849 NW STATE ROAD 45
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TIMCO ENGINEERING, Inc.

An IIA Company

RF Exposure Evaluation Report

APPLICANT	KELVIN HUGHES LIMITED
ADDRESS	VOLTAGE, MOLLISON AVENUE ENFIELD EN3 7XQ UNITED KINGDOM
FCC ID	CICDTX-A613-SF
MODEL NUMBER	DTX-A613-AMMA
PRODUCT DESCRIPTION	SHARPEYE RADAR TRANSCEIVER
DATE SAMPLE RECEIVED	12/29/2019
FINAL TEST DATE	01/27/2020
PREPARED BY	Franklin Rose

Report Number	Report Version	Description	Issue Date
3561AUT19 MPE_TestReport_	Rev1	Initial Issue	03/19/2020
3561AUT19 MPE_TestReport_	Rev2	Clerical Update	03/19/2020
3561AUT19 MPE_TestReport_	Rev3	Clerical Update	08/20/2020

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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	03/19/2020

GENERAL INFORMATION

EUT Description	SHARPEYE RADAR TRANSCEIVER		
Model Number	DTX-A613-AMMA		
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	WR-90 Waveguide		
Test Conditions	The temperature was 26ºC Relative humidity of 50%.		
Modification to the EUT	No Modification to EUT.		
Applicable Standards	FCC CFR 47 Part 2.1091, RSS-102		
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:

	Antenna 1	Antenna 2	Antenna 3	Antenna 4	Antenna 5
Name	LPA-A13	LPA-A19	LPA-A25	LPA-A37	LPA-A55
Size (LxWxD) (meters)	1.309 x 0.192 x 0.047	1.909 x 0.192 x 0.047	2.509 x 0.192 x 0.046	3.639 x 0.24 x 0.046	5.509 x 0.24 x 0.046
Type	Slotted Array	Slotted Array	Slotted Array	Slotted Array	Slotted Array
Gain	≥ 28 dBi	≥ 29.8 dBi	≥ 31 dBi	≥ 32.5 dBi	≥ 34.5 dBi
Sidelobe Suppression	≥ 10° ≥ 28 dB	≥ 10° ≥ 28 dB	≥ 10° ≥ 29 dB	≥ 10° ≥ 27 dB	≥ 10° ≥ 27 dB
Backlobe Suppression	≥ 38 dB	≥ 38 dB	≥ 38 dB	≥ 38 dB	≥ 38 dB

Worst-Case Exposure	Type	Typical Gain (dBi)
Antenna 5	Slotted Array LPA-A55	**34.5**

MPE CALCULATION

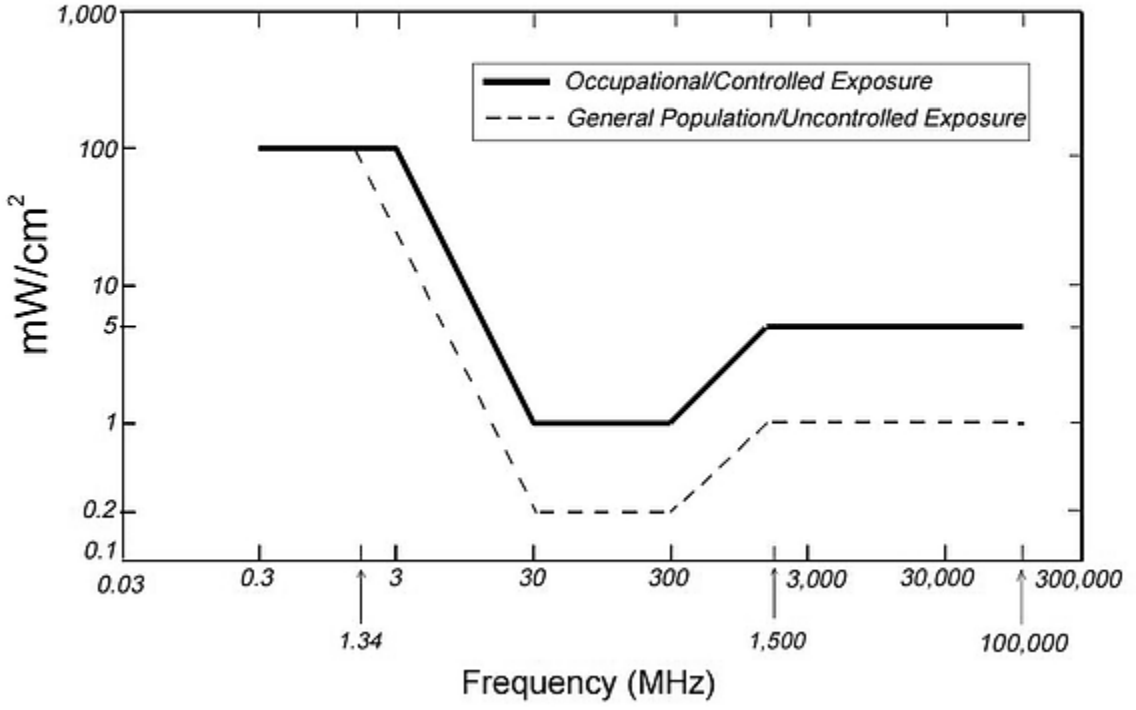
The minimum separation distance is calculated as follows:

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

MPE LIMITS

Figure 1. FCC Limits for Maximum Permissible Exposure (MPE)

Plane-wave Equivalent Power Density



MPE DATA

FCC MPE Calculation: Slotted Array LPA-A55

Inside Beam

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 (mean value)	34.8 W
Duty Cycle (at full power)	8.3507 %
Antenna Gain	34.5 dBi
Losses	0 dB
Transmit Frequency	9000 - 9500 MHz
Power Density	1.00 mW/cm^2
Minimum Separation Distance	2793.73 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 (mean value)	34.8 W
Duty Cycle (at full power)	8.3507 %
Antenna Gain	34.5 dBi
Losses	0 dB
Transmit Frequency	9000 - 9500 MHz
Power Density	5.00 mW/cm^2
Minimum Separation Distance	1249.39 cm

NOTE: Exposure distances calculated here do not take the rotation of the array into account, and assume direct exposure.

MPE CALCULATION

Outside Beam (> 10° Outside of Beam)

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 (mean value)	34.8 W
Duty Cycle (at full power)	8.3507 %
Antenna Gain	7.5 dBi
Losses	0 dB
Transmit Frequency	9000 - 9500 MHz
Power Density	1.00 mW/cm^2
Minimum Separation Distance	124.79 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 (mean value)	34.8 W
Duty Cycle (at full power)	8.3507 %
Antenna Gain	7.5 dBi
Losses	0 dB
Transmit Frequency	9000 - 9500 MHz
Power Density	5.00 mW/cm^2
Minimum Separation Distance	55.81 cm