APPLICATION CERTIFICATION
On Behalf of
Bedford, Freeman & Worth Publishing Group, LLC

IOLab Dongle
Model No.: IOL15B

FCC ID: 2AF5F-IOL15B

Prepared for	:	Bedford, Freeman & Worth Publishing Group, LLC
Address	:	175 Fifth Avenue, New York, NY 10010 United States
Prepared by	:	ACCURATE TECHNOLOGY CO., LTD
Address	:	F1, Bldg. A, Changyuan New Material Port, Keyuan Rd. Science & Industry Park, Nanshan, Shenzhen, Guangdong P.R. China
		Tel: (0755) 26503290
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Report Number	:	ATE20152072
Date of Test	:	September 24, 2015
Date of Report	:	October 8, 2015

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Description Page

Test Report Certification

Applicant	:	Bedford, Freeman & Worth Publishing Group, LLC
Manufacturer	:	Shenzhen C&D Electronics Co., Ltd
EUT Description	:	IOLab Dongle
		(A) Model No.: IOL15B
		(B) Trade Mark: Macmillan
		(C) Power Supply: DC 5V

Measurement Procedure Used:

FCC Rules and Regulations Part 15 Subpart C Section 15.249: 2015
ANSI C63.10: 2013

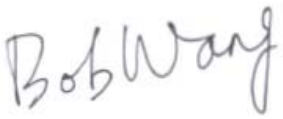
The EUT was tested according to FCC 47CFR 15.249 for compliance to FCC 47CFR 15.249 requirements

The device described above is tested by ACCURATE TECHNOLOGY CO. LTD to determine the maximum emission levels emanating from the device. The maximum emission levels are compared to the FCC Part 15 Subpart C Section 15.249 limits. The measurement results are contained in this test report and ACCURATE TECHNOLOGY CO. LTD is assumed full responsibility for the accuracy and completeness of these measurements. Also, this report shows that the Equipment Under Test (EUT) is to be technically compliant with the FCC requirements.

This report applies to above tested sample only. This report shall not be reproduced in part without written approval of ACCURATE TECHNOLOGY CO. LTD.

Date of Test :	September 24, 2015
Date of Report:	October 8, 2015

Prepared by :



(Bob Wang, Engineer)

Approved & Authorized Signer :

(Sean Lu, Manager)

1. GENERAL INFORMATION

1.1.Description of Device (EUT)

EUT	:	IOLab Dongle
Model Number	:	IOL15B
Trade Mark	:	Macmillan
Power Supply	:	DC 5V (Power by USB port)
Modulation:	:	GFSK
Frequency Range	:	2.402-2.480GHz
Number of Channels	:	79
Type of Antenna	:	PCB Antenna
Max antenna gain	:	0dBi
Applicant	:	Bedford, Freeman & Worth Publishing Group, LLC
Address	:	175 Fifth Avenue, New York, NY 10010 United States
Manufacturer	:	Shenzhen C&D Electronics Co., Ltd
Address	:	The 9th floor of 9th A Building Baoneng technology park, Longhua Town, BaoAn District, ShenZhen, Guangdong, China
Date of sample received	:	September 21, 2015
Date of Test	:	September 24, 2015

1.2.Special Accessory and Auxiliary Equipment

N/A

1.3.Description of Test Facility

EMC Lab	:	Accredited by TUV Rheinland Shenzhen Listed by FCC The Registration Number is 752051 Listed by Industry Canada The Registration Number is 5077A-2 Accredited by China National Accreditation Committee for Laboratories The Certificate Registration Number is L3193
Name of Firm	:	ACCURATE TECHNOLOGY CO. LTD
Site Location	:	F1, Bldg. A, Changyuan New Material Port, Keyuan Rd. Science & Industry Park, Nanshan, Shenzhen, Guangdong P.R. China

1.4.Measurement Uncertainty

Conducted Emission Expanded Uncertainty	=	2.23dB, k=2
Radiated emission expanded uncertainty (9kHz-30MHz)	=	3.08dB, k=2
Radiated emission expanded uncertainty (30MHz-1000MHz)	=	4.42dB, k=2
Radiated emission expanded uncertainty (Above 1GHz)	=	4.06dB, k=2

2. MEASURING DEVICE AND TEST EQUIPMENT

Table 1: List of Test and Measurement Equipment

Kind of equipment	Manufacturer	Type	S/N	Calibrated dates	Calibrated until
EMI Test Receiver	Rohde&Schwarz	ESCS30	100307	Jan. 11, 2015	Jan. 10, 2016
EMI Test Receiver	Rohde&Schwarz	ESPI3	101526/003	Jan. 11, 2015	Jan. 10, 2016
Spectrum Analyzer	Agilent	E7405A	MY45115511	Jan. 11, 2015	Jan. 10, 2016
Pre-Amplifier	Rohde&Schwarz	CBLU1183540-01	3791	Jan. 11, 2015	Jan. 10, 2016
Loop Antenna	Schwarzbeck	FMZB1516	1516131	Jan. 15, 2015	Jan. 14, 2016
Bilog Antenna	Schwarzbeck	VULB9163	9163-323	Jan. 15, 2015	Jan. 14, 2016
Horn Antenna	Schwarzbeck	BBHA9120D	9120D-655	Jan. 15, 2015	Jan. 14, 2016
Horn Antenna	Schwarzbeck	BBHA9170	9170-359	Jan. 15, 2015	Jan. 14, 2016
LISN	Rohde&Schwarz	ESH3-Z5	100305	Jan. 11, 2015	Jan. 10, 2016
LISN	Schwarzbeck	NSLK8126	8126431	Jan. 11, 2015	Jan. 10, 2016
Highpass Filter	Wainwright Instruments	WHKX3.6/18G-10SS	N/A	Jan. 11, 2015	Jan. 10, 2016
Band Reject Filter	Wainwright Instruments	WRCG2400/2485-2375/2510-60/11SS	N/A	Jan. 11, 2015	Jan. 10, 2016

3. OPERATION OF EUT DURING TESTING

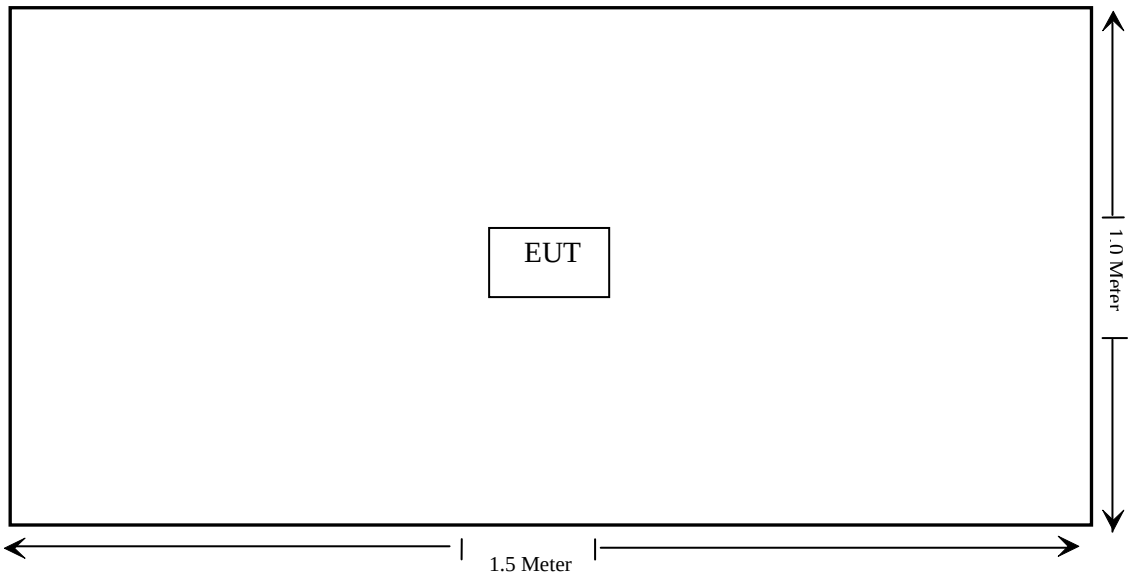
3.1.Operating Mode

The mode is used: **Transmitting mode**

Low Channel: 2402MHz
Middle Channel: 2450MHz
High Channel: 2480MHz

3.2.Configuration and peripherals

Block Diagram of Test Setup

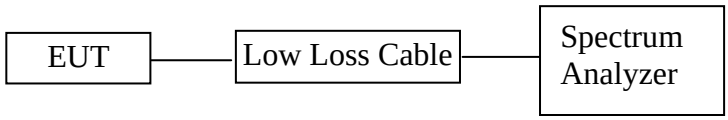


4. TEST PROCEDURES AND RESULTS

FCC Rules	Description of Test	Result
Section 15.215(c)	20dB Bandwidth	Compliant
Section 15.249(d)	Band Edge Compliance Test	Compliant
Section 15.205(a), Section 15.209(a), Section 15.249, Section 15.35	Radiated Spurious Emission Test	Compliant
Section 15.207	AC Power Line Conducted Emission Test	Compliant
Section 15.203	Antenna Requirement	Compliant

5. 20DB BANDWIDTH MEASUREMENT

5.1.Block Diagram of Test Setup



5.2.The Requirement For Section 15.215(c)

The bandwidth of a frequency hopping channel is the 20 dB emission bandwidth, measured with the hopping stopped. The system RF bandwidth is equal to the channel bandwidth multiplied by the number of channels in the hopset. The hopset shall be such that the near-term distribution of frequencies appears random, with sequential hops randomly distributed in both direction and magnitude of change in the hopset while the long-term distribution appears evenly distributed.

5.3.Operating Condition of EUT

5.3.1.Setup the EUT and simulator as shown as Section 5.1.

5.3.2.Turn on the power of all equipment.

5.3.3.Let the EUT work in TX modes measure it. The transmit frequency is 2402, 2450, 2480MHz.

5.4.Test Procedure

5.4.1.Place the EUT on the table and set it in transmitting mode.

5.4.2.Remove the antenna from the EUT and then connect a low loss RF cable from the antenna port to the spectrum analyzer.

5.4.3.Set RBW of spectrum analyzer to 100 kHz and VBW to300 kHz, Detector function=peak, Trace=max hold, Sweep=auto.

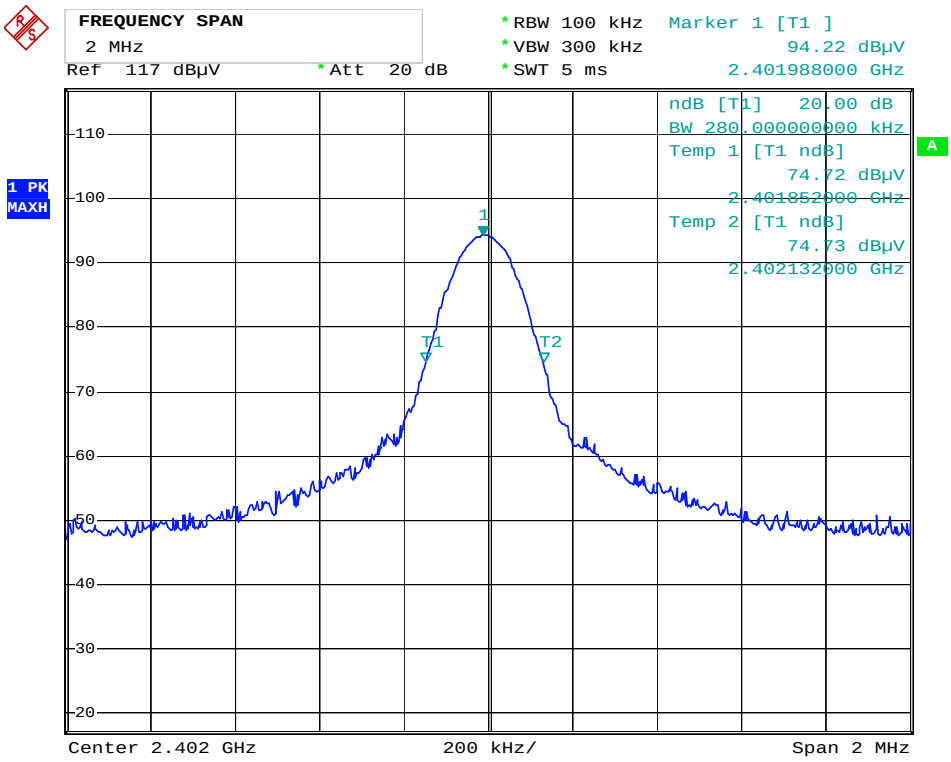
5.4.4.Set the measured low, middle and high frequency and test 20dB bandwidth with spectrum analyzer.

