

CITY OF NEW YORK OFFICE OF THE COMPTROLLER SCOTT M. STRINGER

MARJORIE LANDA
DEPUTY COMPTROLLER FOR
AUDIT

BUREAU OF AUDIT

December 22, 2016

By Electronic Mail

Thomas F. Prendergast Chairman and Chief Executive Officer Metropolitan Transportation Authority 2 Broadway New York, NY 10004

Re: Letter Audit Report on Phase III of the Wireless Voice and Data Service in New

York City's Subway System as Provided by Transit Wireless

(Audit Number SZ17-095AL)

Dear Chairman Prendergast:

This Letter Report contains the findings of our audit of the Wireless Voice and Data Service in New York City's Subway System as provided by Transit Wireless ("TW"). The audit's objective was to determine whether the wireless voice and data communication system installed by TW within certain New York City subway stations (including platforms, mezzanines and various points within public access passageways) operates effectively. This audit is the third in a series of audits of the ongoing installation of cellular and wireless services in the New York City subway system. We found that the wireless voice and data communications system installed in the 38 Phase III underground Manhattan subway stations we tested operates as intended. In addition, we found that *Subway Reads*, which is a partnership between the Metropolitan Transportation Authority ("MTA") New York City Transit ("NYCT"), TW and Penguin Random House, that brings free electronic books through free wireless internet services to the underground subway system, also works as planned.

Background

In 2007, following a request for proposals process, the MTA's Board awarded a license agreement to TW that granted an exclusive license to provide commercial cellular/PCS and Wi-Fi service in 277 underground subway stations. Under the agreement, TW acts as a neutral host, constructing the distributed antenna system within the stations (excluding the tunnels between stations) and sub-licenses rights to use that system to cellular carriers, Wi-Fi providers, and other network users.

TW installs equipment and antennas at each underground station to provide cellular and Wi-Fi coverage throughout public areas. The in-station equipment and antennas are linked by

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fiber optic cables to TW trunk fiber optic cables, which run through the streets and connect back to a "base station hotel" or hub that houses the "head-end" equipment for TW, the cellular carriers, Wi-Fi providers, and NYCT.

In addition, in August 2016, MTA, NYCT and TW joined with Penguin Random House to begin *Subway Reads*, a service that allows subway riders access to five free full-length e-short stories and excerpts from a minimum of 175 full-length e-books from the publisher in categories such as fiction, non-fiction, sci-fi and fantasy, and young adults and children for periods of 10, 20, or 30 minutes each, as chosen by the rider. The subway rider also has the ability to purchase an e-book in its entirety through this service.

TW installed the wireless network in 47 underground subway stations in Manhattan as part of Phase I (previous Audit Number SZ15-062AL), including major station complexes such as Times Square and Grand Central, 29 stations in Queens as part of Phase II (previous Audit Number SZ16-086AL), and more recently in 38 additional Manhattan stations as part of Phase III (the subject of this audit). Phase IV is underway and includes stations located in Manhattan and the Bronx. TW is contractually required to have all 277 underground stations in New York City in service by the end of 2017.

Conclusion

We found that the wireless voice and data communication system currently installed by TW within the 38 Phase III subway stations we tested (including platforms, mezzanines and various points within public access passageways) operates as intended. In addition, on October14, 2016, October 18, 2016, October 19, 2016, October 20, 2016, October 28, 2016, and November 5, 2016, we revisited the 76 stations tested in Phases I and II and found that they remain operational and that there was an immediate Wi-Fi connection in each such station. Further, we were able to download e-books from the Penguin Random House site at the appropriate stations. We recommend that the MTA, NYCT and TW continue their current plan to provide voice and data service to the remaining 163 underground New York City subway stations.

Scope and Methodology

We conducted this performance audit in accordance with generally accepted government auditing standards ("GAGAS"). Those standards require that we plan and perform the audit to obtain sufficient, appropriate evidence to provide a reasonable basis for our findings and conclusions based on our audit objectives. We believe that the evidence obtained provides a reasonable basis for our findings and conclusions based on our audit objectives. This audit was conducted in accordance with the audit responsibilities of the City Comptroller as set forth in Chapter 5, §93, of the New York City Charter.

