

職務再設計：聆聽活動與需求

聲音測量

- 音量單位
 - dB HL
 - dB SPL
 - dB A
- 頻率單位 Hz

聽力圖

- AudiogramMaker:
<http://www.audiogrammaker.com/>
- 符號
 - 氣導 AC
 - 骨導 BC
 - 不舒適音量 UCL
- 氣骨導差 A-B Gap
- 動態範圍 Dynamic Range
- 聽損類型與程度

聆聽需求與溝通對象

- 活動、對象、類型、規模、頻率
- 內容熟悉程度、變化／複雜程度

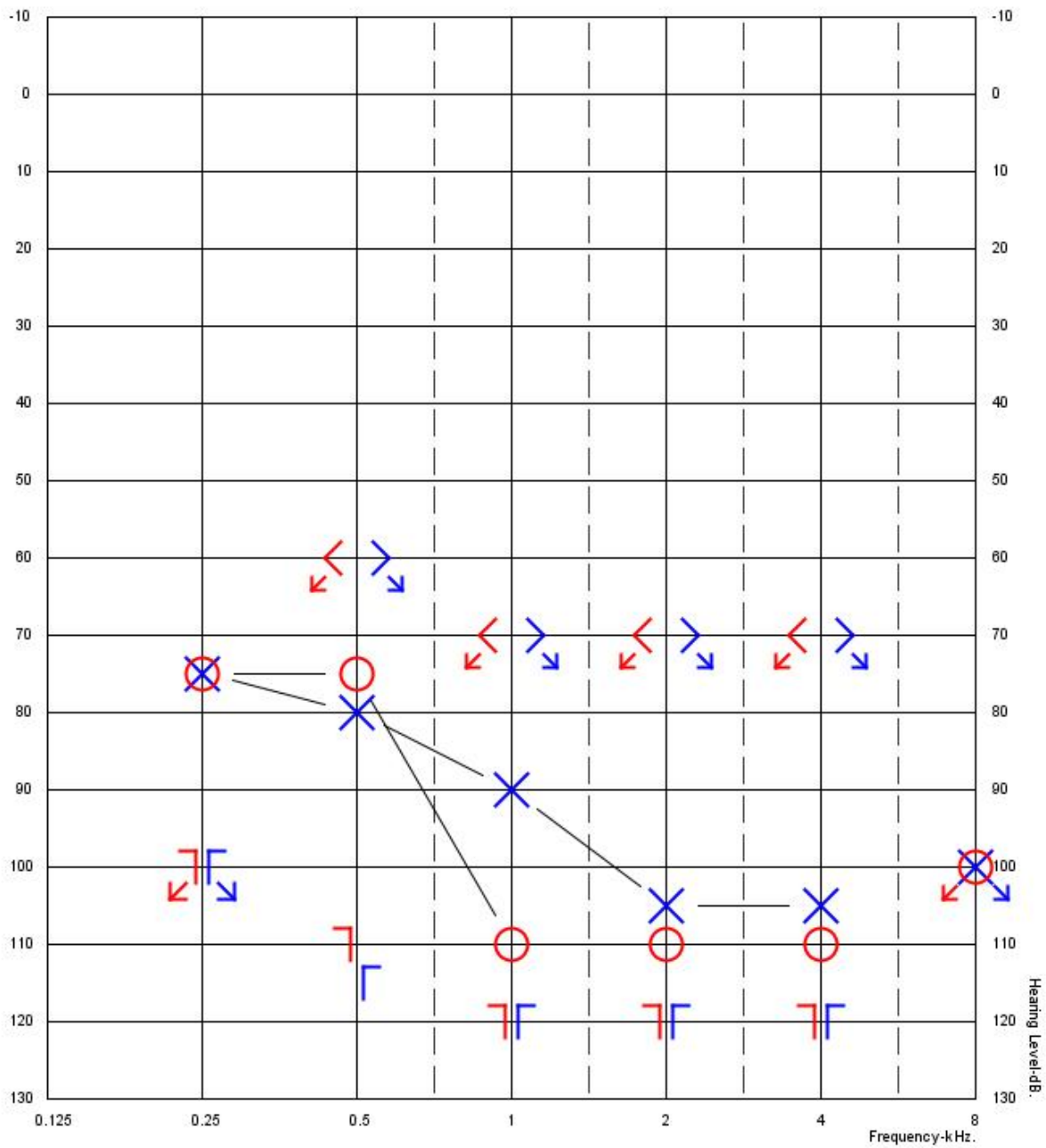
職場環境測量

- 空間尺寸
App: magicplan
- 照明／採光
- 背景噪音
App: NIOSH Sound Level Meter
- 現有輔具（電話機、擴音設備）
- 餘響（回音）
教室規範：餘響時間 $RT_{60} \leq 0.3 \times \log\left(\frac{V}{10}\right)$
註： RT_{60} 單位為秒， V 單位為立方公尺
App: ClapIR、Sound Balance Assistant



助聽器規格與驗證

- 規格建議表
- 影片：什麼是「頻率壓縮」
- 實耳測量報告
- COSI 量表





AMERICAN
SPEECH-LANGUAGE-
HEARING
ASSOCIATION

AUDIOLOGY

Information Series

Type, Degree, and Configuration of Hearing Loss

When describing hearing loss, we generally look at three aspects: type of hearing loss, degree of hearing loss, and configuration of hearing loss.

TYPES OF HEARING LOSS

There are three basic types of hearing loss: conductive, sensorineural, and mixed.

○ **Conductive hearing loss** occurs when sound is not sent easily through the outer ear canal to the eardrum and the tiny bones (ossicles) of the middle ear. Conductive hearing loss makes sounds softer and less easy to hear. This type of hearing loss can often be corrected medically or surgically. Some possible causes of conductive hearing loss are:

- Fluid in the middle ear from colds or allergies
- Ear infection (otitis media)
- Poor eustachian tube function
- Hole in the eardrum
- Too much earwax (cerumen)
- Swimmer's ear (external otitis)
- Foreign body in the ear canal
- Malformation of the outer ear, ear canal, or middle ear

○ **Sensorineural hearing loss (SNHL)** happens when there is damage to the inner ear (cochlea) or to the nerve pathways from the inner ear to the brain. Most of the time, SNHL cannot be medically or surgically corrected. This is the most common type of permanent hearing loss.

