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Supplemental “Transmit Simultaneously” TEST REPORT

REPORT NO.: RF990108H03A-4

MODEL NO.: DIR-456U

RECEIVED: Jan. 08, 2010

TESTED: Jan. 08 to 25, 2010 and Sep. 21, 2010

ISSUED: Nov. 12, 2010

APPLICANT: D-Link Corporation

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1 CERTIFICATION

PRODUCT : Residential USIM Embedded HSUPA 3G Router
BRAND NAME : D-Link
MODEL NO. : DIR-456U
TESTED : Jan. 08 to 25, 2010 and
Sep. 21, 2010 (Only for radiated emissions test)
APPLICANT : D-Link Corporation
TEST SAMPLE : MASS-PRODUCTION
STANDARDS : 47 CFR Part 15, Subpart C (Section 15.247)
ANSI C63.4-2003

The above equipment (Model: DIR-456U) 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 : Carol Liao , **DATE:** Nov. 12, 2010
(Carol Liao, Specialist)

TECHNICAL ACCEPTANCE : Hank Chung , **DATE:** Nov. 12, 2010
(Hank Chung, Deputy Manager)

APPROVED BY : May Chen , **DATE:** Nov. 12, 2010
(May Chen, Deputy Manager)



2 SUMMARY OF TEST RESULTS

The EUT has been tested according to the following specifications:

APPLIED STANDARD: 47 CFR Part 15, Subpart C			
Standard Section	Test Type and Limit	Result	REMARK
15.207	AC Power Conducted Emission	PASS	Meet the requirement of limit. Minimum passing margin is -9.59dB at 0.158MHz
15.247(d)	Transmitter Radiated Emissions Limit: Table 15.209	PASS	Meet the requirement of limit Minimum passing margin is -3.84 dB at 2483.5 MHz

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	2.45 dB
Radiated emissions (30MHz-1GHz)	3.94 dB
Radiated emissions (1GHz -18GHz)	2.49 dB
Radiated emissions (18GHz -40GHz)	2.70 dB



3 GENERAL INFORMATION

3.1 GENERAL DESCRIPTION OF EUT

PRODUCT	Residential USIM Embedded HSUPA 3G Router
MODEL NO.	DIR-456U
FCC ID	KA2IR456UA1
POWER SUPPLY	12V from power adapter
MODULATION TYPE	CCK, DQPSK, DBPSK for DSSS 64QAM, 16QAM, QPSK, BPSK for OFDM
MODULATION TECHNOLOGY	DSSS, OFDM
TRANSFER RATE	802.11b: 11 / 5.5 / 2 / 1Mbps 802.11g: 54 / 48 / 36 / 24 / 18 / 12 / 9 / 6Mbps 802.11n (20MHz, 800ns GI): 65 / 58.5 / 52 / 39 / 26 / 19.5 / 13 / 6.5Mbps 802.11n (40MHz, 800ns GI): 135 / 121.5 / 108 / 81 / 54 / 40.5 / 27 / 13.5Mbps 802.11n (20MHz, 400ns GI): 72.2 / 65 / 57.8 / 43.3 / 28.9 / 21.7 / 14.4 / 7.2Mbps 802.11n (40MHz, 400ns GI): 150 / 135 / 120 / 90 / 60 / 45 / 30 / 15Mbps
FREQUENCY RANGE	2412MHz ~ 2462MHz
NUMBER OF CHANNEL	11 for 802.11b, 802.11g, 802.11n (20MHz) 7 for 802.11n (40MHz)
MAXIMUM OUTPUT POWER	802.11b: 91.2mW 802.11g: 288.4mW 802.11n (20MHz): 182.0mW 802.11n (40MHz): 154.9mW
ANTENNA TYPE	Please see note 1
ANTENNA CONNECTOR	Please see note 1
DATA CABLE	RJ-11 Cable (Unshielded, 1.8m) Ethernet cable (Unshielded, 1.5m)
I/O PORT	WAN Port x1 (Ethernet (10,100Mbps)) LAN Port x2 (Ethernet (10,100Mbps)) PHONE Port x1 3G SIM Port x1
ASSOCIATED DEVICES	Adapter x1

NOTE:

1. There is one antenna provided to this EUT, please refer to the following table:

Brand No.	Model No.	Net Gain (dBi)	Antenna Type	Connector
WHA YU GROUP	C037-511052-A (SSR-209493)	2.41	PCB Antenna	MHF

2. The EUT must be supplied with a power adapter and following two different models could be chosen:

Adapter 1	
Brand:	D-Link
Model No.:	AMS4-1202000SU
Input power :	100-120V, 0.8A, 60Hz
Output power :	+12V, 2.0A DC Power core: 1.5m/ Without core/ Non shielded
Adapter 2	
Brand:	D-Link
Model No.:	CG2412-B
Input power :	100-240V, 0.5A, 50/60Hz
Output power :	+12V, 2.0A DC Power core: 1.5m/ Without core/ Non shielded

The EUT was pre-tested in chamber with above adapters, the radiated emission worst case was found in model: **AMS4-1202000SU**. Therefore only the test data of the mode was recorded in this report.

