



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

FCC part 15.247
RSS-247_Issue 2, February 2017
RSS-102, Issue 5, March 2015

Company: **TE Connectivity sensors**
Address.....: 4 rue Gaye Marie
31027 Toulouse
FRANCE

Test item description: **3 axes vibration sensor BLE**
Trade Mark: BLE Vibration sensor
Manufacturer.....: TE Connectivity sensors
Model/Type reference.....: 8531
FCC ID.....: 2A7FN08531
IC: 28633-08531
Ratings.....: 2.8Vdc-3.6Vdc

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

Report Reference No: **RR-EVE-21A654-1A**
Test procedure: FCC IC Certification
Diffusion.....: Bernard KAMEL
Applicant's name: TE Connectivity sensors
Date of issue.....: August 3, 2022
Total number of pages.....: 69
Revision: 0
Modified page(s).....: Creation
Compiled by.....: Nicolas SOULAY
Approved by (+ signature): David MONTAULON (Technical Manager)



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

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REVISION HISTORY:

Revision	Date	Modified pages	Modifications
0	August 3, 2022	/	Creation

1. GENERAL INFORMATION

This document submits the results of Radio tests performed on the equipment **3 axes vibration sensor BLE** (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 : Nicolas SOULAY Test supervisor : Olivier AELBRECHT Date of receipt of test item : N/A Date (s) of performance of tests : Between may and june of 2021					
APPLICANT'S GENERAL INFORMATION:					
Company name : TE Connectivity sensors Company address : 4 rue Gaye Marie 31027 Toulouse FRANCE Person(s) present during the tests : No representative for company attended the tests. Responsible : Bernard KAMEL					
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

RSS/CNR-Gen, Issue 5, April 2018

General Requirements for Compliance of Radio Apparatus

ANSI C 63.10:2013

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

ANSI C 63.4:2014

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

KDB 447498 D04

Interim General RF Exposure Guidance v01

RSS-102, Issue 5, March 2015

Radio Frequency (RF) Exposure Compliance of Radiocommunication Apparatus (All Frequency Bands)

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. : *3 axes vibration sensor BLE*
Model/Type reference..... : *8531*
FCC ID..... : *2A7FN08531*
IC. : *28633-08531*
Trade Mark. : *BLE Vibration sensor*
Serial number (S/N)..... : *Not communicated*
Part number (P/N). : *Not communicated*
Software version..... : *1.2.1*
Firmware version. : *1.2.1*
Type of sample. : *Prototype*
Function(s)..... : *3 axes vibration sensor with BLE*
Manufacturer name. : *TE Connectivity sensors*
Address. : *4 rue Gaye Marie*
31027 Toulouse
FRANCE

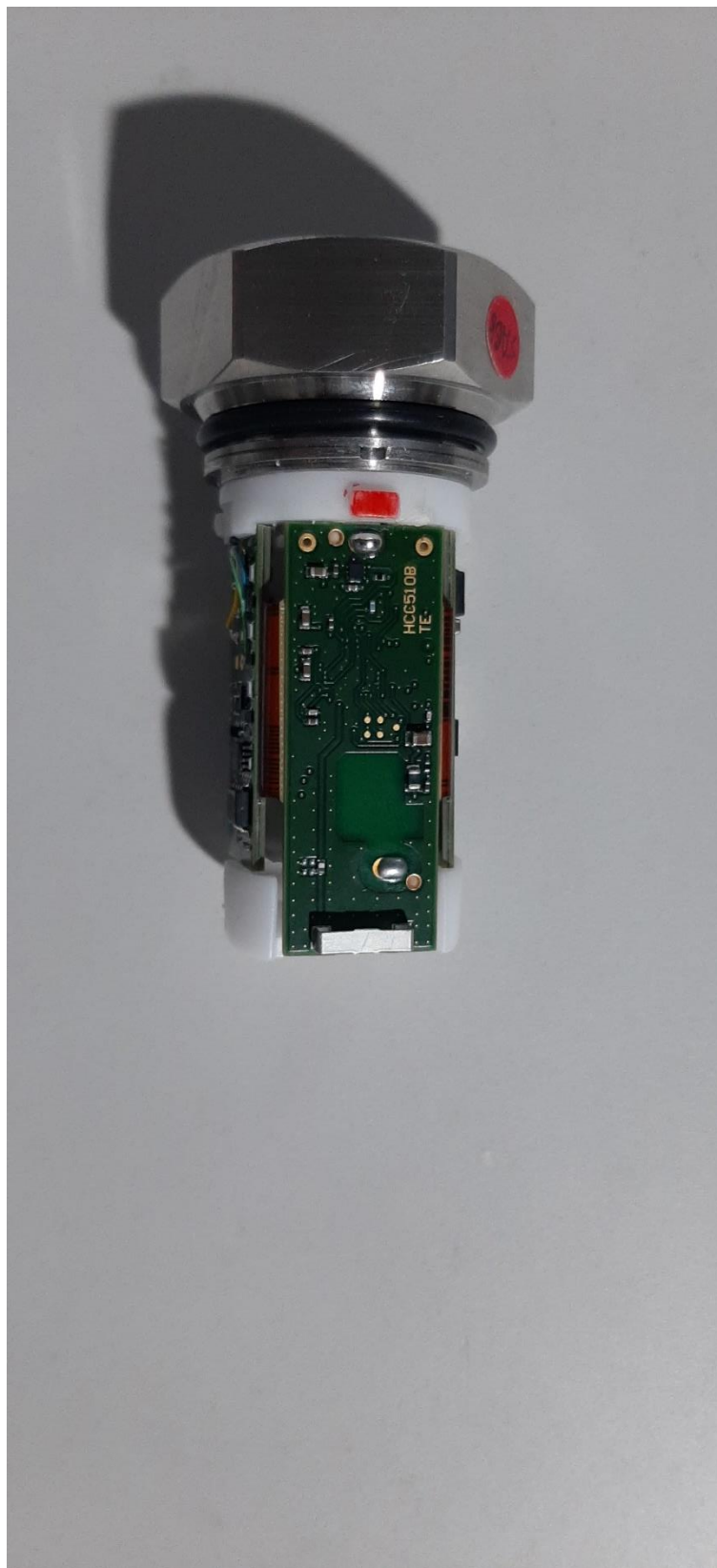
General product information:

N/A

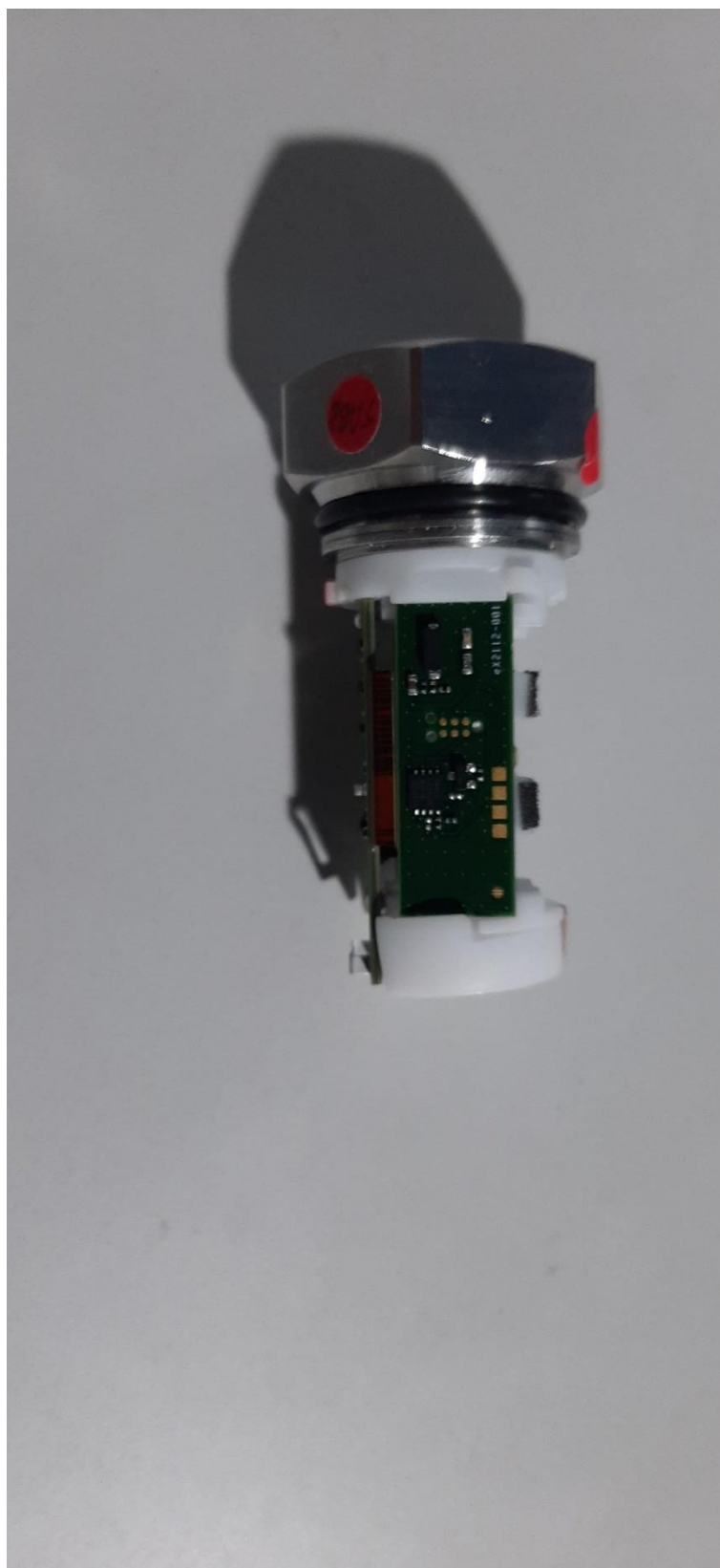
3.2.EUT General view



3.3.EUT Electronic board



3.3.EUT Electronic board



3.3.EUT Electronic board



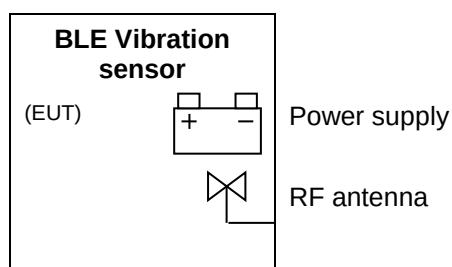
3.4. EUT Mechanical and Electrical Design

Power supply. : 3.6Vdc
 Power supply range..... : 2.8Vdc-3.6Vdc
 Power type..... : Battery powered
 Power (W)..... : N/C
 Nominal current (A). : N/C
 Dimensions (L x W x H) (m). : 81 mm x 31.8 mm
 Weight (kg). : N/C
 Temperature range (°C). : -40°C to +80°C
 Ground bounding strap..... : No

Comments:

N/A

3.5. EUT Input/Output ports



PORT	NAME	TYPE	LENGHT	CABLE TYPE	COMMENTS
0	Main frame	N/E	N/A	Plastic	
1	Power supply	DC		2P	3.6V
2	RF antenna	RF	N/A	N/A	

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

3.6. Supporting Equipment Used During Test

Sample subject to the tests was tested with following equipment.

PRODUCT TYPE	MANUFACTURER	MODEL	N°EMITECH / COMMENTS
Raspberry pi	Raspberry pi	N/C	Receive the EUT sensor data and display it on a screen

RASPBERRY PI (EA)



3.7. EUT Radio Specifications

a) GENERAL INFORMATIONS	
According to manufacturer's declarations :	
EUT type.....	Transmitter
Technology.....	Bluetooth BLE
Environmental profile.....	Data transmission
Temperature range.....	-40°C to +80°C
Antenna type	Integral
Antenna Gain.....	2.4 dBi
Comments:	
b) TRANSMITTER PARAMETERS (Tx)	
Frequency bands.....	2400MHz-2483.5MHz
RF Power.....	N/C
Number of channels / Separation.....	36
Modulation type	GFSK
Duty cycle	N/C
Tested frequency.....	2402MHz, 2426MHz, 2480MHz
c) RECEIVER PARAMETERS (Rx)	
Frequency bands.....	2400MHz-2483.5MHz
Category/Class	Category 3
Bandwidth	N/C

4. RESULT SUMMARY

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

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

Sample subject to the test complies for tests done 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 into account of uncertainty associated with the results with the exception of emission tests based on CISPR standards.

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

5. RF EXPOSURE

Maximum EIRP with antenna = 0.03mW (eirp) at 2480.2MHz

In accordance with KDB 447498 D04 Interim General RF Exposure Guidance v01 §2.1.2:
EIRP is lower than 1mW. Then no RF exposure evaluation is necessary.

In accordance with RSS-102, Issue 5, Section 2.5.1., as EIRP is lower than 2 mW between 2 450 and 3 500 MHz, routine evaluation exemption of RF exposure for ISSED can be considered.

6. 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	$\pm 0.8\text{dB}$	$\pm 1 \text{ dB}$
RF power (EN 300328 / EN 301893)	$\pm 1.3\text{dB}$	$\pm 1.5 \text{ dB}$
Power spectral density	$\pm 2.3\text{dB}$	$\pm 3 \text{ dB}$
Occupied bandwidth		
RF power	$\pm 3.8 \%$	$\pm 5 \%$
RF power (EN 300328 / EN 301893)	$\pm 3.8 \%$	$\pm 5 \%$
Maximum frequency deviation		
300 Hz < audio frequency < 6 kHz	$\pm 1.2 \%$	$\pm 5 \%$
6 kHz < audio frequency < 25 kHz	$\pm 1.2 \%$	$\pm 3 \text{ dB}$
Adjacent channel power	$\pm 1.6 \text{ dB}$	$\pm 3 \text{ dB}$
Sensibility of receiver (conducted)	$\pm 2.0 \text{ dB}$	$\pm 3 \text{ dB}$
Blocking	$\pm 4.0 \text{ dB}$	$\pm 4 \text{ dB}$
Transitoire		
Amplitude	$\pm 8.5 \%$	$\pm 20 \%$
At the frequency	$\pm 166 \text{ Hz}$	$\pm 250 \text{ Hz}$
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	$\pm 5.4 \text{ dB}$	$\pm 6 \text{ dB}$
180-1000 MHz / 1 – 12.75 GHz (EN 301 908-1)	$\pm 3.0 / 2.9 \text{ dB}$	$\pm 3 \text{ dB}$
RF power (EN 300328 / EN 301893)	$\pm 5.3 \text{ dB}$	$\pm 6 \text{ dB}$
PIRE and power spectral density with diode	$\pm 5.2 \text{ dB}$	$\pm 6 \text{ dB}$
Radiated emission (magnetic field)		
9kHz – 30MHz	$\pm 3 \text{ dB}$	$\pm 6 \text{ dB}$
RF level for a given BER	$\pm 0.8 \text{ dB}$	$\pm 1.5 \text{ dB}$
Supply voltages	$\pm 3 \%$	$\pm 3 \%$
Temperature	$\pm 1 \text{ }^{\circ}\text{C}$	$\pm 1 \text{ }^{\circ}\text{C}$
Humidity	$\pm 5 \%$	$\pm 5 \%$

PARAMETER	MAXIMAL EMITECH UNCERTAINTY	MINIMAL STANDARD UNCERTAINTY
Time / Duty cycle	$\pm 4.4 \%$	$\pm 5 \%$
Adaptivity	$\pm 2.9 \text{ dB}$	/
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).

7. TEST CONDITIONS AND RESULTS

7.1. 6dB bandwidth

Reference standard:	FCC part 15 Radio part 15.247 and RSS-247
Test method:	FCC part 15.247 and RSS-247
Test description: a) (2): Systems using digital modulation techniques may operate in the 902-928 MHz, 2400-2483.5 MHz, and 5725-5850 MHz bands. The minimum 6 dB bandwidth shall be at least 500 kHz. EUT is Measured with a proximity antenna. The measurements are carried out relative to the EIRP measurment. Tests are done in max-hold mode in order to capture all channels.	

TESTED PARAMETER	SEVERITY	VERDICT
6dB Bandwidth Low channel 2.8Vdc	>500kHz	PASS
6dB Bandwidth Low channel 3.6Vdc	>500kHz	PASS
6dB Bandwidth Mid channel 2.8Vdc	>500kHz	PASS
6dB Bandwidth Mid channel 3.6Vdc	>500kHz	PASS
6dB Bandwidth High channel 2.8Vdc	>500kHz	PASS
6dB Bandwidth High channel 3.6Vdc	>500kHz	PASS

LABORATORY PARAMETERS:	REQUIRED PRIOR TO THE TEST	DURING THE TEST
Ambient Temperature	15 to 35 °C	20.9 °C
Relative Humidity	20 to 75 %	36.8 %
Atmospheric pressure	N/A	1016 hPa
Test method deviation: N/A		
Supplementary information: N/A		

TEST EQUIPMENT USED					
CATEGORY	BRAND	TYPE	IDENTIFIER	CAL. DATE	CAL. DUE
Attenuator	Techniwave	TWSMA-10dB-18G-SMA	14672	28/12/2019	28/02/2023
Cable	MegaPhase	TM8S1S179	16653	30/10/2019	30/12/2021
Climatic enclosure	CLIMATS	EXCAL 7714-HA	14261	19/09/2019	19/11/2021
Multimeter	Keithley	2010	6094	30/05/2019	30/07/2021
Power supply	TTI	PL303QMD	8496		
Spectrum analyzer	Agilent Technologies	E4440A	5824	22/10/2020	22/12/2022
Thermohygrometer	Testo	608-H2	12268	07/05/2020	07/07/2022

Blank cells = Permanent validity

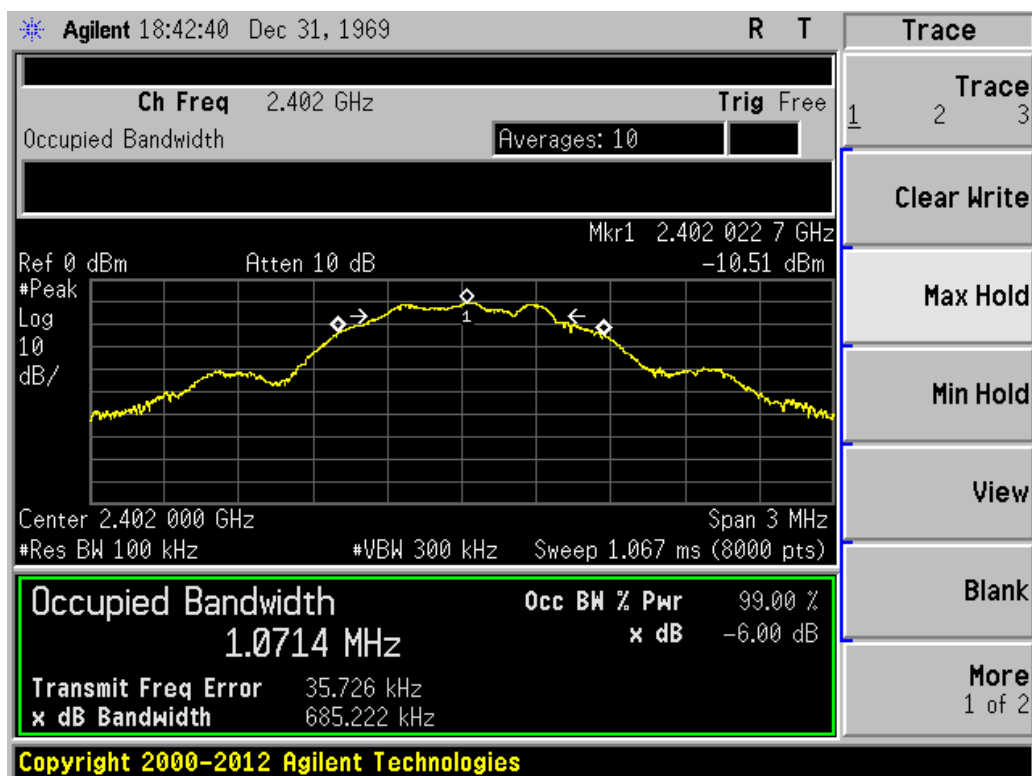
TEST SETUP PHOTO(S)



