Preliminary Regulatory Impact Analysis, Initial Regulatory Flexibility Analysis, and Paperwork Reduction Act Analysis for Notice of Proposed Rulemaking for Securing the Information and Communications Technology and Services Supply Chain: Connected Vehicles, RIN 0694-AJ56

The Office of Management and Budget (OMB) has determined that this rulemaking is significant under Section 3(f)(1) of Executive Order (E.O.) 12866, as amended by E.O. 14094. As required by E.O. 12866, and the Regulatory Flexibility Act, 5 U.S.C. 601, *et seq.*, the Department of Commerce (the Department) has prepared the following preliminary regulatory impact analysis (PRIA) and initial regulatory flexibility analysis (IRFA) for this proposed rule.

The Department seeks comment on this PRIA and IRFA.

A. Preliminary Regulatory Impact Analysis

1. Need for Regulatory Action

The reasons for this action and an explanation of its necessity are articulated in the preamble to the Notice of Proposed Rulemaking (NPRM, or proposed rule) and are summarized here. Connected Vehicles contain a myriad of components that provide greater convenience for consumers and dramatically increase road safety for Vulnerable Road Users, including pedestrians, cyclists, and wheelchair users, for example. However, the incorporation of increasingly complex hardware and software to facilitate these connected features has also increased the attack surfaces through which malign actors may exploit vulnerabilities to gain access to the vehicle. Importantly, these components are subject to regulatory requirements for performance, but are not currently being reviewed by or subject to any regulations addressing their potential risks to U.S. national security or to the security and safety of U.S. Persons.

As noted in the NPRM, the risks presented by certain ICTS integral to Connected Vehicles present undue or unacceptable risks to U.S. national security or to the security and safety of U.S. Persons when those systems are designed, developed, manufactured, or supplied by persons owned by, controlled by, or subject to the jurisdiction or direction of the PRC or Russia, which are each listed as foreign adversaries in 15 CFR 791.4(a).

As described in more detail in Section IV of the NPRM, foreign adversaries have the intent and capability to harm the national security of the United States. For example, the People's Republic of China (PRC) and the Russian Federation (Russia), are able to leverage legislation, regulatory regimes, and their judiciaries in those countries to compel private companies—including carmakers and their suppliers—to cooperate with foreign adversary security and intelligence services. These laws and regulations also enable foreign adversaries to compel persons subject to their jurisdiction or direction to provide to the government, upon request, data, logical access, encryption keys, and other vital technical information about their products or services. The ability to acquire such information can allow the foreign adversary government to install monitoring devices, backdoors or bugs in ICTS equipment, which can create security flaws easily exploitable by foreign adversary authorities when such ICTS is integrated into products abroad.

When such components are part of a Connected Vehicle, they may allow foreign adversaries to gain illicit access to the Connected Vehicle through components manufactured, produced, or sold by entities subject to their jurisdiction or control. Additionally, this access could enable those foreign adversaries to exfiltrate sensitive data collected by Connected Vehicles and, potentially, allow remote access and manipulation of the vehicles driven every day by U.S. Persons. Pursuant to E.O. 13873, the Department has identified the exfiltration of data and remote manipulation of Connected Vehicles as undue or unacceptable risks to U.S. national security and to the security and safety of U.S. Persons.

2. Description of the Proposed Rule

For the purposes of the NPRM, a Connected Vehicle is defined as a vehicle driven or drawn by mechanical power and manufactured primarily for use on public streets, roads, and highways—and which integrates onboard networked hardware with automotive software systems to communicate via dedicated short-range communication, cellular telecommunications connectivity, satellite communication, or other wireless spectrum connectivity with any other network or device. This definition does not include any vehicle operated only on a rail line. The Department seeks comment on whether this PRIA, in estimating the number of regulated entities, appropriately captures manufacturers of vehicles meeting the definition of Connected Vehicles.

The proposed rule would (1) prohibit Vehicle Connectivity Systems (VCS) Hardware Importers ("VCS Hardware Importers," as defined in the NPRM) from knowingly importing into the United States certain hardware for VCS ("VCS Hardware," as defined in the NPRM); (2) prohibit Connected Vehicle Manufacturers from knowingly importing into the United States Completed Connected Vehicles incorporating certain software that supports the function of VCS or Automated Driving Systems (ADS) (VCS and ADS software are collectively referred to herein as "Covered Software," as defined in the NPRM); (3) prohibit Connected Vehicle Manufacturers from knowingly selling within the United States Completed Connected Vehicles that incorporate Covered Software; and (4) prohibit Connected Vehicle Manufacturers who are owned by, controlled by, or subject to the jurisdiction or direction of the PRC or Russia from knowingly selling in the United States Completed Connected Vehicles that incorporate VCS Hardware or Covered Software. Such prohibitions would apply where the VCS Hardware or Covered Software is designed, developed, manufactured, or supplied by persons owned by, controlled by, or subject to the jurisdiction or direction of the PRC or Russia.

To allow market participants more time to establish alternative supply chains, if necessary, the Department proposes a shorter implementation period for the prohibition involving Covered Software and proposes a longer lead time for implementing the prohibition involving VCS Hardware. Any such delay in implementation would be expected to reduce both the costs and benefits of the proposed rule. However, this PRIA does not quantify the expected benefits and only partially quantifies expected costs, so we do not attempt to quantify the effect of any delay on costs or benefits.

3. Description of Affected Entities

The proposed rule would indirectly affect U.S. automobile consumers, and would directly affect Connected Vehicle Manufacturers and VCS Hardware Importers in the United States. According to estimates from the Statistics of U.S. Businesses (SUSB) released by the U.S. Census Bureau, there were 281 firms operating in the North American Industry Classification System (NAICS) code 3361 (Motor Vehicle Manufacturing) in 2021, with 42 of these firms employing 500 or more people in total nationwide. We estimate that the number of affected entities is in the range of 42 to 281. Although we do not have publicly available data to estimate the number of VCS Hardware Importers, we believe that commercially available data validates this range, and we seek comment on the estimated number of regulated entities. Collectively, foreign and domestic automakers will sell about 16 million automobiles in the United States in 2024. There were also over 3 trillion vehicle miles travelled in 2023. Total output in motor vehicles, bodies and trailers, and parts was valued at over $700 billion in 2022.[1]

While Russia currently has a small presence in the global automotive sector, the PRC has emerged as the leading global producer and consumer of automobiles. The PRC produced nearly 30.2 million vehicles in 2023, nearly three times more vehicles than were produced in the United States that same year (10.6 million).[2] In fact, a Chinese electric vehicle (EV) company became the world leader in EV manufacturing in January 2024, and Chinese-made vehicles are already sold in the U.S. Despite this, there have been no Chinese-branded passenger vehicles sold in the United States as of 2023.

