

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 IPR2025-00641
Patent No. 11,694,053

PETITION FOR *INTER PARTES* REVIEW

TABLE OF CONTENTS

I.	INTRODUCTION	1
II.	MANDATORY NOTICES UNDER 37 C.F.R. §42.8.....	5
	A. Real Party-in-Interest	5
	B. Related Matters.....	5
	C. Lead and Back-Up Counsel.....	6
III.	PAYMENT OF FEES	6
IV.	REQUIREMENTS FOR <i>INTER PARTES</i> REVIEW.....	7
	A. Grounds for Standing	7
	B. Identification of Challenge.....	7
	1. The Specific Art on Which the Challenge Is Based	7
	2. Statutory Grounds on Which the Challenge Is Based	8
V.	'053 PATENT AND PROSECUTION HISTORY.....	8
	A. '053.....	8
	B. Prosecution History	11
	1. '053 Prosecution	11
	2. '722 Prosecution	12
	C. Priority Date of the Claims.....	13
VI.	§325(d) AND §314(a) DISCRETION DOES NOT APPLY	15
	A. §325(d)	15
	B. §314(a).....	17
VII.	LEVEL OF ORDINARY SKILL IN THE ART.....	21
VIII.	CLAIM CONSTRUCTION	22
IX.	GROUND OF UNPATENTABILITY.....	22
	A. Ground 1: Bangs (Claims 1-8 and 17-20).....	23
	1. Overview of Bangs.....	23
	2. Claim Chart	27
	B. Ground 2: Bangs in View of Kerdraon (Claims 1-8 and 17-20).....	60

C.	Ground 3: Bangs in View of Koh (Claims 1-8 and 17-20).....	66
D.	Grounds -4-6: Grounds 1--3 in Further View of Fisher (Claims 2--4, 19-20).....	71
X.	SECONDARY CONSIDERATIONS	75
XI.	CONCLUSION.....	76

EXHIBIT LIST

Exhibit No.	DESCRIPTION
1001*	U.S. Patent No. 11,694,053 (“’053”)
1002*	File History of U.S. Application No. 14/517,495 (“’053FH”)
1003*	Declaration of Emmanouil Tentzeris in Support of Petition for <i>Inter Partes</i> Review of U.S. Patent. No. 11,694,053 (“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	File History for U.S. Patent Application No. 13/038,341 (“’341 Application File History”)
1011	File History for U.S. Patent No. 9,483,722 (“’722 File History”)
1012	Redline Comparison of Specifications for U.S. Patent App. No. 12/188, 346 and U.S. Patent App. No. 13/038,341
1013	U.S. Patent No. 9,122,965 (“’965”)
1014	<i>Reserved</i>
1015	Dachs, C., NFC — The Intuitive Contactless Technology Becomes Reality, 122 E&I Elektrotechnik und Informationstechnik 466 (Dec. 1, 2005) (“Dachs”)
1016	U.S. Patent No. 9,483,722 (“’722”)
1017	U.S. Patent App. Pub. No. 2005/0224589 (“Park”)

Exhibit No.	DESCRIPTION
1018	U.S. Patent No. 8,260,199 (“Kowalski”)
1019 - 1020	<i>Reserved</i>
1021	U.S. Patent App. Pub. No. 2007/0035396 (“Chand”)
1022	U.S. Patent App. Pub. No. 2008/0163361 (“Davis”)
1023	U.S. Patent No. 5,943,624 (“Fox”)
1024	U.S. Patent No. 6,026,125 (“Larrick”)
1025	U.S. Patent App. Pub. No. 2009/0227882 (“Foo”)
1026	U.S. Patent App. Pub. No. 2008/0235796 (“Buhr”)
1027 - 1028	<i>Reserved</i>
1029	U.S. Patent App. Pub. No. 2008/0126260 (“Cox”)
1030	Ortiz, E., An Introduction to Near-Field Communication and the Contactless Communication API (June 2008)
1031	U.S. Patent App. Pub. No. 2004/0133787 (“Doughty”)
1032	<i>Reserved</i>
1033	U.S. Patent App. Pub. No. 2008/0194200 (“Keen”)
1034	International Patent Pub. No. WO2007/135434 (“Wilson”)
1035	U.S. Patent App. Pub. No. 2008/0169351 (“Whiting”)
1036	Mayes, K. et al., Smart Cards, Tokens, Security and Applications (December 11, 2007)
1037-1049	<i>Reserved</i>
1050	Docket Control Order, <i>iCashe, Inc. v. Samsung Electronics Co.</i> , No. 2:24-cv-00429-JRG (E.D. Tex.)
1051	Docket Control Order, <i>Valtrus Innovations Ltd. v. NTT Data Services, LLC</i> , No. 2:24-cv-00361, (E.D. Tex.)

U.S. Patent No. 11,694,053
Petition for *Inter Partes* Review

Exhibit No.	DESCRIPTION
1052	Docket Control Order, <i>Fleet Connect Solutions LLC v. The Kroger Co.</i> , No. 2:24-cv-00430 (E.D. Tex.)
1053	Docket Control Order, <i>C47 Technologies LLC v. TCL Technology Group Corporation f/k/a TCL Corporation</i> , No. 2:24-cv-00417 (E.D. Tex.)
1054	Docket Control Order, <i>SiOnyx, LLC v. Samsung Electronics, Co., Ltd.</i> , No. 2:24-cv-00408 (E.D. Tex.)
1055	Docket Control Order, <i>Stingray IP Solutions LLC v. Allegion Public Limited Company</i> , No. 2:24-cv-00396 (E.D. Tex.)
1056	Docket Control Order, <i>ElectraLED, Inc. v. Astera LED Technology GmbH</i> , No. 2:24-cv-00512 (E.D. Tex.)
1057	Docket Control Order, <i>Alto Dynamics, LLC v. Fresha.com SV Ltd.</i> , 2:24-cv-00468 (E.D. Tex.)
1058	Docket Control Order, <i>Cloud Byte LLC v. Dell Inc.</i> , No. 2:24-cv-00637 (E.D. Tex.)
1059	September 20, 2024 Production Letter in <i>iCashe, Inc. v. Samsung Electronics Co.</i> , No. 2:24-cv-00429-JRG (E.D. Tex.)
1060	December 12, 2024 Production Letter in <i>iCashe, Inc. v. Samsung Electronics Co.</i> , No. 2:24-cv-00429-JRG (E.D. Tex.)
1061*	Declaration of Cheryl Sloane in Support of Petition for <i>Inter Partes</i> Review of U.S. Patent No. 11,694,053
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
'053	U.S. Patent No. 11,694,053 (“’053”) (Ex.1001)
'053FH	File History of U.S. Application No. 17/179,237 (Ex.1002)
'722FH	File History of U.S. Application No. 14/517,575 (Ex.1011)
Claims / Challenged Claims	Claims 1-8, 17-20 of the '053
IPR	<i>Inter Partes</i> 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 power source;

[1.b] a smartcard controller coupled to the power source to receive power;

[1.c] an antenna tuned to operate at substantially 13.56 MHz, wherein the antenna interacts with a Near Field Communication (NFC) reader external to the mobile device; and

[1.d] an active transmit driver circuit coupled to the power source to receive the power, wherein the active transmit driver circuit affects transmission of data between the antenna and the NFC reader.

[2] The mobile device of claim 1, wherein the transmitted data includes ticketing information for a mass transit system.

[3] The mobile device of claim 1, wherein the transmitted data includes transaction information for a mobile payment.

[4] The mobile device of claim 1, wherein the NFC reader is a point-of-sale NFC reader.

[5] The mobile device of claim 1, wherein the antenna includes an inductive element.

[6] The mobile device of claim 1, wherein the active transmit driver circuit includes one or more of an amplifier filter, oscillator, and/or modulator.

[7] The mobile device of claim 1 comprising an amplifier coupled to the power

source to receive the power, wherein the amplifier is further coupled to the antenna.

[8] The mobile device of claim 7, wherein the amplifier amplifies a signal received at the antenna and generates an amplified signal, and provides the amplified signal to the smartcard controller.

[17.pre] A method of near field communication between a mobile device and an NFC reader, the method comprising:

[17.a] coupling a smartcard controller and an active transmit driver circuit to a power source of the mobile device;

[17.b] providing power to the smartcard controller and the active transmit driver circuit from the power source of the mobile device;

[17.c] coupling the active transmit driver circuit to an antenna of the mobile device, wherein the antenna is tuned to operate at substantially 13.56 MHz; and

[17.d] driving transmission of data by the active transmit driver circuit from the antenna to the NFC reader.

[18] The method of claim 17 further comprising: amplifying a signal received from the antenna to generate an amplified signal; and providing the amplified signal to the smartcard controller.

[19] The method of claim 10 or 17, wherein the transmitted data includes ticketing information for a mass transit system.

[20] The method of claim 10 or 17, wherein the transmitted data includes

transaction information for a mobile payment.

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 1-8 and 17-20 (“Claims”) of U.S. Patent No. 11,694,053 (Ex.1001, “’053”). 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 ’053 is directed to “contactless smartcard devices,” namely a mobile computing device that can be used in NFC smartcard applications. ’053, 1:40-43, 9:21-27. The mobile device includes a **smartcard controller** and **active transmit driver circuit**, powered by the mobile device power source, and an **antenna tuned to 13.56 MHz** to communicate with an NFC reader. ’053, 7:15-35, 15:56-16:6, 17:25-40. Tentzeris ¶32.

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.

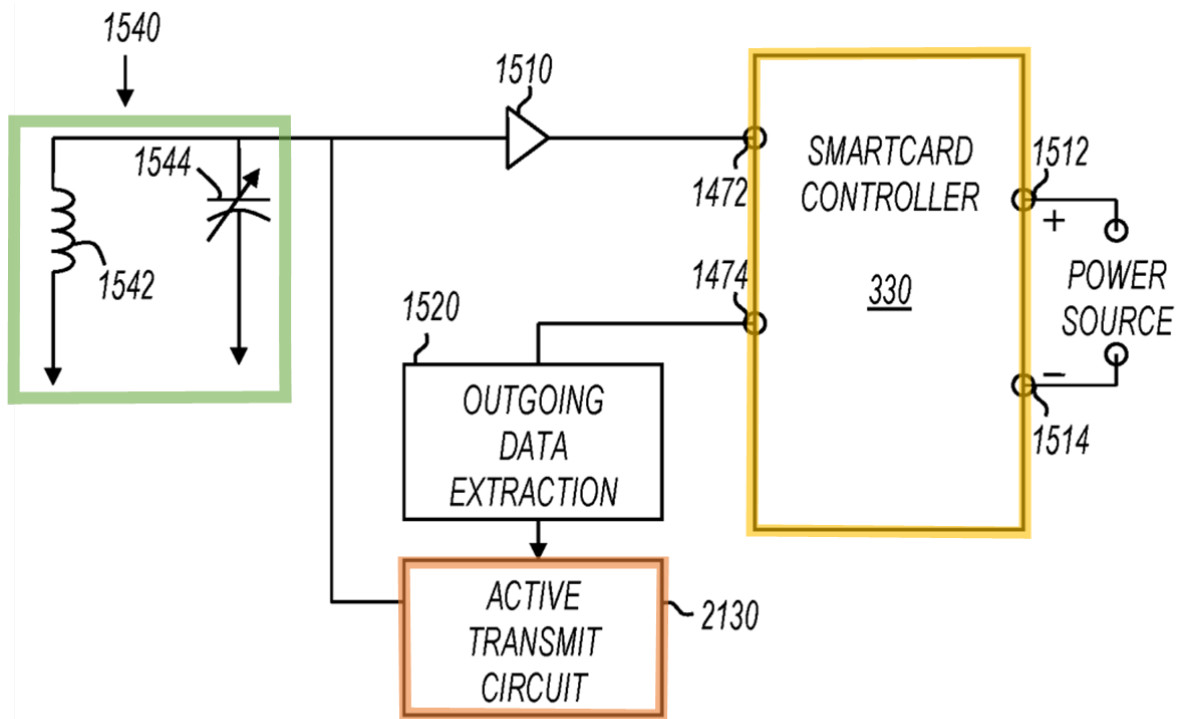


FIG. 21

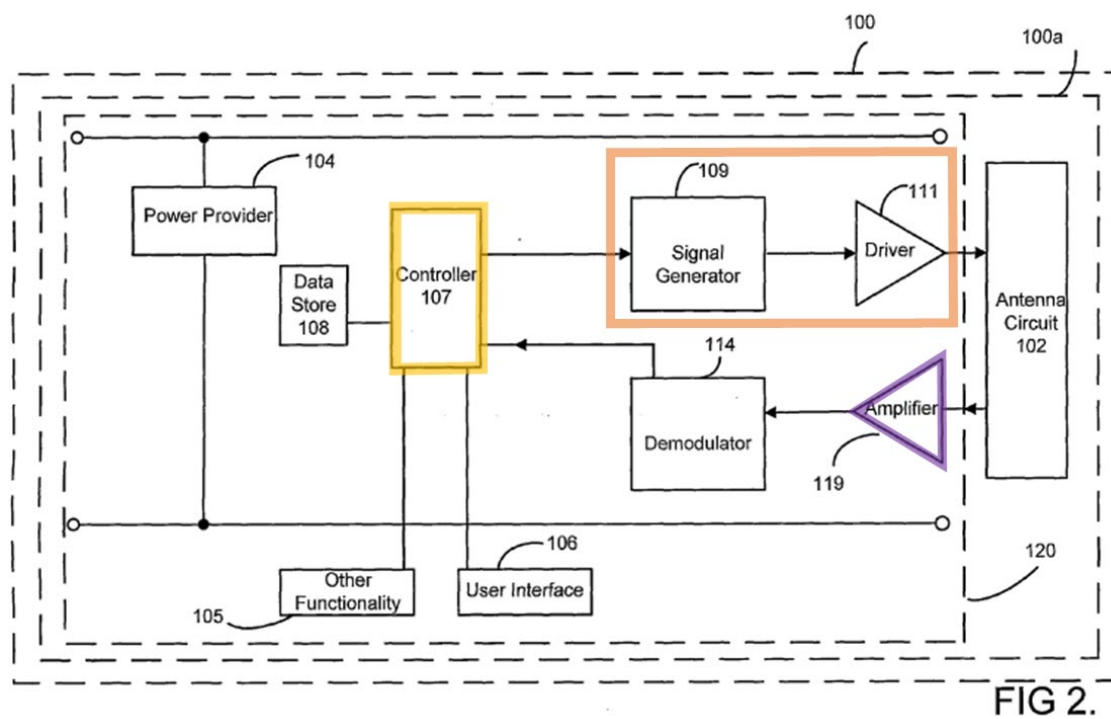
'053, Fig. 21.

But the '053 admits that a power source, a smartcard controller, an antenna tuned to 13.56 MHz, and an active transmit driver circuit were each known. '053, 1:45-55, 3:7-9, 2:18-39, 1:45-55, 16:35-40 (admitting an RFID tag powered by “a local power source,” “smartcard controllers,” “tag antenna[s]...operat[ing] at 13.56 MHz,” “active...transmi[ssion],” and “Load modulation driver circuits” as prior art). Tentzeris ¶33.

