IEEE P802.19
Wireless Coexistence

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| May 2011 TG1 Minutes |
|  Date: 9th to 13th May 2011  |
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The document records the IEEE 802.19 TG1 minutes of 802 Wireless Interim Session in Palm Springs, USA, May 9-13, 2011

IEEE 802.19 TG1 Chair: Tuncer Baykas
IEEE 802.19 TG1 Vice Chair: Mika Kasslin
IEEE 802.19 TG1 Secretary: Junyi Wang

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# MEETING MINUTES

First session of the meeting was called to order on AM2, 9 May 2011 at 10:32 PM.

### APPROVE AGENDA

The Chair called the meeting to order and presented the agenda in Doc 802.19-11/47r0.

* S.Filin indicated that a full proposal 802.19-11/49r0 has been updated to the mentor; he requested time slots for the presentation of this document.
* J. Kwak suggested not scheduling any presentation during 11af session. He suggested postponing the full proposal pretention to Monday PM2
* M. Kasslin indicated a presentation on neighbour discovery algorithm example which was scheduled in Tuesday PM1
* S. Shellhammer indicated that there would be an 802.18 session today and the group may need time to draft some document for 802.18. The chair scheduled a time slot for this in Tuesday AM 2.
* There were some discussions on whether we should cancel time slots overlapping with 11af, there were two opinions in the group: (1) Keep 19 TG1 meeting for as many as possible discussions in the group, the attendee shall make selection by themselves. (2) Cancel or not schedule presentations in the time slots of 11af so that 19 member can take time to join 11af.
* M. Kasslin indicated that we may have a look at the status of the group and discuss the way forward on Thursday. After that we may have a set of motions on the way forward. The chair scheduled time slots on Thursday for this.
* M. Kassilin indicated that having an earlier discussion on the way forward would be benefit. A time slot is scheduled in Tuesday PM 1, while H. Kang believes that the Tuesday PM1 is too early to discuss this.
* I.Reede suggested to have today’s agenda and temporary tomorrow agenda, and we can update agenda during next review of the agenda. The group agreed and the chair will show the agenda at each of meeting, anyone can change agenda during review.

All above changes are reflected in 802.19-11/47r1.

**Motion**

To approve the agenda in Document 802.19-11/47r1.

Moved by M. Kasslin

Seconded by J. Wang

Agenda approved with unanimous consensus.

### APPROVAL OF MINUTES FROM MARCH MEETING

**Motion**

To approve the 802.19 TG1 MARCH minutes in document 802.19-11/38r0, and teleconference minutes in document 802.19-11/r0, 802.19-11/41r1, 802.19-11/43r0 and 802.19-11/44r0.

Moved by J. Wang

Seconded By I. Reede

Motion passes with unanimous concerns.

### IEEE IPR STATEMENT

The TG Chair 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.

* 11:20 PM – The Chair made a call for essential patents: no one came forward with any essential patents.

### 802.19 TG1 Opening Report

The chair presented opening report in document 802.19-11/46r0.

### The session recessed 11:20PM

### Monday PM2

The meeting called to order at 4:05PM

**Full proposal 802.19-11/48r0 presented by M. Kasslin, Nokia**

* S. Shellhammer: In Figure 1, is there an interface between TVBD and TVWS database? M. Kasslin: Although it is not shown, we assume that there is an interface. It could be beneficial to show it in the figure to provide overall picture.
* Section 4.4 Coexistence Services: CDIS provides neighbour discovery service to CMs; the system provides coexistence services to TVDBs.
* S. Shellhammer: How does discovery service work? M. Kasslin: No specific algorithm is provided but, basically it provides the list of neighbouring TVBDs.
* J. Kwak: CDIS provides the discovery service. It requires a lot of information at the CDIS. What was the reason? M. Kasslin: Nokia always suggested that CDIS should do the neighbour discovery. A lot of information is needed at CDIS. That’s true but it enables to protect sensitive information at the CDIS and not shared by CMs.
* J. Kwak: Where is B3 interface in the diagram? Will there be services between CMs? M. Kasslin: Although there are messages transferring between CMs, we don’t see them as services.
* I. Reede clarified that not the geolocation of the interferer but the interference power at the receiver is important.
* H. Kang: We want to discuss more on neighbor discovery for pros and cons of CMs.
* M. Kasslin: We are ready to accept more changes if necessary. One very critical question is: Are we developing a system in which we can get a list of all neighbouring CMs. It should work like DNS.
* M. Kasslin explained section 7 related to CE.

