

**Before the
Federal Communications Commission
Washington, D.C. 20554**

In the Matter of)	
)	
Wireless E911 Location Accuracy Requirements)	PS Docket No. 07-114
)	
AT&T Services, Inc. Request for Authorization and Waiver)	
)	

ORDER

Adopted: August 19, 2020

Released: August 19, 2020

By the Chief, Public Safety and Homeland Security Bureau:

I. INTRODUCTION

1. This Order grants the Request for Authorization (Request) of AT&T Services, Inc. (AT&T) to use the European Union Global Navigation Satellite System (GNSS), known as Galileo, for Enhanced 911 (E911) purposes.¹ AT&T “seeks authority to use Galileo, in conjunction with the U.S. Global Positioning System (GPS), to improve the accuracy of E911 location services and thereby facilitate rapid response by emergency services when wireless callers dial 911.”² We find that AT&T satisfies the conditions for Commercial Mobile Radio Service (CMRS) providers to integrate foreign satellite signals into E911 services outlined in the *Fourth Report and Order* in this proceeding.³ Therefore, we conclude that granting AT&T’s Request would serve the public interest by improving mobile device location determination, thus improving emergency response and saving lives, without increasing the exposure of AT&T devices to harmful interference.

II. BACKGROUND

2. *Enhanced 911*. In 2015, the Commission issued a *Fourth Report and Order* in this proceeding that strengthened the E911 location accuracy rules to improve location determination for outdoor and indoor calls. Among other things, the Commission addressed the combined use of foreign GNSS signals with GPS that could augment E911. At that time, CMRS providers intended to test the potential use of non-U.S. systems (such as Galileo) to support E911 location.⁴ The Commission emphasized that it had not approved any waiver petition or application that would authorize use of any non-U.S. GNSS to support E911 location services, noted concerns with such operations, and identified procedures for CMRS providers to follow before non-U.S. GNSS signals could be integrated into E911.⁵

¹ On May 26, 2020, AT&T Services, Inc., on behalf of its wireless affiliates (collectively, “AT&T”), submitted a request for authorization, seeking waiver as necessary, to use Galileo, for E911 purposes. *See* AT&T Request for Authorization and Waiver (filed May 26, 2020) (Request). The Request was filed publicly via the FCC’s Electronic Comment Filing System in PS Docket No. 07-114. As discussed in this Order, we find no waiver of our rules is required for this authorization to become effective.

² Request at 1.

³ *Wireless E911 Location Accuracy Requirements*, PS Docket No. 07-114, Fourth Report and Order, 30 FCC Rcd 1259 (2015) (*Fourth Report and Order*).

⁴ *Fourth Report and Order*, 30 FCC Rcd at 1272, para. 39.

⁵ *Fourth Report and Order*, 30 FCC Rcd at 1272-1273, para. 40.

The Commission stated that parties who request authorization of such signals for E911 must first consider such issues as potential interference to adjacent bands, potential increased exposure of devices to interference from additional signals, the potential for increased signal noise, and data integrity problems including inaccuracy in transmitted E911 location data.⁶

3. Given the need for additional study, in the *Fourth Report and Order*, the Commission further identified what CMRS providers must do to receive authorization to incorporate foreign GNSS signals into E911 service:

We believe that CMRS providers seeking to use non-U.S. satellites should also conduct testing to ensure that operation with these signals does not inadvertently introduce vulnerabilities to the devices that could impair E911 performance or compromise data integrity. For example, devices that are augmented to receive signals from multiple satellite constellations may be more susceptible to radio frequency interference than devices that receive signals from GPS alone. Devices should also be evaluated to determine their capabilities to detect and mitigate the effects of inaccurate or corrupted data from any RNSS system that could result in incorrect location information, or no information at all, being relayed to a PSAP. We expect CMRS providers, at the time they certify their compliance with the Commission's location accuracy requirements, to also certify that any devices on their network operating with foreign A-GNSS signals for 911 location accuracy have proper authorizations in place to permit such use. Before incorporating foreign A-GNSS into E911, CMRS providers must coordinate plans for foreign A-GNSS signal integration with the Public Safety and Homeland Security Bureau to confirm that signals are interoperable with GPS and that measures to prevent interference are appropriate. Furthermore, CMRS providers are expected to certify that the devices have been tested to determine their ability to detect and mitigate the effects of harmful interference.⁷

