



Test report issued under the responsibility of:
EMITECH ILE DE FRANCE Laboratory
MRA US-EU Designation Number: FR0004
IC Assigned Code: 4379A

RADIO TEST REPORT

FCC 47 CFR PART 15 : 2023 (§15.247)
RSS-247_Issue 2 : 2017
RSS-Gen_Issue 5 : 2018 / AMD1: 2019 / AMD2: 2021

Company : **DAVEY BICKFORD**
Address..... : Le Moulin Gaspard
Chemin de la Pyrotechnie
89550 HERY France

Test item description. : **EDGE MODULE**
Trade Mark. : *DaveyTronic Edge*
Manufacturer..... : *Davey Bickford SAS*
Model/Type reference..... : *Not communicated*
Ratings..... : *1.8 Vdc to 3 Vdc (battery)*

Testing Laboratory : **EMITECH ILE DE France Laboratory**
Address..... : 30-32, avenue des 3 Peuples
78180 MONTIGNY LE BRETONNEUX
FRANCE

Report Reference No...... : **RRA-EMIESS23E175DAV-04A v0**
Test procedure. : FCC and CANADA marking
Diffusion..... : Mr LO
Applicant's name. : DAVEY BICKFORD
Date of issue..... : 27/11/2023
Total number of pages..... : 57
Revision. : v0
Modified pages. : Creation
Compiled by..... : F. LHEUREUX (Tests technician)

Technical verification. :

Quality approval..... :

Certain services reported in this document are not covered by the accreditation. They are identified by the symbol (*)

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
v0	27/11/2023	/	Creation

1. GENERAL INFORMATIONS

This document submits the results of Radio tests performed on the equipment (denominated hereafter E.U.T.: equipment under test) according to documents listed in §2 of this test report.

TESTING PROCEDURE AND TESTING LOCATION:			
Testing Laboratory	EMITECH ILE DE France Laboratory		
Address.	30-32, avenue des 3 Peuples 78180 MONTIGNY LE BRETONNEUX FRANCE		
Test procedure.	FCC and CANADA marking		
Tested by	F. LHEUREUX / L. CHEVALIER		
Test supervisor	P. PELLERIN		
Date of receipt of test item	02/11/2023		
Dates of performance of tests	From the 02/11/2023 to 17/11/2023		
APPLICANT'S GENERAL INFORMATIONS:			
Company name	DAVEY BICKFORD		
Company address.	<i>Le Moulin Gaspard Chemin de la Pyrotechnie 89550 HERY France</i>		
Person present during the tests.	Mr LELANDAIS		
Responsible.....	Mr LO		
GENERAL REMARKS:			
<p>The test results presented in this report relate only to the object tested. The results contained in this report reflect the results for this particular model and serial number. It is the responsibility of the manufacturer to ensure that all production models meet the intent of the requirements detailed within this report.</p> <p>This report shall not be reproduced, except in full, without the written approval of the Issuing testing laboratory. "(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.</p>			
POSSIBLE TEST CASE VERDICTS:			
Test case does not apply to the test object. :	N/A		
Test case not performed.....	N/P		
Test object does meet the requirement.....	P (Pass)		
Test object does not meet the requirement. :	F (Fail)		
Test object was not subjected to all tests....	I (Inconclusive)		
DEFINITIONS AND ABBREVIATIONS:			
E.U.T.	Equipment under test	AE	Auxiliary / Associated equipment
RBW	Resolution bandwidth	VBW	Video bandwidth
OATS	Open area test site	FAR	Full anechoic room
RF	Radio frequency	NTR	Nothing to report

2. REFERENCE DOCUMENTS

NORMATIVE REFERENCES:

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

FCC 47 CFR Part 15 : 2023

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.

RSS-247 Issue 2 : 2017

Digital Transmission Systems (DTSs), Frequency Hopping Systems (FHSs) and Licence-Exempt Local Area Network (LE-LAN) Devices

RSS-Gen_Issue 5 : 2018 / AMD1: 2019 / AMD2: 2021

General Requirements and Information for the Certification of Radio Apparatus.

ANSI C63.4 : 2014

Methods of Measurement of Radio-Noise Emissions from Low Voltage Electrical and Electronics Equipment in the range of 9 kHz to 40 GHz.

KDB 558074 D01 DTS Meas Guidance V05 r02

Guidance for performing compliance measurement on Digital Transmission Systems (DTS) operating under § 15.247.

ANSI C63.10 : 2013

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

INFORMATIVE REFERENCE:

/

3. EQUIPMENT TECHNICAL DESCRIPTION

3.1. Test Conditions

Test item description. : *EDGE MODULE*
Model/Type reference..... : *Not communicated*
Trade Mark. : *DaveyTronic Edge*
Serial number (S/N)..... : *E1 1023 0784 (for Tx at 915.062 MHz)*
E1 1023 1376 (for Tx at 918.062 MHz)
E1 1023 0785 (for Tx at 919.187 MHz)
13EDGE010203P1S233300509 (for "Sleeping radio")
Part number (P/N). : *No Part number on the EUT*
Software version..... : *V.0.2.11*
Firmware version..... : *V.0.2.11*
Fcc ID : *2AUQC-EDGEMOD*
N°IC : *25586-EDGEMOD*
Type of sample..... : *Pre-serial*
Functions. : *Surface module connected to a pyrotechnic detonator*
Manufacturer name. : *Davey Bickford SAS*
Address. : *Chemin de la Pyrotechnie*
Le Moulin Gaspard
89550 HERY France

General product information:

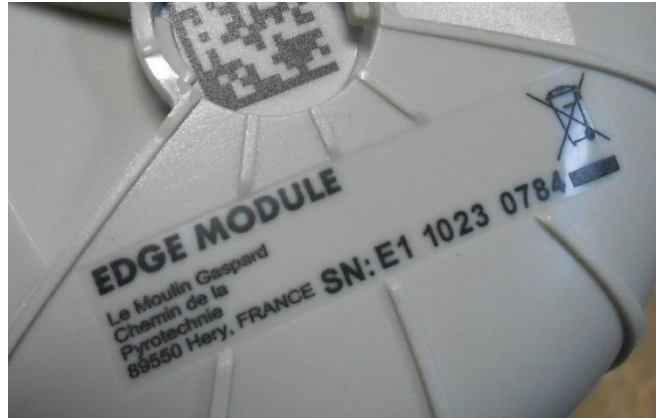
N/A

3.2.EUT Overview





3.3.EUT Marking Plate



3.4. Electronic board

No photograph

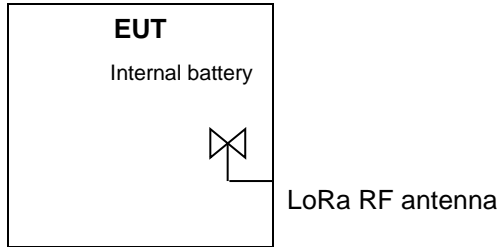
3.5. EUT Mechanical and Electrical Design

Power supply : *3.0 Vdc (battery)*
Power supply range..... : *1.8 Vdc to 3 Vdc (battery)*
Power type..... : *DC (2 batteries of 1.5 Vdc)*
Power (W)..... : *0.3*
Nominal current (A). : *0.1*
Dimensions (L x W x H) (mm). : *73 x 73 x 110*
Weight (g)..... : *5*
Temperature range (°C). : *-20 to +60*
Ground bounding strap..... : *No*

Comments: -**3.6. Auxiliary equipment**

No auxiliary equipment

3.7. EUT Input/Output ports



PORT	NAME	TYPE	LENGHT	CABLE TYPE	COMMENTS
0	Main frame	N/E	-	-	-
1	LoRa RF antenna	RF	-	-	Internal antenna

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

3.8. EUT Radio Specifications

a) GENERAL INFORMATIONS	
According to manufacturer's declarations :	
EUT type.....	<i>Transceiver</i>
Technology	<i>SRD (LoRa technology)</i>
Environmental profile.....	<i>Heavy industry</i>
Temperature range.....	<i>Low extremes conditions: -20°C</i> <i>High extremes conditions: +60°C</i>
Antenna type	<i>Dedicated</i>
Antenna Gain.....	<i>-1.64 dBi</i>
Comments:	
- The "LoRa" radio module is used as a hybrid system.	
b) TRANSMITTER PARAMITERS (Tx)	
Frequency bands.....	<i>915 - 928 MHz</i>
RF Power.....	<i>+14 dBm</i>
Number of channels / Separation.....	<i>8 / 125 kHz</i>
Modulation type	<i>LoRa</i>
Duty cycle	<i>Not communicated</i>
Frequency plan.....	<i>915.062 MHz</i> <i>915.437 MHz</i> <i>915.812 MHz</i> <i>916.187 MHz</i> <i>918.062 MHz</i> <i>918.437 MHz</i> <i>918.812 MHz</i> <i>919.187 MHz</i>
Tested frequency.....	<i>Lowest channel : 915.062 MHz</i> <i>Middle channel : 918.062 MHz</i> <i>Highest channel : 919.187 MHz</i>
c) RECEIVER PARAMETERS (Rx)	
Frequency bands.....	<i>915 - 928 MHz</i>
Category/Class	<i>Not communicated</i>
Bandwidth.....	<i>125 kHz</i>

4. RESULT SUMMARY

Subpart B of the standard FCC part 15 – Unintentional radiators

TEST DESIGNATION	TEST PROCEDURE	VERDICT	COMMENTS
Measurement of conducted emission on AC mains ports	15.107	N/A	
Radiated emission limits	15.109	PASS	

Subpart C of the standard FCC part 15 – Intentional radiators

TEST DESIGNATION	TEST PROCEDURE	VERDICT	COMMENTS
Restriction bands of operation	15.205	PASS	
Measurement of conducted emission on AC mains ports	15.207	N/A	
Radiated emission limits; general requirements	15.209	PASS	
Additional provision to the general radiated emission limitations	15.215	-	
- (a) Alternative to general radiated emission limits		N/A	
- (b) Unwanted emissions outside of § 15.247 frequency bands	-	N/A	
- (c) 20 dB bandwidth and band-edge compliance		PASS	
Intentional radiated emissions	15.247	-	
- a) frequency hopping and digitally modulated	-	N/A	
- a) (1) hopping mode	-	N/A	
- a) (1) (i) frequency hopping in the band 902-928 MHz	-	PASS	
- a) (1) (ii) frequency hopping in the band 5725-5850 MHz	-	N/A	
- a) (1) (iii) frequency hopping in the band 2400-2483.5 MHz	-	N/A	
- a) (2) systems using digital modulation in the bands 902-928 MHz, 2400-2483.5 MHz, and 5725-5850 MHz (6 dB bandwidth)	-	N/A	
- b) maximum peak conducted	-	-	
- b) (1) frequency hopping in the bands 2400-2483.5 MHz or 5725-5850 MHz	-	N/A	
- b) (2) frequency hopping in the band 902-928 MHz	-	N/A	
- b) (3) systems using digital modulation in the bands 902-928 MHz, 2400-2483.5 MHz, and 5725-5850 MHz	-	PASS	
- b) (4) maximum peak conducted > 6 dBi	-	N/A	
- b) (4) (i) frequency hopping in the band 2400-2483.5 MHz	-	N/A	
- b) (4) (ii) frequency hopping in the band 5725-5850 MHz	-	N/A	
- b) (4) (iii) fixed, point-to-point	-	N/A	
- c) directional antenna > 6 dBi	-	N/A	
- c) (1) fixed, point-to-point operation	-	N/A	
- c) (1) (i) in the band 2400-2483.5 MHz	-	N/A	
- c) (1) (ii) in the band 5725-5850 MHz	-	N/A	
- c) (1) (iii) fixed, point-to-point	-	N/A	

TEST DESIGNATION	TEST PROCEDURE	VERDICT	COMMENTS
- c) (2) multiple directional beams in the band 2400–2483.5 MHz	-	N/A	
- c) (2) (i) information	-	N/A	
- c) (2) (ii) sum of the power supplied to all antennas	-	N/A	
- c) (2) (iii) one antenna for multiple directional beams	-	N/A	
- c) (2) (iv) single directional beam	-	N/A	
- d) intentional radiator	-	PASS	
- e) peak power spectral density	-	PASS	
- f) hybrid system	-	PASS	
- g) continuous data stream during the test	-	N/A	
- h) to avoid hopping on occupied channels	-	N/A	
- i) RF exposure compliance	-	N/A	P < 500 mW

Standard RSS-247 Issue 2 : 2017

TEST DESIGNATION	TEST PROCEDURE	VERDICT	COMMENTS
3. Certification Requirements	-	-	
- 3.1 RSS-gen compliance	-	N/A	
5.2 Digital Modulation Systems	-	-	
- (1) -6 dB bandwidth	-	N/A	
- (2) transmitter power spectral density	-	PASS	
5.4 Transmitter Output Power and e.i.r.p. Requirement	-	-	
- 1) 902-928 MHz frequency hopping systems output power / e.i.r.p.	-	N/A	
- 2) 2400-2483.5 MHz frequency hopping systems output power / e.i.r.p	-	N/A	
- 3) 5725-5850 MHz frequency hopping systems output power / e.i.r.p.	-	N/A	
- 4) Digital modulation systems output power / e.i.r.p.	-	PASS	
- 5) point-to-point systems (2400-2483.5 and 5725-5850 MHz)	-	N/A	
- 6) Multiple directional beams antenna systems (2400-2483.5 MHz)	-	N/A	
5.5 Unwanted emission	-	PASS	

Standard RSS-Gen Issue 5 : 2018 / AMD1: 2019 / AMD2: 2021

TEST DESIGNATION	TEST PROCEDURE	VERDICT	COMMENTS
6 Technical Requirements	-		
- 6.7 Occupied Bandwidth	-	PASS	
- 6.9 CISPR Quasi-peak detector	-	PASS	
- 6.12 Transmitter Output Power	-	PASS	
- 6.13 Transmitter unwanted emissions	-	PASS	
7.2 Measurement Methods and Standard Specifications	-	-	
- 7.2.1 Measurement Bandwidths and Detector Functions	-	N/A	
- 7.2.2 Emissions Falling Within Restricted Frequency Bands	-	N/A	
- 7.2.3 Devices Employing Pulsed Operation	-	N/A	
- 7.2.4 AC Power Line Conducted Emissions Limits	-	N/A	
- 7.2.5 Transmitter Spurious Emission Limits	-	N/A	
- 7.2.6 Transmitter Frequency Stability	-	N/A	
- 7.2.7 Measurement Distance	-	N/A	
8.Licence-Exempt radio Apparatus	-	-	
- 8.8 AC Power Line Conducted Emission Limits for licence-Exempt Radio Apparatus	-	N/A	

Sample subject to the test **complies** with the requirements of the reference document listed in §2 of this test report and, where applicable, with deviations 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.

