



VARIANT FCC TEST REPORT (15.247)

REPORT NO.: RF130729C17A-1
MODEL NO.: TX201L
FCC ID: MSQ-TX201L
RECEIVED: Oct. 22, 2013
TESTED: Nov. 05, 2013 ~ Nov. 06, 2013
ISSUED: Nov. 14, 2013

APPLICANT: ASUSTek COMPUTER INC.

ADDRESS: 4F., No. 150, LI-TE Rd., PEITOU, TAIPEI 112, TAIWAN

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

LAB ADDRESS: No. 47, 14th Ling, Chia Pau Vil., Lin Kou Dist.,
New Taipei City, Taiwan (R.O.C)

TEST LOCATION: No. 19, Hwa Ya 2nd Rd, Wen Hwa Tsuen, Kwei
Shan Hsiang, Taoyuan Hsien 333, Taiwan, R.O.C.

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RELEASE CONTROL RECORD

ISSUE NO.	REASON FOR CHANGE	DATE ISSUED
RF130729C17A-1	Original release	Nov. 14, 2013



1. CERTIFICATION

PRODUCT: Notebook PC
MODEL NO.: TX201L
BRAND: ASUS
APPLICANT: ASUSTek COMPUTER INC.
TESTED: Nov. 05, 2013 ~ Nov. 06, 2013
TEST SAMPLE: Production Unit
STANDARDS: **FCC Part 15, Subpart C (Section 15.247)**
ANSI C63.10-2009

This report is issued as a supplementary report to BV ADT report no.: RF130729C17-1.
This report shall be used by combining with its original report.

PREPARED BY : Vera Huang , **DATE :** Nov. 14, 2013

Vera Huang / Specialist

APPROVED BY : Sam chen , **DATE :** Nov. 14, 2013

Sam Chen / Assistant Manager



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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	NA	Refer to NOTE
15.247(d) 15.209	Radiated Emissions	PASS	Meet the requirement of limit. Minimum passing margin is -5.66dB at 3863.3MHz.
15.247(d)	Band Edge Measurement	NA	Refer to NOTE
15.247(a)(2)	6dB bandwidth	NA	Refer to NOTE
15.247(b)	Conducted power	NA	Refer to NOTE
15.247(e)	Power Spectral Density	NA	Refer to NOTE
15.203	Antenna Requirement	NA	Refer to NOTE

NOTE: Only radiated emission was performed for this addendum. Refer to original report for other test data.

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	UNCERTAINTY
Radiated emissions	30MHz ~ 200MHz	2.93 dB
	200MHz ~ 1000MHz	2.95 dB
	1GHz ~ 18GHz	2.26 dB
	18GHz ~ 40GHz	1.94 dB

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



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3. GENERAL INFORMATION

3.1 GENERAL DESCRIPTION OF EUT

<Pad>

EUT	Notebook PC
MODEL NO.	TX201L
POWER SUPPLY	5Vdc (adapter or host equipment) 3.75Vdc (battery)
MODULATION TYPE	CCK, DQPSK, DBPSK for DSSS 64QAM, 16QAM, QPSK, BPSK for OFDM
MODULATION TECHNOLOGY	DSSS, OFDM
TRANSFER RATE	802.11b: 11.0/ 5.5/ 2.0/ 1.0Mbps 802.11g: 54.0/ 48.0/ 36.0/ 24.0/ 18.0/ 12.0/ 9.0/ 6.0Mbps 802.11a: 54.0/ 48.0/ 36.0/ 24.0/ 18.0/ 12.0/ 9.0/ 6.0Mbps 802.11n: up to MCS7
OPERATING FREQUENCY	2.4GHz: 2412 ~ 2462MHz 5.0GHz: 5745 ~ 5825MHz
NUMBER OF CHANNEL	2.4GHz: 11 for 802.11b, 802.11g, 802.11n (20MHz) 5.0GHz: 5 for 802.11a, 802.11n (20MHz) 2 for 802.11n (40MHz)
ANTENNA TYPE	2.4GHz: PIFA antenna with -2.71dBi gain 5GHz: PIFA antenna with 1.04dBi gain
ANTENNA CONNECTOR	NA
DATA CABLE	Refer to Note as below
I/O PORTS	Refer to user's manual
ACCESSORY DEVICES	Refer to Note as below



