EMITECH GROUPE

R300-17-102785-8A - AA / EN

E.M.C. TEST REPORT

According to the standard(s):

Draft ETSI EN 301 489-1 : 2017 V2.2.0

Equipment under test:

Amplifier 920 268 001 / 96 740 634 80

Company:

HIRSCHMANN CAR COMMUNICATION S.A.S. FRANCE

Diffusion: Mr BOURION (Company: HIRSCHMANN CAR COMMUNICATION S.A.S. FRANCE)

Number of pages: 23 with 1 appendix

Ed.	Date	Modified page(s)	Technical verification Quality approval Name / Visa
0	22/11/2017	Creation	A.ALVAREZ

Certain services reported in this document are not covered by the accreditation. They are identified by the symbol (*).

Duplication of this test report is only permitted for an integral photographic facsimile. It includes the number of pages referenced here above. This document is the result of testing a specimen or a sample of the product submitted. It does not imply an assessment of the conformity of the whole manufactured products of the tested sample.

History of changes

Edition	Date	Page or §	Changes description
00	22/11/2017	All	Creation

NAME OF THE EQUIPMENT UNDER TEST (E.U.T.)	:	Amplifier 920 268 001
Serial number	:	2011-08-03 0184 03
P/N	:	Not communicated
Software version	:	None
MANUFACTURER'S NAME	:	HIRSCHMANN CAR COMMUNICATION S.A.S. FRANCE

APPLICANT'S ADDRESS:

Company	:	HIRSCHMANN CAR COMMUNICATION S.A.S. FRANCE
Address	:	84, Bd de la mission Marchand 92400 Courbevoie France
Person(s) present during the tests	:	No representative for company has been at test.
Responsible	:	Mr BOURION

DATE(S) OF TESTS	:	From 28th June to 11th August 2017
TESTS LOCATION(S)	:	EMITECH Toulouse laboratory in Toulouse (31) - France
TESTS OPERATOR(S)	:	F. ALLENO / A. ALVAREZ

CONTENTS

1. INTRODUCTION

This document submits the results of Electromagnetic Compatibility tests performed on the equipment Amplifier 920 268 001 (denominated hereafter E.U.T.: equipment under test) according to document(s) listed below.

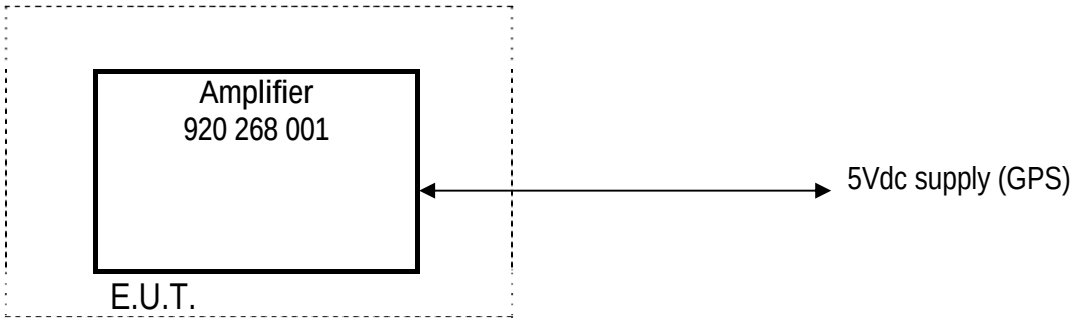
The product is considered exclusively as Ancillary equipment for vehicular use

2. REFERENCE DOCUMENT(S)

Draft ETSI EN 301 489-1 Ed. 2017 V2.2.0	ElectroMagnetic Compatibility (EMC) standard for radio equipment and services; Part 1: Common technical requirements; Harmonised Standard covering the essential requirements of article 3.1(b) of Directive 2014/53/EU and the essential requirements of article 6 of Directive 2014/30/EU

3. EQUIPMENT UNDER TEST CONFIGURATION SCHEME

Equipment under test (E.U.T.) description: Amplifier for Radio and/or DAB and/or GPS applications in vehicle



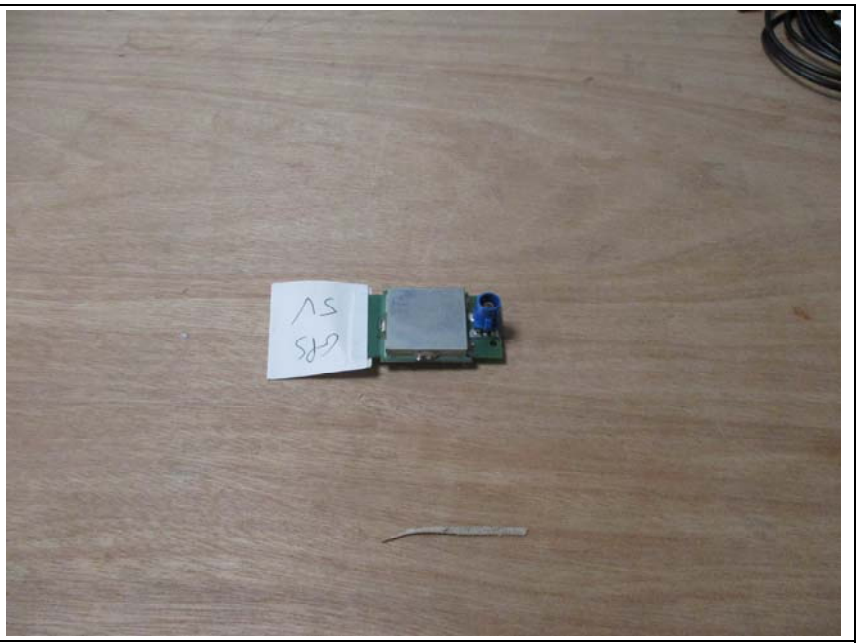
Equipment control procedure during immunity tests: Check of consumption on each power supply

Susceptibility criteria during a continuous disturbance: Maximal variation admitted

