



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

FCC part 15
FCC part 15.247
RSS-247_Issue 2, February 2017

Company: **APPI TECHNOLOGY SAS**
Address.....: 443 RUE JEAN PROUVE
LE MINOTAURE - 1ER ETAGE
30900 NIMES
FRANCE

Test item description: **APPI-CovR**
Trade Mark: APPI-CovR
Manufacturer: APPI TECHNOLOGY SAS
Model/Type reference.....: APPI-CovR / BS-ACOU-01, BS-ACOU-02 and BS-ACOU-03
FCC ID.....: 2AG7HBSACOU01
IC: 21024-BSACOU01
Ratings.....: 3.2Vdc to 3.7Vdc

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

Report Reference No: **RR410-21-101013-6A**
Test procedure: FCC IC Certification
Diffusion.....: Mr. COULON
Applicant's name: APPI TECHNOLOGY SAS
Date of issue.....: April 26, 2022
Total number of pages.....: 66
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Compiled by.....: Olivier AELBRECHT
Approved by (+ signature).....: Olivier HEYER (Laboratory Manager)

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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:

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1. GENERAL INFORMATION

This document submits the results of Radio tests performed on the equipment **APPI-CovR BS-ACOU-01, BS-ACOU-02 and BS-ACOU-03** (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 : Olivier AELBRECHT Test supervisor : None Date of receipt of test item : N/A Date (s) of performance of tests : from March the 9 th to the 16 th of 2021					
APPLICANT'S GENERAL INFORMATION:					
Company name : APPI TECHNOLOGY SAS Company address. : 443 RUE JEAN PROUVE LE MINOTAURE - 1ER ETAGE 30900 NIMES FRANCE Person(s) present during the tests. : Mr. CHAIX Responsible. : Mr. COULON					
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	NTR	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 part 15

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

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

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. : APPI-CovR
Model/Type reference..... : APPI-CovR / BS-ACOU-01, BS-ACOU-02 and BS-ACOU-03
FCC ID..... : 2AG7HBSACOU01
IC. : 21024-BSACOU01
Trade Mark. : APPI-CovR
Serial number (S/N)..... : Rxx-xxxx-xxx
Part number (P/N). : Not communicated
Software version..... : *APPI-COVR 3.3*
Firmware version. : *APPI-COVR 3.3*
Type of sample. : Prototype
Function(s)..... : Full-Duplex Audio Headphones (Personal protective equipment)
Manufacturer name. : APPI TECHNOLOGY SAS
Address..... : 443 Avenue Jean Prouvé,
30900 Nîmes
FRANCE

General product information:

N/A

3.2. EUT Configurations

Sample subject to the tests was tested with following equipment configuration.

Configuration #	#1	#2	#3
EUT Type reference	BS-ACOU-01	BS-ACOU-02	BS-ACOU-03
RF Antenna (SRD)			
RF Antenna (SRD) Reference	BS-APC-ANT01US	BS-APC-ANT02US	BS-APC-ANT03

3.3. EUT Marking plate / Configuration #1

During tests, the EUT didn't have its marking plate.

3.4. EUT Marking plate / Configuration #2

During tests, the EUT didn't have its marking plate.

3.5. EUT Marking plate / Configuration #3

During tests, the EUT didn't have its marking plate.

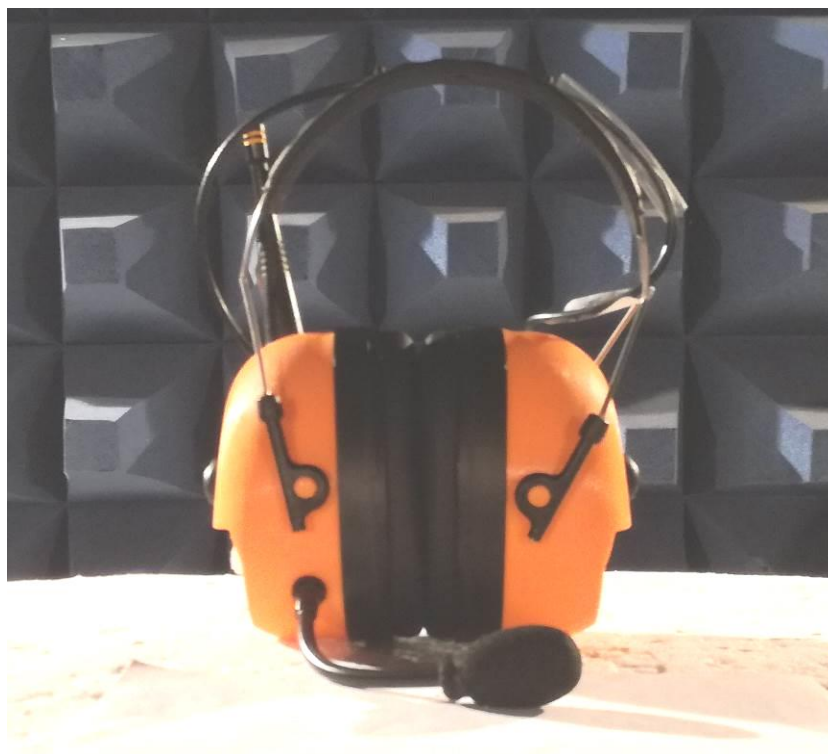
3.6. EUT General view / Configuration #1

EUT with antenna BS-APC-ANT01US



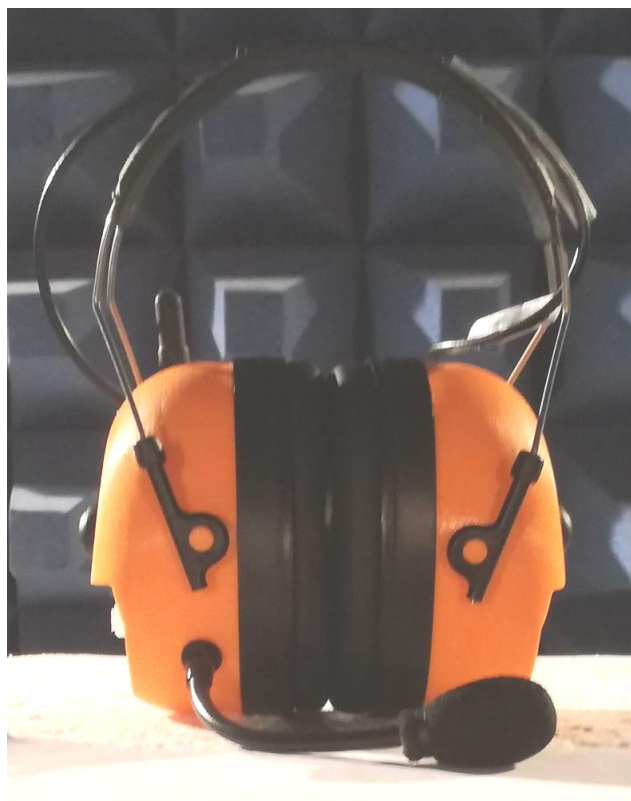
3.7. EUT General view / Configuration #2

EUT with antenna BS-APC-ANT02US



3.8. EUT General view / Configuration #3

EUT with antenna BS-APC-ANT03



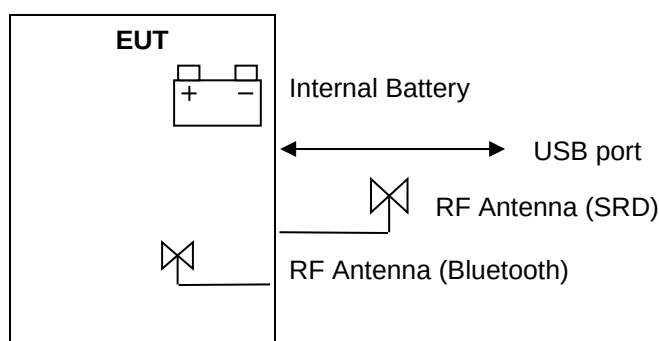
3.9. EUT Mechanical and Electrical Design

Power supply. : 3.7Vdc
Power supply range. : 3.2Vdc to 3.7Vdc
Power type. : Battery powered
Power (W). : 1.85
Nominal current (A). : 0.5
Dimensions (L x W x H) (mm). : 100x100x110
Weight (kg). : 0.445
Temperature range (°C). : Not communicated
Ground bounding strap. : No

Comments:

N/A

3.10. EUT Input/Output ports



PORT	NAME	TYPE	LENGHT	CABLE TYPE	COMMENTS
0	Main frame	N/E	N/A	Plastic	
1	Internal Battery	DC	N/A	N/A	3.7Vdc
2	USB port	I/O	<1m	Not shielded	Used for battery charging and device configuration
3	RF Antenna	RF	N/A	N/A	Used for SRD (915MHz)
4	RF Antenna	RF	N/A	N/A	Used for Bluetooth

AC/DC : AC/DC Converter port

I/O.....: Input or Output port

N/E: Non Electrical port

AC.....: Alternative current port

TP: Telecommunication port

DC.....: Discontinuous current port

RF.....: Radio frequency port

3.11. Supporting Equipment Used During Test

Sample subject to the tests was tested with following equipment.

PRODUCT TYPE	MANUFACTURER	MODEL	N°EMITECH / COMMENTS
AC/DC USB Charger	SAMSUNG	EP-TA10EWE	Used for conducted measuerement and during radiated test for battery charging

(AE) AC/DC USB CHARGER



3.12. EUT Radio Specifications

a) GENERAL INFORMATIONS	
According to manufacturer's declarations :	
EUT type.....	Transceiver
Technology	SRD / Bluetooth
Environmental profile.....	Data transmissions
Temperature range.....	-20°C to +55°C
Antenna type	Bluetooth: Internal SRD: External dedicated
Antenna Gain.....	SRD: +2dBi Bluetooth : not communicated
Comments: N/A	
b) TRANSMITTER PARAMETERS (Tx)	
Frequency bands.....	SRD: 902MHz to 928MHz Bluetooth : 2400MHz to 2483.5MHz
RF Power.....	SRD: 500mW Bluetooth : <10mW
Number of channels / Separation.....	SRD: 16 channels (Groups) with 50 sub channels (FHSS) Bluetooth: 79 channel each 1MHz (DSSS)
Modulation type	GFSK
Tested frequency.....	SRD 902.179 (Low channel) 914.996 (Mid channel) 927.804 (High channel) Bluetooth 2.402MHz (Low channel) 2440MHz Mid. channel) 2480MHz High channel)
c) RECEIVER PARAMETERS (Rx)	
Frequency bands.....	SRD: 902MHz to 928MHz Bluetooth : 2400MHz to 2483.5MHz
Bandwidth.....	SRD: 62.5kHz Bluetooth: not communicated

4. RESULT SUMMARY

TEST DESIGNATION	SEVERITY	VERDICT	BASIC STANDARDS / COMMENTS
Conducted emission (measurement) - Power Supply / 110Vac/60Hz / All Configurations	Class B	PASS	FCC part 15.107, 15.207 and RSS-Gen
Transmitter radiated spurious emissions at frequencies <30MHz - Tx Mode / 0° - All Channels / All Configurations - Tx Mode / 45° - All Channels / All Configurations - Tx Mode / 90° - All Channels / All Configurations	15.209 15.209 15.209	PASS PASS PASS	FCC part 15.109, 15.209, 15.205, 15.215 RSS-210, CNR Gen
Transmitter radiated spurious emissions at frequencies >30MHz - Tx Mode / Bluetooth All Channels / SRD All Channels / All Positions / All Configurations- For Freq < 1ghz - Tx mode / Bluetooth All Channels / SRD Low Channel / All positions / Configuration #1 - For Freq > 1GHz - Tx mode / Bluetooth All Channels / SRD Mid Channel / All positions / Configuration #1 - For Freq > 1GHz - Tx mode / Bluetooth All Channels / SRD High Channel / All positions / Configuration #1 - For Freq > 1GHz - Tx mode / Bluetooth All Channels / SRD Low Channel / All positions / Configuration #2 - For Freq > 1GHz - Tx mode / Bluetooth All Channels / SRD Mid Channel / All positions / Configuration #2 - For Freq > 1GHz - Tx mode / Bluetooth All Channels / SRD High Channel / All positions / Configuration #2 - For Freq > 1GHz - Tx mode / Bluetooth All Channels / SRD Low Channel / All positions / Configuration #3 - For Freq > 1GHz - Tx mode / Bluetooth All Channels / SRD Mid Channel / All positions / Configuration #3 - For Freq > 1GHz - Tx mode / Bluetooth All Channels / SRD High Channel / All positions / Configuration #3 - For Freq > 1GHz	15.209 15.209 15.209 15.209 15.209 15.209 15.209 15.209 15.209 15.209 15.209	PASS PASS PASS PASS PASS PASS PASS PASS PASS PASS PASS	FCC part 15.109, 15.209, 15.205, 15.215, RSS-210, CNR Gen
Band-edge compliance - BandEdge / SRD - Low Channel - BandEdge / SRD - High Channel	15.247 15.247	PASS PASS	FCC part 15.247 RSS-247
Maximum peak conducted of intentional radiation - SRD Low Channel - SRD Mid Channel - SRD High Channel	1W 1W 1W	PASS PASS PASS	FCC part 15.147, RSS-247
Effective isotropic radiated power - EIRP - Bluetooth / Low Channel / All Positions / All Configurations - EIRP - Bluetooth / Mid Channel / All Positions / All Configurations - EIRP - Bluetooth / High Channel / All Positions / All Configurations	1W 1W 1W	PASS PASS PASS	FCC part 15.147, RSS-247
20dB bandwidth, Carrier Frequency separation and Number of Hopping Channels - SRD / Number of hopping channels - SRD / Channels frequency separation	50 -	PASS PASS	FCC part 15.147, RSS-247

TEST DESIGNATION	SEVERITY	VERDICT	BASIC STANDARDS / COMMENTS
- SRD / 20dB Bandwidth - SRD / Channel Occupation time	- 0.4s	PASS PASS	FCC part 15 Radio part 15.215 c) and RSS Gen
Frequency error			
- SRD / Low channel - SRD / Mid channel - SRD / High channel	902MHz < Freq < 928MHz	PASS PASS PASS	

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		
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	$\pm 3.8 \%$	$\pm 5 \%$
Adjacent channel power	$\pm 1.6 \text{ dB}$	$\pm 3 \text{ dB}$
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	$\pm 5.2 \text{ dB}$	$\pm 6 \text{ dB}$
Radiated emission (magnetic field)		
9kHz – 30MHz	$\pm 3 \text{ dB}$	$\pm 6 \text{ dB}$
Supply voltages	$\pm 3 \%$	$\pm 3 \%$
Temperature	$\pm 1 \text{ }^{\circ}\text{C}$	$\pm 1^{\circ}\text{C}$
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	$\pm 5.0 \text{ dB}$	/
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. TEST CONDITIONS AND RESULTS

6.1. Conducted emission (measurement)

Reference standard:	FCC part 15.107, 15.207 and RSS-Gen
Test method:	ANSI C63.4: 2014
General test setup: EUT is set on an insulating support at 40cm above the ground reference plane. All power was connected to the system through Artificial Mains Network (AMN). The AMN is placed at 80cm from the boundary of the EUT and bonded to a ground reference plane. 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
Power Supply / 110Vac/60Hz / All Configurations	150kHz-30MHz	Class B	EMI4737	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: N/A		

TEST EQUIPMENT USED					
CATEGORY	BRAND	TYPE	IDENTIFIER	CAL. DATE	CAL. DUE
Cable	N	3m	16429	04/05/2019	04/07/2021
Cable	EMITECH	Current absorber sheath	9491	23/06/2020	23/08/2022
Cable	Huber + Suhner	SF102K	16041	28/02/2019	28/04/2021
Ground plane	EMITECH	Test area	11569		
LISN	PMM	L2-16	1209	08/06/2020	08/08/2022
Multimeter	Keithley	2010	6094	30/05/2019	30/07/2021
Receiver	Rohde & Schwarz	FSW43	14830	29/07/2020	29/09/2021
Software	Nexio		0000		
Surges Suppressor	Hewlett Packard	11947A	0238	20/12/2019	20/02/2023
Thermohygrometer	Testo	608-H2	12269	07/05/2020	07/07/2022
Thermohygrometer	Bioblock Scientific	Météostar	0963	25/01/2019	25/03/2021

BAT-EMC software version: V3.18.0.26

Blank cells = Permanent validity

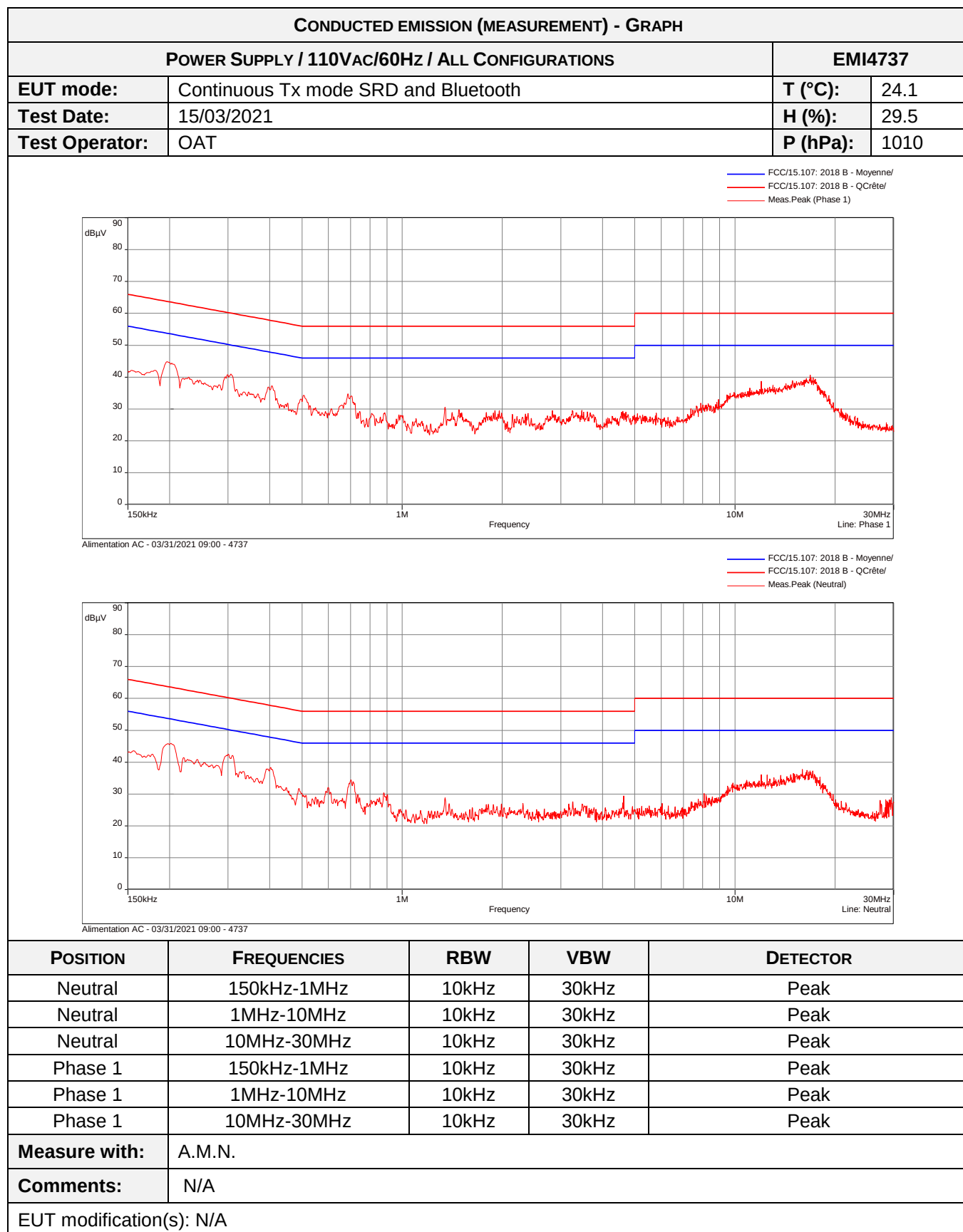
TEST SETUP PHOTO(S)



CONDUCTED EMISSION (MEASUREMENT) - TABULATED RESULTS

POWER SUPPLY / 110VAC/60Hz / ALL CONFIGURATIONS						EMI4737	
Terminal	Test Frequency (MHz)	Meter Reading dB (μV)	Detector (Pk/QP/Av)	Gain/Loss Factor (dB)	Level dB (μV)	Limit dB (μV)	Margin (dB)
N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Supplementary information: N/A							

No spurious emissions were detected.



6.2. Transmitter radiated spurious emissions at frequencies <30MHz

Reference standard:	FCC part 15 Radio part 15.247 and RSS-247
Test method:	FCC part 15.109, 15.209, 15.205, 15.215 RSS-247, CNR Gen
Test description: : Spurious domain emission limits are limits on emissions at frequencies other than those of the carrier and sidebands associated with normal test modulation. 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 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. All frequencies were investigated, where applicable.	

