message reported by SSs and share DB updating for ND

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Purpose:

   Consolidate the mechanism of neighbor discovery

message reported by SSs and share DB updating for ND

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General description

- Need to define the message to be reported
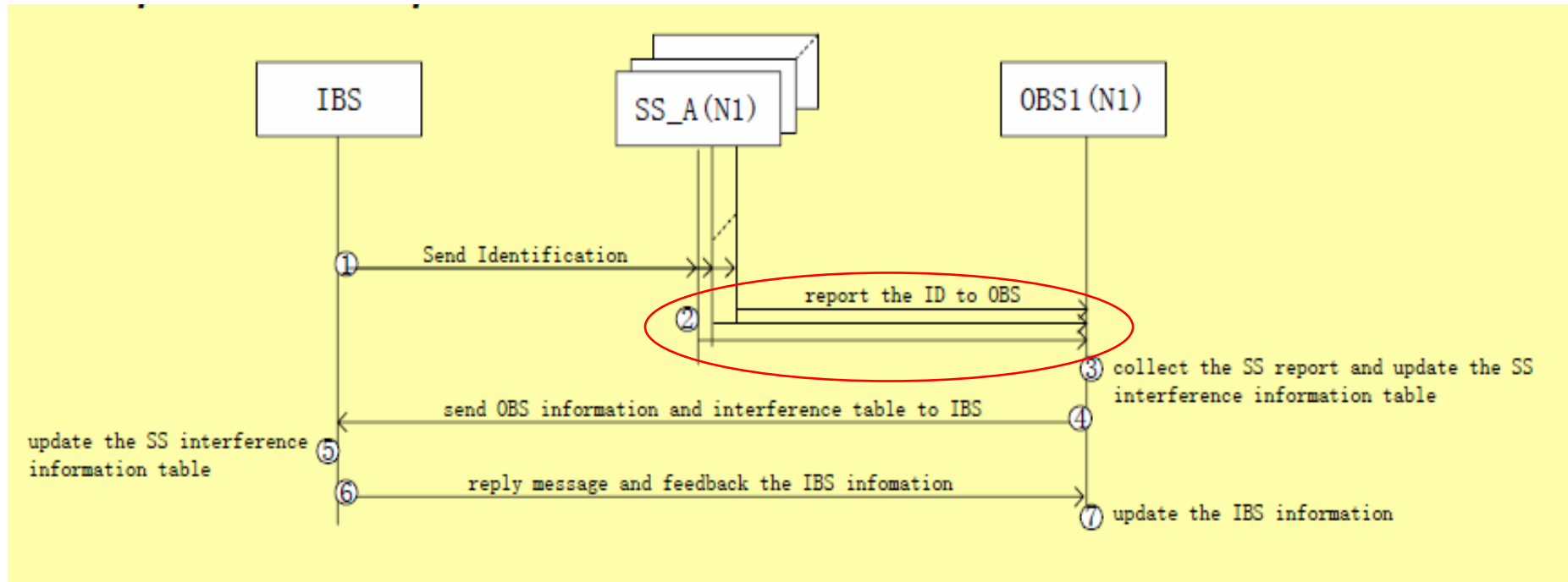
General Concept (cont.)

- element needed into the database

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General Concept (cont.2)

SSs in the interference free zone could use interference free Subframe/resource and corresponding master subframe/resource

SSs in the interference zone and could use only corresponding master subframe/resource

