

UNITED STATES COURT OF INTERNATIONAL TRADE

ENI TECHNOLOGY INC.,

Plaintiff,

v.

UNITED STATES,

Defendant.

Before: Pogue, Judge

Consol. Court No. 05-00170

OPINION

[Plaintiff's Motion for Summary Judgment is granted in part. Defendant's Motion for Summary Judgment is denied.]

Dated: September 1, 2009

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Tony West, Assistant Attorney General; Barbara S. Williams, Attorney in Charge, International Trade Field Office, Commercial Litigation Branch, Civil Division, U.S. Department of Justice (Aimee Lee); Yelena Slepak, Office of Assistant Chief Counsel, International Trade Litigation, U.S. Customs and Border Protection for the Defendant.

Pogue, Judge: This consolidated action involves the proper classification of merchandise, identified as "radio frequency generators" ("RF Generators" or "merchandise"), imported by Plaintiff ENI Technology Inc. ("ENI"), for use, *inter alia*, in

semiconductor manufacturing processes.¹ ENI challenges the United States Customs and Border Protection's ("Customs" or "Government") classification of the merchandise as "static converters," with a 1.5% *ad valorem* duty. ENI claims that its merchandise is properly classified as "machines [used] for processing semiconductor materials," which are duty free.

Before the Court are cross motions for summary judgment pursuant to USCIT Rule 56. The Court has exclusive jurisdiction pursuant to 28 U.S.C. § 1581(a) (2000).²

Because ENI's merchandise is principally used as parts of plasma³ processing systems, which are machines used for semiconductor manufacturing, and because the merchandise does not

¹ As described by ENI expert Stephen Fairfax, semiconductor manufacturing is:

the process of taking materials, silicon or other materials, that don't conduct electricity very well and altering their conducting properties in very precise and somewhat complicated ways to produce useful electrical circuits, such as computers or memories.

(Pl.'s Mem. of Law in Supp. of Pl.'s Mot. for Summ. J. ("Pl.'s Mem."), Ex. 4, Fairfax Dep. at 81.)

² 28 U.S.C. § 1581(a) (2000) provides: "The Court of International Trade shall have exclusive jurisdiction of any civil action commenced to contest the denial of a protest, in whole or in part, under section 515 of the Tariff Act of 1930 [19 U.S.C. § 1515]." Unless otherwise indicated, further citations to Title 28 of the U.S. Code are from the 2000 edition.

³ See Illustrated Dictionary of Electronics 536 (Stan Gibilisco ed., 8th ed., McGraw-Hill 2001) (plasma is "[a] usually high-temperature gas that is so highly ionized that it is electrically conductive and susceptible to magnetic fields").

meet the definition of "static converters," the court grants ENI's motion as to "principal" use. However, because the record, as currently before the court, does not resolve the subsidiary issue of the type of plasma processing in which ENI's imports are used, (see Def.'s Mem. of Law in Opp'n to Pl.'s Mot. for Summ. J. & in Supp. of Def.'s Cross-Mot. ("Def.'s Mem."), Ex. A, Pl.'s Resp. to Def.'s First Interrogs. & Req. for Produc. of Docs. ("Interrogs.") at 1-2 ("The semiconductor processing systems include plasma-assisted etch systems, which remove materials ('ETCH'); plasma-assisted chemical vapor deposition systems, which deposit materials from a gaseous source ('CVD'); and plasma-assisted physical vapor deposition systems, which deposit materials from a solid source ('PVD')"), the court otherwise denies both motions, directing the parties to address this subsidiary issue.

For ease of reference, the court opinion is organized in accordance with the following **TABLE OF CONTENTS**:

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BACKGROUND

At issue here are three entries⁴ of ENI's⁵ RF Generators,⁶

⁴ The merchandise, imported through the Port of Buffalo, New York, entered under entry number 336-2732463-8 (entered February 9, 2004, liquidated August 27, 2004), number 336-4092963-6 (entered December 9, 2002, liquidated September 10, 2004) and number 336-4092697-0 (entered November 22, 2002, liquidated September 10, 2004). (Def.'s Mem. 1 n.1.)

⁵ ENI is now known as MKS Instruments, Inc. However, for consistency, the court will refer to the importer by its former name. ENI describes itself as a "producer and distributor of instruments, components and subsystems for advanced manufacturing processes," particularly for "semiconductor manufacturing." (Pl.'s Mem. 3.)

⁶ "RF" connotes "radio frequency," that is, frequency in the radio spectrum - 10 KHz to 300,000 MHz. See IEEE 100: The Authoritative Dictionary of IEEE Standards Terms ("IEEE 100") 912, 914 (7th ed. 2000); Illustrated Dictionary of Electronics,

imported between 2002 and 2004. As noted above, upon liquidation, Customs classified the RF Generators as "static converters" pursuant to the Harmonized Tariff Schedule of the United States ("HTSUS") Subheading 8504.40.95 (2002) and HTSUS Subheading 8504.40.95 (2004).⁷ ENI protested the classification, and Customs denied ENI's protest on February 11, 2005, applying HQ 966466 (Oct. 24, 2003), available at 2003 WL 23303566. After paying the required duties, charges and exactions on its RF Generators, ENI filed suit here.

In its complaint, ENI asserts that its RF Generators are more

supra note 3, 577, 580. ("Hz," "MHz," and "KHz" stand for hertz, megahertz, kilohertz, which are units of frequency.) The Government refers to the subject machines as "RF Generators"; ENI originally referred to them as such. (See Pl.'s Compl. at 1; Pl.'s Mem., Ex. 4, Fairfax Dep. at 43-44.) However, ENI's marketing materials and ENI's more recent filings identify the subject merchandise as "RF plasma generators." (Pl.'s Mem., Ex. 1; Pl.'s Resp. to Def.'s Cross Mot. for Summ. J. ("Pl.'s Resp."), Ex. 2, Stenglein Aff. ¶¶ 4-13; Pl.'s Mem., Ex. 2, Holber Aff. *passim*; Pl.'s Mot. for Summ. J.; Pl.'s Mem., Ex. 3, Fairfax Aff. ¶¶ 15-19.) The Government objects to the latter characterization. The court makes no finding on this issue, but, for the purposes of this opinion, refers to the machines as "RF Generators" consistent with ENI's complaint.

⁷ Subheading 8504.40.95 covers:

Electrical transformers, static converters (for example, rectifiers) and inductors; . . .

Static converters: . . .

Other

Machines liquidated under this Subheading are subject to an *ad valorem* duty of 1.5%. Further references to the HTSUS, unless otherwise indicated, are to the 2004 edition, as the relevant HTSUS provisions have remained identical from 2002 through 2004.

properly classified either as machines for the processing of semiconductor materials, under HTSUS 8479.89.84,⁸ or physical vapor deposition apparatus, under HTSUS 8543.89.10.⁹ Accordingly, ENI's complaint requests that the court direct the appropriate Customs officer to re-liquidate the entries, and refund the excess duties collected, with lawful interest.

⁸ Subheading 8479.89.84 extends to:

Machines and mechanical appliances having individual functions, not specified or included elsewhere in this chapter; parts thereof[]:

 Other machines and mechanical appliances[]:

 Other[]:

 Other:

 Machines for processing of semiconductor materials; machines for production and assembly of diodes, transistors and similar semiconductor devices and electronic integrated circuits[]

Machines liquidated under this Subheading are free of duty.

⁹ Subheading 8543.89.10 covers:

Electrical machines and apparatus, having individual functions, not specified or included elsewhere in this chapter; parts thereof:

 Other machines and apparatus: . . .

 Physical vapor deposition apparatus:

 Other:

 Machines for processing of semiconductor materials; machines for production of diodes, transistors and similar semiconductor devices and electronic integrated circuits.

Machines liquidated under this Subheading are also free of duty.

Following discovery, ENI moved for summary judgment,¹⁰ arguing that its RF Generators should be classified under HTSUS 8479.89.84.¹¹ The Government has cross-moved for summary judgment, defending the original classification, "static converters," and, in the alternative, proffering HTSUS 8543.89.96 ("Electrical machines and apparatus . . . Other" - a "basket" provision¹²).

Undisputed Facts

The following undisputed facts are before the court.

I. The RF Generator

The RF Generators are machines that generate power at a fixed radio frequency.¹³ They are powered by electricity, i.e., they

¹⁰ ENI supports its motion with an affidavit from William M. Holber, former Senior Director of Advanced Technology at MKS Instruments (formerly ENI); two affidavits from William Steinglein, Director of Product Engineering for MKS Instruments (formerly ENI); two affidavits and a deposition from Stephen A. Fairfax, owner and president of MTechnology, Inc., a consulting engineering firm; and ENI specification sheets and marketing materials.

¹¹ At oral argument, ENI abandoned its requested alternative classification under HTSUS 8525.10.90.25 ("Transmission apparatus for radiotelephony").

¹² "'Basket' or residual provisions of HTSUS Headings . . . are intended as a broad catch-all to encompass the classification of articles for which there is not a more specifically applicable subheading." Rollerblade, Inc. v. United States, 282 F.3d 1349, 1354 (Fed. Cir. 2002) (quoting EM Indus., Inc. v. United States, 22 CIT 156, 165, 999 F. Supp. 1473, 1480 (1998)).

