

FCC/IC – Test report

Report Number : **60/790.14.008.01** Date of Issue: 29th April 2014

Model : **Duotrap S**

Product Type : **Bike speed and cadence transmitter**

Applicant : **DAYTON INDUSTRIAL CO.,LTD**

Address : **2-12 Kwai Fat Road,11-A Kwai Chung,New Territories,Hong Kong**

Production Facility : **KENDY ENTERPISE LTD**

Address : **2-12 Kwai Fat Road,11-A Kwai Chung,New Territories,Hong Kong**

Test Result : ☒ **Positive** ☐ **Negative**

Total pages including Appendices : **28**

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2. Details about the Test Laboratory

Details about the Test Laboratory

Test site 1

Company name: TÜV SÜD HONG KONG LTD.
3/F, West Wing, Lakeside 2,
10 Science Park West Avenue,
Science Park, Shatin
HK.

Telephone: 852 2776 1323

Fax: 852 2776 1372

Test site 2

Company name: TMC-Telecommunication Metrology Center of M.I.I.T
No 52 Hua Yuanbei Road, Haidian District, Beijing, P.R.China

3. Description of the Equipment Under Test

Description of the Equipment Under Test

Product: Bike speed and cadence transmitter

Model no.: Duotrap S

Serial number: NIL

Options and accessories: NIL

FCC ID: 04GDUOTRAPS

IC: 7666A-DUOTRAPS

Rated Voltage: 3 VDC

Rated Current: NIL

Rated Power: NIL

Frequency: 2402-2480MHz

RF Transmission Frequency: 2402-2480MHz

Antenna gain: 0 dBi

No. of Operated Channel: 40

Modulation: GFSK

Description of the EUT: Battery operated – 1x 3V battery

4. Summary of Test Standards

Test Standards	
FCC Part 15 Subpart C, Intentional Radiators, 10-1-12 Edition	PART 15 – RADIO FREQUENCY DEVICES Subpart C – Intentional Radiators
RSS-Gen Issue 3 December 2010	General Requirements and Information for the Certification of Radio Apparatus
RSS-210 Issue 8 December 2010	RSS-210 — Licence-exempt Radio Apparatus (All Frequency Bands): Category I Equipment

5. Summary of Test Standards and Results

Emission Tests					
Test Condition	Pages	Test site	Test Result		
			Pass	Fail	N/A
AC Line Conducted Emissions FCC§15.207(a) RSS-GEN 7.2.4	NIL	/	☐	☐	☒
Spurious Emissions at Antenna Terminals FCC §2.1051 & §15.247(d)	11	Site 2	☒	☐	☐
Spurious Radiated Emissions FCC §15.205, §15.209 & §15.247(d) RSS-GEN 4.9	14	Site 2	☒	☐	☐
6 dB Bandwidth FCC §15.247(a)(2) RSS-GEN 4.6.2 & RSS 210 A8.2(a)	18	Site 2	☒	☐	☐
Peak Output Power FCC §15.247(b) RSS-GEN 4.8 & RSS 210 A8.4(4)	21	Site 2	☒	☐	☐
100 kHz Bandwidth of Band Edges FCC §15.247(d) RSS 210 A8.5	24	Site 2	☒	☐	☐
Power Spectral Density FCC §15.247(e) RSS 210 A8.2(b)	26	Site 2	☒	☐	☐
Antenna Requirements FCC §15.203	29	Site 2	☒	☐	☐

6. General Remarks

Remarks

This submittal(s) (test report) is intended for FCC ID: 04GDUOTRAPS complies with the FCC Part 15, Subpart C Rules.

This submittal(s) (test report) is intended for IC: 7666A-DUOTRAPS, complies with the IC RSS 210 and RSS-GEN Rules.

All the configurations of the product were tested and only the worst test results are listed in the report.

SUMMARY:

All tests according to the regulations cited on page 6 were

- - Performed
- - **Not** Performed

The Equipment Under Test

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

Sample Received Date: 03rd April 2014

Testing Start Date: 04th April 2014

Testing End Date: 20th April 2014

- TÜV SÜD HONG KONG LTD. -

Reviewed by:


Edmond FUNG

Prepared by:


CHAN Kwong Ngai



7. Emission Test Results

7.1 Spurious Emissions at Antenna Terminals

Date of test : 15th April 2014

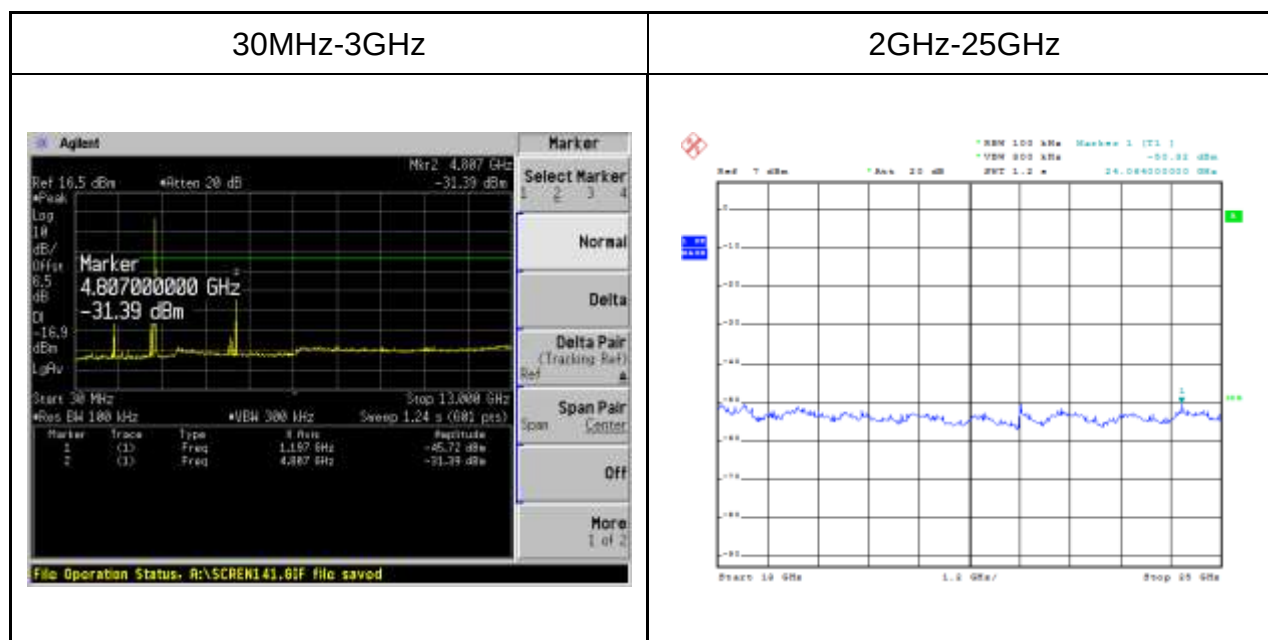
Test requirement : FCC §2.1051 & §15.247(d)

Test method : Conducted

Operating mode : Transmit mode

Frequency channel : 2402MHz

Remarks : 30MHz-25GHz



Remark: No emissions were detected below 30MHz.

