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LAB N° 0168 L

Independent Testing Laboratory
Accredited by ACCREDIA according to UNI CEI EN ISO/IEC 17025 cert. nr. 0168

TEST REPORT
Nr. R20181901

Federal Communication Commission (FCC)

Report Reference No. ..... :	R20181901
Date of issue: ..... :	26.01.2021
Total number pages: ..... :	41
Applicant´s name ..... :	Intercomp S.p.A.
Address ..... :	Via della Scienza, 27, 37139 Verona (VR) - Italy
Test specification:	
Standards ..... :	FCC Rules & Regulations, Title 47:2019 Part 15 paragraph(s): 209
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	.....

1 Summary

2 Reference standard	
FCC Rules and Regulation Title 47 part 15:2019	Radio frequency devices
3 List of attachments	
Attachment 1: Instruments list, measurement uncertainty, judgement of compliance and quality manual references Attachment 2: Components list	
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	--

Testing and sampling:	
Date of receipt of test item	05.10.2020
Testing start date	12.11.2020
Testing end date	18.01.2021
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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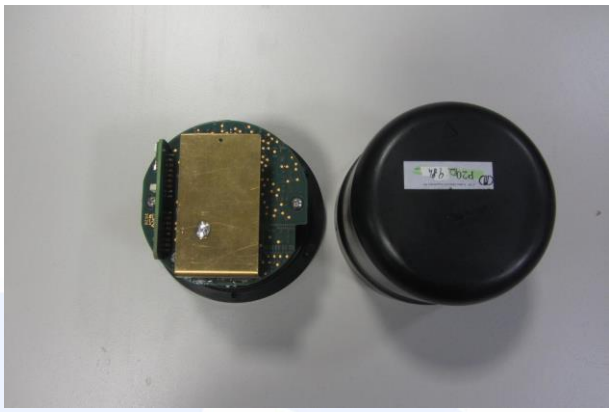
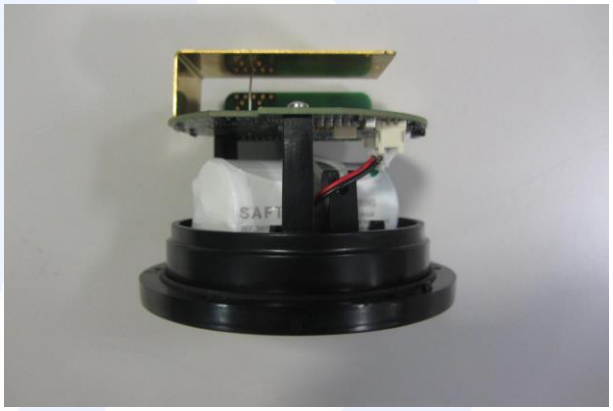
Possible test case verdicts:	
Test case does not apply to the test object:	N/A (Not Applicable)
Test object does meet the requirement:	P (Pass)
Test object does not meet the requirement:	F (Fail)
Test object does not performed:	N/E (Not Executed)
Definition of symbols used in this test report:	
☒ Indicates 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.	

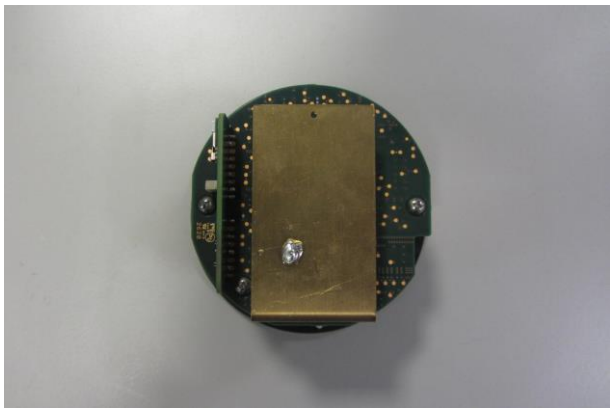
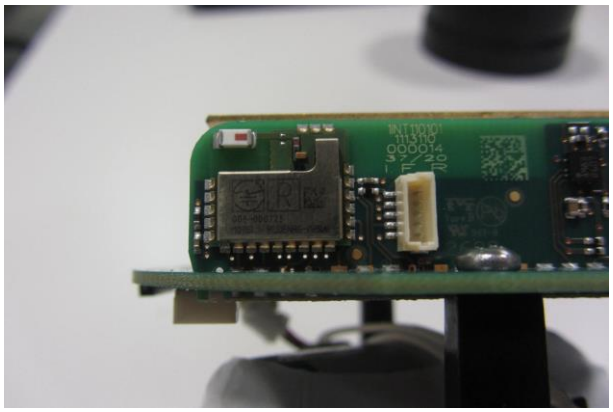
6 General description of tested item and testing condition(s)

