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Supplemental “Transmit Simultaneously” Test Report

REPORT NO.: RF141029E01-2

MODEL NO.: DVW32G

FCC ID: XCNDVW32G

RECEIVED: Oct. 29, 2014

TESTED: Oct. 29 to Dec. 08, 2014

ISSUED: Dec. 23, 2014

APPLICANT: Ubee Interactive Corp.

ADDRESS: 10F-1, No.5, Taiyuan 1st St. Jhubei Hsinchu, 302
Taiwan

ISSUED BY: Bureau Veritas Consumer Products Services
(H.K.) Ltd., Taoyuan Branch Hsin Chu Laboratory

LAB ADDRESS : No. 81-1, Lu Liao Keng, 9th Ling, Wu Lung Tsuen,
Chiung Lin Hsiang, Hsin Chu Hsien 307, Taiwan,
R.O.C.

TEST LOCATION (1): No. 81-1, Lu Liao Keng, 9th Ling, Wu Lung Tsuen,
Chiung Lin Hsiang, Hsin Chu Hsien 307, Taiwan,
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Chiung Lin Hsiang, Hsin Chu Hsien 307, Taiwan,
R.O.C.

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RELEASE CONTROL RECORD

ISSUE NO.	REASON FOR CHANGE	DATE ISSUED
RF141029E01-2	Original release	Dec. 23, 2014

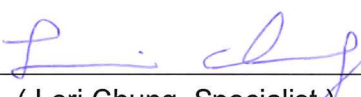


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1. CERTIFICATION

PRODUCT : Wireless eMTA
BRAND NAME : Ubee
MODEL NO. : DVW32G
TEST SAMPLE: ENGINEERING SAMPLE
APPLICANT : Ubee Interactive Corp.
TESTED: Oct. 29 to Dec. 08, 2014
STANDARDS: **FCC Part 15, Subpart C (Section 15.247)**
ANSI C63.10-2009

The above equipment (Model: DVW32G) 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. 23, 2014
(Lori Chung, Specialist)

Approved by : , **Date:** Dec. 23, 2014
(May Chen, Manager)

2. SUMMARY OF TEST RESULTS

The EUT has been tested according to the following specifications:

APPLIED STANDARD: FCC PART 15, SUBPART C (SECTION 15.247)			
STANDARD SECTION	TEST TYPE	RESULT	REMARK
15.207	AC Power Conducted Emission	PASS	Meet the requirement of limit. Minimum passing margin is -21.96dB at 0.18516MHz
15.247(d) 15.209	Radiated Emissions	PASS	Meet the requirement of limit. Minimum passing margin is -3.8dB at 17355.00MHz

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:

This uncertainty represents an expanded uncertainty expressed at approximately the 95% confidence level using a coverage factor of $k=2$.

Measurement	Value
Conducted emissions	2.86 dB
Radiated emissions (30MHz-1GHz)	5.37 dB
Radiated emissions (1GHz -6GHz)	3.72 dB
Radiated emissions (6GHz -18GHz)	4.00 dB
Radiated emissions (18GHz -40GHz)	4.11 dB



3. GENERAL INFORMATION

3.1 GENERAL DESCRIPTION OF EUT

PRODUCT	Wireless eMTA
MODEL NO.	DVW32G
POWER SUPPLY	AC Input: 100-120Vac
MODULATION TYPE	CCK, DQPSK, DBPSK for DSSS 64QAM, 16QAM, QPSK, BPSK for OFDM 256QAM for OFDM in 11ac mode and VHT (20/40) mode in 2.4GHz
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	For 15.407 5.18 ~ 5.24GHz, 5.745 ~ 5.825GHz
	For 15.247 2.412 ~ 2.462GHz
NUMBER OF CHANNEL	For 15.407 9 for 802.11a, 802.11n (HT20), 802.11ac (VHT20) 4 for 802.11n (HT40), 802.11ac (VHT40) 2 for 802.11ac (VHT80)
	For 15.247 11 for 802.11b, 802.11g, 802.11n (HT20). VHT20 7 for 802.11n (HT40), VHT40
MAXIMUM OUTPUT POWER	For 15.407 CDD Mode: 802.11a: 251.281mW 802.11ac (VHT20): 234.222mW 802.11ac (VHT40): 272.803mW 802.11ac (VHT80): 143.433mW Beamforming Mode: 802.11ac (VHT20): 225.239mW 802.11ac (VHT40): 208.671mW 802.11ac (VHT80): 112.167mW For 15.247 CDD Mode: 802.11b: 437.359mW 802.11g: 679.335mW VHT20: 584.672mW VHT40: 188.996mW Beamforming Mode: VHT20: 371.197mW VHT40: 188.996mW

ANTENNA TYPE	Please see NOTE
DATA CABLE	RJ11 cable (Unshielded, 1.5m) RJ45 cable (Unshielded, 1.5m)
I/O PORTS	Refer to user's manual
ASSOCIATED DEVICES	Battery (optional)

NOTE:

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

Antenna set 1						
Antenna No.	Brand	Model	Gain (dBi) Including cable loss	Antenna Type	Connector Type	Frequency range (GHz to GHz)
1	WHA YU	NA	4.6	Dipole (PCB)	MHF	2.4~2.4835
			4.4			5.15~5.25
			6.3			5.725~5.850
2	WHA YU	NA	6	Dipole (PCB)	MHF	2.4~2.4835
			4.6			5.15~5.25
			5.8			5.725~5.850
3	WHA YU	NA	5.3	Dipole (PCB)	MHF	2.4~2.4835
			3.8			5.15~5.25
			4.2			5.725~5.850
Antenna set 2						
Antenna No.	Brand	Model	Gain (dBi) Including cable loss	Antenna Type	Connector Type	Frequency range (GHz to GHz)
1 (Black)	TONGDA	NA	4.453	Dipole (PCB)	MHF	2.4~2.4835
			4.289			5.15~5.25
			6.158			5.725~5.850
2 (Gray)	TONGDA	NA	5.989	Dipole (PCB)	MHF	2.4~2.4835
			4.442			5.15~5.25
			5.633			5.725~5.850
3 (White)	TONGDA	NA	5.120	Dipole (PCB)	MHF	2.4~2.4835
			3.508			5.15~5.25
			4.058			5.725~5.850

From the above antenna sets, antenna set 1 was selected as representative antenna for the 802.11b/g test and its data was recorded in this report.

2. 2.4GHz & 5GHz technology can transmit at same time.

3. The EUT must be supplied with an internal power supply as below table:

Brand	Model No.	Spec.
CHICONY POWER TECHNOLOGY CO LTD	N12-035N1A	AC Input: 100-120Vac, 0.9A max, 60Hz DC Output: 12Vdc, 2.92A, class II

4. The associated devices(optional) of EUT information are as below:

Battery (optional)		
Brand	Model No.	Rated
SIMPLO TECHNOLOGY CO LTD	SMPCM10	7.4Vdc, 2550mAh

5. The EUT incorporates a MIMO function.

2.4GHz			
MODULATION MODE	DATA RATE (MCS)	TX & RX CONFIGURATION	
802.11b	1 ~ 11Mbps	3TX	3RX
802.11g	6 ~ 54Mbps	3TX	3RX
802.11n (HT20)	MCS 0~7	3TX	3RX
	MCS 8~15	3TX	3RX
	MCS 16~23	3TX	3RX
802.11n (HT40)	MCS 0~7	3TX	3RX
	MCS 8~15	3TX	3RX
	MCS 16~23	3TX	3RX
VHT20	MCS 0~8, Nss=1	3TX	3RX
	MCS 0~8, Nss=2	3TX	3RX
	MCS 0~9, Nss=3	3TX	3RX
VHT40	MCS 0~9, Nss=1	3TX	3RX
	MCS 0~9, Nss=2	3TX	3RX
	MCS 0~9, Nss=3	3TX	3RX
5GHz			
MODULATION MODE	DATA RATE (MCS)	TX & RX CONFIGURATION	
802.11a	6 ~ 54Mbps	3TX	3RX
802.11n (HT20)	MCS 0~7	3TX	3RX
	MCS 8~15	3TX	3RX
	MCS 16~23	3TX	3RX
802.11n (HT40)	MCS 0~7	3TX	3RX
	MCS 8~15	3TX	3RX
	MCS 16~23	3TX	3RX
802.11ac (VHT20)	MCS 0~8, Nss=1	3TX	3RX
	MCS 0~8, Nss=2	3TX	3RX
	MCS 0~9, Nss=3	3TX	3RX
802.11ac (VHT40)	MCS 0~9, Nss=1	3TX	3RX
	MCS 0~9, Nss=2	3TX	3RX
	MCS 0~9, Nss=3	3TX	3RX
802.11ac (VHT80)	MCS 0~9, Nss=1	3TX	3RX
	MCS 0~9, Nss=2	3TX	3RX
	MCS 0~9, Nss=3	3TX	3RX

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

3.2 TEST MODE APPLICABILITY AND TESTED CHANNEL DETAIL:

EUT CONFIGURE MODE	APPLICABLE TO				DESCRIPTION
	PLC	RE < 1G	RE ≥ 1G	OB	
-	√	√	√	√	-

Where **PLC:** Power Line Conducted Emission

RE < 1G: Radiated Emission below 1GHz

RE ≥ 1G: Radiated Emission above 1GHz

OB: Conducted Out-Band Emission Measurement

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	DATA RATE (Mbps)
2.4 GHz 802.11g + 5 GHz 802.11a	1 to 11	6	OFDM	BPSK	6
	149 to 165	157	OFDM	BPSK	6

RADIATED EMISSION TEST:

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

MODE	AVAILABLE CHANNEL	TESTED CHANNEL	MODULATION TECHNOLOGY	MODULATION TYPE	DATA RATE (Mbps)
2.4 GHz 802.11g + 5 GHz 802.11a	1 to 11	6	OFDM	BPSK	6
	149 to 165	157	OFDM	BPSK	6

**CONDUCTED OUT-BAND EMISSION MEASUREMENT:**

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

MODE	AVAILABLE CHANNEL	TESTED CHANNEL	MODULATION TECHNOLOGY	MODULATION TYPE	DATA RATE (Mbps)
2.4 GHz 802.11g + 5 GHz 802.11a	1 to 11	6	OFDM	BPSK	6
	149 to 165	157	OFDM	BPSK	6

TEST CONDITION:

APPLICABLE TO	ENVIRONMENTAL CONDITIONS	INPUT POWER	TESTED BY
PLC	25deg. C, 71%RH	120Vac, 60Hz	Wythe Lin
RE<1G	25deg. C, 73%RH	120Vac, 60Hz	Andy Ho
RE≥1G	20deg. C, 69%RH	120Vac, 60Hz	Gary Cheng
OB	25deg. C, 60%RH	120Vac, 60Hz	Gary Cheng

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.