Susceptibility criteria during a transitory disturbance: Self-recoverable degradation allowed

Cycle and operating mode during emission tests: Supplied with its nominal voltage through BIAS-Tee and 50 Ohms load on each antenna port

Equipment modifications applied during tests: No

E.U.T. photograph(s)	
E.U.T. photograph(s)	

4. SUMMARY OF TEST RESULTS

Tests designation	Results satisfying?	Comments
EMISSION		
Harmonics current emission	N.A.	DC supplied
Measurement of voltage fluctuation and flicker	N.A.	DC supplied
Conducted emission	YES	Class B
Radiated electric field measurement	YES	Class B
IMMUNITY		
Electrostatic discharges immunity	N.A.	Vehicular enviromnent
Radiated, radio-frequency, electromagnetic field immunity (*)	YES	
Electrical fast transient/burst immunity	N.A.	Vehicular enviromnent
Surge immunity	N.A.	Vehicular enviromnent
Immunity to conducted disturbances, induced by radio-frequency fields (*)	YES	
Voltage dips and short interruptions immunity	N.A.	Vehicular enviromnent
Immunity to transient and surge in a vehicular environment (*)	N.A.	5Vdc supplied

N.P.: Not Performed. N.A.: Not Applicable.

- In emission:

Sample subject to the test complies with prescriptions of the standard ETSI EN 301 489-1 Ed.2017 V2.2.0 according to limits, specified in this test report.

- In immunity:

Although deviations of the method(s) were used during the tests, sample subject to the test can be considered as compliant with prescriptions of the standard ETSI EN 301 489-1 Ed.2017 V2.2.0 according to criteria, specified in this test report.

To declare or not compliance with the specification, it has not been given explicit account of the uncertainty associated with result(s).

5. CONDUCTED EMISSION

Standard: ETSI EN 301 489-1 2017 V2.2.0

Test method: EN 55032: 2015

Test configuration:

Tested cable(s)	Measure with	E.U.T. height
GPS supply 5Vdc (vehicular use - CISPR25 LISN)	L.I.S.N.	40cm

Frequency band	Configuration	Resolution bandwidth	Video bandwidth	Detection mode
150kHz-1MHz	Vehicular use - CISPR25 LISN	10kHz	30kHz	Peak
1MHz-10MHz	Vehicular use - CISPR25 LISN	10kHz	30kHz	Peak
10MHz-30MHz	Vehicular use - CISPR25 LISN	10kHz	30kHz	Peak

Test method deviation: No

Test equipment list:

CATEGORY	BRAND	TYPE	N° EMITECH	DATE CAL.	DATE VAL
Software	Nexio	BAT EMC v3.6.0.32	0000		
Cable	Huber + Suhner	N-2m	12897	29/04/2016	29/06/2018
Limiter	ELECTRo-Metrics	EM-7600-2	14538	11/05/2017	11/07/2018
Receiver	Rohde & Schwarz	ESMI	1841	01/04/2016	01/06/2018
LISN	EMITECH	5µH-100A	2996	26/11/2015	26/01/2018

Blank cell: Permanent validity

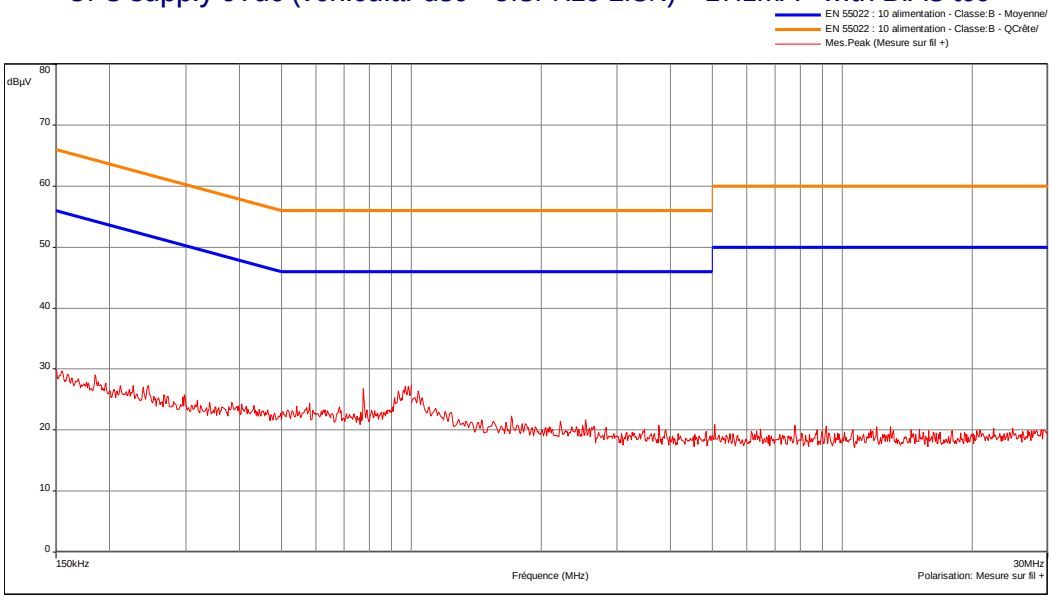
Results: See Graph(s) hereafter.
Limits on the graphs are average and quasi-peak limits (upper limit).

