



# **TEST REPORT**

Applicant Name : Address :

Report Number : FCC ID:

Therabody, Inc. 6100 Wilshire Blvd. Suite 200 Los Angeles, CA 90048-5107, **United States** SZNS220307-07616E-RF-00 2AU6T-RTKN

# Test Standard (s)

FCC PART 15.247

# **Sample Description**

Product Type:	RecoveryTherm Hot/Cold/Vibration Knee
Model No.:	RecoveryTherm Hot/Cold/Vibration Knee
Multiple Model(s) No.:	N/A
Trade Mark:	N/A
Date Received:	2022/03/07
Report Date:	2022/05/17

**Test Result:** 

Pass\*

\* In the configuration tested, the EUT complied with the standards above.

# **Prepared and Checked By:**

Bluese Dr

Black Ding **EMC Engineer** 

# **Approved By:**

R6port li

Robert Li **EMC Engineer** 

Note: This report may contain data that are not covered by the A2LA accreditation and are marked with an asterisk "\* ".

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the sample(s) tested. This report is valid only with a valid digital signature. The digital signature may be available only under the Adobe software above version 7.0.

#### Shenzhen Accurate Technology Co., Ltd.

1/F., Building A, Changyuan New Material Port, Science & Industry Park, Nanshan District, Shenzhen, Guangdong, P.R. China Tel: +86 755-26503290 Fax: +86 755-26503396 Web: www.atc-lab.com

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# **GENERAL INFORMATION**

#### **Product Description for Equipment under Test (EUT)**

Frequency Range	BLE 1M: 2402-2480MHz
Maximum Conducted Peak Output Power	BLE 1M: -0.47dBm
Modulation Technique	BLE 1M: GFSK
Antenna Specification*	0 dBi (provided by the applicant)
Voltage Range	DC 11.1V from battery or DC 20V/15V/12V/9V/5.0V from adapter for charging battery
Sample serial number	SZNS220307-07616E-RF-S1(Assigned by ATC)
Sample/EUT Status	Good condition
Adapter Information	Model:EM1047S Input: AC 100-240 V,2.0A,50-60Hz Output: DC 20.0V 2.25A, 15.0V 3.0A, 12.0 V 3.0A, 9.0V,3.0A, 5.0V 3.0A, 45W max

### Objective

This test report is in accordance with Part 2-Subpart J, Part 15-Subparts A and C of the Federal Communication Commission's rules.

The tests were performed in order to determine compliance with FCC Part 15, Subpart C, and section 15.203, 15.205, 15.209 and 15.247 rules.

### **Test Methodology**

All measurements contained in this report were conducted with ANSI C63.10-2013, American National Standard of Procedures for Compliance Testing of Unlicensed Wireless Devices.

And KDB 558074 D01 15.247 Meas Guidance v05r02.

All emissions measurement was performed at Shenzhen Accurate Technology Co., Ltd. The radiated testing was performed at an antenna-to-EUT distance of 3 meters.

Each test item follows test standards and with no deviation.

### **Measurement Uncertainty**

Parameter		Uncertainty
Occupied Char	nnel Bandwidth	5%
RF Fre	equency	$0.082*10^{-7}$
RF output pov	wer, conducted	0.73dB
Unwanted Emis	ssion, conducted	1.6dB
AC Power Lines C	onducted Emissions	2.72dB
	9kHz - 30MHz	2.66dB
	30MHz - 1GHz	4.28dB
Emissions, Radiated	1GHz - 18GHz	4.98dB
Radiated	18GHz - 26.5GHz	5.06dB
	26.5GHz - 40GHz	4.72dB
Temperature		1 °C
Humidity		6%
Supply	voltages	0.4%

Note: The extended uncertainty given in this report is obtained by combining the standard uncertainty times the coverage factor K with the 95% confidence interval. Otherwise required by the applicant or Product Regulations, Decision Rule in this report did not consider the uncertainty.

### **Test Facility**

The test site used by Shenzhen Accurate Technology Co., Ltd. to collect test data is located on the 1/F., Building A, Changyuan New Material Port, Science & Industry Park, Nanshan District, Shenzhen, Guangdong, P.R. China.

The test site has been approved by the FCC under the KDB 974614 D01 and is listed in the FCC Public Access Link (PAL) database, FCC Registration No.: 708358, the FCC Designation No.: CN1189. Accredited by American Association for Laboratory Accreditation (A2LA) The Certificate Number is 429 7.01.

Listed by Innovation, Science and Economic Development Canada (ISEDC), the Registration Number is 5077A.

# SYSTEM TEST CONFIGURATION

# **Description of Test Configuration**

For BLE mode, 40 channels are provided to testing:

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

EUT was tested with Channel 0, 19 and 39.

# **Equipment Modifications**

No modification was made to the EUT tested.

### EUT Exercise Software

"BT tool.exe"\* software was used to test and power level set was default\*. The software and power level was provided by the applicant.

# Duty cycle

Test Result: Compliant. Please refer to the Appendix.