In this analysis, it is important to note that the proposed rule would not affect all Connected Vehicle Manufacturers and VCS Hardware Importers equally, as some VCS and ADS supply chains are more closely integrated with foreign adversaries than others. The Department seeks comment on whether this PRIA appropriately captures the number of affected entities.

4. Expected Costs and Benefits of the Proposed Rule

a) Costs

i. Key Assumptions and Limitations

The global automotive supply chain is remarkably complex. The cost approximations presented in this PRIA represent our best estimate given limited information. The Department welcomes comments on the methods and estimates in this analysis, including the assumptions discussed below.

First, for the purposes of our analysis, we assume that all new vehicles sold in the United States, as defined in this rule, will be subject to the proposed rule. This assumption means that we do not attempt to determine if there are vehicles being sold in the United States that are not "Connected Vehicles."

---

[1] "Gross Output by Industry" (last revised May 23, 2024). U.S. Bureau of Economic Analysis, BEA Interactive Data Application.

[2] *See generally* "International Organization of Motor Vehicle Manufacturers." OICA, https://www.oica.net.

Second, we assume that shifting supply chains away from Covered Software and VCS Hardware supplied by foreign adversaries will lead to increased costs for automotive vehicle manufacturers, and that these costs will ultimately be passed on to U.S. consumers. As described below, increased prices for consumers may reduce the number of vehicles sold in the U.S. by an estimated 0.01% to 0.16% (*see* Table 3). A reduction in vehicles sold may result in a decrease in consumer welfare.

Third, we assume that the principal costs resulting from implementation of the proposed rule would be borne by the entities responsible for compliance with the rule, but that those cost burdens would be delayed until the final rule would take effect. As stated in Section V of the proposed rule, the entities responsible for compliance with the proposed rule would be the Connected Vehicle Manufacturers and VCS Hardware Importers. Once the rule is finalized, the proposed prohibitions relating to Covered Software would not take effect until Model Year 2027, while the proposed prohibitions relating to VCS Hardware would not take effect until Model Year 2030.

Fourth, we acknowledge that information about the country of origin, market structure, and the availability of substitutes for inputs in the supply chain is limited. This is true for manufactured goods generally, and for software systems sold separately from hardware especially. For these reasons, we specifically request comments from the public containing information on the incidences of Chinese and Russian supplied software and hardware in vehicles.

Given the limited information about the incidences of foreign adversary supplied Covered Software and VCS Hardware in vehicles sold in the United States and the market structure for these inputs in production, we rely on a set of assumptions and values to estimate key information regarding costs associated with the proposed rule.

While researchers have acknowledged that "there is no perfect way to measure supply chain integration,"[3] efforts to estimate foreign content in U.S. purchased automobiles can be based on trade statistics, American Automobile Labeling Act (AALA) reports, or input-output analysis, which, as discussed below, is our preferred source of information.

Aggregate trade statistics may lead to multiple instances of double counting, particularly for industries "highly integrated across borders."[4] For example, "in the process of aggregation, [a] capacitor crosses a North American border four times before the finished seat, which includes the seat controls, gets installed in a vehicle at an assembly line."[5] Each time the product enters the United States, it will be counted as an import, and so likely will be double counted. Furthermore, trade statistics pick up the country of last import and do not account for other foreign content, so it might be difficult, if not impossible, in most instances to determine the

[3] Thomas H. Klier and James Rubenstein, "What Do We Know About the Origin of Parts in Vehicles Sold in the U.S. Market?" (2019). Federal Reserve Bank of Chicago, https://www.chicagofed.org/publications/blogs/midwest-economy/2019/what-do-we-know-about-the-origin.

[4] Ibid.

[5] Ibid.

origin of any foreign-made component. Therefore, we do not rely on aggregate trade statistics for this analysis.

AALA reports are also of limited utility for this analysis. The AALA requires carmakers to report parts content, country of final assembly, and country of origin of its engine and transmission, along with any country that accounts for more than 15% of the vehicle model's parts content.[6] Due to the 15% threshold and other data limitations, we do not use this data to estimate the share of Connected Vehicle content sourced from suppliers subject to foreign adversary direction or control.

Research published by the National Bureau of Economic Research uses input-output analysis to estimate U.S. supply-chain exposure by country, taking into account the content added to products before they are exported to the economy that exports to the United States.[7] That research finds that the PRC and Russia were the sources of 5.1% and 0.2% of all manufactured inputs used by the U.S. vehicle sector in 2018, respectively (together, equaling 5.3%). We rely on this 5.3% estimate from this research as a key assumption in our cost estimates below. The Department seeks comment on this estimate.

Finally, the limited information regarding the markets for Covered Software and VCS Hardware—including market concentration and existing substitutes for the inputs in production—require that we make assumptions about the expected increases in the prices that domestic firms would pay for inputs obtained from sources other than the PRC and Russia. We assume that transitioning to new systems would increase prices for these systems by 10% to 100%. However, the dearth of information about the Connected Vehicle supply chain renders our assumed range to be highly uncertain. The information limitations also prevent us from estimating one-time costs associated with firms switching to new suppliers or adjusting production. The Department seeks information that will help to assess the market structure, including the degree of product differentiation and the elasticity of substitution in production, for these inputs.

[6] "Part 583 American Automobile Labeling Act Reports." National Highway Traffic Safety Administration, https://www.nhtsa.gov/part-583-american-automobile-labeling-act-reports.

