TEST REPORT (SPOT CHECK)

CERTIFICATE OF CONFORMITY

Standard:	**47 CFR FCC Part 15, Subpart C (Section 15.247)**
Report No.:	RFBAOZ-WTW-P21060679D
FCC ID:	2AHKM-ARIA34118
Original FCC ID:	2AHKM-ARIA3411
Product:	Tri-band WiFi Extender
Brand:	hitron
Model No.:	ARIA3411
Series Model:	OS3411
Received Date:	2022/9/21
Test Date:	2022/11/13 ~ 2022/11/16
Issued Date:	2022/12/5
Applicant:	Hitron Technologies Inc.
Address:	No. 1-8, Li-Hsin 1st Rd. Hsinchu Science Park, Hsinchu 30078, Taiwan
Issued By:	Bureau Veritas Consumer Products Services (H.K.) Ltd., Taoyuan Branch Hsin Chu Laboratory
Lab Address:	E-2, No.1, Li Hsin 1st Road, Hsinchu Science Park, Hsinchu City 300, Taiwan
Test Location:	E-2, No.1, Li Hsin 1st Road, Hsinchu Science Park, Hsinchu City 300, Taiwan
FCC Registration / Designation Number:	723255 / TW2022

Approved by: _____ , **Date:** **2022/12/5**

May Chen / Manager

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Prepared by : Vito Lung / Specialist

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Report Issue History Record

Issue No.	Reason for Change	Date Issued
RFBAOZ-WTW-P21060679	Original release.	2021/11/30
RFBAOZ-WTW-P21060679A	Add shielding & gasket.	2022/4/25
RFBAOZ-WTW-P21060679D	Exhibit prepared for Spot Check Verification report	2022/12/5

Release Control Record

Issue No.	Description	Date Issued
RFBAOZ-WTW-P21060679D	Original release.	2022/12/5

1 Certificate

Product:	Tri-band WiFi Extender
Brand:	hitron
Test Model:	ARIA3411
Series Model:	OS3411
Sample Status:	Engineering sample
Applicant:	Hitron Technologies Inc.
Test Date:	2022/11/13 ~ 2022/11/16
Standard:	47 CFR FCC Part 15, Subpart C (Section 15.247)
Measurement procedure:	ANSI C63.10-2013 KDB 558074 D01 15.247 Meas Guidance v05r02 KDB 662911 D01 Multiple Transmitter Output v02r01

The above equipment has been tested by **Bureau Veritas Consumer Products Services (H.K.) Ltd., Taoyuan Branch**, and found compliance with the requirement of the above standards. The test record, data evaluation & Equipment Under Test (EUT) configurations represented herein are true and accurate accounts of the measurements of the sample's RF characteristics under the conditions specified in this report.

2 Summary of Test Results

47 CFR FCC Part 15, Subpart C (Section 15.247)			
Standard / Clause	Test Item	Result	Remark
15.247(b)	RF Output Power	Pass	Meet the requirement of limit.
15.247(e)	Power Spectral Density	NA	Refer to Note 1 below
15.247(a)(2)	6 dB Bandwidth	NA	Refer to Note 1 below
15.247(d)	Conducted Out of Band Emissions	NA	Refer to Note 1 below
15.207	AC Power Conducted Emissions	NA	Refer to Note 1 below
15.205 / 15.209 / 15.247(d)	Unwanted Emissions below 1 GHz	NA	Refer to Note 1 below
15.205 / 15.209 / 15.247(d)	Unwanted Emissions above 1 GHz	Pass	Minimum passing margin is -0.8 dB at 2483.50 MHz
15.203	Antenna Requirement	Pass	Antenna connector is ipex(MHF) not a standard connector.

Note:

1. RF Output Power & Unwanted Emissions above 1 GHz Measurement were performed for this addendum. The others testing data refer to original test report.
2. Determining compliance based on the results of the compliance measurement, not taking into account measurement instrumentation uncertainty.

2.1 Measurement Uncertainty

Where relevant, the following measurement uncertainty levels have been estimated for tests performed on the EUT as specified in CISPR 16-4-2:

Measurement	Specification	Expanded Uncertainty (k=2) (±)
Unwanted Emissions above 1 GHz	1 GHz ~ 18 GHz	5.0 dB
	18 GHz ~ 40 GHz	5.3 dB

The other instruments specified are routine verified to remain within the calibrated levels, no measurement uncertainty is required to be calculated.

2.2 Supplementary Information

There is not any deviation from the test standards for the test method, and no modifications required for compliance.

3 General Information

3.1 General Description

Product	Tri-band WiFi Extender
Brand	hitron
Test Model	ARIA3411
Series Model	OS3411
Status of EUT	Engineering sample
Power Supply Rating	12 Vdc from power adapter
Modulation Type	CCK, DQPSK, DBPSK for DSSS 64QAM, 16QAM, QPSK, BPSK for OFDM 256QAM for OFDM in VHT mode 1024QAM for OFDMA in 11ax mode only
Modulation Technology	DSSS, OFDM, OFDMA
Transfer Rate	802.11b: up to 11 Mbps 802.11g: up to 54 Mbps 802.11n: up to 300 Mbps 802.11ax: up to 573.5 Mbps
Operating Frequency	2.412 GHz ~ 2.462 GHz
Number of Channel	802.11b, 802.11g, 802.11n (HT20), VHT20, 802.11ax (HE20): 11 802.11n (HT40), VHT40, 802.11ax (HE40): 7
Output Power	**CDD Mode:** 979.56 mW (29.91 dBm) **Beamforming Mode:** 760.435 mW (28.81 dBm)

Note:

1. Exhibit prepared for Spot Check Verification report, the format, test items and amount of spot–check test data are decided by applicant's engineering judgment, for more details please refer to the declaration letter exhibit. (Original FCC ID: 2AHKM-ARIA3411, Report No.: RFBAOZ-WTW-P21060679 & RFBAOZ-WTW-P21060679A)
2. The EUT has two model names which are identical to each other in all aspects except for the followings:

Model Name	Difference
ARIA3411	with black housing
OS3411	with white housing
Node: From the above models, the radiated emission worst case was found in **model: ARIA3411**. Therefore only the test data of the mode was recorded in this report.	

