

IEEE P802.21 Media Independent Handover Services

Tentative Minutes of the IEEE P802.21 Working Group

Session #40 Meeting, St. Petersburg, Russia

Chair: Subir Das

Vice Chair: Juan Carlos Zuniga

Secretary: H Anthony Chan

Editor: David Cypher

(Version: Technical corrections from last version are as marked in red.)

# First Day AM2 (10:30AM-12:30PM): Red 7; Monday, Sept 13, 2010

## 802.21 WG Opening Plenary (Chair of IEEE 802.21WG): Meeting is called to order by Subir Das, Chair of IEEE 802.21WG at 10:35AM with opening notes (21-10-0181-00).

## Approval of the Sept 2010 Meeting Agenda (21-10-0173-01-0000)

### Session Details are described in 21-10-0173-01

### Some sessions are moved and some are canceled. The updated agenda is available at 21-10-0173-02) and is as follows:

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
|  | **Monday** | **Tuesday** | **Wednesday** | **Thursday** |
| **AM-1**  **8:00-10:00a** |  | Security TG | NA | HBS TG |
| **AM-2**  **10:30-12:30** | 802.21 WG Opening Plenary | Wireless Network Mgmt SG | 802.21 WG Mid week Plenary | Security TG |
| **PM-1**  **1:30 – 3:30p** | HBS TG | SRHO TG | SRHO TG | 802.21 WG Closing Plenary |
| **PM-2**  **4:00 – 6:00p** | Security TG | HBS TG | HBS TG | NA |
| **Eve 2**  **7:30 – 9:30p** | HBS TG |  | Social (6:00 pm onwards) | NA |

### Agenda is approved with unanimous consent.

## The WG is sorry to hear the loss of Alice Cheng, who had been an excellent contributor to the group. She also worked very hard as an assistant editor . Members shared their memories about her: For example, she had a very kind heart, she distributed food to homeless people after dinner at 802.21 WG meeting in Florida. Words cannot describe her loss, and she will be remembered by all of us. A minute of silence was observed in her memory.

## IEEE 802.21 Session #40 Opening Notes

### WG Officers

#### Chair: Subir Das

#### Vice Chair: Juan Carlos Zuniga

#### Secretary: Anthony Chan

#### Editor: David Cypher

#### 802.11 Liaison: Clint Chaplin

#### 802.16 Liaison: Peretz Feder

#### IETF Liaison: Yoshihiro Ohba

The WG has 32 voting members as of this meeting.

### Network information for the documents

#### <https://mentor.ieee.org/802.21/documents>.

### Attendance and voting membership are presented.

#### Attendance is taken electronically ONLY at <https://seabass.ieee.org/imat/index>

#### Enter your personal information and profile

#### Mark attendance during every session

There is an access code by accident which has not yet been fixed. Manual attendance is taken this morning.

#### Total number of 802.21 WG sessions: 14 (Tentative)

#### 11 sessions for 75% attendance to be counted towards WG voting membership.

#### All attendance records on the 802.21 website. Please check the attendance records for any errors

### Voting membership

#### 802.21 Voting membership is described in DCN 21-06-075-02-0000

#### Maintenance of Voting Membership

Two plenary sessions out of four consecutive plenary sessions on a moving window basis

One out of the two plenary session requirement could be substituted by an Interim session

#### WG Letter Ballots: Members are expected to vote on WG LBs. Failure to vote on 2 out of last 3 WG LBs could result in loss of voting rights

