



Guideline for Competency Skills Assessment Tools: Performing EEG (Basic)

The ANTA Inc. Competency Statements were written and established in 2014. This guideline for competency skills assessment is to establish the standard criteria to evaluate competencies for technologists/scientists performing an electroencephalogram (EEG) in accordance with the ANTA Inc Competency Statements.

The competent EEG technologists/scientists must be tested for quality of patient care and interaction, basic knowledge of EEG instrumentation, technical requirements during EEG performance and clinical knowledge of presenting conditions for appropriate adaptation of recording techniques and interpretive skills.

There are three major components in each assessment tool (both practical and written examination), these include criteria, indicators and a graduated scale.

- Criteria: Identification of the essential skills items
- Indicators: For consistent assessment and evaluation of performance
- A graduated scale: Identification of the degree of skill (Bondy)

Assessment Tools for Performing EEG (Basic)

The assessment tools for basic level of EEG technologists/scientists in accordance to the ANTA Inc. Competency Statements EEG and in alignment with the ANTA Inc Recording Guidelines are:

1. Log book and portfolio:
At least 100 EEGs performed by the candidate, 16 EEG samples and 3 factual reports. See Appendix I and II for complete Logbook and Portfolio instructions.
On submission of the Logbook and Portfolio the candidate will be granted 'complete' or 'incomplete' status for this assessment tool. The candidate must attain 'complete' status to be granted a pass for this section.
2. Written Examination: 50 multiple choice questions (MCQs)
The candidate must attain 80% to be granted a pass for this section.
3. Practical Examination: To be assessed by 2 assessors
The candidate must attain 100% in electrode application and 80% for the remainder of the practical examination to be granted a pass for this section.

The candidate must pass each of the above sections (1, 2 and 3) to be deemed competent in Performing EEG (Basic). A certificate of attainment will be issued to the candidate on successful completion of all three (3) Assessment Tools.

Guidelines for Performing EEG (Basic) Assessment

The Assessment Tools for Performing EEG (Basic) are prepared in alignment with the following ANTA Inc Competency Statements and Test Guidelines

- Competency Statements EEG
- EEG Guideline
- Non Routine EEG Guideline
- Other Physiological Measurement Guideline
- Infection Control Guideline

NB: Neonatal EEG Guideline has not been included in this Competency Assessment Tool 'Performing EEG (Basic)'.

Assessment Tool Format

Assessment Tool 1 – Log book and Folio

The candidate must submit the Logbook containing a record of at least 100 EEGs they have recorded as outlined in Appendix I. The candidate must also submit a portfolio containing at least 16 EEG samples and 3 written factual reports as outlined in Appendix II.

Assessment Tool 2 – Written Examination

The candidate must complete the MCQ written examination under examination conditions. Access to the written examination will be offered on application.

Assessment Tool 3 -Practical Examination

Two formats for Competency Skills Assessment: Performing EEG (Basic) – Practical Examination (Assessment Tool 3) are outlined.

- Traditional Competency Skills Assessment – Performing EEG (Basic)
- Modified Competency Skills Assessment – Performing EEG (Basic)

Traditional Competency Skills Assessment: Performing EEG (Basic) -Practical Examination

The **traditional** format for the Practical Examination includes setting up for and recording an EEG on a subject connected to a live EEG acquisition apparatus. This format covers **all** key essential skill items in section 3 (Assessment Tool 3) in the live practical examination as outlined below.

Modified Competency Skills Assessment – Performing EEG (Basic)

The **modified** version of the Practical Competence Examination includes setting up for an EEG without connecting to a live EEG acquisition apparatus (non-live) and allows for insurance implications related to non-employee candidates and examiners in the place of the examination. An independent battery-operated impedance measuring meter will be made available to assess the integrity of the applied electrode impedance. A pre-recorded EEG will be utilised to complete the practical examination.

This format will cover key essential skill items 3.1 to 3.2.2 in the non-live practical examination as outlined below in section 3 (Assessment Tool 3). Assessment points 3.2.3 to 3.2.14 will be covered in the pre-recorded EEG presented to the candidate.

