UNITED STATES PATENT AND TRADEMARK OFFICE

BEFORE THE PATENT TRIAL AND APPEAL BOARD

SAMSUNG ELECTRONICS CO., LTD., and

SAMSUNG ELECTRONICS AMERICA, INC.,

Petitioners,

v.

ICASHE, INC.,

Patent Owner.

Case IPR2025-00640
Patent No. 9,483,722

PETITION FOR *INTER PARTES* REVIEW

TABLE OF CONTENTS

EXHIBIT LIST

Exhibit No.	DESCRIPTION
1001*	U.S. Patent No. 9,483,722 ("'722")
1002*	File History of U.S. Application No. 14/517,575 ("'722FH")
1003*	Declaration of Emmanouil Tentzeris in Support of Petition for *Inter Partes* Review of U.S. Patent. No. 9,483,722 ("Tentzeris Decl.")
1004	U.S. Patent App. Pub. No. 2010/0112941 ("Bangs")
1005	U.S. Patent App. Pub. No. 2009/0040022 ("Finkenzeller")
1006	U.S. Patent App. Pub. No. 2009/0215489 ("Kerdraon")
1007	U.S. Patent App. Pub. No. 2008/0073426 ("Koh")
1008	U.S. Patent App. Pub. No. 2007/0156436 ("Fisher")
1009	File History for U.S. Patent Application No. 12/188,346 ("'346 Application File History")
1010 - 1013	*Reserved*
1014*	Plaintiff iCashe's Infringement Contentions, Including Exhibit B
1015	Dachs, C., NFC — The Intuitive Contactless Technology Becomes Reality, 122 E&I Elektrotechnik und Informationstechnik 466 (Dec. 1, 2005) ("Dachs")
1016	*Reserved*
1017	U.S. Patent App. Pub. No. 2005/0224589 ("Park")
1018	U.S. Patent No. 8,260,199 ("Kowalski")
1019 - 1022	*Reserved*
1023	U.S. Patent No. 5,943,624 ("Fox")

Exhibit No.	DESCRIPTION
1024 - 1025	*Reserved*
1026	U.S. Patent App. Pub. No. 2008/0235796 ("Buhr")
1027	Finkenzeller, K., RFID Handbook, First Edition ("Finkenzeller-RFID")
1028	Goldweber Declaration for Ex. 1027
1029 - 1030	*Reserved*
1031	U.S. Patent App. Pub. No. 2004/0133787 ("Doughty")
1032 - 1035	*Reserved*
1036	Mayes, K. et al., Smart Cards, Tokens, Security and Applications (December 11, 2007)
1037-1049	*Reserved*
1050	Docket Control Order, *iCashe, Inc. v. Samsung Electronics Co.*, No. 2:24-cv-00429-JRG (E.D. Tex.)
1051	Docket Control Order, *Valtrus Innovations Ltd. v. NTT Data Services, LLC*, No. 2:24-cv-00361, (E.D. Tex.)
1052	Docket Control Order, *Fleet Connect Solutions LLC v. The Kroger Co.*, No. 2:24-cv-00430 (E.D. Tex.)
1053	Docket Control Order, *C47 Technologies LLC v. TCL Technology Group Corporation f/k/a TCL Corporation*, No. 2:24-cv-00417 (E.D. Tex.)
1054	Docket Control Order, *SiOnyx, LLC v. Samsung Electronics, Co., Ltd.*, No. 2:24-cv-00408 (E.D. Tex.)
1055	Docket Control Order, *Stingray IP Solutions LLC v. Allegion Public Limited Company*, No. 2:24-cv-00396 (E.D. Tex.)
1056	Docket Control Order, *ElectraLED, Inc. v. Astera LED Technology GmbH*, No. 2:24-cv-00512 (E.D. Tex.)
1057	Docket Control Order, *Alto Dynamics, LLC v. Fresha.com SV Ltd.*, 2:24-cv-00468 (E.D. Tex.)
1058	Docket Control Order, *Cloud Byte LLC v. Dell Inc.*, No. 2:24-cv-00637 (E.D. Tex.)

Exhibit No.	DESCRIPTION
1059	September 20, 2024 Production Letter in *iCashe, Inc. v. Samsung Electronics Co.*, No. 2:24-cv-00429-JRG (E.D. Tex.)
1060	December 12, 2024 Production Letter in *iCashe, Inc. v. Samsung Electronics Co.*, No. 2:24-cv-00429-JRG (E.D. Tex.)
1061*	Declaration of Cheryl Sloane in Support of Petition for *Inter Partes* Review of U.S. Patent No. 9,483,722
Petitioners have used the same exhibit number to refer to the same document across IPR2025-00639, -00640, and -00641, except for those exhibits designated by an *, which indicates that the exhibit is unique to each IPR proceeding.	

TABLE OF ABBREVIATIONS

Abbreviation	DESCRIPTION
’722	U.S. Patent No. 9,483,722 (“’722”) (Ex.1001)
’722FH	File History of U.S. Application No. 14/517,575 (Ex.1002)
Claims / Challenged Claims	Claims 1-14 of the ’722
IPR	*Inter Partes* Review
Petitioners	Petitioners Samsung Electronics Co. Ltd. and Samsung Electronics America Inc.
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 mobile device comprising:

[1.a] a smartcard controller that includes load modulation circuitry for half duplex communication by creating at least one frequency sideband about a carrier frequency of an interrogating radio frequency (RF) field;

[1.b] an antenna tuned to operate at 13.56 MHz; and

[1.c] at least one active circuit coupled between the smartcard controller and the antenna, wherein the at least one active circuit includes an amplifier coupled to be powered by the mobile device, and wherein the amplifier is coupled to amplify a signal received from the antenna and to provide an amplified signal to the smartcard controller, and the at least one active circuit further includes a transmit circuit coupled between the smartcard controller and the antenna that in operation forms a signal that mimics the at least one frequency sideband and wherein the signal drives the antenna.

[2] The mobile device of claim 1 wherein the antenna comprises an inductive element too small to draw enough power sufficient to operate the smartcard controller from the interrogating radio frequency (RF) field.

[3] The mobile device of claim 1 wherein the smartcard controller is coupled to be powered by the mobile device.

[4] The mobile device of claim 1 wherein the mobile device comprises a mobile phone.

[5.pre] A mobile device comprising:

[5.a] a smartcard controller that includes load modulation circuitry for half duplex communication by creating at least one frequency sideband about a carrier frequency of an interrogating radio frequency (RF) field;

[5.b] an antenna tuned to operate at 13.56 MHz;

[5.c] an amplifier coupled between the smartcard controller and the antenna, wherein the amplifier is coupled to be powered by the mobile device, and wherein the amplifier is coupled to amplify a signal received from the antenna and to provide an amplified signal to the smartcard controller; and

[5.d] a transmit circuit coupled between the smartcard controller and the antenna that in operation forms a signal that mimics the at least one frequency sideband and wherein the signal drives the antenna.

[6] The mobile device of claim 5 wherein the antenna comprises an inductive element too small to draw enough power sufficient to operate the smartcard controller from the interrogating radio frequency (RF) field.

[7] The mobile device of claim 5 wherein the smartcard controller is coupled to be powered by the mobile device.

[8] The mobile device of claim 5 wherein the transmit circuit comprises a load modulation circuit.

[9] The mobile device of claim 5 further comprising wherein the transmit circuit comprises an active transmit driver.

[10] The mobile device of claim 5 wherein the mobile device comprises a mobile phone.

[11.pre] A mobile device comprising:

[11.a] a smartcard controller that includes load modulation circuitry for half duplex communication by creating at least one frequency sideband about a carrier frequency of an interrogating radio frequency (RF) field;

[11.b] an antenna tuned to operate at 13.56 MHz;

[11.c] an amplifier coupled to be powered by the mobile device, wherein the amplifier is coupled to amplify a signal received from the antenna and to provide an amplified signal to the smartcard controller; and

[11.d] an active transmit driver circuit coupled between the smartcard controller and the antenna, wherein the active transmit driver circuit is coupled to be powered by the mobile device.

[12] The mobile device of claim 11 wherein the antenna comprises an inductive element too small to draw enough power sufficient to operate the smartcard controller from the interrogating radio frequency (RF) field.

[13] The mobile device of claim 11 wherein the smartcard controller is coupled to be powered by the mobile device.

[14] The mobile device of claim 11 wherein the mobile device comprises a mobile phone.

Pursuant to §§311-319 and §42.1,[1] Samsung Electronics Co. Ltd. and Samsung Electronics America Inc. ("Petitioners") respectfully petition for *inter partes* review of claims 1-14 ("Claims") of U.S. Patent No. 9,483,722 (Ex.1001, "'722"). There is a reasonable likelihood—and it is highly likely—that at least one challenged claim is unpatentable as explained herein. Petitioners request review of the Claims and judgment finding them unpatentable under §§102 and 103.

I. INTRODUCTION

The '722 generally concerns the implementation of "contactless smartcard devices" in mobile devices. '722, 1:7-9. The '722 asserts that conventional RFID devices (or "tags") used to perform near-field communication (NFC) had power constraints, and were "powered using energy received by" the interrogating "signals transmitted by the RFID reader" instead of having their own power source. '722, 1:32-40. Because of these power constraints, the '722 states that it was difficult to incorporate RFID functionality into "smaller mobile devices" without

[1] Section cites are to 35 U.S.C. 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.

compromising communication range. ’722, 1:22-31, 2:6-20, 2:43-45, 15:8-20. Tentzeris ¶32.

To purportedly solve this limited communication range problem in the context of smartcard-enabled mobile devices, the ’722 discloses adding a “transmit circuit” to existing, off-the-shelf smartcard controllers (e.g., “SmartMX” family of “smartcard controllers” implementing the ISO 14443 standard). ’722, 2:21-42, 8:56-9:6, 16:57-17:5. Whereas “prior art” smartcard controllers allegedly used “load modulation circuitry” (a “passive” form of communication with limited range) to transmit signals, the ’722’s transmit circuit was “active”—internally powered by the host device’s battery—thus allowing for increased communication range. ’722, Fig. 14, 2:21-42, 9:16-32, 16:57-17:5. It was this addition of a “transmit circuitry separate from the load modulation circuitry in the smartcard controller” that led to allowance of the ’722 claims. ’722FH, 1716; 1728. Tentzeris ¶33.

But mobile devices that included active transmit circuits coupled to prior art smartcard controllers were already known. For example, **Finkenzeller** discloses a “mobile terminal” with RFID chip CL (a smartcard controller) that uses the well-known ISO 14443 standard that employs load modulation for communicating with external near-field readers. Finkenzeller, [0029], [0106]-[0107]. Like the ’722, **Finkenzeller** recognized problems of limited range of passive communication devices that employed load modulation. Finkenzeller, [0006]-[0008]. And just like the ’722, **Finkenzeller** addresses this issue by disclosing an “active transponder unit”—powered by the mobile terminal’s own “battery”—that is coupled to the smartcard controller, thus increasing the mobile terminal’s range. Finkenzeller, [0106], [0127]. Tentzeris ¶34.

Accordingly, Petitioners request that the Board institute trial and find the Claims unpatentable.

II. MANDATORY NOTICES UNDER 37 C.F.R. §42.8

A. Real Party-in-Interest

Petitioners Samsung Electronics Co. Ltd. and Samsung Electronics America, Inc. are the real parties-in-interest. No other party 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 ’722 is the subject of the following co-pending civil action:

iCashe, Inc. v. Samsung Elecs. Co., No. 2:24-cv-00429 (E.D. Tex.) filed June 6, 2024 (“Texas Case”).

Petitioners have also filed petitions for IPR of the related U.S. Patents 9,122,965 (IPR2025-00639) and 11,694,053 (IPR2025-00641).

C. Lead and Back-Up Counsel

Lead Counsel	Backup Counsel
James L. Davis, Jr. Reg. No. 57,325 **ROPES & GRAY LLP** 525 University Avenue, 8th Floor Palo Alto, CA 94301 Phone: +1-650-617-4000 Fax: +1-617-235-9492 james.l.davis@ropesgray.com Samsung-iCashe-IPR-Ropes@ropesgray.com **Mailing address for all PTAB correspondence:** ROPES & GRAY LLP IPRM—Floor 43 Prudential Tower 800 Boylston Street Boston, Massachusetts 02199-3600	Alexander E. Middleton Reg. No. 75,285 **ROPES & GRAY LLP** 1211 Avenue of the Americas New York, NY 10036-8704 Phone: +1-212-596-9000 Fax: +1-617-235-9492 alexander.middleton@ropesgray.com Frances Zhang Reg. No. 73,589 **ROPES & GRAY LLP** 2099 Pennsylvania Avenue, N.W. Washington, DC 20006-6807 Phone: +1-202-508-4600 Fax: +1-617-235-9492 frances.zhang@ropesgray.com

Petitioners consent to electronic service of documents to the email addresses 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. 110797-0057-655.

IV. REQUIREMENTS FOR *INTER PARTES* REVIEW

A. Grounds for Standing

Pursuant to §42.104(a), Petitioners certify the ’722 is available for IPR. Petitioners 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) and (b)(1), Petitioners request IPR of the Claims and that the Board cancel the same as unpatentable.

1. The Specific Art on Which the Challenge Is Based

Petitioners rely upon the following art (Tentzeris ¶¶55-56):

Name	Ex.	Publication	Filed	Published/ Issued	Prior art under at least
Finkenzeller	1005	US2009/0040022	6/27/2005	2/12/2009	§§102(a)/(b)/(e)
Kerdraon	1006	US2009/0215489	2/26/2009	8/27/2009	§§102(a)/(b)/(e)
Koh	1007	US2008/0073426	9/24/2006	3/27/2008	§§102(a)/(b)/(e)
Bangs	1004	US2010/0112941	3/20/2008	5/6/2010	§§102(a)/(e)

Each of the above references is prior art to the Claims based on the 3/1/2011 filing date of U.S. App. No. 13/038,341 (“’341-App.”) listed in the ’722’s priority claim.[2] Moreover, even if the Claims were entitled to the benefit of the earlier filed U.S. Pat. App. No. 12/188,346 (“ ’346-App.,” filed 8/8/2008), **Finkenzeller**, **Koh**, and **Bangs** on which Grounds 1, 3, 4, and 6 are based, are still prior art. Tentzeris ¶¶57-58.

2. Statutory Grounds on Which the Challenge Is Based

<table>
<tr><th>Ground</th><th>Claim(s)</th><th>Basis</th><th>References</th></tr>
<tr><td>1</td><td rowspan="3">1-14</td><td>§§102/103</td><td>Finkenzeller</td></tr>
<tr><td>2</td><td rowspan="3">§103</td><td>Finkenzeller in view of Kedraon</td></tr>
<tr><td>3</td><td>Finkenzeller in view of Koh</td></tr>
<tr><td>4-6</td><td>8</td><td>Grounds 1-3 in further view of Bangs</td></tr>
</table>

V. ’722 PATENT AND PROSECUTION HISTORY

A. ’722

The ’722 generally relates to implementing “contactless smartcard devices” in mobile devices. ’722, 1:7-9. For example, the ’722 discusses coupling additional circuitry to existing “smartcard controllers” to increase the communication range of mobile devices with limited size antennas that are less powerful. ’722, 2:21-42, 8:56-9:6, 16:57-17:5, Fig. 14. Tentzeris ¶35.

[2] As discussed *infra* §V.B, the Claims are not entitled to the benefit of the earlier filed ’346-App. filing date.

According to the ’722, “**smartcard controller 330**” is a prior art smartcard controller, such as those from the “‘SmartMX’ family of controllers available from NXP Semiconductors N.V.” ’722, 8:56-9:4, 2:40-42. For example, “**smartcard controller 330**” includes “RFID functionality” and “may be a device capable of implementing all or part of the ISO 14443 standard for contactless NFC devices.” ’722, 8:56-62. Per the ’722, prior art smartcard controllers used “load modulation” to communicate with external reader devices by “creat[ing] a half-duplex communications path between the device presenting the interrogating RF field and smartcard controller 330.” ’722, 2:21-42. As the ’722 further explains, “when the coil (antenna 1480) is inductively coupled to a separate device presenting the interrogating RF field,” the load modulation driver circuit “modulates an impedance seen by the [external] device presenting the interrogating RF field.” ’722, 2:32-37. As the ’722 admits, “[l]oad modulation driver circuits are well known, and may be as simple as a switched transistor.” ’722, 15:67-16:3. Specifically, load modulation involves “creat[ing] frequency sidebands 1610 about the carrier frequency 1620 of the interrogating RF field,” which is the “frequency of operation (e.g., 13.56 MHz).” ’722, 15:25-28, 15:52-55, Fig. 14. Tentzeris ¶36.

