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DATE: 30 August 2017

I.T.L. (PRODUCT TESTING) LTD.

FCC Radio Test Report

For

Ninox Medical

Equipment under test:

Device for Treatment of Sleep Disorders

keePAP-00

Tested by: _____
M. Zohar

Approved by: _____
I. Raz

ISRAEL TESTING LABORATORIES
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Measurement/Technical Report for

Ninox Medical

Device for Treatment of Sleep Disorders

keePAP-00

FCC ID: 2AL4V13EA2AL4V

This report concerns:	Original Grant: X Class I Change: Class II Change:
Equipment type:	Digital Transmission System
Limits used:	47CFR15 Section 15.247

Measurement procedure used is KDB 558074 D01 v04 and ANSI C63.10-2013.

Application for Certification prepared by:

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Applicant for this device: (different from "prepared by")

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1. General Information

1.1 Administrative Information

Manufacturer:	Ninox Medical
Manufacturer's Address:	29 Moshe Sharet Rishon Le Zion, Israel 7570450 Tel: +972-3-5170837 Fax: +972-3- 5170838
Manufacturer's Representative:	Omer Shalev
Equipment Under Test (E.U.T):	Device for Treatment of Sleep Disorders
Equipment Model No.:	keePAP-00
Equipment Serial No.:	Not designated
Date of Receipt of E.U.T:	May 18, 2017
Start of Test:	May 18, 2017
End of Test:	May 29, 2017
Test Laboratory Location:	I.T.L (Product Testing) Ltd. 1 Batsheva St., Lod ISRAEL 7120101
Test Specifications:	FCC Part 15, Subpart C

1.2 List of Accreditations

The EMC laboratory of I.T.L. is accredited by the following bodies:

1. The American Association for Laboratory Accreditation (A2LA) (U.S.A.), Certificate No. 1152.01.
2. The Federal Communications Commission (FCC) (U.S.A.), FCC Designation No. IL1005.
3. The Israel Ministry of the Environment (Israel), Registration No. 1104/01.
4. Industry Canada (Canada), IC File No.: 46405-4025; Site Nos. IC 4025A-1, IC 4025A-2.

I.T.L. Product Testing Ltd. is accredited by the American Association for Laboratory Accreditation (A2LA) and the results shown in this test report have been determined in accordance with I.T.L.'s terms of accreditation unless stated otherwise in the report.

1.3 Product Description

KeePAP™ is a wearable, non-continuous, Automatic Positive Air Pressure system indicated for treatment of Sleep Apnea. The device operates from rechargeable battery. The system monitors patient's breathing during sleep and automatically adjusts the pressure level to meet patient's needs.
The KeePAP™ is a standalone device with a single on/off button and with LEDs for providing operational feedback to the user.
The KeePAP™ has a Micro-USB port for charging the KeePAP™ rechargeable battery and for direct data exchange between the KeePAP™ and a tablet computer via a USB data cable. The KeePAP™ has BLE (Bluetooth Low Energy) for wireless communication between the KeePAP™ and a smartphone or tablet computer. The communication capability is required for downloading data recorded by the device, software updates, etc.

Model name	KeePAP-00
Working voltage	3.7VDC rechargeable battery via USB to laptop or via wall charger
Mode of operation	BLE Transceiver
Modulations	GFSK
Assigned Frequency Range	2400.0-2483.5MHz
Operating Frequency Range	2402MHz-2480MHz
Transmit power	~4.0dBm
Antenna Gain	0.5dBi
Modulation BW	>500kHz

1.4 Test Methodology

Both conducted and radiated testing was performed according to the procedures in KDB 558074 D01 v04 and ANSI C63.10: 2013. Radiated testing was performed at an antenna to EUT distance of 3 meters.

1.5 Test Facility

Emissions tests were performed at I.T.L.'s testing facility in Lod, Israel. I.T.L.'s EMC Laboratory is accredited by A2LA, certificate No. 1152.01 and its FCC Designation Number is IL1005.

1.6 Measurement Uncertainty

Conducted Emission

(CISPR 11, EN 55011, CISPR 22, EN 55022, ANSI C63.4)

0.15 – 30 MHz:

Expanded Uncertainty (95% Confidence, K=2):

± 3.44 dB

Radiated Emission

Radiated Emission (CISPR 11, EN 55011, CISPR 22, EN 55022, ANSI C63.4) for open site:
30-1000MHz:
Expanded Uncertainty (95% Confidence, K=2):
± 4.96 dB

1 GHz to 6 GHz
Expanded Uncertainty (95% Confidence, K=2):
±5.19 dB

>6 GHz
Expanded Uncertainty (95% Confidence, K=2):
±5.51 dB

2. System Test Configuration

2.1 Justification

The unit was evaluated while transmitting at the low channel (2402MHz), the mid channel (2440MHz) and the high channel (2480MHz) with duty cycle above 98% in BLE technology.

Exploratory emission testing was performed in 3 orthogonal polarities to determine the "worst case" radiation.

According to the below result, the worst case was the X axis.

Frequency	X axis				Y axis				Z axis			
	Field Strength (dBuV/m)	2rd Harmonic (dBuV/m)	3th Harmonic (dBuV/m)	Band Edge (dBuV/m)	Field Strength (dBuV/m)	2rd Harmonic (dBuV/m)	3th Harmonic (dBuV/m)	Band Edge (dBuV/m)	Field Strength (dBuV/m)	2rd Harmonic (dBuV/m)	3th Harmonic (dBuV/m)	Band Edge (dBuV/m)
2402.0	94.2	44.6	48.5	55.5	91.7	43.7	48.0	53.6	92.2	44.4	48.3	54.8
2440.0	95.2	47.1	47.9	-	92.4	45.0	47.7	-	93.9	46.7	47.9	-
2480.0	94.6	46.8	48.3	60.5	92.4	45.9	48.0	54.2	92.1	46.7	48.1	59.1

Figure 1. Screening Results

For AC conducted emission testing 2 modes of operation were tested:

1. with wall charger
2. with laptop

2.2 EUT Exercise Software

No special exercise software was used.

2.3 Special Accessories

AC/DC charger details:

Manufacturer: SIMSUKIAN

Model: SK12G-0500100Z

s/n: 17110100001

Laptop details:

Manufacturer: Lenovo

Model: T410

s/n: R8-W3PZ8

2.4 Equipment Modifications

No modifications were necessary in order to achieve compliance.

2.5 Configuration of Tested System

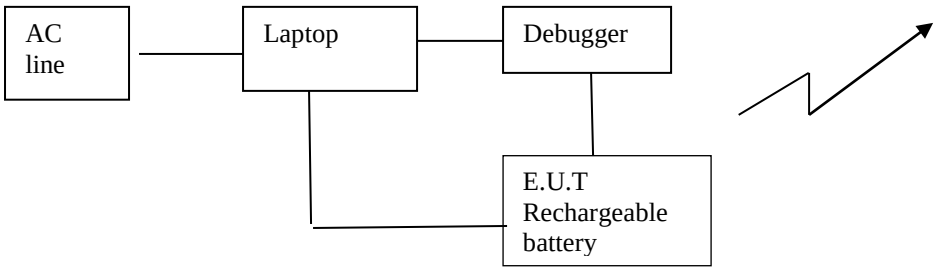

Figure 2. Configuration of Tested System – Radiated and AC Line Conducted Emission (laptop charge mode)

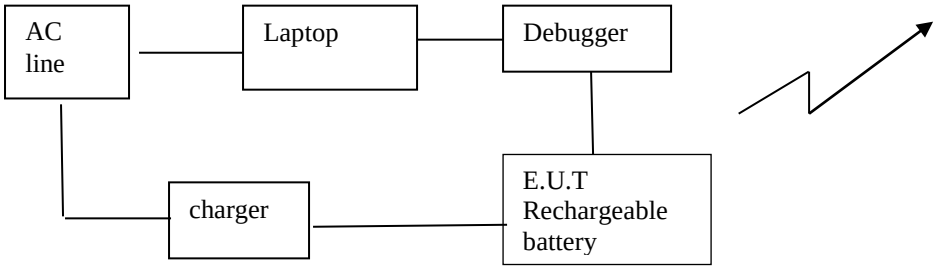

Figure 3. Configuration of Tested System - Radiated AC Line Conducted Emission (wall charge mode)

