China

FCC - TEST REPORT

Report Number	:	60.790.15.022.01R02	Date of Issue	: September 21, 2015
Model	:	VBLE		
Product Type	:	HEART RATE MONITOR STRAP-ON		
Applicant	:	4iiii Innovations Inc.		
Address	:	228 RIVER AVE. COCHRANE, AB CANADA		
Production Facility	:	Kendy Electronics Co. Ltd.		
Address	:	Xin Si Huang Tang Village, Hengli Town, Dongguan City, Guangdong, China		
Test Result	:	■Positive ☐Negative		
Total pages including Appendices	:	29		

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1 Table of Contents

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2 Description of Equipment Under Test

Description of the Equipment Under Test

Product:	HEART RATE MONITOR STRAP-ON
Model no.:	VBLE
FCC ID:	ZZNVBLE
Rating:	3.0VDC (1 x 3.0VDC size “CR2032“ batteries)
Frequency:	2457MHz, 2410MHz, 2473MHz
Antenna gain:	-1.0 dBi
Number of operated channel:	1
Modulation:	GFSK

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3 Summary of Test Standards

Test Standards
FCC Part 15 Subpart C 10-1-13 Edition Federal Communications Commission, PART 15 — Radio Frequency Devices, Subpart C — Unintentional Radiators

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4 Details about the Test Laboratory

Site 1

Company name: TÜV SÜD Hong Kong Ltd.
3/F, West Wing, Lakeside 2,
10 Science Park West Avenue,
Science Park, Shatin, Hong Kong

Site 2

Company name: TÜV SÜD China Ltd.
Building 12&13 Zhiheng Wisdomland Business Park,
Nantou Checkpoint Road 2,
Shenzhen 518052, P.R.China
FCC Registration Number: 502708

Emission Tests	
Test Item	Test Site
FCC Part 15 Subpart C	
FCC Title 47 Part 15.249 & 15.209 Radiated Emission	Site 2
FCC Title 47 Part 15.249 & 15.207 Conduct Emission	NIL
FCC Title 47 Part 15.215 20dB & 99% Bandwidth	Site 2
FCC Title 47 Part 15.249 Bandedge Emission	Site 2

4.1 Test Equipment Site List

Radiated emission Test, Bandedge Emission – Site 3

DESCRIPTION	MANUFACTURER	MODEL NO.	SERIAL NO.	CAL. DUE DATE
EMI Test Receiver	Rohde & Schwarz	ESR 26	101269	17-Aug-16
Trilog Super Broadband Test Antenna	Schwarzbeck	VULB 9163	707	17-Aug-17
Horn Antenna	Rohde & Schwarz	HF907	102294	17-Aug-17
Pre-amplifier	Rohde & Schwarz	SCU 18	102230	17-Aug-16
3m Semi-anechoic chamber	TDK	9X6X6	----	29-May-19

20dB & 99% Bandwidth – Site 3

DESCRIPTION	MANUFACTURER	MODEL NO.	SERIAL NO.	CAL. DUE DATE
Signal Generator	Rohde & Schwarz	SMB100A	108272	17-Aug-16
Signal Analyzer	Rohde & Schwarz	FSV40	101030	17-Aug-16
Vector Signal Generator	Rohde & Schwarz	SMU 200A	105324	17-Aug-16
RF Switch Module	Rohde & Schwarz	OSP120/OSP-B157	101226/100851	17-Aug-16

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4.2 Measurement System Uncertainty

Measurement System Uncertainty Emissions

System Measurement Uncertainty	
Items	**Extended Uncertainty**
Uncertainty for Radiated Emission in 3m chamber 9kHz-30MHz	4.54dB
Uncertainty for Radiated Emission in 3m chamber 30MHz-1000MHz	Horizontal: 4.83dB; Vertical: 4.91dB;
Uncertainty for Radiated Emission in 3m chamber 1000MHz-25000MHz	Horizontal: 4.89dB; Vertical: 4.88dB;
Uncertainty for Conducted RF test	2.04dB

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5 Summary of Test Results

Emission Tests				
FCC Part 15 Subpart C				
Test Condition	Pages	Test Result		
		Pass	Fail	N/A
FCC Title 47 Part 15.249 & 15.209 Radiated Emission	10-15	☒	☐	☐
FCC Title 47 Part 15.249 & 15.207 Conduct Emission	NIL	☐	☐	☒
FCC Title 47 Part 15.215 20dB & 99% Bandwidth	16-21	☒	☐	☐
FCC Title 47 Part 15.249 Bandedge Emission	22-23	☒	☐	☐

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6 General Remarks

Remarks

NIL

SUMMARY:

- All tests according to the regulations cited on page 5 were

■ - Performed

☐ - **Not** Performed

- The Equipment Under Test

■ - **Fulfills** the general approval requirements.

☐ - **Does not** fulfill the general approval requirements.