5.5.Test Result

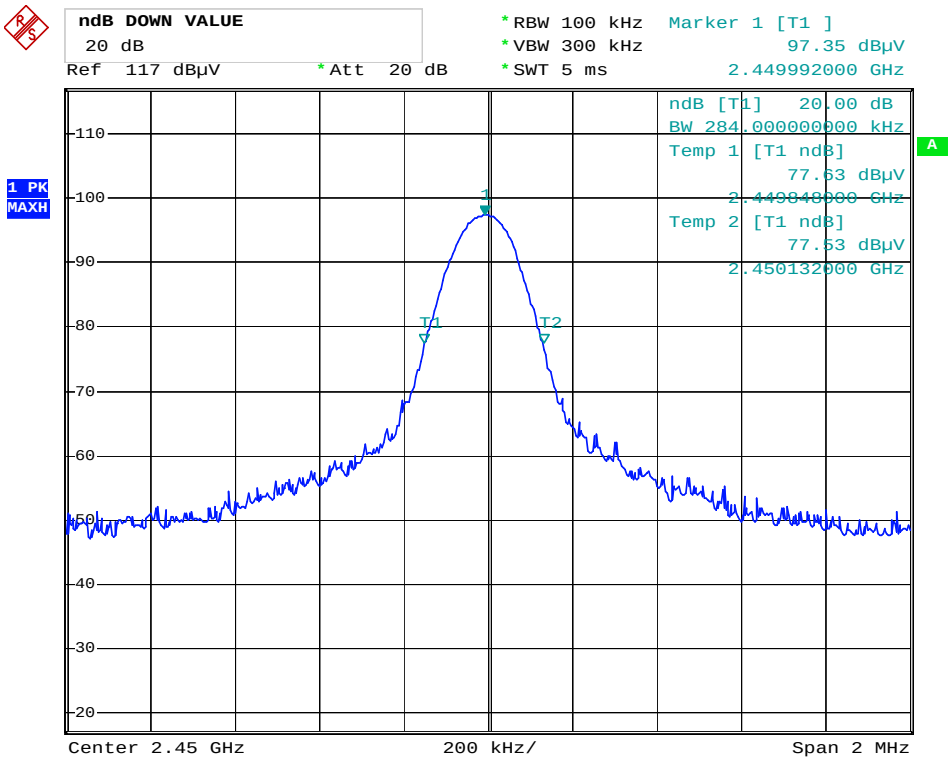
Channel	Frequency (MHz)	20 dB Bandwidth (MHz)
Low	2402	0.28
Mid	2450	0.28
High	2480	0.29

The spectrum analyzer plots are attached as below.

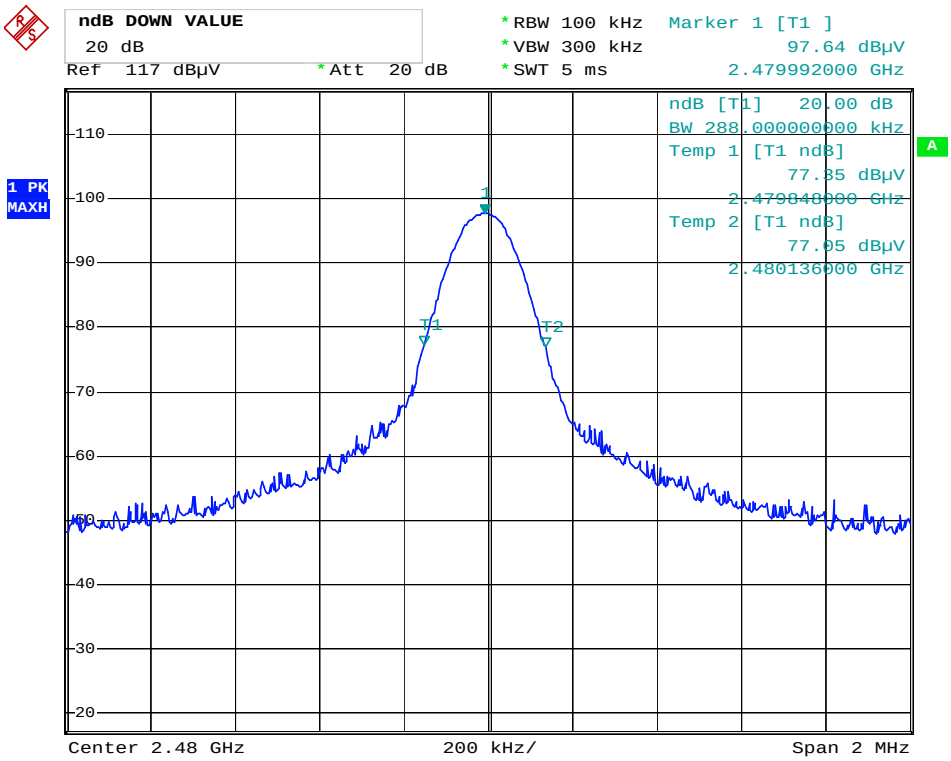
Low channel



Middle channel

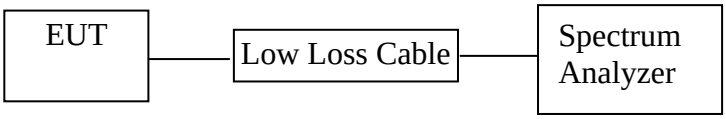


High channel



6. BAND EDGE COMPLIANCE TEST

6.1.Block Diagram of Test Setup



6.2.The Requirement For Section 15.249

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 A8.4(4), the attenuation required shall be 30 dB instead of 20 dB. Attenuation below the general limits specified in Section 15.209(a) is not required. In addition, radiated emissions which fall in the restricted bands, as defined in Section 15.205(a), must also comply with the radiated emission limits specified in Section 15.209(a).

6.3.EUT Configuration on Measurement

The equipment are installed on the emission Measurement to meet the commission requirements and operating regulations in a manner which tends to maximize its emission characteristics in normal application.

6.4.Operating Condition of EUT

6.4.1.Setup the EUT and simulator as shown as Section 6.1.

6.4.2.Turn on the power of all equipment.

6.4.3.Let the EUT work in TX modes measure it. The transmit frequency is 2402, 2480 MHz.

6.5.Test Procedure

Conducted Band Edge:

6.5.1.The transmitter output was connected to the spectrum analyzer via a low loss cable.

6.5.2.Set RBW of spectrum analyzer to 100 kHz and VBW to 300 kHz.

Radiated Band Edge:
Note:
1. Emissions attenuated more than 20 dB below the permissible value are not reported.
2. The field strength is calculated by adding the antenna factor, high pass filter loss(if used) and cable loss, and subtracting the amplifier gain(if any)from the measured reading. The basic equation calculation is as follows:
Result = Reading + Corrected Factor
3. Display the measurement of peak values.

Test Procedure:

The EUT and its simulators are placed on a turntable, which is 1.5 meter high above ground(Above 1GHz). The turntable can rotate 360 degrees to determine the position of the maximum emission level. EUT is set 3.0 meters away from the receiving antenna, which is mounted on an antenna tower. The antenna can be moved up and down between 1.0 meter and 4 meters to find out the maximum emission level. Broadband antenna (calibrated bi-log antenna) is used as receiving antenna. Both horizontal and vertical polarizations of the antenna are set on measurement. In order to find the maximum emission levels, all of the EUT location must be manipulated according to ANSI C63.10:2013 on radiated emission measurement. The EUT was tested in 3 orthogonal planes.

Let the EUT work in TX modes then measure it.

During the radiated emission test, the spectrum analyzer was set with the following configurations:
1.The resolution bandwidth of test receiver/spectrum analyzer is 1MHz and video bandwidth is 3MHz for peak measurement with peak detector at frequency above 1GHz.
2.The resolution bandwidth of test receiver/spectrum analyzer is 1MHz and video bandwidth is 10Hz for Average measurement with peak detection at frequency above 1GHz.
3.All modes of operation were investigated and the worst-case emissions are reported.

6.6.Test Result

Pass

Radiated Band Edge Result

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Site: 2# Chamber
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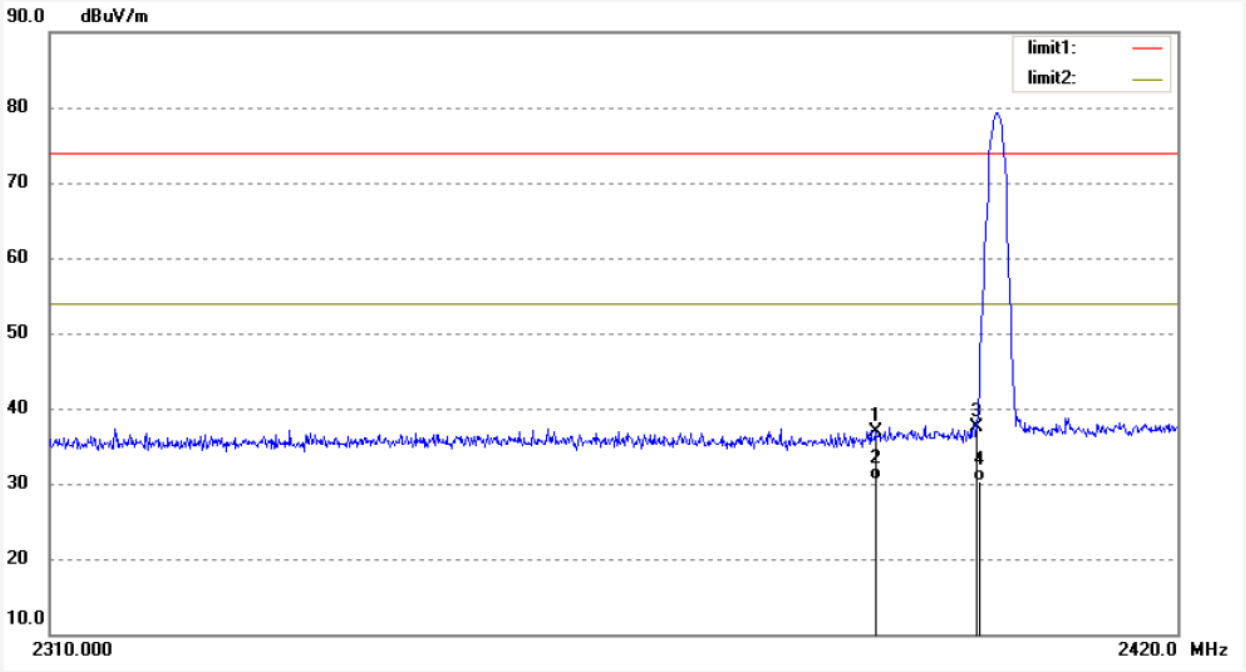
Job No.: ricky2015 #174
Standard: FCC PK
Test item: Radiation Test
Temp.(C)/Hum.(%) 23 C / 48 %
EUT: IOLab Dongle
Mode: TX 2402MHz
Model: IOL15B
Manufacturer: C&D

Polarization: Horizontal
Power Source: DC 5V
Date: 15/09/24/
Time: 16/56/30
Engineer Signature: Ricky
Distance: 3m

Note: Report NO.:ATE20152072



No.	Freq. (MHz)	Reading (dBuV/m)	Factor (dB)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Detector	Height (cm)	Degree (deg.)	Remark
1	2390.000	44.88	-7.96	36.92	74.00	-37.08	peak			
2	2390.000	38.54	-7.96	30.58	54.00	-23.42	AVG			
3	2400.000	45.50	-7.93	37.57	74.00	-36.43	peak			
4	2400.000	38.22	-7.93	30.29	54.00	-23.71	AVG			

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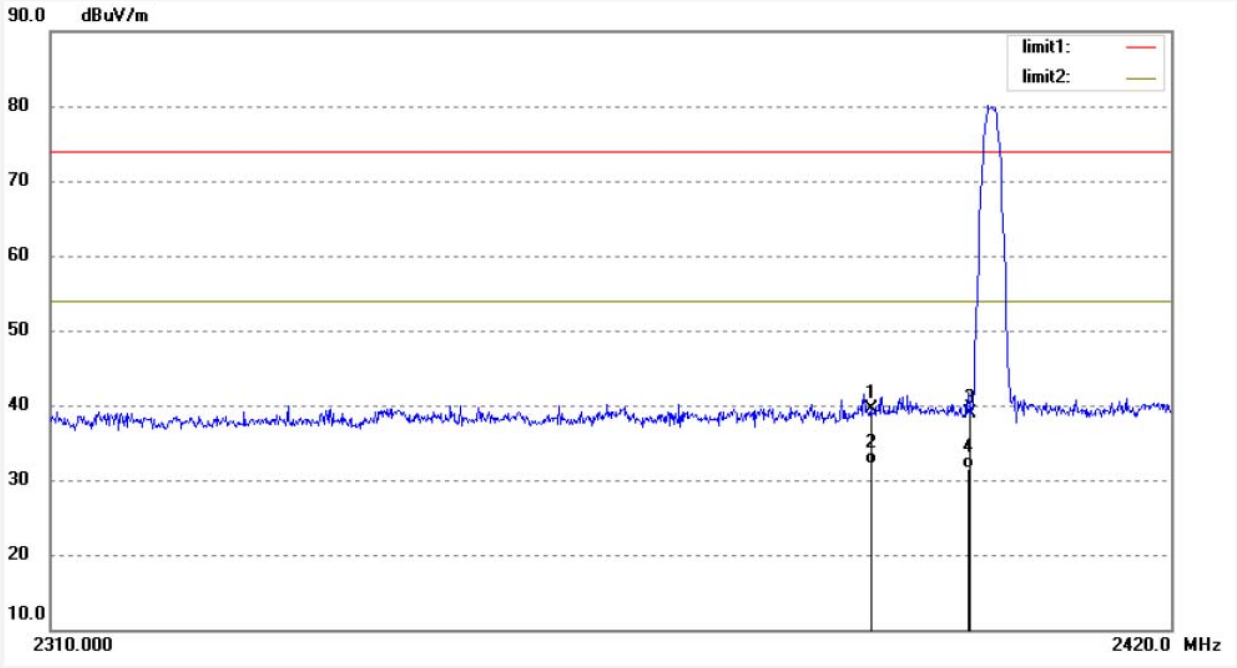
Job No.: ricky2015 #173	Polarization: Vertical
Standard: FCC PK	Power Source: DC 5V
Test item: Radiation Test	Date: 15/09/24/
Temp.(C)/Hum.(%) 23 C / 48 %	Time: 16/54/18
EUT: IOLab Dongle	Engineer Signature: Ricky
Mode: TX 2402MHz	Distance: 3m
Model: IOL15B	
Manufacturer: C&D	

Note: Report NO.:ATE20152072



No.	Freq. (MHz)	Reading (dBuV/m)	Factor (dB)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Detector	Height (cm)	Degree (deg.)	Remark
1	2390.000	47.37	-7.96	39.41	74.00	-34.59	peak			
2	2390.000	40.12	-7.96	32.16	54.00	-21.84	AVG			
3	2400.000	46.77	-7.93	38.84	74.00	-35.16	peak			
4	2400.000	39.52	-7.93	31.59	54.00	-22.41	AVG			

