APPLICATION CERTIFICATION FCC Part 15C
On Behalf of
Ectosense NV

Airpatch Sensor
Model No.: DEV00093

FCC ID: 2ASBE-DEV00093

Prepared for	:	Ectosense NV
Address	:	Bosbessenlaan 19a, Rotselaar, 3110 Belgium
Prepared by	:	Shenzhen Accurate Technology Co., Ltd.
Address	:	1/F., Building A, Changyuan New Material Port, Science & Industry Park, Nanshan District, Shenzhen, Guangdong, P.R. China Tel: (0755) 26503290 Fax: (0755) 26503396

Report No.	:	ATE20190036
Date of Test	:	January 16-January 17, 2019
Date of Report	:	January 18, 2019

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Description Page

Test Report Certification

Applicant	:	Ectosense NV
Address	:	Bosbessenlaan 19a, Rotselaar, 3110 Belgium
Manufacturer	:	Ectosense NV
Address	:	Bosbessenlaan 19a, Rotselaar, 3110 Belgium
Product	:	Airpatch Sensor
Model No.	:	DEV00093
Trade Mark	:	NightOwl

Measurement Procedure Used:

FCC Rules and Regulations Part 15 Subpart C Section 15.247
ANSI C63.10: 2013

The EUT was tested according to DTS test procedure of KDB558074 D01 15.247 Meas Guidance v05r01 for compliance to FCC 47CFR 15.247 requirements

The device described above is tested by Shenzhen Accurate Technology Co., Ltd. to determine the maximum emission levels emanating from the device. The maximum emission levels are compared to the FCC Part 15 Subpart C Section 15.247 limits. The measurement results are contained in this test report and Shenzhen Accurate Technology Co., Ltd. is assumed full responsibility for the accuracy and completeness of these measurements. Also, this report shows that the Equipment Under Test (EUT) is to be technically compliant with the FCC requirements.

This report applies to above tested sample only. This report shall not be reproduced in part without written approval of Shenzhen Accurate Technology Co., Ltd.

Date of Test :	January 16-January 17, 2019
Date of Report :	January 18, 2019

Prepared by : _____
(Stan Yang, Engineer)

Approved & Authorized Signer : _____
(Sean Liu, Manager)

1. GENERAL INFORMATION

1.1.Description of Device (EUT)

EUT	:	Airpatch Sensor
Model Number	:	DEV00093
Bluetooth Version	:	V4.2 BLE
Frequency Range	:	2402-2480MHz
Modulation Type	:	GFSK
Number of Channels	:	40 channels
Channel Spacing	:	2MHz
Antenna Gain	:	-0.3dBi
Antenna Type	:	Integral Antenna
Rating	:	DC 5V⎓1A

1.2.Carrier Frequency of Channels

Channel	Frequency (MHz)	Channel	Frequency (MHz)	Channel	Frequency (MHz)	Channel	Frequency (MHz)
0	2402	10	2422	20	2442	30	2462
1	2404	11	2424	21	2444	31	2464
2	2406	12	2426	22	2446	32	2466
3	2408	13	2428	23	2448	33	2468
4	2410	14	2430	24	2450	34	2470
5	2412	15	2432	25	2452	35	2472
6	2414	16	2434	26	2454	36	2474
7	2416	17	2436	27	2456	37	2476
8	2418	18	2438	28	2458	38	2478
9	2420	19	2440	29	2460	39	2480

1.3.Special Accessory and Auxiliary Equipment

Notebook PC:	Manufacturer: Lenovo M/N: ThinkPad X240 S/N:n.a

1.4.Description of Test Facility

EMC Lab	:	Recognition of accreditation by Federal Communications Commission (FCC) The Designation Number is CN1189 The Registration Number is 708358 Listed by Innovation, Science and Economic Development Canada (ISEDC) The Registration Number is 5077A-2 Accredited by China National Accreditation Service for Conformity Assessment (CNAS) The Registration Number is CNAS L3193 Accredited by American Association for Laboratory Accreditation (A2LA) The Certificate Number is 4297.01
Name of Firm	:	Shenzhen Accurate Technology Co., Ltd.
Site Location	:	1/F., Building A, Changyuan New Material Port, Science & Industry Park, Nanshan District, Shenzhen, Guangdong, P.R. China

1.5.Measurement Uncertainty

Conducted Emission Expanded Uncertainty	=	2.23dB, k=2
Radiated emission expanded uncertainty (9kHz-30MHz)	=	3.08dB, k=2
Radiated emission expanded uncertainty (30MHz-1000MHz)	=	4.42dB, k=2
Radiated emission expanded uncertainty (Above 1GHz)	=	4.06dB, k=2

2. MEASURING DEVICE AND TEST EQUIPMENT

Table 1: List of Test and Measurement Equipment

Kind of equipment	Manufacturer	Type	S/N	Calibrated dates	Cal. Interval
EMI Test Receiver	Rohde&Schwarz	ESCS30	100307	Jan. 05, 2019	One Year
EMI Test Receiver	Rohde&Schwarz	ESR	101817	Jan. 05, 2019	One Year
Spectrum Analyzer	Rohde&Schwarz	FSV-40	101495	Jan. 05, 2019	One Year
Pre-Amplifier (Radiated Emission)	Compliance Direction	RSU-M2	38322	Jan. 05, 2019	One Year
Pre-Amplifier (Radiated Emission)	Agilent	8447D	294A10619	Jan. 05, 2019	One Year
Loop Antenna	Schwarzbeck	FMZB1516	1516131	Jan. 05, 2019	One Year
Bilog Antenna	Schwarzbeck	VULB9163	9163-323	Jan. 05, 2019	One Year
Horn Antenna	Schwarzbeck	BBHA9120D	9120D-655	Jan. 05, 2019	One Year
Horn Antenna	Schwarzbeck	BBHA9170	9170-359	Jan. 05, 2019	One Year
LISN	Schwarzbeck	NSLK8126	8126431	Jan. 05, 2019	One Year
Highpass Filter	Wainwright Instruments	WHKX3.6/18G-10SS	N/A	Jan. 05, 2019	One Year
Band Reject Filter	Wainwright Instruments	WRCG2400/2485-2375/2510-60/11SS	N/A	Jan. 05, 2019	One Year
RF Coaxial Cable (Conducted Emission)	SUHNER	N-2m	No.2	Jan. 05, 2019	One Year
RF Coaxial Cable (Radiated Emission)	SUHNER	N-5m	NO.3	Jan. 05, 2019	One Year
RF Coaxial Cable (Radiated Emission)	SUHNER	N-5m	NO.4	Jan. 05, 2019	One Year
RF Coaxial Cable (Radiated Emission)	SUHNER	N-1m	NO.5	Jan. 05, 2019	One Year
RF Coaxial Cable (Radiated Emission)	SUHNER	N-1m	NO.6	Jan. 05, 2019	One Year
Conducted Emission Measurement Software: ES-K1 V1.71					
Radiated Emission Measurement Software: EZ_EMC V1.1.4.2					

3. OPERATION OF EUT DURING TESTING

3.1.Operating Mode

The mode is used: **Transmitting mode**

Low Channel: 2402MHz
Middle Channel: 2440MHz
High Channel: 2480MHz

Its duty cycle setting is greater than 98%.

3.2.Configuration and peripherals

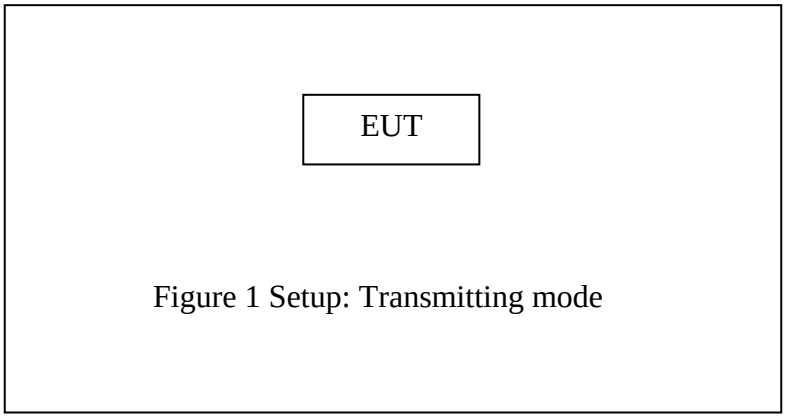


Figure 1 Setup: Transmitting mode

Note: Full battery is used during all test

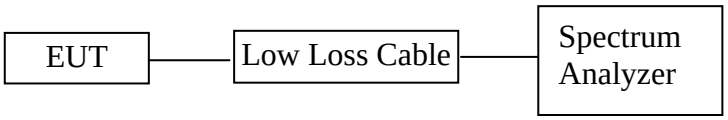
4. TEST PROCEDURES AND RESULTS

FCC Rules	Description of Test	Result
Section 15.247(a)(2)	6dB Bandwidth Test	Compliant
Section 15.247(b)(3)	Maximum Peak Output Power Test	Compliant
Section 15.247(e)	Power Spectral Density Test	Compliant
Section 15.247(d)	Band Edge Compliance Test	Compliant
Section 15.247(d) Section 15.209	Radiated Spurious Emission Test	Compliant
Section 15.207	AC Power Line Conducted Emission Test	N/A
Section 15.203	Antenna Requirement	Compliant

Note: The product is battery powered, so conducted emission testing is not applicable and skipped

5. 6DB BANDWIDTH TEST

5.1.Block Diagram of Test Setup



5.2.The Requirement For Section 15.247(a)(2)

Section 15.247(a)(2): Systems using digital modulation techniques may operate in the 902-928MHz, 2400-2483.5MHz, and 5725-5850MHz bands. The minimum 6 dB bandwidth shall be at least 500 kHz.

5.3.EUT Configuration on Measurement

The equipment is installed on the emission measurement to meet the commission requirements and operating regulations in a manner which tends to maximize its emission characteristics in normal application.

5.4.Operating Condition of EUT

5.4.1.Setup the EUT and simulator as shown as Section 5.1.

5.4.2.Turn on the power of all equipment.

5.4.3.Let the EUT work in TX modes measure it. The transmit frequency are 2402-2480MHz. We select 2402MHz, 2440MHz, and 2480MHz TX frequency to transmit.

5.5.Test Procedure

5.5.1.The transmitter output was connected to the spectrum analyzer through a low loss cable.

5.5.2.Set RBW of spectrum analyzer to 100 kHz and VBW to 300 kHz.

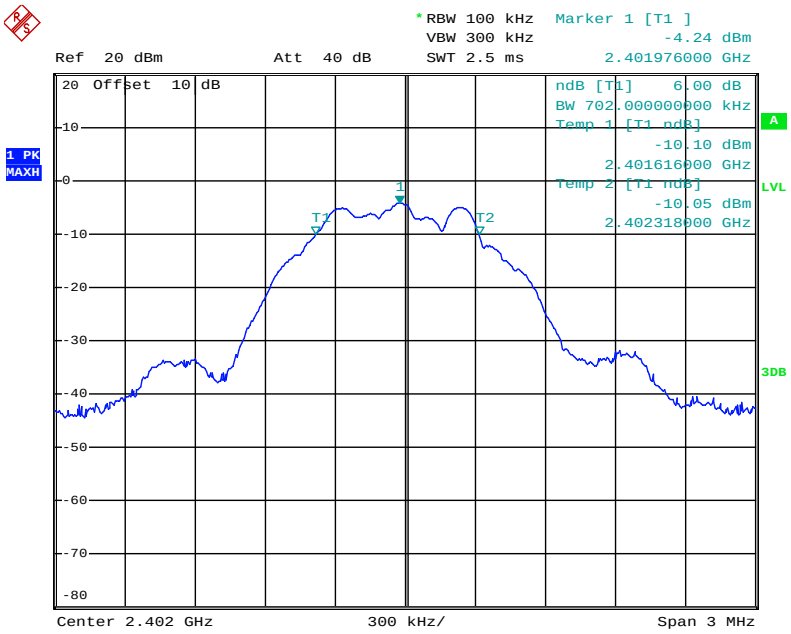
5.5.3.The 6dB bandwidth is defined as the total spectrum the power of which is higher than peak power minus 6dB.

5.6. Test Result

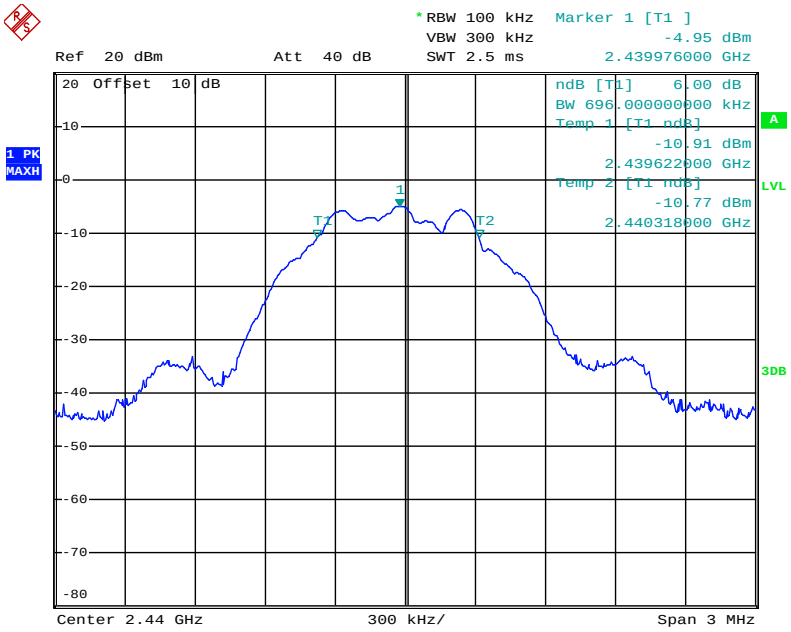
Channel	Frequency (MHz)	6 dB Bandwidth (MHz)	Minimum Limit(MHz)	Result
0	2402	0.702	0.5	Pass
19	2440	0.696	0.5	Pass
39	2480	0.690	0.5	Pass

The spectrum analyzer plots are attached as below.

