Hong Kong

FCC / IC – Test report

Report Number	: **60/790.13.032.01**	Date of Issue:	28th November 2013
Model	: **OP243**		
Product Type	: **Smart Watch**		
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	: 28		

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1. Table of Contents

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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: Audix Technology(Shenzhen) Co., Ltd.
No.6,Ke Feng Road,Block 52,Shenzhen Science & Industy Park,Nanshan,Shenzhen,Guangdong,China（518057）

3. Description of the Equipment Under Test

Description of the Equipment Under Test

Product:	Smart Watch
Model no.:	OP243
Serial number:	NIL
Options and accessories:	NIL
Rated Voltage:	3.7 VDC
Rated Current:	NIL
Rated Power:	NIL
Frequency:	2406-2475MHz
RF Transmission Frequency:	2406-2475MHz
Antenna gain:	0 dBi
No. of Operated Channel:	70
Modulation:	GFSK(FHSS)
Description of the EUT:	Battery operated – 3.7V rechargeable Li-ion Polymer battery

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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

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5. Summary of Test Standards and Results

Emission Tests					
Test Condition	Pages	Test site	Test Result		
			Pass	Fail	N/A
Conducted Emission (47 CFR 15.207, 15.209 & RSS-GEN 7.2.4)	8	Site 2	☒	☐	☐
Radiated Emission (47 CFR 15.249, 15.209 & RSS-210 A2.9, GEN 7.2.5 & RSS-GEN 6.1)	11	Site 2	☒	☐	☐
20dB Bandwidth (47 CFR 15.215)	21	Site 2	☒	☐	☐
99% occupied bandwidth (RSS-GEN 4.6.1)	21	Site 2			
Bandedge Emission (47 CFR 15.249)	25	Site 2	☒	☐	☐

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6. General Remarks

Remarks

This submittal(s) (test report) is intended for FCC ID: O4GSMARTWTH and IC: 7666A-SMARTWTH complies with the FCC Part 15, Subpart C 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 5 were

■ - Performed
☐ - **Not** Performed

The Equipment Under Test

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

Sample Received Date: 20th October 2013

Testing Start Date: 30th October 2013

Testing End Date: 09th November 2013

- TÜV SÜD HONG KONG LTD. -

Reviewed by: Edmond FUNG

Prepared by: CHAN Kwong Ngai

7. Emission Test Results

7.1 Conducted Emission

Date of test : 30th October 2013

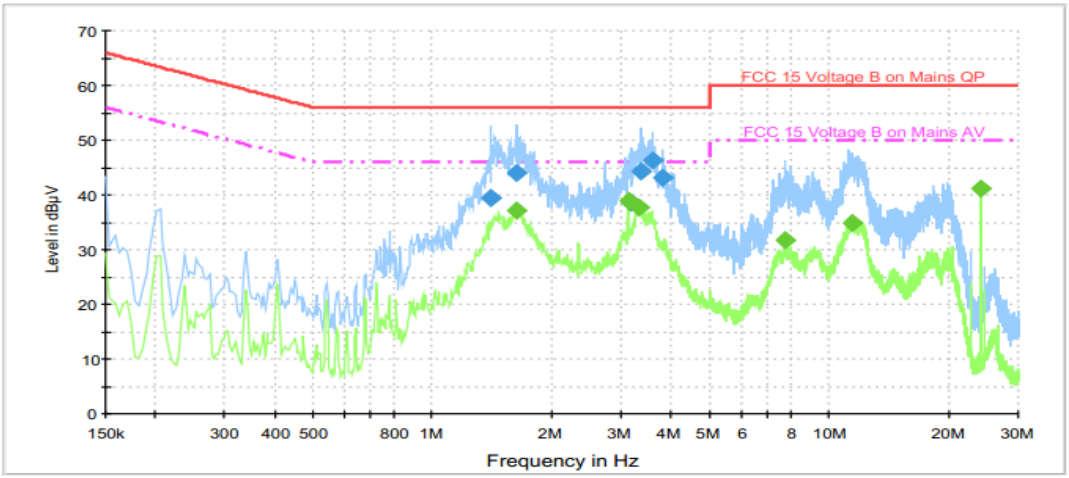
Test requirement : NIL

Test method : NIL

Operating mode : Transmit mode

Frequency channel : 2442MHz

Remarks : L line



Final Result 1

Frequency (MHz)	QuasiPeak (dBµV)	PE	Line	Corr. (dB)	Margin (dB)	Limit (dBµV)
1.406000	39.4	FLO	L1	10.1	16.6	56.0
1.638000	44.0	FLO	L1	10.1	12.0	56.0
3.154000	38.7	FLO	L1	10.2	17.3	56.0
3.362000	44.3	FLO	L1	10.2	11.7	56.0
3.582000	46.4	FLO	L1	10.2	9.6	56.0
3.790000	43.1	FLO	L1	10.2	12.9	56.0

