

Partial FCC Test Report

(Spot Check)

Report No.: RFDLK-WTW-P20070241

FCC ID: KA2BAX1230PA1

Test Model: DBA-X1230P

Received Date: Jul. 14, 2020

Test Date: Oct. 06, 2020 ~ Nov. 25, 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 /
Designation Number:** 788550 / TW0003



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Release Control Record

Issue No.	Description	Date Issued
RFDLK-WTW-P20070241	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: Oct. 06, 2020 ~ Nov. 25, 2020

Standards: 47 CFR FCC Part 15, Subpart C (Section 15.247)
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 : Vera Huang, **Date:** Nov. 26, 2020
Vera Huang / Specialist

Approved by : Dylan Chiou, **Date:** Nov. 26, 2020
Dylan Chiou / Senior Project Engineer

2 Summary of Test Results

47 CFR FCC Part 15, Subpart C (Section 15.247)			
FCC Clause	Test Item	Result	Remarks
15.207	AC Power Conducted Emission	Pass	Meet the requirement of limit. Minimum passing margin is -1.55 dB at 0.59000 MHz.
15.205 / 15.209 / 15.247(d)	Radiated Emissions and Band Edge Measurement	Pass	Meet the requirement of limit. Minimum passing margin is -1.3 dB at 2483.50 MHz.
15.247(d)	Antenna Port Emission	N/A	Refer to Note
15.247(a)(2)	6 dB Bandwidth	N/A	Refer to Note
---	Occupied Bandwidth Measurement	N/A	Refer to Note
15.247(b)	Conducted power	Pass	Meet the requirement of limit.
15.247(e)	Power Spectral Density	N/A	Refer to Note
15.203	Antenna Requirement	N/A	Refer to Note

Note:

1. This report is a supplementary report to the original BV CPS report no.: RFDLK-WTW-P20070248 (The difference compared with the report (RFDLK-WTW-P20070248) 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, the format, test items and amount of spot-check test data are decided by applicant's engineering judgment, for more details please refer to declaration letter exhibit. Therefore, only Output Power, AC Power Conducted Emission and Radiated Emissions were verified and recorded in this report. AC Power Conducted Emission and Radiated Emission tests according to original report radiated emission worst channel, and Conducted power were re-test.
2. For 2.4G band compliance with rule 15.247(d) of the band-edge items, the test plots were recorded in Annex A. Test Procedures refer to report 4.1.3.
3. 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)
Conducted Emissions at mains ports	150 kHz ~ 30 MHz	2.79 dB
Radiated Emissions up to 1 GHz	9 kHz ~ 30 MHz	3.04 dB
	30 MHz ~ 200 MHz	2.93 dB
	200 MHz ~ 1000 MHz	2.95 dB
Radiated Emissions above 1 GHz	1 GHz ~ 18 GHz	2.26 dB
	18 GHz ~ 40 GHz	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
Status of EUT	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
Modulation Technology	DSSS, OFDM, 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 802.11n: up to 400 Mbps 802.11ax: up to 573.5 Mbps
Operating Frequency	2412 ~ 2462 MHz
Number of Channel	11 for 802.11b, 802.11g, 802.11n (HT20), (VHT20), 802.11ax (HE20) 7 for 802.11n (HT40), (VHT40), 802.11ax (HE40)
Output Power	CDD Mode: 822.476 mW Beamforming Mode: 256.663 mW
Antenna Type	PIFA antenna with 3.1 dBi gain (Chain 1) PIFA antenna with 3.2 dBi gain (Chain 2)
Antenna Connector	i-pex(MHF)
Accessory Device	Refer to Note as below
Data Cable Supplied	N/A

Note:

1. This report is a supplementary report to the original BV CPS report no.: RFDLK-WTW-P20070248 (The difference compared with the report (RFDLK-WTW-P20070248) 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, the format, test items and amount of spot-check test data are decided by applicant's engineering judgment, for more details please refer to declaration letter exhibit. Therefore, only Output Power, AC Power Conducted Emission and Radiated Emissions were verified and recorded in this report. AC Power Conducted Emission and Radiated Emission tests according to original report radiated emission worst channel, and Conducted power were re-test.

2. The EUT incorporates a MIMO function. Physically, the EUT provides two completed transmitters and two receivers.

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

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

*For 802.11n and 802.11ax, CDD mode and Beamforming mode are presented in power output test item. For other test items, CDD mode is the worst case for final tests after pretesting.

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

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

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

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

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

3.2.1 Test Mode Applicability and Tested Channel Detail

EUT Configure Mode	Applicable To				Description
	RE \geq 1G	RE<1G	PLC	APCM	
A	√	√	√	√	EUT with Adapter (WB18Q12FU1)
B	-	√	√	-	EUT with POE
C	-	√	√	-	EUT with Adapter (WA-30P12R)

Where **RE \geq 1G**: Radiated Emission above 1 GHz

RE<1G: Radiated Emission below 1 GHz

PLC: Power Line Conducted Emission

APCM: Antenna Port Conducted Measurement

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	Available Channel	Tested Channel	Modulation Technology	Modulation Type	Data Rate (Mbps)
A	802.11b	1 to 11	11	DSSS	DBPSK	1.0

Radiated Emission Test (Below 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	Available Channel	Tested Channel	Modulation Technology	Modulation Type	Data Rate (Mbps)
A~C	802.11b	1 to 11	6	DSSS	DBPSK	1.0

Power Line Conducted Emission Test:

- ☒ 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	Available Channel	Tested Channel	Modulation Technology	Modulation Type	Data Rate (Mbps)
A~C	802.11b	1 to 11	6	DSSS	DBPSK	1.0

Bandedge Measurement:

- ☒ 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	Available Channel	Tested Channel	Modulation Technology	Modulation Type	Data Rate (Mbps)
-	802.11b	1 to 11	11	DSSS	DBPSK	1.0

Antenna Port Conducted Measurement:

- ☒ This item includes all test value of each mode, but only includes spectrum plot of worst value of each mode.
- ☒ 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	Available Channel	Tested Channel	Modulation Technology	Modulation Type	Data Rate (Mbps)
A	802.11b	1 to 11	1, 6, 11	DSSS	DBPSK	1.0
	802.11g	1 to 11	1, 6, 11	OFDM	BPSK	6.0
	802.11n (HT20)	1 to 13	1, 7, 13	OFDM	BPSK	6.5
	802.11n (HT40)	3 to 11	3, 7, 11	OFDM	BPSK	13.5
	802.11n (VHT20)	1 to 13	1, 7, 13	OFDM	BPSK	7.2
	802.11n (VHT40)	3 to 11	3, 7, 11	OFDM	BPSK	15.0
	802.11ax (HE20)	1 to 11	1, 6, 11	OFDMA	BPSK	MCS0
	802.11ax (HE40)	3 to 9	3, 6, 9	OFDMA	BPSK	MCS0

Test Condition:

Applicable To	Environmental Conditions	Input Power	Tested by
RE \geq 1G	22 deg. C, 67 % RH	120 Vac, 60 Hz	Greg Lin
RE<1G	22 deg. C, 67 % RH	120 Vac, 60 Hz	Greg Lin
PLC	25 deg. C, 75 % RH	120 Vac, 60 Hz	Adair Peng
APCM	25 deg. C, 60 % RH	120 Vac, 60 Hz	Ivan Tseng

