

UNITED STATES PATENT AND TRADEMARK OFFICE

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BEFORE THE PATENT TRIAL AND APPEAL BOARD

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**HARMAN INTERNATIONAL INDUSTRIES, INC.**

Petitioner,

v.

**ST CASESTECH LLC,**

Patent Owner.

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Case IPR2024-01299

U.S. Patent No. 8,319,620

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**PETITION FOR *INTER PARTES* REVIEW**

**TABLE OF CONTENTS**

|                                                            |     |
|------------------------------------------------------------|-----|
| EXHIBIT LIST .....                                         | iii |
| TABLE OF ABBREVIATIONS .....                               | iv  |
| LIST OF CHALLENGED CLAIMS .....                            | v   |
| I. INTRODUCTION .....                                      | 1   |
| II. MANDATORY NOTICES .....                                | 3   |
| A. Real Party-in-Interest .....                            | 3   |
| B. Related Matters.....                                    | 3   |
| C. Counsel and Service Information:.....                   | 4   |
| III. PAYMENT OF FEES .....                                 | 5   |
| IV. REQUIREMENTS FOR <i>INTER PARTES</i> REVIEW .....      | 5   |
| A. Grounds for Standing .....                              | 5   |
| B. Identification of Challenge.....                        | 5   |
| 1. Specific Art on Which the Challenge Is Based .....      | 5   |
| 2. Statutory Grounds on Which the Challenge Is Based ..... | 6   |
| V. '620 PATENT AND PROSECUTION HISTORY .....               | 6   |
| A. '620.....                                               | 6   |
| B. Prosecution History .....                               | 8   |
| VI. §325(d) AND §314(a) DISCRETION DOES NOT APPLY .....    | 9   |
| A. §325(d) .....                                           | 9   |
| B. §314(a).....                                            | 10  |
| VII. LEVEL OF ORDINARY SKILL IN THE ART .....              | 10  |
| VIII. CLAIM CONSTRUCTION .....                             | 11  |

|     |                                                                        |    |
|-----|------------------------------------------------------------------------|----|
| IX. | GROUND OF UNPATENTABILITY .....                                        | 11 |
| A.  | Ground 1: Kim in view of Kobayashi (Claims 1-4 and 15).....            | 12 |
| 1.  | Overview of Kim .....                                                  | 12 |
| 2.  | Overview of Kobayashi .....                                            | 14 |
| 3.  | Motivation to Apply Kobayashi’s Teachings to Kim.....                  | 15 |
| 4.  | Claim Chart .....                                                      | 18 |
| B.  | Ground 2: Kim in view of Bergholz (Claims 1-4, 6-8, and 15).....       | 36 |
| 1.  | Overview of Bergholz.....                                              | 36 |
| 2.  | Motivation to Apply Bergholz’s Teachings to Kim .....                  | 37 |
| 3.  | Claim Chart .....                                                      | 41 |
| C.  | Grounds 3-4: Grounds 1-2 in further view of Hermann (Claim 5)<br>..... | 48 |
| D.  | Ground 5: Mohan in view of Bergholz (Claims 6 and 9-14).....           | 50 |
| 1.  | Overview of Mohan .....                                                | 50 |
| 2.  | Motivation to Apply Bergholz’s Teachings to Mohan.....                 | 52 |
| 3.  | Claim Chart .....                                                      | 57 |
| X.  | SECONDARY CONSIDERATIONS.....                                          | 74 |
| XI. | CONCLUSION .....                                                       | 74 |

**EXHIBIT LIST**

| <b>Exhibit No.</b> | <b>DESCRIPTION</b>                                                                                                                                       |
|--------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------|
| 1001               | U.S. Patent No. 8,319,620 (“620”)                                                                                                                        |
| 1002               | File History of U.S. Application No. 12/487,639 (“’620FH”)                                                                                               |
| 1003               | Declaration of Dr. Sayfe Kiaei in Support of Petition for <i>Inter Partes</i> Review of U.S. Patent No. 8,319,620 (“Kiaei”)                              |
| 1004               | Certified Translation of Korean Patent Application Publication No. KR10-2004-0091262 (“Kim”)                                                             |
| 1005               | Korean Patent Application Publication No. 10-2004-0091262                                                                                                |
| 1006               | Certified Translation of Japanese Patent Publication No. JPH06-325291 (“Kobayashi”)                                                                      |
| 1007               | Japanese Patent Publication No. JPH06-325291                                                                                                             |
| 1008               | Certified Translation of German Patent Application Publication No. DE19749372 (“Bergholz”)                                                               |
| 1009               | German Patent Application Publication No. DE19749372                                                                                                     |
| 1010               | U.S. Patent No. 6,360,187 (“Hermann”)                                                                                                                    |
| 1011               | U.S. Patent No. 7,791,499 (“Mohan”)                                                                                                                      |
| 1012               | U.S. Patent No. 6,150,927 (“Nesbitt”)                                                                                                                    |
| 1013               | United States District Courts - National Judicial Caseload Profile                                                                                       |
| 1014               | Complaint for Patent Infringement, <i>Staton Techiya, LLC v. Harman International Industries, Inc.</i> , No. 1:23-cv-801, D.I. 1 (D. Del. July 25, 2023) |
| 1015               | Ito, <i>Visual Distraction While Driving: Trends in Research and Standardization</i> , 25 IATSS Research 20-28 (2001) (“Ito”)                            |
| 1016               | U.S. Patent Application Publication No. 2005/0074131                                                                                                     |

| <b>Exhibit No.</b> | <b>DESCRIPTION</b>                                                                                                           |
|--------------------|------------------------------------------------------------------------------------------------------------------------------|
| 1017               | U.S. Patent Application Publication No. 2006/0030987 (“Akita”)                                                               |
| 1018               | U.S. Patent Application Publication No. 2003/0138118 (“Stahl”)                                                               |
| 1019               | Excerpts of MICHAEL H. COHEN, VOICE USER INTERFACE DESIGN (2004) (“Cohen”)                                                   |
| 1020               | U.S. Patent Application Publication No. 2006/0116175 (“Chu”)                                                                 |
| 1021               | U.S. Patent No. 6,219,645 (“Byers”)                                                                                          |
| 1022               | U.S. Patent Application Publication No. 2005/0154505 (“Nakamura”)                                                            |
| 1023               | U.S. Patent Application Publication No. 2008/0117038 (“Stark”)                                                               |
| 1024               | Declaration of Jonathan Bradford in Support of Petition for <i>Inter Partes</i> Review of United States Patent No. 8,319,620 |

### TABLE OF ABBREVIATIONS

| <b>Abbreviation</b> | <b>DESCRIPTION</b>                                         |
|---------------------|------------------------------------------------------------|
| '620                | U.S. Patent No. 8,319,620 (Ex. 1001)                       |
| '620FH              | File History of U.S. Application No. 12/487,639 (Ex. 1002) |
| IPR                 | <i>Inter Partes</i> Review                                 |
| Petitioner          | Petitioner                                                 |
| PO                  | Patent Owner                                               |
| POSITA              | Person of Ordinary Skill in the Art                        |
| PTAB                | Patent Trial and Appeal Board                              |
| USPTO               | United States Patent and Trademark Office                  |

## LIST OF CHALLENGED CLAIMS

**[1.pre]** A vehicle situation awareness device for a vehicle comprising:

**[1.a]** a notification device in the vehicle configured to emit an audio signal;

**[1.b]** an internal microphone configured to measure an internal acoustic signal in the vehicle;

**[1.c]** an ambient microphone configured to measure an ambient acoustic signal external to the vehicle; and

**[1.d]** a processor configured to:

**[1.d.i]** determine an internal sound pressure level (SPL) in the vehicle based on the internal acoustic signal,

**[1.d.ii]** identify at least one sonic signature from the ambient acoustic signal, and

**[1.d.iii]** when the at least one sonic signature is identified, determine whether to send an emit signal to the notification device to emit the audio signal based on the internal SPL.

**[2]** The awareness device according to claim 1, where the notification device includes a receiver.

**[3]** The awareness device according to claim 1, where the notification device further includes a video display.

**[4]** The awareness device according to claim 1, where the audio signal includes at least one of the ambient acoustic signal, a voice message or a non-voice message.

**[5]** The awareness device according to claim 1, where the processor adjusts a reproduction SPL of the audio signal based on the internal SPL.

**[6.pre]** A vehicle situation awareness device for a vehicle comprising:

**[6.a]** a notification device in the vehicle configured to emit an alert signal including an audio signal;

**[6.b]** an internal microphone configured to measure an internal acoustic signal in the vehicle;

**[6.c]** an external microphone configured to measure a vehicle equipment signal; and

**[6.d]** a processor configured to:

**[6.d.i]** determine an internal sound pressure level (SPL) in the vehicle based on the internal acoustic signal,

**[6.d.ii]** identify at least one sonic signature from the vehicle equipment signal, and

**[6.d.iii]** when the at least one sonic signature is identified, determine whether to send an emit signal to the notification device to emit the audio signal based on the internal SPL.

**[7]** The awareness device according to claim 6, where the notification device includes a receiver.

**[8]** The awareness device according to claim 6, where the notification device includes a video display.

**[9]** The awareness device according to claim 6, where the alert signal is an input to a second processor, the alert signal used by the second processor to affect an operation of the vehicle.

**[10]** The awareness device according to claim 9, where the operation is at least one of shifting gears, decreasing power usage, sending a remote signal, operating a windshield wiper, and changing a headlight illumination.

**[11.pre]** A vehicle situation awareness device for a vehicle comprising:

**[11.a]** a notification device in the vehicle configured to emit an alert signal to a first processor, the first processor used to modify an operation of the vehicle responsive to the alert signal;

**[11.b]** an internal microphone configured to measure an interior vehicle acoustic signal in the vehicle;

**[11.c]** an external microphone configured to measure an external vehicle acoustic signal; and

**[11.d]** a second processor, configured to:

**[11.d.i]** determine an interior sound pressure level (SPL) in the vehicle based on the interior vehicle acoustic signal;

**[11.d.ii]** identify at least one sonic signature from at least one of the interior vehicle acoustic signal or the external vehicle acoustic signal, and

**[11.d.iii]** when the at least one sonic signature is identified, determine whether to send an emit signal to the notification device to emit the alert signal based on the interior SPL.

**[12]** The awareness device according to claim 11, where the at least one sonic signature is a vocal command.

**[13]** The awareness device according to claim 12, where the alert signal uniquely corresponds to the voice command.

**[14]** The awareness device according to claim 11, where the operation includes one of at least opening a door, opening a trunk, opening a gas tank access panel, opening the hood, turning on headlights, turning on an audio alarm, and beginning an audio recording.

**[15.pre]** A method of situation awareness facilitation for a vehicle driver of a vehicle, the method comprising:

**[15.a]** receiving an internal acoustic signal from inside the vehicle and converting the internal acoustic signal to an internal acoustic electronic signal;

**[15.b]** receiving an ambient acoustic signal from outside the vehicle and converting the ambient acoustic signal into an ambient acoustic electronic signal;

**[15.c]** determining, by a processor, an internal sound pressure level (SPL) in the vehicle based on the internal acoustic electronic signal;

**[15.d]** matching, by the processor, the ambient acoustic electronic signal to one or more stored reference electronic signals; and

**[15.e]** determining whether to send an acoustic message associated with a matched reference electronic signal to a speaker in the vehicle based on the internal SPL.

Pursuant to §§311-319 and §42.1,<sup>1</sup> Harman International Industries, Incorporated (“Petitioner”) petitions for *inter partes* review (“IPR”) of claims 1-15 (“Claims”) of U.S. Patent No. 8,319,620 (Ex. 1001, “’620”), assigned to ST CasesTech, LLC (“PO”). There is a reasonable likelihood—and it is highly likely—that at least one challenged claim is unpatentable as explained herein. Petitioner requests review of the Claims and judgment finding them unpatentable under §103.

## I. INTRODUCTION

The ’620 is generally directed to a device that detects a sound—such as a siren—using an ambient microphone, and determines whether to notify a driver of the detected sound based on the volume inside of a vehicle, which is measured using an internal microphone. The driver is notified only if the measured volume inside the vehicle is too loud that the driver would not be able to hear the detected sound. ’620, cl. 1. Kiaei, ¶32.

The Claims were allowed after being amended to recite a **notification device** “in the vehicle” configured to emit “an audio signal,” “an **internal microphone**

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<sup>1</sup> Section cites reference 35 U.S.C. (pre-AIA) or 37 C.F.R. as context indicates. All emphasis/annotations added unless noted. Figure annotations herein generally quote the Claims for reference. Citations herein are exemplary and not meant to be limiting.

configured to measure an internal acoustic signal in the vehicle,” “an **ambient microphone**...external to the vehicle,” and a **processor** “configured to[] determine an internal sound pressure level (SPL) in the vehicle based on the internal acoustic signal,” “identify” at least one sonic signature from the “ambient acoustic signal,” and when the sonic signature is identified, “determine whether to send an emit signal to the notification device to emit the audio signal based on the internal SPL.” ’620 File History (“’620FH, Ex. 1002), 83-86.

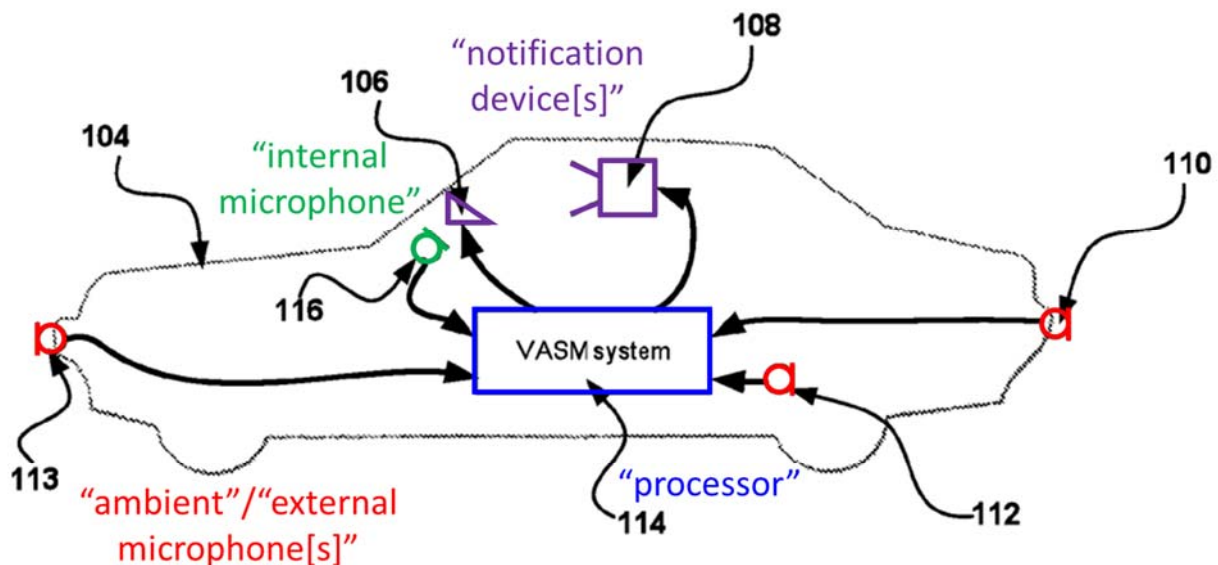
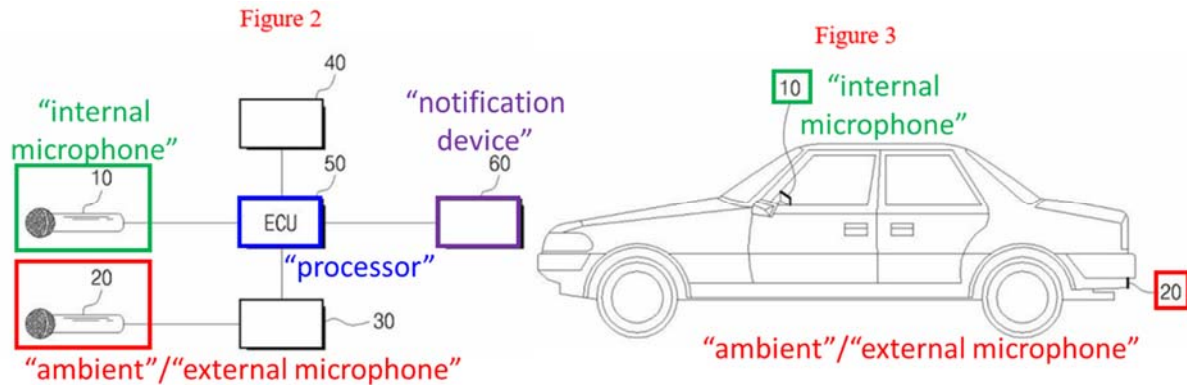


FIG. 1

'620, Fig. 1. Kiaei, ¶33.

But these concepts were not new. **Kim** discloses **indoor microphone 10** that measures the volume inside the vehicle and **outdoor microphone 20** that measures the sound outside the vehicle. **ECU 50** detects a sound, such as a horn, received by

**outdoor microphone 20** and outputs a warning message to **display 60** to the driver if the volume level measured by **indoor microphone 10** is greater than a certain level. Kim, 1-3. Kiaei, ¶34.



Kim, Figs. 2-3. **Kobayashi** discloses sending both **audio and visual notifications** to a driver when a particular sound is detected, such as a siren. Kobayashi, [0019]-[0021]. Kiaei, ¶¶35-36.

Accordingly, Petitioner requests that the Board institute trial and find the Claims unpatentable.

## II. MANDATORY NOTICES

### A. Real Party-in-Interest

Petitioner Harman International Industries, Inc. is the real party-in-interest. No other parties had access to or control over the present Petition, and no other party funded or participated in preparation of the present Petition.

### B. Related Matters

The '620 is the subject of the following co-pending civil action:

*Staton Techiya, LLC v. Harman Int’l Indus., Inc*, 1:23-cv-00801-JCG (D. Del.)  
 (“Delaware Case”).

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Petitioner consents to electronic service of documents to the email addresses  
of the counsel identified above.

### III. PAYMENT OF FEES

The undersigned authorizes the Office to charge the fee required by §42.15(a) and any additional fees that might be due to Deposit Account No. 18-1945, under Order No. 111496-0011-652.

### IV. REQUIREMENTS FOR *INTER PARTES* REVIEW

#### A. Grounds for Standing

Pursuant to §42.104(a), Petitioner certifies that the '620 is available for IPR. Petitioner and any real parties-in-interest are not barred or estopped from requesting IPR challenging the Claims on the Grounds identified herein.

#### B. Identification of Challenge

Pursuant to §§42.104(b)-(b)(1), Petitioner requests IPR of Claims 1-15, and that the Board cancel the same as unpatentable.

