



Test report issued under the responsibility of:
EMITECH MONTPELLIER laboratory
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RADIO TEST REPORT

FCC 47 CFR PART 15

FCC part 15.247

RSS-247_Issue 2, February 2017

RSS-Gen, Issue 5, April 2018 / AMD 1: 2019 / AMD 2: 2021

Company: **STID**
Address.....: 20 Parc d'activités des Pradeaux
13850 GREASQUE
FRANCE

Test item description: **RFID reader**
Trade Mark: Spectre Nano
Manufacturer: STID
Model/Type reference.....: SNA / SNA-R52
FCC ID.....: OVNSNA
IC: 10520A-SNA
Ratings.....: 10Vdc to 36Vdc

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

Report Reference No.: **RR-EVE-21G105-2A**
Test procedure: FCC IC Certification
Diffusion.....: Mr Nicolas SOGOYAN
Applicant's name: STID
Date of issue.....: June 15, 2023
Total number of pages.....: 52
Revision.....: 0
Compiled by.....: Célien FOUGEROLLE
Approved by (+ signature).....: Olivier HEYER (Laboratory 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.*

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REVISION HISTORY:

Revision	Date	Modified pages	Modifications
0	June 15, 2023	/	Creation

1. GENERAL INFORMATION

This document submits the results of Radio tests performed on the equipment **SNA-R52** (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 Location : EMITECH MONTPELLIER laboratory Address : 145 rue de Massacan 34740 VENDARGUES FRANCE Test procedure. : FCC IC Certification Tested by : Alexis TOUZET, Célien FOUGEROLLE and Morgan PATEY Test supervisor : N/A Date of receipt of test item : N/A Date (s) of performance of tests : Between october, the 15 th of 2021 to June the 30 th of 2022					
APPLICANT'S GENERAL INFORMATION:					
Company name : STID Company address. : 20 Parc d'activités des Pradeaux 13850 GREASQUE FRANCE Person(s) present during the tests. : Mr SOGOYAN Nicolas Responsible. : Mr SOGOYAN Nicolas					
GENERAL REMARKS:					
The information in italics is declared by the manufacturer and is under his responsibility 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. "(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)					
DEFINITIONS AND ABBREVIATIONS:					
E.U.T.	Equipment Under Test	AE	Ancillary Equipment	Pk	Peak detector
RBW	Resolution BandWidth	VBW	Video BandWidth	QP	Quasi-peak detector
OATS	Open Area Test Site	FAR	Full Anechoic Room	Av	Average detector
VP	Vertical Polarization	HP	Horizontal Polarization	RMS	Root Mean Square
RF	Radio Frequency	N.T.R	Nothing To Report	N/C	Not Communicated

2. REFERENCE DOCUMENT(S)

NORMATIVE REFERENCES:

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

FCC 47 CFR PART 15: April 2020

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 / AMD 1: 2019 / AMD 2: 2021

General requirements and information relating to the certification of radiocommunication equipment

ANSI C 63.10 : 2013

American National Standard of Procedures for Compliance Testing of Unlicensed Wireless Devices

ANSI C63.4 : 2014

American National Standard for Methods of Measurement of Radio-Noise Emissions from Low-Voltage Electrical and Electronic Equipment in the Range of 9kHz to 40GHz.

KDB 447498 D01 General RF Exposure Guidance v06

RF Exposure Procedures and Equipment Authorization Policies for Mobile and Portable Device.

Although the product standard uses obsolete technical standards, the latest versions of standards achievable by the laboratory will be used for testing.

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..... : SNA / SNA-R52
FCC ID..... : OVNSNA
IC. : 10520A-SNA
Trade Mark. : Spectre Nano
Serial number (S/N)..... : S21411112
Part number (P/N). : Not communicated
Software version..... : *Not communicated*
Firmware version. : *I01 et V08P*
Type of sample. : Pre-serial
Function(s)..... : RFID reader
Manufacturer name. : STID
Address..... : 20 Parc d'activités des Pradeaux
13850 GREASQUE
FRANCE

General product information:

N/A

3.2. EUT Marking plate



3.3. EUT General view



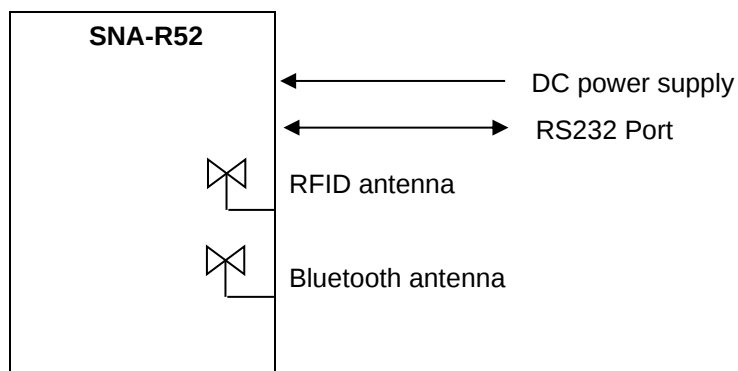
3.4. EUT Mechanical and Electrical Design

Power supply.....: 12Vdc
 Power supply range.....: 10Vdc to 36Vdc
 Power type.....: DC power supply
 Power (W).....: <15
 Nominal current (A).: 0.9
 Dimensions (L x W x H) (m).: 0.23*0.185*0.035
 Weight (kg).: 1.25
 Temperature range (°C).: -30 / +60
 Ground bounding strap.....: No

Comments:

N/A

3.5. EUT Input/Output ports



PORT	NAME	TYPE	LENGTH	CABLE TYPE	COMMENTS
0	Main frame	N/E	N/A	Plastic	N/A
1	DC power supply	DC	N/C	Shielded	12Vdc
2	RS232 Port	I/O	N/C	Shielded	N/A
3	RFID antenna	N/A	N/A	N/A	N/A
3	Bluetooth antenna	N/A	N/A	N/A	N/A

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: Direct current port

RF.....: Radio frequency port

3.6. Supporting Equipment Used During Test

Sample subject to the tests was tested with following equipment.

PRODUCT TYPE	MANUFACTURER	MODEL	N°EMITECH / COMMENTS
Laptop	Dell	Latitudfe 5510	Used to set EUT in test mode through RS232 port
AC/DC adaptor	Mean Well	GE40I12P1J	Used as power supply for AC power-line conducted emissions measurments

(AE) LAPTOP



(AE) AC/DC ADAPTOR



3.7. EUT Radio Specifications

a) GENERAL INFORMATIONS	
According to manufacturer's declarations :	
EUT type.....	<i>Transceiver</i>
Technology	<i>RFID UHF</i>
Environmental profile.....	<i>Data transmissions</i>
Temperature range.....	<i>-30°C / +60°C</i>
Antenna type	<i>Integrated</i>
Antenna Gain.....	<i>2dBi</i>
Comments:	
<i>N/A</i>	
b) TRANSMITTER PARAMETERS (Tx)	
Frequency bands.....	<i>902MHz to 928MHz</i>
RF Power.....	<i>Not communicated</i>
Number of channels / Separation.....	<i>50 cchannels / 500kHz</i>
Modulation type	<i>ASK</i>
Duty cycle	<i>Not communicated</i>
Tested frequency.....	<i>Low channel : 902.75MHz</i>
	<i>Mid channel : 915.25MHz</i>
	<i>High channel : 927.25MHz</i>
c) RECEIVER PARAMETERS (Rx)	
Frequency bands.....	<i>902MHz to 928MHz</i>
Bandwidth.....	<i>Not communicated</i>

4. RESULT SUMMARY

TEST DESIGNATION	SEVERITY	VERDICT	BASIC STANDARDS / COMMENTS
SUBPART A - GENERAL			
Measurement standards		PASS	15.31
Frequency range of radiated measurements		PASS	15.33
Measurement detector functions and bandwidths		PASS	15.35
SUBPART B – UNINTENTIONAL RADIATORS			
Conducted limits	Class B	PASS	15.107
Radiated emission limits	Class B	PASS	15.109
SUBPART C –INTENTIONAL RADIATORS			
Equipment authorization requirement		PASS	15.201 / Transmitter part is subject to Certification procedure
Antenna requirement		PASS	15.203 / Dedicated integral antenna
Restricted bands of operation		PASS	15.204
Conducted limits	Class B	PASS	15.207
Radiated emission limits; general requirements	Class B	PASS	15.209
Additional provisions to the general radiated emission limits		PASS	15.215
Operation within the band 902-928MHz, 2400-2483.5MHz and 5725-5850MHz			15.247
- Frequency hopping and digitally modulated		-	a)
- Frequency hopping system		PASS	a) (1)
- 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		N/A	c)
- Out-of-band emissions		PASS	d)
- Power spectral density conducted		N/A	e)
- Hybrid system		N/A	f)
- Frequency hopping additional requirements		PASS	g)
- Frequency hopping intelligence		PASS	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.

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		
Power spectral density	$\pm 2.3\text{dB}$	$\pm 3\text{ dB}$
Occupied bandwidth		
RF power	$\pm 3.8\%$	$\pm 5\%$
Conducted emission (spurious)		
$f \leq 1\text{ GHz}$	$\pm 0.8\text{ dB}$	
1 GHz - 12.75 GHz	$\pm 1.6\text{ dB}$	$\pm 3\text{ dB}$
Radiated emission (ERP / EIRP)		
$f \leq 62.5\text{ MHz}$	$\pm 5.1\text{ dB}$	$\pm 6\text{ dB}$
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	$\pm 5.4\text{ dB}$	$\pm 6\text{ dB}$
Radiated emission (magnetic field)		
9kHz – 30MHz	$\pm 3\text{ dB}$	$\pm 6\text{ dB}$
Supply voltages	$\pm 3\%$	$\pm 3\%$
Temperature	$\pm 1\text{ }^{\circ}\text{C}$	$\pm 1\text{ }^{\circ}\text{C}$
Humidity	$\pm 5\%$	$\pm 5\%$
Time / Duty cycle	$\pm 4.4\%$	$\pm 5\%$
Adaptivity	$\pm 2.9\text{ dB}$	/
Conducted emission (FCC)		
(Artificial Mains Network) 150kHz – 30MHz	$\pm 3.4\text{ dB}$	$\pm 3.4\text{ dB}$
Radiated emission (electric field for FCC standard)		
9kHz – 30MHz	$\pm 2.7\text{ dB}$	/
30MHz – 1GHz	$\pm 5.0\text{ dB}$	/
1GHz – 18GHz	$\pm 5.6\text{ dB}$	/
18GHz – 26GHz	$\pm 5.7\text{ dB}$	/
26GHz – 40GHz	$\pm 5.7\text{ dB}$	/

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

6. RF EXPOSURE

RF EXPOSURE – TABULATED RESULT		
FREQUENCY (MHz)	MAXIMUM EIRP (dBm)	MAXIMUM EIRP (mW)
915.25	27.1	512.86
In accordance with KDB 447498 D01 General RF Exposure Guidance v06: $PSD = \frac{EIRP_{mW}}{4 \times \pi \times d^2}$ <i>d : distance of use in centimeter</i> $PSD = \frac{512.86}{4 \times \pi \times 20cm^2}$		
RESULT		LIMIT
0.102 mW/cm ²		0.61 mW/cm ²

7. TEST CONDITIONS AND RESULTS

7.1. AC power-line conducted emissions

Reference standard:	FCC part 15.207 RSS-Gen
Test method:	ANSI C63.10 : 2013 ANSI C63.4 : 2014
General test setup: EUT is set on an insulating support at 40cm from 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. All tested telecommunications lines (if applicable) were connected to an Asymmetric Artificial Network (AAN) and conducted voltage measurements on telecommunications lines were made at the output of the AAN. Where an AAN was not appropriate or available, measurements were made using a Capacitive Voltage Probe and/or a Current probe. Additional ground terminals (if any) are connected to earth terminal of the AMN.	

TESTED CABLE	PARAMETER	SEVERITY	RESULT TAB.	VERDICT
120Vac/60Hz	150kHz-30MHz	15.207	EMI4932	PASS

LABORATORY PARAMETERS:	REQUIRED PRIOR TO THE TEST	DURING THE TEST
Ambient Temperature	15 to 35 °C	See Graph(s)
Relative Humidity	30 to 60 %	See Graph(s)
Atmospheric pressure	N/A	See Graph(s)
Test method deviation: N/A		
Supplementary information: N/A		

TEST EQUIPMENT USED					
CATEGORY	BRAND	TYPE	IDENTIFIER	CAL. DATE	CAL. DUE
AC power source	KIKUSUI	PCR 4000L	3074	24/07/2020	24/09/2022
Cable	EMITECH	Current absorber sheath	9491	23/06/2020	23/08/2022
Cable	C&C	N-3m	14335	18/03/2021	18/05/2023
LISN	Rohde & Schwarz	ENV216	17925	24/09/2021	24/11/2023
PE choke	EMITECH	CISPR 16-2-1 : 2008	10071		
Multimeter	FLUKE	8808A	12446	29/09/2020	29/11/2021
Receiver	Rohde & Schwarz	ESI	9704	24/08/2021	24/10/2022
Software	Nexio	BAT EMC	0000		
Thermohygrometer	Testo	608-H2	12268	07/05/2020	07/07/2022
Thermohygrometer	Bioblock Scientific	Météostar	0963	07/06/2021	07/08/2023

