

FCC Test Report

(Spot Check)

Report No.: RF180629E05

FCC ID: KA2IR1760A1

Original FCC ID: KA2IR867A1

Test Model: DIR-1760

Received Date: June 29, 2018

Test Date: Aug. 04, 2018

Issued Date: Dec. 12, 2018

Applicant: D-Link Corporation

Address: 17595 Mt. Herrmann Street Fountain Valley, CA92708 USA

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 R.O.C.

Test Location: E-2, No.1, Li Hsin 1st Road, Hsinchu Science Park, Hsinchu City 300,

Taiwan R.O.C.

FCC Registration /

723255 / TW2022 **Designation Number:**





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Release Control Record

| Issue No. | Description | Date Issued |
|-------------|-------------------|---------------|
| RF180629E05 | Original release. | Dec. 12, 2018 |



Certificate of Conformity 1

Product: AC1750 Mesh-Enabled Smart Wi-Fi Router

Brand: D-Link

Test Model: DIR-1760

Sample Status: ENGINEERING SAMPLE

Applicant: D-Link Corporation

Test Date: Aug. 04, 2018

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 EMC characteristics under the conditions specified in this report.

Prepared by: _______, Date: _______, Dec. 12, 2018

Wendy Wu / Specialist

Approved by : Date: Dec. 12, 2018

May Chen / Manager



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 -12.88dB at 0.36484MHz. | | |
| 15.205 / 15.209 / 15.247(d) | Radiated Emissions and Band Edge Measurement | PASS | Meet the requirement of limit. Minimum passing margin is -7.2dB at 500.01MHz. | | |

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) (±) |
|------------------------------------|----------------|--------------------------------|
| Conducted Emissions at mains ports | 150kHz ~ 30MHz | 1.84 dB |
| Radiated Emissions up to 1 GHz | 30MHz ~ 1GHz | 5.53 dB |

2.2 Modification Record

There were no modifications required for compliance.



3 General Information

3.1 General Description of EUT

| Product | AC1750 Mesh-Enabled Smart Wi-Fi Router | | |
|----------------------------|---|--|--|
| Brand | D-Link | | |
| Test Model | DIR-1760 | | |
| Status of EUT | ENGINEERING SAMPLE | | |
| Power Supply Rating | DC 12V from power adapter | | |
| Modulation Type | CCK, DQPSK, DBPSK for DSSS 64QAM, 16QAM, QPSK, BPSK for OFDM 256QAM for OFDM in 11ac mode and VHT20/40 in 2.4GHz band | | |
| Modulation Technology | DSSS,OFDM | | |
| Transfer Rate | 802.11b: up to 11Mbps 802.11a/g: up to 54Mbps 802.11n: up to 450Mbps 802.11ac: up to 1300Mbps | | |
| Operating Frequency | 2.4GHz: 2.412GHz ~ 2.462GHz 5GHz: 5.18GHz ~ 5.24GHz, 5.745GHz ~ 5.825GHz | | |
| Number of Channel | 2.4GHz: 802.11b, 802.11g, 802.11n (HT20), VHT20: 11 802.11n (HT40), VHT40: 7 5GHz: 802.11a, 802.11n (HT20), 802.11ac (VHT20): 9 802.11n (HT40), 802.11ac (VHT40): 4 802.11ac (VHT80): 2 | | |
| Antenna Type Refer to Note | | | |
| Antenna Connector | Refer to Note | | |
| Accessory Device | Adapter x1 | | |
| Data Cable Supplied | NA | | |

Note:

1. 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 pleae refer to declaration letter exhibit.

