

Supplemental "Transmit Simultaneously" Test Report (Spot Check)

Report No.: RF180629E05-2

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 / **Designation Number:**

723255 / TW2022





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Release Control Record

Issue No.	Description	Date Issued
RF180629E05-2	Original release.	Dec. 12, 2018

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1 Certificate of Conformity

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)

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 EMC characteristics under the conditions specified in this report.

Prepared by:

Wendy Wu / Specialist

Approved by:

, Date: Dec. 12, 2018

May Chen / Manager



2 Summary of Test Results

47 CFR FCC Part 15, Subpart C, E (SECTION 15.247, 15.407)					
FCC Clause	Test Item	Result	Remarks		
15.207 15.407(b)(6)	AC Power Conducted Emission	PASS	Meet the requirement of limit. Minimum passing margin is -18.19dB at 0.36875MHz.		
15.205 / 15.209 / 15.247(d) 15.407(b) (1/2/3/4(i/ii)/6)	Radiated Emissions and Band Edge Measurement	PASS	Meet the requirement of limit. Minimum passing margin is -7.5dB 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.

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3 General Information

3.1 General Description of EUT

	Colorar Description of Edi					
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					
Operating Frequency	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 x 1					
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

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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		RF21C02116A	4.75	2400~2483.5	Dipole	i-pex	130
'			4.96	5150~5850			
2	DE link	RF link RF21C02116A	4.75	2400~2483.5	Dinala	:	420
2	KF IINK		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.

·	5. The EOT incorporates a MIMO function. 2.4GHz 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 0~7 MCS 8~15	3TX	3RX			
802.11n (HT20)	MCS 8~15 MCS 16~23	3TX 3TX	3RX 3RX			
, ,	MCS 8~15 MCS 16~23 MCS 0~7	3TX	3RX			
802.11n (HT20) 802.11n (HT40)	MCS 8~15 MCS 16~23	3TX 3TX	3RX 3RX			
, ,	MCS 8~15 MCS 16~23 MCS 0~7	3TX 3TX 3TX	3RX 3RX 3RX 3RX 3RX			
802.11n (HT40)	MCS 8~15 MCS 16~23 MCS 0~7 MCS 8~15 MCS 16~23 MCS 0~8, Nss=1	3TX 3TX 3TX 3TX 3TX 3TX	3RX 3RX 3RX 3RX 3RX 3RX			
, ,	MCS 8~15 MCS 16~23 MCS 0~7 MCS 8~15 MCS 16~23 MCS 0~8, Nss=1 MCS 0~8, Nss=2	3TX 3TX 3TX 3TX 3TX 3TX 3TX	3RX 3RX 3RX 3RX 3RX 3RX 3RX			
802.11n (HT40)	MCS 8~15 MCS 16~23 MCS 0~7 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 3TX 3TX	3RX 3RX 3RX 3RX 3RX 3RX 3RX 3RX 3RX			
802.11n (HT40)	MCS 8~15 MCS 16~23 MCS 0~7 MCS 8~15 MCS 16~23 MCS 0~8, Nss=1 MCS 0~8, Nss=2	3TX 3TX 3TX 3TX 3TX 3TX 3TX 3TX 3TX	3RX 3RX 3RX 3RX 3RX 3RX 3RX 3RX 3RX 3RX			
802.11n (HT40)	MCS 8~15 MCS 16~23 MCS 0~7 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 3TX 3TX	3RX 3RX 3RX 3RX 3RX 3RX 3RX 3RX 3RX 3RX			
802.11n (HT40) 802.11ac (VHT20)	MCS 8~15 MCS 16~23 MCS 0~7 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 MCS 0~9, Nss=2	3TX 3TX 3TX 3TX 3TX 3TX 3TX 3TX 3TX 3TX	3RX 3RX 3RX 3RX 3RX 3RX 3RX 3RX 3RX 3RX			
802.11n (HT40) 802.11ac (VHT20) 802.11ac (VHT40)	MCS 8~15 MCS 16~23 MCS 0~7 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 MCS 0~9, Nss=3 MCS 0~9, Nss=3 MCS 0~9, Nss=3	3TX 3TX 3TX 3TX 3TX 3TX 3TX 3TX	3RX 3RX 3RX 3RX 3RX 3RX 3RX 3RX 3RX 3RX			
802.11n (HT40) 802.11ac (VHT20)	MCS 8~15 MCS 16~23 MCS 0~7 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 MCS 0~9, Nss=2	3TX 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.
- 3. The modulation and bandwidth are similar for 802.11n mode for 20MHz (40MHz) and 802.11ac mode for 20MHz (40MHz), therefore investigated worst case to representative mode in test report.
- 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.

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3.1.1 Test Mode Applicability and Tested Channel Detail

EUT Configure	Applica	able To	Description	
Mode	RE<1G	PLC	Description	
-	V	V	-	

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):

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

MODE	AVAILABLE CHANNEL	TESTED CHANNEL	MODULATION TECHNOLOGY	MODULATION TYPE
802.11b	1 to 11	6	DSSS	DBPSK
+ 802.11a	36 to 48 149 to 165	157	OFDM	BPSK

Power Line Conducted Emission Test:

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

MODE	AVAILABLE CHANNEL	TESTED CHANNEL	MODULATION TECHNOLOGY	MODULATION TYPE
802.11b	1 to 11	6	DSSS	DBPSK
+ 802.11a	36 to 48 149 to 165	157	OFDM	BPSK

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

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3.2 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.