Both versions of Assessment Tool 3 are in alignment with the ANTA Inc. Competency Statements and Guidelines and are equally weighted in all areas of assessment.

It is recommended that the candidate submit the Log book and Portfolio prior to attempting the practical examination in order to be best prepared. However, this is not a requirement.

Assessment Scale

A graduated assessment scale identifying the degree of skill will be used for the final outcome of the *Competency Skills Assessment: Performing EEG (Basic)*.

Five-point Bondy rating scale tested for quality of performance in 5 ways.

5 score. Independent (No supporting cues required)

4 score. Supervised (Requires occasional supportive cues)

3 score. Assisted (Required frequent verbal and occasional physical directives)

2 score. Marginal (Required continuous verbal and frequent physical directive cues)

1 score. Dependent (Required continuous verbal and continuous physical directive cues)

Bondy, K.N. (1983). Criterion-referenced definitions for rating scales in clinical evaluation. *J Nurs Educ*, 22(9): 376-382

Assessment Timeline

The candidate must complete the Competency Skills Assessment within 12 months of application. This includes all three Competency Assessment Tools. Once payment for the Competency Skills Assessment Tools has been accepted the period of 12 month begins.

Fee for Assessment

A fee for this Competency Assessment will be charged to the candidate to begin the assessment process. The fee will be a one off payment and will include all three assessment tools, appropriate resources required to complete the Assessment such as the Guideline, the log book and other instructional documentation. The fee will also include a written report for each assessment tool and a final Assessment Completion Report. The fee does not cover travel expenses for the candidate or for the examiner, however time spent by the examiners to assess and to prepare reports is covered in the fee.

In the event that the candidate does not complete and /or gain competence in all three Assessment Tools within the 12 month period, and additional fee may be charged to complete the assessment.

As at October 2019 the Fee for the ANTA Inc Competency Assessment: Performing EEG (Basic) is \$500.00 for ANTA members and \$700 for non ANTA members. This

fee is subject to change at the discretion of the ANTA Education Committee and the Executive Council.

Key Essential Skill Items

Assessment Tool 1 - Log book and Portfolio

The following criteria are identified as key essential skill items in Performing EEG (Basic) and will be assessed by means of submitted logbook and portfolio.

Practical experience

- 1.1 Log Book
The log book must record 100 EEGs performed by the candidate as outlined in Appendix I
- 1.2 Portfolio
 - 1.2.1 Interpret EEG waveforms – 16 EEG samples to be provided as outlined in Appendix II.1
 - 1.2.2 Factual report writing – 3 factual reports to be provided as outlined in Appendix II.2

Assessment Tool 2 - Written Examination

The following criteria are identified as key essential skills items in performing EEG and will be assessed by mean of Written Examination multiple choice questions (MCQs).

- 2.1 Major anatomical structures and function of the major brain regions
- 2.2 Effects of the diseases of the nervous system including
 - i. Epilepsy
 - ii. Inflammatory processes/infections
 - iii. Neuro-degenerative disorders
 - iv. Metabolic disorders
 - v. Drug effects
 - vi. Space occupying lesions
 - vii. Cerebrovascular diseases
- 2.3 The effects of medication on the EEG
- 2.4 Seizure classification
- 2.5 Activation procedures and changes including responses and contraindications
- 2.6 Normal EEG patterns and variants
- 2.7 Abnormal EEG patterns
- 2.8 Technical requirements for recording suspected electro-cerebral silence
- 2.9 Other physiological measurements
- 2.10 Clinical and Non-Convulsive Status Epilepticus EEG patterns
- 2.11 Equipment/amplifiers
 - i. Analogue to digital conversion and digital recording
 - ii. Bandwidth and frequency response characteristics
 - iii. Frequency filters
 - iv. Differential amplifiers
 - v. Common mode rejection ratio
 - vi. Amplification and sensitivity
 - vii. Electrode types and characteristics
 - viii. Electrode impedance
 - ix. Maintenance and Repairs including calibration

- 2.13 Montages
- 2.14 The EEG apparatus
- 2.15 EEG recording parameters
- 2.16 EEG convention
- 2.17 Infection control and sterilisation techniques for EEG recording electrodes

Assessment Tool 3 -Practical Examination

The following criteria are identified as key essential skill items in Performing EEG (Basic) and will be assessed by means of Practical Examination.