¹³ The entries at issue contain five different models from three different product lines of ENI-imported RF Generators. The imported RF Generators include ENI's model number 1B-10013-10 (from its "Spectrum" series, with an output of 10 kW at 13.56 MHz); model numbers ACG-6B-01 and ACG-6B-02 (from its "ACG"

receive alternating current ("AC")¹⁴ at 60 Hz from the main U.S. electric grid¹⁵ ("mains power"), from which they generate or produce power at radio frequencies. To be exact, the RF Generator creates RF current at 13.56 MHz¹⁶ ranging from 300 to 10,000 watts.¹⁷ It is undisputed that the output of RF Generator is RF current,¹⁸ in other

series, with an output of 600 W at 13.56 MHz); and model numbers GHW12Z13DF2N01 and GHW25A13DF3N01 (from its "GHW" series, with an output of 1.25 kW at 13.56 MHz and 2.5 kW at 13.56 MHz, respectively). (Pl.'s Mem., Ex. 1, at 8, 11-19; Pl.'s Mem. 3 & ns.1-3; Pl.'s Mem., Ex. 4, Fairfax Dep. at 40-42; Pl.'s Resp., Ex. 2, Stenglein Aff. ¶¶ 10-11; Pl.'s Mem., Ex. 3, Fairfax Aff. ¶ 17.) "W" and "kW" stand for watts and kilowatts, respectively, which are units of electric power.

¹⁴ "Alternating current" identifies a current that alternates in direction of flow. See Concise Encyclopedia of Engineering 31 (2004); Illustrated Dictionary of Electronics, *supra* note 3, 22; IEEE 100, *supra* note 6, 28. (See also Pl.'s Mem., Ex. 4, Fairfax Dep. at 21-22 ("[C]urrent is the flow of charged particles, and alternating current means that the flow of the charge periodically reverses"), 32; Pl.'s Mem., Ex. 3, Fairfax Aff. ¶¶ 4-5.)

¹⁵ (See Pl.'s Mem., Ex. 2, Holber Aff. ¶ 7; Pl.'s Mem., Ex. 4, Fairfax Dep. at 42.)

¹⁶ (See Pl.'s Mem., Ex. 2, Holber Aff. ¶ 7; Pl.'s Mem., Ex. 4, Fairfax Dep. at 63; Pl.'s Mem., Ex. 3, Fairfax Aff. ¶ 18(g).) "Factory-set frequencies cannot be reset by purchaser/user." (Pl.'s Mem., Ex. 2, Holber Aff. ¶ 13(c).)

¹⁷ (See Pl.'s Mem., Ex. 2, Holber Aff. ¶ 8; Pl.'s Resp., Ex. 2, Stenglein Aff. ¶ 11.)

¹⁸ (See Pl.'s Mem., Ex. 4, Fairfax Dep. at 35, 39; Pl.'s Resp., Ex. 2, Stenglein Aff. ¶ 6.)

The parties generally describe the RF Generator's output as "RF power." "Power" generally indicates "[a]ny form of energy or force available for application to work" or "[m]otive power or heat . . . obtained from an electrical supply." XII Oxford English Dictionary 261 (2d ed. 1989). "Radio-frequency power" is defined as "alternating current power at radio frequencies."

words, alternating current in the radio frequency range, at a certain wattage.¹⁹

In the process of making RF current, RF Generators convert the AC to direct current ("DC") using a rectifier or similar device.²⁰ The RF Generator also regulates the DC "to keep the voltage very uniform" in order to "hold the RF power constant." (Pl.'s Mem., Ex. 4, Fairfax Dep. at 60.) Subsequently, the various RF Generator models utilize either a narrow band RF crystal oscillator or a direct digital synthesis module ("DDS") to generate RF signal.²¹ The oscillator or DDS "shape[s] the wave form," that is, it

Illustrated Dictionary of Electronics, *supra* note 3, 578. (See also Pl.'s Mem., Ex. 3, Fairfax Aff. ¶ 9 ("AC power' refers to voltage (pressure of flow) x current (mass of flow) at AC frequencies (not over 400 Hz)." (emphasis omitted)); Pl.'s Mem., Ex. 4, Fairfax Dep. at 38 ("RF is for radio frequency. The intent of this generator is to produce power at radio frequencies and to transmit that power to the load.").)

¹⁹ The parties debate whether the "RF current" can technically be considered "AC." However, this disagreement does not create issues of material fact for trial.

²⁰ (See Def.'s Mem., Ex. A, Interrogs. ¶ 4(a); Pl.'s Mem., Ex. 2, Holber Aff. ¶ 12; Pl.'s Mem., Ex. 4, Fairfax Dep. at 42, 47; Pl.'s Resp., Ex. 2, Stenglein Aff. ¶ 12.)

A "rectifier" is a "nonlinear circuit component that allows more current to flow in one direction than in the other" that is "used primarily for the conversion of alternating current (ac) to direct current (dc)." Concise Encyclopedia of Engineering, *supra* note 14, 602; see also IEEE 100, *supra* note 6, 939 (a "rectifier" is a "converter for conversion from ac [alternating current] to dc [direct current]").

²¹ (See *id.* at 49-50, 52-53; Pl.'s Mem., Ex. 2, Holber Aff. ¶ 12; Pl.'s Resp., Ex. 2, Stenglein Aff. ¶ 12(b).)

generates the desired 13.56 MHz frequency.²²

End users purchase RF Generators to obtain "not just the [RF] frequency but [also] . . . hundreds or thousands of watts of power at that frequency." (Pl.'s Mem., Ex. 4, Fairfax Dep. at 64.) To serve this purpose, the RF signal is transferred from the oscillator/DDS through a "variable attenuator"²³ to either an amplifier or an inverter, depending on the model.²⁴ The variable attenuator, which reduces the amplitude or magnitude of the signal, is used so as to "control the final amount of power that is delivered to the load^[25]." (Pl.'s Mem., Ex. 4, Fairfax Dep. at 57.)

The amplifier or inverter receives the signal and increases its wattage and current levels to desired specifications.²⁶ Amplifiers and inverters operate in different ways - the amplifier matches and amplifies an incoming signal,²⁷ whereas an inverter

²² (See Pl.'s Mem., Ex. 2, Holber Aff. ¶ 12; Pl.'s Mem., Ex. 4, Fairfax Dep. at 52-53.)

²³ (See Pl.'s Mem., Ex. 4, Fairfax Dep. at 56.) Some, though not all, of the models contain a variable attenuator. (See id. at 60-61.)

²⁴ (See id. at 45-46, 48-49, 51; Pl.'s Mem., Ex. 2, Holber Aff. ¶ 12.)

²⁵ "[E]lectrical engineers use the term 'load' to denote the ultimate use of the electric power." (Pl.'s Mem., Ex. 4, Fairfax Dep. at 67-68.)

²⁶ (See Pl.'s Mem., Ex. 2, Holber Aff. ¶ 12; Pl.'s Resp., Ex. 2, Stenglein Aff. ¶ 12(c).)

²⁷ (See Pl.'s Mem., Ex. 4, Fairfax Dep. at 48-49, 56.)

"converts DC to some form of alternating current" and makes only one type of waveform whose "design is fixed by the inverter" - but both devices perform this "same function" in the RF Generator. (Pl.'s Mem., Ex. 4, Fairfax Dep. at 48, 51.)

In essence, according to ENI's evidence, the AC input at 60 Hz is converted into DC; that DC then facilitates the creation of or is converted into (alternating) RF current.²⁸ Notably, the RF Generator converts AC to RF in two steps rather than one. (Id. at 58-59.) According to Fairfax, RF is created in two steps because to do so is "most practical and most economical." (Id.)²⁹

Once created, the RF Generator's alternating current at radio frequency 13.56 MHz is transmitted through a 50-ohm coaxial cable. (Pl.'s Stmt. of Material Facts Not in Issue ("Pl.'s Stmt.") ¶ 9.)³⁰ It is this output which then has utility within the manufacturing process.

²⁸ The Government does not agree that the DC "facilitates the creation of" RF current, but contends that the DC "is converted into" RF current. The court need not resolve this disputed factual issue.

²⁹ The nature of this "conversion" step in the RF Generators' operation is contested, although this factual matter is not germane to the motions before the court.

³⁰ (See Pl.'s Mem., Ex. 4, Fairfax Report at 8; Pl.'s Mem., Ex. 2, Holber Aff. ¶¶ 12, 13(b); Pl.'s Resp., Ex. 2, Stenglein Aff. ¶ 6; Pl.'s Mem., Ex. 4, Fairfax Dep. at 39.)

II. The Plasma Processing System

The RF Generator can be used in various types of plasma processing, e.g., production of semiconductor devices and integrated circuits through PVD, CVD and etch plasma processing.³¹

The plasma processing system or "tool"³² is comprised of a set of room-sized machines, each segregated in its own housing and performing its own function, which together form the plasma processing system.³³ (See Def.'s Mem., Ex. A, Interrogs. ¶¶ 2-4.) The RF Generator operates with these machines.³⁴ (See id.)

When used as a part of a plasma processing system, the RF

³¹ (See Pl.'s Mem. 8; Def.'s Mem., Ex. A, Interrogs. ¶ 2(a); Pl.'s Mem., Ex. 4, Fairfax Dep. at 82.) ENI has not presented evidence as to what percentage of its RF Generators are used or intended to be used, respectively, in CVD, PVD or plasma etch processing of semiconductors.

