7IEEE P802.19
Wireless Coexistence

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| DRAFT July 2009 Minutes |
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Abstract

This document contains minutes of 802.19 Coexistence TAG and Study Group held at IEEE802 Plenary in San Francisco.

There were five sessions of the TVWS SG where ten documents were discussed. The output of the meeting was:

* IEEE 80219-09-0026R5 approved as the SG TVWS Use Case document; and
* A motion was passed to ask the EC for permission to develop a PAR, a preliminary draft PAR was also submitted to the EC for information.

The TAG met this week and approved the motion to ask the EC to rescind the PAR for the RP. It was agreed that the need for the RP had been superseded due to the increased number of CA (six) available on the 802.19 home page.

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# MEETING TIMES

Meetings were scheduled for:

* Tuesday 14 July 2009 @ 13:30 – 15:30: TVWS Coexistence Study Group
* Tuesday 14 July 2009 @ 19:30 – 21:30: TVWS Coexistence Study Group
* Wednesday 15 July 2009 @ 13:30 – 15:30: TVWS Coexistence Study Group
* Wednesday 15 July 2009 @ 16:00 – 18:00: TAG
* Thursday 16 July 2009 @ 13:30 – 15:30: TVWS Coexistence Study Group (additional timeslot)
* Thursday 16 July 2009 @ 16:00 – 18:00: TVWS Coexistence Study Group

# OBJECTIVES FOR THE MEETING

* Presentations on TV white space use case and coexistence scenarios
* Presentations on TV white space coexistence mechanisms
* Discuss any next steps
* Any TAG business as needed

# MEETING MINUTES

First session of the meeting was called to order on Tuesday 14 July 2009 at 13:35

### APPROVE AGENDA

The Chairman opened the meeting and introduced the agenda in Document 802.19-09-0003

Alex Resnik proposed the following changes to the agenda:

* Motion on use cases to be added for Thursday;
* Allocating time to discuss the study group extension and tasks on Thursday.

Joe: Requested that the PAR discussion discussed on the teleconference was to be assigned to this meeting.

Mark Cummings: Requested that an additional timeslot on Thursday PM1 be added as more time would be needed for the TVWS discussion.

These requests were approved and the chair revised the agenda.

The meeting agenda was approved (13:45)

### IEEE IPR STATEMENT

The Chairman informed the TAG about the IEEE patent policy and showed the set of 5 slides identified as “Highlights of the *IEEE-SA Standards Board Bylaws* on Patents in Standards” available at the IEEE PATCOM web site (<http://standards.ieee.org/board/pat/pat-slideset.ppt>). He directed the secretary to record the fact that this presentation was made in the minutes for the meeting. He asked if anyone wished to make a disclosure. No one spoke up.

### REMINDER ABOUT USE OF AUTOMATED ATTENDANCE SOFTWARE

The attendance system was reviewed and all delegates were asked to report any problems logging attendance to the Chair.

### APPROVE MINUTES FROM MAY INTERIM MEETING AND 07/07/09 TELECONFERENCE

The minutes for the last Co existence TAG meeting in May (Document IEEE802.19-09-0028R1) were reviewed and approved. (13:47).

The minutes for the teleconference call held on the 07/07/09 were reviewed and approved. 13:48

# Main Body

Note: The italic indented text is copied directly from the presented documents.

### Tuesday PM1

**Document IEEE 80219-09-0026R2** was presented by Alex Reznik.

*This document contains a discussion of coexistence use cases, text proposal for three use cases and a discussion on the coexistence matrix.*

Comment

* A new revision of this document will be needed to correct errors in the Coexistence matrix present in this version of the document.
* Thomas Kolze had asked for a text to the third paragraph of section 1, his request had been sent to the 802.19 reflector and had been missed by the authors; this text will be discussed offline and incorporated in the next version of the document.

**Open forum discussion**

Due to a 30 minute free slot in the agenda the Chair asked for an open forum discussion on the next steps / way forward for the SG; this is summarised below.