6dB BANDWIDTH - GRAPH

LOW CHANNEL 2.8VDC

EUT mode:	#1
Test Date:	19/05/2021
Test Operator:	NSO

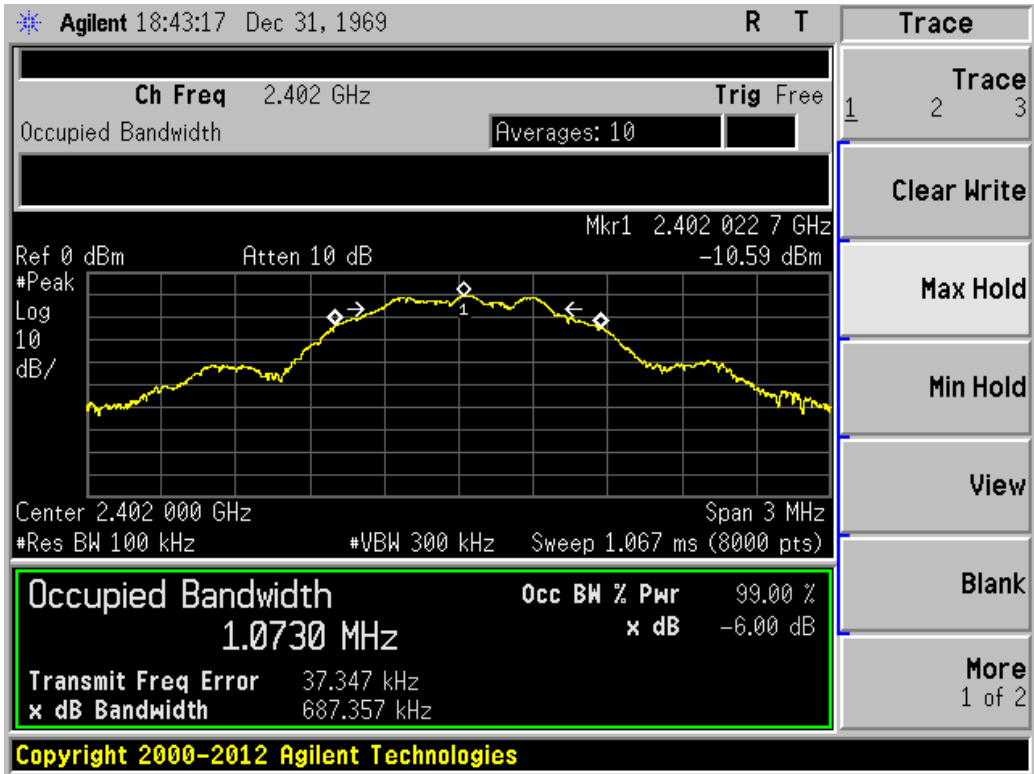


EUT modification(s): N/A

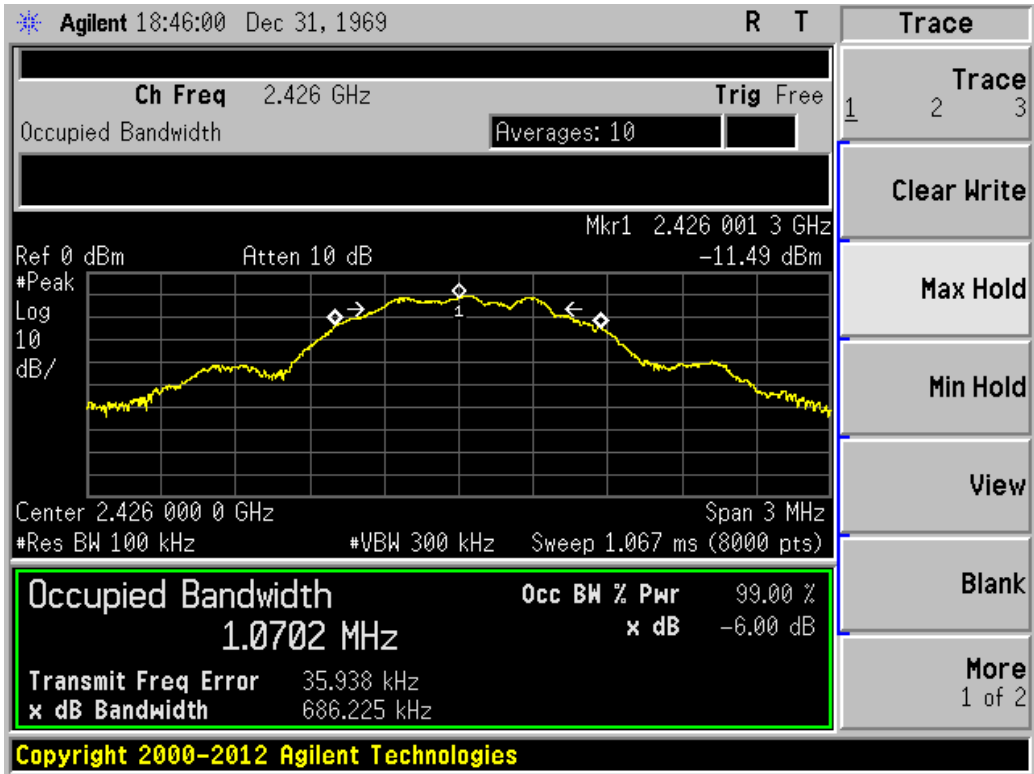
6dB BANDWIDTH - TABULATED RESULTS

LOW CHANNEL 2.8VDC

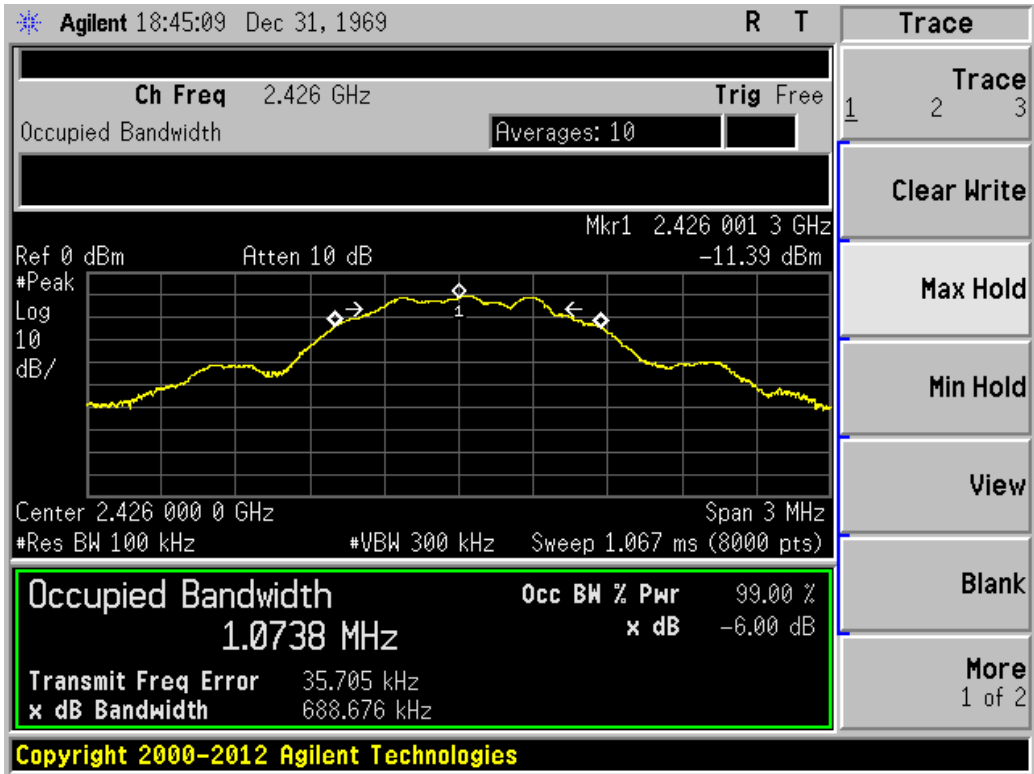
Frequency	RBW	6dB Bandwidth	Limit
2402MHz	100kHz	685.222kHz	> 500kHz

6dB BANDWIDTH - GRAPH	
LOW CHANNEL 3.6VDC	
EUT mode:	#1
Test Date:	19/05/2021
Test Operator:	NSO
	
Configuration:	N/A
Comments:	N/A
EUT modification(s): N/A	

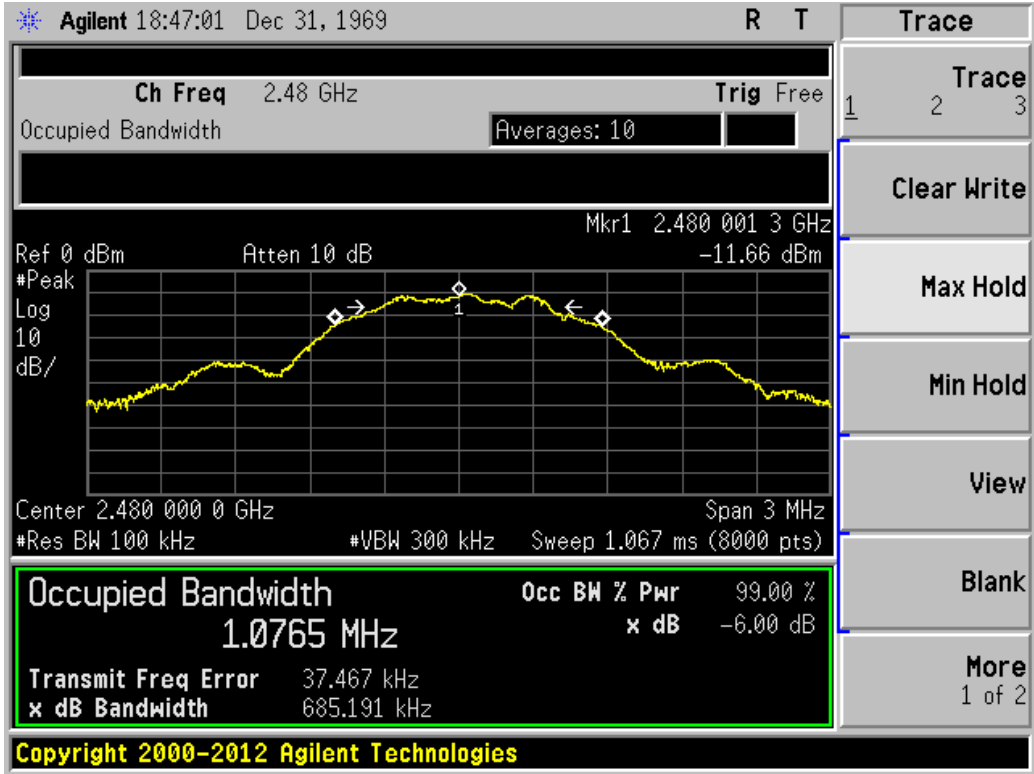
6dB BANDWIDTH - TABULATED RESULTS			
LOW CHANNEL 3.6VDC			
Frequency	RBW	6dB Bandwidth	Limit
2402MHz	100kHz	687.357kHz	> 500kHz

6dB BANDWIDTH - GRAPH	
MID CHANNEL 2.8VDC	
EUT mode:	#1
Test Date:	19/05/2021
Test Operator:	NSO
	
Configuration:	N/A
Comments:	N/A
EUT modification(s): N/A	

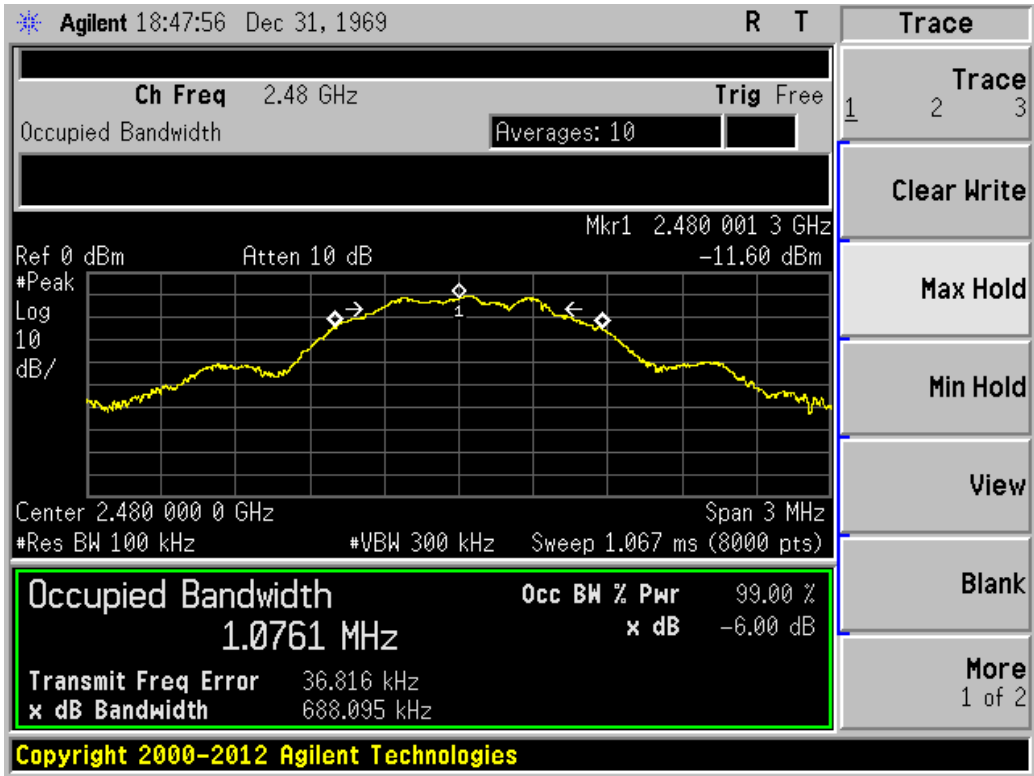
6dB BANDWIDTH - TABULATED RESULTS			
MID CHANNEL 2.8VDC			
Frequency	RBW	6dB Bandwidth	Limit
2426MHz	100kHz	686.225kHz	> 500kHz

6dB BANDWIDTH - GRAPH	
MID CHANNEL 3.6VDC	
EUT mode:	#1
Test Date:	19/05/2021
Test Operator:	NSO
	
Configuration:	N/A
Comments:	N/A
EUT modification(s): N/A	

6dB BANDWIDTH - TABULATED RESULTS			
MID CHANNEL 3.6VDC			
Frequency	RBW	6dB Bandwidth	Limit
2426MHz	100kHz	688.676kHz	> 500kHz

6dB BANDWIDTH - GRAPH	
HIGH CHANNEL 2.8VDC	
EUT mode:	#1
Test Date:	19/05/2021
Test Operator:	NSO
	
Configuration:	N/A
Comments:	N/A
EUT modification(s): N/A	

6dB BANDWIDTH - TABULATED RESULTS			
HIGH CHANNEL 2.8VDC			
Frequency	RBW	6dB Bandwidth	Limit
2480MHz	100kHz	685.191kHz	> 500kHz

6dB BANDWIDTH - GRAPH	
HIGH CHANNEL 3.6VDC	
EUT mode:	#1
Test Date:	19/05/2021
Test Operator:	NSO
	
Configuration:	N/A
Comments:	N/A
EUT modification(s): N/A	

6dB BANDWIDTH - TABULATED RESULTS			
HIGH CHANNEL 3.6VDC			
Frequency	RBW	6dB Bandwidth	Limit
2480MHz	100kHz	688.095kHz	> 500kHz

7.2. Occupied Bandwidth

Reference standard:	FCC part 15 Radio part 15.247 and RSS-247
Test method:	FCC part 15.247 and RSS-247
Test description: The occupied bandwidth (OBW) is the Frequency Range in which 99 % of the total mean power of a given emission falls. The residual part of the total power being denoted as β, which, in cases of symmetrical spectra, splits up into $\beta/2$ 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 Measured with a proximity antenna. The measurements are carried out relative to the EIRP measurment.	

TESTED CHANNEL	SEVERITY	RESULT TAB.	VERDICT
Low channel / 25°C /3.6Vdc	>500kHz	EMI5074	PASS
Low channel / 25°C /2.8Vdc	>500kHz	EMI5075	PASS
Mid channel / 25°C /3.6Vdc	>500kHz	EMI5076	PASS
Mid channel / 25°C /2.8Vdc	>500kHz	EMI5077	PASS
High channel / 25°C /3.6Vdc	>500kHz	EMI5078	PASS
High channel / 25°C /2.8Vdc	>500kHz	EMI5079	PASS

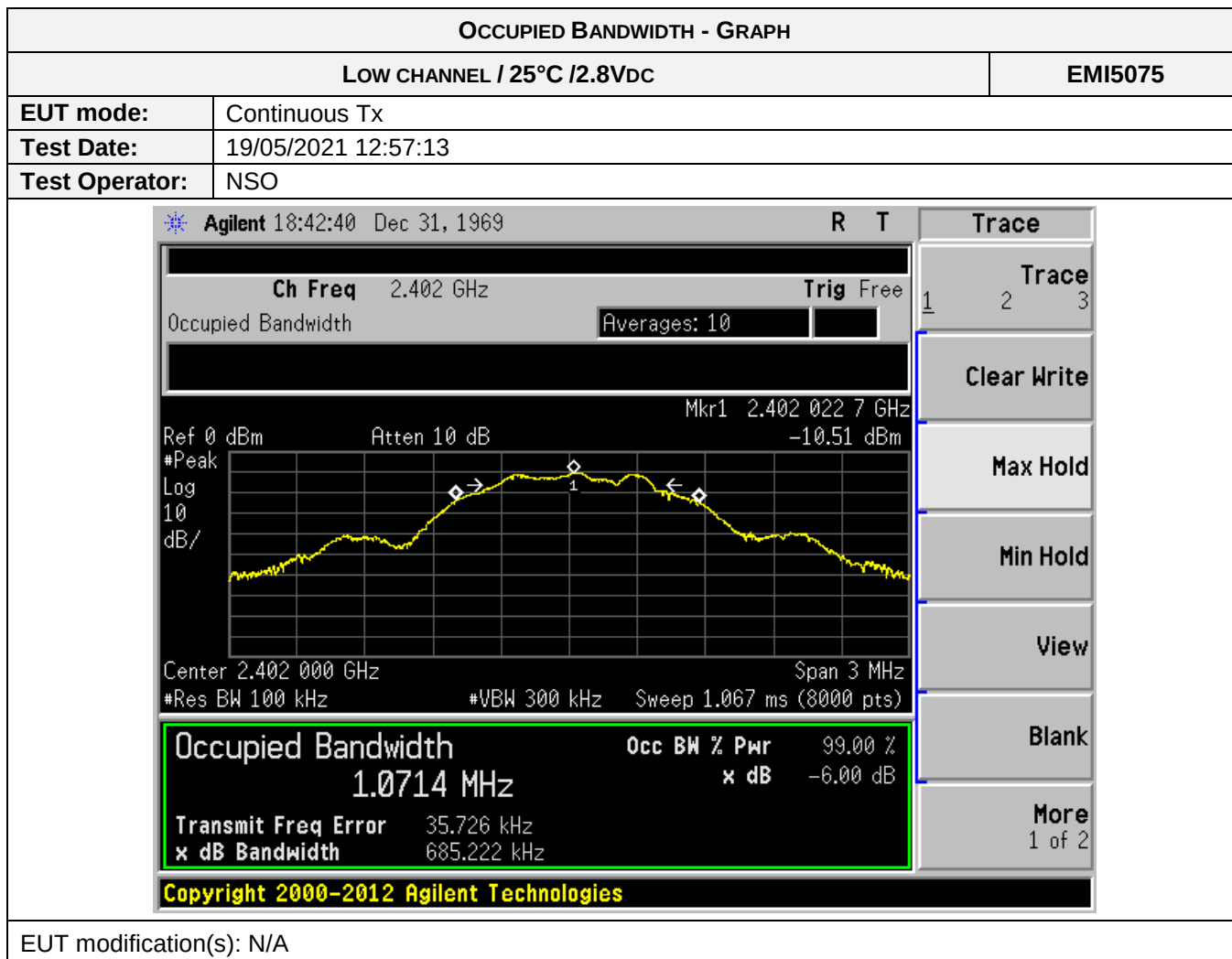
LABORATORY PARAMETERS:	REQUIRED PRIOR TO THE TEST	DURING THE TEST
Ambient Temperature	15 to 35 °C	20.9 °C
Relative Humidity	20 to 75 %	36.8 %
Atmospheric pressure	N/A	1016 hPa
Test method deviation: N/A		
Supplementary information: EUT power supply is replaced by a stabilized power supply.		

