This test report cancels and replaces R410-18-100918-3A Ed.0
Test report issued under the responsibility of:
EMITECH MONTPELLIER laboratory
MRA US-EU Designation Number: FR0006
IC Assigned Code: 4379C

RADIO TEST REPORT

FCC part 15.247
RSS-247_Issue 2, February 2017

Company	**STID**
Address	20 PA des Pradeaux Bd Salvador Allende 13850 GREASQUE FRANCE

Test item description	**RFID reader**
Trade Mark	STID
Manufacturer	STID
Model/Type reference	R5X / SMA
FCC ID	OVNSMA
IC	10520A-SMA
Ratings	9 Vdc to 36 Vdc

Testing Laboratory	**EMITECH MONTPELLIER laboratory**
Address	145 rue de Massacan 34740 VENDARGUES Cedex FRANCE

Report Reference No	**R410-18-100474-1A**
Test procedure	FCC IC Certification
Diffusion	Mr SOGOYAN
Applicant's name	STID
Date of issue	04/03/2019
Total number of pages	46
Revision	1
Modified page(s)	Refer to lines in margin
Compiled by	Morgan PATEY
Approved by (+ signature)	David MONTAULON (Technical Manager)

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1. GENERAL INFORMATIONS

This document submits the results of Radio tests performed on the equipment **RFID reader SMA - R5X** (denominated hereafter E.U.T.: equipment under test) according to document(s) listed in §2 of this test report.

TESTING PROCEDURE AND TESTING LOCATION:	
Testing Laboratory	EMITECH MONTPELLIER laboratory
Address	145 rue de Massacan 34740 VENDARGUES Cedex FRANCE
Test procedure.	FCC IC Certification
Tested by	Morgan PATEY
Test supervisor	None
Date of receipt of test item	N/A
Date (s) of performance of tests	April between the 03th to the 18th of 2018 and December 17th of 2018

APPLICANT'S GENERAL INFORMATIONS:	
Company name	STID
Company address.	20 PA des Pradeaux Bd Salvador Allende 13850 GREASQUE FRANCE
Person(s) present during the tests.	Mr SOGOYAN
Responsible.	Mr SOGOYAN

GENERAL REMARKS:

The test results presented in this report relate only to the object tested.
The results contained in this report reflect the results for this particular model and serial number. It is the responsibility of the manufacturer to ensure that all production models meet the intent of the requirements detailed within this report.

This report shall not be reproduced, except in full, without the written approval of the Issuing testing laboratory.
"(see Enclosure #)" refers to additional information appended to the report.
"(see appended table)" refers to a table appended to the report.
Throughout this report the decimal separator is point.

POSSIBLE TEST CASE VERDICTS:	
Test case does not apply to the test object.	N/A
Test case not performed	N/P
Test object does meet the requirement.	P (Pass)
Test object does not meet the requirement.	F (Fail)
Test object was not subjected to all tests.	I (Inconclusive)

DEFINITIONS AND ABBREVIATIONS:

E.U.T.	Equipement under test	AE	Ancillary equipment
RBW	Resolution bandwidth	VBW	Video bandwidth
OATS	Open area test site	FAR	Full anechoic room
RF	Radio frequency	NTR	Nothing to report

2. REFERENCE DOCUMENT(S)

NORMATIVE REFERENCES:

The following referenced documents are necessary for the application of the present test report.

FCC Part 15 :2018
Code of federal regulations. Title 47- Telecommunication Chapter 1- Federal Communication Commission. Part 15- Radio frequency devices Subpart B- Unintentional Radiators. Limits and methods of measurement of radio disturbance. Characteristic of information technology equipment.

FCC part 15.247
Operation within the bands 902–928 MHz, 2400–2483.5 MHz, and 5725–5850MHz. (frequency hopping and digitally modulated)

RSS-247_Issue 2, February 2017
Digital Transmission Systems (DTSs), Frequency Hopping Systems (FHSs) and Licence Exempt Local Area Network (LE-LAN) Devices

RSS-Gen - Issue 5, April 2018
General requirements and Information for the Certification of radio Apparatus

RSS-102 - Issue 5, March 2015
Radio Frequency (RF) Exposure Compliance of Radiocommunication Apparatus (All Frequency Bands)

ANSI C63.10 : 2013
American National Standard of Procedures for Compliance Testing of Unlicensed Wireless Devices.

ANSI C 63.4:2014
American National Standard for Methods of measurement of Radio-Noise from low-voltage Electrical and Electronic Equipment in the Range of 9 kHz to 40 GHz

INFORMATIVE REFERENCES:

The following referenced documents are not necessary for the application of the present test report but they assist the user with regard to a particular subject area.

3. EQUIPMENT TECHNICAL DESCRIPTION

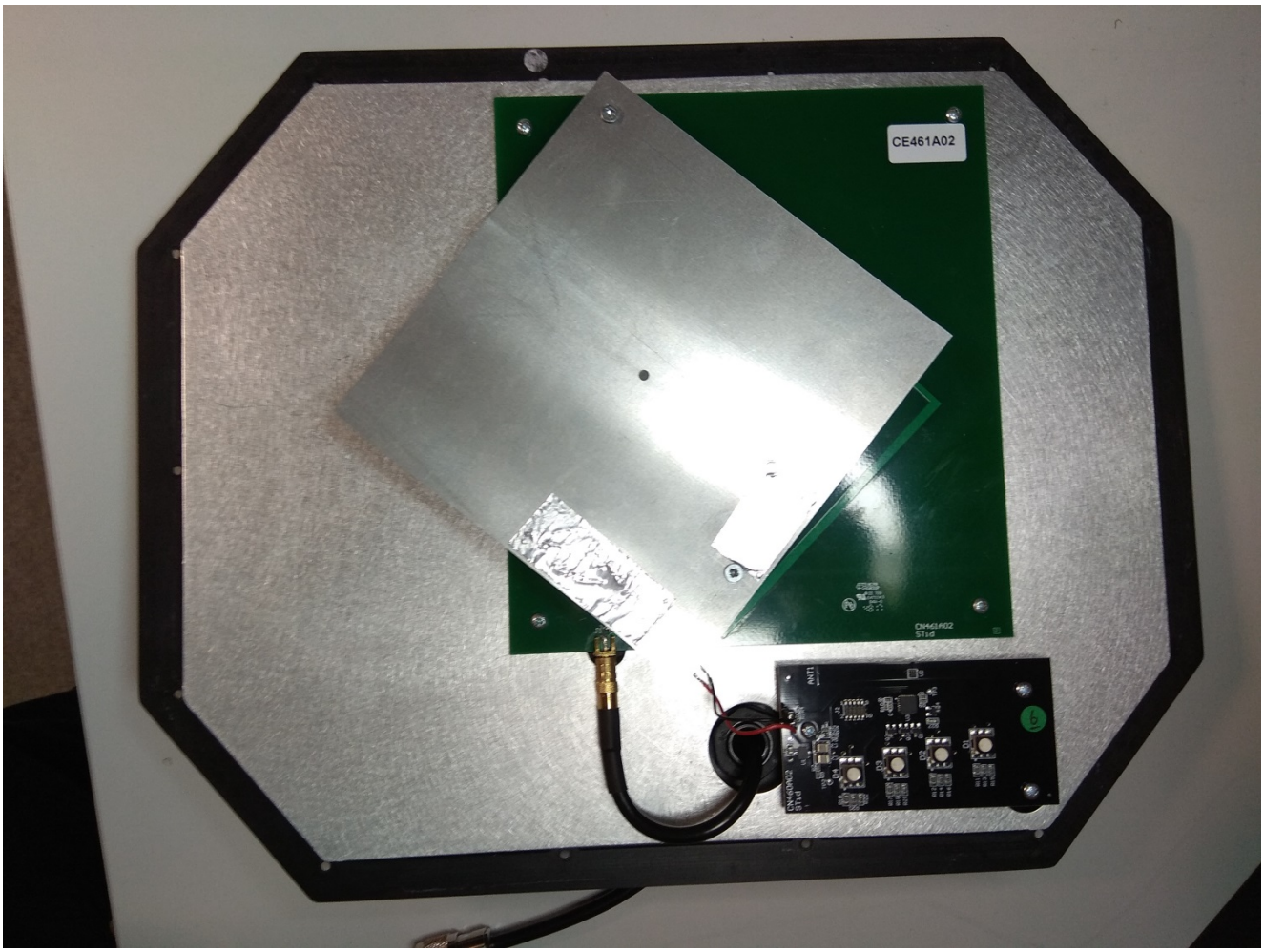
3.1. Test Conditions

Test item description. ..... : RFID reader
Model/Type reference..... : R5X / SMA
Trade Mark. ..... : STID
Serial number (S/N). ..... : Not communicated
Part number (P/N). ..... : Not communicated
Software version. ..... : Not communicated
Firmware version. ..... : Not communicated
Type of sample. ..... : Pre-serial
Function(s). ..... : UHF RFID reader
Manufacturer name. ..... : STID

General product information:

N/A

3.2. EUT Antenna internal view



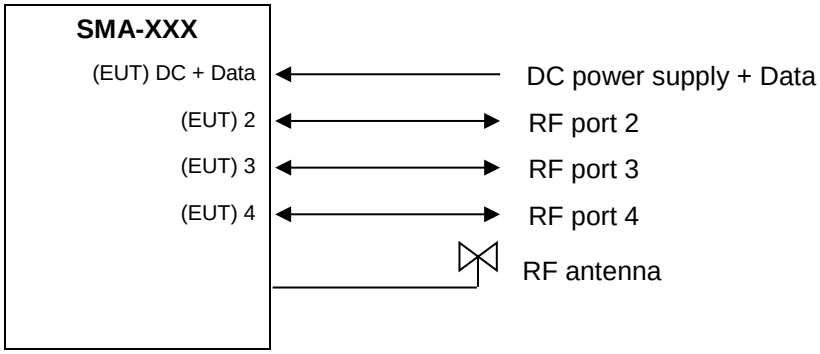
3.3. EUT Antenna

3.4. EUT Mechanical and Electrical Design

Power supply. ..... : 12 Vdc
Power supply range. ..... : 9 Vdc to 36 Vdc
Power type. ..... : DC
Power ..... : Not communicated
Nominal current . ..... : Not communicated
Dimensions (L x W x H) (m). ..... : 0.272 x 0.15 x 0.0445
Weight (kg). ..... : Not communicated
Temperature range (°C). ..... : -25°C to +60°C
Ground bounding strap. ..... : No

Comments:

3.5. EUT Input/Output ports



PORT	NAME	TYPE	LENGHT	CABLE TYPE	COMMENTS
0	Main frame	N/E	N/A	Metallic	
1	DC power supply + Data	DC	N/A	24 Vdc + Data	
2	RF port 2	RF	N/A	RF port	All RF ports are identical
3	RF port 3	RF	N/A	RF port	All RF ports are identical
4	RF port 4	RF	N/A	RF port	All RF ports are identical
5	RF antenna	RF	N/A	RF Antenna	All RF ports are identical

AC/DC : AC/DC Converter port
I/O.....: Input or Output port
N/E .....: Non Electrical port

AC.....: Alternative current port
TP .....: Telecommunication port

DC .....: Discontinuous current port
RF.....: Radio frequency port

3.6. EUT Radio Specifications

a) General Informations

According to manufacturer's declarations :

EUT type..... : Transceiver
Technology..... : RFID
Environmental profile..... : Data transmissions
Temperature range..... : -25°C to +60°C
Antenna type ..... : External
Antenna Gain..... : 9.38dBi

Comments:

EUT has 4 identicals RF ports, according to manufacturer's declaration, these ports cannot be used at the same time.

b) Transmitter Paramitters (Tx)

Frequency bands..... : 902MHz to 928MHz
RF Power..... : 4 W eirp
Number of channels / Separation..... : 50
Modulation type ..... : FHSS
Duty cycle ..... : See certification documents
Tested frequency..... : 902.75 MHz (Low channel)
915.2 MHz (Middle channel)
927.25 MHz (High channel)

c) Receiver Parameters (Rx)

Frequency bands..... : 902MHz to 928MHz
Category/Class ..... : N/A
Bandwidth..... : Not communicated

4. RESULT SUMMARY

TEST DESIGNATION	SEVERITY	VERDICT	BASIC STANDARDS / COMMENTS
SUBPART A - GENERAL			
Labeling requirements		**PASS**	**15.19 / See certification documents**
Information to user		**PASS**	**15.21**
Home-built devices		**N/A**	**15.23**
Kits		**N/A**	**15.25**
Special Accessories		**PASS**	**15.27 / See certification documents**
Inspection by the Commission		**N/A**	**15.29**
Measurement standards		**PASS**	**15.31**
Test procedure for CPU boards and computer power supplies		**N/A**	**15.32**
Frequency range of radiated measurements		**PASS**	**15.33**
Measurement detector functions and bandwidths		**PASS**	**15.35**
Transition provisions for compliance with the rules		**PASS**	**15.37 / See certification documents**
SUBPART B – UNINTENTIONAL RADIATORS			
Equipment authorization			**15.101**
- Verification		N/A	
- Declaration of Conformity		N/A	
CPU boards and power supplies used in personal computers		**N/A**	**15.102**
Exempted device		**N/A**	**15.103**
Information to the user		**N/A**	**15.105 / See certification documents**
Conducted limits	**Class B**	**PASS**	**15.107**
Radiated emission limits	**Class B**	**PASS**	**15.109**
Antenna power conduction limits for receivers		**N/A**	**15.111**
Power line carrier systems		**N/A**	**15.113**
TV interface devices, including cable system terminal devices		**N/A**	**15.115**
TV broadcast receivers		**N/A**	**15.117**
Cable ready consumer electronics equipment		**N/A**	**15.118**
Program blocking technology requirements for TV receivers		**N/A**	**15.120**
Scanning receivers and frequency converters used with scanning receivers		**N/A**	**15.121**
Labeling of digital cable ready products		**N/A**	**15.123**
SUBPART C –INTENTIONAL RADIATORS			

TEST DESIGNATION	SEVERITY	VERDICT	BASIC STANDARDS / COMMENTS
Equipment authorization requirement		**PASS**	**15.201 / Transmitter part is subject to Certification procedure**
Certified operating frequency range		**N/A**	**15.202**
Antenna requirement		**PASS**	**15.203 / Dedicated and glued antenna**
External radio frequency power amplifiers and antenna modifications		**N/A**	**15.204**
Restricted bands of operation		**PASS**	**15.205**
Conducted limits	**Class B**	**PASS**	**15.207**
Radiated emission limits; general requirements	**Class B**	**PASS**	**15.209**
Tunnel radio systems		**N/A**	**15.211**
Modular transmitters		**N/A**	**15.212**
Cable locating equipment		**N/A**	**15.213**
Cordless telephones		**N/A**	**15.214**
Additional provisions to the general radiated emission limits		**PASS**	**15.215**
Operation within the band 902-928MHz, 2400-2483.5MHz and 5725-5850MHz		**PASS**	**15.247**
- **Frequency hopping and digitally modulated**		**-**	**a)**
- Frequency hopping system		PASS	a) (1) See also Opdes file for RF ON timing management
- Digital modulation system		N/A	a) (2)
- **Maximum peak conducted output power**		**-**	**b)**
- For hopping system in the 2400-2483.5 MHz and 5725-5850 MHz bands		N/A	b) (1)
- For hopping system in the 902-928MHz band		PASS	b) (2)
- For system using digital modulation in the 902-928 MHz, 2400-2483.5 MHz and 5725-5850 MHz bands		N/A	b) (3)
- **Operation with directional antenna gains > 6 dBi**		**PASS**	**c)**
- **Out-of-band emissions**		**PASS**	**d)**
- **Power spectral density conducted**		**N/A**	**e)**
- **Hybrid system**		**N/A**	**f)**
- **Frequency hopping additional requirements**		**N/A**	**g)**
- **Frequency hopping intelligence**		**N/A**	**h)**
- **RF exposure compliance**		**PASS**	**i)**

Sample subject to the test complies with the requirements of the reference document(s) listed in §2 of this test report and, where applicable, with deviation(s) specified in this document.