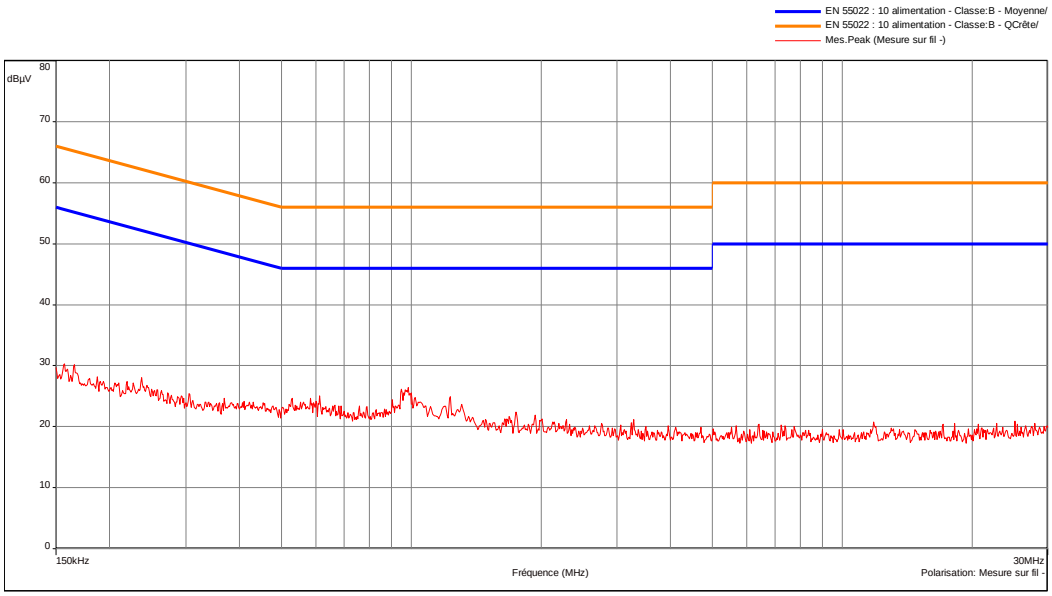
Conducted emissions	

(Typical installation for conducted emissions)

Conducted voltage emission (measurement) | EMI1606

GPS supply 5Vdc (vehicular use - CISPR25 LISN) – 27.1mA - with BIAS tee





Date: 03/07/2017

Technician: AAL

Class: B of the standard

Detection:
Peak

Modification(s) during test:
No

Maximal uncertainty: 3.38dB (k=2)

6. RADIATED ELECTRIC FIELD MEASUREMENT

Standard: ETSI EN 301 489-1 2017 V2.2.0

Test method: EN 55032: 2015

Test configuration: First measurement in peak detection is done with recording maximal value, antenna varying from 1m to 4m and table performing a complete rotation.
Then, when necessary, highest levels are measured in quasi-peak detection.

Frequency band	Configuration	Resolution bandwidth	Video bandwidth	E.U.T. height
30MHz-200MHz	Maximalization	100kHz	300kHz	80cm
200MHz-1GHz	Maximalization	100kHz	300kHz	80cm

Test method deviation: Radiated emission limits are specified at 10 meters. Measurement distance used during the test, subject of this report, is 3 meters. Then published results come from a theoretical conversion as described in the standard.

Measuring distance: 3 meters

Test equipment list:

CATEGORY	BRAND	TYPE	N° EMITECH	DATE CAL.	DATE VAL
Software	Nexio	BAT EMC v3.6.0.32	0000		
Antenna	A.H. Systems	SAS 543	12057	15/03/2016	15/05/2019
Antenna	A.H. Systems	SAS 512-2	12058	15/03/2016	15/05/2019
Cable	SUCOFLEX	N-1,5m	11931	22/05/2017	22/07/2019
Cable	SUCOFLEX	N-1,5m	11932	22/05/2017	22/07/2019
Cable	SUCOFLEX	N-16m	11930	22/05/2017	22/07/2019
Preamplifier	Mini-circuits	ZFL-1000LN	11808	04/01/2017	04/03/2018
Receiver	Rohde & Schwarz	ESMI	1841	01/04/2016	01/06/2018

