CLAIMS

1. ~~A first~~An originator multi-link device (MLD) ~~configured to operate with a first plurality of affiliated stations, the first multi-link device~~ comprising:

circuitry, which in operation, ~~initiates setup of~~establishes a multi-link ~~block acknowledgement~~Block Ack agreement for a plurality of links with a recipient MLD;~~second multi-link device that is configured to operate with a second plurality of affiliated stations, wherein a link has been established between each station of the first plurality of stations and a corresponding station of the second plurality of stations; and~~

a transmitter~~,~~ which, in operation, transmits to the recipient MLD a plurality of MAC layer Protocol Data Units (MPDUs) ~~frames of~~ with a common Traffic Identifier (TID) on one or more links among the plurality of links; and

a receiver which, in operation, receives one or more per-link Block Acks from the recipient MLD, each of the one or more per-link Block Acks indicating reception status of a subset of the plurality of MPDUs, the subset being transmitted on one of the one or more links. ~~to the second multi-link device based on the block acknowledgement agreement, wherein the first plurality of stations are configured to share a common transmit buffer that stores the frames of the TID to be transmitted to the second multi-link device and a common transmit buffer control to manage the transmission of the frames over the one or more links, and wherein each of the first plurality of stations is configured to maintain a per-link transmit buffer control to manage the transmission of the frames on a corresponding one of the one or more links.~~

2. The ~~first multi-link device~~originator MLD according to claim 1, wherein the multi-link Block Ack agreement is established per TID by:

transmitting an Add Block Ack (ADDBA) Request frame on an enabled link; and

receiving an Add Block Ack (ADDBA) Response frame on the enabled link. ~~each of the first plurality of stations is configured to maintain a separate per-link transmit buffer to store the frames to be transmitted on the corresponding one of the one or more links.~~

~~2.~~3. The ~~first multi-link device~~originator MLD according to claim ~~2~~1, wherein the circuitry, in operation, maintains a single common transmit buffer control to feed the plurality of MPDUs for transmission across the one or more links. ~~is configured to store the frames in the common transmit buffer until they are acknowledged by the second multi-link device as successfully received or until they are discarded at the end of a MAC Service Data Unit (MSDU) lifetime, the first plurality of stations storing frames in the per-link transmit buffer only for the duration of a transmit opportunity (TXOP).~~

~~3.~~4. The ~~first multi-link device~~ originator MLD according to claim ~~1~~3, wherein the single common transmit buffer control uses WinStart and WinSize for each block acknowledgement agreement, the WinStart indicating a starting sequence number of a common transmit window for the plurality of links, and the WinSize indicating a size of a receive reordering buffer maintained by the recipient MLD. ~~control is used to prevent overflow of a receive reordering buffer that is maintained by the second multi-link device due to a transmission of frames over the one or more links; the per-link transmit buffer control being used to prevent overflow of a block acknowledgment record maintained by each of the second plurality of stations due to transmission of the frames over the one of the one or more links.~~

~~4.~~5. The ~~first multi-link device~~originator MLD according to claim ~~1~~4, wherein the circuitry, in operation, releases a common transmit buffer associated with a successfully received MPDU upon receiving the one or more per-link Block Acks containing a reception status of the

successfully received MPDU. ~~is configured to negotiate the block acknowledgement agreement with the second multi-link device by exchanging ADDBA action frames over the one of the one or more links, wherein a size of a block acknowledgment record maintained by each station of the second plurality of stations is independently negotiated.~~

~~5.~~6. The ~~first multi-link device~~originator MLD according to claim ~~4~~1, wherein the received one or more per-link Block Acks are consolidated to a Multi-link Block Ack scoreboard to determine which of the plurality of MPDUs needs retransmission. ~~a size of the receive reordering buffer that is managed by the second multi-link device is negotiated independently.~~

~~6.~~7. The ~~first multi-link device~~originator MLD according to claim ~~1~~6, wherein the Multi-link Block Ack scoreboard comprises a bitmap comprising a plurality of bits, each bit indicating whether a corresponding MPDU is successfully received by the recipient MLD. ~~the circuitry is configured to transmit a BlockAckReq frame to the second multi-link device on the one of the one or more links to solicit a BlockAck frame, wherein the BlockAckReq frame is configured to indicate whether or not a starting point of a block acknowledgment record maintained by one of the second plurality of stations should be replaced with a value of a Starting Sequence Number (SSN) carried in the BlockAckReq frame.~~