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<Base>

POWER SUPPLY	19Vdc (adapter) 7.54Vdc (battery)
MODULATION TYPE	CCK, DQPSK, DBPSK for DSSS 256QAM, 64QAM, 16QAM, QPSK, BPSK for OFDM
MODULATION TECHNOLOGY	DSSS, OFDM
TRANSFER RATE	802.11b: 11.0/ 5.5/ 2.0/ 1.0Mbps 802.11g: 54.0/ 48.0/ 36.0/ 24.0/ 18.0/ 12.0/ 9.0/ 6.0Mbps 802.11a: 54.0/ 48.0/ 36.0/ 24.0/ 18.0/ 12.0/ 9.0/ 6.0Mbps 802.11n: up to MCS7 802.11ac: up to V9
OPERATING FREQUENCY	2.4GHz: 2412 ~ 2462MHz 5.0GHz: 5745 ~ 5825MHz
NUMBER OF CHANNEL	2.4GHz: 11 for 802.11b, 802.11g, 802.11n (20MHz) 7 for 802.11n (40MHz) 5.0GHz: 5 for 802.11a, 802.11n (20MHz) 2 for 802.11n (40MHz) 1 for 802.11ac (80MHz)
ANTENNA TYPE	2.4GHz: PIFA antenna with -1.93dBi gain 5GHz: PIFA antenna with 1.37dBi gain
ANTENNA CONNECTOR	NA
DATA CABLE	Refer to Note as below
I/O PORTS	Refer to user's manual
ACCESSORY DEVICES	Refer to Note as below



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NOTE:

1. This report is issued as a supplementary report to BV ADT report no.: RF130729C17-1. The difference compared with original report is adding 2.4GHz/5GHz RF diplexer for pad. Therefore, only radiated emission for pad had been performed and presented in the report.
2. The EUT has following accessories.

<For Pad>

ITEM	BRAND	MODEL	DESCRIPTION
AC Adapter 1	ASUS	AD83531	I/P: 100-240Vac, 50-60Hz, 0.3A O/P: 5Vdc, 2A
AC Adapter 2	ASUS	AD835M1	I/P: 100-240Vac, 50-60Hz, 0.3A O/P: 5Vdc, 2A
Li-ion Battery	Dynapack International Technology Corp/ Trademark for ASUS	C11N1312	Rating: 3.75Vdc, 19Wh
USB cable	ASUS	N/A	0.9m shielded cable w/o ferrite core
Photo Camera	LITEON	13P2BA515	--
Video Camera	CHICONY	CNFDH3021003870LH	--
WLAN/BT Module	Broadcom	BCM43340	--
CPU	Intel	Z2560	760 Pin
Main Borad	ASUS	TX201LA PAD MAIN BOARD	--
LCD Panel 1	INNOLUX	N116HSE	--
LCD Panel 2	BOE	HN116WX1	--
Flash Memory 1	HYNIX	H9TKNNNBPDARAR-NGM	Co-POP LPDDR2 Memory 2G Support Dual 32-bit channels. 6.4GB/s @ 800MHz, 8.2GB/s @ 1066MHz.
Flash Memory 2	ELPIDA	EDB8164B3PD-1D-F	Co-POP LPDDR2 Memory 1G Support Dual 32-bit channels. 6.4GB/s @ 800MHz, 8.2GB/s @ 1066MHz.
eMMC 1	HYNIX	H26M64003DQR	eMMC 32G
eMMC 2	SANDISK	SDIN8DE4-32G	eMMC 16G

* Adapter 1 and adapter 2 have same design, material, and specification. The difference between them is adapter 2 could change plug type.



<For Base>

ITEM	BRAND	MODEL	DESCRIPTION
AC Adapter	ASUS	AD883J20	I/P: 100-240Vac, 50-60Hz, 1A O/P: 19Vdc, 2.37A 2.2m shielded cable w/o ferrite core
Li-ion Battery	Dynapack International Technology Corp/ Trademark for ASUS	C21N1313	Rating: 7.54Vdc, 33Wh
WLAN/BT Module	AZWAVE	AW-CB161H	--
USB to RJ45 Cable	ASUS	USB Ethernet cable	0.18m shielded cable w/o ferrite core Support 10Mbps and 100Mbps
MDP to VGA Cable	ASUS	N/A	0.12m shielded cable w/o ferrite core
CPU 1	Intel	i5-4200U	1168 Pin, 1.8GHz
CPU 2	Intel	i74500u	1168 Pin, 1.6GHz
Main Borad	ASUS	TX201LA BASE BOARD	--
Flash Memory 1	HYNIX	H5TC4G63AFR-PBA	Onboard 4G (256 x 16 x8), 8G (512 x 16 x 8) 1600MHz DDR3L SDRAM
Flash Memory 2	ELPIDA	EDJ4216EFBG-GNL-F	Onboard 4G (256 x 16 x8), 8G (512 x 16 x 8) 1600MHz DDR3L SDRAM
HDD 1	HGST	HTS545050A7E680	7mm HDD 320G/500G/750G 5400RPM
HDD 2	Seagate	ST500LT012	7mm HDD 320G/500G/750G 5400RPM