- 3.1 Preparation and patient care
 - 3.1.1 Preparation before EEG recording
 - 3.1.2 Recording Environment
 - 3.1.3 Prepare equipment for procedure
 - 3.1.4 Rapport with the patient and the patient's family
 - 3.1.5 Prepare patient for procedure
 - 3.1.6 Register patient data
 - 3.1.7 Taking Clinical History

- 3.2 Equipment, Electrode Application and Performing EEG study
 - 3.2.1 International 10-20 Electrode placement
 - 3.2.2 Electrode impedance measurement
 - 3.2.3 Calibration and machine check
 - 3.2.4 Recording parameters including sensitivity and filters
 - 3.2.5 Record annotation
 - 3.2.6 EEG montages
 - 3.2.7 Basic EEG patterns
 - 3.2.8 EEG polarity and conventions
 - 3.2.9 Recording standard EEG with reactivity and activation tests
 - 3.2.10 Recognition of EEG waveforms including normal and abnormal waveforms
 - 3.2.11 Recognition of artefacts, causes and remedies
 - 3.2.12 Identify the need to adapt the EEG procedure including additional recording electrodes and or other physiological measurements
 - 3.2.13 Identify and respond to emergent medical or behavioural situations
 - 3.2.14 Electrocerebral inactivity (ECI) standard procedure

- 3.3 Understanding Infection Control
 - 3.3.1 Identify and perform hand hygiene
 - 3.3.2 Identify the importance of infection control
 - 3.3.3 Identify appropriate dress attire in regard to preventing spread of infection
 - 3.3.4 Identify Personal Protective Equipment (PPE)
 - 3.3.5 Outline WH&S regulations for cleaning electrodes including those for infectious diseases

APPENDIX I - LOG BOOK

A log book is provided in spreadsheet format for ease of use and submission via electronic means. Access to the Log Book will be provided on application.

The log book ensures the candidate gains the relevant experience in performing routine EEG recordings and tasks relevant to them. The successful completion of this log book forms part of the *Competency Skills Assessment: Performing EEG(Basic)*.

The logbook must show a record of at least 100 Routine EEGs perform by the candidate with appropriate notation of each recording including: -

- Date
- Age of the patient
- EEG Procedure (ie Routine/Sleep deprived)
- Variations to the routine procedure
- Factual Report - Main Points
- Workplace Supervisors comment and or signature

See sample logbook below

To preface your logbook please provide a detailed description of your Routine EEG Procedure. You will also be required to provide identification of your supervisor who can verify you have completed the required tasks. See Logbook for detailed instructions.

Log book sample

No	Date	Age	EEG Procedure	Variations to Routine Procedure	Factual Report - Main points
1	5/3/2019	52	Routine awake EEG	The patient went to sleep – not a planned sleep EEG	<ul style="list-style-type: none"> • 9Hz alpha • N2 sleep
Supervisors comment			<i>No assistance required</i>	Signature	
2	5/3/2019	12	Sleep Deprived EEG Pt slept from 12 midnight to 4amSleep deprived EEG	Photo paroxysmal response – monocular stimulation during PS added	<ul style="list-style-type: none"> • 10Hz alpha • N2 sleep • 4-5Hz sp&w paroxysms • Single poly spike and slow wave complexes Photoparoxysmal response at 12-20Hz flash
Supervisors comment			<i>Assistance needed with electrode application</i>	Signature	

Workplace Supervisor

A workplace supervisor will be required to verify these observations in the log book. All items must be completed satisfactorily, under the supervision of a Senior Scientist/Technologist at the candidates place of work. In small departments it may be necessary for an alternate supervisor eg. the attending Neurologist.

An “Identification of Supervisor” form is attached with the log book for the supervisor to complete. Without verification of the signature(s) in the log book, it cannot be accepted.