2. Simultaneously transmission condition.

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

3. The EUT must be supplied with a power adapter as following table:

| No | Brand | Model No. | Spec. |
|----|--|-------------------|--|
| 1 | Shenzhen Gongjin Electronics Co., Ltd | S24B72-120A200-0K | AC Input: 100-240V, 0.8A, 50/60Hz DC Output: 12V, 2A DC Output cable: unshielded, 1.2m |



4. The antennas provided to the EUT, please refer to the following table:

| Antenna No. | Brand | Model | Ant. Gain(dBi) Including cable loss | Frequency range (MHz) | Antenna Type | Connecter Type | Cable Length (mm) |
|-------------|-------------------------|-------------|---|-----------------------|--------------|-------------------|-------------------|
| 1 | 1 | RF21C02116A | 4.75 | 2400~2483.5 | Dipole | i-pex | 130 |
| ' | | | 4.96 | 5150~5850 | | | |
| 2 | DE limb DE04.00044.04 | 4.75 | 2400~2483.5 | Dinala | : | 420 | |
| 2 | RF link | RF21C02116A | 4.96 | 5150~5850 | Dipole | i-pex | 130 |
| 3 | | RF21C02546A | 5 | 2400~2483.5 | Dipole | i-pex | 160 |
| 4 | | RF21C02547A | 5 | 5150~5850 | Dipole | i-pex | 160 |

5. The EUT incorporates a MIMO function.

| | 2.4 | GHz Band | |
|------------------------------------|---|---|--|
| MODULATION MODE | DATA RATE (MCS) | TX & RX CON | FIGURATION |
| 802.11b | 1 ~ 11Mbps | 3TX | 3RX |
| 802.11g | 6 ~ 54Mbps | 3TX | 3RX |
| | MCS 0~7 | 3TX | 3RX |
| 802.11n (HT20) | MCS 8~15 | 3TX | 3RX |
| | MCS 16~23 | 3TX | 3RX |
| | MCS 0~7 | 3TX | 3RX |
| 802.11n (HT40) | MCS 8~15 | 3TX | 3RX |
| | MCS 16~23 | 3TX | 3RX |
| | MCS 0~8, Nss=1 | 3TX | 3RX |
| VHT20 | MCS 0~8, Nss=2 | 3TX | 3RX |
| | MCS 0~9, Nss=3 | 3TX | 3RX |
| | MCS 0~9, Nss=1 | 3TX | 3RX |
| VHT40 | MCS 0~9, Nss=2 | 3TX | 3RX |
| | MCS 0~9, Nss=3 | 3TX | 3RX |
| | 50 | GHz Band | |
| MODULATION MODE | DATA RATE (MCS) | TX & RX CONFIGURATION | |
| 802.11a | 6 ~ 54Mbps | 3TX | 3RX |
| | MCS 0~7 | 3TX | 3RX |
| 802.11n (HT20) | MCS 8~15 | 3TX | 3RX |
| | MCS 16~23 | 3TX | 3RX |
| | | | 0.00 |
| | MCS 0~7 | 3TX | 3RX |
| 802.11n (HT40) | MCS 0~7 MCS 8~15 | | |
| 802.11n (HT40) | | 3TX | 3RX |
| 802.11n (HT40) | MCS 8~15 | 3TX 3TX | 3RX 3RX |
| 802.11n (HT40) 802.11ac (VHT20) | MCS 8~15 MCS 16~23 | 3TX 3TX 3TX | 3RX 3RX 3RX |
| , , | MCS 8~15 MCS 16~23 MCS 0~8, Nss=1 | 3TX 3TX 3TX 3TX | 3RX 3RX 3RX 3RX |
| , , | MCS 8~15 MCS 16~23 MCS 0~8, Nss=1 MCS 0~8, Nss=2 | 3TX 3TX 3TX 3TX 3TX | 3RX 3RX 3RX 3RX 3RX |
| , , | MCS 8~15 MCS 16~23 MCS 0~8, Nss=1 MCS 0~8, Nss=2 MCS 0~9, Nss=3 | 3TX 3TX 3TX 3TX 3TX 3TX | 3RX 3RX 3RX 3RX 3RX 3RX |
| 802.11ac (VHT20) | MCS 8~15 MCS 16~23 MCS 0~8, Nss=1 MCS 0~8, Nss=2 MCS 0~9, Nss=3 MCS 0~9, Nss=1 | 3TX 3TX 3TX 3TX 3TX 3TX 3TX | 3RX 3RX 3RX 3RX 3RX 3RX 3RX 3RX |
| 802.11ac (VHT20) | MCS 8~15 MCS 16~23 MCS 0~8, Nss=1 MCS 0~8, Nss=2 MCS 0~9, Nss=3 MCS 0~9, Nss=1 MCS 0~9, Nss=1 | 3TX 3TX 3TX 3TX 3TX 3TX 3TX 3TX | 3RX 3RX 3RX 3RX 3RX 3RX 3RX 3RX 3RX |
| 802.11ac (VHT20) | MCS 8~15 MCS 16~23 MCS 0~8, Nss=1 MCS 0~8, Nss=2 MCS 0~9, Nss=3 MCS 0~9, Nss=1 MCS 0~9, Nss=2 MCS 0~9, Nss=2 | 3TX 3TX 3TX 3TX 3TX 3TX 3TX 3TX 3TX | 3RX 3RX 3RX 3RX 3RX 3RX 3RX 3RX 3RX 3RX |