Modifications : No

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	$\pm 0.8\text{dB}$	$\pm 1 \text{ dB}$
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 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 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	$\pm 5.4 \text{ dB}$	$\pm 6 \text{ dB}$
RF power (EN 300328 / EN 301893)	$\pm 5.3 \text{ dB}$	$\pm 6 \text{ dB}$
PIRE and power spectral density with diode	$\pm 5.4 \text{ dB}$	$\pm 6 \text{ dB}$
Radiated emission (magnetic field)		
9kHz – 30MHz	$\pm 3 \text{ dB}$	$\pm 6 \text{ dB}$
RF level for a given BER	$\pm 0.8 \text{ dB}$	$\pm 1.5 \text{ dB}$
Supply voltages	$\pm 3 \%$	$\pm 3 \%$
Temperature	$\pm 1 \text{ }^\circ\text{C}$	$\pm 1^\circ\text{C}$
Humidity	$\pm 5 \%$	$\pm 5 \%$
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 calcul of expanded uncertainty, the confidence interval is 95 % (k=2).

6. TEST CONDITIONS AND RESULTS

6.1. 20 dB bandwidth and 99% bandwidth

Reference standard:	FCC 47 CFR PART 15 : 2023 RSS-Gen Issue 5 : 2018 / AMD1: 2019 / AMD2: 2021
Test method:	§ 15.247 (a) (1) (i) of FCC 47 CFR PART 15 : 2023 § 6.7 of RSS-Gen Issue 5 : 2018 / AMD1: 2019 / AMD2: 2021
<p>General test setup: E.U.T. is set on an insulating support at 80 cm above the ground reference plane. Measurement are done on a normalized test site by the substitution method.</p> <p>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.</p> <p>For portable equipments a research of maximum level is done on the 3 axes. Only the highest levels are recorded.</p>	

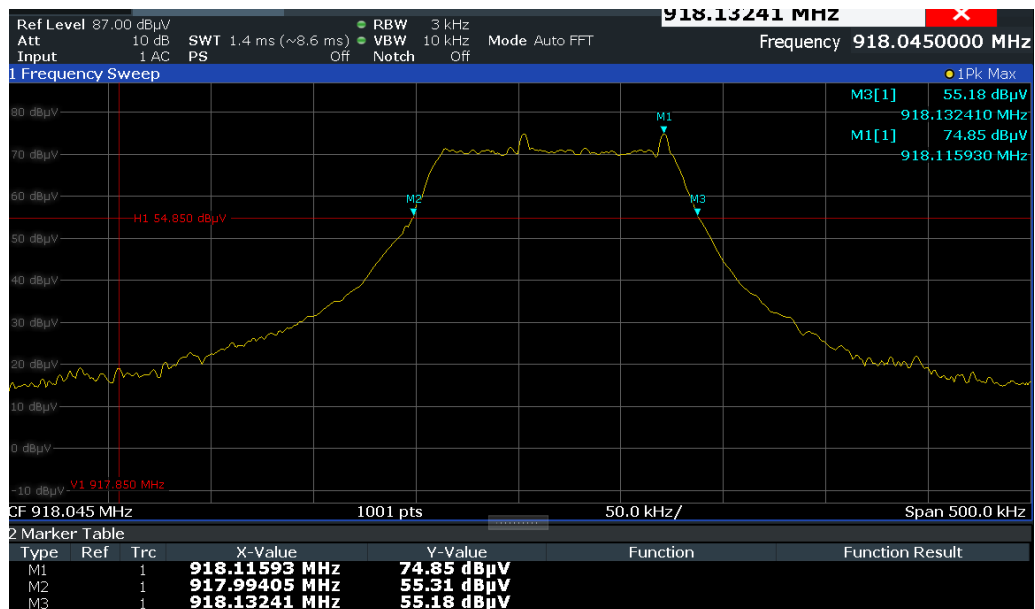
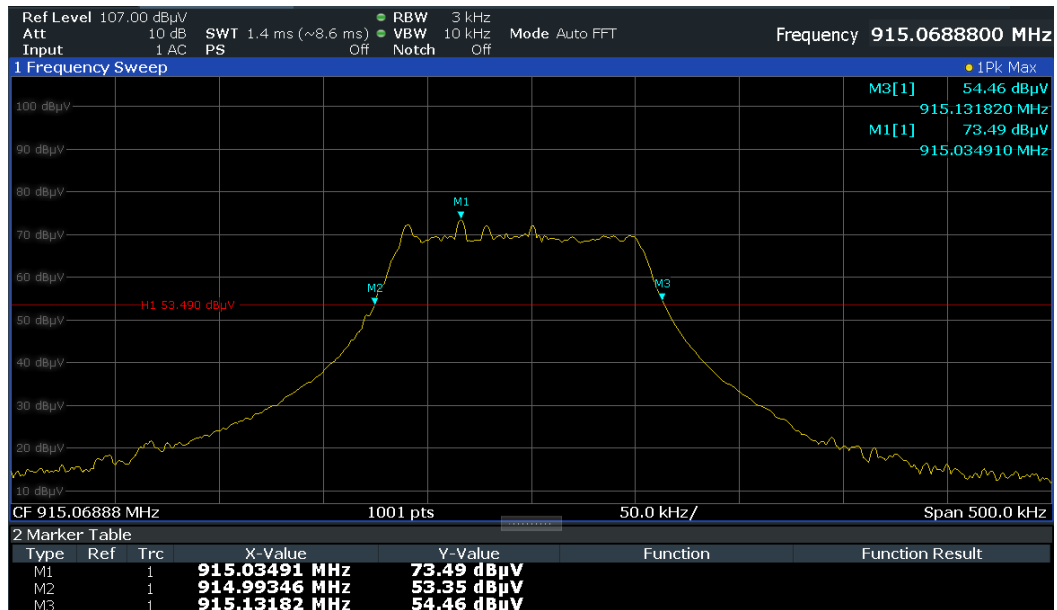
LABORATORY PARAMETERS:	REQUIRED PRIOR TO THE TEST	DURING THE TEST
Ambient Temperature	10 to 40 °C	22°C
Relative Humidity	10 to 90 %	45%
Atmospheric pressure	N/A	N/A
Test method deviation: No		
Supplementary information: -		

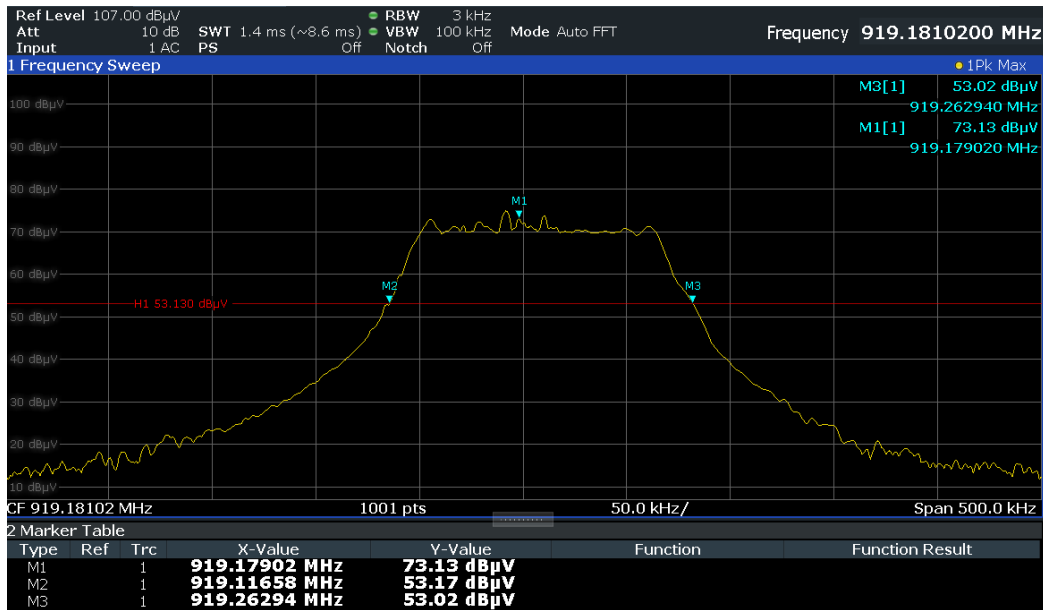
TEST EQUIPMENT USED					
Order Nr	Category	Manufacturer	Type	Last validity date	Next validity date
15226	Amplifier	Prâna	MT1400	06/05/2021	06/07/2024
00294	Antenna	Rohde & Schwarz	HL223	05/05/2023	05/07/2026
11184	Cable	C&C	N-5M	22/06/2023	22/08/2024
17269	Cable	Huber + Suhner	N-6M	29/08/2022	29/10/2024
06089	Receiver	Rohde & Schwarz	ESIB26	15/11/2022	15/01/2025
14622	Shielded enclosure	Comtest	SAC 3M	27/04/2022	27/06/2025

Blank cells = Permanent validity

20 dB Bandwidth

Frequency	Results (kHz)	Limit (kHz)
915.062 MHz	138.40	500
918.062 MHz	143.86	500
919.187 MHz	146.36	500

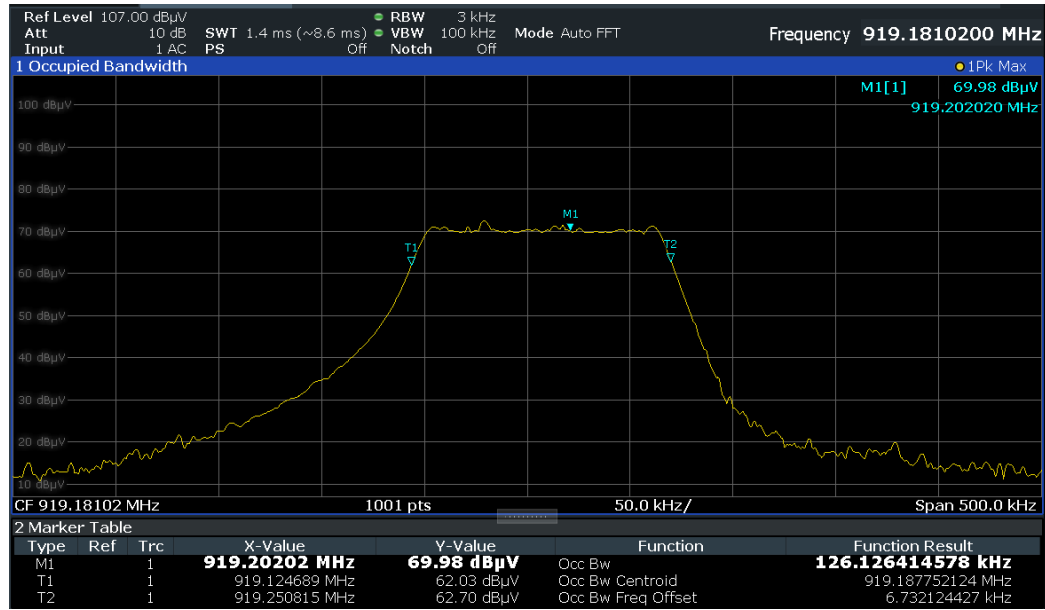




99% Bandwidth

Frequency	Results (kHz)
915.062 MHz	126.4
918.062 MHz	126.4
919.187 MHz	126.1





6.2. Carrier Frequency Separation

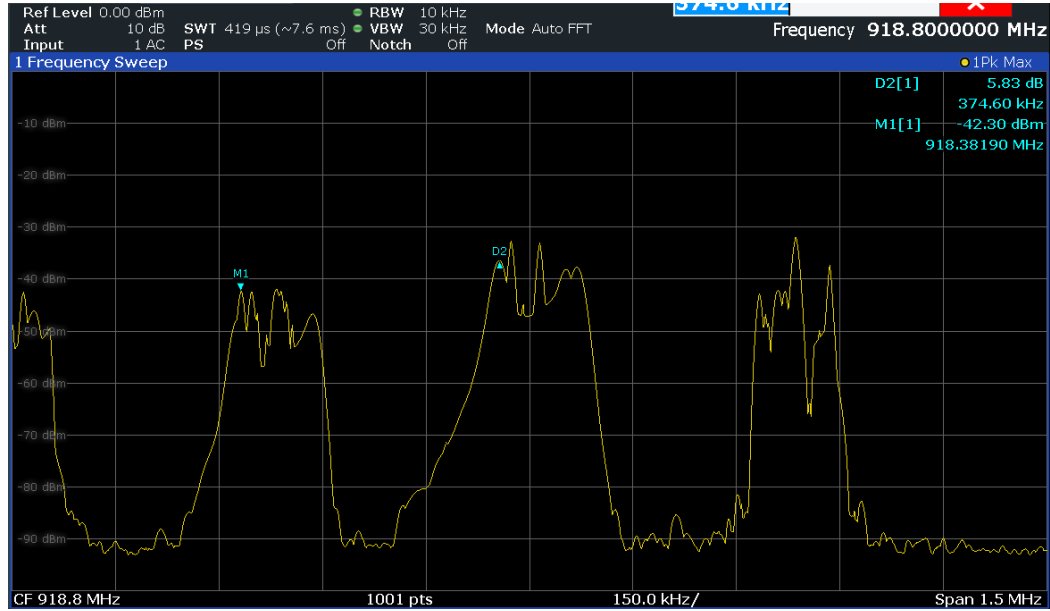
Reference standard:	FCC 47 CFR PART 15 : 2023 RSS-247 Issue 2 : 2017
Test method:	§ 15.247 a) (1) of FCC 47 CFR PART 15 : 2023 § 5.1 a) of RSS-247 Issue 2 : 2017
<p>General test setup: E.U.T. is set on an insulating support at 80 cm above the ground reference plane. Measurement are done on a normalized test site.</p> <p>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.</p> <p>For portable equipments a research of maximum level is done on the 3 axes. Only the highest levels are recorded.</p>	

LABORATORY PARAMETERS:	REQUIRED PRIOR TO THE TEST	DURING THE TEST
Ambient Temperature	10 to 40 °C	22°C
Relative Humidity	10 to 90 %	45%
Atmospheric pressure	N/A	N/A
Test method deviation: No		
Supplementary information: -		

TEST EQUIPMENT USED					
Order Nr	Category	Manufacturer	Type	Last validity date	Next validity date
15226	Amplifier	Prâna	MT1400	06/05/2021	06/07/2024
00294	Antenna	Rohde & Schwarz	HL223	05/05/2023	05/07/2026
11184	Cable	C&C	N-5M	22/06/2023	22/08/2024
17269	Cable	Huber + Suhner	N-6M	29/08/2022	29/10/2024
06089	Receiver	Rohde & Schwarz	ESIB26	15/11/2022	15/01/2025
14622	Shielded enclosure	Comtest	SAC 3M	27/04/2022	27/06/2025

