IEEE P802.11
Wireless LANs

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| TGaz meeting minutes – November meeting |
| Date: 2016-11-22 |
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Abstract

Minutes for the TGaz meeting in San Antonio, TX.

**IEEE 802.11 Task Group AZ**

**November 2016 San Antonio, Plenary**

**November 7-11, 2016**

1. **Tuesday PM1 Nov 08, 2016**
	1. Called to order by TGaz chair, Jonathan Segev (Intel Corporation) at 13:31 (local time)
	2. TGaz secretary (acting) Naveen Kakani (Qualcomm), Ganesh Venkatesan (Intel Corporation).
	3. Agenda is in document 11-16-1309r1 to be review and updated according to discussion to create 11-16-1309r2 post first timeslot.
	4. Review Patent Policy and logistics
		1. Chair reviewed the IEEE-SA Patency Policy, additional guidelines about IEEE-SA meeting and logistics
		2. Chair called for any potentially essential patent, no one stepped forward.
		3. Chair reminded all to record their attendance.
	5. Chair reviewed the agenda and schedule for the week and call for additional submissions.
	6. Chair asked for feedback on the agenda prior to approval– no further feedback received.
	7. Approve Meeting TG Minutes for the Sep meeting
		1. **Motion (#1):**

Approve document 16/1320r0 Meeting Minutes for the September 2016 Session

* + 1. Moved: Ganesh Venkatesan
		2. Seconded: Chaochun Wang
		3. **Results(Y/N/A)**: 14/0/0 Motion Passes
	1. Review 3GPP RAN4 Liaison submission 11-16-1338r0 (Allan Zhu)
		1. This liaison request was also sent to WFA by 3GPP RAN-4
		2. WLAN RTT included in Rel-13, in Rel-14 intends to specify requirements for indoor WLAN RTT Roundtrip Time Measurements - Min RTT, Max RTT, Resolution and Accuracy.
		3. C: WFA may have specific numbers.
		4. C: would coution against 802.11 re-directing to WFA, the group should answer to its best ability.
		5. C: Perfromance figures depends heavily on the assumed environment. Need to understand the environment in which these performance figures are requested.
		6. C: The GPS system advertises both accuracy at 50% and 90% performance figures.
		7. Hard to specify numbers unless a channel model/environment is identified.
		8. Strawpoll:

For Q3. in the Liaison Request, do you support 3GPP with a description of FTM Protocol Limitations?