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	--

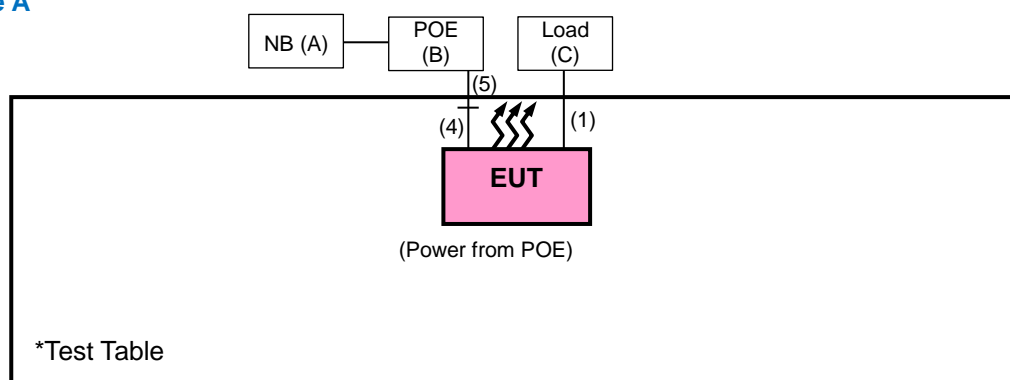
ID	Cable Descriptions	Qty.	Length (m)	Shielding (Yes/No)	Cores (Qty.)	Remarks
1.	Console Cable	1	1.8	N	0	Accessory of the EUT
2.	LAN Cable	1	10	N	0	RJ45
3.	Adapter Cable	1	1.0	N	0	Accessory of the EUT
4.	LAN Cable	1	1.5	N	0	RJ45
5.	LAN Cable	1	1.5	N	0	RJ45
6.	LAN Cable	1	1.0	N	0	RJ45

Note:

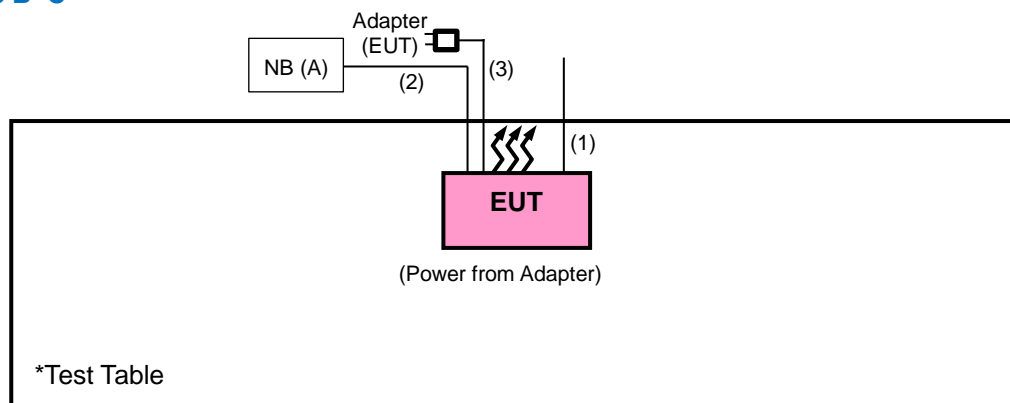
1. All power cords of the above support units are non-shielded (1.8m).
2. Item A acted as communication partner to transfer data.

3.3.1 Configuration of System under Test

Mode A



Mode B~C



3.4 General Description of Applied Standards and References

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)

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

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 30 dB 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 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.

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. 22, 2020	Nov. 23, 2020 Nov. 21, 2021
HORN Antenna SCHWARZBECK	BBHA 9170	BBHA9170241	Nov. 24, 2019 Nov. 22, 2020	Nov. 23, 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
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
USB Wideband Power Sensor KEYSIGHT	U2021XA	MY55050005/MY55 190004/MY551900 07/MY55210005	Jul. 13, 2020	Jul. 12, 2021

- 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 30 MHz

- 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 9 kHz at frequency below 30 MHz.

For Radiated Emission above 30 MHz

- a. The EUT was placed on the top of a rotating table 0.8 meters (for 30 MHz ~ 1 GHz) / 1.5 meters (for above 1 GHz) 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 detected 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:

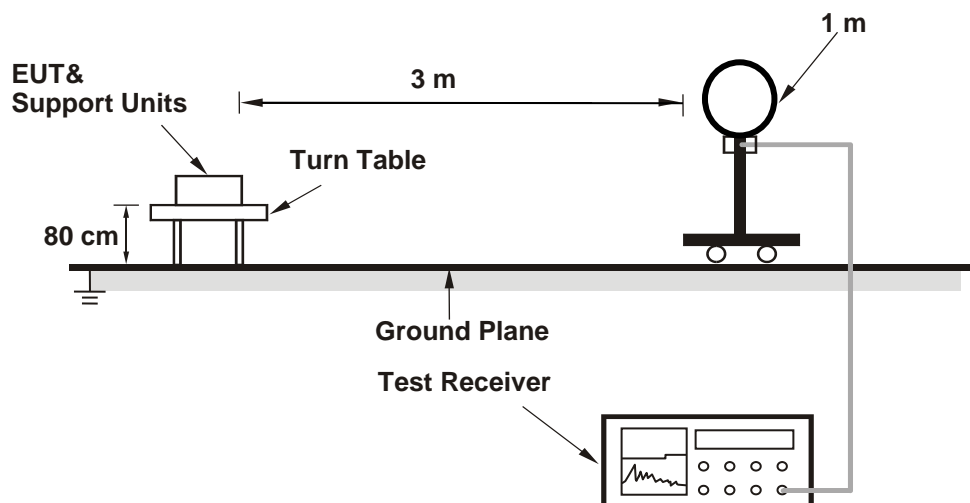
1. The resolution bandwidth and video bandwidth of test receiver/spectrum analyzer is 120 kHz for Quasi-peak detection (QP) or Peak detection (PK) at frequency below 1 GHz.
2. The resolution bandwidth of test receiver/spectrum analyzer is 1 MHz and the video bandwidth is 3 MHz for Peak detection (PK) at frequency above 1 GHz.
3. The resolution bandwidth of test receiver/spectrum analyzer is 1 MHz and the video bandwidth is $\geq 1/T$ (Duty cycle $< 98\%$) or 10 Hz (Duty cycle $\geq 98\%$) for Average detection (AV) at frequency above 1 GHz.
(11b: RBW = 1 MHz, VBW = 3 kHz ; 11g: RBW = 1 MHz, VBW = 1 kHz ;
11ax (HE20): RBW = 1 MHz, VBW = 1 kHz ; 11ax (HE40): RBW = 1 MHz, VBW = 1 kHz) (Duty cycle references original report)
4. All modes of operation were investigated and the worst-case emissions are reported.

4.1.4 Deviation from Test Standard

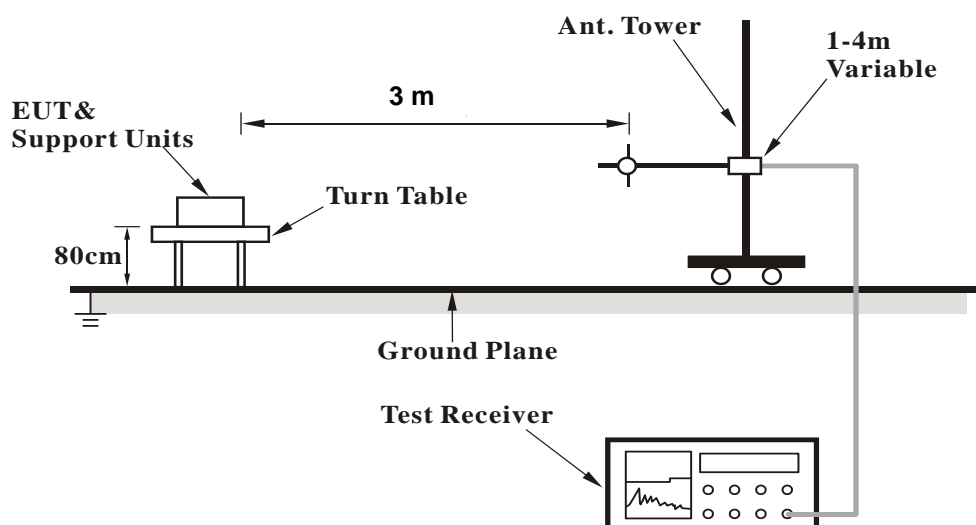
No deviation.

