

FCC Test Report (Co-Located)

Report No.: RFDLK-WTW-P20070241-2

FCC ID: KA2BAX1230PA1

Test Model: DBA-X1230P

Received Date: Jul. 14, 2020

Test Date: Aug. 07, 2020 ~ Nov. 24, 2020

Issued Date: Nov. 26, 2020

Applicant: D-Link Corporation

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Issued By: Bureau Veritas Consumer Products Services (H.K.) Ltd., Taoyuan Branch
Lin Kou Laboratories

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FCC Registration / 788550 / TW0003
Designation Number:



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Release Control Record

Issue No.	Description	Date Issued
RFDLK-WTW-P20070241-2	Original Release	Nov. 26, 2020

1 Certificate of Conformity

Product: Nuclias Cloud-Managed AX1800 Access Point

Brand: D-Link Corporation

Test Model: DBA-X1230P

Sample Status: Engineering Sample

Applicant: D-Link Corporation

Test Date: Aug. 07, 2020 ~ Nov. 24, 2020

Standards: 47 CFR FCC Part 15, Subpart C (Section 15.247)

47 CFR FCC Part 15, Subpart E (Section 15.407)

ANSI C63.10:2013

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.

Prepared by :



Date: Nov. 26, 2020

Vera Huang / Specialist

Approved by :



Date: Nov. 26, 2020

Dylan Chiou / Senior Project Engineer

2 Summary of Test Results

Applied Standard:	47 CFR FCC Part 15, Subpart C (Section 15.247) 47 CFR FCC Part 15, Subpart E (Section 15.407)		
FCC Clause	Test Item	Result	Remarks
15.205 / 15.209 / 15.247(d) 15.407(b) (1/2/3/4(i/ii)/6)	Radiated Emissions	Pass	Meet the requirement of limit. Minimum passing margin is -4.4 dB at 722.58 MHz.

Note: 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	Frequency	Expanded Uncertainty (k=2) (\pm)
Radiated Emissions up to 1 GHz	9 kHz ~ 30 MHz	3.04 dB
	30MHz ~ 200MHz	2.93 dB
	200MHz ~1000MHz	2.95 dB
Radiated Emissions above 1 GHz	1GHz ~ 18GHz	2.26 dB
	18GHz ~ 40GHz	1.94 dB

2.2 Modification Record

There were no modifications required for compliance.

3 General Information

3.1 General Description of EUT

Product	Nuclias Cloud-Managed AX1800 Access Point		
Brand	D-Link Corporation		
Test Model	DBA-X1230P		
Sample Status	Engineering sample		
Power Supply rating	12 Vdc (Adapter)		
Modulation Type	CCK, DQPSK, DBPSK for DSSS 256QAM, 64QAM, 16QAM, QPSK, BPSK for OFDM 1024QAM, 256QAM, 64QAM, 16QAM, QPSK, BPSK for OFDMA		
Transfer Rate	802.11b: 11.0/ 5.5/ 2.0/ 1.0 Mbps 802.11g: 54.0/ 48.0/ 36.0/ 24.0/ 18.0/ 12.0/ 9.0/ 6.0 Mbps 802.11a: 54.0/ 48.0/ 36.0/ 24.0/ 18.0/ 12.0/ 9.0/ 6.0 Mbps 802.11n: up to 400 Mbps 802.11ac: up to 866.7 Mbps 802.11ax: up to 1201 Mbps		
Operating Frequency	2.4GHz: 2412 ~ 2462MHz 5.0GHz: 5180 ~ 5240MHz, 5745 ~ 5825MHz		
Number of Channel	2412 ~ 2462MHz: 11 for 802.11b, 802.11g, 802.11n (HT20), (VHT20), 802.11ax (HE20) 7 for 802.11n (HT40), (VHT40), 802.11ax (HE40) 5180 ~ 5240 MHz: 4 for 802.11a, 802.11n (HT20), 802.11ac (VHT20), 802.11ax (HE20) 2 for 802.11n (HT40), 802.11ac (VHT40), 802.11ax (HE40) 1 for 802.11ac (VHT80), 802.11ax (HE80) 5745 ~ 5825 MHz: 5 for 802.11a, 802.11n (HT20), 802.11ac (VHT20), 802.11ax (HE20) 2 for 802.11n (HT40), 802.11ac (VHT40), 802.11ax (HE40) 1 for 802.11ac (VHT80), 802.11ax (HE80)		
Output Power		CCD Mode	Beamforming Mode
	2412 ~ 2462 MHz	822.476 mW	256.663 mW
	5180 ~ 5240 MHz	685.652 mW	300.593 mW
	5745 ~ 5825 MHz	458.251 mW	229.141 mW
Antenna Type	2.4 GHz	PIFA antenna with 3.1 dBi gain (Chain 1) PIFA antenna with 3.2 dBi gain (Chain 2)	
	5 GHz	PIFA antenna with 4.3 dBi gain (Chain 1) PIFA antenna with 4.2 dBi gain (Chain 2)	
Antenna Connector	i-pex(MHF)		
Accessory Device	Refer to Note as below		
Cable Supplied	N/A		

