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TEST REPORT
Nr. R20181801

Federal Communication Commission (FCC)

Report Reference No. .....:	R20181801
Date of issue: .....:	26.01.2021
Total number pages: .....:	16
Applicant´s name .....:	Intercomp S.p.A.
Address .....:	Via della Scienza, 27, 37139 Verona (VR) - Italy
Test specification:	
Standards .....:	KDB 447498 D01 General RF Exposure Guidance v06
Non-standard test method .....:	N/A
Test Report Form No. .....:	15-247_HoppingCMC
Test Report Form(s) Originator ..:	CMC Centro Misure Compatibilità S.r.l.
Master TRF .....:	2021-01

General disclaimer:

The test results presented in this report relate only to the object tested.
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Test item description .....:	LoRa WAN magnetic sensor for parked vehicles detection for inground installation
Trademark .....:	Intercomp
Manufacturer .....:	Intercomp S.p.A.
Model / Type reference .....:	Ecoh-915
FCC ID .....:	2AUT7Ecoh-915
Rating(s) .....:	3,6 Vdc from battery

Report

Tested by (name + signature).....:	G. Gandini	.....
Approved by (name + signature) .....:	R. Beghetto	.....

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1 Summary

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2 Reference standard	
KDB 447498 D01 General RF Exposure Guidance v06	RF exposure procedures and equipment authorization policies for mobile and portable devices
3 List of attachments	
Attachment 1: Instruments list, measurement uncertainty, judgement of compliance and quality manual references	
4 Deviation(s) from test specification	
None	
5 Testing location	
CMC Centro Misure Compatibilità S.r.l. Via della Fisica, 20 – 36016 Thiene (VI) – Italy Test site facility's FCC registration number: 182474	

Revision index	***Date***	***Change history***
1.0	26.01.2021	--

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Testing and sampling:	
Date of receipt of test item.....	05.10.2020
Testing start date	26.01.2021
Testing end date	26.01.2021
Sampling procedure.....	Equipment used for testing was picked up by the manufacturer, at the end of the production process with random criterion. The results relate to the sample as it has been received.
Internal identification.....	Adhesive label with the product number P200985
General remarks:	
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Possible test case verdicts:	
Test case does not apply to the test object:	N/A (Not Applicable)
Test object does meet the requirement:	P (Pass)
Test object does not meet the requirement:	F (Fail)
Test object does not performed:	N/E (Not Executed)
Definition of symbols used in this test report:	
☒ Indicates that the listed condition, standard or equipment is applicable for this report. ☐ Indicates that the listed condition, standard or equipment is not applicable for this report.	

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6 General description of tested item and testing condition(s)

Description .....:	LoRa WAN magnetic sensor for parked vehicles detection for inground installation						
Model Number .....:	Ecoh-915						
FCC ID .....:	2AUT7ECOH-915						
Serial Number .....:	--						
Brand name .....:	Intercomp						
Frequency band .....:	902 – 928 MHz						
Test power supply.....:		Voltage and Frequency	Reference poles				
			N	L1	L2	L3	PE
	☐	AC:	☐	☐	☐	☐	☐
	☐	AC:	☐	☐	☐	☐	☐
	☒	DC: 3,6 V from battery					☐
Test configuration .....:	☒	Table top equipment					
	☐	Floor standing equipment					
	☐	Hand-held equipment					
Type of equipment .....:	☒	Transmitter unit					
	☐	Receiver unit					
Type of station .....:	☐	Portable station					
	☒	Mobile station					
Operating modes .....:	No.	Operating mode of test item					
	1	EUT in continuous transmission at maximum power					