Because load modulation is a “passive” form of communication that is powered solely from the interrogating signal, prior art smartcard controllers purportedly had limited communication range. ’722, 1:22-31, 1:41-50. As such, the

’722 discloses adding a transmit circuit that is separate from the load modulation circuitry in the prior art smartcard controller to drive more powerful signals, thus extending usable distance of the mobile device. ’722, 15:64-16:5, 16:57-17:5. Tentzeris ¶37.

As illustrated in Figure 21 below, an example of such a transmit circuit is the “**active transmit driver circuit 2130**” that is coupled between an “**antenna 1542**” and “**smartcard controller 330**.” ’722, 16:57-17:5, Fig. 21. Notably, because “smartcard controller 330” outputs data by load modulating the received signal from the interrogating device, the transmit circuit must first extract the data before the data can be modulated onto a signal using the **active transmit driver circuit 2130**. To do this, the load-modulated signal is provided to the “[o]utgoing data extraction circuit 1520,” which extracts data from the load-modulated signal. ’722, 15:39-58. The **active transmit driver circuit 2130** then generates a new signal modulated with the data to mimic a load modulated signal (but with greater power). ’722, 15:39-58. The “**active transmit driver circuit 2130** may include one or more amplifiers[,] filters, oscillators, modulators, etc., to form a signal that mimics…[a modulated] interrogating RF field.” ’722, 16:65-67. Tentzeris ¶38.

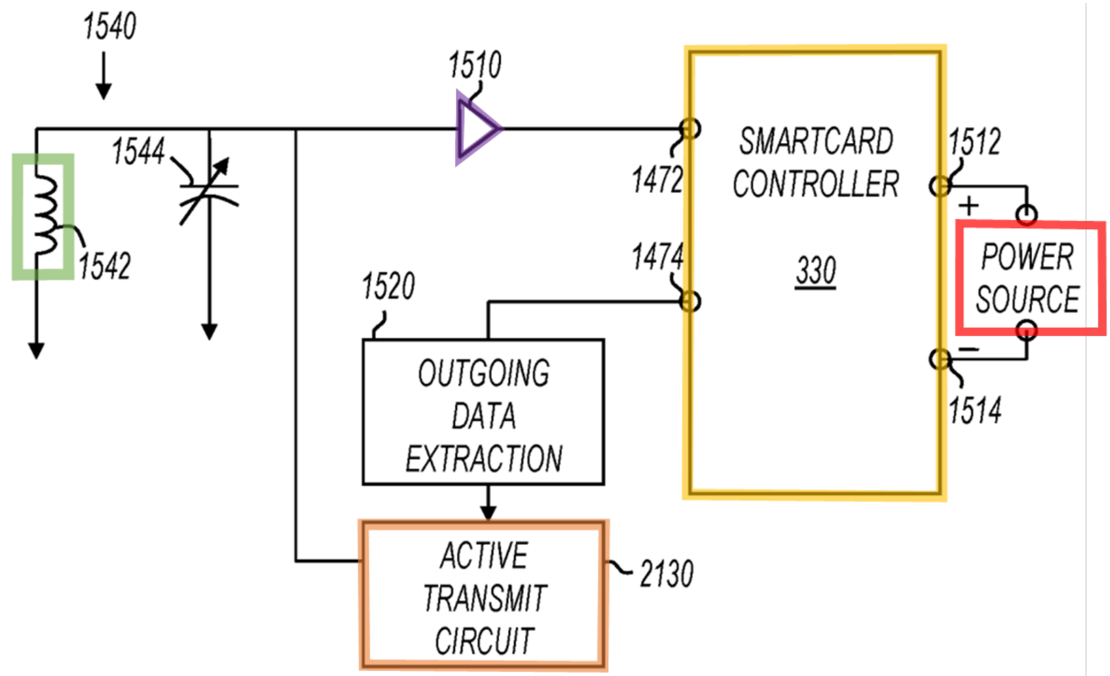


FIG. 21

On the receive path, an "**amplifier 1510**" is coupled between the **smartcard controller 330** and **antenna 1542**. '722, 15:21-38, Fig. 21. "**Antenna 1542** is a small inductive element" that forms a "tuned circuit" with capacitor 1544 "resonant at…13.56 MHz," the frequency at which prior art "controllers provide RFID functionality." '722, 8:56-9:6, 15:24-28. "**Amplifier 1510** amplifies the voltage received at **antenna 1542**" from an external reader device and provides "the amplified voltage…to the **smartcard controller**." '722, 15:21-38. Tentzeris ¶39.

The **smartcard controller 330** and the **active transmit driver circuit 2130** are powered by the host **mobile device**. '722, 9:7-15, 17:2-5. The host **mobile device** may be a "mobile phone, or includes mobile phone functionality." '722, 4:43-49, 5:59-61, Figs. 1, 2. The '722 admits that powering a tag device with a "**local power source**," such as a **battery**, was known in the prior art. '722, 1:13-21. Tentzeris ¶40.

B. Prosecution History

1. '722 Prosecution

The '722 issued from U.S. Pat. App. 14/517,575 ("'575-App."), filed 10/17/2014. The '575-App. claims priority, through a chain of continuations and a continuation-in-part, to the '346-App. filed 8/8/2008. Tentzeris ¶¶41-42.

During prosecution of the '722, the Examiner issued two rejections based on prior art. Ex.1002 ("'722FH"), 1576-83, 1694-99. In both instances, Applicant did not contest any of the Examiner's mapping of the claims to the prior art, instead amending the claims to overcome the prior art rejections. '722FH, 1655, 1716 (amending claims "to overcome" prior art rejections without traversal). Tentzeris ¶¶43-44.

For example, with respect to the claimed "smartcard controller," the Examiner relied on prior art disclosure of controlling circuitry in an integrated circuit to satisfy the "smartcard controller" of the pending claims. '722FH, 1579, 1696. For example, in the first office action, the Examiner relied on Kowalski's (U.S. Patent No. 8,260,199, Ex.1018) disclosure of "central processor 311" of a mobile phone to show "smartcard controller." '722FH, 1579 ("Kowalski discloses a mobile phone comprising a smartcard controller (311)"); Ex.1018, 14:15, 14:50-58 ("central processor 311" of "mobile phone"). In the second office action, the Examiner additionally pointed to Park's (U.S. Patent Appl. Pub. 2005/0224589, Ex.1017) disclosure of a "controller 130" within an "SD memory card having functions of a contactless integrated circuit (IC) card" to show "smartcard controller." '722FH, 1696 ("Park…discloses a smartcard with an amplifier to amplify the received signal to provide an amplified signal to the smartcard controller [0052]"); Ex.1017, ¶¶ 3, 17, 52, Fig. 1 ("controller 130" is within "SD memory card 100 having functions of a contactless integrated circuit (IC) card (ISO 14443 Types A and B)"). Applicant did not contest that the prior art "processor" or "controller" satisfied the claimed "smartcard controller." Tentzeris ¶45.

Additionally, with respect to the limitation "the antenna comprises an inductive element too small to draw enough power sufficient to operate the smartcard controller from an interrogating radio frequency (RF) field," the Examiner relied on prior art disclosure of "inductive coupling of [two] antennas" to "maximize" "inductive coupling rate" to conclude that the antennas must be "small by themselves." '722FH, 1581 (citing Kowalski, 13:55-61); Ex.1018, 13:55-61 ("putting the antenna coils AC1, AC2 closer in order to bring the inductive coupling rate between the antenna coils to its maximum value"). Applicant did not contest this disclosure. '722FH, 1655. Tentzeris ¶46.

After the last rejection, the Applicant amended the independent claims (each using slightly different language) to recite the concept of "the mobile device including transmit circuitry separate from the load modulation circuitry in the smartcard controller." '722, 1716 (remarks); 1714-15 (amendments). For example, to capture this concept, Applicant amended then-pending independent claim 1 to recite two additional limitations reflected in the following underlined language: 1) "a smartcard controller <u>that includes load modulation circuitry for half duplex communication by creating at least one frequency sideband about a carrier frequency of an interrogating radio frequency (RF) field</u>;" and 2) "<u>and the at least one active circuit further includes a transmit circuit coupled between the smartcard controller and the antenna that in operation forms a signal that mimics the at least one frequency and wherein the signal drives the antenna</u>." '722FH, 1713, 1714-15 (amending independent claims 7 and 14 to include similar concept). Thereafter, all pending claims were allowed. '722FH, 1728-32. Tentzeris ¶47.

2. Priority Date of the Claims

The Claims are not entitled to the 2008 filing date of the '346-App. because the '346-App. fails to provide written description support for at least the following limitations: "a smartcard controller that includes load modulation circuitry…creating at least one frequency sideband" ('722 independent claims 1, 5, 11); "at least one active circuit" ('722 independent claim 1); "an amplifier coupled to…amplify a signal received from the antenna and to provide an amplified signal to the smartcard controller" ('722 independent claims 1, 5, 11); "transmit circuit…forms a signal that mimics the at least one frequency sideband" ('722 independent claims 1, 5); "an active transmit driver circuit coupled between the smartcard controller and the antenna" ('722 independent claim 11). The challenged independent claims and thus each of the Challenged Claims recites at least one of these limitations. Tentzeris ¶48.

The '346-App does not disclose a "smartcard controller that includes load modulation circuitry…creating at least one frequency sideband," "amplifier," "transmit circuit," nor "active transmit driver circuit." '722, 2:21-42, 15:28-38, 15:42-47, 15:52-55, 16:57-17:5. *See generally* Ex.1009 ('346-App. File History), 40-78. While the '346-App generally discusses the inclusion of a smartcard controller in a host device, it does *not* describe the '722 claimed "transmit circuit" for a "signal that mimics the at least one frequency sideband." *See generally*, Ex. 1009, 40-78. In its discussion of the background art, the '346-App. makes cursory mention of prior art "Active tags" that have "a local power source" and "generally transmit information…using a locally generated RF carrier," and of prior art "Passive tags" that use "energy…from an interrogating RF field" "to transmit response codes." Ex.1009, 41. But there is no explanation of how this is done, let alone, a disclosure of a "smartcard controller that includes load modulation circuitry," an "amplifier," or a "transmit circuit" ('722, cls. 1, 5, 11) for transmission as claimed in the ’722. *See generally* Ex.1009, 40-78. Moreover, there is no disclosure of the claimed connections or functionality of the claimed “smartcard controller that includes load modulation circuitry” or “active transmit driver circuit.” *Id.* Tentzeris ¶49.

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

A. §325(d)

There is no basis for discretionary denial under § 325(d). The references relied upon in the Grounds— **Finkenzeller**, **Kerdraon**, **Koh**, and **Bangs**—were not cited in an IDS or otherwise identified by the Examiner, or applied to reject claims during ’722’s prosecution. The Examiner also never considered the testimony of Petitioners’ expert Dr. Tentzeris regarding the scope and content of these documents. Tentzeris ¶¶61-199.

Furthermore, the disclosures considered by the Examiner are not substantially the same as any of the references relied upon in the Grounds of the Petition. For example, **Finkenzeller** (which is the primary reference in all Grounds in the Petition) teaches at least the claimed concepts that the Examiner believed was missing from the prior art, *e.g.*: “the mobile device including transmit circuitry separate from the load modulation circuitry in the smartcard controller.” *See* §V.B.1 (’722 Prosecution). For example, **Finkenzeller** discloses a transmit circuit that comprises separate transmission circuitry (“modulator circuit 9,” “oscillator 8,” and "transmitter amplifier 80" of "transmit branch") from the "load modulation" circuitry used in a smartcard controller ("RFID chip CL" implementing the "ISO/IEC 14443" standard for contactless NFC devices). *See* §IX ([1.b], [1.c3]); Finkenzeller, [062], [0106], [0108], [0112]-[0113], [0115], Fig. 9; '722, 8:56-9:6. Tentzeris ¶¶61-168.

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" nor issue any rejections based on the art relied on in this petition, it is difficult, if not impossible, to explain "why the Examiner allowed the claims" or "how the Examiner might have considered the arguments presented in the Petition." *Bowtech, Inc. v. MCP IP, LLC*, IPR2019-00379, Pap. 14, *20 (declining to exercise §325(d) discretion). To the extent art considered by the Examiner was substantially the same as the references identified in the Grounds, the Examiner erred by not rejecting the Claims for the reasons discussed in §IX. Tentzeris ¶¶61-168.

B. §314(a)

Co-pending district court litigation pending in the Eastern District of Texas also does not warrant the exercise of discretion under §314(a). *See Apple Inc. v. Fintiv, Inc.*, No. IPR2020-00019, Pap. 11 (designated precedential).

Factor 1 weighs in favor of institution. Petitioners intend to seek a stay of the district court litigation pending the outcome of this IPR, along with other IPRs related to the litigation dispute. At the time of institution, it is highly unlikely that the Court will have conducted a *Markman* hearing, which is currently scheduled for October 28, 2025. Ex.1050, 3.

The Eastern District of Texas has routinely granted stays prior to claim construction, noting such cases have "not reached such an advanced stage that it would weigh against a stay." *Broadphone LLC v. Samsung Elecs. Co.*, No. 2:23-CV-00001-JRG-RSP, 2024 WL 3524022, at *2-3 (E.D. Tex. July 24, 2024) (granting stay where "significant amount of discovery remains, the claim construction hearing has not occurred, and trial is currently set for [over six months later]"). Even in cases that are far more advanced, the Eastern District of Texas has granted stays where an IPR has been instituted, recognizing "the PTAB's insight and expertise 'is likely to be of considerable assistance to the Court.'" *Onpoint Sys., LLC v. Protect Animals With Satellites, LLC*, No. 4:20-CV-657, 2022 WL 2704166, at *3-4 (E.D. Tex. July 12, 2022) (citation omitted) (granting stay even where "no dispute that this case is in an advanced stage"); *see also Cywee Grp. Ltd. v. Samsung Elecs. Co.*, No. 17-CV-00140, 2019 U.S. Dist. LEXIS 144149, at *19-22 (E.D. Tex. Feb. 14, 2019) (granting stay three months prior to scheduled trial date) (collecting cases where the court granted stays despite trial being four or fewer months away). Given the uncertainty of whether the district court will grant a stay in the litigation, this factor does not favor denial of institution.

To the extent the Board finds that ***Factors 2 and 3*** are neutral or at most weigh slightly against institution, they deserve little weight given Samsung's diligence in preparing and filing this Petition. *Markman* briefing has not commenced; fact discovery is in its infancy (Ex.1050, 4), with iCashe producing less than 12,000 pages (Exs. 1059-60); and no experts have prepared reports (Ex.1050, 3). *See Apple v. Parus Holdings, Inc.*, No. IPR2020-00686, Pap. 9, at 15-17 (aside from initial invalidity contentions, finding "no other significant investment" where no dispositive motions, expert reports, or *Daubert* challenges occurred). Moreover, although trial is currently set for April 6, 2026, Petitioners expect the district court litigation will be delayed because twelve other active cases are also scheduled for trial on that same date and six of those were filed prior to this litigation. Exs. 1050-58; *see Boe Tech. Grp. Co. v. Optronic Scis. LLC*, No. IPR2024-01130, 2025 WL 305477, at *4 (*Fintiv* factor 2 "neutral or weigh[s] slightly in favor of not exercising discretion" where Judge Gilstrap "set 10 cases for jury selection on the same day"). The district court has also not issued any substantive orders, including any related to the validity of the '722.

Petitioners' diligence averts parallel, duplicative proceedings, and any unfair costs to Patent Owner. *Sotera Wireless, Inc. v. Masimo Corp.*, No. IPR2020-01019, Pap. 12, at 16-17 (precedential as to § II.A); *Apple Inc. v. Maxell, Ltd.*, No. IPR2020-

00204, Pap. 11, at 16 (refusing to exercise discretionary denial even where trial would be complete nine months before FWD will issue, district court had already issued claim construction order, fact discovery had closed, and expert discovery was underway); *Lego Sys., Inc. v. Mq Gaming LLC*, No. IPR2020-01445, 2021 WL 606917, at *8 (granting institution where trial expected to occur "five months before a final written decision," because outweighed by "low" "investment by the court and parties in the [parallel case] on issues common to this proceeding," Petitioner's *Sotera* stipulation "that allays concerns about inefficient duplication of resources and the potential for inconsistent decisions," and "the merits of the Petition are strong"); *CoolIT Sys., Inc., v. Asetek Danmark A/S*, No. IPR2021-01195, Pap. 10, at 9-14 (instituting where district court trial was expected to occur five months before Board's decision, and narrower Sand stipulation filed).

