

RADIO PERFORMANCE TEST REPORT

Test Report No. : OT-203-RWD-029

AGR No. : A202A-086

Applicant : HUWANT Co.,ltd.

Address : 203 Ho, 201 Dong, 40, Yeonam-ro, Buk-gu, Daegu, Republic of Korea

Manufacturer : HUWANT Co.,ltd.

Address : 203 Ho, 201 Dong, 40, Yeonam-ro, Buk-gu, Daegu, Republic of Korea

Type of Equipment : Breathe-On

FCC ID. : 2AVSG-BREATHE-ONNB

Model Name : Breathe-On(NB)

Multiple Model Name : Breathe-On(OB)

Serial number : N/A

Total page of Report : 26 pages (including this page)

Date of Incoming : February 10, 2020

Date of issue : March 10, 2020

SUMMARY

The equipment complies with the regulation; **FCC PART 15 SUBPART B Section 15.109 & 107**

This test report only contains the result of a single test of the sample supplied for the examination.

It is not a generally valid assessment of the features of the respective products of the mass-production.

Reviewed by:


Ha-Ram Lee / Manager
ONETECH Corp.

Approved by:


Jae-Ho Lee / General Manager
ONETECH Corp.

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Revision History

Issued Report No.	Issued Date	Revisions	Effect Section
OT-203-RWD-029	March 10, 2020	Initial Issue	All

1. VERIFICATION OF COMPLIANCE

Applicant : HUWANT Co.,ltd.
Address : 203 Ho, 201 Dong, 40, Yeonam-ro, Buk-gu, Daegu, Republic of Korea
Contact Person : WOOKJIN LEE/ CEO & Founder
Telephone No. : +821030762955
FCC ID : 2AVSG-BREATHE-ONNB
Model Name : Breathe-On(NB)
Serial Number : N/A
Brand/Trade Name: N/A
Date : March 10, 2020

EQUIPMENT CLASS	JAB – Part 15 Class B Digital Device
KIND OF EQUIPMENT	Breathe-On
THIS REPORT CONCERNS	Original Grant
MEASUREMENT PROCEDURES	ANSI C63.10: 2013
TYPE OF EQUIPMENT TESTED	Pre-Production
KIND OF EQUIPMENT AUTHORIZATION REQUESTED	Certification
EQUIPMENT WILL BE OPERATED UNDER FCC RULES PART(S)	FCC PART 15 SUBPART B Section 15.109 & 107
Modifications on the Equipment to Achieve Compliance	None
Final Test was Conducted On	3 m, Semi Anechoic Chamber

-. The above equipment was tested by ONETECH Corp. for compliance with the requirement set forth in the FCC Rules and Regulations. This said equipment in the configuration described in this report, shows the maximum emission levels emanating from equipment are within the compliance requirements.

2. TEST SUMMARY

2.1 Test items and results

SECTION	TEST ITEMS	RESULTS
15.247 (a) (2)	Minimum 6 dB Bandwidth	N/A (See Note 1)
15.247 (b) (3)	Maximum Peak Conducted Output Power	N/A (See Note 1)
15.247 (d)	100 kHz Bandwidth Outside the Frequency Band	N/A (See Note 1)
15.247 (d)	Radiated Emission which fall in the Restricted Band	Met the Limit / PASS
15.247 (e)	Peak Power Spectral Density	N/A (See Note 1)
15.109	Radiated Emission Limits	Met the Limit / PASS
15.107	Conducted Limits	Met the Limit / PASS
15.203	Antenna Requirement	N/A (See Note 1)

- Note 1: The EUT uses certified RF module. (FCC ID: QECGWBMD0X)

Please refer to the test report of module. (Report No.: CGZ3150210-00184-EF)

2.2 Additions, deviations, exclusions from standards

No additions, deviations or exclusions have been made from standard.

2.3 Related Submittal(s) / Grant(s)

Original submittal only

2.4 Purpose of the test

To determine whether the equipment under test fulfills the requirements of the regulation stated in FCC PART 15 SUBPART B Section 15.109 & 107.

2.5 Test Methodology

Both conducted and radiated testing was performed according to the procedures in ANSI C63.10: 2013. Radiated testing was performed at a distance of 3 m from EUT to the antenna.

2.6 Test Facility

The Onetech Corp. has been designated to perform equipment testing in compliance with ISO/IEC 17025.

The Electromagnetic compatibility measurement facilities are located at 43-14, Jinsaegol-gil, Chowol-eup, Gwangju-si, Gyeonggi-do, 12735, Korea

-. Site Filing:

VCCI (Voluntary Control Council for Interference) – Registration No. R-4112/ C-14617/ G-10666 / T-1842

ISED (Innovation, Science and Economic Development Canada) – Registration No. Site# 3736A-3

-. Site Accreditation:

KOLAS (Korea Laboratory Accreditation Scheme) - Accreditation NO. KT085

FCC (Federal Communications Commission) - Accreditation No. KR0013

RRA (Radio Research Agency) – Designation No. KR0013

3. GENERAL INFORMATION

3.1 Product Description

The HUWANT Co.,ltd., Model Breathe-On(NB) (referred to as the EUT in this report) is a Breathe-On. The product specification described herein was obtained from product data sheet or user's manual.

Device Type	Breathe-On
RF Spec.	Bluetooth LE (FCC ID of certified RF module : QECGWBMD0X)
Electrical Rating	DC 3.7 V

3.2 Alternative type(s)/model(s); also covered by this test report.

-. The following lists consist of the added model and their differences.

Model Name	Differences	Tested
Breathe-On(NB)	Basic Model	☒
Breathe-On(OB)	This model is identical to the basic model except for the sensor board.	☒

Note: 1. Applicant consigns only basic model to test. Therefore, this test report just guarantees the units, which have been tested.

2. The Applicant/manufacturer is responsible for the compliance of all variants.

4. EUT MODIFICATIONS

-. None

5. SYSTEM TEST CONFIGURATION

5.1 Justification

This device was configured for testing in a typical way as a normal customer is supposed to be used. During the test, the following components were installed inside of the EUT.