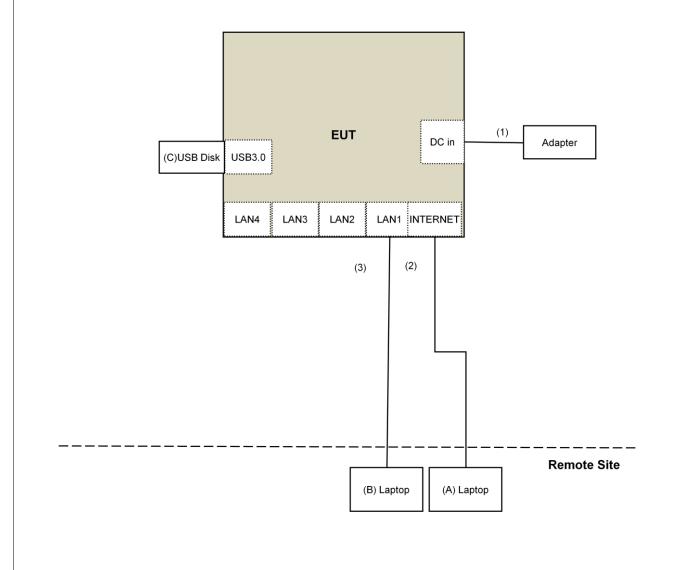
ID	Product	Brand	Model No.	Serial No.	FCC ID	Remarks
A.	Laptop	DELL	E6420	B92T3R1	FCC DoC	Provided by Lab
B.	Laptop	DELL	E5430	HYV4VY1	FCC DoC	Provided by Lab
C.	USB Disk	Tracscend	NA	NA	NA	Provided by Lab

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

3.2.1 Configuration of System under Test



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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.

specified as below table.		
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

Limits of unwanted emission out of the restricted bands					
Applicable To		Limit			
789033 D02 General UNII Test Procedure		Field Strer	ngth at 3m		
New Ru	les v()2r01	PK:74 (dBμV/m)	AV:54 (dBμV/m)	
Frequency Band	Applicable To		EIRP Limit	Equivalent Field Strength at 3m	
5150~5250 MHz		15.407(b)(1)			
5250~5350 MHz	15.407(b)(2) 15.407(b)(3)		PK:-27 (dBm/MHz)	PK:68.2(dBµV/m)	
5470~5725 MHz					
5725~5850 MHz	\boxtimes	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(dBµV/m) *1 PK:105.2 (dBµV/m) *2 PK: 110.8(dBµV/m) *3 PK:122.2 (dBµV/m) *4	
		15.407(b)(4)(ii)	Emission limits in section 15.247(d)		
1	² holow the hand adap increasing linearly to 10				

¹ beyond 75 MHz or more above of the band edge.

Note:

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

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

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^{*3} below the band edge increasing linearly to a level of 15.6 dBm/MHz at 5 MHz above.

below the band edge increasing linearly to 10 dBm/MHz at 25 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.



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

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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:

- 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

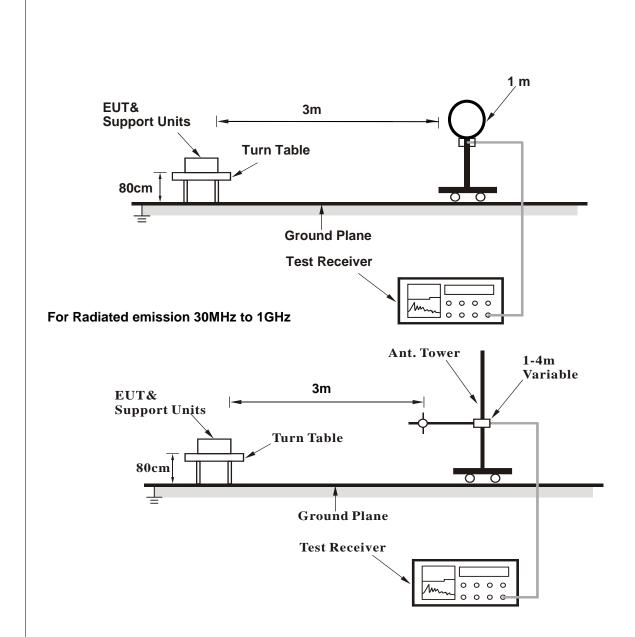
No deviation.

4.1.5 Test Setup

For Radiated emission below 30MHz

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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.

