

IEEE 802.19 Wireless Coexistence Working Group

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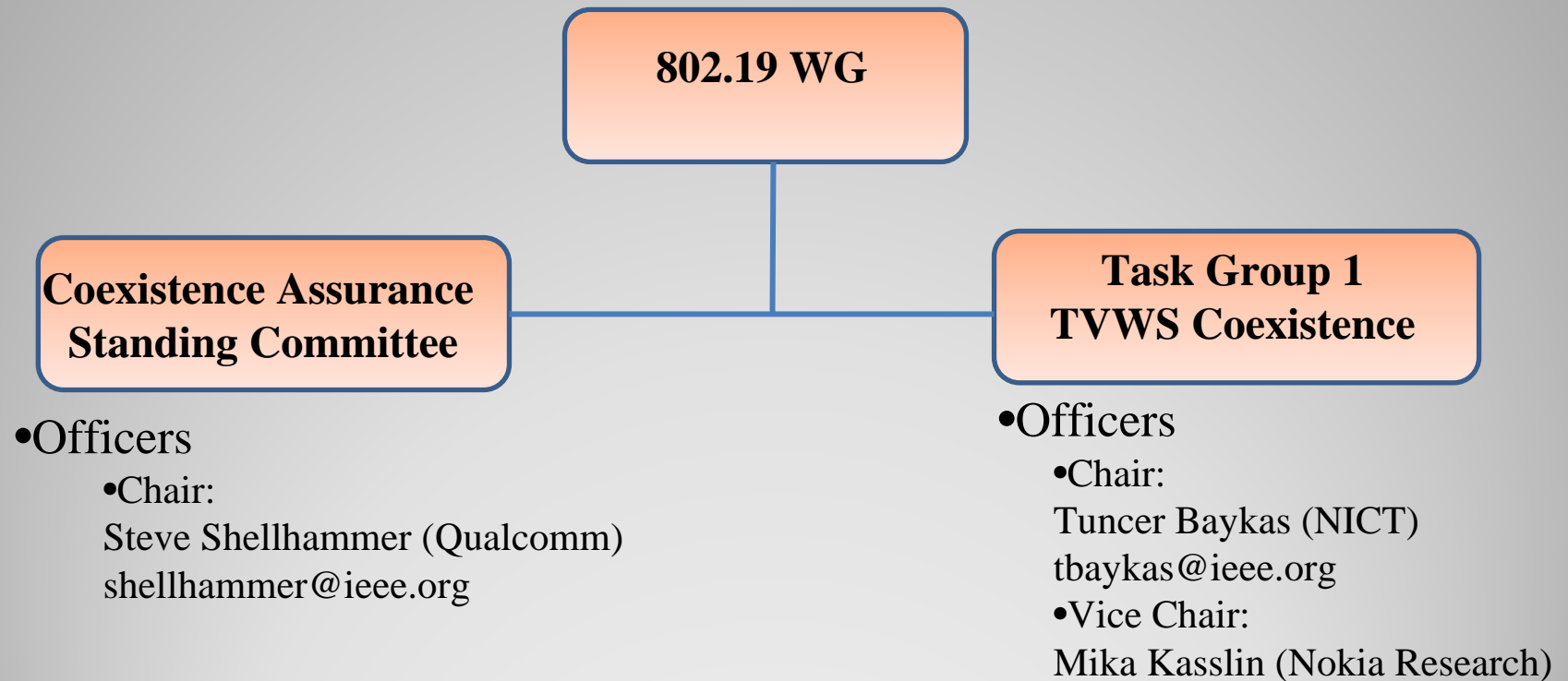
Summary

- Structure of IEEE 802.19 Wireless Coexistence Working Group
- Coexistence between 802 Networks
- TV White Spaces and 802.19 Task Group 1