To declare, or not, the compliance with the specifications, it was not explicitly taken account of uncertainty associated with the results.

Opinion(s) and interpretation(s): N/A

5. RF EXPOSURE

Maximum conducted measurement = 26.42dBm
Maximum antenna gain = 9.38dBi
Maximum EIRP with antenna gain of 9.38dBi = 3.802 W (eirp) at 915.2MHz

In accordance with KDB 447498 D01 General RF Exposure Guidance v06:
PSD= EIRP/(4*π*R^2)=3802/(4*π*(23 cm)²)= 0.57 mW/cm²
The minimum separation distance from EUT should be 23cm.
Limit= 0.61 mW/cm² (f /1500 if 300<f< 1500 MHz)

In accordance with RSS-102 (issue 5):
PSD= EIRP/(4*π*R^2)=3802/(4*π*(34 cm)²)= 0.26 mW/cm²
The minimum separation distance from EUT should be 34cm.
Limit= 0.274 mW/cm² (0,02619$f^{0,6834}$ if 300<f< 6000 MHz)

6. MEASUREMENT UNCERTAINTY

PARAMETER	MAXIMAL EMITECH UNCERTAINTY	MINIMAL STANDARD UNCERTAINTY
Conducted emission		
(Artificial Mains Network) 3kHz – 9kHz	± 3.8 dB	/
(Artificial Mains Network) 9kHz – 150kHz	± 3.6 dB	± 3.6 dB
(Artificial Mains Network) 150kHz – 30MHz	± 3.4 dB	± 3.4 dB
(Voltage probe) 9kHz – 30MHz	± 2.9 dB	± 2.9 dB
(Asymmetric Artificial Network) 150kHz – 30MHz	± 3.5 dB	± 5.0 dB
(Current measurement) 150kHz – 30MHz	± 2.9 dB	± 2.9 dB
(Capacitive Voltage Probe) 150kHz – 30MHz	± 3.6 dB	± 3.9 dB
(Discontinuous) 150kHz – 30MHz	± 3.4 dB	± 3.4 dB
(Van Veen) 9kHz – 30MHz	± 3.3 dB	/
(Coupling Decouplingl Network) 30MHz – 300MHz	± 3.5 dB	± 3.8 dB
(Splitter) 30MHz – 2.15GHz	± 3.4 dB	/
Radio frequency	± 1 x 10^{-7}	±1 x 10^{-7}
Occuped bandwidth		
RF power	± 1.2 %	± 5 %
Radiated emission (magnetic field)		
9kHz – 30MHz	± 2.7 dB	± 6 dB
Supply voltages	± 3 %	± 3 %
Temperature	± 1 °C	± 1°C
Humidity	± 5 %	± 5 %
Time / Duty cycle	± 4.4 %	± 5 %
Radiated emission (electric field for FCC standard)		
9kHz – 30MHz	± 2.7 dB	/
30MHz – 1GHz	± 5.2 dB	/
1GHz – 18GHz	± 5.3 dB	/
18GHz – 26GHz	± 5.5 dB	/
26GHz – 40GHz	± 5.5 dB	/

For the calcul of expanded uncertainty, the confidence interval is 95 % (k=2).

7. TEST CONDITIONS AND RESULTS

7.1. Conducted voltage emission (measurement)

Reference standard:	FCC part 15.107, 15.207 and RSS-Gen
Test method:	ANSI C63.4: 2014
General test setup: EUT is set on an insulating support at 40cm above the ground reference plane. All power was connected to the system through Artificial Mains Network (AMN). The AMN is placed at 80cm from the boundary of the EUT and bonded to a ground reference plane.	

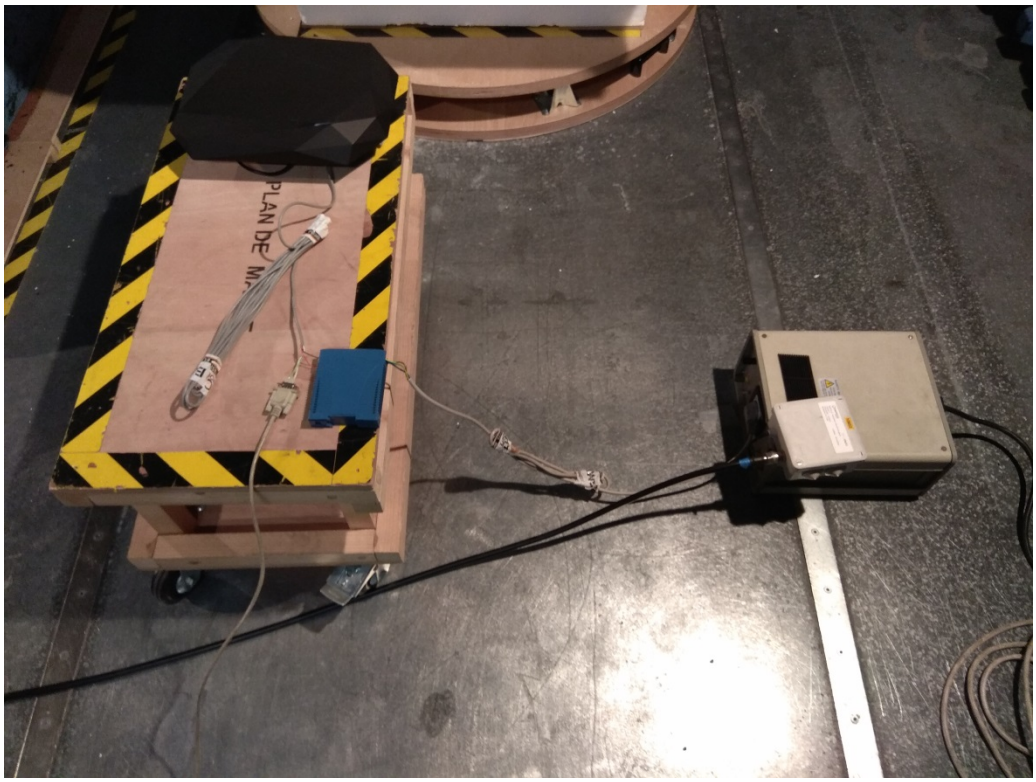
TESTED CABLE	PARAMETER	SEVERITY	RESULT TAB.	VERDICT
110Vac/60Hz power supply	150kHz-30MHz	Class B	EMI5049	**PASS**

LABORATORY PARAMETERS:	REQUIRED PRIOR TO THE TEST	DURING THE TEST
Ambient Temperature	15 to 35 °C	*See Graph(es)*
Relative Humidity	30 to 60 %	*See Graph(es)*
Atmospheric pressure	N/A	*See Graph(es)*
Test method deviation: N/A		
Supplementary information: EUT power supply is done trought a “standard power supply” wich meets FCC and RSS requirements.		

TEST EQUIPMENT USED					
CATEGORY	BRAND	TYPE	IDENTIFIER	CAL. DATE	CAL. DUE
Cable	EMITECH	Current absorber sheath	10653	16/03/2018	16/05/2020
Cable	C&C	N-3m	14334	15/12/2016	15/02/2019
Cable	SUCOFLEX	N-3m	14379	18/01/2017	18/03/2019
Cable	C&C	N-5m	14340	15/12/2016	15/02/2019
LISN	PMM	L2-16	1209	08/02/2018	08/04/2020
PE choke	EMITECH	CISPR 16-2-1 : 2008	10071		
Receiver	Agilent Technologies	E7405A	2161	22/08/2017	22/10/2019
Receiver	Rohde & Schwarz	ESI	9704	23/04/2018	23/06/2019
Software	Nexio	BAT EMC v3.17.0.25	0000		
Surges Suppressor	Hewlett Packard	11947A	0238	11/09/2017	11/11/2019
Thermohygrometer	Bioblock Scientific	Météostar	0963	27/12/2016	27/02/2019

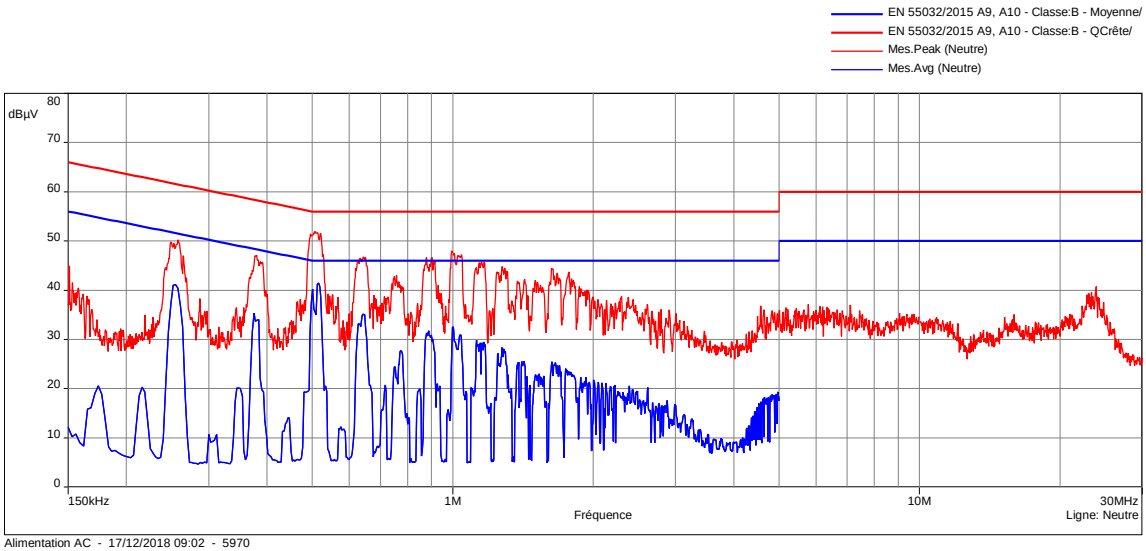
Blank cells = Permanent validity

TEST SETUP PHOTO(S) -

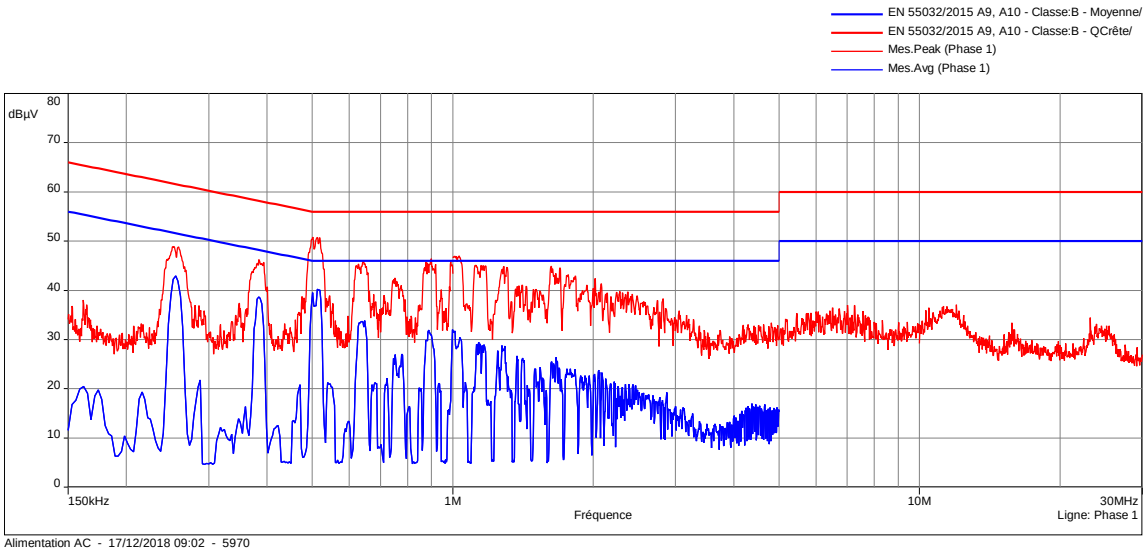


POWER SUPPLY USED FOR CONDUCTED EMISSIONS -

CONDUCTED VOLTAGE EMISSION (MEASUREMENT) - GRAPH			
110VAC/60HZ POWER SUPPLY		**EMI5049**	
EUT mode:	Tx hopping mode.	**T (°C):**	24.3
Test Date:	17/12/2018	**H (%):**	42.6
Test Operator:	MPA	**P (hPa):**	1026



Alimentation AC - 17/12/2018 09:02 - 5970



Alimentation AC - 17/12/2018 09:02 - 5970

POSITION	FREQUENCIES	RBW	VBW	DETECTOR
Neutral	150kHz-1MHz	10kHz	30kHz	Peak
Neutral	1MHz-10MHz	10kHz	30kHz	Peak
Neutral	10MHz-30MHz	10kHz	30kHz	Peak
Neutral	150kHz-5MHz	10kHz	30kHz	Avg
Phase 1	150kHz-1MHz	10kHz	30kHz	Peak
Phase 1	1MHz-10MHz	10kHz	30kHz	Peak
Phase 1	10MHz-30MHz	10kHz	30kHz	Peak
Phase 1	150kHz-5MHz	10kHz	30kHz	Avg
Measure with:	L.I.S.N.			
Comments:	N/A			
EUT modification(s): N/A				

7.2. Occupied Bandwidth

Reference standard:	FCC part 15 Radio part 15.247 and RSS-247
Test method:	FCC part 15.247 and RSS-247
Test description: The occupied bandwidth (OBW) is the Frequency Range in which 99 % of the total mean power of a given emission falls. The residual part of the total power being denoted as β, which, in cases of symmetrical spectra, splits up into β/2 on each side of the spectrum. Unless otherwise specified, β/2 is taken as 0,5 %. The maximum occupied bandwidth includes all associated side bands above the appropriate emissions level and the frequency error or drift under extreme test conditions. EUT is connected to the measuring receiver via 50Ω attenuator(s).	

