China

FCC - TEST REPORT

Report Number	:	60.790.15.016.02	Date of Issue	: August 24, 2015
Model	:	Ridesense		
Product Type	:	Ant+/BLE Combo		
Applicant	:	DAYTON INDUSTRIAL CO., LTD		
Address	:	2-12 Kwai Fat Road, 11-A Kwai Chung, New Territories, Hong Kong		
Production Facility	:	KENDY Enterprise Ltd		
Address	:	2-12 Kwai Fat Road, 11-A Kwai Chung, New Territories, Hong Kong		
Test Result	:	■Positive	☐Negative	
Total pages including Appendices	:	41		

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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:	Ant+/BLE Combo
Model no.:	Ridesense
FCC ID:	04GRS1
Rating:	3.0VDC (1 x 3.0VDC size “CR2032“ batteries)
Frequency:	2402MHz-2480MHz
Antenna gain:	0 dBi
Number of operated channel:	40
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 15.205, 15.209 & 15.247(d) Spurious Radiated Emission	Site 2
FCC Title 47 Part 15.207 Conduct Emission	NIL
FCC Title 47 Part 15.247(a)(2) 6dB & 99% Bandwidth	Site 2
FCC Title 47 Part 15.247(b) Peak Output Power	Site 2
FCC Title 47 Part 2.1051 & 15.247(d) Spurious Emissions at Antenna Terminals	Site 2
FCC Title 47 Part 15.247(d) 100kHz Bandwidth of band edges	Site 2
FCC Title 47 Part 15.247(e) Power Spectral Density	Site 2
FCC Title 47 Part 15.203 & 15.247(b) Antenna Requirement	Site 2

4.1 Test Equipment Site List

Radiated emission Test – Site 3

DESCRIPTION	MANUFACTURER	MODEL NO.	SERIAL NO.	CAL. DUE DATE
EMI Test Receiver	Rohde & Schwarz	ESR 26	101269	17-Aug-15
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-15
3m Semi-anechoic chamber	TDK	9X6X6	----	29-May-19

6dB & 99% Bandwidth, Peak Output Power, Spurious Emissions at Antenna Terminals, 100kHz Bandwidth of band edges, Power Spectral Density – Site 3

DESCRIPTION	MANUFACTURER	MODEL NO.	SERIAL NO.	CAL. DUE DATE
Signal Generator	Rohde & Schwarz	SMB100A	108272	17-Aug-15
Signal Analyzer	Rohde & Schwarz	FSV40	101030	17-Aug-15
Vector Signal Generator	Rohde & Schwarz	SMU 200A	105324	17-Aug-15
RF Switch Module	Rohde & Schwarz	OSP120/OSP-B157	101226/100851	17-Aug-15

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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 15.205, 15.209 & 15.247(d) Spurious Radiated Emission	10-15	☒	☐	☐
FCC Title 47 Part 15.207 Conduct Emission	NIL	☐	☐	☒
FCC Title 47 Part 15.247(a)(2) 6dB & 99% Bandwidth	16-21	☒	☐	☐
FCC Title 47 Part 15.247(b) Peak Output Power	22-24	☒	☐	☐
FCC Title 47 Part 2.1051 & 15.247(d) Spurious Emissions at Antenna Terminals	25-27	☒	☐	☐
FCC Title 47 Part 15.247(d) 100kHz Bandwidth of band edges	28-31	☒	☐	☐
FCC Title 47 Part 15.247(e) Power Spectral Density	32-34	☒	☐	☐
FCC Title 47 Part 15.203 & 15.247(b) Antenna Requirement	35	☒	☐	☐

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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: July 8, 2015

Testing Start Date: July 9, 2015

Testing End Date: July 31, 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 Spurious Radiated Emission

EUT: Ridesense
Op Condition: Operated, TX Mode (2402MHz)
Test Specification: FCC15.205, 15.209 & 15.247(d) 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
120.358	38.62	43.5	-4.88	Quasi Peak
146.672	38.43	43.5	-5.07	Quasi Peak
168.793	39.03	43.5	-4.47	Quasi Peak
407.625	41.57	46	-4.43	Quasi Peak
418.960	41.80	46	-4.20	Quasi Peak
1595.432	46.52	74	-27.48	Peak
2436.500	31.58	54	-22.42	Average
2436.500	46.73	74	-27.27	Peak
2487.350	45.55	74	-28.45	Peak
4804.014	44.93	74	-29.07	Peak
7206.300	45.65	74	-28.35	Peak
9608.325	46.03	74	-27.97	Peak

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Spurious Radiated Emission

EUT: Ridesense
Op Condition: Operated, TX Mode (2402MHz)
Test Specification: FCC15.205, 15.209 & 15.247(d) 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
119.967	29.49	43.5	-14.01	Quasi Peak
143.975	29.98	43.5	-13.52	Quasi Peak
167.982	30.31	43.5	-13.19	Quasi Peak
272.924	31.14	46	-14.86	Quasi Peak
408.057	35.04	46	-10.96	Quasi Peak
2059.500	38.07	74	-35.93	Peak
2139.500	38.16	74	-35.84	Peak
2440.000	38.78	54	-15.22	Average
2440.000	41.25	74	-32.75	Peak
4803.750	49.25	74	-24.75	Peak
7205.625	54.34	74	-19.66	Peak
7206.250	32.16	54	-21.84	Average
9606.875	50.45	74	-23.55	Peak

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Spurious Radiated Emission

EUT:	Ridesense
Op Condition:	Operated, TX Mode (2440MHz)
Test Specification:	FCC15.205, 15.209 & 15.247(d) 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
120.287	38.26	43.5	-5.24	Quasi Peak
141.568	38.71	43.5	-4.79	Quasi Peak
168.290	37.93	43.5	-5.57	Quasi Peak
409.642	41.63	46	-4.37	Quasi Peak
420.571	41.52	46	-4.48	Quasi Peak
1086.320	38.88	74	-35.12	Peak
1204.000	38.52	74	-35.48	Peak
1601.325	36.21	74	-37.79	Peak
2412.870	48.75	74	-25.25	Peak
2424.315	47.80	74	-26.20	Peak
2464.000	52.52	74	-21.48	Peak
4880.000	48.03	74	-25.97	Peak
7320.500	51.25	74	-22.75	Peak
9760.125	49.32	74	-24.68	Peak

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Spurious Radiated Emission

EUT: Ridesense
Op Condition: Operated, TX Mode (2440MHz)
Test Specification: FCC15.205, 15.209 & 15.247(d) 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
120.258	37.89	43.5	-5.61	Quasi Peak
142.364	38.03	43.5	-5.47	Quasi Peak
168.271	38.15	43.5	-5.35	Quasi Peak
273.065	40.23	46	-5.77	Quasi Peak
407.710	41.02	46	-4.98	Quasi Peak
1394.120	38.54	74	-35.46	Peak
1597.580	39.05	74	-34.95	Peak
1990.350	41.69	74	-32.31	Peak
2058.000	40.53	54	-13.47	Average
2058.000	41.90	74	-32.10	Peak
2453.500	43.62	74	-30.38	Peak
4880.000	47.56	74	-26.44	Peak
7320.500	52.17	74	-21.83	Peak
7320.500	30.85	54	-23.15	Average
9760.000	51.22	74	-22.78	Peak
9760.000	31.02	54	-22.98	Average

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Spurious Radiated Emission

EUT: Ridesense
Op Condition: Operated, TX Mode (2480MHz)
Test Specification: FCC15.205, 15.209 & 15.247(d) 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
120.487	38.13	43.5	-5.37	Quasi Peak
142.965	37.96	43.5	-5.54	Quasi Peak
168.120	38.45	43.5	-5.05	Quasi Peak
407.960	41.63	46	-4.37	Quasi Peak
418.450	40.75	46	-5.25	Quasi Peak
1597.325	47.65	74	-26.35	Peak
1597.600	46.32	54	-21.46	Average
4960.500	45.95	74	-28.05	Peak
7440.000	31.88	54	-22.12	Average
7440.000	50.15	74	-23.85	Peak
9920.325	48.79	74	-25.21	Peak