**Motion**

To approve the agenda in document 802.19-11/47r2

Moved by M. Kasslin

Seconded by S. Filin

Motion passed with unanimous consensus

**The meeting recessed at 5:50 PM**

### Tuesday AM1

The chair called the meeting to order at 8:02 AM

S. Shellhammer summarized status of 802.18: they are preparing the informational document for ITU-R. They intend to give information about what 802 is doing in TVWS. This is initiated by 802.22. In the document, there is a place holder for 802.19.1. There might be some material from 802.15. He will forward the material of 802.22 to the group as an example.

The chair made a call for any objection for the group to write some information about 802.19.1 to this informational document. No objections.

The chair made a call for volunteers to do this job. J. Wang volunteered to write the first version and forward to J. Kwak and S. Shellhammer for edits.

**Full proposal 11/48r0 presented by S. Filin, NICT**

* S. Shellhammer: There should be potential state where CM sends messages. S. Filin: CM may send message in any of the state.
* J. Kwak: CE’s diagram is a simple and reasonable. State diagrams for the CM and CDIS are not clear. CM has to deal with a lot of subscribers there is no clear state for CM when CM is operated.
* I. Reede: In the sever, there would be hundreds of CMs for Hundreds of CEs, this is just a software issue. This is for one of CM. S. Filin : This is not the case, one CMs shall process for multiple CEs.
* There were some discussions on the interface between CM and TVDB, it was agreed that unless there are some opportunities to implement it, let have this interface. J. Kwak agreed and indicated we need both interfaces from CDIS and CM to TVBD.
* I .Reede: Do you have any details about negotiation between CMs to share the spectrum? S. Filin: there are no specific algorithms to do this however there are some messages to support such functionality.
* J. Kwak: How does the CM find CDIS? There is no description in this proposal, but one way is that CM looks for some address of CDIS.
* J. Kwak: Chapter 7 shall explain how the system solves the coexistence problem. There should be some algorithms in this chapter, such as neighbour discovery algorithm, algorithms for management services, resource allocation algorithm. He suggested removing the redundancy and put the missing points. S. Filin suggested having further discussion on the algorithms. J. Kwak agreed.
* The meaning of occupancy in page 26 in discussed. S. Filin: It describes the percentage of the system operation load.
* I.Reede: The behaviour of each entity is missing; the algorithm examples may be a good part to describe it.
* H. Kang: we have to take into count the other proposals which provide different algorithms and solutions.
* H.Kang: What topology is your proposal based on. Filin: Not limited.
* I. Reede believed that negotiation algorithm is one of important issues. While M. Kasslin disagreed.
* J. Kwak: Fairness during negotiation algorithm is policy issue; he agreed with M. Kasslin that for the first version to simplify the issue, the policy negotiation can be ignored. However we should consider this anyway, otherwise no one will use 802.19 systems.

**Coexistence discovery algorithm 802.19-11/40r1 presented by M. Kasslin, Nokia**

**The meeting recessed at 9:53AM**

### Tuesday AM2

The chair called the meeting to order at 10:33 AM

I.Reede explained his version of the neighbour discovery algorithm

* I. Reede indicated that the manager of a TVBD is the requester of the details of possible interferences
* M. Kassilin: Negotiation between CDISs may solve the same problem. I. Reede: CDIS may decide whether it would like to expose the CM to the requester. If not, CDIS itself becomes the final node.
* M. Kasslin: Why does CDIS need to access to another CM. I. Reede: CDIS may be in charge of a lot of CMs, CDIS may like to distribute the system load.
* I.Reede.: If you move from one location to another, the device has to tell the location again, this is required by the law. Based on the updated location, new neighbour list will be indicated by the system. Otherwise we have nothing to do.
* J. Kwak: It is a two step process: (1) you get the address of CDIS or CM (2) you get your interference environment.
* The neighbour discovering shall include service discovery and interference environment discovery.

