



Clinical Investigation Plan

Investigation Title: An early feasibility, prospective, exploratory study evaluating the performance of focused multipolar stimulation and sound coding enhancements [REDACTED] in adult cochlear implant recipients (SASC).

Short Title: SASC

CIP Number: AI5781

Version and Date: Refer to system version control

Sponsor: Cochlear Limited
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Macquarie University, NSW 2109
AUSTRALIA
[REDACTED]

This clinical investigation shall be conducted in accordance with ethical principles that have their origin in the Declaration of Helsinki, International Standard ISO 14155:2020 Clinical investigation of medical devices for human subjects - Good Clinical Practice, and any regional or national regulations, as applicable. This study will comply with 21 CFR parts 50, 54, 56, and 812, 42 CFR part 11, and 45 CFR part 160 and 164.

Confidential Information

The information contained in this document is confidential and should not be copied or distributed to persons not involved in the conduct or oversight of the clinical investigation



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A complete list of participating Principal Investigators' names, titles and addresses, and the names and addresses of participating institutions (sites) will be maintained by the Sponsor and will be provided as a separate Principal Investigator List. The definitive Principal Investigator list will be provided in the Clinical Investigation Report.



INVESTIGATOR AGREEMENT

Investigator Declaration

By my signature below, I confirm that I have read, understood and will strictly adhere to the requirements therein. I undertake to ensure that all staff with delegated responsibilities in the conduct of this CIP have also read, understood and will strictly adhere to the requirements therein. This CIP will not be implemented without prior written approval from the Ethics Committee, any applicable National Competent Authorities, and the Sponsor. If amendments to this plan become necessary, written approval by the Ethics Committee and any applicable National Competent Authorities will be obtained before the changes are clinically implemented per the amendment, except under emergency circumstances to protect the rights, safety, and well-being of subjects.

I also agree that my personal information may be provided to regulatory agencies and public clinical trial registry platforms, and stored in their systems in order to comply with regulatory requirements. Examples of the type of personal information include my name, signature and summary of qualifications.

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Site Name	Site Address
Signature	Date

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1 DEFINITIONS AND ABBREVIATIONS

Term	Description
ACE	Advanced Combination Encoder
ADE	Adverse Device Effect
AE	Adverse Event
BKB	Bench-Kowal-Bamford
CI	Cochlear Implant
CI1032	Phoenix Cochlear Implant with Slim Modiolar electrode array
CIP	Clinical Investigation Plan
CIR	Clinical Investigation Report
CNC	Consonant-Nucleus-Consonant Synonymous abbreviations/terms include: CVC (Consonant-Vowel-Consonant)
CP1000	Nucleus 7 Sound Processor
CP1000 Smart	Nucleus 7 Sound Processor with investigational firmware and split-link coil
CRF	Case Report Form
DD	Device Deficiency
EC	Ethics Committee Synonymous abbreviations/terms include: IRB (Institutional Review Board) IEC (Institutional Ethics Committee or Independent Ethics Committee) HREC (Human Research Ethics Committee)
ECE	Extracochlear Electrode
eCRF	Electronic Case Report Form
EDC	Electronic Data Capture
EVT	Electrode Voltage Tomography
FMS	Focused Multipolar Stimulation Synonymous terms include: Focused Stimulation
GCP	Good Clinical Practices
IB	Investigator's Brochure
ICE	Intracochlear Electrode
ICF	Informed Consent Form
IDE	Investigational Device Exemption
IDMC	Independent Data Monitoring Committee



Term	Description
IMD	Investigational Medical Device
MP	Monopolar Stimulation
NRT	Neural Response Telemetry
NSA	Nucleus Smart App
PI	Principal Investigator
PPTH	Perc-Plug Take Home
QSMD	Quick Spectral Modulation Detection
SADE	Serious Adverse Device Effect
SAE	Serious Adverse Event
SAP	Statistical Analysis Plan
SOP	Standard Operating Procedure
SP	Sound Processor
SPACE	Spread Precompensation Advanced Combination Encoder
SPCS	Spread Precompensation Channel Selection
SSQ12	Speech, Spatial, and Qualities of Hearing Scale, 12-item version
TIM	Trans-Impedance Matrix
UADE	Unanticipated Adverse Device Effect
USADE	Unanticipated Serious Adverse Device Effect



2 CLINICAL INVESTIGATION SYNOPSIS

Investigation title	An early feasibility, prospective, exploratory study evaluating the performance of focused multipolar stimulation and sound coding enhancements [REDACTED] in adult cochlear implant recipients.
Short title	SASC
Investigation number	AI5781
Name of investigational medical device(s)	[REDACTED] comprising the CI1032 cochlear implant, the CP1000 Smart sound processor with investigational firmware to stimulate in both monopolar (MP) and focused multipolar stimulation (FMS) modes, and Cochlear Research Platform fitting software.
Intended use of investigational medical device(s)	The investigational device [REDACTED] is intended to be used in this investigation for individuals 18 years of age or older who have postlingual sensorineural hearing loss and who are unilateral cochlear implant candidates as determined by the implanting clinic. The investigational medical device is not approved by a regulatory body.
Name and description of comparator device/product(s)	Not applicable.
Estimated recruitment period	8-10 months
Expected duration per subject	14 months
Number of subjects planned	20
Number of investigational sites planned	Up to 6
Inclusion criteria	1) Candidate for unilateral cochlear implantation according to bilateral sensorineural hearing loss criteria, who has decided to proceed with implantation through routine processes. a) Bilateral sensorineural hearing loss criteria for clinics in the United States: i) Ear to be implanted: (1) Moderate to profound sensorineural hearing loss, defined as a pure-tone average (PTA) (250 – 1000 Hz) $\geq$ 40 dB HL and a PTA (2000 – 8000 Hz) $\geq$ 65 dB HL (2) Aided word score $\leq$ 40% ii) Contralateral ear: (1) Currently implanted with a Nucleus® cochlear implant OR (1) PTA (500, 1000, 2000, and 4000 Hz) $>$ 30 dB HL (2) Aided word score $\leq$ 80% b) Bilateral sensorineural hearing loss criteria for clinics in Belgium: i) Ear to be implanted:



	(1) PTA (500, 1000, 2000, and 4000 Hz) $\geq$ 70 dB HL for average of 3 out of 4 frequencies (2) Unaided phoneme score $\leq$ 50% on CVC in quiet at 70 dB SPL in free field (3) ABR peak $\geq$ 75 dB nHL ii) Contralateral ear: (1) Currently implanted with a Nucleus® cochlear implant OR (1) Same audiological criteria as the ear to be implanted 2) 18 years of age or older. 3) Fluent in the language used for speech testing. 4) Willing to comply with all investigational requirements. 5) Willing and able to provide written informed consent.
Exclusion criteria	1) Severe or greater sensorineural hearing loss in the ear to be implanted prior to five years of age. 2) Duration of severe to profound hearing loss > 20 years in the ear to be implanted. 3) Ossification or other cochlear anomaly that might prevent complete insertion of the electrode array. 4) Diagnosis of auditory neuropathy. 5) Deafness due to lesions of the acoustic nerve or central auditory pathway. 6) Pregnant at the time of surgery. 7) Additional handicaps that would prevent or restrict participation in the audiological evaluations. 8) Unrealistic expectations on the part of the subject regarding the possible benefits, risks, and limitations that are inherent to the surgical procedure and prosthetic device. 9) Unable or unwilling to comply with the requirements of the clinical investigation as determined by the Investigator. 10) Investigator site personnel directly affiliated with this study and/or their immediate families; immediate family is defined as a spouse, parent, child, or sibling. 11) Cochlear employees or employees of Contract Research Organisations or contractors engaged by Cochlear for the purposes of this investigation. 12) Current participation, or participation in another interventional clinical study/trial in the past 30 days, involving an investigational drug or device.



Objectives and Endpoints	
Primary Objective	Primary Endpoints
To evaluate different combinations of focused multipolar stimulation, sound coding parameters, and channel/pulse definitions to maximize hearing outcomes within power requirements.	- Maximum map stimulation (C) levels - Spectral resolution (QSMD) - Phoneme discrimination (LIT)





4 BACKGROUND INFORMATION AND RATIONALE

4.1 Introduction

The [REDACTED] CI1000 series implant with the Slim Modiolar electrode array (CI1032) is a next-generation cochlear implant with advanced stimulation capabilities. When using the standard-of-care monopolar (MP) stimulation strategy, the CI1032 cochlear implant is expected to provide similar benefits to hearing performance as those expected for existing Nucleus cochlear implants with 22-electrode perimodiolar electrode arrays. [REDACTED]

Enabled by multiple current sources, [REDACTED] Research System, comprising the CI1032 cochlear implant paired with the CP1000 Smart sound processor, offers the potential for improved hearing performance through the use of focused multipolar stimulation (FMS). By delivering patterns of positive and negative current across multiple intracochlear electrodes, FMS narrows the spread of cochlear excitation from the active electrode. [REDACTED]

Monopolar (MP) Stimulation

Focused Multipolar Stimulation (FMS)

n.



The purpose of this early feasibility study is to assess different combinations of stimulation parameters aimed at optimizing the implementation of FMS in newly implanted CI1032 recipients. [REDACTED]

The current study is part of a broader line of research using the Phoenix Research System. Through a series of feasibility studies, FMS is being evaluated for performance, safety, and clinical viability. [REDACTED]

4.2 Findings of Previous Nonclinical and Clinical Studies

4.2.1 Nonclinical Data

The CI1032 is the first variant of the CI1000 Series of cochlear implant devices, which incorporate refinements to the internal circuitry over the previous generation (CI600 Series) as a natural consequence of the design process. Device verification has been completed to ensure safety and reliability of the CI1032 implant prior to initiating this clinical study. [REDACTED]



4.2.2 Clinical Data

As this feasibility study is being conducted at an early stage of technology development with [REDACTED] stimulation capabilities, published clinical evidence for the current implementation of FMS is limited. However, Cochlear-sponsored pilot studies have been conducted with subjects using a percutaneous cochlear implant with the Contour Advance® electrode and a prototype implementation of FMS for acute and take-home experiments (IDE G920119).

