Next Generation Wireless Technology

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24th of November 2017 (2.30pm – 3.00pm)
BICSI South East Asia (SEA) 15th Conference
Avani Riverside Hotel - Bangkok, Thailand

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Agenda

• Wireless Design
• Wireless Validation
• Wireless Security
• New Wireless Technologies
Wi-Fi Design in buildings

- 3D wireless designs
- 3D Antenna Patterns
- Cable Path planning
- Project & BoM
Dual 5 GHz radios

- 2x 5 GHz radios in 1x Access Point (AP)
- RF planning tools need to support it
- Smaller cells
- Proper channel planning
Residential Wireless

- Cabling per room (and APs where needed)
  e.g. Finland, Cat-6 cabling per room

- Wi-Fi Mesh Access Points
  e.g. Service Providers in Singapore

Note: Wi-Fi repeaters degrade your Wi-Fi network performance

IPTV streaming (see Globeron 1-2-3)
Site Survey Tools

• Site Survey Tool + External Site Survey Device

(2.4 GHz / 5 GHz / Spectrum)
KRACKS (published 16 Oct 2017)

- https://www.krackattacks.com/
- **Key Reinstallation Attacks**
- Breaking WPA2 by forcing nonce reuse
- *Discovered by Mathy Vanhoef (researcher at the University in Leuven, Belgium)*
- Solution both Clients and AP need to be patched
Wireless Security – WPA2-PSK

• Reminder - you can patch “KRACKS”, but
• If you know the password then still WPA2-PSK data frames can be decrypted (both TKIP and AES) and you authenticate/associate to the network.
• Globeron 1-2-3 series: http://www.youtube.com/wwwgloberoncom
• Obtain passwords:
  – Displayed on tables (e.g. Coffee shops)
  – Social Engineering (just ask for it)
  – Extract it from the Windows registry
  – Or file on the mobile phone
• PPSK (Person / Private / Per-user PSK)
WPA2-Enterprise

- Man in the Middle (MITM) attack
Emerging Mobile/Cellular Standards

- 5G
- Spectrum Auctions can be challenging
- Small cells in building
Emerging Wi-Fi Standards

- **IEEE 802.11ad**
  - Aka “WiGig”
  - 60 GHz

- **IEEE 802.ai**
  - FILS Fast Initial Link Setup
Emerging Wi-Fi Standards

• **IEEE 802.11ax**
  – MU-MIMO Downstream / Upstream
  – 2.4 GHz and 5 GHz and backwards compatible
  – Better power savings
  – Maybe 6 GHz spectrum

• **IEEE 802.11ay**
  – Improvement of IEEE 802.11ad
  – 60 GHz with speeds up to 20-40 Gbps
  – Backhaul or Mesh
Emerging Wi-Fi Standards

• **IEEE 802.11ah**
  – 900 MHz - longer range - 350 Mbps
  – IoT – Internet of Things
  – Aka “HaLow”
  – Better power savings

• **IEEE 802.11af**
  – UHF-VHF spectrum between 54 and 790 MHz
  – Super WiFi or White-Fi (TV White Spaces)
  – Requires a license
Wireless Experts - we want wireless services that work
ITU-T’s Key Performance Indicators (KPI’s) for Smart Sustainable Cities (SSC)

- ICT (Information Communication Technology)
- Productivity
- Environmental Sustainability
- Physical Infrastructure
- Quality of Life
- Equity and Social Inclusion

Sources: ITU-T SSC KPI, Smart Nation SG  [http://www.smartnation.sg/]
Emerging

- **IoT** – Internet of Things / IoE (Everything)
- **SoT** – Security of Things
- **Smart Villages**
  - Thailand, India, etc.
  - Reduce the digital divide
  - New business models
  - Local language
Sustainable Development Goals (SDG) by United Nations

1. No Poverty
2. Zero Hunger
3. Good Health and Well-being
4. Quality Education
5. Gender Equality
6. Clean Water and Sanitation
7. Affordable and Clean Energy
8. Decent Work and Economic Growth
9. Industry, Innovation and Infrastructure
10. Reduced Inequalities
11. Sustainable Cities and Communities
12. Responsible Consumption and Production
13. Climate Action
14. Life Below Water
15. Life on Land
16. Peace, Justice and Strong Institutions
17. Partnerships for the Goals
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