

EXHIBIT B

TECHNICAL DESCRIPTION

A. Product Description:

The Handy-Mic transmitter is designed to be use for auditory assistance. It is a convenient wireless microphone that transmits to an FM receiver which attaches to the users hearing aid. It is used in combination with the MicroLink Receiver (FCC ID: KWC003R).

The HandyMic transmitter operates in the Low Power Radio Service LPRS, 216 to 217 MHz band at Channels 1 through 60 (excluding 19, 20, and 50) as defined in FCC Part 95.629. Each transmitter operates on a single channel. The frequency is crystal controlled. Different channel may be selected by changing the oscillator plug-in module. The signal is frequency modulated.

The transmitter is a small, battery operated device intended to be set on the table top during use.

It has controls for ON/OFF switching and microphone characteristic selection.

The device uses an internal antenna or optional external antenna. The extenal antenna is a 60 cm wire which connects to audio port on the side of the device. The range of the transmitter increases with the external antenna.

Further information on the HandyMic is presented in the attached Technical Note.

B. Block Diagram:

The block diagram is shown in Figure B-1.

C. Schematics:

The schematics are shown in Figures B-2 through B-13.

Phonak Communications SA 3280 Morat Development	Technical Note Subject : FM Transmitter Handy-Mic, Technical description	No. : TN971022/V1.0 Page : 1 of 8 Writer : F.Callias UpDate : October 22, 97
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Subject : FM Transmitter Handy-Mic (TX3), Technical description.

Distribution : Montana EMC-Fribourg, Rossens, Mr E. De Rémy

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Controlled by	F.Callias	22/10/97	
Released by	F.Callias	22/10/97	

Revision History.

Version	Date	Changes Description	Pages
V 1.0	22/10/97	new document	toutes

Phonak Communications SA 3280 Morat Development	Technical Note Subject : FM Transmitter Handy-Mic, Technical description	No. : TN971022/V1.0 Page : 2 of 8 Writer : F.Callias UpDate : October 22, 97
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Background

Hearing impaired persons use hearing aids (HA), which are electroacoustic amplifiers including a microphone and an earphone and having frequency response and dynamic characteristics specific to each hearing loss. BTE (Behind-The-Ear) hearing aids have the possibility to be connected to an external microphone, by means of electrical contacts placed on the bottom of the apparatus.

A wireless solution for a remote microphone still exists : an FM radio receiver is connected to the HA, via the electrical contact system for the external microphone. This FM radio receiver can be either :

- In form of a little box, self powered by its own battery, and connected to the contact system by a cable (for example Microvox R), or
- A new system, fully miniaturised (Microlink), having the form of a piece of sugar, powered by the hearing aid battery, an clipped on the bottom of the BTE-HA.

A previous FM transmitter (Microvox T, TX2) was still in use for application in schools. The microphone was connected with a cable to a small transmitter having the form of a little box. The transmitter was fixed to clothes by a grip and the microphone by a small cord around the neck or a needle to the shirt.

The « Handy-Mic » (TX3) is a more convenient remote microphone for hearing impaired persons. It is intended for a broader range of use.

Description of the product.

« Handy-Mic » is a wireless microphone. It includes a VHF FM transmitter operating in the new low power band 173MHz - 223MHz (in the past TV VHF-II band).

Fig 1 shows the complete system.

Fig 2 shows the modes of operation of the handy-mic. Its functions are controlled by a slide-switch :

○ Transmitter OFF	OFF
● Transmitter ON, microphone characteristic omni-directional	OMNI
▼ Transmitter ON, microphone characteristic directional	DIR
◆ Transmitter ON, microphone characteristic super-directional	ZOOM

Fig 3 shows the construction of the transmitter.