Sample Received Date: August 21, 2015

Testing Start Date: August 24, 2015

Testing End Date: September 4, 2015

- TÜV SÜD HONG KONG LTD. -

Reviewed by: Prepared by:

TSENG Chi Kit	CHAN Kwong Ngai
EMC Project Engineer	EMC Test Engineer

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7 Emission Test Results

7.1 Radiated Emission

EUT: VBLE
Op Condition: Operated, TX Mode (2457MHz)
Test Specification: FCC15.249 & 15.209, Antenna: Horizontal
Comment: 3.0VDC
Remark: 9kHz to 25GHz

Test Result
☒ Passed
☐ Not Passed

Frequency MHz	Result dBµV/m	Limit dBµV/m	Margin dB	Detector
49.885	17.71	40	-22.29	Quasi Peak
93.103	10.21	43.5	-33.29	Quasi Peak
281.661	19.92	46	-26.08	Quasi Peak
847.925	26.36	46	-19.64	Quasi Peak
1584.416	36.18	74	-37.82	Peak
1584.416	34.52	54	-19.84	Average
2457.000	88.42	114	-25.58	Peak
2457.000	86.17	94	-7.83	Average
2720.083	40.07	74	-33.93	Peak
4914.375	55.72	74	-18.28	Peak
4914.375	37.18	54	-16.82	Average
7458.750	41.45	74	-32.55	Peak
7458.750	39.03	54	-14.97	Average

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Radiated Emission

EUT: VBLE
Op Condition: Operated, TX Mode (2457MHz)
Test Specification: FCC15.249 & 15.209, Antenna: Vertical
Comment: 3.0VDC
Remark: 9kHz to 25GHz

Test Result
☒ Passed
☐ Not Passed

Frequency MHz	Result dBµV/m	Limit dBµV/m	Margin dB	Detector
48.807	13.13	40	-26.87	Quasi Peak
103.073	15.46	43.5	-28.04	Quasi Peak
279.559	17.66	46	-28.34	Quasi Peak
700.000	20.64	46	-25.36	Quasi Peak
1584.250	35.74	74	-38.26	Peak
1584.250	34.02	54	-19.98	Average
2457.166	76.93	114	-37.07	Peak
2457.166	74.15	94	-19.85	Average
2857.833	39.96	74	-34.04	Peak
4914.375	55.25	74	-18.75	Peak
4914.375	37.48	54	-16.52	Average
7330.625	41.13	74	-32.87	Peak
7330.625	39.13	54	-14.87	Average

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Radiated Emission

EUT: VBLE
Op Condition: Operated, TX Mode (2410MHz)
Test Specification: FCC15.249 & 15.209, Antenna: Horizontal
Comment: 3.0VDC
Remark: 9kHz to 25GHz

Test Result
☒ Passed
☐ Not Passed

Frequency MHz	Result dBµV/m	Limit dBµV/m	Margin dB	Detector
49.885	17.71	40	-22.29	Quasi Peak
93.103	10.21	43.5	-33.29	Quasi Peak
281.661	19.92	46	-26.08	Quasi Peak
847.925	26.36	46	-19.64	Quasi Peak
1585.645	36.85	74	-37.15	Peak
1585.645	34.73	54	-19.27	Average
2410.125	86.72	114	-27.28	Peak
2410.125	84.16	94	-9.84	Average
2700.435	39.58	74	-34.42	Peak
4820.250	53.12	74	-20.88	Peak
4820.250	36.55	54	-17.45	Average
7230.000	41.04	74	-32.96	Peak
7230.000	38.59	54	-15.41	Average

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Radiated Emission

EUT:	VBLE
Op Condition:	Operated, TX Mode (2410MHz)
Test Specification:	FCC15.249 & 15.209, Antenna: Vertical
Comment:	3.0VDC
Remark:	9kHz to 25GHz

Test Result
☒ Passed
☐ Not Passed

Frequency MHz	Result dBµV/m	Limit dBµV/m	Margin dB	Detector
48.807	13.13	40	-26.87	Quasi Peak
103.073	15.46	43.5	-28.04	Quasi Peak
279.559	17.66	46	-28.34	Quasi Peak
700.000	20.64	46	-25.36	Quasi Peak
1585.135	34.93	74	-38.26	Peak
1585.135	34.12	54	-34.12	Average
2410.000	78.56	114	-35.44	Peak
2410.000	76.13	94	-17.87	Average
2702.125	38.33	74	-35.67	Peak
4820.000	54.17	74	-19.83	Peak
4820.000	38.48	54	-15.52	Average
7230.000	42.52	74	-31.48	Peak
7230.000	40.17	54	-13.83	Average

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Radiated Emission

EUT: VBLE
Op Condition: Operated, TX Mode (2473MHz)
Test Specification: FCC15.249 & 15.209, Antenna: Horizontal
Comment: 3.0VDC
Remark: 9kHz to 25GHz

Test Result
☒ Passed
☐ Not Passed

Frequency MHz	Result dBµV/m	Limit dBµV/m	Margin dB	Detector
49.885	17.71	40	-22.29	Quasi Peak
93.103	10.21	43.5	-33.29	Quasi Peak
281.661	19.92	46	-26.08	Quasi Peak
847.925	26.36	46	-19.64	Quasi Peak
1613.472	35.82	74	-38.18	Peak
1613.472	34.26	54	-19.74	Average
2473.120	80.64	114	-33.36	Peak
2473.120	78.22	94	-15.78	Average
2733.000	38.59	74	-35.41	Peak
4946.500	52.53	74	-21.47	Peak
4946.500	40.48	54	-13.52	Average
7419.650	41.22	74	-32.78	Peak
7419.650	40.39	54	-13.61	Average

