

# System Record Sheet—PAUT 相控阵系统记录

1. Equipment Name and Serial No. 设备名称和序列号:

Software version 软件版本:

|  |         |                |
|--|---------|----------------|
| Declaration of conformity No. 符合证明证书编号 | Type 类型 | Valid Date 有效期 |
|  |         |                |

2. Probe Type information 探头信息:

|   |  |
|---|--|
| Probe Name and Serial No. 探头名称和序列号                              |  |
| Certificate according to ISO 18563-2 No.: 探头按照 ISO 18563-2 证书编号 |  |

3. Beam characterization and Used Block information 声束特性和采用试块:

|   |  |
|---|--|
| Used channels of the instrument or used part of the array and specific settings for a given mode of operation<br>仪器的常用通道或阵列的常用部分以及特定操作模式的具体设置 |  |
| Block Type and serial No.: 试块类型和序列号   |  |
| Tested parameters and the settings (e. g. transmitter voltage, gain, filters)<br>测试参数和设置 (如发射电压、增益、滤波器)                                       |  |

4. Applied standard and Frequency of checking: 执行标准和测试频次

|  |   |
|--|---|
| Standard used, including year of publication 执行标准及出版年份 | ISO 18563-3: 2024   |
| Frequency of checking 核查频次                             | 1. before starting and at the end of the non-destructive testing 检测前后 ( )<br>2. daily 每天 ( )<br>3. weekly 每周 ( )<br>4. monthly 每月 ( ) |



