



Test report issued under the responsibility of:
EMITECH MONTPELLIER laboratory
MRA US-EU Designation Number: FR0006
IC Assigned Code: FR0003

RADIO TEST REPORT

RSS-210
FCC part 15.225

Company: **STMICROELECTRONICS SAS**
Address.....: 190 AVENUE CELESTIN COQ
13106 ROUSSET
FRANCE

Test item description: **NFC card reader evaluation board based on ST25R3916 integrated circuit**
Trade Mark: STMICROELECTRONICS SAS
Manufacturer: STMICROELECTRONICS (ROUSSET) SAS
Model/Type reference.....: X-NUCLEO-NFC06A1
FCC ID.....: YCPNFC06A1
IC: 8976A-NFC06A1
Ratings.....: 5Vdc +/-5%

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

Report Reference No: **R412-18-106619-5A**
Test procedure: FCC IC Certification
Diffusion.....: Mr ROMAN
Applicant's name: STMICROELECTRONICS SAS
Date of issue.....: 25/10/2019
Total number of pages.....: 57
Revision.....: 0
Modified page(s).....: Creation
Compiled by.....: Morgan PATEY
Approved by (+ signature).....: David MONTAULON (Technical Manager)

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.



REPORT INDEX:

1. GENERAL INFORMATIONS	3
2. REFERENCE DOCUMENT(S).....	4
3. EQUIPMENT TECHNICAL DESCRIPTION	5
3.1. TEST CONDITIONS	5
3.2. EUT GENERAL VIEW.....	6
3.3. EUT MECHANICAL AND ELECTRICAL DESIGN.....	7
3.4. EUT INPUT/OUTPUT PORTS.....	7
3.5. EUT RADIO SPECIFICATIONS.....	8
4. RESULT SUMMARY	9
5. MEASUREMENT UNCERTAINTY	11
6. TEST CONDITIONS AND RESULTS	12
6.1. CONDUCTED VOLTAGE EMISSION (MEASUREMENT).....	12
6.2. OCCUPIED BANDWIDTH	15
6.3. RADIATED SPURIOUS EMISSIONS.....	17
6.4. FIELD STRENGTH IN THE BAND 13.553-13.567MHZ.....	52
6.5. FIELD STRENGTH OUTSIDE THE BAND 13.110-14.010MHZ.....	54
6.6. MEASUREMENT OF FREQUENCY STABILITY.....	56

1. GENERAL INFORMATIONS

This document submits the results of Radio tests performed on the equipment **NFC card reader evaluation board based on ST25R3916 integrated circuit** (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 & Open Area Test Site in SALINELLES (30)		
Address.....	145 rue de Massacan 34740 VENDARGUES FRANCE		
Test procedure.	FCC IC Certification		
Tested by	Morgan PATEY		
Test supervisor	David MONTAULON		
Date of receipt of test item.....	N/A		
Date (s) of performance of tests.....	Between April, 10 th and June 3 th of 2019		
APPLICANT'S GENERAL INFORMATIONS:			
Company name	STMICROELECTRONICS SAS		
Company address.	190 Avenue Celestin Coq 13106 Rousset FRANCE		
Person(s) present during the tests.	M. ROMAN		
Responsible.....	M. ROMAN		
GENERAL REMARKS:			
<p>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.</p> <p>This report shall not be reproduced, except in full, without the written approval of the Issuing testing laboratory. Throughout this report the decimal separator is point.</p>			
POSSIBLE TEST CASE VERDICTS:			
Test case does not apply to the test object..	N/A		
Information not communicated.	N/C		
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
SRD	Short Range Device	GPS	Global Positioning System

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 15.225

Operation within the bands 13.553-13.567MHz

RSS-210, Issue 9, August 2016, Amendment November 2017

Licence-Exempt Radio Apparatus: Category I Equipment

RSS/CNR-Gen, Issue 5, March 2019, Amendment 1

General Requirements for Compliance of Radio Apparatus

ANSI C 63.10:2013

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. : NFC card reader evaluation board based on ST25R3916 integrated circuit

Model/Type reference..... : X-NUCLEO-NFC06A1

Trade Mark. : STMICROELECTRONICS SAS

FCC ID..... : YCPNFC06A1

IC. : 8976A-NFC06A1

Serial number (S/N)..... : Not communicated

Part number (P/N). : Not communicated

Software version..... : N/A

Firmware version. : N/A

Type of sample. : Prototype

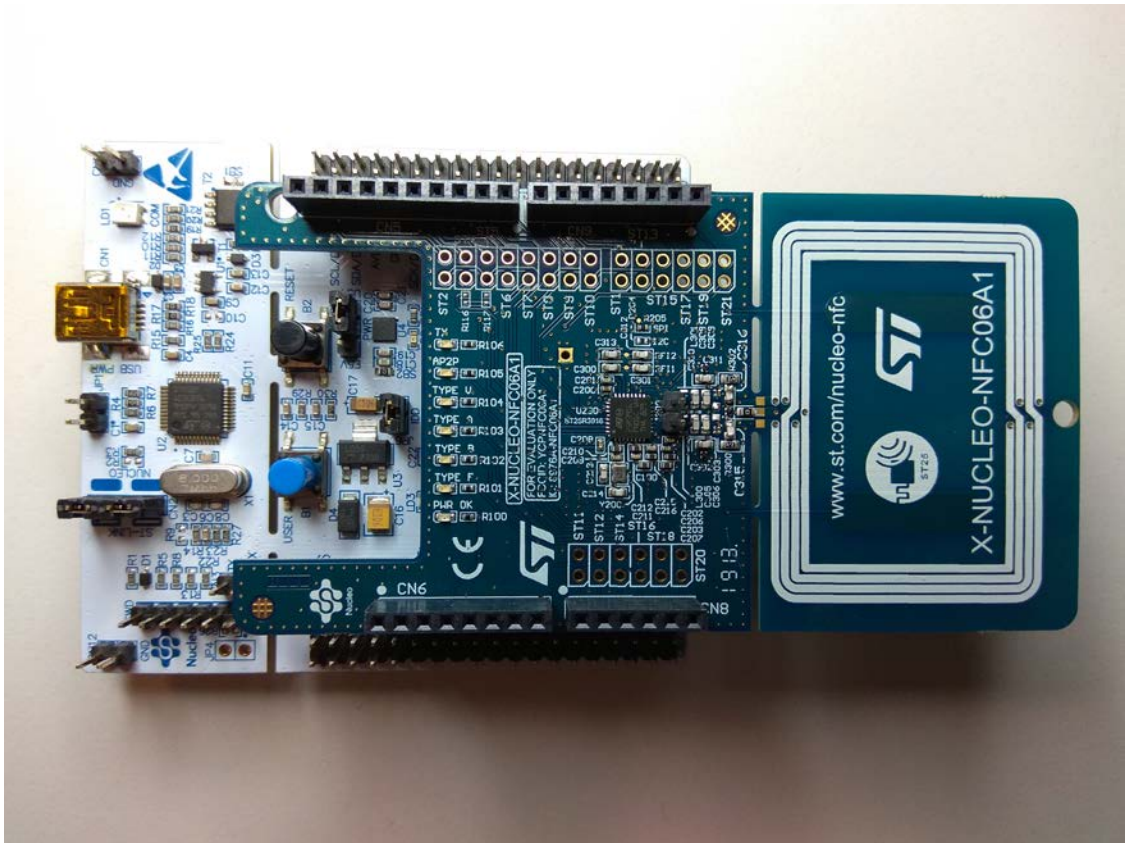
Function(s)..... : The X-NUCLEO-NFC06A1 is a ready-to-use development kit to evaluate the features and functionality in reader/writer and card emulation modes of the high-performance NFC universal device ST25R3916 for contactless applications.
 The ST25R3916 is a card reader IC for contact-less applications that provides the 13.56MHz air interface and that communicates with the host through dedicated interface.
 This expansion board has to be plugged into the Arduino R3 connector of STM32 Nucleo board.

Manufacturer name. : STMICROELECTRONICS SAS

Address..... : 190 Avenue Celestin Coq
 13106 Rousset
 FRANCE

General product information:
 N/A

3.2. EUT general view



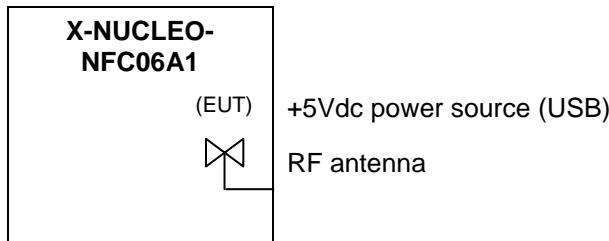
3.3. EUT Mechanical and Electrical Design

Power supply..... : 5Vdc
 Power supply range..... : 5Vdc +/-5%
 Power type..... : USB
 Power (W)..... : 0.8
 Nominal current (A). : 0.1
 Dimensions (L x W x H) (m). : 0.105 x 0.056 x 0.01
 Weight (kg). : 0.05
 Temperature range (°C). : 0 to 35
 Ground bounding strap..... : No

Comments:

N/A

3.4. EUT Input/Output ports



PORT	NAME	TYPE	LENGHT	CABLE TYPE	COMMENTS
0	Main frame	N/E	N/A	PCB	N/A
1	DC power source	DC	N/C	USB	5Vdc
2	RF antenna	RF	N/A	N/A	13.56 MHz

AC/DC : AC/DC Converter port AC..... : Alternative current port DC: Discontinuous current port
 I/O.....: Input or Output port TP: Telecommunication port RF.....: Radio frequency port
 N/E: Non Electrical port

3.5. EUT Radio Specifications

a) GENERAL INFORMATIONS	
According to manufacturer's declarations :	
EUT type.....	: Transceiver
Technology	: RFID
Environmental profile.....	: Data transmissions
Temperature range.....	: 0 to +35
Antenna type	: Integral
Antenna Gain.....	: N/A
Comments:	
N/A	
b) TRANSMITTER PARAMITERS (Tx)	
Frequency bands.....	: 13.553 MHz to 13.567 MHz
RF Power.....	: <1 W
Number of channels / Separation.....	: 1
Modulation type	: NFC-A / ISO14443A, NFC-B / ISO14443B, NFC-F / Felica™, NFC-V / ISO15693 up to 53 kb/s NFC-A / ISO14443A and NFC-F / FeliCa™ card emulation A test mode allow to test all modulations at the same time.
Duty cycle	: Not communicated
Tested frequency.....	: 13.56 MHz
c) RECEIVER PARAMETERS (Rx)	
Frequency bands.....	: 13.553 MHz to 13.567 MHz
Category/Class	: Not communicated
Bandwidth.....	: Not communicated

4. RESULT SUMMARY

TEST DESIGNATION	SEVERITY	VERDICT	COMMENTS
GENERAL			
Labeling requirements		N/P	See certification documents
Information to user		N/P	See certification documents
Home-built devices		N/A	
Kits		N/A	
Special Accessories		N/P	See certification documents
Inspection by the Commission		N/A	
Measurement standards		PASS	
Test procedure for CPU boards and computer power supplies		N/A	
Frequency range of radiated measurements		PASS	
Measurement detector functions and bandwidths		PASS	
Transition provisions for compliance with the rules		N/P	See certification documents
UNINTENTIONAL RADIATORS			
Equipment authorization		N/A	
- Verification		N/A	
- Declaration of Conformity		N/A	
CPU boards and power supplies used in personal computers		N/A	
Exempted device		N/A	
Information to the user		N/P	See certification documents
Conducted limits		PASS	
Radiated emission limits	Class B	PASS	
Antenna power conduction limits for receivers		N/A	
Power line carrier systems		N/A	
TV interface devices, including cable system terminal devices		N/A	
TV broadcast receivers		N/A	
Cable ready consumer electronics equipment		N/A	
Program blocking technology requirements for TV receivers		N/A	
Scanning receivers and frequency converters used with scanning receivers		N/A	
Labeling of digital cable ready products		N/A	
INTENTIONAL RADIATORS			

TEST DESIGNATION	SEVERITY	VERDICT	COMMENTS
Equipment authorization requirement		PASS	Transmitter part is subject to Certification procedure
Certified operating frequency range		N/A	
Antenna requirement		PASS	Dedicated integral antenna
External radio frequency power amplifiers and antenna modifications		N/A	
Restricted bands of operation		PASS	
Conducted limits	Class B	PASS	
Radiated emission limits; general requirements	Class B	PASS	
Tunnel radio systems		N/A	
Modular transmitters		N/A	
Cable locating equipment		N/A	
Cordless telephones		N/A	
Additional provisions to the general radiated emission limits		PASS	
Operation within the band 13.110-14.010 MHz.		PASS	
- Field strength in the band 13.553-13.567 MHz		PASS	
- Field strength in the band 13.410-13.553 MHz and 13.567-13.710 MHz		PASS	
- Field strength in the band 13.110-13.410 MHz and 13.710-14.010 MHz		PASS	
- Field strength outside the band 13.110-14.010 MHz		PASS	
- Frequency tolerance of the carrier signal		PASS	
- Radio frequency powered tag		N/A	EUT is an RFID reader

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. MEASUREMENT UNCERTAINTY

PARAMETER	MAXIMAL EMITECH UNCERTAINTY	MINIMAL STANDARD UNCERTAINTY
Radio frequency	$\pm 1 \times 10^{-7}$	$\pm 1 \times 10^{-7}$
RF power, conducted		
RF power	$\pm 0.8\text{dB}$	$\pm 1 \text{ dB}$
Power spectral density	$\pm 2.3\text{dB}$	$\pm 3 \text{ dB}$
Occupied bandwidth		
RF power	$\pm 1.2 \%$	$\pm 5 \%$
Conducted emission (spurious)		
$f \leq 1 \text{ GHz}$	$\pm 0.8 \text{ dB}$	$\pm 3 \text{ dB}$
1 GHz - 12.75 GHz	$\pm 1.6 \text{ dB}$	
Radiated emission (PAR / PIRE / RNE)		
$f \leq 62.5 \text{ MHz}$	$\pm 5.1 \text{ dB}$	$\pm 6 \text{ dB}$
62.5 MHz - 1 GHz	$\pm 5.1 \text{ dB}$	$\pm 6 \text{ dB}$
1 GHz - 18 GHz	$\pm 5.2 \text{ dB}$	$\pm 6 \text{ dB}$
18 GHz – 26 GHz	$\pm 5.1 \text{ dB}$	$\pm 6 \text{ dB}$
26 GHz – 40 GHz	$\pm 5.4 \text{ dB}$	$\pm 6 \text{ dB}$
PIRE and power spectral density with diode	$\pm 5.4 \text{ dB}$	$\pm 6 \text{ dB}$
Radiated emission (magnetic field)		
9kHz – 30MHz	$\pm 2.7 \text{ dB}$	$\pm 6 \text{ dB}$
Supply voltages	$\pm 3 \%$	$\pm 3 \%$
Temperature	$\pm 1 \text{ }^\circ\text{C}$	$\pm 1^\circ\text{C}$
Humidity	$\pm 5 \%$	$\pm 5 \%$
Time / Duty cycle	$\pm 4.4 \%$	$\pm 5 \%$
Radiated emission (electric field for FCC standard)		
9kHz – 30MHz	$\pm 2.7 \text{ dB}$	/
30MHz – 1GHz	$\pm 5.2 \text{ dB}$	/
1GHz – 18GHz	$\pm 5.3 \text{ dB}$	/
18GHz – 26GHz	$\pm 5.5 \text{ dB}$	/
26GHz – 40GHz	$\pm 5.5 \text{ dB}$	/

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

6. TEST CONDITIONS AND RESULTS

6.1. Conducted voltage emission (measurement)

Reference standard:	FCC part 15.107, 15.207 and RSS-Gen
Test method:	ANSI C63.4: 2014
General test setup: Test is done inside a shielded room. EUT is set on an insulating support at 80cm 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.	

