

E.M.C Test Report

According to the standards:

FCC 47 CFR PART 15 : 2018 (§15.247)

RSS-247 issue 2 : 2017

RSS-Gen Issue 5 : 2019

Equipment under test:

Electronic wind instrument SYLPHYO

(FCC ID: 2ASYT-AODYOSYLPHYO)

(IC: 24942-SYLPHYO)

and Wireless receiver device SYLPHYO LINK

(FCC ID: 2ASYT-AODYOSLINK)

(IC: 24942-SLINK)

Company:

AODYO SAS

FCC accredited: FR0004

IC accredited: 4379A

Distribution: Mr. POUILLARD

(Company: AODYO SAS)

Number of pages: 53 with 3 annexes

Ed.	Date	Modified pages	Written by		Technical Verification and Quality Approval	
			Name	Visa	Name	Visa
0	22/03/2019	Creation	F. ROHRI Radio Technician		B. Pellerin Radio Technical Manager	

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

Duplication of this report is only permitted for an integral photographic facsimile. It includes the number of pages referenced 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 production of the item tested.



TEST CERTIFICATION FOR: : FCC and Canada Certifications

NAME OF THE EQUIPMENT UNDER TEST : Electronic wind instrument SYLPHYO and
Wireless receiver device SYLPHYO LINK

Serial number : SYLPHYO: AS01282
SYLPHYO LINK: AL01281

Reference / model (P/N) : SYLPHYO: EAN 711 203 121 9320
SYLPHYO LINK: EAN 711 203 180 7763

Software version : V1.3.3

NAME OF THE MANUFACTURER : AODYO SAS

ADDRESS OF THE APPLICANT :

Company : AODYO SAS

Address : 11b, Avenue de l'Harmonie –
Ruche de Villeneuve d'Ascq
59650 VILLENEUVE D'ASCQ
FRANCE

Person present during the tests : Mr. POUILLARD

Responsible : Mr. POUILLARD

DATES OF TESTS : 2019, from the 25th to the 27th of February
2019, the 7th of March

TESTS LOCATION : EMITECH Ile De France
CAP 78- ZA de l'Observatoire
3 rue des Coudriers
78180 Montigny Le Bretonneux - FRANCE

TESTS SUPERVISOR : B. PELLERIN

TESTS OPERATORS : F. ROHRI / A. BERNARD

TABLE OF CONTENTS

1. INTRODUCTION	4
2. REFERENCE DOCUMENTS	4
3. PRODUCT DESCRIPTION	5
4. TESTS AND CONCLUSION	8
5. DIGITAL MODULATION SYSTEMS	13
6. TRANSMITTER OUTPUT POWER	16
7. PEAK POWER SPECTRAL DENSITY	18
8. ADDITIONAL PROVISIONS TO THE GENERAL RADIATED EMISSIONS LIMITATION	22
9. UNINTENTIONAL RADIATED EMISSIONS AND TRANSMITTER UNWANTED EMISSION IN THE BAND 9 kHz – 25 GHz	24
10. CONDUCTED EMISSION	29

ANNEX 1: EXTERNAL PHOTOGRAPHS

ANNEX 2: 6 dB BANDWIDTH, 20 dB BANDWIDTH, 99% BANDWIDTH

ANNEX 3: BAND EDGE

1. INTRODUCTION

This document presents the results of Electromagnetic Compatibility tests performed on the equipment « **Electronic wind instrument SYLPHYO and Wireless receiver device SYLPHYO LINK** » according to reference documents listed below.

2. REFERENCE DOCUMENTS

FCC 47 CFR Part 15: 2018

Code of Federal Regulations. Title 47- Telecommunication
Chapter 1- Federal Communication Commission
Part 15- Radio frequency devices

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: March 2019

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

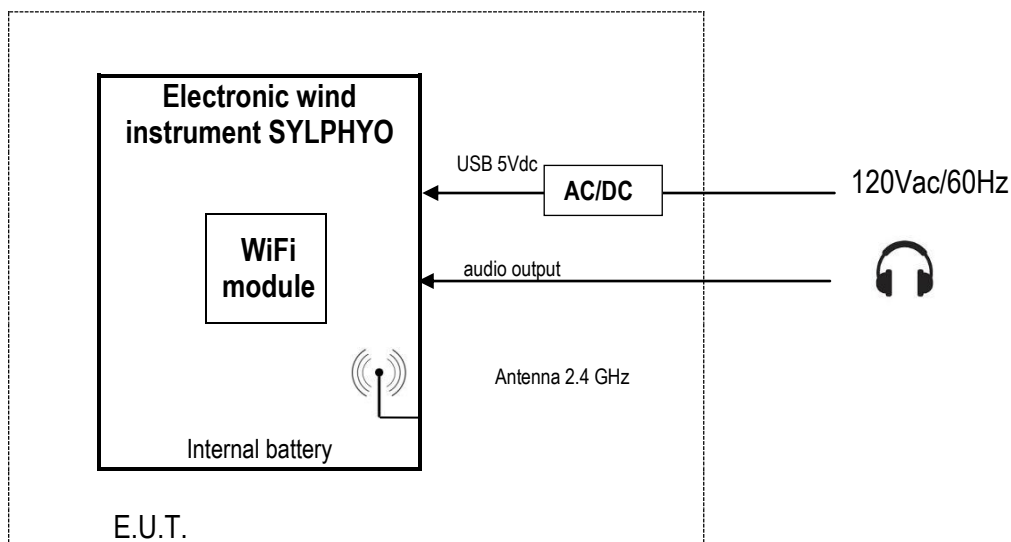
American National Standard of Procedures for Compliance Testing of Unlicensed Wireless Devices.

3. PRODUCT DESCRIPTION

Class:	B (Residential environment)
Antenna type and gain:	Integral antenna: Not communicated
Operating frequency range:	from 2408 MHz to 2474 MHz
Number of channels:	64
Channel spacing:	1 MHz
Modulation:	-
Power source:	SYLPHYO: 120Vac/60Hz (AC/DC adapter), 5Vdc (USB) or 3,7Vdc (battery) SYLPHYO LINK: 120Vac/60Hz (AC/DC adapter) or 5Vdc (USB)
Software power setting:	-
Modification of the equipment during the tests:	No.

Electronic wind instrument SYLPHYO

The electronic wind instrument SYLPHYO is presented in a plastic housing, intended for use portable in every environment; it is tested in horizontal position and vertical position. That used for all measurements in a horizontal position.



E.U.T.: Equipment under Test.

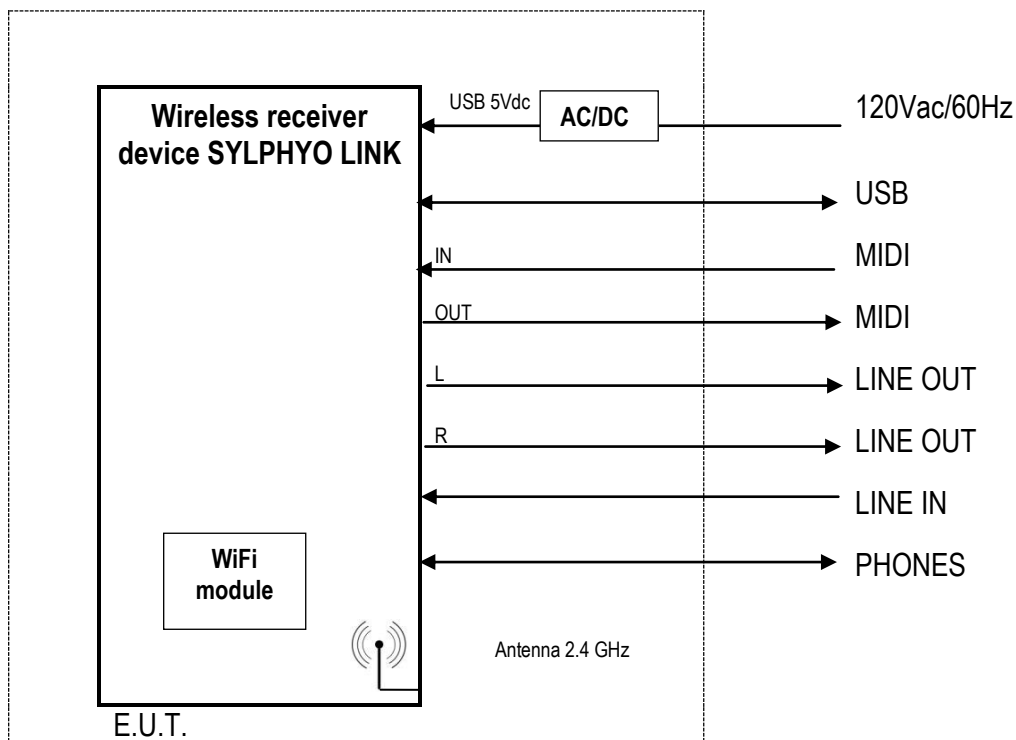
- Reference module: *BT832X FANSTEL*

Power (W).....	0.1
Nominal current (A).....	0.4
Dimensions (L x W x H) (m).....	0.43 x 0.08 x 0.08
Weight (kg).....	0.395
Modulation.....	Digital modulation GFSK
Test software.....	SylphyoCertTest V1.0
Antenna gain.....	PCB antenna 2.82 dBi
Input impedance.....	50 Ω
Output parameter module.....	- 8 dB

Wireless receiver device SYLPHYO LINK

The wireless receiver device SYLPHYO LINK is presented in a plastic housing, intended for use on table in every environment. That used for all measurements in a vertical position.

Tests performed in configuration “powered by USB” and “powered by adapter AC/DC.



E.U.T.: Equipment under Test.

- Reference module: *BT832X FANSTEL*

Power (W).....	0.1
Nominal current (A).....	0.120
Dimensions (L x W x H) (m).....	0.14 x 0.08 x 0.05
Weight (kg).....	0.250
Modulation.....	Digital modulation GFSK
Test software.....	SylphyoCertTest V1.0
Antenna gain.....	PCB antenna 2.82 dBi
Input impedance.....	50 Ω
Output parameter module.....	- 8 dB

4. TESTS AND CONCLUSION

The following table summarizes test results of the EUT.

Subpart B of the standard FCC part 15 – Unintentional radiators

Test procedure	Designation of test	Test results				Comments
		Pass	Fail	N.A.	N.P.	
15.107	Measurement of conducted emission on AC mains ports	X				
15.109	Radiated emission limits	X				

Subpart C of the standard FCC part 15 – Intentional radiators

Test procedure	Designation of test	Test results				Comments
		Pass	Fail	N.A.	N.P.	
15.205	Restricted bands of operation	X				
15.207	Measurement of conducted emission on AC mains ports	X				
15.209	Radiated emission limits; general requirements	X				
15.215	Additional provisions to the general radiated emission limitations					
	(a) Alternative to general radiated emission limits			X		
	(b) Unwanted emissions outside of § 15.247 frequency bands	X				
	(c) 20 dB bandwidth and band-edge compliance			X		
15.247	Intentional radiated emissions					
	a) frequency hopping and digitally modulated					
	a) (1) hopping mode			X		
	a) (1) (i) frequency hopping in the band 902-928 MHz			X		
	a) (1) (ii) frequency hopping in the band 5725-5850 MHz			X		
	a) (1) (iii) frequency hopping in the band 2400-2483.5 MHz			X		
	a) (2) systems using digital modulation in the bands 902-928 MHz, 2400-2483.5 MHz, and 5725-5850 MHz (6 dB bandwidth)	X				
	b) maximum peak conducted					
	b) (1) frequency hopping in the bands 2400-2483.5 MHz or 5725-5850 MHz			X		
	b) (2) frequency hopping in the band 902-928 MHz			X		

Test procedure	Designation of test	Test results				Comments
		Pass	Fail	N.A.	N.P.	
15.247	b) (3) systems using digital modulation in the bands 902–928 MHz, 2400–2483.5 MHz, and 5725–5850 MHz	X				
	b) (4) maximum peak conducted > 6 dBi			X		
	b) (4) (i) frequency hopping in the band 2400–2483.5 MHz			X		
	b) (4) (ii) frequency hopping in the band 5725–5850 MHz			X		
	b) (4) (iii) fixed, point-to-point			X		
	c) directional antenna > 6 dBi					
	c) (1) fixed, point-to-point operation			X		
	c) (1) (i) in the band 2400–2483.5 MHz			X		
	c) (1) (ii) in the band 5725–5850 MHz			X		
	c) (1) (iii) fixed, point-to-point			X		
	c) (2) multiple directional beams in the band 2400–2483.5 MHz			X		
	c) (2) (i) information			X		
	c) (2) (ii) sum of the power supplied to all antennas			X		
	c) (2) (iii) one antenna for multiple directional beams			X		
	c) (2) (iv) single directional beam			X		
	d) intentional radiator	X				
	e) peak power spectral density	X				
	f) hybrid system			X		
	g) continuous data stream during the test			X		
	h) to avoid hopping on occupied channels			X		
	i) RF exposure compliance			X		P < 500 mW