[REDACTED]

[REDACTED]

[REDACTED]

[REDACTED]

[REDACTED]

[REDACTED]

[REDACTED]

[REDACTED]

[REDACTED]

[REDACTED]

[REDACTED]

[REDACTED]

[REDACTED]

[REDACTED]

[REDACTED]

[REDACTED]

[REDACTED]

[REDACTED]

[REDACTED]

[REDACTED]

[REDACTED]

4.3 Study Rationale

In the prototype implementation used for the clinical studies discussed above, FMS consistently delivered better spectral resolution than MP stimulation on a range of psychophysical tests (Smith et al., 2013; CTC5643; AI5765). Better spectral resolution is associated with improved speech perception in quiet on tests of phoneme, word, and sentence recognition across groups of cochlear-implant recipients (Anderson et al., 2011; Anderson et al., 2012; Berenstein et al., 2008; Drennan et al., 2014; Gifford et al., 2014; Gifford et al., 2018; Saoji et al., 2009; Winn et al., 2016; Won et al., 2007). Similar correlations have been established between spectral resolution and speech recognition in noise for both words and sentences (Berenstein et al., 2008; Gifford et al., 2018; Jeon et al., 2015; Won et al., 2007). Additionally, Won et al. (2010) found that cochlear-implant subjects who performed better on tests of psychophysical spectral resolution also had better music perception scores for melody recognition, timbre recognition, and pitch discrimination.

This feasibility study is based on the premise that FMS may offer some or all of the benefits described above that are shown in the literature to be related to spectral resolution, particularly improving hearing in complex environments such as speech recognition in noise and music appreciation. [REDACTED]



[REDACTED]

[REDACTED]

[REDACTED]

As an early feasibility study, the objectives of this investigation are exploratory in nature. Learnings will be used to guide decision making on sound processing algorithms, optimize the fitting flow, assess the strengths and weaknesses of FMS, further product development, and guide the design of future studies.

5 MEDICAL DEVICE INFORMATION

5.1 Identity and Description of the Investigational Medical Device (IMD)

The [REDACTED] Research System is a fully investigational system, comprising the CI1032 cochlear implant, the CP1000 Smart sound processor with investigational firmware to stimulate in both MP and FMS modes, and Cochlear Research Platform – Phoenix Research Module fitting software.

The CI1032 is the first variant of the new CI1000 Series of devices from Cochlear Ltd. [REDACTED]

[REDACTED]. The other strategy (FMS) has only been implemented in prototype devices and is now being introduced on the CI1032 platform. [REDACTED]

[REDACTED]

[REDACTED]

- [REDACTED]
- [REDACTED]

[REDACTED]

5.1.8 How the Device Achieves its Intended Function

The CI1032 implant is the implanted component of a cochlear implant system and is used in conjunction with an externally worn sound processor in order to provide an auditory perception to patients with bilateral or unilateral moderately severe to profound deafness. The implant system functions by providing electrical stimulation to surviving neural elements in the cochlea, bypassing the transduction mechanism normally provided by cochlear hair cells, which have typically been impaired or are absent in such individuals.

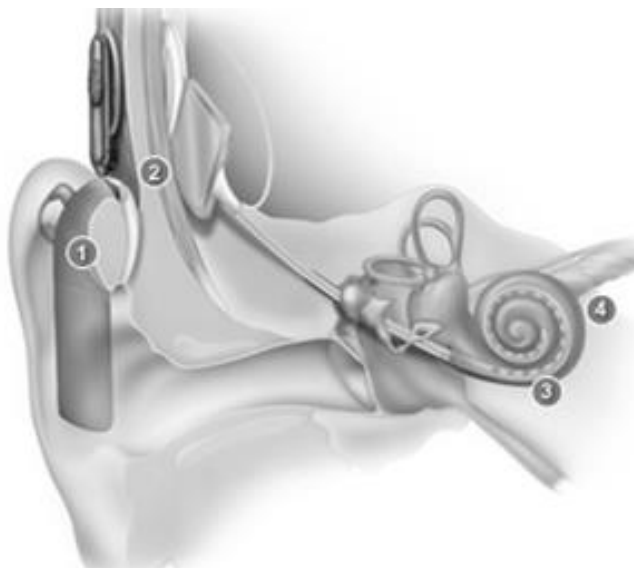


Figure 12. The CI system with the implant device *in-situ*. 1: speech processor, 2: implanted electronics package, 3: intracochlear electrode array, 4: (cochlear) nerve.

The electrode array is inserted into the scala tympani of the cochlea, either through a small opening (cochleostomy) drilled by the surgeon or through an enlargement of the round window. Electrodes in the



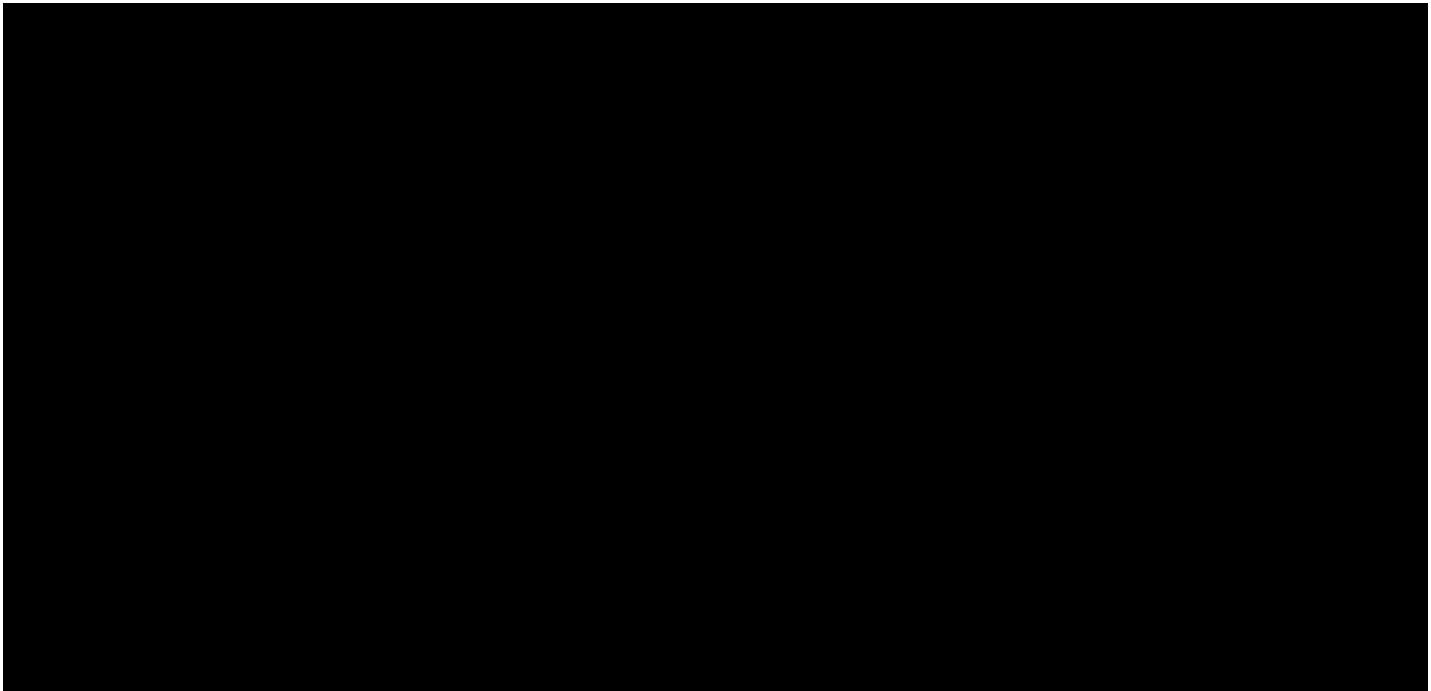
lower (basal) region of the cochlea, closest to the cochleostomy, stimulate auditory neural processes that perceive the high frequency sounds while the more distal (apical) electrodes stimulate the apical auditory neurons that perceive the lower frequencies. Further details on the electrode insertion technique are provided in the CI1032 Physician's Guide.

With reference to Figure 12, incoming sounds detected by the microphone of the sound processor (1) are converted to a data stream that is transmitted across intact skin to the receiver-stimulator (consisting of an implant body housing the electronic assembly) of the CI1032 implant (2) via the transmitter and receiver coils of the external processor and implant respectively. These signals are decoded and converted to a sequence of short current pulses that are directed to the appropriate intracochlear electrodes, depending on the frequency content of the incoming signal (3). Spectral information is therefore provided by appropriate matching of the frequency content of the incoming signal to the selection of intracochlear electrodes while information on fluctuations of sound intensity over time (temporal information) is provided by modulation of the stimulating current levels. The resulting auditory signal passes to central auditory processing centers via the auditory (cochlear) nerve (4).

[REDACTED]

[REDACTED]

- [REDACTED]
- [REDACTED]
- [REDACTED]
- [REDACTED]
- [REDACTED]



[REDACTED]

[REDACTED]

This study is exploratory and iterative in nature. The primary objective is to evaluate different combinations of FMS, sound coding parameters, and channel/pulse definitions to maximize hearing outcomes within power requirements. [REDACTED]

[REDACTED]

Safety will be assessed by recording and summarizing all adverse events (AEs), adverse device effects (ADEs), and device deficiencies (DDs). Both external and internal investigators will be responsible for safety reporting [REDACTED]. No data monitoring committee will be used for this clinical investigation.