DEVICE TYPE	MANUFACTURER	MODEL/PART NUMBER	FCC ID
Main Board	N/A	N/A	N/A
Sensor Board A/B	N/A	N/A	N/A

5.2 Peripheral equipment

Defined as equipment needed for correct operation of the EUT, but not considered as tested:

Model	Manufacturer	Description	Connected to
HP Probook	HP	Notebook PC	EUT
PPP009C	LITE-ON TECHNOLOGY (CHANGZHOU)CO.,LTD.	AC Adapter	

5.3 Mode of operation during the test

For the testing, software used to control the EUT for staying in continuous transmitting is programmed.

For final testing, the EUT was set at 2 402 MHz, 2 440 MHz, and 2 480 MHz to get a maximum emission levels from the EUT. The EUT was moved throughout the XY, XZ, and YZ planes and the worst case is “XY” axis, but the worst data was recorded in this report.

5.4 Configuration of Test System

Line Conducted Test: The EUT was connected to LISN. All supporting equipments were connected to another LISN. Preliminary Power line Conducted Emission test was performed by using the procedure in ANSI C63.10: 2013 to determine the worse operating conditions.

Radiated Emission Test: Preliminary radiated emissions test were conducted using the procedure in ANSI C63.10: 2013 to determine the worse operating conditions. Final radiated emission tests were conducted at 3 meter open area test site.

The turntable was rotated through 360 degrees and the EUT was tested by positioned three orthogonal planes to obtain the highest reading on the field strength meter. Once maximum reading was determined, the search antenna was raised and lowered in both vertical and horizontal polarization.

5.5 Antenna Requirement

For intentional device, 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.

Antenna Construction:

The antenna of the EUT is a Chip Antenna, so no consideration of replacement by the user.

6. PRELIMINARY TEST

6.1 AC Power line Conducted Emissions Tests

During Preliminary Tests, the following operating mode was investigated

Operation Mode	The Worse operating condition (Please check one only)
Charging mode	X

6.2 General Radiated Emissions Tests

During Preliminary Tests, the following operating modes were investigated

Operation Mode	The Worse operating condition (Please check one only)
Transmitting Mode	X

7. Radiated Emission which fall in the Restricted Band

7.1 Operating environment

Temperature : 24 °C
Relative humidity : 48 % R.H.

7.2 Test set-up for radiated measurement

The radiated emissions measurements were performed on the 3 m semi anechoic chamber. The EUT was placed on turntable approximately 1.5 m above the ground plane.

The frequency spectrum from 30 MHz to 26.5 GHz was scanned and maximum emission levels at each frequency recorded. The system was rotated 360°, and the antenna was varied in the height between 1.0 m and 4.0 m in order to determine the maximum emission levels. This procedure was performed for horizontal and vertical polarization of the receiving antenna.

7.3 Test equipment used

	Model Number	Manufacturer	Description	Serial Number	Last Cal.
■ -	FSV30	Rohde & Schwarz	Signal Analyzer	101199	Feb. 20, 2020 (1Y)
■ -	ESW	Rohde & Schwarz	EMI Test Receiver	101851	Aug. 07, 2019 (1Y)
■ -	310N	Sonoma Instrument	Pre-Amplifier	392756	Oct. 18, 2019 (1Y)
■ -	DT2000-2t	Innco System	Turn Table	N/A	N/A
■ -	MA-4640-XPET	Innco System	Antenna Master	640/652/4631003	N/A
■ -	Loop Antenna	Schwarzbeck	FMZB 1513	1513-235	May. 13, 2018 (2Y)
■ -	VULB9163	Schwarzbeck	TRILOG Broadband Antenna	9163-255	Jun. 05, 2018 (2Y)

All test equipment used is calibrated on a regular basis.

7.4 Test data for Basic model (Breathe-On(NB))

- Test Date : February 13, 2020
- Resolution bandwidth : 1 MHz for Peak and Average Mode
- Video bandwidth : 3 MHz for Peak and Average Mode
- Detector : Peak Mode(Peak), Average Mode(RMS)
- Measurement distance : 3 m
- Result : PASSED

Frequency (MHz)	Reading (dBμV)	Detector Mode	Ant. Pol. (H/V)	Ant. Factor	Cable Loss	Total (dBμV/m)	Limits (dBμV/m)	Margin (dB)
Test Data for Low Channel								
2 345.13	20.65	Peak	H	27.90	5.10	53.65	74.00	20.35
2 365.98	13.20	Average	H			47.85	54.00	6.15
2 359.27	20.40	Peak	V			53.40	74.00	20.60
2 365.50	13.28	Average	V			47.93	54.00	6.07
Test Data for High Channel								
2 495.03	19.24	Peak	H	28.40	5.20	52.84	74.00	21.16
2 484.96	13.35	Average	H			48.60	54.00	5.40
2 489.25	19.91	Peak	V			53.51	74.00	20.49
2 497.12	13.08	Average	V			48.33	54.00	5.67

Tabulated test data for Restricted Band

Remark: "H": Horizontal, "V": Vertical

$$\text{Margin (dB)} = \text{Limits (dB}\mu\text{V/m)} - \text{Total Level (dB}\mu\text{V/m)}$$

$$\text{Total Level} = \text{Reading} + \text{Antenna Factor} + \text{Cable Loss} - \text{Pre-Amplifier Gain}$$



Tested by: Ha-Ram Lee / Manager

7.5 Test data for Multiple model (Breathe-On(OB))

- Test Date : February 13, 2020
- Resolution bandwidth : 1 MHz for Peak and Average Mode
- Video bandwidth : 3 MHz for Peak and Average Mode
- Detector : Peak Mode(Peak), Average Mode(RMS)
- Measurement distance : 3 m
- Result : PASSED

Frequency (MHz)	Reading (dBμV)	Detector Mode	Ant. Pol. (H/V)	Ant. Factor	Cable Loss	Total (dBμV/m)	Limits (dBμV/m)	Margin (dB)
Test Data for Low Channel								
2 388.68	19.56	Peak	H	27.90	5.10	52.56	74.00	21.44
2 351.04	13.30	Average	H			47.95	54.00	6.05
2 389.24	19.67	Peak	V			52.67	74.00	21.33
2 312.36	13.48	Average	V			48.13	54.00	5.87
Test Data for High Channel								
2 499.99	19.94	Peak	H	28.40	5.20	53.54	74.00	20.46
2 491.83	13.46	Average	H			48.71	54.00	5.29
2 497.52	20.63	Peak	V			54.23	74.00	19.77
2 495.58	13.38	Average	V			48.63	54.00	5.37

Tabulated test data for Restricted Band

Remark: "H": Horizontal, "V": Vertical

$$\text{Margin (dB)} = \text{Limits (dB}\mu\text{V/m)} - \text{Total Level (dB}\mu\text{V/m)}$$

$$\text{Total Level} = \text{Reading} + \text{Antenna Factor} + \text{Cable Loss} - \text{Pre-Amplifier Gain}$$



Tested by: Ha-Ram Lee / Manager

8. Spurious & Harmonic Radiated Emission

8.1 Test data for Basic model (Breathe-On(NB))

Temperature : 24 °C
Relative humidity : 48 % R.H.