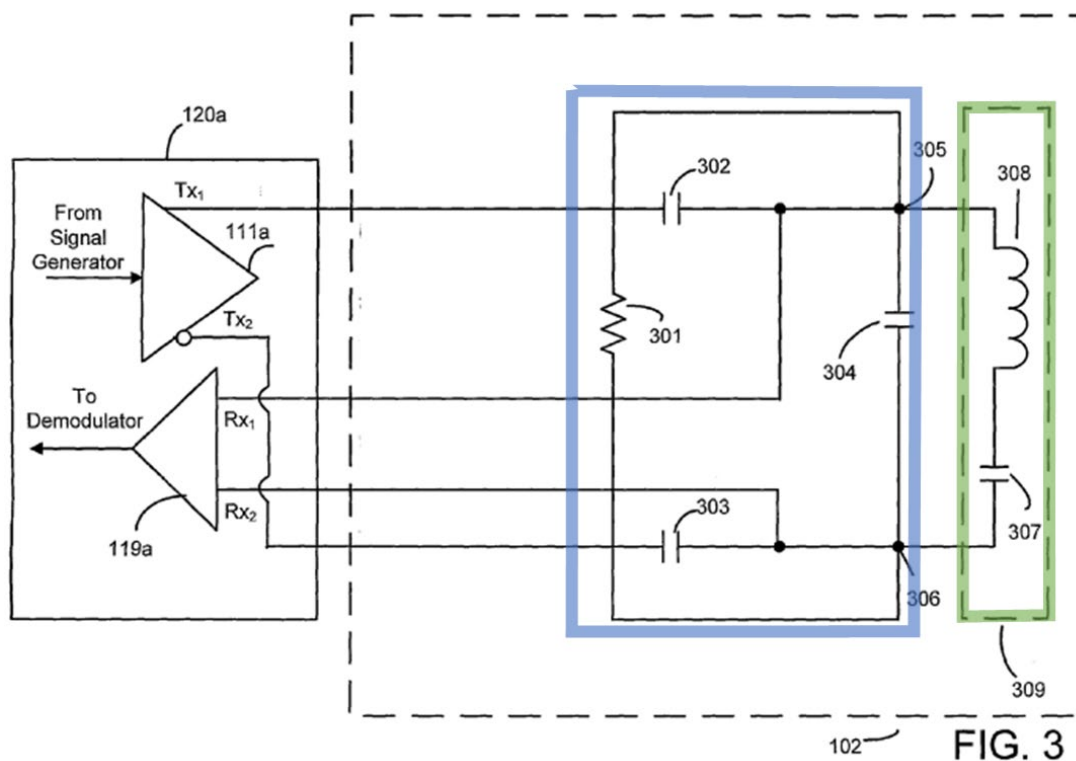
During prosecution, in allowing the Challenged Claims, the Examiner concluded the prior art under consideration failed to teach “an antenna tuned to operate at substantially 13.56 MHz, wherein the antenna interacts with a Near Field

Communication (NFC) reader” and “an active transmit driver circuit coupled to the power source to receive power, wherein the active transmit driver circuit affects transmission of data between the antenna and the NFC reader.” *See infra* §V.B. Tentzeris ¶34.

But the concepts of tuning an NFC-enabled mobile device antenna to 13.56 MHz and using active transmission circuits to drive communication with an NFC reader were known prior to the '053. For example, **Bangs** discloses an NFC-enabled mobile device comprising a **smartcard controller**, and an **active transmit driver circuit** each coupled to be powered by the mobile device battery. Bangs [0041], [0046], [0049]-[0050], Fig. 2. The NFC-enabled mobile device further includes an **antenna, tuned to 13.56 MHz**, that the **active transmit circuit** drives to transmit data to an NFC reader device. Bangs, [0070], Fig. 2 (providing a functional diagram of NFC communicator 100a with components providing NFC functionality 120 coupled to an antenna circuit 102), Fig. 3 (providing a functional diagram of antenna circuit 102). Tentzeris ¶35.



Bangs, Fig. 2.



Bangs, Fig. 3.

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 '053 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 9,483,722 (IPR2025-00640) and 9,122,965 (IPR2025-00639).

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 Phone: 212-596-9000 Fax: 617-235-9492 alexander.middleton@ropesgray.com Frances Zhang Reg. No. 73,589 ROPES & GRAY LLP 2099 Pennsylvania Avenue NW Washington, DC 20006 Phone: +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. 110797-0057-657.

IV. REQUIREMENTS FOR *INTER PARTES* REVIEW

A. Grounds for Standing

Pursuant to §42.104(a), Petitioners certify the '053 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 ¶¶58-59):

Name	Ex.	Publication	Filed	Published/ Issued	Prior art under at least
Bangs	1004	U.S. 2010/0112941	3/20/2008	5/6/2010	§102(e)
Kerdraon	1006	U.S. 2009/0215489	2/26/2009	8/27/2009	§102(b)
Koh	1007	U.S. 2008/0073426	9/24/2006	3/27/2008	§102(b), (e)
Fisher	1008	U.S. 2007/0156436	8/25/2006	7/5/2007	§102(b), (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 '053'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), **Bangs, Koh,** and **Fisher**, on which Grounds 1, 3, 4 and 6 are based, are still prior art. Tentzeris ¶¶60-61.

2. Statutory Grounds on Which the Challenge Is Based

Ground	Claim(s)	Basis	References
1	1-8, 17-20	§102/103	Bangs
2		§103	Bangs in view of Kerdraon
3			Bangs in view of Koh
4	2-4, 19-20	§103	Bangs in view of Fisher
5			Bangs in view of Kerdraon and Fisher
6			Bangs in view of Koh and Fisher

V. ’053 PATENT AND PROSECUTION HISTORY

A. ’053

The purported “invention” of the ’053 relates to “contactless smartcard devices” implemented in a mobile device comprising “a **smartcard controller** and an **inductive element** capable of interacting with an NFC reader” according to “the

² As discussed *infra* §V.C, the Claims are not entitled to the benefit of the earlier filed ’346-App. filing date. The later-filed ’341-App. is a continuation-in-part of the ’346-App., and not a “continuation” as claimed on the face of the ’053.

ISO 14443 standard for contactless NFC devices.” ’053, 1:41-43, 5:47-56, 9:21-38. The ’053 purports to solve the problem of implementing NFC communication “in smaller mobile devices” to “allow smartcard controller functions to be accessed” from a mobile device, such as a “mobile phone.” ’053, 2:40-42, 3:11-14, 5:9-16, 11:64-67. Tentzeris ¶37.

The mobile device comprises a “**smartcard controller 330**,” “a local **power source**,” “**antenna 1542**,” “**amplifier 1510**,” and “**active transmit driver circuit 2130**.” ’053, 1:47-55, 15:56-16:6, 16:41-50, 17:25-40, Fig. 21. **Smartcard controller 330** processes a received “memory access command.” See ’053, 8:17-34, 14:19-27. Tentzeris ¶38.

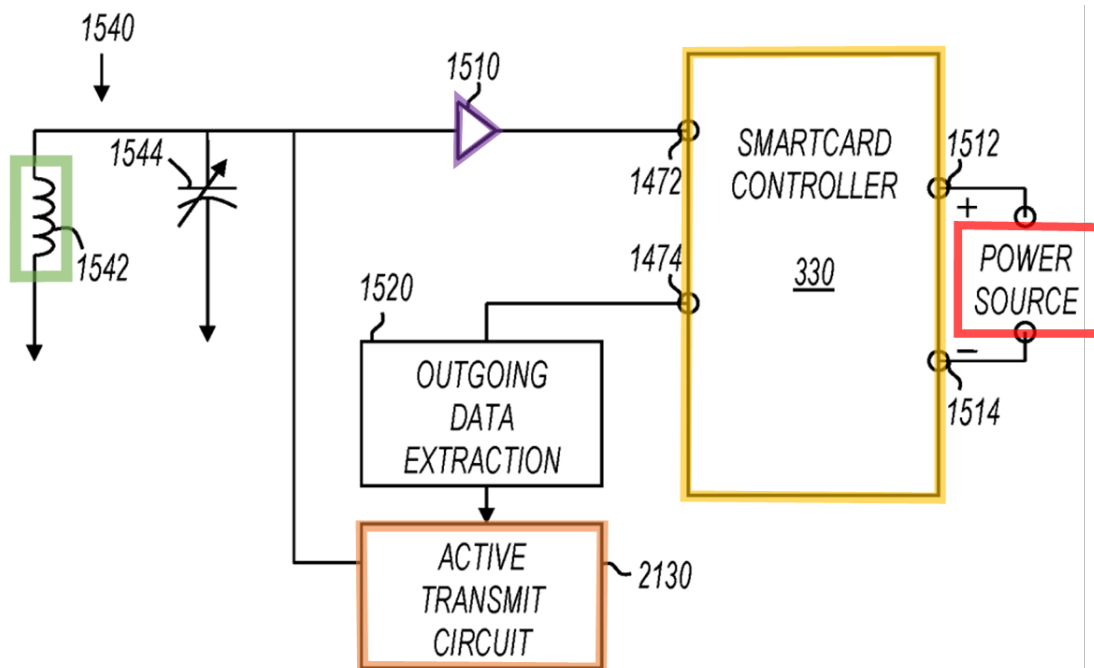


FIG. 21

As shown in Figure 21 above, “**amplifier 1510**” is coupled between the **smartcard controller 330** and **antenna 1542**. ’053, 15:56-16:6, 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.” ’053, 9:21-37, 15:59-63. “**Amplifier 1510** amplifies the voltage received at **antenna 1542**” and provides “the amplified voltage...to the **smartcard controller**.” ’053, 15:56-16:6. The ’053 admits “suitable” prior art **smartcard controllers** include “[t]he ‘SmartMX’ family of controllers available from NXP Semiconductors N.V.” ’053, 9:21-37. Tentzeris ¶39.

The mobile device further comprises “**active transmit driver circuit 2130**” to “actively transmit a signal” and thus “increase” the RFID card’s “usable distance when [the] **smartcard controller 330** is transmitting” data. ’053, 17:25-40. Specifically, **active transmit driver circuit 2130** includes circuits “to form a signal that mimics [a modulated] interrogating RF field.” ’053, 17:25-40. Tentzeris ¶40.

The **smartcard controller 330**, **amplifier 1510**, and the **active transmit driver circuit 2130** are powered by the host mobile device. ’053, 9:39-47, 17:37-40. The ’053 describes “a power delivery mechanism from the host” **power source** to the claimed components include “[c]ycling power” through an “interface” with the host mobile device. ’053, 7:25-35, 9:39-64, 15:4-12, 15:43-55. The ’053 admits

that powering a tag device with a “**local power source**,” such as a **battery**, was known in the prior art. ’053, 1:46-55. Tentzeris ¶41.

The ’053 explains the **smartcard controller** “is compatible with passive RFID tag readers in NFC applications” and as such, the mobile device is “capable of interacting with an NFC reader.” ’053, 5:47-56, 9:21-38. Thus, the mobile device may be used in NFC applications including “with a point-of-sale payment device to effect mobile payments” and “wave-and-pay ticketing in mass transit environments.” ’053, 6:14-20. Tentzeris ¶42.

B. Prosecution History

1. ’053 Prosecution

The ’053 issued from U.S. Pat. App. 17/179,237 (“’237-App.”), filed 2/18/2021. The ’237-App. claims priority, through a chain of continuations and one continuation-in-part, to the ’346-App. filed 8/8/2008. Tentzeris ¶44.

During prosecution of the ’237-App., the ’053 issued following approval of the Applicant’s terminal disclaimer to overcome a nonstatutory double patenting rejection over the related U.S. Pat. No. 9,489,608. *See* ’053FH, 155-59, 259-63, 396-98. The Examiner’s Notice of Allowance states that the Claims were allowed because: “The prior art fail to teach: ‘an antenna tuned to operate substantially at 13.56 MHz, wherein the antenna interacts with a Near Field Communication (NFC) reader external to the mobile phone device; and an active transmit driver circuit

coupled to the power source to receive power, wherein the active transmit driver circuit affects transmission of data between the antenna and the NFC reader.” ’053FH, 397. Tentzeris ¶45.

2. ’722 Prosecution

The ’053 claims contain claim language that overlaps with the claims of U.S. Patent No. 9,483,722 (“’722”), a related patent that shares the same specification as the ’053. ’722 (Ex.1016); Tentzeris ¶47.

During prosecution of the ’722, the Examiner relied on prior art disclosure of controlling circuitry in integrated circuits (e.g., ISO 14443-compliant contactless IC card) to satisfy the “smartcard controller” limitations of the pending claims. ’722FH, 1579, 1696. For example, in the first office action, the Examiner relied on Kowalski’s (U.S. Patent No., Ex.1018) disclosure of “central processor 311” of a mobile phone to show a “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”), 1:25-35 (“NFC component” “integrated into a mobile phone 15” implements “contactless communication protocols” such as “ISO-1444-A, ISO 14443-B”). 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,” instead amending the claims to overcome both prior art rejections. ’722FH, 1655, 1716 (amending claims “to overcome” prior art rejections without traversal); Tentzeris ¶48.

C. 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 independent claim limitations: “an active transmit driver circuit coupled to the power source to receive the power, wherein the active transmit driver circuit affects transmission of data between the antenna and the NFC reader” (’053 claim 1), “coupling...an active transmit driver circuit to a power source of the mobile device,” “providing power to...the active transmit driver circuit,” “coupling the active transmit driver circuit to an antenna of the mobile device,” and “driving transmission of data by the active transmit driver circuit” (’053 claim 17). The challenged

independent claims and thus each of the Challenged Claims recites at least one of these limitations. Tentzeris ¶¶49-50.

The '346-App does not disclose an “active transmit driver circuit.” '053, 15:66-16:1, 17:25-40. *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 '053 claimed circuitry for affecting transmission of data to an NFC reader. -*See generally* Ex. 1009, 40-78.³ 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.” Ex.1009, 41. But there is no explanation of how this is done, let alone the disclosure of an “active transmit driver circuit” ('053, cls. 1, 17) for active transmission as claimed in the '053. *See generally* Ex.1009, 40-78. Moreover, there is no disclosure of the claimed connections or functionality of the claimed “active transmit driver circuit.” *Id.* Tentzeris ¶51.

The '053 incorrectly characterizes the '341-App., filed 3/1/2011 and identified in the '053 priority chain, as a continuation of the '346-App. The Application Data Sheet filed during prosecution of the '341-App. confirms the '341-

³ *See also* Ex.1012 (comparing disclosures in 346-App. specification with the later-filed '341-App.); *see also generally*, Ex.1009, 40-78.

App. is a continuation-in-part of the '346-App. Ex.1010 ('341-App. File History), 40-78.⁴ Tentzeris ¶¶52.

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—**Bangs**, **Kerdraon**, **Koh**, and **Fisher**—were not cited in an IDS or otherwise identified by the Examiner, or applied to reject claims during '053's prosecution. The Examiner also never considered the testimony of Petitioners' expert Dr. Tentzeris (Ex.1003) regarding the scope and content of these documents. Tentzeris ¶¶62-179.

