IEEE P802.11
Wireless LANs

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| IEEE 802.11 NG60 SGNovember 2014 San Antonio Meeting Minutes |
| Date: 2014-11-7 |
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Abstract

NG60 SG meeting minutes from the IEEE 802.11 San Antonio session, November 2nd-7th, 2014.

**IEEE 802.11 Next Generation 60 GHz (NG60) Study Group**

**November 2014 San Antonio Meeting**

**November 2-7, 2014**

**Tuesday, November 4th, 2014, AM1 Session (08:00-10:00)**

1. The meeting called to order by Edward Au (Marvell Semiconductor), the chairperson of the NG60 SG, at 08:00. Reminded everyone to record the attendance. Introduced himself and secretary Jeorge Hurtarte (Teradyne)
2. Agenda Doc.11-14/1313r1
	1. Chair reminded all to record their attendance.
	2. Reviews the time slots for the meetings of this week: three sessions scheduled per the agenda slides 4 and 16.
3. The chair reviewed the mandatory 5 slides of the Patent Policy
	1. Call for potentially essential patents
		1. Chair asked if anyone is aware of potentially essential patents.
		2. No potentially essential patents reported
4. Review of Submissions
	1. Four presentations already noted
	2. One more presentation added by Alexander Maltsev (Intel) on “Channel Models in NG60” and another one by Amichai Sandeovich (Qualcomm) also on “NG60 Channel Model Challenges”
	3. Six presentations total noted
5. Review of the agenda for the week.
	1. Thanks Carlos Cordeiro (Intel) for his past leadership
	2. Reviews Summary from September 2014 meetings
6. Call for approval of the September 2014 meetings
	1. Move: Rakesh Taori (Samsung)
	2. Second: Rob Sun (Huawei)
	3. All in favor, none against. Meetings Minutes from September 2014 approved.
7. Review of the Study Group Timeline, slide 20.
	1. Asked if there are any comments on the timeline.
	2. No comments.
	3. Will review the timeline again on Thursday PM2 session.
	4. Questions asked by Rakesh if there is a need for Thursday PM2 if all presentations are concluded by the second session on Wednesday AM1.
8. Presentations:
	1. Doc. 802.11-14/1386r0 by Takuda Takama from NTT DoCoMo: “NG60 Usage Models.”
		1. The contribution details the use-cases for NG60 discussed in IEEE 802 Wireless Interim Meeting in Athens.
		2. Floor open for question:
			1. Question asked on slide 6 regarding Use Models
			2. Discussion on metrics of slide 6, how about power requirements?
			3. Discussion on data rates normalization
	2. Doc. 802.11-14/1378r1 by: Amichai Sandeovichfrom Qualcomm: “PHY Rate for NG60”
		1. Topics covered:
			1. Channel Bonding
			2. MIMO
			3. Constellation, suggesting up to 128QAM and 256QAM, or even APSK
			4. Symbol Length and Guard Interval
			5. Coding Rate
			6. Modulation
			7. Conclusion is that 100Gbps is achievable with maximum improvement assumptions and 40Gbps at conservative assumptions.
		2. Floor opened for questions:
			1. Challenging “achievable” as overstatement and requests qualifying stated targets with support data. Amichai replies that simulation with 4x4 MIMO supports presented data.
			2. How about power consumption assumptions?
			3. Would like to see EVM for each modulation assumption.
	3. Doc. 802.11-14/1486r0 by: Alexander Maltsev from Intel: “PHY Channel Models for NG60”
		1. A quasi-deterministic (Q-D) approach is introduced for modeling 60 GHz channels
		2. Topics covered:
			1. Access Links Scenarios
			2. D2D and Backhaul Scenarios
			3. Experimental measurements results
			4. Ray-tracing simulations model(D-, R-, F- rays)
			5. Antenna Models
			6. Proposed new mmWave channel model structure.
			7. Recommending that an ad-hoc group should be formed in NG60 to look into experimental channel measurements and modeling
		3. Floor opened for questions:
			1. Inquired about experimenting with >800MHz bandwidth.
			2. Slide 21: Human Blocking scenario. Discussion on the proposed channel model versus others published in academia.
			3. Discussion on applicability of the outdoor experimental results in indoor environment
			4. Discussion on Intra Cluster vs. Inter Cluster definition.
			5. Discussion on the classification on classes of rays (D-, R-. F-, etc) in the context of system level simulations an how to decide the number of each ray types to consider in simulations.
			6. Slide 12: requests some clarification on the antenna set up and assumptions specifically on the “equal gains of antenna pattern” text.
			7. Discussion on comparing other experimental measurements at 28GHz and 87GHz to 802.11ad measurements presented.
			8. Discussion on comparing channel models in E-Band vs. 802.11ad channel models
9. Recessed at 10:01 CT untilWednesdayAM1 and reminded everyone to record their attendance.