* + 1. Results(Y/N/A): 6/2/7
		2. Straw Poll:
		3. For Q1 and Q2. in the Liaison Request, how should we respond:
		4. (1) We do not have data
		5. (2) Ask 3GPP for more information
		6. (3) Identify a channel condition and respond with corresponding results
		7. (4) Provide theoretical expectations
		8. (5) Provide theoretical value and ask for additional information from 3GPP (2) + (4).
		9. (6) Use numbers from the WNG presentation and ask for more information
		10. C: What does this brings us to IEEE 802.11 by responding to 3GPP request.
		11. C: 3GPP has a larger footprint and it can help to respond back to 3GPP.
		12. Continue discussion on this expected during Wed Session.
	1. Room count of the number of people in the meeting room: 43
	2. A Unified 11az Protocol (Ganesh Venkatesan)
		1. Presented submission 11-16-1494r0
		2. Discussion of motion text (slide 17):
		3. C: Not sure what is being motioned
		4. R: The protocol as described on Slide 17.
		5. C: Slide 17 is not an actionable text, recommend to use the text on Slide 19
		6. C: Recommends to modify the slide to reflect the content in Slide 19
		7. R: As of now there is no specific SFD text, so would want to work on the actual text based on the Protocol Shown in the slideset (Slide 17 and not Slide 19).
		8. **Motion (#2)**
		9. Move to approve
		10. The proposed 802.11az protocol (as exemplified in Slide 17)
		11. And develop corresponding FRD/SFD text for future discussion and approval
		12. Move: Ganesh Venkatesan
		13. 2nd: Manish Kumar
		14. **Results**: (Y/N/A): 8/4/8 – motion fails.
	3. TG recess.
1. **Wednesday PM1 Nov 09, 2016**
	1. Called to order by TGaz chair, Jonathan Segev (Intel Corporation) at 13:34 (local time)
	2. Agenda is in document 11-16-1309r2 (r3 will include changes made in the meeting and posted after the meeting).
	3. Chair reminded the members to register their attendance
	4. The chair reminded the group of the Patent Policies and Operating Rules
	5. Call for potentially essential Patents, no one stepped forward.
	6. Room count of the number of people in the meeting room: 22
	7. Chair indicated an additional timeslot allocated to TGaz (Thu. AM1)
	8. 11ax-based MU Negotiation Phase (Chittabrata Ghosh)
		1. Review submissions 11-16-1496 11ax-based MU Negotiation Phase
		2. C: Trigger Frame Service Request is not defined –
		3. R: could re-use the Trigger Frame as defined in .11ax or define a new one for use in .11az
		4. Q: Is it possible to coalesce M-BA and iFTM?
		5. A: Yes, if iFTM can be generated in SIFS. Otherwise, we need an ack (of M-BA) and an iFTM.
		6. Straw Poll:
		7. Do you agree that 11az negotiation phase should support enhanced FTM Request in both SU and MU modes for both associated and unassociated states?
		8. Result (Y/N/A): 13/0/6
		9. C: Is it an enhancement to the frame or to the frame and the procedure?
		10. R: For now, we will focus on frame enhancement for SU, MU, associated and unassociated. The procedure may need enhancements and will be discussed later.
		11. C: Do we need to deal with Beam Forming -- beam forming may be a factor when ranging is done. Not needed in the Negotiation phase for 2.4 and 5Ghz.
		12. **Motion (#3):**
		13. Move to adopt the foloowing spec frame work requirement:
		14. "11az negotiation phase shall support an enhancement to FTM Request frame in both SU and MU modes for both associated and unassociated states"
		15. and instruct the SFD Editor to include it in the TGaz SFD for the .11az Ranging protocol and allow editing rights to the editor
		16. Moved: Ganesh Venkatesan
		17. Seconded: SK Yong
		18. **Results (Y/N/A):** 13/0/5 - motion passes.
	9. FTM Security in Associated and Un-associated States (Qi Wang)
		1. Reviewed submission 11-16-1498.
		2. This submission is a follow up to the discussion in the last (Warsaw) meeting (which discussed associated mode) and is focused on the unassociated mode. The proposed mechanism applies to FTM but could be used for all 802.11 Management frames that are exchanged while in an Unassociated State.
		3. Q: What is the threat model? What are we protecting from?
		4. R: FTM frames with the t1 and t4 values and the corresponding ACK are not protected. This proposal protects the FTM frame and the corresponding ACK.
		5. Q: The receiver of the ACK frame can be deceived by an ACK from another party?
		6. R: Yes
		7. Q: Does it apply to both the Negotiation Phase and Ranging Phase?
		8. A: May be. At this point, we are leaving it open.
		9. A: Think that this is an important topic that needs to be addressed in .11az.
		10. A: we should ensure that one mechanism is defined to cover both the phases
		11. Straw Poll:
		12. The 802.11az FRD and SFD shall address FTM security.
		13. Results (Y/N/A): 21-0-1
		14. C: Need to identify what use cases are addressed with this feature.
		15. C: Need more clarity/details on the security aspect before adding anything to FRD/SFD.
		16. C: suggest to remove option of “in neither associated nor un-associated mode” since the previous straw poll indicated support for Security.
		17. Q: How would (b) work?
		18. R: A new unassociated mode authentication/key derivation will be defined for un-associated operation.
		19. Q: Would (b) provide more security?
		20. R: currently FTM has no security.
		21. Q: Would the protocol always enforce security? Is there a mode for operating without Security?
		22. A: the security-les mode should be supported, security would be optional.
		23. Straw Poll 2:
		24. Do you support to add the following requirement to the 802.11az Functional Requirement document [3] under the section of 2.1.1 “Range measurement and coverage” TGaz Rx: The 802.11az protocol shall describe one or more mechanisms to provide secure range measurement:

(a) in an associated mode (Y/N/A): 6/11/3

(b) in an un-associated mode (Y/N/A): 0/18/2

(c) in both associated and un-associated modes (Y/N/A): 17/1/2

* + 1. Straw Poll 3:
		2. FTM security in an associated state shall leverage the keys derived using the existing 802.11 methods. Should we leverage existing methods? Or invent something new?
		3. Result: 10/0/9
		4. C: Positioning involves exchanging information with more than one AP and may be associated with only one AP. So, using existing methods may not work all the time.
		5. Q: Are we referring to PMF?
		6. R: PMF and may be something new.
		7. Q: How does it work with MU Modes?
		8. R: Have not explored MU modes? Leverage refers to whatever mechanisms that already exist.
		9. C: May be too early to respond meaningfully to this straw poll
		10. Straw Poll 4:
		11. The protection of the management frame exchanges (such as, FTM/Ack) in the un-associated state shall use a common mechanism that applies to the protection of all management frame exchanges that require security.
		12. Results: Out of time for this straw poll.
		13. Q: Does protection mean PMF?
		14. R: Not necessarily. PMF does not apply to un-associated mode(s). Mechanisms for un-associated mode is open (at this time).
		15. C: the straw poll envisions a mechanism that applies to FTM and potentially any management frame exchange that may need protection
		16. Q: are we proposing to use the same mechanism from Straw Poll #3 here?
		17. R: No. In unassociated mode, it is a new mechanism
	1. FTM Frame Authentication (Naveen Kakani)
		1. C: Does proposal address the same issues brought up by the previous submission?
		2. R: Yes but need some tweak to address the case where non-FTM exchanges are protected
		3. Q: What processing delay crtitcal paths if any are presented by the scheme?
		4. R: Authentication Code from previous frame is used to protect the current frame. Current FTM minimum spacing which is negotiable (125 usec min). Future protocols which may require SIFS response time may bring constraints (and may not need protection since to attack a SIFS response is harder but do-able).
		5. Q: does the proposal protects against replay attacks e.g. a third party replays a missed frame/s.
		6. R: Not sure if a replay attack can be staged.
		7. Q: Slide #3 iFTMR and iFTM are not protected in this proposal
		8. R: the data that needs protection are the timestamps contained in the measurement frames.
1. **Thursday AM1: November 10th 2016, AM1**
	1. Called to order by TGaz chair, Jonathan Segev (Intel Corporation) at 08:05 (local time).
	2. Agenda is in document 11-16-1309r3 (r4 will include changes made during this timeslot and posted after the meeting).
	3. Chair reminded the members to register their attendance
	4. The chair reminded the group of the Patent Policies and Operating Rules
	5. Call for potentially essential Patents, no one stepped forward.
	6. Room count of the number of people in the meeting room: 9
	7. Response to 3GPP Liasion (Ganesh Venkatesan)
		1. Ganesh presented skeleton for proposed response to 3GPP RAN 4 liaison, submission 11-16-1535r0.
		2. Q: where does the +/-6nsec comes from?
		3. R: the WNG presentation reflects 1-2 m range accuracy, this translates to max +/-6nsec RTT.
		4. C: Physical layer measurement period over which the above measurement accuracy is met depends on implementation and the parameters negotiated to execute the protocol.
		5. C: RTT is derived from timestamps represented with protocol resolution in units of picoseconds.
		6. C: It is possible for an implementation to count the number of samples but the protocol itself does not have a means to formulate or indicate from AP to STA or cross layer the number of samples and standard deviation.
		7. Q: Can a range be negative?
		8. R: Local clock/oscillator may run faster or slower then optimal oscilation rate.
		9. C: The current response is based on a WNG presentation and the results are not validated by IEEE 802.11, does it make sense to use these numbers to respond to 3GPP ?
		10. **Strawpoll**
		11. For the 1st and 2nd questions, which options do you support?
		12. O1) Indicate the IEEE 802.11 spec does not include minimum performance level and performance is market derived
		13. O2) Ask the 3GPP to define the channel condition under which they would like to receive performance level for. Individual contributors present results
		14. O3) Select scenarios and channel conditions and do the analysis
		15. O4) We provide the supported protocol ranges (protocol analysis).
		16. O5) Report the values used as reference for TGaz establishment/early implementation
		17. Results: O1: 8, O2: 0, O3: 0, O4: 2, O5: 5
		18. C: Can a response include both Option 1 and Option 5?