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, **Bangs** (which is the primary reference in all Grounds in the Petition) teaches at least the limitation the Examiner erroneously believed was missing from the prior art: "an antenna tuned to operate substantially 13.56 MHz, wherein the antenna interacts with a Near Field Communication (NFC) reader external to the

⁴ The related '053 and '722 patents each characterize the '341-App. as a continuation-in-part of the '346-App. on the face of the patent. Ex.1016 at 1; Ex.1013 at 1. Tentzeris ¶¶52.

mobile phone; and an active transmit driver circuit coupled to the power source to receive power, wherein the active transmit driver circuit affects transmission of data between the antenna and the NFC reader.” See §V.B.1 (’053 Prosecution). For example, unlike the art cited during prosecution, **Bangs** discloses an “antenna circuit...tuned to...13.56 MHz” configured to be “inductively coupled to” an antenna of “[an]other near field RF communicator,” a “reader[,],” and “transmitter circuitry,” “coupl[ed] to derive power from...device battery 11,” for “active communication.” See §IX ([1.c]-[1.d]); Bangs, [0003], [0021], [0041], [0050], [0070], Fig. 2; Tentzeris ¶¶64-138.

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). Indeed, the Examiner did not recognize any art teaching that the claimed “amplifier is coupled to amplify a signal received from the antenna and to provide an amplified signal to the smartcard controller.” See §V.B.1 (’053 Prosecution). 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 ¶¶62-175.

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. Optronix 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 ’053.

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 ’053) 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 ’053.

Factor 6 weighs strongly in favor of institution. The Petition is strong and presents compelling unpatentability arguments that were not previously considered during prosecution. The primary reference, **Bangs**, anticipates all Claims and at minimum renders them obvious. *See* §IX.A. Tentzeris, ¶¶64-138. 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 ¶¶53-55.

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 ¶¶56-57. 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 '053. Tentzeris ¶¶1-185.

Although the '053 purports to have invented circuitry for incorporating contactless and smartcard functionality into a mobile device, such a system was already known. Tentzeris ¶62. For example, **Bangs** discloses an NFC-enabled mobile device that includes the claimed arrangement of a power source, smartcard controller, antenna, active transmit driver, and amplifier. [0043], [0046]-[0050]. **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]. **Fisher** further teaches NFC applications, including payment systems, transit systems, etc. in which the '053 claims its NFC-enabled mobile

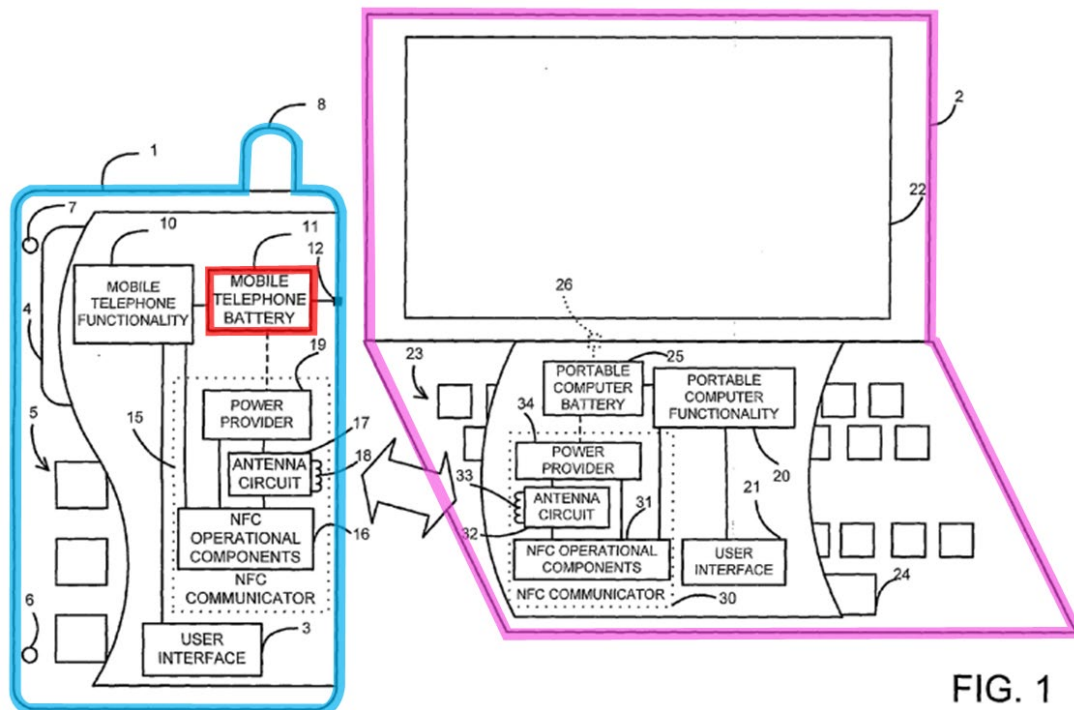
device is used. Fisher [0006]-[0007]. Tentzeris ¶63.

As demonstrated below, the prior art renders the Claims unpatentable.
Tentzeris ¶¶64-179.

A. Ground 1: Bangs (Claims 1-8 and 17-20)

1. Overview of Bangs

Bangs discloses an “NFC communication enabled...mobile telephone” with antenna circuit 102 comprising antenna element 309 is “compatible” with “initiating” NFC communicators, such as computer 2, operating “in accordance with the protocols set out in various standards,” including “ISO/IEC 14443.” [0052], [0057].



[0035], Fig. 1. Tentzeris ¶64.

The NFC functionality of the **mobile phone** is provided by an “NFC communicator 100a,” comprising the “NFC operational components” shown in Figure 2. [0006], [0046]. NFC communicator 100a (in Figure 2) corresponds to NFC communicator 15 of **mobile phone 1**, but Figure 2 provides additional functional detail on the “NFC operational components 16 and 31” therein that comprise components providing NFC functionality 120 coupled to antenna circuit 102. [0039], [0046]. Figure 3 further provides additional detail of antenna circuit 102. [0056]-[0057]. Tentzeris ¶65.

The NFC components of the **mobile phone** include “**controller 107**,” a power provider 104 coupled to “**battery 11**,” “**antenna element 309**” (within antenna circuit 102), “**amplifier 119**,” and “**signal generator 109**” and “**driver 111**.” [0046], [0049], [0057], Figs. 2-3. **Controller 107** is a smartcard controller that “control[s] overall operation of the NFC communicator,” which operates “in accordance with” “various standards” for near-field RF communication, such as “ISO/IEC 14443.” [0051], [0052], [0005]. **Controller 107** is coupled to a data store to process and store data “transmitted from and/or...received by” the **NFC-enabled mobile phone**. [0051]. Bangs acknowledges that “[s]ome areas of application are payment systems” for NFC communicators are “payment systems” and “ticketing systems.” [0006]. Tentzeris ¶66.

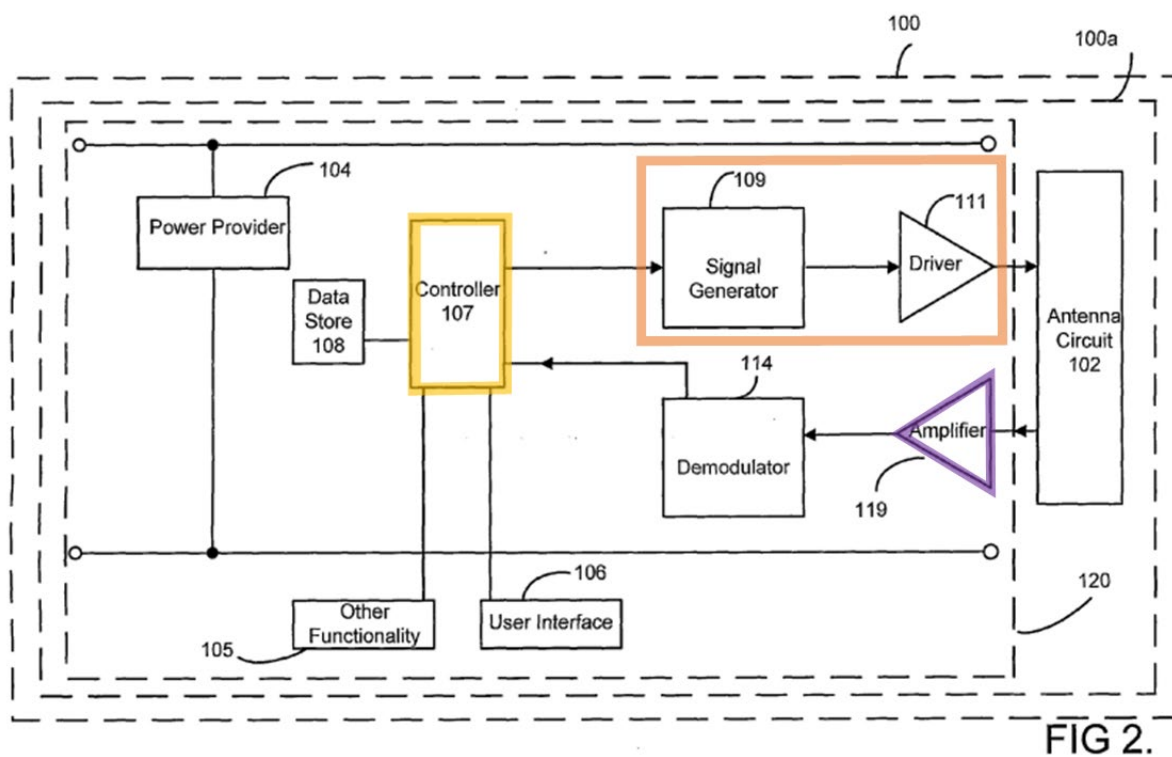


Fig. 2.

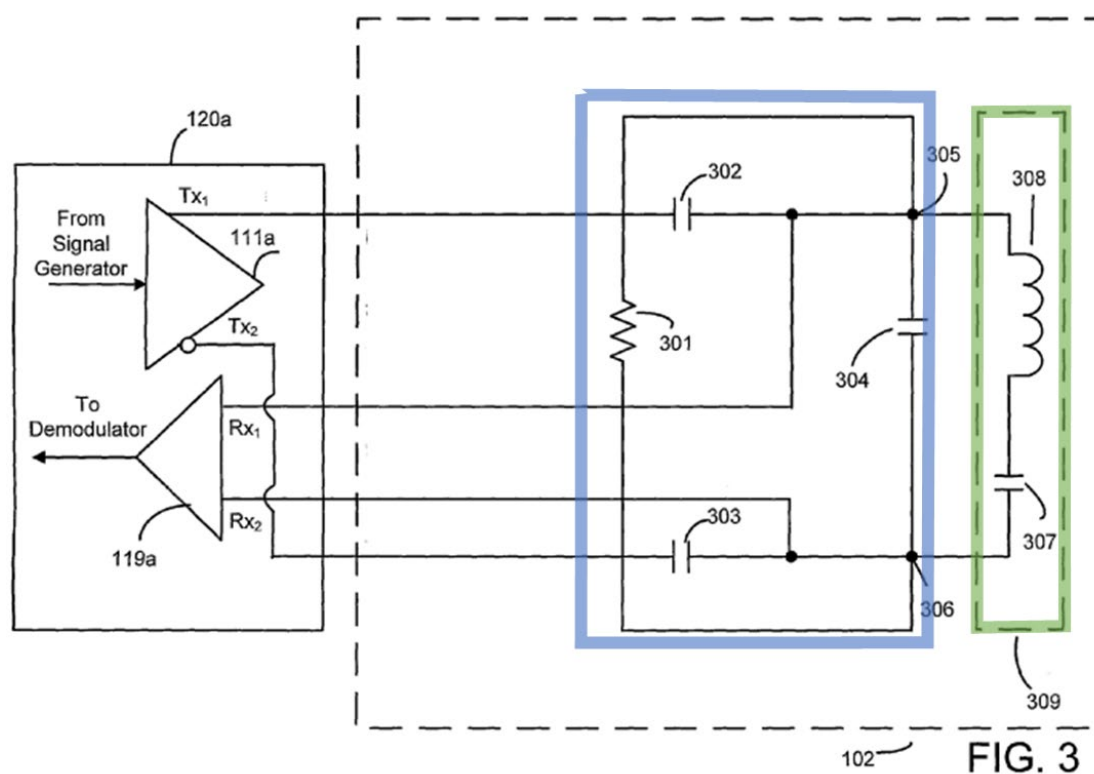


FIG. 3

Fig. 3.

As shown in Figures 2-3 above, “**amplifier 119**” is coupled between **antenna element 309** and demodulator 114, which is coupled to **controller 107**. [0049], [0057]-[0059]. Antenna circuit 102 comprising **antenna element 309** “is tuned to...13.56 MHz,” the frequency at which “NFC communicators commonly operate.” [0052], [0057], [0070]. **Amplifier 119** amplifies the received signal, and demodulator 114 demodulates the amplified signal to provide “the thus-extracted data to the **controller 107**.” [0049]. As such, the **NFC-enabled mobile phone** can communicate with “**initiating**” **NFC communicators, i.e., NFC readers**, used in various applications including “payment systems, ticketing systems,” “ticket checking systems,” etc. [0006]. Tentzeris ¶67.

NFC communicator 100a’s “transmitter circuitry” comprises circuitry to effect “active communication mode.” [0068]. “[S]ignal generator 109 coupled via...driver 111 to the antenna circuit 102” “drive[s] the antenna circuit 102” comprising **antenna element 309** “to initiate or generate an RF-H field.” [0050], [0057], [0070], [0071]. Tentzeris ¶68.

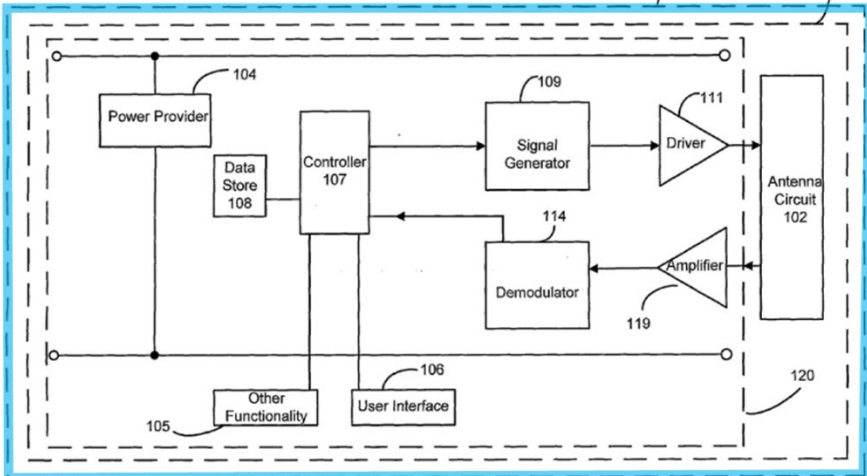
Bangs discloses the **controller 107**, **amplifier 119**, and **signal generator 109 and driver 111** are powered by the **mobile phone’s “battery 11.”** [0036], [0047]. Power provider 104, shown in Figure 2 above, comprises “coupling[s] to derive

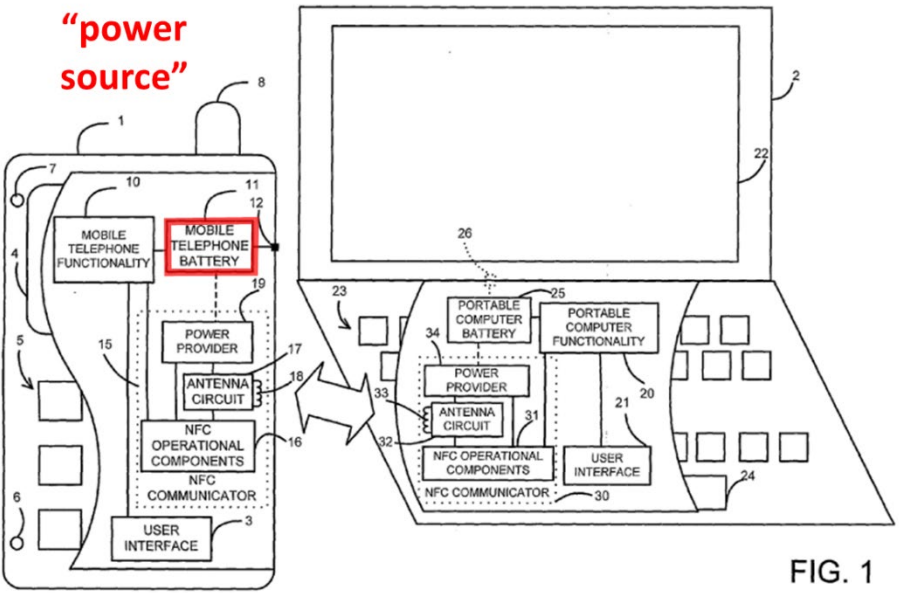
power from...**battery 11**” and supply it to the NFC communicator components.