Note:

- 1. All of modulation mode support beamforming function except 2.4GHz & 802.11a 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.
- The modulation and bandwidth are similar for 802.11n mode for 20MHz (40MHz) and VHT for 20MHz (40MHz), therefore investigated worst case to representative mode in test report. (Final test mode refer section 3.2.1)
- 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 Description of Test Modes

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

| 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), VHT40:

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



3.2.1 Test Mode Applicability and Tested Channel Detail

| EUT CONFIGURE | APPLICA | ABLE TO | DESCRIPTION |
|------------------|---------|-----------|-------------|
| MODE | RE<1G | PLC | DESCRIPTION |
| - | V | $\sqrt{}$ | - |

Where

RE<1G: Radiated Emission below 1GHz

PLC: Power Line Conducted Emission

NOTE: 1. The EUT had been pre-tested on the positioned of each 2 axis. The worst case was found when positioned on X-plane.

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.

| MODE | AVAILABLE | TESTED | MODULATION | MODULATION | DATA RATE |
|---------|-----------|---------|------------|------------|-----------|
| | CHANNEL | CHANNEL | TECHNOLOGY | TYPE | (Mbps) |
| 802.11b | 1 to 11 | 6 | DSSS | DBPSK | 1 |

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.

| MODE | MODE AVAILABLE CHANNEL | | MODULATION TECHNOLOGY | MODULATION TYPE | DATA RATE (Mbps) |
|---------|------------------------|---|--------------------------|--------------------|---------------------|
| 802.11b | 1 to 11 | 6 | DSSS | DBPSK | 1 |

Test Condition:

| APPLICABLE TO | ENVIRONMENTAL CONDITIONS | INPUT POWER | TESTED BY | |
|---------------------------------|--------------------------|--------------|--------------|--|
| RE<1G 22deg. C, 67%RH | | 120Vac, 60Hz | Frank Chaing | |
| PLC | 24deg. C, 72%RH | 120Vac, 60Hz | Andy Ho | |



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.

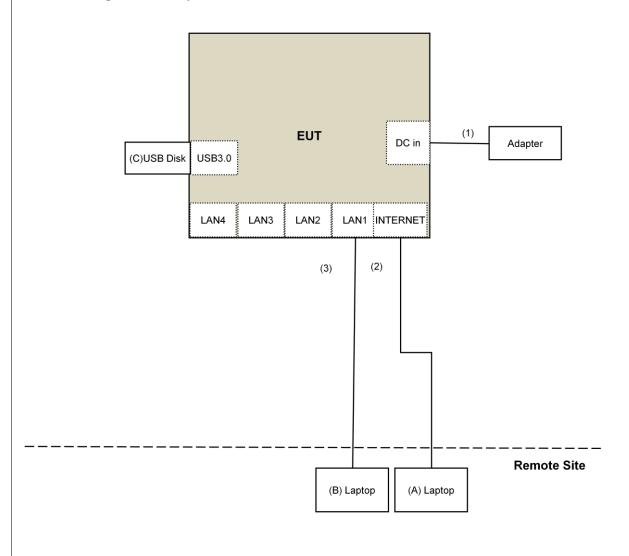
| ID | Product | Brand | Model No. | Serial No. | FCC ID | Remarks |
|----|----------|-----------|-----------|------------|---------|-----------------|
| A. | Laptop | DELL | E6420 | B92T3R1 | FCC DoC | Provided by Lab |
| B. | Laptop | DELL | E5430 | HYV4VY1 | FCC DoC | Provided by Lab |
| C. | USB Disk | Tracscend | NA | NA | NA | Provided by Lab |