The scope period of this audit was June 25, 2016, through November 6, 2016. Our audit reviewed all 114 stations that were reportedly operational in our scope period.

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To meet our objective, auditors equipped with laptops and cellular phones visited the 76 stations that were listed on NYCT and TW websites as having Wi-Fi service, established a Wi-Fi connection, and completed cellular calls (911 service was not tested). At each station location, auditors took screenshots showing Wi-Fi connectivity on the laptop and emailed them to Comptroller email addresses. Initial visits to the 38 stations took place on June 28, 2016 and October 3, 2016. Subsequent visits to stations were completed as of November 6, 2016.

To determine whether the voice (cellular) service was active, the auditors made phone calls to the Comptroller's office and either spoke with other employees or left voice messages.

To determine whether the text messaging features were available, the auditors sent text messages to other cellular devices while in the train stations and on the train (if the next station was listed as being equipped with service).

To determine the accessibility of social media websites, the auditors downloaded Yahoo, Google and Facebook to cellular devices and attempted to read mail and send messages. The auditors also accessed Netflix and Pandora to determine whether it was possible to watch movies, play music and stream video. The auditors also used laptops to test social media applications and video streaming while in the subway stations and on platforms.

To determine whether the *Subway Reads* service was working, the auditors downloaded excerpts from fiction, non-fiction, sci-fi and fantasy, young adults and children books within the various time allotments of 30 minutes, 20 minutes, and 10 minutes.

In order to determine which stations had been chosen to have wireless service during our scope period, we reviewed the MTA Board Action Items and station listings, as well as the MTA's and TW's websites. In addition, we received from the MTA listing of stations by phases.

Testing was performed Monday through Sunday at various times from 6 a.m. to 12 a.m. to ensure that Wi-Fi and cellular service were available. In addition, the auditors tested service in inclement weather to determine the effect on Wi-Fi and cellular service. (See Appendices I, II and III for a listing of stations and services available.)

Based on our positive conclusion, we recommend that the MTA, NYCT and TW continue their current plan to provide voice and data service to the remaining 163 underground New York City subway stations.

On November 22, 2016, we submitted a draft letter report providing MTA and NYCT officials the opportunity to formally respond. The MTA's and NYCT's responses were received on December 14, 2016 for Phase III and Phase IV Transit Wireless audits. In their written responses, the MTA and NYCT agreed with the report. NYCT stated, "MTA New York City

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Transit acknowledges and accepts the conclusions of the attached audits conducted by the New York City Comptroller. The audits found the wireless communication system installed in 150 stations in Phases I to IV is working as intended. We welcome the validation of the system by a third party and our partnership with the comptroller in bringing this service to our customers. The agency is on schedule to bring wireless communication to the remaining 132 stations including (Second Avenue Stations and 34th/Hudson Yards) by the end of December 2016."

The full text of the MTA's and NYCT's comments are included as addenda to this report.

Sincerely,

Marjorie Landa

c: Veronique Hakim, President, NYCT
Michael J. Fucilli, Auditor General, MTA
Darren Jurgens, Audit Manager, MTA
Mindy Tarlow, Director, Mayor's Office of Operations
George Davis III, Deputy Director, Mayor's Office of Operations

