

**IEEE P802.11
Wireless LANs**

Proposed resolutions to comments on clause 26.3.9.8

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Abstract

This submission contains proposed comment resolutions to comments on TGax Draft D0.1.

The comments assigned to the author in Clause 26.3.9.8 are:

302, 304, 306, 310, 311, 477, 478, 479, 527, 1001, 1002, 1003, 1009, 1010, 1692, 2020, 2022, 2023, 2024, 2025, 2026, 2027, 2028, 2029, 2032, 2033, 2035, 2036, 2037, 2038, 2039, 2040, 2130, 2131, 2132, 2133, 2150, 2151, 2157, 2245, 2246, 2543, 2544, 2545, 2546, 2547, 2548, 2549, 2550, 2679, 2680, 2681, 2748, 2749.

The resolutions proposed in this document are marked with green.

306, 310, 311, 477, 1002, 1003, 1010, 1692, 2020, 2022, 2023, 2024, 2025, 2026, 2027, 2028, 2029, 2036, 2037, 2130, 2151, 2245, 2246, 2543, 2544, 2545, 2546, 2547, 2679, 2681

The changes marked in this document are based on **TGax Draft 0.2**.

Revision Notes

R0	Initial revision
R1	Changes to the resolution of some comments
R2	Fix comment reference errors and changes to the resolution of some comments.

Comments for Clause 26.3.9.8**CID 2020, 2022, 2543**

CID	Page. Line	Clause Number	Comment	Proposed Change	Proposed Resolution
2020	111.3 1	26.3.9.8.1	The notion of "content channel" should be explained in this section, as it is used later on in the description of HE-SIG-B	See comment	Revised. The original spec text has been augmented, clarifying the definition of content channel by the text below. Instruction to Editor: TGax editor to make the changes shown in 11-16/928r1 under all headings that include CID 2020
2022	111.5 2	26.3.9.8.1	Replace "multiple" with "one or more"	See comment	Accepted. The change has been made as per the comment Instruction to Editor: TGax editor to make the changes shown in 11-16/928r1 under all headings that include CID 2022
2543	111.3 1	26.3.8.9.1	HE-SIG-B may not contain Common Block field.	Add some where in this subclause that there is a mode in which the HE-SIG-B Common Block field is not included.	Revised. Agree with the commenter. A sentence has been added to describe the absence of HE-SIG-B Common

					<p>Block when compression bit is set – as shown in the text below. Further description of the user field arrangement was also missing. That has been added</p> <p>Instruction to Editor: TGax editor to make the changes shown in 11-16/928r1 under all headings that include CID 2543</p>
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Proposed Text Changes for CID 2020, 2022 and 2543

Instruction to Editor:

Please make the following changes in TGax D0.2 P114 L 6 under subclause 26.3.9.8. 1

The HE-SIG-B field is separately encoded on each 20 MHz band. The encoding structure in one such 20 MHz band is shown in Figure 26-19 (HE-SIG-B field encoding structure in each 20 MHz). It consists of a Common Block field followed by a User Specific field which together are referred to as the HE-SIG-B content channel.(#2020)

The Common Block field of a HE-SIG-B content channel (#2020) contains information regarding the resource unit allocation such as the RU arrangement in frequency domain, the RUs allocated for MU-MIMO and the number of users in MU-MIMO allocations. The Common Block field is described in detail in 26.3.9.8.4 (HE-SIG-B common content).

The User Specific field of a HE-SIG-B content channel consists of ~~multiple~~ one or more (#2022) User Block fields. Each User Block field ~~contains~~ is made up of two user fields that contain (#2020) information for two STAs to decode their payloads. The last User Block field may contain information for only one STA, if the number of user fields indicated by the RU allocation signaling in the common block is odd. See 26.3.9.8.5 (HE-SIG-B per-user content) for a description of the contents of the User Block field.

When SIGB Compression bit in HE-SIG-A of a HE-MU-PPDU is set to 1 indicating full bandwidth MU-MIMO transmission, the Common Block field is not transmitted and the content channel consists of only the User Specific field. -(#2543)

Please add the following sentences to TGax D0.2 P121 L 36 under subclause 26.3.9.8.5

When SIGB Compression bit in HE-SIG-A of a HE-MU PPDU is set to 1 indicating full bandwidth MU-MIMO transmission, the number of STAs in the MU-MIMO group is indicated in the ‘SIGB Number of Symbols/Number of MU-MIMO users field’ in HE-SIG-A. For bandwidths larger than 20 MHz, the User block fields are split equitably between two HE-SIG-B content channels, i.e., for a k user MU-MIMO PPDU, 1, …, $\text{ceil}(k/2)$ User block fields are carried in HE-SIG-B content channel 1 and $\text{ceil}(k/2)+1, \dots, k$ User block fields in HE-SIG-B content channel 2. (#2543)