Importantly, fairness considerations weigh in favor of institution under *NHK*. *Fintiv*, Pap. 11, at 11 ("[E]vidence…that the petitioner filed the petition expeditiously…weigh[] against exercising the authority to deny institution under *NHK*."). iCashe has asserted multiple patents against Samsung. Samsung diligently investigated and assessed its options for challenging those patents (including the '722) and had a right to do so before the statutory deadline for pursuing IPR expired. §315(b); *see also Lego*, 2021 WL 606917, at *5 (finding no delay supporting discretionary denial even where invalidity contentions had been served nearly a year prior, recognizing "preparing a petition for *inter partes* review requires substantial effort even after the references and basic theories have been identified"). This right should not be violated. iCashe's selection of a venue with an expedited trial schedule should not be rewarded at the expense of Samsung's rights to pursue review within one year of service of the complaint.

Factor 4 weighs strongly in favor of institution. Upon institution of this IPR proceeding, Petitioners stipulate that, they will not pursue in *iCashe, Inc. v. Samsung Elecs. Co.*, No. 2:24-cv-00429 (E.D. Tex. filed June 6, 2024), the grounds of invalidity asserted in the IPR, or any other ground that was raised or could have reasonably been raised in the IPR with respect to the Challenged Claims. *Sotera*, Pap. 12, at 19 (finding "stipulation here mitigates any concerns of duplicative efforts…as well as concerns of potentially conflicting decisions" and "ensures that an *inter partes* review is a 'true alternative' to the district court proceeding"); *Lego*, 2021 WL 606917, at *6 ("[F]actor weighs strongly against discretionary denial" where "Petitioner has agreed to be bound by the same stipulation as in *Sotera*").

Factor 5 is either neutral or weighs at most only slightly against institution. Petitioners and Patent Owner are the same parties in the district court litigation. While the overlapping parties may weigh slightly in favor of exercising discretion, institution and a public trial record of the important invalidity grounds in the Petition will reduce issues for the public, including all parties besides Samsung who may in the future be subject to litigation involving the ’722.

Factor 6: The Petition is strong and presents compelling unpatentability arguments that were not previously considered during prosecution. The primary reference, **Finkenzeller**, anticipates all Claims, and at minimum renders them obvious. *See* §IX.A. Tentzeris ¶¶61-168. There is a significant public interest against “leaving bad patents enforceable,” *Thryv, Inc v. Click-ToCall Techs., LP*, 590 U.S. 45, 55 (2020). Accordingly, the Board should not exercise its discretion to deny institution. §314(a).

VII. LEVEL OF ORDINARY SKILL IN THE ART

A person of ordinary skill in the art (“POSITA”) would have had a Bachelor’s degree in computer science, computer engineering, electrical engineering, or a similar field, with 2-3 years of experience in smartcards and contactless communications. Additional graduate education could substitute for professional experience, or significant experience in the field could substitute for formal education. This is the appropriate level of skill whether the claims are entitled to priority as of 8/8/2008 or 3/1/2011. Tentzeris ¶¶50-52.

VIII. CLAIM CONSTRUCTION

Claim terms subject to IPR are to be construed according to the *Phillips* standard applied in district court. §42.100(b). Petitioners apply the plain and ordinary meanings of terms. Tentzeris ¶¶53-54. Only terms necessary to resolve the controversy must be construed.

IX. GROUNDS OF UNPATENTABILITY

This Petition is supported by the Declaration of Dr. Tentzeris, which describes the prior art's scope and content at the time of the '722. Tentzeris ¶¶1-205.

Although the '722 purports to have invented circuitry for incorporating contactless and smartcard functionality into a mobile device, such a system was already known. Tentzeris ¶¶59. For example, **Finkenzeller** discloses a mobile device that includes the claimed arrangement of a smartcard controller, antenna, amplifier, and transmit circuit. [0106]-[0108]. **Kerdraon** discloses an NFC-enabled mobile device comprising a smartcard controller. Kerdraon [0070]. **Koh** similarly discloses an NFC-enabled mobile device with a smartcard controller, and is prior art to the 8/8/2008 date of the earlier '346-App. Koh [0033]. **Bangs** discloses an NFC-enabled mobile device that includes the claimed transmit circuit including load modulation. [0043], [0046]-[0050]. Tentzeris ¶¶59-60.

As demonstrated below, the prior art renders the Claims unpatentable. Tentzeris ¶68.

A. Ground 1: Finkenzeller (Claims 1-14)

1. Overview of Finkenzeller

Finkenzeller discloses contactless smartcard devices in mobile devices. Finkenzeller, [0001]-[0003], [0029], [0091]. **Finkenzeller** discloses an "inventive transponder unit" that uses "active" communication circuitry to communicate with an external "reading device" to extend the "transmit range of the transponder unit." [0006]-[0008], [0010]-[0011], [0017], [0106]-[0107]. Tentzeris ¶61.

For example, Finkenzeller discloses that its "transponder unit" is connected to a "smart card chip," which may be implemented as an "RFID chip" called "**RFID chip CL**." [0042], [0106]-[0107], [0110], Fig. 9. According to Finkenzeller, "**RFID chip CL**" is "a conventional RFID chip according to the prior art." [0107], [0110]. For example, "**RFID chip CL**" is compliant with standards for contactless cards, such as "ISO/IEC 14443." [0107]. "**RFID chip CL**" is "so designed that data transfer from the transponder unit to a reading device is carried out by means of load modulation," which "is almost always the case in usual RFID systems used at 13.56 MHz." [0107], [0048], [0065], [0005]. According to **Finkenzeller**, **RFID chip CL** "normally uses a load modulation" to perform half-duplex (or bi-directional) communication with a "remote RFID reading device." [0109], [0111]-[0112]. As **Finkenzeller** explains, "[a]s soon as the **RFID chip CL** has received and processed a command" from the remote reading device, **RFID chip CL** "tries to send a response back to the remote reading device" using "load modulation i.e. an additional parallel resistor in the chip [that] is switched on and off in time with the modulation signal" to create an "amplitude-modulated alternating voltage signal." [0112]. Specifically, **Finkenzeller** explains that load modulation creates an "upper subcarrier band" and a "lower subcarrier band" about a "carrier frequency f_T of the RFID reading device of for example 13.56 MHz." [0113]. Tentzeris ¶62.

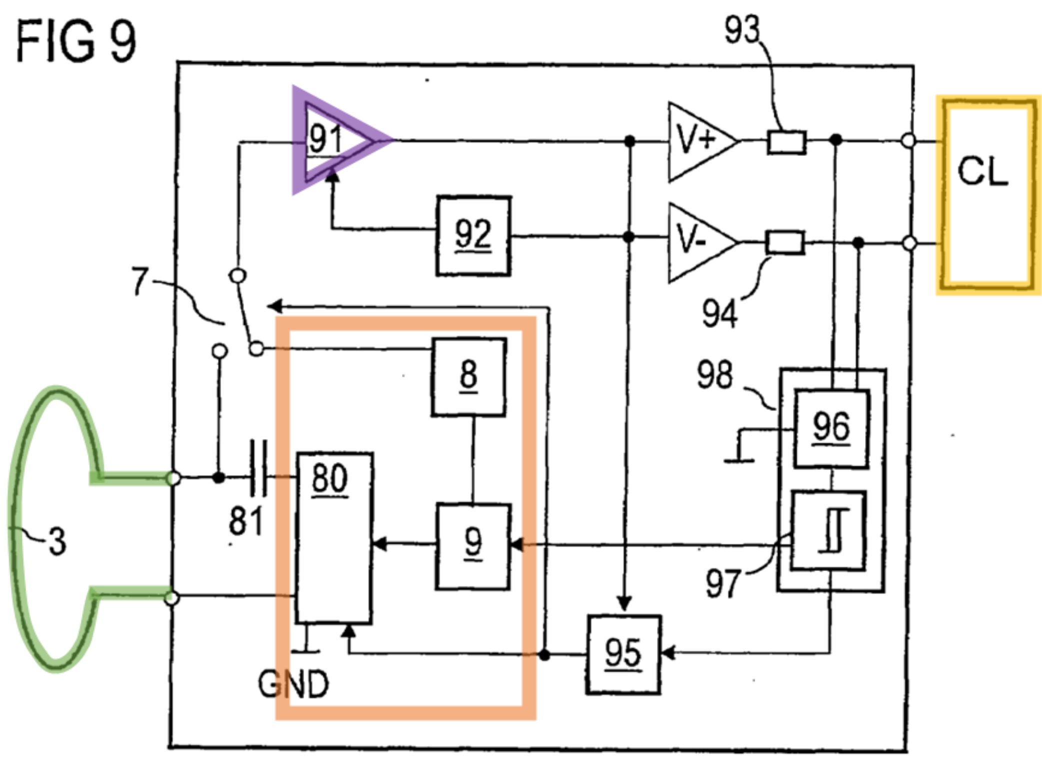
As **Finkenzeller** acknowledges, "[c]onventional transponders without their own energy supply," referred to as "passive transponders," had limited communication "range." [0004]. To overcome this, **Finkenzeller's** inventive transponder unit adds a **transmit circuit** that is separate from the load modulation circuitry in **RFID chip CL** to allow the mobile device to "communicate with ordinary RFID reading devices over a higher range." [0010]-[0011], [0017], [0108], [0129]. Tentzeris ¶63.

As illustrated in Figure 9 below, an example of such a **transmit circuit** is shown (outlined in **orange** below) coupled between an "**antenna 3**" and "**RFID chip CL**." [0106]-[0108], [0115], Fig. 9. As shown, this **transmit circuit** (which is part of "transmit branch") consists of "**oscillator 8 (e.g. 13.56 MHz)**" and "**modulator circuit 9**" and a "**transmitter amplifier 80**" for active transmission. [0106], [0108], Fig. 9. Tentzeris ¶64.

As discussed above, "**RFID chip CL**" performs load modulation by modulating an amplified "signal that corresponds to the signal of the remote reading device" to include data in at least one "subcarrier band resulting from the load modulation." [0111]-[0113]. This load-modulated signal is then provided to "demodulator circuit 98," which extracts data from the sidebands. [0112]-[0113].

For example, "demodulation circuit 98" is used to "filter[] out a subcarrier band resulting from the load modulation" of the "**RFID chip CL**" and provide the side bands to the **modulator circuit 9** to form a new signal with the side bands about "the frequency of **the oscillator signal**, the so-called carrier frequency" (13.56 MHz), which is then amplified by "**amplifier 80** and sent via **antenna 3**." [0069], [0112]-[0114]. This new signal mimics the "two modulation side bands" of the load modulated response of the **RFID chip CL**. Tentzeris ¶65.

FIG 9



The "receive branch" comprises an "**input amplifier 91**" that is coupled between the **transponder chip CL** and **antenna 3**. [0106], [0109], Fig. 9.

"Together with the capacitor 81 **the antenna 3** forms parallel-resonant circuit whose resonant frequency corresponds approximately to the transmitting frequency of the RFID reading device," which is "13.56 MHz for ISO/IEC 14443." [0078], [0107], [0109]. **The antenna 3** comprises an inductive "coil," and is small enough such that the transponder unit can be "preferably integrated in a card or data carrier insertable into the mobile terminal." [0032], [0109]. The "voltage thus available on the resonant circuit is supplied to the **input amplifier 91**," and the "voltage amplified" is "supplied to **a further amplifier**" and "supplied to the connections of the **contactless RFID chip CL**." [0109]-[0110]. Tentzeris ¶66.

The **transponder chip CL**, **input amplifier 91**, **oscillator 8**, and **modulator 9** are powered by the host mobile device. [0012], [0060], [0127]. The transponder unit may be integrated into mobile devices such as "mobile telephones, PDAs, etc.," which have "their own energy supply (battery) which can also be used for supplying an inventive circuit." [0001], [0028], [0032], [0092], [0124], [0127]. Tentzeris ¶67.

2. Claim Chart

'722 Claims	Finkenzeller (U.S. Patent Pub. No. 2009/0040022)
[1.pre] A mobile device comprising:	**To the extent the preamble is limiting, Finkenzeller discloses a mobile device** (*e.g.*, "mobile terminal"**).** ***E.g.*, Finkenzeller** **Finkenzeller** discloses a "mobile terminal" that includes a "transponder unit." [0028]. For example, the transponder unit is

’722 Claims	**Finkenzeller (U.S. Patent Pub. No. 2009/0040022)**
	“integrated in a card or data carrier insertable into the mobile terminal.” [0032]. Tentzeris ¶¶69-71. • **[0028]:** “***The transponder unit can also be part of a mobile terminal***, for example a mobile telephone.…” • **[0032]:** “***The transponder unit is preferably integrated in a card or data carrier insertable into the mobile terminal***….”
[1.a] a smartcard controller that includes load modulation circuitry for half duplex communication by creating at least one frequency sideband about a carrier frequency of an interrogating radio frequency (RF) field;	**Finkenzeller discloses a smartcard controller** (*e.g.*, “RFID chip CL”; “smart card chip”) **that includes load modulation circuitry** (*e.g.*, “parallel resistor in the chip” for “load modulation”) **for half duplex communication** (*e.g.*, “switch[ing] between receive mode and transmit mode”) **by creating at least one frequency sideband about a carrier frequency** (*e.g.*, creating “a subcarrier band” about a “13.56 MHz carrier frequency signal”) **of an interrogating radio frequency (RF) field** (*e.g.*, RF “field” from “reader device”)**.** ***E.g.*, Finkenzeller** *See* [1.pre]. **Finkenzeller** further discloses connecting its “transponder unit” to “a smart card chip.” [0029]. For example, Finkenzeller discloses that this “smart card chip” is implemented as an “RFID chip” called “RFID chip CL.” [0028]-[0031], [0042], [0106]-[0107], [0110], Fig. 9. As such, Finkenzeller discloses that the “RFID chip CL” is a “smart card chip.” [0107], [0110]. Tentzeris ¶¶72-75. In this regard, **Finkenzeller** discloses two “smart card chip” alternatives: a “first alternative” in which the smart card chip “which generates and modulates the subcarrier signal, and a “second alternative” in which the transponder unit itself (not the smart card chip) contains circuitry for “generating and modulating the subcarrier signal.” [0029]-[0030]. **Finkenzeller** explains one way of implementing the “first alternative” is by using its “transponder chip CL” (implemented