Date of test : 15th April 2014

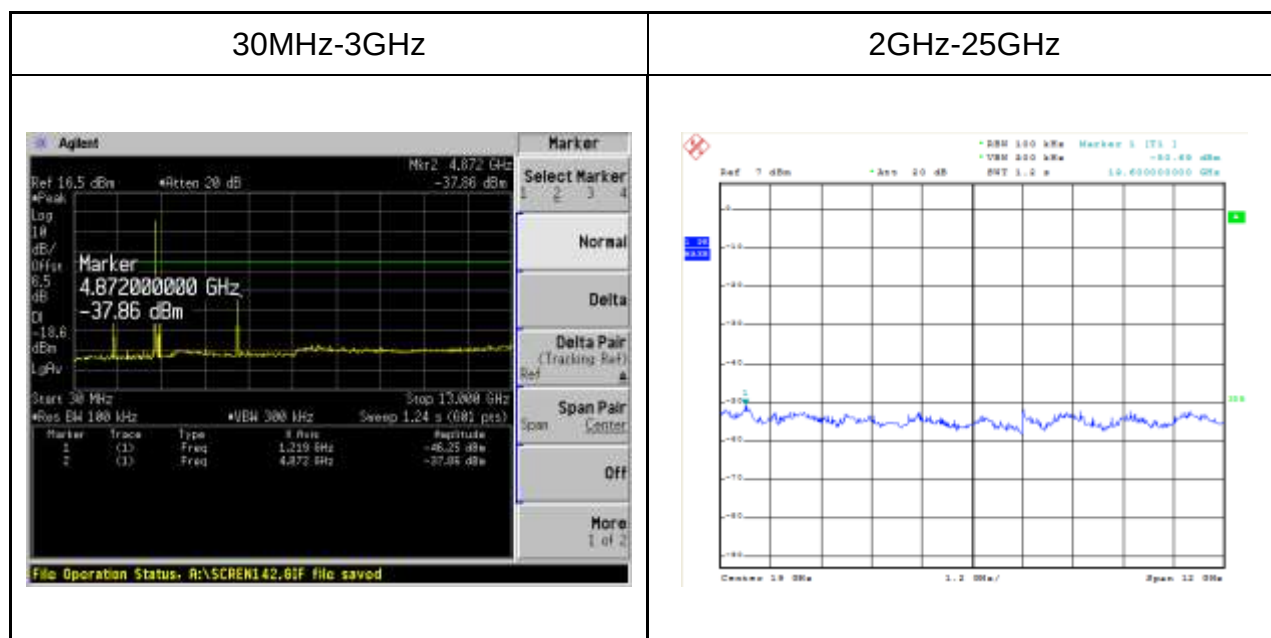
Test requirement : FCC §2.1051 & §15.247(d)

Test method : Conducted

Operating mode : Transmit mode

Frequency channel : 2440MHz

Remarks : 30MHz-25GHz



Remark: No emissions were detected below 30MHz.

Date of test : 15th April 2014

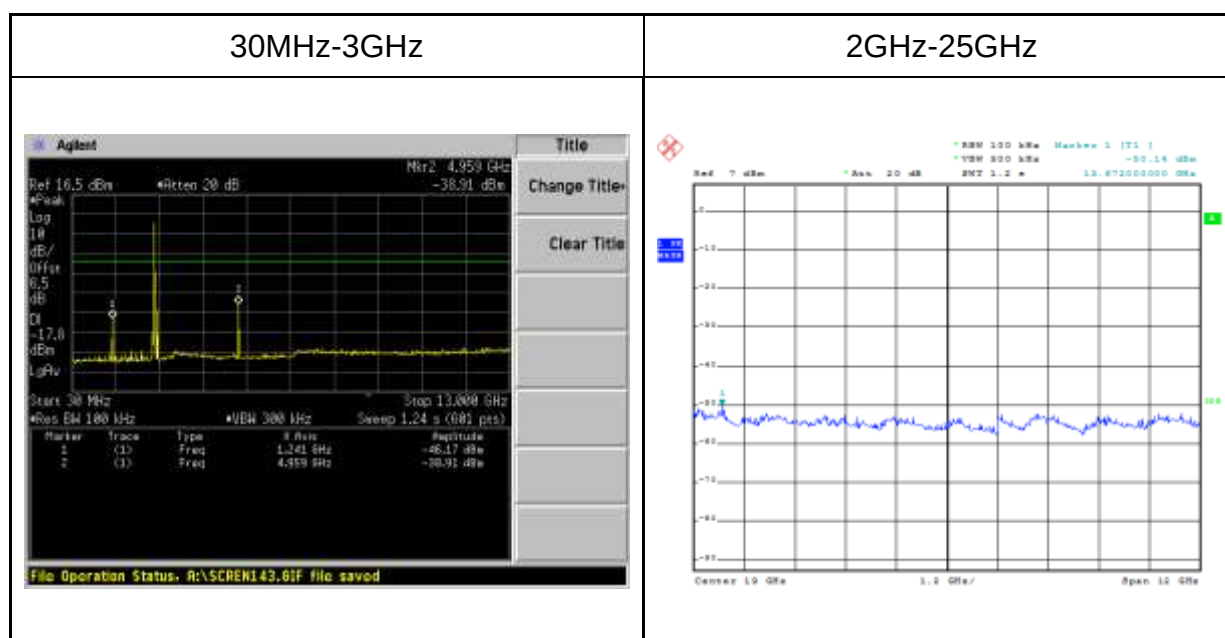
Test requirement : FCC §2.1051 & §15.247(d)

Test method : Conducted

Operating mode : Transmit mode

Frequency channel : 2480MHz

Remarks : 30MHz-25GHz



Remark: No emission were detected below 30MHz.

7.2 Spurious Radiated Emissions

Date of test : 06th April 2014
 Test requirement : FCC §15.205, §15.209 & §15.247(d)
 Test method : Radiated
 Operating mode : Transmit mode
 Frequency channel : 2402MHz(worst case)
 Remarks : 9kHz-1GHz

Frequency (MHz)	Reading (dBuV)	Correct Factor (dB/m)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Remark	Ant.Polar. H / V
41.26	40.57	-33.4	7.17	40.0	-32.83	QP	H
297.12	50.63	-35.7	14.93	43.5	-28.57	QP	H
381.19	47.81	-31.3	16.51	46.0	-29.49	QP	H
491.21	54.51	-28.9	25.61	46.0	-20.39	QP	H
755.43	46.67	-24.2	22.47	46.0	-23.53	QP	H
998.21	46.27	-21.0	25.27	54.0	-28.73	QP	H
63.56	50.42	-35.2	15.22	40	-24.78	QP	V
86.98	55.28	-38.0	17.28	43.5	-26.22	QP	V
184.92	44.88	-37.3	7.58	43.5	-35.92	QP	V
230.24	52.5	-35.0	17.5	46	-28.50	QP	V
491.92	51.37	-28.9	22.47	46	-23.53	QP	V
662.76	53.1	-25.6	27.5	46	-18.50	QP	V

Remark: All three frequencies (2042MHz, 2440MHz and 2480MHz) were performed test, and the 2480MHz was the worst case.