TEST EQUIPMENT USED					
CATEGORY	BRAND	TYPE	IDENTIFIER	CAL. DATE	CAL. DUE
Attenuator	Techniwave	TWSMA-10dB-18G-SMA	14672	28/12/2019	28/02/2023
Cable	MegaPhase	TM8S1S179	16653	30/10/2019	30/12/2021
Climatic enclosure	CLIMATS	EXCAL 7714-HA	14261	19/09/2019	19/11/2021
Multimeter	Keithley	2010	6094	30/05/2019	30/07/2021
Power supply	TTI	PL303QMD	8496		
Spectrum analyzer	Agilent Technologies	E4440A	5824	22/10/2020	22/12/2022
Thermohygrometer	Testo	608-H2	12268	07/05/2020	07/07/2022

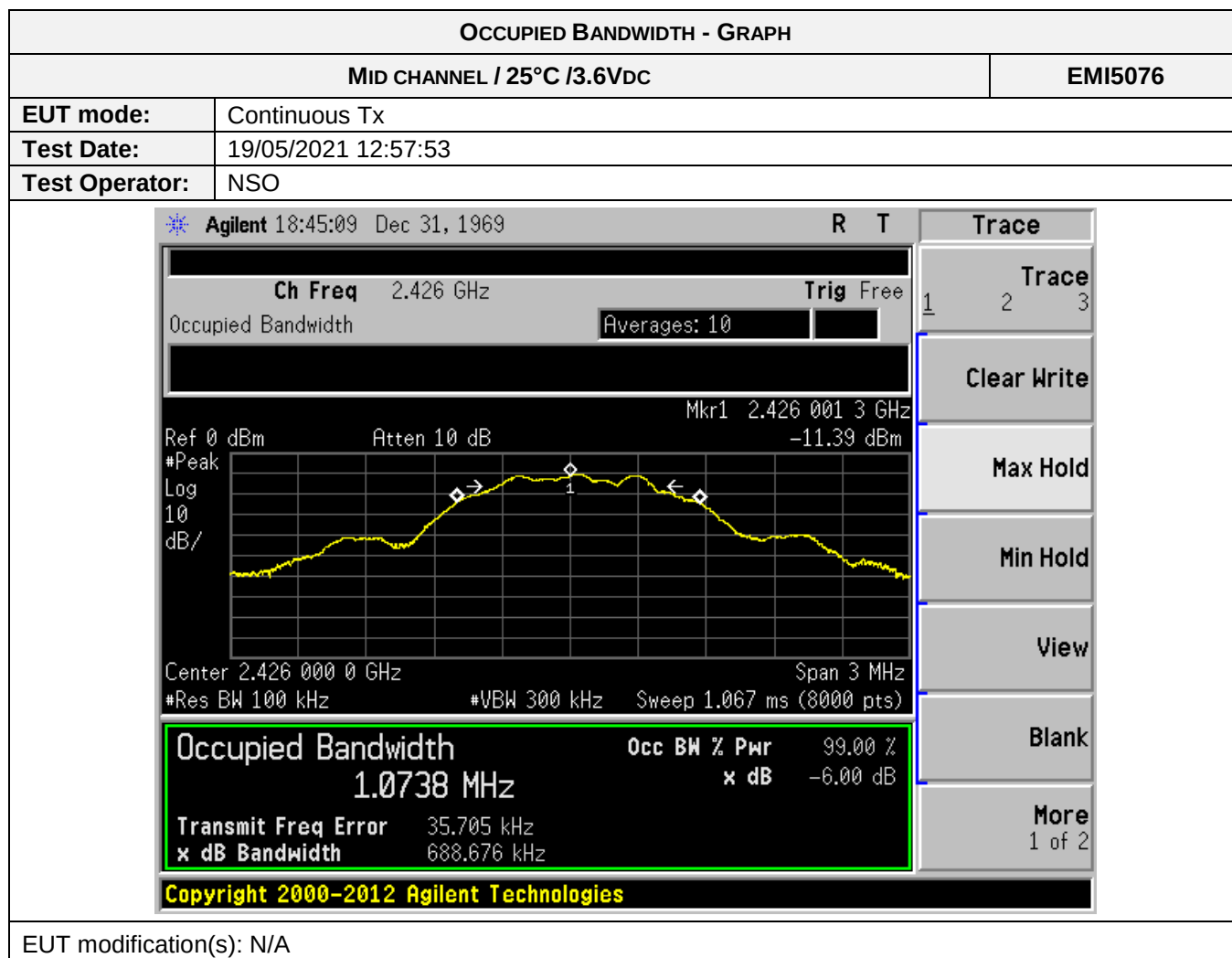
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EUT modification(s): N/A

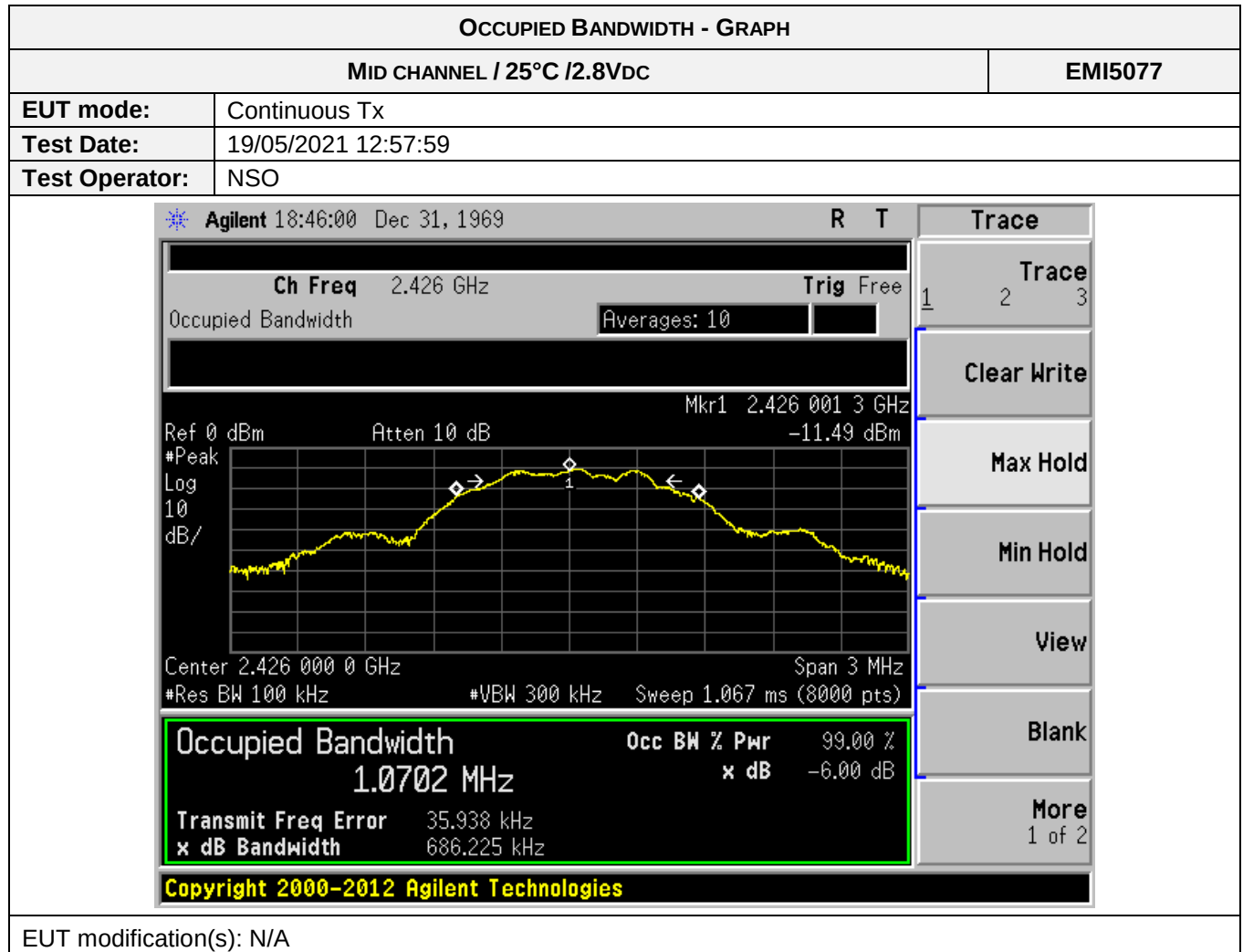
OCCUPIED BANDWIDTH - TABULATED RESULTS			
LOW CHANNEL / 25°C /3.6Vdc			EMI5074
U _{Start} (start of the test):	3.6Vdc	U _{End} (end of the test):	3.6Vdc
Voltage drop:	0%	Limit:	+/- 5%
Frequency	RBW	OBW 99%	Limit
2402MHz	100kHz	1.073MHz	> 500kHz



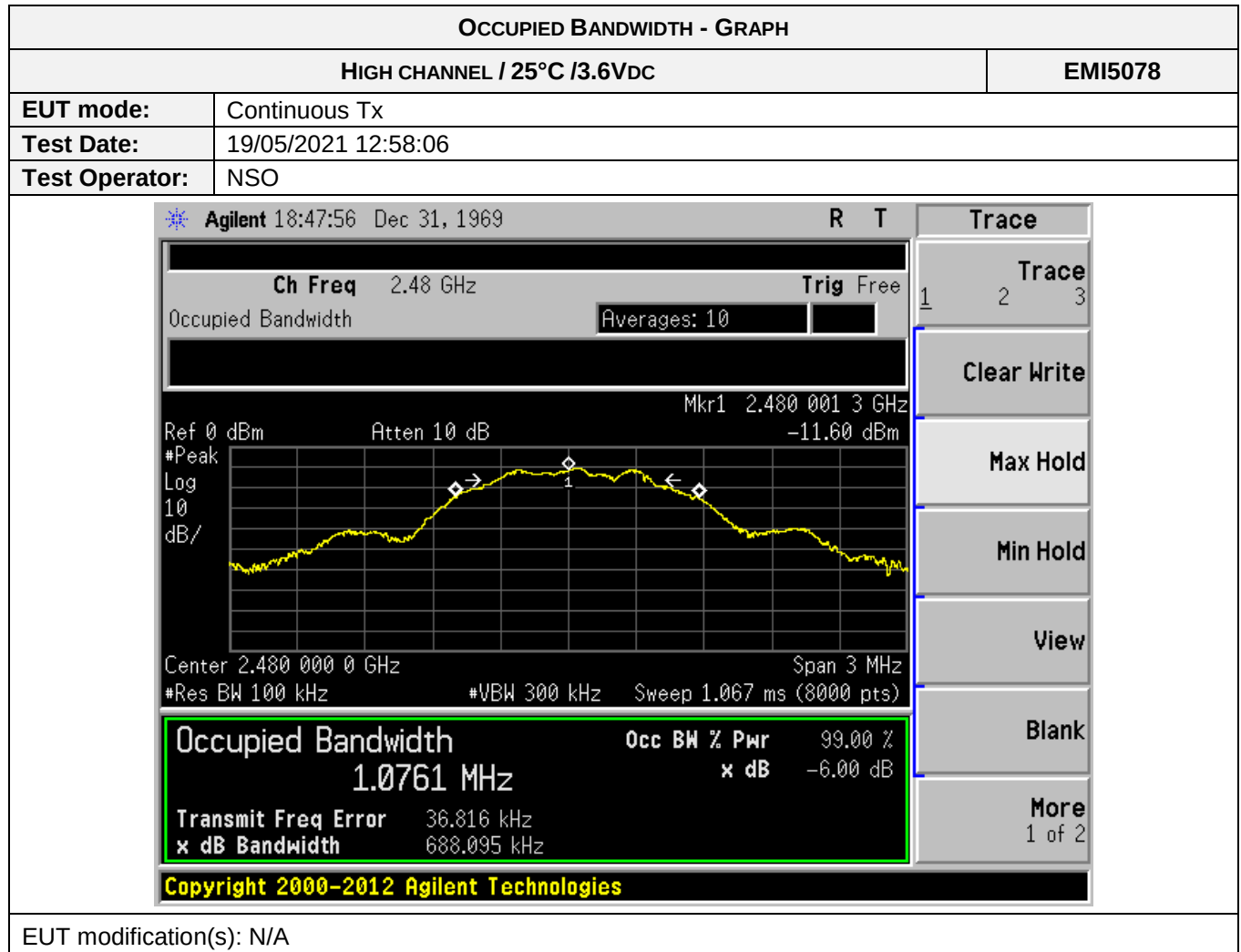
OCCUPIED BANDWIDTH - TABULATED RESULTS			
LOW CHANNEL / 25°C / 2.8Vdc			EMI5075
U _{Start} (start of the test):	2.8Vdc	U _{End} (end of the test):	2.8Vdc
Voltage drop:	0%	Limit:	+/- 5%
Frequency	RBW	OBW 99%	Limit
2402MHz	100KHz	1.0714MHz	> 500kHz



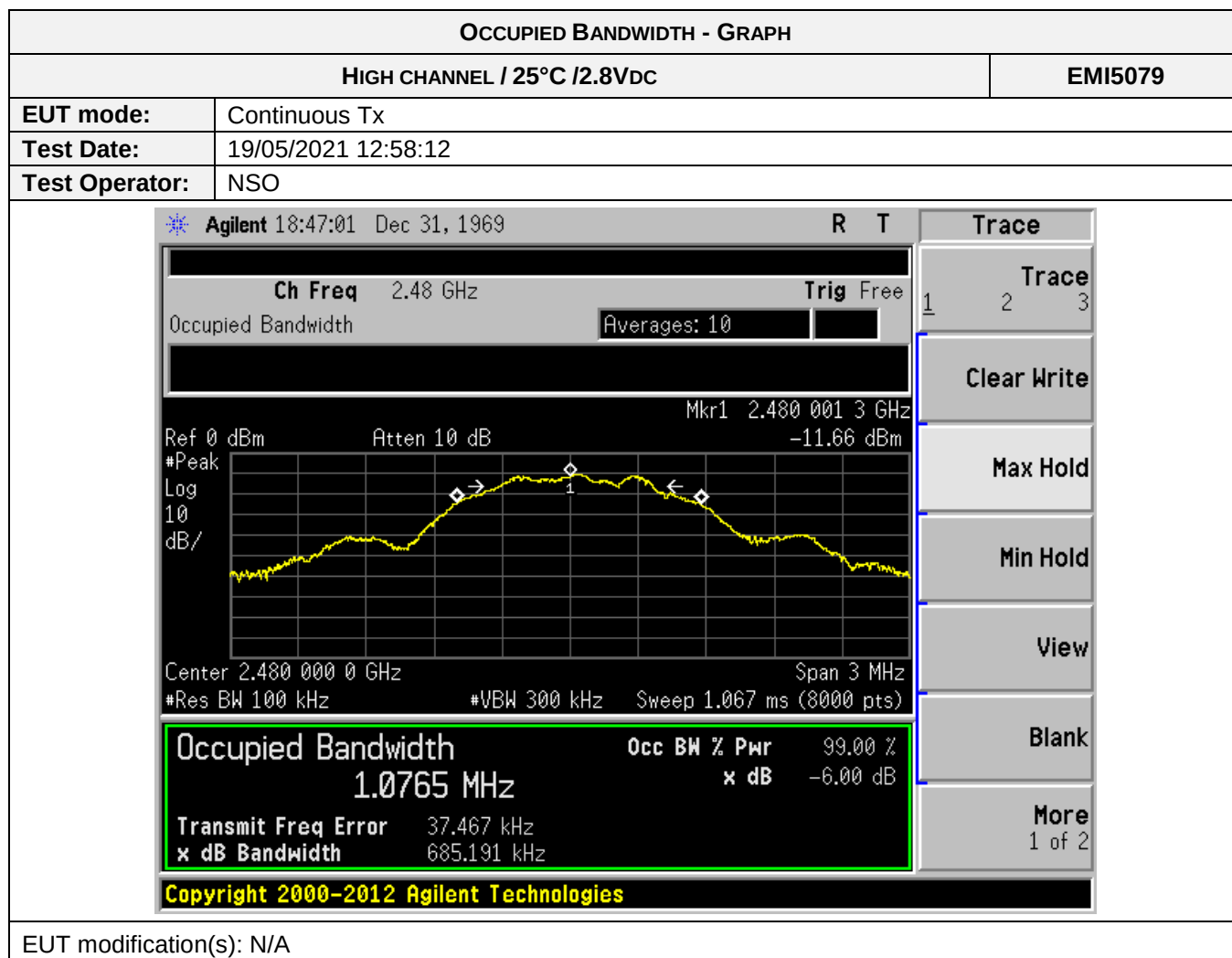
OCCUPIED BANDWIDTH - TABULATED RESULTS			
MID CHANNEL / 25°C / 3.6VDC			EMI5076
U _{Start} (start of the test):	3.6Vdc	U _{End} (end of the test):	3.6Vdc
Voltage drop:	0%	Limit:	+/- 5%
Frequency	RBW	OBW 99%	Limit
2426MHz	100kHz	1.0738MHz	> 500kHz



OCCUPIED BANDWIDTH - TABULATED RESULTS			
MID CHANNEL / 25°C / 2.8VDC			EMI5077
U _{Start} (start of the test):	2.8Vdc	U _{End} (end of the test):	2.8Vdc
Voltage drop:	0%	Limit:	+/- 5%
Frequency	RBW	OBW 99%	Limit
2426MHz	100kHz	1.0702MHz	> 500kHz