**The meeting recessed 11:32AM**

### Tuesday PM1

The meeting called to order at 1:40PM

The chair updated the agenda in 802.19-11/47r3, and make a motion to change the agenda

**Motion**

To approve the agenda in 802.19-11/47r3

Moved by M. Kassilin

Seconded by J. Wang

Motion approved with unanimous consensus.

Discussion on the motion

H. Kang questioned on why there are two motions on the way forward in both Thursdays AM1 and AM2. The chair clarified that these are just place holder, if motions are done in AM1 then that would be no motions in AM2

**Discussion on the way forward**

* J. Kwak: How many merging proposal do we have currently. What happened in the close discussion?
* H. Kang: In Singapore meeting, we shared the points and discussed each company’s opinion to the other companies’ proposal. And we compared the points between 6 companies.
* M. Kasslin: In the comparing table, we are discussing in very different levels. It is very hard to compromise to each other.
* I. Reede: The table shows good underline and points that the companies agreed. Although there is no item which is 100% agreed, there is no item which got very bad value.
* M. Kasslin: We need to consider what we need to do instead of what happened. That is why NICT and Nokia have a joint proposal hoping to move forward.
* J. Kwak: Although the content of current joint proposal is not controversial, and parts of chapters are redundant, it is better than any other proposal to be a starting point.
* R. Gloger: There are a lot of details inside although something is missing, can we go with this as a baseline document, and other proposers can comment and amend it.
* M. Kasslin: This is exactly our intention. It may be finally with a totally different structure, we would like to hear your input to the changes in the proposal. We are ready to make modification. But we hope you would bring a text into the proposal.
* J. Kwak : Normative text is required for figures. The annex A should be in chapter 7. The material in chapter 7 is useful and should be in chapter 6, while chapter 6 seems redundant.
* M.Kasslin: We tried to change the structure half year ago, but we met a very hard resistance, that is why we had such a structure. I do not believe algorithm should be in chapter 7 as a normative text, it should be in annex.
* J. Kwak: I am not suggesting changing the outline. There are no coexistence mechanism and algorithm in chapter 7. The good structure should be: move all chapter 7 into chapter 6 and keep chapter 7 and annex A empty.
* H. Kang: The total number of proposals is decreasing. I would like to suggest having other merging proposal to continuously reducing the number of proposal.
* J. Kwak: According to the procedure we are going to do the downselectoin, and unless the group decides to delay the downselection, we should follow the procedure. But we can change the procedure any time we like.
* C. William: We do not have to do downselection. He is expecting the group sincerely consider the procedure.
* It was questioned on whether the group believe that any of proposals is qualified for downselection? The chair answered that if there is any missing points, the group can comment and amend it. C. William: If there is any missing point, you cannot put it into the procedure.
* J. Kwak: it provides normative text for messages, while there is no normative text that fully describes the whole behaviour of each entity. People reading this standard cannot get the whole image.

**The meeting recessed at 2:33PM**

### Wednesday AM2

The meeting called to order 10:35AM

**TVBD Neighbor discovery algorithm example 802.19-11/51r0 presented by M. Kassilin Nokia**

* S. Shellhammer: Is this based on model or measurement? M. Kasslin: model
* M. Kasslin clarified that Frequency means here the operating frequency.
* J. Kwak: Do you have to know receiver bandwidth? NO answered by M. Kasslin. J. Kwak: for the receive interference calculation, you may need bandwidth.
* J. Junell: Bandwidth and transmission power are scalable, we have to consider this correctly.
* I. Reede: if we know Noise figure, calculate noise floor, we need bandwidth.
* S. Filin: Do we expect to have small interference in frequency domain. I.Reede: Yes, for example, wireless microphone. S.Filin: We do not need to care this interface in this presentation since it considered multiple devices, comparing with signal, this small inference can be ignored.
* J. Kwak: All we need to do is to estimate interference level, we do not really care the definition of neighbours.
* M. Kasslin: we have to have some terms to describe two TVBDs which need to live together, they are potential interferers.
* J. Kwak: In addition to the value, the direction of interference is very important.
* S. Filin: what would be the accuracy of such estimation? J. Junell: This depends on the propagation model and the worst case of estimation.
* M. Kassilin: In order to have calculation in some normative text, we need to have some algorithms.
* J. Kwak: We have to standardize the calculation. So in Chapter 7 there should be some algorithms for example, neighbour discovery, resource allocation.
* J. Junell: The neighbour information is the input of resource allocation. J. Kwak: We have to update information between CMs, this is not done once but constantly done by the system.