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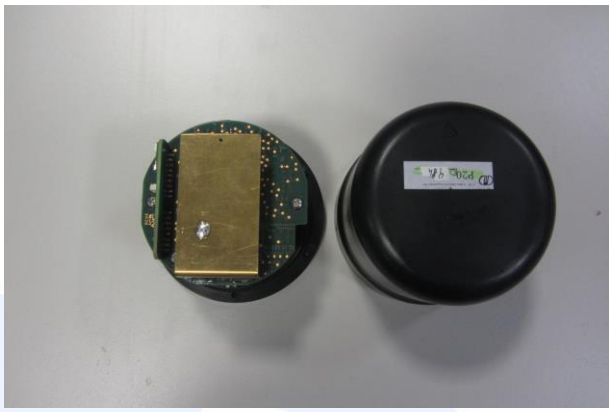
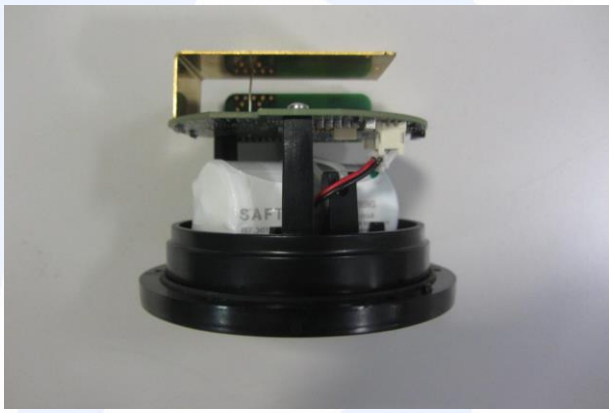
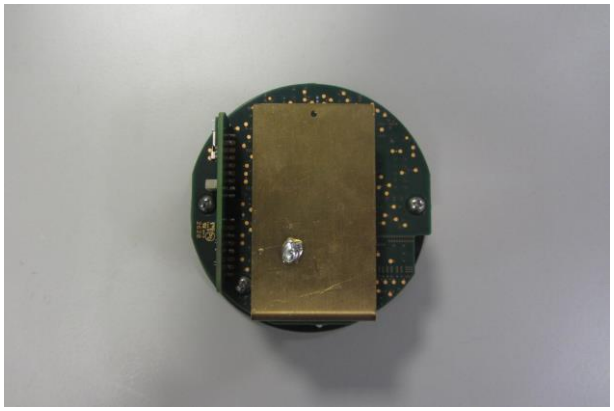
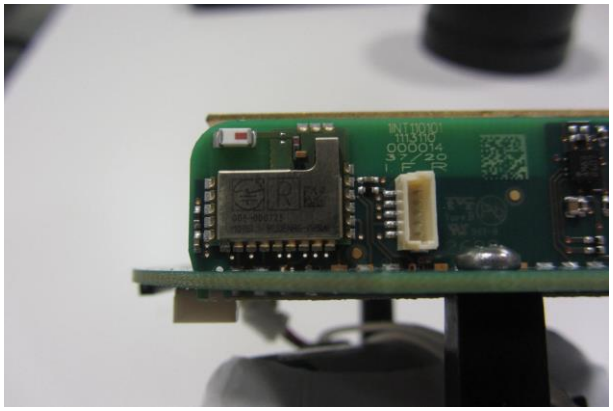
6.1 Photos of the test item









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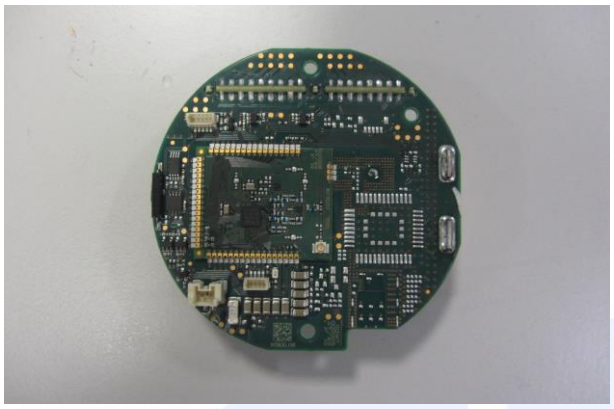

