Session #47 802.16 Relay TG Session Summary draft

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Mitsuo Nohara
Relay TG Chair, KDDI Corp.
3-10-10, Iidabashi, Chiyoda-ku, Tokyo 102-8460 Japan

Voice: +81 3 6678 3599
Fax: +81 3 6678 0219
E-mail: mi-nohara@kddi.com

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TG Meeting organization

Session #47 802.16 Relay TG
Session Summary

5th Task Group Meeting on Multi-hop Relay in IEEE 802.16

Relay TG Chair Mitsuo Nohara

Vice Chair Peiying Zhu

Technical Editor/Secretary Jung Je Son

Technical Editor Mike Hart

IEEE 802.16 Relay TG Meeting

15-18 Jan., 2007, London, UK

Objectives of this 5th TG Meeting

- To advance the development of the P802.16j Baseline Document (IEEE802.16j-06/026r1)
  - Through the Technical Contributions presentation and discussion,
  - Considering the five Guideline Documents of:
    - Usage Models (IEEE802.16j-06/015),
    - Definitions and Terminology (IEEE802.16j-06/014r1),
    - Evaluation Methodology (IEEE802.16j-06/013r2),
    - Technical Requirements (IEEE802.16j-06/016r1) and
    - Table of Contents (IEEE802.16j-06/017r2).
- To proceed to the "call for comments" on the baseline document towards the next meeting for the draft standard.

Agenda - 1

Session Agenda Introduction and Approval

(IEEE 802.16-07/002)

Motion 1 (at 16:xx): to approve the session agenda

1st: I-Kan Fu, 2nd :Itzk, Motion passed with no objection

- Session #46 802.16 Relay TG Minutes Review

(IEEE 802.16-06/033)

Motion 2 (at 16:xx): to approve the Relay TG Minutes

1st: I-Kan Fu, 2nd: , Motion passed with no objection

Agenda - 2

2. Technical Contributions Presentation and Discussion,

   * in reply to the call for Technical Proposals (IEEE 802.16-06/034) on:
   - P802.16j Baseline Document (IEEE802.16j-06/026r1)

   * considering the five guideline documents of:
   - Usage Models (IEEE802.16j-06/015),
   - Definitions and Terminology (IEEE802.16j-06/014r1),
   - Evaluation Methodology (IEEE802.16j-06/013r2),
   - Technical Requirements (IEEE802.16j-06/016r1) and
   - Table of Contents (IEEE802.16j-06/017r2).

   - with the presentation order as attached.
   - some discussions to be conducted in parallel, subject to meeting room availability

3. Text Proposals for the Baseline Draft.
4. AOB

Technical Contributions

(Call for Technical Proposals by 8 Jan., 2007)

- 170* Contributions submitted,

  * some associated with presentation materials.
  * revisions not double-counted.
  * S802.16j-07/070 has no main document thus rejected.
    - Docs. 07/052, 07/115, 07/121, 07/133, 07/155, 07/160 broke the numbering scheme thus some numbers remain unused. Please don't do this again.

- Contributions Presentation during this session:
  - Please provide the following information:
    - Key Feature
    - Difference from the previous one, if any
    - Usage Model and/or Technical Conditions applied (e.g., BS-MS link required, Centralized and/or Distributed Control, Mandatory and/or Optional, etc.,)

Topics and Categories

1. Relay concepts (4)
2. Security (5)
3. Frame structure (33)
4. Network entry (33)
5. BW request (10)
6. Construction & transmission of MAC PDUs (5)
7. Measurement & reporting (9)
8. Mobility management (41)
9. Routing & path management (11)
10. RRM, Scheduling & Interference control (4)
11. PHY (12)
12. Evaluation methodology (2)

Ref. How we did last time: 1. Relay concepts

No.	Title	Author 1	Affiliation	Category
127	A Proposal for combined A&F and D&F relaying	Junichi Suga	Fujitsu	Relay concepts
130	A proposal for introducing a shared RS system in MR	Keniichi Nakatsugawa	Fujitsu	Relay concepts
132	Relaying methods proposal for 802.16j	Masato Okuda	Fujitsu	Relay concepts
160	Support for a Simplified Uplink-Only Relaying Mode	Philippe Sartori,.	Motorola	Relay concepts
200	Cooperative Relay Protocol	D.J. Shyy	MITRE	Relay concepts
201	SMART Relay Alliance Proposal	Arnaud Tonnerre,	Thales (SMART)	Relay concepts
225	Directional Distributed Relay with Interference Control and Management	Yong Sun,	Toshiba Research Europe	Relay concepts
238	MMR Protocol Stack	Hang Zhang	Nortel, Institute for Information Industry	Relay concepts
235	Moving RS operation	Hang Zhang,	Nortel	Relay concepts

Ref. How we did last time:
1. Relay concepts: Summary & Discussion Points

- 127: A&F concept for in-frame relaying
- 130: Shared RS (one RS to two or more BS)
- 132: Transparent & Non-transparent RS with connection mgmt @ MR-BS
- 160: Transparent UL relaying
- 200: Co-operative relay group concept (264, 273)
- 201: Smart relay (low complexity & enhanced → CC)
- 225: Directional distributed RS
- 238: Description of .16j protocol stack
- 235: Proposal to relay at CS for Mobile RS

Categories

- Relay concepts (4)
- Security (5)
- Frame structure (33)
- Network entry (33)
- Bandwidth request (10)
- Construction & transmission of M-PDUs (5)
- Measurement & reporting (9)
- Mobility management (41)
- Routing & path management (11)
- RRM, scheduling & interference control (4)
- PHY (12)
- Evaluation methodology (2)

Relay concepts

No	Title	First Author	Company	Topic	Sub-topic
6160	Support for a Simplified Uplink-Only Relaying Mode	Philippe Sartori,.	Motorola	Relay concepts	Connections & addressing
7006	A proposal for introducing a shared RS system in MR	Keiichi Nakatsugawa	Fujitsu Laboratories Ltd.,Fujitsu Microelectronics Canada Inc.	Relay concepts	Shared RS
7096	MMR Protocol Stack and Definition of RS Types	Hang Zhang	Nortel, III	Relay concepts	Protocol stack
7160	Proposal of an RS Concept Utilizing True Sectoring Capabilities	Antonopoulos Ch,	INTRACOM S.A. Telecom Solutions	Relay concepts	Segmentation

Concept – UL only relay

- Contribution C802.16j-06_160r1
  - Resubmission from the last meeting
  - UL relay only station
    - Simplicity
    - New messages to support the UL relay, which could also be used for normal RS
  - No objection to the UL only relay concept
  - Suggestion:
    - Author to discuss the issue in related ad-hoc groups and make sure that harmonized proposals will support the concept.

Concept - Shared RS

- Contribution C802.16j-07-006r1
  - Resubmission from the last meeting
  - A straw poll was taken to see if people support the concept: 11/3
  - Some suggested that more details are needed to make the decision
  - Suggestion:
    - Author to explore more details in related ad-hoc groups

Concept - Protocol Stacks

- Contribution C802.16j-07-096
  - Modified resubmission to clarify the various relay functionality
  - Provided to help clarify the assumptions
- Feedback from the team
  - Need more time to read the contribution
  - Terminology is not well defined currently, explanation used in the contribution is good, not sure that we need to put the types in the standard text
- Suggestion:
    - Discuss it the related ad-hocs
    - Come back later

Security

No	Title	First Author	Company	Topic	Sub-topic
7069	Management Message Integrity Check for Multi-hop Relay Systems	Kanchei (Ken) Loa	Institute for Information Industry (III)	Security	
7075	Authorization and Key Exchange in 802.16j system	Yanling Lu,	Hisilicon Technologies	Security	
7098	Hybrid authentication hierarchy in MMR Control Plane for the relay network	Sheng Sun	Nortel	Security	
7134	Key Hierarchy of the RRSP for the MMR Relay Network	Sheng Sun	Nortel	Security	
7149	TEK Transfer in Relay Systems	Masato Okuda	Fujitsu	Security	

Concept - frequency reuse

- Contribution C802.16j-07/160
- Presenter is not here
- No text proposal, topic is skipped.