* Concerns were raised that Working Groups within 802 felt that the work within this Study group was not progressing.
* As an introduction into the work of the study group the Chair introduced document IEEE802.19-09-0010r4 that contains the current tasks of the Study Group as set out in the May interim.
* The group was close to completing the first task to develop use case once document IEEE802.19-09-0026 was completed.
* The group discussed how the work should be carried on; the options centred around whether to develop a PAR to create a WG to focus on coexistence or to carry out this work within IEEE802.19.
* Many of the WG in IEEE 802 want to have control of their development within TVWS band, this will be the same for SDO outside IEEE802. It would be good to have an umbrella group to allow the different technologies to communicate.
* Whether the work was carried out in 802.19 or in an new WG, it was agreed that:
	+ the work would have to be ‘given teeth’ for it to be recognised; how this could be achieved was not agreed;
	+ the work should be relevant i.e. it should be carried out in parallel or slightly in front of the development of the PHY/MAC requirements in the WGs. It was felt if the work lagged behind or looked at coexistence of technologies once the standards were in letter ballot, it would be too late.
	+ Whatever method that was adopted to carry out this work; the group felt that the only way that it would be adopted by the working groups was for it to be relevant and of a high quality.
* The general feeling within the SG was they were happy with the work of the SG so far. However, there were some concerns raised about where this information would go i.e. to the EC or to the WGs and also whether the work should be normative or informative.

**Doc IEEE 802.19-09-00048R1 TVWS Coexistence Use Cases – User Experience** was presented by Mariana Goldhamer

Comments

There was a long discussion on the levels set out in slide 5.

Mariana confirmed this paper advocated synchronised silent intervals; if you have a synchronised silent period to sense the incumbents, you can use this period for coexistence.

Meeting adjourned: 15.34

**Tuesday Evening**

Meeting opened: 19.32

The Chair confirmed that there would be an extra session on Thursday PM1 and this could be used to allow a discussion on the SG future.

**IEEE 802.19-09-0047 White space database** was presented by Minnie Ingersoll, Google, Inc.

*Brief background on Google’s interest in spectrum and our involvement in TV White Spaces. TV White Spaces Database requirements, Group formation, membership, and Google’s view of work being done in the WSDB Group. This presentation will briefly cover the ongoing work to define White Space database security, interfaces, and specifications for data integrity.*

Comments

Questions were raised about how to join and how the IEEE 802 could communicate with the TVWS Database group. This group has been meeting on a more informal basis; they are now looking at formalising the work.

The SG TVWS felt it would be good to set up a dialogue with the TVWS Database group; how this will be carried out will be discussed this week and on future teleconferences. It is expected that the communication between the groups will be in the form of a liaison statement though it could also be a presentation.

Attendees discussed with Minnie the content of the presentation, the interpretation of the FCC R&O, what data would need to be held in the data base and data security of the information.

The group thanked Minnie for this informative presentation and discussion.

**IEEE 802.19-09-0044 Alternatives For Coexistence Mechanisms in White Space** was presented by Mark Cummings

***Presentation Objectives***

* ***Outline The Alternatives***
* ***Present a Framework For Discussion***
* ***Assess The Forces At Work***
* ***Recommend a General Way Forward***

Comments

It was agreed that it made sense to maintain open communication channels between all the different groups working on this issue and that if there is an incentive then these groups will work together.

Meeting closed 21.25

**Wednesday PM1**

Meeting opened 13.34

The Chairman posted Revision 7 of the agenda.

**IEEE 802.19-09-0046 A Cooperation Mechanism for Coexistence between Secondary User Networks on TVWS** was presented by Ari Ahtiainen

*This presentation deals with coexistence between secondary user networks operating in TVWS. Database is believed to be the solution to protect the primary users of the TVWS spectrum. We doubt its applicability to address coexistence problems between all secondary users. In this presentation we present an idea of a cooperation network to address the problems in a distributed and more flexible manner.*

Comment

There was extensive discussion on the proposals in this presentation; we concluded it was a good introduction. The previous presentations on Tuesday talked about what the information is going to be exchanged and the group felt that the document IEEE 802.19-09-0046shows a way how this could be carried out.