BAT-EMC software version: V3.18.0.26

Blank cells = Permanent validity

TEST SETUP PHOTO(S) - 120VAC/60Hz

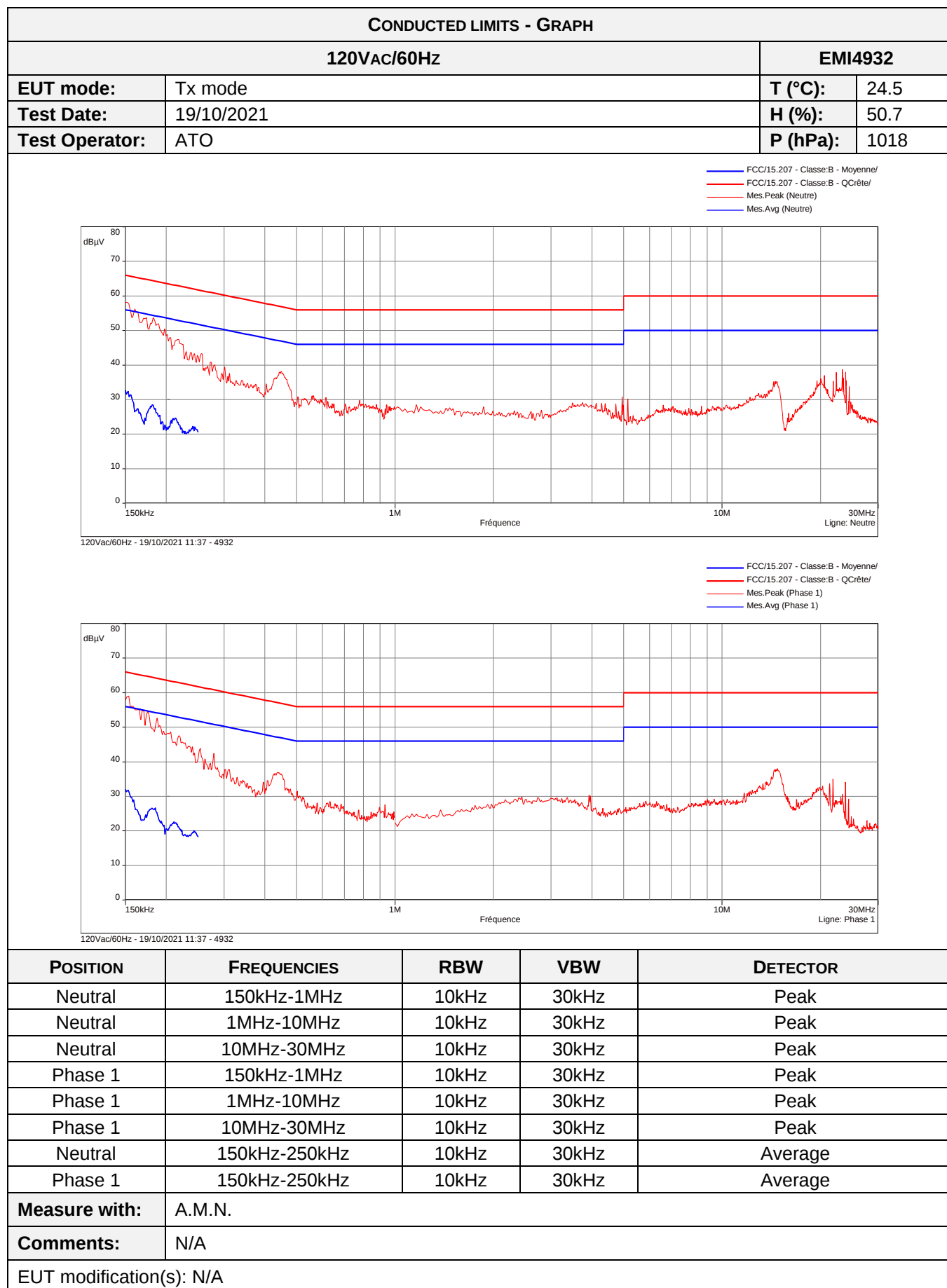


CONDUCTED LIMITS - TABULATED RESULTS

120VAC/60Hz						EMI4932	
Terminal	Test Frequency (MHz)	Meter Reading dB (μV)	Detector (Pk/QP/Av)	Gain/Loss Factor (dB)	Level dB (μV)	Limit dB (μV)	Margin (dB)
Neutral	0.15	N/A	AV	N/A	32.69	56	-23.31
Phase 1	0.15	N/A	AV	N/A	31.99	56	-24.01

Supplementary information: when margin between peak measurements and average/quasi-peak limit(s) is > 6dB, no average/quasi-peak measurements were performed.

Spurious which have more than 20 dB of margin compared to the applicable limit are not necessarily reported.



7.2. Occupied Bandwidth

Reference standard:	FCC part 15.247 RSS-247
Test method:	ANSI C63.10 : 2013
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 %. 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 CHANNEL	OBW	SEVERITY	RESULT TAB.	VERDICT
Low channel	62.448 kHz	< 250 kHz	EMI4789	PASS
Mid channel	61.467 kHz	< 250 kHz	EMI4954	PASS
High channel	64.390 kHz	< 250 kHz	EMI4955	PASS

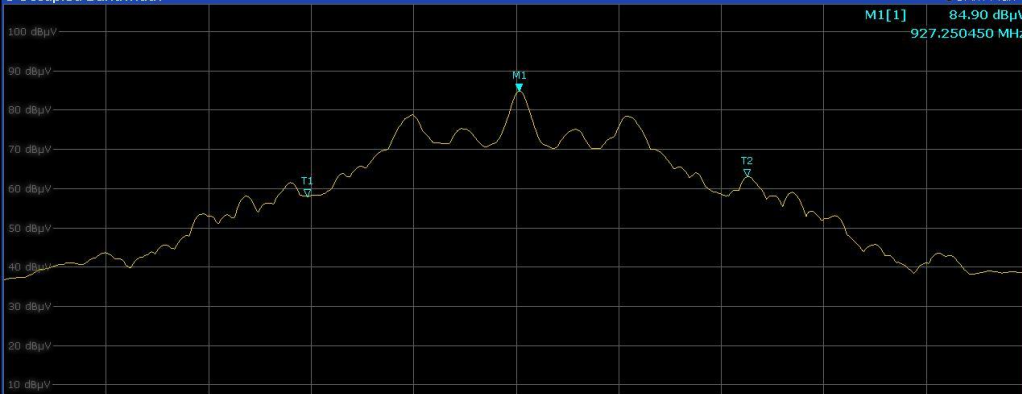
LABORATORY PARAMETERS:	REQUIRED PRIOR TO THE TEST	DURING THE TEST
Ambient Temperature	15 to 35 °C	21.4 °C
Relative Humidity	20 to 75 %	59.3 %
Atmospheric pressure	N/A	1018 hPa
Test method deviation: N/A		
Supplementary information: N/A		

TEST EQUIPMENT USED					
CATEGORY	BRAND	TYPE	IDENTIFIER	CAL. DATE	CAL. DUE
Cable	SUCOFLEX	N-6,5m	14380	25/07/2019	25/03/2022
Cable	MegaPhase	N-8m	15813	14/01/2021	14/03/2023
Cable	MegaPhase	TM18-N1N1-118	12842	02/12/2020	02/02/2023
Multimeter	FLUKE	8808A	12446	29/09/2020	29/11/2021
Power supply	TTI	TSX-1820P	4365		
Shielded enclosure	COMTEST	SAC 3m	14494	02/10/2019	02/12/2022
Spectrum analyzer	Rohde & Schwarz	ESW26	17791	14/04/2021	14/06/2022
Thermohygrometer	Testo	608-H2	12269	07/05/2020	07/07/2022
Thermohygrometer	Bioblock Scientific	Météostar	0963	07/06/2021	07/08/2023

Blank cells = Permanent validity

OCCUPIED BANDWIDTH - GRAPH																															
LOW CHANNEL		EMI4789																													
EUT mode:	Continuous modulated Tx	T (°C):	21.4																												
Test Date:	19/10/2021	H (%):	59.3																												
Test Operator:	ATO	P (hPa):	1018																												
MultiView Receiver Spectrum Ref Level 107.00 dBµV Att 10 dB Input 1 AC SWT 5 ms PS On RBW 2 kHz VBW 5 kHz Mode Sweep Frequency 902.7500000 MHz 1 Occupied Bandwidth 100 dBµV 90 dBµV 80 dBµV 70 dBµV 60 dBµV 50 dBµV 40 dBµV 30 dBµV 20 dBµV 10 dBµV CF 902.75 MHz M1 T1 T2 1001 pts 15.0 kHz/ Span 150.0 kHz 2 Marker Table <table><thead><tr><th>Type</th><th>Ref</th><th>Trc</th><th>X-Value</th><th>Y-Value</th><th>Function</th><th>Function Result</th></tr></thead><tbody><tr><td>M1</td><td>1</td><td></td><td>902.75045 MHz</td><td>82.38 dBµV</td><td>Occ Bw</td><td>62.447934517 kHz</td></tr><tr><td>T1</td><td>1</td><td></td><td>902.719119 MHz</td><td>55.36 dBµV</td><td>Occ Bw Centroid</td><td>902.750342807 MHz</td></tr><tr><td>T2</td><td>1</td><td></td><td>902.781567 MHz</td><td>55.20 dBµV</td><td>Occ Bw Freq Offset</td><td>342.807176828 Hz</td></tr></tbody></table> Aborted 19.10.2021 10:25:54 Ref Level RBW 10:25:55 19.10.2021				Type	Ref	Trc	X-Value	Y-Value	Function	Function Result	M1	1		902.75045 MHz	82.38 dBµV	Occ Bw	62.447934517 kHz	T1	1		902.719119 MHz	55.36 dBµV	Occ Bw Centroid	902.750342807 MHz	T2	1		902.781567 MHz	55.20 dBµV	Occ Bw Freq Offset	342.807176828 Hz
Type	Ref	Trc	X-Value	Y-Value	Function	Function Result																									
M1	1		902.75045 MHz	82.38 dBµV	Occ Bw	62.447934517 kHz																									
T1	1		902.719119 MHz	55.36 dBµV	Occ Bw Centroid	902.750342807 MHz																									
T2	1		902.781567 MHz	55.20 dBµV	Occ Bw Freq Offset	342.807176828 Hz																									
Results:	The system has an OBW of 62.448 kHz																														
EUT modification(s): N/A																															

OCCUPIED BANDWIDTH - GRAPH																																
MID CHANNEL			EMI4954																													
EUT mode:	Continuous modulated Tx		T (°C):	21.4																												
Test Date:	19/10/2021		H (%):	59.3																												
Test Operator:	ATO		P (hPa):	1018																												
MultiView Receiver Spectrum Ref Level 107.00 dBuV Att 10 dB SWT 5 ms RBW 2 kHz Input 1 AC PS On Notch Off Mode Sweep Frequency 915.250000 MHz 1 Occupied Bandwidth 100 dBuV 90 dBuV 80 dBuV 70 dBuV 60 dBuV 50 dBuV 40 dBuV 30 dBuV 20 dBuV 10 dBuV CF 915.25 MHz 1001 pts 15.0 kHz/ Span 150.0 kHz 2 Marker Table <table><thead><tr><th>Type</th><th>Ref</th><th>Trc</th><th>X-Value</th><th>Y-Value</th><th>Function</th><th>Function Result</th></tr></thead><tbody><tr><td>M1</td><td>1</td><td>1</td><td>915.25045 MHz</td><td>85.11 dBuV</td><td>Occ Bw</td><td>61.467099936 kHz</td></tr><tr><td>T1</td><td>1</td><td>1</td><td>915.220273 MHz</td><td>57.30 dBuV</td><td>Occ Bw Centroid</td><td>915.251006952 MHz</td></tr><tr><td>T2</td><td>1</td><td>1</td><td>915.281741 MHz</td><td>57.94 dBuV</td><td>Occ Bw Freq Offset</td><td>1.006951564 kHz</td></tr></tbody></table> Aborted 19.10.2021 10:27:58 Ref Level RBW 10:27:58 19.10.2021					Type	Ref	Trc	X-Value	Y-Value	Function	Function Result	M1	1	1	915.25045 MHz	85.11 dBuV	Occ Bw	61.467099936 kHz	T1	1	1	915.220273 MHz	57.30 dBuV	Occ Bw Centroid	915.251006952 MHz	T2	1	1	915.281741 MHz	57.94 dBuV	Occ Bw Freq Offset	1.006951564 kHz
Type	Ref	Trc	X-Value	Y-Value	Function	Function Result																										
M1	1	1	915.25045 MHz	85.11 dBuV	Occ Bw	61.467099936 kHz																										
T1	1	1	915.220273 MHz	57.30 dBuV	Occ Bw Centroid	915.251006952 MHz																										
T2	1	1	915.281741 MHz	57.94 dBuV	Occ Bw Freq Offset	1.006951564 kHz																										
Results:	The system has an OBW of 61.467 kHz																															
EUT modification(s): N/A																																

OCCUPIED BANDWIDTH - GRAPH																																
HIGH CHANNEL			EMI4955																													
EUT mode:	Continuous modulated Tx		T (°C):	21.4																												
Test Date:	19/10/2021		H (%):	59.3																												
Test Operator:	ATO		P (hPa):	1018																												
MultiView Receiver Spectrum Ref Level 107.00 dBµV Att 10 dB Input 1 AC PS On SWT 5 ms RBW 2 kHz VBW 5 kHz Mode Sweep Frequency 927.2500000 MHz 1 Occupied Bandwidth  CF 927.25 MHz 1001 pts 15.0 kHz/ Span 150.0 kHz 2 Marker Table <table><thead><tr><th>Type</th><th>Ref</th><th>Trc</th><th>X-Value</th><th>Y-Value</th><th>Function</th><th>Function Result</th></tr></thead><tbody><tr><td>M1</td><td>1</td><td>1</td><td>927.25045 MHz</td><td>84.90 dBµV</td><td>Occ Bw</td><td>64.390551494 kHz</td></tr><tr><td>T1</td><td>1</td><td>1</td><td>927.219388 MHz</td><td>57.99 dBµV</td><td>Occ Bw Centroid</td><td>927.251583747 MHz</td></tr><tr><td>T2</td><td>1</td><td>1</td><td>927.263779 MHz</td><td>63.02 dBµV</td><td>Occ Bw Freq Offset</td><td>1.583747326 kHz</td></tr></tbody></table> Aborted 19.10.2021 10:29:02 Ref Level RBW 10:29:03 19.10.2021					Type	Ref	Trc	X-Value	Y-Value	Function	Function Result	M1	1	1	927.25045 MHz	84.90 dBµV	Occ Bw	64.390551494 kHz	T1	1	1	927.219388 MHz	57.99 dBµV	Occ Bw Centroid	927.251583747 MHz	T2	1	1	927.263779 MHz	63.02 dBµV	Occ Bw Freq Offset	1.583747326 kHz
Type	Ref	Trc	X-Value	Y-Value	Function	Function Result																										
M1	1	1	927.25045 MHz	84.90 dBµV	Occ Bw	64.390551494 kHz																										
T1	1	1	927.219388 MHz	57.99 dBµV	Occ Bw Centroid	927.251583747 MHz																										
T2	1	1	927.263779 MHz	63.02 dBµV	Occ Bw Freq Offset	1.583747326 kHz																										
Results:	The system has an OBW of 64.390 kHz																															
EUT modification(s): N/A																																

7.3. Number of channels, 20 dB bandwidth, and average time of occupancy

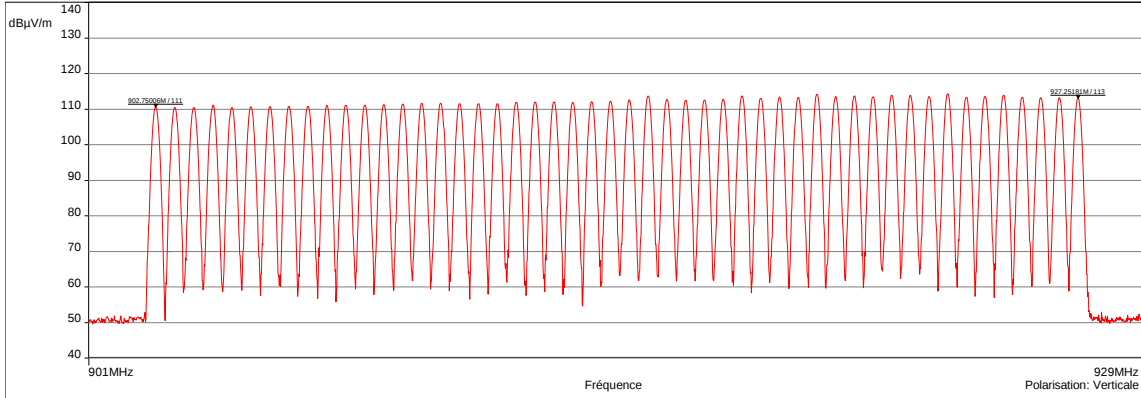
Reference standard:	FCC part 15.247 RSS-247
Test method:	ANSI C63.10 : 2013
Test description: (a) (1) (i) For frequency hopping systems operating in the 902-928 MHz band: if the 20 dB bandwidth of the hopping channel is less than 250 kHz, the system shall use at least 50 hopping frequencies and the average 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.	

