



FEDERAL TRADE COMMISSION

16 CFR Part 432

RIN: 3084-AB62

Trade Regulation Rule Relating to Power Output Claims for Amplifiers Utilized in Home Entertainment Products

AGENCY: Federal Trade Commission.

ACTION: Supplemental notice of proposed rulemaking.

SUMMARY: The Federal Trade Commission (“FTC” or “Commission”) seeks public comment on proposed amendments to the Trade Regulation Rule Relating to Power Output Claims for Amplifiers Utilized in Home Entertainment Products (“Amplifier Rule” or “Rule”). The proposed amendments modify the previous proposal by updating a required test condition (total harmonic distortion), improving differentiation between power output disclosures that comply with the Rule’s testing methods and those that do not, and modernizing as well as clarifying Rule language considering the foregoing modifications. Additionally, the proposed amendments now formalize prior Commission guidance on applying the Rule to multichannel amplifiers.

DATES: Written comments must be received on or before [INSERT DATE 60 DAYS AFTER PUBLICATION IN THE *FEDERAL REGISTER*]. Parties interested in an opportunity to present views orally should submit a request to do so as explained below, and such requests must be received on or before [INSERT DATE 60 DAYS AFTER PUBLICATION IN THE *FEDERAL REGISTER*].

ADDRESSES: Interested parties may file a comment online or on paper, by following the instructions in the Request for Comment part of the **SUPPLEMENTARY INFORMATION** section below. Write “Amplifier Rule Review; Project No. P974222” on your comment and file your comment online through <https://www.regulations.gov>. If

you prefer to file your comment on paper, mail your comment to the following address:
Federal Trade Commission, Office of the Secretary, 600 Pennsylvania Avenue NW, Suite
CC-5610 (Annex A), Washington, DC 20580.

FOR FURTHER INFORMATION CONTACT: Hong Park, Attorney, (202) 326-
2158, hpark@ftc.gov, Division of Enforcement, Bureau of Consumer Protection, Federal
Trade Commission, 600 Pennsylvania Avenue, NW, Mail Stop CC-6316, Washington,
DC 20580.

SUPPLEMENTARY INFORMATION:

I. Background

The Commission promulgated the Amplifier Rule in 1974 to address sellers' failure to provide essential pre-purchase information regarding the performance of home entertainment amplifiers.¹ Specifically, manufacturers described their products' performance through power output claims (*e.g.*, "25 Watts"), but tested their amplifiers under a variety of conditions and procedures. Thus, consumers could not effectively use advertised wattage claims to compare brands or determine how individual amplifiers would perform. At the time, the Commission noted, "[s]ince the mid-50's the [audio] industry" had failed "to agree upon a single industry standard which is meaningful to the consumer."² Accordingly, the Rule standardized the measurement and disclosure of some, but not all, performance characteristics of power amplification equipment to "assure that . . . performance characteristics are based upon conditions of normal use by the consumer, *i.e.*, conditions which are encountered in the home."³

Under the Rule, sellers making certain power claims (*i.e.*, for power output, power band or power frequency response, or distortion characteristics) must disclose

¹ 39 FR 15387 (May 3, 1974).

² *Id.* at 15388.

³ *Id.* at 15392. Merely testing amplifiers under identical test conditions will not produce useful consumer information if the test conditions differ significantly from normal use conditions.

power output measured under specified test conditions. For example, amplifiers must be tested at an ambient air temperature of at least 77 °F (25 °C).⁴ The Rule, however, does not specify values for three test conditions that strongly affect power output measurements: (1) load impedance;⁵ (2) rated power band or power frequency response;⁶ and (3) total harmonic distortion (“THD”).⁷ Instead, the original Rule required disclosure of these values wherever sellers made certain power claims.⁸ In 2000, the Commission eliminated this disclosure requirement in “media advertising” but retained the requirement in product brochures and manufacturer specification sheets.⁹

Pursuant to its ongoing regulatory review schedule, on December 18, 2020, the Commission published an advance notice of proposed rulemaking (“ANPR”) seeking comment on the Amplifier Rule. 85 FR 82391 (Dec. 18, 2020). Specifically, the ANPR sought comments regarding possible Rule improvements, the continuing need for the Rule, the Rule’s costs and benefits, as well as whether, and how, technological or economic changes have affected the Rule.

⁴ This requirement prevents testing with cooling equipment while driving amplifiers to high power outputs that would overheat amplifiers during normal use. *See* 16 CFR 432.3(d) (“The preconditioning and testing shall be in still air and an ambient temperature of at least 77 °F (25 °C) . . .”).

⁵ The current Rule sets a default load impedance of 8 ohms for measuring power output but permits measurement at a different load impedance if the amplifier is designed primarily for that impedance. 16 CFR 432.2(a). “[T]he lower the load impedance utilized in testing . . . equipment, the higher the output of the amplifier.” 39 FR 15387, 15390 (May 3, 1974). For example, an amplifier that outputs 550 watts into 2 ohms might only output 350 watts into 4 ohms and 215 watts into 8 ohms. *See Speaker Impedance Changes Amplifier Power*, GEOFF THE GREY GEEK, <https://geoffthegreygeek.com/speaker-impedance-changes-amplifier-power/> (last visited Mar. 22, 2023).

⁶ High quality amplifiers can output a broad range of frequencies, such as the sounds of all the instruments in an orchestra, at high power. Lower quality amplifiers can only output certain frequencies, such as 1 kHz (*e.g.*, the sound of a trumpet), at high power, and output lower frequencies (*e.g.*, a timpani or bass) or higher frequencies (*e.g.*, a piccolo) at lower power. Power output measurements made at a single frequency or over a limited power band do not permit consumers to distinguish between these quality differences in amplifiers. The Commission has stated “a measurement [on a 1 kHz test signal] is inherently deceptive to the consumer who expects that a piece of equipment represented as being capable of a stated power output will deliver that power output across its full audio range.” 39 FR 15387, 15390 (May 3, 1974).

⁷ The output of an amplifier driven to increasingly higher power will distort and sound different from the original performance. When the Commission promulgated the Rule, it received evidence that distortion limits during testing affect power output measurements. For example, the same amplifier might output 20 watts if driven only until the output reaches 0.5% THD, and output 30 watts when driven to 5% THD. The Rule requires disclosure of the THD during testing so consumers can determine the value of power output measurements. *See* 39 FR 15387, 15391 – 92 (May 3, 1974).