~~7.~~8. A transmission method ~~for~~ by ~~multi-link communication~~an originator multi-link device (MLD), the transmission method comprising:

~~initiating setup, at a first multi-link device, of~~ establishing a multi-link ~~block acknowledgement~~Block Ack agreement for a plurality of links with a recipient MLD ~~second multi-link device that is configured to operate with a second plurality of stations, the first multi-link device being configured to operate with a first plurality of stations, wherein a link has been~~

~~established between each station of the first plurality of stations and a corresponding station of the second plurality of stations~~; ~~and~~

transmitting to the recipient MLD a plurality of MAC layer Protocol Data Units (MPDUs) with ~~frames of~~ a common Traffic Identifier (TID) on one or more links among the plurality of links; and

receiving one or more per-link Block Acks from the recipient MLD, each of the one or more per-link Block Acks indicating reception status of a subset of the plurality of MPDUs, the subset being transmitted on one of the one or more links.~~to the second multi-link device based on the block acknowledgement agreement,~~

~~wherein the first plurality of stations are configured to share a common transmit buffer that stores the frames of the TID to be transmitted to the second multi-link device and a common transmit buffer control to manage the transmission of the frames over the one or more links, and~~

~~wherein each of the first plurality of stations is configured to maintain a per-link transmit buffer control to manage the transmission of the frames on a corresponding one of the one or more links.~~

9. The transmission method according to claim 8, where–in the multi-link Block Ack agreement is established per TID by:

transmitting an Add Block Ack (ADDBA) Request frame on an enabled link; and

receiving an Add Block Ack (ADDBA) Response frame on the enabled link.~~each of the first plurality of stations is configured to maintain a separate per-link transmit buffer to store the frames to be transmitted on the corresponding one of the one or more links.~~

10. The transmission method according to claim ~~9~~8, ~~further~~ comprising:

maintaining a single common transmit buffer control to feed the plurality of MPDUs for transmission across the one or more links.~~storing the frames in the common transmit buffer until they are acknowledged by the second multi-link device as successfully received or until they are discarded at the end of a MAC Service Data Unit (MSDU) lifetime, the first plurality of stations storing frames in the per link transmit buffer only for the duration of a transmit opportunity (TXOP).~~

~~8.~~11. The transmission method according to claim ~~8~~10, wherein the single common transmit buffer control uses WinStart and WinSize for each ~~block acknowledgement~~Block Ack agreement, the WinStart indicating a starting sequence number of a common transmit window for the plurality of links, and the WinSize indicating a size of a receive reordering buffer maintained by the recipient MLD.~~ is used to prevent overflow of a receive reordering buffer that is maintained by the second multi-link device due to a transmission of frames over the one or more links; the per link transmit buffer control being used to prevent overflow of a block acknowledgment record maintained by each of the second plurality of stations due to transmission of the frames over the one of the one or more links.~~

12. The transmission method according to claim ~~8~~11, ~~further~~ comprising:

releasing a common transmit buffer associated with a successfully received MPDU upon receiving the one or more per-link Block Acks containing a reception status of the successfully received MPDU. ~~negotiating the block acknowledgement agreement with the second multi-link device by exchanging ADDBA action frames over the one of the one or more links, wherein a size of a block acknowledgment record maintained by each station of the second plurality of stations is independently negotiated.~~

13. The transmission method according to claim ~~11~~8, comprising:

consolidating the received one or more per-link Block Acks to a Multi-link Block Ack scoreboard to determine which of the plurality of MPDUs needs retransmission. ~~wherein a size of the receive reordering buffer that is managed by the second multi-link device is negotiated independently.~~

~~9.~~14. The transmission method according to claim ~~8~~13, wherein the Multi-link Block Ack scoreboard comprises a bitmap comprising a plurality of bits, each bit indicating whether a corresponding MPDU is successfully received by the recipient MLD.~~urther comprising transmitting a BlockAckReq frame to the second multi-link device on the one of the one or more links to solicit a Block Acknowledgement frame, wherein the BlockAck Request frame is configured to indicate whether or not a starting point of a block acknowledgment record maintained by one of the second plurality of stations should be replaced with a value of a Starting Sequence Number (SSN) carried in the Block AckReq frame.~~