

VARIANT FCC TEST REPORT (15.407)

REPORT NO.: RF130814C33B-4

MODEL NO.: NeverLost® 6 Tablet

FCC ID: 2AA4L-HTZNLTABLET

RECEIVED: Jun. 09, 2014

TESTED: Jun. 21, 2014 ~ Jun. 22, 2014

ISSUED: Jul. 01, 2014

APPLICANT: MiTAC International Corp.

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

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RELEASE CONTROL RECORD

ISSUE NO.	REASON FOR CHANGE	DATE ISSUED
RF130814C33B-4	Original release	Jul. 01, 2014

1. CERTIFICATION

PRODUCT: Automotive Navigation Device

MODEL: NeverLost® 6 Tablet

BRAND: Hertz

APPLICANT: MiTAC International Corp.

TESTED: Jun. 21, 2014 ~ Jun. 22, 2014

TEST SAMPLE: Production Unit

STANDARDS: FCC Part 15, Subpart E (Section 15.407)

ANSI C63.10-2009

This report is issued as a supplementary report to BV ADT report no.: RF130814C33-4. This report shall be used by combining with its original report.

PREPARED BY : Gina Liu **DATE** : Jul. 01, 2014
Gina Liu / Specialist

APPROVED BY : Sam chen **DATE** : Jul. 01, 2014
Sam Chen / Senior Project Engineer

2. SUMMARY OF TEST RESULTS

The EUT has been tested according to the following specifications:

APPLIED STANDARD: FCC PART 15, SUBPART E (SECTION 15.407)			
STANDARD SECTION	TEST TYPE	RESULT	REMARK
15.407(b)(6)	AC Power Conducted Emission	NA	Refer to Note
15.407(b/1/2/3) (b)(6)	Radiated Emissions	PASS	Meet the requirement of limit. Minimum passing margin is -1.56dB at 5150MHz.
15.407(a/1/2)	Max Average Transmit Power	NA	Refer to Note
15.407(a)(6)	Peak Power Excursion	NA	Refer to Note
15.407(a/1/2)	Peak Power Spectral Density	NA	Refer to Note
15.407(g)	Frequency Stability	NA	Refer to Note
15.203	Antenna Requirement	NA	Refer to Note

NOTE:

- Only radiated emissions test 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
Conducted emissions	9kHz~30MHz	2.44 dB
Radiated emissions	30MHz ~ 200MHz	3.34 dB
	200MHz ~ 1000MHz	3.35 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 $k = 2$.

3. GENERAL INFORMATION

3.1 GENERAL DESCRIPTION OF EUT

EUT	Automotive Navigation Device
MODEL NO.	NeverLost® 6 Tablet
POWER SUPPLY	3.7Vdc (battery)
MODULATION TYPE	64QAM, 16QAM, QPSK, BPSK
MODULATION TECHNOLOGY	OFDM
TRANSFER RATE	802.11a: 54.0/ 48.0/ 36.0/ 24.0/ 18.0/ 12.0/ 9.0/ 6.0Mbps 802.11n: up to 300.0Mbps
OPERATING FREQUENCY	5180 ~ 5240MHz, 5260 ~ 5320MHz & 5500 ~ 5700MHz
NUMBER OF CHANNEL	5180 ~ 5240MHz: 4 for 802.11a, 802.11n (20MHz) 2 for 802.11n (40MHz) 5260 ~ 5320MHz: 4 for 802.11a, 802.11n (20MHz) 2 for 802.11n (40MHz) 5500 ~ 5700MHz: 8 for 802.11a, 802.11n (20MHz) 3 for 802.11n (40MHz)
ANTENNA TYPE	PIFA antenna with 3.3dBi gain (5180 ~ 5240MHz) PIFA antenna with 3.2dBi gain (5260 ~ 5320MHz) PIFA antenna with 3.9dBi gain (5500 ~ 5700MHz)
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

NOTE:

1. This report is issued as a supplementary report to BV ADT report no.: RF130814C33-4. The difference compared with original report is update Main board. Therefore, only radiated emissions test was performed and presented in the test report.
2. The EUT incorporates a MIMO function. Physically, the EUT provides 2 completed transmitters and 2 receivers.