CID 306, 2026, 2547

CID	Page Line	Clause Number	Comment	Proposed Change	Proposed Resolution
306	113.3 8	26.3.9.8.2	If the padding bits are used to round the number of symbols to the	Clarify that the padding bits are added both to have an integer number	Revised

			"nearest" integer, then how would it be possible to align the number of symbols across both content channels?	of symbols as well as to ensure that both content channels have the same number of symbols. Addition descriptions on how this should be done also need to be added - by adding more padding bits to the content channel with the smaller number of users etc..	The revised text for the spec draft has been added that addresses the comments intent. Instruction to Editor: TGax editor to make the changes shown in 11-16/928r1 under all headings that include CID 306
2026	113.3 8	26.3.9.8.3	"bits are added to round up the number of symbols to the nearest integer"	The number of symbols in HE-SIG-B is communicated in HE-SIG-A	DUPLICATE of CID 306 in doc 16-928r0.
2547	113.5 6	26.3.9.8.3	HE-SIG-B on different 20 MHz bands must end at the same OFDM symbol.	clarify "... round up the number of symbols to the nearest integer." to indicate that HE-SIG-B padding should be done so that HE-SIG-B on different 20 MHz bands end at the OFDM symbol.	DUPLICATE of CID 306 in doc 16-928r0.

Proposed Text Changes for CID 306

Instruction to Editor:

Please make the following changes in TGax D0.2 P115 L 59 under subclause 26.3.9.8.3

In the User Specific field, in any 20 MHz band, the bits corresponding to two STAs (i.e. two User fields) are encoded together. Specifically, the STAs scheduled in the HE-MU-PPDU are split into groups of two. Each group of two User fields shall have CRC and tail bits added and then BCC encoded at rate $R = \frac{1}{2}$ using the encoder described in 18.3.5.6. ~~If the number of users is even, padding bits are added to round up the number of symbols to the nearest integer.~~ If the number of users in a content channel is odd, the User Block field corresponding to the last user, who is not grouped, is encoded after adding tail and CRC bits. ~~After encoding, padding bits are added to each content channel to round up the number of symbols the content channel occupies to the nearest integer value. Further padding is added to each content channel until the number of OFDM symbols in the content channel equals the Number of HE-SIG-B symbols signalled by a 4 bit field in HE-SIG-A for an HE MU PDU. Thus, padding ensures that the content channels in different 20MHz bands end at the same OFDM symbol. (#306)and only then are any padding bits added. The padding bits added ensure that both content channels have the same number of symbols.~~ The specific method of generating padding bits is TBD. When the code rate is not equal to $\frac{1}{2}$, the convolutional encoder output bits for each field (including padding bits) are concatenated, then the concatenated bit streams are punctured continuously as described in 18.3.5.6 (Convolutional encoder).

CID 2024, 2544, 2545, 2130, 2023, 1692

CID	Page. Line	Clause Number	Comment	Proposed Change	Proposed Resolution

2024	112.2 7	26.3.9.8.2	Improve wording	"the 1st and 3rd 20 MHz bands from the top" is not very precise. Find better formulation.	Revised. The commenter is correct. However the proposed change is insufficient. An alternate text for Section 26.3.9.8.2 has been proposed. Instruction to Editor: TGax editor to make the changes shown in 11-16/928r1 under all headings that include CID 2024
2544	112.0 4	26.3.9.8.2	242-tones RU can cross the physical 20 MHz boundary. So, the notion that the HE-SIG-B Common Block field is transmitted on the same 20 MHz band as the STA's data is not strictly correct.	Clarify the HE-SIG-B description to match the actual design of the standard.	Revised. The commenter is correct. However the proposed change is insufficient. An alternate text for Section 26.3.9.8.2 has been proposed Instruction to Editor: TGax editor to make the changes shown in 11-16/928r1 under all headings that include CID 2544
2545	112.2 6	26.3.9.8.2	What is the "1st" 20 MHz band? For example, in an 80 MHz BSS using channels 36/40/44/48 (5GHz) with channel 40 being the Primary20, what is the "1st" 20 MHz band? Is it channel 40? Channel 36? Also, in case of 80+80 MHz BSS where the Primary80 segment has higher carrier frequency than the Secondary80 segment, would the "1st" 20 MHz band start in the Primary80 segment, or the segment lower in frequency?	Clarify what a "1st" 20 MHz band is.	DUPLICATE of CID 2024 in doc 16-928r1.

