Digital 9000

Quick Setup Guide

SENNHEISER

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

Observing parameters during transmission

live

- RF and audio level
- Diversity evaluation
- Charge status of the batteries

Configuring the system

sys

- 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

Configuring the channels

ch

- 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

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

Receiver	Up to 8 DRX receiver modules 470–798 MHz															
Booster variant A/AB/AD 9000	A1–A8 470–638 MHz								B1–B8 630–798 MHz							
Booster frequency range	A1	A2	A3	A4	A5	A6	A7	A8	B1	B2	B3	B4	B5	B6	B7	B8
Bandwidth in MHz	470–494	494–518	510–534	534–558	550–574	574–598	590–614	614–638	630–654	654–678	670–694	694–718	710–734	734–758	750–774	774–798
SK/SKM 9000	type A1–A4 470–558 MHz				type A5–A8 550–638 MHz				type B1–B4 630–718 MHz				type B5–B8 710–798 MHz			

Performing a frequency scan

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

min. 0.5 m

min. 1 m
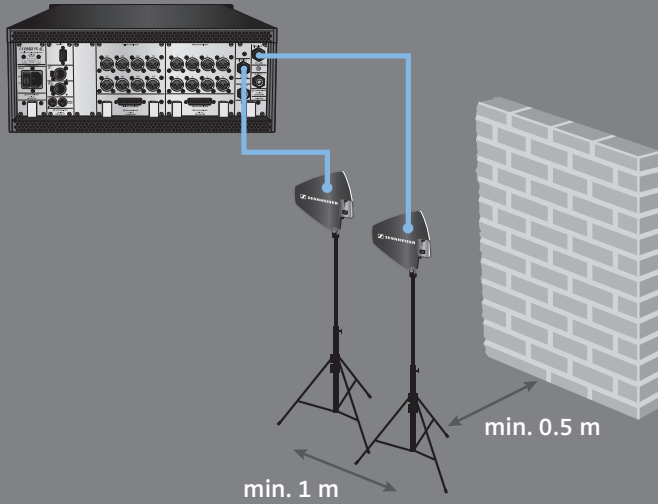
2. Switch on the EM 9046, switch off the SK and SKM 9000. Switch on all possible sources of interference and other transmission links.
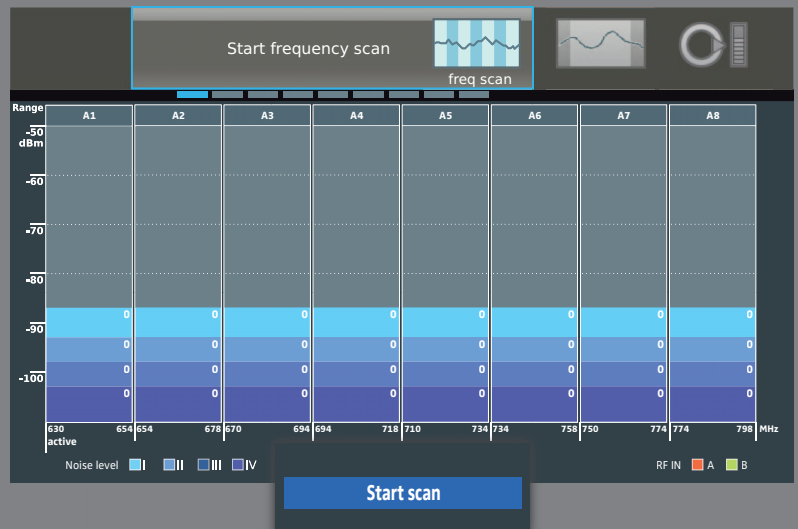
ON