[7] Richard Baldwin, Rebecca Freeman, and Angelos Theodorakopoulos, "Hidden Exposure: Measuring U.S. Supply Chain Reliance" (2023). Working Paper 31820. National Bureau of Economic Research, https://www.nber.org/papers/w31820.

ii. Costs of Implementing the Proposed Rule

We identify two primary costs to Connected Vehicle Manufacturers and VCS Hardware Importers expected to be associated with implementation of the proposed rule: (1) Costs related to rule compliance, which would include (but is not limited to) spending time and resources reviewing and understanding the new rule, re-mapping supply chains, identifying the country of origin of Covered Software and VCS Hardware, and submitting annual Declarations of Conformity; and (2) Costs associated with substitute parts and services, which may include changing to input suppliers that are not owned by, controlled by, or subject to the jurisdiction or direction of foreign adversaries. These are discussed below.

Increased Costs Related to Rule Compliance.

The proposed rule would include various mechanisms to monitor compliance. Parties to covered transactions generally would be required to provide annual certifications to the Department, known as Declarations of Conformity, certifying that their import of VCS Hardware and/or import or manufacture of Completed Connected Vehicles does not involve hardware or software subject to the prohibitions of the proposed rule. Connected Vehicle Manufacturers and VCS Hardware Importers might also avail themselves of a General Authorization under certain circumstances. For example, Connected Vehicle Manufacturers and VCS Hardware Importers who deal in "small quantities" of Completed Connected Vehicles or VCS Hardware (defined in the proposed rule as fewer than 1,000 units in a calendar year) would qualify for a General Authorization. Finally, the rule would allow entities to seek a Specific Authorization to engage in an otherwise Prohibited Transaction.

The methods of submitting Declarations and Authorizations could vary but nonetheless would impose additional compliance costs for Connected Vehicle Manufacturers and VCS Hardware Importers. Table 1 calculates the estimated one-time cost of reading and understanding the rule in preparation for Connected Vehicle Manufacturers and VCS Hardware Importers to comply. We assume that these costs would be incurred beginning in the first year the rule takes effect.

Table 1: Framework for Estimating One-Time Cost of Reading and Understanding the Rule in Preparation for Compliance

Line	Description	Low Estimate	High Estimate	Basis for estimate
1	Entities potentially impacted by the rule[(1)]	42	281	This is the U.S. Census Bureau Statistics of U.S. Businesses estimate for the number of firms operating at least one establishment in NAICS 3361: Motor Vehicle Manufacturing. Low estimate is firms with 500+ employees in total nationwide and high estimate is all firms.[(2)]
2	Operations manager hours	50	70	

3	Operations manager hourly wage, doubled to account for benefits and overhead ($)	$155	$155	This is the BLS estimate for the mean hourly wage of an operations manager, doubled to reflect benefits and overhead.
4	Operations manager cost per entity	$7,754	$10,856	Line 2 * Line 3
5	Engineers hours	50	70	
6	Engineers hourly wage, doubled to account for benefits and overhead ($)	$105	$105	This is the BLS estimate for the mean hourly wage of an engineer in the motor vehicle manufacturing industry, doubled to reflect benefits and overhead.
7	Engineers cost per entity	$5,256	$5,256	Line 5 * Line 6
8	Lawyer hours	80	100	
9	Lawyer hourly wage, doubled to account for benefits and overhead ($)	$224	$224	This is the BLS estimate for the mean hourly wage of a lawyer in the motor vehicle manufacturing industry, doubled to reflect benefits and overhead.
10	Lawyer cost per entity	$17,954	$22,442	Line 8 * Line 9
11	Total initial cost per entity to comply with rule ($)	$30,964	$38,554	Line 4 + Line 7 + Line 10
12	Total initial cost to comply with rule ($)	$1,300,471	$10,833,562	Line 1 * Line 11
13	Annualized cost per entity over 10 years at 2% discount rate ($)	$3,379	$4,208	Line 11 is a one-time cost per firm to comply with the rule. Line 13 annualizes that one time cost over 10 years at a 2% discount rate.
14	Total annualized costs at 2% discount rate ($)	$141,938	$1,182,415	Line 1 * Line 13
15	Total hours	180	240	Line 2 + Line 5 + Line 8

Notes:
(1) This public data is validated by complimentary private data that relates to a subset of market participants.
(2) Entities that produce less than 1,000 units of Completed Connected Vehicles or VCS Hardware in a calendar year would qualify for a General Authorization.

The Department estimates that it will take operations managers between 50 and 70 hours (line 2), engineers between 50 and 70 hours (line 5), and lawyers between 80 and 100 hours (line 8) to read and understand the rule in preparation to comply. The Department seeks comment on these hour estimates. The Department estimates that the total cost per entity to learn about this rule is between $30,964 and $38,554 (line 11), or between $3,379 and $4,208 if annualized over 10 years at a 2% discount rate (line 13). Applying this per-entity cost across all entities, the overall total initial cost to learn about this rule is between $1.3 million and $10.8 million (line 12), or between $142,000 and $1.2 million annualized over 10 years at a 2% discount rate (line 14).

Every subsequent year after the final rule would take effect, the Department anticipates that the total annual burden (in hours) for Connected Vehicle Manufacturers and VCS Hardware Importers to implement the rule will be 100 to 500 hours. In terms of recurring compliance cost, the Department anticipates that the total annual cost burden for Connected Vehicle Manufacturers and VCS Hardware Importers to implement the rule will be $16,133 to $80,667 per year (average of operations manager, engineer, and lawyer hourly salaries [$484/hour / 3 = $161.33] * [100 and 500 hours]). This broad range is due to the potential varying levels of information needed for Declarations of Conformity and Specific Authorizations. For example, a manufacturer could submit a Declaration detailing as many as five new vehicle models, so the time it may take for a respondent to gather all the necessary information to implement the rule is variable. These estimates are also subject to variations among respondents due to application type. Declarations of Conformity will need to be submitted annually, while Specific Authorizations will only need to be updated on an as-needed basis.

Increased Costs Associated with Substitute Parts and Services.

The increased costs identified in this section have indirect effects on both U.S. consumers and automobile manufacturers. For example, U.S. or trusted manufacturers may be less competitive in the global market because of the relatively higher prices of their vehicles, which would also negatively impact consumers who will face higher prices for vehicles. However, the Department assesses that reducing the potential of catastrophic risk (including Connected Vehicle malfunction due to exfiltration of data and remote manipulation) outweighs the regulatory costs borne by Connected Vehicle Manufacturers, VCS Hardware Importers, and consumers and necessitates this regulatory action.