Blank cells = Permanent validity

Channel separation Results (kHz)	Limit (kHz)
374.6	> 25



6.3. Number of Hopping Channel

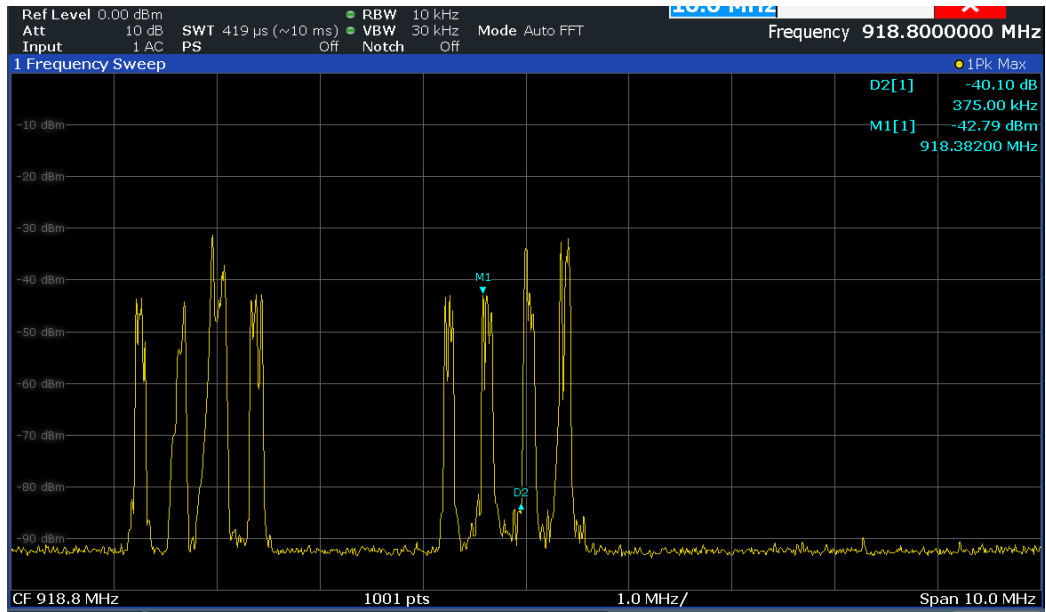
Reference standard:	FCC 47 CFR PART 15 : 2023 RSS-247 Issue 2 : 2017
Test method:	§ 15.247 f) of FCC 47 CFR PART 15 : 2023 § 5.1 c) of RSS-247 Issue 2 : 2017
<p>General test setup: E.U.T. is set on an insulating support at 80 cm above the ground reference plane. Measurement are done on a normalized test site.</p> <p>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.</p> <p>For portable equipments a research of maximum level is done on the 3 axes. Only the highest levels are recorded.</p>	

LABORATORY PARAMETERS:	REQUIRED PRIOR TO THE TEST	DURING THE TEST
Ambient Temperature	10 to 40 °C	22°C
Relative Humidity	10 to 90 %	45%
Atmospheric pressure	N/A	N/A
Test method deviation: No		
Supplementary information: -		

TEST EQUIPMENT USED					
Order Nr	Category	Manufacturer	Type	Last validity date	Next validity date
15226	Amplifier	Prâna	MT1400	06/05/2021	06/07/2024
00294	Antenna	Rohde & Schwarz	HL223	05/05/2023	05/07/2026
11184	Cable	C&C	N-5M	22/06/2023	22/08/2024
17269	Cable	Huber + Suhner	N-6M	29/08/2022	29/10/2024
06089	Receiver	Rohde & Schwarz	ESIB26	15/11/2022	15/01/2025
14622	Shielded enclosure	Comtest	SAC 3M	27/04/2022	27/06/2025

Blank cells = Permanent validity

Number of hopping channels Results	Limit
8	-



6.4. Dwell Time

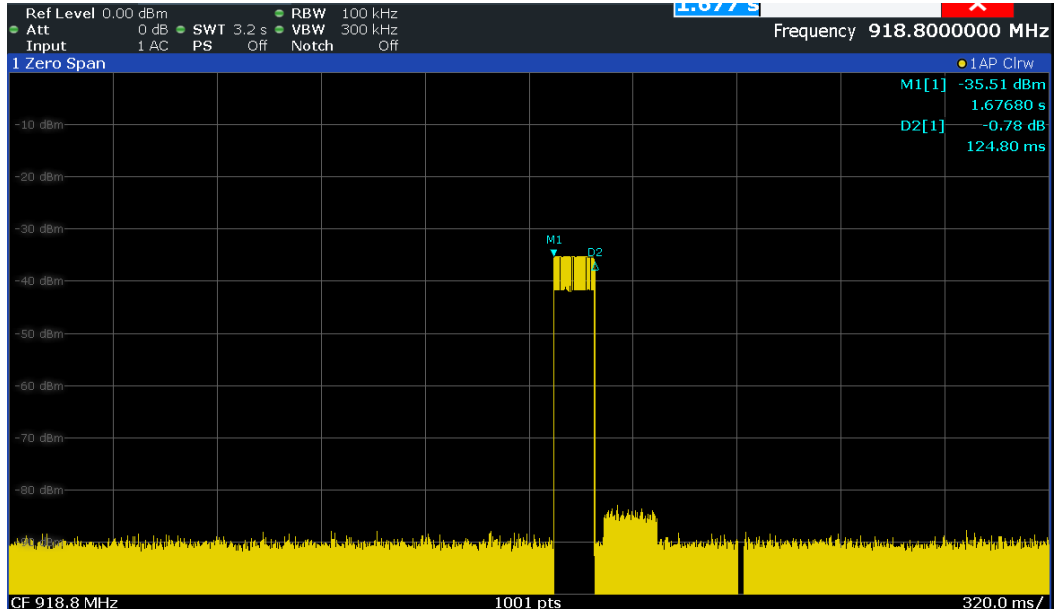
Reference standard:	FCC 47 CFR PART 15 : 2023 RSS-247 Issue 2 : 2017
Test method:	§ 15.247 a) (1) (i) of FCC 47 CFR PART 15 : 2023 § 5.1 c) of RSS-247 Issue 2 : 2017
<p>General test setup: E.U.T. is set on an insulating support at 80 cm above the ground reference plane. Measurement are done on a normalized test site.</p> <p>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.</p> <p>For portable equipments a research of maximum level is done on the 3 axes. Only the highest levels are recorded.</p>	

LABORATORY PARAMETERS:	REQUIRED PRIOR TO THE TEST	DURING THE TEST
Ambient Temperature	10 to 40 °C	22°C
Relative Humidity	10 to 90 %	45%
Atmospheric pressure	N/A	N/A
Test method deviation: No		
Supplementary information: -		

TEST EQUIPMENT USED					
Order Nr	Category	Manufacturer	Type	Last validity date	Next validity date
15226	Amplifier	Prâna	MT1400	06/05/2021	06/07/2024
00294	Antenna	Rohde & Schwarz	HL223	05/05/2023	05/07/2026
11184	Cable	C&C	N-5M	22/06/2023	22/08/2024
17269	Cable	Huber + Suhner	N-6M	29/08/2022	29/10/2024
06089	Receiver	Rohde & Schwarz	ESIB26	15/11/2022	15/01/2025
14622	Shielded enclosure	Comtest	SAC 3M	27/04/2022	27/06/2025

Blank cells = Permanent validity

Dwell time Results (ms)	Pulse's on time (ms)	Total hops	Limit (ms)
124.8	124.8	1	< 400



6.5. Transmitter output power

Reference standard:	FCC 47 CFR PART 15 : 2023 RSS-247 Issue 2 : 2017
Test method:	§ 15.247 b) (3) of FCC 47 CFR PART 15 : 2023 § 5.4 of RSS-247 Issue 2 : 2017
<p>General test setup: E.U.T. is set on an insulating support at 80 cm above the ground reference plane. Measurement are done on a normalized test site by the substitution method.</p> <p>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.</p> <p>For portable equipments a research of maximum level is done on the 3 axes. Only the highest levels are recorded.</p>	

LABORATORY PARAMETERS:	REQUIRED PRIOR TO THE TEST	DURING THE TEST
Ambient Temperature	10 to 40 °C	22°C
Relative Humidity	10 to 90 %	45%
Atmospheric pressure	N/A	N/A
Test method deviation: No		
Supplementary information: -		

TEST EQUIPMENT USED					
Order Nr	Category	Manufacturer	Type	Last validity date	Next validity date
15226	Amplifier	Prâna	MT1400	06/05/2021	06/07/2024
00294	Antenna	Rohde & Schwarz	HL223	05/05/2023	05/07/2026
11184	Cable	C&C	N-5M	22/06/2023	22/08/2024
17269	Cable	Huber + Suhner	N-6M	29/08/2022	29/10/2024
06089	Receiver	Rohde & Schwarz	ESIB26	15/11/2022	15/01/2025
14622	Shielded enclosure	Comtest	SAC 3M	27/04/2022	27/06/2025

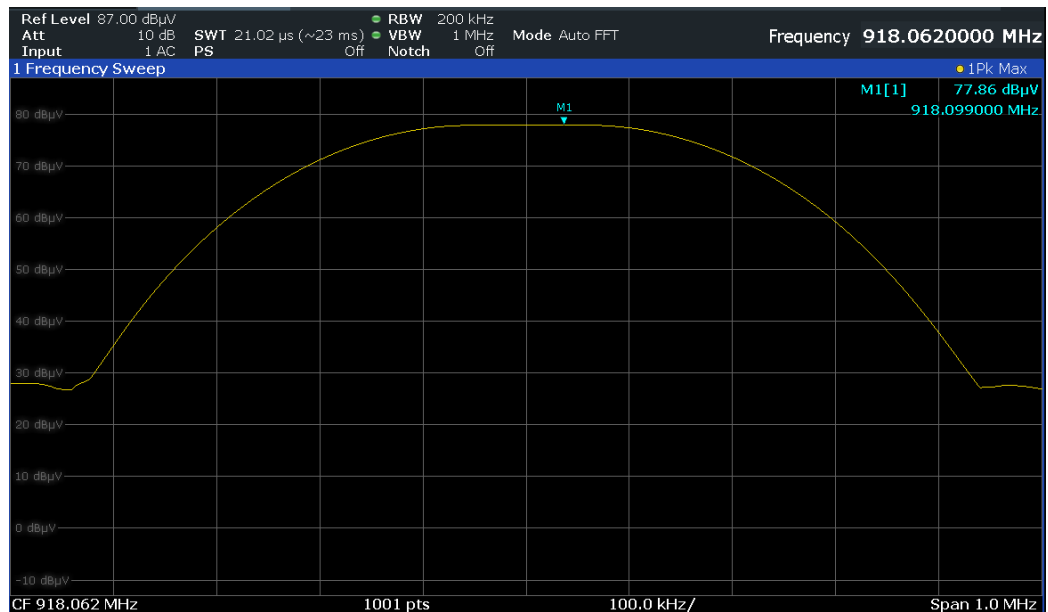
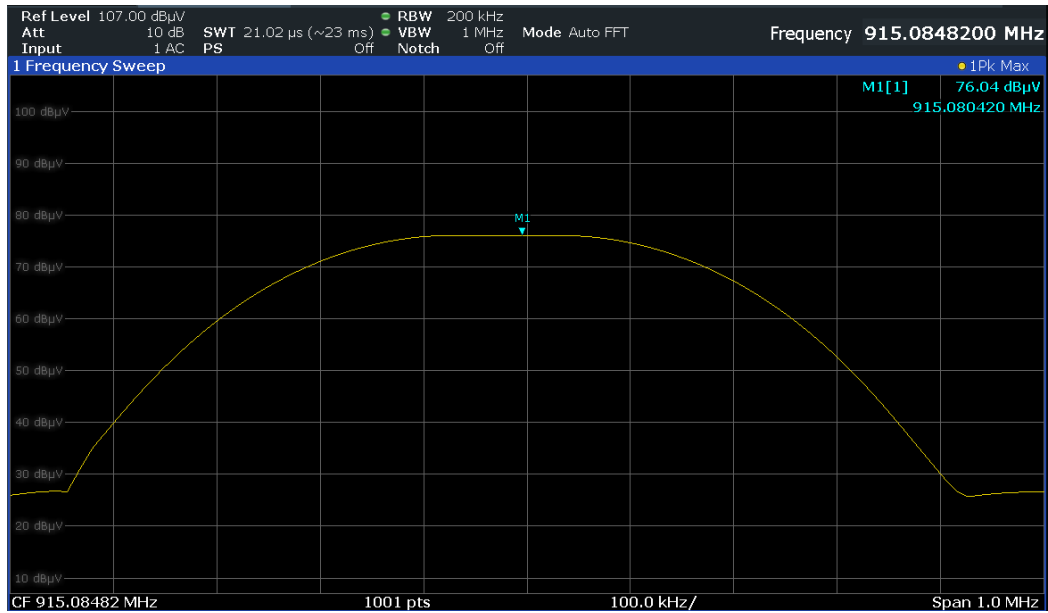
Blank cells = Permanent validity

Frequency	Electro-magnetic field (dBµV/m)	TP* (dBm)	Limit (dBm)
915.062 MHz	103.67	+ 6.3	+ 30.0
918.062 MHz	105.46	+ 8.1	+ 30.0
919.187 MHz	102.70	+ 5.3	+ 30.0

* TP = (E x d)² / (30 x 1.64) for d = 3 m

E.U.T. position:





6.6. Peak power spectral density

Reference standard:	FCC 47 CFR PART 15 : 2023 RSS-247 Issue 2 : 2017
Test method:	§ 15.247 f) of FCC 47 CFR PART 15 : 2023 § 5.2 b) of RSS-247 Issue 2 : 2017
<p>General test setup: E.U.T. is set on an insulating support at 80 cm above the ground reference plane. Measurement are done on a normalized test site by the substitution method.</p> <p>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.</p> <p>For portable equipments a research of maximum level is done on the 3 axes. Only the highest levels are recorded.</p>	

LABORATORY PARAMETERS:	REQUIRED PRIOR TO THE TEST	DURING THE TEST
Ambient Temperature	10 to 40 °C	22°C
Relative Humidity	10 to 90 %	45%
Atmospheric pressure	N/A	N/A
Test method deviation: No		
Supplementary information: -		