BSs need to know the interference situation of SSs to arrange the scheduling
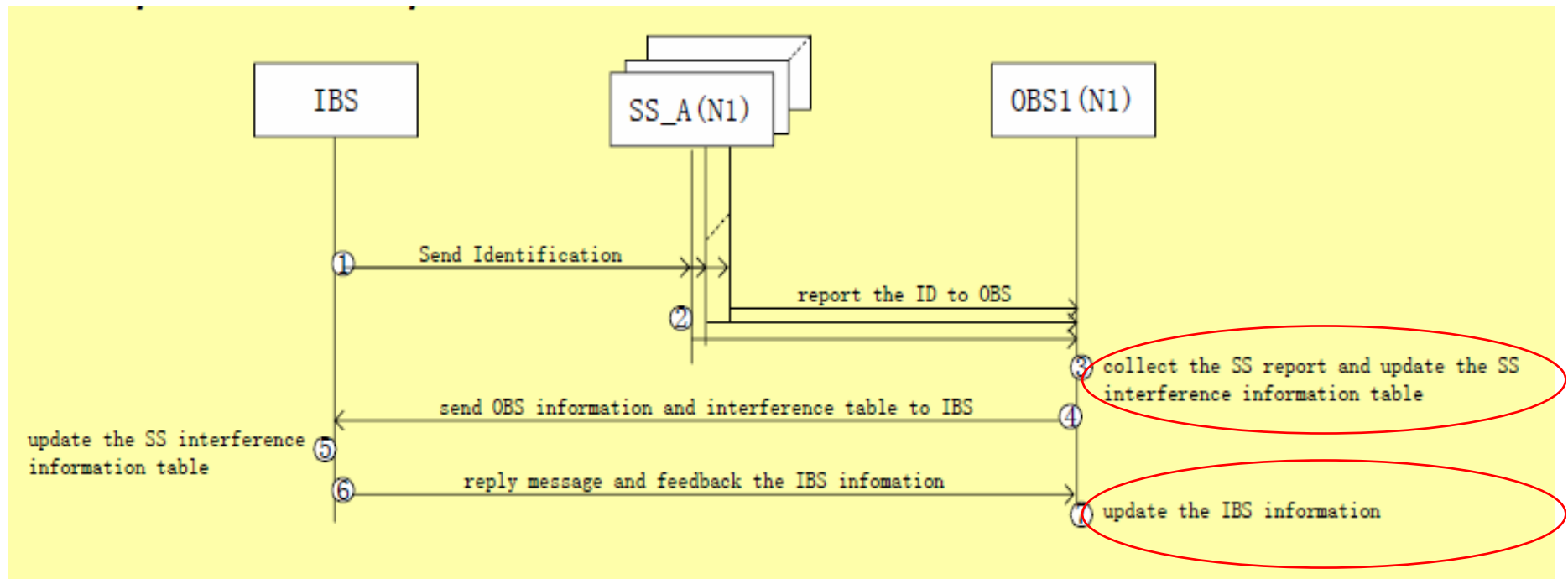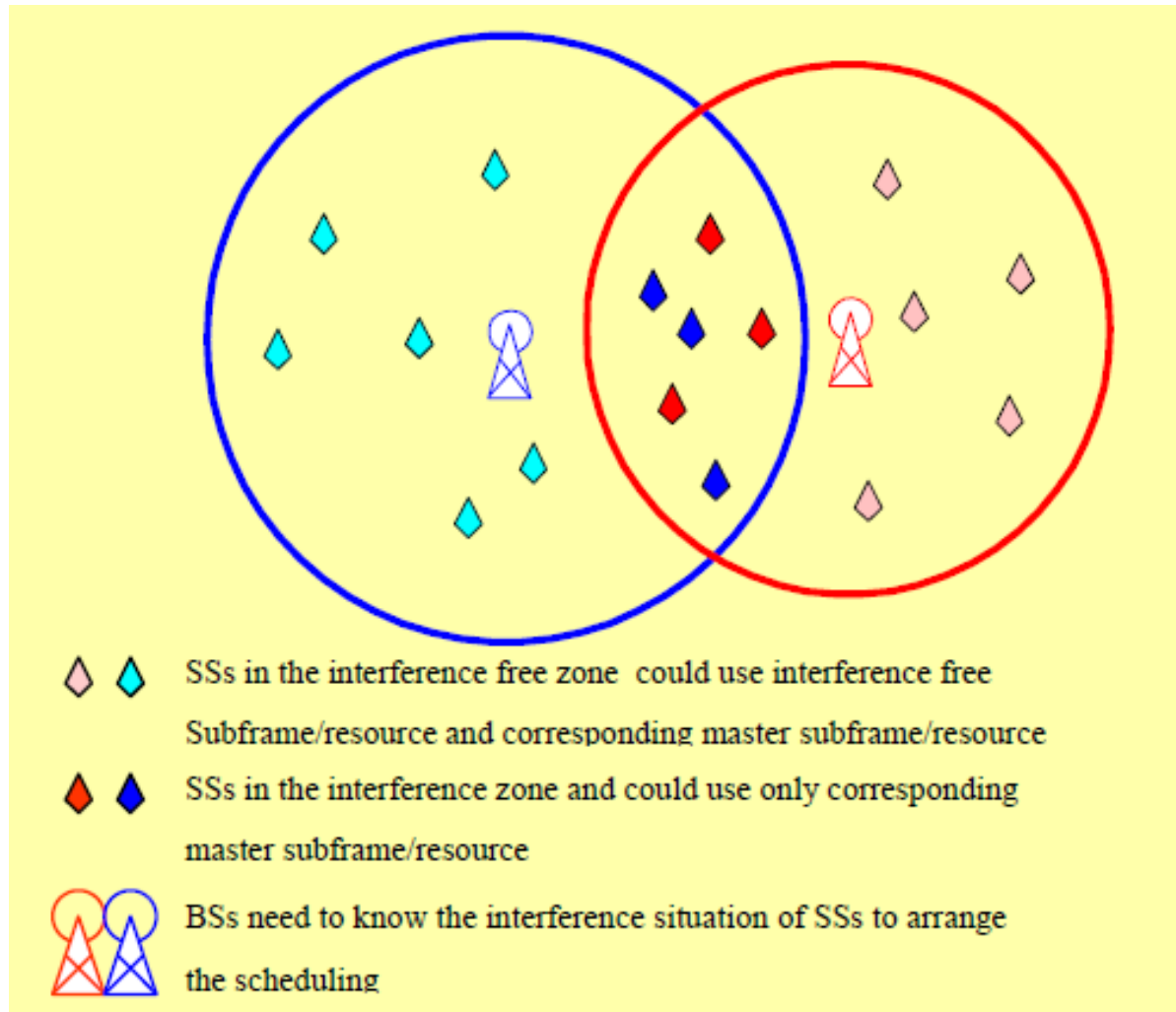
Issues

