



January 31, 2017

Food and Drug Administration
10903 New Hampshire Avenue
Document Control Center - WO66-G609
Silver Spring, MD 20993-0002

St. Jude Medical, Inc.
Colleen Canan
Sr. Manager, Regulatory Affairs
15900 Valley View Court
Sylmar, California 91342

Re: P140033

Trade/Device Name: Assurity MRI™ Models PM 1272, PM 2272
Endurity MRI™ Models PM 1172, PM 2172
Tendril MRI™ lead Model LPA 1200M
MRI Activator™ Model EX4000
Merlin™ PCS Programmer Software Model 3330 v 22.1.1
Merlin.net MN5000 7.4d
Merlin@home EX2000 8.2.2

Filed: December 29, 2014

Amended: March 26, 2015, April 1, 2015, April 9, 2015, May 21, 2015, August 7, 2015,
December 15, 2015, July 14, 2016; December 19, 2016; January 9, 2017

Product Codes: LWP, NVN

Dear Colleen Canan:

The Center for Devices and Radiological Health (CDRH) of the Food and Drug Administration (FDA) has completed its review of your premarket approval application (PMA) for the St. Jude Medical MR Conditional Pacemaker System. This device is indicated as follows:

Implantation of a single-chamber pulse generator or dual-chamber pulse generator is indicated in one or more of the following permanent conditions:

- Syncope
- Presyncope
- Fatigue
- Disorientation
- Or any combination of those symptoms

MR Conditional pacemakers are conditionally safe for use in the MRI environment when used in a complete MR Conditional system and according to the instructions in the MRI procedure document for the St. Jude Medical MR Conditional System.

Rate-Modulated Pacing is indicated for patients with chronotropic incompetence, and for those who would benefit from increased stimulation rates concurrent with physical activity. Chronotropic incompetence has not been rigorously defined. A conservative approach,

supported by the literature, defines chronotropic incompetence as the failure to achieve an intrinsic heart rate of 70% of the age-predicted maximum heart rate or 120 bpm during exercise testing, whichever is less, where the age-predicted heart rate is calculated as $197 - (0.56 \times \text{age})$.

Dual-Chamber Pacing (Dual-chamber pulse generators) is indicated for those patients exhibiting:

- Sick sinus syndrome
- Chronic, symptomatic second- and third-degree AV block
- Recurrent Adams-Stokes syndrome
- Symptomatic bilateral bundle branch block when tachyarrhythmia and other causes have been ruled out.

Atrial Pacing is indicated for patients with sinus node dysfunction and normal AV and intraventricular conduction systems.

Ventricular Pacing is indicated for patients with significant bradycardia and:

- Normal sinus rhythm with only rare episodes of A-V block or sinus arrest
- Chronic atrial fibrillation
- Severe physical disability

AF Suppression (Dual-chamber pulse generators) stimulation is indicated for suppression of paroxysmal or persistent atrial fibrillation episodes in patients with one or more of the above pacing indications.

The Tendril MRI lead is a 7.9 French, transvenous, steroid eluting, bipolar, IS-1 compliant active fixation lead designed for permanent sensing and pacing in either the right atrium or the right ventricle, in combination with a compatible device. Active leads such as the Tendril MRI lead may be indicated for patients where permanent fixation of a passive fixation lead is suspected to be unstable.

In atrial applications, the use of screw-in leads such as Tendril MRI lead may be indicated in the presence of an abnormal, surgically altered or excised atrial appendage.

The MRI Activator handheld device is used to evaluate the status of, and to enable and disable, the previously stored MRI settings. The activator is intended for use with St. Jude Medical MR Conditional pulse generators.

We are pleased to inform you that the PMA is approved. You may begin commercial distribution of the device in accordance with the conditions of approval described below.

The sale and distribution of this device are restricted to prescription use in accordance with 21 CFR 801.109 and under section 515(d)(1)(B)(ii) of the Federal Food, Drug, and Cosmetic Act (the act). The device is further restricted under section 515(d)(1)(B)(ii) of the act insofar as the labeling must specify the specific training or experience practitioners need in order to use the device. FDA has determined that these restrictions on sale and distribution are necessary to

provide reasonable assurance of the safety and effectiveness of the device. Your device is therefore a restricted device subject to the requirements in sections 502(q) and (r) of the act, in addition to the many other FDA requirements governing the manufacture, distribution, and marketing of devices.

Expiration dating for this device has been established and approved at 18 months for the Assurity MRI and Endurity MRI devices and 6 months for the Tendril MRI lead Model LPA 1200M.