TESTED PARAMETER	RESULT	SEVERITY	RESULT TAB.	VERDICT
Number of channels	50 channels	≥ 50 channels	EMI4911	PASS
Channels separation	502kHz	≥20dB bandwidth	EMI4959	PASS
20 dB bandwidth / Low channel	47.95 kHz	< 250 kHz	EMI4956	PASS
20 dB bandwidth / Mid channel	47.35 kHz	< 250 kHz	EMI4957	PASS
20 dB bandwidth / High channel	47.95 kHz	< 250 kHz	EMI4958	PASS
Average time of occupancy	395.38 ms / 20 s	≤ 400 ms / 20 s	EMI4960	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
Cable	SUCOFLEX	N-6,5m	14380	25/07/2019	25/03/2022
Cable	MegaPhase	N-8m	15813	14/01/2021	14/03/2023
Cable	MegaPhase	TM18-N1N1-118	12842	02/12/2020	02/02/2023
Multimeter	FLUKE	8808A	12446	29/09/2020	29/11/2021
Power supply	TTI	TSX-1820P	4365		
Shielded enclosure	COMTEST	SAC 3m	14494	02/10/2019	02/12/2022
Spectrum analyzer	Rohde & Schwarz	ESW26	17791	14/04/2021	14/06/2022
Thermohygrometer	Testo	608-H2	12269	07/05/2020	07/07/2022
Thermohygrometer	Bioblock Scientific	Météostar	0963	07/06/2021	07/08/2023

Blank cells = Permanent validity

NUMBER OF CHANNELS FOR FREQUENCY HOPPING SYSTEMS - GRAPH				
NUMBER OF CHANNELS			EMI4911	
EUT mode:	Tx hopping mode		T (°C):	21.4
Test Date:	25/11/2021		H (%):	59.3
Test Operator:	ATO		P (hPa):	1018
Description Sous-bande 1 Fréquences:901 MHz - 929 MHz (Mode analyseur) 30000 Points Réglages: RBW: 100kHz, VBW: 300kHz, Auto, Atténuation : 10 dB, Nombre de Balayages : 1, Preamp : Off, LN Preamp : Off, Preselecteur: Off Polarisation:Verticale Distance: 3 m FCC/15.247 d) Band Edge - Classe:Tx - Moyenne/3.0m/ FCC/15.247 d) Band Edge - Classe:Tx - Crête/3.0m/ Mes.Peak (Verticale)  Number of channels - 4911				
POSITION	FREQUENCIES	RBW	VBW	DETECTOR
N/A	901.MHz-929MHz	100kHz	300kHz	Peak
Configuration:	N/A			
Comments:	The system uses 50 channels			
EUT modification(s): N/A				

NUMBER OF CHANNELS FOR FREQUENCY HOPPING SYSTEMS - GRAPH																																
CHANNELS SEPARATION			EMI4959																													
EUT mode:	Tx hopping mode		T (°C):	21.4																												
Test Date:	19/10/2021		H (%):	59.3																												
Test Operator:	ATO		P (hPa):	1018																												
MultiView Receiver Spectrum Ref Level 98.00 dBµV Att 10 dB Input 1 AC SWT 30 ms PS Off RBW 100 kHz VBW 300 kHz Notch Off Mode Sweep Frequency 915.2500000 MHz 1 Frequency Sweep 90 dBµV 80 dBµV 70 dBµV 60 dBµV 50 dBµV 40 dBµV 30 dBµV 20 dBµV 10 dBµV 0 dBµV M1 D2 D3 M1[1] 69.95 dBµV 914.6365340 MHz 0.24 dB 502.2330 kHz D2[1] 0.24 dB 502.2330 kHz CF 915.25 MHz 30000 pts 200.0 kHz/ Span 2.0 MHz 2 Marker Table <table><thead><tr><th>Type</th><th>Ref</th><th>Trc</th><th>X-Value</th><th>Y-Value</th><th>Function</th><th>Function Result</th></tr></thead><tbody><tr><td>M1</td><td></td><td>1</td><td>914.636534 MHz</td><td>69.95 dBµV</td><td></td><td></td></tr><tr><td>D2</td><td>M1</td><td>1</td><td>502.233 kHz</td><td>0.24 dB</td><td></td><td></td></tr><tr><td>D3</td><td>D2</td><td>1</td><td>498.0 kHz</td><td>-0.13 dB</td><td></td><td></td></tr></tbody></table> Aborted 19.10.2021 09:50:36 Ref Level RBW 09:50:37 19.10.2021					Type	Ref	Trc	X-Value	Y-Value	Function	Function Result	M1		1	914.636534 MHz	69.95 dBµV			D2	M1	1	502.233 kHz	0.24 dB			D3	D2	1	498.0 kHz	-0.13 dB		
Type	Ref	Trc	X-Value	Y-Value	Function	Function Result																										
M1		1	914.636534 MHz	69.95 dBµV																												
D2	M1	1	502.233 kHz	0.24 dB																												
D3	D2	1	498.0 kHz	-0.13 dB																												
EUT modification(s): N/A																																
POSITION	FREQUENCIES	RBW	VBW	DETECTOR																												
N/A	914.25MHz-916.25MHz	100kHz	300kHz	Peak																												
Configuration:	N/A																															
Comments:	The channels separation is 500 kHz																															
EUT modification(s): N/A																																

20 dB BANDWIDTH FOR FREQUENCY HOPPING SYSTEMS - GRAPH																															
20dB BANDWIDTH - LOW CHANNEL		EMI4956																													
EUT mode:	Continuous modulated Tx	T (°C):	21.4																												
Test Date:	19/10/2021	H (%):	59.3																												
Test Operator:	ATO	P (hPa):	1018																												
MultiView Receiver Spectrum Ref Level 109.00 dBµV Att 10 dB SWT 5 ms RBW 2 kHz Input 1 AC PS On Notch Off Mode Sweep Frequency 902.750000 MHz 1 Frequency Sweep 100 dBµV 90 dBµV 80 dBµV 70 dBµV 60 dBµV 50 dBµV 40 dBµV 30 dBµV 20 dBµV M1 D2 D3 D3[1] M1[1] -0.15 dB 47.950 kHz 82.14 dBµV 902.750450 MHz CF 902.75 MHz 1001 pts 15.0 kHz/ Span 150.0 kHz 2 Marker Table <table><thead><tr><th>Type</th><th>Ref</th><th>Trc</th><th>X-Value</th><th>Y-Value</th><th>Function</th><th>Function Result</th></tr></thead><tbody><tr><td>M1</td><td></td><td>1</td><td>902.75045 MHz</td><td>82.14 dBµV</td><td></td><td></td></tr><tr><td>D2</td><td>M1</td><td>1</td><td>-23.98 kHz</td><td>-20.10 dB</td><td></td><td></td></tr><tr><td>D3</td><td>D2</td><td>1</td><td>47.95 kHz</td><td>-0.15 dB</td><td></td><td></td></tr></tbody></table> Aborted 19.10.2021 10:37:33 Ref Level RBW 10:37:33 19.10.2021				Type	Ref	Trc	X-Value	Y-Value	Function	Function Result	M1		1	902.75045 MHz	82.14 dBµV			D2	M1	1	-23.98 kHz	-20.10 dB			D3	D2	1	47.95 kHz	-0.15 dB		
Type	Ref	Trc	X-Value	Y-Value	Function	Function Result																									
M1		1	902.75045 MHz	82.14 dBµV																											
D2	M1	1	-23.98 kHz	-20.10 dB																											
D3	D2	1	47.95 kHz	-0.15 dB																											
Results:	The system has an OBW of 47.95 kHz																														
EUT modification(s): N/A																															

20 dB BANDWIDTH FOR FREQUENCY HOPPING SYSTEMS - GRAPH																																
20dB BANDWIDTH - MID CHANNEL			EMI4957																													
EUT mode:	Continuous modulated Tx		T (°C):	21.4																												
Test Date:	19/10/2021		H (%):	59.3																												
Test Operator:	ATO		P (hPa):	1018																												
MultiView Receiver Spectrum Ref Level 109.00 dBµV Att 10 dB SWT 5 ms RBW 2 kHz Input 1 AC PS On VBW 5 kHz Mode Sweep Notch Off Frequency 915.2500000 MHz 1 Frequency Sweep 100 dBµV 90 dBµV 80 dBµV 70 dBµV 60 dBµV 50 dBµV 40 dBµV 30 dBµV 20 dBµV M1 D2 D3 H1 64.070 dBµV D3[1] 0.05 dB M1[1] 84.07 dBµV 47.350 kHz 915.250450 MHz CF 915.25 MHz 1001 pts 15.0 kHz/ Span 150.0 kHz 2 Marker Table <table><thead><tr><th>Type</th><th>Ref</th><th>Trc</th><th>X-Value</th><th>Y-Value</th><th>Function</th><th>Function Result</th></tr></thead><tbody><tr><td>M1</td><td></td><td>1</td><td>915.25045 MHz</td><td>84.07 dBµV</td><td></td><td></td></tr><tr><td>D2</td><td>M1</td><td>1</td><td>-23.98 kHz</td><td>-20.07 dB</td><td></td><td></td></tr><tr><td>D3</td><td>D2</td><td>1</td><td>47.35 kHz</td><td>0.05 dB</td><td></td><td></td></tr></tbody></table> Aborted 19.10.2021 10:39:26 Ref Level RBW 10:39:27 19.10.2021					Type	Ref	Trc	X-Value	Y-Value	Function	Function Result	M1		1	915.25045 MHz	84.07 dBµV			D2	M1	1	-23.98 kHz	-20.07 dB			D3	D2	1	47.35 kHz	0.05 dB		
Type	Ref	Trc	X-Value	Y-Value	Function	Function Result																										
M1		1	915.25045 MHz	84.07 dBµV																												
D2	M1	1	-23.98 kHz	-20.07 dB																												
D3	D2	1	47.35 kHz	0.05 dB																												
Results:	The system has an OBW of 47.35 kHz																															
EUT modification(s): N/A																																

20 dB BANDWIDTH FOR FREQUENCY HOPPING SYSTEMS - GRAPH																																
20dB BANDWIDTH - HIGH CHANNEL			EMI4958																													
EUT mode:	Continuous modulated Tx		T (°C):	21.4																												
Test Date:	19/10/2021		H (%):	59.3																												
Test Operator:	ATO		P (hPa):	1018																												
MultiView Receiver Spectrum Ref Level 109.00 dBµV Att 10 dB SWT 5 ms RBW 2 kHz Input 1 AC PS On VBW 5 kHz Mode Sweep Notch Off Frequency 927.2500000 MHz 1 Frequency Sweep 100 dBµV 90 dBµV 80 dBµV 70 dBµV 60 dBµV 50 dBµV 40 dBµV 30 dBµV 20 dBµV M1 D2 D3 H1 64.790 dBµV D3[1] 0.05 dB M1[1] 84.82 dBµV 927.250450 MHz CF 927.25 MHz 1001 pts 15.0 kHz/ Span 150.0 kHz 2 Marker Table <table><thead><tr><th>Type</th><th>Ref</th><th>Trc</th><th>X-Value</th><th>Y-Value</th><th>Function</th><th>Function Result</th></tr></thead><tbody><tr><td>M1</td><td></td><td>1</td><td>927.25045 MHz</td><td>84.82 dBµV</td><td></td><td></td></tr><tr><td>D2</td><td>M1</td><td>1</td><td>-24.13 kHz</td><td>-19.90 dB</td><td></td><td></td></tr><tr><td>D3</td><td>D2</td><td>1</td><td>47.95 kHz</td><td>0.05 dB</td><td></td><td></td></tr></tbody></table> Measuring... 19.10.2021 10:41:27 Ref Level RBW 10:41:27 19.10.2021					Type	Ref	Trc	X-Value	Y-Value	Function	Function Result	M1		1	927.25045 MHz	84.82 dBµV			D2	M1	1	-24.13 kHz	-19.90 dB			D3	D2	1	47.95 kHz	0.05 dB		
Type	Ref	Trc	X-Value	Y-Value	Function	Function Result																										
M1		1	927.25045 MHz	84.82 dBµV																												
D2	M1	1	-24.13 kHz	-19.90 dB																												
D3	D2	1	47.95 kHz	0.05 dB																												
Results:	The system has an OBW of 47.95 kHz																															
EUT modification(s): N/A																																

OCCUPANCTION TIME FOR FREQUENCY HOPPING SYSTEMS - GRAPH											
OCCUPATION TIME		EMI4960									
EUT mode:	Tx hopping mode	T (°C):	21.4								
Test Date:	19/10/2021	H (%):	59.3								
Test Operator:	ATO	P (hPa):	1018								
MultiView Receiver Spectrum Ref Level 98.00 dBµV Att 10 dB Input 1 AC TRG:VID SWT 300 ms PS Off RBW 100 kHz VBW 300 kHz Notch Off SGL Frequency 915.2500000 MHz 1 Zero Span 90 dBµV 80 dBµV 70 dBµV 60 dBµV 50 dBµV 40 dBµV 30 dBµV 20 dBµV 10 dBµV 0 dBµV TRG 35.000 dBµV TRG CF 915.25 MHz 10000 pts 30.0 ms/ D2[1] M1[1] 1Pk Max -56.04 dB 197.6898 ms 83.84 dBµV -9.0 µs Ready 19.10.2021 10:11:11 Ref Level RBW 10:11:11 19.10.2021 MultiView Receiver Spectrum Ref Level 98.00 dBµV Att 10 dB Input 1 AC TRG:VID SWT 20 s PS Off RBW 100 kHz VBW 300 kHz Notch Off SGL Frequency 915.2500000 MHz 1 Zero Span 90 dBµV 80 dBµV 70 dBµV 60 dBµV 50 dBµV 40 dBµV 30 dBµV 20 dBµV 10 dBµV 0 dBµV TRG 35.000 dBµV TRG CF 915.25 MHz 10000 pts 2.0 s/ Ready 19.10.2021 10:08:16 Ref Level RBW 10:08:17 19.10.2021 <tr><td>Results:</td><td colspan="3">The worst case average time is 395.38ms in a period of 20s.</td></tr> <tr><td colspan="4">EUT modification(s): N/A</td></tr>				Results:	The worst case average time is 395.38ms in a period of 20s.			EUT modification(s): N/A			
Results:	The worst case average time is 395.38ms in a period of 20s.										
EUT modification(s): N/A											

7.4. Radiated spurious emissions

Reference standard:	FCC part 15.209, 15.205, 15.247 RSS-247, RSS-Gen
Test method:	ANSI C63.10 : 2013
General test setup: For $f < 30\text{MHz}$, EUT is set on an insulating support at 80cm 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 $f > 30\text{MHz}$, EUT is set on an insulating support at 80cm above the ground reference plane (150cm for $f > 1\text{GHz}$). 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 equipments 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 mode - All channels - 0°	9kHz-30MHz	15.209	EMI4907	PASS
Tx mode - All channels - 45°	9kHz-30MHz	15.209	EMI4908	PASS
Tx mode - All channels - 90°	9kHz-30MHz	15.209	EMI4909	PASS
Tx mode - Low channel - For freq $< 1\text{GHz}$	30MHz-1GHz	15.209	EMI4865	PASS
Tx mode - Mid channel - For freq $< 1\text{GHz}$	30MHz-1GHz	15.209	EMI4864	PASS
Tx mode - High channel - For freq $< 1\text{GHz}$	30MHz-1GHz	15.209	EMI4866	PASS
Tx mode - All channels - For freq $> 1\text{GHz}$	1GHz-10GHz	15.209	EMI4831	PASS

LABORATORY PARAMETERS:	REQUIRED PRIOR TO THE TEST	DURING THE TEST
Ambient Temperature	15 to 35 °C	See Graph(s)
Relative Humidity	20 to 75 %	See Graph(s)
Atmospheric pressure	N/A	See Graph(s)
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. Above 1GHz average limit in restricted bands §15.205 is 54dB$\mu\text{V}/\text{m}$. Otherwise, the limit is 20dB under carrier emission level at 3m without averaging.		