The most significant expected impact of the proposed rule on Connected Vehicle Manufacturers and VCS Hardware Importers would be the need to change existing supply chains to avoid engaging in Prohibited Transactions and thereby ensuring that particular inputs for Connected Vehicles do not impose undue or unacceptable risks as described above. To estimate the value of inputs potentially affected by this proposed rule, we first estimate share of the intermediate inputs used in the U.S. automobile industry accounted for by Covered Software and VCS Hardware, and then estimate the share of Covered Software and VCS Hardware inputs that are sourced from the PRC and Russia.

The total value of intermediate inputs purchased by the U.S. automobile industry was approximately $577 billion in 2022, the most recent year for which data are available. To identify the portion of intermediate inputs that would include Covered Software and VCS Hardware, we relied on two industries identified by NAICS codes: 336320 – Motor Vehicle Electrical and Electronic Equipment Manufacturing; and 334 – Computer and Electronic Product Manufacturing. We estimate that the inputs produced in NAICS 334 represent 5.0% of all intermediate inputs into motor vehicles. We also estimate that the inputs produced in NAICS 336320 represent 3% of all intermediate inputs into motor vehicle manufacturing (together, totaling 8%). However, the Department acknowledges that these NAICS codes over-capture Covered Software and VCS Hardware.

To identify the reliance of the U.S. Connected Vehicle supply chain on the PRC and Russia, we relied on existing academic research estimating that the PRC and Russia together were the source

of 5.3% of all manufactured inputs used by the U.S. vehicle sector. In turn, we made the simplifying assumption that 5.3% of the inputs potentially affected by this proposed rule were sourced from PRC and Russia (*see* Table 2). This percentage may be an underestimate because PRC market representation in electronics may be higher than it is in other intermediate inputs. However, we cannot evaluate this without additional information.

Although Table 2 provides a rough estimate of the value of inputs potentially affected by this proposed rule, it is difficult to provide a more exact estimate of the cost of changing existing supply chains for these inputs because the Department has very limited information about Covered Software and VCS Hardware costs. The Department welcomes cost estimates of these systems in order to more accurately describe the expected cost related to changes in supply chains.

Table 2: Estimated Value of Inputs Impacted

	Low Estimate		High Estimate	
Description	**Value**	**Source**	**Value**	**Source**
Intermediate inputs in the automotive industry	$574 billion	2022 estimate (in $2023).(1) Office of the Under Secretary for Economic Affairs, "2022: What is made in America? Quantitative Measures of Made in America"	$574 billion	2022 estimate (in $2023).(1) Office of the Under Secretary for Economic Affairs, "2022: What is made in America? Quantitative Measures of Made in America"
Foreign adversaries' percentage of inputs	5.3%	2018 estimate. Baldwin (2023). Includes PRC (5.1%) and Russia (0.2%) as a source of manufactured inputs used by the U.S. Vehicles sector.(2)	5.3%	2018 estimate. Baldwin (2023). Includes PRC (5.1%) and Russia (0.2%) as a source of manufactured inputs used by the U.S. Vehicles sector.(2)
Computer and electronic parts as a percent of intermediate inputs, contained within other products	5.0%	2022 estimate. U.S. Bureau of Economic Analysis, "The Use of Commodities by Industries - Summary." (3)	7.6%	2022 estimate. U.S. Bureau of Economic Analysis, "The Use of Commodities by Industries - Summary." (4)
Estimated value of intermediate inputs affected by this rule	$1.51 billion (0.3%)	Intermediate inputs * foreign adversaries' percentage of inputs * computer and electronic parts percentage of inputs	$2.32 billion (0.4%)	Intermediate inputs * foreign adversaries' percentage of inputs * computer and electronic parts percentage of inputs

Annualized value of impacted inputs over 10 years at 2% discount rate ($2023)	$0.16 billion	Calculation	$0.25 billion	Calculation

Notes:
(1) We use the chain-type price index for motor vehicle output from the Bureau of Economic Analysis to adjust to Dollar Year 2023 ($2023) (*see* U.S. Bureau of Economic Analysis, Motor vehicle output: Personal consumption expenditures (chain-type price index) [AB61RG3A086NBEA], retrieved from FRED, Federal Reserve Bank of St. Louis; https://fred.stlouisfed.org/series/AB61RG3A086NBEA, August 30, 2024.).
(2) This percentage is of manufactured inputs, not all inputs. However, manufactured inputs are the vast percentage of inputs into the car industry. This assumes that the 5.3% of overall manufactured inputs applies to the subcategory of systems affected by the potential rule.
(3) Only including computer and electronic parts.
(4) Including computer and electronic parts and motor vehicle electrical and electronic equipment manufacturing. Using the share of motor vehicle electrical parts and equipment manufacturing as in input into motor vehicle and electrical parts.

Other Impacts.

This regulation may also increase prices for Connected Vehicles, and therefore raise prices for consumers generally, and specifically with respect to vehicle purchases. It is also possible that the final rule, if similar to the proposed rule, could disrupt the entire Connected Vehicle supply chain, resulting in significant time costs as well as cost increases for producing Connected Vehicles. However, it is difficult to determine the extent to which any single (or even multiple) supply chain disruption(s) would lead to an increase in consumer spending or consumer prices for such vehicles. Economic reasoning and empirical evidence indicate that this regulation could have noticeable effects on vehicle prices.

Changes in vehicle prices would, in turn, be expected to impact Connected Vehicle sales. The extent to which any increase in prices would result in reduced demand for vehicles from the impacted (or complying) entities is captured by the "price elasticity of demand," or the responsiveness of quantity demanded of a good to changes in its price when holding other factors constant. To estimate this expected impact on prices, we rely on the following assumptions.

First, we assume that all cost increases would be passed on to consumers—in other words, the ratio of revenue to costs of automakers would remain the same regardless of the additional disruptions to or costs involved in the supply chain. Second, we assume that the next best VCS and ADS alternatives would be between 10% and 100% above current prices. We develop this range based on examples of supply-chain challenges in the past, like the increase in semiconductor prices during the COVID-19 pandemic.[8] The wide range is consistent with the high level of uncertainty and the possibility that some components may be difficult to substitute. Third, we assume that these costs will occur every year (i.e., they are not one-time fixed costs).