3. Conducted & Radiated Measurement Test Set-Up Photos

Figure 4. AC Line Conducted Emission Test - Laptop Charge Mode

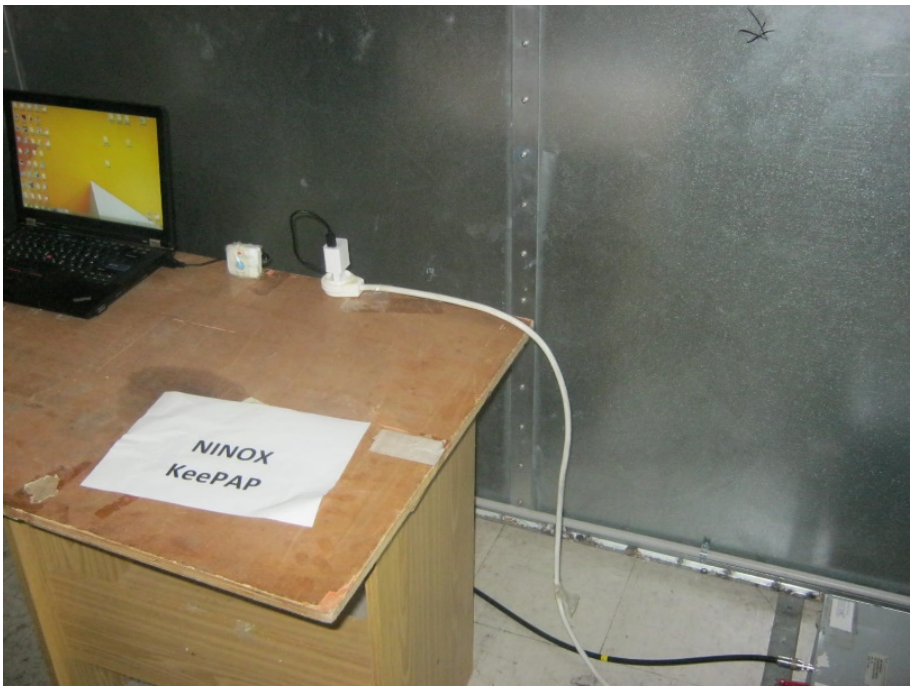

Figure 5. AC Line Conducted Emission Test - Wall Charge Mode

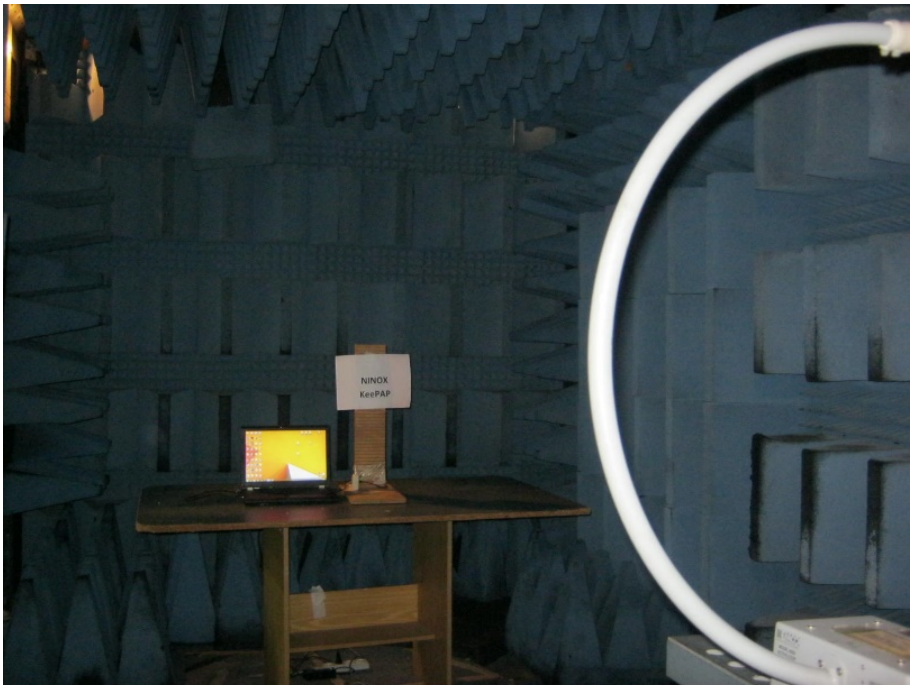

Figure 6. Radiated Emission Test for 0.009-30MHz

Figure 7. Radiated Emission Test for 30-200MHz

Figure 8. Radiated Emission Test for 200-1000MHz

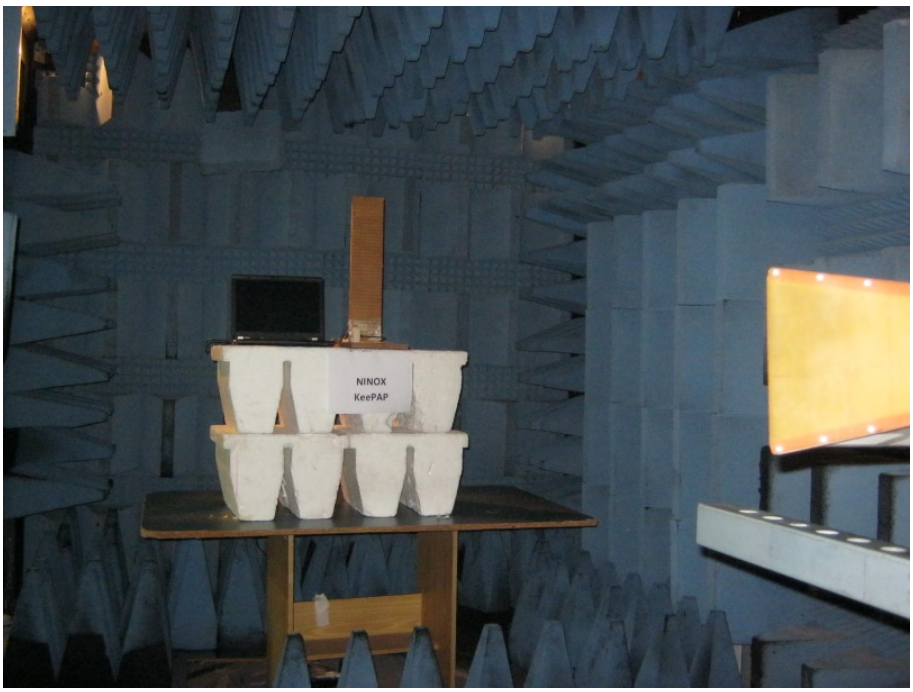

Figure 9. Radiated Emission Test above 1GHz

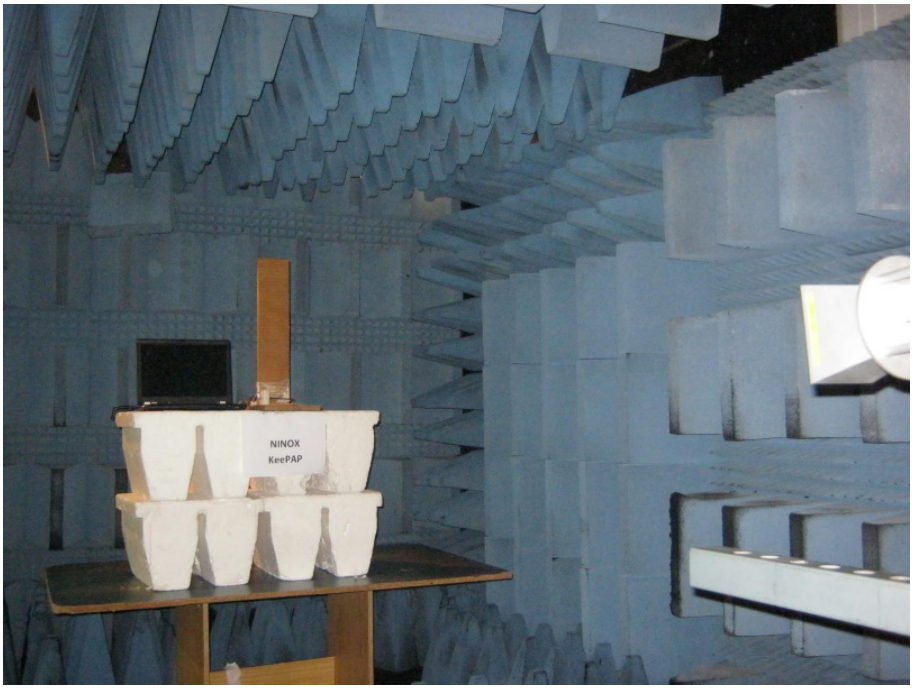

Figure 10. Radiated Emission Test above 1GHz

4. Conducted Emission From AC Mains

4.1 Test Specification

FCC Part 15, Subpart C, Section 15.207

4.2 Test Procedure

(Temperature (22°C)/ Humidity (53%RH))

The E.U.T operation mode and test setup are as described in Section 2 of this report. In order to minimize background noise interference, the conducted emission testing was performed inside a shielded room, with the E.U.T placed on a 0.8 meter high wooden table, 0.4 meter from the room's vertical wall. In the case of a floor-standing E.U.T., it was placed on the horizontal ground plane.

The E.U.T was powered from 115 V AC / 60 Hz via 50 Ohm / 50 µHn Line Impedance Stabilization Network (LISN) on the phase and neutral lines. The LISN's were grounded to the shielded room ground plane (floor), and were kept at least 0.8 meters from the nearest boundary of the E.U.T

The center of the E.U.T.'s AC cable was folded back and forth, in order to form a bundle less than 0.40 meters and a total cable length of 1 meter.

The effect of varying the position of the cables was investigated to find the configuration that produces maximum emission.

The emission voltages at the LISN's outputs were measured using a computerized receiver, complying with CISPR 16 requirements. The specification limits are loaded to the receiver and are displayed on the receiver's spectrum display.

The E.U.T was evaluated in TX operation mode

A frequency scan between 0.15 and 30 MHz was performed at 9 kHz I.F. band width, using peak detection.

The spectral components having the highest level on each line were measured using a quasi-peak and average detector.

4.3 Test Limit

Frequency of emission (MHz)	**Conducted limit (dBµV)**	
	Quasi-peak	Average
0.15-0.5	66 to 56*	56 to 46*
0.5-5	56	46
5-30	60	50

* Decreases with the logarithm of the frequency.

4.4 Test Results

JUDGEMENT: Passed by 12.79 dB

The margin between the emission levels and the specification limit is, in the worst case, 14.93 dB for the phase line at 0.490 MHz and 12.79 dB at 0.486 MHz for the neutral line.

The EUT met the F.C.C. Part 15, Subpart C specification requirements.

The details of the highest emissions are given in *Figure 11* to *Figure 18.*

Conducted Emission

E.U.T Description	Device for Treatment of Sleep Disorders
Type	keePAP-00
Serial Number:	Not designated

Specification:	FCC Part 15, Subpart C
Lead:	Phase
Detectors: :	Peak, Quasi-peak, Average
Power Operation	Laptop

EDIT PEAK LIST (Final Measurement Results)

Trace1: CE22BQP
Trace2: CE22BAP
Trace3: ---

	TRACE	FREQUENCY	LEVEL dBµV	DELTA LIMIT dB
1	Quasi Peak	150 kHz	46.73	-19.26
2	Average	150 kHz	42.28	-13.71
1	Quasi Peak	222 kHz	44.57	-18.16
2	Average	222 kHz	37.26	-15.48
1	Quasi Peak	294 kHz	36.82	-23.58
2	Average	294 kHz	32.21	-18.19
2	Average	374 kHz	24.93	-23.47
2	Average	438 kHz	29.62	-17.47
1	Quasi Peak	526 kHz	38.53	-17.46
2	Average	526 kHz	22.56	-23.43
2	Average	590 kHz	23.79	-22.20
1	Quasi Peak	654 kHz	30.69	-25.30
1	Quasi Peak	930 kHz	28.83	-27.16
1	Quasi Peak	982 kHz	26.50	-29.50
2	Average	3.734 MHz	26.49	-19.50
1	Quasi Peak	4.006 MHz	32.37	-23.62
2	Average	7.582 MHz	26.56	-23.44
1	Quasi Peak	7.994 MHz	32.04	-27.95
1	Quasi Peak	16.626 MHz	36.66	-23.33
2	Average	18.406 MHz	31.86	-18.14

Date: 21.MAY.2017 17:06:12

Figure 11. Detectors: Peak, Quasi-peak, Average

Note: QP Delta/Av Delta refers to the test results obtained minus specified requirement; thus a positive number indicates failure, and a negative result indicates that the product passes the test.

Conducted Emission

E.U.T Description	Device for Treatment of Sleep Disorders
Type	keePAP-00
Serial Number:	Not designated

Specification:	FCC Part 15, Subpart C
Lead:	Phase
Detectors:	Peak, Quasi-peak, Average
Power Operation	Laptop

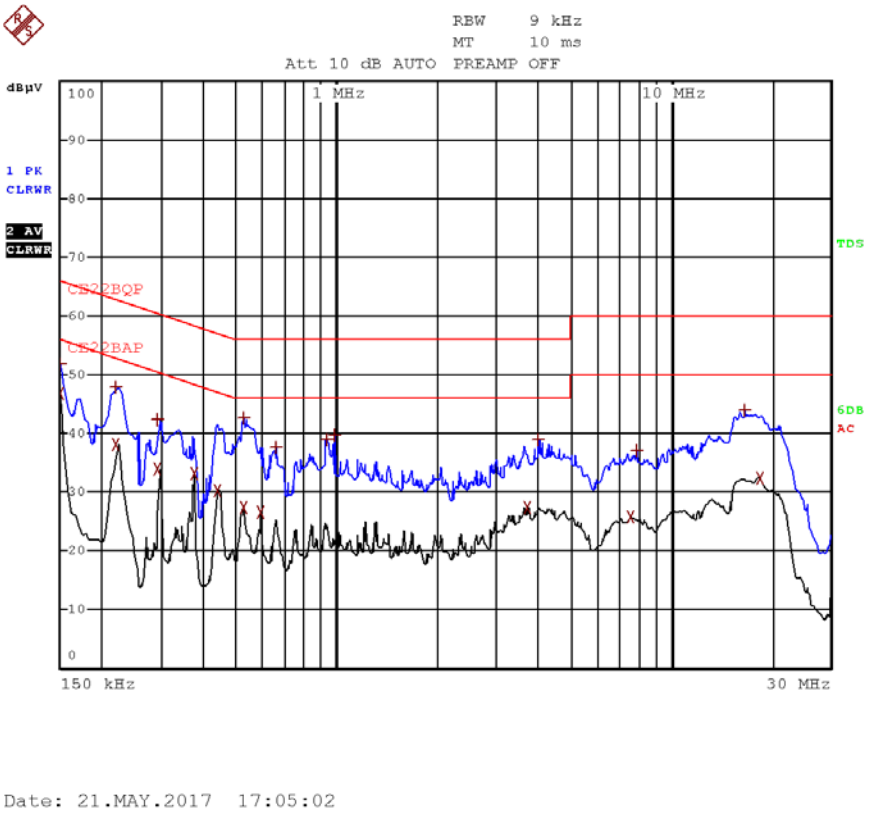

Figure 12. Detectors: Peak, Quasi-peak, Average

Conducted Emission

E.U.T Description	Device for Treatment of Sleep Disorders
Type	keePAP-00
Serial Number:	Not designated