8.2 Test set-up for radiated measurement

The radiated emissions measurements were performed on the 3 m semi anechoic chamber. The EUT was placed on turntable approximately 1.5 m above the ground plane.

The frequency spectrum from 30 MHz to 26.5 GHz was scanned and maximum emission levels at each frequency recorded. The system was rotated 360°, and the antenna was varied in the height between 1.0 m and 4.0 m in order to determine the maximum emission levels. This procedure was performed for horizontal and vertical polarization of the receiving antenna.

8.3 Test equipment used

	Model Number	Manufacturer	Description	Serial Number	Last Cal.
■ -	FSV30	Rohde & Schwarz	Signal Analyzer	101199	Feb. 20, 2020 (1Y)
■ -	ESW	Rohde & Schwarz	EMI Test Receiver	101851	Aug. 07, 2019 (1Y)
■ -	310N	Sonoma Instrument	Pre-Amplifier	392756	Oct. 18, 2019 (1Y)
■ -	DT2000-2t	Innco System	Turn Table	N/A	N/A
■ -	MA-4640-XPET	Innco System	Antenna Master	640/652/4631003	N/A
■ -	Loop Antenna	Schwarzbeck	FMZB 1513	1513-235	May. 13, 2018 (2Y)
■ -	VULB9163	Schwarzbeck	TRILOG Broadband Antenna	9163-255	Jun. 05, 2018 (2Y)

All test equipment used is calibrated on a regular basis.

8.4 Test data for Basic model (Breathe-On(NB))

- Test Date : February 13, 2020
- Resolution bandwidth : 1 MHz for Peak and Average Mode
- Video bandwidth : 3 MHz for Peak and Average Mode
- Detector : Peak Mode(Peak), Average Mode(RMS)
- Frequency range : 1 GHz ~ 26.5 GHz
- Measurement distance : 3 m
- Result : PASSED

Frequency (GHz)	Reading (dBμV)	Detector Mode	Ant. Pol. (H/V)	Ant. Factor	Cable Loss	Total (dBμV/m)	Limits (dBμV/m)	Margin (dB)
Test Data for Low Channel								
4 804.00	19.27	Peak	H	32.90	7.10	59.27	74.00	14.73
	10.62	Average	H			52.27	54.00	1.73
	19.65	Peak	V			59.65	74.00	14.35
	10.18	Average	V			51.83	54.00	2.17
Test Data for Middle Channel								
4 880.00	20.41	Peak	H	33.10	7.10	60.61	74.00	13.39
	10.60	Average	H			52.45	54.00	1.55
	20.50	Peak	V			60.70	74.00	13.30
	10.76	Average	V			52.61	54.00	1.39
Test Data for High Channel								
4 960.00	20.26	Peak	H	33.10	7.00	60.36	74.00	13.64
	10.08	Average	H			51.83	54.00	2.17
	20.00	Peak	V			60.10	74.00	13.90
	10.65	Average	V			52.40	54.00	1.60

Tabulated test data for Restricted Band

Remark: "H": Horizontal, "V": Vertical

Margin (dB) = Limits (dBμV/m) - Total Level (dBμV/m)

Total Level = Reading + Antenna Factor + Cable Loss – Pre-Amplifier Gain



Tested by: Ha-Ram Lee / Manager

8.5 Test data for Multiple model (Breathe-On(OB))

- Test Date : February 13, 2020
- Resolution bandwidth : 1 MHz for Peak and Average Mode
- Video bandwidth : 3 MHz for Peak and Average Mode
- Detector : Peak Mode(Peak), Average Mode(RMS)
- Frequency range : 1 GHz ~ 26.5 GHz
- Measurement distance : 3 m
- Result : PASSED

Frequency (GHz)	Reading (dBμV)	Detector Mode	Ant. Pol. (H/V)	Ant. Factor	Cable Loss	Total (dBμV/m)	Limits (dBμV/m)	Margin (dB)
Test Data for Low Channel								
4 804.00	20.08	Peak	H	32.90	7.10	60.08	74.00	13.92
	10.47	Average	H			52.12	54.00	1.88
	19.82	Peak	V			59.82	74.00	14.18
	10.84	Average	V			52.49	54.00	1.51
Test Data for Middle Channel								
4 880.00	20.82	Peak	H	33.10	7.10	61.02	74.00	12.98
	10.07	Average	H			51.92	54.00	2.08
	19.75	Peak	V			59.95	74.00	14.05
	10.35	Average	V			52.20	54.00	1.80
Test Data for High Channel								
4 960.00	19.27	Peak	H	33.10	7.00	59.37	74.00	14.63
	10.19	Average	H			51.94	54.00	2.06
	19.29	Peak	V			59.39	74.00	14.61
	10.13	Average	V			51.88	54.00	2.12

Tabulated test data for Restricted Band

Remark: "H": Horizontal, "V": Vertical

$$\text{Margin (dB)} = \text{Limits (dBμV/m)} - \text{Total Level (dBμV/m)}$$

$$\text{Total Level} = \text{Reading} + \text{Antenna Factor} + \text{Cable Loss} - \text{Pre-Amplifier Gain}$$



Tested by: Ha-Ram Lee / Manager

9. RADIATED EMISSION TEST

9.1 Operating environment

Temperature : 24 °C
Relative humidity : 48 % R.H.

9.2 Test set-up

The radiated emissions measurements were on the 3 m semi anechoic chamber. The EUT and other support equipment were placed on a non-conductive turntable above the ground plane. The interconnecting cables from outside test site were inserted into ferrite clamps at the point where the cables reach the turntable.

