“live”, “ch”, “sys” – The operating modes of the EM 9046

Observing parameters during transmission
- RF and audio level
- Diversity evaluation
- Charge status of the batteries

Configuring the channels
- Setting frequencies and entering channel names
- Configuring the audio and command outputs
- Muting channels
- Protecting the audio signals against eavesdropping
- Recording the antenna signals and the diversity evaluation
- Retrieving and adjusting transmitter parameters

Configuring the system
- Performing a frequency scan
- Assigning frequency presets
- Adjusting the audio output level
- Configuring the network and the word clock
- Loading and saving configurations
- Adjusting the display brightness and the date and time
- Error diagnosis

Overview of the receiver, the boosters and the transmitters of the Digital 9000 series

<table>
<thead>
<tr>
<th>Receiver</th>
<th>Up to 8 DRX receiver modules</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
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</tr>
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<td><strong>Receiver</strong></td>
<td><strong>Up to 8 DRX receiver modules</strong></td>
</tr>
<tr>
<td><strong>Booster variant A/AB/AD 9000</strong></td>
<td><strong>470–798 MHz</strong></td>
</tr>
<tr>
<td><strong>Booster frequency range</strong></td>
<td><strong>A1–A8</strong></td>
</tr>
<tr>
<td><strong>Bandwidth in MHz</strong></td>
<td><strong>B1–B8</strong></td>
</tr>
<tr>
<td><strong>SK/SKM 9000</strong></td>
<td><strong>470–798 MHz</strong></td>
</tr>
</tbody>
</table>

- **A1–A8**
  - **470–638 MHz**
  - **534–558 MHz**

- **B1–B8**
  - **630–798 MHz**
  - **710–798 MHz**

- **Type**
  - **A1–A4**
  - **A5–A8**
  - **B1–B4**
  - **B5–B8**

- **Frequency Presets**
  - **A1**
  - **A2**
  - **A3**
  - **A4**
  - **A5**
  - **A6**
  - **A7**
  - **A8**
  - **B1**
  - **B2**
  - **B3**
  - **B4**
  - **B5**
  - **B6**
  - **B7**
  - **B8**

- **Frequency Bands**
  - **470–494 MHz**
  - **494–518 MHz**
  - **510–534 MHz**
  - **534–558 MHz**
  - **550–574 MHz**
  - **574–598 MHz**
  - **590–614 MHz**
  - **614–638 MHz**
  - **630–654 MHz**
  - **654–678 MHz**
  - **670–694 MHz**
  - **694–718 MHz**
  - **710–734 MHz**
  - **734–758 MHz**
  - **750–774 MHz**
  - **774–798 MHz**
Performing a frequency scan

1. Position the antennas and connect the EM 9046 to the antennas.

2. Switch on the EM 9046, switch off the SK and SKM 9000. Switch on all possible sources of interference and other transmission links.

3. Call up the “sys” operating mode.

4. Call up the “Frequency scan” menu item.

5. Start the frequency scan.

All audio outputs are muted and the interference levels are recorded.
Evaluating the frequency scan and selecting a suitable booster frequency range

The recorded interference levels are divided into 4 interference zones. The number of unused frequency presets is displayed per booster frequency range and per interference zone:

- Select a suitable booster frequency range:
  - Required number of transmission links?
  - Sufficient number of transmitters of the correct type?
  - Recommended transmission mode “HD” or “LR”:

<table>
<thead>
<tr>
<th>Interference levels of antenna A/B in interference zone</th>
<th>“HD”</th>
<th>“HD/LR”</th>
<th>“LR/HD”</th>
<th>“LR”</th>
</tr>
</thead>
<tbody>
<tr>
<td>Recommended transmission mode</td>
<td>“HD”</td>
<td>“HD”* or “LR”</td>
<td>“LR” or “HD”*</td>
<td>“LR”*</td>
</tr>
</tbody>
</table>

* Transmission mode can be used with a restricted range
** It might be that the transmission mode can only be used with a severely restricted range

- Sufficient number of unused frequency presets?

“HD” – High Definition
Signal transmission without audio data compression.

“LR” – Long Range
Signal transmission with audio data compression (Sennheiser Digital Audio Codec, SeDAC)
Example

- Required number of transmission links: 8
- A sufficient number of transmitters of type “B5–B8” is available
- Desired transmission mode: “HD”

<table>
<thead>
<tr>
<th>Possible booster frequency ranges (see diagram on previous page)</th>
<th>Unused frequency presets in interference zone “HD” (see diagram on previous page)</th>
<th>Number of required frequency presets in the following interference zones</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>B5</strong></td>
<td>29</td>
<td>“HD”</td>
</tr>
<tr>
<td><strong>B6</strong></td>
<td>6</td>
<td>“HD”</td>
</tr>
<tr>
<td><strong>B7</strong></td>
<td>26</td>
<td>“HD”</td>
</tr>
<tr>
<td><strong>B8</strong></td>
<td>31</td>
<td>“HD”</td>
</tr>
</tbody>
</table>

B5, B7 and B8 are suitable booster frequency ranges, B8 provides the highest number of unused frequency presets.

1. Select B8.


3. Store your setting.
Assigning frequency presets

1. Call up the “detail scan” menu item.

2. Start the detail scan (optional).

3. Press a “Channel” button.

4. Select a frequency preset or select “auto”.

5. Press the next “Channel” button.

6. Store your setting.

The “auto” setting automatically assigns the frequency preset with the lowest EMI/RFI available in the selected booster frequency range.

Thus make sure to assign the most important channel, e.g. the lead vocals, at first.
Manually setting and assigning a frequency

1. Press a “Channel” button.
   - Frequency spacing at least 600 kHz

2. Change to the “MHz”/“kHz” setting and adjust the frequency.

3. Press the next “Channel” button.

   ... 8

4. Store your setting.

Adjusting transmitter settings on the EM 9046

1. Call up the “ch” operating mode.

2. Press a “Channel” button.

3. Call up the “Transmitter setup” menu.

4. Call up the “RF mode” menu item.

5. Adjust the menu item, store your setting.

6. If necessary, adjust further transmitter settings and store your settings.

7. Press the next “Channel” button.

   ... 8

Synchronizing the transmitter and receiver

1. Call up the “ch” operating mode.

2. Press a “Channel” button.

3. Press the “Sync” button.

4. Place the transmitter in front of the infra-red interface.
Performing a walk test – RF level recorder

1. Switch on sources of interference and other transmission links.

2. Call up the “ch” operating mode.

3. Switch on all transmitters that you want to use for the walk test and establish transmission links between the EM 9046 and the transmitters.

4. Press a “Channel” button.

5. Call up the “RF level recorder” menu item.

6. Start the walk test.

7. Perform the walk test; the antenna signals and the diversity evaluation are recorded for each channel.
   - Use one or several transmitters to walk-test the operating environment.
   - If necessary, set markers (SKM 9000 COM or SK 9000 with KA 9000 COM).
   - If necessary, you can additionally activate the 1 kHz test tone to check the signal quality.
   - Change between the channels 1 ... 8 to view the antenna signals and the diversity evaluation.

8. Interpret the result.

9. Improve the result:
   - Reposition the antennas.
   - Repeat the walk test.