3. The EUT has below radios as following table:

Radio 1	Radio 2	Radio 3	Radio 4
Bluetooth	WLAN 2.4GHz	WLAN 5GHz	WLAN 6GHz

4. Simultaneously transmission condition.

Condition	Technology			
1	WLAN 2.4GHz	WLAN 5GHz	WLAN 6GHz	Bluetooth
Note: The emission of the simultaneous operation has been evaluated and no non-compliance was found.				

5. The EUT uses following accessories.

AC Adapter 1			
Brand	Model	Specification	Description
APD	WA-30P12FU	AC Input : 100-240V~,50-60 Hz； 0.9 A Max DC Output : 12V--2.5A Signal Line : 1.5 meter	Black (for model: ARIA3411), White (for model: OS3411)
RJ45 Cable (Yellow for Model: ARIA3411)			
Brand	Model	Specification	
EKSON	ZQ01-C069	Signal Line : 1.5 meter, unshielded	
RJ45 Cable (White for Model: OS3411)			
Brand	Model	Specification	
EKSON	MT01-C044	Signal Line : 1.5 meter, unshielded	

6. The above EUT information is declared by manufacturer and for more detailed features description, please refer to the manufacturer's specifications or user's manual.

3.2 Antenna Description of EUT

1. The antenna information is listed as below.

Antenna NO.	RF Chain NO.	Model	Antenna Net Gain(dBi)	Frequency range (GHz)	Antenna Type	Connector Type	Cable Length
1	0	RFPCA252525IMLB901	2.63	2.4~2.4835	printed PCB	ipex(MHF)	24cm
			4.02	5.15~5.85			
2	1	RFPCA282525IMLB901	2.6	2.4~2.4835	printed PCB	ipex(MHF)	24cm
			3.81	5.15~5.85			
3	0	RFPCA212009IMMB901	3.59	5.85~7.125	printed PCB	ipex(MHF)	10cm
4	1	RFPCA221508IMMB901	4.71	5.85~7.125	printed PCB	ipex(MHF)	7.5cm
5	2	RFPCA221514IMMB901	4.7	5.85~7.125	printed PCB	ipex(MHF)	13.5cm
6	3	RFPCA212009IMMB902	4.59	5.85~7.125	printed PCB	ipex(MHF)	8.5cm
7 (for BT)	-	RFPCA381007IMAB301	4.77	2.4~2.4835	printed PCB	ipex(MHF)	6.5cm

* Detail antenna specification please refer to antenna datasheet and/or antenna measurement report.

2. The EUT incorporates a MIMO function:

2.4 GHz Band		
Modulation Mode	**TX & RX Configuration**	
802.11b	2TX	2RX
802.11g	2TX	2RX
802.11n (HT20)	2TX	2RX
802.11n (HT40)	2TX	2RX
VHT20	2TX	2RX
VHT40	2TX	2RX
802.11ax (HE20)	2TX	2RX
802.11ax (HE40)	2TX	2RX

Note:
1. All of modulation mode support beamforming function except 802.11b/g modulation mode.
2. The EUT support Beamforming and CDD mode, therefore both mode were investigated and the worst case scenario was identified. The worst case data were presented in test report.
3. The modulation and bandwidth are similar for 802.11n mode for 20MHz (40MHz), VHT mode for 20MHz (40MHz) and 802.11ax mode for 20MHz (40MHz), therefore the manufacturer will control the power for 802.11n/ VHT mode is the same as the 802.11ax mode or more lower than it and investigated worst case to representative mode in test report.

3.3 Channel List

11 channels are provided for 802.11b, 802.11g, 802.11n (HT20), VHT20, 802.11ax (HE20):

Channel	Frequency	Channel	Frequency
1	2412 MHz	7	2442 MHz
2	2417 MHz	8	2447 MHz
3	2422 MHz	9	2452 MHz
4	2427 MHz	10	2457 MHz
5	2432 MHz	11	2462 MHz
6	2437 MHz		

7 channels are provided for 802.11n (HT40), VHT40, 802.11ax (HE40):

Channel	Frequency	Channel	Frequency
3	2422 MHz	7	2442 MHz
4	2427 MHz	8	2447 MHz
5	2432 MHz	9	2452 MHz
6	2437 MHz		

3.4 Test Mode Applicability and Tested Channel Detail

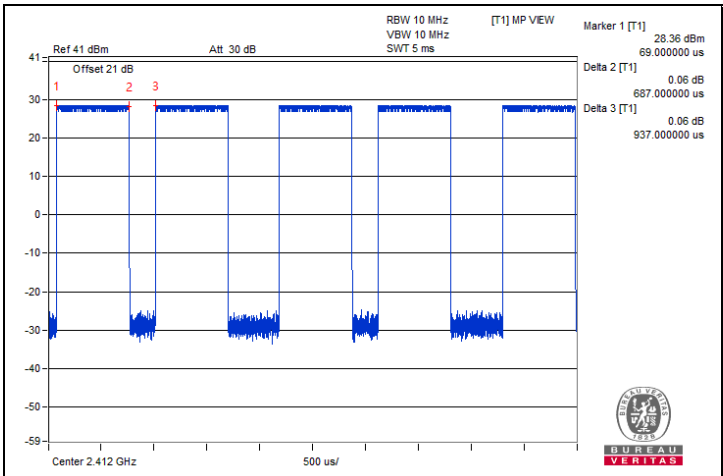
Pre-Scan:	1. The RJ45 Cable has the following appearance: yellow/white. Pre-scan these of RJ45 Cable and find the worst case as a representative test condition. 2. Pre-Scan has been conducted to determine the worst-case mode from all possible combinations between available modulations, data rates and antenna ports (if EUT with antenna diversity architecture).
Worst Case:	1. RJ45 Cable Worst condition : yellow RJ45 cable

