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1. Overview

This document describes how to use Coil SNR Tool. In the installation of new coils, field engineers are requested to use Coil SNR Tool. When the mean value and SD (standard deviation) value are typed into the system by the field engineer, the SNR is automatically calculated, and the values along with other parameters are stored in a log file. The values in the log file will be useful in future troubleshooting, because by analyzing the data, you will be able to determine whether it is the coil that is out of order, or the system that is out of order. For this purpose, the tool will ask you to scan with the coil in an ordinary environment, and also in an extraordinary environment where you set the TG (Transmit Gain) to -30 db. The TG value being 30db lower than auto scanned value simulates the case where the system is out of order.

Refer to Illustration 1 for the flowchart.

At the beginning of the procedure, you are asked to select from 3 types of methods to calculate SNR. The three types of methods are :

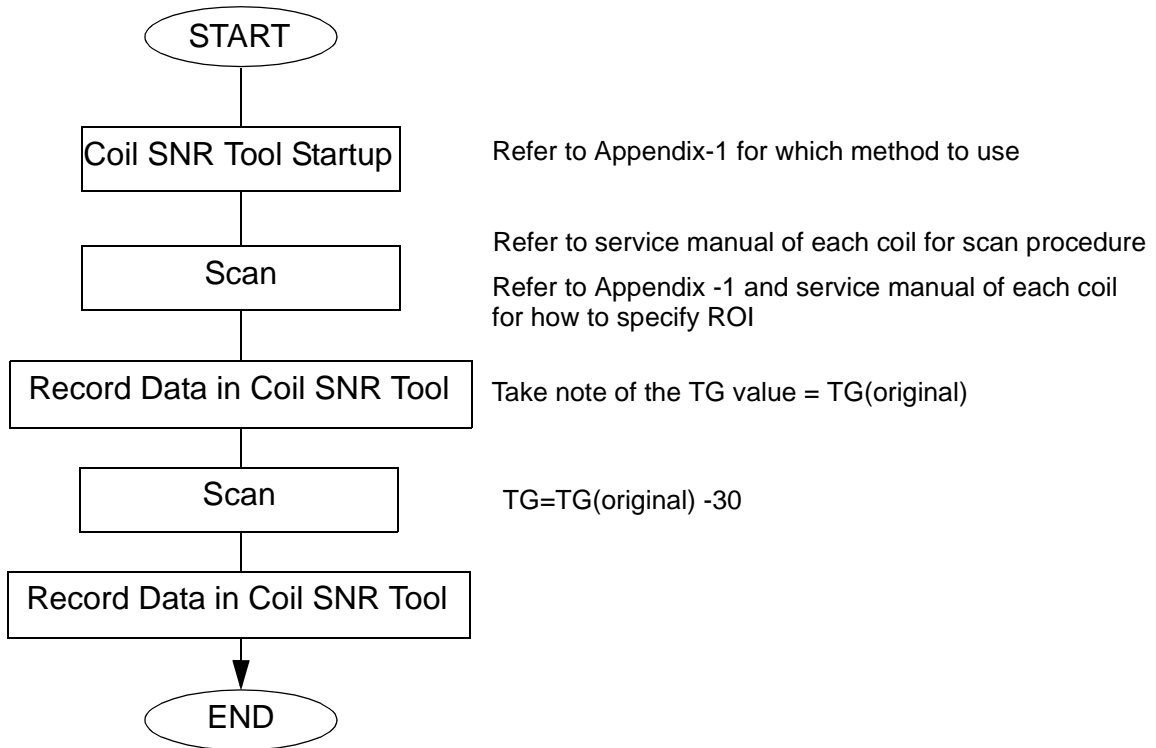
1. Sub Method
2. Mean Method
3. Sub Method / Mean Method

In Sub Method, the Coil SNR Tool uses the subtraction method to calculate SNR. The method requires two phantom scans to create two signal images. The signal value is measured from two images, and the noise value is measured from one subtracted image that is generated. In Mean Method, the Coil SNR Tool uses the mean method to calculate SNR. The method requires one phantom scan to create one signal image, and one noise scan (RF disabled) to create one noise image. In Sub Method / Mean Method, the Coil SNR Tool uses both methods. **The type of method you should use for the coil you are installing differs according to the coil. Refer to Appendix - 1 for combination of coils and the method you should choose.** The scan procedure that you should follow to get the images also differs according to the coil. Refer to each coil's service manual listed also in Appendix - 1 for the procedure.