OFF

ON
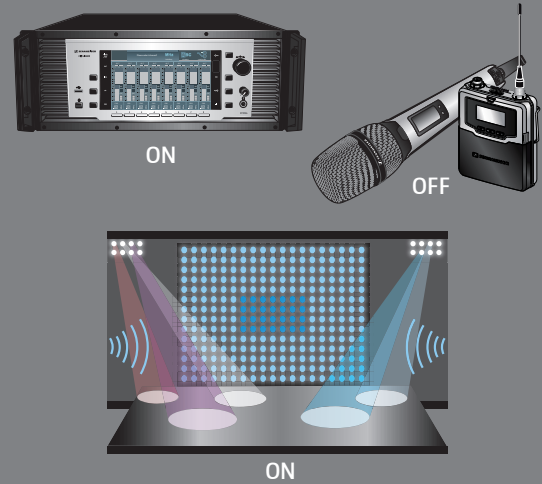
3. Call up the "sys" operating mode.

sys

4. Call up the "Frequency scan" menu item.

5. Start the frequency scan.

Start frequency scan

freq scan

Range	A1	A2	A3	A4	A5	A6	A7	A8
-50 dBm								
-60								
-70								
-80								
-90	0	0	0	0	0	0	0	0
	0	0	0	0	0	0	0	0
-100	0	0	0	0	0	0	0	0
	0	0	0	0	0	0	0	0

630   654 654   678 670   694 694   718 710   734 734   758 750   774 774   798 MHz
active

Noise level   I   II   III   IV   RF IN   A   B
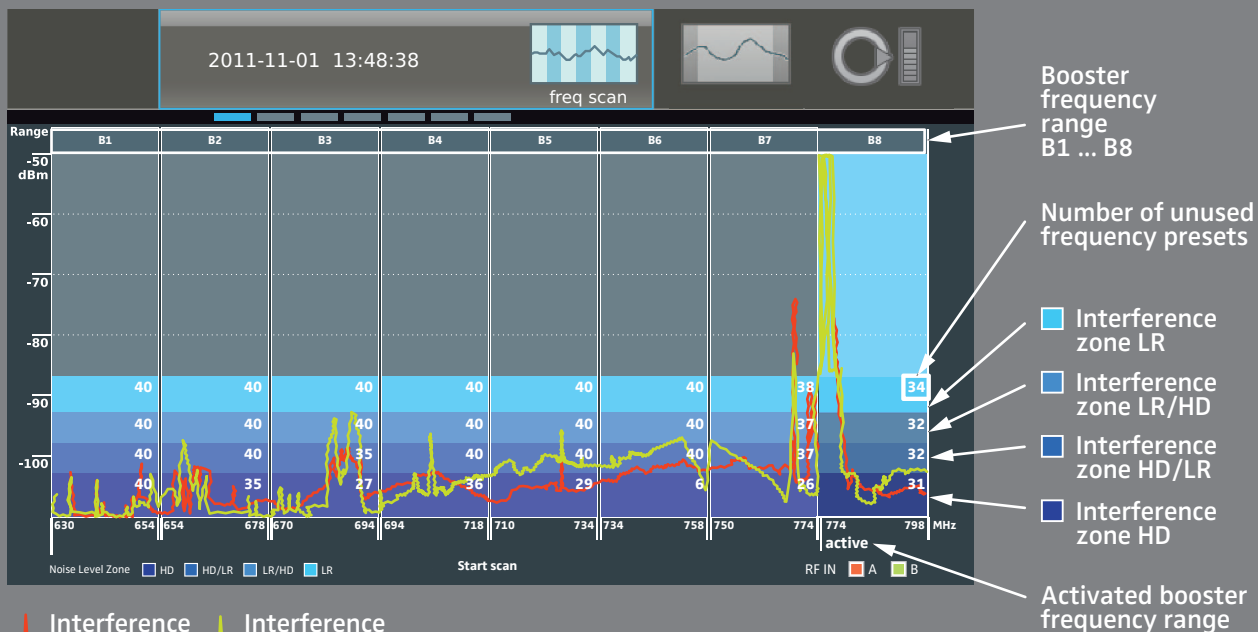
Start scan

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:

Booster frequency range B1 … B8

Number of unused frequency presets

■ Interference zone LR

■ Interference zone LR/HD

■ Interference zone HD/LR

■ Interference zone HD

Activated booster frequency range

Interference levels of antenna A

Interference levels of antenna B

▶ 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":