⁸ 16 CFR 432.2 (1974).

⁹ 65 FR 81232 (Dec. 22, 2000).

In response, the Commission received 530 unique comments, including from amplifier and speaker manufacturers, amplifier sellers and purchasers, and engineers or journalists in the audio field.¹⁰ All but one commenter supported retaining the Rule.¹¹ Based on this near universal support, the Commission concluded there was a continuing need for the Rule.

Although commenters overwhelmingly supported the Rule, some recommended amendments. For example, many commenters urged the Commission to require uniform power band, load impedance, and THD limits to prevent manipulation of these three test conditions.¹²

Consistent with these comments, Commission staff found this manipulation ubiquitous in the marketplace. Specifically, staff found dozens of examples of the same equipment advertised with significantly different power output claims (*e.g.*, some sellers advertised a particular model with 45 watts output per channel, while others advertised the same model with 100 watts per channel¹³). Using specification sheets on manufacturers' websites, staff confirmed these widely divergent claims resulted from different testing parameters.

¹⁰ These comments are available at <https://www.regulations.gov/document/FTC-2020-0087-0001/comment>. In this publication, commenters are referred to by name, the acronym for the notice to which the commenter responded (either ANPR or NPRM), and the number assigned to each comment. For example, the comment to the ANPR from Garry Grube, which was assigned ID FTC-2020-0087-0187 on www.regulations.gov, is referred to as "Garry Grube (ANPR 187)."

¹¹ The one commenter did not provide a substantive comment.

¹² For instance, Alan McConnaughey (ANPR 5) commented, "More rules should be [enacted] to require 8 ohm ratings so everything is apples do [*sic*] apples." Jim McCabe (ANPR 378) commented that amplifiers should be tested "driven from 20 to 20k" to "stop the lying." Danny Anonymous (ANPR 4325) commented that, "[t]o eliminate confusion, just use Output Watts@1%THD." *See also, e.g.*, comments from Dennis Murphy, Philharmonic Audio (ANPR 525) and David Rich (ANPR 548). In all, twenty-seven commenters recommended specifying the load impedance; 36 recommended specifying the power band to be 20 Hz to 20 kHz; 26 recommended specifying a THD or requiring a low THD; and 159 recommended, in conjunction with a recommendation regarding multichannel amplifier testing, specifying values for all three test conditions.

¹³ *See, e.g., Onkyo TX-8220*, CRUTCHFIELD, https://www.crutchfield.com/p_580TX8220/Onkyo-TX-8220.html (last visited on Oct. 1, 2021); *Onkyo TX-8220*, AMAZON.COM, https://www.amazon.com/Onkyo-TX-8220-Channel-Receiver-Bluetooth/dp/B075P831VY/ref=sr_1_1?dchild=1&keywords=Onkyo+TX-8220&qid=1633096775&sr=8-1 (viewed on Oct. 1, 2021; advertisement subsequently revised).

Based on the comments and staff’s review, the Commission found requiring disclosure of test conditions is unlikely to prevent deceptive power output claims. Test conditions are highly technical and require complex calculations to convert claims into apples-to-apples power output comparisons. Thus, the average consumer is unlikely to understand or use the disclosed test conditions to avoid deception.¹⁴ This problem is amplified by the fact that consumers now shop online more frequently, providing fewer opportunities to listen to equipment before purchasing.

To address widespread misleading power output claims, the Commission published a notice of proposed rulemaking (“NPRM”), proposing an amendment to the Amplifier Rule to standardize the three test conditions.¹⁵ Specifically, the Commission proposed the following standard values: (1) a load impedance of 8 ohms; (2) a power band of 20 Hz to 20 kHz (except for self-powered subwoofer systems); and (3) a THD limit of less than 0.1%. Staff’s review found amplifiers are generally designed to drive a nominal load impedance of 8 ohms; 20 Hz to 20 kHz covers the normal range of human hearing;¹⁶ and 0.1% THD does not audibly distort a signal. Several commenters suggested these test conditions, and many manufacturers’ specification sheets already

¹⁴ Staff has surveyed numerous academic articles finding that consumers are not able to effectively comprehend highly technical disclosures; no surveyed research found to the contrary. *See, e.g.*, Omri Ben-Shahar and Carl E. Schneider, *The Failure of Mandated Disclosure*, 159 U. PA. L. REV. 647, available at <http://www.jstor.org/stable/41149884>. The Commission promulgated the Rule so consumers would not need to perform complex calculations to derive useful power ratings. It found that, prior to the Rule, consumers had to “deduct 10 to 25 percent [from the “music power” ratings previously claimed] and divide by 2” to derive power ratings that reflected normal usage. 39 FR 15387, 15388 (May 3, 1974). Additionally, the Commission has previously concluded that “an insufficient number of consumers . . . understand the meaning and significance of . . . disclosures concerning power bandwidth and impedance.” 63 FR 37238, 37239 (July 9, 1998).

¹⁵ 87 FR 45047 (July 27, 2022).

¹⁶ The Commission’s NPRM proposal excluded amplifiers in self-powered subwoofers used in systems that employ two or more amplifiers dedicated to different portions of the audio frequency spectrum from being tested over a power band of 20 Hz to 20 kHz. The Commission has previously recognized that, while “stand-alone . . . amplifiers . . . must reproduce signals covering the full musical frequency bandwidth,” “self-powered subwoofer systems . . . incorporate crossover circuitry that filters out frequencies above the bass range,” and the amplifiers in self-powered subwoofer systems only amplify bass frequencies. 64 FR 38610, 38613 – 4 (July 19, 1999). Consequently, the Commission proposed to limit the power band for testing self-powered subwoofer amplifiers to the frequencies within those amplifiers’ intended operating bandwidth. The proposed amendments would require testing amplifiers in self-powered full-range loudspeakers, such as full-range Bluetooth speakers that output more than two watts, over a power band of 20 Hz to 20 kHz.

disclose power outputs tested at 8 ohms, 20 Hz to 20 kHz, and at THD limits of, or slightly below, 0.1%.