MODULATION MODE	TX FUNCTION
802.11b	1TX
802.11g	1TX
802.11a	1TX
802.11n (20MHz)	2TX
802.11n (40MHz)	2TX

3. The EUT contains following accessory devices.

ITEM	BRAND	MODEL	DESCRIPTION
Battery	Tian Yu	N425	Rating: 3.7Vdc, 920mAh
WWAN Module	CINTERION	PHS8-P	--
WLAN Module	nFore	NF3301	--
NFC Module	Jogtek	TM-007A	--
BT Module	nFore	NF3301	--

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

3.2 DESCRIPTION OF TEST MODES

FOR 5180 ~ 5240MHz

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

CHANNEL	FREQUENCY	CHANNEL	FREQUENCY
36	5180 MHz	44	5220 MHz
40	5200 MHz	48	5240 MHz

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

CHANNEL	FREQUENCY	CHANNEL	FREQUENCY
38	5190 MHz	46	5230 MHz

FOR 5260 ~ 5320MHz

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

CHANNEL	FREQUENCY	CHANNEL	FREQUENCY
52	5260 MHz	60	5300 MHz
56	5280 MHz	64	5320 MHz

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

CHANNEL	FREQUENCY	CHANNEL	FREQUENCY
54	5270 MHz	62	5310 MHz

FOR 5500 ~ 5700MHz

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

CHANNEL	FREQUENCY	CHANNEL	FREQUENCY
100	5500 MHz	116	5580 MHz
104	5520 MHz	132	5660 MHz
108	5540 MHz	136	5680 MHz
112	5560 MHz	140	5700 MHz

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

CHANNEL	FREQUENCY	CHANNEL	FREQUENCY
102	5510 MHz	134	5670 MHz
110	5550 MHz		

3.2.1 TEST MODE APPLICABILITY AND TESTED CHANNEL DETAIL

EUT CONFIGURE MODE	APPLICABLE TO		DESCRIPTION
	RE $\geq$ 1G	RE<1G	
A	√	-	Chain 0 only
B	√	√	Chain 0 + Chain 1

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

NOTE:

The antenna of 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	FREQ. BAND (MHz)	AVAILABLE CHANNEL	TESTED CHANNEL	MODULATION TECHNOLOGY	MODULATION TYPE	DATA RATE (Mbps)
A	802.11a	5180-5240	36 to 48	36	OFDM	BPSK	6.0
B	802.11n (40MHz)		38 to 46	38	OFDM	BPSK	15.0
A	802.11a	5260-5320	52 to 64	64	OFDM	BPSK	6.0
B	802.11n (20MHz)		52 to 64	64	OFDM	BPSK	7.2
A	802.11a	5500-5700	100 to 140	100	OFDM	BPSK	6.0
B	802.11n (40MHz)		102 to 134	102	OFDM	BPSK	15.0

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	FREQ. BAND (MHz)	AVAILABLE CHANNEL	TESTED CHANNEL	MODULATION TECHNOLOGY	MODULATION TYPE	DATA RATE (Mbps)
B	802.11n (40MHz)	5180-5240	38 to 46	38	OFDM	BPSK	15.0
	802.11n (20MHz)	5260-5320	52 to 64	64	OFDM	BPSK	7.2
	802.11n (40MHz)	5500-5700	102 to 134	102	OFDM	BPSK	15.0

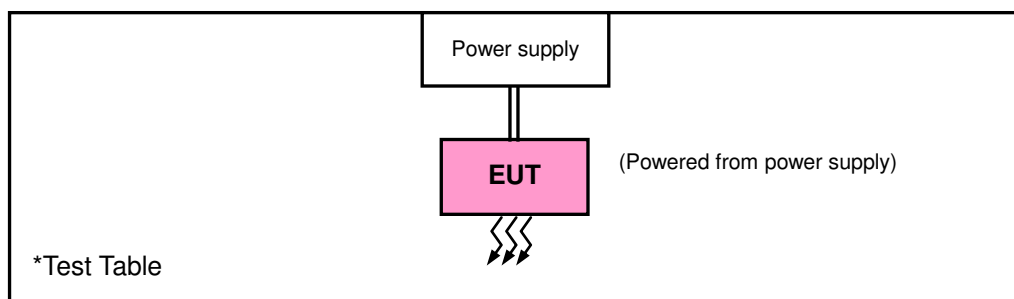
TEST CONDITION:

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

3.3 DESCRIPTION OF SUPPORT UNITS

The EUT has been tested as an independent unit together with other necessary accessories or support units.

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 E (15.407)

789033 D01 General UNII Test Procedures v01 r03

662911 D01 Multiple Transmitter Output v02

ANSI C63.10-2009

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 (DoC). The test report has been issued separately.

4. TEST TYPES AND RESULTS

4.1 RADIATED EMISSION AND BANDEDGE MEASUREMENT

4.1.1 LIMITS OF RADIATED EMISSION AND BANDEDGE MEASUREMENT

Radiated emissions which fall in the restricted bands must comply with the radiated emission limits specified as below table:

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 LIMITS OF UNWANTED EMISSION OUT OF THE RESTRICTED BANDS

APPLICABLE TO	LIMIT	
	FIELD STRENGTH AT 3m (dBμV/m)	
	PK	AV
	74	54
√	EIRP LIMIT (dBm)	EQUIVALENT FIELD STRENGTH AT 3m (dBμV/m)
	PK	PK
	-27	68.3