Channel 0



Channel 19



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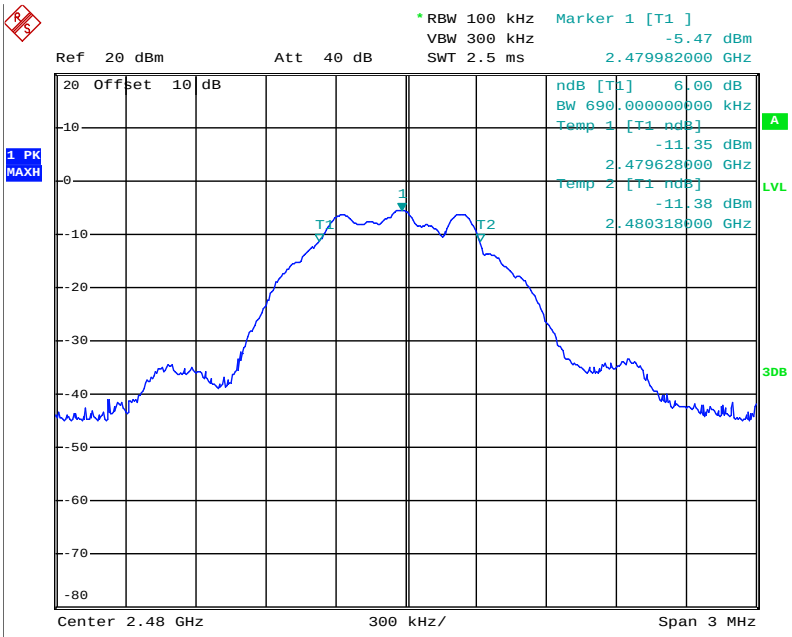
Channel 39



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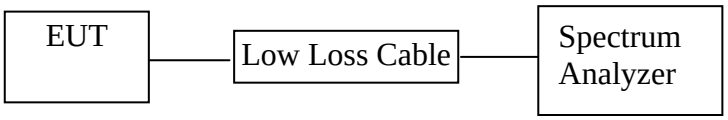
6. MAXIMUM PEAK OUTPUT POWER TEST

6.1.Block Diagram of Test Setup



6.2.The Requirement For Section 15.247(b)(3)

Section 15.247(b)(3): For systems using digital modulation in the 902-928MHz, 2400-2483.5MHz, and 5725-5850MHz bands: 1 Watt.

6.3.EUT Configuration on Measurement

The equipment are installed on the emission Measurement to meet the commission requirements and operating regulations in a manner which tends to maximize its emission characteristics in normal application.

6.4.Operating Condition of EUT

6.4.1.Setup the EUT and simulator as shown as Section 6.1.

6.4.2.Turn on the power of all equipment.

6.4.3.Let the EUT work in TX modes measure it. The transmit frequency are 2402-2480MHz. We select 2402MHz, 2440MHz, and 2480MHz TX frequency to transmit.

6.5.Test Procedure

6.5.1.The transmitter output was connected to the spectrum analyzer through a low loss cable.

6.5.2.Set RBW of spectrum analyzer to 1MHz and VBW to 3MHz.

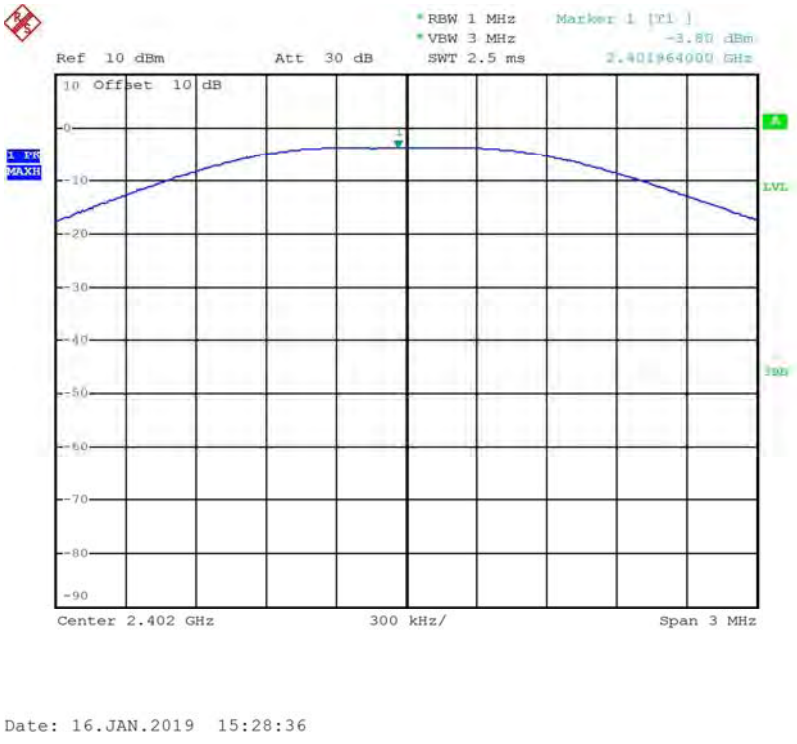
6.5.3.Measurement the maximum peak output power.

6.6. Test Result

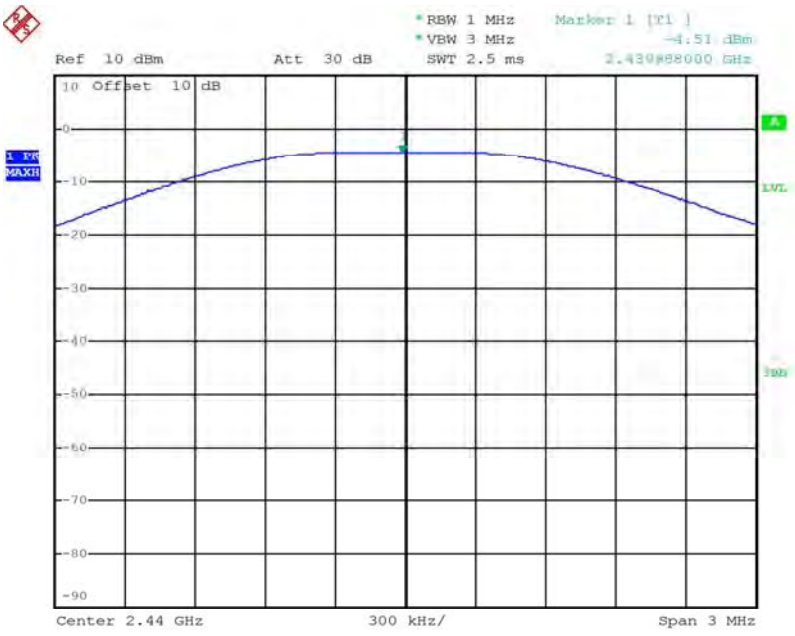
Channel	Frequency (MHz)	Peak Power Output (dBm)	Peak Power Limit (dBm)	Result
0	2402	-3.80	30	Pass
19	2440	-4.51	30	Pass
39	2480	-5.14	30	Pass

The spectrum analyzer plots are attached as below.

Channel 0



Channel 19



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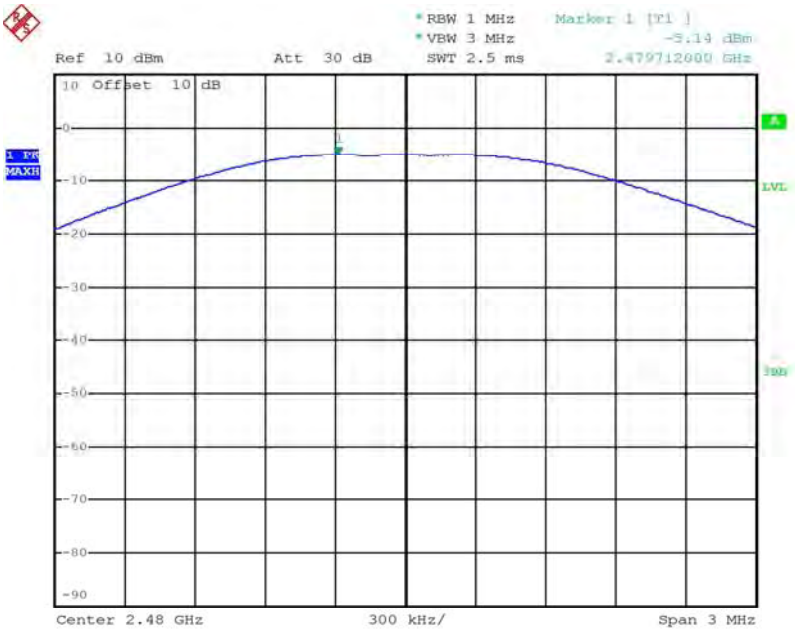
Channel 39



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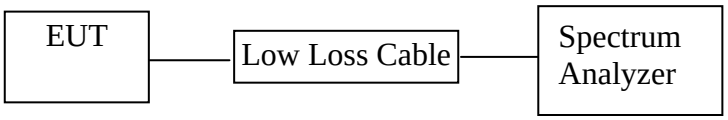
7. POWER SPECTRAL DENSITY TEST

7.1.Block Diagram of Test Setup



7.2.The Requirement For Section 15.247(e)

Section 15.247(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.

7.3.EUT Configuration on Measurement

The equipment are installed on the emission Measurement to meet the commission requirements and operating regulations in a manner which tends to maximize its emission characteristics in normal application.

7.4.Operating Condition of EUT

7.4.1.Setup the EUT and simulator as shown as Section 7.1.

7.4.2.Turn on the power of all equipment.

7.4.3.Let the EUT work in TX modes measure it. The transmit frequency are 2402-2480MHz. We select 2402MHz, 2440MHz, and 2480MHz TX frequency to transmit.

7.5.Test Procedure

7.5.1.The transmitter output was connected to the spectrum analyzer through a low loss cable.

7.5.2.Measurement Procedure PKPSD:

7.5.3.This procedure must be used if maximum peak conducted output power was used to demonstrate compliance to the fundamental output power limit, and is optional if the maximum (average) conducted output power was used to demonstrate compliance.

1. Set analyzer center frequency to DTS Channel center frequency.
2. Set the span to 1.5 times the DTS Channel bandwidth.
3. Set the RBW to: 3 kHz ≤ RBW ≤ 100 kHz.
4. Set the VBW ≥ 3 x RBW.
5. Detector = peak.
6. Sweep time = auto couple.
7. Trace mode = max hold.
8. Allow trace to fully stabilize.
9. Use the peak marker function to determine the maximum amplitude level.
10. If measured value exceeds limit, reduce RBW (no less than 3kHz) and repeat.

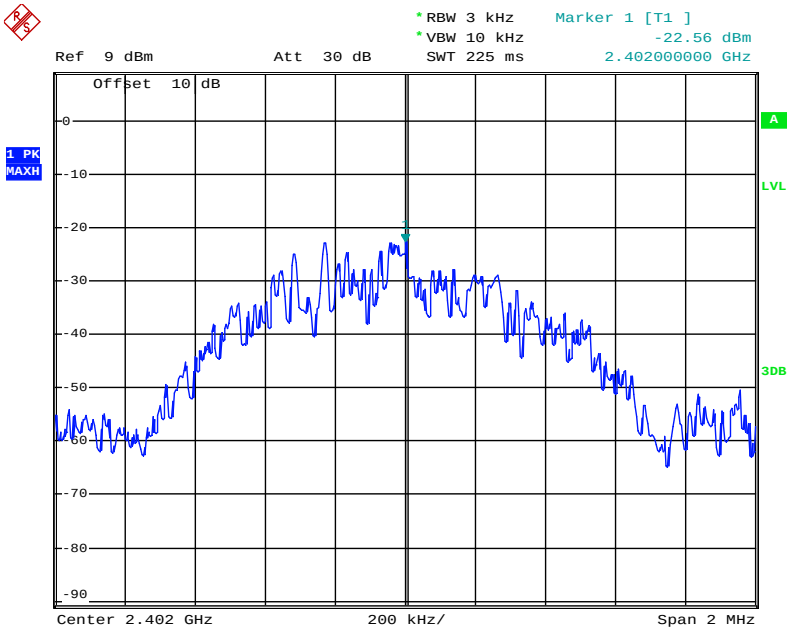
7.5.4.Measurement the maximum power spectral density.

7.6.Test Result

Channel	Frequency (MHz)	PSD (dBm/3KHz)	Limit (dBm/3KHz)	Result
0	2402	-22.56	8	Pass
19	2440	-23.38	8	Pass
39	2480	-23.95	8	Pass

The spectrum analyzer plots are attached as below.