TESTED	FREQUENCY	SEVERITY	RESULT TAB.	VERDICT
OBW 99%	902.75 MHz	NA	EMI5797	**PASS**

LABORATORY PARAMETERS:	REQUIRED PRIOR TO THE TEST	DURING THE TEST
Ambient Temperature	15 to 35 °C	20.1 °C
Relative Humidity	20 to 75 %	42.5%
Atmospheric pressure	N/A	1015 hPa
Test method deviation: N/A		
Supplementary information: N/A		

TEST EQUIPMENT USED					
CATEGORY	**BRAND**	**TYPE**	**IDENTIFIER**	**CAL. DATE**	**CAL. DUE**
Attenuator	Radiall	R412720124	4390	01/02/2018	01/04/2020
Attenuator	Radiall	R412720124	4391	01/02/2018	01/04/2020
Attenuator	Techniwave	TWSMA-10dB-18G-SMA	14670	21/09/2017	21/11/2019
Cable	C&C	N-3m	14333	15/12/2016	15/02/2019
Multimeter	Agilent Technologies	U1252A	6138	24/01/2018	24/03/2020
Power supply	TTi	PL303QMD	8496		
Receiver	Rohde & Schwarz	FSW43	14830	13/11/2017	13/01/2019
Software	Nexio	BAT EMC v3.16.0.64	0000		
Thermohygrometer	Testo	608-H2	12268	27/11/2017	27/01/2020
Thermohygrometer	Bioblock Scientific	Météostar	0963	27/12/2016	27/02/2019

Blank cells = Permanent validity

OCCUPIED BANDWIDTH - GRAPH	
OCCUPIED BANDWITH 99%	**EMI5797**
EUT mode:	Tx hopping mode
Test Date:	06/04/2018
Test Operator:	MPA

15:10:28 06.04.2018

EUT modification(s): N/A

Center Frequency	RBW	OCCUPIED BANDWITH 99%
902.75 MHz	2 kHz	63.4 kHz

7.3. 20dB bandwidth, Carrier Frequency separation and Number of Hopping Channels

Reference standard:	FCC part 15 Radio part 15.247 and RSS-247
Test method:	FCC part 15.247 and RSS-247

Test description: a) (1) (i)

For frequency hopping systems operating in the 902-928 MHz band: if the 20 dB bandwidth of the hopping channel is less than 250 kHz, the system shall use at least 50 hopping frequencies and the average time of occupancy on any frequency shall not be greater than 0.4 seconds within a 20 second period; if the 20 dB bandwidth of the hopping channel is 250 kHz or greater, the system shall use at least 25 hopping frequencies and the average time of occupancy on any frequency shall not be greater than 0.4 seconds within a 10 second period. The maximum allowed 20 dB bandwidth of the hopping channel is 500 kHz.

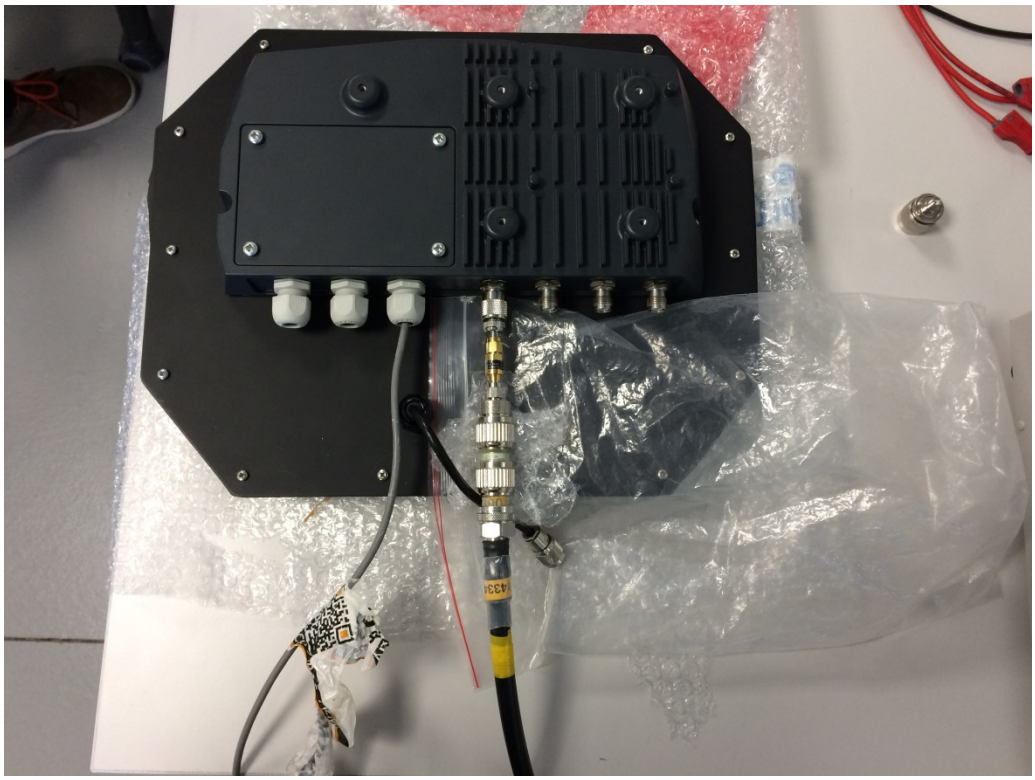
EUT is connected to the measuring receiver via 50Ω attenuator(s). Tests are done in max-hold mode in order to capture all channels.

TESTED PARAMETER	RESULT	SEVERITY	RESULT TAB.	VERDICT
Number of channels	50	>=50	EMI5564	**PASS**
Channels separation	500.4kHz	>42.7kHz	EMI5565	**PASS**
20dB Bandwidth	42.7kHz	<500.4kHz	EMI5567	**PASS**
Occupation time	155.8ms on 20s	<400ms	EMI5568	**PASS**

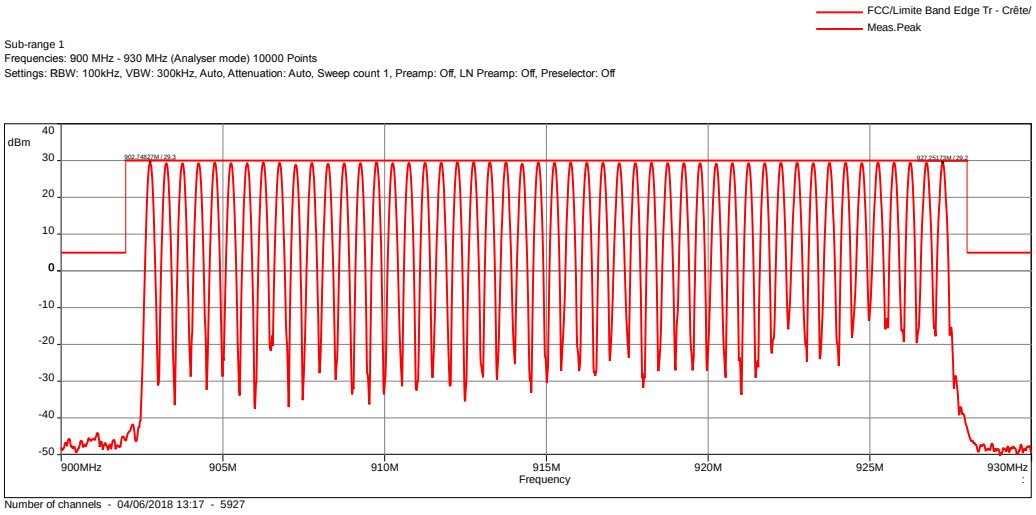
LABORATORY PARAMETERS:	REQUIRED PRIOR TO THE TEST	DURING THE TEST
Ambient Temperature	15 to 35 °C	21.6 °C
Relative Humidity	20 to 75 %	46%
Atmospheric pressure	N/A	1010 hPa
Test method deviation: N/A		
Supplementary information: N/A		

TEST EQUIPMENT USED					
CATEGORY	**BRAND**	**TYPE**	**IDENTIFIER**	**CAL. DATE**	**CAL. DUE**
Attenuator	Radiall	R412720124	4390	01/02/2018	01/04/2020
Attenuator	Radiall	R412720124	4391	01/02/2018	01/04/2020
Attenuator	Techniwave	TWSMA-10dB-18G-SMA	14670	21/09/2017	21/11/2019
Cable	C&C	N-3m	14333	15/12/2016	15/02/2019
Multimeter	Agilent Technologies	U1252A	6138	24/01/2018	24/03/2020
Power supply	TTi	PL303QMD	8496		
Receiver	Rohde & Schwarz	FSW43	14830	13/11/2017	13/01/2019
Software	Nexio	BAT EMC v3.16.0.64	0000		
Thermohygrometer	Testo	608-H2	12268	27/11/2017	27/01/2020
Thermohygrometer	Bioblock Scientific	Météostar	0963	27/12/2016	27/02/2019

Blank cells = Permanent validity

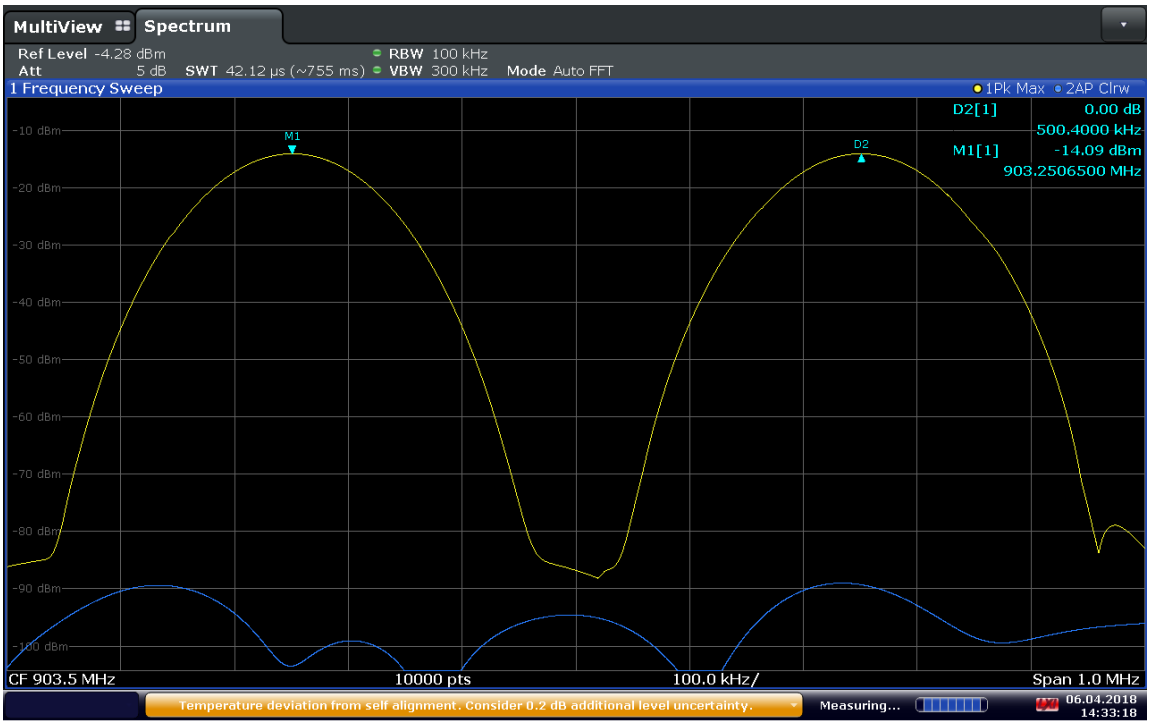
TEST SETUP PHOTO(S) -


NUMBER OF CHANNELS FOR FREQUENCY HOPPING SYSTEMS - GRAPH	
NUMBER OF CHANNELS	**EMI5797**
EUT mode:	Tx hopping mode
Test Date:	06/04/2018
Test Operator:	MPA



POSITION	FREQUENCIES	RBW	VBW	DETECTOR
RF port	900MHz-930MHz	100kHz	300kHz	Peak max hold
Configuration:	N/A			
Comments:	The system uses 50 channels			
EUT modification(s): N/A				

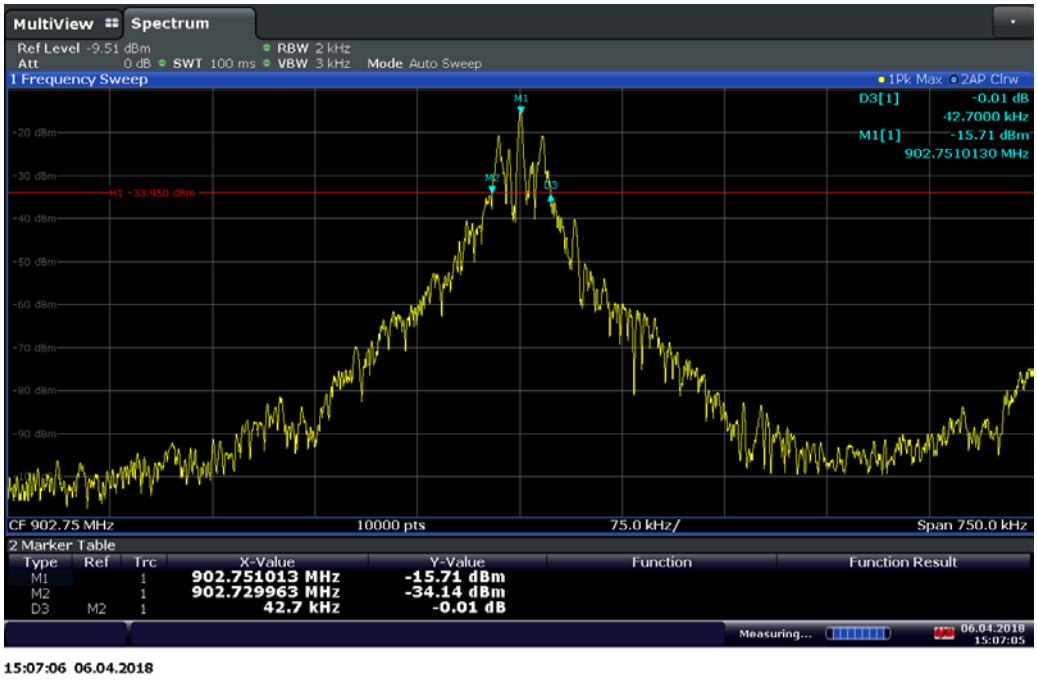
CHANNEL SEPARATION FOR FREQUENCY HOPPING SYSTEMS - GRAPH			
CHANNEL SEPARATION		EMI5565	
EUT mode:	Tx hopping mode	**T (°C):**	21.6
Test Date:	06/04/2018 14:33:18	**H (%):**	46
Test Operator:	MPA	**P (hPa):**	1010