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Spurious Radiated Emission

EUT: Ridesense
Op Condition: Operated, TX Mode (2480MHz)
Test Specification: FCC15.205, 15.209 & 15.247(d) 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
120.286	36.52	43.5	-6.98	Quasi Peak
144.058	37.45	43.5	-6.05	Quasi Peak
168.350	36.96	43.5	-6.54	Quasi Peak
278.035	40.53	46	-5.47	Quasi Peak
407.985	41.03	46	-4.97	Quasi Peak
1594.325	30.02	54	-23.98	Average
1594.600	48.12	74	-25.88	Peak
2436.125	47.56	74	-26.44	Peak
2498.000	44.98	74	-29.02	Peak
4960.500	46.87	74	-27.13	Peak
7440.000	51.97	74	-22.03	Peak
7440.000	31.68	54	-22.32	Average
9920.325	50.14	74	-23.86	Peak

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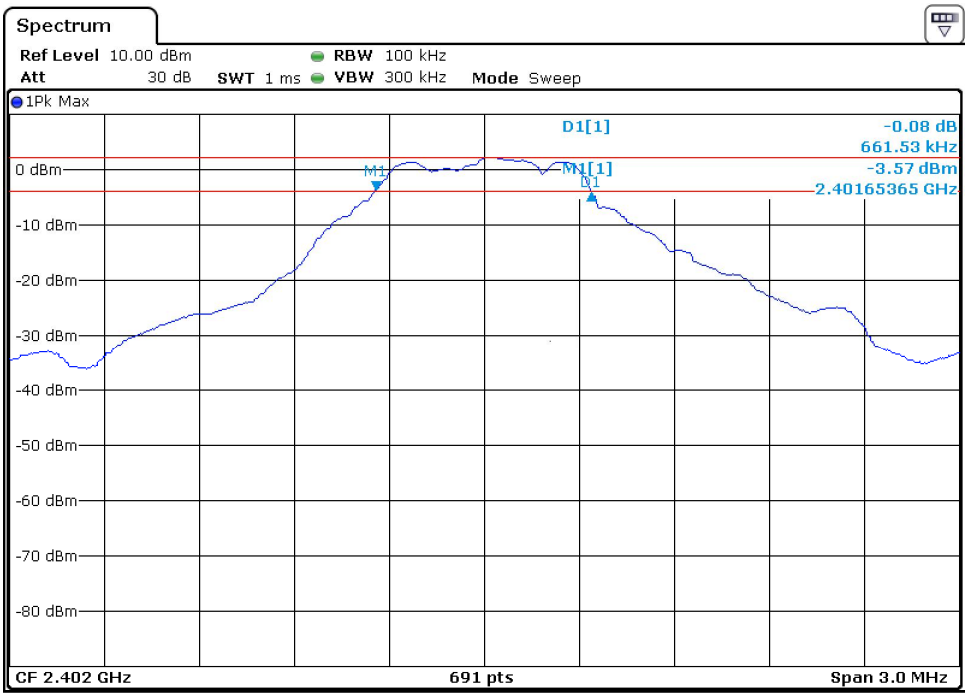
7.2 6dB & 99% Bandwidth

EUT:	Ridesense
Op Condition:	Operated, TX Mode (2402MHz)
Test Specification:	FCC15.247(a)(2), 6dB Bandwidth
Comment:	3.0VDC

Test Result
☒ Passed
☐ Not Passed



6dB bandwidth	Limit
661.53 kHz	> 500 kHz

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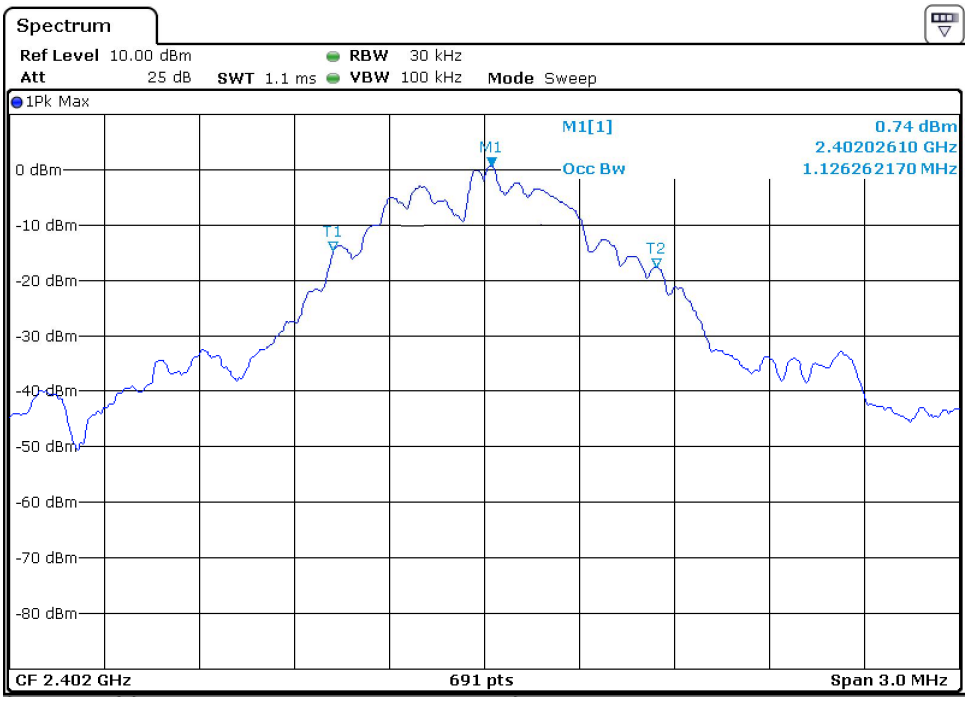
6dB & 99% Bandwidth

EUT:	Ridesense
Op Condition:	Operated, TX Mode (2402MHz)
Test Specification:	FCC15.247(a)(2), 99% Bandwidth
Comment:	3.0VDC

Test Result
☒ Passed
☐ Not Passed



99% bandwidth
1126.262 kHz

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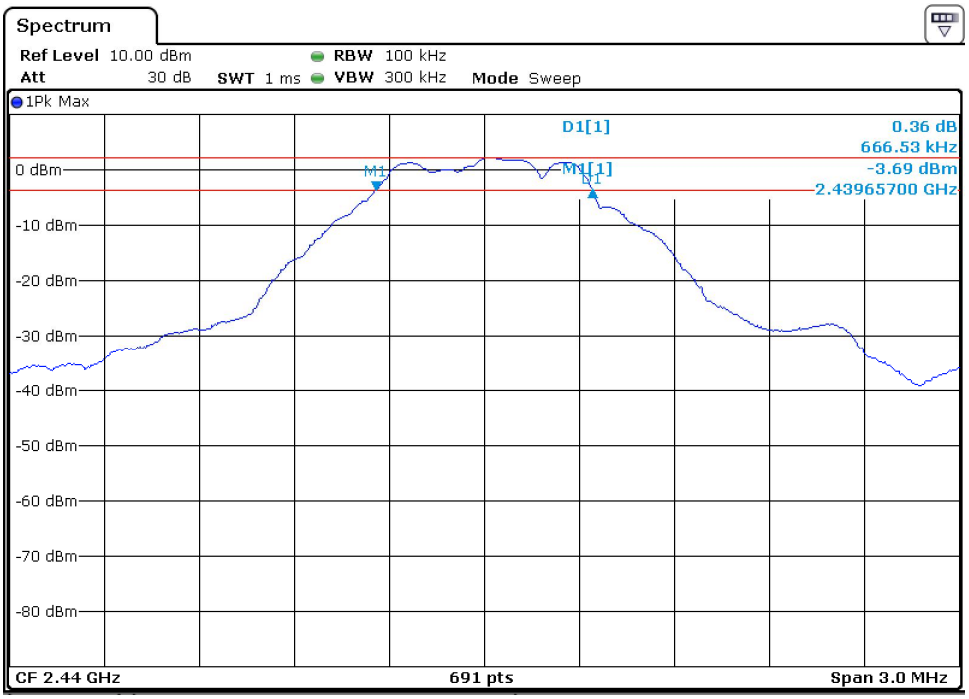
6dB & 99% Bandwidth