Following channel(s) was (were) selected for the final test as listed below:

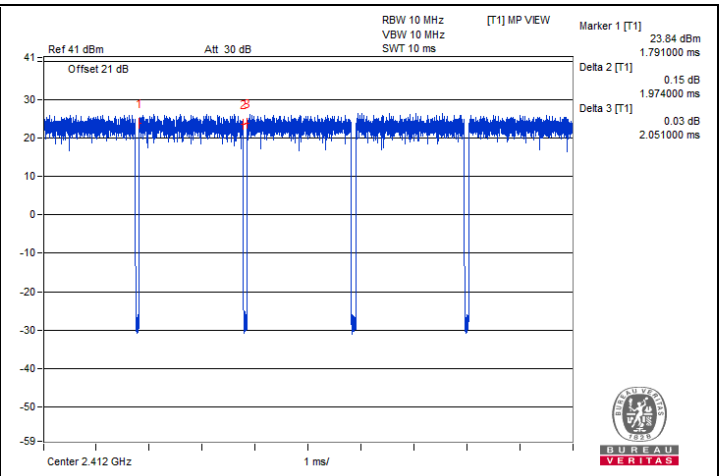
Test Item	Mode	Signal Mode	Tested Channel	Modulation	Data Rate Parameter
RF Output Power	802.11b	CDD	1, 6, 11	DBPSK	1Mb/s
	802.11g	CDD	1, 6, 11	BPSK	6Mb/s
	VHT20	CDD & Beamforming	1, 6, 11	BPSK	MCS0
	VHT40	CDD & Beamforming	3, 6, 9	BPSK	MCS0
	802.11ax (HE20)	CDD & Beamforming	1, 6, 11	BPSK	MCS0
	802.11ax (HE40)	CDD & Beamforming	3, 6, 9	BPSK	MCS0
Unwanted Emissions above 1 GHz	802.11b	CDD	11	DBPSK	1Mb/s

3.5 Duty Cycle of Test Signal

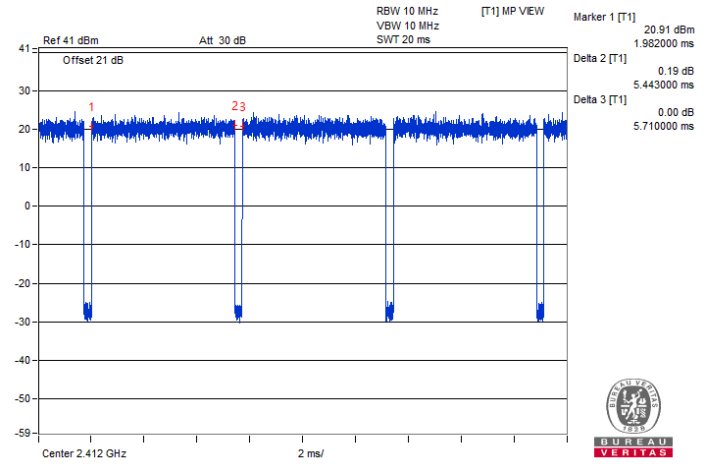
802.11b: Duty cycle = 0.687 ms / 0.937 ms x 100% = 73.3%, duty factor = 10 * log (1/Duty cycle) = 1.35 dB
802.11g: Duty cycle = 1.974 ms / 2.051 ms x 100% = 96.2%, duty factor = 10 * log (1/Duty cycle) = 0.17 dB
802.11ax (HE20): Duty cycle = 5.443 ms / 5.71 ms x 100% = 95.3%, duty factor = 10 * log (1/Duty cycle) = 0.21 dB
802.11ax (HE40): Duty cycle = 5.435 ms / 5.72 ms x 100% = 95.0%, duty factor = 10 * log (1/Duty cycle) = 0.22 dB



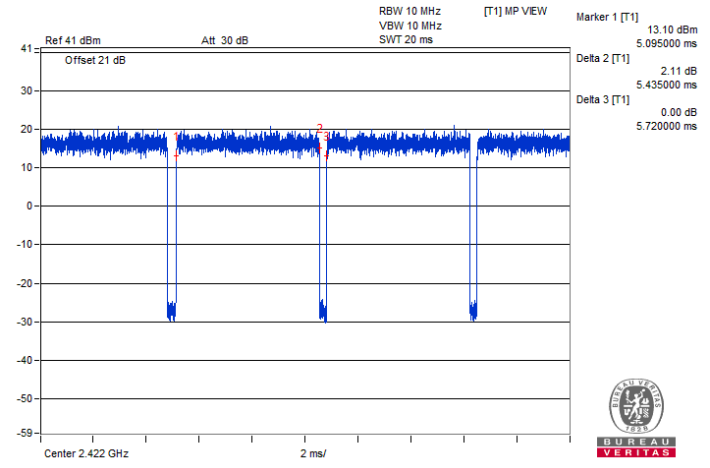
802.11b



802.11g



802.11ax (HE20)