Final Result 2

Frequency (MHz)	CAverage (dBµV)	PE	Line	Corr. (dB)	Margin (dB)	Limit (dBµV)
1.638000	37.2	FLO	L1	10.1	8.8	46.0
3.118000	38.8	FLO	L1	10.2	7.2	46.0
3.314000	37.7	FLO	L1	10.2	8.3	46.0
7.794000	31.6	FLO	L1	10.3	18.4	50.0
11.482000	34.7	FLO	L1	10.3	15.3	50.0
24.002000	41.2	FLO	L1	10.6	8.8	50.0

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Date of test : 30th October 2013

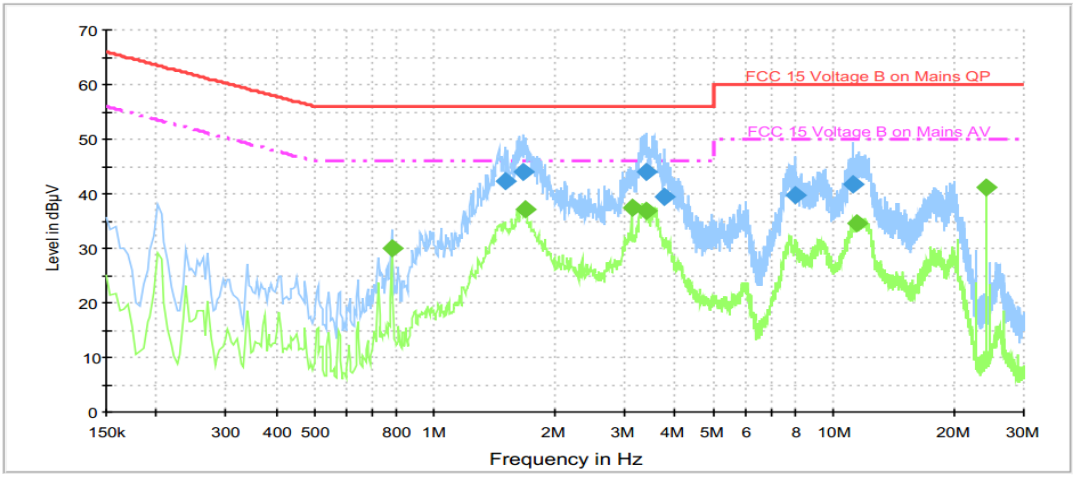
Test requirement : NIL

Test method : NIL

Operating mode : Transmit mode

Frequency channel : 2442MHz

Remarks : N line



Final Result 1

Frequency (MHz)	QuasiPeak (dBµV)	PE	Line	Corr. (dB)	Margin (dB)	Limit (dBµV)
1.498000	42.4	FLO	N	10.1	13.6	56.0
1.670000	44.1	FLO	N	10.1	11.9	56.0
3.398000	44.0	FLO	N	10.2	12.0	56.0
3.778000	39.5	FLO	N	10.2	16.5	56.0
7.998000	39.8	FLO	N	10.3	20.2	60.0
11.186000	41.8	FLO	N	10.4	18.2	60.0

Final Result 2

Frequency (MHz)	CAverage (dBµV)	PE	Line	Corr. (dB)	Margin (dB)	Limit (dBµV)
0.782000	30.1	FLO	N	10.1	15.9	46.0
1.686000	37.3	FLO	N	10.1	8.7	46.0
3.118000	37.3	FLO	N	10.2	8.7	46.0
3.390000	37.0	FLO	N	10.2	9.0	46.0
11.482000	34.7	FLO	N	10.4	15.3	50.0
24.002000	41.2	FLO	N	10.6	8.8	50.0