14:33:18 06.04.2018

POSITION	FREQUENCIES	RBW	VBW	DETECTOR
RF port	903-904MHz	100kHz	300kHz	Peak max hold
Configuration:	N/A			
Comments:	The channels separation is almost 500.4kHz.			
EUT modification(s): N/A				

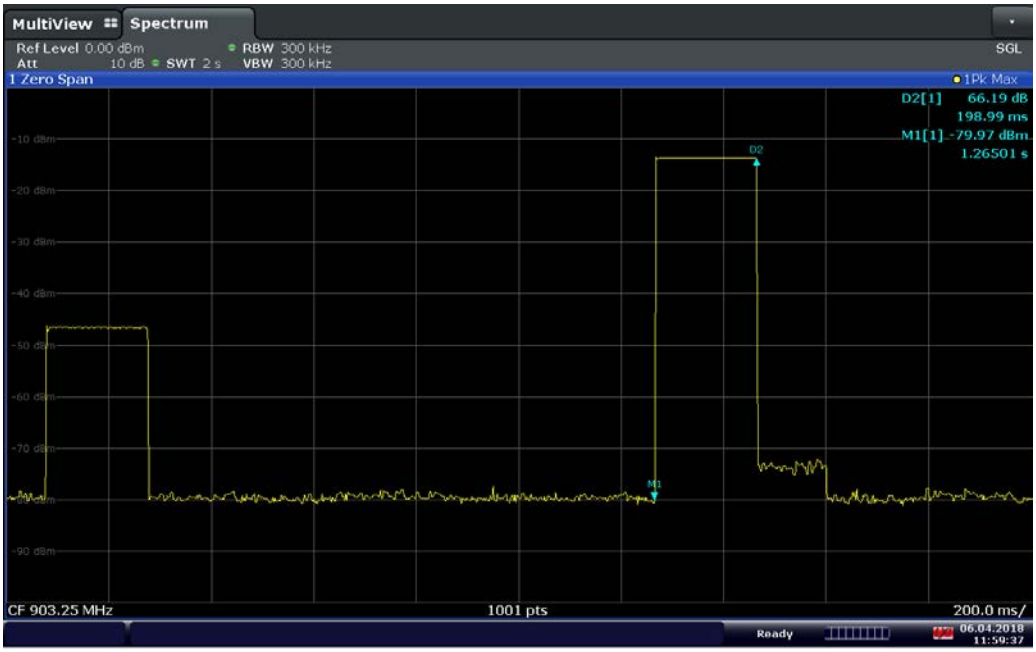
20DB BANDWITH - GRAPH		
-20DB		EMI5797
EUT mode:	Tx hopping mode	
Test Date:	06/04/2018	
Test Operator:	MPA	



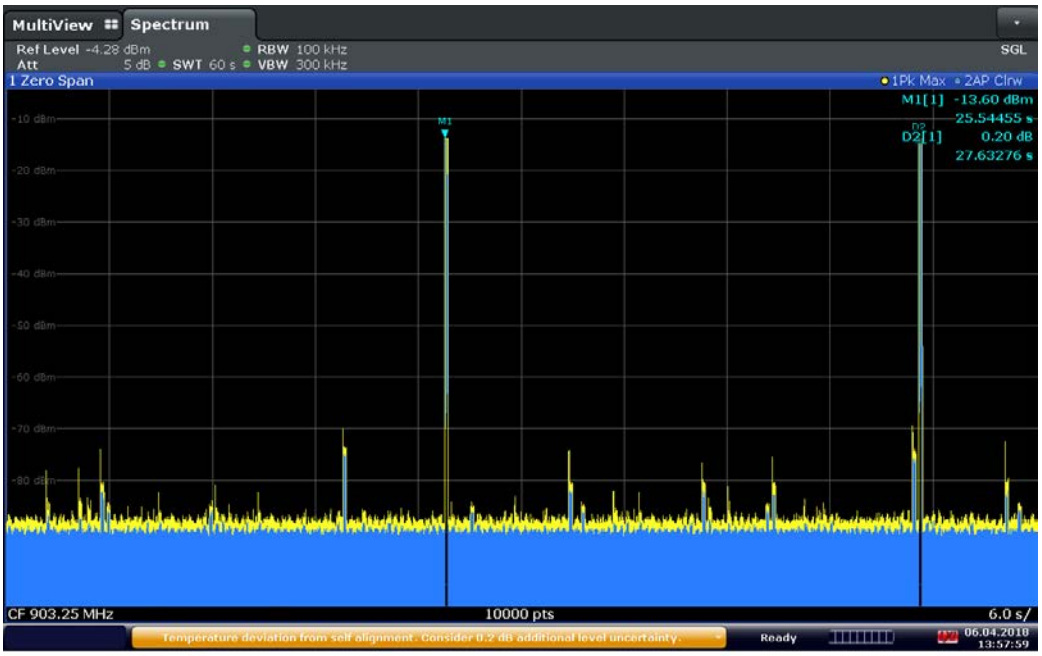
15:07:06 06.04.2018

POSITION	FREQUENCIES	RBW	VBW	DETECTOR
RF port	902.75MHz	2kHz	3kHz	Peak max hold
Configuration:	N/A			
Comments:	The 20dB bandwidth is 42.7kHz			
EUT modification(s): N/A				

OCCUPATION TIME FOR FREQUENCY HOPPING SYSTEMS - GRAPH			
TRANSMISSION TIME		**EMI5567**	
EUT mode:	Tx hopping mode	**T (°C):**	21.6
Test Date:	06/04/2018 11:59:37	**H (%):**	46
Test Operator:	MPA	**P (hPa):**	1010



11:59:38 06.04.2018



13:58:00 06.04.2018

Results:	The system uses 50 channels in any conditions and the averaging time of occupancy on any channel is less than 0.4 seconds within a period of 20 seconds: The measurement during a long transmission gives 198.99ms every 25.54455s on each channel, so the average time within a period of 20 second is 155.8ms which is less than the 400ms limit. For additional informations see certifications documents (file Opdes)

7.4. Maximum peak conducted power of the intentional radiator

Reference standard:	FCC part 15 Radio part 15.247 and RSS-247
Test method:	FCC part 15.247 and RSS-247

Test description: b) (2)

For frequency hopping systems operating in the 902-928 MHz band: 1 watt for systems employing at least 50 hopping channels; and, 0.25 watts for systems employing less than 50 hopping channels, but at least 25 hopping channels, as permitted under paragraph (a)(1)(i) of this section.

EUT is connected to the measuring receiver via 50Ω attenuator(s).Only the highest levels are recorded.

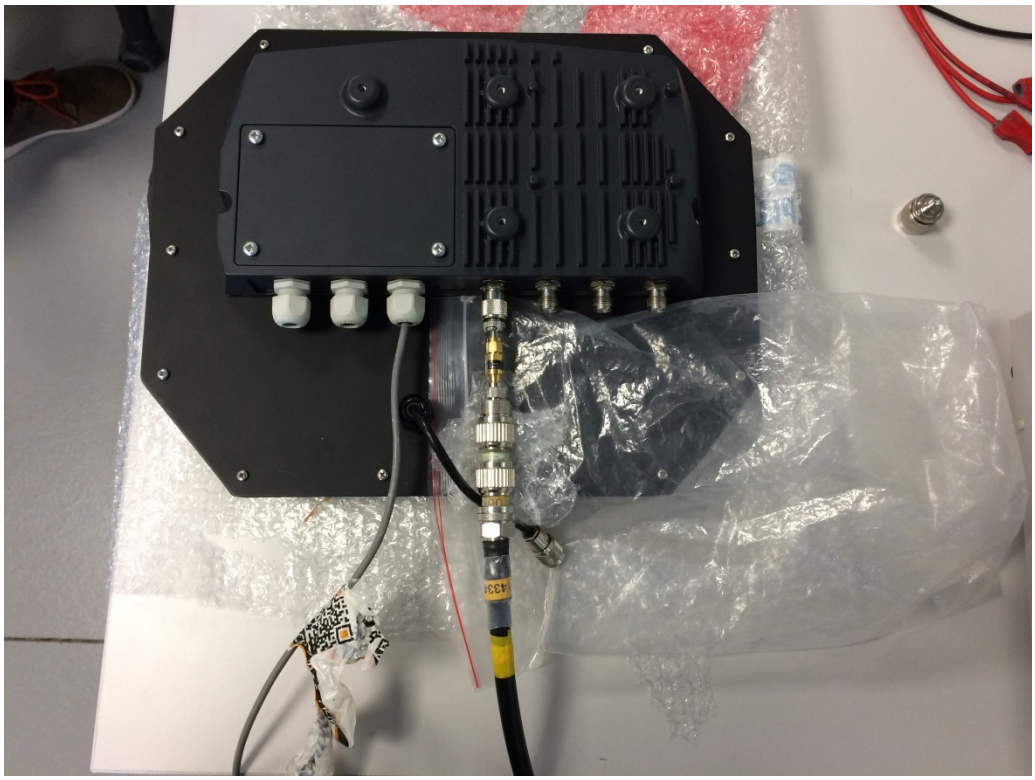
TESTED CONFIGURATION	PARAMETER	SEVERITY	RESULT TAB.	VERDICT
Low channel	902MHz-903MHz	1W (30dBm)	EMI5848	**PASS**
Middle channel	914.95MHz-915.55MHz	1W (30dBm)	EMI5849	**PASS**
High channel	927MHz-928MHz	1W (30dBm)	EMI5850	**PASS**

LABORATORY PARAMETERS:	REQUIRED PRIOR TO THE TEST	DURING THE TEST
Ambient Temperature	15 to 35 °C	*See Graph(es)*
Relative Humidity	20 to 75 %	*See Graph(es)*
Atmospheric pressure	N/A	*See Graph(es)*
Test method deviation: N/A		
Supplementary information: N/A		

TEST EQUIPMENT USED

CATEGORY	BRAND	TYPE	IDENTIFIER	CAL. DATE	CAL. DUE
Attenuator	Radiall	R412720124	4390	01/02/2018	01/04/2020
Attenuator	Radiall	R412720124	4391	01/02/2018	01/04/2020
Attenuator	Techniwave	TWSMA-10dB-18G-SMA	14670	21/09/2017	21/11/2019
Cable	C&C	N-3m	14333	15/12/2016	15/02/2019
Multimeter	Agilent Technologies	U1252A	6138	24/01/2018	24/03/2020
Power supply	TTi	PL303QMD	8496		
Receiver	Rohde & Schwarz	FSW43	14830	13/11/2017	13/01/2019
Software	Nexio	BAT EMC v3.16.0.64	0000		
Thermohygrometer	Testo	608-H2	12268	27/11/2017	27/01/2020
Thermohygrometer	Bioblock Scientific	Météostar	0963	27/12/2016	27/02/2019

Blank cells = Permanent validity

TEST SETUP PHOTO(S) -


MAXIMUM PEAK CONDUCTED POWER - TABULATED RESULTS				
PEAK CONDUCTED POWER				EMI6021
Frequency (MHz)	$P_{conducted}$ (dBm)	$Gain_{dBi}$	P_{eirp} (dBm)	Limit $_{eirp}$ (dBm)
902.75	26.02	9.38 dBi	35.4	36
915.2	26.42	9.38 dBi	35.8	36
927.25	26.24	9.38 dBi	35.6	36

$P_{erp} = P_{conducted}$ + antenna $Gain_{dBd}$; $Gain_{dBd} = Gain_{dBi}$ - 2.15dB
$P_{erp} = P_{conducted} + Gain_{dBi}$ - 2.15dB
$P_{eirp} = P_{erp}$ + 2.15dB
$P_{eirp} = P_{conducted} + Gain_{dBi}$
In case of a dedicated antenna the antenna gain (in dB, i.e. relative to a dipole) is declared by the manufacturer.

Using the formula $E_{(V/m)} = \sqrt{(30 P_{dBm} G_{dBi})}/d_{(m)}$ where P is the conducted power and G the maximum antenna gain. Equivalent maximum E-field should be approximatively of 131.03dBµV/m for a test distance of 3 meters.

MAXIMUM PEAK CONDUCTED POWER - PARAMETERS					
LOW CHANNEL				EMI5848	
EUT mode:	D-M1			**T (°C):**	20.4
Test Date:	05/04/2018 14:59:25			**H (%):**	57
Test Operator:	MPA			**P (hPa):**	1020
POSITION	**FREQUENCIES**	**RBW**	**VBW**	**DETECTOR**	
N/A	902MHz-903MHz	100kHz	300kHz	Peak	
EUT modification(s): N/A					
Frequency (MHz)	**Polarization**	**Level (dBm)**		**Limit (dBm)**	
902.75	N/A	26.02		30	

MAXIMUM PEAK CONDUCTED POWER - PARAMETERS					
MIDDLE CHANNEL				EMI5848	
EUT mode:	D-M1			**T (°C):**	20.4
Test Date:	05/04/2018 14:55:18			**H (%):**	57
Test Operator:	MPA			**P (hPa):**	1020
POSITION	**FREQUENCIES**	**RBW**	**VBW**	**DETECTOR**	
N/A	914.95MHz–915.55MHz	100kHz	300kHz	Peak	
EUT modification(s): N/A					
Frequency (MHz)	**Polarization**	**Level (dBm)**		**Limit (dBm)**	
915.2	N/A	26.42		30	

MAXIMUM PEAK CONDUCTED POWER - PARAMETERS					
HIGH CHANNEL				EMI5848	
EUT mode:	D-M1			**T (°C):**	20.4
Test Date:	05/04/2018 15:04:20			**H (%):**	57
Test Operator:	MPA			**P (hPa):**	1020
POSITION	**FREQUENCIES**	**RBW**	**VBW**	**DETECTOR**	
N/A	927MHz–928MHz	100kHz	300kHz	Peak	
EUT modification(s): N/A					
Frequency (MHz)	**Polarization**	**Level (dBm)**		**Limit (dBm)**	
927.25	N/A	26.24		30	

7.5. Band-edge compliance of conducted emissions (Transmitter)

Reference standard:	FCC part 15 Radio part 15.247 and RSS-247
Test method:	FCC part 15.247 subclause d) and RSS-247

Test description: d)

In any 100 kHz bandwidth outside the frequency band in which the 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. If the transmitter complies with the conducted power limits based on the use of RMS averaging over a time interval, the attenuation required under this paragraph shall be 30 dB instead of 20 dB.

EUT is connected to the measuring receiver via 50Ω attenuator(s).Only the highest levels are recorded.