3. The EUT is a Residential USIM Embedded HSUPA 3G Router. The functions of EUT listed as below table:

FUNCTIONS	TEST STANDARD	REFERENCE REPORT
WLAN 802.11b/g	FCC Part 15	RF990108H03A
GSM 850 / WCDMA 850	FCC Part 22	RF990108H03A-1
PCS 1900 / WCDMA 1900	FCC Part 24	RF990108H03A-2

4. The communicated functions of EUT listed as below:

		GSM850MHz	PCS1900MHz	WCDMA850MHz	WCDMA1900MHz
2G	GSM	√	√		
	GPRS	√	√		
	E-GPRS	√	√		
3G	WCDMA			√	√
	Release 6 HSUPA			√	√

5. The EUT inside has one HSUPA PCI Express Mini Card as below table:

Brand	Model
ZTE Corporation	MF210V

6. The EUT was pre-tested under the following modes:

Test Mode	Description
Mode A	Level-set
Mode B	Tower-set

From the above modes, the radiated emission worst case was found in **Mode B**. Therefore only the test data of the mode was recorded in this report.

7. The EUT incorporates a SISO function with 802.11b, 802.11g, 802.11n. Physically, the EUT provides one completed transmitter and receiver.
8. The EUT is 1 * 1 spatial SISO without beam forming function. The antenna configuration is one transmitter antenna and one receiver antenna, as there is 1 PCB antenna. There is one transmitter and one receiver.
9. The EUT complies with 802.11n standards and backwards compatible with 802.11b, 802.11g products.
10. The EUT, operates in the 2.4GHz frequency range, lets you connect IEEE 802.11g or IEEE 802.11b and 802.11n technique devices to the network.
11. 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 DESCRIPTION OF TEST MODES

Eleven channels are provided for 802.11b, 802.11g:

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		

Seven channels are provided for draft 802.11n (40MHz):

CHANNEL	FREQUENCY	CHANNEL	FREQUENCY
1	2422MHz	5	2442MHz
2	2427MHz	6	2447MHz
3	2432MHz	7	2452MHz
4	2437MHz		



3.3 TEST MODE APPLICABILITY AND TESTED CHANNEL DETAIL:

EUT configure mode	Applicable to			Description
	PLC	RE<1G	RE ³ 1G	
A	√	√	√	Co-located mode with adapter 1 (Normal mode + 2G: PCS1900MHz)
B	√	-	-	Co-located mode with adapter 2 (Normal mode + 2G: PCS1900MHz)
C	-	√	√	Co-located mode with adapter 1 (Normal mode + 2G: GSM850MHz)

Where PLC: Power Line Conducted Emission RE<1G RE: Radiated Emission below 1GHz
 RE≥1G: Radiated Emission above 1GHz

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	AVAILABLE CHANNEL	TESTED CHANNEL	MODULATION TECHNOLOGY	MODULATION TYPE	DATA RATE (Mbps)	EUT configure mode
802.11g / 2G	1 to 11/ 512 to 810	11 / 810	OFDM / GSM	BPSK / -	6 / -	A, B

Radiated 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	AVAILABLE CHANNEL	TESTED CHANNEL	MODULATION TECHNOLOGY	MODULATION TYPE	DATA RATE (Mbps)	EUT configure mode
802.11g / 2G	1 to 11/ 512 to 810	11 / 512	OFDM / GSM	BPSK / -	6 / -	A
802.11g / 2G	1 to 11/ 128 to 251	11 / 251	OFDM / GSM	BPSK / -	6 / -	C

TEST CONDITION:

APPLICABLE TO	ENVIRONMENTAL CONDITIONS	INPUT POWER	TESTED BY
RE ³ 1G	26deg. C, 67%RH, 1015 hPa	120Vac, 60Hz	Wen Yu
RE<1G	26deg. C, 67%RH, 1015 hPa	120Vac, 60Hz	Wen Yu
PLC	24deg. C, 58%RH, 1024 hPa	120Vac, 60Hz	Leo Peng

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:

47 CFR Part 15, Subpart C. (15.247)
ANSI C63.4 : 2003

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

NOTE: The EUT is also considered as a kind of computer peripheral, because the connection to computer is necessary for typical use. It has been verified to comply with the requirements of 47 CFR Part 15, Subpart B, Class B (DoC). The test report has been issued separately.