N.A.: Not Applicable

N.P.: Not Performed

Standard RSS-247 Issue 2 : 2017

Designation of test	Test results				Comments
	Pass	Fail	N.A.	N.P.	
1. Scope					
3. Certification Requirements					
3.1 RSS-gen compliance			X		See RSS-Gen Issue 5
			X		See RSS-Gen Issue 5
			X		See RSS-Gen Issue 5
			X		See CS-03
			X		See RSS-Gen Issue 5
5.2 Digital Modulation Systems					
(1) -6 dB bandwidth	X				
(2) transmitter power spectral density	X				
5.4 Transmitter Output Power and e.i.r.p. Requirements					
1) 902-928 MHz frequency hopping systems output power / e.i.r.p.			X		
2) 2400-2483.5 MHz frequency hopping systems output power / e.i.r.p.			X		
3) 5725-5850 MHz frequency hopping systems output power / e.i.r.p.			X		
4) Digital modulation systems output power / e.i.r.p.	X				
5) point-to-point systems (2400-2483.5 and 5725-5850 MHz)			X		
6) Multiple directional beams antenna systems (2400-2483.5 MHz)			X		
5.5 Unwanted emission	X				

Standard RSS-Gen Issue 5 : March 2019

Designation of test	Test results				Comments
	Pass	Fail	N.A.	N.P.	
1. Scope					
2. Purpose and application					
2.1 Certification of Radio Apparatus			X		
2.2 Categories of radio Equipment					Category 1
2.3 Exclusions			X		
2.4 Determination of Interference			X		
3. Normative Reference Publications					
4. application for an Exemption					
5. Receivers					
5.1 Scanner Receivers			X		
5.2 Stand-Alone Receivers Operating in the Band 30-960 MHz (Category II)			X		
5.3 Receivers Exempted From Industry Canada Requirement (Category II)			X		
6. Technical Requirements					
6.1 Test Site Facilities					See ANSI C63.4-2014
6.2 Test report					
6.3 External control			X		
6.4 Near Field Measurement Method Below 30 MHz			X		
6.5 Measurement Distance Above 30 MHz					
6.6 Occupied Bandwidth	X				See RSS 247
6.7 Transmitter Antenna for Licensed Radio Apparatus			X		
6.8 Operating Bands and Selection of Test Frequencies			X		
6.9 CISPR Quasi-peak Detector	X				
6.10 Pulsed Operation			X		
6.11 Transmitter Frequency Stability			X		
6.12 Transmitter Output Power	X				See RSS 247
6.13 Transmitter unwanted Emissions	X				
7. Receiver limit					
8. Licence-Exempt radio Apparatus					
8.1 Measurement Bandwidths and Detector Functions	X				
8.2 Amplifiers			X		
8.3 Transmitter Antenna for Licence-Exempt Radio Apparatus			X		
8.4 User Manual notice for Licence-Exempt Radio Apparatus			X		
8.5 Measurement of Licence-Exempt Devices On-Site (in-situ)			X		
8.6 Operating frequency Range of Device in Master/Slave networks			X		
8.7 Radio Frequency identification (RFID) Devices			X		
8.8 AC Power Line Conducted Emission Limits for licence-Exempt Radio Apparatus	X				
8.9 Transmitter Emission limits for Licence-Exempt Radio Apparatus			X		
8.10 Restricted Frequency bands			X		
8.11 Frequency Stability for Licence-Exempt transmitters			X		

Designation of test	Test results				Comments
	Pass	Fail	N.A.	N.P.	
7. Licence-exempt Radio Apparatus					
7.1 General Informations					
7.1.1 External Amplifiers			X		
7.1.2 Transmitter Antenna			X		
7.1.3 User manual Notice			X		User manual shall include the required statements
7.1.4 Radio Apparatus Containing Digital Circuits			X		See ICES-003
7.1.5 Measurement After Installation			X		
7.1.6 operating Frequency range of Devices in Master/Slave Networks			X		
7.1.7 Home-built Devices			X		
7.1.8 RFID Devices			X		
7.2 Measurement Methods and Standard Specifications					
7.2.1 Measurement Bandwidths and Detector Functions	X				
7.2.2 Emissions Falling Within Restricted Frequency Bands			X		
7.2.3 Devices Employing Pulsed Operation			X		
7.2.4 AC Power Line Conducted Emissions Limits	X				
7.2.5 Transmitter Spurious Emission Limits	X				
7.2.6 Transmitter Frequency Stability			X		
7.2.7 Measurement Distance			X		

Note 1: Single / Split / limited modular transmitter.

The host devices of the certified module(s) shall be properly labeled to identify the module(s) within.

Note 2: Spectrum investigated from 30 MHz or the lowest radio frequency signal generated in the equipment, whichever is lower, without going below 9 kHz to the 10th harmonic of the highest fundamental frequency or 40 GHz, whichever is lower (F<10 GHz) or to the 5th harmonic of the highest fundamental frequency or 100 GHz, whichever is lower (F≥10 GHz).

Note 3: Spectrum investigated from the lowest frequency internally generated or used in the receiver or 30 MHz, whichever is higher to at least 3 times the highest tune-able or local oscillator frequency, whichever is higher without exceeding 40 GHz.

Note 4: The certificate holder shall be able to demonstrate a quality control process used for production.
Inspection and testing in accordance with good engineering practices.

Note 5: The device must be properly identified and labeled.

Note 6: Suppliers of radio apparatus shall provide notices and user information in both English and French.

Note 7: The device shall not have any external controls accessible to the user.

Note 8: When transitioning between bands, the equipment shall not actively transmit

Conclusion:

The tested sample «**Electronic wind instrument SYLPHYO and Wireless receiver device SYLPHYO LINK**» submitted to the tests complies with the requirements of the standards:

- FCC 47 CFR PART 15 : 2018
- RSS-247 issue 2: 2017
- RSS-Gen Issue 5 : March 2019

According to the limits specified in this report.

5. DIGITAL MODULATION SYSTEMS

Standards: FCC 47 CFR PART 15 : 2018
RSS-247 Issue 2 : 2017
RSS-Gen Issue 5 : 2019

Sections: §15.247 a) (2) of FCC 47 CFR PART 15 : 2018
§5.2 a) of RSS-247 issue 2 : 2017
§6.6 of RSS-Gen issue 5 : 2019

Test configuration:

The system is tested in normalized test site.

The test unit is placed on a rotating table, 1.5 m from a ground plane. Zero degree azimuth corresponds to the front of the equipment under test.

The level was maximised in azimuth and polarization. The maximum level measured on the spectrum analyser was recorded.

Distance of antenna: 3 meters

Instrumentation test list:

Category	Manufacturer	Type	Emitech Nr	Last validity date	Next validity date
Antenna	Emco	3115	0941	08/02/2019	08/04/2022
Cable	C&C	N-2m	11178	04/05/2018	04/07/2020
Cable	C&C	N-2m	11182	18/04/2018	18/06/2020
Cable	C&C	N-8m	11183	18/04/2018	18/06/2020
Receiver	Rohde & Schwarz	ESR7	14768	10/01/2019	10/03/2020
Shielded enclosure	Comtest	SAC 3m	14803	-	-

Equipment under test operating condition:

EUT is in continuous transmission mode.

Measure conditions:

Ambient temperature (°C): 21

Relative humidity (%): 50

Resolution bandwidth: 100 kHz

Results:

Power source: 120Vac/60Hz

Electronic wind instrument SYLPHYO

6 dB bandwidth

Frequency	Results (MHz)	Comments
2408 MHz	0.738	See annex n°2
2440 MHz	0.748	See annex n°2
2474 MHz	0.738	See annex n°2

20 dB bandwidth

Frequency	Results (MHz)	Comments
2408 MHz	1.248	See annex n°2
2440 MHz	1.258	See annex n°2
2474 MHz	1.253	See annex n°2

99% bandwidth

Frequency	Results (MHz)	Comments
2408 MHz	1.092	See annex n°2
2440 MHz	1.086	See annex n°2
2474 MHz	1.095	See annex n°2

Wireless receiver device SYLPHYO LINK

6 dB bandwidth

Frequency	Results (MHz)	Comments
2408 MHz	0.768	See annex n°2
2440 MHz	0.768	See annex n°2
2474 MHz	0.758	See annex n°2

20 dB bandwidth

Frequency	Results (MHz)	Comments
2408 MHz	1.268	See annex n°2
2440 MHz	1.248	See annex n°2
2474 MHz	1.248	See annex n°2

99% bandwidth

Frequency	Results (MHz)	Comments
2408 MHz	1.089	See annex n°2
2440 MHz	1.095	See annex n°2
2474 MHz	1.089	See annex n°2

Test conclusion: Complies with the requirements of the standards.

6. TRANSMITTER OUTPUT POWER

Standards: FCC 47 CFR PART 15 : 2018
RSS-247 Issue 2 : 2017

Sections: §15.247 b) (3) of FCC 47 CFR PART 15 : 2018
§5.4 of RSS-247 issue 2 : 2017

Test configuration:

The system is tested in normalized test site.

The test unit is placed on a rotating table, 1.5 m from a ground plane. Zero degree azimuth corresponds to the front of the equipment under test.

The level was maximised in azimuth and polarization. The maximum level measured on the spectrum analyser was recorded.

Distance of antenna: 3 meters.

Instrumentation test list:

Category	Manufacturer	Type	Emitech Nr	Last validity date	Next validity date
Antenna	Emco	3115	0941	08/02/2019	08/04/2022
Cable	C&C	N-2m	11178	04/05/2018	04/07/2020
Cable	C&C	N-2m	11182	18/04/2018	18/06/2020
Cable	C&C	N-8m	11183	18/04/2018	18/06/2020
Receiver	Rohde & Schwarz	ESR7	14768	10/01/2019	10/03/2020
Shielded enclosure	Comtest	SAC 3m	14803	-	-

Equipment under test operating condition:

EUT is in continuous transmission mode.

Measure conditions:

Ambient temperature (°C): 21

Relative humidity (%): 50

Resolution bandwidth: 1 MHz

Results:

Power source: 120Vac/60Hz

Electronic wind instrument SYLPHYO

Frequency	Electro-magnetic field (dBμV/m)	TP* (dBm)	Limit (dBm)
2408 MHz	96.4	- 0.9	+ 30
2440 MHz	102.4	+ 5.0	+ 30
2474 MHz	100.9	+ 3.5	+ 30

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

Wireless receiver device SYLPHYO LINK

Frequency	Electro-magnetic field (dBμV/m)	TP* (dBm)	Limit (dBm)
2408 MHz	99.3	+ 1.9	+ 30
2440 MHz	103.6	+ 6.2	+ 30
2474 MHz	102.5	+ 5.1	+ 30

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

Test conclusion: Complies with the requirements of the standards.

7. PEAK POWER SPECTRAL DENSITY

Standards: FCC 47 CFR PART 15 : 2018
RSS-247 Issue 2 : 2017

Sections: §15.247 e) of FCC 47 CFR PART 15 : 2018
§5.2 b) of RSS-247 issue 2 : 2017

Test configuration:

The system is tested in normalized test site.

The test unit is placed on a rotating table, 1.5m from a ground plane. Zero degree azimuth corresponds to the front of the equipment under test.

The level was maximised in azimuth and polarization. The maximum level measured on the spectrum analyser was recorded.

Distance of antenna: 3 meters

Instrumentation test list:

Category	Manufacturer	Type	Emitech Nr	Last validity date	Next validity date
Antenna	Emco	3115	0941	08/02/2019	08/04/2022
Cable	C&C	N-2m	11178	04/05/2018	04/07/2020
Cable	C&C	N-2m	11182	18/04/2018	18/06/2020
Cable	C&C	N-8m	11183	18/04/2018	18/06/2020
Receiver	Rohde & Schwarz	ESR7	14768	10/01/2019	10/03/2020
Shielded enclosure	Comtest	SAC 3m	14803	-	-

Equipment under test operating condition:

EUT is in continuous transmission mode.