Specification:	FCC Part 15, Subpart C
Lead:	Neutral
Detectors:	Peak, Quasi-peak, Average
Power Operation	Laptop

EDIT PEAK LIST (Final Measurement Results)

Trace1: CE22BQP
Trace2: CE22BAP
Trace3: ---

	TRACE	FREQUENCY	LEVEL dBµV	DELTA LIMIT dB
1	Quasi Peak	150 kHz	45.62	-20.37
2	Average	150 kHz	37.45	-18.54
1	Quasi Peak	186 kHz	36.80	-27.41
1	Quasi Peak	218 kHz	48.80	-14.09
2	Average	218 kHz	39.82	-13.07
2	Average	286 kHz	33.43	-17.20
1	Quasi Peak	326 kHz	43.27	-16.27
2	Average	358 kHz	32.59	-16.18
2	Average	434 kHz	29.93	-17.24
1	Quasi Peak	530 kHz	40.96	-15.03
2	Average	574 kHz	25.44	-20.55
2	Average	734 kHz	22.02	-23.97
1	Quasi Peak	870 kHz	31.60	-24.39
2	Average	1.018 MHz	22.07	-23.92
1	Quasi Peak	7.13 MHz	31.34	-28.65
2	Average	7.954 MHz	26.65	-23.34
1	Quasi Peak	8.574 MHz	33.01	-26.98
1	Quasi Peak	13.47 MHz	33.40	-26.59
1	Quasi Peak	15.926 MHz	36.58	-23.42
2	Average	18.346 MHz	31.11	-18.88

Date: 21.MAY.2017 17:13:26

Figure 13. Detectors: Peak, Quasi-peak, Average

Note: QP Delta/Av Delta refers to the test results obtained minus specified requirement; thus a positive number indicates failure, and a negative result indicates that the product passes the test.

Conducted Emission

E.U.T Description	Device for Treatment of Sleep Disorders
Type	keePAP-00
Serial Number:	Not designated

Specification:	FCC Part 15, Subpart C
Lead:	Neutral
Detectors:	Peak, Quasi-peak, Average
Power Operation	Laptop

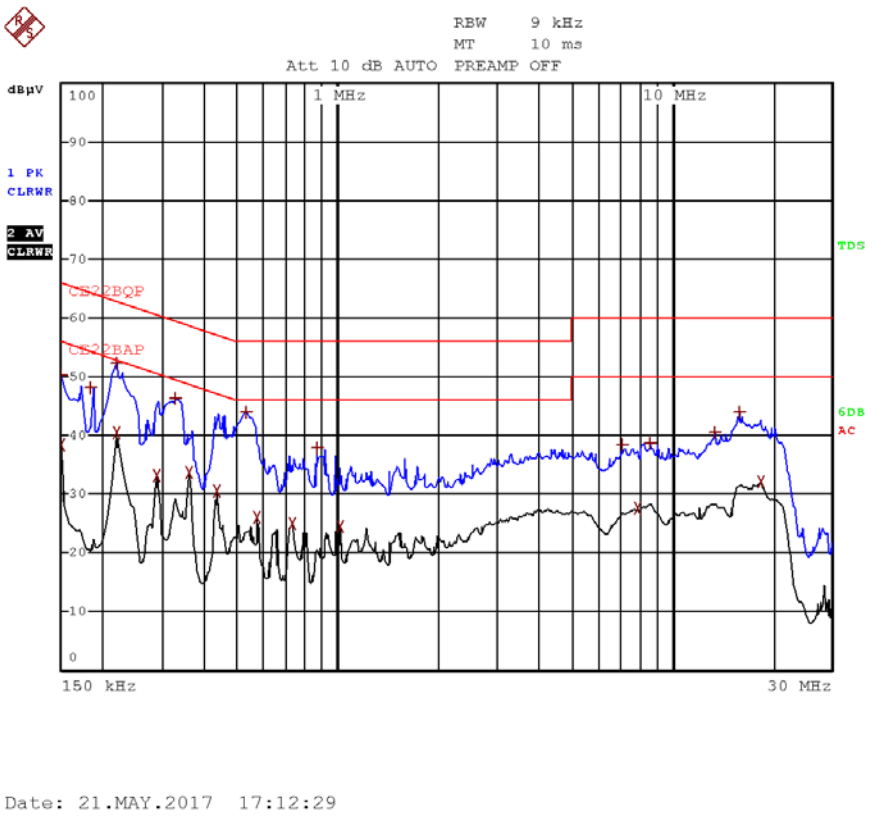

Figure 14 Detectors: Peak, Quasi-peak, Average

Conducted Emission

E.U.T Description	Device for Treatment of Sleep Disorders
Type	keePAP-00
Serial Number:	Not designated

Specification:	FCC Part 15, Subpart C
Lead:	Phase
Detectors: :	Peak, Quasi-peak, Average
Power Operation	Wall Charger

EDIT PEAK LIST (Final Measurement Results)

Trace1: CE22BQP
Trace2: CE22BAP
Trace3: ---

	TRACE	FREQUENCY	LEVEL dBµV	DELTA LIMIT dB
1	Quasi Peak	242 kHz	12.76	-49.26
2	Average	250 kHz	9.22	-42.53
1	Quasi Peak	410 kHz	17.43	-40.21
2	Average	418 kHz	14.97	-32.51
1	Quasi Peak	478 kHz	21.12	-35.25
2	Average	478 kHz	19.22	-27.14
1	Quasi Peak	982 kHz	13.64	-42.35
2	Average	1.082 MHz	8.90	-37.10
2	Average	1.31 MHz	9.53	-36.46
1	Quasi Peak	1.574 MHz	14.72	-41.27
2	Average	3.346 MHz	10.11	-35.89
1	Quasi Peak	3.55 MHz	16.10	-39.89
2	Average	4.33 MHz	11.18	-34.82
1	Quasi Peak	4.922 MHz	22.64	-33.35
1	Quasi Peak	9.834 MHz	34.56	-25.43
2	Average	9.834 MHz	24.31	-25.68
2	Average	11.998 MHz	36.37	-13.63
1	Quasi Peak	15.986 MHz	46.25	-13.75
2	Average	20.854 MHz	42.69	-7.30
1	Quasi Peak	21.442 MHz	53.38	-6.61

Date: 21.MAY.2017 17:50:42

Figure 15. Detectors: Peak, Quasi-peak, Average

Note: QP Delta/Av Delta refers to the test results obtained minus specified requirement; thus a positive number indicates failure, and a negative result indicates that the product passes the test.

Conducted Emission

E.U.T Description	Device for Treatment of Sleep Disorders
Type	keePAP-00
Serial Number:	Not designated

Specification:	FCC Part 15, Subpart C
Lead:	Phase
Detectors:	Peak, Quasi-peak, Average
Power Operation	Wall Charger

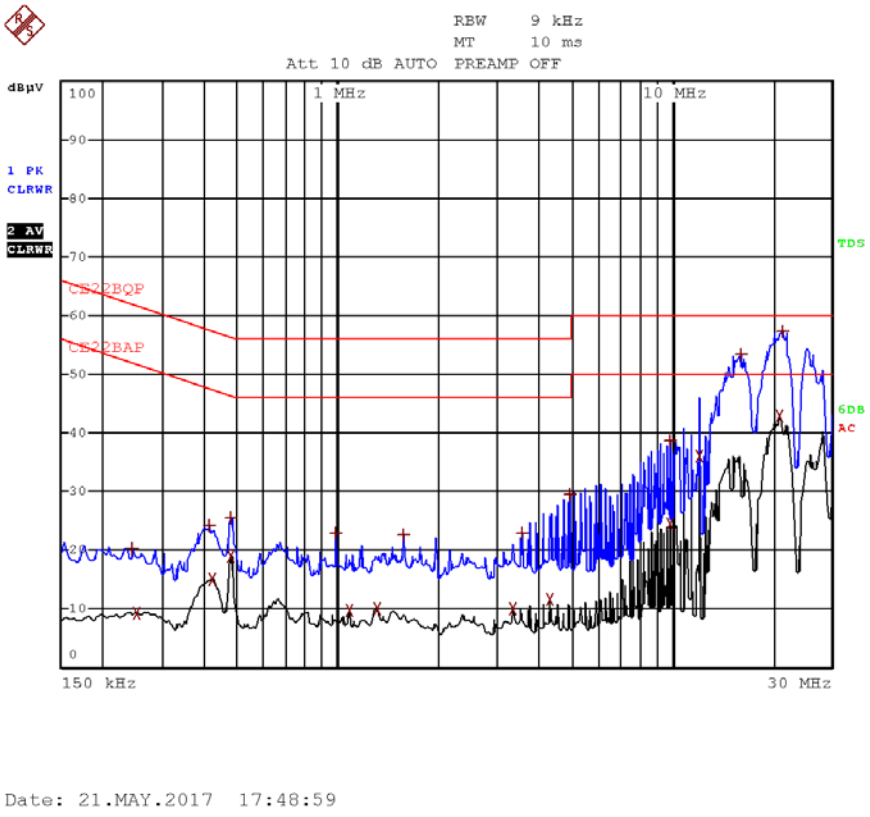

Figure 16. Detectors: Peak, Quasi-peak, Average

Conducted Emission

E.U.T Description	Device for Treatment of Sleep Disorders
Type	keePAP-00
Serial Number:	Not designated

Specification:	FCC Part 15, Subpart C
Lead:	Neutral
Detectors:	Peak, Quasi-peak, Average
Power Operation	Wall Charger

EDIT PEAK LIST (Final Measurement Results)

Trace1: CE22BQP
Trace2: CE22BAP
Trace3: ---

	TRACE	FREQUENCY	LEVEL dBµV	DELTA LIMIT dB
1	Quasi Peak	242 kHz	13.20	-48.82
2	Average	254 kHz	9.53	-42.08
1	Quasi Peak	426 kHz	17.83	-39.49
2	Average	426 kHz	15.01	-32.31
2	Average	478 kHz	19.50	-26.86
1	Quasi Peak	482 kHz	20.85	-35.45
2	Average	798 kHz	9.18	-36.81
1	Quasi Peak	1.182 MHz	14.26	-41.73
2	Average	1.294 MHz	9.65	-36.34
1	Quasi Peak	1.378 MHz	13.75	-42.24
1	Quasi Peak	3.346 MHz	17.10	-38.89
2	Average	3.346 MHz	9.05	-36.94
2	Average	4.522 MHz	9.26	-36.73
1	Quasi Peak	4.918 MHz	20.65	-35.34
1	Quasi Peak	10.23 MHz	37.29	-22.70
2	Average	10.23 MHz	21.12	-28.87
1	Quasi Peak	15.934 MHz	56.48	-3.51
2	Average	15.934 MHz	35.41	-14.58
1	Quasi Peak	19.278 MHz	57.30	-2.69
2	Average	28.13 MHz	43.20	-6.79

Date: 21.MAY.2017 17:43:10

Figure 17. Detectors: Peak, Quasi-peak, Average

Note: QP Delta/Av Delta refers to the test results obtained minus specified requirement; thus a positive number indicates failure, and a negative result indicates that the product passes the test.