SNHL reduces the ability to hear faint sounds. Even when speech is loud enough to hear, it may still be unclear or sound muffled.

Some possible causes of SNHL are:

- Drugs that are toxic to hearing
- Hearing loss that runs in the family (genetic or hereditary)
- Aging

- Head trauma
- Malformation of the inner ear
- Exposure to loud noise

○ **Mixed hearing loss** occurs when a conductive hearing loss happens in combination with an SNHL. In other words, there may be damage in the outer or middle ear and in the inner ear (cochlea) or auditory nerve.

DEGREE OF HEARING LOSS

Degree of hearing loss refers to the severity of the loss. The table below shows one of the more commonly used classification systems. The numbers are representative of the patient's hearing loss range in decibels (dB HL).

Degree of hearing loss	Hearing loss range (dB HL)
Normal	-10 to 15
Slight	16 to 25
Mild	26 to 40
Moderate	41 to 55
Moderately severe	56 to 70
Severe	71 to 90
Profound	91+

Source: Clark, J. G. (1981). Uses and abuses of hearing loss classification. *Asha*, 23, 493-500.

CONFIGURATION OF HEARING LOSS

The configuration, or shape, of the hearing loss refers to the degree and pattern of hearing loss across frequencies (tones) as illustrated in a graph called an audiogram. For example, a hearing loss that only affects the high tones would be described as a high-frequency loss. Its configuration would show good hearing in the low tones and poor hearing in the high tones.

On the other hand, if only the low frequencies were affected, the configuration would show poorer hearing for low tones and better hearing for high tones. Some hearing

loss configurations are flat, indicating the same amount of hearing loss for low and high tones.