2130	112.0 1	26.3.9.8.2	Unclear what subbands A,B,C,D are tied to. (ie, to i_{BW} in eqn 26-25)	clarify mapping A,B,C,D to subband indices	DUPLICATE of CID 2024 in doc 16-928r1.
2023	112.0 2	26.3.9.8.2	Is there a specific relationship between content channels and the primary channel when $BW > 20$?	The order of the content channels matter for MU transmissions. Is it correct to assume that the first content channel is always in the primary channel?	Revised. The arrangement of the content channels is in the order of increasing sub-carrier index starting from the lowest – which carries content channel #1. The text to clarify this has been proposed Instruction to Editor: TGax editor to make the changes shown in 11-16/928r1 under all headings that include CID 2023
1692	86.09	26.3.9.8.3	It is not clear at which position, and in which SIG-B channel that it carries the per-user content of the center 26-tone RU of 80MHz tone plan	specify the per-user content is located in the last per-user block of channel 1 , if common info is not 11010yyy or 11011yyy	Revised, The comment is correct but the proposed change is not. An alternate text that shows a 1-bit signaling in the content channel corresponding to the center 26 tone RU – to indicate presence of user field is proposed. Instruction to Editor: TGax editor to make the changes shown in 11-16/928r1 under all headings that include CID 1692

Proposed Text Changes for CID 2024, 2544, 2023 and 1692

Instruction to Editor:

Replace the contents of sub-clause 26.3.9.8.2 Frequency domain mapping in TGax D0.2 beginning P114 until P 115 line 47 with the following:

26.3.9.8.2 Frequency domain mapping (#2024)

The 20 MHz PPDU contains one content channel in which the Common Block field and User Specific field are carried as shown in Figure 26-20(HE-SIG-B content channel for a 20 MHz PPDU). The Common Block field contains the RU allocation signaling for RUs that occur within the 242-subcarrier RU boundary.



Figure 26-20—HE-SIG-B content channel for a 20 MHz PPDU

The 40MHz PPDU contains two content channels, each occupying a 20MHz segment. Each content channel contains a Common Block field followed by User Specific field as shown in Figure 26-21 (HE-SIG-B content channel arrangement for a 40 MHz PPDU). The content channels are ordered in increasing order of the absolute frequency i.e., the first content channel carries Common Block field and User Specific field corresponding to RUs whose sub-carrier indices fall between [-244:-3] and the second content channel carries Common Block field and User Specific field corresponding to RUs whose sub-carrier indices fall between [3:244]. (#2544) In case a 484-subcarrier RU is signaled, both content channels will carry Common Block field and User Specific field corresponding to the 484-subcarrier RU.



Figure 26-21—HE-SIG-B content channel arrangement for a 40 MHz PPDU

The 80MHz PPDU contains two content channels each of which are duplicated once as shown in Figure 26.22 (Default mapping of the two HE-SIG-B content channels and their duplication in an 80MHz PPDU). The arrangement of the content channels are in increasing order of the absolute frequency – where HE-SIG-B content channel #1 occupies the tones in the 20MHz segment with the lowest subcarrier indices followed by the HE-SIG-B content channel #2 in the adjacent 20MHz segment. This structure of the first content channel occupying the lower subcarrier index followed by the second content channel is repeated with content duplication in the remaining two 20MHz segments respectively. The first content channel appearing in the 20MHz segments carries a Common Block field and User Specific field corresponding to RUs whose subcarriers indices overlap those segments. (#2544) The Common Block field of content channel 1 contains the following: a RU allocation signaling field for RUs whose sub-carrier indices fall in the range [-500:-259], followed by a second RU allocation signaling field for RUs whose sub-carrier indices are between [17:258] and 1 bit to indicate presence of the user field corresponding to the center 26 sub-carrier RU that spans subcarriers [-16:-4, 4:16]. (#1692) The second content channel carries a Common Block field and User Specific field corresponding to RUs whose subcarrier indices fall in those segments. The Common Block field of content channel 2 contains the following: a RU allocation signaling field for RUs whose sub-carrier indices fall in the range [-258:-17], followed by a second RU allocation signaling field for RUs whose sub-carrier indices are between [259:500] and 1 bit to indicate presence of the user field corresponding to center 26 sub-carrier RU that spans subcarriers [-16:-4, 4:16]. The same value for the bit signaling presence of center 26 sub-carrier RU is carried in both content channels. (#1692) The user fields in the User Specific field that follow the common field are arranged in the same order as the RU allocation signaling. When assigned, the user field corresponding to center 26 sub-carrier RU that spans subcarriers [-16:-4, 4:16] is carried as the last user field in HE-SIG-B content channel 1. (#1692) (#2023) When RUs greater than 242 subcarriers are signaled in the RU allocation signaling in a portion of the bandwidth, the signaling is carried in both content channels placed in the order of the absolute sub-carrier index.