Security - 1

- Contribution C802.16j-07/69
  - Information on types of messages which need security information to understand
  - Information sharing to raise the awareness of security issues
- Suggestion:
  - People to pay attention to their proposal if messages listed are used by RS

Security -2

- Contribution C802.16j-07/75
  - Authorization procedure for MS via relay
  - Requires the security key distribution
  - The proposed solution is applicable to RSs which are capable of handling security function
  - Some thinks that the proposal is partial solution
- Suggestion: Need more discussions

Security - 3

- Contribution C802.16j-07/134
  - New security mechanism between BS-RS for multi-casting control messages
  - Re-use the existing group key security concept
- Suggestion
  - Wait for messages defined

Security

- C802.16j-07/98
  - A mechanism to speed up the authentication process by delegating the handshaking to RS
  - What is the benefit since the time spent on the authentification process is mainly related to the AAA server

Security - Issues

- In order to look into the MAC sub-header such as piggybacked BW sub-header, RS needs TEK. Proposed a TEK distribution mechanism.
- Security breach

Security Summary

- Model 1: BS-RS security, no security capability on RS
- Model 2: BS-RS security, RS has authentication capability
- Model 3: BS-RS security, BS shares authentication and encryption keys with RS
- Model 4: RS handles security
- Security on relay link, new, modified or use the same one on access RL?
- Suggestion:
  - Ad-hoc discussion via Web or Email
  - For other proposals, please try to identify the implied security model, especially when we adopt certain text

Session #47 802.16 Relay TG
Adhoc Sessions Report

Frame structure adhoc
Tues 08:00 to 11:30 & Thurs 12:30 to 17:00

Chairs: Mike Hart & Peiying Zhu

Frame structure

- Non-transparent
  - Multi-hop
  - Ambles (frame start and relay)
- Transparent
- Signaling
- Construction & transmission of MAPs
- Others
  - Non-transparent frame alignment (1)
  - MAC (1)
  - A&F (1)
  - Out-of-band (1)
  - Transition gaps (1)

Frame structure – Multi-hop

No	Title	First Author	Company	Topic	Sub-topic
7012	Frame structure for support of multihop relaying	Mike Hart	Fujitsu	Frame structure	Multi-hop
7100	Frame Structure to Support Relay Node Operations	Hang Zhang	Nortel, III	Frame structure	Multi-hop
7106	A General Frame Structure for IEEE802.16j Relaying Transmission	Yong Sun	Toshiba Research Europe Limited	Frame structure	Multi-hop
7109	Frame Structure to Support Multi-hop Relay Operation	Wendy C Wong	Intel, Motorola, ITRI	Frame structure	Multi-hop
7117	An adaptive frame structure for OFDMA-based mobile multi-hop relay networks	Jeffrey Z. Tao	Mitsubishi Electric Research Lab, Mitsubishi Electric Corp	Frame structure	Multi-hop
7135	Comments on Frame Structure for multi-hop relay	Changyoon Oh	Samsung Electronics	Frame structure	Multi-hop
7145	Non-transparent relay frame structure extension for multi-hop (>2 hops) support	Xiaobing Leng	Alcatel-Lucent	Frame structure	Multi-hop

Frame structure – Multi-hop extension

Points to discuss:

- Approaches:
  - Multiple (more than 1) relay "zones" per frame or partitioning For: 19. Against: 1 (concern on no upper limit on zones in a subframe)
  - Super-frame approach 20. Against: 0
  - Transmit to sub and/or super ordinate stations in a single relay zone. Receive from sub and/or super ordinate stations in a single relay zone. 5. Against: 1 (concern on issues with compatibility with exist standard)
- Do we support both approaches?
- Interval/zone & other editorial issues
- Text/diagrams that is required for each in frame structure section
  - Text to defer to other sections (e.g. signaling, configuration)

Frame structure – Multi-hop extension

Requirements for text proposals

- Partitioning
  - Signaling/configuration
  - Amble
  - Usage of relay zone (tx, rx, non-transmission)
  - Need to deal with gaps between adjacent relay zones (add or strike out)
- Super-frame
  - Issues list above for partitioning
  - Definition of concept (For: 10 Against: 8)

Frame Structure- non-transparent RS

- 7012
  - Illustrate the existing text enables both in frame relay (in frame partition) or multi frame relay (super-frame)
  - No additional text changes are needed
- 7100
  - Explain that existing text Support both in frame relay and super frame relay
  - Proposed signaling to support both
  - Defer the signaling discussion to the signaling subtopic
- 7106
  - Propose to add amble R-preamble in the beginning of the relay Zone
  - Use the existing frame structure adopted in the text
  - Defer the R-preamble discussion to the subtopic
- 7109
  - Concept:
    - Support partitioning (multiple zone in one frame)
    - Super frame (recurring pattern in number of frames)
  - Similar to 7012 and 7100 conceptually
  - Difference:
    - prefer explicit diagram in the text
    - number of frames in a super frame is configurable

Frame Structure- non-transparent RS

- 7117
  - Use the existing frame structure in the text to support either in frame relay (partition) or super frame, emphasize importance of flexibility
  - Insert R-preamble in the beginning of relay
  - Defer R-Preamble to amble subtopic
- 7135
  - Use the existing frame structure in the text, derive signaling,
  - add Editorial changes:
    - Change Zone to Interval
    - Replace the existing diagram to be consistent with the frame structure diagram in .16e
    - clarification that only the first access zone needs frame start preamble, DL-MAP/UL-MAP
  - Add generalized frame structure to illustrate the concept in addition to the minimum configuration frame structure diagram in the current text
- 7145
  - Insert an optional amble in the relay zone
  - The actual zones, locations are configurable

Summary for non-transparent RS

- Agreement:
  - The existing frame structure supports both in-frame relay and super frame
- Issues to resolve:
  - Whether to add clarification to explicitly describe super frame? If yes
    - Via text/definition
    - Via explicit drawing
  - Actual signaling schemes to configure the frame structure
  - Additional concept (bi-directional transmission, no contribution in this meeting)
  - Editorial modification
- Defer part of 7100 to Signaling subtopic
- Part of 7106, 7117, 7145 to Amble subtopic

Frame structure - Ambles

No	Title	First Author	Company	Topic	Sub-topic
6240	RS DL Synchronization and Radio Environment Measurement – Introduction of RS-Preamble	Hang Zhang,	Nortel	Frame structure	Ambles
6241	RS 802.16e Preamble Transmission	Hang Zhang,	Nortel	Frame structure	Ambles
7015	Relay amble position	Mike Hart	Fujitsu	Frame structure	Ambles
7017	Relay zone amble	Mike Hart	Fujitsu	Frame structure	Ambles
7021	Re-organizing the PN sequences for RS access.	Dorin Viorel	Fujitsu Microelectronics Canada Inc.	Frame structure	Ambles
7038	RS-amble position for Multihop Relays	Adrian Boariu	Nokia	Frame structure	Ambles
7040	Fixed/Nomadic Relay-Station Preamble Segment Assignment Scheme	Peter Wang,	Nokia, ITRI, , III	Frame structure	Ambles
7041	Mobile Relay Station Preamble Segment Re-Assignment Scheme	Peter Wang,	Nokia, Motorola, ITRI, ETRI, III	Frame structure	Ambles
7081	Discussions on the RS-Preamble Location	Hang Zhang	Nortel, University of Waterloo, III	Frame structure	Ambles
7088	Moving Relay Station Preamble/Segment Selection	Hang Zhang,	Nortel	Frame structure	Ambles
7136	On the use of postamble for the relay link	Changyoon Oh	Samsung Electronics	Frame structure	Ambles
7141	Postamble sequence design for supporting relay zone synchronization	Youngbin Chang	Samsung Electronics	Frame structure	Ambles
7144	*Relay Grouping and PUSC Segment Selection for FCH/MAP Transmission*	*Hang Zhang*	*Nortel, III, MITRE,ITRI/NCTU*	*Frame structure*	*Ambles*
7156	RS preamble transmission for continuous synchronization and neighborhood scanning	Gamini Senarnath	Nortel	Frame structure	Ambles

Frame Structure- Ambles

- RS amble location
  - 240: One amble somewhere in RS zone that is fixed in location across the network. Configurable transmission cycle. Sync & network monitoring.
  - 015: Two approaches of relay zone preamble or relay zone postamble
  - 038: Fixed in location. Two approaches: end of DL subframe or end of UL subframe.
  - 081: End of DL subframe. End of UL subframe (last symbol before RTG)
  - 136: Two approaches: end of DL relay zone or end of DL subframe
- Summary:
  - Start of relay zone
  - End of relay zone
  - End of DL subframe
  - End of UL subframe (two different: last symbol, one symbol before frame start preamble)

Frame Structure- Ambles

- RS amble properties (points to discuss)
  - 017: Repetition rate (flexible/fixed) & sequence design (boosting & waveform)
  - 141: XOR PRBS and frame start PN sequence, and use of tone reservation to reduce PAPR, boosting configurable
  - 156: Amble needed for sync & neighbour scanning. Propose two repetition patterns to meet the requirements two requirements and minimise overhead.
- Discuss:
  - Sequence to be modulated
  - Repetition: how often and pattern: can it be a system parameter with minimum requirement?