Note:

^{1.} All power cords of the above support units are non-shielded (1.8m).

| ID | Descriptions | Qty. | Length (m) | Shielding (Yes/No) | Cores (Qty.) | Remarks |
|----|--------------|------|------------|-----------------------|--------------|--------------------|
| 1. | DC Cable | 1 | 1.2 | No | 0 | Supplied by client |
| 2. | RJ-45 Cable | 1 | 10 | No | 0 | Provided by Lab |
| 3. | RJ-45 Cable | 1 | 10 | No | 0 | Provided by Lab |

3.3.1 Configuration of System under Test



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| venu. | Α σ |
|--|-----|
| | |
| 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: | |
| FCC Part 15, Subpart C (15.247) KDB 558074 D01 15.247 Meas Guidance v05 ANSI C63.10-2013 | |
| All test items have been performed and recorded as per the above standards. | |
| | |
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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.

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4.1.2 Test Instruments

| DESCRIPTION & MANUFACTURER | MODEL NO. | SERIAL NO. | CALIBRATED DATE | CALIBRATED UNTIL |
|---|-----------------------|-------------|-----------------|------------------|
| Test Receiver Agilent | N9038A | MY50010156 | July 12, 2018 | July 11, 2019 |
| Pre-Amplifier EMCI | EMC001340 | 980142 | Feb. 09, 2018 | Feb. 08, 2019 |
| Loop Antenna ^(*) Electro-Metrics | EM-6879 | 264 | Dec. 16, 2016 | Dec. 15, 2018 |
| RF Cable | NA | LOOPCAB-001 | Jan. 15, 2018 | Jan. 14, 2019 |
| RF Cable | NA | LOOPCAB-002 | Jan. 15, 2018 | Jan. 14, 2019 |
| Pre-Amplifier Mini-Circuits | ZFL-1000VH2 B | AMP-ZFL-05 | May 05, 2018 | May 04, 2019 |
| Trilog Broadband Antenna SCHWARZBECK | VULB 9168 | 9168-361 | Nov. 29, 2017 | Nov. 28, 2018 |
| RF Cable | 8D | 966-3-1 | Mar. 20, 2018 | Mar. 19, 2019 |
| RF Cable | 8D | 966-3-2 | Mar. 20, 2018 | Mar. 19, 2019 |
| RF Cable | 8D | 966-3-3 | Mar. 20, 2018 | Mar. 19, 2019 |
| Fixed attenuator Mini-Circuits | UNAT-5+ | PAD-3m-3-01 | Oct. 03, 2017 | Oct. 02, 2018 |
| Software | ADT_Radiated _V8.7.08 | NA | NA | NA |
| Antenna Tower & Turn Table Max-Full | MF-7802 | MF780208406 | 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 calibration interval of the above test instruments is 24 months and the calibrations are traceable to NML/ROC and NIST/USA.
- 3. The test was performed in 966 Chamber No. 3.
- 4. The CANADA Site Registration No. is 20331-1
- 5. Loop antenna was used for all emissions below 30 MHz.
- 6. Tested Date: Aug. 04, 2018



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 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.

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. All modes of operation were investigated and the worst-case emissions are reported.