3. The configurations of the device are as below.

SKU 1 Pad: LCD Panel 1 + Flash Memory 1 + eMMC 1

SKU 2 Pad: LCD Panel 2 + Flash Memory 2 + eMMC 2

SKU 1 Base: CPU 1 + Flash Memory 1 + HDD 1

SKU 2 Base: CPU 2 + Flash Memory 2 + HDD 2

4. The EUT provides one completed transmitter and one receiver.

MODULATION MODE	TX FUNCTION
802.11b	1TX
802.11g	1TX
802.11a	1TX
802.11n (20MHz)	1TX
802.11n (40MHz)	1TX
802.11ac (80MHz) (for Base only)	1TX

5. The above EUT information is declared by the manufacturer and for more detailed features description, please refer to the manufacturer's specifications or User's Manual.

3.2 DESCRIPTION OF TEST MODES

FOR 2.4GHz:

11 channels are provided for 802.11b, 802.11g and 802.11n (20MHz):

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		

FOR 5.0GHz:

5 channels are provided for 802.11a, 802.11n (20MHz):

CHANNEL	FREQUENCY	CHANNEL	FREQUENCY
149	5745MHz	161	5805MHz
153	5765MHz	165	5825MHz
157	5785MHz		

2 channels are provided for 802.11n (40MHz):

CHANNEL	FREQUENCY	CHANNEL	FREQUENCY
151	5755MHz	159	5795MHz



3.2.1 TEST MODE APPLICABILITY AND TESTED CHANNEL DETAIL

FOR 2.4GHz:

EUT CONFIGURE MODE	APPLICABLE TO		DESCRIPTION
	RE \geq 1G	RE<1G	
A	√	√	SKU 1 Pad

Where **RE \geq 1G:** Radiated Emission above 1GHz **RE<1G:** Radiated Emission below 1GHz

NOTE: The EUT had been pre-tested on the positioned of each 3 axis. The worst case was found when positioned on Y-plane.

RADIATED EMISSION TEST (ABOVE 1GHz):

- Pre-Scan has been conducted to determine the worst-case mode from all possible combinations between available modulations, data rates and antenna ports (if EUT with antenna diversity architecture).
- Following channel(s) was (were) selected for the final test as listed below.

EUT CONFIGURE MODE	MODE	AVAILABLE CHANNEL	TESTED CHANNEL	MODULATION TECHNOLOGY	MODULATION TYPE	DATA RATE (Mbps)
A	802.11n (20MHz)	1 to 11	11	OFDM	BPSK	MCS0

RADIATED EMISSION TEST (BELOW 1GHz):

- Pre-Scan has been conducted to determine the worst-case mode from all possible combinations between available modulations, data rates and antenna ports (if EUT with antenna diversity architecture).
- Following channel(s) was (were) selected for the final test as listed below.

EUT CONFIGURE MODE	MODE	AVAILABLE CHANNEL	TESTED CHANNEL	MODULATION TECHNOLOGY	MODULATION TYPE	DATA RATE (Mbps)
A	802.11n (20MHz)	1 to 11	11	OFDM	BPSK	MCS0

TEST CONDITION:

APPLICABLE TO	ENVIRONMENTAL CONDITIONS	INPUT POWER	TESTED BY
RE \geq 1G	25deg. C, 65%RH	120Vac, 60Hz	Anson Lin
RE<1G	25deg. C, 65%RH	120Vac, 60Hz	Anson Lin



FOR 5.0GHz:

EUT CONFIGURE MODE	APPLICABLE TO		DESCRIPTION
	RE≥1G	RE<1G	
A	√	√	SKU 1 Pad

Where **RE≥1G**: Radiated Emission above 1GHz **RE<1G**: Radiated Emission below 1GHz

NOTE: The EUT had been pre-tested on the positioned of each 3 axis. The worst case was found when positioned on Z-plane.

RADIATED EMISSION TEST (ABOVE 1GHz):

Pre-Scan has been conducted to determine the worst-case mode from all possible combinations between available modulations, data rates and antenna ports (if EUT with antenna diversity architecture).