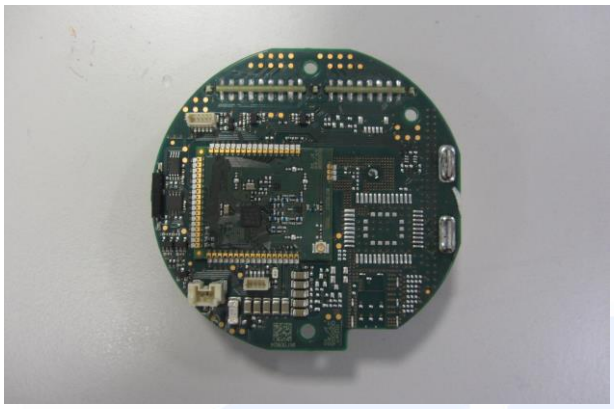
Description ..... :	LoRa WAN magnetic sensor for parked vehicles detection for inground installation						
Model Number ..... :	Ecoh-915						
FCC ID ..... :	2AUT7ECOH-915						
Serial Number ..... :	--						
Brand name ..... :	Intercomp						
Frequency band ..... :	902 – 928 MHz						
Test power supply ..... :		Voltage and Frequency	Reference poles				
			N	L1	L2	L3	PE
	☐	AC:	☐	☐	☐	☐	☐
	☐	AC:	☐	☐	☐	☐	☐
	☒	DC: 3,6 V from battery					☐
Software version ..... :	0.0.0						
Components list ..... :	Attachment 2						
Test configuration ..... :	☒	Table top equipment					
	☐	Floor standing equipment					
	☐	Hand-held equipment					
Type of equipment ..... :	☒	Transmitter unit					
	☐	Receiver unit					
Type of station ..... :	☒	Fixed station					
	☐	Portable station					
	☐	Mobile station					
Components list ..... :	Attachment 2						
Operating modes ..... :	No.	Operating mode of test item					
	1	2 radio enabled, 900 MHz frequency hopping and Bluetooth frequency hopping					
Declination of responsibility ..... :	Components list and software/hardware version (if reported) are provided by the manufacturer. CMC Centro Misure Compatibilità S.r.l. cannot be considered responsible for these information, for any other document sent by the manufacturer and for any difference between the software version present in the tested sample and that present in the object intended for final sale. In some cases, the software in the tested sample is in a version dedicated exclusively to the test, and therefore does not represent the software installed in the final version of the product.						