Date of test : 06th April 2014
 Test requirement : FCC §15.205, §15.209 & §15.247(d)
 Test method : Radiated
 Operating mode : Transmit mode
 Frequency channel : 2402MHz
 Remarks : 1GHz-25GHz

Frequency (MHz)	Reading (dBuV)	Correct Factor (dB/m)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Remark	Ant.Polar. H / V
2402	85.7	1.8	87.5	/	/	/	H
2402	73.6	1.8	75.4	/	/	/	H
4804	47.9	5.8	53.7	74.0	-20.3	peak	H
4804	34.6	5.8	40.4	54.0	-13.6	Average	H
7206	43	6.8	49.8	74.0	-24.2	peak	H
7206	28.6	6.8	35.4	54.0	-18.6	Average	H
2402	86.8	1.8	88.6	/	/	/	V
2402	74.4	1.8	76.2	/	/	/	V
4804	50.1	5.8	55.9	74.0	-18.1	peak	V
4804	35.6	5.8	41.4	54.0	-12.6	Average	V
7206	44.7	6.8	51.5	74.0	-22.5	peak	V
7206	33.9	6.8	40.7	54.0	-13.3	Average	V

Date of test : 06th April 2014
 Test requirement : FCC §15.205, §15.209 & §15.247(d)
 Test method : Radiated
 Operating mode : Transmit mode
 Frequency channel : 2440MHz
 Remarks : 1GHz-25GHz

Frequency (MHz)	Reading (dBuV)	Correct Factor (dB/m)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Remark	Ant.Polar. H / V
2440	86.3	1.8	88.1	/	/	/	H
2440	74.4	1.8	76.2	/	/	/	H
4880	46.6	5.9	52.5	74.0	-21.5	peak	H
4880	31.7	5.9	37.6	54.0	-16.4	Average	H
7320	43.7	6.8	50.5	74.0	-23.5	peak	H
7320	31	6.8	37.8	54.0	-16.2	Average	H
2440	85.8	1.8	87.6	/	/	/	V
2440	76.0	1.8	77.8	/	/	/	V
4880	51.2	5.9	57.1	74.0	-16.9	peak	V
4880	34.3	5.9	40.2	54.0	-13.8	Average	V
7320	45.8	6.8	52.6	74.0	-21.4	peak	V
7320	35.6	6.8	42.4	54.0	-11.6	Average	V

Date of test : 06th April 2014
 Test requirement : FCC §15.205, §15.209 & §15.247(d)
 Test method : Radiated
 Operating mode : Transmit mode
 Frequency channel : 2480MHz
 Remarks : 1GHz-25GHz

Frequency (MHz)	Reading (dBuV)	Correct Factor (dB/m)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Remark	Ant.Polar. H / V
2480	85.6	1.9	87.5	/	/	/	H
2480	73.4	1.9	75.3	/	/	/	H
4960	44.6	5.9	50.5	74	-23.5	peak	H
4960	35.2	5.9	41.1	54	-12.9	Average	H
7440	41.4	6.8	48.2	74	-25.8	peak	H
7440	32.8	6.8	39.6	54	-14.4	Average	H
2480	86.7	1.9	88.6	/	/	/	V
2480	74.9	1.9	76.8	/	/	/	V
4960	45.4	5.9	51.3	74	-22.7	peak	V
4960	33.7	5.9	39.6	54	-14.4	Average	V
7440	46.7	6.8	53.5	74	-20.5	peak	V
7440	35.9	6.8	42.7	54	-11.3	Average	V

7.3 6dB Bandwidth

Date of test : 15th April 2014

Test requirement : FCC §15.247(a)(2)

Test method : Conducted

Operating mode : Transmit mode

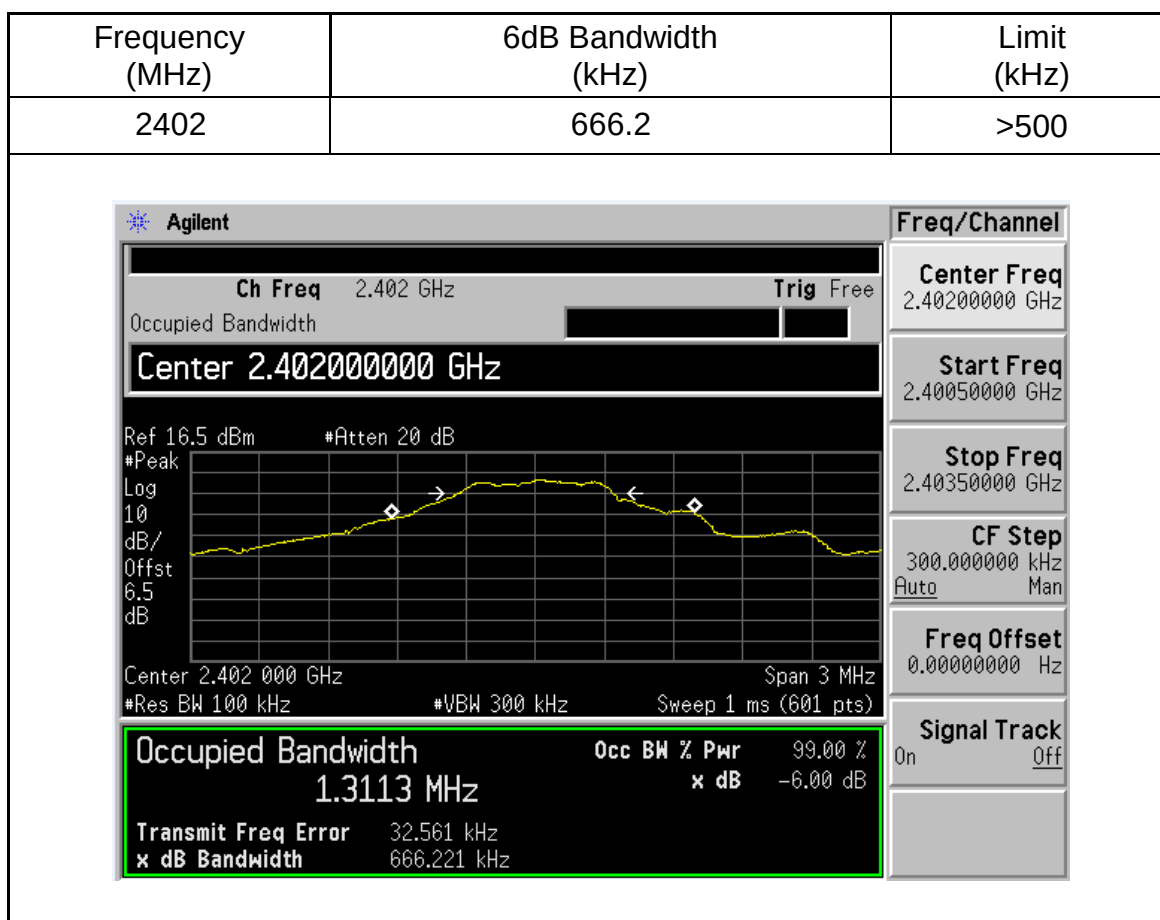
Frequency channel : 2402MHz

Remarks : NIL

Test Result

☒ Passed

☐ Not Passed



Date of test : 15th April 2014

Test requirement : FCC §15.247(a)(2)