II. Comments Received in Response to NPRM

The Commission received nine unique comments in response to the NPRM.¹⁷ Seven either broadly supported the regulation of power output claims or the standardization of test conditions.¹⁸ Two of these commenters, however, expressed concern about the THD limit. They explained many vacuum tube and solid state amplifiers “would not be able to qualify for a power output claim” under the proposed 0.1% limit.¹⁹ Accordingly, they recommended the Commission allow manufacturers to disclose their chosen THD level rather than setting a fixed limit. Additionally, one commenter recommended replacing the term “total harmonic distortion” with “THD with noise,” or “THD+N,” to align the Rule with the Commission’s original intent.²⁰

Only one commenter opposed the Commission’s proposal in its entirety. The Consumer Technology Association (“CTA”) stated the Commission’s proposal is unnecessary for component audio devices because manufacturers “generally already use [the Commission’s proposed] parameters to test their devices.”²¹ As for integrated audio devices, such as soundbars, CTA stated that standardizing the power output test conditions would be irrelevant to consumers. According to CTA, consumers do not

¹⁷ These comments can be found at <https://www.regulations.gov/document/FTC-2022-0048-0001>. The Commission received a total of 11 comments. However, two of these comments neither responded to the NPRM nor discussed any aspect of the Rule. A third comment raised concerns outside the scope of this proceeding (*e.g.*, health risks posed by amplifiers) and did not supply any supporting evidence. *See* Chelsy Graves (NPRM 5).

¹⁸ *See, e.g.*, Travis Surprenant (NPRM 2) (“It needs to be a uniform rating to ensure consumers are comparing products on a level playing field.”); Peiyan Wang (NPRM 4) (“A uniform testing method could provide convenience for consumers to compare different products.”); Kiet Hoang (NPRM 10) (“I believe it needs to be a uniform testing method in order to provide the customers to compare the products on a comparable basis.”).

¹⁹ Dennis Murphy (NPRM 9) (stating that all the tube amplifiers reviewed by the audio publication *Stereophile* over the past 10 years and many solid state amplifiers could not meet the 0.1% maximum THD requirement); *see also* E.W. Blackwood (NPRM 7) (“0.1% total harmonic distortion (THD) is too restrictive and would have an impact on many manufacturers.”).

²⁰ E.W. Blackwood (NPRM 7).

²¹ CTA (NPRM 8).

evaluate “specific technical capabilities of individual components,” such as power output, but rather look to the “immersive audio experience” reviewed in online videos and other online sources. Therefore, CTA urged the Commission to reject the proposal, or at a minimum, to narrow its application to component audio devices and not integrated audio devices.

III. Analysis and Additional Proposed Amendments to the Rule

After reviewing these comments, the Commission reaffirms its proposed approach of standardizing power output test conditions governing impedance, power band, and distortion. The Commission proposed standardizing these conditions based on the vast majority of comments,²² as well as Commission staff’s research, indicating standardization is necessary to eliminate conflicting and confusing power output claims. CTA’s comments do not change this conclusion. CTA asserts such standardization is unnecessary with respect to component audio devices because manufacturers “generally” use the Commission’s proposed standard. However, staff found numerous instances of sellers advertising component audio devices using power output standards that differed from each other and from the Commission’s proposal.²³ CTA also contends power output information is irrelevant to consumers of integrated home audio equipment. In contrast, Commission staff easily found multiple instances of sellers advertising such equipment

²² See 87 FR 45047, 45049 (July 27, 2022).

²³ See, e.g., *Denon PMA-600NE Stereo Integrated Amplifier*, AMAZON.COM, https://www.amazon.com/Denon-PMA-600NE-Integrated-Amplifier-Connectivity/dp/B07XL4TM3M/ref=sr_1_4?crid=3VROHBG0858SO&keywords=integrated%2Bamplifier&qid=1678911254&srefix=integrated%2Bamplifier%2Caps%2C92&sr=8-4&th=1 (last visited on Mar. 22, 2023) (advertising 70 watts at 4 ohms, 1kHz, THD 0.7%); *Onkyo A-9110 Home Audio Integrated Stereo Amplifier – Black*, AMAZON.COM, https://www.amazon.com/Onkyo-A-9110-Integrated-Stereo-Amplifier/dp/B07J2S755K/ref=sr_1_6?crid=3VROHBG0858SO&keywords=integrated+amplifier&qid=1678911254&srefix=integrated+amplifier%2Caps%2C92&sr=8-6 (last visited on Mar. 22, 2023) (advertising 50 watts at 4 ohms, 20Hz-20kHz, 0.9% THD); *Russound P75*, CRUTCHFIELD, https://www.crutchfield.com/p_543P75/Russound-P75.html?tp=48757 (Mar. 22, 2023) (advertising 60 watts into 8 ohms, 1kHz, 1% THD).

using power output claims, presumably because they believe consumers find power output information relevant to their purchasing decision.²⁴

Based on the comments, however, the Commission modifies its NPRM proposal in three ways. First, it proposes replacing the Rule’s reference to “total harmonic distortion” with “total harmonic distortion plus noise” (“THD+N”).²⁵ As one commenter observed, the modern audio equipment industry distinguishes between THD and THD+N.²⁶ THD measures only the discrepancy in harmonics between the original audio signal and the amplified signal (harmonic distortion).²⁷ In contrast, THD+N measures