4. *Galileo Order*. In January 2017, the International Bureau released a *Public Notice* seeking comment on a request from the National Telecommunication and Information Administration (NTIA), on behalf of the European Commission (EC), seeking a waiver to permit all non-Federal receive-only earth stations to operate with the Galileo system's E1, E5, and E6 signals.⁸ In 2018, the Commission authorized devices to receive signals from the Galileo system (E1 and E5, but not E6).⁹ Specifically, the Commission waived former section 25.131(j)(1) (now section 25.115(b)(9))¹⁰ and section 25.137 requiring either earth station licensing or satellite system market access approval prior to such use.¹¹ At

⁶ *Fourth Report and Order*, 30 FCC Rcd at 1272-1273, para. 40.

⁷ *Fourth Report and Order*, 30 FCC Rcd at 1273, para. 40.

⁸ See *FCC Seeks Comment on Waiver of Part 25 Licensing Requirement for Receive-Only Earth Stations Operating with the Galileo Radionavigation-Satellite Service*, Public Notice, IB Docket No. 17-16, 32 FCC Rcd 8225, 8225 (Jan. 6, 2017) (Galileo Public Notice).

⁹ *Waiver of Part 25 Licensing Requirements for Receive-Only Earth Stations Operating with the Galileo Radionavigation-Satellite Service*, Order, IB Docket No. 17-16, 33 FCC Rcd 11322, 11346, para. 53 (2018) (*Galileo Order*) (granting the requested waiver for non-Federal receiver operations with two of the Galileo signals, E1 and E5, which are transmitted in the same Radionavigation-Satellite Service (RNSS) bands where GPS transmits its L1, L5, and L2 signals, and denying the requested waiver for the Galileo E6 signal).

¹⁰ 47 CFR § 25.115(b)(9); see also *Amendment of Parts 2 & 25 of the Commission's Rules*, Report & Order and Further Notice of Proposed Rulemaking, IB Docket No. 17-95, 33 FCC Rcd 9327, 9353, para. 84 (2018) (“[W]e move all requirements regarding receive-only earth stations, with minor revisions, from § 25.131 into § 25.115(b)”).

¹¹ The rules require licensing of non-federal receive-only equipment (e.g. wireless handsets) operating with foreign satellite systems, including receive-only earth stations operating with non-U.S. licensed radionavigation-satellite service (RNSS) satellites. 47 CFR. §§ 25.115(b) (formerly § 25.131(j)); 25.137. The *Galileo Order* granted a

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that time, the Commission did not authorize Galileo receivers to use the E1 and E5 signals in support of E911.¹² The Commission observed that the *Fourth Report and Order* “identified procedures for Commercial Mobile Radio Service (CMRS) providers to follow before non-U.S. GNSS signals could be integrated into E911.”¹³ The Commission specified it did “not address these additional procedures that CMRS providers must follow before integrating the Galileo E1 and E5 signals for E911 location services.”¹⁴

5. Pursuant to authority delegated by the Commission, the Public Safety and Homeland Security Bureau (PSHSB), in coordination with the Office of Engineering and Technology (OET) and the Wireless Telecommunications Bureau (WTB), developed a set of procedures to evaluate whether nationwide CMRS providers comply with the conditions of the *Fourth Report and Order* in order to be authorized to use Galileo in connection with E911 geolocation in the U.S..¹⁵ These procedures called for each nationwide carrier to implement the following requirements: 1) conduct testing; 2) develop a signal integration plan; and 3) provide certification. We set forth these criteria here to explain how we evaluated AT&T’s request and how we currently believe we will evaluate future similar requests.