Measure conditions:

Ambient temperature (°C): 21

Relative humidity (%): 50

Resolution bandwidth: 30 kHz

Video bandwidth: 100 kHz

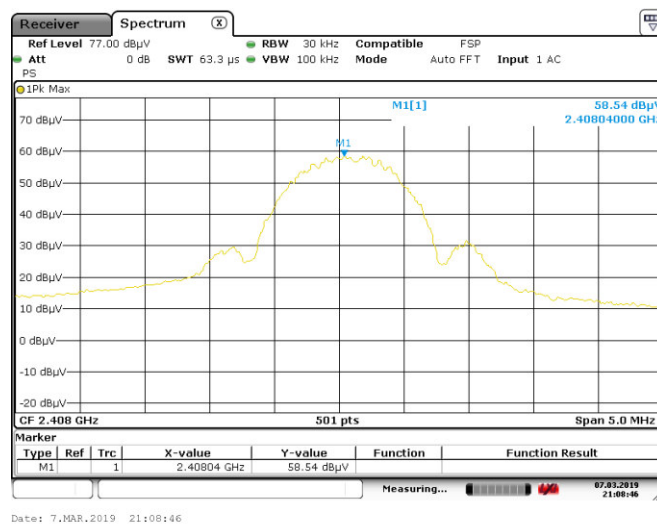
Results:

Power source: 120Vac/60Hz

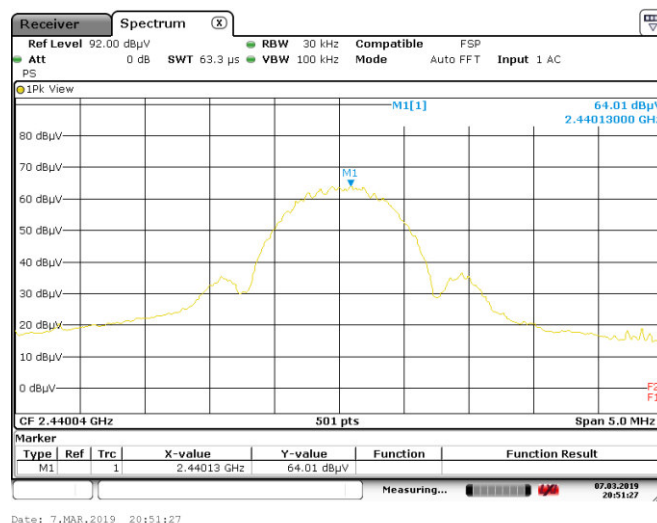
Electronic wind instrument SYLPHYO

Frequency	Electro-magnetic field (dBμV/m)	PPSD* (dBm)	Limit (dBm)
2408 MHz	92.6	- 4.8	+ 8.0
2440 MHz	98.1	+ 0.8	
2474 MHz	96.9	- 0.5	

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



2408 MHz



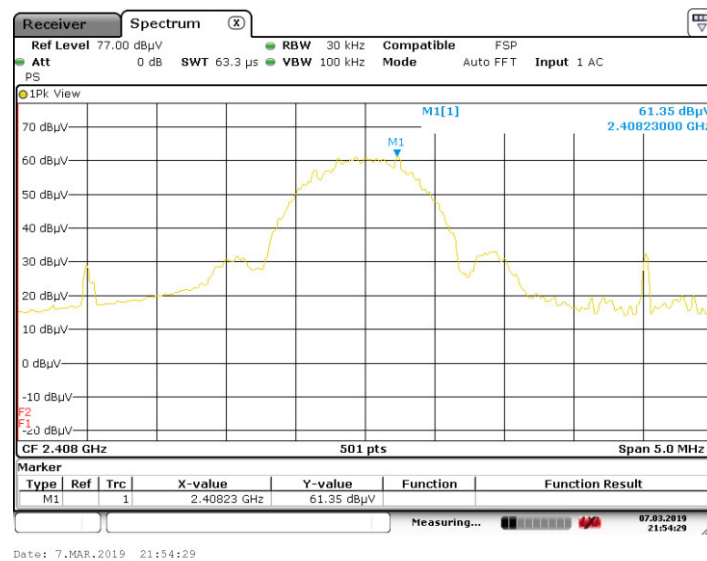
2440 MHz

No screenshot for frequency 2474 MHz

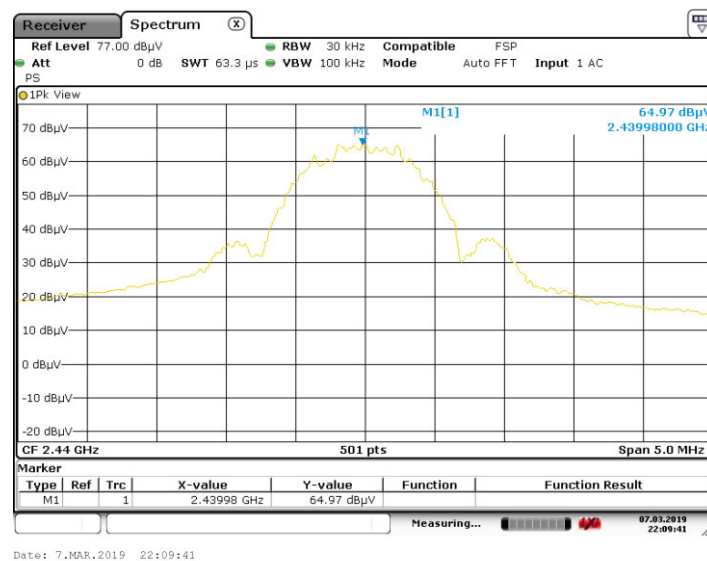
Wireless receiver device SYLPHYO LINK

Frequency	Electro-magnetic field (dBμV/m)	PPSD* (dBm)	Limit (dBm)
2408 MHz	95.4	- 2.0	+ 8.0
2440 MHz	99.1	+ 1.7	
2474 MHz	99.0	+ 1.6	

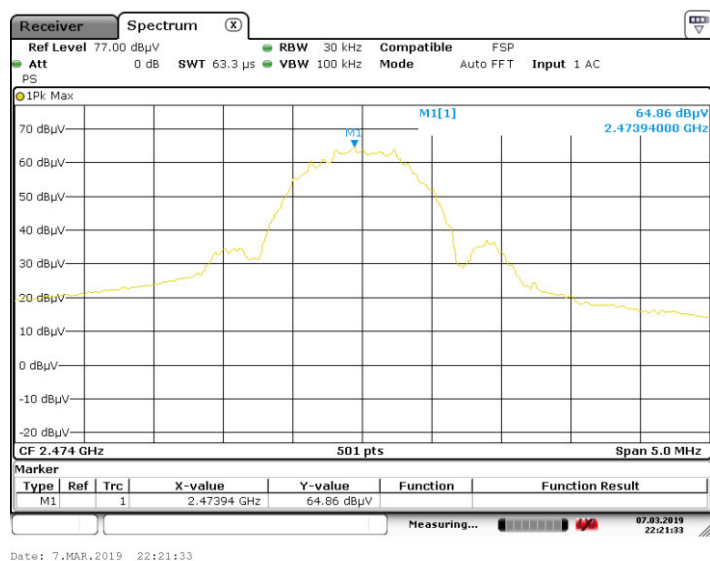
* PPST = $(E \times d)^2 / (30 \times 1.64)$ for $d = 3 \text{ m}$



2408 MHz



2440 MHz



2474 MHz

Test conclusion: Complies with the requirements of the standards.

8. ADDITIONAL PROVISIONS TO THE GENERAL RADIATED EMISSIONS LIMITATION

Standards: FCC 47 CFR PART 15 : 2018
RSS-247 Issue 2 : 2017

Sections: §15.215 (b) and §15.247 (d) of FCC 47 CFR PART 15 : 2018
§5.5 of RSS-247 issue 2 : 2017

Instrumentation test list:

Category	Manufacturer	Type	Emitech Nr	Last validity date	Next validity date
Antenna	Emco	3115	0941	08/02/2019	08/04/2022
Cable	C&C	N-2m	11178	04/05/2018	04/07/2020
Cable	C&C	N-2m	11182	18/04/2018	18/06/2020
Cable	C&C	N-8m	11183	18/04/2018	18/06/2020
Receiver	Rohde & Schwarz	ESR7	14768	10/01/2019	10/03/2020
Shielded enclosure	Comtest	SAC 3m	14803	-	-

Equipment under test arrangement:

The system is tested in normalized test site.

The test unit is placed on a rotating table, 1.5 m from a ground plane. Zero degree azimuth corresponds to the front of the equipment under test.

The level was maximised in azimuth and polarization. The maximum level measured on the spectrum analyser was recorded.

Results:

Ambient temperature (°C): 21

Relative humidity (%): 50

Lower Band Edge: from 2310 MHz to 2390 MHz

Upper Band Edge: from 2483.5 MHz to 2500 MHz

Electronic wind instrument SYLPHYO

Polarization of test antenna: Horizontal (height = 150 cm) } For 2408 MHz
Position of equipment: azimuth = 185°

Polarization of test antenna: Horizontal (height = 150 cm) } For 2474 MHz
Position of equipment: azimuth = 190°

Wireless receiver device SYLPHYO LINK

Polarization of test antenna: Vertical (height = 150 cm) } For 2408 MHz
Position of equipment: azimuth = 30°

Polarization of test antenna: Vertical (height = 150 cm) } For 2474 MHz
Position of equipment: azimuth = 20°

Electronic wind instrument SYLPHYO

Fundamental frequency (MHz)	Field Strength Level of fundamental (dBμV/m)	Detector (Peak or Average)	Frequency of maximum Band-edges Emission (MHz)	Delta Marker (dB) *	Calculated Max Out of Band Emission Level (dBμV/m)	Limits (dBμV/m)	Margin (dB)
2408.01	96.4	Average	2343.88	50.0	46.4	54	7.6
2474.048	100.9	Average	2491.413	53.8	47.1		6.9

* According to step 2 of Marker-Delta Method DA 00-705.

Band-edge curves are given in annex 3.

Wireless receiver device SYLPHYO LINK

Fundamental frequency (MHz)	Field Strength Level of fundamental (dBμV/m)	Detector (Peak or Average)	Frequency of maximum Band-edges Emission (MHz)	Delta Marker (dB) *	Calculated Max Out of Band Emission Level (dBμV/m)	Limits (dBμV/m)	Margin (dB)
2408.22	99.3	Average	2365.46	51.0	48.3	54	5.7
2474.017	102.5	Average	2489.037	54.5	48.0		6.0

* According to step 2 of Marker-Delta Method DA 00-705.

Band-edge curves are given in annex 3.

Test conclusion: Complies with the requirements of the standards.

9. UNINTENTIONAL RADIATED EMISSIONS AND TRANSMITTER UNWANTED EMISSION IN THE BAND 9 kHz – 25 GHz

Standards: FCC 47 CFR PART 15 : 2018
RSS-Gen Issue 5 : March 2019

Sections: §15.205; 15.109; 15.209 and §15.247 of FCC 47 CFR PART 15 : 2018
§6.13 of RSS-Gen Issue 5 : March 2019

Equipment under test arrangement:

The equipment under test (EUT) is placed on a non-conductive test table at 0.8 m (<1GHz) and 1.5 m (>1GHz) above the horizontal metal ground plane.

For maximum meter reading at each frequency, the antenna height is adjusted between 1 m and 4 m above the ground plane for 30MHz-1GHz, at 1 m for 9kHz-30MHz and 1.5 m for 1GHz-25GHz. A 360 degrees rotation of the EUT is performed in vertical and horizontal polarization. The frequency azimuth and antenna height are presented in the table on the next pages.

The E.U.T. is blocked in continuous transmission.

Frequencies range: 9 kHz – 30 MHz
30 MHz - 1 GHz
1 GHz – 25 GHz

Detections mode: Quasi-peak for 9 kHz – 30 MHz
Quasi-peak for 30 MHz - 1 GHz
Average for 1 GHz – 25 GHz

Resolutions bandwidth: 200 Hz for 9 kHz – 150 kHz
9 kHz for 150 kHz – 30 MHz
120 kHz for 30 MHz - 1 GHz
1 MHz for 1 GHz – 25 GHz

Measurements distance: 3 meters from 9 kHz to 30 MHz
3 meters from 30 MHz to 25 GHz

Limit for emission radiated outside the frequency band, except the harmonics, shall be attenuated by at least 20 dB below the level of fundamental or the general radiated emission limits.

From 9 kHz to 30 MHz

Frequencies range	Limit ($\mu\text{V/m}$)
9 – 490 kHz	2400/F (F in kHz) *
490 – 1705 kHz	24000/F (F in kHz) **
1.705 – 30 MHz	30 **

* Limits in $\mu\text{V/m}$ can be extrapolated to 3 m using 40 dB / decade.