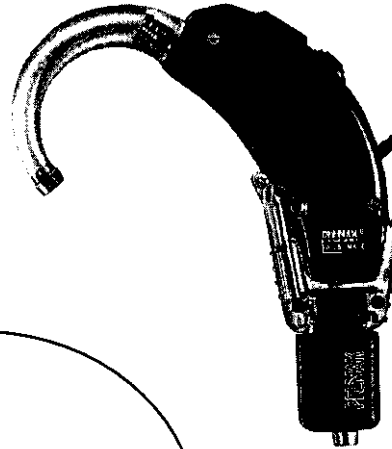
Phonak Communications SA 3280 Morat Development	Technical Note Subject: FM Transmitter Handy-Mic, Technical description	No. : TN971022/V1.0 Page: 3 of 8 Writer: F.Callias UpDate : October 22, 97
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Fig 1: View of Handy-Mic and of a hearing aid fitted with the MicroLink receiver

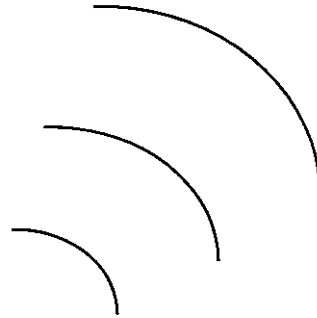
Hearing Aid Instrument



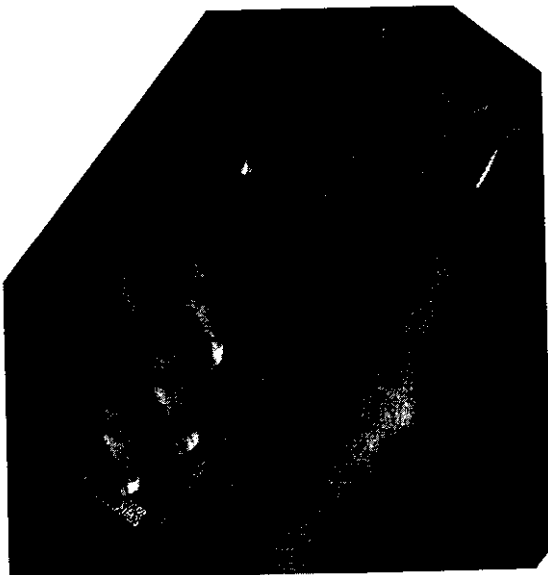
Hearing Aid with MicroLink



MicroLink

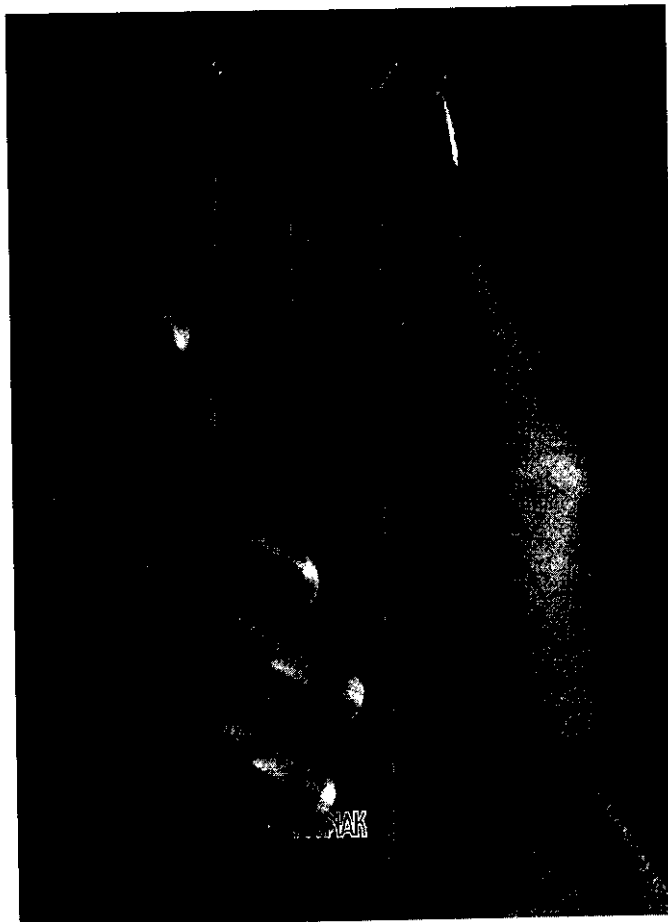


Handy-Mic



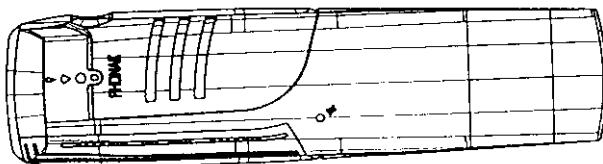
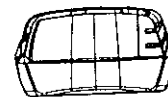
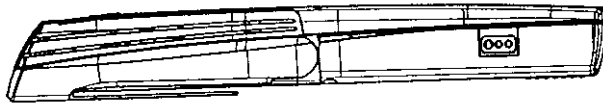
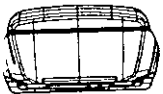