Note:

1. This report is a supplementary report to the original BV CPS report no.: RFDLK-WTW-P20070248-2 (The difference compared with the report (RFDLK-WTW-P20070248-2) is changing test model (DBA-X1230P), product name, and FW. The model have the same appearance, circuit, layout, and RF characteristic with DAP-X2810). Exhibit prepared for FCC Spot Check Verification report. All test data had been re-tested.
2. The EUT incorporates a MIMO function. Physically, the EUT provides two completed transmitters and two receivers.

Modulation Mode	Beamforming	TX Function
802.11a	Not Support	2TX (MIMO)
802.11b	Not Support	2TX (MIMO)
802.11g	Not Support	2TX (MIMO)
802.11n (HT20)	Support	2TX (MIMO)
802.11n (HT40)	Support	2TX (MIMO)
802.11ac (VHT20)	Support	2TX (MIMO)
802.11ac (VHT40)	Support	2TX (MIMO)
802.11ac (VHT80)	Support	2TX (MIMO)
802.11ax (HE20)	Support	2TX (MIMO)
802.11ax (HE40)	Support	2TX (MIMO)
802.11ax (HE80)	Support	2TX (MIMO)

* The modulation and bandwidth are similar for 802.11n mode for HT20 / HT40 and VHT20/VHT40 on 802.11n mode and 802.11ac mode for VHT20 / VHT40 / VHT80 and 802.11ax mode for HE20 / HE40 / HE80, therefore investigated worst case to representative mode in test report. (Final test mode refer section 3.2.1)

* For 802.11n and 802.11ac, CDD mode is the worst case for final radiated emission and power line conducted emission tests after pretesting CDD mode and beamforming mode.

3. The EUT contains following accessory devices.

Product	Brand	Model	Description
Adapter 1	ASIAN	WB-18Q12FU1(US)	I/P: 100-240 Vac, 50-60 Hz, 0.6 A O/P: 12 Vdc, 1.5 A
Adapter 2	ASIAN	WA-30P12R	I/P: 100-240 Vac, 50-60 Hz, 0.9 A O/P: 12 Vdc, 2.5 A
Console cable	N/A	N/A	--

4. The above Antenna information is declared by manufacturer and for more detailed features description, please refer to the manufacturer's specifications, the laboratory shall not be held responsible.
5. The above EUT information is declared by manufacturer and for more detailed features description, please refers to the manufacturer's specifications or user's manual.

3.2 Description of Test Modes

For 2.4GHz

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

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

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

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

5180~5240MHz:

4 channels are provided for 802.11a, 802.11n (HT20), 802.11ac (VHT20), 802.11ax (HE20):

Channel	Frequency	Channel	Frequency
36	5180MHz	44	5220MHz
40	5200MHz	48	5240MHz

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

Channel	Frequency	Channel	Frequency
38	5190MHz	46	5230MHz

1 channel is provided for 802.11ac (VHT80) and 802.11ax (HE80):

Channel	Frequency
42	5210MHz

5745~5825MHz:

5 channels are provided for 802.11a, 802.11n (HT20), 802.11ac (VHT20), 802.11ax (HE20):

Channel	Frequency	Channel	Frequency
149	5745MHz	161	5805MHz
153	5765MHz	165	5825MHz
157	5785MHz		

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

Channel	Frequency	Channel	Frequency
151	5755MHz	159	5795MHz

1 channel is provided for 802.11ac (VHT80) and 802.11ax (HE80):

Channel	Frequency
155	5775MHz

3.2.1 Test Mode Applicability and Tested Channel Detail

EUT Configure Mode	Applicable to		Description
	RE \geq 1G	RE<1G	
A	-	√	EUT with POE
B	√	√	EUT with Adapter (WA-30P12R)

Where RE \geq 1G: Radiated Emission above 1GHz & Bandedge Measurement RE<1G: Radiated Emission below 1GHz

NOTE: The EUT had been pre-tested on the positioned of each 3 axis. The worst case was found when positioned on **X-plane**

NOTE: "-" means no effect.

Radiated Emission Test (Above 1 GHz):

- ☒ 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).
- ☒ Following channel(s) was (were) selected for the final test as listed below.