<1> We need a message type for the SSs to carry the parameter reported to their serving BS;

<2> We need to define the content in the database for gathering the SSs interference status and sources. The interference source and status information for each SS related to the decision by the serving BS for their traffic scheduling. So the serving BS need to maintain a table inside there database and update the table in time.

Messages

6.3.2.3.33 Channel measurement Report Request/Response (REP-REQ/RSP)

If the BS, operating in bands below 11 GHz or a DM-configured BS operating at any frequency, requires RSSI and CINR channel measurement reports, it shall send the channel measurements Report Request message. In license-exempt bands, it shall additionally be used to request the results of the DFS measurements the BS has previously scheduled. Table 62 shows the REP-REQ meassage.

Table 62—Channel measurements Report Request (REP-REQ) message format

Syntax	Size	Notes
Report_Request_Message_Format() {		
Management Message Type = 36	8 bits	
Report Request TLVs	variable	
}		

The REP-REQ message shall contain the following TLV encoded parameters:

Report Request

The channel measurement Report Response message shall be used by the SS to respond to the channel measurements listed in the received Report Requests. In license-exempt bands, the SS shall also send a REP-RSP in an unsolicited fashion upon detecting a Primary User on the channel it is operating in. The SS may also send a REP-RSP containing channel measurement reports, in an unsolicited fashion, or when non-primary user interference is detected above a threshold value. Table 63 shows the REP-RSP message.

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Messages (cont.)

Table 63—Channel measurement Report Response (REP-RSP) message format

Syntax	Size	Notes
Report_Response_Message_Format {		
Management Message Type = 37	8 bits	
Report Response TLVs	variable	
}		

The REP-RSP shall contain the following TLV encoded parameters:

Report
Compound TLV that shall contain the measurement Report in accordance with the Report Request (see 11.11).

