CLAIMS

1. A multi-channel communication device comprising:

a frequency converter comprising: a Local Oscillator (LO) usable to output an LO signal at a fixed frequency; and a mixer usable to receive an input Radio Frequency (RF) signal and the LO signal, and to output a converted radio-signal having an Intermediate Frequency (IF);

a Radio Frequency (RF) power splitter usable for splitting the converted radio-signal into a plurality of split radio-signals;

a plurality of receivers, each usable for receiving the split radio signals within a corresponding distinct selected frequency band within a spectrum; and

a filter bank that comprises a plurality of Surface Acoustic Wave (SAW) filters each having a respective distinct passband within the spectrum, and a routing mechanism configured to route each of the split radio-signals into respective selected SAW filters of the SAW filters, selected in accordance with the selected frequency band of each of the receivers, wherein each of the selected SAW filters outputs a corresponding output radio-signal, in the passband of the respective SAW filter, to a respective receiver of the receivers.

2. The multi-channel communication device of claim 1, wherein utilization of the RF power splitter enables at least one pair of distinct selected frequency bands to be adjacent.

3. The multi-channel communication device of claim 1, wherein the passbands of at least one adjacent pair of the SAW filters overlap by at least a bandwidth of the selected frequency band.

4. The multi-channel communication device of claim 3, wherein the overlap enables employing Maximal-Ratio Combining (MRC) on at least one of the incoming radio-signals having a frequency within the overlapping portion of the passbands of the adjacent pair.

5. The multi-channel communication device of claim 1, wherein a frequency of each of the incoming radio-signals is an Ultra High Frequency (UHF).

6. The multi-channel communication device of claim 1, wherein the passband of each of the SAW filters is an Ultra High Frequency (UHF) passband.

7. The multi-channel communication device of claim 1, further comprising a frequency hopping mechanism configured to instruct the routing mechanism to switch between frequencies as part of a frequency hopping process, in synchronization with one or more other communication devices, wherein a time required to hop between subsequent frequencies is a time required for the routing mechanism to switch between the subsequent frequencies.

8. The multi-channel communication device of claim 1, further comprising a transmitter capable of transmitting one or more outgoing signals in an outgoing frequency range, wherein each of the outgoing signals has a corresponding outgoing frequency within the outgoing frequency range, and each of the outgoing signals is filtered by one or more respective SAW filters of the plurality of SAW filters having a passband associated with the outgoing frequency of the outgoing signal.

9. The multi-channel communication device of claim 9, further comprising a digital bandwidth aggregation mechanism configured to:

obtain information having a given outgoing bandwidth, wherein the given outgoing bandwidth is not continuously available within the outgoing frequency range; and

generate the outgoing signals so that each outgoing signal covers an available portion of the outgoing frequency range, wherein the outgoing signals, when combined, cover the given outgoing bandwidth.

10. The multi-channel communication device of claim 8, wherein utilization of the filter bank enables the transmitter to simultaneously transmit an outgoing signal while at least one of the receivers receives the corresponding output radio-signal without mutual interference, thereby enabling a full-duplex conversation.

11. A multi-channel Multiple Input and Multiple Output (MIMO) device, comprising:

a plurality of multi-channel communication devices in accordance to claim 1, wherein each of the multi-channel communication devices receives a corresponding signal as the input radio-signal and each outputs, utilizing the filter bank, a plurality of output frequencies, wherein at least two common frequencies of the output frequencies outputted by at least two of the devices are identical; and

a processing resource, wherein the processing resource is configured to: receive the output frequencies and perform MIMO on the at least two common frequencies.

