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TIMCO ENGINEERING, Inc.

An IIA Company

# RF Exposure Evaluation Report

| | |
|---|---|
| **APPLICANT** | NAVICO RBU ITALIA S.R.L. |
| **ADDRESS** | VIA ROMITA, 26<br>MONTAGNANA VAL di PESA, MONTESPERTOLI, FIRENZE<br>50025 ITALY |
| **FCC ID** | 2AJJ3SRTLAN30S |
| **IC** | 21849-SRTLAN30S |
| **MODEL NUMBER** | SRTLAN30S |
| **PRODUCT DESCRIPTION** | S-BAND RADAR |
| **DATE SAMPLE RECEIVED** | 10/31/2018 |
| **FINAL TEST DATE** | 02/04/2018 |
| **PREPARED BY** | Franklin Rose |

| Report Number | Report Version | Description | Issue Date |
|---|---|---|---|
| 2004AUT18 MPE_TestReport_ | Rev1 | Initial Issue | 02/04/2018 |

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## GENERAL REMARKS

### Summary

The device under test does:

☒ Fulfill the general approval requirements as identified in this test report and was selected by the customer.

☐ Not fulfill the general approval requirements as identified in this test report

### Attestations

This equipment has been tested in accordance with the standards identified in this test report. To the best of my knowledge and belief, these tests were performed using the measurement procedures described in this report.

All instrumentation and accessories used to test products for compliance to the indicated standards are calibrated regularly in accordance with ISO 17025 requirements.

I attest that the necessary measurements were made at:

**Timco Engineering Inc.**
**849 NW State Road 45**
**Newberry, FL 32669**
**Designation #: US1070**

**Prepared by:**

| | |
|---|---|
| **Name and Title** | Franklin Rose, EMC Project Manager / EMC Specialist |
| **Date** | 02/04/2018 |

## GENERAL INFORMATION

| | | | |
|---|---|---|---|
| **EUT Description** | S-BAND RADAR | | |
| **Model Number** | SRTLAN30S | | |
| **EUT Power Source** | ☒110–120 VAC | ☐ DC Power (12 V) | ☐ Battery Operated |
| **Test Item** | ☐ Prototype | ☒ Pre-Production | ☐ Production |
| **Type of Equipment** | ☒ Fixed | ☐ Mobile | ☐ Portable |
| **Antenna Connector** | 7/16 DIN Connector | | |
| **Test Conditions** | The temperature was 26ºC<br>Relative humidity of 50%. | | |
| **Modification to the EUT** | No Modification to EUT. | | |
| **Applicable Standards** | FCC CFR 47 Part 2.1091 | | |
| **Test Facility** | Timco Engineering Inc. at 849 NW State Road 45 Newberry, FL 32669 USA. Designation #: US1070 | | |

## ANTENNA INFORMATION

This information was provided by the client:

| | 6 ft X-Band | 9 ft X-Band | 12 ft X-Band | 12 ft S-Band |
|---|---|---|---|---|
| Antenna type | End-fed-slotted wave guide | | | |
| Polarization | Horizontal | | | |
| Antenna length/swing circle (ft/mm) | 6 / 1800 | 9 / 2650 | 12 / 3618 | 12 / 3695 |
| Gain (dB) | ≥ 29 | ≥ 31 | ≥ 32.5 | ≥ 27 |
| Horizontal beam width at -3 dB | 1.3° | 0.9° | 0.7° | 1,9 |
| Vertical beam width at -3 dB | 22° | 22° | 22° | 24 |
| Horizontal side lobes (dB):<br>- within 10°<br>- outside 10° | <br>- 27<br>- 30 | <br>- 27<br>- 30 | <br>- 27<br>- 30 | <br>- 23<br>- 30 |
| VSWR | Lower than 1.20 | | | |