# Support Equipment List and Details

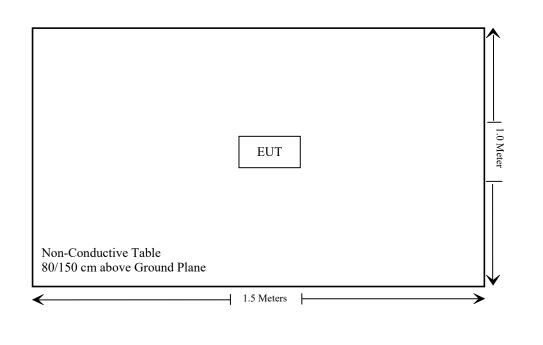
Manufacturer	Description	Model	Serial Number
/	/	/	/

# External I/O Cable

Cable Description	Length (m)	From Port	То
/	/	/	/

# **Block Diagram of Test Setup**

For Radiated Emissions:



# SUMMARY OF TEST RESULTS

FCC Rules	Description of Test	Result
§15.247 (i), §1.1307 (b) (1) & §2.1093	RF Exposure	Compliant
§15.203	Antenna Requirement	Compliant
§15.207 (a)	AC Line Conducted Emissions	Not Applicable
§15.205, §15.209, §15.247(d)	Spurious Emissions	Compliant
§15.247 (a)(2)	6 dB Emission Bandwidth & Occupied Bandwidth	Compliant
§15.247(b)(3)	Maximum Conducted Output Power	Compliant
§15.247(d)	100 kHz Bandwidth of Frequency Band Edge	Compliant
§15.247(e)	Power Spectral Density	Compliant

Note Applicable: EUT was powered by battery when operating Bluetooth

# **TEST EQUIPMENT LIST**

Manufacturer	Description	Model	Serial Number	Calibration Date	Calibration Due Date			
	Radiated Emissions Test							
Rohde& Schwarz	Test Receiver	ESR	102725	2021/12/13	2022/12/12			
Rohde&Schwarz	Spectrum Analyzer	FSV40	101949	2021/12/13	2022/12/12			
SONOMA INSTRUMENT	Amplifier	310 N	186131	2021/11/09	2022/11/08			
A.H. Systems, inc.	Preamplifier	PAM-0118P	135	2021/11/09	2022/11/08			
Quinstar	Amplifier	QLW- 18405536-J0	15964001002	2021/11/11	2022/11/10			
Schwarzbeck	Bilog Antenna	VULB9163	9163-323	2021/07/06	2024/07/05			
Schwarzbeck	Horn Antenna	BBHA9120D	9120D-1067	2020/01/05	2023/01/04			
Schwarzbeck	HORN ANTENNA	BBHA9170	9170-359	2020/01/05	2023/01/04			
Radiated Emission T	est Software: e3 19821b	(V9)						
Unknown	RF Coaxial Cable	No.10	N050	2021/12/14	2022/12/13			
Unknown	RF Coaxial Cable	No.11	N1000	2021/12/14	2022/12/13			
Unknown	RF Coaxial Cable	No.12	N040	2021/12/14	2022/12/13			
Unknown	RF Coaxial Cable	No.13	N300	2021/12/14	2022/12/13			
Unknown	RF Coaxial Cable	No.14	N800	2021/12/14	2022/12/13			
Unknown	RF Coaxial Cable	No.15	N600	2021/12/14	2022/12/13			
Unknown	RF Coaxial Cable	No.16	N650	2021/12/14	2022/12/13			
Wainwright	High Pass Filter	WHKX3.6/18 G-10SS	5	2021/12/14	2022/12/13			
	RF Conducted Test							
Rohde & Schwarz	Spectrum Analyzer	FSV-40	101948	2021/12/13	2022/12/12			
Tonscend	RF Control Unit	JS0806-2	19G8060182	2021/07/06	2022/07/05			
Unknown	RF Coaxial Cable	No.31	RF-01	Eacl	n time			
Unknown	RF Cable	Unknown	Unknown	Eacl	n time			

\* **Statement of Traceability:** Shenzhen Accurate Technology Co., Ltd. attests that all calibrations have been performed in accordance to requirements that traceable to National Primary Standards and International System of Units (SI).

# FCC§15.247 (i), §1.1307 (b) (1) & §2.1093 – RF EXPOSURE

### **Applicable Standard**

According to FCC §2.1093 and §1.1307(b) (1), systems operating under the provisions of this section shall be operated in a manner that ensure that the public is not exposed to radio frequency energy level in excess of the Commission's guideline.

According to KDB 447498 D01 General RF Exposure Guidance

The 1-g and 10-g SAR test exclusion thresholds for 100 MHz to 6 GHz at test separation distances  $\leq$  50 mm are determined by:

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

 $[\sqrt{f}(GHz)] \le 3.0$  for 1-g SAR and  $\le 7.5$  for 10-g extremity SAR, where

1. f(GHz) is the RF channel transmit frequency in GHz.