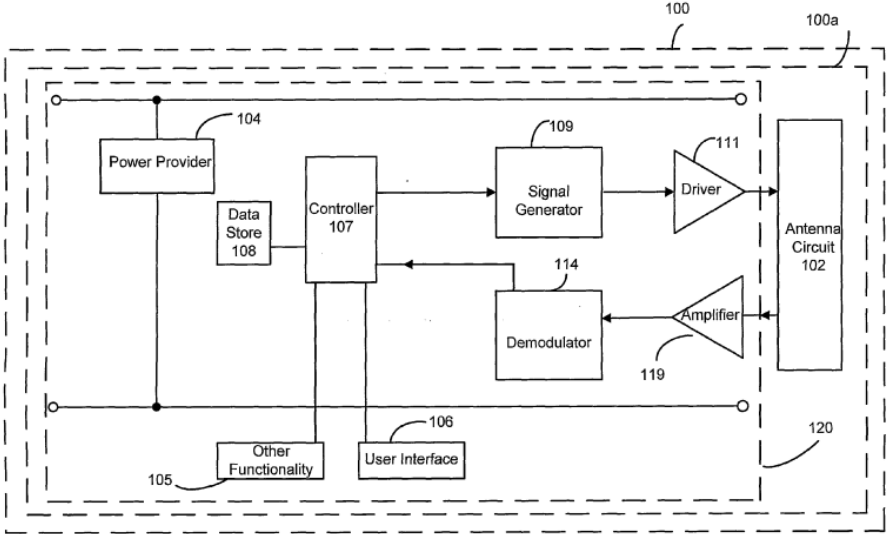
[0041], [0047]. Tentzeris ¶69.

2. Claim Chart

'053	Bangs
[1.pre] A mobile device comprising:	To the extent the preamble is limiting, Bangs discloses a mobile device (e.g., “mobile telephone”). <u>E.g., Bangs:</u> Bangs discloses an “NFC communications enabled device,” such as “mobile telephone 1,” which includes an “NFC communicator 15.” [0006], [0035], [0038], Fig. 1. As further illustrated in the “functional block diagram” of Figure 2, “NFC communications enabled device 100 comprises an NFC communicator 100a,” which contains various “NFC operational components.” [0045]-[0046], Fig. 2. Tentzeris ¶¶71-73. • Fig. 1 FIG. 1 • Fig. 2

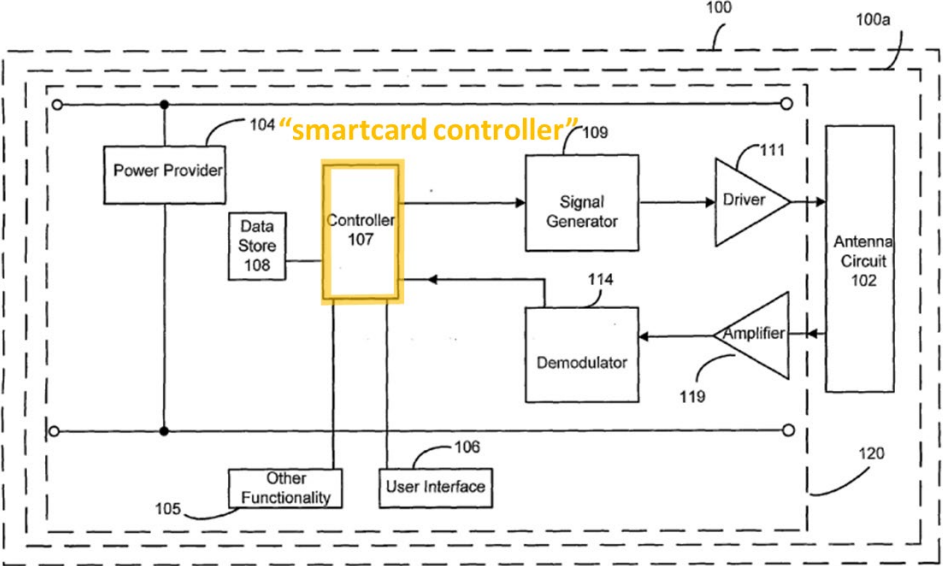
'053	Bangs
	“mobile device”  FIG. 2. • [0006]: “<i>Near field RF communicators may...be incorporated within or coupled to larger electrical devices or host devices (referred to below as near field RF communications enabled devices)....</i>” • [0035]: “As shown in FIG. 1, <i>one NFC communications enabled device comprises a mobile telephone (cellphone) 1....</i>” • [0038]: “[A]s shown in FIG. 1, <i>both NFC communications enabled devices 1 and 2 have an NFC communicator 15 and 30</i>. As shown, the NFC communicators 15 and 30 are incorporated within the larger devices and, as with the other functional blocks, may be discrete entities within the host devices...” • [0039]: “<i>Each NFC communicator 15 and 30 comprises NFC operational components 16 and 31 for, as will be described below, enabling control of the NFC functionality....</i>” • [0045]: “FIG. 2 shows a functional block diagram of <i>an NFC communications enabled device 100 in accordance with the invention</i> to illustrate in greater detail one way in which the NFC operational components

'053	Bangs
	of an NFC communications enabled device embodying the invention may be implemented. • [0046]: “In this example, <i>the NFC communications enabled device 100 comprises an NFC communicator 100a</i> having NFC operational components....” • [0064]: “[T]he NFC functionality 120a...formed as one or more integrated circuits.”
[1.a] a power source;	Bangs discloses a power source (e.g., “battery 11”). <u>E.g., Bangs:</u> <i>See [1.pre].</i> Bangs further discloses “mobile telephone 1” “has a chargeable battery 11.” [0036], Fig. 1. The mobile telephone’s NFC communicator includes “power provider 104” comprising “a coupling to derive power from...battery 11” to provide the power to the components of the NFC communicator (shown in Figure 2). [0041], [0047], Fig. 2. Tentzeris ¶¶74-76. • Fig. 1  FIG. 1 • Fig. 2

'053	Bangs
	 FIG. 2. • [0041]: “<i>Each NFC communicator 15 and 30 also comprises a power provider 19 and 34. The power providers 19 and 34 may be power supplies within the host device.... As another possibility or additionally as shown by dashed lines in FIG. 1, one or both of the power providers 19 and 34 may simply comprise a coupling to derive power from the corresponding device battery 11 or 25.</i>” • [0047]: “...In the interests of simplicity, <i>power supply couplings from the power provider 104 to other components</i> are not shown <i>in FIG. 2.</i>” • [0036]: “<i>The mobile telephone 1 has the usual features of a mobile telephone.... The mobile telephone also has a chargeable battery 11....</i>”
[1.b] a smartcard controller coupled to the power source to receive power;	Bangs discloses a smartcard controller (e.g., “controller 107” of “NFC communicator” compliant with ISO14443) coupled to the power source to receive power (e.g., “coupl[ed] to derive power from...battery 11”). <u>E.g., Bangs:</u> See [1.pre]-[1.a].

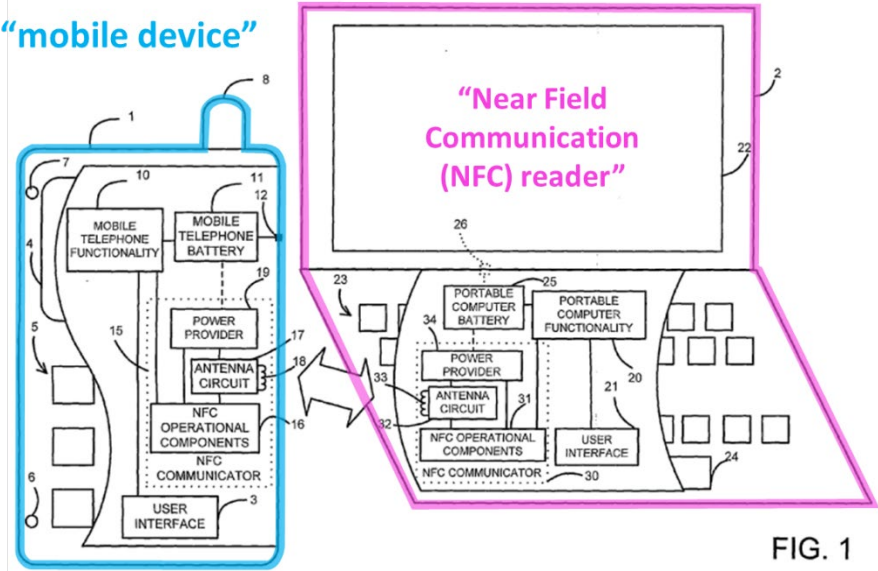
'053	Bangs
	Bangs further discloses “NFC communicator 100a” included in host mobile telephone 1 (<i>see</i> [1.pre]) includes “controller 107...to control overall operation of the NFC communicator,” which operates “in accordance with” “various standards” for near-field RF communication, such as “ISO/IEC 14443.” [0051], [0052], [0005]. For example, Bangs discloses that “controller 107 is coupled to the data store 108 which is provided to store data (information and/or control data) to be transmitted from and/or data received by the NFC communications enabled device,” and that “[s]ome areas of application are payment systems, ticketing systems,” etc. [0051], [0005]-[0006]. Tentzeris ¶¶77-79. In light of the above, a POSITA would have understood that Bangs’ “controller 107” is a smartcard controller,⁵ and at minimum, would have found it obvious to implement controller 107 as a smartcard controller to advantageously provide smartcard functionality in Bangs’ mobile telephone without needing to carry a separate smartcard device. Tentzeris ¶¶80-83. Demodulator 114 “demodulat[es] a modulated RF signal...from another near field RF communicator” and “suppl[ies] the thus-

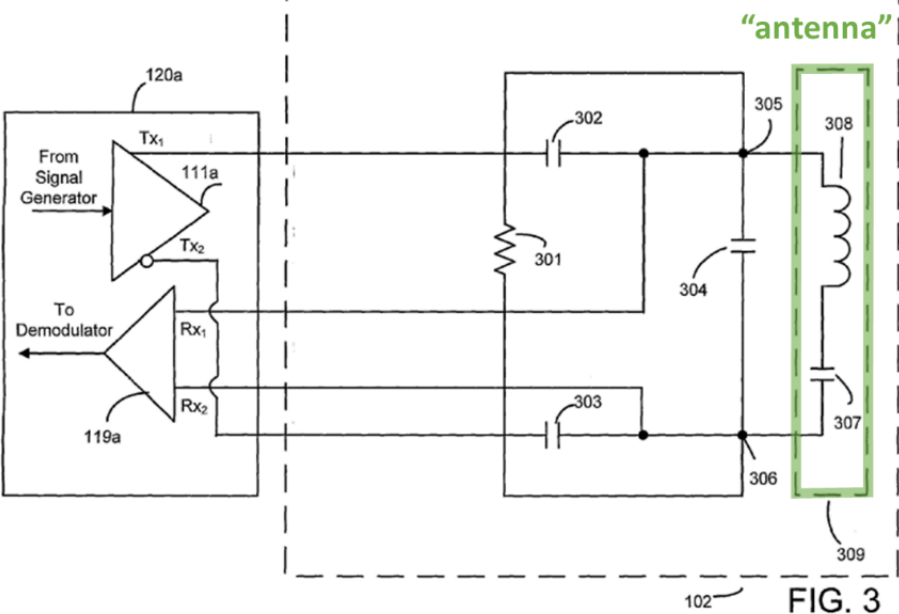
⁵ The use of a controller that supports the ISO 14443 standard is consistent with the '053 specification and prosecution of the related '722 patent. *See* '053, 9:25-27 (“smartcard controller 330 may be a device capable of implementing all or part of the ISO 14443 standard for contactless NFC devices.”); § V.B.2 (Examiner’s uncontested finding during '722 prosecution that prior art disclosures of a “controller”/“central processor” having ISO 14443-compliant functionality satisfied the claimed “smartcard controller”). Tentzeris ¶¶80.