### Miscellaneous Meeting Logistics are presented.

#### Breaks:

#### AM coffee break 10:00-10:30AM;

#### Lunch 12:30-1:30PM;

#### PM coffee break 3:30-4PM

#### Monday evening session is on HBS TG.

#### Wednesday night: Social is at 6PM onwards

### Rules on registration and media recording policy are presented.

### Rules on Membership & Anti-Trust are presented

### Rules to inform about patents are presented as follows:



### Chair asked whether there are any potential essential patent claims by any 802.21 WG participants. None.



### Other guidelines for IEEE WG meetings, including discussions that are inappropriate are presented.



### LMSC Chair’s guidelines on commercialism at meeting are presented.

### Rules on copyright are presented. Note that the copyright procedures are being updated.

### Chair: How many people are attending the IEEE 802.21 WG meetings for the first time? Floor: counted 0

## Summary of the Completed Work

### P802.21 base Specification

#### P802.21 published in Jan-2009

### Requirements submitted to ITU through 802.18 for IMT-Advanced

### Interaction with other 802 groups and other SDOs

#### MIH solution incorporated in 802.16g in Nov ‘05,

#### MIH solution incorporated in 802.11u in Sep ‘06

#### 3GPP: Concept of ANDSF incorporated in 3GPP TS 23.402, TS 24.302, TS 24.312

#### WMF: 802.21 IS is now a part of WiMAX 1.6 specification for WiMAX-WiFi IWK

#### 8021.16m Sponsored Ballot discussion

### Task Group Status

#### 802.21a Security TG: Proposals merged and agreed

#### 802.21b Handover with Broadcast Services TG: Completed letter ballot

#### 802.21c Single Radio Handovers: Call for Proposals Issued

### LB#4

#### Started on August 09, 2010 and ended on September 08, 2010

#### Result is published on September 10, 2010 at http://www.ieee802.org/21/ballots.html

#### Summary

Approve : 12

Disapprove : 09

Abstain: 02

Return ratio : 72 %

Approval ratio : 57 %

The ballot is not approved

### Study Group Status

#### Wireless Network Management: Discussed several presentations

## Objectives for the Sept Meeting

### Task Group Activities

#### 802.21a: Security Extensions to MIH Services

Resolve outstanding issues, draft specification update and preparation for Letter Ballot