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

EUT CONFIGURE MODE	MODE	AVAILABLE CHANNEL	TESTED CHANNEL	MODULATION TECHNOLOGY	MODULATION TYPE	DATA RATE (Mbps)
A	802.11n (40MHz)	151 to 159	159	OFDM	BPSK	MCS0

RADIATED EMISSION TEST (BELOW 1GHz):

Pre-Scan has been conducted to determine the worst-case mode from all possible combinations between available modulations, data rates and antenna ports (if EUT with antenna diversity architecture).

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

EUT CONFIGURE MODE	MODE	AVAILABLE CHANNEL	TESTED CHANNEL	MODULATION TECHNOLOGY	MODULATION TYPE	DATA RATE (Mbps)
A	802.11n (40MHz)	151 to 159	159	OFDM	BPSK	MCS0

TEST CONDITION:

APPLICABLE TO	ENVIRONMENTAL CONDITIONS	INPUT POWER	TESTED BY
RE≥1G	25deg. C, 65%RH	120Vac, 60Hz	Anson Lin
RE<1G	25deg. C, 65%RH	120Vac, 60Hz	Anson Lin

3.3 DESCRIPTION OF SUPPORT UNITS

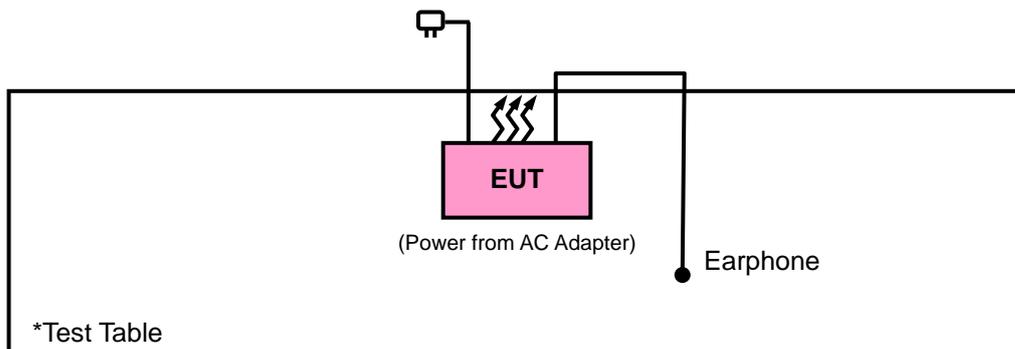
The EUT has been tested as an independent unit together with other necessary accessories or support units. The following support units or accessories were used to form a representative test configuration during the tests.

NO.	PRODUCT	BRAND	MODEL NO.	SERIAL NO.	FCC ID
1	EARPHONE	Acon	CW-010M.V	N/A	N/A

NO.	SIGNAL CABLE DESCRIPTION OF THE ABOVE SUPPORT UNITS
1	N/A

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

3.3.1 CONFIGURATION OF SYSTEM UNDER TEST



3.4 GENERAL DESCRIPTION OF APPLIED STANDARDS

The EUT is a RF Product. According to the specifications of the manufacturer, it must comply with the requirements of the following standards:

FCC Part 15, Subpart C (15.247)

ANSI C63.10-2009

KDB 558074 D01 DTS Meas Guidance v02

All test items 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 FCC Part 15, Subpart B, Class B. The test report has been issued separately.

4. TEST TYPES AND RESULTS (FOR 2.4GHz BAND)

4.1 RADIATED EMISSION AND BANDEDGE MEASUREMENT

4.1.1 LIMITS OF RADIATED EMISSION AND BANDEDGE MEASUREMENT

Radiated emissions which fall in the restricted bands must comply with the radiated emission limits specified as below table. Other emissions shall be at least 20dB 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.



