161. Additionally, on information and belief, the NXP SN110U chip contains functional blocks and circuitry within the embedded NFC controller that correspond to the amplifier and ADC shown and described with respect to the PN7150. The amplifier of the NXP SN110U is arranged between the antenna and the smartcard controller, so as to amplify signals received at the antenna and drive the smartcard controller. Paragraphs 66-69 above are incorporated herein by reference.

162. The smartcard circuitry also includes a functional block for load modulation. The NXP SN110U was designed for ALM. On information and belief, the NXP SN110U chip contains functional blocks and circuitry within the embedded NFC controller that correspond to the active load modulation circuitry shown and described above with respect to the PN7150. Paragraphs 70-74 above are incorporated herein by reference.

163. Further, testing of the Samsung Galaxy S21 5G smartphone confirms that the Samsung Galaxy S21 5G smartphone uses ALM functionality of the NXP SN110U chip for actively transmitting modulated data to an NFC reader. Paragraphs 75-76 above are incorporated herein by reference.

164. The point-of-sale interface in the Samsung Galaxy S21 5G smartphone receives power from the mobile phone. The Samsung Galaxy S21 5G smartphone contains a battery, which is a power source. Paragraph 105 above is incorporated herein by reference.

165. The NXP SN110U chip is coupled to the battery such that the point-of-sale interface in the NXP SN110U receives power from the mobile phone. Testing indicates

that the NFC transmission from the Samsung Galaxy S21 5G smartphone does not depend on coupling with the NFC reader, indicating that the NXP SN110U chip is powered by the mobile device. Paragraphs 75-76 above are incorporated herein by reference.

166. The point-of-sale interface in the Samsung Galaxy S21 5G smartphone comprises circuitry to produce at least one time-varying magnetic field. The Samsung Galaxy S21 5G smartphone contains an antenna tuned to operate at substantially 13.56 MHz. Paragraphs 63-64 above are incorporated herein by reference.

167. The antenna produces a time-varying magnetic field, i.e., a 13.56 MHz alternating current. The signal transmitted over the antenna is modulated and driven by circuitry of the NXP SN110U chip. This modulation pattern is generated by actively driving a signal over the TX pin(s). Paragraphs 70-76 above are incorporated herein by reference.

ALM Mode (SINGLE):

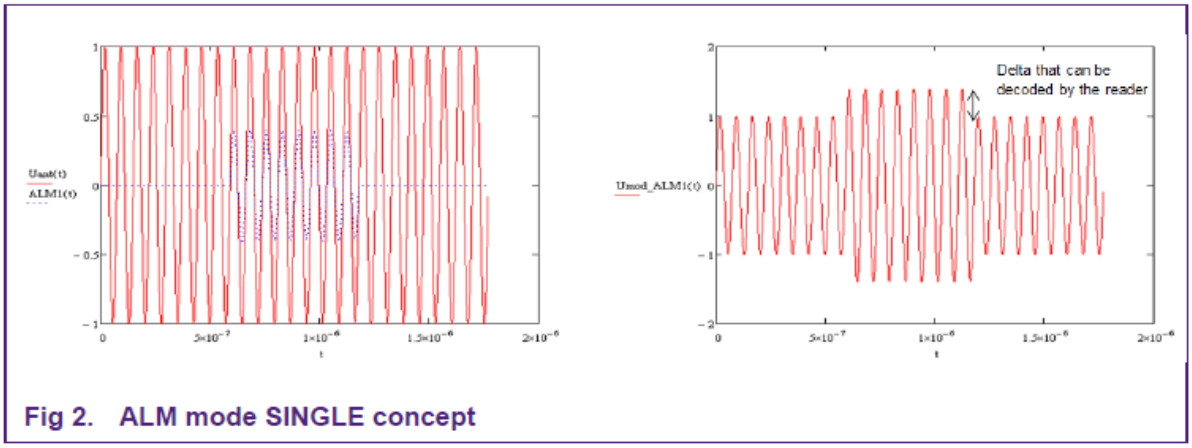


Fig 2. ALM mode SINGLE concept

On the left graph the red 13.56MHz signal shows the voltage at the NFC antenna which is induced by the reader field, the blue curve shows the modulation pattern. This modulation pattern is generated by actively driving 13.56MHz with TX1 or TX2 while the other TX pin (TX2 or TX1) is kept silent.

On the right we can see the modulated reader field.

PN7150 Antenna Design and Matching Guide at 5.

ALM Mode (DUAL):

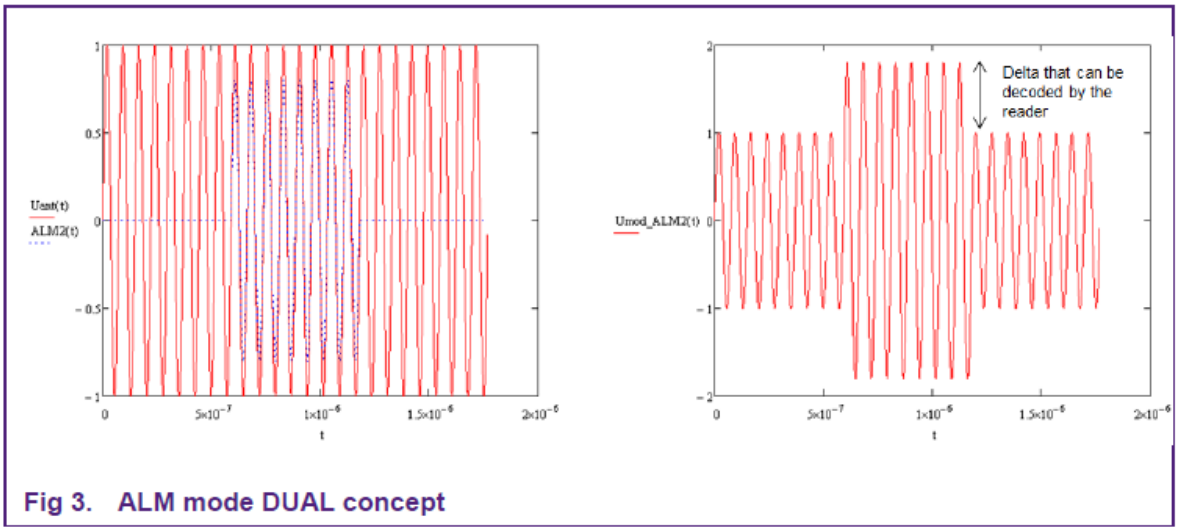


Fig 3. ALM mode DUAL concept

In this mode the modulation pattern is generated by actively driving 13.56MHz with TX1 and TX2. The modulation depth observed is twice the modulation depth of mode 1.

PN7150 Antenna Design and Matching Guide at 5.

168. The Accused Instrumentalities directly infringe at least claims 1 and 2 of the '219 patent at least in the manner described in paragraphs 156-167 above. Plaintiff's allegations of infringement are not limited to claims 1 and 2, and additional infringed claims will be identified and disclosed through discovery and infringement contentions.

169. Defendants have actual notice pursuant to 35 U.S.C. § 287(a) of the '219 patent and the infringement alleged herein at least upon the filing of this Complaint. iCashe has complied with the notice requirement of 35 U.S.C. § 287. Neither iCashe nor any authorized licensee made, offered for sale, or sold within the United States any article embodying the '219 patent claims following issuance of the '219 patent.

170. Defendants indirectly infringe the '219 patent by actively inducing the

direct infringement of others of the ’219 patent, in the United States, the State of Texas, and the Eastern District of Texas.

171. Defendants induce, through affirmative acts, their customers and other third parties, such as retailers and end users, to directly infringe the ’219 patent by using, offering to sell, selling within the United States, and/or importing into the United States those Accused Instrumentalities, which infringe the ’219 patent.

172. On information and belief, Defendants actively promote the Accused Instrumentalities for the U.S. market. For example, on information and belief, for every one of Defendants’ Accused Instrumentalities sold in the United States, Defendants pursue and obtain approval from U.S. and state regulatory agencies, such as the United States Federal Communications Commission, to allow sales of such Accused Instrumentalities in the United States.

173. Defendants know that their customers will sell infringing Accused Instrumentalities in the United States or cause Accused Instrumentalities to be sold in the United States, and Defendants specifically intend their customers to purchase those Accused Instrumentalities from Defendants and sell the Accused Instrumentalities in the United States or cause Accused Instrumentalities to be sold in the United States. Defendants’ direct and indirect purchasers directly infringe the ’219 patent by importing such Accused Instrumentalities into the United States, selling such Accused Instrumentalities in the United States, and using such Accused Instrumentalities in the United States.

174. Defendants further induce others’ direct infringement of the ’219 patent by

providing instruction and direction to end users, such as consumers, about how to use the Accused Instrumentalities such that those end users use the Accused Instrumentalities and directly infringe the '219 patent. Defendants have knowledge that end users will use Accused Instrumentalities in the manner directed by Defendants and specifically intend that end users will perform such uses in the United States. Such infringing uses occur upon operation of the Accused Instrumentalities in their normal, intended manner without any specific action of the end user other than turning on the product. That is, Defendants have configured the Accused Instrumentalities in such a way as to induce infringement by end users upon any use of those Accused Instrumentalities.

175. Defendants induce others' direct infringement despite actual notice that the Accused Instrumentalities infringe the '219 patent. At least as of the date of filing of this Complaint, Defendants know that the induced conduct would constitute infringement—and intend that infringement at the time of committing the aforementioned affirmative acts, such that the acts and conduct have been and continue to be committed with the specific intent to induce infringement—or deliberately avoided learning of the infringing circumstances at the time of committing these acts so as to be willfully blind to the infringement that was induced.

176. The above-described acts of infringement committed by Defendants have caused injury and damage to iCashe, and will cause additional severe and irreparable injury and damages in the future.

177. Defendants' acts of infringement as described above are willful, at least as of the date of filing of this Complaint.

178. iCashe is entitled to recover damages sustained as a result of Defendants' wrongful acts in an amount subject to proof at trial, but in no event less than a reasonable royalty.

COUNT V: INFRINGEMENT OF U.S. PATENT NO. 9,202,156

179. The allegations set forth in paragraphs 1 through 44 of this Complaint are incorporated by reference as though fully set forth herein.

180. Pursuant to 35 U.S.C. § 282, the '156 patent is presumed valid.

181. Defendants have directly infringed and continue to infringe one or more claims of the '156 patent in violation of 35 U.S.C. § 271. The infringing products are the Accused Instrumentalities. The Samsung Galaxy S20 5G smartphone, described below, provides a representative example of Samsung's infringement of the '156 patent.