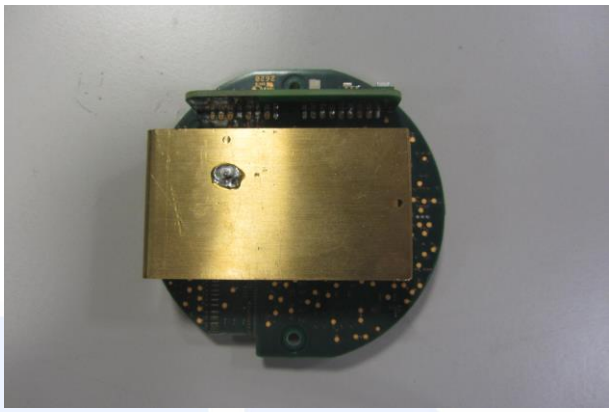
6.1 Photos of the test item

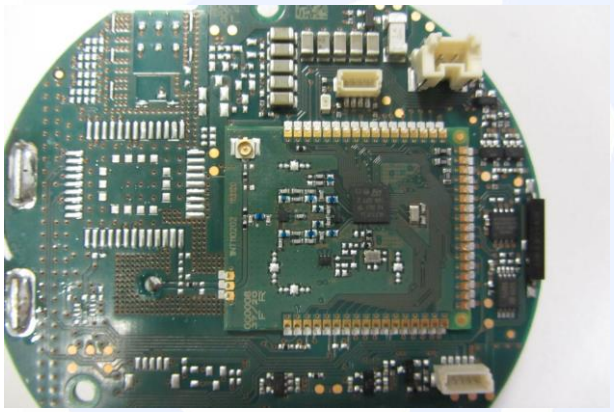



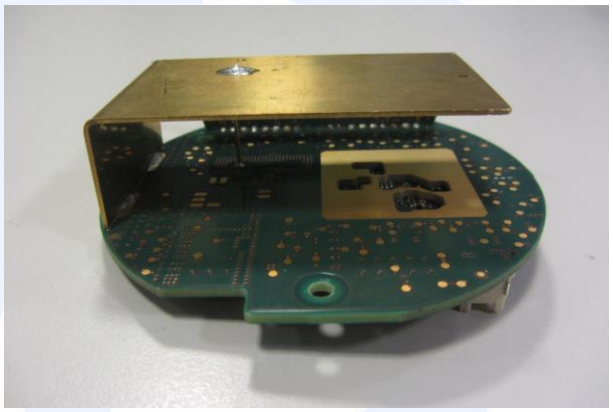


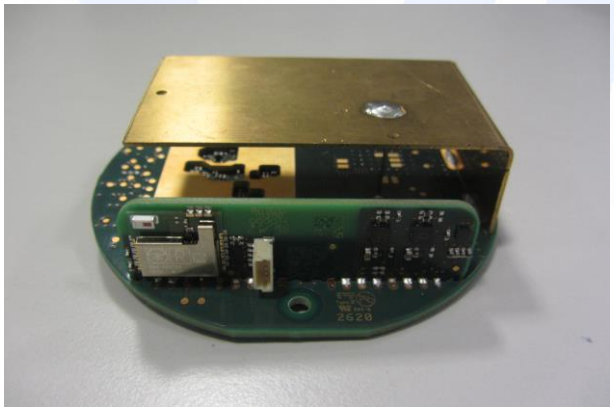




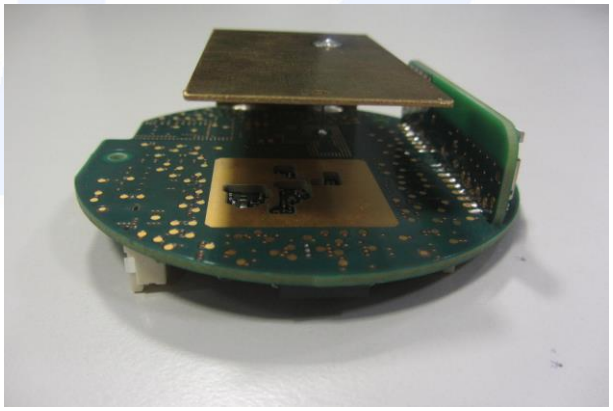


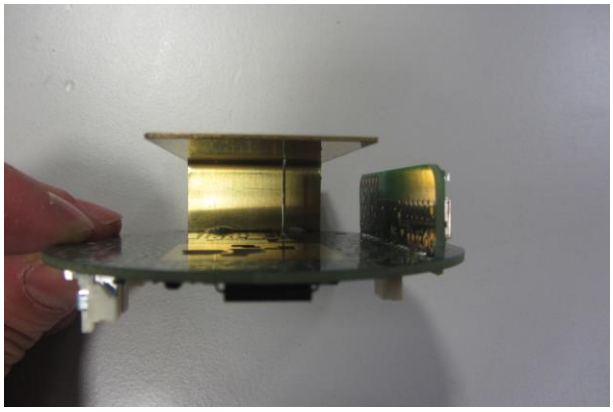












7 Verdict summary section

FCC Rules & Regulations, Title 47:2019 Part 15 paragraph(s): 203, 209 and 247			
Clause	**Requirement – Test case**	**Basic standard**	**Verdict**
Part 15.209	Radiated emissions and spurious emission	ANSI C63.10	**P**

Normative references	
Reference no.	***Description***
FCC Rules and Regulation Title 47 part 15:2019	--
ANSI C63.10:2013	American National Standard of Procedures for Compliance Testing of Unlicensed Wireless Devices

8 Test conditions

8.1 General

Environmental reference conditions.....:	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:

Temperature	Humidity	Atmospheric pressure
15 °C – 35 °C	30 % - 60 %	800 hPa – 1060 hPa
If explicitly required in the basic standard or applied product standard the climatic values are recorded and documented separately in this test report.		

Measurement uncertainties .....:	Attachment 1

9 Test results

9.1 Emissions in restricted frequency bands and in unrestricted frequency bands

Tested by ..... :	G. Gandini	
Test date ..... :	12.11.2020	
Test location (stand) ..... :	Semi-anechoic chamber (CMC A070)	
Reference standards ..... :	FCC Rules and Regulation; Titles 47 Part. 15.209 ANSI C63.10 cl. 6.3, 6.4, 6.5 and 6.6	
Test set-up description ..... :	☒	Table top equipment set-up (80 cm above the reference ground plane)
	☐	Floor standing equipment set-up (insulating material up to 12 mm thick)
	☐	False floor installation equipment set-up (insulating material up to 34 cm above the reference ground plane)
Supplementary test set-up description ..... :	--	
Test method applied ..... :	SAC with measurement distance [m]: 10	
Supplementary information..... :	--	

Acceptance limits

Acceptance limits for emissions in restricted frequency bands (f < 1000 MHz)		
Frequency range (MHz)	*Test distance (m)*	*Limits [dB(µV/m)]*
0,009 to 0,490	300	48,5 to 13,8
0,490 to 1,705	30	33,8 to 22,9
1,705 to 30	30	29,5
30 to 88	3	40
88 to 216	3	43,5
216 to 960	3	46,0
960 to 1000	3	54

Remarks: The emission limits shown in the above table are based on measurements employing a CISPR quasi-peak detector except for the frequency bands 9–90 kHz and 110–490 kHz. Radiated emission limits in these two bands are based on measurements employing an average detector. The results have been extrapolated to the specified distance using an extrapolation factor

Acceptance limits for emissions in restricted frequency bands (f ≥ 1000 MHz)			
Frequency (MHz)	*Test distance (m)*	*AV limits [dB(µV/m)]*	*Peak limits [dB(µV/m)]*
> 1000	3	54	74