Channel 0



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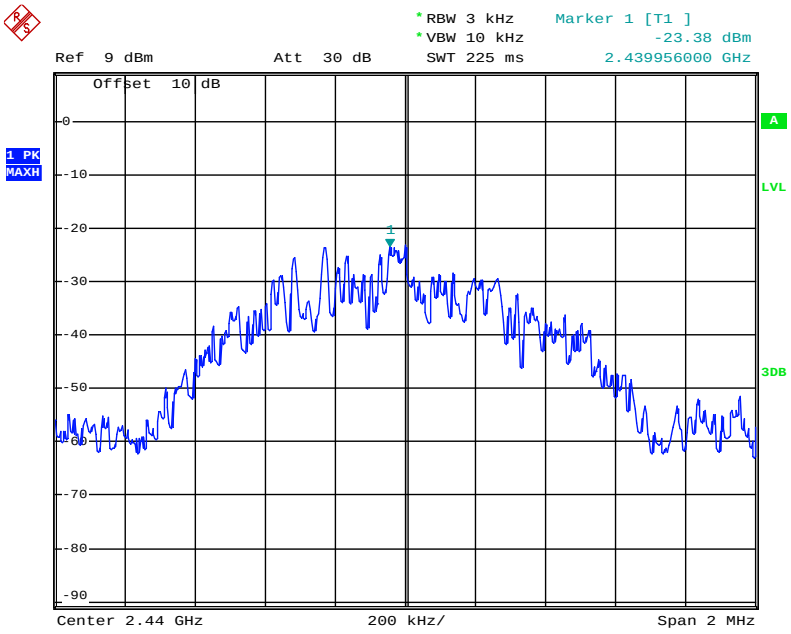
Channel 19



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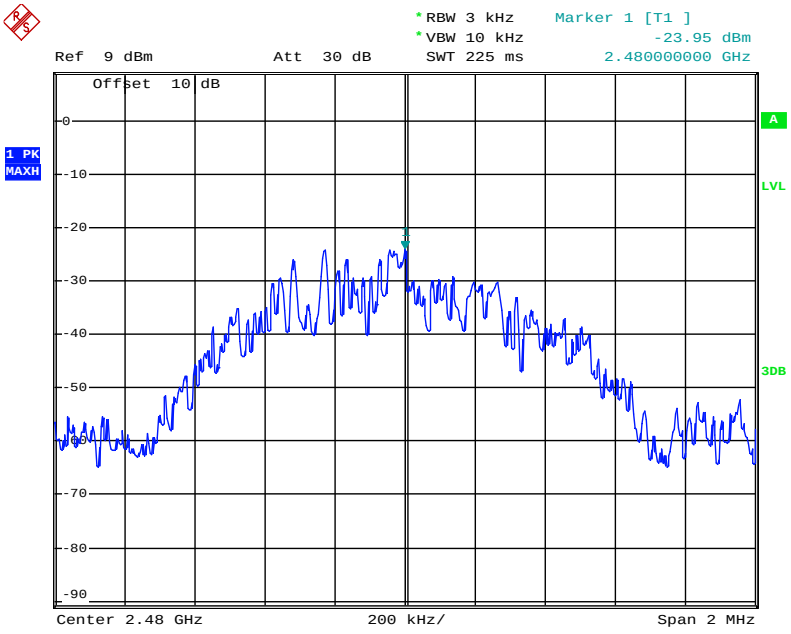

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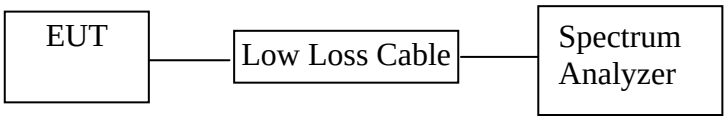
8. BAND EDGE COMPLIANCE TEST

8.1.Block Diagram of Test Setup



8.2.The Requirement For Section 15.247(d)

Section 15.247(d): In any 100 kHz bandwidth outside the frequency band in which the spread spectrum or digitally modulated 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, as permitted under paragraph (b)(3) of this section, the attenuation required under this paragraph shall be 30 dB instead of 20 dB. Attenuation below the general limits specified in Section 15.209(a) is not required. In addition, radiated emissions which fall in the restricted bands, as defined in Section 15.205(a), must also comply with the radiated emission limits specified in Section 15.209(a).

8.3.EUT Configuration on Measurement

The equipment are installed on the emission Measurement to meet the commission requirements and operating regulations in a manner which tends to maximize its emission characteristics in normal application.

8.4.Operating Condition of EUT

8.4.1.Setup the EUT and simulator as shown as Section 8.1.

8.4.2.Turn on the power of all equipment.

8.4.3.Let the EUT work in TX modes measure it. The transmit frequency are 2402-2480MHz. We select 2402MHz, 2480MHz TX frequency to transmit.

8.5. Test Procedure

Conducted Band Edge:

8.5.1. The transmitter output was connected to the spectrum analyzer via a low loss cable.

8.5.2. Set RBW of spectrum analyzer to 100 kHz and VBW to 300 kHz.

Radiate Band Edge:

8.5.3. The EUT is placed on a turntable, which is 1.5m above the ground plane and worked at highest radiated power.

8.5.4. The turntable was rotated for 360 degrees to determine the position of maximum emission level.

8.5.5. EUT is set 3m away from the receiving antenna, which is varied from 1m to 4m to find out the highest emission.

8.5.6. Set the spectrum analyzer in the following setting in order to capture the lower and upper band-edges of the emission:

8.5.7. RBW=1MHz, VBW=1MHz

8.5.8. The band edges was measured and recorded.

8.6. Test Result

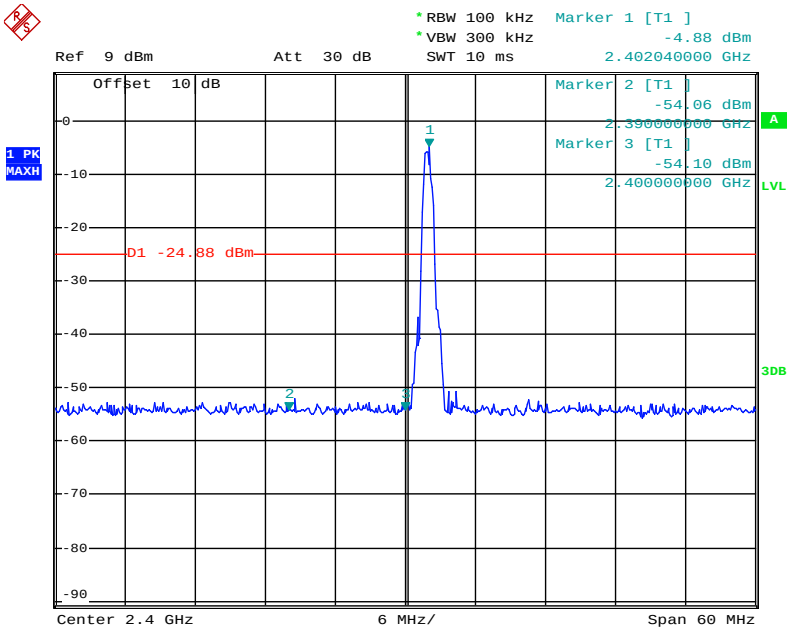
Pass.

Conducted Band Edge Result

Channel	Frequency	Delta peak to band emission	Limit(dBc)
0	2402MHz	49.22	＞20
39	2480MHz	49.59	＞20

The spectrum analyzer plots are attached as below.

Channel 0



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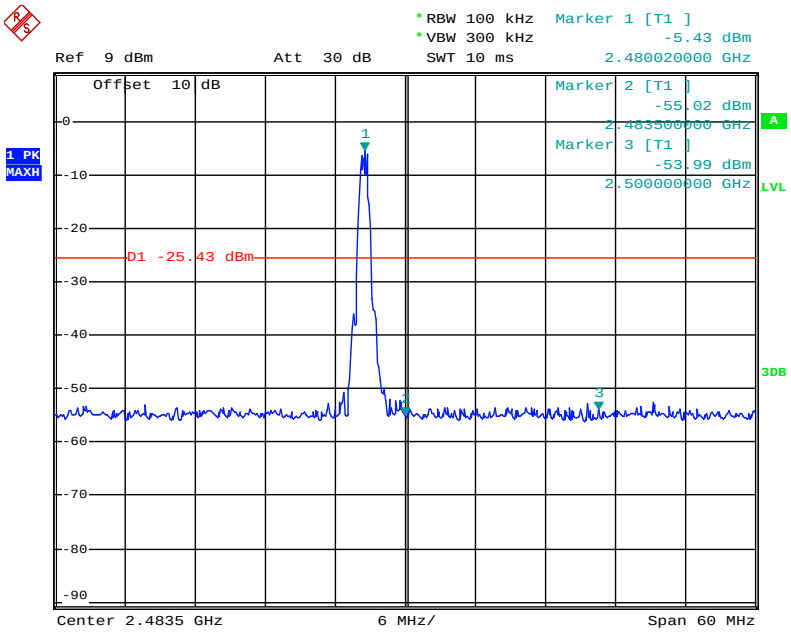
Channel 39



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Radiated Band Edge Result

ACCURATE TECHNOLOGY CO., LTD.
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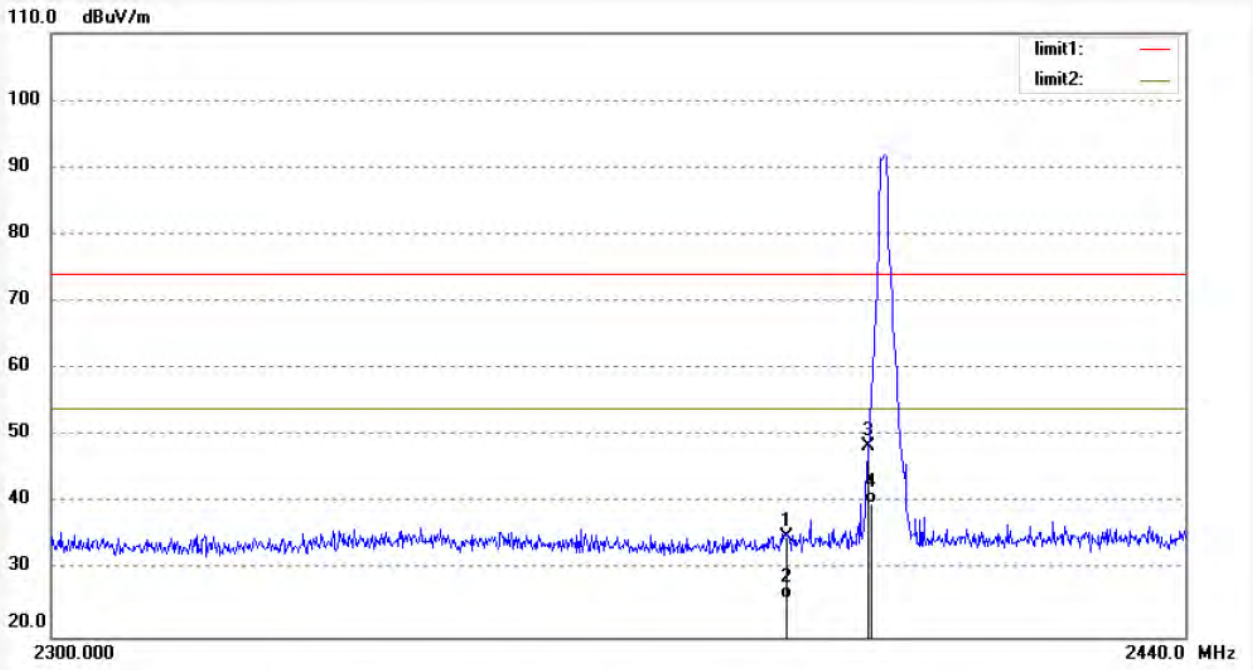
Science & Industry Park,Nanshan Shenzhen,P.R.China
Site: 1# Chamber
Tel:+86-0755-26503290
Fax:+86-0755-26503396

Job No.: FRANK2019 #105	Polarization: Horizontal
Standard: FCC PK	Power Source: DC 5V
Test item: Radiation Test	Date: 19/01/17/
Temp.(C)/Hum.(%) 25 C / 55 %	Time: 10/47/58
EUT: Airpatch Sensor	Engineer Signature:
Mode: TX 2402MHz	Distance: 3m
Model: DEV00093	
Manufacturer: Ectosense NV	

Note: Report NO.:ATE20190036



No.	Freq. (MHz)	Reading (dBuV/m)	Factor (dB)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Detector	Height (cm)	Degree (deg.)	Remark
1	2390.000	41.20	-6.32	34.88	74.00	-39.12	peak	200	153	
2	2390.000	32.15	-6.32	25.83	54.00	-28.17	AVG	250	66	
3	2400.000	54.80	-6.27	48.53	74.00	-25.47	peak	200	149	
4	2400.000	46.15	-6.27	39.88	54.00	-14.12	AVG	250	302	