Continued approval of the PMA is contingent upon the submission of periodic reports, required under 21 CFR 814.84, at intervals of one year (unless otherwise specified) from the date of approval of the original PMA. Two copies of this report, identified as "Annual Report" and bearing the applicable PMA reference number, should be submitted to the address below. The Annual Report should indicate the beginning and ending date of the period covered by the report and should include the information required by 21 CFR 814.84. This is a reminder that as of September 24, 2014, class III devices are subject to certain provisions of the final UDI rule. These provisions include the requirement to provide a UDI on the device label and packages (21 CFR 801.20), format dates on the device label in accordance with 21 CFR 801.18, and submit data to the Global Unique Device Identification Database (GUDID) (21 CFR 830 Subpart E). Additionally, 21 CFR 814.84 (b)(4) requires PMA annual reports submitted after September 24, 2014, to identify each device identifier currently in use for the subject device, and the device identifiers for devices that have been discontinued since the previous periodic report. It is not necessary to identify any device identifier discontinued prior to December 23, 2013. For more information on these requirements, please see the UDI website, <http://www.fda.gov/udi>.

In addition to the above, and in order to provide continued reasonable assurance of the safety and effectiveness of the PMA device, the Annual Report must include, separately for each model number (if applicable), the number of devices sold and distributed during the reporting period, including those distributed to distributors. The distribution data will serve as a denominator and provide necessary context for FDA to ascertain the frequency and prevalence of adverse events, as FDA evaluates the continued safety and effectiveness of the device.

You have agreed to provide the following non-clinical information in a semiannual report, which may be followed by a PMA supplement where applicable.

FDA notes that you have made efforts to improve the manufacturing controls of the drug components of the subject leads. However, FDA identified several items that require further updates and improvement. These items are outlined in detail below as non-clinical conditions of approval. To satisfy these conditions of approval you will need to address each item.

FDA is allowing this information to be submitted as a post-approval commitment based upon the unique collection of evidence submitted under this PMA. Future submissions should meet all premarket requirements for the drug component as requested in the PMA submission. Within 30 days, please provide a timeline for your proposal to address these items. For any item below not addressed within 6 months of approval, you will be required to provide interim reporting every 6 months on the progress made with respect to addressing the below items until a PMA/S is submitted as necessary to remove the below conditions.

1. You should collect release and stability data for 3 batches of finished product made with the final manufacturing controls and test methods and provide the data to FDA to support the regulatory specification and a shelf life for the LPA1200M finished lead. As described in your commitment stability study protocol 60074333, please use the same 3 finished product batches for long-term, intermediate (if warranted), and accelerated stability studies to support an expiration date.

For 3 batches of finished leads manufactured according to the commercial process (with all process revisions and optimizations), provide:

- a. By Q3 CY2017 (or Within 6 months of PMA approval), provide an initial report with release data and 6 months of long-term and all available accelerated stability data
 - b. By Q1 CY2018 (or Within 12 months of PMA approval), provide a second report with 12 months of long-term and 6 months of accelerated stability data
2. By Q4 CY2017 (or within 9 months of PMA approval), submit updated acceptance criteria for your drug elution test method and submit an updated Regulatory Specification Table reflecting the updated criteria. Your criteria should take into account the following:
 - a. Elution data from the stability batches of final finished leads manufactured with all the improved processes must be used.
 - b. In general, the selection of the drug elution acceptance criteria ranges is based on mean target value $\pm 10\%$ and NLT 80% for the last sampling time-point. However, if the drug elution plateau does not reach 80%, the limit for the last time point should be adjusted as appropriate.
 - c. The drug elution acceptance criteria should be set in a way to ensure consistent performance from lot to lot.
3. By Q3 CY2017 (or within 6 months of PMA approval), provide long-term stability data (including elution) for the MCRD component using the improved manufacturing process to support an in-process hold time of longer than 4 months. Such data will include finished product release data from leads built using MCRDs that have been stored in inventory for the maximum hold time to support the finished lead continuous flow manufacturing approach.
 - a. Since in-process components should have tighter quality controls to ensure that the finished lead will meet the regulatory specification at release throughout shelf-life, the proposed impurity limits for the MCRD component should be tightened (i.e., dexamethasone NMT 2.0% and total impurities NMT 5.0%).
4. By Q1 CY2018 (or within 12 months of PMA approval), complete a bridging study using a minimum of 3 batches of MCRDs (or distal tip subassemblies) and 3 batches of finished leads manufactured using the proposed improved processes and analytical procedures to provide support for using MCRD component (or distal tip subassembly) testing in lieu of

testing the proposed commercial product LPA1200M lead. The bridging study may evaluate the following drug attributes: assay, identity, content uniformity, impurities/degradants, and elution. Please indicate the batch numbers of the MCRD components (or distal tip subassemblies) and finished leads used in the study.