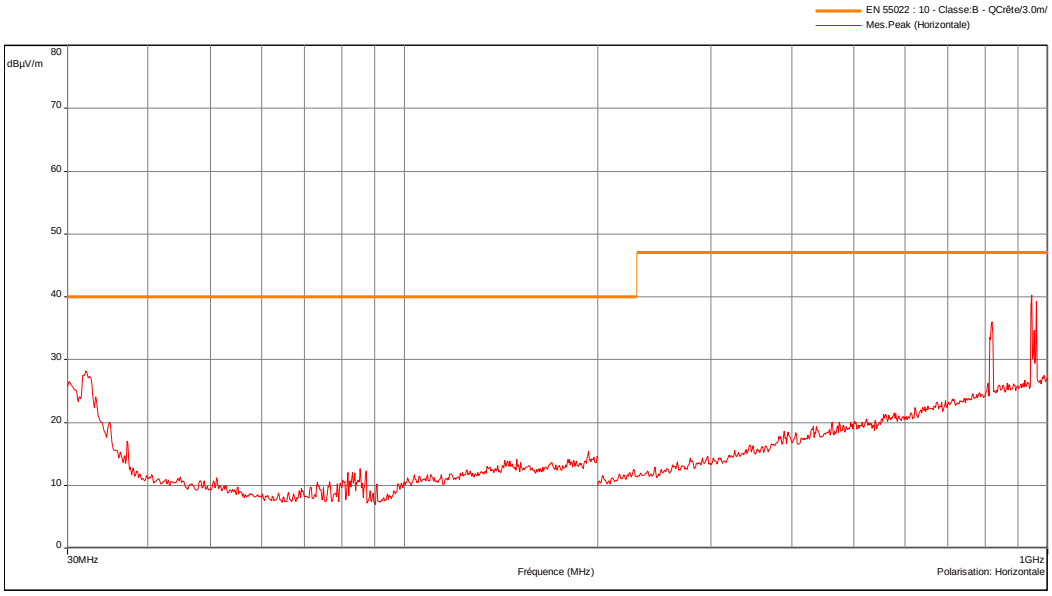
Blank cell: Permanent validity

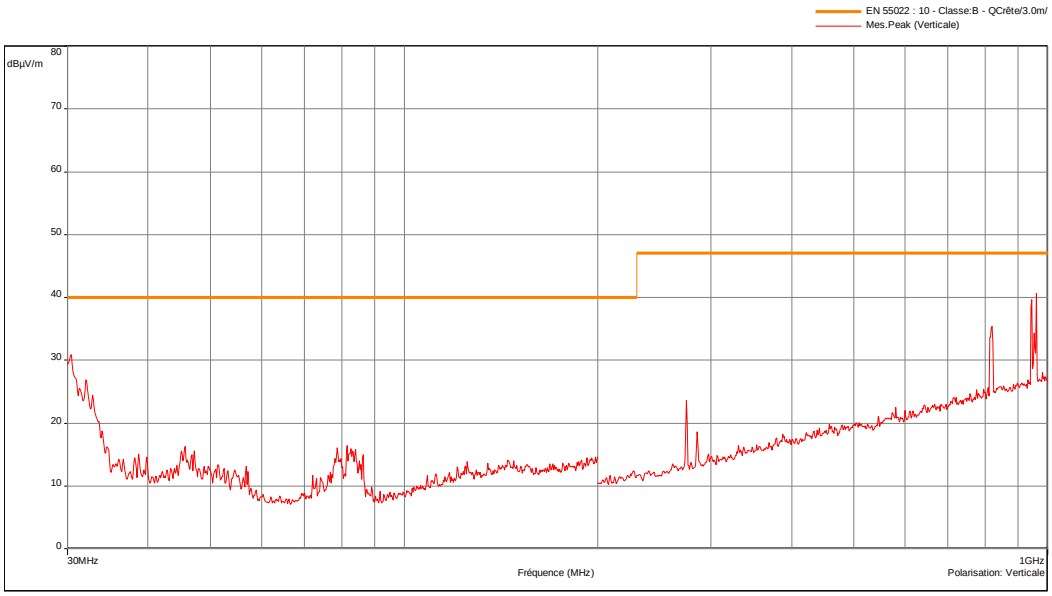
Results: See Graph(s) hereafter.

Radiated electric field (initial position = 0°)	

Radiated electric emission (measurement) — EMI2783

Maximalization





Date: 11/07/2017

Technician: F.ALLENO

Class: B of the standard

Detection:
Peak

Modification(s) during test:
No

Maximal uncertainty: 4.85dB (k=2)

7. *RADIATED, RADIO-FREQUENCY, ELECTROMAGNETIC FIELD IMMUNITY (*)*

Standard: ETSI EN 301 489-1 2017 V2.2.0

Test method: EN 61000-4-3: 2006 / A1: 2008 / A2: 2010

Test configuration:

Tested side	Frequency band	E.U.T. height	Polarization	Level	Step
Axe X	80MHz-1GHz	80cm	Vertical	3 V/m	1%
Axe X	80MHz-1GHz	80cm	Horizontal	3 V/m	1%
Axe X	1GHz-2.5GHz	80cm	Vertical	3 V/m	1%
Axe X	1GHz-2.5GHz	80cm	Horizontal	3 V/m	1%
Axe X	2.5GHz-6GHz	80cm	Vertical	3 V/m	1%
Axe X	2.5GHz-6GHz	80cm	Horizontal	3 V/m	1%
Axe Z	80MHz-1GHz	80cm	Vertical	3 V/m	1%
Axe Z	80MHz-1GHz	80cm	Horizontal	3 V/m	1%
Axe Z	1GHz-2.5GHz	80cm	Vertical	3 V/m	1%
Axe Z	1GHz-2.5GHz	80cm	Horizontal	3 V/m	1%
Axe Z	2.5GHz-6GHz	80cm	Vertical	3 V/m	1%
Axe Z	2.5GHz-6GHz	80cm	Horizontal	3 V/m	1%

Polarization	Frequency range	Calibration(s) used during the test
Vertical	80MHz – 1GHz	CT1_V1 (06/2017_18V)
Horizontal		CT1_H1 (06/2017_18V)
Vertical	1GHz – 2.5GHz	CT1_V2 (06/2017_18V)
Horizontal		CT1_H2 (06/2017_18V)
Vertical	2.5GHz – 6GHz	CT1_V3 (06/2017_5.4V)
Horizontal		CT1_H3 (06/2017_5.4V)

Modulation	Duration
AM (80%, 1kHz)	2000ms

The test is performed on 2 sides (See photographs in annex 1).
The equipment under test is set out in such a way that the side submitted to the test be located in homogeneous zone (1.5m x 1.5m) of the previously calibrated field. In compliance with the calibration, some anechoic panels are placed on the ground and antennas used are placed according to the calibration.

Aptitude criteria: §6 and §9.2.3 of the standard.

Test method deviation: Standard requires a test on 4 sides. However, a 2 side test can be sufficient to respect essential requirements of the European Directive. Due to small dimensions of the product, 2 axes have been tested (natural position and PCB facing the generating antenna).

Test equipment list:

CATEGORY	BRAND	TYPE	N° EMITECH	DATE CAL.	DATE VAL
Amplifier	ETM	200SC	3035	23/04/2015	23/06/2017
Amplifier	Amplifier Research	250T1G3	4108	23/04/2015	23/06/2017
Amplifier	Prâna	MT1400	12830	31/03/2016	31/05/2018
Antenna	Emco	3115	1053	16/03/2016	16/05/2019
Antenna	A.H. Systems	SAS-517	12009		
Cable	SUCOFLEX	N-1,5m	11931	22/05/2017	22/07/2019
Cable	SUCOFLEX	N-1,5m	11932	22/05/2017	22/07/2019
Cable	SUCOFLEX	N-16m	11930	22/05/2017	22/07/2019
Cable	MICRO-COAX	N-3m	11907	26/04/2017	26/06/2019
Coupler	Prâna	80MHz-1GHz 60dB	12831	31/03/2016	31/05/2018
Coupler	ETM	40dB - 2.5GHz-8GHz	3457	23/04/2015	23/06/2017
Coupler	Amplifier Research	40dB - 1GHz-2.5GHz	4109	23/04/2015	23/06/2017
Power probe	Keysight	N1922A	12564	30/03/2017	30/05/2018
Synthesizer	Anritsu	MG3692A	3131	06/10/2016	06/12/2018
Synthesizer	Rohde & Schwarz	SME-03	11819	15/02/2017	15/04/2019
Wattmeter	Keysight	N1911A	12563	30/03/2017	30/05/2018