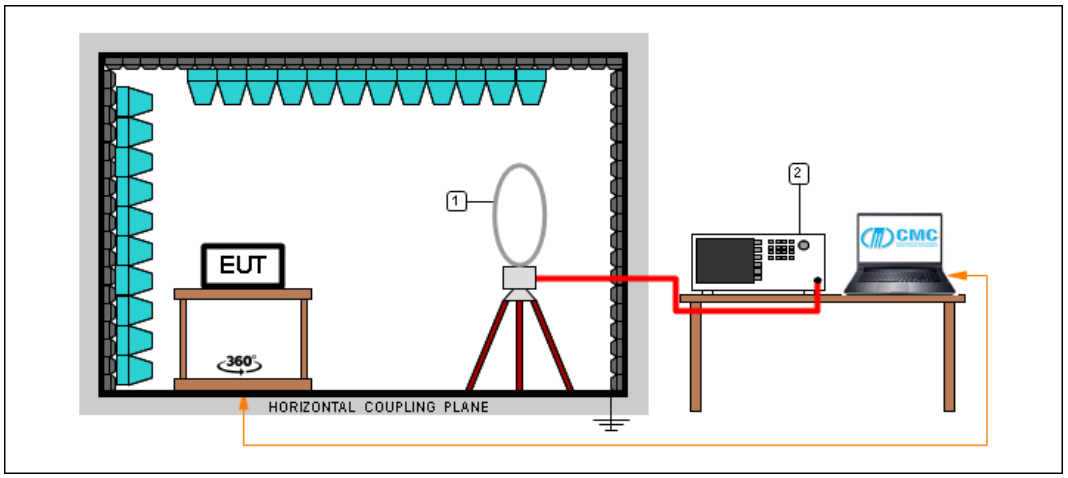
The restricted frequency bands are listed in the following table

MHz	*MHz*	*MHz*	*GHz*
0,090 – 0,110	16,42 – 16,423	399,9 – 410	4,5 – 5,15
0,495 – 0,505	16,69475 – 16,69525	608 – 614	5,35 – 5,46
2,1735 – 2,1905	16,80425 – 16,80475	960 – 1240	7,25 – 7,75
4,125 – 4,128	25,5 – 25,67	1300 – 1427	8,025 – 8,5
4,17725 – 4,17775	37,5 – 38,25	1435 – 1626,5	9,0 – 9,2
4,20725 – 4,20775	73 – 74,6	1645,5 – 1646,5	9,3 – 9,5
6,215 – 6,218	74,8 – 75,2	1660 – 1710	10,6 – 12,7
6,26775 – 6,26825	108 – 121,94	1718,8 – 1722,2	13,25 – 13,4
6,31175 – 6,31225	123 – 138	2200 – 2300	14,47 – 14,5
8,291 – 8,294	149,9 – 150,05	2310 – 2390	15,35 – 16,2
8,362 – 8,366	156,52475 – 156,52525	2483,5 – 2500	17,7 – 21,4
8,37625 – 8,38675	156,7 – 156,9	2690 – 2900	22,01 – 23,12
8,41425 – 8,41475	162,0125 – 167,17	3260 – 3267	23,6 – 24,0
12,29 – 12,293	167,72 – 173,2	3332 – 3339	31,2 – 31,8
12,51975 – 12,52025	240 – 285	3345,8 – 3358	36,43 – 36,5
12,57675 – 12,57725	322 – 335,4	3600 – 4400	Above 38,6
13,36 – 13,41			

Acceptance limits for emissions in non-restricted frequency bands
In any 100 kHz bandwidth outside the frequency band in which the spread spectrum or digitally modulated intentional radiator is operating, the radio frequency power that is produced by the intentional radiator shall be at least 20 dB below that in the 100 kHz bandwidth within the band that contains the highest level of the desired power, based on either an RF conducted or a radiated measurement, provided the transmitter demonstrates compliance with the peak conducted power limits.