#### 1. Specific Art on Which the Challenge Is Based

Petitioner relies on the following prior art (Kiaei, ¶¶50-51):

| Name      | Ex.           | Publication/Title     | Filed     | Published/<br>Issued | Prior art<br>under at<br>least |
|-----------|---------------|-----------------------|-----------|----------------------|--------------------------------|
| Kim       | 1004-<br>1005 | KR10-2004-<br>0091262 | 4/21/2003 | 10/28/2004           | §102(b)                        |
| Kobayashi | 1006-<br>1007 | JPH06-325291          | 2/28/1991 | 11/25/1994           | §102(b)                        |
| Bergholz  | 1008-<br>1009 | DE19749372            | 11/7/1997 | 5/12/1999            | §102(b)                        |
| Hermann   | 1010          | US6,360,187           | 6/28/1999 | 3/19/2002            | §102(b)                        |
| Mohan     | 1011          | US7,791,499           | 1/15/2008 | 9/7/2010             | §102(e)                        |

Each of **Kim**, **Kobayashi**, **Bergholz**, and **Hermann** was published at least one year before the earliest possible claimed priority date of the '620 of 6/19/2008, and therefore qualifies as prior art under §102(b).

**Mohan** was filed 1/15/2008, before the earliest possible claimed priority date of the '620 of 6/19/2008, and therefore qualifies as prior art under §102(e).

## 2. Statutory Grounds on Which the Challenge Is Based<sup>2</sup>

| Ground | Claims           | Basis | References                             |
|--------|------------------|-------|----------------------------------------|
| 1      | 1-4 and 15       | §103  | Kim in view of Kobayashi               |
| 2      | 1-4, 6-8, and 15 |       | Kim in view of Bergholz                |
| 3-4    | 5                |       | Grounds 1-2 in further view of Hermann |
| 5      | 6 and 9-14       |       | Mohan in view of Bergholz              |

## V. '620 PATENT AND PROSECUTION HISTORY

### A. '620

The purported “invention” of the '620 relates to “devices and methods for vehicle situation awareness” that use microphones and a processor to detect target sounds and determine whether to send a signal to a notification device. '620, Abstract, 1:14-15, 2:27-37, 4:30-42, 5:37-42. As shown in Fig. 1, the “[v]ehicle ambient sound monitoring system (VASM)” includes “at least one **Ambient Sound Microphone (ASM) 110, 112, 113**...mounted on the exterior of the vehicle and

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<sup>2</sup> See Kiaei, ¶¶52-53.

configured to detect sound around the vehicle 104” and an “**internal microphone sensor 116**...configured to detect the sound pressure level (SPL)...within the vehicle cabin.” ’620, 3:37-41, 4:30-32. The VASM system comprises a “**signal processing unit**” to detect “signature sounds with the **ASMs**,” such as “sirens” or “car horns.” ’620, 3:51-63, 4:60-5:3, Fig. 2. If a sound signature is detected, “the SPL in the interior cabin of the vehicle is determined...using [the] **internal microphone**.” ’620, 5:34-37, Fig. 3. If “the SPL of the interior cabin of the vehicle is greater than a predetermined threshold,” then an alert is issued, such as “[a]n audible warning” using an “**internal loudspeaker**” and/or “[a] visual warning” using a “**visual display**.” ’620, 3:64-4:8, 4:13-21, 4:61-5:3, 5:37-42, Fig. 3.

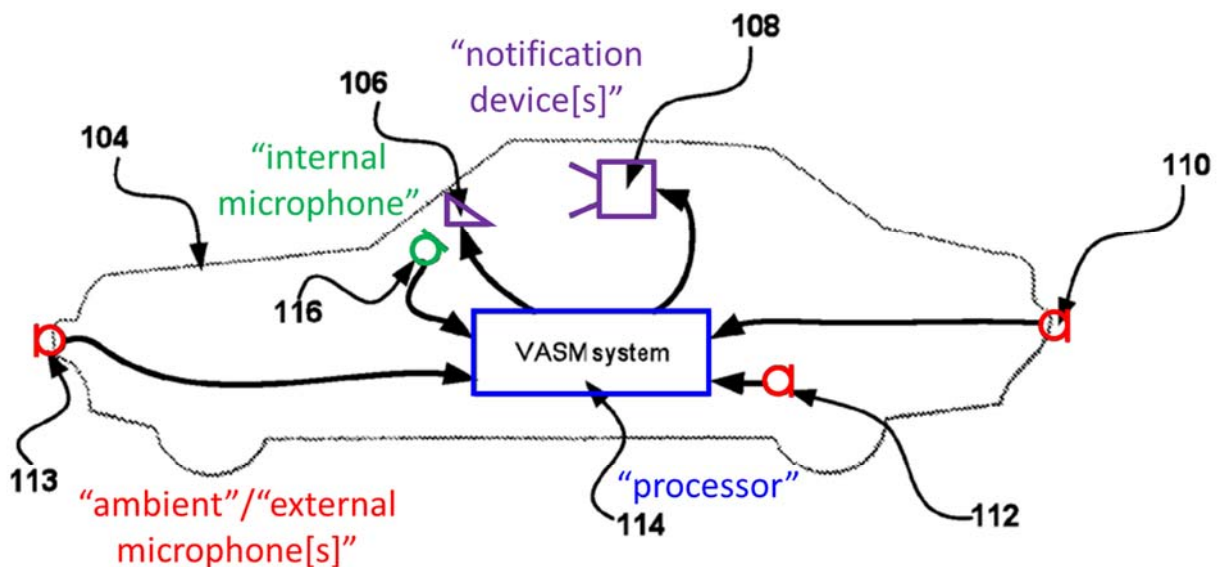


FIG. 1

’620, Fig. 1. Kiaei, ¶¶37-38.

**B. Prosecution History**

U.S. Patent Application 12/487,639, which matured into the '620, was filed 6/18/2009. The Examiner issued a Non-Final Office Action on 2/23/2012 rejecting the as-filed claims under §§102(b) and 103 based on U.S. 6,150,927 ("Nesbitt"). '620 FH (Ex. 1002), 57-63. Applicant amended independent claim 1 to recite a notification device "in the vehicle" configured to emit "an audio signal," "an internal microphone configured to measure an internal acoustic signal in the vehicle," "an ambient microphone...external to the vehicle," and a processor "configured to[] determine an internal sound pressure level (SPL) in the vehicle based on the internal acoustic signal," "identify" at least one sonic signature from the "ambient acoustic signal," and when the sonic signature is identified, "determine whether to send an emit signal to the notification device to emit the audio signal based on the internal SPL." *Id.*, 83-86. Applicant amended independent claims 6 and 15 to include substantially the same limitations. *Id.*, 83-84, 86. Applicant amended independent claim 11 (prosecuted as claim 14) similarly but included that the notification device is configured to emit "an alert signal to a...first processor used to modify an operation of the vehicle responsive to the alert signal." *Id.*, 85. Kiaei, ¶¶39-41.

The claims were subsequently allowed on 7/16/2012 and the patent issued on 11/7/2012. *Id.*, 123-127. Kiaei, ¶42.

**VI. §325(d) AND §314(a) DISCRETION DOES NOT APPLY**

**A. §325(d)**

Under the two-part *Advanced Bionics* framework, the Board should not exercise discretion.

**The Grounds raised by this Petition are not the same or substantially the same as the art or arguments raised during '620's prosecution. Kim, Kobayashi, Bergholz, Hermann, and Mohan** were not considered during prosecution. These references' disclosures of, *e.g.*, [1.a]-[1.d.iii] are not substantially similar to those the Examiner considered. *See* §IX.

Further, the prior art references the Examiner used to reject the claims during prosecution are not substantially the same as any of the references relief upon in the Grounds of this Petition. For example, the Examiner rejected the claims under §102 and §103 based on U.S. 6,150,927 (“Nesbitt,” Ex. 1012) alone, which discloses an “anti-vandalism detection and alarm system” that uses “[h]igh frequency microphone sensors...mounted on selected windows” to detect vibrations having “distinct characteristic[s]” to report vandalism. Nesbitt, Abstract, 4:43-65, 5:22-35, Fig. 6. However, Nesbitt does not teach a device including, *e.g.*, (1) an internal microphone, (2) an ambient microphone, and (3) a processor that determines the internal SPL in the vehicle and sends an emit signal to the notification device based

on the internal SPL. Indeed, as discussed in §V.B, the claims were allowed when applicant amended the claims to include such limitations. *Kiaei*, ¶¶40-43.

**Even if the art or arguments were substantially the same, the Examiner erred in a manner material to the patentability of the Claims.** Because the Examiner “did not expressly consider” **Kim, Kobayashi, Bergholz, Hermann, and Mohan** as prior art, “[i]t is...difficult, if not impossible, to discern exactly why the Examiner allowed the claims of the [’329] patent, or how the Examiner might have considered the arguments presented in the Petition, had they been presented to the Examiner.” *Bowtech, Inc. v. MCP IP, LLP*, IPR2019-00379, Pap. 14, \*19-20 (declining to exercise §325(d) discretion where Petitioner did not “even attempt[] to explain how the Examiner erred in any way”); see §IX.

**B. §314(a)**

The PTAB should not exercise its §314(a) discretion where, as here, no schedule has been set in the Delaware Case (filed July 2023), and the median time to trial in Delaware is 33 months, which would set the Harman trial to about April 2026, one month after an expected FWD. Ex. 1013, 14. Ex. 1014.

**VII. LEVEL OF ORDINARY SKILL IN THE ART**

For purposes of this Petition only, Petitioner assumes the Claims are entitled to the 6/19/2008 filing date of provisional application no. 61/074,096, to which the ’620 claims priority. *Kiaei*, ¶¶45-46.

A person of ordinary skill in the art (“POSITA”) as of the claimed priority date of the ’620 would have had a bachelor’s degree in electrical or computer engineering, computer science, or a similar field, and at least two years of experience with signal or acoustic data processing systems. Kiaei, ¶¶46-47. More education can supplement practical experience, and vice-versa. *Id.*

### **VIII. CLAIM CONSTRUCTION**

Claim terms subject to IPR are construed using *Phillips v. AWH Corp.*, 415 F.3d 1303, 1313 (Fed. Cir. 2005). 37 C.F.R. §42.100(b). Only terms necessary to resolve the controversy need construction. *Nidec Motor Corp. v. Zhongshan Broad Ocean Motor*, 868 F.3d 1013, 1017 (Fed. Cir. 2017). Because the prior art asserted herein discloses embodiments within the Claims’ indisputable scope, the Board need not construe the Claims’ outer bounds. All claim terms should be construed according to their plain and ordinary meaning. Kiaei, ¶¶48-49.

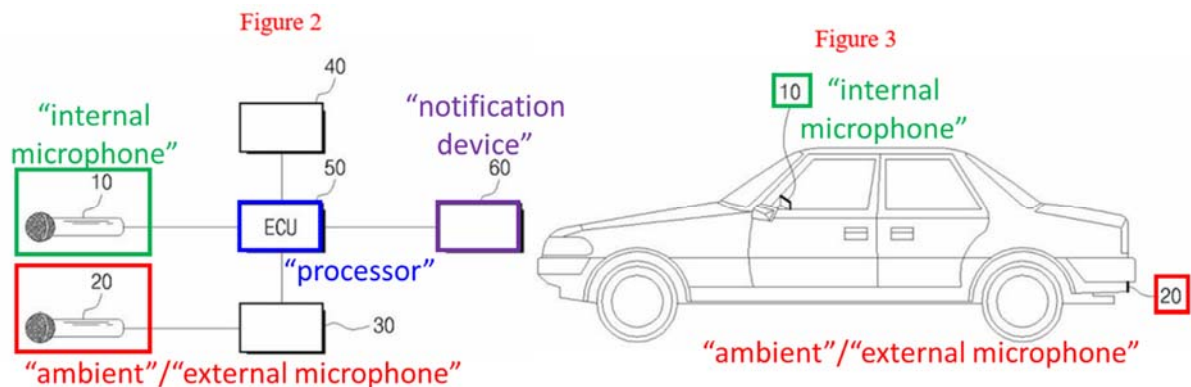
### **IX. GROUNDS OF UNPATENTABILITY**

This Petition is supported by the Declaration of Dr. Sayfe Kiaei, which describes the prior art’s scope and content at the time of and well before the ’620. *See Ex. 1003.* The prior art renders the Claims unpatentable based on the below Grounds. Kiaei.

**A. Ground 1: Kim in view of Kobayashi (Claims 1-4 and 15)**

**1. Overview of Kim**

**Kim** provides a solution that “enhanc[es] the safety of the vehicle by visually warning the driver when the horn of another vehicle occurs” and the “music output from the [vehicle’s] audio speaker” is high such that “the horn of another vehicle cannot be heard,” risking “a major accident.” Kim, 1-3. Kiaei, ¶¶54-55. **Kim** discloses “[a]n **indoor microphone (10)**...installed inside...the vehicle” that “measures the volume inside the vehicle” and “an **outdoor microphone (20)** installed...outside the vehicle” that “measures the sound generated around the vehicle.” Kim, 2, Figs. 2-3.



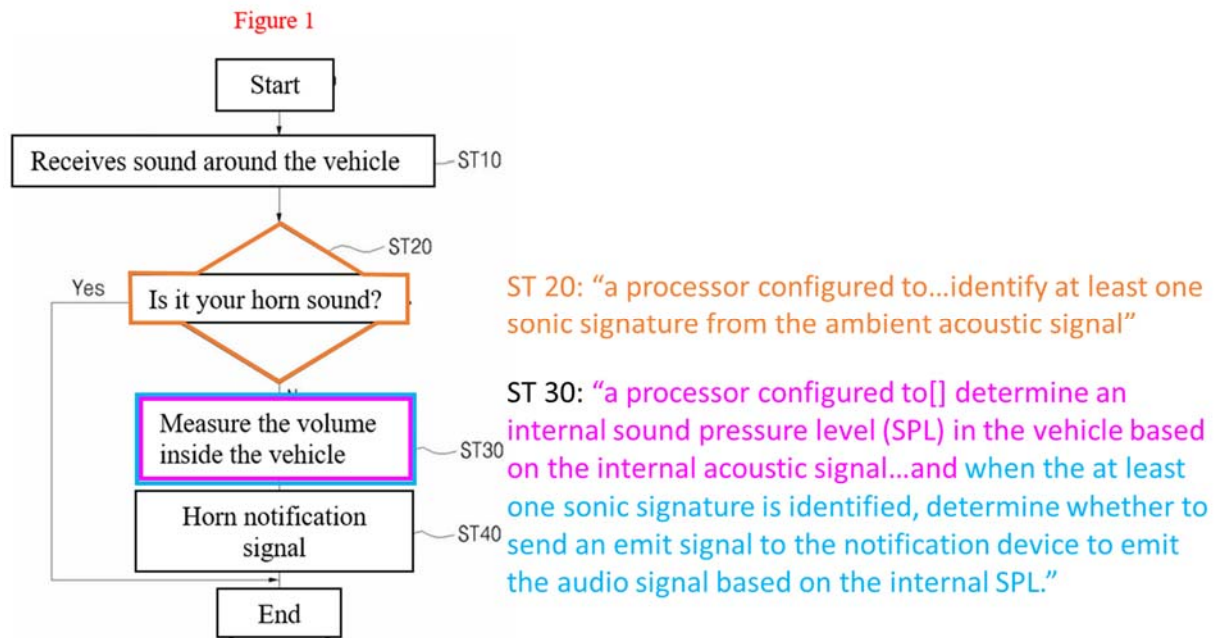
Kim, Figs. 2-3. Kiaei, ¶56.

**Kim** further discloses a horn notification method in which, at step ST10, frequency analyzer (30) measures “the frequency of the external sound received by

the **outdoor microphone (20)**,” and “**ECU (50)**<sup>3</sup> determines **whether the frequency measured by the frequency analyzer (30) includes the frequency corresponding to the horn (ST20)**.” Kim, 3. **ECU (50)** then determines whether “the horn sound [was] generated from vehicle” itself, and if not, at step ST30, “the **volume of the vehicle interior** using the **indoor microphone (10)**” is measured to determine if “the volume...is more than a certain level.” Kim, 3. If “the volume...is small,” the driver may hear the horn himself and a separate warning is unnecessary. Kim, 3. If “**the volume of the sound received by the indoor microphone (10) is greater than or equal to a certain level, the ECU (50) outputs a control signal**” to “displayer (60)” to “present[] a warning message...to notify the driver” at step ST40. Kim, 3.

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<sup>3</sup> The term “ECU” refers to an “electronic control unit.” Kiaei, ¶58.

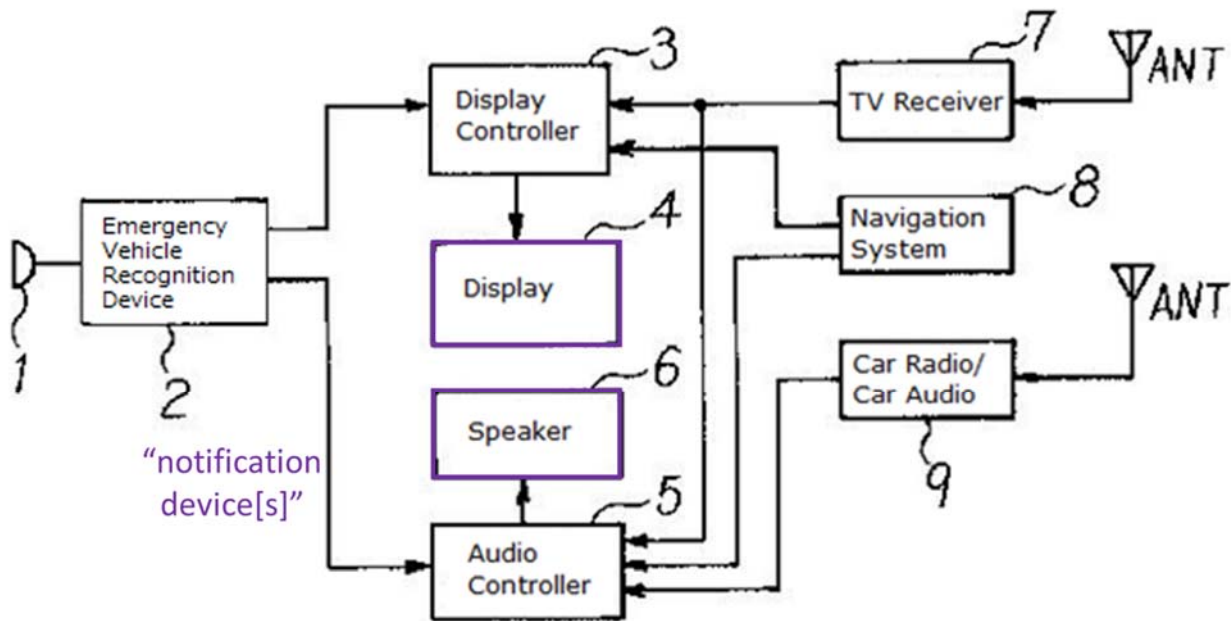


Kim, Fig. 1. Kiaei, ¶¶57-59.