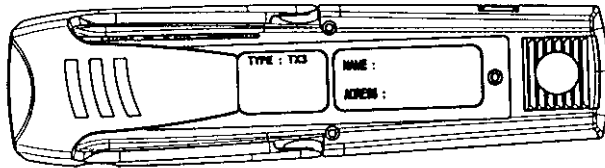
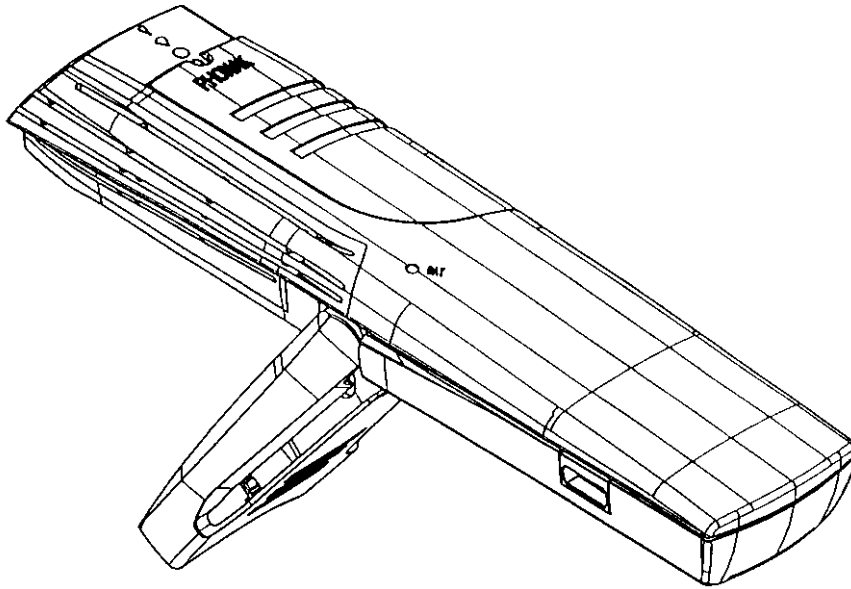
Phonak Communications SA 3280 Morat Development	Technical Note Subject: FM Transmitter Handy-Mic, Technical description	No. : TN971022/V1.0 Page: 4 of 8 Writer: F. Callias UpDate : October 22, 97
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Fig 2: Modes of operating the Handy-Mic.



- Super-directional Mic (Zoom)
- Directional-Microphone (DIR)
- Microphone OMNI-Directional
- OFF

Phonak Communications SA 3280 Morat Development	Technical Note Subject : FM Transmitter Handy-Mic, Technical description	No. :	TN971022/V1.0
		Page :	5 of 8
		Writer :	F.Callias
		UpDate :	October 22, 97

Fig 3 : Construction of Handy-Mic.

