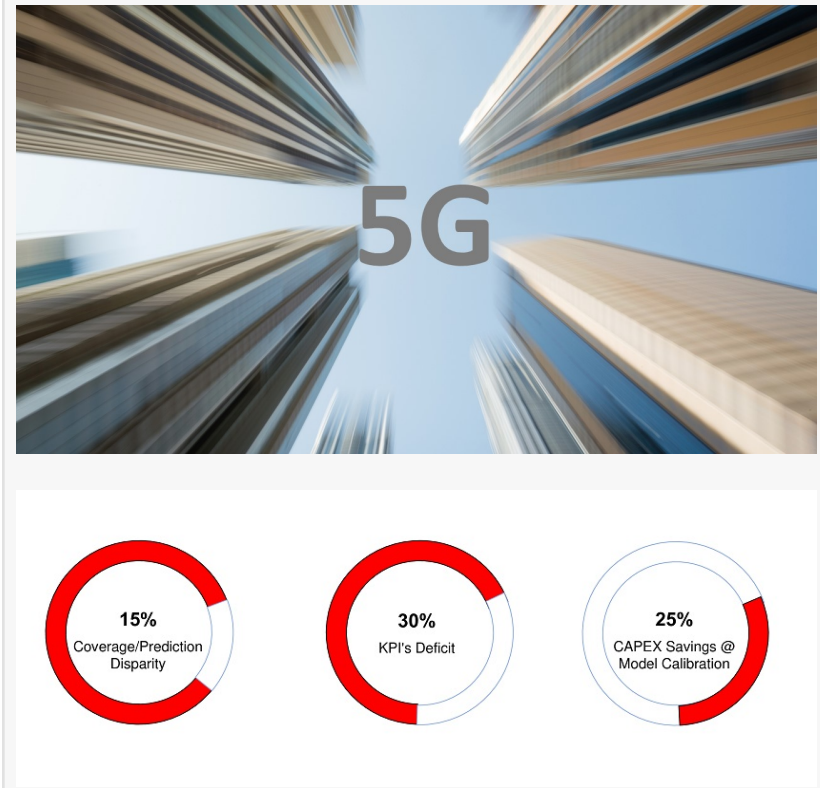
Consultix Fosters 5G Coverage with mmWave Portable Equipment

The Way to Robust 5G Networks



CAIRO, EGYPT, February 5, 2021 /EINPresswire.com/ -- Initial deployment of 5G networks at mmWave bands showed promising indications while experienced coverage gaps and dead spots in some scenarios.

This is something that can't be interpreted far from propagation modeling which is the basis of planning and the knowledge of propagation characteristics is key to fulfill network KPI's and optimize CAPEX.

Propagation studies of sub-6 GHz bands are quite mature; however, less knowledge has been obtained yet regarding mmWave propagation -particularly inside buildings-. mmWave coverage cannot be adequately predicted nor optimized without the aid of real field testing to tune coverage simulations to every area or venue specifics. Else, this eventually leads either to extra infrastructure cost or bad user experience -vs. the 5G promise-.

> Walk your Site before Customers talk"
>
> *Consultix*

Additionally, radio propagation in indoor environment differs greatly from outdoor, not only because of wall losses but also due to complex propagation mechanisms. And all are resulting in a totally different RF behavior that varies greatly even from one place to another within the same building.

• mmWave behaves differently

1. According to Physics, the higher the frequency, the higher the path loss

2. Diffraction plays a considerable role in low GHz propagation; however, its effects significantly decay with mmWave
3. Reflection assists mmWave multipath propagation; however, this is unpredictable
4. At mmWave frequencies, scattering has a great effect on received signal strength and polarization
5. Different materials commonly used in building construction have a diverse of penetration losses that can be up to 40 dB compared to low GHz
6. Signal coming indoors from macro site will experience magnificent attenuation at mmWave compared to low GHz bands.

• The VIRTUAL and The REALITY
Prediction and simulation tools are essential elements during radio planning; however, they can't take into consideration all aspects of each specific site. In several cases, the financial and technical risks could be significant if this adaptation is ignored. And this gave rise to the need for real field measurement in order to optimize infrastructure costs and fulfil operator's KPI's.

1) Outdoor Coverage:
Model calibration is the safety net of coverage simulation, and hence a standard function in any reliable planning software. However, in mmWave case it is becoming a more critical step in order to mitigate the effect of uncertainties, tune the selected model and quantify the growing effects of factors such as Foliage, Raining and Oxygen per every region.

By using tuned/calibrated models for developing new site plans or optimizing an existing cluster of sites, radio planning engineer will be in a better position to set site parameters that accurately model the real world.

2) Indoor Coverage:
While nearly 80 % of mobile traffic originates or terminates within a building, the cost and network complexity of indoor communications systems -particularly at mmWave bands- is strongly a function of the number of small cells or RF node required to achieve coverage objectives. When 49% of architects see the cost of provisioning indoor network is the greatest challenge in their projects, this calls for highly optimized designs.

This is getting the talk of the town knowing for example that most of healthcare workers claim

poor cellular coverage at least some of the time and almost 30 % of warehouse distribution workers have to go outside to make calls.

While leading vendors of indoor planning tools work hardly to make sure materials in their database are as accurate as possible, in fact, the prediction is not always accurate due to the following factors:

1. Database/Reality dissimilarities
2. Missing inputs
3. Wrong material selection
4. One or more material not in DB
5. Other hidden materials on-site

That's why during indoor network planning, RF site measurements should be conducted to examine how propagation mechanisms aggregate at every venue type. And this is the only method to collect true information about the structure, examine the effect of actual wall materials on signal strength and reveal any complex propagation mechanisms.

Worth mentioning, the price increase in case the error is recognized before construction works, is significantly lower than realizing that in a later phase. Thinking which parameters are correct for a given venue? Accurate predictions calibration requires true signal testing employing CW testing process in various building morphologies which can then be used to modify prediction parameters. Otherwise, this will eventually lead to a scenario where everybody is blamed!

• Financial & Technical Interpretation

Post deployment analysis of several projects & case studies showed 3 typical numbers sorting out coverage and KPI's deficiencies in case of prediction-only scenarios and alternatively the cases of CW-augmented modelling.

The chart here summarizes the financial, technical risks and implications when ignoring to fine tune propagation models to each specific environment/venue.

• Consultix Field Test Portability

Professional planning engineers realize the coverage defects due to lack of field measurements during the planning phase. However, the challenge is that test equipment at mmWave bands used to be expensive and bulky for such field missions.

2 years ago, Consultix eyed the incoming demand for portable test tools @ mmWave bands and added to its CW family the world's 1st test transmitter for indoor & outdoor propagation studies up to 28.6 GHz. The first model has been used by leading operators, vendors and service companies in their initial deployments of 5G worldwide.

Recently the company announced the 5G Duo transmitter as the top-tier model in its portable family. The new 40 GHz test transmitter provides unprecedented power levels to serve both

indoor and outdoor model calibration campaigns. And it is characterized by the same family attributes such as portability, simplicity and value-for-money.

Since field setup at this band is quite tricky, and sourcing the right accessories might be overwhelming for project managers, Consultix as a one-stop provider for CW test solutions made available a turn key system including high-gain antennas, low-loss cables, non-metal tripods as well as training on the best practices for high measurement integrity.

Leveraging real case studies and field analysis the company in general helps decision makers to build their business cases aiming at delivering the promised mmWave performance.

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