³² A "tool" is "a semiconductor industry term for a particular machine that does some sort of step in the process of making an integrated circuit." (Pl.'s Mem., Ex. 4, Fairfax Dep. at 78.)

³³ (Pl.'s Mem. 7; id., Ex. 4, Fairfax Dep. at 83 ("The plasma chamber is also part of the tool, but the tool itself is usually a very large, very complicated machine that will have a lot of other stuff besides the RF Generator and the plasma chamber.").)

³⁴ Other machines in the tool include the "plasma chamber, electrostatic chuck, RF matching network, chemical/gas transmission pumps and valves, effluent handling devices, material handlers, and system controller." (Pl.'s Resp., Ex. 2, Stenglein Aff. ¶ 5; see also Pl.'s Mem., Ex. 1 at 5 (diagram representing the RF Generator as part of the "complete RF delivery subsystem" - including a "serial interface," a "plasma generator," a "matching network," a "plasma probe," and a "plasma chamber"); Pl.'s Mem., Ex. 4, Fairfax Dep. at 72-73.)

Generator is the only source of RF power to the plasma chamber.³⁵ As such, RF Generators, in providing RF current at 13.56 MHz, are integral to the plasma processing system.³⁶ From the RF Generator, the RF output flows through the coaxial cable to a separate machine called an "impedance^[37] matching network" that "matches the output impedance of the RF [G]enerator to that of the plasma processing chamber."³⁸ The output then flows from the impedance matching network to an antenna located within the sealed plasma chamber containing a gas.³⁹ The antenna is also not part of the RF

³⁵ (See Pl.'s Resp., Ex. 2, Stenglein Aff. at 2.)

³⁶ (Def.'s Mem., Ex. A, Interrogs. ¶ 5(a); Pl.'s Mem., Ex. 2, Holber Aff. ¶ 9; Pl.'s Mem., Ex. 4, Fairfax Dep. at 132-33.)

³⁷ "Impedance" is defined as "[t]he overall opposition to an electric current, arising from the combined effect of resistance R and reactance X and measured by the ratio of the e.m.f. to the resulting current" VII Oxford English Dictionary, *supra* note 18, 704; see also Illustrated Dictionary of Electronics, *supra* note 3, 356 (impedance is the "total opposition offered by a circuit or device to the flow of alternating current"). "Impedance matching" involves "[t]he insertion of a suitable transformer or network between circuits having different impedances, for the purpose of optimizing power transfer." Illustrated Dictionary of Electronics, *supra* note 3, 356. Thus, an "impedance-matching network" is a "network of discrete components, often adjustable, that is used to match a circuit having a certain impedance to a circuit having a different impedance." Id.

³⁸ (Pl.'s Mem., Ex. 2, Holber Aff. ¶ 10; see also Pl.'s Resp., Ex. 2, Stenglein Aff. ¶ 6; Pl.'s Mem., Ex. 4, Fairfax Dep. at 57-58.)

³⁹ (Pl.'s Mem., Ex. 2, Holber Aff. ¶ 10; Pl.'s Resp., Ex. 2, Stenglein Aff. ¶¶ 6-7.)

Generator.⁴⁰ Rather, the antenna receives the RF Generator's output and emits RF electromagnetic waves into the chamber.⁴¹ The waves transform the gas into an ionized gas or "plasma."⁴² This plasma, in turn, causes materials to be deposited on or patterns etched into substrate, i.e., silicon "wafers."⁴³

III. ENI's Marketing of the RF Generator

ENI has presented evidence that it markets its RF Generators primarily for use in plasma processing or thin film processing systems,⁴⁴ including the processing of semiconductors or integrated circuits.⁴⁵ ENI does not advertise its products as "static converters."⁴⁶ However, ENI's marketing materials, as presented to the court, do mention uses for the RF Generators apart from semiconductor processing, such as other thin film processing

⁴⁰ (Def.'s Stmt. of Undisputed Material Facts ("Def.'s Stmt.") ¶ 11.)

⁴¹ (Pl.'s Stmt. ¶ 9; Pl.'s Resp., Ex. 2, Stenglein Aff. ¶ 7.)

⁴² (Pl.'s Stmt. ¶ 11; Pl.'s Resp., Ex. 1, Fairfax Aff. ¶ 13.)

⁴³ (Pl.'s Stmt. ¶ 12.)

⁴⁴ (See Pl.'s Mem., Ex. 4, Fairfax Report at 7 ("[ENI] markets and sells the RF [G]enerators at issue specifically for plasma processing applications."); Pl.'s Mem., Ex. 1 at 3, 4, 8, 9.)

⁴⁵ (See Pl.'s Mem., Ex. 1 at 4, 8.)

⁴⁶ (See Pl.'s Resp., Ex. 1, Fairfax Aff. ¶ 14. See also Pl.'s Mem., Ex. 1.)

applications (i.e., manufacture of flat panel displays, optical media and industrial coatings) and industrial uses.⁴⁷

IV. Use of the RF Generator

Despite the potential for other industrial uses, ENI has presented evidence that its RF Generators are principally used by its consumers in plasma processing applications.⁴⁸ ENI also offers evidence to show that RF Generators are primarily used specifically for plasma processing of semiconductors.⁴⁹ One study cited by ENI states that, on average in 2002 through 2004, over 80 percent of RF Generators sold in the United States were used for semiconductor manufacturing. (See Pl.'s Mem., Ex. 2 at Ex. B.) According to ENI's proffered evidence, most end users of RF Generators are indeed in the business of manufacturing semiconductors.⁵⁰ However, as noted above, ENI's evidence also indicates that the RF Generators are used for other applications aside from semiconductor processing, again, including thin film processing applications to manufacture or package products other than semiconductors.⁵¹

⁴⁷ (See Pl.'s Mem., Ex. 1 at 4, 8.)

⁴⁸ (See Pl.'s Mem., Ex. 4, Fairfax Dep. at 43, 70-71, 126; Pl.'s Resp., Ex. 2, Stenglein Aff. ¶ 5; Pl.'s Mem., Ex. 2, Holber Aff. ¶¶ 10-11.)

⁴⁹ (See, e.g., Pl.'s Mem., Ex. 4, Fairfax Report at 4; Pl.'s Mem., Ex. 2, Holber Aff. ¶¶ 10-11, 14.)

⁵⁰ (See Pl.'s Mem., Ex. 2, Holber Aff. ¶ 14; Pl.'s Mem., Ex. 4, Fairfax Report at 6.)

⁵¹ (See Pl.'s Mem., Ex. 4, Fairfax Dep. at 78-79.)

V. Design of the RF Generator

Moreover, ENI presents evidence that the principal design purpose of its RF Generator is to produce RF current or RF power⁵² for plasma processing,⁵³ and, more specifically, to manufacture semiconductor devices.⁵⁴ In support, ENI further notes that this design purpose is reflected in the subject RF Generators' particular characteristics that distinguish them from static converters and other RF Generators.⁵⁵ For example, the subject RF Generators:

- comply with specific safety standards of the semiconductor manufacturing industry, namely SEMI Standards F-47 or S2-02000;⁵⁶
- emit output factory-set at 13.56 MHz for use in plasma processing⁵⁷ and, more specifically, plasma processing of

⁵² (See Pl.'s Mem., Ex. 4, Fairfax Dep. at 64-65; Pl.'s Mem., Ex. 2, Holber Aff. ¶ 5; see also Pl.'s Resp., Ex. 2, Stenglein Aff. ¶ 12(g).)

⁵³ (Pl.'s Mem., Ex. 4, Fairfax Report at 6.)

⁵⁴ (See Pl.'s Mem., Ex. 2, Holber Aff. at 2; Pl.'s Mem., Ex. 4, Fairfax Dep. at 18, 64-65, 75.)

⁵⁵ (See Pl.'s Mem., Ex. 4, Fairfax Dep. at 77; Pl.'s Mem., Ex. 2, Holber Aff. ¶¶ 13, 17; Pl.'s Mem., Ex. 4, Fairfax Report at 8-9.)

⁵⁶ (See Pl.'s Mem., Ex. 2, Holber Aff. ¶ 13(e); Pl.'s Ex. to Pl.'s Resp. to the Court's Questions in its Letter Dated May 13, 2009 ("Pl.'s Resp. to Court") Ex. 1, Stenglein Aff. ¶¶ 8-9.)

⁵⁷ (See Pl.'s Mem., Ex. 2, Holber Aff. ¶ 13(c); Pl.'s Mem., Ex. 3, Fairfax Aff. ¶ 18(g); Pl.'s Resp., Ex. 2, Stenglein Aff. ¶

semiconductors;⁵⁸

- control and monitor this output to keep it constant and uniform;⁵⁹
- are designed to interact with remotely-operated user computers;⁶⁰
- utilize a specified language or protocol;⁶¹
- are designed to interact with and bolt into the tool;⁶²
- can measure "reflected power"⁶³ (which is particularly a problem when using RF current to stimulate plasma);⁶⁴
- are designed to manage the fluctuating impedance of plasma and

11.)

⁵⁸ (Def.'s Mem., Ex. A, Interrogs. ¶ 4(a).)