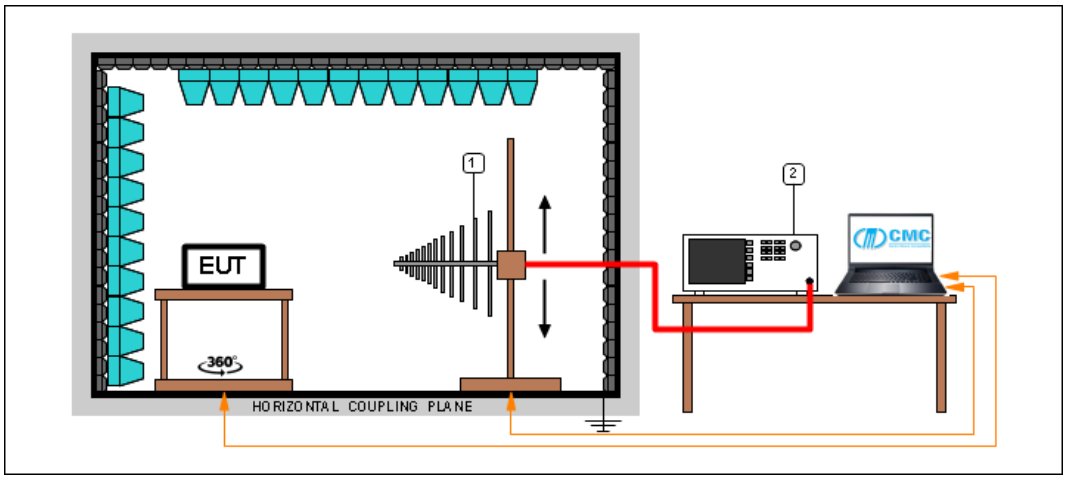
Test setup

Frequency ≤ 30 MHz



Test setup PE004_01				
Nr.	*Id. Number*	*Manufacturer*	*Model*	*Description*
2	CMC S164	Rohde & Schwarz	ESU26	Receiver 20 Hz - 26.5 GHz
1	CMC S127	Schaffner	HLA6120	Loop Antenna 9kHz - 30MHz

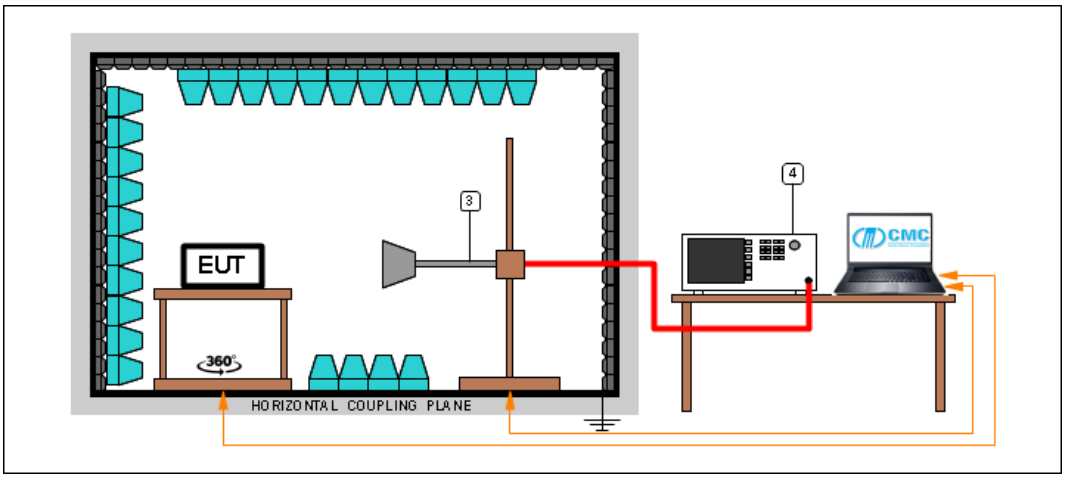
Frequency ≤ 1 GHz



Test setup PE004_02				
Nr.	*Id. Number*	*Manufacturer*	*Model*	*Description*
2	CMC S164	Rohde & Schwarz	ESU26	Receiver 20 Hz - 26.5 GHz
1	CMC S271	Schwarzbeck	BBA 9106 + VHBB 9124	Broadband Antenna

Test setup PE004_03				
Nr.	*Id. Number*	*Manufacturer*	*Model*	*Description*
2	CMC S164	Rohde & Schwarz	ESU26	Receiver 20 Hz - 26.5 GHz
1	CMC S287	Schwarzbeck	VUSLP 9111B	Broadband Antenna