TEST EQUIPMENT USED					
Order Nr	Category	Manufacturer	Type	Last validity date	Next validity date
15226	Amplifier	Prâna	MT1400	06/05/2021	06/07/2024
00294	Antenna	Rohde & Schwarz	HL223	05/05/2023	05/07/2026
11184	Cable	C&C	N-5M	22/06/2023	22/08/2024
17269	Cable	Huber + Suhner	N-6M	29/08/2022	29/10/2024
06089	Receiver	Rohde & Schwarz	ESIB26	15/11/2022	15/01/2025
14622	Shielded enclosure	Comtest	SAC 3M	27/04/2022	27/06/2025

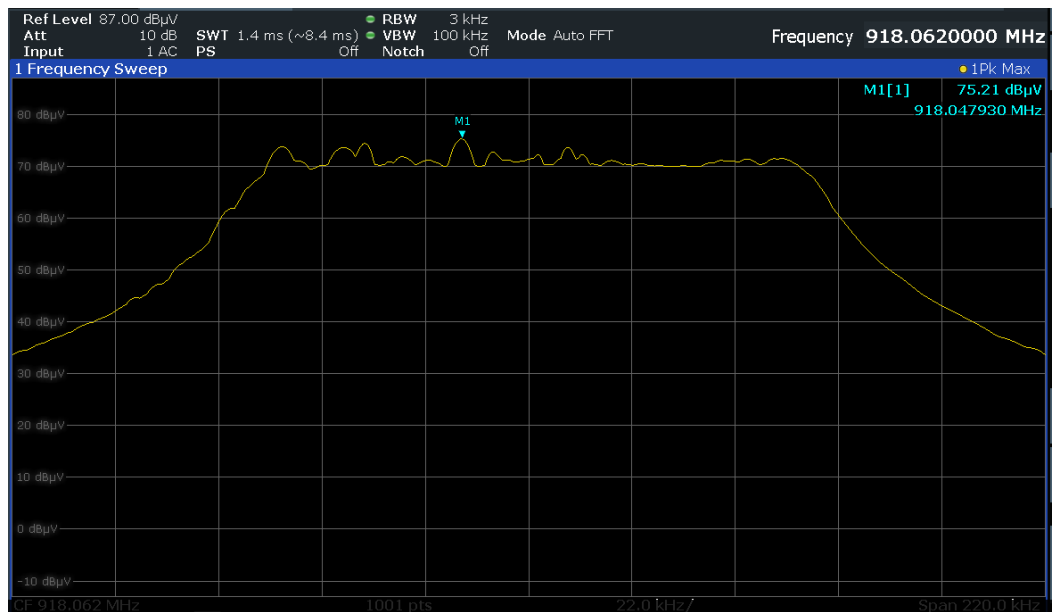
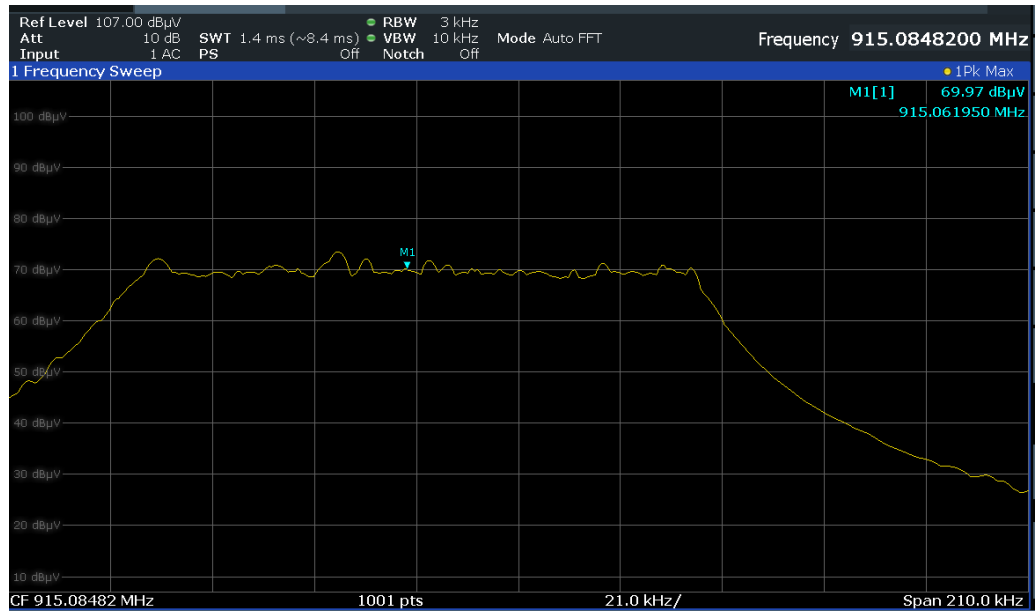
Blank cells = Permanent validity

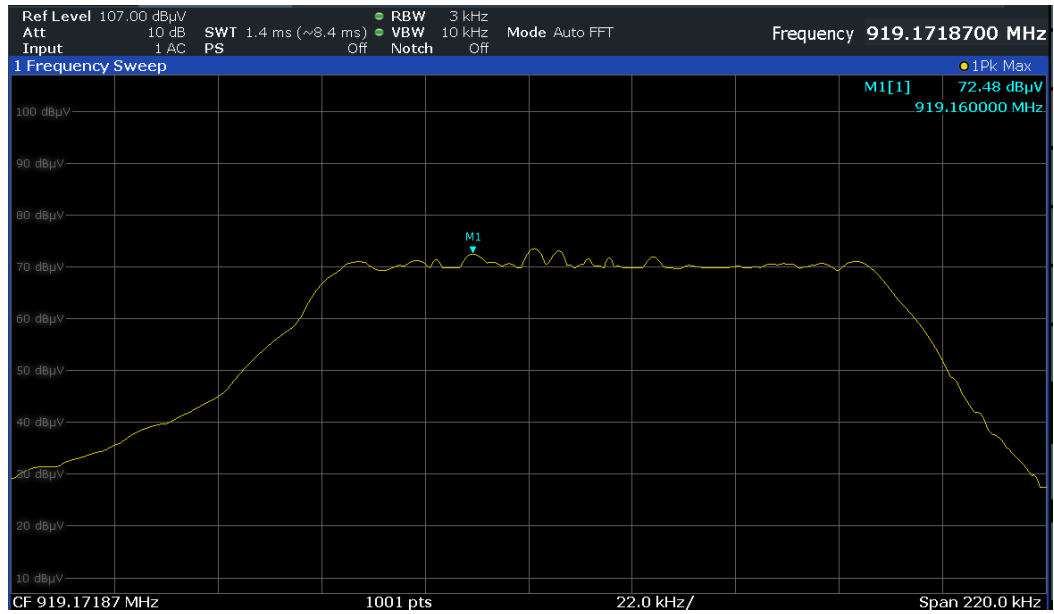
Frequency	Electro-magnetic field (dB μ V/m)	TP* (dBm)	Limit (dBm)
915.062 MHz	97.40	0.0	+ 8.0
918.062 MHz	102.81	+ 5.4	+ 8.0
919.187 MHz	97.38	0.0	+ 8.0

* TP = $(E \times d)^2 / (30 \times 1.64)$ for d = 3 m

E.U.T. position:







6.7. Additional provisions to the general radiated emissions limitation

Reference standard:	FCC 47 CFR PART 15 : 2023 RSS-247 Issue 2 : 2017
Test method:	§ 15.215 b) and § 15.247 d) of FCC 47 CFR PART 15 : 2023 § 5.5 of RSS-247 Issue 2 : 2017
<p>General test setup: E.U.T. is set on an insulating support at 80 cm above the ground reference plane. Measurement are done on a normalized test site by the substitution method.</p> <p>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.</p> <p>For portable equipments a research of maximum level is done on the 3 axes. Only the highest levels are recorded.</p>	

LABORATORY PARAMETERS:	REQUIRED PRIOR TO THE TEST	DURING THE TEST
Ambient Temperature	10 to 40 °C	22°C
Relative Humidity	10 to 90 %	45%
Atmospheric pressure	N/A	N/A
Test method deviation: No		
Supplementary information: -		

TEST EQUIPMENT USED					
Order Nr	Category	Manufacturer	Type	Last validity date	Next validity date
15226	Amplifier	Prâna	MT1400	06/05/2021	06/07/2024
00294	Antenna	Rohde & Schwarz	HL223	05/05/2023	05/07/2026
11184	Cable	C&C	N-5M	22/06/2023	22/08/2024
17269	Cable	Huber + Suhner	N-6M	29/08/2022	29/10/2024
06089	Receiver	Rohde & Schwarz	ESIB26	15/11/2022	15/01/2025
14622	Shielded enclosure	Comtest	SAC 3M	27/04/2022	27/06/2025

Blank cells = Permanent validity

Band Edge measurement :

Polarization of test antenna: Vertical (height = 100 cm)
 Position of equipment: azimuth = 80° } For 915.062 MHz

Polarization of test antenna: Vertical (height = 100 cm)
 Position of equipment: azimuth = 80° } For 918.062 MHz

Polarization of test antenna: Vertical (height = 100 cm)
 Position of equipment: azimuth = 80° } For 919.187 MHz

Frequency (MHz)	Field Strength Level of fundamental (dBµV/m)	Detector (Peak or Average)	Frequency of maximum Band-edges Emission (MHz)	Calculated Max Out of Band Emission Level (dBµV/m)	Limit (dBµV/m)	Margin (dB)
915.62	103.67	Peak	①	-	54.0	-
918.062	105.46	Peak	①	-		-
919.187	102.70	Peak	①	-		-

① : No frequencies were observed above the measurement noise.

6.8. Unintentional radiated emissions and transmitter unwanted emission in the band 9 kHz – 10 GHz

Reference standard:	FCC 47 CFR PART 15 : 2023 RSS-Gen Issue 5 : 2018 / AMD1: 2019 / AMD2: 2021
Test method:	§ 15.205; § 15.209 and § 15.247 of FCC 47 CFR PART 15 : 2023 § 6.13 of RSS-Gen Issue 5 : 2018 / AMD1: 2019 / AMD2: 2021
<p>General test setup: E.U.T. is set on an insulating support at 0.8 m (<1GHz) and 1.5 m (>1GHz) above the ground reference plane.</p> <p>For maximum meter reading at each frequency, the antenna height is adjusted between 1 m and 4 m above the ground plane for 9 kHz - 10 GHz. A 360 degrees rotation of the EUT is performed in vertical and horizontal polarization.</p>	

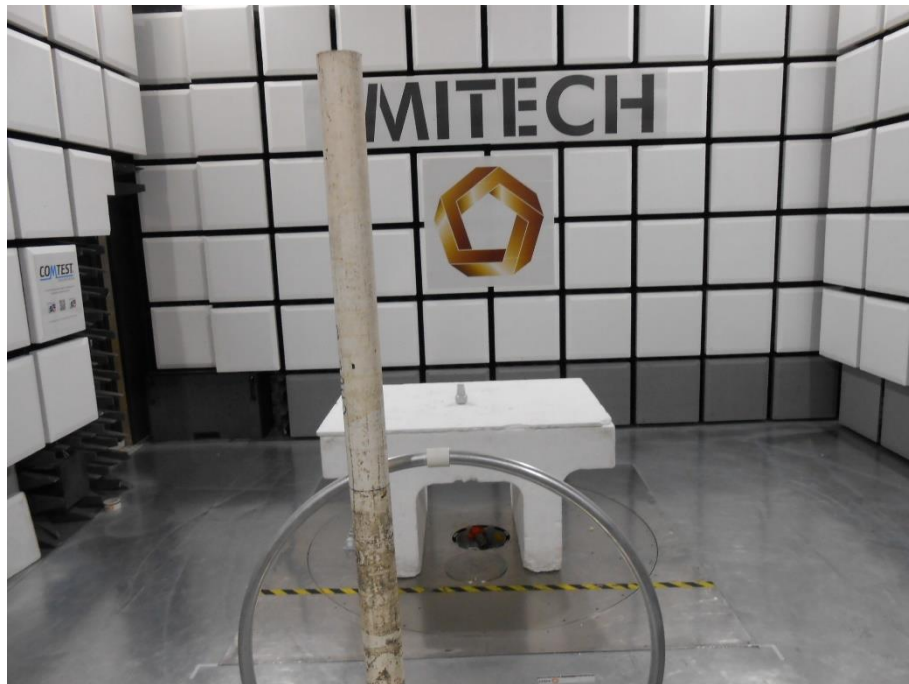
TESTED CONFIGURATION	PARAMETER	VERDICT
Maxhold 360° - Tx 915.062 MHz	9kHz-30MHz	PASS
Maxhold 360° - Tx 918.062 MHz	9kHz-30MHz	PASS
Maxhold 360° - Tx 919.187 MHz	9kHz-30MHz	PASS
Maxhold 360° - Tx 915.062 MHz	30MHz-1GHz	PASS
Maxhold 360° - Tx 918.062 MHz	30MHz-1GHz	PASS
Maxhold 360° - Tx 919.187 MHz	30MHz-1GHz	PASS
Maxhold 360° - Tx 915.062 MHz	1GHz-10GHz	PASS
Maxhold 360° - Tx 918.062 MHz	1GHz-10GHz	PASS
Maxhold 360° - Tx 919.187 MHz	1GHz-10GHz	PASS

LABORATORY PARAMETERS:	REQUIRED PRIOR TO THE TEST	DURING THE TEST
Ambient Temperature	10 to 40 °C	23°C
Relative Humidity	10 to 90 %	37%
Atmospheric pressure	N/A	N/A
Test method deviation: No		
Supplementary information: -		