EUT:	Ridesense
Op Condition:	Operated, TX Mode (2440MHz)
Test Specification:	FCC15.247(a)(2), 6dB Bandwidth
Comment:	3.0VDC

Test Result
☒ Passed
☐ Not Passed



6dB bandwidth	Limit
666.53 kHz	> 500 kHz

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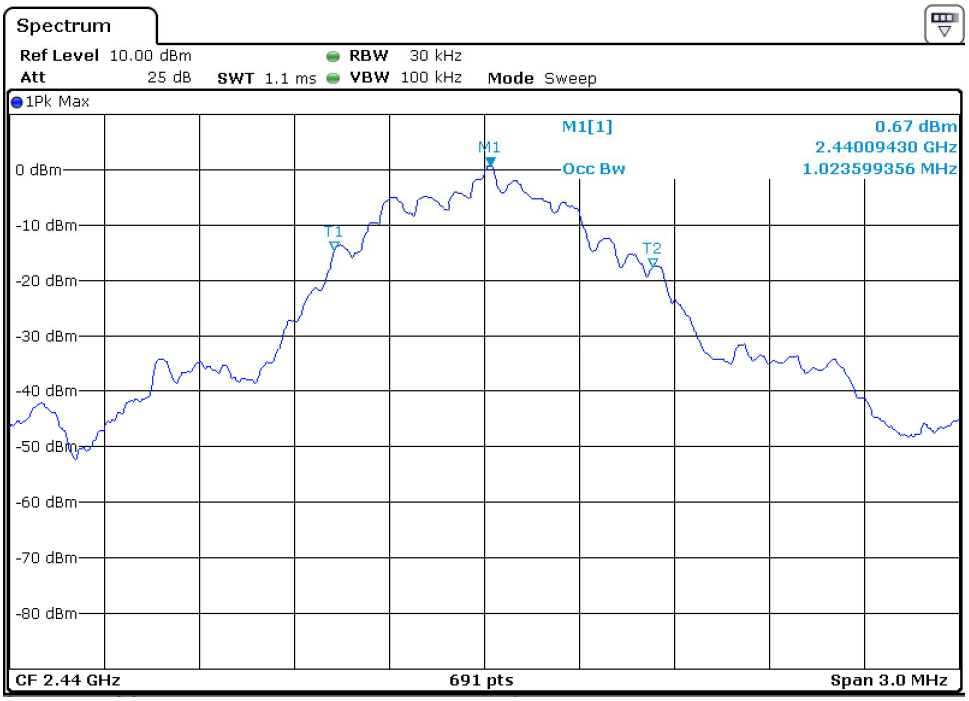
6dB & 99% Bandwidth

EUT:	Ridesense
Op Condition:	Operated, TX Mode (2440MHz)
Test Specification:	FCC15.247(a)(2), 99% Bandwidth
Comment:	3.0VDC

Test Result
☒ Passed
☐ Not Passed



99% bandwidth
1023.599 kHz

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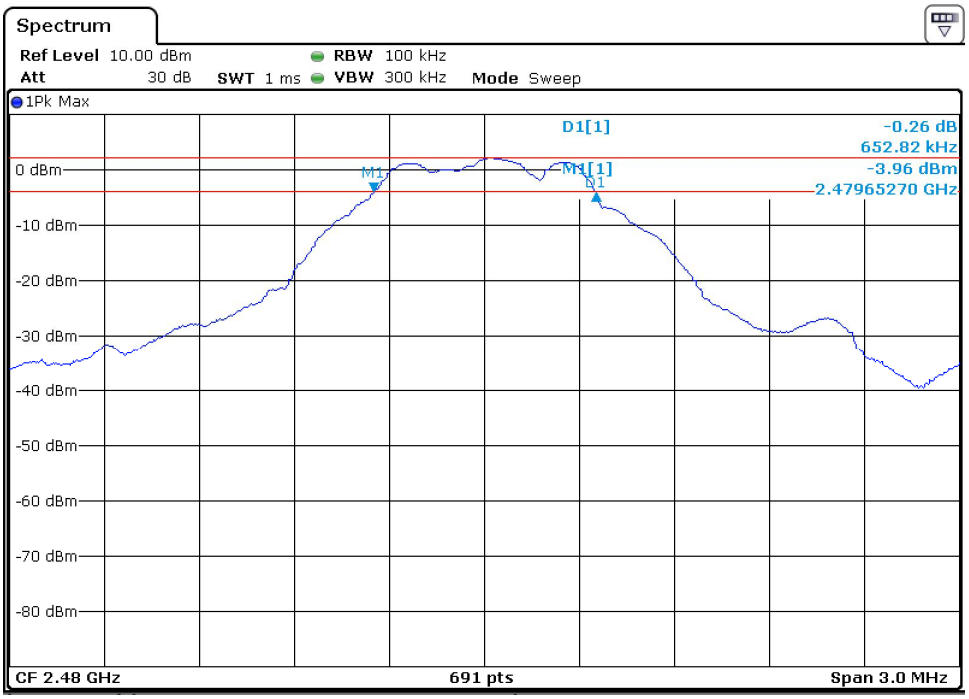
6dB & 99% Bandwidth

EUT:	Ridesense
Op Condition:	Operated, TX Mode (2480MHz)
Test Specification:	FCC15.247(a)(2), 6dB Bandwidth
Comment:	3.0VDC

Test Result
☒ Passed
☐ Not Passed



6dB bandwidth	Limit
652.82 kHz	> 500 kHz

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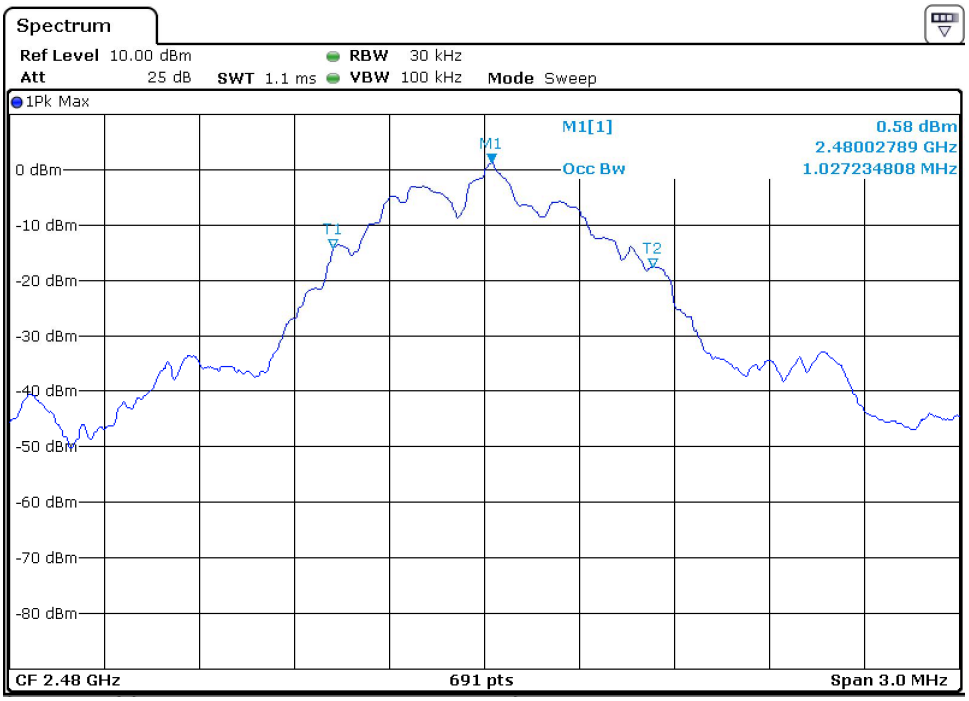
6dB & 99% Bandwidth