** Limits in $\mu\text{V/m}$ can be extrapolated to 3 m using 20 dB / decade.

From 30 MHz to 25 GHz

Frequencies range (MHz)	Limit (dB $\mu\text{V/m}$)	Limit ($\mu\text{V/m}$)
30 to 88	40.0	100
88 to 216	43.5	150
216 to 960	46.0	200
Above 960	54.0	500

Instrumentation test list:

Category	Manufacturer	Type	Emitech Nr	Last validity date	Next validity date
Amplifier	Mini-circuit	ZFL-1000N	5023	13/11/2018	13/01/2020
Amplifier	Agilent	8449B	14524	20/04/2018	20/06/2019
Filter	Micro-Tronics	HPM 14758	4691	10/05/2017	10/07/2019
Antenna	Emco	3115	0941	08/02/2019	08/04/2022
Antenna	Oritel	CM 42/25	1045	13/07/2018	13/07/2021
Antenna	Schwarzbeck	UHALP 9108	3106	07/04/2017	07/06/2019
Antenna	Schwarzbeck	VHA 9103	3426	05/07/2017	05/07/2020
Cable	Sucoflex	SMA-2m	12914	04/05/2018	04/07/2020
Cable	Sucoflex	SMA-2m	12915	04/05/2018	04/07/2020
Cable	C&C	N-6m	14224	18/04/2018	18/06/2020
Cable	C&C	N-2m	11176	18/04/2018	18/06/2020
Cable	C&C	N-4m	14426	12/11/2018	12/01/2021
Cable	C&C	N-5m	11184	18/04/2018	18/06/2020
Spectrum analyzer	Rohde & Schwarz	FSP40 (V 4.00SP1-V3.0-10-2)	5175	20/09/2018	20/11/2020
Spectrum analyzer	Rohde & Schwarz	ESRP7	10517	27/08/2018	27/10/2020
Shielded enclosure	Comtest	C4	14622	---	---
Software	Nexio	BAT EMC v3.18.0.19	0000	---	---

Results:

Maximal uncertainty: 5.53 dB

Ambient temperature (°C): 22
Relative humidity (%): 43
Power source: 120Vac/60Hz

Electronic wind instrument SYLPHYO

Frequency 2408 MHz

Frequency (MHz)	Height (cm)	Polarization (H or V)	Azimuth (°)	Electro-magnetic field (dBμV/m)	Limit (dBμV/m)	Margin (dB)
36.000	100	V	120	35.1	40.0	4.9
48.000	100	V	60	32.4	40.0	7.6
72.000	100	V	80	30.7	40.0	9.3
588.000	110	V	330	41.7	46.0	4.3
756.000	145	V	340	43.7	46.0	2.3
840.000	140	V	100	34.7	46.0	11.3
252.000	210	H	0	34.8	46.0	11.2
588.000	180	H	20	41.8	46.0	4.2
756.000	200	H	160	42.7	46.0	3.3
840.000	110	H	20	37.7	46.0	8.3

H : Horizontal – V : Vertical

Frequency 2440 MHz

Frequency (MHz)	Height (cm)	Polarization (H or V)	Azimuth (°)	Electro-magnetic field (dBμV/m)	Limit (dBμV/m)	Margin (dB)
36.000	100	V	120	35.1	40.0	4.9
48.000	100	V	60	32.4	40.0	7.6
72.000	100	V	80	30.7	40.0	9.3
588.000	110	V	330	41.7	46.0	4.3
756.000	145	V	340	43.7	46.0	2.3
840.000	140	V	100	34.7	46.0	11.3
252.000	210	H	0	34.8	46.0	11.2
588.000	180	H	20	41.8	46.0	4.2
756.000	200	H	160	42.7	46.0	3.3
840.000	110	H	20	37.7	46.0	8.3

H : Horizontal – V : Vertical

Frequency 2474 MHz

Frequency (MHz)	Height (cm)	Polarization (H or V)	Azimuth (°)	Electro-magnetic field (dBμV/m)	Limit (dBμV/m)	Margin (dB)
36.000	100	V	120	35.1	40.0	4.9
48.000	100	V	60	32.4	40.0	7.6
72.000	100	V	80	30.7	40.0	9.3
588.000	110	V	330	41.7	46.0	4.3
756.000	145	V	340	43.7	46.0	2.3
840.000	140	V	100	34.7	46.0	11.3
252.000	210	H	0	34.8	46.0	11.2
588.000	180	H	20	41.8	46.0	4.2
756.000	200	H	160	42.7	46.0	3.3
840.000	110	H	20	37.7	46.0	8.3

H : Horizontal – V : Vertical

Wireless receiver device SYLPHYO LINK

Frequency 2408 MHz

Frequency (MHz)	Height (cm)	Polarization (H or V)	Azimuth (°)	Electro-magnetic field (dBμV/m)	Limit (dBμV/m)	Margin (dB)
36.000	100	V	170	39.6	40.0	0.4
42.750	100	V	20	36.2	40.0	3.8
48.000	100	V	70	39.4	40.0	0.6
60.000	100	V	120	39.3	40.0	0.7
72.000	100	V	210	38.4	40.0	1.6
108.000	100	V	300	37.4	43.5	6.1
120.000	100	V	120	36.0	43.5	7.5
156.000	100	V	290	37.8	43.5	5.7
588.000	190	V	230	34.3	46.0	11.7
756.000	150	V	180	42.9	46.0	3.1
180.000	100	H	30	32.0	43.5	11.5
756.000	200	H	100	40.4	46.0	5.6

H : Horizontal – V : Vertical

Frequency 2440 MHz

Frequency (MHz)	Height (cm)	Polarization (H or V)	Azimuth (°)	Electro-magnetic field (dBμV/m)	Limit (dBμV/m)	Margin (dB)
36.000	100	V	170	39.6	40.0	0.4
42.750	100	V	20	36.2	40.0	3.8
48.000	100	V	70	39.4	40.0	0.6
60.000	100	V	120	39.3	40.0	0.7
72.000	100	V	210	38.4	40.0	1.6
108.000	100	V	300	37.4	43.5	6.1
120.000	100	V	120	36.0	43.5	7.5
156.000	100	V	290	37.8	43.5	5.7
588.000	190	V	230	34.3	46.0	11.7
756.000	150	V	180	42.9	46.0	3.1
180.000	100	H	30	32.0	43.5	11.5
756.000	200	H	100	40.4	46.0	5.6

H : Horizontal – V : Vertical

Frequency 2474 MHz

Frequency (MHz)	Height (cm)	Polarization (H or V)	Azimuth (°)	Electro-magnetic field (dBμV/m)	Limit (dBμV/m)	Margin (dB)
36.000	100	V	170	39.6	40.0	0.4
42.750	100	V	20	36.2	40.0	3.8
48.000	100	V	70	39.4	40.0	0.6
60.000	100	V	120	39.3	40.0	0.7
72.000	100	V	210	38.4	40.0	1.6
108.000	100	V	300	37.4	43.5	6.1
120.000	100	V	120	36.0	43.5	7.5
156.000	100	V	290	37.8	43.5	5.7
588.000	190	V	230	34.3	46.0	11.7
756.000	150	V	180	42.9	46.0	3.1
180.000	100	H	30	32.0	43.5	11.5
756.000	200	H	100	40.4	46.0	5.6

H : Horizontal – V : Vertical

Test conclusion: The equipment complies with the requirements of the standards.

10. CONDUCTED EMISSION

Standards: FCC 47 CFR PART 15: 2018
RSS-Gen Issue 5 : March 2019

Test methods: § 15.107 and 15.207 of FCC 47 CFR PART 15: 2018
§ 8.8 of RSS-Gen Issue 5 : March 2019

Test configuration:

Tested cable	Measure with	E.U.T. height
Power supply 120Vac/60Hz	L.I.S.N	80 cm

Frequency band	Tested cable	Detector	Resolution bandwidth	Video bandwidth
150 kHz – 30 MHz	Power supply 120Vac/60Hz	Peak	10 kHz	30 kHz
150 kHz – 30 MHz	Power supply 120Vac/60Hz	Average value	9 kHz	Auto

Test method deviation: No

Instrumentation test list:

Category	Manufacturer	Type	Emitech Nr	Last validity date	Next validity date
Cable	/	N-2m	02813	18/04/2018	18/06/2020
Cable	C&C	BNC-0.3m	09953	12/02/2019	12/04/2021
Limiter	Hewlett Packard	11947A	01060	14/11/2018	14/01/2021
LISN	Rohde & Schwarz	ESH3-Z5	03490	06/06/2018	06/08/2020
Power source	Schaffner	NSG 1007-5-400	4637	25/05/2018	25/07/2019
Sheath current absorber	Emitech	Sheath current absorber	12366	31/10/2017	31/12/2029
Software	Nexio	BAT EMC v3.18.0.19	00000	---	---
Spectrum analyzer	Rohde & Schwarz	ESRP7	10517	27/08/2018	27/10/2020
Test enclosure	Emitech	JD 3P1	14875	---	---

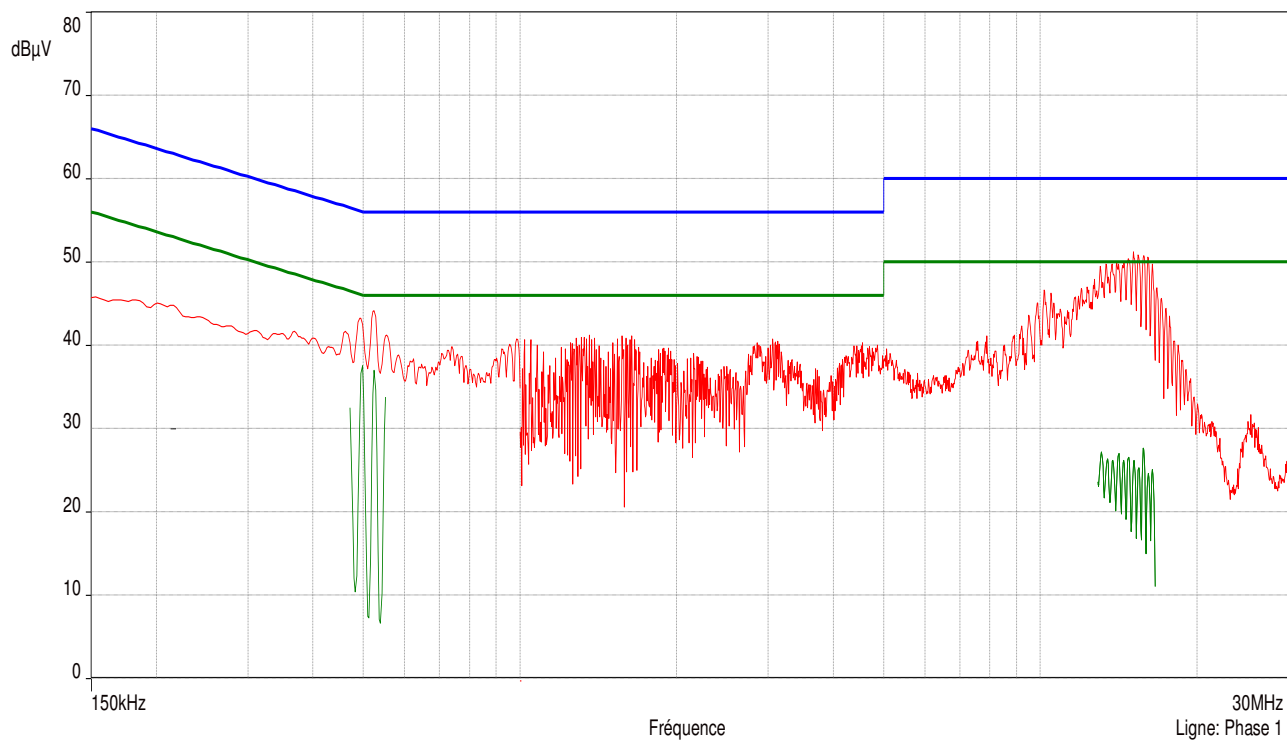
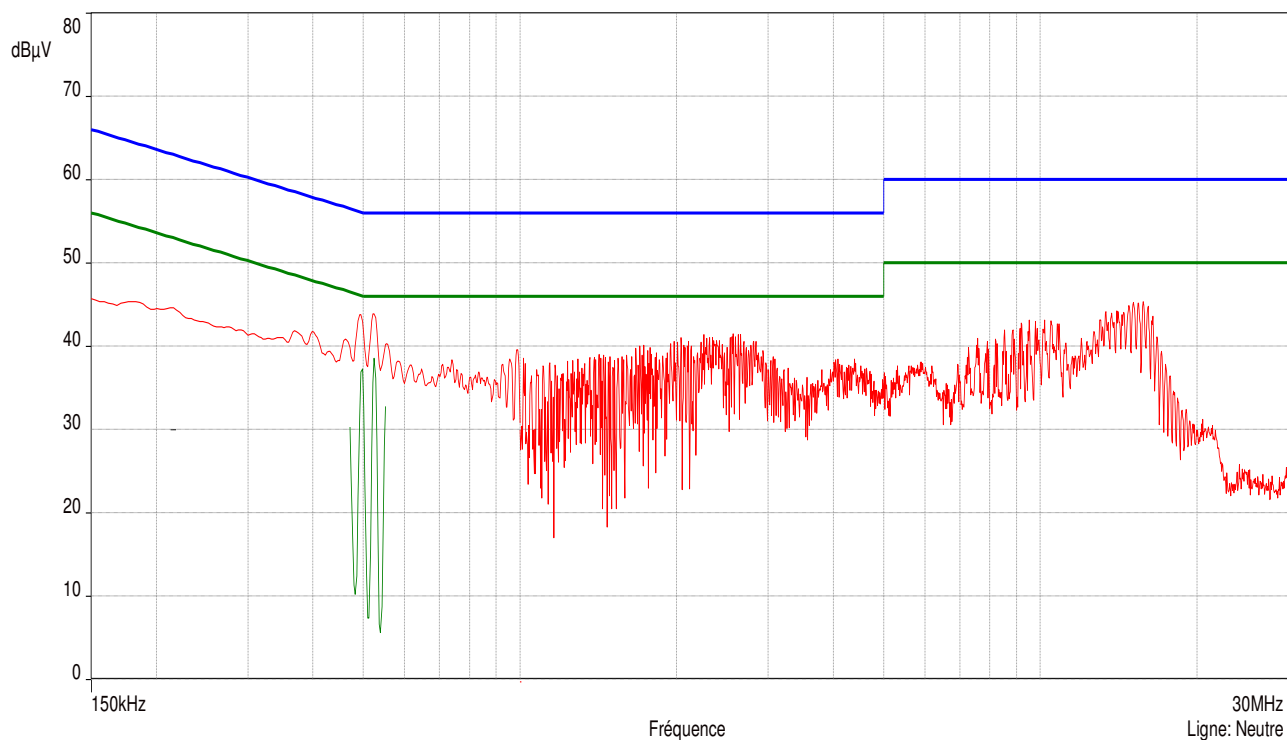
Results: See curves below including detections and limits in peak (red), average (green) and quasi-peak (blue).

