Minutes of the 4th mmWave Standards meeting of International SparkLink Alliance (iSLA)

Location: AC Hotel Malaga Palacio, Malaga, Spain

Dates: 15 – 16 January, 2025

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| Meeting | SparkLink International mmWave Standards meeting |
| Meeting # | 4 |
| Location | AC Hotel Malaga Palacio, Malaga, Spain |
| Date | 15 – 16 January, 2025 |
| Chairman | Prof. Lorenzo Vangelista, Wireless and More |
| Secretary | Shen Yan, International SparkLink Alliance (iSLA) |
| Participants | 18 participants (see Appendix #1) |
| Contributions | 0021 – 0034 (see Appendix #2) |
| Delivery | SparkLink members, meeting participants |

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DATE #1: 15.01.2025 - Attendees: 17 in total

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The Chairman opened the meeting at 9:00 on 15 January 2025.

Chairman (Lorenzo) introduced general guidelines of the meeting, including non-competition and antitrust requirements.

**01. Agenda 0021r2 approval**

* Approved.
* The agenda for today has been discussed, modified/updated and finally agreed.
* The meeting minutes from the last plenary are accepted by the attendees.
* Request from the chairman: We need the IT system up and running as soon as possible.
* There are 4 new proposals to discuss in this 2nd meeting (15-16.01.2025)
* Discussion on contribution rules.
  + There is a typo on the statement of copyright.
  + There was a question whether contributors keep the copyright. Yes, they keep copyright on their own contribution, but also allow iSLA to use the contribution freely under its own copyright.
  + Another question related to the deadline for contributions: Chairman must to be informed about the contribution title (5 working days before the meeting) and the contribution should be available for everyone (2 days before the meeting). This rule of proceeding is approved
  + Online meeting should be counted into the meeting number Online meetings should be considered to have same right such as approving something. Ad-hoc meeting (Task groups and Working Groups) cannot approve but plenary meeting, even online, have the rights to approve. This rule of proceeding is approved.
  + Word document (0031) template approved. The word document is also suggested to use in OL meeting.

**02. Juan Carlos DEKRA:**

* Brief speech "Welcome to Malaga".

**03. Yanshen, iSLA secretary:**

* Logistics (access to the slides):
  + wifi: SparkLink-mmW
  + password: 12345678
  + ftp:// 192.168.3.7:9999
* It is expected that on March 26th the new legal entity "international SparkLink Alliance European Branch" will be created.
* Tommi tried to create an email list based on Google group and also Microsoft. However, there is a technical problem so we shall forget this approach and Tommi will look at another solution soon.

**04. Agenda Topic: Ad-Hoc Group 1 (AHG1) report.**

04.1. Speaker: Vinod. Final version of the template.

* Discussed already in the meeting in December. (See table with the first row in green). There are 2 front pages, to use from 1.0.0 to onwards and from 0.0.0 to 1.0.0.
* Final version about use case template, mainly contributed by Juan Carlos and Vinod, is approved.
* Mr. Chairman proposes if we shall approve it today or in the next meeting to let attendees to review it with time. Tommi says it was already reviewed in the last online Plenary and there are only little changes. As there are only little changes, it is proposed to be approved today and it has been approved. This document is only for internal use, not external. Document approved.

04.2. Speaker: Mr. Chairman Lorenzo.

* Question from chairman: We should treat the online plenaries as plenaries to approve docs and so on also there?
* Joan Borras says ok.
* Juan Carlos also ok. Approving docs is allowed in online meeting but organization changes should be approved in in-person meetings.
* Theodoros: both online and onsite plenary meetings should have the same rights.
* Agreement: In the plenary online meeting is not allowed to approve organization changes, but it is allowed to approve documents.
* Chairman opinion: plenary online and onsite meetings should be equal. Asked for this approval. It has been approved!