4.1.2 TEST INSTRUMENTS

DESCRIPTION & MANUFACTURER	MODEL NO.	SERIAL NO.	DATE OF CALIBRATION	DUE DATE OF CALIBRATION
Test Receiver ROHDE & SCHWARZ	ESCI	100744	Apr. 15, 2013	Apr. 14, 2014
Spectrum Analyzer ROHDE & SCHWARZ	FSU43	101261	Dec. 17, 2012	Dec. 16, 2013
BILOG Antenna SCHWARZBECK	VULB9168	9168-472	Mar. 25, 2013	Mar. 24, 2014
HORN Antenna SCHWARZBECK	BBHA 9120 D	9120D-969	Jan. 07, 2013	Jan. 06, 2014
HORN Antenna SCHWARZBECK	BBHA 9170	9170-480	Dec. 25, 2012	Dec. 24, 2013
Loop Antenna	HFH2-Z2	100070	Jan. 31, 2012	Jan. 30, 2014
Preamplifier EMCI	EMC 012645	980115	Dec. 28, 2012	Dec. 27, 2013
Preamplifier EMCI	EMC 184045	980116	Dec. 28, 2012	Dec. 27, 2013
Preamplifier EMCI	EMC 330H	980112	Dec. 28, 2012	Dec. 27, 2013
RF signal cable HUBER+SUHNNER	SUCOFLEX 104	309219/4	Oct. 18, 2013	Oct. 17, 2014
RF signal cable HUBER+SUHNNER	SUCOFLEX 104	250130/4	Oct. 18, 2013	Oct. 17, 2014
RF signal cable Worken	RG-213	NA	Dec. 29, 2012	Dec. 28, 2013
Software	E3 6.120103	NA	NA	NA
Antenna Tower MF	MFA-440H	NA	NA	NA
Turn Table MF	MFT-201SS	NA	NA	NA
Antenna Tower & Turn Table Controller MF	MF-7802	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 calibration interval of the loop antenna is 24 months and the calibrations are traceable to NML/ROC and NIST/USA.
 3. The test was performed in HwaYa Chamber 10.
 4. The horn antenna and HP preamplifier (model: 8449B) are used only for the measurement of emission frequency above 1GHz if tested.
 5. The FCC Site Registration No. is 690701.
 6. The IC Site Registration No. is IC 7450F-10.

4.1.3 TEST PROCEDURES

- a. The EUT was placed on the top of a rotating table 0.8 meters above the ground at a 3 meters semi-anechoic chamber. 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. Height of receiving 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 Peak Detect Function and Specified Bandwidth with Maximum Hold Mode.
- f. If the emission level of the EUT in peak mode was lower than the limit specified, then testing could be stopped and the peak values of the EUT would be reported. Otherwise the emissions would be re-tested one by one using peak, quasi-peak or average method as specified and then reported in a data sheet.

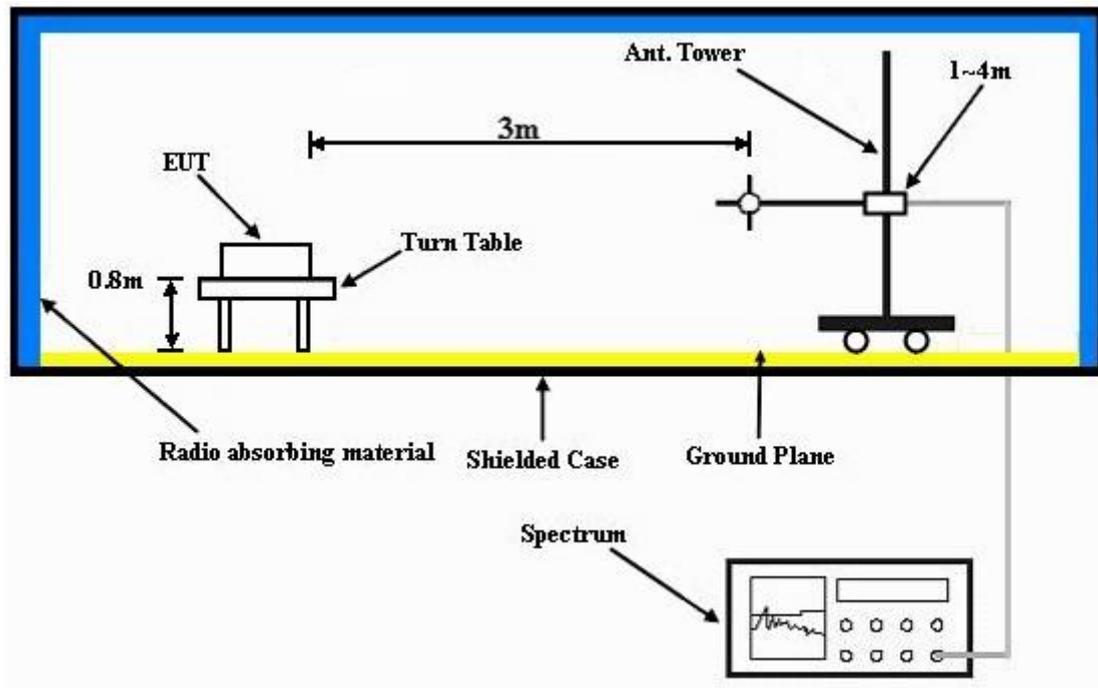
NOTE:

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 of test receiver/spectrum analyzer is 1MHz and video bandwidth is 3MHz for Peak detection at frequency above 1GHz.
3. The resolution bandwidth of test receiver/spectrum analyzer is 1MHz and the video bandwidth is 10Hz for Average detection (AV) at frequency above 1GHz.
4. 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 the actual test configuration, please refer to the attached file (Test Setup Photo).

