

## **NARRATIVE STATEMENT**

By this application, and pursuant to Section 5.71(a)(2) of the Federal Communications Commission (“FCC”) Rules, 47 C.F.R. §§ 5.71(a)(a), Starry Spectrum LLC (“Starry”) respectfully seeks renewal and limited modification<sup>1</sup> of the experimental authority granted by the FCC under call sign WI2XEB. That license allows Starry: (a) to evaluate the functionality, reliability and user acceptability of equipment and technologies being designed and developed to support new and innovative point-to-point and point-to-multipoint communications capabilities; and (b) conduct market studies on a limited basis. In compliance with the conditions of that license, Starry filed an experimental report detailing the results of its tests to date with the FCC.<sup>2</sup>

As described in its experimental report, Starry’s tests and operations under the license has been instrumental in informing the development of Starry’s innovative fixed wireless technology and its potential business model. However, its technology is still nascent, and it has generated a data set for one only possible business model over a short timescale. Granting the application will further allow Starry to improve its technology, generate more business and technical data on its existing operations, experiment in markets with different characteristics, and test different business models.

In this application for renewal, Starry is seeking an extension of the technical and operational parameters previously granted, modified only to eliminate one market and add a five new markets. Starry is not requesting any modifications to the technical parameters or any change to the number of base stations and end user devices approved by the Commission under its existing license.

Starry understands and acknowledges that any operation under its license modified as requested herein would be subject to same conditions imposed upon its current experimental operations and that the FCC may specify additional conditions it deems appropriate. For example, and as discussed in greater detail below, Starry will advise participants that: (a) the operations are being conducted under an experimental authority issued to Starry, (b) the company is responsible for the experimental activities, (c) all operations are being conducted on a non-interference basis, and (d) after the test is completed, Starry will retrieve and recover all devices that do not comply with FCC regulations.

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<sup>1</sup> As discussed further below, Starry seeks modification of its license to delete one location (Leesburg, VA) and to permit similar tests at five additional locations (Sioux Falls, SD; Portland, OR; Manchester, NH; Phoenix, AZ; and Memphis, TN). Although this narrative describes both the renewal and the modification, Starry will file separate renewal and modifications with the FCC’s Experimental Licensing System (“ELS”).

<sup>2</sup> See Second Experimental Report, ELS File No. 0072-EX-CM-2016, Post-Grant Exhibits (filed Dec. 6, 2017).

The following additional information is provided in support of this request:

**1. Company Background and Purpose of Operation**

Starry, headquartered at 38 Chauncy Street, 2nd Floor, Boston, Massachusetts (FRN: 0025185505), designs and develops new and innovative equipment and technologies to meet users' communications and information needs, such as for fixed and mobile cellular and private mobile radio communications, backhaul and backbone infrastructure, and broadband transmission capabilities.

Under its existing experimental authority, Starry has evaluated the functionality, reliability and user acceptability of equipment and technologies being designed and developed for operation in microwave bands to support point-to-point and point-to-multipoint communications capabilities. For example, Starry has tested the technical characteristics of prototype equipment, including the propagation and interference effects related to: (a) weather (e.g., rain, snow); (b) foliage; (c) construction materials (e.g., brick, plaster, wood); (d) reflective and multipath transmissions); and (e) power level. As required by the Special Condition No. 1 of its current license, Starry has, and will continue to, file progress reports providing additional information regarding its experimental operations.

**2. Modification of Locations of Operation**

By the instant application for renewal and modification, Starry seeks to delete one location from its experimental license, but also to enhance its experimentation and trials by conducting tests at five additional locations and on additional spectrum. Specifically, it seeks to conduct tests in Sioux Falls, SD; Portland, OR; Manchester, NH; Phoenix, AZ; and Memphis, TN. Starry is also correcting the coordinates of one of the locations.<sup>3</sup> Starry recognizes that the proposed operations are in spectrum allocated in the *Spectrum Frontiers* Proceeding and Starry emphasizes that its experimental operations will comply with all requirements adopted by the agency pursuant to that rulemaking in the event that it may be in use in some areas by other entities or licensees. Accordingly, it will coordinate its experimental tests so as not to operate on channels that are currently assigned to or used by existing or future licensees or entities.

**3. Technical Specifications**

**a. Power Levels and Emissions**

Maximum Transmitter Power Output ("TPO"):	12 Watts Mean
Maximum Effective Radiated Power ("ERP"):	1 kWatt Mean
Necessary bandwidth:	200 MHz
Emissions:	D7D

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<sup>3</sup> In its application, Starry incorrectly listed the coordinates of New York City as 38° 54' 07" N, 77° 02' 26" W, which are being corrected to 40° 42' 46" N, 74° 0' 22" W.