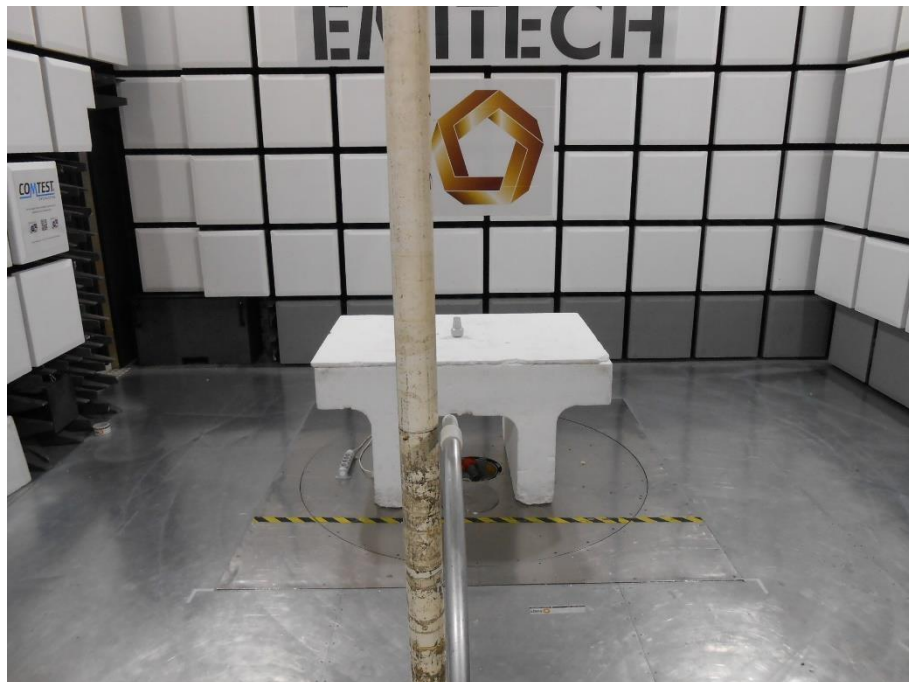
TEST EQUIPMENT USED					
CATEGORY	BRAND	TYPE	IDENTIFIER	CAL. DATE	CAL. DUE
Amplifier	Mini-Circuit	ZFL-1000LN	00364	15/02/2023	15/04/2024
Amplifier	Agilent	8449B	14487	12/09/2023	12/11/2024
Antenna	Rohde & Schwarz	HL223	00294	05/05/2023	05/07/2026
Antenna	Rohde & Schwarz	HK116	00293	30/09/2021	30/11/2024
Antenna	Eaton	96009/2	04713	22/02/2023	22/04/2025
Antenna	Emco	3115	00941	01/03/2022	01/05/2025
Cable	C&C	N-5M	11184	22/06/2023	22/08/2024
Cable	C&C	N-4M	14226	26/06/2023	26/08/2024
Cable	Câbles Et Connectiques	N-2M	02451	29/08/2022	29/10/2024
Cable	Huber + Suhner	N-6M	17269	29/08/2022	29/10/2024
Filter	Trilithic	6HC1300-2.5-KK	01097	13/06/2022	13/08/2025
Receiver	Rohde & Schwarz	ESIB26	06089	15/11/2022	15/01/2025
Receiver	Rohde & Schwarz	ESW44	17058	15/06/2023	15/08/2024
Shielded enclosure	Comtest	SAC 3M	14622	27/04/2022	27/06/2025
Software	NEXIO	BAT EMC	00000		