TESTED CONFIGURATION	PARAMETER	SEVERITY	RESULT TAB.	VERDICT
Tx mode / 0° - All channels / All configurations	9kHz-30MHz	15.209	EMI4707	PASS
Tx mode / 45° - All channels / All configurations	9kHz-30MHz	15.209	EMI4723	PASS
Tx mode / 90° - All channels / All configurations	9kHz-30MHz	15.209	EMI4724	PASS

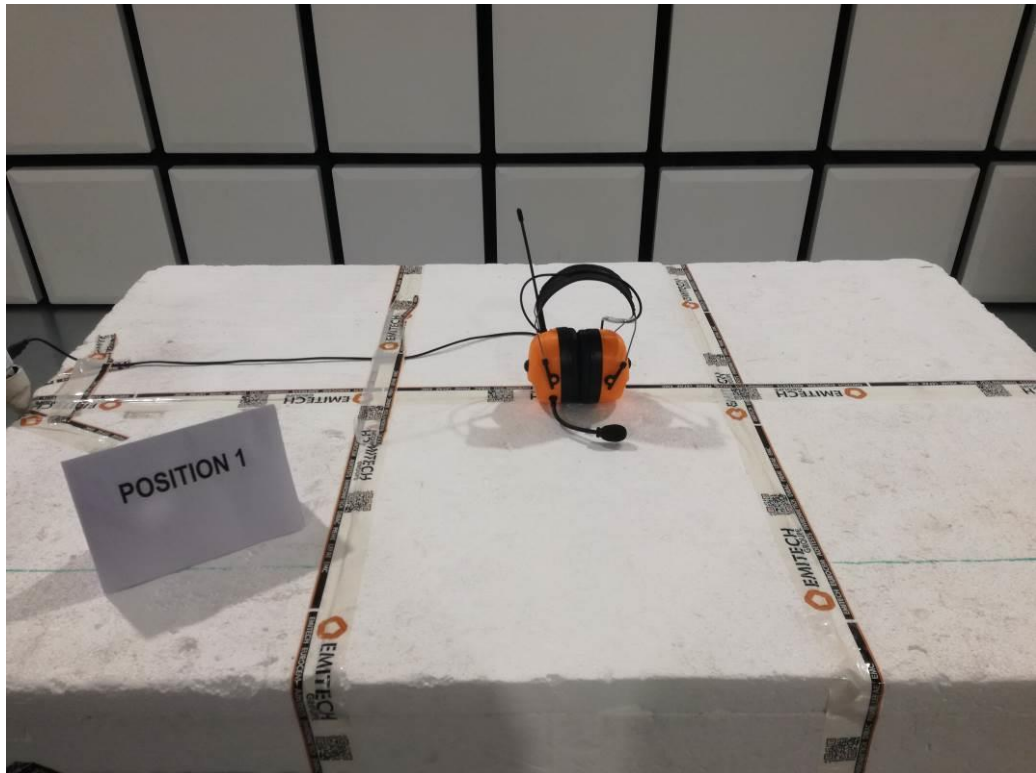
LABORATORY PARAMETERS:	REQUIRED PRIOR TO THE TEST	DURING THE TEST
Ambient Temperature	15 to 35 °C	See Graph(es)
Relative Humidity	20 to 75 %	See Graph(es)
Atmospheric pressure	N/A	See Graph(es)
Test method deviation: N/A		
Supplementary information: limit indicated on the curves is computed with 40 dB/decade extrapolation factor and 51.5 dB conversion factor.		

TEST EQUIPMENT USED					
CATEGORY	BRAND	TYPE	IDENTIFIER	CAL. DATE	CAL. DUE
Antenna	Rohde & Schwarz	HFH2-Z2	5825	24/04/2020	24/06/2022
Cable	SUCOFLEX	N-6,5m	14380	25/07/2019	25/09/2021
Cable	MegaPhase	N-8m	15813	14/01/2021	14/03/2023
Cable	MegaPhase	TM18-N1N1-118	12841	14/08/2020	14/10/2022
Receiver	Agilent Technologies	E4440A	5824	22/10/2020	22/12/2022
Shielded enclosure	COMTEST	SAC 3m	14494	02/10/2019	02/12/2022
Software	Nexio		0000		
Thermohygrometer	Bioblock Scientific	Météostar	0963	25/01/2019	25/03/2021
Thermohygrometer	Testo	608-H2	12269	07/05/2020	07/07/2022

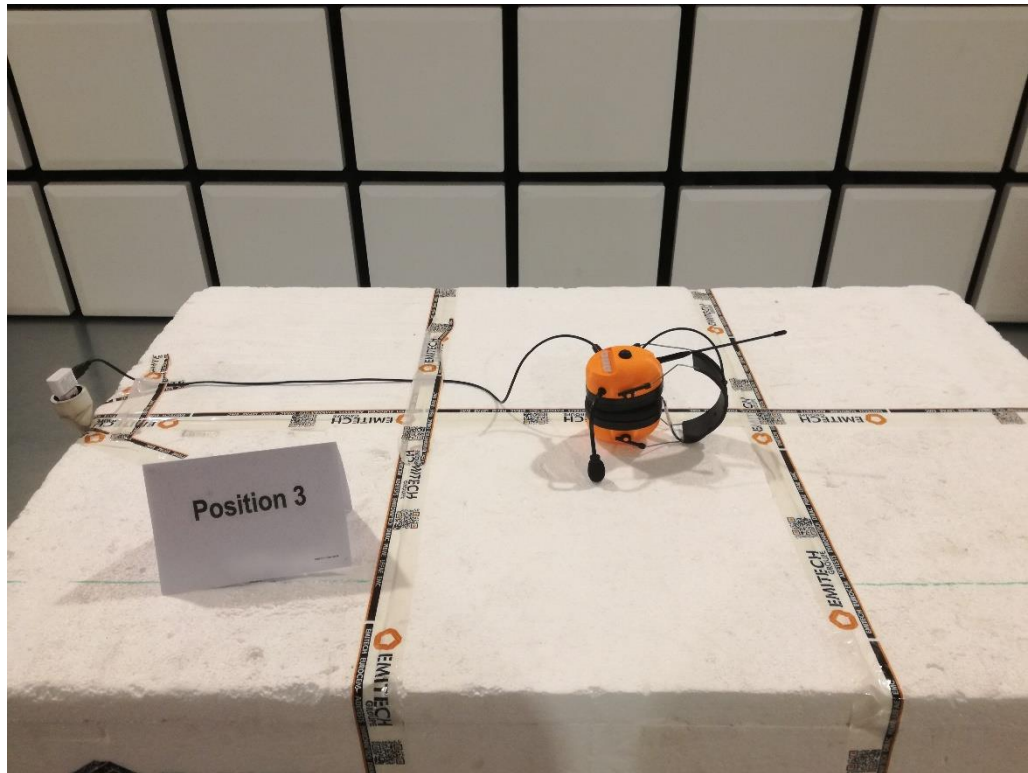
BAT-EMC software version: V3.18.0.26

Blank cells = Permanent validity

TEST SETUP PHOTO(S) – EUT POSITIONS



TEST SETUP PHOTO(S) – EUT POSITIONS

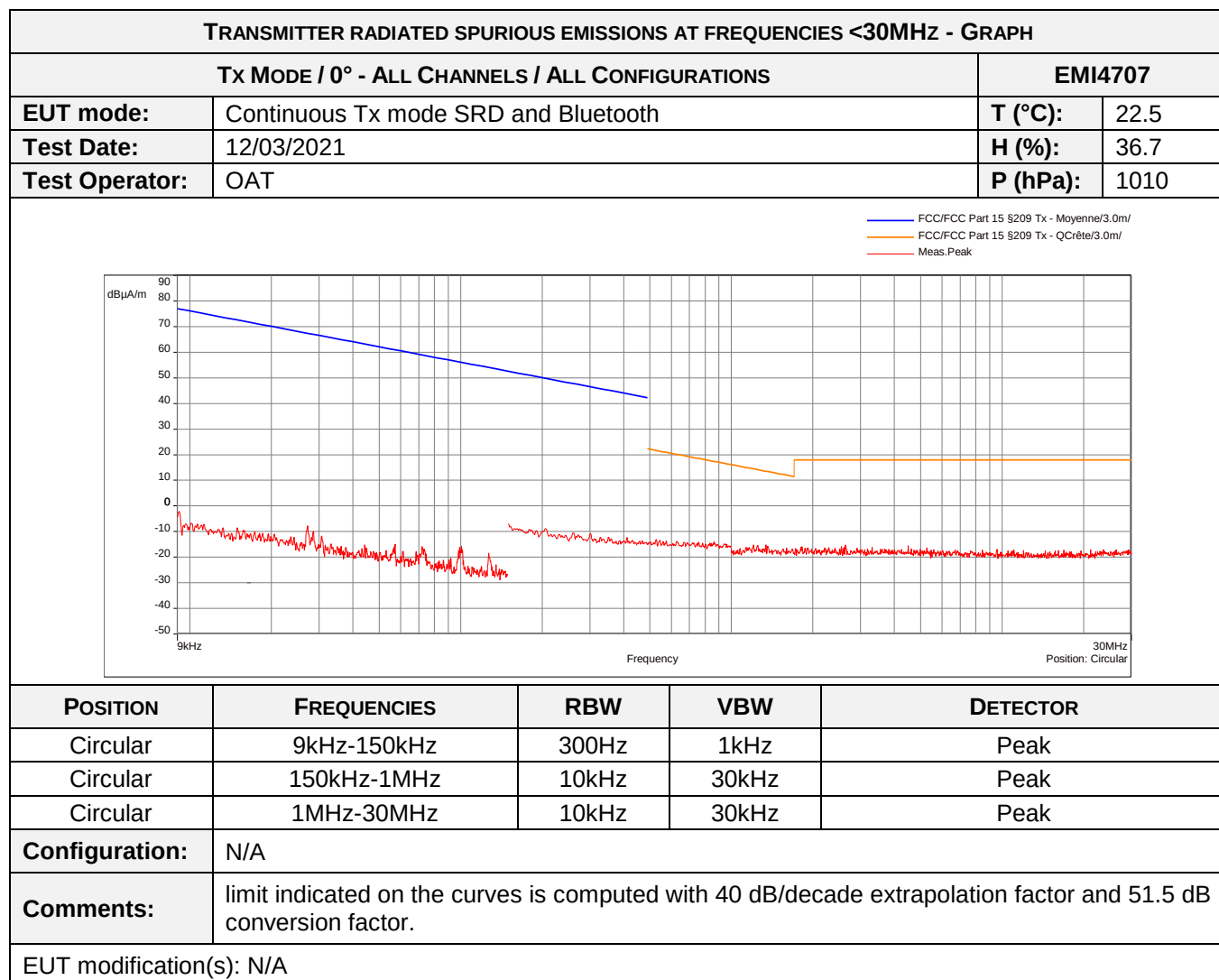


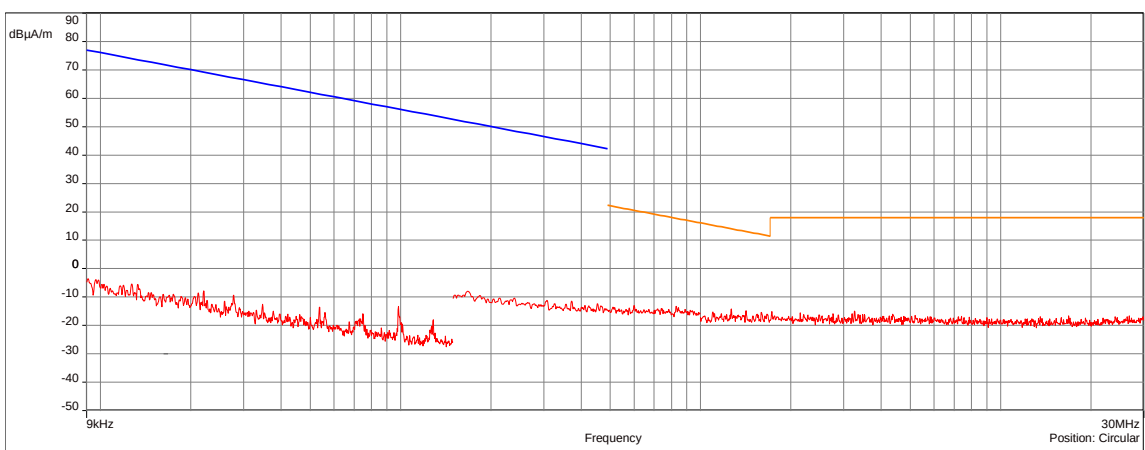
TEST SETUP PHOTO(S)

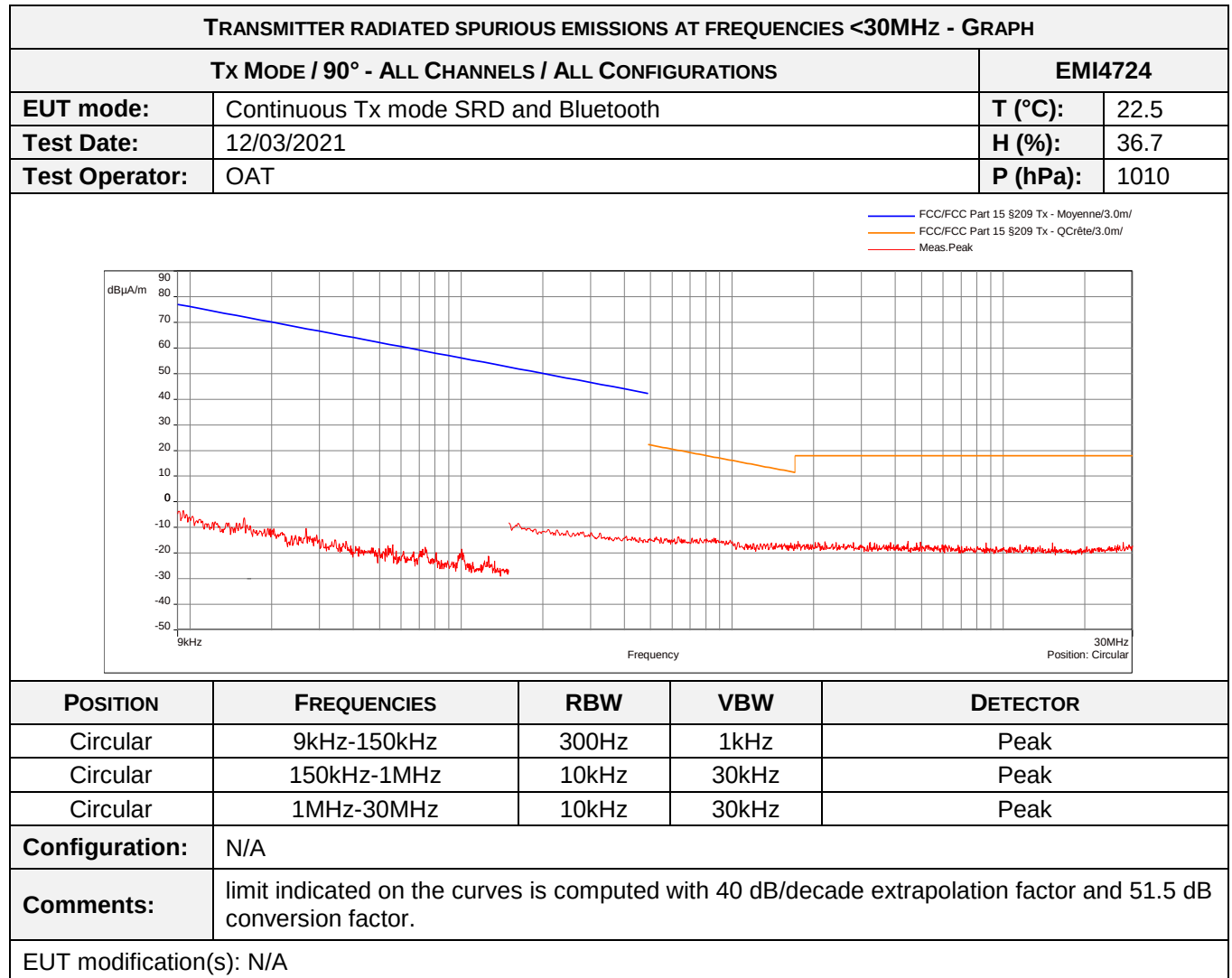


TRANSMITTER RADIATED SPURIOUS EMISSIONS AT FREQUENCIES <30MHz - TABULATED RESULTS			
Frequency (MHz)	Antenna Position	Level (dBμA/m)	Limit (dBμA/m)
N/A	N/A	N/A	N/A

No spurious emissions were detected.



TRANSMITTER RADIATED SPURIOUS EMISSIONS AT FREQUENCIES <30MHZ - GRAPH					
Tx Mode / 45° - ALL CHANNELS / ALL CONFIGURATIONS				EMI4723	
EUT mode:	Continuous Tx mode SRD and Bluetooth			T (°C):	22.5
Test Date:	12/03/2021			H (%):	36.7
Test Operator:	OAT			P (hPa):	1010
FCC/FCC Part 15 §209 Tx - Moyenne/3.0m/ FCC/FCC Part 15 §209 Tx - QCrête/3.0m/ Meas.Peak 					
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 the curves is computed with 40 dB/decade extrapolation factor and 51.5 dB conversion factor.				
EUT modification(s): N/A					



6.3. Radiated spurious emissions (transmitter)

Reference standard:	FCC part 15 Radio part 15.247 and RSS-247
Test method:	FCC part 15.109, 15.209, 15.205, 15.215 RSS-247, CNR Gen
General test setup: EUT is set on an insulating support at 80cm for Freq < 1GHz and 150cm for Freq > 1Ghz 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
Tx Mode / Bluetooth All Channels / SRD All Channels / All Positions / All Configurations - For Freq < 1GHz	30MHz-1GHz	15.209	EMI4688	PASS
Tx mode / Bluetooth All Channels / SRD Low Channel / All positions / Configuration #1 - For Freq > 1GHz	1GHz-18GHz	15.209	EMI4682	PASS
Tx mode / Bluetooth All Channels / SRD Mid Channel / All positions / Configuration #1 - For Freq > 1GHz	1GHz-18GHz	15.209	EMI4677	PASS
Tx mode / Bluetooth All Channels / SRD High Channel / All positions / Configuration #1 - For Freq > 1GHz	1GHz-18GHz	15.209	EMI4676	PASS
Tx mode / Bluetooth All Channels / SRD Low Channel / All positions / Configuration #2 - For Freq > 1GHz	1GHz-18GHz	15.209	EMI4681	PASS
Tx mode / Bluetooth All Channels / SRD Mid Channel / All positions / Configuration #2 - For Freq > 1GHz	1GHz-18GHz	15.209	EMI4678	PASS
Tx mode / Bluetooth All Channels / SRD High Channel / All positions / Configuration #2 - For Freq > 1GHz	1GHz-18GHz	15.209	EMI4674	PASS
Tx mode / Bluetooth All Channels / SRD Low Channel / All positions / Configuration #3 - For Freq > 1GHz	1GHz-18GHz	15.209	EMI4680	PASS
Tx mode / Bluetooth All Channels / SRD Mid Channel / All positions / Configuration #3 - For Freq > 1GHz	1GHz-18GHz	15.209	EMI4679	PASS
Tx mode / Bluetooth All Channels / SRD High Channel / All positions / Configuration #3 - For Freq > 1GHz	1GHz-18GHz	15.209	EMI4675	PASS