Other emission modes may be utilized, but in no event will the emissions extend beyond the frequency bands requested. All power levels will comply with the limits set forth in the FCC's rules, including those relating to human exposure to radiation.

**b. Location Information**

Starry seeks authority to conduct its experimental operations at the locations authorized in its current license, with the exception of Leesburg, VA, which is being deleted, as well as at five additional locations, as listed in Attachment A and in the accompanying FCC Form 442. Specifically, Starry seeks authority to operate and demonstrate products and services: (i) at its own offices; and (ii) at the premises of entities working under Starry's authorization to evaluate the devices and related software and services. The company also seeks to continue to conduct limited market studies at the locations requested that will involve the lease, but not the sale, of the test equipment so that the company may evaluate the acceptability of various marketing models and policies. Accordingly, these operations would be consistent with the requirements set forth in Section 2.805 of the Commission's marketing rules and 47 C.F.R. § 2.805 (2015); *see also Revision of Part 2 of the Commission's Rules Relating to the Marketing and Authorization of Radio Frequency Devices*, ET Docket No. 94-45, Report and Order, released Feb. 12, 1997, at 11-13, 19-20 ("Marketing Rule Revisions").

**c. Equipment To Be Used**

As detailed in its initial application, to obtain valid data and present an accurate demonstration of real-world operations, the company must deploy a sufficient number of units during its tests to simulate actual usage. The type of capabilities Starry seeks to evaluate would likely be deployed by hundreds of thousands of users. For example, the potential market for the capabilities include the over 350 million consumers that currently subscribe to cellular and cellular like services in the United States.

Starry expects that it will be able to complete its experimentation at each location with 15 or fewer temporary fixed base stations and 250 temporary fixed end user devices at each location identified in Attachment A. In limited cases, however, Starry might need up to 30 temporary fixed base stations and 400 temporary fixed end user devices at a location. Nevertheless, 540 temporary base stations and 7,200 temporary fixed end user devices reflect the *maximum* number of unapproved or unlicensed devices that would be in operation at any given time under the requested authorization.

Moreover, after the experimentation and evaluations cease, Starry would recall and recover all unapproved devices. If any different treatment becomes necessary during the course of its experimentation, Starry will seek separate and additional authority from the agency.

**d. Antenna Information and Station Identification**

The base station antennas to be deployed operate directionally with a one-sided half power beamwidth of 6 degrees. The end user devices operate directionally with a maximum half power beamwidth of less than 8.5 degrees. Since the antennas can be installed in any direction, however, the application characterizes the antennas as omnidirectional. Moreover, the antennas will not extend more than 6 meters above the ground, man-made structure, antenna structure or building. The antennas will be installed and operated in accordance with all FCC and Federal Aviation Administration (“FAA”) rules and regulations.

Starry does not propose to supply station identification as set forth in Section 5.115 of the Commission’s Rules, 47 C.F.R. § 5.115 (2015).

**4. Limited Market Studies**

As noted above, the FCC granted Starry authority to conduct limited market studies in connection with its experimentation that involved the lease, but not the sale, of the test equipment. Moreover, to obtain valid data and present an accurate demonstration of real-world operations, Starry was permitted to deploy the proposed capabilities in a manner that simulates actual usage and, thus, allows the company to evaluate the acceptability of various marketing models and policies. For example, such authority permits Starry to determine, among other things, the effect of: (a) demographics (e.g., household size, household income, age and gender, current type of service/provider used); (b) psychographics / behavioral characteristics (e.g., attitudes, values, lifestyles); (c) competition (e.g., the use and availability of fiber, cable and DSL alternatives); (d) adoption dynamics; (e) penetration/growth rate; (f) customer acquisition costs; (g) usage (e.g., during peak and non-peak periods, type and frequency, maximums and minimums, capacity and usage limitations); (h) pricing; and (i) operational performance and reliability (e.g., propagation and interference characteristics).

Starry respectfully requests that it be granted authority under its modified license to continue to conduct limited market studies as permitted under Section 5.3(k) of the FCC’s rules, 47 C.F.R. § 5.3(k) (2015).

**5. Protection Against Interference**

As noted in its initial application and as repeated in this application, Starry recognizes that the 37-38.6 GHz band is has been assigned in some areas to other licensees. Accordingly, it will coordinate and cooperate with other current or future licensees and users to ensure against interference. Further, company personnel will monitor the operations of other licensees and users before commencing transmissions to avoid interference to such licensees and users. In the event that Starry receives a complaint of harmful interference resulting from the operations as proposed, it will take immediate action to address the interference, including if necessary discontinuing its operations. The company has designated Mr. John Westbrook, whose contact information is provided below, to act as the “stop buzzer” for this purpose.