APPENDIX I Page 1 of 2

Listing of Stations and Dates Tested

Phase III 38 Stations Tested

| | Station Name | I in Total | | Cellular | 1 | Social | I | Music/Video |
|---------|--------------------|--------------|---|----------|----------------|--------|-------|-------------|
| ļ | Station Name | Line Tested | Dates Tested | Voice* | Cellular Voice | Media | Wi-Fi | Streaming |
| <u></u> | Cortland St | R | 10/14/2016 | YES | YES | YES | YES | YES |
| | | 0 M 2 | | | | | | |
| -2- | Essex St | <u> </u> | 10/4/2016 | YES | YES | YES | YES | YES |
| 3- | Fulton St | 0 0 2 | 6/28/2016 | YES | YES | YES | YES | YES |
| 4 | 207th St | <u>A</u> | 10/3/2016 | YES | YES | YES | YES | YES |
| 5_5_ | Dyckman St | A | 10/3/2016 | YES | YES | YES | YES | YES |
| 6 | 190th St | A O | 10/3/2016 | YES | YES | YES | YES | YES |
| 7 | 181st St. | A | 10/3/2016 | YES | YES | YES | YES | YES |
| 8 | 175th St | A | 10/3/2016 | YES | YES | YES | YES | YES |
| 9 | 163rd St | 0 | 10/3/2016 | YES | YES | YES | YES | YES |
| 10 | 155th St | 0 | 10/3/2016 | YES | YES | YES | YES | YES |
| 11 | 145th St mezzanine | A B OD | 10/3/2016 | YES | YES | YES | YES | YES |
| 12 | 135th St | B C | 10/3/2016 | YES | YES | YES | YES | YES |
| 13 | 125th St | A B G D | 10/3/2016 | YES | YES | YES | YES | YES |
| 14 | 116th St | B G | 10/3/2016 | YES | YES | YES | YES | YES |
| 15 | 110thSt | B G | 10/3/2016 | YES_ | YES_ | YES | YES | YES |
| 16 | 103rd St | BC | 10/3/2016 | YES | YES | YES | YES | YES |
| 17 | Broadway-Nassau | A C | 68/2016,10/14/2016, 10/15/2016, 10/31/2016,11/4/2016 | YES | YES | YES | YES | YES |
| 18 | 155th St | B D | 11/5/2016 | YES | YES | YES | YES | YES |
| 19 | 2nd Ave | <u>[</u> | 10/4/2016 | YES | YES | YES | YES | YES |
| 20 | Delancey St | (| 10/4/2016 | YES | YES | YES | YES | YES |
| 21 | East Broadway | (| 10/4/2016 | YES | YES | YES | YES | YES |
| 22 | 191st St | 0 | 10/4/2016 | YES | YES | YES | YES | YES |
| 23 | 157th St | 0 | 10/14/2016 | YES | YES | YES | YES | YES |
| 24 | 145th St | 0 | 10/14/2016 | YES | YES | YES | YES | YES |

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| | ,_, <u>_,_,</u> | T | | | 1 age 2 01 | _ | | |
|-----|-------------------------|------------------------------|--|-----|------------|-----|------|-----|
| .25 | 137th St | 0 | 10/14/2016 | YES | YES | YES | YES | YES |
| 26 | 116th St | 0 | 10/14/2016 | YES | YES | YES | YES | YES |
| 27 | 110th St | 0 | 10/14/2016 | YES | YES | YES | YES | YES |
| 28 | 103rd St | 0 | 10/14/2016 | YES | YES | YES | YES | YES |
| 29 | Fulton St | 2 3 | 6/28/2016,11/4/2016 | YES | YES | YES | YES | YES |
| 30 | Fulton St | 4 5 | 68/2016,10/14/2016, 10/15/2016, 11/4/2016 | YES | YES | YES | YES | YES |
| 31 | 148th St | 3 | 10/14/2016 | YES | YES | YES | YES | YES |
| 32 | 145th St | 2 3 | 10/14/2016 | YES | YES | YES | YES | YES |
| 33 | 135th St | 2 3 | 10/14/2016 | YES | YES | YES | YES | YES |
| 34 | 125th St | 2 3 | 10/14/2016 | YES | YES | YES | YES | YES |
| 35 | 116th St | 2 3 | 10/14/2016 | YES | YES | YES | YES | YES |
| 36 | 110th St/Central Park N | 2 3 | 10/14/2016 | YES | YES | YES | YES | YES |
| 37 | Main St. | 7 | 10/28/2016 | YES | YES | YES | YES | YES |
| 38 | Fulton St Trn. Ctr. | AC JM Z 2 3 4 5 | 6/28/2016,10/14/2016,10/15/2016; 10/30/2016;11/4/2016 | YES | YES | YES | YES | YES |
| | | t have AT&T, T-Mobile Verize | on Wireless, and Sprint service. | | | | IESI | TES |

