

Leading the way in 5G



Summary

The Brooklyn 5G Summit
April 23-25, 2014

Brooklyn 5G Summit 2014 (<http://brooklyn5gsummit.com/>)

Organized by NSN and NYU

1st Brooklyn 5G
Summit:
New York
23rd -25th April 2014



Participants from
industry, academia
and regulators

150

General
presentations,
open microphone,
panel discussions,
exhibitions, IEEE TV
live broadcast

Many channel
measurements
results and
preliminary
channel models
presented.

Antennas,
propagation and
channel
modeling

>6 GHz

Keynote speakers,
including e.g.
Mr. John Stankey
(AT&T) and Seizo
Onoe (NTT
DOCOMO)

5



Millimeter wave
communication
proven suitable for
backhaul and (small
cell) access - so far no
show stoppers. More
work needed.

Brooklyn 5G Summit – Blogs, Articles and Press Releases

- **Blog:** “Brooklyn 5G Summit: brainstorming real solutions” by Amitava Ghosh, NAM Radio Systems Research, @NSNtweets_ : <http://bit.ly/1jzM9Lj>
- **1st RCR Wireless Article:** <http://www.rcrwireless.com/20140506/opinion/reality-check-5g-performance-can-expect>
- **2nd RCR Wireless Article :** <http://www.rcrwireless.com/20140513/policy/reality-check-defining-future-5g-wireless>
- **Press Release;** <http://nsn.com/news-events/press-room/press-releases/nokia-and-ntt-docomo-pave-the-way-for-5g>
- **Light Reading Article :** <http://www.lightreading.com/mobile/mobile-security/docomos-2020-vision-for-5g/d/d-id/708784>
- **NSN Inside News:** <https://inside.nsn.com/sites/news/insidenews/2014/may/pages/brooklyn-5g-summit.aspx>



Thank you

Brooklyn 5G Summit – Focus on antennas, propagation & channel modeling

Preliminary Conclusions

- Millimeter wave band communication is already proven suitable for backhaul and no show stoppers were identified for use in small cell mobile access
- Preliminary conclusions from channel measurements (Indoor and outdoor) for 28 GHz- 100 GHz bands
 - Pathloss exponent : LOS ~ 2.0 , NLOS ~ 3.4-3.5 (Reference distance based model) - similar as for lower frequency bands
 - Modeling of blockage is important at mmWave band
 - mmWave frequencies have similar reflection loss as lower frequency bands but much higher diffraction loss
 - Rain/Oxygen no problem for ISD < 200 meters
 - Further work needed to clarify whether mmWave systems are noise or interference limited
 - Outdoor and Indoor deployments, System Bandwidth, Bands covering 28 GHz-100 GHz
- Channel modeling options: based on 3GPP or do we need a more complex model?
- Antenna opportunities
 - Additional pathloss at higher frequency bands can be compensated by increasing size of antenna arrays for additional beamforming gain while keeping the aperture size the same.
- Common sense: more extensive measurements needed



Way forward

Capitalize momentum of the conference and start defining the channel model and measurements for 5G systems, possibly with a joint data base for measurements conducted in different regions of the globe.