#### 802.21b: Handovers with Broadcast Services

Letter Ballot #4 discussion and comment resolution

#### 802.21c: Single Radio Handovers

Presentation of Contributions and discussion

### Study Group Activities

#### Wireless Network Management

Presentation and discussion

## Next session:

### Plenary: Nov 7-12, 2010, Hyatt Regency, Dallas, Texas

#### Co-located with all 802 groups

### Meeting details

#### http://ieee802.facetoface-events.com/plenary

### EARLY Web Registration Fee:  $700 US

#### Before 6:00 PM Pacific Daylight Time (PT), Friday, October 8, 2010

### STANDARD Web Registration Fee:  $800 US

#### Before 6:00 PM Pacific Standard Time (PT), Monday, November 1, 2010

### ONSITE Web Registration Fee $900 US

## July Plenary Meeting Minutes (21-10-0142-04).

### Meeting minutes is approved with unanimous consent.

## 802 architecture update (21-10-0166-00) is presented by Juan Carlos Zuniga

### Summarized the update

#### The revised architecture has control plane added. It includes a figure and definitions

#### It will go for sponsor ballot.

## 802.21a Security task group update (21-10-0184-00) is presented by TG Chair, Yoshihiro Ohba

### Progress so far:

#### January 2009: The 1st 802.21a meeting

#### March 2009: Issued CFP

#### May – Sept 2009: Proposal Presentations (7 proposals)

#### Nov 2009 – May 2010: Harmonization discussions

#### July 2010 – Completed down-selection

#### Two teleconferences in August 2010 (Aug. 17th and 31st)

### Main Objectives of this meeting:

#### Resolve outstanding issues as much as possible

#### Produce 802.21a draft specification D1.0 to be ready for WG Letter Ballot after this meeting

### Sept Agenda

### Monday, September 13th, 2010, PM2

#### Editor’s presentation on latest pre-draft specification

### Tuesday, September 14th, 2010, AM1

#### Discussion on outstanding issues

### Thursday, September 16th, 2010, PM1

#### TG vote to approve pre-draft specification as draft specification D1.0

## 802.21b Broadcast handovers task group update (21-10-0189-00) is presented by TG Chair, Juan Carlos Zuniga

### Letter ballot has enough return to become valid but did not pass. This session will mainly be resolution

## 802.21c Single radio handover task group update (21-10-0178-00) is presented by TG Chair, Junghoon Jee

### Progress July, 2010

#### Discussion

3GPP IWLAN and SRVCC: 21-10-135-00-srho

SRHO Procedures: 21-10-114-03-srho

IEs and CS applicability for WMF SRHO: 21-10-128-00-srho

Amendment for WMF SRHO (Proposal): 21-10-131-02-srho

#### Motion: 21-10-131-02-srho was incorporated into the TGc Framework Document

#### Technical Editor appointment: Dapeng Liu (China Mobile)

#### Conference Calls

July 22nd 21:30 ET

August 10th 21:30 ET

### Items to be covered:

#### SFF Discovery

#### CS Applicability Discussion

#### Distributed Mobility Management

### Tuesday, 13:30- 15:30

#### SFF Discover discussion by Junghoon Jee

#### DNS based discovery by Anthony Chan

### Wednesday, 13:30 – 15:30

#### CS applicability discussion by Junghoon Jee

#### Distributed mobility management by Anthony Chan

## Heterogeneous wireless network management Study Group update (21-10-0190-00) is presented by Johannes Lessmann

### Study group was established in Nov 2009

### Considerable number of contributions

#### Past contributions: NEC, FhG, i2CAT, UC3M, Telcordia, Intel, China Mobile, MediaTek, Toshiba, Proximity

### Main ongoing issues

#### Discuss overlap with current IEEE 802.19.1 activities and contribute to proposal for 802.19.1

### Agenda for SG meeting on Tuesday September 14 AM2

#### Discussion of a possible sub-set of current SG items, in relation to 802.19.1 scope

### The SG feels it is not ready to propose PARs and 5Cs, but will issue a report.

## Any other business

There is question on registration fee, when it is charged and when the receipt will be available.

It was mentioned that the meeting Internet access is available 24 hours in the second floor.

Logistics issue: The meeting room needs 2 more extension cord at the back.

## Meeting recess at 12:03PM

# Third Day Midweek Plenary AM2 (10:30AM-12:30PM): Red 7; Wednesday, Sept 15, 2010

## 802.21 WG Meeting called to order by Subir Das, Chair of IEEE 802.21WG at 10:30AM with agenda in 21-10-0173-02.

### The updated agenda 21-10-0173-02 is agreed unanimously.

## Approved LMSC P&P

Section 7.3 subgroups: all TG and ad hoc groups should follow

Section 9 on Voting:

To get this document, start at [www.ieee802.org](http://www.ieee802.org)

Click under general information: Policies and Procedures etc.

Click Working Group Policies and procedures to download

Voting: need 3/4 approval for technical, 2/3 or 3/4 for general issues.

Quorum: a quorum is one-third of working group members, but no quorum is required for any WG meeting publicly announced at least 45 days in advance

It is encouraged to solve issues

## Discussion:

We need to complete the Amendment PAR

Plenary attendance is sufficient but the interim meetings have only about half of our plenary participation.

### Should we continue with interim meetings in future plan or rather use ad hoc group to conduct business?

802.21a estimates to complete sponsor ballot by next May.

802.21b estimates to complete sponsor ballot by next March.

### Should we collocate Interim Session with 802.16

If there are good synergies with 16, it is worthwhile.

It was mentioned that synergy with other groups are needed: joint sessions are good.

### Projects and name of WG

It was mentioned that what projects are being planned to continue this effort. We need to remember that we are currently media independent group. The current names limits to handover. Media independent services is much broader.

Chair plans to give a presentation in November meeting.

Meanwhile, the thoughts from the members are solicited and welcome.

## Meeting recess at 11:54PM

# Fourth Day Plenary PM1 (1:30PM-3:30PM): Red 7; Thursday, Sept 16, 2010

## 802.21 WG Meeting called to order by Subir Das, Chair of IEEE 802.21WG at 1:35PM with agenda 21-10-0173-02

## WiMAX Forum Update

### No update related to 802.21.

## 3GPP Update is briefed by Subir Das

### CT group has frozen specification on Rel 9.

## 802.21a report (21-10-0198-00) is presented by TG Chair, Yoshihiro Ohba

### Progress in this Sept 2010 meeting

#### Discussed outstanding issues

Most issues are either being closed or detailed text provided

Issue List: DCN 21-10-0187

#### Revised 802.21a pre-draft specification

The latest snapshot shall be uploaded in 802.21 WG member-only area.

