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September 10, 2013

Regulatory Policy Division
Bureau of Industry and Security
U.S. Department of Commerce
Room 2900B
14th Street and Pennsylvania Ave NW
Washington, DC 20230

September 3, 2013

Re: BIS-2012-0045 (RIN 0694-AF64)

Dear Sir or Madam:

On July 25, 2013, the Bureau of Industry and Security (BIS) published a Proposed Rule entitled "Revisions to the Export Administration Regulations (EAR): Control of Military Electronic Equipment and Related Items the President Determines No Longer Warrant Control Under the United States Munitions List (USML)", which item appeared at 78 FR 45026.

Avago Technologies appreciates the opportunity to comment on this proposed rule. This comment pertains to proposed ECCN subparagraphs 3A611.c.9/c.10/c.11, which we believe are overly-restrictive. We would potentially be impacted by this because we are a manufacturer of MMIC amplifiers controlled under ECCN 3A001.b.2.

The proposed new ECCNs 3A611.c.9 (37-43.5 GHz), c.10 (43.5-75 GHz) and c.11 (75-90 GHz) correspond to ECCNs 3A001.b.2.e, b.2.f and b.2.g, as summarized in the following Tables:

Importantly, 3A001.b.2.e (37-43.5 GHz) was modified and 3A001.b.2.f and 3A001.b.2.g were created very recently (all on June 20, 2013, the effective date of the 2012 Wassenaar implementation rule, 78 FR 37372). Avago believes that the intent of these modifications to 3A001.b.2 was to define a parameter space of bona fide dual-use applications. It is therefore curious and unexpected that the proposed 3A611.c controls for the frequency ranges 37-90 GHz overlap so closely with 3A001.b.2. It appears that 3A611.c.9/c.10/c.11 will supersede much or even most of what Wassenaar intended to dual-use items. It is useful to observe that this same

close overlap does not exist at frequencies <=37 GHz, because the control thresholds for output power are significantly higher for 3A611.c than for 3A001.b.2 within the corresponding frequency ranges.

	Proposed 3A611.c.9	**Old 3A001.b.2.e (prior to June 20, 2013)**	**Current 3A001.b.2.e (effective June 20, 2013)**
Frequency range	>37 GHz; <=43.5 GHz	>37 GHz; <=43.5 GHz	>37 GHz; <=43.5 GHz
Fractional Bandwidth	>10%	>10%	N/A, no longer a control parameter
Peak Saturated output power	>1 W	N/A, see "Average Output Power"	N/A, see "Average Output Power"
Average Output power	N/A	>0.25 W	>1 W
Power Added Efficiency	>=15%	N/A	N/A

	Proposed 3A611.c.10	**Current 3A001.b.2.f (effective June 20, 2013)**
Frequency range	>43.5 GHz; <=75 GHz	>43.5 GHz; <=75 GHz
Fractional Bandwidth	>10%	>10%
Peak Saturated output power	>31.62 mW (15 dBm)	N/A, see "Average Output Power"
Average Output power	N/A	>31.62 mW (15 dBm)
Power Added Efficiency	>=10%	N/A

	Proposed 3A611.c.11	**Current 3A001.b.2.g (effective June 20, 2013)**
Frequency range	>75 GHz; <=90 GHz	>75 GHz; <=90 GHz
Fractional Bandwidth	>5%	>5%
Peak Saturated output power	>10 mW (10 dBm)	N/A, see "Average Output Power"
Average Output	N/A	>10 mW (10 dBm)

power		
Power Added Efficiency	>=10%	N/A

For entry 3A001.b.2.e in particular, note that the June 20, 2013 update removed fractional bandwidth as a control parameter and relaxed the control threshold for output power from 0.25 W to 1 W.

Avago has no products that are currently uncontrolled that would be captured by the proposed 3A611.c. However, we do have products (AMMC-6442 and AMMP-6442), intended for commercial/civilian use, having performance above two of the three the proposed 3A611.c.9 thresholds (output power and power added efficiency): these devices are excluded from 3A611.c.9 only because of their small fractional bandwidth. Another device, AMGP-6445, is very close to the 3A611.c.9 levels. ***It is easy to envision future products that are only small extensions of these devices, which would be controlled by 3A611.c.9. We offer this as evidence that the proposed 3A611.c.9 is too restrictive because it is too close to actual performance of existing commercial/civilian devices.***

	Proposed 3A611.c.9	**AMMC-6442**	**AMMP-6442**	**AMGP-6445**
Frequency range	>37 GHz; <=43.5 GHz	37-40 GHz	37-40 GHz	40.5-43.5 GHz
Fractional Bandwidth	>10%	7.8%	7.8%	7.1%
Output Power	>1 W (Psat)	30 dBm/1 W (P-1dB)	30 dBm/1 W (P-1dB)	27 dBm/0.5 W (P-1dB)
Power Added Efficiency	>=15%	25% (typ)	25% (typ)	20% (typ)

Avago's greatest concern with 3A611.c.9 is that the proposed control thresholds for Power Added Efficiency and for Output Power are too low. The value of 15% PAE within the frequency range 37-43.5 GHz is easily achieved by commercial/civilian devices and therefore does not adequately differentiate commercial from military devices. The value of 1 W for Output Power in 3A611.c.9, being equal to that of 3A001.b.2.e, does not provide differentiation between those two control entries.

Accordingly, Avago proposes that 3A611.c.9 should be modified by increasing the control threshold for power added efficiency upward from 15% to at least 35% (i.e. by about a factor of

two, to align with existing commercial devices), and by increasing the control threshold for output power from >1 W to >3 W (i.e., by about a factor of three, comparable to the factor of 3.75 that is proposed for the 16-31.8 GHz frequency range [3W for 3A611.c.7 relative to 0.8 W for 3A001.b.2.c]). These modifications would provide adequate margins between existing commercial MMIC amplifiers and would also provide a reasonable allowance for improvements to the designs of these commercial amplifiers. That is, Avago proposes that 3A611.c.9 should be modified as follows:

> 3A611.c Microwave "monolithic integrated circuits" (MMIC) power amplifiers having any of the following:
>
> …
>
> c.9. Rated for operation at frequencies exceeding 37 GHz up to and including 43.5 GHz with a "fractional bandwidth" greater than 10%, and having peak saturated output power greater than ~~1 W (30 dBm)~~ **3 W (34.77 dBm)** and a power added efficiency of ~~15%~~ **35%** or greater anywhere within the operating frequency range.

Similarly, 3A611.c.10 and 3A611.c.11 should be modified by increasing the control threshold for Power Added Efficiency by about a factor of two and the Output Power by about a factor of three:

> c.10. Rated for operation at frequencies exceeding 43.5 GHz up to and including 75 GHz with a "fractional bandwidth" greater than 10%, and having peak saturated output power greater than ~~31.62 mW (15 dBm)~~ **100 mW (20 dBm)** and a power added efficiency of ~~10%~~ **25%** or greater anywhere within the operating frequency range.
>
> c.11. Rated for operation at frequencies exceeding 75 GHz up to and including 90 GHz with a "fractional bandwidth" greater than 5%, and having peak saturated output power greater than ~~10 mW (10 dBm)~~ **20 mW (13 dBm)** and a power added efficiency of ~~10%~~ **20%** or greater anywhere within the operating frequency range.

Again, Avago appreciates the opportunity to comment on this Proposed Rule.

Please contact me if you have questions.

Sincerely yours,

Alice Tsai
Avago Technologies