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Site: 1# Chamber
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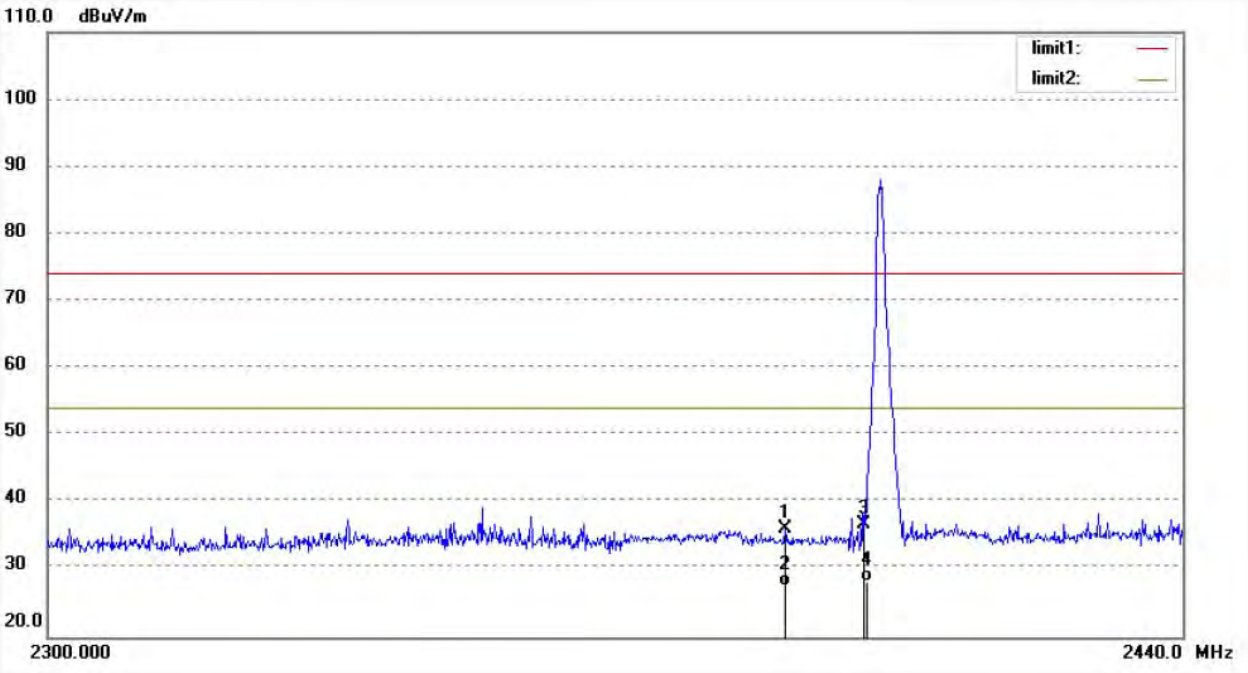
Fax:+86-0755-26503396

Job No.: FRANK2019 #106
Standard: FCC PK
Test item: Radiation Test
Temp.(C)/Hum.(%) 25 C / 55 %
EUT: Airpatch Sensor
Mode: TX 2402MHz
Model: DEV00093
Manufacturer: Ectosense NV

Polarization: Vertical
Power Source: DC 5V
Date: 19/01/17/
Time: 10/49/02
Engineer Signature:
Distance: 3m

Note: Report NO.:ATE20190036



No.	Freq. (MHz)	Reading (dBuV/m)	Factor (dB)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Detector	Height (cm)	Degree (deg.)	Remark
1	2390.000	42.51	-6.32	36.19	74.00	-37.81	peak	150	302	
2	2390.000	33.78	-6.32	27.46	54.00	-26.54	AVG	150	226	
3	2400.000	43.07	-6.27	36.80	74.00	-37.20	peak	150	166	
4	2400.000	34.40	-6.27	28.13	54.00	-25.87	AVG	150	92	

ACCURATE TECHNOLOGY CO., LTD.
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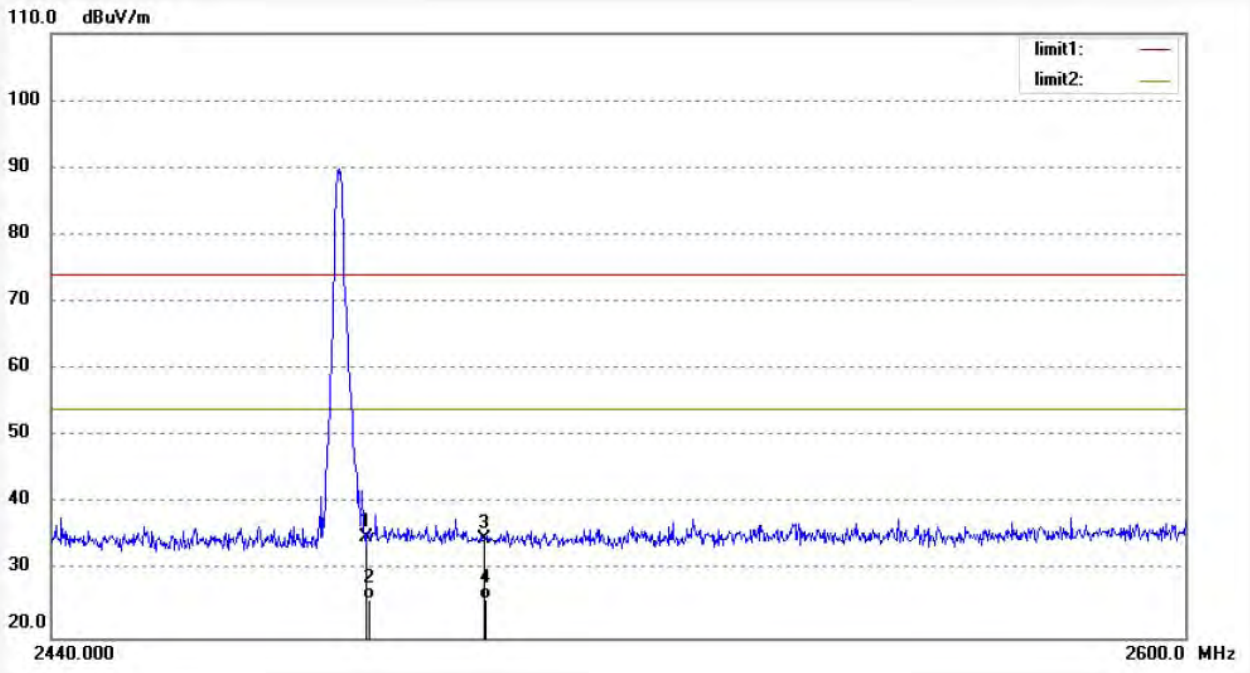
Science & Industry Park,Nanshan Shenzhen,P.R.China
Site: 1# Chamber
Tel:+86-0755-26503290
Fax:+86-0755-26503396

Job No.: FRANK2019 #104	Polarization: Horizontal
Standard: FCC PK	Power Source: DC 5V
Test item: Radiation Test	Date: 19/01/17/
Temp.(C)/Hum.(%) 25 C / 55 %	Time: 10/45/59
EUT: Airpatch Sensor	Engineer Signature:
Mode: TX 2480MHz	Distance: 3m
Model: DEV00093	
Manufacturer: Ectosense NV	

Note: Report NO.:ATE20190036



No.	Freq. (MHz)	Reading (dBuV/m)	Factor (dB)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Detector	Height (cm)	Degree (deg.)	Remark
1	2483.500	40.96	-5.89	35.07	74.00	-38.93	peak	200	324	
2	2483.500	31.55	-5.89	25.66	54.00	-28.34	AVG	250	92	
3	2500.000	40.48	-5.81	34.67	74.00	-39.33	peak	200	119	
4	2500.000	31.54	-5.81	25.73	54.00	-28.27	AVG	250	32	

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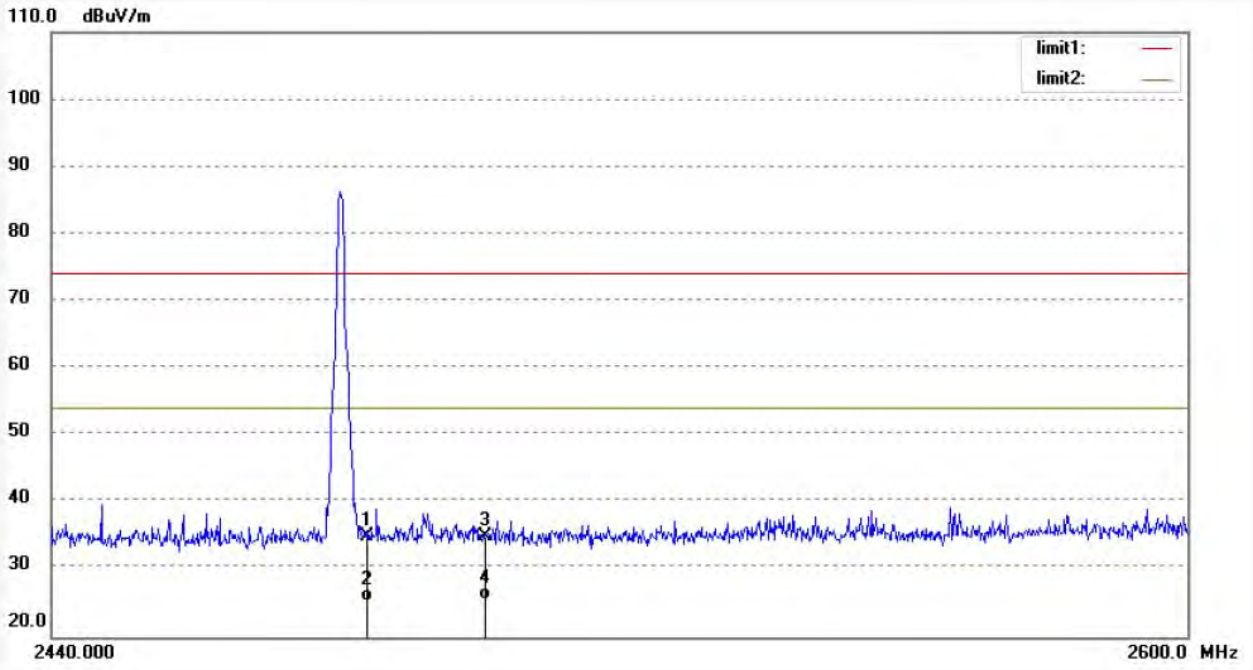
Fax:+86-0755-26503396

Job No.: FRANK2019 #103	Polarization: Vertical
Standard: FCC PK	Power Source: DC 5V
Test item: Radiation Test	Date: 19/01/17/
Temp.(C)/Hum.(%) 25 C / 55 %	Time: 10/44/45
EUT: Airpatch Sensor	Engineer Signature:
Mode: TX 2480MHz	Distance: 3m
Model: DEV00093	
Manufacturer: Ectosense NV	

Note: Report NO.:ATE20190036



No.	Freq. (MHz)	Reading (dBuV/m)	Factor (dB)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Detector	Height (cm)	Degree (deg.)	Remark
1	2483.500	40.79	-5.89	34.90	74.00	-39.10	peak	150	184	
2	2483.500	31.12	-5.89	25.23	54.00	-28.77	AVG	150	66	
3	2500.000	40.83	-5.81	35.02	74.00	-38.98	peak	150	215	
4	2500.000	31.42	-5.81	25.61	54.00	-28.39	AVG	150	103	

Note:

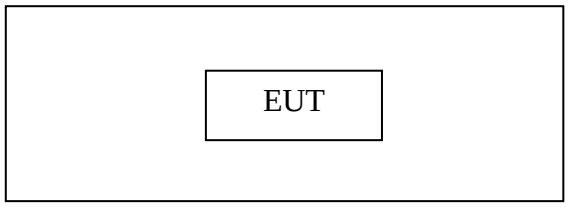
1. Emissions attenuated more than 20 dB below the permissible value are not reported.
2. The field strength is calculated by adding the antenna factor, high pass filter loss(if used) and cable loss, and subtracting the amplifier gain(if any)from the measured reading. The basic equation calculation is as follows:

   Result = Reading + Corrected Factor

9. RADIATED SPURIOUS EMISSION TEST

9.1.Block Diagram of Test Setup

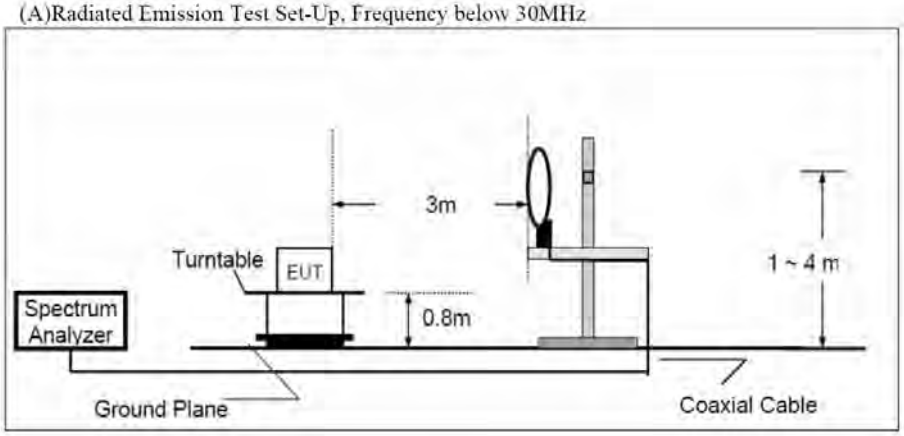
9.1.1.Block diagram of connection between the EUT and peripherals