## 2. Overview of Kobayashi

**Kobayashi** discloses “an emergency vehicle detection and alert device that detects the approach of an emergency vehicle using a microphone and recognition device” and “plays the siren or announces the approach of an emergency vehicle on the speakers.” Kobayashi, [0003]. A “microphone located outside the car” supplies signals to “emergency vehicle recognition device 2,” which “compares inputted signals with the patterns in [its] memory,” such as “emergency vehicle sirens.” Kobayashi, [0019]. Upon a match, “a signal is outputted to a display controller 3 and an audio controller 5” to generate both “alert screen video signals” for **display 4** and “an alert announcement” for **speaker 6**. Kobayashi, [0019]-[0020].

[Fig. 1]



Kobayashi, Fig. 1. Kiaei, ¶¶60-61.

### 3. Motivation to Apply Kobayashi's Teachings to Kim

**Kim** and **Kobayashi** are in the same field as the '620—which includes situation awareness—and are reasonably pertinent to the problems purportedly addressed by the '620—e.g., detecting sounds and responding thereto in vehicles. See '620, Abstract, 1:14-15, 2:27-37; Kim, 1-3; Kobayashi, Abstract, [0001]-[0005]. Like the '620, **Kim** and **Kobayashi** each contemplate detection systems comprising a microphone that detects a horn and/or siren from another vehicle and responds thereto, such as warning the driver of the sound. See '620, Abstract, 2:27-37; Kim, 1-3; Kobayashi, Abstract, [0001]-[0005], [0019]-[0020]. Kiaei, ¶¶62-65.

A POSITA would have been motivated to apply **Kobayashi's** teaching of audio notifications to **Kim's** notification device. Both **Kim** and **Kobayashi** concern the driver's cognizance of his/her surroundings, including sounds from other vehicles, and **Kobayashi** discloses providing both audio and visual warnings to a driver. Kobayashi, [0015] ("In the emergency vehicle detection and alert device described above, the display on the location indicator is combined with speaker sounds."). **Kim** discloses warning drivers of detected horns using visual notifications on a display. Kim, 3. However, a POSITA would also have been motivated to apply **Kobayashi's** teachings of audio notifications in implementing **Kim's** horn notification device to advantageously make the driver's experience safer. Kiaei, ¶¶66-67. Visual notifications divert drivers' attention and cause them to take their eyes off the road, whereas audio notifications allow drivers to maintain focus on driving the vehicle instead of splitting their focus on driving and processing a visual notification. See, e.g., Ito, *Visual Distraction While Driving: Trends in Research and Standardization*, 25 IATSS Research 20-28 (2001) (Ex. 1015) ("draw[ing] the driver's eye from the visual field where it belongs while driving and creates a visual distraction that may impede safety"). Kiaei, ¶¶67-68.

In view of **Kobayashi's** teachings of using both audio and visual warnings, a POSITA would have been motivated to modify **Kim's** horn notification device such that it provides visual warnings via displayer (60) and audio notifications via the

vehicle's "audio speaker." Kim, 3; Kobayashi, [0019]-[0021]. Kiaei, ¶69. Further, a POSITA would have been motivated to use the vehicle's already existing "audio speaker" as taught by **Kim** to advantageously simplify the system, obviating the need to include an additional speaker solely for horn notifications. Kiaei, ¶69. Indeed, **Kobayashi** teaches alerting the driver "by voice over the speakers of the car stereo system" such that using **Kim's** "audio speaker" for such audio notifications would have provided predictable results. Kobayashi, [0018]; Kim, 3. Kiaei, ¶69.

Further, **Kobayashi** teaches that when the siren sound is recognized, "an alert is announced over the speaker 6." Kobayashi, [0020]-[0021]. This is true even when "the volume of the sound equipment is turned up," so that "the driver is able to reliably recognize the approach of an emergency vehicle." Kobayashi, [0021]. In applying **Kobayashi's** audio warning teachings in implementing **Kim's** notification device, a POSITA would have been motivated to play an audio signal at a sound level above "the volume of the sound received by [**Kim's**] indoor microphone," so the audio signal is heard over the ambient noise in the vehicle. Kiaei, ¶70.

**Kim** teaches the ECU sends a control signal to displayer 60 if "the volume of the sound received by the indoor microphone (10) is greater than or equal to a certain level," such that the driver cannot hear "other sounds," such as the detected horn, not emanating from the audio speaker. Kim, 3. Kiaei, ¶71. In implementing **Kobayashi's** teachings in **Kim**, a POSITA would have understood that **Kim's** ECU

would send a control signal to play an audio warning if the internal SPL of the vehicle, measured by the indoor microphone, is greater than or equal to a certain level, such that the driver would not hear multiple horn sounds (e.g., the original horn sound and the notification regarding the detected horn sound). Kiaei, ¶71.

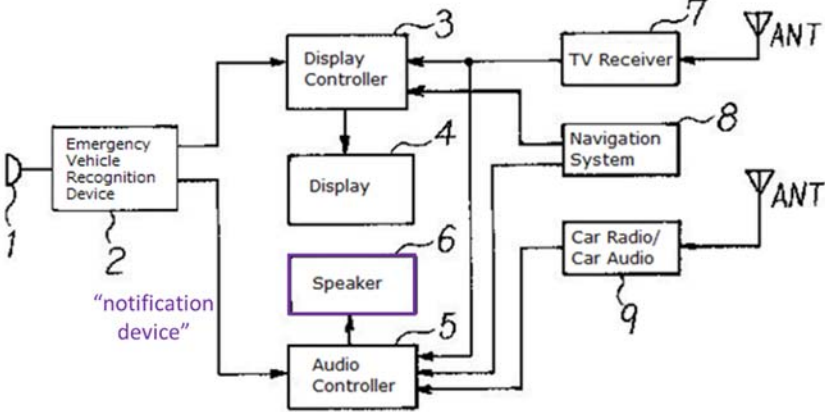
Accordingly, a POSITA would have had a reasonable expectation of success in applying **Kobayashi**'s teachings in implementing **Kim**'s horn notification device, as it was well-known in the art to give drivers audio and visual warnings. Kobayashi, [0015]. Indeed, the '620 patent identifies US2005/0074131 (Ex. 1016) as known, background art, which discloses using both audio and visual alerts for the driver. '620, 1:45-53, 1:66-2:8; Ex. 1016 (US2005/0074131), [0033] (using "Display 310 and sound system 312" to provide both audio a video notifications). Further, **Kim** already discloses "sounds...output from the audio speaker" (Kim, 3), and it would have been a straightforward application of **Kobayashi**'s teachings to use the audio speaker to issue audio notifications to the driver. Kiaei, ¶72.

#### 4. Claim Chart

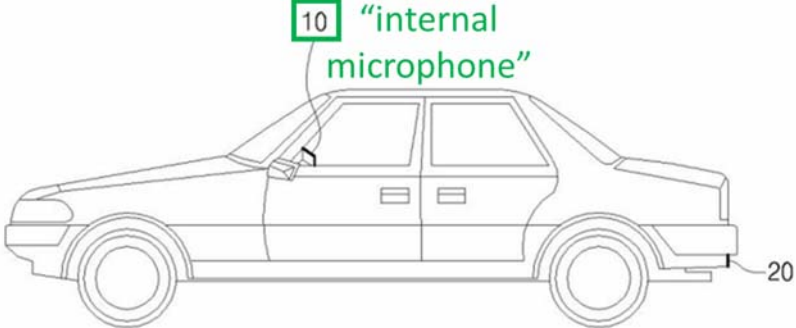
| '620 Claim                                                             | Kim in view of Kobayashi                                                                                                                                                                                                                                                                                       |
|------------------------------------------------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| [1.pre] A vehicle situation awareness device for a vehicle comprising: | <b>To the extent the preamble is limiting, Kim discloses a vehicle situation awareness device for a vehicle (e.g., "horn notification device" in a "vehicle").</b><br><b><u>E.g., Kim:</u></b><br><b>Kim</b> discloses a "horn notification device" that "enhanc[es] the safety of the vehicle" by warning the |

| '620 Claim                                                                            | Kim in view of Kobayashi                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               |
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|                                                                                       | <p>driver when another vehicle's horn is detected. Kim, 2-3. Kiaei, ¶¶74-76.</p> <ul style="list-style-type: none"> <li>• 2: "This invention relates to <b><i>a horn notification device of a counterpart vehicle</i></b>...that visually informs the driver of the occurrence of the horn sound of the other vehicle...."</li> <li>• 3: "the present invention...has the effect of <b><i>enhancing the safety of the vehicle by visually warning the driver</i></b> when the horn of another vehicle occurs."</li> </ul>                                                                                                                                                                                                                                                                                                                                                                                                                                                              |
| <p>[1.a] a notification device in the vehicle configured to emit an audio signal;</p> | <p><b>Kim discloses a notification device in the vehicle</b> (e.g., "displayer (60)") <b>configured to emit a signal</b> (e.g., "outputting a warning signal to a driver").</p> <p><b><u>E.g., Kim:</u></b></p> <p><b>See [1.pre]</b> (§IX.A.4). <b>Kim</b> further discloses "displayer (60)," which provides notifications, such as a "warning signal to a driver." Kim, 2-3. Kiaei, ¶¶77-80.</p> <ul style="list-style-type: none"> <li>• <b>Fig. 2:</b></li> </ul> <div> <p style="text-align: center; color: red;"><b>Figure 2</b></p> <pre> graph LR     10 --- ECU[50]     20 --- ECU     ECU --- 40     ECU --- 30     ECU --- 60     subgraph "notification device"         60     end </pre> </div> <ul style="list-style-type: none"> <li>• 2: "...<b><i>a horn notification device of another vehicle that visually informs the driver of the occurrence of the horn sound of the other vehicle...</i></b>"</li> </ul> |

| '620 Claim | Kim in view of Kobayashi                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             |
|------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
|            | <ul style="list-style-type: none"> <li>2: “[A] <i>displayer (60) for outputting a warning signal to a driver by a control signal output from the ECU (50).</i>”</li> <li>3: “...<i>displayer (60) presents a warning message such as ‘Horn’ to notify the driver that another vehicle has sounded a horn.</i>”</li> </ul> <p><b>Kobayashi discloses a notification device in the vehicle</b> (e.g., “speaker 6” in “vehicle”) <b>configured to emit an audio signal</b> (e.g., playing “alert[s]” after a “siren is recognized”).</p> <p><b><u>E.g., Kobayashi:</u></b></p> <p><b>Kobayashi</b> discloses an “emergency vehicle recognition device 2” that, when “the sound of the siren is recognized,” an “alert is announced over the speaker 6” of the “car stereo system,” such as by “play[ing] the siren” or “announc[ing] the approach of an emergency vehicle” using a “built-in speech synthesizer.” Kobayashi, [0003], [0018], [0020]-[0021]. Kiaei, ¶¶81-82.</p> <p>As discussed in §IX.A.3, a POSITA would have been motivated to apply <b>Kobayashi’s</b> audio notification teachings in implementing <b>Kim’s</b> horn notification device such that upon detection of a horn, an alert is played using <b>Kim’s</b> audio speaker. Kiaei, ¶83.</p> <ul style="list-style-type: none"> <li><b>Fig. 1:</b></li> </ul> |

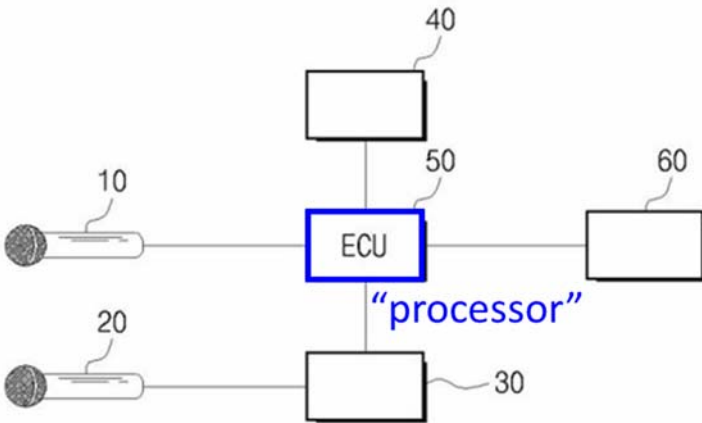
| '620 Claim | Kim in view of Kobayashi                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            |
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|            | <p>[Fig. 1]</p>  <ul style="list-style-type: none"> <li> <b>Abstract:</b> “[Purpose] To notify a driver of an approaching emergency vehicle <i>even when the windows of the vehicle are closed and the volume of the car stereo, etc., is turned up.</i> [Constitution] Signals from a microphone 1 are inputted to <b>an emergency vehicle recognition device 2, which detects the sound of an emergency vehicle siren and outputs signals</b> to a display controller 3 and <b>audio controller 5...The audio controller 5 generates an alert announcement from a built-in speech synthesizer and operates a speaker 6.</b>” </li> <li> <b>[0003]:</b> “...<b>emergency vehicle detection and alert device that detects the approach of an emergency vehicle using a microphone and recognition device,</b> temporarily stops the car stereo or other audio equipment, <b>plays the siren or announces the approach of an emergency vehicle on the speakers...</b>” </li> <li> <b>[0018]:</b> “<b>The driver is alerted to the information obtained in this way by voice over the speakers of the car stereo....</b>” </li> <li> <b>[0020]:</b> “...<b>audio controller 5 generates an alert announcement using the built-in speech</b> </li> </ul> |

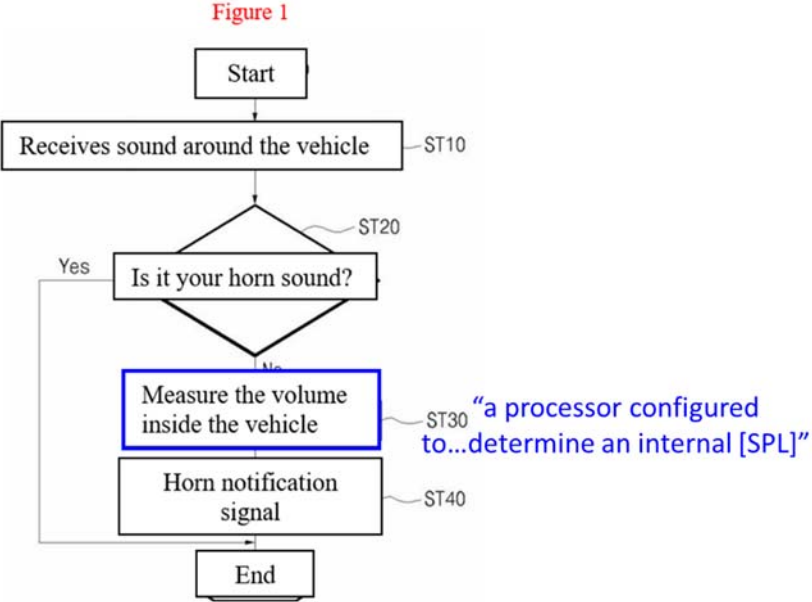
| '620 Claim                                                                                            | Kim in view of Kobayashi                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              |
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|                                                                                                       | <p><i>synthesizer and these signals operate a speaker 6.</i></p> <ul style="list-style-type: none"> <li>• [0021]: “[W]hen an emergency vehicle approaches, <i>the sound of the siren is recognized using the microphone 1 and the emergency vehicle recognition device 2</i>, and...<i>an alert is announced over the speaker 6</i>...”</li> <li>• See also [0005], [0007], [0022]-[0023], [0026]-[0027]</li> </ul>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   |
| <p>[1.b] an internal microphone configured to measure an internal acoustic signal in the vehicle;</p> | <p><b>Kim discloses an internal microphone</b> (e.g., “indoor microphone (10)...installed inside...the vehicle”) <b>configured to measure an internal acoustic signal in the vehicle</b> (e.g., “for measuring the volume inside the vehicle”).</p> <p><u><b>E.g., Kim:</b></u></p> <p><b>See [1.pre] (§IX.A.4).</b></p> <p><b>Kim</b> further discloses “indoor microphone (10)” installed inside the vehicle for measuring the vehicle’s cabin volume. Kim, 1-2. Kiaei, ¶¶84-87.</p> <ul style="list-style-type: none"> <li>• <b>Fig. 2:</b></li> </ul> <div> <p style="text-align: center; color: red;">Figure 2</p> <pre> graph TD     40[40] --- 50[ECU 50]     50 --- 60[60]     50 --- 30[30]     10["internal microphone 10"] --- 50     20[20] --- 30   </pre> </div> <ul style="list-style-type: none"> <li>• <b>Fig. 3:</b></li> </ul> |

| '620 Claim                                                                                                       | Kim in view of Kobayashi                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               |
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|                                                                                                                  | <p style="text-align: center;">Figure 3</p>  <ul style="list-style-type: none"> <li>• 1: "...horn notification methods for other vehicles consisting of the <b>indoor microphone (10) that measures the volume inside the vehicle...</b>"</li> <li>• 2: "...<b>indoor microphone (10) for measuring the volume inside the vehicle...</b>"</li> <li>• 2: "[I]ndoor microphone (10) that measures the volume inside the vehicle and...<b>installed inside and outside the vehicle</b>, respectively, <b>to receive sound inside and outside the vehicle. It is preferable that the indoor microphone (10) is installed at a position close to the driver's position...</b>"</li> <li>• 3: "An <b>indoor microphone (10) for measuring the volume inside the vehicle...</b>"</li> </ul> |
| <p>[1.c] an ambient microphone configured to measure an ambient acoustic signal external to the vehicle; and</p> | <p><b>Kim discloses an ambient microphone</b> (e.g., "outdoor microphone (20)...installed...outside the vehicle") <b>configured to measure an ambient acoustic signal external to the vehicle</b> (e.g., "measures the sound generated around the vehicle").</p> <p><b><u>E.g., Kim:</u></b></p> <p><b>See [1.pre] (§IX.A.4).</b></p> <p><b>Kim</b> further discloses "outdoor microphone (20)" installed outside the vehicle for measuring ambient sound around the vehicle. Kim, 1-2. Kiaei, ¶¶88-91.</p>                                                                                                                                                                                                                                                                                                                                                            |

| '620 Claim | Kim in view of Kobayashi                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       |
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|            | <ul style="list-style-type: none"><li>• <b>Fig. 2:</b><p><b>Figure 2</b></p><p>“ambient microphone”</p></li><li>• <b>Fig. 3:</b><p><b>Figure 3</b></p><p>“ambient microphone”</p></li><li>• 1: “[O]utdoor microphone (20) installed on both sides of the rear of the vehicle to receive sound generated around the vehicle, the frequency analyzer (30) that measures the frequency of the sound received by the <b>outdoor microphone (20)</b> and outputs a measurement result”</li><li>• 2: “[O]utdoor microphone (20) installed on both sides of the rear side of the vehicle to receive sound generated around the vehicle....”</li></ul> |