Frame Structure- Ambles

- Frame start preamble
  - 241: Allocation of RS frame start preamble sequence. Assigned at network entry. RS will inform MR-BS of preferred set to be assigned.
  - 021: Reorganise PN sequences to form subset for MR-BS and subset for RS.
  - 040: RS sends measurement information of preambles to MR-BS. MR-BS makes preamble assignment.
  - 041: MR-BS is able to reallocate the preamble dynamically.
  - 088: MR-BS can reserve subset of PN sequences for MRSs and FRSs. MR-BS will also advertise thresholds for MRS to use in selection of PN sequences.
  - Two different approaches to determining assignment
  - How to deal with HO when reallocating the preamble sequence?

Frame structure - Transparent

No	Title	First Author	Company	Topic	Sub-topic
7023	Frame Structure for Transparent Mode	Michiharu Nakamura	Alcatel-Lucent, ITRI, Fujitsu, Toshiba	Frame structure	Transparent
7064	In-band Transparent Relay Frame Structure	Kanchei (Ken) Loa	Institute for Information Industry (III), Nortel	Frame structure	Transparent
7103	Frame Structure to Support Transparent Relay Node Operation	Kevin Baum	Motorola	Frame structure	Transparent
7127	Frame Structure for Transparent Relay	Aik Chindapol	Siemens	Frame structure	Transparent
7170	Frame Structure for Transparent Relay	Jae Hyung Eom, Kyu Ha Lee, Changkyoon Kim, Byung-Jae Kwak, Suchang Chae, Young-il Kim	Samsung Thales, ETRI	Frame structure	Transparent

Frame Structure- transparent RS

- 7023
  - Propose to use wither optional R-MAP or use the existing DL/UL-MAP with modification
  - Location is flexible as long as it is before relay zone or right after DL/UL-MAP (should it be known to relay?)
- 7064r1
  - Propose to a separate frame structure including co-operative diversity/silent interval
  - Similar proposal in terms of R-MAP
- 7103
  - Add some text to explicitly define UL relay only support
  - Could wait to see the final text to decide if we need add proposed text
- 7127r1, 7170
  - Same concept with 64r1 to allow cooperative diversity
- Suggestion:
  - No one against the idea
  - Generate a harmonized contribution offline

Frame structure - Signaling

No	Title	First Author	Company	Topic	Sub-topic
7013	Signalling support for two-hop and multi-hop frame structure	Mike Hart	Fujitsu	Frame structure	Signalling
7018	Relay zone structure definition	Mike Hart	Fujitsu	Frame structure	Signalling
7090	Format of R-MAP within RS-Zone	Hang Zhang	Nortel, III	Frame structure	Signalling

Frame Structure- Signalling

- Also looked at 07-100.
- Four contributions have some similar concepts for supporting zone definition and format of zone
- Authors will work on harmonising on these areas of commonality

Frame structure - MAPs

No	Title	First Author	Company	Topic	Sub-topic
6157	MAP construction and transmission for a relay station	Mohsin Mollah	Motorola	Frame structure	Construction & transmission of MAP
7130	MAP-based Data Relay in Transparent RS	Sungcheol Chang	ETRI	Frame structure	Construction & transmission of MAP

Frame Structure- MAPs

- 06-157: non-transparent RS case
- 07-130: transparent RS case

Frame structure - Others

No	Title	First Author	Company	Topic	Sub-topic
7003	Direct Relaying Zone	Junichi Suga	Fujitsu, ETRI, Samsung Thales	Frame structure	A&F
7142	On the definition of the transition gap for accommodating Relay operation	Youngbin Chang	Samsung Electronics	Frame structure	Gaps
7162	Multiple Frame and Relay Operation for 802.16 MMR Networks	D.H. Ahn, Junhong Hui, C.I.Yeh, Young-il Kim,Hyukjoon Lee,Kyu Ha Lee,Chung-wook Suh	ETRI, Kwangwoon University, Samsung Thales, Securepia	Frame structure	MAC
7102	Frame Alignment Requirement in Relays	Gamini Senarath	Nortel, Intel	Frame structure	Non-transparent
7110	Frame Structure to Support Out-of-Band Relay	Wendy C Wong	Intel	Frame structure	Out-of-band

Frame Structure- Other

- 07-003: Proposes IE to define direct relaying zone for A&F/M&F. Need to consider in conjunction with 07-013, 07-018, 07-090, 07-100.
- 07-142: Information of transition gaps
- 07-162: Could be similar in concept to 144
- 07-102 going to discuss with authors of 07-073 to explore potential methods to propose for alignment

Session #47 802.16 Relay TG
Adhoc Sessions Report

NE and BW Request

Chair: Jung Je Son

Network entry

- MS
- RS
- Connection & addressing

Network entry - MS

No	Title	First Author	Company	Topic	Sub-topic
7001	MS network entry for transparent Relay Station	Masato Okuda	Fujitsu, ITRI, NCTU, IIR, Alcatel Shanghai Bell	Network entry	MS
7008	MS network entry for non-transparent Relay Station with centralized Scheduling	Masato Okuda	Fujitsu, ITRI, NCTU, Nokia, Alcatel Shanghai Bell	Network entry	MS
7024	MS network entry for non-transparent Relay Station with distributed Scheduling	Masato Okuda	Fujitsu, ITRI, NCTU, Nokia, Alcatel Shanghai Bell	Network entry	MS
7028	Message definition to support MS network entry in centralized allocation model	Shashikant Maheshwari,	Nokia	Network entry	MS
7055	MS Initial Ranging with Non-Transparent RS	Kanchei (Ken) Loa	Institute for Information Industry (III)	Network entry	MS
7056	MS Initial Ranging with Transparent RS	Kanchei (Ken) Loa	Institute for Information Industry (III), Nortel	Network entry	MS
7077	Initial Ranging in 802.16j system	Yanling Lu,	Hisilicon Technologies, Huawei Technologies	Network entry	MS
7125	Relay-Assisted MS Network Entry	Aik Chindapol	Siemens	Network entry	MS
7169	Ranging in MMR System	Changkyoon Kim, Kyu Ha Lee, Hyung Kee Kim	Samsung Thales, ETRI	Network entry	MS

Network entry - RS

No	Title	First Author	Company	Topic	Sub-topic
7016	Transparent RS network entry	Mike Hart	Fujitsu	Network entry	RS
7025	Non-transparent RS network entry procedure	Mike Hart	Fujitsu	Network entry	RS
7045	A grouping scheme of relay stations for 802.16j	Tzu-Ming Lin	ITRI/NCTU	Network entry	RS
7067	RS Initial ranging with MR-BS	Kanchei (Ken) Loa	Institute for Information Industry (III)	Network entry	RS
7068	RS Initial Ranging with Non-transparent RS	Kanchei (Ken) Loa	Institute for Information Industry (III)	Network entry	RS
7074	GNSS-equipped RS CDMA-based Ranging	Kanchei (Ken) Loa	Institute for Information Industry (III)	Network entry	RS
7088	Moving Relay Station Preamble/Segment Selection	Hang Zhang	Nortel, University of Waterloo, III	Network entry	RS
7097	RS Initial Network Entry	Hang Zhang	Nortel	Network entry	RS

Network entry – Connection & addr

No	Title	First Author	Company	Topic	Sub-topic
6156	Connections in a Multihop Relay Network	Shyamal Ramachandran	Motorola	Network entry	Connections & addressing
6158	Routing Announcements for Network Entry Support	Shyamal Ramachandran	Motorola	Network entry	Connections & addressing
6241	RS 802.16e Preamble Transmission	Hang Zhang,	Nortel	Network entry	Connections & addressing
6242	RS Configuration Description Broadcast	Hang Zhang,	Nortel	Network entry	Connections & addressing
6243	RS Configuration Signaling	Hang Zhang,	Nortel	Network entry	Connections & addressing
6274	Proposal on addresses, identifiers and types of connections for 802.16j	Jerry Sydir	Intel, Samsung, KDDI, ITRI, IIR, Telcordia, Mitsubishi	Network entry	Connections & addressing
6281	Management CID allocation	Kenji Saito,	KDDI R&D Labs., Samsung Electronics, Motorola	Network entry	Connections & addressing
7091	Constraint-Based Routing for End-to-End MMR Cell Connection Management	G.Q Wang	Nortel	Network entry	Connections & addressing
7092	MMR Network end-to-end routing and connection management	G.Q Wang	Nortel	Network entry	Connections & addressing
7095	Introduction of RS ID	Hang Zhang	Nortel	Network entry	Connections & addressing
7108	Enabling MAC tunneling over HARQ in 802.16j	Jeffrey Z. Tao	Mitsubishi Electric Research Lab, Mitsubishi Electric Corp	Network entry	Connections & addressing
7115	Relay Tunnel Connection for 802.16j	Jeffrey Z. Tao	Mitsubishi Electric Research Lab, Mitsubishi Electric Corp	Network entry	Connections & addressing
7126	Routing with CID Encapsulation	Aik Chindapol	Siemens	Network entry	Connections & addressing
7167	Encapsulation of CID	Changkyoon Kim, Hyung Kee Kim	Samsung Thales	Network entry	Connections & addressing