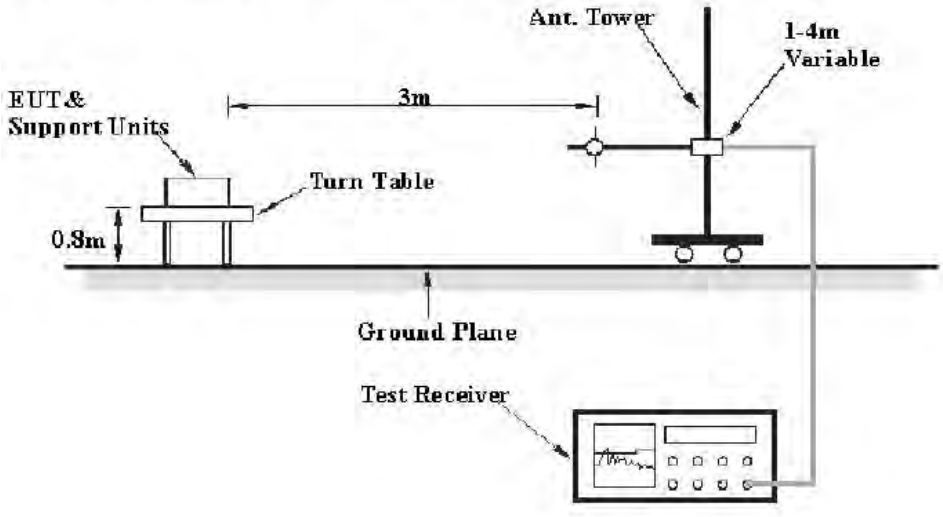
Setup: Transmitting mode

9.1.2.Semi-Anechoic Chamber Test Setup Diagram

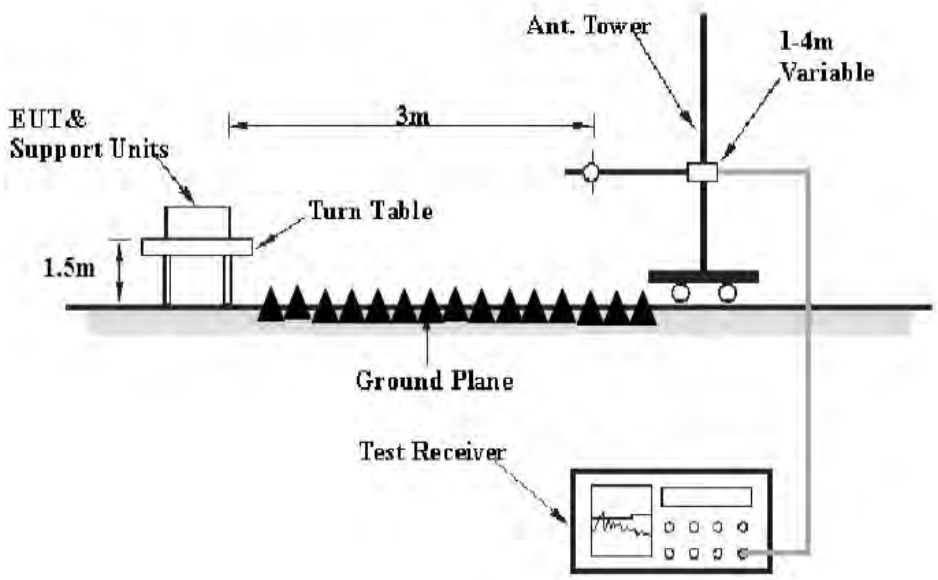
(A)Radiated Emission Test Set-Up, Frequency below 30MHz



(B)Radiated Emission Test Set-Up, Frequency 30MHz-1GHz



(C) Radiated Emission Test Set-Up. Frequency above 1GHz



9.2.The Limit For Section 15.247(d)

Section 15.247(d): In any 100 kHz bandwidth outside the frequency band in which the spread spectrum or digitally modulated 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, as permitted under paragraph (b)(3) of this section, the attenuation required under this paragraph shall be 30 dB instead of 20 dB. Attenuation below the general limits specified in Section 15.209(a) is not required. In addition, radiated emissions which fall in the restricted bands, as defined in Section 15.205(a), must also comply with the radiated emission limits specified in Section 15.209(a).

9.3. Restricted bands of operation

9.3.1.FCC Part 15.205 Restricted bands of operation

(a) Except as shown in paragraph (d) of this section, Only spurious emissions are permitted in any of the frequency bands listed below:

MHz	MHz	MHz	GHz
0.090-0.110	16.42-16.423	399.9-410	4.5-5.15
[1]0.495-0.505	16.69475-16.69525	608-614	5.35-5.46
2.1735-2.1905	16.80425-16.80475	960-1240	7.25-7.75
4.125-4.128	25.5-25.67	1300-1427	8.025-8.5
4.17725-4.17775	37.5-38.25	1435-1626.5	9.0-9.2
4.20725-4.20775	73-74.6	1645.5-1646.5	9.3-9.5
6.215-6.218	74.8-75.2	1660-1710	10.6-12.7
6.26775-6.26825	108-121.94	1718.8-1722.2	13.25-13.4
6.31175-6.31225	123-138	2200-2300	14.47-14.5
8.291-8.294	149.9-150.05	2310-2390	15.35-16.2
8.362-8.366	156.52475-156.52525	2483.5-2500	17.7-21.4
8.37625-8.38675	156.7-156.9	2690-2900	22.01-23.12
8.41425-8.41475	162.0125-167.17	3260-3267	23.6-24.0
12.29-12.293	167.72-173.2	3332-3339	31.2-31.8
12.51975-12.52025	240-285	3345.8-3358	36.43-36.5
12.57675-12.57725	322-335.4	3600-4400	([2])
13.36-13.41			

[1]Until February 1, 1999, this restricted band shall be 0.490-0.510
[2]Above 38.6

(b) Except as provided in paragraphs (d) and (e), the field strength of emission appearing within these frequency bands shall not exceed the limits shown in Section 15.209. At frequencies equal to or less than 1000MHz, Compliance with the limits in Section 15.209 shall be demonstrated using measurement instrumentation employing a CISPR quasi-peak detector. Above 1000MHz, compliance with the emission limits in Section15.209 shall be demonstrated based on the average value of the measured emissions. The provisions in Section 15.35 apply to these measurements.

9.4.Configuration of EUT on Measurement

The equipment are installed on Radiated Emission Measurement to meet the commission requirements and operating regulations in a manner which tends to maximize its emission characteristics in normal application.

9.5. Operating Condition of EUT

9.5.1.Setup the EUT and simulator as shown as Section 9.1.

9.5.2.Turn on the power of all equipment.

9.5.3.Let the EUT work in TX modes measure it. The transmit frequency are 2402-2480MHz. We select 2402MHz, 2440MHz, and 2480MHz TX frequency to transmit.

9.6.Test Procedure

The EUT and its simulators are placed on a turntable, which is 0.8 meter high above ground(Below 1GHz). The EUT and its simulators are placed on a turntable, which is 1.5 meter high above ground(Above 1GHz). The turntable can rotate 360 degrees to determine the position of the maximum emission level. EUT is set 3.0 meters away from the receiving antenna, which is mounted on an antenna tower. The antenna can be moved up and down between 1.0 meter and 4 meters to find out the maximum emission level. Broadband antenna (calibrated bi-log antenna) is used as receiving antenna. Both horizontal and vertical polarizations of the antenna are set on measurement. In order to find the maximum emission levels, all of the EUT location must be manipulated according to ANSI C63.10:2013 on radiated emission measurement. This EUT was tested in 3 orthogonal positions and the worst case position data was reported.

The bandwidth of test receiver is set at 9 kHz in below 30MHz. and set at 120 kHz in 30-1000MHz, and 1MHz in above 1000MHz.

The final measurement in band 9-90 kHz, 110-490 kHz and above 1000MHz is performed with Average detector. Except those frequency bands mention above, the final measurement for frequencies below 1000MHz is performed with Quasi Peak detector.
The field strength is calculated by adding the antenna factor, and cable loss, and subtracting the amplifier gain from the measured reading.

9.7.Data Sample

Frequency (MHz)	Reading (dBμv)	Factor (dB/m)	Result (dBμv/m)	Limit (dBμv/m)	Margin (dB)	Remark
X.XX	43.85	-22.22	21.63	43.5	-21.87	QP

Frequency(MHz) = Emission frequency in MHz
Reading(dBμv) = Uncorrected Analyzer/Receiver reading
Factor (dB/m) = Antenna factor + Cable Loss – Amplifier gain
Result(dBμv/m) = Reading(dBμv) + Factor(dB/m)
Limit (dBμv/m) = Limit stated in standard
Margin (dB) = Result(dBμv/m) - Limit (dBμv/m)
QP = Quasi-peak Reading

Calculation Formula:
Margin(dB) = Result (dBμV/m)–Limit(dBμV/m)
Result(dBμV/m)= Reading(dBμV)+ Factor(dB/m)

The “Margin” column of the following data tables indicates the degree of compliance with the applicable limit. For example, a margin of -7dB means the emission is 7dB below the limit.

9.8.Test Results

Pass.

The frequency range from 9kHz to 26.5GHz is checked.

Testing is carried out with frequency rang 9kHz to the tenth harmonics, which above 3th Harmonics are attenuated more than 20dB below the permissible limits or the field strength is too small to be measured.
The measurements greater than 20dB below the limit from 9kHz to 30MHz and 18 to 26.5GHz.

The spectrum analyzer plots are attached as below.

30MHz-1000MHz test data

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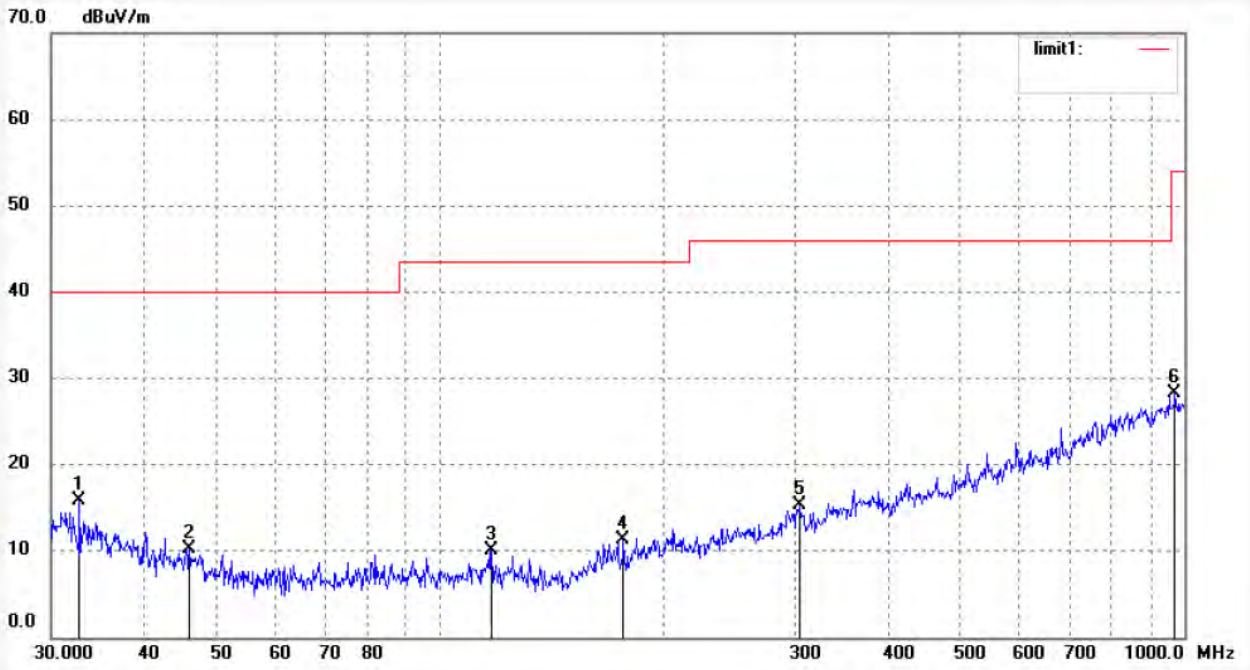
Job No.: FRANK2019 #90
Standard: FCC Class B 3M Radiated
Test item: Radiation Test
Temp.(C)/Hum.(%) 25 C / 55 %
EUT: Airpatch Sensor
Mode: TX 2402MHz
Model: DEV00093
Manufacturer: Ectosense NV

Polarization: Horizontal
Power Source: DC 5V
Date: 19/01/17/
Time: 9/50/19
Engineer Signature:
Distance: 3m

Note: Report NO.:ATE20190036



No.	Freq. (MHz)	Reading (dBuV/m)	Factor (dB)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Detector	Height (cm)	Degree (deg.)	Remark
1	32.7542	36.77	-20.89	15.88	40.00	-24.12	peak	200	302	
2	46.0557	34.98	-24.80	10.18	40.00	-29.82	peak	200	201	
3	117.2686	37.37	-27.39	9.98	43.50	-33.52	peak	200	44	
4	176.2744	37.60	-26.39	11.21	43.50	-32.29	peak	200	69	
5	304.9547	36.38	-21.07	15.31	46.00	-30.69	peak	200	216	
6	972.2826	33.99	-5.74	28.25	54.00	-25.75	peak	200	103	