IEEE 802.19 Wireless Coexistence Working Group

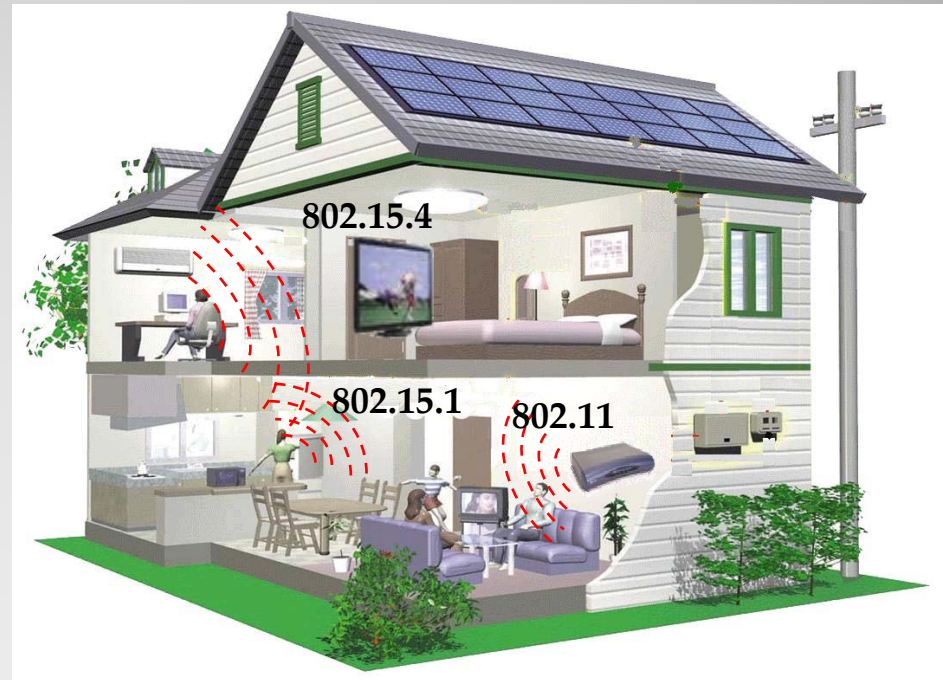
- Providing technical advice to the working groups and evaluating coexistence assurance documents.
- Preparing a standard, which enables effective use of TV White Spaces by IEEE 802 algorithms via coexistence methods.
- **Website:** <http://www.ieee802.org/19/>
- **Officers**
 - Chair: Steve Shellhammer (Qualcomm) shellhammer@ieee.org
 - Vice Chair: Ivan Reede (Amerisys)
 - Editor: Mark Austin (Ofcom)
- Number of Voting Members: 46
- Number of attendees during last meeting: 37 (5 Mandarin speaking)
 - Junyi Wang: junyi.wang@nict.go.jp

IEEE 802.19 WG Structure



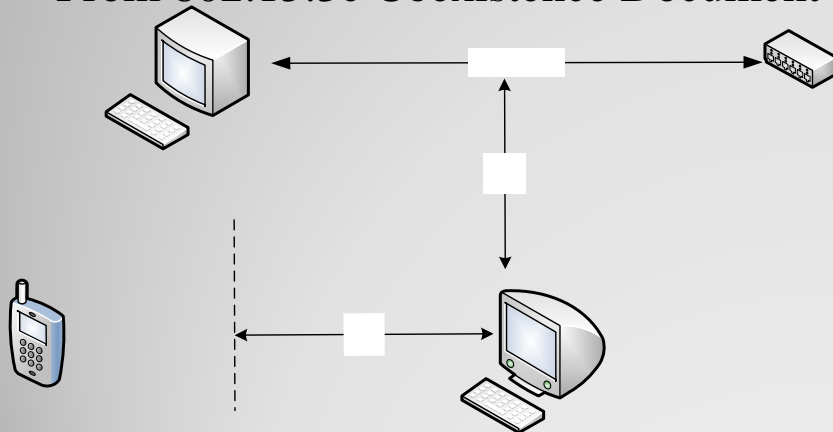
Coexistence among 802 Networks

- Wireless standards developed by IEEE 802 operate in unlicensed spectrum.
- Therefore many networks can operate in a relatively small area in the same spectrum band.
 - For example, in the figure 802.15.1, 802.15.4 , 802.11 may operate in 2.4 GHz ISM band.
- As a result transmissions from different devices interfere each other and communication could be disrupted.
- 802.19 checks if 802 standards are taking necessary precautions to coexist with other 802 standards.