OCCUPIED BANDWIDTH - TABULATED RESULTS			
HIGH CHANNEL / 25°C / 3.6Vdc			EMI5078
U _{Start} (start of the test):	3.6Vdc	U _{End} (end of the test):	3.6Vdc
Voltage drop:	0%	Limit:	+/- 5%
Frequency	RBW	OBW 99%	Limit
2480MHz	100kHz	1.0761MHz	> 500kHz



OCCUPIED BANDWIDTH - TABULATED RESULTS			
HIGH CHANNEL / 25°C / 2.8Vdc			EMI5079
U _{Start} (start of the test):	2.8Vdc	U _{End} (end of the test):	2.8Vdc
Voltage drop:	0%	Limit:	+/- 5%
Frequency	RBW	OBW 99%	Limit
2480MHz	100kHz	1.0765 MHz	> 500kHz

7.3. Maximum peak radiated 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
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 pos 1	2.395GHz-2.485GHz	1 Watt	EMI5277	PASS
EIRP pos 2	2.395GHz-2.485GHz	1 Watt	EMI5278	PASS
EIRP pos 3	2.395GHz-2.485GHz	1 Watt	EMI5279	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	ETS-Lindgren	3117	8387	24/07/2019	24/09/2022
Attenuator	EMITECH	SUB.V1-H	14780	04/05/2020	04/07/2021
Attenuator	EMITECH	SUB.V1-V	14781	04/05/2020	04/07/2021
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	16042	24/03/2021	24/05/2023
Receiver	Rohde & Schwarz	FSW43	14830	29/07/2020	29/09/2021
Shielded enclosure	RAY PROOF	C.V1	1123	16/06/2018	16/08/2021
Software	Nexio	BAT EMC	0000		
Thermohygrometer	Testo	608-H1	7561	26/01/2019	26/09/2021
Thermohygrometer	Bioblock Scientific	Météostar	0963	26/01/2019	26/09/2021

BAT-EMC software version: V3.18.0.26

Blank cells = Permanent validity

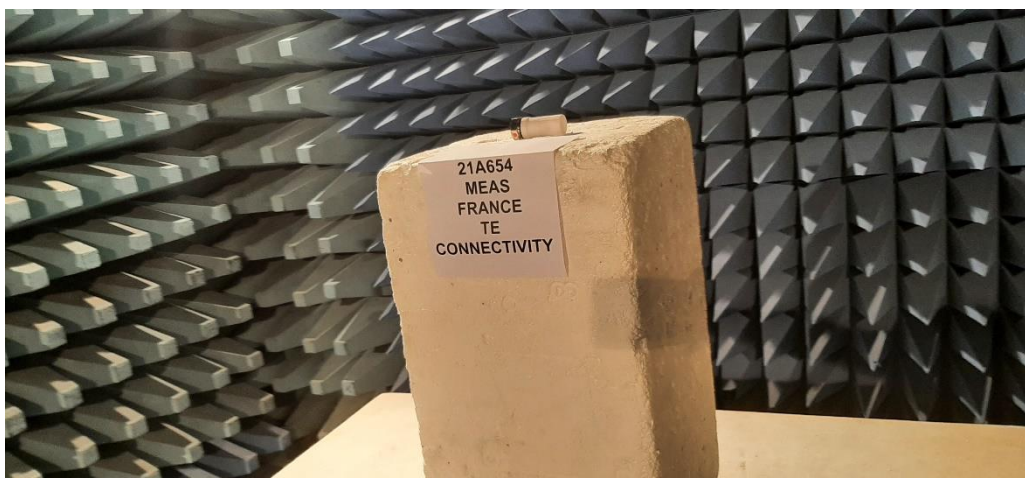
TEST SETUP PHOTO(S) – POSITION 1



TEST SETUP PHOTO(S) – POSITION 2

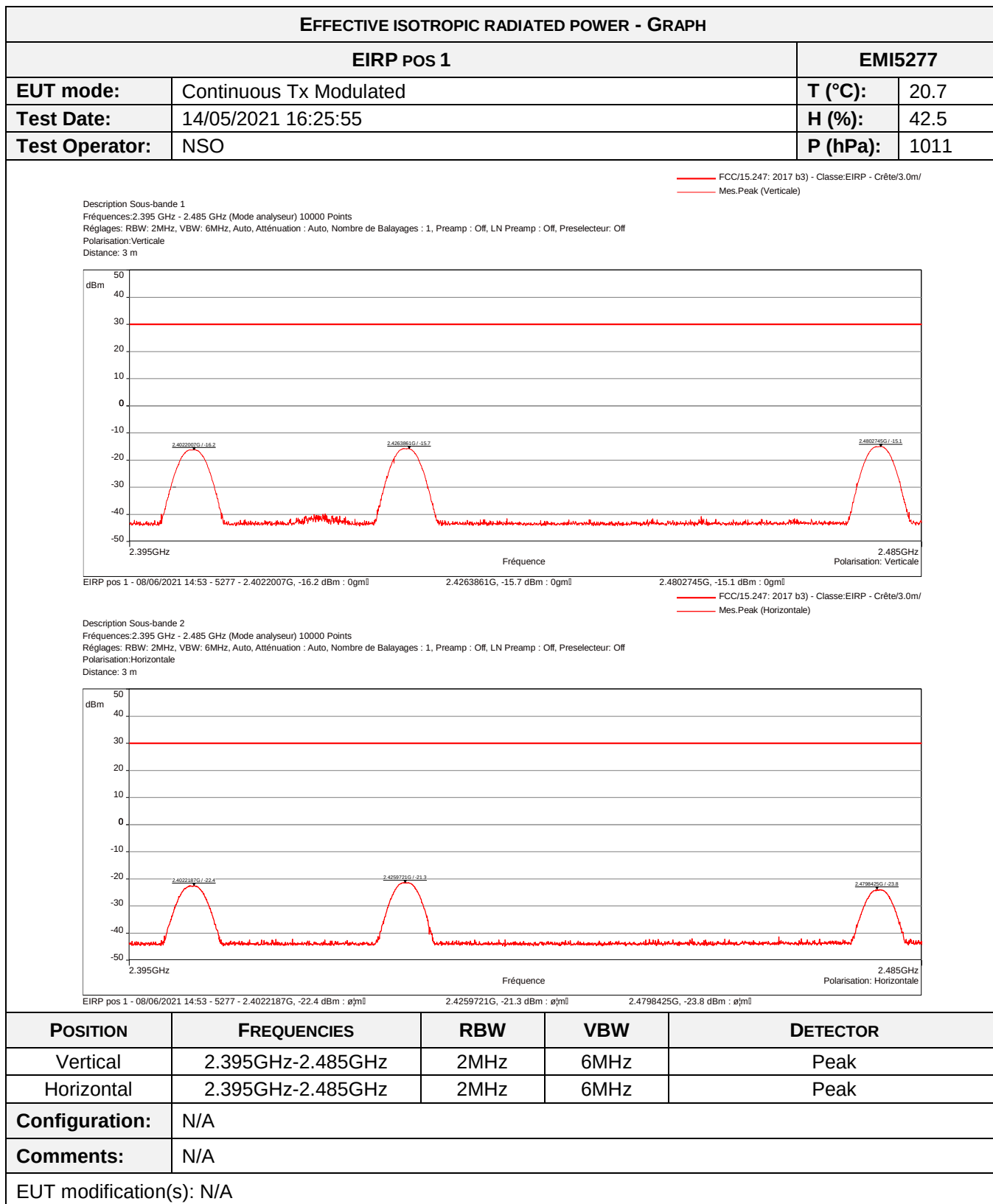


TEST SETUP PHOTO(S) – POSITION 3

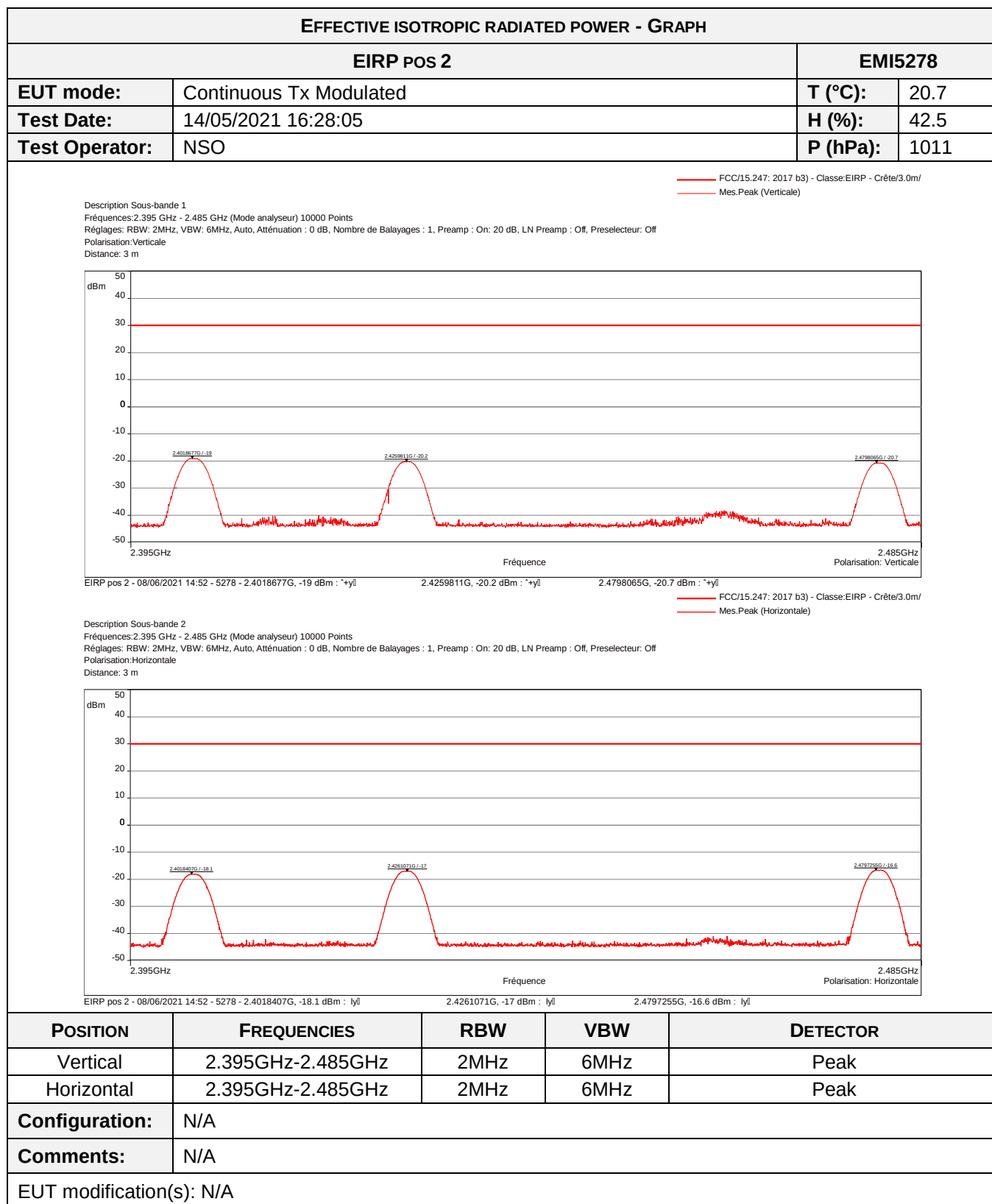


TEST SETUP PHOTO(S) – SETUP

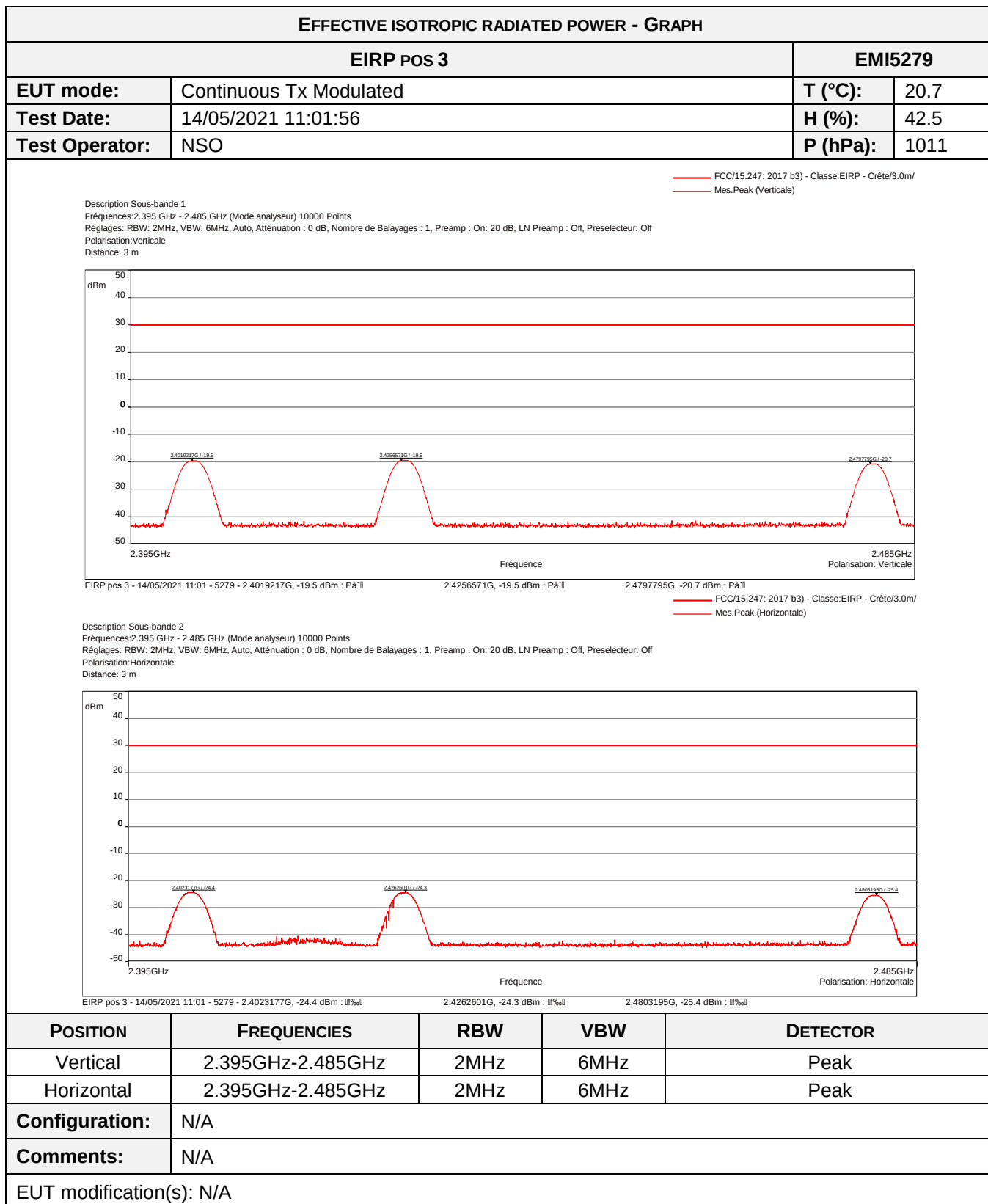




EFFECTIVE ISOTROPIC RADIATED POWER - TABULATED RESULTS				
U_{Start} (start of the test):	3.6Vdc	U_{End} (end of the test):	3.6Vdc	
Voltage drop:	0%	Limit:	+/- 5%	
EIRP POS 1				EMI5277
Frequency (MHz)	Polarization	Radiated level (dBm)	Conducted level (dBm)	Limit (dBm)
2402.20	Vertical	-16.2	-18.6	20
2426.38	Vertical	-15.7	-18.1	20
2480.27	Vertical	-15.1	-17.5	20
2402.21	Horizontal	-22.4	-24.8	20
2459.72	Horizontal	-21.3	-23.7	20
2479.84	Horizontal	-23.8	-26.2	20



EFFECTIVE ISOTROPIC RADIATED POWER - TABULATED RESULTS				
U_{Start} (start of the test):	3.6Vdc	U_{End} (end of the test):	3.6Vdc	
Voltage drop:	0%	Limit:	+/- 5%	
EIRP POS 2				EMI5278
Frequency (MHz)	Polarization	Radiated level (dBm)	Conducted level (dBm)	Limit (dBm)
2401.86	Vertical	-19	-21.4	20
2425.98	Vertical	-20.2	-22.6	20
2479.80	Vertical	-20.7	-23.1	20
2401.84	Horizontal	-18.1	-20.5	20
2426.10	Horizontal	-17	-19.4	20
2479.72	Horizontal	-16.6	-19	20



EFFECTIVE ISOTROPIC RADIATED POWER - TABULATED RESULTS				
U_{Start} (start of the test):	3.6Vdc	U_{End} (end of the test):	3.6Vdc	
Voltage drop:	0%	Limit:	+/- 5%	
EIRP POS 3				EMI5279
Frequency (MHz)	Polarization	Radiated level (dBm)	Conducted level (dBm)	Limit (dBm)
2401.92	Vertical	-19.5	-21.9	20
2425.65	Vertical	-19.5	-21.9	20
2479.77	Vertical	-20.7	-23.1	20
2402.31	Horizontal	-24.4	-26.8	20
2426.26	Horizontal	-24.3	-26.7	20
2480.31	Horizontal	-25.4	-27.8	20

7.4. Band-edge compliance

Reference standard:	FCC part 15 Radio part 15.247 and RSS-247
Test method:	FCC part 15.247 subclause d) and RSS-247
General test setup: 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 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
Band Edge all position	2.39GHz-2.494GHz	>20dBc	EMI5001	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	8387	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	16664	25/10/2019	25/12/2021
Cable	MegaPhase	F135N1N28	16666	25/10/2019	25/12/2021
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-5,5m	14381	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	16042	24/03/2021	24/05/2023
Cable	MegaPhase	TM18-N1N1-118	12841	14/08/2020	14/10/2022
Preamplifier	Techniwave	APS16-0087	14040	02/12/2020	02/02/2022
Receiver	Rohde & Schwarz	ESW26	17791		
Receiver	Rohde & Schwarz	FSW43	14830	29/07/2020	29/09/2021
Shielded enclosure	RAY PROOF	C.V1	1123	16/06/2018	16/08/2021
Shielded enclosure	COMTEST	SAC 3m	14494	02/10/2019	02/12/2022

CATEGORY	BRAND	TYPE	IDENTIFIER	CAL. DATE	CAL. DUE
Software	Nexio		0000		
Thermohygrometer	Testo	608-H1	7561	26/01/2019	26/09/2021
Thermohygrometer	Testo	608-H2	12269	07/05/2020	07/07/2022