| '620 Claim                                     | Kim in view of Kobayashi                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               |
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|                                                | <ul style="list-style-type: none"> <li>• 2: “[O]utdoor microphone (20) that measures the sound generated around the vehicle are installed inside and <b>outside the vehicle, respectively</b>, to receive sound inside and outside the vehicle...[O]utdoor microphones (20) are <b>installed on both sides of the rear of the vehicle to receive the horn of another vehicle.</b>”</li> <li>• 3: “[S]ound around the vehicle is received using the outdoor microphone (20) (ST10)...”</li> </ul>                                                                                                                                                                                                                                                                                                                                                                       |
| <p><b>[1.d]</b> a processor configured to:</p> | <p><b>Kim discloses a processor</b> (<i>e.g.</i>, “ECU (50)”).<br/> <b><u>E.g., Kim:</u></b><br/> For example, <b>Kim</b> discloses an “ECU (50) outputs a control signal so that the displayer (60) operates” when “it is determined that a frequency corresponding to the vehicle horn is included, that the horn is the horn of another vehicle, and that the volume of the sound received by the indoor microphone (10) is greater than or equal to a certain level.” Kim, 3. A POSITA would have understood (or at least found it obvious) the ECU advantageously comprises a processor to dynamically process warnings. Kiaei, ¶¶92-96; <i>see also</i> Akita (Ex. 1017), Abstract, [0033] (“[T]he present invention includes the <b>electronic control unit ECU</b>...including a CPU”).</p> <ul style="list-style-type: none"> <li>• <b>Fig. 2:</b></li> </ul> |

| '620 Claim                                                                                                            | Kim in view of Kobayashi                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               |
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|                                                                                                                       | <p style="text-align: center; color: red;">Figure 2</p>  <ul style="list-style-type: none"> <li>3: “As a result of measuring the frequency of the sound received by the outdoor microphone (20), <i>when it is determined that a frequency corresponding to the vehicle horn is included, that the horn is the horn of another vehicle, and that the volume of the sound received by the indoor microphone (10) is greater than or equal to a certain level, the ECU (50) outputs a control signal so that the displayer (60) operates.</i>”</li> <li>See also 1, 2.</li> </ul>                      |
| <p>[1.d.i] determine an internal sound pressure level (SPL) in the vehicle based on the internal acoustic signal,</p> | <p><b>Kim discloses a processor (see [1.d]) configured to determine an internal sound pressure level (SPL) in the vehicle based on the internal acoustic signal (e.g., “determin[ing]...the volume of the sound received by the indoor microphone (10)”).</b></p> <p><b><u>E.g., Kim:</u></b></p> <p><b>See [1.b], [1.d] (§IX.A.4).</b></p> <p><b>Kim</b> further discloses ECU 50 determines “the volume of the sound received by the indoor microphone (10) is greater than or equal to a certain level.” Kim, 3. A POSITA would have understood this reference to “volume” in <b>Kim</b> refers to the internal SPL of the vehicle. Kiaei, ¶¶97-101; Kim, 2 (“indoor microphone</p> |

| '620 Claim | Kim in view of Kobayashi                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 |
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|            | <p>(10)...[is] installed inside...the vehicle...to receive sound inside...the vehicle” to “measure[] the volume inside the vehicle”). Moreover, a POSITA would have at least found it obvious for microphone 10 to measure SPL, as measuring SPL would reliably indicate if a notification is required (see [1.d.iii] (§IX.A.4)). Kiaei, ¶102.</p> <p>While <b>Kim</b> discloses “[a]n indoor microphone (10) for measuring the volume inside the vehicle,” a POSITA would have understood (or at minimum found it obvious) that the ECU performs the analysis to compare the “volume inside the vehicle” to “a certain level.” See Kim, 2-3. Kiaei, ¶¶103-104.</p> <ul style="list-style-type: none"> <li>• <b>Fig. 1:</b></li> </ul>  <pre> graph TD     Start([Start]) --&gt; ST10[Receives sound around the vehicle]     ST10 --&gt; ST20{Is it your horn sound?}     ST20 -- Yes --&gt; End([End])     ST20 -- No --&gt; ST30[Measure the volume inside the vehicle]     ST30 --&gt; ST40[Horn notification signal]     ST40 --&gt; ST20   </pre> <ul style="list-style-type: none"> <li>• 2: “[I]ndoor microphone (10) for measuring the volume inside the vehicle...”</li> <li>• 3: “As a result of measuring the frequency of the sound received by the outdoor microphone (20), <b>when it is determined</b> that a frequency corresponding to the vehicle horn is included, that</li> </ul> |

| '620 Claim                                                                                  | Kim in view of Kobayashi                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    |
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|                                                                                             | <p>the horn is the horn of another vehicle, and <i>that the volume of the sound received by the indoor microphone (10) is greater than or equal to a certain level, the ECU (50) outputs a control signal so that the displayer (60) operates.</i></p>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      |
| <p>[1.d.ii] identify at least one sonic signature from the ambient acoustic signal, and</p> | <p><b>Kim discloses a processor</b> (see [1.d]) <b>configured to identify at least one sonic signature from the ambient acoustic signal</b> (e.g., “determine[s] whether the frequency” of “the external sound received by the outdoor microphone (20)” “correspond[s] to” a “horn sound”).</p> <p><u><b>E.g., Kim:</b></u></p> <p><b>See [1.c]-[1.d]</b> (§IX.A.4).</p> <p><b>Kim</b> further discloses the ECU 50 determines whether the “frequency measured” of sound captured by outdoor microphone 20 is that of a “horn sound,” thereby identifying the sonic signature of a horn from the signal provided by outdoor microphone 20. Kim, 3. This is consistent with the '620, which discloses using the frequency spectrum of an audio signal as a sonic signature. '620, 5:65-6:18, Fig. 5. Kiaei, ¶¶105-108.</p> <ul style="list-style-type: none"> <li>• <b>Fig. 1</b></li> </ul> |

| '620 Claim | Kim in view of Kobayashi                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          |
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|            | <p style="text-align: center;"><b>Figure 1</b></p> <pre> graph TD     Start([Start]) --&gt; ST10[Receives sound around the vehicle]     ST10 --&gt; ST20{Is it your horn sound?}     ST20 -- Yes --&gt; End([End])     ST20 -- No --&gt; ST30[Measure the volume inside the vehicle]     ST30 --&gt; ST40[Horn notification signal]     ST40 --&gt; End   </pre> <ul style="list-style-type: none"> <li>1: <b><i>“ECU (50) that detects the horn of another vehicle according to the output result of the frequency analyzer (30) and the operation signal of the horn sensor (40) and outputs a control signal accordingly...”</i></b></li> <li>3: <b><i>“The sound around the vehicle is received using the outdoor microphone (20) (ST10), the frequency of the external sound received by the outdoor microphone (20) is measured using the frequency analyzer (30), and the ECU (50) determines whether the frequency measured by the frequency analyzer (30) includes the frequency corresponding to the horn (ST20).”</i></b></li> <li>3: <b><i>“Even when the frequency of the horn sound is detected by the ECU (50), if it is found that the horn sound generated from the vehicle is received using the signal output from the horn sensor (40), the operation of the next step is not performed. However, if it is determined that the frequency of the horn sound detected by the ECU (50) is not</i></b></li> </ul> |

| '620 Claim                                                                                                                                                                                           | Kim in view of Kobayashi                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               |
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|                                                                                                                                                                                                      | <i>the horn sound generated by the vehicle, the next step is performed.”</i>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           |
| <p><b>[1.d.iii]</b> when the at least one sonic signature is identified, determine whether to send an emit signal to the notification device to emit the audio signal based on the internal SPL.</p> | <p><b>Kim discloses a processor</b> (<i>see</i> [1.d]) <b>configured to, when the at least one sonic signature is identified</b> (<i>see</i> [1.d.ii]), <b>determine whether to send an emit signal</b> (<i>e.g.</i>, “control signal”) <b>to the notification device</b> (<i>e.g.</i>, “displayer”) <b>based on the internal SPL</b> (<i>e.g.</i>, “ECU (50)” emits the “control signal” “when it is determined that...the volume of the sound received by the indoor microphone (10) is greater than or equal to a certain level”).</p> <p><u><b>E.g., Kim:</b></u></p> <p><b>See [1.a], [1.d]-[1.d.ii]</b> (§IX.A.4).</p> <p><b>Kim</b> further discloses when ECU 50 detects a “horn sound,” ECU 50 sends a warning to displayer 60 if “the volume of the sound received by the indoor microphone (10) is greater than or equal to a certain level.” Kim, 3. However, if “the volume received by the indoor microphone (10) is small,” ECU 50 does not send a warning to displayer 60. Kim, 3. Thus, whether the warning is sent is based on the sound measured inside the car—i.e., the internal SPL. Kiaei, ¶¶109-112.</p> <ul style="list-style-type: none"> <li>• 1: “<b>ECU (50)</b> that detects the horn of another vehicle according to the output result of the frequency analyzer (30) and the operation signal of the horn sensor (40) and <b>outputs a control signal</b> accordingly...”</li> <li>• 3: “Even when <b><i>the frequency of the horn sound is detected by the ECU (50)</i></b>, if it is found that the horn sound generated from the vehicle is received using the signal output from the horn sensor (40), the operation of the next step is not performed. However, <b><i>if it is determined that the frequency of the horn sound detected by the ECU (50) is not</i></b></li> </ul> |

| '620 Claim                                               | Kim in view of Kobayashi                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         |
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|                                                          | <p><i>the horn sound generated by the vehicle, the next step is performed.”</i></p> <ul style="list-style-type: none"> <li>• 3: “By...measuring the volume of the vehicle interior using the indoor microphone (10), <i>if it is determined that the volume received by the indoor microphone (10) is more than a certain level, that is, the driver is unable to listen to and recognize other sounds due to music output from the audio speaker, the ECU (50) outputs a control signal.</i>”</li> <li>• 3: “However, <i>if the volume received by the indoor microphone (10) is small, the driver may listen to the horn sound of the external vehicle without using a separate device, so it is okay not to output a separate warning signal.</i>”</li> <li>• 3: “As a result of measuring the frequency of the sound received by the outdoor microphone (20), <i>when it is determined that a frequency corresponding to the vehicle horn is included, that the horn is the horn of another vehicle, and that the volume of the sound received by the indoor microphone (10) is greater than or equal to a certain level, the ECU (50) outputs a control signal so that the displayer (60) operates.</i>”</li> </ul> <p><b>Kobayashi discloses a notification device emitting the audio signal</b> (e.g., “alert...announced over the speaker 6”). See [1.a]. As discussed in §IX.A.3, a POSITA would have been motivated to apply <b>Kobayashi’s</b> teachings of providing both a visual and audio warning to <b>Kim’s</b> horn notification device. Kiaei, ¶¶113-115.</p> |
| [2] The awareness device according to claim 1, where the | <b>See [1]. Kobayashi further discloses the notification device includes a receiver</b> (e.g., “speaker 6”).                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     |

| '620 Claim                                                                                                     | Kim in view of Kobayashi                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       |
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| notification device includes a receiver. <sup>4</sup>                                                          | <b>See [1.a]</b> (§IX.A.4). As discussed in §IX.A.3, a POSITA would have been motivated to apply <b>Kobayashi's</b> teachings of providing both a visual and audio warning to <b>Kim's</b> horn notification device, and in doing so, to play the audio warning from Kim's "audio speaker." Kiaei, ¶¶116-119.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  |
| [3] The awareness device according to claim 1, where the notification device further includes a video display. | <p><b>See [1]. Kim discloses the notification device includes a video display</b> (e.g., "displayer (60)" "presents a warning message").</p> <p><b><u>E.g., Kim:</u></b></p> <p><b>Kim</b> discloses "displayer (60) presents a warning message such as 'Horn'" when a horn is detected. Kim, 3. A POSITA would have understood (or at least found it obvious) that <b>Kim's</b> displayer 60 is implemented as a video display to advantageously allow for flexibility in the displayed warning and that the displayer is used to display the warning message "Horn" (as opposed to needing to add a separate device for notifying the driver of the warning message). Kiaei, ¶¶120-123.<sup>5</sup></p> <ul style="list-style-type: none"> <li>• 2: "<b><i>...a horn notification device of another vehicle that visually informs the driver of the occurrence of the horn sound of the other vehicle...</i></b>"</li> </ul> |

<sup>4</sup> The '620 equates "receiver" to "speaker." '620, 7:41-47 ("notification device can be a **speaker (receiver)**...an audio signal can be emitted from the **speaker (receiver)**...."). Kiaei, ¶117.

<sup>5</sup> U.S.2005/0154505 (Ex. 1022), [0009], [0023] (discussing the advantages of "displaying...information without hindering a driver's visual field").

| '620 Claim                                                                                                                          | Kim in view of Kobayashi                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            |
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|                                                                                                                                     | <ul style="list-style-type: none"> <li>• 2: “[D]isplayer (60) for outputting a warning signal to a driver by a control signal output from the ECU (50).”</li> <li>• 3: “[D]isplayer (60) presents a warning message such as ‘Horn’ to notify the driver that another vehicle has sounded a horn.”</li> </ul> <p><b>To the extent further disclosure is required, Kobayashi discloses a video display (e.g., “video signals” displayed on “display 4”).</b></p> <p><b><u>E.g., Kobayashi:</u></b></p> <p><b>Kobayashi</b> discloses a “display controller 3” that generates “video signals” and outputs them to “display 4 to display an alert screen.” Kobayashi, [0019]. Kiaei, ¶125.</p> <p>A POSITA would have been motivated to apply <b>Kobayashi’s</b> teachings of a video display in implementing <b>Kim’s</b> displayer 60 to advantageously provide flexibility in the warnings that can be provided to the driver. Kim, 3. Kiaei, ¶126.</p> <ul style="list-style-type: none"> <li>• [0019]: “When signals are inputted from the emergency vehicle recognition device 2, <b>the display controller 3 generates alert screen video signals using its built-in video signal generator and outputs the signals to the display 4 to display an alert screen.</b>”</li> </ul> |
| [4] The awareness device according to claim 1, where the audio signal includes at least one of the ambient acoustic signal, a voice | <p><b>See [1]. Kobayashi discloses the audio signal (e.g., “alert...announced over the speaker 6”) includes the ambient acoustic signal (e.g., “play[ing] the siren”) or a voice message (e.g., “alert announcement using the built-in speech synthesizer”).</b></p> <p><b>See [1.a] (§IX.A.4). Kiaei, ¶¶127-129.</b></p>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           |

| '620 Claim                                                                                                                                                         | Kim in view of Kobayashi                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          |
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| message or a non-voice message.                                                                                                                                    |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   |
| <b>[15.pre]</b> A method of situation awareness facilitation for a vehicle driver of a vehicle, the method comprising:                                             | <b>See [1.pre]</b> (§IX.A.4). Kiaei, ¶¶130-131.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   |
| <b>[15.a]</b> receiving an internal acoustic signal from inside the vehicle and converting the internal acoustic signal to an internal acoustic electronic signal; | <b>Kim discloses receiving an internal acoustic signal from inside the vehicle and converting the internal acoustic signal to an internal acoustic electronic signal</b> ( <i>e.g.</i> , “indoor microphone (10)...installed inside...the vehicle” for “measuring the volume inside the vehicle”).<br><b>See [1.b], [15.pre]</b> (§IX.A.4). Moreover, a POSITA would have understood (and at least found obvious) that a microphone is a transducer that converts sound into an electrical signal. Kiaei, ¶¶132-135. <sup>6</sup> |
| <b>[15.b]</b> receiving an ambient acoustic signal from outside the vehicle and converting the ambient acoustic signal into an ambient acoustic electronic signal; | <b>Kim discloses receiving an ambient acoustic signal from outside the vehicle and converting the ambient acoustic signal into an ambient acoustic electronic signal</b> ( <i>e.g.</i> , “outdoor microphone (20)” installed “outside the vehicle” that “measures the sound generated around the vehicle”).<br><b>See [1.c], [15.pre]-[15.a]</b> (§IX.A.4). Kiaei, ¶¶136-138.                                                                                                                                                     |
| <b>[15.c]</b> determining, by a processor, an internal sound                                                                                                       | <b>Kim discloses determining, by a processor</b> ( <i>see</i> [1.d]), <b>an internal sound pressure level (SPL) in the vehicle based on the internal acoustic electronic signal</b> ( <i>e.g.</i> ,                                                                                                                                                                                                                                                                                                                               |

<sup>6</sup> Ex. 1021 (US6219645), 5:2-7 (“The microphones...each...pick up or transduce the voice command into a microphone signal....”).

| '620 Claim                                                                                                                                                          | Kim in view of Kobayashi                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 |
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| pressure level (SPL) in the vehicle based on the internal acoustic electronic signal;                                                                               | <p>“determin[ing] that the volume of the sound received by the indoor microphone (10) is greater than or equal to a certain level”).</p> <p><b>See [1.d]-[1.d.i], [15.pre]-[15.a]</b> (§IX.A.4). Kiaei, ¶¶139-141. A POSITA would have understood that “ECU (50)” determines the volume based on the electronic signal it receives from “indoor microphone (10).” Kiaei, ¶142.</p>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       |
| [15.d] matching, by the processor, the ambient acoustic electronic signal to one or more stored reference electronic signals; and                                   | <p><b>Kim discloses matching, by the processor</b> (<i>see</i> [1.d]), <b>the ambient acoustic electronic signal</b> (<i>e.g.</i>, “sound generated around the vehicle” supplied to “ECU (50)”) <b>to one or more stored reference electronic signals</b> (<i>e.g.</i>, “ECU (50)...determine[s] whether the frequency” of the “sound generated around the vehicle” “correspond[s] to [a] horn sound”).</p> <p><b>See [1.d], [1.d.ii], [15.pre]-[15.c]</b> (§IX.A.4). Kiaei, ¶¶143-145.</p>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              |
| [15.e] determining whether to send an acoustic message associated with a matched reference electronic signal to a speaker in the vehicle based on the internal SPL. | <p><b>Kim discloses determining whether to send a message</b> (<i>e.g.</i>, “warning message”) <b>associated with a matched reference electronic signal</b> (<i>e.g.</i>, “ECU (50)” sends “control signal” to the “displayer (60) for outputting a warning signal to a driver” if the “the external sound” “correspond[s] to [a] horn sound”) <b>based on the internal SPL</b> (<i>e.g.</i>, “outputs a control signal” if “the volume of the sound received by the indoor microphone (10) is greater than or equal to a certain level”). <b>See [1.a], [1.d], [1.d.ii]-[1.d.iii], [2], [4]</b> (§IX.A.4). Kiaei, ¶¶146-147.</p> <p><b>Kobayashi discloses sending an acoustic message</b> (<i>e.g.</i>, “alert announcement”) <b>to a speaker in the vehicle</b> (<i>e.g.</i>, “speaker 6”). <b>See [1.a], [1.d.iii], [2], [4]</b> (§IX.A.4).</p> <p>As discussed in §IX.A.3, a POSITA would have been motivated to apply <b>Kobayashi’s</b> audio notification teachings in implementing <b>Kim’s</b> horn notification device. Kiaei, ¶¶148-149.</p> |

**B. Ground 2: Kim in view of Bergholz (Claims 1-4, 6-8, and 15)**

**1. Overview of Bergholz**

**Bergholz** discloses “an electronic detection system for...warning signals from other vehicles and unusual noises from one’s own vehicle.” Bergholz, Abstract, 1:2-7. The system includes “**microphones 1** that are attached to the outside of the vehicle” such that “they can pick up acoustic signals outside the vehicle,” including “vehicle malfunctions” (e.g., “squealing tires, the sound of a flat tire, engine or exhaust defects”), “horn[s],” and “siren[s].” Bergholz, 3:19-24, 5:13-15, 7:7-10, 7:49-53, Fig. 1, Fig. 2. The acoustic signals are “convert[ed]...into digital data” and “classification features” of the data are determined, including “the frequency response of the signal.” Bergholz, 3:37-40, 4:13-17, 4:25-27. The “**computing unit 5**” compares “the classification features...with predetermined and previously stored patterns.” Bergholz, 4:19-25. The computing unit outputs a “comparison result” as “an information and control signal” to “an **acoustic output device 15** for speech reproduction” via a “loudspeaker” and an **optical display device 16** for the visualization of the evaluation results” via “an LCD or an LED display.” Bergholz, 4:47-63.