3.5 DESCRIPTION OF SUPPORT UNITS

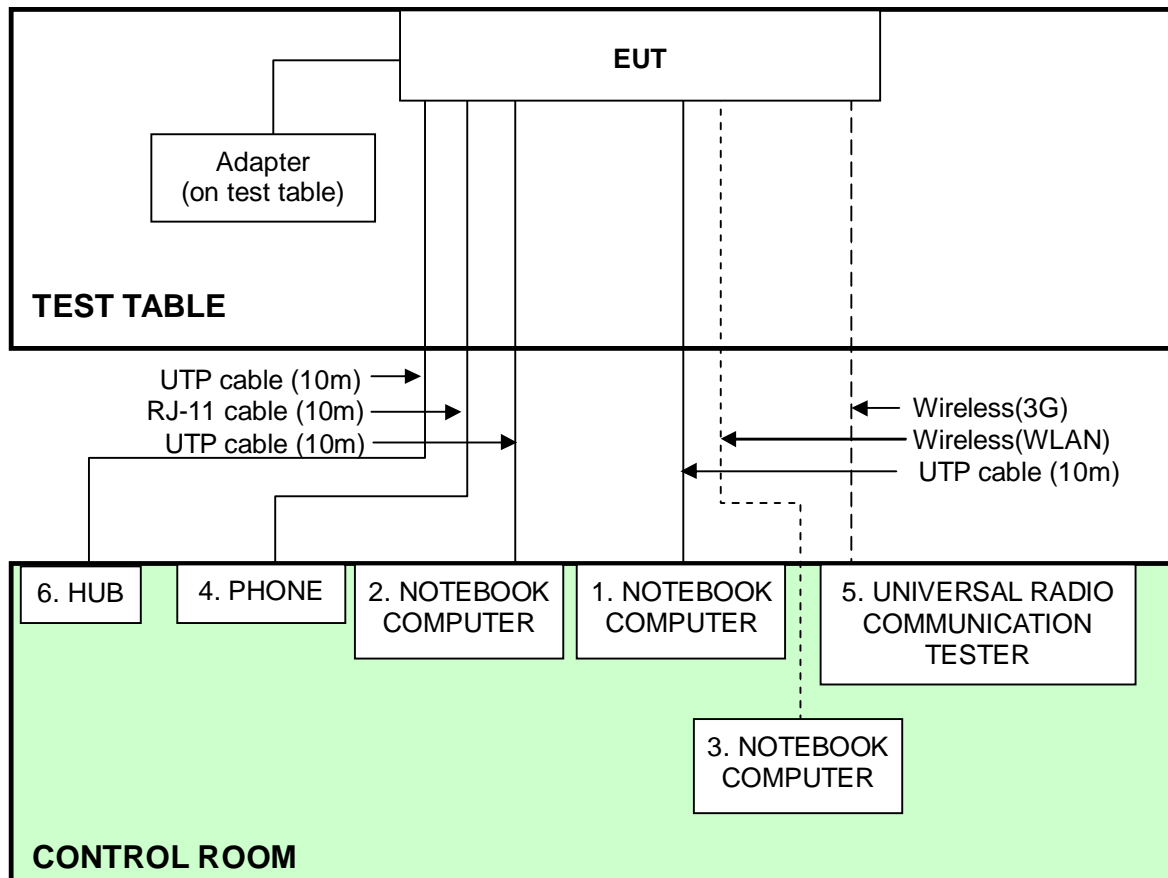
The EUT has been tested as an independent unit together with other necessary accessories or support units. The following support units or accessories were used to form a representative test configuration during the tests.

NO.	PRODUCT	BRAND	MODEL NO.	SERIAL NO.	FCC ID
1	NOTEBOOK COMPUTER	DELL	PP18L	6976685584	FCC DoC
2	NOTEBOOK COMPUTER	DELL	PP17L	CN-ONF743-48643-7AV-0124	FCC DoC
3	NOTEBOOK COMPUTER	DELL	D531	CN-0XM006-48643-86L-4472	QDS-BRCM1019
4	TELEPHONE	Romeo	TE-812	97280926	NA
5	Universal Radio Communication Tester	R&S	CMU200	101095	NA
6	HUB	ZyXEL	ES-116P	S060H02000215	FCC DoC

NO.	SIGNAL CABLE DESCRIPTION OF THE ABOVE SUPPORT UNITS
1	UTP cable (Unshielded, 10m)
2	UTP cable (Unshielded, 10m)
3	NA
4	RJ-11 cable (Unshielded, 10m)
5	NA
6	UTP cable (Unshielded, 10m)

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

3.6 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 (dB μ V)	
	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.
 3. All emanations from a class A/B digital device or system, including any network of conductors and apparatus connected thereto, shall not exceed the level of field strengths specified above.

4.1.2 TEST INSTRUMENTS

DESCRIPTION & MANUFACTURER	MODEL NO.	SERIAL NO.	CALIBRATED DATE	CALIBRATED UNTIL
ROHDE & SCHWARZ Test Receiver	ESCS 30	100287	Mar. 05, 2009	Mar. 04, 2010
Line-Impedance Stabilization Network (for EUT)	KNW-407	8-1395-12	May 04, 2009	May 03, 2010
Line-Impedance Stabilization Network (for Peripheral)	ENV-216	100072	June 08, 2009	June 07, 2010
RF Cable (JYBAO)	5DFB	COACAB-001	Dec 14, 2009	Dec 13, 2010
50 ohms Terminator	50	3	Oct. 28, 2009	Oct. 27, 2010
Software	BV ADT_Cond_V7.3.7	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. A.
3. The VCCI Con A Registration No. is C-817.