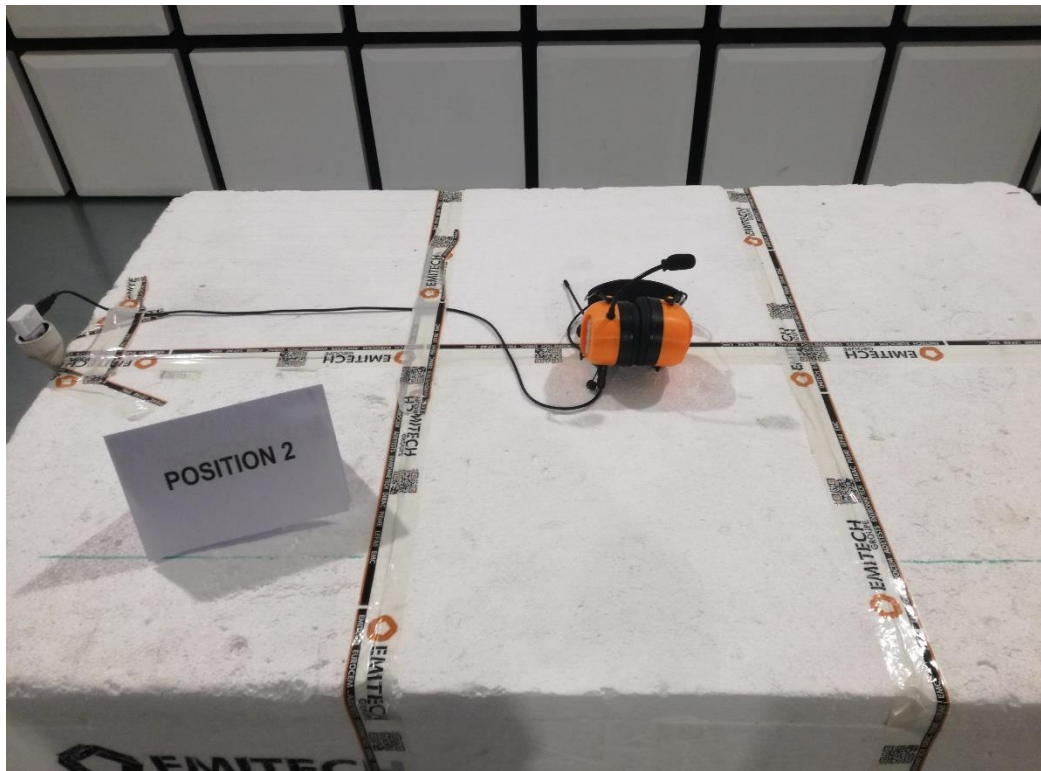
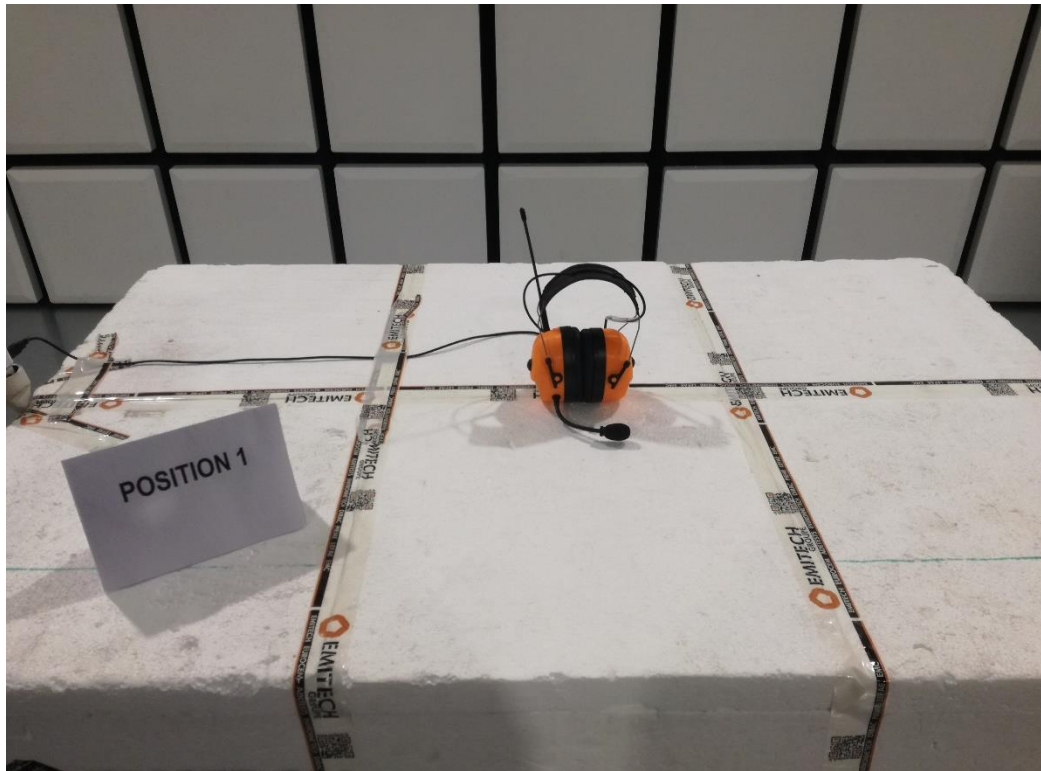
LABORATORY PARAMETERS:	REQUIRED PRIOR TO THE TEST	DURING THE TEST
Ambient Temperature	15 to 35 °C	See Graph(es)
Relative Humidity	20 to 75 %	See Graph(es)
Atmospheric pressure	N/A	See Graph(es)
Test method deviation: N/A		
Supplementary information: N/A		

TEST EQUIPMENT USED					
CATEGORY	BRAND	TYPE	IDENTIFIER	CAL. DATE	CAL. DUE
Antenna	ETS-Lindgren	3117	5456	24/07/2019	24/09/2022
Antenna	Electro Metrics	BIA-30HF	0824	13/06/2018	13/08/2021
Antenna	Rohde & Schwarz	HL223	3126	13/06/2018	13/08/2021
Cable	MegaPhase	F135N1N28	16666	25/10/2019	25/12/2021
Cable	C&C	N-1.5m	10554	20/12/2019	20/02/2022
Cable	SUCOFLEX	N-3m	14378	25/06/2019	25/08/2021
Cable	SUCOFLEX	N-3m	14379	25/06/2019	25/08/2021
Cable	SUCOFLEX	N-6,5m	14380	25/07/2019	25/09/2021
Cable	MegaPhase	N-8m	15813	14/01/2021	14/03/2023
Cable	Huber + Suhner	SF102K	16041	28/02/2019	28/04/2021
Cable	MegaPhase	TM18-N1N1-118	12841	14/08/2020	14/10/2022
Cable	MegaPhase	TM18-N1N1-118	12842	02/12/2020	02/02/2023
Filter	Micro-Tronics	HPM 15162	10273	12/01/2019	12/03/2022
Filter	Micro-Tronics	HPM18865	12843	09/06/2018	09/08/2021
Preamplifier	Techniwave	APS16-0087	14040	02/12/2020	02/02/2022
Receiver	Agilent Technologies	E4440A	5824	22/10/2020	22/12/2022
Receiver	Rohde & Schwarz	ESI	9704	03/03/2020	03/05/2021
Receiver	Rohde & Schwarz	FSW43	14830	29/07/2020	29/09/2021
Shielded enclosure	RAY PROOF	C.V2	1423	04/10/2019	04/12/2022
Shielded enclosure	COMTEST	SAC 3m	14494	02/10/2019	02/12/2022
Software	Nexio		0000		
Thermohygrometer	Bioblock Scientific	Météostar	0963	25/01/2019	25/03/2021
Thermohygrometer	Testo	608-H2	12269	07/05/2020	07/07/2022

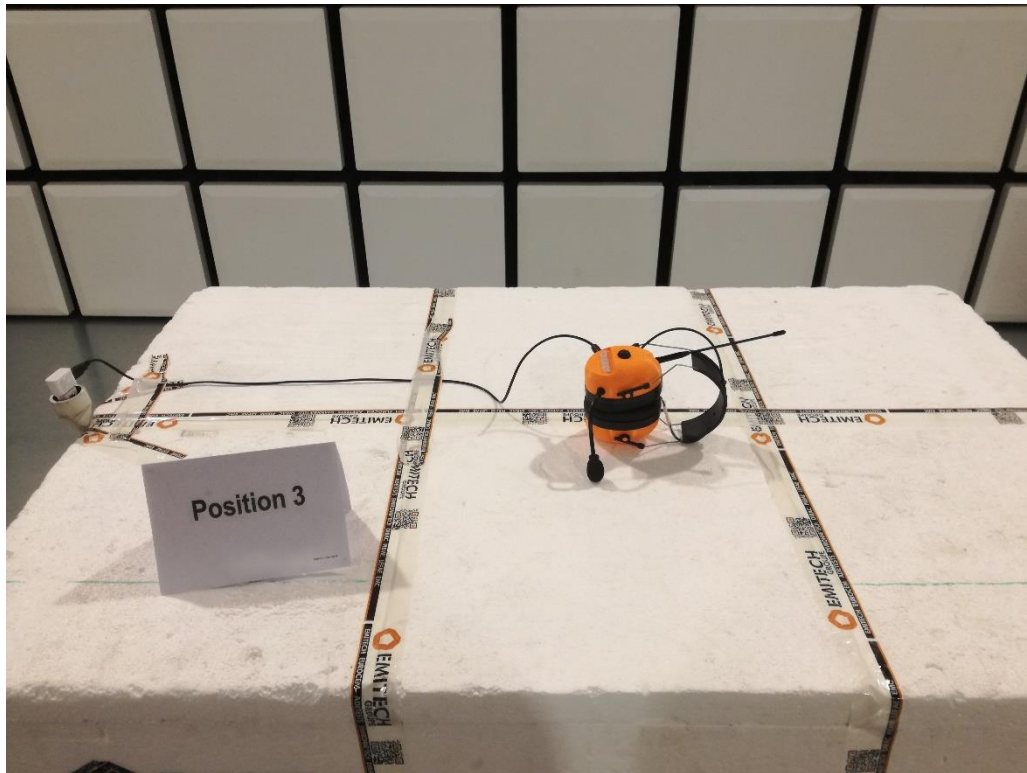
BAT-EMC software version: V3.18.0.26

Blank cells = Permanent validity

TEST SETUP PHOTO(S) – EUT POSITIONS



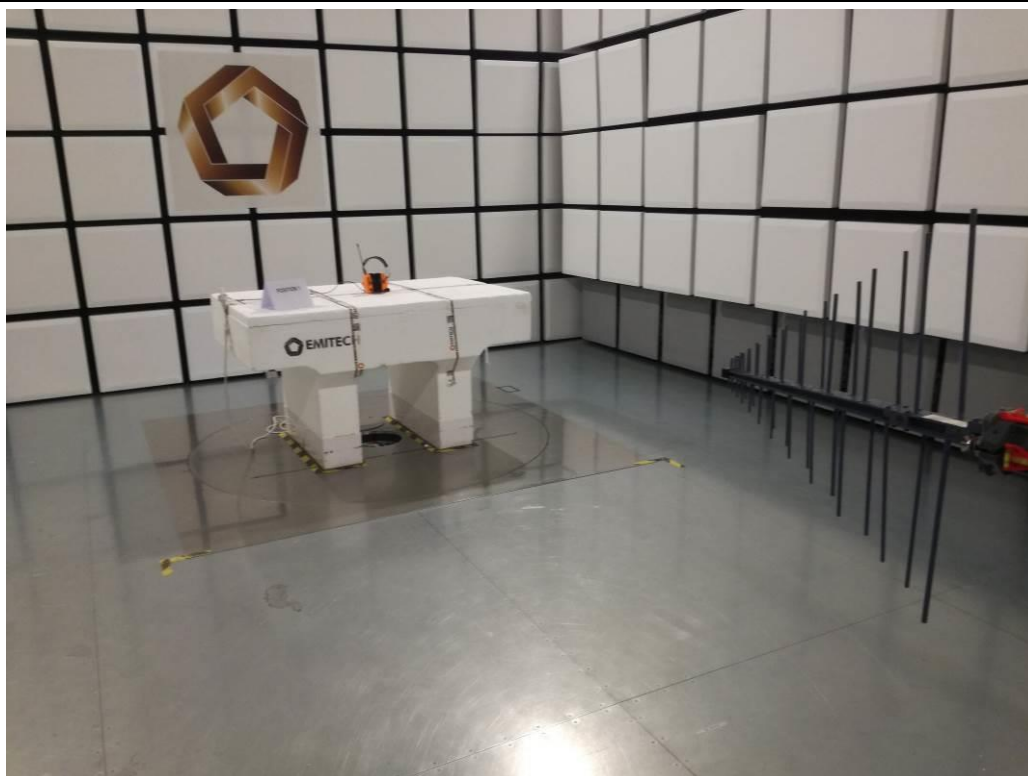
TEST SETUP PHOTO(S) – EUT POSITIONS



TEST SETUP PHOTO(S) – FOR FREQ < 200MHz



TEST SETUP PHOTO(S) – FOR $200\text{MHz} < \text{FREQ} < 1\text{GHz}$



TEST SETUP PHOTO(S) – FOR $\text{FREQ} > 1\text{GHz}$



TRANSMITTER RADIATED SPURIOUS EMISSIONS AT FREQUENCIES >30MHz - TABULATED RESULTS					
Tx Mode / BLUETOOTH ALL CHANNELS / SRD ALL CHANNELS / ALL POSITIONS / ALL CONFIGURATIONS- FOR FREQ < 1GHz				EMI4688	
Frequency (MHz)	Polarization	Level Peak (dBµV/m)	Level Qpeak (dBµV/m)	Limit Qpeak (dBµ/m)	Margin (Limit – Level)
59.966	Vertical	36.99	38.38	40.0	1.62
60.009	Vertical	37.19	38.63	40.0	1.37
60.030	Vertical	35.09	36.71	40.0	3.29
83.960	Vertical	32.79	35.08	40.0	4.92
83.982	Vertical	34.04	35.68	40.0	4.32
84.003	Vertical	33.76	35.63	40.0	4.37
84.024	Vertical	32.11	34.18	40.0	5.82
84.046	Vertical	29.53	32.36	40.0	7.64
198.279	Vertical	30.04	N/P	43.5	13.46
59.966	Horizontal	33.77	35.51	40.0	4.49
59.987	Horizontal	34.52	36.09	40.0	3.91
60.009	Horizontal	33.72	35.58	40.0	4.42
84.003	Horizontal	32.08	N/P	40.0	7.92
108.019	Horizontal	35.39	N/P	43.5	8.11
156.007	Horizontal	31.32	N/P	43.5	12.18
180.001	Horizontal	34.56	N/P	43.5	8.94
198.874	Horizontal	33.15	N/P	43.5	10.35
204.001	Vertical	24.30	N/P	43.5	19.20
252.007	Vertical	26.84	N/P	46.0	19.16
276.410	Vertical	25.05	N/P	46.0	20.95
300.013	Vertical	27.46	N/P	46.0	18.54
500.038	Vertical	33.44	N/P	46.0	12.56
842.680	Vertical	37.60	N/P	46.0	8.40
869.384	Vertical	38.34	N/P	46.0	7.66
206.101	Horizontal	25.28	N/P	43.5	18.22
300.013	Horizontal	27.27	N/P	46.0	18.73
500.038	Horizontal	32.92	N/P	46.0	13.08

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

TRANSMITTER RADIATED SPURIOUS EMISSIONS AT FREQUENCIES >30MHz - TABULATED RESULTS					
TX MODE / BLUETOOTH ALL CHANNELS / SRD LOW CHANNEL / ALL POSITIONS / CONFIGURATION #1 - FOR FREQ > 1GHz				EMI4682	
Frequency (MHz)	Polarization	Level Peak (dBμV/m)	Level AVG (dBμV/m)	Limit AVG (dBμ/m)	Margin (Limit – Level)
1529.316	Vertical	42.5	N/P	54	11.5
2777.472	Vertical	50.03	N/P	54	3.97
1531.566	Horizontal	43.91	N/P	54	10.09
2775.222	Horizontal	49.79	N/P	53	3.21
3609.061	Horizontal	60.64	45.16	54	8.84
4515.152	Horizontal	64.28	49.98	54	4.02
4953.195	Horizontal	47.18	N/P	54	6.82
5427.243	Vertical	56.75	42.39	54	11.61
8142.514	Vertical	45.73	N/P	54	8.27
3610.561	Horizontal	58.55	44.79	54	9.21
4518.152	Horizontal	65.81	48.65	54	5.35
4929.193	Horizontal	48.41	N/P	54	5.59
5425.743	Horizontal	58.27	43.75	54	10.25
8139.514	Horizontal	47.73	N/P	54	6.27
10847.285	Horizontal	50.53	N/P	54	3.47

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

TRANSMITTER RADIATED SPURIOUS EMISSIONS AT FREQUENCIES >30MHz - TABULATED RESULTS					
TX MODE / BLUETOOTH ALL CHANNELS / SRD MID CHANNEL / ALL POSITIONS / CONFIGURATION #1 - FOR FREQ > 1GHz				EMI4677	
Frequency (MHz)	Polarization	Level Peak (dBμV/m)	Level AVG (dBμV/m)	Limit AVG (dBμ/m)	Margin (Limit – Level)
2745.218	Vertical	50.93	N/P	54	3.07
2746.968	Horizontal	50.79	N/P	54	3.21
3658.566	Vertical	63.11	48.98	54	5.02
4572.157	Vertical	63.8	48.81	53	4.19
4857.186	Vertical	49.98	N/P	54	4.02
7312.931	Vertical	48.23	N/P	54	5.77
8226.523	Vertical	48.98	N/P	54	5.02
3657.066	Horizontal	60.11	47.48	54	6.52
4567.657	Horizontal	66.13	50.43	54	3.57
4929.193	Horizontal	48.25	N/P	54	5.75
7303.930	Horizontal	49.81	N/P	54	4.19
8214.521	Horizontal	51.05	N/P	54	2.95
9120.612	Horizontal	44.13	N/P	54	9.87
10946.295	Horizontal	48.44	N/P	54	5.56

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

TRANSMITTER RADIATED SPURIOUS EMISSIONS AT FREQUENCIES >30MHz - TABULATED RESULTS					
TX MODE / BLUETOOTH ALL CHANNELS / SRD HIGH CHANNEL / ALL POSITIONS / CONFIGURATION #1 - FOR FREQ > 1GHz				EMI4676	
Frequency (MHz)	Polarization	Level Peak (dBµV/m)	Level AVG (dBµV/m)	Limit AVG (dBµ/m)	Margin (Limit – Level)
2712.964	Vertical	51.15	N/P	54	2.85
2709.964	Horizontal	50.06	N/P	54	3.94
3700.570	Vertical	61.4	46.75	54	7.25
4623.162	Vertical	64.41	48.07	53	4.93
4852.685	Vertical	49.46	N/P	54	4.54
7417.942	Vertical	47.49	N/P	54	6.51
8346.535	Vertical	45.27	N/P	54	8.73
3699.070	Horizontal	60.59	47.49	54	6.51
4626.163	Horizontal	63.23	49.61	54	4.39
7405.941	Horizontal	49.76	N/P	54	4.24
8336.034	Horizontal	47.43	N/P	54	6.57

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

TRANSMITTER RADIATED SPURIOUS EMISSIONS AT FREQUENCIES >30MHz - TABULATED RESULTS					
TX MODE / BLUETOOTH ALL CHANNELS / SRD LOW CHANNEL / ALL POSITIONS / CONFIGURATION #2 - FOR FREQ > 1GHz				EMI4681	
Frequency (MHz)	Polarization	Level Peak (dBµV/m)	Level AVG (dBµV/m)	Limit AVG (dBµ/m)	Margin (Limit – Level)
2774.722	Vertical	50.64	N/P	54	3.36
2783.723	Horizontal	47.85	N/P	54	6.15
3615.062	Vertical	59.34	47.29	54	6.71
4519.652	Vertical	63.89	50.42	54	3.58
4909.691	Vertical	43.90	N/P	54	10.10
5428.743	Vertical	54.42	41.82	54	12.18
8120.012	Vertical	45.15	N/P	54	8.85
10854.785	Vertical	50.80	N/P	54	3.20
3610.561	Horizontal	55.89	44.64	54	9.36
4510.651	Horizontal	65.31	50.11	54	3.89
4810.681	Horizontal	51.32	N/P	54	2.68
5425.743	Horizontal	57.03	43.94	54	10.06
7222.922	Horizontal	50.40	N/P	54	3.60
8142.514	Horizontal	47.50	N/P	54	6.50
10854.785	Horizontal	49.18	N/P	54	4.82

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

TRANSMITTER RADIATED SPURIOUS EMISSIONS AT FREQUENCIES >30MHz - TABULATED RESULTS					
TX MODE / BLUETOOTH ALL CHANNELS / SRD Mid CHANNEL / ALL POSITIONS / CONFIGURATION #2 - FOR FREQ > 1GHz				EMI4678	
Frequency (MHz)	Polarization	Level Peak (dBμV/m)	Level AVG (dBμV/m)	Limit AVG (dBμ/m)	Margin (Limit – Level)
2745.218	Vertical	51.2	N/P	54	2.8
2746.968	Horizontal	50.43	N/P	54	3.57
3657.066	Vertical	62.61	48.45	54	5.55
4572.157	Vertical	62.49	50.39	54	3.61
4852.685	Vertical	46.71	N/P	54	7.29
7314.431	Vertical	49.91	N/P	54	4.09
8231.023	Vertical	43.48	N/P	54	10.52
10950.795	Vertical	49.87	N/P	54	4.13
3655.566	Horizontal	59.31	46.74	54	7.26
4570.657	Horizontal	64.18	51.92	54	2.08
4909.691	Horizontal	49.47	N/P	54	4.53
7309.931	Horizontal	50.2	N/P	54	3.8
8220.522	Horizontal	45.18	N/P	54	8.82
10953.795	Horizontal	49.83	N/P	54	4.17

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

TRANSMITTER RADIATED SPURIOUS EMISSIONS AT FREQUENCIES >30MHz - TABULATED RESULTS					
TX MODE / BLUETOOTH ALL CHANNELS / SRD High CHANNEL / ALL POSITIONS / CONFIGURATION #2 - FOR FREQ > 1GHz				EMI4674	
Frequency (MHz)	Polarization	Level Peak (dBμV/m)	Level AVG (dBμV/m)	Limit AVG (dBμ/m)	Margin (Limit – Level)
2711.464	Vertical	49.67	N/P	54	4.33
2713.964	Horizontal	50.19	N/P	54	3.81
3703.570	Vertical	64.61	48.6	54	5.4
4632.163	Vertical	66.78	51.85	54	2.15
4909.691	Vertical	48.26	N/P	54	5.74
7402.940	Vertical	49.55	N/P	54	4.45
8334.533	Vertical	42	N/P	54	12
11130.813	Vertical	45.57	N/P	54	8.43
3705.071	Horizontal	56.21	46.05	54	7.95
4629.163	Horizontal	65.02	51.8	54	2.2
4807.681	Horizontal	47.81	N/P	54	6.19
4929.193	Horizontal	48.41	N/P	54	5.59
7417.942	Horizontal	49.78	N/P	54	4.22