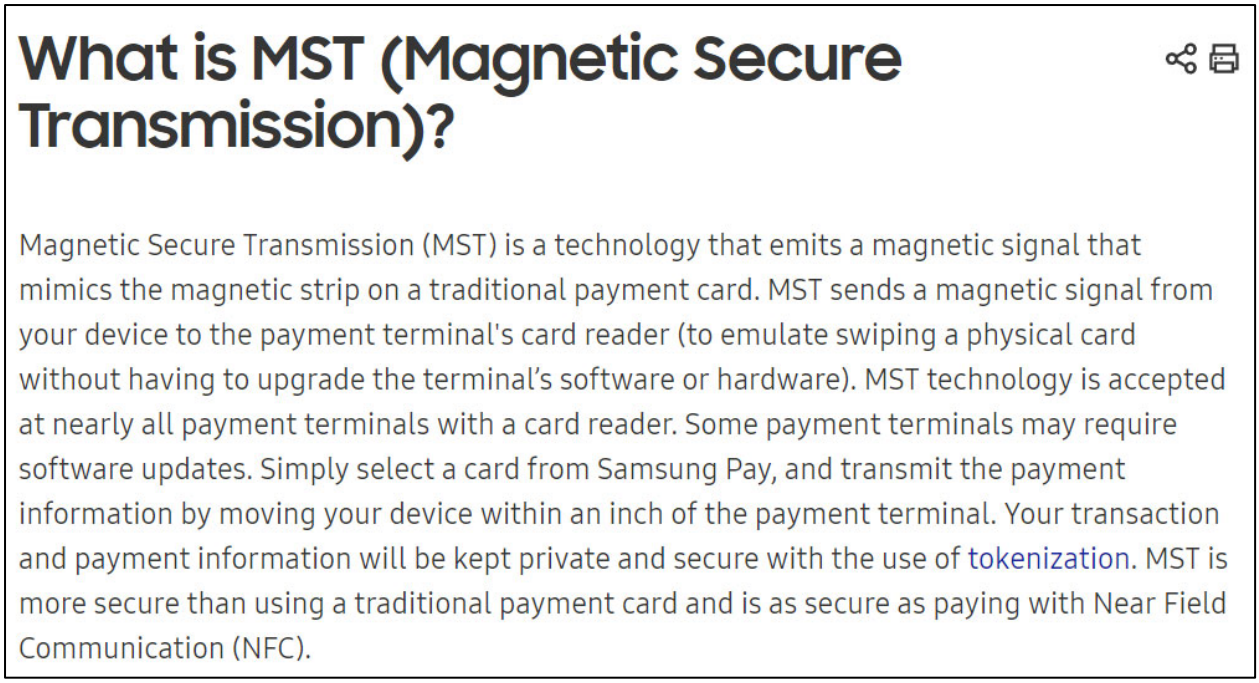
182. Paragraphs 184-195 describe the manner in which the Accused Instrumentalities infringe claim 1 of the '156 patent, by way of the exemplary Samsung Galaxy S20 5G smartphone.

183. On information and belief, the Accused Instrumentalities are in relevant part substantially similar to the exemplary Samsung Galaxy S20 5G smartphone, in particular with regard to the manner in which the Accused Instrumentalities include and utilize NFC- and/or TVMF-based functionality. Paragraphs 184-195 are thus illustrative of the manner in which each of the Accused Instrumentalities infringes.

184. The Samsung Galaxy S20 5G smartphone is a mobile device. Specifically, the Samsung Galaxy S20 5G smartphone is a mobile phone.

https://www.samsung.com/us/mobile/galaxy-s20-5g/buy/galaxy-s20-fe-5g-128gb-unlocked-sm-g781uzbmxaa/ (last accessed June 6, 2024).

185. The Samsung Galaxy S20 5G smartphone contains circuitry to provide a time-varying magnetic field that mimics a swipe of a magnetic card. For example, the Samsung Galaxy S20 5G smartphone includes an antenna element and a driver chip for performing payment transactions using Magnetic Secure Transmission (MST).

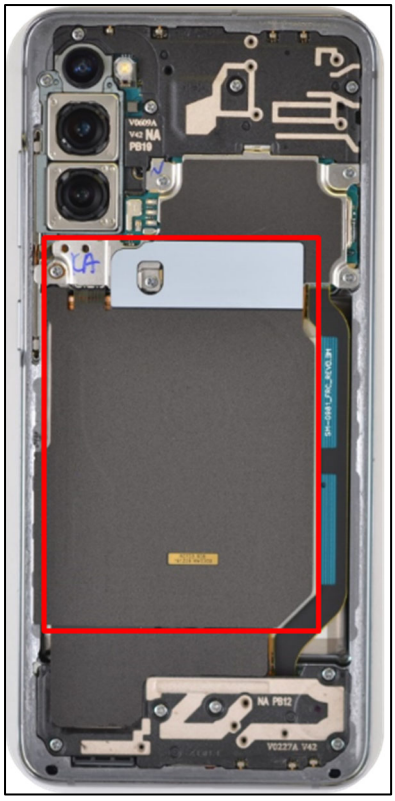


What is MST (Magnetic Secure Transmission)?

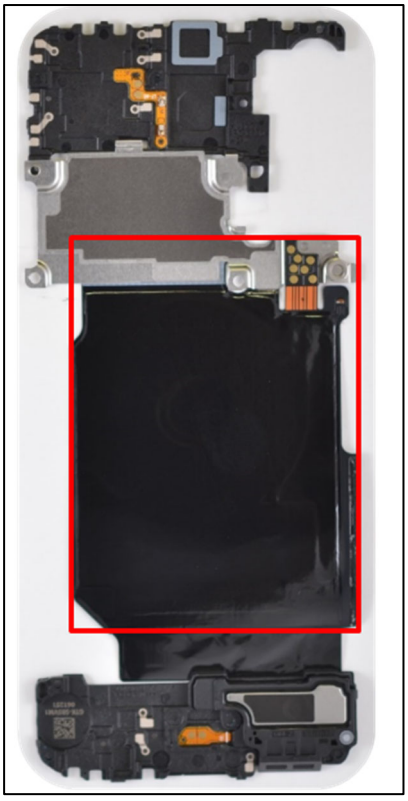
Magnetic Secure Transmission (MST) is a technology that emits a magnetic signal that mimics the magnetic strip on a traditional payment card. MST sends a magnetic signal from your device to the payment terminal's card reader (to emulate swiping a physical card without having to upgrade the terminal's software or hardware). MST technology is accepted at nearly all payment terminals with a card reader. Some payment terminals may require software updates. Simply select a card from Samsung Pay, and transmit the payment information by moving your device within an inch of the payment terminal. Your transaction and payment information will be kept private and secure with the use of tokenization. MST is more secure than using a traditional payment card and is as secure as paying with Near Field Communication (NFC).

https://web.archive.org/web/20181010181540/https://www.samsung.com/us/support/answer/ANS00043865/ (last accessed June 6, 2024).

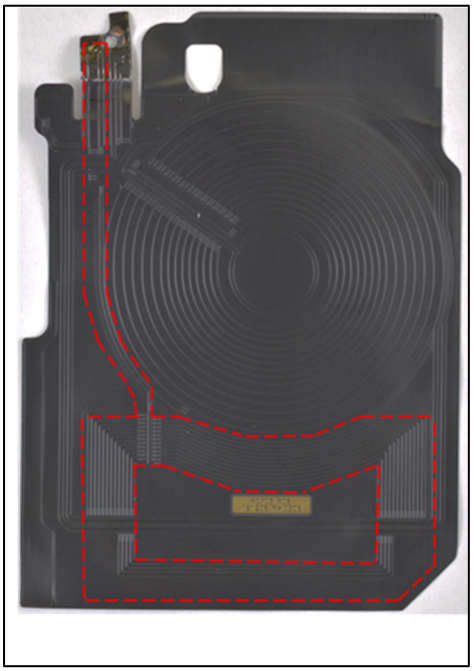
186. The antenna of the Samsung Galaxy S20 5G smartphone is part of the wireless charging coil component depicted below.



Teardown image from Samsung Galaxy S20 5G smartphone (emphasis added).



Teardown image from Samsung Galaxy S20 5G smartphone (emphasis added).



Teardown image from Samsung Galaxy S20 5G smartphone (emphasis added).

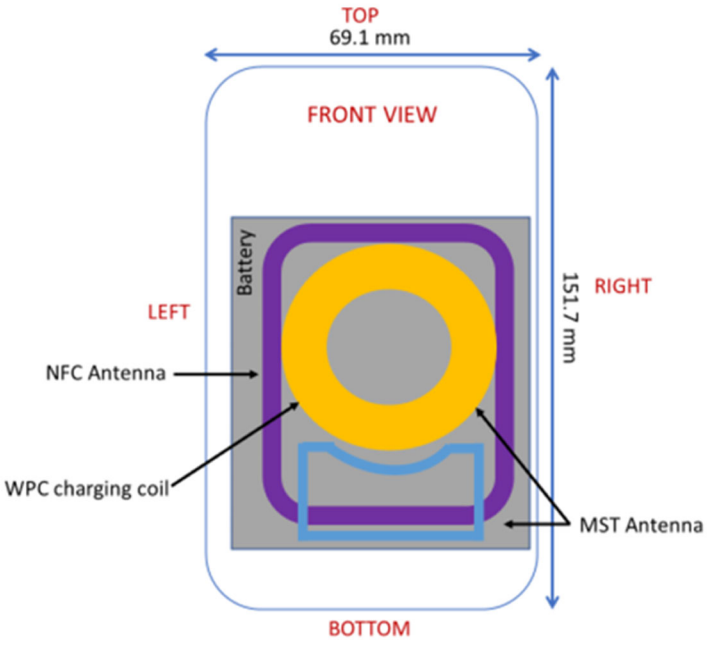
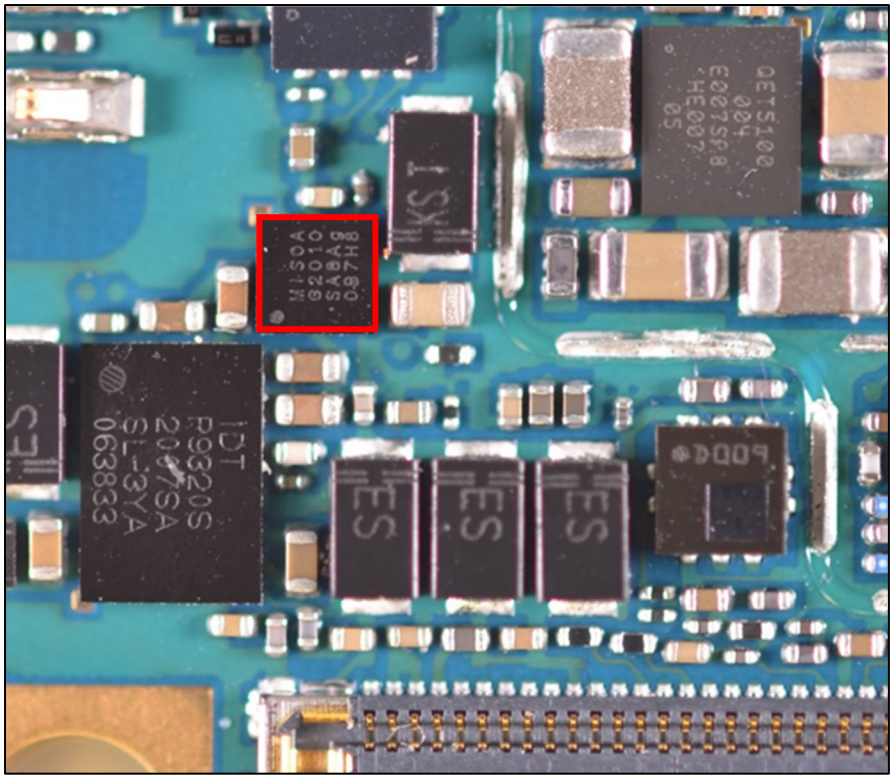


Figure E-2
WPC Charging Coil + NFC/MST Antenna Locations

FCC ID: A3LSMG981U Part-0-1-SAR-Test Report, Appendix E: DUT Antenna Diagram & SAR Test Setup Photographs at 3.