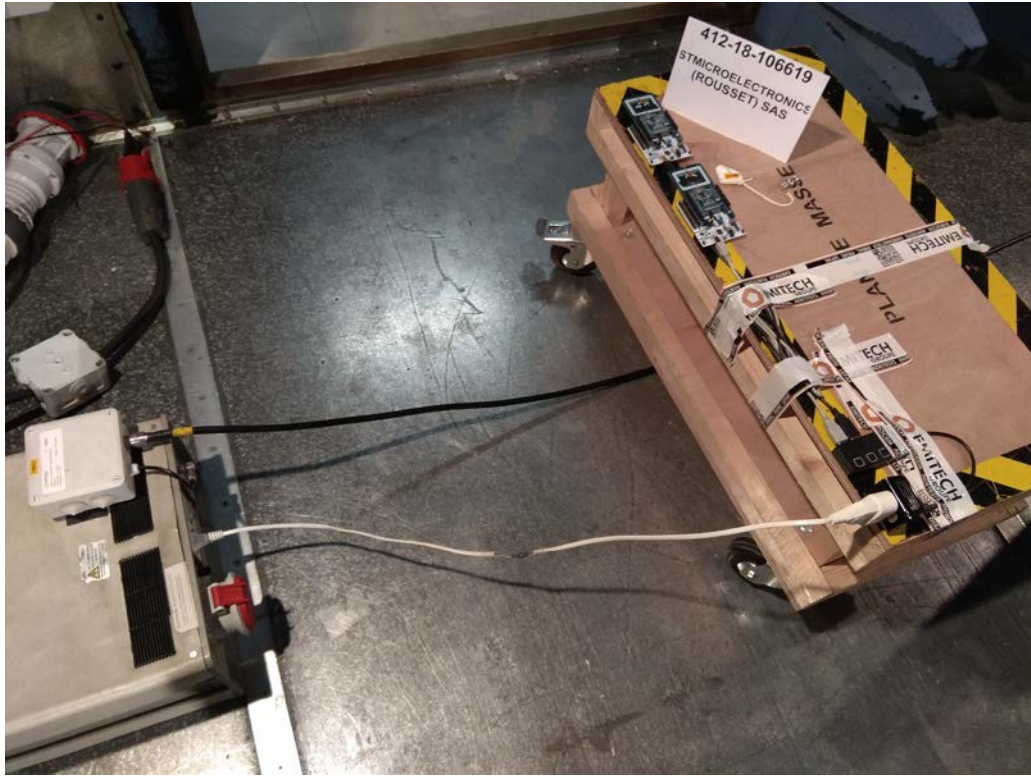
TESTED CABLE	PARAMETER	SEVERITY	RESULT TAB.	VERDICT
115Vac/60Hz power supply	150kHz-30MHz	Class B	EMI5050	PASS

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 through a "standard power supply" which meets FCC and RSS requirements. Test are done in the worst configuration mode: Config Tag which presents the higher carrier level (All modulations activated at the same time).		

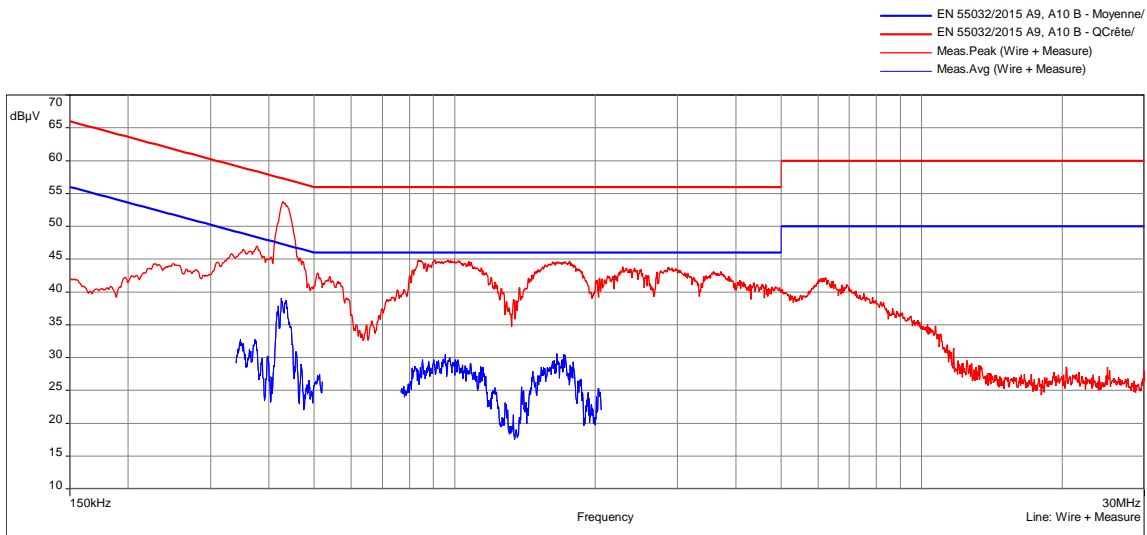
TEST EQUIPMENT USED					
CATEGORY	BRAND	TYPE	IDENTIFIER	CAL. DATE	CAL. DUE
AC power source	KIKUSUI	PCR2000L	0800	12/06/2018	12/08/2019
Cable	MICRO-COAX	N-3m	10536	12/10/2017	12/12/2019
Cable	EMITECH	Current absorber sheath	10653	19/10/2018	19/12/2020
Cable	SUCOFLEX	N-3m	14378	19/01/2017	19/09/2019
LISN	PMM	L2-16	1209	08/02/2018	08/04/2020
PE choke	EMITECH	CISPR 16-2-1 : 2008	10071		
Receiver	Rohde & Schwarz	ESI	9704	15/02/2019	15/04/2020
Shielded enclosure	COMTEST	SAC 3m	14494	14/02/2017	14/04/2020
Software	Nexio		0000		
Surges Suppressor	Hewlett Packard	11947A	0238	11/09/2017	11/11/2019
Thermohygrometer	Bioblock Scientific	Météostar	0963	25/01/2019	25/03/2021
Thermohygrometer	Testo	608-H2	12269	27/11/2017	27/01/2020

Blank cells = Permanent validity

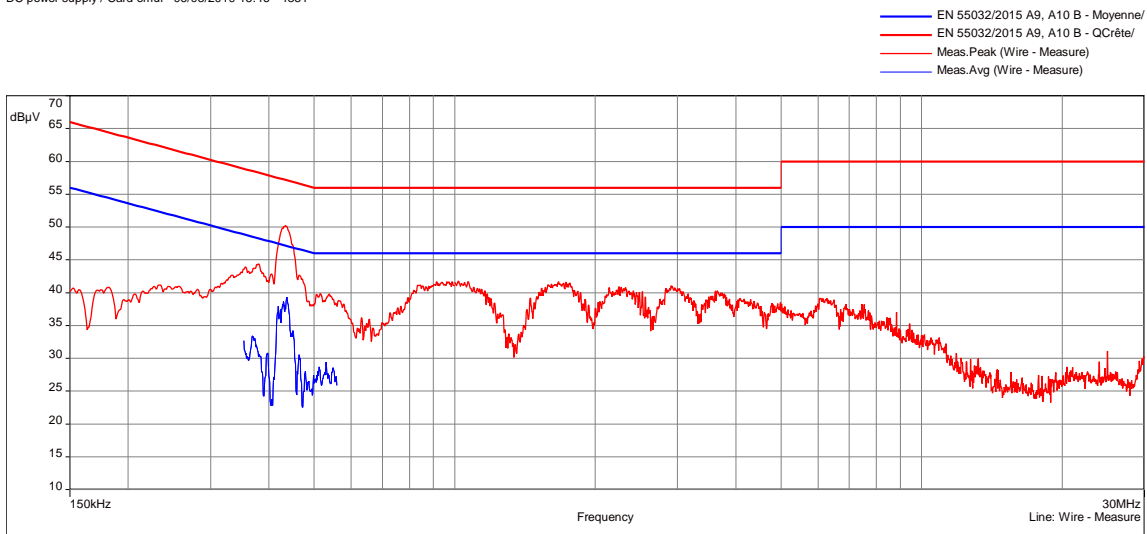
TEST SETUP PHOTO(S) – POWER SUPPLY USED FOR CONDUCTED MEASUREMENT



CONDUCTED EMISSION (MEASUREMENT) - GRAPH			
DC POWER SUPPLY / CARD EMUL		EMI4381	
EUT mode:	#1	T (°C):	21.2
Test Date:	03/06/2019 15:46:44	H (%):	50.5
Test Operator:	MPA	P (hPa):	1011



DC power supply / Card emul - 06/03/2019 15:46 - 4381



DC power supply / Card emul - 06/03/2019 15:46 - 4381

POSITION	FREQUENCIES	RBW	VBW	DETECTOR
Wire- port	150kHz-1MHz	10kHz	30kHz	Peak/Avg
Wire- port	1MHz-10MHz	10kHz	30kHz	Peak
Wire- port	10MHz-30MHz	10kHz	30kHz	Peak
Wire+ port	150kHz-1MHz	10kHz	30kHz	Peak/Avg
Wire+ port	1MHz-10MHz	10kHz	30kHz	Peak/Avg
Wire+ port	10MHz-30MHz	10kHz	30kHz	Peak
Measure with:	A.M.N.			
Comments:	N/A			
EUT modification(s): N/A				

6.2. Occupied Bandwidth


Reference standard:	FCC part 15 Radio part 15.225 & RSS-210
Test method:	FCC part 15.225 & RSS-210
<p>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 $\beta/2$ on each side of the spectrum. Unless otherwise specified, $\beta/2$ is taken as 0,5 %.</p> <p>The maximum occupied bandwidth includes all associated side bands above the appropriate emissions level and the frequency error or drift under extreme test conditions.</p> <p>EUT is connected to the measuring receiver via 50Ω attenuator(s).</p>	

TESTED PARAMETER	OBW	SEVERITY	RESULT TAB.	VERDICT
99% Bandwidth	7.7944 kHz	<14kHz	EMI5993	PASS

LABORATORY PARAMETERS:	REQUIRED PRIOR TO THE TEST	DURING THE TEST
Ambient Temperature	15 to 35 °C	21.3°C
Relative Humidity	20 to 75 %	39.4 %
Atmospheric pressure	N/A	1015 hPa
Test method deviation: N/A		
Supplementary information: Test are done in the worst configuration mode: Config Tag which presents the higher carrier level (All modulations activated at the same time).		

TEST EQUIPMENT USED					
CATEGORY	BRAND	TYPE	IDENTIFIER	CAL. DATE	CAL. DUE
AC power source	KIKUSUI	PCR4000L	3074	12/06/2018	12/08/2019
Antenna	Emitech	3.5 cm	4653		
Cable	MICRO-COAX	N-3m	10535	06/04/2017	06/06/2019
Climatic enclosure	CLIMATS	EXCAL 7714-HA	14261	26/04/2018	26/06/2019
Multimeter	FLUKE	8808A	12446	24/04/2018	24/06/2019
Spectrum analyzer	Rohde & Schwarz	FSW43	14830	28/12/2018	28/02/2020
Thermohygrometer	Bioblock Scientific	Météostar	0963	25/01/2019	25/03/2021
Thermohygrometer	Testo	608-H2	12268	27/11/2017	27/01/2020

Blank cells = Permanent validity

OCCUPIED BANDWIDTH - GRAPH	
99% BANDWIDTH	
EMI5993	
EUT mode:	D-M3
Test Date:	29/05/2019
Test Operator:	MPA
 <p>The graph shows a spectrum plot with a peak at 13.560268 MHz. The y-axis represents power in dBµV, ranging from 20 to 100. The x-axis represents frequency in MHz, ranging from approximately 13.55 to 13.57. A marker M1 is placed at the peak, and two other markers T1 and T2 are placed on the curve to define the bandwidth. The graph also displays various parameters such as RBW (300 Hz), VBW (1 kHz), and Mode (Sweep).</p>	
Results:	The system has an OBW of 4.456 kHz
<i>EUT modification(s): N/A</i>	

6.3. Radiated spurious emissions

Reference standard:	FCC part 15 Radio part 15.225 & CNR-Gen
Test method:	FCC part 15.109, 15.209, 15.205, 15.215, CNR-Gen
<p>General test setup: For $f < 30\text{MHz}$, EUT is set on an insulating support at 80cm above the ground reference plane.</p> <p>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°).</p> <p>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.</p> <p>For $f > 30\text{MHz}$, EUT is set on an insulating support at 80cm above the ground reference plane (150cm for $f > 1\text{GHz}$).</p> <p>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.</p> <p>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.</p> <p>All frequencies were investigated, where applicable.</p> <p>For portable equipments a research of maximum level is done on the 3 axes. Only the highest levels are recorded.</p>	

TESTED CONFIGURATION	PARAMETER	SEVERITY	RESULT TAB.	VERDICT
All modes	9kHz-150kHz	15.209	See below	PASS
All modes	150kHz-30MHz	15.209	See below	PASS
All modes	30MHz-1GHz	15.209	See below	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:

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.

TEST EQUIPMENT USED					
CATEGORY	BRAND	TYPE	IDENTIFIER	CAL. DATE	CAL. DUE
AC power source	CHROMA	61603	12532	24/04/2018	24/06/2019
Antenna	Rohde & Schwarz	HFH2-Z2	5825	20/09/2017	20/11/2019
Antenna	Electro Metrics	BIA-30HF	0824	13/06/2018	13/08/2021
Antenna	Rohde & Schwarz	HL223	3126	13/06/2018	13/08/2021
Cable	SUCOFLEX	N-3m	14378	19/01/2017	19/09/2019
Cable	SUCOFLEX	N-6,5m	14380	19/01/2017	19/09/2019
Cable	TechniWAVE	N-0.23m	14891	23/02/2018	23/04/2020
Cable	TechniWAVE	N-0.23m	14899	23/02/2018	23/04/2020

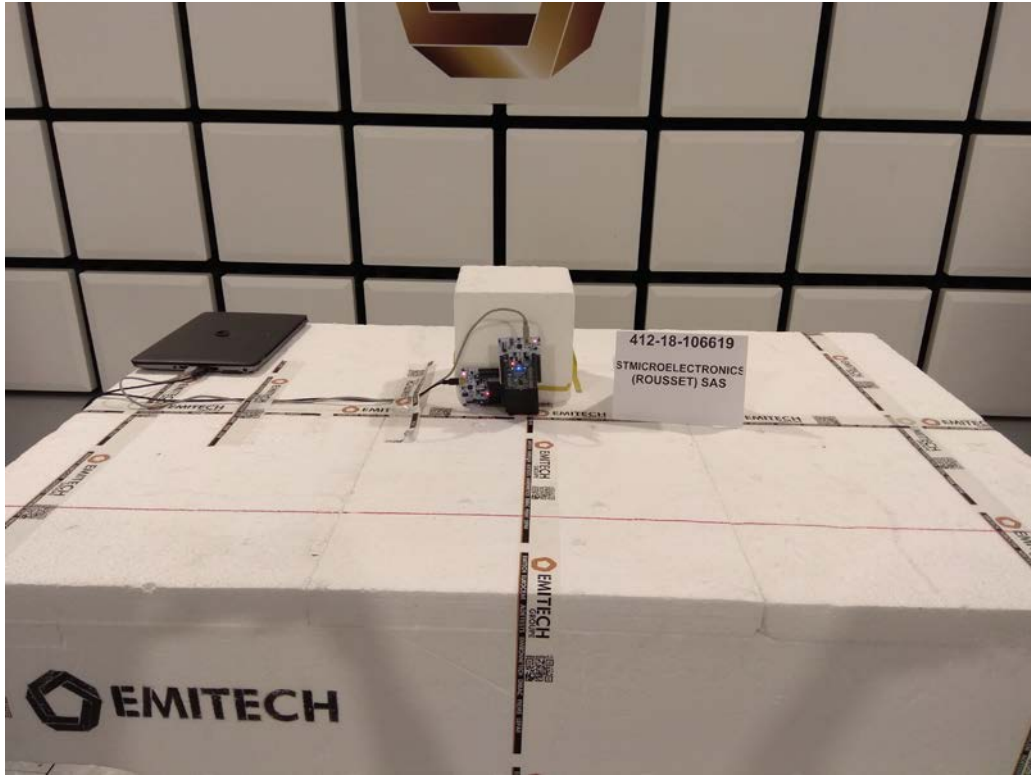
CATEGORY	BRAND	TYPE	IDENTIFIER	CAL. DATE	CAL. DUE
Cable	MegaPhase	N-8m	15813	12/11/2018	12/01/2021
Receiver	Agilent Technologies	E4440A	5824	18/04/2018	18/06/2020
Shielded enclosure	COMTEST	SAC 3m	14494	14/02/2017	14/04/2020
Software	Nexio		0000		
Thermohygrometer	Bioblock Scientific	Météostar	0963	25/01/2019	25/03/2021
Thermohygrometer	Testo	608-H2	12269	27/11/2017	27/01/2020
Turntable	Maturo	NCD	14657		