Interference levels of antenna A/B in interference zone	■ "HD"	■ "HD/LR"	■ "LR/HD"	■ "LR"
Recommended transmission mode	"HD"	"HD"* or "LR"	"LR" or "HD"**	"LR"*

* 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"

Possible booster frequency ranges (see diagram on previous page)	Unused frequency presets in interference zone "HD" (see diagram on previous page)	Number of required frequency presets in the following interference zones			
		"HD"	"HD/LR"	"LR/HD"	"LR"
B5	29	8	0	0	0
B6	6	6	2	0	0
B7	26	8	0	0	0
B8	31	8	0	0	0

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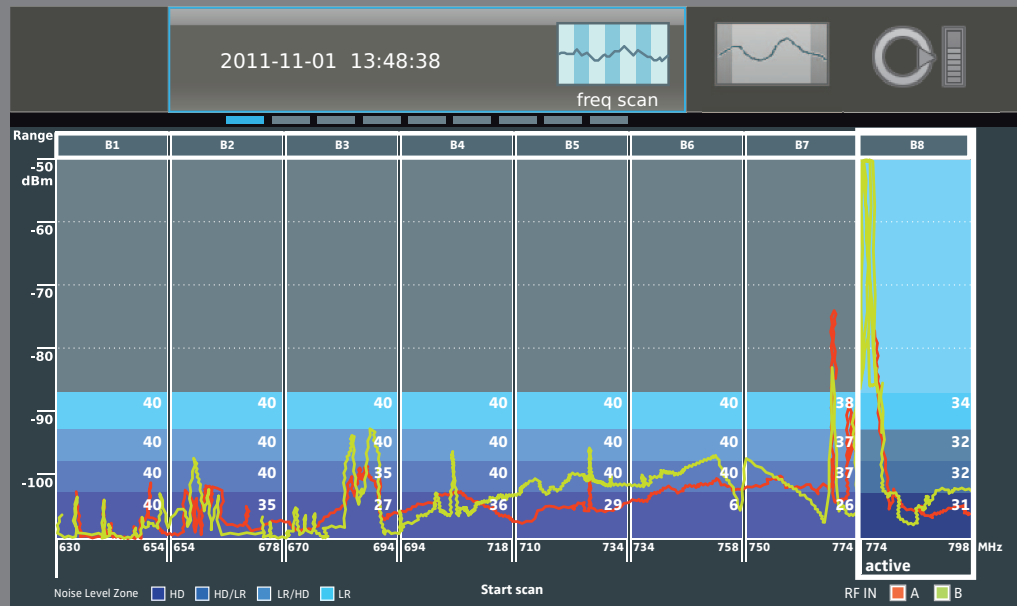B8 provides the highest number of unused frequency presets.

1. **Select B8.**

2. **Activate 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.

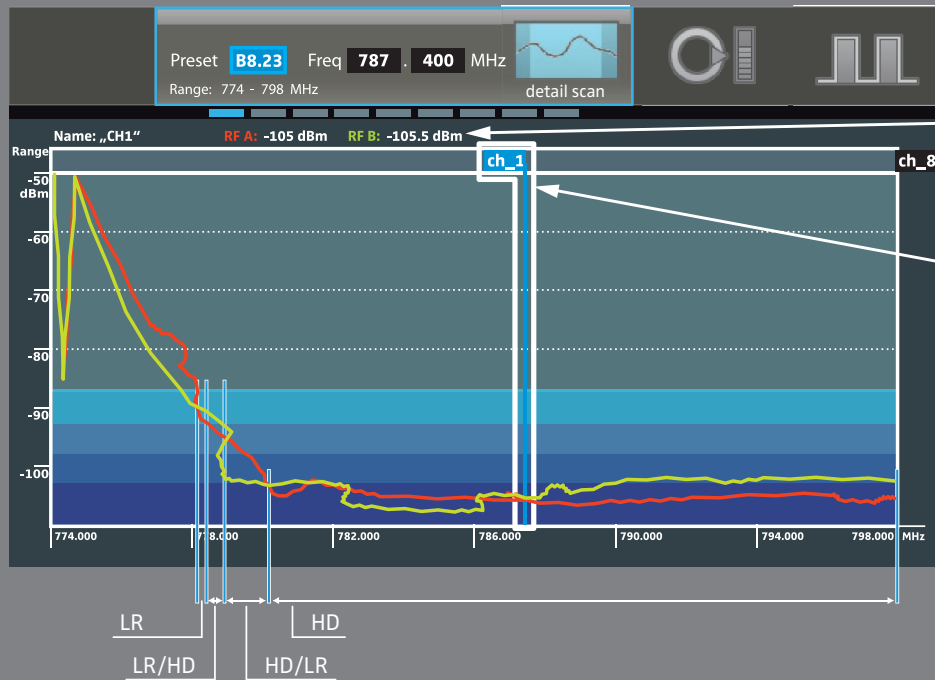4. Select a frequency preset or select "auto".