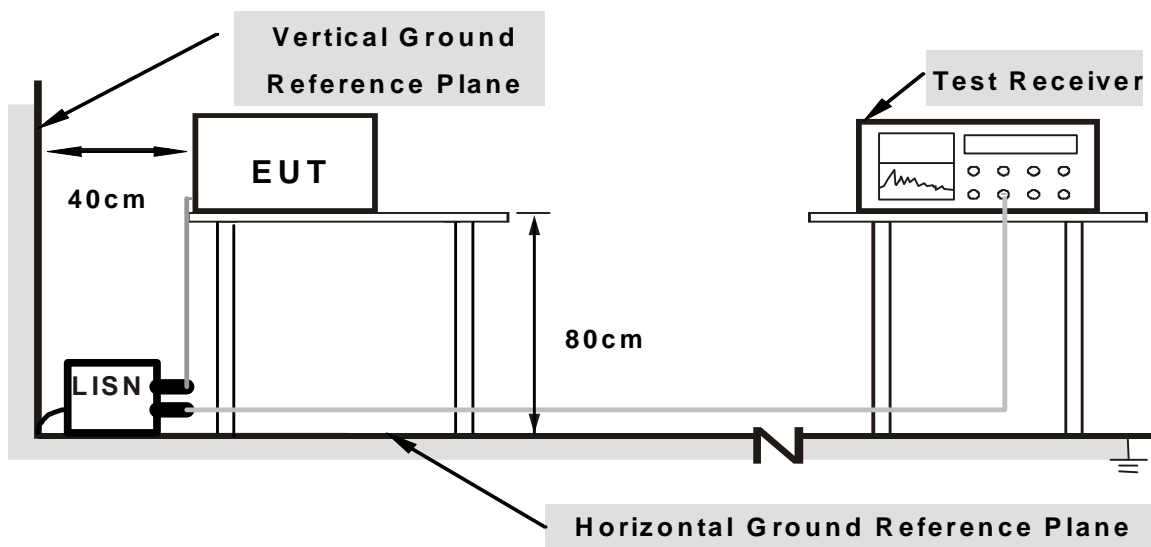
4.1.3 TEST PROCEDURES

- 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) were not recorded.

4.1.4 DEVIATION FROM TEST STANDARD

No deviation

4.1.5 TEST SETUP



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

2.Both of LISNs (AMN) are 80 cm from EUT and at least 80 from other units and other metal planes

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

4.1.6 EUT OPERATING CONDITIONS

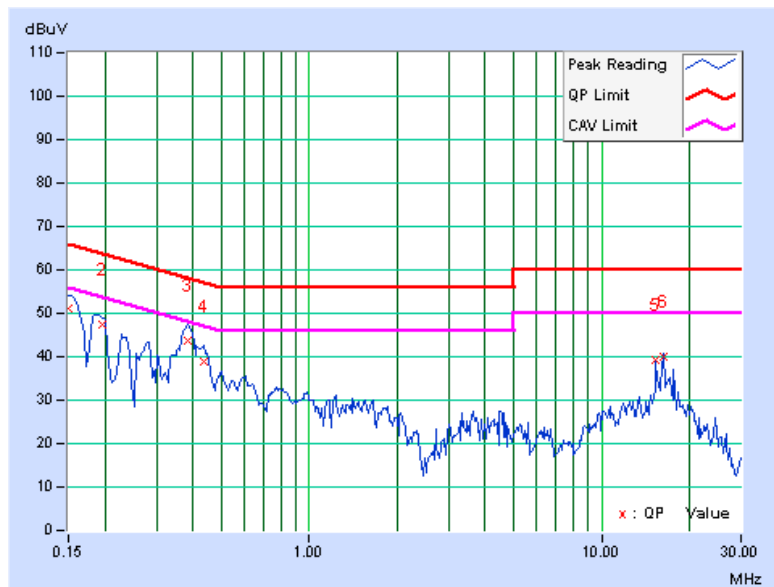
1. Placed the EUT on testing table.
2. The 3G card (inside of the EUT) link support unit 5 (Universal Radio Communication Tester) via wireless.
3. Prepared other computer systems (support units 1 ~ 3) to act as communication partners and placed them outside of testing area.
4. The support unit 3 (Telephone) link EUT via one RJ11 cable.
5. The communication partners run test program "Ping.exe" to enable EUT under transmission/receiving condition continuously via one UTP cable and wireless transmission.

4.1.7 TEST RESULTS (Mode A)

CHANNEL	11g :Channel 11 / 2G :Channel 810		
PHASE	Line (L)	6dB BANDWIDTH	9 kHz
TEST MODE	Co-located mode with adapter 1(Normal mode + 2G: PCS1900MHz)		

No	Freq. [MHz]	Corr. Factor (dB)	Reading Value		Emission Level		Limit		Margin	
			[dB (uV)]		[dB (uV)]		[dB (uV)]		(dB)	
			Q.P.	AV.	Q.P.	AV.	Q.P.	AV.	Q.P.	AV.
1	0.150	0.04	51.04	37.44	51.08	37.48	66.00	56.00	-14.92	-18.52
2	0.195	0.04	47.22	38.75	47.26	38.79	63.81	53.81	-16.55	-15.02
3	0.384	0.06	43.68	37.10	43.74	37.16	58.18	48.18	-14.45	-11.03
4	0.435	0.06	38.81	32.10	38.87	32.16	57.15	47.15	-18.28	-14.99
5	15.363	0.47	38.86	36.55	39.33	37.02	60.00	50.00	-20.67	-12.98
6	16.227	0.48	39.59	38.67	40.07	39.15	60.00	50.00	-19.93	-10.85

- REMARKS:**
1. Q.P. and AV. are abbreviations of quasi-peak and average individually.
 2. "-": The Quasi-peak reading value also meets average limit and measurement with the average detector is unnecessary.
 3. The emission levels of other frequencies were very low against the limit.
 4. Margin value = Emission level - Limit value
 5. Correction factor = Insertion loss + Cable loss
 6. Emission Level = Correction Factor + Reading Value.