04.3. Speaker: Vinod. 2nd document for the use case description. Contribution proposed by Vinod.

* Use case proposed by Vinod. xR (AR: augmented reality, MR: mixt reality, VR: virtual reality, applications) implementation --> Asymmetric comms (uplink, downlink). Virtual reality mainly for gamming and immersive experience.
* Critical parameters to take into account in these applications based on xR:
  + datarates of uplink/downlink transmission
  + uplink is xR device sending info to server
  + downlink is server sending data to xR device
  + up/down link datarates
  + refresh rates of the frames. refresh rate of 90 frames per second is the minimum requirement.
  + information latency. frame to by updated by the xR device because there is some update in the frame, time for rending to the screen coming from the environment, this is the latency time. Depends on the application (e.g. for gaming apps latency is low, but for real applications like TV the latency is high). For AR datarate is 20Mbps, downlink 20 and latency 20ms, etc.
  + For MR is the same except latency=10ms. [see data in the use cases doc.]
* Question from Bart, NXP. What about "Environment" between device and server, how is this affecting at interference mitigation level, etc.? Answer from Vinod. There is always line of sight between the device.

**05 Agenda Topic: Ad-Hoc Group 2 (AHG2) Report**

* In search of candidate for taking the role of Group 2 leader related to implementation issues of mmWave --> Not assigned yet.

COFFEE BREAK

**06. Agenda Topic: Task Group T1 Spectrum.**

06.01. Speaker: Theodoros.

* To prepare skeleton doc for spectrum topic.
* The spectrum regulation is chaotic so we must have spectrum regulation roadmap. We target 60 GHz frequency band. It is designated for high-capacity wireless communication and short-range comms.
* There are regulations from European institutions to harmonize across countries.

06.02. Presentation of spectrum roadmap and tools from DEKRA by Juan Carlos, for our information.

* The DEKRA tool is available for everybody but under contract with DEKRA.
* With the tool we can ask the database about what frequencies in what area is used. Report shows spectrum regulation and location. The alliance shall pay the fee if the group wants to use this tool to see the regulation of 60 GHz in Europe, etc. Price: 6000 EUR/year.
* The Alliance has to decide where we want to operate. In the next Face to face meeting we have to agree/consult and come to a consensus about where the technology is supposed to be standardized. Only EU? What countries?
* To know what freq. band is available in what countries. This info is possible to be extracted from the DEKRA tool, just to see what kind of interference we can have in each location.
* Proposal from Vinod: Spectrum group to make a proposal about spectrum and countries as starting point, sent upfront to discuss in the next meeting. Subscribed by Francesc. This is a first approach that we can extend later in other countries, freqs, etc.
* Spectrum group to focus first in EU and then see constraints in other regions in the world. There is consensus about this.

**07. TOPIC. SparkLink Tutorial (Part 1of2) Synchronized Low-Latency Broadband (SLB) 1.0bis. Speaker: Li Xu**

* Question from Moray about subcarriers spacing: Why subcarriers higher than 120 kHz of 60 GHz? Normally it is not the case, it is the state of the art to 120 kHz. Why now 10 times higher? What is the motivation and advantages for this? This goes in the other direction to 3GPP at 60 GHz.
* Answer from Xu: disadvantage: larger subcarriers are a problem for design of chip, it is challenging. Advantage: to reuse some blocks of the chip already done. Reuse all the IP cores already done..
* The real solution is actually the column in blue of the document, the rest of columns are only proposals.

LUNCH 13:00 - 14:30

**08. TOPIC. SparkLink Tutorial (Part 2of2) Speaker: Li Xu.**

* SLB 1.0bis protocol basically based on 3GPP.
* Synchronism through G node (master) to the other T nodes. Multi-domains synchronization process.
* Question: How many T terminals can be connected? Answer from Xu: at bits level, 1024 since we have 10 bits, but the reality depends on the memory you have in the chip for the number of T nodes connected at the same time
* FISA presentation