The frequency spectrum from 30 MHz to 26.5 GHz was scanned and emission levels maximized at each frequency recorded. The system was rotated 360°, and the antenna was varied in height between 1.0 m and 4.0 m in order to determine the maximum emission levels. This procedure was performed for both horizontal and vertical polarization of the receiving antenna.

9.3 Test equipment used

	Model Number	Manufacturer	Description	Serial Number	Last Cal.
■ -	FSV30	Rohde & Schwarz	Signal Analyzer	101199	Feb. 20, 2020 (1Y)
■ -	ESW	Rohde & Schwarz	EMI Test Receiver	101851	Aug. 07, 2019 (1Y)
■ -	310N	Sonoma Instrument	Pre-Amplifier	392756	Oct. 18, 2019 (1Y)
■ -	DT2000-2t	Innco System	Turn Table	N/A	N/A
■ -	MA-4640-XPET	Innco System	Antenna Master	640/652/4631003	N/A
■ -	Loop Antenna	Schwarzbeck	FMZB 1513	1513-235	May. 13, 2018 (2Y)
■ -	VULB9163	Schwarzbeck	TRILOG Broadband Antenna	9163-255	Jun. 05, 2018 (2Y)
■ -	BBHA9120D	Schwarzbeck	Horn Antenna	9120D-1366	Jul. 16, 2019 (1Y)
■ -	BBHA9170	Schwarzbeck	Horn Antenna	BBHA9170178	Jun. 10, 2019 (1Y)

All test equipment used is calibrated on a regular basis.

9.4 Test data for Transmitting Mode

9.4.1 Test data for Basic model (Breathe-On(NB))

9.4.1.1 Test data for 30 MHz ~ 1 GHz

Humidity Level : 48 % R.H.

Temperature: 24 °C

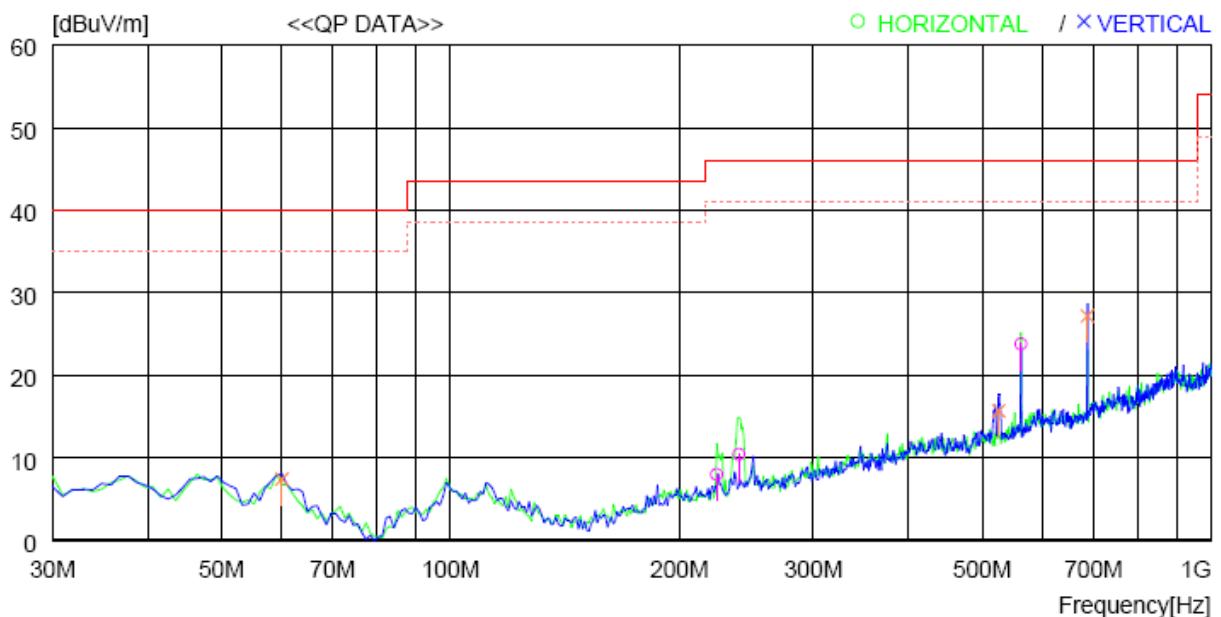
Limits apply to : FCC CFR 47, PART 15, SUBPART B, SECTION 15.109

Result : PASSED

EUT : Breathe-On

Date: February 13, 2020

Detector : CISPR Quasi-Peak (6 dB Bandwidth: 120 kHz)



No.	FREQ [MHz]	READING QP [dBuV]	ANT FACTOR [dB]	LOSS [dB]	GAIN [dB]	RESULT [dBuV/m]	LIMIT [dBuV/m]	MARGIN [dB]	ANTENNA [cm]	TABLE [DEG]
---- Horizontal ----										
1	224.000	27.5	11.2	1.9	32.6	8.0	46.0	38.0	100	359
2	239.520	29.1	12.0	1.9	32.6	10.4	46.0	35.6	100	359
3	562.529	36.3	17.6	2.9	33.0	23.8	46.0	22.2	300	359
---- Vertical ----										
4	60.070	26.0	13.2	0.9	32.7	7.4	40.0	32.6	300	0
5	525.670	28.6	17.3	2.7	32.9	15.7	46.0	30.3	300	0
6	687.655	37.5	19.2	3.4	32.9	27.2	46.0	18.8	200	164



Tested by: Ha-Ram Lee / Manager

9.4.1.2 Test data for Below 30 MHz

- Test Date : February 13, 2020
- Resolution bandwidth : 200 Hz (from 9 kHz to 0.15 MHz), 9 kHz (from 0.15 MHz to 30 MHz)
- Frequency range : 9 kHz ~ 30 MHz
- Measurement distance : 3 m
- Operating mode : Transmitting mode

Frequency (MHz)	Reading (dBμV)	Ant. Pol. (H/V)	Ant. Height (m)	Angle (°)	Ant. Factor (dB/m)	Cable Loss	Emission Level(dBμV/m)	Limits (dBμV/m)	Margin (dB)
Any emissions less than 20 dB below the limit were not observed.									