Blank cells = Permanent validity

TEST SETUP PHOTO(S) RADIATED EMISSIONS (CONFIG TAG)



TEST SETUP PHOTO(S) RADIATED EMISSIONS (CARD EMUL)



TEST SETUP PHOTO(S) RADIATED EMISSIONS (30MHz-200MHz)



TEST SETUP PHOTO(S) RADIATED EMISSIONS (200MHZ-1GHZ)

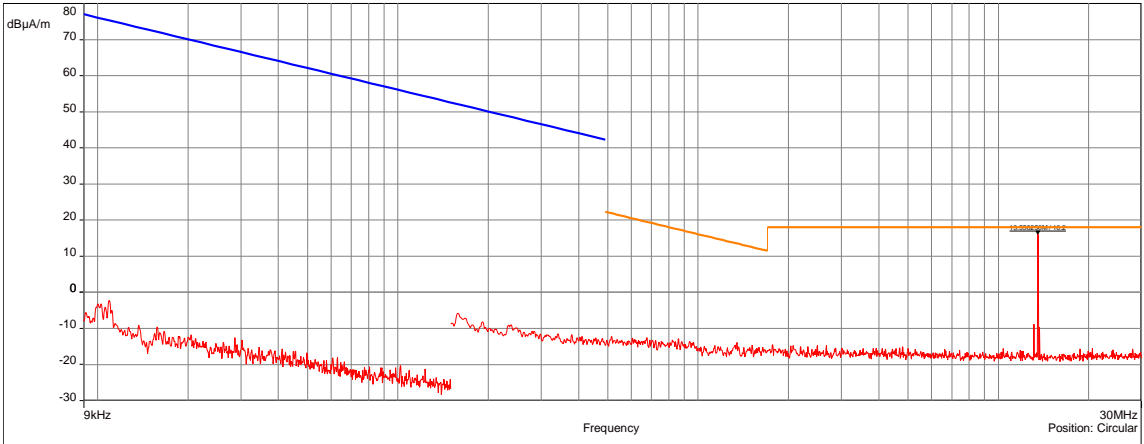


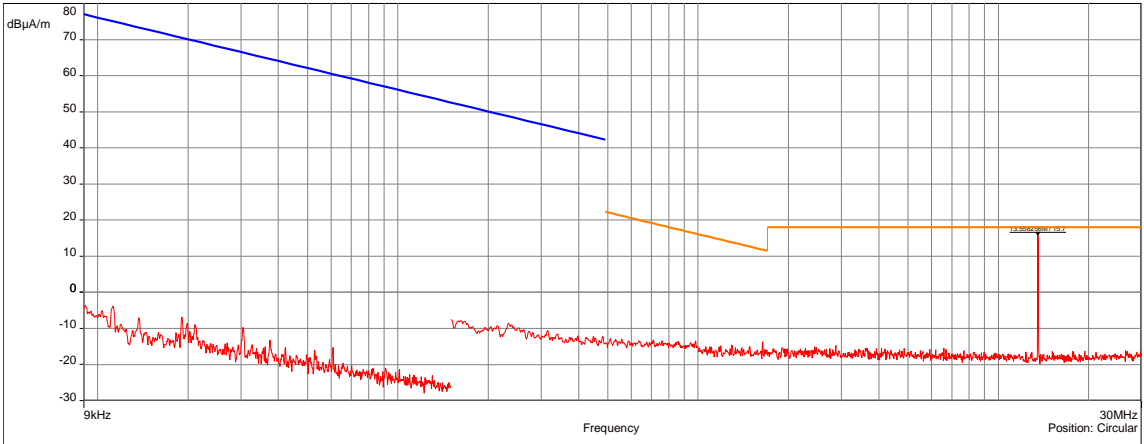
TEST SETUP PHOTO(S) RADIATED EMISSION(F<30MHZ, PRE MEASUREMENT)

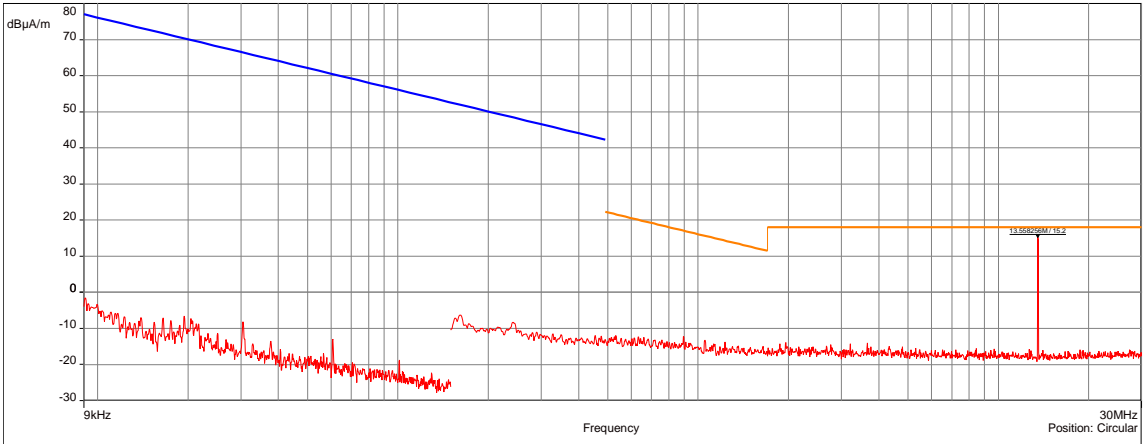


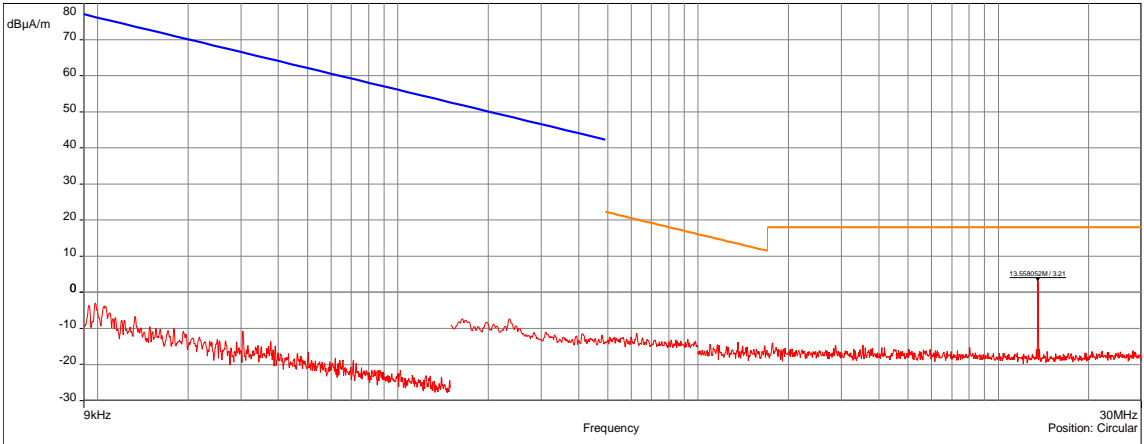
TEST SETUP PHOTO(S) RADIATED EMISSION(F<30MHZ, FINAL MEASUREMENT)

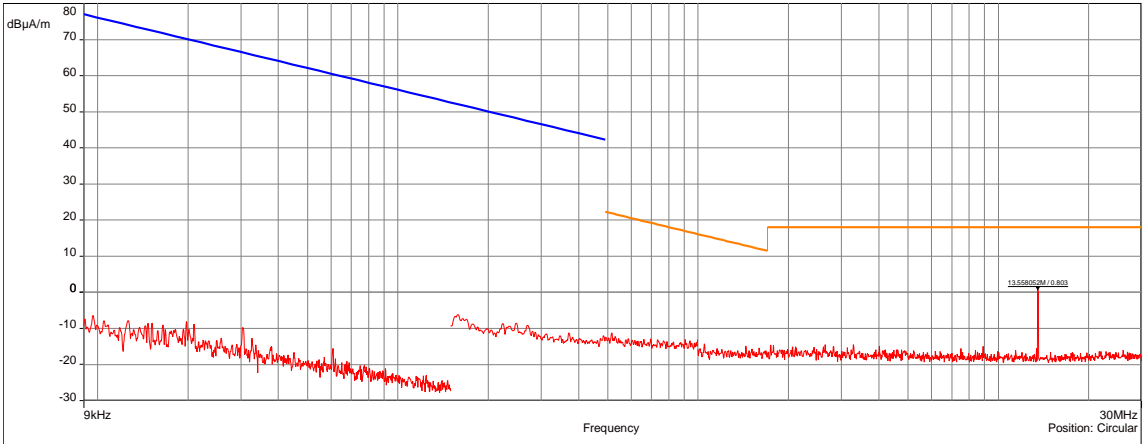


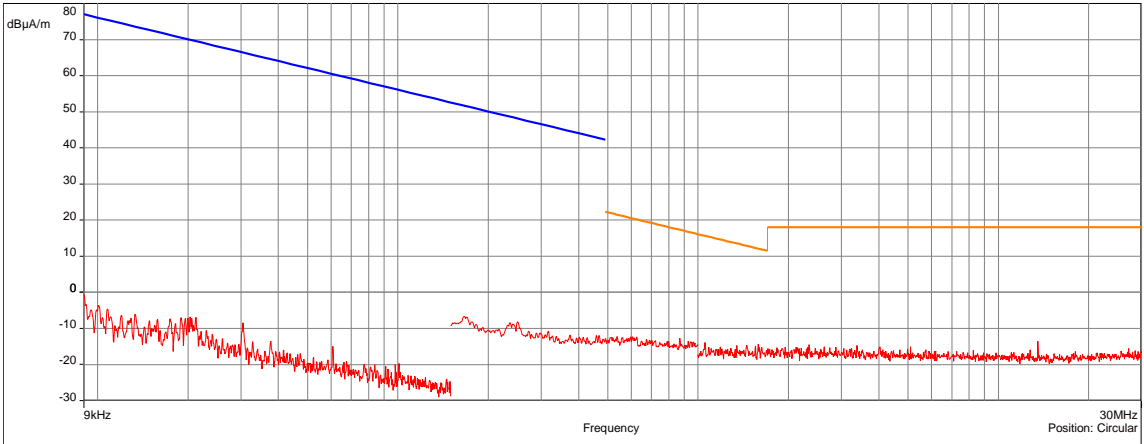
TRANSMITTER RADIATED SPURIOUS EMISSIONS AT FREQUENCIES <30MHZ - GRAPH				
TX/ 0° / CONFIG TAG / POSITION 1				EMI4301
EUT mode:	D-M2	T (°C):	22	
Test Date:	28/05/2019 08:36:56	H (%):	48.7	
Test Operator:	MPA	P (hPa):	1010	
<div style="text-align: right;"> — FCC/FCC Part 15 §209 Tx - Moyenne/3.0m/ — FCC/FCC Part 15 §209 Tx - QCrête/3.0m/ — Meas.Peak </div> 				
POSITION	FREQUENCIES	RBW	VBW	DETECTOR
Circular	9kHz-150kHz	300Hz	1kHz	Peak
Circular	150kHz-1MHz	10kHz	30kHz	Peak
Circular	1MHz-30MHz	10kHz	30kHz	Peak
Configuration:	N/A			
Comments:	Limit indicated on these plots are calculated with 40 dB/decade extrapolation factor and 51.5dB conversion factor. 13.56MHz: Util frequency			
<i>EUT modification(s): N/A</i>				

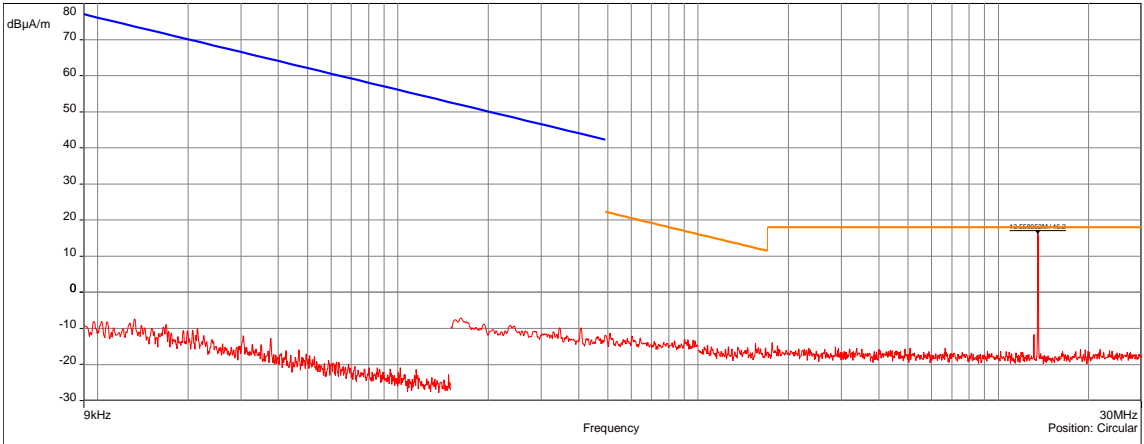
TRANSMITTER RADIATED SPURIOUS EMISSIONS AT FREQUENCIES <30MHz - GRAPH				
TX/ 45° / CONFIG TAG / POSITION 1				EMI4302
EUT mode:	D-M2	T (°C):	22	
Test Date:	28/05/2019 08:37:39	H (%):	48.7	
Test Operator:	MPA	P (hPa):	1010	
<div style="text-align: right;"> — FCC/FCC Part 15 §209 Tx - Moyenne/3.0m/ — FCC/FCC Part 15 §209 Tx - QCrête/3.0m/ — Meas.Peak </div> 				
POSITION	FREQUENCIES	RBW	VBW	DETECTOR
Circular	9kHz-150kHz	300Hz	1kHz	Peak
Circular	150kHz-1MHz	10kHz	30kHz	Peak
Circular	1MHz-30MHz	10kHz	30kHz	Peak
Configuration:	N/A			
Comments:	Limit indicated on these plots are calculated with 40 dB/decade extrapolation factor and 51.5dB conversion factor. 13.56MHz: Util frequency			
<i>EUT modification(s): N/A</i>				

