

Ingalls Health – High Visibility Chicago Area Hospital Network

Providing in-building mobile network coverage

Background

Ingalls Health is a hospital and health system serving Chicago's south suburbs, consisting of Ingalls Memorial Hospital in Harvey, and three Ingalls Family Care Centers located in Flossmoor, Tinley Park and Calumet City. Existing indoor mobile signal coverage at their hospital and all of the family care centers was deemed unsatisfactory towards meeting mobile user's high expectations.

Comba and local system integrator, Wireless Concepts, have deployed an in-building coverage enhancement systems at the hospital as well as all three family care centers, shown below.

Coverage Challenges

In this digital age, there is the trend of healthcare communications towards the use of high-tech medical instruments, computerized and digitized medical records. Tablets and smart phones are used by medical staff as monitoring and recording devices on the patient's condition. Patient's condition is always updated and made available to the doctors for immediate attention and examination.

Providing an efficient mobile signal with data coverage is essential inside the hospital in order to facilitate fast and reliable communications. There is the need to minimize signal interference between different technologies during the signal combining process. Reducing PIM and interference in the system, between different sectors, ensures high SNIR, to achieve high data throughput.

A key objective is to avoid RF interference with sensitive medical equipment and devices - achieved by design, antenna placement in more sensitive areas, such as ICUs.

Careful planning and good design practices will mitigate interference, ensure network operation efficiency, and yield a superior mobile user experience.



Ingalls Memorial Hospital - Harvey



Calumet City



Flossmoor



Tinley Park

Solution

Comba has provided a cost effective, end-to-end mobile coverage solution, to accommodate a multi-operator (AT&T/Sprint/T-Mobile/Verizon Wireless) and multi-technology network that supports CDMA 850/1900, WCDMA 850/1900 and LTE 700/AWS systems. Comba modular, digital, band selective mBDA repeaters and active fiber optic solutions comprised of Master Units (MUs) and Remote Units (RUs), being deployed in Ingalls Memorial Hospital as shown in Figure 1.

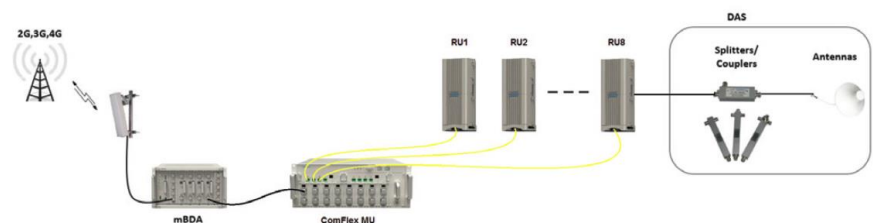


Figure 1: Connection Diagram – Ingalls Memorial Hospital (Harvey)

Summarizing, four quad-band (700/850/1900/AWS MHz) planar donor antennas were installed on the roof top oriented towards the strongest nearby cell site. Two (2) quad-band low power mBDAs, Two (2) quad-band MUs, Ten (10) quad-band medium power RUs, Six (6) quad-band low power RUs and One Hundred and Thirty two (132) indoor serving antennas are deployed at Ingalls Memorial Hospital. Similar design approach is applied at the three clinics / family care centers.

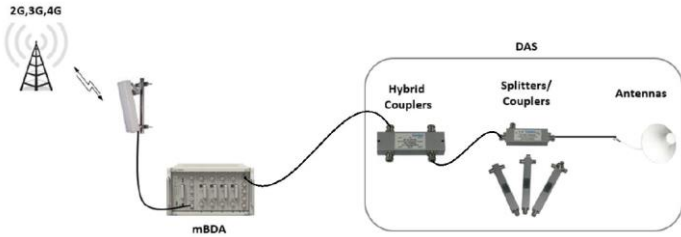


Figure 2: Connection Diagram
 – Family Care Centers
 (Flossmoor, Tinley Park and Calumet City)

To support smaller coverage targets, the clinics / family care centers, only low power mBDA repeaters are used to provide the necessary coverage without active fiber optic solution (MUs & RUs) as shown in Figure 2. In summary, Four (4) quad-band (700/850/1900/AWS MHz) planar donor antennas and Two (2) quad-band low power mBDAs are required at each center to provide full mobile coverage through Seven (7), Fourteen (14) and Eleven (11) indoor antennas at Calumet City, Flossmoor and Tinley Park locations, respectively.

The post-commissioning “acceptance walk test” results have shown that indoor signal coverage strength has been significantly enhanced with average measured value to be better than -80 dBm as shown in Figure 3.

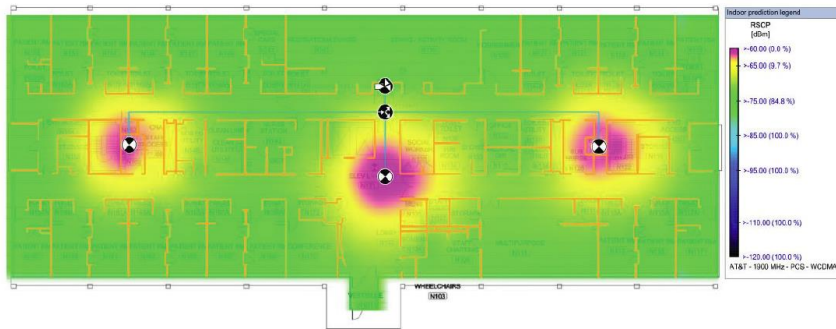


Figure 3: iBwave propagation map
 – AT&T – 700 MHz – LTE / LTE RSRP

Equipment

ComFlex-6100-Series MU & RU



mBDA-200s



Site Photos



Donor Antenna Installation



Remote Unit Installation

Product Features

--ComFlex DAS system is designed especially for multi-operator & multi-technology coverage for in-building apps. The Remote Unit is IP30 with zero noise, convection cooling chassis.

--Comba provides most efficient and compact Remote Unit, for space restricted / site limited installations. Any downtime is minimized with redundant power amplifiers & power supply units.

--User friendly web GUI supports remote monitoring and control of all different models / types of Comba's System Components, inside the equipment closet.