

# TAMU Private Cellular Wireless Network Topics



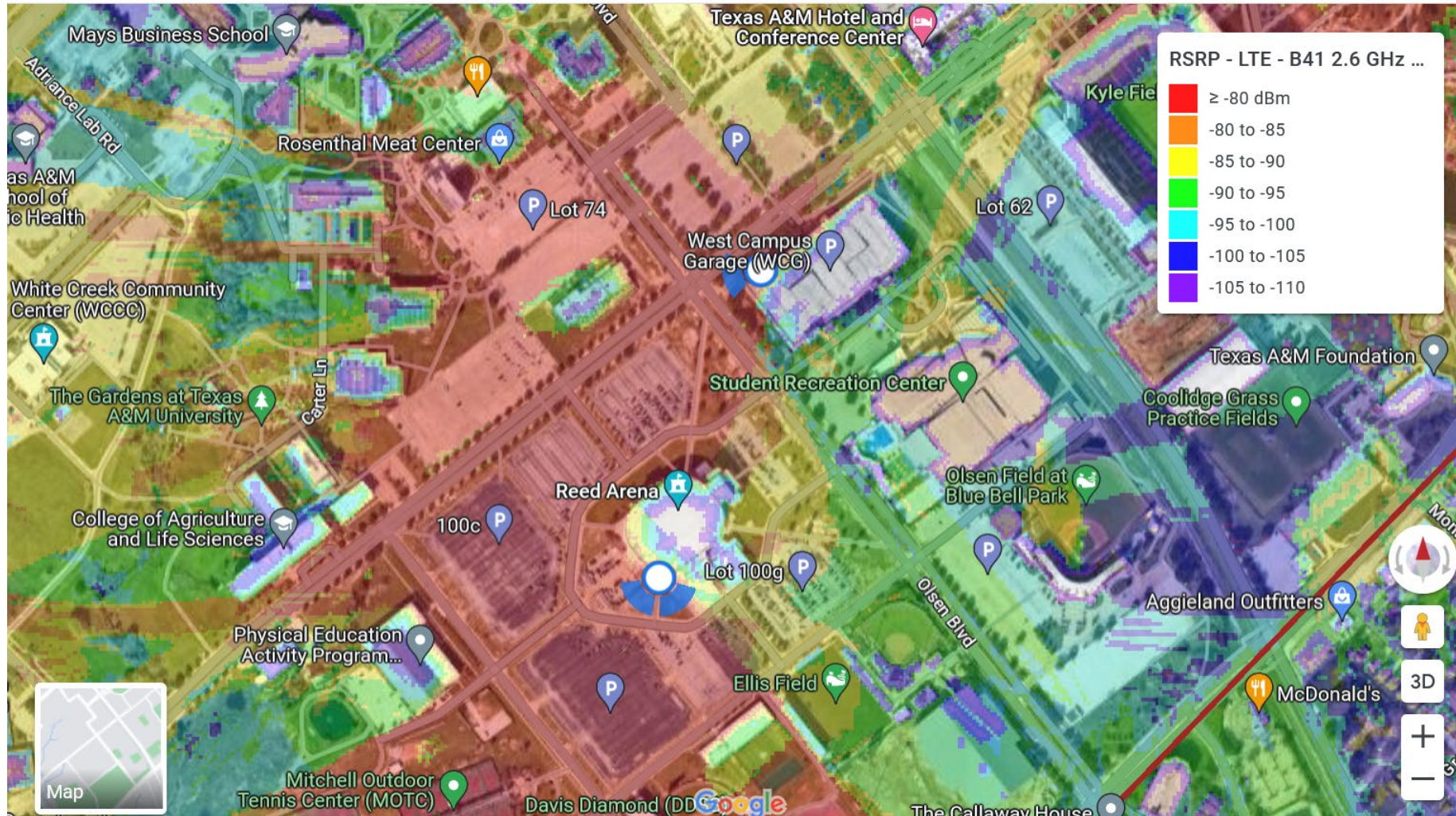
# Overview

- Private cellular needed for operational support and research purposes
  - 1<sup>st</sup> operational use case is TAMU transportation managing parking and buses
  - Research is widely varied
- Spectrum
  - B41 (EBS) @ 2.5GHz
    - Leasing agreements with other license holders will make ~90MHz of spectrum available
  - CBRS
    - TAMU has 1 PAL, will use GAA channels to augment bandwidth
- Equipment is an ever-evolving picture, it's a journey not a destination
  - TAMU starting with Samsung RAN and Druid cloud core
- Daily operations overseen by TAMU staff and Kajeet