Bandwidth Request

No	Title	First Author	Company	Topic	Sub-topic
7011	Distributed Bandwidth Request and Allocation in Multi-Hop Relay	Kerstin Johnsson	Intel Corp., Fujitsu	Bandwidth request	
7034	Relay Support for Distributed Scheduling and its Bandwidth Request/Allocation Mechanism	Haihong Zheng,	Nokia, Siemens	Bandwidth request	
7039	Resource Request for Bandwidth	Yousuf Saifullah,	Nokia, Fujitsu, Intel	Bandwidth request	
7042	Channel Access for Multihop Relay Chains	Saravanan Govindan,	Panasonic Singapore Laboratories, Toshiba Research Europe, US ARMY	Bandwidth request	
7057	MS CDMA-based BR with Transparent RS	Kanchei (Ken) Loa	Institute for Information Industry (III), Nortel	Bandwidth request	Ranging
7058	MS CDMA-based BR with Non-transparent RS	Kanchei (Ken) Loa	Institute for Information Industry (III), Nortel	Bandwidth request	Ranging
7078	*Distributed Scheduling in 802.16j system*	*Yanling Lu,*	*Hisilicon Technologies*	*Bandwidth request*	
7101	Dedicated Relay Uplink Resource Assignment for Control Signaling and Data Transmission	Derek Yu	Nortel	Bandwidth request	
7128	CDMA Code Partitioning for R-UL Ranging Control	Sungcheol Chang	ETRI	Bandwidth request	
7148	Bandwidth Request for Distributed Systems	Masato Okuda	Fujitsu	Bandwidth request	
7166	Dedicated Bandwidth Reservation for RS in MR Networks	Byung-Jae Kwak,	ETRI, Samsung Thales, Fujitsu, Siemens	Bandwidth request	

Session Info

- Total Contribution : 43
  - Network Entry (32)
    - MS(9)
    - RS(9)
    - Conn(14)
  - BW request(11)
- Time Slot
  - Tuesday morning
  - Wednesday Afternoon

Network entry on MS

- 07/001
  - Ranging with transparent RS + support for uplink only relay
- 07/008
  - Non-transparent, centralized, code based ranging(success : MRBS, contrinuous : RS)
- 07/024
  - Non-transparent, distributed, code based ranging(success : MRBS, contrinuous : RS), pre-admission control before RNG-REQ/RSP.
- 07/028
  - Non-transparent, centralized, BW request/allocation for RNG-RSP from RS in response to cdma ranging co de.
- 07/055
  - Non-transparent, centralized, two scheme(forwarding to ranging info to BS, BW request/allocation bet BS an d RS).
- 07/056
  - Transparent, centralized.
- 07/077
  - Superceded by 001(transparent), 024(transparent) for harmonization
- 07/125
  - Transparent, ranging report from RS for cdma based ranging, RNG-REQ(RNG-REP)
- 07/169
  - Superceded by 008 for harmonization.

Network Entry on MS

- Transparent
  - Ongoing harmonization(001, 056, 125)
- Non-transparent
  - Distributed : 024
  - Centralized :
    - ongoing harmonization(008, 055)
    - 028
- Ranging Procedure
  - 07/008
    - Non-transparent, centralized, code based ranging(success : MRBS, contrinu ous : RS)
  - 07/028
    - Non-transparent, centralized, BW request/allocation for RNG-RSP from RS i n response to cdma ranging code.
  - 07/055
    - Non-transparent, centralized, two scheme(forwarding to ranging info to BS, BW request/allocation bet BS and RS).

Network entry on RS

- 07/016 : transparent
  - TLV for relay type
- 07/025 : non-transparent
  - TLV for relay type + timing to tx preamble
- 07/067 (transparent)
  - Ranging of RS shall be same as MS
  - **Different ranging code for RS (06/206)**
- 07/068
  - Ranging of RS shall be same as MS
  - Different ranging code for RS
- 07/074
  - Introduction of GNSS for synchronization & RS ranging
- 07/097
  - Path selection / preamble selection / timing to tx preamble
- 07/088
  - Requested to move to frame structure
- 07/144r1
  - Requested to Move to frame structure.
- 07/045
    - Superceded by 144r1

- Related to capability for handover, path management, frame strucutre.

Network Entry on RS

- 07/016,
  - propose TLV for relay type
- (07/025, 046 vs 097)→ revision 097
  - timing to tx preamble
- 07/067, 07/068
  - introduction of RS code for initial ranging
  - Harmonization will be made after initial ranging of MS.
- 07/074 → forward to TG
  - Introduction of GNSS for synchronization & RS ranging
- 07/097
  - Path selection (vs 46)
  - preamble selection → discuss with 07/40, 07/41
  - timing to tx preamble → vs 07/025

Connection managemant & addres sing

- 06/156 :
  - Ranging (CID allocation) in RS for MS or subordinate RSs
  - lookup table for subordinate device
- 06/158
  - Provision of information about path selection in DCD/DL-MAP
  - Path selection of RS based on metric using such information(hop count, ..)
- 06/274
  - Tunneling (tunnel CID).
- 06/281
  - Ranging (CID allocation) in RS for MS or subordinate RSs by using ranging pool assigned from BS
- 07/091; 07/092 → routing & path management.
  - General description of path management or QoS control
- 07/108; 07/115
  - Tunneling with HARQ (T-CID → RCID) or introduce SDU SN extended subheader
  - Link by link Tunnel for distributed scheduling
- 07/167
  - Superseded by 07/126 for harmonization.
- 06/241
  - Moved to frame structure
- 06/242
  - Channel description message for management of RS and BS link
- 06/243
  - Superseded by 07/097
- 07/095
  - Introduction of relay CID for relay link.
- 07/126
  - CID encapsulation

- Path selection entity
  - Initial path selection (DCD/UCD or)
  - Last path selection
- 06/156; 06/274; 07/091; 07/092

Connection management

- Basic, management CID allocation in RS (vs 24)
  - 156
  - 281
- Tunneling
  - Base concept : 274r6 (in harmonization)
  - HARQ facilitating tunnel proposed by 108
  - 115
- Relay CD
  - 242
- Relay ID
  - 095
- Encapsulation
  - 126
- 06/158 (vs 07/97)
  - Provision of information about path selection in DCD/DL-MAP
  - Path selection of RS based on metric using such information(hop count, ..)
  - On going harmonization

Network Entry – Connections & Addressing (1/2)

- 06/156r1
  - CID pool allocation to RS
- 06/158r1
  - Transmit routing related parameters in RS Network Entry
- 06/241r1
  - proposes a procedure
  - regarding how to reuse 802.16e preamble resource among MR-BS and RSs.
- 06/242r1
  - suggests introducing a message dedicated to broadcast
  - configuration parameters specific for RS operation.
- 06/243r1
  - Introduction of RS_Config-REQ/RSP management messages
- 06/247r1
  - suggests add a new routing path list TLV into RNG-REQ message
  - This routing path list is an array of Idcell
- 06/274r3
  - Propose a tunneling solution with T-CID

- 06/281r1
  - CID pool allocation to RS
- 07/028
  - RS Network Entry ____

Network Entry – Connections & Addressing (2/2)

- 07/091
  - Constraint-Based Routing for End-to-End MMR Cell Connection Management
- 07/092
  - With new proposed R-MAC header
  - Propose full proposed solution of new R-Link connection management
  - E.g. propose to divide CID into two (for access link and R-link)
- 07/095
  - Propose a new 8bit size RSID assigned by a MR-BS
- 07/108
  - HARQ consideration in Tunneling (same tunneling concept with 274)
- 07/115
  - Tunneling solution with relay CID
- 07/126r2
  - CID encapsulation for path management
- 07/144
  - RS grouping for Cooperative relay
- 07/167
  - Encapsulation concept (not clearly understood)

BW request

- #7011 : distributed scheduling
  - time advanced BW request
  - aggregated BW request
  - RS supports MS BW request allocation on access link, reuse same BW req mechanism on relay link.
- #7034 : distributed scheduling
  - Uplink MAP IE
- #7039 : centralized scheduling
  - RS specific BW request ranging code
- #7042
  - Modify contribution
- #7057(transparent), #7058(non-transparent)
  - centralized scheduling
  - BW request code report
- #7058
  - Non-transparent with centralized scheduling
- #7101 (r2 : harmonized with 166)
  - Dedicated resource allocation for relay uplink.
- #7128 (vs 7039)
  - Relay only CDMA BW request code.
- #7148
  - Aggregate BW request with timer as representative of QoS class.
- #7166
  - Harmonized with 101r2
- #07/078
  - Distributed scheduling.
  - Assignment of MRBS to RS with specific planned BW to be assigned