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Radiated Emission

EUT:	VBLE
Op Condition:	Operated, TX Mode (2473MHz)
Test Specification:	FCC15.249 & 15.209, Antenna: Vertical
Comment:	3.0VDC
Remark:	9kHz to 25GHz

Test Result
☒ Passed
☐ Not Passed

Frequency MHz	Result dBµV/m	Limit dBµV/m	Margin dB	Detector
48.807	13.13	40	-26.87	Quasi Peak
103.073	15.46	43.5	-28.04	Quasi Peak
279.559	17.66	46	-28.34	Quasi Peak
700.000	20.64	46	-25.36	Quasi Peak
1612.560	36.02	74	-37.98	Peak
1612.560	35.23	54	-18.77	Average
2473.120	78.88	114	-35.12	Peak
2473.120	76.12	94	-17.88	Average
2732.500	40.12	74	-33.88	Peak
4946.500	53.56	74	-20.44	Peak
4946.500	38.37	54	-15.63	Average
7419.650	42.22	74	-31.78	Peak
7419.650	40.15	54	-13.85	Average

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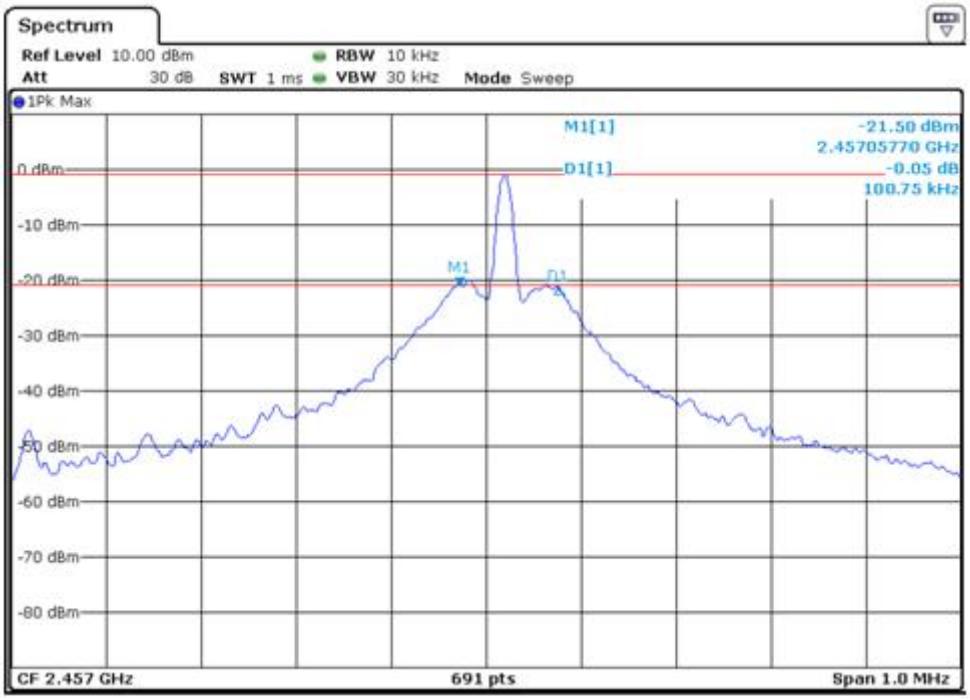
7.2 20dB & 99% Bandwidth

EUT:	VBLE
Op Condition:	Operated, TX Mode (2457MHz)
Test Specification:	FCC15.215, 20dB Bandwidth
Comment:	3.0VDC

Test Result
☒ Passed
☐ Not Passed



20dB bandwidth
100.75 kHz

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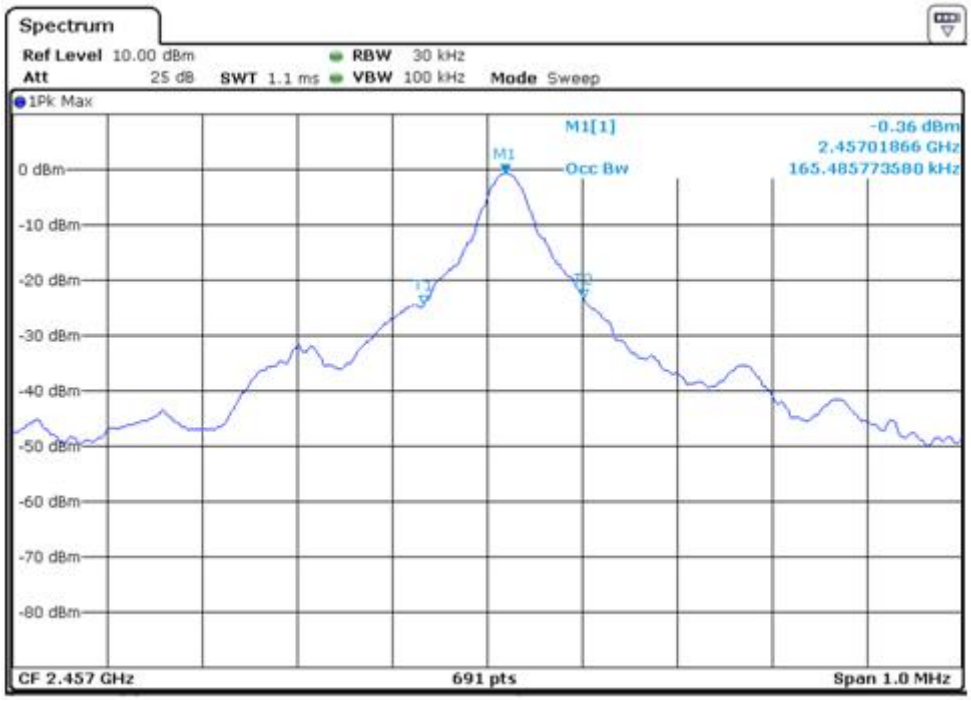
20dB & 99% Bandwidth