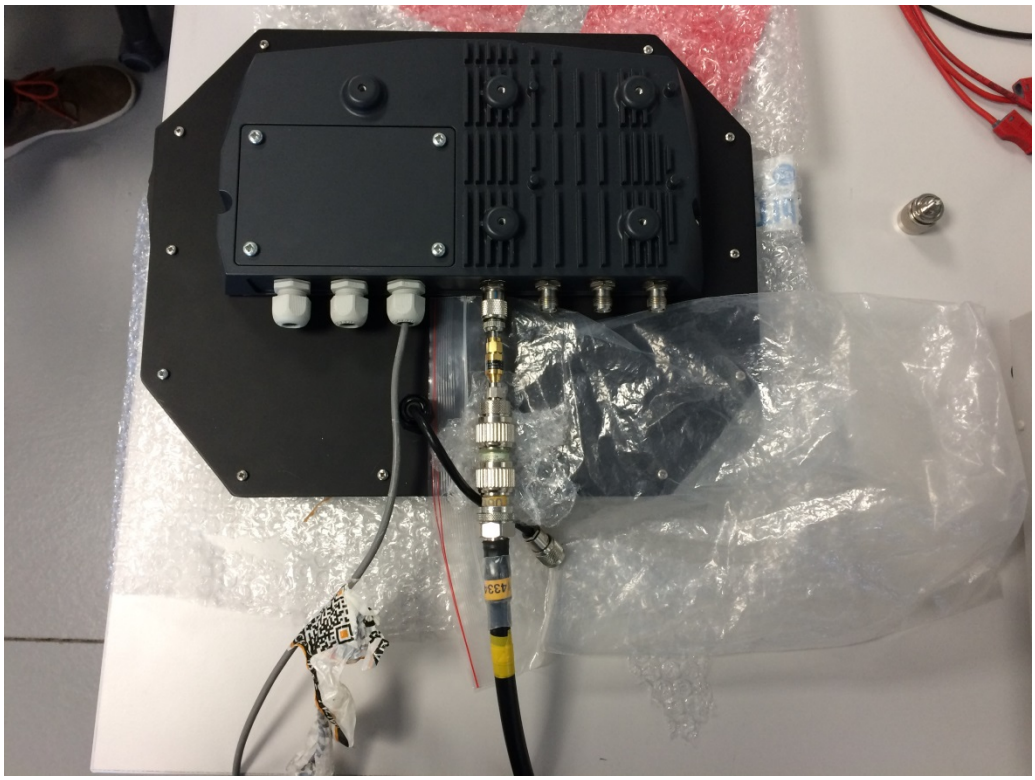
TESTED PARAMETER	PARAMETER	SEVERITY	RESULT TAB.	VERDICT
Band edge	900MHz-930MHz	20dBc	EMI5797	**PASS**

LABORATORY PARAMETERS:	REQUIRED PRIOR TO THE TEST	DURING THE TEST
Ambient Temperature	15 to 35 °C	21.6 °C
Relative Humidity	20 to 75 %	46%
Atmospheric pressure	N/A	1010 hPa
Test method deviation: N/A		
Supplementary information: N/A		

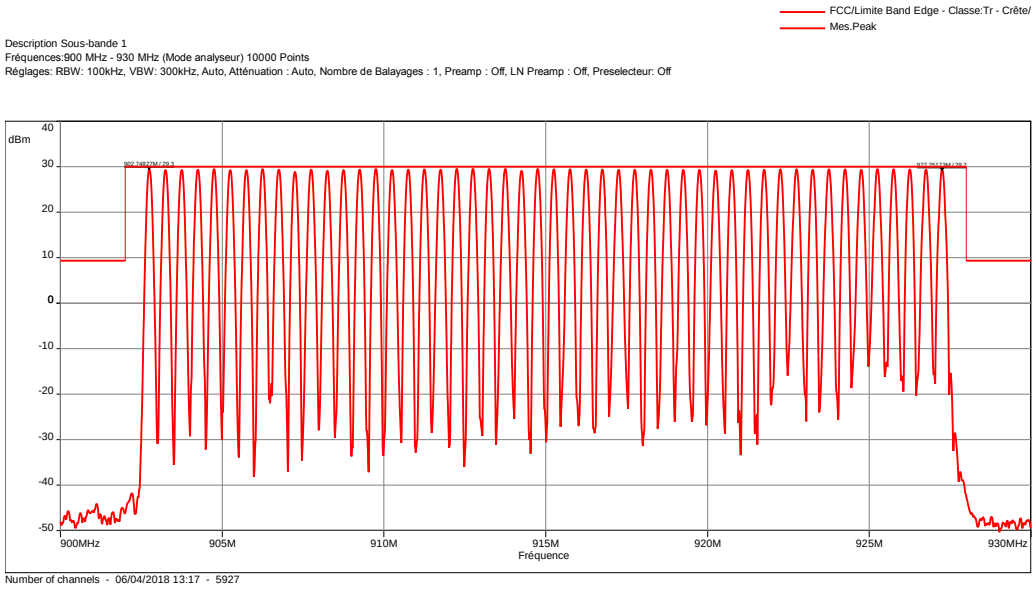
TEST EQUIPMENT USED

CATEGORY	BRAND	TYPE	IDENTIFIER	CAL. DATE	CAL. DUE
Attenuator	Radiall	R412720124	4390	01/02/2018	01/04/2020
Attenuator	Radiall	R412720124	4391	01/02/2018	01/04/2020
Attenuator	Techniwave	TWSMA-10dB-18G-SMA	14670	21/09/2017	21/11/2019
Cable	C&C	N-3m	14333	15/12/2016	15/02/2019
Multimeter	Agilent Technologies	U1252A	6138	24/01/2018	24/03/2020
Power supply	TTi	PL303QMD	8496		
Receiver	Rohde & Schwarz	FSW43	14830	13/11/2017	13/01/2019
Software	Nexio	BAT EMC v3.16.0.64	0000		
Thermohygrometer	Testo	608-H2	12268	27/11/2017	27/01/2020
Thermohygrometer	Bioblock Scientific	Météostar	0963	27/12/2016	27/02/2019

Blank cells = Permanent validity

TEST SETUP PHOTO(S) -


BAND EDGE COMPLINACE - GRAPH		
BAND EDGE		**EMI5797**
EUT mode:	Tx hopping mode	
Test Date:	06/04/2018	
Test Operator:	MPA	



POSITION	FREQUENCIES	RBW	VBW	DETECTOR
RF port	900MHz-930MHz	100kHz	300kHz	Peak max hold
Configuration:	N/A			
Comments:	No Out of Band Emissions			
EUT modification(s): N/A				

7.6. Radiated spurious emissions

Reference standard:	FCC part 15 Radio part 15.247 and RSS-247
Test method:	FCC part 15.109, 15.209, 15.205, 15.215 RSS-247, CNR Gen

General test setup: For f <30MHz, EUT is set on an insulating support at 80cmcm above the ground reference plane.

Preliminary (peak) measurements were performed at an antenna to EUT separation distance of 3-meter in a semi-anechoic chamber. The EUT was rotated 360°in order to maximize radiated levels. Test antenna was oriented in 3 axes (0°, 45° and 90°).

Final measurements (quasi-peak) were then performed in a 10-meter Open Area Test Site that complies to CISPR 16 in the same measurement conditions.

For f > 30MHz, EUT is set on an insulating support at 80cm above the ground reference plane (150cm for f >1GHz).

Preliminary (peak) measurements were performed at an antenna to EUT separation distance of 3-meter. The EUT was rotated 360° about its azimuth with the receive antenna located at various heights in horizontal and vertical polarities.

Final measurements (quasi-peak or average) were then performed in a semi-anechoic chamber or Open Area Test Site that complies to CISPR 16. The EUT was rotated 360° about its azimuth and adjusting the receive antenna height from 1 to 4 m.

All frequencies were investigated, where applicable.

For portable equipements a research of maximum level is done on the 3 axes. Only the highest levels are recorded.

TESTED CONFIGURATION	PARAMETER	SEVERITY	RESULT TAB.	VERDICT
Tx hopping mode / 0°	9kHz-30MHz	15.209	EMI5797	**PASS**
Tx hopping mode / 45°	9kHz-30MHz	15.209	EMI5798	**PASS**
Tx hopping mode / 90°	9kHz-30MHz	15.209	EMI5799	**PASS**
Tx hopping mode / notch 918- 926MHZ	30MHz-1GHz	15.209	EMI5800	**PASS**
Tx hopping mode / notch 902- 918MHZ	30MHz-1GHz	15.209	EMI5801	**PASS**
Tx hopping mode / f>1Ghz / RF port 1	1GHz-10GHz	15.209	EMI5802	**PASS**
Tx hopping mode / f>1Ghz / RF port 2	1GHz-10GHz	15.209	EMI5803	**PASS**
Tx hopping mode / f>1Ghz / RF port 3	1GHz-10GHz	15.209	EMI5804	**PASS**
Tx hopping mode / f>1Ghz / RF port 4	1GHz-10GHz	15.209	EMI5805	**PASS**

LABORATORY PARAMETERS:	REQUIRED PRIOR TO THE TEST	DURING THE TEST
Ambient Temperature	15 to 35 °C	*See Graph(es)*
Relative Humidity	20 to 75 %	*See Graph(es)*
Atmospheric pressure	N/A	*See Graph(es)*

Test method deviation: N/A

Supplementary information: In order to avoid overload on measurement system, frequency band between 30MHz and 1GHz were tested in both time: one for 902-918MHz and one more for 918-926MHz.

From 9 kHz to 30MHz: limit indicated on the curves is calculated with 40 dB/decade extrapolation factor and 51.5 dB conversion factor.

From 30MHz to 1GHz Quasi peak limit provided is the limit given in §15.209.

Above 1GHz average limit in restricted bands §15.205 is 54dBµV/m. Otherwise, the limit is 20dB under carrier emission level at 3m without averaging.

TEST EQUIPMENT USED					
CATEGORY	BRAND	TYPE	IDENTIFIER	CAL. DATE	CAL. DUE
Antenna	ETS-Lindgren	3117	5456	16/03/2016	16/05/2019
Antenna	Electro Metrics	BIA-30HF	0824	25/04/2015	25/06/2018
Antenna	Rohde & Schwarz	HFH2-Z2	5825	20/09/2017	20/11/2019
Antenna	Rohde & Schwarz	HL223	3126	25/04/2015	25/06/2018
Antenna mast	Maturo	NCD	14656		
Cable	TechniWAVE	N-0.23m	14894	23/02/2018	23/04/2020
Cable	TechniWAVE	N-0.23m	14896	23/02/2018	23/04/2020
Cable	STORM MICROWAVE	N-0.2m	10265	05/10/2016	05/12/2018
Cable	Huber Suhner	N-10m	8472	16/02/2017	16/04/2019
Cable	SUCOFLEX	N-3m	14378	18/01/2017	18/03/2019
Cable	SUCOFLEX	N-3m	14379	18/01/2017	18/03/2019
Cable	SUCOFLEX	N-6,5m	14380	18/01/2017	18/03/2019
Filter	Micro-Tronics	HPM 11630	4392	05/10/2016	05/12/2018
Filter	Wainwright Instruments	WTRCTV5-700-1000-20-60	12838	04/04/2016	04/06/2018
Preamplifier	IMPULSE	CA118-546ACN	9169	13/10/2017	13/12/2018
Receiver	Agilent Technologies	E4440A	5824	15/01/2016	15/05/2018
Shielded enclosure	COMTEST	SAC 3m	14494	14/02/2017	14/04/2020
Software	Nexio	BAT EMC v3.16.0.64	0000		
Thermohygrometer	Testo	608-H1	12269	27/12/2016	27/02/2019
Thermohygrometer	Testo	608-H2	12268	27/11/2017	27/01/2020
Thermohygrometer	Bioblock Scientific	Météostar	0963	27/12/2016	27/02/2019
Turntable	Maturo	NCD	14657		

Blank cells = Permanent validity

RADIATED SPURIOUS EMISSIONS - TABULATED RESULTS				
TX MODE / QUASI PEAK DETECTION				
Frequency (MHz)	**Configuration / Polarization**	**Quasi peak Level (dBµV/m)**	**Quasi peak Limit (dBµV/m)**	**Margin (dB)**
38.4	All ports / V	31.21	40	-8.79
38.4	All ports / V	31.18	40	-8.82

RADIATED SPURIOUS EMISSIONS - TABULATED RESULTS				
TX MODE / PEAK DETECTION				
Frequency (MHz)	**Configuration / Polarization**	**Peak Level (dBµV/m)**	**Peak Limit (dBµV/m)**	**Margin (dB)**
1851.7	RF port 1 / H	68	111.03	-43.03
4610.5	RF port 1 / H	53.20	74	-20.80
7378.4	RF port 1 / H	50.60	74	-23.40
1852.8	RF port 1 / V	65	111.03	-46.03
4610.5	RF port 1 / V	54.20	74	-19.80
5428.5	RF port 1 / V	52.20	74	-21.80
7378.4	RF port 1 / V	50.50	74	-23.50
1847.2	RF port 2 / H	67.40	111.03	-43.63

RADIATED SPURIOUS EMISSIONS - TABULATED RESULTS				
TX MODE / PEAK DETECTION				
Frequency (MHz)	**Configuration / Polarization**	**Peak Level (dBµV/m)**	**Peak Limit (dBµV/m)**	**Margin (dB)**
4616.2	RF port 2 / H	54.30	74	-19.70
5556.8	RF port 2 / H	45.70	74	-28.30
7402	RF port 2 / H	52.1	74	-21.90
1849.9	RF port 2 / V	67	111.03	-44.03
4608.3	RF port 2 / V	58.10	74	-15.90
5419.5	RF port 2 / V	48.80	74	-25.20
7406.5	RF port 2 / V	53	74	-21.00
1851.7	RF port 3 / H	67.60	111.03	-43.43
4618.4	RF port 3 / H	58.80	74	-15.20
7406.5	RF port 3 / H	49.7	74	-24.30
1847.2	RF port 3 / V	67	111.03	-44.03
4636.4	RF port 3 / V	55.60	74	-18.40
5431.9	RF port 3 / V	49.40	74	-24.60
6473.8	RF port 3 / V	46.8	111.03	-64.23
7397.5	RF port 3 / V	53.10	74	-20.90
1853.9	RF port 4 / H	66.30	111.03	-44.73
4606	RF port 4 / H	56.90	74	-17.10
6480.5	RF port 4 / H	47.20	111.03	-63.83
7417.8	RF port 4 / H	49.70	74	-24.30
1831.4	RF port 4 / V	63.6	111.03	-47.43
4603.8	RF port 4 / V	56.70	74	-17.30
5419.5	RF port 4 / V	50.10	74	-23.90
6483.9	RF port 4 / V	48.30	111.03	-62.73
7381.7	RF port 4 / V	50	74	-24.00