6. *Testing.* The purpose of the testing requirement is to ensure that integrating non-US signals and GPS signals into the same device would not introduce radiofrequency interference that could impair E911 performance. In the case of Galileo, many of these concerns have been addressed by the Galileo Order’s findings on channel compatibility.¹⁶ Therefore, we believe the need for additional test data is limited – it is only needed to the extent necessary to verify that mobile devices can mitigate the potential effects of harmful interference that could impair E911 performance. To meet this requirement, CMRS providers may rely on either 1) their own testing of CMRS devices (*e.g.*, in the industry test bed); or 2) test data from other sources (*e.g.*, testing conducted by other carriers or third parties). CMRS providers that do their own testing do not need an experimental license if they are only using receive equipment in their testing. If providers are using a transmitter that simulates satellite transmissions, they may need to obtain an experimental license first and should coordinate with OET. An example of sufficient third-party test data would be results for comparable satellite-receive devices that have been tested to determine their reliability and resiliency to radiofrequency interference. Providers will not be required to submit test data to the Commission, but must maintain the data and make the data available if requested by the Bureau. This requirement follows the E911 indoor location rules, which similarly rely on carrier compliance certifications without requiring submission of testing data.¹⁷

7. *Signal Integration Plan.* Each CMRS provider seeking authorization to use Galileo for E911 purposes must submit a signal integration plan to the Bureau. The plan should describe the mechanisms the provider will use to detect, mitigate, and if necessary, disable Galileo signals if they cause harmful interference that impairs E911 performance. The plan should also include a commitment to abide by best practices relevant to the use of GNSS signals, certifying that they have met the

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waiver for receive-only earth stations to operate with Galileo, but this did not constitute a grant of market access under Section 25.137 of the rules.

¹² *Galileo Order*, 33 FCC Rcd at 11345, para. 50.

¹³ *Galileo Order*, 33 FCC Rcd at 11345, para. 50, citing *Fourth Report and Order*, 30 FCC Rcd at 1272-1273, paras. 39-40; *see also* 47 CFR §§ 25.115(b)(9), 25.137.

¹⁴ *Galileo Order*, 33 FCC Rcd at 11345, para. 50.

¹⁵ PSHSB will address non-nationwide CMRS provider compliance separately from today’s Order.

¹⁶ *Galileo Order*, 33 FCC Rcd at 11335, 11339, paras. 27, 36.

¹⁷ *See e.g.* 47 CFR § 9.10(i)(2)(iii)(A) (“All CMRS providers must certify that the indoor location technology (or technologies) used in their networks are deployed consistently with the manner in which they have been tested in the test bed.”).

requirements in the latest GPS Interface Control Document (ICD)¹⁸ and those set forth in the DHS Best Practices Guide, “Improving the Operation and Development of Global Positioning System (GPS) Equipment Used by Critical Infrastructure.”¹⁹

8. *Certification.* The *Fourth Report and Order* requires CMRS providers to certify that they have authorizations in place to permit the use of non-U.S. GNSS signals and that they have complied with the specified testing conditions. Each CMRS provider must certify in writing that it has met these requirements. These certifications must accompany the signal integration plan.

9. *AT&T Request for Authorization and Waiver Request.* In the Request, AT&T explains the steps it has taken to satisfy five of the six conditions outlined in the *Fourth Report and Order*, the sixth condition being satisfied by the *Galileo Order*'s waiver allowing devices to receive the approved foreign satellite signals (Galileo E1 and E5).²⁰ AT&T explains that it worked with vendors to perform a series of lab tests to show that the wireless devices could detect and mitigate interference in the Galileo spectrum and still provide accurate location estimates using GPS.²¹ It represents that the tests successfully demonstrated that wireless devices could detect and mitigate any interference resulting from reception of signals from the Galileo satellite system.²²

10. AT&T also submits a signal integration plan to the Commission that affirms testing was completed and that the provider is aware of the best practices contained at www.gps.gov and will periodically review them.²³ Those best practices call for meeting the requirements in the latest GPS ICD and those set forth in the above mentioned DHS Best Practices Guide. In its Request, AT&T submits an abbreviated signal integration plan that affirms that testing was completed and that it has effective mitigation options if an unforeseen or untested anomaly arises with use of Galileo. AT&T also attests it is aware of the best practices at www.gps.gov, will periodically review such best practices, and will generally abide by them.²⁴ In an attachment to the Request, AT&T includes attestations certifying that AT&T completed the tests, which show that AT&T's handsets can detect interference resulting from reception of Galileo signals and mitigate any interference from incorporating those signals into its E911 service by disabling Galileo signal reception and determining location for 911 using GPS alone.²⁵

III. DISCUSSION

11. Consistent with the Commission's procedures for authorizing CMRS providers to use Galileo for E911, we grant AT&T's Request.²⁶ As noted above, the Commission listed six conditions for

¹⁸ The GPS Interface Control Documents (ICD) are available at <https://www.gps.gov/technical/icwg/#icd-gps-240> (last visited August 19, 2020).