BW request

- Transparent
  - 7057, 7039, 7128
- Non-transparent
  - Centralized
    - Report on Received BW request code (7058)
    - ranging code for RS(7039, 7128)
    - dedicated channel for relay uplink to request BW or others(7101, 7166) → 101r2
  - Distributed
    - 7011 (time advanced BW request, aggregating BW request, reuse of BW req mech on relay link,)
    - 7034 (uplink MAP IE with resource allocation frame offset)
    - 7148 (Aggregate BW request with timer in associated to QoS class)
    - 7078 (Assignment of MRBS to RS with planned BW to be assigned)
    - 7101, 7166 (dedicated resource allocation for relay uplink)
- Distributed scheduling with MR-Chain
  - 7042

Expected harmonization _Network Entry

- Network Entry on MS
  - Transparent : 001, 056
  - Centralized Non-transparent : 008, 055
- Network Entry on RS
  - Timing to TX preamble : 025, 026, 097
- 07/097
  - Path selection vs 07/46, 06/158
  - preamble selection vs 07/40, 07/41
  - timing to tx preamble vs 07/025
- Tunneling Concept: 274r6
- Encapsulation : 126

Separated Topics_Network Entry

- 07/028
- 07/016
- 07/067
- 07/068
- 07/074
- 07/108
- 07/115
- 07/242
- 07/095
- 07/24
- 06/156
- 06/281

More discussion_Network Entry

- 125

Expected harmonization _BW Request

- Transparent
  - 7057, 7039, 7128
- Non-transparent
  - Centralized
    - ranging code for RS(7039, 7128)
    - dedicated channel for relay uplink to request BW or others(7101, 7166) → 101r2
  - Distributed
    - 7011 (time advanced BW request, aggregating BW request, reuse of BW req mech on relay link,)
    - Resource Allocation with frame offset
      - 7034, 7148, 7078

Separated Topics_BW Request

– 07/058
– 07/042

More discussion_BW Request

Session #47 802.16 Relay TG
Adhoc Sessions Report

Construction & Transmission of M-PDUs
PHY – Others
Tues 12:30 to 13:30

Chair: Mike Hart

Construction & tx of M-PDUs

No	Title	First Author	Company	Topic	Sub-topic
7009	MAC PDU concatenation in RS	Yuefeng Zhou	Fujitsu Laboratories of Europe Ltd, ZTE. Communications, ZTE San Diego Inc., Mitsubishi Electric Research Lab, Mitsubishi Electric Corp	Construction & transmission of MAC PDUs	
7022	MAC-PDU Reconstruction at RS	Masato Okuda	Fujitsu	Construction & transmission of MAC PDUs	
7033	Transmission Scheme of MAC Management Message towards a RS Group in Multi-Hop Relay System	Haihong Zheng,	Nokia	Construction & transmission of MAC PDUs	
7094	MAC PDU Design for Supporting Data Forwarding Schemes in 802.16j	Hang Zhang	Nortel	Construction & transmission of MAC PDUs	
7118	MAC PDU Construction on relay links	Jeffrey Z. Tao	Mitsubishi Electric Research Lab, Mitsubishi Electric Corp	Construction & transmission of MAC PDUs	

Ad-hoc Summary: Construction & transmission of M-PDUs

- Concatenation of PDUs (009 & 118)
  - Clarify PDUs on access and PDUs on relay not concatenated into single burst
  - 118 already harmonised into 009
- Support fragmentation and packing at RS (022)
  - Security is the first issue to consider
- Multi-casting of MAC mgmt messages (two approaches) (033) – considering withdrawing as no message identified for which the mechanism is required
- Headers on relay link
  - New header and subheaders for relay link (Type 1 – data, Type 2 – control) (094)
  - PDU on R-link has a GMH followed by concatenated PDUs (118)
  - Authors of 094 & 118 to discuss further on issue of Headers on R-link

Session #47 802.16 Relay TG
Adhoc Sessions Report

Measurement & reporting
RRM, etc
Wed 08:00 to 11:00

Chair: Mike Hart

Measurement & reporting

No	Title	First Author	Company	Topic	Sub-topic
6120	The 2nd fast feedback channel region to reduce transfer delay of fast feedback data for 2-hop MMR system	Ki Seok Kim	ETRI, Samsung Thales	Measurement & reporting	
6248	R-link TLV for MMR relay link monitoring and reporting procedure	G.Q. Wang,	Nortel	Measurement & reporting	
7043	Interference Measurement and Neighborhood Discovery for IEEE 802.16j Multi-hop Relay Network	I-Kang Fu	NCTU/ITRI, Toshiba Europe	Measurement & reporting	Interference
7065	RS Location Report for Neighbor Discovery	Kanchei (Ken) Loa	Institute for Information Industry (III), Nokia	Measurement & reporting	Location
7123	Relay-Assisted Scheduling for Exploiting Multi-User Diversity on Access Links	Karthikeyan Sundaresan	Broadband and Mobile Networking Dept, NEC Labs America	Measurement & reporting	CQI
7129	RS Measurements and Channel Estimation between RS and MS	Sungcheol Chang	ETRI	Measurement & reporting	CQI
7138	Messages for Requesting and Providing Location Information in 802.16	Rakesh Taori,	Samsung Advanced Institute of Technology	Measurement & reporting	Location
7140	Radio Resource Reuse in access zone and relay zone	Youngbin Chang	Samsung Electronics	Measurement & reporting	
7019	Interference Measurement by RS Sounding in MR Networks	Wei-Peng Chen	Fujitsu, ITRI, Toshiba	RRM, Scheduling & Interference control	
7020	Interference Detection and Measurement in OFDMA Relay Networks	Wei-Peng Chen	Fujitsu Laboratories of America etc.	RRM, Scheduling & Interference control	

Ad-hoc Summary: Measurement & rpting

- Measurements for RS neighbourhood discovery/advertisement
  - 07-043: Neighbourhood discovery at RS through RS scanning & reporting. MR-BS informs RS where to make a measurement. RS informs MR-BS of its neighbourhood measurements.
  - 06-240 (in ambles): Use RS amble transmitted on relay link in fixed location. One RS will monitor all other RSs and measure the RS amble of all other RSs.
- Summary:
  - Difference: Co-ordination of all measurements? Further discussion is dependent on frame structure. Authors of 240 and 043 continue to discuss.

Ad-hoc Summary: Measurement & rpting

- Interference estimation:
  - 07-140: Based on location (dependent on 07-138/07-065)
  - 07-140: Scanning report (propose new message to collect info). MS DL Interference through using existing scanning mechanism. Proposal deals with method for informing MR-BS of MSs' reports.
  - 07-020: Use sounding and REP-REQ/RSP report.
  - 07-129: Based on measurement of unicast data and new report message
  - 06-240: Based on measurement of RS amble
- Summary:
  - Need to explore harmonisation between 020 and 240 as two different mechanisms to try achieve the same result. Also need to consider 129
  - Relay amble in relay downlink (dependent on frame structure discussions) vs. sounding in UL (access or relay)
  - Recommended authors to work on harmonisation or at least a harmonised comparison of the two approaches for presentation to TG

Ad-hoc Summary: Measurement & rpting

- Reporting:
  - 06-248: Use existing REP-REQ/RSP for reporting UL/DL measurements at RS by including new TLV to indicate the link at RS (will incorporate 07-079)
  - 07-129: New message. Proposes message to report measured Access UL received CINR at RS (absolute & threshold). Propose message can also report received CDMA code information.
  - 07-020: Use existing message to report the sounding measurement.
  - 07-140: New message
- Summary
  - Authors of 248 will discuss with authors of 129 whether 248 solves the issue relating to reporting access UL received CINR @ RS
  - Authors of 07-140 & 07-043 explore requirements of new messages (see if existing messages can be reused in anyway) and harmonise any areas of overlap

Mobility management

- MS
- RS
- Sleep/idle/MBS(1)
- Periodic & unsolicited ranging (4 – same author)
- MRS (1)

Session #47 802.16 Relay TG
Adhoc Sessions Report

Mobility Management – MS HO, etc.