BAT-EMC software version: V3.18.0.26
 Blank cells = Permanent validity

TEST SETUP PHOTOS
9 kHz – 30 MHz



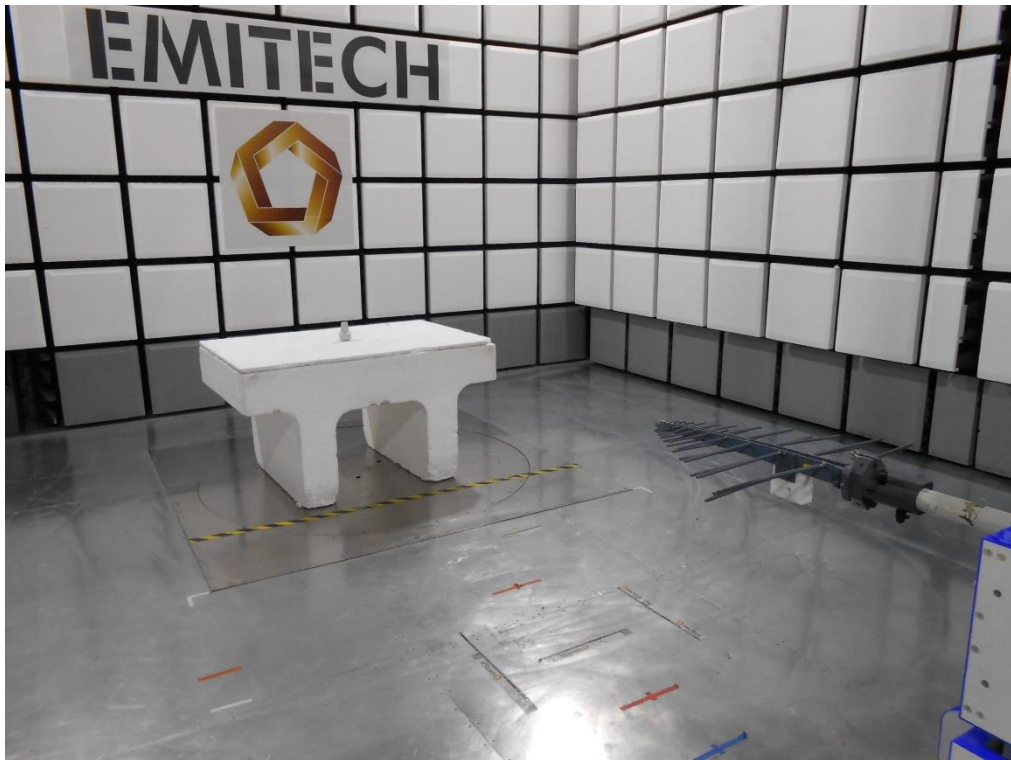
TEST SETUP PHOTOS
9 KHZ – 30 MHZ



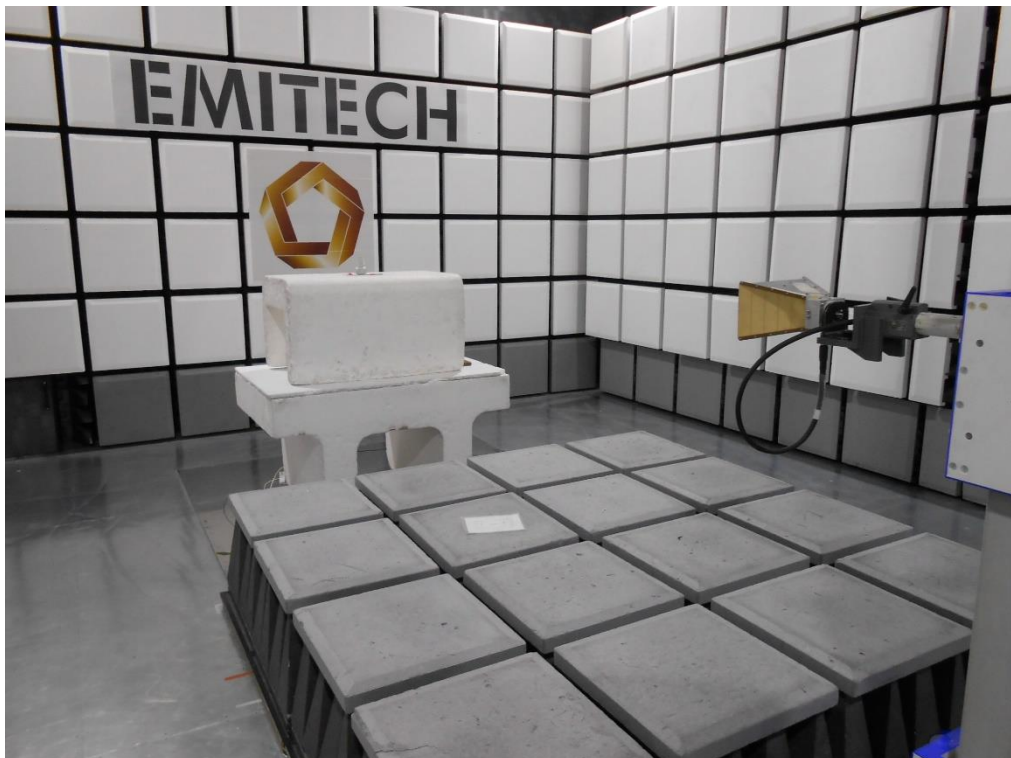
TEST SETUP PHOTOS
30 MHz – 1 GHz

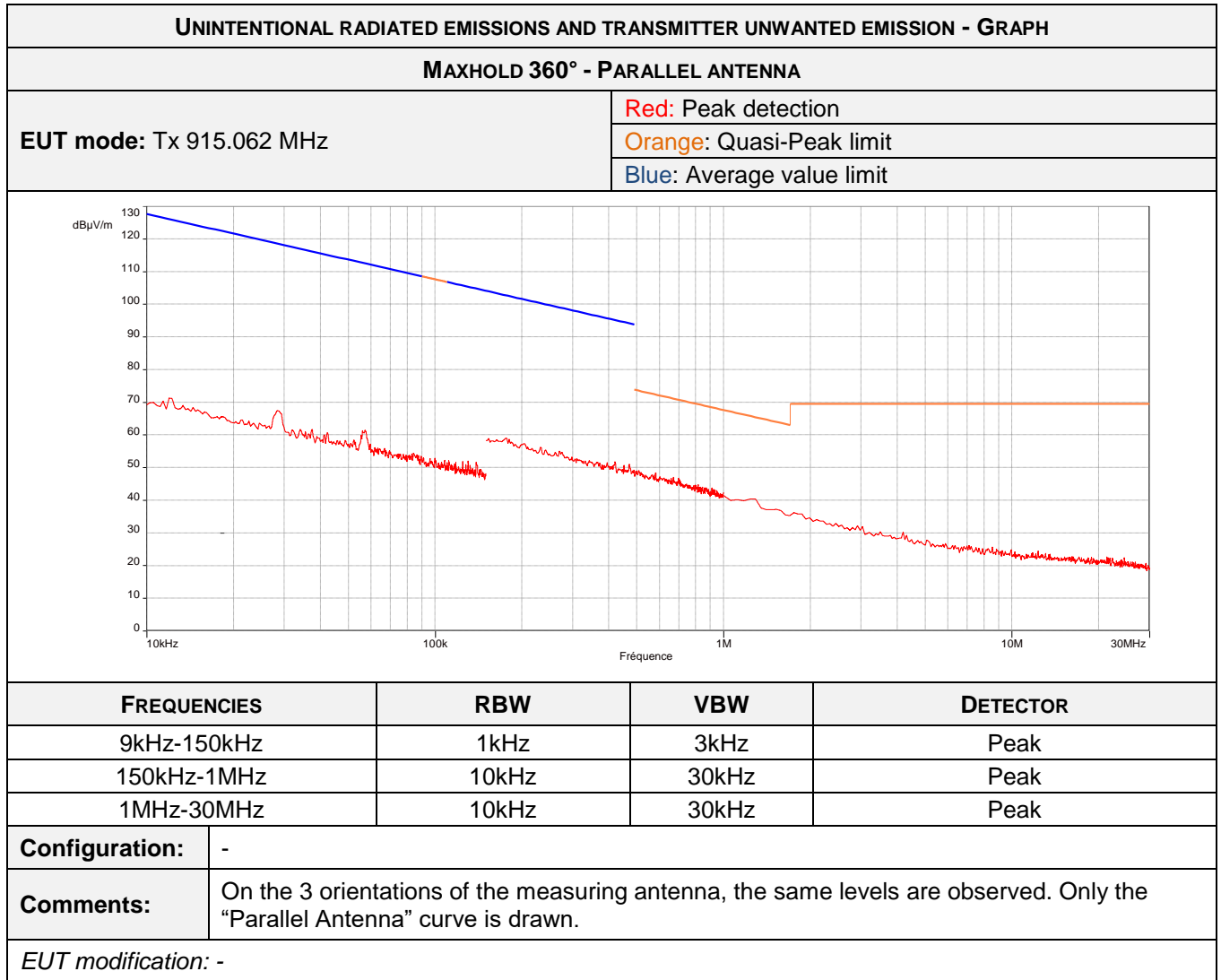


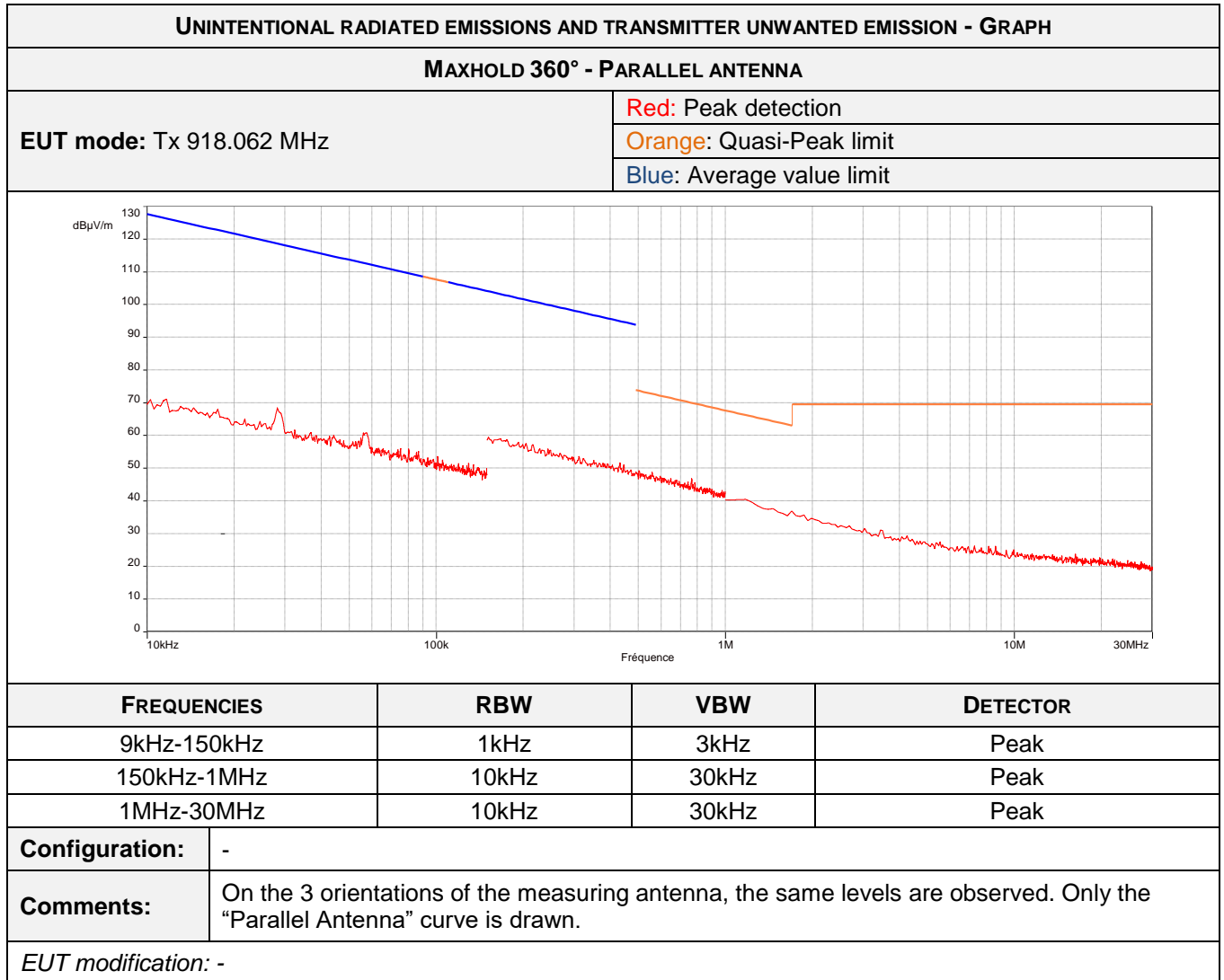
TEST SETUP PHOTOS
30 MHz – 1 GHz

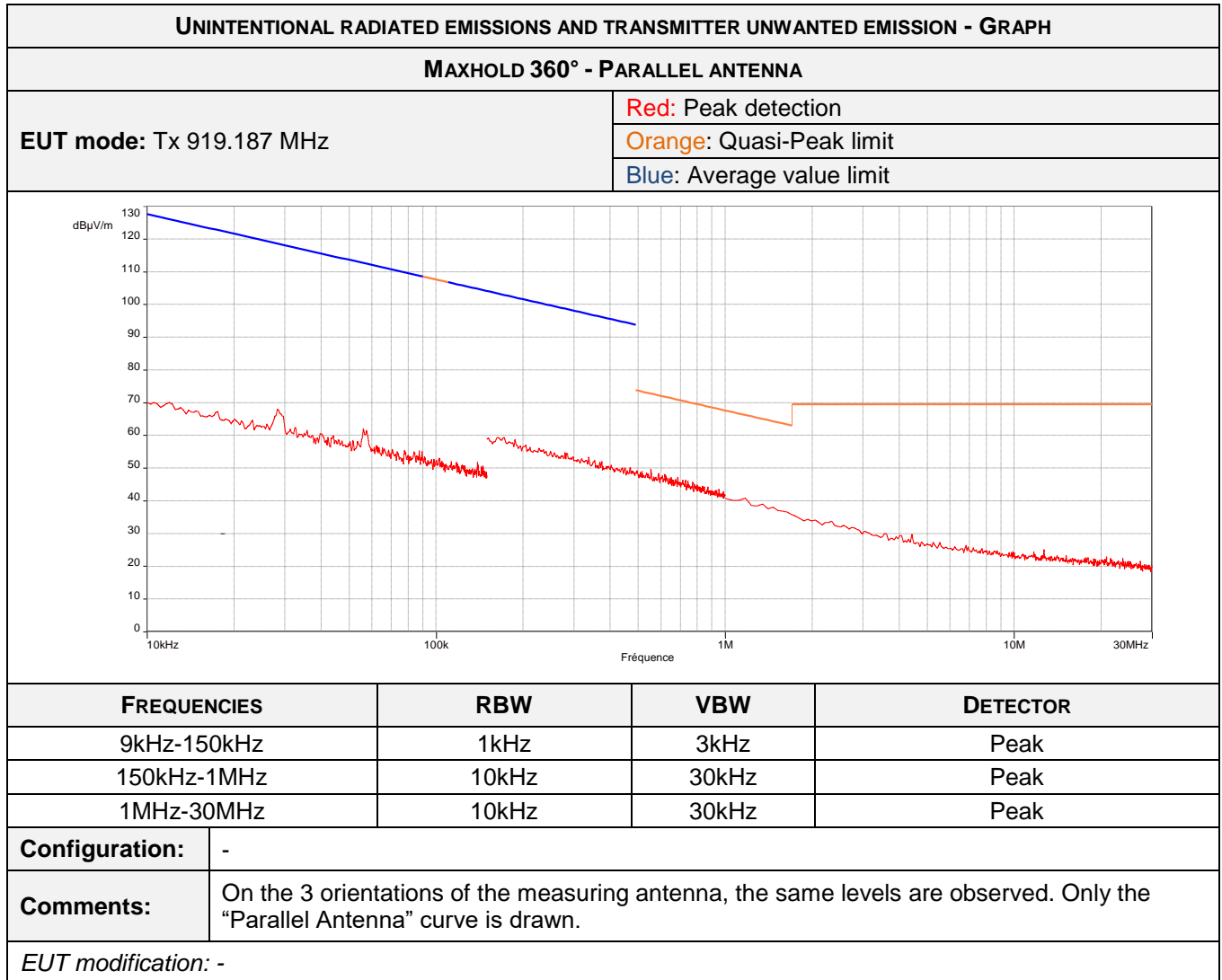


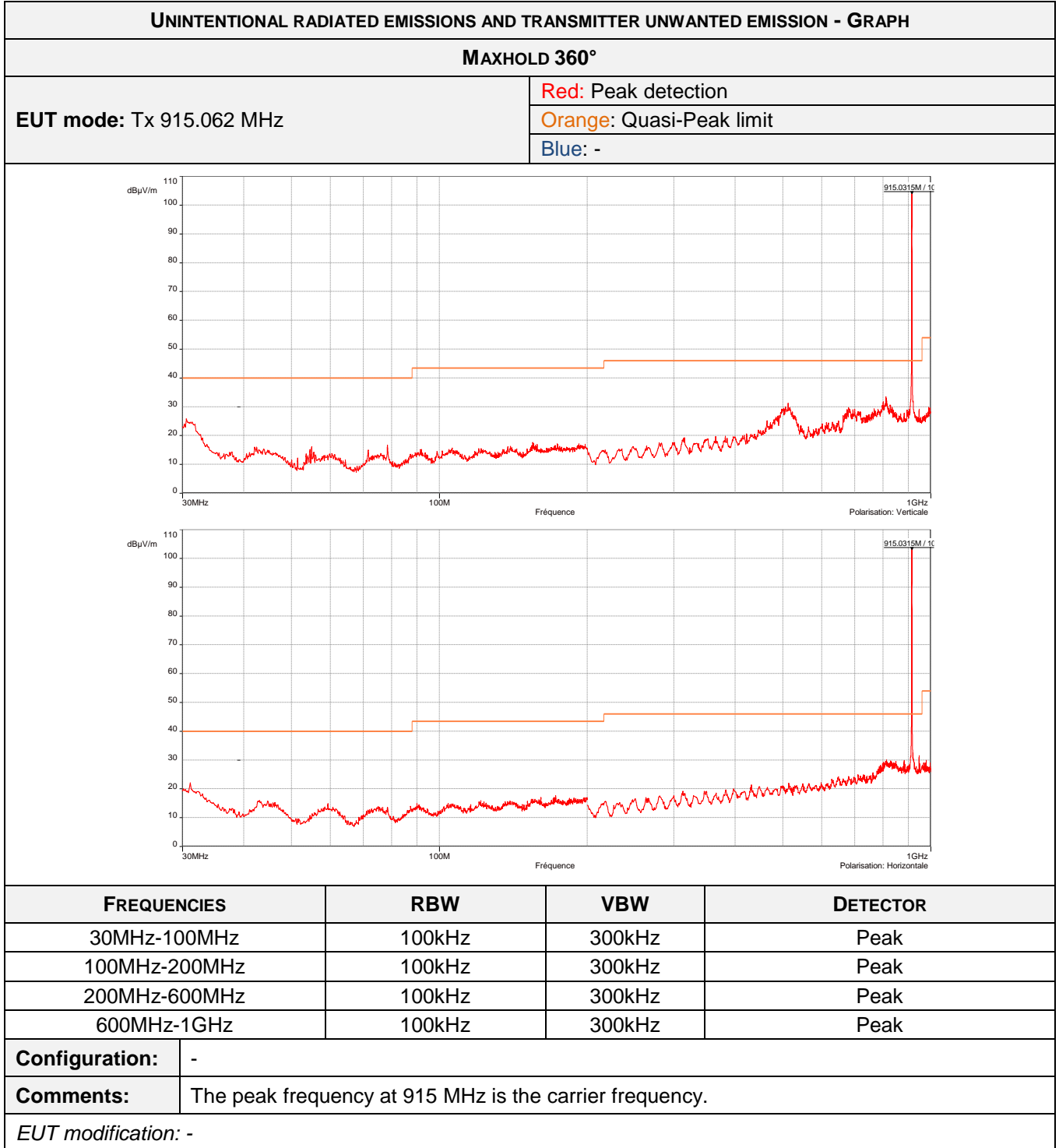
TEST SETUP PHOTOS
1 GHz – 10 GHz









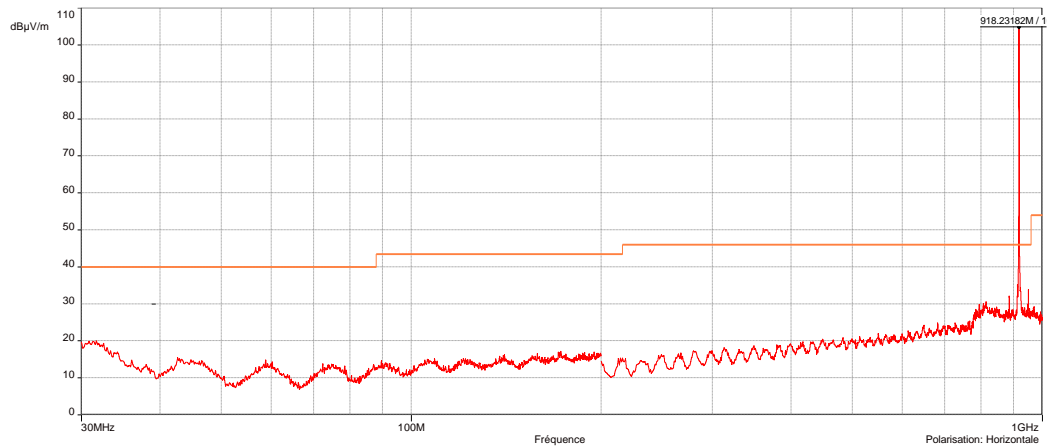
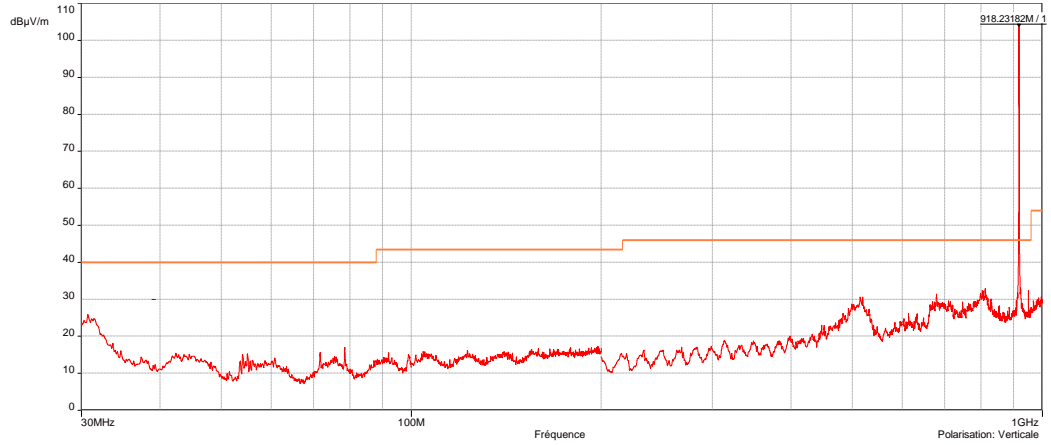