9.4.1.3 Test data for above 1 GHz

- Test Date : February 13, 2020
- Resolution bandwidth : 1 MHz for Peak and Average Mode
- Video bandwidth : 1 MHz for Peak Mode, 10 Hz for Average Mode
- Frequency range : 1 GHz ~ 26.5 GHz
- Measurement distance : 3 m
- Operating mode : Transmitting mode

Frequency (MHz)	Reading (dBμV)	Ant. Pol. (H/V)	Ant. Height (m)	Angle (°)	Ant. Factor (dB/m)	Cable Loss	Emission Level(dBμV/m)	Limits (dBμV/m)	Margin (dB)
Any emissions less than 20 dB below the limit were not observed.									



Tested by: Ha-Ram Lee / Manager

9.4.2 Test data for Basic model (Breathe-On(OB))

9.4.2.1 Test data for 30 MHz ~ 1 GHz

Humidity Level : 48 % R.H.

Temperature: 24 °C

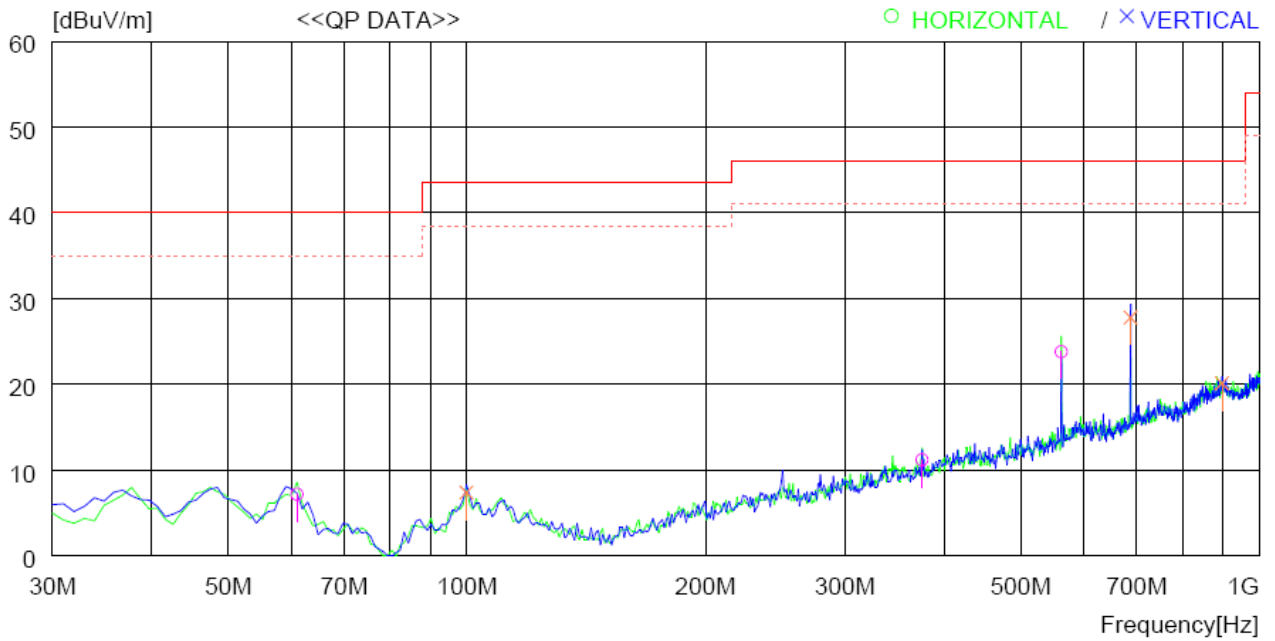
Limits apply to : FCC CFR 47, PART 15, SUBPART B, SECTION 15.109

Result : PASSED

EUT : Breathe-On

Date: February 13, 2020

Detector : CISPR Quasi-Peak (6 dB Bandwidth: 120 kHz)



No.	FREQ	READING	ANT	LOSS	GAIN	RESULT	LIMIT	MARGIN	ANTENNA	TABLE
	[MHz]	QP	FACTOR							
		[dBuV]	[dB]	[dB]	[dB]	[dBuV/m]	[dBuV/m]	[dB]	[cm]	[DEG]
----- Horizontal -----										
1	61.040	26.2	12.8	0.9	32.7	7.2	40.0	32.8	100	359
2	375.320	26.8	14.8	2.3	32.7	11.2	46.0	34.8	200	304
3	562.529	36.3	17.6	2.9	33.0	23.8	46.0	22.2	300	228
----- Vertical -----										
4	99.840	27.0	11.9	1.2	32.7	7.4	43.5	36.1	300	0
5	687.655	38.1	19.2	3.4	32.9	27.8	46.0	18.2	200	258
6	897.169	25.1	22.4	4.6	32.0	20.1	46.0	25.9	100	0



Tested by: Ha-Ram Lee / Manager

9.4.2.2 Test data for Below 30 MHz

- Test Date : February 13, 2020
- Resolution bandwidth : 200 Hz (from 9 kHz to 0.15 MHz), 9 kHz (from 0.15 MHz to 30 MHz)
- Frequency range : 9 kHz ~ 30 MHz
- Measurement distance : 3 m
- Operating mode : Transmitting mode

Frequency (MHz)	Reading (dBμV)	Ant. Pol. (H/V)	Ant. Height (m)	Angle (°)	Ant. Factor (dB/m)	Cable Loss	Emission Level(dBμV/m)	Limits (dBμV/m)	Margin (dB)
Any emissions less than 20 dB below the limit were not observed.									

9.4.2.3 Test data for above 1 GHz

- Test Date : February 13, 2020
- Resolution bandwidth : 1 MHz for Peak and Average Mode
- Video bandwidth : 1 MHz for Peak Mode, 10 Hz for Average Mode
- Frequency range : 1 GHz ~ 26.5 GHz
- Measurement distance : 3 m
- Operating mode : Transmitting mode

Frequency (MHz)	Reading (dBμV)	Ant. Pol. (H/V)	Ant. Height (m)	Angle (°)	Ant. Factor (dB/m)	Cable Loss	Emission Level(dBμV/m)	Limits (dBμV/m)	Margin (dB)
Any emissions less than 20 dB below the limit were not observed.									