5. System record data according to ISO 18563-3 按照 ISO 18563-3 系统记录数据

| Item 测试项目   |   | Base values 基准值               |                  |                                       |   |                                       |  |                     |  |  |                 |        |                  |                  |        |        |        |        |          |   |                |                     |                |                     |  |                               |  |           |   |           |                               |  |                                       |   |                                       |  |                |                                     |
|---|---|-------------------------------|------------------|---------------------------------------|---|---------------------------------------|--|---------------------|--|--|-----------------|--------|------------------|------------------|--------|--------|--------|--------|----------|---|----------------|---------------------|----------------|---------------------|--|-------------------------------|--|-----------|---|-----------|-------------------------------|--|---------------------------------------|---|---------------------------------------|--|----------------|-------------------------------------|
| External aspects<br>外观                              | External aspects of the equipment<br>设备的外观情况 9.2  |                               |                  |                                       |   |                                       |  |                     |  |  |                 |        |                  |                  |        |        |        |        |          |   |                |                     |                |                     |  |                               |  |           |   |           |                               |  |                                       |   |                                       |  |                |                                     |
| Elements and channels<br>晶元和通道                      | Channel assignment 通道核查 9.3.2   |                               |                  |                                       |   |                                       |  |                     |  |  |                 |        |                  |                  |        |        |        |        |          |   |                |                     |                |                     |  |                               |  |           |   |           |                               |  |                                       |   |                                       |  |                |                                     |
|   | Relative sensitivity of elements, reference amplitude and dead elements<br>晶元相对灵敏度、参考波幅和死晶 9.3.3 <sup>a</sup>   |                               |                  |                                       |   |                                       |  |                     |  |  |                 |        |                  |                  |        |        |        |        |          |   |                |                     |                |                     |  |                               |  |           |   |           |                               |  |                                       |   |                                       |  |                |                                     |
| Correct operation<br>运行正确                           | Amplification system 幅值 9.4.2 <sup>b</sup>  |                               |                  |                                       |   |                                       |  |                     |  |  |                 |        |                  |                  |        |        |        |        |          |   |                |                     |                |                     |  |                               |  |           |   |           |                               |  |                                       |   |                                       |  |                |                                     |
|   | Using imaging 采用图像 9.4.3 <sup>c</sup> ( )   |                               |                  |                                       |   |                                       |  |                     |  |  |                 |        |                  |                  |        |        |        |        |          |   |                |                     |                |                     |  |                               |  |           |   |           |                               |  |                                       |   |                                       |  |                |                                     |
|   | Using beams 采用声束 9.4.4 <sup>d</sup> ( )   |                               |                  |                                       |   |                                       |  |                     |  |  |                 |        |                  |                  |        |        |        |        |          |   |                |                     |                |                     |  |                               |  |           |   |           |                               |  |                                       |   |                                       |  |                |                                     |
|   | Skew angle 偏转角度 9.4.5 <sup>e</sup>  |                               |                  |                                       |   |                                       |  |                     |  |  |                 |        |                  |                  |        |        |        |        |          |   |                |                     |                |                     |  |                               |  |           |   |           |                               |  |                                       |   |                                       |  |                |                                     |
|   | <table border="1"> <thead> <tr> <th>Test and clause</th> <th>Mode 1</th> <th>Mode 2 Example a</th> <th>Mode 2 Example b</th> <th>Mode 3</th> <th>Mode 4</th> <th>Mode 5</th> <th>Mode 6</th> <th>TFM mode</th> </tr> </thead> <tbody> <tr> <td>Using imaging<sup>a</sup><br/><a href="#">9.4.3</a></td> <td>Not applicable</td> <td>S-scan presentation</td> <td>Not applicable</td> <td>L-scan presentation</td> <td>At least one L-scan or S-scan presentation</td> <td>L-scan or S-scan presentation</td> <td>At least three L-scan or S-scan presentations<sup>b</sup></td> <td>TFM image</td> </tr> <tr> <td>Using beams<sup>a</sup><br/><a href="#">9.4.4</a></td> <td rowspan="2">Used beam</td> <td colspan="2" rowspan="2">At least 3 beams<sup>b</sup></td> <td rowspan="2">At least three apertures<sup>b</sup></td> <td rowspan="2">At least the three following beams: first shot of first aperture, last shot of last aperture and median shot of median aperture</td> <td rowspan="2">At least three apertures<sup>b</sup></td> <td rowspan="2">At least three apertures<sup>b</sup>, and three beams<sup>b</sup> for each of these apertures</td> <td>Not applicable</td> </tr> <tr> <td>Skew angle<br/><a href="#">9.4.5</a></td> <td>Required if applied</td> </tr> </tbody> </table> <p>a) Verification of correct operation is either done by using imaging (9.4.3) or by using beams (9.4.4). 通过成像 (9.4.3) 或声束 (9.4.4) 验证是否正确。</p> <p>b) Verifications shall be done for extreme and median beams or apertures or presentations. 必须对最大、小值和中值声束或孔径或演示进行验证。</p> <p>c) For matrix array probes generating beams with skew angles, the verifications shall be performed in the extreme and median deflection planes. 对于产生偏转声束的面阵探头, 应在最大偏转和中间偏转平面进行验证。</p> |                               |                  |                                       |   |                                       |  |                     |  |  | Test and clause | Mode 1 | Mode 2 Example a | Mode 2 Example b | Mode 3 | Mode 4 | Mode 5 | Mode 6 | TFM mode | Using imaging <sup>a</sup><br><a href="#">9.4.3</a> | Not applicable | S-scan presentation | Not applicable | L-scan presentation | At least one L-scan or S-scan presentation | L-scan or S-scan presentation | At least three L-scan or S-scan presentations <sup>b</sup> | TFM image | Using beams <sup>a</sup><br><a href="#">9.4.4</a> | Used beam | At least 3 beams <sup>b</sup> |  | At least three apertures <sup>b</sup> | At least the three following beams: first shot of first aperture, last shot of last aperture and median shot of median aperture | At least three apertures <sup>b</sup> | At least three apertures <sup>b</sup> , and three beams <sup>b</sup> for each of these apertures | Not applicable | Skew angle<br><a href="#">9.4.5</a> |
| Test and clause                                     | Mode 1  | Mode 2 Example a              | Mode 2 Example b | Mode 3                                | Mode 4  | Mode 5                                | Mode 6   | TFM mode            |  |  |                 |        |                  |                  |        |        |        |        |          |   |                |                     |                |                     |  |                               |  |           |   |           |                               |  |                                       |   |                                       |  |                |                                     |
| Using imaging <sup>a</sup><br><a href="#">9.4.3</a> | Not applicable  | S-scan presentation           | Not applicable   | L-scan presentation                   | At least one L-scan or S-scan presentation  | L-scan or S-scan presentation         | At least three L-scan or S-scan presentations <sup>b</sup>                                       | TFM image           |  |  |                 |        |                  |                  |        |        |        |        |          |   |                |                     |                |                     |  |                               |  |           |   |           |                               |  |                                       |   |                                       |  |                |                                     |
| Using beams <sup>a</sup><br><a href="#">9.4.4</a>   | Used beam   | At least 3 beams <sup>b</sup> |                  | At least three apertures <sup>b</sup> | At least the three following beams: first shot of first aperture, last shot of last aperture and median shot of median aperture | At least three apertures <sup>b</sup> | At least three apertures <sup>b</sup> , and three beams <sup>b</sup> for each of these apertures | Not applicable      |  |  |                 |        |                  |                  |        |        |        |        |          |   |                |                     |                |                     |  |                               |  |           |   |           |                               |  |                                       |   |                                       |  |                |                                     |
| Skew angle<br><a href="#">9.4.5</a>                 |   |                               |                  |                                       |   |                                       |  | Required if applied |  |  |                 |        |                  |                  |        |        |        |        |          |   |                |                     |                |                     |  |                               |  |           |   |           |                               |  |                                       |   |                                       |  |                |                                     |
| Other 其他核查  | Squint angle 偏转角度 9.5.1 <sup>f</sup>  |                               |                  |                                       |   |                                       |  |                     |  |  |                 |        |                  |                  |        |        |        |        |          |   |                |                     |                |                     |  |                               |  |           |   |           |                               |  |                                       |   |                                       |  |                |                                     |
| Result 结论   |   |                               |                  |                                       |   |                                       |  |                     |  |  |                 |        |                  |                  |        |        |        |        |          |   |                |                     |                |                     |  |                               |  |           |   |           |                               |  |                                       |   |                                       |  |                |                                     |
| Date 日期   |   |                               |                  |                                       |   |                                       |  |                     |  |  |                 |        |                  |                  |        |        |        |        |          |   |                |                     |                |                     |  |                               |  |           |   |           |                               |  |                                       |   |                                       |  |                |                                     |
| Operator name /level 测试人及级别                         |   |                               |                  |                                       |   |                                       |  |                     |  |  |                 |        |                  |                  |        |        |        |        |          |   |                |                     |                |                     |  |                               |  |           |   |           |                               |  |                                       |   |                                       |  |                |                                     |