Conducted Emission

E.U.T Description	Device for Treatment of Sleep Disorders
Type	keePAP-00
Serial Number:	Not designated

Specification:	FCC Part 15, Subpart C
Lead:	Neutral
Detectors:	Peak, Quasi-peak, Average
Power Operation	Wall Charger

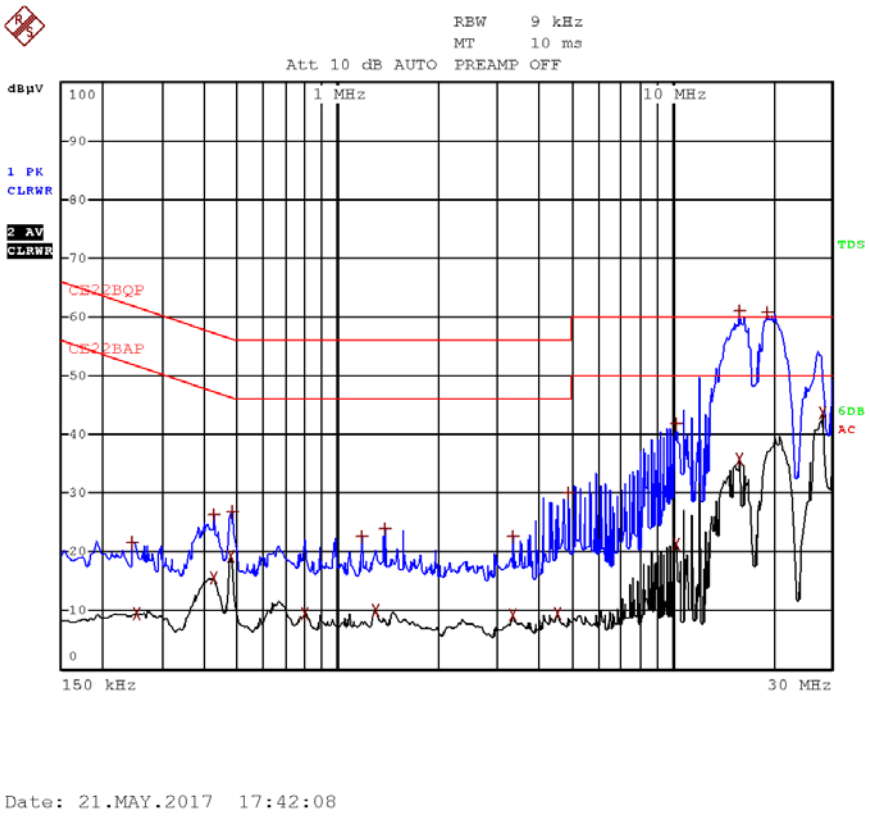

Figure 18 Detectors: Peak, Quasi-peak, Average

4.5 Test Equipment Used; Conducted Emission

Instrument	Manufacturer	Model	Serial No.	Last Calibration Date	Next Calibration Due
LISN	Fischer	FCC-LISN-25A	127	June 23, 2016	June 23, 2017
Transient Limiter	HP	11947A	3107A03041	June 15, 2016	June 15, 2017
EMI Receiver	R&S	ESCI7	100724	February 28, 2017	February 28, 2018

Figure 19 Test Equipment Used

5. 6 dB Minimum Bandwidth

5.1 Test Specification

FCC Part 15, Subpart C, Section 247(a)(2)

5.2 Test Procedure

(Temperature (23°C)/ Humidity (60%RH))

The E.U.T operation mode and test set-up are as described in Section 2 of this report.

The E.U.T was tested in the chamber, and placed on a remote-controlled turntable. The E.U.T was placed on a non-metallic table, 1.5 meters above the ground. The emissions were measured at a distance of 3 meters.

The spectrum bandwidth of the E.U.T. at the point of 6 dB below maximum peak power was measured and recorded. The RBW was set to 100 kHz.

5.3 Test Limit

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

5.4 Test Results

Operation Frequency	Reading	Specification
(MHz)	(kHz)	(kHz)
2402.0	740.0	≥500.0
2440.0	750.0	≥500.0
2480.0	780.0	≥500.0

Figure 20 6 dB Minimum Bandwidth

JUDGEMENT: Passed

For additional information see *Figure 21* to *Figure 23.*

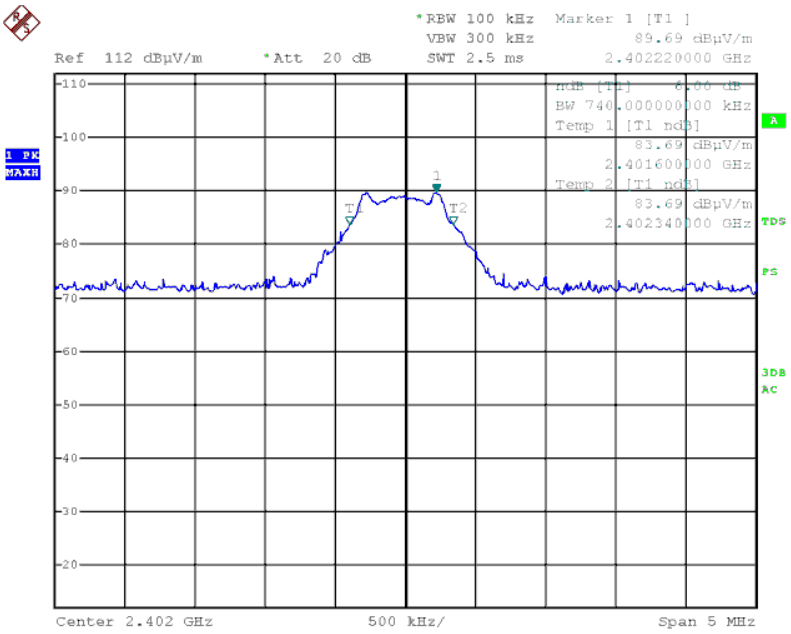

Figure 21. 2402.0 MHz

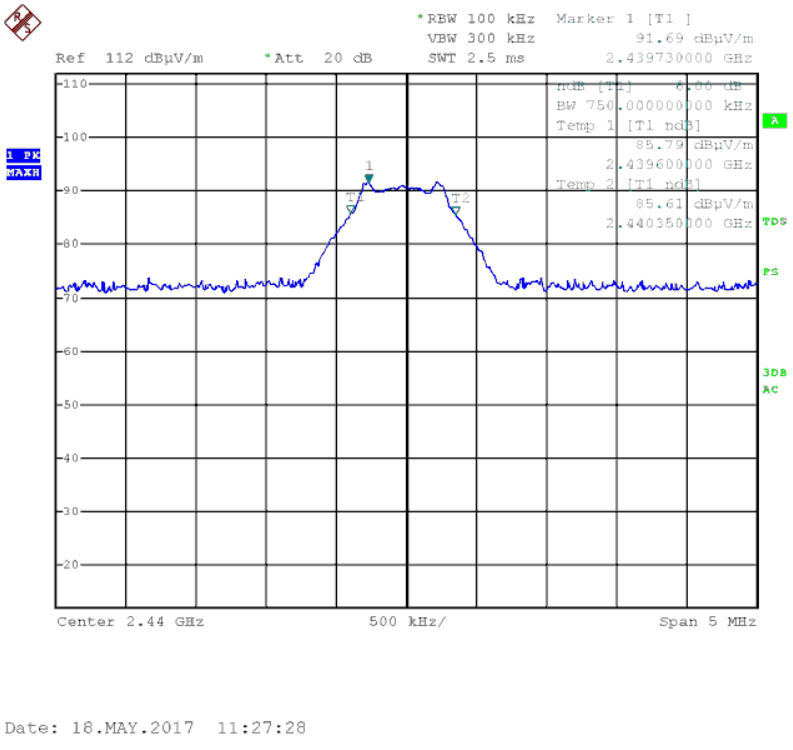

Figure 22. 2440.0 MHz

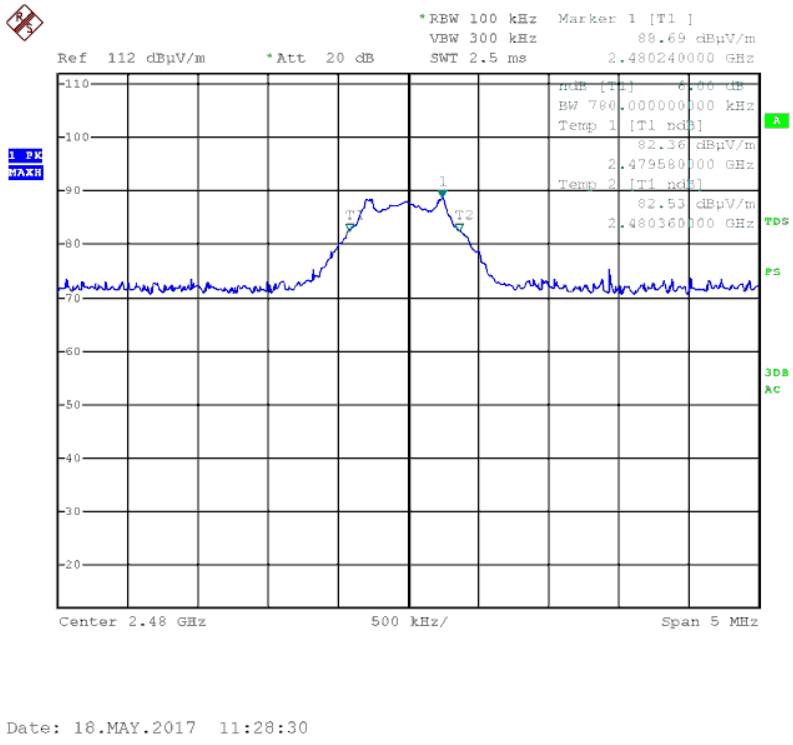

Figure 23. 2480.0 MHz

5.5 Test Equipment Used; 6dB Bandwidth

Instrument	Manufacturer	Model	Serial No.	Last Calibration Date	Next Calibration Due
Spectrum Analyzer	R&S	FSL6	100194	March 2, 2017	March 2, 2018
Horn Antenna	ETS	3115	6142	May 19, 2015	May 19, 2018
Semi Anechoic Civil Chamber	ETS	S81	SL 11643	NCR	NCR

Figure 24 Test Equipment Used

6. Maximum Transmitted Peak Power Output

6.1 Test Specification

FCC, Part 15, Subpart C, Section 247(b)(3)

6.2 Test Procedure

(Temperature (23°C)/ Humidity (60%RH))

The E.U.T operation mode and test set-up are as described in Section 2 of this report.