TEST EQUIPMENT USED – 9KHZ TO 30MHZ					
CATEGORY	BRAND	TYPE	IDENTIFIER	CAL. DATE	CAL. DUE
AC power source	KIKUSUI	PCR2000L	0800		
Antenna	Rohde & Schwarz	HFH2-Z2	5825	24/04/2020	24/06/2022
Cable	SUCOFLEX	N-6,5m	14380	23/08/2021	23/10/2023
Cable	MegaPhase	N-8m	15813	14/01/2021	14/03/2023
Cable	MegaPhase	TM18-N1N1-118	12842	02/12/2020	02/02/2023
Multimeter	FLUKE	8808A	12446	29/09/2020	29/11/2021
Receiver	Rohde & Schwarz	ESW26	17791	14/04/2021	14/06/2022
Shielded enclosure	COMTEST	SAC 3m	14494	02/10/2019	02/12/2022
Software	Nexio	BAT EMC	0000		
Thermohygrometer	Testo	608-H2	12269	07/05/2020	07/07/2022
Thermohygrometer	Bioblock Scientific	Météostar	0963	07/06/2021	07/08/2023

BAT-EMC software version: V3.18.0.26

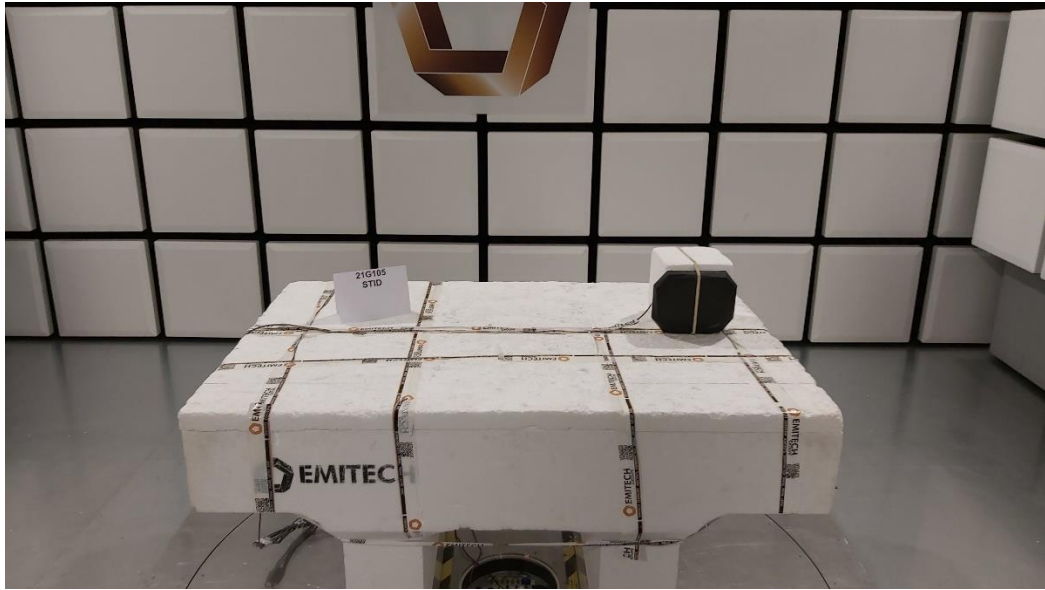
Blank cells = Permanent validity

TEST EQUIPMENT USED – 30MHZ TO 10GHZ					
CATEGORY	BRAND	TYPE	IDENTIFIER	CAL. DATE	CAL. DUE
AC power source	KIKUSUI	PCR2000L	0800		
Antenna	ETS-Lindgren	3117	8387	23/07/2019	23/09/2022
Antenna	Electro Metrics	BIA-30HF	0824	22/08/2021	22/10/2024
Antenna	Rohde & Schwarz	HL223	3126	21/08/2021	21/10/2024
Cable	MegaPhase	F135N1N28	16664	24/10/2019	24/12/2021
Cable	MegaPhase	F135N1N28	16666	24/10/2019	24/12/2021
Cable	/	N-1m	3625	27/01/2021	27/03/2023
Cable	/	N-1m	3626	27/01/2021	27/03/2023
Cable	SUCOFLEX	N-3m	14378	23/08/2021	23/10/2023
Cable	SUCOFLEX	N-3m	14379	23/08/2021	23/10/2023
Cable	SUCOFLEX	N-6,5m	14380	23/08/2021	23/10/2023
Cable	MegaPhase	N-8m	15813	14/01/2021	14/03/2023
Cable	Huber + Suhner	SF102K	16042	24/03/2021	24/05/2023
Cable	MegaPhase	TM18-N1N1-118	12842	02/12/2020	02/02/2023
Filter	Micro-Tronics	HPM18865	12843	24/08/2021	24/10/2024
Filter	Wainwright Instruments	WRCGV 2402/2480- 2380/2500- 40/10EE-200W	9771	07/01/2019	07/03/2022
Multimeter	FLUKE	8808A	12446	29/09/2020	29/11/2021
Power supply	TTI	TSX-1820P	4365		
Preamplifier	IMPULSE	CA118-546ACN	9169	13/01/2021	13/03/2022
Receiver	Rohde & Schwarz	ESW26	17791	14/04/2021	14/06/2022
Receiver	Rohde & Schwarz	FSW43	14830	29/07/2020	29/09/2022
Shielded enclosure	RAY PROOF	C.V1	1123	19/08/2021	19/10/2024
Shielded enclosure	COMTEST	SAC 3m	14494	02/10/2019	02/12/2022
Software	Nexio	BAT EMC	0000		
Thermohygrometer	Testo	608-H1	7561	26/01/2019	26/03/2022
Thermohygrometer	Testo	608-H2	12269	07/05/2020	07/07/2022
Thermohygrometer	Bioblock Scientific	Météostar	0963	07/06/2021	07/08/2023

BAT-EMC software version: V3.18.0.26

Blank cells = Permanent validity

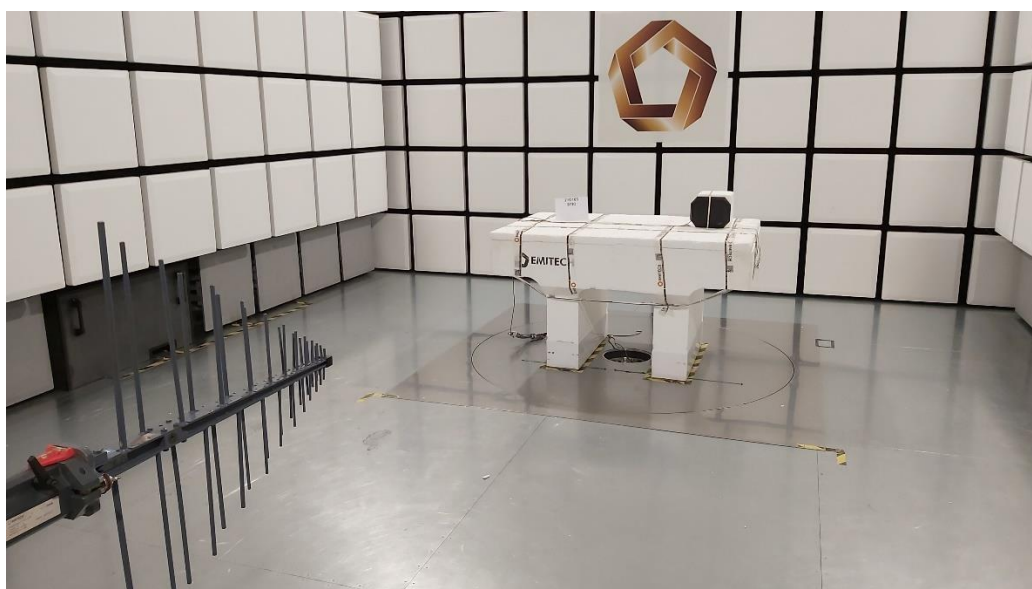
TEST SETUP PHOTO(S) – EUT POSITIONS



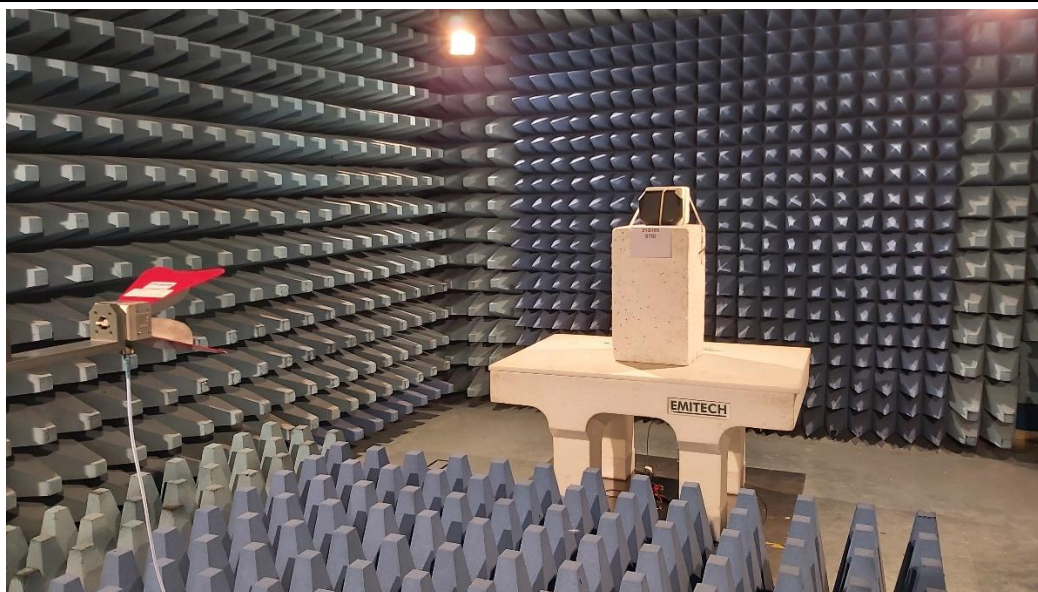
TEST SETUP PHOTO(S) – RADIATED MEASUREMENT FROM 9KHZ TO 30MHZ



TEST SETUP PHOTO(S) – RADIATED MEASUREMENT FROM 30MHz TO 1GHz



TEST SETUP PHOTO(S) – RADIATED MEASUREMENT FROM 1GHZ TO 10GHZ



RADIATED EMISSION LIMITS – TABULATED RESULTS

TX MODE - ALL CHANNELS – 0°

EMI4907

FREQUENCY (MHz)	POLARIZATION	PEAK LEVEL (dBμA/m)	AVERAGE LEVEL (dBμA/m)	AVERAGE LIMIT (dBμA/m)	MARGING
N/A	N/A	N/A	N/A	N/A	N/A

Supplementary information: No spurious emissions were detected.

RADIATED EMISSION LIMITS – TABULATED RESULTS

TX MODE - ALL CHANNELS – 45°

EMI4908

FREQUENCY (MHz)	POLARIZATION	PEAK LEVEL (dBμA/m)	AVERAGE LEVEL (dBμA/m)	AVERAGE LIMIT (dBμA/m)	MARGING
N/A	N/A	N/A	N/A	N/A	N/A

Supplementary information: No spurious emissions were detected.

RADIATED EMISSION LIMITS – TABULATED RESULTS

TX MODE - ALL CHANNELS – 90°

EMI4909

FREQUENCY (MHz)	POLARIZATION	PEAK LEVEL (dBμA/m)	AVERAGE LEVEL (dBμA/m)	AVERAGE LIMIT (dBμA/m)	MARGING
N/A	N/A	N/A	N/A	N/A	N/A

Supplementary information: No spurious emissions were detected.

RADIATED EMISSION LIMITS – TABULATED RESULTS

TX MODE - LOW CHANNEL - FOR FREQ <1GHZ

EMI4865

FREQUENCY (MHz)	POLARIZATION	PEAK LEVEL (dBμV/m)	QPEAK LEVEL (dBμV/m)	QPEAK LIMIT (dBμV/m)	MARGING (dB)
444.44	Vertical	36.15	N/P	46	-9.85
444.44	Horizontal	34.68	N/P	46	-11.32

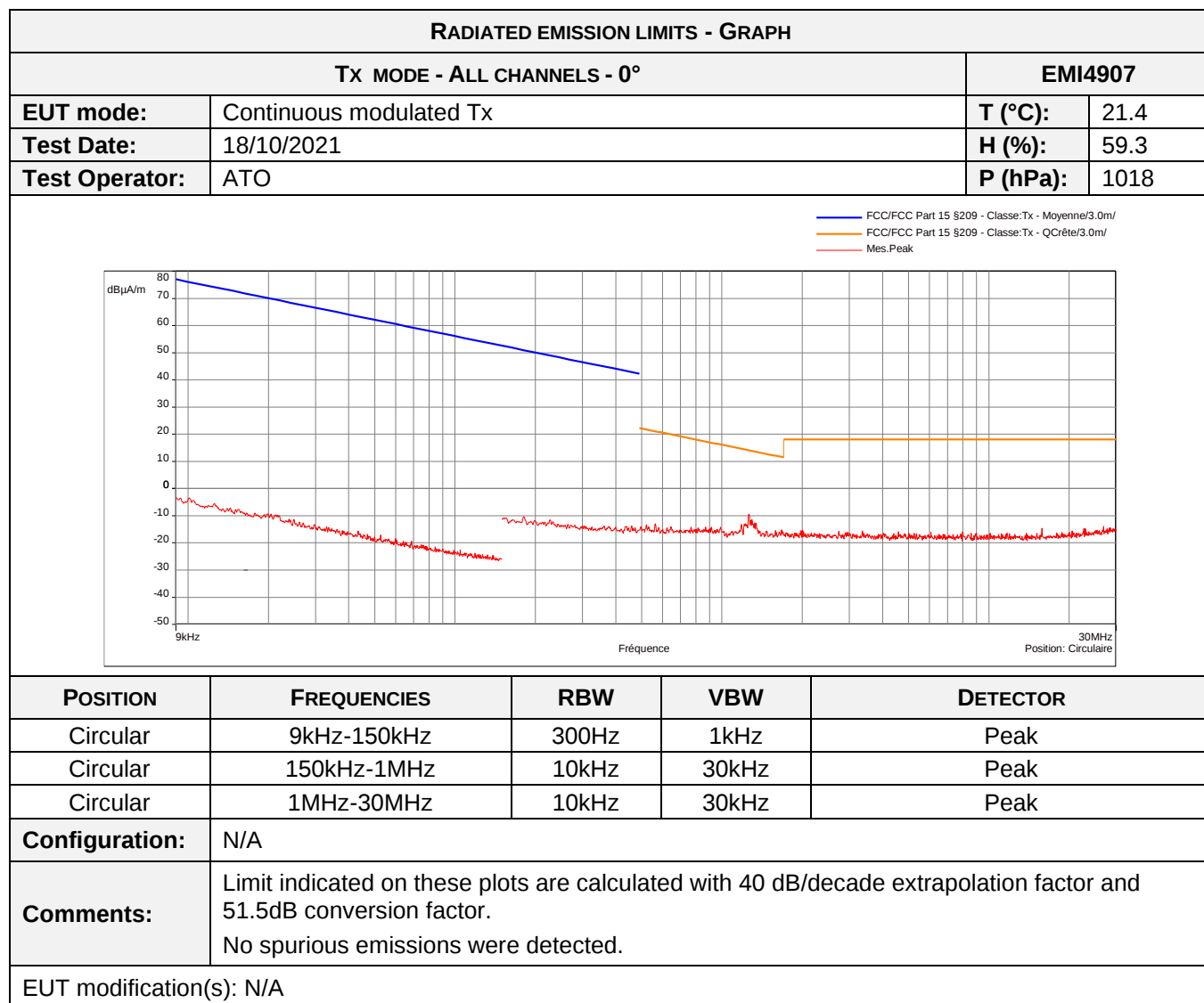
Supplementary information: when margin between peak measurements and average/quasi-peak limit(s) is > 6dB, no average/quasi-peak measurements were performed

