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1- INTRODUCTION

1-1 Surface Coil Test

The Surface Coil Test is a Signal-to-Noise measurement test with improved Tool Gage R&R. The Test allows the user to make a definite pass/fail decision on the GE 1.5T CTL Array Coil, M1087CT.

The Test allows the operator to input comments and customer observations of coil performance prior to test execution. This information assists in data collection and Test usage feedback to GE MR Headquarters.

Prepare the phantom for this test by using the methods suggested in the **Appendix**, Section 4.

1-2 Related Documents

- *Signa® 1.5T CTL Phased Array Coil*, 46-003014, found on *MR Release Signa® 5X/8X Service Methods*, CD-ROM, 2187583-1, Revision 6 and newer as well as *Signa® Horizon LX Service Methods*, CD-ROM, 2160623-2, Revision 6 and newer.

2- SETUP, CALIBRATION, AND EXECUTION

2-1 Phantom Required

- CTL Array TLT Phantom, 46-317605G1

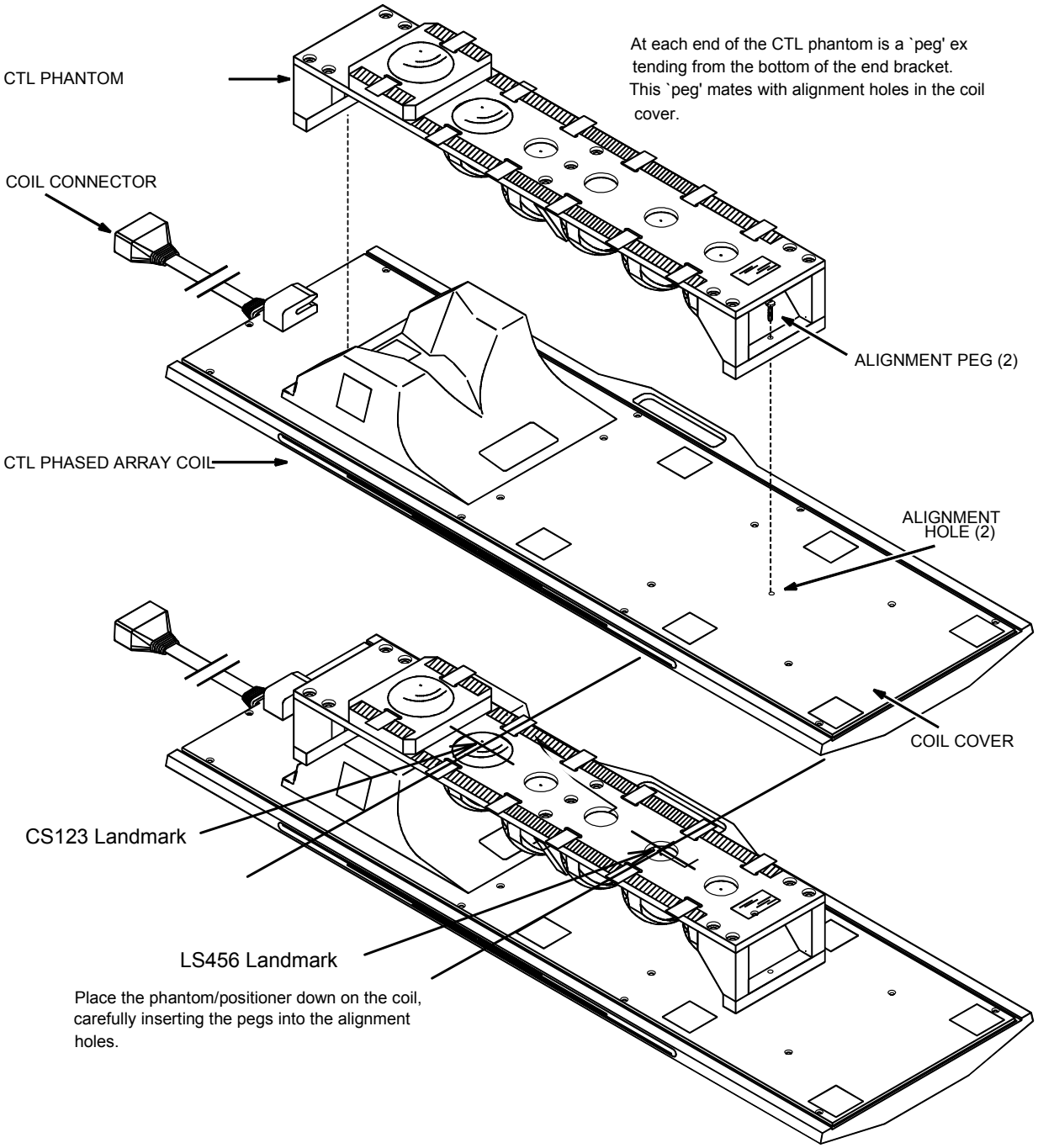
2-2 Setup Procedure

Caution

The Quad Head Coil must be completely removed from the cradle before performing any body scans. Failure to do this may result in damage to the Head Coil T/R Network.