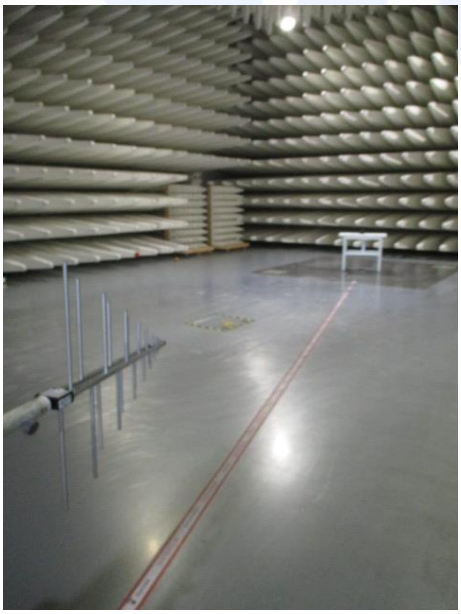
Frequency > 1 GHz

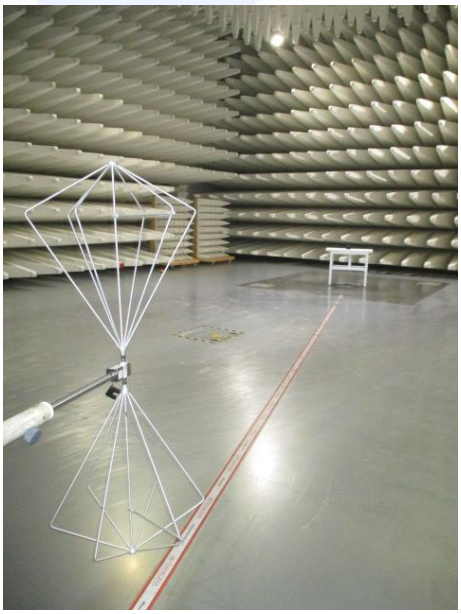


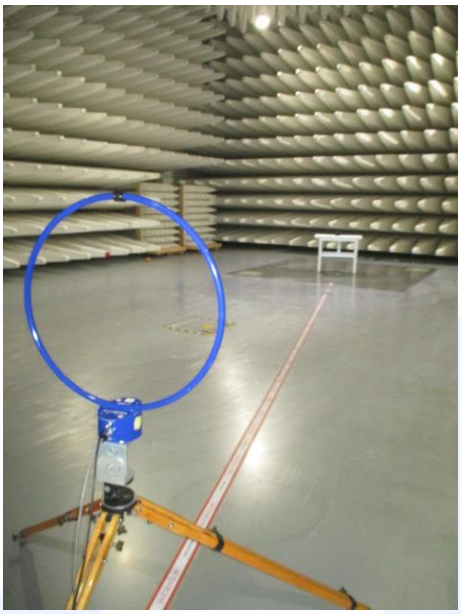
Test setup PE004_04				
Nr.	*Id. Number*	*Manufacturer*	*Model*	*Description*
4	CMC S164	Rohde & Schwarz	ESU26	Receiver 20 Hz - 26.5 GHz
3	CMC S108	Emco	3115	Waveguide antenna

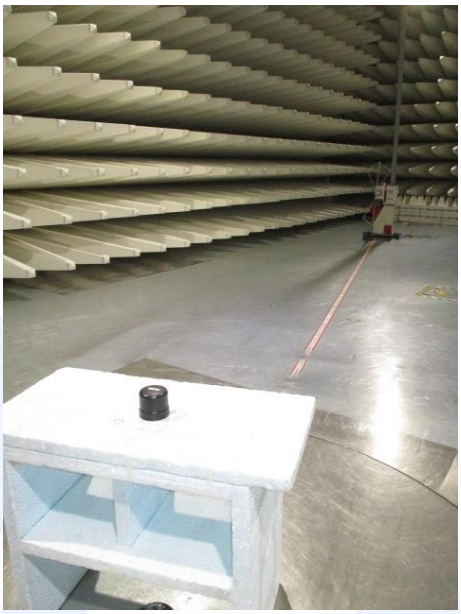
Test setup PE004_05				
Nr.	*Id. Number*	*Manufacturer*	*Model*	*Description*
4	CMC S164	Rohde & Schwarz	ESU26	Receiver 20 Hz - 26.5 GHz
3	CMC S290	Schwarzbeck	BBHA 9170	Horn Antenna (15-40 GHz)