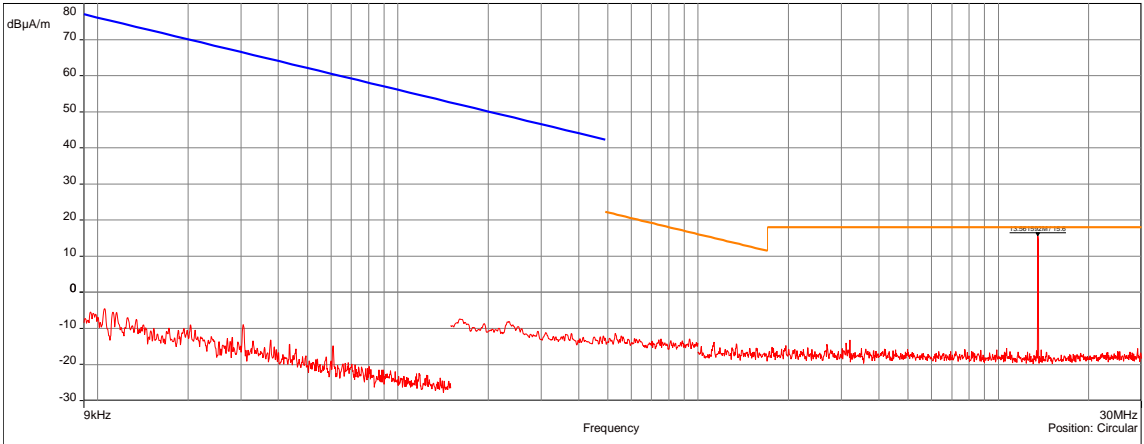
TRANSMITTER RADIATED SPURIOUS EMISSIONS AT FREQUENCIES <30MHZ - GRAPH				
TX/ 90° / CONFIG TAG / POSITION 1				EMI4303
EUT mode:	D-M2	T (°C):	22	
Test Date:	28/05/2019 08:40:28	H (%):	48.7	
Test Operator:	MPA	P (hPa):	1010	
<div style="text-align: right; font-size: small;"> — FCC/FCC Part 15 §209 Tx - Moyenne/3.0m/ — FCC/FCC Part 15 §209 Tx - QCrête/3.0m/ — Meas.Peak </div> 				
POSITION	FREQUENCIES	RBW	VBW	DETECTOR
Circular	9kHz-150kHz	300Hz	1kHz	Peak
Circular	150kHz-1MHz	10kHz	30kHz	Peak
Circular	1MHz-30MHz	10kHz	30kHz	Peak
Configuration:	N/A			
Comments:	Limit indicated on these plots are calculated with 40 dB/decade extrapolation factor and 51.5dB conversion factor. 13.56MHz: Util frequency			
<i>EUT modification(s): N/A</i>				

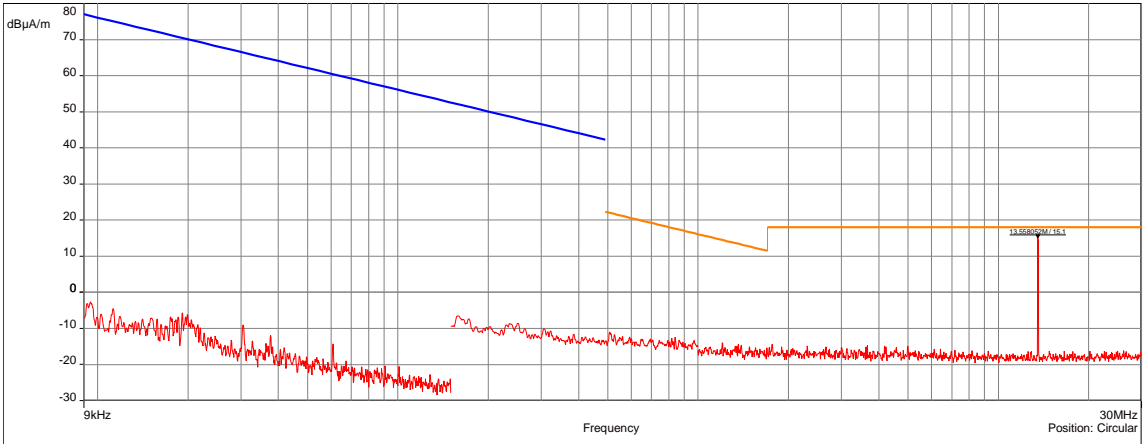
TRANSMITTER RADIATED SPURIOUS EMISSIONS AT FREQUENCIES <30MHZ - GRAPH				
TX/ 0° / CONFIG TAG / POSITION 2				EMI4304
EUT mode:	D-M2			T (°C): 22
Test Date:	28/05/2019 08:45:31			H (%): 48.7
Test Operator:	MPA			P (hPa): 1010
<div style="text-align: right;"> — FCC/FCC Part 15 §209 Tx - Moyenne/3.0m/ — FCC/FCC Part 15 §209 Tx - QCrête/3.0m/ — Meas.Peak </div> 				
POSITION	FREQUENCIES	RBW	VBW	DETECTOR
Circular	9kHz-150kHz	300Hz	1kHz	Peak
Circular	150kHz-1MHz	10kHz	30kHz	Peak
Circular	1MHz-30MHz	10kHz	30kHz	Peak
Configuration:	N/A			
Comments:	Limit indicated on these plots are calculated with 40 dB/decade extrapolation factor and 51.5dB conversion factor. 13.56MHz: Util frequency			
<i>EUT modification(s): N/A</i>				

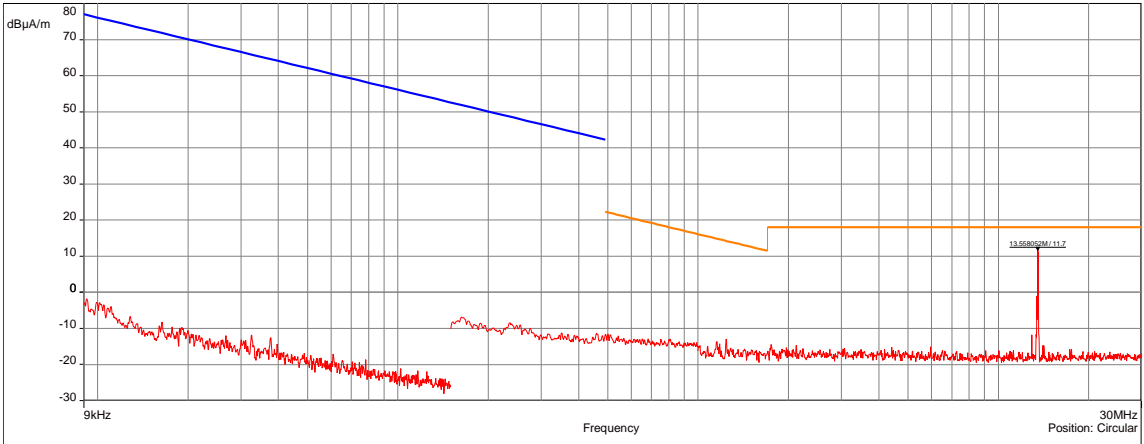
TRANSMITTER RADIATED SPURIOUS EMISSIONS AT FREQUENCIES <30MHZ - GRAPH				
TX/ 45° / CONFIG TAG / POSITION 2				EMI4305
EUT mode:	D-M2	T (°C):	22	
Test Date:	28/05/2019 08:48:19	H (%):	48.7	
Test Operator:	MPA	P (hPa):	1010	
<div style="text-align: right;"> — FCC/FCC Part 15 §209 Tx - Moyenne/3.0m/ — FCC/FCC Part 15 §209 Tx - QCrête/3.0m/ — Meas.Peak </div> 				
POSITION	FREQUENCIES	RBW	VBW	DETECTOR
Circular	9kHz-150kHz	300Hz	1kHz	Peak
Circular	150kHz-1MHz	10kHz	30kHz	Peak
Circular	1MHz-30MHz	10kHz	30kHz	Peak
Configuration:	N/A			
Comments:	Limit indicated on these plots are calculated with 40 dB/decade extrapolation factor and 51.5dB conversion factor. 13.56MHz: Util frequency			
<i>EUT modification(s): N/A</i>				

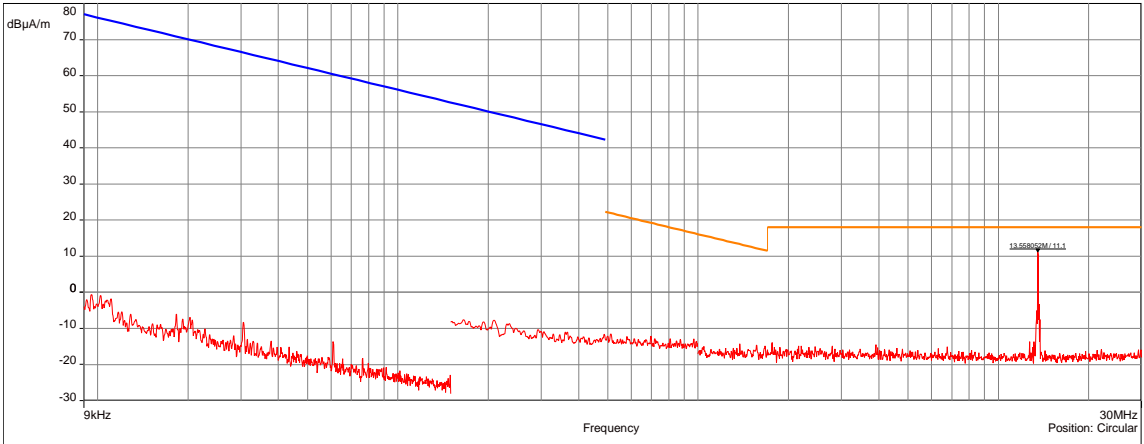
TRANSMITTER RADIATED SPURIOUS EMISSIONS AT FREQUENCIES <30MHZ - GRAPH				
TX/ 90° / CONFIG TAG / POSITION 2				EMI4306
EUT mode:	D-M2	T (°C):	22	
Test Date:	28/05/2019 08:51:45	H (%):	48.7	
Test Operator:	MPA	P (hPa):	1010	
				
POSITION	FREQUENCIES	RBW	VBW	DETECTOR
Circular	9kHz-150kHz	300Hz	1kHz	Peak
Circular	150kHz-1MHz	10kHz	30kHz	Peak
Circular	1MHz-30MHz	10kHz	30kHz	Peak
Configuration:	N/A			
Comments:	Limit indicated on these plots are calculated with 40 dB/decade extrapolation factor and 51.5dB conversion factor. 13.56MHz: Util frequency			
EUT modification(s): N/A				

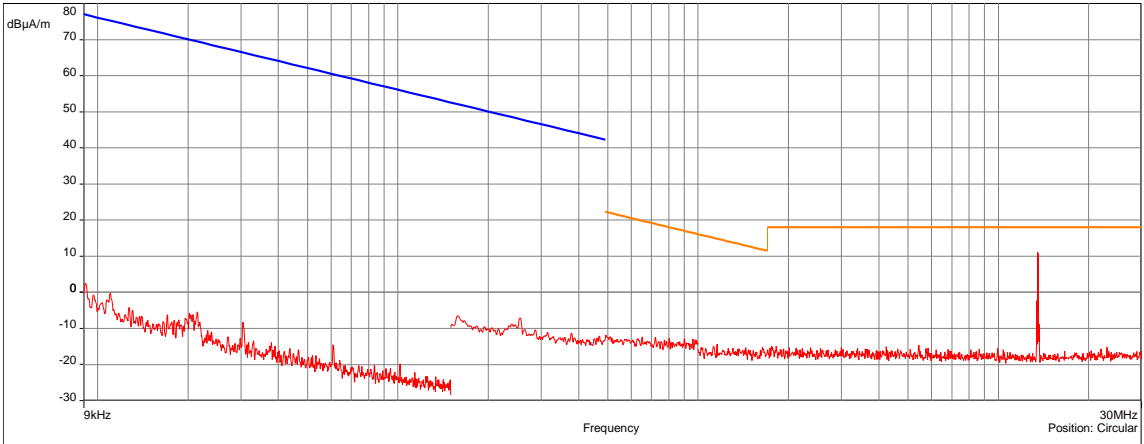
TRANSMITTER RADIATED SPURIOUS EMISSIONS AT FREQUENCIES <30MHz - GRAPH				
TX/ 0° / CONFIG TAG / POSITION 3				EMI4307
EUT mode:	D-M2	T (°C):	22	
Test Date:	28/05/2019 08:54:59	H (%):	48.7	
Test Operator:	MPA	P (hPa):	1010	
<div style="text-align: right;"> — FCC/FCC Part 15 §209 Tx - Moyenne/3.0m/ — FCC/FCC Part 15 §209 Tx - QCrête/3.0m/ — Meas.Peak </div> 				
POSITION	FREQUENCIES	RBW	VBW	DETECTOR
Circular	9kHz-150kHz	300Hz	1kHz	Peak
Circular	150kHz-1MHz	10kHz	30kHz	Peak
Circular	1MHz-30MHz	10kHz	30kHz	Peak
Configuration:	N/A			
Comments:	Limit indicated on these plots are calculated with 40 dB/decade extrapolation factor and 51.5dB conversion factor. 13.56MHz: Util frequency			
<i>EUT modification(s): N/A</i>				

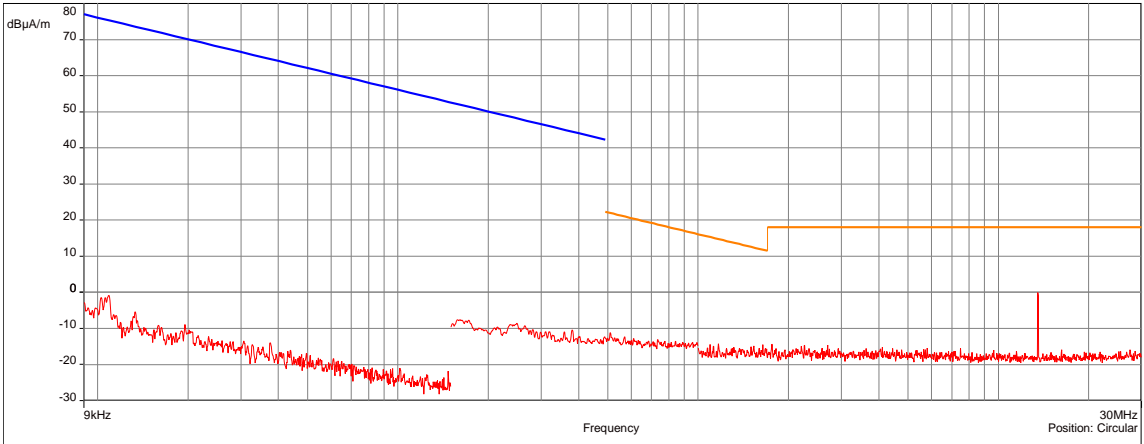
TRANSMITTER RADIATED SPURIOUS EMISSIONS AT FREQUENCIES <30MHZ - GRAPH				
TX/ 45° / CONFIG TAG / POSITION 3				EMI4308
EUT mode:	D-M2	T (°C):	22	
Test Date:	28/05/2019 08:57:27	H (%):	48.7	
Test Operator:	MPA	P (hPa):	1010	
<div style="text-align: right;"> — FCC/FCC Part 15 §209 Tx - Moyenne/3.0m/ — FCC/FCC Part 15 §209 Tx - QCrête/3.0m/ — Meas.Peak </div> 				
POSITION	FREQUENCIES	RBW	VBW	DETECTOR
Circular	9kHz-150kHz	300Hz	1kHz	Peak
Circular	150kHz-1MHz	10kHz	30kHz	Peak
Circular	1MHz-30MHz	10kHz	30kHz	Peak
Configuration:	N/A			
Comments:	Limit indicated on these plots are calculated with 40 dB/decade extrapolation factor and 51.5dB conversion factor. 13.56MHz: Util frequency			
<i>EUT modification(s): N/A</i>				