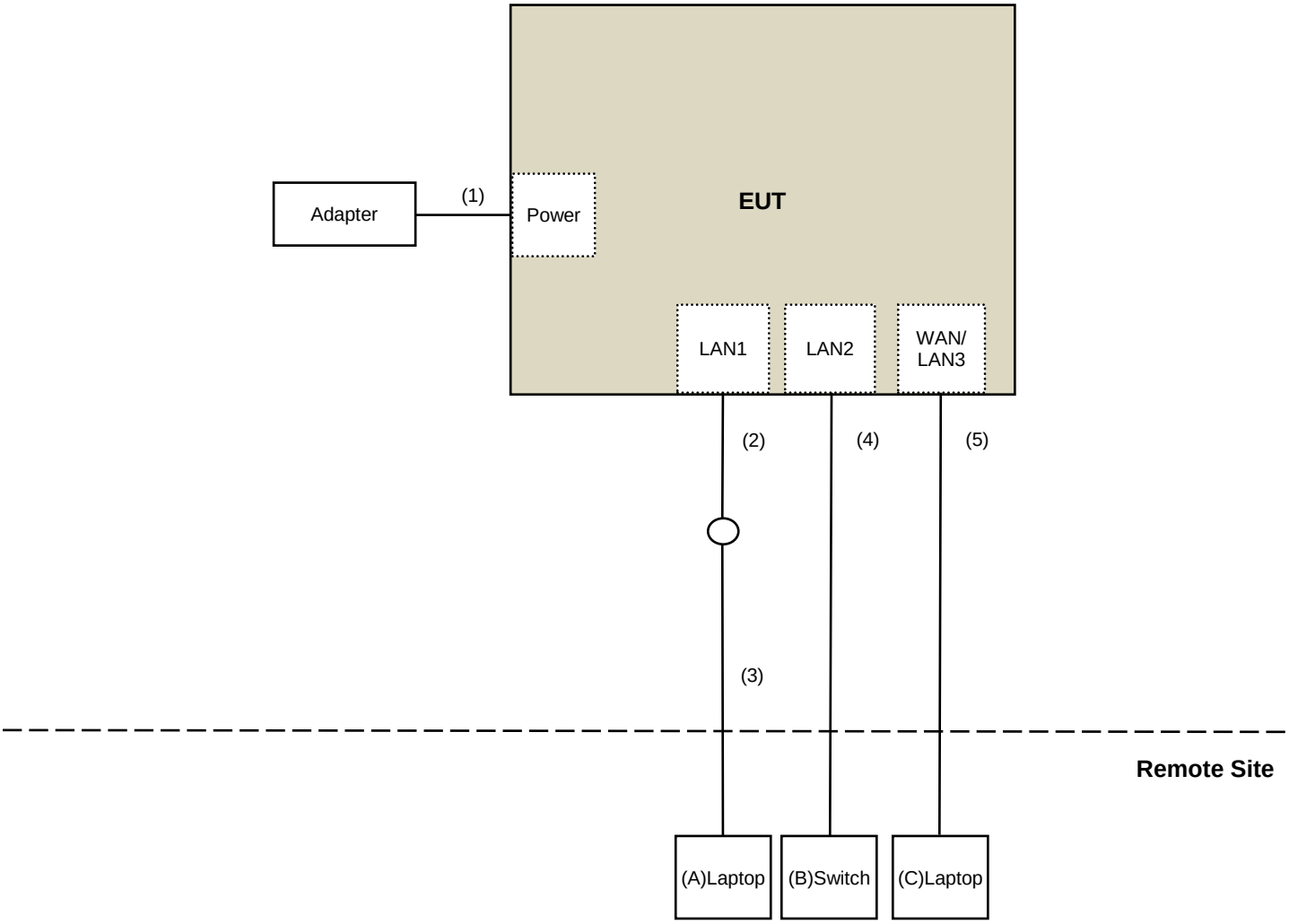


802.11ax (HE40)

3.6 Test Program Used and Operation Descriptions

Controlling software (qdart_conn.win.1.0_installer_00076.1) has been activated to set the EUT under transmission condition continuously at specific channel frequency.

3.7 Connection Diagram of EUT and Peripheral Devices



3.8 Configuration of Peripheral Devices and Cable Connections

ID	Product	Brand	Model No.	Serial No.	FCC ID	Remarks
A	Laptop	Lenovo	20U5S01X00 L14	PF-1ANPYA	N/A	Provided by Lab
B	Switch	D-Link	DGS-1005D	DR8WC92000523	N/A	Provided by Lab
C	Laptop	Lenovo	20U5S01X00 L14	PF-28LKK7	N/A	Provided by Lab

ID	Cable Descriptions	Qty.	Length (m)	Shielding (Yes/No)	Cores (Qty.)	Remarks
1	DC Cable	1	1.5	No	0	Supplied by applicant
2	RJ-45 Cable	1	1.5	No	0	Supplied by applicant
3	RJ-45 Cable	1	10	No	0	Provided by Lab
4	RJ-45 Cable	1	10	No	0	Provided by Lab
5	RJ-45 Cable	1	10	No	0	Provided by Lab

4 Test Instruments

The calibration interval of the all test instruments are 12 months and the calibrations are traceable to NML/ROC and NIST/USA.