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7.2 Duty cycle

Date of test : 30th October 2013

Test requirement : NIL

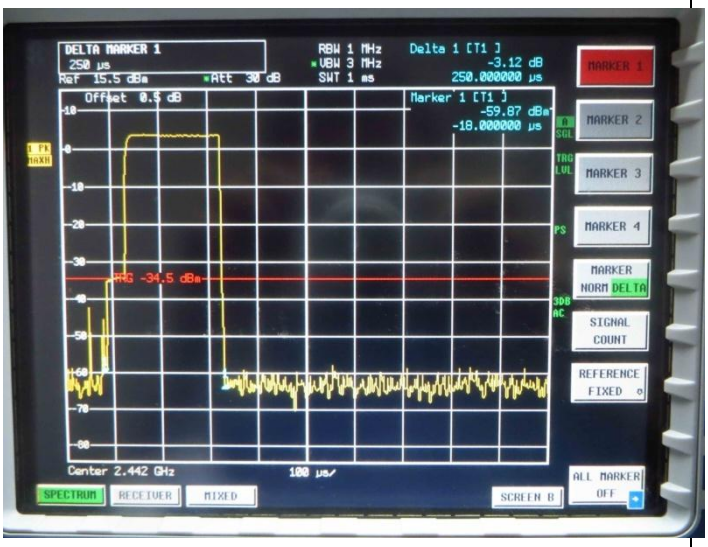
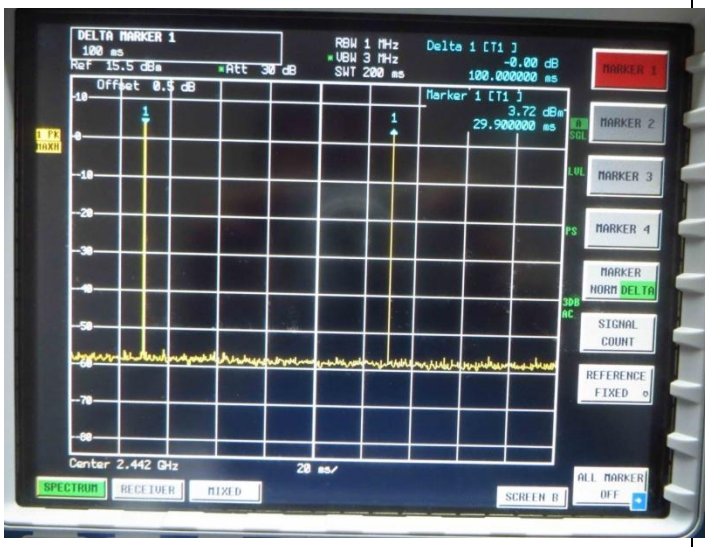
Test method : NIL

Operating mode : Transmit mode

Frequency channel : 2442MHz

Remarks : NIL

Ton(ms)	Tp(ms)	Duty cycle	Duty cycle factor(dB)
0.25	100	0. 25%	-52.04

Ton	Tp
	

Remark: Duty cycle=Ton/Tp*100%
Duty cycle factor=20lg(Duty cycle)

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7.3 Radiated Emission Test (Fundamental)

Date of test : 06th November 2013

Test requirement : FCC Part 15

Test method : ANSI C63.4:2009

Operating mode : Transmit mode

Frequency channel : 2406MHz

Remarks : NIL

Test Result
☒ Passed
☐ Not Passed

Frequency (MHz)	Polarity (H/V)	Result (dBµV/m)	Limit (dBµV/m)	Margin (dB)	Detector
2406.000	H	78.78	114	-35.22	Peak
2406.000	H	26.74	94	-67.26	Average
2406.000	V	79.87	114	-34.13	Peak
2406.000	V	27.83	94	-66.17	Average

Remark: 1.The EUT was placed on the top of the turntable in test site area.
The test shall be made in the operation mode. The turntable was rotated by 360 degrees to determine the position of the highest radiation.
For emissions measurement, the receiving antenna was placed 3 meters far away from the turntable.
The antenna was fixed on the same height with the EUT to find each suspected emissions of both horizontal and vertical polarization.
Adjust the emission and slightly rotate the turntable to locate the position with maximum reading.
Adjust the emission and slightly height of the antenna to locate the position with maximum reading.

2.Average=Peak+ duty cycle factor

Date of test	:	06th November 2013
Test requirement	:	FCC Part 15
Test method	:	ANSI C63.4:2009
Operating mode	:	Transmit mode
Frequency channel	:	2442MHz
Remarks	:	NIL

Test Result
☒ Passed
☐ Not Passed

Frequency (MHz)	Polarity (H/V)	Result (dBµV/m)	Limit (dBµV/m)	Margin (dB)	Detector
2442.000	H	79.33	114	-34.67	Peak
2442.000	H	27.29	94	-66.71	Average
2442.000	V	79.47	114	-34.53	Peak
2442.000	V	27.43	94	-66.57	Average

Remark: 1.The EUT was placed on the top of the turntable in test site area.
The test shall be made in the operation mode. The turntable was rotated by 360 degrees to determine the position of the highest radiation.
For emissions measurement, the receiving antenna was placed 3 meters far away from the turntable.
The antenna was fixed on the same height with the EUT to find each suspected emissions of both horizontal and vertical polarization.
Adjust the emission and slightly rotate the turntable to locate the position with maximum reading.
Adjust the emission and slightly height of the antenna to locate the position with maximum reading.