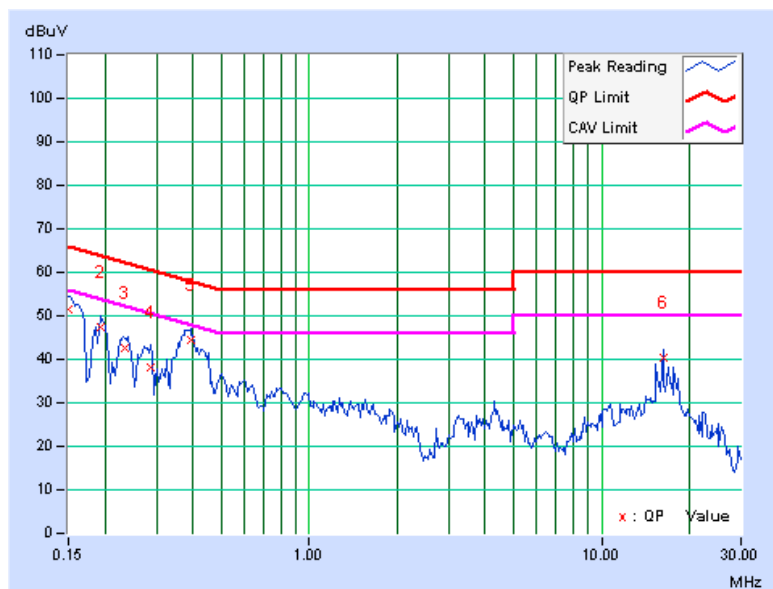


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CHANNEL	11g :Channel 11 / 2G :Channel 810		
PHASE	Neutral (N)	6dB BANDWIDTH	9 kHz
TEST MODE	Co-located mode with adapter 1(Normal mode + 2G: PCS1900MHz)		

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	0.150	0.05	51.53	38.66	51.58	38.71	66.00	56.00	-14.42	-17.29
2	0.193	0.05	47.26	38.00	47.31	38.05	63.91	53.91	-16.60	-15.86
3	0.234	0.05	42.37	33.70	42.42	33.75	62.32	52.32	-19.89	-18.56
4	0.287	0.06	38.12	26.38	38.18	26.44	60.62	50.62	-22.44	-24.18
5	0.392	0.07	44.38	38.33	44.45	38.40	58.02	48.02	-13.57	-9.62
6	16.227	0.50	39.73	38.26	40.23	38.76	60.00	50.00	-19.77	-11.24

- REMARKS:**
1. Q.P. and AV. are abbreviations of quasi-peak and average individually.
 2. "-": The Quasi-peak reading value also meets average limit and measurement with the average detector is unnecessary.
 3. The emission levels of other frequencies were very low against the limit.
 4. Margin value = Emission level - Limit value
 5. Correction factor = Insertion loss + Cable loss
 6. Emission Level = Correction Factor + Reading Value.

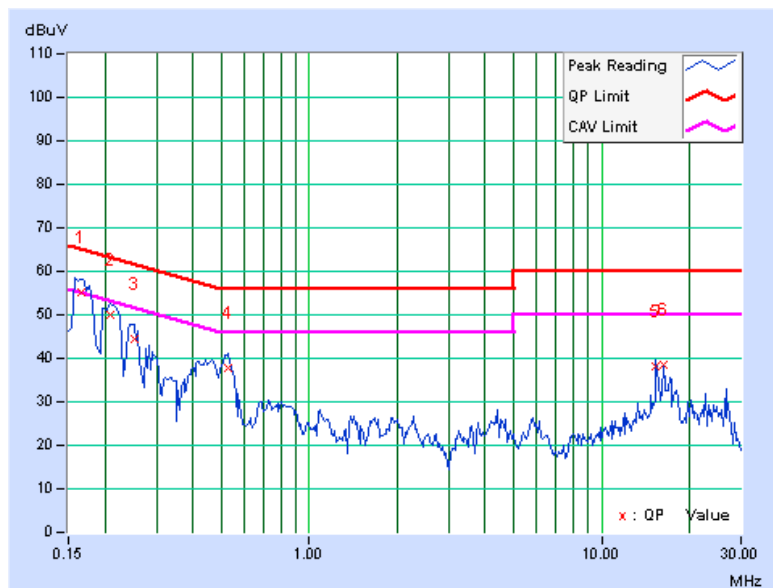


4.1.8 TEST RESULTS (Mode B)

CHANNEL	11g :Channel 11 / 2G :Channel 810		
PHASE	Line (L)	6dB BANDWIDTH	9 kHz
TEST MODE	Co-located mode with adapter 2(Normal mode + 2G: PCS1900MHz)		

No	Freq. [MHz]	Corr. Factor (dB)	Reading Value		Emission Level		Limit		Margin	
			[dB (uV)]		[dB (uV)]		[dB (uV)]		(dB)	
			Q.P.	AV.	Q.P.	AV.	Q.P.	AV.	Q.P.	AV.
1	0.166	0.04	55.23	44.25	55.27	44.29	65.18	55.18	-9.91	-10.89
2	0.209	0.04	49.96	39.38	50.00	39.42	63.26	53.26	-13.26	-13.84
3	0.252	0.05	44.56	34.75	44.61	34.80	61.71	51.71	-17.10	-16.91
4	0.529	0.07	37.68	29.05	37.75	29.12	56.00	46.00	-18.25	-16.88
5	15.359	0.47	37.85	36.69	38.32	37.16	60.00	50.00	-21.68	-12.84
6	16.227	0.48	37.87	37.48	38.35	37.96	60.00	50.00	-21.65	-12.04

- REMARKS:**
1. Q.P. and AV. are abbreviations of quasi-peak and average individually.
 2. "-": The Quasi-peak reading value also meets average limit and measurement with the average detector is unnecessary.
 3. The emission levels of other frequencies were very low against the limit.
 4. Margin value = Emission level - Limit value
 5. Correction factor = Insertion loss + Cable loss
 6. Emission Level = Correction Factor + Reading Value.