Next step: be ready for WG Letter Ballot in November meeting

### Teleconference schedule

#### Sept 28 (Tue) 9-11AM ET

#### Nov 2 (Tue) 9-11AM ET

## 802.21b report (21-10-200-00) is presented by TG Chair, Juan Carlos Zuniga

### LB4 results

#### 12 approve (voters) + 1 non-voter

#### 9 Disapprove

#### 2 abstain

### Comment received: 87

#### Technical: 38

#### Editorial: 49

### All comments resolved during session #40

### TG Motion: To accept all Editorial comment resolutions revised by the 802.21b Technical Editor as defined in document 21-10-0192-04-bcst-lb4-comments

#### Moved by: Hongseok Jeon

#### Seconded: Anthony Chan

#### Yes: 7

#### No: 0

#### Abstain: 2

### TG Motion: To instruct the 802.21b Technical Editor to incorporate the comment resolutions as defined in document 21-10-0192-07-bcst-lb4-comments, and produce a new IEEE P802.21b™/D02 version of the draft including the changes indicated

#### Moved by: Antonio de la Oliva

#### Seconded: Johannes Lessmann

#### Yes: 5

#### No: 1

#### Abstain: 2

### TG Motion: To request the 802.21 WG to issue a LB on the question "Should IEEE P802.21b D02 be forwarded to Sponsor Ballot?"

#### Moved by: Antonio de la Oliva

#### Seconded: Hongseok Jeon

#### Yes: 6

#### No: 0

#### Abstain: 2

### Next Steps

#### Group will have no Teleconference until the November meeting

#### Work will continue with the new LB comments that will be received before the November meeting

### WG Motion: To carry out a Working Group 30 days Letter Ballot on the question: "Should P802.21bD02 be forwarded to Sponsor Ballot?"

#### Mover: Juan Carlos Zuniga

#### Second: Antonio de la Oliva

Discussion: Because P802.21bD02 does not exist, it is suggested to first conduct another motion to instruct the editor to produce this document. Yet it is mentioned that the other motion has already been approved by the TG.

#### Yes: 7

#### No: 3

#### Abstain: 0

**Motion failed.**

**TG will continue business in November, following the letter ballot process.**

## 802.21c report (21-10-0179-00) is presented by TG Chair, Junghoon Jee

### Discussion

#### SFF Discovery Discussion

21-10-0193-00-srho: Hongseok Jeon (ETRI)

21-10-0197-00-srho: Anthony Chan (Huawei)

#### CS Applicability Discussion

21-10-0128-01-srho: Junghoon Jee (ETRI)

### Conference Calls

#### October 26th 21:30 ET

## Meeting wireless network management Study Group report (21-10-0201-00) is presented by SG Chair, Johannes Lessmann

### 1 presentation

#### A. de la Oliva (UC3M), Explanation of proposal to IEEE 802.19.1

### Plan for future progress: discuss overlap of SG objectives with 802.19.1

## Liaison report from 802.16 is presented by Ajay

### 802.16m/D6

#### Resolve comments of LB for 802.16m

#### Will go for recirculation.

### 802.16p – M2M SG

#### Approved in July meeting for m2m to form TG. Unofficial work on requirements has taken place in this meeting.

### TGn GRIDMAN on Network Robustness and Reliability (formerly NRR)

#### Highly reliable network: for public safety

### Questions:

802.16e is available to public

## Liaison report from IETF (21-10-0196-00) is presented by IETF liaison, Yoshihiro Ohba

### MIPSHOP WG

#### Dynamic Host Configuration Protocol (DHCPv4 and DHCPv6) Options for Access Network Discovery and Selection Function(ANDSF) Discovery

#### draft-das-mipshop-andsf-dhcp-options-04

#### Under IESG Review, 5 DISCUSSes

### HOKEY WG

#### The Local Domain Name DHCP Option: draft-ietf-hokey-ldn-discovery-03 WGLC completed

#### EAP Re-authentication Protocol Extensions for Authenticated Anticipatory Keying (ERP/AAK): draft-ietf-hokey-erp-aak-02

#### New WG drafts

draft-ietf-hokey-arch-design-00

draft-ietf-hokey-rfc5296bis-00 (Updates to ERP)

#### Status Update of 802.21a were presented in IETF78 Maastricht:

### MEXT WG

#### Re-charter discussion is ongoing: One or more experimental MIPv6 security mechanisms are in scope

#### RFC 3775bis: draft-ietf-mext-rfc3775bis-06.txt ; Status update to be provided in IETF78

#### Flow binding (mapping between flow and CoA)

I-D.ietf-mext-flow-binding defines transport of the mapping. Status: In IESG Evaluation (with 1 DISCUSS)

I-D. ietf-mext-binary-ts defines Traffic Selectors. Status: In RFC Ed Queue (MISREF IANA), same as May 2010