Other descriptors associated with hearing loss are:

- **Bilateral versus unilateral.** Bilateral hearing loss means hearing loss in both ears. Unilateral hearing loss (UHL) means that hearing is normal in one ear but there is hearing loss in the other ear. The hearing loss can range from mild to very severe. UHL can occur in both adults and children.

Approximately 1 out of every 10,000 children is born with UHL, and nearly 3% of school-age children have UHL. Children with UHL are at higher risk for having academic, speech-language, and social-emotional difficulties than their normal hearing peers. This may be because UHL is often not identified, and the children do not receive intervention.

Below are some possible causes of UHL:

- Hearing loss that runs in the family (genetic or hereditary)
- An outer, middle, or inner ear abnormality
- Syndromes such as Down and Usher syndrome

- Illnesses or infections such as CMV, Rubella
- Head injury
- Exposure to loud noise
- Traumatic brain injury (TBI)

- **Symmetrical versus asymmetrical.** Symmetrical means the degree and configuration of hearing loss are the same in each ear. Asymmetrical means the degree and configuration are different in each ear.
- **Progressive versus sudden hearing loss.** Progressive means that hearing loss becomes worse over time. Sudden means that the loss happens quickly. Such a hearing loss requires immediate medical attention to determine its cause and treatment.
- **Fluctuating versus stable hearing loss.** Fluctuating means hearing loss that changes over time—sometimes getting better, sometimes getting worse. Stable hearing loss does not change over time and remains the same.

NOTES:



For more information and to view the entire Audiologist Information Series library, scan with your mobile device.

For more information about hearing loss, hearing aids, or referral to an ASHA-certified audiologist, contact:



AMERICAN
SPEECH-LANGUAGE-
HEARING
ASSOCIATION

2200 Research Boulevard
Rockville, MD 20850
800-638-8255

E-mail: actioncenter@asha.org
Website: www.asha.org

Compliments of

American Speech-Language-Hearing Association

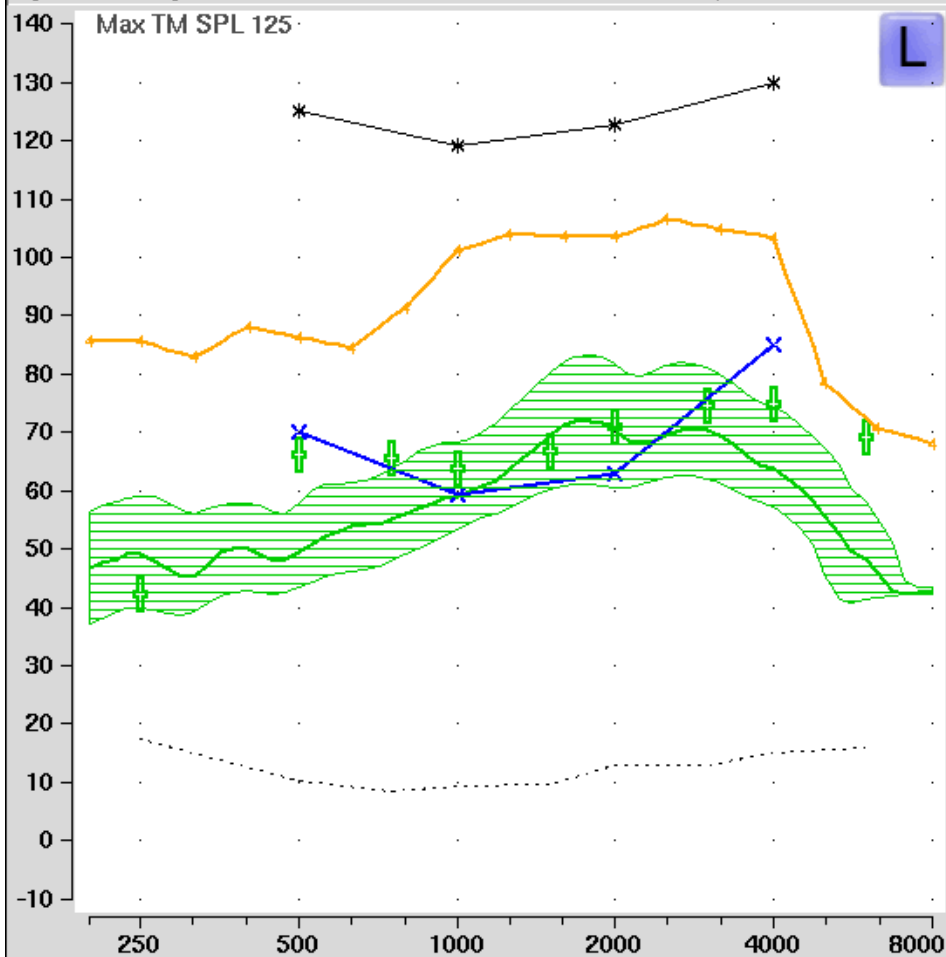
2200 Research Boulevard, Rockville, MD 20850 • 800-638-8255