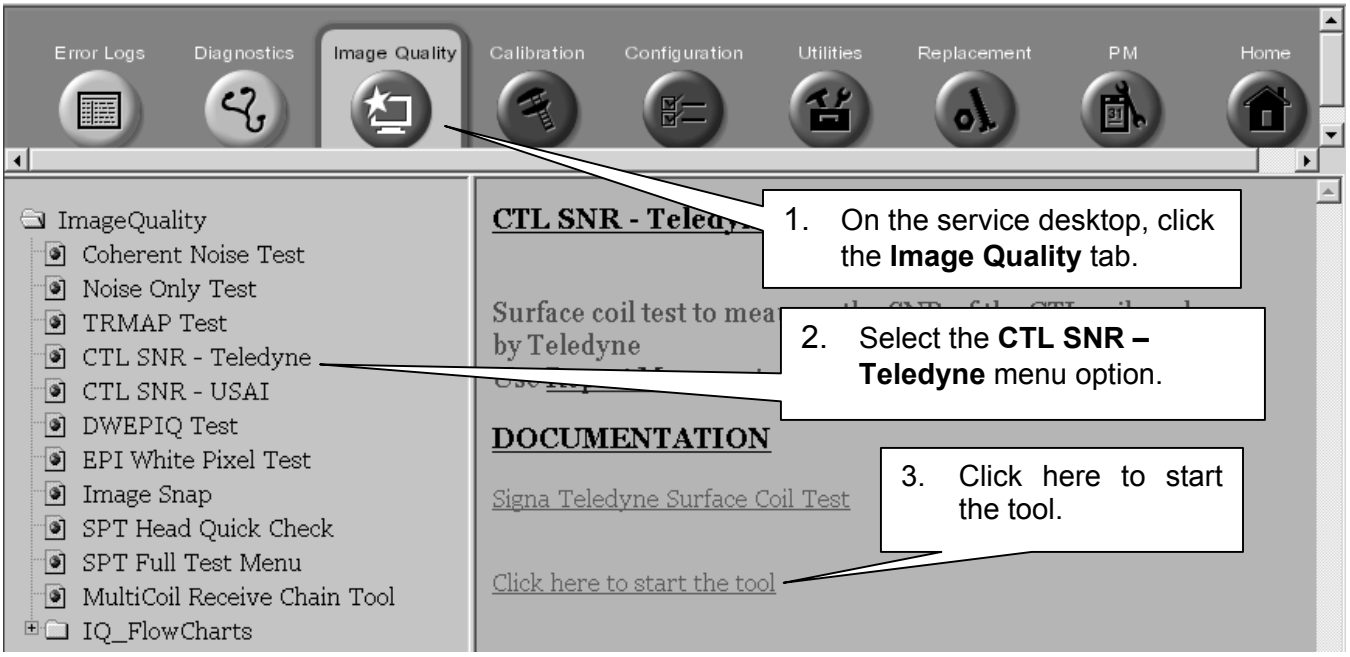
1. Remove Quad Head Coil (if present) from cradle.
2. Select **[Set Up Scan], Patient ID: geservice, and Weight: 111 lbs** to allow a new Landmark to be set.

3. Position the CTL Array onto the cradle.
4. Position the CTL Array Phantom, 46-317605G1, onto the CTL Array. See Illustration 2-1.
5. Landmark onto the appropriate phantom for the configuration desired. See Illustration 2-1.