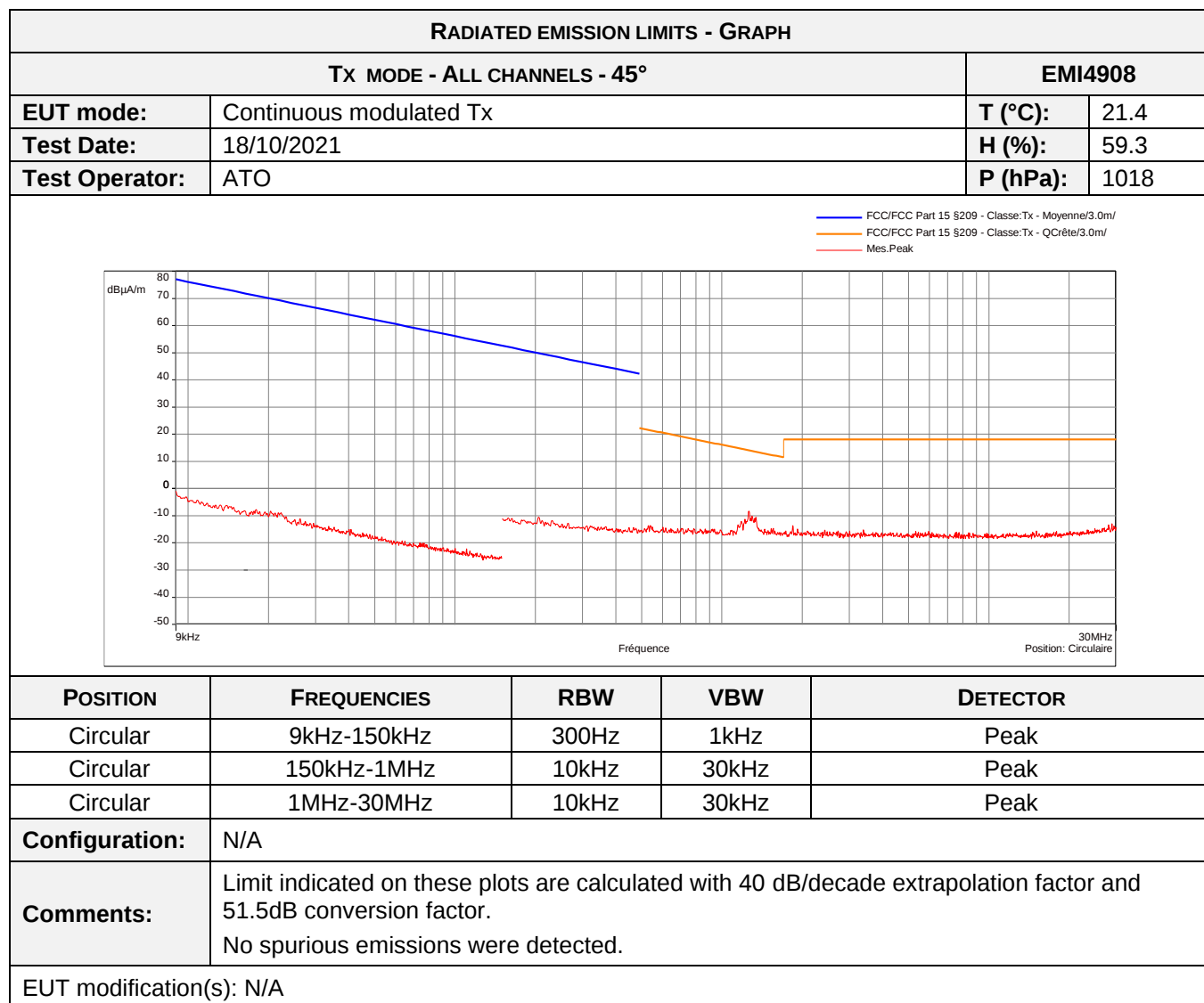
Spurious which have more than 20 dB of margin compared to the applicable limit are not necessarily reported.

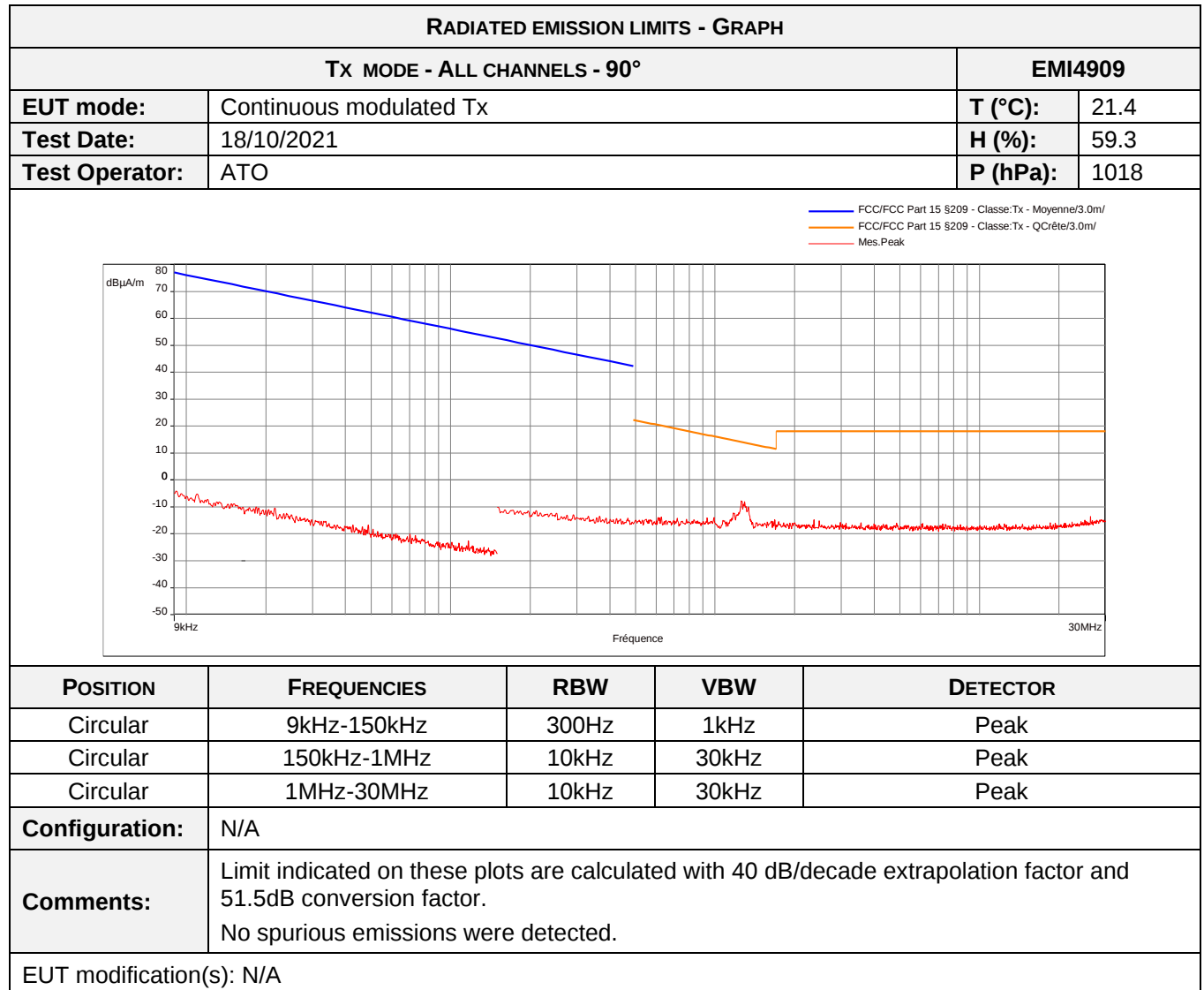
RADIATED EMISSION LIMITS – TABULATED RESULTS					
TX MODE - MID CHANNEL - FOR FREQ <1GHz					EMI4864
FREQUENCY (MHz)	POLARIZATION	PEAK LEVEL (dBµV/m)	QPEAK LEVEL (dBµV/m)	QPEAK LIMIT (dBµV/m)	MARGING (dB)
444.44	Vertical	36.02	N/P	46	-9.98
444.50	Horizontal	33.87	N/P	46	-12.13
Supplementary information: when margin between peak measurements and average/quasi-peak limit(s) is > 6dB, no average/quasi-peak measurements were performed					
Spurious which have more than 20 dB of margin compared to the applicable limit are not necessarily reported.					

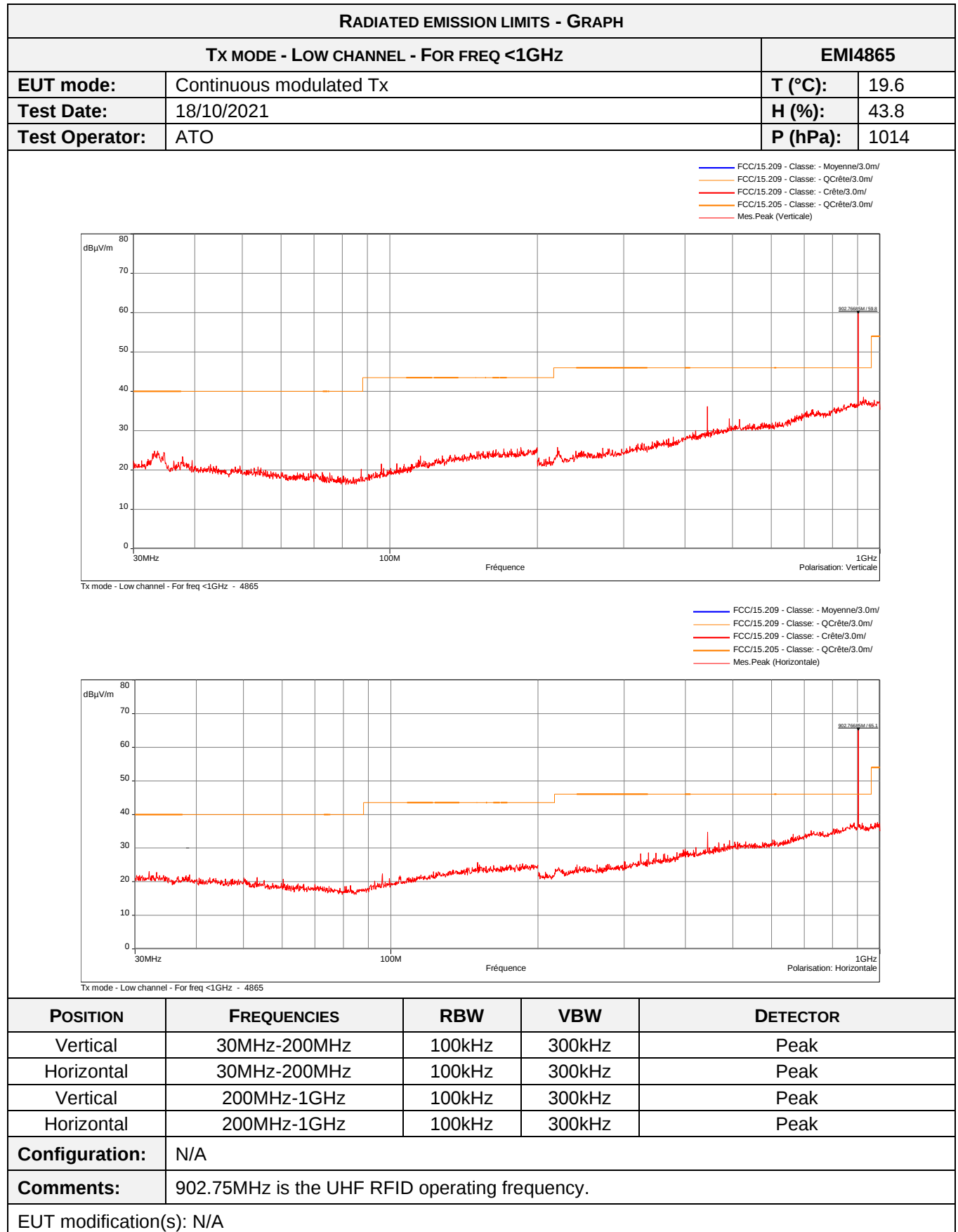
RADIATED EMISSION LIMITS – TABULATED RESULTS					
TX MODE - HIGH CHANNEL - FOR FREQ <1GHz					EMI4866
FREQUENCY (MHz)	POLARIZATION	PEAK LEVEL (dBµV/m)	QPEAK LEVEL (dBµV/m)	QPEAK LIMIT (dBµV/m)	MARGING (dB)
444.44	Vertical	36.02	N/P	46	-9.98
516.61	Vertical	33.77	N/P	46	-12.23
444.4963	Horizontal	35.32	N/P	46	-10.68
Supplementary information: when margin between peak measurements and average/quasi-peak limit(s) is > 6dB, no average/quasi-peak measurements were performed					
Spurious which have more than 20 dB of margin compared to the applicable limit are not necessarily reported.					