7.2 Subjects

Written, informed consent must be obtained from the subject before any study procedures are initiated.

The [REDACTED] Research System is intended for adults with bilateral sensorineural hearing loss. [REDACTED]

[REDACTED]

Eligibility of enrolled subjects must be supported by pre-operative audiological testing and medical assessment. Candidates will undergo interviews at the clinical sites to ensure willingness and ability to comply with all study-related procedures.

7.2.1 Inclusion Criteria

Subjects must meet all of the inclusion criteria described below to be eligible for this clinical investigation.

- 1) Candidate for unilateral cochlear implantation according to bilateral sensorineural hearing loss criteria, who has decided to proceed with implantation through routine processes.
 - a) Bilateral sensorineural hearing loss criteria for clinics in the United States:
 - i. Ear to be implanted:
 1. Moderate to profound sensorineural hearing loss, defined as a pure-tone average (PTA) (250 – 1000 Hz) $\geq$ 40 dB HL and a PTA (2000 – 8000 Hz) $\geq$ 65 dB HL
 2. Aided word score $\leq$ 40%
 - ii. Contralateral ear:
 1. Currently implanted with a Nucleus® cochlear implant
OR
 1. PTA (500, 1000, 2000, and 4000 Hz) $>$ 30 dB HL
 2. Aided word score $\leq$ 80%
 - b) Bilateral sensorineural hearing loss criteria for clinics in Belgium:
 - i. Ear to be implanted:
 1. PTA (500, 1000, 2000, and 4000 Hz) $\geq$ 70 dB HL for average of 3 out of 4 frequencies

2. Unaided phoneme score $\leq$ 50% on CVC in quiet at 70 dB SPL in free field
3. ABR peak $\geq$ 75 dB nHL
- ii. Contralateral ear:
 1. Currently implanted with a Nucleus® cochlear implant
OR
 1. Same audiological criteria as the ear to be implanted
- 2) 18 years of age or older.
- 3) Fluent in the language used for speech testing.
- 4) Willing to comply with all investigational requirements.
- 5) Willing and able to provide written informed consent.

7.2.2 Exclusion Criteria

Subjects who meet any of the exclusion criteria described below will not be eligible for this clinical investigation.

- 1) Severe or greater sensorineural hearing loss in the ear to be implanted prior to five years of age.
- 2) Duration of severe to profound hearing loss $>$ 20 years in the ear to be implanted.
- 3) Ossification or other cochlear anomaly that might prevent complete insertion of the electrode array.
- 4) Diagnosis of auditory neuropathy.
- 5) Deafness due to lesions of the acoustic nerve or central auditory pathway.
- 6) Pregnant at the time of surgery.
- 7) Additional handicaps that would prevent or restrict participation in the audiological evaluations.
- 8) Unrealistic expectations on the part of the subject regarding the possible benefits, risks, and limitations that are inherent to the surgical procedure and prosthetic device.
- 9) Unable or unwilling to comply with the requirements of the clinical investigation as determined by the Investigator.
- 10) Investigator site personnel directly affiliated with this study and/or their immediate families; immediate family is defined as a spouse, parent, child, or sibling.
- 11) Cochlear employees or employees of Contract Research Organisations or contractors engaged by Cochlear for the purposes of this investigation.
- 12) Current participation, or participation in another interventional clinical study/trial in the past 30 days, involving an investigational drug or device.



7.2.3 Number of Subjects Required

A sample size calculation was not conducted for this early feasibility study. [REDACTED]

[REDACTED]

[REDACTED]

[REDACTED]

7.2.4 Vulnerable Populations

Not applicable for the current clinical investigation. This study will not enroll vulnerable populations including children, prisoners, or handicapped or mentally disabled persons. This study will not seek to enroll economically or educationally disadvantaged persons.

Pregnant women are excluded from enrollment, as assessed by the implanting center prior to surgery. This study includes an intraoperative or postoperative CT scan. Women are required to inform the CT technician if there is any possibility they are pregnant at the time of the CT scan.

There is no additional risk to breastfeeding women from participation in this study.

7.2.5 Recruitment and Study Duration

The following subject status definitions apply:

- Enrolled: A subject that has signed the Informed Consent form for the study.
- Screen Fail: An Enrolled subject that has been determined to not meet one or more eligibility criteria.
- Participated: Subjects who have met eligibility criteria and have undergone surgery.
- Discontinued: An Enrolled subject who withdrew consent, was discontinued by the Investigator or Sponsor before the expected End of Study visit, or lost to follow-up. Discontinued subjects may still have safety follow up data collection until their scheduled End of Study visit, for reasons described in section 7.2.6.
- Completed: Enrolled subjects who complete the required treatment and visit schedule.

The recruitment period for the clinical investigation is estimated to be 8-10 months from the time of first subject consent to recruitment of the last subject.

The expected duration of each subject's participation in the clinical investigation, is 14 months from the time of informed consent through to the End of Study visit 12 months after initial activation.

Clinical Investigation completion is last subject last visit. Serious adverse events (SAEs) and serious adverse device effects (SADEs) will be followed for 30 days after the subject completes or withdraws from the study, or until resolution or stabilization of the event, whichever comes first. In the event of an ongoing SAE or SADE at the time of last subject last visit, clinical investigation completion will be extended until the end of the 30-day time period for that event, or until resolution or stabilization of the event, whichever comes first.



7.2.6 Criteria and Procedures for Subject Withdrawal

Subjects can decide to withdraw from the investigation at any time. The Investigator shall ask the reason(s), however subjects have the right to withhold their reason if preferred. The reason for withdrawal should be documented in the subject's source files and the case report form (CRF), if provided.

The Investigator or Sponsor may also decide to withdraw a subject from the clinical investigation or stop the use of the investigational device if it is considered to be in the subject's best interests. If the CI1032 implant does not have market approval at the time of withdrawal, the Sponsor will continue to provide clinical support until a commercially available sound processor and commercial fitting software can be utilized in combination with the CI1032 implant.

Subject withdrawal may be for any of the following reasons:

- Adverse Event (AE)
- Device Deficiency (DD)
- CIP or GCP deviation
- Subject withdrew consent
- Subject lost to follow-up
- Subject death
- Sponsor decision
- Investigator decision
- Other (specify)

If subject withdrawal is due to problems related to the IMD safety or performance, the Investigator shall ask for the subject's permission to continue in safety follow up (for example, adverse events and device deficiencies) until their scheduled End-of-Study visit.

If a subject is lost to follow-up, every possible effort must be made by the study site personnel to contact the subject and determine the reason for discontinuation. At least 3 separate attempts taken to contact the subject must be documented.

Participating subjects who are withdrawn/discontinued will not be replaced.

[REDACTED]

[REDACTED]

[REDACTED]

[REDACTED]

[REDACTED]

[REDACTED]

[REDACTED]

[REDACTED]



7.2.7.1 Blinding Procedures

This will be a single-blinded investigation. Subjects will not be informed of the parameters provided within each of the investigational programs. Investigators will not share with subjects which map is being used for testing or take-home. Subjects will not be able to see the programming software during mapping sessions. When conducting testing with more than one map during the same visit, the investigator will usually control switching between programs. If the subject is given control to switch between programs during testing, then the investigator will not inform the subject which map is in which program.

In some cases, subjects may be able to hear differences between the maps. It may be necessary to break the blind at the end of the study to counsel subjects on what they might expect to hear after they receive the commercial sound processor. However, the study team will avoid making any explicit references to the types of maps used during the investigation.

7.2.8 Post-investigation Medical Care

Following the investigation, subjects will continue with standard of care (MP stimulation mode) treatment. Subjects will continue to use the investigational CP1000 Smart sound processor with investigational firmware, and clinicians will continue to program devices using the Cochlear Research Platform fitting software. The Sponsor will continue to provide clinical support during this period of time before a commercially available sound processor and commercial fitting software (Custom Sound Pro) can be utilized in combination with the CI1032 implant. At the time of market approval each subject will be provided with a new commercial sound processor, and the CP1000 Smart sound processor will be returned to the Sponsor.

7.3 Evaluations and Procedures

This section provides an overview of the evaluations and procedures. Specific details will be provided in a separate procedures manual.

7.3.1 Screening/eligibility

7.3.1.1 Preoperative Standard of Care Procedures

These screening measures are considered standard of care for cochlear-implant candidacy. Preoperative testing procedures will be conducted by the external clinical site as part of clinical evaluation and treatment.

7.3.1.1.1 CT Scan

A preoperative CT scan will be conducted according to standard of care at the implanting clinic.

7.3.1.1.2 Unaided Audiometric Thresholds

Unaided audiometric thresholds will be obtained for each ear independently, using standard audiometric procedures for pure-tone air and bone conduction testing. Thresholds will be measured at the following frequencies preoperatively to establish candidacy for cochlear implantation and participation in the clinical investigation.

- Air Conduction: 250, 500, 1000, 2000, 4000, and 8000 Hz

Air conduction thresholds >90 dB HL at 250 Hz, >100 dB HL at 8000 Hz, and >120 dB HL for other test frequencies will be marked no response (NR). Where the subject reports feeling rather than hearing the acoustic stimuli, the response shall be recorded as vibrotactile (VT).



- Bone conduction: 250, 500, 1000, 2000, and 4000 Hz

Bone conduction thresholds >30 dB HL at 250 Hz, >60 dB HL at 500 Hz, and >70 dB HL for other test frequencies will be marked no response (NR). Where the subject reports feeling rather than hearing the acoustic stimuli, the response shall be recorded as vibrotactile (VT).