EUT:	Ridesense
Op Condition:	Operated, TX Mode (2480MHz)
Test Specification:	FCC15.247(a)(2), 99% Bandwidth
Comment:	3.0VDC

Test Result
☒ Passed
☐ Not Passed



99% bandwidth
1027.234 kHz

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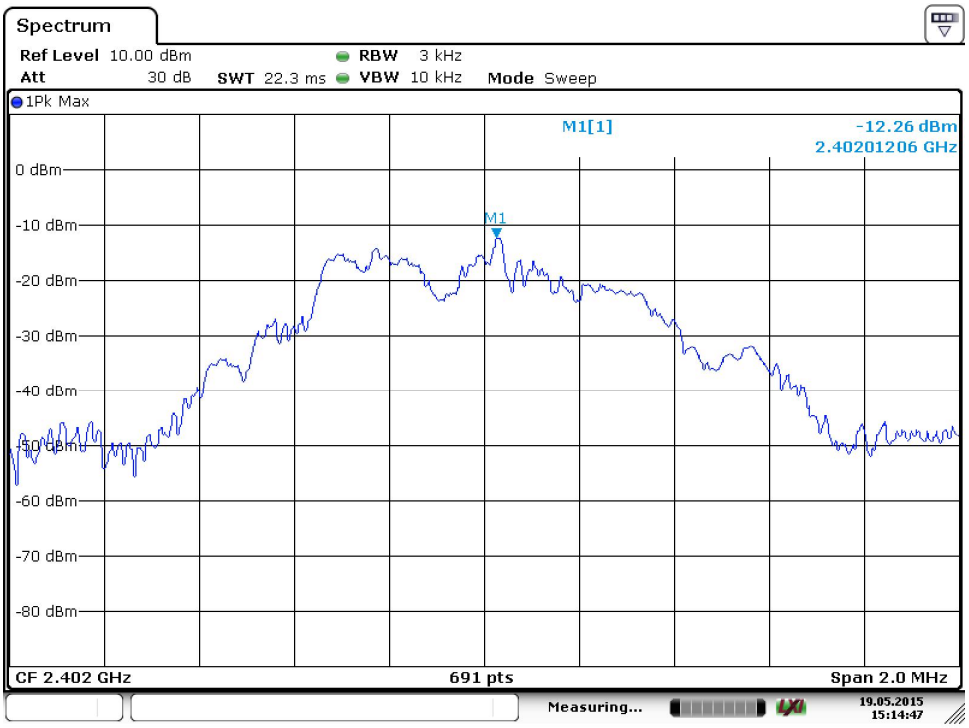
7.3 Peak Output Power

EUT: Ridesense
Op Condition: Operated, TX Mode (2402MHz)
Test Specification: FCC15.247(b)
Comment: 3.0VDC

Test Result
☒ Passed
☐ Not Passed



Date: 19.MAY.2015 15:14:47

Conducted Output Power	Limit
-12.26 dBm	< 30dBm

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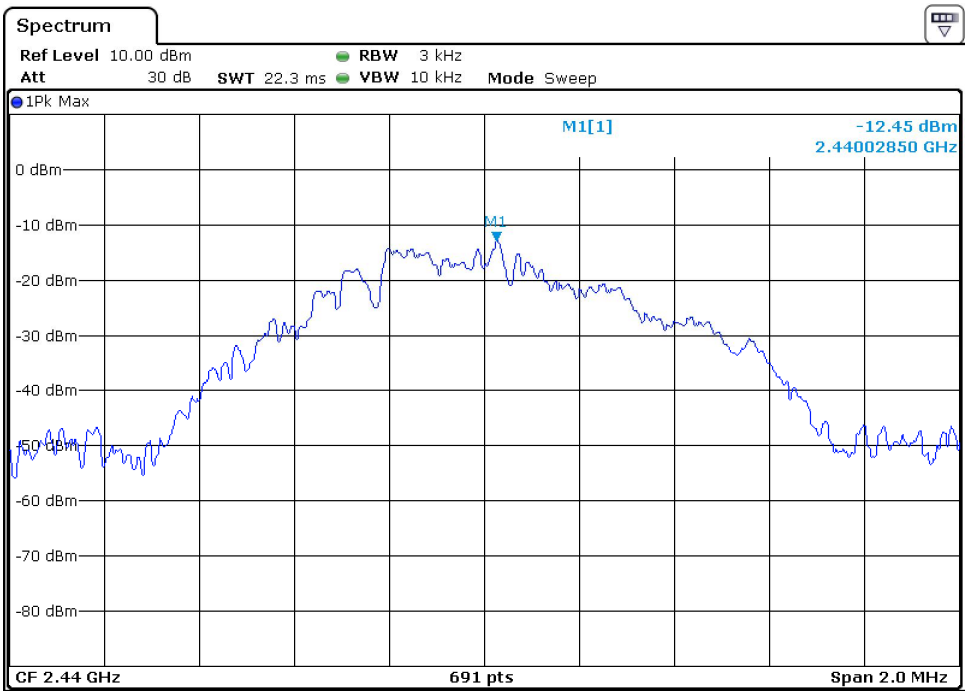
Peak Output Power

EUT:	Ridesense
Op Condition:	Operated, TX Mode (2440MHz)
Test Specification:	FCC15.247(b)
Comment:	3.0VDC

Test Result
☒ Passed
☐ Not Passed



Conducted Output Power	Limit
-12.45 dBm	< 30dBm

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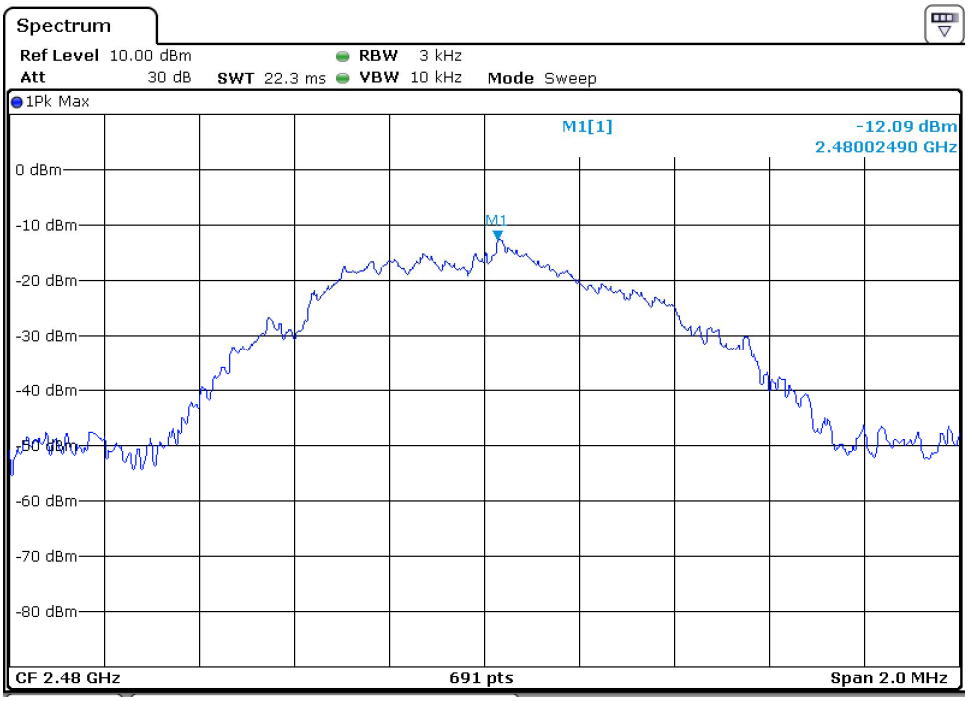
Peak Output Power