The E.U.T was tested in the chamber, and placed on a remote-controlled turntable. The E.U.T was placed on a non-metallic table, 1.5 meters above the ground. The readings were maximized by the turntable azimuth between 0-360°, and the antenna polarization. The emissions were measured at a distance of 3 meters.

The E.U.T was evaluated in 3 channels: Low (2402.0 MHz), Mid (2440.0 MHz) and High (2480 MHz).

Radiated output power levels were measured at selected operation frequencies and the results were converted to power level according to the formula as shown below:

$$P = \frac{(E_{V/m} \times d)^2}{(30 \times G)} \text{ [W]}$$

E - Field Strength (V/m)

d – Distance from transmitter (m) = 3m

G – Antenna gain = 0.5 dBi

P – Peak power (W)

6.3 Test Limit

The maximum peak conducted output power of the intentional radiator for systems using digital modulation in the 902-928 MHz, 2400-2483.5 MHz, and 5725-5850MHz bands: 1 Watt.

6.4 Test Results

Operation Frequency (MHz)	Polarization (V/H)	Field Strength (dBuV/m)	Power (dBm)	Power (mW)	Limit (mW)	Margin (mW)
2402.0	V	96.7	1.5	1.41	1000.0	-998.59
	H	91.1	-4.1	0.39	1000.0	-999.61
2440.0	V	96.7	1.5	1.41	1000.0	-998.59
	H	91.6	-3.6	0.44	1000.0	-999.56
2480.0	V	94.7	-0.5	0.89	1000.0	-999.11
	H	90.1	-5.1	0.31	1000.0	-999.69

Figure 25 Maximum Peak Power Output

JUDGEMENT: Passed by 998.59 mW

For additional information see *Figure 26* to *Figure 31*.