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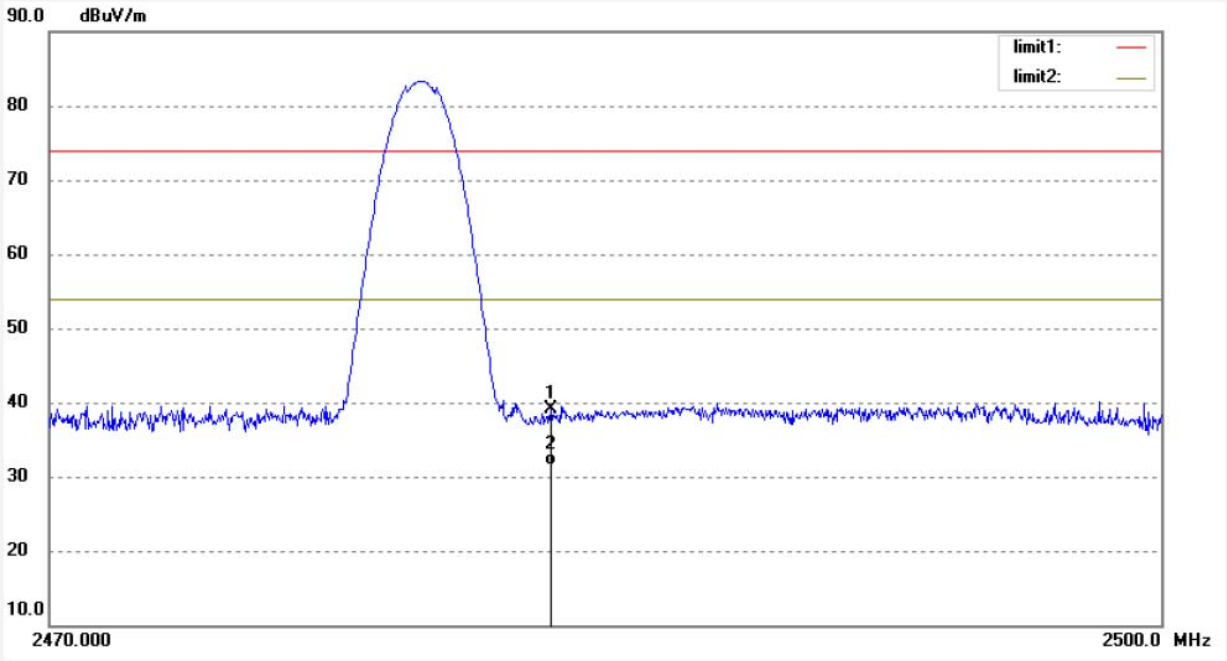
Fax:+86-0755-26503396

Job No.: ricky2015 #172
Standard: FCC PK
Test item: Radiation Test
Temp.(C)/Hum.(%) 23 C / 48 %
EUT: IOLab Dongle
Mode: TX 2480MHz
Model: IOL15B
Manufacturer: C&D

Polarization: Horizontal
Power Source: DC 5V
Date: 15/09/24/
Time: 16/52/50
Engineer Signature: Ricky
Distance: 3m

Note: Report NO.:ATE20152072



No.	Freq. (MHz)	Reading (dBuV/m)	Factor (dB)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Detector	Height (cm)	Degree (deg.)	Remark
1	2483.500	46.94	-7.75	39.19	74.00	-34.81	peak			
2	2483.500	39.21	-7.75	31.46	54.00	-22.54	AVG			

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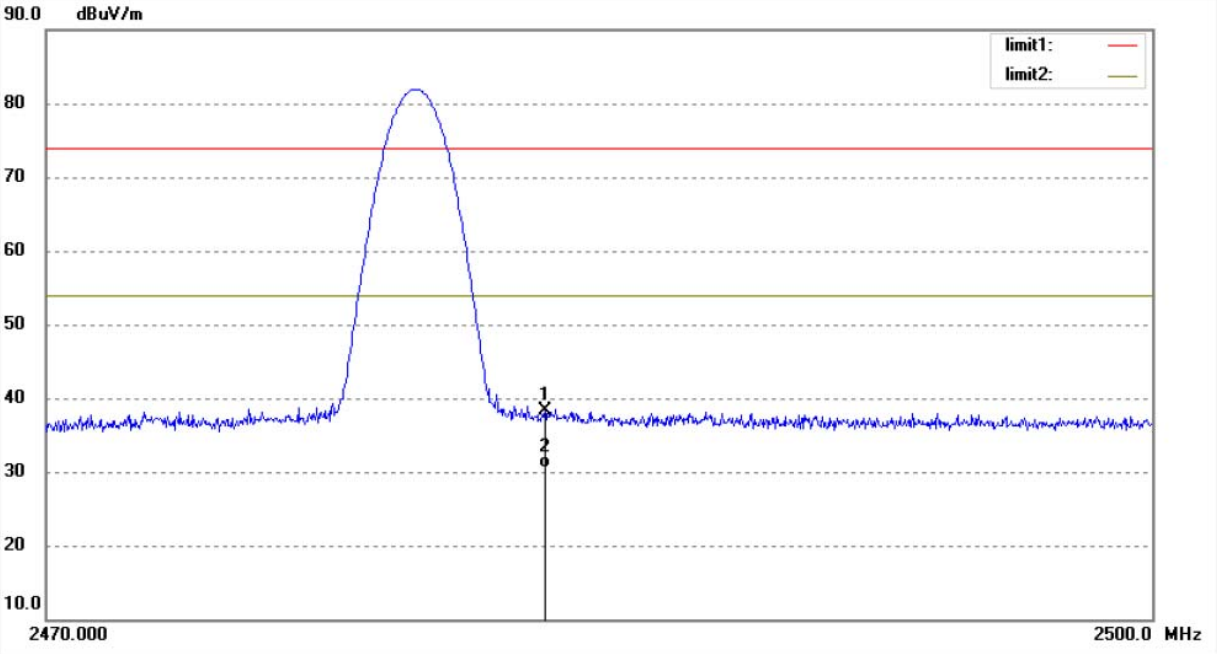
Fax:+86-0755-26503396

Job No.: ricky2015 #171	Polarization: Vertical
Standard: FCC PK	Power Source: DC 5V
Test item: Radiation Test	Date: 15/09/24/
Temp.(C)/Hum.(%) 23 C / 48 %	Time: 16/51/21
EUT: IOLab Dongle	Engineer Signature: Ricky
Mode: TX 2480MHz	Distance: 3m
Model: IOL15B	
Manufacturer: C&D	

Note: Report NO.:ATE20152072

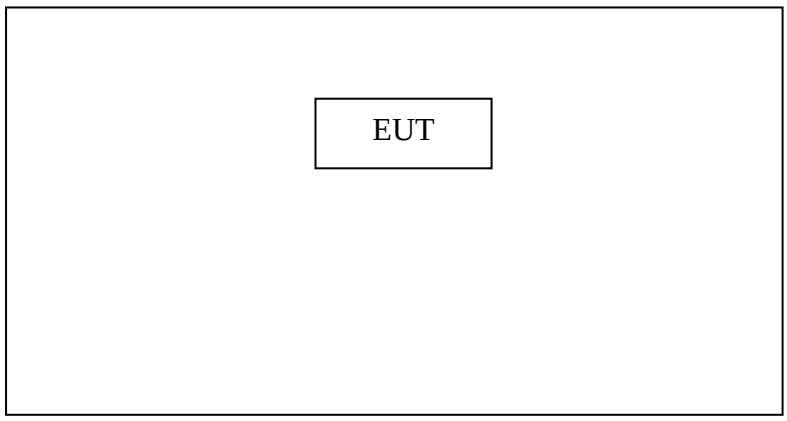


No.	Freq. (MHz)	Reading (dBuV/m)	Factor (dB)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Detector	Height (cm)	Degree (deg.)	Remark
1	2483.500	45.96	-7.75	38.21	74.00	-35.79	peak			
2	2483.500	38.25	-7.75	30.50	54.00	-23.50	AVG			

7. RADIATED SPURIOUS EMISSION TEST

7.1.Block Diagram of Test Setup

7.1.1.Block diagram of connection between the EUT and peripherals

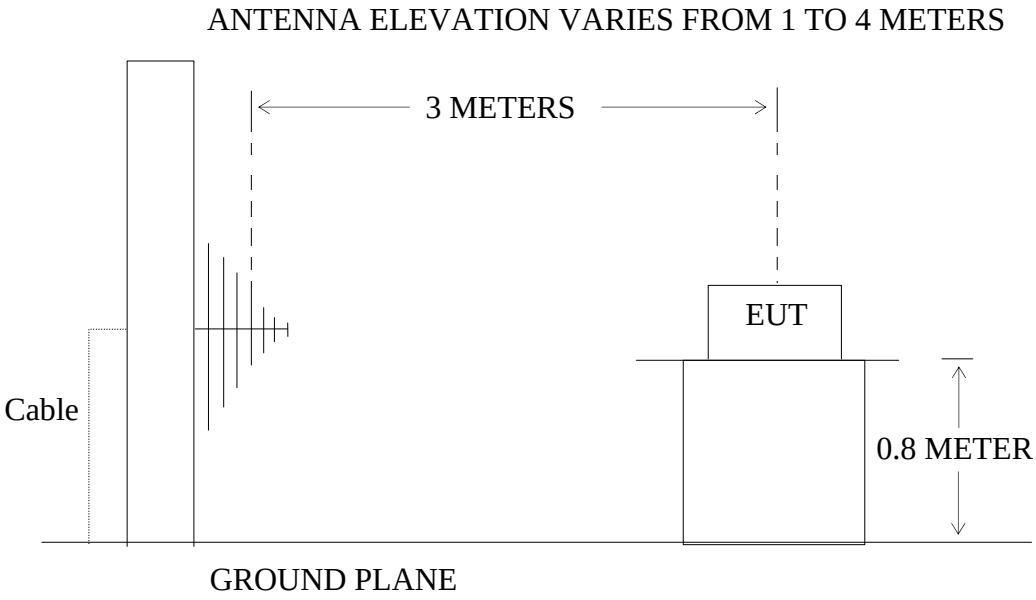


Setup: Transmitting mode

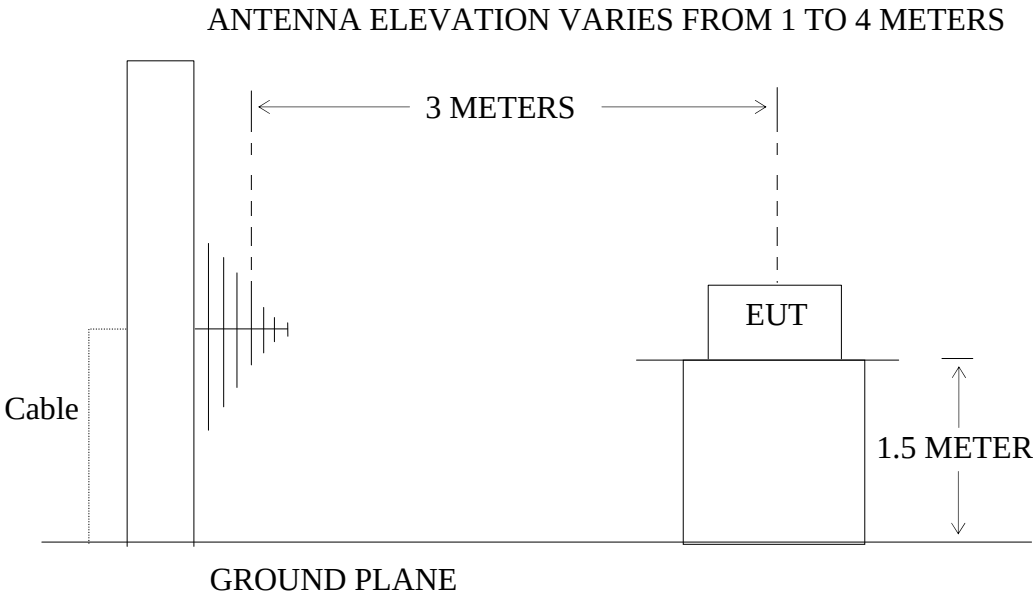
(EUT: IOLab Dongle)

7.1.2.Semi-Anechoic Chamber Test Setup Diagram

Below 1GHz



Above 1GHz



7.2.The Limit For Section 15.249

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 A8.4(4), the attenuation required under this paragraph shall be 30 dB instead of 20 dB. Attenuation below the general limits specified in Section 15.209(a) is not required. In addition, radiated emissions which fall in the restricted bands, as defined in Section 15.205(a), must also comply with the radiated emission limits specified in Section 15.209(a).