EUT:	Ridesense
Op Condition:	Operated, TX Mode (2480MHz)
Test Specification:	FCC15.247(b)
Comment:	3.0VDC

Test Result
☒ Passed
☐ Not Passed



Conducted Output Power	Limit
-12.09 dBm	< 30dBm

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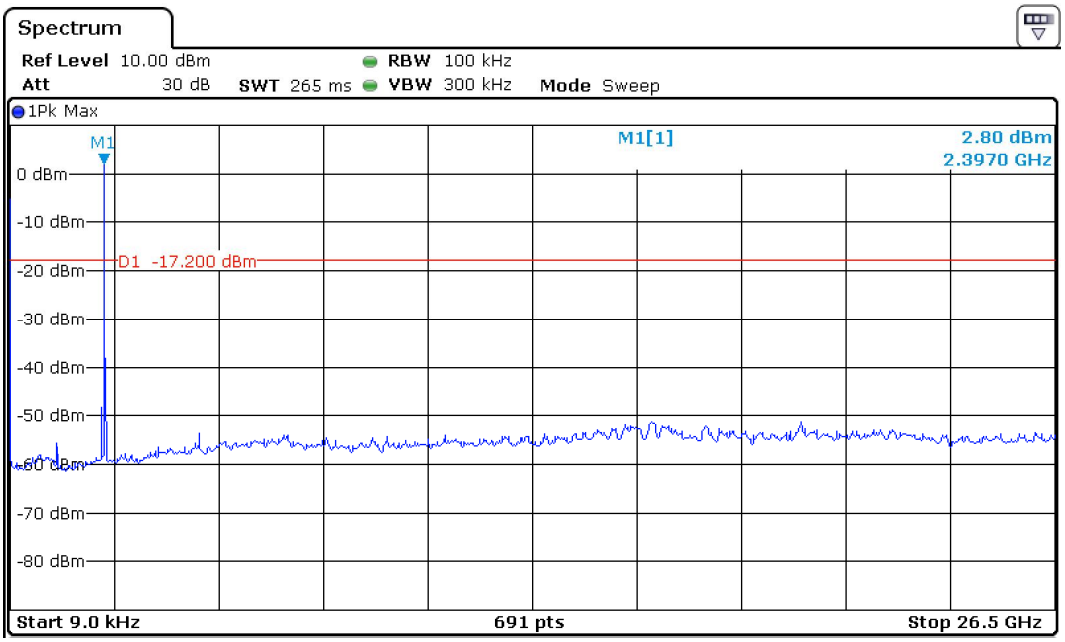
7.4 Spurious Emissions at Antenna Terminals

EUT:	Ridesense
Op Condition:	Operated, TX Mode (2402MHz)
Test Specification:	FCC2.1051 & 15.247(d)
Comment:	3.0VDC
Remark:	9kHz to 26.5GHz

Test Result
☒ Passed
☐ Not Passed



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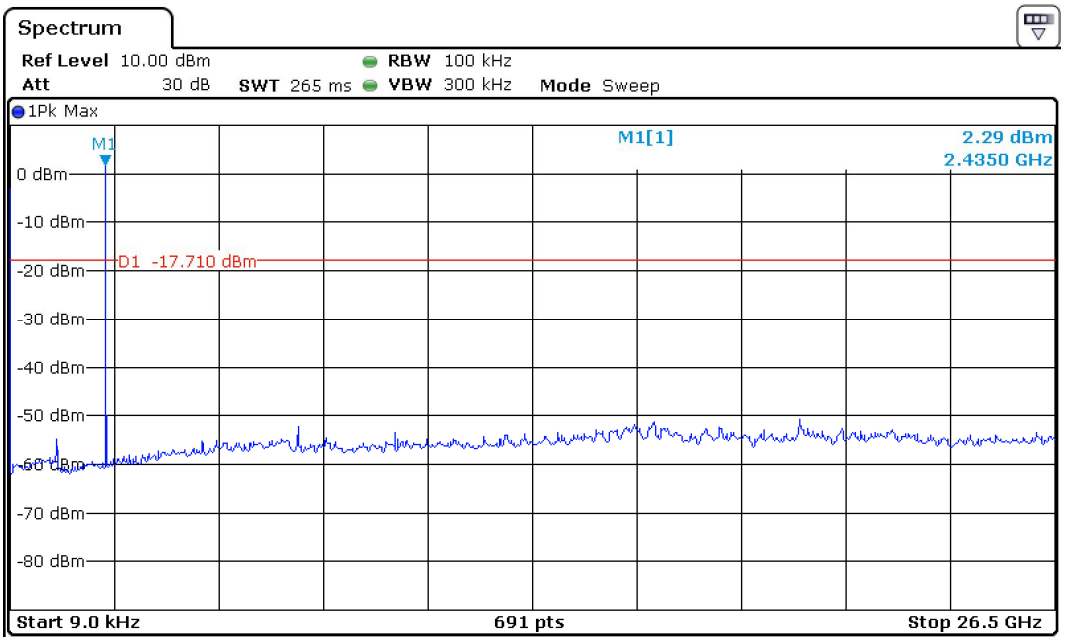
Spurious Emissions at Antenna Terminals

EUT:	Ridesense
Op Condition:	Operated, TX Mode (2440MHz)
Test Specification:	FCC2.1051 & 15.247(d)
Comment:	3.0VDC
Remark:	9kHz to 26.5GHz

Test Result
☒ Passed
☐ Not Passed



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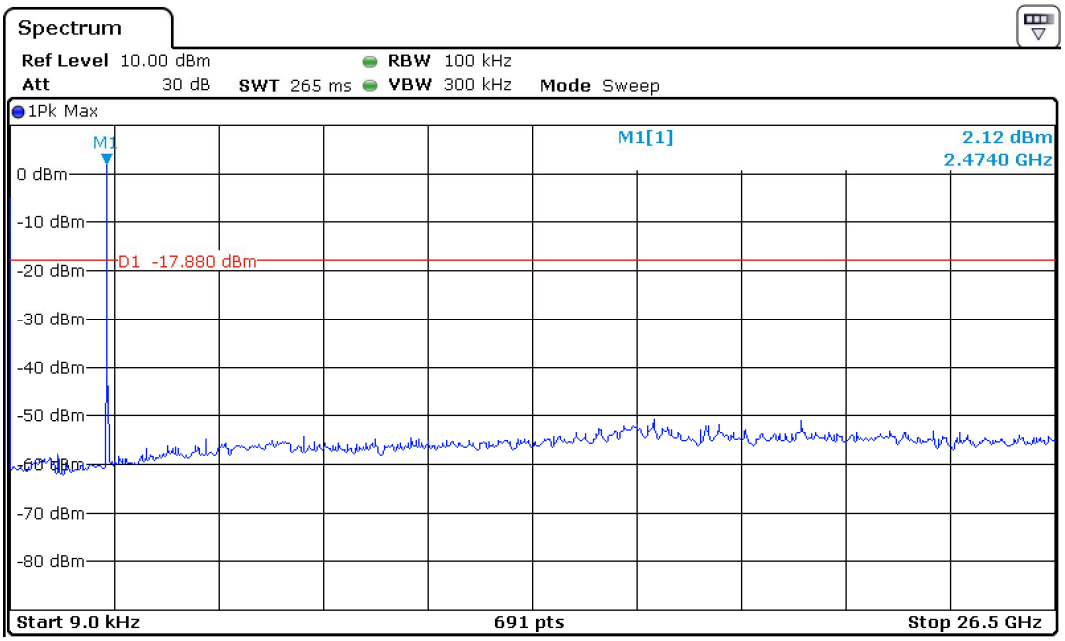
Spurious Emissions at Antenna Terminals

EUT:	Ridesense
Op Condition:	Operated, TX Mode (2480MHz)
Test Specification:	FCC2.1051 & 15.247(d)
Comment:	3.0VDC
Remark:	9kHz to 26.5GHz