Speechmap/NAL-NL2

Dec 11, 2018 10:46am

audioScan



Instrument: BTE
 Mode: On-ear
 Format: Graph
 Scale (dB): SPL

Audiometry

Age: Adult
 Transducer: Headphone
 UCL: Entered
 RECD: Average

BCT: Entered
 Binaural: Yes
 REDD: Average

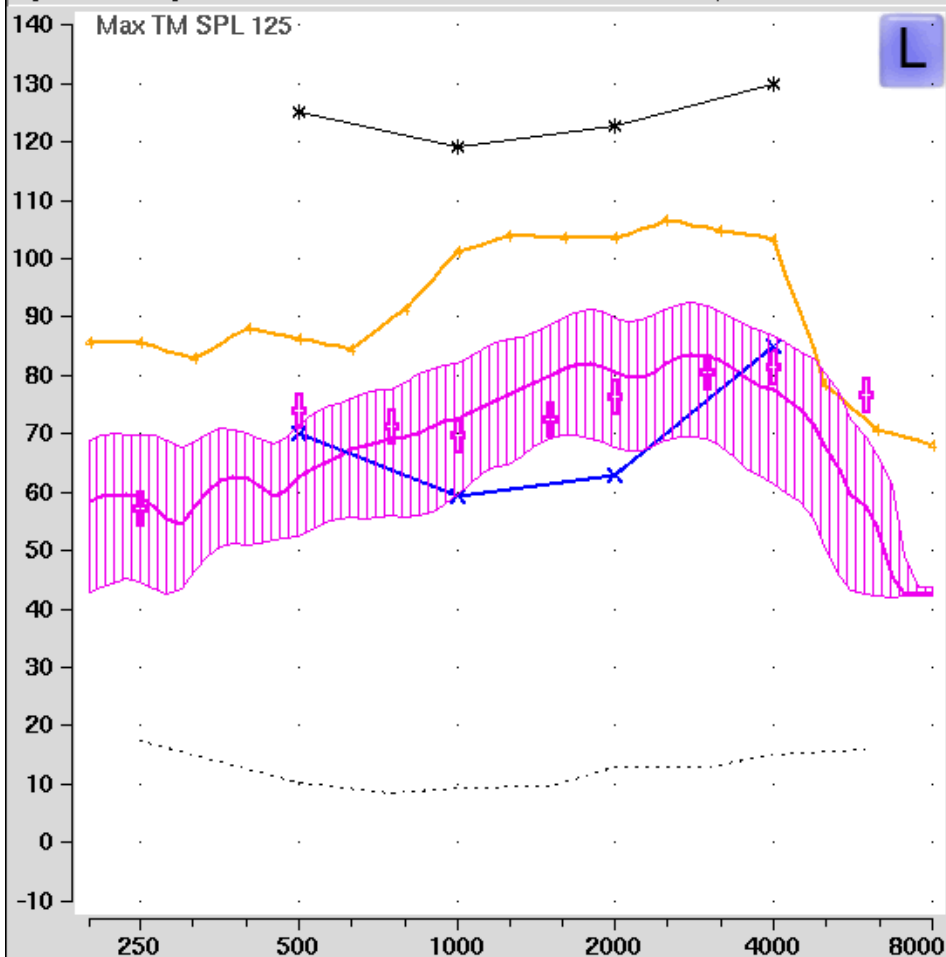
Test	Stimulus	Level	SII
1	Speech-ISTS	Soft (50)	21
2	Speech-ISTS	Avg (65)	49
3	Speech-ISTS	Loud (75)	62
4	MPO	85	N/A
Unaided avg (65)			6