4.1.6 EUT OPERATING CONDITIONS

- a. Placed the EUT on a testing table.
- b. Use the software to control the EUT under transmission condition continuously at specific channel frequency.



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4.1.7 TEST RESULTS

ABOVE 1GHz WORST-CASE DATA

802.11n (20MHz)

EUT TEST CONDITION		MEASUREMENT DETAIL	
CHANNEL	Channel 11	FREQUENCY RANGE	1GHz ~ 25GHz
INPUT POWER (SYSTEM)	120Vac, 60 Hz	DETECTOR FUNCTION	Peak (PK) Average (AV)
ENVIRONMENTAL CONDITIONS	25deg. C, 65%RH	TESTED BY	Anson Lin

ANTENNA POLARITY & TEST DISTANCE: HORIZONTAL AT 3 M										
FREQ. (MHz)	EMISSION LEVEL (dBuV/m)	READ LEVEL (dBuV)	LIMIT (dBuV/m)	MARGIN (dB)	ANTENNA FACTOR (dB/m)	CABLE LOSS (dB)	PREAMP FACTOR (dB)	ANTENNA HEIGHT (cm)	TABLE ANGLE (Degree)	REMARK
2374	34.11	41.23	54	-19.89	26.86	3.52	37.5	102	46	Average
2374	50.71	57.83	74	-23.29	26.86	3.52	37.5	102	46	Peak
2462	91.36	98.07			27.1	3.58	37.39	102	46	Average
2462	100.97	107.68			27.1	3.58	37.39	102	46	Peak
2494	43.56	49.99	54	-10.44	27.2	3.62	37.25	102	46	Average
2494	61.44	67.87	74	-12.56	27.2	3.62	37.25	102	46	Peak
ANTENNA POLARITY & TEST DISTANCE: VERTICAL AT 3 M										
FREQ. (MHz)	EMISSION LEVEL (dBuV/m)	READ LEVEL (dBuV)	LIMIT (dBuV/m)	MARGIN (dB)	ANTENNA FACTOR (dB/m)	CABLE LOSS (dB)	PREAMP FACTOR (dB)	ANTENNA HEIGHT (cm)	TABLE ANGLE (Degree)	REMARK
2380	34.84	41.96	54	-19.16	26.86	3.52	37.5	119	4	Average
2380	50.5	57.62	74	-23.5	26.86	3.52	37.5	119	4	Peak
2462	93.5	100.21			27.1	3.58	37.39	119	4	Average
2462	103.32	110.03			27.1	3.58	37.39	119	4	Peak
2484	45.08	51.65	54	-8.92	27.15	3.6	37.32	119	4	Average
2484	64.53	71.1	74	-9.47	27.15	3.6	37.32	119	4	Peak

REMARKS:

- 2462MHz: Fundamental frequency.
- Emission Level = Read Level + Antenna Factor + Cable Loss - Preamp Factor
Margin Value = Emission Level - Limit Value



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BELOW 1GHz WORST-CASE DATA

802.11n (20MHz)

EUT TEST CONDITION		MEASUREMENT DETAIL	
CHANNEL	Channel 11	FREQUENCY RANGE	30MHz ~ 1GHz
INPUT POWER (SYSTEM)	120Vac, 60 Hz	DETECTOR FUNCTION	Peak (PK) Quasi-Peak (QP)
ENVIRONMENTAL CONDITIONS	25deg. C, 65%RH	TESTED BY	Anson Lin