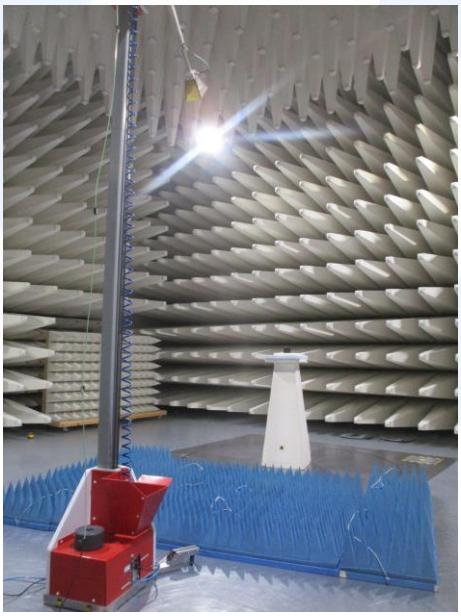
Photograph(s) of setup

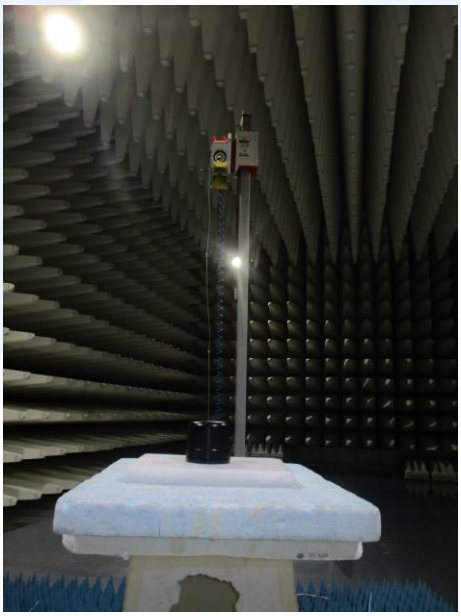


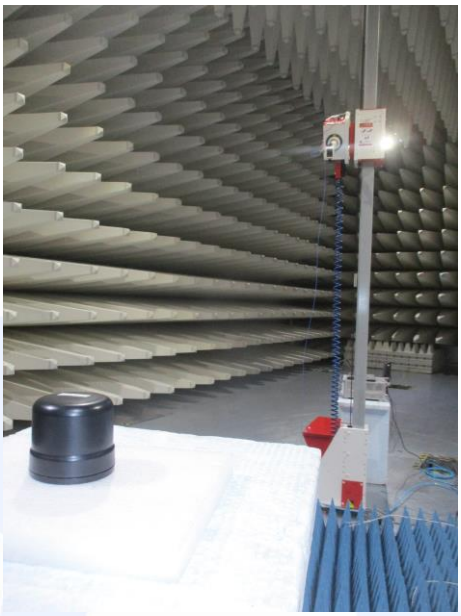


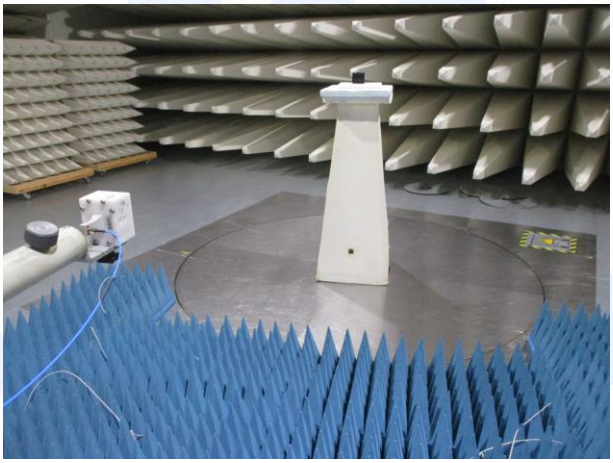












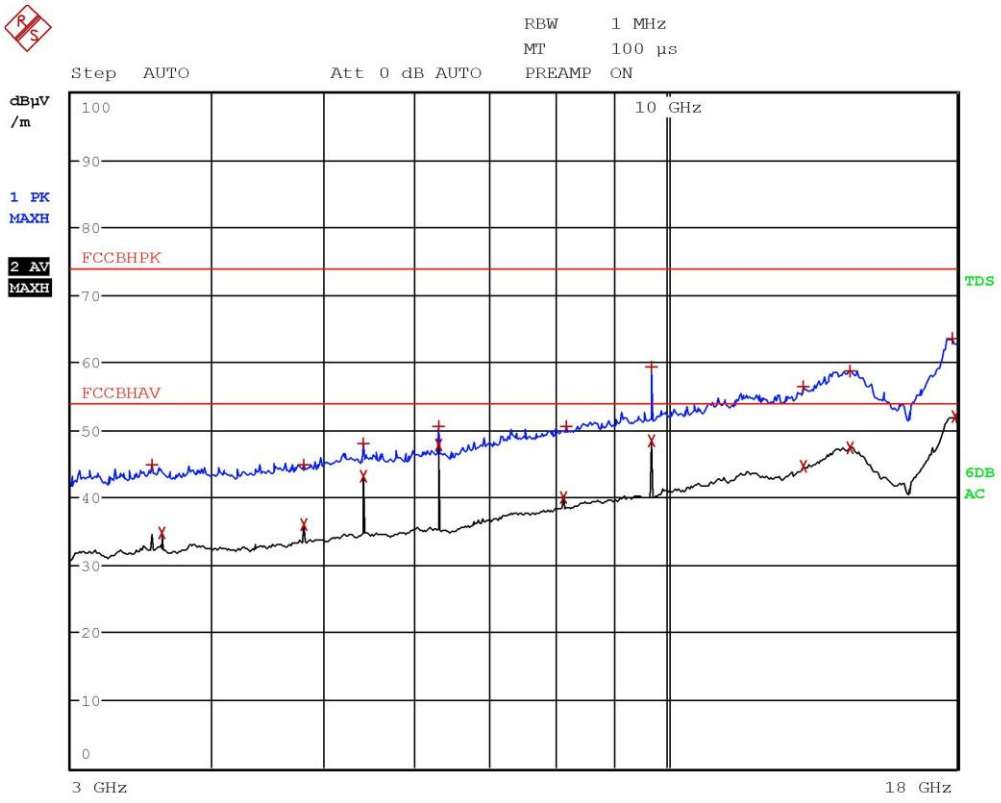
Result

Polarization	*Frequency Range (MHz)*	*Graphs*	*Remarks*	*Result*
H	3000 – 18000	G20181901	--	P
V	3000 – 18000	G20181902	--	P
V	1000 – 3000	G20181903	--	P
H	1000 – 3000	G20181904	--	P
V	18000 – 26000	G20181905	--	P
H	18000 – 26000	G20181906	--	P
H	30 – 300	G20181907	--	P
V	30 – 300	G20181908	--	P
V	300 – 1000	G20181909	--	P
H	300 – 1000	G20181910	--	P

Remarks: EUT was tested in 3 orthogonal planes, graphs are related to the highest detected levels. Peaks above the limits are due to the main transmitting frequencies

Graphs Legend
PK: Peak; QP [1s] (quasi-peak at 1 second) values are marked with a +
AV: Average; AV [1s] (average at 1 second) values are marked with a X