2.Average=Peak+ duty cycle factor

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Date of test	:	06th November 2013
Test requirement	:	FCC Part 15
Test method	:	ANSI C63.4:2009
Operating mode	:	Transmit mode
Frequency channel	:	2475MHz
Remarks	:	NIL

Test Result
☒ Passed
☐ Not Passed

Frequency (MHz)	Polarity (H/V)	Result (dBμV/m)	Limit (dBμV/m)	Margin (dB)	Detector
2475.000	H	78.76	114	-35.24	Peak
2475.000	H	26.72	94	-67.28	Average
2475.000	V	79.05	114	-34.95	Peak
2475.000	V	27.01	94	-66.99	Average

Remark: 1.The EUT was placed on the top of the turntable in test site area.
The test shall be made in the operation mode. The turntable was rotated by 360 degrees to determine the position of the highest radiation.
For emissions measurement, the receiving antenna was placed 3 meters far away from the turntable. The antenna was fixed on the same height with the EUT to find each suspected emissions of both horizontal and vertical polarization.
Adjust the emission and slightly rotate the turntable to locate the position with maximum reading.
Adjust the emission and slightly height of the antenna to locate the position with maximum reading.
2.Average=Peak+ duty cycle factor

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Radiated Emission Test (Spurious Emission)

Date of test : 06th November 2013

Test requirement : FCC Part 15

Test method : ANSI C63.4:2009

Operating mode : Transmit mode

Frequency channel : 2406MHz

Remarks : 9kHz-25GHz

Test Result
☒ Passed
☐ Not Passed

Frequency (MHz)	Polarity (H/V)	Result (dBμV/m)	Limit (dBμV/m)	Margin (dB)	Detector
359.800	H	20.24	46.00	-25.76	Quasi Peak
810.850	H	26.36	46.00	-19.64	Quasi Peak
892.330	H	27.54	46.00	-18.46	Quasi Peak
1148.256	H	41.36	74.00	-32.64	Peak
1148.256	H	/	54.00	/	Average
4812.000	H	49.96	74.00	-24.04	Peak
4812.000	H	/	54.00	/	Average
7218.000	H	44.85	74.00	-29.15	Peak
7218.000	H	/	54.00	/	Average

Remark: 1.The EUT was placed on the top of the turntable in test site area.
The test shall be made in the operation mode. The turntable was rotated by 360 degrees to determine the position of the highest radiation.
For emissions measurement, the receiving antenna was placed 3 meters far away from the turntable.
The antenna was fixed on the same height with the EUT to find each suspected emissions of both horizontal and vertical polarization.
Adjust the emission and slightly rotate the turntable to locate the position with maximum reading.
Adjust the emission and slightly height of the antenna to locate the position with maximum reading.
2. Average=Peak+ duty cycle factor
3.For harmonics, the calculated average value were negative that not recorded.

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Radiated Emission Test (Spurious Emission)

Date of test : 06th November 2013

Test requirement : FCC Part 15

Test method : ANSI C63.4:2009

Operating mode : Transmit mode

Frequency channel : 2406MHz

Remarks : 9kHz-25GHz

Test Result
☒ Passed
☐ Not Passed

Frequency (MHz)	Polarity (H/V)	Result (dBμV/m)	Limit (dBμV/m)	Margin (dB)	Detector
359.600	V	22.13	46.00	-23.87	Quasi Peak
600.360	V	25.29	46.00	-20.71	Quasi Peak
854.500	V	26.96	46.00	-19.04	Quasi Peak
1148.000	V	40.59	74.00	-33.41	Peak
1148.000	V	/	54.00	/	Average
4812.000	V	49.51	74.00	-24.49	Peak
4812.000	V	/	54.00	/	Average
7218.000	V	46.22	74.00	-17.78	Peak
7218.000	V	/	54.00	/	Average

Remark: 1.The EUT was placed on the top of the turntable in test site area.
The test shall be made in the operation mode. The turntable was rotated by 360 degrees to determine the position of the highest radiation.
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Radiated Emission Test (Spurious Emission)

Date of test : 06th November 2013

Test requirement : FCC Part 15

Test method : ANSI C63.4:2009

Operating mode : Transmit mode

Frequency channel : 2442MHz

Remarks : 9kHz-25GHz

Test Result
☒ Passed
☐ Not Passed

Frequency (MHz)	Polarity (H/V)	Result (dBμV/m)	Limit (dBμV/m)	Margin (dB)	Detector
359.800	H	20.51	46.00	-25.49	Quasi Peak
478.140	H	21.71	46.00	-24.29	Quasi Peak
742.950	H	24.79	46.00	-21.21	Quasi Peak
2883.000	H	44.14	74.00	-29.86	Peak
2883.000	H	/	54.00	/	Average
4884.000	H	49.44	74.00	-24.56	Peak
4884.000	H	/	54.00	/	Average
7326.000	H	47.53	74.00	-26.47	Peak
7326.000	H	/	54.00	/	Average

Remark: 1.The EUT was placed on the top of the turntable in test site area.
The test shall be made in the operation mode. The turntable was rotated by 360 degrees to determine the position of the highest radiation.
For emissions measurement, the receiving antenna was placed 3 meters far away from the turntable.
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Adjust the emission and slightly height of the antenna to locate the position with maximum reading.
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3.For harmonics, the calculated average value were negative that not recorded.