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4.1.7 Test Results

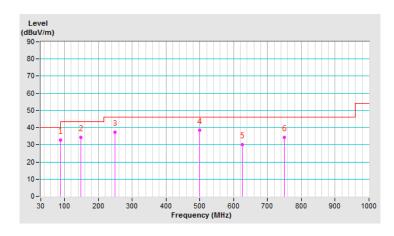
Below 1GHz Data:

FREQUENCY RANGE	9kHz ~ 1GHz	DETECTOR 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	89.05	32.9 QP	43.5	-10.6	2.00 H	310	46.7	-13.8	
2	148.58	34.2 QP	43.5	-9.3	2.00 H	106	41.8	-7.6	
3	250.02	37.2 QP	46.0	-8.8	1.00 H	105	46.1	-8.9	
4	500.01	38.5 QP	46.0	-7.5	1.50 H	147	40.5	-2.0	
5	625.02	30.2 QP	46.0	-15.8	1.50 H	7	29.3	0.9	
6	749.98	34.1 QP	46.0	-11.9	2.00 H	305	30.8	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.



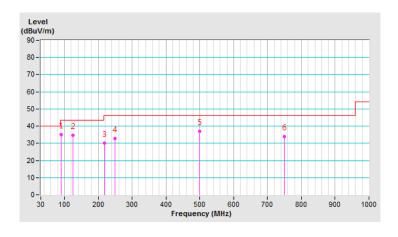


FREQUENCY RANGE	19kHz ~ 1(iHz	DETECTOR FUNCTION	Quasi-Peak (QP)
-----------------	---------------	----------------------	-----------------

	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	89.58	35.0 QP	43.5	-8.5	1.00 V	153	48.6	-13.6	
2	125.01	34.7 QP	43.5	-8.8	1.00 V	186	44.0	-9.3	
3	218.57	30.1 QP	46.0	-15.9	1.00 V	176	40.9	-10.8	
4	250.02	32.7 QP	46.0	-13.3	1.00 V	84	41.6	-8.9	
5	500.01	37.0 QP	46.0	-9.0	2.00 V	174	39.0	-2.0	
6	750.01	34.0 QP	46.0	-12.0	2.00 V	360	30.7	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.



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4.2 Conducted Emission Measurement

4.2.1 Limits of Conducted Emission Measurement

Fraguency (MHz)	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

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^{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

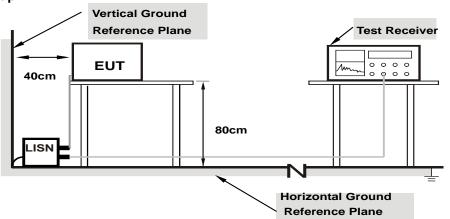
- a. The EUT was placed 0.4 meters from the conducting wall of the shielded room with EUT being connected to the power mains through a line impedance stabilization network (LISN). Other support units were connected to the power mains through another LISN. The two LISNs provide 50 ohm/ 50uH of coupling 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.

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4.2.7 Test Results

Phase	Line (L)	Detector Function	Quasi-Peak (QP) / Average (AV)
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Phase Of Power : Line (L)										
No	Frequency	Correction Factor	Reading Value Emission Level Limit (dBuV) (dBuV)		Margin (dB)					
	(MHz)	(dB)	Q.P.	AV.	Q.P.	AV.	Q.P.	AV.	Q.P.	AV.
1	0.16953	10.05	34.08	19.57	44.13	29.62	64.98	54.98	-20.85	-25.36
2	0.21641	10.07	22.24	6.60	32.31	16.67	62.96	52.96	-30.65	-36.29
3	0.36875	10.11	28.40	20.23	38.51	30.34	58.53	48.53	-20.02	-18.19
4	1.96484	10.22	15.09	5.22	25.31	15.44	56.00	46.00	-30.69	-30.56
5	2.68359	10.26	15.26	6.10	25.52	16.36	56.00	46.00	-30.48	-29.64
6	9.16016	10.66	19.05	12.35	29.71	23.01	60.00	50.00	-30.29	-26.99

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



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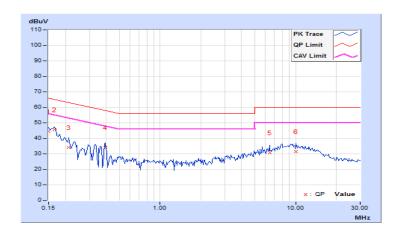


Phase	Neutral (N)	Detector Function	Quasi-Peak (QP) / Average (AV)
			Average (Av)

	Phase Of Power : Neutral (N)									
No	Frequency	Correction Factor	Reading Value (dBuV)		Emission Level (dBuV)		Limit (dBuV)		Margin (dB)	
	(MHz)	(dB)	Q.P.	AV.	Q.P.	AV.	Q.P.	AV.	Q.P.	AV.
1	0.15000	9.95	34.48	14.16	44.43	24.11	66.00	56.00	-21.57	-31.89
2	0.16562	9.96	35.48	21.95	45.44	31.91	65.18	55.18	-19.74	-23.27
3	0.21250	9.97	24.17	8.10	34.14	18.07	63.11	53.11	-28.97	-35.04
4	0.39219	10.02	23.94	17.74	33.96	27.76	58.02	48.02	-24.06	-20.26
5	6.44531	10.33	20.35	11.46	30.68	21.79	60.00	50.00	-29.32	-28.21
6	10.01172	10.54	21.09	14.27	31.63	24.81	60.00	50.00	-28.37	-25.19

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



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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 accredited and approved 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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