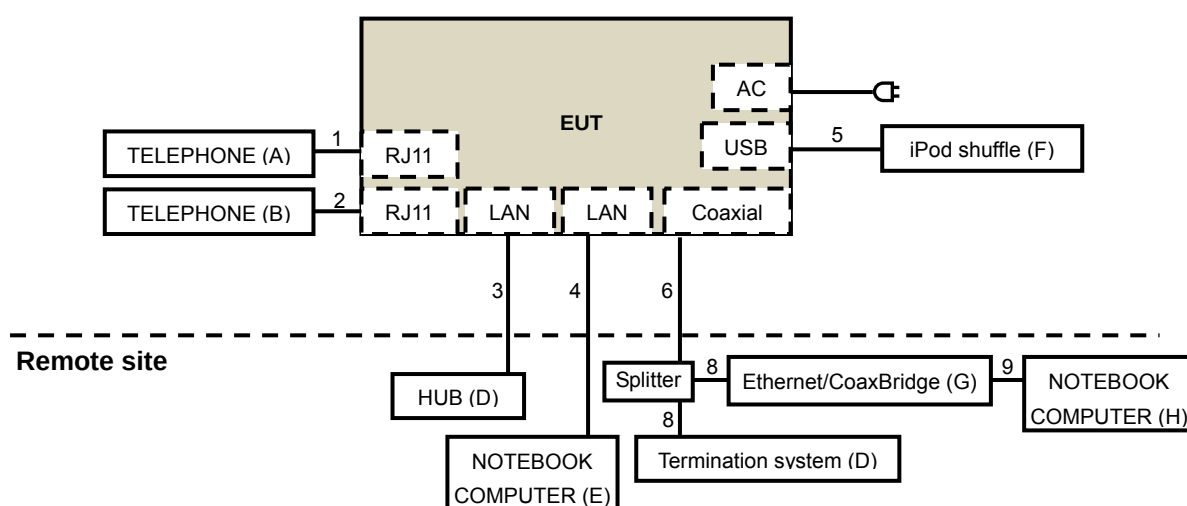
No.	Product	Brand	Model No.	Serial No.	FCC ID	Remark
A	TELEPHONE	WONDER	WD-303	7C17KA04011	NA	Provided by Lab
B	TELEPHONE	WONDER	WD-303	7C17KA05211	NA	Provided by Lab
C	iPod shuffle	Apple	MD778TA/A	CC4JMH7LF4T1	NA	Provided by Lab
D	HUB	ZyXEL	ES-116P	S060H02000215	FCC DoC	Provided by Lab
E	NOTEBOOK COMPUTER	DELL	E5440	6FC7F12	FCC DoC	Provided by Lab
F	Termination system	CASA SYSTEM	CASA C2200	NA	NA	Supplied by client
G	Ethernet/Coax Bridge	Broadcom	BCM97428	NA	NA	Supplied by client
H	NOTEBOOK COMPUTER	DELL	E5430	4N1SKV1	FCC DoC	Provided by Lab

NOTE:

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

No.	Cable	Qty.	Length (m)	Shielded (Yes/ No)	Cores (Number)	Remark
1	RJ11	1	1.5	No	0	Supplied by client
2	RJ11	1	1.5	No	0	Supplied by client
3	RJ45	3	10	No	0	Provided by Lab
4	RJ45	1	10	No	0	Provided by Lab
5	USB	1	0.1	No	0	Provided by Lab
6	Coaxial	1	10	No	0	Provided by Lab
7	AC	1	1.5	No	0	Supplied by client
8	Coaxial	1	1	Yes	0	Supplied by client
9	RJ45	1	1	No	0	Supplied by client

3.4 CONFIGURATION OF SYSTEM UNDER TEST



4. TEST TYPES AND RESULTS

4.1 CONDUCTED EMISSION MEASUREMENT

4.1.1 LIMITS OF CONDUCTED EMISSION MEASUREMENT

FREQUENCY OF EMISSION (MHz)	CONDUCTED LIMIT (dBμV)	
	Quasi-peak	Average
0.15-0.5	66 to 56	56 to 46
0.5-5	56	46
5-30	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.