187. Additionally, the Samsung Galaxy S20 5G smartphone includes an MST chip, which provides magnetic secure transmission functionality, enabling MST payment transactions. For example, certain models of the Samsung Galaxy S20 5G smartphone sold in the United States contain a Samsung S2MIS01A MST Driver chip, as shown below.



Teardown image from Samsung Galaxy S20 5G smartphone (emphasis added).

188. The antenna and the Samsung S2MIS01A chip operate to produce a time-varying magnetic field that mimics a swipe of a magnetic card.

What is MST (Magnetic Secure Transmission)?

Magnetic Secure Transmission (MST) is a technology that emits a magnetic signal that mimics the magnetic strip on a traditional payment card. MST sends a magnetic signal from your device to the payment terminal's card reader (to emulate swiping a physical card without having to upgrade the terminal's software or hardware). MST technology is accepted at nearly all payment terminals with a card reader. Some payment terminals may require software updates. Simply select a card from Samsung Pay, and transmit the payment information by moving your device within an inch of the payment terminal. Your transaction and payment information will be kept private and secure with the use of tokenization. MST is more secure than using a traditional payment card and is as secure as paying with Near Field Communication (NFC).

https://web.archive.org/web/20181010181540/https://www.samsung.com/us/support/answer/ANS00043865/ (last accessed June 6, 2024).

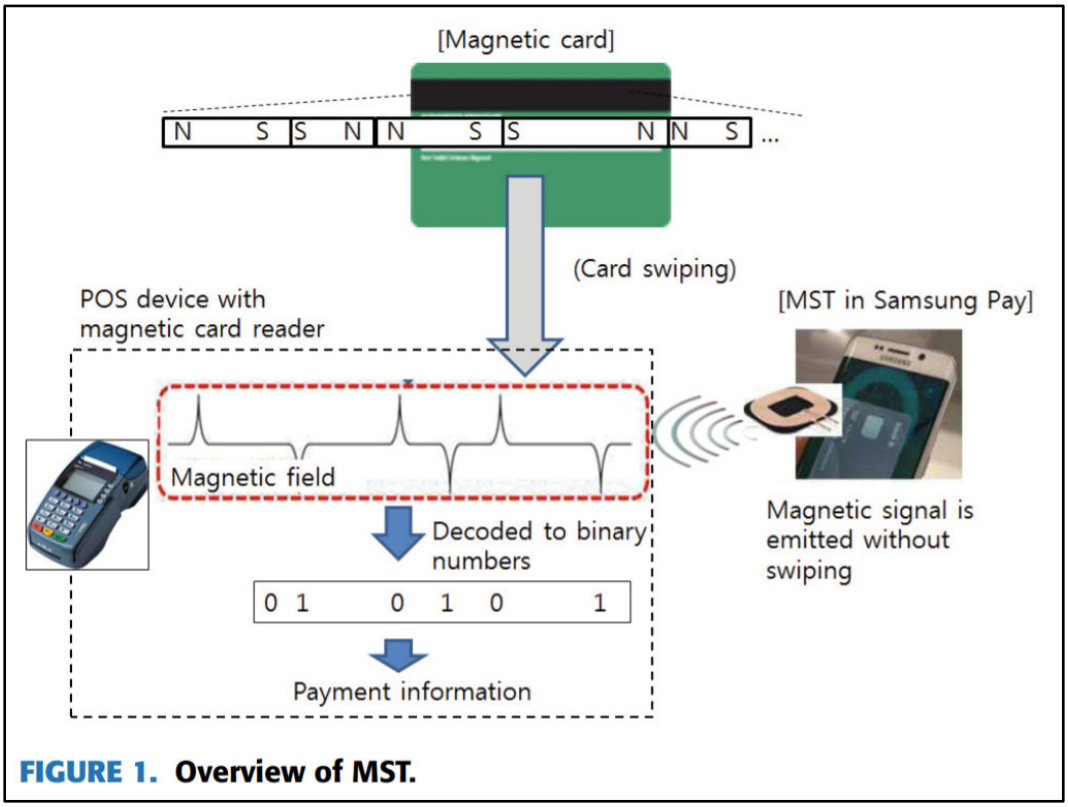
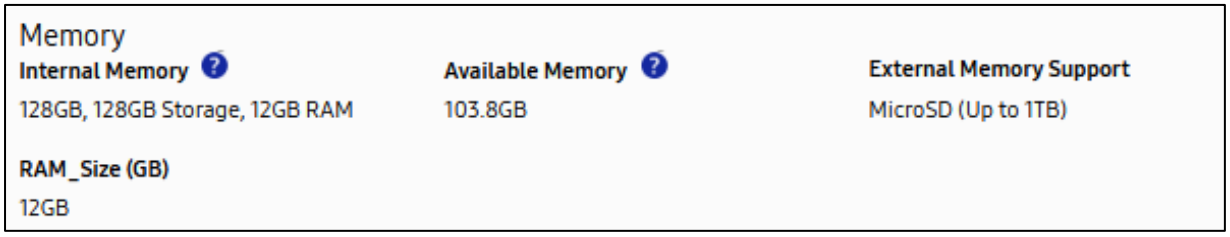


FIGURE 1. Overview of MST.

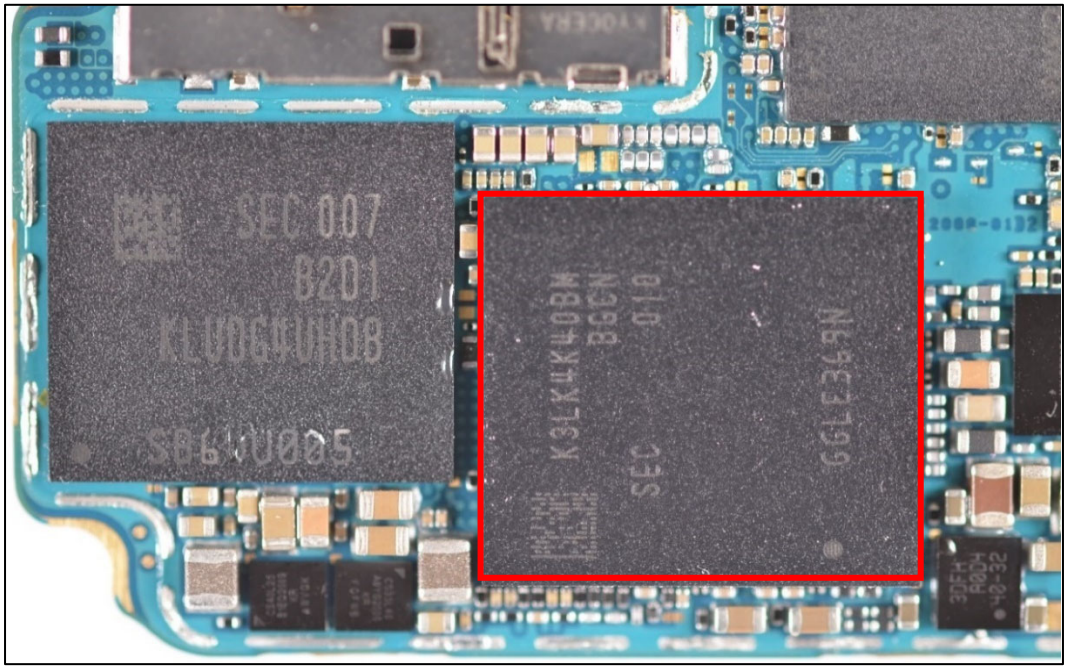
Choi, et al., *Eavesdropping of Magnetic Secure Transmission Signals and its Security Implications for a Mobile Payment Protocol*, IEEE Access vol. 6 (2018).

189. The Samsung Galaxy S20 5G smartphone contains a memory to hold transaction data. As indicated below, the Samsung Galaxy S20 5G smartphone includes internal memory storage as well as random access memory (RAM).



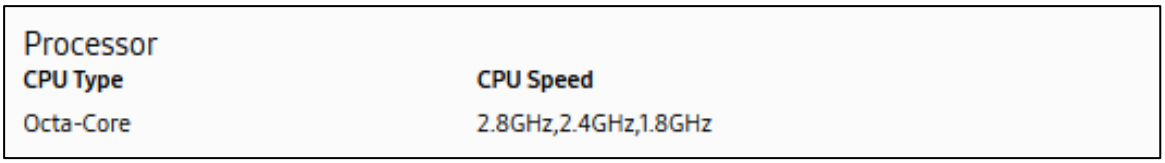
https://www.samsung.com/us/business/support/owners/product/galaxy-s20-5g-unlocked/ (last accessed June 6, 2024).

190. For example, the Samsung Galaxy S20 5G smartphone includes LPDDR5 memory such as the Samsung K3LK4K40BM-BGCN chip, as shown below.



Teardown image from Samsung Galaxy S20 5G smartphone (emphasis added).

191. Additionally, the Samsung Galaxy S20 5G smartphone includes an application processor, i.e., an octa-core processor. For example, certain models of the Samsung Galaxy S20 5G smartphone sold in the United States contain a Qualcomm SM8250 Octa-Core Snapdragon 865 application processor. *See* https://www.qualcomm.com/snapdragon/device-finder/samsung-galaxy-s20-5g. In addition to the discrete LPDDR5 memory chip, the Snapdragon 865 processor necessarily contains on-chip memory stores.