4.1.5 Test Set Up

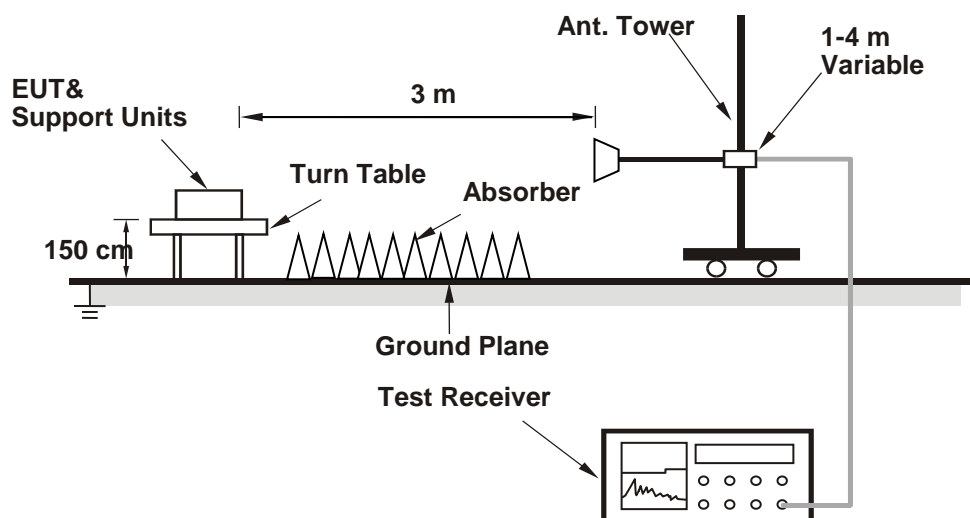
<Radiated Emission below 30 MHz>



<Radiated Emission 30 MHz to 1 GHz>



<Radiated Emission above 1 GHz>



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

4.1.6 EUT Operating Conditions

- Placed the EUT on a testing table.
- Use the software to control the EUT under transmission condition continuously at specific channel frequency.

4.1.7 Test Results

Above 1 GHz Data :

802.11b

CHANNEL	TX Channel 11	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	*2462.00	108.3 PK			2.50 H	288	77.2	31.1
2	*2462.00	103.3 AV			2.50 H	288	72.2	31.1
3	2483.50	57.0 PK	74.0	-17.0	2.50 H	288	25.8	31.2
4	2483.50	45.6 AV	54.0	-8.4	2.50 H	288	14.4	31.2
5	4924.00	43.9 PK	74.0	-30.1	1.06 H	340	41.8	2.1
6	4924.00	32.8 AV	54.0	-21.2	1.06 H	340	30.7	2.1
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	115.4 PK			1.48 V	153	84.3	31.1
2	*2462.00	110.3 AV			1.48 V	153	79.2	31.1
3	2483.50	60.3 PK	74.0	-13.7	1.48 V	153	29.1	31.2
4	2483.50	52.7 AV	54.0	-1.3	1.48 V	153	21.5	31.2
5	4924.00	46.0 PK	74.0	-28.0	1.82 V	328	43.9	2.1
6	4924.00	36.7 AV	54.0	-17.3	1.82 V	328	34.6	2.1

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.

9 kHz ~ 30 MHz Data:

The amplitude of spurious emissions attenuated more than 20 dB below the permissible value is not required to be report.

30 MHz ~ 1 GHz Worst-Case Data:

802.11b

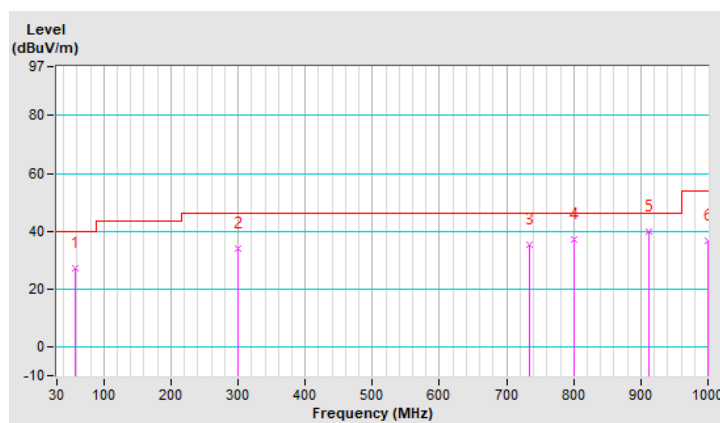
Mode A

CHANNEL	TX Channel 6	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	58.16	27.2 QP	40.0	-12.8	2.00 H	260	36.6	-9.4
2	300.66	33.8 QP	46.0	-12.2	1.00 H	330	40.9	-7.1
3	733.33	35.2 QP	46.0	-10.8	1.00 H	140	33.9	1.3
4	800.18	37.2 QP	46.0	-8.8	1.00 H	166	34.4	2.8
5	911.79	39.9 QP	46.0	-6.1	1.00 H	146	34.9	5.0
6	1000.00	36.9 QP	54.0	-17.1	2.00 H	219	30.9	6.0

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 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.

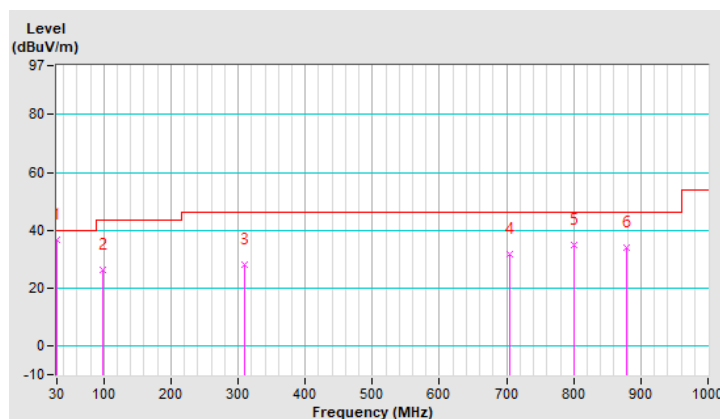


CHANNEL	TX Channel 6	DETECTOR FUNCTION	Quasi-Peak (QP)
FREQUENCY RANGE	30MHz ~ 1GHz		

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	30.00	36.5 QP	40.0	-3.5	1.50 V	6	47.0	-10.5
2	97.90	26.2 QP	43.5	-17.3	1.00 V	169	40.0	-13.8
3	310.30	28.3 QP	46.0	-17.7	1.00 V	236	35.0	-6.7
4	705.09	31.6 QP	46.0	-14.4	2.00 V	179	30.7	0.9
5	800.18	35.0 QP	46.0	-11.0	1.00 V	150	32.2	2.8
6	878.75	34.1 QP	46.0	-11.9	1.00 V	250	30.0	4.1

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.