4.1.2 TEST INSTRUMENTS

DESCRIPTION & MANUFACTURER	MODEL NO.	SERIAL NO.	CALIBRATED DATE	CALIBRATED UNTIL
Test Receiver ROHDE & SCHWARZ	ESCS 30	100375	Apr. 29, 2014	Apr. 28, 2015
Line-Impedance Stabilization Network (for EUT) SCHWARZBECK	NSLK-8127	8127-522	Sep. 15, 2014	Sep. 14, 2015
Line-Impedance Stabilization Network (for Peripheral) ROHDE & SCHWARZ	ENV216	100071	Nov. 10, 2014	Nov. 09, 2015
RF Cable (JYEBAO)	5DFB	COCCAB-001	Mar. 10, 2014	Mar. 09, 2015
50 ohms Terminator	N/A	EMC-03	Sep. 22, 2014	Sep. 21, 2015
50 ohms Terminator	N/A	EMC-02	Sep. 30, 2014	Sep. 29, 2015
Software ADT	BV ADT_Cond_V7.3.7 .3	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 Shielded Room No. C.
3. The VCCI Con C Registration No. is C-3611.
4. Tested Date: Nov. 27, 2014

4.1.3 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/ 50uH 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 150kHz to 30MHz was searched. Emission levels under (Limit - 20dB) were not recorded.

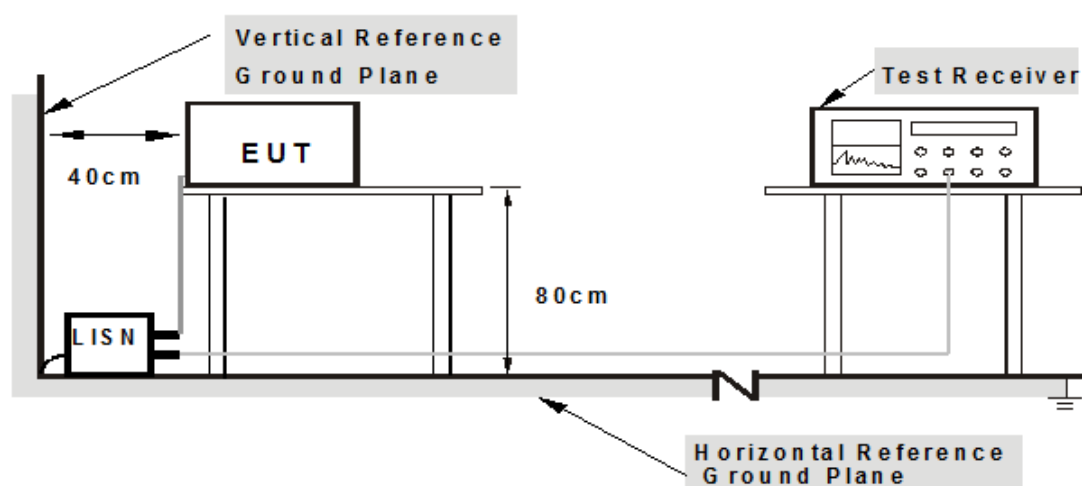
NOTE:

- The resolution bandwidth of test receiver is 9kHz for Quasi-peak detection (QP) & Average detection (AV).

4.1.4 DEVIATION FROM TEST STANDARD

No deviation

4.1.5 TEST SETUP



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

For the actual test configuration, please refer to the related item – Photographs of the Test Configuration.

4.1.6 EUT OPERATING CONDITIONS

1. Connect the EUT with the support unit E (Notebook Computer) which is placed on remote site.
2. Controlling software (MTool_2.0.1.1.msi) has been activated to set the EUT on specific status.

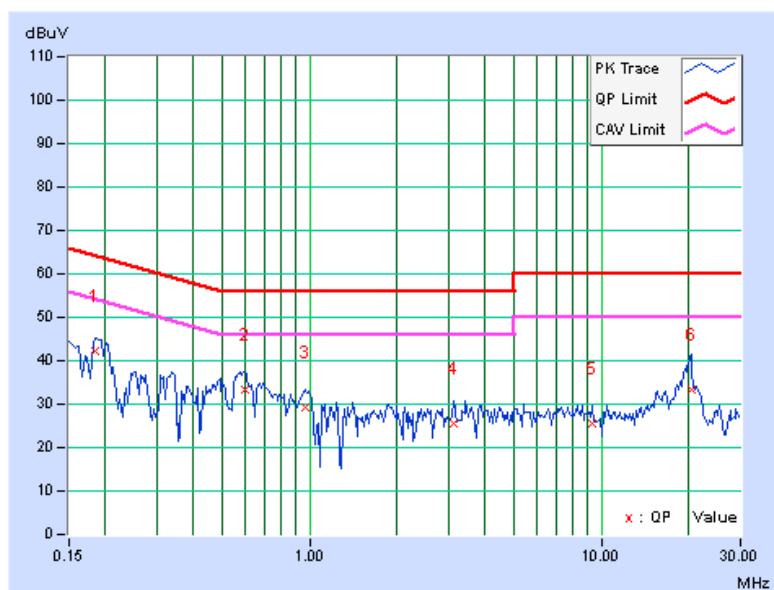
4.1.7 TEST RESULTS

PHASE	Line (L)	DETECTOR FUNCTION	Quasi-Peak (QP) / Average (AV)
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No	Freq. [MHz]	Corr. Factor (dB)	Reading Value [dB (uV)]		Emission Level [dB (uV)]		Limit [dB (uV)]		Margin (dB)	
			Q.P.	AV.	Q.P.	AV.	Q.P.	AV.	Q.P.	AV.
1	0.18516	0.07	42.22	27.95	42.29	28.02	64.25	54.25	-21.96	-26.23
2	0.59922	0.10	33.30	19.52	33.40	19.62	56.00	46.00	-22.60	-26.38
3	0.97031	0.13	28.99	14.11	29.12	14.24	56.00	46.00	-26.88	-31.76
4	3.10938	0.22	25.33	15.36	25.55	15.58	56.00	46.00	-30.45	-30.42
5	9.27734	0.43	25.06	16.54	25.49	16.97	60.00	50.00	-34.51	-33.03
6	20.31250	0.71	32.54	24.94	33.25	25.65	60.00	50.00	-26.75	-24.35