2. Power and distance are rounded to the nearest mW and mm before calculation.

3. The result is rounded to one decimal place for comparison.

4. When the minimum test separation distance is < 5 mm, a distance of 5 mm is applied to determine SAR test Exclusion.

#### **Measurement Result**

For worst case:

Mode	Frequency (MHz)	Max tune-up conducted power (dBm)	Max tune-up conducted power (mW)	Distance (mm)	Calculated value	Threshold (1-g SAR)	SAR Test Exclusion
BLE	2480	0	1.0	5	0.3	3.0	Yes

**Result: No SAR test is required** 

# FCC §15.203 - ANTENNA REQUIREMENT

### **Applicable Standard**

According to § 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. The use of a permanently attached antenna or of an antenna that uses a unique coupling to the intentional radiator shall be considered sufficient to comply with the provisions of this section. The manufacturer may design the unit so that a broken antenna can be replaced by the user, but the user of a standard antenna jack or electrical connector is prohibited. The structure and application of the EUT were analyzed to determine compliance with section §15.203 of the rules. §15.203 state that the subject device must meet the following criteria:

a. Antenna must be permanently attached to the unit.

b. Antenna must use a unique type of connector to attach to the EUT.

Unit must be professionally installed, and installer shall be responsible for verifying that the correct antenna is employed with the unit.

And according to FCC 47 CFR section 15.247 (b), if the transmitting antennas of directional gain greater than 6dBi are used, the power shall be reduced by the amount in dB that the directional gain of the antenna exceeds 6 dBi.

### **Antenna Connector Construction**

The EUT has one internal antenna arrangement, which was permanently attached and the antenna gain is 0 dBi, fulfill the requirement of this section. Please refer to the EUT photos.

Result: Compliance.

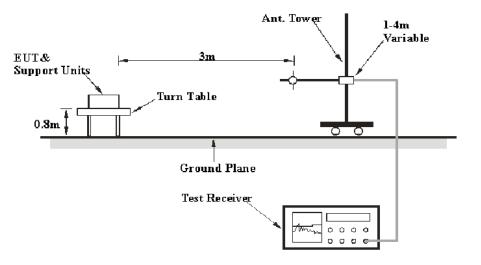
# FCC §15.209, §15.205 & §15.247(d) - SPURIOUS EMISSIONS

### **Applicable Standard**

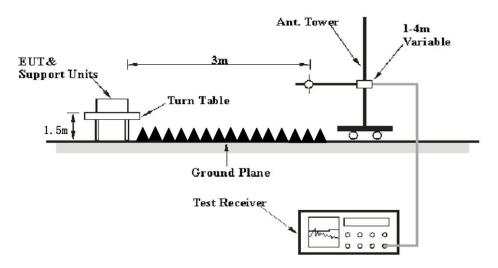
FCC §15.247 (d); §15.209; §15.205;

# **EUT Setup**

### Below 1 GHz:



#### Above 1GHz:



The radiated emission tests were performed in the 3 meters test site, using the setup accordance with the ANSI C63.10-2013. The specification used was the FCC 15.209, and FCC 15.247 limits.

#### EMI Test Receiver & Spectrum Analyzer Setup

During the radiated emission test, the EMI test receiver & Spectrum Analyzer Setup were set with the following configurations:

Frequency Range	RBW	Video B/W	IF B/W	Measurement
30 MHz – 1000 MHz	100 kHz	300 kHz	120 kHz	QP
	1MHz	3 MHz	/	РК
Above 1 GHz	1MHz	$10 \text{ Hz}^{\text{Note 1}}$	/	Average
	1MHz	$> 1/T^{Note 2}$	/	Average

Note 1: when duty cycle is no less than 98% Note 2: when duty cycle is less than 98%

### **Test Procedure**

Maximizing procedure was performed on the highest emissions to ensure that the EUT complied with all installation combinations.

Data was recorded in Quasi-peak detection mode for frequency range of 30 MHz-1 GHz, peak and Average detection modes for frequencies above 1 GHz.

#### Factor & Margin Calculation

The Factor is calculated by adding the Antenna Factor and Cable Loss, and subtracting the Amplifier Gain. The basic equation is as follows:

Factor = Antenna Factor + Cable Loss - Amplifier Gain

The "**Over Limit/Margin**" column of the following data tables indicates the degree of compliance with the applicable limit. For example, an Over Limit/margin of -7dB means the emission is 7dB below the limit. The equation for calculation is as follows:

Over Limit/Margin = Level / Corrected Amplitude – Limit Level / Corrected Amplitude = Read Level + Factor

#### **Test Data**

#### **Environmental Conditions**

Temperature:	25~25.8 °C
Relative Humidity:	51~55 °C
ATM Pressure:	101.2 kPa

*The testing was performed by Nick Fang on 2022-04-28 for below 1GHz and Nick Fang on 2022-05-09 and Amy Cao on 2022-03-29 for above 1GHz.* 

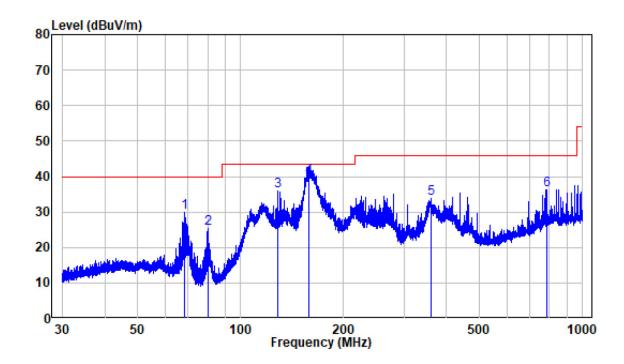
*EUT operation mode: Transmitting (Pre-scan in the X,Y and Z axes of orientation, the worst case X-axis of orientation was recorded)* 