UNINTENTIONAL RADIATED EMISSIONS AND TRANSMITTER UNWANTED EMISSION - GRAPH
MAXHOLD 360°
EUT mode: Tx 918.062 MHz

Red: Peak detection

Orange: Quasi-Peak limit

Blue: -

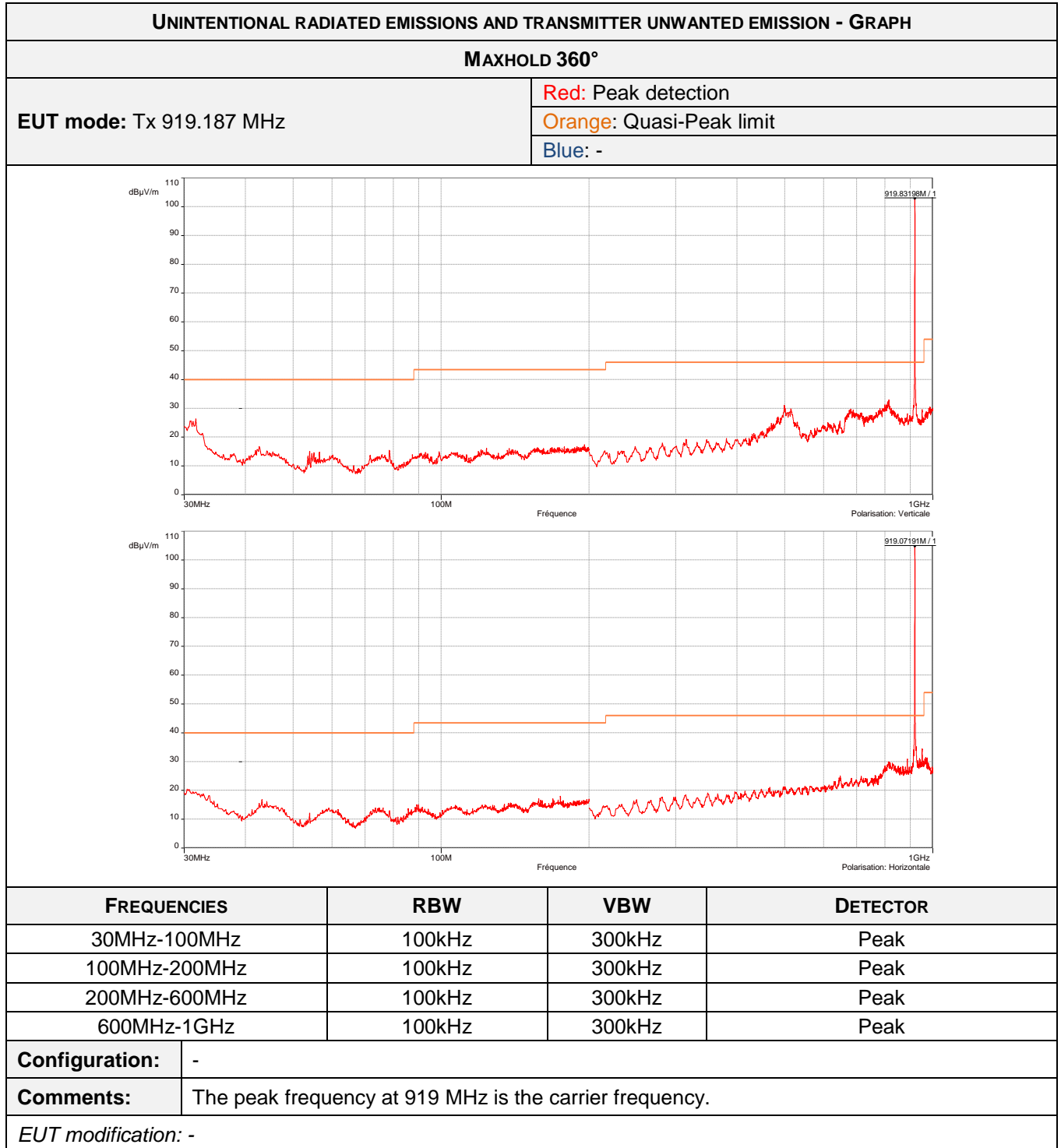


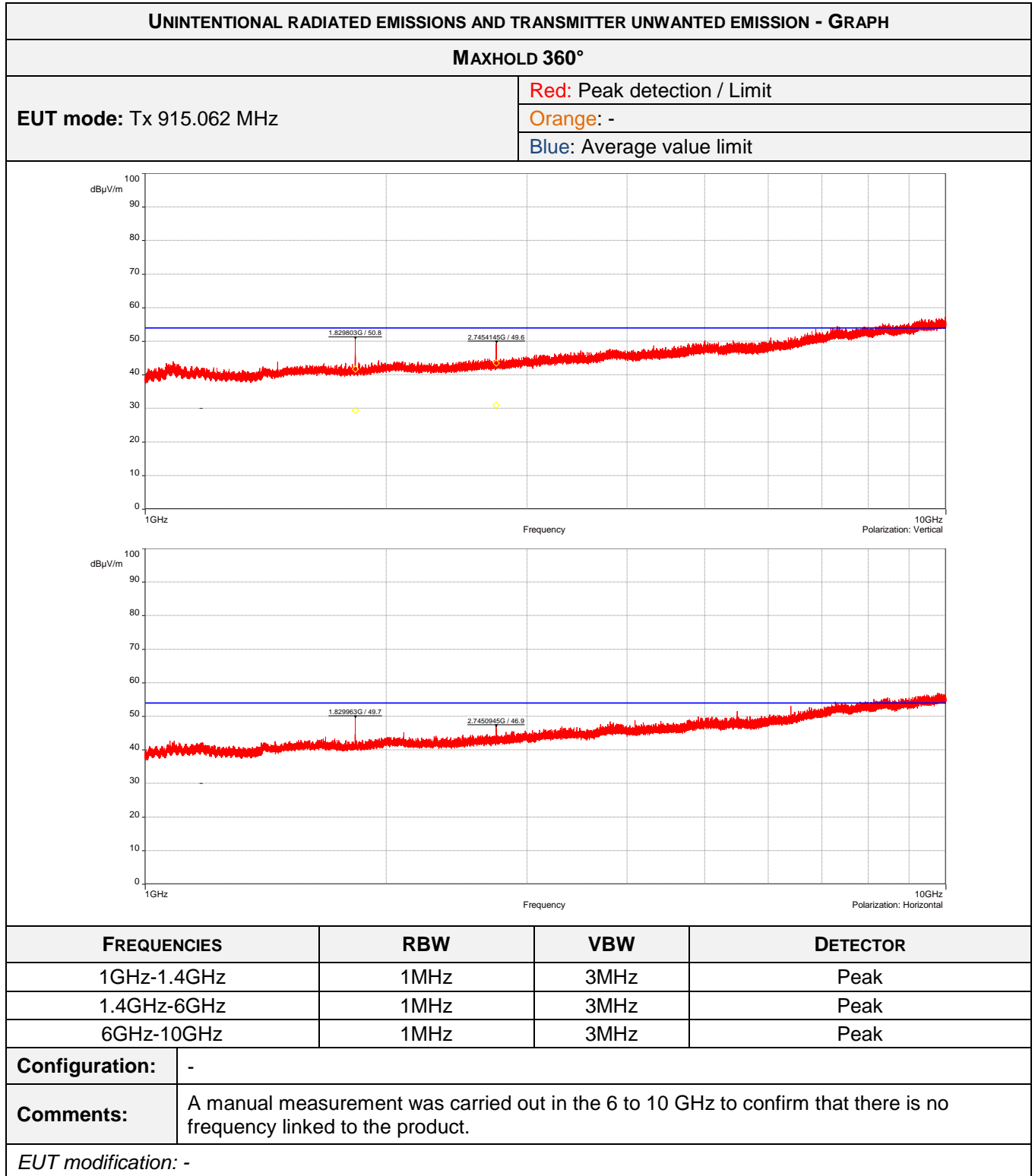
FREQUENCIES	RBW	VBW	DETECTOR
30MHz-100MHz	100kHz	300kHz	Peak
100MHz-200MHz	100kHz	300kHz	Peak
200MHz-600MHz	100kHz	300kHz	Peak
600MHz-1GHz	100kHz	300kHz	Peak

Configuration: -

Comments: The peak frequency at 918 MHz is the carrier frequency.

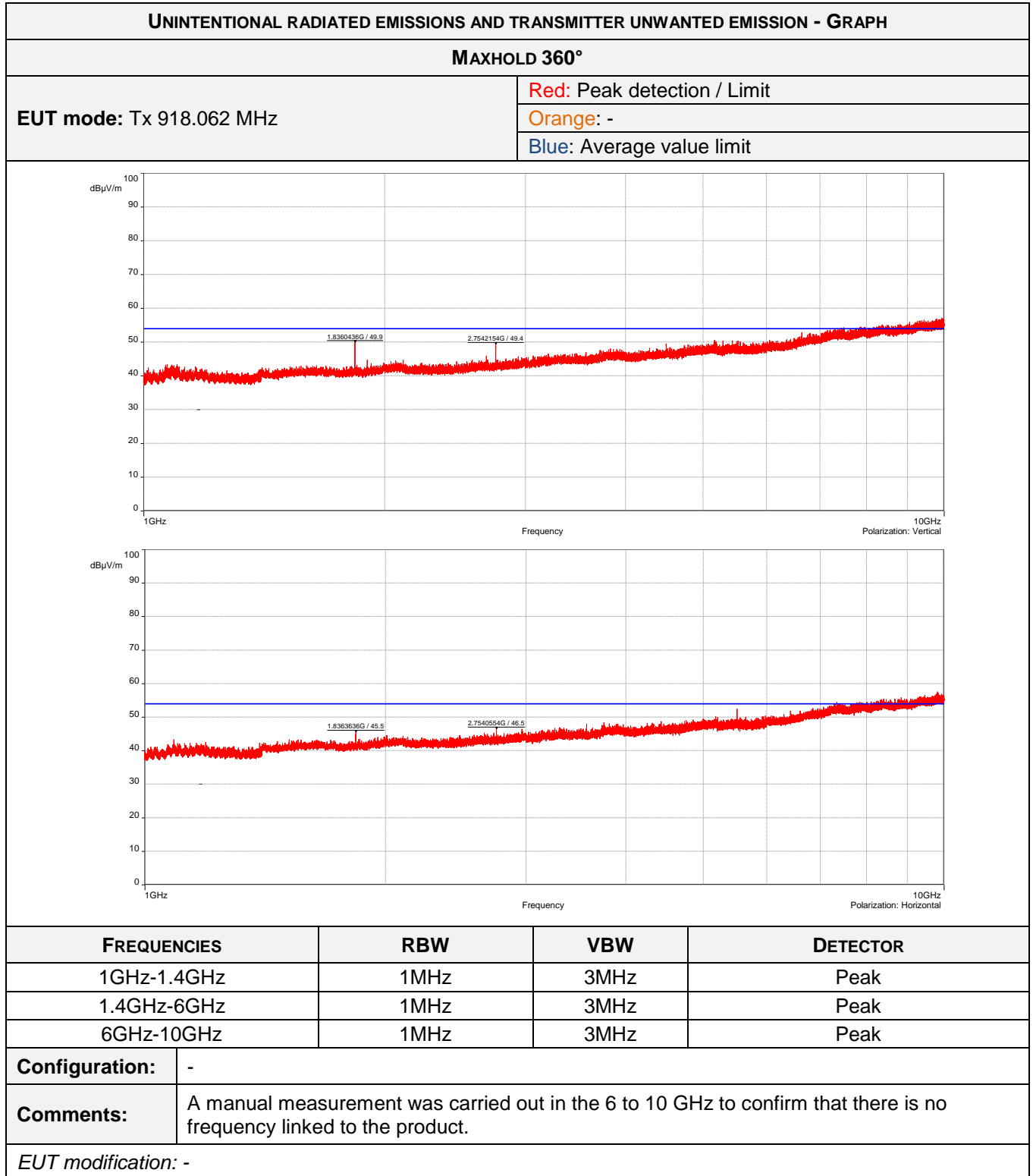
EUT modification: -





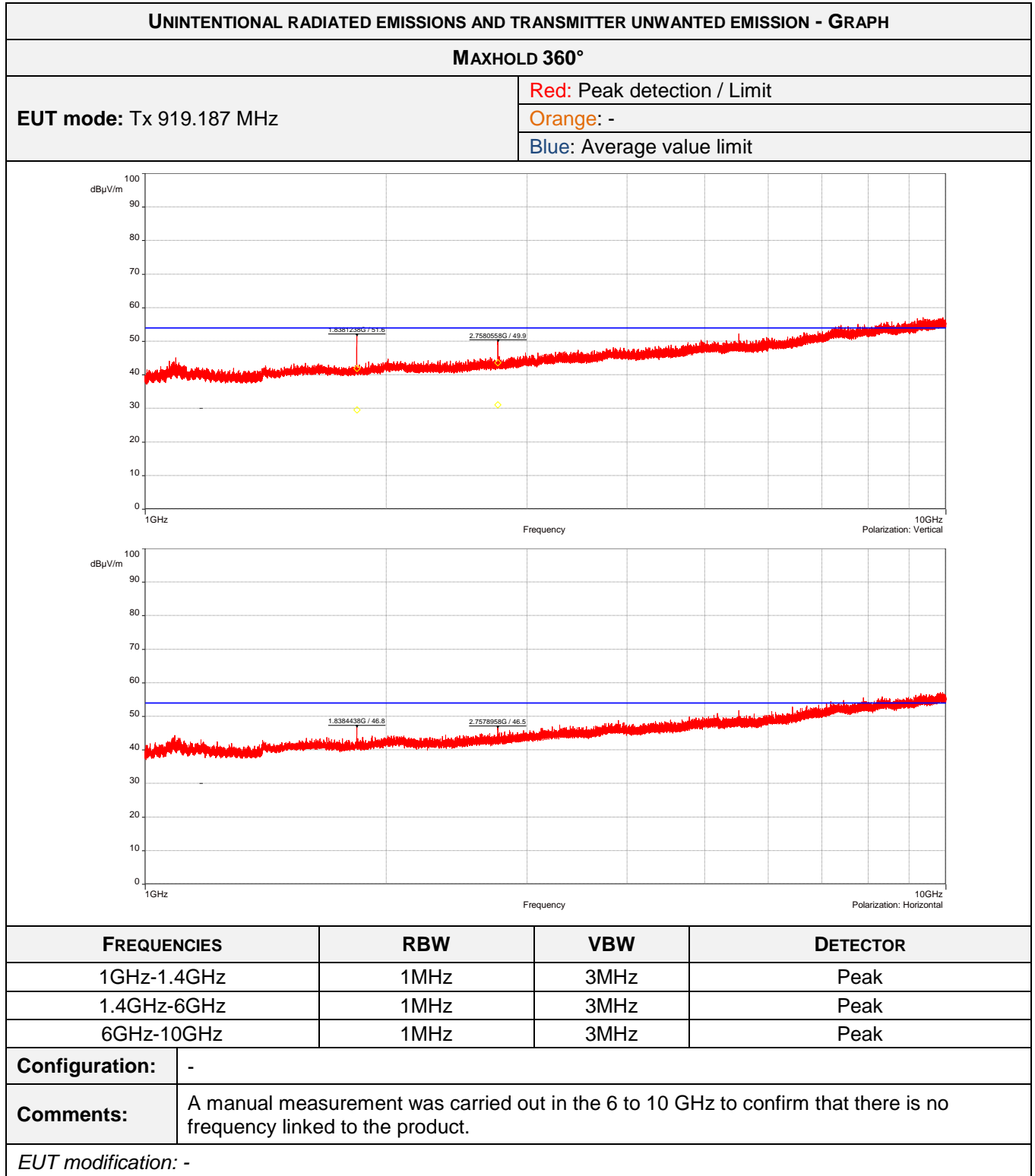
Frequency (GHz)	Height (cm)	Polarization (H or V)	Azimuth (°)	Electro-magnetic field (dBµV/m)	Limit (dBµV/m)	Margin (dB)
1830.28	150	V	0	29.5	54.0	24.5
2745.14	150	V	0	31.0	54.0	23.0

H : Horizontal – V : Vertical



Frequency (GHz)	Height (cm)	Polarization (H or V)	Azimuth (°)	Electromagnetic field (dBµV/m)	Limit (dBµV/m)	Margin (dB)
1836.18	150	V	170	29.5	54.0	24.5
2754.55	150	V	0	30.9	54.0	23.1

H : Horizontal – V : Vertical



Frequency (GHz)	Height (cm)	Polarization (H or V)	Azimuth (°)	Electro-magnetic field (dBµV/m)	Limit (dBµV/m)	Margin (dB)
1838.45	150	V	0	29.6	54.0	24.4
2757.66	150	V	0	31.1	54.0	22.9

H : Horizontal – V : Vertical

6.9. Unintentional radiated emissions in the band 30 MHz – 5 GHz

Reference standard:	FCC 47 CFR PART 15 : 2023 RSS-Gen Issue 5 : 2018 / AMD1: 2019 / AMD2: 2021
Test method:	§ 15.109 of FCC 47 CFR PART 15 : 2023 § 6.13 of RSS-Gen Issue 5 : 2018 / AMD1: 2019 / AMD2: 2021
<p>General test setup: E.U.T. is set on an insulating support at 0.8 m (<1GHz) and 1.5 m (>1GHz) above the ground reference plane.</p> <p>For maximum meter reading at each frequency, the antenna height is adjusted between 1 m and 4 m above the ground plane for 30 MHz - 5 GHz. A 360 degrees rotation of the EUT is performed in vertical and horizontal polarization.</p>	

TESTED CONFIGURATION	PARAMETER	VERDICT
Maxhold 360° - "Sleeping radio" mode	30MHz-1GHz	PASS
Maxhold 360° - "Sleeping radio" mode	1GHz-5GHz	PASS

