

## Submitter Information

**Submitter:** Hitachi Medical Systems America, Inc.  
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DEC 05 2008

**Contact:** Douglas J. Thistlethwaite

**Date:** September 10, 2008

## Device Name

**Classification Name:** Coil, magnetic resonance, specialty  
**Classification Number:** 90MOS  
**Trade/Proprietary Name:** MR-HRF-150, ECHELON High Resolution Foot Coil  
**Predicate Device(s):** ECHELON RAPID Foot Coil

**Classification Name:** Coil, magnetic resonance, specialty  
**Classification Number:** 90MOS  
**Trade/Proprietary Name:** MR-LBC-150, ECHELON Long Bone Coil  
**Predicate Device(s):** ECHELON RAPID Foot Coil

## Device Intended Use

The MR system is an imaging device and is intended to provide the physician with physiological and clinical information, obtained non-invasively and without the use of ionizing radiation. The ECHELON Specialty Coils are receive-only devices that detect the MR signal used to produce transverse, coronal, sagittal, oblique, and/or curved cross-sectional images that display the internal structure of the body. The images produced by the MR system reflect the spatial distribution of protons (hydrogen nuclei) exhibiting magnetic resonance. When interpreted by a trained physician, these images provide information that can be useful in diagnosis determination.

The indications for use for the ECHELON Specialty Coils are as follows:

- The **MR-HRF-150, ECHELON High Resolution Foot Coil** is a receive-only multiple array device used for MRI imaging of the ankle.
- The **MR-LBC-150, ECHELON Long Bone Coil** is a receive-only multiple array device used for MRI imaging of the extremities.

## Device Description

### *Function*

The **MR-HRF-150, ECHELON High Resolution Foot Coil** is a receive-only multiple array device used for MRI imaging of the ankle.

The **MR-LBC-150, ECHELON Long Bone Coil** is a receive-only multiple array device used for MRI imaging of the extremities.

### *Scientific Concepts*

Magnetic Resonance Imaging (MRI) is based on the fact that certain atomic nuclei have electromagnetic properties that cause them to act as small spinning bar magnets. The most ubiquitous of these nuclei is hydrogen, which makes it the primary nuclei currently used in magnetic resonance imaging. When placed in a static magnetic field, these nuclei assume a net orientation or alignment with the magnetic field, referred to as a net magnetization vector. The introduction of a short burst of radiofrequency (RF) excitation of a wavelength specific to the magnetic field strength and to the atomic nuclei under consideration can cause a re-orientation of the net magnetization vector. When the RF excitation is removed, the protons relax and return to their original vector. The rate of relaxation is exponential and varies with the character of the proton and its adjacent molecular environment. This re-orientation process is characterized by two exponential relaxation times, called T1 and T2.

A RF emission or echo that can be measured accompanies these relaxation events. The emissions are used to develop a representation of the relaxation events in a three dimensional matrix. Spatial localization is encoded into the echoes by varying the RF excitation, applying appropriate magnetic field gradients in the x, y, and z directions, and changing the direction and strength of these gradients. Images depicting the spatial distribution of the NMR characteristics can be reconstructed by using image processing techniques similar to those used in computed tomography.

### *Physical and Performance Characteristics*

The **MR-HRF-150, ECHELON High Resolution Foot Coil** is a receive-only device suitable for imaging the ankle. The coil consists of 8 elements. The signal output of each element is independently processed by the MRI system to enhance performance.

The **MR-LBC-150, ECHELON Long Bone Coil** is a receive-only device suitable for imaging extremities. The coil consists of 4 channels. The signal output of each element is independently processed by the MRI system to enhance performance.

## **Device Technological Characteristics**

The technological characteristics of the ECHELON High Resolution Foot Coil and ECHELON Long Bone Coil are similar to the predicate devices as listed in Section 10 – Substantial Equivalence Discussion.

## **Conclusions**

It is the opinion of Hitachi Medical Systems America, Inc. that the ECHELON High Resolution Foot Coil and ECHELON Long Bone Coil are substantially equivalent to the listed predicate devices.