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

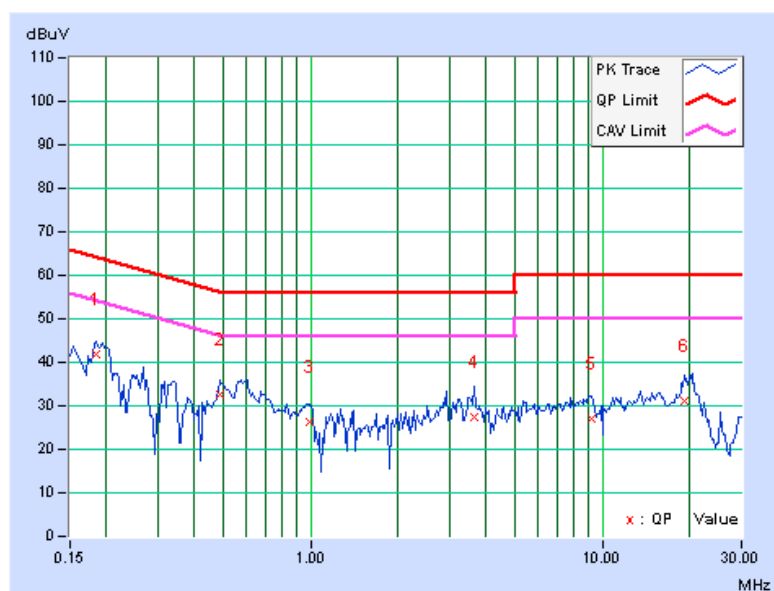


PHASE	Neutral (N)	DETECTOR FUNCTION	Quasi-Peak (QP) / Average (AV)
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	Freq.	Corr.	Reading Value		Emission Level		Limit		Margin	
No		Factor	[dB (uV)]		[dB (uV)]		[dB (uV)]		(dB)	
	[MHz]	(dB)	Q.P.	AV.	Q.P.	AV.	Q.P.	AV.	Q.P.	AV.
1	0.18516	0.06	41.80	26.67	41.86	26.73	64.25	54.25	-22.39	-27.52
2	0.48984	0.10	32.60	17.08	32.70	17.18	56.17	46.17	-23.47	-28.99
3	0.99766	0.13	26.31	12.52	26.44	12.65	56.00	46.00	-29.56	-33.35
4	3.64453	0.25	27.31	16.01	27.56	16.26	56.00	46.00	-28.44	-29.74
5	9.19922	0.43	26.44	19.75	26.87	20.18	60.00	50.00	-33.13	-29.82
6	19.22656	0.72	30.24	23.10	30.96	23.82	60.00	50.00	-29.04	-26.18

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



4.2 RADIATED EMISSION MEASUREMENT

4.2.1 LIMITS OF RADIATED EMISSION 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.



4.2.2 TEST INSTRUMENTS

For Below 1GHz test:

DESCRIPTION & MANUFACTURER	MODEL NO.	SERIAL NO.	CALIBRATED DATE	CALIBRATED UNTIL
MXE EMI Receiver Agilent	N9038A	MY51210105	July 21, 2014	July 20, 2015
Pre-Amplifier Mini-Circuits	ZFL-1000VH2 B	AMP-ZFL-03	Nov. 12, 2014	Nov. 11, 2015
Trilog Broadband Antenna SCHWARZBECK	VULB 9168	9168-360	Feb. 26, 2014	Feb. 25, 2015
RF Cable	NA	CHGCAB_001	Oct. 04, 2014	Oct. 03, 2015
Horn_Antenna AISl	AIH.8018	0000320091110	Aug. 27, 2014	Aug. 26, 2015
Pre-Amplifier Agilent	8449B	3008A02578	June 24, 2014	June 23, 2015
RF Cable	NA	131205 131214 SNMY23684/4	Jan. 17, 2014	Jan. 16, 2015
Spectrum Analyzer R&S	FSV40	100964	July 05, 2014	July 04, 2015
Pre-Amplifier EMCI	EMC184045	980143	Jan. 17, 2014	Jan. 16, 2015
Horn_Antenna SCHWARZBECK	BBHA 9170	9170-424	Aug. 26, 2014	Aug. 25, 2015
RF Cable	NA	RF104-121 RF104-204	Dec. 12, 2013	Dec. 11, 2014
Antenna Tower & Turn Table CT	NA	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 horn antenna, preamplifier (model: 8449B) are used only for the measurement of emission frequency above 1GHz if tested.
3. The test was performed in 966 Chamber No. G.
4. The FCC Site Registration No. is 966073.
5. The VCCI Site Registration No. is G-137.
6. The CANADA Site Registration No. is IC 7450H-2.
7. Tested Date: Nov. 25, 2014



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For Above 1GHz test:

DESCRIPTION & MANUFACTURER	MODEL NO.	SERIAL NO.	CALIBRATED DATE	CALIBRATED UNTIL
MXE EMI Receiver Agilent	N9038A	MY50010156	Aug. 11, 2014	Aug. 10, 2015
Pre-Amplifier Mini-Circuits	ZFL-1000VH2 B	AMP-ZFL-04	Nov. 12, 2014	Nov. 11, 2015
Trilog Broadband Antenna SCHWARZBECK	VULB 9168	9168-361	Feb. 27, 2014	Feb. 26, 2015
RF Cable	NA	CHHCAB_001	Oct. 05, 2014	Oct. 04, 2015
Horn_Antenna AISL	AIH.8018	0000220091110	Aug. 26, 2014	Aug. 25, 2015
Pre-Amplifier Agilent	8449B	300801923	Oct. 28, 2014	Oct. 27, 2015
RF Cable	NA	131206 131215 SNMY23685/4	Jan. 17, 2014	Jan. 16, 2015
Spectrum Analyzer R&S	FSV40	100964	July 05, 2014	July 04, 2015
Pre-Amplifier EMCI	EMC184045	980143	Jan. 17, 2014	Jan. 16, 2015
Horn_Antenna SCHWARZBECK	BBHA 9170	9170-424	Aug. 26, 2014	Aug. 25, 2015
RF Cable	NA	RF104-121 RF104-204	Dec. 12, 2013	Dec. 11, 2014
Software	ADT_Radiated _V8.7.07	NA	NA	NA
Antenna Tower & Turn Table CT	NA	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 horn antenna, preamplifier (model: 8449B) are used only for the measurement of emission frequency above 1GHz if tested.
3. The test was performed in 966 Chamber No. H.
4. The FCC Site Registration No. is 797305.
5. The CANADA Site Registration No. is IC 7450H-3.
6. Tested Date: Dec. 08, 2014

4.2.3 TEST PROCEDURES

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

NOTE:

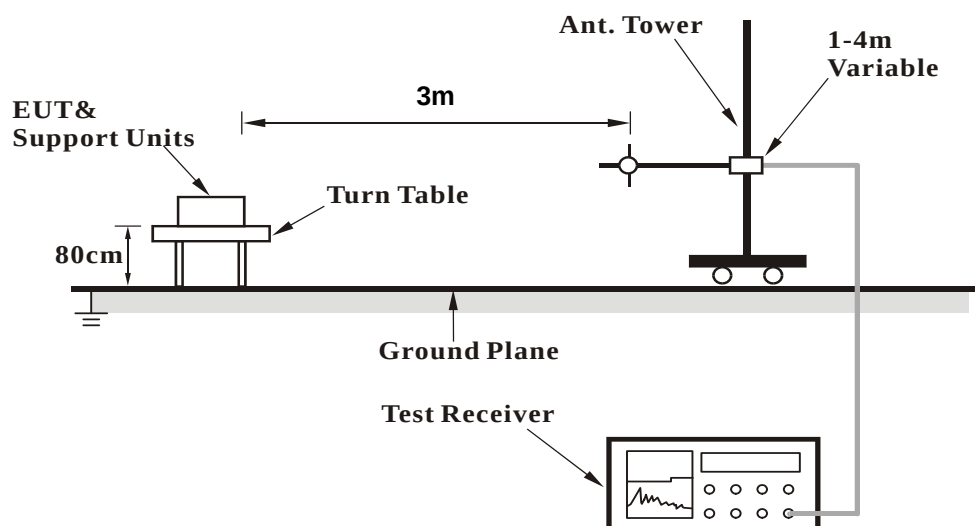
1. The resolution bandwidth and video bandwidth of test receiver/spectrum analyzer is 120kHz for Quasi-peak detection (QP) at frequency below 1GHz.
2. The resolution bandwidth of test receiver/spectrum analyzer is 1 MHz and the video bandwidth is 3 MHz for Peak detection (PK) at frequency above 1GHz.
3. The resolution bandwidth of test receiver/spectrum analyzer is 1MHz and the video bandwidth is 3MHz for RMS Average (Duty cycle < 98%) for Average detection (AV) at frequency above 1GHz, then the measurement results was added to a correction factor ($10 \log(1/\text{duty cycle})$).
4. The resolution bandwidth of test receiver/spectrum analyzer is 1MHz and the video bandwidth is 10Hz (Duty cycle $\geq 98\%$) for Average detection (AV) at frequency above 1GHz.
5. All modes of operation were investigated and the worst-case emissions are reported.