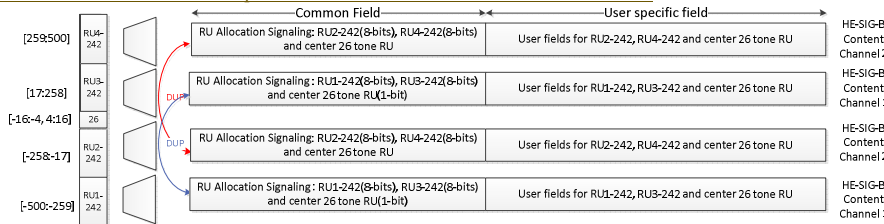


Figure 26-22—Default mapping of the two HE-SIG-B channels and their duplication in an 80 MHz PPDU

Field Code Changed

Field Code Changed

Field Code Changed

The 160MHz PPDU contains two content channels each of which are duplicated four times as shown in Figure 26-27 (Default mapping of the two HE-SIG-B channels and their duplication in a 160MHz PPDU). The arrangement of the content channels are in increasing order of the absolute frequency. (#2023) The first content channel occupies the tones in the 20MHz segment with the lowest subcarrier indices and the second content channel in the adjacent 20MHz segment. This pattern of arranging HE-SIG-B content channel 1 and HE-SIG-B content channel 2 is duplicated over the other segments. The HE-SIG-B content channel 1 and HE-SIG-B content channel 2 carries RU allocation signaling at 242 sub-carrier RU granularity that overlap with the 20MHz segments in which the content channels are carried (including duplication). The signaling for the presence of the user field corresponding to a center 26 tone RU in the 80MHz segment with the lower sub-carrier index is carried in HE-SIG-B content channel 1 as a 1-bit sub-field placed at the end of the Common field. Similarly, signalling for the center 26 tone RU in the 80MHz segment with the higher sub-carrier index is carried in HE-SIG-B content channel 2 as 1-bit sub-field placed at the end of the common field. When assigned, the user field corresponding to the center 26 tone RU in the 80MHz segments is carried as the last user field in their respective content channels. (#1692) When RUs greater than 242 subcarriers are signaled in the RU allocation signaling in a portion of the bandwidth, the signaling is carried in both content channels placed in the order of the absolute sub-carrier index.

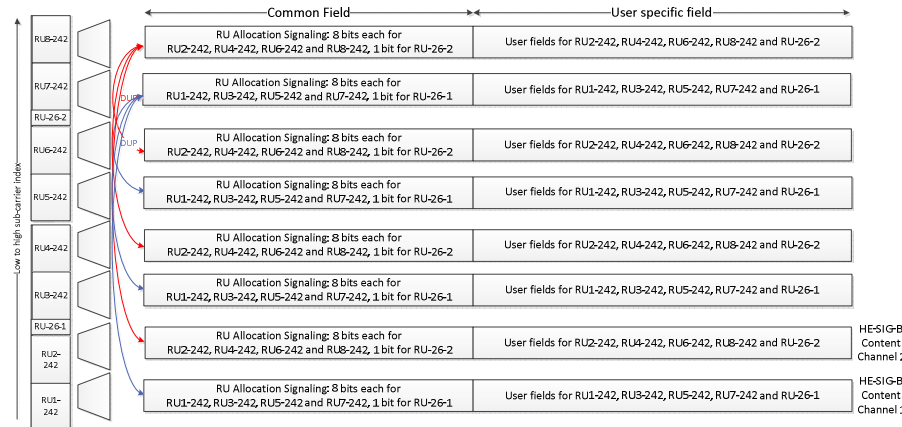


Figure 26-23—Default mapping of the two HE-SIG-B channels and their duplication in a 160 MHz PPDU

Instruction to Editor:

Insert the following in TGax D0.2 beginning P117 line 5 in Section 26.3.9.8.4.

Table 26-xx HE-SIG-B Common field in HE MU PPDU (#2024, #1692)

Field	# of bits	Description
RU Allocation	$N \times 8$	Indicates the RU arrangement in frequency domain. It also indicates number of user fields in each RU. For RUs of size greater than or equal to 106-tones that support MU-MIMO, it indicates the number of users multiplexed using MU-MIMO. $N = 1$ for 20 MHz and 40 MHz HE MU PPDU $N = 2$ for 80 MHz HE MU PPDU $N = 4$ for 160/80+80 MHz HE MU PPDU
Center 26-tone RU	1	This field is present only for full bandwidth 80 MHz and 160/80+80 MHz. For full bandwidth 80 MHz Set to 1 to indicate that Center 26-tone RU is allocated in the Common Block fields of both SIGB content channels with same value. Set to 0, otherwise. For full bandwidth 160/80+80 MHz Set to 1 to indicate that Center 26-tone RU is allocated for one individual 80 MHz in Common Block fields of both SIGB content channels. Set to 0, otherwise.