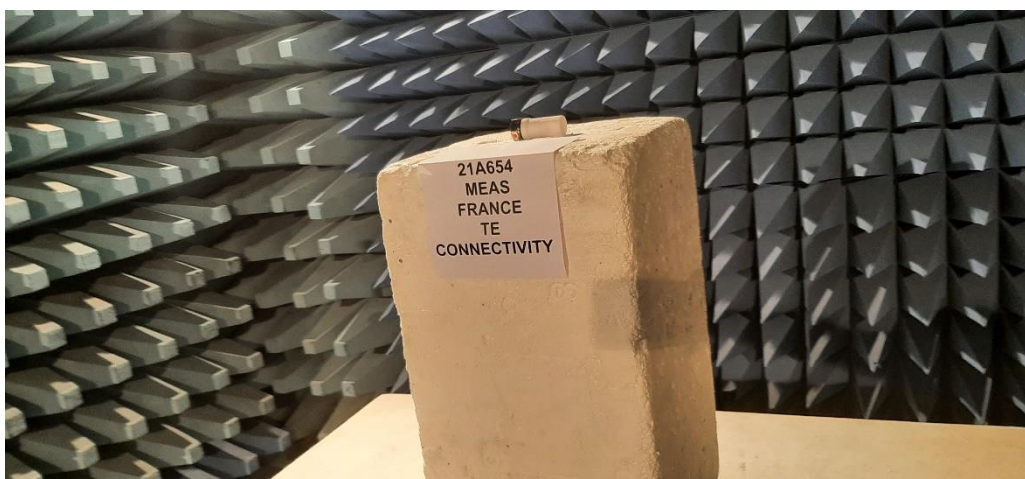
BAT-EMC software version: V3.18.0.26

Blank cells = Permanent validity

TEST SETUP PHOTO(S) – POSITION 1

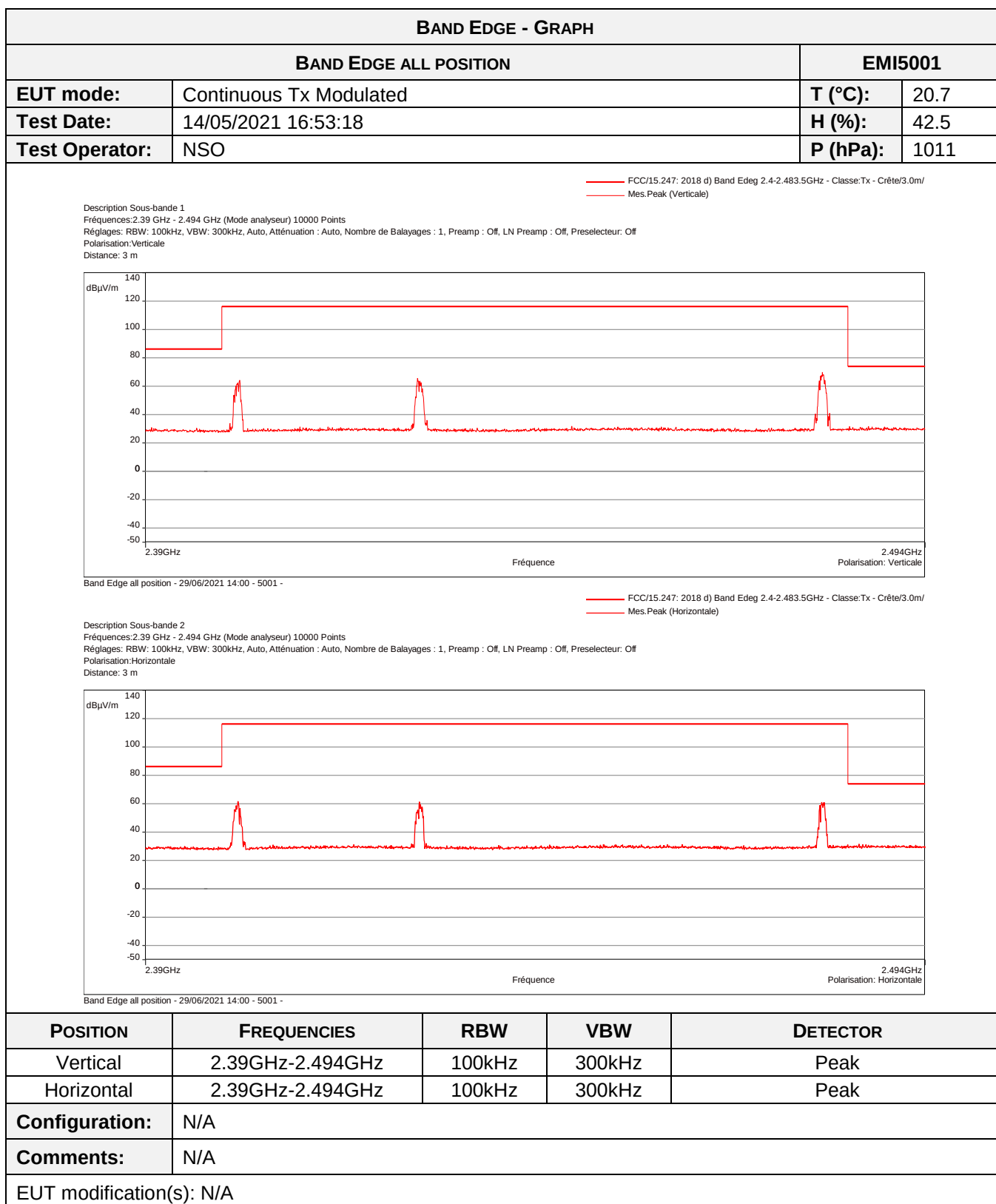
TEST SETUP PHOTO(S) – POSITION 2


TEST SETUP PHOTO(S) – POSITION 3



TEST SETUP PHOTO(S) – SETUP





7.5. Power spectral density

Reference standard:	FCC part 15 Radio part 15.247 and RSS-247
Test method:	FCC part 15.247 and RSS-247
General test setup: e) For digitally modulated systems, the power spectral density conducted from the intentional radiator to the antenna shall not be greater than 8 dBm in any 3 kHz band during any time interval of continuous transmission. This power spectral density shall be determined in accordance with the provisions of paragraph (b) of this section. The same method of determining the conducted output power shall be used to determine the power spectral density. averaging over a time interval, the attenuation required under this paragraph shall be 30 dB instead of 20 dB. 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
PSD Low Channel pos 3	2.4008GHz-2.4033GHz	8dBm/3kHz	EMI4992	PASS
PSD mid Channel pos 3	2.4247GHz-2.4272GHz	8dBm/3kHz	EMI4993	PASS
PSD high Channel pos 3	2.4247GHz-2.4813GHz	8dBm/3kHz	EMI4994	PASS
PSD Low Channel pos 2	2.4008GHz-2.4033GHz	8dBm/3kHz	EMI4995	PASS
PSD mid Channel pos 2	2.4247GHz-2.4272GHz	8dBm/3kHz	EMI4996	PASS
PSD high Channel pos 2	2.4247GHz-2.4813GHz	8dBm/3kHz	EMI4997	PASS
PSD Low Channel pos 1	2.4008GHz-2.4033GHz	8dBm/3kHz	EMI4998	PASS
PSD mid Channel pos 1	2.4247GHz-2.4272GHz	8dBm/3kHz	EMI4999	PASS
PSD high Channel pos 1	2.4247GHz-2.4813GHz	8dBm/3kHz	EMI5000	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	8387	24/07/2019	24/09/2022
Attenuator	EMITECH	SUB.V1-H	14780	04/05/2020	04/07/2021
Attenuator	EMITECH	SUB.V1-V	14781	04/05/2020	04/07/2021
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	16042	24/03/2021	24/05/2023
Receiver	Rohde & Schwarz	FSW43	14830	29/07/2020	29/09/2021
Shielded enclosure	RAY PROOF	C.V1	1123	16/06/2018	16/08/2021
Software	Nexio		0000		
Thermohygrometer	Testo	608-H1	7561	26/01/2019	26/09/2021
Thermohygrometer	Bioblock Scientific	Météostar	0963	26/01/2019	26/09/2021