EUT Configure Mode	Mode	Freq. Range (MHz)	Available Channel	Tested Channel	Modulation Technology
B	802.11b + 802.11a	2412 ~ 2462	1 to 11	6 + 40	OFDM
		5180 ~ 5240	36 to 48		OFDM
		5745 ~ 5825	149 to 165		OFDM

Radiated Emission Test (Below 1GHz):

- ☒ 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).
- ☒ Following channel(s) was (were) selected for the final test as listed below.

EUT Configure Mode	Mode	Freq. Range (MHz)	Available Channel	Tested Channel	Modulation Technology
A, B	802.11b + 802.11a	2412 ~ 2462	1 to 11	6 + 40	OFDM
		5180 ~ 5240	36 to 48		OFDM
		5745 ~ 5825	149 to 165		OFDM

Test Condition:

Applicable to	Environmental Conditions	Input Power (System)	Tested by
RE \geq 1G	23 deg. C, 67% RH	120 Vac, 60 Hz	Greg Lin
RE<1G	23 deg. C, 67% RH	120 Vac, 60 Hz	Greg Lin

3.3 Description of Support Units

The EUT has been tested as an independent unit together with other necessary accessories or support units. The following support units or accessories were used to form a representative test configuration during the tests.

ID	Product	Brand	Model No.	Serial No.	FCC ID	Remarks
A.	Notebook	Lenovo	81A4	YD02TWF5	PPD-QCNFA435	--
B.	POE	UBIQUITI	GP-H480-050G	N/A	N/A	Provided by client
C.	Load	N/A	N/A	N/A	N/A	--

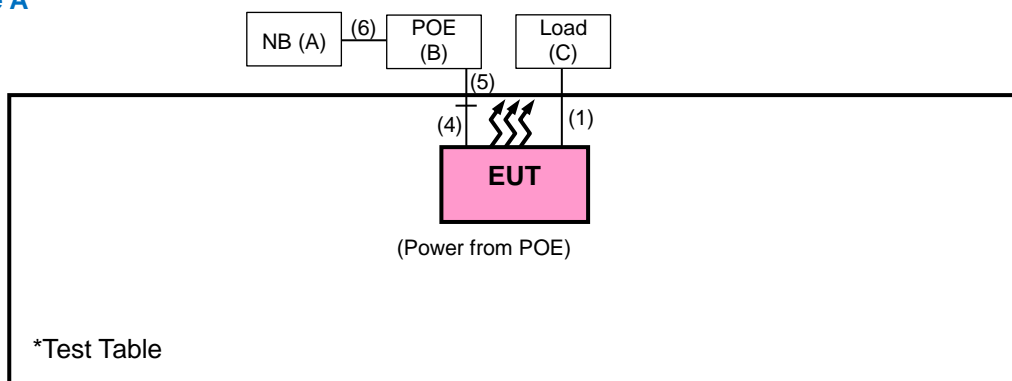
ID	Cable Descriptions	Qty.	Length (m)	Shielding (Yes/No)	Cores (Qty.)	Remarks
1.	Console Cable	1	1.8	N	0	Accessory of the EUT
2.	LAN Cable	1	10	N	0	RJ45
3.	Adapter Cable	1	1.0	N	0	Accessory of the EUT
4.	LAN Cable	1	1.5	N	0	RJ45
5.	LAN Cable	1	1.5	N	0	RJ45
6.	LAN Cable	1	1.0	N	0	RJ45

Note:

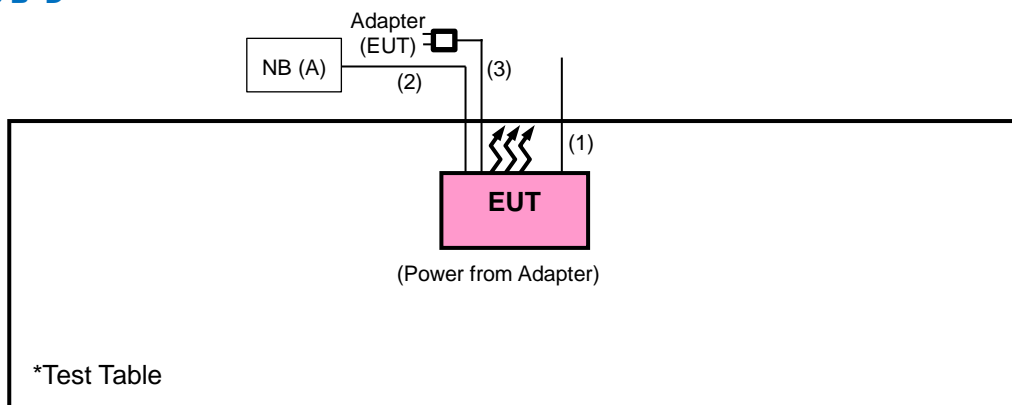
1. All power cords of the above support units are non-shielded (1.8m).
2. Item A acted as communication partner to transfer data.