4.2.4 DEVIATION FROM TEST STANDARD

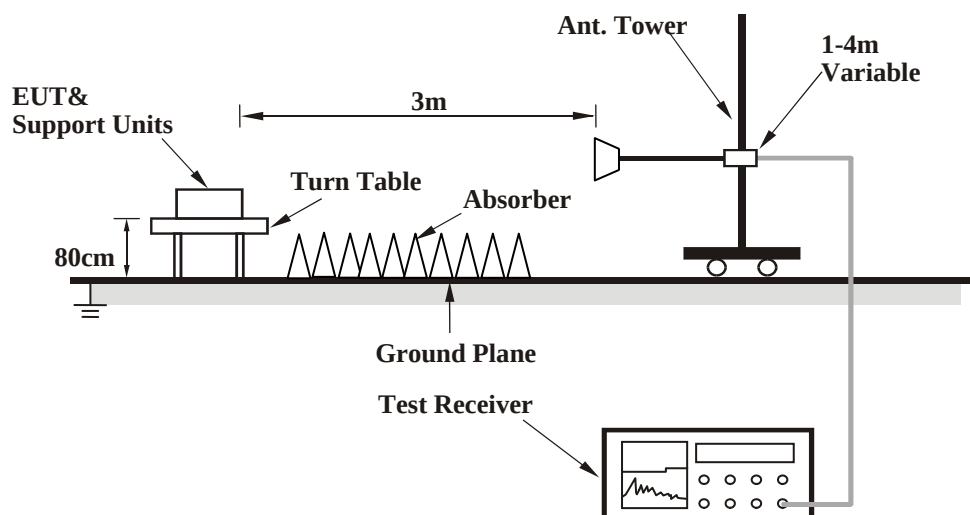
No deviation

4.2.5 TEST SETUP

<Frequency Range below 1GHz>



<Frequency Range above 1GHz>



For the actual test configuration, please refer to the related item – Photographs of the Test Configuration.

4.2.6 EUT OPERATING CONDITIONS

Same as 4.1.6

4.2.7 TEST RESULTS

BELOW 1GHz DATA :

FREQUENCY RANGE	Below 1GHz	DETECTOR FUNCTION	Quasi-Peak (QP)
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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	159.98	34.1 QP	43.5	-9.5	1.50 H	206	46.83	-12.78
2	250.00	36.2 QP	46.0	-9.8	1.00 H	214	50.15	-13.92
3	375.03	38.1 QP	46.0	-7.9	1.00 H	106	47.90	-9.78
4	625.00	40.6 QP	46.0	-5.4	1.00 H	108	44.30	-3.68
5	749.98	41.9 QP	46.0	-4.1	1.00 H	217	43.09	-1.21
6	902.76	40.1 QP	46.0	-5.9	1.00 H	155	39.19	0.87
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	35.52	32.4 QP	40.0	-7.6	1.00 V	223	46.43	-14.02
2	71.95	30.8 QP	40.0	-9.2	1.06 V	237	46.48	-15.64
3	200.04	34.4 QP	43.5	-9.1	1.00 V	237	50.34	-15.93
4	374.98	36.6 QP	46.0	-9.4	1.50 V	147	46.42	-9.78
5	749.98	37.3 QP	46.0	-8.7	1.50 V	238	38.49	-1.21
6	902.81	37.4 QP	46.0	-8.6	1.00 V	105	36.51	0.87

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. The other emission levels were very low against the limit.
4. Margin value = Emission Level – Limit value



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ABOVE 1GHz DATA

FREQUENCY RANGE	1GHz ~ 40GHz	DETECTOR FUNCTION	Peak (PK) Average (AV)
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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	4924.00	46.5 PK	74.0	-27.5	1.13 H	135	42.70	3.80
2	4924.00	35.2 AV	54.0	-18.8	1.13 H	135	31.40	3.80
3	7386.00	51.6 PK	74.0	-22.4	1.23 H	67	43.05	8.55
4	7386.00	38.4 AV	54.0	-15.6	1.23 H	67	29.85	8.55
5	11570.00	59.5 PK	74.0	-14.5	1.11 H	25	48.82	10.68
6	11570.00	45.5 AV	54.0	-8.5	1.11 H	25	34.82	10.68
7	#17355.00	62.3 PK	74.0	-11.7	1.23 H	123	42.54	19.76
8	#17355.00	50.0 AV	54.0	-4.0	1.23 H	123	30.24	19.76
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	4924.00	48.8 PK	74.0	-25.2	1.34 V	101	45.00	3.80
2	4924.00	37.0 AV	54.0	-17.0	1.34 V	101	33.20	3.80
3	7386.00	51.9 PK	74.0	-22.1	1.05 V	133	43.35	8.55
4	7386.00	38.7 AV	54.0	-15.3	1.05 V	133	30.15	8.55
5	11570.00	59.2 PK	74.0	-14.8	1.06 V	253	48.52	10.68
6	11570.00	47.8 AV	54.0	-6.2	1.06 V	253	37.12	10.68
7	#17355.00	62.5 PK	74.0	-11.5	1.00 V	113	42.74	19.76
8	#17355.00	50.2 AV	54.0	-3.8	1.00 V	113	30.44	19.76

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. The other emission levels were very low against the limit.
4. Margin value = Emission Level – Limit value



4.3 CONDUCTED OUT-BAND EMISSION MEASUREMENT

4.3.1 LIMITS OF CONDUCTED OUT-BAND EMISSION MEASUREMENT

Below 30dB of the highest emission level of operating band (in 100kHz Resolution Bandwidth).

4.3.2 TEST INSTRUMENTS

DESCRIPTION & MANUFACTURER	MODEL NO.	SERIAL NO.	CALIBRATED DATE	CALIBRATED UNTIL
R&S SPECTRUM ANALYZER	FSV 40	100964	July 05, 2014	July 04, 2015

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. Tested date : Oct. 29, 2014

4.3.3 TEST PROCEDURE

Measurement Procedure - Reference Level

1. Set the RBW = 100 kHz.
2. Set the VBW $\geq$ 300 kHz.
3. Detector = peak.
4. Sweep time = auto couple.
5. Trace mode = max hold.
6. Allow trace to fully stabilize.
7. Use the peak marker function to determine the maximum power level in any 100 kHz band segment within the fundamental EBW.