'053	Bangs
	extracted data to controller 107 for processing.” [0049], Fig. 2. To the extent it is argued that the signal provided to the controller cannot be demodulated, controller 107 and demodulator 114 work together to process information in an interrogating field from another RF communicator and thus also collectively form a controller. Tentzeris ¶84. As explained in [1.a], components of NFC communicator 100a (including controller 107 and demodulator 114) are coupled to device battery 11 via power provider 104 to receive power. Tentzeris ¶85. • Fig. 2  FIG 2. • [0005]: “Examples of <i>near field RF communicators are defined in various standards for example ISO/IEC 18092, ISO/IEC 14443, ISO/IEC 15693 ISO/IEC 21481.</i>” • [0006]: “<i>Some areas of application are payment systems, ticketing systems....</i>” • [0041]: “<i>Each NFC communicator 15 and 30 also comprises a power provider 19 and 34. The power providers 19 and 34 may be power supplies within the</i>

'053	Bangs
	<i>host device</i>.... As another possibility or additionally as shown by dashed lines in FIG. 1, one or both of <i>the power providers</i> 19 and 34 <i>may simply comprise a coupling to derive power from the corresponding device battery 11 or 25.</i>" • [0046]: "In this example, <i>the NFC communications enabled device 100 comprises an NFC communicator 100a having</i> NFC operational components...and <i>NFC functionality 120 comprising</i> power provider 104, <i>controller 107</i>, data store 108, receiver circuitry and transmitter circuitry." • [0049]: "In this example, the receiver circuitry comprises an amplifier 119 coupled to the antenna circuit 102 and <i>a demodulator 114 coupled to</i> the amplifier 119 and the <i>controller 107 for</i> amplifying and <i>demodulating a modulated RF signal</i>...from another near field RF communicator in near field range and for <i>supplying</i> the thus-extracted data to the controller 107 for <i>processing.</i>" • [0051]: "<i>The controller 107</i> of the NFC functionality 120 <i>is provided to control overall operation of the NFC communicator. The controller 107 is coupled to the data store 108</i> which is <i>provided to store data (information and/or control data) to be transmitted from and/or data received by the NFC communications enabled device....</i> [C]ontrol data for communication to another near field RF communicator may be stored in an internal memory of the controller and/or the data store." • [0052]: "...[W]hen in target mode an NFC communicator waits for a communication from <i>a compatible initiating near field RF communicator</i> (for example an NFC communicator in initiator mode or an RFID initiator or transceiver). As thus used, <i>compatible means</i> operable at the same frequency and <i>in accordance with the same protocols, for example in accordance</i>

'053	Bangs
	<i>with the protocols set out in various standards</i> such as ISO/IEC 18092, ISO/IEC 21481, <i>ISO/IEC 14443</i> and ISO/IEC 15693. NFC communicators commonly operate at or around 13.56 MHz.” • [0067]: “In operation of the NFC communicator...when the NFC communicator is acting as a target...<i>the NFC communicator will communicate</i> any response <i>to an initiator near field RF communicator</i> in near field range by modulating the RF H field received from that near field RF communicator <i>under the control of the controller 107....</i>” • <i>See also</i> [0043], [0049], [0054].
[1.c] an antenna tuned to operate at substantially 13.56 MHz, wherein the antenna interacts with a Near Field Communication (NFC) reader external to the mobile device; and	Bangs discloses an antenna tuned to operate at substantially 13.56 MHz (e.g., “antenna element 309” in “antenna circuit...tuned to...13.56 MHz”), wherein the antenna interacts with a Near Field Communication (NFC) reader external to the mobile device (e.g., “antenna element 309” “inductively coupled to the antenna of the other near field RF communicator,” which is a “NFC communications” “reader[]” external to the “mobile telephone”). <u>E.g., Bangs:</u> <i>See</i> [1.pre]. Bangs further discloses that NFC communicator 100a includes “antenna element 309” in “antenna circuit 102...tuned to...13.56 MHz.” [0057], [0070], Fig. 3. The “antenna element 309” (of “antenna circuit 102”) enables “inductive[] coupl[ing]” with other NFC enabled devices external to the mobile telephone 1. [0035], [0039], [0058], [0070], Fig. 1. Bangs discloses that the NFC communicator 100a operates as a tag device “which...waits for a communication from” an “initiating near field RF communicator.” [0052]. In this regard, Bangs explains that “initiating near field RF communicators” are “referred to below as RFID readers.” [0003]. Moreover,

'053	Bangs
	Bangs defines “NFC communicators” (such as NFC communicator 100a) as “a type of near field RF communicator that is capable of both initiating a near field RF communication...with another near field RF communication and of responding to initiation of a near field RF communication by another near field RF communicator” (i.e., a reader). [0003]. Thus, Bangs’s NFC communicator 100a is responsive to an external NFC reader that performs the “initiation.” Tentzeris ¶¶86-88. • Fig. 1 “mobile device”  The diagram, labeled FIG. 1, illustrates a system for Near Field Communication (NFC). On the left, a blue-outlined rectangle represents a "mobile device" (1). Inside this device, several components are shown: MOBILE TELEPHONE FUNCTIONALITY (10), MOBILE TELEPHONE BATTERY (11), POWER PROVIDER (17), ANTENNA CIRCUIT (18), NFC OPERATIONAL COMPONENTS (16), and USER INTERFACE (3). On the right, a pink-outlined trapezoidal shape represents an NFC reader (2). This reader contains: PORTABLE COMPUTER BATTERY (25), PORTABLE COMPUTER FUNCTIONALITY (26), POWER PROVIDER (34), ANTENNA CIRCUIT (31), NFC OPERATIONAL COMPONENTS (32), and USER INTERFACE (24). A dashed line with arrows at both ends (23) connects the antenna circuit of the mobile device (18) to the antenna circuit of the NFC reader (31), indicating bidirectional communication. The entire figure is captioned "FIG. 1" in the bottom right corner. • Fig. 3

'053	Bangs
	 FIG. 3 [0003]: “<i>NFC communicators</i> are a type of near field RF communicator that is <i>capable of both initiating a near field RF communication</i> (through transmission or generation of an alternating magnetic field) with another near field RF communicator <i>and of responding to initiation of a near field RF communication by another near field RF communicator</i>. The term “<i>near field RE [sic: RF] communicator</i>” includes not only NFC communicators but also: <i>initiating near field RF communicators such as RFID transceivers or readers</i> (referred to below as <i>RFID readers</i>) that are capable of initiating a near field RF communication...<i>and responding near field RF communicators such as RFID transponders or tags</i> (referred to below as RFID tags) that are capable of responding to initiation of a near field RF communication by another near field RF communicator.... <i>NFC communicators</i>...are able to <i>communicate with other NFC communicators, RFID transceivers and RFID transponders</i>.” [0008]: “...[A] single design of NFC communicator may be used for many different applications and in some of

'053	Bangs
	those applications the NFC communicator may function like an RFID tag, in other applications <i>the NFC communicator may function like an RFID reader....</i>” • [0035]: “As shown in FIG. 1, <i>one NFC communications enabled device comprises a mobile telephone (cellphone) 1 and the other NFC communications enabled device comprises a portable computer 2</i> such as a notebook or laptop computer.” • [0039]: “<i>Each NFC communicator 15 and 30 also comprises an antenna circuit 17 and 32 comprising an inductor or coil in the form of an antenna 18 and 33. The antenna circuits 17 and 32 enable an alternating magnetic field (RF H field) generated by the antenna of one near field RF communicator 15 (or 30) by transmission of an RF signal (for example a 13.56 Mega Hertz signal) to be inductively coupled to the antenna of the other near field RF communicator 30 (or 15) when that antenna is within the near field of the RF signal generated by the one near field RF communicator 15 (or 30).</i>” • [0046]: “<i>[T]he NFC communications enabled device 100 comprises an NFC communicator 100a having NFC operational components including an antenna circuit 102....</i>” • [0052]: “<i>...[W]hen in target mode an NFC communicator waits for a communication from a compatible initiating near field RF communicator (for example an NFC communicator in initiator mode or an RFID initiator or transceiver). As thus used, compatible means operable at the same frequency and in accordance with the same protocols, for example in accordance with the protocols set out in various standards such as ISO/IEC 18092, ISO/IEC 21481, ISO/IEC 14443 and ISO/IEC 15693. NFC</i>

'053	Bangs
	<i>communicators commonly operate at or around 13.56 MHz.”</i> • [0057]: “As shown in FIG. 3, <i>antenna circuit 102 comprises an antenna element 309</i> coupled in parallel with a first capacitor 304 to form a tank circuit (a parallel LC resonant circuit).” • [0058]: “The <i>antenna element 309 comprises an antenna coil element 308</i> in series with a second capacitor 307 which second capacitor 307 is anti-phase to the antenna coil element 308 <i>and affects a voltage resulting from inductive coupling of an RF H field to the antenna circuit</i>. As shown the antenna coil element 308 comprises a single antenna coil which may comprise one, two or more coils or loops.” • [0070]: “<i>When the NFC communicator is in the active communication mode</i>, the controller 107 (FIG. 2) will cause the signal generator 109 (FIG. 2) and driver 111a to drive the antenna circuit 102 to initiate or generate an RF-H field. The <i>antenna circuit 102 is tuned to the required RF transmission frequency which</i>, for an NFC communicator operating in accordance with ISO 18092, <i>is 13.56 MHz (Megahertz)</i>. The capacitors 302 and 303 add capacitance to bring the tuning closer to the required frequency.” • See also [0068], [0087].
[1.d] an active transmit driver circuit coupled to the power source to receive the power, wherein the active transmit driver circuit affects transmission of data	Bangs discloses an active transmit driver circuit (e.g., “transmitter circuitry” for “active communication” “compris[ing] signal generator 109 coupled” to “driver 111”) coupled to the power source to receive the power (e.g., “coupl[ed] to derive power from...device battery 11”), wherein the active transmit driver circuit affects transmission of data between the antenna and the NFC reader (e.g., “transmitter circuitry” including “signal generator 109,” “driver 111” for “active communication” “drive[s] the antenna circuit”

'053	Bangs
between the antenna and the NFC reader.	including “antenna element 309” to “generate an RF-H field” for “transmission” of “data to be communicated” to “NFC communications” “reader[]”). <u>E.g., Bangs:</u> <i>See</i> [1.pre]-[1.a], [1.c]. Bangs further discloses “NFC communicator 100a” includes “transmitter circuitry compris[ing] components for driving the antenna circuit 102,” which comprises “antenna element 309,” “to transmit an RF signal” to the external NFC reader (<i>see</i> [1.c]). [0046], [0050], [0057], [0071]. Bangs further explains that the NFC communicator 100a communicates in an “active communication mode” where it uses its “own RF-H field to enable communication.” [0004]. Tentzeris ¶¶89-91. To effect active communication, the “transmitter circuitry” includes “signal generator 109 coupled via a driver 111 to the antenna circuit 102,” which comprises antenna element 309. [0050], [0057], Fig. 2. Signal generator 109 and driver 111 “drive the antenna circuit 102,” which comprises antenna element 309, “to initiate or generate an RF-H field” that is “modulat[ed]...in accordance with the data to be communicated.” [0050], [0070], [0071], [0074]. Moreover, as discussed in [1.a], Bangs discloses NFC communicator components, including the transmitter circuitry illustrated in Figure 2, are “coupl[ed] to derive power from the corresponding device battery 11.” [0041], Fig. 2. Tentzeris ¶92. • Figs. 2-3

'053	Bangs
	FIG. 2. FIG. 3

- [0003]: "...The term 'near field RE [*sic*: RF] communicator' includes not only NFC communicators but also: ***initiating near field RF communicators such as RFID transceivers or readers (referred to below as RFID readers)*** that are capable of initiating a near field RF communication...***NFC communicators*** can act as both RFID transceivers and RFID transponders and ***are able to communicate with other NFC communicators, RFID transceivers and RFID transponders.***"

'053	Bangs
	• [0004]: "...When communication is by the 'passive communications mode', an initiator NFC communicator will generate an RF field and a target NFC communicator will respond by modulation of the received H field, usually by load modulation. <i>When communication is by the 'active communications mode' the initiator NFC communicator and the target NFC communicator each use their own RF H field to enable communication.</i> The terms 'passive' and 'active' in the context of NFC communicators do not...define whether the RFID tags and readers have their own power supply or whether a power supply is derived from the received RF HF field." • [0041]: "Each NFC communicator 15 and 30 also <i>comprises a power provider</i> 19 and 34. The power providers 19 and 34 may...simply comprise a <i>coupling to derive power from the corresponding device battery 11</i> or 25." • [0046]: "[T]he NFC communications enabled device <i>100 comprises</i> an NFC communicator 100a having...NFC functionality 120 comprising power provider 104, controller 107, data store 108, receiver circuitry and <i>transmitter circuitry.</i>" • [0050]: "[T]he transmitter circuitry <i>comprises components for driving the antenna circuit 102 to transmit an RF signal</i> and for modulating an RF signal <i>to enable communication of data between near field RF communicators in near field range.</i> As shown in FIG. 2, the transmitter circuitry <i>comprises a signal generator 109 coupled via a driver 111 to the antenna circuit 102....</i> In this example, <i>the signal generator 110 is configured to cause modulation</i> by gating or switching on and off the RF signal <i>in accordance with the data to be communicated.</i>" • [0057]: "As shown in FIG. 3, <i>antenna circuit 102 comprises an antenna element 309</i> coupled in parallel

'053	Bangs
	with a first capacitor 304 to form a tank circuit (a parallel LC resonant circuit).” • [0070]: “When the NFC communicator is <i>in the active communication mode</i>, the controller 107 (FIG. 2) will cause <i>the signal generator 109 (FIG. 2) and driver 111a to drive the antenna circuit 102 to initiate or generate an RF-H field.....</i>” • [0071]: “The <i>drive signal from the driver 111 a is coupled to the antenna coil 308</i> via capacitors 302 and 303. The <i>driver 111 a thus develops an RF voltage across transmission connections Tx1 and Tx2 which causes an RF current to flow</i> between transmission connections Tx1 and Tx2 through antenna circuit 102. As this RF current flows between points 306 and 305, it <i>divides between resistor 301, capacitor 304 and antenna element 309 in accordance with their relative impedances</i>. The portion of the RF current <i>that flows through antenna element 309 passes through antenna coil 308 producing an RF H field.</i>” • [0074]: “Any appropriate form of modulation may be used to enable data communication....For example, <i>a current drive will control the current supplied to the antenna circuit 102</i> and may achieve modulation by changing the current. <i>A voltage drive</i> on the other hand <i>will control the voltage supplied to the antenna circuit 102</i> and may achieve modulation by controlling pulses supplied the antenna circuit 102.”
[2] The mobile device of claim 1, wherein the transmitted data includes ticketing information for a mass transit system.	<i>See</i> [1]. Bangs discloses that the transmitted data (e.g., “data to be communicated,” <i>see</i> [1.d]) includes ticketing information for a mass transit system (e.g., “bus tickets, train tickets”). <u>E.g., Bangs:</u> <i>See</i> [1.d].