Listing of Stations and Dates Tested

Phase I 47 Stations Retested as of November 6, 2016

| | Station Name | Line Tested | Dates Tested | Cellular Voice* | Cellular Voice | Social Media | Wi-Fi | Music/Video Streaming |
|----------|----------------------|----------------|--------------|--------------------|----------------|-----------------|-------|--------------------------|
| | 8th Av | O | 10/20/2016 | YES | YES | YES | YES | YES |
| | | 1230 | | | | | | |
| 2 | 6th Av | 6 0 | 10/20/2016 | YES | YES | YES | YES | YES |
| 3 | 23rd St | O E | 10/20/2016 | YES | YES | YES | YES | YES |
| 4 4 | 14th St | A O B | 10/20/2016 | YES | YES | YES | YES | YES |
| 5 | 14th St | (i) (M) | 10/20/2016 | YES | YES | YES | YES | YES |
| 6 | 14th St | 123 | 10/14/2016 | YES | YES | YES | YES | YES |
| 7 | 5th Ave | N R | 10/18/2016 | YES | YES | YES | YES | YES |
| 8 | 57th St | N Q R | 10/18/2016 | YES | YES | YES | YES | YES |
| 9 | 49th St | N R | 10/18/2016 | YES | YES | YES | YES | YES |
| 10 | Times Square | NQR | 10/18/2016 | YES | YES | YES | YES | YES |
| 11 | 28th St | R | 10/18/2016 | YES | YES | YES | YES | YES |
| 12 | 23rd St | R | 10/18/2016 | YES | YES | YES | YES | YES |
| 13 | 96th St | B G | 11/5/2016 | YES | YES | YES | YES | YES |
| 14 | 86th St | B G | 11/5/2016 | YES | YES | YES | YES | YES |
| 15 | 81st St | B C | 11/5/2016 | YES | YES | YES | YES | YES |
| 16 | 72nd St | B C | 11/5/2016 | YES | YES | YES | YES | YES |
| 17 | 59th St | A B G | 11/5/2016 | YES | YES | YES | YES | YES |
| 18 | 50th St | G B | 10/1/2016 | YES | YES | YES | YES | YES |
| 19 | 42nd St | A O E | 18/2016 | YES | YES | YES | YES | YES |
| 20 | 57th St | (| 10/19/2016 | YES | YES | YES | YES | YES |
| 21 | 47-50 St Rock Ctr | BDFM | 10/19/2016 | YES | YES | YES | YES | YES |
| 22 | 5th Ave | B | 10/1/2016 | YES | YES | YES | YES | YES |
| 23 | 7th Ave | BDB | 10/1/2016 | YES | YES | YES | YES | YES |
| 24 | 96th St | 123 | 10/14/2016 | YES | YES | YES | YES | YES |
| | | 1 | | | | | | |
| 25 | 86th St | 1 | 10/14/2016 | YES | YES | YES | YES | YES |
| <u> </u> | | · | 10/14/2016 | YES j | YES | YES J | YES | YES |

APPENDIX II

| | | T | | Page 2 of 4 | | | | | |
|-----------------|---------------|-------------------------------|------------|-------------|-----|-----|-----|-----|--|
| 27 | 72nd St | 123 | 10/14/2016 | YES | YES | YES | YES | YES | |
| 28 | 66th St | 0 | 10/14/2016 | YES | YES | YES | YES | YES | |
| 29 | 59th St | 1 | 10/14/2016 | YES | YES | YES | YES | YES | |
| 30 | 50th St | 1 | 10/14/2016 | YES | YES | YES | YES | YES | |
| 31 | Times Square | 123 | 10/14/2016 | YES | YES | YES | YES | YES | |
| 32 | 28th St | 1 | 10/14/2016 | YES | YES | YES | YES | YES | |
| 33 | 23rd St | 1 | 10/14/2016 | YES | YES | YES | YES | YES | |
| 34 | 18th St | 0 | 10/14/2016 | YES | YES | YES | YES | YES | |
| 35 | Times Square | 7 | 10/18/2016 | YES | YES | YES | YES | YES | |
| 36 | Times Square | S | 10/18/2016 | YES | YES | YES | YES | YES | |
| 37 | 34th St | N Q R | 10/18/2016 | YES | YES | YES | YES | YES | |
| 38 | 42nd St | BDBM | 10/19/2016 | YES | YES | YES | YES | YES | |
| 39 | 34th St | BDFM | 10/18/2016 | YES | YES | YES | YES | YES | |
| 40 | 23rd St | (F) (M) | 10/19/2016 | YES | YES | YES | YES | YES | |
| 41 | Grand Central | 4 5 6 | 10/18/2016 | YES_ | YES | YES | YES | YES | |
| 42 | 33rd St | 6 | 10/18/2016 | YES | YES | YES | YES | YES | |
| 43 | 28th St | 6 | 10/18/2016 | YES | YES | YES | YES | YES | |
| 44 | 23rd St | 6 | 10/18/2016 | YES | YES | YES | YES | YES | |
| 45 | Grand Central | 7 | 10/18/2016 | YES | YES | YES | YES | YES | |
| 46 | 5th Ave | 7 | 10/18/2016 | YES | YES | YES | YES | YES | |
| 47 *This lis | Grand Central | at have AT&T, Verizon Wireles | 10/18/2016 | YES | YES | YES | YES | YES | |