⁵⁹ (See Pl.'s Mem., Ex. 4, Fairfax Dep. at 76; Pl.'s Resp., Ex. 2, Stenglein Aff. ¶ 12(g); Pl.'s Mem., Ex. 2, Holber Aff. ¶ 12; Pl.'s Mem., Ex. 3, Fairfax Aff. ¶ 18(f); Def.'s Mem., Ex. A, Interrogs. ¶ 4(a).)

⁶⁰ (See Pl.'s Mem., Ex. 2, Holber Aff. ¶ 13(d); Pl.'s Mem., Ex. 3, Fairfax Aff. ¶ 18(h); Pl.'s Resp., Ex. 2, Stenglein Aff. ¶ 12(e).)

⁶¹ (See Pl.'s Mem., Ex. 4, Fairfax Dep. at 75-76; Pl.'s Resp., Ex. 2, Stenglein Aff. ¶ 8(b).)

⁶² (See Pl.'s Resp., Ex. 2, Stenglein Aff. ¶ 8(a); Pl.'s Mem., Ex. 4, Fairfax Dep. at 78.)

⁶³ "Reflected power," in the context of "a transmission line not perfectly matched to a load at the feed point," is "an expression of the amount of electromagnetic field reflected from the feed point rather than absorbed by the load." Illustrated Dictionary of Electronics, *supra* note 3, 589.

⁶⁴ (Pl.'s Mem., Ex. 4, Fairfax Report at 8; Pl.'s Mem., Ex. 4, Fairfax Dep. at 66-67.)

work with ENI-manufactured impedance matching networks to protect against reflected power;⁶⁵ and

- come with output connectors for 50-ohm-impedance coaxial cables.⁶⁶

VI. The RF Generator as Known in the Trade

ENI also presents expert evidence that, in the trade, RF Generators are primarily described with reference to their application in semiconductor and integrated circuit processing.⁶⁷ According to ENI's evidence, the RF Generator could be considered a RF "power supply,"⁶⁸ a "machine,"⁶⁹ an "electrical machine"⁷⁰ or an "electrical appliance."⁷¹ However, ENI's proffered evidence disputes that, in the electrical engineering trade, the RF

⁶⁵ (See Pl.'s Mem., Ex. 2, Holber Aff. at ¶¶ 13(f), 16; Pl.'s Mem., Ex. 4, Fairfax Dep. at 77.) However, according to Fairfax, impedance matching networks are generally used with all RF Generators, regardless of whether they are being used to manufacture semiconductors. (See Pl.'s Mem., Ex. 4, Fairfax Dep. at 116-17.)

⁶⁶ (See Pl.'s Mem., Ex. 2, Holber Aff. ¶ 12; Pl.'s Mem., Ex. 3, Fairfax Aff. ¶ 14; Pl.'s Mem., Ex. 4, Fairfax Report at 8; Pl.'s Resp., Ex. 2, Stenglein Aff. ¶ 12(f).)

⁶⁷ (See Pl.'s Mem., Ex. 2, Holber Aff. ¶ 18.)

⁶⁸ (Pl.'s Mem., Ex. 4, Fairfax Dep. at 79, 87.) However, the RF Generator is not the only power source of electrical energy to ENI's plasma processing system. (See id. at 125-26, 132.)

⁶⁹ (See id. at 85.)

⁷⁰ (See id. at 86-87; Def.'s Stmt. ¶ 3.)

⁷¹ (See Pl.'s Mem., Ex. 4, Fairfax Dep. at 86.)

Generators themselves constitute "conductors,"⁷² "current regulators,"⁷³ "chemical, vapor or deposition apparatus"⁷⁴ or "high tension generators."⁷⁵

ENI also presents evidence that RF Generators are not known in the trade as "alternating current converters [and/or] cycloconverters."⁷⁶ Alternating current converters or cycloconverters, according to Fairfax, are viewed by the engineering community as special devices effecting the conversion from alternating current at one frequency to alternating current at another frequency, without the intervening step of direct current conversion.⁷⁷ Fairfax further maintains that these machines only

⁷² (See id. at 40.)

⁷³ (Id. at 91-92.)

⁷⁴ (Id. at 86.)

⁷⁵ (See id. at 97.)

⁷⁶ (Id. at 93.) ENI's expert identifies alternating current converters and cycloconverters as two terms identifying the same machine. (See id. at 94; Pl.'s Resp., Ex. 1, Fairfax Aff. ¶ 6.) Fairfax cites electrical engineering authorities. See IEEE 100, *supra* note 6, 265 ("cycloconverter[:] [a] converter using controlled rectifier or transistor devices that has the capability of adjusting the frequency and proportional voltage of the output waveform to provide speed control of motors."); Keith H. Sueker, Power Electronics Design: A Practitioner's Guide 220 (Newnes 2005) (cycloconverters "are a special case of motor drives"; "[t]he only serious barrier to the application of cycloconverters is that the output frequency must be less than half of the input frequency to avoid asymmetry of output voltage waveforms.").

⁷⁷ (Pl.'s Mem., Ex. 4, Fairfax Dep. at 93-94, 98-99, 109; Pl.'s Resp., Ex. 1, Fairfax Aff. ¶ 6.)

involve conversion of alternating current in the "mains" frequency range.⁷⁸

Finally, ENI presents evidence, and the Government agrees, that RF Generators are not known in the electrical engineering industry as "static converters."⁷⁹ Thus, this particular fact is not at issue here.

STANDARD OF REVIEW

The court's review of Customs' classification decisions is bifurcated. While "[t]he proper scope and meaning of a tariff classification term is a question of law[,] . . . determining whether the goods at issue fall within a particular tariff term as properly construed is a question of fact." Franklin v. United States, 289 F.3d 753, 757 (Fed. Cir. 2002) (citations omitted). On questions of law, a Customs' classification decision is subject to *de novo* review as to the meaning of the tariff provision, pursuant to 28 U.S.C. § 2640, but may be accorded a "respect proportional to its 'power to persuade.'" United States v. Mead Corp., 533 U.S. 218, 235 (2001) (quoting Skidmore v. Swift & Co., 323 U.S. 134, 140 (1944)).

⁷⁸ (Pl.'s Resp., Ex. 1, Fairfax Aff. ¶ 8.)

⁷⁹ (See Def.'s Reply Mem. to Pl.'s Resp. to Def.'s Cross Mot. ("Def.'s Reply") 6 ("[The Government] do[es] not dispute that the RF Generator is not known in the trade as a static converter."); see also Pl.'s Mem., Ex. 4, Fairfax Report at 9-10; Pl.'s Mem., Ex. 3, Fairfax Aff. ¶¶ 8-14; Pl.'s Resp., Ex. 1, Fairfax Aff. ¶¶ 5, 12-14.)

In interpreting classification terms contained in the HTSUS, the General Rules of Interpretation ("GRI") to the HTSUS direct the court's *de novo* review. Specifically, GRI 1 states:

The table of contents, alphabetical index, and titles of sections, chapters and sub-chapters are provided for ease of reference only; for legal purposes, classification shall be determined according to the terms of the headings and any relative section or chapter notes and, provided such headings or notes do not otherwise require, according to the following provisions

This rule "is intended to make it quite clear that the terms of the headings and any relative Section or Chapter Notes are paramount, i.e., they are the first consideration in determining classification." 1 World Customs Org., Harmonized Commodity Description & Coding Sys., Explanatory Notes 1 (3d ed. 2002) ("Explanatory Notes").⁸⁰ Thus, interpretation of tariff headings, and the court's analysis, originate in the headings, subheadings, section notes and chapter notes of the relevant parts of the HTSUS, in this case, Section XVI including Chapters 84 and 85.

On factual issues, summary judgment is only appropriate "if the pleadings, discovery and disclosure materials on file, and any affidavits show that there is no genuine issue as to any material fact and that the movant is entitled to judgment as a matter of law." USCIT R. 56(c) (emphasis added). Material issues only arise

⁸⁰ The Explanatory Notes "do not constitute controlling legislative history but nonetheless are intended to clarify the scope of [the] HTSUS [] and to offer guidance" in its interpretation. Mita Copystar America v. United States, 21 F.3d 1079, 1082 (1994).

concerning "facts that might affect the outcome of the suit under the governing law." Anderson v. Liberty Lobby, Inc., 477 U.S. 242, 248 (1986). Consequently, in classification cases, genuine issues of material fact only arise when there is a dispute over the use, characteristics, or properties of the merchandise being classified, see Brother Int'l Corp. v. United States, 26 CIT 867, 869, 248 F. Supp. 2d 1224, 1226 (2002), or where commercial meaning is in question. See Russell Stadelman & Co. v. United States, 242 F.3d 1044, 1048 (Fed. Cir. 2001).

DISCUSSION

I. The RF Generator as a Heading 8466 "Part" or "Accessory"

ENI's main contention is that its RF Generators are parts of a plasma processing system that manufactures semiconductors and integrated circuits. The controlling section note, HTSUS Section XVI Note 2, instructs that "parts of machines (not being parts of the articles of heading 8484, 8544, 8545, 8546 or 8547)^[81] are to be classified according to the following rules":

(a) Parts which are goods included in any of the headings of chapter 84 or 85 (other than headings 8409, 8431, 8448, 8466, 8473, 8485, 8503, 8522, 8529, 8538 and 8548) are in all cases to be classified in their respective headings;

(b) Other parts, if suitable for use solely or principally with a particular kind of machine, or with a

⁸¹ Headings 8484 (gaskets), 8544 (insulated wire), 8545 (articles of graphite or other carbon), 8546 (electric insulators) and 8547 (insulating fittings for electrical machines) are inapplicable to the subject merchandise.

number of machines of the same heading (including a machine of heading 8479 or 8543) are to be classified with the machines of that kind or in heading 8409, 8431, 8448, 8466, 8473, 8503, 8522, 8529 or 8538 as appropriate. However, parts which are equally suitable for use principally with the goods of headings 8517 and 8525 to 8528 are to be classified in heading 8517;

(c) All other parts are to be classified in heading 8409, 8431, 8448, 8466, 8473, 8503, 8522, 8529 or 8538 as appropriate or, failing that, in heading 8485 or 8548.