²⁴ See, e.g., *Nakamichi Shockwafe Ultra 9.2.4 Channel 1000W Dolby Atmos/DTS:X Soundbar with Dual 10" Subwoofers (Wireless) & 4 Rear Surround Speakers. Enjoy Plug and Play Explosive Bass & High End Cinema Surround*, AMAZON.COM, https://www.amazon.com/Nakamichi-Shockwafe-Ultra-9-2Ch-DTS/dp/B07HHZ94BW/ref=sr_1_2_sspa?c=ts&keywords=Home+Theater+Systems&qid=1678919591&s=aht&sr=1-2-spons&ts_id=281056&psc=1&spLa=ZW5jcnlwdGVkUXVhbGlmaWVyPUEzR0VUSE9aNjNEUDIIJmVuY3J5cHRlZElkPUEwODM4ODgyMIElVDYyMVBUTVRVCVSlbmNyeXB0ZWRBZElkPUEwMzkwOTY1Mk9WSjkwMjNPNkg1QSZ3aWRnZXROYWl1PjNwX2F0ZiZhY3Rpb249Y2xpY2tSZWRpcmVjdCZkb05vdExvZ0NsaWNrPXRydWU= (advertising 1000 watts); *Bobtot Home Theater Systems Surround Sound Speakers - 1200 Watts 10 inch Subwoofer 5.1/2.1 Channel Home Audio Stereo System*, AMAZON.COM, [Rockville HTS56 1000w 5.1 Channel Home Theater System/Bluetooth/USB+8" Subwoofer, AMAZON.COM, \[https://www.amazon.com/Rockville-HTS56-Channel-Bluetooth-Subwoofer/dp/B076R7HYKN/ref=sr_1_6?c=ts&keywords=Home+Theater+Systems&qid=1678919591&s=aht&sr=1-6&ts_id=281056\]\(https://www.amazon.com/Rockville-HTS56-Channel-Bluetooth-Subwoofer/dp/B076R7HYKN/ref=sr_1_6?c=ts&keywords=Home+Theater+Systems&qid=1678919591&s=aht&sr=1-6&ts_id=281056\) \(last visited on Mar. 22, 2023\) \(advertising 1000 watts\).](https://www.amazon.com/Bobtot-Theater-System-Surround-Speakers/dp/B09MRW83PZ/ref=sxin_16_pa_sp_search_thematic_sspa?c=ts&content-id=amzn1.sym.711b623b-fef6-4340-9590-f21d01371ab3%3Aamzn1.sym.711b623b-fef6-4340-9590-f21d01371ab3&cv_ct_cx=Home+Theater+Systems&keywords=Home+Theater+Systems&pd_rd_i=B09MRW83PZ&pd_rd_r=d167b2e2-a2f1-4119-9562-90cc123dce28&pd_rd_w=W8eOP&pd_rd_wg=f6w1j&pf_rd_p=711b623b-fef6-4340-9590-f21d01371ab3&pf_rd_r=ZDVKAESB3BDAQR1KTNJA&qid=1678919591&s=aht&sbo=RZvfv%2F%2FHxDF%2BO5021pAnSA%3D%3D&sr=1-1-2b34d040-5c83-4b7f-ba01-15975dfb8828-spons&ts_id=281056&psc=1&spLa=ZW5jcnlwdGVkUXVhbGlmaWVyPUEzR0VUSE9aNjNEUDIIJmVuY3J5cHRlZElkPUEwMTM2MzA1MkNRTkFXTVg2NVUzTyZlbnNyeXB0ZWRBZElkPUEwNzgwNDkxVUxPRFRWSIBWVEI4JndpZGldE5hbWU9c3Bfc2VhcmNoX3RoZW1hdGljJmFjdGlvbj1jbGlja1JlZGlyZWNOJmRvTm90TG9nQ2xpY2s9dHJlZQ==)

²⁵ See *infra* proposed 16 CFR 432.3(e).

²⁶ E.W. Blackwood (NPRM 7).

²⁷ Typically, the original audio signal used in measuring distortion is a sinusoidal wave with a defined frequency called a “fundamental frequency.” Amplifying the original audio signal may generate harmonics, which are sinusoidal waves with frequencies that are a positive integer multiple of the fundamental frequency. Harmonic distortion is the measure of the harmonics introduced into the amplified output signal. See *THD And THD+N – Similar But Not The Same*, AUDIO PRECISION, INC., <https://www.ap.com/blog/thd-and-thdn-similar-but-not-the-same/> (last visited on Mar. 22, 2023); *What Is Total Harmonic Distortion Plus Noise (THD+N)?*, AUDIO INTERFACING (Nov. 15, 2022), [https://audiointerfacing.com/total-harmonic-distortion-plus-noise/#:~:text=THD%20is%20a%20measure%20of,relative%20to%20the%20input%20signal.; Understanding, Calculating, and Measuring Total Harmonic Distortion \(THD\), ALL ABOUT CIRCUITS \(Feb. 20, 2017\), https://www.allaboutcircuits.com/technical-articles/the-importance-of-total-harmonic-distortion/#:~:text=Harmonics%20or%20harmonic%20frequencies%20of,of%20a%20periodic%20signal%20shows.](https://audiointerfacing.com/total-harmonic-distortion-plus-noise/#:~:text=THD%20is%20a%20measure%20of,relative%20to%20the%20input%20signal.; Understanding, Calculating, and Measuring Total Harmonic Distortion (THD), ALL ABOUT CIRCUITS (Feb. 20, 2017), https://www.allaboutcircuits.com/technical-articles/the-importance-of-total-harmonic-distortion/#:~:text=Harmonics%20or%20harmonic%20frequencies%20of,of%20a%20periodic%20signal%20shows.)

both harmonic distortion and noise introduced by the power line, the electronics of the amplifier, and other sources.²⁸ When the Commission originally promulgated the Rule, it intended the term “total harmonic distortion” to capture both harmonic distortion and noise signified by the broader term THD+N.²⁹ The modified proposal preserves this original meaning.³⁰

Second, the Commission proposes raising the THD+N limit to 1.0% to address commenters’ concerns that a significant number of amplifiers on the market cannot qualify for any power output claim under the NPRM proposal’s 0.1% limit.³¹ Staff research confirms that a number of entry-level solid state amplifiers cannot rate the power output at a 0.1% THD+N limit but most can rate at a 1.0% limit.³² Although the

²⁸ See, e.g., *What Is Total Harmonic Distortion Plus Noise (THD+N)?*, AUDIO INTERFACING (Nov. 15, 2022), <https://audiointerfacing.com/total-harmonic-distortion-plus-noise/#:~:text=THD%20is%20a%20measure%20of,relative%20to%20the%20input%20signal.>; *More About THD+N And THD*, AUDIO PRECISION, INC. (Feb. 1, 2013), <https://www.ap.com/technical-library/more-about-thdn-and-thd/>; *Not All Distortion Is Created Equal -A Guide to THD & THD+N*, BANDWIDTH AUDIO, <https://www.bandwidthaudio.com/post/not-all-distortion-is-created-equal-a-guide-to-thd-thd-n> (last visited Mar. 22, 2023).