# Recipe

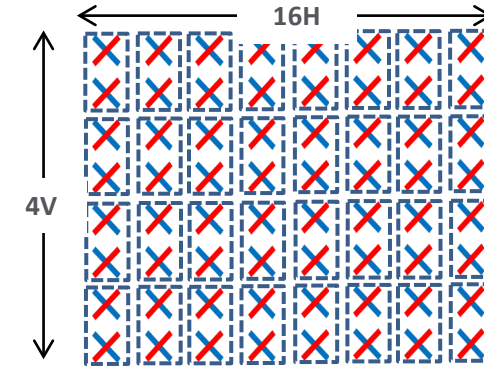
- Recipe for Private Cellular Wireless
  - Design
    - Outsource
      - Various vendors, some bundled service providers
    - In house
      - Google Network Planner for Google SAS customers
  - Build
    - Best method varies with institution, involves **making fiber and power connections to rooftops and lightpole-like structures for RAN nodes**, core equipment in data centers
  - Operate
    - Weave alarming into existing IT NOC organization OR
    - Outsource to service provider

# Band 41 Predicted Coverage



# Antenna Specification

Feature	Specifications
Frequency	2496~2690 MHz
Antenna Configuration	64T64R (4V16H)
Polarization	$\pm 45^\circ$
Port Impedance	50 $\Omega$
Transmit line (0~63) Impedance	50 $\Omega$
Antenna VSWR	< 1.5:1
Max Handling Power / port	$\geq 20$ W
5th harmonic suppression (12480 – 13450 MHz)	40 dB
Element Spacing (electrical length)	Horizontal $0.5\lambda$ @2593 MHz Vertical $0.74\lambda$ @2593 MHz



Sub-array Beam	Half Power Beamwidth	Horizontal	$\geq 60^\circ$
		Vertical	$35 \pm 5^\circ$
	Cross Polarization Ratio	$0^\circ$	15 dB
		$\pm 60^\circ$	8 dB
	Isolation(dB)	X-pol	$> 20$
		Co-pol	$> 20$

Broadcast Beam	Antenna element gain	$\geq 7$ dBi
	Sub-array gain	Typ. 9.5 dBi
	Antenna column gain	15.5 dBi (Based on 8-Array single column)
	Horizontal Beam Width for wide beam	35, 45, 55, 65, 75, 85, 95
	Vertical Beam Width for wide beam	10, 15

# B41/n41 64T64R Massive MIMO Radio – Main Specifications



Item	Specifications	
	LTE	5G NR
Operating Frequency	2496MHz~2690MHz	
RF Chain	32T32R	32T32R
Antenna Element	64 (4V8H)	64 (4V8H)
IBW	60MHz	60MHz
Channel BW/Capacity	5/15/20MHz x 3Carrier	40/50/60MHz x 1Carrier
RF Output Power/EIRP	EIRP: 69dBm ±2.2dB (Conductive Power: 80W, Ant. Gain: 20dBi) Total conductive power: 160W, (LTE 80W, NR 80W)	
Numerology	15kHz SCS	30kHz SCS
Modulation (DL/UL)	256QAM/ 64QAM	
MIMO Layer	DL Max 8L, UL 2L	DL Max 8L, UL 4L
MIMO Functions	MU-MIMO DL 16 layers / UL 4 layers Supporting SU MIMO during MU MIMO LTE/NR 32T32R Split Massive MIMO+3CC CA	
Fronthaul	CPRI (10Gbps x 1port)	CPRI (10Gbps x 2port)
Input Voltage	-48VDC (-38V ~ -57VDC)	
Operating Temperature	-40~55°C (w/o solar load)	
Cooling Method	Natural convection cooling	
Installation	Pole, Wall	
Function Split	Option2	Option 7-2a
Size(HxWxD)/Weight	72.2L(1050x500x137.5mm) / 60kg	
Power consumption	1,275W (@100% RF load @Room Temperature)	

※ Specification is subject to change

# Samsung B41/n41 64T64R Massive MIMO Radio – Dimensions

72.2L (1050 x 500 x 137.5 mm)  
(41.3" x 19.7" x 5.4")