BAT-EMC software version: V3.18.0.26

Blank cells = Permanent validity

TEST SETUP PHOTO(S) – POSITION 1



TEST SETUP PHOTO(S) – POSITION 2

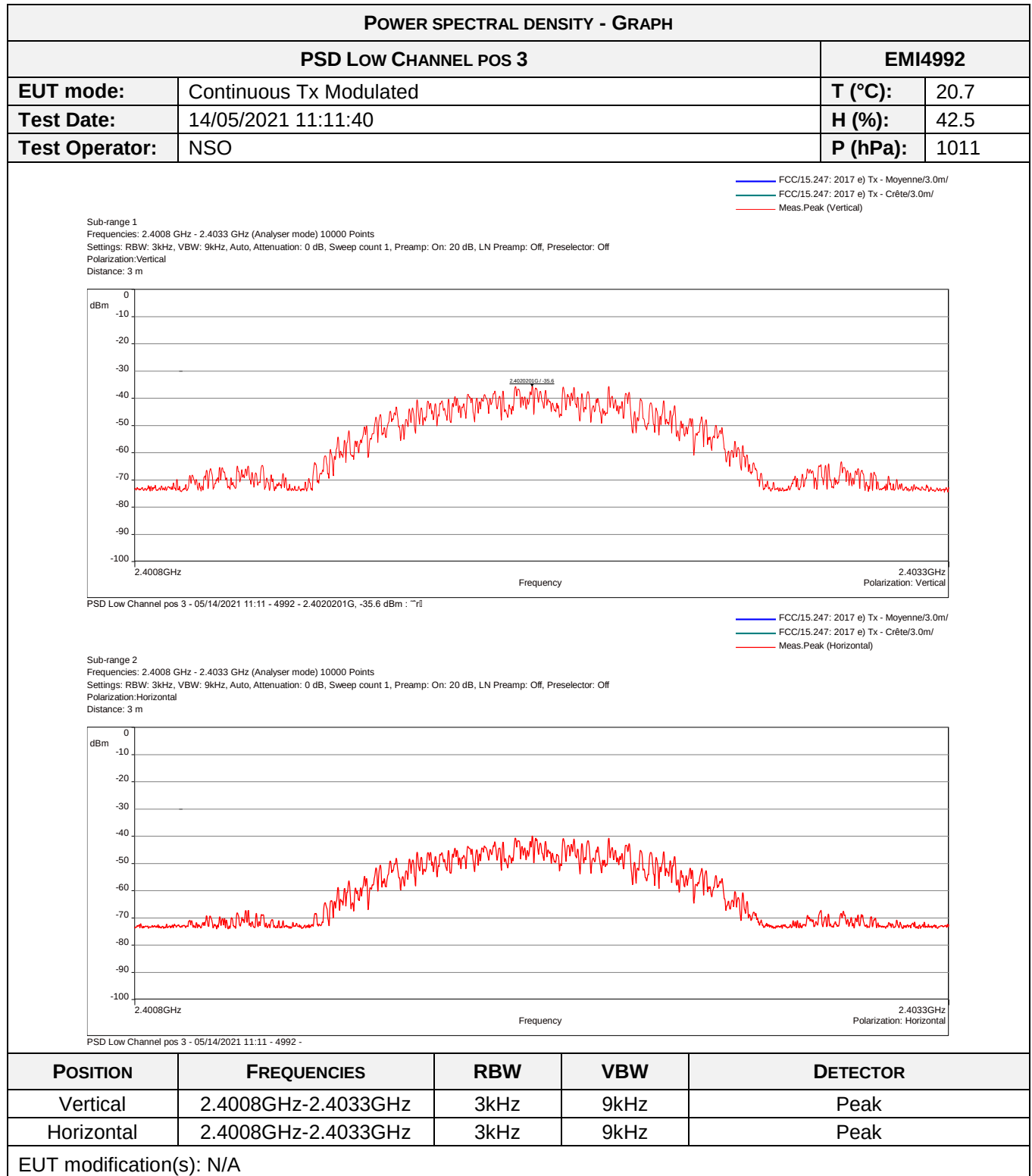


TEST SETUP PHOTO(S) – POSITION 3

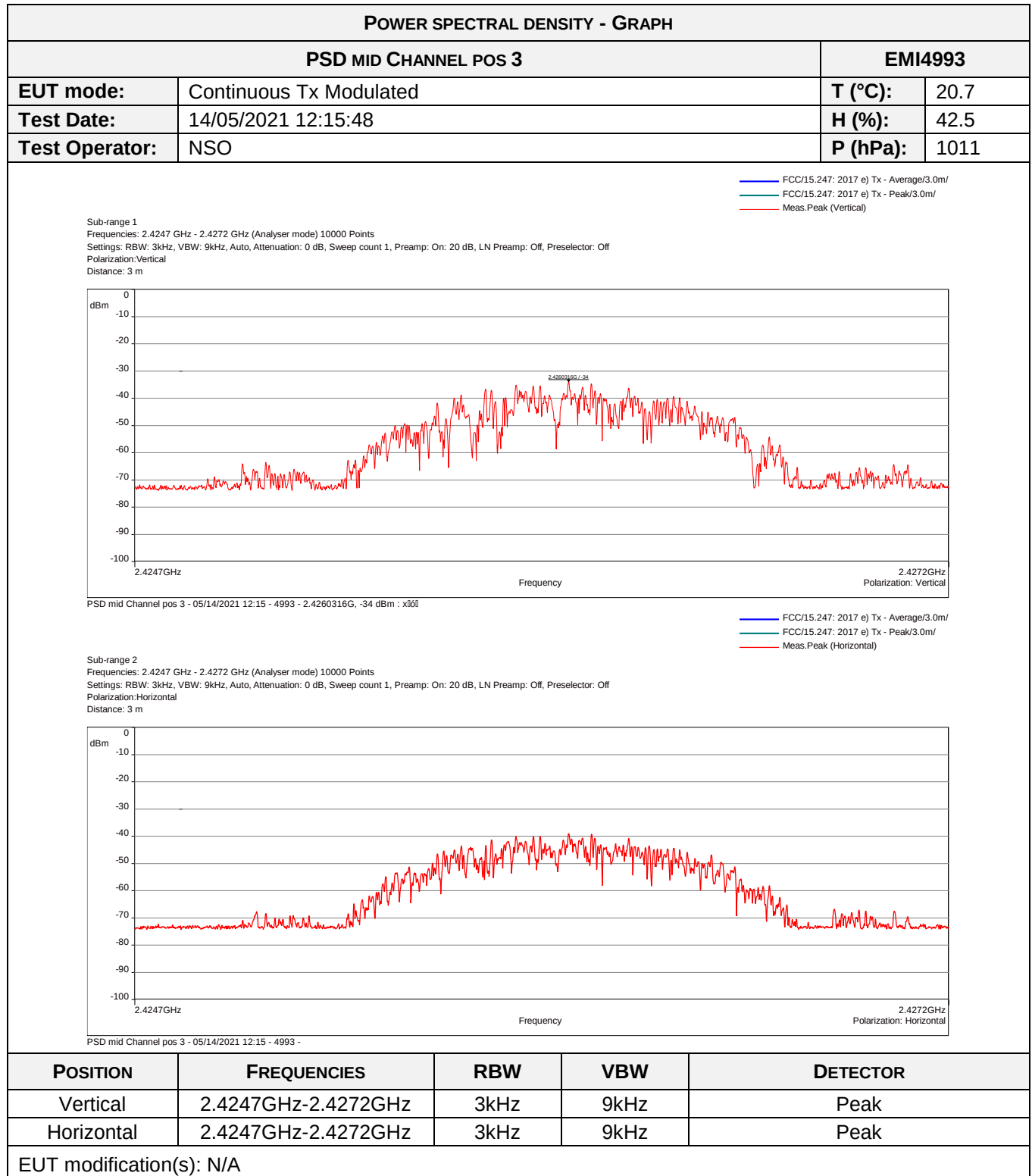


TEST SETUP PHOTO(S) – SETUP

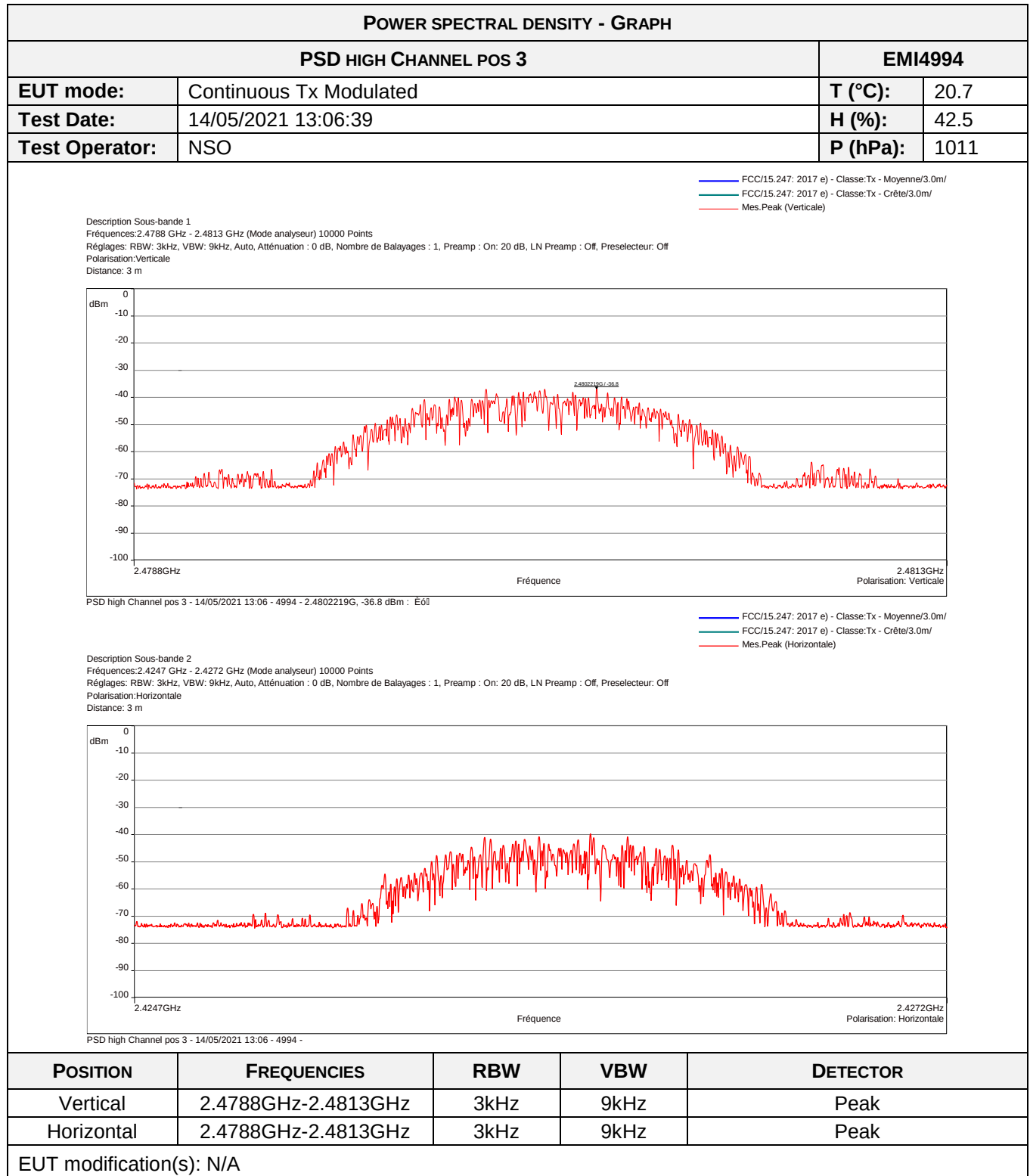




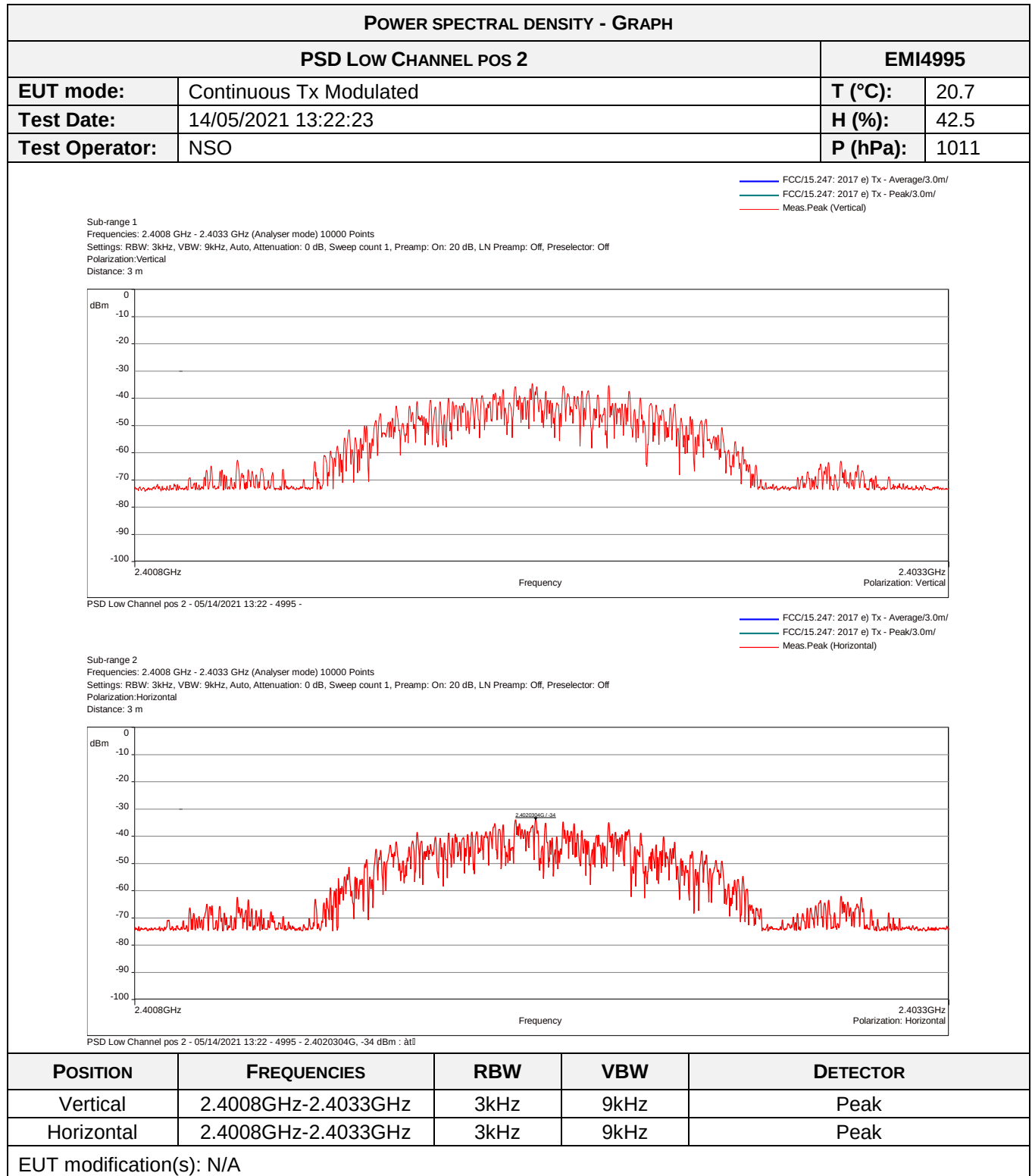
POWER SPECTRAL DENSITY - TABULATED RESULTS			
LOW CHANNEL POS 3			EMI4992
U _{Start} (start of the test):	3.6Vdc	U _{End} (end of the test):	3.6Vdc
Voltage drop:	0%	Limit:	+/- 5%
Frequency (MHz)	Polarization	Level (dBm/3kHz)	Limit (dBm/3kHz)
2402.0201	Vertical	-35.6	<8



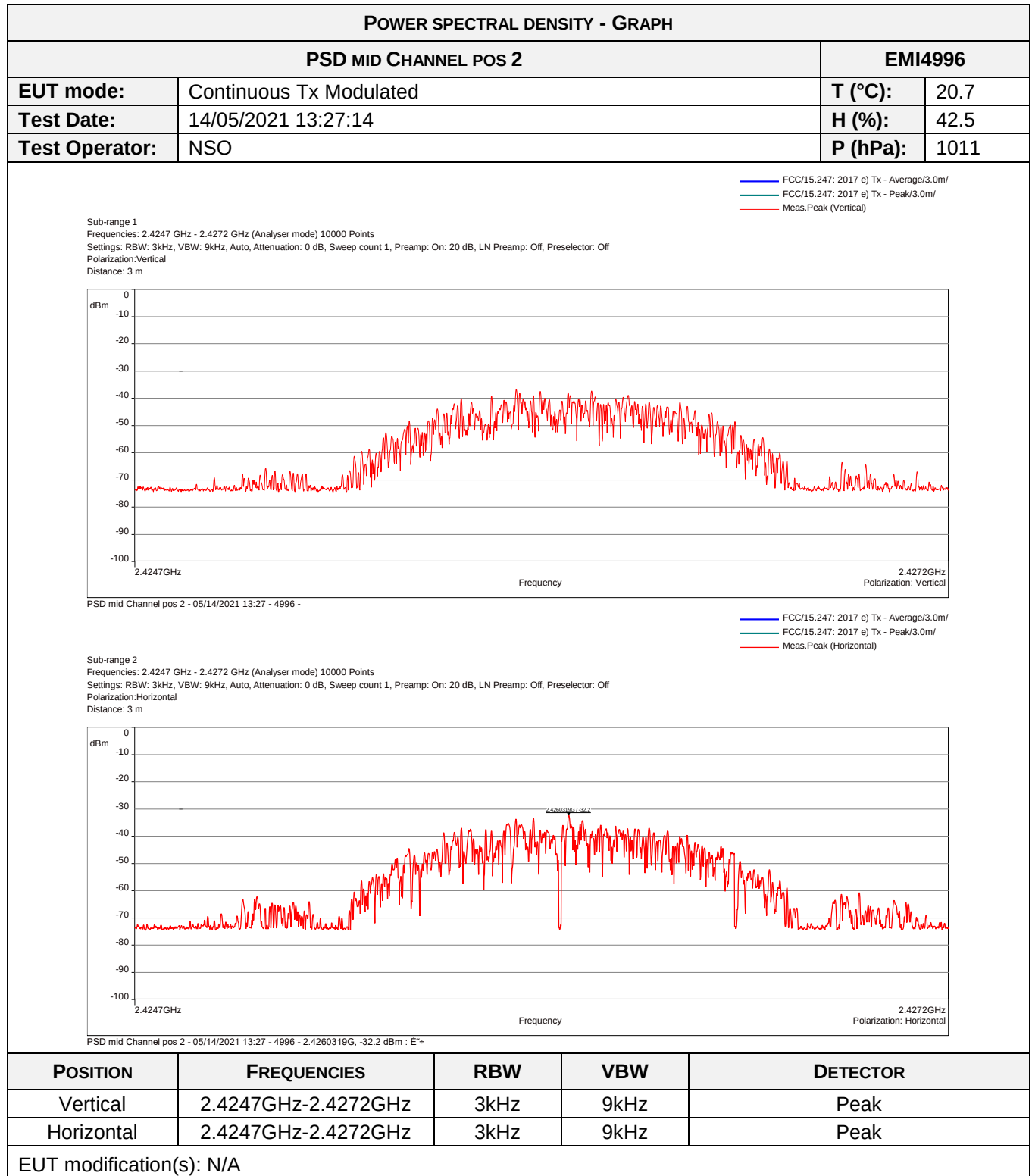
POWER SPECTRAL DENSITY - TABULATED RESULTS			
PSD MID CHANNEL POS 3			EMI4993
U _{Start} (start of the test):	3.6Vdc	U _{End} (end of the test):	3.6Vdc
Voltage drop:	0%	Limit:	+/- 5%
Frequency (MHz)	Polarization	Level (dBm/3kHz)	Limit (dBm/3kHz)
2426.0316	Vertical	-34	<8



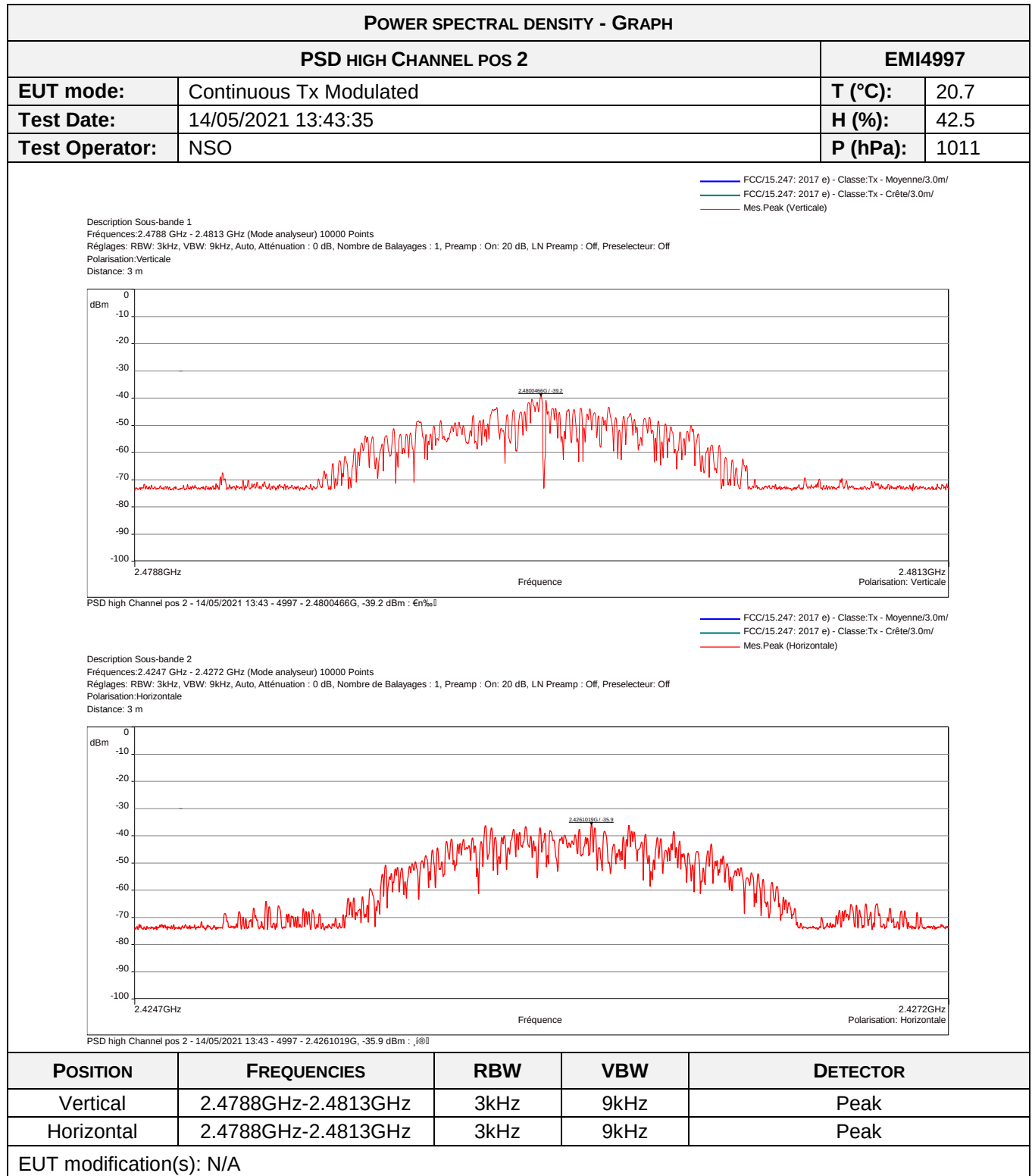
POWER SPECTRAL DENSITY - TABULATED RESULTS			
PSD HIGH CHANNEL POS 3			EMI4994
U _{Start} (start of the test):	3.6Vdc	U _{End} (end of the test):	3.6Vdc
Voltage drop:	0%	Limit:	+/- 5%
Frequency (MHz)	Polarization	Level (dBm/3kHz)	Limit (dBm/3kHz)
2480.2219	Vertical	-36.8	<8



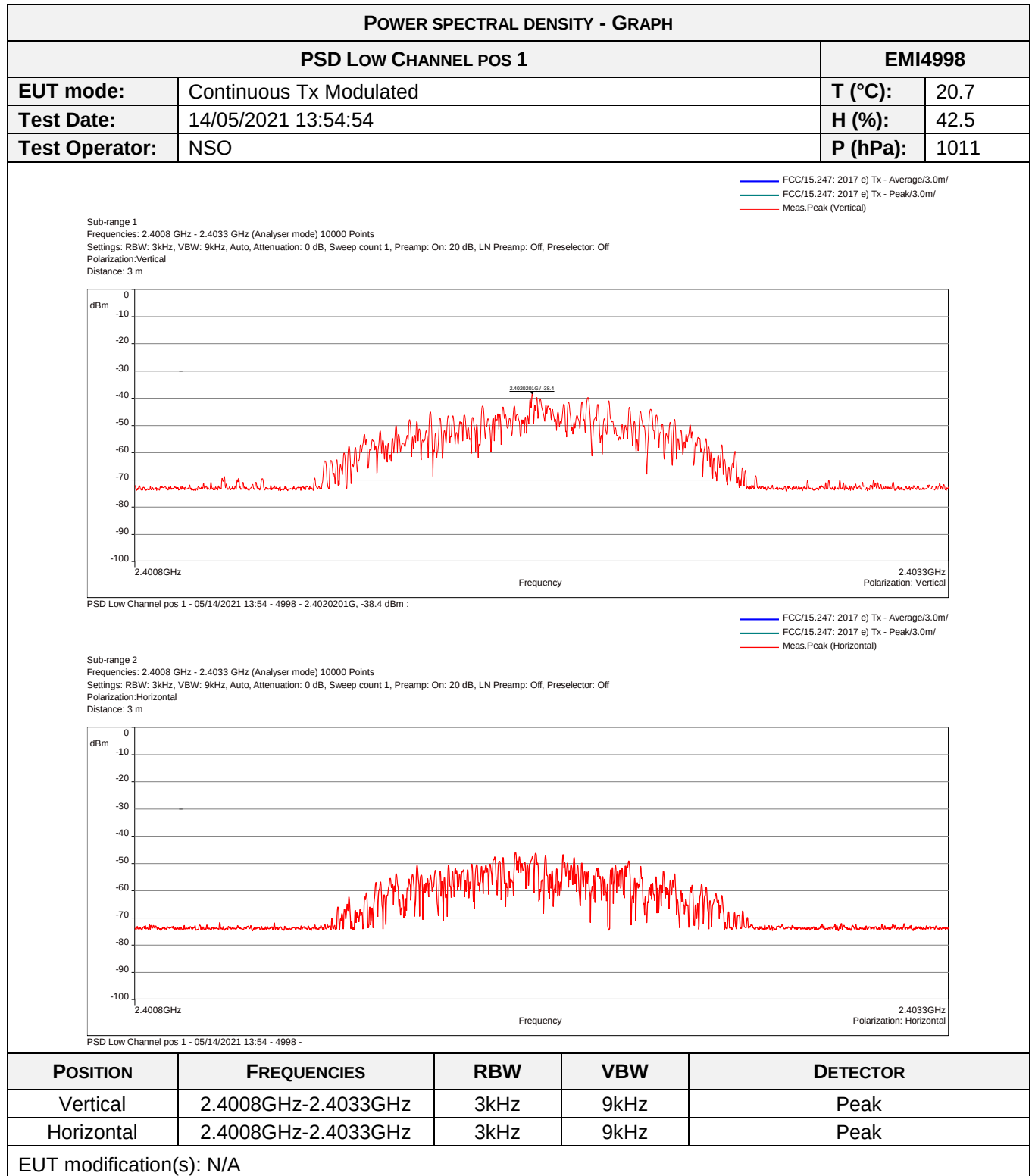
POWER SPECTRAL DENSITY - TABULATED RESULTS			
PSD Low CHANNEL POS 2			EMI4995
U _{Start} (start of the test):	3.6Vdc	U _{End} (end of the test):	3.6Vdc
Voltage drop:	0%	Limit:	+/- 5%
Frequency (MHz)	Polarization	Level (dBm/3kHz)	Limit (dBm/3kHz)
2402.0304	Horizontal	-34	<8



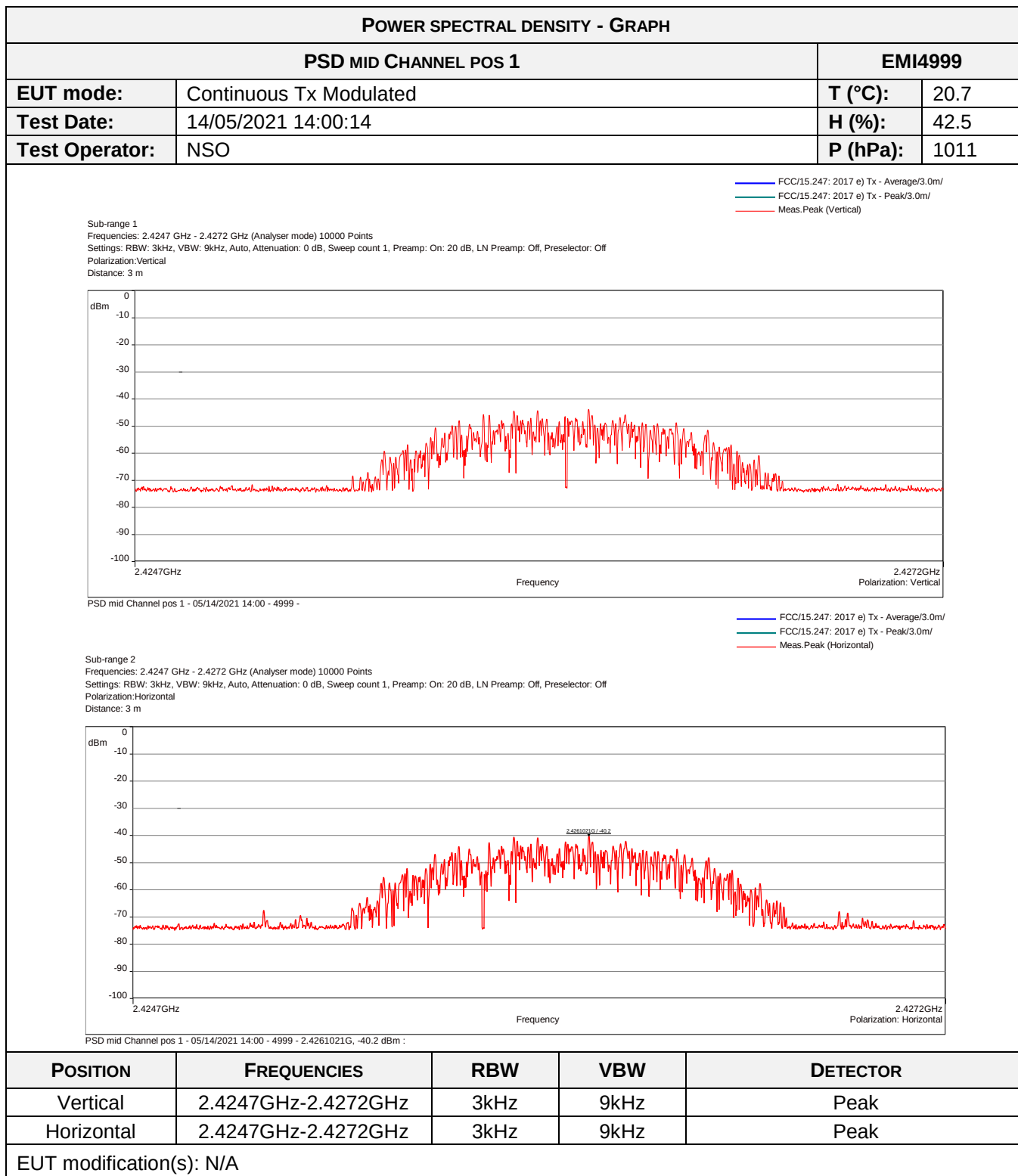
POWER SPECTRAL DENSITY - TABULATED RESULTS			
PSD MID CHANNEL POS 2			EMI4996
U _{Start} (start of the test):	3.6Vdc	U _{End} (end of the test):	3.6Vdc
Voltage drop:	0%	Limit:	+/- 5%
Frequency (MHz)	Polarization	Level (dBm/3kHz)	Limit (dBm/3kHz)
2426.0319	Horizontal	-32.2	<8