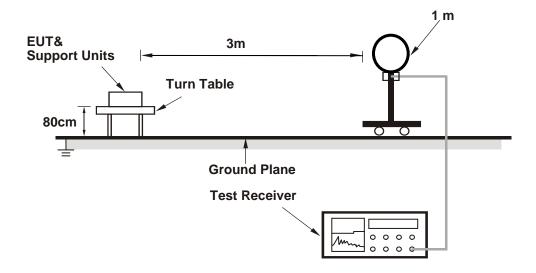
4.1.4 Deviation from Test Standard

No deviation.

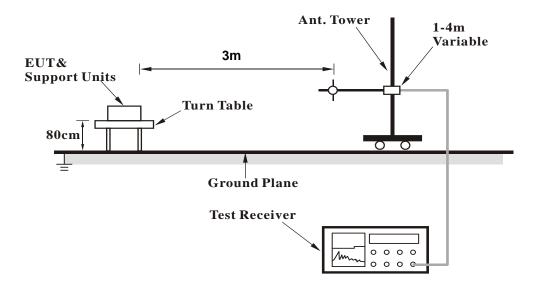


4.1.5 Test Setup

For Radiated emission below 30MHz



For Radiated emission 30MHz to 1GHz



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

4.1.6 EUT Operating Conditions

- a. Connected the EUT with the Laptop which is placed on remote site.
- b. Controlling software (MT7615 QA 0.0.1.73) has been activated to set the EUT on specific status.



4.1.7 Test Results

Below 1GHz Data:

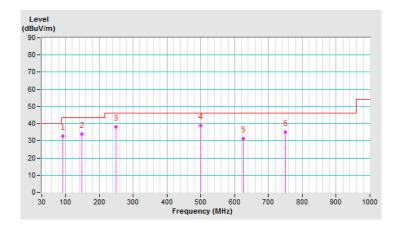
802.11b

| CHANNEL | TX Channel 6 | DETECTOR | Overi Back (OB) |
|-----------------|--------------|----------|-----------------|
| FREQUENCY RANGE | 9kHz ~ 1GHz | FUNCTION | Quasi-Peak (QP) |

| | ANTENNA POLARITY & TEST DISTANCE: HORIZONTAL AT 3 M | | | | | | | | | | |
|-----|---|-------------------------------|-------------------|----------------|--------------------------|----------------------------|------------------------|--------------------------------|--|--|--|
| NO. | FREQ. (MHz) | EMISSION LEVEL (dBuV/m) | LIMIT (dBuV/m) | MARGIN (dB) | ANTENNA HEIGHT (m) | TABLE ANGLE (Degree) | RAW VALUE (dBuV) | CORRECTION FACTOR (dB/m) | | | |
| 1 | 91.13 | 32.8 QP | 43.5 | -10.7 | 2.00 H | 102 | 46.4 | -13.6 | | | |
| 2 | 148.22 | 34.0 QP | 43.5 | -9.5 | 2.00 H | 104 | 41.6 | -7.6 | | | |
| 3 | 250.02 | 38.2 QP | 46.0 | -7.8 | 1.00 H | 116 | 47.1 | -8.9 | | | |
| 4 | 500.01 | 38.8 QP | 46.0 | -7.2 | 1.50 H | 144 | 40.8 | -2.0 | | | |
| 5 | 625.05 | 31.3 QP | 46.0 | -14.7 | 1.50 H | 23 | 30.4 | 0.9 | | | |
| 6 | 750.01 | 35.0 QP | 46.0 | -11.0 | 1.00 H | 134 | 31.7 | 3.3 | | | |

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 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.