EUT:	VBLE
Op Condition:	Operated, TX Mode (2457MHz)
Test Specification:	FCC15.215, 99% Bandwidth
Comment:	3.0VDC

Test Result
☒ Passed
☐ Not Passed



99% bandwidth
165.485 kHz

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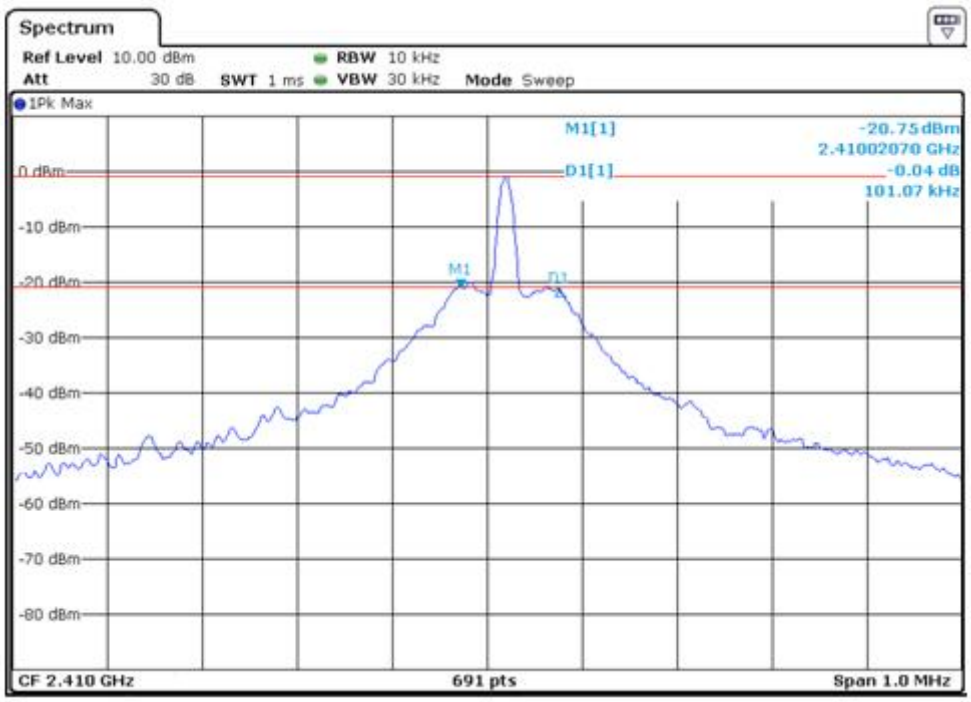
20dB & 99% Bandwidth

EUT:	VBLE
Op Condition:	Operated, TX Mode (2410MHz)
Test Specification:	FCC15.215, 20dB Bandwidth
Comment:	3.0VDC

Test Result
☒ Passed
☐ Not Passed



20dB bandwidth
101.07 kHz

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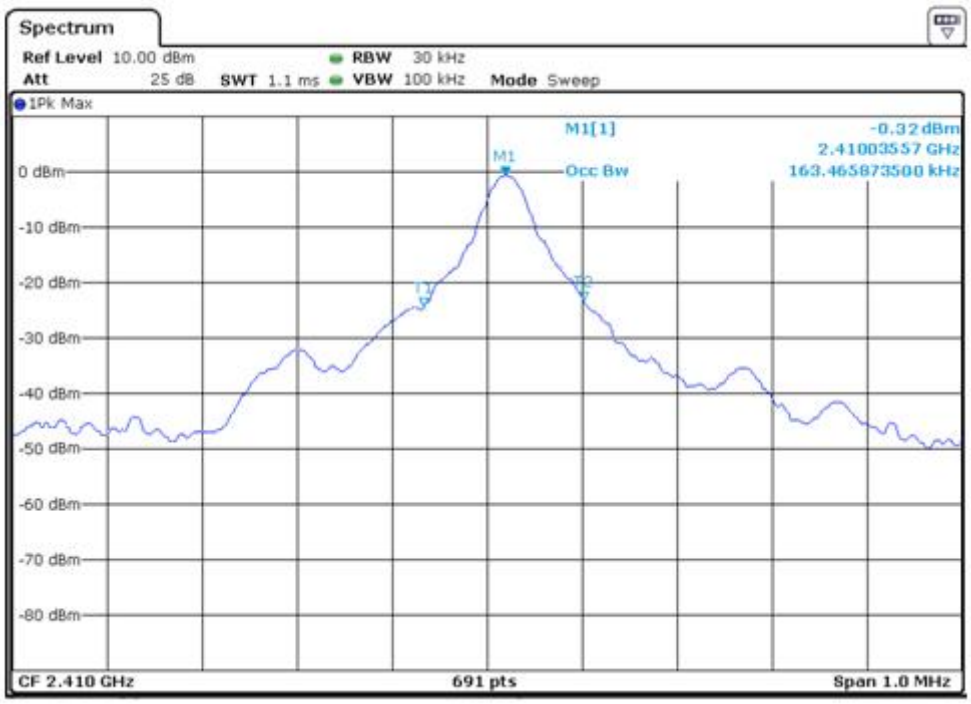
20dB & 99% Bandwidth