<u>CRC</u>	<u>4</u>	<u>See CRC computation (26.3.9.7.3)</u>
<u>Tail</u>	<u>6</u>	<u>Used to terminate the trellis of the convolutional decoder. Set to 0.</u>

NOTE- Integer fields are transmitted in unsigned binary format, LSB first, where the LSB is in the lowest numbered bit position.

CID 2546

CID	Page. Line	Clause Number	Comment	Proposed Change	Proposed Resolution
2546	113.2 3	26.3.9.8.2	Using "MHz" for RU size is not very accurate. For example, is a 26-tones RU 2 MHz RU? 2.5 MHz RU? 2.0312 MHz RU? Suggest to use # of tones when referring to RU size.	Change "RU size > 20 MHz" to "RU size greater than 242-tones".	Revised Instruction to Editor: TGax editor to make the changes shown in 11-16/928r1 under all headings that include CID 2546

Proposed Text Changes for CID 2546

Instruction to Editor:

Please make the following changes in TGax D0.2 P115 L 48 under subclause 26.3.9.8.3

For MU-MIMO allocation of RU size \rightarrow 20 MHz greater than 242-sub-carriers (#2546), the User Block subfields are dynamically split between the two HE-SIG-B content channels (1/2) and the split is decided by the AP (on a per case basis).

CID 477 and 2679

CID	Page. Line	Clause Number	Comment	Proposed Change	Proposed Resolution
477	113.5 6	26.3.9.8.3	Section 25.3.9.2.4 does not exist. The definition of the default mode in HE SIG-A is missing.	Clarify what the default mode in HE SIG-A means. Additionally, rename the "default mode" default is typically specified in case some signaling is missing. The name of the mode implies some signaling is not transmitted in some cases and transmitted in other cases.	Revised. The word default mode is confusing. The HE-SIG-A has been clarified as that in a HE-MU PPDU Instruction to Editor: TGax editor to make the changes shown

					in 11-16/928r1 under all headings that include CID 477
2679	113.5 6	26.3.9.8.3	There's no Section 25.3.9.2.4, and there's no definition on "default mode".	Add the definition of the "default mode".	DUPLICATE of CID 477 in doc 16-928r1.

Proposed Text Changes for CID 477**Instruction to Editor:**

Please make the following changes in TGax D0.2 P116 L 18 under subclause 26.3.9.8.3

The number of ~~symbols in HE-SIG-B symbols~~, denoted by $N_{SYM,HE-SIG-B}$, shall be ~~signaled~~ signalled by a 4 bit field in HE-SIG-A of a HE MU PPDU (#477) in the default mode (see (#1304)26.3.9.7.2 (Content)(#2781)).

CID 2025

CID	Page. Line	Clause Number	Comment	Proposed Change	Proposed Resolution
2025	113.3 0	26.3.9.8.3	For CRC, add reference to 26.3.9.7.3	See comment	Revised. The comment should have been the proposed change Instruction to Editor: TGax editor to make the changes shown in 11-16/928r1 under all headings that include CID 2025

Proposed Text Changes for CID 2025**Instruction to Editor:**

Please make the following changes in TGax D0.2 P116 L 18 under subclause 26.3.9.8.3

In each 20 MHz band, the bits in the Common Block field shall have CRC and tail bits added and then be BCC encoded at rate $R = \frac{1}{2}$. The CRC bits are computed as described in 26.3.9.7.3.(#2025)

CID 2027

CID	Page. Line	Clause Number	Comment	Proposed Change	Proposed Resolution
2027	113.4 3	26.3.9.8.3	TBD	Define	Revised. The comment seeks to resolve the TBD in the sentence "The specific method of generating

					padding bits is TBD". The padding can either be defined as all zeros or left unspecified. Simulations [1] have verified that the PAPR with a long zero padding is within reasonable limits when used with the adopted phase rotation method for PAPR reduction in HE-SIG-B We can leave the padding sequence unspecified. The recommendation is to delete the sentence. Instruction to Editor: TGax editor to make the changes shown in 11-16/928r1 under all headings that include CID 2027
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Proposed Text Changes for CID 2027

Instruction to Editor:

Please delete the following changes in TGax D0.2 P116 L 2 under subclause 26.3.9.8.3

