

## Beeping Tones Associated with “Out-of-Range” Shock Lead Impedance

### SUMMARY

This article describes beeping associated with “out-of-range” Shock Lead Impedance:

- Boston Scientific defibrillators display a programmer message window and (in some cases) emit beeping tones when an “out-of-range” shock lead impedance is detected.
- Detection of shock impedances outside the normal range warrants additional investigation to identify root cause. After resolving the issue, the Clinical Event should be reset through the programmer.
- Beeping tones may occur prior to implant if the device is taken out of Storage mode *before* a lead is attached.

ICD: Implantable Cardioverter Defibrillator

CRT-D: Cardiac Resynchronization Therapy Defibrillator

### CRM PRODUCTS REFERENCED\*

VITALITY® HE,  
 CONTAK RENEWAL® 3 / 4 / HE,  
 CONTAK RENEWAL 3RF / 4RF,  
 CONTAK RENEWAL 3RF HE / 4RF HE,  
 CONTAK RENEWAL 3 AVT / 4 AVT,  
 CONFIENT®, and LIVIAN®

\*Products referenced herein may not be approved in all geographies. For comprehensive information on device operation, reference the appropriate product labeling.

### CRM CONTACT INFORMATION

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 1.800.CARDIAC (227.3422)  
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Patient Services  
 1.866.484.3268 – U.S. and Canada  
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In addition to visual indicators displayed on the programmer (Clinical Events and/or yellow warning messages), some Boston Scientific defibrillators also emit an **audible indicator** to alert patients/clinicians when the device has detected an “out-of-range” shock lead impedance measurement. These two indicators are triggered by impedance measurements of less than 20 ohms ( $\Omega$ ) or greater than 125  $\Omega$ .

### Audible Indicator (Beeping Tones) for CONFIENT®, LIVIAN®, VITALITY® HE, CONTAK RENEWAL® 3/4, 3/4 HE, 3/4 RF, and 3/4 AVT Devices

Upon the first detection of a shock lead impedance value outside the normal range, 16 R-wave synchronous beeping tones will sound. Once beeping tones begin, they will repeat every six hours until the Clinical Event is manually reset with a programmer (Figure 2).

### Visual Indicator

Upon the first programmer interrogation following detection of an out-of-range shock lead impedance value, a message will display in the Clinical Events window of the System Summary screen (Figure 1). Additionally, for those devices enrolled in LATITUDE Patient Management System, an out-of-range value also triggers a red alert.<sup>1</sup>

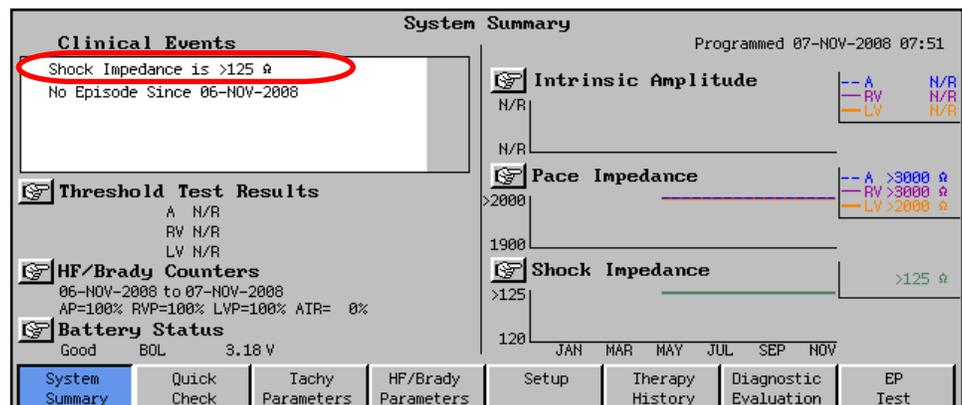


Figure 1. System Summary screen displaying shock lead impedance outside the normal range.

### Out-of-Range Impedance Measurements

Any time an out-of-range shock lead impedance condition is reported, clinicians should conduct standard lead testing and troubleshooting procedures to identify root cause and resolve the issue. For assistance with any out-of-range messages, please contact a local Boston Scientific CRM representative or CRM Technical Services.

<sup>1</sup>In order for red alerts to be detected by the LATITUDE System, an upload of device information must be received.

- Shock impedance >125 Ω (e.g., open condition):
  - **Prior to implant**—Will occur if a daily measurement is conducted before a lead is attached to the device. Since daily measurements are activated upon removal from Storage mode, a device should not be removed from Storage mode until the lead is attached. Note that programmable parameters may be adjusted without taking the device out of Storage mode.
  - **During and Post-implant**—May indicate a lead connection issue (e.g., loose setscrew or incomplete lead insertion) or a breach in the electrical pathway (e.g., lead conductor fracture).
- Shock Impedance <20 Ω (e.g., shorted condition):
  - May indicate a possible internal insulation breach (e.g., clavicle/first rib damage), inappropriate electrode contact, or a damaged defibrillator.

### Resetting the Clinical Event and Beeping Associated with Out-of-Range Shock Lead Impedance

Once the underlying reason for the out-of-range measurement is understood and resolved, the Clinical Event should be reset as outlined in Figure 2. **Resetting the Clinical Event will terminate the beeping tones.** Until the Clinical Event message window is reset, additional Clinical Events/LATITUDE alerts for out-of-range shock lead impedance will not be generated, and the device will continue to emit beeping tones every six hours.

**1** Tap anywhere on the message text within the white Clinical Events message window on the programmer screen; a yellow message window appears.

**2** To print the message window, select the Print Notice button.  
*NOTE: Once the Reset Event button is selected, the option to print is no longer available.*

**3** After resolving the issue, select the Reset Event button. The message will automatically disappear and the beeping tones are now reset.

**Figure 2. Reset the Clinical Event and beep by selecting the Reset Event button in the yellow message window.**

For additional information, refer to the **A Closer Look** article entitled *Investigate, Report, Print, and Reset Clinical Event Messages in the System Summary Screen* available through CRM Technical Services or at [www.bostonscientific.com](http://www.bostonscientific.com).