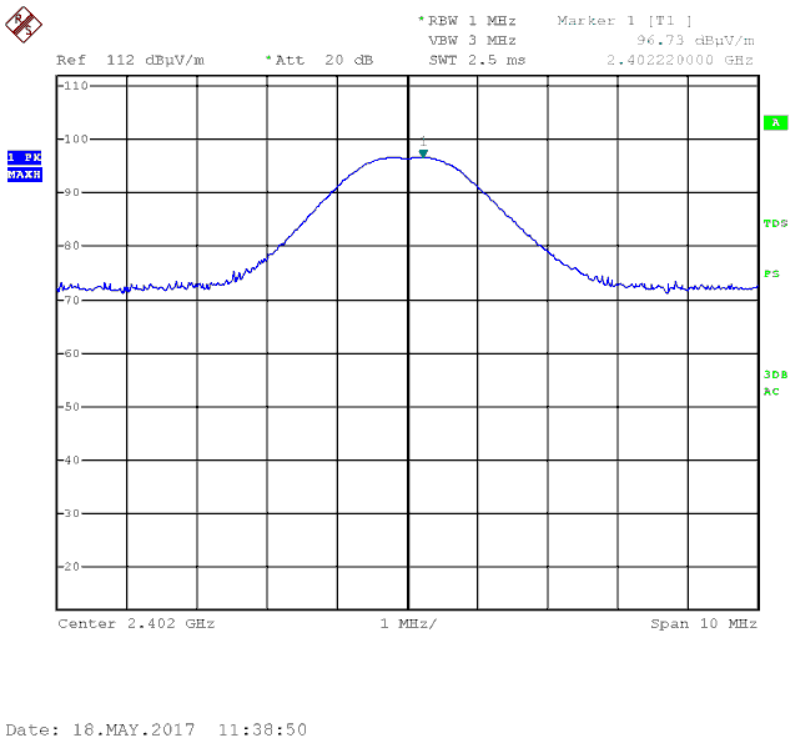

Figure 26 2402.0 MHz – Vertical

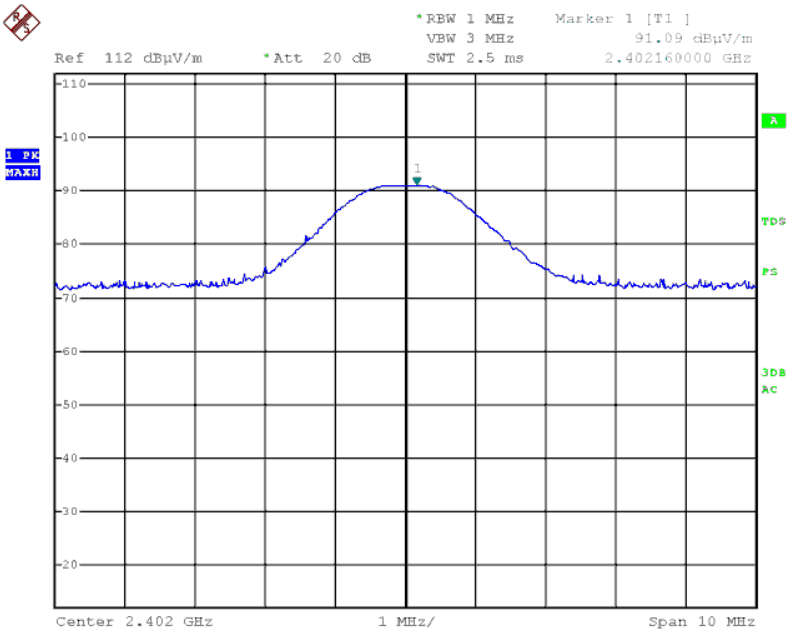

Figure 27 2402.0 MHz – Horizontal

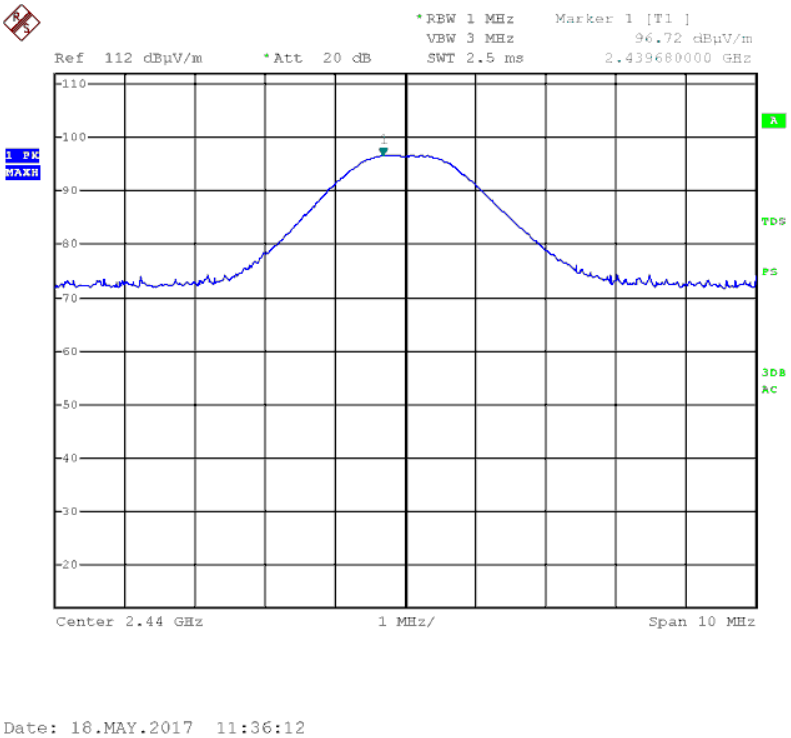

Figure 28 2440.0 MHz – Vertical

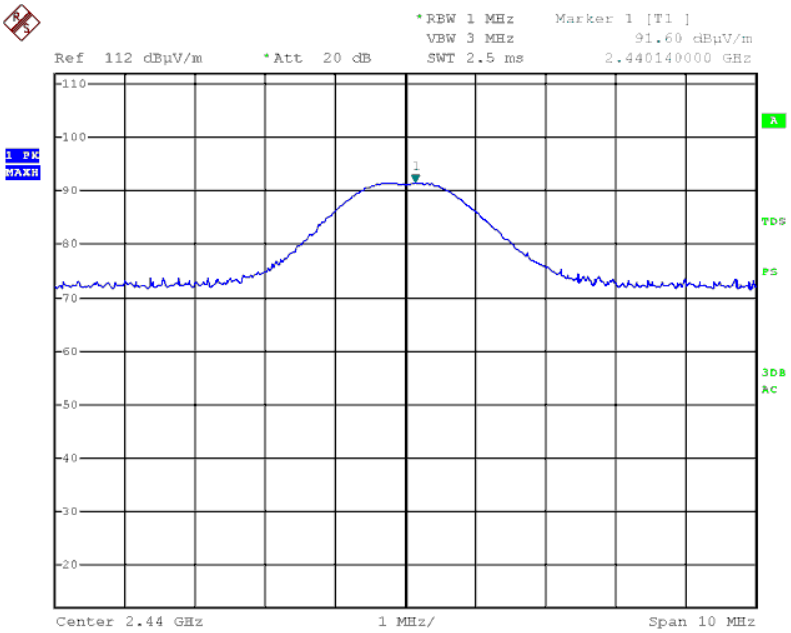

Figure 29 2440.0 MHz – Horizontal

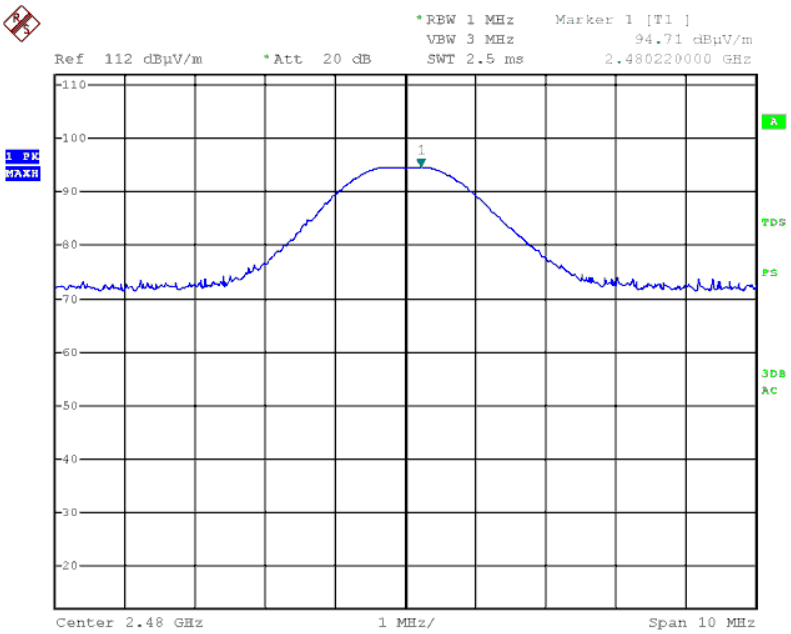

Figure 30 2480.0 MHz – Vertical

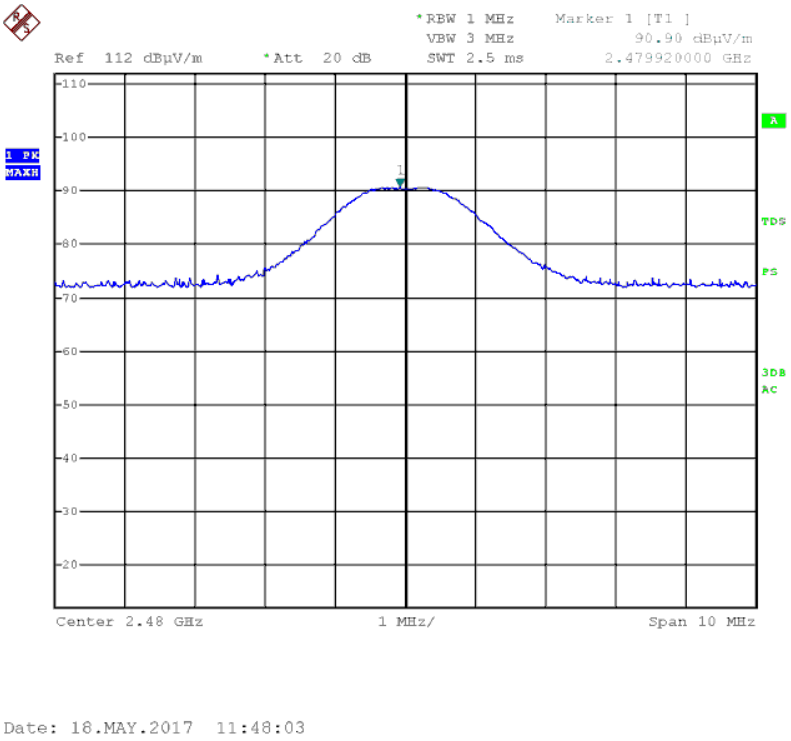

Figure 31 2480.0 MHz – Horizontal

6.5 Test Equipment Used; Maximum Peak Power Output

Instrument	Manufacturer	Model	Serial No.	Last Calibration Date	Next Calibration Due
EMI Receiver	R&S	ESCI7	100724	February 28, 2017	February 28, 2018
Horn Antenna	ETS	3115	6142	May 19, 2015	May 19, 2018
Semi Anechoic Civil Chamber	ETS	S81	SL 11643	NCR	NCR

Figure 32 Test Equipment Used

7. Band Edge Spectrum

7.1 Test Specification

FCC, Part 15, Subpart C, Section 247(d)

7.2 Test Procedure

(Temperature (23°C)/ Humidity (60%RH))

The E.U.T operation mode and test set-up are as described in Section 2 of this report.

The E.U.T was tested in the chamber, and placed on a remote-controlled turntable. The E.U.T was placed on a non-metallic table, 1.5 meters above the ground. The readings were maximized by the turntable azimuth between 0-360°, and the antenna polarization.
The emissions were measured at a distance of 3 meters.

The RBW was set to 100 kHz.

7.3 Test Limit

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 20dB below that in the 100 kHz bandwidth within the band that contains the highest level of the desired power.

7.4 Test Results

Operation Frequency	Band Edge Frequency	Spectrum Level	Limit	Margin
(MHz)	(MHz)	(dBuV/m)	(dBuV/m)	(dB)
Low	2400.0	63.5	75.3	-11.8
High	2483.5	62.5	73.8	-11.3

Figure 33 Band Edge Spectrum

JUDGEMENT: Passed by 11.8 dB

For additional information see *Figure 34* and *Figure 35.*

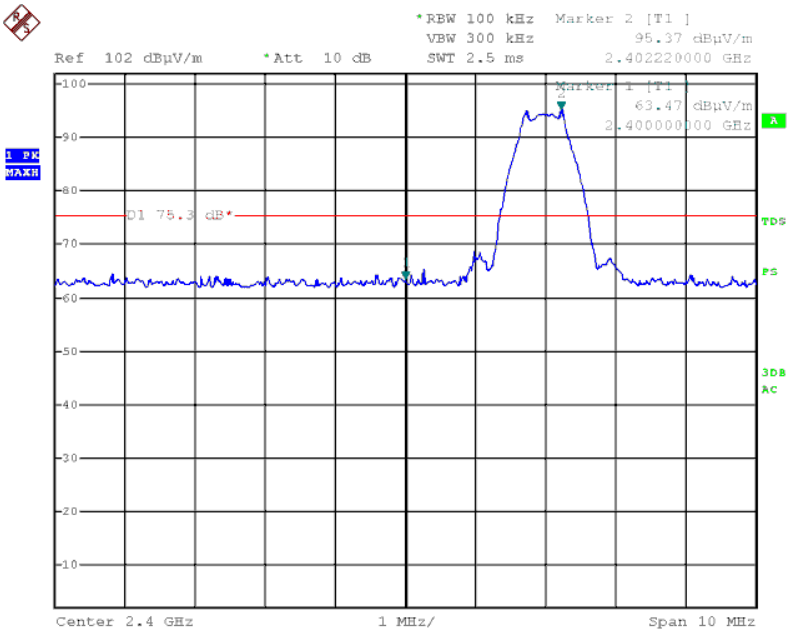

Figure 34 —Lower Band Edge

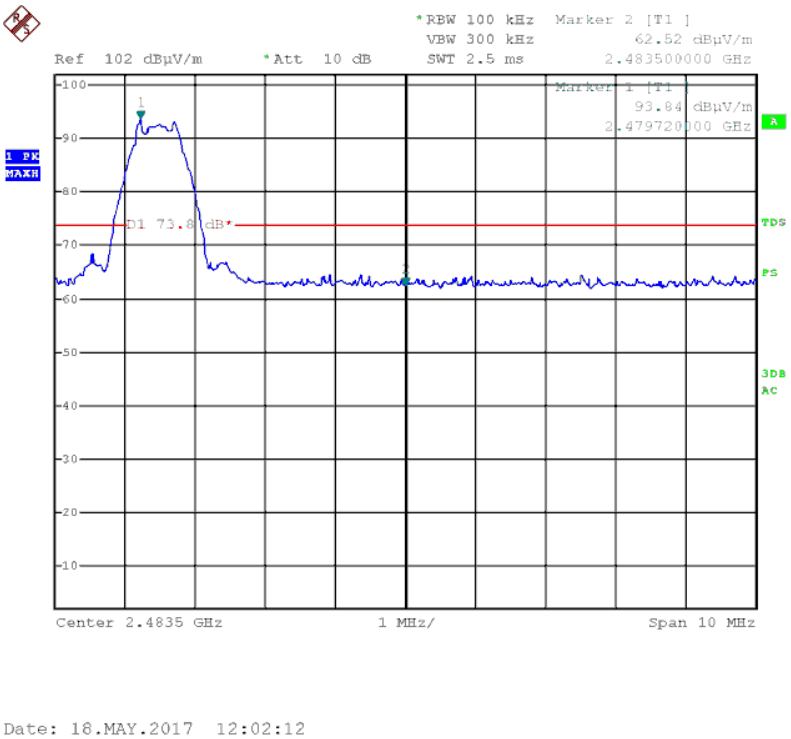

Figure 35 —Upper Band Edge

7.5 Test Equipment Used; Band Edge Spectrum

Instrument	Manufacturer	Model	Serial No.	Last Calibration Date	Next Calibration Due
EMI Receiver	R&S	ESCI7	100724	February 28, 2017	February 28, 2018
Horn Antenna	ETS	3115	6142	May 19, 2015	May 19, 2018
Semi Anechoic Civil Chamber	ETS	S81	SL 11643	NCR	NCR

Figure 36 Test Equipment Used

8. Emissions in Non-Restricted Frequency Bands

8.1 Test Specification

FCC, Part 15, Subpart C, Section 247(d)

8.2 Test Procedure

(Temperature (22°C)/ Humidity (56%RH))
The E.U.T. operation mode and test set-up are as described in Section 2 of this report.

For measurements between 0.009MHz-30MHz:

The E.U.T was tested inside the shielded room at a distance of 3 meters and the E.U.T was placed on a non-metallic table, 0.8 meters above the ground. The frequency range 0.009MHz-30MHz was scanned. The readings were maximized by the turntable azimuth between 0-360°.
The emissions were measured at a distance of 3 meters.

For measurements between 30.0MHz-1.0GHz:
A preliminary measurement to characterize the E.U.T was performed inside the shielded room at a distance of 3 meters, using peak detection mode and broadband antennas. The preliminary measurements produced a list of the highest emissions. The E.U.T was then transferred to the open site, and placed on a remote-controlled turntable. The E.U.T was placed on a non-metallic table, 0.8 meters above the ground. The frequency range 30.0MHz -1.0GHz was scanned and the list of the highest emissions was verified and updated accordingly.
The readings were maximized by adjusting the antenna height between 1-4 meters, the turntable azimuth between 0-360°, and the antenna polarization.
The emissions were measured at a distance of 3 meters.

For measurements between 1.0GHz-25.0GHz:

The E.U.T was tested inside the shielded room at a distance of 3 meters and the E.U.T was placed on a non-metallic table, 1.5 meters above the ground. The frequency range 1.0GHz -25.0GHz was scanned. The readings were maximized by the turntable azimuth between 0-360°, and the antenna polarization.
The emissions were measured at a distance of 3 meters.

RBW was set to 100kHz, detector set to max peak and trace to “max hold”
The E.U.T. was operated at the low, mid and high channels (2402.0 MHz, 2440 MHz and 2480.0 MHz).

8.3 Test Limit

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 20dB below that in the 100 kHz bandwidth within the band that contains the highest level of the desired power.

8.4 Test Results

JUDGEMENT: Passed

All detected emissions were greater than 20dBc below the fundamental level.

The EUT met the requirements of the F.C.C. Part 15, Subpart C, Section 247(d) specification.

8.5 Test Instrumentation Used, Emission in Non Restricted Frequency Bands

Instrument	Manufacturer	Model	Serial No.	Last Calibration Date	Next Calibration Due
EMI Receiver	R&S	ESCI7	100724	February 28, 2017	February 28, 2018
Spectrum Analyzer	HP	8592L	3826A01204	March 1, 2017	March 1, 2018
EMI Receiver	HP	8542E	3906A00276	March 1, 2017	March 1, 2018
RF Filter Section	HP	85420E	3705A00248	March 1, 2017	March 1, 2018
Spectrum Analyzer	HP	8564E	3442A00275	March 19, 2017	March 19, 2018
Biconical Antenna	EMCO	3110B	9912-3337	March 24, 2016	March 24, 2018
Active Loop Antenna	EMCO	6502	9506-2950	September 12, 2016	September 12, 2017
Log Periodic Antenna	EMCO	3146	9505-4081	May 15, 2017	May 15, 2018
Horn Antenna	ETS	3115	29845	May 19, 2015	May 19, 2018
Horn Antenna	ARA	SWH-28	1007	March 30, 2014	December 31, 2017
Low Noise Amplifier	Narda	DBS-0411N313	13	August 8, 2016	August 8, 2017
Low Noise Amplifier	Sophia Wireless	LNA28-B	232	August 8, 2016	August 8, 2017
Spectrum Analyzer	HP	8593EM	3536A00120ADI	February 28, 2017	February 28, 2018
Semi Anechoic Civil Chamber	ETS	S81	SL 11643	NCR	NCR

Figure 37 Test Equipment Used

8.6 Field Strength Calculation

The field strength is calculated directly by the EMI Receiver software, and a "Correction Factors", using the following equation:

$$FS = RA + AF + CF$$

FS:	Field Strength [dBμv/m]
RA:	Receiver Amplitude [dBμv]
AF:	Receiving Antenna Correction Factor [dB/m]
CF:	Cable Attenuation Factor [dB]

Example: FS = 30.7 dBμV (RA) + 14.0 dB (AF) + 0.9 dB (CF) = 45.6 dBμV

No external pre-amplifiers are used.