Chair: Peiying Zhu and Jung Je Son

Mobility management : HO/Ranging

- MS HO: 21
- RS/MRS HO : 8
- HO ranging: 4

- Total: 33 contributions

MS Handover

No	Title	First Author	Company	Topic	Sub-topic
6159	Signaling for Efficient Routing	Eugene Visotsky	Motorola	Mobility management	Handover (MS)
6245	MS Intra-Cell FBSS	Hang Zhang,	Nortel	Mobility management	Handover (MS)
7036	MS Handover with Relay	Yousuf Saifullah,	Nokia, Siemens Corporate Research	Mobility management	Handover (MS)
7047	Proposal for MS handover procedure in an MR Network	Ray-Guang Cheng	NTUST/ITRI	Mobility management	Handover (MS)
7063	MS Handover Ranging with RS	Kanchei (Ken) Loa	Institute for Information Industry (III), Nortel	Mobility management	Handover (MS)
7071	MS Handover with Transparent RS	Kanchei (Ken) Loa	Institute for Information Industry (III)	Mobility management	Handover (MS)
7072	MS Handover with Non-Transparent RS	Kanchei (Ken) Loa	Institute for Information Industry (III)	Mobility management	Handover (MS)
7076	Association Procedure in 802.16j	Yanling Lu,	Hisilicon Technologies, Intel Corporation, Ewha Womans University, Huawei Technologies	Mobility management	Handover (MS)
7082	Overview of the proposal for MS MAC handover procedure in an MR Network	Hyunjeong Lee	Intel, Samsung, Ewha Womans University	Mobility management	Handover (MS)
7083	MS MAC Handover Procedure in an MR Network – Handover Decision and Initiation	Hyunjeong Kang	Samsung, Intel, Ewha Womans University	Mobility management	Handover (MS)

MS Handover (cont.)

No	Title	First Author	Company	Topic	Sub-topic
7084	MS MAC Handover Procedure in an MR Network – Handover Execution	Hyunjeong Lee	Intel, Samsung, Ewha Womans University	Mobility management	Handover (MS)
7085	MS MAC Handover Procedure in an MR Network-Termination	Hyunjeong Lee	Intel, Samsung, Ewha Womans University	Mobility management	Handover (MS)
7086	Using the Relative Thresholds in Handover Procedure	Ardian Ulvan	Czech Technical University in Prague	Mobility management	Handover (MS)
7119	Macro Diversity Handover and Fast Access Station Switching for MMR Network	Shengjie Zhao	Mitsubishi Electric Research Lab, Mitsubishi Electric Corp	Mobility management	Handover (MS)
7139	Reduced Neighbor Information Generation and Customized Delivery	Rakesh Taori,	Samsung Advanced Institute of Technology, Samsung Electronics, Intel, ITRI	Mobility management	Handover (MS)
7143	MS scanning support by RS	Hyunjeong Kang	Samsung Electronics	Mobility management	Handover (MS)
7146	MS handover procedure in relay mode	Gang Shen	Alcatel-Lucent	Mobility management	Handover (MS)
7150	Early Handover Trigger	Yong-Hoon Choi,	Kwangwoon University, ETRI	Mobility management	Handover (MS)
7151	RS-initiated Handover Procedure for Handover-unmanageable RS	Woosin Lee,	Kwangwoon University, ETRI	Mobility management	Handover (MS)
7152	RS-initiated Handover Procedure for Handover-manageable RS	Woosin Lee,	Kwangwoon University, ETRI	Mobility management	Handover (MS)
7165	MS Handover support in Transparent RS-Slides	David Comstock	Huawei Technologies	Mobility management	Handover (MS)

MS Handover Discussion Order

- MS HO
  - General: 47, 146, 72, 63
  - Transparent HO: 71,65
  - Non-Transparent: 36, 82, 83, 84, 85,
  - Scanning/Association: 76,43
  - NBR-ADV 139
  - Handover Trigger: 50, 86
  - RS initiated HO: 51, 52
  - Routing: 59
- RS/MRS HO
- HO Ranging

MS Handover

- General :
  - 7047 (introduction of virtual cell by grouping RS, transparent/non-transparent)

- Transparent (harmonization btw 7146, 7071, 7165)
  - 7146 (intra MR BS HO with transparent relay, not normal HO scenario but unsolicited ranging)
    - Introduction of Signal measurement function in transparent relay.
  - 7071 (transparent HO scenario, general HO procedure, HO termination, completion)
  - 7165 (virtual candidate set, new trigger)
    - [vs 7047 (in transparent)]
      - Same measurement; different report scheme
- Non-Transparent
  - Centralized control (centralized / distributed scheduling)
    - 7072 (non-transparent with centralized control, RS relay HO-related message).
    - 7063 (description on handover ranging resource allocation)
    - 7036 (RS relay HO-related message)
  - Distributed control
    - 7082, 7083, 7084, 7085
      - Vs. 7047

MS Handover

- Scanning / Association
  - 7076(distributed, ASC-REQ, ASC-RSP)
  - 7143(distributed, scanning inform, scanning finish)
  - Need to authenticate MAC management message.
- FBSS/MDHO
  - 6245(intraBS FBSS), 7119(intra, inter MRBS)
    - Handover message flow
- NBR-ADV
  - 7139
- Handover Trigger
  - 7150, 7086(absent)
- RS initiated HO
  - 7151(RS inform BS to initiate BS-initiated HO)
  - 7152(RS initiate BS-initiated HO)
- Routing
  - 6159
  - Move to path management & routing.

Recommendation on MS HO

- HO for transparent relay:
  - Harmonize the following contributions: 47,146, 71, 165 and come back with summary.
- Harmonize 36, 71,,47 for non-transparent relay, centralized control.
- Centralized control
    - need to harmonize
      - 36,71,47
      - 82-83-84-85
- Distributed control
    - 82-85
- Ray to summarize the applicability of all the HO related contributions for different scenarios to help the harmonization and understanding. Including definition of scenarios
  - 47,146,71,165,36,71,47,82,83,84,85

Discussion summary on MS Handover

- Consensus:
  1. In the case of centralized HO control, the HO may use the procedure defined in section 6.3.2.2 in IEEE802.16e-2005. RS shall relay all related MAC messages between MS and MR-BS
  2. Note: The case where access station change occurs between two RSs (or RS-MR-BS) with the same preamble is for further study.

MS Handover

- 47,146, 71, 165 for transparent relay=>47r2
- 36, 71,,47 non transparent relay , centralized control , => 36r1
- 6245, 7119 => further harmonization needed, suggest to open the discussion to the group
- 82-83-84-85, 7076, 7143 => further discussion needed pending on the ongoing offline harmonization outcome
- 7139, pre-harmonized among the authors before the meeting based on the contributions (6270, 6166, 6218) submitted in Session #46 => group discussion
- 7150, 7086(absent) -> Need further discussion, suggested that author to do some offline discussion
- 7151, 7152-> Need further discussion, suggested that author to do some offline discussion
- 6159-> Harmonize with Routing related contributions

Suggest the TG to evaluate 47r2, 36r1, 139

RS Handover

No	Title	First Author	Company	Topic	Sub-topic
7037	MRS Handover	Yousuf Saifullah,	Nokia, ETRI	Mobility management	Handover (RS)
7054	Deactivation procedure of mobile RS	Su Chang Chae	ETRI, Samsung Thales	Mobility management	Handover (RS)
7089	RS Handover	Hang Zhang	Nortel	Mobility management	Handover (RS)
7107	Handover and its network model for IEEE 802.16j	Yong Sun,	Toshiba Research Europe Limited	Mobility management	Handover (RS)
7122	Mobile RS Handover	Sungkyung Kim	ETRI, Nokia	Mobility management	Handover (RS)
7133	NEMO Basic Support Capability for Mobile RS	Jai Eu	Jcast Networks	Mobility management	Handover (RS)
7147	Handover of Mobile Relay Station	Kaibin Zhang	Alcatel-Lucent	Mobility management	Handover (RS)

RS Handover

- 7037
  - MRS HO with no preamble change and CID.
- 7054
  - Deactivation of MRS when no service available. RNG-RSP
  - Handover case; network re-entry.
- 7087 / 7089 (vs 7037, 7122)
  - Inter MRBS HO / may induce network re-entry by changing of physical parameter.
  - Moving RS mode / Moving BS mode
- 7107 (for HO scenario, vs 082)
  - Network reference model in consideration of MRS ho case
  - Inter RS communication.
- 7122
  - Handover procedure of MS initiated by MRS handover.
- 7133 (vs 7089)
  - Definition update on MRS with support of NEMO
  - For session continuation in MRS
- 7147 (vs 7037, 7122)
  - MRS HO procedure including the scenario inducing MS's handover

RS/MRS handover

- Harmonization outcome of 7087,7089,7037, 7122
  - 37r1 will reflect the harmonization on moving RS HO when no preamble reassignment (part of 7087,7089,7037, 7122)
  - 122r1 will reflect the harmonization on moving RS handover with preamble reassignment
  - 87r1 will reflect the harmonization on two operation modes of MRS.
- 54, 133: need more offline discussion
- 7107: The concern may not exist, (TBC with author), may superseded by 082
- 7147: need more offline discussion

