

### 6.3 CRYSTALS AND OSCILLATORS (03)

#### 6.3.1 Crystals

| CRYSTALS, TO-5 CAN                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         |                                             |                                                                                                                                                                                                                                                        |                       | 333D                       |  |          |          |    |          |          |    |           |           |    |           |           |
|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|---------------------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----------------------|----------------------------|--|----------|----------|----|----------|----------|----|-----------|-----------|----|-----------|-----------|
| Procurement Specifications                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 | Manufacturer                                | Nature of Approval                                                                                                                                                                                                                                     | Supervising Authority | Initial Qualification Date |  |          |          |    |          |          |    |           |           |    |           |           |
| Generic<br><br>ESCC 3501<br><br>Detail ESCC<br><br>3501/018                                                                                                                                                                                                                                                                                                                                                                                                                                                | RAKON France<br>Pont Sainte Marie<br>France | Qualification                                                                                                                                                                                                                                          | CNES                  | Sept 2015                  |  |          |          |    |          |          |    |           |           |    |           |           |
|                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            |                                             | Previously qualified in Argenteuil site                                                                                                                                                                                                                |                       | (Oct. 1979)                |  |          |          |    |          |          |    |           |           |    |           |           |
|                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            |                                             | Remarks<br>Upon receipt of a request for any retired Variant, the Manufacturer will allocate a new Specific Crystal Identification Number in accordance with 3501/018. It will have identical crystal characteristics to those of the retired variant. |                       |                            |  |          |          |    |          |          |    |           |           |    |           |           |
| <p>Qualified range:</p> <p>All variants are qualified.</p> <p>Types covered by similarity:</p> <p>All variants previously specified in (retired) specifications:<br/>3501/001, 3501/008, 3501/011, 3501/012</p> <p>TO-5 Can (T 807)</p> <p>Frequency Ranges:</p> <table><tr><td></td><td>AT (MHz)</td><td>SC (MHz)</td></tr><tr><td>P1</td><td>14 to 35</td><td>15 to 38</td></tr><tr><td>P3</td><td>20 to 100</td><td>22 to 110</td></tr><tr><td>P5</td><td>45 to 140</td><td>55 to 140</td></tr></table> |                                             |                                                                                                                                                                                                                                                        |                       |                            |  | AT (MHz) | SC (MHz) | P1 | 14 to 35 | 15 to 38 | P3 | 20 to 100 | 22 to 110 | P5 | 45 to 140 | 55 to 140 |
|                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            | AT (MHz)                                    | SC (MHz)                                                                                                                                                                                                                                               |                       |                            |  |          |          |    |          |          |    |           |           |    |           |           |
| P1                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         | 14 to 35                                    | 15 to 38                                                                                                                                                                                                                                               |                       |                            |  |          |          |    |          |          |    |           |           |    |           |           |
| P3                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         | 20 to 100                                   | 22 to 110                                                                                                                                                                                                                                              |                       |                            |  |          |          |    |          |          |    |           |           |    |           |           |
| P5                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         | 45 to 140                                   | 55 to 140                                                                                                                                                                                                                                              |                       |                            |  |          |          |    |          |          |    |           |           |    |           |           |

| CRYSTALS, TO-8 CAN                                                                                                                                                                                                                 |                                             |                                                                                                                                                                                                                                                        |                       | 334D                       |
|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|---------------------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----------------------|----------------------------|
| Procurement Specifications                                                                                                                                                                                                         | Manufacturer                                | Nature of Approval                                                                                                                                                                                                                                     | Supervising Authority | Initial Qualification Date |
| Generic<br><br>ESCC 3501<br><br>Detail ESCC<br><br>3501/019                                                                                                                                                                        | RAKON France<br>Pont Sainte Marie<br>France | Qualification                                                                                                                                                                                                                                          | CNES                  | Sept 2015                  |
|                                                                                                                                                                                                                                    |                                             | Previously qualified in Argenteuil site                                                                                                                                                                                                                |                       | (Oct. 1979)                |
|                                                                                                                                                                                                                                    |                                             | Remarks<br>Upon receipt of a request for any retired Variant, the Manufacturer will allocate a new Specific Crystal Identification Number in accordance with 3501/019. It will have identical crystal characteristics to those of the retired variant. |                       |                            |
| Qualified range:<br><br>All variants are qualified.<br><br>Types covered by similarity:<br><br>All variants previously specified in (retired) specifications: 3501/002, 3501/009<br><br>TO-8 Can (T 1507)<br><br>Frequency Ranges: |                                             |                                                                                                                                                                                                                                                        |                       |                            |
|                                                                                                                                                                                                                                    | AT (MHz)                                    | SC (MHz)                                                                                                                                                                                                                                               |                       |                            |
| P1                                                                                                                                                                                                                                 | 3 to 20                                     | 3 to 22                                                                                                                                                                                                                                                |                       |                            |
| P3                                                                                                                                                                                                                                 | 10 to 30                                    | 10 to 33                                                                                                                                                                                                                                               |                       |                            |
| P5                                                                                                                                                                                                                                 | 15 to 65                                    | 16 to 71                                                                                                                                                                                                                                               |                       |                            |

6.3.2 Oscillators

|                                                                                                               |                                                |                    |                                              |                              |              |                                   |
|---------------------------------------------------------------------------------------------------------------|------------------------------------------------|--------------------|----------------------------------------------|------------------------------|--------------|-----------------------------------|
| CRYSTAL OSCILLATOR RK135, CLASS 2, 4MHz to 100MHz, AHCMOS compatible output, Rad-Hard                         |                                                |                    |                                              | 371B                         |              |                                   |
| Procurement Specifications                                                                                    | Manufacturer                                   | Nature of Approval | Supervising Authority                        | Initial Qualification Date   |              |                                   |
| Generic<br>ESCC 3503<br>Detail ESCC<br>3503/001                                                               | RAKON France<br>Pont Sainte Marie<br>France    | Qualification      | CNES                                         | Feb 2021                     |              |                                   |
| Remarks: For frequencies below 24MHz, Customers should contact Rakon to confirm feasibility and availability. |                                                |                    |                                              |                              |              |                                   |
| Qualified range:                                                                                              |                                                |                    |                                              |                              |              |                                   |
| Variant Number                                                                                                | Nominal Output Frequency<br>$f_{Nom}$<br>(MHz) | Case               | Nominal Supply Voltage<br>$V_{CCNom}$<br>(V) | Terminal Material and Finish | Weight max g | Total Dose Radiation Level Letter |
| 01                                                                                                            | 4 to 100                                       | FP1                | 3.3                                          | D2                           | 5            | R [100krad(Si)]                   |
| 02                                                                                                            | 4 to 100                                       | FP2                | 3.3                                          | D2                           | 5            | R [100krad(Si)]                   |
| 03                                                                                                            | 4 to 100                                       | FP3                | 3.3                                          | D2                           | 5            | R [100krad(Si)]                   |
| 04                                                                                                            | 4 to 100                                       | FP4                | 3.3                                          | D2                           | 5            | R [100krad(Si)]                   |
| Operating Temperature Range (°C): -55 to +110                                                                 |                                                |                    |                                              |                              |              |                                   |