#### DHCPv6 Prefix Delegation for NEMO: I-D. draft-ietf-mext-nemo-pd; Status: in IETF last call

#### Home Agent reliability: I-D. ietf-mip6-hareliability; Status: WG discussion

### NETLMN WG

#### PMIPv6 heartbeat (between MAG and LMA): Published as RFC 5847

#### GRE Key Option for Proxy Mobile IPv6: Published as RFC 5845

#### IPv4 support for PMIPv6: Published as RFC 5844

#### Interactions between PMIPv6 and MIPv6: I-D. draft-ietf-netlmm-mip-interactions; Status: IESG Evaluation (two Discusses on security considerations)

#### LMA discovery: I-D. ietf-netlmm-lma-discovery; WGLC comments being addressed

### NETEXT WG

#### LMA Redirection: I-D. draft-ietf-netext-redirect; Status: Completed WGLC

#### Localized Routing: Problem statement: I-D.ietf-netext-pmip6-lr-ps; Status: Under discussion in WG

#### Bulk Refresh: I-D.ietf-netlmm-bulk-re-registration; Status: Under discussion in WG

#### RADIUS support for PMIPv6: I.D. ietf-netext-radius-pmip6

#### Flow mobility & Inter-technology handover support documents:

I.D.bernardos-netext-pmipv6-flowmob; Actual solution describing PMIPv6 extensions; A consensus call issued on July 9 to make this as a WG draft

### Possible BoFs in Int Area

#### DMM - Distributed Mobility Management

#### ARMD - Address Resolution for Massive amount of hosts in one broadcast Domain

#### NBS - Name-Based Sockets

#### LWIP - Light-Weight IP Protocol Design

#### For more information see: http://trac.tools.ietf.org/bof/trac/wiki/WikiStart

## Teleconference schedule

### 802.21a TG

#### September 28 (Tue) 9-11AM ET

#### November 2 (Tue) 9-11AM ET

### 802.21c TG

#### October 26th 21:30 ET

## Future session information

### Plenary: Nov 7-12, 2010, Hyatt Regency, Dallas, Texas

#### Co-located with all 802 groups

### Interim: 10-13 January 2011, Taipei

#### Meeting co-located with 802.16

### Plenary: 13-18 March 2011, Marina Bay Sands, Singapore

#### Co-located with all 802 groups

### Interim: 16-19 May 2011, Banff, Alberta, Canada.

#### Meeting co-located with 802.16

### Plenary: 17-22 July 2011, Hyatt Regency San Francisco,

#### Co-located with all 802 groups

### Interim: 19-22 September 2011, TBD

#### Meeting co-located with 802.16

### Plenary: 6-11 Nov 2011, Hyatt Regency Atlanta

#### Co-located with all 802 groups

### Interim: 9-12 January 2012, TBD

#### Meeting co-located with 802.16

### Plenary: 11-16 March 2012, Macao? (non North America)

#### Co-located with all 802 groups

### Interim: target 14-17 May 2012, TBD

#### Meeting co-located with 802.16

### Plenary: 15-20 July 2012, Grand Hyatt Manchester, San Diego, CA

#### Co-located with all 802 groups

### Interim: 10-13 September 2012, TBD

#### Meeting co-located with 802.16

### Plenary: 11-16 Nov 2012, Grand Hyatt, San Antonio, TX

#### Co-located with all 802 groups

### Discussion:

The registration is discounted by $300 for staying in the hotel. It is suggested to itemize the cost. It is also suggested to understand these costs first, and then negotiate the contract.

## Any other business

### Views on future Interim

It is asked about the future of the logistics for interim meetings: whether to continue with 3 interim meetings a year and whether to continue to co-located with 802.16. It is necessary to find out the commitments and the rules first.

### Plan for future work:

It is suggested that 802.21 should have future planning. For example, there are currently 3 TG’s. What will 802.21 do after that? What topics are of interest to work on? For information, 802.16 have plans for future activities.