**Eldad Perahia presented IEEE802.11 view on the work being carried out in the TVWS SG**

The slide presented was in Doc 802.11-09/0763r1 slide 7 and is shown below,

* ***Two use case documents presented to 802.19 depict how 802.11 would behave in TVWS***
	+ [*https://mentor.ieee.org/802.19/dcn/09/19-09-0026-01-tvws-whitespace-coexistence-use-cases.doc*](https://mentor.ieee.org/802.19/dcn/09/19-09-0026-01-tvws-whitespace-coexistence-use-cases.doc)
	+ [*https://mentor.ieee.org/802.19/dcn/09/19-09-0031-02-tvws-tvws-coexistence-use-cases-user-experience.doc*](https://mentor.ieee.org/802.19/dcn/09/19-09-0031-02-tvws-tvws-coexistence-use-cases-user-experience.doc)
* ***Both misrepresent 802.11 and should not be considered as an 802.19 position***
* ***Both make claims about how 802.11 devices will behave in the TVWS bands even though 802.11 does not specify operation in this band***
* ***There are numerous examples of band specific modifications to 802.11, so assumptions based on basic 802.11 operation in an ISM band from 1999 are unfounded***
	+ *802.16h/802.11y simulations demonstrated good coexistence*
* ***There is a time slot in 802.19 on Wed 2-2:30pm for 802.11***

Comments

A delegate asked what version of 802.11 had been used to populate the matrix as it was felt 802.11k addition of radio resource measurements would be able to help sense the environment.

The outcome of the discussion was the authors of Document IEEE80219-09-0026R2 would liaise with Eldad to edit the document to incorporate his comments and to try to reach an agreed way forward.

The chairman confirmed that:

* the use case documents would be left as separate documents and these would not be merged;
* the SG TVWS were not planning to send the use case documents to the EC but would send them to the WG’s as advisory information.

**IEEE 802.19-09-0045 Need for Coexistence Certification Testing? Was presented by Fanny MLinarsky**

*This contribution poses a question to the group about the need for coexistence certification testing, particularly since increasing number of 802 and non-802 wireless services now need to share the airwaves under new FCC regulations.*

Comments

Delegates commented it was not clear whether sensing testing would be carried out in the lab or in the field. The complexity of the test bed could be an issue depending on the type of solution that is chosen, and that the protection of the incumbents would not be such a difficult issue as testing the coexistence between TVWS devices.

**IEEE 802.19-09-0049 The Geographic Electromagnetic Radiation**

**Domain Control System (GERDCSTM)** was presented by Ivan Reede.

*The Geographic Electromagnetic Radiation Domain Control System (GERDCSTM) this system was seeded from the need to promote frequency reuse, plan for coexistence between licensed and license-exempt spectrum users, determine spectrum availability and efficiently convey needed information in a timely manner. It consists of a web of client, server and resolver computers.*

Comments

Ivan clarified that this system is under development and that it is being used in the AmeriSys network.

Apart from this presentation there is no open document describing this system, but one is currently being developed.

Meeting recess: 15.43

**Wednesday PM2**

TAG meeting was opened at 16:10

The only issue on the TAG agenda for this meeting was the status the Recommended Practice. There was a base document created from the original inputs but no contributions had been received for over a year. The TAG believed this was in part due to work of the TAG focusing on the development of the Coexistence Assurance (CA) documents. There are now six CA documents on the 802.19 home page and these could be used by future WGs as a resource when they create new CA documents.

Motion

With the fact that there are 6 CA documents that can be used as examples for producing future CA has superseded the need for a recommended practice on how to produce a CA document. Hence the TAG moves to rescind the PAR P802.19 entitled “Recommended Practice for Information Technology – Telecommunications and information exchange between systems – Local and metropolitan networks – Specific requirements – Part 19: Methods for assessing coexistence of wireless networks”

Moved: Mark Austin

Second: Steve Shellhammer

Vote: 2/0/0

Future business was discussed and it was noted that currently 802.15.4 g and 802.11 ad are developing CA documents.

It was also noted that the 802.11n has added a coexistence mechanism to avoid Bluetooth and Zigbee.