7.3.Restricted bands of operation

7.3.1.FCC Part 15.205 Restricted bands of operation

(a) Except as shown in paragraph (d) of this section, Only spurious emissions are permitted in any of the frequency bands listed below:

MHz	MHz	MHz	GHz
0.090-0.110	16.42-16.423	399.9-410	4.5-5.15
[1]0.495-0.505	16.69475-16.69525	608-614	5.35-5.46
2.1735-2.1905	16.80425-16.80475	960-1240	7.25-7.75
4.125-4.128	25.5-25.67	1300-1427	8.025-8.5
4.17725-4.17775	37.5-38.25	1435-1626.5	9.0-9.2
4.20725-4.20775	73-74.6	1645.5-1646.5	9.3-9.5
6.215-6.218	74.8-75.2	1660-1710	10.6-12.7
6.26775-6.26825	108-121.94	1718.8-1722.2	13.25-13.4
6.31175-6.31225	123-138	2200-2300	14.47-14.5
8.291-8.294	149.9-150.05	2310-2390	15.35-16.2
8.362-8.366	156.52475-156.52525	2483.5-2500	17.7-21.4
8.37625-8.38675	156.7-156.9	2690-2900	22.01-23.12
8.41425-8.41475	162.0125-167.17	3260-3267	23.6-24.0
12.29-12.293	167.72-173.2	3332-3339	31.2-31.8
12.51975-12.52025	240-285	3345.8-3358	36.43-36.5
12.57675-12.57725	322-335.4	3600-4400	([2])
13.36-13.41			

[1]Until February 1, 1999, this restricted band shall be 0.490-0.510
[2]Above 38.6

(b) Except as provided in paragraphs (d) and (e), the field strength of emission appearing within these frequency bands shall not exceed the limits shown in Section 15.209. At frequencies equal to or less than 1000MHz, Compliance with the limits in Section 15.209 shall be demonstrated using measurement instrumentation employing a CISPR quasi-peak detector. Above 1000MHz, compliance with the emission limits in Section15.209 shall be demonstrated based on the average value of the measured emissions. The provisions in Section 15.35 apply to these measurements.

7.4.Configuration of EUT on Measurement

The equipment are installed on Radiated Emission Measurement to meet the commission requirements and operating regulations in a manner which tends to maximize its emission characteristics in normal application.

7.5.Operating Condition of EUT

7.5.1.Setup the EUT and simulator as shown as Section 7.1.

7.5.2.Turn on the power of all equipment.

7.5.3.Let the EUT work in TX modes measure it. The transmit frequency is 2402, 2450, 2480MHz.

7.6. Test Procedure

The EUT and its simulators are placed on a turntable, which is 0.8 meter high above ground(Below 1GHz). The EUT and its simulators are placed on a turntable, which is 1.5 meter high above ground(Above 1GHz). The turntable can rotate 360 degrees to determine the position of the maximum emission level. EUT is set 3.0 meters away from the receiving antenna, which is mounted on an antenna tower. The antenna can be moved up and down between 1.0 meter and 4 meters to find out the maximum emission level. Broadband antenna (calibrated bi-log antenna) is used as receiving antenna. Both horizontal and vertical polarizations of the antenna are set on measurement. In order to find the maximum emission levels, all of the EUT location must be manipulated according to ANSI C63.10:2013 on radiated emission measurement. The EUT was tested in 3 orthogonal planes.

The frequency range from 30MHz to 25000MHz is checked.
Result = Reading + Corrected Factor
Where Corrected Factor = Antenna Factor + Cable Loss – Amplifier Gain

During the radiated emission test, the spectrum analyzer was set with the following configurations:

1. The resolution bandwidth and video bandwidth of test receiver/spectrum analyzer is 120kHz for Quasi-peak at frequency below 1GHz.
2. The resolution bandwidth of test receiver/spectrum analyzer is 1MHz and video bandwidth is 3MHz for peak measurement with peak detector at frequency above 1GHz.
3. The resolution bandwidth of test receiver/spectrum analyzer is 1MHz and video bandwidth is 10Hz for Average measurement with peak detection at frequency above 1GHz.
4. All modes of operation were investigated and the worst-case emissions are reported.

7.7.The Field Strength of Radiation Emission Measurement Results

PASS.

For 30MHz-1000MHz

Corrected Factor = Antenna Factor + Cable Loss – Amplifier Gain

Frequency (MHz)	Reading (dBμV/m)	Factor Corr. (dB)	Result (dBμV/m)	Limit (dBμV/m)	Margin (dB)	Polarization
	QP		QP	QP	QP	
---	---	---	---	---	---	Vertical
---	---	---	---	---	---	Vertical
---	---	---	---	---	---	Vertical
---	---	---	---	---	---	Horizontal
---	---	---	---	---	---	Horizontal
---	---	---	---	---	---	Horizontal

For 1GHz-25GHz

Corrected Factor = Antenna Factor + Cable Loss – Amplifier Gain

Frequency (MHz)	Reading(dBμV/m)		Factor Corr. (dB)	Result(dBμV/m)		Limit(dBμV/m)		Margin(dBμV/m)		Polarization
	AV	PEAK		AV	PEAK	AV	PEAK	AV	PEAK	
-	-	-	-	-	-	-	-	-	-	Vertical
-	-	-	-	-	-	-	-	-	-	Horizontal

Note: 1. Emissions attenuated more than 20 dB below the permissible value are not reported.

2. *: Denotes restricted band of operation.

3. The EUT is tested radiation emission at Low, Middle, High channel in three axes. The worst emissions are reported in all channels.

4. The radiation emissions from 18-25GHz are not reported, because the test values lower than the limits of 20dB.

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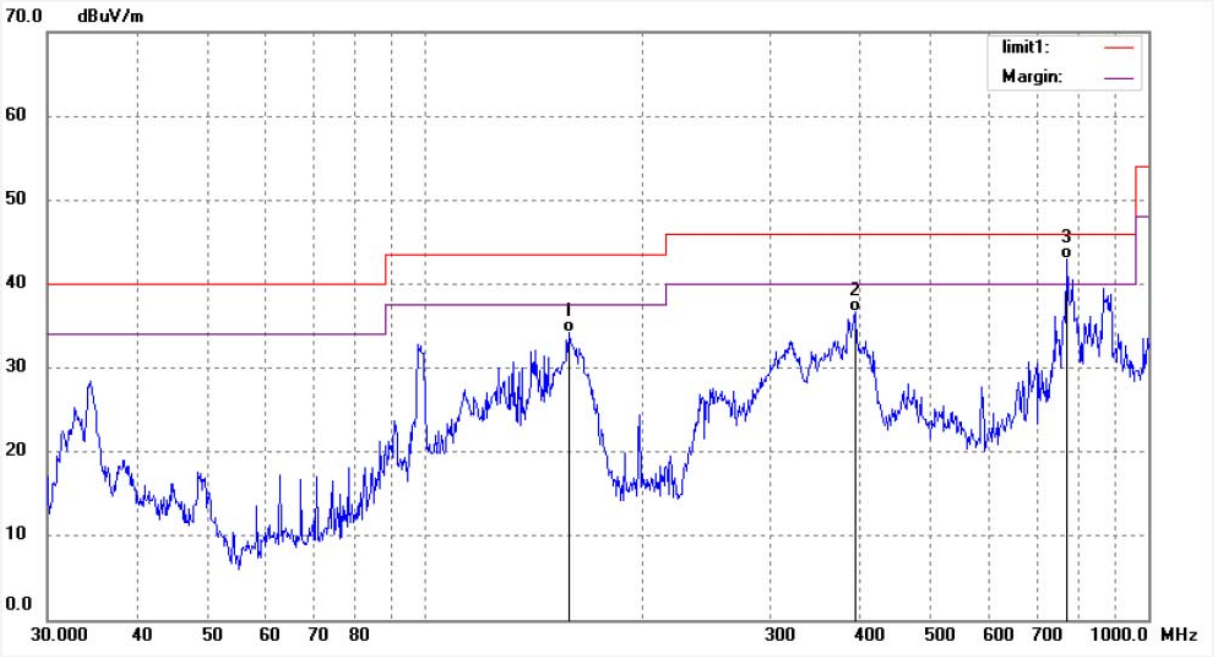
Job No.: ricky 2015 #834	Polarization: Vertical
Standard: FCC Class B 3M Radiated	Power Source: DC 5V
Test item: Radiation Test	Date: 15/09/24/
Temp.(C)/Hum.(%) 25 C / 55 %	Time: 8/40/13
EUT: IOLab Dongle	Engineer Signature: Ricky
Mode: TX 2402MHz	Distance: 3m
Model: IOL15B	
Manufacturer: C&D	

Note: Report No.:ATE20152072



No.	Freq. (MHz)	Reading (dBuV/m)	Factor (dB)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Detector	Height (cm)	Degree (deg.)	Remark
1	158.0835	55.74	-21.56	34.18	43.50	-9.32	QP			
2	392.7376	50.73	-14.05	36.68	46.00	-9.32	QP			
3	771.0475	49.39	-6.39	43.00	46.00	-3.00	QP			

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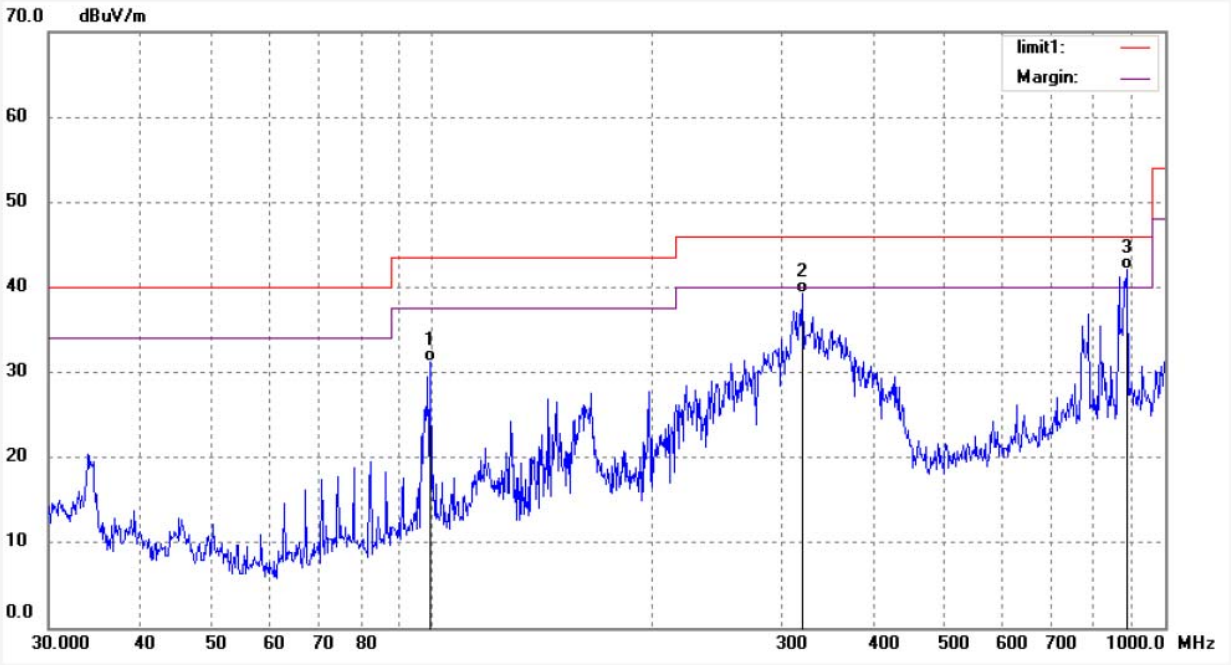
Job No.: ricky 2015 #835	Polarization: Horizontal
Standard: FCC Class B 3M Radiated	Power Source: DC 5V
Test item: Radiation Test	Date: 15/09/24/
Temp.(C)/Hum.(%) 25 C / 55 %	Time: 8/41/55
EUT: IOLab Dongle	Engineer Signature: Ricky
Mode: TX 2402MHz	Distance: 3m
Model: IOL15B	
Manufacturer: C&D	

Note: Report No.:ATE20152072



No.	Freq. (MHz)	Reading (dBuV/m)	Factor (dB)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Detector	Height (cm)	Degree (deg.)	Remark
1	99.4177	52.91	-21.67	31.24	43.50	-12.26	QP			
2	320.3306	55.10	-15.78	39.32	46.00	-6.68	QP			
3	887.3978	46.46	-4.39	42.07	46.00	-3.93	QP			

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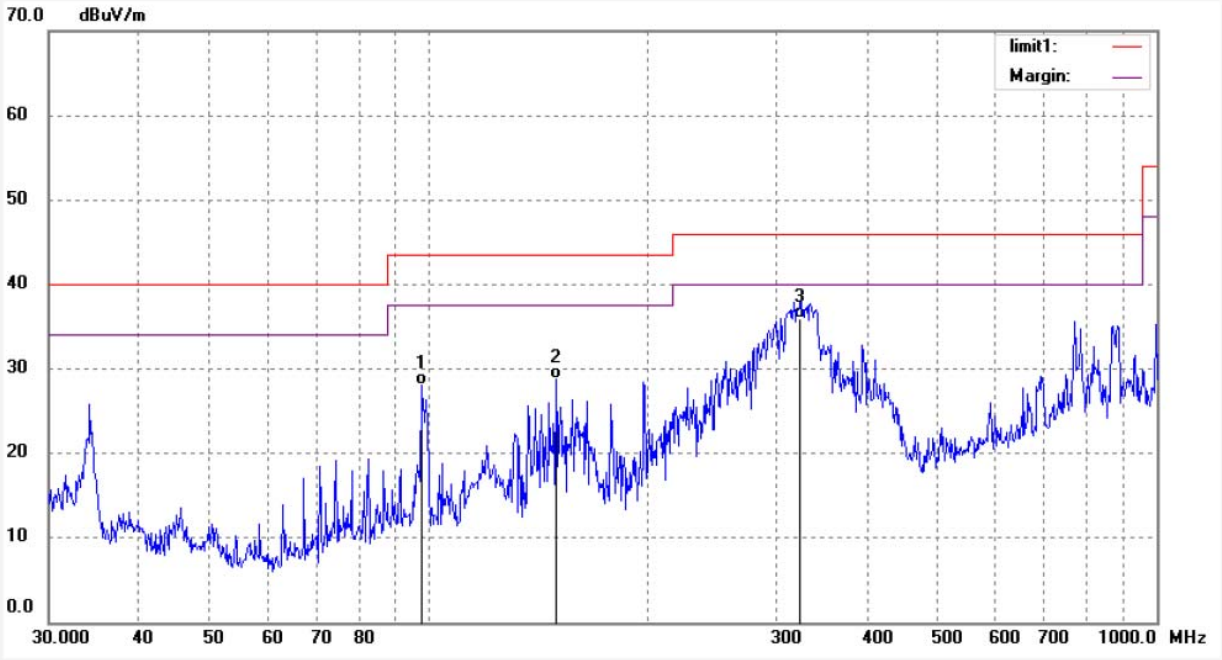
Job No.: ricky 2015 #836
Standard: FCC Class B 3M Radiated
Test item: Radiation Test
Temp.(C)/Hum.(%) 25 C / 55 %
EUT: IOLab Dongle
Mode: TX 2450MHz
Model: IOL15B
Manufacturer: C&D