4.1 RF Output Power

Description Manufacturer	Model No.	Serial No.	Calibrated Date	Calibrated Until
Power Meter Anritsu	ML2495A	1529002	2022/6/22	2023/6/21
Pulse Power Sensor Anritsu	MA2411B	1726434	2022/6/22	2023/6/21

Notes:

1. The test was performed in Oven room 2.
2. Tested Date: 2022/11/16

4.2 Unwanted Emissions above 1 GHz

Description Manufacturer	Model No.	Serial No.	Calibrated Date	Calibrated Until
Antenna Tower & Turn Table Max-Full	MF-7802	MF780208406	N/A	N/A
Fix tool for Boresight antenna tower BV	FBA-01	FBA_SIP01	N/A	N/A
Horn Antenna Schwarzbeck	BBHA 9170	9170-739	2021/11/14	2022/11/13
	BBHA9120-D	9120D-406	2022/11/13	2023/11/12
Pre_Amplifier EMCI	EMC12630SE	980384	2022/1/10	2023/1/9
	EMC184045SE	980387	2022/1/10	2023/1/9
RF Cable EMCI	EMC104-SM-SM-6000	210201	2022/5/10	2023/5/9
RF Cable-Frequency range: 1-40GHz EMCI	EMC102-KM-KM-1200	160924	2022/1/10	2023/1/9
RF Coaxial Cable EMCI	EMC-KM-KM-4000	200214	2022/3/8	2023/3/7
	EMC104-SM-SM-1500	180504	2022/4/25	2023/4/24
	EMC104-SM-SM-2000	180601	2022/6/6	2023/6/5
Software	ADT_Radiated_V8.7.08	N/A	N/A	N/A
Spectrum Analyzer KEYSIGHT	N9030B	MY57142938	2022/4/26	2023/4/25
Test Receiver KEYSIGHT	N9038A	MY59050100	2022/6/20	2023/6/19

Notes:

1. The test was performed in 966 Chamber No. 3.
2. Tested Date: 2022/11/13

5 Limits of Test Items

5.1 RF Output Power

For systems using digital modulation in the 2400–2483.5 MHz bands: 1 Watt (30 dBm)

Per KDB 662911 D01 Multiple Transmitter Output Method of conducted output power measurement on IEEE 802.11 devices,

Array Gain = 0 dB (i.e., no array gain) for $N_{ANT} \leq 4$;
Array Gain = 0 dB (i.e., no array gain) for channel widths ≥ 40 MHz for any N_{ANT};
Array Gain = 5 log(N_{ANT}/N_{SS}) dB or 3 dB, whichever is less, for 20-MHz channel widths with $N_{ANT} \geq 5$.

For power measurements on all other devices: Array Gain = 10 log(N_{ANT}/N_{SS}) dB.

For transmitting antennas with a directional gain greater than 6 dBi, as long as the antenna's directional gain exceeds 6 dBi every 3 dB, the maximum conducted output power of the deliberate radiator is reduced by 1 dB.

5.2 Unwanted Emissions above 1 GHz

Radiated emissions above 1 GHz which fall in the restricted bands must comply with the radiated emission limits specified as below table. Other emissions shall be at least 30 dB below the highest level of the desired power:

Frequencies (MHz)	Field Strength (microvolts/meter)	Measurement Distance (meters)
Above 960	500	3

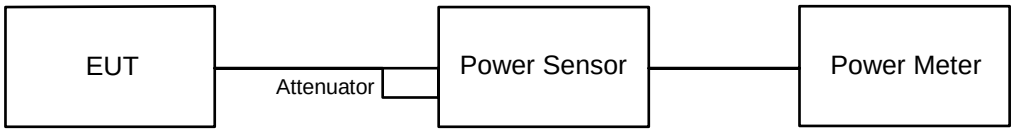
Notes:

1. The lower limit shall apply at the transition frequencies.
2. Emission level (dBuV/m) = 20 log Emission level (uV/m).
3. For frequencies above 1000 MHz, the field strength limits are based on average detector, however, the peak field strength of any emission shall not exceed the maximum permitted average limits, specified above by more than 20 dB under any condition of modulation.

6 Test Arrangements

6.1 RF Output Power

6.1.1 Test Setup

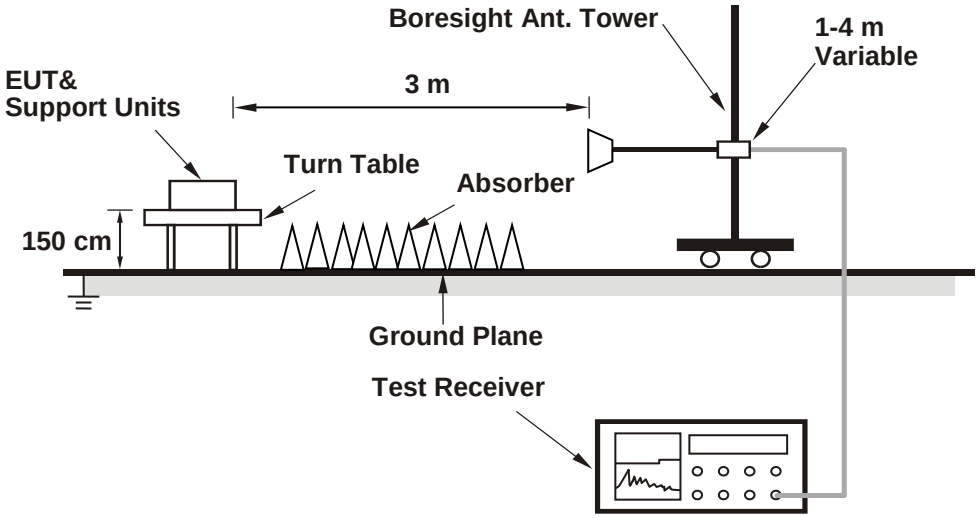


6.1.2 Test Procedure

Average Power:
Average power sensor was used to perform output power measurement, trigger and gating function of wide band power meter is enabled to measure max output power of TX on burst. Duty factor is not added to measured value.

6.2 Unwanted Emissions above 1 GHz

6.2.1 Test Setup



For the actual test configuration, please refer to the attached file (Test Setup Photo).