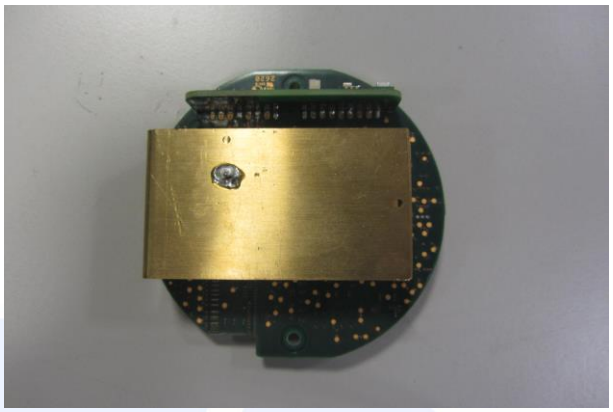

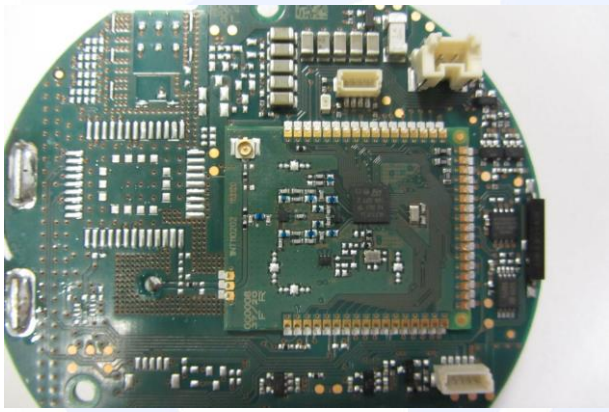

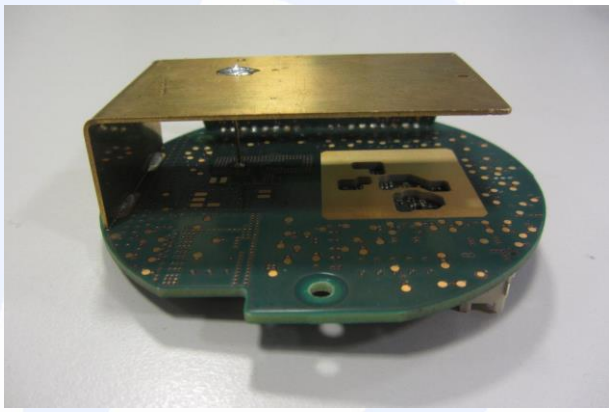

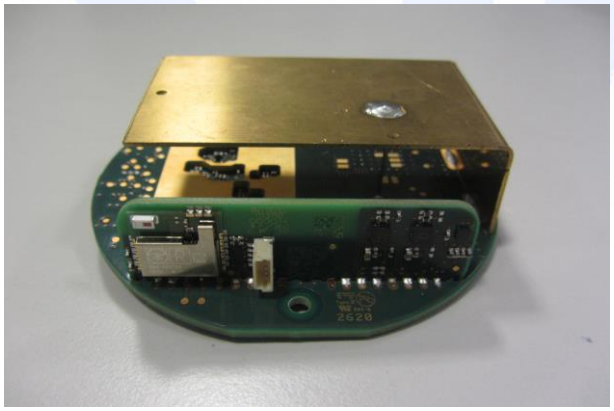

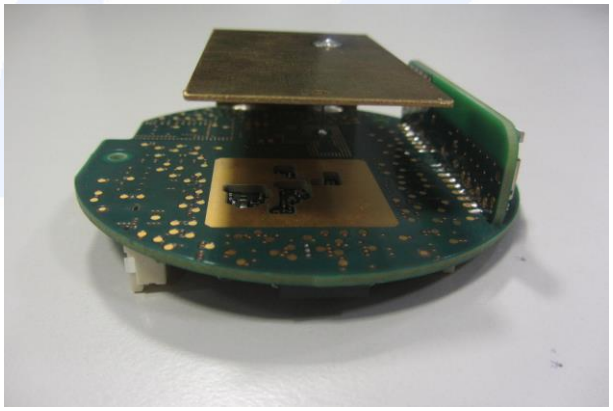

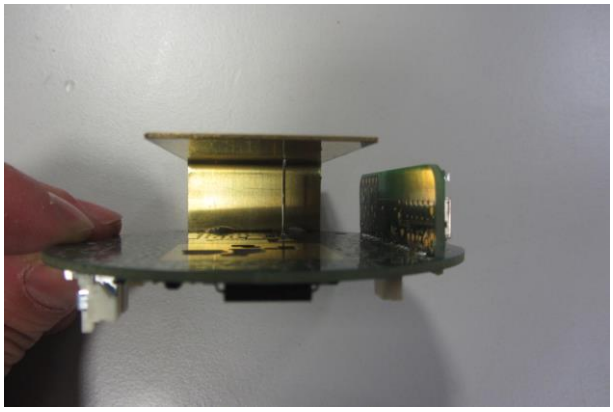

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7 Verdict summary section

KDB 447498 D01 General RF Exposure Guidance v06			
Clause	**Requirement – Test case**	**Basic standard**	**Verdict**
7.1	RF Exposure Analysis	--	**P**

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Normative references	
Reference no.	***Description***
KDB 447498 D01 General RF Exposure Guidance v06	RF exposure procedures and equipment authorization policies for mobile and portable devices

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8 Test conditions

8.1 General

<table>
<tr><td rowspan="4">Environmental reference conditions.....:</td><td colspan="3">The climatic conditions during the tests are within the limits specified by the manufacturer for the operation of the EUT and the test equipment.
The climatic conditions during the tests were within the following limits:</td></tr>
<tr><td>Temperature</td><td>Humidity</td><td>Atmospheric pressure</td></tr>
<tr><td>15 °C – 35 °C</td><td>30 % - 60 %</td><td>800 hPa – 1060 hPa</td></tr>
<tr><td colspan="3">If explicitly required in the basic standard or applied product standard the climatic values are recorded and documented separately in this test report.</td></tr>
<tr><td>Measurement uncertainties .....:</td><td colspan="3">Attachment 1</td></tr>
</table>