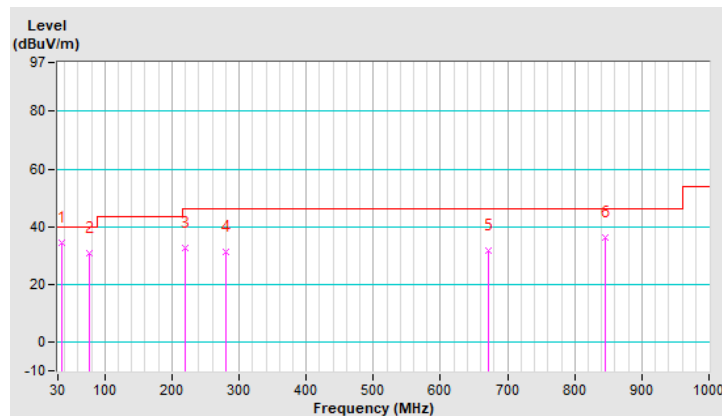
Mode B

CHANNEL	TX Channel 6	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	35.82	34.4 QP	40.0	-5.6	1.50 H	87	44.8	-10.4
2	76.56	30.6 QP	40.0	-9.4	1.00 H	93	43.2	-12.6
3	220.12	32.4 QP	46.0	-13.6	1.25 H	114	43.3	-10.9
4	280.26	31.1 QP	46.0	-14.9	1.00 H	114	38.5	-7.4
5	671.17	31.5 QP	46.0	-14.5	1.50 H	71	31.2	0.3
6	844.80	36.1 QP	46.0	-9.9	1.00 H	53	32.6	3.5

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.

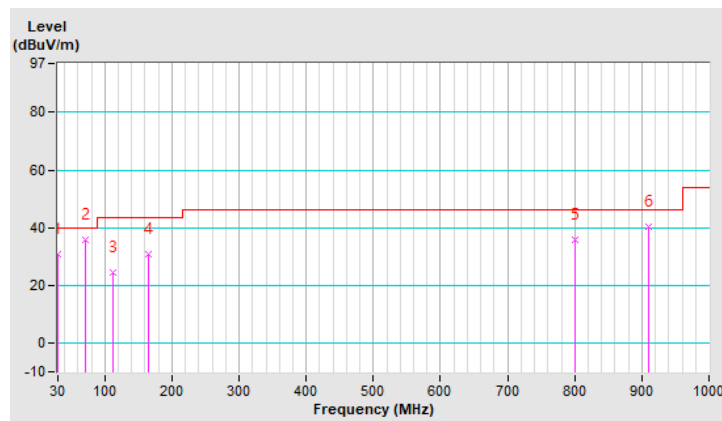


CHANNEL	TX Channel 6	DETECTOR FUNCTION	Quasi-Peak (QP)
FREQUENCY RANGE	30MHz ~ 1GHz		

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	30.00	31.0 QP	40.0	-9.0	1.00 V	75	41.5	-10.5
2	71.71	35.7 QP	40.0	-4.3	1.25 V	205	47.0	-11.3
3	112.45	24.4 QP	43.5	-19.1	1.00 V	296	36.1	-11.7
4	165.80	30.6 QP	43.5	-12.9	1.50 V	125	39.3	-8.7
5	800.18	35.7 QP	46.0	-10.3	1.00 V	161	32.9	2.8
6	909.79	40.5 QP	46.0	-5.5	1.00 V	99	35.6	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.



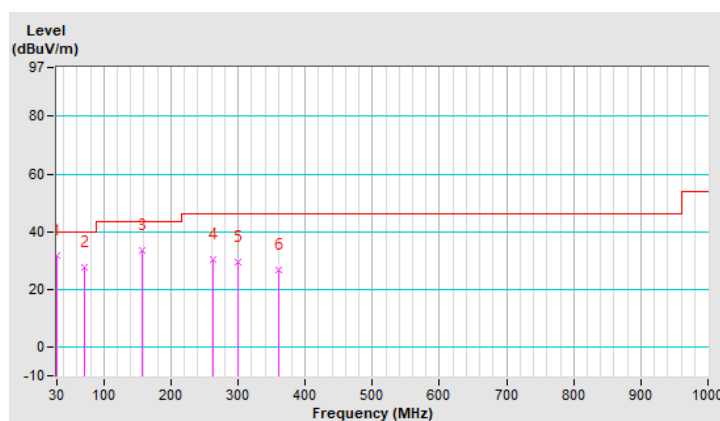
Mode C

CHANNEL	TX Channel 6	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	31.9 QP	40.0	-8.1	2.00 H	298	42.4	-10.5
2	71.71	27.8 QP	40.0	-12.2	1.00 H	85	39.1	-11.3
3	158.04	33.7 QP	43.5	-9.8	1.25 H	108	42.1	-8.4
4	262.80	30.3 QP	46.0	-15.7	1.00 H	279	38.6	-8.3
5	300.63	29.3 QP	46.0	-16.7	1.50 H	124	36.4	-7.1
6	359.80	26.9 QP	46.0	-19.1	1.25 H	239	32.6	-5.7

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.

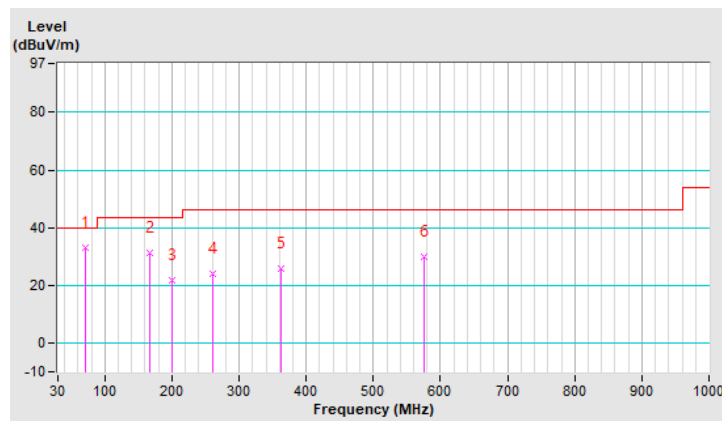


CHANNEL	TX Channel 6	DETECTOR FUNCTION	Quasi-Peak (QP)
FREQUENCY RANGE	30MHz ~ 1GHz		

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	71.71	33.0 QP	40.0	-7.0	1.00 V	192	44.3	-11.3
2	166.77	31.3 QP	43.5	-12.2	1.00 V	203	40.1	-8.8
3	199.75	21.7 QP	43.5	-21.8	1.50 V	71	33.3	-11.6
4	259.89	24.2 QP	46.0	-21.8	1.00 V	308	32.7	-8.5
5	361.74	25.6 QP	46.0	-20.4	2.00 V	13	31.3	-5.7
6	575.14	29.8 QP	46.0	-16.2	1.50 V	116	31.3	-1.5

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.



4.2 Conducted Emission Measurement

4.2.1 Limits of Conducted Emission Measurement

Frequency (MHz)	Conducted Limit (dBuV)	
	Quasi-Peak	Average
0.15 - 0.5	66 - 56	56 - 46
0.50 - 5.0	56	46
5.0 - 30.0	60	50

- Note: 1. The lower limit shall apply at the transition frequencies.
 2. The limit decreases in line with the logarithm of the frequency in the range of 0.15 to 0.50 MHz.

4.2.2 Test Instruments

Description & Manufacturer	Model No.	Serial No.	Date of Calibration	Due Date of Calibration
Test Receiver ROHDE & SCHWARZ	ESCI	100613	Dec. 11, 2019	Dec. 10, 2020
RF signal cable Woken	5D-FB	Cable-cond1-01	Sep. 04, 2020	Sep. 03, 2021
LISN/AMN ROHDE & SCHWARZ (EUT)	ENV216	101826	Feb. 20, 2020	Feb. 19, 2021
LISN/AMN ROHDE & SCHWARZ (Peripheral)	ESH3-Z5	100311	Aug. 28, 2020	Aug. 27, 2021
Software ADT	BV ADT_Cond_ V7.3.7.4	NA	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 Shielded Room 1 (Conduction 1).
 3. The VCCI Site Registration No. is C-12040.