Graphs



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EDIT PEAK LIST (Prescan Results)			
Trace1:	FCCBHPK		
Trace2:	FCCBHAV		
Trace3:	---		
TRACE	FREQUENCY	LEVEL dBµV/m	DELTA LIMIT dB
1 Max Peak	3.5356 GHz	44.86	-29.11
2 Average	3.6092 GHz	34.74	-19.24
1 Max Peak	4.8 GHz	44.86	-29.11
2 Average	4.804 GHz	36.02	-17.95
2 Average	5.4136 GHz	43.17	-10.80
1 Max Peak	5.414 GHz	47.92	-26.05
1 Max Peak	6.316 GHz	50.54	-23.43
2 Average	6.316 GHz	47.88	-6.10
2 Average	8.1208 GHz	40.05	-13.93
1 Max Peak	8.1732 GHz	50.62	-23.35
2 Average	9.7028 GHz	48.52	-5.45
1 Max Peak	9.7032 GHz	59.39	-14.58
1 Max Peak	13.2048 GHz	56.35	-17.62
2 Average	13.2068 GHz	44.59	-9.39
2 Average	14.5012 GHz	47.42	-6.55
1 Max Peak	14.5296 GHz	58.72	-15.26
1 Max Peak	17.8436 GHz	63.65	-10.32
2 Average	17.9592 GHz	51.89	-2.08

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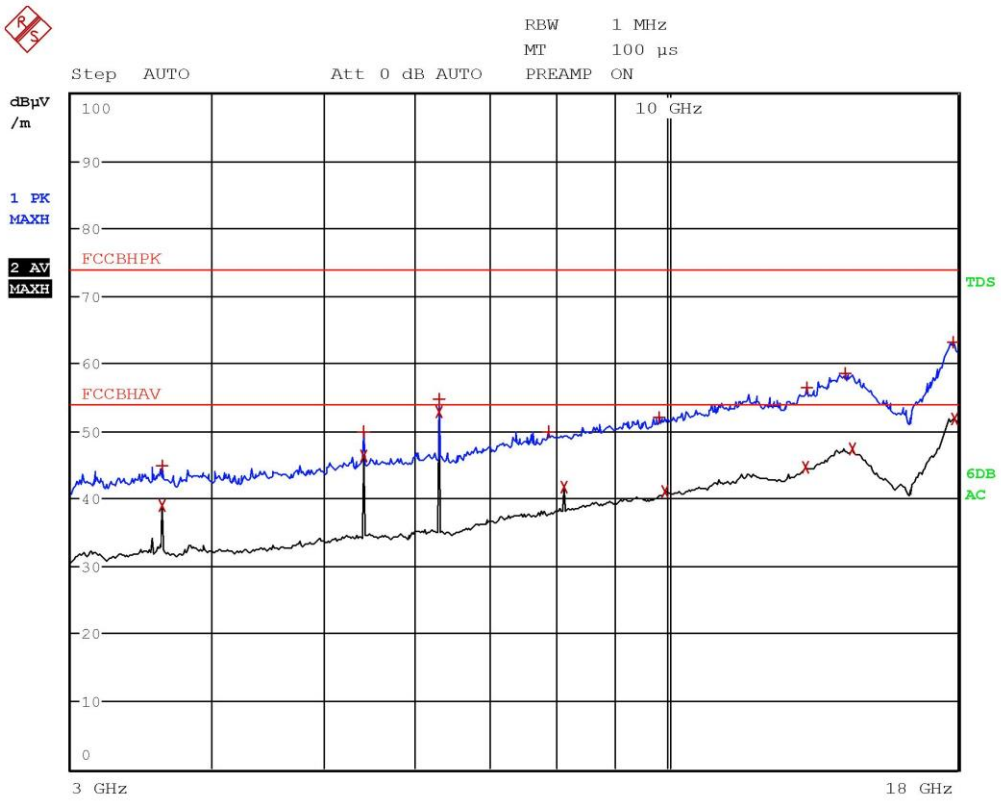

Gandini 20181902

EDIT PEAK LIST (Prescan Results)			
Trace1:	FCCBHPK		
Trace2:	FCCBHAV		
Trace3:	---		
TRACE	FREQUENCY	LEVEL dBµV/m	DELTA LIMIT dB
1 Max Peak	3.6092 GHz	44.78	-29.19
2 Average	3.6092 GHz	38.90	-15.07
1 Max Peak	5.414 GHz	49.88	-24.09
2 Average	5.414 GHz	46.32	-7.65
1 Max Peak	6.3164 GHz	54.67	-19.30
2 Average	6.3164 GHz	52.76	-1.21
1 Max Peak	7.8732 GHz	49.86	-24.11
2 Average	8.1208 GHz	41.59	-12.38
1 Max Peak	9.8564 GHz	51.98	-21.99
2 Average	9.956 GHz	41.08	-12.90
2 Average	13.234 GHz	44.54	-9.43
1 Max Peak	13.266 GHz	56.38	-17.59
1 Max Peak	14.3652 GHz	58.46	-15.51
2 Average	14.54 GHz	47.27	-6.70
1 Max Peak	17.8704 GHz	63.09	-10.88
2 Average	17.8728 GHz	51.83	-2.14

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