ANTENNA POLARITY & TEST DISTANCE: HORIZONTAL AT 3 M										
FREQ. (MHz)	EMISSION LEVEL (dBuV/m)	READ LEVEL (dBuV)	LIMIT (dBuV/m)	MARGIN (dB)	ANTENNA FACTOR (dB/m)	CABLE LOSS (dB)	PREAMP FACTOR (dB)	ANTENNA HEIGHT (cm)	TABLE ANGLE (Degree)	REMARK
37.56	23.74	40.89	40	-16.26	13.24	0.63	31.02	100	115	Peak
142.59	18.35	36.23	43.5	-25.15	12.44	1.31	31.63	100	317	Peak
211.71	19.53	39.63	43.5	-23.97	9.85	1.65	31.6	100	63	Peak
412.7	19.59	33.52	46	-26.41	15.6	2.48	32.01	100	194	Peak
643.7	25.03	33.73	46	-20.97	20.14	3.22	32.06	100	244	Peak
902.7	28.1	32.62	46	-17.9	23.53	3.97	32.02	100	203	Peak
ANTENNA POLARITY & TEST DISTANCE: VERTICAL AT 3 M										
FREQ. (MHz)	EMISSION LEVEL (dBuV/m)	READ LEVEL (dBuV)	LIMIT (dBuV/m)	MARGIN (dB)	ANTENNA FACTOR (dB/m)	CABLE LOSS (dB)	PREAMP FACTOR (dB)	ANTENNA HEIGHT (cm)	TABLE ANGLE (Degree)	REMARK
30	27.02	45.61	40	-12.98	11.98	0.57	31.14	100	221	QP
37.7	29.66	46.81	40	-10.34	13.24	0.63	31.02	100	127	QP
211.71	15.94	36.04	43.5	-27.56	9.85	1.65	31.6	100	261	Peak
425.3	19.84	33.5	46	-26.16	15.85	2.52	32.03	100	155	Peak
666.8	24.76	32.91	46	-21.24	20.41	3.3	31.86	100	196	Peak
925.8	28.54	32.85	46	-17.46	23.66	4.02	31.99	100	289	Peak

REMARKS:

- 1. Emission Level = Read Level + Antenna Factor + Cable Loss - Preamp Factor
Margin Value = Emission Level - Limit Value

5. TEST TYPES AND RESULTS (FOR 5.0GHz BAND)

5.1 RADIATED EMISSION AND BANDEDGE MEASUREMENT

5.1.1 LIMITS OF RADIATED EMISSION AND BANDEDGE MEASUREMENT

Radiated emissions which fall in the restricted bands must comply with the radiated emission limits specified as below table. Other emissions shall be at least 20dB below the highest level of the desired power:

FREQUENCIES (MHz)	FIELD STRENGTH (microvolts/meter)	MEASUREMENT DISTANCE (meters)
0.009 ~ 0.490	2400/F(kHz)	300
0.490 ~ 1.705	24000/F(kHz)	30
1.705 ~ 30.0	30	30
30 ~ 88	100	3
88 ~ 216	150	3
216 ~ 960	200	3
Above 960	500	3

NOTE:

1. The lower limit shall apply at the transition frequencies.
2. Emission level (dBuV/m) = 20 log Emission level (uV/m).
3. For frequencies above 1000MHz, the field strength limits are based on average detector, however, the peak field strength of any emission shall not exceed the maximum permitted average limits, specified above by more than 20dB under any condition of modulation.



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5.1.2 TEST INSTRUMENTS

Same as item 4.1.2.

5.1.3 TEST PROCEDURES

Same as item 4.1.3.

5.1.4 DEVIATION FROM TEST STANDARD

No deviation.

5.1.5 TEST SETUP

Same as item 4.1.5.

5.1.6 EUT OPERATING CONDITIONS

Same as 4.1.6.



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5.1.7 TEST RESULTS

ABOVE 1GHz WORST-CASE DATA

802.11n (40MHz)

EUT TEST CONDITION		MEASUREMENT DETAIL	
CHANNEL	Channel 159	FREQUENCY RANGE	1GHz ~ 40GHz
INPUT POWER (SYSTEM)	120Vac, 60 Hz	DETECTOR FUNCTION	Peak (PK) Average (AV)
ENVIRONMENTAL CONDITIONS	25deg. C, 65%RH	TESTED BY	Anson Lin