Note:

- a. -1)  $A_{max} - A_{min} < 50\%$  of FSH; -2) For linear array probes and matrix array probes with up to 64 elements, the dead elements shall not be adjacent. -3) For matrix array probes with more than 64 elements, each dead element shall have maximum one adjacent dead element. -4) If new dead elements are found during periodical tests, it should be verified that the reference amplitude of the affected active apertures and the signal-to-noise ratio remain acceptable for the application. -5) **Maximum number of dead elements**

| Type of array probe                         | $0,5 < f \leq 5 \text{ MHz}$ | $5 < f \leq 10 \text{ MHz}$ |
|---|------------------------------|-----------------------------|
| Linear array                                | 1 out of 16                  |                             |
| Matrix array with number $\leq 64$ elements |                              |                             |
| Matrix array with number $> 64$ elements    | 10 %                         | 15 %                        |

- b. **Acceptance criteria for the linearity of summed signals**

Table 7 — Acceptance criteria for the linearity of summed signals up to 100 % of FSH

| Gain setting (dB) | Expected amplitude (% of full screen height) | Limits (% of full screen height) |
|-------------------|--|----------------------------------|
| + 2               | 101  | Not less than 95                 |
| 0                 | 80   | (Reference value)                |
| - 6               | 40   | 37 to 43                         |
| - 12              | 20   | 17 to 23                         |

Table 8 — Acceptance criteria for the linearity of summed signals above 100 % of FSH

| Gain setting (dB) | Expected amplitude value (% of maximum value) | Limits (% of maximum value) |
|-------------------|---|-----------------------------|
| + 2               | 101   | Not less than 95            |
| 0                 | 80  | (Reference value)           |
| - 6               | 40  | 37 to 43                    |
| - 12              | 20  | 17 to 23                    |
| - 18              | 10  | 8 to 12                     |

- c. a) 1) Each indication shall be located at the probe side of the center of the hole; 2) The position of maximum amplitude shall be located in an annular band as defined in Figure 5, 3) Or the distance DCM shall be approximately equal to the radius  $r$  of the side-drilled holes.  
 b) The tolerance in Figure 5 (half the width of the annular band), or the value  $|DCM - r|$  shall not exceed:  
 -1) For frequency  $f \geq 5 \text{ MHz}$ : 0,75 mm; -2) For frequency  $f$  with  $2 \text{ MHz} \leq f < 5 \text{ MHz}$ : 1 mm; -3) For frequency  $f < 2 \text{ MHz}$ : 1,25 mm.
- d. a) Probe index points shall be within  $\pm 1 \text{ mm}$  of the base values. b) For angles of refraction up to  $65^\circ$ , the measured angles of refraction shall be within  $\pm 2^\circ$  of the values specified in the settings of the delay laws. c) For angles of refraction greater than  $65^\circ$ , the measured angles shall be within  $\pm 5^\circ$  of the specified values.
- e. The measured skew angle values shall be equal to the values specified, to  $\pm 4^\circ$ .
- f. Shall be equal to the value specified to  $\pm 2^\circ$ .