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Radiated Emission Test (Spurious Emission)

Date of test : 06th November 2013

Test requirement : FCC Part 15

Test method : ANSI C63.4:2009

Operating mode : Transmit mode

Frequency channel : 2442MHz

Remarks : 9kHz-25GHz

Test Result
☒ Passed
☐ Not Passed

Frequency (MHz)	Polarity (H/V)	Result (dBμV/m)	Limit (dBμV/m)	Margin (dB)	Detector
127.000	V	16.17	46.00	-27.33	Quasi Peak
359.800	V	25.34	46.00	-20.66	Quasi Peak
600.360	V	25.72	46.00	-20.28	Quasi Peak
2883.000	V	45.82	74.00	-28.18	Peak
2883.000	V	/	54.00	/	Average
4884.000	V	49.12	74.00	-24.88	Peak
4884.000	V	/	54.00	/	Average
7326.000	V	46.33	74.00	-27.67	Peak
7326.000	V	/	54.00	/	Average

Remark: 1.The EUT was placed on the top of the turntable in test site area.
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For emissions measurement, the receiving antenna was placed 3 meters far away from the turntable.
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Adjust the emission and slightly rotate the turntable to locate the position with maximum reading.
Adjust the emission and slightly height of the antenna to locate the position with maximum reading.
2. Average=Peak+ duty cycle factor
3.For harmonics, the calculated average value were negative that not recorded.

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Radiated Emission Test (Spurious Emission)

Date of test : 06th November 2013

Test requirement : FCC Part 15

Test method : ANSI C63.4:2009

Operating mode : Transmit mode

Frequency channel : 2475MHz

Remarks : 9kHz-25GHz

Test Result
☒ Passed
☐ Not Passed

Frequency (MHz)	Polarity (H/V)	Result (dBµV/m)	Limit (dBµV/m)	Margin (dB)	Detector
553.800	H	22.44	46.00	-23.56	Quasi Peak
604.240	H	23.04	46.00	-22.96	Quasi Peak
873.900	H	26.43	46.00	-19.57	Quasi Peak
1525.000	H	42.18	74.00	-31.81	Peak
1525.000	H	/	5400	/	Average
4950.000	H	49.54	74.00	-24.46	Peak
4950.000	H	/	5400	/	Average
7425.000	H	44.37	74.00	-29.63	Peak
7425.000	H	/	5400	/	Average

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The test shall be made in the operation mode. The turntable was rotated by 360 degrees to determine the position of the highest radiation.
For emissions measurement, the receiving antenna was placed 3 meters far away from the turntable.
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Adjust the emission and slightly rotate the turntable to locate the position with maximum reading.
Adjust the emission and slightly height of the antenna to locate the position with maximum reading.
2. Average=Peak+ duty cycle factor
3.For harmonics, the calculated average value were negative that not recorded.

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Radiated Emission Test (Spurious Emission)

Date of test : 06th November 2013

Test requirement : FCC Part 15

Test method : ANSI C63.4:2009

Operating mode : Transmit mode

Frequency channel : 2475MHz

Remarks : 9kHz-25GHz

Test Result
☒ Passed
☐ Not Passed

Frequency (MHz)	Polarity (H/V)	Result (dBμV/m)	Limit (dBμV/m)	Margin (dB)	Detector
204.600	V	17.49	46.00	-26.01	Quasi Peak
359.800	V	25.58	46.00	-20.42	Quasi Peak
600.360	V	26.22	46.00	-19.78	Quasi Peak
1525.000	V	44.16	74.00	-29.84	Peak
1525.000	V	/	54.00	/	Average
4950.000	V	49.02	74.00	-24.98	Peak
4950.000	V	/	54.00	/	Average
7425.000	V	43.87	74.00	-30.13	Peak
7425.000	V	/	54.00	/	Average

Remark: 1.The EUT was placed on the top of the turntable in test site area.
The test shall be made in the operation mode. The turntable was rotated by 360 degrees to determine the position of the highest radiation.
For emissions measurement, the receiving antenna was placed 3 meters far away from the turntable.
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Test Equipment List