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Messages TLV in 2004

Name	Type	Length	Value
Report	1	*variable*	Compound
Channel Type Report in WirelessMAN OFDMA PHY	2	*variable*	Compound
Current transmitted power	147	1	See 8.3.7.4 and 11.1.1

The report consists of the following parameters (see also 8.2.2, 8.3.9, or 8.4.11 for details).

REP-REQ Report type	Name	Type	Length	Value
bit #0 = 1	Channel number	1.1	1	Physical channel number (see 8.5.1) to be reported on
bit #0 = 1	Start frame	1.2	2	Frame number in which measurement for this channel started
bit #0 = 1	Duration	1.3	3	Cumulative measurement duration on the channel in multiples of T_s. For any value exceeding 0xFFFFFF, report 0xFFFFFF
bit #0 = 1	Basic report	1.4	1	Bit #0: WirelessHUMAN detected on the channel Bit #1: Unknown transmissions detected on the channel Bit #2: Primary User detected on the channel Bit #3: Unmeasured. Channel not measured
bit #1 = 1	CINR report	1.5	2	1 byte: mean (see also 8.2.2, 8.3.9, 8.4.11) for details) 1 byte: standard deviation
bit #2 = 1	RSSI report	1.6	2	1 byte: mean (see also 8.2.2, 8.3.9, 8.4.11) for details) 1 byte: standard deviation

REP-REQ Channel Type request	Name	Type	Length	Value
Channel Type = 00	Normal sub-channel Report	2.1	1	First 5 bits for the CINR measurement report and the rest for don't care
Channel Type = 01	Band AMC Report	2.2	4	First 12 bits for the band indicating bitmap and Next 25 bits for CINR reports (5 bits per each band)
Channel Type = 10	Safety Channel Report	2.3	5	The first 20 bits for the reported bin indices and the next 20 bits for CINR reports (5 bits for each bin)

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Messages

REP-RSP

" *Where regulation mandates detection of specific signals by the SS, the SS shall also send a REP-RSP in an unsolicited fashion upon detecting such signals on the channel it is operating in, if mandated by regulatory requirements. The SS may also send a REP-RSP containing channel measurement reports, in an unsolicited fashion, or when other interference is detected above a threshold value.*"

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Messages TLV

Name	Type	Length	Value
Report	1	variable	Compound
Channel type report in OFDMA PHY	2	variable	Compound
REP_RSP Zone specific physical CINR report	3	variable	Compound
REP_RSP preamble physical CINR report	4	variable	Compound
REP_RSP Zone specific effective CINR report	5	variable	Compound
REP_RSP preamble effective CINR report	6	variable	Compound
Current transmit power	147	1	See 8.3.7.4 and 11.1.1

REP_REQ/RSP modification

[insert the following text into the WD 2.1.3]

[change the 6.3.2.3.33 into the following text in 802.16 primary standard]

6.3.2.3.33 Channel measurement Report Request/Response (REP-REQ/RSP)

If the BS, operating in bands below 11 GHz, requires RSSI and CINR channel measurement reports, or requires neighbor detection reports, it shall send the channel measurements Report Request message. The Report Request message shall additionally be used to request the results of the measurements the BS has previously scheduled. Table 62 shows the REP-REQ message.

The channel measurement Report Response message shall be used by the SS to respond to the channel measurements listed in the received Report Requests. Where regulation mandates detection of specific signals by the SS, the SS shall also send a REP-RSP in an unsolicited fashion upon detecting such signals on the channel it is operating in, if mandated by regulatory requirements. The SS may also send a REP-RSP containing channel measurement reports, in an unsolicited fashion, or when other interference is detected above a threshold value. In cases where specific signal detection by an SS is not mandated by regulation, the SS may indicate 'Unmeasured. Channel not measured.' (see 11.12) in the REP-RSP message when responding to the REP-REQ message from the BS. Especially for coexistence network, when SS have detected the IP broadcasting message from the coexistence neighbor BS, the SS need to use REP_RSP to report the information to its serving BS unsolicitedly. Table 63 shows the REP-RSP message.