ANTENNA POLARITY & TEST DISTANCE: HORIZONTAL AT 3 M										
FREQ. (MHz)	EMISSION LEVEL (dBuV/m)	READ LEVEL (dBuV)	LIMIT (dBuV/m)	MARGIN (dB)	ANTENNA FACTOR (dB/m)	CABLE LOSS (dB)	PREAMP FACTOR (dB)	ANTENNA HEIGHT (cm)	TABLE ANGLE (Degree)	REMARK
3863.3	47.68	50.8	54	-6.32	29.38	4.53	37.03	115	292	Average
3863.3	51.12	54.24	74	-22.88	29.38	4.53	37.03	115	292	Peak
5725	43.29	43.17	75.23	-31.94	31.96	5.59	37.43	100	323	Average
5725	59.92	59.8	84.34	-24.42	31.96	5.59	37.43	100	323	Peak
5795	95.23	95.07			32.07	5.63	37.54	100	323	Average
5795	104.34	104.18			32.07	5.63	37.54	100	323	Peak
5850	43.68	43.38	75.23	-31.55	32.15	5.66	37.51	100	323	Average
5850	61.36	61.06	84.34	-22.98	32.15	5.66	37.51	100	323	Peak
ANTENNA POLARITY & TEST DISTANCE: VERTICAL AT 3 M										
FREQ. (MHz)	EMISSION LEVEL (dBuV/m)	READ LEVEL (dBuV)	LIMIT (dBuV/m)	MARGIN (dB)	ANTENNA FACTOR (dB/m)	CABLE LOSS (dB)	PREAMP FACTOR (dB)	ANTENNA HEIGHT (cm)	TABLE ANGLE (Degree)	REMARK
3863.3	48.34	51.46	54	-5.66	29.38	4.53	37.03	100	343	Average
3863.3	52.5	55.62	74	-21.5	29.38	4.53	37.03	100	343	Peak
5725	40.01	39.89	70.03	-30.02	31.96	5.59	37.43	100	355	Average
5725	59.64	59.52	79.1	-19.46	31.96	5.59	37.43	100	355	Peak
5795	90.03	89.87			32.07	5.63	37.54	100	355	Average
5795	99.1	98.94			32.07	5.63	37.54	100	355	Peak
5850	40.06	39.76	70.03	-29.97	32.15	5.66	37.51	100	355	Average
5850	60.5	60.2	79.1	-18.6	32.15	5.66	37.51	100	355	Peak

REMARKS:

- 5795MHz: Fundamental frequency.
- 5725MHz & 5850MHz: Out of restricted band
- Emission Level = Read Level + Antenna Factor + Cable Loss - Preamp Factor
Margin Value = Emission Level - Limit Value



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BELOW 1GHz WORST-CASE DATA

802.11n (40MHz)

EUT TEST CONDITION		MEASUREMENT DETAIL	
CHANNEL	Channel 159	FREQUENCY RANGE	30MHz ~ 1GHz
INPUT POWER (SYSTEM)	120Vac, 60 Hz	DETECTOR FUNCTION	Peak (PK) Quasi-Peak (QP)
ENVIRONMENTAL CONDITIONS	25deg. C, 65%RH	TESTED BY	Anson Lin

ANTENNA POLARITY & TEST DISTANCE: HORIZONTAL AT 3 M

FREQ. (MHz)	EMISSION LEVEL (dBuV/m)	READ LEVEL (dBuV)	LIMIT (dBuV/m)	MARGIN (dB)	ANTENNA FACTOR (dB/m)	CABLE LOSS (dB)	PREAMP FACTOR (dB)	ANTENNA HEIGHT (cm)	TABLE ANGLE (Degree)	REMARK
37.83	24.98	42.13	40	-15.02	13.24	0.63	31.02	100	244	Peak
197.67	24.87	45.54	43.5	-18.63	9.5	1.58	31.75	100	128	Peak
292.17	16.12	33.1	46	-29.88	12.71	2.01	31.7	100	206	Peak
349	17.94	33.44	46	-28.06	14.12	2.22	31.84	100	175	Peak
650	23.48	32.05	46	-22.52	20.21	3.24	32.02	100	288	Peak
944	28.23	32.31	46	-17.77	23.75	4.06	31.89	100	164	Peak

ANTENNA POLARITY & TEST DISTANCE: VERTICAL AT 3 M

FREQ. (MHz)	EMISSION LEVEL (dBuV/m)	READ LEVEL (dBuV)	LIMIT (dBuV/m)	MARGIN (dB)	ANTENNA FACTOR (dB/m)	CABLE LOSS (dB)	PREAMP FACTOR (dB)	ANTENNA HEIGHT (cm)	TABLE ANGLE (Degree)	REMARK
30.27	26.8	45.39	40	-13.2	11.98	0.57	31.14	100	132	QP
37.31	29.93	47.08	40	-10.07	13.24	0.63	31.02	100	265	QP
178.77	16.78	36.19	43.5	-26.72	10.92	1.49	31.82	100	129	Peak
397.3	18.36	32.77	46	-27.64	15.28	2.42	32.11	100	186	Peak
638.1	24.47	33.3	46	-21.53	20.07	3.2	32.1	100	263	Peak
918.1	27.52	31.91	46	-18.48	23.61	4.01	32.01	100	164	Peak

REMARKS:

- Emission Level = Read Level + Antenna Factor + Cable Loss - Preamp Factor
Margin Value = Emission Level - Limit Value



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6. PHOTOGRAPHS OF THE TEST CONFIGURATION

Please refer to the attached file (Test Setup Photo).

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



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8. 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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