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

TRANSMITTER RADIATED SPURIOUS EMISSIONS AT FREQUENCIES >30MHz - TABULATED RESULTS					
TX MODE / BLUETOOTH ALL CHANNELS / SRD LOW CHANNEL / ALL POSITIONS / CONFIGURATION #3 - FOR FREQ > 1GHz				EMI4680	
Frequency (MHz)	Polarization	Level Peak (dBμV/m)	Level AVG (dBμV/m)	Limit AVG (dBμ/m)	Margin (Limit – Level)
2714.214	Vertical	51.9	N/P	54	2.10
1559.070	Horizontal	47.09	N/P	54	6.91
2713.964	Horizontal	49.89	N/P	54	4.11
3699.070	Vertical	64.85	48.28	54	5.72
4638.164	Vertical	59.45	48.40	54	5.60
4957.696	Vertical	46.4	N/P	54	7.6
7401.440	Vertical	43.69	N/P	54	10.31
8327.033	Vertical	45.29	N/P	54	8.71
3699.070	Horizontal	60.54	46.000	54	8.00
4623.162	Horizontal	62.24	48.31	54	5.69
4845.185	Horizontal	52.39	N/P	54	1.61
7401.440	Horizontal	47.57	N/P	54	6.43
8334.533	Horizontal	50.08	N/P	54	3.92

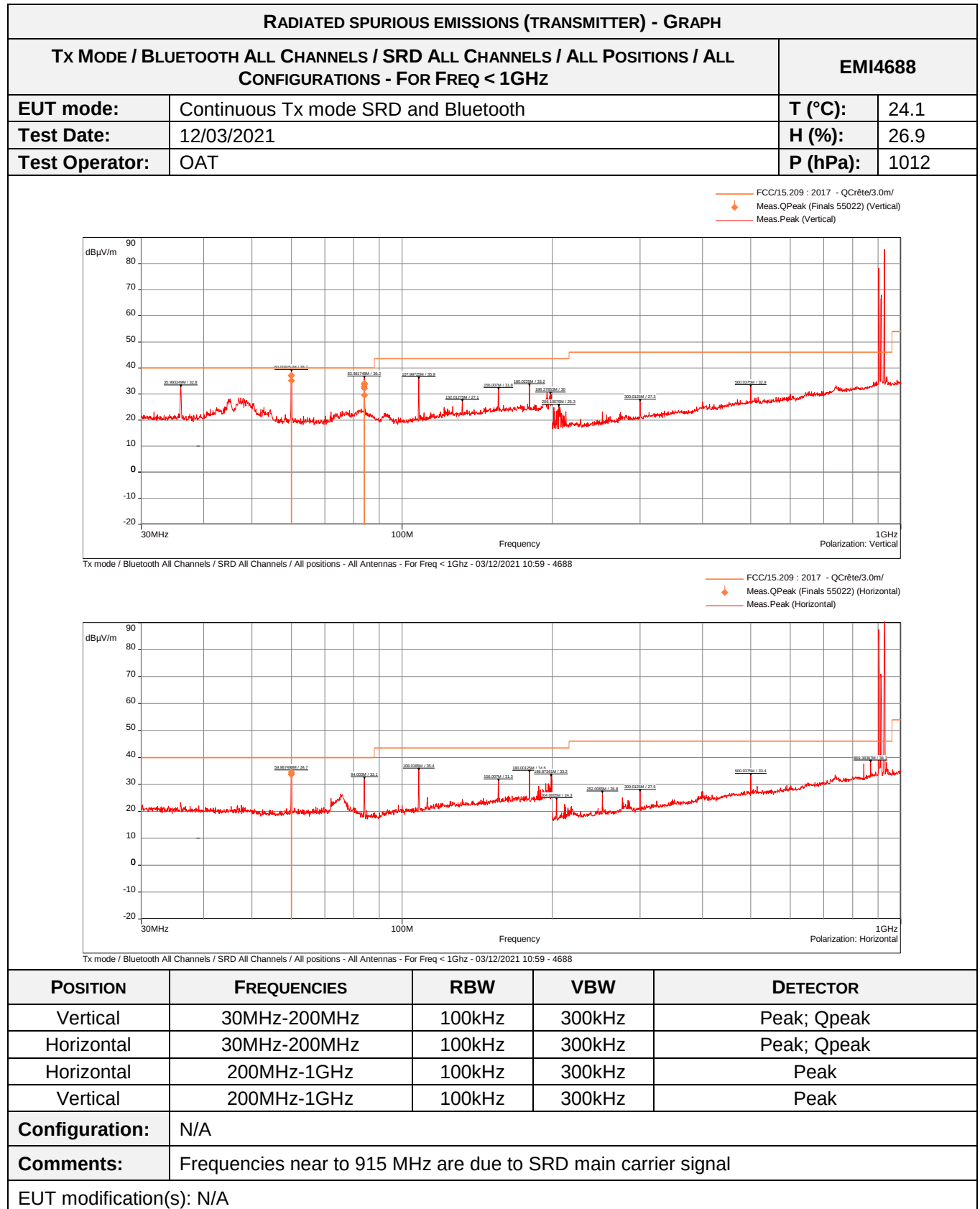
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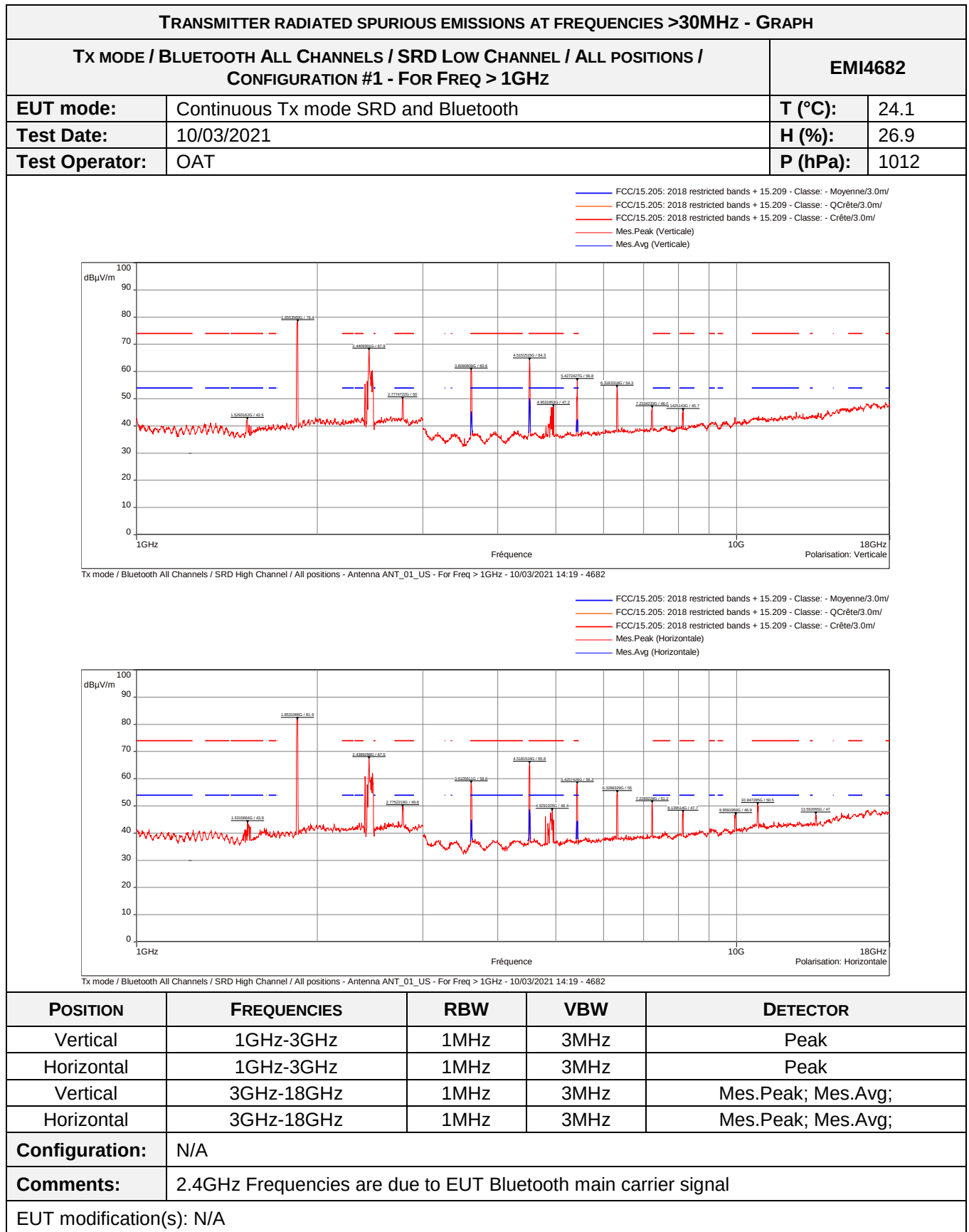
TRANSMITTER RADIATED SPURIOUS EMISSIONS AT FREQUENCIES >30MHz - TABULATED RESULTS					
TX MODE / BLUETOOTH ALL CHANNELS / SRD MID CHANNEL / ALL POSITIONS / CONFIGURATION #3 - FOR FREQ > 1GHz				EMI4679	
Frequency (MHz)	Polarization	Level Peak (dBμV/m)	Level AVG (dBμV/m)	Limit AVG (dBμ/m)	Margin (Limit – Level)
2745.218	Vertical	51.2	N/P	54	2.8
2746.968	Horizontal	50.43	N/P	54	3.57
3657.066	Vertical	62.61	48.45	54	5.55
4572.157	Vertical	62.49	50.39	54	3.61
4852.685	Vertical	46.71	N/P	54	7.29
7314.431	Vertical	49.91	N/P	54	4.09
8231.023	Vertical	43.48	N/P	54	10.52
10950.795	Vertical	49.87	N/P	54	4.13
3655.566	Horizontal	59.31	46.74	54	7.26
4570.657	Horizontal	64.18	51.92	54	2.08
4909.691	Horizontal	49.47	N/P	54	4.53
7309.931	Horizontal	50.2	N/P	54	3.8
8220.522	Horizontal	45.18	N/P	54	8.82
10953.795	Horizontal	49.83	N/P	54	4.17

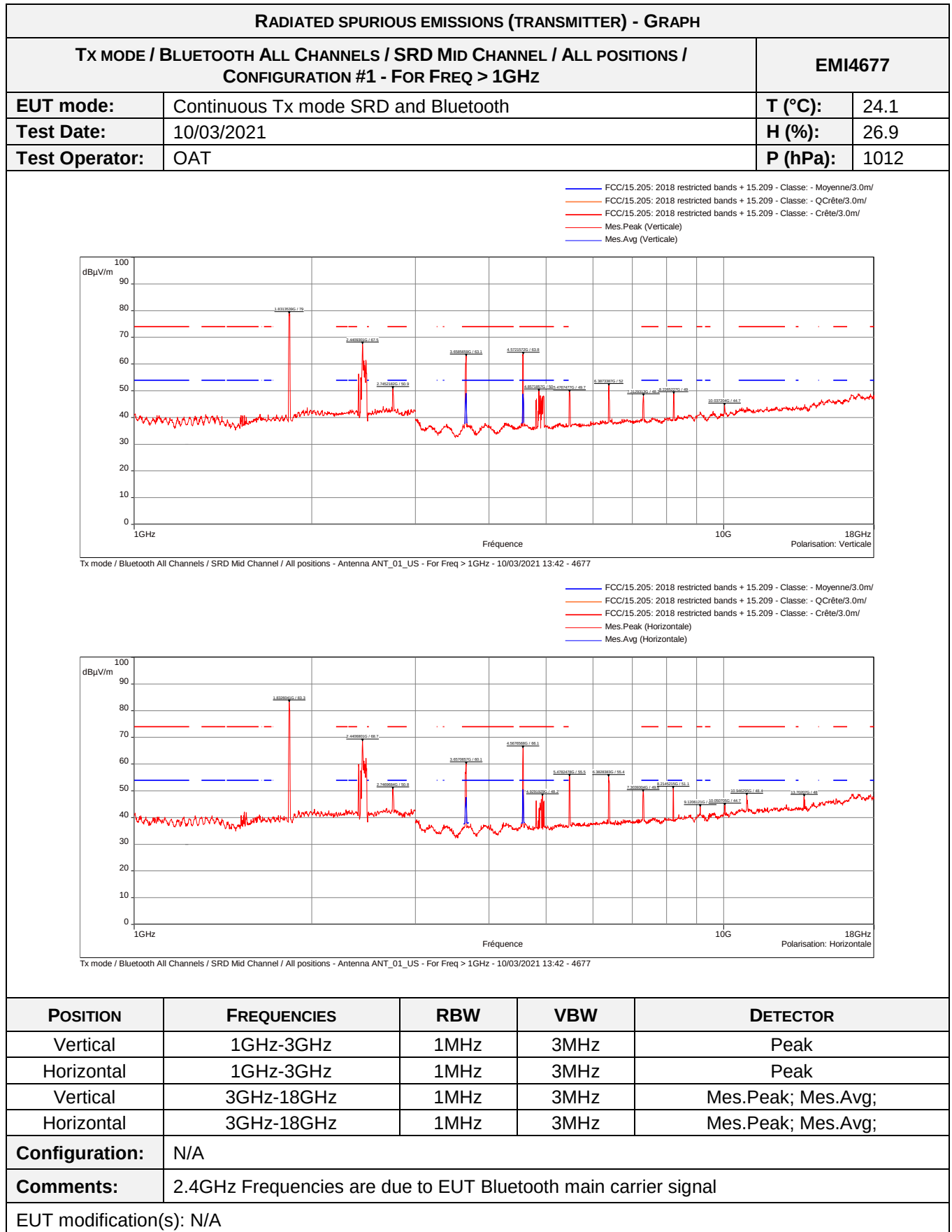
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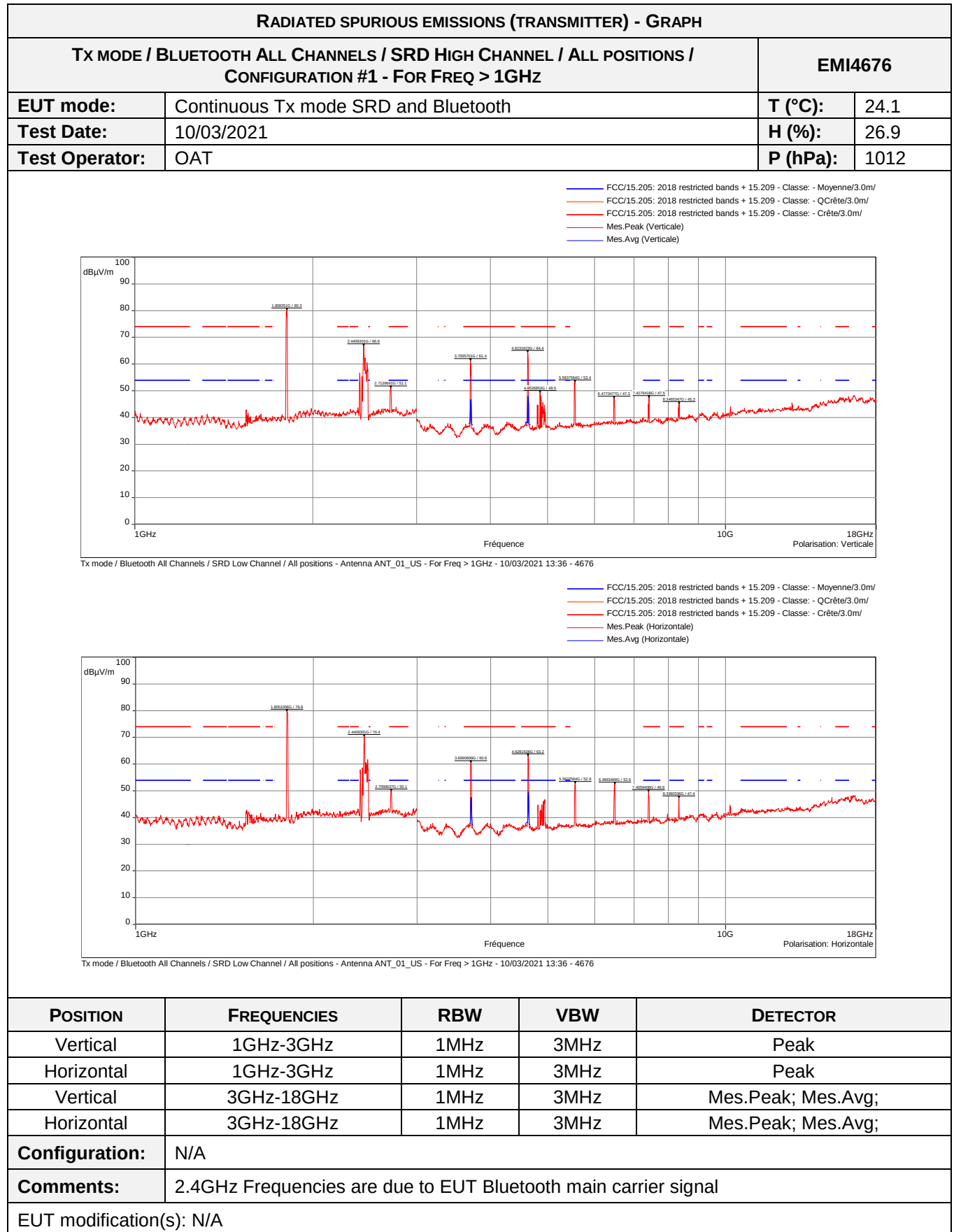
TRANSMITTER RADIATED SPURIOUS EMISSIONS AT FREQUENCIES >30MHz - TABULATED RESULTS					
TX MODE / BLUETOOTH ALL CHANNELS / SRD HIGH CHANNEL / ALL POSITIONS / CONFIGURATION #3 - For FREQ > 1GHz				EMI4675	
Frequency (MHz)	Polarization	Level Peak (dBμV/m)	Level AVG (dBμV/m)	Limit AVG (dBμ/m)	Margin (Limit – Level)
2711.464	Vertical	49.67	N/P	54	4.33
2713.964	Horizontal	50.19	N/P	54	3.81
3703.570	Vertical	64.61	48.6	54	5.4
4632.163	Vertical	66.78	51.85	54	2.15
4909.691	Vertical	48.26	N/P	54	5.74
7402.940	Vertical	49.55	N/P	54	4.45
8334.533	Vertical	42	N/P	54	12
11130.813	Vertical	45.57	N/P	54	8.43
3705.071	Horizontal	56.21	46.05	54	7.95
4629.163	Horizontal	65.02	51.8	54	2.2
4807.681	Horizontal	47.81	N/P	54	6.19
4929.193	Horizontal	48.41	N/P	54	5.59
7417.942	Horizontal	49.78	N/P	54	4.22

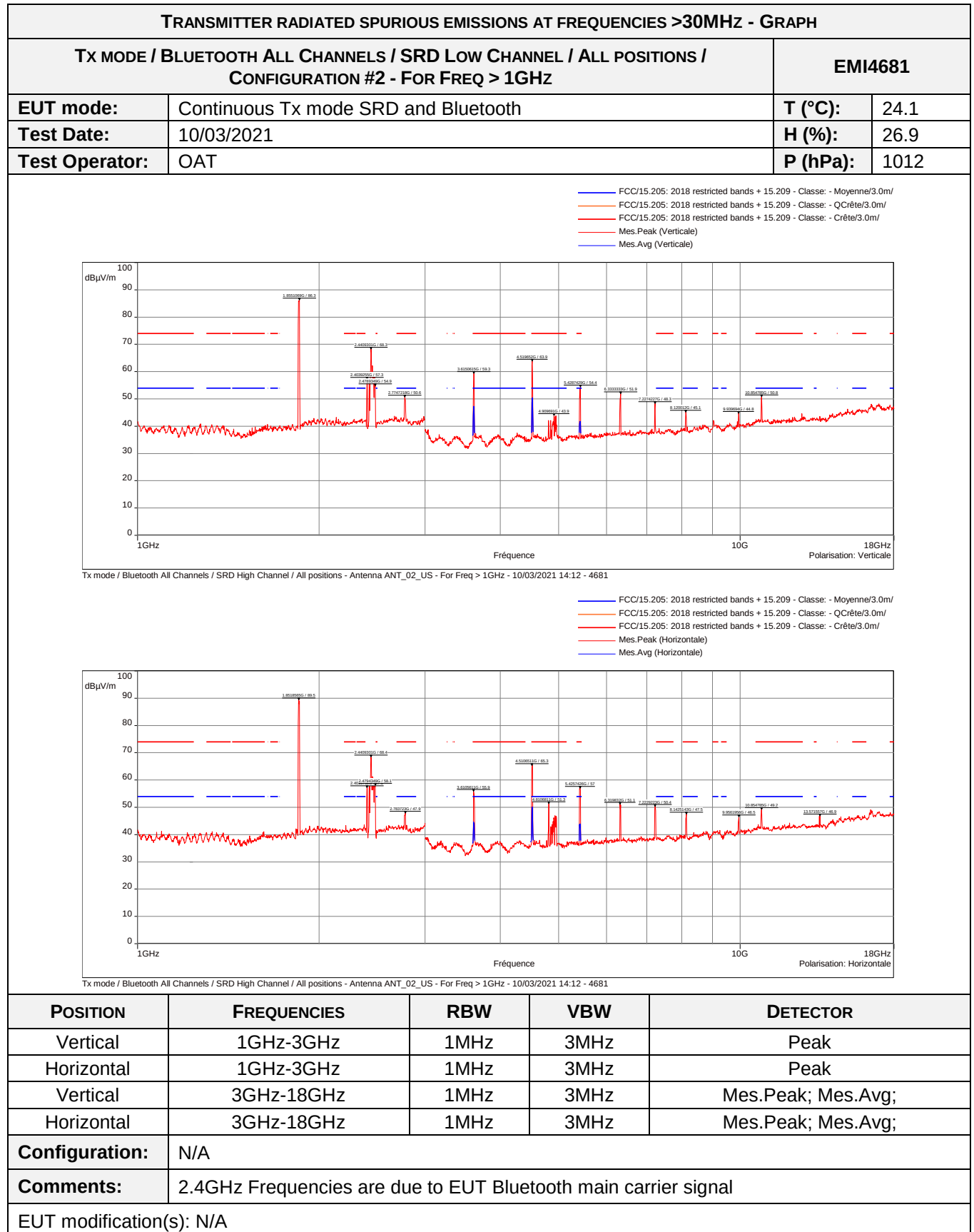
Spurious which has more than 20 dB of margin compared to the applicable limit is not necessarily reported.