Thus, Note 2(b) establishes that parts are to be classified with the goods with which they are principally used unless such parts have a particular or respective heading as specified by Note 2(a), except for the headings listed in the parentheses in Note 2(a) which are themselves "parts" provisions. These "parts" headings are specifically excluded from the scope of Note 2(a) by the force of the "other than" provision in the parentheses, and thus these parts are not "to be classified in their respective headings," but rather are to be classified, in accordance with 2(b), "with the machines of that kind or heading." All of these "other than" provisions are clearly inapplicable to the subject merchandise, save one - Heading 8466.⁸²

⁸² Headings 8409 (parts of spark-ignition reciprocating or rotary internal combustion piston engines or compression-ignition internal combustion piston engines), 8431 (parts of certain lifting or shoveling machinery), 8448 (auxiliary machinery for certain textile manufacturing machines), 8473 (parts for typewriters, calculators, automatic data processing machines and similar), 8485 ("[m]achinery parts, not containing electrical connectors, insulators, coils, contacts or other electrical features, and not specified or included elsewhere" in chapter 84), 8503 (parts of electric motors, generators or rotary converters), 8522 (parts of certain video or audio recording

Subheading 8466.93.85 covers

Parts and accessories suitable for use solely or principally with the machines of headings 8456 to 8465 . . . [:]

Other []: . . .

For machines of headings 8456 to 8461: . . .

Other: . . .

Other: . . .

. . . of machines of subheading 8456.91 [plasma etching systems for "dry etching patterns on semiconductor materials"]; . . . of machines of subheading 8456.99.70 [plasma etching systems for "stripping and cleaning semiconductor wafers"].

As a result, if some or all of the RF Generators imported by ENI are "suitable for use solely or principally" as parts of plasma etching systems falling in Subheadings 8456.91 or 8456.99.70, Section XVI Note 2(b) dictates that the RF Generators are to be classified in Heading 8466 "as appropriate," because Subheading 8466.93.85 includes "parts and accessories suitable for use solely or principally with" plasma etching machines as identified in Heading 8456.⁸³

devices), 8538 (parts of electrical apparatus for switching or protecting electrical circuits and similar) and 8548 ("[w]aste and scrap" of certain cells and batteries) are not involved in this case. Heading 8529, covering, among other things, parts of radio transmission apparatus under Heading 8525, likewise is inapplicable to the subject merchandise.

⁸³ The Government argues that the court's analysis should be limited to Chapter 85, as the RF Generators are "electrical in nature" and Chapter 84 only contains mechanical items "generally not electrical in nature." (Def.'s Mem. 18-19.) The Government differentiates between "mechanical" and "electrical" machines based upon language from the Chapter 84 Explanatory Notes:

Subject to the provisions of the General Explanatory Note to Section XVI, this Chapter covers all machinery and mechanical appliances, and parts thereof, not more specifically covered by Chapter 85

In general, Chapter 84 covers machinery and mechanical apparatus and Chapter 85 electrical goods. However, certain machines are specified in headings of Chapter 85 . . . while Chapter 84 on the other hand covers certain non-mechanical apparatus. . . .

It should also be noted that machinery and apparatus of a kind covered by Chapter 84 remain in this Chapter even if electric

3 Explanatory Notes 1393. While it is true that Chapter 84 does indeed "in general" cover machinery, the Explanatory Note stops short of dictating that electrical goods always fall in Chapter 85 and never fall into Chapter 84. In fact, the Explanatory Note indicates that there is some overlap in the two categories. Further, the Note is "[s]ubject to" the Section XVI Note 2(b), which, as explained above, instructs that certain parts and accessories "suitable for use solely or principally" with items in Chapter 84 should either be classified with the item or in an "appropriate" Heading for the item's parts and accessories. Finally, while it appears generally that Chapter 84 covers mechanical and Chapter 85 covers electrical goods, GRI 1 again states that "[t]he table of contents, alphabetical index, and titles of sections, chapters and sub-chapters are provided for ease of reference only"

The Government further argues that

Chapter 84 covers machines which operate by using supplied electrical power/current. But they do not produce or convert power/current. In other words, a mechanical machine may receive power from a source such as a motor, but this power merely assists in the mechanical functioning of the machine Chapter 85, on the other hand, covers machines which produce or convert power/current. . . . Here, the RF Generator[s] are classifiable in Chapter 85, and excluded from Chapter 84, because, the functioning of the RF Generator is to "produce RF power."

(Def.'s Resps. to the Court's Questions in its Letter Dated May

This analysis is not complete, however, because the HTSUS does not define "part" or "accessory." When the HTSUS does not define a tariff term, the term receives its "common and popular meaning." E.M. Chems. v. United States, 920 F.2d 910, 913 (Fed. Cir. 1990). To determine a term's common meaning, a court may consult "dictionaries, scientific authorities, and other reliable information sources." Warner-Lambert Co. v. United States, 407 F.3d 1207, 1209 (Fed. Cir. 2005). Specific definitions of "part" and "accessory" have been used. See Rollerblade, Inc. v. United States, 282 F.3d 1349, 1352-53 (Fed. Cir. 2002). In Rollerblade, the Federal Circuit determined that "dictionary definitions indicate that an 'accessory' must bear a direct relationship to the primary article that it accessorizes." Id. at 1352. In other words, the court noted, the "accessory" must directly act on or affect the operation of the accessorized item. Id. at 1353.⁸⁴ Likewise, a

13, 2009 11-12 (citations and footnote omitted) (emphasis in original).) The court finds no support for this assertion in the Headings or the Section, Chapter or Explanatory Notes.

As a consequence, the court does not find the Government's arguments persuasive and will not eliminate Chapter 84 from the analysis.

⁸⁴ The Explanatory Notes to Heading 8466 similarly describe "accessories" as "subsidiary devices used in connection with machine-tools, such as interchangeable devices which modify the machine-tool so that it can perform a wider range of operations; devices to increase precision; devices which perform a particular service relative to the main function of the machine." 3 Explanatory Notes 1564.

"part" is "an essential element or constituent; integral portion which can be separated, replaced, etc." Rollerblade, 282 F.3d at 1352 (quoting Webster's New World Dictionary 984 (3d College Ed. 1988)). Thus, a "part" also "must have a direct relationship to the primary article, rather than to the general activity in which the primary article is used." Id. Accordingly, the Rollerblade court determined that imported in-line roller skating protective gear did not qualify as a "part" or an "accessory" to roller-skates, because the protective gear did not affect the roller-skates' operation and instead the gear accessorized the "general activity of roller skating." Id. at 1352-54.

Unlike roller-skating protective gear, the RF Generators used with plasma etching undisputedly act on and affect the operation of plasma etching systems. Both parties agree that the subject machines provide "RF power," or significant wattage of power at radio-frequency current, to the plasma chambers in order to create RF waves which stimulate the plasma, thereby effecting the plasma etching process. The court also notes that the Explanatory Note to HTSUS Subheading 8456.91 describes ENI's machines by name: "[d]ry etchers generally incorporate one or more reaction chambers, pumps, vacuum pumps, radio-frequency or microwave generators, gas-flow control equipment and process control equipment." 3 Explanatory Notes 1543 (emphasis added). It thus appears to the court that, in accordance with Subheading 8466.93.85, RF Generators used with

plasma etching systems would qualify as a "part" or "accessory" of such systems, and accordingly be classified therein. (The "principal use" of the imported RF Generators is discussed below in Section V.)⁸⁵

As to the remaining RF Generators, i.e., those not used for plasma etching, Note 2(a) requires additional analysis prior to the application of Notes 2(b). Specifically, because the parentheses exception in Note 2(a) is not applicable to ENI's RF Generators used principally as parts of PVD apparatus or CVD, Note 2(a) instructs that these RF Generators are to be "classified in their respective headings" where such headings exists. It follows that, in accordance with Note 2(a), the court must determine whether these other RF Generators are classifiable "in their respective headings." Although, like many of the Section XVI headings, HTSUS Headings 8543 and 8479 include "parts thereof" within the heading descriptions, this inclusion is "[s]ubject to the general provisions regarding classification of parts," i.e., Section XVI Note 2(a). See 4 Explanatory Notes 1701; 3 Explanatory Notes 1597. Thus the Section Note and the Explanatory Notes require an initial review of other particular headings. Specifically, the Explanatory

⁸⁵ ENI has not identified for the court which of the subject machines are used principally with machines for plasma etching of semiconductors. However, as is explained below, the court finds that ENI has presented evidence to show the RF Generators' "principal use" in manufacturing semiconductors and integrated circuits. The court leaves it to the parties to determine which of the RF Generators belong under Subheading 8466.93.85.