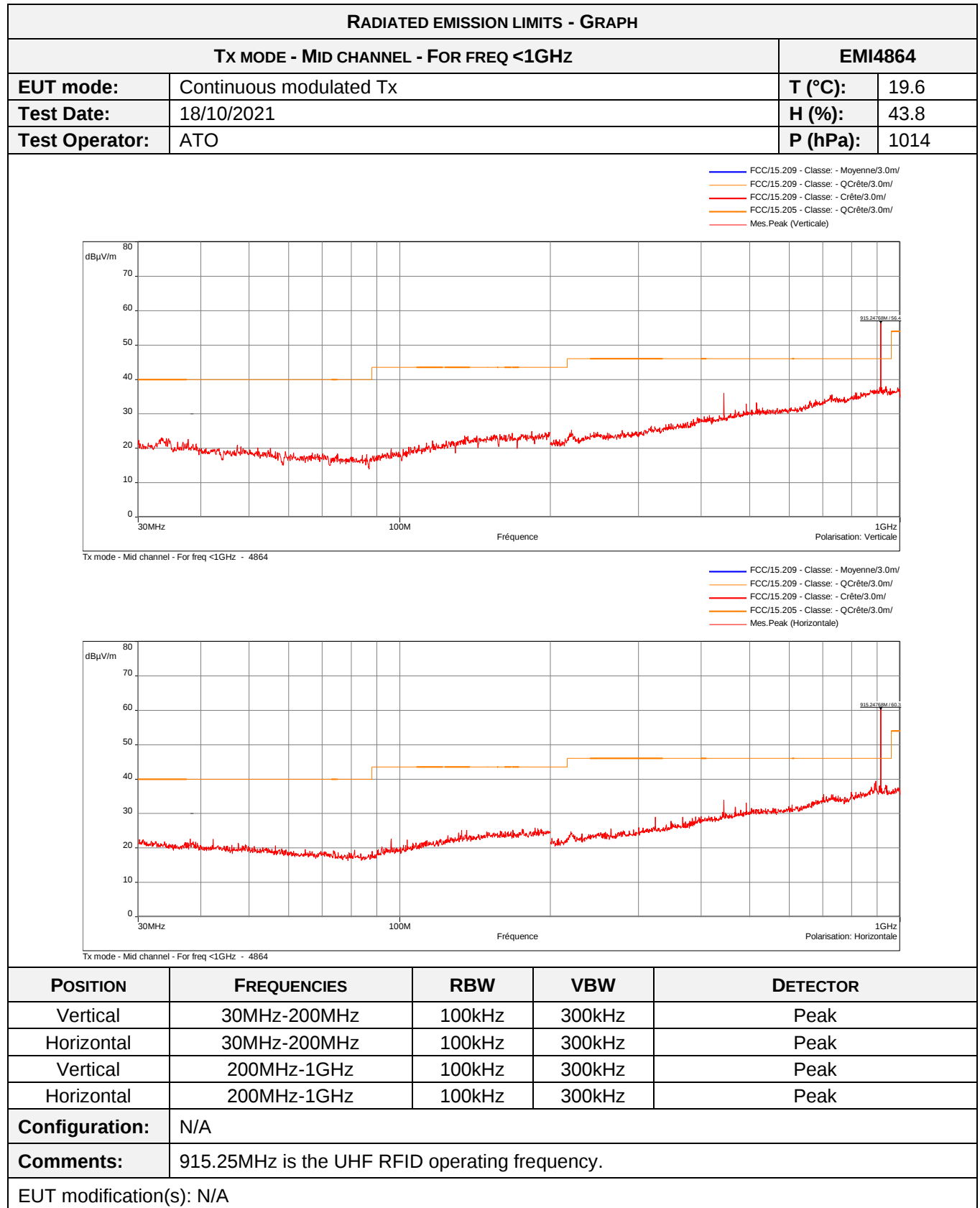
RADIATED EMISSION LIMITS – TABULATED RESULTS						
TX MODE - ALL CHANNELS - FOR FREQ >1GHz						EMI4831
FREQUENCY (MHz)	POLARIZATION	PEAK LEVEL (dBµV/m)	AVERAGE LIMIT (dBµV/m)	AVERAGE LEVEL (dBµV/m)	AVERAGE LIMIT (dBµV/m)	MARGING
1805.23	Vertical	61.96	102.30	N/P	N/P	-40.34
1830.13	Vertical	56.88	102.30	N/P	N/P	-45.42
1854.43	Vertical	58.81	102.30	N/P	N/P	-43.49
1805.23	Horizontal	64.15	102.30	N/P	N/P	-38.15
1830.13	Horizontal	62.97	102.30	N/P	N/P	-39.33
1854.43	Horizontal	66.01	102.30	N/P	N/P	-36.29
4636.12	Vertical	46.63	74.00	N/P	54.00	-7.37
3708.79	Horizontal	45.48	74.00	N/P	54.00	-8.52
4576.42	Horizontal	47.68	74.00	N/P	54.00	-6.32
4635.82	Horizontal	51.12	74.00	50.41	54.00	-3.59
Supplementary information: when margin between peak measurements and average/quasi-peak limit(s) is > 6dB, no average/quasi-peak measurements were performed						
Spurious which have more than 20 dB of margin compared to the applicable limit are not necessarily reported.						

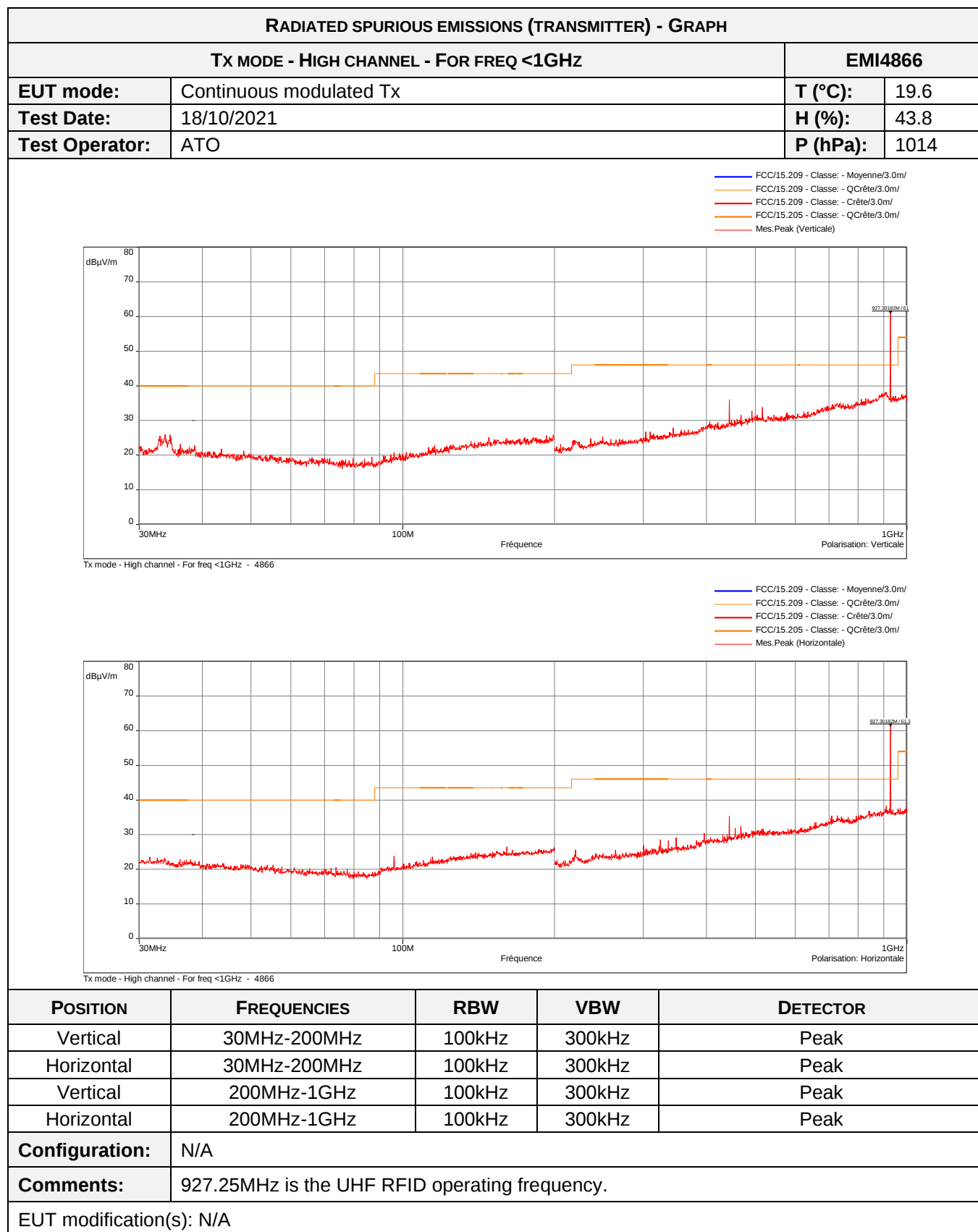


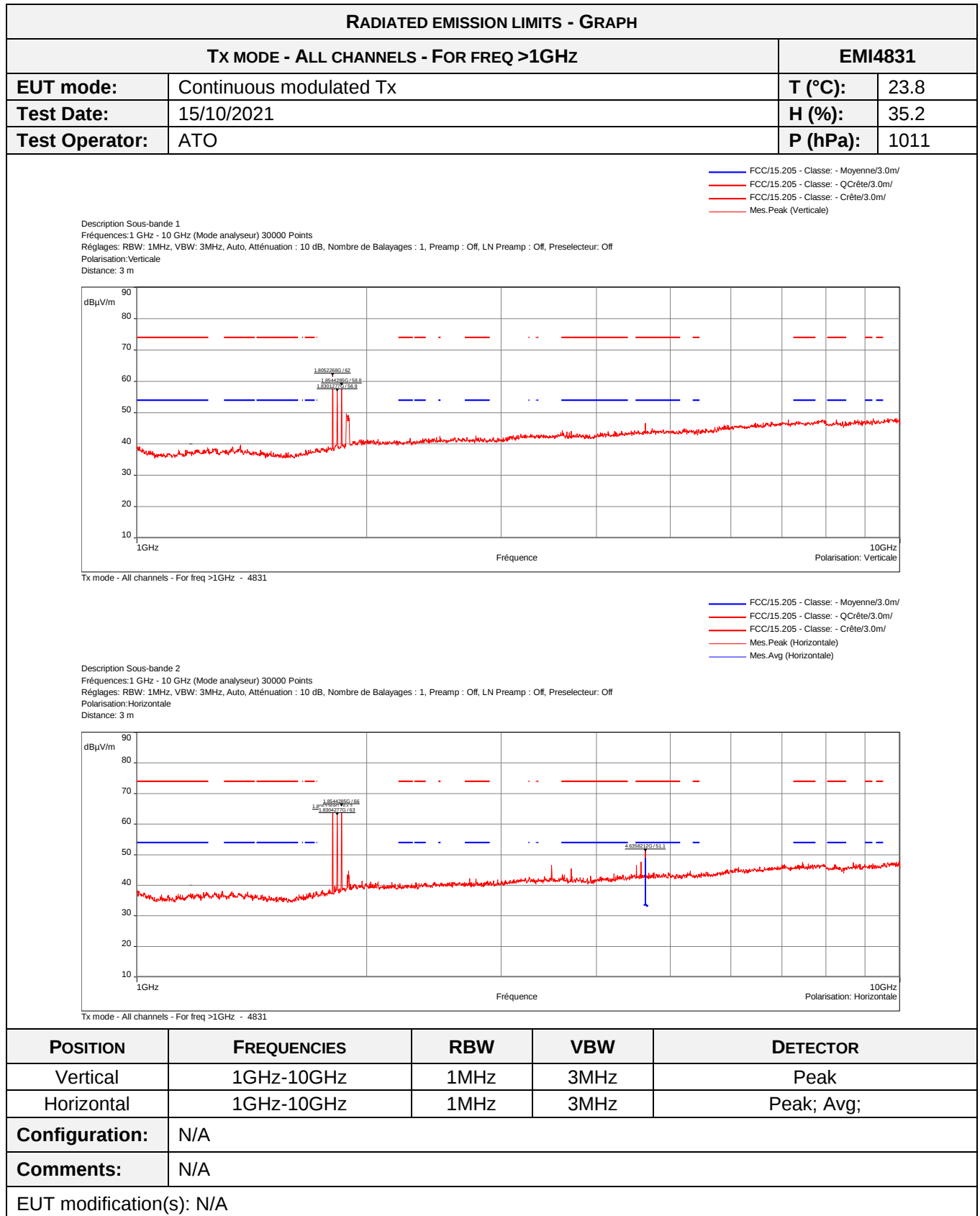












7.5. Band-edge compliance

Reference standard:	FCC part 15.247; 15.209, 15.205 RSS-247, RSS-Gen
Test method:	ANSI C63.10 : 2013
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. Only the highest levels are recorded.	

TESTED CONFIGURATION	PARAMETER	SEVERITY	RESULT TAB.	VERDICT
Band edge / All Channels	892MHz-938MHz	20 dBc and §15.209	EMI4868	PASS

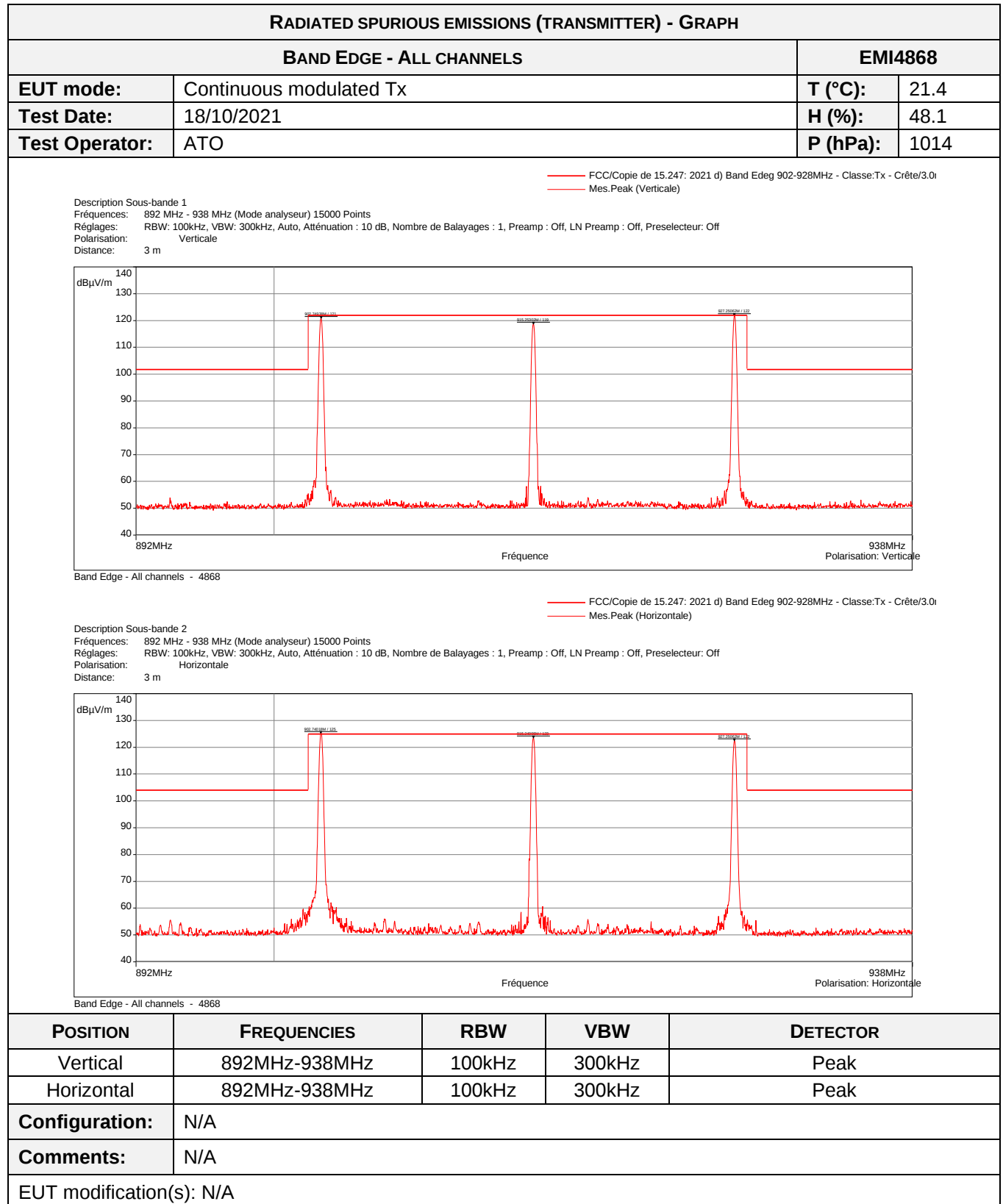
TEST EQUIPMENT USED – 30MHZ TO 10GHZ					
CATEGORY	BRAND	TYPE	IDENTIFIER	CAL. DATE	CAL. DUE
AC power source	KIKUSUI	PCR2000L	0800		
Antenna	Rohde & Schwarz	HL223	3126	21/08/2021	21/10/2024
Cable	MegaPhase	F135N1N28	16666	24/10/2019	24/12/2021
Cable	SUCOFLEX	N-6,5m	14380	23/08/2021	23/10/2023
Cable	MegaPhase	N-8m	15813	14/01/2021	14/03/2023
Cable	MegaPhase	TM18-N1N1-118	12842	02/12/2020	02/02/2023
Multimeter	FLUKE	8808A	12446	29/09/2020	29/11/2021
Receiver	Rohde & Schwarz	ESW26	17791	14/04/2021	14/06/2022
Shielded enclosure	COMTEST	SAC 3m	14494	02/10/2019	02/12/2022
Software	Nexio	BAT EMC	0000		
Thermohygrometer	Testo	608-H2	12269	07/05/2020	07/07/2022
Thermohygrometer	Bioblock Scientific	Météostar	0963	07/06/2021	07/08/2023