7.3.1.1.3 Aided Audiometric Thresholds

- Sound Field: 250, 500, 1000, 2000, and 4000 Hz

Audiometric thresholds with hearing aids will be obtained for each ear using warble tones in the sound field. The contralateral ear will be plugged for all tests, and appropriate clinical masking will be employed where required.

[REDACTED]

7.3.2 Performance/Effectiveness

7.3.2.1 Intraoperative Procedures

Intraoperative measures are optional and will be conducted depending on access to the operating room during surgery. These procedures may be conducted by study external clinical investigators or internal investigators employed by the sponsor.

7.3.2.1.1 Impedance testing

Standard clinical impedances will be tested in common ground (CG) and monopolar (MP1, MP2 and MP1+2) modes using Cochlear Research Platform software.

7.3.2.1.2 TIM/EVT

TIM will be measured using the EVT function in Cochlear Research Platform and will be used to provide information about electrode placement and/or define focused channel weights.

7.3.2.1.3 NRT

Neural Response Telemetry (NRT) is a non-invasive objective measure of peripheral neural function that captures the response of the auditory nerve by use of the implanted intracochlear electrodes. It may be conducted using monopolar or focused multipolar stimulation. Objective measures derived from NRT may include thresholds for neural stimulation and amplitude growth functions. Tests may be conducted manually or automatically within the Cochlear Research Platform software. Results gathered from NRT will provide information about the underlying neural health of individual subjects and may help predict behavioral fitting levels for future applications.

7.3.2.2 Postoperative Research Procedures

Following implantation of the investigational device, patients will participate in research visits either at the external clinical site or Cochlear research site. Unless otherwise specified, these research procedures will be



conducted by Cochlear staff or may be co-conducted with investigators from both the Cochlear research site and the external clinical site.

Postoperative research procedures may be tested in the implant-only condition or may include presenting sounds to the contralateral ear or both ears, with the subject wearing a personal hearing aid to represent real-world listening situations. Testing may include confirming hearing-aid function, e.g, via real-ear verification, but Cochlear investigators will not change the subject's personal hearing-aid prescription.

7.3.2.2.1 CT Scan

In addition to the preoperative CT scan to determine study eligibility, an intraoperative or postoperative CT scan will be completed to measure the distance between individual electrode contacts and the modiolus. Information learned may help account for outcome variability across subjects due to electrode placement issues.

The postoperative CT Scan will be conducted by the external clinical site.

7.3.2.2.2 Impedance Testing

Post-operative impedance testing will be conducted in the same manner as described for intraoperative measures in section 7.3.2.1.1.

7.3.2.2.3 TIM/EVT

Post-operative TIM/EVT testing will be conducted in the same manner as described for intraoperative measures in section 7.3.2.1.2.

7.3.2.2.4 NRT

Post-operative NRT testing will be conducted in the same manner as described for intraoperative measures in section 7.3.2.1.3.

7.3.2.2.5 Electrically Evoked Stapedial Reflex Threshold (eSRT)

eSRT is an objective measure that confirms nerve response to electrical stimulation in order to establish stimulation thresholds. Using eSRT may help predict behavioural fitting levels for future applications of investigational stimulation paradigms.

[REDACTED]



[REDACTED]

7.3.2.2.7 Spectral Resolution

The quick spectral modulation detection (QSMD) test has been shown to be well correlated with speech recognition in cochlear implant-recipients (Gifford et al., 2018; Gifford et al., 2014). It measures the minimum modulation depth in dB that a recipient can perceive to enable discrimination of a spectrally modulated noise from a flat spectrum noise with the same bandwidth and overall intensity level (Gifford et al., 2014). Six trials are conducted for each of five modulation depths (ranging between 10 and 16 dB) and two modulation frequencies (0.5 cycles/octave and 1.0 cycles per octave). A three-interval forced-choice procedure is employed in which two of the intervals contain the flat spectrum noise and the third contains the spectral modulation.

Stimuli will be presented in the sound field or will be delivered via direct streaming to the sound processor.

7.3.2.2.8 Phoneme Discrimination

The Language-independent test of candidacy for cochlear implants (LIT) comprises the following consonants that commonly occur in the 40 most widely spoken languages in the world; [p] [t] [k] [m] [n] [s] [l] and [j] (Ching et al., 2019). These are combined with the vowels [i] [a] and [o] to form VCV syllables in which V is one of the 3 vowels, and C is one of the 8 consonants. The stimuli are spoken by a native Australian female speaker and equalized in overall rms level. The stimuli are presented in speech-shaped noise in a three-alternative choice format. The recipient's task is to choose the odd one out in 81 trials. The test is self-administered, with minimal input from the clinician.

[REDACTED]

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7.3.2.3 Postoperative Standard of Care Procedures

Clinical follow-up after implantation will be conducted according to the standard of care schedule at the external clinical site, with at least two visits required between surgery and the end of study visit to evaluate adverse events and concomitant medications. Medical treatment, audiological evaluation, and auditory rehabilitation will be provided as clinically appropriate (with the exception of device fittings, which will be conducted as part of the postoperative research procedures). All follow-up procedures will be conducted using the investigational device and software until a commercially available sound processor and commercial fitting software can be utilized in combination with the CI1032 implant.

7.3.3 Study Visit Procedures

The menu of procedures for each visit is listed below. As shown in the schedule of events, some procedures are optional and may be omitted for the specified study intervals. Procedures designated as optional may also be added to other visits as time permits.

7.3.3.1 Screening (Preoperative Standard of Care Procedures)

If historical exams are available for the candidacy evaluation, they must be within the timeframes provided. The following must be completed by the external site prior to study participation:

- Written informed consent: must be completed before any study-specific procedures are completed (may include discussions with Cochlear investigators as required)



- Demographics: document age, sex, and other demographic variables as required
- Eligibility: confirm subject meets all inclusion criteria and no exclusion criteria; source documentation must be available before confirming eligibility
- Hearing History: document history of hearing loss (may be subject reported)
- Device History: document history with hearing aids and audiological devices (may be subject reported)
- Medical History: document medical history and concomitant medications (may be subject reported)
- Unaided and aided audiometric thresholds: must be completed within 60 days prior to screening or repeated after signing of the informed consent form

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- CT Scan: must be completed within 2 years prior to screening

Due to the collaborative nature of this study with external and internal investigators, subjects who pass screening by the external site will attend a required meeting with at least one internal Cochlear investigator. The purpose of the meeting is to provide the subject with the opportunity to tour the research facilities for post-operative research procedures and to meet the Cochlear investigational team.

Subjects who pass screening and complete the meeting with the Cochlear investigator team will continue to surgery.

7.3.3.2 Surgery (Intraoperative Procedures)

Surgical techniques will follow standard of care for the slim modiolar electrode array. When possible based on surgical time and access to the operating room, optional intraoperative measurements will include impedances, EVT, monopolar NRT, and focused NRT.

In addition to the preoperative CT scan to determine study eligibility, an intraoperative or postoperative CT scan will be completed to measure the distance between individual electrode contacts and the modiolus. Information learned may help account for outcome variability across subjects due to electrode placement issues

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7.3.3.7 Unscheduled Visits

Additional unscheduled visits may occur at the external clinical site or the internal Cochlear site. For example, subjects may need to be seen by the investigator to evaluate and manage DDs or AEs. Sites will complete the CRF for any unscheduled visit.

7.3.4 Safety Evaluations and Procedures

Investigators are expected to report all observed AEs and ADEs from the time of first surgery until last subject last visit, regardless of severity, relatedness, or seriousness. The risks and anticipated ADEs for the Phoenix Research System are identified in Sections 8.2 and 8.3 of the CIP.

Safety data adjudication may be conducted by the Sponsor's Safety Officer in accordance with the Sponsor's standard operating procedures.

Upon review of data available in the CRF, the Sponsor may query data or request de-identified source documents to review the event.

7.3.4.1 Concomitant Medication and Therapies

Concomitant medications will be recorded in the subject's CRF at the screening appointment and surgery and will be updated during the clinical investigation when changes to medication and/or therapies occur. Therapies recorded for this study include all prescription medications and routine over-the-counter medications. There are no prohibited medications under this clinical investigation. Medications taken for anesthesia purposes during surgery will not be recorded unless their use deviates from normal clinical practice.

7.4 Equipment Used for Evaluations and Procedures

Clinical and research tools including software, firmware, and sound equipment (e.g., speakers or audio streaming accessories) will be used to conduct fittings, measure impedance values, gather NRT responses, and assess hearing performance. For equipment used in this clinical investigation, calibration records must be maintained in site files and copies provided to the Sponsor. As part of the Site Initiation Visit, records should be provided to the Sponsor and confirmed to be up to date. Records will be monitored at interim monitoring visits, in accordance with the Sponsor's Monitoring Plan.

Cochlear Research Platform software will be used to measure impedances, EVT, NRT, and conduct device fittings. Hearing assessments including speech, psychophysical, and music testing will be conducted using clinical software or custom research applications provided by the Sponsor. Real-world surveys (e.g., SSQ12, battery logs, acceptability questionnaire) may be conducted remotely as indicated in the schedule of events.

7.5 Sponsor Role in Conduct of the Clinical Investigation

This study includes Cochlear investigators who are employed by the Sponsor as well as independent investigators at external clinical sites. Cochlear investigators may conduct procedures at internal sites as well as supporting certain activities and/or conducting research procedures at the external sites. Sponsor representatives may be present in the operating room with the surgical team and subject. The representative



will not provide medical assistance. During the surgery, the Sponsor representative may assist in completing the electrical testing of the cochlear implant.