Notes to Section XVI Note 2 state:

In general, parts which are suitable for use solely or principally with particular machines or apparatus (including those of heading 84.79 or 85.43), or with a group of machines or apparatus falling in the same heading, are classified in the same heading as those machines or apparatus The above rules do not apply to parts which in themselves constitute an article covered by a heading of this Section . . . ; these are in all cases classified in their own appropriate heading even if specially designed to work as part of a specific machine. This applies in particular to . . . Electrical transformers and other machines and apparatus of heading 85.04.

3 Explanatory Notes 1385-86 (emphasis added). The court therefore must determine whether any particular heading in Section XVI applies specifically to these RF Generators themselves. If such headings do not exist, Note 2(b) then instructs that these parts are to be classified in the heading with the particular machine for which they have such a dedicated principal use.

II. Heading 8504 ("Static Converters")

As noted above, it is the Government's position that the RF Generators fall under Heading 8504 as, *eo nomine*, "static converters." Specifically, Subheading 8504.40.95 provides:

Electrical transformers, static converters (for example, rectifiers) and inductors^[86] . . . [:]
 Static converters: . . .
 Other

ENI claims that the tariff term "static converter" is not broad enough to include RF Generators "by any definition or common

⁸⁶ No party claims that RF Generators may be classified as "Electrical transformers" or "inductors."

usage in the trade." (Pl.'s Mem. 13 (emphasis added).)⁸⁷ Furthermore, ENI argues that the RF Generator contains different components and performs different functions than a static converter.

For the reasons explained below, the court declines to apply the broad definition of "static converter" advocated by the Government, and instead holds that, in accordance with the IEEE 100 definition and the Explanatory Notes, HTSUS Heading 8504 "static converters" does not extend to machines that produce fixed-frequency alternating current to fixed-frequency alternating current of another frequency via conversion to direct current.

A. Common Meaning of "Static Converter"

As explained above, "[w]hen a tariff term is not defined in either the HTSUS or its legislative history, the term's correct meaning is presumed to be its common meaning in the absence of evidence to the contrary." Timber Prods. Co. v. United States, 515 F.3d 1213, 1219 (Fed. Cir. 2008) (citing Rohm & Haas Co. v. United States, 727 F.2d 1095, 1097 (Fed. Cir. 1984)). The HTSUS does not define the term "static converter," and therefore, once again, the court turns to "dictionaries, scientific authorities, and other

⁸⁷ The Government agrees with ENI on this point that the RF Generator is not known in the trade as a static converter. (Def.'s Reply 6, 7-8.) However, the Government argues, as explained below, that the Explanatory Notes nevertheless demonstrate a Congressional intent to have a broader definition of "static converter" than that proffered by ENI as known in the electrical engineering industry.

reliable information sources." Warner-Lambert Co., 407 F.3d at 1209.

No standard dictionaries define the term "static converter," but one authoritative technical dictionary,⁸⁸ IEEE 100, defines static converter as "[a] unit that employs solid state devices^[89] such as semiconductor rectifiers or controlled rectifiers (thyristors), gated power transistors, electron tubes, or magnetic amplifiers to change ac power to dc power, dc power to ac power, or fixed frequency ac power^[90] to variable frequency ac power.^[91]" IEEE 100, *supra* note 6, 1103. Because the IEEE 100 definition

⁸⁸ The Federal Circuit has affirmed this Court's use of scientific and technical dictionaries to determine the common meaning of technical terms. See Russell Stadelman & Co. v. United States, 242 F.3d 1044, 1049-50 (Fed. Cir. 2001).

⁸⁹ Devices are "solid state" if they are "[b]ased on or consisting chiefly or exclusively of semiconducting materials, components, and related devices." American Heritage Dictionary of the English Language 1715 (3d ed. 1996). Accord XV Oxford English Dictionary, *supra* note 18, 974 ("utilizing the electronic properties of solids (as in transistors and other semiconductor devices, in contrast to the partial vacuum of valves)"); Illustrated Dictionary of Electronics, *supra* note 3, 641 ("[p]ertaining to devices and circuits in which the flow of charge carriers (electrons and holes) is controlled in specially prepared blocks, wafers, rods, or disks of solid materials. Semiconductor devices, such as transistors and integrated circuits, are solid-state components").

⁹⁰ "Fixed frequency" connotes alternating current "preset to operate on one frequency." See Illustrated Dictionary of Electronics, *supra* note 3, 286.

⁹¹ "Variable frequency" current is "adjustable" by the user. See Michael F. Hordeski, New Technologies for Energy Efficiency 136 (2003).

provides a discrete list of devices identified by function, the canon of statutory construction "*expressio unius est exclusio alterius*" - the expression of one thing is the exclusion of another - applies. See Nissan Motor Mfg. Corp. v. United States, 884 F.2d 1375, 1377 (Fed. Cir. 1989). Thus, "static converter" excludes machines with functions not listed in the IEEE 100 definition, for example, machines that convert fixed-frequency alternating current to fixed-frequency alternating current of another frequency.

B. Explanatory Notes for HTSUS Heading 8504

In contrast to the Government's arguments, the Explanatory Notes for HTSUS Heading 8504 further limit rather than expand the reach of the term "static converter." The relevant portions read:

(II) ELECTRICAL STATIC CONVERTERS

The apparatus of this group are used to convert electrical energy in order to adapt it for further use. They incorporate converting elements (e.g., valves) of different types. They may also incorporate various auxiliary devices (e.g., transformers, induction coils, resistors, command regulators, etc.). Their operation is based on the principle that the converting elements act alternately as conductors and non-conductors.

The fact that these apparatus often incorporate auxiliary circuits to regulate the voltage of the emerging current does not affect their classification in this group, nor does the fact that they are sometimes referred to as voltage or current regulators.

This group includes:

(A) Rectifiers by which alternating current (single or polyphase) is converted to direct current, generally accompanied by a voltage change.

(B) Inverters by which direct current is converted

to alternating current.

(C) Alternating current converters and cycle converters by which alternating current (single or polyphase) is converted to a different frequency or voltage.

(D) Direct current converters by which direct current is converted to a different voltage.

4 Explanatory Notes 1626 (emphasis omitted).

Relying on the first sentence of these Explanatory Notes, the Government defends its classification of the RF Generator as a "static converter" that is an "apparatus . . . used to convert electrical energy in order to adapt it for further use." Id. ENI takes issue with this broad definition, as "this sentence is so general that it 'describes any apparatus that uses electric power in any form.'" (Pl.'s Mem. 15 (quoting id., Ex. 4 Fairfax Dep. at 88-89).)

The court agrees with ENI that reliance on such a broad definition could be over-inclusive; the issue, however, is resolved by sections (A) through (D). Because the Explanatory Notes use the word "includes," established case law requires application of the doctrine of "*expressio unius est exclusio alterius*" to limit the broad definition to the four enumerated examples (A) - (D). See Bausch & Lomb, Inc. v. United States, 148 F.3d 1363, 1367 (Fed. Cir. 1998) (interpreting the phrase "including brushes constituting parts of machines, appliance or vehicles" to limit the definition of "brush" in Heading 9603 to cover only brushes that are part of

a machine, appliance or vehicle); see also Cummins Inc. v. United States, 29 CIT 525, 533-34, 377 F. Supp. 2d 1365, 1373 (2005), aff'd, 454 F.3d 1361 (Fed. Cir. 2006).⁹²

In accordance with Bausch & Lomb and Cummins, to give HTSUS Heading 8504 meaning, the word "includes" must qualify the broader definition of "static converter." As a consequence, in order for a machine to fit the "static converter" rubric, said machine must be a (A) rectifier,⁹³ (B) inverter,⁹⁴ (C) alternating current converter/cycle converter or (D) direct current converter.⁹⁵

Because the RF Generator accepts input of alternating current at a mains frequency and subsequently generates current in radio frequencies, the Government argues that the RF Generator "meets the term of an 'alternating current converter' as defined by the

⁹² At oral argument, the Government relied, in part, on the Federal Circuit opinion in Midwest of Cannon Falls, Inc. v. United States, 122 F.3d 1423, 1429 (Fed Cir. 1997) ("Although the examples in the Explanatory Notes are probative and sometimes illuminating, we will not employ their limiting characteristics to narrow the language of the classification heading itself."). Here, however, unlike Midwest of Cannon Falls, the court is not narrowing the language of the classification heading, but is applying the common definition of that language; the Explanatory Notes support that definition.

⁹³ A rectifier is a device that converts alternating current to direct current. See supra note 20.

⁹⁴ An "inverter" is a "machine, device or system that changes direct-current power to alternating-current power." IEEE 100, supra note 6, 588.

⁹⁵ A "direct current converter" is a "converter for changing dc power at a given voltage to dc power at a higher or lower voltage." IEEE 100, supra note 6, 312.

relevant Explanatory Note.” (Def.’s Mem. 14.) However, ENI disagrees, arguing that “alternating current converters” or “cyclo converters” have circumscribed technical definitions. (Pl.’s Mem. 16 (quoting id., Ex. 4, Fairfax Dep. at 93-94 (“[w]hat’s in C, alternating current converter and cycle converters [i.e., types of ‘static converters’], those are terms of art [to ‘power engineers’]. They refer to a specific kind of a machine where AC of one frequency is converted to AC of another frequency with no DC in between.”)).)