It is also asked about liaison with IEEE 802.19. One may draft a letter to bring to WG or we can have joint sessions again with them, if there are interests

## Adjourn at 3:41PM until November 2010 Plenary in Dallas



IEEE P802.21 Media Independent Handover Services

Tentative Meeting Minutes of the IEEE P802.21a Security Task Group in September 2010 Interim

Chair: Yoshihiro Ohba

Editor: Lily Chen

Minutes taken by Subir Das and Antonio de la Oliva

(The following Security TG minutes are copied here from 21-10-0211-00 for information only)

# Monday, Sept 13th, 2010, 4:00 pm -6:00 pm

## Chair called the meeting to order

## Agenda (DCN# 21-10-0182-00-0sec) by Chair

The agenda is displayed. Agenda was approved.

## Meeting opening notes (DCN#21-10-0183-00-0Sec) by Chair

Meeting opening notes were presented.

## Approval of outstanding meeting minutes

July meeting minutes were approved via WG minutes. Teleconference meeting minutes on August 17th, 2010 (DCN# 21-10-0122-00-0Sec) and on August 31st, 2010 (DCN# 21- 10-0174-00-0Sec) were approved.

## Presentation on snapshot of pre-draft specification by Editor

Editor presented the updated draft specification. Editor clarified how the accepted proposals are inserted into the document.

Two issues were identified in Dapeng’s proposals: i) On IEs: Issue: same IEs are mentioned in two places: Resolution: remove one; ii) Primitives for new messages: need to receive update from him

Rafa and Fernando’s contribution: Capability discovery contribution is provided but need to receive contribution on data types. Figure 8 describes MIH\_Start\_Auth request and then in figure 9 it is again used which seemed to be a response. This is something that needs to be resolved.

Q: Where should we put the security related messages in Section 8?

A: It would be good to add all security messages under ‘Service Management’.

Q: Any other opinion?

A: It should be ok with management service

Q: Can we use the same messages for all authentication methods?

A: We may be able to do this but let’s keep three mechanisms separate.

Comment: MIH service capability should be done after MIH security negotiation happens.

## Issue List (DCN 21-10-0187-00-0sec) by Chair

Chair discussed the issue list and assignment.

## Chair called the meeting to recess at 6pm

# Tuesday, Sept 14th, 2010, 8am-10am

## Chair called the meeting to order at 8:10am

## Discussion on outstanding issues

DCN 79-03, DCN 123-01 and 78-06 were discussed. Editor started with updated version of the document.

Some issues were identified in DCN 78-06 and editor needs to check with the authors. Chair has added the issues (Issues #24 to #27) in issue list table (DCN 21-10-0187).

## Chair called the meeting to recess at 9:30am

# Thursday, Sept 16th, 2010, 10:30am-12:30pm

## Chair called the meeting to order at 10:33am

## Editor’s presentation on latest snapshot of pre-draft specification

Editor gives status report.

For this meeting all essential parts are finished, including IEs, Primitives and Messages.

Text explaining essential parts is close to finish

Important to do items:

* MIH SA: Coordinate TLS and EAP case
* MIH protection: Ciphersuite and key derivation
* Cryptographic details EAP case

Issue list will be presented by Chair.

Editor proposes to send the current document to the contributors so they can provide feedback, in this way the contributions will not change their contributions again.

Chair mentioned that the issue list will be updated to the server.

## Closing Node (DCN 21-10-0198) by Chair

Issue list is DCN 187.

Audio Conference schedule is discussed. A tentative schedule is: September 28 (Tue) 9am-11am ET, November 2 (Tue) 9am-11am ET.

## Chair called the meeting to adjourn at 11:50am

# Attendees

# 802.21 Attendee

|  |  |  |
| --- | --- | --- |
| Name | Affiliation | Percentage |
| H Anthony Chan | Huawei Technologies Co., Ltd. | 100 |
| Lidong Chen | NIST | 100 |
| De la Oliva Antonio Delgado | Universidad Carlos III Madrid | 100 |
| Junghoon Jee | Electronics and Telecommunications Research Instititute (ETRI) | 100 |
| Hongseok Jeon | Electronics and Telecommunications Research Instititute (ETRI) | 100 |
| Lee Jin | LG ELECTRONICS (802.16) | 100 |
| Johannes Lessmann | NEC Corporation | 100 |
| Yoshihiro Ohba | Toshiba Corporation | 100 |
| Changmin Park | Electronics and Telecommunications Research Instititute (ETRI) | 100 |
| Ajay Rajkumar | Alcatel Lucent | 100 |
| Juan Carlos Zuniga | InterDigital Communications, LLC | 100 |

# 