Sponsor representatives may also attend clinical visits to provide support to external investigators during routine medical and audiological follow-up. This support may include training or guiding the use of the investigational device. In their dual sponsor-investigator role, Cochlear investigators will collaborate closely with external investigators and may conduct audiological and research procedures at either location. However, Cochlear investigators will not provide medical treatment or advice to the subjects.

External investigators will be financially compensated for conduct of the study according to a signed research agreement between the investigator and the sponsor.

8 BENEFITS AND RISKS OF THE INVESTIGATIONAL MEDICAL DEVICE AND CLINICAL INVESTIGATION

8.1 Anticipated Clinical Benefits

The anticipated clinical benefits may include the following. These are the same benefits anticipated with the predicate 632 device.

- detection of medium to loud environmental sounds at comfortable listening levels
- detection of conversational speech at comfortable listening levels.
- limited improvement in the recognition of environmental sounds
- limited ability to use the telephone.
- improvement in speech recognition in a quiet environment in the implanted ear
- improvement in speech recognition in a noisy environment
- improvement in overall sound quality
- reduced tinnitus
- reduced fatigue when listening.

Potential additional benefits associated with participation in the clinical investigation include:

- Potential for improved hearing through access to and experience with a wider range of stimulation paradigms than commercially available. Anticipated additional benefits that will be investigated in this study are improved hearing performance in areas such as speech perception, music appreciation, and sound quality compared with the standard-of-care stimulation mode. However, the investigational programs will be provided only within the period of the study, and there is no guarantee that they will become commercially available.
- Access to future product enhancements given that the research implant has firmware that can be upgraded.
- Access to a smaller commercial sound processor when it becomes available after the completion of the study.

- Helping to find better treatments, therapies and/or diagnostic tests in the area of hearing loss.

8.2 Anticipated Adverse Device Effects

Based on the available safety reference information and literature, the potential clinical risks associated with the investigational device include risks associated with receiving a cochlear implant.

8.2.1 Risks of Cochlear Implant Surgery

The following risks of cochlear implant surgery are equivalent to the predicate CI632 device.

- Normal risks associated with surgery and general anaesthesia.
- Increased surgical and anaesthetic risks for certain populations.
- Complications most frequently associated with this surgical procedure – stimulation of the facial nerve, taste disturbance and tinnitus.
- Loss of residual hearing:
 - Inserting the electrode into the cochlea may result in complete loss of residual hearing in the implanted ear.
- Complications that may require additional medical treatment, surgery and/or removal of the device, such as:
 - Acute Otitis Media (AOM)
 - facial nerve injury leading to temporary facial nerve weakness
 - perilymph fistula
 - Concurrent Cerebrospinal Fluid (CSF) leakage
 - vestibular dysfunction
 - subdural injury
 - subcutaneous haematoma
 - irritation, inflammation or breakdown of the skin flap; infection; and in some cases, extrusion of the device caused by the presence of a foreign body under the skin
 - decreased hearing ability caused by the electrode array migrating partially or completely out of the cochlea
 - perforation of external ear structures, such as the tympanic membrane or canal wall, by the electrode lead
 - perception of non-auditory sensations and poorer performance than expected from misplacement of the electrode array.
- Electrical stimulation may result in increased tinnitus, temporary facial nerve stimulation, temporary dizziness, or temporary pain.



- The long term effects of electrode insertion trauma or chronic electrical stimulation are unknown. Such effects may include new bone growth in the cochlea or deterioration of the nerve cells. These effects may preclude replacement of the electrode array or may lead to eventual deterioration of cochlear response.
- Failure of component parts (both external and internal) could result in the perception of an uncomfortably loud sound sensation, intermittent sound, or no sound.
- Failure of various component parts of the implanted device could require removal or replacement of the implant, or a reduction in the number of electrodes used.
- Meningitis:
 - Before implantation, candidates should consult their primary care physician and implanting surgeon regarding vaccination status against micro-organisms that cause meningitis.
 - Meningitis is a known risk of inner ear surgery and candidates should be appropriately counselled of this risk. Certain preoperative conditions may increase the risk of meningitis with or without an implant. These conditions include:
 - Mondini's syndrome and other congenital cochlear malformations
 - CSF shunts or drains
 - recurrent episodes of bacterial meningitis before implantation
 - perilymph fistulas and skull fracture/defect with CSF communication.

8.2.2 Other Risks

Potential risks that can be associated with the external sound processor include:

- sounds becoming uncomfortable
- discomfort during assessments, exams and/or programming
- pressure sores may develop at the external device coil site if the magnet is too strong or in contact with the skin
- adverse effects in environments of high magnetic or electric field strength (e.g. close to high power commercial radio transmitters)

Additional warnings as described in the CP1000 Smart Sound Processor User Guide, Recipient Important Information Booklet, and MRI Guidelines.

8.3 Risks Associated with Participation in the Clinical Investigation

Potential clinical risks associated with participation in the clinical investigation are shown below. These are additional risks, beyond the risks associated with standard cochlear implant surgery.

- a. The procedures conducted in this study include a post-operative CT scan, which may not be routine clinical care at all study sites.



- A CT scan may risk exposure to a very small amount of radiation. As part of everyday living, everyone is exposed to naturally occurring background radiation and receives a dose of about 2 millisieverts (mSv) each year. The effective dose from this research project is about 0.919 mSv. At this dose no harmful effects of radiation have been demonstrated, as any effect is too small to measure. This risk is believed to be very low.
 - A CT scan may cause malfunction of some electronic medical devices such as pacemakers or drug pumps. Subjects are asked to inform the research staff of these devices prior to undergoing the scan.
 - A CT scan may be harmful to an embryo or fetus. Women participants must agree to inform the CT technician if there is any possibility they are pregnant.
- b. During device programming there is a low risk that subjects may experience an uncomfortably loud or painful sound due to a software or firmware bug or clinician error. This risk is higher than with the predicate device implant, given that several novel programs will be created for the subject. The risk of pain associated with device programming is mitigated by careful clinician training and software warnings. Furthermore, the subject will be reminded by the investigator during programming to remove the coil immediately if they experience an uncomfortably loud sound, and the investigator will stop the stimulation immediately in the software if the recipient hears an uncomfortably loud sound.
- c. [REDACTED]
- d. The study schedule requires several changes in listening programs over the course of participation. Subjects may experience difficulty adjusting between programs. It may be difficult for a subject to adjust to a different program after they have become comfortable with the previous program. Some programs could have poorer sound quality than others, which may or may not improve with additional listening experience or device adjustments. If required a program map can be modified to address sound quality issues.

- [REDACTED]
- [REDACTED]
 - [REDACTED]
 - [REDACTED] for



[REDACTED]

■ [REDACTED]

■ [REDACTED]

■ [REDACTED]

8.4 Risk Mitigation

The following will be performed during the clinical investigation to mitigate the risks identified above:

- All surgeons have experience in the use and handling of the CI632 implant, the predicate device to the CI1032 implant.
- All audiologists will receive training in the use and handling of the CP1000 Smart Sound Processor and the investigational software. In addition, a Sponsor representative will be present to provide support during audiological procedures performed by the investigational sites until such time as the investigational site team are confident and competent to complete the study requirements and programming support. The duration and level of support provided by the Sponsor will be guided by the investigators. Sponsor representatives may attend intraoperative or postoperative sessions also to trouble-shoot any device deficiencies that may arise during the investigation.
- All reported ADEs and DDs will be regularly reviewed by the Sponsor's Clinical Review Board for the duration of the study to facilitate early detection and appropriate intervention if events are unanticipated with respect to incidence, severity, or outcome.
- Specific risk mitigations to address risks b) and d) in section 8.3 are described in 8.3.

8.5 Benefit-to Risk Rationale

Benefits of a cochlear implant to the recipient may include improved detection and recognition of environmental sounds, improved detection and recognition of conversational speech, limited ability to use the telephone, and overall improvement in sound quality.

The anticipated additional benefits of FMS that will be investigated in this study are improved hearing performance in areas such as speech perception and music appreciation, compared with the standard-of-care MP stimulation mode. The additional risks that may be posed by FMS have been assessed and do not alter the conclusion that the potential benefits outweigh the risks for the investigational device.



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[REDACTED]

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[REDACTED]

9.3 Hypotheses

No formal testable hypotheses are applicable for this early feasibility study.

9.3.1 Primary Hypothesis

There is no primary hypothesis due to the feasibility nature of the investigation.

9.3.2 Secondary Hypothesis

There are no secondary hypotheses due to the feasibility nature of the investigation

9.3.3 Exploratory Hypothesis

There are no exploratory hypotheses due to the feasibility nature of the investigation.

[REDACTED]

[REDACTED]

[REDACTED]

[REDACTED]



[REDACTED]

[REDACTED]

[REDACTED]

[REDACTED]

[REDACTED]

[REDACTED]

9.6 Endpoint Analyses

9.6.1 Primary Endpoint Analyses

This study does not have a formal statistical evaluation of pre-defined hypotheses. See section 9.1 regarding general data analysis considerations.

[REDACTED]

[REDACTED]

[REDACTED]

[REDACTED]

[REDACTED]

9.7 Safety Analyses

Adverse events will be tabulated according to the study interval, the number of procedure-related events, and the number of device-related events. Procedure- and device-related adverse events will be summarized as rates, where the numerator for each rate will be the number of subjects with at least one procedure- or device-related event, and the denominator will be the total number of subjects. Adverse events will be reported by type, frequency, and severity. No formal statistical comparisons will be conducted.