9. Emissions in Restricted Frequency Bands

9.1 Test Specification

FCC, Part 15, Subpart C, Sections 15.209, 15.205, 15.247(d)

9.2 Test Procedure

(Temperature (23°C)/ Humidity (45%RH))

For measurements between 0.009MHz-30MHz:

The E.U.T was tested inside the shielded room at a distance of 3 meters and the E.U.T was placed on a non-metallic table, 0.8 meters above the ground. The frequency range 0.009MHz-30MHz was scanned. The readings were maximized by the turntable azimuth between 0-360°.
The emissions were measured at a distance of 3 meters.

For measurements between 30.0MHz-1.0GHz:
A preliminary measurement to characterize the E.U.T was performed inside the shielded room at a distance of 3 meters, using peak detection mode and broadband antennas. The preliminary measurements produced a list of the highest emissions. The E.U.T was then transferred to the open site, and placed on a remote-controlled turntable. The E.U.T was placed on a non-metallic table, 0.8 meters above the ground. The frequency range 30.0MHz -1.0GHz was scanned and the list of the highest emissions was verified and updated accordingly.
The readings were maximized by adjusting the antenna height between 1-4 meters, the turntable azimuth between 0-360°, and the antenna polarization.
The emissions were measured at a distance of 3 meters.

For measurements between 1.0GHz-25.0GHz:

The E.U.T was tested inside the shielded room at a distance of 3 meters and the E.U.T was placed on a non-metallic table, 1.5 meters above the ground. The frequency range 1.0GHz -25.0GHz was scanned. The readings were maximized by the turntable azimuth between 0-360°, and the antenna polarization.
The emissions were measured at a distance of 3 meters.

The E.U.T. was operated at the low, mid and high channels. (2402, 2440, 2480 MHz).

The levels of the emissions within the frequency ranges of the restricted bands (Section 15.205 of FCC Part 15) were compared to the limits of the table in Section 15.209 (a), General Requirements.

9.3 Test Limit

Radiated emissions which fall in the restricted bands, as defined in §15.205(a), must comply with the radiated emission limits specified in §15.209(a) (see §15.205(c)).

Frequency (MHz)	Field strength (microvolts/meter)	Measurement distance (meters)	Field strength (dBµV/m)	Field strength* (dBµV/m)@3m
0.009-0.490	2400/F(kHz)	300	48.5-13.8	128.5-73.8
0.490-1.705	24000/F(kHz)	30	33.8-23.0	73.8-63.0
1.705-30.0	30	30	29.5	69.5
30-88	100	3	40.0	40.0
88-216	150	3	43.5	43.5
216-960	200	3	46.0	46.0
Above 960	500	3	54.0	54.0

*The emission limits shown in the above table are based on measurements employing a CISPR quasi-peak detector except for the frequency bands 9-90 kHz, 110-490 kHz and above 1000 MHz. Radiated emission limits in these three bands are based on measurements employing an average detector. For average radiated emission measurements above 1000 MHz, there is also a limit corresponding to 20 dB above the indicated values in the table is specified when measuring with peak detector function.

Figure 38 Table of Limits

9.4 Test Results

JUDGEMENT: Passed by 1.8dB

For the operation frequency of 2402 MHz, the margin between the emission level and the specification limit is in the worst case 10.0dB at the frequency of 2390.0 MHz, horizontal polarization.

For the operation frequency of 2440 MHz, the margin between the emission level and the specification limit is in the worst case 26.0dB at the frequency of 7320.0 MHz, vertical polarization.

For the operation frequency of 2480 MHz, the margin between the emission level and the specification limit is in the worst case 1.8dB at the frequency of 2483.5 MHz, vertical polarization.

The EUT met the requirements of the F.C.C. Part 15, Subpart C specification.

The details of the highest emissions are given in *Figure 39* to *Figure 40.*

Radiated Emission

E.U.T Description	Device for Treatment of Sleep Disorders
Type	keePAP-00
Serial Number:	Not designated

Specification: FCC, Part 15, Subpart C

Antenna Polarization: Horizontal/Vertical
Frequency range: 0.009MHz to 25.0 GHz
Test Distance: 3 meters
Detector: Peak

Operation Frequency (MHz)	**Freq.** (MHz)	**Polarity** (H/V)	**Peak Reading** (dBµV/m)	**Peak Limit** (dBµV/m)	**Peak Margin** (dB)
2402.0	2390.0	H	63.8	74.0	-10.2
	2390.0	V	64.0	74.0	-10.0
	4804.0	H	42.4	74.0	-31.6
	4804.0	V	46.2	74.0	-27.8
2440.0	4880.0	H	46.7	74.0	-27.3
	4880.0	V	47.1	74.0	-26.9
	7320.0	H	45.2	74.0	-28.8
	7320.0	V	48.0	74.0	-26.0
2480.0	4960.0	H	46.1	74.0	-27.9
	4960.0	V	47.3	74.0	-26.7
	2483.5	H	57.5	74.0	-16.5
	2483.5	V	57.7	74.0	-16.3

Figure 39. Radiated Emission. Antenna Polarization: HORIZONTAL / VERTICAL. Detector: Peak

Margin refers to the test results obtained minus specified requirement; thus a positive number indicates failure, and a negative result indicates that the product passes the test.

"Peak Amp" includes correction factor.

* "Correction Factor" = Antenna Factor + Cable Loss- Low Noise Amplifier Gain

Radiated Emission

E.U.T Description	Device for Treatment of Sleep Disorders
Type	keePAP-00
Serial Number:	Not designated

Specification: FCC, Part 15, Subpart C

Antenna Polarization: Horizontal/Vertical
Frequency range: 0.009MHz to 25.0 GHz
Test Distance: 3 meters
Detector: Average

Operation Frequency (MHz)	**Freq.** (MHz)	**Polarity** (H/V)	**Average Reading** (dBµV/m)	**Average Limit** (dBµV/m)	**Average Margin** (dB)
2402.0	2390.0	H	41.4	54.0	-12.6
	2390.0	V	41.5	54.0	-12.5
	4804.0	H	-	54.0	-
	4804.0	V	-	54.0	-
2440.0	4880.0	H	-	54.0	-
	4880.0	V	-	54.0	-
	7320.0	H	-	54.0	-
	7320.0	V	-	54.0	-
2480.0	4960.0	H	-	54.0	-
	4960.0	V	-	54.0	-
	2483.5	H	50.6	54.0	-3.4
	2483.5	V	52.2	54.0	-1.8

Figure 40. Radiated Emission. Antenna Polarization: HORIZONTAL / VERTICAL. Detector: Average

Notes:

Margin refers to the test results obtained minus specified requirement; thus a positive number indicates failure, and a negative result indicates that the product passes the test.

"Average Amp" includes correction factor.

* Correction Factor = Antenna Factor + Cable Loss- Low Noise Amplifier Gain

9.5 Test Instrumentation Used; Emissions in Restricted Frequency Bands

Instrument	Manufacturer	Model	Serial No.	Last Calibration Date	Next Calibration Due
EMI Receiver	R&S	ESCI7	100724	February 28, 2017	February 28, 2018
Spectrum Analyzer	HP	8592L	3826A01204	March 1, 2017	March 1, 2018
EMI Receiver	HP	8542E	3906A00276	March 1, 2017	March 1, 2018
RF Filter Section	HP	85420E	3705A00248	March 1, 2017	March 1, 2018
Spectrum Analyzer	HP	8564E	3442A00275	March 19, 2017	March 19, 2018
Biconical Antenna	EMCO	3110B	9912-3337	March 24, 2016	March 24, 2018
Active Loop Antenna	EMCO	6502	9506-2950	September 12, 2016	September 12, 2017
Log Periodic Antenna	EMCO	3146	9505-4081	May 15, 2017	May 15, 2018
Horn Antenna	ETS	3115	29845	May 19, 2015	May 19, 2018
Horn Antenna	ARA	SWH-28	1007	March 30, 2014	December 31, 2017
Low Noise Amplifier	Narda	DBS-0411N313	13	August 8, 2016	August 8, 2017
Low Noise Amplifier	Sophia Wireless	LNA28-B	232	August 8, 2016	August 8, 2017
Spectrum Analyzer	HP	8593EM	3536A00120ADI	February 28, 2017	February 28, 2018
Semi Anechoic Civil Chamber	ETS	S81	SL 11643	NCR	NCR

Figure 41 Test Equipment Used

10. Transmitted Power Density

10.1 Test Specification

FCC, Part 15, Subpart C, Section 247(e)

10.2 Test Procedure

(Temperature (23°C)/ Humidity (60%RH))

The E.U.T operation mode and test set-up are as described in Section 2 of this report.

The E.U.T was tested in the chamber, and placed on a remote-controlled turntable. The E.U.T was placed on a non-metallic table, 1.5 meters above the ground.

The readings were maximized by the turntable azimuth between 0-360°, and the antenna polarization. The emissions were measured at a distance of 3 meters.

The spectrum analyzer was set to 3 kHz RBW and VBW to 10 kHz.

The E.U.T was evaluated in 3 channels: Low (2402MHz), Mid (2440MHz) and High (2480MHz).

Radiated output power levels were measured at selected operation frequencies and the results were converted to power level according to the formula as shown below:

$$P = \frac{(E_{V/m} \times d)^2}{(30 \times G)} \text{ [W]}$$

E - Field Strength (V/m)

d – Distance from transmitter (m)

G – Antenna gain

P – Peak power (W)

10.3 Test Limit

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.