Polarization: Horizontal
Power Source: DC 5V
Date: 15/09/24/
Time: 8/43/22
Engineer Signature: Ricky
Distance: 3m

Note: Report No.:ATE20152072



No.	Freq. (MHz)	Reading (dBuV/m)	Factor (dB)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Detector	Height (cm)	Degree (deg.)	Remark
1	97.6864	49.69	-21.59	28.10	43.50	-15.40	QP			
2	149.4416	51.05	-22.30	28.75	43.50	-14.75	QP			
3	323.7250	51.61	-15.64	35.97	46.00	-10.03	QP			

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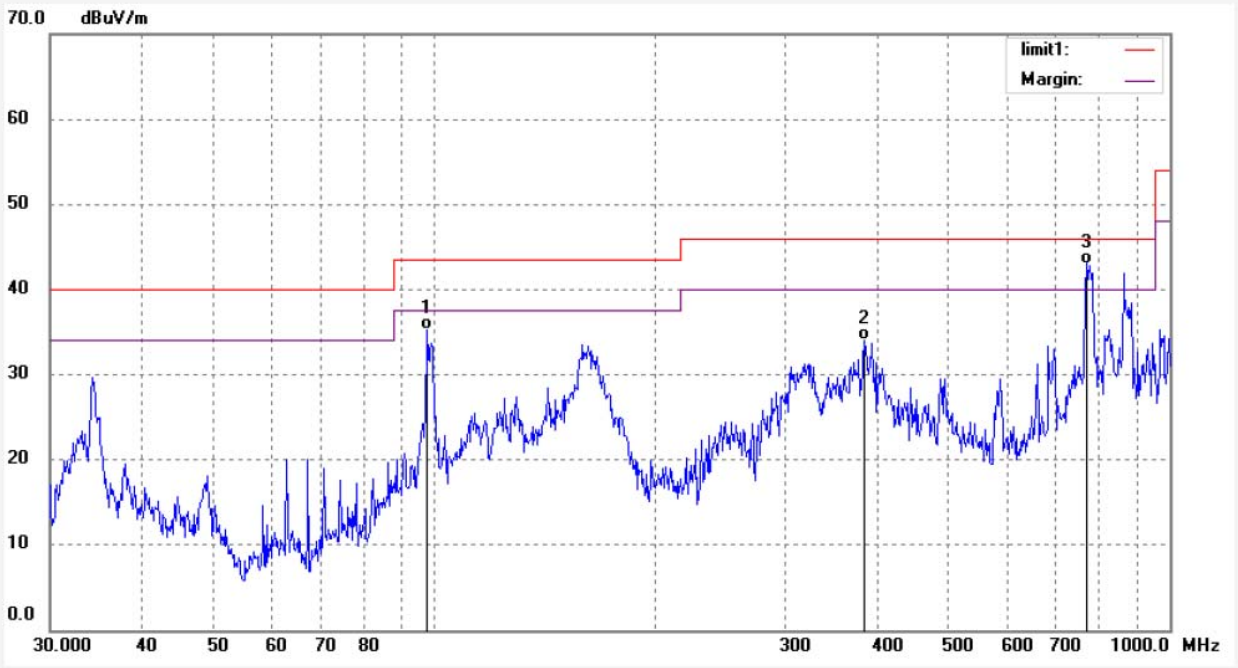
Job No.: ricky 2015 #837
Standard: FCC Class B 3M Radiated
Test item: Radiation Test
Temp.(C)/Hum.(%) 25 C / 55 %
EUT: IOLab Dongle
Mode: TX 2450MHz
Model: IOL15B
Manufacturer: C&D

Polarization: Vertical
Power Source: DC 5V
Date: 15/09/24/
Time: 8/44/29
Engineer Signature: Ricky
Distance: 3m

Note: Report No.:ATE20152072



No.	Freq. (MHz)	Reading (dBuV/m)	Factor (dB)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Detector	Height (cm)	Degree (deg.)	Remark
1	97.6864	56.88	-21.59	35.29	43.50	-8.21	QP			
2	384.5447	48.17	-14.13	34.04	46.00	-11.96	QP			
3	771.0475	49.34	-6.39	42.95	46.00	-3.05	QP			

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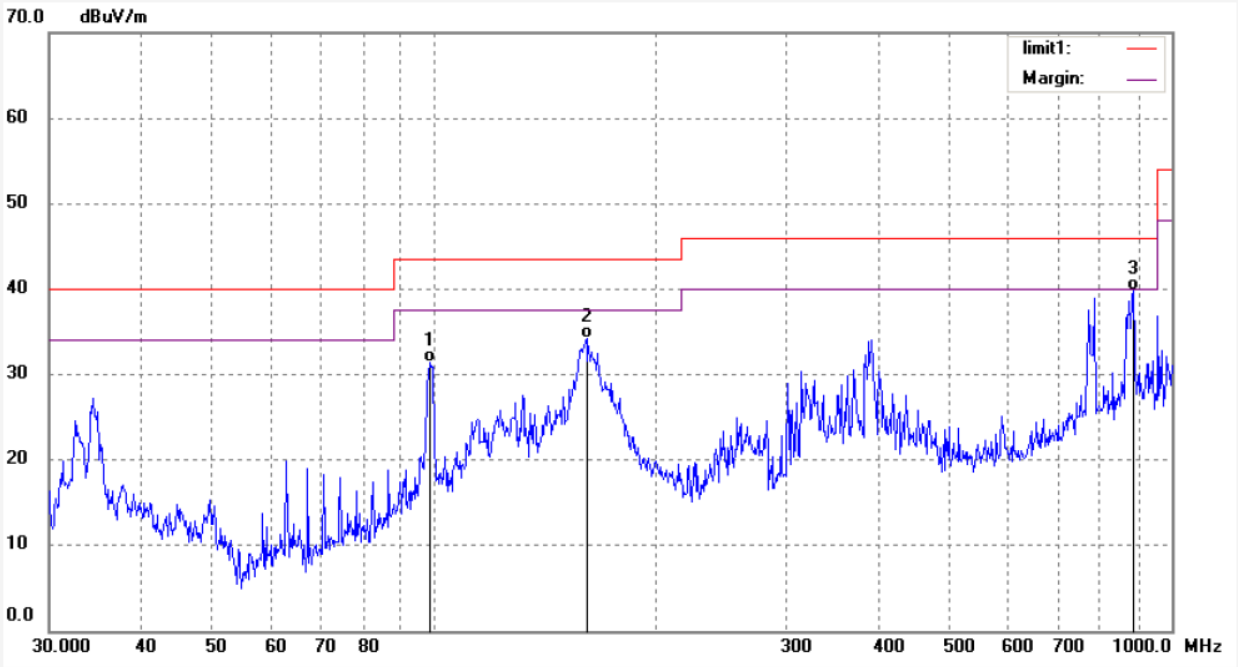
Job No.: ricky 2015 #838
Standard: FCC Class B 3M Radiated
Test item: Radiation Test
Temp.(C)/Hum.(%) 25 C / 55 %
EUT: IOLab Dongle
Mode: TX 2480MHz
Model: IOL15B
Manufacturer: C&D

Polarization: Vertical
Power Source: DC 5V
Date: 15/09/24/
Time: 8/45/35
Engineer Signature: Ricky
Distance: 3m

Note: Report No.:ATE20152072



No.	Freq. (MHz)	Reading (dBuV/m)	Factor (dB)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Detector	Height (cm)	Degree (deg.)	Remark
1	98.7215	53.02	-21.64	31.38	43.50	-12.12	QP			
2	160.8852	55.48	-21.25	34.23	43.50	-9.27	QP			
3	887.3978	44.21	-4.39	39.82	46.00	-6.18	QP			

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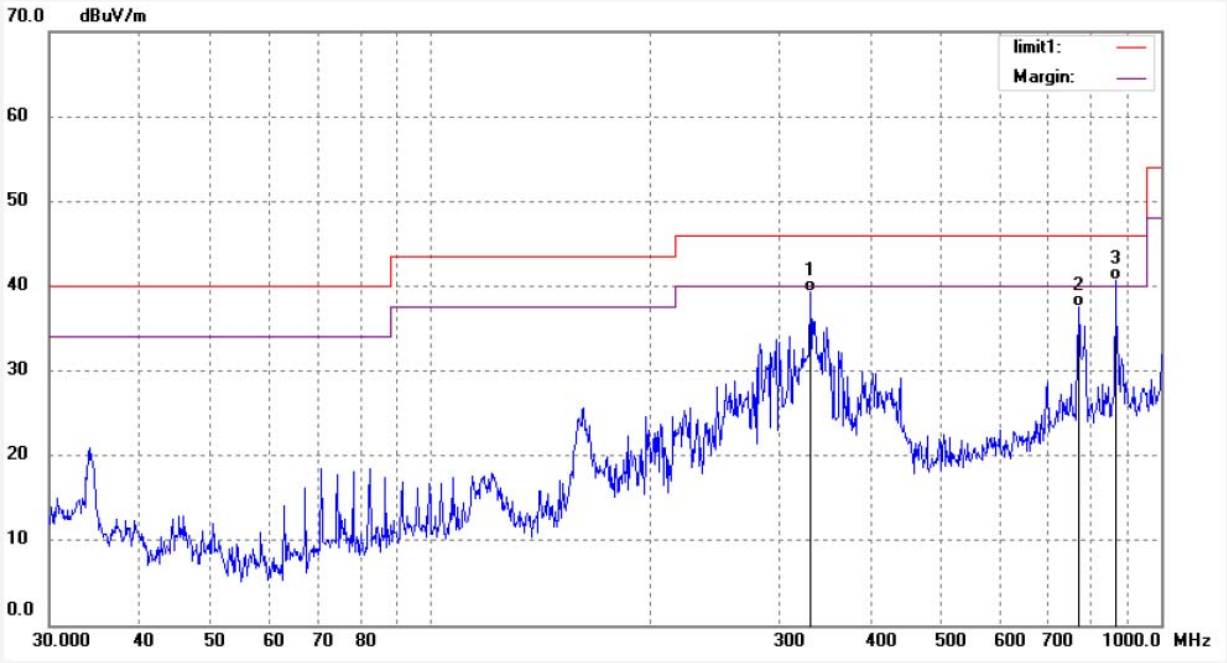
Job No.: ricky 2015 #839
Standard: FCC Class B 3M Radiated
Test item: Radiation Test
Temp.(C)/Hum.(%) 25 C / 55 %
EUT: IOLab Dongle
Mode: TX 2480MHz
Model: IOL15B
Manufacturer: C&D

Polarization: Horizontal
Power Source: DC 5V
Date: 15/09/24/
Time: 8/46/34
Engineer Signature: Ricky
Distance: 3m

Note: Report No.:ATE20152072



No.	Freq. (MHz)	Reading (dBuV/m)	Factor (dB)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Detector	Height (cm)	Degree (deg.)	Remark
1	330.6220	54.70	-15.34	39.36	46.00	-6.64	QP			
2	771.0475	43.89	-6.39	37.50	46.00	-8.50	QP			
3	865.8384	45.48	-4.77	40.71	46.00	-5.29	QP			

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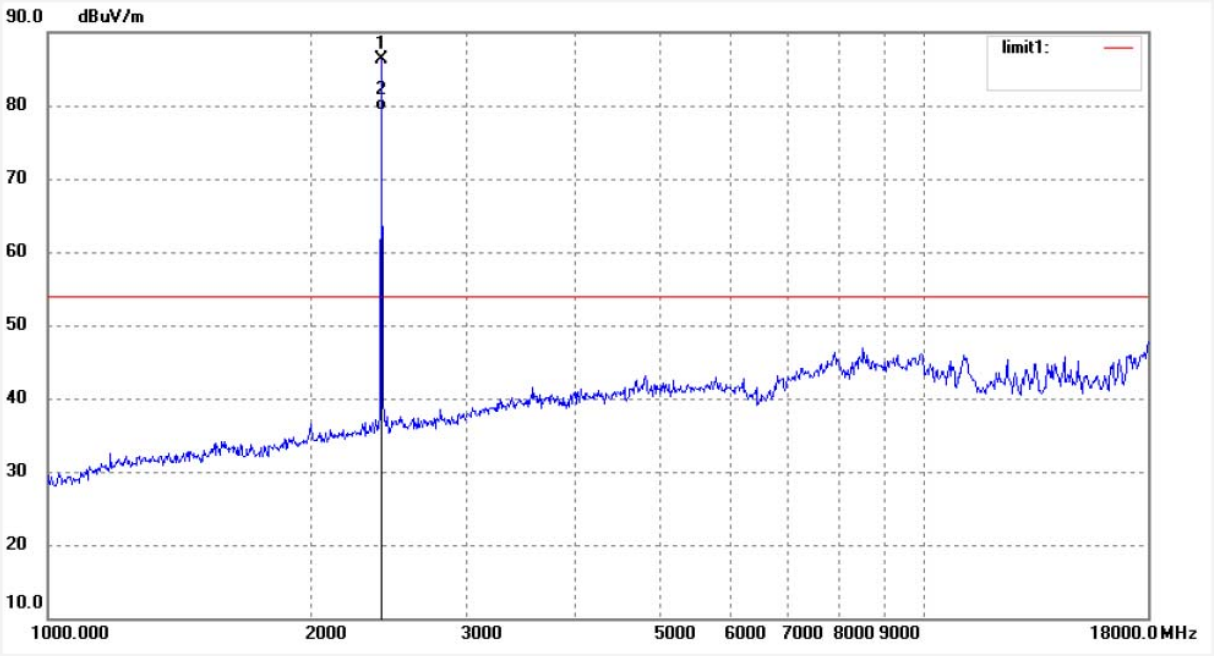
Job No.: ricky2015 #165	Polarization: Horizontal
Standard: FCC Class B 3M Radiated	Power Source: DC 5V
Test item: Radiation Test	Date: 15/09/24/
Temp.(C)/Hum.(%) 23 C / 48 %	Time: 16/39/22
EUT: IOLab Dongle	Engineer Signature: Ricky
Mode: TX 2402MHz	Distance: 3m
Model: IOL15B	
Manufacturer: C&D	