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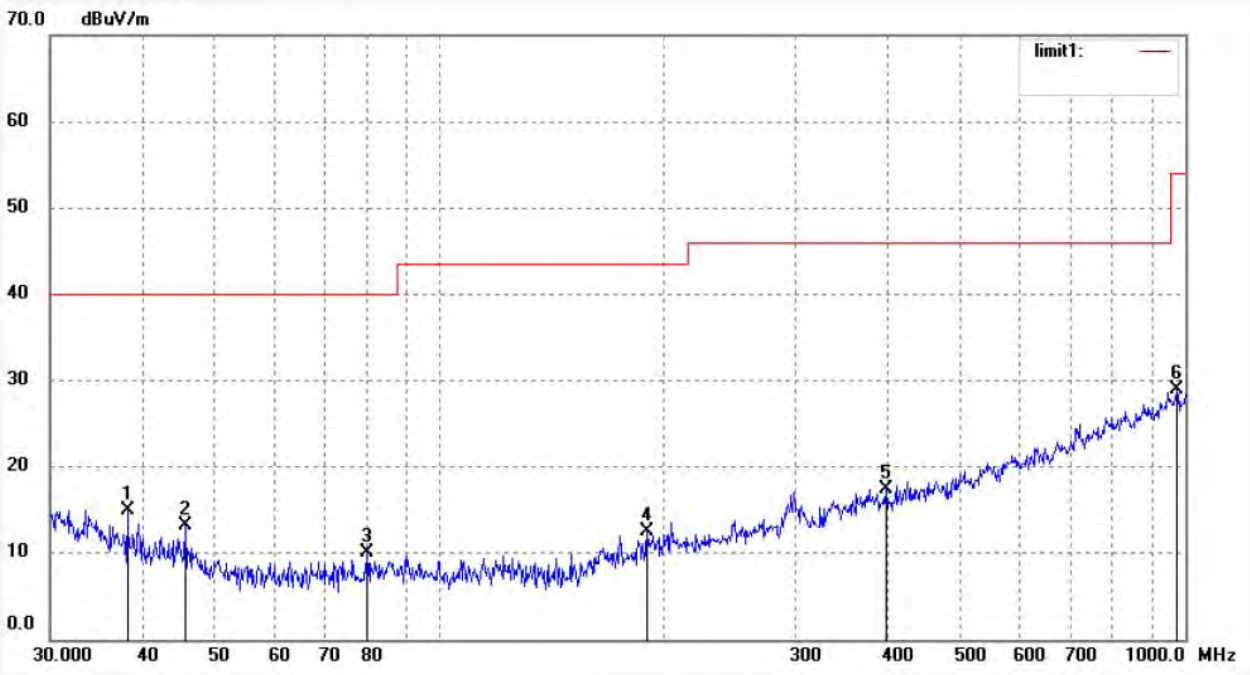
Job No.: FRANK2019 #89
Standard: FCC Class B 3M Radiated
Test item: Radiation Test
Temp.(C)/Hum.(%) 25 C / 55 %
EUT: Airpatch Sensor
Mode: TX 2402MHz
Model: DEV00093
Manufacturer: Ectosense NV

Polarization: Vertical
Power Source: DC 5V
Date: 19/01/17/
Time: 9/49/40
Engineer Signature:
Distance: 3m

Note: Report NO.:ATE20190036



No.	Freq. (MHz)	Reading (dBuV/m)	Factor (dB)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Detector	Height (cm)	Degree (deg.)	Remark
1	38.0964	37.81	-22.78	15.03	40.00	-24.97	peak	100	301	
2	45.5728	37.77	-24.62	13.15	40.00	-26.85	peak	100	221	
3	79.9569	37.40	-27.40	10.00	40.00	-30.00	peak	100	195	
4	189.7732	37.61	-25.14	12.47	43.50	-31.03	peak	100	62	
5	396.8992	35.84	-18.36	17.48	46.00	-28.52	peak	100	221	
6	975.7047	34.65	-5.64	29.01	54.00	-24.99	peak	100	103	

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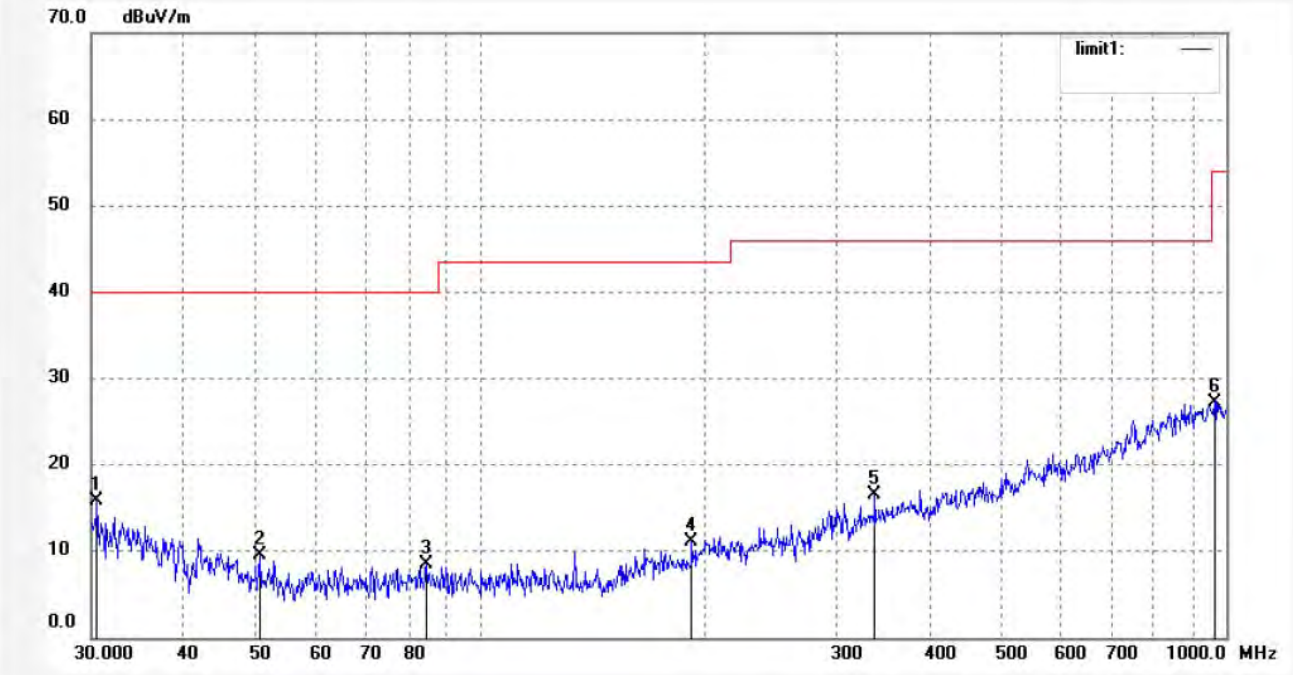
Job No.: FRANK2019 #91
Standard: FCC Class B 3M Radiated
Test item: Radiation Test
Temp.(C)/Hum.(%) 25 C / 55 %
EUT: Airpatch Sensor
Mode: TX 2440MHz
Model: DEV00093
Manufacturer: Ectosense NV

Polarization: Horizontal
Power Source: DC 5V
Date: 19/01/17/
Time: 9/50/41
Engineer Signature:
Distance: 3m

Note: Report NO.:ATE20190036



No.	Freq. (MHz)	Reading (dBuV/m)	Factor (dB)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Detector	Height (cm)	Degree (deg.)	Remark
1	30.5317	36.11	-20.33	15.78	40.00	-24.22	peak	200	66	
2	50.6389	35.85	-26.30	9.55	40.00	-30.45	peak	200	156	
3	84.5806	35.99	-27.45	8.54	40.00	-31.46	peak	200	92	
4	191.7839	36.13	-24.95	11.18	43.50	-32.32	peak	200	295	
5	337.6659	36.30	-19.81	16.49	46.00	-29.51	peak	200	116	
6	965.4741	33.06	-5.91	27.15	54.00	-26.85	peak	200	302	

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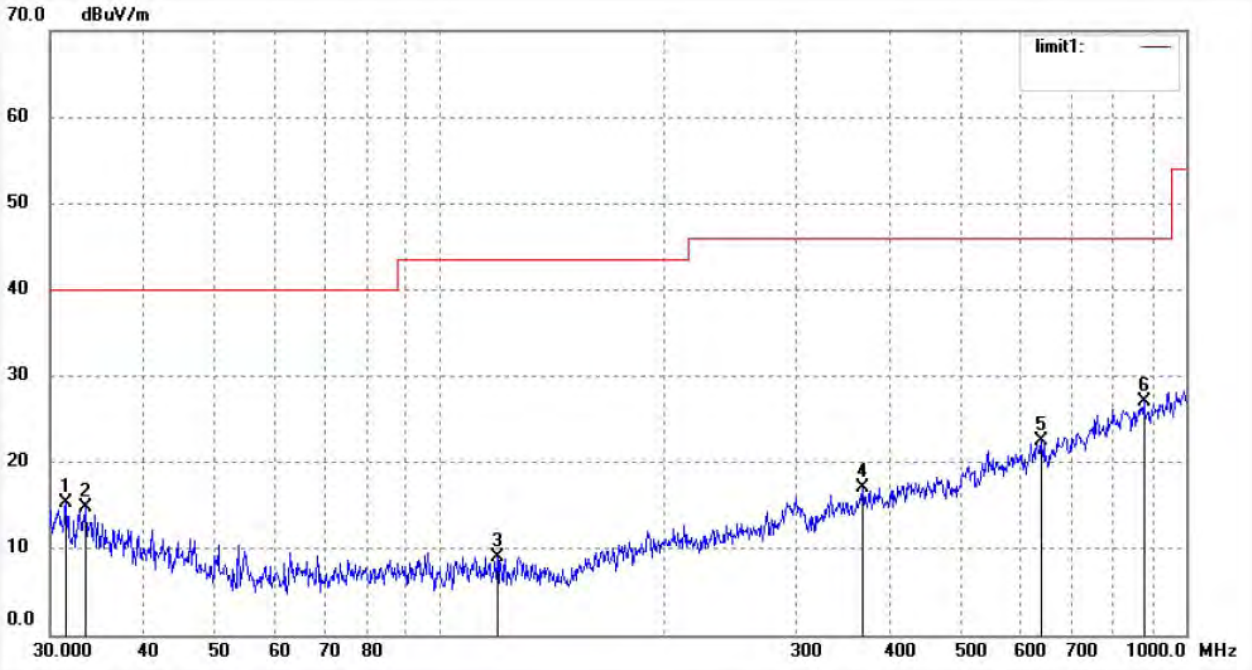
Job No.: FRANK2019 #92
Standard: FCC Class B 3M Radiated
Test item: Radiation Test
Temp.(C)/Hum.(%) 25 C / 55 %
EUT: Airpatch Sensor
Mode: TX 2440MHz
Model: DEV00093
Manufacturer: Ectosense NV

Polarization: Vertical
Power Source: DC 5V
Date: 19/01/17/
Time: 9/51/16
Engineer Signature:
Distance: 3m

Note: Report NO.:ATE20190036



No.	Freq. (MHz)	Reading (dBuV/m)	Factor (dB)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Detector	Height (cm)	Degree (deg.)	Remark
1	31.5124	35.95	-20.57	15.38	40.00	-24.62	peak	100	246	
2	33.4520	35.85	-21.06	14.79	40.00	-25.21	peak	100	91	
3	119.3469	36.46	-27.43	9.03	43.50	-34.47	peak	100	210	
4	368.6681	35.89	-18.80	17.09	46.00	-28.91	peak	100	64	
5	640.0394	35.35	-12.85	22.50	46.00	-23.50	peak	100	116	
6	878.0931	34.59	-7.56	27.03	46.00	-18.97	peak	100	302	

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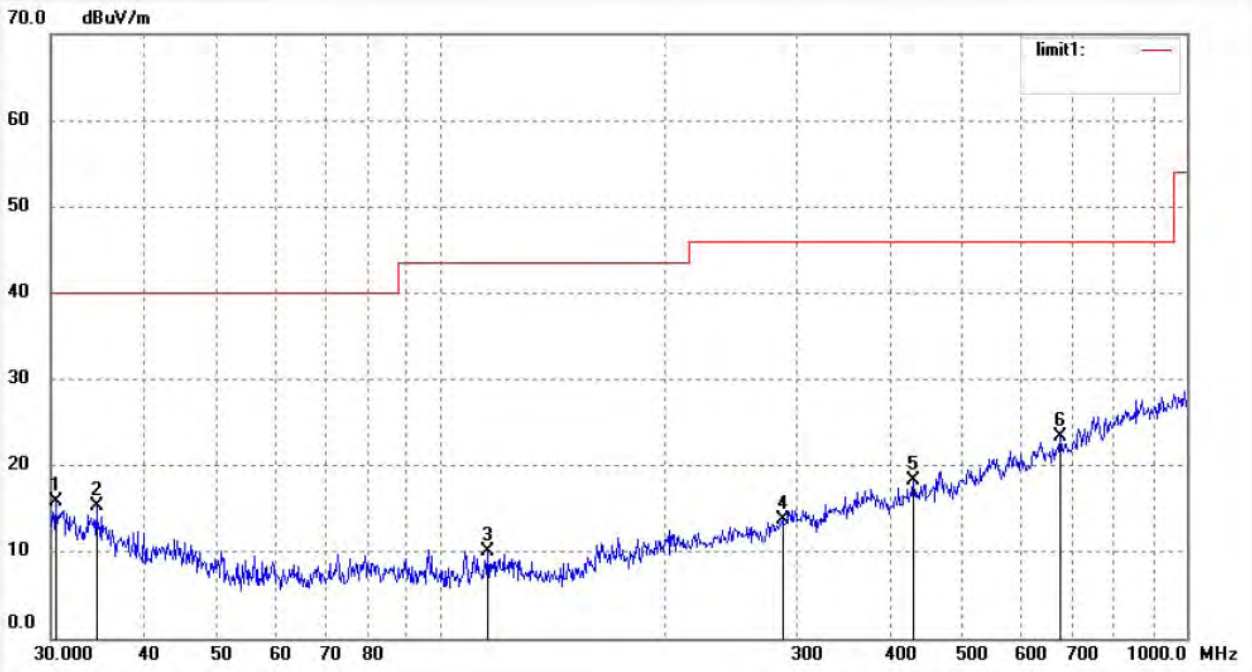
Job No.: FRANK2019 #94
Standard: FCC Class B 3M Radiated
Test item: Radiation Test
Temp.(C)/Hum.(%) 25 C / 55 %
EUT: Airpatch Sensor
Mode: TX 2480MHz
Model: DEV00093
Manufacturer: Ectosense NV

Polarization: Horizontal
Power Source: DC 5V
Date: 19/01/17/
Time: 9/52/38
Engineer Signature:
Distance: 3m