Listing of Stations and Dates Tested

Phase II

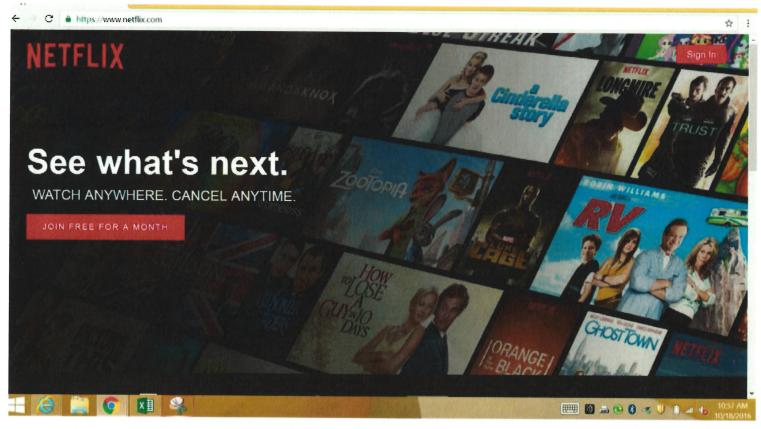
29 Stations Retested as of November 6, 2016, 2016

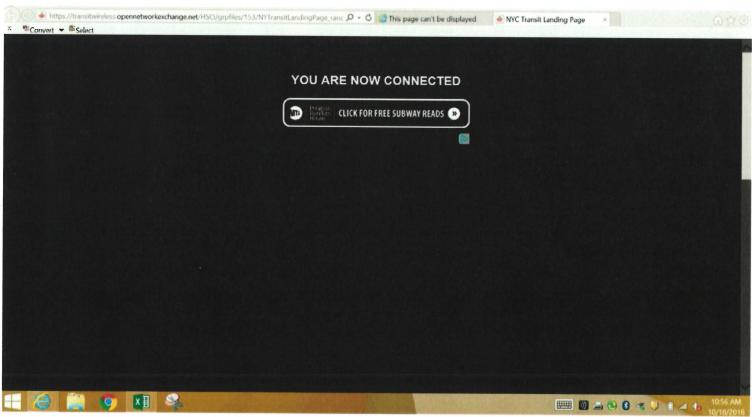
| | Station Name | Line Tested | Dates Tested | Cellular Voice* | Cellular Voice | Social Media | Wi-Fi | Music/Video Streaming |
|--------|----------------|-------------------|-----------------------|--------------------|----------------|-----------------|-------|--------------------------|
| 1_1_ | 21st St | <u> </u> | 10/19/2016,10/28/2016 | YES | YES | YES_ | YES | YES |
| 2 | 179th St | (| 10/19/2016 | YES | YES | _YES | YES | YES |
| 3 | 169th St | <u> </u> | 10/19/2016 | YES | YES | YES | YES | YES |
| 4 | Parsons Blvd | <u> </u> | 10/19/2016,10/28/2016 | YES | YES | YES | YES | YES |
| 5 | Sutphin Blvd | (| 10/19/2016,10/28/2016 | YES | YES | YES | YES | YES |
| 6 | Van Wyck Blvd | E G | 10/19/2016,10/28/2016 | YES | YES | YES | YES | YES |
| 7 | Union Turnpike | 6 6 | 10/19/2016 | YES | YES | YES | YES | YES |
| 8 | 75th Ave | (3 (3) | 10/19/2016 | YES | YES | YES | YES | YES |
| ļ9 | 71st Ave | | 10/19/2016 | YES | YES | YES | YES | YES |
| 10 | 67th Ave | M R | 10/28/2016 | YES | YES | YES | YES | YES |
| 11 | 63rd Drive | M R | 10/28/2016 | YES | YES | YES | YES | YES |
| 12 | Woodhaven Blvd | M R | 10/28/2016 | YES | YES | YES_ | YES | YES |
| 13 | Grand Ave | M R | 10/28/2016 | YES | YES | YES | YES | YES |
| 14 | Elmhurst Ave | M R | 10/28/2016 | YES | YES | YES | YES | YES |
| 15 | Roosevelt Ave | E D MR | 10/19/2016 | YES | YES | YES | YES | YES |
| 16 | 65th St | M R | 10/28/2016 | YES | YES | YES | YES | YES |
| 17 | Northern Blvd | M R | 10/28/2016 | YES | YES | YES | YES | YES |
| 18 | 46th St | M R | 10/28/2016 | YES | YES | YES | YES | YES |
| 19 | Steinway St | M R | 10/28/2016 | YES | YES | YES | YES | YES |
| 20 | 36th St | M R | 10/28/2016 | YES | YES | YES | YES | YES |
| 21 | Queens Plaza | (■ (M) (R) | 10/28/2016 | YES | YES | YES | YES | YES |
| 22 | Ely Ave-23rd | E W | 10/20/2016 | YES | YES | YES | YES | YES |
| 23 | Parsons Blvd | 6 0 2 | 10/19/2016 | YES | YES | YES | YES | YES |