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#### **30MHz-1GHz:** (worst case is high channel)

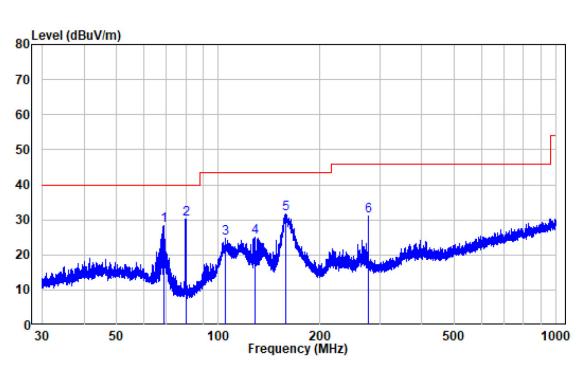
Note: When the test result of peak was less than the limit of QP more than 6dB, just peak value were recorded.





Site : chamber Condition: 3m HORIZONTAL Job No. : SZNS220307-07616E-RF Test Mode: BLE

	Freq	Factor			Limit Line		Remark
1.0	MHz	dB/m	dBuV	dBuV/m	dBuV/m	dB	
1	68.451	-14.04	43.79	29.75	40.00	-10.25	Peak
2	80.010	-16.79	42.29	25.50	40.00	-14.50	Peak
3	128.507	-14.75	50.61	35.86	43.50	-7.64	Peak
4	157.835	-14.52	54.29	39.77	43.50	-3.73	QP
5	359.344	-7.65	41.51	33.86	46.00	-12.14	Peak
6	786.471	-0.06	36.18	36.12	46.00	-9.88	Peak



Vertical

Site :	chamber
Condition:	3m VERTICAL
Job No. :	SZNS220307-07616E-RF
Test Mode:	BLE

	Freq	Factor			Limit Line		Remark
	MHz	dB/m	dBuV	dBuV/m	dBuV/m	dB	
1	68.842	-14.23	42.62	28.39	40.00	-11.61	Peak
2	80.010	-16.79	47.10	30.31	40.00	-9.69	Peak
3	105.226	-11.85	36.73	24.88	43.50	-18.62	Peak
4	128.001	-14.70	39.70	25.00	43.50	-18.50	Peak
5	157.835	-14.52	46.30	31.78	43.50	-11.72	Peak
6	278.189	-9.70	40.87	31.17	46.00	-14.83	Peak

#### Report No.: SZNS220307-07616E-RF-00

#### 1-25 GHz:

E	Re	eceiver	Turntable	Rx An	tenna	Corrected	Corrected	T :: 14	Manain
Frequency (MHz)	Reading (dBµV)	PK/QP/Ave.	Degree	Height (m)	Polar (H/V)		Amplitude (dBµV/m)	Limit (dBµV/m)	Margin (dB)
	Low Channel(2402MHz)								
2310	67.79	PK	238	1.2	Н	-7.24	60.55	74	-13.45
2310	53.63	Ave.	238	1.2	Н	-7.24	46.39	54	-7.61
2390	68.38	PK	268	1.8	Н	-7.22	61.16	74	-12.84
2390	53.23	Ave.	268	1.8	Н	-7.22	46.01	54	-7.99
2310	68.29	РК	251	1.1	V	-7.24	61.05	74	-12.95
2310	53.64	Ave.	251	1.1	V	-7.24	46.4	54	-7.6
2390	68.06	PK	8	1	V	-7.22	60.84	74	-13.16
2390	53.25	Ave.	8	1	V	-7.22	46.03	54	-7.97
4804	55.9	PK	314	1	Н	-3.51	52.39	74	-21.61
4804	57.27	РК	146	1.8	V	-3.51	53.76	74	-20.24
	Middle Channel(2440MHz)								
4880	55.6	РК	251	2.5	Н	-3.38	52.22	74	-21.78
4880	56.8	РК	4	2.2	V	-3.38	53.42	74	-20.58
High Channel(2480 MHz)									
2483.5	69.11	РК	214	2.3	Н	-7.2	61.91	74	-12.09
2483.5	54.16	Ave.	214	2.3	Н	-7.2	46.96	54	-7.04
2500	69.04	РК	92	1.3	Н	-7.18	61.86	74	-12.14
2500	54.65	Ave.	92	1.3	Н	-7.18	47.47	54	-6.53
2483.5	68.65	PK	130	2	V	-7.2	61.45	74	-12.55
2483.5	53.66	Ave.	130	2	V	-7.2	46.46	54	-7.54
2500	69.32	PK	46	1.3	V	-7.18	62.14	74	-11.86
2500	54.5	Ave.	46	1.3	V	-7.18	47.32	54	-6.68
4960	55.06	РК	272	2.5	Н	-3.01	52.05	74	-21.95
4960	56.42	РК	261	1.9	V	-3.01	53.41	74	-20.59