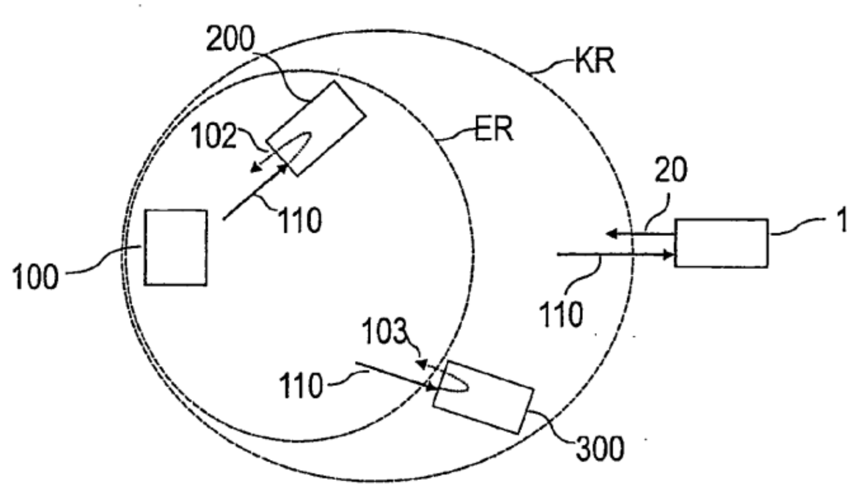
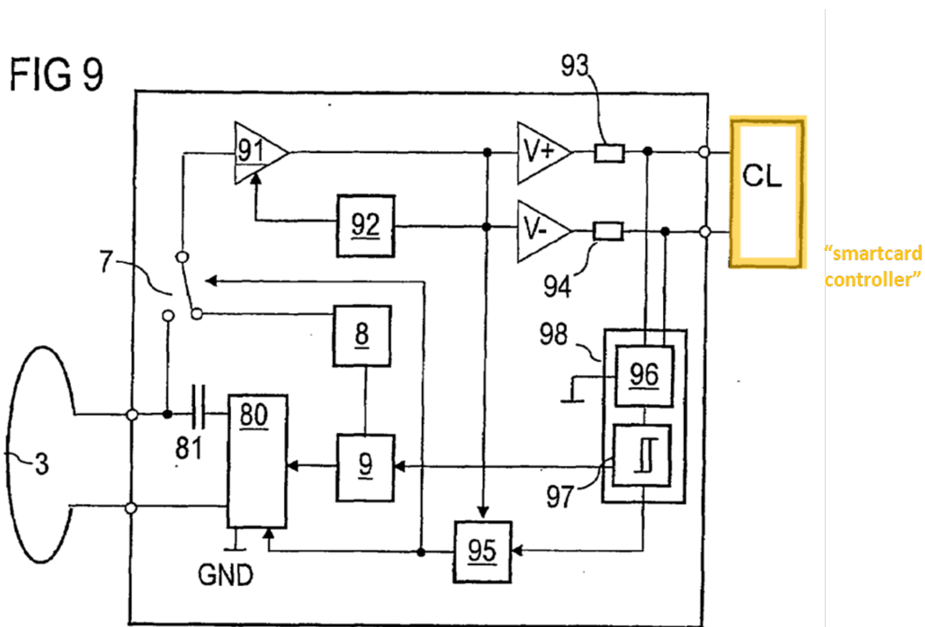
’722 Claims	Finkenzeller (U.S. Patent Pub. No. 2009/0040022)
	as RFID chip CL) as the externally connected “smart card chip” connected to the transponder unit. [0029], [0106]-[0107], [0112]-[0113], Fig. 9. For example, consistent with the “first alternative “smart card chip” in the “first alternative” that modulates a subcarrier signal, Finkenzeller discloses that RFID chip CL performs “load modulation with a subcarrier.” [0113]. Tentzeris ¶76. As **Finkenzeller** explains, its RFID chip CL is “able to receive, evaluate and optionally process commands sent from” a reading device and supports “13.56 MHz” communications using, e.g., the “ISO/IEC 14443” standard for contactless communication, in the context of “security-critical applications.” [0067], [0107], [0111]. Tentzeris ¶77. In light of the above, a POSITA would have understood that Finkenzeller’s RFID chip CL is a smartcard controller,[3] and at minimum would have found it obvious to implement RFID chip CL as a smartcard controller to advantageously provide smartcard functionality in Finkenzeller’s mobile telephone without needing to carry a separate smartcard device. Tentzeris ¶¶78-81. **Finkenzeller** discloses that RFID chip CL includes load modulation circuitry using sidebands about a carrier frequency. For example, RFID chip CL sends “a response back to the

[3] This is consistent with the ’722 specification and prosecution history. *See* ’722, 8:56-9:6 (“smartcard controller 330 may be a device capable of implementing all or part of the ISO 14443 standard for contactless NFC devices.”); Section V.B.1 (Examiner’s uncontested finding during prosecution that prior art disclosures of a “controller”/“central processor” having ISO 14443-compliant functionality satisfied the claimed “smartcard controller”). Tentzeris ¶¶78, 43-45.

’722 Claims	Finkenzeller (U.S. Patent Pub. No. 2009/0040022)
	remote reading device” using “load modulation, i.e. an additional parallel resistor in the chip.” [0112]. **Finkenzeller** explains that the output of RFID chip CL includes “a subcarrier band resulting from the load modulation,” where these sideband subcarriers are centered around 13.56 MHz of an RF field of the reading device. [0113], [0107]-[0109], [0048], Fig. 1. Tentzeris ¶¶82-83. **Finkenzeller** further discloses that the load modulation circuitry is for half duplex communication.[4] For example, “[a]s soon as the **RFID chip CL** has received and processed a command” from the remote reading device, **RFID chip CL** “tries to send a response back to the remote reading device,” and “the RFID chip normally uses a load modulation” “[f]or this purpose.” [0111]-[0112], Fig. 9. **Finkenzeller** further discloses using a switch 7 for “switch[ing] between receive mode and transmit mode” according to whether received data is to be provided to the RFID chip CL or data from the RFID chip CL is to be transmitted. [0056], [0114]. That this communication is half-duplex is confirmed by the RFID chip CL’s implementation of ISO 14443, which uses half-duplex communication. [0107].[5] Tentzeris ¶¶84-86. • **Fig. 1**

[4] Half-duplex communication involves a “bidirectional path” that alternates data transfer between a transmitting and receiving device. ’722, 15:33-38; Ex.1027, 52. Tentzeris ¶85.

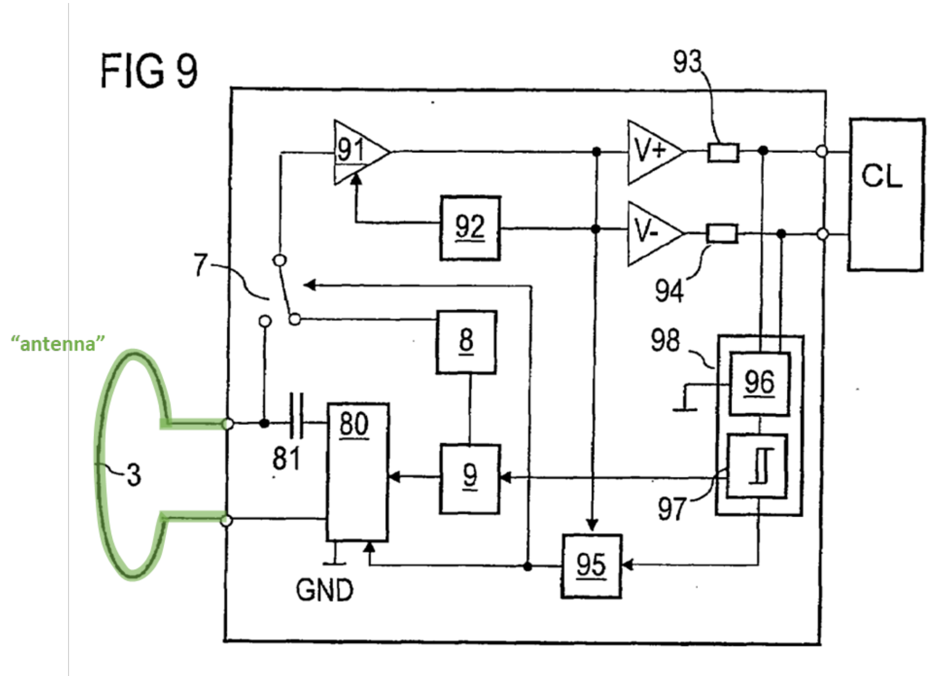
[5] Ex.1036, 343. Tentzeris ¶86.

’722 Claims	Finkenzeller (U.S. Patent Pub. No. 2009/0040022)
	FIG 1  • **Fig. 9** FIG 9  • **[0029]:** “According to a first alternative, the circuit configuration for generating and modulating the subcarrier signal is a separate part of the mobile terminal. ***The transponder unit then has a signal input for receiving the subcarrier signal*** modulated by means of

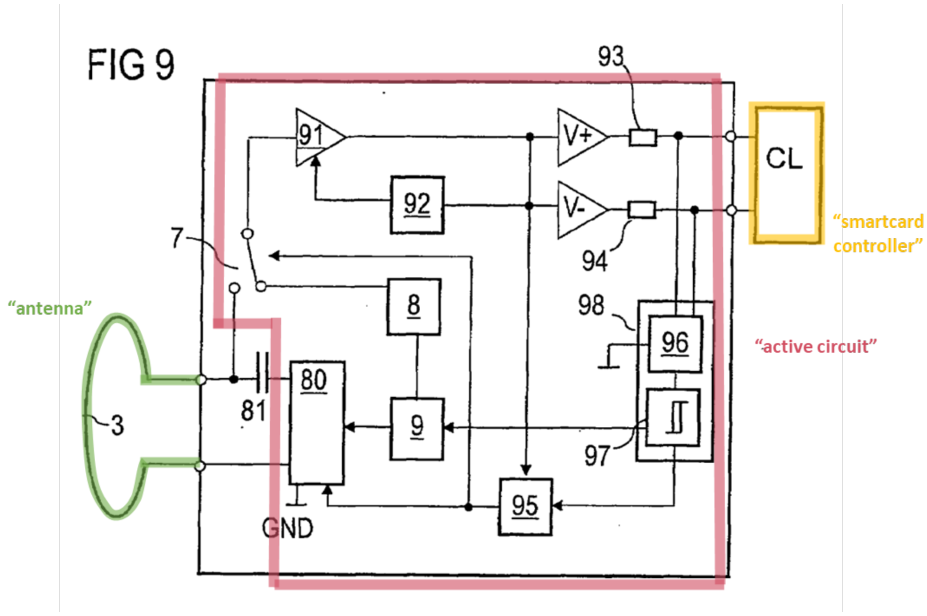
’722 Claims	Finkenzeller (U.S. Patent Pub. No. 2009/0040022)
	the data to be sent from the circuit configuration. ***The signal input is connected via a suitable interface in particular to a chip, for example a smart card chip, which generates and modulates the subcarrier signal.***” • **[0030]:** “According to ***a second alternative***, the ***circuit configuration for generating and modulating the subcarrier signal*** is part of the inventive transponder unit itself….” • **[0031]:** “The advantage of this alternative is that the smart card chip itself need not make any HF (or RFID) interface available…all necessary functions for transferring data are performed by the transponder unit.” • **[0042]:** “FIG. 9 a transponder unit in which ***a chip with a conventional HF interface is connected to an interface module***….” • **[0048]:** “The transponder unit 1 sends for data transfer to the reading device 100 a signal which the reading device 100 can evaluate as ***a signal of a transponder which carries out a load modulation of the field 110 of the reading device 100***....” • **[0049]:** “…***The load resistance in the transponder unit is switched on and off at the frequency fH, so that two subcarrier signals spaced +/−fH arise in the signal spectrum besides the strong signal of the carrier frequency fT of the reading device.*** When the subcarrier is now modulated in the transponder unit 1 according to the data to be transferred, the modulation ***side bands carrying the information arise in the spectrum below and above the two subcarriers. The data to be transferred are thus contained equally in the side bands of the sub-carriers which are disposed on both sides of the two corresponding spectral lines in each case***..” • **[0056]:** “Furthermore, the controller 5 transmits a control signal to the switch 7 which ***switches between receive***

’722 Claims	Finkenzeller (U.S. Patent Pub. No. 2009/0040022)
	mode and transmit mode of the transponder unit. However, a separate antenna can instead be provided for sending. The controller 5 used can be for example a part of the operating system of a portable data carrier, such as a chip card.” • **[0067]** “The ***type of application for which the data are transferred*** can also be a criterion for the operating mode. Thus, ***the transponder unit should only work in*** the passive mode for ***security-critical applications***….” • **[0106]:** “…Further, ***a transponder chip CL is connected via its antenna connections to the push-pull amplifier***.” • **[0107]:** “The ***transponder chip CL is a conventional RFID chip*** according to the prior art.…Further, the transponder chip CL is so designed that data transfer from the transponder unit to a reading device is ***carried out by means of load modulation***. ***This is almost always the case in usual RFID systems used at 13.56 MHz or also 125 kHz (e.g. ISO/IEC 14443***, ISO/IEC 15693, ISO/IEC 18000-3).” • **[0108]:** “The transmit branch consists of a ***demodulation circuit 97, a modulator circuit 9, an oscillator 8 (e.g. 13.56 MHz),*** a controller 95, and a transmitter amplifier 80 connected to the antenna 3….” • **[0109]:** “In the receive mode a ***voltage is induced in the antenna 3 by the magnetic field of a remote RFID reading device***….” • **[0110]:** “The output signal of the amplifier 91 is supplied to a further amplifier, preferably a push-pull amplifier (V+, V−). The ***output signal of the push-pull amplifier is supplied to the connections of the contactless RFID chip CL*** via (at least) one series resistor 93….” • **[0111]:** “***The RFID chip CL thus receives a signal that corresponds to the signal of the remote reading device*** in time response and is proportional thereto in amplitude.

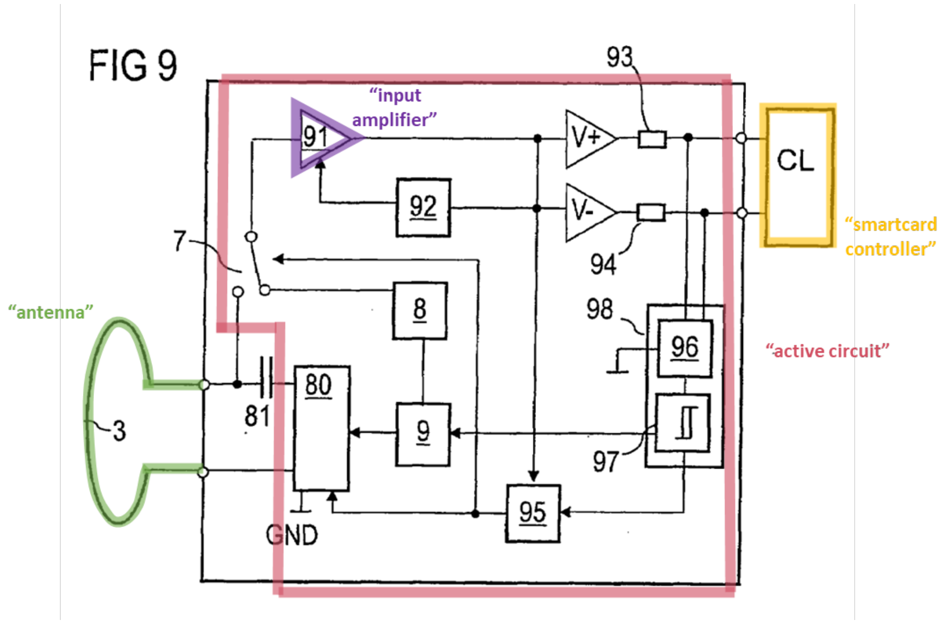
'722 Claims	**Finkenzeller (U.S. Patent Pub. No. 2009/0040022)**
	The RFID chip is thus also able to receive, evaluate, and optionally process commands sent from said reading device." • **[0112]:** "***As soon as the RFID chip CL has received and processed a command, it tries to send a response back to the remote reading device. For this purpose the RFID chip normally uses a load modulation, i.e. an additional parallel resistor in the chip is switched on and off in time with the modulation signal****….*" • **[0113]:** "…In RFID systems working with load modulation with a subcarrier, filtering out ***a subcarrier band resulting from the load modulation (upper subcarrier band 13.56 MHz+f_{HT}, lower subcarrier band −13.56 MHz-f_{HT}***) and down-stream processing is also possible." • **[0114]:** "The modulation signal reconstructed by the demodulation circuit 97 is also supplied to a controller 95. ***The latter switches the inventive circuit with the first edge of the modulation signal to a transmit mode without delay if possible***, so that the data generated by the RFID chip CL can also be transferred to the remote reading device. ***For this purpose, the switch 7 is first switched from the antenna 3 to the oscillator 8 (13.56 MHz).***…"***See also*** **[0028], [0030]-[0031], [0042]**
[1.b] an antenna tuned to operate at 13.56 MHz; and	**Finkenzeller discloses an antenna** (*e.g.*, "antenna 3") **tuned to operate at 13.56 MHz** (*e.g.*, "carrier frequency being 13.56 MHz")**.** <u>***E.g.*, Finkenzeller**</u> *See* [1.pre]. **Finkenzeller** further discloses that capacitor 81 and antenna 3 form "a parallel-resonant circuit" that is tuned to a "resonant frequency correspond[ing] approximately to the transmitting

’722 Claims	Finkenzeller (U.S. Patent Pub. No. 2009/0040022)
	frequency of the RFID reading device,” which is 13.56 MHz. Fig. 9, [0107], [0109]. Tentzeris ¶¶87-90. • **Fig. 9**  • **[0107]:** “…Further, the transponder chip CL is so designed that data transfer from the transponder unit to a reading device is carried out by means of load modulation. ***This is almost always the case in usual RFID systems used at 13.56 MHz*** or also 125 kHz (e.g. ISO/IEC 14443, ISO/IEC 15693, ISO/IEC 18000-3).” • **[0108]:** “The transmit branch consists of a demodulation circuit 97, a modulator circuit 9, an ***oscillator 8 (e.g. 13.56 MHz), a controller 95, and a transmitter amplifier 80 connected to the antenna 3***….” • **[0109]:** “In the receive mode ***a voltage is induced in the antenna 3 by the magnetic field of a remote RFID reading device. Together with the capacitor 81 the antenna 3 forms a parallel-resonant circuit whose***