²⁹ For instance, the Commission’s intent to include noise in using the term “total harmonic distortion” is demonstrated by its explanation of § 432.3(a) when it first promulgated the Rule. That section requires AC power lines for testing equipment capable of using AC as a power source. The Commission explained that testing cannot artificially eliminate the “hum and noise factor” present in AC power lines by using a battery to power equipment capable of AC power. 39 FR 15387, 15393 (May 3, 1974).

³⁰ The modified proposal also reduces the burden on industry. Measuring THD+N is simpler because it does not require the additional step of separating harmonic distortion from noise for measuring THD. See, e.g., *THD And THD+N – Similar But Not The Same*, AUDIO PRECISION, INC., <https://www.ap.com/blog/thd-and-thdn-similar-but-not-the-same/> (last visited on Mar. 22, 2013) (“[T]he test setup [for measuring THD] is inherently more complicated than the THD+N technique.”); *What Is Total Harmonic Distortion Plus Noise (THD+N)?*, AUDIO INTERFACING (Nov. 15, 2022), <https://audiointerfacing.com/total-harmonic-distortion-plus-noise/#:~:text=THD%20is%20a%20measure%20of,relative%20to%20the%20input%20signal.> (“[I]n practice THD+N is easier to measure than THD.”).

³¹ See *infra* proposed 16 CFR 432.3(e).

³² FTC staff examined graphs of THD+N vs. 1kHz continuous output power into 8 ohms for a sampling of solid state amplifier devices on www.stereophile.com. 8 out of 30 devices were not capable of generating any power output at a maximum THD+N threshold of 0.1%, but all 30 devices were capable of generating a power output at a maximum THD+N threshold of 1.0%. Similarly, FTC staff reviewed a sampling of solid state amplifier devices available on www.crutchfield.com. Out of the 50 devices reviewed, 10 advertised power output ratings at THD levels that exceeded 0.1% but that were within the 1.0% limit. As for vacuum tube amplifiers, many of the reviews on www.stereophile.com did not provide the THD or THD+N level for the rated power output. However, FTC staff’s online research suggests that these amplifiers generally produce a higher level of distortion than solid state amplifiers. See, e.g., *Why Tubes Sound Better*, KEN ROCKWELL, <https://www.kenrockwell.com/audio/why-tubes-sound-better.htm#:~:text=Tube%20amplifiers%20have%20much%20more,same%20note%2C%20an%20octave%20above> (last visited on Mar. 22, 2023) (“Tube amplifiers have much more distortion than solid-state amplifiers . . .”). “In addition, one commenter stated he independently evaluated all of the tube amplifiers reviewed by www.stereophile.com and found that “none achieved THD levels as low as .1% over a 20 Hz to 20kHz bandwidth into 8 Ohms, even when driven with as little as 3 watts.” Dennis Murphy (NPRM 9).

new proposal allows a higher percentage of distortion, research referenced by commenter Dennis Murphy indicates the average consumer cannot audibly detect distortion at the 1.0% level, especially when listening to content typically played on home audio equipment, such as music and movie programming.³³ The Commission recognizes some amplifiers would not qualify for a power output rating even at the 1.0% THD+N limit. However, these sellers may voluntarily disclose power output ratings that do not conform to the FTC's testing standard, provided their disclosures comply with the Rule's requirements governing "Optional Disclosures" set forth in § 432.4.³⁴

Third, the Commission proposes requiring sellers to use specific language to clearly distinguish power output disclosures under § 432.2 from Optional Disclosures under § 432.4. By standardizing the test conditions for power output claims under § 432.2, the Commission anticipates more sellers would also use Optional Disclosures to distinguish specific features of their products. While such claims can be useful to consumers seeking particular audio qualities, they raise the specter of confusion. To address this issue, the Commission proposes to amend both § 432.2 and § 432.4 to require sellers to designate disclosures that meet the FTC's standard with the words "FTC Power Output Rating," and those that do not (*i.e.*, disclosures that fall within the Optional

³³ Dennis Murphy (NPRM 9). Mr. Murphy noted "the published research has found that consumers cannot begin to detect distortion on music program material until it reaches at least 1% [THD]. . ." *Id.* (citing Mark Sanfilippo, *Human Hearing - Distortion Audibility Part 3*, AUDIOHOLICS (Apr. 22, 2005), available at <https://www.audioholics.com/room-acoustics/human-hearing-distortion-audibility-part-3>). The www.audioholics.com webpage cited by Mr. Murphy references 6 studies, 4 of which support the notion that the average consumer cannot detect distortion below 1%. Other internet sources seem to support this conclusion. *See, e.g., What Is Total Harmonic Distortion (THD)?*, LIFEWIRE, <https://www.lifewire.com/total-harmonic-distortion-3134704> (last visited Mar. 28, 2023) ("As long as THD is less than one percent, most listeners will not hear any distortion."); *Understanding Amplifier Power*, GEOFF THE GREY GEEK, <https://geoffthegreygeek.com/understanding-amplifier-power/> (last visited on Mar. 28, 2023) (stating THD or THD+N "should be 1% or less" to avoid inflated power output claims achieved at unacceptably high levels of distortion); *cf. Blind Test Results Part II: "Is High Harmonic Distortion in Music Audible?" Respondent Results*, ARCHIMAGO'S MUSINGS (June 6, 2020), available at <http://archimago.blogspot.com/2020/06/blind-test-results-part-ii-is-high.html> (informal online listening test showing 31% of listeners detected only a "small difference" in sound between a 0.000002% THD sample and 3.0% THD sample, 21% detected "very little to no difference," and 18% detected "no noticeable difference").

³⁴ 16 CFR 432.4. Both the current and proposed versions of this section mandate that Optional Disclosures be less conspicuous and prominent than the disclosure of the FTC power output rating and that they use testing methods that are generally recognized by the industry, among other requirements.

Disclosures section) with the words “This rating does not meet the FTC standard.”³⁵ This information should alert consumers to the type of power output claim being made and facilitate an apples-to-apples comparison across different brands and models.

Additionally, the Commission proposes making four non-substantive changes to update and clarify the language of the Rule. First, the Commission proposes eliminating language in § 432.4 that currently incorporates § 432.2’s requirement to disclose the test conditions.³⁶ As explained above, the proposed amendments to the Rule eliminate this requirement because such highly technical disclosures are unlikely to protect the general consumer from deceptive power output claims.