BAT-EMC software version: V3.18.0.26

Blank cells = Permanent validity

TEST SETUP PHOTO(S)





7.6. Equivalent isotropic radiated power

a) NORMAL TESTS CONDITIONS

Reference standard:	FCC part 15.247 RSS-247
Test method:	ANSI C63.10: 2013
Test description: EUT is set on an insulating support at 150cm above the ground reference plane. Measurement are done on a normalized test site by the substitution method. The test antenna is oriented in the two polarizations (vertical and horizontal), and the product is rotated at 360° in the horizontal plane (See photo(s) for initial position of the EUT(0°)). If applicable the test antenna was raised and lowered through the specified range of height until a maximum signal level is detected. For portable equipments a research of maximum level is done on the 3 axes. Only the highest levels are recorded.	

TESTED CONFIGURATION	PARAMETER	SEVERITY	RESULT TAB.	VERDICT
EIRP - 902.75MHz	902.5MHz-903MHz	1W (30dBm)	EMI4833	PASS
EIRP - 915.25MHz	915MHz-915.5MHz	1W (30dBm)	EMI4834	PASS
EIRP - 927.25MHz	927MHz-927.5MHz	1W (30dBm)	EMI4835	PASS

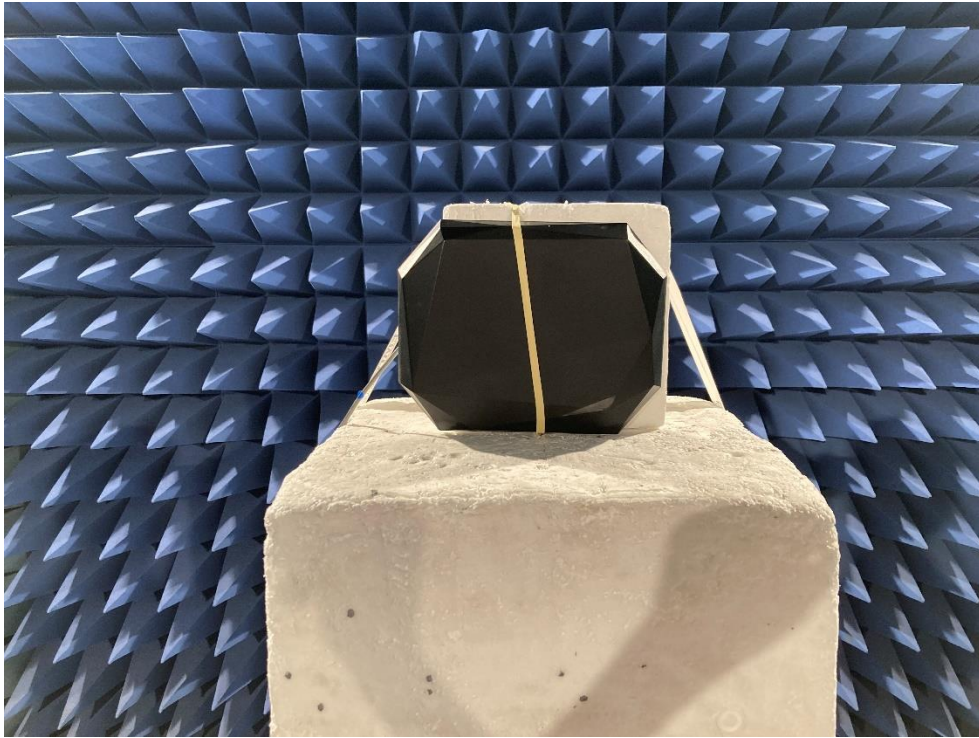
LABORATORY PARAMETERS:	REQUIRED PRIOR TO THE TEST	DURING THE TEST
Ambient Temperature	15 to 35 °C	See Graph(s)
Relative Humidity	20 to 75 %	See Graph(s)
Atmospheric pressure	N/A	See Graph(s)
Test method deviation: N/A		
Supplementary information: N/A		

TEST EQUIPMENT USED					
CATEGORY	BRAND	TYPE	IDENTIFIER	CAL. DATE	CAL. DUE
Antenna	Rohde & Schwarz	HL223	1137	21/08/2021	21/10/2024
Attenuator	EMITECH	SUB.V1-H	14780	21/09/2022	21/11/2023
Attenuator	EMITECH	SUB.V1-V	14781	21/09/2022	21/11/2023
Cable	MegaPhase	F135N1N28	16668	24/10/2019	24/12/2021
Cable	SUCOFLEX	N-3m	14378	23/08/2021	23/10/2023
Cable	SUCOFLEX	N-5,5m	14381	23/08/2021	23/10/2023
Multimeter	FLUKE	8808A	12446	29/09/2020	29/11/2021
Power supply	TTI	TSX-1820P	4365		
Receiver	Rohde & Schwarz	FSW43	14830	29/07/2020	29/09/2022
Shielded enclosure	RAY PROOF	C.V1	1123	16/06/2018	16/02/2022
Software	Nexio	BAT EMC	0000		
Thermohygrometer	Testo	608-H1	7561	26/01/2019	26/03/2022
Thermohygrometer	Bioblock Scientific	Météostar	0963	07/06/2021	07/08/2023