’722 Claims	Finkenzeller (U.S. Patent Pub. No. 2009/0040022)
	resonant frequency corresponds approximately to the transmitting frequency of the RFID reading device*.” • **[0123]:** “For an inductive coupling, the circuit has an additional ***antenna 29 which can be made to resonate with the working frequency (e.g. 13.56 MHz) by means of a capacitor 26….” • ***See also* [0002], [0006], [0069].**
[1.c.1] at least one active circuit coupled between the smartcard controller and the antenna,	**Finkenzeller discloses at least one active circuit** (*e.g.*, “receive branch” and “transmit branch” of “active transponder unit”) **coupled between the smartcard controller and the antenna** (*e.g.,* between “RFID chip CL” and “antenna 3,” *see* [1.a]-[1.b], Fig. 9)**.** ***E.g.*, Finkenzeller** *See* [1.pre]-[1.b]. **Finkenzeller** further discloses an “inventive active transponder unit has a receive branch and a transmit branch.” [0106]. As **Finkenzeller** explains, “active transponders” are “transponders with their own energy supply.” [0004], [0060]. Tentzeris ¶¶91-94. As illustrated in annotated Figure 9 below, **Finkenzeller’s** active circuit (outlined in red), which includes the “transmit branch” and “receive branch,” is coupled between RFID chip CL and antenna 3. Fig. 9, [0106]. Tentzeris ¶95. • **Fig. 9**

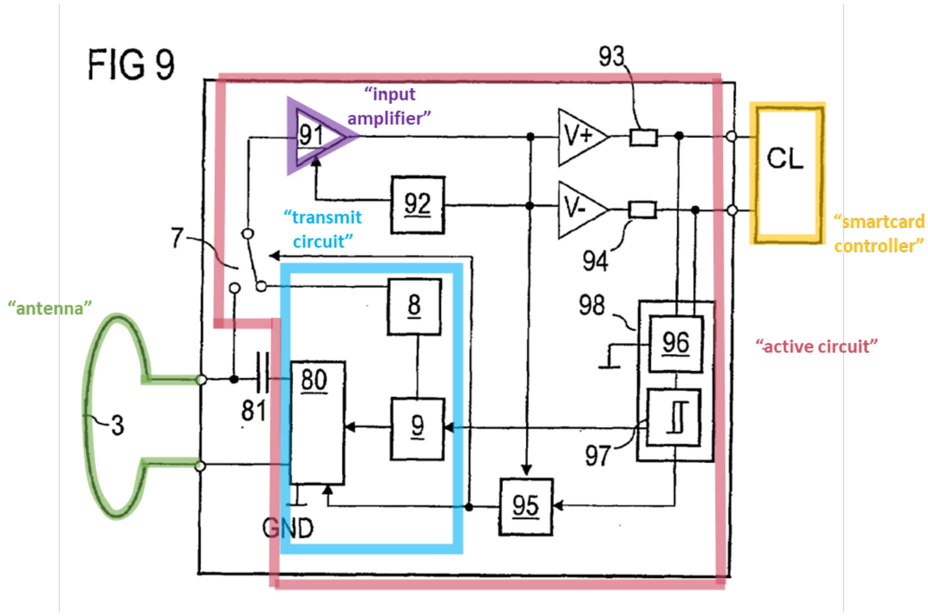
’722 Claims	Finkenzeller (U.S. Patent Pub. No. 2009/0040022)
	 • **[0004]:** "…. ***The energy supply of the active transponder, for example in form of a battery, operates its electronic circuit***. Conventional transponders without their own energy supply are referred to as passive transponders, in contrast." • **[0060]:** "To ***supply the active components of the transponder unit at least partly with energy*** and to increase the energy range between the transponder unit 1 and the reading device 100, ***the inventive transponder unit has a battery 2***." • **[0106]:** "The ***inventive active transponder unit has a receive branch and a transmit branch***….." • **[0110]:** "***The output signal of the amplifier 91 is supplied to a further amplifier***, preferably a push-pull amplifier (V+, V−). The ***output signal of the push-pull amplifier is supplied to the connections of the contactless RFID chip CL*** via (at least) one series resistor 93. The amplitude of the output signal of the push-pull amplifier V+/V− is so selected here that the ***RFID chip CL can be supplied with sufficient energy for operation by the output signal***."

’722 Claims	Finkenzeller (U.S. Patent Pub. No. 2009/0040022)
	• **[0115]:** “The ***reconstructed modulation signal and the signal of the oscillator 8 are supplied to the modulator circuit 9***. The exact function of such a circuit has already been described in detail. The ***output signal of the modulator circuit 9 is supplied to the amplifier 80 and sent via the antenna 3 to the remote reading device***.” • **[0127]:** “Moreover, it can be advantageously exploited that mobile terminals such as mobile telephones, PDAs, etc., have their ***own energy supply (battery) which can also be used for supplying an inventive circuit.***”
[1.c.2] wherein the at least one active circuit includes an amplifier coupled to be powered by the mobile device, and wherein the amplifier is coupled to amplify a signal received from the antenna and to provide an amplified signal to the smartcard controller, and	**Finkenzeller discloses the at least one active circuit includes an amplifier coupled to be powered by the mobile device** (*e.g.*, “input amplifier 91” powered by “energy supply (battery)”)**, and wherein the amplifier is coupled to amplify a signal received from the antenna** (*e.g.*, “voltage is induced in the antenna 3…is supplied to the input amplifier,” *see* [1.b]) **and to provide an amplified signal to the smartcard controller** (*e.g.*, “output signal of amplifier 91 is supplied to” “RFID chip CL,” *see* [1.a])**.** ***E.g.*, Finkenzeller** *See* [1.pre]-[1.c.1]. **Finkenzeller** further discloses that its active circuit includes an input amplifier 91. [0106]. The input amplifier 91 is included in the “inventive active transponder,” which is supplied power by a battery of the mobile telephone. [0060], [0106], [0127]. Tentzeris ¶¶96-99. **Finkenzeller** discloses that “a voltage is induced in the antenna 3” and “supplied to the input amplifier 91 via the switch 7”—the input amplifier 91 amplifies the signal and provides the amplified signal to RFID chip CL. [0109]-[0110], Fig. 9. Tentzeris ¶¶100-101. As illustrated in Figure 9, the amplified “output signal of the amplifier 91 is supplied to” the “push-pull amplifier (V+, V-),”

’722 Claims	Finkenzeller (U.S. Patent Pub. No. 2009/0040022)
	and “the output signal of the push-pull amplifier is supplied to the connections of the contactless RFID chip CL.” [0110]. Tentzeris ¶102. To the extent it is argued that the amplifier must directly receive the signal from the antenna and directly provide the amplified signal to the smartcard controller, the combination of the input amplifier 91 and push-pull amplifier receive the signal from antenna 3, amplify the signal, and provide the amplified signal to RFID chip CL. [0109]-[0110]. Moreover, like input amplifier 91, the push-pull amplifier is a circuit of the “inventive active transponder,” which is supplied power by a battery of the mobile telephone. [0060], [0106], [0127]. Tentzeris ¶103. • **Fig. 9**  • **[0060]:** “To ***supply the active components of the transponder unit at least partly with energy*** and to increase the energy range between the transponder unit 1 and the reading device 100, ***the inventive transponder unit has a battery 2***.”

’722 Claims	Finkenzeller (U.S. Patent Pub. No. 2009/0040022)
	• **[0106]:** “The ***inventive active transponder unit*** has a receive branch and a transmit branch. The receive branch consists of an antenna 3, ***an input amplifier 91***, an automatic gain control 92 and an amplifier which is preferably designed as a push-pull amplifier (V+, V−). ***Further, a transponder chip CL is connected via its antenna connections to the push-pull amplifier***.” • **[0109]:** “In the receive mode a voltage is induced in the antenna 3 by the magnetic field of a remote RFID reading device….***The voltage thus available on the resonant circuit is supplied to the input amplifier 91 via the switch*** *7*. Via a gain control 92 the gain factor of the input amplifier 91 is now so adjusted that the output amplitude of the voltage amplified by the input amplifier 91 remains largely constant….” • **[0110]:** “The output signal of the amplifier 91 is supplied to a further amplifier, preferably a push-pull amplifier (V+, V−). ***The output signal of the push-pull amplifier is supplied to the connections of the contactless RFID chip CL via (at least) one series resistor 93***. The amplitude of the output signal of the push-pull amplifier V+/V− is so selected here that the RFID ***chip CL can be supplied with sufficient energy for operation by the output signal***.” • **[0127]:** “…Moreover, it can be advantageously exploited that mobile terminals such as mobile telephones, PDAs, etc., have their ***own energy supply (battery) which can also be used for supplying an inventive circuit***.”
[1.c.3] the at least one active circuit further includes a transmit circuit	**Finkenzeller discloses the at least one active circuit further includes a transmit circuit coupled between the smartcard controller and the antenna** (*e.g.*, “modulator circuit 9, an oscillator 8…and a transmitter amplifier 80” of “transmit branch” coupled between “RFID chip CL” and “antenna 3,” *see* [1.a]-[1.b]) **that in operation forms a signal that mimics the**

'722 Claims	Finkenzeller (U.S. Patent Pub. No. 2009/0040022)
coupled between the smartcard controller and the antenna that in operation forms a signal that mimics the at least one frequency sideband and wherein the signal drives the antenna.	**at least one frequency sideband** (*e.g.*, "modulator circuit 9" which forms an "output signal" using "the signal of the oscillator 8" and at least "a subcarrier band resulting from the load modulation" of the "parallel resistor" in "RFID chip CL," *see* [1.a]) **and wherein the signal drives the antenna** (*e.g.*, "output signal of the modulator circuit 9" amplified by "transmitter amplifier 80" to drive "antenna 3", *see* [1.b]). ***E.g.*, Finkenzeller** *See* [1.pre]-[1.c.1]. **Finkenzeller** further discloses that its active circuit includes a transmit circuit. As outlined in blue in Figure 9 below, this transmit circuit includes a "modulator circuit 9, an oscillator 8…and a transmitter amplifier 80," all of which are part of a "transmit branch." [0108]. This transmit circuit is coupled between the antenna 3 and the RFID chip CL. Fig. 9. Tentzeris ¶¶104-107. **Finkenzeller** discloses that the transmit circuit forms a signal that mimics the at least one frequency sideband created by the load modulation circuitry in the RFID chip CL (*see* [1.a]). As **Finkenzeller** explains, demodulation circuit 98 first "filter[s] out a subcarrier band resulting from [the] load modulation (upper subcarrier band 13.56 MHz+f_{HT}, lower subcarrier band −13.56 MHz−f_{HT})" performed within "RFID chip CL." [0112]-[0113]. The oscillator 8 generates a "13.56 MHz" carrier frequency signal. [0103], [0114]. The "subcarrier band" filtered by demodulator circuit 98 and the newly generated "signal of the oscillator 8" are "supplied to the modulator circuit 9." [0062], [0115]. The "modulator circuit 9" then performs modulation of the 13.56 MHz signal generated by oscillator 8 using the filtered subcarrier data extracted from the load-modulated signal to form the "data to be sent…in side bands" around the "frequency of the oscillator signal, the so-called carrier frequency." [0062], [0115]. Tentzeris ¶108. **Finkenzeller** further discloses that the "output signal of the modulator circuit 9 is supplied to the amplifier 80" for

’722 Claims	Finkenzeller (U.S. Patent Pub. No. 2009/0040022)
	amplification to drive transmission “via the antenna 3 to the remote reading device.” [0115]. Tentzeris ¶109. • **Fig. 9**  • **[0062]:** “The ring modulator 9 has the feature of carrying out a special form of amplitude modulation. As in usual amplitude modulation, two spectral lines, regarded in the frequency spectrum, are generated spaced at the frequency of the ASK-modulated signal ***around the frequency of the oscillator signal, the so-called carrier frequency***….***The data to be sent contained in the ASK-modulated signal are located after the amplitude modulation in the ring modulator 9 in side bands around the two spectral lines of the subcarrier frequency….The increased range is possible primarily when the total transmit power is put into the side bands where the data to be sent are located. The carrier frequency is fundamentally required for demodulation of the signal, for extracting the data transmitted from the transponder unit in the reading device***….”

’722 Claims	Finkenzeller (U.S. Patent Pub. No. 2009/0040022)
	• **[0103]:** “The oscillator 88 generates ***the 13.56 MHz carrier frequency signal required in the transmit mode***….” • **[0106]:** “***The inventive active transponder unit has a receive branch and a transmit branch.*** The receive branch consists of ***an antenna 3***, an input amplifier 91, an automatic gain control 92 and an amplifier which is preferably designed as a push-pull amplifier (V+, V−). ***Further, a transponder chip CL is connected via its antenna connections to the push-pull amplifier.***” • **[0108]:** “***The transmit branch consists of a*** demodulation circuit 97, ***a modulator circuit 9, an oscillator 8 (e.g. 13.56 MHz)***, a controller 95, and a ***transmitter amplifier 80 connected to the antenna 3***....” • **[0112]:** “As soon as the RFID chip CL has received and processed a command, it tries to send a response back to the remote reading device. For this purpose the ***RFID chip normally uses a load modulation, i.e. an additional parallel resistor in the chip is switched on and off in time with the modulation signal***....By the demodulator circuit 98 this amplitude-modulated alternating voltage signal is demodulated and the original modulation signal thus reconstructed again.” • **[0113]:** “The demodulation circuit 98 consists in the simplest case of a bridge rectifier 96 and a threshold switch 97....In RFID systems working with load modulation with a subcarrier, ***filtering out a subcarrier band resulting from the load modulation (upper subcarrier band 13.56 MHz+f_{HT}, lower subcarrier band −13.56 MHz−f_{HT})*** and down-stream processing is also possible.” • **[0114]:** “The modulation signal reconstructed by the demodulation circuit 97 is also supplied to a controller 95. The latter ***switches the inventive circuit with the first edge of the modulation signal to a transmit mode***

’722 Claims	**Finkenzeller (U.S. Patent Pub. No. 2009/0040022)**
	without delay if possible, so that the data generated by the RFID chip CL can also be transferred to the remote reading device. For this purpose, the switch 7 is first switched from the antenna 3 to ***the oscillator 8 (13.56 MHz)***....” • **[0115]:** “***The reconstructed modulation signal and the signal of the oscillator 8 are supplied to the modulator circuit 9***. The exact function of such a circuit has already been described in detail. ***The output signal of the modulator circuit 9 is supplied to the amplifier 80 and sent via the antenna 3 to the remote reading device***.”
[2] The mobile device of claim 1 wherein the antenna comprises an inductive element too small to draw enough power sufficient to operate the smartcard controller from the interrogating radio frequency (RF) field.	***See*** **[1].** **Finkenzeller discloses that the antenna** (e.g., “antenna 3,” *see* [1.b]) **comprises an inductive element** (*e.g.*, “coil”) **too small to draw enough power sufficient to operate the smartcard controller** (*e.g.*, “RFID chip CL,” *see* [1.a]) **from the interrogating radio frequency (RF) field** (*e.g.*, RF “field” from “reader device,” *see* [1.a])**.** ***E.g.*, Finkenzeller** *See* [1.a]-[1.b], [1.c.2]. **Finkenzeller** further discloses antenna 3 is an “inductive antenna” in the form of “coil 3.” [0055], [0109]. During operation, there is an “induced voltage in the coil 3.” [0109]. Tentzeris ¶¶110-113. **Finkenzeller** further discloses that the size of the coil is too small to draw enough power to operate the RFID chip CL. For example, **Finkenzeller** discloses that instead of supplying the signal from the antenna 3 to the RFID chip CL directly to power the RFID chip CL, the input amplifier 91 and push-pull amplifier are needed to amplify the signal, and that the combined amplification from these amplifiers “is so selected here that the RFID chip CL can be supplied with sufficient

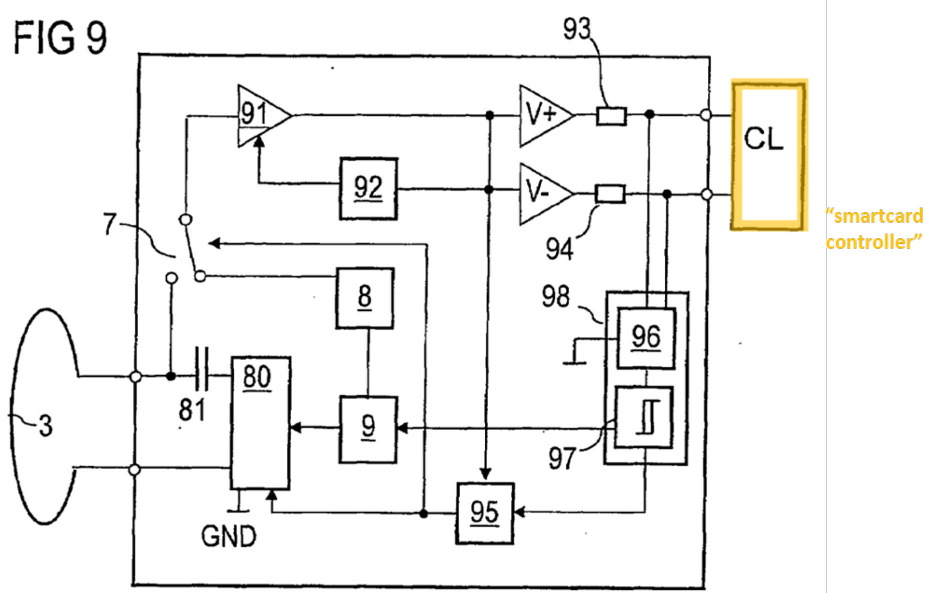
’722 Claims	Finkenzeller (U.S. Patent Pub. No. 2009/0040022)
	energy for operation by the output signal.” [0110].[6] As explained in [1.c.2], the amplifiers are themselves powered by a battery, and thus, additional energy from the battery is needed to amplify the signal to have enough energy to power RFID chip CL. Tentzeris ¶¶114-115. At minimum, **Finkenzeller** renders obvious this limitation. For example, **Finkenzeller** discloses that “small antennas, e.g., in a SIM card with its own antenna (approx. 15x25 mm2), obtain very low read ranges,” often making it “impossible to communicate with a contactless reading device” using load modulation. [0127].[7] To address this issue, **Finkenzeller** teaches the use of an “energy supply (battery) which can also be

[6] This is consistent with the examiner’s uncontested finding during prosecution of the ’722 that Kowalski’s disclosure of an antenna coil needing more inductance (and thus more power) satisfied the limitation in claim 2. *See* V.B.1; ’722FH, 1581 (citing Kowalski, 13:55-61), 1655; Ex.1018, 13:55-61 (“putting the antenna coils AC1, AC2 closer in order to bring the inductive coupling rate between the antenna coils to its maximum value”). Tentzeris ¶¶115, 43-44, 46.