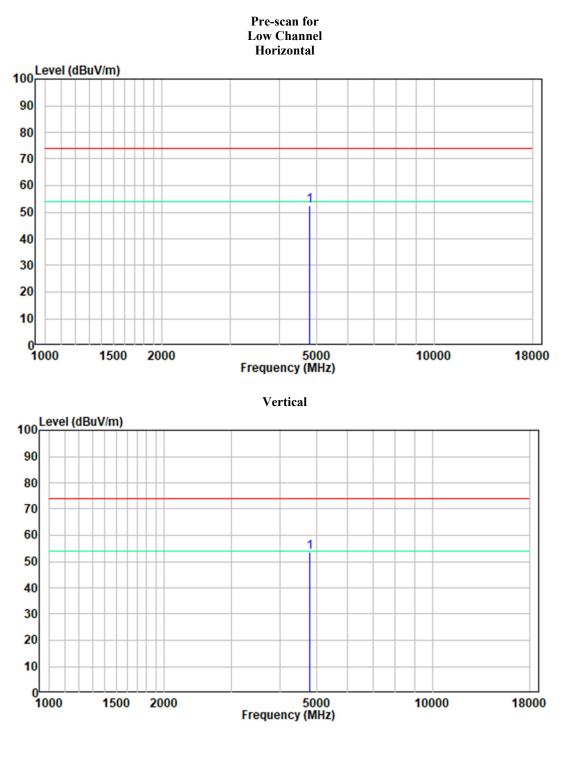
#### Note:

Corrected Factor = Antenna factor (RX) + Cable Loss – Amplifier Factor Corrected Amplitude = Corrected Factor + Reading Margin = Corrected. Amplitude - Limit

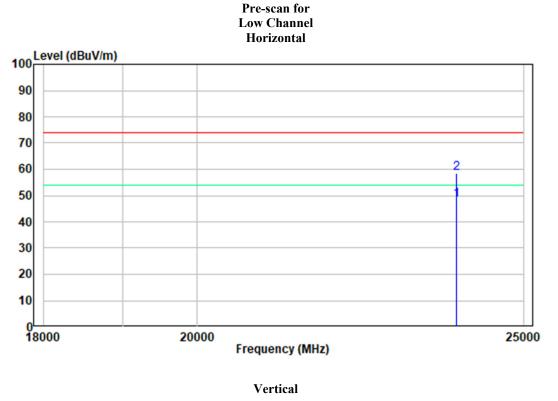
The other spurious emission which is in the noise floor level was not recorded.

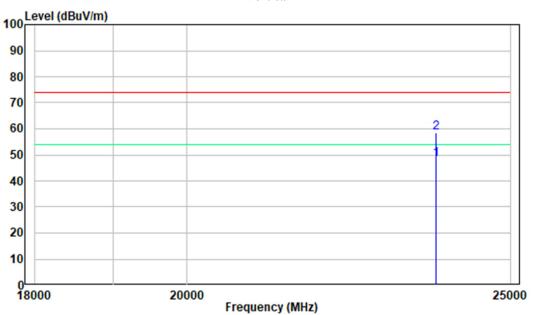
The test result of peak was less than the limit of average, so just peak value were recorded.

#### 1-18 GHz:



#### 18 -25GHz:





# FCC §15.247(a) (2) – 6 dB EMISSION BANDWIDTH & OCCUPIED BANDWIDTH

### **Applicable Standard**

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.

# **Test Procedure**

- 1. Check the calibration of the measuring instrument using either an internal calibrator or a known signal from an external generator.
- 2. Position the EUT without connection to measurement instrument. Turn on the EUT and connect it to measurement instrument. Then set it to any one convenient frequency within its operating range. Set a reference level on the measuring instrument equal to the highest peak value.
- 3. Measure the frequency difference of two frequencies that were attenuated 6 dB from the reference level. Record the frequency difference as the emission bandwidth.
- 4. Repeat above procedures until all frequencies measured were complete.

EUT	RF control unit		Spectrum Analyzer
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### **Test Data**

#### **Environmental Conditions**

Temperature:	25 ℃
<b>Relative Humidity:</b>	55 °C
ATM Pressure:	101.0 kPa

The testing was performed by Key Pei on 2022-03-28.

EUT operation mode: Transmitting

# FCC §15.247(b) (3) - MAXIMUM CONDUCTED OUTPUT POWER

### **Applicable Standard**

According to FCC §15.247(b) (3), for systems using digital modulation in the 902-928 MHz, 2400-2483.5 MHz, and 5725-5850 MHz bands: 1 Watt. As an alternative to a peak power measurement, compliance with the one Watt limit can be based on a measurement of the maximum conducted output power. Maximum Conducted Output Power is defined as the total transmit power delivered to all antennas and antenna elements averaged across all symbols in the signaling alphabet when the transmitter is operating at its maximum power control level. Power must be summed across all antennas and antenna elements. The average must not include any time intervals during which the transmitter is off or is transmitting at a reduced power level. If multiple modes of operation are possible (e.g., alternative modulation methods), the maximum conducted output power is the highest total transmit power occurring in any mode.

### **Test Procedure**

- c. Place the EUT on a bench and set it in transmitting mode.
- d. Remove the antenna from the EUT and then connect a low loss RF cable from the antenna port to one test equipment.
- e. Add a correction factor to the display.

EUT RF control	unit
----------------	------

Note: the RF control unit with a built-in power sensor.