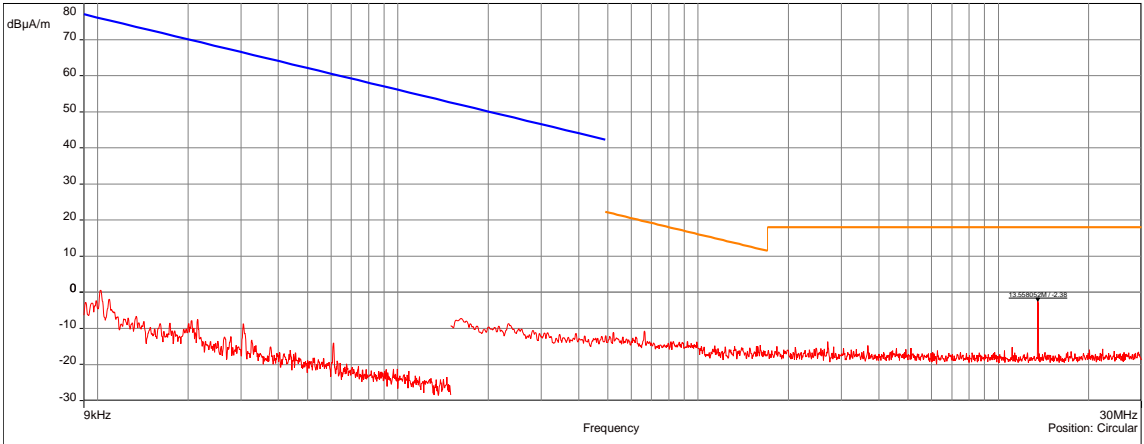
TRANSMITTER RADIATED SPURIOUS EMISSIONS AT FREQUENCIES <30MHz - GRAPH				
TX/ 90° / CONFIG TAG / POSITION 3				EMI4309
EUT mode:	D-M2	T (°C):	22	
Test Date:	28/05/2019 08:59:59	H (%):	48.7	
Test Operator:	MPA	P (hPa):	1010	
<div style="text-align: right;"> — FCC/FCC Part 15 §209 Tx - Moyenne/3.0m/ — FCC/FCC Part 15 §209 Tx - QCrête/3.0m/ — Meas.Peak </div> 				
POSITION	FREQUENCIES	RBW	VBW	DETECTOR
Circular	9kHz-150kHz	300Hz	1kHz	Peak
Circular	150kHz-1MHz	10kHz	30kHz	Peak
Circular	1MHz-30MHz	10kHz	30kHz	Peak
Configuration:	N/A			
Comments:	Limit indicated on these plots are calculated with 40 dB/decade extrapolation factor and 51.5dB conversion factor. 13.56MHz: Util frequency			
<i>EUT modification(s): N/A</i>				

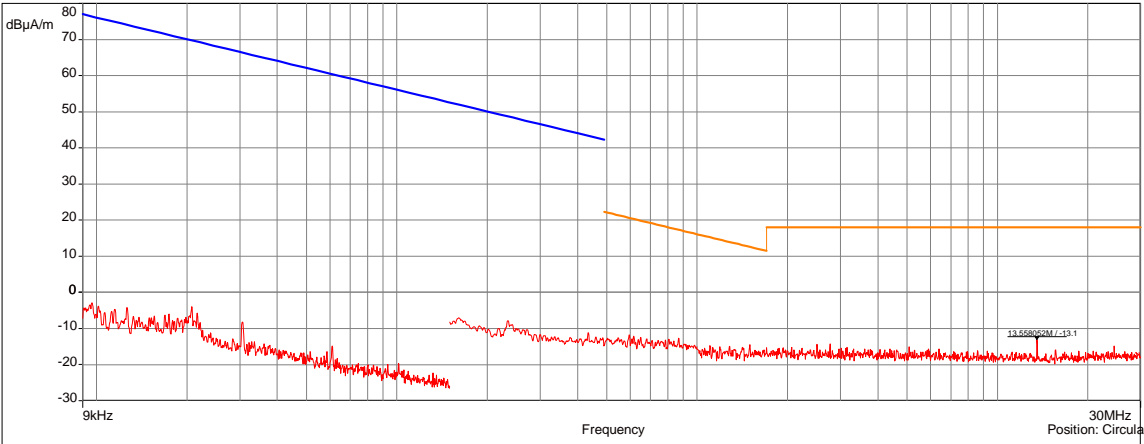
TRANSMITTER RADIATED SPURIOUS EMISSIONS AT FREQUENCIES <30MHZ - GRAPH				
TX/ 0° / CARD EMUL / POSITION 1				EMI4310
EUT mode:	D-M2			T (°C): 22
Test Date:	28/05/2019 09:22:25			H (%): 48.7
Test Operator:	MPA			P (hPa): 1010
<div style="text-align: right;"> <p>— FCC/FCC Part 15 §209 Tx - Moyenne/3.0m/</p> <p>— FCC/FCC Part 15 §209 Tx - QCrête/3.0m/</p> <p>— Meas.Peak</p> </div> 				
POSITION	FREQUENCIES	RBW	VBW	DETECTOR
Circular	9kHz-150kHz	300Hz	1kHz	Peak
Circular	150kHz-1MHz	10kHz	30kHz	Peak
Circular	1MHz-30MHz	10kHz	30kHz	Peak
Configuration:	N/A			
Comments:	Limit indicated on these plots are calculated with 40 dB/decade extrapolation factor and 51.5dB conversion factor. 13.56MHz: Util frequency			
<i>EUT modification(s): N/A</i>				

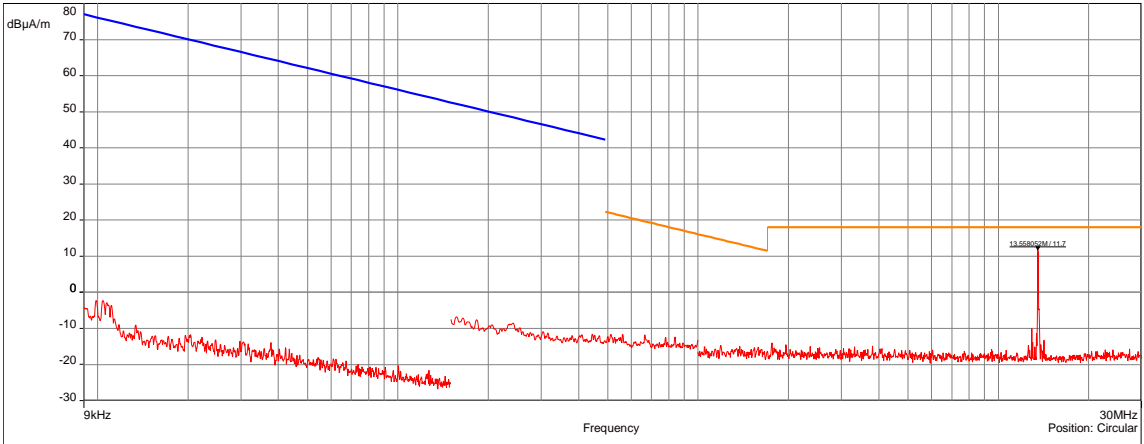
TRANSMITTER RADIATED SPURIOUS EMISSIONS AT FREQUENCIES <30MHZ - GRAPH				
TX/ 45° / CARD EMUL / POSITION 1			EMI4311	
EUT mode:	D-M2		T (°C):	22
Test Date:	28/05/2019 09:25:52		H (%):	48.7
Test Operator:	MPA		P (hPa):	1010
<div style="text-align: right; font-size: small;"> — FCC/FCC Part 15 §209 Tx - Moyenne/3.0m/ — FCC/FCC Part 15 §209 Tx - QCrête/3.0m/ — Meas.Peak </div> 				
POSITION	FREQUENCIES	RBW	VBW	DETECTOR
Circular	9kHz-150kHz	300Hz	1kHz	Peak
Circular	150kHz-1MHz	10kHz	30kHz	Peak
Circular	1MHz-30MHz	10kHz	30kHz	Peak
Configuration:	N/A			
Comments:	Limit indicated on these plots are calculated with 40 dB/decade extrapolation factor and 51.5dB conversion factor. 13.56MHz: Util frequency			
<i>EUT modification(s): N/A</i>				

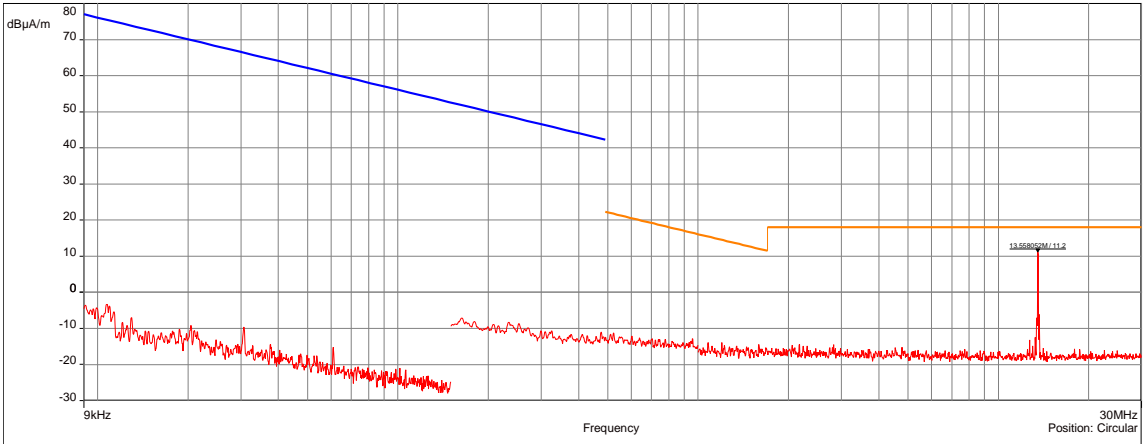
TRANSMITTER RADIATED SPURIOUS EMISSIONS AT FREQUENCIES <30MHZ - GRAPH				
TX/ 90° / CARD EMUL / POSITION 1			EMI4312	
EUT mode:	D-M2		T (°C):	22
Test Date:	28/05/2019 09:28:50		H (%):	48.7
Test Operator:	MPA		P (hPa):	1010
<div style="text-align: right; font-size: small;"> — FCC/FCC Part 15 §209 Tx - Moyenne/3.0m/ — FCC/FCC Part 15 §209 Tx - QCrête/3.0m/ — Meas.Peak </div> 				
POSITION	FREQUENCIES	RBW	VBW	DETECTOR
Circular	9kHz-150kHz	300Hz	1kHz	Peak
Circular	150kHz-1MHz	10kHz	30kHz	Peak
Circular	1MHz-30MHz	10kHz	30kHz	Peak
Configuration:	N/A			
Comments:	Limit indicated on these plots are calculated with 40 dB/decade extrapolation factor and 51.5dB conversion factor. 13.56MHz: Util frequency			
<i>EUT modification(s): N/A</i>				

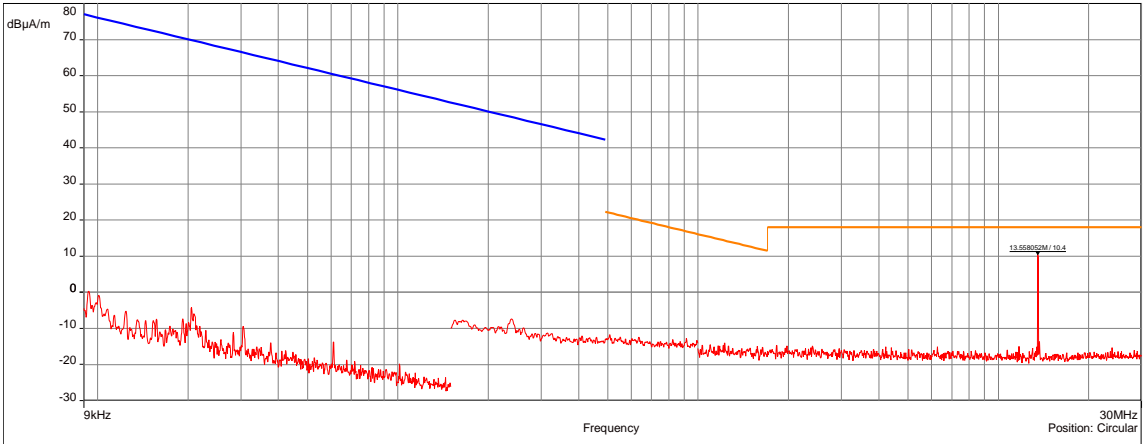
TRANSMITTER RADIATED SPURIOUS EMISSIONS AT FREQUENCIES <30MHZ - GRAPH				
TX/ 0° / CARD EMUL / POSITION 2			EMI4314	
EUT mode:	D-M2		T (°C):	22
Test Date:	28/05/2019 09:41:44		H (%):	48.7
Test Operator:	MPA		P (hPa):	1010
<div style="text-align: right;"> — FCC/FCC Part 15 §209 Tx - Moyenne/3.0m/ — FCC/FCC Part 15 §209 Tx - QCrête/3.0m/ — Meas.Peak </div> 				
POSITION	FREQUENCIES	RBW	VBW	DETECTOR
Circular	9kHz-150kHz	300Hz	1kHz	Peak
Circular	150kHz-1MHz	10kHz	30kHz	Peak
Circular	1MHz-30MHz	10kHz	30kHz	Peak
Configuration:	N/A			
Comments:	Limit indicated on these plots are calculated with 40 dB/decade extrapolation factor and 51.5dB conversion factor. 13.56MHz: Util frequency			
<i>EUT modification(s): N/A</i>				

TRANSMITTER RADIATED SPURIOUS EMISSIONS AT FREQUENCIES <30MHZ - GRAPH				
TX/ 45° / CARD EMUL / POSITION 2			EMI4315	
EUT mode:	D-M2		T (°C):	22
Test Date:	28/05/2019 09:46:16		H (%):	48.7
Test Operator:	MPA		P (hPa):	1010
<div style="text-align: right;"> — FCC/FCC Part 15 §209 Tx - Moyenne/3.0m/ — FCC/FCC Part 15 §209 Tx - QCrête/3.0m/ — Meas.Peak </div> 				
POSITION	FREQUENCIES	RBW	VBW	DETECTOR
Circular	9kHz-150kHz	300Hz	1kHz	Peak
Circular	150kHz-1MHz	10kHz	30kHz	Peak
Circular	1MHz-30MHz	10kHz	30kHz	Peak
Configuration:	N/A			
Comments:	Limit indicated on these plots are calculated with 40 dB/decade extrapolation factor and 51.5dB conversion factor. 13.56MHz: Util frequency			
<i>EUT modification(s): N/A</i>				

TRANSMITTER RADIATED SPURIOUS EMISSIONS AT FREQUENCIES <30MHZ - GRAPH				
TX/ 90° / CARD EMUL / POSITION 2				EMI4316
EUT mode:	D-M2			T (°C): 22
Test Date:	28/05/2019 09:46:48			H (%): 48.7
Test Operator:	MPA			P (hPa): 1010
<div style="text-align: right;"> — FCC/FCC Part 15 §209 Tx - Moyenne/3.0m/ — FCC/FCC Part 15 §209 Tx - QCrête/3.0m/ — Meas.Peak </div> 				
POSITION	FREQUENCIES	RBW	VBW	DETECTOR
Circular	9kHz-150kHz	300Hz	1kHz	Peak
Circular	150kHz-1MHz	10kHz	30kHz	Peak
Circular	1MHz-30MHz	10kHz	30kHz	Peak
Configuration:	N/A			
Comments:	Limit indicated on these plots are calculated with 40 dB/decade extrapolation factor and 51.5dB conversion factor.			
<i>EUT modification(s): N/A</i>				