'053	Bangs
	Bangs further discloses in its background discussion that NFC communications enabled devices have various “areas of application,” including “ticketing systems” for mass transit, e.g., “bus tickets, train tickets.” Bangs [0006]. As such, a POSITA would have understood, and at minimum found it obvious, that Bangs’ mobile telephone 1 is deployed in a mass transit “ticketing system” to advantageously allow commuters to purchase tickets without pulling a separate form of payment from their wallet or purse to ride mass transit. <i>See</i> [0006]. In such an application, a POSITA would have understood, and at least found it obvious, the “data to be communicated” (<i>see</i> [1.d]) to the NFC reader device includes mass transit ticketing information (such as information about a bus or train ticket) to advantageously allow the ticketing transaction to be performed. Tentzeris ¶¶93-95. • [0006]: “When incorporated within a larger device or host, <i>a near field RF communicator may be a discrete entity or may be provided by functionality within the larger device</i> or host....Some areas of application are payment systems, <i>ticketing systems, for example in tickets (for example parking tickets, bus tickets, train tickets or entrance permits or tickets) or in ticket checking systems....</i>” • [0050]: “[T]he transmitter circuitry comprises <i>components</i> for driving the antenna circuit 102 to transmit an RF signal and <i>for modulating an RF signal</i> to enable communication of data between near field RF communicators in near field range.... [T]he signal generator 110 is configured to cause modulation by gating or switching on and off the RF signal <i>in accordance with the data to be communicated.</i>”
[3] The mobile device of claim 1, wherein the transmitted data	<i>See</i> [1]. Bangs discloses that the transmitted data (e.g., “data to be communicated,” <i>see</i> [1.d]) includes transaction information

'053	Bangs
includes transaction information for a mobile payment.	for a mobile payment (e.g., is for “payment system[]” accessed via the “mobile telephone”). <u>E.g., Bangs:</u> <i>See</i> [1.pre], [1.d]. Bangs further discloses in its background discussion that another “area[] of application” for its NFC communications enabled mobile telephone is “payment systems.” [0006]. A POSITA would have understood, and at minimum found it obvious, that the “data to be communicated” (<i>see</i> [1.d]) to the reader device in a mobile payment environment includes payment transaction information to advantageously allow the device to make a payment as part of the transaction. Tentzeris ¶¶96-98. • [0006]: “When incorporated within a larger device or host, <i>a near field RF communicator may be a discrete entity or may be provided by functionality within the larger device</i> or host.... [E]xamples of such larger devices or host devices are, for example, mobile telephones...electronic devices, apparatus or systems. Some areas of application are <i>payment systems</i>....” • [0050]: “[T]he transmitter circuitry...is configured to cause modulation by gating or switching on and off the RF signal <i>in accordance with the data to be communicated</i>...”
[4] The mobile device of claim 1, wherein the NFC reader is a point-of-sale NFC reader.	<i>See</i> [1]. Bangs discloses that the NFC reader (e.g., “NFC communications” “reader[],” <i>see</i> [1.c]) is a point-of-sale NFC reader (e.g., used for “payment systems,” <i>see</i> [3]). <u>E.g., Bangs:</u> <i>See</i> [1.c], [3]. As discussed in [1.c], Bangs discloses an NFC reader. And as discussed in [3], Bangs discloses “payment systems” are an area of application for NFC communication. [0006]. A

'053	Bangs
	POSITA would have understood, and at minimum found it obvious, that Bangs' NFC communicator is used with a point-of-sale reader device to advantageously implement a contactless payment system. Tentzeris ¶¶99-101. • [0006]: “When incorporated within a larger device or host, <i>a near field RF communicator may be a discrete entity or may be provided by functionality within the larger device</i> or host....for example, mobile telephones...electronic devices, apparatus or systems. Some areas of application are <i>payment systems....</i>”
[5] The mobile device of claim 1, wherein the antenna includes an inductive element.	See [1]. Bangs discloses that the antenna includes an inductive element (e.g., “antenna element 309” includes “antenna coil element 308”; “inductor”). <u>E.g., Bangs:</u> See [1.c]. Bangs further discloses the “antenna element 309 comprises...antenna coil element 308.” [0057], Fig. 3. Antenna coil 308 is an “inductor” to enable inductive coupling with an antenna of another NFC communicator. [0039], [0057]-[0058], Fig. 3. When the antenna element 309 is near another NFC communicator’s RF-H field, the “inductive impedance” of antenna element 309 generates a current across coil element 308. [0068]. Tentzeris ¶¶102-104. • Fig. 3

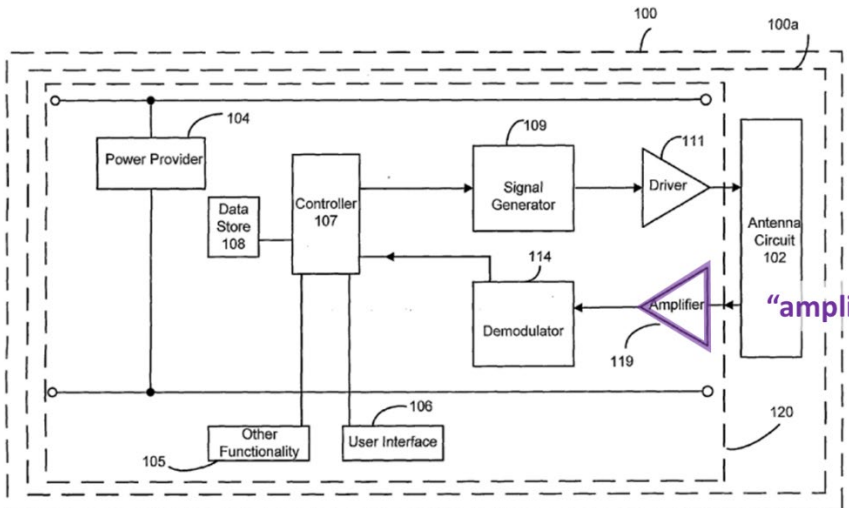
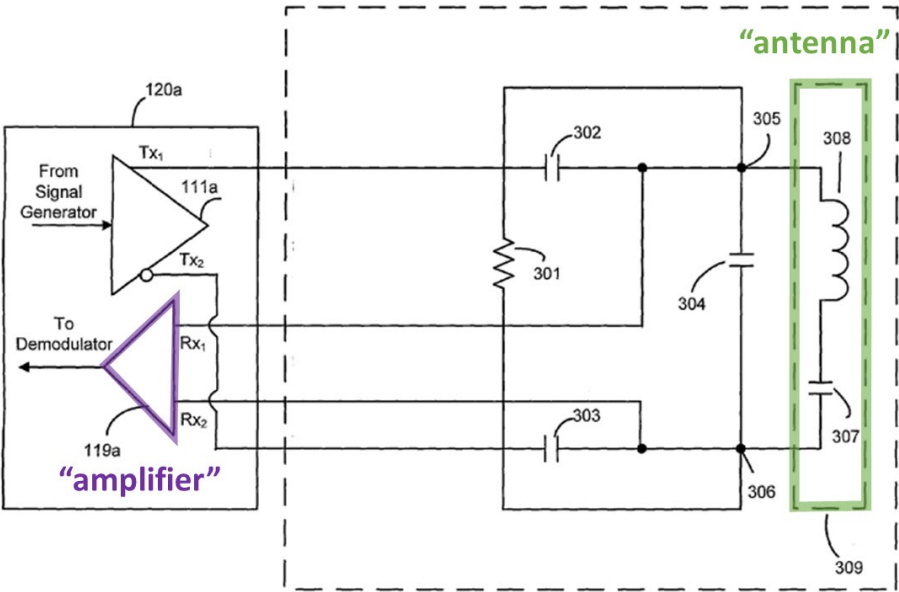
'053	Bangs
	FIG. 3 [0039]: “Each NFC communicator 15 and 30 also comprises an <i>antenna circuit</i> 17 and 32 <i>comprising an inductor or coil</i> in the form of an antenna 18 and 33. The antenna circuits 17 and 32 <i>enable</i> an alternating magnetic field (RF H field) generated by <i>the antenna of one near field RF communicator</i> 15 (or 30) by transmission of an RF signal (for example a 13.56 Mega Hertz signal) <i>to be inductively coupled to the antenna of the other near field RF communicator</i> 30 (or 15) when that antenna is within the near field of the RF signal generated by the one near field RF communicator 15 (or 30).” [0057]: “As shown in FIG. 3, <i>antenna circuit 102 comprises an antenna element 309</i> coupled in parallel with a first capacitor 304 to form a tank circuit (a parallel LC resonant circuit).” [0058]: “<i>The antenna element 309 comprises an antenna coil element 308</i> in series with a second capacitor 307 which second capacitor 307 is anti-phase to the antenna coil element 308 and affects a voltage resulting from inductive coupling of an RF H field to the antenna circuit. As shown the antenna coil element 308

'053	Bangs
	comprises a single antenna coil which may comprise one, two or more coils or loops.” • [0068]: “When the NFC communicator antenna circuit 102 is within an RF H field...<i>the inherent inductive impedance of the coil 308 results in the current induced in the antenna coil 308 generating a voltage across the coil</i> while the capacitive impedance of the capacitor 307 results in the current induced in the antenna coil 308 generating a voltage....”
[6] The mobile device of claim 1, wherein the active transmit driver circuit includes one or more of an amplifier filter, oscillator, and/or modulator.	See [1]. Bangs discloses that the active transmit driver circuit (<i>e.g.</i>, “transmitter circuitry” for “active communication” “compris[ing] a signal generator 109 coupled” to “driver 111”; <i>see</i> [1.d]) includes one or more of an amplifier filter, oscillator, and/or modulator (<i>e.g.</i>, “signal generator 109” “generate[s]...signal” and “is configured to cause modulation”). <u>E.g., Bangs:</u> <i>See [1.d].</i> As discussed in [1.d], Bangs further discloses “a signal generator 109,” that is “configured to cause modulation” of the “generated...signal” to communicate desired data, and is thus a modulator. Bangs [0050]. Tentzeris ¶¶105-107. Moreover, a POSITA would have understood, and at a minimum found it obvious, that signal generator 109 further includes an amplifier filter and oscillator to advantageously “generate[]” an RF carrier waveform with a desired frequency bandwidth (centered around 13.56 MHz) at the appropriate strength. <i>See</i> Bangs [0050].⁶ This waveform is what is

⁶ *See, e.g.*, Ex.1024 3:12–30 (describing an RF source signal with “a low-level impulse-gated oscillator,” a “bandpass filter,” and “a gated power amplifier”);

'053	Bangs
	modulated with transmit data, <i>i.e.</i>, “switch[ed] on an off in accordance with data to be communicated.” Bangs [0050]. Tentzeris ¶108. • [0050]: “As shown in FIG. 2, <i>the transmitter circuitry comprises a signal generator 109</i> coupled via a driver 111 to the antenna circuit 102. In this example, the signal generator 110 is <i>configured to cause modulation</i> by gating or switching on and off the RF signal in accordance with the data to be communicated. The <i>NFC communicator may use any appropriate modulation scheme that is in accordance with the standards and/or protocols under which the NFC communicator operates....</i>” • [0070]: “When the <i>NFC communicator is in the active communication mode</i>, the controller 107 (FIG. 2) will cause the <i>signal generator 109</i> (FIG. 2) and driver 111 a to drive the antenna circuit 102 to <i>initiate or generate an RF-H field....</i>”
[7] The mobile device of claim 1 comprising an amplifier coupled to the power source to receive the power, wherein the amplifier is further coupled to the antenna.	See [1]. Bangs discloses an amplifier coupled to the power source to receive the power (e.g., “amplifier 119” “coupl[ed] to derive power from...device battery 11”), wherein the amplifier is further coupled to the antenna (e.g., “antenna element 309...coupled to” “amplifier 119”). <u>E.g., Bangs:</u> <i>See [1.a], [1.c].</i> Bangs further discloses NFC communicator 100a includes “amplifier 119” “coupled to...antenna circuit 102” comprising antenna element 309. [0049], [0057], [0059], Fig. 3. Antenna

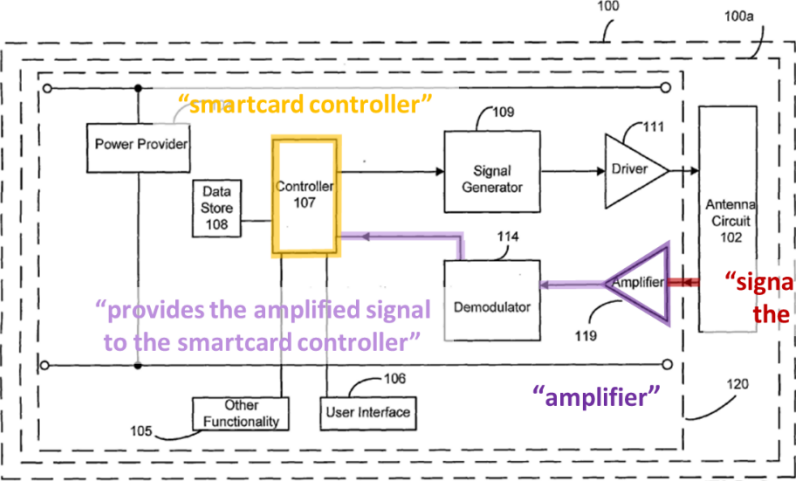
Ex.1025 [0067] (“an oscillator” and “gated amplifier” are used to “create a pulsed radiofrequency (RF) waveform”). Tentzeris ¶¶108.

'053	Bangs
	element 309 “is coupled to” “input[s]...of a differential amplifier 119a forming...amplifier 119.” [0059]. As discussed in [1.a], Bangs discloses the NFC communicator 100a components, including amplifier 119, are “coupl[ed] to derive power from the corresponding device battery 11.” [0041], Fig. 2. Tentzeris ¶¶109-111. • Figs. 2-3  FIG 2.  FIG. 3

'053	Bangs
	• [0041]: “Each NFC communicator 15 and 30 also <i>comprises a power provider</i> 19 and 34. The power providers 19 and 34...may simply comprise a <i>coupling to derive power from the corresponding device battery 11</i> or 25.” • [0049]: “[T]he receiver circuitry comprises an <i>amplifier 119 coupled to the antenna circuit 102</i> and a demodulator 114 coupled to the amplifier 119 and the controller 107 <i>for amplifying</i> and demodulating a <i>modulated RF signal</i> inductively coupled to the antenna circuit 102 <i>from another near field RF communicator</i> in near field range and for supplying the thus-extracted data to the controller 107 for processing.” • [0057]: “As shown in FIG. 3, <i>antenna circuit 102 comprises an antenna element 309</i> coupled in parallel with a first capacitor 304 to form a tank circuit (a parallel LC resonant circuit).” • [0059]: “The junction 305 between capacitor 304 and <i>antenna element 309 is coupled to one input Rx1 of a differential amplifier 119a forming the amplifier 119</i> shown in FIG. 2 while the junction 306 between capacitor 304 and <i>antenna element 309 is coupled to the other input Rx2 of the differential amplifier 119a....</i>”
[8] The mobile device of claim 7, wherein the amplifier amplifies a signal received at the antenna and generates an amplified signal, and provides the amplified signal to	<i>See</i> [7]. Bangs discloses the amplifier amplifies a signal received at the antenna (e.g., “amplifier 119...for amplifying” “a modulated RF signal” from “antenna element 309”) and generates an amplified signal (e.g., generates “amplif[ied]...modulated RF signal”), and provides the amplified signal to the smartcard controller (e.g., provides the “amplif[ied]...signal” to “controller 107”). <u>E.g., Bangs:</u> <i>See</i> [1.b]-[1.c].

'053	Bangs
the smartcard controller.	Bangs further discloses amplifier 119 “amplif[ies]...a modulated RF signal” received from “antenna element 309” and the amplified signal is provided to “demodulator 114 coupled to...controller 107” (<i>see</i> [1.b]). [0049], [0059], Figs. 2-3. Demodulator 114 demodulates the amplified signal to extract data from the signal and “suppl[ies] the thus-extracted data to...controller 107” for further processing. [0049]. Tentzeris ¶¶112-114.⁷ To the extent it is argued that the amplified signal must be supplied directly to the controller, demodulator 114 coupled to controller 107 collectively satisfy this requirement. Tentzeris ¶115. And to the extent it is argued that the demodulator must be internal to controller 107, this also would have been obvious as doing so would amount to nothing more than reorganizing familiar elements according to known methods to yield predictable results; there is no functional difference between demodulating before or as part of controller 107; and providing demodulation within a controller was known in the art.

⁷ This is consistent with the examiner’s uncontested finding during prosecution of the related ’722 patent that Park (Ex.1017) discloses an amplifier “provides the amplified signal to the smartcard controller” when data in the amplified signal is first demodulated. Ex.1017, ¶52; Ex.1011, 1695 (citing Ex.1017, ¶52 (disclosing “demodulating the signal amplified by the amplifier 444 to generate the reader reception data and outputting the reader reception data to the controller 130”)); Tentzeris ¶114.