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Proposed Messages TLV

[insert the following entry in the second table of 11.11]

Neighbor Interference Report	1.9	1	Bit #0: 1-include IP address received in IPBC Bit #1: 1-include RSSI of CTS symbols(only valid when bit#0 is set to one) Bit #2: 1-include FSN that start to receive IPBC Bit #3~7: reserved, shall be set to zero

[insert the following entry in the first table of 11.12]

Neighbor Report	7	variable	Compound

[insert the following table into 11.12 as indicates:]

Neighbor Interference Report type	Name	Type	Length	Value
all	Neighbor count /New NDS	7.1	1	Bit #0:1-New Neighbor Discovered by IPBC received Bit #1-7:The number of neighbor that interference to this SS
bit #0=1	Neighbor IP address	7.2	4	4bytes IP address of neighbor interference to this SS, 255. 255. 255. 255 indicate the fail of CRC check.
bit #1=1	Neighbor IP address with RSSI	7.3	2	1byte RSSI mean (see also 8.2.2, 8.3.9, 8.4.11) for details) 1byte standard deviation
Bit #2=1	Starting Frame Serial Number of IPBC	7.4	2	Bit# 0-10: FSN of IPBC starting frame Bit#11-15: reserved

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Complement of the database

The BS data base will include:

……

For every active SS: SSID and its attenuation relative to radio-signature power, in the used subframes, in the interval between two Master sub-frames.

For every neighbor BS: the BSID, the IP address of the neighbor and other profile information, and the SSs it interfered to, (and the SSs belong to it that interfered by the database owner BS.)

For every BS in the same community: the contact IP address and the interference with this BS, and the interference situation with the DB owner.

For every SS registered: the interference situation, the number of interference source, the IP address and RSSI of each source detected.

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Proposed Text Changes(2.1.5)

2.1.5 BS regular operation

• Schedule SS traffic

The traffic of each served SS should be schedule into corresponding sub-frame/resource based on the SSs' interference situation. Traffic of SSs in the interference free zone could be scheduled into any available sub-frame/resource of the serving BS, and traffic of SSs in the interference zone should take only corresponding master subframe/resource of the serving BS.

• Set Tx power levels, such to use minimum power levels for both BS and SSs;

• Maintain it own database when other BSs join the network.

The BS need to keep updating the information of all the BS in the community including the neighbor BS, and the information of the served SSs in the own network. The information include the profile and the interference situation of the stations. The interference situation information include the interference status, the interference source and corresponding RSSI, the interference victims founded. Etc.

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Proposed Text Changes(2.1.8.3)

2.1.8.3 **Interference to SS**

Report to BS about experienced interference

    List of frame_number, sub-frame, offset, <u>IP address of source BS</u>

BS start process for interference reduction with *feedback from the SS.*

Proposed Text Changes(2.1.3)

The first phase of the Community Entry is to judge the validity of country/region data base. If the country/region database is valid, process uses the country/region (FCC) data base::

- *Read the Regional/country (FCC) data base;*
- Identify which Base Stations might create interference, based on the location information;
- Learn the IP identifier for those Base Stations;

Otherwise:

- *New BS uses the interference free slot to broadcast the contact request*
- *The SS in the common coverage will forward the information to its operating base station using REP_RSP message.*
- *The operating neighbor BS update its database and send feedback information using IP network*
- *learn the IP identifier By the message from neighbor BS via IP network*

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Proposed BS info Tables to be inserted

- **This BS information Table & Table for BS in the community**

    - IDs
    - Master Resources
    - Status
    - CTS parameters (only for this BS)
    - Neighboring Topology and relates SS
    - Serving SS
    - Profile
    - *(tbc.)*

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Proposed SS info Tables to be inserted

- **SS information Table**

    – IDs
    – Interference Status
    – Interference sources detected
      (IP identifier from each source)
    – Interference RSSI with each source

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Discussion

Format of the parameter table
Where to put the parameter table

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