6.2.2 Test Procedure

a. The EUT was placed on the top of a rotating table 1.5 meters above the ground at 3 meter chamber room for test. The table was rotated 360 degrees to determine the position of the highest radiation.

b. The EUT was set 3 meters away from the interference-receiving antenna, which was mounted on the top of a variable-height antenna tower.

c. The height of antenna is varied from one meter to four meters above the ground to determine the maximum value of the field strength. Both horizontal and vertical polarizations of the antenna are set to make the measurement.

d. For each suspected emission, the EUT was arranged to its worst case and then the antenna was tuned to heights from 1 meter to 4 meters and the rotatable table was turned from 0 degrees to 360 degrees to find the maximum reading.

e. The test-receiver system was set to peak and average detects function and specified bandwidth with maximum hold mode when the test frequency is above 1 GHz. If the peak reading value also meets average limit, measurement with the average detector is unnecessary.

Notes:

4. The resolution bandwidth of test receiver/spectrum analyzer is 1 MHz and the video bandwidth is 3 MHz for Peak detection (PK) and Average detection (AV) at frequency above 1 GHz.
5. For fundamental and harmonic signal measurement, the resolution bandwidth of test receiver/spectrum analyzer is 1 MHz and the video bandwidth is ≥ 1/T (Duty cycle < 98%) or 10 Hz (Duty cycle ≥ 98%) for Average detection (AV) at frequency above 1 GHz.
6. All modes of operation were investigated and the worst-case emissions are reported.

7 Test Results of Test Item

7.1 RF Output Power

Input Power:	120 Vac, 60 Hz	Environmental Conditions:	25°C, 60% RH	Tested By:	Katina Lu

802.11b CDD

Chan.	Chan. Freq. (MHz)	Average Power (dBm)		Total Power (mW)	Total Power (dBm)	Power Limit (dBm)	Test Result
		Chain 0	Chain 1				
1	2412	25.45	25.04	669.906	28.26	30	Pass
6	2437	26.75	26.76	947.393	29.77	30	Pass
11	2462	26.91	26.89	979.56	29.91	30	Pass

Notes:

1. Directional gain is the maximum gain of antennas.
2. The maximum gain is 2.63 dBi < 6 dBi, so the output power limit shall not be reduced.

802.11g CDD

Chan.	Chan. Freq. (MHz)	Average Power (dBm)		Total Power (mW)	Total Power (dBm)	Power Limit (dBm)	Test Result
		Chain 0	Chain 1				
1	2412	21.24	20.86	254.944	24.06	30	Pass
6	2437	26.54	25.88	838.074	29.23	30	Pass
11	2462	23.42	23.62	449.93	26.53	30	Pass

Notes:

1. Directional gain is the maximum gain of antennas.
2. The maximum gain is 2.63 dBi < 6 dBi, so the output power limit shall not be reduced.

VHT20 CDD

Chan.	Chan. Freq. (MHz)	Average Power (dBm)		Total Power (mW)	Total Power (dBm)	Power Limit (dBm)	Test Result
		Chain 0	Chain 1				
1	2412	17.44	17.01	105.697	20.24	30	Pass
6	2437	25.77	25.15	704.913	28.48	30	Pass
11	2462	20.81	20.75	239.354	23.79	30	Pass

Notes:

1. Directional gain is the maximum gain of antennas.
2. The maximum gain is 2.63 dBi < 6 dBi, so the output power limit shall not be reduced.

VHT40 CDD

Chan.	Chan. Freq. (MHz)	Average Power (dBm)		Total Power (mW)	Total Power (dBm)	Power Limit (dBm)	Test Result
		Chain 0	Chain 1				
3	2422	16.69	16.24	88.739	19.48	30	Pass
6	2437	21.01	20.69	243.402	23.86	30	Pass
9	2452	19.66	19.35	178.569	22.52	30	Pass

Notes:

1. Directional gain is the maximum gain of antennas.
2. The maximum gain is 2.63 dBi < 6 dBi, so the output power limit shall not be reduced.

802.11ax (HE20) CDD

Chan.	Chan. Freq. (MHz)	Average Power (dBm)		Total Power (mW)	Total Power (dBm)	Power Limit (dBm)	Test Result
		Chain 0	Chain 1				
1	2412	17.86	17.60	118.638	20.74	30	Pass
6	2437	26.15	25.42	760.435	28.81	30	Pass
11	2462	21.30	21.15	265.213	24.24	30	Pass

Notes:

1. Directional gain is the maximum gain of antennas.
2. The maximum gain is 2.63 dBi < 6 dBi, so the output power limit shall not be reduced.

802.11ax (HE40) CDD

Chan.	Chan. Freq. (MHz)	Average Power (dBm)		Total Power (mW)	Total Power (dBm)	Power Limit (dBm)	Test Result
		Chain 0	Chain 1				
3	2422	16.56	16.44	89.345	19.51	30	Pass
6	2437	21.18	20.69	248.44	23.95	30	Pass
9	2452	19.72	19.48	182.472	22.61	30	Pass

Notes:

1. Directional gain is the maximum gain of antennas.
2. The maximum gain is 2.63 dBi < 6 dBi, so the output power limit shall not be reduced.

VHT20 Beamforming

Chan.	Chan. Freq. (MHz)	Average Power (dBm)		Total Power (mW)	Total Power (dBm)	Power Limit (dBm)	Test Result
		Chain 0	Chain 1				
1	2412	17.44	17.01	105.697	20.24	30	Pass
6	2437	25.77	25.15	704.913	28.48	30	Pass
11	2462	20.81	20.75	239.354	23.79	30	Pass

Notes:

1. Directional gain = $10 \log[(10^{Chain0/20} + 10^{Chain1/20})^2 / 2]$
2. The directional gain is 5.63 dBi < 6 dBi, so the output power limit shall not be reduced.