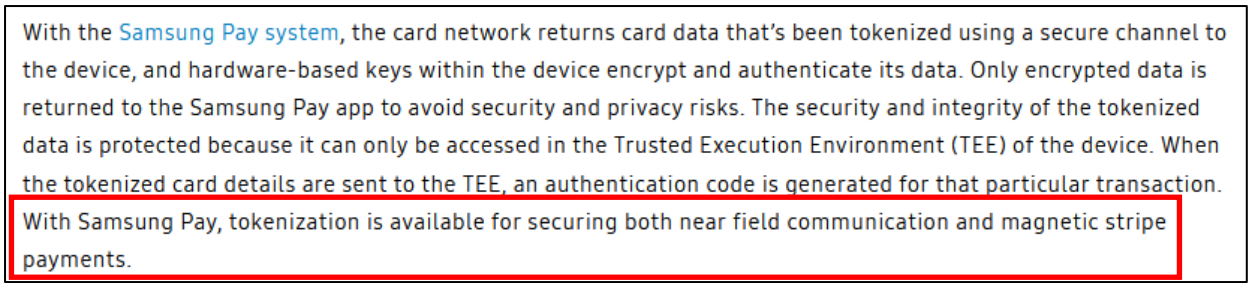


Processor

CPU Type	CPU Speed
Octa-Core	2.8GHz,2.4GHz,1.8GHz

https://www.samsung.com/us/business/support/owners/product/galaxy-s20-5g-unlocked/ (last accessed June 6, 2024).

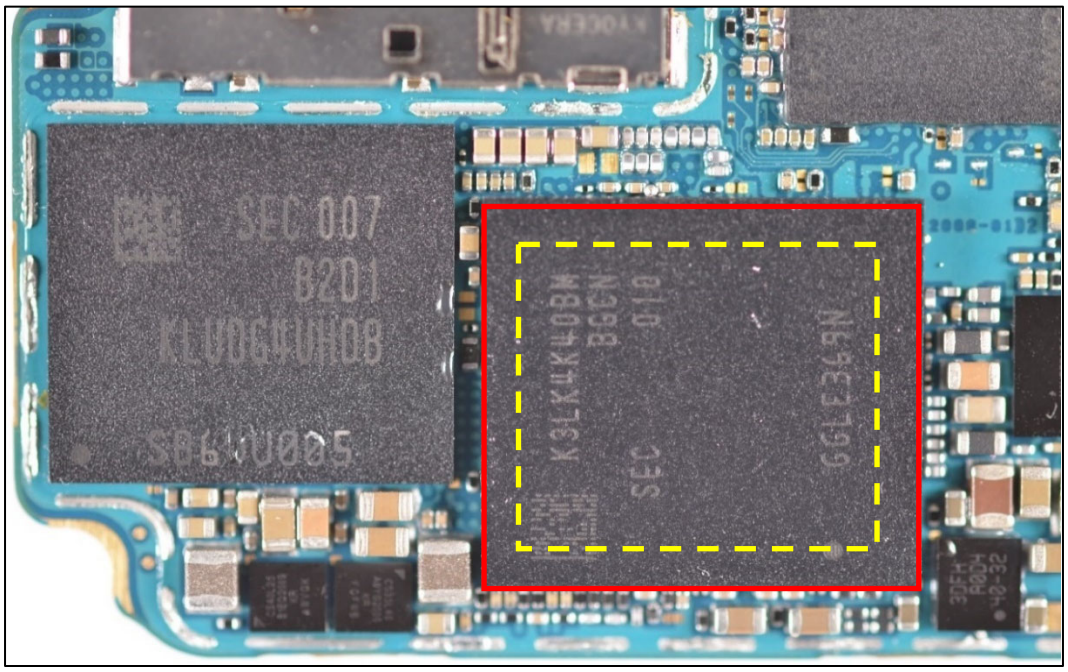
192. When the Samsung Pay application is used to complete a payment transaction via MST transmission, a one-time token associated with the transaction is transmitted by the Samsung Galaxy S20 5G smartphone to a POS device. The Samsung Galaxy S20 5G smartphone therefore necessarily stores this token (transaction data) in memory to send the transmission.



With the Samsung Pay system, the card network returns card data that's been tokenized using a secure channel to the device, and hardware-based keys within the device encrypt and authenticate its data. Only encrypted data is returned to the Samsung Pay app to avoid security and privacy risks. The security and integrity of the tokenized data is protected because it can only be accessed in the Trusted Execution Environment (TEE) of the device. When the tokenized card details are sent to the TEE, an authentication code is generated for that particular transaction. With Samsung Pay, tokenization is available for securing both near field communication and magnetic stripe payments.

https://insights.samsung.com/2016/02/08/advancing-mobile-payment-security-with-tokenization/ (last accessed June 6, 2024) (emphasis added).

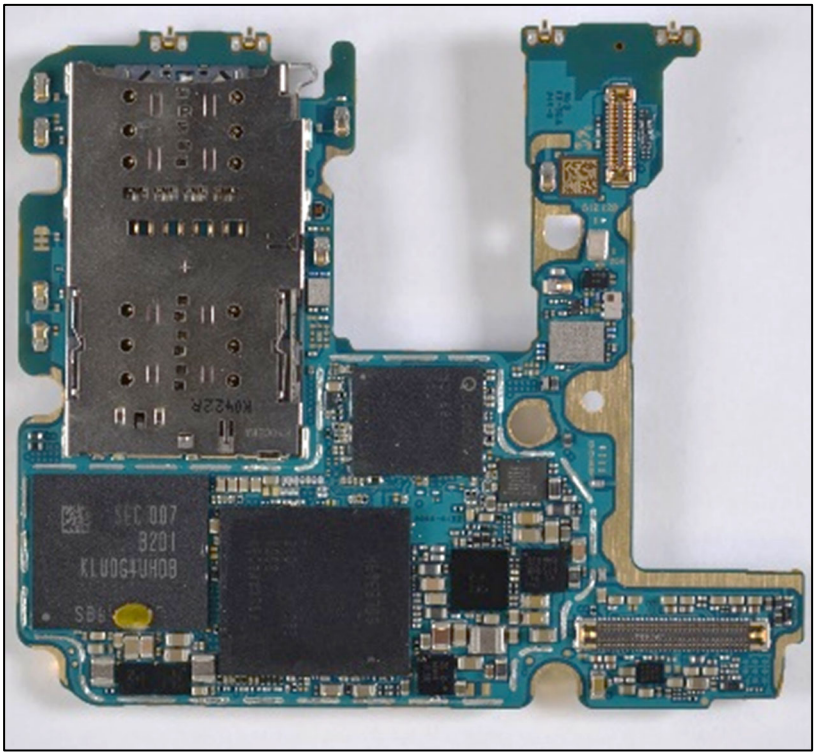
193. The Samsung Galaxy S20 5G smartphone contains a processor coupled to the circuitry to cause the circuitry to produce a time-varying magnetic field that represents the transaction data. As described above, the Samsung Galaxy S20 5G smartphone includes an application processor, i.e., an octa-core processor, such as the Qualcomm SM8250 Octa-Core Snapdragon 865 application processor. The application processor and LPDDR5 memory are configured in a stacked arrangement with the LPDDR5 memory attached to the top surface of the application processor. In the image below, the location of the processor (beneath the memory chip) is designated by a dashed yellow line.



Teardown image from Samsung Galaxy S20 5G smartphone (emphasis added).

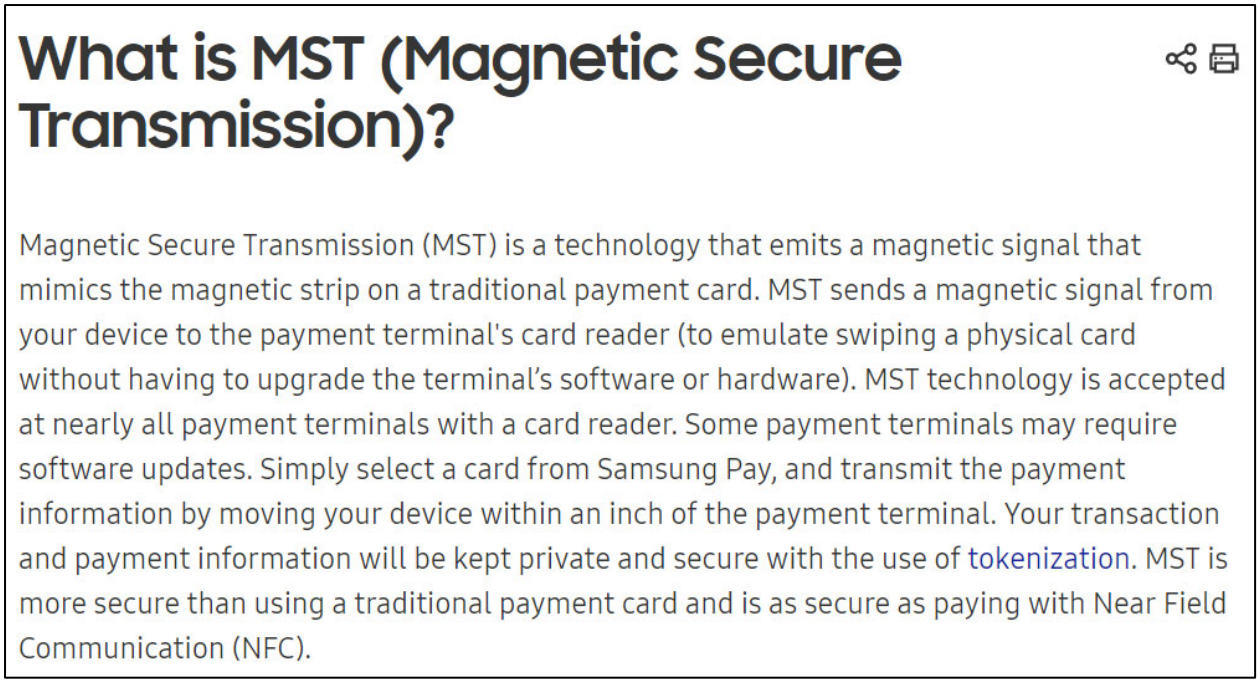
194. The processor is coupled to the Samsung S2MIS01A MST Driver chip and the MST antenna element via traces on the main circuit board. Additionally, the processor may include functional blocks or circuitry that may be contained within the

MST Driver chip.



Teardown image from Samsung Galaxy S20 5G smartphone.