Maximal uncertainty: 3.38 dB

Electronic wind instrument SYLPHYO

Curves 1 and 2

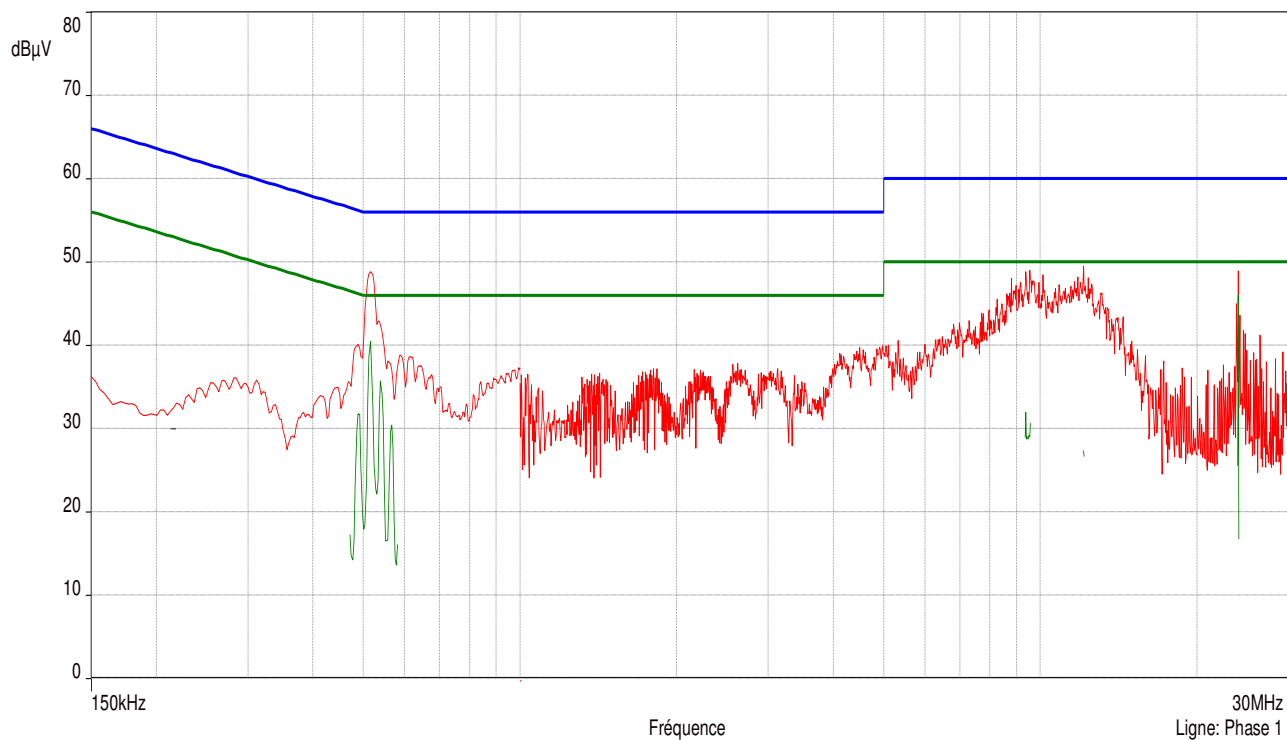
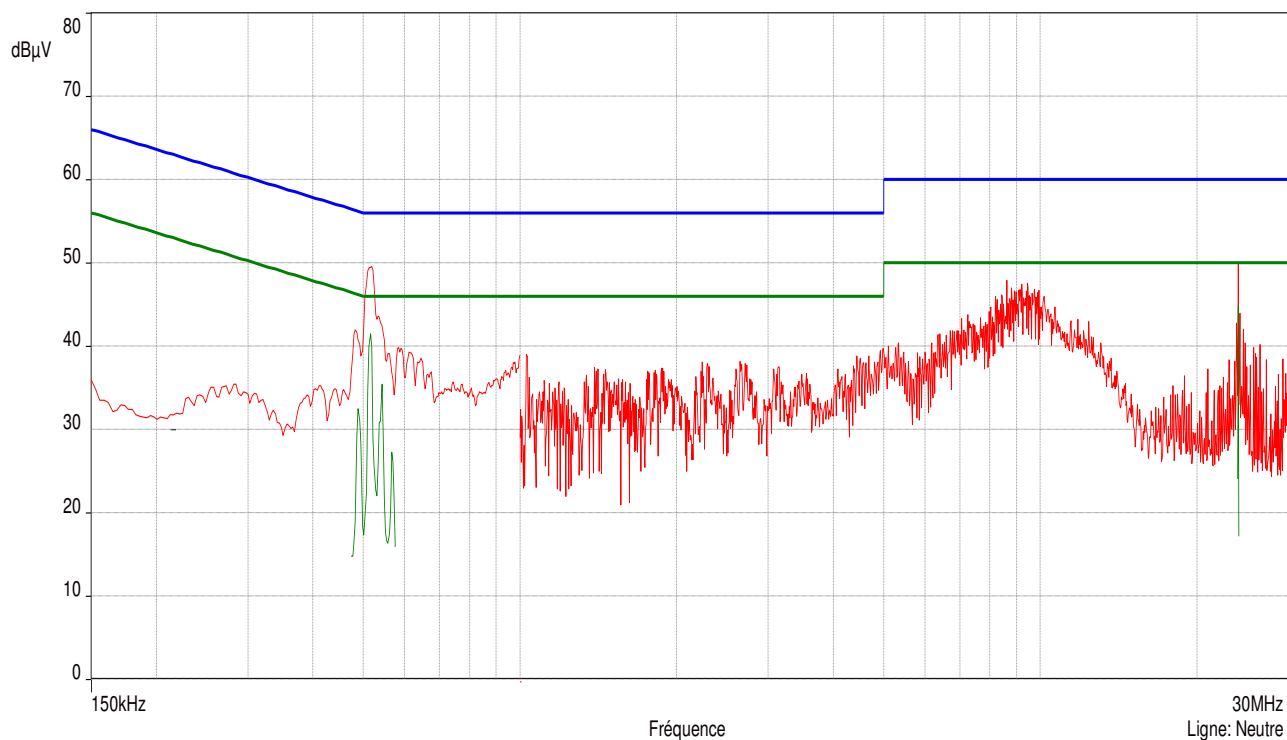
Conducted emission (measurement):
Power supply 120Vac/60Hz in peak (red) and average (green) detection



Wireless receiver device SYLPHYO LINK

Curves 3 and 4

Conducted emission (measurement):
Power supply 120Vac/60Hz in peak (red) and average (green) detection



« □□□ End of report, 3 annexes to be forwarded □□□ »

ANNEX 1:

PHOTOGRAPHS OF THE EQUIPMENT UNDER TEST

Electronic wind instrument SYLPHYO

General view



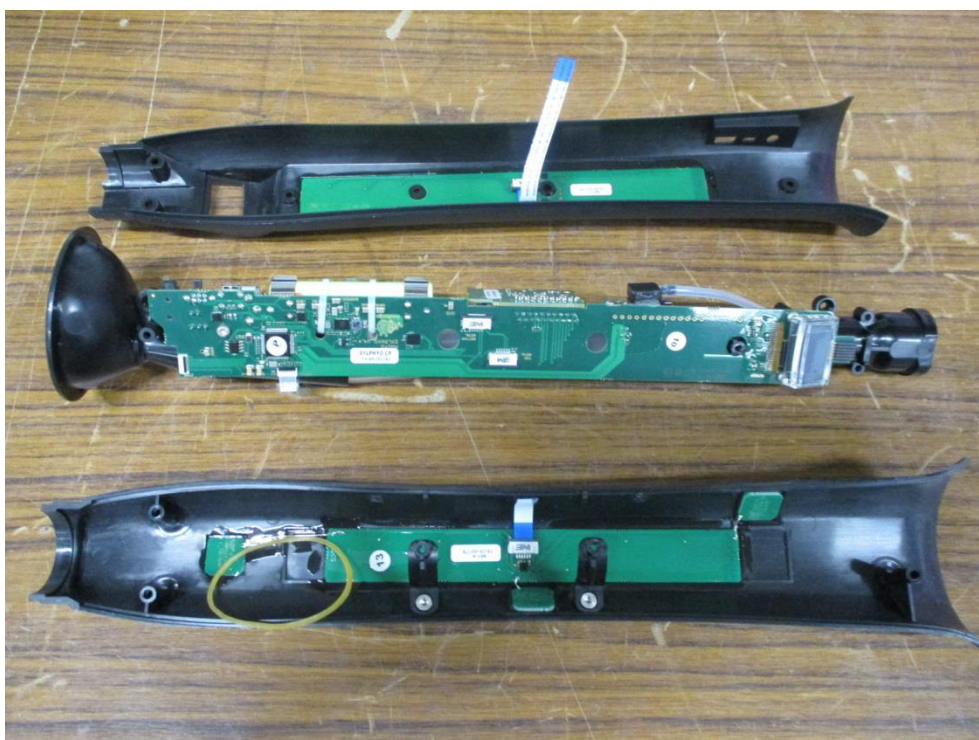


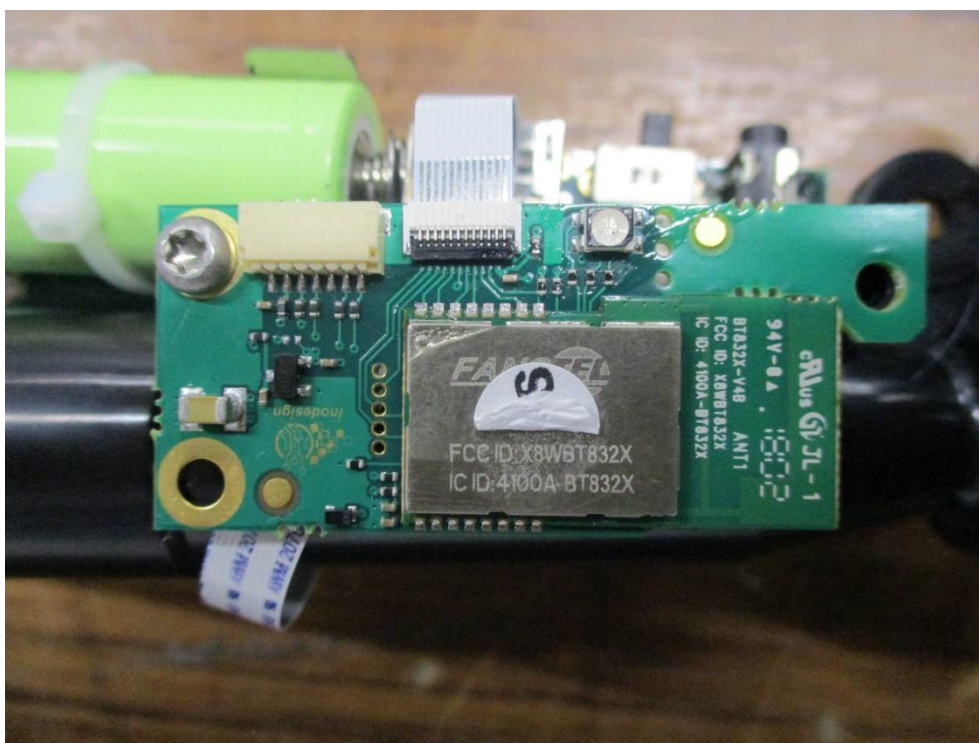
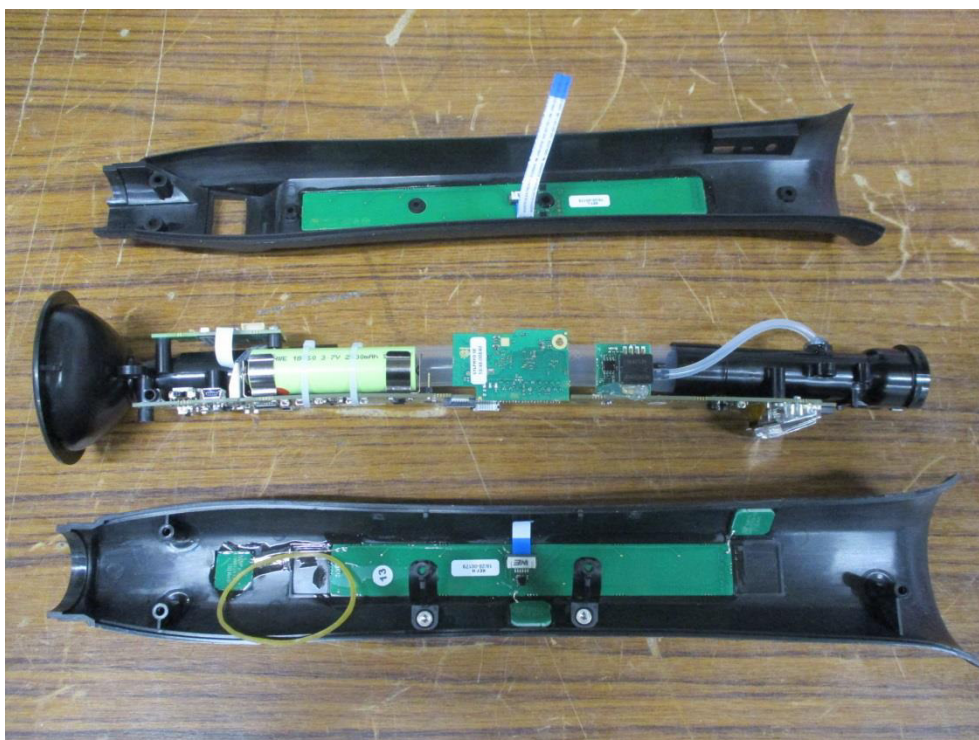
Labels





Internal view





Wireless receiver device SYLPHYO LINK

General view





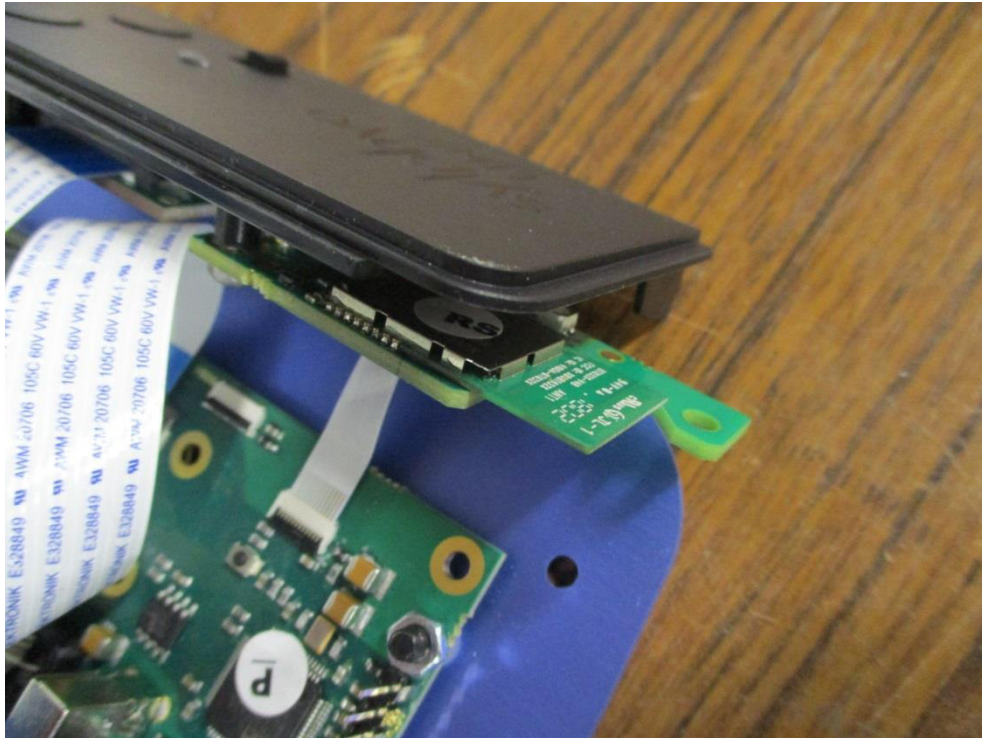
Labels





Internal view





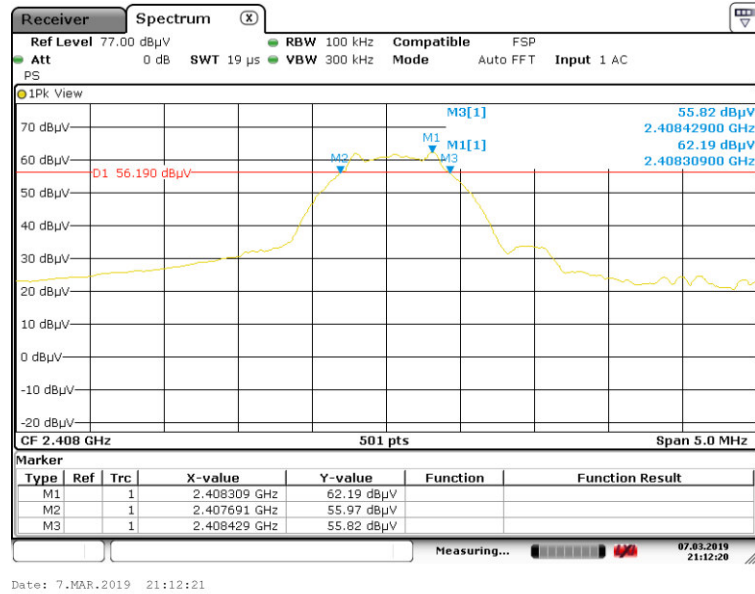
ANNEX 2:

6 dB BANDWIDTH
20 dB BANDWIDTH
99% BANDWIDTH

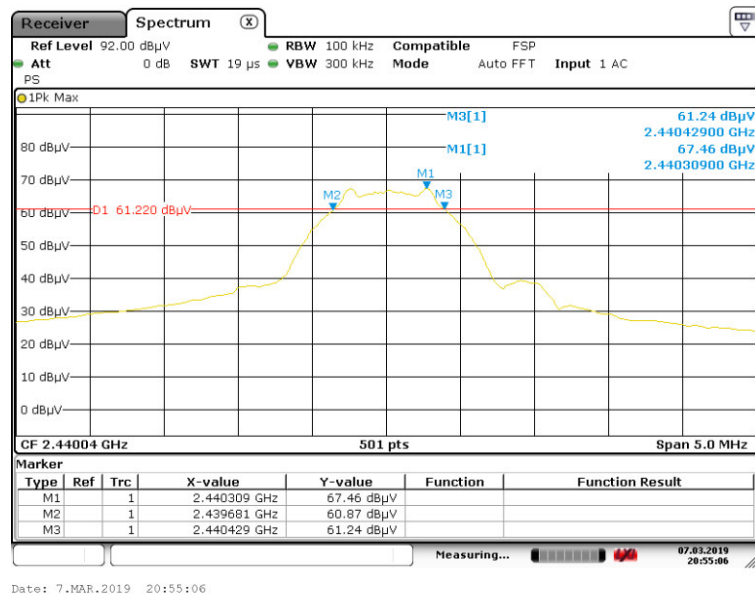
6 dB BANDWIDTH

Electronic wind instrument SYLPHYO

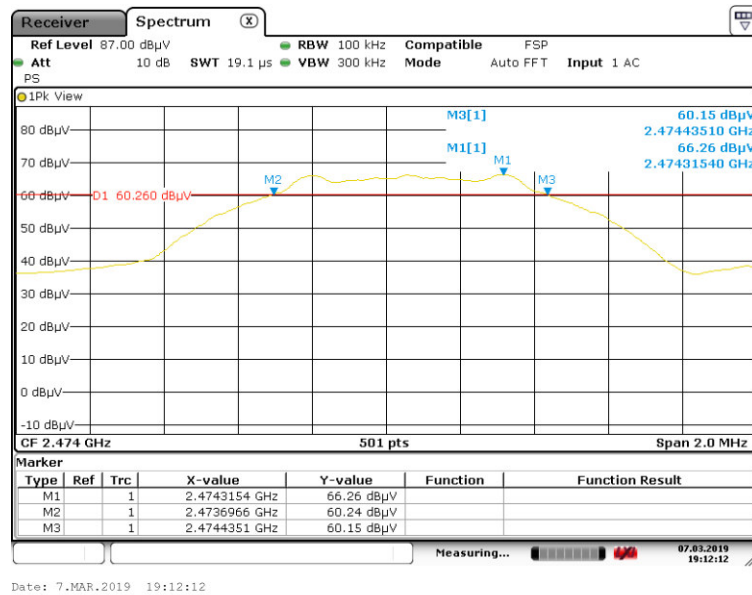
Frequency 2408 MHz



Frequency 2440 MHz

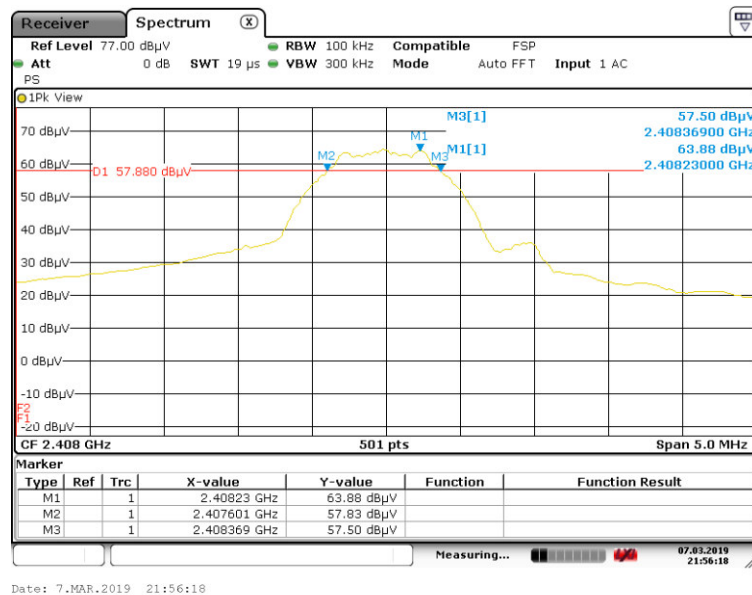


Frequency 2474 MHz

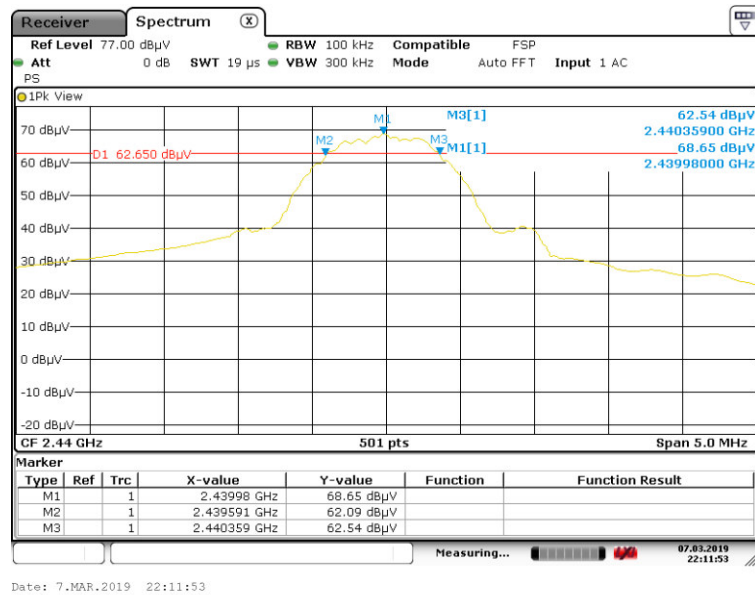


Wireless receiver device SYLPHYO LINK

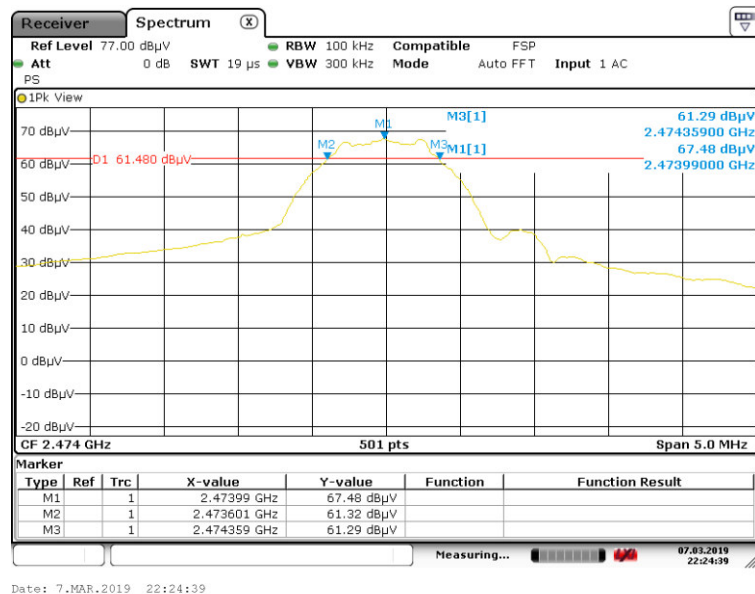
Frequency 2408 MHz



Frequency 2440 MHz



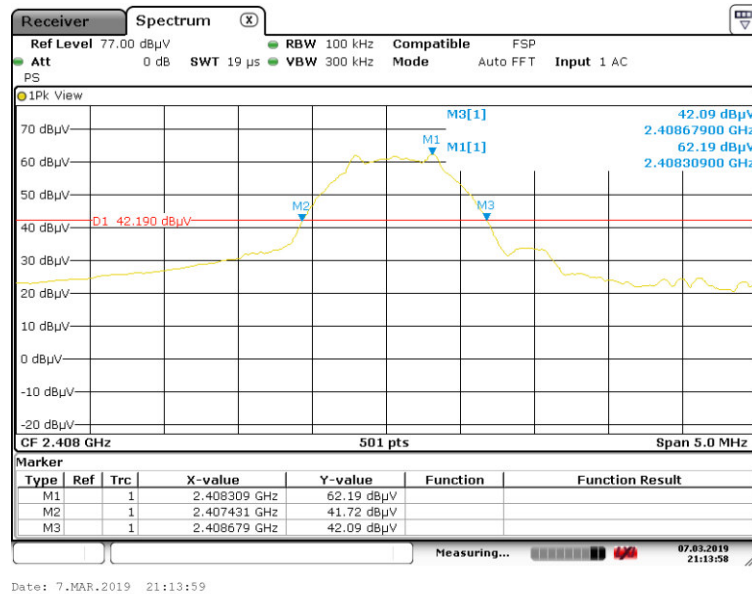
Frequency 2474 MHz



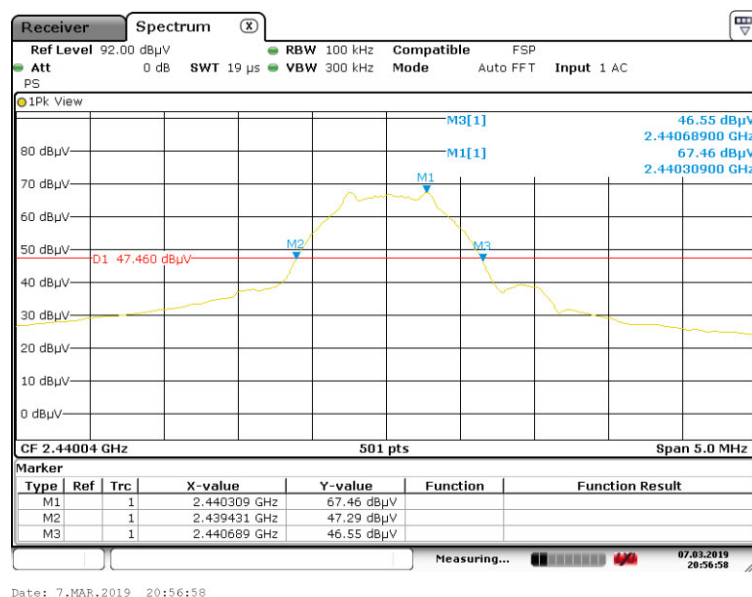
20 dB BANDWIDTH

Electronic wind instrument SYLPHYO

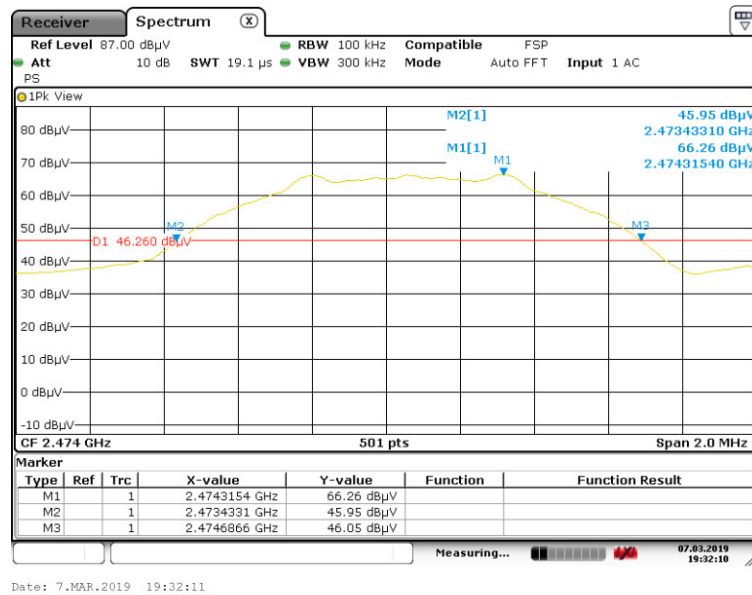
Frequency 2408 MHz



Frequency 2440 MHz

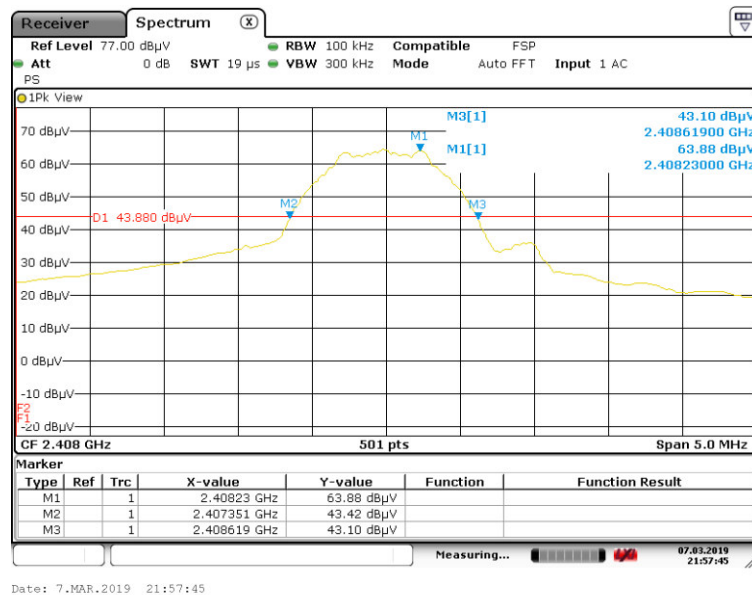


Frequency 2474 MHz

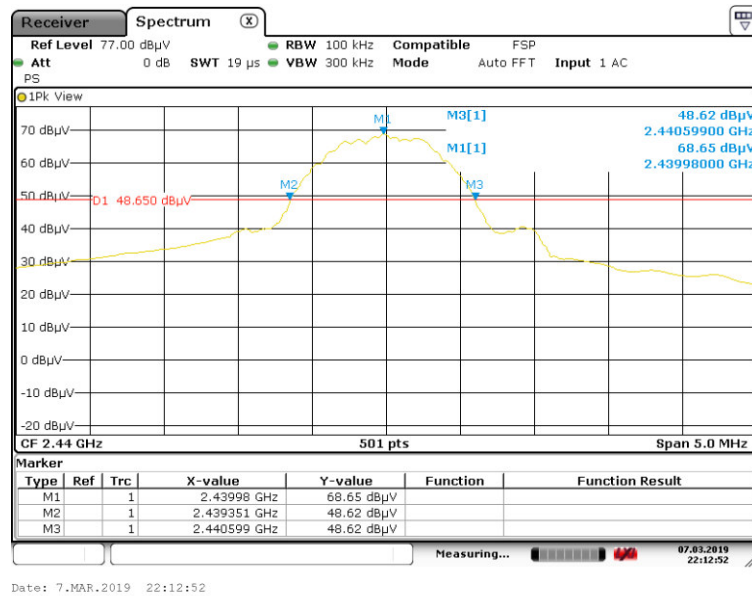


Wireless receiver device SYLPHYO LINK

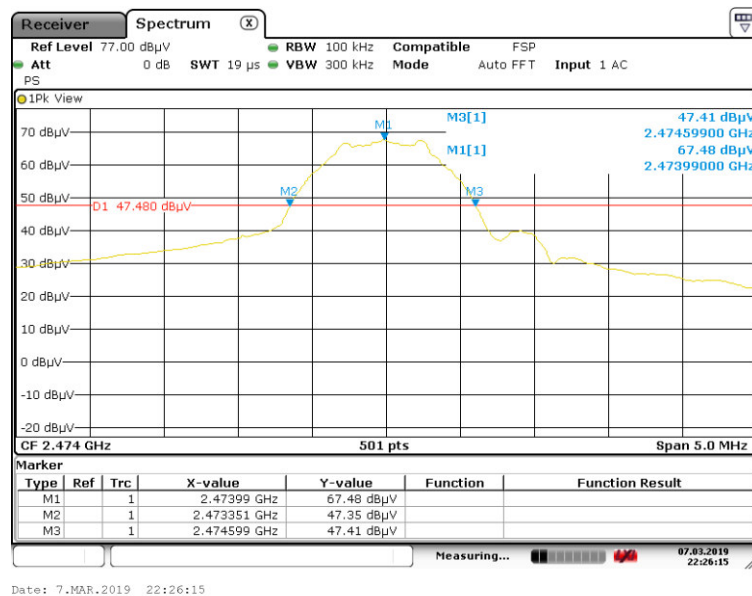