VHT40 Beamforming

Chan.	Chan. Freq. (MHz)	Average Power (dBm)		Total Power (mW)	Total Power (dBm)	Power Limit (dBm)	Test Result
		Chain 0	Chain 1				
3	2422	16.69	16.24	88.739	19.48	30	Pass
6	2437	21.01	20.69	243.402	23.86	30	Pass
9	2452	19.66	19.35	178.569	22.52	30	Pass

Notes:

1. Directional gain = $10 \log[(10^{Chain0/20} + 10^{Chain1/20})^2 / 2]$
2. The directional gain is 5.63 dBi < 6 dBi, so the output power limit shall not be reduced.

802.11ax (HE20) Beamforming

Chan.	Chan. Freq. (MHz)	Average Power (dBm)		Total Power (mW)	Total Power (dBm)	Power Limit (dBm)	Test Result
		Chain 0	Chain 1				
1	2412	17.86	17.60	118.638	20.74	30	Pass
6	2437	26.15	25.42	760.435	28.81	30	Pass
11	2462	21.30	21.15	265.213	24.24	30	Pass

Notes:

1. Directional gain = $10 \log[(10^{Chain0/20} + 10^{Chain1/20})^2 / 2]$
2. The directional gain is 5.63 dBi < 6 dBi, so the output power limit shall not be reduced.

802.11ax (HE40) Beamforming

Chan.	Chan. Freq. (MHz)	Average Power (dBm)		Total Power (mW)	Total Power (dBm)	Power Limit (dBm)	Test Result
		Chain 0	Chain 1				
3	2422	16.56	16.44	89.345	19.51	30	Pass
6	2437	21.18	20.69	248.44	23.95	30	Pass
9	2452	19.72	19.48	182.472	22.61	30	Pass

Notes:

1. Directional gain = $10 \log[(10^{Chain0/20} + 10^{Chain1/20})^2 / 2]$
2. The directional gain is 5.63 dBi < 6 dBi, so the output power limit shall not be reduced.

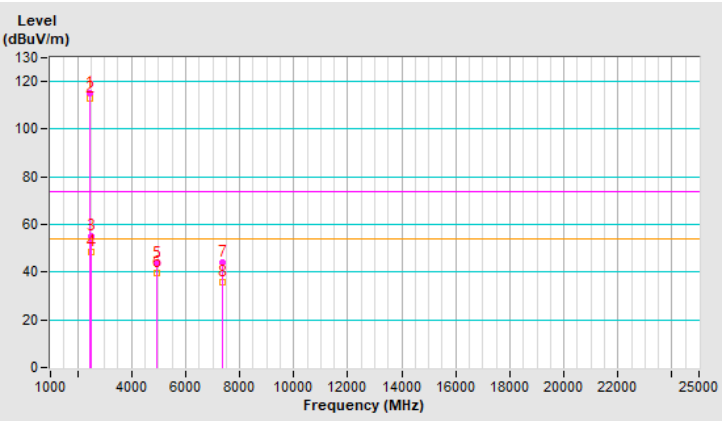
7.2 Unwanted Emissions above 1 GHz

RF Mode	802.11b	**Channel**	CH 11：2462 MHz
Frequency Range	1 GHz ~ 25 GHz	**Detector Function & Bandwidth**	(PK) RB = 1 MHz, VB = 3 MHz (AV) RB = 1 MHz, VB = 2 kHz
Input Power	120 Vac, 60 Hz	**Environmental Conditions**	20°C, 70% RH
Tested By	Nelson Teng		

Antenna Polarity & Test Distance : Horizontal at 3 m								
No	**Frequency (MHz)**	**Emission Level (dBuV/m)**	**Limit (dBuV/m)**	**Margin (dB)**	**Antenna Height (m)**	**Table Angle (Degree)**	**Raw Value (dBuV)**	**Correction Factor (dB/m)**
1	*2462.00	115.1 PK			1.83 H	181	116.0	-0.9
2	*2462.00	112.7 AV			1.83 H	181	113.6	-0.9
3	2483.50	55.0 PK	74.0	-19.0	1.83 H	181	56.0	-1.0
4	2483.50	48.2 AV	54.0	-5.8	1.83 H	181	49.2	-1.0
5	4924.00	43.5 PK	74.0	-30.5	3.62 H	352	39.5	4.0
6	4924.00	39.7 AV	54.0	-14.3	3.62 H	352	35.7	4.0
7	7386.00	44.3 PK	74.0	-29.7	3.27 H	53	34.0	10.3
8	7386.00	35.9 AV	54.0	-18.1	3.27 H	53	25.6	10.3

Remarks:

1. Emission Level(dBuV/m) = Raw Value(dBuV) + Correction Factor(dB/m)
2. Correction Factor(dB/m) = Antenna Factor(dB/m) + Cable Factor(dB) – Pre-Amplifier Factor(dB)
3. Margin value = Emission Level – Limit value
4. The other emission levels were very low against the limit.
5. " * ": Fundamental frequency, the limit was restricted at the RF Output Power.