Test Result
☒ Passed
☐ Not Passed



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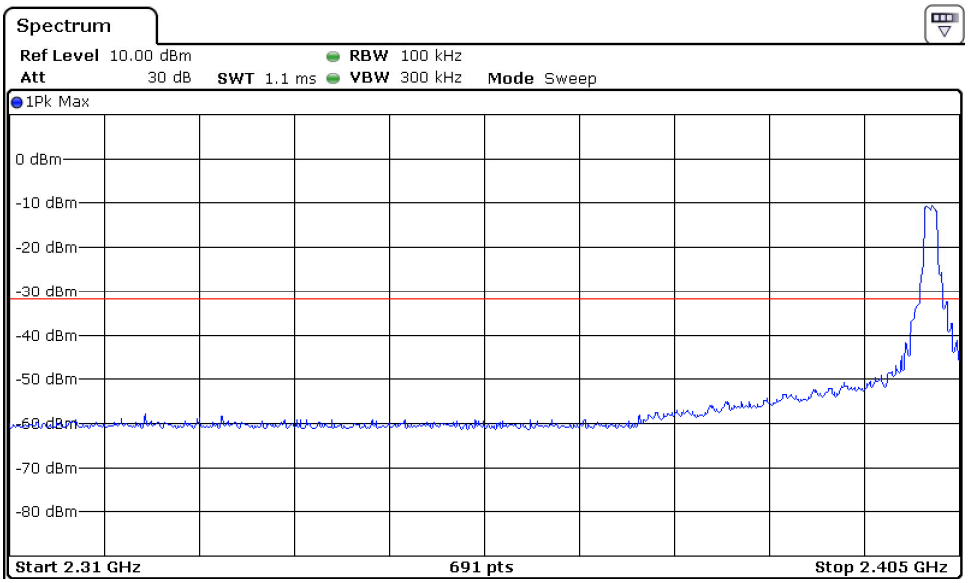
7.5 100kHz Bandwidth of band edges

EUT:	Ridesense
Op Condition:	Operated, TX Mode (2402MHz)
Test Specification:	FCC15.247(d), Conducted
Comment:	3.0VDC

Test Result
☒ Passed
☐ Not Passed



Frequency	Result
2.402 GHz	-12.20 dBm
2.390 GHz	-52.21 dBm

Band edges	Limit
40.01 dB	> 20dB

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100kHz Bandwidth of band edges

EUT:	Ridesense
Op Condition:	Operated, TX Mode (2402MHz)
Test Specification:	FCC15.247(d), Radiated
Comment:	3.0VDC

Test Result
☒ Passed
☐ Not Passed

Frequency MHz	Result dBµV/m	Limit dBµV/m	Margin dB	Detector
2439.000	46.37	74	-27.63	Peak
2439.000	30.47	54	-23.53	Average

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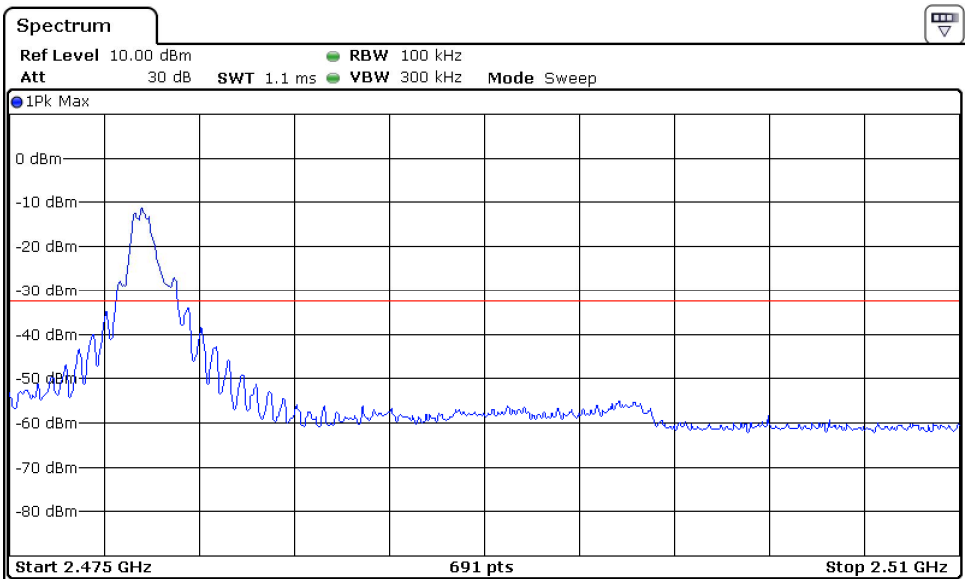
100kHz Bandwidth of band edges

EUT:	Ridesense
Op Condition:	Operated, TX Mode (2480MHz)
Test Specification:	FCC15.247(d), Conducted
Comment:	3.0VDC

Test Result
☒ Passed
☐ Not Passed



Frequency	Result
2.480 GHz	-12.17 dBm
2.4835 GHz	-49.83 dBm

Band edges	Limit
37.66 dB	> 20dB

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100kHz Bandwidth of band edges

EUT:	Ridesense
Op Condition:	Operated, TX Mode (2480MHz)
Test Specification:	FCC15.247(d), Radiated
Comment:	3.0VDC

Test Result
☒ Passed
☐ Not Passed

Frequency MHz	Result dBµV/m	Limit dBµV/m	Margin dB	Detector
2483.500	44.58	74	-29.42	Peak
2483.500	30.86	54	-23.14	Average

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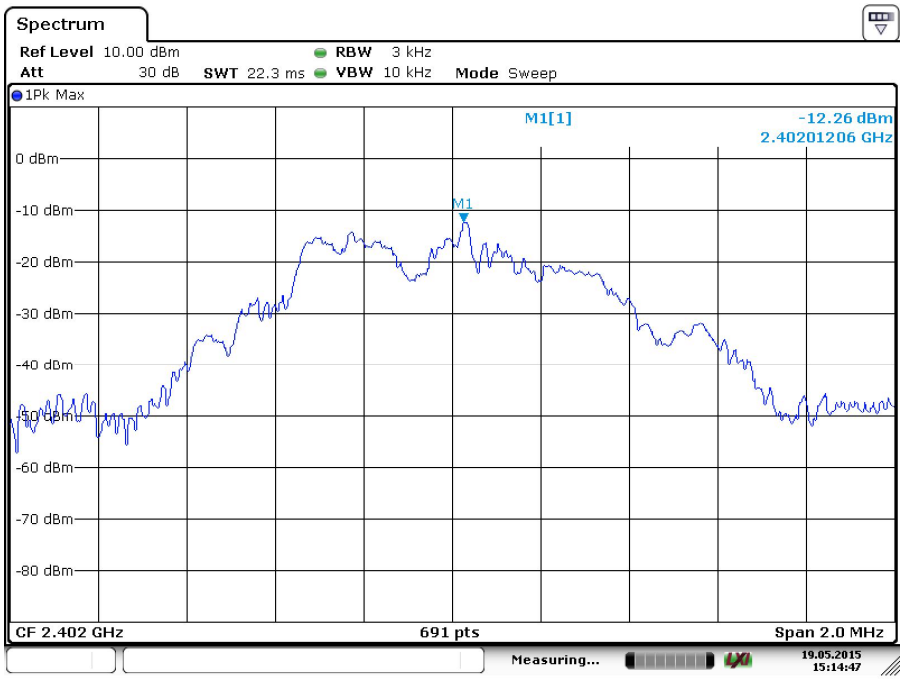
7.6 Power Spectral Density

EUT:	Ridesense
Op Condition:	Operated, TX Mode (2402MHz)
Test Specification:	FCC15.247(e)
Comment:	3.0VDC