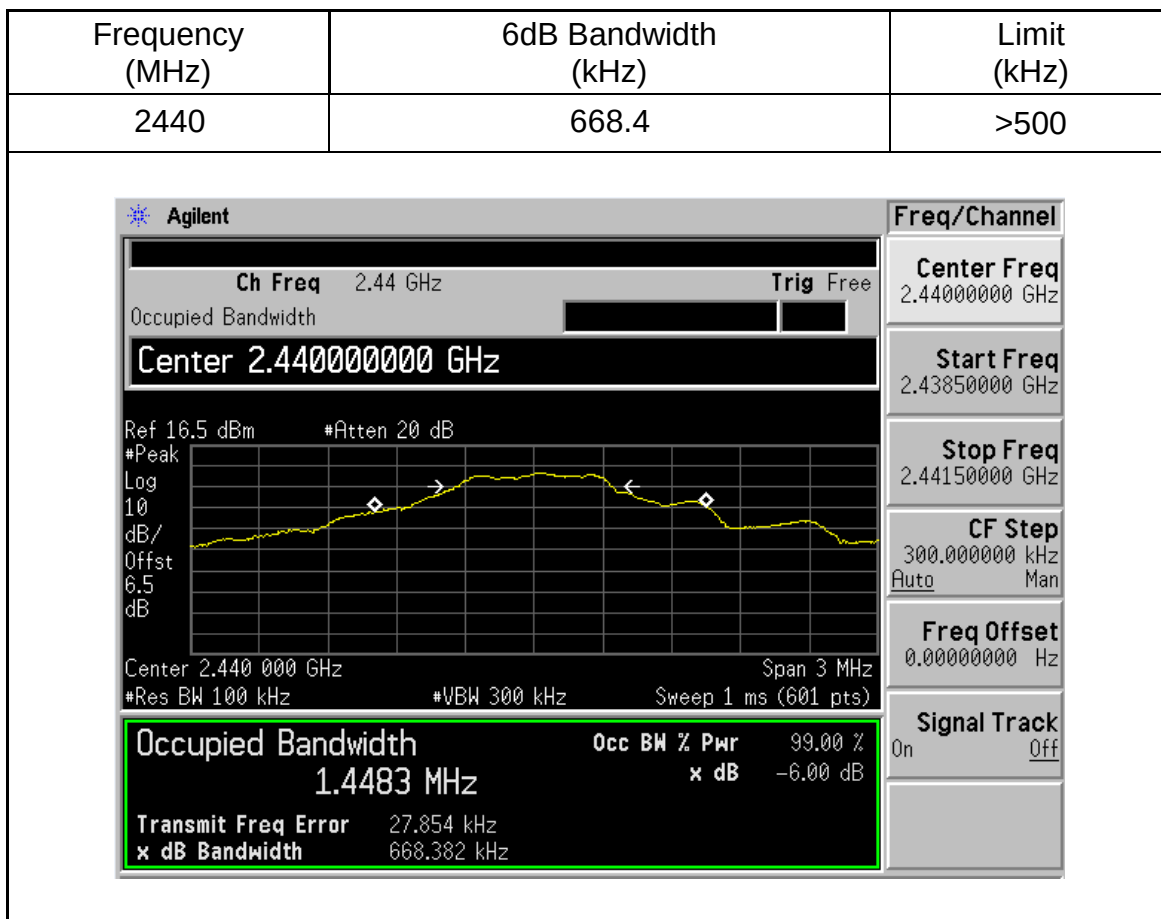
Test method : Conducted

Operating mode : Transmit mode

Frequency channel : 2440MHz

Remarks : NIL

Test Result	
☒	Passed
☐	Not Passed



Date of test : 15th April 2014

Test requirement : FCC §15.247(a)(2)

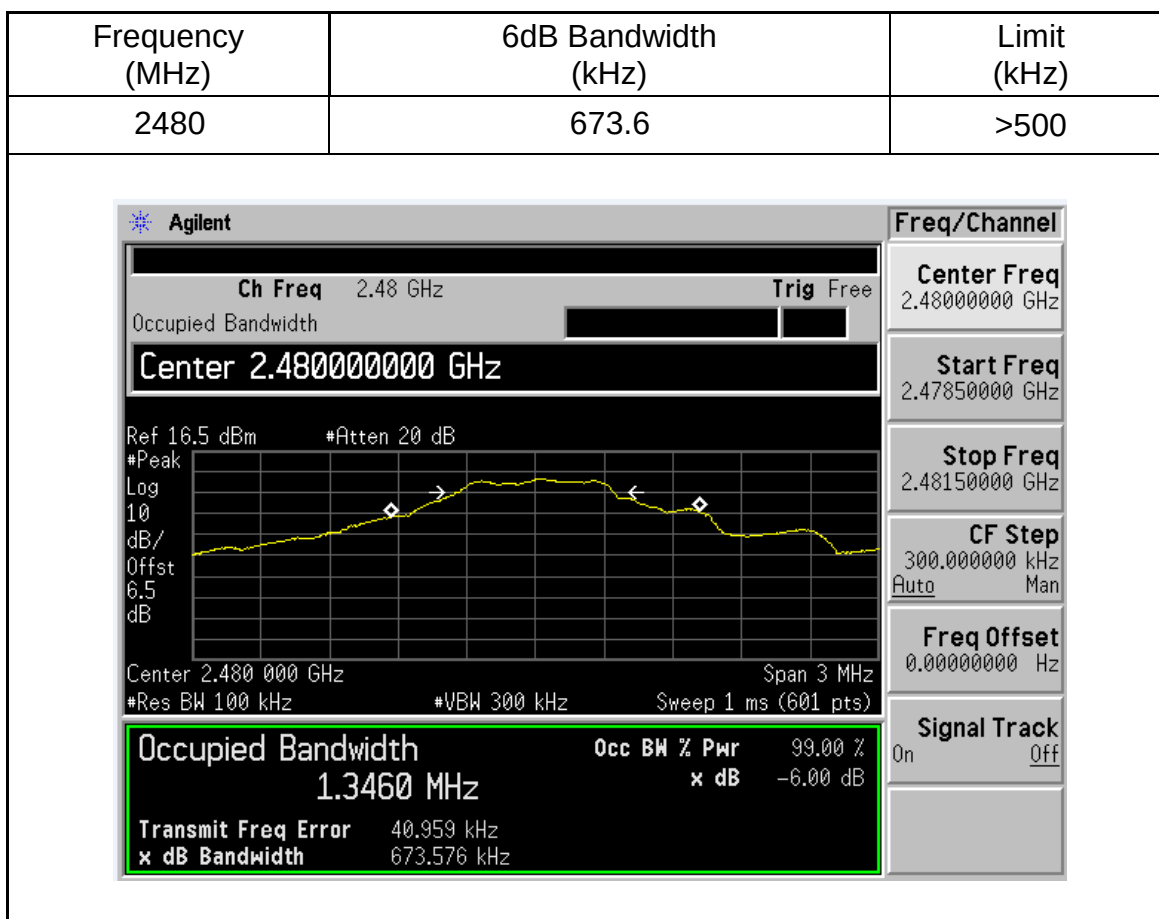
Test method : Conducted

Operating mode : Transmit mode

Frequency channel : 2480MHz

Remarks : NIL

Test Result	
☒	Passed
☐	Not Passed



7.4 Peak Output Power Measurements

Date of test : 15th April 2014

Test requirement : FCC §15.247(b)