5. By Q3 CY2017 (or within 6 months of PMA approval), submit your proposal for the assignment of the part and batch numbers.
6. Please note that the interim shelf life of the finished lead cannot be extended beyond that given at commercial approval until you have fulfilled commitments #1 and 2 listed above.

In addition, because your device is a pacemaker, implantable cardioverter-defibrillator (ICD), or system lead, FDA has determined that the following additional information is necessary to provide continued reasonable assurance of the safety and effectiveness of the device. In the Annual Report, provide the following information known by or reported to the applicant:

1. The number of pacemakers and leads domestically implanted and the number of reported explants and deaths.
2. A breakdown of the reported deaths into pacemaker related and non-pacemaker related; as well as lead related and non-lead related.
3. A breakdown of the reported explants into the number reported that were:
 - a. For pacemakers and pulse generators: at end of battery life, the number that had complications not resolvable by programming, and, as applicable, the numbers that experienced other safety and effectiveness complications as ascertained by the user, applicant, or otherwise, or
 - b. For leads: associated with mechanical failure, associated with clinical complications, and as applicable, the numbers that experienced other safety and effectiveness complications as ascertained by the user, applicant, or otherwise.
4. The number of pacemakers and leads returned to the applicant for cause from domestic sources, with a breakdown into:
 - a. For pacemakers and pulse generators: the number currently in analysis, the number operating properly, and the number at normal battery depletion and failed (with the failure mechanisms described).
 - b. For leads: the number currently in analysis, the number operating properly, the number failed (with failure mechanisms described); broken down into groupings for full leads and partial leads.
5. A cumulative survival table for the pacemakers and leads.

In addition to the Annual Report requirements, you must provide the following data in post-approval study (PAS) reports for each PAS listed below. Separate PAS Progress Reports must be submitted for each study every six (6) months during the first two (2) years of the study and annually thereafter, unless otherwise specified by FDA. Two (2) copies of each report, identified as an "OSB Lead PMA Post-Approval Study Report" in accordance with how the study is identified below and bearing the applicable PMA reference number, should be submitted to the address below.

OSB Lead PMA Post-Approval Study – SJM Brady MRI Post Approval Study. The Office of Surveillance and Biometrics (OSB) will have the lead for studies initiated after device approval. This study will be conducted as per protocol dated November 30, 2015 included in P140033/A006. The purpose of this study is to evaluate the long term safety of Tendril MRI lead implanted with a SJM Brady MRI implantable pulse generator (IPG) in subjects with a standard bradycardia pacing indication and the safety of the pacemaker system in an MRI environment. This is a prospective, multi-center clinical study designed to evaluate the long-term safety of the Tendril MRI lead implanted with a SJM Brady MRI IPG in subjects with a standard bradycardia pacing indication. The primary hypothesis is to demonstrate that the complication-free probability is greater than 92.5% at five years post-implant for Tendril MRI right atrial (RA) lead and Tendril MRI right ventricular (RV) lead. The minimum enrollment requirement for completing this study is 1756 subjects including Accent MRI IDE study roll over subjects at up to 70 centers in (>50%) and outside of the US. Primary endpoints are to assess Tendril MRI RA/VA lead-related complications through 60 months of follow up and MRI scan-related complications rate through one-month following the MRI scan. The MRI scan-related complication rate will be presented as the probability of an occurrence of MRI Scan related complications. The study will evaluate long-term lead safety of the Tendril MRI lead at 60 months with study evaluations occurring every six (6) months following enrollment.

Be advised that the failure to conduct any such study in compliance with the good clinical laboratory practices in 21 CFR part 58 (if a non-clinical study subject to part 58) or the institutional review board regulations in 21 CFR part 56 and the informed consent regulations in 21 CFR part 50 (if a clinical study involving human subjects) may be grounds for FDA withdrawal of approval of the PMA.

Be advised that protocol information, interim and final results will be published on the Post Approval Study Webpage <http://www.fda.gov/devicepostapproval>.