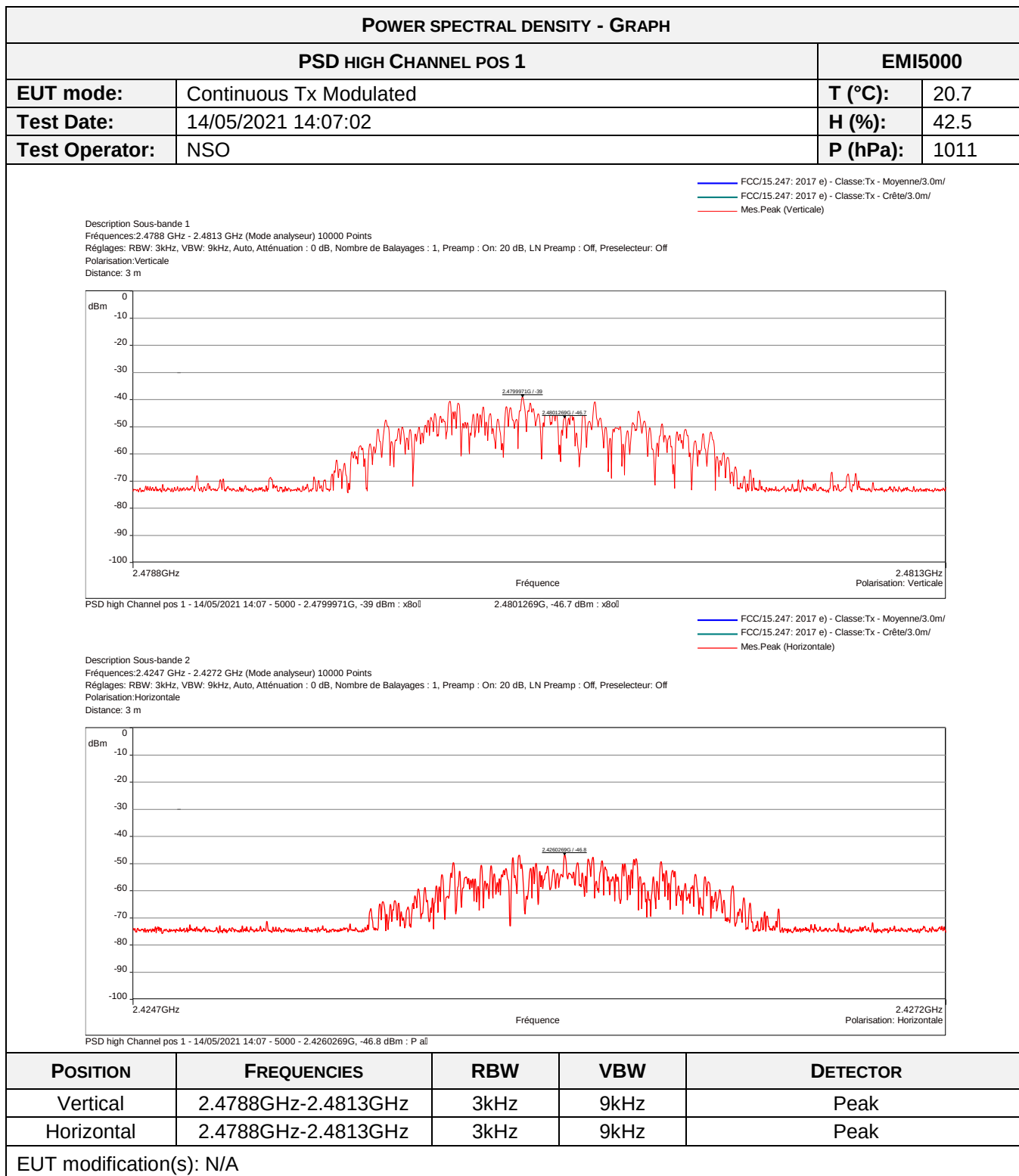
POWER SPECTRAL DENSITY - TABULATED RESULTS			
PSD HIGH CHANNEL POS 2			EMI4997
U _{Start} (start of the test):	3.6Vdc	U _{End} (end of the test):	3.6Vdc
Voltage drop:	0%	Limit:	+/- 5%
Frequency (MHz)	Polarization	Level (dBm/3kHz)	Limit (dBm/3kHz)
2480.2121	Horizontal	-35.9	<8



POWER SPECTRAL DENSITY - TABULATED RESULTS			
PSD Low CHANNEL POS 1			EMI4998
U _{Start} (start of the test):	3.6Vdc	U _{End} (end of the test):	3.6Vdc
Voltage drop:	0%	Limit:	+/- 5%
Frequency (MHz)	Polarization	Level (dBm/3kHz)	Limit (dBm/3kHz)
2402.0201	Vertical	-38.4	<8



POWER SPECTRAL DENSITY - TABULATED RESULTS			
PSD MID CHANNEL POS 1			EMI4999
U _{Start} (start of the test):	3.6Vdc	U _{End} (end of the test):	3.6Vdc
Voltage drop:	0%	Limit:	+/- 5%
Frequency (MHz)	Polarization	Level (dBm/3kHz)	Limit (dBm/3kHz)
2426.1021	Horizontal	-40.2	<8



POWER SPECTRAL DENSITY - TABULATED RESULTS			
PSD HIGH CHANNEL POS 1			EMI5000
U _{Start} (start of the test):	3.6Vdc	U _{End} (end of the test):	3.6Vdc
Voltage drop:	0%	Limit:	+/- 5%
Frequency (MHz)	Polarization	Level (dBm/3kHz)	Limit (dBm/3kHz)
2479.9971	Vertical	-39	<8

7.6. Frequency drift

Reference standard:	FCC part 15 Radio part 15.247 and RSS-247
Test method:	FCC part 15.247 and RSS-247
Test description: Frequency drift is the difference between the measured unmodulated carrier frequency under extreme conditions and the nominal Centre Frequency as stated by the manufacturer. EUT is set inside the climatic enclosure and is Measured with a proximity antenna. The measurements are carried out relative to the EIRP measurment. RBW=300Hz	

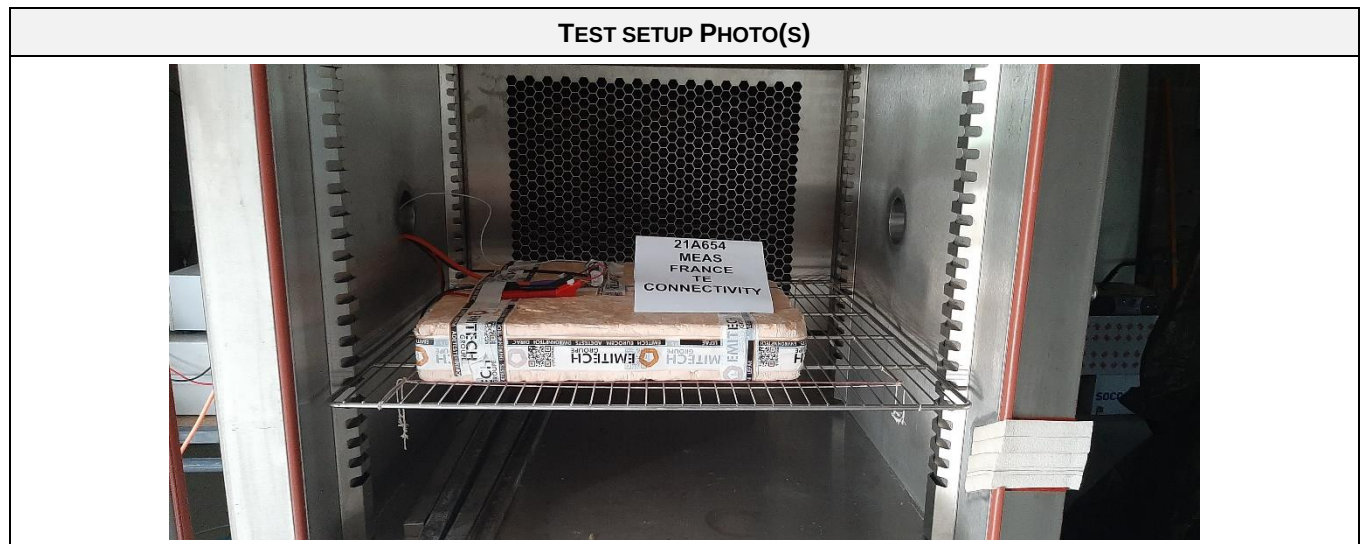
TEST CASE	EUT MODE	SEVERITY	RESULT TAB.	VERDICT
Low channel / 25°C/ 3.6Vdc	Continuous Tx	-	EMI5056	PASS
Low channel / 25°C/ 2.8Vdc	Continuous Tx	-	EMI5057	PASS
Mid channel / 25°C/ 3.6Vdc	Continuous Tx	-	EMI5058	PASS
Mid channel / 25°C/ 2.8Vdc	Continuous Tx	-	EMI5059	PASS
High channel / 25°C/ 3.6Vdc	Continuous Tx	-	EMI5060	PASS
High channel / 25°C/ 2.8Vdc	Continuous Tx	-	EMI5061	PASS
Low channel / -40°C/ 3.6Vdc	Continuous Tx	-	EMI5062	PASS
Low channel / -40°C/ 2.8Vdc	Continuous Tx	-	EMI5063	PASS
Mid channel / -40°C/ 3.6Vdc	Continuous Tx	-	EMI5064	PASS
Mid channel / -40°C/ 2.8Vdc	Continuous Tx	-	EMI5065	PASS
High channel / -40°C/ 3.6Vdc	Continuous Tx	-	EMI5066	PASS
High channel / -40°C/ 2.8Vdc	Continuous Tx	-	EMI5067	PASS
Low channel / +80°C/ 3.6Vdc	Continuous Tx	-	EMI5068	PASS
Low channel / +80°C/ 2.8Vdc	Continuous Tx	-	EMI5069	PASS
Mid channel / +80°C/ 3.6Vdc	Continuous Tx	-	EMI5070	PASS
Mid channel / +80°C/ 2.8Vdc	Continuous Tx	-	EMI5071	PASS
High channel / +80°C/ 3.6Vdc	Continuous Tx	-	EMI5072	PASS
High channel / +80°C/ 2.8Vdc	Continuous Tx	-	EMI5073	PASS

LABORATORY PARAMETERS:	REQUIRED PRIOR TO THE TEST	DURING THE TEST
Ambient Temperature	15 to 35 °C	20 °C
Relative Humidity	20 to 75 %	42.5 %
Atmospheric pressure	N/A	1011 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	Techniwave	TWSMA-10dB-18G-SMA	14672	28/12/2019	28/02/2023
Cable	MegaPhase	TM8S1S179	16653	30/10/2019	30/12/2021
Climatic enclosure	CLIMATS	EXCAL 7714-HA	14261	19/09/2019	19/11/2021
Multimeter	Keithley	2010	6094	30/05/2019	30/07/2021
Power supply	TTI	PL303QMD	8496		
Spectrum analyzer	Agilent Technologies	E4440A	5824	22/10/2020	22/12/2022

CATEGORY	BRAND	TYPE	IDENTIFIER	CAL. DATE	CAL. DUE
Thermohygrometer	Testo	608-H2	12268	07/05/2020	07/07/2022
Thermohygrometer	Testo	608-H2	12269	07/05/2020	07/07/2022
Thermometer contactless	GHM Greisinger	GMH 3710	12968	19/05/2021	19/07/2022

Blank cells = Permanent validity



FREQUENCY ERROR - TABULATED RESULTS				
TEST CASE	FREQUENCY	FREQUENCY ERROR	LIMIT	RESULT TAB.
Low channel / 25°C/ 3.6Vdc	2401.783000 MHz	16000 Hz	2400MHz-2483.5MHz	EMI5056
Low channel / 25°C/ 2.8Vdc	2401.783000 MHz	16000 Hz	2400MHz-2483.5MHz	EMI5057
Mid channel / 25°C/ 3.6Vdc	2425.800000 MHz	33000 Hz	2400MHz-2483.5MHz	EMI5058
Mid channel / 25°C/ 2.8Vdc	2425.783000 MHz	16000 Hz	2400MHz-2483.5MHz	EMI5059
High channel / 25°C/ 3.6Vdc	2479.767000 MHz	-16000 Hz	2400MHz-2483.5MHz	EMI5060
High channel / 25°C/ 2.8Vdc	2479.800000 MHz	17000 Hz	2400MHz-2483.5MHz	EMI5061
Low channel / -40°C/ 3.6Vdc	2401.783000 MHz	16000 Hz	2400MHz-2483.5MHz	EMI5062
Low channel / -40°C/ 2.8Vdc	2401.783000 MHz	16000 Hz	2400MHz-2483.5MHz	EMI5063
Mid channel / -40°C/ 3.6Vdc	2425.800000 MHz	33000 Hz	2400MHz-2483.5MHz	EMI5064
Mid channel / -40°C/ 2.8Vdc	2425.783000 MHz	16000 Hz	2400MHz-2483.5MHz	EMI5065
High channel / -40°C/ 3.6Vdc	2479.767000 MHz	-16000 Hz	2400MHz-2483.5MHz	EMI5066
High channel / -40°C/ 2.8Vdc	2479.800000 MHz	17000 Hz	2400MHz-2483.5MHz	EMI5067
Low channel / +80°C/ 3.6Vdc	2401.783000 MHz	16000 Hz	2400MHz-2483.5MHz	EMI5068
Low channel / +80°C/ 2.8Vdc	2401.783000 MHz	16000 Hz	2400MHz-2483.5MHz	EMI5069
Mid channel / +80°C/ 3.6Vdc	2425.800000 MHz	33000 Hz	2400MHz-2483.5MHz	EMI5070
Mid channel / +80°C/ 2.8Vdc	2425.783000 MHz	16000 Hz	2400MHz-2483.5MHz	EMI5071
High channel / +80°C/ 3.6Vdc	2479.767000 MHz	-16000 Hz	2400MHz-2483.5MHz	EMI5072
High channel / +80°C/ 2.8Vdc	2479.800000 MHz	17000 Hz	2400MHz-2483.5MHz	EMI5073

EUT MODIFICATIONS	OPERATOR	TEST DATE	RESULT TAB.
N/A	NSO	19/05/2021	All

7.7. Radiated spurious emissions

Reference standard:	FCC part 15 Radio part 15.247 and RSS-247
Test method:	FCC part 15.109, 15.209, 15.205, 15.215 RSS-247, CNR Gen
Test description: 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
0° - All positions	9kHz-30MHz	15.209	EMI5002	PASS
45° - All positions	9kHz-30MHz	15.209	EMI5003	PASS
90° - All positions	9kHz-30MHz	15.209	EMI5004	PASS
Tx mode / All Frequencies / All Positions	30MHz-1GHz	15.209	EMI4990	PASS
Tx mode / All Frequencies / All Positions	1GHz-18GHz	15.209	EMI4991	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: 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					
CATEGORY	BRAND	TYPE	IDENTIFIER	CAL. DATE	CAL. DUE
Antenna	ETS-Lindgren	3117	8387	24/07/2019	24/09/2022
Antenna	Electro Metrics	BIA-30HF	0824	13/06/2018	13/08/2021
Antenna	Rohde & Schwarz	HFH2-Z2	5825	24/04/2020	24/06/2022
Antenna	Rohde & Schwarz	HL223	3126	13/06/2018	13/08/2021
Cable	MegaPhase	F135N1N28	16664	25/10/2019	25/12/2021

CATEGORY	BRAND	TYPE	IDENTIFIER	CAL. DATE	CAL. DUE
Cable	MegaPhase	F135N1N28	16666	25/10/2019	25/12/2021
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-5,5m	14381	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	16042	24/03/2021	24/05/2023
Cable	MegaPhase	TM18-N1N1-118	12841	14/08/2020	14/10/2022
Preamplifier	Techniwave	APS16-0087	14040	02/12/2020	02/02/2022
Receiver	Rohde & Schwarz	ESW26	17791		
Receiver	Rohde & Schwarz	FSW43	14830	29/07/2020	29/09/2021
Shielded enclosure	RAY PROOF	C.V1	1123	16/06/2018	16/08/2021
Shielded enclosure	COMTEST	SAC 3m	14494	02/10/2019	02/12/2022
Software	Nexio		0000		
Thermohygrometer	Testo	608-H1	7561	26/01/2019	26/09/2021
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 PHOTOS – 9kHz - 30MHz