### **Test Data**

#### **Environmental Conditions**

Temperature:	25 ℃
<b>Relative Humidity:</b>	55 °C
ATM Pressure:	101.0 kPa

The testing was performed by Key Pei on 2022-03-28.

EUT operation mode: Transmitting

# FCC §15.247(d) – 100 kHz BANDWIDTH OF FREQUENCY BAND EDGE

### Applicable Standard

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 §15.209(a) is not required. In addition, radiated emissions which fall in the restricted bands, as defined in §15.205(a), must also comply with the radiated emission limits specified in §15.209(a) (see §15.205(c)).

# **Test Procedure**

- f. Check the calibration of the measuring instrument using either an internal calibrator or a known signal from an external generator.
- g. Position the EUT without connection to measurement instrument. Turn on the EUT and connect its antenna terminal to measurement instrument via a low loss cable. Then set it to any one measured frequency within its operating range, and make sure the instrument is operated in its linear range.
- h. Set RBW to 100 kHz and VBW of spectrum analyzer to 300 kHz with a convenient frequency span including 100 kHz bandwidth from band edge.
- i. Measure the highest amplitude appearing on spectral display and set it as a reference level. Plot the graph with marking the highest point and edge frequency.
- j. Repeat above procedures until all measured frequencies were complete.

|--|

# **Test Data**

### **Environmental Conditions**

Temperature:	25 °C
<b>Relative Humidity:</b>	55 °C
ATM Pressure:	101.0 kPa

The testing was performed by Key Pei on 2022-03-28.

EUT operation mode: Transmitting

# FCC §15.247(e) - POWER SPECTRAL DENSITY

### **Applicable Standard**

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. This power spectral density shall be determined in accordance with the provisions of paragraph (b) of this section. The same method of determining the conducted output power shall be used to determine the power spectral density.

### **Test Procedure**

- k. Use this procedure when the maximum peak conducted output power in the fundamental emission is used to demonstrate compliance.
- 1. Set the RBW to:  $3kHz \le RBW \le 100 kHz$ .
- m. Set the VBW  $\geq 3 \times RBW$ .
- n. Set the span to 1.5 times the DTS bandwidth.
- o. Detector = peak.
- p. Sweep time = auto couple.
- q. Trace mode = max hold.
- r. Allow trace to fully stabilize.
- s. Use the peak marker function to determine the maximum amplitude level within the RBW.
- t. If measured value exceeds limit, reduce RBW (no less than 3 kHz) and repeat.

Spectrum Anaryzer	EUT		RF control unit		Spectrum Analyzer
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# **Test Data**

#### **Environmental Conditions**

Temperature:	25 °C
<b>Relative Humidity:</b>	55 °C
ATM Pressure:	101.0 kPa

The testing was performed by Key Pei on 2022-03-28.

EUT operation mode: Transmitting

# APPENDIX

# Appendix A: DTS Bandwidth

# Test Result

Test Mode	Antenna	Channel	DTS BW [MHz]	Limit[MHz]	Verdict
BLE_1M Ant1		2402	0.72	0.5	PASS
	Ant1	2440	0.72	0.5	PASS
		2480	0.72	0.5	PASS