DEPARTMENT OF HEALTH & HUMAN SERVICES

Public Health Service

Food and Drug Administration  
9200 Corporate Boulevard  
Rockville MD 20850

DEC 05 2008

Mr. Doug Thistlethwaite  
Manager, Regulatory Affairs  
Hitachi Medical Systems America, Inc.  
1959 Summit Commerce Park  
TWINSBURG OH 44087

Re: K083086

Trade/Device Name: Echelon High Resolution Foot Coil and Long Bone Coil  
Regulation Number: 21 CFR 892.1000  
Regulation Name: Magnetic resonance diagnostic device  
Regulatory Class: II  
Product Code: MOS  
Dated: October 14, 2008  
Received: October 16, 2008

Dear Mr. Thistlethwaite:

We have reviewed your Section 510(k) premarket notification of intent to market the device referenced above and have determined the device is substantially equivalent (for the indications for use stated in the enclosure) to legally marketed predicate devices marketed in interstate commerce prior to May 28, 1976, the enactment date of the Medical Device Amendments, or to devices that have been reclassified in accordance with the provisions of the Federal Food, Drug, and Cosmetic act (Act) that do not require approval of a premarket approval application (PMA). You may, therefore, market the device, subject to the general controls provisions of the Act. The general controls provisions of the Act include requirements for annual registration, listing of devices, good manufacturing practice, labeling, and prohibitions against misbranding and adulteration.

If your device is classified (see above) into either class II (Special Controls) or class III (PMA), it may be subject to such additional controls. Existing major regulations affecting your device can be found in the Code of Federal Regulations, Title 21, Parts 800 to 898. In addition, FDA may publish further announcements concerning your device in the Federal Register.

Please be advised that FDA's issuance of a substantial equivalence determination does not mean that FDA has made a determination that your device complies with other requirements of the Act or any Federal statutes and regulations administered by other Federal agencies. You must comply with all the Act's requirements, including, but not limited to: registration and listing (21 CFR Part 807); labeling (21 CFR Part 801); good manufacturing practice requirements as set forth in the quality systems (QS) regulation (21 CFR Part 820); and if applicable, the electronic product radiation control provisions (Sections 531-542 of the Act); 21 CFR 1000-1050.

This letter will allow you to begin marketing your device as described in your Section 510(k) premarket notification. The FDA finding of substantial equivalence of your device to a legally marketed predicate device results in a classification for your device and thus, permits your device to proceed to the market.

If you desire specific advice for your device on our labeling regulation (21 CFR Part 801), please contact the Office of Compliance at one of the following numbers, based on the regulation number at the top of this letter:

21 CFR 876.xxx	(Gastroenterology/Renal/Urology)	240-276-0115
21 CFR 884.xxx	(Obstetrics/Gynecology)	240-276-0115
21 CFR 894.xxx	(Radiology)	240-276-0120
Other		240-276-0100

Also, please note the regulation entitled, "Misbranding by reference to premarket notification" (21 CFR Part 807.97). For questions regarding postmarket surveillance, please contact CDRH's Office of Surveillance and Biometrics' (OSB's) Division of Postmarket Surveillance at 240-276-3474. For questions regarding the reporting of device adverse events (Medical Device Reporting (MDR)), please contact the Division of Surveillance Systems at 240-276-3464. You may obtain other general information on your responsibilities under the Act from the Division of Small Manufacturers, International and Consumer Assistance at its toll-free number (800) 638-2041 or (240) 276-3150 or at its Internet address <http://www.fda.gov/cdrh/industry/support/index.html>.

Sincerely yours,



Joyce M. Whang, Ph.D.  
Acting Director, Division of Reproductive,  
Abdominal, and Radiological Devices  
Office of Device Evaluation  
Center for Devices and Radiological Health

Enclosure

510(k) Number (if known):

K083086

Device Name: ECHELON High Resolution Foot Coil and Long Bone Coil

**Indications for Use:**

The MR-HRF-150, ECHELON High Resolution Foot Coil is a receive-only multiple array device used for MRI imaging of the ankle.

The MR-LBC-150, ECHELON Long Bone Coil is a receive-only multiple array device used for MRI imaging of the extremities.

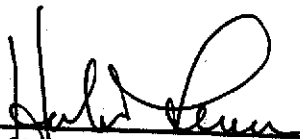
Prescription Use   X    
(Part 21 CFR 801 Subpart D)

AND/OR

Over-the-Counter Use \_\_\_\_\_  
(21 CFR 801 Subpart C)

(PLEASE DO NOT WRITE BELOW THIS LINE - CONTINUE ON ANOTHER PAGE IF NEEDED)

Concurrence of CDRH, Office of Device Evaluation (ODE)



(Division Sign-Off)

Division of Reproductive, Abdominal and  
Radiological Devices

510(k) Number K083086