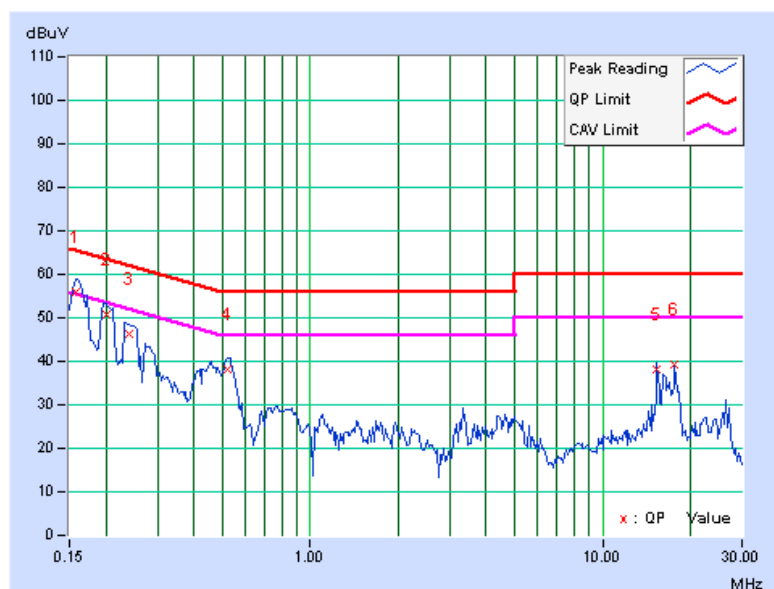


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CHANNEL	11g :Channel 11 / 2G :Channel 810		
PHASE	Neutral (N)	6dB BANDWIDTH	9 kHz
TEST MODE	Co-located mode with adapter 2(Normal mode + 2G: PCS1900MHz)		

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	0.158	0.05	55.94	44.86	55.99	44.91	65.58	55.58	-9.59	-10.67
2	0.201	0.05	50.80	40.82	50.85	40.87	63.58	53.58	-12.73	-12.71
3	0.241	0.05	46.23	36.33	46.28	36.38	62.08	52.08	-15.79	-15.69
4	0.521	0.08	37.96	30.01	38.04	30.09	56.00	46.00	-17.96	-15.91
5	15.359	0.49	37.51	36.29	38.00	36.78	60.00	50.00	-22.00	-13.22
6	17.693	0.52	38.73	35.33	39.25	35.85	60.00	50.00	-20.75	-14.15

- REMARKS:**
1. Q.P. and AV. are abbreviations of quasi-peak and average individually.
 2. "-": The Quasi-peak reading value also meets average limit and measurement with the average detector is unnecessary.
 3. The emission levels of other frequencies were very low against the limit.
 4. Margin value = Emission level - Limit value
 5. Correction factor = Insertion loss + Cable loss
 6. Emission Level = Correction Factor + Reading Value.





4.2 RADIATED EMISSION MEASUREMENT

4.2.1 LIMITS OF RADIATED EMISSION MEASUREMENT

Emissions radiated outside of the specified bands, shall be according to the general radiated limits in 15.209 as following:

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. As shown in 15.35(b), 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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4.2.2 TEST INSTRUMENTS

DESCRIPTION & MANUFACTURER	MODEL NO.	SERIAL NO.	CALIBRATED DATE	CALIBRATED UNTIL
ROHDE & SCHWARZ Spectrum Analyzer	FSP40	100036	Dec. 18, 2009	Dec. 17, 2010
Agilent PSA Spectrum Analyzer	E4446A	MY46180622	May 12 , 2010	May 11 , 2011
HP Pre_Amplifier	8449B	300801923	Nov. 02, 2009	Nov. 01, 2010
ROHDE & SCHWARZ Test Receiver	ESCS30	847124/029	Sep. 03, 2010	Sep. 02, 2011
SCHWARZBECK TRILOG Broadband Antenna	VULB 9168	138	Apr. 28, 2010	Apr. 27, 2011
Schwarzbeck Horn_Antenna	BBHA9120	D124	Dec. 18, 2009	Dec. 17, 2010
Schwarzbeck Horn_Antenna	BBHA 9170	BBHA9170153	Jan. 22, 2010	Jan. 21, 2011
RF Switches	EMH-011	1001	NA	NA
RF CABLE (Chaintek)	Sucoflex 104+ Sucoflex 106	RF104-101+R F106-101	Aug. 24, 2010	Aug. 23, 2011
RF Cable	8DFB	STCCAB-30M- 1GHz	NA	NA
Software	ADT_Radiated_ V7.6.15.9.2	NA	NA	NA
CT Antenna Tower & Turn Table	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) and Spectrum Analyzer (model: FSP40) are used only for the measurement of emission frequency above 1GHz if tested.

3. The test was performed in Open Site No. C.

4. The FCC Site Registration No. is 656396.

5. The VCCI Site Registration No. is R-1626.

6. The CANADA Site Registration No. is IC 7450G-3.



4.2.3 TEST PROCEDURES

- a. The EUT was placed on the top of a rotating table 0.8 meters above the ground at a 10 meter open area test site. 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 antenna is a broadband antenna, and its height 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 Peak Detect Function and Specified Bandwidth with Maximum Hold Mode.
- f. If the emission level of the EUT in peak mode was 10 dB lower than the limit specified, then testing could be stopped and the peak values of the EUT would be reported. Otherwise the emissions that did not have 10 dB margin would be re-tested one by one using peak, quasi-peak or average method as specified and then reported in a data sheet.