3.3.1 Configuration of System under Test

Mode A



Mode B~D



3.4 General Description of Applied Standards

The EUT is a RF Product. According to the specifications of the manufacturer, it must comply with the requirements of the following standards and references:

Test Standard:

FCC Part 15, Subpart C (15.247)

FCC Part 15, Subpart E (15.407)

ANSI C63.10-2013

All test items have been performed and recorded as per the above standards.

References Test Guidance:

KDB 558074 D01 Meas Guidance v05r02

KDB 662911 D01 Multiple Transmitter Output v02r01

KDB 789033 D02 General UNII Test Procedures New Rules v02r01

All test items have been performed as a reference to the above KDB test guidance.

4 Test Types and Results

4.1 Radiated Emission and Bandedge Measurement

4.1.1 Limits of Radiated Emission and Bandedge Measurement

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

Frequencies (MHz)	Field Strength (microvolts/meter)	Measurement Distance (meters)
0.009 ~ 0.490	2400/F(kHz)	300
0.490 ~ 1.705	24000/F(kHz)	30
1.705 ~ 30.0	30	30
30 ~ 88	100	3
88 ~ 216	150	3
216 ~ 960	200	3
Above 960	500	3

Note:

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 1000MHz, 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 20dB under any condition of modulation.

Limits of unwanted emission out of the restricted bands

Applicable To		Limit	
789033 D02 General UNII Test Procedure New Rules v02r01		Field Strength at 3m	
		PK: 74 (dBuV/m)	AV: 54 (dBuV/m)
Frequency Band	Applicable To	EIRP Limit	Equivalent Field Strength at 3m
5150~5250 MHz	15.407(b)(1)	PK: -27 (dBm/MHz)	PK: 68.2(dBuV/m)
5250~5350 MHz	15.407(b)(2)		
5470~5725 MHz	15.407(b)(3)		
5725~5850 MHz	<input checked="" type="checkbox"/> 15.407(b)(4)(i)	PK: -27 (dBm/MHz) ^{*1} PK: 10 (dBm/MHz) ^{*2} PK: 15.6 (dBm/MHz) ^{*3} PK: 27 (dBm/MHz) ^{*4}	PK: 68.2(dBuV/m) ^{*1} PK: 105.2 (dBuV/m) ^{*2} PK: 110.8(dBuV/m) ^{*3} PK: 122.2 (dBuV/m) ^{*4}
	<input type="checkbox"/> 15.407(b)(4)(ii)	Emission limits in section 15.247(d)	
^{*1} beyond 75 MHz or more above of the band edge.		^{*2} below the band edge increasing linearly to 10 dBm/MHz at 25 MHz above.	
^{*3} below the band edge increasing linearly to a level of 15.6 dBm/MHz at 5 MHz above.		^{*4} from 5 MHz above or below the band edge increasing linearly to a level of 27 dBm/MHz at the band edge.	

Note: The following formula is used to convert the equipment isotropic radiated power (eirp) to field strength:

$$E = \frac{1000000\sqrt{30P}}{3} \text{ } \mu\text{V/m, where P is the eirp (Watts).}$$

4.1.2 Test Instruments

Description & Manufacturer	Model No.	Serial No.	Date of Calibration	Due Date of Calibration
Test Receiver KEYSIGHT	N9038A	MY55420137	Apr. 16, 2020	Apr. 15, 2021
Spectrum Analyzer ROHDE & SCHWARZ	FSP40	100039	Jun. 12, 2020	Jun. 11, 2021
BILOG Antenna SCHWARZBECK	VULB9168	9168-160	Nov. 07, 2019	Nov. 06, 2020
			Nov. 06, 2020	Nov. 05, 2021
HORN Antenna SCHWARZBECK	BBHA 9120 D	9120D-1169	Nov. 24, 2019	Nov. 23, 2020
			Nov. 22, 2020	Nov. 21, 2021
HORN Antenna SCHWARZBECK	BBHA 9170	BBHA9170241	Nov. 24, 2019	Nov. 23, 2020
			Nov. 22, 2020	Nov. 21, 2021
Preamplifier Agilent (Below 1GHz)	8447D	2944A10638	Jun. 08, 2020	Jun. 07, 2021
Preamplifier Agilent (Above 1GHz)	8449B	3008A02367	Feb. 18, 2020	Feb. 17, 2021
Preamplifier EMCI	EMC 184045	980116	Oct. 08, 2019	Oct. 07, 2020
			Oct. 07, 2020	Oct. 06, 2021
RF signal cable HUBER+SUHNER&EMCI	SUCOFLEX 104 & EMC104-SM- SM8000	CABLE-CH9-02 (248780+171006)	Jan. 18, 2020	Jan. 17, 2021
RF signal cable HUBER+SUHNER	SUCOFLEX 104	CABLE-CH9- (250795/4)	Jan. 18, 2020	Jan. 17, 2021
RF signal cable Woken	8D-FB	Cable-CH9-01	Jun. 08, 2020	Jun. 07, 2021
Software BV ADT	ADT_Radiated_ V7.6.15.9.5	NA	NA	NA
Antenna Tower EMCO	2070/2080	512.835.4684	NA	NA
Turn Table EMCO	2087-2.03	NA	NA	NA
Antenna Tower & Turn BV ADT	AT100	AT93021705	NA	NA
Turn Table BV ADT	TT100	TT93021705	NA	NA
Turn Table Controller BV ADT	SC100	SC93021705	NA	NA
Boresight Antenna Fixture	FBA-01	FBA-SIP01	NA	NA