**09. TECHNICAL CONTRIBUTION: SparkLink mmW Channel Model. Speaker: Tommi Jamsa**

* Low frequency (<7 GHz) vs 60 GHz high freq.
* Overview at high level, not low level details.
* 3GPP is like cellular communication. IEEE is another option.
* Opening short discussion about the proposal: discussion about 3GPP or IEEE. Moray prefers IEEE.
* IEEE focused in the environment and designed something that worked well in that environment. 3GPP was not focused on the environment aspects and it failed, it did not reach to make it work.
* It is pending to decide the CHANNEL MODEL (for indoor environments). This decision shall be taken for the Technical Report in March.
* When 3GPP went from low frequency to high freqquency, some relevant aspects were missed/dropped and that the reason why it failed. However, the IEEE model does consider those aspects.
* Moray: prefer to take IEEE model because the scenarios are similar. 3GPP focuses on the environments and complex in many scenarios.
* Ignacio: 3GPP is widely used. But the design and optimistic is not satisfy with the SparkLink scenarios. Cannot compare easily because of the KPIs are far different.
* Vinod: what is the final result of evaluation?
* Xu: firstly, we can reuse the existing CM for evaluation (IEEE 802.11ay preferred). Secondly, to ray tracing simulations. Thirdly, Measure real hardware.
* Next steps suggested by Tommi in the slides have been approved.
* Proposed a new task group (T2) to work on Channel Modeling. Accepted by the attendees. --> Ignacio, Moray, Tommi, Dor and Theodoros agree to take part in this task group of channel modeling. The leader is going to be Tommi.

**10. TECHNICAL CONTRIBUTION. Speaker: Li Xu. Numerology Spatial Streams & MCS.**

* PHY Numerology (and Superframe proposed).
* Spatial Streams --> modification done in comparison to low frequency. To decide which one of the structures is to one we choose.
* Modulation and Coding Scheme (MCS). --> suggested MCS table.
* Working assumptions written down by LiXu in the last slide have been approved by the attendees.

**11. ANNOUNCEMENTS. Speaker: Yanshen.**

* SparkLink roundtable event in March 5th afternoon in MWC 2025: open, free of cost.
* End of March, iSLA summit in Shenzhen, half day demo + 2 days conference.

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DATE #2: 16.01.2025 - Attendees: 18 in total (members attending yesterday + Francisco Lobo from IDNEO)

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**12. CONTRIBUTION: BEAM MANAGAMENT, speaker: Dor**

* Beam Management vs Beamforming
* Vinod: how does the node report the beam situation? At what time? Only the strongest beam response. The reporting process has been explained in the P15.
* Ignacio: depend on the scenarios.
* Beamforming with different antennas, addressing N and also N+1 and N-1 --> Comment from Ignacio (Univ.Oviedo), that this is random depending on the specific scenario, not necessarily consecutive but broader range. To analyze!

**13. CONTRIBUTION: ASSOCIATION, speaker: Dor Chay**

* Association is the process to connect the G-node with the T-node.
* Michele: Do you consider interference? – no.
* There are trade-offs between coverage and association. Could 5GNR association method be used in SLB mmW? – not sure.
* Question from Michele added to be discussed concerning association. FB1 is the anchor and you transmit data through FB2. You keep both operative.

**15. NEXT MEETINGS, speakers: Yanshen & Mr. Chairman Lorenzo**

* Plenary #5: remote, 13.02, 10:00 CET --> Approved!
* Plenary #6: f2f, Barcelona, 6-7.03 (06.03: 14:30-18:30, 07.03: 9:00-17:00) --> Approved with a note that exact schedule between 5th and 7th March will be confirmed by Shen Yan after confirmation from the meeting hotel!
* Submission Process --> Approved!

COFFEE BREAK

**16. CONTRIBUTION: TR (technical report), speaker: Tommi Jamsa**

* Proposal about the format of the Technical Report --> Approved!
* Operating band candidates: 45 GHz (tentative) and 60 GHz
* Spectrum --> 60 GHz unlicensed band is the target, initially in Europe.
* Channel Models

**17. CLOSURE**

* Thanks to everyone for the participation and contributions.
* The chairman closed the meeting at 12:30 p.m. on 16 January 2025.

