(PR No. 1000042198)   **(Rfx No. 6100001863)**

Technical Specification for Electrophysiology

Sr.No.	Technical Description	Compliance (Yes/No)	Additional information (If any)
1	Medical Grade 2 channel transcranial electrical stimulator (tES with a cathode and an anode) for precise targeting of cortical structures in the mediolateral and anterior posterior directions by means of carbonised rubber electrodes, with sponge pouches – both in various sizes including 5x5cm and 5x7cm.		
2	System should be ideally lightweight, compact and portable.		
3	Should have 5 standard modes: DC (tDCS, pulsed tDCS and toDCS) and non-DC (tACS, amplitude modulated tACS, tRNS)		
4	Adjustable output current range: 5000 µA DC ± 1%		
5	Maximum Output Voltage: 35V ± 5%		
6	Adjustable frequencies up to 600 Hz with minimum of 0.01 Hz resolution		
7	adjustable current duration up to 30 minutes		
8	Should have internal rechargeable battery for patient safety and isolation, and automatic safety shutdown when charger is connected.		
9	Should be provided with medical grade charger.		
10	Should have a low battery indicator		

11	Should have advanced monitoring and control systems updating performance and feedback over 256 times per second.		
12	Stimulation output fidelity (signal-to-noise) should be maintained during the entire		
13	Stimulation session even if electrode conditions change.		
14	Interface should have a touch screen control for ease of use and access to adjust all parameters with maximum flexibility.		
15	Should have an automatic stimulation sham feature, with both single-blind and double-blind functionality.		
16	System should be clinically validated for non-invasive and targeted neuromodulation.		
17	Should have a "Smartscan" feature to provide a continuous visual indication of electrode contact quality before and during stimulation. From pre-stimulation set-up, to during stimulation monitoring, to post-stimulation confirmation, the stimulator should provide an intuitive and clear indication of electrode contact quality throughout.		
18	Should have a user defined impedance limit, with optional alarm for early warning if impedance increases.		
19	Must log all stimulation parameters and output throughout the stimulation session automatically, with log files accessible and downloadable from the device via USB.		
20	Should have a skip to fade-out button, and an emergency stop button available to end the stimulation prematurely by the operator.		
21	Should provide continuous monitoring of current flow conditions and can engage automatic ramp-down when an unusual performance is detected.		

22	Should have an abort button to safely ramp down the current		
23	Must include a 4x1 HD system using the appropriate adapter and ring electrodes of appropriate dimensions.		
24	Should be possible to place electrodes by using modeling software to show optimum		
25	placement to target specific brain regions or explore current delivery with specific electrode placement.		
26	Must have the facility to start and stop stimulation via a TTL signal, and synchronize output with external devices via a TTL signal output		
27	Must have the ability to control stimulation output directly via an analogue signal input, for closed-loop applications. Analogue bandwidth should be up to 1kHz.		
28	Must include an analogue signal output to allow live monitoring of stimulation output, in particular for combination with EEG.		
29	Must allow direct control via USB, using a supplied user interface PC application, and via user-defined scripts in Matlab and Python.		
30	Should have option for safe and noise-free use inside MRI scanner.		
31	Should have been used in clinical trials and over 10 publications in peer-reviewed journals and must have at least 3 installations in reputed Central Govt Institutes in India.		