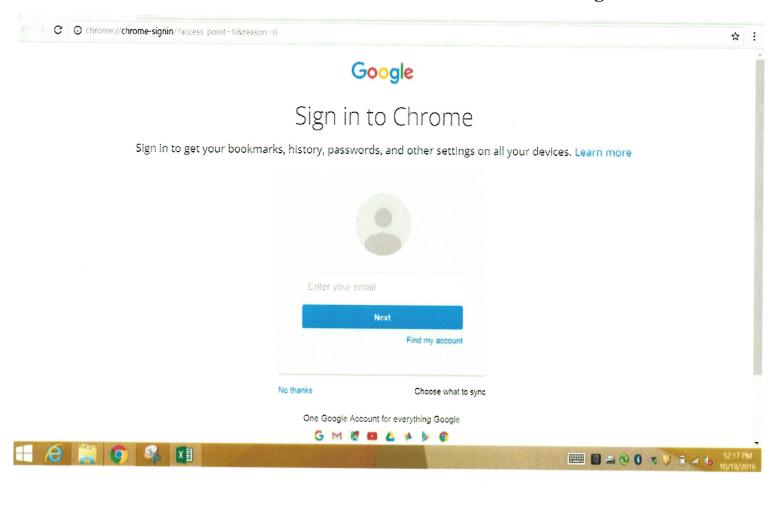
APPENDIX II

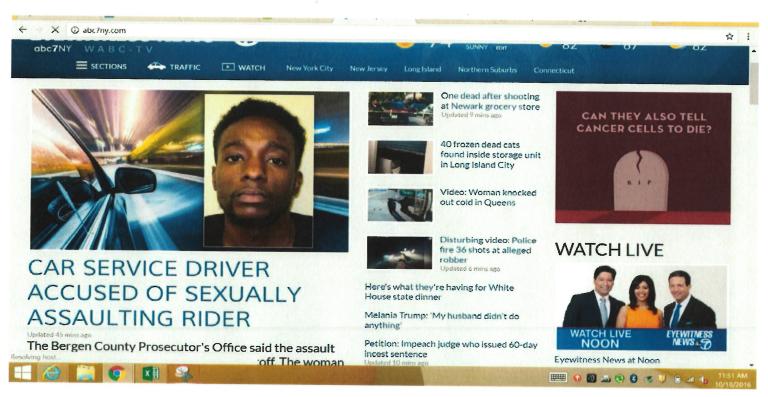
| | Ţ | | Page 4. of 4 | | | | | | | |
|----------|--|-------|----------------------|------|-----|------|-----|-----|--|--|
| 24 | Sutphin Blvd | E 0 2 | 10/19/2016,11/5/2016 | YES | YES | YES | YES | YES | | |
| 25 | Jamaica-Van Wyck | E | 10/19/2016 | YES | YES | YES | YES | YES | | |
| 26 | Court Square | G | 10/20/2016 | YES_ | YES | YES_ | YES | YES | | |
| 27 | 21st St/Van Alst Ave | G | 10/20/2016 | YES | YES | YES | YES | YES | | |
| 28 | Hunters Point | 7 | 10/18/2016 | YES | YES | YES | YES | YES | | |
| 29 | Vernon-Jackson | 7 | 10/18/2016 | YES | YES | YES | YES | YES | | |
| *This li | *This listing includes stations that have AT&T, T-Mobile Verizon Wireless, and Sprint service. | | | | | | | | | |