Second, the Commission proposes to consolidate all provisions that standardize test conditions into a single section. Doing so should improve the Rule’s useability. Currently, the Rule has two sections that contain standard test conditions. Section 432.3 entitled “Standard Test Conditions” contains most of the Rule’s test condition requirements; however, the requirement to test using “minimum sine wave continuous average power output, in watts, per channel . . .” appears in § 432.2(a). Consolidating these requirements into § 432.3 should make the requirements easier to find.³⁷

Third, the Commission proposes modifying § 432.3(e) to clarify that amplifiers must meet the standard for impedance, power band, and THD+N at all levels from 250mW to the disclosed level. Retaining this requirement from the current rule³⁸ while standardizing test conditions should ensure the advertised power claim does not mask lower power levels at which the amplifier would not meet the FTC’s standard.

³⁵ See *infra* proposed 16 CFR 432.2(c) and 432.4(a), respectively.

³⁶ 16 CFR 432.4(a) (requiring “such power output representation(s) complies with the provisions of § 432.2 of this part; except that if a peak or other instantaneous power rating, such as music power or peak power, is represented under this section, the maximum percentage of total harmonic distortion (see § 432.2(d) of this part) may be disclosed only at such rated output”).

³⁷ See *infra* proposed 16 CFR 432.3(g) & (h).

³⁸ 16 CFR 432.2(b).

Fourth, the Commission proposes updates to § 432.4's prohibition against using an "asterisk" to make disclosures required under the Rule. The new proposal updates this language to similarly prohibit the use of footnotes and other notations typically used to obscure disclosures in advertising.³⁹

Finally, the Commission proposes formalizing its guidance regarding how channels in a multichannel amplifier must be driven when measuring power output under the FTC standard. The FTC standard requires all "associated channels" to be fully driven when measuring power output of the amplifier.⁴⁰ In 2010, the Commission found that "associated channels" for multichannel systems include, at a minimum, the front-left and front-right channels used for stereo programming, and issued guidance stating that power output measurements that do not meet this floor violate the Rule.⁴¹ While ANPR commenters proposed a variety of alternative standards for driving multichannel amplifiers,⁴² and the NPRM specifically solicited evidence regarding normal usage of multichannel amplifiers,⁴³ no commenters to either the ANPR or the NPRM provided evidence regarding real-life use of multichannel systems. Accordingly, considering the Commission's 2010 finding and in the absence of any evidence supporting an alternative,

³⁹ The prohibition against using an asterisk is currently contained in Note 2 of § 432.4. The Commission's proposed amendments eliminate Note 2, as well as Note 1 addressing the font style of certain disclosures, and move the substantive requirements of these two Notes into the main text of § 432.2(d) and § 432.4(a) and (b).

⁴⁰ This requirement is currently in § 432.2(a). The proposed amendments consolidate this requirement with the other standard test conditions in § 432.3. *See* paragraph accompanying fn. 37 *supra*.

⁴¹ The Commission based its guidance on the finding that "[t]he left and right front channels of home theater multichannel amplifiers are responsible for reproducing a substantial portion of the musical soundtracks of movies, as well as a substantial portion of the program content of music CDs and DVDs." 75 FR 3985, 3987 (Jan. 26, 2010).

⁴² Commenters to the ANPR proposed fully driving 2 channels, fully driving 3 channels and partially driving the remaining channels, and driving 5 channels at 70%, among other proposals. *See, e.g.*, Leo Nolan (ANPR 67); Gene DellaSala (ANPR 6); Jason Jenkins (ANPR 70). In its response to the NPRM, CTA correctly observed that none of the commenters supported their respective proposals with any evidence of how channels are driven in typical use in the home. CTA (NPRM 8).

⁴³ 87 FR 45047, 45049 – 50 (July 27, 2022). As the Commission stated in the prior 2000 proceeding to amend the Rule, "[t]he controlling consideration in determining the proper interpretation of 'associated channels' is whether audio/video receivers and amplifiers would, when operated by consumers in the home at high playback volume, be required to deliver full rated power output in all channels simultaneously, or whether such maximum stress conditions would more likely be restricted at any given moment of time to certain sub-groupings of available channels." 65 FR 80798, 80800 (Dec. 22, 2000).

the Commission proposes to modify § 432.2 to formalize its long-standing guidance on “associated channels” for multichannel amplifiers -- the front-left and front-right channels used for stereo programming must be driven simultaneously.⁴⁴

IV. Request for Comments

The Commission seeks comments on all aspects of the proposed requirements, including the likely effectiveness of the proposed Rule amendments in helping the Commission combat unfair or deceptive practices in the marketing of amplifiers utilized in home entertainment equipment. In particular, the Commission seeks comments on each of the modifications to its NPRM proposal. It also seeks comments on other approaches to addressing unfair and deceptive practices, such as the publication of additional consumer and business education material. Commenters should provide any available evidence and data that supports their position, such as empirical data, consumer perception studies, and consumer complaints.

You can file a comment online or on paper. For the Commission to consider your comment, we must receive it on or before [INSERT DATE 60 DAYS FROM DATE OF PUBLICATION IN THE *FEDERAL REGISTER*]. Include “Amplifier Rule Review; Project No. P974222” on your comment. Your comment, including your name and your state, will be placed on the public record of this proceeding, including, to the extent practicable, on the <https://www.regulations.gov> website.

Postal mail addressed to the Commission is subject to delay due to heightened security screening. As a result, we strongly encourage you to submit your comments online through the <https://www.regulations.gov> website. To ensure that the Commission considers your online comment, please follow the instructions on the web-based form.

⁴⁴ See *infra* proposed 16 CFR 432.3(h) (“Associated channels for multichannel amplifiers shall include, at a minimum, the left front and right front channels used for reproducing stereo programming.”).

If you file your comment on paper, write “Amplifier Rule Review; Project No. P974222” on your comment and on the envelope, and mail your comment to the following address: Federal Trade Commission, Office of the Secretary, 600 Pennsylvania Avenue, N.W., Suite CC-5610 (Annex A), Washington, DC 20580. If possible, please submit your paper comment to the Commission by overnight service.