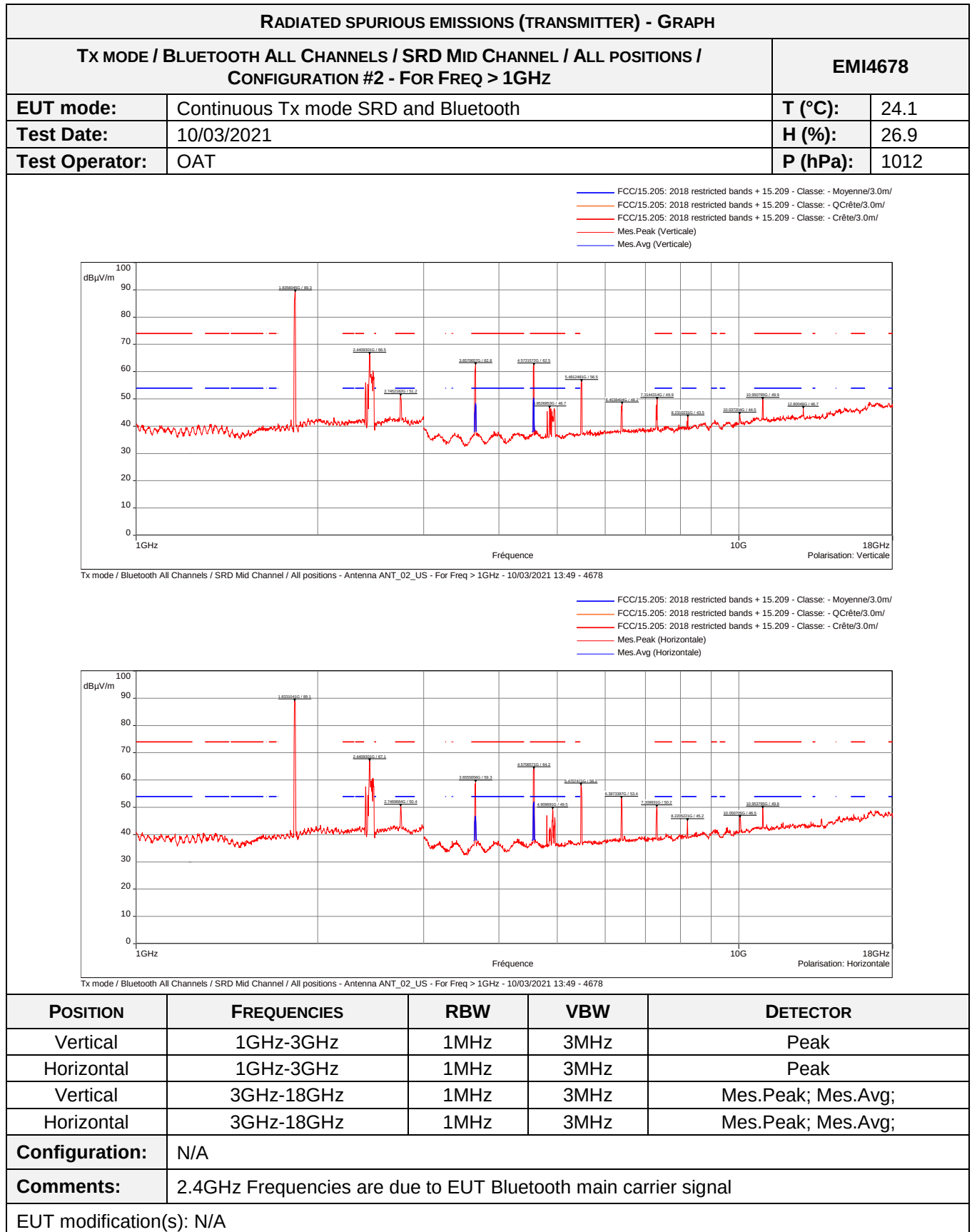


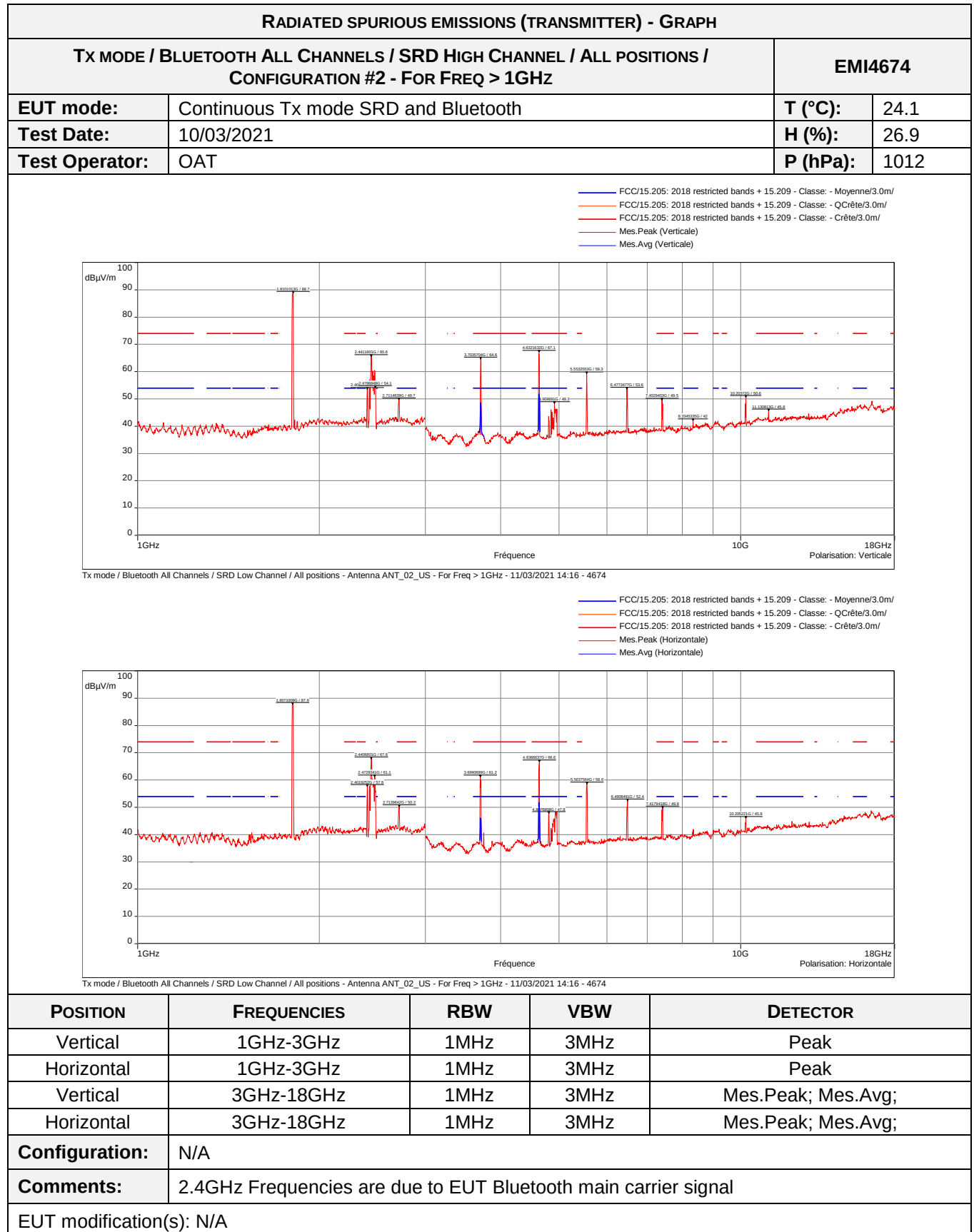


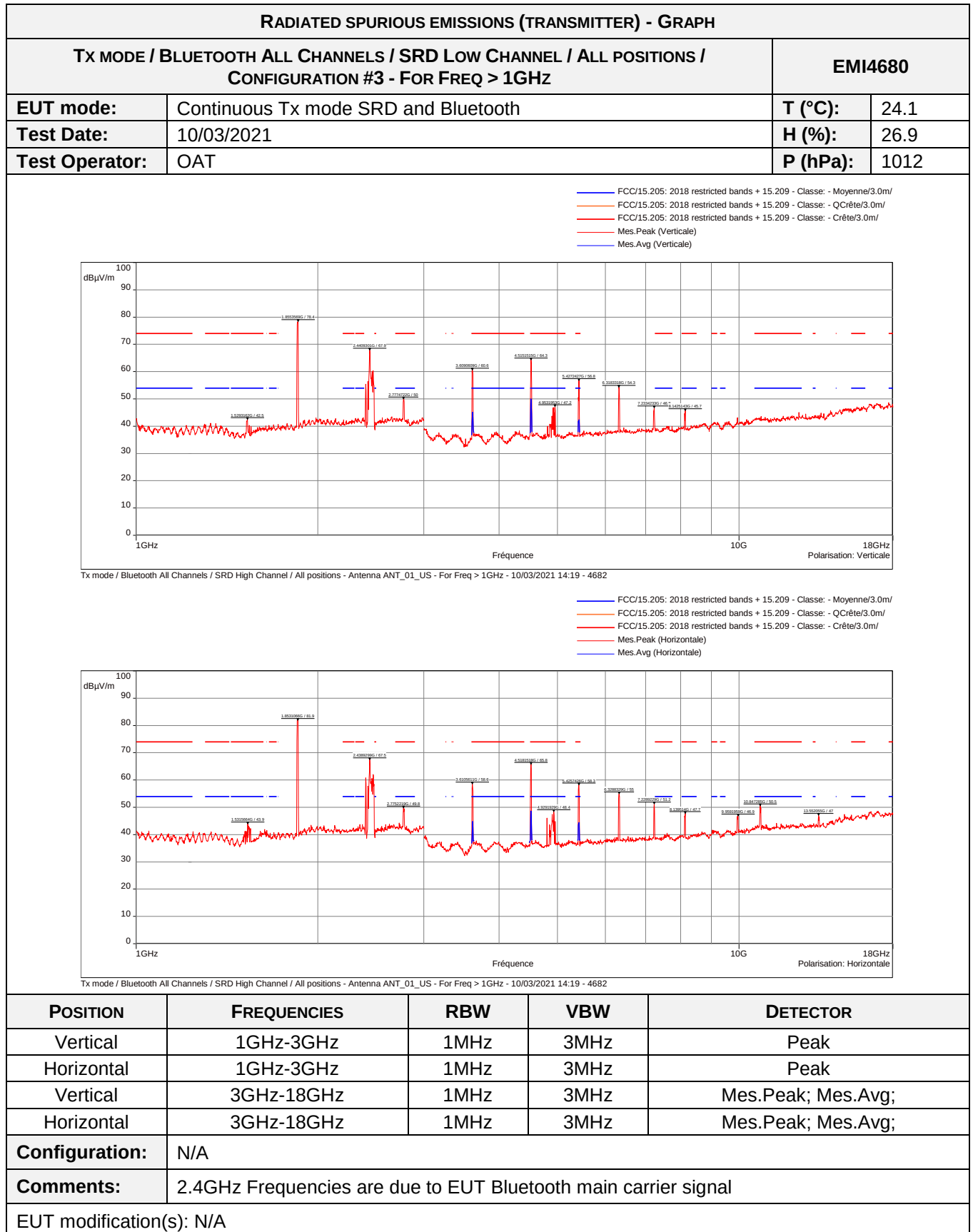


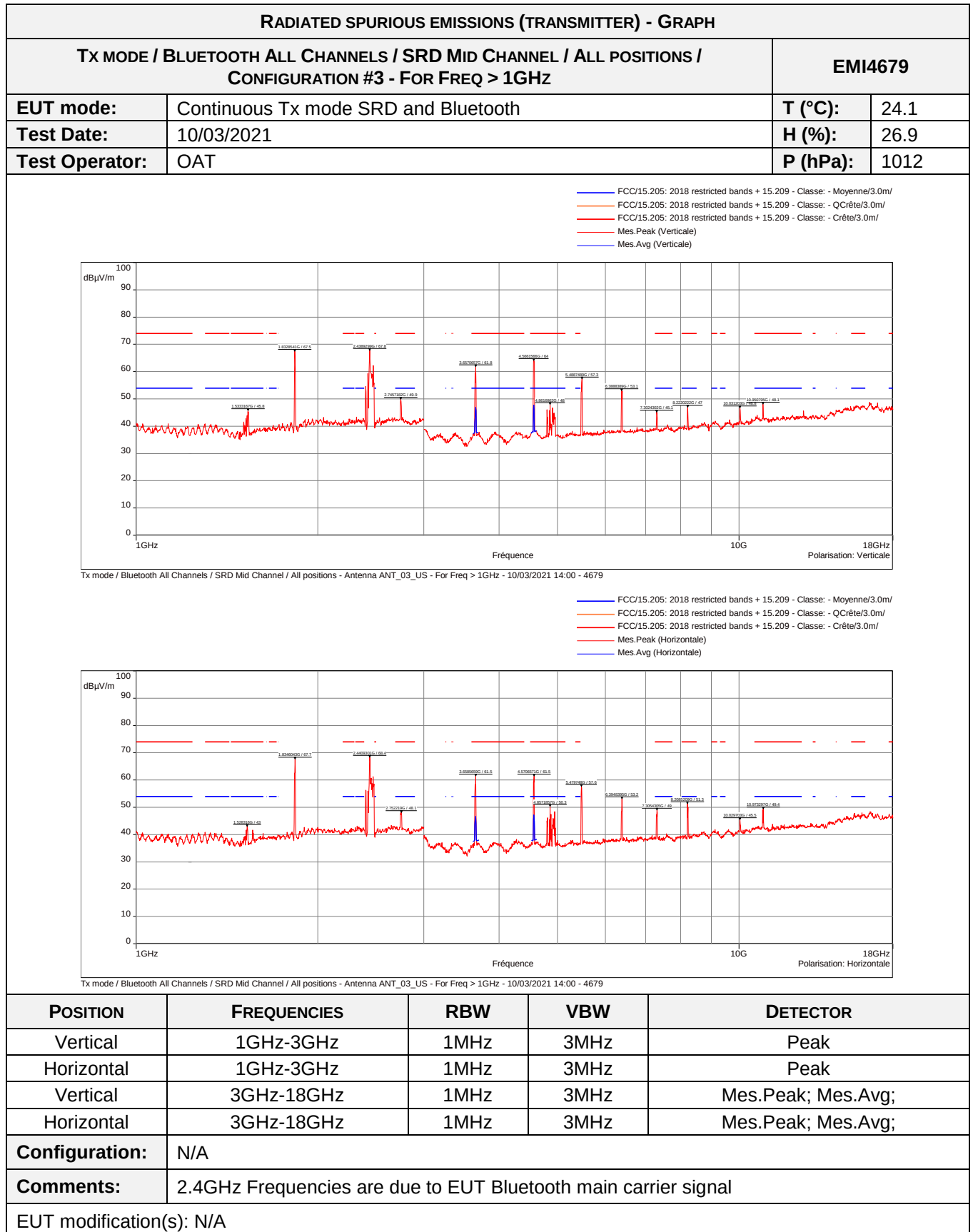


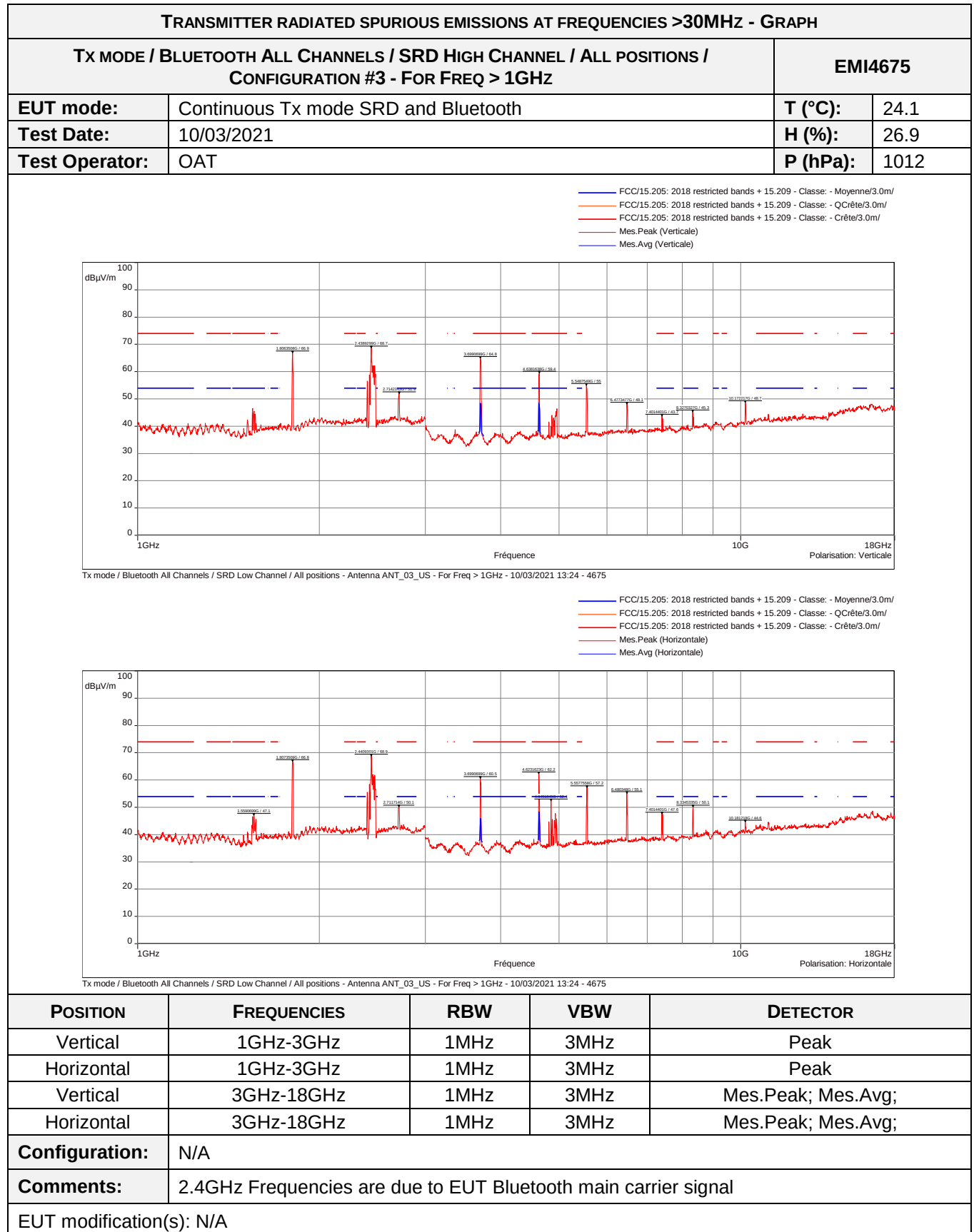












6.4.20dB bandwidth, Carrier Frequency separation and Number of Hopping Channels

Reference standard:	FCC part 15 Radio part 15.247 and RSS-247
Test method:	FCC part 15.247 and RSS-247
Test description: a) (1) (i) For frequency hopping systems operating in the 902-928 MHz band: if the 20 dB bandwidth of the hopping channel is less than 250 kHz, the system shall use at least 50 hopping frequencies and the average time of occupancy on any frequency shall not be greater than 0.4 seconds within a 20 second period; if the 20 dB bandwidth of the hopping channel is 250 kHz or greater, the system shall use at least 25 hopping frequencies and the average time of occupancy on any frequency shall not be greater than 0.4 seconds within a 10 second period. The maximum allowed 20 dB bandwidth of the hopping channel is 500 kHz. EUT is connected to the measuring receiver via 50Ω attenuator(s). Tests are done in max-hold mode in order to capture all channels.	