Coexistence Assurance Document

- Each standard should provide a coexistence assurance document, if it is operating in an unlicensed band.
- The CA document
 - lists the other unlicensed 802 wireless standards that could have a potential mutual interference with the proposed standard
 - develops a model for the mutual interference between the proposed standard and all other potential mutual interferers
- From 802.15.3c Coexistence Document



Throughput

| | x:2m | 5m | 7m | 9m | 11m |
|------|------|-------|-----|-----|------|
| y:0m | 0% | 0% | 0% | 0% | 20% |
| 0.5m | 0% | 0% | 0% | 0% | 30% |
| 1m | 0% | 0% | 0% | 0% | 40% |
| 1.5m | 0% | 0% | 0% | 0% | 80% |
| 2m | 100% | 0% | 0% | 0% | 95% |
| 2.5m | 100% | 0% | 0% | 31% | 100% |
| 3m | 100% | 98.4% | 40% | 90% | 100% |

Responsibilities of the 802.19 Working Group

- Evaluation of coexistence assurance documents for IEEE 802 wireless standards.
- Providing technical advice to the working groups and the IEEE 802 Sponsor Executive Committee (SEC) upon request
- Voting as a body on coexistence issues in wireless working group letter ballots that are accompanied by coexistence assurance (CA) documents.
- Proposing changes to IEEE Project 802 Policies and Procedures on issues of coexistence
- **In Dec 2009**, 802.19.1 Task Group is established with the aim of preparing a standard, which enables the family of IEEE 802 Wireless Standards to most effectively use TV White Space by providing standard coexistence methods among dissimilar or independently operated networks and devices.

Introduction to TVWS

- TV White spaces refer to frequencies allocated to a broadcasting service but not used locally in .
- In 2008, FCC of USA ruled that unlicensed devices that can guarantee that they will not interfere with assigned broadcasts can use the empty white spaces in frequency spectrum. This decision created more than 250 MHz new available spectrum in UHF and VHF bands.
- Currently there are 2 IEEE 802 Groups, 802.11.af and 802.22 working on developing PHY/MAC standards.
- Using such broad spectrum in a fair and efficient manner creates need for coexistence methods.

Coexistence methods provide,

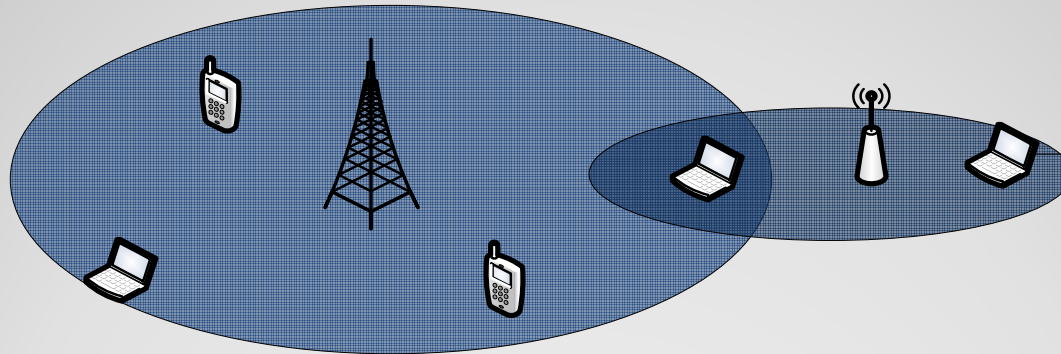
- A means of discovery and connection between networks
- A set of coexistence parameters providing information about the interference environment and the set of MAC/PHY capabilities
- Algorithms for adapting MAC/PHY parameters to enhance coexistence between networks

As a result:

802.19.1 will enable better use of spectrum and higher quality of service in TVWS.