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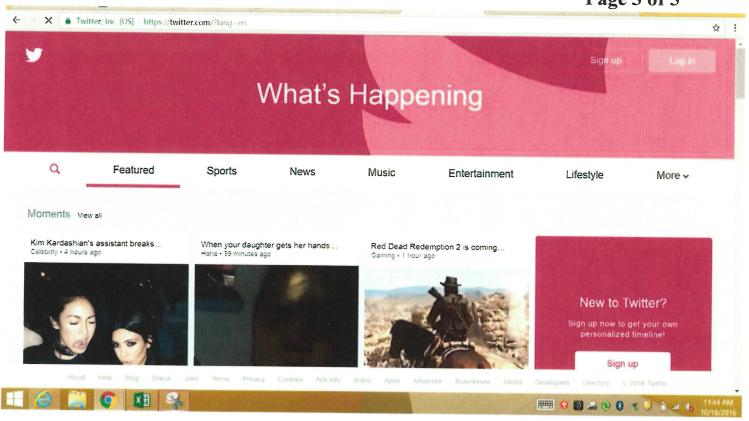


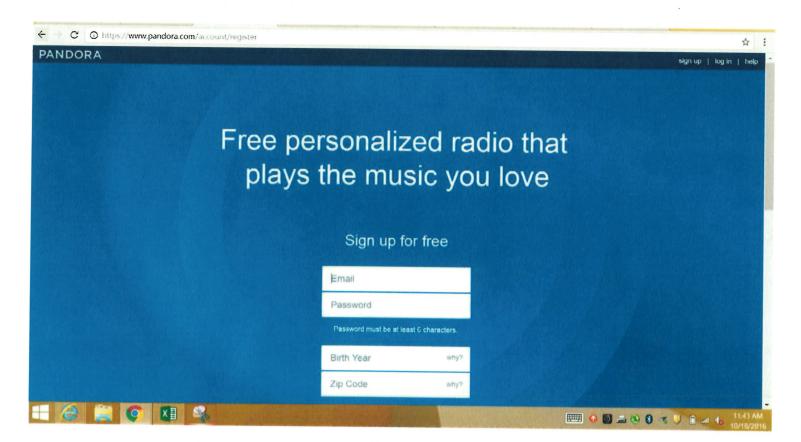




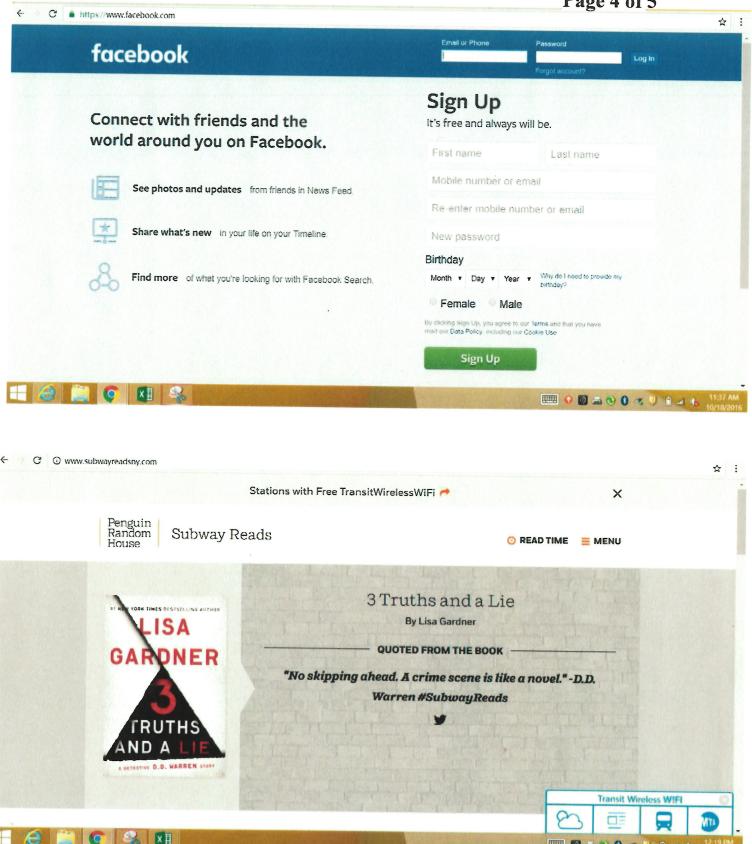


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Stations with Free TransitWirelessWiFi 🥕

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Subway Reads

Dreamsongs: Volume I

by George R. R. Martin

② 103 min.

Sandkings

Simon Kress lived alone in a sprawling manor house among the dry, rocky hills fifty kilometers from the city. So, when he was called away unexpectedly on business, he had no neighbors he could conveniently impose on to take his pets. The carrion hawk was no problem; it roosted in the unused belfry and customarily fed itself anyway. The shambler Kress simply shooed outside and left to fend for itself; the little monster would gorge on slugs and birds and rockjocks. But the fish tank, stocked with genuine Earth piranha, posed a difficulty. Kress finally just threw a haunch of beef into the huge tank. The piranha could always eat one another if he were detained longer than expected. They'd done it before. It amused him.

Unfortunately, he was detained much longer than expected this time. When he finally returned, all the fish were dead. So was the carrion hawk. The shambler had climbed up to the belfry and eaten it. Simon Kress was vexed.

The next day he flew his skimmer to Asgard, a journey of some two hundred kilometers. Asgard was Baldur's largest city and boasted the oldest and largest starport as well. Kress liked to impress his friends with animals that were unusual, entertaining, and expensive; Asgard was the place to buy them.

This time, though, he had poor luck. Xenopets had closed its doors, t'Etherane the Petseller tried to foist another carrion hawk off on him, and Strange Waters offered



Metropolitan Transportation Authority