10.4 Test Results

Operation Frequency (MHz)	Reading Spectrum Analyzer (dBµV/m)	Reading Spectrum Analyzer (dBm)	Limit (dBm)	Margin (dB)
2402.0	86.2	-9.0	8.0	-17.0
2440.0	84.4	-10.8	8.0	-18.8
2480.0	83.4	-11.8	8.0	-19.8

Figure 42 Test Results

JUDGEMENT: Passed by 17.0 dB

For additional information see *Figure 43* to *Figure 45.*

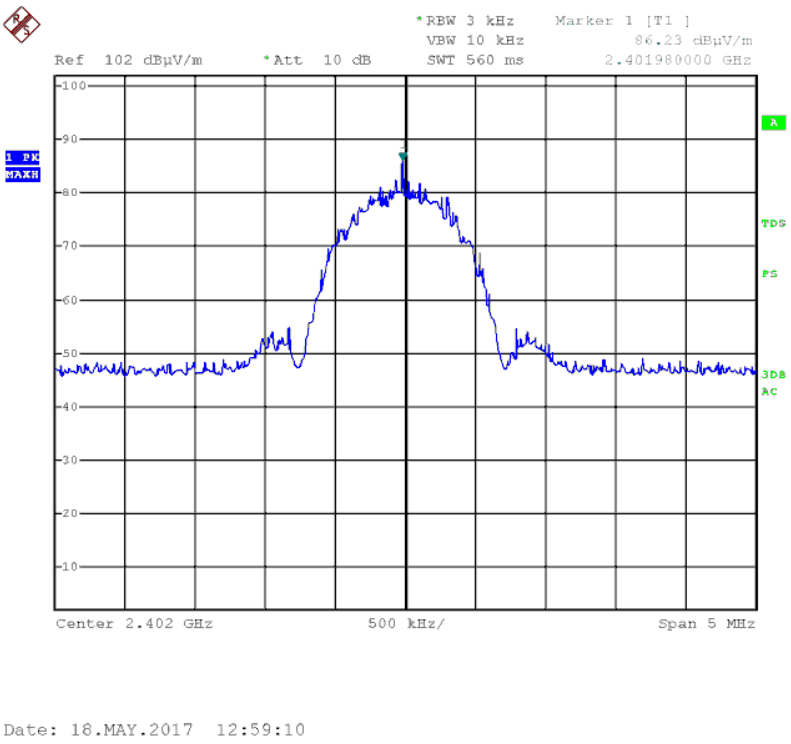

Figure 43 — 2402.0 MHz

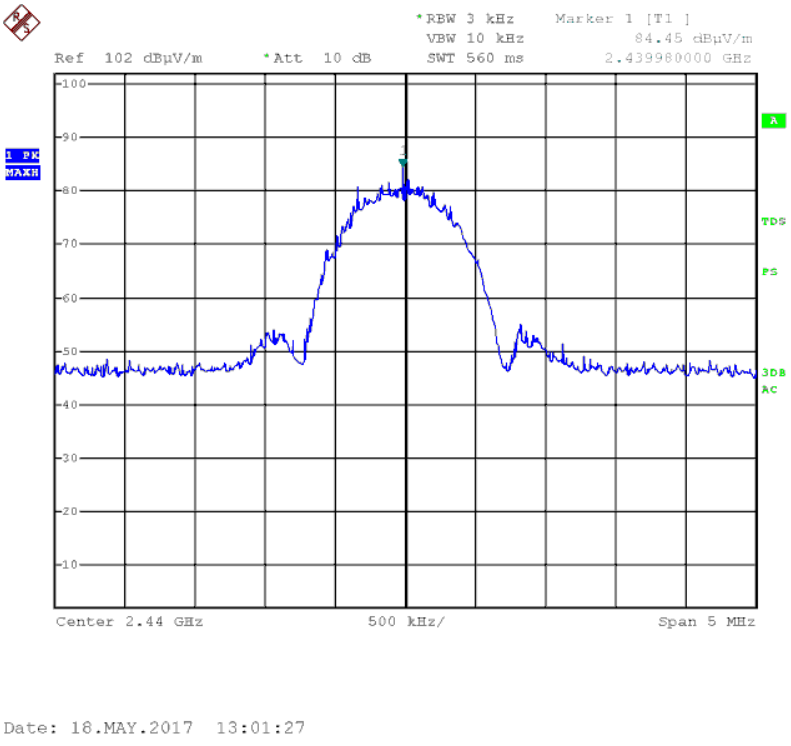

Figure 44 — 2440.0 MHz

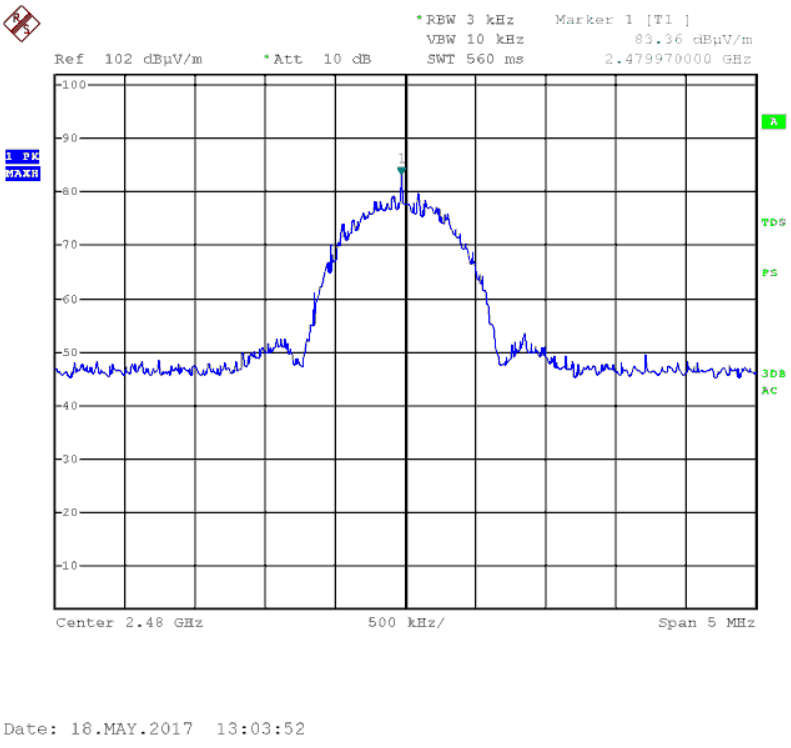

Figure 45 — 2480.0 MHz

10.5 Test Equipment Used; Transmitted Power Density

Instrument	Manufacturer	Model	Serial No.	Last Calibration Date	Next Calibration Due
EMI Receiver	R&S	ESCI7	100724	February 28, 2017	February 28, 2018
Horn Antenna	ETS	3115	6142	May 19, 2015	May 19, 2018
Semi Anechoic Civil Chamber	ETS	S81	SL 11643	NCR	NCR

Figure 46 Test Equipment Used

11. Antenna Gain/Information

The antenna gain is 0.5 dBi, integral.

"High Frequency Ceramic Solutions"

2450 MHz Antenna **P/N 2450AT18B100**
Detail Specification: 03/08/2016 Page 1 of 4

General Specifications			
Part Number	2450AT18B100	**Input Power**	2W max.
Frequency Range	2400 - 2500 Mhz	**Impedance**	50 Ω
Peak Gain	0.5 dBi typ. (XZ-V)	**Operating Temperature**	-45°C to 125°C
Average Gain	-0.5 dBi typ. (XZ-V)	**Reel Quanity**	3,000
Return Loss	9.5 dB min.		

12. R.F Exposure/Safety

Typical use of the E.U.T. is as a sleep apnea treatment device.

The typical placement of the E.U.T. is on the headgear unit. The typical distance between the E.U.T. and the user is 0.5 cm.

SAR Testing Exclusion Based on Section 4.3.1 and Appendix A of KDB 447498 D01 V05 Requirements

Section 4.3.1 and Appendix A of KDB447498 D01 V05 was used as the guidance as follows:

Peak power output = 96.7 dBuV/m (Peak) = 1.5dBm=1.41mW.

[(max. power of channel, including tune-up tolerance, mW)/(min. test separation distance, mm)] *· [√f(GHz)]

=1.41/5 * 1.55=0.4371 this value is less than 3.0 for 1-g SAR and ≤ 7.5 for 10-g extremity SAR.

The SAR measurement is not necessary

RF Exposure Calculation Based on Section 1.1310 Requirements

(a) FCC limits at 2402 MHz is:

$$1\frac{mW}{cm^2}$$

Using table 1 of Section 1.1310 limit for general population/uncontrolled exposures, the above level is an average over 30 minutes.

(b) The power density produced by the E.U.T. is

$$S = \frac{P_t G_t}{4\pi R^2}$$

P_t- Transmitted Power 96.7 dBuV/m (Peak) =1.41 mW (testing performed radiated; power results include antenna gain)

G_T- Antenna Gain, 0.5 dBi

R- Distance from Transmitter using 0.5cm worst case

(c) The peak power density is:

$$S = \frac{(1.41)}{4\pi(0.5)^2} = 0.448\frac{mW}{cm^2}$$

(d) This is below the FCC limit.

13. APPENDIX A - CORRECTION FACTORS

13.1 Correction factors for RF OATS Cable 35m ITL #1879

Frequency (MHz)	Cable loss (dB)
30.0	1.1
50.0	1.1
100.0	1.7
150.0	2.1
200.0	2.5
250.0	2.7
300.0	2.9
350.0	3.1
400.0	3.5
450.0	3.7
500.0	3.9
550.0	4.0
600.0	4.2
650.0	4.4
700.0	4.9
750.0	5.0
800.0	5.0
850.0	4.9
900.0	5.0
950.0	5.1
1000.0	5.4

13.2 Correction factors for biconical antenna – ITL # 1356

Model: EMCO 3110B

Serial No.:9912-3337

Frequency [MHz]	AF [dB/m]
30.0	14.18
35.0	13.95
40.0	12.84
45.0	11.23
50.0	11.10
60.0	10.39
70.0	9.34
80.0	9.02
90.0	9.31
100.0	8.95
120.0	11.53
140.0	12.20
160.0	12.56
180.0	13.49
200.0	15.27

13.3 Correction factors for Log Periodic Antenna

ITL # 1349
Model: EMCO 3146
Serial No.:9505-4081

Frequency [MHz]	AF [dB/m]
200.0	11.47
250.0	12.06
300.0	14.77
400.0	15.77
500.0	18.01
600.0	18.84
700.0	20.93
800.0	21.27
900.0	22.44
1000.0	24.10

13.4 Correction factors for Correction factors for Active Loop Antenna

Model 6502 S/N 9506-2950
ITL # 1075:

f(MHz)	MAF(dBs/m)	AF(dB/m)
0.01	-33.1	18.4
0.02	-37.2	14.3
0.03	-38.2	13.3
0.05	-39.8	11.7
0.1	-40.1	11.4
0.2	-40.3	11.2
0.3	-40.3	11.2
0.5	-40.3	11.2
0.7	-40.3	11.2
1	-40.1	11.4
2	-40	11.5
3	-40	11.5
4	-40.1	11.4
5	-40.2	11.3
6	-40.4	11.1
7	-40.4	11.1
8	-40.4	11.1
9	-40.5	11
10	-40.5	11
20	-41.5	10
30	-43.5	8

13.5 Correction factors for Horn ANTENNA

Model: 3115
Serial number: 6142
3 meter range; ITL # 1352

f(GHz)	AF(dB/m)	GA(dB)
0.75	25	3
1G	23.5	7
1.5G	26	8
2G	29	7
2.5G	27.5	10
3G	30	10
3.5G	31.5	10
4G	32.5	9.5
4.5G	32.5	10.5
5G	33	10.5
5.5G	35	10.5
6G	36.5	9.5
6.5G	36.5	10
7G	37.5	10
7.5G	37.5	10
8G	37.5	11
8.5G	38	11
9G	37.5	11.5
9.5G	38	11.5
10G	38.5	11.5
10.5G	38.5	12
11G	38.5	12.5
11.5G	38.5	13
12G	38	13.5
12.5G	38.5	13
13G	40	12
13.5G	41	12
14G	40	13
14.5G	39	14
15G	38	15.5
15.5G	37.5	16
16G	37.5	16
16.5G	39	15
17G	40	15
17.5G	42	13.5
18G	42.5	13

13.6 Correction factors for *Horn Antenna*

Model: SWH-28
at 1 meter range.

ITL #:1353

Frequency, MHz	Measured antenna factor, dB/m 1)
18000	33.0
18500	32.9
19000	33.1
19500	33.3
20000	33.6
20500	33.6
21000	33.4
21500	33.8
22000	33.7
22500	33.9
23000	34.8
23500	34.5
24000	34.2
24500	34.8
25000	34.4
25500	35.2
26000	35.9
26500	36.0