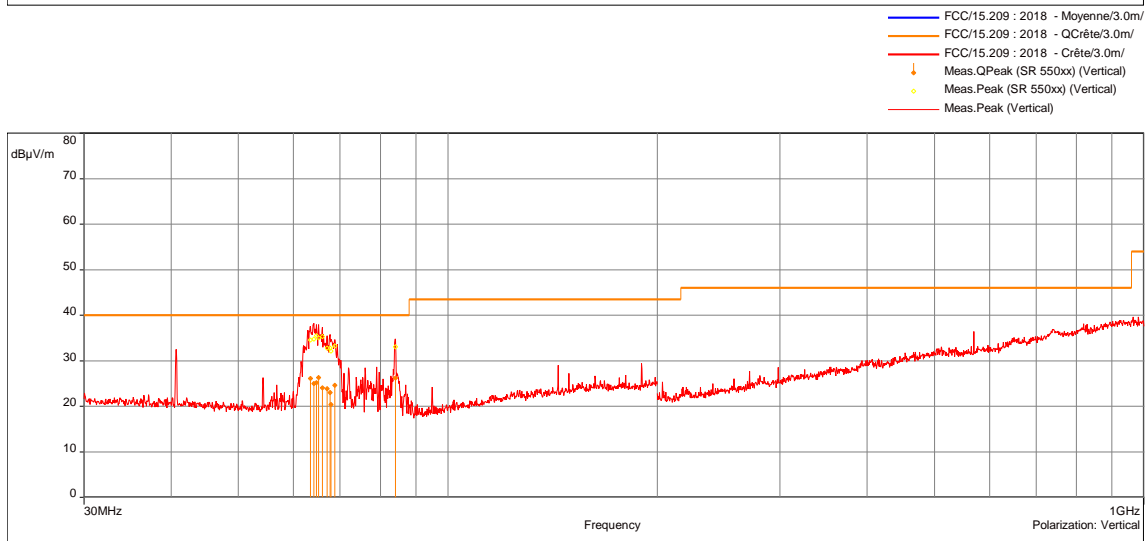
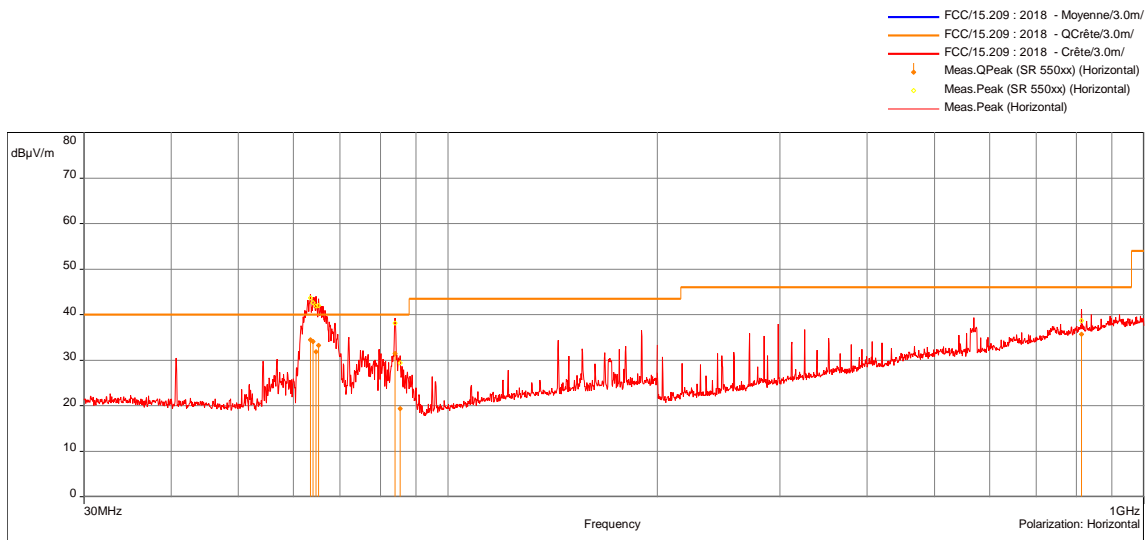
TRANSMITTER RADIATED SPURIOUS EMISSIONS AT FREQUENCIES <30MHZ - GRAPH				
TX/ 0° / CARD EMUL / POSITION 3			EMI4317	
EUT mode:	D-M2		T (°C):	22
Test Date:	28/05/2019 09:54:27		H (%):	48.7
Test Operator:	MPA		P (hPa):	1010
<div style="text-align: right;"> — FCC/FCC Part 15 §209 Tx - Moyenne/3.0m/ — FCC/FCC Part 15 §209 Tx - QCrête/3.0m/ — Meas.Peak </div> 				
POSITION	FREQUENCIES	RBW	VBW	DETECTOR
Circular	9kHz-150kHz	300Hz	1kHz	Peak
Circular	150kHz-1MHz	10kHz	30kHz	Peak
Circular	1MHz-30MHz	10kHz	30kHz	Peak
Configuration:	N/A			
Comments:	Limit indicated on these plots are calculated with 40 dB/decade extrapolation factor and 51.5dB conversion factor. 13.56MHz: Util frequency			
<i>EUT modification(s): N/A</i>				

TRANSMITTER RADIATED SPURIOUS EMISSIONS AT FREQUENCIES <30MHZ - GRAPH					
TX/ 45° / CARD EMUL / POSITION 3				EMI4318	
EUT mode:	D-M2			T (°C):	22
Test Date:	28/05/2019 09:57:28			H (%):	48.7
Test Operator:	MPA			P (hPa):	1010
<div style="text-align: right;"> — FCC/FCC Part 15 §209 Tx - Moyenne/3.0m/ — FCC/FCC Part 15 §209 Tx - QCrête/3.0m/ — Meas.Peak </div> 					
POSITION	FREQUENCIES	RBW	VBW	DETECTOR	
Circular	9kHz-150kHz	300Hz	1kHz	Peak	
Circular	150kHz-1MHz	10kHz	30kHz	Peak	
Circular	1MHz-30MHz	10kHz	30kHz	Peak	
Configuration:	N/A				
Comments:	Limit indicated on these plots are calculated with 40 dB/decade extrapolation factor and 51.5dB conversion factor. 13.56MHz: Util frequency				
<i>EUT modification(s): N/A</i>					

TRANSMITTER RADIATED SPURIOUS EMISSIONS AT FREQUENCIES <30MHZ - GRAPH				
TX/ 90° / CARD EMUL / POSITION 3				EMI4319
EUT mode:	D-M2	T (°C):	22	
Test Date:	28/05/2019 10:00:41	H (%):	48.7	
Test Operator:	MPA	P (hPa):	1010	
<div style="text-align: right;"> <p>— FCC/FCC Part 15 §209 Tx - Moyenne/3.0m/</p> <p>— FCC/FCC Part 15 §209 Tx - QCrête/3.0m/</p> <p>— Meas.Peak</p> </div> 				
POSITION	FREQUENCIES	RBW	VBW	DETECTOR
Circular	9kHz-150kHz	300Hz	1kHz	Peak
Circular	150kHz-1MHz	10kHz	30kHz	Peak
Circular	1MHz-30MHz	10kHz	30kHz	Peak
Configuration:	N/A			
Comments:	Limit indicated on these plots are calculated with 40 dB/decade extrapolation factor and 51.5dB conversion factor. 13.56MHz: Util frequency			
<i>EUT modification(s): N/A</i>				

TRANSMITTER RADIATED SPURIOUS EMISSIONS AT FREQUENCIES >30MHz - GRAPH

TX MODE/ CONFIG TAG / POSITION 1		EMI4295	
EUT mode:	D-M2	T (°C):	22.3
Test Date:	27/05/2019 16:18:15	H (%):	48
Test Operator:	MPA	P (hPa):	1011

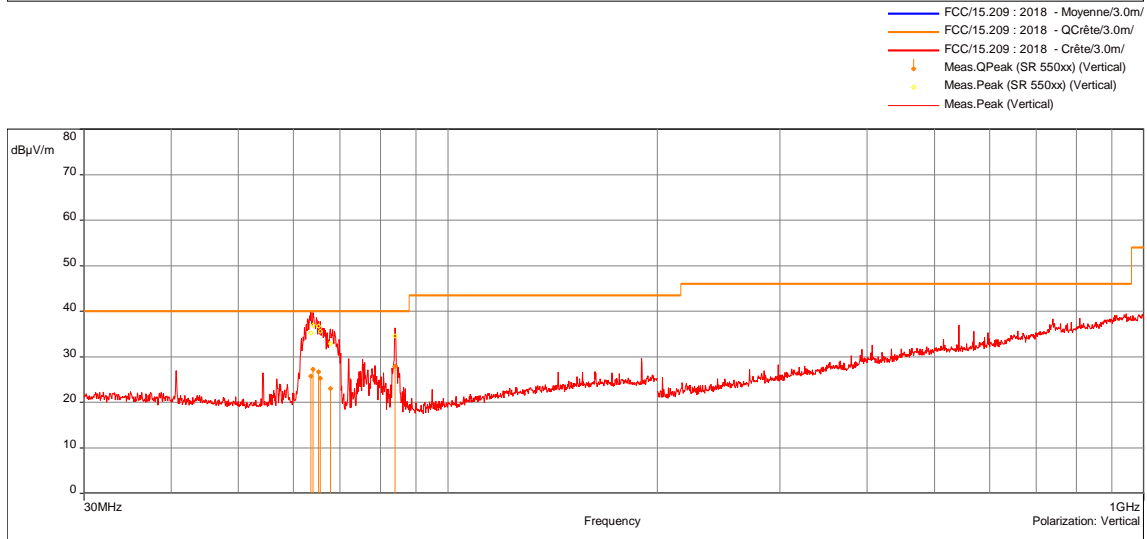
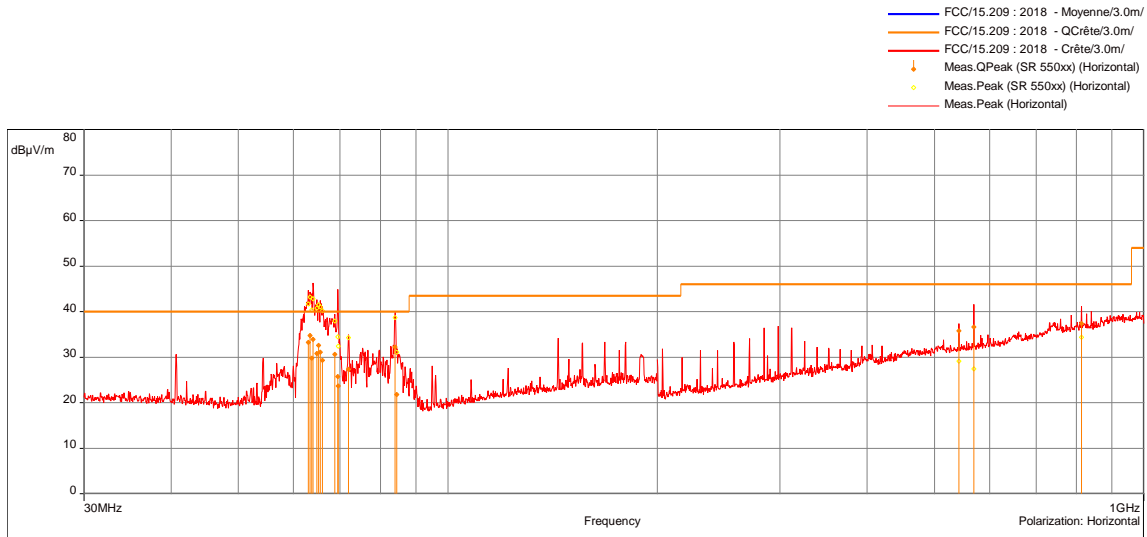


POSITION	FREQUENCIES	RBW	VBW	DETECTOR
Vertical	30MHz-200MHz	100kHz	300kHz	Peak
Horizontal	30MHz-200MHz	100kHz	300kHz	Peak
Horizontal	200MHz-1GHz	100kHz	300kHz	Peak
Vertical	200MHz-1GHz	100kHz	300kHz	Peak
Configuration:				
Comments:	N/A			
<i>EUT modification(s): N/A</i>				

Frequency (MHz)	Polarisation	Peak (dB μ V/m)	QP (dB μ V/m)	QP Limit (dB μ V/m)	Margin (dB)
63.435478	Vertical	34.54	26.15	40	-13.85
64.203394	Vertical	34.76	25	40	-15
64.6807472	Vertical	35.5	25.19	40	-14.81
65.1581004	Vertical	35.02	26.34	40	-13.66
66.0090343	Vertical	35.35	24	40	-16
67.0260042	Vertical	32.81	23.88	40	-16.12
67.7524112	Vertical	32.81	23.03	40	-16.97
67.8769381	Vertical	32.09	20.4	40	-19.6
68.81089	Vertical	33.28	24.61	40	-15.39
84.0446832	Vertical	33.08	26.16	40	-13.84
63.435478	Horizontal	43.63	34.51	40	-5.49
64.0166036	Horizontal	42.65	34.11	40	-5.89
64.6392382	Horizontal	41.91	31.82	40	-8.18
65.1996093	Horizontal	41.99	33.26	40	-6.74
83.9824197	Horizontal	38.13	31.44	40	-8.56
85.3314614	Horizontal	29.43	19.36	40	-20.64
813.649127	Horizontal	38.71	35.72	46	-10.28

TRANSMITTER RADIATED SPURIOUS EMISSIONS AT FREQUENCIES >30MHz - GRAPH

TX MODE/ CONFIG TAG / POSITION 2		EMI4296	
EUT mode:	D-M2	T (°C):	22.3
Test Date:	27/05/2019 13:42:11	H (%):	48
Test Operator:	MPA	P (hPa):	1011



POSITION	FREQUENCIES	RBW	VBW	DETECTOR
Vertical	30MHz-200MHz	100kHz	300kHz	Peak
Horizontal	30MHz-200MHz	100kHz	300kHz	Peak
Horizontal	200MHz-1GHz	100kHz	300kHz	Peak
Vertical	200MHz-1GHz	100kHz	300kHz	Peak

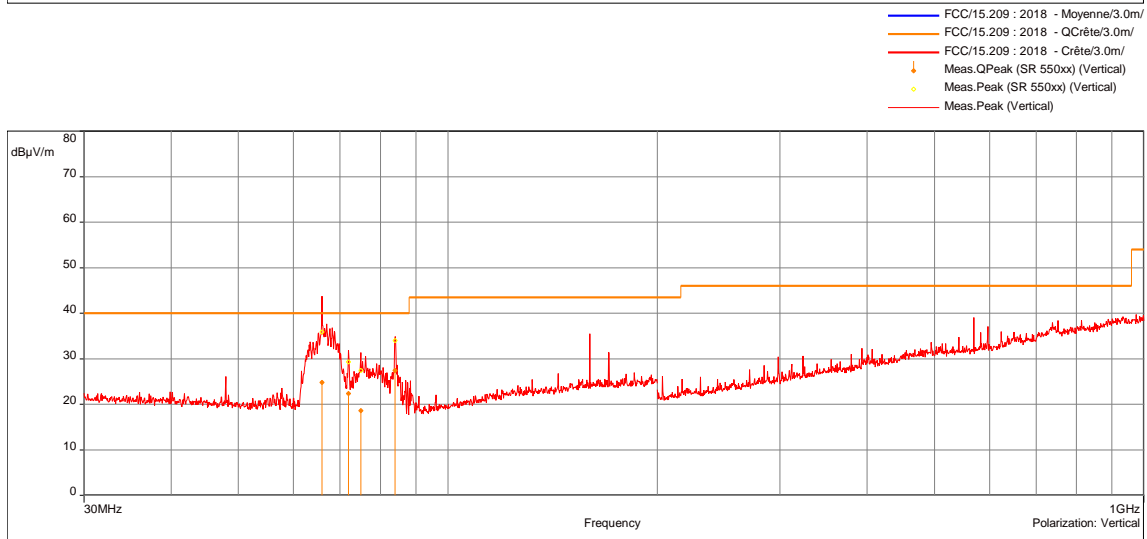
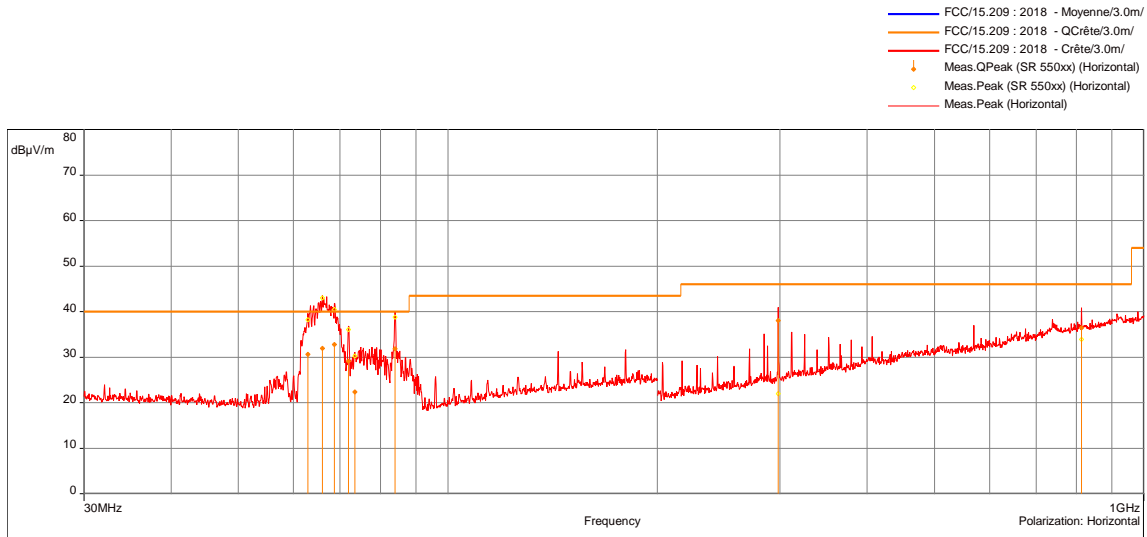
Configuration:	
Comments:	N/A

