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1- DESCRIPTION

QRT is a proprietary tool that collects noise data in the receiver chain with the receiver biased to the Head and Body Ports, as well as the Loopback Mode. The analysis of the noise data helps in localizing the noise source to the equipment room or the scan room, and in determining if the noise is common to both the body and the head receiver signal paths.

QRT takes 43 seconds (see theory) of scan time. The results provide TLT-like noise calculations, and also produce six images (for coherent noise) and six raw data files (for spike noise) to help catch most types of noise problems.

The QRT test was originally developed for use by Online Engineers to collect data from a site, while the patient is still in the bore. This would provide information for the Online Engineer to aid the Field Engineer. The test would allow the gathering of noise information from the scanner during the time a customer is complaining about image quality.

2- INITIAL CONDITIONS

Signa Horizon LX system must be at scan level.

3- DATA COLLECTION

1. Since no RF is produced by the QRT psd, no phantom is required for this test, so landmark anywhere (if not previously done).

2. At the operator work space, prepare the system for a “First Image” scan using the scan protocol shown in the "Service Protocols" procedure located under [Software Utilities] menu on the service methods CD-ROM, or for the alternate proprietary procedure, refer to the following:

   This alternate proprietary procedure is available for GE use, and to sites with a valid Advanced Service Package Limited License.
   a. Click on **[New Pt]**, and enter
      Patient Id: **geservice**
      Patient Name: **qrt**
      Weight (Lb): **111**
      Set Patient Protocols to **Service**.
   b. In the Protocol field, type **o.4.1** (o=Other, 1=series number) and enter, to load the protocol, **[Save Series]**.

3. Right click on **[Research Operations]**, select **Setup Params**, and enter settings:
   R1=**11**
   R2=**14**
   TG=**0**
   [Done]

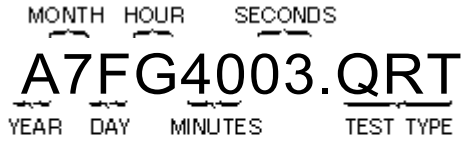
4. **[Manual Prescan]** for several seconds, then select **[Done]**.

5. **[Scan]**

4- QRT RESULTS

Quick Receiver Test (QRT) results can be reported with both graphics and text using the Report Manager tool program located in the MR Service Tools group on the SGI host computer. Refer to the Report Manager Tool procedure to view the QRT test results.

The following sections provide sample QRT report results. See Illustration 4-1 for an example file name. Refer to Table 4-1 for data file naming convention.



*EXAMPLE FILE CREATED: JULY 15, 2000 at 16:40:03

FILENAME EXAMPLE
ILLUSTRATION 4-1

TABLE 4-1
FILE NAMING CONVENTION

YEAR	MONTH	DAY		HOUR		MINUTES, SECONDS
0 = 1990 1 = 1991 2 = 1992 3 = 1993 4 = 1994 5 = 1995 6 = 1996 7 = 1997 8 = 1998 9 = 1999 A = 2000 B= 2001 : Z= 2026	1 = JAN. 2 = FEB. 3 = MAR. 4 =APR. 5 = MAY 6 = JUN. 7 = JUL. 8 = AUG. 9 = SEP. A = OCT. B = NOV. C = DEC.	1 = 01 2 = 02 3 = 03 4 = 04 5 = 05 6 = 06 7 = 07 8 = 08 9 = 09 A = 10 B = 11 C = 12 D = 13 E = 14 F = 15 G = 16	H = 17 I = 18 J = 19 K = 20 L = 21 M = 22 N = 23 O = 24 P = 25 Q = 26 R = 27 S = 28 T = 29 U = 30 V = 31	0 = 00:00 1 = 01:00 2 = 02:00 3 = 03:00 4 = 04:00 5 = 05:00 6 = 06:00 7 = 07:00 8 = 08:00 9 = 09:00 A = 10:00 B = 11:00 C = 12:00	D = 13:00 E = 14:00 F = 15:00 G = 16:00 H = 17:00 I = 18:00 J = 19:00 K = 20:00 L = 21:00 M = 22:00 N = 23:00 O = 24:00	0 to 59

4-1 Example QRT Report Screens

The following tables contain QRT test results examples displayed by the Report Manager.

Scan Header –

```
9ALD1254.QRT/0 Header Info RDF/GRP Revision:   1.0   /41
=======================================================
SITENAME    = Cardiac Bay 3
USN         = 54321
MLN         = 9999
SRVCONFIG   = 11/08/1999 21:13:05
EXCITER     = 000
RECEIVER    = S0/E0/PE0
XMTRFCOIL   = BODY
RCVRFCOIL   = BODY
FREQ        = 63892058 Hz
TIME        = 11/10/1999 11:02:00
BASERUN     = 00512
CONFIGCODE  = 000
SOFTREV     = 8.3.9944c
NUCLIDE     = 000
HEADERCODE  = 0x00000000
RCVCOILGAIN = 2.94  R1 = 11  R2 = 14  TG = 0.0
-------  Exam description  -------
8.3 M4 validation
------- Series description  -------
Body,Ax,2D,SE
```

(Refer to Table 4-2 for a description of the items on the Header Parameters screen.)