CTL ARRAY PHANTOM POSITIONING
ILLUSTRATION 2-1

6. To start the Teledyne tool:



STARTING THE TELEDYNE TOOL
ILLUSTRATION 2-2

7. A c-shell will begin running with the typical script of Illustration 2-3:

```
Updating config files for protocols...Please wait.
setupProtocols succeeded.

Please choose one of the following:
    (1) Test the top three coils (CS123)
    (2) Test the bottom three coils (LS456)
Selection: 2

Would you like to see instructions on how to run the tool (y/n) [n]? n

=============================================================================
|                                                                           |
| It is recommended that you run the tool a minimum of 6 times.             |
| The first run takes approximately 8 minutes.                              |
| Each subsequent run takes approximately 2.5 minutes.                      |
=============================================================================

Enter number of times to run the tool [6]: 2

Estimated test duration: 10.5 minutes

Is the customer:
    (1) Very satisfied
    (2) Satisfied
    (3) Not satisfied
with this coil? 2

Enter two lines of comments or press Enter twice to continue
This is a baseline test of the manufacturing CTLBOT Array
This is only for representation purposes
coil = LS456

Host name: lx-bay13a

Fri Feb 19 12:02:16 1999
 -> Command to svat: RESET_SCAN
Fri Feb 19 12:02:16 1999
 -> Command to svat: DISABLE_IO
```

CTL SNR SAMPLE SCRIPT
ILLUSTRATION 2-3

8. The script will display the following output and prompts:

```
Updating config files for protocols...Please wait.
setupProtocols succeeded.

Please choose one of the following:
    (1) Test the top three coils (CS123)
    (2) Test the bottom three coils (LS456)
Selection:
```
Enter appropriate choice <ENTER>

```
Would you like to see instructions on how to run the tool (y/n) [n]?
```
…… **Enter appropriate choice <ENTER>**

```
==========================================================================
|                                                                        |
| It is recommended that you run the tool a minimum of 6 times.          |
| The first run takes approximately 8 minutes.                           |
| Each subsequent run takes approximately 2.5 minutes.                   |
==========================================================================
```

```
Enter number of times to run the tool [6]:
```
… **Enter appropriate choice <ENTER>**

```
Estimated test duration: 10.5 minutes
```
…… **This value will be determined by your choice. This choice resulted from [2] being entered.**

```
Is the customer:
    (1) Very satisfied
    (2) Satisfied
    (3) Not satisfied
with this coil?
```
…… **Enter appropriate choice <ENTER>**

```
Enter two lines of comments or press Enter twice to continue
```
…… **Enter appropriate choice <ENTER>**
…… **Enter appropriate choice <ENTER>**

```
coil = LS456
```
…… **Appropriate choice will appear.**

9. The program will begin execution similar to that seen in Illustration 2. Use ScanTime to monitor scan progress.

Note

Program execution can be stopped by doing a <CTRL><C> twice. Operator will need to do an [End Exam] to reset the scan window.

10. The typical scan will provide the following typical scan specific feedback. Script lines have been removed:

```
Noise scan for pass 1

Exam_No = 50059,   Series_No = 1,  Image_No = 1

The image file will be copied to /usr/g/insite/tmp/E50059S1I1.MR

Exam_No = 50059,   Series_No = 1,  Image_No = 2

The image file will be copied to /usr/g/insite/tmp/E50059S1I2.MR

Exam_No = 50059,   Series_No = 1,  Image_No = 3

The image file will be copied to /usr/g/insite/tmp/E50059S1I3.MR

Exam_No = 50059,   Series_No = 2,  Image_No = 1

The image file will be copied to /usr/g/insite/tmp/E50059S2I1.MR
```

```
Exam_No = 50059,   Series_No = 4,  Image_No = 1

The image file will be copied to /usr/g/insite/tmp/E50059S4I1.MR
```

Program execution will continue...

```
The image file will be copied to /usr/g/insite/tmp/E50060S2I1.MR

Exam_No = 50060,   Series_No = 2,  Image_No = 2

The image file will be copied to /usr/g/insite/tmp/E50060S2I2.MR

Exam_No = 50060,   Series_No = 2,  Image_No = 3

The image file will be copied to /usr/g/insite/tmp/E50060S2I3.MR
==============
|SNR Summary:|
==============

Coil    Mean      StdDev             MeanSpec   StdDevSpec
========================

 4     464.4          n/a      PASS 0    450.0        90.0
 5     484.1          n/a      PASS 0    450.0        90.0
 6     603.9          n/a      PASS 0    450.0        90.0


Results files: ctlsnrout.92JB5355 92JB5355.CTL
Done!

Press Enter to close the window…… <ENTER>
```