Test Result
☒ Passed
☐ Not Passed



Date: 19.MAY.2015 15:14:47

Frequency	PSD	Result
2.402GHz	-12.26 dBm / 3kHz	< 8 dBm / 3 kHz

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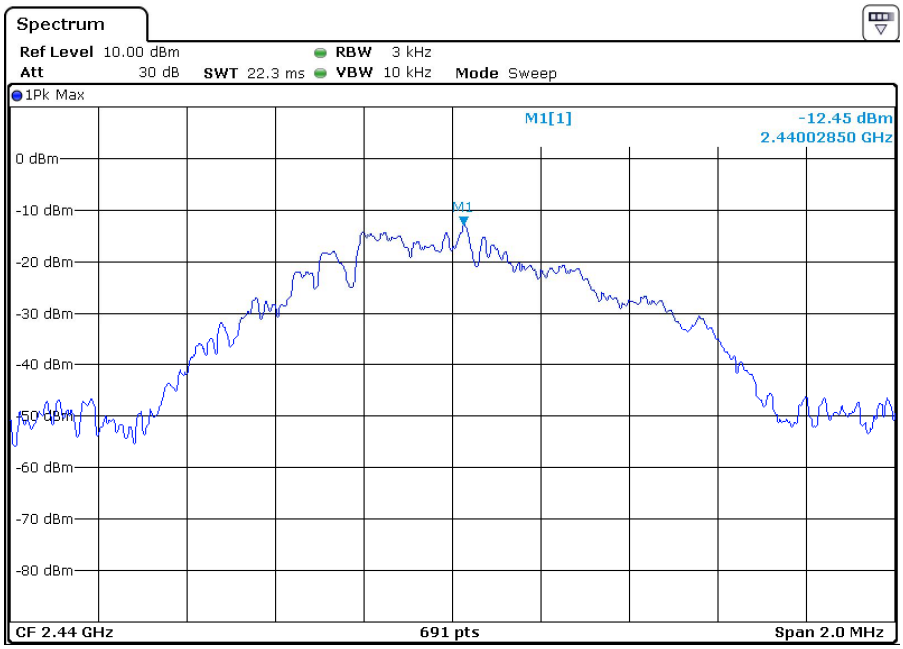
Power Spectral Density

EUT:	Ridesense
Op Condition:	Operated, TX Mode (2440MHz)
Test Specification:	FCC15.247(e)
Comment:	3.0VDC

Test Result
☒ Passed
☐ Not Passed



Frequency	PSD	Result
2.440GHz	-12.45 dBm / 3kHz	< 8 dBm / 3 kHz

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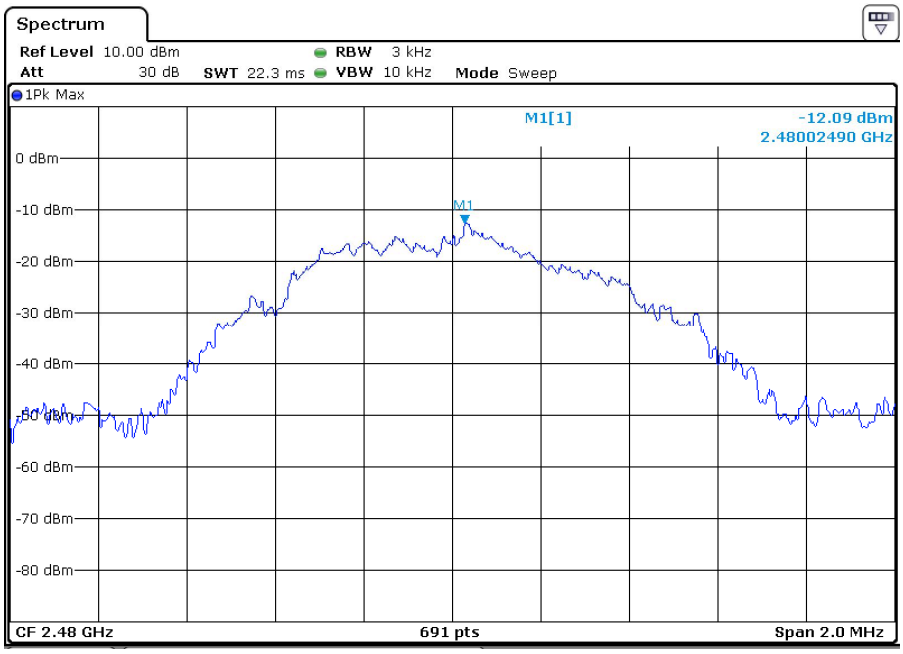
Power Spectral Density

EUT:	Ridesense
Op Condition:	Operated, TX Mode (2480MHz)
Test Specification:	FCC15.247(e)
Comment:	3.0VDC

Test Result
☒ Passed
☐ Not Passed



Frequency	PSD	Result
2.480GHz	-12.09 dBm / 3kHz	< 8 dBm / 3 kHz

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7.7 Antenna Requirement

EUT:	Ridesense
Op Condition:	Operated, TX Mode
Test Specification:	FCC15.203 & 15.247(b)
Comment:	3.0VDC

Test Result
☒ Passed
☐ Not Passed

Limit

For intentional device, according to FCC Title 47 Part 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. And according to FCC Title 47 Part 15.247(b), if transmitting antennas of directional gain greater than 6 dBi 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 antenna used in this product is PCB antenna, and the maximum gain of this antenna is 0.0 dBi.

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8 Appendix A - Photographs of EUT

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Appendix A

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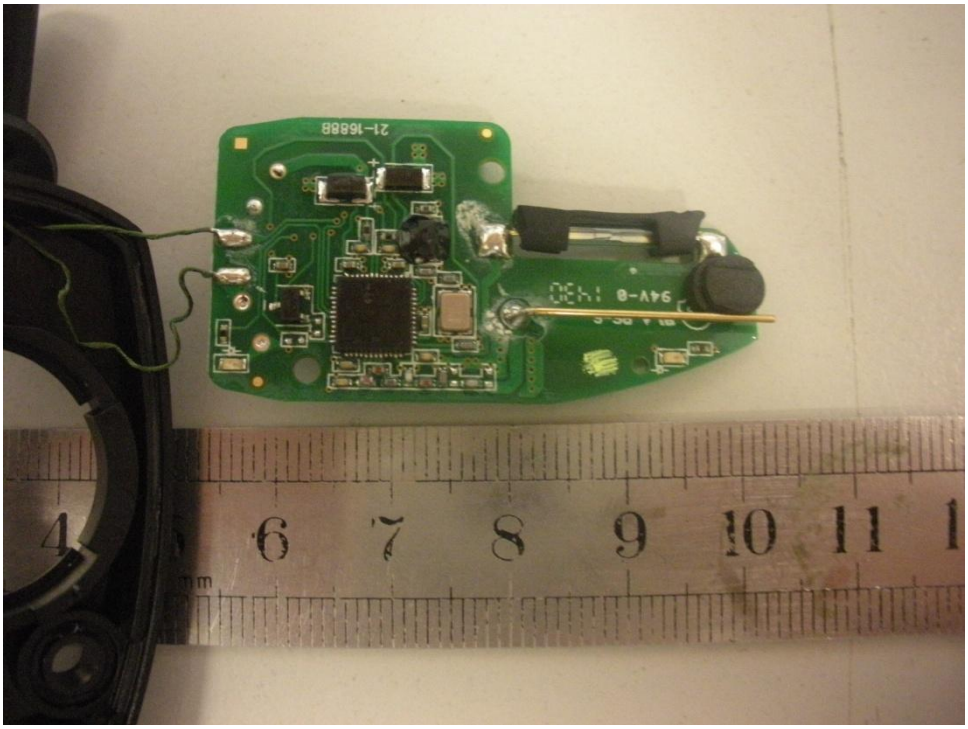
Appendix A