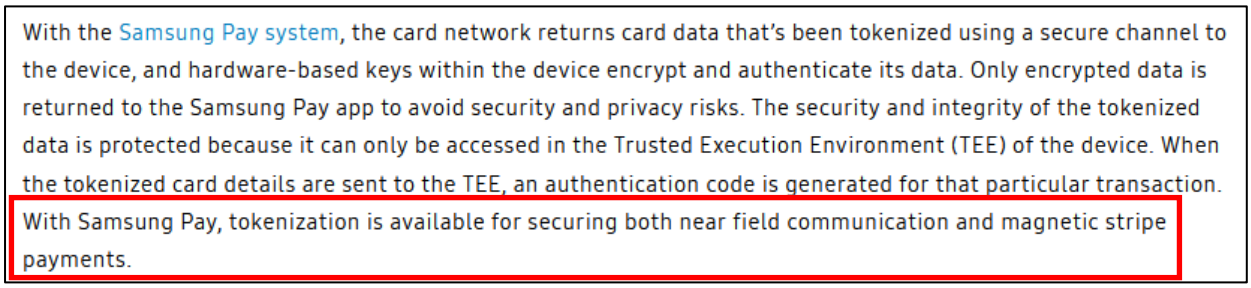
195. The processor of the Samsung Galaxy S20 5G smartphone operates in conjunction with the antenna and the Samsung S2MIS01A MST Driver chip to produce a time-varying magnetic field that represents the transaction data. For example, when the Samsung Pay application is used to complete a payment transaction via MST transmission, a time-varying magnetic field is generated to transmit a one-time token associated with a transaction to a POS device.



What is MST (Magnetic Secure Transmission)?

Magnetic Secure Transmission (MST) is a technology that emits a magnetic signal that mimics the magnetic strip on a traditional payment card. MST sends a magnetic signal from your device to the payment terminal's card reader (to emulate swiping a physical card without having to upgrade the terminal's software or hardware). MST technology is accepted at nearly all payment terminals with a card reader. Some payment terminals may require software updates. Simply select a card from Samsung Pay, and transmit the payment information by moving your device within an inch of the payment terminal. Your transaction and payment information will be kept private and secure with the use of tokenization. MST is more secure than using a traditional payment card and is as secure as paying with Near Field Communication (NFC).

https://web.archive.org/web/20181010181540/https://www.samsung.com/us/support/answer/ANS00043865/ (last accessed June 6, 2024).



With the Samsung Pay system, the card network returns card data that's been tokenized using a secure channel to the device, and hardware-based keys within the device encrypt and authenticate its data. Only encrypted data is returned to the Samsung Pay app to avoid security and privacy risks. The security and integrity of the tokenized data is protected because it can only be accessed in the Trusted Execution Environment (TEE) of the device. When the tokenized card details are sent to the TEE, an authentication code is generated for that particular transaction. With Samsung Pay, tokenization is available for securing both near field communication and magnetic stripe payments.

https://insights.samsung.com/2016/02/08/advancing-mobile-payment-security-with-tokenization/ (last accessed June 6, 2024) (emphasis added).

196. The Accused Instrumentalities directly infringe at least claim 1 of the '156 patent at least in the manner described in paragraphs 184-195 above. Plaintiff's allegations of infringement are not limited to claim 1, and additional infringed claims will be identified and disclosed through discovery and infringement contentions.

197. Defendants have actual notice pursuant to 35 U.S.C. § 287(a) of the '156 patent and the infringement alleged herein at least upon the filing of this Complaint.

iCashe has complied with the notice requirement of 35 U.S.C. § 287. Neither iCashe nor any authorized licensee made, offered for sale, or sold within the United States any article embodying the '156 patent claims following issuance of the '156 patent.

198. Defendants indirectly infringe the '156 patent by actively inducing the direct infringement of others of the '156 patent, in the United States, the State of Texas, and the Eastern District of Texas.

199. Defendants induce, through affirmative acts, their customers and other third parties, such as retailers and end users, to directly infringe the '156 patent by using, offering to sell, selling within the United States, and/or importing into the United States those Accused Instrumentalities, which infringe the '156 patent.

200. On information and belief, Defendants actively promote the Accused Instrumentalities for the U.S. market. For example, on information and belief, for every one of Defendants' Accused Instrumentalities sold in the United States, Defendants pursue and obtain approval from U.S. and state regulatory agencies, such as the United States Federal Communications Commission, to allow sales of such Accused Instrumentalities in the United States.

201. Defendants know that their customers will sell infringing Accused Instrumentalities in the United States or cause Accused Instrumentalities to be sold in the United States, and Defendants specifically intend their customers to purchase those Accused Instrumentalities from Defendants and sell the Accused Instrumentalities in the United States or cause Accused Instrumentalities to be sold in the United States. Defendants' direct and indirect purchasers directly infringe the '156 patent by importing

such Accused Instrumentalities into the United States, selling such Accused Instrumentalities in the United States, and using such Accused Instrumentalities in the United States.

202. Defendants further induce others' direct infringement of the '156 patent by providing instruction and direction to end users, such as consumers, about how to use the Accused Instrumentalities such that those end users use the Accused Instrumentalities and directly infringe the '156 patent. Defendants have knowledge that end users will use Accused Instrumentalities in the manner directed by Defendants and specifically intend that end users will perform such uses in the United States. Such infringing uses occur upon operation of the Accused Instrumentalities in their normal, intended manner without any specific action of the end user other than turning on the product. That is, Defendants have configured the Accused Instrumentalities in such a way as to induce infringement by end users upon any use of those Accused Instrumentalities.

203. Defendants induce others' direct infringement despite actual notice that the Accused Instrumentalities infringe the '156 patent. At least as of the date of filing of this Complaint, Defendants know that the induced conduct would constitute infringement—and intend that infringement at the time of committing the aforementioned affirmative acts, such that the acts and conduct have been and continue to be committed with the specific intent to induce infringement—or deliberately avoided learning of the infringing circumstances at the time of committing these acts so as to be willfully blind to the infringement that was induced.

204. The above-described acts of infringement committed by Defendants have

caused injury and damage to iCashe, and will cause additional severe and irreparable injury and damages in the future.

205. Defendants' acts of infringement as described above are willful, at least as of the date of filing of this Complaint.

206. iCashe is entitled to recover damages sustained as a result of Defendants' wrongful acts in an amount subject to proof at trial, but in no event less than a reasonable royalty.

COUNT VI: INFRINGEMENT OF U.S. PATENT NO. 9,208,423

207. The allegations set forth in paragraphs 1 through 44 of this Complaint are incorporated by reference as though fully set forth herein.

208. Pursuant to 35 U.S.C. § 282, the '423 patent is presumed valid.

209. Defendants have directly infringed and continue to infringe one or more claims of the '423 patent in violation of 35 U.S.C. § 271. The infringing products are the Accused Instrumentalities. The Samsung Galaxy S20 5G smartphone, described below, provides a representative example of Samsung's infringement of the '423 patent.

210. Paragraphs 212-216 describe the manner in which the Accused Instrumentalities infringe claim 1 of the '423 patent, by way of the exemplary Samsung Galaxy S20 5G smartphone.

211. On information and belief, the Accused Instrumentalities are in relevant part substantially similar to the exemplary Samsung Galaxy S20 5G smartphone, in particular with regard to the manner in which the Accused Instrumentalities include and utilize NFC- and/or TVMF-based functionality. Paragraphs 212-216 are thus illustrative

of the manner in which each of the Accused Instrumentalities infringes.

212. The Samsung Galaxy S20 5G smartphone is a mobile phone. Paragraph 184 above is incorporated herein by reference.

213. The Samsung Galaxy S20 5G smartphone comprises circuitry to produce a time-varying magnetic field that mimics the swipe of a magnetic card. For example, the Samsung Galaxy S20 5G smartphone includes an antenna element and a driver chip, such as a Samsung S2MIS01A MST Driver chip, for performing payment transactions using MST transmission. The antenna and the Samsung S2MIS01A chip operate to produce a time-varying magnetic field that mimics a swipe of a magnetic card. Paragraphs 185-188 above are incorporated herein by reference.

214. The Samsung Galaxy S20 5G smartphone contains a processor coupled to the circuitry to cause the circuitry to produce a time-varying magnetic field that represents a single transaction account number. The Samsung Galaxy S20 5G smartphone includes an application processor, such as the Qualcomm SM8250 Octa-Core Snapdragon 865 application processor. Paragraphs 191-194 above are incorporated herein by reference.

215. The processor operates in conjunction with the antenna and the Samsung S2MIS01A MST Driver chip to produce a time-varying magnetic field that represents a single transaction account number. Paragraph 195 above is incorporated herein by reference.

216. For example, when the Samsung Pay application is used to complete a payment transaction via MST transmission, a time-varying magnetic field is generated to

transmit a one-time token associated with the transaction to a POS device. Paragraphs 189-192 above are incorporated herein by reference.

> With the Samsung Pay system, the card network returns card data that's been tokenized using a secure channel to the device, and hardware-based keys within the device encrypt and authenticate its data. Only encrypted data is returned to the Samsung Pay app to avoid security and privacy risks. The security and integrity of the tokenized data is protected because it can only be accessed in the Trusted Execution Environment (TEE) of the device. When the tokenized card details are sent to the TEE, an authentication code is generated for that particular transaction. With Samsung Pay, tokenization is available for securing both near field communication and magnetic stripe payments.

https://insights.samsung.com/2016/02/08/advancing-mobile-payment-security-with-tokenization/ (last accessed June 6, 2024) (emphasis added).

217. The Accused Instrumentalities directly infringe at least claim 1 of the '423 patent at least in the manner described in paragraphs 212-216 above. Plaintiff's allegations of infringement are not limited to claim 1, and additional infringed claims will be identified and disclosed through discovery and infringement contentions.

218. Defendants have actual notice pursuant to 35 U.S.C. § 287(a) of the '423 patent and the infringement alleged herein at least upon the filing of this Complaint. iCashe has complied with the notice requirement of 35 U.S.C. § 287. Neither iCashe nor any authorized licensee made, offered for sale, or sold within the United States any article embodying the '423 patent claims following issuance of the '423 patent.

219. Defendants indirectly infringe the '423 patent by actively inducing the direct infringement of others of the '423 patent, in the United States, the State of Texas, and the Eastern District of Texas.

220. Defendants induce, through affirmative acts, their customers and other third parties, such as retailers and end users, to directly infringe the '423 patent by using,

offering to sell, selling within the United States, and/or importing into the United States those Accused Instrumentalities, which infringe the '423 patent.

221. On information and belief, Defendants actively promote the Accused Instrumentalities for the U.S. market. For example, on information and belief, for every one of Defendants' Accused Instrumentalities sold in the United States, Defendants pursue and obtain approval from U.S. and state regulatory agencies, such as the United States Federal Communications Commission, to allow sales of such Accused Instrumentalities in the United States.

222. Defendants know that their customers will sell infringing Accused Instrumentalities in the United States or cause Accused Instrumentalities to be sold in the United States, and Defendants specifically intend their customers to purchase those Accused Instrumentalities from Defendants and sell the Accused Instrumentalities in the United States or cause Accused Instrumentalities to be sold in the United States. Defendants' direct and indirect purchasers directly infringe the '423 patent by importing such Accused Instrumentalities into the United States, selling such Accused Instrumentalities in the United States, and using such Accused Instrumentalities in the United States.