¹⁹ The DHS Best Practices Guide is available at www.gps.gov and at www.dhs.gov/science-and-technology/pnt-program (last visited August 19, 2020).

²⁰ Request at 3-4, 5-8. In addition, AT&T requests any additional waiver needed under Section 25.115 or Paragraph 50 of the *Galileo Order* to integrate Galileo signals into its E911 service. Request at 4.

²¹ Request at 3.

²² Request at 6.

²³ Request at 3-4.

²⁴ Request at 7-8 and Attachment.

²⁵ Request at Attachment.

²⁶ AT&T also seeks a waiver of Rule 25.115 and Paragraph 50 of the *Galileo Order* to the extent necessary. Request at 4. AT&T argues a waiver is warranted under the Commission's rules. 47 CFR § 1.3 (“Any provision of the rules may be waived by the Commission... on petition if good cause therefor is shown.”). CMRS providers already have authorization to receive Galileo handset signals pursuant to the *Galileo Order*. AT&T's Request is for

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CMRS providers to satisfy before incorporating GNSS signals into their E911 service.²⁷ In the *Galileo Order*, the Commission found significant benefit to waiving the rules to permit the use of the E1 and E5 signals and emphasized that devices must have the authorizations contemplated by the procedures established in the *Fourth Report and Order* for E911.²⁸ To integrate Galileo into their E911 service, however, CMRS providers must satisfy the five remaining conditions: A) coordinate with PSHSB to ensure the signals are interoperable and no interference will result; B) certify location accuracy compliance; C) test devices to ensure there are no device signal interference problems from using the GNSS satellite feed; D) test devices to ensure no inaccurate location data is sent to Public Safety Answering Point (PSAP) due to satellite signal noise; and E) certify that these device tests show the CMRS provider's devices can detect and mitigate any interference that might result from incorporating GNSS satellite signals into their E911 service. Furthermore, the Commission has conducted federal inter-agency coordination and review of today's Order with the National Telecommunications and Information Administration prior to release.

12. *Satisfaction of Coordination and Testing Requirements.* AT&T's discussions with PSHSB staff about meeting the conditions for E911 foreign satellite signal use satisfy condition A in the *Fourth Report and Order*, i.e., Bureau coordination to ensure Galileo signals are interoperable with GPS and no interference will result.²⁹ In its Request, AT&T explains that it worked with two test vendors in a lab environment to test for signal interference and avoidance of signal noise without negative impact on location accuracy.³⁰ AT&T states that "all test cases passed and produced results consistent with the expectations of AT&T and demonstrated the ability of the wireless devices to detect and mitigate interference of signals to the Galileo satellite system."³¹ After a description of the testing, in the Request, AT&T states that its mitigation options for disruptions to location accuracy would include disabling Galileo usage on chipsets and modifying software or configuring settings via over-the-air updates, which could be pushed to device software.³² AT&T concludes that its "testing demonstrated that the risk of interference due to use of Galileo is low, and if interference does occur, it could be quickly mitigated without sacrificing location accuracy."³³ In discussions with the PSHSB in mid-2019, staff outlined certain expectations for wireless carriers to follow to receive authorization to use Galileo for E911. PSHSB staff stated that it would expect a provider to perform testing showing that wireless devices could detect and mitigate interference in the Galileo spectrum. AT&T tested for multiple scenarios, including

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additional authorization to use the Galileo signals specifically for E911. Therefore, no further waiver is required for receive-only handsets to receive Galileo signals. Accordingly, we dismiss AT&T's waiver request as moot.

²⁷ *Fourth Report and Order*, 30 FCC Rcd at 1272-1273, para. 40.

²⁸ Although receive authority was granted by the *Galileo Order*, that order did not grant market access to the Galileo satellite system under Rule 25.137, which would have automatically granted device / earth station receive authority by satisfying Rule 25.115(b)(9)(ii) instead of waiving Rule 25.115(b)(9). Rule 25.115(b)(9) (formerly Rule 25.131(j)(1)) specifies receive-only earth station operators must request a Commission license to receive signals from foreign satellite unless the Commission has granted market access to the GNSS satellite signal. The *Galileo Order* waived the receive-only earth station licensing requirement of 25.115(b)(9) without granting the Galileo system market access. *Galileo Order*, 33 FCC Rcd at 11346, para. 53; 47 CFR §§ 25.115(b)(9), 25.137.