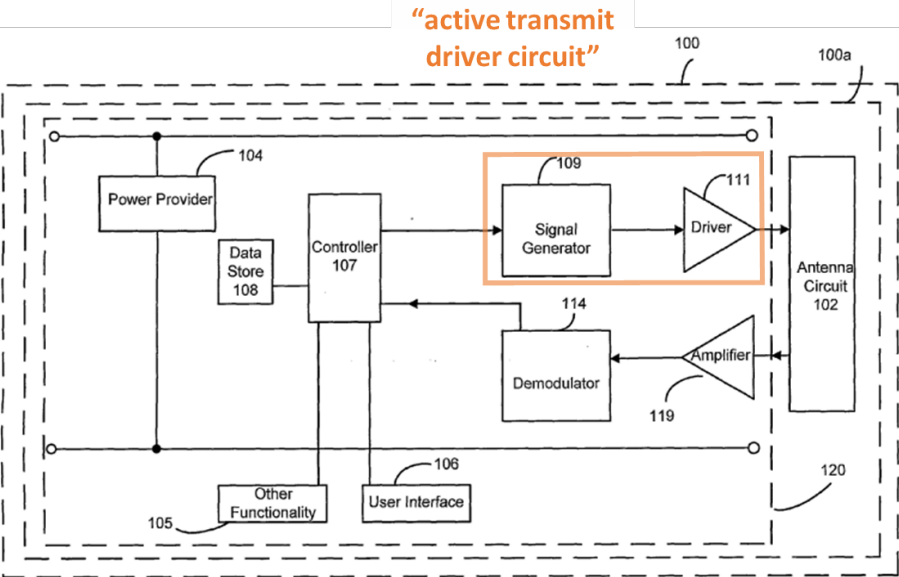
'053	Bangs
	Tentzeris ¶116.⁸ Moreover, Bangs discloses that “equivalents and modifications not described above may also be employed without departing from the scope of the invention.” Bangs [0100]. Tentzeris ¶117. • Figs. 2-3  The diagram, labeled FIG 2, shows a system 100 enclosed in a dashed box. Inside, a 'smartcard controller' (107) is highlighted with a yellow box. It is connected to a Power Provider (105), a Data Store (108), a Signal Generator (109), a Driver (111), a Demodulator (114), and Other Functionality (106). A User Interface (108) is also connected to the Controller. An Antenna Circuit (102) is connected to the Driver (111) and an Amplifier (119). A signal path is shown from the Antenna Circuit (102) through the Amplifier (119) to the Demodulator (114), and then to the Controller (107). Handwritten annotations include: 'smartcard controller' in orange above the controller; 'provides the amplified signal to the smartcard controller' in purple below the demodulator; 'amplifier' in purple below the amplifier block; and 'signal received at the antenna' in red next to the antenna circuit. The figure is labeled 'FIG 2.' at the bottom right.

⁸ See, e.g., Ex.1021 [0007]–[0009] (discussing an “RFID component” “controller” that provides “demodulation...of data streams into the controller”); Ex.1022 [0043] (“[C]ontroller 308” of RFID device “is capable of properly []demodulating data...received from external devices.”). Tentzeris ¶¶116.

'053	Bangs
	FIG. 3 [0001]: <i>“This invention relates to NFC (Near Field Communication) communicators and antenna circuits for NFC communicators.”</i> [0028]-[0032]: <i>“FIG. 2 shows a functional block diagram of an example of an NFC communicator or NFC communications enabled device. FIG. 3 shows a functional circuit diagram of an NFC communicator to illustrate one example of an antenna circuit embodying the present invention; FIG. 4 shows a functional circuit diagram of an NFC communicator to illustrate another example of an antenna circuit embodying the present invention; FIG. 5 shows a functional circuit diagram of an NFC communicator to illustrate another example of an antenna circuit embodying the present invention; and FIG. 6 shows a functional circuit diagram of an NFC communicator to illustrate another example of an antenna circuit embodying the present invention.”</i> [0045]: <i>“FIG. 2 shows a functional block diagram of an NFC communications enabled device 100 in accordance with the invention to illustrate in greater detail one way in which the NFC operational components of an NFC</i>

'053	Bangs
	<i>communications enabled device embodying the invention may be implemented.”</i> • [0049]: “[T]he receiver circuitry comprises an <i>amplifier 119</i> coupled to the antenna circuit 102 and a demodulator 114 coupled to the amplifier 119 and the controller 107 <i>for amplifying and demodulating a modulated RF signal inductively coupled to the antenna circuit 102 from another near field RF communicator</i> in near field range <i>and for supplying the thus-extracted data to the controller 107</i> for processing.” • [0059]: “The junction 305 between capacitor 304 and <i>antenna element 309</i> is coupled to one input Rx1 of a <i>differential amplifier 119a</i> forming the <i>amplifier 119</i> shown in FIG. 2 while the junction 306 between capacitor 304 and <i>antenna element 309</i> is coupled to the other input Rx2 of the <i>differential amplifier 119a</i>....” • [0064]: “Generally, <i>the NFC functionality 120a</i> will be formed as one or more integrated circuits (generally <i>monocrystalline silicon integrated circuits</i>) mounted on a <i>Printed Circuit Board(s) (PCB(s)) or the like</i> and the <i>antenna circuit</i> will be formed by external discrete components formed on or carried by (e.g. <i>surface mounted on</i>) a <i>PCB</i>, for example the antenna coil element may be defined by conductive tracks on a PCB while any capacitors and resistors of the antenna circuit may be provided by discrete components mounted to the PCB.” • [0100]: “....It is to be understood that <i>any feature described in relation to any one embodiment</i> may be used alone, or in combination with other features described, and may also be used in combination with one or more features of any other of the embodiments, or any combination of any other of the embodiments. Furthermore, <i>equivalents and modifications not described above</i> may also be employed without

'053	Bangs
	<i>departing from the scope of the invention</i> , which is defined in the accompanying claims.”
[17.pre] A method of near field communication between a mobile device and an NFC reader, the method comprising:	To the extent the preamble is limiting, Bangs discloses a method of near field communication (e.g., “Near field RF communication”) between a mobile device and an NFC reader (e.g., between “mobile telephone 1” and “NFC “reader[]” device). <u>E.g., Bangs:</u> <i>See [1.pre], [1.c]-[1.d].</i> As explained in [1.c]-[1.d], Bangs discloses operations in mobile telephone 1 for NFC with an NFC reader. Tentzeris ¶¶118-120.
[17.a] coupling a smartcard controller and an active transmit driver circuit to a power source of the mobile device;	Bangs discloses coupling a smartcard controller (e.g., “controller 107,” <i>see</i> [1.b]) and an active transmit driver circuit (e.g., “transmitter circuitry” for “active communication” “comprises a signal generator 109 coupled” to “driver 111,” <i>see</i> [1.d]) to a power source of the mobile device (e.g., “coupl[ed] to...device battery 11” of the “mobile telephone,” <i>see</i> [1.a]). <i>See [1.pre]-[1.b], [1.d], [17.pre].</i> Tentzeris ¶¶121-123.
[17.b] providing power to the smartcard controller and the active transmit driver circuit from the power source of the mobile device;	Bangs discloses providing power to the smartcard controller (e.g., “controller 107,” <i>see</i> [1.b]) and the active transmit driver circuit (e.g., “transmitter circuitry” for “active communication” “comprises a signal generator 109 coupled” to “driver 111,” <i>see</i> [1.d]) from the power source of the mobile device (e.g., “derive power from the corresponding device battery 11” of the “mobile telephone,” <i>see</i> [1.a]-[1.b], [1.d]). <u>E.g., Bangs:</u> <i>See [1.pre]-[1.b], [1.d], [17.pre].</i> As explained in [1.b], Bangs further discloses the “power provider” supplies NFC communicator components with power

'053	Bangs
	“derive[d]...from the corresponding battery 11” of the mobile telephone. Bangs [0041], [0047], Fig. 2. Tentzeris ¶¶124-126. Fig. 2  FIG. 2. [0041]: “Each NFC communicator 15 and 30 also <i>comprises a power provider</i> 19 and 34. The power providers 19 and 34...may simply comprise a <i>coupling to derive power from the corresponding device battery 11</i> or 25.” [0047]: “...In the interests of simplicity, <i>power supply couplings from the power provider 104 to other components</i> are not shown <i>in FIG. 2.</i>”
[17.c] coupling the active transmit driver circuit to an antenna of the mobile device, wherein the antenna is tuned to operate at substantially 13.56 MHz; and	Bangs discloses coupling the active transmit driver circuit to an antenna of the mobile device (e.g., “transmitter circuitry” for “active communication” “coupled...to the antenna circuit 102” comprising antenna element 309 of “mobile telephone”), wherein the antenna is tuned to operate at substantially 13.56 MHz (e.g., “antenna element 309” in “antenna circuit...tuned to” “13.56 MHz”; see [1.c]). <u>E.g., Bangs:</u>

'053	Bangs
	See [1.pre], [1.c]-[1.d], [17.pre]-[17.b]. Bangs further discloses the “transmitter circuitry” to effect “active communication” is “coupled...to the antenna circuit 102” comprising “antenna element 309.” Bangs [0050], [0057], [0070]. See [1.d]. Tentzeris ¶¶127-129. Figs. 2-3 “active transmit driver circuit” FIG 2. “antenna” FIG. 3

'053	Bangs
	• [0050]: “[T]he transmitter circuitry comprises components for driving the antenna circuit 102 to transmit an RF signal and for modulating an RF signal to enable communication of data between near field RF communicators in near field range. As shown in FIG. 2, <i>the transmitter circuitry comprises a signal generator 109 coupled via a driver 111 to the antenna circuit 102....</i>” • [0057]: “As shown in FIG. 3, <i>antenna circuit 102 comprises an antenna element 309</i> coupled in parallel with a first capacitor 304 to form a tank circuit (a parallel LC resonant circuit).” • [0070]: “When the NFC communicator is in <i>the active communication mode</i>, the controller 107 (FIG. 2) will cause the <i>signal generator 109 (FIG. 2) and driver 111 a to drive the antenna circuit 102</i> to initiate or generate an RF-H field. The antenna circuit 102 is tuned to the required RF transmission frequency which, for an NFC communicator operating in accordance with ISO 18092, is 13.56 MHz (Megahertz)....”
[17.d] driving transmission of data by the active transmit driver circuit from the antenna to the NFC reader.	Bangs discloses driving transmission of data by the active transmit driver circuit from the antenna (e.g., “driver 111” of “transmitter circuitry” for “active communication” “driving the antenna circuit” comprising “antenna element 309” to “generate an RF-H field” for “transmission” of “data to be communicated”) to the NFC reader (e.g., to “NFC communications” “reader[,]” <i>see</i> [1.d]). <u>E.g., Bangs:</u> <i>See</i> [1.c]-[1.d], [17.pre]-[17.c]. As explained in [1.d], Bangs further discloses “driver 111” drives “the antenna circuit 102 to transmit an RF signal” (which includes “data to be communicated”) to another NFC communicator. Bangs [0050], [0057]. The other NFC

'053	Bangs
	communicator is “an RFID reader” device. <i>See</i> [1.c]. Tentzeris ¶¶130-132. • [0050]: “[T]he transmitter circuitry comprises components for <i>driving the antenna circuit 102 to transmit an RF signal</i> and for modulating an RF signal <i>to enable communication of data between near field RF communicators in near field range</i>. As shown in FIG. 2, the transmitter circuitry comprises a signal generator 109 coupled via a driver 111 to the antenna circuit 102....” • [0057]: “As shown in FIG. 3, <i>antenna circuit 102 comprises an antenna element 309</i> coupled in parallel with a first capacitor 304 to form a tank circuit (a parallel LC resonant circuit).” • [0070]: “When the NFC communicator is in the active communication mode, the controller 107 (FIG. 2) will cause <i>the signal generator 109 (FIG. 2) and driver 111a to drive the antenna circuit 102 to initiate or generate an RF-H field....</i>”
[18] The method of claim 17 further comprising: amplifying a signal received from the antenna to generate an amplified signal; and providing the amplified signal to the smartcard controller.	<i>See</i> [8], [17]. Tentzeris ¶¶133-134.
[19] The method of claim 10 or 17, wherein the transmitted data includes ticketing	<i>See</i> [2], [17]. Tentzeris ¶¶135-136.

'053	Bangs
information for a mass transit system.	
[20] The method of claim 10 or 17, wherein the transmitted data includes transaction information for a mobile payment.	<i>See</i> [3], [17]. Tentzeris ¶¶137-138.

B. Ground 2: Bangs in View of Kerdraon (Claims 1-8 and 17-20)

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]. Moreover, to the extent it is argued further disclosure of a “Near Field Communication (NFC) reader” is required, **Kerdraon discloses interaction with a Near Field Communication (NFC) reader** (*e.g.*, “mobile terminal 21” communicates with “external reader” using “near-field communication”) as recited in [1.c]-[1.d], [17.pre], [17.d]. [0078]. Tentzeris ¶139.

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], [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 ¶140.

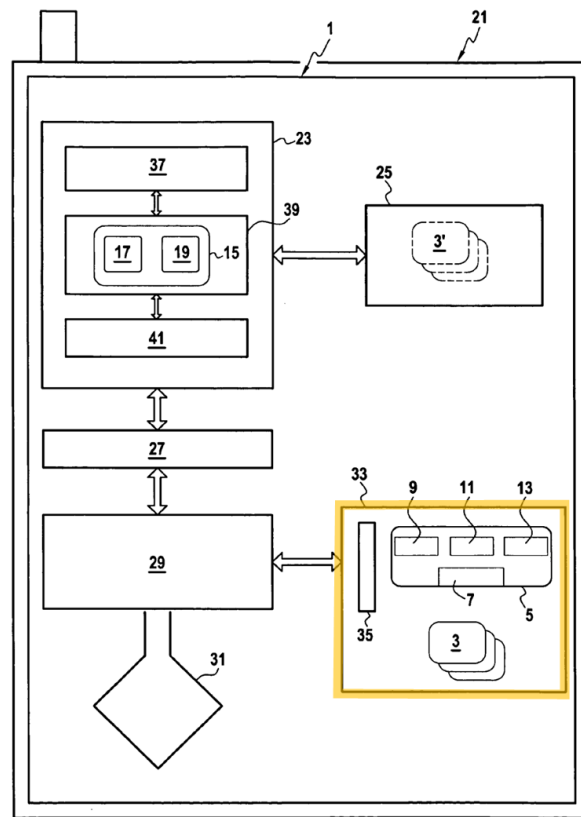


FIG.4

Kerdraon, [0069], Fig. 4.

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 ¶141.

To effect certain services provided by smartcard capabilities, **Kerdraon's** mobile terminal 21 interacts with an “external reader” device over “near-field communication” using “near-field communication module 29.” Kerdraon [0078]. For example, a “payment service” cardlet is “linked to another application or...system” provided in “a local external reader” that activates the payment service cardlet to complete a payment. [0067]. Tentzeris ¶142.

Bangs and **Kerdraon** are analogous art, because they are in the same field as the '053, which includes contactless communications devices, and are reasonably pertinent to the alleged problems addressed by the '053, including incorporating contactless communication and smartcard functionality into a mobile device. *See, e.g.,* '053, 1:40-44, 2:30-3:15, 11:61-67, Figs. 14-15, 17, 19, 21-36, 39; Tentzeris ¶143. For example, both **Bangs** and **Kerdraon** discuss contactless communications devices, such as NFC-enabled devices. *See, e.g.,* Bangs, [0001], [0005], [0036]-[0038], [0052], cl. 44; Kerdraon, [0046], [0069]-[0071], [0078]. Tentzeris ¶¶144-

⁹ This is consistent with the '053's disclosure of “smartcard controller.” '053, 9:21–38 (“The ‘SmartMX’ family of controllers available from NXP Semiconductors N.V. of The Netherlands are examples of suitable dual interface smartcard controllers.”).

