COMPLIANCE ENGINEERING IRELAND LTD

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Confidential Report

Client:	Test of:
Tekelek Europe Ltd., **Unit 118,** **Shannon Industrial Estate,** **Shannon,** **Co. Clare,** **V14 XY18,** **Ireland.** **Attention of: Seamus Normoyle**	**Tek 880 LTE Radar Sensor** **To:** **EN 301 489-1 V2.2.3** **EN 301 489-3 v2.1.1** **EN 301 489-17 v3.2.0**

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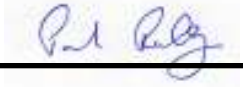
	SIGNATURE: 

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13. CEI is an accredited test laboratory and relevant test reports are denoted by use of the accreditation logo. When the accreditation logo is not used, the report is outside our scope of accreditation.
14. In IEC standards measurement uncertainty is already incorporated into the specifications. Statements of conformity in the CEI test report follow these decision rules: Pass – Results within the stated limit, Fail – Results outside the stated limit.
15. The test results presented in this report relate only to the object tested.

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1 Equipment Under Test (EUT)

1.1 Identification of EUT

Brand Name:	LTE Radar Sensor
Description:	Radar Tank Level Sensor
Model Name:	TEK 880

1.2 Description of EUT

The EUT was a battery powered radar LTE level sensor.

1.3 Modifications Incorporated in EUT

There were no modifications incorporated into the EUT during testing.

1.4 Support Equipment List

There was no manufacturer supplied support equipment used in the testing.

1.5 Date of test

The tests were carried out on one sample of the unit between the 31st May – 01st June 2022.

2 Test Specification, Methods and Procedures

2.1 Immunity

Immunity was assessed according to the following standards:

EN 301 489-1
Title:
ElectroMagnetic Compatibility (EMC) standard for radio equipment and services; Part 1: Common technical requirements; Harmonised Standard for ElectroMagnetic Compatibility

EN 301 489-3
Title:
Electromagnetic compatibility and Radio spectrum Matters (ERM); ElectroMagnetic Compatibility (EMC) standard for radio equipment and services; Part 3: Specific conditions for Short-Range Devices (SRD) operating on frequencies between 9 kHz and 40 GHz

EN 301 489-17
Title:
Electromagnetic compatibility and Radio spectrum Matters (ERM); ElectroMagnetic Compatibility (EMC) standard for radio equipment; Part 17: Specific conditions for Broadband Data Transmission Systems

EN 61000-4-2: 2009	Electromagnetic Compatibility (EMC) Part4: Testing and measurement techniques Section2: Electrostatic discharge immunity test
EN IEC 61000-4-3: 2020	Electromagnetic Compatibility (EMC) Part 4-3: Testing and measurement techniques – radiated, radio frequency, electromagnetic field immunity test

2.2 Apparatus and Methods:

Measuring apparatus used during tests was designed and built to the requirements of: C.I.S.P.R. 16.

2.3 Purpose of Test:

Testing was carried out to demonstrate compliance to the EMC aspects of the RED directive 2014/53/EU.

3 Deviations and Exclusions from the Test Specifications

3.1 Deviations

Up to date versions of the basic standards have been used in this test programme. Where necessary, we have verified that the requirements of any older basic standards as may be referred to in the product standard have been complied with.

3.2 Exclusions

There were no exclusions from the test specification.

4 Operation of EUT During Testing

4.1 Operating Environment

Supply Voltage: 3.6V, Battery Powered.

The unit was in a fully functioning state before the commencement of testing.

The following were the conditions at the time of immunity testing:
Temperature: 23-24ºC
Humidity: 48-49 % RH
Atmospheric Pressure: 1017-1018 hPa

4.2 Operating Modes:

The EUT was operated in Active, Transmitting mode during testing.

4.3 Compliance Criteria:

For the criteria A tests:
The EUT should continue to operate as intended.

For the criteria B tests:
Temporary degradation or loss of function or performance that self recovers without operator intervention.

For the criteria C tests:
Temporary degradation or loss of function or performance which requires operator intervention or system reset occurs.

5 Results

5.1 Electrostatic Discharge Test

Port:	Enclosure
Basic Standard:	EN 61000-4-2
Performance Criterion:	B
Limit:	±2 & ±4 kV contact discharges ±2, ±4 & ±8 kV air discharges

The ESD generator contained a discharge capacitor of 150pF and resistor of 330Ω in accordance with the requirements of EN 61000-4-2. The tests were carried out using both positive and negative discharges.

Only parts of the equipment which can be touched during normal operation were subjected to discharges.

Air discharges of ±2, ±4 & ±8 kV were applied to different points on the enclosure. Contact discharges of ±2 & ±4 kV were applied to conductive points on the enclosure.

The EUT was found to be operating satisfactorily during and subsequent to testing.

The test configuration is shown in Appendix 2.

5.2 Immunity to Radiated, Radio Frequency Electromagnetic Fields

Port:	Enclosure
Basic Standard:	EN IEC 61000-4-3
Performance Criterion:	A
Limit:	3 V/m (80% AM 1 kHz modulation)
Frequency range:	80-6000 MHz
Dwell time:	3 second dwell

The EUT was placed in the anechoic chamber.

The step sizes from 80-6000 MHz were in 1% steps. The dwell time at each frequency was 3 seconds. The test level was maintained at over 3 V/m at all frequencies from 80-6000 MHz in accordance with EN IEC 61000-4-3.

The distance of the antenna from the EUT was 2.2 metres. The tests were carried out with the antenna oriented in horizontal and vertical polarisations for each side of the EUT.

The EUT was deemed to comply in accordance with the manufacturer's specification.

Frequency	Modulation Frequency	Polarisation (V/H)	Level (V/m)	Result
80-6000 MHz	1 kHz	V and H	3	Complied

Results of Radiated Immunity Testing

6 Analysis of Test Results, Conclusions

6.1 Measurement Uncertainties

The measurement uncertainties stated were calculated in accordance with the requirements of CISPR 16-4 with a confidence level of 95%.

6.2 Immunity

The EUT complied with the immunity tests carried out to demonstrate compliance with EN 301 489-1, EN 301 489-3 and EN 301 489-17, when tested in accordance with the manufacturer's specifications.

Appendix 1:
Test Equipment Used

Instrument	Mftr.	Model	Serial No.
Electrostatic Discharge Simulator	Schaffner	NSG435	788
Signal Generator	Rohde and Schwarz	SMCV100B	1131
Power Amplifier	Milmega	AS0825-125	1134
Directional Coupler	Narda	-	813
Directional Coupler	Hewlett Packard	87300B	951
Power Amplifier	Schaffner	CBA9433	1133
Directional Coupler	Narda	-	767
Bilog Antenna	Schaffner	CBL6111C	699
Power Amplifier	Ophir	RF 5292	1016
Power Sensor	Rohde and Schwarz	NRV-Z6	944
Horn Antenna	DRG	SAS-200/571	920
Power Sensor	Rohde and Schwarz	NRV-Z8	943
Power Meter	Rohde and Schwarz	NRVS-Z5	842

Appendix 2:
Test Configurations

Figure 1: Radiated Immunity Test

Figure 2: ESD Test