[REDACTED]

[REDACTED]



10 INFORMED CONSENT PROCESS

Informed consent must be obtained by the external investigator and may include discussions with the Cochlear investigator as required (e.g., to answer questions regarding postoperative research procedures). The Investigator shall obtain written informed consent from the subject using an approved ICF prior to any clinical investigation-related examination or activity. The rationale of the clinical investigation, as well as the benefits and risks, what participation will involve, and established alternatives to participation will be explained to the subject in native non-technical language, understandable to the subject. Ample time will be provided for the subject to enquire about details of the clinical investigation and to decide whether to participate.

All questions about the clinical investigation shall be answered to the satisfaction of the subject or the subject's legally acceptable representative. Subjects shall not be coerced or unduly influenced to participate or to continue to participate in a clinical investigation. They shall not waive or appear to waive their legal rights.

Each subject (or their legally designated representative) and the person who conducted the informed consent discussion, shall sign and personally date the Informed Consent Form (ICF). Where required, an independent and impartial witness shall sign and personally date the ICF. A copy of the signed ICF shall be given to the subject. The original signed ICF shall be archived in the Investigator's Site File or subject file at the investigational site.

This process shall be documented in the subject's source documents.

The subject, or the subject's legally designated representative, shall be informed in a timely manner if new information becomes available that may be relevant to the subject's willingness to continue participation in the clinical investigation. The communication of this information must be documented as an update to the ICF and re-consent of the subject. Re-consent must be obtained by the external investigator and may include discussions with the Cochlear investigator as required (e.g., to answer questions regarding postoperative research procedures).

11 ADVERSE EVENTS AND DEVICE DEFICIENCIES

11.1 Definitions

11.1.1 Adverse Event

An adverse event (AE) is any untoward medical occurrence, unintended disease or injury, or untoward clinical signs (including abnormal laboratory findings) in subjects, users or other persons whether or not related to the medical device or the procedures required for implant or use, and whether anticipated or unanticipated.

NOTE 1: This definition includes events related to the medical device or the comparator device.

NOTE 2: This definition includes events related to the procedures involved.



NOTE 3: For users and other persons, this definition is restricted to events related to the use of medical devices.

11.1.2 Adverse Device Effect

An adverse device effect (ADE) is an AE related to the use of a medical device.

NOTE 1: This includes any AE resulting from insufficiencies or inadequacies in the instructions for use, the deployment, the implantation, the installation, the operation, or any malfunction of the medical device.

NOTE 2: This definition includes any event resulting from use error or from intentional misuse of the medical device.

NOTE 3: This includes 'comparator' if the comparator is a medical device.

11.1.3 Serious Adverse Event

A serious adverse event (SAE) is any AE that led to any of the following:

- 1) death,
- 2) serious deterioration in the health of the subject, users, or other persons as defined by one or more of the following:
 - a life-threatening illness or injury, or
 - a permanent impairment of, or damage to, a body structure or a body function including chronic diseases, or
 - in-patient hospitalisation or prolonged hospitalisation, or
 - medical or surgical intervention to prevent life-threatening illness or injury or permanent impairment or damage to a body structure or a body function,
- 3) foetal distress, foetal death or a congenital physical or mental abnormality, or birth defect including physical or mental impairment.

NOTE: Planned hospitalisation for a pre-existing condition, or a procedure required by the CIP, without serious deterioration in health, is not considered a SAE.

11.1.4 Serious Adverse Device Effect

A serious adverse device effect (SADE) is an ADE that has resulted in any of the consequences characteristic of a SAE.

11.1.5 Unanticipated Serious Adverse Device Effect

An unanticipated serious adverse device effect (USADE) is a SADE, which by its nature, incidence, severity, or outcome has not been identified in the current version of the IB, IFUs, CIP, or ICF.

USADE are also known as a UADE (Unanticipated Adverse Device Effect) for the purposes of US FDA reporting.

NOTE: An anticipated serious adverse device effect is an effect, which by its nature, incidence, severity, or outcome has been identified in the IB, IFUs, CIP, or ICF.



11.1.6 Adverse Events of Special Interest

Not applicable.

11.1.7 Device Deficiency

A Device Deficiency (DD) is an inadequacy of a medical device with respect to its identity, quality, durability, reliability, usability, safety, or performance.

NOTE 1: Device Deficiencies include malfunctions, use errors, and inadequacy in the information supplied by the manufacturer including labelling.

NOTE 2: This definition includes device deficiencies related to the IMD or the comparator.

11.1.8 Serious Health Threat

A signal from any adverse event or device deficiency that indicates an imminent risk of death or a serious deterioration in the health in subjects, users or other persons, and that requires prompt remedial action for other subjects, users or other persons.

NOTE: This would include events that are of significant and unexpected nature such that they become alarming as a potential serious health hazard or possibility of multiple deaths occurring at short intervals.

11.2 Recording and Handling of Adverse Events

Subjects shall be carefully monitored during the clinical investigation and the investigator should enquire about AEs at investigation visits.

All AEs will be recorded from the time of first use/contact with the IMD. AE recording will continue for each subject until completion of their End of Study visit. Ongoing SAEs/SADEs will be followed until resolution or stabilization of the event, up to 30 days beyond the subject's End of Study visit. Management of the SAE/SADE beyond the clinical investigation completion will be absorbed into standard clinical and medical care by the participating clinical investigational site. Safety data will be reviewed in accordance with the Sponsor's standard operating procedures regarding safety events.

Source notes should indicate the evaluation for AEs, even if there was none to report. All required AEs will be reported if observed, even if anticipated and/or acknowledged as a risk factor in the consent.

All AEs will have the following information documented: start and stop dates, action taken, outcome, severity and investigators opinion on the potential relationship to the IMD and study procedures. If an AE changes in severity, the most severe (highest) grade will be captured for that event on the Adverse Events CRF.

Both external and internal investigators will assess AEs at each study visit. To ensure proper medical oversight, AEs identified by internal Cochlear investigators will be referred for assessment and reporting by the external clinical site, unless the AE is an expected event that is procedure-related as part of the postoperative research procedures.



11.2.1 Assessment of Severity

The Principal Investigator (or qualified delegate) will make an assessment of severity for each event based on clinical judgement. The intensity of each event recorded in the CRF should be assigned to one of the following categories:

Mild	An event that is easily tolerated by the subject, causing minimal discomfort and not interfering with everyday activities.
Moderate	An event that is sufficiently discomforting to interfere with normal activities
Severe	An event which is incapacitating and prevents normal everyday activities

11.2.2 Assessment of Causality

The Investigator will assess the potential causal relationship of each event, using clinical judgement. Alternative causes, such as natural history of underlying diseases, other risk factors and the temporal relationship of the event to the IMD product will be considered and investigated. The causal relationship to the IMD is to be assessed by the Investigator (or medically qualified delegate) using the following classifications:

Not related	Relationship to the medical device or procedures can be excluded when: - the event is not a known side effect of the product category the device belongs to or of similar devices and procedures; - the event has no temporal relationship with the use of the device or the procedures; - the event does not follow a known response pattern to the medical device (if the response pattern is previously known) and is biologically implausible; - the discontinuation of medical device application or the reduction of the level of activation/exposure - when clinically feasible - and reintroduction of its use (or increase of the level of activation/exposure), do not impact on the event; - the event involves a body-site or an organ not expected to be affected by the device or procedure; - the event can be attributed to another cause (for example, an underlying or concurrent illness/ clinical condition, an effect of another device, drug, treatment or other risk factors); - the event does not depend on a false result given by the investigational medical device used for diagnosis, when applicable; - harms to the subject are not clearly due to use error; In order to establish the non-relatedness, not all the criteria listed above might be met at the same time, depending on the type of device/procedures and the event.
Unlikely related	The relationship with the use of the medical device seems not relevant and/or the event can be reasonably explained by another cause, but additional information may be obtained.
Possibly related	The relationship with the use of the medical device is weak but cannot be ruled out completely. Alternative causes are also possible (for example, an underlying or concurrent illness/ clinical condition or/and an effect of another device, drug or treatment). Cases where relatedness cannot be assessed or no information has

	been obtained should also be classified as possibly related.
Probably related	The relationship with the use of the medical device seems relevant and/or the event cannot be reasonably explained by another cause, but additional information may be obtained.
Definitely related	The event is associated with the medical device or with procedures beyond reasonable doubt when: - the event is a known side effect of the product category the device belongs to or of similar devices and procedures; - the event has a temporal relationship with the medical device use/application or procedures; - the event involves a body-site or organ that - the medical device or procedures are applied to - the medical device or procedures have an effect on; - the event follows a known response pattern to the medical device (if the response pattern is previously known); - the discontinuation of medical device application (or reduction of the level of activation/exposure) and reintroduction of its use (or increase of the level of activation/exposure), impact on the event (when clinically feasible); - other possible causes (for example, an underlying or concurrent illness/ clinical condition or/and an effect of another device, drug or treatment) have been adequately ruled out; - harm to the subject is due to error in use; - the event depends on a false result given by the medical device used for diagnosis, when applicable; In order to establish the relatedness, not all the criteria listed above might be met at the same time, depending on the type of device/procedures and the event.

Due to the different causality reporting requirements in participating regions, the Sponsor will request causality assessments from investigators using the five categories described in the preceding table. Cochlear will report causality to competent authorities and ethics committees based on local regional requirements as described in Section 11.4.2.

11.2.3 Assessment of Seriousness

The Investigator will assess the seriousness of each event according to clinical judgement and the definition provided in section 11.1.3.

11.2.4 Assessment of Expectedness

An event should be considered unanticipated if the nature, severity, or frequency of that event is not consistent with the applicable safety reference information, such as the hazards analysis, IB, or Product Information/IFU if the product is approved for marketing.