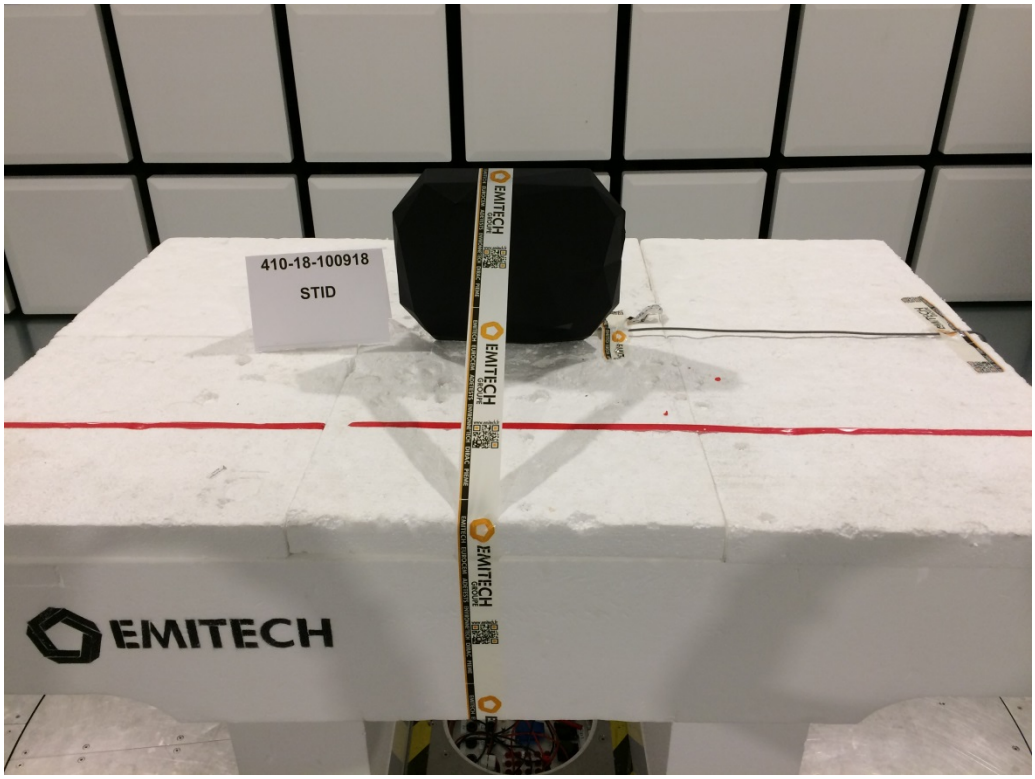
RADIATED SPURIOUS EMISSIONS - TABULATED RESULTS				
TX MODE / AVERAGE DETECTION				
Frequency (MHz)	**Configuration / Polarization**	**Average Level (dBµV/m)**	**Average Limit (dBµV/m)**	**Margin (dB)**
1851.7	RF port 1 / H	53.52	54	-0.48
4610.5	RF port 1 / H	44.7	54	-9.3
7378.4	RF port 1 / H	41.16	54	-12.84
1852.8	RF port 1 / V	50.52	54	-3.48
4610.5	RF port 1 / V	45.7	54	-8.3
5428.5	RF port 1 / V	42.27	54	-11.73
7378.4	RF port 1 / V	41.06	54	-12.94
1847.2	RF port 2 / H	52.92	54	-1.08
4616.2	RF port 2 / H	45.8	54	-8.2
5556.8	RF port 2 / H	37.77	54	-16.23
7402	RF port 2 / H	42.96	54	-11.04
1849.9	RF port 2 / V	52.52	54	-1.48
4608.3	RF port 2 / V	50.77	54	-3.23
5419.5	RF port 2 / V	40.87	54	-13.13
7406.5	RF port 2 / V	43.56	54	-10.44
1851.7	RF port 3 / H	53.12	54	-0.88
4618.4	RF port 3 / H	50.3	54	-3.7

RADIATED SPURIOUS EMISSIONS - TABULATED RESULTS				
TX MODE / AVERAGE DETECTION				
Frequency (MHz)	**Configuration / Polarization**	**Average Level (dBµV/m)**	**Average Limit (dBµV/m)**	**Margin (dB)**
7406.5	RF port 3 / H	40.26	54	-13.74
1847.2	RF port 3 / V	52.52	54	-1.48
4636.4	RF port 3 / V	47.1	54	-6.9
5431.9	RF port 3 / V	41.47	54	-12.53
6473.8	RF port 3 / V	38.87	54	-15.13
7397.5	RF port 3 / V	43.66	54	-10.44
1853.9	RF port 4 / H	51.82	54	-2.18
4606	RF port 4 / H	48.4	54	-5.6
6480.5	RF port 4 / H	39.27	54	-14.73
7417.8	RF port 4 / H	40.26	54	-13.74
1831.4	RF port 4 / V	49.12	54	-4.88
4603.8	RF port 4 / V	48.2	54	-5.8
5419.5	RF port 4 / V	42.17	54	-11.83
6483.9	RF port 4 / V	40.37	54	-13.63
7381.7	RF port 4 / V	40.56	54	-13.44

V= Vertical H=Horizontal

Spurious which has more than 20 dB of margin compared to the applicable limit is not necessarily reported

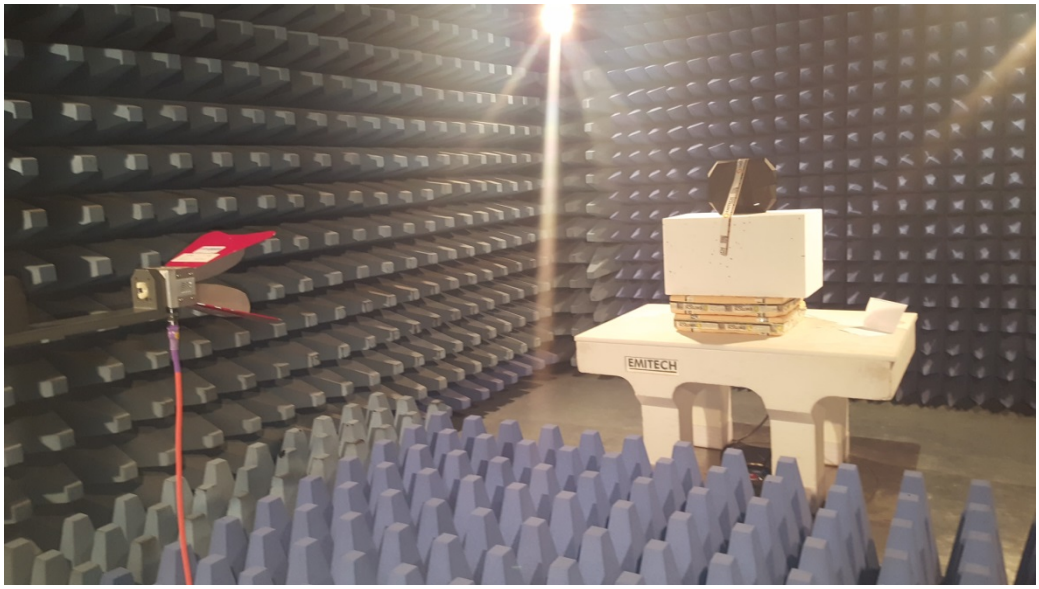
TEST SETUP PHOTO(S) -



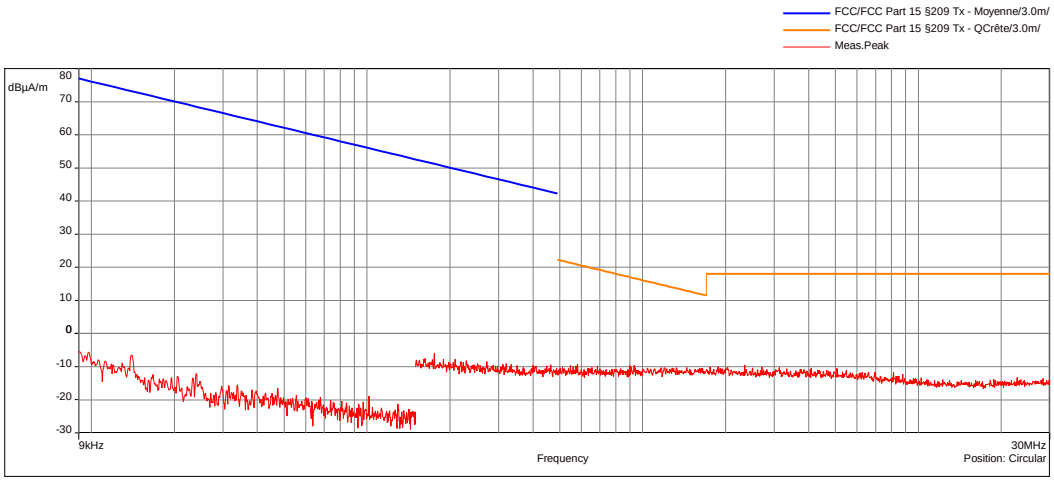
TEST SETUP PHOTO(S) - F<30MHZ

TEST SETUP PHOTO(S) – 30MHZ<F<200MHZ

TEST SETUP PHOTO(S) – 200MHZ<F<1GHZ

TEST SETUP PHOTO(S) - F>1GHZ


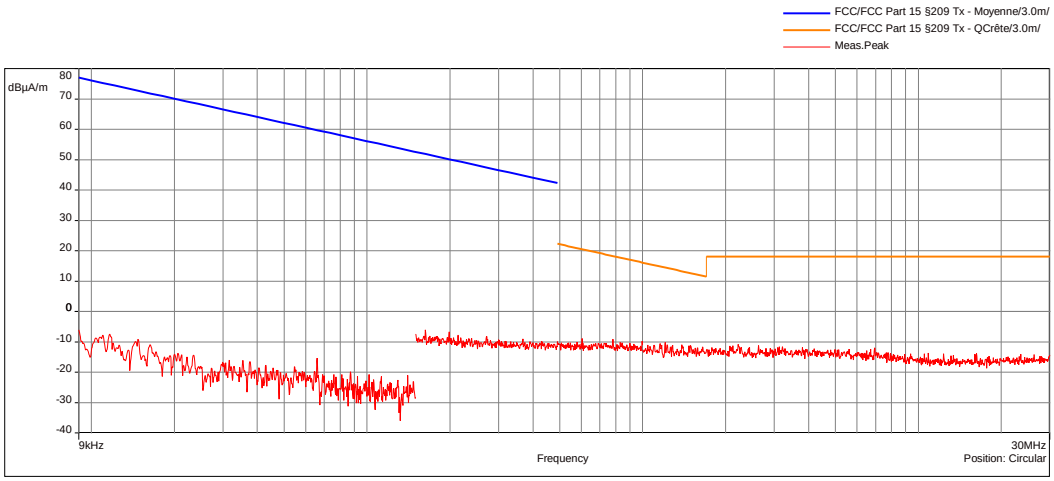
RADIATED FIELD STRENGTH <30MHZ - GRAPH			
0°		EMI5797	
EUT mode:	ALL MODES	**T (°C):**	19.7
Test Date:	05/04/2018	**H (%):**	41.6
Test Operator:	MPA	**P (hPa):**	1009



POSITION	FREQUENCIES	RBW	VBW	DETECTOR
Circular	9kHz-150kHz	1kHz	3kHz	Peak
Circular	150kHz-1MHz	10kHz	30kHz	Peak
Circular	1MHz-30MHz	10kHz	30kHz	Peak
Configuration:	Measurements maximized at 360 ° in peak maxhold mode.			
Comments:	N/A			

EUT modification(s): N/A

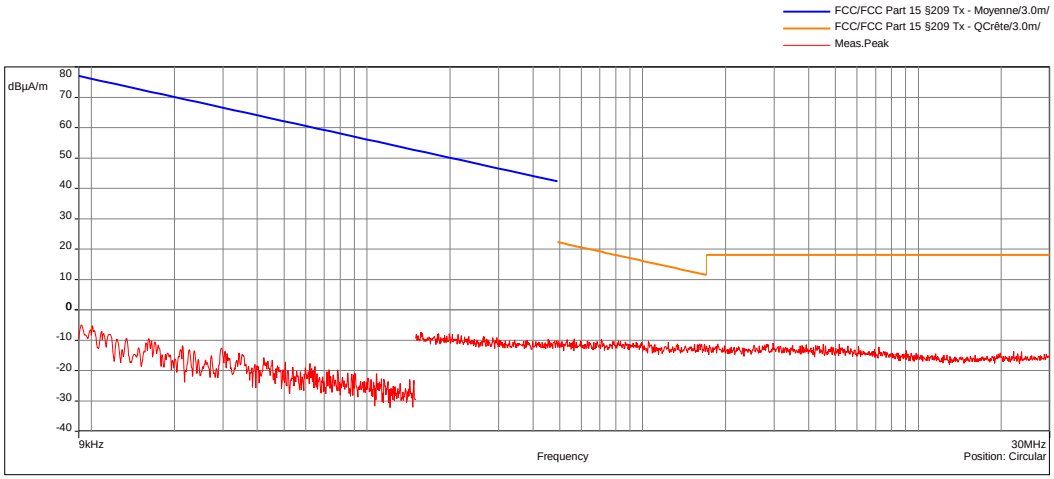
RADIATED FIELD STRENGTH <30MHZ - GRAPH			
45°		EMI5798	
EUT mode:	ALL MODES	**T (°C):**	19.7
Test Date:	05/04/2018	**H (%):**	41.6
Test Operator:	MPA	**P (hPa):**	1009



POSITION	FREQUENCIES	RBW	VBW	DETECTOR
Circular	9kHz-150kHz	1kHz	3kHz	Peak
Circular	150kHz-1MHz	10kHz	30kHz	Peak
Circular	1MHz-30MHz	10kHz	30kHz	Peak
Configuration:	Measurements maximized at 360 ° in peak maxhold mode.			
Comments:	N/A			

EUT modification(s): N/A

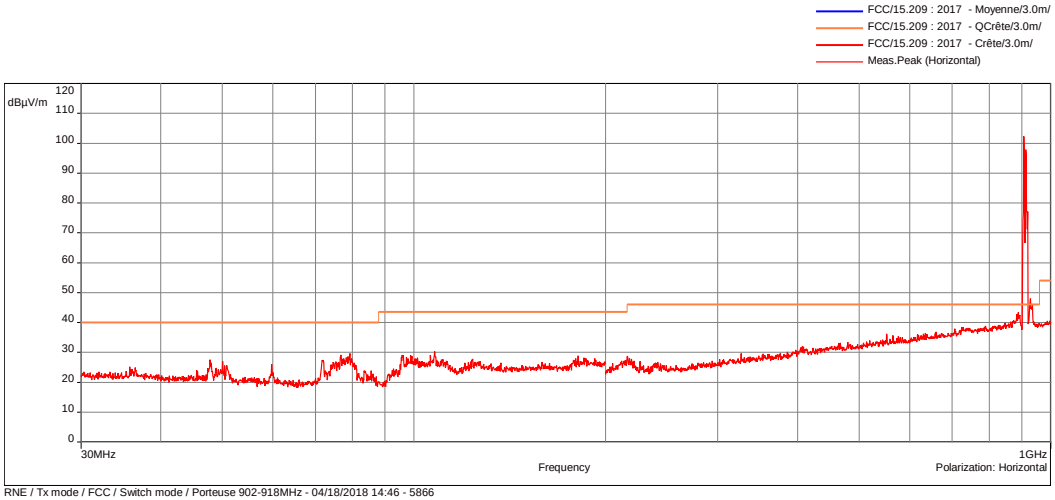
RADIATED FIELD STRENGTH <30MHZ - GRAPH			
90°		EMI5799	
EUT mode:	ALL MODES	**T (°C):**	19.7
Test Date:	05/04/2018	**H (%):**	41.6
Test Operator:	MPA	**P (hPa):**	1009