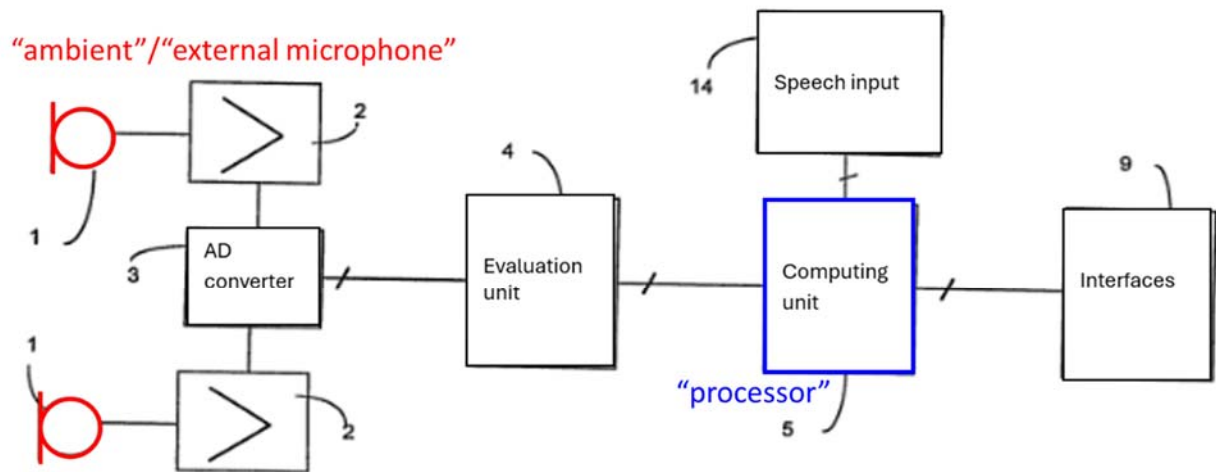


Fig. 1

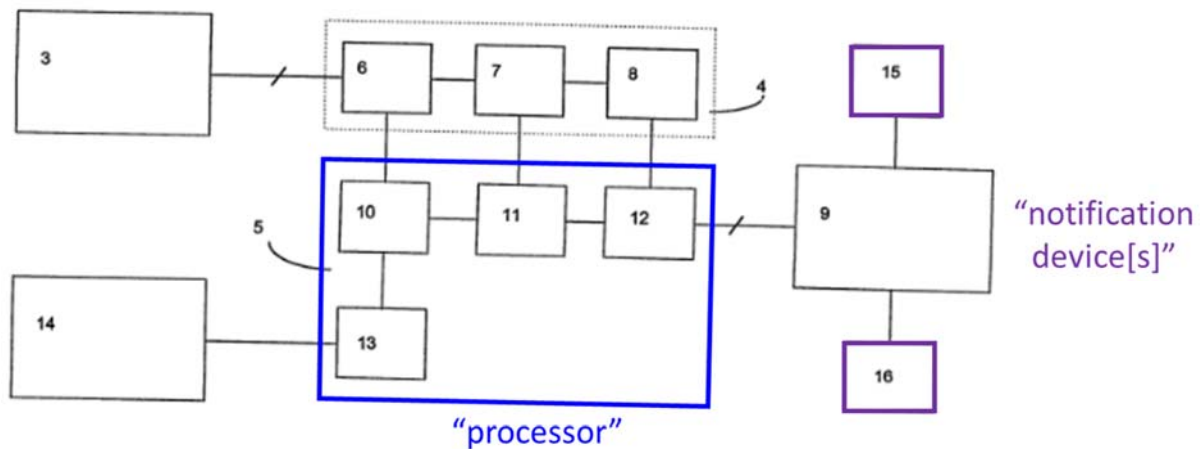


Fig. 2

Bergholz, Figs. 1-2. Kiaei, ¶¶150-151.

## 2. Motivation to Apply Bergholz's Teachings to Kim

**Kim** and **Bergholz** are in the same field as the '620—which includes situation awareness—and are reasonably pertinent to the problems purportedly addressed by the '620—e.g., detecting sounds and responding thereto in vehicles. See '620,

Abstract, 1:14-15, 2:27-37; Kim, 1-3; Bergholz, Abstract, 1:2-7, 1:64-2:24. Like the '620, **Kim** and **Bergholz** each contemplate detection systems comprising a microphone that detects a horn and/or siren from another vehicle and responds thereto, such as warning the driver of the sound. *See* '620, Abstract, 1:14-15, 2:27-37; Kim, 1-3; Bergholz, Abstract, 3:19-24, 4:19-25, 4:47-63, 5:13-15, 7:7-10, 7:49-53. Kiaei, ¶¶152-153.

A POSITA would have been motivated to apply **Bergholz's** teachings of audio notifications to **Kim's** horn notification device such that **Kim's** notification device includes both audio and visual capabilities, for the same reasons as described above for applying **Kobayashi's** teachings of an audio warning to **Kim**, such that **Kim's** horn notification device provides both visual notification via displayer (60) and audio notifications via the audio speaker. *See* §IX.A.3. A POSITA would have been further motivated to apply **Bergholz's** teachings of audio notifications to **Kim's** horn notification device to advantageously “contribute to a comprehensive and more complete assessment of the current traffic situation than is possible by visual means alone.” Bergholz, 1:47-50. Kiaei, ¶154.

Further, a POSITA would have been motivated to apply **Bergholz's** teachings of detecting vehicle malfunctions, such as squealing tires or flat tires, in implementing **Kim's** horn notification device to advantageously enhance **Kim's** device to “detect vehicle malfunctions in a timely manner and to provide an early

warning prior to scheduled maintenance.” Bergholz, 7:41-54. As **Kim** recognizes, “when the driver operates the vehicle while maximizing the audio volume of the vehicle,” the driver cannot hear the horn of another vehicle, thereby risking an accident. Kim, 2. A POSITA would have understood that, when the driver’s audio volume is too loud, the driver also cannot hear vehicle malfunctions that affect the car’s ability to operate properly, thereby risking an accident. A POSITA would have understood the benefits in enhancing **Kim’s** device to recognize vehicle equipment signals, such as acoustic signals from the vehicle malfunctions, to decrease the likelihood of an accident occurring by warning the driver of an issue. Kiaei, ¶155.

**Bergholz** teaches when the sound is recognized, an alert is announced via a “loudspeaker.” Bergholz, 4:47-63. Providing an audio alert even when the vehicle’s internal volume is high was known in the art. *E.g.*, Kobayashi, [0021] (“even when the volume of the sound equipment is turned up, the driver is able to reliably recognize the approach of an emergency vehicle”). In applying **Bergholz’s** teachings of providing audio warnings regarding vehicle malfunctions in implementing **Kim’s** notification device, a POSITA would have been motivated to play an audio signal at a sound level above “the volume of the sound received by [**Kim’s**] indoor microphone” so the audio signal is heard over the ambient noise in the vehicle. Kiaei, ¶156.

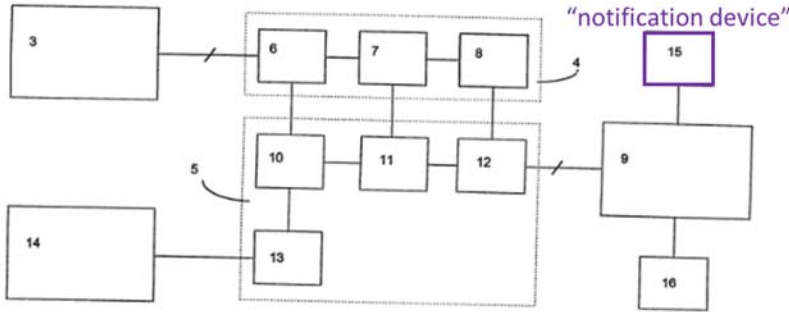
**Kim** teaches the ECU sends a control signal to displayer if “the volume of the sound received by the indoor microphone (10) is greater than or equal to a certain level,” such that the driver cannot hear other sounds not emanating from the audio speaker. *Kim*, 3. *Kiaei*, ¶157. In implementing **Bergholz’s** teachings of detecting vehicle malfunctions in **Kim**, a POSITA would have understood that **Kim’s** ECU would send a control signal to play an audio warning if the internal SPL of the vehicle, measured by the indoor microphone, is greater than or equal to a certain level, such as the vehicle malfunction itself or a notification regarding the detected vehicle malfunction. *Kiaei*, ¶157.

For the same reasons as described above for applying **Kobayashi’s** teachings of an acoustic warning to **Kim**, a POSITA would have had a reasonable expectation of success in applying **Bergholz’s** audio notifications teachings in implementing **Kim’s** notification device, as it was well-known in the art to give drivers audio and visual warnings. *See* §IX.A.3; *see also* *Bergholz*, 4:47-63. *Kiaei*, ¶158. A POSITA would have also had a reasonable expectation of success in applying **Bergholz’s** teachings of detecting vehicle malfunctions in implementing **Kim**, as both references teach detecting sounds to perform an appropriate response. *Kiaei*, ¶159. Further, both **Kim** and **Bergholz** disclose using frequency analyzers and computing units to carry out their respective functionalities, and implementing **Bergholz’s** teaching of detecting vehicle malfunctions in **Kim’s** notification device would have

required recognizing additional frequencies by **Kim’s** ECU. *See* Kim, 3; Bergholz, 4:19-25, 4:47-63, 5:6-9. This would have been a straightforward application of **Bergholz’s** teachings of detecting vehicle malfunctions in a manner that advantageously improves **Kim’s** device. Kiaei, ¶159.

### 3. Claim Chart

| '620 Claim                                                                     | Kim in view of Bergholz                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                |
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| [1.pre] A vehicle situation awareness device for a vehicle comprising:         | <i>See</i> [1.pre] (§IX.A.4). Kiaei, ¶¶161-162.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        |
| [1.a] a notification device in the vehicle configured to emit an audio signal; | <p><i>See</i> [1.a] (§IX.A.4) (discussing Kim). Kiaei, ¶¶163-164.</p> <p><b>Bergholz discloses a notification device in the vehicle</b> (<i>e.g.</i>, “loudspeaker...in the vehicle”) <b>configured to emit an audio signal</b> (<i>e.g.</i>, reproducing “speech”).</p> <p><u><b>E.g., Bergholz:</b></u></p> <p><b>Bergholz</b> discloses “an acoustic output device 15” comprising a “loudspeaker...in the vehicle” “for speech reproduction.” Bergholz, 4:46-60. The “acoustic output device 15 comprises a speech generator...for the composition of speech sequences,” such that it outputs an audio signal comprising the speech sequences via the loudspeaker. Bergholz, 4:56-60. Kiaei, ¶¶165-166.</p> <p>As discussed in §IX.B.2, a POSITA would have been motivated to apply <b>Bergholz’s</b> audio notification teachings in implementing <b>Kim’s</b> horn notification device such that upon detection of a horn, an alert is played using <b>Kim’s</b> audio speaker. Kiaei, ¶167.</p> <ul style="list-style-type: none"><li>• <b>Fig. 2:</b></li></ul> |

| '620 Claim                                                                                                                                                                             | Kim in view of Bergholz                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      |
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|                                                                                                                                                                                        |  <p style="text-align: center;">Fig. 2</p> <ul style="list-style-type: none"> <li>• 4:46-55: “[A]n acoustic output device 15 for speech reproduction...The output is used to inform the driver...”</li> <li>• 4:56-60: “The acoustic output device 15 comprises a speech generator (not shown) for the composition of speech sequences depending on the evaluation result of the computing unit 5. In addition, the output device 15 comprises a loudspeaker, which can be part of an existing playback device in the vehicle.”</li> </ul> |
| [1.b]-[1.d.ii]                                                                                                                                                                         | See [1.b]-[1.d.ii] (§IX.A.4). Kiaei, ¶¶168-177.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              |
| [1.d.iii] when the at least one sonic signature is identified, determine whether to send an emit signal to the notification device to emit the audio signal based on the internal SPL. | <p>See [1.d.iii] (§IX.A.4) (discussing Kim). Kiaei, ¶¶178-179.</p> <p><b>Bergholz discloses a notification device emitting an audio signal</b> (e.g., reproducing “speech” using the “loudspeaker...in the vehicle”). See [1.a] (§IX.B.3). Kiaei, ¶¶180-181.</p> <p>As discussed in §IX.B.2, a POSITA would have been motivated to apply <b>Bergholz’s</b> audio notification teachings in implementing <b>Kim’s</b> notification device. Kiaei, ¶182.</p>                                                                                                                                                                   |
| [2] The awareness device according to claim 1, where the                                                                                                                               | See [1]. <b>Bergholz discloses a notification device that includes a receiver</b> (e.g., “loudspeaker”).                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     |

| '620 Claim                                                                                                                                                          | Kim in view of Bergholz                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  |
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| notification device includes a receiver.                                                                                                                            | <i>See</i> [1.a] (§IX.B.3). Kiaei, ¶¶183-185.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            |
| [3] The awareness device according to claim 1, where the notification device further includes a video display.                                                      | <p><i>See</i> [1].</p> <p><i>See</i> [3] (§IX.A.4) (discussing Kim). Kiaei, ¶¶186-187.</p> <p><b>To the extent further disclosure is required, Bergholz discloses a video display</b> (<i>e.g.</i>, “LED or LCD display 16”).</p> <p><b><u>E.g., Bergholz:</u></b></p> <p><b>Bergholz</b> discloses using “an LED or LCD display 16” to display warning results to a driver when a target sound is detected. Bergholz, 6:19-26. Kiaei, ¶¶188-189.</p> <p>A POSITA would have been motivated to apply <b>Bergholz’s</b> teachings of a video display in implementing <b>Kim’s</b> displayer 60 to advantageously provide flexibility in the warnings that can be provided to the driver. Kim, 3. Kiaei, ¶190.</p> <ul style="list-style-type: none"> <li>• <b>6:19-26:</b> “...The results obtained from the classification are compared to predefined classification features in the computing unit 5. <b>The results are then either displayed for the driver, for example on an LED or LCD display 16.</b>”</li> </ul> |
| [4] The awareness device according to claim 1, where the audio signal includes at least one of the ambient acoustic signal, a voice message or a non-voice message. | <p><i>See</i> [1]. <b>Bergholz discloses the audio signal</b> (<i>e.g.</i>, “speech sequences”) <b>includes a voice message</b> (<i>e.g.</i>, “speech reproduction” from “speech generator”).</p> <p><i>See</i> [1.a] (§IX.B.3). Kiaei, ¶¶191-193.</p>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   |
| [6.pre] A vehicle situation awareness                                                                                                                               | <i>See</i> [1.pre] (§IX.A.4); [1.pre] (§IX.B.3). Kiaei, ¶¶194-195.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       |

| '620 Claim                                                                                                      | Kim in view of Bergholz                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          |
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| device for a vehicle comprising:                                                                                |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  |
| <b>[6.a]</b> a notification device in the vehicle configured to emit an alert signal including an audio signal; | <p><b>See [1.a], [6.pre]</b> (§IX.B.3).</p> <p><b>Bergholz’s</b> “speech sequence[]” is an “alert signal” because it “is used to inform the driver.” Bergholz, 4:46-55. Kiaei, ¶¶196-197.</p>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    |
| <b>[6.b]</b> an internal microphone configured to measure an internal acoustic signal in the vehicle;           | <p><b>See [1.b]</b> (§IX.A.4); <b>[1.b], [6.pre]</b> (§IX.B.3). Kiaei, ¶¶198-199.</p>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            |
| <b>[6.c]</b> an external microphone configured to measure a vehicle equipment signal; and                       | <p><b>Kim discloses an external microphone</b> (<i>e.g.</i>, “outdoor microphone (20)...installed...outside the vehicle”) <b>configured to measure an acoustic signal</b> (<i>e.g.</i>, “measures the sound generated around the vehicle”).</p> <p><b>See [1.c]</b> (§IX.A.4); <b>[1.c]</b> (§IX.B.3). Kiaei, ¶¶200-202.</p> <p><b>Bergholz discloses a vehicle equipment signal</b> (<i>e.g.</i>, “acoustic signals outside the vehicle,” such as “squealing tires, the sound of a flat tire, engine or exhaust defects”).</p> <p><b><u>E.g., Bergholz:</u></b></p> <p><b>Bergholz</b> discloses “microphones” that “pick up acoustic signals outside the vehicle” to “detect abnormal driving noises” and “vehicle malfunctions,” including “squealing tires, the sound of a flat tire, engine or exhaust defects.” Bergholz, 3:19-36, 7:49-54. Kiaei, ¶¶203-204.</p> <p>As discussed in §IX.B.2, a POSITA would have been motivated to apply <b>Bergholz’s</b> teachings of detecting vehicle malfunctions in implementing <b>Kim’s</b> notification device. Kiaei, ¶205.</p> |

| '620 Claim | Kim in view of Bergholz                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             |
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|            | <ul style="list-style-type: none"> <li> <b>Fig. 1</b> <p>Fig. 1</p> </li> <li> <b>3:11-17:</b> “The embodiment of an electronic detection system...comprises <i>microphones 1 for picking up acoustic signals</i>, each of which is directly connected to a preamplifier 2...”         </li> <li> <b>3:19-36:</b> “[T]he detection system preferably has <i>four microphones 1 that are attached to the outside of the vehicle</i>, or at least in such a way that they can <i>pick up acoustic signals outside the vehicle</i>...In addition, <i>microphones 1</i> can be arranged inside the vehicle, either for monitoring the passenger cabin or <i>for monitoring the engine compartment or other vehicle regions</i>, such as radar and the like...”         </li> <li> <b>7:41-54:</b> “Furthermore, <i>the recorded acoustic signal can also be used to detect abnormal driving noises (squealing tires, the sound of a flat tire, engine or exhaust defects)</i> and <i>thus be used to detect vehicle malfunctions in a timely manner and to provide an early warning prior to scheduled maintenance</i>...(2) <i>The driver is given a cause message by means of optical and acoustic output devices 15 and 16.</i>”         </li> </ul> |