4.2.3 Test Procedures

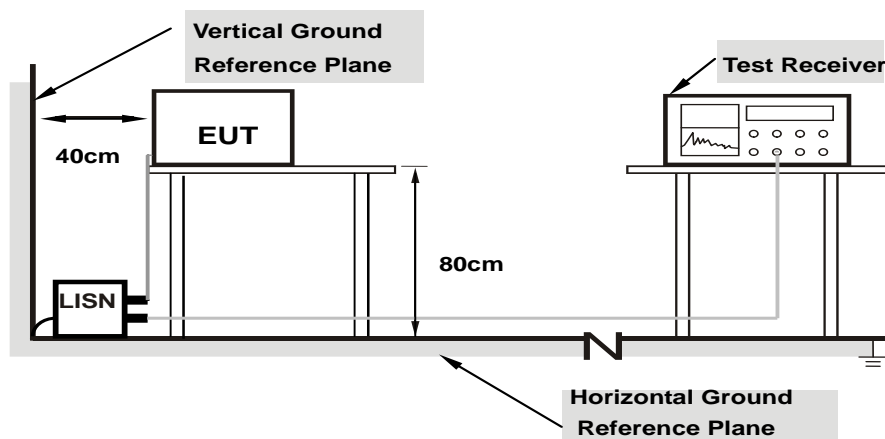
- The EUT was placed 0.4 meters from the conducting wall of the shielded room with EUT being connected to the power mains through a line impedance stabilization network (LISN). Other support units were connected to the power mains through another LISN. The two LISNs provide 50 ohm/50 uH of coupling impedance for the measuring instrument.
- Both lines of the power mains connected to the EUT were checked for maximum conducted interference.
- The frequency range from 150 kHz to 30 MHz was searched. Emission levels under (Limit – 20 dB) was not recorded.

Note: The resolution bandwidth and video bandwidth of test receiver is 9 kHz for quasi-peak detection (QP) and average detection (AV) at frequency 0.15 MHz – 30 MHz.

4.2.4 Deviation from Test Standard

No deviation.

4.2.5 Test Setup



Note: 1.Support units were connected to second LISN.

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

4.2.6 EUT Operating Conditions

- Placed the EUT on a testing table.
- Use the software to control the EUT under transmission condition continuously at specific channel frequency.

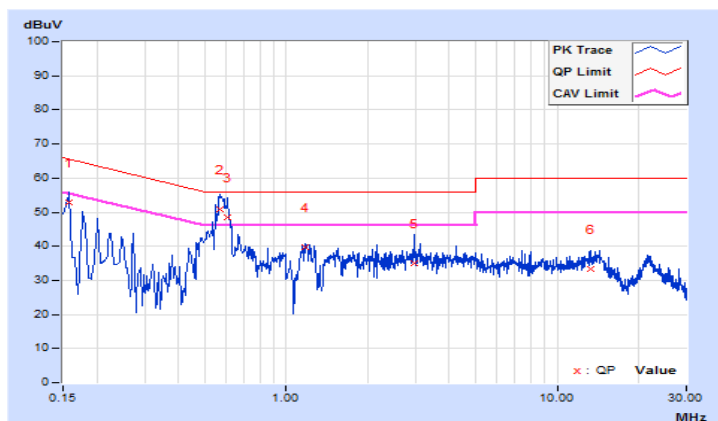
4.2.7 Test Results

Frequency Range	150kHz ~ 30MHz	Detector Function & Resolution Bandwidth	Quasi-Peak (QP) / Average (AV), 9kHz
Input Power	120Vac, 60Hz	Environmental Conditions	25°C, 75%RH
Tested by	Adair Peng	Test Date	2020/11/25
Test Mode	Mode A		

Phase Of Power : Line (L)										
No	Frequency (MHz)	Correction Factor (dB)	Reading Value (dBuV)		Emission Level (dBuV)		Limit (dBuV)		Margin (dB)	
			Q.P.	AV.	Q.P.	AV.	Q.P.	AV.	Q.P.	AV.
1	0.15800	9.65	43.08	27.56	52.73	37.21	65.57	55.57	-12.84	-18.36
2	0.56591	9.66	41.25	32.90	50.91	42.56	56.00	46.00	-5.09	-3.44
3	0.60600	9.66	38.94	30.59	48.60	40.25	56.00	46.00	-7.40	-5.75
4	1.18200	9.68	29.96	22.05	39.64	31.73	56.00	46.00	-16.36	-14.27
5	2.95400	9.72	25.33	18.22	35.05	27.94	56.00	46.00	-20.95	-18.06
6	13.27400	9.83	23.37	17.22	33.20	27.05	60.00	50.00	-26.80	-22.95

Remarks:

1. Q.P. and AV. are abbreviations of quasi-peak and average individually.
2. The emission levels of other frequencies were very low against the limit.
3. Margin value = Emission level – Limit value
4. Correction factor = Insertion loss + Cable loss
5. Emission Level = Correction Factor + Reading Value

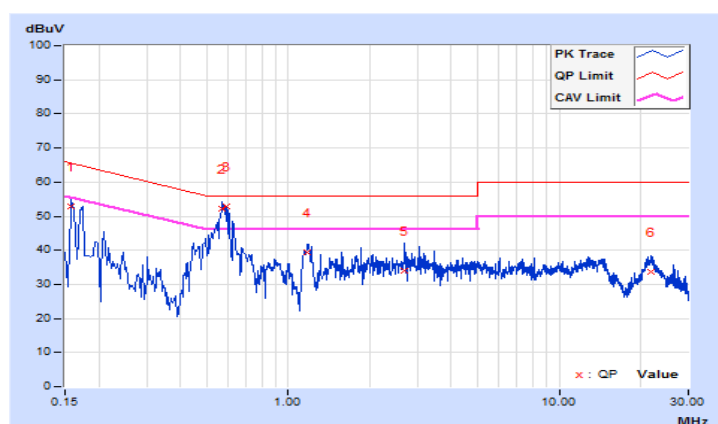


Frequency Range	150kHz ~ 30MHz	Detector Function & Resolution Bandwidth	Quasi-Peak (QP) / Average (AV), 9kHz
Input Power	120Vac, 60Hz	Environmental Conditions	25°C, 75%RH
Tested by	Adair Peng	Test Date	2020/11/25
Test Mode	Mode A		

Phase Of Power : Neutral (N)										
No	Frequency (MHz)	Correction Factor (dB)	Reading Value (dBuV)		Emission Level (dBuV)		Limit (dBuV)		Margin (dB)	
			Q.P.	AV.	Q.P.	AV.	Q.P.	AV.	Q.P.	AV.
1	0.15800	9.68	43.05	27.49	52.73	37.17	65.57	55.57	-12.84	-18.40
2	0.57000	9.68	42.58	34.17	52.26	43.85	56.00	46.00	-3.74	-2.15
3	0.59000	9.68	43.16	34.77	52.84	44.45	56.00	46.00	-3.16	-1.55
4	1.17715	9.70	29.66	21.73	39.36	31.43	56.00	46.00	-16.64	-14.57
5	2.68200	9.74	24.18	17.70	33.92	27.44	56.00	46.00	-22.08	-18.56
6	21.94600	9.98	23.76	18.07	33.74	28.05	60.00	50.00	-26.26	-21.95

Remarks:

1. Q.P. and AV. are abbreviations of quasi-peak and average individually.
2. The emission levels of other frequencies were very low against the limit.
3. Margin value = Emission level – Limit value
4. Correction factor = Insertion loss + Cable loss
5. Emission Level = Correction Factor + Reading Value