TABLE 4-2
HEADER PARAMETERS DESCRIPTION

PARAMETER	LEGAL VALUES	SOURCE
SITENAME	SITE NAME	RAW HEADER
USN	UNIQUE SYSTEM NUMBER (GECARES ISSUED)	Host.cfg FILE
MLN	MOBILE LOCATION NUMBER (9999 = NON-MOBIL)	MRconfig.cfg FILE
SRVCONFIG	DATE/TIME MRCONFIG FILE LAST CHANGED	MRconfig.cfg FILE
EXCITER	(NOT USED)	(NONE)
RECEIVER	STARTING RCVR #, ENDING RCVR #, PORT ENABLE #	SCAN Rx; MRconfig.cfg FILE
XMTRFCOIL	BODY, HEAD	RAW HEADER
RCVRFCOIL	BODY, HEAD, <SURFACE COIL NAME>	RAW HEADER
FREQ	MAGNET FREQUENCY	RAW HEADER
TIME	YY/MM/DD HH:MM:SS	RAW HEADER
BASERUN	BASE RUN NUMBER OF SCAN	RAW HEADER
CONFIGCODE	(NOT USED)	(NONE)
SOFTREV	SOFTWARE REVISION	“mrswrev”SCRIPT
NUCLIDE	(NOT USED)	(NONE)
HEADERCODE	ERROR # IF PROBLEM CREATING THIS TEST HEADER	CREATED BY TEST ANALYSIS
REVCOILGAIN	CALIBRATION VALUE (TYP. 1-10)	CoilConfig.cfg FILE
R1, R2, TG	1-13, 1-15, 0-200	RAW HEADER
Exam *“Comments”*	UP TO 22 CHARACTER FROM EXAM DESCRIPTION	IMAGE HEADER
Series “Comments”	UP TO 29 CHARACTER FROM SERIES DESCRIPTION	IMAGE HEADER

4-2 Troubleshooting

For an example of QRT results refer to the following:

```
Running Quick Receiver Test

Processing raw data.  Please wait....

                                i_stdev    q_stdev   combined
Loopback,  Gradients Off:       0.837      0.838     0.837
Loopback,  Gradients On :       0.834      0.837     0.836
Body Port, Gradients Off:       2.960      2.962     2.961
Body Port, Gradients On :       2.970      2.969     2.969
Head Port, Gradients Off:       1.210      1.207     1.208
Head Port, Gradients On :       1.202      1.202     1.202

QRT completed successfully.
```

1. Record results in appropriate data sheet (specs not available yet) in Appendix A.

2. Look at the images created:
   - For troubleshooting zipper problems, see procedure for Correlated Noise Check.
   - For corduroy artifact problems, see procedure for Spike Noise.

3. Troubleshoot for cause of noise.

5- QRT THEORY

QRT consists of a PSD and an analysis program. The PSD does not play any RF pulses. Instead, it opens the receiver window to collect noise; first without any gradients, and then with 30% full scale gradients. The PSD automatically switches between the Loopback Mode, the Head Port, and the Body Port, regardless of which coil is prescribed in the scan prescription.

The TR scan time is 30 msec. A total of six slices of noise data are collected. The resolution is 256 frames per slice x 256 samples per frame. No baselines are collected. The scans are NO_REC and the raw data are locked.

The QRT analysis program calculates noise in the same manner as TLT, so the noise numbers for QRT should correspond directly with results of the Pin Diode check that uses the TLT noise only scan.

After the scan has been completed, the QRT analysis tool automatically calculates the noise standard deviations. The raw data created is locked for retrieval and viewing by the On Line Center if needed. The results are displayed on the console screen as well as written to a report file readable via the Report Manager Tool.

APPENDIX A - DATA SHEET

QRT BODY/HEAD DATA

	I_STDEV	Q_STDEV	COMBINED
LOOPBACK, GRADIENT OFF			
LOOPBACK, GRADIENT ON			
BODY PORT, GRADIENT OFF			
BODY PORT, GRADIENT ON			
HEAD PORT, GRADIENT OFF			
HEAD PORT, GRADIENT ON			
NOTE: QUICK RECEIVER TEST SPECIFICATIONS TO BE DETERMINED			

REVISION HISTORY

REV	DATE	AUTHOR	PRIMARY REASONS FOR CHANGE
0		M. Keber	Initial Release
1	9/28/95		Elminated Signa Advantage and Release 5.4 reference
2	5/6/97	WEK	Updated protocols to 8.1
3	8/18/97		Fixed linking with L1426A
4	Oct 9, 1997	K. L-P	Changed format to word. Modified for Report Manager tool (rel 8.2)
5	Mar 23, 1998	K. L-P	Added release 8.1 for test results.
6	Sept 3, 1998	M. Keber	Removed obsolete Release 8.1 information.
7	Nov. 11, 1999	M. Keber	Updated manual prescan step and section 4-1 header example and table.
8	Aug 17, 2000	M. Jones	Updated and corrected file header example; deleted Section 6—RESTORATION.