Note: Report NO.:ATE20152072



No.	Freq. (MHz)	Reading (dBuV/m)	Factor (dB)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Detector	Height (cm)	Degree (deg.)	Remark
1	2402.000	94.22	-7.93	86.29	114.00	-27.71	peak			
2	2402.000	87.23	-7.93	79.30	94.00	-14.70	AVG			

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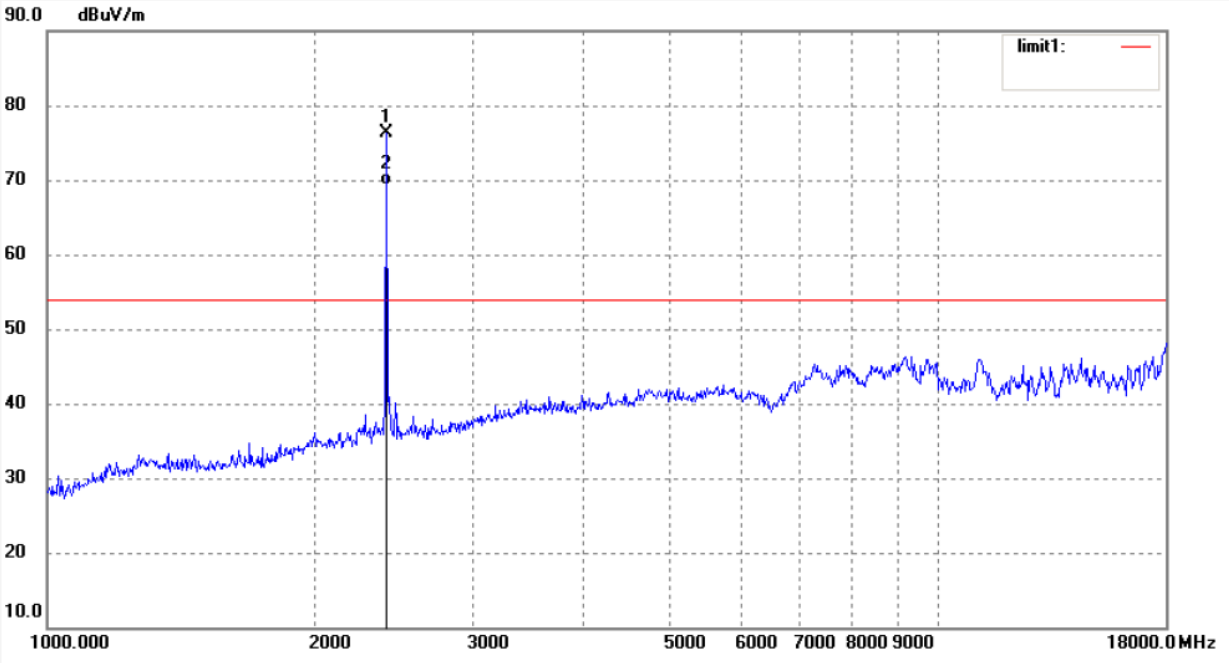
Job No.: ricky2015 #166
Standard: FCC Class B 3M Radiated
Test item: Radiation Test
Temp.(C)/Hum.(%) 23 C / 48 %
EUT: IOLab Dongle
Mode: TX 2402MHz
Model: IOL15B
Manufacturer: C&D

Polarization: Vertical
Power Source: DC 5V
Date: 15/09/24/
Time: 16/41/18
Engineer Signature: Ricky
Distance: 3m

Note: Report NO.:ATE20152072



No.	Freq. (MHz)	Reading (dBuV/m)	Factor (dB)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Detector	Height (cm)	Degree (deg.)	Remark
1	2402.000	84.16	-7.93	76.23	114.00	-37.77	peak			
2	2402.000	77.23	-7.93	69.30	94.00	-24.70	AVG			

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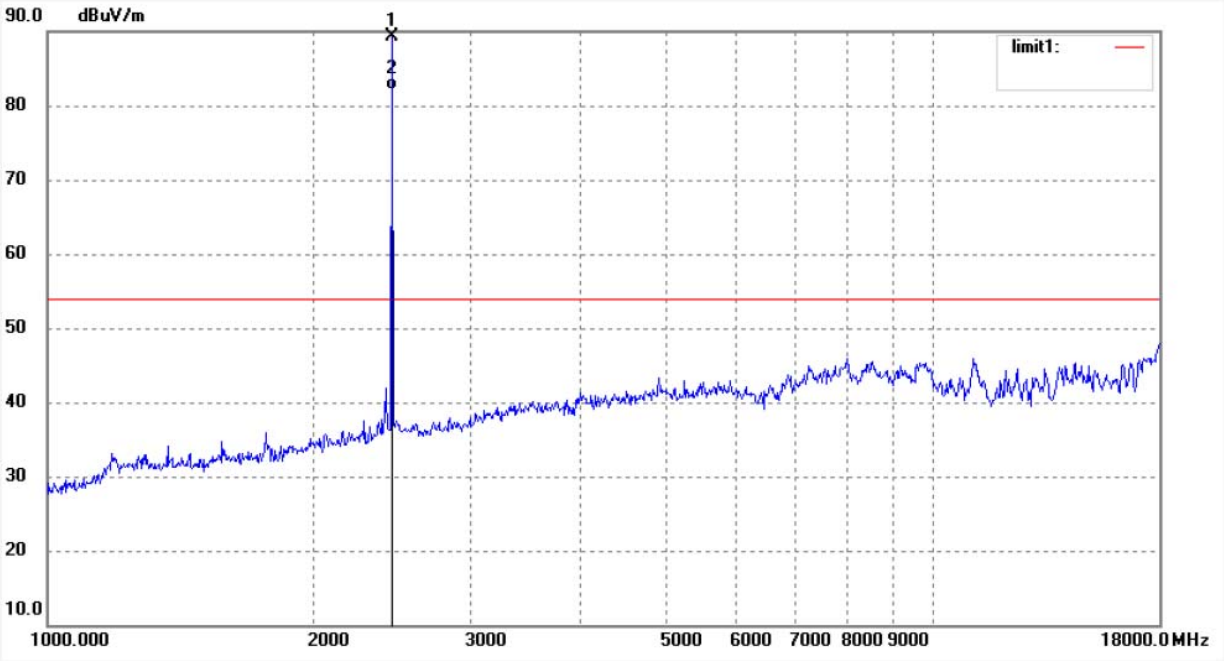
Job No.: ricky2015 #167
Standard: FCC Class B 3M Radiated
Test item: Radiation Test
Temp.(C)/Hum.(%) 23 C / 48 %
EUT: IOLab Dongle
Mode: TX 2450MHz
Model: IOL15B
Manufacturer: C&D

Polarization: Horizontal
Power Source: DC 5V
Date: 15/09/24/
Time: 16/43/22
Engineer Signature: Ricky
Distance: 3m

Note: Report NO.:ATE20152072



No.	Freq. (MHz)	Reading (dBuV/m)	Factor (dB)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Detector	Height (cm)	Degree (deg.)	Remark
1	2450.000	97.04	-7.82	89.22	114.00	-24.78	peak			
2	2450.000	89.97	-7.82	82.15	94.00	-11.85	AVG			

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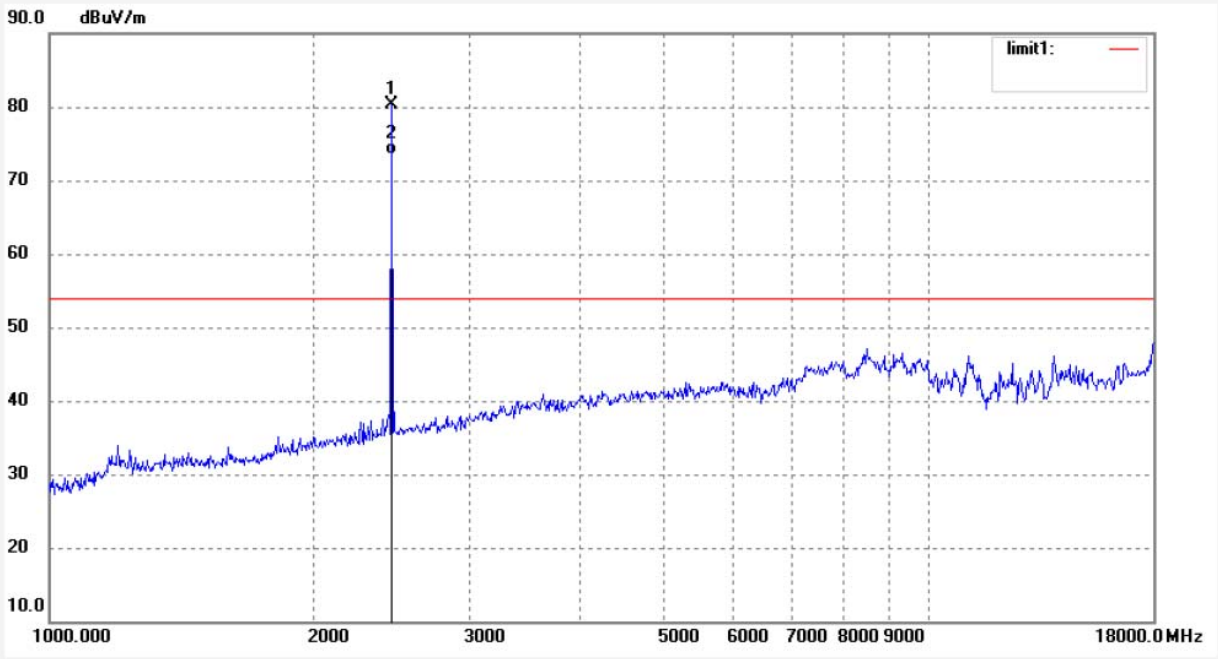
Job No.: ricky2015 #168
Standard: FCC Class B 3M Radiated
Test item: Radiation Test
Temp.(C)/Hum.(%) 23 C / 48 %
EUT: IOLab Dongle
Mode: TX 2450MHz
Model: IOL15B
Manufacturer: C&D

Polarization: Vertical
Power Source: DC 5V
Date: 15/09/24/
Time: 16/45/30
Engineer Signature: Ricky
Distance: 3m

Note: Report NO.:ATE20152072



No.	Freq. (MHz)	Reading (dBuV/m)	Factor (dB)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Detector	Height (cm)	Degree (deg.)	Remark
1	2450.000	88.09	-7.82	80.27	114.00	-33.73	peak			
2	2450.000	81.25	-7.82	73.43	94.00	-20.57	AVG			

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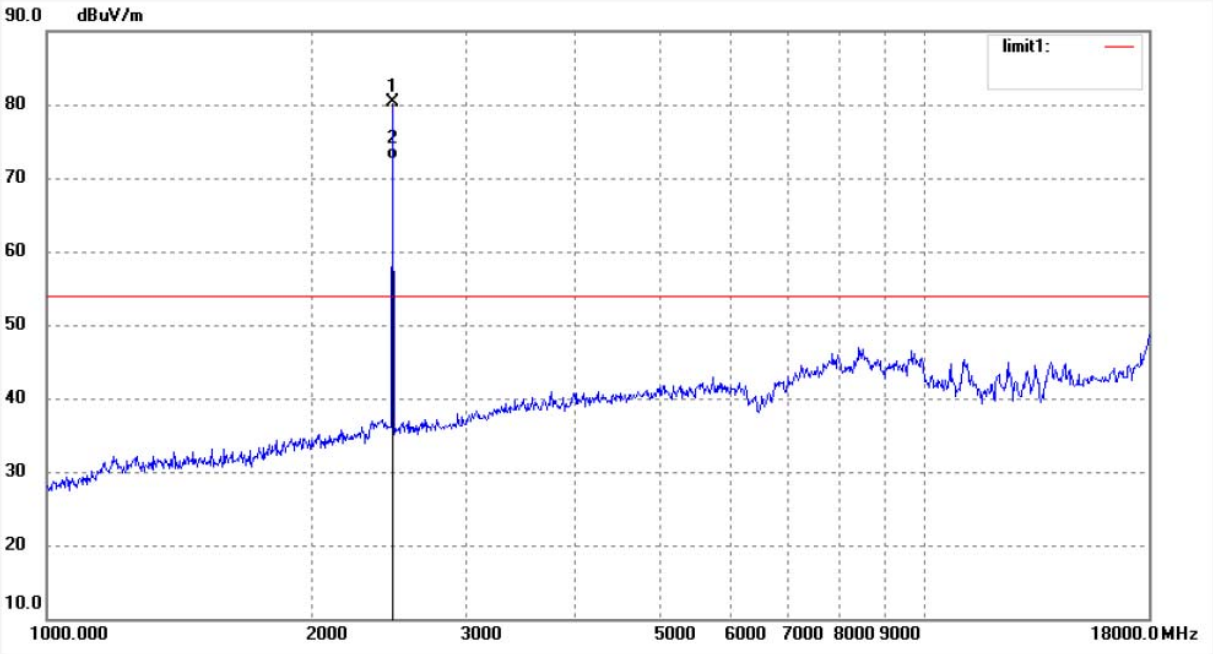
Job No.: ricky2015 #169	Polarization: Vertical
Standard: FCC Class B 3M Radiated	Power Source: DC 5V
Test item: Radiation Test	Date: 15/09/24/
Temp.(C)/Hum.(%) 23 C / 48 %	Time: 16/47/36
EUT: IOLab Dongle	Engineer Signature: Ricky
Mode: TX 2480MHz	Distance: 3m
Model: IOL15B	
Manufacturer: C&D	

