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Supplemental “Dual Xmit” Test Report

REPORT NO.: RF980417H02C

MODEL NO.: RTL8192SE

RECEIVED: May 14, 2010

TESTED: May 19 to 31, 2010

ISSUED: June 18, 2010

APPLICANT: Realtek Semiconductor Corp.

ADDRESS: No. 2, Innovation Road II, Hsinchu Science Park,
Hsinchu 300, Taiwan

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

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

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1 CERTIFICATION

PRODUCT : 802.11 b/g/n RTL8192SE miniCard
BRAND NAME : Realtek
MODEL NO. : RTL8192SE
FCC ID : TX2-RTL8192SE
TESTED : May 19 to 31, 2010
APPLICANT : Realtek Semiconductor Corp.
TEST SAMPLE : MASS-PRODUCTION
STANDARDS : 47 CFR FCC Part 15, Subpart C
ANSI C63.4-2003

The above equipment (Model: RTL8192SE) 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:** June 18, 2010
(Carol Liao, Specialist)

TECHNICAL ACCEPTANCE : Hank Chung , **DATE:** June 18, 2010
(Hank Chung, Deputy Manager)

APPROVED BY : May Chen , **DATE:** June 18, 2010
(May Chen, Deputy Manager)



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2 GENERAL DESCRIPTION OF EUT

Note:

1. This report is prepared for FCC class II permissive change. The difference compared with the Report No.: RF980417H02 design is as the following information:

u The EUT was changed from Mobile device to Portable device.

2. The EUT will be installed into Notebook which trade name and model number is SAMSUNG and NP-NB30.

3. NP-NB30 Notebook is with other transmitter which is Bluetooth module.

PRODUCT	BRAND	MODEL NO.	FCC ID
Bluetooth Transceiver Module	Broadcom Corporation	BCM92070MD_REF	QDS-BRCM1043

4. Per a request of the FCC, the 802.11 b/g/n RTL8192SE miniCard was tested for conducted and radiated emissions in restricted bands while transmitting on both 2.4 GHz and bluetooth at simultaneously.

5. The antennas used in this EUT are listed below table :

No.	Brand	Model No.	Peak Gain (dBi)	Antenna Type	Connector Type	Ant. Freq. (MHz)	Remark
1	Wistron	81.EHD15.G15	-4.84	PIFA	IPEX	2400-2500	Tx2
2	Foxconn	WDAN-M1STL700-DF	-1.28	PIFA	IPEX	2400-2500	Tx2
3	Auden	220207-09	0.79	PIFA	IPEX	2400-2500	Tx2
4	Wistron	81.EHD15.G21	0.04	PIFA	IPEX	2400-2500	Tx1
5	Foxconn	WDAN-M1STR500-DF	-0.65	PIFA	IPEX	2400-2500	Tx1
6	Auden	220215-09	-2.42	PIFA	IPEX	2400-2500	Tx1

* Antenna 3 & 4 was chosen as the representative for testing.



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3 DESCRIPTION OF SUPPORT UNITS

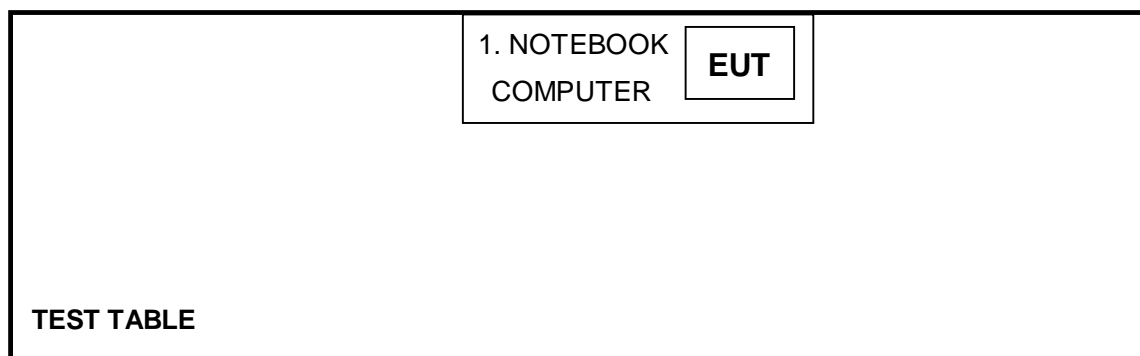
The EUT has been tested as an independent unit together with other necessary accessories or support units. The following support units or accessories were used to form a representative test configuration during the tests.