223. Defendants further induce others' direct infringement of the '423 patent by providing instruction and direction to end users, such as consumers, about how to use the Accused Instrumentalities such that those end users use the Accused Instrumentalities and directly infringe the '423 patent. Defendants have knowledge that end users will use Accused Instrumentalities in the manner directed by Defendants and specifically intend

that end users will perform such uses in the United States. Such infringing uses occur upon operation of the Accused Instrumentalities in their normal, intended manner without any specific action of the end user other than turning on the product. That is, Defendants have configured the Accused Instrumentalities in such a way as to induce infringement by end users upon any use of those Accused Instrumentalities.

224. Defendants induce others' direct infringement despite actual notice that the Accused Instrumentalities infringe the '423 patent. At least as of the date of filing of this Complaint, Defendants know that the induced conduct would constitute infringement—and intend that infringement at the time of committing the aforementioned affirmative acts, such that the acts and conduct have been and continue to be committed with the specific intent to induce infringement—or deliberately avoided learning of the infringing circumstances at the time of committing these acts so as to be willfully blind to the infringement that was induced.

225. The above-described acts of infringement committed by Defendants have caused injury and damage to iCashe, and will cause additional severe and irreparable injury and damages in the future.

226. Defendants' acts of infringement as described above are willful, at least as of the date of filing of this Complaint.

227. iCashe is entitled to recover damages sustained as a result of Defendants' wrongful acts in an amount subject to proof at trial, but in no event less than a reasonable royalty.

COUNT VII: INFRINGEMENT OF U.S. PATENT NO. 11,270,174

228. The allegations set forth in paragraphs 1 through 44 of this Complaint are incorporated by reference as though fully set forth herein.

229. Pursuant to 35 U.S.C. § 282, the '174 patent is presumed valid.

230. Defendants have directly infringed and continue to infringe one or more claims of the '174 patent in violation of 35 U.S.C. § 271. The infringing products are the Accused Instrumentalities. The Samsung Galaxy S21 5G smartphone, described below, provides a representative example of Samsung's infringement of the '174 patent.

231. Paragraphs 233-250 describe the manner in which the Accused Instrumentalities infringe claim 1 of the '174 patent, by way of the exemplary Samsung Galaxy S21 5G smartphone.

232. On information and belief, the Accused Instrumentalities are in relevant part substantially similar to the exemplary Samsung Galaxy S21 5G smartphone, in particular with regard to the manner in which the Accused Instrumentalities include and utilize NFC- and/or TVMF-based functionality. Paragraphs 233-250 are thus illustrative of the manner in which each of the Accused Instrumentalities infringes.

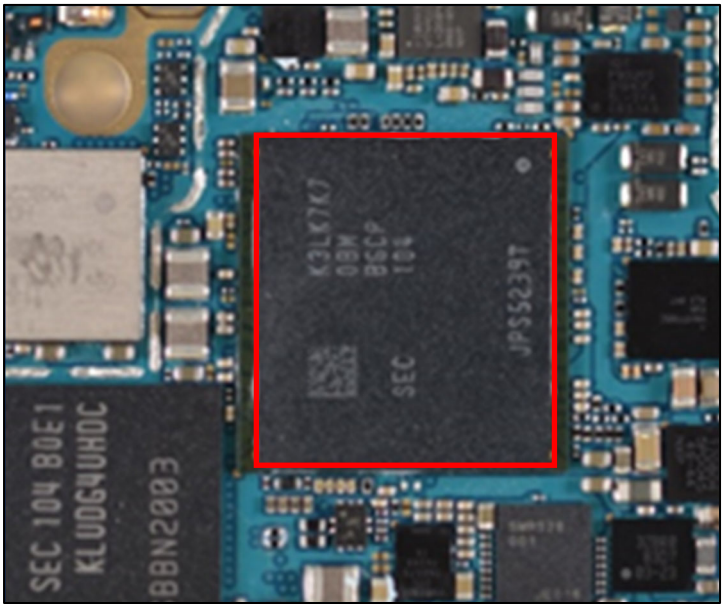
233. The Samsung Galaxy S21 5G smartphone is a mobile phone. Paragraph 50 above is incorporated herein by reference.

234. The Samsung Galaxy S21 5G smartphone contains a memory to hold transaction data for use in a plurality of transactions. In particular, the Samsung Galaxy S21 5G smartphone includes an internal memory storage as well as random access memory (RAM).

Memory		
Internal Memory	**Available Memory**	**RAM_Size (GB)**
128GB, 256GB	101.2GB, 219.5GB	8GB

https://www.samsung.com/us/business/support/owners/product/galaxy-s21-5g-unlocked/ (last accessed June 6, 2024).

235. For example, the Samsung Galaxy S21 5G smartphone includes LPDDR5 memory such as the Samsung K3LK7K70BM-BGCP chip, shown below.



Teardown image from Samsung Galaxy S21 5G smartphone (emphasis added).

236. Additionally, the Samsung Galaxy S21 5G smartphone includes an application processor, such as an octa-core processor, such as a Qualcomm SM8350 Octa-Core Snapdragon 888 application processor. *See* https://www.qualcomm.com/snapdragon/device-finder/samsung-galaxy-s21-5g. In addition to the discrete LPDDR5 memory chip, the Snapdragon 888 processor necessarily contains on-chip memory stores (e.g., cache, register banks, etc.).

Processor	
CPU Type	**CPU Speed**
Octa-Core	2.84GHz,2.4GHz,1.8GHz

https://www.samsung.com/us/business/support/owners/product/galaxy-s21-5g-unlocked/ (last accessed June 6, 2024).

237. The Samsung Pay application stores an encrypted version of a card number that is sent to POS devices during Samsung Pay transactions. The Samsung Galaxy S21 5G smartphone therefore necessarily stores this encrypted data (transaction data) in memory to send the transmission. Samsung Pay may be used to complete a plurality of transactions.

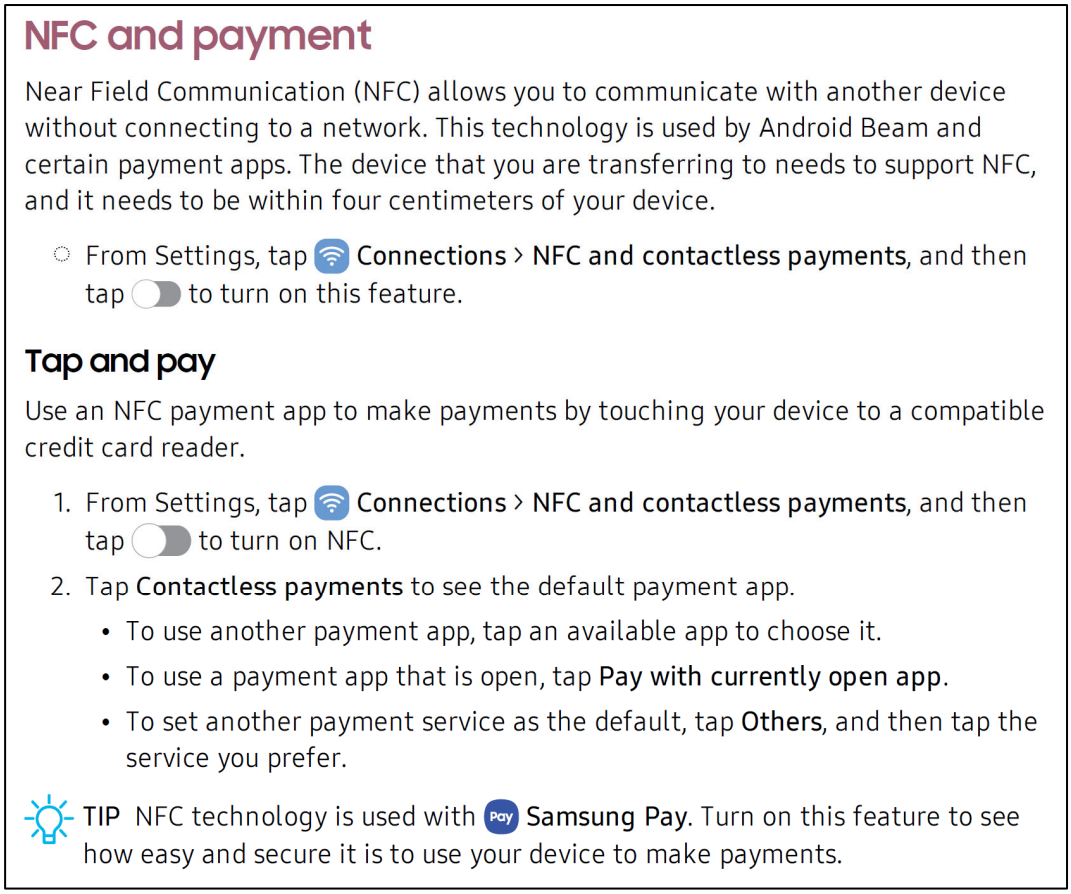
Is my credit or debit card number actually stored on my device?

No. The card information is encrypted and sent to the Samsung Pay server for processing with the payment card network's (i.e., Visa, MasterCard, or American Express) tokenization server. After processing, a token is assigned to your device, and this token is used in place of the card number. When you process a payment, this token along with other transactional information is sent to the payment terminal. Your card number is not part of this data. The terminal processing the payment does not receive your card number as part of the transaction.

Is my credit or debit card number actually stored on the Samsung Pay server?

No. The card number is encrypted and passed to the payment card network's (i.e., Visa, MasterCard, or American Express) tokenization server. After processing, a token is assigned to your device, and this token is used in place of the card number. This token information is stored on the Samsung Pay server and a copy is stored on your device. Your card number is not kept on the Samsung Pay server.

https://www.samsung.com/us/support/answer/ANS00078533/ (last accessed June 6, 2024) (emphasis added).



NFC and payment

Near Field Communication (NFC) allows you to communicate with another device without connecting to a network. This technology is used by Android Beam and certain payment apps. The device that you are transferring to needs to support NFC, and it needs to be within four centimeters of your device.

- From Settings, tap **Connections** > **NFC and contactless payments**, and then tap to turn on this feature.

Tap and pay

Use an NFC payment app to make payments by touching your device to a compatible credit card reader.

1. From Settings, tap **Connections** > **NFC and contactless payments**, and then tap to turn on NFC.
2. Tap **Contactless payments** to see the default payment app.
   - To use another payment app, tap an available app to choose it.
   - To use a payment app that is open, tap **Pay with currently open app**.
   - To set another payment service as the default, tap **Others**, and then tap the service you prefer.

TIP NFC technology is used with **Samsung Pay**. Turn on this feature to see how easy and secure it is to use your device to make payments.

Galaxy S21 User Manual at 118.