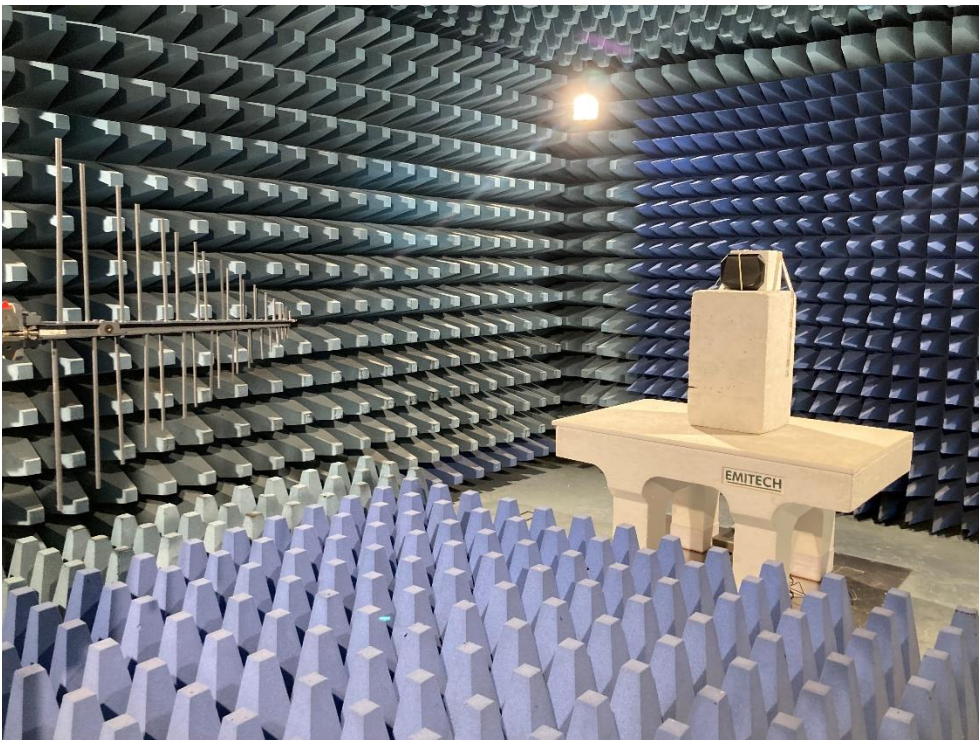
BAT-EMC software version: V3.18.0.26

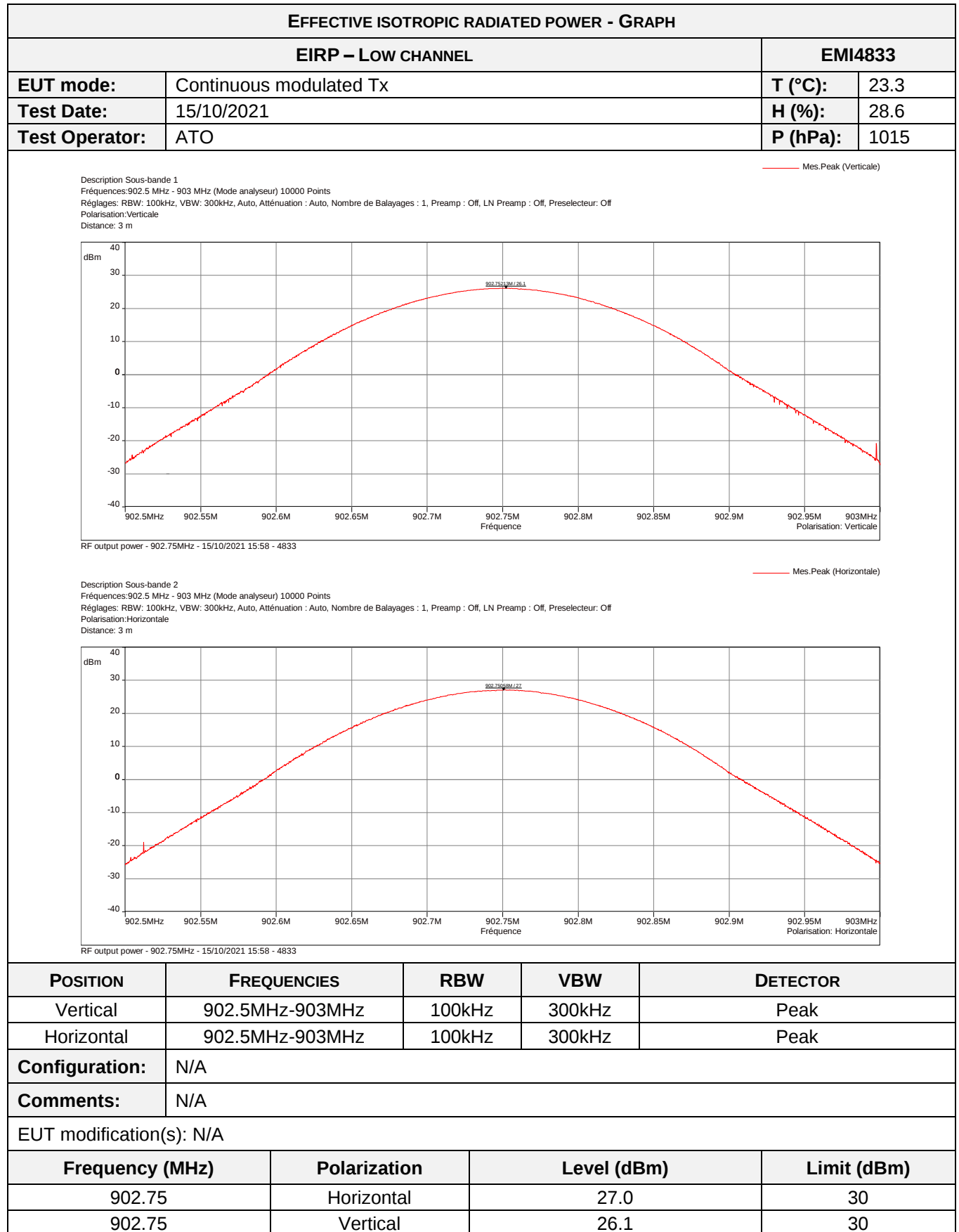
Blank cells = Permanent validity

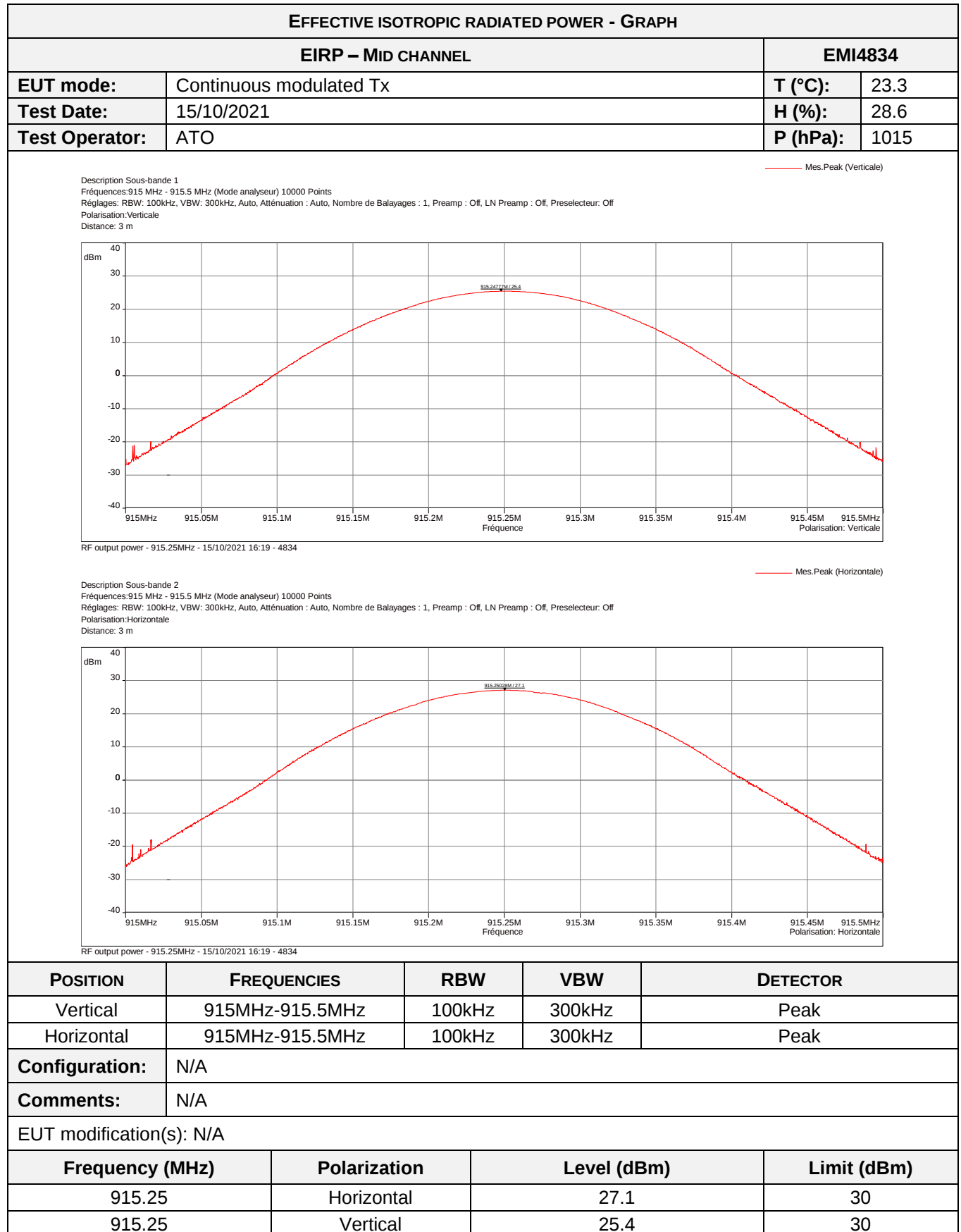
TEST SETUP PHOTO(S) – EUT POSITION

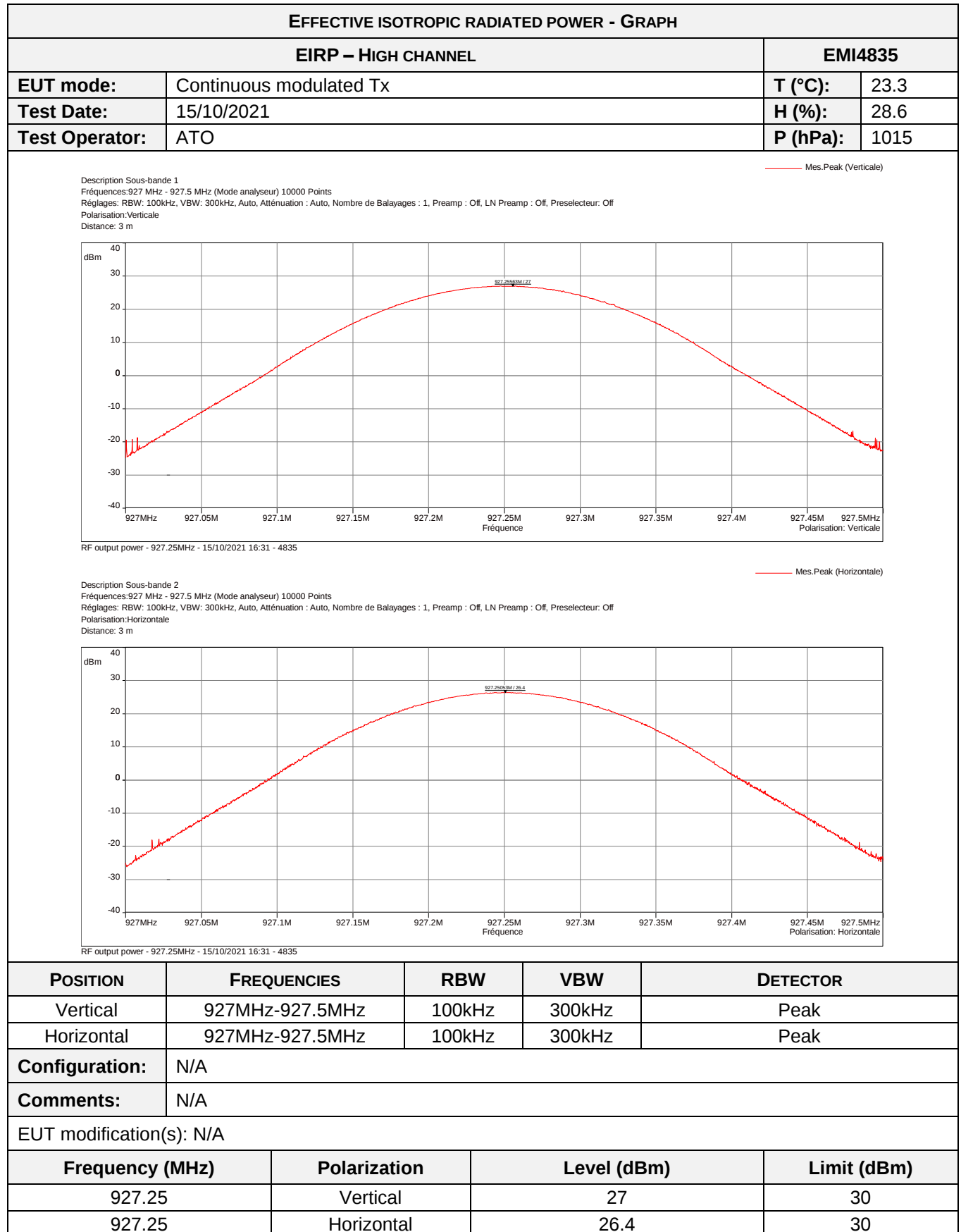


TEST SETUP PHOTO(S) – RADIATED MEASUREMENT









b) EXTREMES TESTS CONDITIONS

Reference standard:	FCC part 15.247 RSS-247
Test method:	ANSI C63.10: 2013
General test setup: EUT is set inside the climatic enclosure. EIRP measurements are repeated in extreme test conditions with the power levels correlated with the maximum effective isotropic radiated power measured in normal conditions.	

TEST CASE	EUT MODE	SEVERITY	RESULT TAB.	VERDICT
Low channel / 25°C / 12Vdc	Continuous Tx	20 dBm	EMI4471	PASS
Low channel / 25°C / 10Vdc	Continuous Tx	20 dBm	EMI5044	PASS
Low channel / 25°C / 30Vdc	Continuous Tx	20 dBm	EMI5045	PASS
Mid channel / 25°C / 12Vdc	Continuous Tx	20 dBm	EMI5046	PASS
Mid channel / 25°C / 10Vdc	Continuous Tx	20 dBm	EMI5047	PASS
Mid channel / 25°C / 30Vdc	Continuous Tx	20 dBm	EMI5048	PASS
High channel / 25°C / 12Vdc	Continuous Tx	20 dBm	EMI5049	PASS
High channel / 25°C / 10Vdc	Continuous Tx	20 dBm	EMI5050	PASS
High channel / 25°C / 30Vdc	Continuous Tx	20 dBm	EMI5051	PASS
Low channel / -30°C / 12Vdc	Continuous Tx	20 dBm	EMI5052	PASS
Mid channel / -30°C / 12Vdc	Continuous Tx	20 dBm	EMI5053	PASS
High channel / -30°C / 12Vdc	Continuous Tx	20 dBm	EMI5054	PASS
Low channel / 60°C / 12Vdc	Continuous Tx	20 dBm	EMI5055	PASS
Mid channel / 60°C / 12Vdc	Continuous Tx	20 dBm	EMI5056	PASS
High channel / 60°C / 12Vdc	Continuous Tx	20 dBm	EMI5057	PASS

LABORATORY PARAMETERS:	REQUIRED PRIOR TO THE TEST	DURING THE TEST
Ambient Temperature	15 to 35 °C	24.2°C
Relative Humidity	20 to 75 %	26.8%
Atmospheric pressure	N/A	1008hPa
TEST METHOD DEVIATION: N/A		
Supplementary information: N/A.		

CATEGORY	BRAND	TYPE	IDENTIFIER	CAL. DATE	CAL. DUE
Antenna	EMITECH	3.5 cm	4653		
Attenuator	Radiall	R412710124	17329	22/06/2020	22/08/2023
Cable	C&C	N-3m	14335	18/03/2021	18/05/2023
Climatic enclosure	Secasi	SM600C	1670		
Multimeter	FLUKE	8808A	10382	01/03/2022	01/05/2023
Power supply	TTI	TSX-1820P	4365		
Spectrum analyzer	Rohde & Schwarz	FPL1007	17908	26/08/2021	26/10/2022
Thermohygrometer	Testo	608-H1	7561	16/05/2022	16/07/2024
Thermohygrometer	Bioblock Scientific	Météostar	0963	07/06/2021	07/08/2023
Thermometer contactless	GHM Greisinger	GMH 3710	12968	06/10/2020	06/12/2022

Blank cells = Permanent validity

TEST SETUP PHOTO(S) - LOW CHANNEL / 25°C



EFFECTIVE ISOTROPIC RADIATED POWER - TABULATED RESULTS

TEST CASE	FREQUENCY	LEVEL	LIMIT	RESULT TAB.
Low channel / 25°C / 12Vdc	902.75MHz	27.00 dBm	20 dBm	EMI4471
Low channel / 25°C / 10Vdc	902.75MHz	26.71 dBm	20 dBm	EMI5044
Low channel / 25°C / 30Vdc	902.75MHz	26.58 dBm	20 dBm	EMI5045
Mid channel / 25°C / 12Vdc	915.25MHz	27.11 dBm	20 dBm	EMI5046
Mid channel / 25°C / 10Vdc	915.25MHz	26.92 dBm	20 dBm	EMI5047
Mid channel / 25°C / 30Vdc	915.25MHz	26.79 dBm	20 dBm	EMI5048
High channel / 25°C / 12Vdc	927.25MHz	27.00 dBm	20 dBm	EMI5049
High channel / 25°C / 10Vdc	927.25MHz	26.93 dBm	20 dBm	EMI5050
High channel / 25°C / 30Vdc	927.25MHz	26.94 dBm	20 dBm	EMI5051
Low channel / -30°C / 12Vdc	902.75MHz	27.18 dBm	20 dBm	EMI5052
Mid channel / -30°C / 12Vdc	915.25MHz	28.17 dBm	20 dBm	EMI5053
High channel / -30°C / 12Vdc	927.25MHz	28.35 dBm	20 dBm	EMI5054
Low channel / 60°C / 12vdc	902.75MHz	25.05 dBm	20 dBm	EMI5055
Mid channel / 60°C / 12vdc	915.25MHz	23.53 dBm	20 dBm	EMI5056
High channel / 60°C / 12Vdc	927.25MHz	25.40 dBm	20 dBm	EMI5057

EUT MODIFICATIONS	OPERATOR	TEST DATE
N/A	MPA	30/06/2022

7.7.Measurement of frequency stability.

Reference standard:	FCC part 15.215 RSS-Gen
Test method:	ANSI C63.10: 2013
General test setup: Frequency stability is the difference between the measured main carrier frequency under normal and extreme conditions and the nominal centre frequency as stated by the manufacturer. EUT is set inside the climatic enclosure. It is connected to the measuring receiver via 50Ω attenuator(s).	

TEST CASE	EUT MODE	SEVERITY	RESULT TAB.	VERDICT
Low channel / 25°C/ 12Vdc	Tx mode	Within 902MHz to 928MHz	EMI4790	PASS
Low channel / 25°C/ 10Vdc	Tx mode		EMI4791	PASS
Low channel / 25°C/ 30Vdc	Tx mode		EMI4792	PASS
Mid channel / 25°C/ 12Vdc	Tx mode		EMI4793	PASS
Mid channel / 25°C / 10Vdc	Tx mode		EMI4794	PASS
Mid channel / 25°C / 30Vdc	Tx mode		EMI4795	PASS
High channel / 25°C/ 12Vdc	Tx mode		EMI4796	PASS
High channel / 25°C/ 10Vdc	Tx mode		EMI4797	PASS
High channel / 25°C/ 30Vdc	Tx mode		EMI4798	PASS
Low channel / -30°C / 12Vdc	Tx mode		EMI4799	PASS
Mid channel / -30°C / 12Vdc	Tx mode		EMI4800	PASS
High channel / -30°C / 12Vdc	Tx mode		EMI4801	PASS
Low channel / 60°C / 12Vdc	Tx mode		EMI4802	PASS
Mid channel / 60°C / 12Vdc	Tx mode		EMI4803	PASS
High channel / 60°C / 12Vdc	Tx mode		EMI4804	PASS

LABORATORY PARAMETERS:	REQUIRED PRIOR TO THE TEST	DURING THE TEST
Ambient Temperature	15 to 35 °C	24.2°C
Relative Humidity	20 to 75 %	26.8%
Atmospheric pressure	N/A	1008hPa
Test method deviation: N/A		
Supplementary information: N/A		

TEST EQUIPMENT USED					
CATEGORY	BRAND	TYPE	IDENTIFIER	CAL. DATE	CAL. DUE
Antenna	EMITECH	3.5 cm	4653		
Attenuator	Radiall	R412710124	17329	22/06/2020	22/08/2023
Cable	C&C	N-3m	14335	18/03/2021	18/05/2023
Climatic enclosure	Secasi	SM600C	1670		
Multimeter	FLUKE	8808A	10382	01/03/2022	01/05/2023
Power supply	TTI	TSX-1820P	4365		
Spectrum analyzer	Rohde & Schwarz	FPL1007	17908	26/08/2021	26/10/2022
Thermohygrometer	Testo	608-H1	7561	16/05/2022	16/07/2024
Thermohygrometer	Bioblock Scientific	Météostar	0963	07/06/2021	07/08/2023
Thermometer contactless	GHM Greisinger	GMH 3710	12968	06/10/2020	06/12/2022

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FREQUENCY ERROR - TABULATED RESULTS				
TEST CASE	FREQUENCY (MHz)	FREQUENCY ERROR (kHz)	LIMIT	RESULT TAB.
Low channel / 25°C / 12Vdc	902.749310	-0.690	Within 902MHz to 928MHz	EMI4790
Low channel / 25°C / 10Vdc	902.749300	-0.700		EMI4791
Low channel / 25°C / 30Vdc	902.749321	-0.679		EMI4792
Mid channel / 25°C / 12Vdc	915.249320	-0.680		EMI4793
Mid channel / 25°C / 10Vdc	915.249305	-0.695		EMI4794
Mid channel / 25°C / 30Vdc	915.249300	-0.700		EMI4795
High channel / 25°C / 12Vdc	927.249330	-0.670		EMI4796
High channel / 25°C / 10Vdc	927.249285	-0.715		EMI4797
High channel / 25°C / 30Vdc	927.249290	-0.710		EMI4798
Low channel / -30°C / 12Vdc	902.749590	-0.410		EMI4799
Mid channel / -30°C / 12Vdc	915.249580	-0.420		EMI4800
High channel / -30°C / 12Vdc	927.249556	-0.444		EMI4801
Low channel / 60°C / 12Vdc	902.749760	-0.240		EMI4802
Mid channel / 60°C / 12Vdc	915.249740	-0.260		EMI4803
High channel / 60°C / 12Vdc	927.249740	-0.260		EMI4804

EUT MODIFICATIONS	OPERATOR	TEST DATE
N/A	MPA	30/06/2022

End of test report