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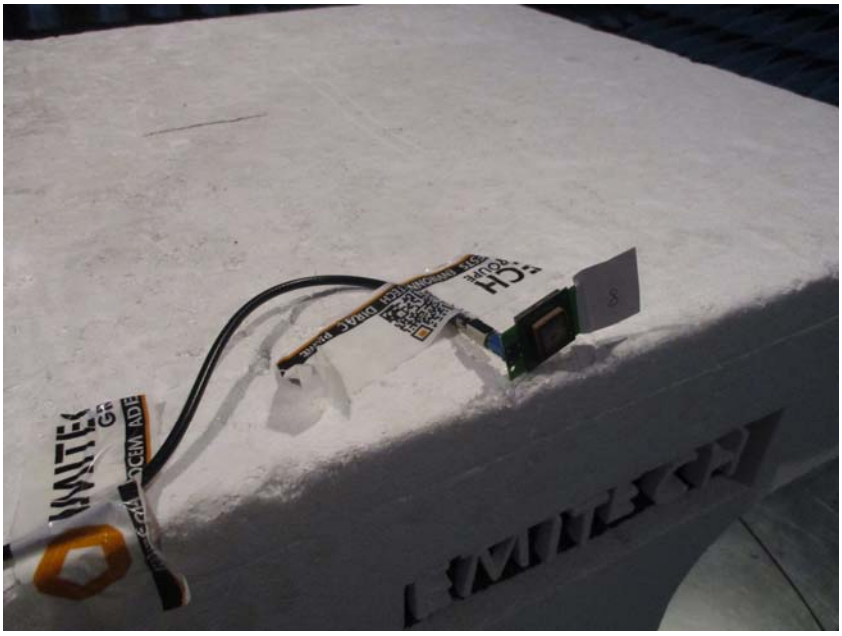
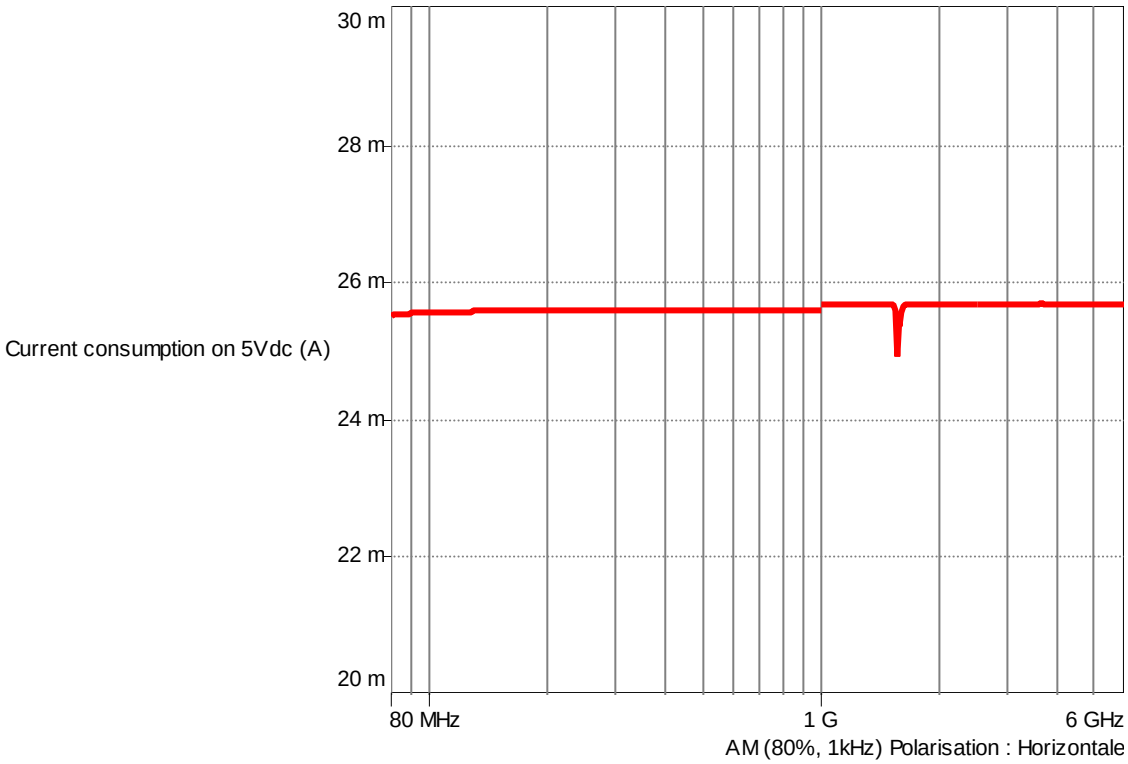
Results:

