memory may include cache storage, main storage, or other internal memory. Peripheral memory devices such as disk drives, tape drives or RAM disks are not included.

For Multiple CEs not sharing memory, interconnected by one or more data channels:

$$C_i = 8 * \frac{S_i}{(WL_i * TP_i)}$$

(i = 2,....., n)

where S_i = sum of the maximum data rates (in units of MByte/sec) for all data channels connected to the i^{th} CE or CPU,

Note: This does not include channels dedicated to transfers between one individual processor and its most immediate memory or related equipment.

WL_i is the operand length for which TP_i was obtained, and the factor 8 normalizes S_i (measured in bytes per second) and WL (given in bits).

Note: If C_i exceeds 0.75, the formula for CE/CPU sharing direct addressable memory applies (i.e., C_i cannot exceed 0.75).

1050. TELECOMMUNICATIONS

NOTES:

A. The embargo status of components, "lasers", test and production equipment, materials and "software" therefor which are specially designed for telecommunications equipment or systems is defined in this Category.

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

1051. Equipment, Assemblies and Components

1051. a. Any type of telecommunications equipment having any of the following characteristics, functions or features:

1. Specially designed to withstand transitory electronic effects or electromagnetic pulse arising from a nuclear explosion;
2. Specially hardened to withstand gamma, neutron or ion radiation;
3. Specially designed to operate outside the temperature range from 219 K (-54°C) to 397 K (124°C);

NOTE:

1051.a.3. applies only to electronic equipment.

NOTE:

1051.a.2. and 3. do not apply to equipment on board satellites.

1051. b. "Telecommunication transmission equipment" or systems, and specially designed components and accessories therefor, having any of the following characteristics, functions or features:

NOTE:

"Telecommunication transmission equipment"

a. Categorised as follows, or combinations thereof:

1. Radio equipment (e.g., transmitters, receivers and transceivers);
2. Line terminating equipment;
3. Intermediate amplifier equipment;
4. Repeater equipment;
5. Regenerator equipment;
6. Translation encoders (transcoders);
7. Multiplex equipment (statistical mutiplex included);
8. Modulators/ demodulators (modems);
9. Transmultiplex equipment (see CCITT Rec. G701);