Curve: Hide / Show

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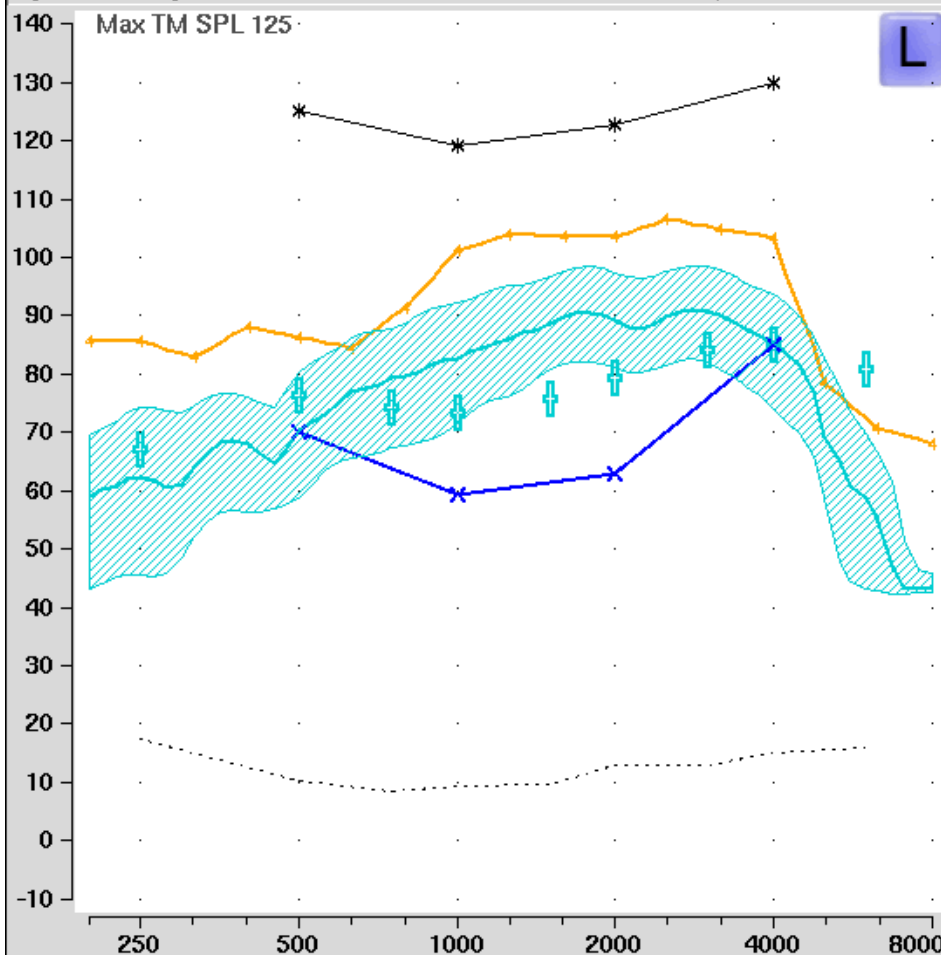
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Unaided avg (65): 6