# **Test Graphs**

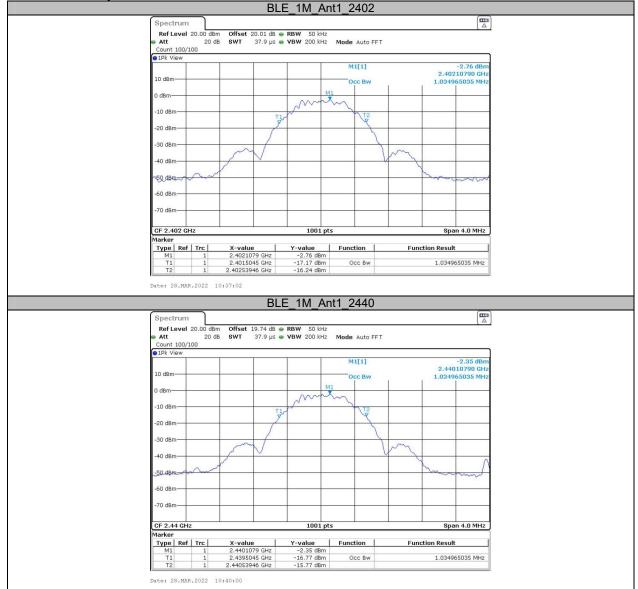
			BLF	E 1M A	nt1 2402			
Spec	rum							
	evel 20.00 dB	m Offset :	20.01 dB 🖷	RBW 100 kH:	2			
👄 Att	20 c 100/100				Z Mode Auto FF	т		
● 1Pk V	6M 100/100							
					M1[1]			6.57 dBm
10 dBn	_	-	-		M2[1]			6000 GHz 0.62 dBm
					M2			6800 GHz
0 dBm-				M1	~			
-10 dB	D1 -6.620	dBm	/		2			
-20 dB			1					
-20 00						1		
-30 dB	n	-				L	-	0
-40 dBi	-	1				1		
6	$\sim$	4					Mart	
-50 dB	1							~~~
-60 dB	n							
-70 dB	1							
CF 2.4	02 GHz	-	1	1001	ots		Span	4.0 MHz
Marker								
Type	Ref Trc 1	X-value	e 66 GHz	Y-value -6.57 dBm	Function	Fur	nction Result	
M2	1	2.4022	68 GHz	-0.62 dBm				
D3	M1 1	71	6.0 kHz	0.02 dB				
Date: 2	8.MAR.2022	10:36:50						
			BIC	= 1N/ A	nt1 2440			
			DLL	A	<u>1111_2440</u>			(m)
Spec		- //						
Ref L Att	evel 20.00 dB 20 d			RBW 100 kH: VBW 300 kH:		т		
		IB SWT						
Count	100/100	IB SWI			Mode Auto Fr			
		IB SWI	1					6.14 dBm
Count PIPK v	ew	18 SW1			M1[1]		2.4396	6.14 dBm 6000 GHz
Count	ew	18 SW1			M1[1]		2.4396	6000 GHz 0.20 dBm
Count ● 1Pk v	ew				M1[1]		2.4396	6000 GHz
Count ● 1Pk V 10 dBm 0 dBm-	ew			M1	M1[1]		2.4396	6000 GHz 0.20 dBm
Count • 1Pk v 10 dBm -10 dBm	D1 -6.200				M1[1]		2.4396	6000 GHz 0.20 dBm
Count P IPK V 10 dBm 0 dBm-	D1 -6.200				M1[1]		2.4396	6000 GHz 0.20 dBm
Count • 1Pk v 10 dBm -10 dBm	D1 -6.200				M1[1]		2.4396	6000 GHz 0.20 dBm
Count IPK V 10 dBm 0 dBm- -10 dBr -20 dBr -30 dBr	D1 -6.200				M1[1]		2.4396	6000 GHz 0.20 dBm
Count ● 1Pk ∿ 10 dBm 0 dBm -10 dBr -20 dBr	D1 -6.200				M1[1]		2.4396	6000 GHz 0.20 dBm
Count IPK V 10 dBm 0 dBm- -10 dBr -20 dBr -30 dBr	D1 -6.200				M1[1]		2.4396	6000 GHz 0.20 dBm
Count • 1Pk V 10 dBn -10 dBn -20 dBn -20 dBn -30 dBn -30 dBn -30 dBn -30 dBn -30 dBn	01 -6.200				M1[1]		2.4396	6000 GHz 0.20 dBm
Count • 1Pk V 10 dBm -10 dB -20 dB -30 dB -40 dB	01 -6.200				M1[1]		2.4396	6000 GHz 0.20 dBm
Count • 1Pk V 10 dBn -10 dBn -20 dBn -20 dBn -30 dBn -30 dBn -30 dBn -30 dBn -30 dBn	01 -6.200				M1[1]		2.4396	6000 GHz 0.20 dBm
Count ● 1Pk ↓ 10 dBm 0 dBm -10 dBu -20 dBu -30 dBu -40 dBu -50 dBu -50 dBu	ew 01 -6.200				M1[1]		2.4396	6000 GHz 0.20 dBm 6800 GHz
Count ● 1Pk ∿ 10 dBn 0 dBm -10 dBi -20 dBi -20 dBi -30 dBi -50 dBi -60 dBi -70 dBi CF 2.4	ew 01 -6.200				M1[1] M2[1] M2		2.4396	6000 GHz 0.20 dBm
Count • 1Pk V 10 dBm 0 dBm -10 dBi -20 dBi -20 dBi -30 dBi -30 dBi -30 dBi -30 dBi -30 dBi -20 dBi -30 dBi -30 dBi -40 dBi -50 dBi -50 dBi -50 dBi -50 dBi -50 dBi -60 dBi -70 dBi -	ew 01 -6.200	CBm		M1	M1[1] M2[1] M2 V3 V3 V3 V3 V3 V3 V3 V3 V3 V3		2.4396	6000 GHz 0.20 dBm 6800 GHz
Count () 10 dBn 0 dBm -10 dBn -20 dBn -20 dBn -20 dBn -30 dBn -30 dBn -50 dBn -50 dBn -60 dBn -70 dBn -60 dBn -70 dBn -70 dBn -60 dBn -70 d	ew 01 -6.200	CBm X-valut 2.439	e 666 GHz	1001 r Y-value	M1[1] M2[1] M2 V3 V3 V3 V3 V3 V3 V3 V3 V3 V3		2.4396	6000 GHz 0.20 dBm 6800 GHz
Count ● 1Pk ∿ 10 dBn 0 dBm -10 dB -20 dB -20 dB -30 dB -40 dB -50 dB -50 dB -70 dB CF 24 Market Type	ew 01 -6.200	CBm X-valut 2.439 2.439		M1	M1[1] M2[1] M2 M2 M2 M2 M2 M2 M2 M2 M2 M2		2.4396	6000 GHz 0.20 dBm 6800 GHz
Count ID dBn 0 dBm -10 dBn -20 dBn -20 dBn -30 dBn -30 dBn -50 dBn -50 dBn -70 dBn	ew 01 -6.200	<b>X-valu</b> 2.439 2.4492 71	e 666 GHz 666 GHz	1001 ; Y-value -6.14 dBr	M1[1] M2[1] M2 M2 M2 M2 M2 M2 M2 M2 M2 M2		2.4396	6000 GHz 0.20 dBm 6800 GHz