**Strawpoll**

For TVBD neighbour discovery (e.g. presented in 11/51r0) what should be defined as normative part of the draft?

Option 1) Input and output parameters

Option 2) Option1+ algorithm to calculate output

Option 3) Abstain

Option 1: 0

 Option 2: 5

Option 3: 9

After strawpoll, I.Reede questioned on the reason of “Abstain”. S.Fillin: To see the opinion of the group. H. Kang: Need more time to consider

**Information paper 802.19-11/50r0 presented by J. Wang, NICT**

 There were some editorial changes reflected in 11/50r1

**Motion**

To forward IEEE 802.19 information paper in document 802.19-11/50r1 to 802.18 subject to the possible changes by the 802.18.

Moved by J. Wang

Seconded by I. Reede

Motion passed with unanimous consensus.

### Wednesday PM1

The meeting called to order at 1:36 PM

S. Shellhammer introduced the background for the following presentation. We had ballots for the coexistence assurance document. We provided only three sets of comments. We didn’t vote NO to their ballots.

**Pat Kinney explained 802.15.4e scope and CA document.**

According to the discussion, the effect of 15.4e to coexistence between systems would be negligible. 802.19 will review new CA document during the next letter ballot.

**S Filin initialled the discussion on how to describe frequency in the draft. He gave the following options:**Option 1) Start and stop frequenciesOption 2) TV channels

* I. Reede : We are for using frequencies. One reason is that in UK they are not following TV channels for channelization anymore. Another reason is that TV channels do not fit globally. Last reason is that this standard will be expanded to other frequency bands. FCC wants to use other bands as well for white space.
* M. Kasslin: I agree with Ivan Reede. I am in favour of using frequencies. For coexistence systems we need to be able to operate in a frequency domain without the restrictions from primary users. If TV channels are used, it limits the CMs’ ability on decision making.
* J. Kwak: We don’t need to be locked to TV channels. It could be used for many different systems. Frequencies are better. When we are accessing from database we may need to ask for TV channels but we can call it regulatory frequencies. We may need both.
* H. Kang: We need to differentiate channelization in different countries. We also need to have TV channel concept. That’s why we need them both.
* M. Kasslin: TV channel is a term used in primary users.
* J. Kwak: Secondary use may go to much narrower band than a TV channel bandwidth; frequency concept is much more flexible than TV channel concept
* H. Kang: Currently, in FCC TV band database, the information is given based on unit of TV channel; when CM calculate the optimized combination of channel (channelization), TV channel concept is needed.
* I. Reede: Even among different countries, the CM-CE using frequency can realize very clear communication.
* H. Kang: Based on Mika’s idea, CM puts three TVBDs into three TV channels. We do not know how often can this happen. In .11 they can develop some narrow channelization. In some case, CM can manipulate the channel, but that is not the case
* H. Kang insisted on going with TV channel since they believed that CM just needs to assign TV channels to TVBD, CMs have no power to command on channelization. Selecting part frequency band from that assigned channel for coexistence is the job of TVBD.
* M. Kasslin: Instead of giving channel number, start freq, stop freq. centre freq rather than the channel
* P.Varshney: The channel number is not useful information.
* M. Kasslin: Main question is how to indicate from CE to TVBD unit? We would like to indicate specific frequencies it can use.
* H. Kang: It will be too complicated.
* I. Reede: Although it is complicated it is necessary to not to have conflicting systems. If we work with low and high frequencies they can work in different regulations. It is good to have for common language between CMs.
* M. Kasslin: We agree that it is a complex problem. But it is good to have this system because it gives flexibility to everyone. The system suggested by ETRI is a semi management system but CM should be able to provide all types of managements.
* I. Reede: We need to look at spectrum sharing methods. FDM, TDM or CDM. We have to think for all ways.
* H. Kang: Two different options can go together.