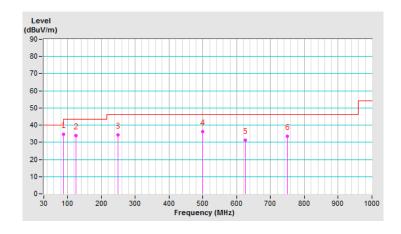


| CHANNEL | TX Channel 6 | DETECTOR | Ougo: Dook (OD) |
|-----------------|--------------|----------|-----------------|
| FREQUENCY RANGE | 9kHz ~ 1GHz | FUNCTION | Quasi-Peak (QP) |

| | ANTENNA POLARITY & TEST DISTANCE: VERTICAL AT 3 M | | | | | | | | | |
|-----|---|-------------------------------|-------------------|----------------|--------------------------|----------------------------|------------------------|--------------------------------|--|--|
| NO. | FREQ. (MHz) | EMISSION LEVEL (dBuV/m) | LIMIT (dBuV/m) | MARGIN (dB) | ANTENNA HEIGHT (m) | TABLE ANGLE (Degree) | RAW VALUE (dBuV) | CORRECTION FACTOR (dB/m) | | |
| 1 | 88.98 | 34.8 QP | 43.5 | -8.7 | 1.50 V | 188 | 48.6 | -13.8 | | |
| 2 | 125.01 | 33.9 QP | 43.5 | -9.6 | 1.50 V | 192 | 43.2 | -9.3 | | |
| 3 | 250.02 | 34.3 QP | 46.0 | -11.7 | 1.50 V | 199 | 43.2 | -8.9 | | |
| 4 | 500.01 | 36.1 QP | 46.0 | -9.9 | 1.00 V | 226 | 38.1 | -2.0 | | |
| 5 | 625.00 | 31.4 QP | 46.0 | -14.6 | 1.00 V | 360 | 30.5 | 0.9 | | |
| 6 | 750.01 | 33.6 QP | 46.0 | -12.4 | 1.50 V | 360 | 30.3 | 3.3 | | |

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 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

| Fragues av (MILIT) | Conducted Limit (dBuV) | | | | |
|--------------------|------------------------|---------|--|--|--|
| Frequency (MHz) | 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.

4.2.2 Test Instruments

| DESCRIPTION & MANUFACTURER | MODEL NO. | SERIAL NO. | CALIBRATED DATE | CALIBRATED UNTIL | |
|--|-------------------------|------------|-----------------|------------------|--|
| Test Receiver R&S | ESCS 30 | 847124/029 | Nov. 01, 2017 | Oct. 31, 2018 | |
| Line-Impedance Stabilization Network (for EUT) R&S | ESH3-Z5 | 848773/004 | Nov. 15, 2017 | Nov. 14, 2018 | |
| Line-Impedance Stabilization Network (for Peripheral) R&S | ENV216 | 100072 | June 04, 2018 | June 03, 2019 | |
| 50 ohms Terminator | N/A | EMC-02 | Sep. 22, 2017 | Sep. 21, 2018 | |
| RF Cable | 5D-FB | COCCAB-001 | Sep. 29, 2017 | Sep. 28, 2018 | |
| Fixed attenuator EMCI | STI02-2200-10 | 003 | Mar. 16, 2018 | Mar. 15, 2019 | |
| Software BVADT | BVADT_Cond_ V7.3.7.4 | NA | NA | NA | |

Note:

- 1. The calibration interval of the above test instruments are 12 months and the calibrations are traceable to NML/ROC and NIST/USA.
- 2. The test was performed in Conduction 1.
- 3 Tested Date: Aug. 04, 2018

^{2.} The limit decreases in line with the logarithm of the frequency in the range of 0.15 to 0.50MHz.



4.2.3 Test Procedures

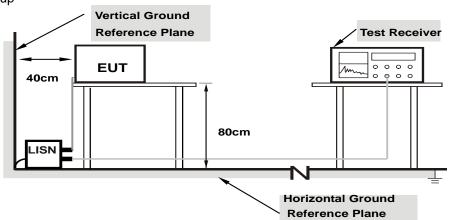
- a. The EUT was placed 0.4 meters from the conducting wall of the shielded room with EUT being connected to the power mains through a line impedance stabilization network (LISN). Other support units were connected to the power mains through another LISN. The two LISNs provide 50 ohm/ 50uH of coupling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

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

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

Same as 4.1.6.