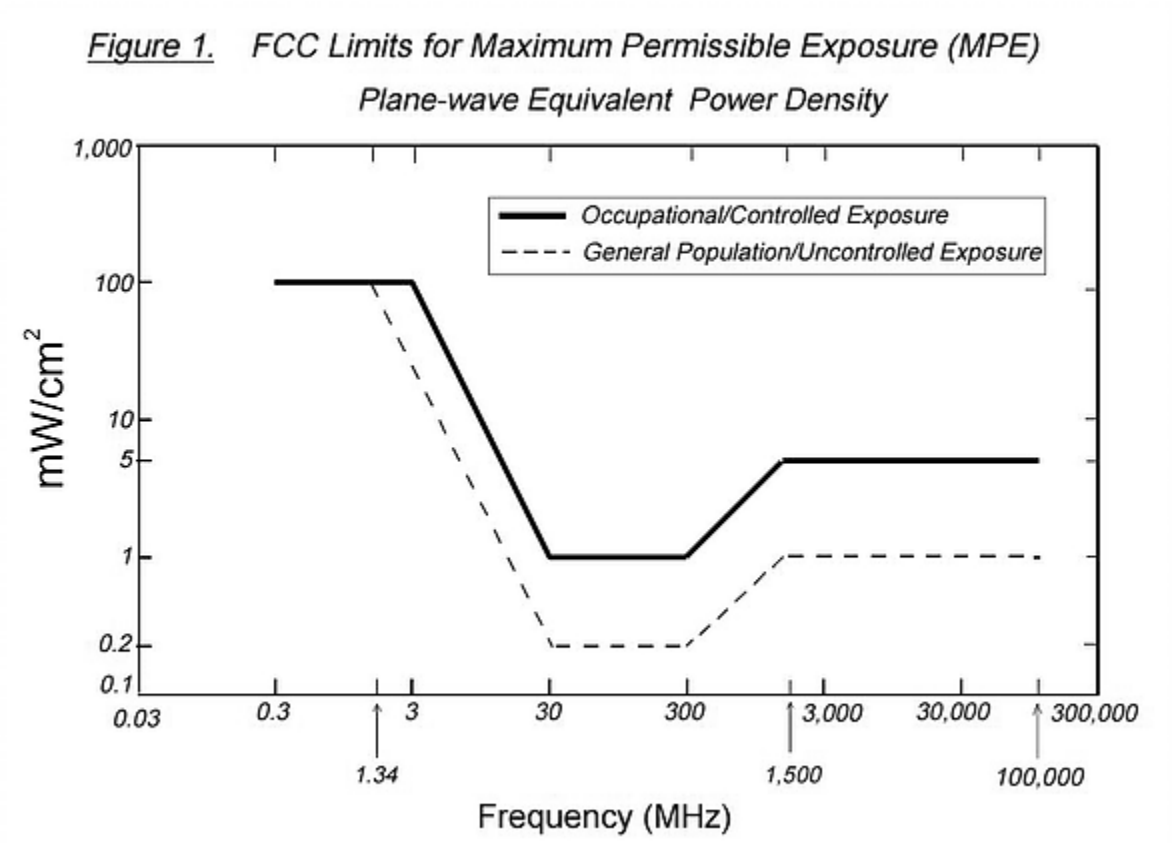
| Manufacturer-Provided Antenna | Type | Max Gain (dBi) |
|---|---|---|
| 12 ft. S-Band | End-fed Slotted Waveguide | **27.0** |

## MPE CALCULATION

The minimum separation distance is calculated as follows:

$$E(V/m) = \frac{\sqrt{30 \times P \times G}}{d} \qquad \text{Power density: } P_d(mW/cm^2) = \frac{E^2}{3770}$$

## MPE LIMITS



## MPE DATA

### FCC MPE Calculation: 12 ft. S-Band Antenna

**Inside Beam** (< 1.9° Horizontal Polarity, < 24° Vertical Polarity)

1. **General <u>Uncontrolled</u> Exposure Environment**: The limit for general uncontrolled exposure environment is shown in FCC rule Part 1.1310, Table 1B.