Notwithstanding the precautions it will take, Starry does not expect harmful interference to occur. First, the proposed operations will be limited in scope. Second, the company will monitor the operations of other users before commencing transmissions to avoid interference. Last, Starry proposes to select channels that are not currently assigned to other licensees or users or are assigned to licensees that have granted consent to Starry for the proposed operations.

## **6. Restrictions on Operation**

Starry recognizes that experimental operations must not cause harmful interference to authorized facilities. It does not anticipate that such interference will occur, but should interference occur, Starry will immediately take reasonable steps to resolve the interference, including if necessary discontinuing operation.

In addition, Starry proposes to advise entities using the equipment that permission to operate the equipment has been granted under experimental authority issued to the company, is strictly temporary and may be canceled at any time. Specifically, Starry proposes to label any unapproved equipment or associated user information conspicuously as follows:

**FCC STATEMENT**

Permission to operate this device has been granted under experimental authority issued by the Federal Communications Commission to Starry Spectrum LLC, is strictly temporary, and may be cancelled at any time. Operation is subject to the condition that this device not cause harmful interference.

This device has not been authorized as required by the rules of the Federal Communications Commission. This device is not offered for sale and may not be sold until authorization is obtained. Thus, the user does not hold a property right in the device and is required to return the device to Starry Spectrum LLC upon its request.

Also, as stated in its initial application and as emphasized herein, Starry will recall and recover all unapproved devices after the experimentation and studies have been completed. If any different treatment becomes necessary during the course of its experimentation, Starry will seek separate and additional authority from the agency.

## **7. Public Interest**

Starry submits that issuance of a modification of license as requested is in the public interest, convenience, and necessity. Grant of a license will permit Starry to enhance and continue its research into the operational and marketing characteristics of innovative equipment and technologies to support important wireless broadband capabilities.

**8. Contact Information**

**Company Contact and Stop Buzzer:**

Mr. John Westbrook  
Starry Spectrum LLC  
38 Chauncy Street, 2<sup>nd</sup> Floor  
Boston, MA 02111  
(781) 361-9096  
fcc@starryspectrum.com

**Legal Representative Contact:**

Mr. Eric DeSilva  
DLA Piper LLP (US)  
500 8<sup>th</sup> St, NW  
Washington, D.C. 20004  
(202) 799-4112  
eric.desilva@DLAPiper.com

## ATTACHMENT A – EXISTING AND PROPOSED LOCATIONS

Starry seeks modification of its experimental authority to: (a) delete the Leesburg, VA test location; and (b) conduct tests at five additional locations listed in the table below (and within a 40 km radius of the coordinates listed below).

Test Location	Center Coordinates (NAD83)	
<i>CURRENTLY AUTHORIZED LOCATIONS</i>		
Boston, MA	42° 21' 01" N	71° 03' 25" W
New York City, NY	40° 42' 46" N	74° 0' 22" W
Washington, DC	38° 54' 17" N	77° 00' 59" W
Los Angeles, CA	34° 03' 00" N	118° 15' 00" W
San Francisco, CA	37° 47' 00" N	122°25' 00" W
Dallas-Ft. Worth, TX	32° 46' 33" N	96° 47' 48" W
Houston, TX	29° 45' 46" N	95° 22' 59" W
Philadelphia, PA	39° 57' 00" N	75° 10' 00" W
Detroit, MI	42° 19' 53" N	83° 02' 45" W
Atlanta, GA	33° 45' 18" N	84° 23' 24" W
Miami, FL	25° 46' 31" N	80° 12' 32" W
Minneapolis-St. Paul, MN	44° 59' 00" N	93° 16' 00" W
Seattle, WA	47° 36' 35" N	122° 19' 59" W
Denver, CO	39° 45' 43" N	104° 52' 52" W
Chicago, IL	41° 50' 13" N	87° 41' 05" W
Cleveland, OH	41° 21' 04" N	81° 38' 58" W
Indianapolis, IN	39° 46' 03" N	86° 09' 29" W
<i>DELETED LOCATIONS</i>		
Leesburg, VA	39° 04' 56" N	77° 28' 42" W
<i>ADDED LOCATIONS</i>		
Sioux Falls, SD	43° 32' 41" N	96° 43' 52" W
Portland, OR	45° 31' 23" N	122° 40' 35" W
Manchester, NH	42° 59' 44" N	71° 27' 17" W
Phoenix, AZ	33° 26' 54" N	112° 04' 26" W
Memphis, TN	35° 8' 58" N	90° 2' 56" W