238. The Samsung Galaxy S21 5G smartphone contains a current carrying conductor capable of producing a time-varying magnetic field that represents the transaction data in the plurality of transactions. The Samsung Galaxy S21 5G smartphone contains an antenna, i.e., a current carrying conductor, used to transmit and receive NFC information and transaction sequences. The antenna is tuned to operate at 13.56 MHz. Paragraphs 63-64 above are incorporated herein by reference.

239. Additionally, at least certain models of the Samsung Galaxy S21 5G smartphone sold in the United States contain the NXP SN110U. The NXP SN110U chip provides near-field communications functionality, enabling NFC payment

transactions, such as for completing Samsung Pay transactions. Paragraphs 51-57 above are incorporated herein by reference.

240. Although certain information regarding the functionality or functional blocks of the SN1xx family devices is not publicly available, NXP has published detailed information about the functionality and functional blocks of other NXP NFC chips, including the PN7150. On information and belief and as detailed below, the PN7150 chip contains certain functional blocks and interfaces that are similar to some of the relevant functional blocks and interfaces of the NXP SN110U chip and surrounding circuitry in the Samsung Galaxy S21 5G smartphone. Paragraphs 58-62 above are incorporated herein by reference.

241. The antenna of the Samsung Galaxy S21 5G smartphone operates in conjunction with the NXP SN110U chip to produce a time-varying magnetic field. The NFC antenna includes a current-carrying conductor that produces a time-varying magnetic field, by producing a 13.56 MHz varying magnetic signal (modulation). The signal transmitted over the antenna is modulated and driven by circuitry of the NXP SN110U chip. The time-varying magnetic field produced by the antenna represents the transaction data in the plurality of transactions. Paragraphs 70-76 above are incorporated herein by reference.

ALM Mode (SINGLE):

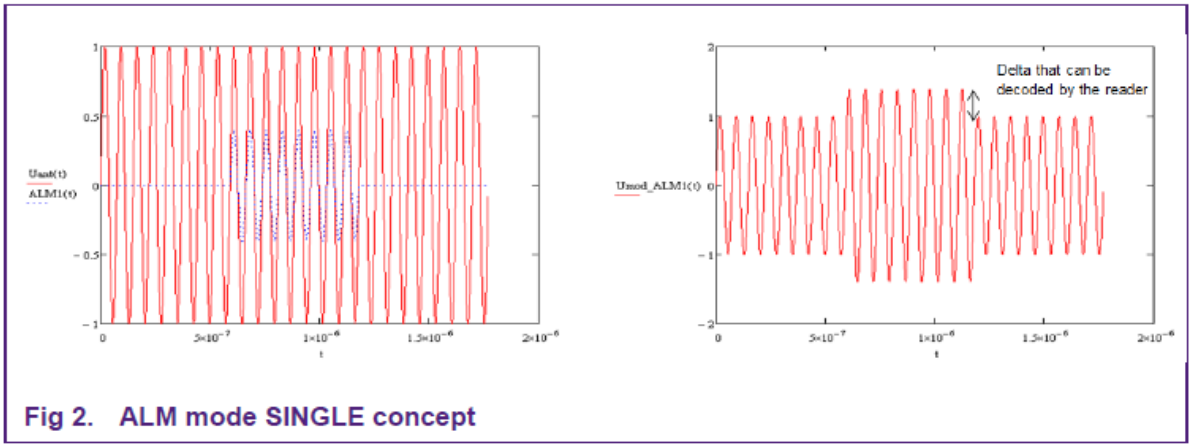


Fig 2. ALM mode SINGLE concept

On the left graph the red 13.56MHz signal shows the voltage at the NFC antenna which is induced by the reader field, the blue curve shows the modulation pattern. This modulation pattern is generated by actively driving 13.56MHz with TX1 or TX2 while the other TX pin (TX2 or TX1) is kept silent.

On the right we can see the modulated reader field.

PN7150 Antenna Design and Matching Guide at 5.

ALM Mode (DUAL):

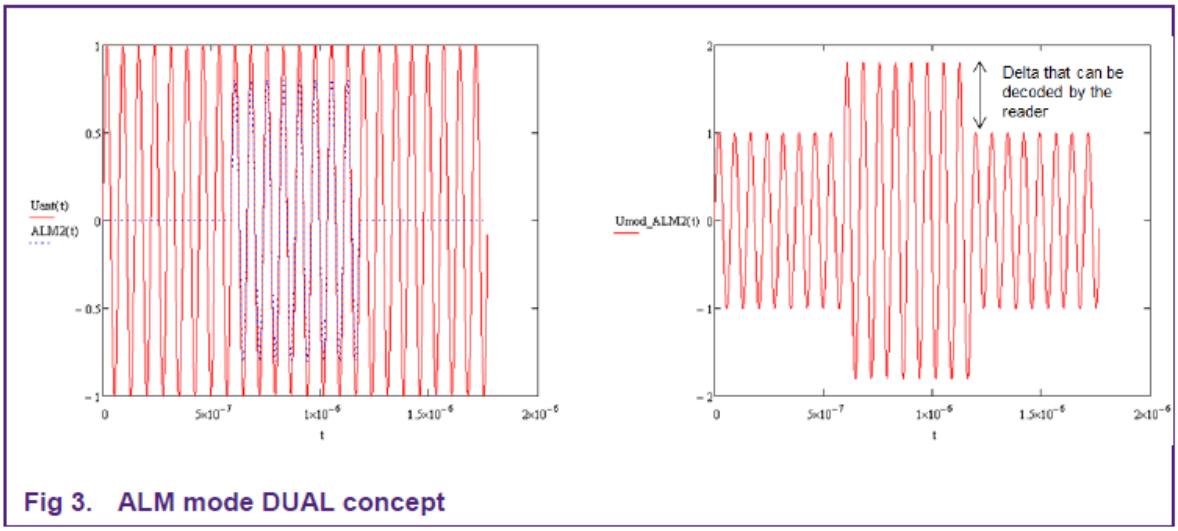
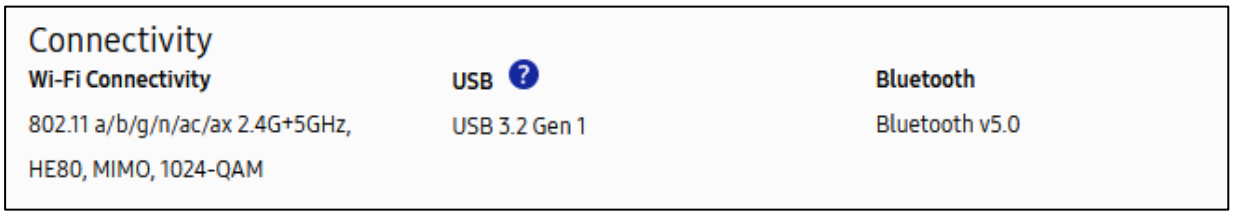


Fig 3. ALM mode DUAL concept

In this mode the modulation pattern is generated by actively driving 13.56MHz with TX1 and TX2. The modulation depth observed is twice the modulation depth of mode 1.

PN7150 Antenna Design and Matching Guide at 5.

242. The Samsung Galaxy S21 5G smartphone contains a network interface for connecting the mobile phone to a network, wherein one or more parts of the transaction data are downloadable to the mobile phone via the network. For example, the Samsung Galaxy S21 5G smartphone has an interface for Wi-Fi network connectivity.



https://www.samsung.com/us/business/support/owners/product/galaxy-s21-5g-unlocked/ (last accessed June 6, 2024).

243. The Samsung Galaxy S21 5G smartphone also includes an interface for cellular network connectivity.

Network		
2G GSM GSM850,GSM900,DCS1800,PCS1900	**2G CDMA** CDMA800,USPCS1900	**3G UMTS** B1(2100),B2(1900),B4(AWS),B5(850),B8(900)
3G CDMA BC0(800),BC1(1900),BC10(800)	**4G FDD LTE** B1(2100),B2(1900),B3(1800),B4(AWS),B5(850),B7(2600),B8(900),B12(700),B13(700),B14(700),B18(800),B19(800),B20(800),B25(1900),B26(850),B28(700),B30(2300),B66(AWS-3),B71(600)	**4G TDD LTE** B38(2600),B39(1900),B40(2300),B41(2500),B46(5200),B48(3600)

https://www.samsung.com/us/business/support/owners/product/galaxy-s21-5g-unlocked/ (last accessed June 6, 2024).

244. Through this network connectivity, one or more parts of the transaction data are downloadable to the mobile phone via the network. For example, the Samsung Pay Application or Samsung Wallet Application may be used to download transaction data, such as card information, to the mobile phone via the network. An example of a request for updated card information is shown below.

Get Card Data

Returns the detailed information of the requested card.

Request

Type	Value			Description
Method	GET			
URL	{Partner server URL}/cards/{Card Id}/{refId}?fields={fields}			
Headers	Authorization	String (1024)	Required	Credential token. The token can have prefix "Bearer" as an authorization type, e.g., Bearer <credentials>. * Refer to ***Authorization Token*** for more details.
	x-request-id	String (32)	Required	Request identifier. Randomly generated UUID string.
Path Parameters	Card Id	String (32)	Required	Wallet card identifier. * Refer to ***"Add to Wallet" Interfaces*** for more details.
	refId	String (32)	Required	Unique content identifier defined by the content provider
Query Parameter	fields	String(128)	Optional	Attributes which intended to retrieve. Can be specified using commas(,) as separators. * Refer to balance,barcode.
Payload	N/A			
Example	GET /cards/12584806754/ref-20230304-0003			

https://developer.samsung.com/wallet/api/server-interaction.html (last accessed June 6, 2024).

245. The Samsung Galaxy S21 5G smartphone contains a driver to excite the current carrying conductor. The NXP SN110U chip, which was designed for ALM, contains a driver for driving the antenna. On information and belief, the NXP SN110U chip contains functional blocks and circuitry within the embedded NFC controller that correspond to the active load modulation circuitry shown and described with respect to the PN7150. Paragraphs 70-74 above are incorporated herein by reference.

246. Further, testing of the Samsung Galaxy S21 5G smartphone confirms that

the Samsung Galaxy S21 5G smartphone uses ALM functionality of the NXP SN110U chip for actively transmitting modulated data to an NFC reader. Paragraphs 75-76 above are incorporated herein by reference.

247. The Samsung Galaxy S21 5G smartphone contains a processor coupled to control the driver. The NXP SN110U chip is and/or contains a processor coupled to control the driver. Specifically, on information and belief, the NXP SN110U chip contains circuitry and functional blocks within the embedded NFC controller that correspond to certain circuitry and functional blocks within the CIU of the PN7150. The CIU includes a transmitter control block, TxCtrl, coupled to drive the modulated signal.