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10. CONDUCTED EMISSION TEST

10.1 Operating environment

Temperature : 24 °C
Relative humidity : 48 % R.H

10.2 Test set-up

The EUT was placed on a wooden table, 0.8 m height above the floor. Power was fed to the EUT through a 50 Ω / 50 μ H + 5 Ω Artificial Mains Network (AMN). The ground plane was electrically bonded to the reference ground system and all power lines were filtered from ambient.

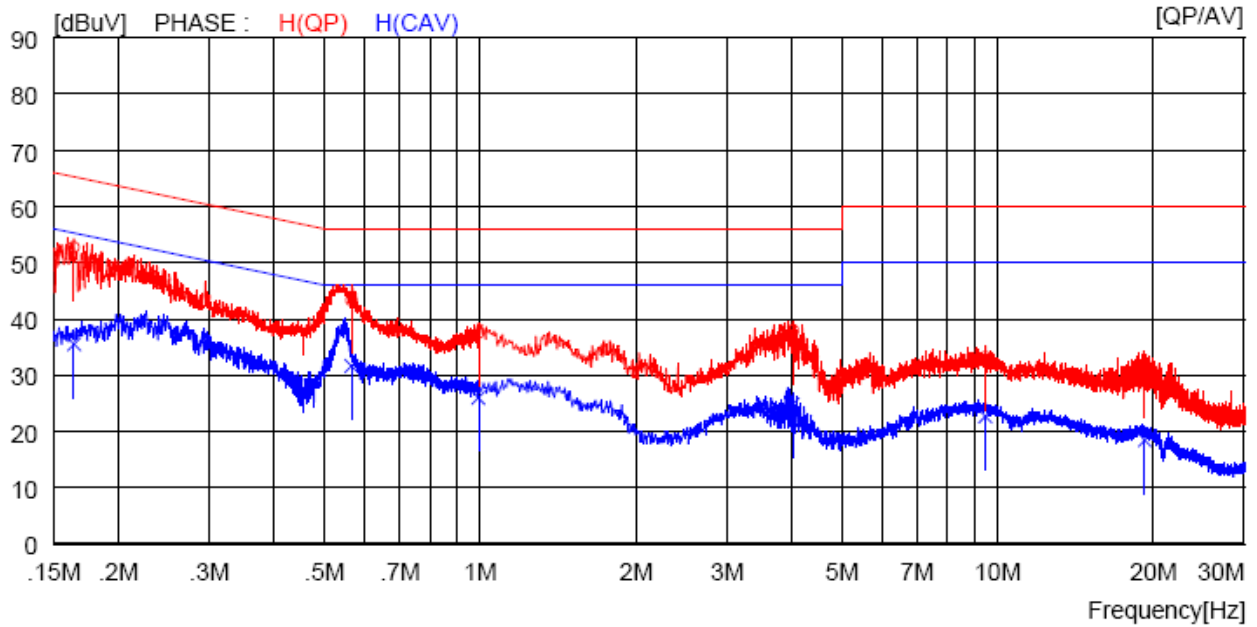
10.3 Test equipment used

Model Number	Manufacturer	Description	Serial Number	Last Cal. (Interval)
■ - ESCI	Rohde & Schwarz	Test Receiver	101012	Oct. 22, 2019 (1Y)
□ - ESU	Rohde & Schwarz	Test Receiver	100261	Mar. 28, 2019 (1Y)
□ - NSLK8128	Schwarzbeck	AMN	8128-216	Mar. 20, 2019 (1Y)
■ - NSLK8126	Schwarzbeck	AMN	8126-404	Mar. 19, 2019 (1Y)
□ - 3825/2	EMCO	AMN	9109-1869	Mar. 19, 2019 (1Y)
■ - 3825/2	EMCO	AMN	9109-1867	Mar. 27, 2019 (1Y)

All test equipment used is calibrated on a regular basis.

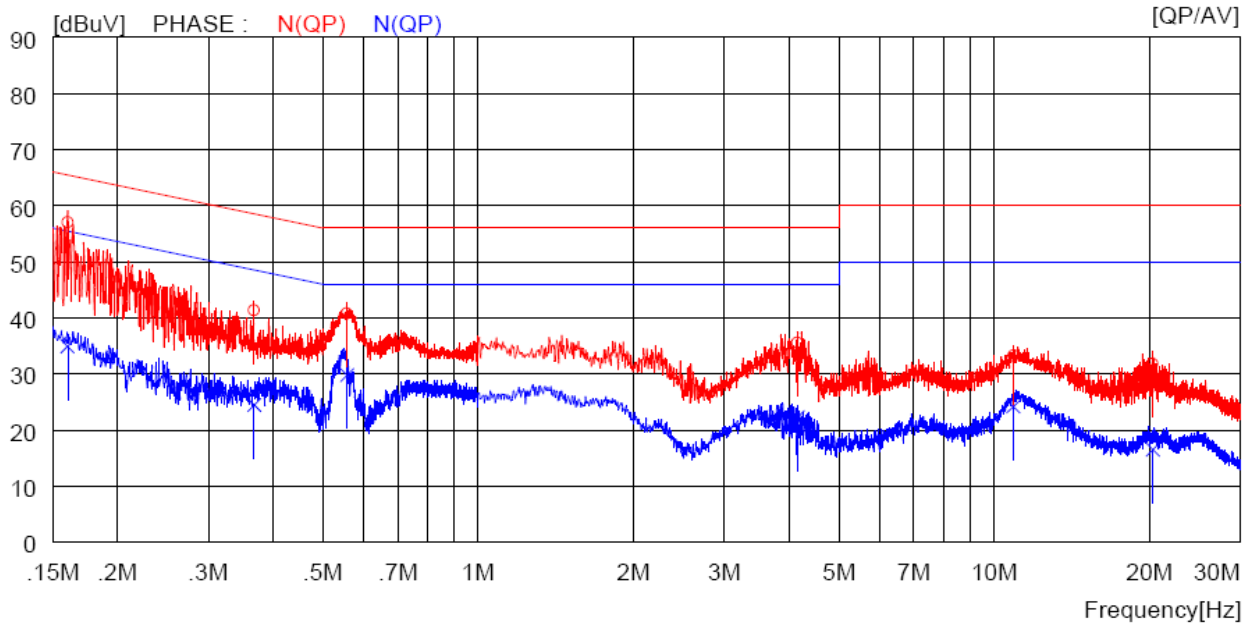
10.4 Test data for Basic model (Breathe-On(NB))