Suggest the TG to evaluate 37r1, 122r1, 87r1

Other Ranging

No	Title	First Author	Company	Topic	Sub-topic
7059	MS Periodic Ranging with Non-transparent RS	Kanchei (Ken) Loa	Institute for Information Industry (III), Nortel, Institute for Infocomm Research	Mobility management	Periodic & unsolicited ranging
7060	MS Periodic Ranging with Transparent RS	Kanchei (Ken) Loa	Institute for Information Industry (III), Nortel, Institute for Infocomm Research	Mobility management	Periodic & unsolicited ranging
7061	Unsolicited RNG-RSP with Transparent-RS	Kanchei (Ken) Loa	Institute for Information Industry (III), Nortel, Institute for Infocomm Research	Mobility management	Periodic & unsolicited ranging
7062	Unsolicited RNG-RSP with Non-transparent RS	Kanchei (Ken) Loa	Institute for Information Industry (III), Nortel, Institute for Infocomm Research	Mobility management	Periodic & unsolicited ranging

Other Ranging

- Periodic or unsolicited Ranging.
- 7059
- 7060
- 7061
- 7062

- Link with initial ranging, propose to reuse initial ranging process

HO Ranging

- 7059, 7060, 7061, 7062:
  - Pending on the resolution of initial ranging

MRS

No	Title	First Author	Company	Topic	Sub-topic
7087	Moving Relay Station Operation	Hang Zhang	Nortel	Mobility management	MRS

Session #47 802.16 Relay TG
Adhoc Sessions Report

Mobility Management: Sleep/Idle/MBS
Tues 15:30 to 18:00

Chair: Mike Hart

Mobility management

- MS
- RS
- Sleep/idle/MBS(1)
- Periodic & unsolicited ranging (4 – same author)
- MRS (1)

Sleep/Idle/MBS

No	Title	First Author	Company	Topic	Sub-topic
7007	A proposal for timing compensation of sleep mode in MR	Keiichi Nakatsugawa	Fujitsu Laboratories Ltd., Fujitsu Laboratories of Europe Ltd., National Chiao Tung University (NCTU) /Industrial Technology Research Institute (ITRI)	Mobility management	Sleep mode
7010	Sleep Mode in MR network	Yuefeng Zhou	Fujitsu Laboratories of Europe Ltd, Fujitsu Laboratories Ltd., National Chiao Tung University (NCTU) /Industrial Technology Research Institute(ITRI),Alcatel Shanghai Bell Co., Ltd.,Mitsubishi Electric Research Lab	Mobility management	Sleep mode
7035	MS Sleep Mode in MR network	Yousuf Saifullah,	Nokia, Institute for Information Industry, Siemens Corporate Research	Mobility management	Sleep mode
7044	Sleep Mode Operations in MR Network for Centralized Scheduling Approach	Shiao-Li Tsao	NCTU/ITRI, Fujitsu, Nokia and III	Mobility management	Sleep mode
7066	RS Sleep Mode	Kanchei (Ken) Loa	Institute for Information Industry (III)	Mobility management	Sleep mode
7004	A proposal for timing compensation of idle mode in MR	Keiichi Nakatsugawa	Fujitsu Laboratories Ltd.,Fujitsu Laboratories of Europe Ltd.,National Chiao Tung University(NCTU) /Industrial Technology	Mobility management	Idle mode
7030	MRS Paging Group Update	Shashikant Maheshwari,	Nokia	Mobility management	Idle mode
7005	A proposal for synchronous MBS transmission in MR	Keiichi Nakatsugawa	Fujitsu Laboratories Ltd., Fujitsu Laboratories of Europe Ltd., National Taiwan University (NTU) National Chiao Tung University (NCTU), Industrial Technology Research Institute (ITRI),Alcatel Shanghai Bell Co., Ltd.,Toshiba Research Europe Ltd.,Mitsubishi Electric Research Lab	Mobility management	MBS

Ad-hoc Summary: Sleep/Idle Mode

Sleep

- Timing compensation for MOB_TRF-IND (7007) in non-transparent
- Support of MS sleep mode in distributed scheduling
  - 7010 & 7035
  - Agree on need to inform RS of MS sleep mode info & ACK the information to MR-BS
  - Differences:
    - Use MOB_SLP-RSP or new message?
      - Overhead? Interpretation?
    - Do we need to approve sleep in the ACK message?
      - Depends on where the buffering is done (MR-BS, RS)
    - Authors to explore how much can be put into a harmonised contribution
    - Any differences that cannot be resolved then to present issues to TG for voting on particular unresolved sections of text
- Support of MS sleep mode in centralised scheduling
  - 7007 (part), 7010 (part), 7035 (part) & 7044: no difference in concepts.
  - Author of 7007 to explore merging relevant text into 7044 for adhoc to recommend for acceptance at TG meeting
- RS sleep mode (7006)
  - Encouraged authors to find more support and find consensus of opinion

Routing and Path Management

Routing & path management

No	Title	First Author	Company	Topic	Sub-topic
7027	End-to-End Throughput Metrics for QoS Management 802.16j MR Systems	Ozgur Oyman	Intel, Motorola	Routing & path management	
7031	Path Management in Multi-hop Relay System	Haihong Zheng,	Nokia, Huawei Technologies Co. Ltd	Routing & path management	
7032	Topology Discovery in Multi-hop Relay System	Haihong Zheng,	Nokia, Huawei Technologies Co. Ltd	Routing & path management	
7046	Path selection and reselection for RSs in IEEE 802.16j Multi-hop Relay Network	Chie Ming Chou	ITRI/NCTU	Routing & path management	
7048	Efficient Systematic CID Allocation and Relay Path Configuration Mechanism for IEEE 802.16j (Multi-hop Relay)	Aik Chindapol	Siemens, Telcordia, ITRI, ETRI, Samsung Thales	Routing & path management	
7079	A new metric for multi-hop path selection	Yukihiro Takatani	Hitachi, Ltd.	Routing & path management	
7093	DSx message extension for Constraint-Based routing and CID/path binding	G.Q Wang	Nortel	Routing & path management	
7131	BS Routing function for Moving RS in Moving BS Mode	Hang Zhang,	Nortel	Routing & path management	
7153	Link Adaptive Multi-hop Path Management for IEEE 802.16j	Hyukjoon Lee	Kwangwoon University, ETRI	Routing & path management	
7161	An Framework for Multi-hop Path Management in MMR Networks	Erwu Liu,	Alcatel-Lucent	Routing & path management	
7168	Simple Path Management by Encapsulation in MMR system	Changkyoon Kim, Kyu Ha Lee, Hyung Kee Kim	Samsung Thales	Routing & path management	

- 027
  - introduction of End-to-End metric
- 31r1
  - Path management in associate with a CID as representative of a path.
  - Establishing/update path, routing information.
- 032 (vs 06/158, 07/97)
  - Initial path discovery for MS, RS
- 046
  - Path selection/reselection with assist from RS
- 048
  - Systematic CID allocation and routing based on assigned CID set.
- 79 (vs 06/248r1)
  - Introduction of metric based on CQICH
- 93 (91, 92)
  - Path management in associate with CID
  - DSx message
- 131
  - Path routing for MRS
- 153 (vs 93, 31r1, 032)
  - Superseded by 046 for harmonization
- 168
  - Superseded by 048 for harmonization

(06/156; 06/274;)

- Routing Metric
  - End to End metric(07/027)
  - 79, 06/248r1
- Path management
  - 31r1, 046, 97, 93, 91, 92, 153
- Topology Discovery
  - 32(vs 06/158, 07/97)
- Systematic CID allocation
  - 48 (harmonized with 168)
- 06/159

(06/156; 06/274;)

Session #47 802.16 Relay TG
Adhoc Sessions Report

Measurement & reporting
RRM, etc
Wed 08:00 to 11:00

Chair: Mike Hart

RRM, etc.