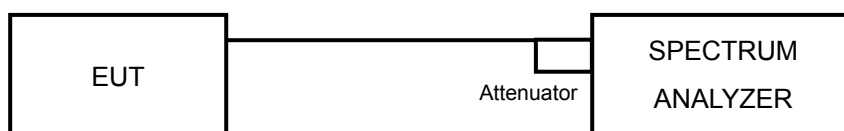
Measurement Procedure –Unwanted Emission Level

1. Set RBW = 100 kHz.
2. Set VBW $\geq$ 300 kHz.
3. Detector = peak.
4. Sweep = auto couple.
5. Trace Mode = max hold.
6. Allow trace to fully stabilize.
7. Use the peak marker function to determine the maximum amplitude level.

4.3.4 DEVIATION FROM TEST STANDARD

No deviation

4.3.5 TEST SETUP



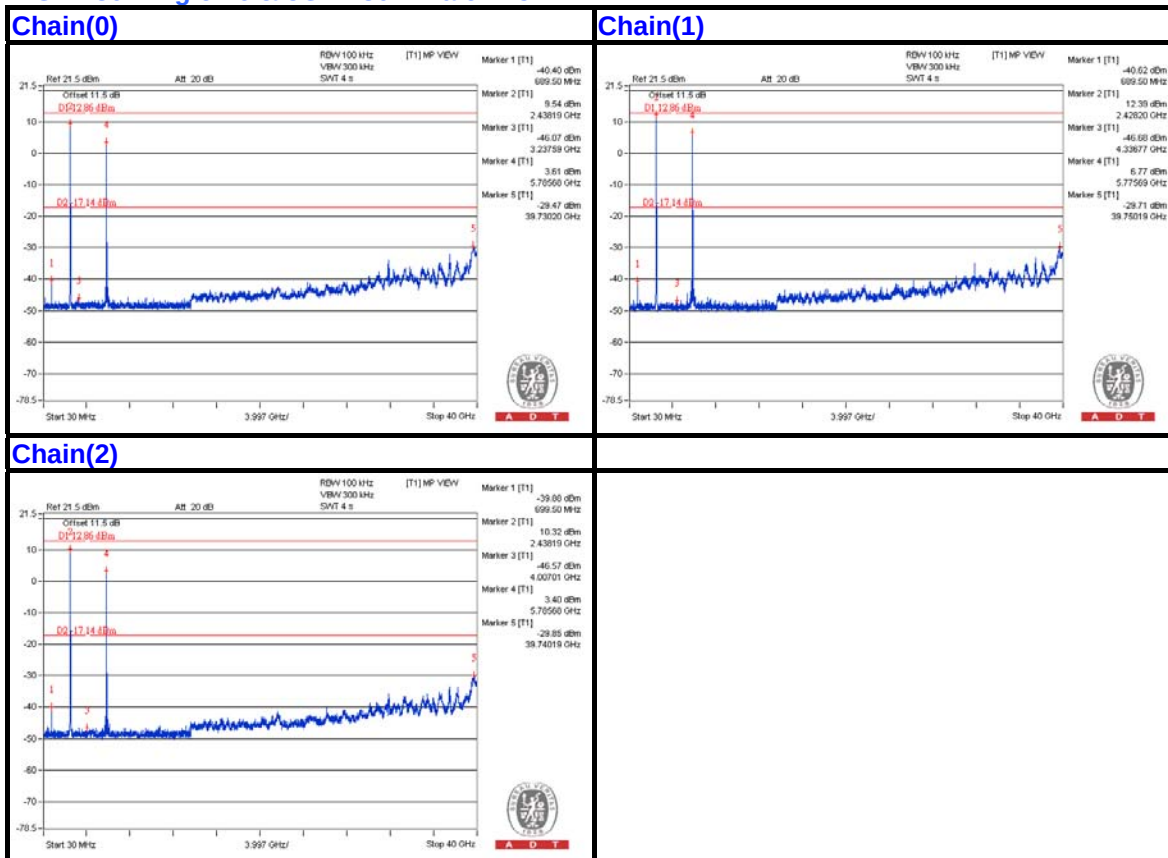
4.3.6 EUT OPERATING CONDITION

The software provided by client enabled the EUT to transmit and receive data at lowest, middle and highest channel frequencies individually.

4.3.7 TEST RESULTS

The spectrum plots are attached on the following pages. D1 line indicates the highest level, and D2 line indicates the 30dB offset below D1. It shows compliance with the requirement.

2.4 GHz 802.11g ch 6 & 5GHz 802.11a ch 157





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5. 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:

Linko EMC/RF Lab:

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Fax: 886-2-26052943

Hsin Chu EMC/RF/Telecom Lab:

Tel: 886-3-5935343

Fax: 886-3-5935342

Hwa Ya EMC/RF/Safety Lab:

Tel: 886-3-3183232

Fax: 886-3-3270892

Email: service.adt@tw.bureauveritas.com

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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