State of New York

December 14, 2016

Ms. Marjorie Landa Deputy Comptroller for Audit The Office of the City Comptroller 1 Centre Street New York, NY 10038

Re: Draft Letter Audit Reports #SZ17-095AL and #SZ17-097AL (Phase III and IV of the Wireless Voice and Data Service in New York City's Subway System as Provided by Transit Wireless)

Dear Ms. Landa:

This is in reply to your letters requesting a response to the above-referenced draft letter reports.

I have attached for your information the comments of Veronique Hakim, President, NYC Transit, which address these two reports.

Sincerely,

Thomas F. Prendergast

Chairman and Chief Executive Officer

C: Donna M. Evans MTA Chief of Staff

Attachment



December 8, 2016

Mr. Thomas F. Prendergast Chairman and Chief Executive Officer Metropolitan Transportation Authority 2 Broadway, 20th Floor, Suite A20.30 New York, New York 10004

Re: Draft Letter Audit Reports on Phases III and IV of the Wireless Voice and Data Service in New York City's Subway System as Provided by Transit Wireless (Audit Numbers SZ17-095AL and SZ17-097AL)

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MTA New York City Transit acknowledges and accepts the conclusions of the attached audits conducted by the New York City Comptroller. The audits found that the wireless communication system installed in 150 stations in Phases I to IV is working as intended.

We welcome the validation of the system by a third party and our partnership with the comptroller in bringing this service to our customers.

The agency is on schedule to bring wireless communication to the remaining 132 stations (including Second Avenue Stations and 34th/Hudson Yards) by the end of December 2016.

Sincerely,

Veronique Hakim

President

MTA New York City Transit

Attachment (2)

Copy: Michael Fucilli

Darren Jurgens John F. O'Grady