TESTED CONFIGURATION	RESULT	SEVERITY	RESULT TAB.	VERDICT
Number of channels - Group A1	50	≥50	EMI4725	PASS
Number of channels - Group A8	50	≥50	EMI4727	PASS
Channels separation	63.45kHz	>46.14 kHz	EMI4730	PASS
20 dB Bandwidth	46.14 kHz	<63.45 kHz	EMI4731	PASS
Occupation time	153.64ms	400ms	EMI4732	PASS

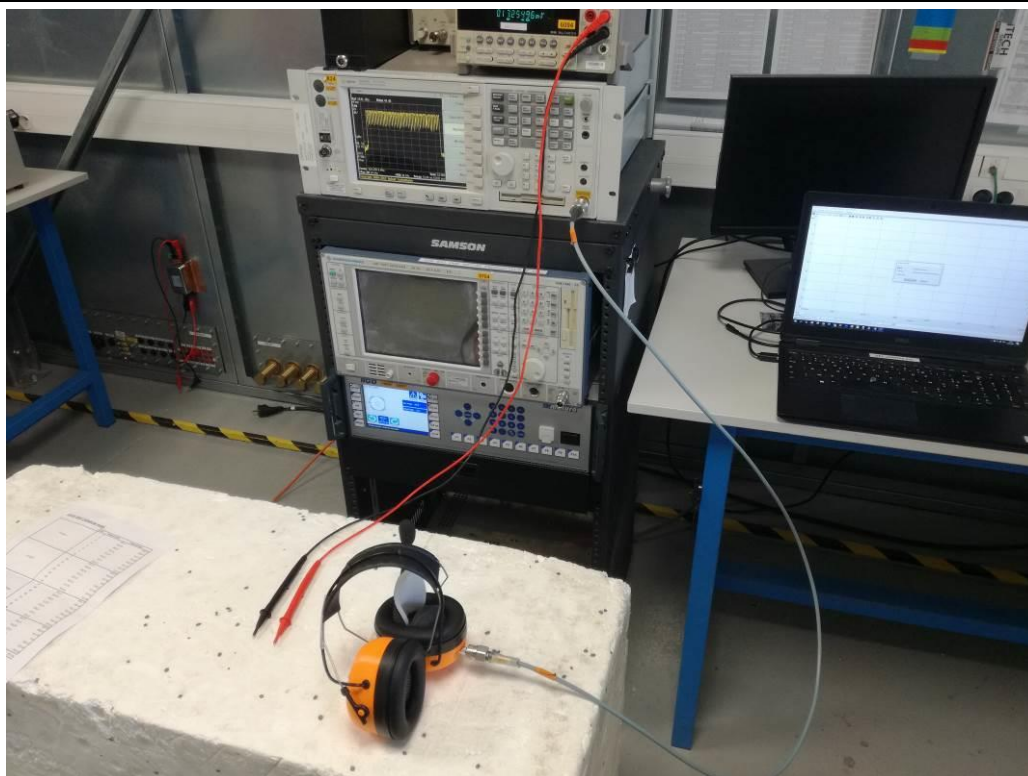
LABORATORY PARAMETERS:	REQUIRED PRIOR TO THE TEST	DURING THE TEST
Ambient Temperature	15 to 35 °C	See Graph(es)
Relative Humidity	20 to 75 %	See Graph(es)
Atmospheric pressure	N/A	See Graph(es)
Test method deviation: N/A		
Supplementary information: N/A		

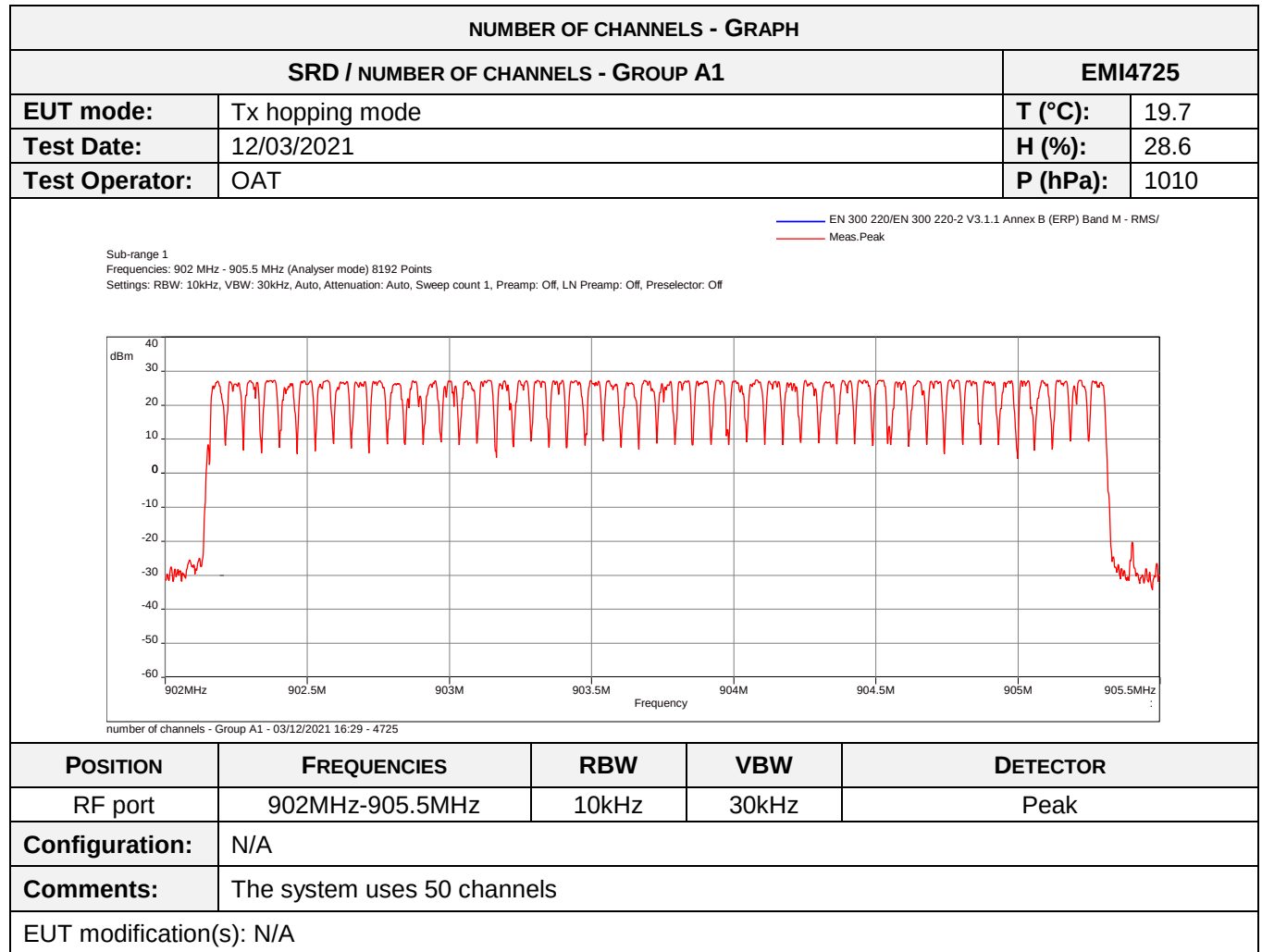
TEST EQUIPMENT USED					
CATEGORY	BRAND	TYPE	IDENTIFIER	CAL. DATE	CAL. DUE
Attenuator	Radiall	R412710124	16490	25/06/2019	25/08/2022
Cable	C&C	N-1.5m	10554	20/12/2019	20/02/2022
Receiver	Agilent Technologies	E4440A	5824	22/10/2020	22/12/2022
Software	Nexio		0000		
Thermohygrometer	Testo	608-H1	7562	25/01/2019	25/03/2021
Thermohygrometer	Bioblock Scientific	Météostar	0963	25/01/2019	25/03/2021

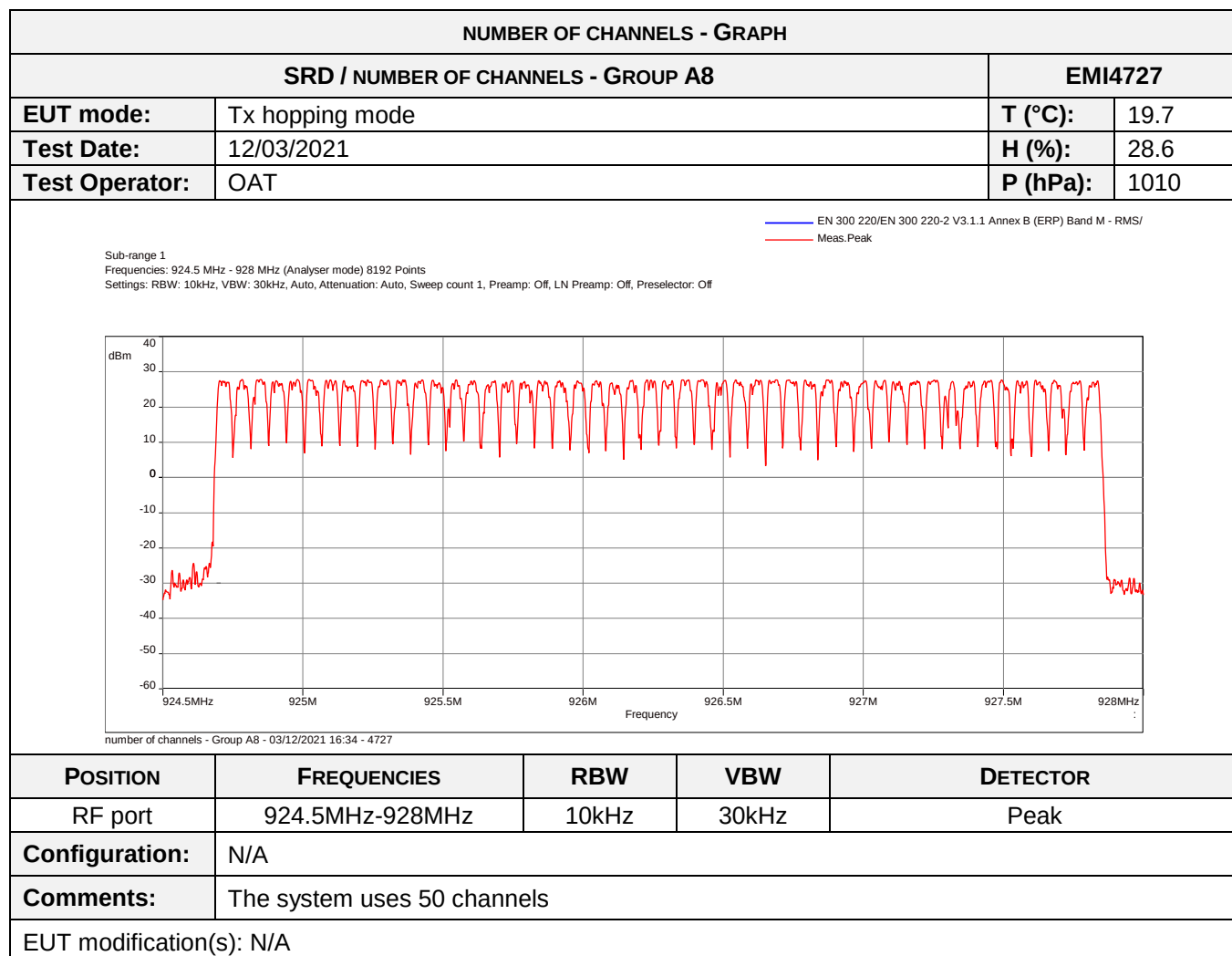
BAT-EMC software version: V3.18.0.26

Blank cells = Permanent validity

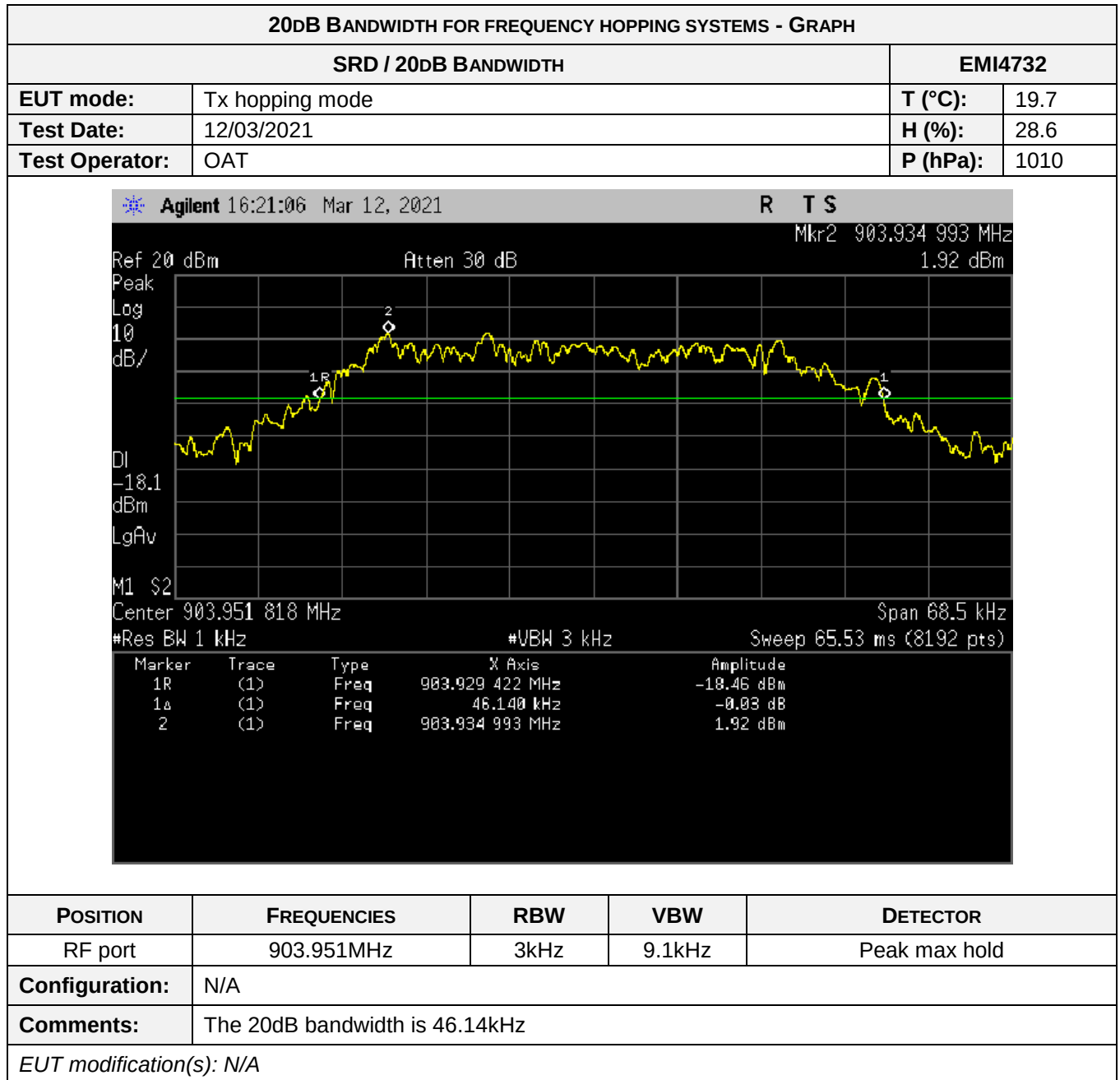
TEST SETUP PHOTO(S)











OCCUPATION TIME FOR FREQUENCY HOPPING SYSTEMS - GRAPH			
SRD / CHANNEL OCCUPATION TIME			EMI4731
EUT mode:	Tx hopping mode	T (°C):	19.7
Test Date:	12/03/2021	H (%):	28.6
Test Operator:	OAT	P (hPa):	1010
Agilent 15:47:24 Mar 12, 2021 R T S Marker Select Marker 1 2 3 4 Normal Delta Delta Pair (Tracking Ref) Ref Span Pair Span Center Off More 1 of 2 Ref 30 dBm #Atten 40 dB Mkr1 38.41 ms -0.20 dB Norm Log 10 dB/ LgAv W1 S2 S3 VS AA E(f): f>50k Center 924.680 0 MHz Span 0 Hz Res BW 30 kHz VBW 30 kHz Sweep 50.13 ms (8000 pts) Allowable span for current center frequency exceeded Agilent 15:42:55 Mar 12, 2021 R T S Ref 30 dBm #Atten 40 dB Norm Log 10 dB/ LgAv W1 S2 S3 VS AA E(f): f>50k Center 924.680 0 MHz Span 0 Hz Res BW 30 kHz VBW 30 kHz Sweep 20 s (601 pts)			
Results:	The system uses 50 channels in any conditions and the averaging time of occupancy on any channel is less than 0.4 seconds within a period of 20 seconds: The measurement gives a transmission time of 153.64ms (4 x 38.41ms) on each channels within a periode of 20s.		

6.5. Maximum peak conducted power of the intentional radiator

Reference standard:	FCC part 15 Radio part 15.247 and RSS-247
Test method:	FCC part 15.247 and RSS-247
Test description: b) (2) For frequency hopping systems operating in the 902-928 MHz band: 1 watt for systems employing at least 50 hopping channels; and, 0.25 watts for systems employing less than 50 hopping channels, but at least 25 hopping channels, as permitted under paragraph (a)(1)(i) of this section. EUT is connected to the measuring receiver via 50Ω attenuator(s). Only the highest levels are recorded.	

TESTED CONFIGURATION	PARAMETER	SEVERITY	RESULT TAB.	VERDICT
Conducted Power / SRD All Channels	902MHz-928MHz	1W (30dBm)	EMI4635	PASS

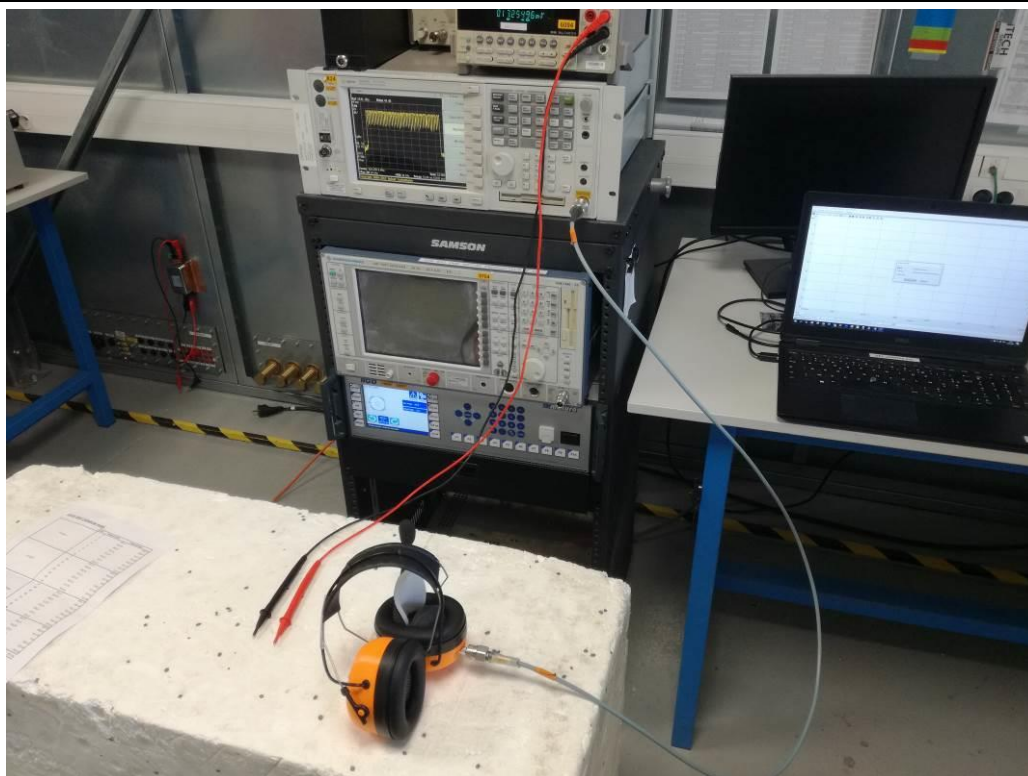
LABORATORY PARAMETERS:	REQUIRED PRIOR TO THE TEST	DURING THE TEST
Ambient Temperature	15 to 35 °C	See Graph(es)
Relative Humidity	20 to 75 %	See Graph(es)
Atmospheric pressure	N/A	See Graph(es)
Test method deviation: N/A		
Supplementary information: N/A		