Test method : Conducted

Operating mode : Transmit mode

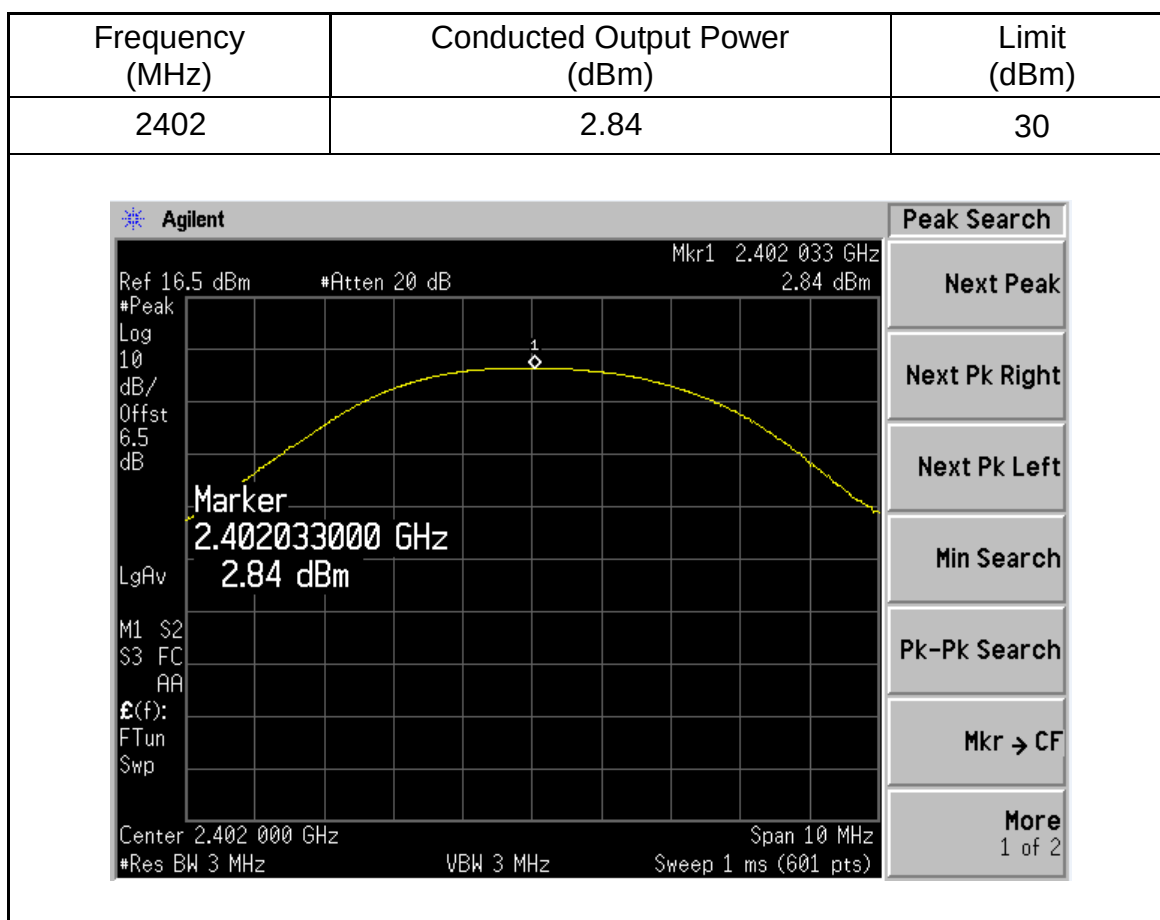
Frequency channel : 2402MHz

Remarks :

Test Result

☒ Passed

☐ Not Passed



Date of test : 15th April 2014

Test requirement : FCC §15.247(b)

Test method : Conducted

Operating mode : Transmit mode

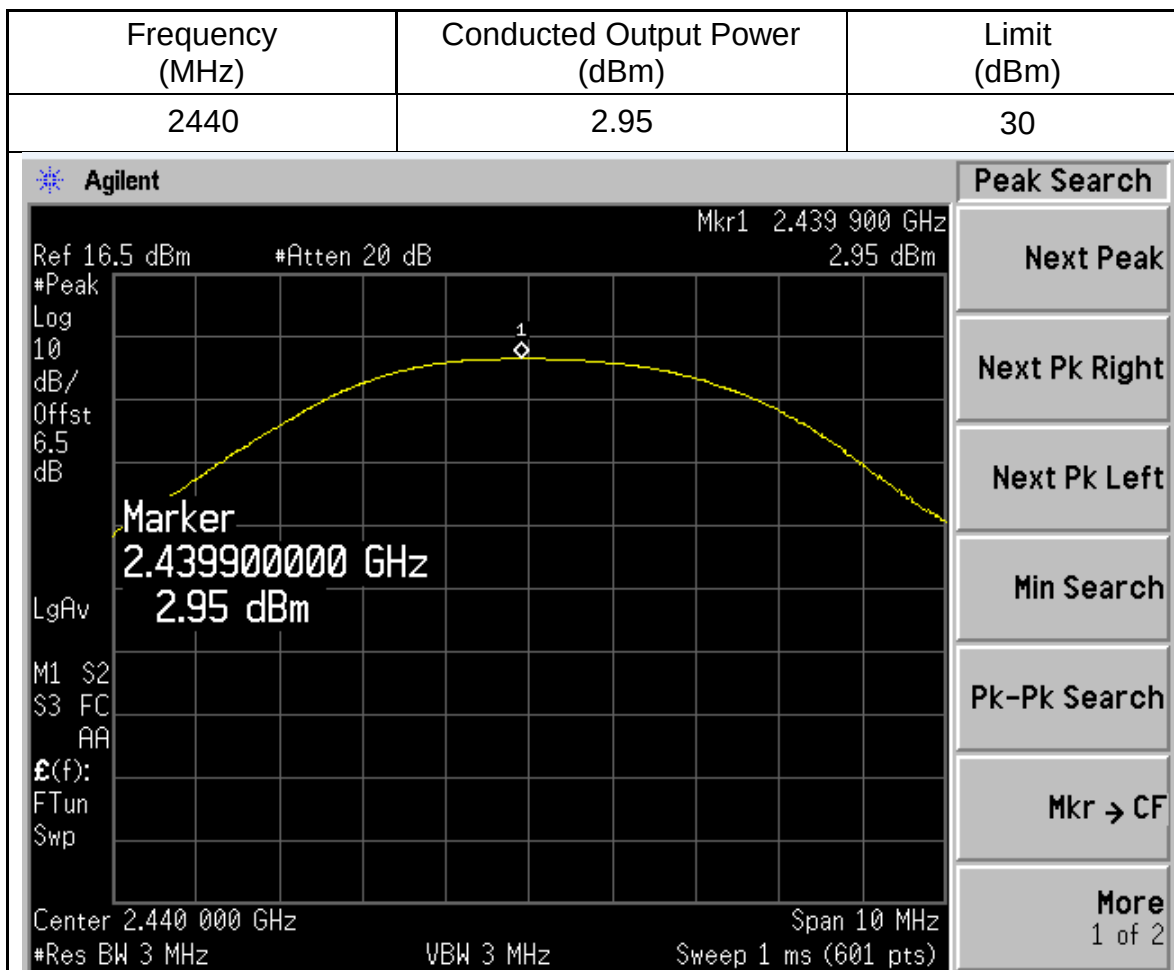
Frequency channel : 2440MHz

Remarks :

Test Result

☒ Passed

☐ Not Passed



Date of test : 15th April 2014

Test requirement : FCC §15.247(b)