12. A multi-channel communication device comprising:

a plurality of receivers, each usable for receiving radio-signals within a corresponding distinct selected frequency band within a spectrum;

a frequency converter usable to convert a Radio Frequency (RF) signal to a converted radio-signal having an Intermediate Frequency (IF) comprising: a Local Oscillator (LO) usable to output an LO signal at a fixed frequency; and a mixer usable to receive the RF signal and the LO signal, and to output the converted radio-signal having the IF; and

a filter bank that comprises a plurality of Surface Acoustic Wave (SAW) filters each having a respective distinct passband within the spectrum and a routing mechanism;

wherein the routing mechanism routes one or more incoming radio-signals, being the respective converted radio-signal, or one or more split radio-signals split from the converted radio-signal, into a plurality of selected SAW filters of the SAW filters, the plurality of selected SAW filters being selected in accordance with the selected frequency band of each of the receivers, and

wherein each of the selected SAW filters outputs a corresponding output radio-signal, in the passband of the respective SAW filter, to a respective receiver of the receivers.

13. The multi-channel communication device of claim 12, wherein the passbands of at least one adjacent pair of the SAW filters overlap by at least a bandwidth of the selected frequency band.

14. The multi-channel communication device of claim 13, wherein the overlap enables employing Maximal-Ratio Combining (MRC) on at least one of the incoming radio-signals having a frequency within the overlapping portion of the passbands of the adjacent pair.

15. The multi-channel communication device of claim 12, wherein a frequency of each of the incoming radio-signals is an Ultra High Frequency (UHF).

16. The multi-channel communication device of claim 12, further comprising:

a Radio Frequency (RF) power splitter usable for splitting the converted radio-signal into the split radio-signals.

17. The multi-channel communication device of claim 12, further comprising a frequency hopping mechanism configured to instruct the routing mechanism to switch between frequencies as part of a frequency hopping process, in synchronization with one or more other communication devices, wherein a time required to hop between subsequent frequencies is a time required for the routing mechanism to switch between the subsequent frequencies.

18. The multi-channel communication device of claim 12, further comprising a transmitter capable of transmitting one or more outgoing signals in an outgoing frequency range, wherein each of the outgoing signals has a corresponding outgoing frequency within the outgoing frequency range, and each of the outgoing signals is filtered by one or more respective SAW filters of the plurality of SAW filters having a passband associated with the outgoing frequency of the outgoing signal.

19. The multi-channel communication device of claim 18, further comprising a digital bandwidth aggregation mechanism configured to:

obtain information having a given outgoing bandwidth, wherein the given outgoing bandwidth is not continuously available within the outgoing frequency range; and

generate the outgoing signals so that each outgoing signal covers an available portion of the outgoing frequency range, wherein the outgoing signals, when combined, cover the given outgoing bandwidth.

20. The multi-channel communication device of claim 18, wherein utilization of the filter bank enables the transmitter to simultaneously transmit an outgoing signal while at least one of the receivers receives the corresponding output radio-signal without mutual interference, thereby enabling a full-duplex conversation.

21. A multi-channel Multiple Input and Multiple Output (MIMO) device, comprising:

a plurality of multi-channel communication devices in accordance to claim 12, wherein each of the multi-channel communication devices receives a corresponding signal as the input radio-signal and each outputs, utilizing the filter bank, a plurality of output frequencies, wherein at least two common frequencies of the output frequencies outputted by at least two of the devices are identical; and

a processing resource, wherein the processing resource is configured to: receive the output frequencies and perform MIMO on the at least two common frequencies.

22. A method of operating a multi-channel communication device in accordance to claim 1, the method comprising:

receiving the input radio-signal;

converting, using the frequency converter, the input radio-signal into the converted radio-signal;

splitting the converted radio-signal into the plurality of split radio-signals;

filtering each of the split radio-signals with the corresponding selected SAW filter, giving rise to filtered signals; and

providing each of the filtered signals to the respective receiver of the receivers.

23. A method of operating a multi-channel communication device in accordance to claim 12, the method comprising:

receiving the RF radio-signal;

converting, using the frequency converter, the RF radio-signal into the converted radio signal;

filtering the incoming radio-signals, being the respective converted radio-signal, or the one or more split radio-signals split from the converted radio-signal with the corresponding selected SAW filter, giving rise to filtered signals; and

providing each of the filtered signals to the respective receiver of the receivers.