| Variable | Value |
|---|---|
| Max Power | 29668.80 W |
| Duty Cycle (at full power) | 0.021 % |
| Max Antenna Gain | 27.0 dBi |
| Coax Loss | 2.20 dB |
| Transmit Frequency | 3060 MHz |
| Power Density | 1.00 $mW/cm^2$ |
| Minimum Separation Distance | 387.0 cm |

2. **General <u>Controlled</u> Exposure Environment**: The limit for controlled exposure environment is shown in FCC rule Part 1.1310, Table 1A.

| Variable | Value |
|---|---|
| Max Power | 29668.80 W |
| Duty Cycle (at full power) | 0.021 % |
| Max Antenna Gain | 27.0 dBi |
| Coax Loss | 2.20 dB |
| Maximum Transmit Frequency | 3060 MHz |
| Power Density | 5.00 $mW/cm^2$ |
| Minimum Separation Distance | 173.1 cm |

**MPE CALCULATION**

**Outside Beam** (> 10° Horizontal Polarity, > 24° Vertical Polarity)

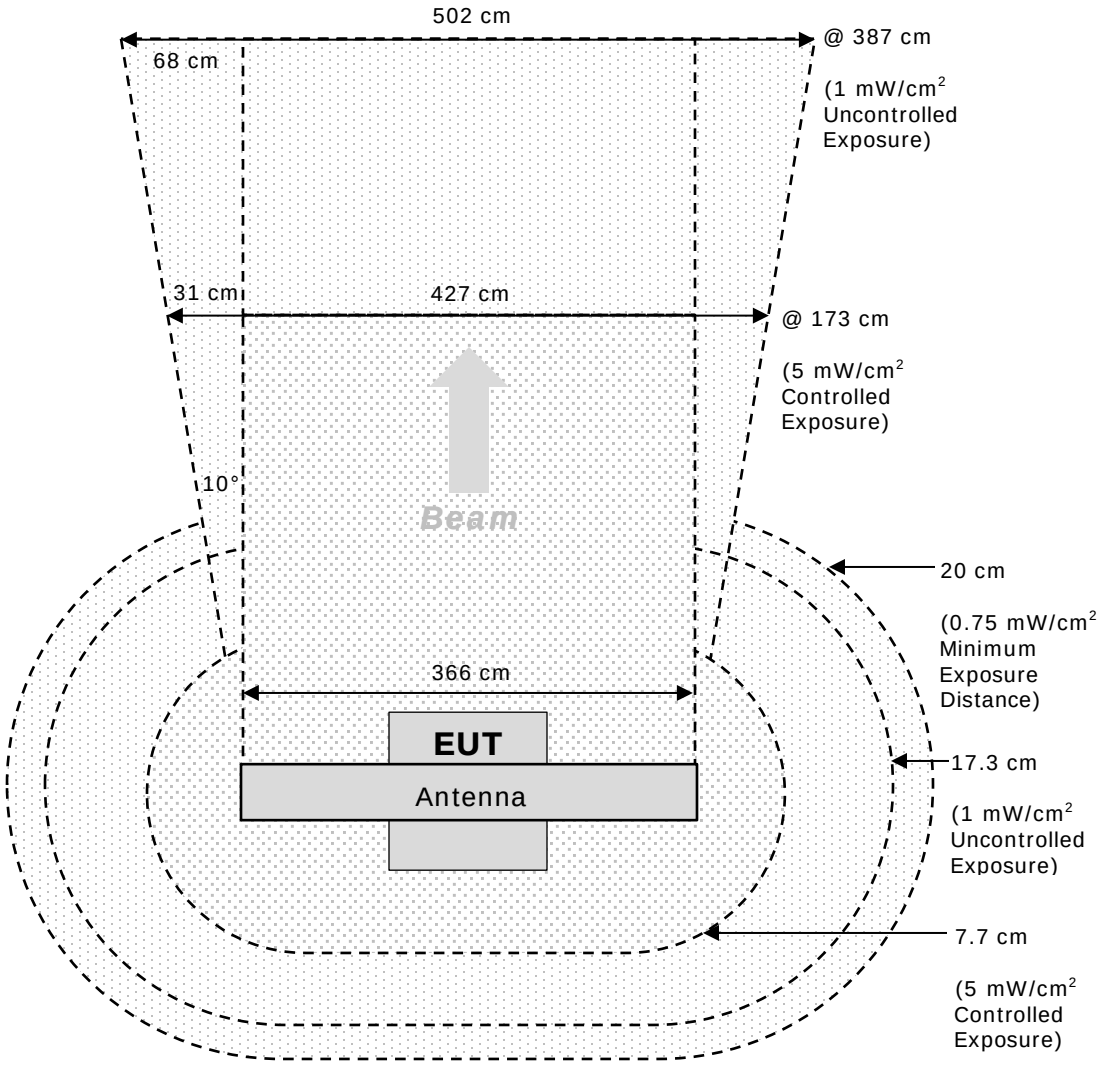
3. **General <u>Uncontrolled</u> Exposure Environment**: The limit for general uncontrolled exposure environment is shown in FCC rule Part 1.1310, Table 1B.