9 Test results

9.1 RF Exposure Analysis

Tested by ..... :	G. Gandini
Test date ..... :	26.01.2021
Test location (stand) ..... :	Laboratory
Reference standards ..... :	KDB 447498 D01 cl. 7.1 ANSI C63.10
Supplementary information..... :	--

Acceptance limits
Unless specifically required by the published RF exposure KDB procedures, standalone 1-g head or body and 10-g extremity SAR evaluation for general population exposure conditions, by measurement or numerical simulation, is not required when the corresponding SAR Test Exclusion Threshold condition(s), listed below, is (are) satisfied

For 100 MHz to 6 GHz and test separation distances ≤ 50 mm, the 1-g and 10-g SAR test exclusion thresholds are determined by the following

[(max. power of channel, including tune-up tolerance, mW)/(min. separation distance, mm)]x(√f(GHz)) ≤ 3 for 1-g SAR and ≤ 7,5 for 10-g SAR

MHz	5	10	15	20	25	mm
150	39	77	116	155	194	*SAR Test Exclusion Threshold* (mW)
300	27	55	82	110	137	
450	22	45	67	89	112	
835	16	33	49	66	82	
900	16	32	47	63	79	
1500	12	24	37	49	61	
1900	11	22	33	44	54	
2450	10	19	29	38	48	
3600	8	16	24	32	40	
5200	7	13	20	26	33	
5400	6	13	19	26	32	
5800	6	12	19	25	31	

10-g Extremity SAR Test Exclusion Power Thresholds are 2,5 times higher than the 1-g SAR Test Exclusion Thresholds indicated above.

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Result

Standalone operation – LoRa WAN (DTS)

Transmission channel (MHz)	*Conducted measured level (dBm)*	*Peak Output Power (mW)*
903,00	10,66	11,64
907,80	10,17	10,40
914,20	10,19	10,45

Standalone 10-g extremity
Using separation distance of 5 mm with the formula above results:

(11,64 mW / 5 mm) * √0,903 GHz = 2,21 ≤ 7,5

Thus for portable use the SAR exclusion condition is fulfilled and SAR evaluation is not required for separation distance of 5 mm or more.

Standalone operation – LoRa WAN (Frequency hopping)

Transmission channel (MHz)	*Conducted measured level (dBm)*	*Peak Output Power (mW)*
902,30	10,60	11,48
908,50	10,30	10,72
914,90	9,50	8,91

Standalone 10-g extremity
Using separation distance of 5 mm with the formula above results:

(11,48 mW / 5 mm) * √0,9023 GHz = 2,18 ≤ 7,5

Thus for portable use the SAR exclusion condition is fulfilled and SAR evaluation is not required for separation distance of 5 mm or more.

Standalone operation – BLE

Transmission channel (MHz)	*Conducted measured level (dBm)*	*Peak Output Power (mW)*
2402	5,27	3,37
2440	6,10	4,07
2480	5,12	3,25

Remarks: the conducted measured levels have been obtained by the Test Report of BLE module (FCC ID S9NBNRGM2SA)

Standalone 10-g extremity
Using separation distance of 5 mm with the formula above results:

(4,07 mW / 5 mm) * √2,44 GHz = 1,27 ≤ 7,5

Thus for portable use the SAR exclusion condition is fulfilled and SAR evaluation is not required for separation distance of 5 mm or more.

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Attachment 1

Instruments list

Id. number	*Manufacturer*	*Model*	*Description*	*Serial number*	*Last calibration*	*Due date calibration*
CMC S164	Rohde & Schwarz	ESU26	EMC interference receiver	100052	January '21	January '22