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Phonak Communications SA 3280 Morat Development	Technical Note Subject : FM Transmitter Handy-Mic, Technical description	No. : TN971022/V1.0 Page : 6 of 8 Writer : F.Callias UpDate : October 22, 97
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The handy-mic has 3 microphones ; they are placed in a grid which is located on the left side near the top.

The antenna is removable and is connected at the left side near the bottom. The antenna socket serves also as audio input for an external electrical audio source.

While in the OFF position, the handy-mic can serve as a relay for the TV, the radio, or a Hifi equipment. The antenna socket of the handy-mic shall in this case be connected by a dedicated cable to the audio system.

A level-detector (VOX system) monitors the signal at the audio input ; it automatically switches ON the transmitter when a ac signal is detected (the microphones remain OFF-switched in this case). When the external audio signal disappears, it switches automatically OFF after a waiting time of about 40 seconds.

The handy-mic is powered by a NiMH accumulator (one cell) having a nominal supply voltage of 1.25V. A standard plug for charger is located on the right side near the top. The charger's connector can be plugged in only if the slide-switch is in the OFF position.

During the charging of the battery, the transmitter can still be ON-switched by the external audio input.

A metal clip allows to level up the transmitter on a table.

Phonak Communications SA 3280 Morat Development	Technical Note Subject : FM Transmitter Handy-Mic, Technical description	No. : TN971022/V1.0 Page : 7 of 8 Writer : F.Callias UpDate : October 22, 97
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FM Transmitter « Handy-Mic », technical specification.

Type of modulation : FM
Channel Bandwidth : 50kHz (L)
Frequency range : 173-217MHz
Alignment range : 173.9MHz - 216.5MHz
Switching range : one channel system
Category : AR2
Frequency : one channel, quartz controlled.
Stability : better ± 10 ppm, over extreme supply voltage and temperature.

Antenna : 60 cm wire, removable
Radiated power : max. +3dBm ERP
Class of equipment : 2
Spurious emissions : below -54dBm ERP

Power Supply : NiMH re-chargeable battery, 1 cell.
Nominal supply voltage : 1.20V
Extreme supply voltage range : 1.08V - 1.56V
« Low-Batt » alarm level : $1.13V \pm 30mV$
Battery current drain : < 60mA
Battery life : > 12h
Charger : $V_{DC} = 3V \div 5V$ bei $I_{Load} = 100mA$

Operating temperature range : -10°C to +60°C (extreme)

Audio signal

Frequency range : 100Hz-8kHz
Microphone input : 30mV rms at the OMNI-Mic input with $f_{MOD} = 1kHz$
will give 100% audio modulation $\Delta f_{DEV} = 5kHz$
Limiter threshold : $U_{IN} = 2mV$ at the OMNI-Mic input
Ext. audio input : 1V rms $Z_{in} \geq 10k\Omega$
Audio VOX Threshold : 20mV \div 30mV rms
THD : $\leq 3\%$

Dimensions : 125x33x18mm (HxWxT)
Weight : 75g (with battery)

Phonak Communications SA 3280 Morat Development	Technical Note Subject : FM Transmitter Handy-Mic, Technical description	No. : TN971022/V1.0 Page : 8 of 8 Writer : F.Callias UpDate : October 22, 97
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Additional specifications for EMC tests following prETS 300445

Ancillary equipment : battery charger

Primary function : VHF transmitter, low power.
Frequency band H (173-217MHz)
Battery operated, NBFM modulation.

Switching range : one channel system, (category AR2).
quartz controlled

User control function : ON/OMNI/DIR/ZOOM switching

Class : 3 (communications)

Acoustic coupling to the microphone during EMC tests : Acoustic tube 1m long and 10cm diameter, fitted with a 8 Ω loudspeaker, see fig 3 of ETS300445,p12. 800mV at the loudspeaker's input gives 30mV at the OMNI microphone's output.

Method to check the communication link.

Use the Microvox R or a Microlink as companion receiver, or check the output signal with an antenna connected to a measuring receiver.