~~The specific method of generating padding bits is TBD. (#2027)~~

CID 2028 and 2029

CID	Page. Line	Clause Number	Comment	Proposed Change	Proposed Resolution
2028	113.4 3	26.3.9.8.3	Clarify puncturing requirement	The concatenation before the puncturing should also include the bits of the common field. Make this explicit and put the puncturing requirement in a separate paragraph, not as part of a paragraph on user-specific field.	Revised. Accepted in principle- an alternate text to clarify the intent of the Instruction to Editor: TGax editor to make the changes shown in 11-16/928r1 under all headings that include CID 2028
2029	113.3 4	26.3.9.8.3	Not clear what "continuously" means	delete "continuously"	Accepted Instruction to Editor: TGax editor to make the changes

					shown in 11-16/928r1 under all headings that include CID 2029
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Proposed Text Changes for CID 2028, 2029

Instruction to Editor:

Please move the following sentence in TGax D0.2 P116 L 3 under subclause 26.3.9.8.3 to a new paragraph with the following change:

For both common and User Specific fields, ~~When~~ when the code rate is not equal to 1/2, the convolutional encoder output bits for each field (including padding bits) are concatenated, then the concatenated bit streams are punctured ~~continuously~~ (#2029) as described in 17.3.5.6 (Convolutional encoder)(#307)(#2028).

CID 310

CID	Page. Line	Clause Number	Comment	Proposed Change	Proposed Resolution
310	118.3 6	26.3.8.9.5	"When MU-MIMO is used in RUs of size 20 MHz or greater" should be "greater than 242 subcarriers". If RU size is 20MHz, still only one HE SIGB content channel is needed. Also RU size should be in the unit of subcarriers	as in comment	Revised. The correct change as described in the comment is proposed as text Instruction to Editor: TGax editor to make the changes shown in 11-16/928r1 under all headings that include CID 310

Proposed Text Changes for CID 310

Instruction to Editor:

Please make the following changes in TGax D0.2 P118 L 32 under subclause 26.3.9.8.5

When MU-MIMO is used in an RU of size ~~≤ 20 MHz~~ less than or equal to 242 sub-carriers (#310), the number of users (Nuser) in an MU-MIMO allocation is equal to the number of user-fields per RU signaled for the RU in the RU allocation subfield of an HE-SIG-B Common Block field. When MU-MIMO is used in RUs of size ~~20 MHz or greater~~ greater than 242 sub-carriers (#310), the number of users (Nuser) in an MU-MIMO allocation is computed as the sum of the number of user-fields per RU indicated for the RU by the 8-bit RU allocation subfield in each HE-SIG-B content channel. For a given value of Nuser, the four bits of the spatial configuration subfield are used as follows: A STA with a STA-ID that matches the 11-bit ID signaled in the user field for an MU-MIMO allocation derives the number of spatial streams allocated to it using the row corresponding to the signaled 4-bit spatial configuration subfield and the column corresponding to the position of the user-field in the user-specific field. The starting stream index for the STA is computed by summing the Nsts in the columns prior to the column indicated by the STA's user-field position. In the case of load balancing for RUs of size ~~> 20 MHz~~ greater than 242 sub-carriers where user fields corresponding to the same MU-MIMO allocations are split into two HE-SIG-B content channels, the user-field positions are logically continuous, with the first user-field corresponding to the same RU in the second HE-SIG-B content channel updating its position (and therefore, column index) from that of the last user-field in the first HE-SIG-B content channel. (#310)

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CID 311

CID	Page. Line	Clause Number	Comment	Proposed Change	Proposed Resolution
311	118.0 0	26.3.8.9.5	The computation for the total number of spatial streams is missing from the description of how the spatial streams are indicated to each user	Mention that the total number of spatial streams is indicated by summing all the columns for the indicated row in the corresponding table.	Revised The total number of spatial streams (Total N_{STS}) is indicated in Table 26-21. The signalled <i>spatial configuration subfield corresponding to a signaled N_{user}</i> indicates the row and the user field position in the content channel specifies the number of spatial streams allocated to the user. The total number of spatial streams is just a table-look up given N_{user} . Instruction to Editor: TGax editor to make the changes shown in 11-16/928r1 under all headings that include CID 311

Proposed Text Changes for CID 311

Instruction to Editor:
Please insert the following sentence in TGax D0.2 P118 L 45 under subclause 26.3.9.8.5

The total number of spatial streams (Total N_{STS}) is computed by summing all columns for the row signalled by the spatial configuration sub-field and is indicated in Table 26-21 (Spatial Configuration subfield encoding) under the column Total N_{STS} (#311).