[8] *See*, e.g., John R. Birge, Agostino Capponi, Peng-Chu Chen (2022). Disruption and Rerouting in Supply Chain Networks. *Operations Research*. *See also* Hendricks, K. B., & Singhal, V. R. (2005). Association between supply chain glitches and operating performance. *Management Science, 51*(5), 695-711. Retrieved from https://www.proquest.com/scholarly-journals/association-between-supply-chain-glitches/docview/213189940/se-2.

The Department seeks information on the supply chain and market structure to improve this estimation and welcomes comment on these assumptions.

To identify the price elasticities of demand for Connected Vehicles and their components, we rely on a recent regulatory analysis by the National Highway Transportation Safety Administration (NHTSA) that estimates the effect of increased mileage standards on the quantity demanded of light-duty vehicles. NHTSA assumes a price elasticity of demand for new light-duty vehicles of -0.4, implying that a 1% increase in the price of these products is associated with a 0.4% decrease in quantity demanded.[9] We assume this price elasticity of demand for Connected Vehicles.

Combining these values and assumptions, we estimate that approximately 1,700 to 26,000 fewer vehicles would be purchased by U.S. consumers per year as a result of the proposed rule. In other words, this proposed rule could be associated with a decline in vehicles sold in the U.S. by 0.01% (low estimate) to 0.16% (high estimate). *See* Table 3.

Table 3: Automobile Price Elasticity and Potential Decline in Automobile Sales

	Low Estimate		**High Estimate**	
Description	**Value**	**Source**	**Value**	**Source**
Percent disruption in supply chain	0.3%	Table 2	0.4%	Table 2
Price increase for next best option for auto-makers	10%	Assumption	100%	Assumption
Resulting increase in price for consumers	0.03%	Assuming that the price increase is passed on to consumers	0.40%	Assuming that the price increase is passed on to consumers
Price elasticity of demand	-0.4	National Highway Traffic Safety Administration model assumption	-0.4	National Highway Traffic Safety Administration model assumption

[9] "Final Regulatory Impact Analysis: Final Rulemaking for Model Years 2024-2026 Light-Duty Vehicle Corporate Average Fuel Economy Standards." U.S. Department of Transportation: National Highway Traffic Safety Administration, https://www.nhtsa.gov/sites/nhtsa.gov/files/2022-04/FRIA_CAFE-MY-2024-2026.pdf.

Total autos sold 2024 forecast	16 million	Ward's Intelligence	16 million	Ward's Intelligence
Decline in the number of autos sold (in units)	-1,680	Price increase * price elasticity of demand * autos sold	-25,841	Price increase * price elasticity of demand * autos sold
Decline in the number of autos sold (as a %)	-0.01%	% change in number of autos sold based on 2024 forecast	-0.16%	% change in number of autos sold based on 2024 forecast

b) Benefits

As outlined in the NPRM, foreign adversaries, including the PRC and Russia, have adopted unique political, legal, and regulatory regimes granting their governments the ability to exercise direct and indirect ownership, control, or influence over companies operating in the VCS and ADS supply chains. The persistent connectivity facilitated by VCS and required by ADS technologies, combined with the vast amounts of diverse data (e.g., mapping, geolocation, traffic, bystander, and driver biometrics) collected by Connected Vehicles, make them vulnerable and valuable targets for foreign adversary governments.

Penetration into the U.S. Connected Vehicle market by Covered Software and VCS Hardware suppliers under the ownership, control, jurisdiction, or direction of the PRC and Russia could have immediate and direct impacts on the reliability of Connected Vehicles manufactured or sold within the United States. Compromised ADS components could result in increased frequency and severity of Connected Vehicle malfunctions resulting in the detection, capture, and retention of information about specific geographic areas or other sensitive data as well as potentially faulty or dangerous vehicle decision making, to include unauthorized control over the Connected Vehicle.[10] Compromised VCS components could result in unauthorized access to vehicle functionality and information including manipulation of vehicle acceleration, the vehicle's identity, and extraction of vehicle-unique credential used for authenticating and authorizing an Original Equipment Manufacturer's internal service network.[11] These compromised components, when combined with the millions of connected vehicles that are expected to be sold in the United States, have the capacity to catastrophically impact U.S. national security, including the resiliency of U.S. critical infrastructure, and the safety of U.S. Persons.

[10] *See* "Autonomous Automotive Vehicle Supply Chain Risk." National Counterintelligence and Security Center, https://www.dni.gov/files/NCSC/documents/supplychain/autonomous-vehicles-placemat-2022-D9A54B50-.pdf.

[11] *See* "2024 Global Automotive Cybersecurity Report" (February 2024). Upstream, https://upstream.auto/reports/global-automotive-cybersecurity-report/.

The primary expected benefit of implementing the proposed rule would be a reduction in the chance of a catastrophic attack due to the exfiltration of data and remote manipulation of Connected Vehicles. The expected value of this benefit would be estimated by subtracting the expected cost of such an attack after implementation of the proposed rule from the expected cost of such an attack absent the proposed rule. Such estimate would involve calculating the cost of an attack absent regulation, multiplied by the probability of an attack absent regulation, as well as calculating the cost of an attack after implementation of the proposed rule, multiplied by the probability of an attack after implementation of the proposed rule. Because such calculations would be highly speculative, we do not attempt to monetize this benefit in this analysis.

c) A-4 Accounting Statement

In accordance with OMB's Circular No. A-4 (A-4), the Department has prepared an accounting statement showing the classification of impacts associated with this proposed rule. Table 4 summarizes the cost analyses from Tables 1 through 3.