- Test Date : February 13, 2020
- Resolution bandwidth : 9 kHz
- Frequency range : 0.15 MHz ~ 30 MHz
- Tested Line : HOT LINE



NO	FREQ [MHz]	READING		C. FACTOR [dB]	RESULT		LIMIT		MARGIN		PHASE
		QP [dBuV]	AV [dBuV]		QP [dBuV]	AV [dBuV]	QP [dBuV]	AV [dBuV]	QP [dBuV]	AV [dBuV]	
1	0.16400	42.8	----	10.0	52.8	----	65.3	----	12.5	----	H (QP)
2	0.56400	33.3	----	10.0	43.3	----	56.0	----	12.7	----	H (QP)
3	0.99300	27.5	----	10.0	37.5	----	56.0	----	18.5	----	H (QP)
4	4.02400	27.9	----	10.1	38.0	----	56.0	----	18.0	----	H (QP)
5	9.48000	23.0	----	10.2	33.2	----	60.0	----	26.8	----	H (QP)
6	19.27000	21.4	----	10.4	31.8	----	60.0	----	28.2	----	H (QP)
7	0.16400	----	25.5	10.0	----	35.5	----	55.3	----	19.8	H (CAV)
8	0.56400	----	21.7	10.0	----	31.7	----	46.0	----	14.3	H (CAV)
9	0.99300	----	16.0	10.0	----	26.0	----	46.0	----	20.0	H (CAV)
10	4.02400	----	14.7	10.1	----	24.8	----	46.0	----	21.2	H (CAV)
11	9.48000	----	12.5	10.2	----	22.7	----	50.0	----	27.3	H (CAV)
12	19.27000	----	8.1	10.4	----	18.5	----	50.0	----	31.5	H (CAV)

-. Tested Line : NEUTRAL LINE



NO	FREQ [MHz]	READING		C.FACTOR [dB]	RESULT		LIMIT		MARGIN		PHASE
		QP [dBuV]	AV [dBuV]		QP [dBuV]	AV [dBuV]	QP [dBuV]	AV [dBuV]	QP [dBuV]	AV [dBuV]	
1	0.16000	47.0	----	10.0	57.0	----	65.5	----	8.5	----	N (QP)
2	0.36800	31.4	----	10.0	41.4	----	58.5	----	17.1	----	N (QP)
3	0.55700	30.8	----	10.0	40.8	----	56.0	----	15.2	----	N (QP)
4	4.16000	25.5	----	10.1	35.6	----	56.0	----	20.4	----	N (QP)
5	10.91000	23.1	----	10.2	33.3	----	60.0	----	26.7	----	N (QP)
6	20.31000	21.4	----	10.4	31.8	----	60.0	----	28.2	----	N (QP)
7	0.16000	----	24.9	10.0	----	34.9	----	55.5	----	20.6	N (CAV)
8	0.36800	----	14.5	10.0	----	24.5	----	48.5	----	24.0	N (CAV)
9	0.55700	----	19.8	10.0	----	29.8	----	46.0	----	16.2	N (CAV)
10	4.16000	----	12.2	10.1	----	22.3	----	46.0	----	23.7	N (CAV)
11	10.91000	----	14.0	10.2	----	24.2	----	50.0	----	25.8	N (CAV)
12	20.31000	----	6.1	10.4	----	16.5	----	50.0	----	33.5	N (CAV)

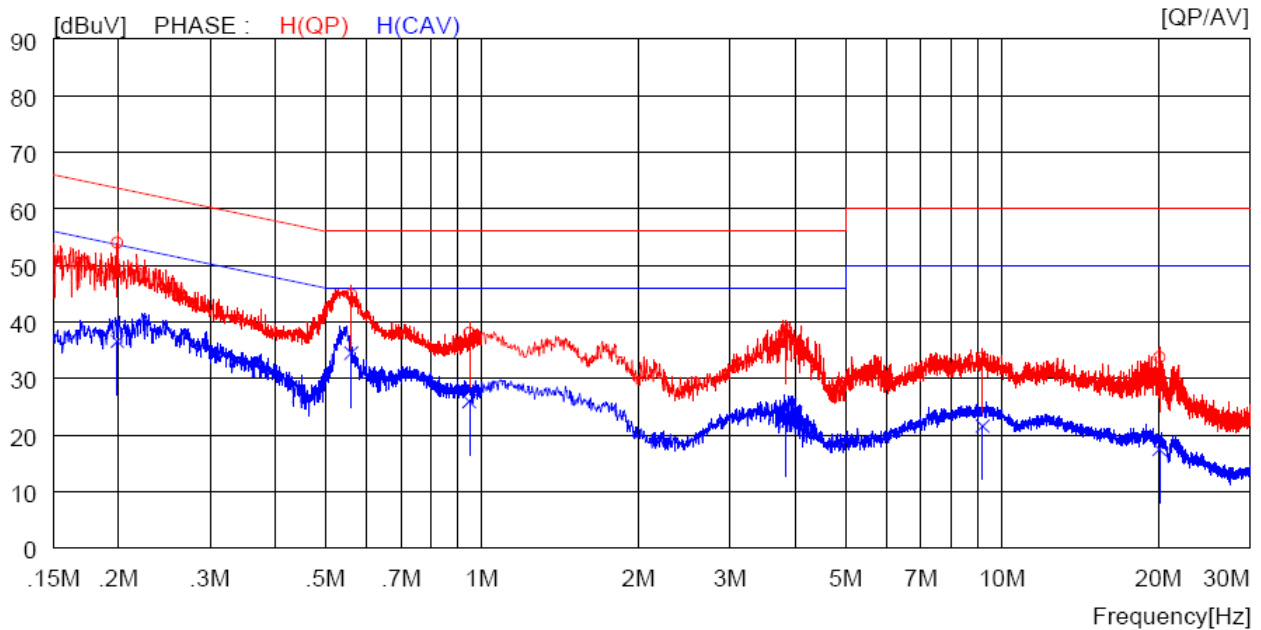
Remark: Margin (dB) = Limit – Level (Result)

The emission level in above table is included the transducer factor that means insertion loss (LISN), cable loss and attenuator.