NOTE:

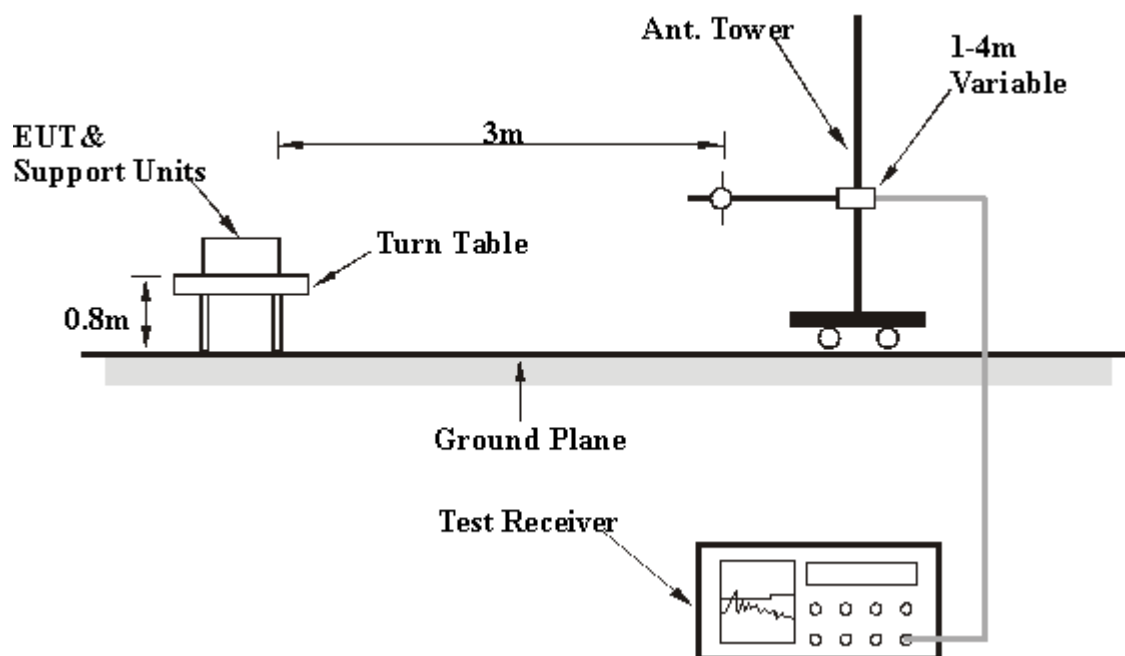
For unlicensed band:

1. The resolution bandwidth and video bandwidth of test receiver/spectrum analyzer is 120kHz for Peak detection (PK) and Quasi-peak detection (QP) at frequency below 1GHz.
2. The resolution bandwidth and video bandwidth of test receiver/spectrum analyzer is 1 MHz for Peak detection at frequency above 1GHz.
3. The resolution bandwidth of test receiver/spectrum analyzer is 1 MHz and the video bandwidth is 10 Hz for Average detection (AV) at frequency above 1GHz.

For licensed band:

1. The resolution bandwidth of spectrum analyzer is 1MHz and the video bandwidth is 3MHz.

4.2.4 TEST SETUP



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

4.2.5 EUT OPERATING CONDITIONS

Same as 4.1.6



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BELOW 1GHZ WORST-CASE DATA

4.2.6 TEST RESULTS (MODE A)

CHANNEL	11g :Channel 11 / 2G :Channel 512	FREQUENCY RANGE	30-1000 MHz
TEST MODE	Co-located mode with adapter 1(Normal mode + 2G: PCS1900MHz)		

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	212.30	24.36 QP	43.50	-19.14	1.99 H	28	12.77	11.59
2	426.70	33.19 QP	46.00	-12.81	1.75 H	265	14.34	18.85
3	500.00	30.26 QP	46.00	-15.74	1.58 H	226	9.50	20.76
4	583.30	32.25 QP	46.00	-13.75	1.44 H	169	9.40	22.85
5	640.00	30.94 QP	46.00	-15.06	1.22 H	127	7.16	23.78
6	960.00	32.68 QP	46.00	-13.32	1.05 H	241	4.61	28.07

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	212.30	24.58 QP	43.50	-18.92	1.00 V	277	12.99	11.59
2	426.70	34.36 QP	46.00	-11.64	1.00 V	32	15.51	18.85
3	500.00	29.85 QP	46.00	-16.15	1.06 V	129	9.09	20.76
4	583.30	32.69 QP	46.00	-13.31	1.22 V	165	9.84	22.85
5	640.00	31.52 QP	46.00	-14.48	1.06 V	29	7.74	23.78
6	960.00	33.61 QP	46.00	-12.39	1.42 V	266	5.54	28.07

- 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)
 3. The other emission levels were very low against the limit.
 4. Margin value = Emission level – Limit value.