The court again agrees with ENI. A “cycle converter” is also known as a “cycloconverter.” See, e.g., S.K. Bhattacharya, et al., Industrial Electronics and Control 250 (1995). Although definitions for “cycle converter” are scarce, locatable definitions for “cycloconverter” all identify cycloconverters as machines that directly convert⁹⁶ alternating current to alternating current of

⁹⁶ See The Electrical Engineering Handbook: Electronics, Power Electronics, Optoelectronics, Microwaves, Electromagnetics, and Radar 9-11 (Richard C. Dorf ed., 3d ed., 2006) (“Cycloconverters are direct ac-to-ac frequency changers. The term direct conversion means that the energy does not appear in any form other than the ac input or ac output. The output frequency is lower than the input frequency and is generally an integral multiple of the input frequency.”) (emphasis in original); Bhattacharya, *supra*, 250 (“A cycloconverter [or] cycle converter[] is a device which directly converts one level of cycle rate (i.e., frequency) into another level without using any intermedia[te] d.c. link. In other words . . . a cycloconverter changes a.c. of one frequency into a.c. of another frequency. . . . These converters are basically meant for producing low frequency a.c. voltage.”).

another frequency, usually lower,⁹⁷ for use particularly in combination with motors.⁹⁸

Definitions for the term "alternating current converter" are similarly difficult to locate. According to Fairfax, the terms "alternating current converter," "cycle converter" and "cycloconverter" are all synonymous. (See Pl.'s Mem., Ex. 4, Fairfax Dep. at 94.) News articles and other available publications primarily refer to "alternating current converters" for use to convert direct current power to alternating current

⁹⁷ See McGraw-Hill Dictionary of Scientific and Technical Terms 535 (6th ed. 2003) (a cycloconverter is "[a] device that produces an alternating current of constant or precisely controllable frequency from variable-frequency alternating-current input, with the output frequency usually one-third or less of the input frequency"); accord Academic Press Dictionary of Science and Technology 573 (Christopher Morris ed. 1992); Dictionary of Electrical and Computer Engineering 133 (2003); Rudolf F. Graf, Modern Dictionary of Electronics 134 (4th ed. 1972).

⁹⁸ See IEEE 100, *supra* note 3, 265 (a cycloconverter is "[a] converter using controlled rectifier or transistor devices that has the capability of adjusting the frequency and proportional voltage of the output waveform to provide speed control of motors"); Webster's Third New International Dictionary of the English Language - Unabridged 564 (2002) ("an electronic device for controlling the speed of a synchronous motor by supplying it with alternating current of grid-controlled frequency"); Sueker, *supra* note 76, 220 (cycloconverters "are a special case of motor drives, since they can also be used in fixed-frequency applications and can supply high overload currents for protective relay coordination in large installations. They are currently used to convert 60 to 25 Hz for the catenary system of Amtrak in the New York to Boston corridor. Another use is for ship propulsion They convert a fixed generator frequency to a variable frequency for the propeller synchronous motors.").

power.⁹⁹ Older publications equate alternating current converters to rectifiers, that is, devices that convert alternating current to direct current.¹⁰⁰

Any possible factual inconsistency in these definitions aside, the Government has not provided the court with any contrary

⁹⁹ See, e.g., EDP Renováveis prices near the bottom, Euroweek, June 6, 2008, available at LEXIS (last visited Aug. 28, 2009) (SMA Solar "is the world's biggest maker of alternating-current converters, which are used to convert the direct current power generated through wind and solar power plants into alternating current for general use"). See also Kyocera Solar Modules Installed on European Court of Justice, Journal of Technology & Science, May 31, 2009, at 1720, available at LEXIS (last visited Aug. 28, 2009) (identifying a Kyocera module, that converts solar energy in direct current form into alternating current for use in the mains grid, as an "alternating current converter"); German solar technology company SMA eyes IPO - report, Thomson Financial News Super Focus, Mar. 26, 2008, available at LEXIS (last visited Aug. 28, 2009); Brunsbuettel nuclear plant to halt briefly, no date, Reuters News, Sept. 7, 2006, available at LEXIS (last visited Aug. 28, 2009).

¹⁰⁰ See, e.g., Albert L. Clough, A Dictionary of Automobile Terms 251 (Horseless Age Co. 1913) (listing "alternating current converter" as a synonym of "rectifier"); Charging Vehicle Batteries from Alternating Mains, Horseless Age, May 16, 1906, at 690 (identifying an "alternating current converter" as a device which creates direct current from alternating current from the mains in order to charge automobile batteries); George Cutter, The Continuous Current, Limited vs. The Alternating Current, Unlimited, The Electrical Engineer, July 1888, at 309-11 (identifying "alternating current converter" as a device to convert alternating current from the mains into direct current for use with household and industrial devices).

The court has located one publication that equates the term "alternating current converter" with the term "AC-AC converter" in reference to switched mode power supplies. See Semiconductors: Technical Information, Technologies and Characteristic Data 134 (2d ed. 2004). However, the reference does not conflict with the more narrow use of "alternating current converter" found by the court, and thus does not alter the court's conclusion.

definitions of these terms, nor has it offered the court any evidence to dispute ENI's expert's assertions that (1) "alternating current converters" are synonymous with "cycle converters" and (2) both terms have a technical meaning that would exclude machines that convert alternating current to direct current and back again.

While the Explanatory Notes do instruct that alternating current converters convert "alternating current (single or polyphase) . . . to a different frequency or voltage," 4 Explanatory Notes 1626, the history and context of the Explanatory Notes counsel in favor of a limited reading of this language. Specifically, the predecessor to the World Customs Organization Harmonized Commodity Description and Coding System Explanatory Notes, the Explanatory Notes to the Brussels Nomenclature, delineate "static converters, rectifiers and rectifying apparatus" to "include" apparatus based on mercury arc rectifiers, diode rectifiers metal and crystal rectifiers, electrolytic rectifiers, battery chargers, high tension generators, vibrating contact rectifiers and converters and synchronous mechanical contact rectifiers. 3 Customs Co-Operation Council, Explanatory Notes to the Brussels Nomenclature 1396-98 (2d ed. 1966); 3 Customs Co-Operation Council, Explanatory Notes to the Brussels Nomenclature 927-28 (1955). Noticeably present in these Notes is the term "static converter" but noticeably absent are any machines remotely resembling a machine that converts alternating current to direct

current to a higher frequency alternating current.

The Government cites to NEC Electronics, Inc. v. United States, 21 CIT 327 (1997), aff'd, 144 F.3d 788 (Fed Cir. 1998), which would, according to the Government, support the use of a broad definition contained in Explanatory Notes over the use of a more limited common commercial usage, the former being more persuasive evidence of legislative intent. NEC held that the meaning of a tariff term may be "broader in scope than its commercial usage." NEC, 21 CIT at 331. Thus, the Government argues that "this Court may rely upon the Explanatory Notes to find the RF Generator in this case to be classified under heading 8504, even if the commercial and scientific communities are of a different view." (Def.'s Mem. 16.)

However, as explained above, the categories (A) through (D) limit the broad definition provided by the Explanatory Notes. In addition, the language and context of the Explanatory Notes, as well as the common usage of terms therein, do not support the broad categorization of "static converter" advocated by the Government. As such, the court holds that the term "static converter" in Heading 8504 does not include machines that convert fixed-frequency alternating current to fixed-frequency alternating current at a higher frequency via conversion to direct current.

III. Headings 8479 and 8543

A direct comparison of Headings 8479 and 8543, applying GRI 1, also does not resolve this dispute. These two headings are nearly identical, the only difference being that Heading 8479¹⁰¹ applies to "Machines" while Heading 8543¹⁰² covers "Electrical machines." But any common definition of "Electrical machine" is not sufficient to provide a clear indication of the appropriate placement of RF Generators. This is because the common meaning of "electrical," in the context of word combinations such as "electrical machine," is having electricity as the "controlling power," V Oxford English Dictionary, *supra* note 18, 118, 120; it is clear that both chapters 84 and 85 include machines powered, and thereby controlled, by electricity. Moreover, both headings include machines and apparatus "having individual functions, not specified or included elsewhere in this chapter." Machines for processing semiconductor materials are "specified or included" elsewhere in both chapters, specifically in Subheading 8479.89.84 and Subheading 8543.89.10, as discussed below, as well as in Subheading 8466.93.85, as discussed

¹⁰¹ Heading 8479 covers:

Machines and mechanical appliances having individual functions, not specified or included elsewhere in this chapter; parts thereof []

¹⁰² Heading 8543 covers:

Electrical machines and apparatus, having individual functions, not specified or included elsewhere in this chapter; parts thereof []

above.

The Government objects to the use of Subheading 8479.89.84 insisting that, even if the RF Generator does not fit within Heading 8504, the RF Generator, by itself, cannot be considered a machine that processes semiconductors; the RF Generator may only be considered a part of such a system.¹⁰³

However, ENI responds, and the court agrees, that the tariff provision at issue, referencing "machines for processing of" semiconductors or integrated circuits, does not necessarily require that the subject merchandise "in and of themselves" be capable of manufacturing semiconductors or integrated circuits. The Section XVI Notes indicate that "parts" of machines for processing semiconductors are included within the Heading. See HTSUS Section XVI Note 2(b). As previously noted, the RF Generator qualifies as a "part" of a plasma processing system.¹⁰⁴

¹⁰³ The Government analogizes the RF Generator to an electric motor incorporated into a grinding machine:

The motor itself does not perform any grinding operation. It merely provides the power which enables the machine to grind the material. The motor alone would not be classified as a grinding machine. By analogy, while the RF Generator provides power to the system which manufactures semiconductor devices, alone, it cannot do it and would not be considered a machine for the processing of semiconductor materials.