Radiated Emission Test

DESCRIPTION	Type No.	Serial No.	Calibrated date	Calibrated until
Antenna	VULB9163	9163 330	2013.02.25	2014.02.24
Antenna	3117	00066577	2013.04.02	2014.04.01
Antenna	3160-09	00118388	2013.09.06	2014.09.05
Loop Antenna	6512	29604	2013.09.25	2014.09.24
Spectrum Analyzer	FSP 40	100378	2012.12.23	2013.12.22
EMI Test Receiver	ESCI	100701	2013.08.04	2014.08.03
Spectrum Analyzer	FSV40	100903	2013.01.27	2014.01.26
Test Cable	SUCOFLEX 104	MY2320/4	2013.02.18	2014.02.17
Amplifier	150A250	326446	2013.03.19	2014.03.17
Temp. & Humid. Chamber	FACT5-2.0	4166	2012.11.22	2013.11.21

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7.4 20dB & 99% bandwidth measurement

Date of test : 06th November 2013

Test requirement : FCC Part 15

Test method : ANSI C63.4:2009

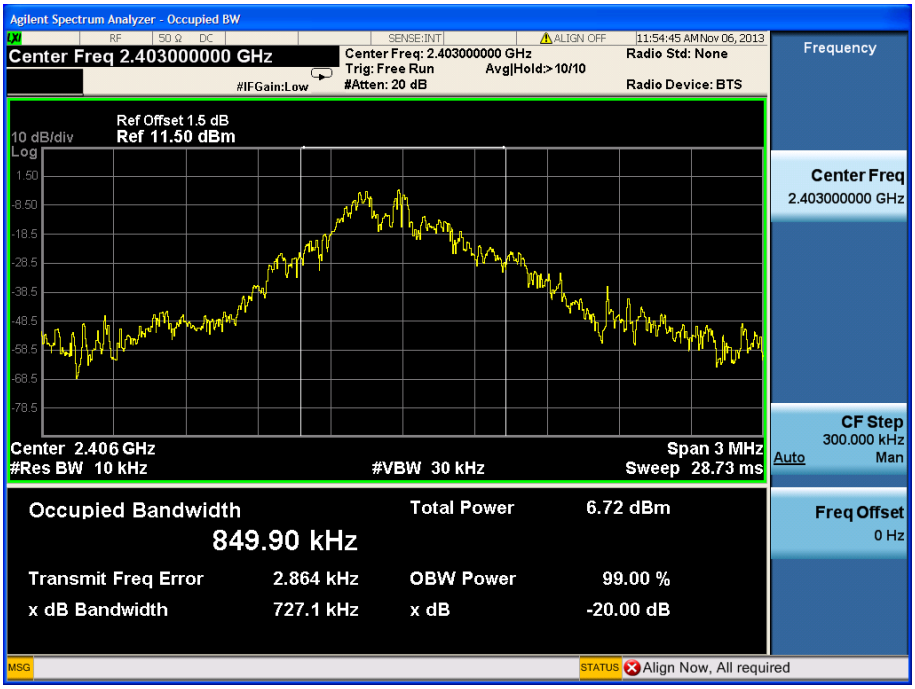
Operating mode : Transmit mode

Frequency channel : 2406MHz

Remarks : NIL

Test Result
☒ Passed
☐ Not Passed

20 dB Bandwidth	99% OBW	Result
kHz	kHz	
727.1	849.9	Pass



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Date of test	:	06th November 2013
Test requirement	:	FCC Part 15
Test method	:	ANSI C63.4:2009
Operating mode	:	Transmit mode
Frequency channel	:	2442MHz
Remarks	:	NIL