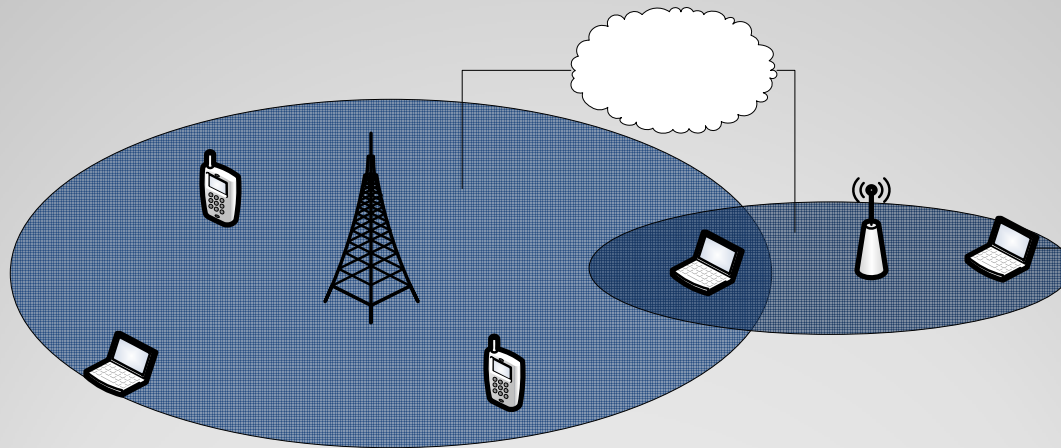
Basic Example

Two independent and heterogeneous networks operating in the same TVWS band



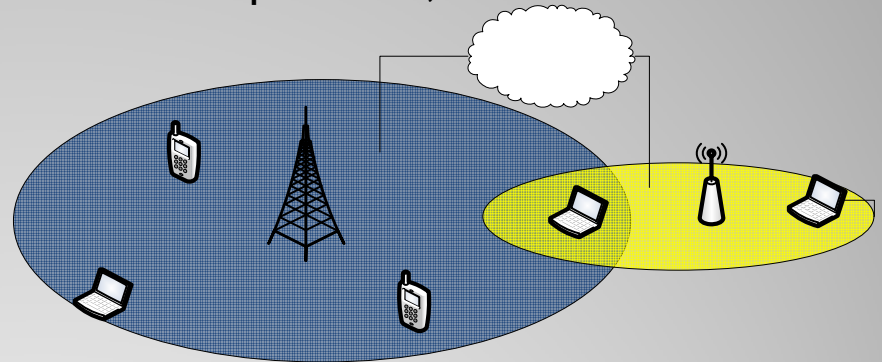
Basic Example

802.19 will enable discovery between networks and through coexistence methods, networks can...

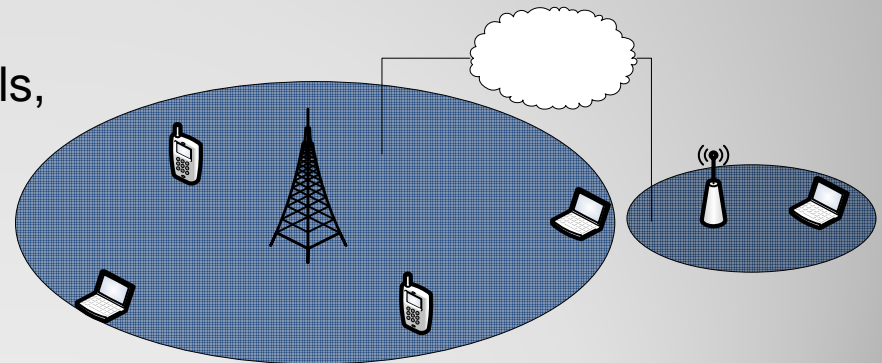


Basic Example

Networks can for example choose different frequencies,



or arrange their transmit power levels,
to reduce interference and improve
QoS



Current Status of 802.19.1

802.19.1 created system design document to assist standardization process and call for proposals document, which are available at <http://ieee802.org/19/pub/TG1.html>.

SDD provides,

- **System Requirements**
- **802.19.1 System Architecture, which includes entities such as Coexistence Discovery and Information Server and Coexistence Manager and necessary Interfaces.**
- **Outline of the Standard**
- **Terminology**

SDD does not put any limitation on future contributions. 802.19.1 will hear contributions during May and July 2010 meetings.

Possible Contribution Topics

- System design, including reference model and SAPs.
- Radio technology independent methods for coexistence
- Means of communication and protocols for exchanging information between dissimilar or independently operated devices and networks
- Coexistence parameters providing information about the interference environment and the set of MAC/PHY capabilities
- Algorithms for adapting MAC/PHY parameters to enhance coexistence between networks
- Interference mitigation techniques

Way forward

- 802.19.11 is planning to give a tutorial and organize a workshop during July IEEE 802 meeting.
- Group will hear proposals on system design and coexistence algorithms during September and December meetings.
- According to current Time Plan, standard will be submitted to 802 EC committee in 3 years.

Thank you very much

- Any Questions?