CLAIMS

What is claimed is:

1. A compact multi-channel communication device comprising, connected between at least one antenna and at least one wideband converter, a filter bank that comprises a plurality of narrowband surface acoustic wave (SAW) filters having respective distinct frequency bands within a bandwidth of the at least one wideband converter,
   wherein each of said distinct frequency bands comprise a plurality of channels each having respective narrow channel width and steep channel edges for channel separation, and wherein each of said SAW filters is configured to provide attenuation between channels.

2. The multi-channel communication device of claim 1, configured as a receiver, wherein the at least one wideband converter is an analog to digital converter (ADC), the at least one antenna is configured to receive radiofrequency (RF) radiation within a specified frequency band that at least partly overlaps the frequency bands of the SAW filters and the bandwidth of the ADC, and wherein the receiver is configured to deliver a plurality of reception channels to a processing unit, the reception channels corresponding to at least some of the plurality of channels and being converted by the ADC.

3. The multi-channel communication device of claim 1, configured as a transmitter, wherein the at least one wideband converter is a digital to analog converter (DAC), the at least one antenna is configured to transmit radiofrequency (RF) radiation within a specified frequency band that at least partly overlaps the frequency bands of the SAW filters and the bandwidth of the DAC, and wherein the transmitter is configured to deliver a plurality of transmission channels from a processing unit, the transmission channels corresponding to at least some of the plurality of channels and being converted by the DAC.

4. The multi-channel communication device of claim 1, configured as a transceiver, wherein the at least one wideband converter comprises an analog to digital converter (ADC) and a digital to analog converter (DAC), the at least one antenna is configured to receive and transmit radiofrequency (RF) radiation within a specified frequency band that at least partly overlaps the frequency bands of the SAW filters and the bandwidths of ADC and the DAC, and wherein the transceiver is configured to deliver a plurality of reception channels to a processing unit, the reception channels corresponding to at least some of the plurality of channels and being converted by the ADC, and to deliver a plurality of transmission

channels from the processing unit, the transmission channels corresponding to at least some of the plurality of channels and being converted by the DAC.

5. The multi-channel communication device of claim 4, wherein the SAW filters associated with different channels are spatially separated in the filter bank.

6. The multi-channel communication device of any one of claims 1-5, operable in ultrahigh frequencies (UHF).

7. The multi-channel communication device of claim 6, wherein the distinct frequency bands of the SAW filters are 10MHz wide.

8. The multi-channel communication device of claim 6, wherein the bandwidth of the at least one wideband converter is several hundred MHz.

9. The multi-channel communication device of claims 2, 4 or 5, further comprising a bandpass filter (BPF) between the at least one antenna and the filter bank and a plurality of low-noise amplifiers (LNAs) connected at respective reception channels before the ADC.

10. The multi-channel communication device of claim 9, further comprising switching circuitry configured to connect SAW filters to the corresponding reception channels.

11. The multi-channel communication device of any one of claims 3-5, further comprising amplifiers before and after the filter bank and a harmonic filter between the amplifier that follows the filter bank and the at least one antenna.

12. A compact multi-channel communication method comprising using a plurality of narrowband SAW filters having respective distinct frequency bands associated with at least one wideband converter having a bandwidth that comprises the filters' frequency bands, to yield multi-channel communication,
wherein each of said distinct frequency bands comprise a plurality of channels each having respective narrow channel width and steep channel edges for channel separation, and wherein each of said SAW filters is configured to provide attenuation between channels.

13. A multi-channel communication method of claim 12, further comprising:
receiving RF radiation within a specified frequency band that at least partly overlaps the frequency bands of the SAW filters,

filtering the received RF radiation through the SAW filters to yield a plurality of reception channels, and

converting the reception channels by the at least one wideband converter, configured as a wideband ADC.

14. A multi-channel communication method of claim 12, further comprising:

converting information by the at least one wideband converter, configured as a wideband DAC, into a wideband signal,

filtering the converted wideband signal through the SAW filters to yield a plurality of transmission channels, and

transmitting the transmission channels as RF radiation.

15. A multi-channel communication method of claim 12, wherein the at least one wideband converter comprises an ADC and a DAC, the method further comprising:

receiving RF radiation within a specified frequency band that at least partly overlaps the frequency bands of the SAW filters,

filtering the received RF radiation through the SAW filters to yield a plurality of reception channels,

converting the reception channels by the ADC,

converting information by the DAC into a wideband signal,

filtering the converted wideband signal through the SAW filters to yield a plurality of transmission channels, and

transmitting the transmission channels as RF radiation.

16. The multi-channel communication method of claim 15, further comprising separating, spatially in the filter bank, the SAW filters associated with different channels.

17. The multi-channel communication method of any one of claims 12-16, carried out in UHF.

18. The multi-channel communication method of claim 13, 15 or 16, further comprising switching the SAW filters to the corresponding reception channels.