For this clinical investigation the listed items in Section 8.2 and 8.3 of this CIP and/or the IB, IFU, or ICF are anticipated ADEs.



Anticipated	An adverse device effect (ADE) which by its nature, incidence, severity, or outcome is consistent with the applicable safety reference information (for example, IB, IFU).
Unanticipated	An adverse device effect (ADE) which by its nature, incidence, severity, or outcome is not consistent with, or has not been identified in the applicable safety reference information (for example, IB, IFU).

11.3 Recording and Handling of Device Deficiencies

Subjects shall be carefully monitored during the clinical investigation and routinely questioned about DDs at investigation visits. Source notes should indicate the evaluation for DDs, even if there are none to report.

The Investigator shall assess if the DD led to an AE or could have led to a serious medical occurrence (serious adverse device effect) if;

- 1) suitable action had not been taken,
- 1) intervention had not been made, or,
- 2) circumstances had been less fortunate

Both external and internal investigators will assess DDs at each study visit. To ensure appropriate management of the IMD including access to investigational fitting software and diagnostic tools, DDs identified by external investigators will be referred for assessment and reporting by the internal Cochlear investigators. All DDs will be documented in the source notes and the DD page of the CRF.

The CI1032 is an implanted device. In the unlikely event of a device failure and explantation, the implant will be returned to the Sponsor device analysis representative.

Investigational sound processors and accessories will be returned to the Sponsor, whether used or unused. If necessary, the sound processor and other external components shall be sent for device analysis.

11.4 Reporting Responsibilities

The Investigator is responsible for reporting all AEs and DDs in the CRF.

11.4.1 Investigator Reporting of Serious Adverse Events

All AEs meeting the criteria for an SAE, or DD that could have led to an SADE, must be reported to the Sponsor in accordance with timeframes required by local regulations, as follows:

Country	Timeframe
Belgium	Immediately.
United States	The investigator must submit to the Sponsor and the reviewing IRB a report of any unanticipated adverse device effect as soon as possible but no later than 10 working days after the investigator first learns of the effect.

Reporting is achieved through completion of the events details in the Adverse Event page of the eCRF.



The Investigator shall always provide an assessment of causality at the time of the initial report, as described in section 11.2.2 'Assessment of Causality'. If data obtained after reporting indicates that the assessment of causality is incorrect, then the SAE form may be appropriately amended, signed, dated, and resubmitted to the Sponsor.

If the Investigator does not have all other information regarding an SAE, he/she will not wait to receive additional information before reporting the event. The reporting forms shall be updated when additional information is received.

In the United States, the Investigator is responsible for reporting of safety events to their local EC using the applicable report form, in accordance with local regulations. In Belgium, reporting to the local EC is coincident with that to the Competent Authority, described in the following section.

11.4.2 Sponsor Notification of Events

The Sponsor is responsible for reviewing all safety data to evaluate potential causality and anticipation of all ADEs, and shall conduct an expedited assessment of all SAEs, unanticipated ADEs, DDs that could have led to an SADE, including serious health threat.

The Sponsor is also responsible for reporting all reportable events according to the requirements and timelines of the regulatory authorities relevant to this clinical investigation. Country specific sponsor reporting responsibilities are outlined in the Sponsor's Safety Data Handling Plan and summarized below.

Belgium:

The sponsor is responsible for reporting to the FAMHP (Federal Agency for Medicines and Health Products): ct.rd@famhp.be, by using the MDCG 2020-10/2 form:

- a) any serious adverse event that has a causal relationship with the investigational device, the comparator or the investigation procedure or where such causal relationship is reasonably possible;
- b) any device deficiency that might have led to a serious adverse event if appropriate action had not been taken, intervention had not occurred, or circumstances had been less fortunate; and
- c) any new findings in relation to any event referred to in points (a) and (b).

Reporting must be:

- a) for all reportable events which indicate an imminent risk of death, serious injury, or serious illness and that requires prompt remedial action for other patients/subjects, users or other persons or a new finding to it: immediately, but not later than 2 calendar days after awareness by sponsor of a new reportable event or of new information in relation with an already reported event; or
- b) any other reportable events or a new finding/update to it: immediately, but not later than 7 calendar days following the date of awareness by the sponsor of the new reportable event or of new information in relation with an already reported event.

In case an initial notification of an SAE/SADE would be incomplete, on receipt of additional information the Sponsor must submit a clearly referenced and numbered follow-up report of the event.

As described in Section 11.2.2, investigators will report causality assessments to Cochlear using a five-category rating scale. In order to comply with Belgian reporting requirements, Cochlear shall map the



reported causality when reporting to the Belgian competent authority and/or ethics committee. Mapping shall be based on following table:

#	Cochlear eCRF Term – Relationship	MDCG 2020-10/2 Form Term
1	Not related	Not related
2	Unlikely related	Possible
3	Possibly related	Possible
4	Probably related	Probable
5	Definitely related	Causal

United States:

The sponsor must report the results of an evaluation of an unanticipated adverse device effect to FDA and all reviewing IRBs and investigators within 10 working days after the sponsor first receives notice of the adverse effect.

The Safety Monitor for AE/DD assessment and any AE/DD related queries is:

E-mail:

CLTD-SafetyMonitor@cochlear.com

11.5 Independent Data Monitoring Committee

No data monitoring committee will be used for this clinical investigation because the study does not meet any of the criteria listed in the table below.

Evaluation	Rationale
☐ Yes ☒ No	The primary endpoint is such that a highly favorable, unfavorable or futility finding at an interim analysis might ethically require termination of the investigation before its planned completion;
☐ Yes ☒ No	There are a priori reasons for a particular safety concern;
☐ Yes ☒ No	The investigation is being performed in a vulnerable population such as children or the very elderly, or other vulnerable populations, such as those who are terminally ill or of diminished mental capacity;
☐ Yes ☒ No	The investigation is being performed in a subject population at elevated risk of serious outcomes, even when the study objective addresses a lesser endpoint;
☐ Yes ☒ No	The study is large, of long duration, and multi-center.

12 DEVICE ACCOUNTABILITY

Supply of investigational medical devices will be recorded using the Sponsor Device Tracking Form (1295388) and Software Tracking Form (1302326). Investigational medical device(s) will be quarantined at the investigational site and clearly labelled to identify exclusively for use in a clinical investigation.



Subject level device supply will be tracked using the Individual Subject Device Accountability Log Form (1295295).

[REDACTED]

[REDACTED]	[REDACTED]
[REDACTED]	[REDACTED]
[REDACTED]	[REDACTED]
[REDACTED]	[REDACTED]

13 DEVIATIONS FROM THE CLINICAL INVESTIGATION PLAN

The Investigator(s) must not deviate from the CIP, except in case of an emergency to protect the safety and well-being of the subject(s). Such deviations will be documented by the site personnel in the source documentation for the subject and reported to the relevant EC as per institutional requirements and to the Sponsor as soon as possible, but not later than 5 working days from the date of the emergency.

If there is a deviation from CIP-defined assessments or parts thereof are omitted or completed incorrectly, the deviation will also be documented by the site personnel in the source documentation for the subject. Depending on the type or severity of the deviation the Investigator may be required to notify the EC, particularly if the deviation potentially impacts subject safety, performance of IMD, or data integrity.

All CIP deviations will be documented in the eCRF to enable analysis and reporting by the Sponsor in the Clinical Investigation Report (CIR), or to the relevant regulatory authority(s), if applicable.

Gross misconduct on behalf of an Investigator, such as intentional non-compliance with CIP or GCP requirements or fraud, will result in disqualification of the Principal Investigator and/or Investigational Site from participation in the investigation. Data provided by the Principal Investigator or Investigational Site will be excluded from the per-protocol analysis group.

14 DATA MANAGEMENT

The CRF will capture the datapoints necessary to determine the subject status according to the criteria described in section 7.2.5.

14.1 Source Data

Source data will be captured in clinic notes, paper-based source data worksheets, or printed directly from testing software. If electronic medical records do not permit read only access for monitoring purposes, a certified printout must be provided, indicated by a dated signature by a member of the site team or generated through a validated process.

An Origin of Source Data Form will be used to capture the location of source data kept at each site, outlining the individual site's process for certification.



14.2 Methods for Data Entry and Collection

Data collection will be performed using Medidata Rave for electronic data capture (EDC) on electronic Case Report Forms (eCRFs). Site staff will be trained on the completion of the eCRFs prior to obtaining access to the system, and will have their own Login/Password. Access to clinical study information will be based on an individual's role and responsibilities.

Medidata Rave uses role-based user permissions for data entry, viewing, and reporting options. All communications between users and the EDC server are encrypted. Web servers are protected by a managed firewall. This application is designed to be in compliance with applicable regulations including 21 CFR Part 11.

The application will include programmed data consistency checks and supports manual generation of data clarifications/queries, including documentation of site responses. The application maintains a comprehensive audit trail for all data entered, including updates and queries, and documents the time that each entry occurred and who made the entry.

Principal Investigators will affirm that the data for each subject at their site is accurate and complete by way of an electronic signature.

In addition, de-identified electronically generated data will be collected from the Cochlear Research Platform, CT imaging, pupillometry software, and device logs. The unamended data file shall be regarded as the source.

Due to the exploratory nature of this feasibility study, data for exploratory endpoints and de-identified electronically generated data as described above may be stored outside of Medidata Rave in a password-protected secure file location.

Source data verification will be conducted as specified in the monitoring plan and according to a risk-based approach that considers reporting, regulatory submission, and publication plans.

14.3 Database Lock

The Sponsor shall confirm that no further subject visits will be conducted, all required forms have been completed and required data have been entered in Medidata Rave, all required monitoring has been performed, all data queries have been closed, and all completed CRFs have been signed by the Principal Investigator or delegate. The Sponsor shall lock the clinical investigation database and generate raw datasets to enable analysis.