| Variable | Value |
|---|---|
| Max Power | 29668.80 W |
| Duty Cycle (at full power) | 0.021 % |
| Max Antenna Gain | 0 dBi |
| Coax Loss | 2.20 dB |
| Transmit Frequency | 3060 MHz |
| Power Density | 0.75 $mW/cm^2$ |
| Minimum Separation Distance | 20 cm |

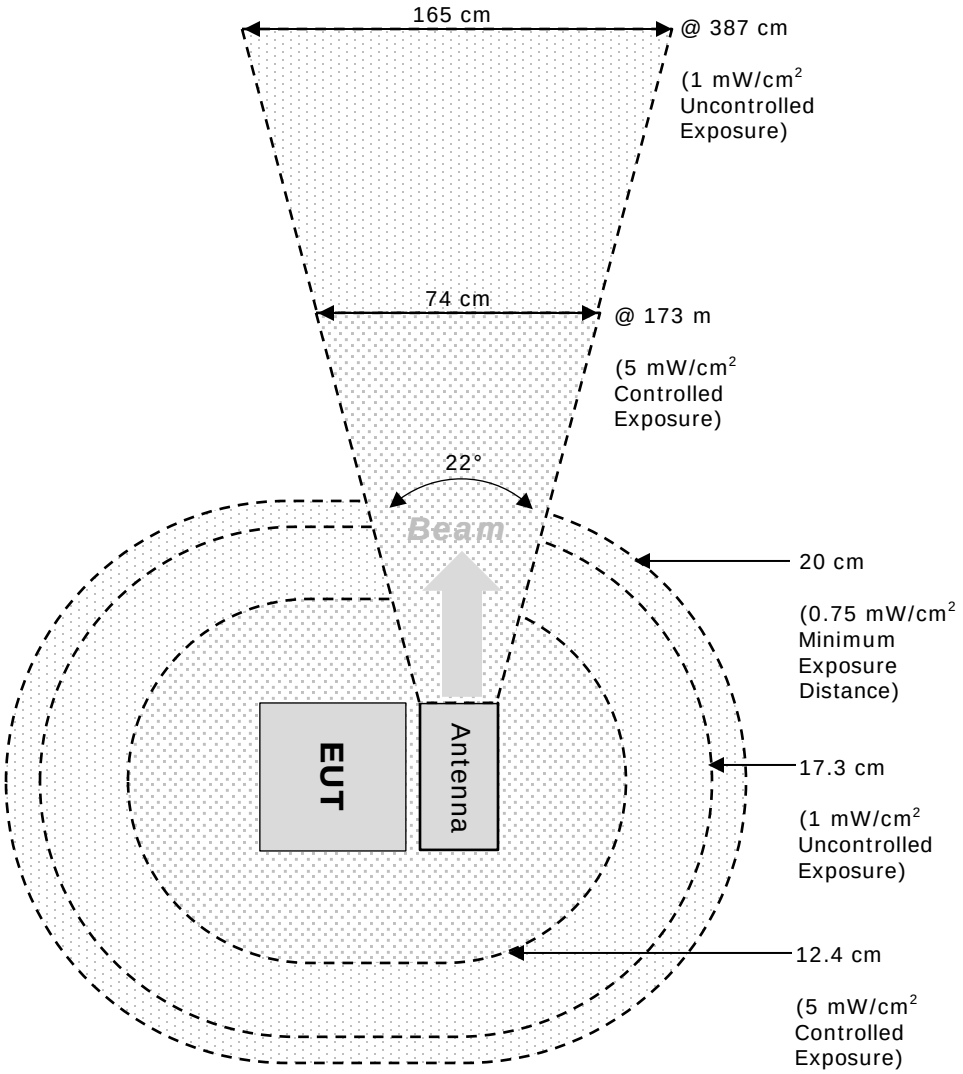
4. **General <u>Controlled</u> Exposure Environment**: The limit for controlled exposure environment is shown in FCC rule Part 1.1310, Table 1A.