TEST SETUP PHOTOS – 30MHz - 200MHz



TEST SETUP PHOTOS – 200MHz – 1GHz



TEST SETUP PHOTOS >1GHz



TEST SETUP PHOTOS - POSITION 1

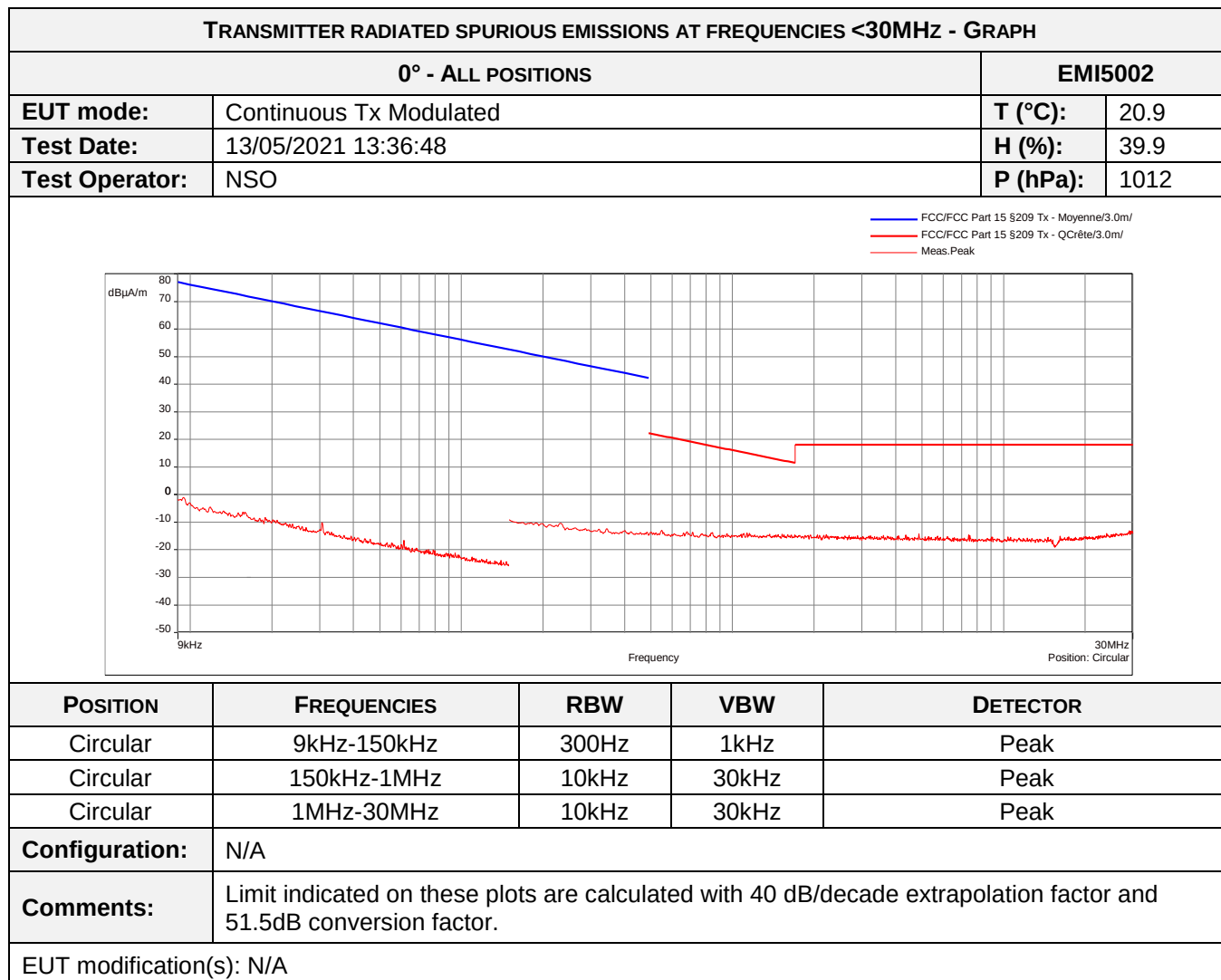


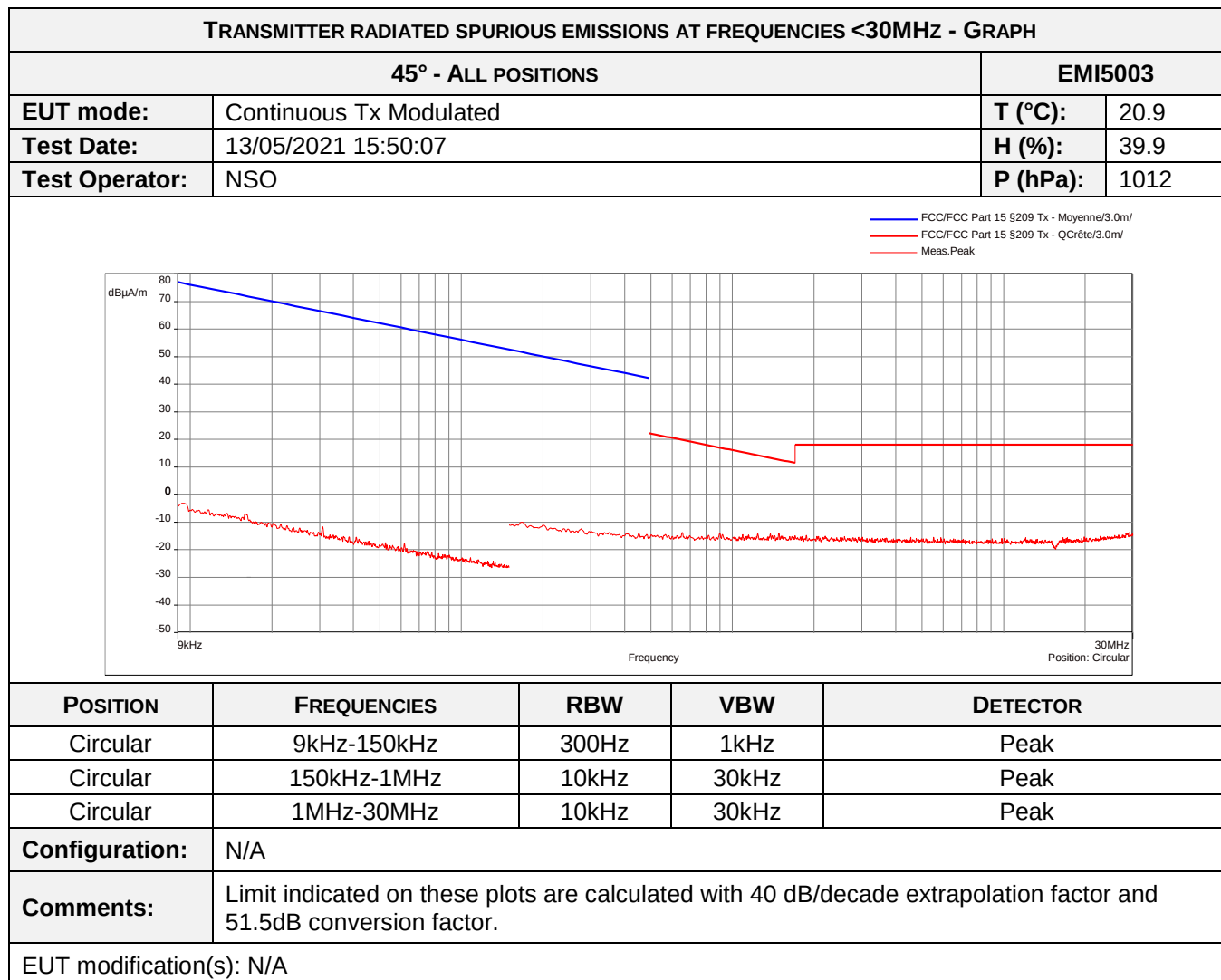
TEST SETUP PHOTOS - POSITION 2

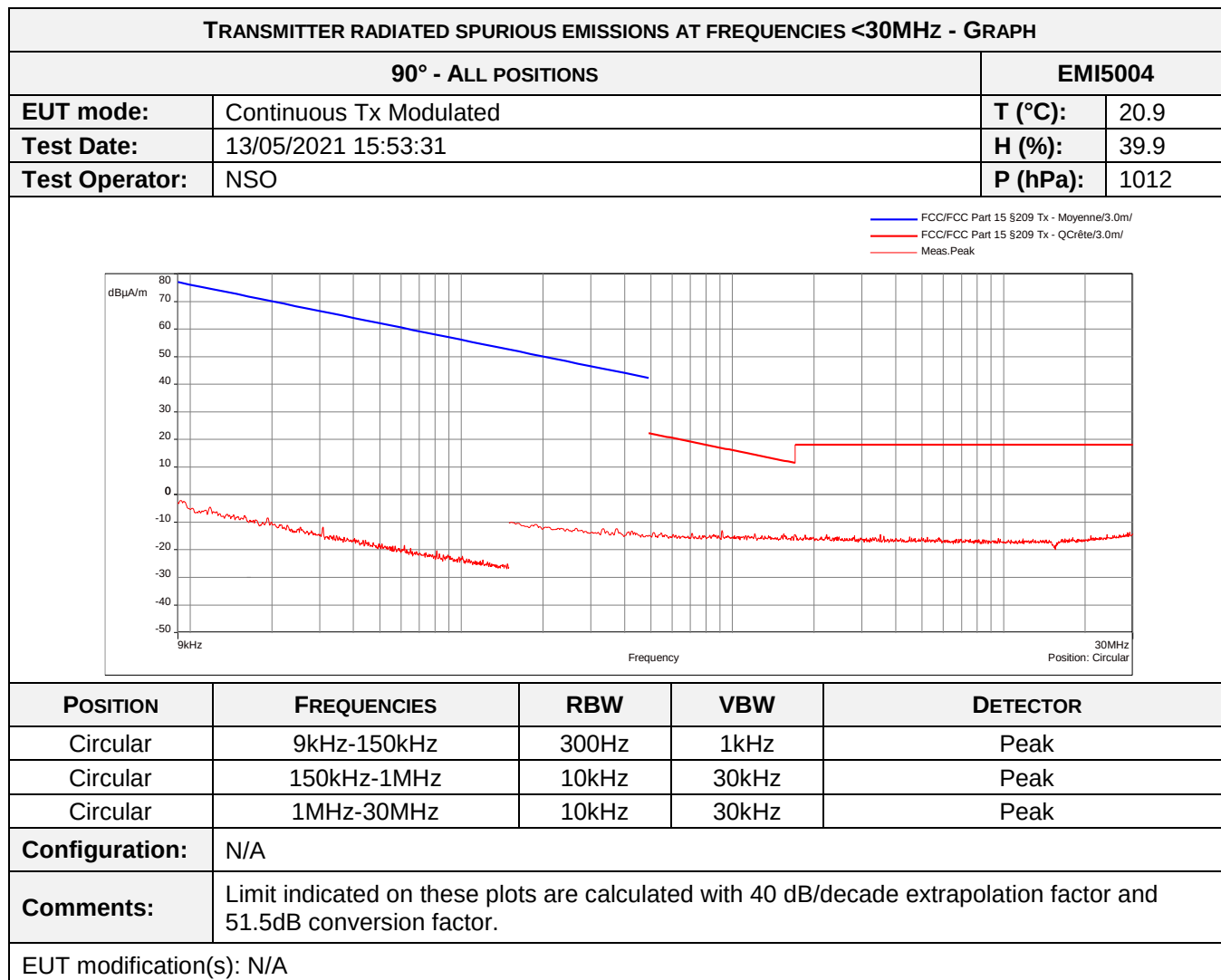


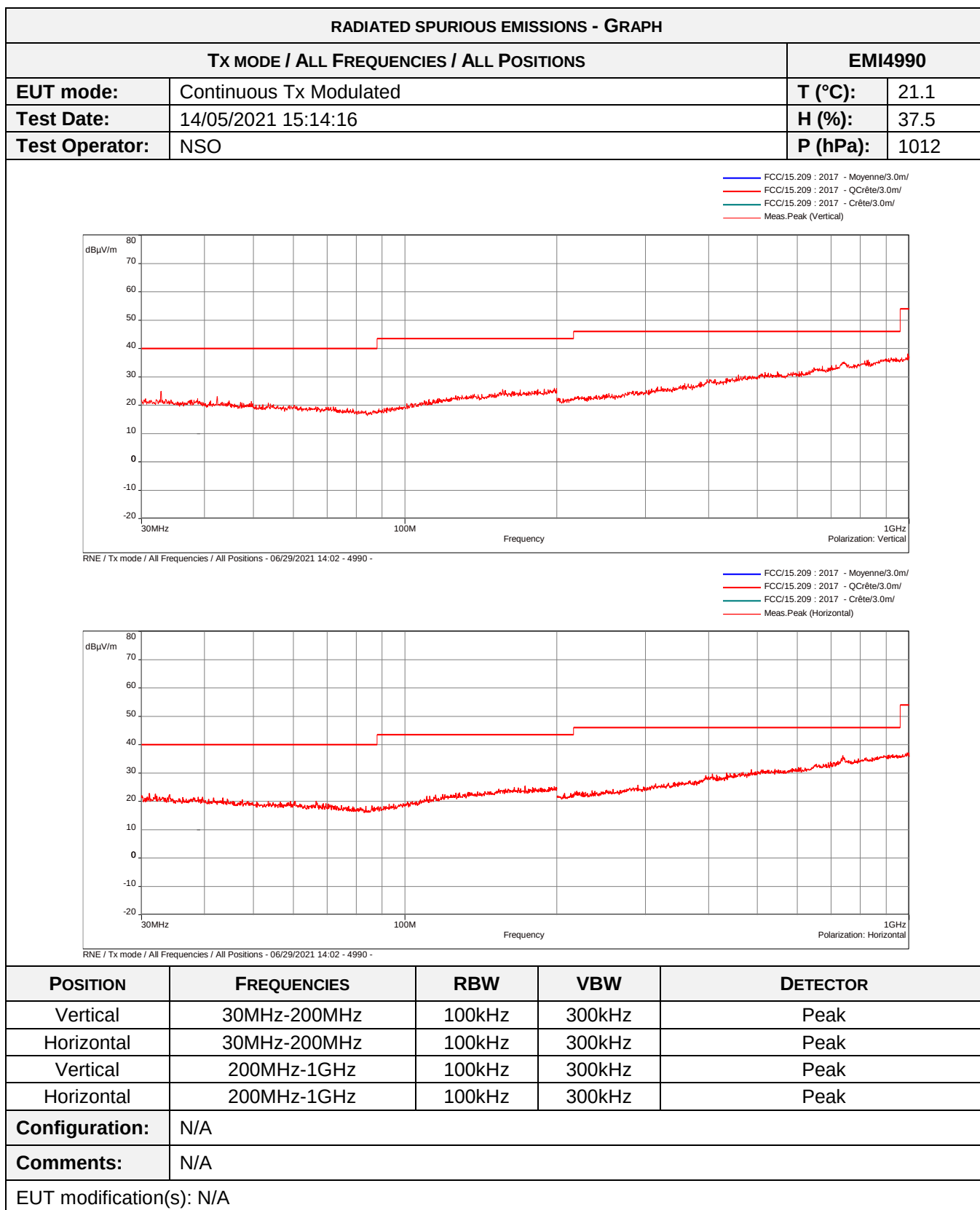
TEST SETUP PHOTOS - POSITION 3

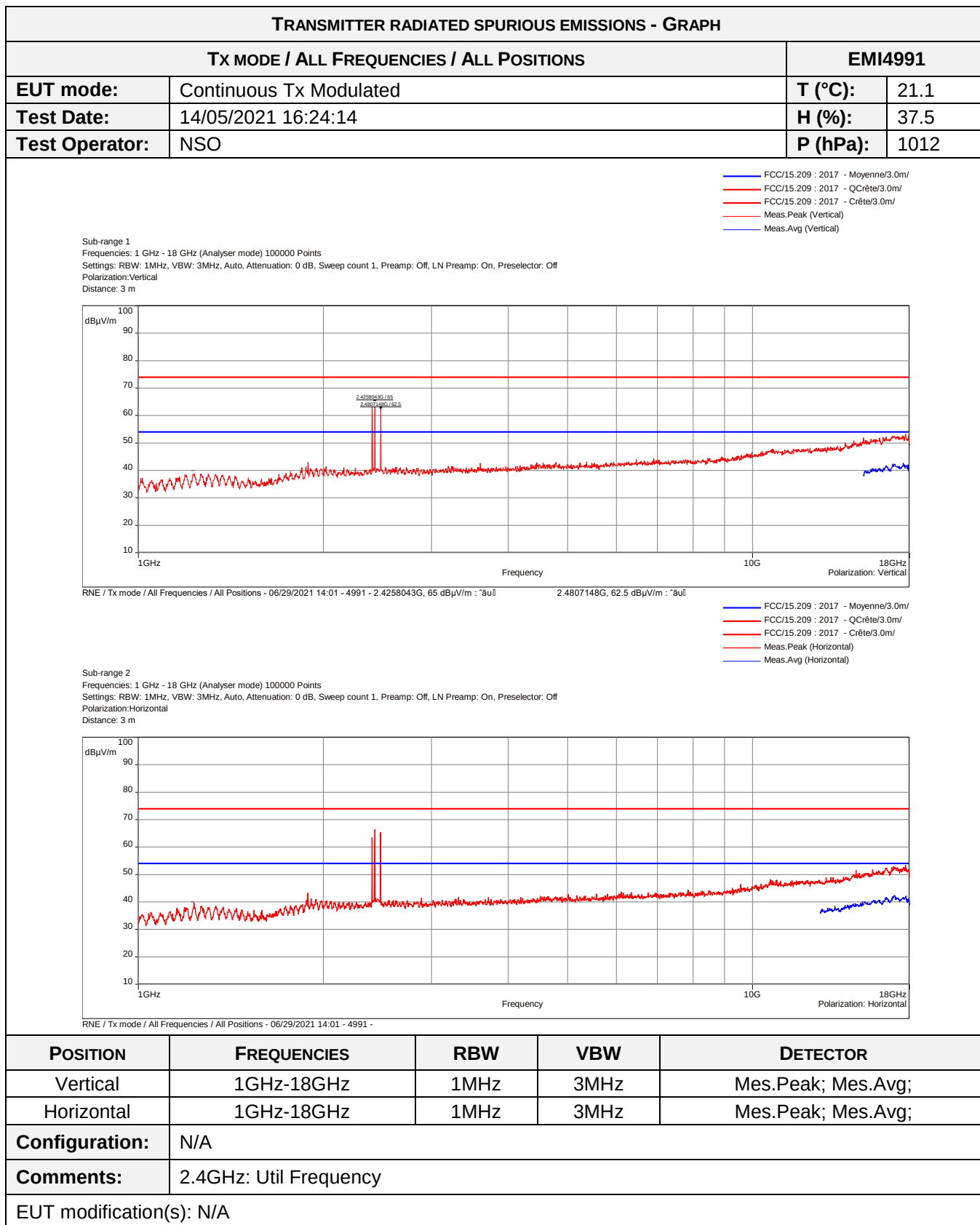












TRANSMITTER RADIATED SPURIOUS EMISSIONS AT FREQUENCIES - TABULATED RESULTS			
RNE / Tx MODE / ALL FREQUENCIES / ALL POSITIONS			EMI4991
U _{Start} (start of the test):	3.6Vdc	U _{End} (end of the test):	3.6Vdc
Voltage drop:	0%	Limit:	+/- 5%
Frequency	Polarization	Level	Limit
30.63 kHz	0°	-10.18 dBμA/m (Peak)	66.38 dBμA/m (QPeak)
4.86 MHz	0°	-14.18 dBμA/m (Peak)	18.04 dBμA/m (QPeak)
30.80 kHz	45°	-11.71 dBμA/m (Peak)	66.33 dBμA/m (QPeak)
1.23 MHz	45°	-13.99 dBμA/m (Peak)	14.25 dBμA/m (QPeak)
153.06 kHz	90°	-10.048 dBμA/m (Peak)	52.40 dBμA/m (QPeak)
915.84 kHz	90°	-13.06 dBμA/m (Peak)	16.86 dBμA/m (QPeak)
32.78 MHz	Vertical	24.97 dBμV/m (Peak)	40 dBμV/m (QPeak)
197.81 MHz	Vertical	26.01 dBμV/m (Peak)	43.5 dBμV/m (QPeak)
825.07 MHz	Vertical	35.89 dBμV/m (Peak)	46 dBμV/m (QPeak)
34.12 MHz	Horizontal	22.44 dBμV/m (Peak)	40 dBμV/m (QPeak)
172.98 MHz	Horizontal	25.45 dBμV/m (Peak)	43.5 dBμV/m (QPeak)
738.56 MHz	Horizontal	36.23 dBμV/m (Peak)	46 dBμV/m (QPeak)
1889.78 MHz	Vertical	42.99 dBμV/m (Peak)	74 dBμV/m (Peak)
3604.25 MHz	Vertical	42.66 dBμV/m (Peak)	74 dBμV/m (Peak)
17.59 GHz	Vertical	42.75 dBμV/m (Average)	54 dBμV/m (Average)
1886.72 MHz	Horizontal	43.29 dBμV/m (Peak)	74 dBμV/m (Peak)
6108.04 MHz	Horizontal	43.74 dBμV/m (Peak)	74 dBμV/m (Peak)
17.00 GHz	Horizontal	42.33 dBμV/m (Average)	54 dBμV/m (Average)

End of test report