EUT:	VBLE
Op Condition:	Operated, TX Mode (2410MHz)
Test Specification:	FCC15.215, 99% Bandwidth
Comment:	3.0VDC

Test Result
☒ Passed
☐ Not Passed



99% bandwidth
163.465 kHz

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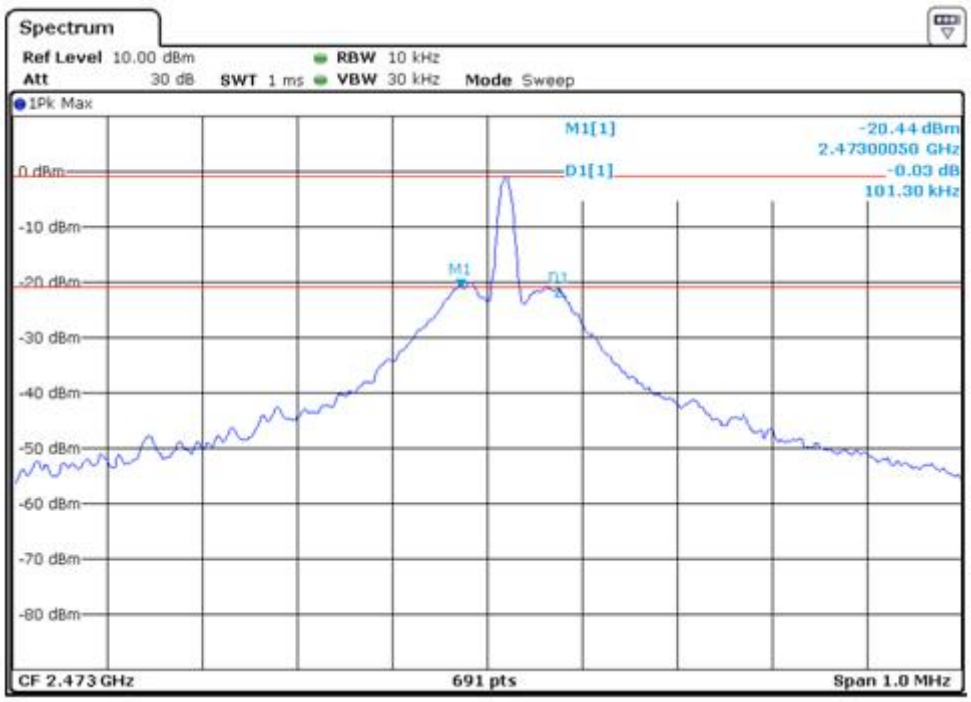
20dB & 99% Bandwidth

EUT:	VBLE
Op Condition:	Operated, TX Mode (2473MHz)
Test Specification:	FCC15.215, 20dB Bandwidth
Comment:	3.0VDC

Test Result
☒ Passed
☐ Not Passed



20dB bandwidth
101.30 kHz

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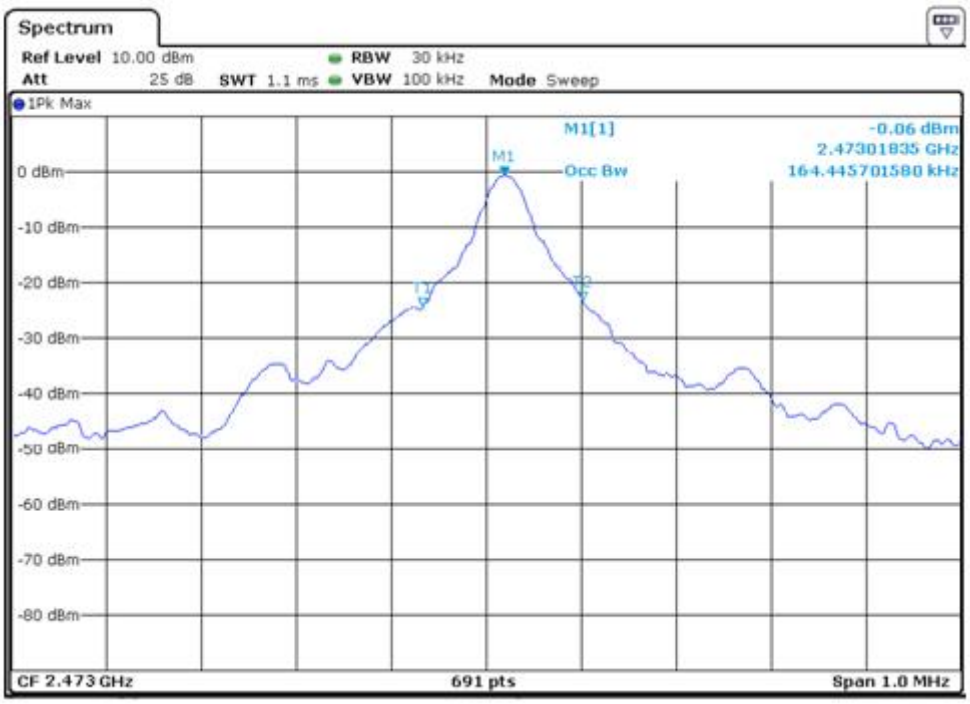
20dB & 99% Bandwidth