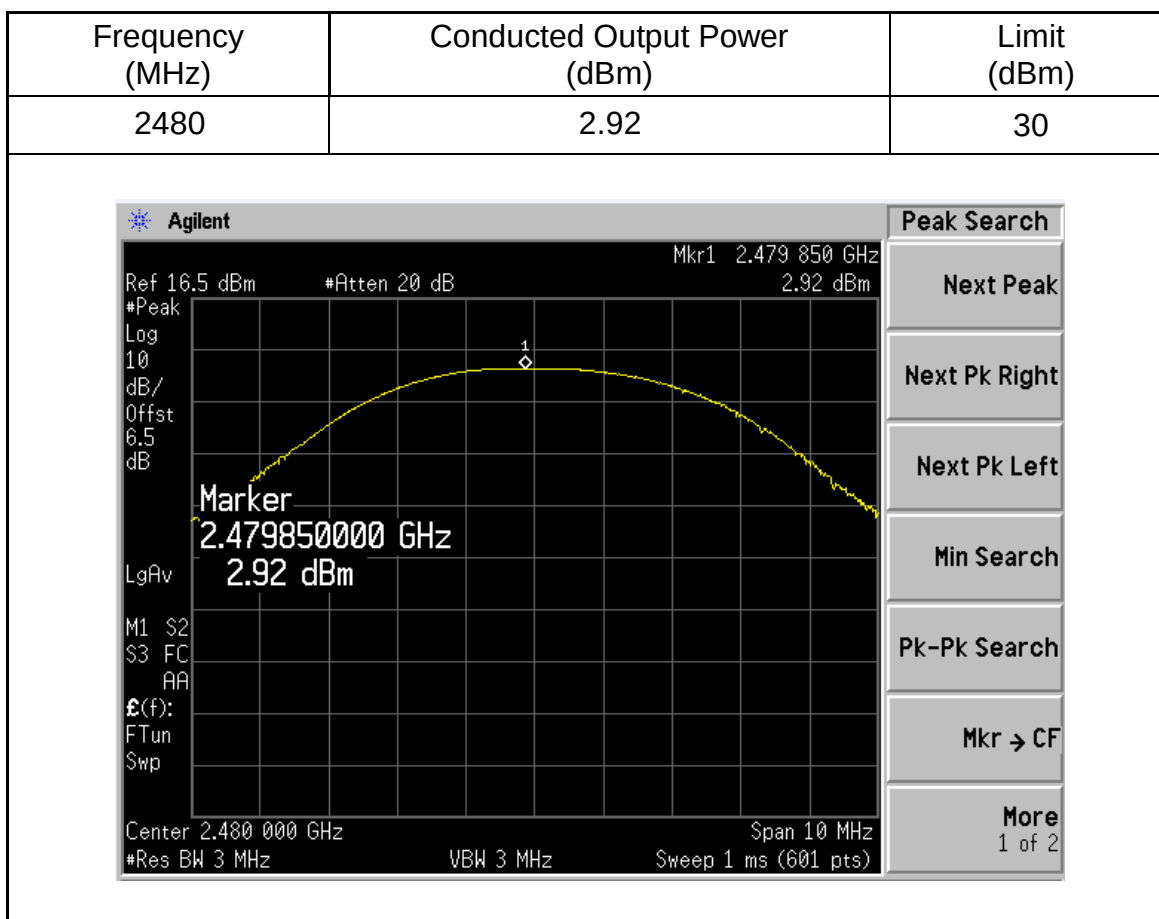
Test method : Conducted

Operating mode : Transmit mode

Frequency channel : 2480MHz

Remarks :

Test Result	
☒	Passed
☐	Not Passed



7.5 100 kHz Bandwidth of Band Edges

Date of test : 15th April 2014

Test requirement : FCC §15.247(d)

Test method : Conducted

Operating mode : Transmit mode

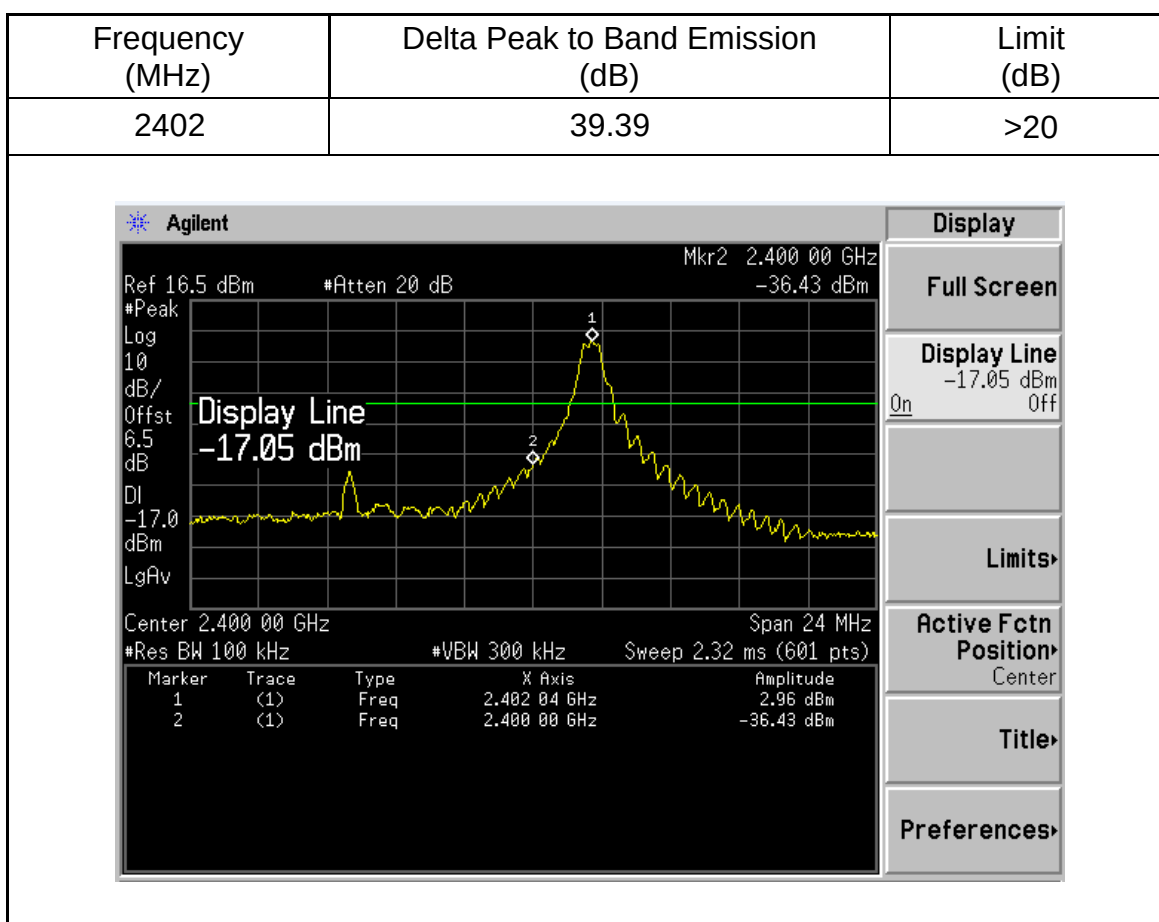
Frequency channel : 2402MHz

Remarks :

Test Result

☒ Passed

☐ Not Passed



Date of test : 15th April 2014

Test requirement : FCC §15.247(d)