4.2.7 Test Results

| Phase | Line (L) | Detector Function | Quasi-Peak (QP) / |
|-------|----------|-------------------|-------------------|
| | (=) | | Average (AV) |

| | Eroa | Corr. | Readin | Reading Value Emission Level Limit | | Margin | | | | |
|----|----------|--------|---------------------|------------------------------------|-----------|--------|-------|-------|--------|--------|
| No | Freq. | Factor | [dB (uV)] [dB (uV)] | | [dB (uV)] | | (dB) | | | |
| | [MHz] | (dB) | Q.P. | AV. | Q.P. | AV. | Q.P. | AV. | Q.P. | AV. |
| 1 | 0.15000 | 10.05 | 37.79 | 21.30 | 47.84 | 31.35 | 66.00 | 56.00 | -18.16 | -24.65 |
| 2 | 0.18125 | 10.06 | 31.32 | 16.08 | 41.38 | 26.14 | 64.43 | 54.43 | -23.05 | -28.29 |
| 3 | 0.36484 | 10.11 | 29.58 | 25.63 | 39.69 | 35.74 | 58.62 | 48.62 | -18.93 | -12.88 |
| 4 | 2.65234 | 10.26 | 15.53 | 6.46 | 25.79 | 16.72 | 56.00 | 46.00 | -30.21 | -29.28 |
| 5 | 8.71094 | 10.63 | 18.90 | 12.00 | 29.53 | 22.63 | 60.00 | 50.00 | -30.47 | -27.37 |
| 6 | 14.59375 | 11.03 | 15.75 | 9.82 | 26.78 | 20.85 | 60.00 | 50.00 | -33.22 | -29.15 |

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.



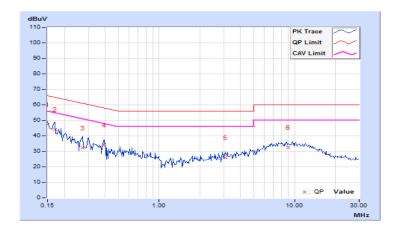


| Phase | Neutral (N) | Detector Function | Quasi-Peak (QP) / Average (AV) |
|-------|-------------|-------------------|-----------------------------------|
| | | | Average (Av) |

| | Frog | Corr. | Reading Value | | Emission Level | | Limit | | Margin | |
|----|---------|--------|---------------|-------|----------------|-------|-----------|-------|--------|--------|
| No | Freq. | Factor | [dB (uV)] | | [dB (uV)] | | [dB (uV)] | | (dB) | |
| | [MHz] | (dB) | Q.P. | AV. | Q.P. | AV. | Q.P. | AV. | Q.P. | AV. |
| 1 | 0.15000 | 9.95 | 37.39 | 20.43 | 47.34 | 30.38 | 66.00 | 56.00 | -18.66 | -25.62 |
| 2 | 0.16953 | 9.96 | 34.26 | 18.51 | 44.22 | 28.47 | 64.98 | 54.98 | -20.76 | -26.51 |
| 3 | 0.27109 | 9.99 | 22.38 | 14.82 | 32.37 | 24.81 | 61.08 | 51.08 | -28.71 | -26.27 |
| 4 | 0.39219 | 10.02 | 23.94 | 16.97 | 33.96 | 26.99 | 58.02 | 48.02 | -24.06 | -21.03 |
| 5 | 3.08594 | 10.15 | 15.63 | 7.31 | 25.78 | 17.46 | 56.00 | 46.00 | -30.22 | -28.54 |
| 6 | 8.99219 | 10.48 | 22.11 | 14.69 | 32.59 | 25.17 | 60.00 | 50.00 | -27.41 | -24.83 |

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.





| 5 Pictures of Test Arrangements |
|---|
| Please refer to the attached file (Test Setup Photo). |
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Appendix - Information on 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.

If you have any comments, please feel free to contact us at the following:

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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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