Curve: Hide / Show

Speechmap/NAL-NL2

Dec 11, 2018 10:47am

audioScan

Max TM SPL: 125

	250	500	750	1000	1500	2000	3000	4000	6000
Left									
SPL UCL		125		119		123		130	
Entered UCL		115		110		110		115	
Target1	42	66	66	64	67	71	74	75	69
Test 1	49	49	55	59	69	70	70	64	48
Target2	57	74	71	70	73	76	81	81	77
Test 2	59	63	69	73	80	81	83	78	58
Target3	67	76	74	73	76	79	84	85	81
Test 3	62	70	79	83	89	89	91	85	59
Target4									
Test 4	86	86	90	101	104	104	105	103	73
SPL threshld		70		59		63		85	
Unaided (65)	56	59	55	53	53	56	57	55	48
Entered HL		60		50		50		70	
Entered BCT		55		50		50		60	
nHL to eHL	30	20	17	15	12	10	7	5	5
HA-1 RECD									
MAP	18	10	9	9	10	13	13	15	16

Instrument: BTE
 Mode: On-ear
 Format: Table
 Scale (dB): SPL

Audiometry

Age: Adult
 Transducer: Headphone
 UCL: Entered
 RECD: Average

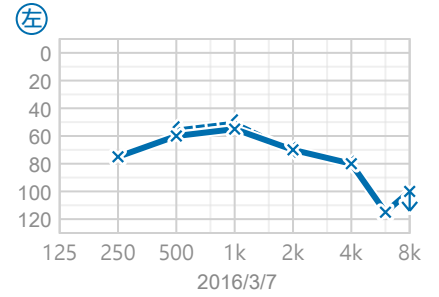
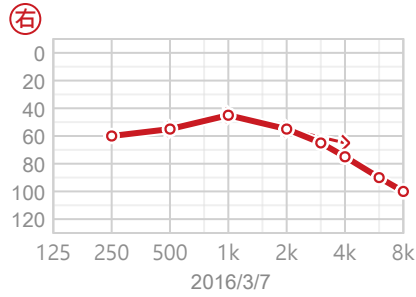
BCT: Entered
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4	MPO	85	N/A

Unaided avg (65): 6

調整報告

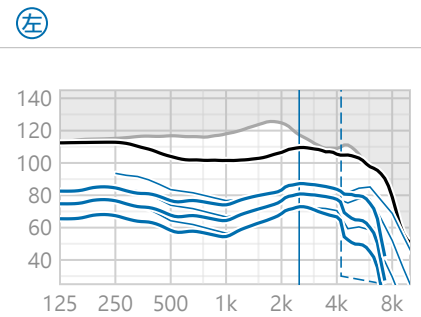
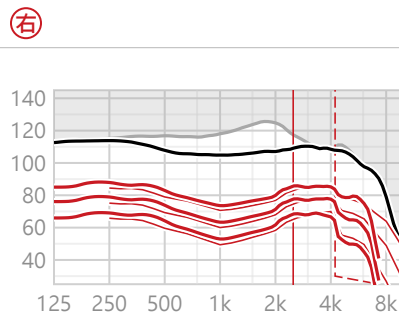
聽力圖



自動程式

顯示數值: 絕對 測量標準: SPL 2cc; 輸出

安靜環境

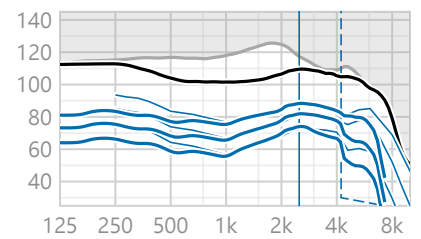
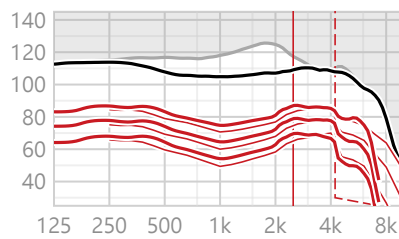