Frequency 2408 MHz



Frequency 2440 MHz



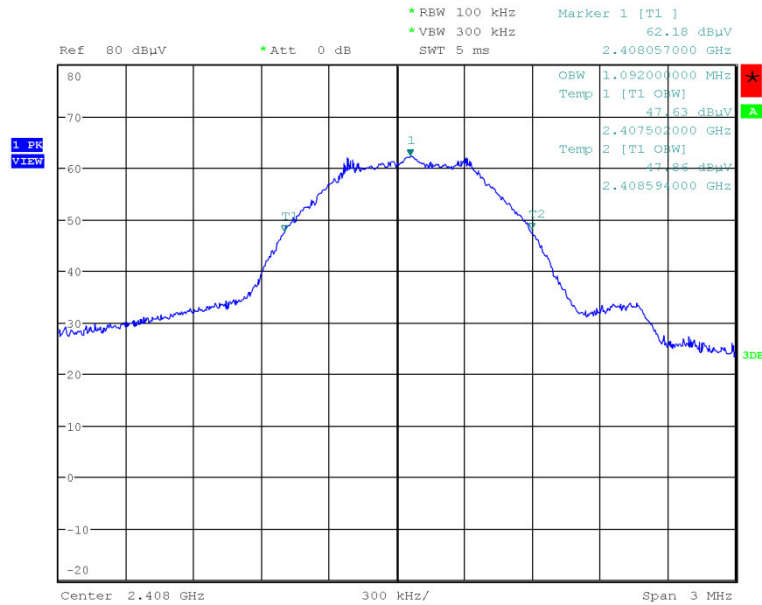
Frequency 2474 MHz



99% BANDWIDTH

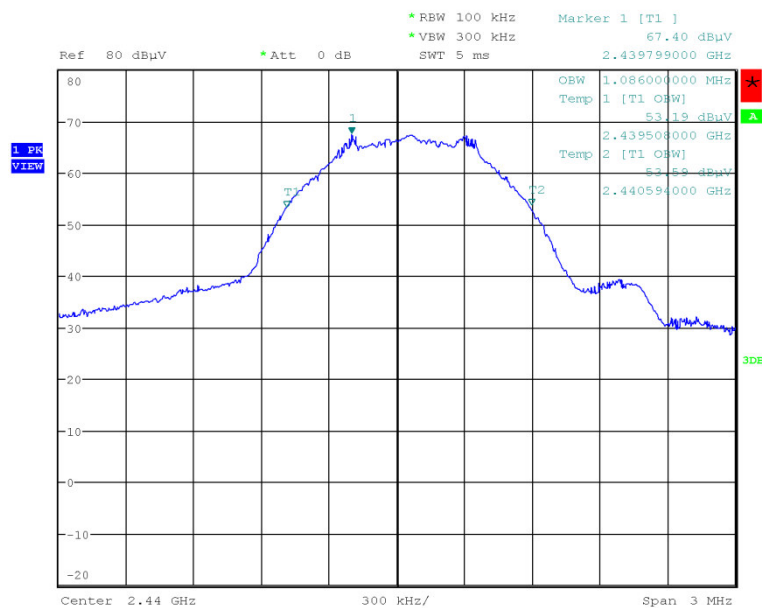
Electronic wind instrument SYLPHYO

Frequency 2408 MHz



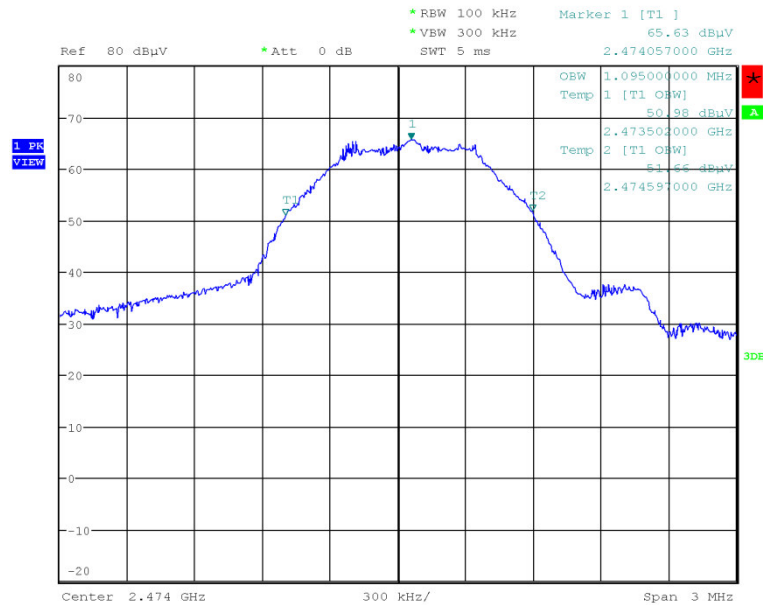
Date: 27.JUN.2019 10:18:03

Frequency 2440 MHz



Date: 27.JUN.2019 10:14:32

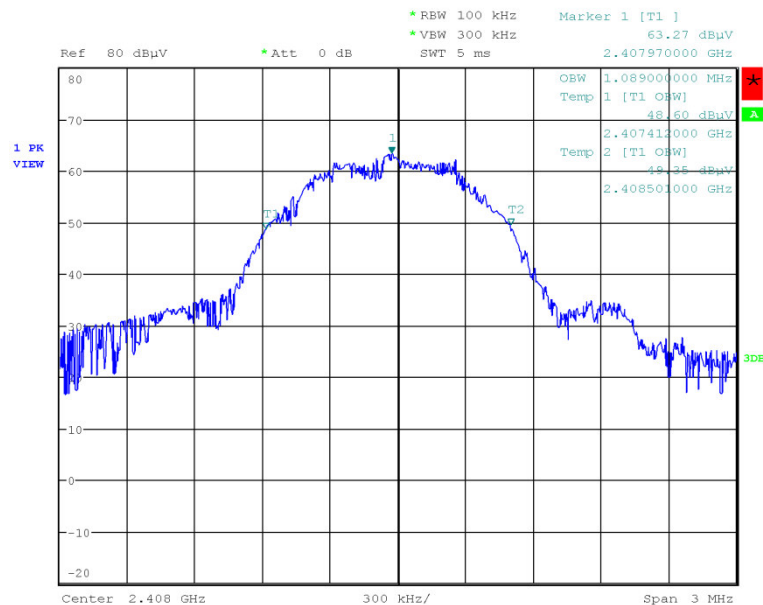
Frequency 2474 MHz



Date: 27.JUN.2019 10:10:47

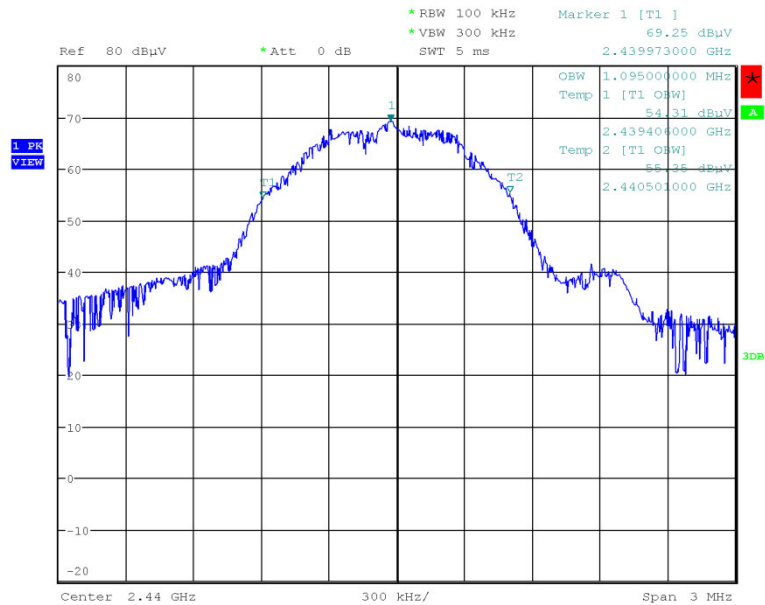
Wireless receiver device SYLPHYO LINK

Frequency 2408 MHz



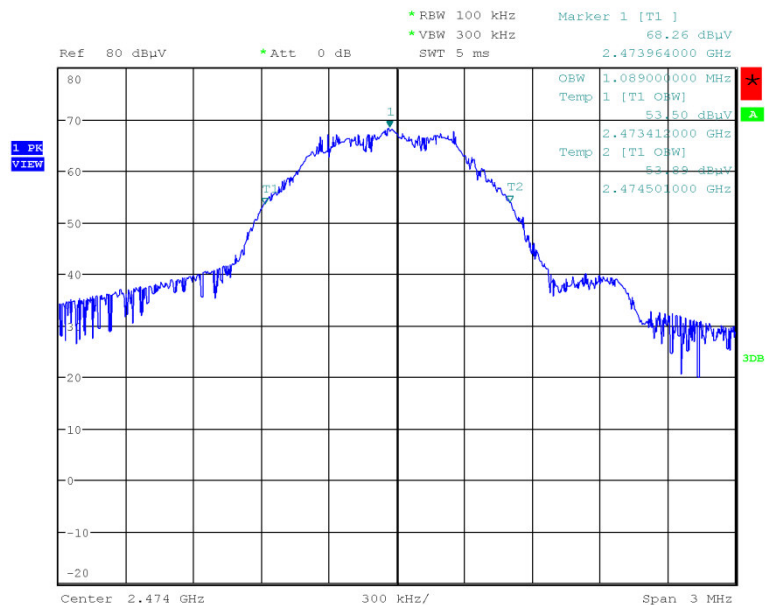
Date: 27.JUN.2019 09:46:55

Frequency 2440 MHz



Date: 27.JUN.2019 09:58:57

Frequency 2474 MHz

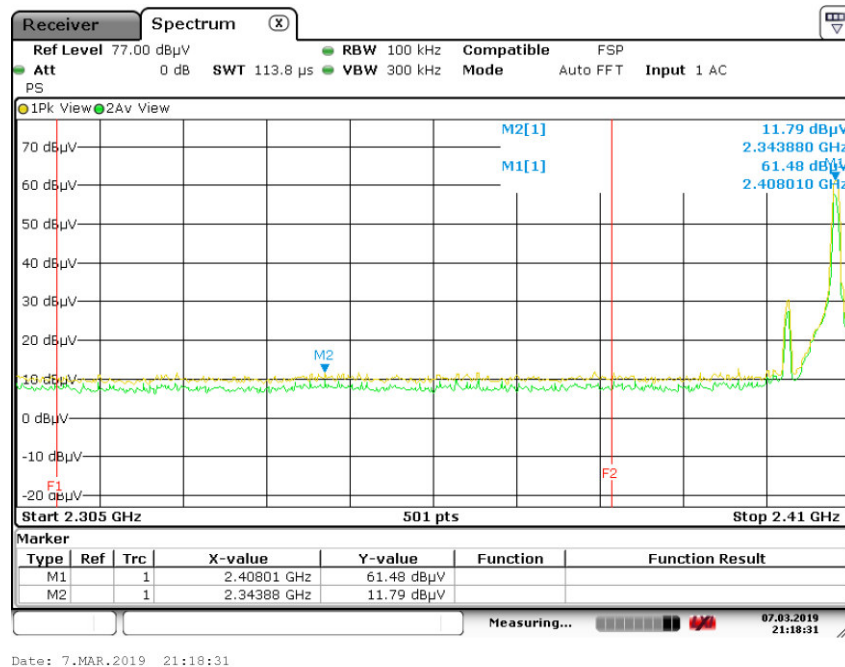
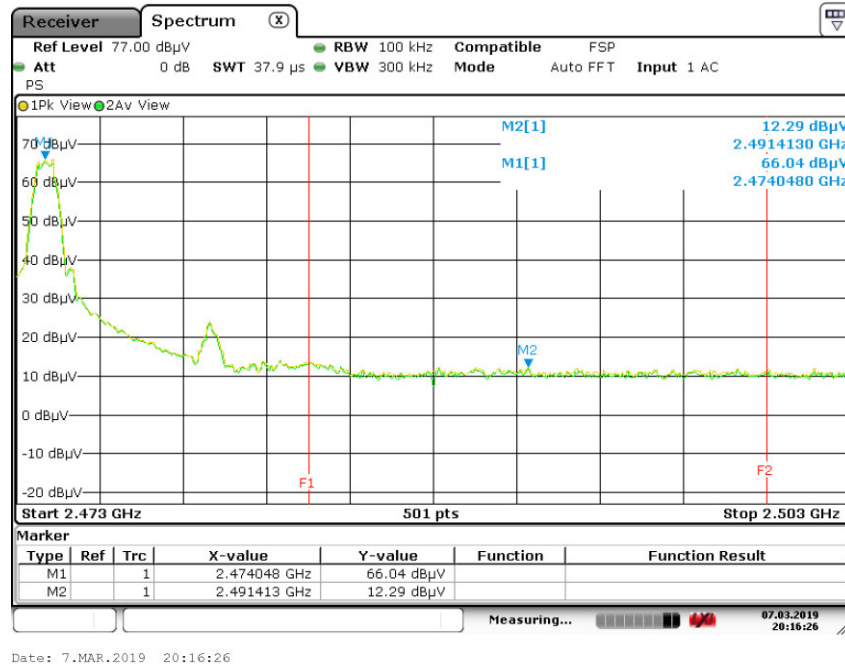


Date: 27.JUN.2019 10:03:18

ANNEX 3:

BAND EDGE

Electronic wind instrument SYLPHYO



Wireless receiver device SYLPHYO LINK