- Note: 1. The calibration interval of the above test instruments is 12 months and the calibrations are traceable to NML/ROC and NIST/USA.
2. The test was performed in HwaYa Chamber 9.

4.1.3 Test Procedures

For Radiated emission below 30MHz

- a. The EUT was placed on the top of a rotating table 0.8 meters above the ground at a 3 meter chamber room. 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. Parallel, perpendicular, and ground-parallel orientations of the antenna are set to make the measurement.
- d. For each suspected emission, the EUT was arranged to its worst case 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 Quasi-Peak Detect Function and Specified Bandwidth with Maximum Hold Mode.

Note:

1. The resolution bandwidth and video bandwidth of test receiver/spectrum analyzer is 9kHz at frequency below 30MHz.

For Radiated emission above 30MHz

- a. The EUT was placed on the top of a rotating table 0.8 meters (for 30MHz ~ 1GHz) / 1.5 meters (for above 1GHz) 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 quasi-peak detect function and specified bandwidth with maximum hold mode when the test frequency is below 1 GHz.
- f. The test-receiver system was set to peak and average detect 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.

Note:

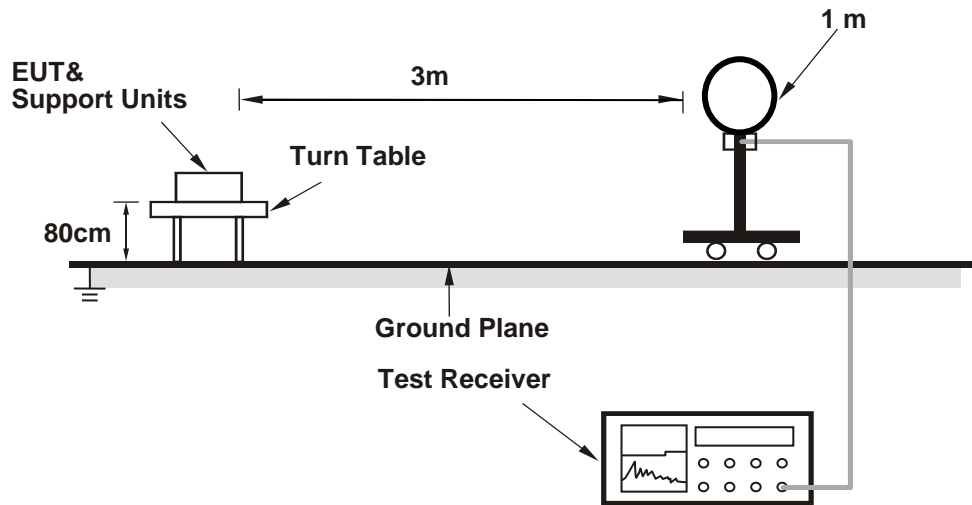
1. The resolution bandwidth and video bandwidth of test receiver/spectrum analyzer is 120kHz for Quasi-peak detection (QP) at frequency below 1GHz.
2. The resolution bandwidth of test receiver/spectrum analyzer is 1 MHz and the video bandwidth is 3 MHz for Peak detection (PK) at frequency above 1GHz.
3. The resolution bandwidth of test receiver/spectrum analyzer is 1MHz and the video bandwidth is $\geq 1/T$ (Duty cycle < 98%) or 10Hz (Duty cycle $\geq 98\%$) for Average detection (AV) at frequency above 1GHz.
4. All modes of operation were investigated and the worst-case emissions are reported.