回饋音抑制
噪音抑制
風噪聲抑制
突噪聲抑制
麥克風模式
第二代非線性頻率壓縮

中度 (13)
弱 (8)
中度 (16)
弱 (8)
Real ear Sound (4)
開啟

中度 (13)
弱 (8)
中度 (16)
弱 (8)
Real ear Sound (4)
開啟

噪音中聆聽語音



回饋音抑制
噪音抑制
風噪聲抑制
突噪聲抑制
麥克風模式
第二代非線性頻率壓縮

中度 (13)
弱 (8)
中度 (16)
弱 (8)
終極聚焦(UltraZoom) & 訊噪比增強 (20)
開啟

中度 (13)
弱 (8)
中度 (16)
弱 (8)
終極聚焦(UltraZoom) & 訊噪比增強 (20)
開啟

調整報告

調整配置

聲學參數



xReceiver	
接收器	xP (Power)
耳塞類型	雙層耳塞
電線長度	2xP R
耳塞大小	小型



xReceiver	
接收器	xP (Power)
耳塞類型	雙層耳塞
電線長度	2xP L
耳塞大小	小型

資料

外殼顏色	銀灰色	銀灰色
耳垢擋板	不確定的	不確定的

助聽器設定

回饋音及實耳測試	2018/12/11	2018/12/11
選配公式	適應性Phonak數位公式	適應性Phonak數位公式
所有程式的增益量	100%	100%
低頻增強	關閉	關閉
閉塞補償	關閉	關閉
壓縮	壓縮	壓縮

AutoSense OS 選項

混合	平衡	平衡
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自動程式 運用SoundRecover2

附加程式 運用SoundRecover2

	右	左		右	左
安靜環境	16a	16a	電話聲	16a	16a
	CT1 2.5 kHz	CT1 2.5 kHz		CT1 2.5 kHz	CT1 2.5 kHz
	CT2 4.2 kHz	CT2 4.2 kHz		CT2 4.2 kHz	CT2 4.2 kHz
	壓縮比 1.2:1	壓縮比 1.2:1		壓縮比 1.2:1	壓縮比 1.2:1
	最大頻率輸出 5.5 kHz	最大頻率輸出 5.5 kHz		最大頻率輸出 5.5 kHz	最大頻率輸出 5.5 kHz
噪音中聆聽語音	16a	16a			
	CT1 2.5 kHz	CT1 2.5 kHz			
	CT2 4.2 kHz	CT2 4.2 kHz			
	壓縮比 1.2:1	壓縮比 1.2:1			
	最大頻率輸出 5.5 kHz	最大頻率輸出 5.5 kHz			
噪音環境中舒適聆聽	16a	16a			
	CT1 2.5 kHz	CT1 2.5 kHz			
	CT2 4.2 kHz	CT2 4.2 kHz			
	壓縮比 1.2:1	壓縮比 1.2:1			
	最大頻率輸出 5.5 kHz	最大頻率輸出 5.5 kHz			
音樂	16a	16a			
	CT1 2.5 kHz	CT1 2.5 kHz			
	CT2 4.2 kHz	CT2 4.2 kHz			
	壓縮比 1.2:1	壓縮比 1.2:1			
	最大頻率輸出 5.5 kHz	最大頻率輸出 5.5 kHz			

職務再設計：聆聽相關活動改善評量

個案姓名：_____ 使用輔具： 無輔具 原有輔具：_____

評估日期：_____ 試用輔具：_____

ICF 編碼	順位	聆聽相關職務活動	能夠完成活動的程度 (%)
	<input type="checkbox"/>	_____	0 20 40 60 80 100 完全不行 充分完成
	<input type="checkbox"/>	_____	0 20 40 60 80 100 完全不行 充分完成
	<input type="checkbox"/>	_____	0 20 40 60 80 100 完全不行 充分完成
	<input type="checkbox"/>	_____	0 20 40 60 80 100 完全不行 充分完成
	<input type="checkbox"/>	_____	0 20 40 60 80 100 完全不行 充分完成

ICF 參考代碼

d155 學得技能	d350 交談	d475 駕駛	d825 職業訓練	e125 溝通用產品與技術	e250 聲音
d310 口語訊息的溝通—接受	d355 討論	d730 與陌生人相處	d840 學徒／職前準備	e135 就業用產品與科技	e325 同事
d315 非口語訊息的溝通—接受	d360 使用溝通裝置與技術	d740 正式人際關係	d850 有報酬工作	e240 光線	e360 其他專業人員