Because your comment will be placed on the publicly accessible website, <https://www.regulations.gov>, you are solely responsible for making sure that your comment does not include any sensitive or confidential information. In particular, your comment should not include any sensitive personal information such as your or anyone’s Social Security number, date of birth, driver’s license number or other state identification number or foreign country equivalent, passport number, financial account number, or credit or debit card number. You are also solely responsible for making sure that your comment does not include any sensitive health information, such as medical records or other individually identifiable health information. In addition, your comment should not include any “[t]rade secret or any commercial or financial information which . . . is privileged or confidential”—as provided in section 6(f) of the FTC Act, 15 U.S.C. 46(f), and FTC Rule 4.10(a)(2), 16 CFR 4.10(a)(2)—including, in particular, competitively sensitive information such as costs, sales statistics, inventories, formulas, patterns, devices, manufacturing processes, or customer names.

Comments containing material for which confidential treatment is requested must be filed in paper form, must be clearly labeled “Confidential,” and must comply with FTC Rule 4.9(c). In particular, the written request for confidential treatment that accompanies the comment must include the factual and legal basis for the request, and must identify the specific portions of the comment to be withheld from the public record. *See* FTC Rule 4.9(c). Your comment will be kept confidential only if the General Counsel grants your request in accordance with the law and the public interest. Once your

comment has been posted publicly at *www.regulations.gov*—as legally required by FTC Rule 4.9(b)—we cannot redact or remove your comment, unless you submit a confidentiality request that meets the requirements for such treatment under FTC Rule 4.9(c), and the General Counsel grants that request.

Visit the FTC website to read this publication and the news release describing it. The FTC Act and other laws that the Commission administers permit the collection of public comments to consider and use in this proceeding as appropriate. The Commission will consider all timely and responsive public comments that it receives on or before [INSERT DATE 60 DAYS FROM DATE OF PUBLICATION IN THE *FEDERAL REGISTER*]. For information on the Commission’s privacy policy, including routine uses permitted by the Privacy Act, see <https://www.ftc.gov/site-information/privacy-policy>.

V. Rulemaking Procedures

The Commission finds that using expedited procedures in this rulemaking will serve the public interest. Expedited procedures will support the Commission’s goals of clarifying and updating existing regulations without undue expenditure of resources, while ensuring that the public has an opportunity to submit data, views, and arguments on whether the Commission should amend the Rule. Pursuant to 16 CFR 1.20, the Commission will use the following procedures: (1) publishing this notice of proposed rulemaking; (2) soliciting written comments on the Commission’s proposals to amend the Rule; (3) holding an informal hearing, if requested by interested parties; and (4) announcing final Commission action in a document published in the Federal Register.

The Commission, in its discretion, has not chosen to schedule an informal hearing and has not made any initial designations of disputed issues of material fact necessary to be resolved at an informal hearing. Interested persons who wish to make an oral submission at an informal hearing must file a comment in response to this publication and submit a statement identifying their interests in the proceeding and describing any

proposals regarding the designation of disputed issues of material fact to be resolved at the informal hearing, on or before [INSERT DATE 60 DAYS AFTER DATE OF PUBLICATION IN THE *FEDERAL REGISTER*]. 16 CFR 1.11. Such requests, and any other motions or petitions in connection with this proceeding, must be filed with the Secretary of the Commission.

VI. Preliminary Regulatory Analysis

Under Section 22 of the FTC Act, 15 U.S.C. 57b-3, the Commission must issue a preliminary regulatory analysis for a proceeding to amend a rule if the Commission: (1) estimates that the amendment will have an annual effect on the national economy of \$100 million or more; (2) estimates that the amendment will cause a substantial change in the cost or price of certain categories of goods or services; or (3) otherwise determines that the amendment will have a significant effect upon covered entities or upon consumers. The Commission has preliminarily determined that the proposed amendments to the Rule will not have such effects on the national economy, on the cost of sound amplification equipment, or on covered businesses or consumers. In developing these proposals, the Commission has sought to minimize prescriptive requirements and provide flexibility to sellers in meeting the Rule's objectives. The Commission, however, requests comment on the economic effects of the proposed amendments.

VII. Regulatory Flexibility Act Requirements

The Regulatory Flexibility Act ("RFA"), 5 U.S.C. 601 – 612, requires that the Commission conduct an analysis of the anticipated economic impact of the proposed amendment on small entities. The purpose of a regulatory flexibility analysis is to ensure that an agency considers potential impacts on small entities and examines regulatory alternatives that could achieve the regulatory purpose while minimizing burdens on small entities. The RFA requires that the Commission provide an Initial Regulatory Flexibility Analysis ("IRFA") with a proposed rule and a Final Regulatory Flexibility Analysis

(“FRFA”) with a final rule, if any, unless the Commission certifies that the rule will not have a significant economic impact on a substantial number of small entities.

The Commission believes that the proposed amendment would not have a significant economic impact upon small entities, although it may affect a substantial number of small businesses. Specifically, the proposed change in the disclosure requirements should not significantly increase the costs of small entities that manufacturer or import power amplification equipment for use in the home. Therefore, based on available information, the Commission certifies that amending the Rule as proposed will not have a significant economic impact on a substantial number of small businesses. Although the Commission certifies under the RFA that the proposed amendment would not, if promulgated, have a significant impact on a substantial number of small entities, the Commission has determined, nonetheless, that it is appropriate to publish an IRFA to inquire into the impact of the proposed amendment on small entities. Therefore, the Commission has prepared the following analysis:

A. Description of the Reasons That Action by the Agency Is Being Taken

The Commission proposes amending the Rule to standardize testing parameters to assist consumers in understanding power output disclosures for amplifiers and to eliminate claims regarding power output that are likely to deceive consumers.

B. Statement of the Objectives of, and Legal Basis for, the Proposed Amendment

The Commission promulgated the Rule pursuant to Section 18 of the FTC Act, 15 U.S.C. 57a. The proposed amendment would standardize testing parameters for amplifiers to prevent deceptive claims regarding power output and assist consumers in understanding power output disclosures.

C. Small Entities to Which the Proposed Amendments Will Apply

The Rule covers manufacturers and importers of power amplification equipment for home use. Under the Small Business Size Standards issued by the Small Business Administration, audio and video equipment manufacturers qualify as small businesses if they have 750 or fewer employees.⁴⁵ The Commission's staff estimates that a substantial number of the entities covered by the Rule likely qualify as small businesses.