Coil SNR Tool can store SNR for multiple ROIs. **The ROI you should specify for SNR data differs according to the coil. Refer to Appendix - 1 and also each coil's service manuals for how to specify ROIs.**

Coil SNR Tool displays the value of TG for your first scan. **When the original TG value is displayed, take a note of the TG value so that you can adjust the TG to TG(original) -30 for your later scan to simulate the extraordinary environment.** The TG value difference must be exactly -30, or the Coil SNR Tool will reject the selection of the image.

1. Overview (continued)



**FLOW CHART
ILLUSTRATION 1**

2. Coil SNR Tool Startup

1. Click [**Service Desktop Icon**], [**Cal / Check**], [**Coil SNR Tool**], and [**Start**]. This operation invokes a C-shell called "Coil SNR Tool"
2. When you are asked "Select the method(s) for calculating SNR", type either <1>, <2> or <3> according to the method appropriate for the coil that is used. Press <Enter>. Refer to Appendix - 1 for combination of coils and the method.
3. When you are asked "Accept above?", type <y> to continue.

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3. Scan

Perform functional check scans specified in the service manual of the coil you are installing.

4. Record Data in Coil SNR Tool

1. Click Service Desktop icon to display Coil SNR Tool C-shell.
2. Place cursor on Coil SNR Tool C-shell.
3. At the prompt asking "Press [Enter] after subtraction image is completed -->", press **<Enter>**.
4. Input Exam/Series/Image Number of the 1st signal image and press **<Enter>**.

```

*****
Input MEAN/SD of 1st Signal Image
*****

Input Exam/Series/Image Number of 1st signal image

Enter Exam   Number [0] : 45
Enter Series Number [0] : 1
Enter image  Number [0] : 1
    
```

COIL SNR TOOL-1
ILLUSTRATION 2

5. Take a note of the TG value displayed by the Coil SNR Tool.
The value you noted is TG(original). You will later have to adjust the TG to TG(original) -30. Refer to Illustration 3.
6. When you get the following confirmation message "Accept above?", type **<y>** and press **<Enter>**.

```

exam   NO.45
series NO.1
image  NO.1

DATE: 2002/01/28
TIME: 09:15:44

Coil Name: HEAD

Analog Gain   (R1): 13
Digital Gain   (R2): 30
Transmit Gain  (TC): 50
Center Frequency(CF): 149015648

Above is image information you selected.
Accept above ? [y/n]: y
    
```

COIL SNR TOOL-2
ILLUSTRATION 3

7. Measure the Mean and SD of 1st image
 - a. Click AW Icon

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4. Record Data in Coil SNR Tool (continued)



AW Icon
ILLUSTRATION 4

b. Measure the Mean and SD.

Measure the Mean and SD referring to service manual of the coil you are installing. Coil SNR Tool can store SNR for multiple ROIs. **The ROI you should specify for SNR data differs according to the coil. Refer to Appendix - 1 and also each coil's service manuals for how to specify ROIs.**

8. Place cursor on Coil SNR Tool C-shell.
9. Input Mean and SD of the appropriate image.

*** ROI#1 ***

Set ROI#1 and input mean/sd

mean[0.00]:4.01

sd[0.00]:2.26

COIL SNR TOOL-3
ILLUSTRATION 5

10. If you need to input data for ROI#2, ROI#3,..., repeat steps 5 through 8 for required number of ROIs.

Note:

The ROI you should specify for SNR data differs according to the coil. Refer to Appendix - 1 and also each coil's service manuals for how to specify ROIs.

11. If you are performing Sub Method, repeat steps 4 through 9 for the 2nd signal image. If you are performing Mean Method, repeat steps 4 through 9 for the noise image.