[7] Notably, there is not even enough power to send a signal back to the reader, let alone provide sufficient power for the RFID chip CL. This is a known problem for “inductively coupled systems” because the “inductance of a conductor loop (coil) depends totally upon the material properties…and the geometry of the layout,” where the geometry is the size and number of loops of the antenna. Ex.1027, 78, 96-97. Tentzeris ¶116.

’722 Claims	Finkenzeller (U.S. Patent Pub. No. 2009/0040022)
	used for supplying an inventive circuit” in place of the power extracted from the interrogating RF field by the antenna 3. [0127]. When the mobile device has its own power supply to power the RFID chip, a POSITA would have recognized that having smaller antennas in a device (including too small to draw sufficient energy to power transponder circuitry including the RFID chip) advantageously allows the host mobile telephone to be more compact and/or allows additional functionality to be added to the device without increasing the size of the mobile telephone. Tentzeris ¶116. • **[0003]:** “Up to a certain distance between reading device and transponder, which is also referred to as ***the energy range, the transponder can take just enough energy for operating its circuit from the field of the reading device***. Typical energy ranges of such systems are about 10 cm for ISO 14443 and up to 1 m for ISO 15693-compatible systems.” • **[0006]:** “…***Primarily due to the small antenna diameters used, NFC systems only permit small communication ranges of up to 20 cm.***” • **[0055]:** “…The transponder unit has a battery 2, ***an inductive antenna 3*** and an electronic circuit 4, 5, 6, 7….” • **[0060]:** “***To supply the active components of the transponder unit at least partly with energy and to increase the energy range*** between the transponder unit 1 and the reading device 100, the inventive transponder unit has a battery 2.” • **[0109]:** “In the receive mode ***a voltage is induced in the antenna 3 by the magnetic field of a remote RFID reading device***.... ***The voltage thus available on the resonant circuit is supplied to the input amplifier 91*** via the switch 7….”

’722 Claims	**Finkenzeller (U.S. Patent Pub. No. 2009/0040022)**
	• **[0110]:** “The output signal of the amplifier 91 is supplied to a further amplifier, preferably a push-pull amplifier (V+, V−). The output signal of the push-pull amplifier is supplied to the connections of the contactless RFID chip CL via (at least) one series resistor 93. ***The amplitude of the output signal of the push-pull amplifier V+/V− is so selected here that the RFID chip CL can be supplied with sufficient energy for operation by the output signal***.” • **[0127]:** “It was ascertained that ***small antennas, e.g. in a SIM card with its own antenna (approx. 15×25 mm2), obtain very low read ranges with a conventional load modulation. It is frequently even impossible to communicate with a contactless reading device*** when the SIM card with an antenna is disposed for example in a mobile telephone….”
[3] The mobile device of claim 1 wherein the smartcard controller is coupled to be powered by the mobile device.	***See* [1].** **Finkenzeller discloses that the smartcard controller** (*e.g.*, “RFID chip CL,” *see* [1.a]) **is coupled to be powered by the mobile device** (*e.g.*, powered by “energy supply (battery),” *see* [1.pre])**.** ***E.g.*, Finkenzeller** *See* [1.pre]-[1.a], [1.c.2], [2]. **Finkenzeller** further discloses a battery is used to “supply the active components of the transponder unit at least partly with energy.” [0055], [0060], [0127]. As discussed in [1.c.2], the amplifier 91 and push-pull amplifier on the transponder unit are powered by the mobile device. Moreover, as explained in [2], the output of the push-pull amplifier is selected to provide sufficient power to the RFID chip CL. *See also*, Fig. 9. Tentzeris ¶¶117-120. • **Fig. 9**

<table>
<tr><th>’722 Claims</th><th>Finkenzeller (U.S. Patent Pub. No. 2009/0040022)</th></tr>
<tr><td></td><td>

[0055]: “…The transponder unit has a battery 2….”
[0060]: “To supply the active components of the transponder unit at least partly with energy…the inventive transponder unit has a battery 2.”
[0127]: “…mobile terminals such as mobile telephones, PDAs, etc., have their own energy supply (battery) which can also be used for supplying an inventive circuit.”
See also [0110], [0129]
</td></tr>
<tr><td>[4] The mobile device of claim 1 wherein the mobile device comprises a mobile phone.</td><td>See [1].

Finkenzeller discloses that the mobile device comprises a mobile phone (e.g., “mobile telephone”).

<u>E.g., Finkenzeller</u>

See [1.pre].

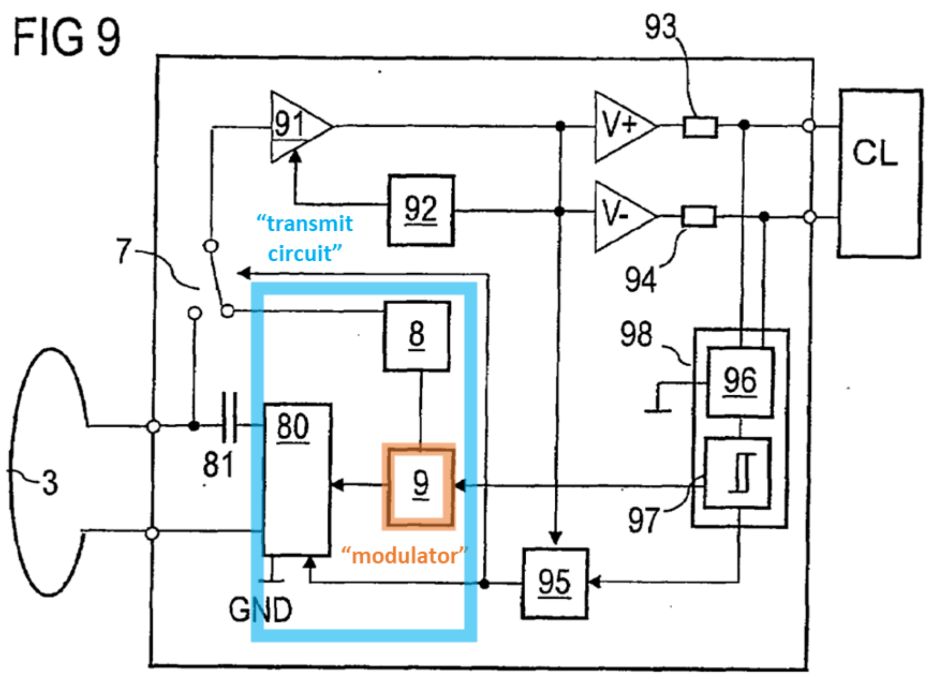
Finkenzeller further discloses that “[t]he transponder unit can also be part of a mobile terminal, for example a mobile telephone.” [0028]. Tentzeris ¶¶121-24.</td></tr>
</table>

’722 Claims	Finkenzeller (U.S. Patent Pub. No. 2009/0040022)
	• **[0028]:** “***The transponder unit can also be part of a mobile terminal, for example a mobile telephone….***” • **[0032]:** “The transponder unit is preferably integrated in a card or data carrier insertable into the mobile terminal….***for example a mobile phone***….” • **[0127]:** “Moreover, it can be advantageously exploited that ***mobile terminals such as mobile telephones***....”
[5.pre]-[5.b]. A mobile device comprising: a smartcard controller that includes load modulation circuitry for half duplex communication by creating at least one frequency sideband about a carrier frequency of an interrogating radio frequency (RF) field; an antenna tuned to operate at 13.56 MHz;	*See* [1.pre]-[1.b]. Tentzeris ¶¶125-130.
[5.c] an amplifier coupled	**Finkenzeller discloses an amplifier coupled between the smartcard controller and the antenna** (*e.g.*, “input amplifier

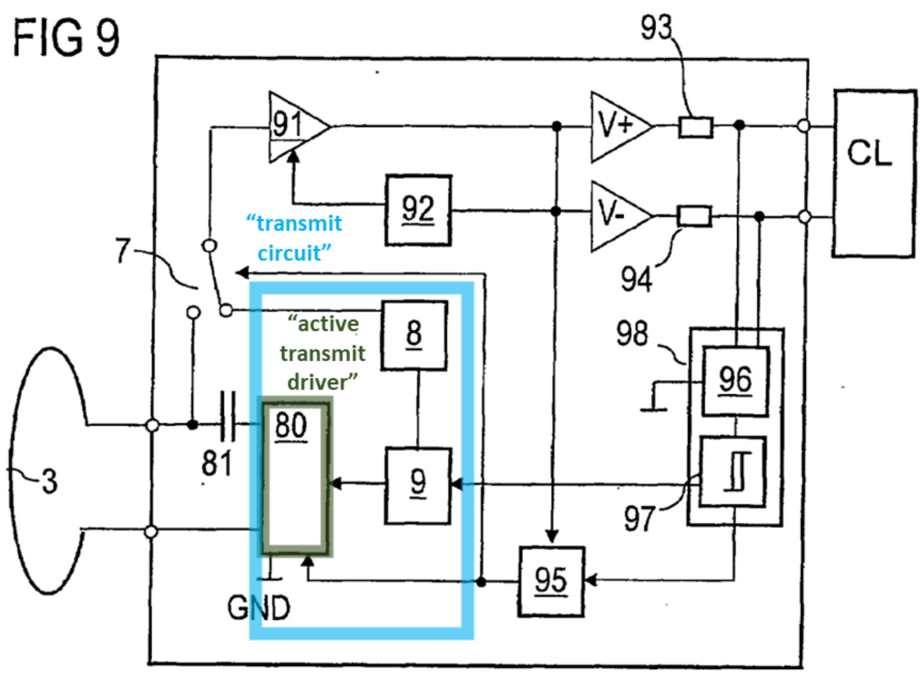
’722 Claims	Finkenzeller (U.S. Patent Pub. No. 2009/0040022)
between the smartcard controller and the antenna, wherein the amplifier is coupled to be powered by the mobile device, and wherein the amplifier is coupled to amplify a signal received from the antenna and to provide an amplified signal to the smartcard controller; and	91” is coupled between “RFID chip CL,” and “antenna 3”; *see* [1.c.1]-[1.c.2])**, wherein the amplifier is coupled to be powered by the mobile device, and wherein the amplifier is coupled to amplify a signal received from the antenna and to provide an amplified signal to the smartcard controller** (*see* [1.c.2])**.** *See* [1.c.1]-[1.c.2], [5.pre]-[5.b]. As explained in [1.c.1], the active circuit (including the amplifier 91 (*see* [1.c.2])) is located between the RFID chip CL and antenna 3. Tentzeris, ¶¶131-34.
[5.d] a transmit circuit coupled between the smartcard controller and the antenna that in operation forms a signal that mimics the at least one frequency sideband and	*See* [1.c.3], [5.pre]-[5.b]. Tentzeris ¶¶135-36.

’722 Claims	Finkenzeller (U.S. Patent Pub. No. 2009/0040022)
wherein the signal drives the antenna.	
[6]	*See* [2], [5]. Tentzeris ¶¶137-38.
[7]	*See* [3], [5]. Tentzeris ¶¶139-40.
[8] The mobile device of claim 5 wherein the transmit circuit comprises a load modulation circuit.	***See* [5].** **Under PO’s interpretation,[8] Finkenzeller discloses that the transmit circuit** (*e.g.*, “modulator circuit 9, an oscillator 8…and a transmitter amplifier 80” of “transmit branch”) **comprises a load modulation circuit** (*e.g.*, “ring modulator 9”)**.** ***E.g.*, Finkenzeller** *See* [1.a], [1.c.1], [1.c.3]. As discussed in [1.c.3], **Finkenzeller** discloses the transmit branch contains a “demodulation circuit 97, a modulator circuit 9,” and an “oscillator 8 (e.g., 13.56 MHz).” [0108]. The demodulation circuit 97 extracts the “data generated by the RFID chip CL,” and provides it to the modulator circuit 9. [0114]. The modulator circuit 9 performs active load modulation on “the signal of the oscillator 8” as “amplitude modulation” to generate “side bands around the two spectral lines of the subcarrier frequency” corresponding to the extracted data. [0062], [0108], [0115]. These side bands are “identical

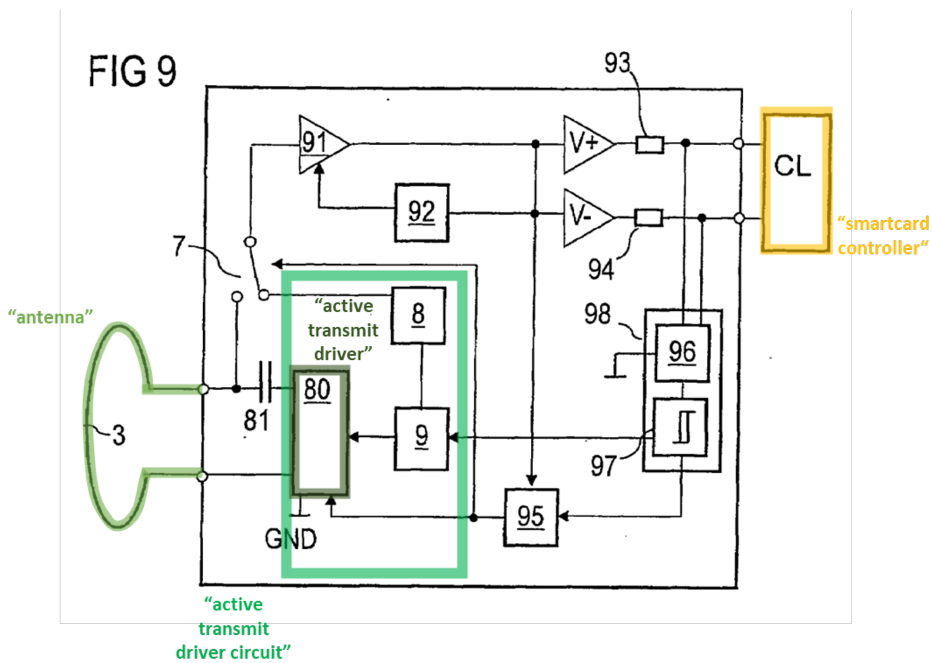
[8] PO’s infringement contentions in the Texas Case equate a load modulation circuit to “active load modulation,” in which the device does not modulate the interrogating field from a reader, but instead generates and modulates its own signal. *See* Ex.1014, 80-89. Tentzeris ¶142 n.1.