D. Projected Reporting, Recordkeeping, and Other Compliance Requirements

The Commission is proposing amendments designed to simplify the Rule and provide clearer amplifier power output measurements for consumers to use to compare products. While the amendments modify the Rule's testing requirements, FTC staff does not anticipate that these changes will result in higher costs for covered entities because manufacturers already test power output for their amplifiers; in many cases under the conditions specified by the proposed amendments.

E. Duplicative, Overlapping, or Conflicting Federal Rules

The Commission has not identified any other Federal statutes, rules, or policies that would duplicate, overlap, or conflict with the proposed amendment.

F. Significant Alternatives to the Proposed Amendment

The Commission has not proposed any specific small entity exemption or other significant alternatives because the proposed amendment would not impose any new requirements or compliance costs.

VIII. Paperwork Reduction Act

The current Rule contains various provisions that constitute information collection requirements as defined by 5 CFR 1320.3(c), the definitional provision within the Office of Management and Budget ("OMB") regulations implementing the

⁴⁵ U.S. Small Business Administration, Table of Size Standards (Eff. Aug. 19, 2019).

Paperwork Reduction Act (“PRA”). OMB has approved the Rule’s existing information collection requirements through April 30, 2024 (OMB Control No. 3084-0105). As described above, the Commission is proposing amendments to simplify power output measurements by standardizing test parameters. The amendments do not change the frequency of the testing or disclosure requirements specified under the Rule.

Accordingly, FTC staff does not anticipate this change will result in additional burden hours or higher costs for manufacturers who already test power output for their amplifiers, in many cases testing amplifiers under the conditions specified by the proposed amendments. Therefore, the amendments do not require further OMB clearance.

IX. Communications by Outside Parties to the Commissioners or Their Advisors

Pursuant to FTC Rule 1.18(c)(1), the Commission has determined that communications with respect to the merits of this proceeding from any outside party to any Commissioner or Commissioner’s advisor shall be subject to the following treatment. Written communications and summaries or transcripts of oral communications shall be placed on the rulemaking record if the communication is received before the end of the comment period. They shall be placed on the public record if the communication is received later. Unless the outside party making an oral communication is a member of Congress, such communications are permitted only if advance notice is published in the Weekly Calendar and Notice of “Sunshine” Meetings.⁴⁶

List of Subjects in 16 CFR Part 432

Amplifiers, Home entertainment products, Trade practices.

For the reasons stated above, the Commission proposes to amend part 432 of title 16 of the Code of Federal Regulations as follows:

⁴⁶ See 15 U.S.C. 57a(i)(2)(A); 16 CFR 1.18(c).

PART 432—POWER OUTPUT CLAIMS FOR AMPLIFIERS UTILIZED IN HOME ENTERTAINMENT PRODUCTS

1. The authority citation for part 432 continues to read:

Authority: 38 Stat. 717, as amended; (15 U.S.C. 41-58).

2. Revise § 432.2 to read as follows:

§ 432.2 Required disclosures.

Whenever any direct or indirect representation is made of the power output, power band or power frequency response, or distortion characteristics of sound power amplification equipment, the manufacturer's rated power output shall be disclosed subject to the following conditions:

(a) The rated power output is measured in compliance with the standard test conditions in § 432.3;

(b) The rated power output is disclosed clearly, conspicuously, and more prominently than any other representations or disclosures permitted under this part;

(c) The disclosure of the rated power output is clearly and conspicuously labeled "FTC Power Output Rating"; and

(d) The disclosures or representations required under this section shall not be made by a footnote, asterisk, or similar notation.

3. Revise § 432.3(e) and add paragraphs (g) and (h) to read as follows:

§ 432.3 Standard test conditions.

* * * * *

(e) Any power level from 250 mW to the rated power shall be obtainable at all frequencies within the rated power band of 20 Hz to 20 kHz without exceeding 1.0% of total harmonic distortion plus noise (THD+N) at an impedance of 8 ohms after input signals at said frequencies have been continuously applied at full rated power for not less than five (5) minutes at the amplifier's auxiliary input, or if not provided, at the phono

input. *Provided*, however, that for amplifiers utilized as a component in a self-powered subwoofer in a self-powered subwoofer-satellite speaker system that employs two or more amplifiers dedicated to different portions of the audio frequency spectrum, any power level from 250 mW to the rated power shall be obtainable at all frequencies within the subwoofer amplifier's intended operating bandwidth without exceeding 1.0% of total harmonic distortion plus noise (THD+N) at an impedance of 8 ohms after input signals at said frequencies have been continuously applied at full rated power for not less than five (5) minutes at the amplifier's auxiliary input, or if not provided, at the phono input.

* * * * *

(g) Rated power shall be minimum sine wave continuous average power output, in watts, per channel (if the equipment is designed to amplify two or more channels simultaneously), measured with all associated channels fully driven to rated per channel power.

(h) Associated channels for multichannel amplifiers shall include, at a minimum, the left front and right front channels used for reproducing stereo programming. *Provided*, however, when measuring the maximum per channel output of self-powered combination speaker systems that employ two or more amplifiers dedicated to different portions of the audio frequency spectrum, such as those incorporated into combination subwoofer-satellite speaker systems, only those channels dedicated to the same audio frequency spectrum should be considered associated channels.

4. Revise § 432.4 to read as follows:

§ 432.4 Optional disclosures.

Other operating characteristics and technical specifications not required in § 432.2 of this part may be disclosed. *Provided* that:

(a) Any other power output is rated by the manufacturer, expressed in minimum watts per channel, and clearly and conspicuously labeled “This rating does not meet the FTC standard” without the use of a footnote, asterisk, or similar notation to make the representation;

(b) All disclosures or representations made under this section are less conspicuously, and prominently made than any rated power output disclosure required in § 432.2. Any disclosure or representation bold faced or more than two-thirds the height of any rated power output disclosure required in § 432.2 is not less prominent; and

(c) The rating and testing methods or standards used in determining such representations are well known and generally recognized by the industry at the time the representations or disclosures are made, are neither intended nor likely to deceive or confuse consumers, and are not otherwise likely to frustrate the purpose of this part.

By direction of the Commission.

April J. Tabor,

Secretary.