| '620 Claim                                                                                                     | Kim in view of Bergholz                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             |
|----------------------------------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| [6.d]-[6.d.i]                                                                                                  | <i>See</i> [1.d]-[1.d.i] (§IX.A.4); [1.d]-[1.d.i] (§IX.B.3). Kiaei, ¶¶206-209.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      |
| [6.d.ii] identify at least one sonic signature from the vehicle equipment signal, and                          | <p><b>Kim discloses a processor</b> (<i>see</i> [1.d]) <b>configured to identify at least one sonic signature from an audio signal</b> (<i>e.g.</i>, “determine[s] whether the frequency” of “the external sound received by the outdoor microphone (20)” “correspond[s] to” a “horn sound”).</p> <p><i>See</i> [1.d.ii] (§IX.A.4); [1.d.ii], [6.c] (§IX.B.3). Kiaei, ¶¶210-212.</p> <p><b>Bergholz discloses the vehicle equipment signal</b> (<i>see</i> [6.c], §IX.B.3).</p> <p><u><b>E.g., Bergholz:</b></u></p> <p><b>Bergholz</b> discloses “[t]he driver is given a cause message by...acoustic output device[] 15” when “vehicle malfunctions” are detected, including “squealing tires, the sound of a flat tire, engine or exhaust defects.” Bergholz, 7:41-62. A POSITA would have understood, when applying <b>Bergholz’s</b> teachings to <b>Kim</b>, <b>Kim’s</b> ECU would perform sonic signature detection on the picked up acoustic signals to detect vehicle malfunctions. For example, a POSITA would have understood, when applying <b>Bergholz’s</b> teachings to <b>Kim</b>, <b>Kim’s</b> ECU would use sonic signatures to detect squealing tires and/or detect a flat tire. Kiaei, ¶¶213-215.</p> <p>As discussed in §IX.B.2, a POSITA would have been motivated to apply <b>Bergholz’s</b> teachings of detecting vehicle malfunctions in implementing <b>Kim’s</b> notification device. Kiaei, ¶216.</p> |
| [6.d.iii] when the at least one sonic signature is identified, determine whether to send an emit signal to the | <i>See</i> [1.d.iii] (§IX.A.4); [1.d.iii], [6.a] (§IX.B.3). Kiaei, ¶¶217-218.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       |

| '620 Claim                                                                                                                                                          | Kim in view of Bergholz                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 |
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| notification device to emit the audio signal based on the internal SPL.                                                                                             |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         |
| [7] The awareness device according to claim 6, where the notification device includes a receiver.                                                                   | <i>See</i> [2], [6] (§IX.B.3). Kiaei, ¶¶219-220.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        |
| [8] The awareness device according to claim 6, where the notification device includes a video display.                                                              | <i>See</i> [3], [6] (§IX.B.3). Kiaei, ¶¶221-222.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        |
| [15.pre]-[15.d]                                                                                                                                                     | <i>See</i> [15.pre]-[15.d] (§IX.A.4). Kiaei, ¶¶223-232.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 |
| [15.e] determining whether to send an acoustic message associated with a matched reference electronic signal to a speaker in the vehicle based on the internal SPL. | <p><i>See</i> [15.e] (§IX.A.4) (discussing Kim). Kiaei, ¶¶233-235.</p> <p><b>Bergholz discloses sending an acoustic message</b> (<i>e.g.</i>, “computing unit 5” sends an “information...signal” to “acoustic output device 15”) <b>associated with a matched reference electronic signal to a speaker in the vehicle</b> (<i>e.g.</i>, “depending on the evaluation result of the computing unit 5” “speech generator...compos[es]... speech sequences” to be played by a “loudspeaker”).</p> <p><i>See</i> [1.a], [1.d.iii], [2], [4] (§IX.B.3). Kiaei, ¶¶236-237</p> <p>For the reasons discussed in [1.a] (§IX.B.3), a POSITA would have been motivated to implement <b>Kim’s</b> notification device to emit an audio signal in view of <b>Bergholz</b>, which discloses a notification device in the vehicle configured to emit an audio signal. Kiaei, ¶238.</p> |

**C. Grounds 3-4: Grounds 1-2 in further view of Hermann (Claim 5)**

Claim 5 requires that the processor “adjusts a reproduction SPL of the audio signal based on the internal SPL.” **Hermann discloses a processor** (*e.g.*, “microprocessor”) **that adjusts a reproduction SPL of the audio signal** (*e.g.*, adjusts the level of “high priority message signal[s]” to be “heard” over “ambient noise level”) **based on the internal SPL** (*e.g.*, “ambient noise level in a vehicle” measured by a “microphone”). Hermann, 1:39-59, 2:44-3:7. Kiaei, ¶240.

**Hermann** discloses “programmable gain controller” receiving “high priority message signals” from a “warning system,” and applying “appropriate gain levels” to the signals “prior to reproduction by speakers” so that the signals “are heard” over “the ambient noise level” in a vehicle. Hermann, 1:5-10, 1:39-44, 2:44-3:7. A “microphone” measures the “ambient noise level in a vehicle” and a “microprocessor” controls “programmable gain” “in response to the measured average ambient noise level” in the vehicle. *Id.*, 1:5-10, 1:51-59, 2:44-3:7. Kiaei, ¶241.

Like **Kim, Kobayashi**, and **Bergholz**, **Hermann** is in the same field as the ’620—which includes situation awareness—and is reasonably pertinent to the problems purportedly addressed by the ’620—*e.g.*, responding to detected sounds. See Hermann, Abstract, 1:5-10, 1:38-59, 2:44-3:7; see §§IX.A.3, IX.B.2. Like the ’620, **Kim, Kobayashi**, and **Bergholz**, **Hermann** contemplates notification systems

comprising a processor that analyzes sound and responds thereto. *See* Hermann, Abstract, 1:5-10, 1:38-59, 2:44-3:7; *see* §§IX.A.3, IX.B.2. Kiaei, ¶¶242-243.

**Kim** identifies the problem of the driver having difficulty noticing horns of other vehicles due to noise within the car cabin. Kim, Abstract. A POSITA would have been motivated to apply **Hermann's** teaching of a microprocessor adjusting the sound level of an audio signal based on the measured average ambient noise level inside a vehicle to **Kim** (as modified by **Kobayashi** or **Bergholz**) to advantageously enhance **Kim's** ECU to increase the volume of audio notifications output from the speaker so that the warning "signals are heard" over the SPL in the vehicle. Hermann, 1:39-44, 1:45-59. Kiaei, ¶244.

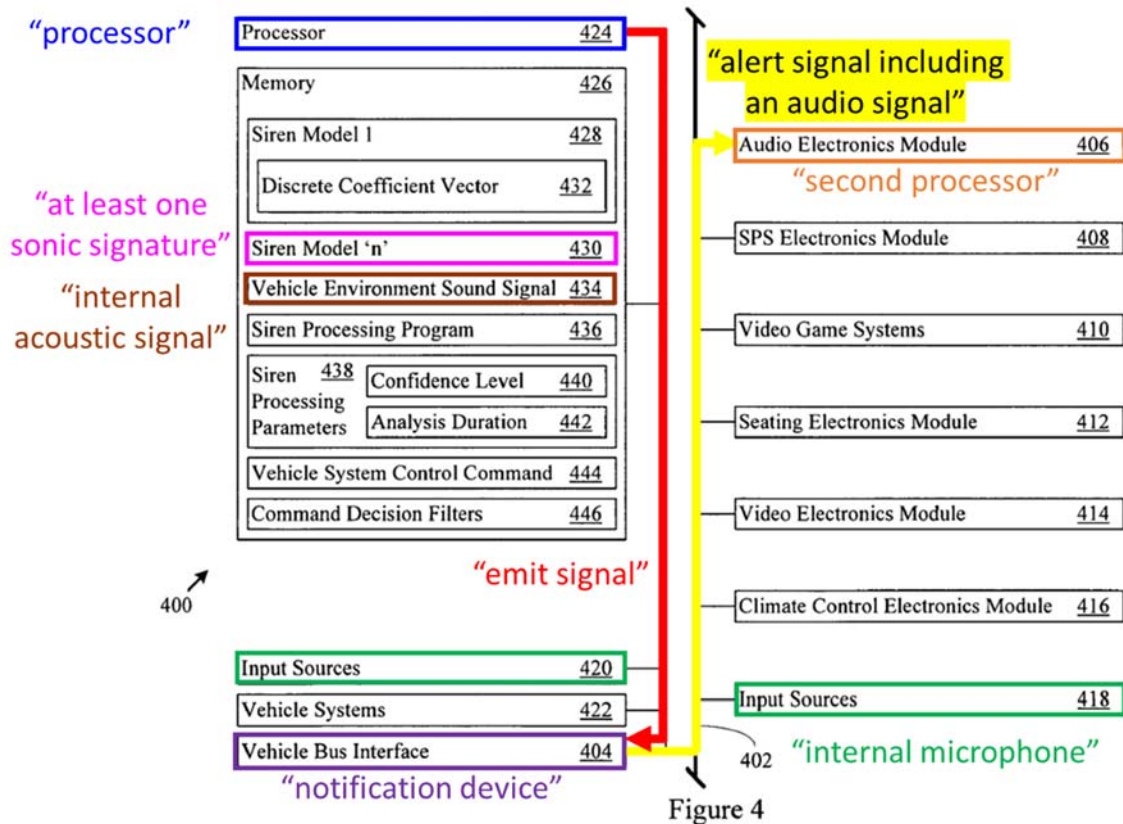
A POSITA would have had a reasonable expectation of success in applying **Hermann's** teachings in implementing **Kim's** notification device (as modified by **Kobayashi** or **Bergholz**). It was well-known in the art to raise the volume of a warning based on ambient noise. Kiaei, ¶245. Further, both **Kim** and **Hermann** disclose using computing units and/or processors to carry out their respective functionalities, and implementing **Hermann's** teaching in **Kim** would have required that **Kim's** ECU implement an additional instruction to amplify the warning messages above the measured ambient noise level so that the messages are heard. *See* Kim, 3; Hermann, 2:55-3:7. This would have been a straightforward application of **Hermann's** teachings of adjusting the volume at which a message is played based

on an ambient noise level in a manner that advantageously improves **Kim's** notification device (as modified by **Kobayashi** or **Bergholz**). Kiaei, ¶245.

**D. Ground 5: Mohan in view of Bergholz (Claims 6 and 9-14)**

**1. Overview of Mohan**

**Mohan** discloses a “monitoring and notification system” that “detects a siren” and provides “audible and visual” siren “notification[s]” to “vehicle occupants.” Mohan, Abstract, 1:7-9. **Mohan** discloses “**microphones**...in the vehicle compartment” as “**input sources 418 and 420**” that provide a “**vehicle environment sound signal**” by “sampl[ing] the ambient sounds within the vehicle.” Mohan, 6:15-24, 7:48-8:26. **Processor 424** is “connected to a memory 426” that executes a “siren processing program 436” to “analyze[] **the vehicle environment sound signal 434** against the **siren models 428-430**.” Mohan, 6:7-14, 6:25-50.



Mohan, Fig. 4. Kiaei, ¶¶246-247.

**Mohan** discloses that “if the siren processing program 436” executed by **processor 424** “detects a siren,” “one or more of the command decision filters” are applied, such as the “High Volume” filter, which “send[s]” “**vehicle system control command[s] 444**” to the **vehicle bus interface 404** “if the current ambient noise level (e.g., including audio generated by the stereo system) is above a pre-determine[d] threshold.” Mohan, 6:51-61, 7:24-47, 8:27-41. Kiaei, ¶248.

**Vehicle bus interface 404** “process[es] data (e.g., **bus packets containing vehicle control commands**)” and “include[s] logic that sends or receives information to and from the modules 406-418 and the system 400 through the

vehicle bus 402,” where the “logic may be implemented with a microprocessor.” Mohan, 5:9-25, 10:58-61. The vehicle system control commands processed by bus interface 404 include an “[a]udible [a]nnouncement,” which is emitted to “audio electronics module 406” to “[g]enerate a specified audio signal.” Mohan, 5:9-25, 5:47-59, 6:51-61, 7:1-23. Audio electronics module 406 “include[s] media access, control, and sound reproduction logic,” which is “implemented with a microprocessor.” Mohan, 5:47-59, 10:58-11:6. Kiaei, ¶249.

## 2. Motivation to Apply Bergholz’s Teachings to Mohan

Like **Bergholz**, **Mohan** is in the same field as the ’620—which includes situation awareness—and is reasonably pertinent to the problems purportedly addressed by the ’620—e.g., detecting sounds and responding thereto in vehicles. See Mohan, Abstract, 1:7-9, 1:37-58; see §IX.B.2. Like the ’620 and **Bergholz**, **Mohan** contemplates detection systems comprising a microphone that detects a siren from another vehicle and responds thereto, such as warning the driver of the sound. See Mohan, Abstract, 1:7-9, 5:9-25, 6:7-61, 7:1-8:26. Kiaei, ¶¶250-251.

A POSITA would have been motivated to apply **Bergholz’s** teachings of an external microphone in implementing **Mohan’s** system to advantageously increase the reliability of **Mohan’s** system. A POSITA would have recognized the benefits of using an external microphone to measure an external sound such as a siren because, when the vehicle’s cabin noise is loud, the internal microphone (Mohan,

6:19-21, 7:1-8:26) would have difficulty capturing the target sound outside of the vehicle over the noise in the vehicle's cabin. Using an external microphone would have improved the reliability of the system because the microphone would not have been capturing noise both inside and outside the car for detection of target sounds outside the car. Kobayashi, [0016]. In addition, the external microphone would be less likely to inadvertently pick up false sound, such as a "siren" sound played on a radio (e.g., as part of a morning radio show's sound effects when a caller wins a prize). Rather, the external microphone would capture sounds not influenced by the vehicle's cabin noise that are then analyzed by the processor to detect target sounds. Kiaei, ¶252.

Further, a POSITA would have been motivated to apply **Bergholz's** teachings of detecting vehicle malfunctions in implementing **Mohan's** system to advantageously enhance **Mohan's** system to "detect vehicle malfunctions in a timely manner and to provide an early warning prior to scheduled maintenance." Bergholz, 7:41-54. As **Mohan** recognizes, "when the stereo system is playing at a high volume, it may be difficult to hear the warning[s]," thereby risking an accident. Mohan, 1:11-23. Similarly, when the driver's audio volume is too loud, the driver cannot hear vehicle malfunctions that affect the car's ability to operate properly, thereby risking an accident. For example, when the vehicle's cabin noise is too loud, the driver cannot hear, e.g., "engine or exhaust defects" (Bergholz, 7:41-54), and a POSITA

would have recognized the benefits of providing the driver with an audio and/or visual warning related to these defects. Kiaei, ¶253.

Further, a POSITA would have been motivated to apply **Bergholz’s** voice commands teachings in implementing **Mohan’s** system. Such an implementation would have advantageously enhanced the system to allow for a hands-free driving experience such that the driver could issue voice commands to control the car’s operation, such as lowering the car’s audio or muting it. Kiaei, ¶254. The system would advantageously provide drivers with a safer experience because the drivers would have been able to speak voice commands while keeping their eyes on the road, whereas a system that would not enable voice commands would have required the drivers to divert their attention to, for example, a volume dial to lower or mute the car’s audio. *See* Ito, 20-28. Kiaei, ¶254.

Indeed, processing voice commands to improve a person’s ability to focus on other tasks—including driving—was known in the art. *See* Ex. 1018 (Stahl), [0002] (using voice commands improves safety “in the case of control of a car radio, where the operator must not take his/her hands off the steering wheel to change the volume or the channel”); *see also* Ex. 1019 (Cohen), 9-11 (“Speech is an ideal solution for accessing services while engaged in such tasks” as “driving”); Ex. 1020 (Chu), [0003] (“[m]any cell phones also include a ‘hands-free’ or voice command setting

that may be utilized when the user is...unable to manually operate the device”).  
Kiaei, ¶¶255-257.

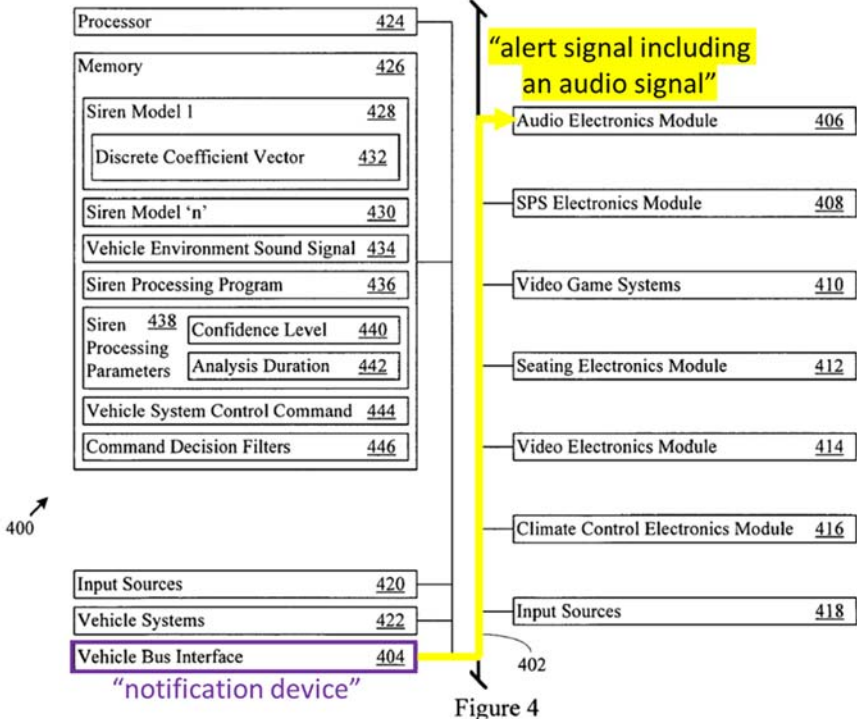
A POSITA would have recognized, when applying **Bergholz’s** voice commands teachings to **Mohan’s** notification system 400, the sonic signatures of these voice commands would have been stored in **Mohan’s** memory 426, and **Mohan’s** processor 424 would perform the voice recognition using the stored voice commands. **Bergholz** teaches the commands are “store[d],” and memory 426 is the only memory included in notification system 400. Mohan, Fig. 4; Bergholz, 4:40-43. Kiaei, ¶258. At minimum, a POSITA would have understood it was a straightforward design choice to place voice commands in memory 426 because that is where other sound signatures are stored, and including all sound signatures in a single memory would reduce the number of components—and thus the complexity—of the system. Mohan, 6:8-10; Kiaei, ¶258. Moreover, a POSITA would have recognized that processor 424 is the natural choice to detect voice commands by comparing detected audio against stored voice commands because it is already programmed to detect other sounds such as sirens by comparing against stored sonic signatures for sirens. Kiaei, ¶259. In this regard, **Mohan** discloses a “voice recognition system[,]” and further explains that systems are implemented with a “microprocessor,” confirming it would have been straightforward to

implement the detection of vocal commands in processor 424. Mohan, 5:38-46, 10:58-11:6. Kiaei, ¶259.