No	Title	First Author	Company	Topic	Sub-topic
7026	RS safety zone	Mike Hart	Fujitsu	RRM, Scheduling & Interference control	
7104	Frequency Domain Power Allocation for Stationary Relay Links	Seung-Jun Kim	NEC Laboratories America	RRM, scheduling & interference control	
7155	Mobile Station (MS) Classifications for Efficient Resource Utilization	Anxin Li,	DoCoMo Beijing Labs, DoCoMo USA Labs	RRM, scheduling & interference control	

Ad-hoc Summary: RRM, etc

- Dealt with the three contributions
  - No presenter for 7104 but seems to be proposing existing sounding concept is supported on relay link (i.e. RS uplink sounding)
  - Some discussions on other proposals but no areas for harmonisation

Session #47 802.16 Relay TG
Adhoc Sessions Report

Construction & Transmission of M-PDUs
PHY – Others
Tues 12:30 to 13:30

Chair: Mike Hart

PHY - Others

No	Title	First Author	Company	Topic	Sub-topic
7014	Closed loop power control	Mike Hart	Fujitsu, Nokia, ITRI, ETRI, Samsung Thales	PHY	Power control
7052	Demodulation and Forwarding method in Relay Station	Su Chang Chae	ETRI, SAMSUNG THALES	PHY	Coding
7073	RS Autonomous Synchronization	Kanchei (Ken) Loa	Institute for Information Industry (III)	PHY	Sync
7080	AAS Direct Signaling Methodologies to Support High Capacity MR-BS to RS Links	Dale Branlund	BRN Phoenix, DIRECTV	PHY	AAS
7124	Cooperative Relaying in Downlink for IEEE 802.16j	Jimmy Chui	Siemens, Samsung Thales, ETRI, DoCoMo Beijing Labs, DoCoMo USA Labs, Nokia	PHY	MIMO

Ad-hoc Summary: Sleep/Idle Mode

Idle

- Timing compensation for MOB_PAG-ADV (7004) in non-transparent
- Efficient MS location update for MSs connected to MRS (7030)
  - Should move to MM HO session as needs to be considered with 7087
  - Authors of 7030 to discuss with authors of 7084

MBS

- Considering timing compensation issue for multi-BS access (07-005)
  - Consider moving proposed text into new section
  - Contribution provides the starting point
  - Need to do further future work on full solution for .16j

Ad-hoc Summary: PHY – Others

- All 5 contributions discussed
- Harmonisation of power control contributions from last meeting already complete
- No further areas for harmonisation
- Suggestions:
  - Authors of 7052 update the text to ensure no changes required to MS (not clear based on proposed text presented)
  - Authors of 7073 to consider working with authors of 7102

Session #47 802.16 Relay TG
Adhoc Sessions Report

PHY – HARQ
Tues 19:00 to 20:00

Chair: Mike Hart

PHY - HARQ

No	Title	First Author	Company	Topic	Sub-topic
7002	DL HARQ with Relays	Junichi Suga	Fujitsu, Nokia, Siemens, Samsung Thales	PHY	HARQ
7029	UL HARQ with Relays	Haihong Zheng,	Nokia, Fujitsu Laboratories Ltd., Siemens, ETRI, Samsung Thales	PHY	HARQ
7111	HARQ method for two-hop and multi-hop relays	Guosen Yue	NEC-LABS	PHY	HARQ
7116	Proposal for Adaptive HARQ ACID Expansion on Relay Links	Toshiyuki Kuze	Mitsubishi Electric Corp, Mitsubishi Electric Research Lab	PHY	HARQ
7121	*Rate Compatibility and Incremental Redundancy HARQ for 802.16j LDPC*	*Wataru Matsumoto*	*Mitsubishi Electric Corp, Mitsubishi Electric Research Lab*	*PHY*	*HARQ*
7163	HARQ Mechanisms in Multi-hop Relay	Wei Ni	Alcatel-Lucent, DoCoMo	PHY	HARQ
7164	HARQ for Multi-hop Relaying System-Slides	David Comstock	Huawei Technologies	PHY	HARQ

Ad-hoc Summary: PHY – HARQ

- HARQ mechanisms:
  - DL HARQ: Transparent RS and non-transparent RS with centralised scheduling (07-002)
  - UL HARQ: Transparent RS and non-transparent RS with centralised scheduling (07-029)
  - DL & UL HARQ: Not clear for which cases. (07-111) Potentially some conflicts with 07-002 & 07-029.
  - DL & UL HARQ: Transparent & non-transparent RS with centralised scheduling (07-163)
  - DL & UL HARQ: Transparent RS (07-164)
- Others:
  - Increase number of HARQ channels for relay link to increase HARQ throughput (07-116)
  - Extension to LDPC to support IR and lower rate on MR-BS to RS link (07-121)
- Authors of 002/029, 163 & 164 to work on harmonising contributions

Eval Methodology

No	Title	First Author	Company	Topic
7105	Proposal for additional pathloss models for 802.16 links with relay stations	A. F. Molisch	Mitsubishi Electric	Evaluation methodology
7137	ART-ART channel Model	Dean Kitchener	Nortel	Evaluation methodology

Categories

- Relay concepts (4)
- Security (5)
- Frame structure (33)
- Network entry (33)
- Bandwidth request (10)
- Construction & transmission of M-PDUs (5)
- Measurement & reporting (7)
- Mobility management (41)
- Routing & path management (11)
- RRM, scheduling & interference control (6)
- PHY (12)
- Evaluation methodology (2)

Planning

	Morning (8:00 – 11:00)	Afternoon (12:30 – 18:00)		Evening (19:00 – 22:00)	
Mon	X	Opening		Relay Concepts & Security (9)	
Tue	Frame structure (P & M) (33) (Viscount 2)	Others (M) (10) 12:30 – 13:30 (MR3-4)	MM - Sleep / Idle / MBS (M) (8) (MR3-4) 15:30 – 18:00	PHY - HARQ (M) (7) (MR7)	Wrap up (Viscount 2) (21:30)
	NE / BW Req (J) (43) (MR3-4)	MM – HO, MRS, Ranging (J & P) (33) (Viscount 2)		Routing & path mgmt (J) (11) (Viscount 2)	
Wed	RRM / Measurement & Reporting (P) (13) / Frame (P & M) (33) (ROOM)	Frame (P & M) (33) (ROOM)	Wrap up (Viscount 2) 17:00	Social	
	MM – HO, MRS, Ranging (J & P) (33) (ROOM)	NE / BW Req (J) (43) (ROOM)			
Thu	Joint (inc. eval methodology)	Joint & Closing			

Others (Tue PM):

- Construction transmission of M-PDUs
- PHY - others

Tentative Schedule (from Tutorial, Mar. 2006)

Year	Month	802.16 session	Actions
2006	Jan.	#41 Interim	SG: the 3rd meeting – PAR Completion
	Mar.	#42 Plenary	Tutorial Session on 802.16 MMR 802 EC to approve 802.16j PAR
	May	#43 Interim	1st TG meeting
	July	#44 Plenary	2nd TG meeting Require Document & Procedure for proposal Selection & merging
	Call for Contribution		
	Sept.	#45 Interim	3rd TG meeting Presentation & Selection
	Drafting standard		
	Nov.	#46 Plenary	1st WG letter ballot
2007	**Jan.**	**#47 Interim**	2nd WG letter ballot
	Mar.	#48 Plenary	1st sponsor ballot
	May.	#49 Interim	Sponsor Recirculation
	July.	#50 Plenary	Submission to Rev. Com
	Sep.	#51 Interim	SA Approval

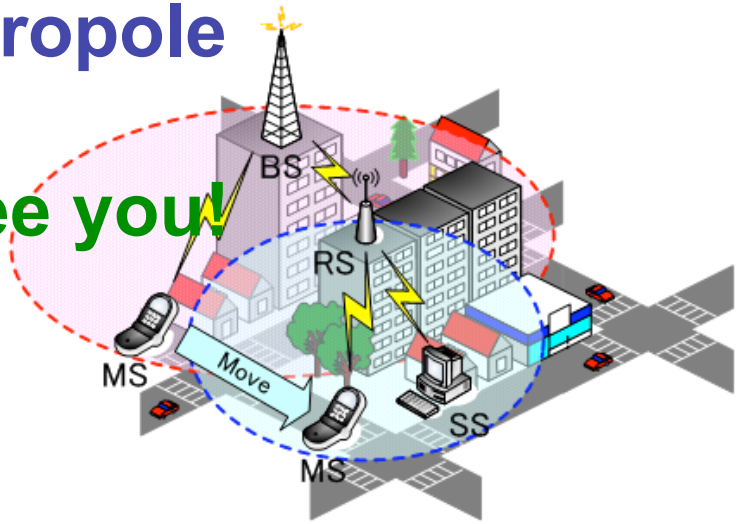
Motion expected to come at Relay TG Closing

1. To authorize the TG Chair to issue a call for comments

Relay-TG Meeting Calendar This Week

15:00-18:00, Mon. 15 Jan. @Sandringham 1, 3rd-F
19:00-22:00, Mon. 15 Jan. @Viscount 2, 1st-F
08:00 – 22:00, Tue. 16 Jan. @Viscount 2, 1st-F
8:00-12:30/15:30-18:00 @MR3-4, Mes.-F
08:00 – 18:00, Wed. 17 Jan.
08:00 – 18:00, Thu. 18 Jan.

Hilton London Metropole
London, UK
Please Join and see you!



*Reference: C802.16-005/013