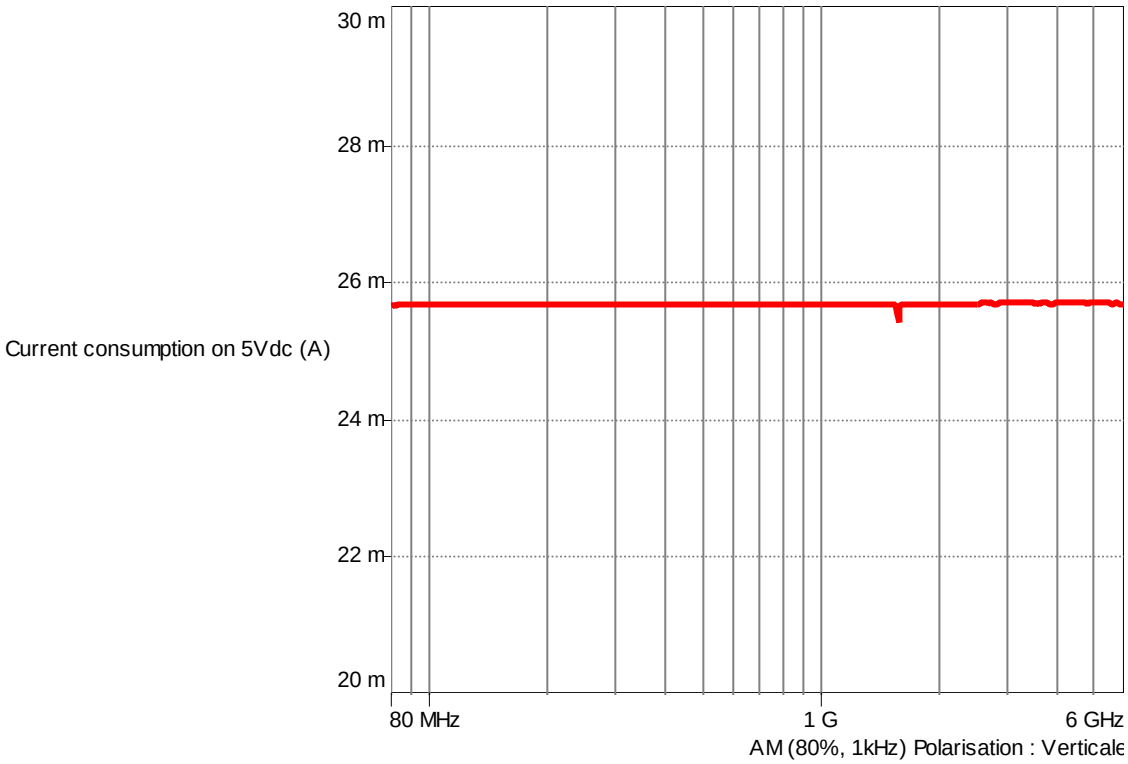
- Axe X : Nothing to report
- Axe Z : Nothing to report

Graphs of measured currents are given hereafter.

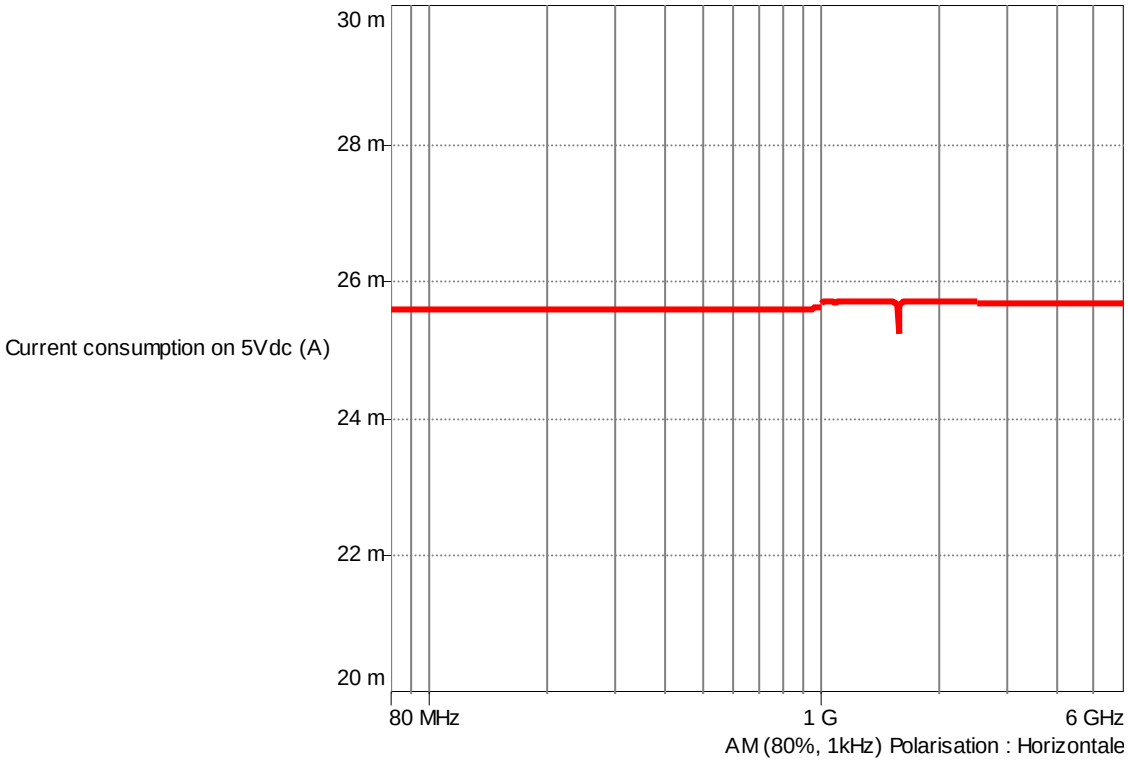
Radiated electric field immunity	
Radiated electric field immunity	