A POSITA would have also had a reasonable expectation of success in applying **Bergholz's** teachings of detecting vehicle malfunctions and voice commands in implementing **Mohan's** notification system, as both references teach detecting sounds to perform an appropriate response. Kiaei, ¶¶260-261. Further, both **Mohan** and **Bergholz** disclose using computing units and/or processors to carry out their respective functionalities, and implementing **Bergholz's** teaching in **Mohan** would have required recognizing additional models by **Mohan's** siren processing program. *See* Mohan, 6:7-14, 6:25-50, 6:51-61, 7:24-47, 8:27-41; Bergholz, 4:19-25, 4:47-63. This would have been a straightforward application of **Bergholz's** teachings of detecting vehicle malfunctions and voice commands in a manner that advantageously improves **Mohan's** notification system. Thus, a POSITA would have found it routine, straightforward and advantageous to apply **Bergholz's** teachings of vocal command detection to **Mohan's** teachings of a notification system, and would have known such a combination (yielding the claimed limitations) would predictably work and provide the expected functionality. Kiaei, ¶¶260-261.

### 3. Claim Chart

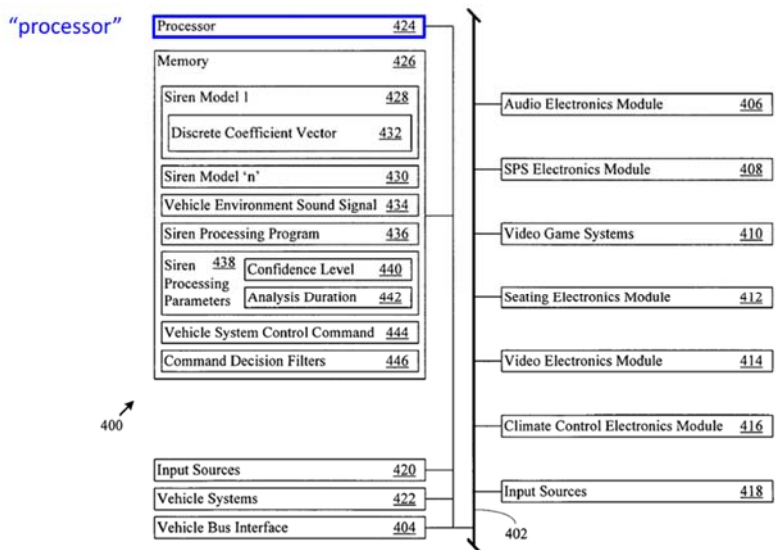
| '620 Claim                                                                                                             | Mohan in view of Bergholz                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  |
|------------------------------------------------------------------------------------------------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <p><b>[6.pre]</b> A vehicle situation awareness device for a vehicle comprising:</p>                                   | <p><b>To the extent the preamble is limiting, Mohan discloses a vehicle situation awareness device for a vehicle</b> (e.g., “siren detection and notification system...used in a vehicle”).</p> <p><b><u>E.g., Mohan:</u></b></p> <p><b>Mohan</b> discloses “[a] siren detection and notification system...used in a vehicle” to “provide[] notification[s] of nearby sirens.” Mohan, 1:37-40. Kiaei, ¶¶263-265.</p> <ul style="list-style-type: none"> <li>• <b>1:37-40: “A <i>siren detection and notification system</i> provides notification of nearby <i>sirens</i>. When <i>used in a vehicle</i> such as an automobile, the siren detection and notification system may adjust radio, phone, or other device settings in the vehicle.”</b></li> </ul>                                                                                                                                                                                              |
| <p><b>[6.a]</b> a notification device in the vehicle configured to emit an alert signal including an audio signal;</p> | <p><b>Mohan discloses a notification device</b> (e.g., “vehicle bus interface 404”) <b>in the vehicle configured to emit an alert signal</b> (e.g., “bus packets containing vehicle control commands”) <b>including an audio signal</b> (e.g., “[a]udible [a]nnouncement”).</p> <p><b><u>E.g., Mohan:</u></b></p> <p><b>See [6.pre]</b> (§IX.D.3).</p> <p><b>Mohan</b> further discloses “bus interface 404” “process[es] data (e.g., bus packets containing vehicle control commands).” See Mohan, 5:9-25. The “vehicle bus interface 404...include[s] logic that sends or receives information to and from the modules 406-418 and the system 400 through the vehicle bus 402,” where the “logic may be implemented with a microprocessor.” Mohan, 5:9-25, 10:58-61. The vehicle system control commands processed by bus interface 404 and “transmitted over the vehicle bus 402” include an “[a]udible [a]nnouncement,” which is emitted to “audio</p> |

| '620 Claim | Mohan in view of Bergholz                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            |
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|            | <p>electronics module 406” to “[g]enerate a specified audio signal.” Mohan, 5:9-25, 5:47-59, 6:51-61, 7:1-23. In this regard, a POSITA would have understood that to “generate” an audio signal in the context of <b>Mohan</b> means that a speaker produces an audio signal to be heard inside the vehicle. See Mohan, 7:42-45 (“If the current <i>ambient noise level (e.g., including audio generated</i> by the stereo system)”). Kiaei, ¶¶266-270.</p> <ul style="list-style-type: none"> <li> <b>Fig. 4:</b>  <p>Figure 4</p> </li> </ul> <ul style="list-style-type: none"> <li> <b>5:9-25:</b> “FIG. 4 shows <i>a dynamic siren detection and notification system 400 (“system 400”) connected to a vehicle bus 402 through the vehicle bus interface 404.</i> The vehicle bus 402 may interconnect a diverse array of vehicle electronics modules. <i>The vehicle bus interface 404 may include logic that sends or receives information to and from the modules 406-418 and the system 400 through the vehicle bus 402.</i> </li> </ul> |

| '620 Claim | Mohan in view of Bergholz                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             |
|------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
|            | <p><i>The vehicle bus interface 404 may process data (e.g., bus packets containing vehicle control commands) transmitted over the vehicle bus 402...</i></p> <ul style="list-style-type: none"> <li>• 5:47-59: <i>“The audio electronics module 406 may include media access, control, and sound reproduction logic such as physical media access mechanisms, amplifiers and speakers for a CD player, SACD player, tape player, MP3 player, carphone (e.g., a hands-free car phone system), or other audio device...”</i></li> <li>• 6:51-61: <i>“In the event that the siren processing program 436 detects a siren, the siren processing program 436 may issue a vehicle system control command 444. One alternative is that the siren processing program 436 issues the vehicle system control command 444 through the vehicle bus interface 404 to one or more of the vehicle electronics modules 406-416...”</i></li> <li>• 6:62-67: <i>“Table 2 shows examples of vehicle system control commands 444...”</i></li> <li>• 7:1-23: <i>“Audible Announcement...[g]enerate a specified audio signal – may be sent to audio electronics module...”</i></li> <li>• 10:58-11:6: <i>“Furthermore, the systems may be implemented with additional, different, or fewer components. As one example, a processor or any other logic may be implemented with a microprocessor, a microcontroller, a DSP, an application specific integrated circuit (ASIC), program instructions, discrete analog or digital logic, or a combination of other types of circuits or logic...The systems may be distributed among multiple components, such as among multiple</i></li> </ul> |

| '620 Claim                                                                                            | Mohan in view of Bergholz                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              |
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|                                                                                                       | <p><i>processors and memories, optionally including multiple distributed processing systems. Logic, such as programs or circuitry, may be combined or split among multiple programs, distributed across several memories and processors, and may be implemented in or as a function library, such as a dynamic link library (DLL) or other shared library.</i></p>                                                                                                                                                                                                                                                                                                                     |
| <p>[6.b] an internal microphone configured to measure an internal acoustic signal in the vehicle;</p> | <p><b>Mohan discloses an internal microphone</b> (<i>e.g.</i>, “microphone in the vehicle compartment”) <b>configured to measure an internal acoustic signal in the vehicle</b> (<i>e.g.</i>, “sample the ambient sounds within the vehicle” to produce “vehicle environment sound signal”).</p> <p><u><b>E.g., Mohan:</b></u></p> <p><b>See [6.pre] (§IX.D.3).</b></p> <p><b>Mohan</b> discloses “microphones...in the vehicle compartment” that provide a “vehicle environment sound signal” by “sampl[ing] the ambient sounds within the vehicle.” Mohan, 6:15-24, 7:48-8:26. Kiaei, ¶¶271-274.</p> <ul style="list-style-type: none"><li>• <b>Fig. 4</b></li></ul> <p>Figure 4</p> |

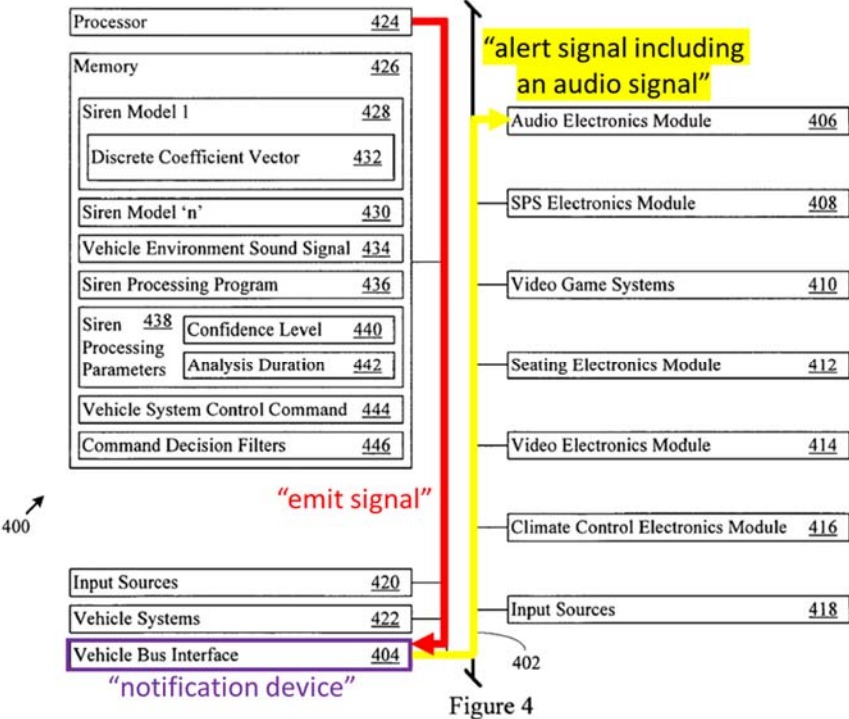
| '620 Claim                                                                                       | Mohan in view of Bergholz                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       |
|--------------------------------------------------------------------------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
|                                                                                                  | <ul style="list-style-type: none"> <li>• <b>6:15-24:</b> “The input sources 418 and 420 may provide the <b>vehicle environment sound signal 434</b> in analog or digital form. As examples, <b>the input sources 418 and 420 may include microphones or microphone arrays, and may sample the ambient sounds within the vehicle...</b>”</li> <li>• <b>7:48-8:26:</b> “The siren processing program 436 <b>samples the vehicle environmental sound using, for example, a microphone in the vehicle compartment</b> (502).”</li> </ul>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            |
| <p><b>[6.c]</b> an external microphone configured to measure a vehicle equipment signal; and</p> | <p><b>Bergholz discloses an external microphone</b> (<i>e.g.</i>, “microphones 1...attached to the outside of the vehicle”) <b>configured to measure a vehicle equipment signal</b> (<i>e.g.</i>, “pick up acoustic signals outside the vehicle,” such as “squealing tires, the sound of a flat tire, engine or exhaust defects”).</p> <p><b><u>E.g., Bergholz:</u></b></p> <p><b>See [6.c]</b> (§IX.B.3).</p> <p>As discussed in [6.c] (§IX.B.3), <b>Bergholz</b> discloses “microphones” that “pick up acoustic signals outside the vehicle” to “detect abnormal driving noises” and “vehicle malfunctions,” including “squealing tires, the sound of a flat tire, engine or exhaust defects.” Bergholz, 3:19-36, 7:49-54. Moreover, <b>Bergholz</b> discloses the “microphones” are “attached to the outside of the vehicle.” <i>Id.</i> Kiaei, ¶¶275-278.</p> <p>As discussed in §IX.D.2, a POSITA would have been motivated to apply <b>Bergholz’s</b> teachings of detecting vehicle malfunctions in implementing <b>Mohan’s</b> system. Kiaei, ¶279.</p> |
| <p><b>[6.d]</b> a processor configured to:</p>                                                   | <p><b>Mohan discloses a processor</b> (<i>e.g.</i>, “processor 424” executing “siren processing program 436”).</p> <p><b><u>E.g., Mohan:</u></b></p>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            |

| '620 Claim                                                                                                                   | Mohan in view of Bergholz                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       |
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|                                                                                                                              | <p><b>Mohan</b> discloses “a processor 424 connected to a memory 426” that executes a “siren processing program 436” to “analyze[] [a] vehicle environment sound signal 434 against the siren models 428-430.” Mohan, 6:7-14, 6:25-50. Kiaei, ¶¶280-282.</p> <ul style="list-style-type: none"> <li> <b>Fig. 4:</b>  </li> </ul> <p style="text-align: right;">Figure 4</p> <ul style="list-style-type: none"> <li> <b>6:7-14:</b> “The dynamic siren detection and notification system 400 includes <i>a processor 424 connected to a memory 426...</i>” </li> <li> <b>6:25-50:</b> “<i>The siren processing program 436 analyzes the vehicle environment sound signal 434 against the siren models 428-430.</i> In that regard, the siren processing program 436 may operate according to siren processing parameters 438....” </li> </ul> |
| <p><b>[6.d.i]</b> determine an internal sound pressure level (SPL) in the vehicle based on the internal acoustic signal,</p> | <p><b>Mohan discloses a processor (see [6.d]) configured to determine an internal sound pressure level (SPL) (e.g., “current ambient noise level”) in the vehicle based on the internal acoustic signal (e.g., “the ambient sounds within the vehicle”).</b></p>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                |

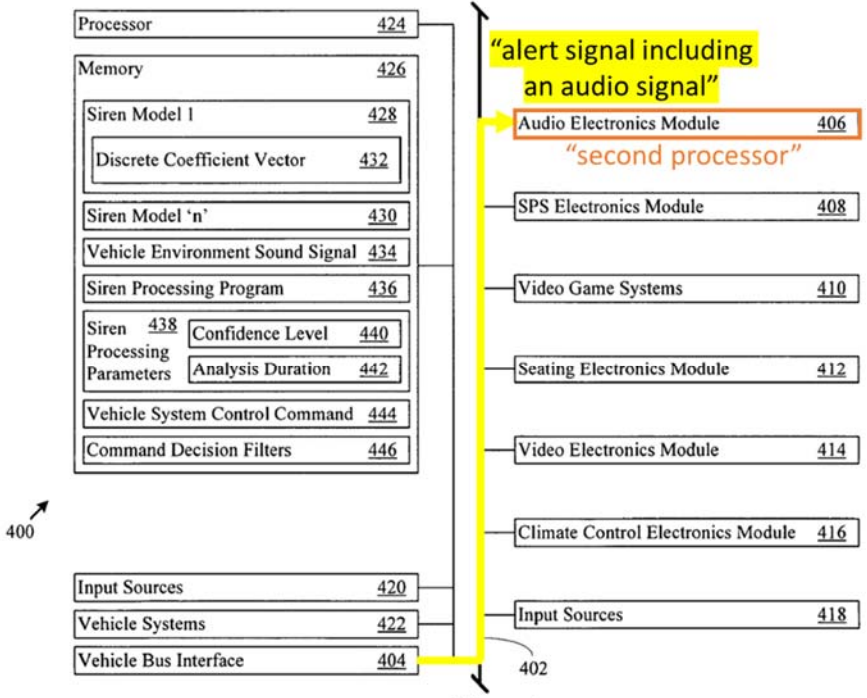
| '620 Claim | Mohan in view of Bergholz                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            |
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|            | <p><b><u>E.g., Mohan:</u></b></p> <p><b>See [6.b], [6.d]</b> (§IX.D.3).</p> <p><b>Mohan</b> discloses “siren processing program 436 samples the vehicle environmental sound using, for example, a microphone in the vehicle compartment (502).” Mohan, 7:48-8:26. <b>Mohan</b> further discloses that “siren processing program 436...exercise[s] control over whether or not to send a vehicle system control command” based on “command decision filters.” Mohan, 6:24-31. One exemplary “command decision filter” accounts for “the current ambient noise level” inside the vehicle (including audio “generated by the stereo system”). Mohan, 7:32-47. A POSITA would have understood that the processor 424 executing the siren processing program 436 determines the “current ambient noise level,” as the program employs the command decision filters. Kiaei, ¶¶283-287.</p> |

| '620 Claim                                                                                          | Mohan in view of Bergholz                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          |
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|                                                                                                     | <ul style="list-style-type: none"> <li>• <b>6:18-21:</b> “As examples, the input sources 418 and 420 may include <i>microphones</i> or microphone arrays, and may <i>sample the ambient sounds within the vehicle.</i>”</li> <li>• <b>7:24-31:</b> “<i>The siren processing program 436 may also exercise control over whether or not to send a vehicle system control command.</i> To that end, <i>the siren processing program may employ command decision filters 446 that affect whether or not the siren processing program 436 sends the vehicle system control command.</i>”</li> <li>• <b>7:32-47:</b> “High Volume...<i>If the current ambient noise level (e.g., including audio generated by the stereo system) is above a pre-determine threshold,</i> send multiple commands to multiple systems....”</li> <li>• <b>7:48-8:26:</b> “<i>The siren processing program 436 samples the vehicle environmental sound using, for example, a microphone in the vehicle compartment (502)....</i>”</li> </ul> |
| <p><b>[6.d.ii]</b> identify at least one sonic signature from the vehicle equipment signal, and</p> | <p><b>Mohan discloses a processor</b> (<i>see</i> [6.d]) <b>configured to identify at least one sonic signature</b> (“siren processing program 436 analyzes the vehicle environment sound signal 434 against the siren models 428-430,” <i>see</i> [6.d]/“siren processing program 436 detects a siren,” <i>see</i> [6.a]). Kiaei, ¶¶288-289.</p> <p><b>Bergholz discloses the vehicle equipment signal</b> (<i>see</i> [6.c]).</p> <p><i>See</i> [6.a], [6.c]-[6.d] (§IX.D.3). Kiaei, ¶¶290-291. A POSITA would have understood, when applying <b>Bergholz’s</b> teachings to <b>Mohan</b>, <b>Mohan’s</b> processor would perform sonic signature detection on the picked up acoustic signals to detect vehicle malfunctions. For example, a POSITA would have understood that, when applying <b>Bergholz’s</b> teachings to <b>Mohan</b>, <b>Mohan’s</b></p>                                                                                                                                                    |