16.40 meeting adjourned.

**Thursday PM1**

Meeting called to order 13:35

**IEEE 802.19-09-0050 On-demand spectrum contention: scalable and fair spectrum sharing protocol for TVWS coexistence** was presented by Wendong Hu

*This contribution presents an overview of the On-demand Spectrum Contention (ODSC) protocol for distributed and dynamic spectrum sharing in TV white-space.*

Comments:

A step-by-step description will be in the next presentation either to teleconference or the September meeting.

**Document IEEE 802.19-09-0032r1 Logical Sector-based Resource Hopping Coexistence using Direct Communication** was presented by Apurva Mody

* *This contribution discusses methods for resource allocation in situations that demand coexistence*
* *We propose Two Modes of operation – Normal mode and Co-existence Mode*
* *We propose that a TVBD system will try and resolve the channel selection issues with neighboring TVBD systems, first, based on what is known as spectrum etiquette in 802.22.*
* *If channel selection does not get resolved using spectrum etiquette, then the TVBD system will go into the Co-Existence Mode. Co-Existence Mode of operation is when it is expected that a TVBD may interfere with other TVBDs in the area.*
* *How the system resource is divided can be left up to future discussion. From the our perspective, we propose sub-frame creation and sharing – concepts similar to the ones discussed in IEEE 802.16h.*
* *In the co-existence mode, the sub-frames are divided into zones. Clock-wise or anti-clock-wise rotation policy is followed to achieve diversity and control message passing.*
* *Using sub-frame for resource allocation allows guaranteed QoS, delay and jitter requirements in situations that demand co-existence – It can drive applications such as VoIP and Gaming*
* *We also suggest a couple of basic coexistence metrics*

Comment

There was a discussion on the metrics that were presented and possible additional ones that would need to be considered in future discussions.

**Study group extension and Tasks**

Straw poll

Is there a need for a PAR for a coexistence standard in the TV white space?

Vote

Yes: 33

No: 1

Abstain: 4

The group discussed the need to have a motion to include a draft scope and purpose of the PAR; this was requested by the Chair of IEEE 802 who was present at the meeting as it would give specific information / clarity to allow the EC to decide on the way forward.

**MOTION**

Move to extend the study group to write a PAR for a coexistence standard in the TV white space

Move: Alex Reznik

Second: Ivan Reede

Yes: 34

No: 1

Abstain: 2

Motion passed

The group then discussed a draft title for the PAR

Draft Title:

**MOTION**

To adopt ‘Standard for coexistence of 802-based devices operating in the white spaces of the TV bands’ as the title for the PAR

Move: Ivan Reede

Second: Alex Resnik

Yes: 33

No: 0

Abstain: 4

Motion passes

PM1 closed: 15.30

**PM2**

The meeting opened at 16:02

**MOTION**

Move to add “IEEE” before 802-based in the draft title.

Move Alex Resnik

Second: Ivan Reede

Yes: 14

No: 0

Abstain: 3

Final Draft Title

**Standard for coexistence of IEEE 802-based devices operating in the white spaces of the TV bands**

The group then discussed and drafted a Draft scope and purpose for the PAR

**Draft Scope**

The standard provides a mechanism for IEEE 802-based heterogeneous networks to collaborate in order to coexist in the TV white space when there are a limited and dynamic number of channels.

 The mechanism will comply with regulatory requirements for the protection of licensed incumbent services.

**Draft Purpose**

Given that a number of regulatory domains have opened up additional spectrum in the TV band for unlicensed devices, known as TV white space, it is important these TV white space devices coexist.

The purpose of this standard is to provide a reasonably equitable mechanism for multiple heterogeneous networks to coexist in the TV white space when there are very few channels available.

The mechanism considers: how TV white space devices connect for coexistence related communications, what information the TV white space devices exchange, and algorithms for TV white space devices to achieve coexistence.