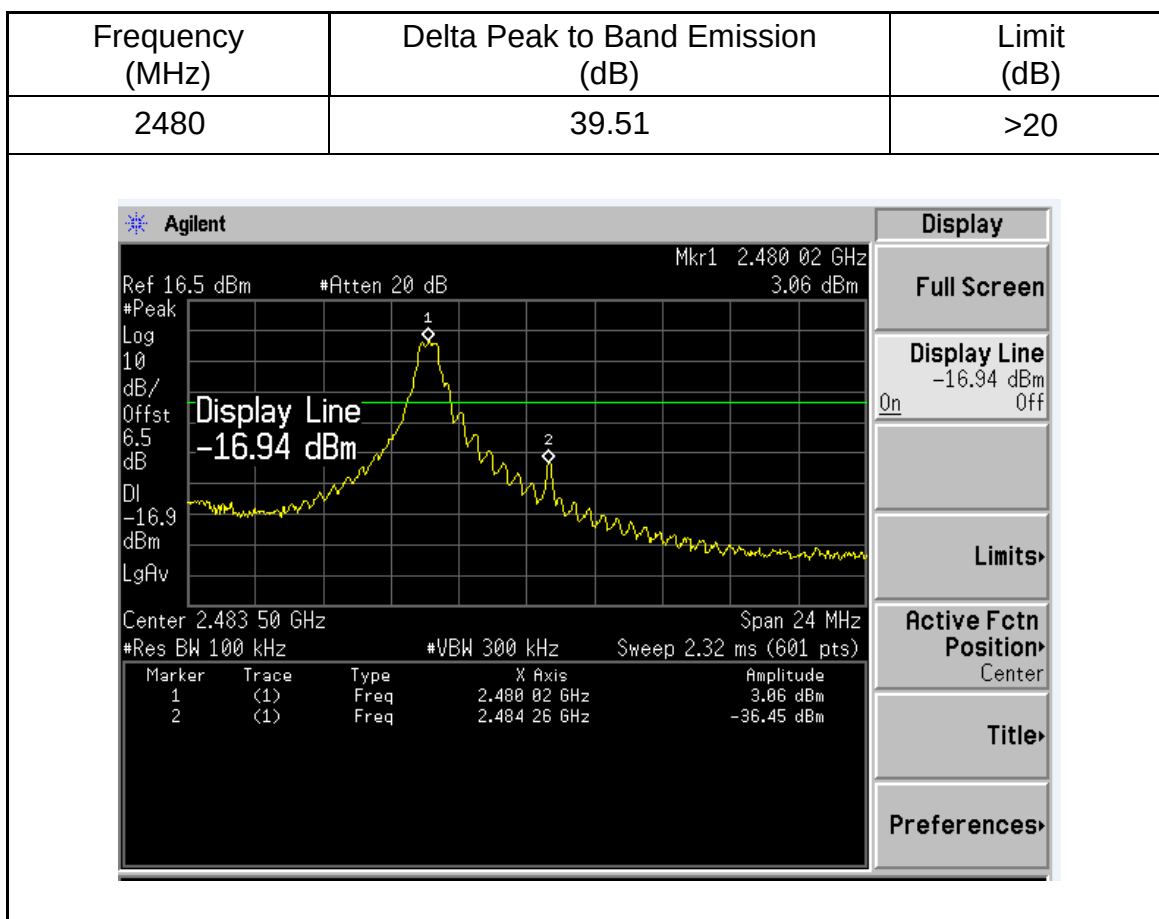
Test method : Conducted

Operating mode : Transmit mode

Frequency channel : 2480MHz

Remarks :

Test Result	
☒	Passed
☐	Not Passed



7.6 Power Spectral Density

Date of test : 15th April 2014

Test requirement : FCC §15.247(e)

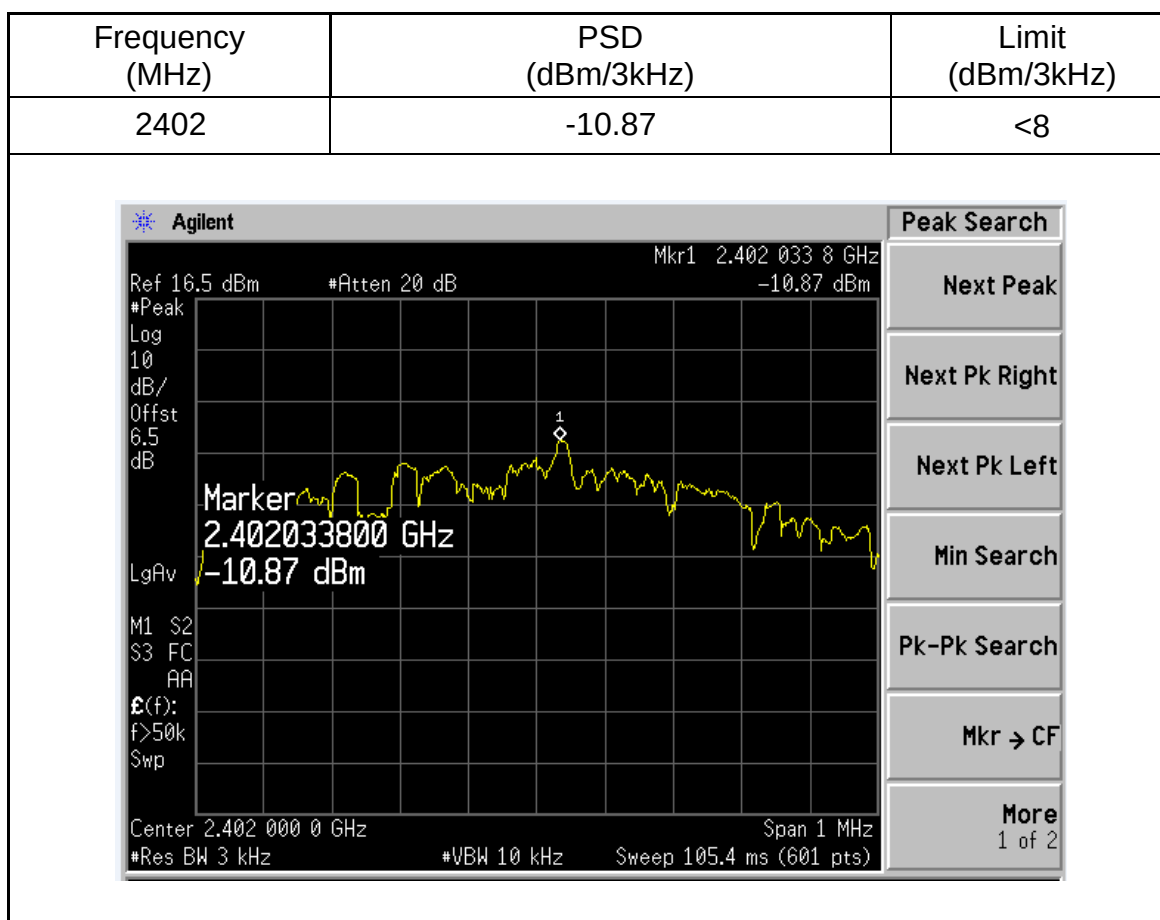
Test method : Conducted

Operating mode : Transmit mode

Frequency channel : 2402MHz

Remarks :

Test Result	
☒	Passed
☐	Not Passed



Date of test : 15th April 2014

Test requirement : FCC §15.247(e)