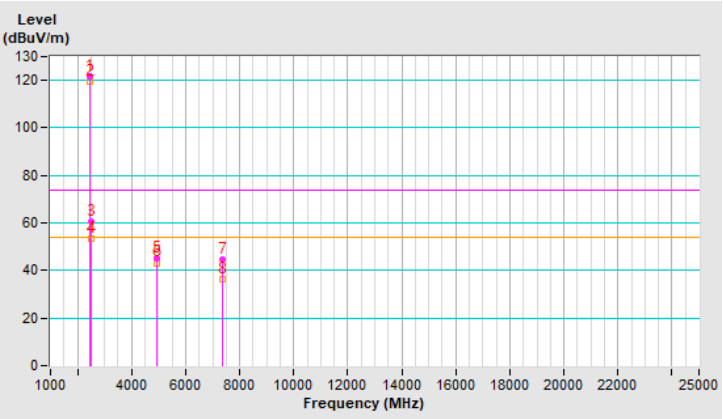


RF Mode	802.11b	Channel	CH 11：2462 MHz
Frequency Range	1 GHz ~ 25 GHz	Detector Function & Bandwidth	(PK) RB = 1 MHz, VB = 3 MHz (AV) RB = 1 MHz, VB = 2 kHz
Input Power	120 Vac, 60 Hz	Environmental Conditions	20°C, 70% RH
Tested By	Nelson Teng		

Antenna Polarity & Test Distance : Vertical at 3 m								
No	Frequency (MHz)	Emission Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Antenna Height (m)	Table Angle (Degree)	Raw Value (dBuV)	Correction Factor (dB/m)
1	*2462.00	121.7 PK			2.01 V	242	122.6	-0.9
2	*2462.00	119.3 AV			2.01 V	242	120.2	-0.9
3	2483.50	60.8 PK	74.0	-13.2	2.01 V	242	61.8	-1.0
4	**2483.50**	**53.2 AV**	**54.0**	**-0.8**	**2.01 V**	**242**	**54.2**	**-1.0**
5	4924.00	45.2 PK	74.0	-28.8	1.00 V	15	41.2	4.0
6	4924.00	43.2 AV	54.0	-10.8	1.00 V	15	39.2	4.0
7	7386.00	44.6 PK	74.0	-29.4	1.55 V	136	34.3	10.3
8	7386.00	36.4 AV	54.0	-17.6	1.55 V	136	26.1	10.3

Remarks:

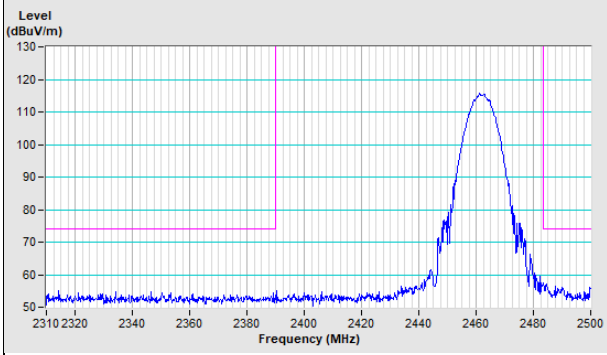
1. Emission Level(dBuV/m) = Raw Value(dBuV) + Correction Factor(dB/m)
2. Correction Factor(dB/m) = Antenna Factor(dB/m) + Cable Factor(dB) – Pre-Amplifier Factor(dB)
3. Margin value = Emission Level – Limit value
4. The other emission levels were very low against the limit.
5. " * ": Fundamental frequency, the limit was restricted at the RF Output Power.



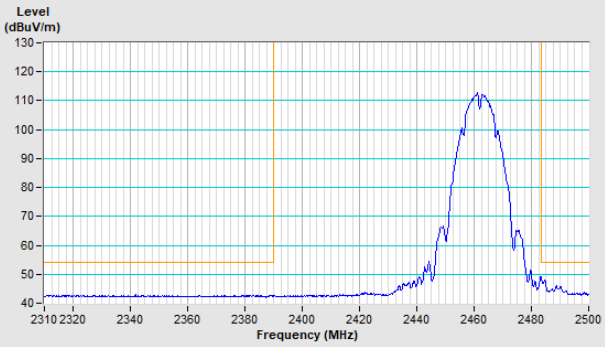
Plot of Band Edge

802.11b Channel 11

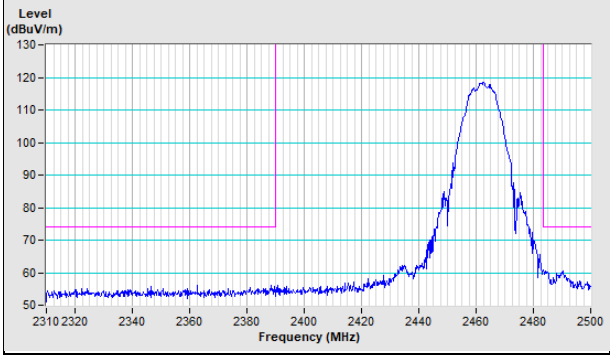
Horizontal (Peak)



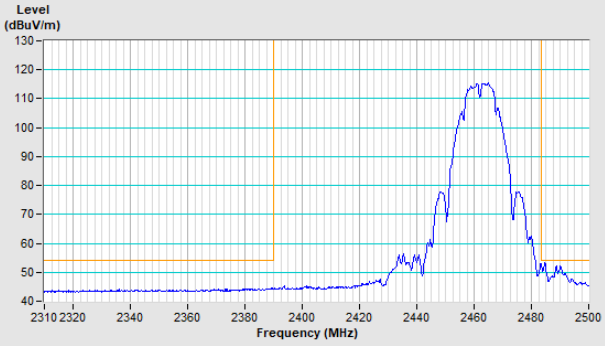
Horizontal (Average)



Vertical (Peak)



Vertical (Average)



8 Pictures of Test Arrangements

Please refer to the attached file (Test Setup Photo)

9 Information of the Testing Laboratories

We, Bureau Veritas Consumer Products Services (H.K.) Ltd., Taoyuan Branch, were founded in 1988 to provide our best service in EMC, Radio, Telecom and Safety consultation. Our laboratories are FCC recognized accredited test firms and accredited according to ISO/IEC 17025.

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The address and road map of all our labs can be found in our web site also.

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