### Wednesday PM2

Meeting called to order at 4:05PM

**Management service modes presented by M. Kasslin, Nokia**

* It was agreed that Option 3 in this presentation can be a subset of option 1 as an extension, in option 3, CE control a set of channels, while in option 1 CE has only 1 channel band decided by the CM . M. Kasslin agreed and modified the document accordingly.
* It was clarified that 11af is not using TV channels, but has their own channel band.
* I. Reede: Frequency expression by low and high frequency is universal. It may not cause misunderstanding of channel number especially on the border.
* S. Shellhammer: The frequency range could be the subset of a set of TV channels.
* H. Kang: One or a list of TV channels can be assigned to a TVBD; the TVBD can do their own channelization.
* S. Filin: How to allocate channel is only dependent on the channelization of the device, TVBD cannot decide freely by himself.
* I .Reede: The channel change is not so frequent; channel assignment may be updated in the resolution of minute or even longer.

**Strawpoll**

Do you support as compromise proposition that 802.19.1 considers supporting both modes as presented in

1. Operating frequency mode
	* The CM tells the CE operation frequency (start frequency, stop frequency) or a list of them
	* The CE orders the TVBD to operate according to the operating frequency or the list of them. No feedback needed from the CE to the CM about the operating frequency but the assumes that the TVBD operates in the indicated operating frequency.
2. ~~Frequency range mode~~ TV channel mode
	* The CM provides the CE a frequency range or multiple frequency ranges
		+ A frequency range indicated with start frequency and stop frequency
	* The CE provides the frequency range(s) to the TVBD that decides on the operating frequency from the given range
	* The TVBD indicates its operating frequency via the CE to the CM

Discussion on the strawpoll

Frequency range mode is amended friendly into TV channel model. M. Kasslin, who raised the strawpoll, agreed.

J. Jo called the order of the day; the strawpoll is postponed to tomorrow

**The Meeting recessed at 6PM**

### Thursday AM1

The meeting called to order 8:03AM

**Continue discussion on the way forward**

H. Kang made a presentation on the modes of management service

* J. Junell: What does available TV channels mean? H. Kang: The channels that TVBD can use
* J. Kwak: The two modes should be the requirement for CE, to provide diversity for TVBD. The system does not need two modes.
* M. Kasslin: The statement here does not mean a TVBD may use part of that channel. H. Kang agreed.

**Strawpoll**

* Do you support as a compromise proposition that 802.19.1 considers supporting both modes somewhere in the system for example as presented here:
* Operating frequency mode
	+ The CM tells the CE the operating frequency (start frequency, stop frequency) or a list of them
	+ The CE orders the TVBD to operate according to the operating frequency or the list of them. No feedback needed from the CE to the CM about the operating frequency but the CM assumes that the TVBD operates in the indicated operating frequency.
* TV channel mode
	+ The CM provides the CE an available TV channel or a list of them
	+ The CE provides an available TV channel or a list of them to the TVBD that decides operating channel(s) based on TVBD’s channelization
	+ The TVBD indicates its operating TV channel(s) via the CE to the CM

Yes:16 / No:0 / Abstain: 1

Discussion on the strawpoll

J. Wang indicated to the group that the strawpoll currently H. Kang is raising is different from the strawpoll that M. kasslin raised yesterday. There are no objections from the group to take place the last strawpoll with the current one. The strawpoll that M. Kasslin raised yesterday is therefore withdrawn.

