Project	**IEEE 802.16 Broadband Wireless Access Working Group <http://ieee802.org/16>**
Title	**Change in RNG-REQ Format**
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Re:	Supporting document for Letter Ballot #13a
Abstract	The document suggests change in RNG-REQ format to make this message shorter and thus to decrease length of Initial Ranging intervals
Purpose	The document is intended for consideration within comments resolution process
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Change in RNG-REQ Format

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1. Rationale

Size of Initial ranging slot depends on the size of RNG-REQ payload, which in turn depends on the mandatory set of parameters present. According to **Error! Reference source not found.**, the following parameters are encoded as fields of the message

- Management Message Type 8 bits
- Downlink Channel ID 8 bits

And the rest of parameters are encoded as TLVs

Field		Length, bytes
Generic MAC Header		6
Management Message Type	Field	1
Downlink Channel ID	Field	1
Requested Downlink Burst Profile	TLV	4
Ranging Anomalies	TLV	3
SS MAC Address	TLV	8
MAC Version	TLV	3
AAS broadcast capability (optional)	TLV	1
CRC		4
Total		31

In OFDM, if transmitted at QPSK ½, it occupies 4 OFDM symbols (together with preamble). In the case the lowest rate in the standard is changed to BPSK, it will occupy 5 OFDM symbols.
To fit into one symbol, it is suggested to include into the very first transmission (the only one performed in contention) only the following parameters:

Field		Length, bytes	Comments
Generic MAC Header		6	
Management Message Type	Field	1	
Downlink Channel ID	Field	1	
Requested Downlink Burst Profile	TLV	3	Format of this TLV is suggested to change (see below)
SS MAC Address	TLV	8	
CRC		4	
Total		23	

The rest of parameters can be transmitted after SS gets RNG-RSP and then the very first unicast UL allocation.

[Change in 8.3.6.2]

Initial ranging transmissions shall use ~~consist of~~ a long preamble and ~~one OFDM symbol using~~ the most robust mandatory burst profile.

[Change in 6.4.2.3.5]

An SS shall generate RNG-REQ messages in the format shown in Table 1~~9~~8, including the following parameter

Downlink Channel ID
The identifier of the downlink channel on which the SS received the UCD describing the uplink on which this ranging request message is to be transmitted. This is an 8 bit field.
All other parameters are coded as TLV tuples as defined in 11.1.3.
The following parameters shall be included in the RNG-REQ message when sent in an Initial Ranging interval:

Requested Downlink Burst Profile
SS MAC Address

~~Ranging Anomalies~~
~~The following parameters shall be included in the RNG-REQ message when transmitted on the Initial Ranging connection:~~
~~SS MAC Address~~
~~MAC Version~~

The following parameters may be included in the RNG-REQ message:

~~The following parameters shall be included in the RNG-REQ message:~~
~~Requested Downlink Burst Profile~~
Ranging Anomalies
~~The following parameters shall be included in the RNG-REQ message when transmitted on the Initial Rang-ing connection:~~
~~SS MAC Address~~
MAC Version

~~The following parameter may be included in the RNG-REQ message:~~
AAS broadcast capability

[Change in the Table 278]

Name	Type (1 byte)	Length	Value (variable length)
Requested Downlink Burst Profile	1	~~2~~ 1	Bits 0-3 ~~Byte 0~~: DIUC of the downlink burst profile requested by the SS for downlink traffic. Bits 4-7~~: Byte 1:~~ 4 LSBs of Configuration Change Count value of DCD defining the burst profile associated with DIUC.

2. References

[1] IEEE P802.16-REVd/D2-2003 Draft IEEE Standard for local and metropolitan area networks Part 16: Air Interface for Fixed Broadband Wireless Access Systems