Following the conclusion of the study, including the completion of the final study report, key study documentation including raw data outputs will be archived in the Electronic Trial Master File (eTMF) system and will be kept for at least 15 years.

Sites will be sent PDF representations of the data captured in Medidata Rave, including audit trail, to enable the site to archive the data for their subjects.

15 CONFIDENTIALITY

The investigator and site staff will collect and process personal data of the subjects in accordance with governing data privacy regulations [such as the EU GDPR regulations].



Data will be reported to the Sponsor on CRFs or related documents (for example, questionnaires). Subjects will be identified on CRFs and other related documents only by a unique subject identification code and shall not include the subject's name or other personal identifiable information. Completed CRFs or related documents are confidential and will only be available to the Investigator and site staff, the Sponsor and their representatives, and if requested to the Ethics Committee and national regulatory authorities. Publications or submission to a regulatory authority shall not disclose the identity of any subject.

16 ETHICS COMMITTEE AND REGULATORY AUTHORITY APPROVAL

This clinical investigation will be conducted under the following regulatory pathways:

Country	Pathway
European Union	EU MDR Article 62
US	Investigational Device Exemption (IDE)

The clinical investigation will not commence prior to the written favorable opinion or approval from the EC and or regulatory authority (if appropriate) is obtained.

The final Sponsor-approved version of the CIP, Informed Consent Form, and other necessary documents shall be submitted to the EC. A copy of the EC opinion/approval shall be provided to the Sponsor.

The Investigator shall forward to the Sponsor, for review and approval, any amendment made to the approved ICF and any other written information to be provided to the subject prior to submission to the EC.

The Sponsor and Principal Investigator will continue communications with the EC, as required by national regulations, the clinical investigational plan, or the responsible regulatory authority.

Any additional requirements imposed by the EC or regulatory authority will be implemented by the Sponsor.

The Investigator shall submit the appropriate documentation if any extension or renewal of the EC approval is required. In particular, substantial amendments to the CIP, the ICF, or other written information provided to subjects will be approved in writing by the EC.

The Investigator shall report to the EC any new information that may affect the safety of the subjects or the conduct of the clinical investigation. The Investigator will send written status summaries of the investigation to the EC regularly, as per local EC requirements.

Upon completion of the clinical investigation, the Investigator shall provide the EC with a brief report of the outcome of the clinical investigation, as per local EC requirements. Local requirements are listed below.

Belgium:

Upon end of a clinical investigation, the sponsor shall notify the EC and regulatory authority within 15 days. In the case the clinical investigation is temporarily halted or terminated early, notification of this shall be made to the EC and regulatory authority within 15 days. Justification for the halt or termination shall be included. If either situation is on safety grounds, then the reporting timeframe is 24 hours.



The clinical investigation report and summary needs to be submitted within one year of the end of the clinical investigation or within three months of the early termination or temporary halt to the EC and regulatory authorities.

United States:

FDA and all reviewing IRBs will be notified within 30 working days of the completion or termination of the investigation

A final report will be submitted to FDA and all reviewing IRBs and participating investigators within 6 months after the completion or termination of the investigation.

The clinical investigation is covered by clinical trial insurance, meeting the requirements of the participating countries.

17 SUSPENSION OR PREMATURE TERMINATION

The Sponsor will discontinue the clinical investigation site if:

- 1) major non-adherence to the CIP or GCP principles is occurring
- 2) it is anticipated that the subject recruitment will not be adequate to meet the objectives of the clinical investigation

An ongoing clinical investigation may be discontinued in case of:

- 1) device failure
- 2) serious or intolerable ADE, leading to the explant or discontinued use of the device
- 3) subject's death

Should the Sponsor discontinue the clinical investigation, the Sponsor will continue to support those subjects who were already implanted with the device under investigation.

18 AMENDMENTS TO THE CLINICAL INVESTIGATION PLAN

No changes in the CIP or investigation procedures shall be made without mutual agreement of the Principal Investigator and the Sponsor. This agreement will be documented as a CIP amendment. Amendments will require notification to the Ethics Committees (ECs) by the Principal Investigators (and to the relevant regulatory authority(s) by the Sponsor, if applicable). In Belgium, the reporting of substantial modifications to the Ethics Committee is coincident with the reporting to the FAMHP. Only one submission is required through the national contact point (FAMHP).

19 RECORD KEEPING AND RETENTION

Data generated from the clinical investigation will be stored in a limited-access file area and be accessible only to representatives of the study site, the Sponsor and its representatives, and relevant health authorities/regulatory agencies. All reports and communications relating to study subjects will identify subjects only by subject unique identification code. Complete subject identification will be maintained by the



Investigator. This information will be treated with strict adherence to professional standards of confidentiality.

The investigator must retain study-related records in accordance with the period required by local regulation, as follows:

Country	Retention period
Belgium	At least 15 years after completion of the investigation, or, in the event that the device is subsequently placed on the market, at least 15 years after the last device has been placed on the market.
United States	At least 2 years after completion of the investigation or after the last device was placed on the market, if the IMD has market authorization.

The Sponsor will notify the Principal Investigator when records are no longer needed. The Investigator will not discard any records without notifying the Sponsor. If the Principal Investigator moves from the current investigational site, the Sponsor should be notified of the name of the person who will assume responsibility for maintenance of the records at the investigational site or the new address at which the records will be stored. The Investigator will notify the Sponsor as soon as possible in the event of accidental loss or destruction of any study documentation.

20 PUBLICATION POLICY

This clinical investigation will be prospectively registered at a public clinical trial registry, ClinicalTrials.gov.

A joint peer-reviewed publication authored by the clinical investigator(s) and Sponsor will be prepared. In addition, the results of the clinical investigation may also be disseminated as conference presentations (for example, abstract and poster session). Manuscript authorship and responsibilities will be discussed and agreed upon prior to investigation start and in accordance with guidelines and recommendations provided by the International Committee of Medical Journal Editors (ICMJE) to enable communication within 12 months of the Clinical Investigation Report (CIR) approval. All contributors who do not meet the criteria for authorship will be listed in an acknowledgments section of the publication.

21 STATEMENTS OF COMPLIANCE

This clinical investigation shall be conducted in accordance with ethical principles that have their origin in the Declaration of Helsinki, International Standard ISO 14155:2020 Clinical investigation of medical devices for human subjects - Good Clinical Practice, and any regional or national regulations, as applicable. This study will comply with 21 CFR parts 50, 54, 56, and 812, 42 CFR part 11, and 45 CFR part 160 and 164.

22 QUALITY CONTROL AND ASSURANCE

In accordance with Cochlear's Quality Management System, all clinical investigations shall be conducted according to internationally recognised ethical principles for the purposes of obtaining clinical safety and performance data about medical devices.



The Sponsor employees (or designee) shall use standard operating procedures (SOP) to ensure that clinical study procedures and documentation are consistently conducted and compliant with the ISO 14155:2020 Standard, Good Clinical Practice (GCP), and applicable local regulations.

22.1 Monitoring

The Sponsor will perform on-site and remote monitoring visits as frequently as necessary to oversee conduct, data collection and record keeping by sites. The clinical investigation monitoring plan is a separate document for the sponsor to follow, describing all the activities performed during site qualification, initiation, monitoring, and close out.

In accordance with applicable regulations, GCP, and sponsor's/CRO's procedures, monitors will contact the site prior to the start of the study to review with the site staff the CIP, study requirements, and their responsibilities to satisfy regulatory, ethical, and sponsor's requirements. When reviewing data collection procedures, the discussion will also include identification and documentation of source data items.

The sponsor/designee will monitor the site activity to verify that the:

- Data are authentic, accurate and complete
- Safety and rights of subjects are being protected
- Study is conducted in accordance with the currently approved CIP
- Any other study agreements, GCP, and all applicable regulatory requirements are met.

The investigator and the head of the medical institution (where applicable) agrees to allow the monitor direct access to all relevant documents.

22.2 Audits

To ensure compliance with GCP, the CIP, study procedures and applicable regulatory and EC requirements, an independent audit of the study may be conducted. The investigator/institution will be informed of the outcome for audits involving their site.

In addition, inspections by regulatory health authority representatives and EC(s) are possible. An Investigator must, in reasonable time, upon request from a relevant health authority or regulatory agency, permit access to requested records and reports, and copy and verify any records or reports made by the Investigator. Upon notification of a visit by a regulatory authority, the Investigator will contact the Sponsor immediately.

The Investigator will grant the Sponsor representatives the same access privileges offered to relevant health authority or regulatory agents, officers, and employees, for the purposes of a Sponsor audit of the site, or in preparation for an inspection.

Audits and inspections may occur at any time during or after completion of the study.

23 TRADEMARKS AND COPYRIGHT

ACE, Advance OffStyler, AOS, Ardium, AutoNRT, Autosensitivity, Baha, Baha SoftWear, BCDrive, Beam, Bring Back the Beat, Button, Carina, Cochlear, 科利耳, コクレア, 코클리어, Cochlear SoftWear, Contour, コントウア, Contour Advance, Custom Sound, DermaLock, Freedom, Hear now. And always, Hugfit, Human Design,

Hybrid, Invisible Hearing, Kanso, LowPro, MET, MP3000, myCochlear, mySmartSound, NRT, Nucleus, Osia, Outcome Focused Fitting, Off-Stylet, Piezo Power, Profile, Slimline, SmartSound, Softip, SoundArc, True Wireless, the elliptical logo, Vistafix, Whisper, WindShield and Xidium are either trademarks or registered trademarks of the Cochlear group of companies. [2022]

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