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4.2.7 TEST RESULTS (MODE C)

CHANNEL	11g :Channel 11 / 2G :Channel 251	FREQUENCY RANGE	30-1000 MHz
TEST MODE	Co-located mode with adapter 1(Normal mode + 2G: GSM850MHz)		

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	212.30	24.25 QP	43.50	-19.25	1.96 H	23	12.66	11.59
2	426.70	33.25 QP	46.00	-12.75	1.85 H	254	14.40	18.85
3	500.00	30.13 QP	46.00	-15.87	1.62 H	251	9.37	20.76
4	583.30	32.15 QP	46.00	-13.85	1.42 H	162	9.30	22.85
5	640.00	30.85 QP	46.00	-15.15	1.25 H	127	7.07	23.78
6	960.00	32.52 QP	46.00	-13.48	1.06 H	237	4.45	28.07

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	212.30	24.69 QP	43.50	-18.81	1.00 V	265	13.10	11.59
2	426.70	34.21 QP	46.00	-11.79	1.00 V	21	15.36	18.85
3	500.00	29.68 QP	46.00	-16.32	1.02 V	125	8.92	20.76
4	583.30	32.66 QP	46.00	-13.34	1.25 V	155	9.81	22.85
5	640.00	31.58 QP	46.00	-14.42	1.05 V	22	7.80	23.78
6	960.00	33.65 QP	46.00	-12.35	1.57 V	213	5.58	28.07

- 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)
 3. The other emission levels were very low against the limit.
 4. Margin value = Emission level – Limit value.



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ABOVE 1GHZ WORST-CASE DATA**4.2.8 TEST RESULTS (MODE A)**

CHANNEL	11g :Channel 11 / 2G :Channel 512	FREQUENCY RANGE	30-1000 MHz
TEST MODE	Co-located mode with adapter 1(Normal mode + 2G: PCS1900MHz)		

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	2483.50	55.58 PK	74.00	-18.42	1.26 H	270	26.97	28.61
2	2483.50	46.12 AV	54.00	-7.88	1.26 H	270	17.51	28.61
3	3700.40	48.92 PK	82.20	-33.28	1.26 H	321	20.31	28.61
4	3774.20	51.14 PK	82.20	-31.06	1.52 H	175	22.53	28.61
5	4924.00	45.21 PK	74.00	-28.79	1.29 H	36	16.60	28.61
6	4924.00	33.52 AV	54.00	-20.48	1.29 H	36	4.91	28.61
7	5661.60	52.45 PK	82.20	-29.75	1.62 H	52	23.84	28.61
8	7548.30	51.18 PK	82.20	-31.02	1.24 H	65	22.57	28.61

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	2483.50	64.49 PK	74.00	-9.51	1.20 V	255	35.88	28.61
2	2483.50	50.13 AV	54.00	-3.87	1.20 V	255	21.52	28.61
3	3700.40	51.25 PK	82.20	-30.95	1.25 V	166	22.64	28.61
4	3774.20	57.15 PK	82.20	-25.05	1.05 V	122	28.54	28.61
5	4924.00	53.55 PK	74.00	-20.45	1.25 V	117	24.94	28.61
6	4924.00	41.23 AV	54.00	-12.77	1.25 V	117	12.62	28.61
7	5661.60	56.39 PK	82.20	-25.81	1.32 V	185	27.78	28.61
8	7548.30	57.65 PK	82.20	-24.55	1.42 V	158	29.04	28.61

- 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)
 3. The other emission levels were very low against the limit.
 4. Margin value = Emission level – Limit value.



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4.2.9 TEST RESULTS (MODE C)

CHANNEL	11g :Channel 11 / 2G :Channel 251	FREQUENCY RANGE	30-1000 MHz
TEST MODE	Co-located mode with adapter 1(Normal mode + 2G: GSM850MHz)		

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	1611.00	49.65 PK	74.00	-24.35	1.25 H	113	21.04	28.61
2	1611.00	30.26 AV	54.00	-23.74	1.25 H	113	1.65	28.61
3	1697.60	75.42 PK	82.20	-6.78	1.26 H	110	46.81	28.61
4	2483.50	55.68 PK	74.00	-18.32	1.25 H	261	27.07	28.61
5	2483.50	45.98 AV	54.00	-8.02	1.25 H	261	17.37	28.61
6	2546.40	65.52 PK	82.20	-16.68	1.29 H	25	36.91	28.61
7	3395.20	46.25 PK	82.20	-35.95	1.33 H	28	17.64	28.61

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	1611.00	53.62 PK	74.00	-20.38	1.25 V	261	25.01	28.61
2	1611.00	33.21 AV	54.00	-20.79	1.25 V	261	4.60	28.61
3	1697.60	64.55 PK	82.20	-17.65	1.25 V	162	35.94	28.61
4	2483.50	64.55 PK	74.00	-9.45	1.21 V	256	35.94	28.61
5	2483.50	50.16 AV	54.00	-3.84	1.21 V	256	21.55	28.61
6	2546.40	63.99 PK	82.20	-18.21	1.26 V	259	35.38	28.61
7	3395.20	43.26 PK	82.20	-38.94	1.32 V	125	14.65	28.61

- 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)
 3. The other emission levels were very low against the limit.
 4. Margin value = Emission level – Limit value.



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.

Copies of accreditation certificates of our laboratories obtained from approval agencies can be downloaded from our web site: www.adt.com.tw/index.5/phtml.

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

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Web Site: www.adt.com.tw

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

6 APPENDIX A - MODIFICATIONS RECORDERS FOR ENGINEERING CHANGES TO THE EUT BY THE LAB

No any modifications are made to the EUT by the lab during the test.

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