EUT:	VBLE
Op Condition:	Operated, TX Mode (2473MHz)
Test Specification:	FCC15.215, 99% Bandwidth
Comment:	3.0VDC

Test Result
☒ Passed
☐ Not Passed



99% bandwidth
164.445 kHz

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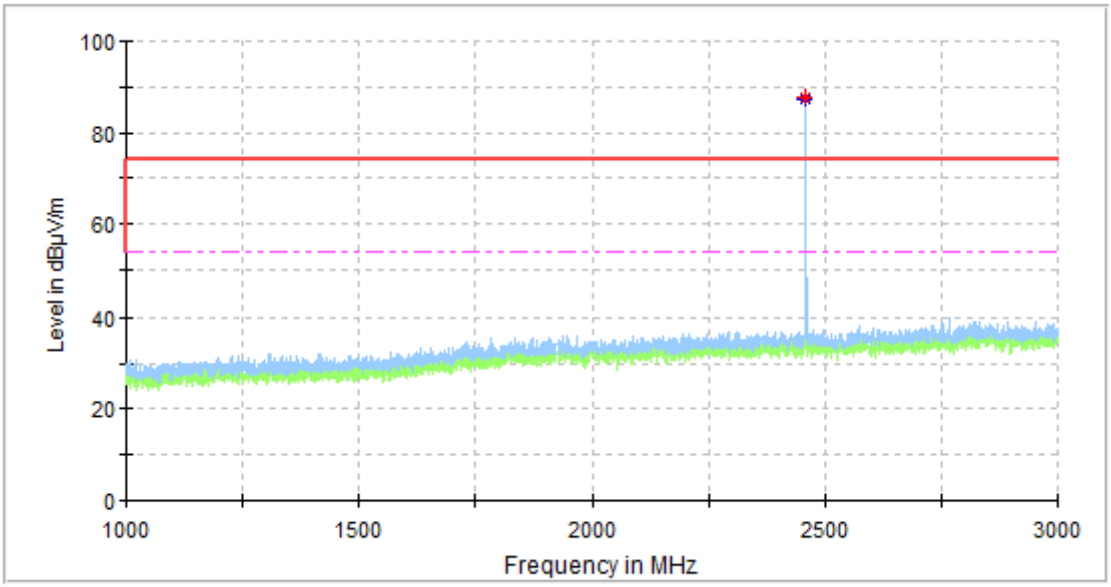
7.3 Bandedge Emission

EUT:	VBLE
Op Condition:	Operated, TX Mode (2457/2410/2473MHz)
Test Specification:	FCC15.247, Antenna: Horizontal
Comment:	3.0VDC

Test Result
☒ Passed
☐ Not Passed



Band	Frequency MHz	Result dBµV/m	Limit dBµV/m	Margin dB	Detector
Low	2396.000	34.53	74	-39.47	Peak
Low	2396.000	30.98	54	-23.02	Average
High	2491.000	36.17	74	-37.83	Peak
High	2491.000	31.87	54	-22.13	Average

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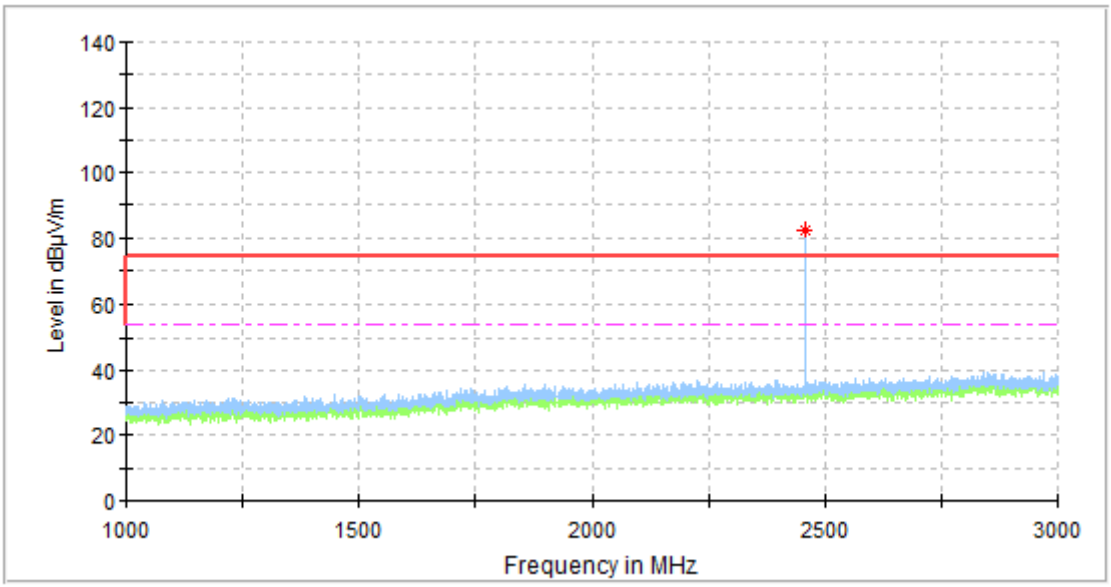
Bandedge Emission