NB: An “Identification of Supervisor” form must be completed for each individual supervisor/signatory.

The Log Book will be marked Complete or Incomplete.

The candidate must receive a 'Complete' outcome to pass this part of the Assessment Tool.

Note: Log book entries indicating reduced standard recording techniques will be accepted providing an explanation of the recording situation and/or cause is provided in the appropriate section. However, no more than 10% of the entries with reduced recording techniques will be accepted to gain a pass.

Log Book Submission:

The candidate may use the provided logbook spreadsheet format to submit their record of EEG's performed (recommended) or they may use a format of their choice providing all entries are in accordance with the ANTA Inc Logbook .

On completion the candidate should submit their logbook in 'read-only' electronic form to the current Education Representative at education.anta@gmail.com (In the future there may be provision to upload log books to the Education Rep via the ANTA Website)

APPENDIX II – PORTFOLIO AND FACTUAL REPORTS

1. PORTFOLIO

The Portfolio ensures the candidate gains the relevant experience in performing routine EEG recordings and tasks relevant to them. The successful completion of this Portfolio forms part of the *Competency Skills Assessment: Performing EEG (Basic)*

The portfolio will be marked Complete or Incomplete.

The candidate must receive a ‘Complete’ outcome to pass this part of the Assessment Tool.

1.1 The normal EEG (5 samples required)

Provide five (5) different samples of a normal EEG.

Recommended samples would include but not limited to: -

- Normal adult
- Normal Paediatric (age between 5-15years)
- Response to hyperventilation
- Response to photic stimulation
- Normal sleep recording including wakefulness, Non REM and REM sleep stages

1.2 The Abnormal EEG (5 samples required)

Provide five (5) different samples of an abnormal EEG. Choose at least two (2) samples from each of the following categories (i.e. activation and diseases).

1.2.1 Activation Responses

- Response to hyperventilation
- Response to photic stimulation

1.2.2 Diseases of the nervous system

- Epilepsy
- Inflammatory processes/infections
- Neuro-degenerative disorders
- Metabolic disorders
- Drug effects
- Space occupying lesions
- Cerebrovascular disease
- Head injury
- Electro-cerebral Silence

1.3 Other physiological measurements (1 sample required)

Provide one (1) EEG sample that has been performed in conjunction with at least two (2) other types of physiological measurement eg. EMG, ECG, EoG

1.4 Artefacts (3 samples required)

Provide an EEG sample for at least three (3) of the following artefact categories

- Electrode pop
- Muscle activity
- Pulse and or ECG artefact
- Sweat sway
- Eye movement

1.5 Enhancing EEG activity (2 samples required)

Provide at least one EEG sample showing how a particular EEG activity has been enhanced for each of the following categories

- altering from the routine EEG recording settings (normal or abnormal)
- altering the montage (normal or abnormal)

NB: Before and after samples are required

2. FACTUAL REPORTS

The factual Report submission ensures the candidate gains the relevant experience in interpreting routine EEG recordings and tasks relevant to them. The successful completion of these factual reports form part of the *Competency Skills Assessment: Performing EEG*.

The factual reports will be marked Complete or Incomplete.

The candidate must receive a ‘Complete’ outcome to pass this part of the Assessment Tool.

Provide three (3) factual reports you have written accompanied by sufficient EEG samples with pertinent portions of EEG that relate to your report.

You are required to submit the description of an EEG for each of the following types

- One (1) normal EEG
- Two (2) abnormal EEGs

Folio and Factual Report Submission:

The candidate may submit their Portfolio and Factual Report in any electronic presentation they choose, providing it is professional and accessible. (eg Power Point presentation).

On completion the candidate should submit their Portfolio and Factual Reports in ‘read-only’ electronic form to the current Education Representative at education.anta@gmail.com (In the future there may be provision to upload Portfolio and factual Reports to the Education Rep via the ANTA Website)

In the event that the electronic files are too large to send via email the candidate should contact the ANTA Inc Education Representative to organise an alternative method of submission. This may include access to Dropbox or other iCloud storage facilities or delivery of files via USB external Flash drive.