4.1.4 Deviation from Test Standard

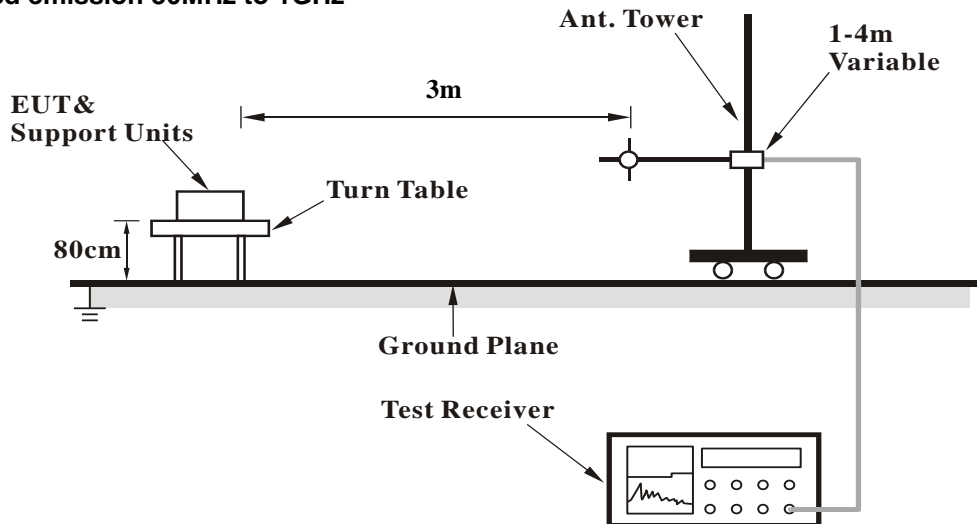
No deviation.

4.1.5 Test Setup

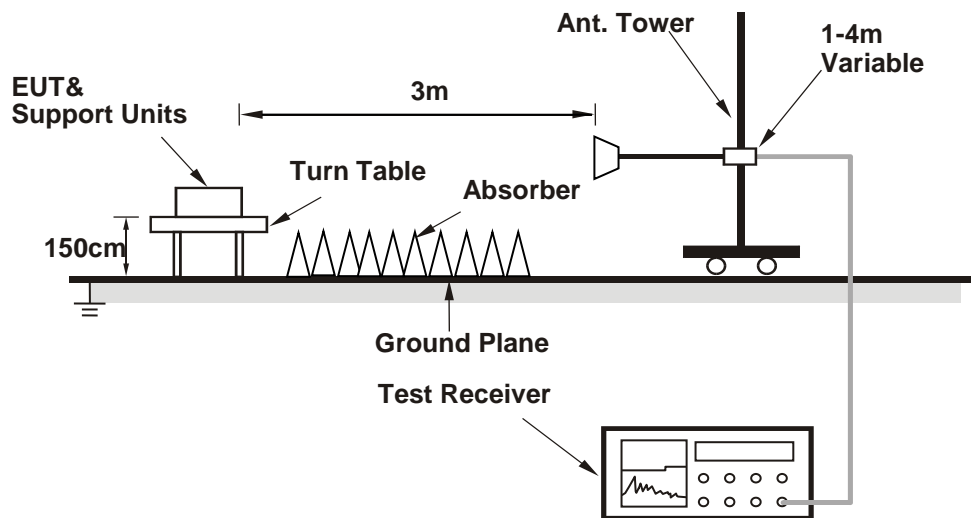
For Radiated emission below 30MHz



For Radiated emission 30MHz to 1GHz



For Radiated emission above 1GHz



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

4.1.6 EUT Operating Conditions

- Placed the EUT on the testing table.
- Prepared a notebook to act as a communication partner and placed it outside of testing area.
- The communication partner connected with EUT via a RJ45 cable and ran a test program (provided by manufacturer) to enable EUT under transmission condition continuously at specific channel frequency.
- The communication partner sent data to EUT by command "PING".

4.1.7 Test Results

Above 1GHz Data:

802.11b + 802.11a

CHANNEL	CH 6 + CH 40	DETECTOR FUNCTION	Peak (PK)
FREQUENCY RANGE	1GHz ~ 25GHz		Average (AV)

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	*2437.00	109.5 PK			2.67 H	299	78.4	31.1
2	*2437.00	105.9 AV			2.67 H	299	74.8	31.1
3	4874.00	44.5 PK	74.0	-29.5	3.55 H	220	42.5	2.0
4	4874.00	33.8 AV	54.0	-20.2	3.55 H	220	31.8	2.0

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	*2437.00	116.8 PK			3.11 V	333	85.7	31.1
2	*2437.00	112.9 AV			3.11 V	333	81.8	31.1
3	4874.00	45.8 PK	74.0	-28.2	2.58 V	339	43.8	2.0
4	4874.00	36.5 AV	54.0	-17.5	2.58 V	339	34.5	2.0

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.