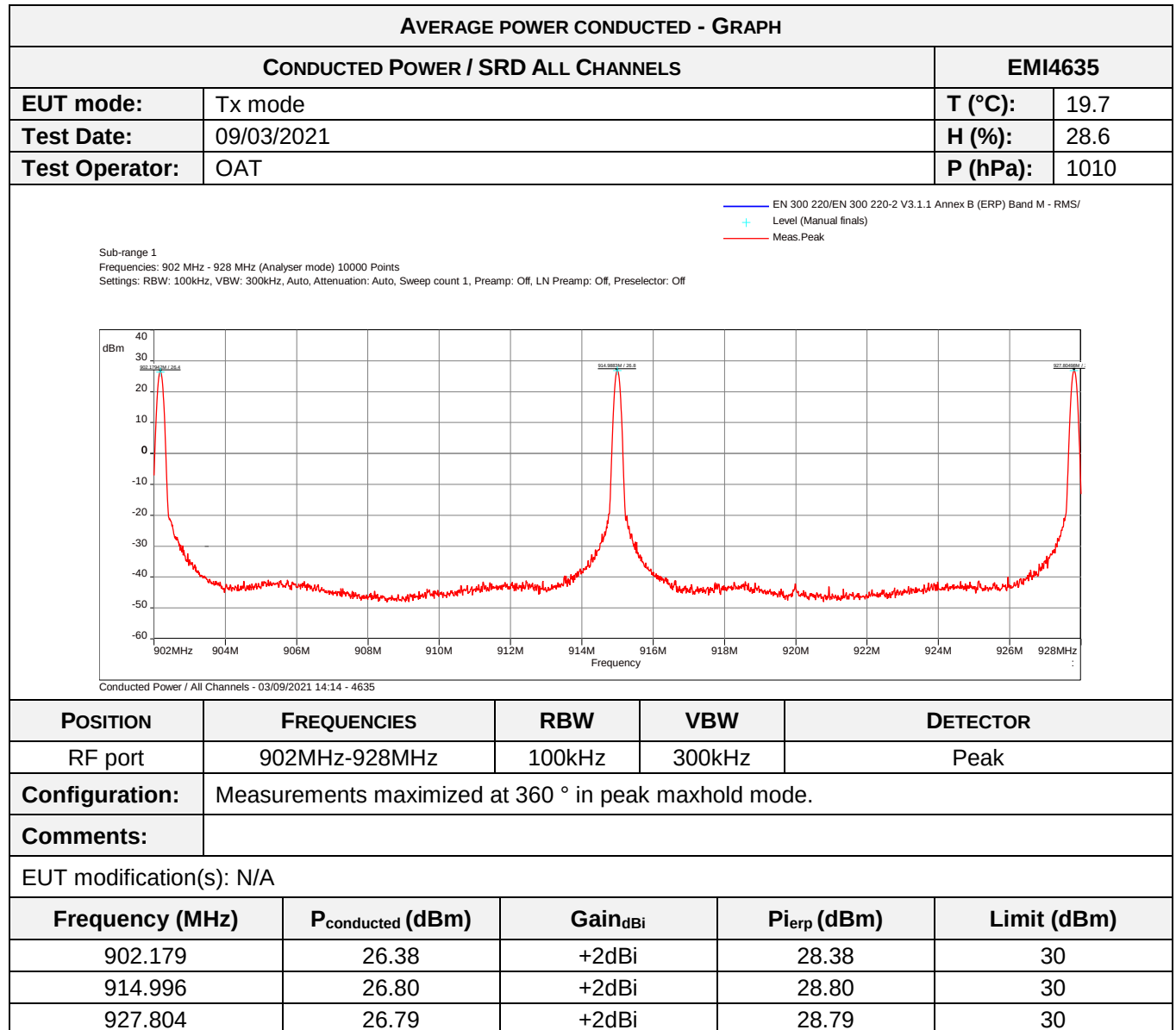
TEST EQUIPMENT USED					
CATEGORY	BRAND	TYPE	IDENTIFIER	CAL. DATE	CAL. DUE
Attenuator	Techniwave	TWSMA-20dB-18G-SMA	14676	28/12/2019	28/02/2023
Cable	STORM MICROWAVE	N-0.2m	10265	27/01/2021	27/03/2023
Cable	Huber + Suhner	SF102K	16041	28/02/2019	28/04/2021
Cable	Atem	SMA-0.3m	10268	28/01/2021	28/03/2023
Receiver	Rohde & Schwarz	FSW43	14830	29/07/2020	29/09/2021
Software	Nexio		0000		
Thermohygrometer	Testo	608-H1	7562	25/01/2019	25/03/2021
Thermohygrometer	Bioblock Scientific	Météostar	0963	25/01/2019	25/03/2021

BAT-EMC software version: V3.18.0.26

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TEST SETUP PHOTO(S)





Perp, the radiated power (e.r.p.) limit applies to the maximum measured conducted power (P_{conducted}) value adjusted by the antenna gain (relative to a dipole(dBd))

P_{erp} = P_{conducted} + antenna Gain_{dBd} ; Gain_{dBd} = Gain_{dBi} - 2.15dB

P_{erp} = P_{conducted} + Gain_{dBi} - 2.15dB

In case of a dedicated antenna the antenna gain (in dB, i.e. relative to a dipole) is declared by the manufacturer.

6.6. Effective isotropic radiated power

Reference standard:	FCC part 15 Radio part 15.247 and RSS-247
Test method:	FCC part 15.247 and RSS-247
General test setup: 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 / Bluetooth / Low channel / All Positions / All Configurations	2.4GHz-2.404GHz	1W (30dBm)	EMI4763	PASS
EIRP / Bluetooth / Mid channel / All Positions / All Configurations	2.439GHz-2.443GHz	1W (30dBm)	EMI4764	PASS
EIRP / Bluetooth / High channel / All Positions / All Configurations	2.478GHz-2.482GHz	1W (30dBm)	EMI4765	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
Antenna	ETS-Lindgren	3117	5456	24/07/2019	24/09/2022
Attenuator	EMITECH	SUB.V2-H	14495	13/01/2021	13/03/2022
Attenuator	EMITECH	SUB.V2-V	14496	13/01/2021	13/03/2022
Cable	SUCOFLEX	N-3m	14378	25/06/2019	25/08/2021
Cable	SUCOFLEX	N-5,5m	14381	25/06/2019	25/08/2021
Cable	Huber + Suhner	SF102K	16041	28/02/2019	28/04/2021
Multimeter	Keithley	2010	6094	30/05/2019	30/07/2021
Receiver	Rohde & Schwarz	FSW43	14830	29/07/2020	29/09/2021
Shielded enclosure	RAY PROOF	C.V2	1423	04/10/2019	04/12/2022
Software	Nexio		0000		
Thermohygrometer	Testo	608-H1	7562	25/01/2019	25/03/2021
Thermohygrometer	Bioblock Scientific	Météostar	0963	25/01/2019	25/03/2021

BAT-EMC software version: V3.18.0.26

Blank cells = Permanent validity

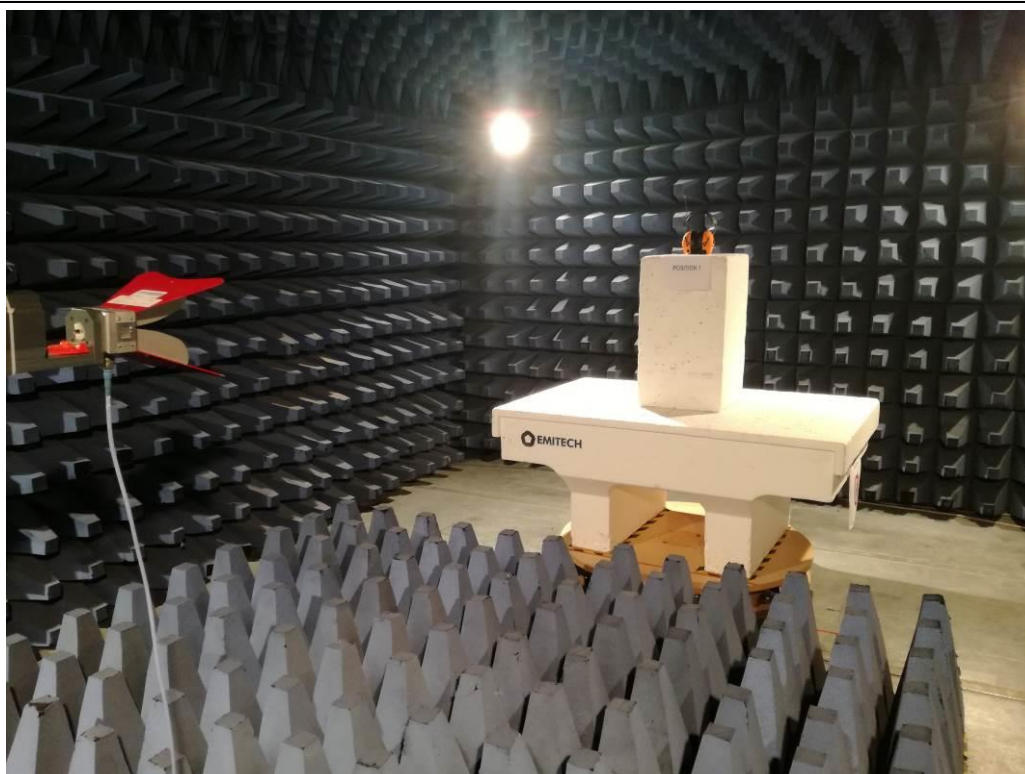
TEST SETUP PHOTO(S) – EUT POSITIONS

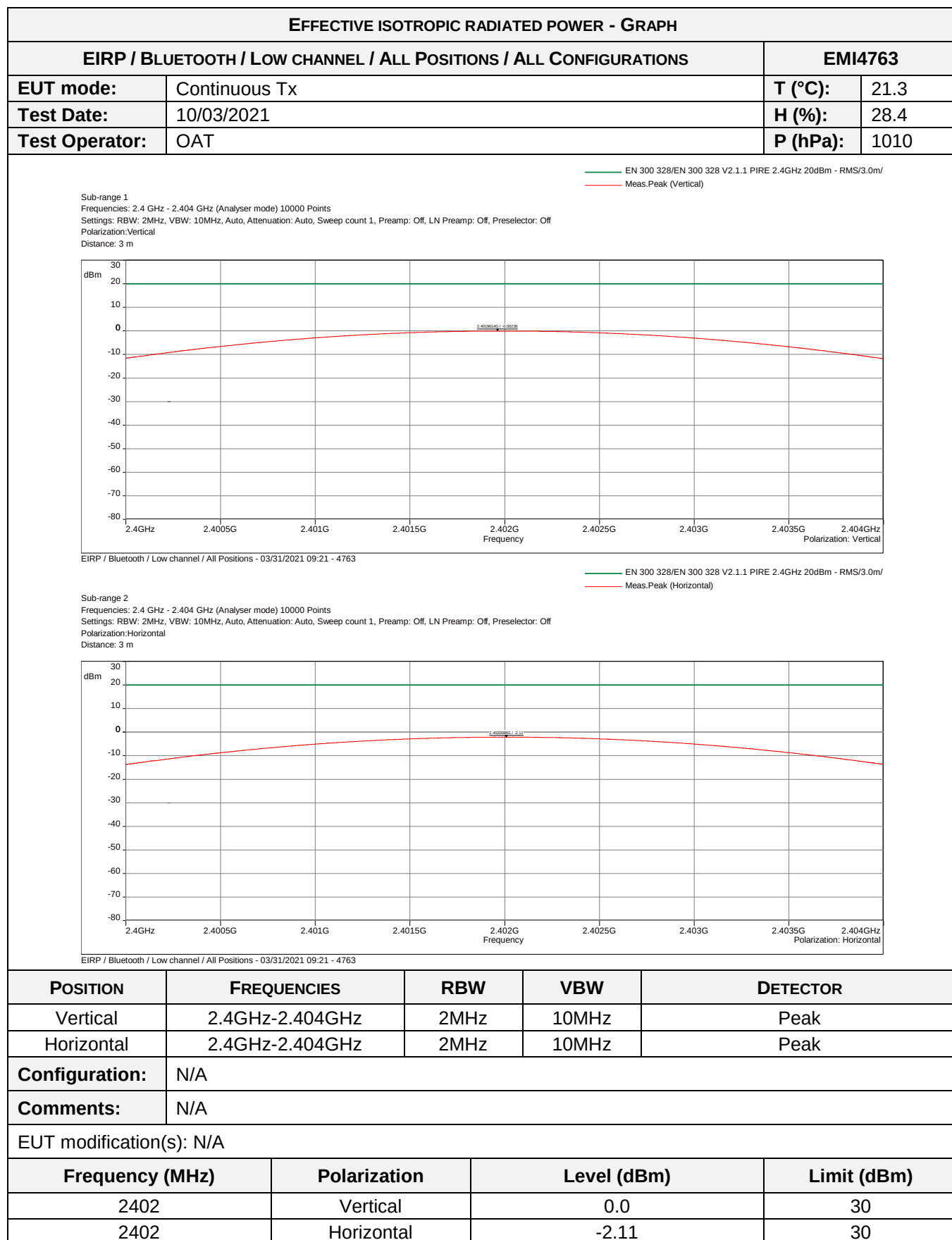


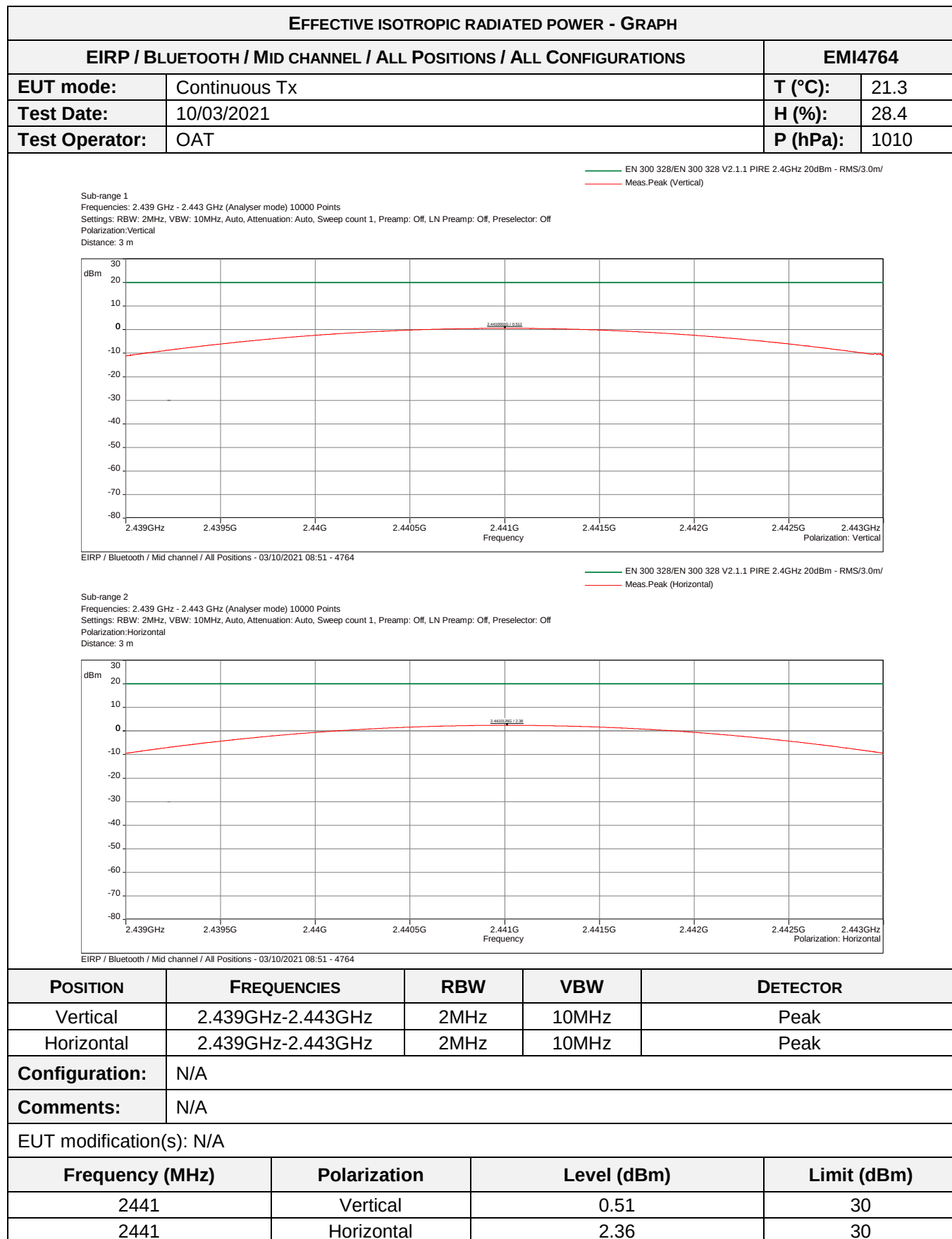
TEST SETUP PHOTO(S) – EUT POSITIONS

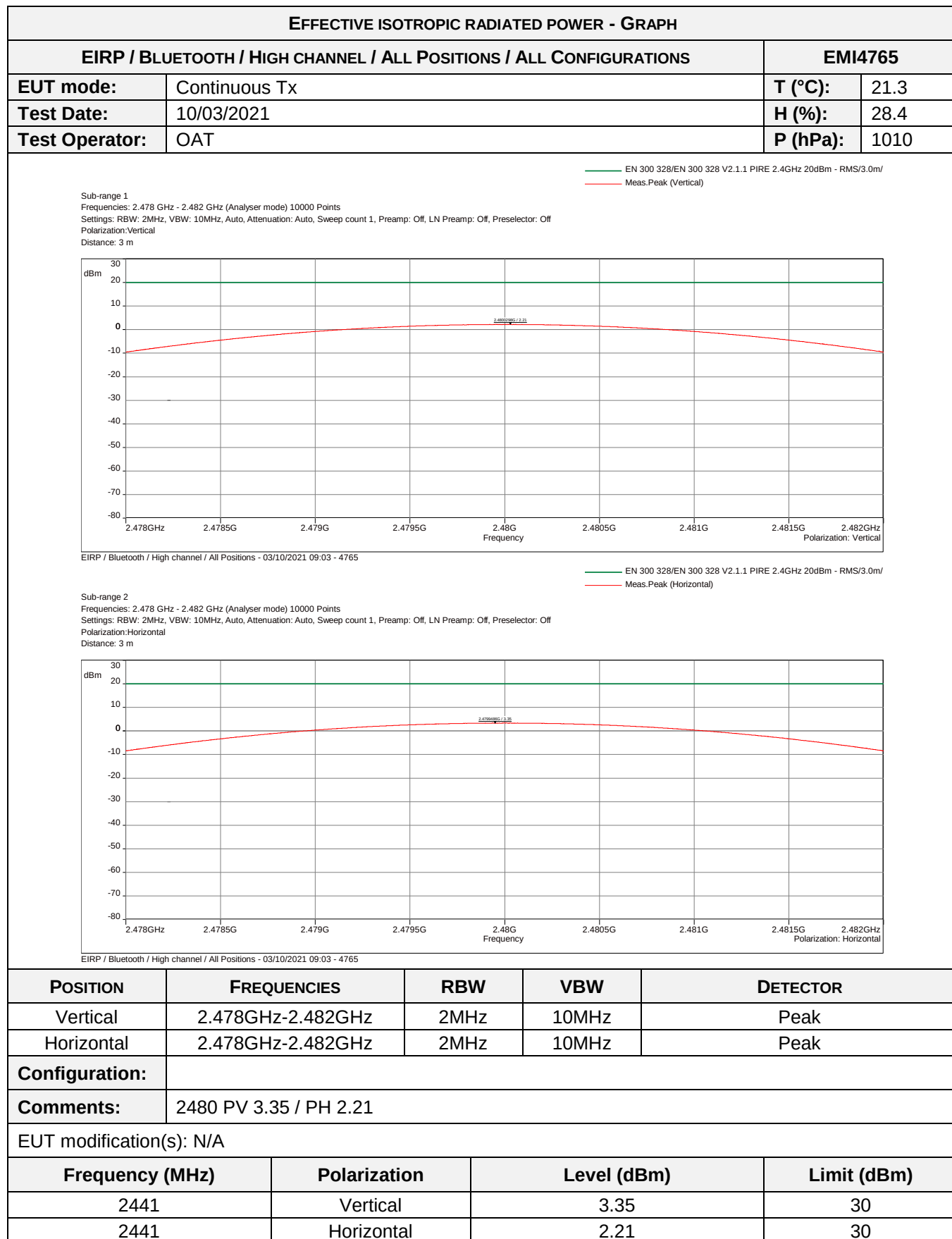


TEST SETUP PHOTO(S)









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

Reference standard:	FCC part 15 Radio part 15.247 and RSS-247
Test method:	FCC part 15.247 subclause d) and RSS-247
Test description: d) In any 100 kHz bandwidth outside the frequency band in which the intentional radiator is operating, the radio frequency power that is produced by the intentional radiator shall be at least 20 dB below that in the 100 kHz bandwidth within the band that contains the highest level of the desired power, based on either an RF conducted or a radiated measurement, provided the transmitter demonstrates compliance with the peak conducted power limits. If the transmitter complies with the conducted power limits based on the use of RMS averaging over a time interval, the attenuation required under this paragraph shall be 30 dB instead of 20 dB. EUT is connected to the measuring receiver via 50Ω attenuator(s). Only the highest levels are recorded.	