12. When you are complete with the data entry, Coil SNR Tool will calculate and display SNR value. Refer to Illustration 6. Record the data in the SNR data sheet attached to each service manual also.

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4. Record Data in Coil SNR Tool (continued)

```
*****  
Result of calculation  
*****
```

```
*** ROI#1 ***  
SNR_sub: 1.34
```

```
*** ROI#2 ***  
SNR_sub: 0.51
```

Data has been logged in usr/g/service/data/cst.log

COIL SNR TOOL-4 ILLUSTRATION 6

5. Scan with extraordinary TG

Perform functional check scans specified in the service manual of the coil you are installing. This time, be sure to adjust TG to TG(original)-30 in Manual Prescan. For instance, if TG(original) was 50, then you should adjust value of TG to 20 in Manual Prescan.

6. Record Data in Coil SNR Tool

Repeat Section 4 to record data in Coil SNR Tool for extraordinary TG.

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7. Appendix -1 Selection of Method and ROI for Different Coils

**TABLE 7-1
SURFACE COIL SNR METHOD**

Surface Coils	SNR Method	ROI#1	ROI#2	ROI#3	ROI#3	Service Manual
9-INCH GP	1	(Image#1)	N/A	N/A	N/A	9 Inch Coil SNR Check
Open Body	1	(Image#1)	N/A	N/A	N/A	Open Body Coil

**TABLE 7-2
PHASED ARRAY COIL SNR METHOD**

Phased Array Coils	SNR Method	ROI#1	ROI#2	ROI#3	ROI#3	Service Manual
Shoulder	1	Composite (Image#1)	N/A	N/A	N/A	Phased Array Shoulder Coil
Cervical CTL (CTL Array Coil)	1	Composite (Image#1)	N/A	N/A	N/A	Phased Array CTL Spine Coil
Thoracic CTL (CTL Array Coil)	1	Composite (Image#1) S 100mm	Composite (Image#1) S/l 0mm	Composite (Image#1) l 100mm	N/A	Phased Array CTL Spine Coil
Lumber CTL (CTL Array Coil)	1	Composite (Image#1) S 100mm	Composite (Image#1) l 20mm	Composite (Image#1) l 100mm	N/A	Phased Array CTL Spine Coil
CT CTL (CTL Array Coil)	N/A	N/A	N/A	N/A	N/A	N/A
Breast-BOTH (Breast Array Coil)	N/A	N/A	N/A	N/A	N/A	N/A
Breast-RIGHT (Breast Array Coil)	1	Ch#1 (Image#1)	Ch#2 (Image#2)	Composite (Image#3)	N/A	Open Breast Coil
Breast-LEFT (Breast Array Coil)	1	Ch#1 (Image#1)	Ch#2 (Image#2)	Composite (Image#3)	N/A	Open Breast Coil
Wrist	1	Ch#1 (Image#1)	Ch#2 (Image#2)	Ch#3 (Image#3)	Composite (Image#5
)	Wrist Array Coil and Base Plate
Knee(L)	1	Ch#1 (Image#1)	Ch#2 (Image#2)	Composite (Image#3)	N/A	Phased Array Knee Coil (Large)
Knee(S) (Knee(S)+Foot Array Coil)	1	Ch#1 (Image#1)	Ch#2 (Image#2)	Composite (Image#3)	N/A	Phased Array Knee and Foot Coil

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Phased Array Coils	SNR Method	ROI#1	ROI#2	ROI#3	ROI#3	Service Manual
Foot (Knee(S)+Foot Array Coil)	1	Ch#1 (Image#1)	Ch#2 (Image#2)	Ch#3 (Image#3)	Composite (Image#5
)	Phased Array Knee and Foot Coil

Note:

(Image#1&2) indicates Image#1 and #2 should be used to create the subtraction image, and the values of these images should be entered into Coil SNR Tool when prompted under specified ROI number.

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REVISION HISTORY

Rev	Date	Author	Primary Reasons For Change
0	Feb.15,2002	M. Ikeda	Initial Release