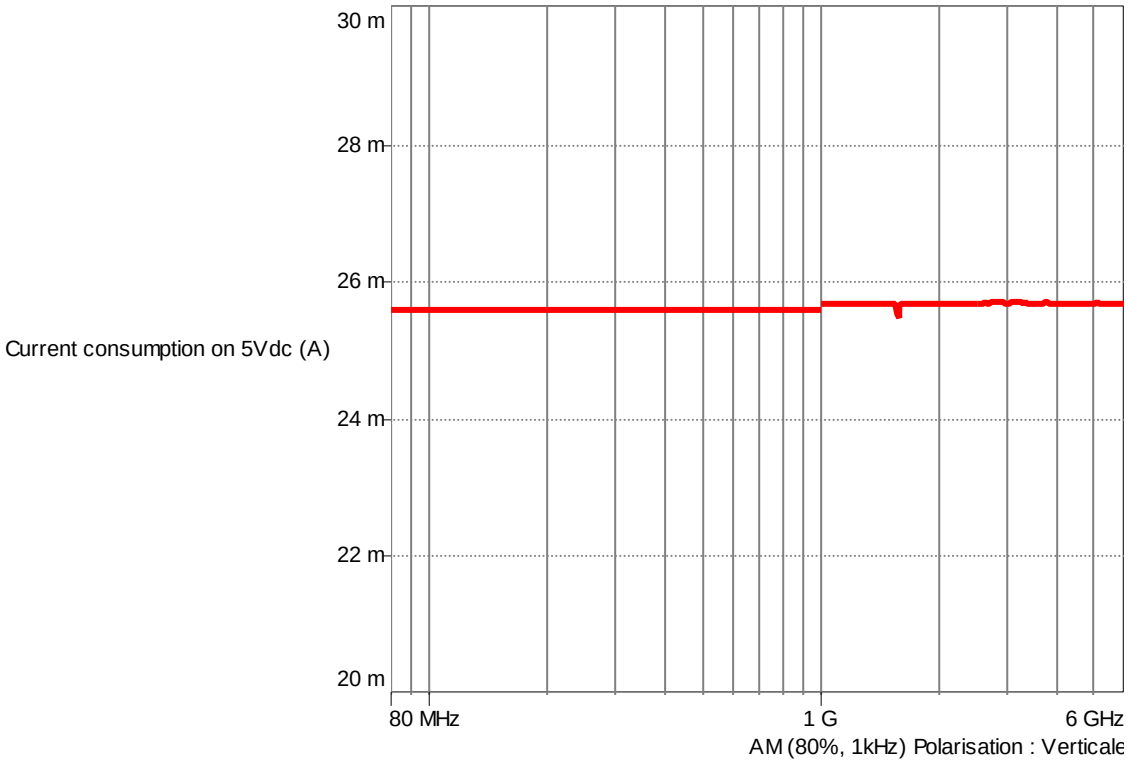
Monitoring – Axe X





Monitoring – Axe Z





8. IMMUNITY TO CONDUCTED DISTURBANCES, INDUCED BY RADIO-FREQUENCY FIELDS (*)

Standard: ETSI EN 301 489-1 2017 V2.2.0

Test method: EN 61000-4-6: 2014

Test configuration:

Tested cable(s)	Frequency band	50Ω load on:	Injection mode	Level	Step
GPS 5Vdc	150kHz-80MHz	-	pinceEM-12030E-(08/2016-10Vfem)	3 Vemf	1%

E.U.T. is set out at 10cm above the reference ground plane.

Modulation	Duration
AM (80%, 1kHz)	2000ms

- Aptitude criteria: §6 et §9.5.3 of the standard.

Test method deviation: EM clamp injection instead of use of CDN

Test equipment list:

CATEGORY	BRAND	TYPE	N° EMITECH	DATE CAL.	DATE VAL
Software	Nexio	BAT EMC v3.6.0.32	0000		
Amplifier	RFPA	RF001220-25	9196	07/10/2016	07/12/2018
Attenuator	JFW	50FH-006-10	1413	04/01/2017	04/03/2019
Cable	SUCOFLEX	N-1,5m	11931	22/05/2017	22/07/2019
Cable	SUCOFLEX	N-1,5m	11932	22/05/2017	22/07/2019
Cable	SUCOFLEX	N-16m	11930	22/05/2017	22/07/2019
Cable	Huber + Suhner	N-5m	12896	28/04/2016	28/06/2018
Coupler	RFPA	RFC001400-40-600	3022	17/08/2016	17/10/2018
Injection clamp	TESEQ	KEMZ 801A	12030		
Synthesizer	Rohde & Schwarz	SME-03	11819	15/02/2017	15/04/2019
Wattmeter	Rohde & Schwarz	FSP	11820	28/04/2017	28/06/2019