’722 Claims	Finkenzeller (U.S. Patent Pub. No. 2009/0040022)
	(exactly enough) to a signal generated by load modulation.” [0063]. Tentzeris ¶¶141-44. • **Fig. 9**  • **[0062]:** “***The ring modulator 9 has the feature of carrying out a special form of amplitude modulation**. **As in usual amplitude modulation, two spectral lines, regarded in the frequency spectrum, are generated spaced at the frequency of the ASK-modulated signal around the frequency of the oscillator signal, the so-called carrier frequency**.... **The data to be sent contained in the ASK-modulated signal are located after the amplitude modulation in the ring modulator 9 in side bands around the two spectral lines of the subcarrier frequency***. Such modulation is called double side band (DSB) modulation or double side band suppressed carrier (DSSC) modulation. At the carrier frequency no data are transferred. Instead, the use of the ring modulator 9 which suppresses the carrier frequency achieves the goal of

’722 Claims	**Finkenzeller (U.S. Patent Pub. No. 2009/0040022)**
	being able to send data to the reading device 100 either at lower transmit power or with a considerably increased range. ***The increased range is possible primarily when the total transmit power is put into the side bands where the data to be sent are located*….” • **[0063]:** “At the output of the ring modulator 9 an output signal is then available that contains the two modulation side bands and is ***identical (exactly enough) to a signal generated by load modulation*** or backscatter modulation…” • **[0108]:** “The ***transmit branch consists of a demodulation circuit 97, a modulator circuit 9, an oscillator 8 (e.g. 13.56 MHz)***, a controller 95, and a transmitter amplifier 80 connected to the antenna 3....” • **[0114]:** “… ***the data generated by the RFID chip CL can also be transferred to the remote reading device***. For this purpose, the switch 7 is first switched from the antenna 3 to the oscillator 8 (13.56 MHz)….” • **[0115]:** “***The reconstructed modulation signal and the signal of the oscillator 8 are supplied to the modulator circuit 9***...The output signal of the modulator circuit 9 is supplied to the amplifier 80 and sent via the antenna 3 to the remote reading device.” • ***See also* [0021]-[0022], [0049]**.
[9] The mobile device of claim 5 wherein the transmit circuit comprises an active transmit driver.	***See* [5].** **Finkenzeller discloses that the transmit circuit comprises an active transmit driver** (*e.g.*, “modulator circuit 9, an oscillator 8…and a transmitter amplifier 80” of “transmit branch” includes “transmitter amplifier 80” “coupled with the battery” which drives the “antenna 3”). ***<u>E.g.</u>*<u>**, Finkenzeller**</u> *See* [1.c.1], [1.c.3].

’722 Claims	Finkenzeller (U.S. Patent Pub. No. 2009/0040022)
	As explained in [1.c.3], **Finkenzeller** discloses that its “transmit branch” includes “transmitter amplifier 80 connected to the antenna 3.” [0108]. The amplifier 80 amplifies “the output signal of the modulator circuit 9” to then be “sent via the antenna 3 to the remote reading device.” [0115]. The transmitter amplifier is an active transmit driver because it is included in the “inventive active transponder,” which is supplied power by a battery of the mobile telephone and uses that power to drive the signal to be transmitted “via the antenna 3 to the remote reading device.” [0115], [0127]. Tentzeris ¶¶145-48. • **Fig. 9**  • **[0102]:** “***Via the control input of the push-pull amplifier 80 the push-pull outputs of the output drivers*** (see amplifier units in FIG. 5) are switched to GND, so that the antenna 3 and the capacitor 41 result in a parallel-resonant circuit.….” • **[0108]:** “***The transmit branch consists of a demodulation circuit 97, a modulator circuit 9, an***

’722 Claims	**Finkenzeller (U.S. Patent Pub. No. 2009/0040022)**
	oscillator 8 (e.g. 13.56 MHz), a controller 95, and ***a transmitter amplifier 80 connected to the antenna 3***….” • **[0114]:** “The modulation signal reconstructed by the demodulation circuit 97 is also supplied to a controller 95. The latter switches the ***inventive circuit with the first edge of the modulation signal to a transmit mode***….***At the same time the amplifier 80 is activated by the controller 95.***” • **[0115]:** “The reconstructed modulation signal and the signal of the oscillator 8 are supplied to the modulator circuit 9. The exact function of such a circuit has already been described in detail. ***The output signal of the modulator circuit 9 is supplied to the amplifier 80 and sent via the antenna 3 to the remote reading device.***” • **[0127]:** “…Moreover, it can be advantageously exploited that ***mobile terminals such as mobile telephones, PDAs, etc., have their own energy supply (battery) which can also be used for supplying an inventive circuit.***” • ***See also* [0099]**.
[10] The mobile device of claim 5 wherein the mobile device comprises a mobile phone.	*See* [4]-[5]. Tentzeris ¶¶149-50.
[11.pre].	*See* [1.pre]. Tentzeris ¶¶151-52.
[11.a]	*See* [1.a], [11.pre]. Tentzeris ¶¶153-54.
[11.b]	*See* [1.b], [11.pre]. Tentzeris ¶¶155-56.

’722 Claims	**Finkenzeller (U.S. Patent Pub. No. 2009/0040022)**
[11.c]	*See* [1.c.2], [11.pre]-[11.a]. Tentzeris ¶¶157-58.
[11.d] an active transmit driver circuit coupled between the smartcard controller and the antenna, wherein the active transmit driver circuit is coupled to be powered by the mobile device.	**Finkenzeller discloses an active transmit driver circuit** (*e.g.*, “modulator circuit 9, an oscillator 8…and a transmitter amplifier 80,” (of “transmit branch”) “coupled with the battery” which drives the “antenna 3”; *see* [9]) **coupled between the smartcard controller and the antenna** (*e.g.*, between “RFID chip CL” and “antenna 3”; *see* [5.d])**, wherein the active transmit driver circuit is coupled to be powered by the mobile device** (*e.g.*, “transmitter amplifier 80” powered by “energy supply (battery)”)**.** ***E.g.*, Finkenzeller** *See* [1.c.1]-[1.c.3], [5.d], [9], [11.pre]-[11.b]. As explained in [9], **Finkenzeller** further discloses the active transmit driver circuit, including a transmitter amplifier 80, is coupled to be powered by the mobile device’s battery. *See also* Fig. 9 (annotated below), [0099], [0102], [0108], [0114]-[0115], [0127]. Tentzeris ¶¶159-62. • **Fig. 9** 

’722 Claims	Finkenzeller (U.S. Patent Pub. No. 2009/0040022)
	• **[0099]:** “The ***antenna 3 and the series capacitor 81 form a series-resonant circuit which is connected to the outputs LA' and LB' of the amplifier 80***, so that the HF current flowing in case of resonance is limited in the antenna resonant circuit only by the ohmic resistances in the lines and in the amplifier 80. This obtains a greatest possible transmit power of the interface module.” • **[0102]:** “***Via the control input of the push-pull amplifier 80 the push-pull outputs of the output drivers*** (see amplifier units in FIG. 5) are switched to GND, so that the antenna 3 and the capacitor 41 result in a parallel-resonant circuit. To save energy, the amplifier 80 can be switched to a power save mode in the receive mode of the interface module.”
[12]	*See* [2], [11]. Tentzeris ¶¶163-64.
[13]	*See* [3], [11]. Tentzeris ¶¶165-66.
[14]	*See* [4], [11]. Tentzeris ¶¶167-68.

B. Ground 2: Finkenzeller in view of Kerdraon (Claims 1-14)

To the extent it is argued that further disclosure of a smartcard controller is required, Kerdraon discloses a smartcard controller (*e.g.,* “smart card controller”) **as recited in each claim**. [0070]-[0071]. Tentzeris ¶169.

Kerdraon discloses “mobile terminal 21 including…a near-field communication (NFC) module 29,” “antenna 31,” and “**a Smart MX card component 33**,” which “is a **smart card controller**” that controls NFC module 29.

[0070]-[0071], [0073], [0077]-[0078], Fig. 4. Near-field communication module 29 "enables near-field communication via the antenna 31 between the mobile terminal 21 and an external reader." [0078]. Tentzeris ¶170.

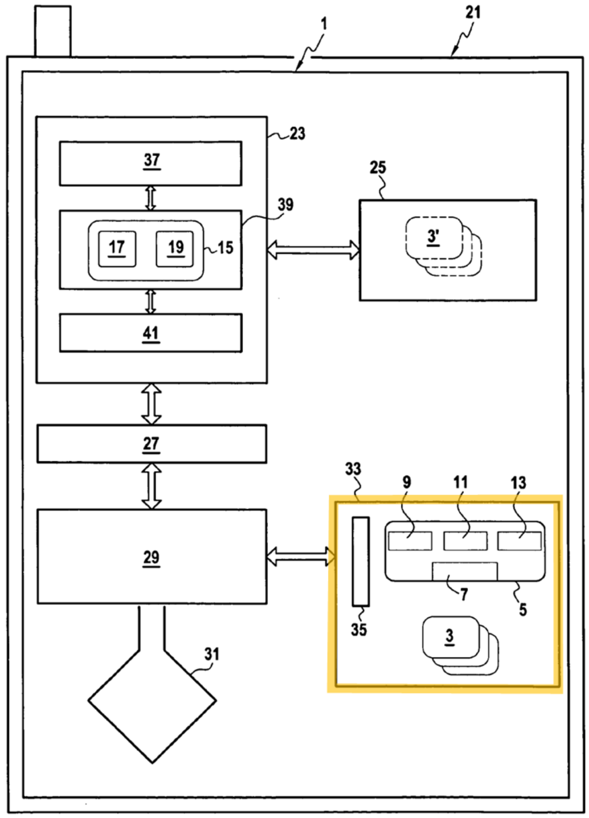


FIG.4

Fig. 4, [0069]. Tentzeris ¶170.

Smart MX smartcard controller 33 implements a smartcard operating system "such as Java Open Platform" to "store[] Java Card applications," "partner applications," "and the relevant data" for the applications. [0071], [0073]. For example, a smartcard application may offer a "payment service." [0067]. **Smart MX smartcard controller 33** is further compatible with "ISO 14443…interfaces."

[0071].[9] Tentzeris ¶171.

Finkenzeller and **Kerdraon** are analogous art, because they are in the same field as the ’722, which includes contactless communications devices, and are reasonably pertinent to alleged problems addressed by the ’722, including incorporating contactless communication and smartcard functionality into a mobile device. *See, e.g.*, ’722, 1:5-9, 1:63-2:47, 11:27-33, Figs. 14-15, 17, 19, 21-36, 39. Tentzeris ¶¶172-73. For example, both **Finkenzeller** and **Kerdraon** discuss contactless communications devices. Finkenzeller, [0001], [0017], [0048]-[0049], [0106]-[0107], Figs. 7-9, 11; Kerdraon, [0046], [0069]-[0071], [0078]. Tentzeris ¶¶174-175. And both Finkenzeller and Kerdraon are pertinent to the alleged problems addressed by the ’722, including incorporating contactless communication functionality, including smartcard functionality, into a mobile device. *See, e.g.,* Finkenzeller, [0006], [0032], [0127], Figs. 7-9, 11; Kerdraon, [0001]-[0006], [0046], [0070]-[0071]. Tentzeris ¶176.

A POSITA would have been motivated to apply **Kerdraon’s** smartcard

[9] This is consistent with the ’722’s disclosure of “smartcard controller.” ’722, 8:65-9:1 (“The ‘SmartMX’ family of controllers available from NXP Semiconductors N.V. of The Netherlands are examples of suitable dual interface smartcard controllers.”). Tentzeris ¶171.

controller teachings to **Finkenzeller's** mobile telephone used for contactless communications to advantageously provide smartcard functionality in a mobile telephone and eliminate a user's need to carry a separate smartcard device. Users regularly engage in secure transactions requiring authentication and regularly carry a mobile phone. *See* Ex.1015, 468. Tentzeris ¶¶177. Instead of carrying a separate device for authentication, *e.g.,* a credit card, access card, or ID card, storing and managing security data and applications on a smartcard controller hosted on a mobile phone provides the same authentication services through applications on a single device—the mobile terminal. *See* Ex.1015, 468 (explaining that smartcard integration in mobile phones "exploits two basic principles of modern society: everyone needs to pay for products and everyday services and just about everyone carries a phone"); Kerdraon [0008] (stating the described invention offers "access to a plurality of applications stored in the mobile terminal"), [0027] (explaining an application may "stor[e] information relating to transactions effected by users via their mobile terminal"). Tentzeris ¶¶177. In applying these teachings to **Finkenzeller**, Finkenzeller's RFID chip CL (as modified with **Kerdraon's** smartcard controller teachings) would be coupled to the output of the push-pull amplifier of the transponder unit, which is powered by the mobile device, as discussed in **[3]**, **[7]**, and **[13]** (*see* § IX.A.2). Tentzeris ¶¶177.

Moreover, a POSITA would have further been motivated to include smartcard functionality in a mobile phone because it allows a user to view information about the smartcard and update information stored in the smartcard using the phone functionality. Ex.1023, 2:21-29 (explaining integration of smartcard functionality provides "the ability to read and access information stored within the smartcard by utilizing the cellular telephone display" and "the ability to update/change information stored within the smartcard by utilizing the cellular telephone functions"). Tentzeris ¶178.

Because **Finkenzeller** already teaches that RFID chip CL can "receive, evaluate, and optionally process commands" in order "to send a response back to the remote reading device" (Finkenzeller [0111]-[0112]), implementing **Kerdraon's** smartcard controller teachings in **Finkenzeller's** mobile telephone would have been a straightforward modification. *See* Finkenzeller [0111]-[0112], [0114]. Similar to **Finkenzeller's** RFID chip CL, which processes requests and provides responses, **Kerdraon** teaches a smartcard controller that processes requests and provides responses for smartcard applications, *e.g.,* "Java Card application…Cardlets." [0071], [0073]. A POSITA would have understood that **Finkenzeller's** RFID chip CL may be implemented with application specific smartcard functions, as taught by **Kerdraon**. Thus, a POSITA would have found it straightforward and advantageous to apply **Kerdraon's** smartcard controller teachings to **Finkenzeller's** mobile telephone and would have known such a combination (yielding the claimed limitations) would predictably work and provide the expected functionality. Tentzeris ¶179.

C. Ground 3: Finkenzeller in view of Koh (Claims 1-14)

To the extent it is argued the '722 patent is entitled to claim priority to August 8, 2008, the Claims are rendered obvious by **Finkenzeller** in view of **Koh**. Tentzeris ¶180

As explained in Grounds 1 and 2 (§§IX.A and IX.B), **Finkenzeller** discloses a mobile terminal, such as a mobile telephone, that communicates with external reading devices using standard contactless communication protocols, such as ISO 14443. **Koh discloses a smartcard controller** (*e.g.,* "Smart MX (SMX) module") as recited in each claim. Koh, [0033]. Tentzeris ¶181.

Koh discloses "a near field communication (NFC) enabled cellphone that includes a Smart MX (SMX) module." [0033]. **Koh's** SmartMX module, which is described as a "smart card module," is a smartcard controller. [0033]. For example, the '722 admits that "[t]he 'SmartMX' family of controllers available from NXP Semiconductors N.V. of The Netherlands are examples of suitable dual interface smartcard controllers." '722, 8:56-9:6. Moreover, **Koh** explains SmartMX "is preloaded with…JCOP 4.1," a smartcard controller operating system. Koh [0032]; *see also, e.g.*, Ex1015, 468-69 (explaining the Smart MX "Smart card IC" uses a "JCOP operating system (Java Card Open Platform)"); Ex.1026 [0040] (describing "smart card controller solution[s]…run versatile, open application environment[s] such as Java Card"). Tentzeris ¶182.

Like **Finkenzeller**, **Koh** is analogous art, in the same field as the '722, which includes contactless communications devices, and is reasonably pertinent to alleged problems identified in the '722, including incorporating contactless communication and smartcard functionality into a mobile device. *See* § IX.B; Tentzeris ¶183. For example, **Koh** discusses contactless communications devices. *See, e.g.*, Koh, [0001]-[0002], [0010], [0033]. Tentzeris ¶184. Additionally, Koh is pertinent to the alleged problems addressed by the '722, including incorporating contactless communication functionality, including smartcard functionality, into a mobile phone. *See, e.g.*, Koh, [0002], [0003]-[0006], [0012], [0032]-[0033], [0040], Fig. 2; Tentzeris ¶185.