**Wednesday, November 5th, 2014,AM1 Session (08:00-10:00)**

1. The meeting called to order by Edward Au (Marvell Semiconductor), the chairperson of the NG60 SG, at 08:00. Introduced himself and secretary Jeorge Hurtarte (Teradyne)
2. Indicated that Agenda Doc.11-14/1313r3 has been uploaded to the server.
3. The chair reviewed the mandatory 5 slides of the Patent Policy
	1. Call for potentially essential patents
		1. Chair asked if anyone is aware of potentially essential patents.
		2. No potentially essential patents reported
4. Review of other guidelines for IEEE WG members and Resources URLs
5. Chair reminds everyone to record their attendance.
6. Presentations:
	1. Chair asks if there are any other presentations.
	2. There is a request to continue asking questions regarding Alexander Maltsev’s Doc. 802.11-14/1486r0 presentation from yesterday. Request granted and floor opened for discussions.
		1. Discussion on future higher bandwidth measurements and update on intra cluster environment. Also need higher bandwidth measurements for outdoor in the range of 2GHz.
	3. Doc. 802.11-14/1487r0 by Amichai Sanderovich from Qualcomm: “NG60 Channel model challenges”
		1. Topics Discussed:
			1. NG60 features required by the channel model
			2. Channel Bonding challenges
			3. MIMO/MU-MIMO in the channel model
		2. Floor opened for discussion:
			1. Discussion on how a channel model can/should accommodate many possible implementation designs.
			2. Discussion on whether a channel model should include the RF part or not as this RF part could/will be different from different vendors and whether the model should only include the antenna pattern.
			3. Discussion on Phase Array antennas and its implications on the channel modeling.
			4. Discussion on what parameters should the channel model include: use cases, antenna models, RF circuitry, etc. Need some definition of the boundaries of the model.
			5. Discussion on whether device orientation and baseband-to-baseband should be included in the channel model.
			6. Discussion on the need to include antenna pattern information if the channel model will include antennas.
7. Review by chairman of Doc. 802.11-14/1510r0 regarding September meeting PAR and CSD discussion.
8. Review of Doc. 802.11-14/1151r2 “802.11 NG60 SG Proposed PAR” by Carlos Cordeiro from Intel:
	1. Redlines from September meeting still in 802.11-14/1151r2 document
	2. Estimating about 60 people to be actively involved in this project.
	3. Added “at least 20Gbps” as the target throughput for NG60.
	4. Floor open for discussion:
		1. Discussion on how range (distance reach) improvements will be addressed.
9. Review of Doc. 802.11-14/1152r2 “IEEE 802.11 NG60 SG Proposed CSD” by Carlos Cordeiro from Intel:
	1. Added a paragraph on backhaul for small cells as a market driver for very high throughput standard.
	2. Discussion on whether Cost of Test should be included in the Economic Feasibility part of the CSD.
	3. Chairman asked the floor if there are any further questions or comments, in particular to the “at least 20Gbps” metric that was added to the PAR and CSD.
	4. Carlos took the action to accept all the changes and upload a new r3 revision to the server.
10. Finished all presentations. Therefore chairman asked if there are any objections to move tomorrow’s agenda items to today with the objective of finishing today. There is no objection.
11. Need a motion to “Request the IEEE 802 LMSC to extend the IEEE 802.11 NG60 Study Group.”
	1. Moved Motion: Rakesh Taori (Samsung)
	2. Second Motion: Yan Xin (Huawei)
	3. All in favor: 58
	4. Objects: none
	5. Abstain: 0
12. Teleconference Schedule:
	1. December 16 (Tuesday), 7:00am PT- 8:00am PT
	2. January 6 (Tuesday), 7:00am-8:00am PT
	3. Will cancel teleconference calls if no agenda items submitted by one day in advance.
13. Adjourned November 2014 meeting at 9:26am CT, and tomorrow’s meeting at PM2 is cancelled.