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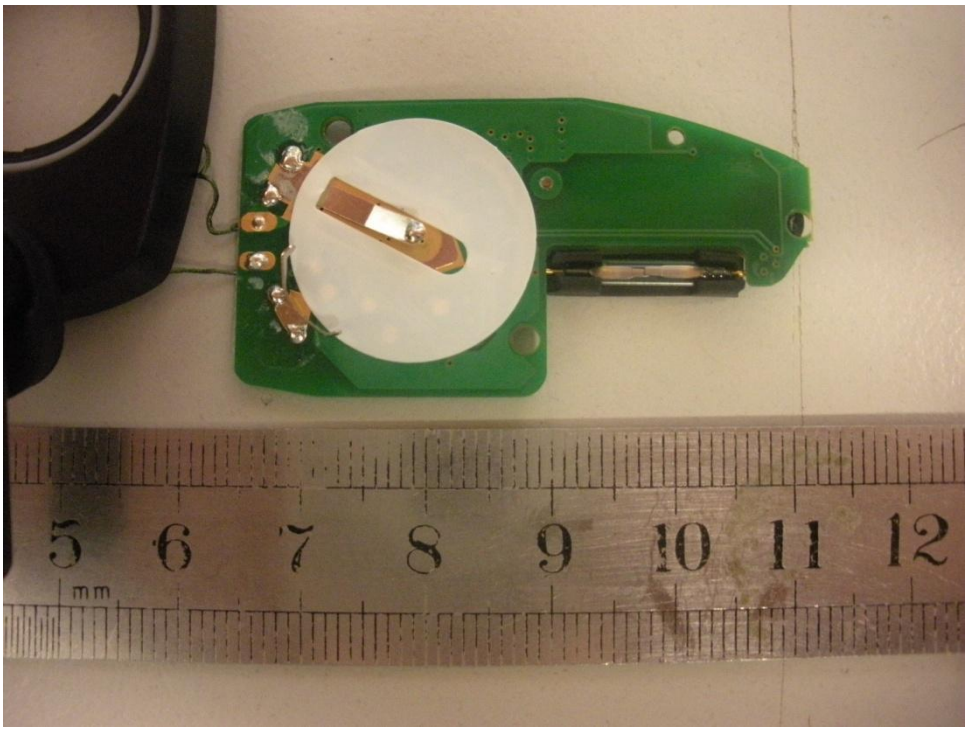
Appendix A



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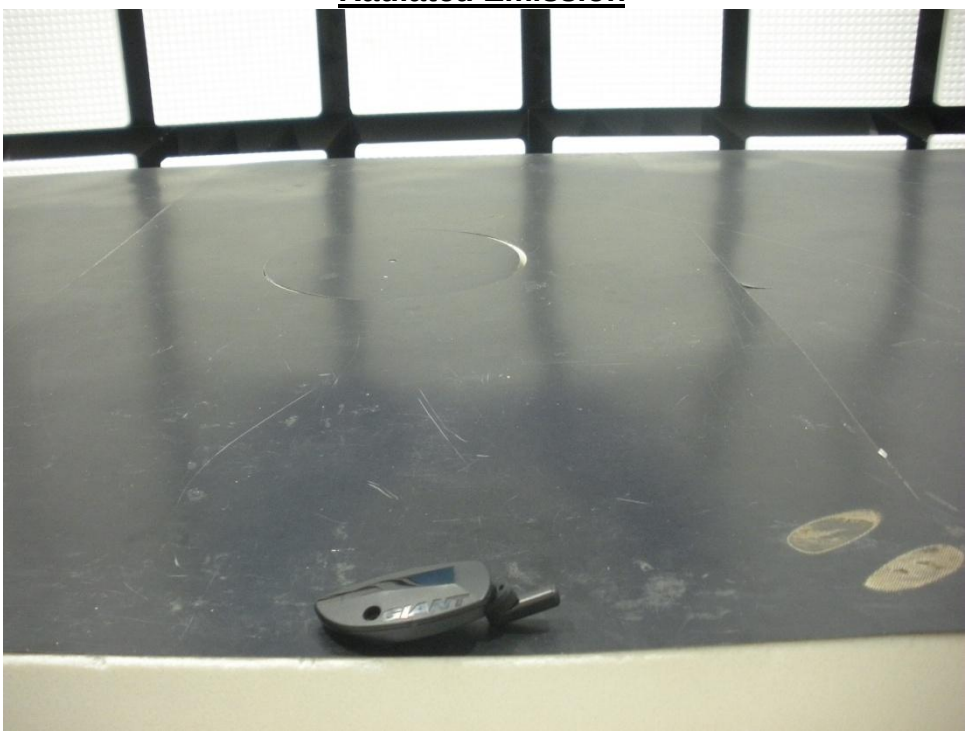
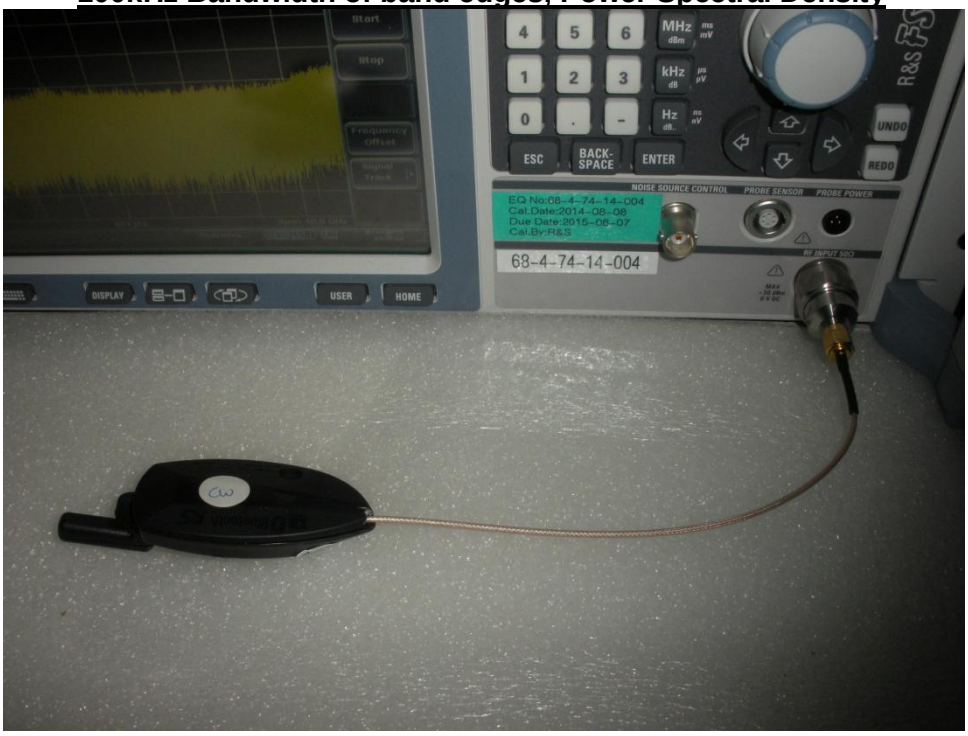
9 Appendix B - Setup Photographs of EUT

Radiated Emission



6dB & 99% Bandwidth, Peak Output Power, Spurious Emissions at Antenna Terminals, 100kHz Bandwidth of band edges, Power Spectral Density



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 2402GHz = 0.0612 mW EIRP
Power at 2440GHz = 0.0571 mW EIRP
Power at 2480GHz = 0.0580 mW EIRP

[(0.0612 mW) / (50 mm)] · [sqrt (2402 GHz)] = 0.0599 which is ≤ 3.0 for 1-g SAR.
[(0.0571 mW) / (50 mm)] · [sqrt (2440 GHz)] = 0.0564 which is ≤ 3.0 for 1-g SAR.
[(0.0580 mW) / (50 mm)] · [sqrt (2480 GHz)] = 0.0577 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 2402MHz-2480MHz, the test separation distance is < 50mm.

>> The power of EUT measured is:

- For 2402MHz: 0.0612mW = 10 log (0.0612) dBm ~ -12.13dBm
- For 2440MHz: 0.0571mW = 10 log (0.0571) dBm ~ -12.43dBm
- For 2480MHz: 0.0580mW = 10 log (0.0580) dBm ~ -12.36dBm

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