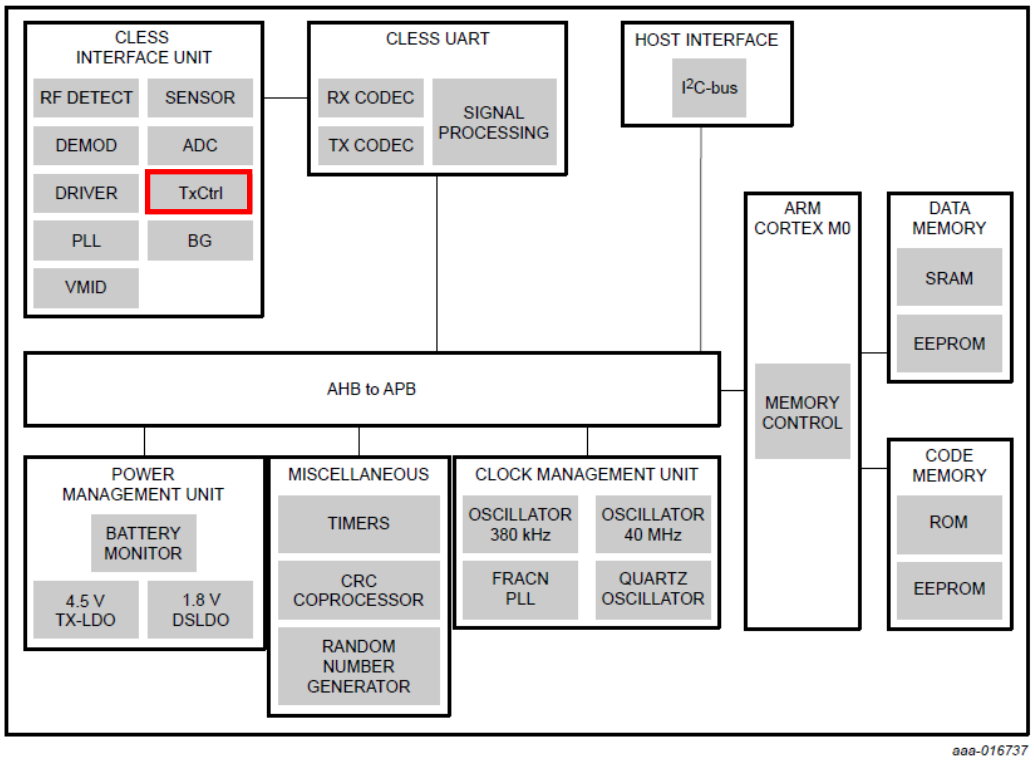


Fig 3. PN7150 block diagram

PN7150 Data Sheet at 10 (emphasis added).

248. Further, the NXP SN110U includes a microcontroller, i.e., a processor, which may include the embedded secure element, and which controls the SN110U chip, as shown below with respect to the PN7150 (ARM Cortex M0). The microcontroller is also a processor coupled to control the driver.

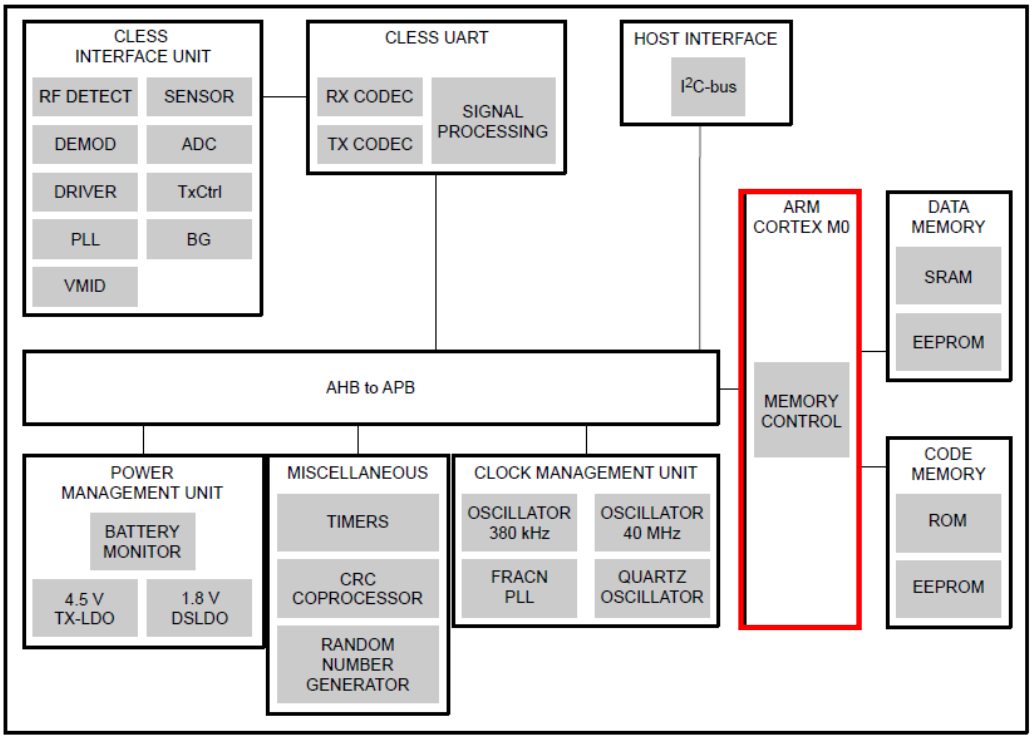


Fig 3. PN7150 block diagram

PN7150 Data Sheet at 10 (emphasis added).

249. Additionally, the Samsung Galaxy S21 5G smartphone includes an application processor, i.e., an octa-core processor such as a Qualcomm SM8350 Octa-Core Snapdragon 888 application processor. In addition to the discrete LPDDR5 memory chip, the Snapdragon 888 processor necessarily contains on-chip memory stores (e.g., cache, register banks, etc.).

Processor	
CPU Type	**CPU Speed**
Octa-Core	2.84GHz,2.4GHz,1.8GHz

https://www.samsung.com/us/business/support/owners/product/galaxy-s21-5g-unlocked/ (last accessed June 6, 2024).

250. The application processor of the Samsung Galaxy S21 5G smartphone is also a processor coupled to control the driver. The application processor is necessarily coupled to the NXP SN110U chip via traces on the main circuit board to the SN110U's UART/I2C and/or SPI interfaces.

251. The Accused Instrumentalities directly infringe at least claim 1 of the '174 patent at least in the manner described in paragraphs 233-250 above. Plaintiff's allegations of infringement are not limited to claim 1, and additional infringed claims will be identified and disclosed through discovery and infringement contentions.

252. Defendants have actual notice pursuant to 35 U.S.C. § 287(a) of the '174 patent and the infringement alleged herein at least upon the filing of this Complaint. iCashe has complied with the notice requirement of 35 U.S.C. § 287. Neither iCashe nor any authorized licensee made, offered for sale, or sold within the United States any article embodying the '174 patent claims following issuance of the '174 patent.

253. Defendants indirectly infringe the '174 patent by actively inducing the direct infringement of others of the '174 patent, in the United States, the State of Texas, and the Eastern District of Texas.

254. Defendants induce, through affirmative acts, their customers and other third parties, such as retailers and end users, to directly infringe the '174 patent by using,

offering to sell, selling within the United States, and/or importing into the United States those Accused Instrumentalities, which infringe the '174 patent.

255. On information and belief, Defendants actively promote the Accused Instrumentalities for the U.S. market. For example, on information and belief, for every one of Defendants' Accused Instrumentalities sold in the United States, Defendants pursue and obtain approval from U.S. and state regulatory agencies, such as the United States Federal Communications Commission, to allow sales of such Accused Instrumentalities in the United States.

256. Defendants know that their customers will sell infringing Accused Instrumentalities in the United States or cause Accused Instrumentalities to be sold in the United States, and Defendants specifically intend their customers to purchase those Accused Instrumentalities from Defendants and sell the Accused Instrumentalities in the United States or cause Accused Instrumentalities to be sold in the United States. Defendants' direct and indirect purchasers directly infringe the '174 patent by importing such Accused Instrumentalities into the United States, selling such Accused Instrumentalities in the United States, and using such Accused Instrumentalities in the United States.

257. Defendants further induce others' direct infringement of the '174 patent by providing instruction and direction to end users, such as consumers, about how to use the Accused Instrumentalities such that those end users use the Accused Instrumentalities and directly infringe the '174 patent. Defendants have knowledge that end users will use Accused Instrumentalities in the manner directed by Defendants and specifically intend

that end users will perform such uses in the United States. Such infringing uses occur upon operation of the Accused Instrumentalities in their normal, intended manner without any specific action of the end user other than turning on the product. That is, Defendants have configured the Accused Instrumentalities in such a way as to induce infringement by end users upon any use of those Accused Instrumentalities.

258. Defendants induce others' direct infringement despite actual notice that the Accused Instrumentalities infringe the '174 patent. At least as of the date of filing of this Complaint, Defendants know that the induced conduct would constitute infringement—and intend that infringement at the time of committing the aforementioned affirmative acts, such that the acts and conduct have been and continue to be committed with the specific intent to induce infringement—or deliberately avoided learning of the infringing circumstances at the time of committing these acts so as to be willfully blind to the infringement that was induced.

259. The above-described acts of infringement committed by Defendants have caused injury and damage to iCashe, and will cause additional severe and irreparable injury and damages in the future.

260. Defendants' acts of infringement as described above are willful, at least as of the date of filing of this Complaint.

261. iCashe is entitled to recover damages sustained as a result of Defendants' wrongful acts in an amount subject to proof at trial, but in no event less than a reasonable royalty.

JURY TRIAL DEMANDED

iCashe, Inc., hereby demands a trial by jury on all claims and issues so triable.

PRAYER FOR RELIEF

WHEREFORE, Plaintiff iCashe respectfully requests that this Court:

A. Enter judgment that each of the Defendants has infringed one or more claims of each of the iCashe Patents and continues to infringe those claims, and that such infringement is willful;

B. Enter an order, pursuant to 35 U.S.C. § 284, awarding to Plaintiff iCashe monetary relief in an amount adequate to compensate for Defendants' infringement of the iCashe Patents, in an amount to be determined at trial, but not less than a reasonable royalty, as well as pre- and post-judgment interest and costs and enhanced damages for Defendants' willful infringement of the iCashe Patents;

C. Enter an order that Defendants pay to Plaintiff iCashe ongoing royalties in an amount to be determined for any infringement occurring after the date that judgment is entered;

D. Enter an order, pursuant to 35 U.S.C. § 285, declaring this to be an exceptional case and thereby awarding to Plaintiff iCashe its reasonable attorneys' fees; and

E. Enter an order awarding to Plaintiff iCashe such other and further relief, whether at law or in equity, that this Court seems just, equitable, and proper.

Dated: June 6, 2024

Respectfully submitted,

By: */s/ Aaron R. Fahrenkrog w/permission Andrea L. Fair*

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