Appendix #1 Participant List

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| --- | --- | --- | --- | --- | --- |
| Name | Affiliation | Meeting #1 | Meeting #2 | Meeting #3 | Meeting #4 |
| Lorenzo Vangelista | Huawei/ Wireless and More / | yes | yes | yes | yes |
| Shen Yan | International SparkLink Alliance (iSLA) | yes |  | yes | yes |
| Boris Bellalta | University UPF | yes | yes |  | yes |
| Tommi Jamsa | Huawei / Tommi Jamsa Consulting | yes | yes | yes | yes |
| Vinod Kumar | WWRF | yes | yes | yes | yes |
| Thomas Li Li | Huawei | yes |  |  |  |
| Xu Li | Huawei | yes | yes | yes | yes |
| Micky Mehta | Pharrowtech | yes | yes |  |  |
| Youssef Nasser | Greenerwave | yes |  |  |  |
| Juan Carlos Mora | DEKRA | yes | yes |  | yes |
| Luis Jorge Romero | Comentropy | yes | yes |  |  |
| Theodoros Tsiftsis | University of Thessaly | yes | yes | yes | yes |
| Lei Wan | International SparkLink Alliance (iSLA) | yes |  |  |  |
| Jianfeng Wang | Lenovo | yes |  |  |  |
| Michele Zorzi | Huawei / Wireless and More | yes | yes | yes | yes |
| Henk Veldhuis | CSA | yes | yes |  |  |
| Francisco Fons | Huawei | yes | yes | yes | yes |
| Moray Rumney | Rumney Telecoms |  | yes |  | yes |
| Hugo Bernadac | Huawei |  | yes |  |  |
| Ignacio Rodriguez Larrad | University of Oviedo |  | yes |  | yes |
| Jacob Zheng | Eagle Drive |  | yes |  |  |
| David Zhangyuebo | LinkOn Semiconductors |  | yes |  |  |
| Her Young Kyu | LinkOn Semiconductors |  | yes |  |  |
| Dor Chay | Huawei |  | yes |  | yes |
| Yang Xiuzhu | Huawei |  | yes |  |  |
| Karthikesh Raju | BanyanWorks |  |  |  |  |
| Jordi Borras | Automotive Safety |  |  |  | yes |
| Albert Sanz | Automotive Safety |  |  |  | yes |
| Bart Vertenten | NXP |  |  |  | yes |
| Francisco Lobo | IDNEO |  |  |  | yes |
| Tim Frost | MediaTek |  |  |  | yes |

Appendix #2 Contribution List

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| Tdoc# | Revised from | Source | Title | Type | Decision |
| 0021r2 | Chair | Chair | Agenda | Approval | Approved |
| 0022r2 | Xu Li | Xu Li | Numerology Spatial Streams & MCS | Approval | Approved |
| 0023r0 | Xu Li | Xiuzhu Yang | Spatial Streams & MCS | Approval | Approved |
| 0024r0 | Tommi Jamsa | Tommi Jamsa | SparkLink mmW Channel Model | Approval | Approved |
| 0025r0 | Dor Chay | Dor Chay | Beam Management | Approval | Approved |
| 0026r0 | Dor Chay | Dor Chay | Association | Approval | Approved |
| 0027r0 | Shen Yan | Shen Yan | Copyright, IPR and Template | Information | Noted |
| 0028r0 | Xu Li | Xu Li | SparkLink Tutorial Synchronized Low-latency Broadband | Information | Noted |
| 0029r1 | Shen Yan | Shen Yan | (the template file of 0027) | Information | Noted |
| 0030r1 | Theodoros Tsiftsis | Theodoros Tsiftsis | TG2 Spectrum Study | Approval | Approved |
| 0031r1 | Vinod Kumar | Vinod Kumar | Use Case Description Format & Version Management Proposal | Approval | Approved |
| 0032r0 | Vinod Kumar | Vinod Kumar | XR (Extended Reality) for Industrial, eHealth and entertainment applications / UC1\_XR | Approval | Approved |
| 0033r0 | Tommi Jamsa | Tommi Jamsa | SLB-mmW Technical Report | Approval | Approved |
| 0034r3 | Secretary | Secretary | Meeting minute | Approval | / |
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