5. Press the next "Channel" button.

   ... 8

6. Store your setting.

Preset **B8.23**   Freq **787** . **400** MHz
Range: 774 - 798 MHz   detail scan

Name: „CH1"   RF A: –105 dBm   RF B: –105.5 dBm

Numeric measured values

Selected frequency preset

Range
-50 dBm
-60
-70
-80
-90
-100

ch_1   ch_8

774.000   778.000   782.000   786.000   790.000   794.000   798.000   MHz

LR
LR/HD
HD
HD/LR

Preset **auto**   Freq **787** . **400** MHz
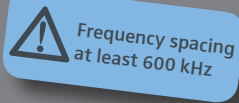Range: 774 - 798 MHz   detail scan

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

Preset **B8.23** Freq **787** . **400** MHz **MHz**
Range: 774 - 798 MHz   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.

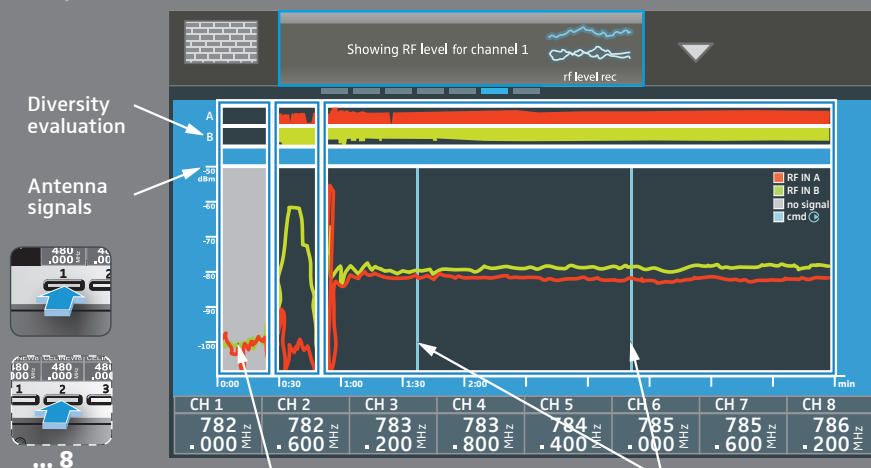5. Call up the "RF level recorder" menu item.

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.

Diversity evaluation

Antenna signals

Showing RF level for channel 1 — rf level rec

CH 1	CH 2	CH 3	CH 4	CH 5	CH 6	CH 7	CH 8
782.000 MHz	782.600 MHz	783.200 MHz	783.800 MHz	784.400 MHz	785.000 MHz	785.600 MHz	786.200 MHz

RF IN A
RF IN B
no signal
cmd

Low antenna signals:
RF signal cannot be evaluated,
the window is highlighted in light gray

COMMAND button has been pressed (SKM 9000 COM, SK 9000 with KA 9000 COM)

9. Improve the result:

   - Reposition the antennas.
   - Repeat the walk test.