EUT:	VBLE
Op Condition:	Operated, TX Mode (2457/2410/2473MHz)
Test Specification:	FCC15.247, Antenna: Vertical
Comment:	3.0VDC

Test Result
☒ Passed
☐ Not Passed



Band	Frequency MHz	Result dBµV/m	Limit dBµV/m	Margin dB	Detector
Low	2396.000	33.54	74	-40.46	Peak
Low	2396.000	30.21	54	-23.79	Average
High	2491.000	34.55	74	-39.45	Peak
High	2491.000	31.92	54	-23.08	Average

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8 Appendix A - Photographs of EUT

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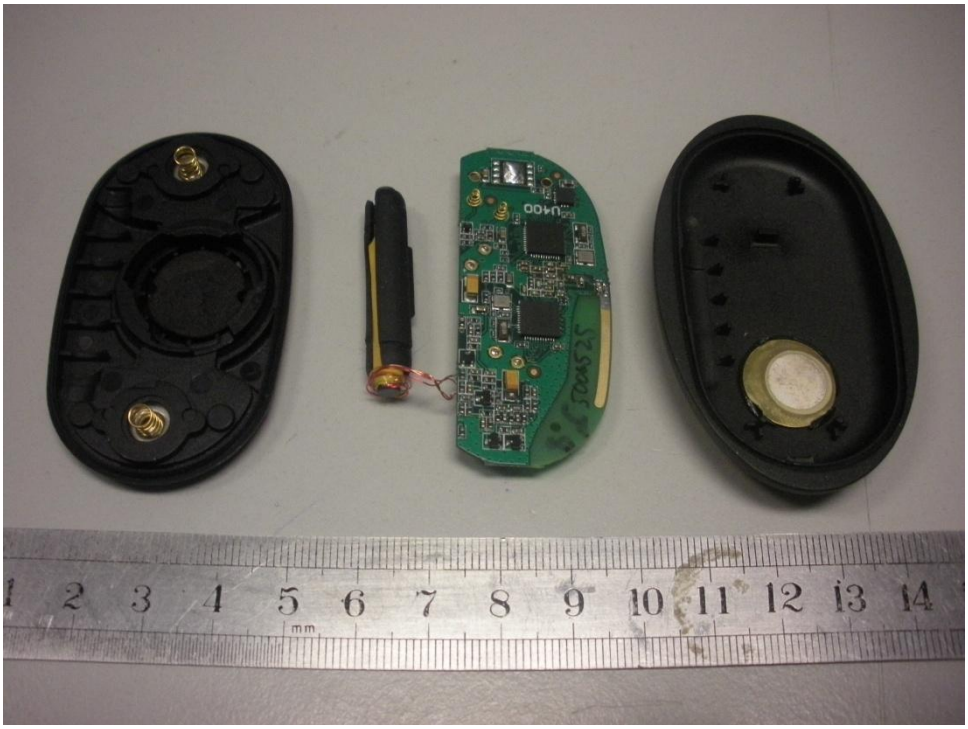
Appendix A



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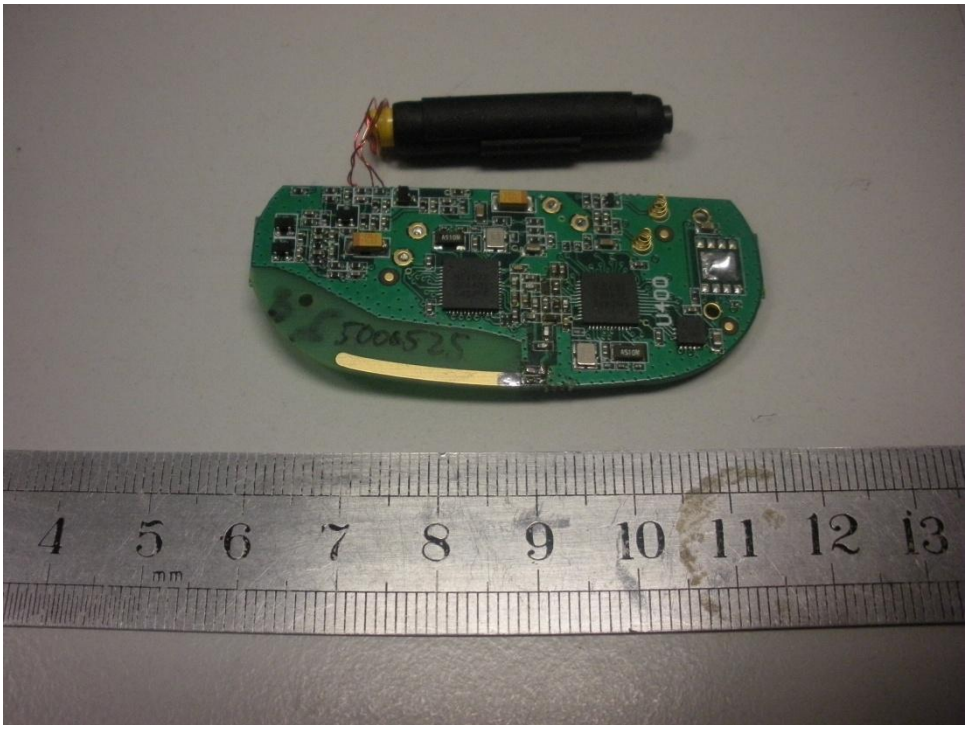
Appendix A