| Variable | Value |
|---|---|
| Max Power | 29668.80 W |
| Duty Cycle (at full power) | 0.021 % |
| Max Antenna Gain | 0 dBi |
| Coax Loss | 2.20 dB |
| Maximum Transmit Frequency | 3060 MHz |
| Power Density | 0.75 $mW/cm^2$ |
| Minimum Separation Distance | 20 cm |

**FCC MPE Diagram,** 12 ft. S-Band Antenna, Top View



**FCC MPE Diagram,** 12 ft. S-Band Antenna, Side View



**IC MPE Calculation: 12 ft. S-Band Antenna**

**Inside Beam** (< 1.9° Horizontal Polarity, < 24° Vertical Polarity)

1. **General <u>Uncontrolled</u> Exposure Environment**: The limit for general uncontrolled exposure environment is shown in RSS-102, Issue 5, Table 4.

| Variable | Value |
|---|---|
| Max Power | 29668.80 W |
| Duty Cycle (at full power) | 0.021 % |
| Max Antenna Gain | 27.0 dBi |
| Coax Loss | 2.20 dB |
| Transmit Frequency | 3060 MHz |
| Power Density | 6.314 $W/m^2$ |
| Minimum Separation Distance | 487.0 cm |

2. **General <u>Controlled</u> Exposure Environment**: The limit for controlled exposure environment is shown in RSS-102, Issue 5, Table 6.

| Variable | Value |
|---|---|
| Max Power | 29668.80 W |
| Duty Cycle (at full power) | 0.021 % |
| Max Antenna Gain | 27.0 dBi |
| Coax Loss | 2.20 dB |
| Maximum Transmit Frequency | 3060 MHz |
| Power Density | 35.707 $W/m^2$ |
| Minimum Separation Distance | 204.8 cm |

