Experimental License Application for 6.925 GHz – 7.325 GHz Massive MIMO Testing

Introduction

To evaluate next-generation cellular equipment, Samsung requests an experimental license to perform multi-user-multiple-input, multiple-output (MU-MIMO) tests between 6.925 and 7.325 GHz band. The tests will have a single prototype base station and up to 32 mobile radios.

Samsung leads the way in wireless innovation, setting new standards for connectivity, speed, and reliability. With cutting-edge technology and unparalleled expertise, we are redefining the future of mobile communication. Our commitment to research and development ensures that our products stay ahead of the curve, delivering unparalleled experiences to our customers. Experimental licenses such as this help us in pursuit of this mission.

Experiment Description

MU-MIMO operation enables several spatial streams to be used simultaneously to beamform to multiple users on the same time and frequency resources, increasing network capacity. A maximum average EIRP of 81 dBm in 400 MHz will be divided among all the spatial streams. At each test site, Samsung will set up mobile test terminals within a radius of 1 kilometer and a 120° sector.

The full antenna is made up of many sub-arrays. Each subarray operates with a with a 3 dB beam width of approximately 100 degrees. The radiation pattern of an example subarray is shown in Figure 1. Finer beam patterns are achieved for MU-MIMO via precoding the signals across the subarrays/elements. In the case of beamforming to a single user, the minimum 3 dB beam width is 9°. The antennas are prototypes developed internally for this purpose.

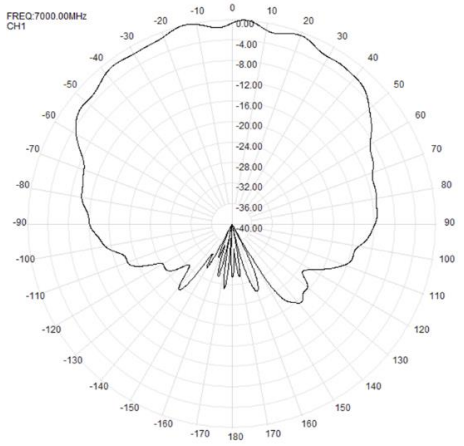

Figure 1. Example radiation pattern measurement from antenna subarray at 7 GHz

The final antenna panel is expected to have over 1000 individual elements arranged in a rectangular grid. We will operate our antenna panel no higher than 23 m off the ground. The corresponding AGL and AMSL are in Table 1.

Samsung will perform MU-MIMO tests with up to 32 users in a sector. During testing, we plan to place our antenna panel on the corner of a building at each site. The details of each site are shown below in Table 1.

Table 2. Site Location Overview

Site Name	Longitude/Latitude	Azimuth	Antenna Height (m)	Mean EIRP / 400 MHz	Signal Bandwidth	Mean EIRP / MHz	Antenna 3 dB beam width (degrees)
Tennyson	N 33° 4' 23" W 96° 49' 52"	315° to 195°	23	81 dBm	100 MHz	55 dBm	9
Excellence	N 33° 3' 53" W 96° 41' 24"	45° to 165°	23	81 dBm	100 MHz	55 dBm	9

Figure 2: Tennyson Test Site. The transmitter will be placed at the corner of the building during testing. The test will take place across a section of parking lot and courtyard space. Azimuths for the beams may range from 315° to 195°.

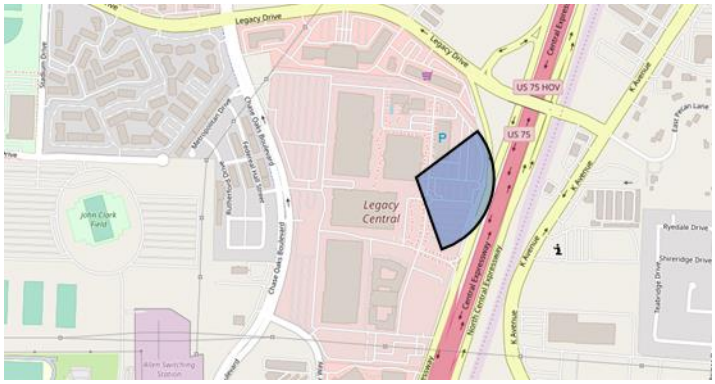

Figure 3 Excellence Test Site. The base station unit will be positioned at the corner of the building and angled to face over the parking lot. Azimuths between the beams to each user will range from 45° to 165°.

Interference Coordination

Samsung is committed to avoiding harmful interference to the spectrum incumbents. Tests will take place only as needed under direct supervision and monitoring. Immediate requests to end transmissions can be directed to Chance Tarver, via email at c.tarver@samsung.com or phone at 3253018992.