146. And both **Bangs** and **Kerdraon** are pertinent to the alleged problems addressed by the '053, including incorporating contactless communication functionality, including smartcard functionality, into a mobile device. *See, e.g.*, Bangs, [0005], [0006], [0010], [0016]; Kerdraon, [0001]-[0006], [0046], [0070]-[0071]. Tentzeris ¶147.

A POSITA would have been motivated to apply **Kerdraon's** smartcard controller teachings to **Bangs'** NFC-enabled mobile phone to advantageously provide smartcard functionality in a mobile phone 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 ¶148. 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 integrating smartcard functions 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 ¶148. In

applying these teachings to **Bangs, Bangs'** controller 107, as modified with **Kerdraon's** smartcard controller teachings, would be coupled to device battery 11 via power provider 104 to receive power as discussed in [1.a] and [17.b] (*see* § IX.A.2). Tentzeris ¶148.

Moreover, a POSITA would have further been motivated to include smartcard functionality into 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 ¶149.

Because **Bangs** already teaches controller 107 accesses and manages stored data (Bangs [0049], [0067]), implementing **Kerdraon's** smartcard controller teachings in **Bangs'** NFC-enabled mobile phone would have been a straightforward modification. Similar to **Bangs'** controller, which accesses and manages stored data, **Kerdraon** teaches a smartcard controller likewise accesses and manages stored data, but the data relates to smartcard functions, *e.g.*, “Java Card application...Cardlets.” [0071], [0073]. Tentzeris ¶150. A POSITA would have understood that **Bangs'** controller 107 may be implemented with application specific smartcard functions,

as taught by **Kerdraon**. Tentzeris ¶150. Thus, a POSITA would have found it straightforward and advantageous to apply **Kerdraon's** smartcard controller teaching to **Bangs'** NFC-enabled mobile phone, and would have known such a combination (yielding the claimed limitations) would predictably work and provide the expected functionality. Tentzeris ¶150.

A POSITA would have further been motivated to implement **Bangs'** NFC-enabled mobile phone such that it interacts with an external NFC reader, as taught by **Kerdraon**. Doing so would advantageously facilitate the phone's use in the wide range of NFC functionalities that had been developed at the time. For example, **Bangs** states NFC communicators "need to be compatible with existing RFID readers" and identifies "payment systems" as an example application for NFC. Bangs [0006], [0009], [0014]. **Kerdraon** provides further detail and explains certain "applications...render[ing] a set of services" from mobile terminal 21 may be "activat[ed]" through a "local external reader," e.g., "for a service payment service." Kerdraon [0067]. Tentzeris ¶151.

Because **Bangs** already teaches its NFC-enabled mobile phone interacts with other NFC communicators (Bangs [0039]), applying **Kerdraon's** external NFC reader interaction teachings would have been straightforward. For example, **Bangs'** NFC-enabled phone is "compatible" with "protocols set out in...ISO/IEC 14443." Bangs [0052]. **Kerdraon** teaches its external NFC reader communicates with NFC-

enabled mobile terminal 21 in accordance with ISO 14443. [0070]-[0071]. Thus, a POSITA would have found it straightforward and advantageous to apply **Kerdraon's** external NFC reader interaction teachings to **Bangs'** NFC-enabled mobile phone interactions and would have known such a combination (yielding the claimed limitations) would predictably work and provide the expected functionality. Tentzeris ¶152.

C. Ground 3: Bangs in View of Koh (Claims 1-8 and 17-20)

To the extent it is argued the '053 patent is entitled to claim priority to August 8, 2008, the Claims are rendered obvious by **Bangs** in view of **Koh**. Tentzeris ¶153.

As set forth for Ground 1, **Bangs** discloses an NFC-enabled phone and operational components that provide the NFC functionality. **Koh discloses a smartcard controller** (e.g., “Smart MX (SMX) module”) as recited in each claim. Moreover, to the extent it is argued **Bangs** does not disclose a “Near Field Communication (NFC) reader,” **Koh discloses interaction with a Near Field Communication (NFC) reader** (e.g., “reader 310” for “near field communication”) as recited in [1.c]-[1.d], [17.pre], [17.d]. Tentzeris ¶154.

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 '053 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.” ’053, 9:25-38. Moreover, **Koh** explains SmartMX “is preloaded with...JCOP 4.1,” a smartcard controller operating system. Koh [0032]. *See, e.g.*, Ex.1015, 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 ¶155.

Koh further discloses interaction between the NFC-enabled phone and “RFID reader 310.” Koh [0041]. For example, the NFC-enabled phone includes an “RFID interface,” compliant with ISO 14443, “that allows the cellphone to act as a tag” such that “RFID reader 310” can “read the tag ID and essential data” from the device. [0033], [0041]. Because RFID reader 310 communicates with an NFC device, it is an NFC reader. *See, e.g.*, Fisher [0007] (explaining “NFC readers” are “usable with” NFC devices), [0039]. NFC between a tag and reader is based on ISO 14443, the international standard for smartcard communication. *See* Ex.1030 at Fig. 2 (illustrating each of three NFC “communication modes” conform to ISO 14443); Ex.1035, [0014] (“The standard for contactless smart card communications is ISO/IEC 14443, dated 2001.”); Ex.1029, [0007] (“Smartcards are governed by many standards, in particular, ISO/IEC standards 7816 and 14443.”). Tentzeris ¶156.

Like **Bangs**, **Koh** is analogous art, in the same field as the ’053, which

includes contactless communications devices, and is reasonably pertinent to alleged problems identified in the '053, including incorporating contactless communication and smartcard functionality into a mobile device. *See* §IX.B. Tentzeris ¶157. For example, **Koh** discusses contactless communications devices, such as NFC-enabled devices. *See, e.g., Koh*, [0001]-[0002], [0010], [0033]. Tentzeris ¶158. Additionally, **Koh** is pertinent to the alleged problems addressed by the '722, including incorporating contactless communication functionality, including smartcard functionality, into a mobile phone. **Koh**, [0002], [0003]-[0006], [0012], [0010], [0032]-[0033], [0040], Fig. 2; Tentzeris ¶159.

A POSITA would have been motivated to apply **Koh's** smartcard controller teachings to **Bangs'** NFC-enabled mobile phone 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 ¶160. 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 ¶160. 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 ¶160.

Because **Bangs** already teaches that controller 107 performs generic controller functions, including “processing” requests received from another component and accessing “store[d] data” to provide a “response” (Bangs [0049]-[0051]), it would have been straightforward to apply **Koh’s** smartcard controller teachings to **Bangs’** mobile device. *See* Bangs [0049], [0067]. Tentzeris ¶161. **Koh’s** SmartMX smartcard controller “stor[es] values” and “run[s] Java applets” effecting smartcard functionality. Koh [0033]. Similar to **Bangs’** controller, 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. Bangs [0049], [0067]; Koh [0053]. Tentzeris ¶161. A POSITA would have understood, and at a minimum found it obvious, to implement **Bangs’** controller 107 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 **Bangs**' NFC-enabled mobile phone and would have known such a combination (yielding the claimed limitations) would predictably work and provide the expected functionality. Tentzeris ¶161.

A POSITA would have further been motivated to implement **Bangs**' NFC-enabled mobile phone such that it interacts with an NFC reader, as taught by **Koh**. Doing so would advantageously enable the phone's use in various NFC applications. For example, **Bangs** states NFC communicators "need to be compatible with existing RFID readers" and identifies "payment systems" as an example application for NFC. Bangs [0006], [0009], [0014], [0098]. **Koh** provides further detail on the interaction between an NFC-enabled cellphone and a reader to complete a payment in such a system using an "e-purse applet...residing in the cellphone." Koh [0035], [0041]. Tentzeris ¶162.

Because **Bangs** already teaches its NFC-enabled phone interacts with other NFC communicators (Bangs [0039]), applying **Koh**'s external NFC reader teachings to **Bangs**' NFC-enabled phone would have been straightforward. For example, **Bangs**' NFC-enabled phone is "compatible" with "protocols set out in...ISO/IEC 14443." Bangs [0052]. **Koh** teaches reader 310 communicates with an NFC-enabled phone over ISO 14443. [0033]. Thus, a POSITA would have found it straightforward and advantageous to apply **Koh**'s NFC reader interaction teachings

to **Bangs'** NFC-enabled mobile interactions and would have known such a combination (yielding the claimed limitations) would predictably work and provide the expected functionality. Tentzeris ¶163.

D. Grounds -4-6: Grounds 1--3 in Further View of Fisher (Claims 2--4, 19-20)

To the extent PO argues further disclosure is required for [2] and [19], **Fisher discloses ticketing information for a mass transit system** (*e.g.*, transmitted “total amount...stored on the smart card of wireless mobile device” to allow a “bus fare [to be] deducted from” a “smart card”). Tentzeris ¶164.

Fisher discloses “known” transactions that leverage NFC include mobile payment transactions and purchasing transit tickets. Fisher [0006]-[0007]. In the mass transit example, a user purchases a bus ticket “by simply waving the wireless mobile device near a reader on the bus, so that the bus fare is deducted from” a “total amount” that is “stored on the smart card of the wireless mobile device.” [0006]. A POSITA would have understood, and at minimum found it obvious, that the NFC-enabled mobile device obtains information confirming the available funds “stored on the smart card of the wireless mobile device” to allow the reader on the bus to confirm that the funds on the smart card are sufficient to pay for the bus ticket. [0006]. In addition, **Fisher** further discloses sending an “RFID for identification purposes” to the bus reader, which the reader forwards to a server, which in turn

identifies the “identification code of the particular RFID,” and uses this information to “charge the user.” [0006]. The RFID is “ticketing information” because it identifies the account associated with the ticket, allowing the system to deduct the fare from the associated account. Tentzeris ¶165.

Moreover, to the extent PO argues further disclosure is required for [3]-[4] and [20], **Fisher discloses transmitted data** (e.g., “transmit[ted]...transaction request signal”) **includes transaction information for a mobile payment** (e.g., “include[s] identification code associated with the user, as well as information relative to the transaction”) as recited in [3] and [20], and **a point-of-sale reader** (e.g., “point of sale terminal reader” using “NFC communications”) as recited in [4]. Tentzeris ¶166.

Fisher discloses transmitting information between the NFC-enabled mobile device and “point-of-sale terminal” to complete a transaction. Fisher [0025], [0009]. The mobile device transmits a “transaction request signal” to a point-of-sale terminal, and the point-of-sale terminal forwards the signal to a remote server that “verifies the transaction,” “identifies the user,” and “provides...a first transaction response signal.” [0025]. **Fisher** further explains the transaction request signal transmitted from the mobile device includes an “identification code associated with the user” and “information relative to the transaction, such as item, quantity, vendor.” [0033]. Tentzeris ¶167.

Fisher further discloses the point-of-sale terminal is a “reader...includ[ing] the provision for NFC communications.” Fisher [0039]. The terminal “has the capability of electronically reading” information from an NFC-enabled mobile device and “simply bringing...the NFC transceiver” of a mobile device near the point-of-sale “will cause initiation of a transaction.” [0039]. Tentzeris ¶168.

Like **Bangs**, **Kerdraon**, and **Koh**, **Fisher** is analogous art and in the same field as the '053, and is reasonably pertinent to alleged problems identified in the '053, including incorporating contactless communication and smartcard functionality into a mobile device. See §§IX.B, IX.C. Tentzeris ¶169. For example, **Fisher** discusses contactless communication devices, such as NFC-enabled devices. See, e.g., Fisher, [0006], [0009], [0024], [0033]. Tentzeris ¶170. Additionally, Fisher 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., Fisher [0006]-[0007], [0009], [0024], [0033]. Tentzeris ¶¶171.

A POSITA would have been motivated to apply **Fisher's** bus ticket purchase teachings in implementing **Bangs'** NFC-enabled mobile phone (as optionally modified by **Kerdraon's** or **Koh's** teachings). While **Bangs** teaches NFC “areas of application” include “payment systems” and “ticketing systems” for mass transit (Bangs [0006]), **Bangs** is silent on the data that is transmitted to complete

transactions in these applications. A POSITA would have looked to **Fisher** for such implementation details. For example, a POSITA would have been motivated to apply **Fisher's** teachings of sending an identification code in implementing **Bangs'** NFC-enabled mobile phone communication (as optionally modified by **Kerdraon's** or **Koh's** teachings) to advantageously facilitate access control in a mass transit system using a mobile phone and eliminate the need to carry a separate transit card. A POSITA would have been motivated to apply **Fisher's** transaction request signal teachings to advantageously facilitate payment transactions using **Bangs'** mobile phone and eliminate the need to carry a separate payment device, e.g., a credit card. Tentzeris ¶172.

A POSITA would have further been motivated to apply **Fisher's** interaction with an NFC point-of-sale reader teachings to **Bangs'** NFC-enabled mobile phone (as optionally modified by **Kerdraon's** or **Koh's** teachings). **Bangs** teaches leveraging NFC in payment systems but is silent on the types of reader devices used to complete payment transactions. A POSITA would have looked to **Fisher** for such implementation detail. For example, a POSITA would have been motivated to apply **Fisher's** NFC point-of-sale reader interaction teachings to advantageously allow a user to purchase items without the need to carry cash or credit cards. Tentzeris ¶173.

Because **Bangs** (as optionally modified by **Kerdraon's** or **Koh's** teachings) already teaches an NFC-enabled mobile phone that interacts with a reader to

complete various NFC transactions, a POSITA would have had a reasonable expectation of success applying **Fisher's** teachings of transmitting data for facilitating bus ticket purchases and point-of-sale reader teachings to **Bangs'** NFC-enabled mobile device. Tentzeris ¶174.

Thus, a POSITA would have found it straightforward and advantageous to apply **Fisher's** bus ticket purchase and NFC point-of-sale teachings to **Bangs'** NFC-enabled mobile phone (as optionally modified by **Kerdraon's** or **Koh's** teachings) and would have known such a combination (yielding the claimed limitations) would predictably work and provide the expected functionality. Tentzeris ¶175.

X. SECONDARY CONSIDERATIONS

There is no evidence in the '053's prosecution history or elsewhere supporting any secondary considerations arguments, or evidence of nexus to any challenged Claim. *See generally* '053FH. Indeed, as demonstrated by the prior art referenced herein, any purported solutions to problems or unexpected results in the '053 were already well known. Tentzeris ¶¶176-177.

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 ¶178.

To the extent PO asserts the existence of any secondary considerations in its responses, Petitioners reserve the right to address any such evidence. Tentzeris ¶179.

XI. CONCLUSION

Substantial, new, and noncumulative technical teachings have been presented for each Challenged Claim, which are anticipated and rendered obvious for the reasons set forth above. Tentzeris ¶¶180-185. There is a reasonable likelihood Petitioners will prevail as to each of these Claims. *Inter partes* review of Claims 1-8, 17-20 of the '053 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 13,769 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. 11,694,053 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:

175023 - MUGHAL GAUDRY & FRANKLIN PC
iCashe, Inc.
1500 NW Bethany Blvd.
Suite 200
Beaverton, OR 97006
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