In addition, the results from any post approval study should be included in the labeling as these data become available. Any updated labeling must be submitted to FDA in the form of a PMA Supplement. For more information on post-approval studies, see the FDA guidance document entitled, "Procedures for Handling Post-Approval Studies Imposed by PMA Order" (<http://www.fda.gov/MedicalDevices/DeviceRegulationandGuidance/GuidanceDocuments/ucm070974.htm>).

Before making any change affecting the safety or effectiveness of the PMA device, you must submit a PMA supplement or an alternate submission (30-day notice) in accordance with 21 CFR 814.39. All PMA supplements and alternate submissions (30-day notice) must comply with the

applicable requirements in 21 CFR 814.39. For more information, please refer to the FDA guidance document entitled, "Modifications to Devices Subject to Premarket Approval (PMA) - The PMA Supplement Decision-Making Process"

<http://www.fda.gov/MedicalDevices/DeviceRegulationandGuidance/GuidanceDocuments/ucm089274.htm>.

You are reminded that many FDA requirements govern the manufacture, distribution, and marketing of devices. For example, in accordance with the Medical Device Reporting (MDR) regulation, 21 CFR 803.50 and 21 CFR 803.52, you are required to report adverse events for this device. Manufacturers of medical devices, including in vitro diagnostic devices, are required to report to FDA no later than 30 calendar days after the day they receive or otherwise becomes aware of information, from any source, that reasonably suggests that one of their marketed devices:

1. May have caused or contributed to a death or serious injury; or
2. Has malfunctioned and such device or similar device marketed by the manufacturer would be likely to cause or contribute to a death or serious injury if the malfunction were to recur.

Additional information on MDR, including how, when, and where to report, is available at <http://www.fda.gov/MedicalDevices/Safety/ReportaProblem/default.htm>.

In accordance with the recall requirements specified in 21 CFR 806.10, you are required to submit a written report to FDA of any correction or removal of this device initiated by you to: (1) reduce a risk to health posed by the device; or (2) remedy a violation of the act caused by the device which may present a risk to health, with certain exceptions specified in 21 CFR 806.10(a)(2). Additional information on recalls is available at <http://www.fda.gov/Safety/Recalls/IndustryGuidance/default.htm>.

CDRH does not evaluate information related to contract liability warranties. We remind you; however, that device labeling must be truthful and not misleading. CDRH will notify the public of its decision to approve your PMA by making available, among other information, a summary of the safety and effectiveness data upon which the approval is based. The information can be found on the FDA CDRH Internet HomePage located at <http://www.fda.gov/MedicalDevices/ProductsandMedicalProcedures/DeviceApprovalsandClearances/PMAApprovals/default.htm>. Written requests for this information can also be made to the Food and Drug Administration, Dockets Management Branch, (HFA-305), 5630 Fishers Lane, Rm. 1061, Rockville, MD 20852. The written request should include the PMA number or docket number. Within 30 days from the date that this information is placed on the Internet, any interested person may seek review of this decision by submitting a petition for review under section 515(g) of the act and requesting either a hearing or review by an independent advisory committee. FDA may, for good cause, extend this 30-day filing period.

Failure to comply with any post-approval requirement constitutes a ground for withdrawal of approval of a PMA. The introduction or delivery for introduction into interstate commerce of a device that is not in compliance with its conditions of approval is a violation of law.

You are reminded that you must submit a copy of the final labeling to FDA as an amendment to this PMA submission within 30 calendar days from your receipt of this letter. Final labeling that is identical to the labeling approved in draft form will not routinely be reviewed by FDA staff when accompanied by a cover letter stating that the final labeling is identical to the labeling approved in draft form. If the final labeling is not identical, any changes from the final draft labeling should be highlighted and explained in the amendment.

All required documents should be submitted in 6 copies, unless otherwise specified, to the address below and should reference the above PMA number to facilitate processing.

U.S. Food and Drug Administration
Center for Devices and Radiological Health
PMA Document Control Center - WO66-G609
10903 New Hampshire Avenue
Silver Spring, MD 20993-0002

If you have any questions concerning this approval order, please contact Matthew Hazelett at 240-402-9875 or Matthew.Hazelett@fda.hhs.gov.

Sincerely,

A handwritten signature in black ink is written over a large, semi-transparent blue watermark of the letters "FDA". The signature appears to read "Bram D. Zuckerman" and includes the word "for" written in smaller letters below the main signature.

Bram D. Zuckerman, M.D.
Director
Division of Cardiovascular Devices
Office of Device Evaluation
Center for Devices and Radiological Health