11. The program has completed execution.

3- VIEWING RESULTS

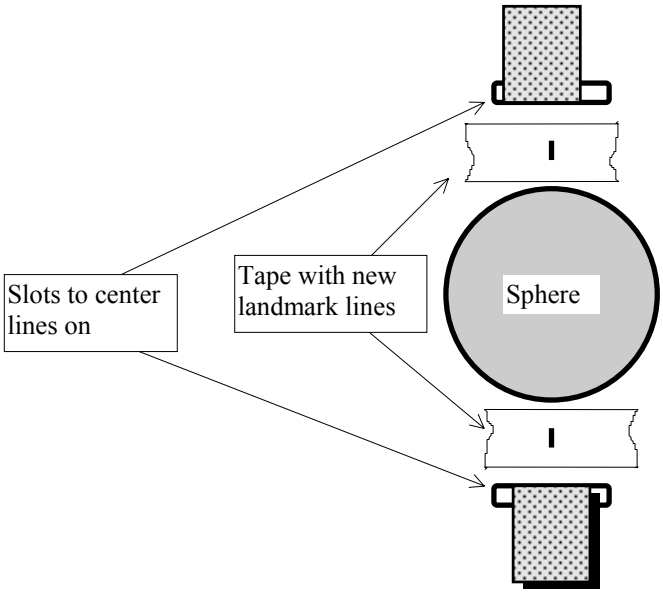
To view data file, use **[Report Manager]**. The files written for **CTL SNR** have the .CTL suffix.

4- APPENDIX

4-1 Phantom Preparation:

Before the first use of the CTL SNR test, you will need to add new landmark lines to the CTL phantom. Landmarks must be added for spheres 2 and 5, the second sphere from each end of the array, see Illustration 2-1. Illustration 4-1 is a top view of one of the spheres in the array. Put a piece of masking tape on each side of the sphere between the circular hole where the sphere sticks through and the elliptical slot where the Velcro strap comes through. Next, using a ruler or a carpenter's or machinist's square, scribe on the tape a line corresponding to the center of the elliptical slot. The lines on the tape pieces will be used for landmarking.

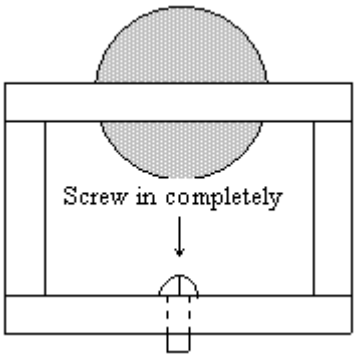
How to create new landmark lines for coils 2 and 5



TOP VIEW OF LANDMARK LOCATIONS OF SPHERES 2 AND 5
ILLUSTRATION 4-1

Check for air bubbles in the spheres. Ideally, no bubbles larger than a dime (~17 mm diameter) should be allowed. Bubbles larger than a nickel (~20 mm) will cause measurement errors. Also, the screws on the phantoms should be aligned in the z axis. If screws align in the x and y plane, an error can occur when the Test attempts to find the phantom. You will need good spheres positioned properly over the coils to be measured (the tool is run for the three top or the three bottom coils/phantoms, so that means at least three of the spheres must meet the requirement above. When testing the entire array, be sure that acceptable spheres are used each time.

Make sure that the alignment screws on the base of the supports of the phantom assembly are screwed in all the way; i.e., that they protrude on the underside of the supports. These screws fit in cut-outs on the coil and ensure proper positioning of the phantom assembly in the x and z direction. See Illustration 4-2.



ALIGNMENT SCREWS
ILLUSTRATION 4-2

4-2 Phantom Positioning and Restraint

1) In the scan room, position the CTL coil on the patient table, taking care to center the coil in the x (patient left - right) direction and positioning it parallel to the table. Adjust the longitudinal coil position so that the coil cable lies flat on the table and cradle as far back as possible and then goes the shortest distance to the plug-in on the “doghouse.”

2) Position the phantom assembly on the coil, making sure the screws on the bottom of the phantom frame engage in the holes on the coil housing. Check to make sure there are no bubbles larger than a dime in any of the spheres you will scan.

3) Using patient restraints, strap the phantom down tightly (make sure not to cover the landmark lines by spheres 2 and 5 with the restraint(s)). Check that there is no gap between the phantom assembly and the coil at either end. One restraint at each end of the phantom assembly may be needed.

REVISION HISTORY

REV	DATE	AUTHOR	PRIMARY REASONS FOR CHANGE
0	Mar. 02, 1999	S. Davis	Initial Release
1	Feb. 17, 2000	R. Kaufman	Changed startup location to Troubleshoot. Changed title to include Teledyne
2	Aug 16, 2000	M. Jones	Deleted old sec. 1-2, “Compatibility”
3	Oct. 14, 2002	C. MacDonald	Added Illustration 2-2 to update user interface and renumbered