		19. R: When including data for Option 5, include the reference to the document from which the values were derived.
		20. **Straw Poll:**
		21. For the 1st and 2nd questions we agree to:
		22. Indicate the IEEE spec does not include minimum performance level and performance is market derived, in addition to that report the values used and references presented in TGaz and its establishment/early
		23. Results (Y/N/A): 11/0/0
		24. Updated the Liason response document and Ganesh to post to mentor and bring to motion on next timeslot.
		25. Recess
2. **Thursday PM2: November 10th PM1**
	1. Called to order by TGaz chair, Jonathan Segev (Intel Corporation) at 13:30 (local time).
	2. Agenda is in document 11-16-1309r4 (r5 will include changes made during this timeslot and posted after the meeting).
	3. Chair reminded the members to register their attendance
	4. The chair reminded the group of the Patent Policies and Operating Rules.
	5. Call for potentially essential Patents, no one stepped forward.
	6. Submission 11-16-1535r2 Liasion Response document (Ganesh Venkatesan)
		1. Reviewed changes of latest revision.
		2. **Motion:**
		3. Approve document 11-16-1535-02-00az-response-to-RAN4-liaison-on-RTT-accuracy.doc as the IEEE 802.11 response to 3GPP RAN 4 request for RTT accuracy, and grant the 802.11 chair editorial license.
		4. Moved: Allan Zhu
		5. 2nd: Chittabratha Ghosh
		6. **Results**: Y: 14, N: 0, A: 3 - motion passes
	7. Ranging using 11az (Naveen Kakani)
		1. Presented submission 11-16-1509r0 Discovery and Negotiation Parameters for 11az Ranging
		2. C: Parameters listed might not be exhaustive, so it might be early to make an opinion about how to signal Parameters for 11az (VHT Parameters, 11ax Parameters, ..) 🡪 agree with the commenter.
		3. Q: What does Response at a later time mean:
		4. R: Processing and allocation of resources to transport measurement of Channel information / Sounding might not be possible to be processed immediately, so resource allocation can be done for response immediately or combined with later Responses
		5. C: Are the possible responses be SIFS separated?
		6. R: That is a possibility.
	8. Room count of the number of people in the meeting room: 29
	9. Ranging for 60GHz (Alecsander Eitan)
		1. Reviewed submission 11-16-1511r0: Ranging for 60GHz
		2. Q: What would happen in the scenario where there is no LOS?
		3. R: Current implementation will use the strongest one which may or may not be the first path because the dominanat path is not the one the SS converged on.
		4. C: it is implementation specific, spec does not specify strongest or any other path for SS convergace.
		5. Q: In 11ay there is discussion about Channel Bonding, is the intent here to transmit in Single Channel or in Multiple Channels?
		6. R: Based on our analysis its better to do single antenna than MIMO technique, but channel bonding may improve the performance.
		7. C: The spec does not preclude the use of beam forming in unassociated mode.
		8. R: believe that maintaining the FTM session in unassociated mode may create an issue.
		9. Q: Is the proposal to send an FTM frame in each sector?
		10. R: If there is a data link already, then they are likely beam formed already. Prior to execution of FTM, a STA will do a sector speep to identify the the LoS in order to use the sector which gives the best LOS component.
	10. A Unified 11az Protocol (Ganesh Venkatesan)
		1. Presented submission 11-16-1494r1, follow up from submission made earlier this week.
		2. Would like to motion the adoption of the changes as shown on Slide 20 to the SFD.
		3. **Motion:**
		4. Move to approve inclusion of the following in the 802.11ax spec framework
		5. Document (SFD); and instruct the SFD editor to incorporate it in the next version of
		6. the 802.11az SFD and grant the SFD editor editorial license:
		7. The .11az protocol shall define the following phases
		8. a capability discovery,
		9. a Time of Flight (ToF) measurement parameter negotiation and
		10. a set of ToF measurement exchanges
		11. Note: Other protocol phases may be defined as needed and is <TBD> based on more discussion(s)
		12. The .11az protocol shall extend the REVmc iFTMR/iFTM for .11az ToF measurement parameter negotiation
		13. Moved:  Ganesh Venkatesan
		14. Seconded: Santosh Pandey
		15. Results (Y/N/A): 9/0/8
		16. Result: Motion Passes
	11. Program timeline:
		1. Program is sliping.
		2. Group made progress this week, however still early to assess the new timelines.
		3. Thus, No update from last meeting.
	12. Reviewed Goals as shown in document:
		1. Continue FRD, SFD document development
		2. Review technical submissions
	13. Teleconference: Nov 30th (Wed 10 AM EST for 1 hour)
		1. Chair called for any other business – none identified.
	14. Task Group meeting adjourned 15:06.