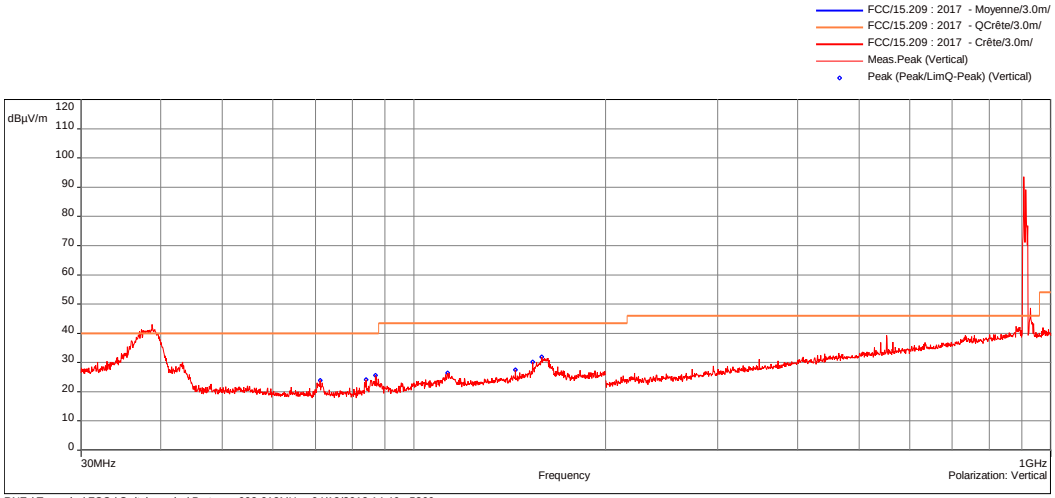
POSITION	FREQUENCIES	RBW	VBW	DETECTOR
Circular	9kHz-150kHz	1kHz	3kHz	Peak
Circular	150kHz-1MHz	10kHz	30kHz	Peak
Circular	1MHz-30MHz	10kHz	30kHz	Peak
Configuration:	Measurements maximized at 360 ° in peak maxhold mode.			
Comments:	N/A			
EUT modification(s): N/A				

All unwanted radiated spurious (<30MHz) are at least 20 dB below specified limits.

RADIATED SPURIOUS EMISSIONS (TRANSMITTER) - GRAPH			
NOTCH 902-918 MHz		EMI5800	
EUT mode:	Tx hopping mode	**T (°C):**	20.4
Test Date:	05/04/2018 15:38:09	**H (%):**	57
Test Operator:	MPA	**P (hPa):**	1016



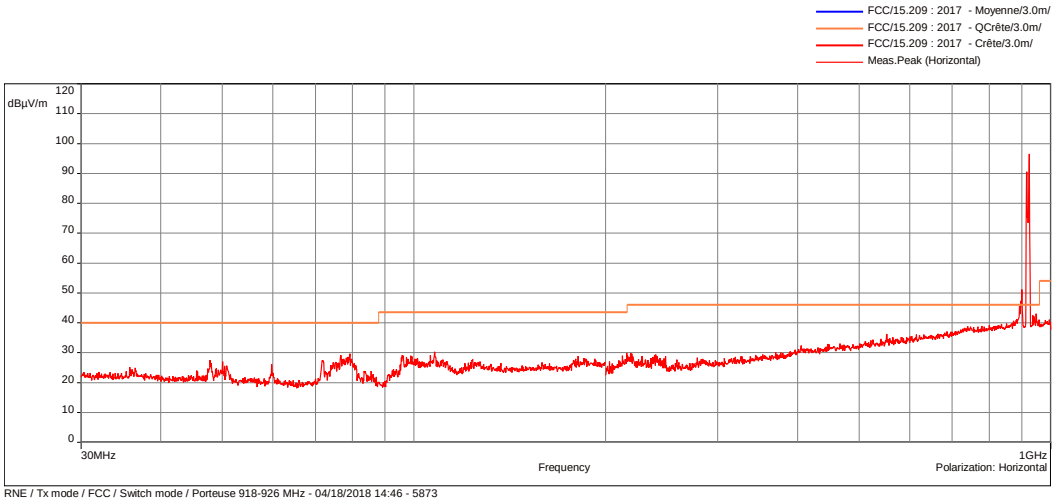
RNE / Tx mode / FCC / Switch mode / Porteuse 902-918MHz - 04/18/2018 14:46 - 5866



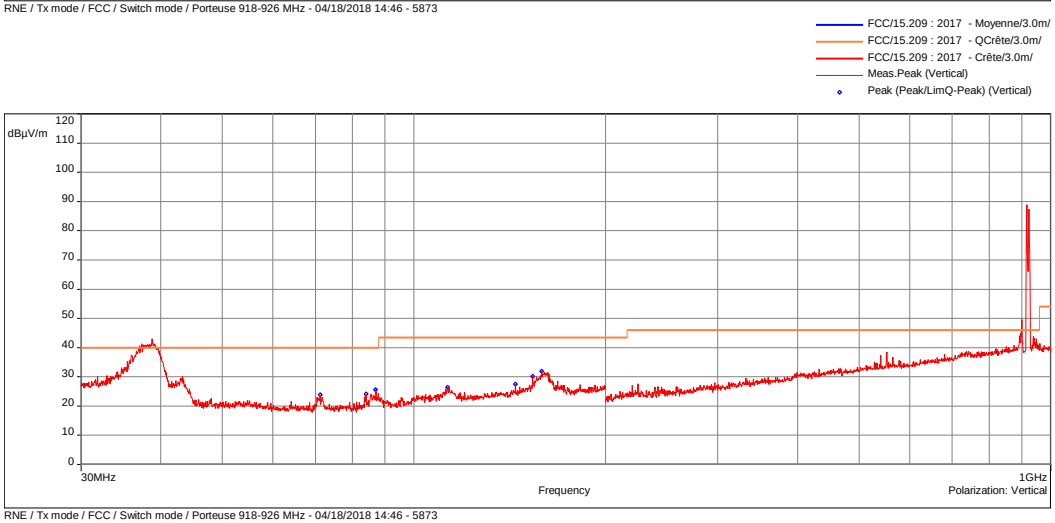
RNE / Tx mode / FCC / Switch mode / Porteuse 902-918MHz - 04/18/2018 14:46 - 5866

POSITION	FREQUENCIES	RBW	VBW	DETECTOR
Vertical	25MHz-200MHz	100kHz	300kHz	Peak
Horizontal	25MHz-200MHz	100kHz	300kHz	Peak
Vertical	200MHz-1GHz	100kHz	300kHz	Peak
Horizontal	200MHz-1GHz	100kHz	300kHz	Peak
Configuration:	N/A			
Comments:	902 MHz to 918 MHz : Util frequency			
EUT modification(s): N/A				

RADIATED SPURIOUS EMISSIONS (TRANSMITTER) - GRAPH			
NOTCH 918- 926MHz		EMI5801	
EUT mode:	Tx hopping mode	**T (°C):**	20.4
Test Date:	05/04/2018 16:00:01	**H (%):**	57
Test Operator:	MPA	**P (hPa):**	1016



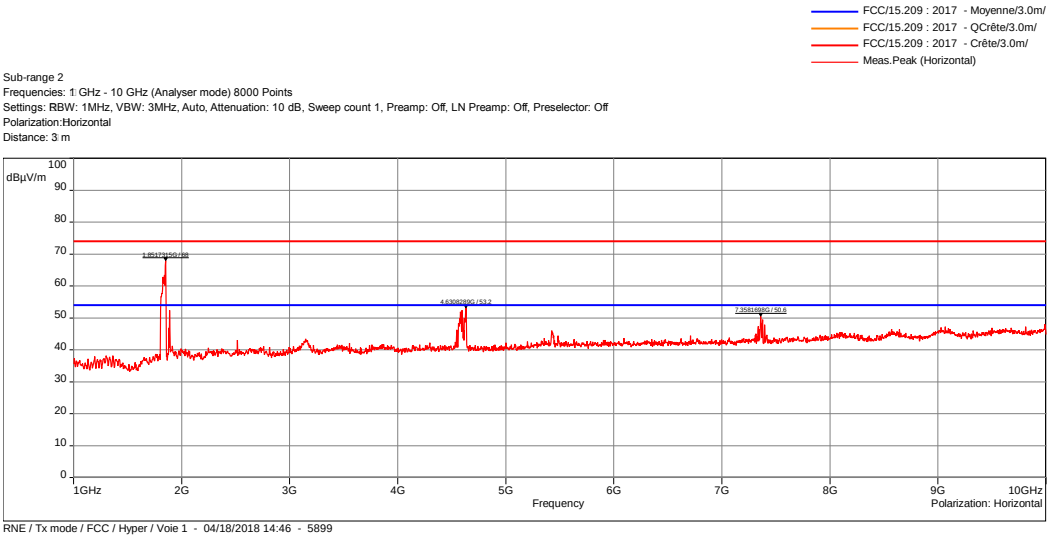
RNE / Tx mode / FCC / Switch mode / Porteuse 918-926 MHz - 04/18/2018 14:46 - 5873

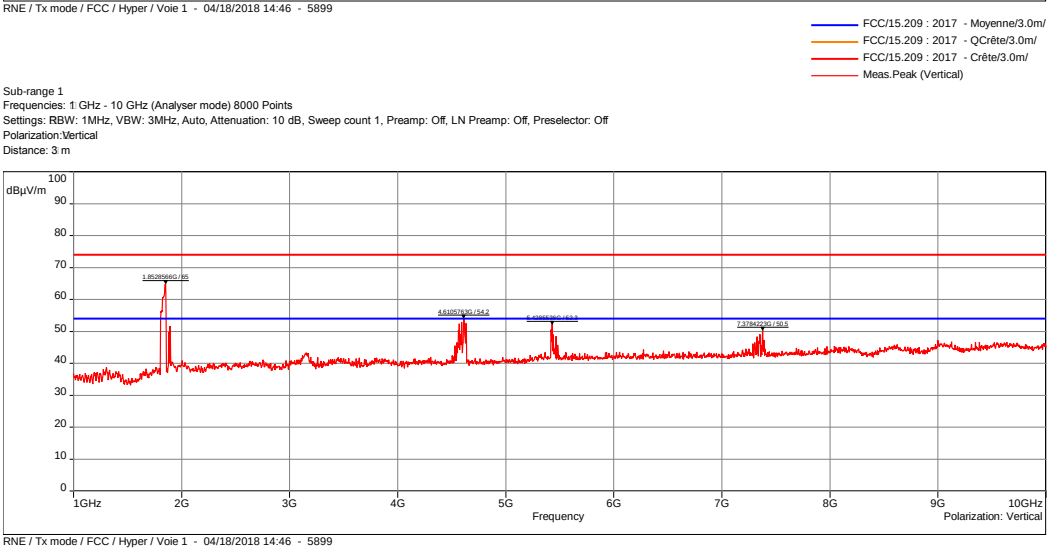


RNE / Tx mode / FCC / Switch mode / Porteuse 918-926 MHz - 04/18/2018 14:46 - 5873

POSITION	FREQUENCIES	RBW	VBW	DETECTOR
Vertical	25MHz-200MHz	100kHz	300kHz	Peak
Horizontal	25MHz-200MHz	100kHz	300kHz	Peak
Vertical	200MHz-1GHz	100kHz	300kHz	Peak
Horizontal	200MHz-1GHz	100kHz	300kHz	Peak
Configuration:	N/A			
Comments:	918 MHz to 926 MHz : Util frequency			
EUT modification(s): N/A				

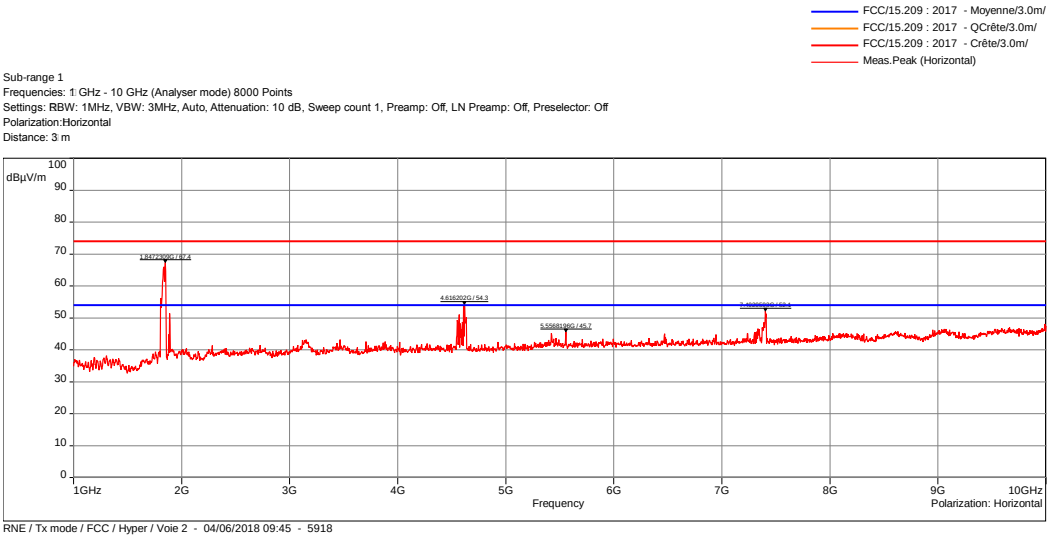
RADIATED SPURIOUS EMISSIONS (TRANSMITTER) - GRAPH			
RF PORT 1		**EMI5802**	
EUT mode:	Tx hopping mode	**T (°C):**	21.6
Test Date:	06/04/2018 09:39:53	**H (%):**	46
Test Operator:	MPA	**P (hPa):**	1010