TESTED CONFIGURATION	PARAMETER	SEVERITY	RESULT TAB.	VERDICT
Band Edge / SRD - Low channel	900MHz-908MHz	Tx	EMI4726	PASS
Band Edge / SRD - High channel	922MHz-932MHz	Tx	EMI4729	PASS

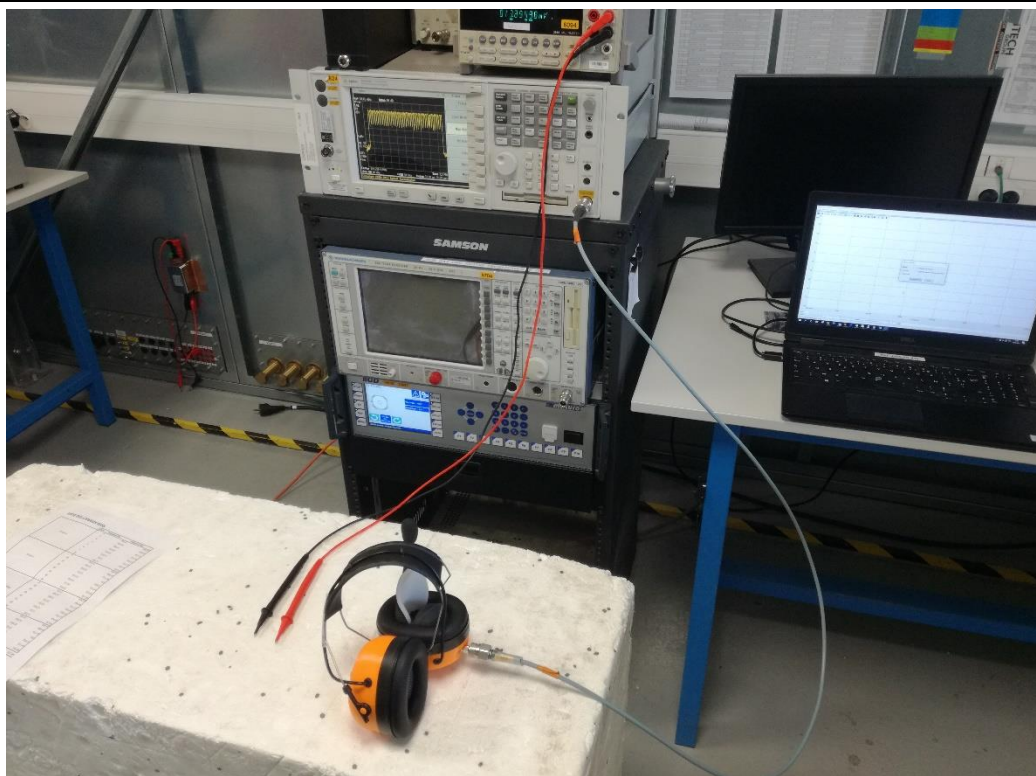
LABORATORY PARAMETERS:	REQUIRED PRIOR TO THE TEST	DURING THE TEST
Ambient Temperature	15 to 35 °C	See Graph(es)
Relative Humidity	20 to 75 %	See Graph(es)
Atmospheric pressure	N/A	See Graph(es)
Test method deviation: N/A		
Supplementary information: N/A		

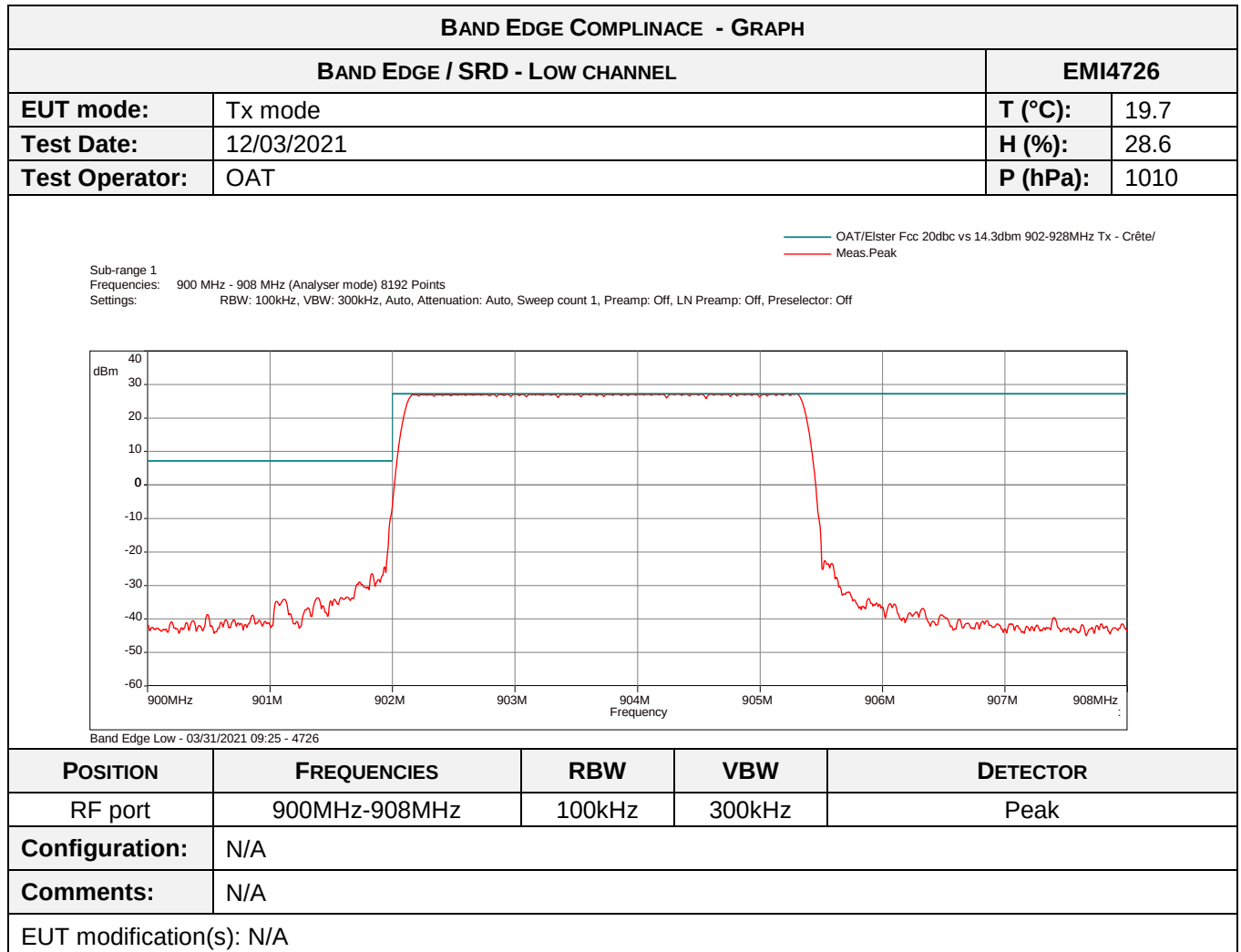
TEST EQUIPMENT USED					
CATEGORY	BRAND	TYPE	IDENTIFIER	CAL. DATE	CAL. DUE
Attenuator	Radiall	R412710124	16490	25/06/2019	25/08/2022
Cable	C&C	N-1.5m	10554	20/12/2019	20/02/2022
Receiver	Agilent Technologies	E4440A	5824	22/10/2020	22/12/2022
Software	Nexio		0000		
Thermohygrometer	Testo	608-H1	7562	25/01/2019	25/03/2021
Thermohygrometer	Bioblock Scientific	Météostar	0963	25/01/2019	25/03/2021

BAT-EMC software version: V3.18.0.26

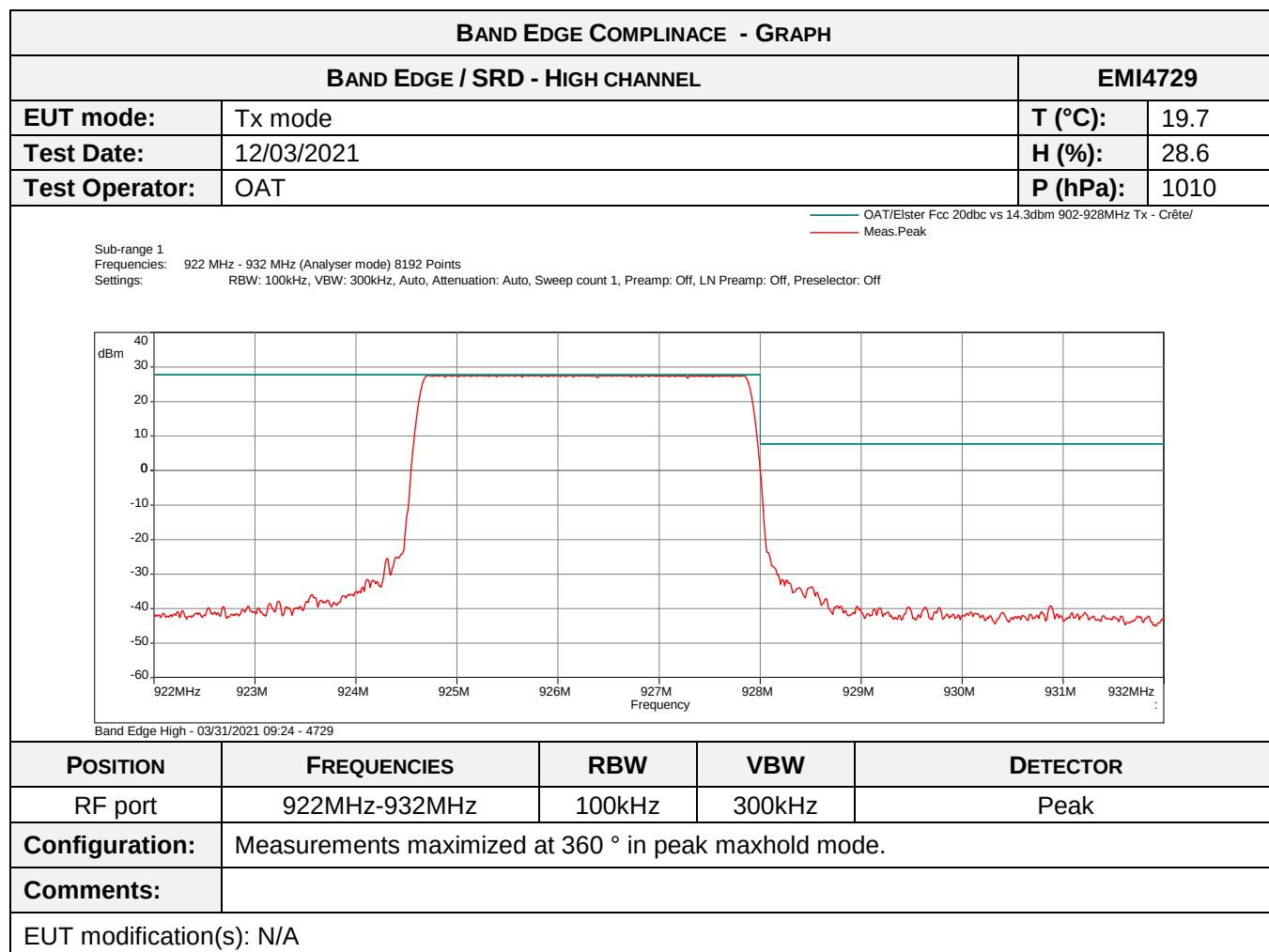
Blank cells = Permanent validity

TEST SETUP PHOTO(S)





No spurious emissions were detected.



No spurious emissions were detected.

6.8. Frequency error

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

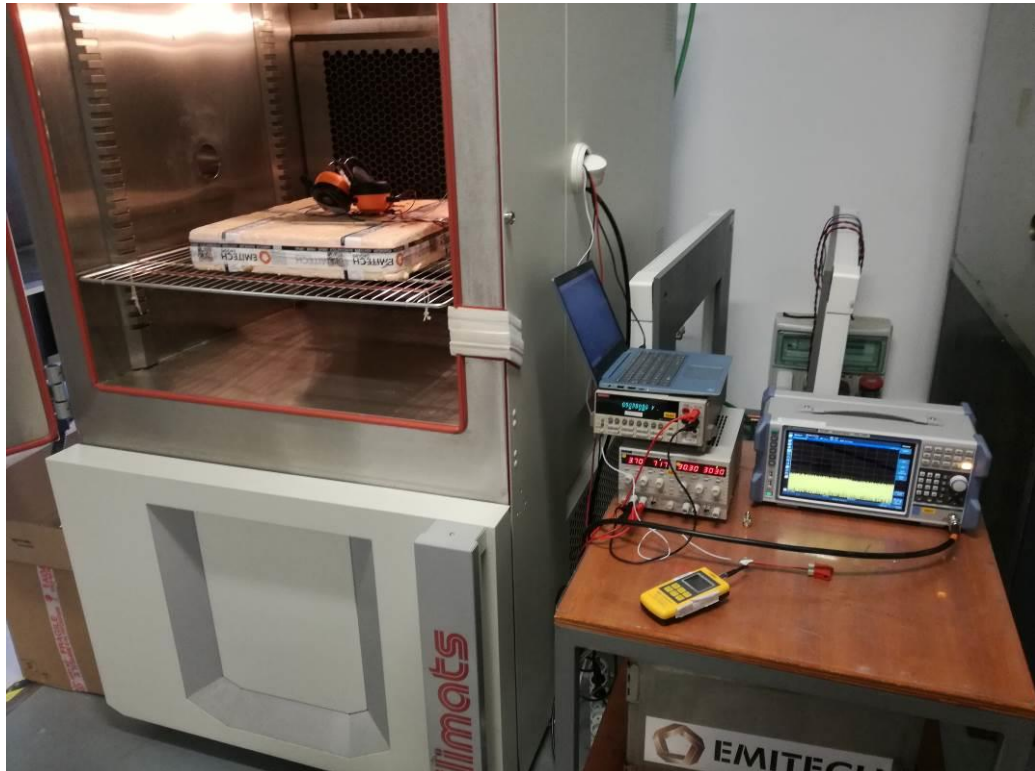
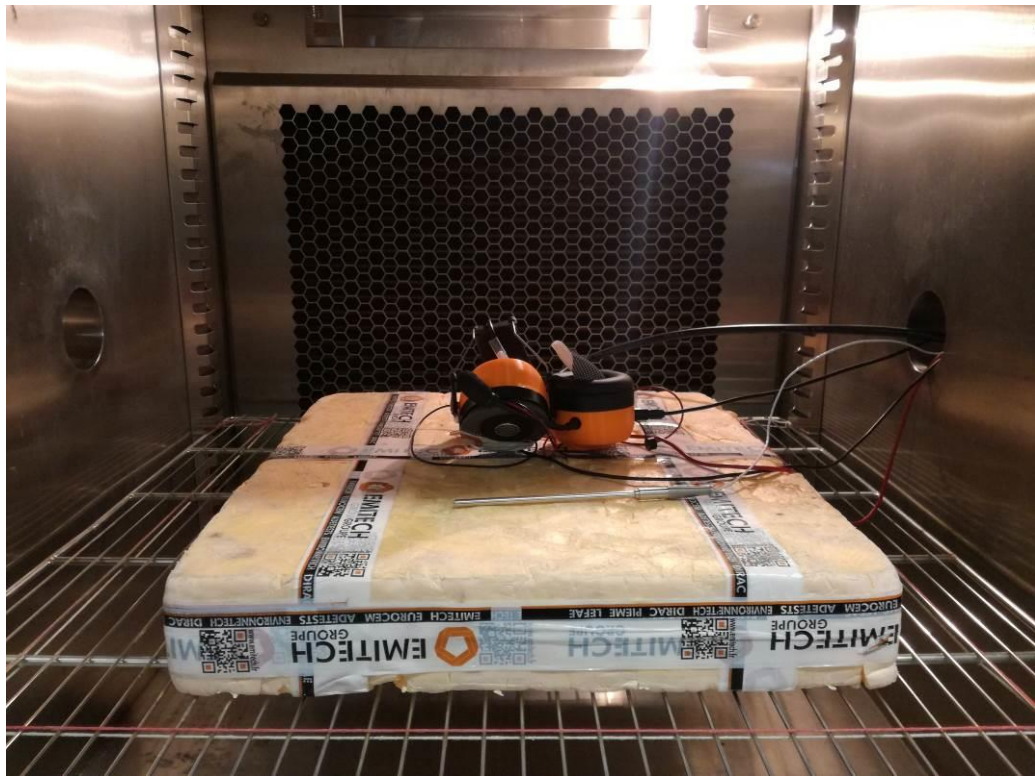
TEST CASE	EUT MODE	SEVERITY	RESULT TAB.	VERDICT
SRD / Low channel / 25°C/ 3.7Vdc	Unmodulated Tx	902MHz < Freq < 928MHz	EMI4594	PASS
SRD / Mid channel / 25°C/ 3.7Vdc	Unmodulated Tx		EMI4766	PASS
SRD / High channel / 25°C/ 3.7Vdc	Unmodulated Tx		EMI4767	PASS
SRD / Low channel / 25°C/ 3.2Vdc	Unmodulated Tx		EMI4768	PASS
SRD / Mid channel / 25°C/ 3.2Vdc	Unmodulated Tx		EMI4769	PASS
SRD / High channel / 25°C/ 3.2Vdc	Unmodulated Tx		EMI4770	PASS
SRD / Low channel / 55°C/ 3.7Vdc	Unmodulated Tx		EMI4771	PASS
SRD / Mid channel / 55°C/ 3.7Vdc	Unmodulated Tx		EMI4772	PASS
SRD / High channel / 55°C/ 3.7Vdc	Unmodulated Tx		EMI4773	PASS
SRD / Low channel / 55°C/ 3.2Vdc	Unmodulated Tx		EMI4774	PASS
SRD / Mid channel / 55°C/ 3.2Vdc	Unmodulated Tx		EMI4775	PASS
SRD / High channel / 55°C/ 3.2Vdc	Unmodulated Tx		EMI4776	PASS
SRD / Low channel / -20°C/ 3.7Vdc	Unmodulated Tx		EMI4777	PASS
SRD / Mid channel / -20°C/ 3.7Vdc	Unmodulated Tx		EMI4778	PASS
SRD / High channel / -20°C/ 3.7Vdc	Unmodulated Tx		EMI4779	PASS
SRD / Low channel / -20°C/ 3.2Vdc	Unmodulated Tx		EMI4780	PASS
SRD / Mid channel / -20°C/ 3.2Vdc	Unmodulated Tx		EMI4781	PASS
SRD / High channel / -20°C/ 3.2Vdc	Unmodulated Tx		EMI4782	PASS

LABORATORY PARAMETERS:	REQUIRED PRIOR TO THE TEST	DURING THE TEST
Ambient Temperature	15 to 35 °C	22.2 °C
Relative Humidity	20 to 75 %	30.1 %
Atmospheric pressure	N/A	1008 hPa
Test method deviation: N/A		
Supplementary information: EUT power supply is replaced by a stabilized power supply.		

TEST EQUIPMENT USED					
CATEGORY	BRAND	TYPE	IDENTIFIER	CAL. DATE	CAL. DUE
Attenuator	Radiall	R412710124	16490	25/06/2019	25/08/2022
Climatic enclosure	Secasi	SM600C	1670		
Multimeter	Keithley	2010	6094	30/05/2019	30/07/2021
Power supply	TTI	PL303QMD	8496		
Receiver	Rohde & Schwarz	FPL1003	16027	14/08/2020	14/10/2021
Thermohygrometer	Testo	608-H1	7562	25/01/2019	25/03/2021

CATEGORY	BRAND	TYPE	IDENTIFIER	CAL. DATE	CAL. DUE
Thermohygrometer	Bioblock Scientific	Météostar	0963	25/01/2019	25/03/2021
Thermometer contactless	GHM Greisinger	GMH 3710	12968	06/10/2020	06/12/2021

Blank cells = Permanent validity

TEST SETUP PHOTO(S) - Low CHANNEL / 25°C / 3.7VDC


FREQUENCY ERROR - TABULATED RESULTS				
TEST CASE	FREQUENCY (MHz)	FREQUENCY ERROR (%)	LIMIT	RESULT TAB.
SRD / Low channel / 25°C/ 3.7Vdc	902.137228	0.000000	902MHz < Freq < 928MHz	EMI4594
SRD / Mid channel / 25°C/ 3.7Vdc	914.996363	0.000000		EMI4766
SRD / High channel / 25°C/ 3.7Vdc	927.876489	0.000000		EMI4767
SRD / Low channel / 25°C/ 3.2Vdc	902.137281	-0.000001		EMI4768
SRD / Mid channel / 25°C/ 3.2Vdc	914.996375	-0.000001		EMI4769
SRD / High channel / 25°C/ 3.2Vdc	927.876500	-0.000001		EMI4770
SRD / Low channel / 55°C/ 3.7Vdc	902.137878	-0.000001		EMI4771
SRD / Mid channel / 55°C/ 3.7Vdc	914.996922	-0.000001		EMI4772
SRD / High channel / 55°C/ 3.7Vdc	927.877050	-0.000001		EMI4773
SRD / Low channel / 55°C/ 3.2Vdc	902.137873	0.000000		EMI4774
SRD / Mid channel / 55°C/ 3.2Vdc	914.996937	0.000000		EMI4775
SRD / High channel / 55°C/ 3.2Vdc	927.877050	0.000000		EMI4776
SRD / Low channel / -20°C/ 3.7Vdc	902.137579	0.000000		EMI4777
SRD / Mid channel / -20°C/ 3.7Vdc	914.996667	0.000000		EMI4778
SRD / High channel / -20°C/ 3.7Vdc	927.876791	0.000000		EMI4779
SRD / Low channel / -20°C/ 3.2Vdc	902.137597	0.000000		EMI4780
SRD / Mid channel / -20°C/ 3.2Vdc	914.996678	0.000000		EMI4781
SRD / High channel / -20°C/ 3.2Vdc	927.876794	0.000000		EMI4782

EUT MODIFICATIONS	OPERATOR	TEST DATE	RESULT TAB.
N/A	OAT	16/03/2021	EMI4594

End of test report