Test Result
☒ Passed
☐ Not Passed

20 dB Bandwidth	99% OBW	Result
kHz	kHz	
845.2	891.7	Pass

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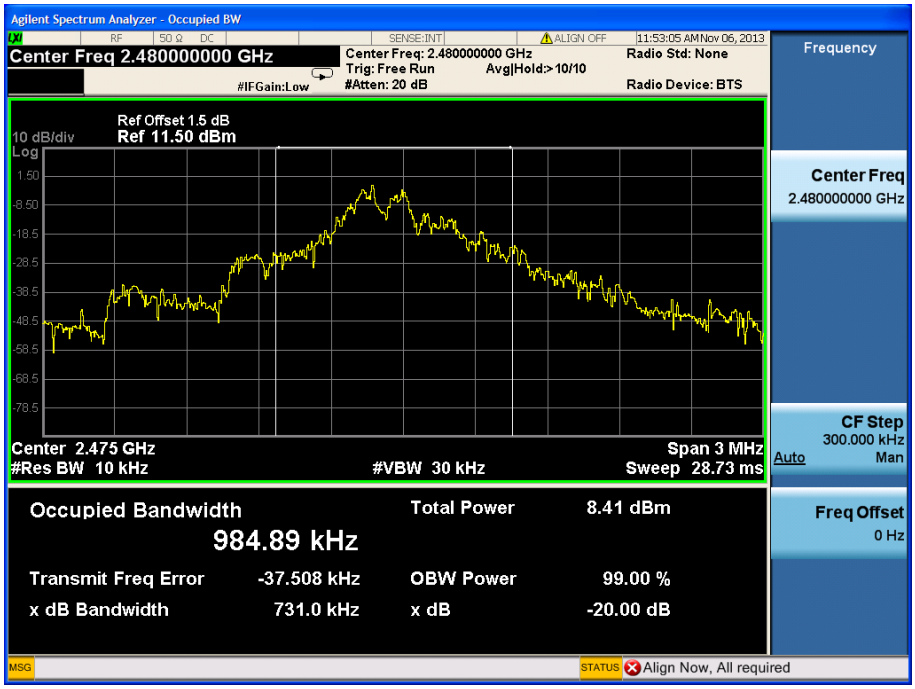
Date of test	:	06th November 2013
Test requirement	:	FCC Part 15
Test method	:	ANSI C63.4:2009
Operating mode	:	Transmit mode
Frequency channel	:	2475MHz
Remarks	:	NIL

Test Result
☒ Passed
☐ Not Passed

20 dB Bandwidth	99% OBW	Result
kHz	kHz	
731.0	984.9	Pass



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Test Equipment List

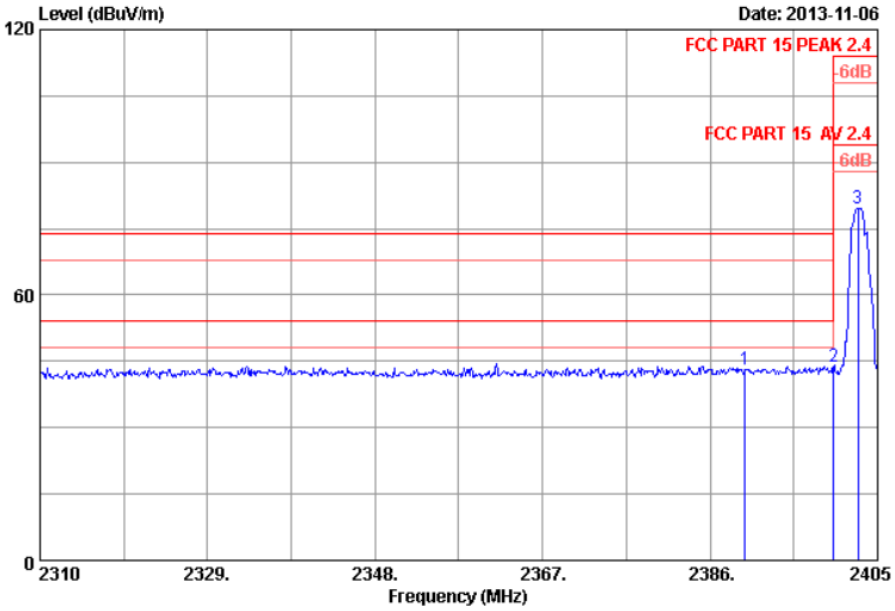
20dB & 99% bandwidth measurement

DESCRIPTION	Type No.	Serial No.	Calibrated date	Calibrated until
Antenna	VULB9163	9163 330	2013.02.25	2014.02.24
Antenna	3117	00066577	2013.04.02	2014.04.01
Antenna	3160-09	00118388	2013.09.06	2014.09.05
Loop Antenna	6512	29604	2013.09.25	2014.09.24
Spectrum Analyzer	FSP 40	100378	2012.12.23	2013.12.22
EMI Test Receiver	ESCI	100701	2013.08.04	2014.08.03
Spectrum Analyzer	FSV40	100903	2013.01.27	2014.01.26
Test Cable	SUCOFLEX 104	MY2320/4	2013.02.18	2014.02.17
Amplifier	150A250	326446	2013.03.19	2014.03.17
Temp. & Humid. Chamber	FACT5-2.0	4166	2012.11.22	2013.11.21

7.5 Bandedge measurement

Date of test	:	06th November 2013
Test requirement	:	FCC Part 15
Test method	:	ANSI C63.4:2009
Operating mode	:	Transmit mode
Frequency channel	:	2406MHz
Remarks	:	NIL