Note: Report NO.:ATE20190036



No.	Freq. (MHz)	Reading (dBuV/m)	Factor (dB)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Detector	Height (cm)	Degree (deg.)	Remark
1	30.4246	36.09	-20.31	15.78	40.00	-24.22	peak	200	219	
2	34.5270	36.59	-21.32	15.27	40.00	-24.73	peak	200	136	
3	115.6320	37.46	-27.36	10.10	43.50	-33.40	peak	200	165	
4	287.2727	35.54	-21.79	13.75	46.00	-32.25	peak	200	92	
5	430.3052	36.09	-17.78	18.31	46.00	-27.69	peak	200	116	
6	677.0515	35.42	-12.00	23.42	46.00	-22.58	peak	200	302	

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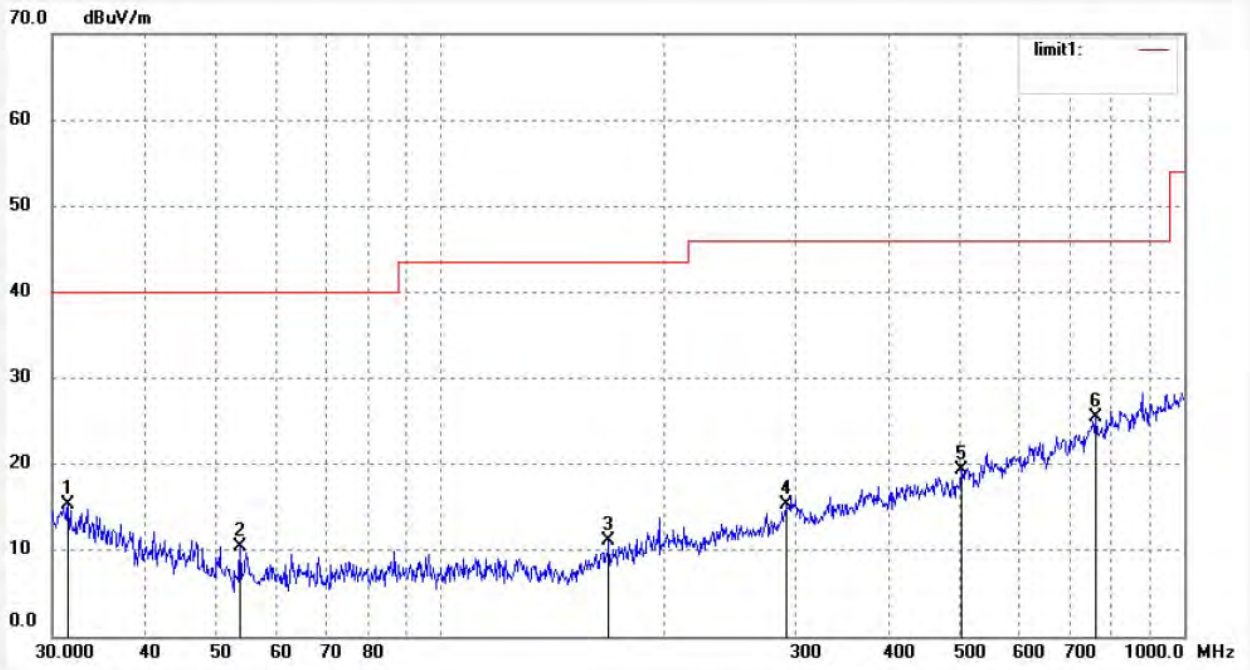
Job No.: FRANK2019 #93
Standard: FCC Class B 3M Radiated
Test item: Radiation Test
Temp.(C)/Hum.(%) 25 C / 55 %
EUT: Airpatch Sensor
Mode: TX 2480MHz
Model: DEV00093
Manufacturer: Ectosense NV

Polarization: Vertical
Power Source: DC 5V
Date: 19/01/17/
Time: 9/51/26
Engineer Signature:
Distance: 3m

Note: Report NO.:ATE20190036



No.	Freq. (MHz)	Reading (dBuV/m)	Factor (dB)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Detector	Height (cm)	Degree (deg.)	Remark
1	31.5124	35.95	-20.57	15.38	40.00	-24.62	peak	100	154	
2	53.7558	37.24	-26.81	10.43	40.00	-29.57	peak	100	66	
3	168.4043	37.30	-26.17	11.13	43.50	-32.37	peak	100	246	
4	292.3643	36.94	-21.56	15.38	46.00	-30.62	peak	100	94	
5	502.2472	35.56	-16.26	19.30	46.00	-26.70	peak	100	146	
6	760.2866	35.45	-10.04	25.41	46.00	-20.59	peak	100	302	

1GHz-18GHz test data

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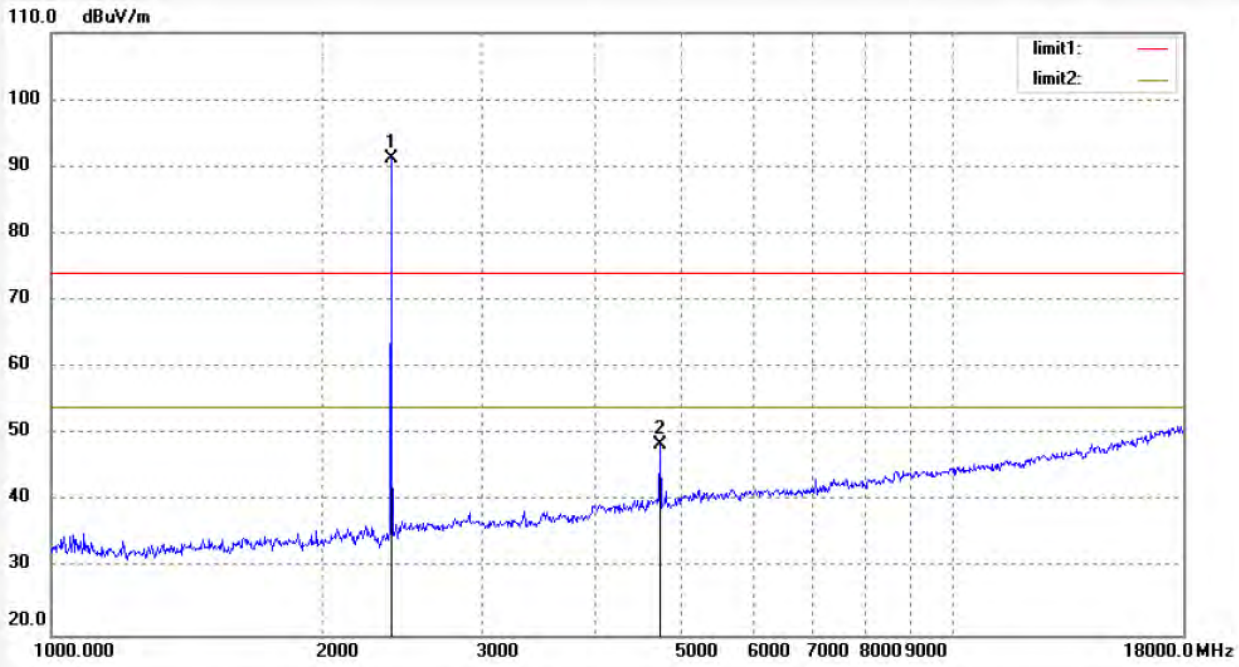
Job No.: FRANK2019 #97
Standard: FCC PK
Test item: Radiation Test
Temp.(C)/Hum.(%) 25 C / 55 %
EUT: Airpatch Sensor
Mode: TX 2402MHz
Model: DEV00093
Manufacturer: Ectosense NV

Polarization: Horizontal
Power Source: DC 5V
Date: 19/01/17/
Time: 10/20/53
Engineer Signature:
Distance: 3m

Note: Report NO.:ATE20190036



No.	Freq. (MHz)	Reading (dBuV/m)	Factor (dB)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Detector	Height (cm)	Degree (deg.)	Remark
1	2402.019	97.56	-6.37	91.19	/	/	peak	200	115	
2	4804.057	47.85	0.70	48.55	74.00	-25.45	peak	200	302	

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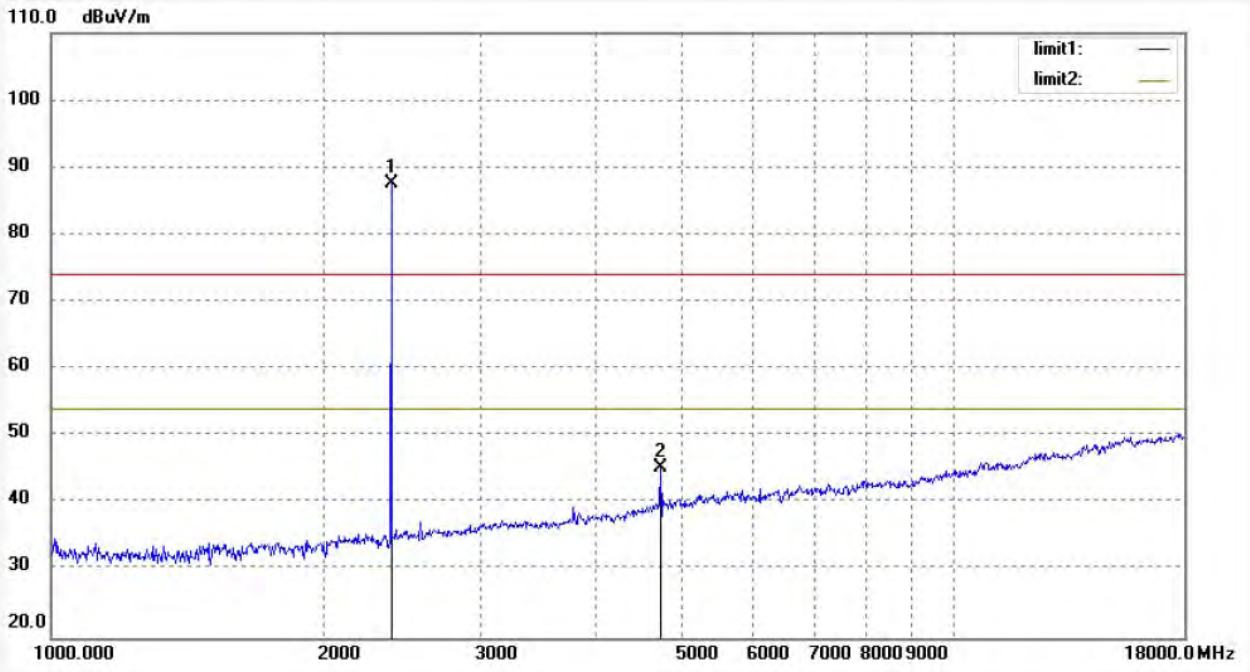
Fax:+86-0755-26503396

Job No.: FRANK2019 #98
Standard: FCC PK
Test item: Radiation Test
Temp.(C)/Hum.(%) 25 C / 55 %
EUT: Airpatch Sensor
Mode: TX 2402MHz
Model: DEV00093
Manufacturer: Ectosense NV

Polarization: Vertical
Power Source: DC 5V
Date: 19/01/17/
Time: 10/22/01
Engineer Signature:
Distance: 3m

Note: Report NO.:ATE20190036



No.	Freq. (MHz)	Reading (dBuV/m)	Factor (dB)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Detector	Height (cm)	Degree (deg.)	Remark
1	2402.019	94.04	-6.37	87.67	/	/	peak	150	113	
2	4804.157	44.72	0.70	45.42	74.00	-28.58	peak	150	102	

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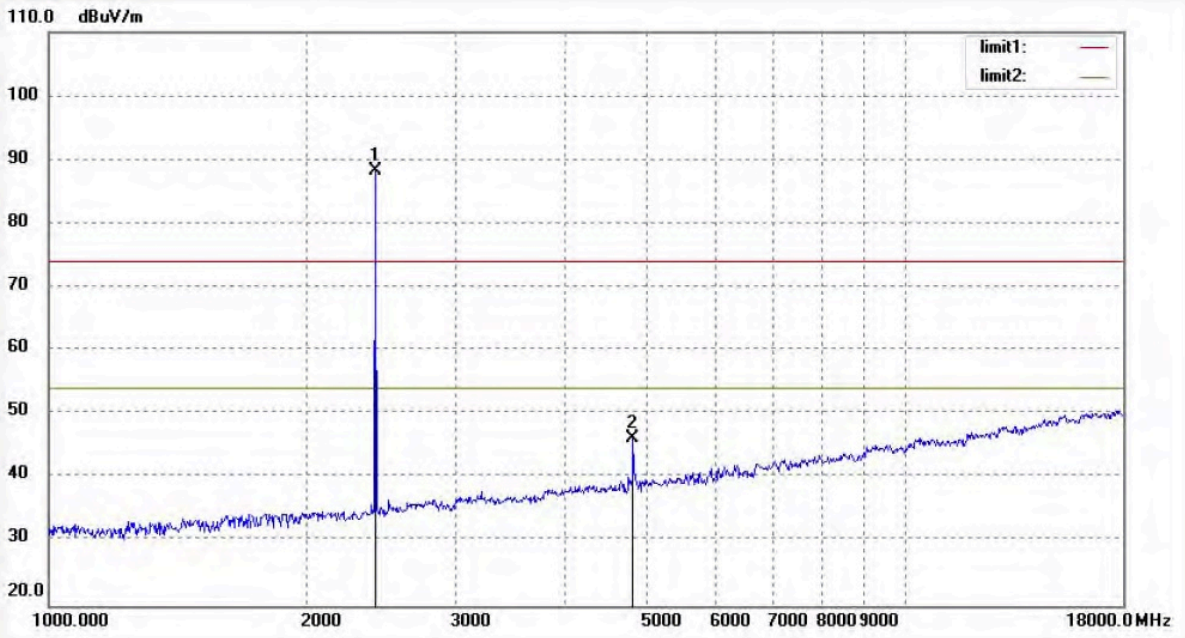
Fax:+86-0755-26503396