²⁹ Request at 3, 5-6. Regarding interoperability with GPS, the Commission concluded that "The Galileo GNSS is uniquely situated as a foreign GNSS system with respect to the U.S. GPS, since the two systems are interoperable and RF compatible under the 2004 EU/US Galileo-GPS Agreement and subsequent EC/U.S. actions to implement that agreement." *Galileo Order*, 33 FCC Rcd at 11327, para. 12.

³⁰ Request at 5-7.

³¹ Request at 6.

³² Request at 7.

³³ Request at 7.

modifying Galileo satellite navigation parameters in the Receiver Independent Exchange Format (RINEX) file for errors, corrupting Galileo assistance data to verify that handset device GPS location data was not impacted, mimicking the 2019 Galileo system failure that occurred in 2019 with outdated satellite location “ephemeris” data, and modification of the Galileo navigation data.³⁴ AT&T states that these test cases showed that its devices were able to detect and mitigate interference received by the Galileo chipsets.³⁵ Based on a review of AT&T’s request, we conclude that AT&T’s testing and statement of results satisfy conditions C and D of the *Fourth Report and Order* – signal interference and satellite noise testing.

13. The AT&T testing further revealed the impact on any potential corruption of Galileo’s signal on AT&T’s E911 device location accuracy. As summarized in the Request, the testing showed that “if the Galileo signals are corrupted, the resulting location estimate will be no worse than if the Galileo chipset was not enabled.”³⁶ Based on its testing, AT&T states that E911 location accuracy can be ensured because Galileo signal “usage on chipsets could be disabled and the corresponding GPS operational mode could be modified through the use of over-the-air updates to either replace the offending software or change device location/GNSS configuration settings,” and that “[t]hese changes could be pushed to device software once AT&T has determined that use of the Galileo constellation or software was the root cause of problems with location accuracy.”³⁷ Combined with the signal integration plan described below, this demonstration establishes AT&T’s compliance with condition B of the *Fourth Report and Order* – certification of location accuracy.

14. *Satisfaction of Signal Integration Plan and Certification Requirements.* Furthermore, AT&T’s Request includes a “signal integration plan” to the Commission along with the description of testing that affirms the testing was completed with results as described, and that the CMRS provider will abide by the best practices for satellite signal use described at www.gps.gov.³⁸ AT&T has made these attestations in an attachment to its Request and has described its plan to abide by the GPS best practices and the technical necessities revealed by its testing.³⁹ AT&T’s signal integration plan states that its personnel have reviewed the documents on the www.gps.gov website, that AT&T has informed its handset vendors of these best practices, and that AT&T and its vendors will “will operate consistent with the best practices and technical documentation on the GPS website, will periodically review such documents, and continue to generally abide by them.”⁴⁰ AT&T has also submitted the attestations of testing completion.⁴¹ AT&T’s signal integration plan and attestations to the Commission satisfy the *Fourth Report and Order*’s conditions A, B, and E.

IV. ORDERING CLAUSES

15. Accordingly, IT IS ORDERED that, pursuant to Sections 301 and 303(b) of the Communications Act of 1934, 47 U.S.C. §§ 301, 303(b), AT&T Services, Inc.’s Request for Authorization IS GRANTED.

16. IT IS FURTHER ORDERED that AT&T Services, Inc.’s Request for Waiver is DISMISSED as moot.

³⁴ Request at 6.

³⁵ Request at 6.

³⁶ Request at 7.

³⁷ Request at 7.

³⁸ Request at 7-8.

³⁹ Request at 8 and Attachment.

⁴⁰ Request at 8.

⁴¹ Request at Attachment.

17. IT IS FURTHER ORDERED that the effective date of this Order is the date upon which this Order is adopted.

18. This action is taken under delegated authority pursuant to Sections 0.191 and 0.392 of the Commission's Rules, 47 CFR §§ 0.191, 0.392.

FEDERAL COMMUNICATIONS COMMISSION

Lisa M. Fowlkes
Chief
Public Safety and Homeland Security Bureau