Test Result
☒ Passed
☐ Not Passed

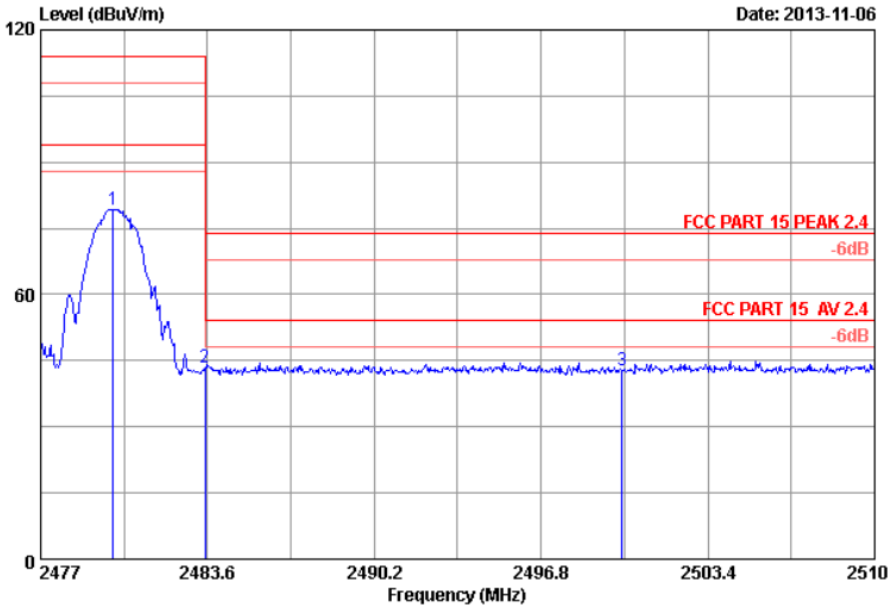


Frequency (MHz)	Reading (dBµV)	Corr. (dB/m)	Test result (dBµV/m)	Limit (dBµV/m)	Margin (dB)	Detector
2400.000	45.54	-1.72	43.82	74.0	30.18	Peak
2400.000	/	-1.72	/	54.0	/	Average

Remark: 1.Use the following spectrum analyzer settings:
Span = wide enough to capture the peak level of the emission operating on the channel closest to the bandedge, as well as any modulation products which fall outside of the authorized band of operation
RBW ≥ 1% of the span
VBW ≥ RBW
Sweep = auto
Detector function = peak
Trace = max hold
2. For harmonics, the calculated average value were negative that not recorded.

Date of test	:	06th November 2013
Test requirement	:	FCC Part 15
Test method	:	ANSI C63.4:2009
Operating mode	:	Transmit mode
Frequency channel	:	2475MHz
Remarks	:	NIL

Test Result
☒ Passed
☐ Not Passed



Frequency (MHz)	Reading (dBµV)	Corr. (dB/m)	Test result (dBµV/m)	Limit (dBµV/m)	Margin (dB)	Detector
2483.500	44.99	-1.42	43.57	74.0	-31.0	Peak
2483.500	/	-1.42	/	54.0	-23.8	Average

Remark: 1.Use the following spectrum analyzer settings:
Span = wide enough to capture the peak level of the emission operating on the channel closest to the bandedge, as well as any modulation products which fall outside of the authorized band of operation
RBW ≥ 1% of the span
VBW ≥ RBW
Sweep = auto
Detector function = peak
Trace = max hold
2. For harmonics, the calculated average value were negative that not recorded.

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Test Equipment List

Bandedge measurement

DESCRIPTION	Type No.	Serial No.	Calibrated date	Calibrated until
Antenna	VULB9163	9163 330	2013.02.25	2014.02.24
Antenna	3117	00066577	2013.04.02	2014.04.01
Antenna	3160-09	00118388	2013.09.06	2014.09.05
Loop Antenna	6512	29604	2013.09.25	2014.09.24
Spectrum Analyzer	FSP 40	100378	2012.12.23	2013.12.22
EMI Test Receiver	ESCI	100701	2013.08.04	2014.08.03
Spectrum Analyzer	FSV40	100903	2013.01.27	2014.01.26
Test Cable	SUCOFLEX 104	MY2320/4	2013.02.18	2014.02.17
Amplifier	150A250	326446	2013.03.19	2014.03.17
Temp. & Humid. Chamber	FACT5-2.0	4166	2012.11.22	2013.11.21

8. 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 (dBµV/m)	U=3.59dB (9kHz-30MHz) U=5.08dB (30MHz-1GHz) U=4.56dB (1GHz-18GHz) U=4.42dB (18GHz-25GHz)
CE	Disturbance Voltage (dBµV)	U=2.7dB

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