Job No.: FRANK2019 #100	Polarization: Horizontal
Standard: FCC PK	Power Source: DC 5V
Test item: Radiation Test	Date: 19/01/17/
Temp.(C)/Hum.(%) 25 C / 55 %	Time: 10/24/55
EUT: Airpatch Sensor	Engineer Signature:
Mode: TX 2440MHz	Distance: 3m
Model: DEV00093	
Manufacturer: Ectosense NV	

Note: Report NO.:ATE20190036



No.	Freq. (MHz)	Reading (dBuV/m)	Factor (dB)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Detector	Height (cm)	Degree (deg.)	Remark
1	2440.010	94.55	-6.24	88.31	/	/	peak	200	95	
2	4880.324	45.03	1.07	46.10	74.00	-27.90	peak	200	125	

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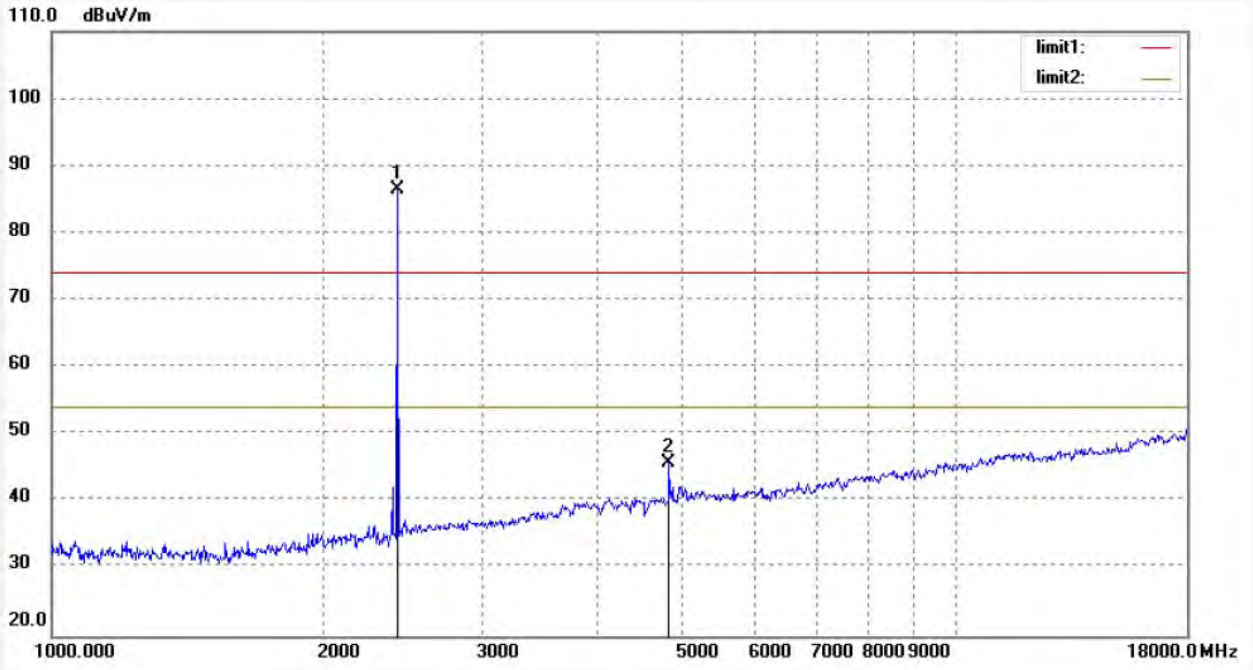
Job No.: FRANK2019 #99
Standard: FCC PK
Test item: Radiation Test
Temp.(C)/Hum.(%) 25 C / 55 %
EUT: Airpatch Sensor
Mode: TX 2440MHz
Model: DEV00093
Manufacturer: Ectosense NV

Polarization: Vertical
Power Source: DC 5V
Date: 19/01/17/
Time: 10/23/22
Engineer Signature:
Distance: 3m

Note: Report NO.:ATE20190036



No.	Freq. (MHz)	Reading (dBuV/m)	Factor (dB)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Detector	Height (cm)	Degree (deg.)	Remark
1	2440.100	92.79	-6.24	86.55	/	/	peak	150	308	
2	4880.324	44.72	1.07	45.79	74.00	-28.21	peak	150	201	

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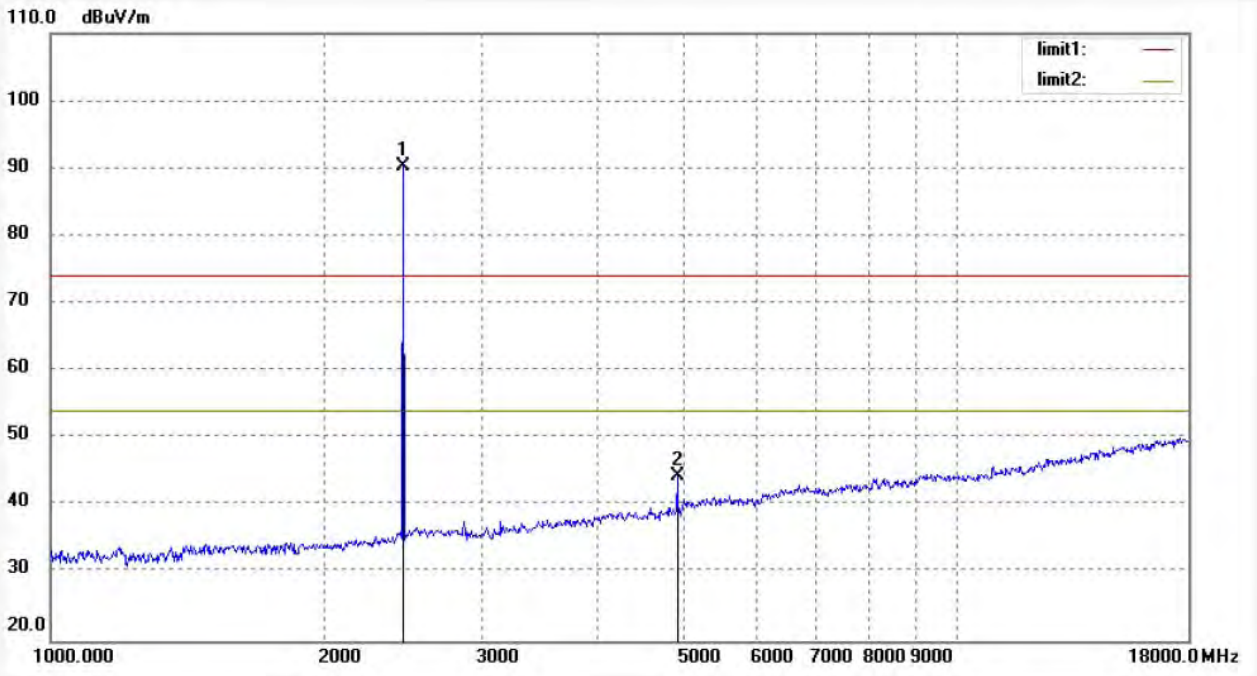
Job No.: FRANK2019 #101
Standard: FCC PK
Test item: Radiation Test
Temp.(C)/Hum.(%) 25 C / 55 %
EUT: Airpatch Sensor
Mode: TX 2480MHz
Model: DEV00093
Manufacturer: Ectosense NV

Polarization: Horizontal
Power Source: DC 5V
Date: 19/01/17/
Time: 10/26/57
Engineer Signature:
Distance: 3m

Note: Report NO.:ATE20190036



No.	Freq. (MHz)	Reading (dBuV/m)	Factor (dB)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Detector	Height (cm)	Degree (deg.)	Remark
1	2480.034	96.30	-6.04	90.26	/	/	peak	200	189	
2	4960.144	42.93	1.50	44.43	74.00	-29.57	peak	200	62	

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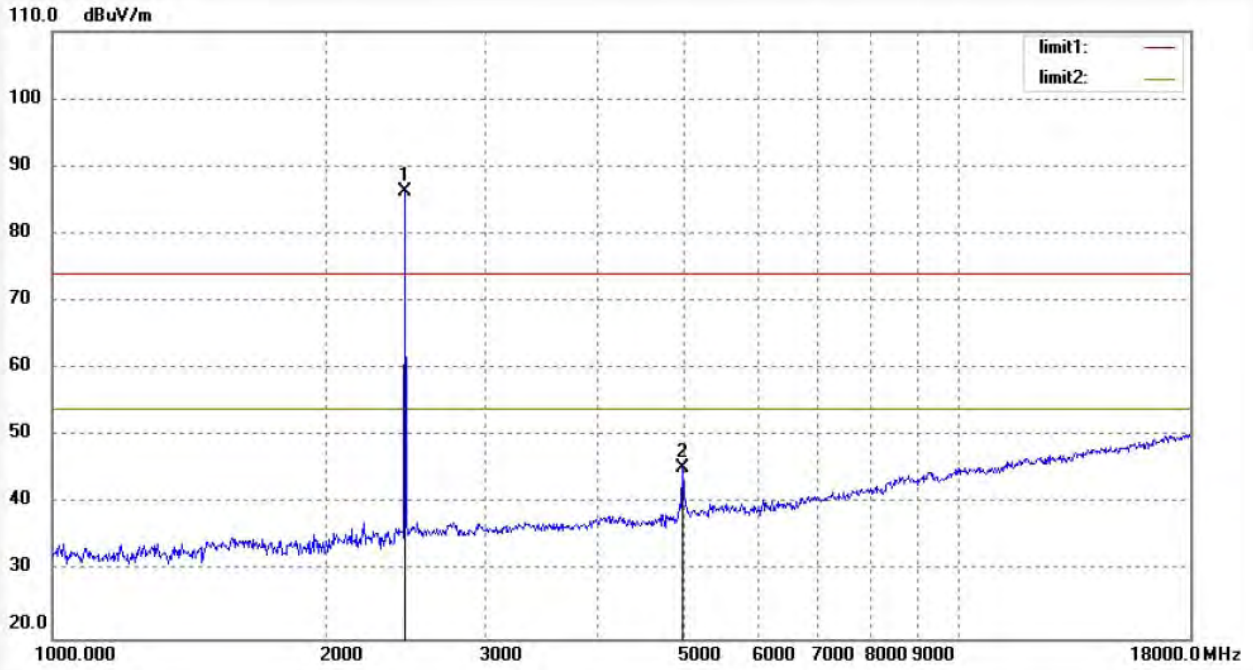
Job No.: FRANK2019 #102
Standard: FCC PK
Test item: Radiation Test
Temp.(C)/Hum.(%) 25 C / 55 %
EUT: Airpatch Sensor
Mode: TX 2480MHz
Model: DEV00093
Manufacturer: Ectosense NV

Polarization: Vertical
Power Source: DC 5V
Date: 19/01/17/
Time: 10/28/13
Engineer Signature:
Distance: 3m

Note: Report NO.:ATE20190036



No.	Freq. (MHz)	Reading (dBuV/m)	Factor (dB)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Detector	Height (cm)	Degree (deg.)	Remark
1	2480.034	92.31	-6.04	86.27	/	/	peak	150	118	
2	4960.046	43.71	1.68	45.39	74.00	-28.61	peak	150	132	

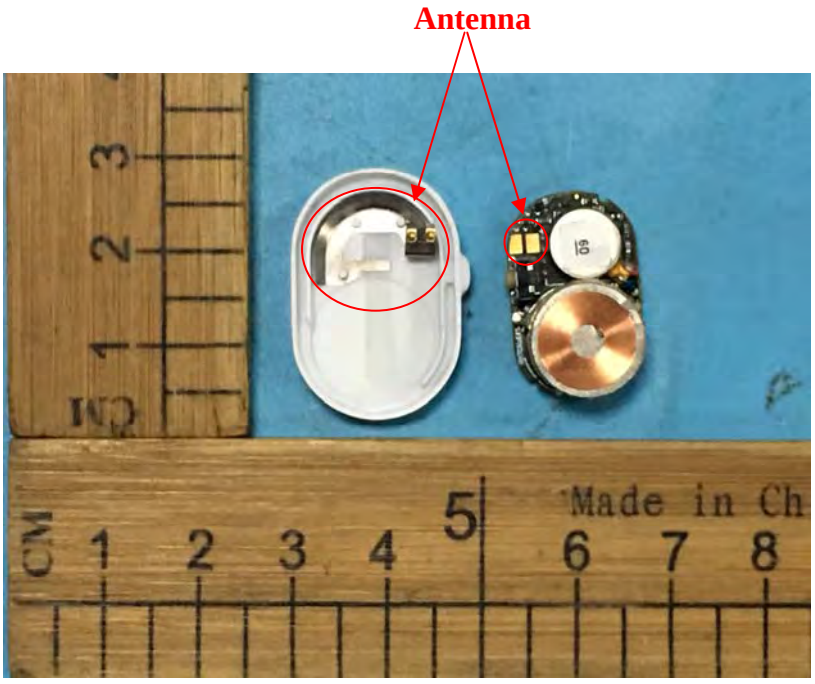
10. ANTENNA REQUIREMENT

10.1. The Requirement

According to Section 15.203, an intentional radiator shall be designed to ensure that no antenna other than that furnished by the responsible party shall be used with the device.

10.2. Antenna Construction

Device is equipped with permanent attached antenna, which isn't displaced by other antenna. The Antenna gain of EUT is -0.3dBi. Therefore, the equipment complies with the antenna requirement of Section 15.203.



******* End of Test Report *******