EUT modification(s): N/A

Frequency (MHz)	Polarisation	Peak (dB μ V/m)	QP (dB μ V/m)	QP Limit (dB μ V/m)	Margin (dB)
63.5600049	Vertical	35.17	25.75	40	-14.25
63.9958491	Vertical	36.95	27.23	40	-12.77
65.1373459	Vertical	36.76	26.69	40	-13.31
65.5316811	Vertical	35.62	25.25	40	-14.75
67.7731657	Vertical	32.86	23.03	40	-16.97
83.9824197	Vertical	34.52	27.89	40	-12.11
62.9996337	Horizontal	41.72	33.27	40	-6.73
63.3732145	Horizontal	43.21	34.72	40	-5.28
63.7467953	Horizontal	40.42	29.81	40	-10.19
64.0166036	Horizontal	42.79	33.86	40	-6.14
64.8467831	Horizontal	40.73	30.78	40	-9.22
65.1996093	Horizontal	41.55	32.61	40	-7.39
65.5524356	Horizontal	41.04	31.07	40	-8.93
66.0505433	Horizontal	40.17	29.28	40	-10.72
68.7486265	Horizontal	37.94	30.6	40	-9.4
69.4957881	Horizontal	34.42	25.72	40	-14.28
69.578806	Horizontal	32.4	23.67	40	-16.33
71.9863265	Horizontal	34.31	27.38	40	-12.62
84.0031742	Horizontal	38.71	32.18	40	-7.82
84.418264	Horizontal	31.05	21.78	40	-18.22
542.424612	Horizontal	29.07	35.8	46	-10.2
569.576364	Horizontal	27.46	36.58	46	-9.42
813.649127	Horizontal	34.34	37.39	46	-8.61

TRANSMITTER RADIATED SPURIOUS EMISSIONS AT FREQUENCIES >30MHz - GRAPH

TX MODE/ CONFIG TAG / POSITION 3		EMI4297	
EUT mode:	D-M2	T (°C):	22.3
Test Date:	27/05/2019 14:07:39	H (%):	48
Test Operator:	MPA	P (hPa):	1011



POSITION	FREQUENCIES	RBW	VBW	DETECTOR
Vertical	30MHz-200MHz	100kHz	300kHz	Peak
Horizontal	30MHz-200MHz	100kHz	300kHz	Peak
Vertical	200MHz-1GHz	100kHz	300kHz	Peak
Horizontal	200MHz-1GHz	100kHz	300kHz	Peak

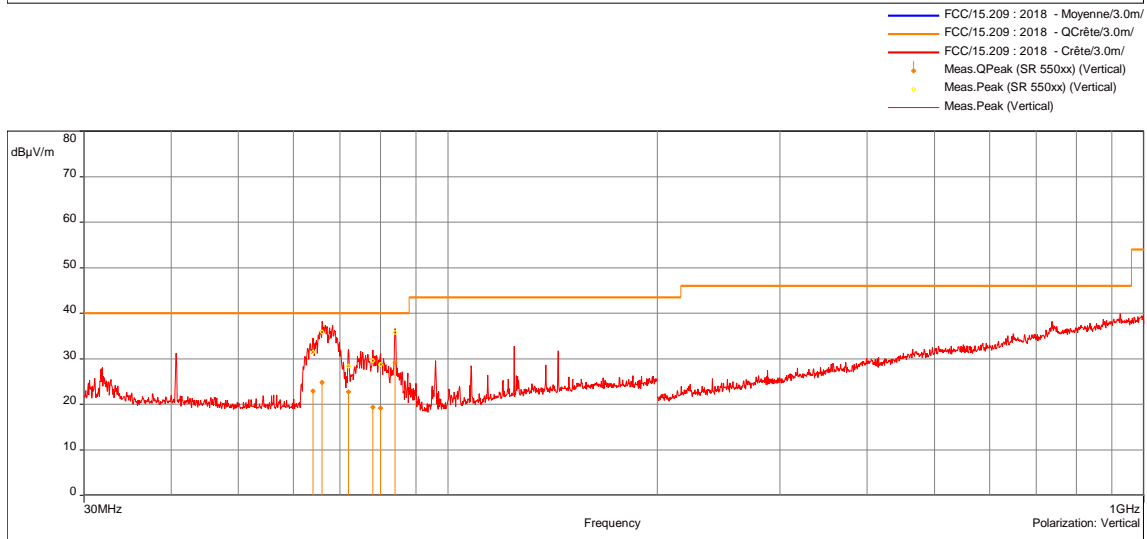
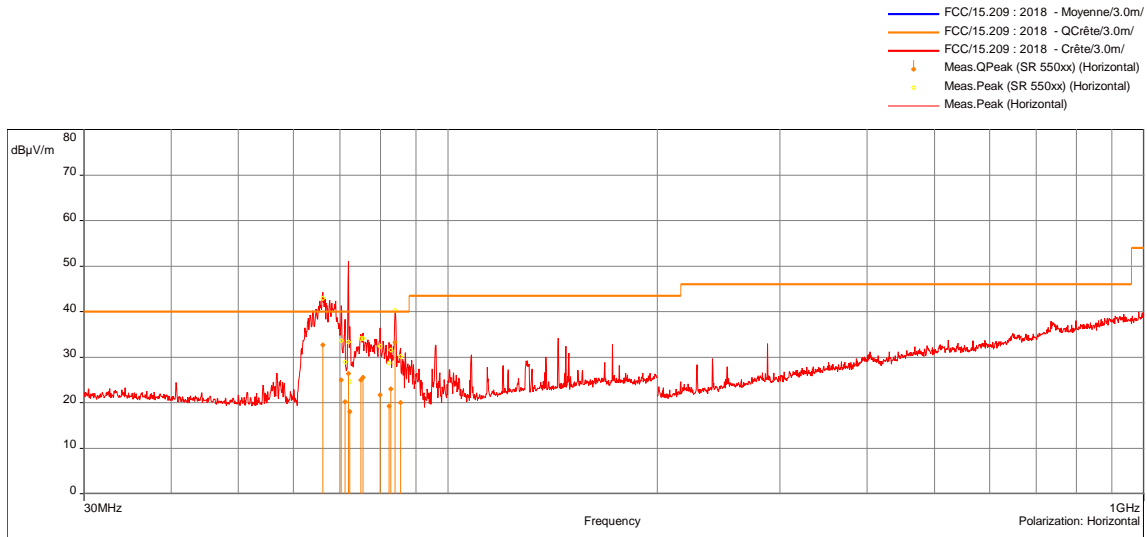
Configuration:	
Comments:	N/A

EUT modification(s): N/A

Frequency (MHz)	Polarisation	Peak (dB μ V/m)	QP (dB μ V/m)	QP Limit (dB μ V/m)	Margin (dB)
65.8845074	Vertical	35.91	24.77	40	-15.23
72.0070809	Vertical	29.28	22.39	40	-17.61
74.954218	Vertical	27.46	18.6	40	-21.4
83.9824197	Vertical	34.01	27.43	40	-12.57
62.9581248	Horizontal	38.21	30.59	40	-9.41
66.0505433	Horizontal	42.99	31.97	40	-8.03
68.7278721	Horizontal	40.47	32.79	40	-7.21
71.965572	Horizontal	36.11	29.16	40	-10.84
73.459895	Horizontal	30.26	22.38	40	-17.62
83.9409108	Horizontal	38.82	31.87	40	-8.13
298.35185	Horizontal	21.99	37.99	46	-8.01
813.649127	Horizontal	33.86	36.48	46	-9.52

TRANSMITTER RADIATED SPURIOUS EMISSIONS AT FREQUENCIES >30MHz - GRAPH

TX MODE/ CARD EMUL / POSITION 1		EMI4298	
EUT mode:	D-M2	T (°C):	22.3
Test Date:	27/05/2019 14:26:57	H (%):	48
Test Operator:	MPA	P (hPa):	1011



POSITION	FREQUENCIES	RBW	VBW	DETECTOR
Vertical	30MHz-200MHz	100kHz	300kHz	Peak
Horizontal	30MHz-200MHz	100kHz	300kHz	Peak
Horizontal	200MHz-1GHz	100kHz	300kHz	Peak
Vertical	200MHz-1GHz	100kHz	300kHz	Peak

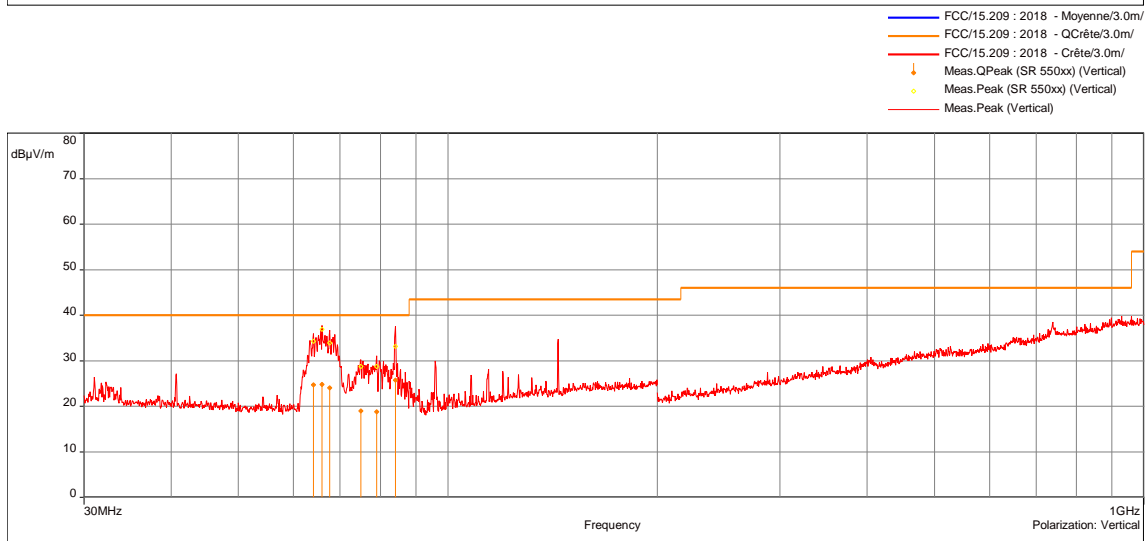
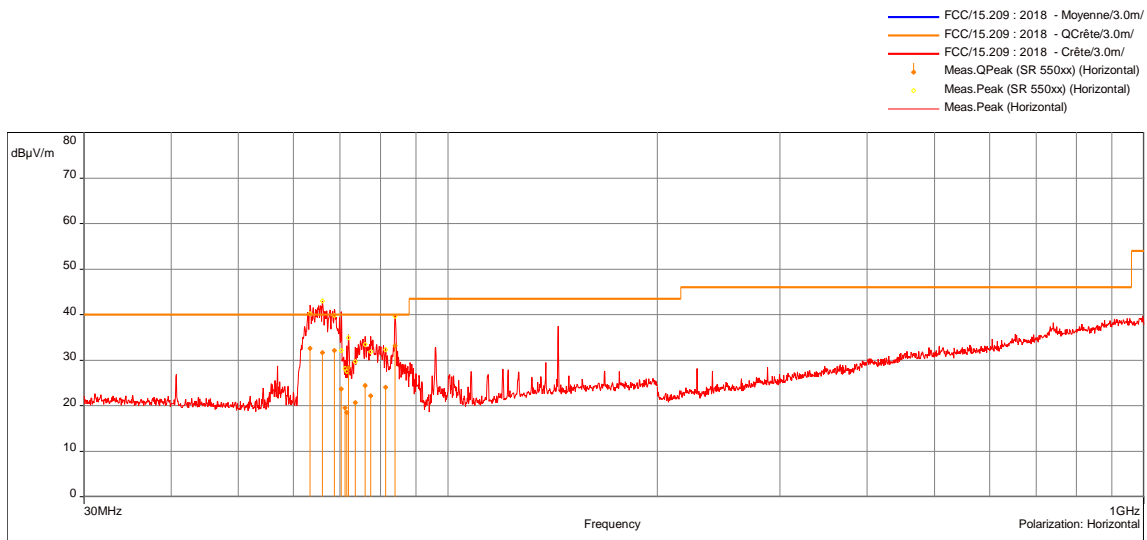
Configuration:	
Comments:	N/A

EUT modification(s): N/A

Frequency (MHz)	Polarisation	Peak (dB μ V/m)	QP (dB μ V/m)	QP Limit (dB μ V/m)	Margin (dB)
63.9958491	Vertical	31.48	22.92	40	-17.08
65.9675253	Vertical	35.83	24.8	40	-15.2
71.9863265	Vertical	28.41	22.7	40	-17.3
78.0051276	Vertical	29.62	19.36	40	-20.64
80.0598218	Vertical	28.74	19.17	40	-20.83
83.9409108	Vertical	35.81	29.11	40	-10.89
66.0920523	Horizontal	42.88	32.67	40	-7.33
70.2844586	Horizontal	33.6	25.02	40	-14.98
71.156147	Horizontal	28.91	20.23	40	-19.77
71.924063	Horizontal	33.36	26.39	40	-13.61
72.3183982	Horizontal	24.57	18.01	40	-21.99
74.954218	Horizontal	34.06	25	40	-15
75.4730802	Horizontal	34.14	25.58	40	-14.42
79.9352948	Horizontal	32.4	21.7	40	-18.3
82.2597973	Horizontal	28.74	19.24	40	-20.76
82.8201685	Horizontal	31.56	23.02	40	-16.98
83.9824197	Horizontal	40.27	33.24	40	-6.76
85.4559883	Horizontal	30.17	19.98	40	-20.02

TRANSMITTER RADIATED SPURIOUS EMISSIONS AT FREQUENCIES >30MHz - GRAPH

TX MODE/ CARD EMUL / POSITION 2		EMI4299	
EUT mode:	D-M2	T (°C):	22.3
Test Date:	27/05/2019 14:52:42	H (%):	48
Test Operator:	MPA	P (hPa):	1011