A POSITA would have been motivated to apply **Koh's** smartcard controller teachings to **Finkenzeller's** mobile telephone used for contactless communications to advantageously eliminate the user's need to carry a separate smartcard device to use smartcard functionality. Users regularly engage in secure transactions requiring authentication and regularly carry a mobile phone. *See* Ex.1015, 468. Tentzeris ¶186. Instead of carrying a separate device for authentication, *e.g.,* a credit card, access card, or ID card, storing and managing security data and applications on a smartcard controller hosted on a mobile phone provides the same authentication services through applications on a single device—the mobile terminal. *See* Ex.1015, 468 (explaining that smartcard integration in mobile phones "exploits two basic principles of modern society: everyone needs to pay for products and everyday services and just about everyone carries a phone"). Tentzeris ¶186. Moreover, a POSITA would have further been motivated to include smartcard functionality in a mobile phone because it allows a user to view information about the smartcard and update information stored in the smartcard using the phone functionality. Ex.1023, 2:21-29 (explaining integration of smartcard functionality provides "the ability to read and access information stored within the smartcard by utilizing the cellular telephone display" and "the ability to update/change information stored within the smartcard by utilizing the cellular telephone functions"). Tentzeris ¶186.

Because **Finkenzeller** already teaches that RFID chip CL performs generic controller functions, including to "receive, evaluate, and optionally process commands" in order "to send a response back to the remote reading device" ([0111]-[0112]), it would have been straightforward to apply **Koh's** smartcard controller teachings to **Finkenzeller's** mobile device. *See* Finkenzeller [0111]-[0112], [0114]. Tentzeris ¶187. **Koh's** SmartMX smartcard controller "stor[es] values" and "run[s] Java applets" effecting smartcard functionality. Koh [0033]. Similar to **Finkenzeller's** chip CL, which processes requests and provides responses, **Koh** teaches a smartcard controller likewise processes requests and provides responses, and does so for smartcard applications, *e.g.,* to effect mobile payments. Finkenzeller [0111]-[0112], [0114]; Koh [0053]. Tentzeris ¶187. A POSITA would have understood, and at a minimum found it obvious, to implement **Finkenzeller's** RFID chip CL with application specific smartcard functions, as taught by **Koh**. As such, a POSITA would have found it straightforward and advantageous to apply **Koh's** smartcard controller teachings to **Finkenzeller's** NFC-enabled mobile phone and would have known such a combination (yielding the claimed limitations) would predictably work and provide the expected functionality. Tentzeris ¶187.

D. Grounds 4-6: Grounds 1-3 in further view of Bangs (Claim 8)

With respect to claim 8, to the extent a load modulation circuit requires load modulating an interrogating field instead of generating a new signal, **Bangs discloses a transmit circuit** (*e.g.,* circuitry between "antenna element 309" and "controller 107") **comprises a load modulation circuit** (*e.g.*, "switchable" "resistor 301…in parallel with capacitor 304"). Bangs [0051], [0057]-[0060], [0066]. Tentzeris ¶188.

Bangs discloses an "NFC communicator 100a" for inclusion in a mobile phone. Bangs, [0006], [0046]. **Bangs** further discloses that, when transmitting in "active communication mode," a signal generator 109[10] and driver 111a "drive the antenna circuit 102 to initiate or generate an RF-H field." [0070]. On the other hand, **Bangs** explains, "in passive target communication mode," NFC communicator 100a responds to "an initiator near field RF communicator…by modulating the RF H field received from that near field RF communicator" "us[ing] load modulation." [0067]. To this end, **Bangs** **discloses resistor 301**, which is **coupled in parallel with capacitor 304**, is "switchable to provide…load modulation," and together are load modulation circuitry. [0060], [0066], [0067], Fig. 3. Tentzeris ¶189.

[10] The specification of **Bangs** in one location refers to "signal generator 110," but this is a typo, and should refer to "signal generator 109." Bangs [0050]. This occurs only once in **Bangs**, and refers to "the signal generator 110" in the sentence after introducing "a signal generator 109." Tentzeris ¶189 n.2.

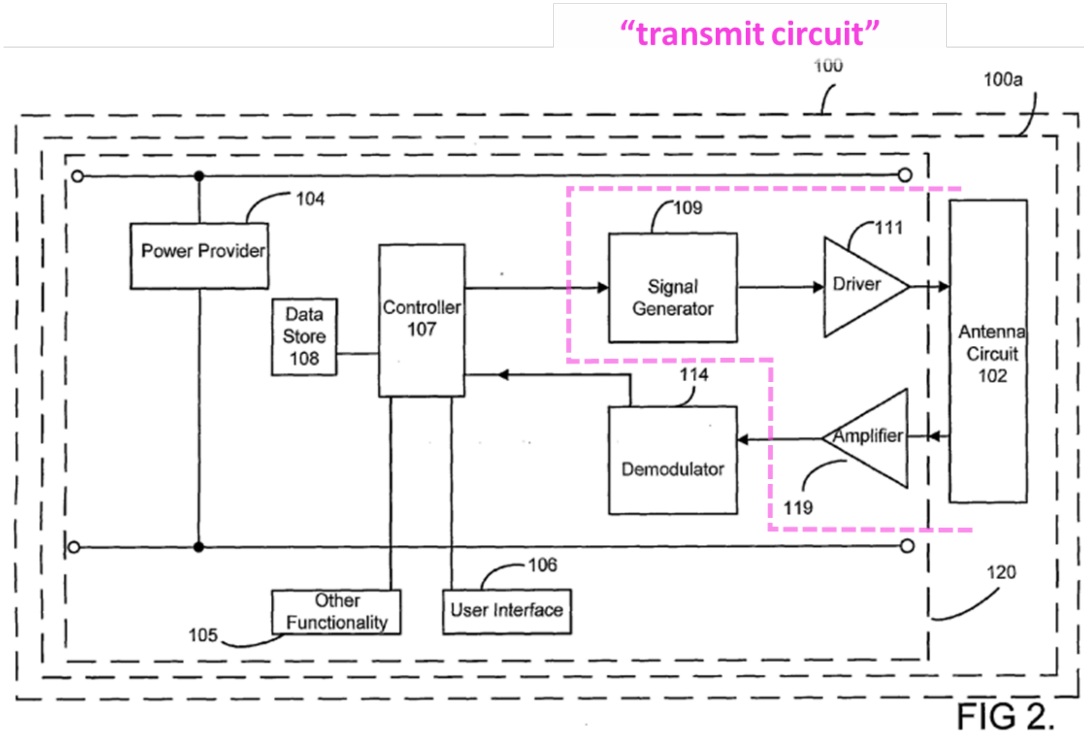
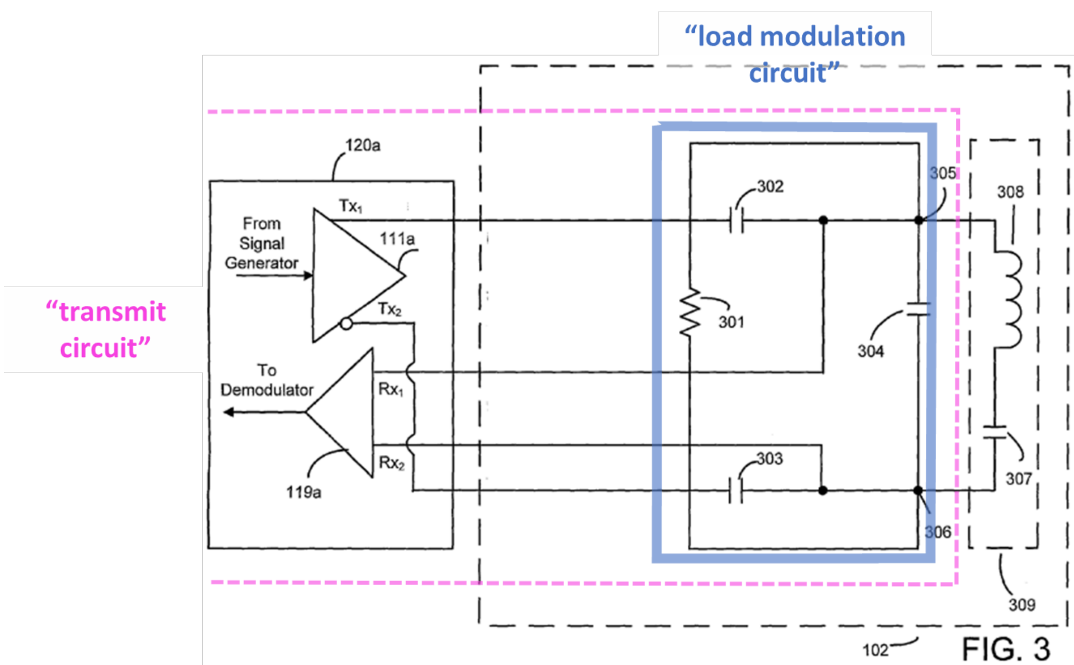


Fig. 2, [0050].



Bangs, Fig. 3, [0056]-[0057], [0067].

Like **Finkenzeller, Kerdraon, and Koh**, **Bangs** is analogous art, in the same field as the ’722, which includes contactless communications devices, and is reasonably pertinent to alleged problems identified in the ’722, including incorporating contactless communication and smartcard functionality into a mobile device. *See* §§ IX.B, IX.C; Bangs, [0001], [0006], [0010], [0016], [0036]-[0038], [0043], [0052]. Tentzeris ¶190. For example, **Bangs** discusses contactless communications devices, such as NFC-enabled devices. *See, e.g.*, Bangs, [0001], [0005], [0036]-[0038], [0052], cl. 44. Tentzeris ¶191. Additionally, **Bangs** is pertinent to the problems addressed by the ’722, including incorporating contactless communication functionality, including smartcard functionality, into a mobile phone. *See, e.g.*, Bangs, [0005], [0006], [0010], [0016]. Tentzeris ¶192.

A POSITA would have been motivated to apply **Bangs’** teachings of a transmit circuit including load modulation circuitry to **Finkenzeller’s** transmit circuitry of the transponder unit (as optionally modified by **Kerdraon’s** or **Koh’s** teachings of a smartcard controller) to advantageously reduce power consumption while ensuring proper communication with a reader. Both **Finkenzeller** and **Bangs** teach that, during active transmission with an external reader, a signal is generated and transmitted using battery power, such as that of a host mobile device. *See* Finkenzeller, [0066]; Bangs, [0015], [0041]. But **Bangs** teaches that users desire to limit power consumption in order to prolong the battery life of their mobile device.

See Bangs, [0015]. **Bangs** explains that one way to reduce power consumption is to use passive load modulation instead of active communication. Bangs, [0015], [0016], [0019]. For example, because load modulation involves "modulating the RF H field received" from a reader instead of having to "transmit its own RF field and data" as required by active communication, load modulation uses less power. Bangs, [0053], [0067]. On the other hand, **Bangs** explains that using active modulation allows for "a greater range." Bangs [0011]. **Bangs** discloses switching between active modulation and passive load modulation according to the "instructions received" and/or to the "response received from a responding near field RF communicator" to benefit from the advantages of both of these active and passive types of communication. Bangs, [0053], [0016], [0019]. Tentzeris ¶193.

It would have been straightforward to apply **Bangs'** load modulation circuitry teachings to **Finkenzeller's** transmit circuit (as optionally modified by **Kerdraon's** or **Koh's** teachings of a smartcard controller). For example, like **Finkenzeller's** teachings of a transmit circuit with an "oscillator 8" and "modulator circuit 9" for generating a signal containing the "data to be sent" via a "transmitter amplifier 80" allowing "a considerably increased range," **Bangs'** active transmission circuitry similarly includes a "signal generator 109 coupled via a driver 111" to send "data or instructions" with a "greater range." Finkenzeller [0062], [0115]; Bangs [0011], [0050]. And **Bangs** teaches how to include load modulation circuitry in a device with this similar active transmission circuitry by adding a switchable resistor 301 "to provide the load modulation" as it is "coupled in parallel with capacitor 304," which is further coupled in parallel to "an antenna element 309." Bangs [0057], [0060], [0066]. And **Bangs** teaches switching between "both active and passive communication modes" to allow the load modulation circuitry and active transmission circuitry to be used in the same device. Bangs [0016], [0019]. Tentzeris ¶194.

As discussed in Ground 1 ([2], [6], [12]), **Finkenzeller's** antenna 3 is too small to draw enough power to operate the RFID chip CL. *See* §IX.A.2. To the extent **Finkenzeller's** antenna is too small to support the passive load modulation (as taught by **Bangs**) with Finkenzeller's active modulation circuit, a POSITA would have found it obvious to increase the inductance of the antenna (e.g., by increasing the size of the antenna or the number of turns in the antenna coil, as taught by Bangs) such that it is large enough to advantageously support communication using load modulation with low power consumption for short distances, while using active modulation for communication over larger distances, to thereby obtain the dual benefits taught by **Bangs**. Bangs, [0011], [0053], [0067], [0088]. Accordingly, a POSITA would have found it straightforward and advantageous to apply **Bangs'** teachings of transmit circuitry with load modulation circuitry to **Finkenzeller's** transmit circuit (as optionally modified by **Kerdraon's** or **Koh's** teachings of a smartcard controller) and would have known such a combination (yielding the claimed limitations) would predictably work and provide the expected functionality. Tentzeris ¶195.

X. SECONDARY CONSIDERATIONS

There is no evidence in the ’722’s prosecution history or elsewhere supporting any secondary considerations arguments, or evidence of nexus to any challenged Claim. *See generally* ’722FH. Indeed, as demonstrated by the prior art referenced herein, any purported solutions to problems or unexpected results in the ’722 were already well known. Tentzeris ¶¶196-97.

To the extent that PO contends that the accused products in the Texas Case are infringing and thus demonstrate commercial success, any such conclusory allegations would fail to provide any indication that the Claims are non-obvious. Such conclusory assertions would not demonstrate that Samsung’s products infringe, let alone show any nexus between any alleged commercial success and the Claims, or that any alleged success is due to an allegedly claimed component instead of the many unclaimed features of the accused products. Tentzeris ¶198.

To the extent PO asserts the existence of any secondary considerations in its responses, Petitioners reserve the right to address any such evidence. Tentzeris ¶199.

XI. CONCLUSION

Substantial, new, and noncumulative technical teachings have been presented for each Challenged Claim, which are anticipated and/or rendered obvious for the reasons set forth above. Tentzeris ¶¶200-205. There is a reasonable likelihood Petitioners will prevail as to each of these Claims. *Inter partes* review of Claims 1-14 of the '722 is accordingly requested.

Dated: March 11, 2025

Respectfully submitted,

By: */James L. Davis, Jr./*
Name: James L. Davis, Jr.
Registration No. 57,325
ROPES & GRAY LLP

Lead Counsel for Petitioners

CERTIFICATE OF COMPLIANCE

Pursuant to 37 C.F.R. § 42.24(a) and (d), the undersigned hereby certify that the Petition For *Inter Partes* Review complies with the type-volume limitation of 37 C.F.R. § 42.24(a)(i) because, exclusive of the exempted portions, it contains 13,858 words as counted by the word processing program used to prepare the paper.

Dated: March 11, 2025

/James L. Davis, Jr./
Name: James L. Davis, Jr.
Registration No. 57,325
ROPES & GRAY LLP

CERTIFICATE OF SERVICE

I hereby certify that on March 11, 2025, I caused a true and correct copy of the foregoing Petition for *Inter Partes* Review of U.S. Patent No. 9,483,722 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:

35781 - Tyfone, Inc.
Patent Dept.
5331 SW Macadam Avenue
Suite 251
Portland, OR 97239
UNITED STATES

A courtesy copy was also sent via electronic mail to Patent Owner's litigation counsel at the following addresses:

Fahrenkrog, Aaron R. AFahrenkrog@RobinsKaplan.com;
Drew, Logan J. LDrew@RobinsKaplan.com;
Tremblay, Emily J. ETremblay@RobinsKaplan.com;
Jones, William R. WJones@RobinsKaplan.com;
Viswanathan, Prateek N. PViswanathan@RobinsKaplan.com;
Schmeckpeper, Kia Y. KSchmeckpeper@RobinsKaplan.com;
Andrea Fair andrea@millerfairhenry.com;
Gutierrez, Jessica L. JGutierrez@RobinsKaplan.com

Dated: March 11, 2025

By: */James L. Davis, Jr./*
Name: James L. Davis, Jr.
Registration No. 57,325
Counsel for Petitioners