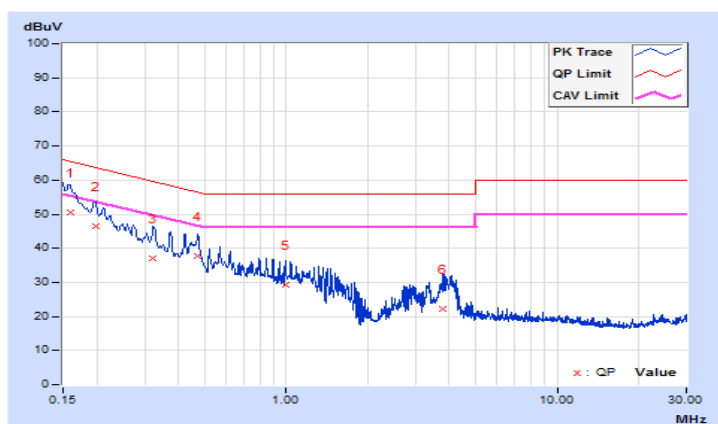


Frequency Range	150kHz ~ 30MHz	Detector Function & Resolution Bandwidth	Quasi-Peak (QP) / Average (AV), 9kHz
Input Power	120Vac, 60Hz	Environmental Conditions	25°C, 75%RH
Tested by	Adair Peng	Test Date	2020/10/14
Test Mode	Mode B		

Phase Of Power : Line (L)										
No	Frequency (MHz)	Correction Factor (dB)	Reading Value (dBuV)		Emission Level (dBuV)		Limit (dBuV)		Margin (dB)	
			Q.P.	AV.	Q.P.	AV.	Q.P.	AV.	Q.P.	AV.
1	0.15900	10.09	40.47	24.40	50.56	34.49	65.52	55.52	-14.96	-21.03
2	0.19931	10.10	36.28	19.58	46.38	29.68	63.64	53.64	-17.26	-23.96
3	0.32312	10.10	26.89	10.71	36.99	20.81	59.63	49.63	-22.64	-28.82
4	0.47134	10.11	27.58	19.76	37.69	29.87	56.49	46.49	-18.80	-16.62
5	0.99150	10.15	19.09	7.88	29.24	18.03	56.00	46.00	-26.76	-27.97
6	3.80175	10.22	11.89	2.36	22.11	12.58	56.00	46.00	-33.89	-33.42

Remarks:

1. Q.P. and AV. are abbreviations of quasi-peak and average individually.
2. The emission levels of other frequencies were very low against the limit.
3. Margin value = Emission level – Limit value
4. Correction factor = Insertion loss + Cable loss
5. Emission Level = Correction Factor + Reading Value

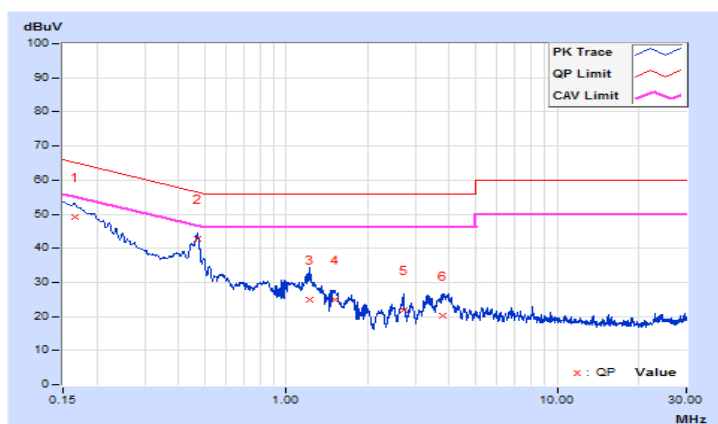


Frequency Range	150kHz ~ 30MHz	Detector Function & Resolution Bandwidth	Quasi-Peak (QP) / Average (AV), 9kHz
Input Power	120Vac, 60Hz	Environmental Conditions	25°C, 75%RH
Tested by	Adair Peng	Test Date	2020/10/14
Test Mode	Mode B		

Phase Of Power : Neutral (N)										
No	Frequency (MHz)	Correction Factor (dB)	Reading Value (dBuV)		Emission Level (dBuV)		Limit (dBuV)		Margin (dB)	
			Q.P.	AV.	Q.P.	AV.	Q.P.	AV.	Q.P.	AV.
1	0.16524	10.06	39.06	23.37	49.12	33.43	65.20	55.20	-16.08	-21.77
2	0.46950	10.09	32.53	25.35	42.62	35.44	56.52	46.52	-13.90	-11.08
3	1.21425	10.13	14.74	5.06	24.87	15.19	56.00	46.00	-31.13	-30.81
4	1.51016	10.14	14.91	5.81	25.05	15.95	56.00	46.00	-30.95	-30.05
5	2.70375	10.18	11.68	4.97	21.86	15.15	56.00	46.00	-34.14	-30.85
6	3.80400	10.22	9.89	2.36	20.11	12.58	56.00	46.00	-35.89	-33.42

Remarks:

1. Q.P. and AV. are abbreviations of quasi-peak and average individually.
2. The emission levels of other frequencies were very low against the limit.
3. Margin value = Emission level – Limit value
4. Correction factor = Insertion loss + Cable loss
5. Emission Level = Correction Factor + Reading Value

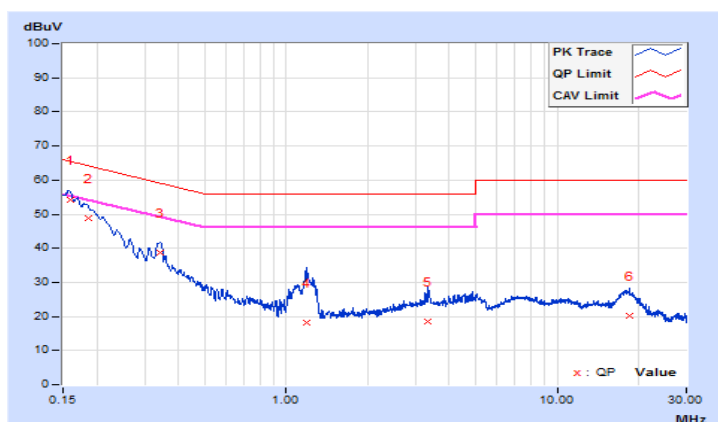


Frequency Range	150kHz ~ 30MHz	Detector Function & Resolution Bandwidth	Quasi-Peak (QP) / Average (AV), 9kHz
Input Power	120Vac, 60Hz	Environmental Conditions	25°C, 75%RH
Tested by	Adair Peng	Test Date	2020/10/14
Test Mode	Mode C		

Phase Of Power : Line (L)										
No	Frequency (MHz)	Correction Factor (dB)	Reading Value (dBuV)		Emission Level (dBuV)		Limit (dBuV)		Margin (dB)	
			Q.P.	AV.	Q.P.	AV.	Q.P.	AV.	Q.P.	AV.
1	0.15900	10.09	43.99	26.23	54.08	36.32	65.52	55.52	-11.44	-19.20
2	0.18600	10.10	38.78	20.19	48.88	30.29	64.21	54.21	-15.33	-23.92
3	0.34064	10.10	28.68	23.50	38.78	33.60	59.19	49.19	-20.41	-15.59
4	1.18500	10.15	8.06	2.37	18.21	12.52	56.00	46.00	-37.79	-33.48
5	3.33375	10.21	8.30	2.47	18.51	12.68	56.00	46.00	-37.49	-33.32
6	18.57525	10.40	9.92	4.00	20.32	14.40	60.00	50.00	-39.68	-35.60

Remarks:

1. Q.P. and AV. are abbreviations of quasi-peak and average individually.
2. The emission levels of other frequencies were very low against the limit.
3. Margin value = Emission level – Limit value
4. Correction factor = Insertion loss + Cable loss
5. Emission Level = Correction Factor + Reading Value