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Attachment 1

Measurement uncertainty

Test	*Test Setup*	*Expanded uncertainty*	*Note*
Conducted emission CISPR 16 LISN 50uH 0,009-0,0150 MHz	PE001_01	3,4 dB	1
Conducted emission CISPR 16 LISN 50uH 0,150-30,0 MHz	PE001_01	3,0 dB	1
Conducted emission CISPR 16 Voltage Probe 0,15-30 MHz	PE001_02	2,9 dB	1
Conducted emission CISPR 16 Current Probe 0,15-30 MHz	PE001_03	2,6 dB	1
Conducted emission CISPR 16 ISN 0,15-30 MHz	PE001_04	4,7 dB	1
Clic CISPR 16 LISN 50uH 0,150-30,0 MHz	PE001_05	2,9 dB	1
Radiated Emission CDNE 30-300 MHz	PE001_06	3,3 dB	1
Disturbance Power 30-300 MHz	PE002_01	3,6 dB	1
Radiated Emission LAS 0,15-30 MHz	PE003_01	2,0 dB	1
Radiated Emission CISPR 16 Loop Ant. 0,15-30 MHz	PE004_01	4,0 dB	1
Radiated Emission CISPR 16 Bicon. Ant. 30-300 MHz	PE004_02	3,9 dB	1
Radiated Emission CISPR 16 LogP. Ant. 300-1000 MHz	PE004_03	3,8 dB	1
Radiated Emission CISPR 16 Horn Ant. 1-18 GHz	PE004_04	4,2 dB	1
Human Exposure to electromagnetic fields	PE005_01	23,6 %	1
Harmonics	PE006_01	10 mA + 2,6 %	1
Flicker	PE007_01	4,79 %	1
Radiated Immunity 80 MHz - 6 GHz	PE102_XX	1,95 dB 0,75 V/m a 3V/m	1
Conducted Immunity 0,15 - 230 MHz	PE105_XX	1,20 dB 0,44 V a 3V	1
AC Magnetic field	PE106_01	1,55 % 0,15 A/m a 10A/m	1
Pulse Magnetic field	PE107_01	6,25 % 18,7 A/m a 300A/m	1
Dumped Magnetic field	PE108_01	6,25 % 1,87 A/m a 30A/m	1
Common mode conducted immunity	PE112_01	2,21 % 0,22 V a 10V	1

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Attachment 1

Test	Test Setup	Expanded uncertainty	Note
Power/Spurious 9kHz-30MHz	PR001_01	4,0 dB	1
Power/Spurious ERP 30-1000MHz d=10m	PR001_02+03	4,7 dB	1
Misura della potenza EiRP 1-18GHz d=3m	PR001_04+05	4,7 dB	1
Misura della potenza EiRP 18-40GHz d=3m	PR001_06	5,4 dB	1
Frequency error	PR002_01+02	< 1x10-7	1
Timing zero span (1001pts.)	PR002_01+02	0,2 % SWT	1
Modulation bandwidth	PR002_01+02	< 1x10-7	1
Conducted RF power and spurious emission	PR002_01+02	1,1 dB	1
Adjacent channel power	PR002_01+02	1,1 dB	1
Blocking	PR002_01+02	1,1 dB	1

Test	Test Setup	Expanded uncertainty	Note
Electrostatic discharge immunity test	PE101_0X		2
Electrical fast transients / burst immunity test	PE103_0X		2
Surge immunity test	PE104_0X		2
Short interruption immunity test	PE109_01		2
Ring Wave immunity test	PE110_01		2
Low frequency immunity test	PE111_01		2
Dumped Oscillotary immunity test	PE113_01		2
Rev_20_02 date 24/02/2020			

Note 1:

The expanded uncertainty reported according to the document EA-4-02 is based on a standard uncertainty multiplied by a coverage factor of k=2, providing a level of confidence of p = 95%

Note 2:

It has been demonstrated that the used test equipment meets the specified requirements in the standard with at least a 95% confidence, covering factor k=2

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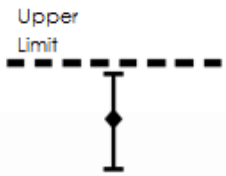
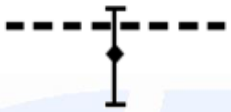
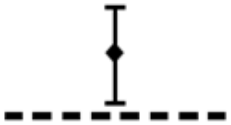
Attachment 1

Judgement of compliance

Case 1	Case 2	Case 3	Case 4
			
The sample complies with the requirements.	The sample complies with the requirements.	The sample does not comply with the requirements.	The sample does not comply with the requirements.
The measurement results is within the specification limit when the measurement uncertainty is taken into account.	It is not possible to state compliance using a 95% coverage probability for the expanded uncertainty although the measurement result is below the limit.	It is not possible to state compliance using a 95% coverage probability for the expanded uncertainty also the measurement result is upper the limit.	The measurement results is outside the specification limit when the measurement uncertainty is taken into account.

In agreement with ILAC-G8: 03/2009 Guidelines on the Reporting of Compliance with Specification

Quality manual references – Internal procedure

Internal Procedure PM001 rev. 3.0 (Quality Manual)	Measure procedure
Internal Procedure INC_M rev. 9.1 (Quality Manual)	Measurement uncertainty calculation

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