CID 1002, 2036

CID	Page. Line	Clause Number	Comment	Proposed Change	Proposed Resolution
1002	117.3 5	26.3.8.9.5	Clarify the STA-ID field in the Table 26.19. The description reference to a MAC section is unclear and needs to be clarified	Replace the sentence "The STA identifier that addresses a STA - reference to MAC section(?)" with the following sentence: "The STA-ID refers to the AID described in the section 8.4.1.8. The 11 LSBs of the AID field are used to address STAs in this field.	Accepted Instruction to Editor: TGax editor to make the changes shown in 11-16/928r1 under all headings that include CID 1002
2036	117.3 6	26.3.8.9.5	missing reference	Replace "reference to MAC section(?)" with correct reference.	DUPLICATE of CID 1002 in doc 16-928r1.

Proposed Text Changes for CID 1002

Instruction to Editor:

Please make the following changes in TGax D0.2 P120 L 13 under subclause 26.3.9.8.5

The STA identifier that addresses a STA —reference to MAC—section(?).The STA-ID refers to the AID described in the section 8.4.1.8. The 11 LSBs of the AID field are used to address STAs in this field (#1002).

CID 1003

CID	Page. Line	Clause Number	Comment	Proposed Change	Proposed Resolution
1003	118.1 1	26.3.8.9.5	Clarify the STA-ID field in the Table 26.20. The description reference to a MAC section is unclear and needs to be clarified	Replace the sentence "The STA identifier that addresses a STA - reference to MAC section(?)" with the following sentence: "The STA-ID refers to the AID described in the section 8.4.1.8. The 11 LSBs of the AID field are used to address STAs in this field."	Accepted. Instruction to Editor: TGax editor to make the changes shown in 11-16/928r1 under all headings that include CID 1003

Proposed Text Changes for CID 1003

Instruction to Editor:

Please make the following changes in TGax D0.2 P120 L 53 under subclause 26.3.9.8.5

~~The STA identifier that addresses an STA reference to MAC section(?). The STA-ID refers to the AID described in the section 8.4.1.8. The 11 LSBs of the AID field are used to address STAs in this field (#1003).~~

CID 2681

CID	Page. Line	Clause Number	Comment	Proposed Change	Proposed Resolution
2681	117.4 9	26.3.8.9.5	In subclause 25.11, it says "For a multiple BSS AP, if the RU is intended for all STAs on all its BSSs, the STA_ID_LIST element is set to 2047". This table should be in line with this text.	Modify the sentence to "For a Multiple BSS AP, the STAID for Broadcast to all BSS of the AP is set to 2047."	Accepted Instruction to Editor: TGax editor to make the changes shown in 11-16/928r1 under all headings that include CID 2681

Proposed Text Changes for CID 2681

Instruction to Editor:

Please make the following changes in TGax D0.2 P120 L 24 under subclause 26.3.9.8.5

~~For Multiple BSS AP, the STAID for Broadcast to all BSS of the AP will have a special STAID value reserved. For a multiple BSS AP, the STAID for Broadcast to all BSS of the AP is set to 2047 (#2681).~~

CID 1010 and 2151

CID	Page. Line	Clause Number	Comment	Proposed Change	Proposed Resolution
1010	116.0 0	26.3.8.9.5	The text of the PHY motion 128 states, "Multiple RU allocation for one STA shall not be allowed in 11ax." This has to be incorporated in the spec text	Will bring a detailed text proposal for this comment	Revised. The proposed change is insufficient. To reflect the agreement accurately, text has been added to the spec as shown. Instruction to Editor: TGax editor to make the changes shown in 11-16/928r1 under all headings that include CID 1010
2151	116.0 0	26.3.8.9.5	Please confirm, maximum of one RU will be		DUPLICATE of CID 1010 in doc 16-928r1.

			expected to be decoded by a given STA		The normative behaviour is on the signalling – where the AP cannot allocate more than one RU to an addressed STA. That clarification is provided by the modification of the text as suggested below.
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Proposed Text Changes for CID 1010

Instruction to Editor:

Please make the following changes in TGax D0.2 P119 L 16 under subclause 26.3.9.8.5

Multiple RU allocations addressed to a single STA shall not be allowed in 802.11ax. Therefore, the signalling that enables STAs to decode its data is carried in only one user field (#1010).