# Appendix B: Occupied Channel Bandwidth Test Result

Test Mode	Antenna	Channel	Channel OCB [MHz]		Verdict
BLE_1M		2402	1.035		
	Ant1	2440	1.035		
		2480	1.035		

# **Test Graphs**





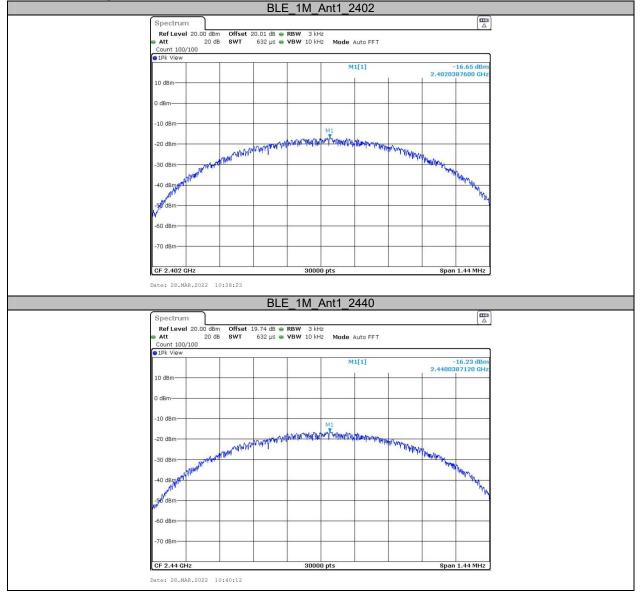
# Appendix C: Maximum conducted Peak output power Test Result

Test Mode	Antenna	Channel	Result[dBm]	Limit[dBm]	Verdict
BLE_1M		2402	-1.50	≤30.00	PASS
	Ant1	2440	-1.03	≤30.00	PASS
		2480	-0.47	≤30.00	PASS

# Appendix D: Maximum power spectral density Test Result

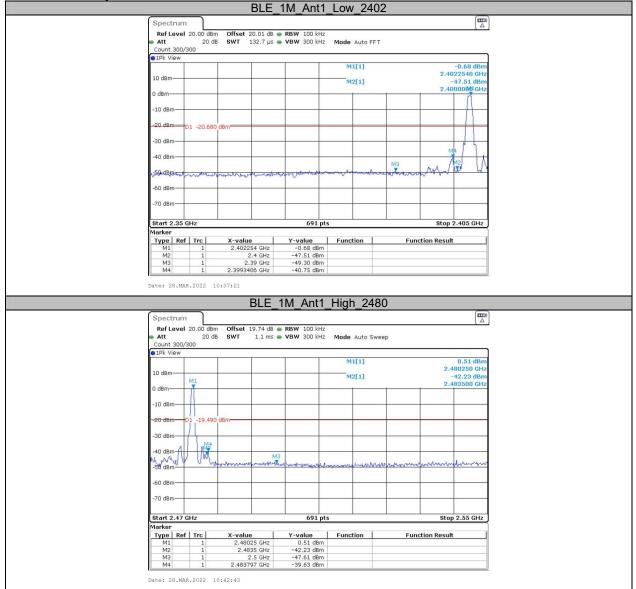
Test Mode	Antenna	Channel	Result[dBm/3kHz]	Limit[dBm/3kHz]	Verdict
BLE_1M Ant1		2402	-16.65	≤8.00	PASS
	Ant1	2440	-16.23	≤8.00	PASS
		2480	-15.63	≤8.00	PASS

# **Test Graphs**





### Appendix E: Band edge measurements Test Graphs



# Appendix F: Duty Cycle Test Result

Test Mode	Antenna	Channel	Transmission Duration [ms]	Transmission Period [ms]	Duty Cycle [%]
BLE_1M	Ant1	2440	2.13	2.50	85.20

# **Test Graphs**

	BL	E 1M Ant	1 2440			
Spectrum	J					
Ref Level 10.0	00 dBm Offset 19.74 dB	RBW 10 MHz				
Att		. VBW 10 MHz				
SGL Count 1/1	TRG: VID					
1Pk Clrw						
			M1[1]		-3.83 dBm 0.00000000 s	
blittBm	D2	24 141	D1[1]		-29.75 dB	
					2.13000 ms	
<mark>⊶10 dBm</mark> ──TRG	-9.600 dBm					
-20 dBm						
-30 dBm	gen	Marrie		holes	44	
-40 dBm	Δ.	100 C				
-40 dBm			0			
-50 dBm						
-60 dBm						
20						
-70 dBm						
00 100						
-80 dBm						
CF 2.44 GHz		1001 pts			1.0 ms/	
Marker		1001 pts			1.0 113/	
Type   Ref   Tr	c X-value	Y-value	Function	Function R	esult	
	1 0.0 s	-3.83 dBm		. unction is		
D1 M1		-29.75 dB				
D2 M1	1 2.5 ms	0.10 dB				
Date: 28.MAR.20	22 10.49.20					
Date: 28.PAR.20	LL 10:40:30					

\*\*\*\*\* END OF REPORT \*\*\*\*\*