Table 4: OMB Circular A-4 Accounting Statement Categorizing Impacts for the NPRM on Connected Vehicles

Category	Primary Estimate	Low Estimate	High Estimate	Dollar Year	Discount Rate	Time Horizon	Notes
BENEFITS							
Annualized monetized benefits							Not estimated
Annualized quantified, but non-monetized, benefits							Not estimated
Unquantified benefits	Increased protection from foreign adversaries and a reduced chance of catastrophic risk						
COSTS							
Annualized monetized value of impacted inputs		$0.16 billion	$0.25 billion	2023	2%	10 years	Table 2: Estimated Value of Inputs Impacted
Annualized monetized costs - rule compliance		$141,938	$1,182,415	2023	2%	10 years	Table 1: Framework for Estimating One-Time Cost of Reading and Understanding the Rule in Preparation for Compliance
Annual recurring costs - rule compliance		$16,133	$80,667	N/A	None	N/A	Table 1: Framework for Estimating One-Time Cost of

						Reading and Understanding the Rule in Preparation for Compliance; Page 7
Annualized quantified, but non-monetized, costs	-1,680 autos sold per year	-25,841 autos sold per year	N/A	None	10 years	Table 3: Automobile Price Elasticity and Potential Decline in Automobile Sales
Unquantified costs - competition	Reduced ability of U.S. carmakers to compete internationally					
Unquantified costs - supply chain disruptions	Disruption in supply chains					
TRANSFERS						
Annualized monetized Federal budgetary transfers						Not identified
Bearers of transfer gain and loss?						Not identified
Other annualized monetized transfers						Not identified
Bearers of transfer gain and loss?						Not identified
NET BENEFITS						
Annualized monetized net benefits						Not identified
Effects on State, local, or Tribal governments						Not identified
Effects on small businesses						Not identified
Effects on wages						Not identified
Effects on growth						Not identified

5. Baseline

Tables 1 through 3 provide estimates of the economic impacts of the regulation relative to the best available data describing the current economic environment. However, as stated in the A-4, the benefits and costs of regulations should be assessed against a baseline of what would happen but-for the proposed regulation. Evidence suggests a shifting baseline in this case. Specifically, some evidence suggests that, absent the regulation, the importance of the PRC to U.S. supply chains and the U.S. market may increase.

The global automotive market is currently in transition. Primary contributors to the transition include the COVID-19 pandemic, which is affecting both the supply and demand of automobiles, and the global increase in EV purchases. Evidence suggests that current U.S. tariffs on EVs have artificially suppressed the presence of Chinese suppliers in the U.S. market.[12] While we assume that the United States will continue to enforce tariffs against the PRC, the net benefits of the proposed rule would change if imports from the PRC were to increase. For these reasons, we expect that our reliance on a 2018 estimate that 5.3% of motor vehicle inputs come from foreign adversaries results in an underestimation of the importance of these entities to the U.S. supply chain over the next 10 years, absent regulation. Therefore, the net benefits of this proposed rule remain ambiguous.

B. Initial Regulatory Flexibility Analysis

In compliance with Section 603 of the Regulatory Flexibility Act (RFA), 5 U.S.C. 601–612, the Department has prepared an initial regulatory flexibility analysis (IRFA) for this proposed rule. The IRFA describes the economic impacts the proposed action may have on small entities. The Department seeks comments on all aspects of the IRFA.

(1) A description of the reasons why action by the agency is being considered. Connected Vehicles contain a growing number of connected components. While these components provide greater safety and convenience through features like Wi-Fi, Bluetooth, cellular telecommunication, and satellite connectivity, the incorporation of progressively complex hardware and software systems enabling vehicle connectivity has also increased the attack surfaces through which malign actors may exploit vulnerabilities to gain access to a vehicle. ICTS integral to Connected Vehicles present an undue or unacceptable risk to U.S. national security when those systems are designed, developed, manufactured, or supplied by persons owned by, controlled by, or subject to the jurisdiction or direction of the PRC or Russia. Furthermore, the PRC and Russia are able to leverage legal and regulatory regimes to compel private companies subject to their jurisdiction, including carmakers and vehicle suppliers, to cooperate with state security and intelligences services. Cooperation can include providing data, logical access, encryption keys, and other vital technical information, as well as by installing backdoors or bugs on equipment or in software updates, ultimately making vehicle equipment exploitable by foreign adversaries. Such privileged access potentially enables the PRC and Russia to exfiltrate sensitive data collected by Connected Vehicles through their components and allow remote manipulation for vehicles driven by U.S. persons.

(2) A succinct statement of the objectives of, and legal basis for, the proposed rule. The Department is proposing this rule pursuant to authority under the International Emergency Economic Powers Act (IEEPA) (50 U.S.C. 1701, *et seq*.), the National Emergencies Act (NEA) (50 U.S.C. 1601, *et seq*.), and Section 301 of Title 3, United

[12] "FACT SHEET: President Biden Takes Action to Protect American Workers and Businesses from China's Unfair Trade Practices" (May 14, 2024). The White House, https://www.whitehouse.gov/briefing-room/statements-releases/2024/05/14/fact-sheet-president-biden-takes-action-to-protect-american-workers-and-businesses-from-chinas-unfair-trade-practices/.

States Code, and in accordance with E.O. 13873, "Securing the Information and Communications Technology and Services Supply Chain," 84 FR 22689 (May 17, 2019), which delegated to the Secretary of Commerce (Secretary) certain authorities provided to the President by IEEPA, the NEA, and Section 301 of Title 3 of the United States Code. In accordance with the National Emergencies Act, the President has declared each year since E.O. 13873 was published that the national emergency declared in E.O. 13873 regarding the ICTS supply chain continues to remain in effect.

To address identified risks to national security from ICTS transactions, E.O. 13873 directs the Secretary (in consultation with other agency heads identified in E.O. 13873) to review any ICTS transaction, defined as any acquisition, importation, transfer, installation, dealing in, or use of any ICTS by any person, or with respect to any property, subject to United States jurisdiction, where the transaction involves any property in which a foreign country or national has any interest. When the Secretary, in consultation with the appropriate agency heads, finds that an ICTS transaction or class of ICTS transactions pose undue risks (including of sabotage, subversion, or catastrophic effects on the security and resiliency of U.S. critical infrastructure), or unacceptable risks to national security or the security and safety of U.S. persons, the Secretary may identify the ICTS transaction as prohibited by Section 1 of E.O. 13873 or impose mitigation measures on the ICTS transaction or class of ICTS transactions reviewed. E.O. 13873 additionally provides that the Secretary issue rules establishing criteria by which particular technologies or market participants may be categorically included in or categorically excluded from prohibitions established pursuant to the E.O.