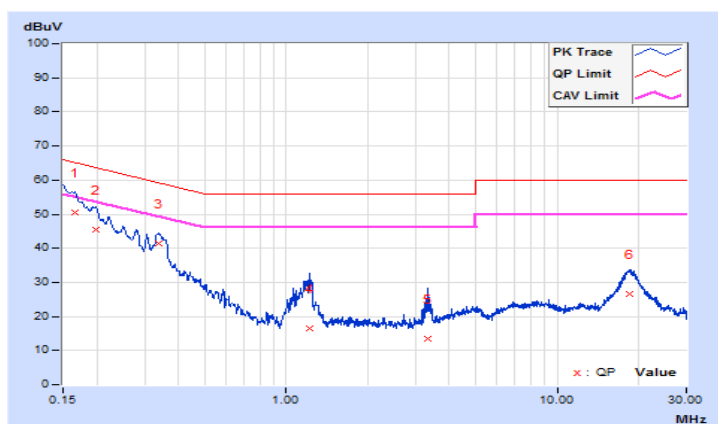


Frequency Range	150kHz ~ 30MHz	Detector Function & Resolution Bandwidth	Quasi-Peak (QP) / Average (AV), 9kHz
Input Power	120Vac, 60Hz	Environmental Conditions	25°C, 75%RH
Tested by	Adair Peng	Test Date	2020/10/14
Test Mode	Mode C		

Phase Of Power : Neutral (N)										
No	Frequency (MHz)	Correction Factor (dB)	Reading Value (dBuV)		Emission Level (dBuV)		Limit (dBuV)		Margin (dB)	
			Q.P.	AV.	Q.P.	AV.	Q.P.	AV.	Q.P.	AV.
1	0.16567	10.06	40.43	23.41	50.49	33.47	65.17	55.17	-14.68	-21.70
2	0.19721	10.06	35.50	21.41	45.56	31.47	63.73	53.73	-18.17	-22.26
3	0.33675	10.07	31.28	28.82	41.35	38.89	59.28	49.28	-17.93	-10.39
4	1.21875	10.13	6.47	2.33	16.60	12.46	56.00	46.00	-39.40	-33.54
5	3.33150	10.20	3.32	12.50	13.52	22.70	56.00	46.00	-42.48	-23.30
6	18.48750	10.58	16.00	10.32	26.58	20.90	60.00	50.00	-33.42	-29.10

Remarks:

1. Q.P. and AV. are abbreviations of quasi-peak and average individually.
2. The emission levels of other frequencies were very low against the limit.
3. Margin value = Emission level – Limit value
4. Correction factor = Insertion loss + Cable loss
5. Emission Level = Correction Factor + Reading Value



4.3 Conducted Output Power Measurement

4.3.1 Limits of Conducted Output Power Measurement

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,

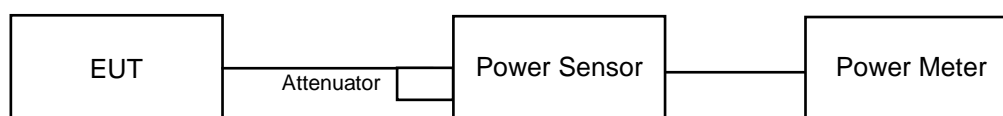
Array Gain = 0 dB (i.e., no array gain) for $NANT \leq 4$;

Array Gain = 0 dB (i.e., no array gain) for channel widths ≥ 40 MHz for any NANT;

Array Gain = $5 \log(NANT/NSS)$ dB or 3 dB, whichever is less for 20 MHz channel widths with $NANT \geq 5$.

For power measurements on all other devices: Array Gain = $10 \log(NANT/NSS)$ dB.

4.3.2 Test Setup



4.3.3 Test Instruments

Refer to section 4.1.2 to get information of above instrument.

4.3.4 Test Procedures

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.

4.3.5 Deviation from Test Standard

No deviation.

4.3.6 EUT Operating Conditions

The software provided by client to enable the EUT under transmission condition continuously at lowest, middle and highest channel frequencies individually.

4.3.7 Test Results

CDD Mode

802.11b

Channel	Frequency (MHz)	Average Power (dBm)		Total Power (mW)	Total Power (dBm)	Limit (dBm)	Pass / Fail
		Chain 0	Chain 1				
1	2412	24.48	23.81	520.98	27.17	30	Pass
6	2437	26.23	26.05	822.476	29.15	30	Pass
11	2462	23.79	23.76	477.016	26.79	30	Pass

802.11g

Channel	Frequency (MHz)	Average Power (dBm)		Total Power (mW)	Total Power (dBm)	Limit (dBm)	Pass / Fail
		Chain 0	Chain 1				
1	2412	23.34	23.06	418.076	26.21	30	Pass
6	2437	24.33	24.07	526.289	27.21	30	Pass
11	2462	21.58	21.54	286.441	24.57	30	Pass

802.11n (HT20)

Channel	Frequency (MHz)	Average Power (dBm)		Total Power (mW)	Total Power (dBm)	Limit (dBm)	Pass / Fail
		Chain 0	Chain 1				
1	2412	22.79	22.38	363.089	25.60	30	Pass
6	2437	24.23	23.84	506.953	27.05	30	Pass
11	2462	20.18	20.01	204.462	23.11	30	Pass

802.11n (VHT20)

Channel	Frequency (MHz)	Average Power (dBm)		Total Power (mW)	Total Power (dBm)	Limit (dBm)	Pass / Fail
		Chain 0	Chain 1				
1	2412	22.72	22.30	356.893	25.53	30	Pass
6	2437	24.19	23.78	501.203	27.00	30	Pass
11	2462	20.15	19.99	203.284	23.08	30	Pass

802.11ax (HE20)

Channel	Frequency (MHz)	Average Power (dBm)		Total Power (mW)	Total Power (dBm)	Limit (dBm)	Pass / Fail
		Chain 0	Chain 1				
1	2412	22.97	22.55	378.04	25.78	30	Pass
6	2437	24.26	23.92	513.29	27.10	30	Pass
11	2462	20.24	20.07	207.307	23.17	30	Pass

802.11n (HT40)

Channel	Frequency (MHz)	Average Power (dBm)		Total Power (mW)	Total Power (dBm)	Limit (dBm)	Pass / Fail
		Chain 0	Chain 1				
3	2422	20.18	19.89	201.731	23.05	30	Pass
6	2437	20.23	20.06	206.83	23.16	30	Pass
9	2452	17.02	16.80	98.213	19.92	30	Pass

802.11n (VHT40)

Channel	Frequency (MHz)	Average Power (dBm)		Total Power (mW)	Total Power (dBm)	Limit (dBm)	Pass / Fail
		Chain 0	Chain 1				
3	2422	20.15	19.83	199.675	23.00	30	Pass
6	2437	20.18	20.11	206.797	23.16	30	Pass
9	2452	17.09	16.76	98.592	19.94	30	Pass

802.11ax (HE40)

Channel	Frequency (MHz)	Average Power (dBm)		Total Power (mW)	Total Power (dBm)	Limit (dBm)	Pass / Fail
		Chain 0	Chain 1				
3	2422	20.22	19.91	203.145	23.08	30	Pass
6	2437	20.29	20.14	210.182	23.23	30	Pass
9	2452	17.10	16.85	99.703	19.99	30	Pass

Beamforming Mode

802.11n (HT20)

Channel	Frequency (MHz)	Average Power (dBm)		Total Power (mW)	Total Power (dBm)	Limit (dBm)	Pass / Fail
		Chain 0	Chain 1				
1	2412	19.78	19.37	181.557	22.59	29.84	Pass
6	2437	21.22	20.83	253.494	24.04	29.84	Pass
11	2462	17.17	17.00	102.238	20.10	29.84	Pass

Note:

1. Directional gain = $10\log[(10^{G1/20} + 10^{G2/20} + \dots + 10^{GN/20})^2 / N_{ANT}] = 6.16 > 6$ dBi, so the power density limit shall be reduced to $30 - (6.16 - 6) = 29.84$ dBm.