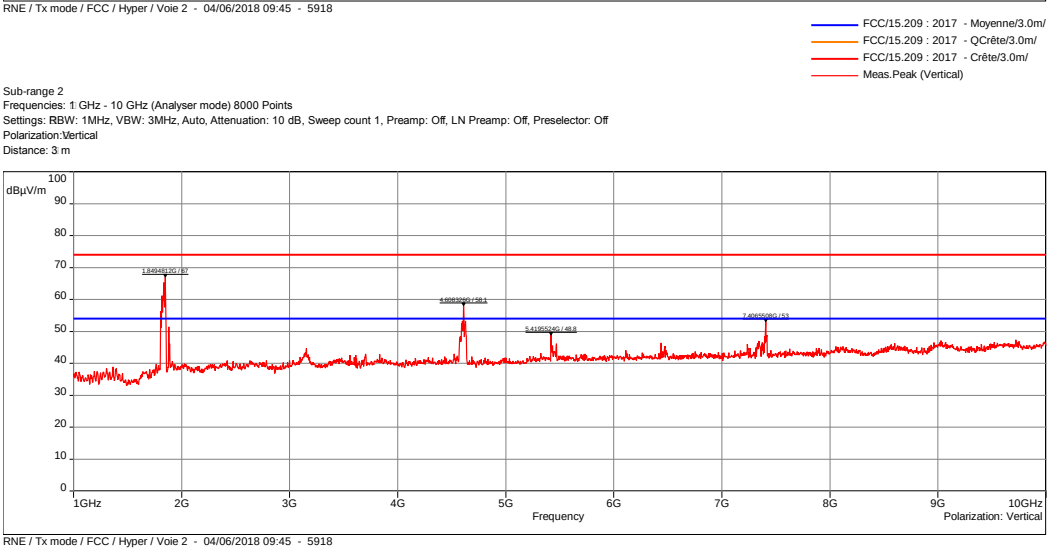




POSITION	FREQUENCIES	RBW	VBW	DETECTOR
Vertical	1GHz-10GHz	1MHz	3MHz	Peak
Horizontal	1GHz-10GHz	1MHz	3MHz	Peak
Configuration:	N/A			
Comments:	N/A			
EUT modification(s): N/A				

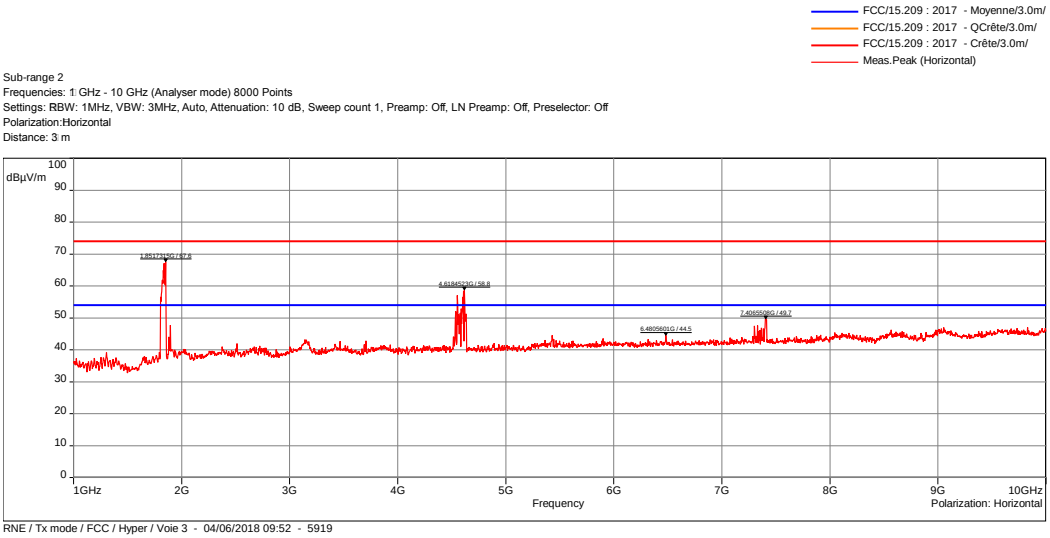
RADIATED SPURIOUS EMISSIONS (TRANSMITTER) - GRAPH			
RF PORT 2		**EMI5803**	
EUT mode:	Tx hopping mode	**T (°C):**	21.6
Test Date:	06/04/2018 09:45:39	**H (%):**	46
Test Operator:	MPA	**P (hPa):**	1010

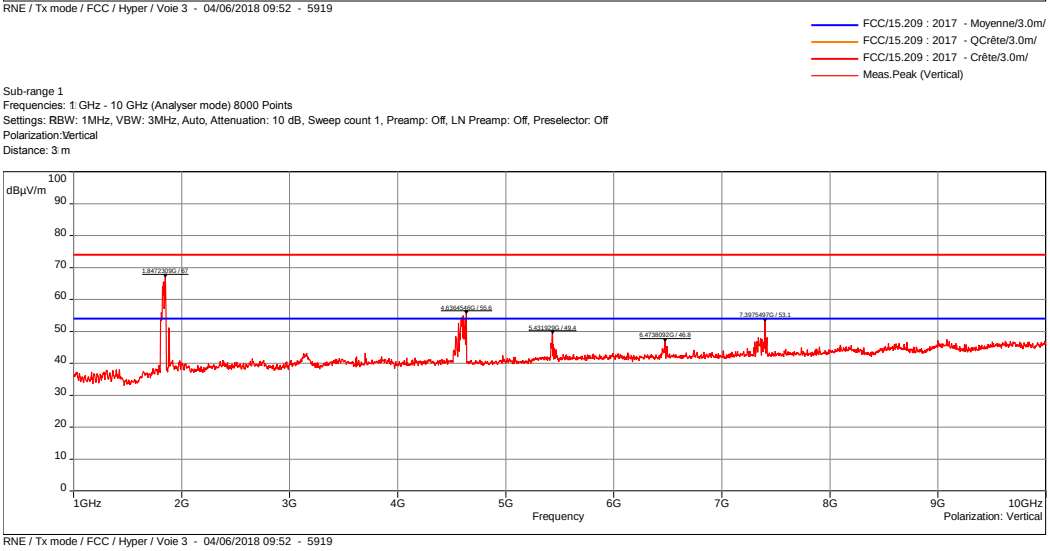




POSITION	FREQUENCIES	RBW	VBW	DETECTOR
Vertical	1GHz-10GHz	1MHz	3MHz	Peak
Horizontal	1GHz-10GHz	1MHz	3MHz	Peak
Configuration:	N/A			
Comments:	N/A			
EUT modification(s): N/A				

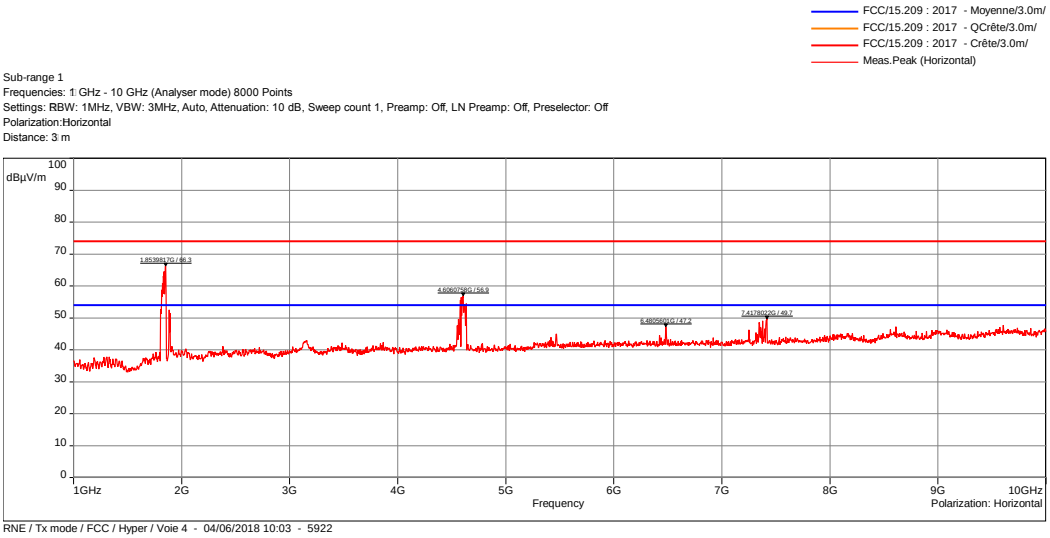
RADIATED SPURIOUS EMISSIONS (TRANSMITTER) - GRAPH			
RF PORT 3		**EMI5804**	
EUT mode:	Tx hopping mode	**T (°C):**	21.6
Test Date:	06/04/2018 09:52:41	**H (%):**	46
Test Operator:	MPA	**P (hPa):**	1010

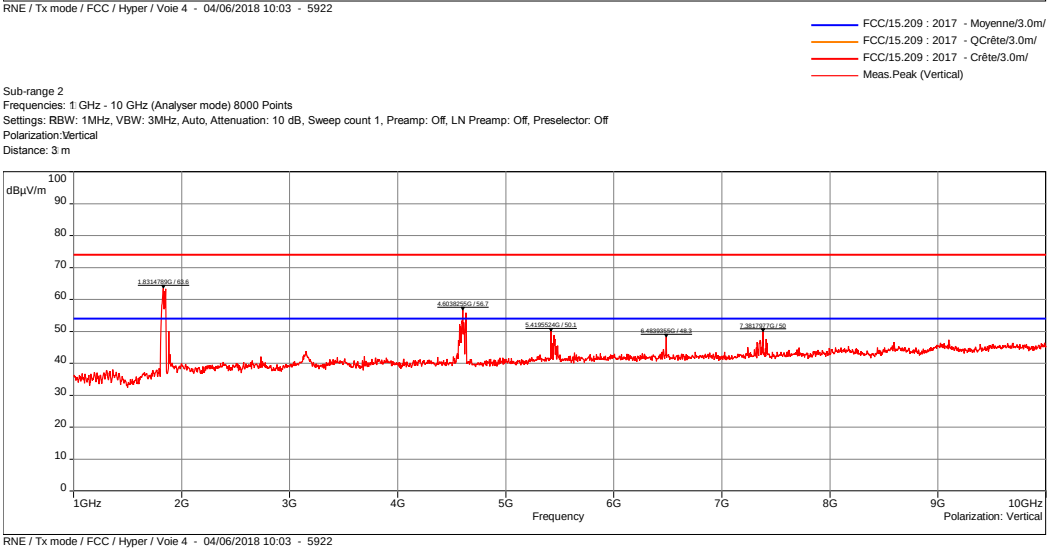




POSITION	FREQUENCIES	RBW	VBW	DETECTOR
Vertical	1GHz-10GHz	1MHz	3MHz	Peak
Horizontal	1GHz-10GHz	1MHz	3MHz	Peak
Configuration:	N/A			
Comments:	N/A			
EUT modification(s): N/A				

RADIATED SPURIOUS EMISSIONS (TRANSMITTER) - GRAPH			
RF PORT 4		**EMI5805**	
EUT mode:	Tx hopping mode	**T (°C):**	21.6
Test Date:	06/04/2018 10:03:36	**H (%):**	46
Test Operator:	MPA	**P (hPa):**	1010





POSITION	FREQUENCIES	RBW	VBW	DETECTOR
Vertical	1GHz-10GHz	1MHz	3MHz	Peak
Horizontal	1GHz-10GHz	1MHz	3MHz	Peak
Configuration:	N/A			
Comments:	N/A			
EUT modification(s): N/A				

7.7. Measurement of Frequency Stability §15.215 (C) And RSS-GEN

Reference standard:	FCC part 15 Radio part 15.215 c)
Test method:	FCC part 15 Radio part 15.215 c) and RSS Gen
General test setup: The requirement to contain the designated bandwidth of the emission within the specified frequency band includes the effects from frequency sweeping, frequency hopping and other modulation techniques that may be employed as well as the frequency stability of the transmitter over expected variations in temperature and supply voltage. If frequency stability is not specified in the regulations, it is recommended that the fundamental emission be kept within at least the central 80% of the permitted band in order to minimize the possibility of out-of-band operation. EUT is set inside the climatic enclosure. EUT is connected to the measuring receiver via 50Ω attenuator(s).	

TESTED	FREQUENCY	SEVERITY	RESULT TAB.	VERDICT
Measurement of frequency stability	902.75 MHz	-	-	**PASS**
	915 MHz	-	-	**PASS**
	927.25 MHz	-	-	**PASS**

LABORATORY PARAMETERS:	REQUIRED PRIOR TO THE TEST	DURING THE TEST
Ambient Temperature	15 to 35 °C	20.1 °C
Relative Humidity	20 to 75 %	42.5%
Atmospheric pressure	N/A	1015 hPa
Test method deviation: N/A		
Supplementary information: N/A		

TEST EQUIPMENT USED

CATEGORY	BRAND	TYPE	IDENTIFIER	CAL. DATE	CAL. DUE
Attenuator	Radiall	R412720124	4390	01/02/2018	01/04/2020
Attenuator	Radiall	R412720124	4391	01/02/2018	01/04/2020
Attenuator	Techniwave	TWSMA-10dB-18G-SMA	14670	21/09/2017	21/11/2019
Cable	C&C	N-3m	14333	15/12/2016	15/02/2019
Multimeter	Agilent Technologies	U1252A	6138	24/01/2018	24/03/2020
Power supply	TTi	PL303QMD	8496		
Receiver	Rohde & Schwarz	FSW43	14830	13/11/2017	13/01/2019
Software	Nexio	BAT EMC v3.16.0.64	0000		
Thermometer contactless	GHM Greisinger	GMH 3710	12968	31/10/2017	31/12/2018
Thermohygrometer	Testo	608-H2	12268	27/11/2017	27/01/2020
Thermohygrometer	Bioblock Scientific	Météostar	0963	27/12/2016	27/02/2019

Blank cells = Permanent validity

TEST SETUP PHOTO(S) -

Measurement of frequency stability – 902.75 MHz				
Conditions	**Temperature (°C)**	**Power supply (Vdc)**	**Frequency (MHz)**	**Frequency Error (kHz)**
Normal conditions	25	12	902.750505	0
		10.8	902.7504978	-0.00724
		13.2	902.7505081	0.00302
Extremes test conditions	-20	12	902.7503417	-0.1633
		10.8	902.750339	-0.16606
		13.2	902.750339	-0.16606
	55	12	902.7504802	-0.02489
		10.8	902.7504875	-0.01754
		13.2	902.7504857	-0.01938

Measurement of frequency stability – 915 MHz				
Conditions	**Temperature (°C)**	**Power supply (Vdc)**	**Frequency (MHz)**	**Frequency Error (kHz)**
Normal conditions	25	12	915.0005081	0
		10.8	915.0005099	0.00181
		13.2	915.0004943	-0.01377
Extremes test conditions	-20	12	915.0003498	-0.15826
		10.8	915.0003525	-0.15551
		13.2	915.000347	-0.16101
	55	12	915.0004875	-0.02055
		10.8	915.0004893	-0.01872
		13.2	915.0004912	-0.01688

Measurement of frequency stability – 927.25 MHz				
Conditions	**Temperature (°C)**	**Power supply (Vdc)**	**Frequency (MHz)**	**Frequency Error (kHz)**
Normal conditions	25	12	927.2504936	0
		10.8	927.2505087	0.01509
		13.2	927.2505105	0.0169
Extremes test conditions	-20	12	927.2503627	-0.13097
		10.8	927.2503663	-0.1273
		13.2	927.2503691	-0.12455
	55	12	927.2504893	-0.00428
		10.8	927.2504967	0.00306
		13.2	927.2504994	0.00582

End of test report