NO.	PRODUCT	BRAND	MODEL NO.	SERIAL NO.	FCC ID
1	NOTEBOOK COMPUTER	SAMSUNG	NP-NB30	NA	NA

NO.	SIGNAL CABLE DESCRIPTION OF THE ABOVE SUPPORT UNITS
1	NA

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

4 CONFIGURATION OF SYSTEM UNDER TEST





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5 DUAL XMIT, CONDUCTED EMISSION MEASUREMENT

4.1 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.
 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.

4.2 TEST INSTRUMENTS

DESCRIPTION & MANUFACTURER	MODEL NO.	SERIAL NO.	CALIBRATED DATE	CALIBRATED UNTIL
ROHDE & SCHWARZ Test Receiver	ESCS 30	100287	Mar. 01, 2010	Feb. 28, 2011
Line-Impedance Stabilization Network (for EUT)	NSLK 8127	8127-523	Sep. 23,2009	Sep. 22, 2010
Line-Impedance Stabilization Network (for Peripheral)	ENV-216	100072	June 08, 2009	June 07, 2010
RF Cable (JYEBAO)	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.

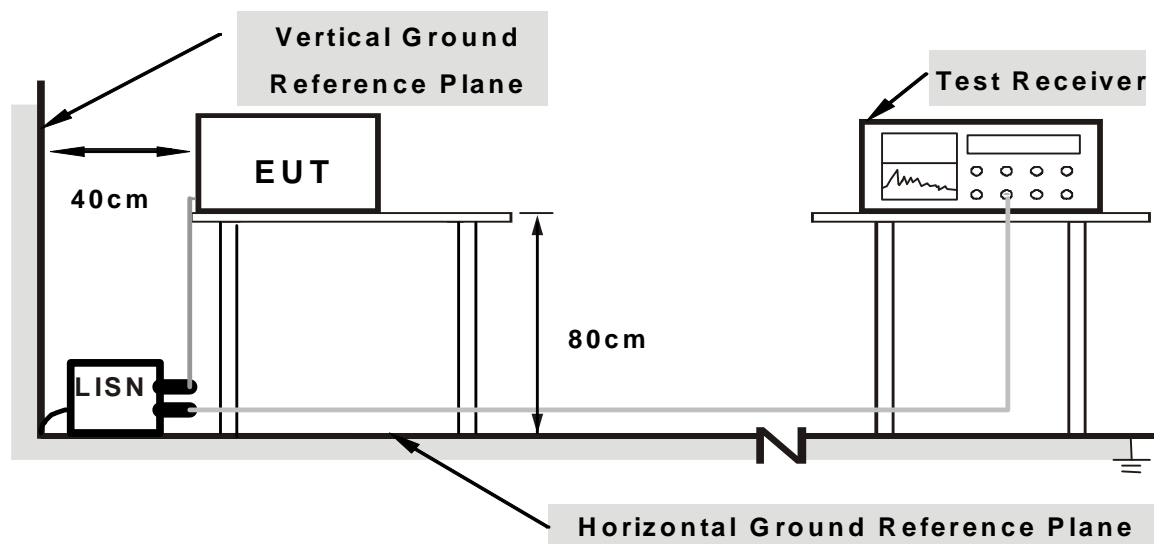
4.3 TEST PROCEDURES

- 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.

4.4 DEVIATION FROM TEST STANDARD

No deviation

4.5 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.

4.6 EUT OPERATING CONDITIONS

Set the transmitter part of EUT under transmission condition continuously at specific channel frequency.

Note:

- 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.

Power Line Conducted Emission Test:

Mode	Available Channel	Tested Channel	Modulation Technology	Modulation Type	Data Rate (Mbps)
WLAN: 802.11n (20MHz) + Bluetooth	1 to 11	6	OFDM	BPSK	13
	0 to 78	39	FHSS	8PSK	-

Radiated Emission Test:

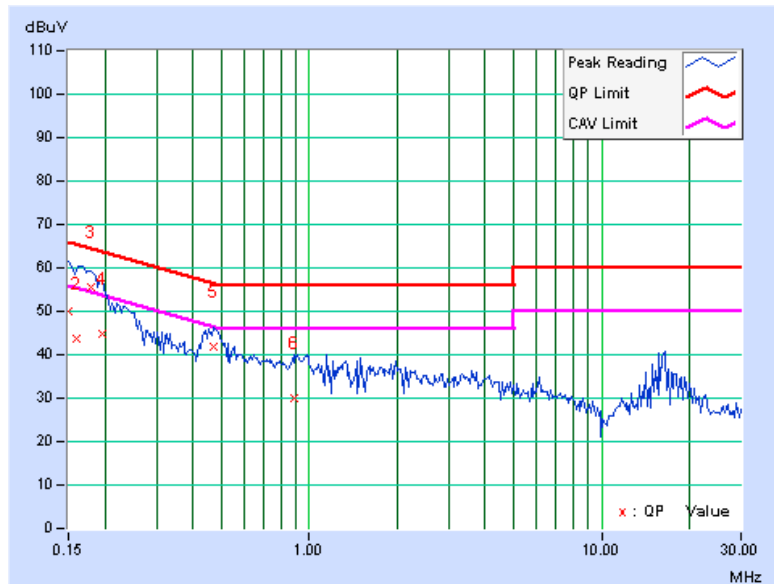
Mode	Available Channel	Tested Channel	Modulation Technology	Modulation Type	Data Rate (Mbps)
WLAN: 802.11n (20MHz) + Bluetooth	1 to 11	6	OFDM	BPSK	13
	0 to 78	39	FHSS	8PSK	-

4.7 TEST RESULTS

INPUT POWER (SYSTEM)	120Vac, 60 Hz	6dB BANDWIDTH	9 kHz
ENVIRONMENTAL CONDITIONS	25deg. C, 60%RH, 1012hPa	PHASE	Line (L)
TESTED BY	Max Tseng		

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	0.03	49.79	-	49.82	-	66.00
2	0.161	0.04	43.60	-	43.64	-	65.44	55.44	-21.80	-
3	0.180	0.04	55.58	42.80	55.62	42.84	64.51	54.51	-8.89	-11.67
4	0.197	0.04	44.82	-	44.86	-	63.74	53.74	-18.88	-
5	0.470	0.07	41.62	-	41.69	-	56.51	46.51	-14.82	-
6	0.884	0.18	29.66	-	29.84	-	56.00	46.00	-26.16	-

- 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.



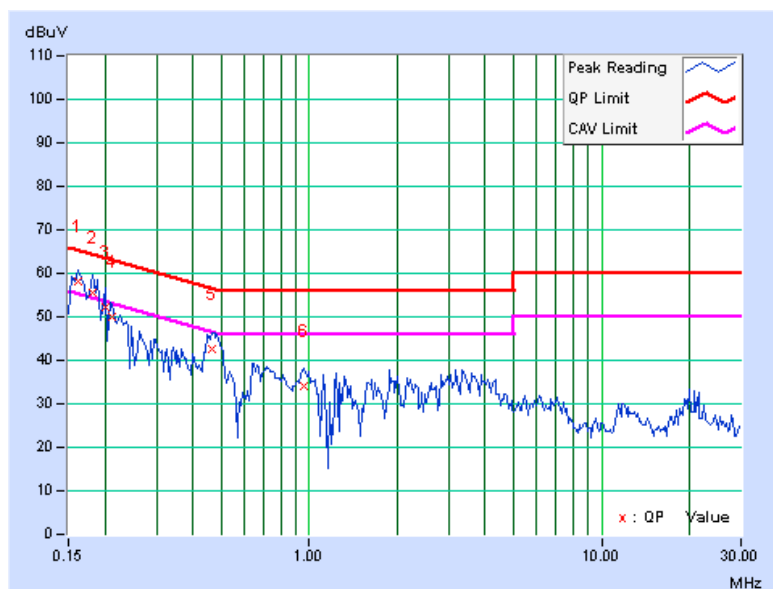


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INPUT POWER (SYSTEM)	120Vac, 60 Hz	6dB BANDWIDTH	9 kHz
ENVIRONMENTAL CONDITIONS	25deg. C, 60%RH, 1012hPa	PHASE	Neutral (N)
TESTED BY	Max Tseng		

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	0.162	0.05	58.03	46.83	58.08	46.88	65.38	55.38	-7.30
2	0.181	0.05	55.34	44.94	55.39	44.99	64.43	54.43	-9.04	-9.44
3	0.201	0.05	52.21	-	52.26	-	63.58	53.58	-11.32	-
4	0.213	0.05	50.01	-	50.06	-	63.11	53.11	-13.05	-
5	0.463	0.08	42.37	-	42.45	-	56.65	46.65	-14.20	-
6	0.959	0.21	33.81	-	34.02	-	56.00	46.00	-21.98	-

- 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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6 DUAL XMIT, RADIATED EMISSION MEASUREMENT

5.1 LIMITS OF RADIATED EMISSION MEASUREMENT

Field strength limits are at the distance of 3 meters, 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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5.2 TEST INSTRUMENTS

Below 1 GHz test:

DESCRIPTION & MANUFACTURER	MODEL NO.	SERIAL NO.	CALIBRATED DATE	CALIBRATED UNTIL
ADVANTEST Spectrum Analyzer	U3751	170100022	Nov. 18, 2009	Nov. 17, 2010
ADVANTEST Spectrum Analyzer	U3772	160100280	Sep. 21, 2009	Sep. 20, 2010
HP Pre_Amplifier	8449B	3008A01922	Sep. 25, 2009	Sep. 24, 2010
ROHDE & SCHWARZ Test Receiver	ESCS 30	100375	Mar. 09, 2010	Mar. 08, 2011
SCHWARZBECK Broadband Antenna	VULB-9168	263	Apr. 28, 2010	Apr. 27, 2011
Schwarzbeck Horn_Antenna	BBHA9120	D123	Sep. 21, 2009	Sep. 20, 2010
Schwarzbeck Horn_Antenna	BBHA 9170	BBHA9170153	Jan. 23, 2010	Jan. 22, 2011
RF Switches	EM-H-01-1	1009	Aug. 10, 2009	Aug. 08, 2010
RF Cable	8DFB	STACAB-30M-1GHz-091	Nov. 20, 2009	Nov. 19, 2010
Software	ADT_Radiated_V7.6.15.9.2	NA	NA	NA
CT Antenna Tower & Turn Table	TT100	ADT01	NA	NA
CORCOM AC Filter	MRI2030	107/108	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: U3772) are used only for the measurement of emission frequency above 1GHz if tested.

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

4. The VCCI Site Registration No. is R-782.

5. The FCC Site Registration No. is 91097.

6. The CANADA Site Registration No. is IC 7450G-1.



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Above 1 GHz test:

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	Apr. 23 , 2010	Apr. 22 , 2011
HP Pre_Amplifier	8449B	300801923	Nov. 02, 2009	Nov. 01, 2010
ROHDE & SCHWARZ Test Receiver	ESCS30	847124/029	Aug. 28, 2009	Aug. 27, 2010
SCHWARZBECK TRILOG Broadband Antenna	VULB 9168	138	April 28, 2010	April 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
R&S Loop Antenna	HFH2-Z2	100070	Jan. 13, 2010	Jan. 12, 2011
RF Switches	EMH-011	1001	NA	NA
RF CABLE (Chaintek)	Sucoflex 106	28077	Aug. 14, 2009	Aug. 13, 2010
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.



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5.3 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 the quasi-peak method or average method as specified and then reported in Data sheet peak mode and QP mode.
- g. The emissions up to 40 GHz were examined. Those emission falling within a restricted band were evaluated against the “restricted band emission limit” (54 dB μ V / 74 dB μ V).

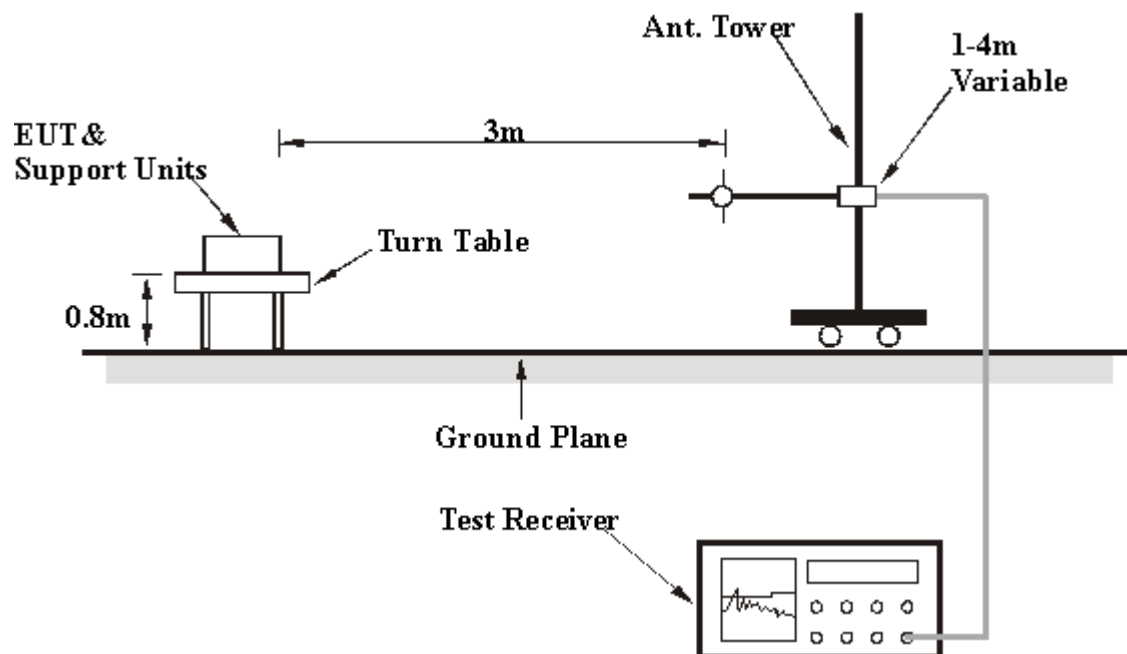
NOTE:

1. The resolution bandwidth and video bandwidth of test receiver/spectrum analyzer is 120kHz for Quasi-peak detection at frequency below 1GHz.
2. The resolution bandwidth and video bandwidth of test receiver/spectrum analyzer is 1 MHz for Peak detection (PK) at frequency above 1GHz.
3. The resolution bandwidth of test receiver/spectrum analyzer is 1 MHz and the video bandwidth is 300 Hz for Average detection (AV) at frequency above 1GHz.

5.4 DEVIATION FROM TEST STANDARD

No deviation

5.5 TEST SETUP



5.6 EUT OPERATING CONDITIONS

Same as 4.6



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5.7 TEST RESULTS

INPUT POWER (SYSTEM)	120Vac, 60Hz	FREQUENCY RANGE	30MHz~1000MHz
ENVIRONMENTAL CONDITIONS	28deg. C, 74%RH, 1012hPa	DETECTOR FUNCTION & BANDWIDTH	Peak (PK) Average (AV) 1 MHz
TESTED BY	Eagle Chen		

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	205.25	32.72 QP	43.50	-10.78	3.26 H	106	20.80	11.92
2	384.00	34.05 QP	46.00	-11.95	3.22 H	227	15.98	18.07
3	429.55	35.62 QP	46.00	-10.38	2.05 H	168	16.32	19.30
4	560.00	34.50 QP	46.00	-11.50	2.42 H	233	11.90	22.60
5	800.00	37.46 QP	46.00	-8.54	1.59 H	127	10.90	26.56
6	880.00	36.86 QP	46.00	-9.14	1.00 H	259	8.98	27.88
7	960.00	40.72 QP	46.00	-5.28	1.00 H	129	11.91	28.81

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	129.96	32.28 QP	43.50	-11.22	1.00 V	33	18.90	13.38
2	205.25	32.86 QP	43.50	-10.64	1.00 V	28	20.94	11.92
3	240.00	33.24 QP	46.00	-12.76	1.00 V	268	19.96	13.28
4	429.55	33.28 QP	46.00	-12.72	1.00 V	127	13.98	19.30
5	560.00	31.59 QP	46.00	-14.41	2.88 V	159	8.99	22.60
6	800.00	36.47 QP	46.00	-9.53	2.31 V	130	9.91	26.56
7	960.00	39.31 QP	46.00	-6.69	1.94 V	305	10.50	28.81

- 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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INPUT POWER (SYSTEM)	120Vac, 60Hz	FREQUENCY RANGE	1000MHz~25000MHz
ENVIRONMENTAL CONDITIONS	28deg. C, 56%RH, 1012hPa	DETECTOR FUNCTION & BANDWIDTH	Peak (PK) Average (AV) 1 MHz
TESTED BY	Duke Tseng		

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	4804.00	46.40 PK	74.00	-27.60	1.82 H	224	11.00	35.40
2	4804.00	16.30 AV	54.00	-37.70	1.82 H	224	-19.10	35.40
3	4874.00	54.30 PK	74.00	-19.70	1.00 H	223	18.80	35.50
4	4874.00	39.10 AV	54.00	-14.90	1.00 H	223	3.60	35.50
5	7311.00	49.80 PK	74.00	-24.20	1.56 H	54	7.80	42.00
6	7311.00	37.30 AV	54.00	-16.70	1.56 H	54	-4.70	42.00

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	4804.00	47.80 PK	74.00	-26.20	1.48 V	154	12.40	35.40
2	4804.00	17.70 AV	54.00	-36.30	1.48 V	154	-17.70	35.40
3	4874.00	54.70 PK	74.00	-19.30	1.00 V	251	19.20	35.50
4	4874.00	38.20 AV	54.00	-15.80	1.00 V	251	2.70	35.50
5	7311.00	55.60 PK	74.00	-18.40	1.48 V	168	13.60	42.00
6	7311.00	41.30 AV	54.00	-12.70	1.48 V	168	-0.70	42.00

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



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6. 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:

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Linko EMC/RF Lab:

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Hsin Chu EMC/RF Lab:

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Hwa Ya EMC/RF/Safety/Telecom Lab:

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