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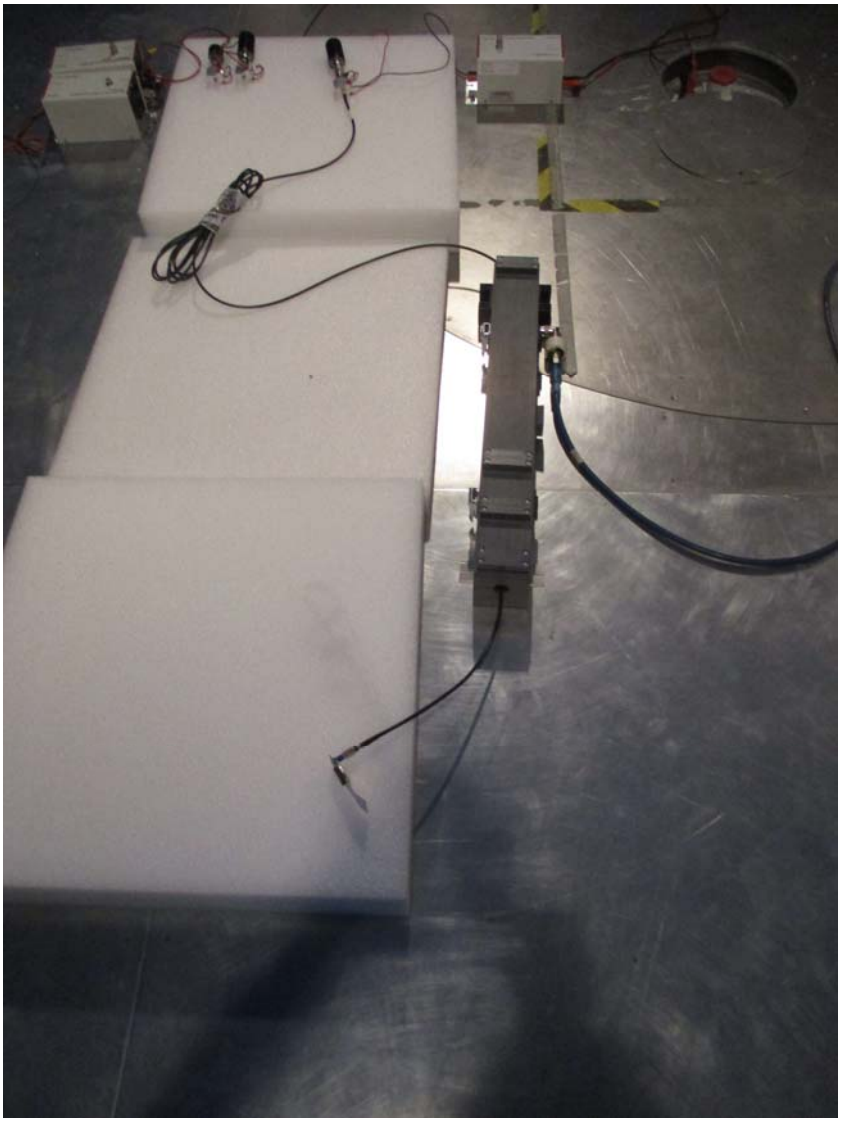
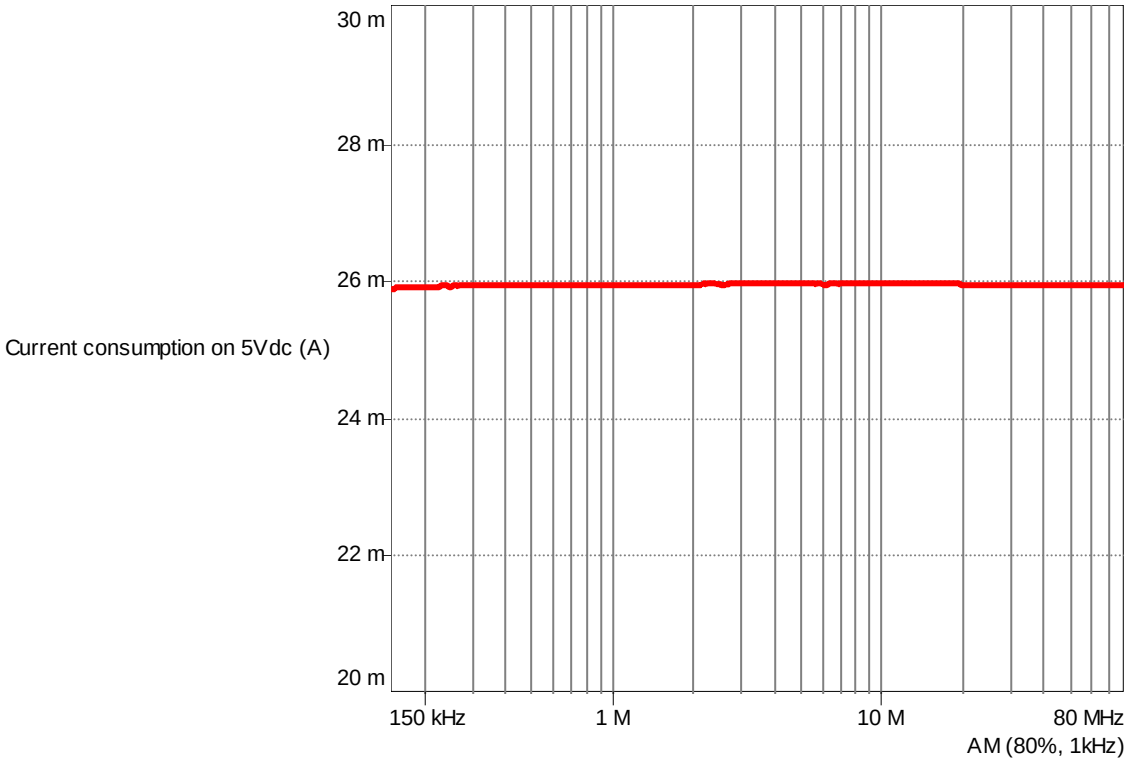
Results:

- GPS 5Vdc : Nothing to report

Graphs of measured currents are given hereafter.

RF conducted immunity	

Monitoring – injection on 5Vdc GPS power supply



End of report – Annex to follow

APPENDIX

Hirschmann reference tested	Customer's correlation	similar Hirschmann references	similar Customer's references
920 204 030	98 196 675 80	920 204 x30 920 204 x31	98 196 675 80 98 196 678 80
920 204 033	98 196 695 80	920 204 x32 920 204 x33	98 196 695 80 98 196 680 80
920 466 003	98 156 148 80	920 466 x03	98 156 148 80
920 204 121	96 665 675 80	920 204 x01 920 204 x02 920 204 x20 920 204 x21 920 204 x51 920 204 x52 920 204 x60 920 204 x61 920 204 x62	96 665 675 80 96 653 638 80 96 663 425 80 96 661 534 80 96 661 543 80 98 016 108 80
920 438 002	98 169 270 80	920 438 x02	98 169 270 80
920 204 041	96 664 528 80	920 204 x23 920 204 x24 920 204 x40 920 204 x41 920 204 x42 920 204 x43 920 204 x44 920 204 x45 920 204 x46 920 204 x22	96 664 527 80 96 664 528 80 98 040 580 80 98 040 581 80 96 785 417 80 96 785 418 80 96 665 612 80 98 105 478 80 98 105 479 80 98 104 931 80
920 063 017	96 657 807 80	920 253 xxx 920 265 xxx 920 063 xxx	96 661 015 80 96 661 017 80 96 661 018 80 96 738 445 80 96 661 015 80 96 610 457 80
920 385 011	98 085 142 80	920 385 x11 920 063 x20	98 085 142 80 98 085 141 80
920 251 001	96 740 629 80	920 251 xxx	96 740 631 80 96 740 629 80
920 268 001	96 740 634 80	920 268 x01	96 740 634 80
921 793 002	96 366 006 80	921 793 201 921 793 002	96 607 991 80 96 366 006 80
921 793 012	96 509 111 80	921 793 221 921 793 012	96 607 999 80 96 509 111 80
920 161 101		920 161 xxx	
951 016 001		951 016 xxx 951 014 xxx	
GPS M		607 010 700 607 010 711 607 010 721 607 010 766	
951 015 xxx		951 015 xxx	
951 011 xxx		951 011 xxx	
951 003 001		951 003 xxx	