802.11n (VHT20)

Channel	Frequency (MHz)	Average Power (dBm)		Total Power (mW)	Total Power (dBm)	Limit (dBm)	Pass / Fail
		Chain 0	Chain 1				
1	2412	19.71	19.29	178.459	22.52	29.84	Pass
6	2437	21.18	20.77	250.619	23.99	29.84	Pass
11	2462	17.14	16.98	101.649	20.07	29.84	Pass

Note:

1. Directional gain = $10\log[(10^{G1/20} + 10^{G2/20} + \dots + 10^{GN/20})^2 / N_{ANT}] = 6.16 > 6$ dBi, so the power density limit shall be reduced to $30 - (6.16 - 6) = 29.84$ dBm.

802.11ax (HE20)

Channel	Frequency (MHz)	Average Power (dBm)		Total Power (mW)	Total Power (dBm)	Limit (dBm)	Pass / Fail
		Chain 0	Chain 1				
1	2412	19.96	19.54	189.033	22.77	29.84	Pass
6	2437	21.25	20.91	256.663	24.09	29.84	Pass
11	2462	17.23	17.06	103.66	20.16	29.84	Pass

Note:

1. Directional gain = $10\log[(10^{G1/20} + 10^{G2/20} + \dots + 10^{GN/20})^2 / N_{ANT}] = 6.16 > 6$ dBi, so the power density limit shall be reduced to $30 - (6.16 - 6) = 29.84$ dBm.

802.11n (HT40)

Channel	Frequency (MHz)	Average Power (dBm)		Total Power (mW)	Total Power (dBm)	Limit (dBm)	Pass / Fail
		Chain 0	Chain 1				
3	2422	17.17	16.88	100.872	20.04	29.84	Pass
6	2437	17.22	17.05	103.422	20.15	29.84	Pass
9	2452	14.01	13.79	49.11	16.91	29.84	Pass

Note:

1. Directional gain = $10\log[(10^{G1/20} + 10^{G2/20} + \dots + 10^{GN/20})^2 / N_{ANT}] = 6.16 > 6$ dBi, so the power density limit shall be reduced to $30-(6.16-6) = 29.84$ dBm.

802.11n (VHT40)

Channel	Frequency (MHz)	Average Power (dBm)		Total Power (mW)	Total Power (dBm)	Limit (dBm)	Pass / Fail
		Chain 0	Chain 1				
3	2422	17.14	16.82	99.845	19.99	29.84	Pass
6	2437	17.17	17.10	103.406	20.15	29.84	Pass
9	2452	14.08	13.75	49.3	16.93	29.84	Pass

Note:

1. Directional gain = $10\log[(10^{G1/20} + 10^{G2/20} + \dots + 10^{GN/20})^2 / N_{ANT}] = 6.16 > 6$ dBi, so the power density limit shall be reduced to $30-(6.16-6) = 29.84$ dBm.

802.11ax (HE40)

Channel	Frequency (MHz)	Average Power (dBm)		Total Power (mW)	Total Power (dBm)	Limit (dBm)	Pass / Fail
		Chain 0	Chain 1				
3	2422	17.21	16.90	101.58	20.07	29.84	Pass
6	2437	17.28	17.13	105.098	20.22	29.84	Pass
9	2452	14.09	13.84	49.855	16.98	29.84	Pass

Note:

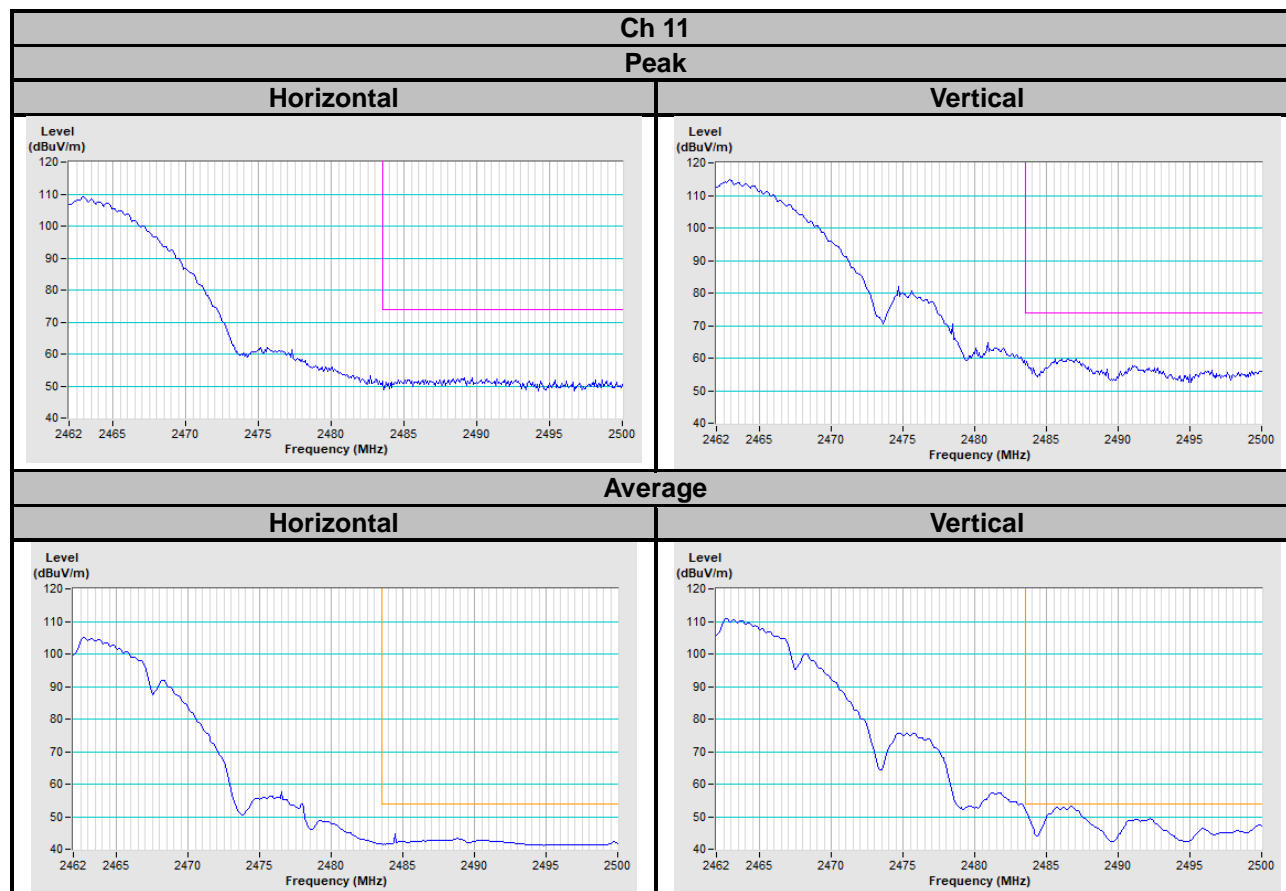
1. Directional gain = $10\log[(10^{G1/20} + 10^{G2/20} + \dots + 10^{GN/20})^2 / N_{ANT}] = 6.16 > 6$ dBi, so the power density limit shall be reduced to $30-(6.16-6) = 29.84$ dBm.

5 Pictures of Test Arrangements

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

Annex A- Band Edge Measurement

802.11b



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 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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