(Def.'s Mem. 21 n.10.)

¹⁰⁴ ENI further argues that "the history and development of heading 8479 demonstrates that the [subject merchandise] belong to a class or kind of merchandise correctly classified in that

Furthermore, the Government's reading of Subheading 8479.89.84 conflicts with its stance on plasma chambers and would read out of Heading 8479 plasma chambers for processing semiconductors through chemical vapor deposition, which the Government has argued fall under Subheading 8479.89.84. As ENI notes, plasma chambers "in and of themselves" cannot process semiconductors or integrated circuits without the radio frequency power provided by the RF Generator. The Government's argument on this point is therefore artificial at best and the court declines to adopt it.

provision." (Pl.'s Mem. 13). In support, ENI references the consolidation of semiconductor production devices into Heading 8486. Effective 2007, note 2 to HTSUS chapter 84 was amended from

a machine or appliance which answers to a description in one or more of the headings 8401 to 8424 and at the same time to a description in one or more of the headings 8425 to 8480 is to be classified under the appropriate heading of the former group and not the latter.

to

a machine or appliance which answers to a description in one or more of the headings 8401 to 8424, or heading 8486 and at the same time to a description in one or more of the headings 8425 to 8480 is to be classified under the appropriate heading of the former group or under heading 8486, as the case may be, and not the latter group.

See Modifications to the Harmonized Tariff Schedule of the United States Under Section 1206 of the Omnibus Trade and Competitiveness Act of 1988, USITC Pub. 3898, Annex 1 ¶ 272 (Dec. 2006), available at http://www.usitc.gov/tariff_affairs/hts_documents/pub3898.pdf (last visited Aug. 28, 2009). The Government responds that Heading 8486 is irrelevant, as it postdates this litigation. As the court has read Heading 8479 to include "parts," it need not address this issue.

IV. Classification of the RF Generators

The court now turns to the proper classification of the RF Generators. As noted above, whether the subject imports properly fall within the scope of the possible headings is a question of fact. Millenium Lumber Distrib. Ltd. v. United States, 558 F.3d 1326, 1328 (Fed. Cir. 2009) (citation omitted). "Because Customs' classification decisions are presumed correct, [ENI] bears the burden of proving otherwise." Id. (citation omitted). On these factual issues, both parties maintain that there is no issue of material fact remaining for trial and that this court may decide this case on the record before it.

The court addresses the application of each proffered subheading in turn.

A. Subheading 8504.40.95

For the reasons explained above, the court must deny summary judgment to the Government as to Heading 8504. It is undisputed that the RF Generators convert its input, i.e., alternating current at mains frequency, into direct current, and then convert the direct current into alternating current with a factory preset frequency of 13.56 MHz. The scope of Heading 8504 excludes machines with the RF Generators' particular function, that is, to convert fixed-frequency alternating current to fixed-frequency alternating current at another frequency via direct current. As a consequence, the RF Generators are not properly classifiable under

HTSUS Heading 8504.

B. Subheading 8479.89.84

As noted above, ENI argues specifically that the proper designation for its RF Generators is “[m]achines for processing of semiconductor materials” in HTSUS Subheading 8479.89.84. ENI argues that its RF Generators are properly classified under HTSUS Subheading 8479.89.84 because they are “principally” used as “machines for processing semiconductor of materials,” “machines for [the] production of . . . electronic integrated circuits” and “chemical vapor deposition (CVD) apparatus.” (Compl. ¶¶ 6-10; Pl.’s Mem. 13, 18-23.) ENI maintains that it has presented evidence to show that its merchandise satisfies all the factors listed in United States v. Carborundum Co., demonstrating that the merchandise falls in the same “class or kind” of merchandise used to process semiconductors. 63 CCPA 98, 102, C.A.D. 1172, 536 F.2d 373, 377 (1976) (“Factors which have been considered by courts to be pertinent in determining whether imported merchandise falls within a particular class or kind include the general physical characteristics of the merchandise, the expectation of the ultimate purchasers, the channels, class or kind of trade in which the merchandise moves, the environment of the sale (i.e., accompanying accessories and the manner in which the merchandise is advertised and displayed), the use, if any, in the same manner as merchandise which defines the class, the economic practicality of so using the

import, [and] the recognition in the trade of this use. Susceptibility, capability, adequacy, or adaptability of the import to the common use of the class is not controlling.”) (internal citations omitted).

The Carborundum analysis, in this case, is supported by application of HTSUS Additional U.S. Rule of Interpretation (“ARI”) 1 (“In the absence of special language or context which otherwise requires -- (a) a tariff classification controlled by use (other than actual use) is to be determined in accordance with the use in the United States at, or immediately prior to, the date of importation, of goods of that class or kind to which the imported goods belong, and the controlling use is the principal use”), and HTSUS Chapter 84 Note 7 (“A machine which is used for more than one purpose is, for the purposes of classification, to be treated as if its principal purpose were its sole purpose.”). As explained in HTSUS ARI 1, an item’s use is determined by the “class or kind to which the imported good[] belong[s],” and the “principal” use controls. HTSUS ARI 1. An item’s “principal use” is “the use ‘which exceeds any other single use’ of the article.” Outer Circle Prods. v. United States, __ CIT __, __, 602 F. Supp. 2d 1294, 1307 (2009)) (quoting Lenox Collections v. United States, 20 CIT 194, 196 (1996)). See also Pillsbury Co. v. United States, 431 F.3d 1377, 1380 (Fed. Cir. 2005) (“Merchandise must be classified ‘in the condition in which it is imported.’” (quoting United States v.

Citroen, 223 U.S. 407, 415 (1912))).

Following the factors enunciated in Carborundum, 63 CCPA at 102, 536 F.2d at 377, Carborundum's progeny, ARI 1 and Chapter 84 Note 7, the subject RF Generators fall within a "class or kind" of merchandise whose "principal use" is to process semiconductors through plasma etching, chemical vapor deposition or physical vapor deposition. In support of its motion, ENI has presented undisputed evidence that the end-users of the vast majority of its RF Generators operate these devices with machines that process semiconductors and integrated circuits. ENI has also proffered undisputed evidence, including both affidavits and expert testimony, that the subject machines are designed and used to operate with semiconductor-industry specific safety standards to provide power in the manner required for such a purpose. Such evidence, if unrebutted by the Government, is sufficient to support a summary judgment motion under USCIT R. 56. See A.D. Sutton & Sons v. United States, No. 03-00510, 2008 WL 2751236, at *4-5, 2008 Ct. Intl. Trade LEXIS 76, at *14-17 (CIT July 16, 2008).

But despite extensive time for discovery, the Government has presented this court with scant rebuttal evidence. Although the Government has cited evidence that ENI advertises its RF Generators for other uses besides plasma processing of semiconductors, this one fact alone is insufficient to raise an issue of material fact for trial as to "principal use." Furthermore, the Government's

insistence that RF Generators can be used for plasma processing applications other than production of semiconductors is unavailing, as this assertion does not, itself, rebut ENI's evidence that the RF Generators are "principally" used for semiconductor-specific plasma processing applications. Therefore, drawing all factual inferences in favor of the Government, see Harlow v. Fitzgerald, 457 U.S. 800, 816 n.26 (1982), the court must grant ENI summary judgment on the issue of principal use.

The court, however, does not wholly grant ENI's motion for summary judgment as to Subheading 8479.89.84. As the court explained above, RF Generators imported for principal use with plasma etching devices, for processing of semiconductors, belong under Subheading 8466.93.85. See supra. Also, because Subheading 8543.90.10 is more specific than Subheading 8479.89.84, RF Generators imported for principal use with physical vapor deposition apparatus for processing of semiconductors fall in Subheading 8543.90.10, rather than Subheading 8479.89.84. See GRI 6 ("For legal purposes, the classification of goods in the subheadings of a heading shall be determined according to the terms of those subheadings and any related subheading notes and, *mutatis mutandis*, to the above rules, on the understanding that only subheadings at the same level are comparable. . . ."), 3(a) ("The heading which provides the most specific description shall be preferred to headings providing a more general description. . .

."). Because there is no more specific subheading, RF Generators imported for principal use with chemical vapor deposition apparatus for semiconductor processing should be categorized under Subheading 8479.89.84.

Furthermore, RF Generators imported for principal use in plasma processing of semiconductors, without specific indication as to their use in CVD, PVD, or plasma etching, fall under Subheading 8479.89.84, as there is no more specific subheading for these RF Generators.

Finally, merchandise imported under all three of the aforementioned Subheadings enters the U.S. free of duty. Accordingly, the court directs the parties to confer in order to determine the appropriate subheadings for the various imports of ENI's RF Generators,¹⁰⁵ and to prepare an appropriate judgment reflecting those subheadings.

¹⁰⁵ As the court finds that the merchandise is properly classified under Subheadings 8479.89.84, 8466.93.85 and 8543.90.10, it denies summary judgment as to the Government's claim for classification under the more general basket Subheading 8543.89.96. See GRI 3(a), 6.