**MPE CALCULATION**

**Outside Beam** (> 10° Horizontal Polarity, > 24° Vertical Polarity)

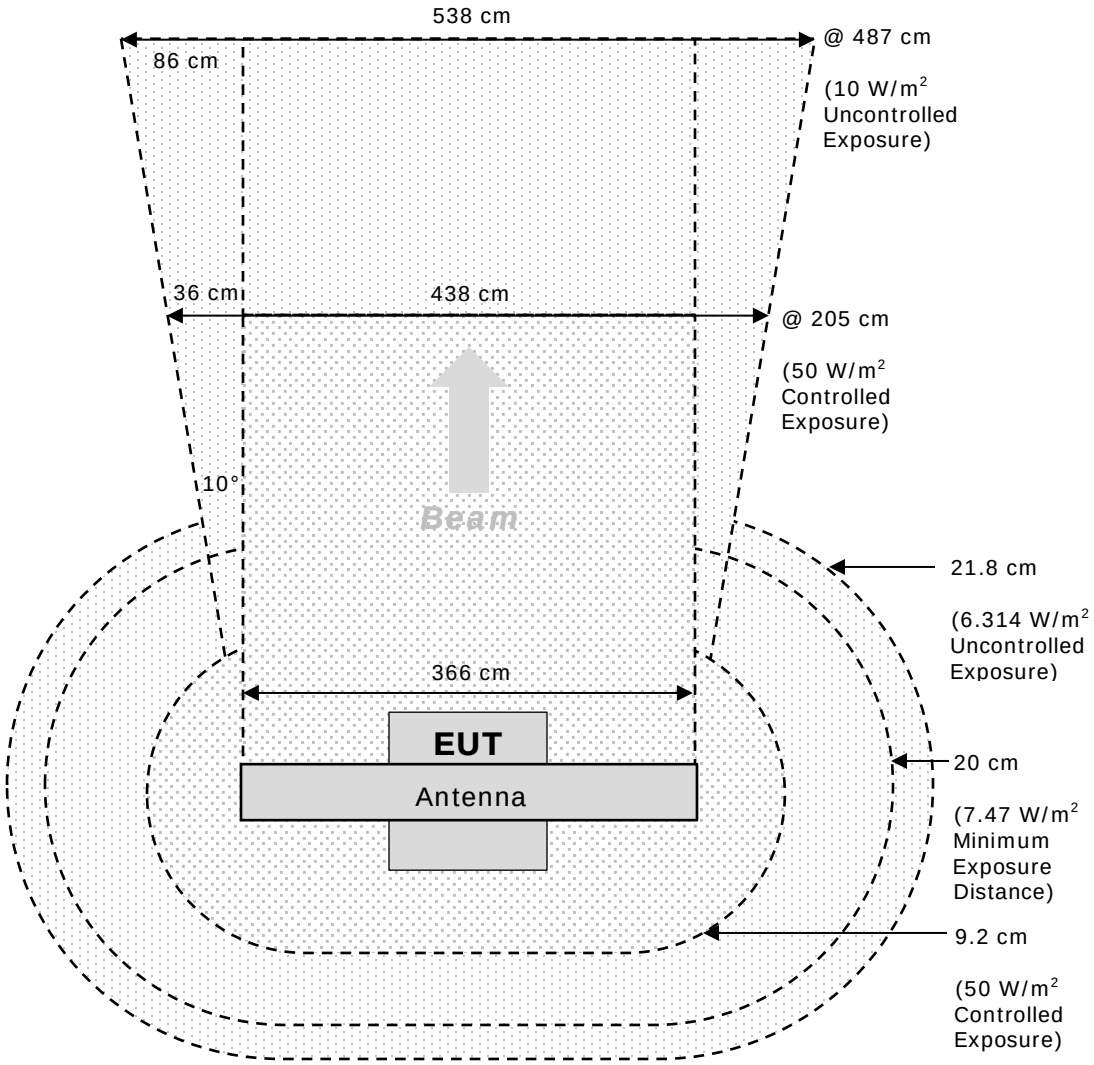
3. **General <u>Uncontrolled</u> Exposure Environment**: The limit for general uncontrolled exposure environment is shown in RSS-102, Issue 5, Table 4.

| Variable | Value |
|---|---|
| Max Power | 29668.80 W |
| Duty Cycle (at full power) | 0.021 % |
| Max Antenna Gain | 0 dBi |
| Coax Loss | 2.20 dB |
| Transmit Frequency | 3060 MHz |
| Power Density | 6.314 $W/m^2$ |
| Minimum Separation Distance | 21.8 cm |

4. **General <u>Controlled</u> Exposure Environment**: The limit for controlled exposure environment is shown in RSS-102, Issue 5, Table 6.

| Variable | Value |
|---|---|
| Max Power | 29668.80 W |
| Duty Cycle (at full power) | 0.021 % |
| Max Antenna Gain | 0 dBi |
| Coax Loss | 2.20 dB |
| Maximum Transmit Frequency | 3060 MHz |
| Power Density | 7.47 $W/m^2$ |
| Minimum Separation Distance | 20 cm |

**IC MPE Diagram,** 12 ft. X-Band Antenna, Top View



**IC MPE Diagram,** 12 ft. X -Band Antenna, Side View