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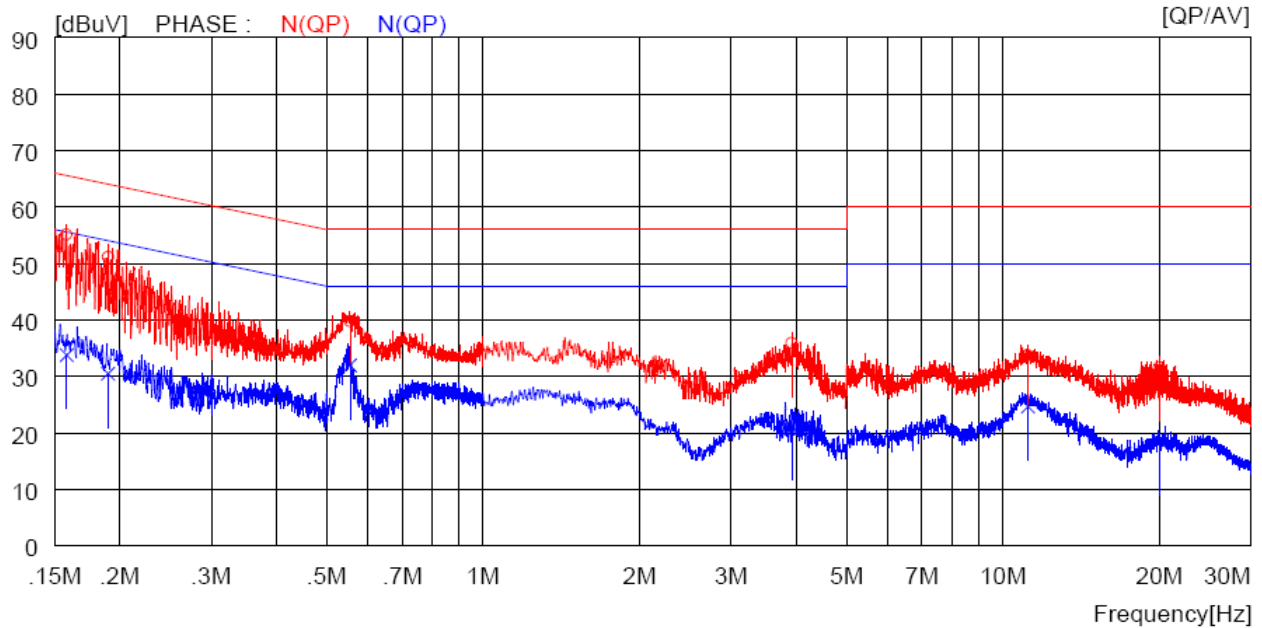
10.5 Test data for Multiple model (Breathe-On(OB))

- Test Date : February 13, 2020
- Resolution bandwidth : 9 kHz
- Frequency range : 0.15 MHz ~ 30 MHz
- Tested Line : HOT LINE



NO	FREQ [MHz]	READING		C. FACTOR [dB]	RESULT		LIMIT		MARGIN		PHASE
		QP [dBuV]	AV [dBuV]		QP [dBuV]	AV [dBuV]	QP [dBuV]	AV [dBuV]	QP [dBuV]	AV [dBuV]	
1	0.19900	44.0	----	10.0	54.0	----	63.7	----	9.7	----	H (QP)
2	0.56100	34.8	----	10.0	44.8	----	56.0	----	11.2	----	H (QP)
3	0.94600	28.1	----	10.0	38.1	----	56.0	----	17.9	----	H (QP)
4	3.84400	28.5	----	10.1	38.6	----	56.0	----	17.4	----	H (QP)
5	9.18000	23.4	----	10.2	33.6	----	60.0	----	26.4	----	H (QP)
6	20.09000	23.3	----	10.4	33.7	----	60.0	----	26.3	----	H (QP)
7	0.19900	----	26.6	10.0	----	36.6	----	53.7	----	17.1	H (CAV)
8	0.56100	----	24.5	10.0	----	34.5	----	46.0	----	11.5	H (CAV)
9	0.94600	----	16.0	10.0	----	26.0	----	46.0	----	20.0	H (CAV)
10	3.84400	----	12.2	10.1	----	22.3	----	46.0	----	23.7	H (CAV)
11	9.18000	----	11.4	10.2	----	21.6	----	50.0	----	28.4	H (CAV)
12	20.09000	----	7.1	10.4	----	17.5	----	50.0	----	32.5	H (CAV)

-. Tested Line : NEUTRAL LINE



NO	FREQ [MHz]	READING		C.FACTOR [dB]	RESULT		LIMIT		MARGIN		PHASE
		QP [dBuV]	AV [dBuV]		QP [dBuV]	AV [dBuV]	QP [dBuV]	AV [dBuV]	QP [dBuV]	AV [dBuV]	
1	0.15800	45.1	----	10.0	55.1	----	65.6	----	10.5	----	N(QP)
2	0.19000	41.2	----	10.0	51.2	----	64.0	----	12.8	----	N(QP)
3	0.55400	29.8	----	10.0	39.8	----	56.0	----	16.2	----	N(QP)
4	3.92400	25.8	----	10.1	35.9	----	56.0	----	20.1	----	N(QP)
5	11.17000	23.6	----	10.2	33.8	----	60.0	----	26.2	----	N(QP)
6	20.01000	21.2	----	10.4	31.6	----	60.0	----	28.4	----	N(QP)
7	0.15800	----	23.8	10.0	----	33.8	----	55.6	----	21.8	N(CAV)
8	0.19000	----	20.5	10.0	----	30.5	----	54.0	----	23.5	N(CAV)
9	0.55400	----	22.0	10.0	----	32.0	----	46.0	----	14.0	N(CAV)
10	3.92400	----	11.1	10.1	----	21.2	----	46.0	----	24.8	N(CAV)
11	11.17000	----	14.5	10.2	----	24.7	----	50.0	----	25.3	N(CAV)
12	20.01000	----	8.2	10.4	----	18.6	----	50.0	----	31.4	N(CAV)

Remark: Margin (dB) = Limit – Level (Result)

The emission level in above table is included the transducer factor that means insertion loss (LISN), cable loss and attenuator.

Tested by: Ha-Ram Lee / Manager