CID 2037

CID	Page. Line	Clause Number	Comment	Proposed Change	Proposed Resolution
2037	117.5 1	26.3.9.8.5	Define values of fields	Also, lines 53, 56, 59, 61	Revised. The comment is correct. The proposed change is unclear. So, an alternate resolution is provided for both Table 26-19 and 26-20. Instruction to Editor: TGax editor to make the changes shown in 11-16/928r1 under all headings that include CID 2037

Proposed Text Changes for CID 2037

Instruction to Editor:

Please make the following changes to Table 26-19 and Table 26-20 under subclause 26.3.9.8.5 in TGax D0.2

Table 26-19—Fields of the HE-SIG-B user field for an (#916) non-MU-MIMO (#1101) allocation

Bit	Sub-Field	Number of bits	Description
B0:B10 FBD	STA-ID	11	The STA identifier that addresses a STA – reference to MAC section(?). For RUs that carry a broadcast allocation:

			<ul style="list-style-type: none"> For single BSS AP, the STAID for Broadcast will be 0; For Multiple BSS AP, the STAID for Broadcast to a specific BSS will follow the group addressed AID assignment in the TIM according to the existing Multi-BSSID TIM operation; For Multiple BSS AP, the STAID for Broadcast to all BSS of the AP will have a special STAID value reserved. STAID value 2046 is used to indicate that the RU carries no data When a STA transmits on the uplink using the HE MU PPDU format, the STA-ID field is populated by the AID of the transmitter assigned by the AP
<u>B11:B13</u> TBD	NSTS	3	Number of spatial streams Set to n for n+1 space time stream, where n = 0, 1, 2, ..., 7
<u>B14</u> TBD	Tx Beamforming	1	Use of transmit beamforming Set to 1 if a Beamforming steering matrix is applied to the waveform in an SU transmission Set to 0 otherwise
<u>B15:B18</u> TBD	MCS	4	Modulation and Coding Scheme. Set to n for MCSn, where n = 0, 1, 2, ..., 11 Values 12 to 15 are reserved
<u>B19</u> TBD	DCM	1	Indication for use of dual carrier modulation. Set to 1 to indicate that the payload of the MU PPDU is modulated with dual sub-carrier modulation for the MCS Set to 0 indicates that the payload of the PPDU is not modulated with dual sub-carrier for the MCS.
<u>B20</u> TBD	Coding	1	Indicates whether BCC or LDPC is used. Indication for use of LDPC Set to 0 for BCC Set to 1 for LDPC

NOTE- Integer fields are transmitted in unsigned binary format, LSB first, where the LSB is in the lowest numbered bit position. (#1010)

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Table 26-20—Fields of the HE-SIG-B user field for an(#2817) MU-MIMO allocation

Bit	Sub-Field	Number of bits	Description
<u>B0:B10</u> TBD	STA-ID	11	The STA identifier that addresses an STA – reference to MAC section(?)
TBD <u>B11:B14</u>	Spatial Configuration	4	Indication for the number of spatial streams for a STA in an(#2817) MU-MIMO allocation. See Table 26-21 (Spatial Configuration subfield encoding).
TBD <u>B15:B18</u>	MCS	4	Modulation and Coding Scheme. Set to n for MCSn, where n = 0, 1, 2, ..., 11 Values 12 to 15 are reserved
TBD <u>B19</u>	DCM	1	Use of dual carrier modulation

			<p>Set to 1 to indicate that the payload of the MU PDU is modulated with dual sub-carrier modulation for the MCS.</p> <p>Set to 0 indicates that the payload of the PDU is not modulated with dual sub-carrier for the MCS.</p>
TBD B20	Coding	1	<p>Use of LDPC</p> <p>Indicates whether BCC or LDPC is used.</p> <p>Set to 0 for BCC</p> <p>Set to 1 for LDPC</p>

NOTE- Integer fields are transmitted in unsigned binary format, LSB first, where the LSB is in the lowest numbered bit position.(#1010)

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CID 2245

CID	Page. Line	Clause Number	Comment	Proposed Change	Proposed Resolution
2245	112.2 4	26.3.9.8.2	HE-SIG-B definition is inelegant and prone to interoperability issues once systems are deployed.	Change SIG-B to be as efficient as possible: encode different users in each 20MHz segment. Or, change SIG-B to be more elegant and encode all users in each 20MHz segment	Rejected. Reason: The proposed change is insufficient in detail. Requires re-design of the HE-SIG-B content channel mapping – needs detailed proposal from the commenter

CID 2246

CID	Page. Line	Clause Number	Comment	Proposed Change	Proposed Resolution
2246	113.3 4	26.3.9.8.3	The time-domain encoding of user-specific-fields is inelegant and prone to interoperability issues	Remove the part about splitting users into two groups and remove the painful process of figuring out padding bits as a function of whether the number of users is even or odd. Encode user-specific-fields contained in a 20MHz segment together with one tail/CRC.	Rejected Reason: The proposed change is insufficient in detail. The comment requires us to revisit the current HE-SIG-B time-domain encoding and change it. While the rationale is to simplify, it will require us to make substantial

					changes to the existing design.
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References:

- [1] Bin Tian, et. Al., "PAPR Reduction for HE SIG-B", IEEE 802.11-16/0619r0