| '620 Claim                                                                                                                                                                                           | Mohan in view of Bergholz                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                |
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|                                                                                                                                                                                                      | processor would be implemented with a sonic signature to detect squealing tires and/or a sonic signature to detect a flat tire. Kiaei, ¶292.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             |
| <p><b>[6.d.iii]</b> when the at least one sonic signature is identified, determine whether to send an emit signal to the notification device to emit the audio signal based on the internal SPL.</p> | <p><b>Mohan discloses a processor</b> (see [6.d], §IX.D.3) <b>configured to, when the at least one sonic signature is identified</b> (e.g., “siren processing program 436 detects a siren”), <b>determine</b> (e.g., determine “[i]f the current ambient noise level...is above a pre-determine threshold”) <b>whether to send an emit signal</b> (e.g., “vehicle system control command 444”) <b>to the notification device to emit the audio signal</b> (“[a]udible [a]nnouncement,” see [6.a]) <b>based on the internal SPL</b> (e.g., “current ambient noise level,” see [6.d.i]).</p> <p><u><b>E.g., Mohan:</b></u></p> <p><b>See [6.a], [6.d]-[6.d.ii]</b> (§IX.D.3).</p> <p><b>Mohan</b> discloses that “if the siren processing program 436 detects a siren,” “one or more of the command decision filters” are applied, such as the “High Volume” filter, which “send[s]” “vehicle system control command[s] 444” to the vehicle bus interface 404 “if the current ambient noise level (e.g., including audio generated by the stereo system) is above a pre-determine[d] threshold.” Mohan, 7:32-47, 8:27-41. Moreover, a POSITA would have understood, when applying <b>Bergholz’s</b> teachings of detecting vehicle malfunctions to <b>Mohan</b>, the audio warning need only be played if the sound inside the vehicle is above a certain volume. Kiaei, ¶¶293-297.</p> <ul style="list-style-type: none"> <li>• <b>Fig. 4:</b></li> </ul> |

| '620 Claim | Mohan in view of Bergholz                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             |
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|            |  <p>Figure 4</p> <ul style="list-style-type: none"> <li>7:32-47: <b><i>“High Volume...If the current ambient noise level (e.g., including audio generated by the stereo system) is above a pre-determine threshold, send multiple commands to multiple systems...”</i></b></li> <li>8:27-41: <b><i>“On the other hand, if the siren processing program 436 detects a siren, the siren processing program may then determine whether the confidence measure meets or exceeds the confidence level 440 established in the siren processing parameters 438. If the confidence threshold is met, the siren processing program 436 may also apply one or more of the command decision filters 446 (510). If a siren is detected with the requisite confidence level and no command decision filter blocks sending a control command, then the siren processing program 436 may proceed by generating and sending a selected vehicle system control command (510)...”</i></b></li> </ul> |

| '620 Claim                                                                                                                                                                                           | Mohan in view of Bergholz                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       |
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| <p>[9] The awareness device according to claim 6, where the alert signal is an input to a second processor, the alert signal used by the second processor to affect an operation of the vehicle.</p> | <p><b>See [6]. Mohan discloses the alert signal</b> (<i>e.g.</i>, “bus packets containing vehicle control commands,” <i>see</i> [6.a], (§IX.D.3)) <b>is an input to a second processor</b> (<i>e.g.</i>, “microprocessor” of the “media access, control, and sound reproduction logic” of “audio electronics module 406”), <b>the alert signal used by the second processor to affect an operation of the vehicle</b> (<i>e.g.</i>, play the “specified audio signal”/“[l]ower audio output by a specified amount”).</p> <p><b><u>E.g., Mohan:</u></b></p> <p><b>See [6.a], [6.d.iii]</b> (§IX.D.3).</p> <p>As discussed in [6.a] (§IX.D.3), <b>Mohan</b> discloses bus packets containing vehicle system control commands processed by bus interface 404 that include an “[a]udible [a]nnouncement,” which is emitted to “audio electronics module 406” to “[g]enerate a specified audio signal.” Mohan, 5:9-25, 5:47-59, 6:51-61, 7:1-23. <b>Mohan</b> further discloses such commands include, <i>e.g.</i>, “multiple commands” to audio electronics module 406 to both “[l]ower audio output by a specified amount” and “[g]enerate a specified audio signal.” Mohan, 5:9-25, 6:51-61, 7:1-23, 7:32-47. <b>Mohan</b> discloses that “audio electronics module 406...include[s] media access, control, and sound reproduction logic,” which is “implemented with a microprocessor” and performs these commands issued by vehicle bus interface 404. Mohan, 5:47-59, 10:58-11:6. In applying <b>Bergholz’s</b> teachings of detecting vehicle malfunctions to <b>Mohan’s</b> notification system a POSITA would have understood that lowering the “audio output by a specified amount” would have allowed the user to better hear the audible announcement and hear the sound causing the vehicle malfunction that prompted the audible announcement. Kiaei, ¶¶298-303.</p> <ul style="list-style-type: none"> <li>• <b>Fig. 4</b></li> </ul> |

| '620 Claim | Mohan in view of Bergholz                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 |
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|            |  <p style="text-align: center;">Figure 4</p> <ul style="list-style-type: none"> <li>5:47-59: “The <i>audio electronics module 406</i> may include media access, control, and sound reproduction logic such as physical media access mechanisms, amplifiers and speakers for a CD player, SACD player, tape player, MP3 player, carphone (e.g., a hands-free car phone system), or other audio device...”</li> <li>7:1-23: “Reduce Volume...Lower audio output by a specified amount...may be sent to the audio electronics module...Audible Announcement...[g]enerate a specified audio signal – may be sent to audio electronics module...”</li> <li>10:58-11:6: Furthermore, the systems may be implemented with additional, different, or fewer components. As one example, a processor or <i>any other logic may be implemented with a microprocessor, a microcontroller, a DSP, an</i></li> </ul> |

| '620 Claim                                                                                                                                                                                                                                 | Mohan in view of Bergholz                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          |
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|                                                                                                                                                                                                                                            | <p><i>application specific integrated circuit (ASIC), program instructions, discrete analog or digital logic, or a combination of other types of circuits or logic...</i>The systems may be distributed among multiple components, such as among multiple processors and memories, optionally including multiple distributed processing systems. Logic, such as programs or circuitry, may be combined or split among multiple programs, distributed across several memories and processors, and may be implemented in or as a function library, such as a dynamic link library (DLL) or other shared library.</p> |
| <p><b>[10]</b> The awareness device according to claim 9, where the operation is at least one of shifting gears, decreasing power usage, sending a remote signal, operating a windshield wiper, and changing a headlight illumination.</p> | <p><b>See [9]. Mohan discloses decreasing power usage</b> (<i>e.g.</i>, “[l]ower[ing] audio output by a specified amount”).</p> <p>A POSITA would have understood, and at least found it obvious, that lowering audio output would result in less power being needed to drive the speaker, thereby decreasing power usage. Kiaei, ¶¶304-307.<sup>7</sup></p>                                                                                                                                                                                                                                                       |
| <p><b>[11.pre]</b> A vehicle situation awareness device for a vehicle comprising:</p>                                                                                                                                                      | <p><b>See [6.pre]</b> (§IX.D.3). Kiaei, ¶¶308-309.</p>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             |

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<sup>7</sup> U.S.2008/0117038 (Ex. 1023), [0011] (discussing “reduc[ing] power consumption” by lowering the volume).

| '620 Claim                                                                                                                                                                                          | Mohan in view of Bergholz                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    |
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| [11.a] a notification device in the vehicle configured to emit an alert signal to a first processor, the first processor used to modify an operation of the vehicle responsive to the alert signal; | <p><b>Mohan a notification device</b> (<i>e.g.</i>, “vehicle bus interface 404”) <b>in the vehicle configured to emit an alert signal</b> (<i>e.g.</i>, “bus packets containing vehicle control commands”) <b>to a first processor</b> (<i>e.g.</i>, “microprocessor” of the “media access, control, and sound reproduction logic” of “audio electronics module”), <b>the first processor used to modify an operation of the vehicle responsive to the alert signal</b> (<i>e.g.</i>, play the “audible announcement”/“[l]ower audio output by a specified amount”).</p> <p><i>See</i> [6.a], [9], [11.pre] (§IX.D.3). Kiaei, ¶¶310-312.</p> |
| [11.b] an internal microphone configured to measure an interior vehicle acoustic signal in the vehicle;                                                                                             | <p><b>Mohan discloses an internal microphone</b> (<i>e.g.</i>, “microphone in the vehicle compartment”) <b>configured to measure an interior vehicle acoustic signal in the vehicle</b> (<i>e.g.</i>, “microphones...sample the ambient sounds within the vehicle”/“vehicle environment sound signal”).</p> <p><i>See</i> [6.b], [11.pre] (§IX.D.3). Kiaei, ¶¶313-315.</p>                                                                                                                                                                                                                                                                   |
| [11.c] an external microphone configured to measure an external vehicle acoustic signal; and                                                                                                        | <p><b>Bergholz discloses an external microphone</b> (<i>e.g.</i>, “microphones 1...attached to the outside of the vehicle”) <b>configured to measure an external vehicle acoustic signal</b> (<i>e.g.</i>, “pick up acoustic signals outside the vehicle,” such as “squealing tires, the sound of a flat tire, engine or exhaust defects”).</p> <p><i>See</i> [6.c] (§IX.D.3). Kiaei, ¶¶316-318. As explained in §IX.D.2, a POSITA would have been motivated to apply <b>Bergholz’s</b> external microphone to <b>Mohan’s</b> system. Kiaei, ¶319.</p>                                                                                       |
| [11.d] a second processor, configured to:                                                                                                                                                           | <p><b>Mohan discloses a second processor</b> (<i>e.g.</i>, “processor 424” executing “siren processing program 436”).</p> <p><i>See</i> [6.d] (§IX.D.3). Kiaei, ¶¶320-322.</p>                                                                                                                                                                                                                                                                                                                                                                                                                                                               |
| [11.d.i] determine an interior sound pressure level (SPL) in the vehicle based                                                                                                                      | <p><i>See</i> [6.d.i], [11.d] (§IX.D.3). Kiaei, ¶¶323-324.</p>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               |

| '620 Claim                                                                                                                                                                              | Mohan in view of Bergholz                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              |
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| on the interior vehicle acoustic signal;                                                                                                                                                |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        |
| [11.d.ii] identify at least one sonic signature from at least one of the interior vehicle acoustic signal or the external vehicle acoustic signal, and                                  | <p><b>Mohan discloses a second processor</b> (<i>see</i> [11.d], §IX.D.3) <b>configured to identify at least one sonic signature from the interior vehicle acoustic signal</b> (e.g., “siren processing program 436 analyzes the vehicle environment sound signal 434 against the siren models 428-430”).</p> <p><b>See</b> [6.d], [6.d.ii], [11.b], [11.d] (§IX.D.3). Kiaei, ¶¶325-327.</p> <p><b>Bergholz discloses the external vehicle acoustic signal</b> (<i>see</i> [6.c], §IX.B.3; [6.d.ii], [11.c], §IX.D.3). Kiaei, ¶¶328-329.</p>                                                                                                                                                                           |
| [11.d.iii] when the at least one sonic signature is identified, determine whether to send an emit signal to the notification device to emit the alert signal based on the interior SPL. | <p><b>Mohan discloses a processor</b> (<i>see</i> [11.d], §IX.D.3) <b>configured to, when the at least one sonic signature is identified</b> (e.g., “siren processing program 436 detects a siren”), <b>determining</b> (e.g., determining “[i]f the current ambient noise level...is above a pre-determine threshold”) <b>whether to send an emit signal</b> (e.g., “vehicle system control command 444”) <b>to the notification device to emit the alert signal</b> (“bus packets containing vehicle control commands”) <b>based on the interior SPL</b> (e.g., “current ambient noise level,” [6.d.iii], [11.d.i], §IX.D.3).</p> <p><b>See</b> [6.d.iii], [11.a], [11.d]-[11.d.ii] (§IX.D.3). Kiaei, ¶¶330-332.</p> |
| [12] The awareness device according to claim 11, where the at least one sonic signature is a vocal command.                                                                             | <p><b>See [11]. Bergholz discloses where the at least one sonic signature is a vocal command</b> (e.g., “human command words”/“personal code words”).</p> <p><b>See</b> [11.d.ii]-[11.d.iii] (§IX.D.3).</p> <p><b><u>E.g., Bergholz:</u></b></p> <p><b>Bergholz</b> discloses the “detection system” is “used for voice control purposes, i.e., human command words” and</p>                                                                                                                                                                                                                                                                                                                                           |

| '620 Claim                                                                                                                       | Mohan in view of Bergholz                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    |
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|                                                                                                                                  | <p>“personal code words” that are “programmed into the system” using “voice input device 14” to “trigger a command.” Bergholz, 4:35-46, 7:41-48. Such “command[s]” include “stop,” “open the door,” or “deactivate the anti-theft device and/or the immobilizer.” Bergholz, 7:41-48. Kiaei, ¶¶333-336</p> <p>As discussed in §IX.B.2, a POSITA would have been motivated to apply <b>Bergholz’s</b> teachings of voice command recognition in implementing <b>Mohan’s</b> notification system. Kiaei, ¶337.</p> <ul style="list-style-type: none"> <li>• <b>4:35-46:</b> “In particular, <i>the voice input device 14 can be used to store command or key words, the repetition of which, for example by the driver, causes a previously defined function to be executed by the detection system...</i>”</li> <li>• <b>7:41-48:</b> “In a further preferred embodiment of the invention, the <i>detection system can also be used for voice control purposes, i.e., human command words (calls for help, stop, code words) can be programmed into the system and used to trigger a command:</i> (1) and (2) Execution of the command (such as “STOP”), but also a response to defined, possibly <i>personal code words (e.g., to open the door, deactivate the anti-theft device and/or the immobilizer)....</i>”</li> </ul> |
| <p><b>[13]</b> The awareness device according to claim 12, where the alert signal uniquely corresponds to the voice command.</p> | <p><b>See [12]. Mohan discloses where the alert signal</b> (<i>e.g.</i>, “bus packets containing vehicle control commands” <i>see</i> [11.a]) <b>uniquely corresponds to an audio signal</b> (<i>e.g.</i>, “[l]ower audio output by a specified amount”/“[d]isable audio output,” <i>see</i> [11.a]).</p> <p><b>See [11.a]</b> (§IX.D.3). Kiaei, ¶¶338-340.</p> <p><b>Bergholz discloses the voice command</b> (“human command words”/“personal code words”). <b>See [12]</b> (§IX.D.3). Kiaei, ¶¶341-342.</p>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               |

| '620 Claim                                                                                                                                                                                                                                                                          | Mohan in view of Bergholz                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             |
|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
|                                                                                                                                                                                                                                                                                     | <p>A POSITA would have recognized, when applying <b>Bergholz's</b> teachings of voice commands in implementing <b>Mohan's</b> notification system, <b>Mohan's</b> vehicle system control commands 444 would uniquely correspond to the voice commands. For example, upon recognition of the voice command "reduce volume," <b>Mohan's</b> system would send a command to the audio electronics module to "[l]ower audio output by a specified amount, to a specified amount, or to no greater than a specified amount." Mohan, 7:1-23. As another example, upon recognition of the voice command "mute," <b>Mohan's</b> system would send a command to the audio electronics module to "[d]isable audio output." <i>Id.</i> Kiaei, ¶343.</p> <p>As discussed in §IX.B.2 and [12] (§IX.D.3), a POSITA would have been motivated to apply <b>Bergholz's</b> teachings of voice command recognition in implementing <b>Mohan's</b> notification system. Kiaei, ¶344.</p> |
| <p><b>[14]</b> The awareness device according to claim 11, where the operation includes one of at least opening a door, opening a trunk, opening a gas tank access panel, opening the hood, turning on headlights, turning on an audio alarm, and beginning an audio recording.</p> | <p><b>See [11]. Mohan discloses turning on an audio alarm</b> (<i>e.g.</i>, "notification logic" to play an "alarm").</p> <p><b><u>E.g., Mohan:</u></b></p> <p><b>See [11.a]</b> (§IX.D.3).</p> <p><b>Mohan</b> discloses that, upon detection of a siren, the driver is notified by an "alarm." Mohan, 3:8-13 ("[T]he <b>processing logic 104 may issue a siren detection notification using the notification logic 108. The notification logic 108</b> may be an indicator light, tone or <b>alarm...</b>"). Kiaei, ¶¶345-348.</p>                                                                                                                                                                                                                                                                                                                                                                                                                                  |

## **X. SECONDARY CONSIDERATIONS**

There is no evidence in the '620's prosecution history or elsewhere supporting any secondary considerations arguments, or evidence of nexus to any challenged Claim. *See generally* '620FH; Kiaei, ¶349. Indeed, as demonstrated by the prior art referenced herein, any purported solutions to problems or unexpected results in the '620 were already well known. Kiaei, ¶349. To the extent PO asserts the existence of any secondary considerations in its responses, Petitioner reserves the right to address any such evidence.

## **XI. CONCLUSION**

Substantial, new, and noncumulative technical teachings have been presented for '620 Claims 1-15, which are obvious for the reasons set forth above. Kiaei, ¶¶350-355. There is a reasonable likelihood that Petitioner will prevail as to the Claims. *Inter partes* review of Claims 1-15 is accordingly requested.

Respectfully submitted,

Dated: September 2, 2024

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Name: James L. Davis, Jr.  
Registration No. 57,325  
Counsel for Petitioner

**CERTIFICATE OF COMPLIANCE**

Pursuant to §42.24(d), the undersigned certifies that the foregoing Petition for *Inter Partes* Review of U.S. Patent No. 8,319,620 contains, as measured by the word-processing system used to prepare this paper, 13,975 words. This word count does not include the items excluded by §42.24 as not counting towards the word limit.

Dated: September 2, 2024

/James L. Davis, Jr./

Name: James L. Davis, Jr.

Registration No. 57,325

Counsel for Petitioner

**CERTIFICATE OF SERVICE**

I hereby certify that on September 2, 2024, I caused a true and correct copy of the foregoing Petition for *Inter Partes* Review of U.S. Patent No. 8,319,620 and supporting exhibits to be served via express mail on the Patent Owner at the following correspondence address of record as listed on Patent Center:

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