**MOTION**

Move to adopt the draft scope and purpose

Move Ivan Reede

Second Mark Cummings

Yes 28

No 0

Abstain 6

Motion passed

**Document IEEE 802.19-09-0026r4 WhiteSpace Coexistence Use Cases** was represented.

This document was modified by the authors to incorporate the comments they received after the presentation earlier in the week and includes the discussion that took place with Eldad to incorporate the concerns of IEEE 802.11. Eldad had sent a email to the reflector stating that he was happy with the changes incorporated in this revision.

**MOTION**

Move that the 802.19 TVWS Coexistence Study Group adopt document IEEE 802.19-09-0026-04.

Moved: Alex Resnik

Second: Mark Cummings

Yes: 15

No: 0

Abstain: 13

Motion passes

**MOTION**

There was extensive discussion on the wording on the second motion and the intention of the motion. There were a number of friendly motions to edit the text.

Move that the 802.19 TVWS Coexistence Study Group recommend that the 802 WGs consider the use cases and scenarios described in document IEEE 802.19-09-0026-04 when developing standards for the TVWS spectrum.

Moved: Alex

Second: Mark

Yes : 16

No: 0

Abstain: 16

Motion passes

**Document IEEE 802.19-09-00**34R3 **Media Independent Coexistence for Devices in TV White Spaces** was presented by Haiguang Wang

* *This contribution propose a to use Media Independent Coexistence mechanism to solve the coexistence of the heterogeneous devices in TV White Spaces.*
* *We propose to use a centralized spectrum manager to manage the spectrum.*
* *We propose to consider the possibility of further dividing the 6MHz TV Channels into more sub-channels. Heterogeneous devices can be put in different sub-channels. This can avoid the interference among heterogeneous devices in TV White Space efficiently. It is suitable for the coexistence of fixed and portable devices*.

Comments

An earlier version of this presentation had been presented to the teleconference.

Adjourned: 1800

# Conference calls

To be confirmed by email to the 802.19 reflector

# AOB

N/A

### Annex 1: Attendance

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| --- | --- |
| **Delegate** | **Affiliation**  |
| Ari Ahtiainen | Nokia |
| Mark Austin | Ofcom |
| Mathilde Benveniste | En-aerion |
| Harry Bims | Bims Laboratories, Inc. |
| Chenyi Chiu | Panasonic |
| Subir Das | Telcordia Technologies Inc |
| Upkarjit Dhaliwal | Fuure Wireless Technologies |
| Charles Einolf | CBS |
| TAKAO GONDO | Panasonic |
| Thomas Gurley | IEEE-BTS |
| Garth Hillman | Oaktree Wireless |
| Ching-T Hsieh | Industrial Technology Research Institute |
| Ju-Lan Hsu | WG802.19 |
| Moo Jeong | NTT DOCOMO |
| MASAHIKO KANEKO | WG802.19 |
| Mika Kasslin | Nokia |
| Richard Kennedy | Research In Motion |
| Chang Kim | ETRI |
| Eunah Kim | WG802.19 |
| Kihong Kim | Samsung Electro-Mechanics |
| Joseph Kwak | InterDigital Communications |
| Valentino Liva | EuramNet, LLC |
| Fanny Mlinarsky | wg802.16 |
| Boyd Murray | CSIRO |
| Chiu Ngo | Samsung Electronics |
| Hiroyo Ogawa | ARIB |
| Richard Paine | Self |
| Changmin Park | ETRI - Electronics and Telecommunications Research Institute |
| Rajaram Ramesh | Ericsson |
| Ivan Reede | AmeriSys Inc. |
| Alex Reznik | InterDigital |
| Shigenobu Sasaki | Niigata University |
| Stephen Shellhammer | Qualcomm, Inc. |
| Matthew Sherman | BAE Systems |
| Mohammed Smadi | Research in Motion |
| David Steer | Research In Motion |
| Mimi Tam | octoScope |
| Shiau-He Tsai | Huawei |
| Jungsun Um | ETRI - Electronics and Telecommunications Research Institute |
| Prabodh Varshney | Nokia |
| Haiguang Wang | Huawei |
| Hung-Yu Wei | National Taiwan University |
| Steve Yao | ITT Corp |
| I-Hsiang Yu | NeuStar, Inc. |
| Victor Hou | Broadcom |