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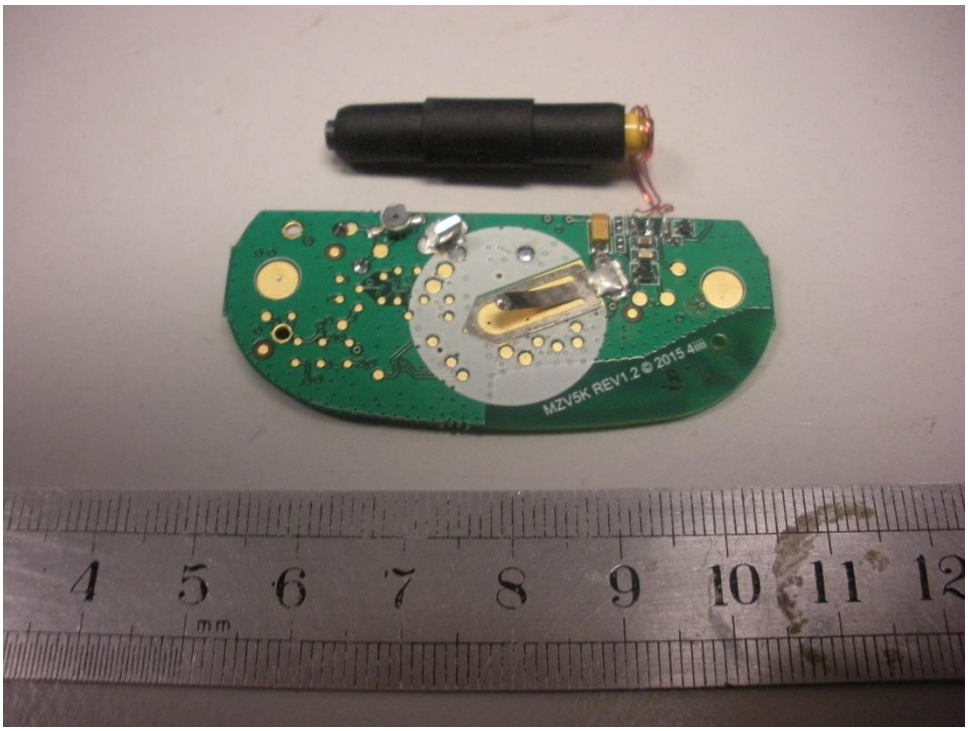
Appendix A



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9 Appendix B - Setup Photographs of EUT

Radiated Emission / Bandedge Emission

20dB & 99% Bandwidth

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10 Appendix C - General Product Information

Radiofrequency radiation exposure evaluation

According to KDB 447498 D01v05r02 section 4.3.1,

>> The 1-g SAR test exclusion thresholds for 100MHz to 6GHz, at test separation distances ≤ 50 mm are determined by:

Power at 2457MHz = 0.0946 mW EIRP
Power at 2410MHz = 0.0928 mW EIRP
Power at 2473MHz = 0.0941 mW EIRP

[(0.0946 mW) / (5 mm)] · [sqrt (2.457 GHz)] = 0.0296 which is ≤ 3.0 for 1-g SAR.
[(0.0928 mW) / (5 mm)] · [sqrt (2.410 GHz)] = 0.0288 which is ≤ 3.0 for 1-g SAR.
[(0.0941 mW) / (5 mm)] · [sqrt (2.473 GHz)] = 0.0295 which is ≤ 3.0 for 1-g SAR.

Therefore the device is exempt from stand-alone SAR test requirements.

>> The fundamental frequency of the EUT is 2457MHz, 2410MHz, 2473MHz, the test separation distance is < 50mm. (Manufacturer Specification distance is <5mm)

>> The power of EUT measured is:

- For 2457MHz: 0.0946mW = 10 log (0.0946) dBm ~ -10.24dBm
- For 2410MHz: 0.0928mW = 10 log (0.0928) dBm ~ -10.32dBm
- For 2473MHz: 0.0941mW = 10 log (0.0941) dBm ~ -10.26dBm

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