Note: Report NO.:ATE20152072



No.	Freq. (MHz)	Reading (dBuV/m)	Factor (dB)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Detector	Height (cm)	Degree (deg.)	Remark
1	2480.000	88.04	-7.76	80.28	114.00	-33.72	peak			
2	2480.000	80.23	-7.76	72.47	94.00	-21.53	AVG			

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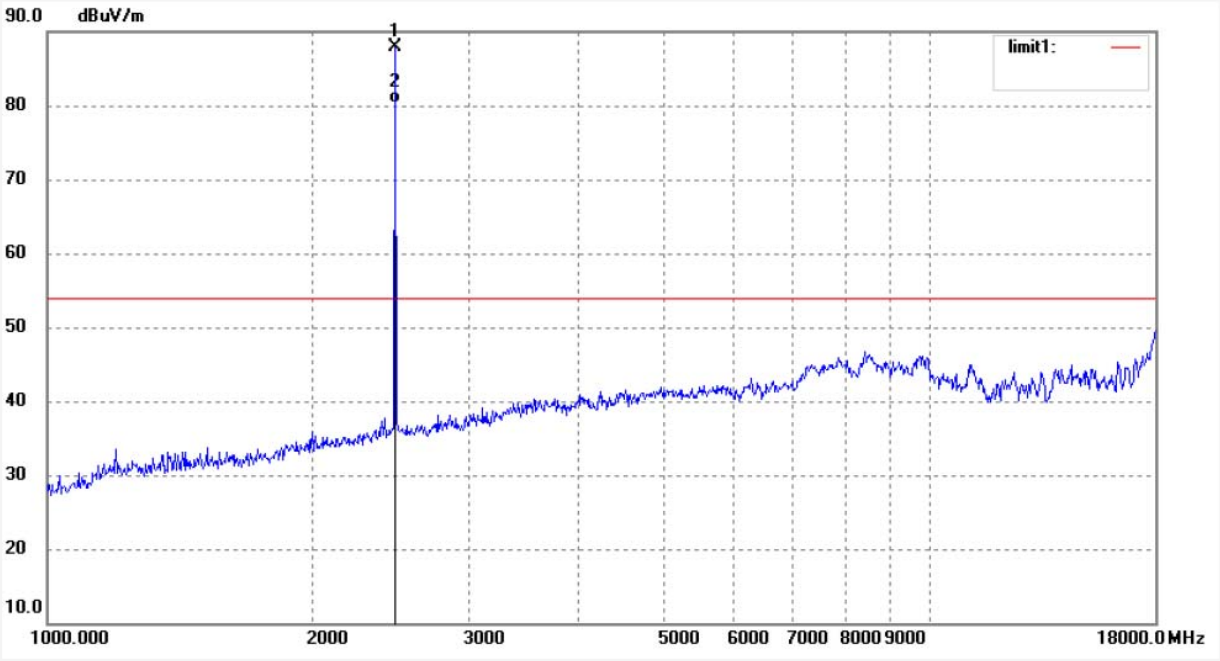
Job No.: ricky2015 #170	Polarization: Horizontal
Standard: FCC Class B 3M Radiated	Power Source: DC 5V
Test item: Radiation Test	Date: 15/09/24/
Temp.(C)/Hum.(%) 23 C / 48 %	Time: 16/49/25
EUT: IOLab Dongle	Engineer Signature: Ricky
Mode: TX 2480MHz	Distance: 3m
Model: IOL15B	
Manufacturer: C&D	

Note: Report NO.:ATE20152072

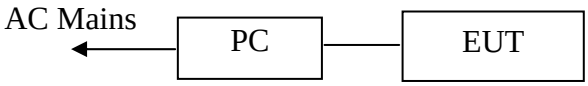


No.	Freq. (MHz)	Reading (dBuV/m)	Factor (dB)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Detector	Height (cm)	Degree (deg.)	Remark
1	2480.000	95.74	-7.76	87.98	114.00	-26.02	peak			
2	2480.000	88.02	-7.76	80.26	94.00	-13.74	AVG			

8. AC POWER LINE CONDUCTED EMISSION FOR FCC PART 15 SECTION 15.207(A)

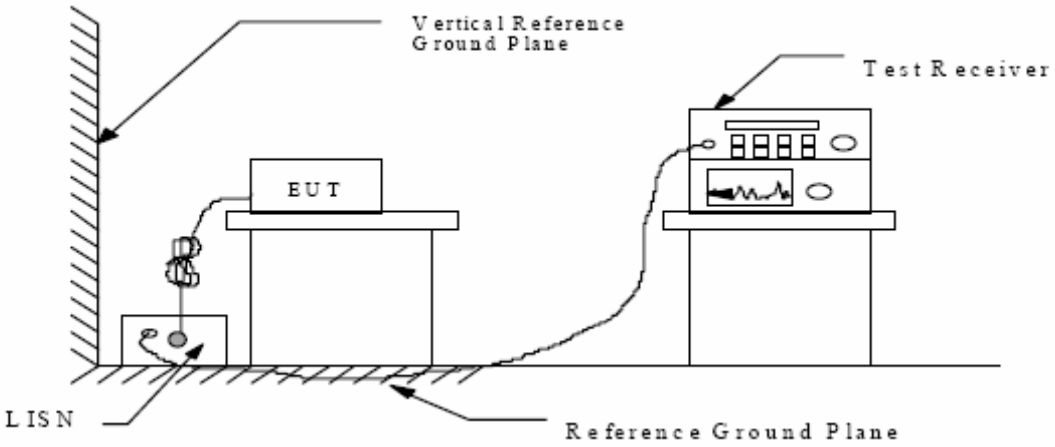
8.1.Block Diagram of Test Setup

8.1.1.Block diagram of connection between the EUT and simulators



(EUT: IOLab Dongle)

8.1.2.Shielding Room Test Setup Diagram



(EUT: IOLab Dongle)

8.2.The Emission Limit

8.2.1.Conducted Emission Measurement Limits According to Section 15.207(a)

Frequency (MHz)	Limit dB(μV)	
	Quasi-peak Level	Average Level
0.15 - 0.50	66.0 – 56.0 *	56.0 – 46.0 *
0.50 - 5.00	56.0	46.0
5.00 - 30.00	60.0	50.0

* Decreases with the logarithm of the frequency.

8.3. Configuration of EUT on Measurement

The following equipment are installed on the Conducted Emission Measurement to meet the commission requirements and operating regulations in a manner which tends to maximize its emission characteristics in normal application.

8.3.1. IOLab Dongle (EUT)

Model Number	:	IOL15B
Serial Number	:	N/A
Manufacturer	:	Shenzhen C&D Electronics Co., Ltd

8.4. Operating Condition of EUT

8.4.1. Setup the EUT and simulator as shown as Section 7.1.

8.4.2. Turn on the power of all equipment.

8.4.3. Let the EUT work in On mode measure it.

8.5. Test Procedure

The EUT is put on the plane 0.8m high above the ground by insulating support and is connected to the power mains through a line impedance stabilization network (L.I.S.N.). This provides a 50ohm coupling impedance for the EUT system. Please refer the block diagram of the test setup and photographs. Both sides of AC lines are checked to find out the maximum conducted emission. In order to find the maximum emission levels, the relative positions of equipment and all of the interface cables shall be changed according to ANSI C63.4: 2003 on Conducted Emission Measurement.

The bandwidth of test receiver (R & S ESCS30) is set at 9kHz.

The frequency range from 150kHz to 30MHz is checked.

8.6.Power Line Conducted Emission Measurement Results

PASS.

The frequency range from 150kHz to 30MHz is checked.

Date of Test:	September 24, 2015	Temperature:	25°C
EUT:	IOLab Dongle	Humidity:	50%
Model No.:	IOL15B	Power Supply:	AC 120V/60Hz
Test Mode:	On	Test Engineer:	Ricky

MEASUREMENT RESULT: "XH031313_fin"

2015-9-24 10:48

Frequency MHz	Level dBµV	Transd dB	Limit dBµV	Margin dB	Detector	Line	PE
0.150000	51.10	10.3	66	14.9	QP	N	GND
0.202000	43.20	10.6	64	20.3	QP	N	GND
0.536000	35.10	11.5	56	20.9	QP	N	GND

MEASUREMENT RESULT: "XH031313_fin2"

2015-9-24 10:48

Frequency MHz	Level dBµV	Transd dB	Limit dBµV	Margin dB	Detector	Line	PE
0.150000	38.40	10.3	56	17.6	AV	N	GND
0.208000	31.30	10.7	53	22.0	AV	N	GND
0.524000	31.20	11.5	46	14.8	AV	N	GND

MEASUREMENT RESULT: "XH031314_fin"

2015-9-24 10:51

Frequency MHz	Level dBµV	Transd dB	Limit dBµV	Margin dB	Detector	Line	PE
0.150000	50.50	10.3	66	15.5	QP	L1	GND
0.306000	32.20	11.0	60	27.9	QP	L1	GND
0.528000	34.80	11.5	56	21.2	QP	L1	GND

MEASUREMENT RESULT: "XH031314_fin2"

2015-9-24 10:51

Frequency MHz	Level dBµV	Transd dB	Limit dBµV	Margin dB	Detector	Line	PE
0.150000	37.90	10.3	56	18.1	AV	L1	GND
0.346000	32.50	11.1	49	16.6	AV	L1	GND
0.526000	30.30	11.5	46	15.7	AV	L1	GND

Date of Test:	September 24, 2015	Temperature:	25°C
EUT:	IOLab Dongle	Humidity:	50%
Model No.:	IOL15B	Power Supply:	AC 240V/60Hz
Test Mode:	On	Test Engineer:	Ricky

MEASUREMENT RESULT: "XH031312_fin"

2015-9-24 10:45

Frequency MHz	Level dBµV	Transd dB	Limit dBµV	Margin dB	Detector	Line	PE
0.152000	49.10	10.4	66	16.8	QP	N	GND
0.348000	32.50	11.1	59	26.5	QP	N	GND
0.526000	35.50	11.5	56	20.5	QP	N	GND

MEASUREMENT RESULT: "XH031312_fin2"

2015-9-24 10:45

Frequency MHz	Level dBµV	Transd dB	Limit dBµV	Margin dB	Detector	Line	PE
0.150000	37.90	10.3	56	18.1	AV	N	GND
0.346000	31.30	11.1	49	17.8	AV	N	GND
0.524000	31.30	11.5	46	14.7	AV	N	GND

MEASUREMENT RESULT: "XH031311_fin"

2015-9-24 10:42

Frequency MHz	Level dBµV	Transd dB	Limit dBµV	Margin dB	Detector	Line	PE
0.150000	51.20	10.3	66	14.8	QP	L1	GND
0.172000	48.30	10.5	65	16.6	QP	L1	GND
0.532000	34.70	11.5	56	21.3	QP	L1	GND

MEASUREMENT RESULT: "XH031311_fin2"

2015-9-24 10:42

Frequency MHz	Level dBµV	Transd dB	Limit dBµV	Margin dB	Detector	Line	PE
0.150000	38.20	10.3	56	17.8	AV	L1	GND
0.346000	32.50	11.1	49	16.6	AV	L1	GND
0.530000	30.20	11.5	46	15.8	AV	L1	GND

Emissions attenuated more than 20 dB below the permissible value are not reported.
The spectral diagrams are attached as below.