**Motion**

* Move that 802.19.1 considers supporting both modes somewhere in the system for example as presented here:
* Operating frequency mode
	+ The CM tells the CE the operating frequency (start frequency, stop frequency) or a list of them
	+ The CE orders the TVBD to operate according to the operating frequency or the list of them. No feedback needed from the CE to the CM about the operating frequency but the CM assumes that the TVBD operates in the indicated operating frequency.
* TV channel mode
	+ The CM provides the CE an available TV channel or a list of them
	+ The CE provides an available TV channel or a list of them to the TVBD that decides operating channel(s) based on TVBD’s channelization
	+ The TVBD indicates its operating TV channel(s) via the CE to the CM

Yes/11 , No/0 , Abstain/6

The chair initiated the discussion on the downselection procedure

* J. Kwak: Is this common view that we have no text on key coexistence algorithms. Is there any reason to fill this at this time? We have no any proposal complete and qualified for downselection, we do not have to run the voting on downselection at this time with affiliation vote
* S. Filin: In the downselection procedure, there is no affiliation vote, after downselection, the proposal will go for group review, and receive comment and amendment from the group.
* I. Reede: We have to continue working on the merging process.
* S.Filin: We have recirculation process by which we can try to get 75%. It is a standard process
* J. Kwak: It is a standard process, once it starts, it continues until it achieves 75%, however what is missing is that there should be a step to vote for the draft asking whether the draft completes.
* I. Reede: To start ballot you need 75%. T. Baykas: it is not working for group letter ballot currently.
* S. Filin: We suggest following the procedure, not to change anything.
* There are two suggestions from the group: (1) follow procedure and have open discussion (2) continue merging process.
* S. Filin: if we delay downselction, what is the procedure for merging to change the situation?
* I. Reede: we can analyze together the technical metrics from different companies.
* C. William suggests having more time to have clause by clause discussion
* I. Reede: We can list all technique items, discuss and close one by one.
* S. Filin: We have done this within last 6 months, we have no results. I.Reede disagreed.
* J. Kwak suggested focusing the current merged proposal of Nokia+NICT in the teleconference.
* I.Reede indicated that there would be some other merged proposals.
* J. Kwak suggested having a hard time line for downselection, he suggested July 19, Tuesday morning 8AM in the first TG1 session. Mika Kasslin agreed.
* I.Reede suggested cancelling downselection process.
* J. Kwak: Nokia+NICT proposal is good enough for starting point. But others disagree. We need to get something to ballet on.
* C. William: It is better to modify the selection process. J. Kwak: it required 75%, if it is in the motion, motion may pass

**Motion**

To start a step 13 of the draft development process of 802.19 TG1 in the first session of 802.19 TG1 on Tuesday July 19, 2011 plenary meeting

Moved by M. Kasslin

Seconded by S. Filin

I.Reede called the order of the day

The meeting recessed 10:05AM

###  Thursday AM2

The meeting called to order at 10:40

Motion on the table

The motion was revised as follows:

**Motion**

To place in July 2011 session agenda to start a step 13 (clause downselection ) of the draft development process (10/29r3) of 802.19 TG1 in the first meeting of 802.19 TG1 on Tuesday July 19, 2011 plenary meeting

Moved by M. Kasslin

Seconded by S. Filin

YES 12, NO 1, Abstain 4

Motion approved.

Discussion on the motion

* The chair clarified that the motion is about the procedure, it required 50%
* The whole agenda will be voted at the beginning of July meeting. If this passes, it will be placed in the agenda.

**The chair review step 13 in procedure document, called for any suggestion from the group to move forward.**

* It is mentioned by the chair that the current procedure is not clear enough. It provides the time for merging process while it does not clearly specify how much time should be given. This may block the down selection.
* It was clarified that Chapter 1,2 and 3 are left for the editor.
* The chair clarified that during downselection, the chapter number is not important. The downselection will be performed on 4 chapters: system description, the reference model, procedure and protocol and coexistence mechanisms and algorithms
* J. Kwak: We can have TBD and do downselection without changing the procedure.

**Motion**

To change draft selection process (10/29r3) (…all the proposals have been presented, rounds of voting will be held per clauses in the clause order defined as: 4,5,6,7,3. Clause 1 and 2 shall be drafted by editor following decision of other clauses. .)

By J. Kwak

Seconded by S. Shellhammer

YES 8 / No:0 / Abstain 4

Discussion on the motion:

The WG chair clarified that the downselection schedule is not limited in the procedure document, it depends on the chair.

* **Closing Report by the Chair.**

The TG1 chair summarised what have done during this week.

**Motion**

To adjourn the TG1 May Interim meeting

Moved By I. Reede

Seconded M. Kasslin

Motion passed.

TG1 meeting adjourned at 2:40PM.