(3) A description of and, where feasible, an estimate of the number of small entities to which the proposed rule will apply. The Department anticipates that the entities primarily responsible for compliance with this regulation will be Connected Vehicle Manufacturers and VCS Hardware Importers. The Department assesses, based on publicly available information, that the U.S. Connected Vehicle market is dominated by a small set of manufacturers, few of which would be considered "small entities" under the Small Business Administration's definitions. The Small Business Administration small business size standard for NAICS 336110: Automobile and Light Duty Motor Vehicle Manufacturing and NAICS 336120: Heavy Duty Truck Manufacturing is 1,500 employees or fewer. However, the Department has limited data on how many of these suppliers engage in Covered Software and VCS Hardware transactions, and therefore cannot estimate how many of these suppliers qualify as small entities. The Department specifically seeks comments on the number of suppliers engaged in Covered Software and VCS Hardware transactions in the United States, as well as the percentage of those entities that might or could qualify as small entities.

(4) A description of the projected reporting, recordkeeping and other compliance requirements of the proposed rule, including an estimate of the classes of small entities that will be subject to the requirement and the type of professional skills necessary for preparation of the report or record. As stated above, Connected Vehicle Manufacturers

and VCS Hardware Importers will bear the majority of the proposed rule's compliance costs. The Department estimates that the recordkeeping and compliance burden placed on responsible small entities would involve operations managers, engineers, and lawyers. On an annual basis, these entities will need to, at minimum and if applicable, submit a Declaration of Conformity certifying that their import of VCS Hardware and/or import or manufacture of Completed Connected Vehicles does not involve hardware or software subject to the prohibitions in this proposed rule. The Declaration of Conformity would also include technical information regarding the hardware or software in question and a Bill of Materials for applicable software, hardware, or both.

The Department proposes to require Connected Vehicle Manufacturers and VCS Hardware Importers to maintain complete records related to any transaction for which a Declaration of Conformity, General Authorization, or Specific Authorization would be required by this rule, for a period of ten years, consistent with IEEPA's statute of limitations. These records would be expected to assist the Department's enforcement efforts for the prohibitions in the proposed rule. The required records would include those related to any transaction that is subject to a General Authorization (including records of any entities producing fewer than 1,000 Connected Vehicle or VCS Hardware units in a calendar year), any transaction that is subject to a Specific Authorization, and any transaction involving Covered Software or VCS Hardware for which the Connected Vehicle Manufacturer or VCS Hardware Importer has not yet sought an authorization. The Department expects such records to include all information submitted in applications, as well as business records related to the execution of any ICTS transaction subject to the rule, such as contracts, import records, bills of sale, and all other files the Department may deem pertinent in assessing compliance with this proposed rule.

Because small entities could avail themselves of a General Authorization, the maintenance of records in support of such authorization would be the only compliance requirement. These records would serve as the small entities' self-certification, which does not need to be submitted to the Department. A General Authorization would allow the VCS Hardware Importer and/or Connected Vehicle Manufacturer to engage in the otherwise Prohibited Transaction, without the need to notify or seek approval from the Department. General Authorizations would be available only in a narrow set of circumstances in which the conditions of the otherwise Prohibited Transaction appropriately mitigate the level of risk associated with the particular transaction. Such conditions would include, for example, when VCS Hardware is imported from the PRC or Russia solely for testing purposes, or where the Completed Connected Vehicle that incorporates VCS Hardware or Covered Software from the PRC or Russia will not be driven on public roads for more than 30 calendar days per year. Those availing themselves of a General Authorization would be required to continuously monitor their use of the VCS Hardware or Completed Connected Vehicles covered by the General Authorization to ensure the Authorization still applies. If a change would render the transaction ineligible for a General Authorization, such as a change in the vehicle's use, the VCS Hardware Importer or Connected Vehicle Manufacturer would be required to

apply for a Specific Authorization and to cease engaging in such transaction unless and until a Specific Authorization is granted. For example, if a Completed Connected Vehicle that incorporates Covered Software or VCS Hardware that is designed, developed, manufactured, or supplied by a person owned by, controlled by, or subject to the jurisdiction or direction of the PRC or Russia is no longer engaged in display, research, or testing, the VCS Hardware Importer or the Connected Vehicle Manufacturer would be required to seek a Specific Authorization. Similarly, if the VCS Hardware Importer or Connected Vehicle Manufacturer exceeds total Model Year production of 1,000 units, or if a Completed Connected Vehicle that incorporates Covered Software or VCS Hardware that is designed, developed, manufactured, or supplied by a person owned by, controlled by, or subject to the jurisdiction or direction of the PRC or Russia is to be used on public roadways for 30 or more days in any calendar year, the VCS Hardware Importer or Connected Vehicle Manufacturer would be required to seek a Specific Authorization from the Department.

(5) An identification, to the extent practicable, of all relevant Federal rules that may duplicate, overlap or conflict with the proposed rule. This rulemaking does not duplicate or conflict with any Federal rules.

(6) A description of any significant alternatives to the proposed rule that accomplish the stated objectives of Executive Order 13984 and Executive Order 14110 and applicable statutes and that would minimize any significant economic impact of the proposed rule on small entities.

The Department has proposed what it believes to be "the least restrictive means necessary [by] tailor[ing] the prohibition to address the undue or unacceptable risk" (*see* 15 CFR Part 791.109(c)) and believes that the proposed rule will materially address significant risks for the United States or U.S. persons while balancing the overall compliance costs of the rule and minimizing the impact on small entities. Below is a description of alternatives considered by the Department; the Department invites comment on these alternatives.

No-action alternative: While the alternative of taking no action would be less costly for Connected Vehicle Manufacturers and VCS Hardware Importers, the no-action alternative is not preferred because the risks presented by foreign adversary involvement in the ICTS of the U.S. Connected Vehicle market could lead to catastrophic negative events for U.S. national security, including the security of U.S. critical infrastructure, and U.S. persons.