802.11b + 802.11a

CHANNEL	CH 6 + CH 40	DETECTOR FUNCTION	Peak (PK)
FREQUENCY RANGE	1GHz ~ 40GHz		Average (AV)

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	*5200.00	113.0 PK			2.99 H	151	76.8	36.2
2	*5200.00	103.0 AV			2.99 H	151	66.8	36.2
3	#10400.00	56.5 PK	68.2	-11.7	1.50 H	339	41.3	15.2
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	*5200.00	119.8 PK			2.40 V	199	83.6	36.2
2	*5200.00	109.9 AV			2.49 V	199	73.7	36.2
3	#10400.00	56.9 PK	68.2	-11.3	2.70 V	250	41.7	15.2

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.
6. " # ": The radiated frequency is out of the restricted band.

Below 1GHz data

802.11b + 802.11a

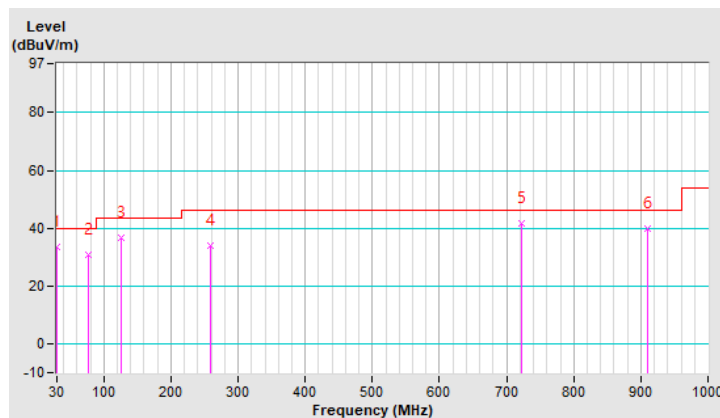
Mode A

CHANNEL	CH 6 + CH 40	DETECTOR FUNCTION	Quasi-Peak (QP)
FREQUENCY RANGE	30MHz ~ 1GHz		

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	30.00	33.6 QP	40.0	-6.4	1.00 H	357	44.1	-10.5
2	76.56	30.6 QP	40.0	-9.4	1.00 H	93	43.2	-12.6
3	126.03	36.6 QP	43.5	-6.9	1.00 H	93	47.0	-10.4
4	258.92	33.8 QP	46.0	-12.2	1.00 H	114	42.3	-8.5
5	722.58	41.6 QP	46.0	-4.4	1.00 H	113	40.5	1.1
6	909.79	39.8 QP	46.0	-6.2	1.00 H	63	34.9	4.9

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 of frequency range 30MHz~1000MHz.
5. The emission levels were very low against the limit of frequency range 9kHz~30MHz: the amplitude of spurious emissions attenuated more than 20 dB below the permissible value to be report.

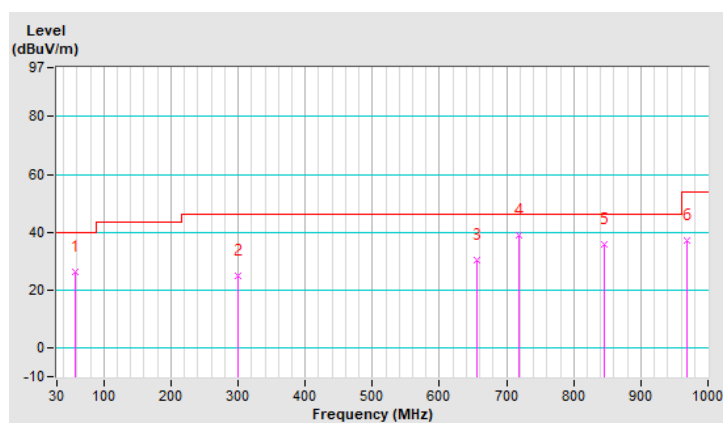


CHANNEL	CH 6 + CH 40	DETECTOR FUNCTION	Quasi-Peak (QP)
FREQUENCY RANGE	30MHz ~ 1GHz		

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	58.13	26.1 QP	40.0	-13.9	1.50 V	3	35.5	-9.4
2	299.66	25.0 QP	46.0	-21.0	1.00 V	187	32.1	-7.1
3	656.62	30.5 QP	46.0	-15.5	1.00 V	221	30.3	0.2
4	717.73	38.8 QP	46.0	-7.2	2.00 V	255	37.7	1.1
5	844.80	35.6 QP	46.0	-10.4	1.00 V	187	32.1	3.5
6	967.99	37.1 QP	54.0	-16.9	1.50 V	281	31.3	5.8

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 of frequency range 30MHz~1000MHz.
5. The emission levels were very low against the limit of frequency range 9kHz~30MHz: the amplitude of spurious emissions attenuated more than 20 dB below the permissible value to be report.