LABORATORY PARAMETERS:	REQUIRED PRIOR TO THE TEST	DURING THE TEST
Ambient Temperature	10 to 40 °C	23°C
Relative Humidity	10 to 90 %	37%
Atmospheric pressure	N/A	N/A
Test method deviation: No		
Supplementary information: -		

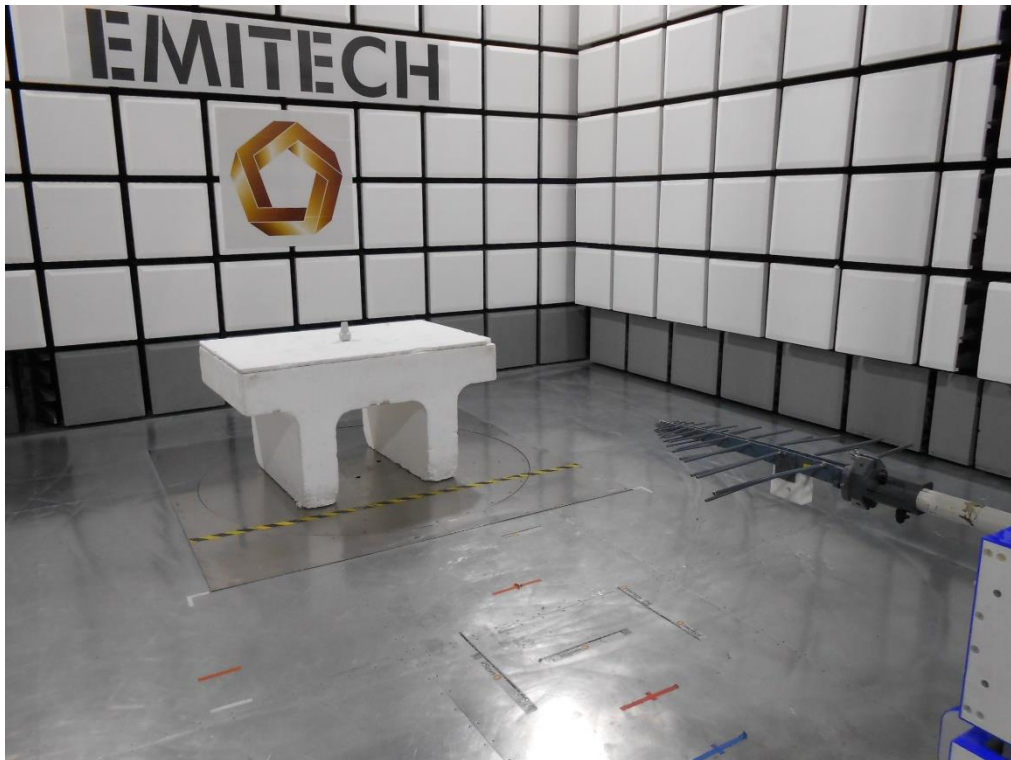
TEST EQUIPMENT USED					
CATEGORY	BRAND	TYPE	IDENTIFIER	CAL. DATE	CAL. DUE
Amplifier	Mini-Circuit	ZFL-1000LN	00364	15/02/2023	15/04/2024
Amplifier	Agilent	8449B	14487	12/09/2023	12/11/2024
Antenna	Rohde & Schwarz	HL223	00294	05/05/2023	05/07/2026
Antenna	Rohde & Schwarz	HK116	00293	30/09/2021	30/11/2024
Antenna	EMCO	3115	00941	01/03/2022	01/05/2025
Cable	C&C	N-5M	11184	22/06/2023	22/08/2024
Cable	C&C	N-4M	14226	26/06/2023	26/08/2024
Cable	Câbles Et Connectiques	N-2M	02451	29/08/2022	29/10/2024
Cable	Huber + Suhner	N-6M	17269	29/08/2022	29/10/2024
Receiver	Rohde & Schwarz	ESIB26	06089	15/11/2022	15/01/2025
Receiver	Rohde & Schwarz	ESW44	17058	15/06/2023	15/08/2024
Shielded enclosure	Comtest	SAC 3M	14622	27/04/2022	27/06/2025
Software	Nexio	BAT EMC	00000		

BAT-EMC software version: V3.18.0.26
Blank cells = Permanent validity

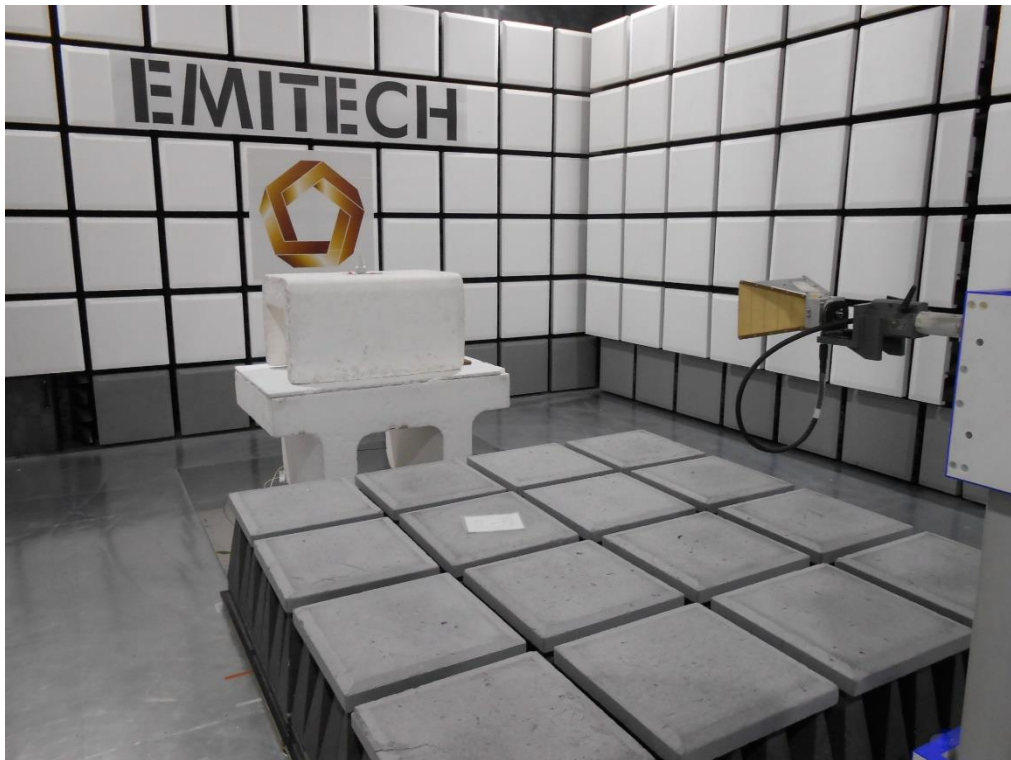
TEST SETUP PHOTOS
30 MHz – 1 GHz

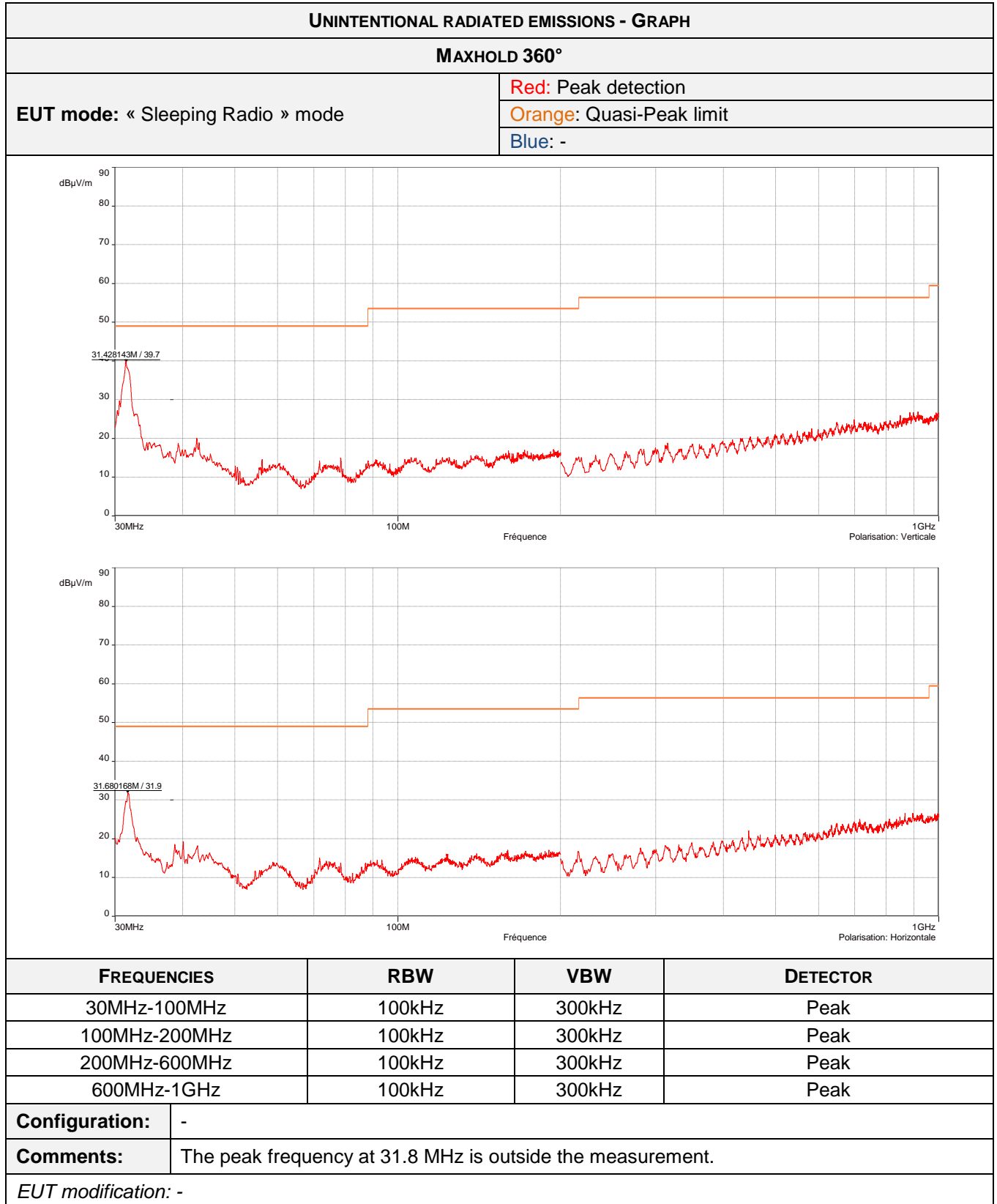


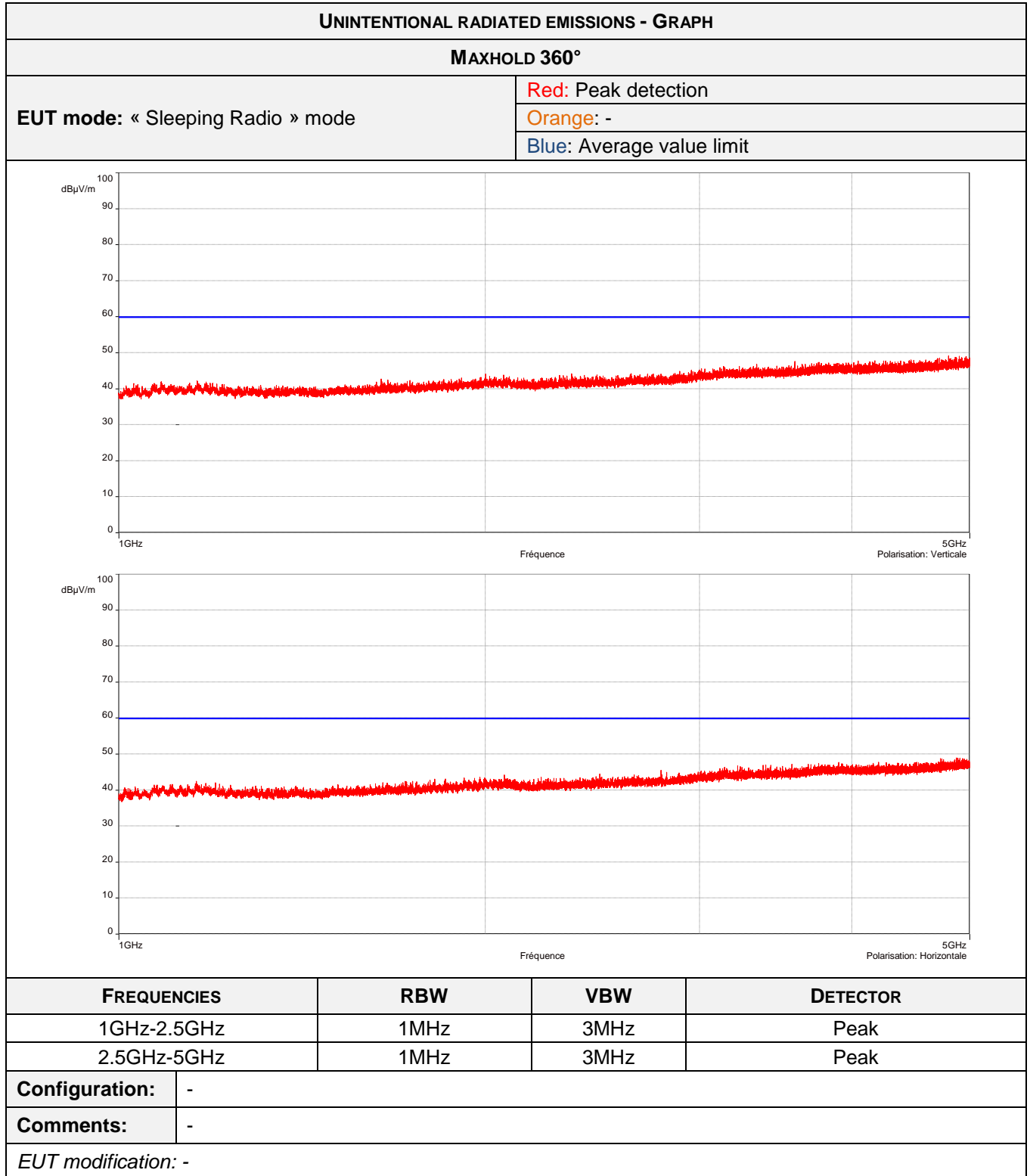
TEST SETUP PHOTOS
30 MHz – 1 GHz



TEST SETUP PHOTOS
1 GHz – 5 GHz







No significant frequencies were found above the measurement noise between 1 GHz and 5 GHz.

●●● End of test report ●●●