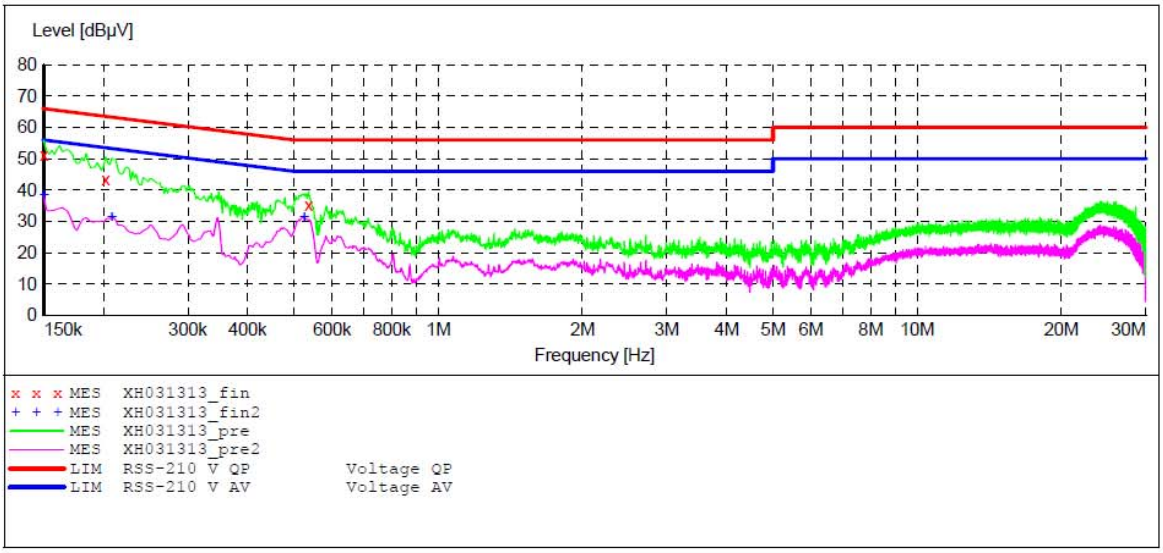
ACCURATE TECHNOLOGY CO.,LTD

CONDUCTED EMISSION STANDARD FCC 15B

```
EUT:                  IOLab Dongle   M/N:IOL15B
Manufacturer:         Shenzhen C&D Electronics Co., Ltd
Operating Condition:  On
Test Site:            2#Shielding Room
Operator:             Ricky
Test Specification:   N   120V/60Hz
Comment:              Report No.:ATE20152072
Start of Test:        2015-9-24 / 10:45:50
```

SCAN TABLE: "V 150K-30MHz fin"

```
  Short Description:                _SUB_STD_VTERM2 1.70
  Start      Stop       Step       Detector  Meas.     IF       Transducer
  Frequency  Frequency  Width                Time      Bandw.
  150.0 kHz  30.0 MHz   4.5 kHz    QuasiPeak 1.0 s     9 kHz    LISN(ESH3-Z5)
                                   Average
```



MEASUREMENT RESULT: "XH031313_fin"

```
2015-9-24  10:48
  Frequency     Level   Transd   Limit   Margin   Detector   Line    PE
        MHz      dBµV       dB   dBµV       dB

   0.150000     51.10     10.3      66     14.9   QP         N      GND
   0.202000     43.20     10.6      64     20.3   QP         N      GND
   0.536000     35.10     11.5      56     20.9   QP         N      GND
```

MEASUREMENT RESULT: "XH031313_fin2"

```
2015-9-24  10:48
  Frequency     Level   Transd   Limit   Margin   Detector   Line    PE
        MHz      dBµV       dB   dBµV       dB

   0.150000     38.40     10.3      56     17.6   AV         N      GND
   0.208000     31.30     10.7      53     22.0   AV         N      GND
   0.524000     31.20     11.5      46     14.8   AV         N      GND
```

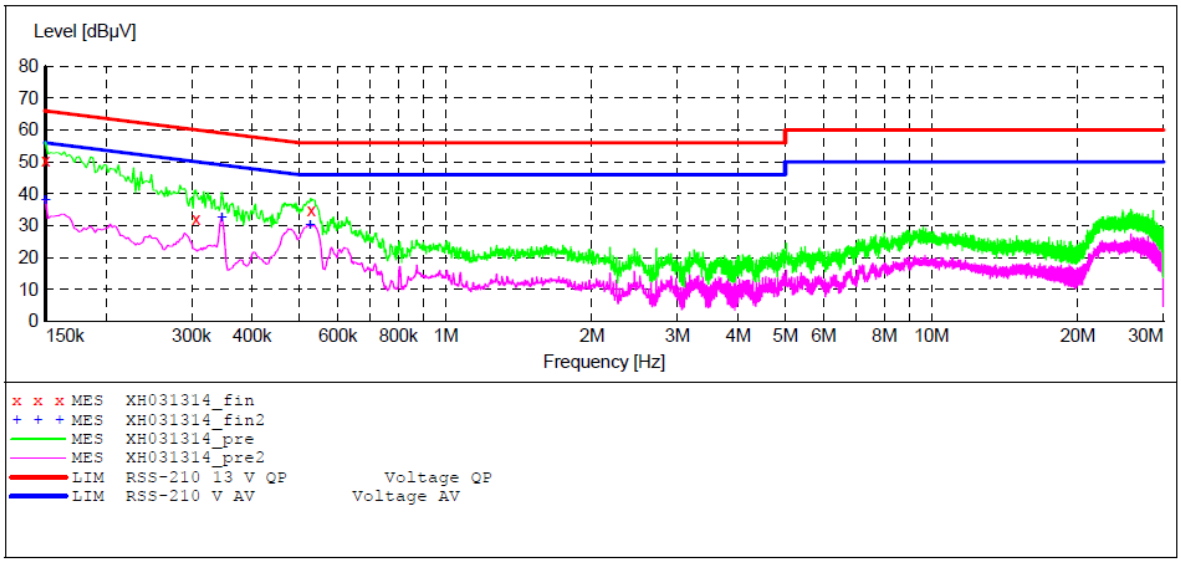
ACCURATE TECHNOLOGY CO.,LTD

CONDUCTED EMISSION STANDARD FCC 15B

```
EUT:                  IOLab Dongle   M/N:IOL15B
Manufacturer:         Shenzhen C&D Electronics Co., Ltd
Operating Condition:  On
Test Site:            2#Shielding Room
Operator:             Ricky
Test Specification:   L   120V/60Hz
Comment:              Report No.:ATE20152072
Start of Test:        2015-9-24 / 10:48:41
```

SCAN TABLE: "V 150K-30MHz fin"

```
  Short Description:              _SUB_STD_VTERM2 1.70
  Start      Stop       Step      Detector  Meas.     IF       Transducer
  Frequency  Frequency  Width               Time      Bandw.
  150.0 kHz  30.0 MHz   4.5 kHz   QuasiPeak 1.0 s     9 kHz    LISN(ESH3-Z5)
                                  Average
```



MEASUREMENT RESULT: "XH031314_fin"

```
2015-9-24  10:51
  Frequency     Level  Transd  Limit  Margin  Detector  Line   PE
        MHz      dBµV      dB   dBµV      dB

   0.150000     50.50    10.3     66    15.5  QP        L1     GND
   0.306000     32.20    11.0     60    27.9  QP        L1     GND
   0.528000     34.80    11.5     56    21.2  QP        L1     GND
```

MEASUREMENT RESULT: "XH031314_fin2"

```
2015-9-24  10:51
  Frequency     Level  Transd  Limit  Margin  Detector  Line   PE
        MHz      dBµV      dB   dBµV      dB

   0.150000     37.90    10.3     56    18.1  AV        L1     GND
   0.346000     32.50    11.1     49    16.6  AV        L1     GND
   0.526000     30.30    11.5     46    15.7  AV        L1     GND
```

ACCURATE TECHNOLOGY CO.,LTD

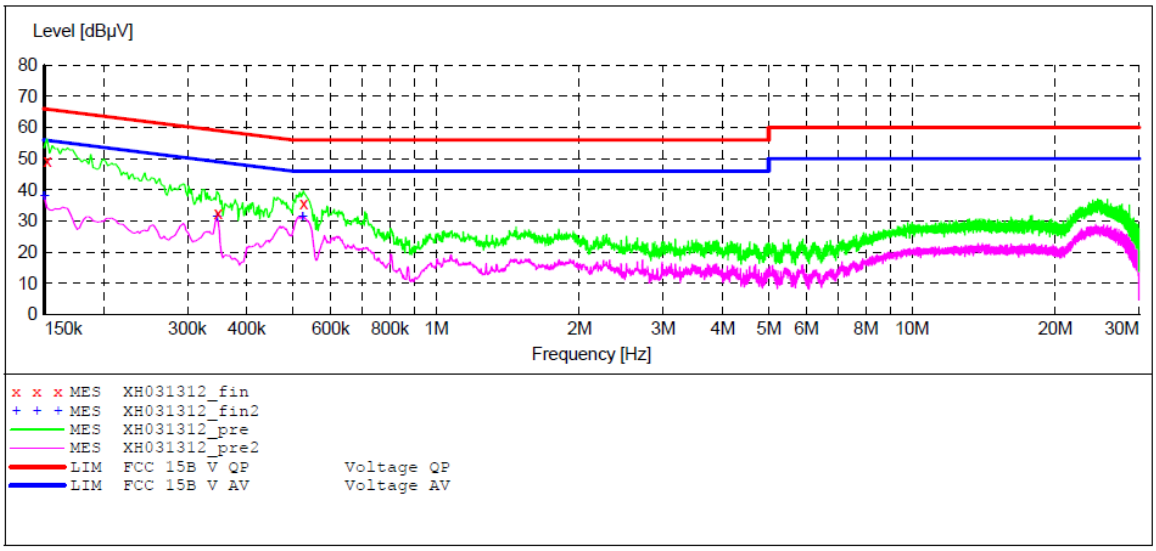
CONDUCTED EMISSION STANDARD FCC PART 15B

```
EUT:                  IOLab Dongle   M/N:IOL15B
Manufacturer:         Shenzhen C&D Electronics Co., Ltd
Operating Condition:  On
Test Site:            2#Shielding Room
Operator:             Ricky
Test Specification:   N   240V/60Hz
Comment:              Report No.:ATE20152072
Start of Test:        2015-9-24 / 10:43:06
```

SCAN TABLE: "V 150K-30MHz fin"

Short Description: _SUB_STD_VTERM2 1.70

Start Frequency	Stop Frequency	Step Width	Detector	Meas. Time	IF Bandw.	Transducer
150.0 kHz	30.0 MHz	4.5 kHz	QuasiPeak Average	1.0 s	9 kHz	LISN(ESH3-Z5)



MEASUREMENT RESULT: "XH031312_fin"

2015-9-24 10:45

Frequency MHz	Level dBµV	Transd dB	Limit dBµV	Margin dB	Detector	Line	PE
0.152000	49.10	10.4	66	16.8	QP	N	GND
0.348000	32.50	11.1	59	26.5	QP	N	GND
0.526000	35.50	11.5	56	20.5	QP	N	GND

MEASUREMENT RESULT: "XH031312_fin2"

2015-9-24 10:45

Frequency MHz	Level dBµV	Transd dB	Limit dBµV	Margin dB	Detector	Line	PE
0.150000	37.90	10.3	56	18.1	AV	N	GND
0.346000	31.30	11.1	49	17.8	AV	N	GND
0.524000	31.30	11.5	46	14.7	AV	N	GND

ACCURATE TECHNOLOGY CO.,LTD

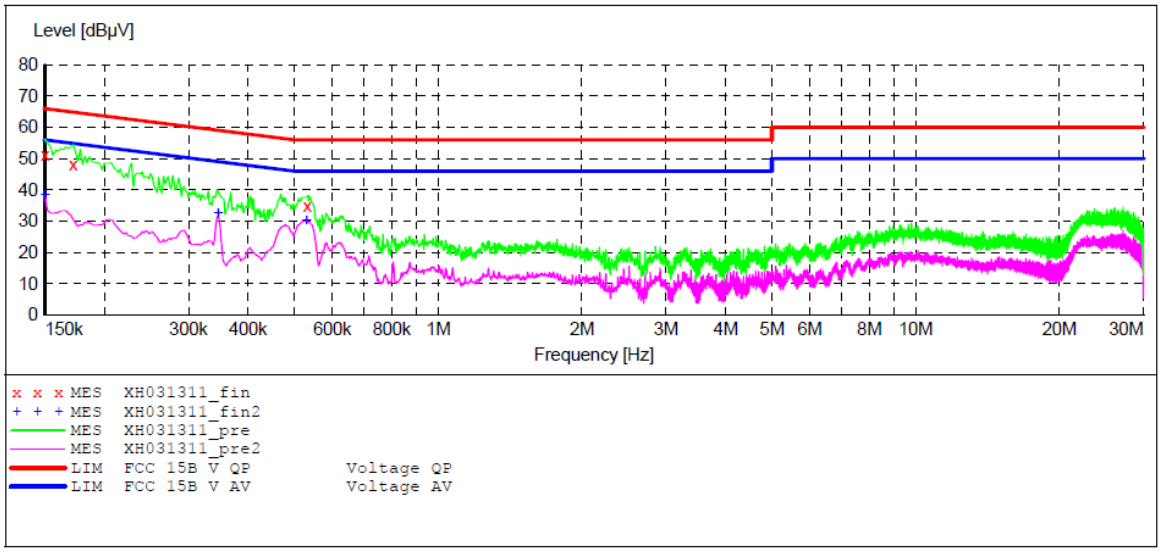
CONDUCTED EMISSION STANDARD FCC PART 15B

EUT: IOLab Dongle M/N:IOL15B
Manufacturer: Shenzhen C&D Electronics Co., Ltd
Operating Condition: On
Test Site: 2#Shielding Room
Operator: Ricky
Test Specification: L 240V/60Hz
Comment: Report No.:ATE20152072
Start of Test: 2015-9-24 / 10:40:21

SCAN TABLE: "V 150K-30MHz fin"

Short Description: _SUB_STD_VTERM2 1.70

Start Frequency	Stop Frequency	Step Width	Detector	Meas. Time	IF Bandw.	Transducer
150.0 kHz	30.0 MHz	4.5 kHz	QuasiPeak Average	1.0 s	9 kHz	LISN(ESH3-Z5)



MEASUREMENT RESULT: "XH031311_fin"

2015-9-24 10:42

Frequency MHz	Level dBµV	Transd dB	Limit dBµV	Margin dB	Detector	Line	PE
0.150000	51.20	10.3	66	14.8	QP	L1	GND
0.172000	48.30	10.5	65	16.6	QP	L1	GND
0.532000	34.70	11.5	56	21.3	QP	L1	GND

MEASUREMENT RESULT: "XH031311_fin2"

2015-9-24 10:42

Frequency MHz	Level dBµV	Transd dB	Limit dBµV	Margin dB	Detector	Line	PE
0.150000	38.20	10.3	56	17.8	AV	L1	GND
0.346000	32.50	11.1	49	16.6	AV	L1	GND
0.530000	30.20	11.5	46	15.8	AV	L1	GND

9. ANTENNA REQUIREMENT

9.1. The Requirement

According to Section 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.

9.2. Antenna Construction

Device is equipped with Integral antenna, which isn't displaced by other antenna. The Antenna gain of EUT is 0dBi. Therefore, the equipment complies with the antenna requirement of Section 15.203.