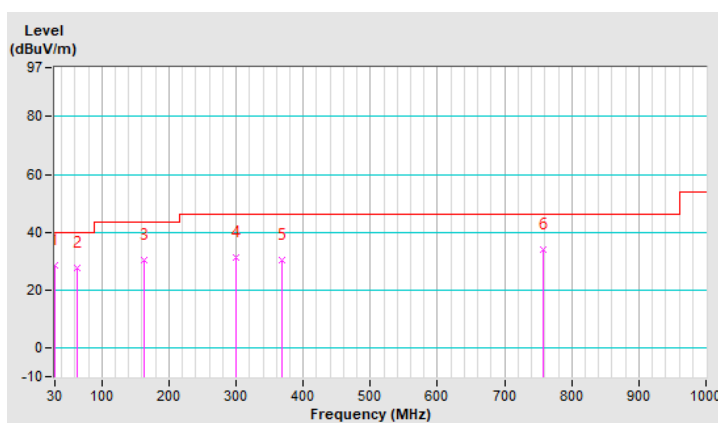
Mode B

CHANNEL	CH 6 + CH 40	DETECTOR FUNCTION	Quasi-Peak (QP)
FREQUENCY RANGE	30MHz ~ 1GHz		

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	30.94	28.7 QP	40.0	-11.3	2.00 H	100	39.7	-11.0
2	64.00	27.8 QP	40.0	-12.2	1.00 H	81	37.7	-9.9
3	163.19	30.2 QP	43.5	-13.3	1.00 H	242	38.7	-8.5
4	299.87	31.4 QP	46.0	-14.6	2.00 H	145	38.5	-7.1
5	368.53	30.3 QP	46.0	-15.7	1.00 H	326	35.8	-5.5
6	756.53	34.1 QP	46.0	-11.9	1.00 H	232	31.9	2.2

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 of frequency range 30MHz~1000MHz.
5. The emission levels were very low against the limit of frequency range 9kHz~30MHz: the amplitude of spurious emissions attenuated more than 20 dB below the permissible value to be report.

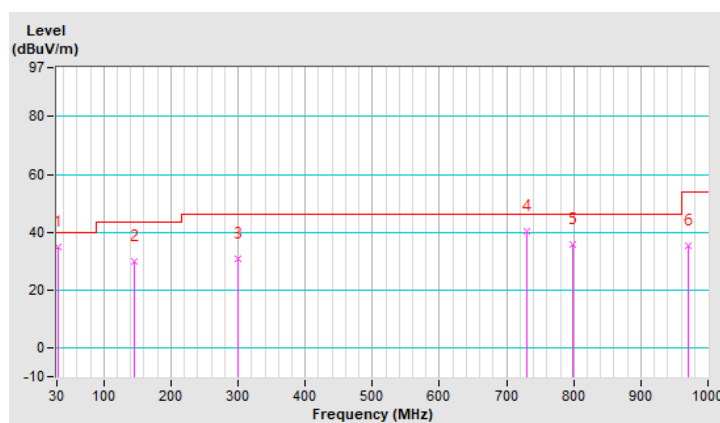


CHANNEL	CH 6 + CH 40	DETECTOR FUNCTION	Quasi-Peak (QP)
FREQUENCY RANGE	30MHz ~ 1GHz		

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	32.88	35.0 QP	40.0	-5.0	1.50 V	173	45.7	-10.7
2	145.40	30.1 QP	43.5	-13.4	1.00 V	109	38.9	-8.8
3	300.07	30.8 QP	46.0	-15.2	1.00 V	272	37.9	-7.1
4	730.04	40.3 QP	46.0	-5.7	1.00 V	9	39.1	1.2
5	799.18	35.9 QP	46.0	-10.1	1.00 V	9	33.1	2.8
6	969.93	35.4 QP	54.0	-18.6	2.00 V	200	29.6	5.8

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 of frequency range 30MHz~1000MHz.
5. The emission levels were very low against the limit of frequency range 9kHz~30MHz: the amplitude of spurious emissions attenuated more than 20 dB below the permissible value to be report.



5 Pictures of Test Arrangements

Please refer to the attached file (Test Setup Photo).

Appendix – 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 and approved according to ISO/IEC 17025.

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Web Site: www.bureauveritas-adt.com

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

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