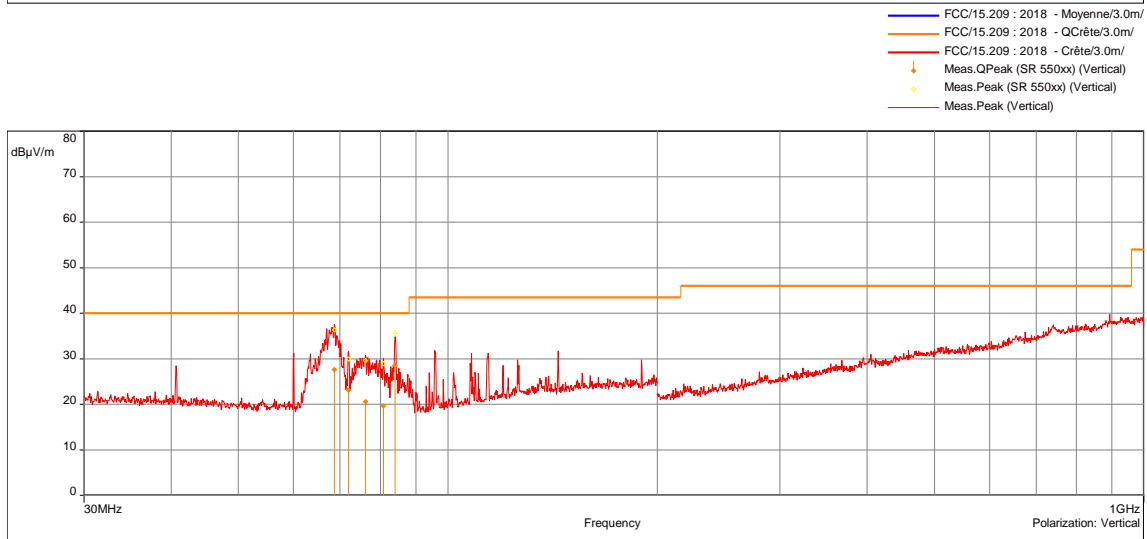
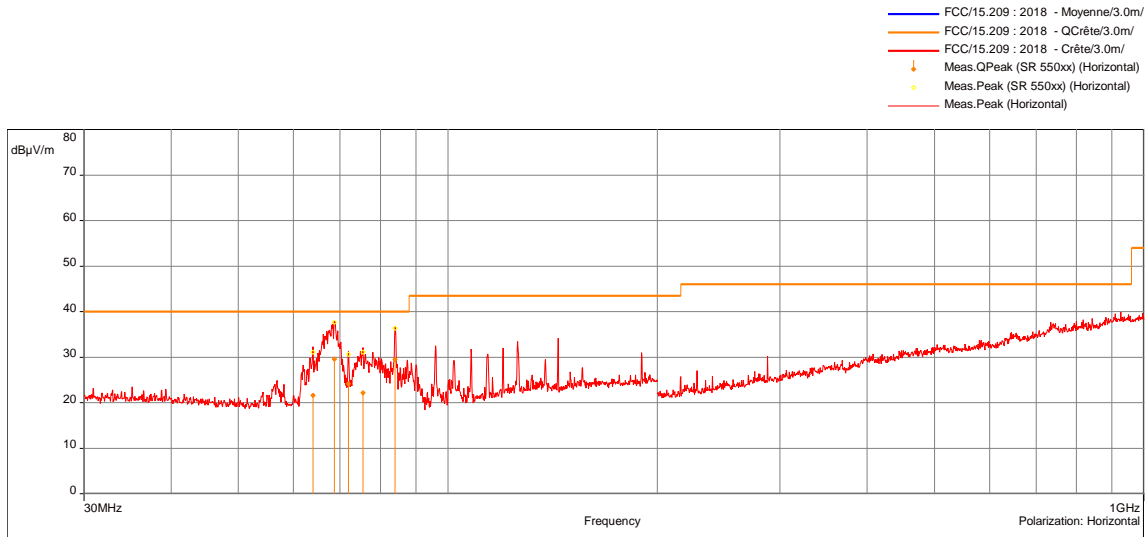


POSITION	FREQUENCIES	RBW	VBW	DETECTOR
Vertical	30MHz-200MHz	100kHz	300kHz	Peak
Horizontal	30MHz-200MHz	100kHz	300kHz	Peak
Horizontal	200MHz-1GHz	100kHz	300kHz	Peak
Vertical	200MHz-1GHz	100kHz	300kHz	Peak
Configuration:				
Comments:	N/A			
<i>EUT modification(s): N/A</i>				

Frequency (MHz)	Polarisation	Peak (dB μ V/m)	QP (dB μ V/m)	QP Limit (dB μ V/m)	Margin (dB)
64.0996215	Vertical	34.33	24.71	40	-15.29
65.9675253	Vertical	36.91	24.83	40	-15.17
67.5863753	Vertical	33.88	24.08	40	-15.92
74.9334636	Vertical	28.74	19	40	-21
78.959834	Vertical	28.72	18.77	40	-21.23
84.0654377	Vertical	33.11	25.76	40	-14.24
63.393969	Horizontal	40.21	32.62	40	-7.38
65.9882798	Horizontal	43.04	31.68	40	-8.32
68.7071176	Horizontal	39.87	32.13	40	-7.87
70.2844586	Horizontal	32.13	23.7	40	-16.3
71.156147	Horizontal	28.2	19.5	40	-20.5
71.5712367	Horizontal	27.5	18.54	40	-21.46
71.9863265	Horizontal	34.92	28.39	40	-11.61
73.6051764	Horizontal	29.72	20.69	40	-19.31
76.0126969	Horizontal	33.47	24.38	40	-15.62
77.5070199	Horizontal	31.86	22.14	40	-17.86
81.3881089	Horizontal	32.26	24.09	40	-15.91
83.9824197	Horizontal	39.66	33.11	40	-6.89

TRANSMITTER RADIATED SPURIOUS EMISSIONS AT FREQUENCIES >30MHz - GRAPH

TX MODE/ CARD EMUL / POSITION 3		EMI4300	
EUT mode:	D-M2	T (°C):	22.3
Test Date:	27/05/2019 15:10:03	H (%):	48
Test Operator:	MPA	P (hPa):	1011



POSITION	FREQUENCIES	RBW	VBW	DETECTOR
Vertical	30MHz-200MHz	100kHz	300kHz	Peak
Horizontal	30MHz-200MHz	100kHz	300kHz	Peak
Horizontal	200MHz-1GHz	100kHz	300kHz	Peak
Vertical	200MHz-1GHz	100kHz	300kHz	Peak
Configuration:				
Comments:	N/A			
<i>EUT modification(s): N/A</i>				

Frequency (MHz)	Polarisation	Peak (dB μ V/m)	QP (dB μ V/m)	QP Limit (dB μ V/m)	Margin (dB)
68.6863631	Vertical	36.37	27.62	40	-12.38
71.9863265	Vertical	29.95	23.07	40	-16.93
76.0957148	Vertical	29.54	20.53	40	-19.47
80.7862288	Vertical	28.96	19.67	40	-20.33
83.9616652	Vertical	35.61	28.53	40	-11.47
63.9958491	Horizontal	31.06	21.58	40	-18.42
68.7278721	Horizontal	37.67	29.6	40	-10.4
71.965572	Horizontal	30.6	24.15	40	-15.85
75.4523257	Horizontal	31.09	22.18	40	-17.82
84.0031742	Horizontal	36.31	29.52	40	-10.48

6.4. Field strength in the band 13.553-13.567MHz

Reference standard:	FCC part 15 Radio part 15.225 a) & RSS-210
Test method:	FCC part 15 Radio part 15.225 a) & RSS-210
<p>General test setup: EUT is set on an insulating support at 80cm. Measurements were then performed in a 10-meter Open Area Test Site that complies to CISPR 16.</p> <p>The EUT was rotated 360° in order to maximize radiated levels. Test antenna was oriented in 3 axes (0°, 45° and 90°).</p> <p>For portable equipments a research of maximum level is done on the 3 axes. Only the highest levels are recorded.</p>	

TEST CASE	EUT MODE	SEVERITY	RESULT TAB.	VERDICT
Tx mode	Permanent emission mode	15848µV/m at 30m	-	PASS

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

TEST EQUIPMENT USED					
CATEGORY	BRAND	TYPE	IDENTIFIER	CAL. DATE	CAL. DUE
Antenna	Rohde & Schwarz	HFH2-Z2	5825	20/09/2017	20/11/2019
Antenna mast	INNCO	MA4000-EP-O	10261		
Cable	Huber + Suhner	N-20m	8385	11/10/2017	11/12/2019
Mast controller	Heinrich Deisel	HD100	4036		
Open area test site	EMITECH	Salinelles	3482	10/10/2017	10/12/2020
Receiver	Rohde & Schwarz	ESHS10	3371	20/09/2018	20/11/2019
Turntable	Heinrich Deisel	D4420	4038		

Blank cells = Permanent validity

FIELD STRENGTH - TABULATED RESULTS – CONFIG TAG				
Frequency (MHz)	Polarization (°)	Level at 10m (dBµA/m)	Limit at 10m (dBµA/m)	Limit at 30m (µV/m)
13.56	0	-1.91	51.58	15848
13.56	45	-0.41	51.58	15848
13.56	90	2.69	51.58	15848

Maximum level at 10m is 2.69dBµA/m for a limit at 51.58 dBµA/m.

Using an extrapolation factor of 40dB/dec and a conversion factor of -51.5dB, level at 30m is 35.11 dBµV/m for a limit at 84 dBµV/m.

FIELD STRENGTH - TABULATED RESULTS – CARD EMULATION				
Frequency (MHz)	Polarization (°)	Level at 10m (dBμA/m)	Limit at 10m (dBμA/m)	Limit at 30m (μV/m)
13.56	0	-5.71	51.58	15848
13.56	45	-4.21	51.58	15848
13.56	90	-1.01	51.58	15848

Maximun level at 10m is -1.01dBμA/m for a limit at 51.58 dBμA/m.

Using an extrapolation factor of 40dB/dec and a conversion factor of -51.5dB, level at 30m is 31.41 dBμV/m for a limit at 84 dBμV/m.



6.5. Field strength outside the band 13.110-14.010MHz

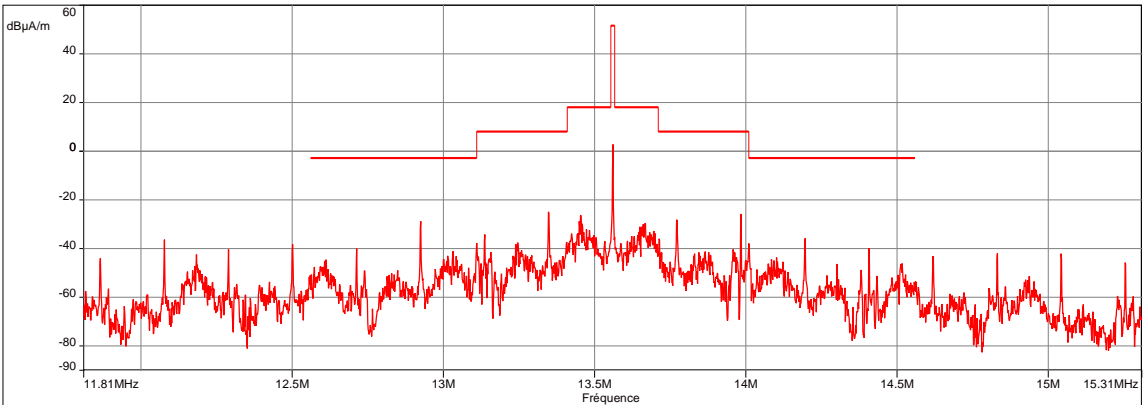
Reference standard:	FCC part 15 Radio part 15.225 b) c) & d) & RSS-210
Test method:	FCC part 15 Radio part 15.225 a) c) & d) & RSS-210
General test setup: EUT is set inside the climatic enclosure. Carrier level are correlated with the maximum carrier level measured in normal conditions.	

FREQUENCY BAND	SEVERITY	RESULT TAB.	VERDICT
Below 13.110MHz	§15.209	See graphic & §6.3 of this report	PASS
13.110-13.410MHz	106µV/m at 30m	See graphic	PASS
13.410-13.553MHz	334µV/m at 30m	See graphic	PASS
13.553-13.567MHz	15,848µV/m at 30m	See graphic & §6.4 of this report	PASS
13.567-13.710MHz	334µV/m at 30m	See graphic	PASS
13.710-14.010MHz	106µV/m at 30m	See graphic	PASS
Above 14.010MHz	§15.209	See graphic & §6.3 of this report	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: Test are done in the worst configuration mode: Config Tag which presents the higher carrier level (All modulations activated at the same time).		

TEST EQUIPMENT USED					
CATEGORY	BRAND	TYPE	IDENTIFIER	CAL. DATE	CAL. DUE
AC power source	KIKUSUI	PCR4000L	3074	12/06/2018	12/08/2019
Antenna	Emitech	3.5 cm	4653		
Cable	MICRO-COAX	N-3m	10535	06/04/2017	06/06/2019
Climatic enclosure	CLIMATS	EXCAL 7714-HA	14261	26/04/2018	26/06/2019
Multimeter	FLUKE	8808A	12446	24/04/2018	24/06/2019
Spectrum analyzer	Rohde & Schwarz	FSW43	14830	28/12/2018	28/02/2020
Thermohygrometer	Bioblock Scientific	Météostar	0963	25/01/2019	25/03/2021
Thermohygrometer	Testo	608-H2	12268	27/11/2017	27/01/2020

Blank cells = Permanent validity

FIELD STRENGTH IN THE BAND 13.110-14.010MHZ AND OUTSIDE - GRAPH					
FIELD STRENGTH IN THE BAND 13.110-14.010MHZ AND OUTSIDE				EMI5564	
EUT mode:	Tx mode			T (°C):	21.3°C
Test Date:	10/04/2019			H (%):	39.4 %
Test Operator:	MPA			P (hPa):	1015hPa
<p>Description Sous-bande 1 Fréquences:11.81 MHz - 15.31 MHz (Mode analyseur) 8000 Points Réglages: RBW: 300Hz, VBW: 1kHz, Auto, Atténuation : Auto, Nombre de Balayages : 1, Preamp : Off, LN Preamp : Off, Preselecteur: Off Position:Circulaire Distance: 10 m</p> <p style="text-align: right;"> — FCC/FCC Part 15 §225 - Classe:Tx - QCrête/10.0m/ — Mes.Peak </p>  <p style="font-size: small;">RFID MASK / 25°C / 5Vdc - 29/05/2019 14:25 - 4341</p>					
POSITION	FREQUENCIES	RBW	VBW	DETECTOR	
RF port	11.81-15.31MHz	300Hz	1kHz	Peak max hold	
Configuration:	N/A				
Comments:	Limit indicated on these plots are calculated with 40 dB/decade extrapolation factor and 51.5dB conversion factor.				
<i>EUT modification(s): N/A</i>					

6.6. Measurement of Frequency Stability

Reference standard:	FCC part 15 Radio part 15.225 e) & RSS-210
Test method :	FCC part 15 Radio part 15.225 e), ANSI C63.10:2013 and RSS Gen
<p>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.</p> <p>EUT is set inside the climatic enclosure. Carrier level are correlated with the maximum carrier level measured in normal conditions.</p> <p>A digital temperature probe is set near the equipment in order to ensure a temperature stabilisation.</p> <p>Measurement are made according to ANSI C63.10:2013 §6.8.1, only extremes tests values are shown in final results.</p>	

TEST CASE	EUT MODE	SEVERITY	RESULT TAB.	VERDICT
Tx mode	Tx mode	+/-0.01%	-	PASS

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

TEST EQUIPMENT USED					
CATEGORY	BRAND	TYPE	IDENTIFIER	CAL. DATE	CAL. DUE
AC power source	KIKUSUI	PCR4000L	3074	12/06/2018	12/08/2019
Antenna	Emitech	3.5 cm	4653		
Cable	MICRO-COAX	N-3m	10535	06/04/2017	06/06/2019
Climatic enclosure	CLIMATS	EXCAL 7714-HA	14261	26/04/2018	26/06/2019
Digital thermometer	GHM Greisinger	GMH 3710	12968	11/02/2019	11/04/2020
Multimeter	FLUKE	8808A	12446	24/04/2018	24/06/2019
Spectrum analyzer	Rohde & Schwarz	FSW43	14830	28/12/2018	28/02/2020
Thermohygrometer	Bioblock Scientific	Météostar	0963	25/01/2019	25/03/2021
Thermohygrometer	Testo	608-H2	12268	27/11/2017	27/01/2020
Thermometer contactless	GHM Greisinger	GMH 3710	12968	11/02/2019	11/04/2020

Blank cells = Permanent validity

EFFECTIVE RADIATED POWER - TABULATED RESULTS				
Test Case (Temperature variation)	Temperature (°C)	Power supply (Vdc)	Frequency (MHz)	Frequency error (%)
Normal conditions	25	5	13.560268	-
Extremes tests conditions	-30	5	13.5602425	0.00179
	+55	5	13.5602025	0.00149



ooo End of test report ooo