More stringent alternatives: The Department considered several more stringent regulatory approaches, including regulating additional Connected Vehicle component systems not included in this proposed rule. For example, the Department considered the risks posed by various Connected Vehicle component systems, including ADS, telematics, battery management systems (BMS), automated driver assistance systems

(ADAS), vehicle operating systems (OS), and satellite or cellular telecommunication systems. The Department currently believes the best approach to address the risks posed by Connected Vehicles and Connected Vehicle components from foreign adversary nations is to focus the scope of the NPRM on PRC- and Russian-supplied VCS Hardware (which encompasses both telematics and satellite or cellular telecommunication systems) and Covered Software. Other systems under consideration, such as ADAS, seem to have a low risk of data exfiltration or, in the case of vehicle OS, would involve regulation that is expected to be extremely burdensome on industry.

Preferred alternative: The proposed rule is the preferred alternative. The Department assesses that the regulatory approach outlined in this proposed rule would have the highest net benefit for Connected Vehicle Manufacturers, VCS Hardware Importers, and consumers. The Department currently believes the provisions in the proposed rule are also to be, for the reasons articulated above and in the NPRM's preamble, "the least restrictive means necessary…to address the undue or unacceptable risk" presented by Covered Software and VCS Hardware in Connected Vehicles.

C. Paperwork Reduction Act

The Paperwork Reduction Act of 1995 (44 U.S.C. 3501, *et seq.*) (PRA) provides that an agency generally cannot conduct or sponsor a collection of information, and no person is required to respond nor be subject to a penalty for failure to comply with a collection of information subject to the requirements of the PRA, unless that collection has obtained OMB approval and displays a currently valid Office of Management and Budget (OMB) Control Number.

This proposed rule will create new information collection requirements, which are subject to review and approval by OMB under the PRA. Specifically, this proposed rule would require Connected Vehicle Manufacturers and VCS Hardware Importers to submit annual Declarations of Conformity certifying that their import of VCS Hardware and/or import or manufacture of Completed Connected Vehicles does not involve hardware or software subject to the prohibitions in this proposed rule. Additional requirements for the Declarations of Conformity include supplying technical information regarding the hardware or software in question and providing a Bill of Materials for applicable software, hardware, or both.

Moreover, entities seeking Specific Authorizations from the Department to engage in otherwise Prohibited Transactions will have to file information with the Department, submissions of which are also subject to the PRA. Applications for a Specific Authorization would require, but are not limited to, a description of the nature of the otherwise Prohibited Transaction(s). For entities that are covered by a General Authorization, a self-certification, without need to notify the Department, would be required (*see* Section VI of the NPRM). The Department proposes to require Connected Vehicle Manufacturers and VCS Hardware Importers to maintain complete records related to any transaction for which a Declaration of Conformity, General Authorization, or Specific Authorization would be required by this rule for a period of ten years, consistent with IEEPA's statute of limitations. These records would include any transaction for which the Connected Vehicle Manufacturer or VCS Hardware Importer has not yet sought an authorization. The Department expects said records to include all information submitted in

applications, as well as business records related to the execution of any ICTS transaction subject to the rule, such as contracts, import records, bills of sale, and all other files the Department may deem pertinent in assessing compliance with this proposed rule. Lastly, entities seeking an advisory opinion from BIS would have to file information with the Department, though this is an optional process for parties looking for additional clarity on proposed transactions. BIS anticipates that this collection would be largely similar to its program in administering 15 CFR 748.3, as it would require similar information and the process for submission is analogous. BIS seeks comment on how many entities would request an advisory opinion in order to better understand the associated costs.

The Department estimates that the initial burden placed on applicable entities would be 180 to 240 hours. This estimate takes into account the one-time initial cost (in hours) per entity to comply with the rule, including reading and understanding the rule's provisions. Every subsequent year, the Department anticipates that the total annual cost burden (in hours) for applicable entities to implement the rule would be 100 to 500 hours.

The Department assesses that there are 42 to 281 entities potentially impacted by the proposed rule and that the initial cost burden for these entities is between $30,964 and $38,554. This estimate takes into account the one-time initial cost per entity to comply with the rule, including reading and understanding the rule's provisions. Every subsequent year, the Department anticipates that the total annual cost burden for applicable entities to implement the rule will be $16,133 to $80,667 a year (average of operations manager, engineer, and lawyer hourly salaries in Table 2 [$484/hour / 3 = $161.33] * [100 and 500 hours]). The annual cost burden placed on impacted entities includes (but is not limited to) producing the necessary HBOMs and SBOMs and documenting due diligence efforts. These hour and cost estimates are subject to variations among responsible entities due to application type. Declarations of Conformity will need to be submitted annually at minimum, while Specific Authorizations will need to be updated on an as-needed basis.

The estimated annual federal salary cost to the U.S. Government is $1,130,000 [500 Declaration of Conformity/Specific Authorization notifications per year * two staff at a GS-13 salary ($113/hour * 2 = $226/hour) * average of 10 hours each to review each notification]. The $113 per staff member per hour cost estimate for this information collection is consistent with the GS-scale salary data for a GS-13 Step 1 (*https://www.opm.gov/policy-data-oversight/pay-leave/salaries-wages/salary-tables/pdf/2024/DCB.pdf*) multiplied by a factor of 2 to include the cost of benefits and overhead.

The total estimated annual cost to the U.S. Government is $1,437,982.00. The calculation is as follows: Federal Employee Salaries (2 full-time employees) [$1,130,000.00] + Federal Government Overhead @ 20% [$226,000.00] + Legal Support (GS-15 Step 1 salary (multiplied by 2 to include the cost of benefits and overhead) @ 25%) [$81,982.00] = $1,437,982.00.

The Department requests comments on the information collection and recordkeeping requirements associated with this proposed rule. These comments will help the Department:

> (i) evaluate whether the information collection is necessary for the proper performance of our agency's functions, including whether the information will have practical utility;

(ii) evaluate the accuracy of our estimate of the burden of the information collection, including the validity of the methodology and assumptions used;

(iii) enhance the quality, utility, and clarity of the information to be collected; and

(iv) minimize the burden of the information collection on those who are to respond (such as through the use of appropriate automated, electronic, mechanical, or other technological collection techniques or other forms of information technology, e.g., permitting electronic submission of responses).