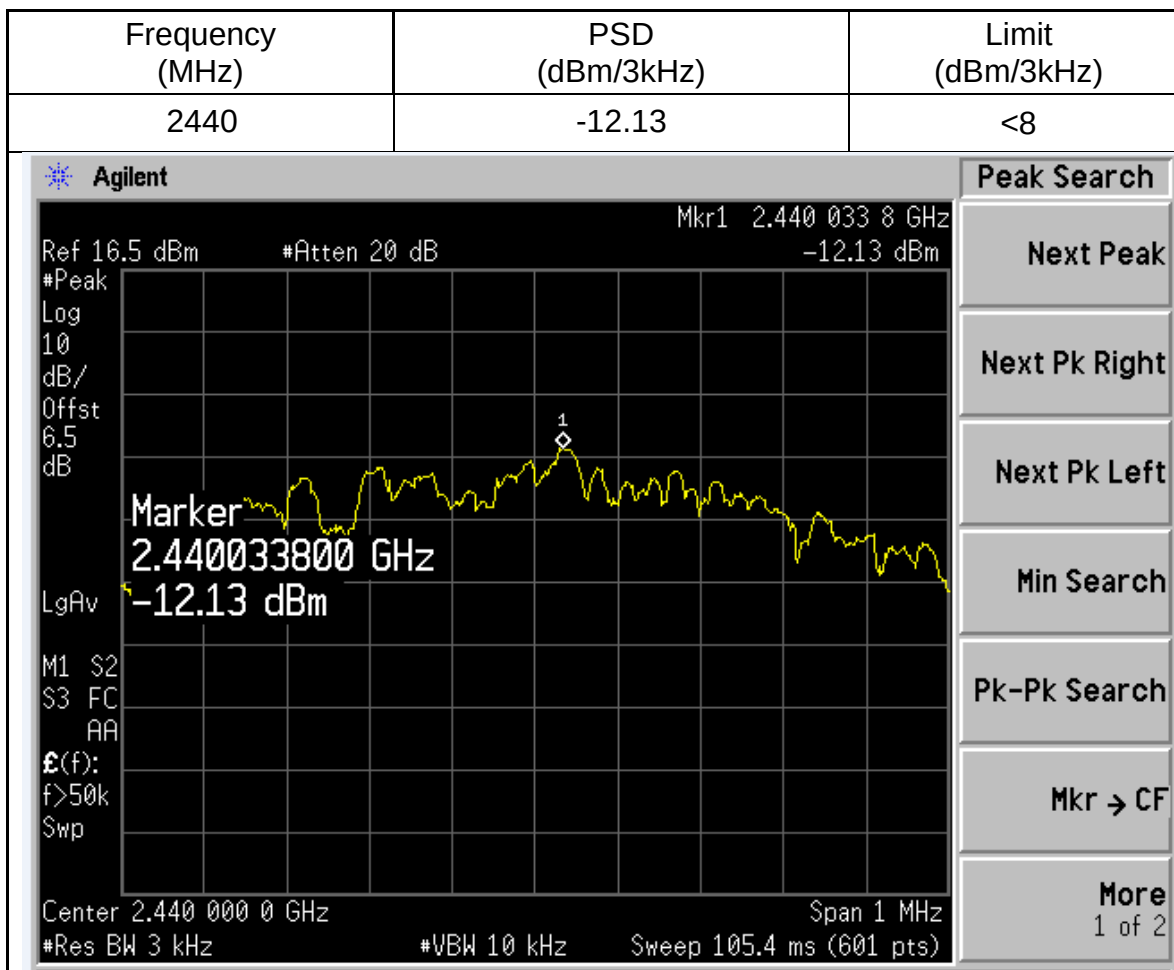
Test method : Conducted

Operating mode : Transmit mode

Frequency channel : 2440MHz

Remarks :

Test Result	
☒	Passed
☐	Not Passed



Date of test : 15th April 2014

Test requirement : FCC §15.247(e)

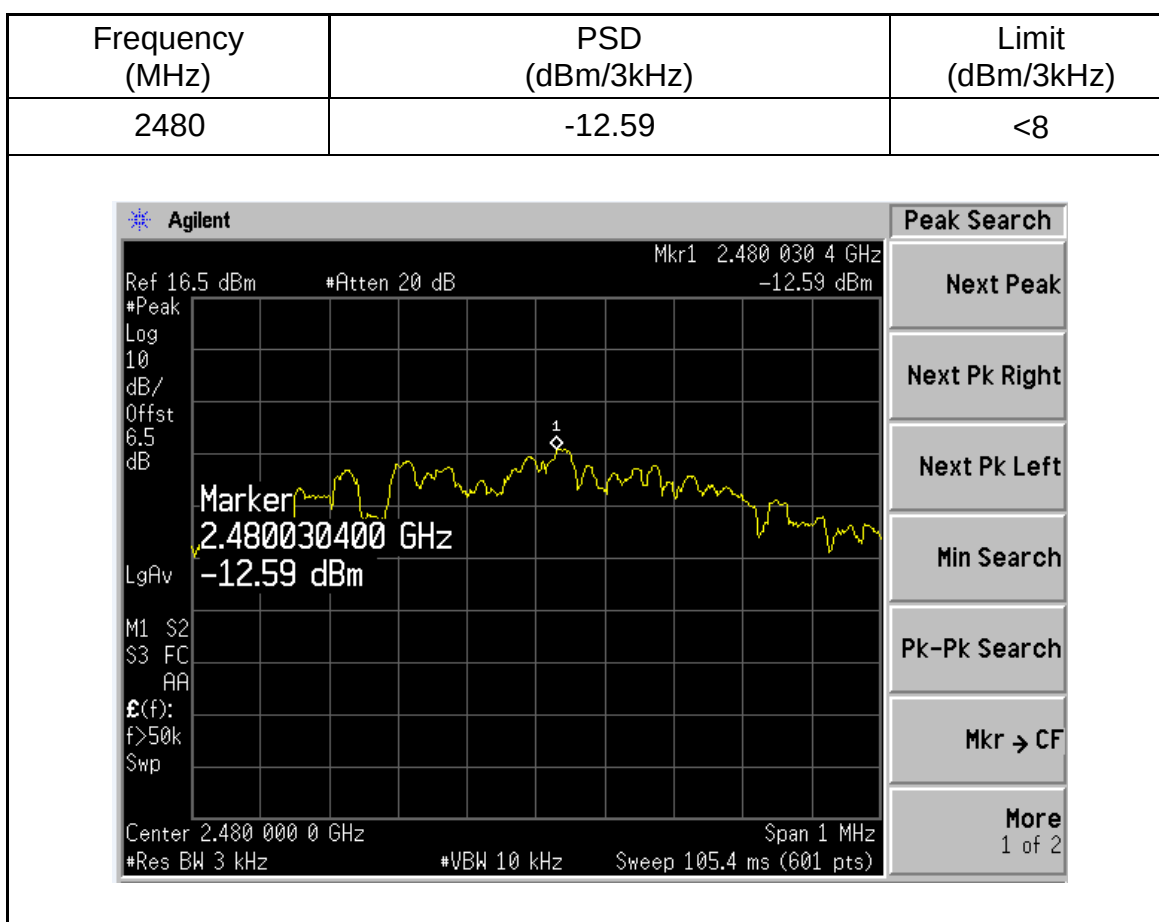
Test method : Conducted

Operating mode : Transmit mode

Frequency channel : 2480MHz

Remarks :

Test Result	
☒	Passed
☐	Not Passed



7.7 Antenna Requirement

Limit

For intentional device, 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. And According to 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 6dBi.

Antenna Connector Construction

The antenna used in this product is PCB antenna. And the maximum Gain of this antenna is 0.0 dBi.

8. Test Equipment List

Radiated Emission Test

DESCRIPTION	Type No.	Serial No.	Calibrated date	Calibrated until
Antenna	VULB9163	9163 330	2014.02.25	2015.02.24
Antenna	3117	00066577	2014.04.02	2015.04.01
Antenna	3160-09	00118388	2013.09.06	2014.09.05
Loop Antenna	6512	29604	2013.09.25	2014.09.24
Spectrum Analyzer	E4440A	US42220815	2013.06.14	2014.06.13
Spectrum Analyzer	FSP 40	100378	2013.12.23	2014.12.22
EMI Test Receiver	ESCI	100701	2013.08.04	2014.08.03
Spectrum Analyzer	FSV40	100903	2014.01.27	2015.01.26
Agilent	E4445A	MY46181814	2013.12.11	2014.12.10
Test Cable	SUCOFLEX 104	MY2320/4	2014.02.18	2015.02.17
Amplifier	150A250	326446	2014.03.19	2015.03.17
Temp. & Humid. Chamber	FACT5-2.0	4166	2013.11.22	2014.11.21

9. System Measurement Uncertainty

For a 95% confidence level, the measurement expanded uncertainties for defined systems, in accordance with the recommendations of ISO 17025 were:

System Measurement Uncertainty

Items		Extended Uncertainty
RE	Field strength (dB μ V/m)	U=3.59dB (9kHz-30MHz)
		U=5.08dB (30MHz-1GHz)
		U=4.56dB (1GHz-18GHz)
		U=4.42dB (18GHz-25GHz)
CE	Disturbance Voltage (dB μ V)	U=2.7dB