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

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

4.1.3 TEST INSTRUMENTS

DESCRIPTION & MANUFACTURER	MODEL NO.	SERIAL NO.	DATE OF CALIBRATION	DUE DATE OF CALIBRATION
Test Receiver ROHDE & SCHWARZ	ESCI	100424	Sep. 09, 2013	Sep. 08, 2014
Spectrum Analyzer ROHDE & SCHWARZ	FSU 43	100115	Dec. 18, 2013	Dec. 17, 2014
BILOG Antenna SCHWARZBECK	VULB9168	9168-155	Feb. 26, 2014	Feb. 25, 2015
HORN Antenna SCHWARZBECK	BBHA 9120D	9120D-404	Jan. 05, 2014	Jan. 04, 2015
HORN Antenna SCHWARZBECK	BBHA 9170	148	Jul. 15, 2013	Jul. 14, 2014
Loop Antenna	HFH2-Z2	100070	Mar. 06, 2014	Mar. 05, 2016
Preamplifier EMCI	EMC 012645	980115	Dec. 26, 2013	Dec. 25, 2014
Preamplifier EMCI	EMC 184045	980116	Jan. 13, 2014	Jan. 12, 2015
Preamplifier EMCI	EMC 330H	980112	Dec. 27, 2013	Dec. 26, 2014
RF signal cable HUBER+SUHNNER	SUCOFLEX 104	309219/4 2950114	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	Nov. 07, 2013	Nov. 06, 2014
Software BV ADT	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
Power Meter	ML2495A	1012010	Jul. 31, 2013	Jul. 30, 2014
Power Sensor	MA2411B	1315050	Jul. 31, 2013	Jul. 30, 2014

- 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.

4.1.4 TEST PROCEDURES

- a. The EUT was placed on the top of a rotating table 0.8 meters above the ground at a 3 meter 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. 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 10dB 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 10dB margin would be re-tested one by one using peak, quasi-peak or average method as specified and then reported in a data sheet.

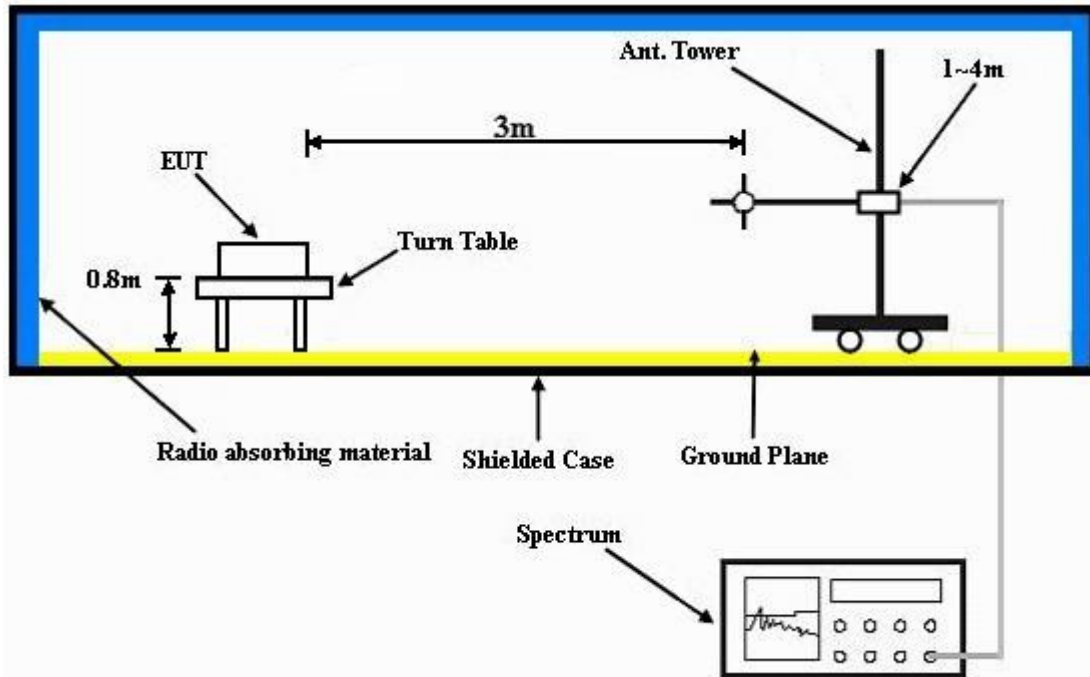
NOTE:

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 1kHz(Duty cycle < 98%) or 10Hz(Duty cycle > 98%) for Average detection (AV) at frequency above 1GHz.
4. All modes of operation were investigated and the worst-case emissions are reported.

4.1.5 DEVIATION FROM TEST STANDARD

No deviation.

4.1.6 TEST SETUP



For the actual test configuration, please refer to the attached file (Test Setup Photo).

4.1.7 EUT OPERATING CONDITION

- Plugged the EUT into a notebook through a convertible board and placed on a test table.
- The notebook ran a test program (provided by manufacturer) to enable EUT under transmission condition continuously at specific channel frequency.

4.1.8 TEST RESULTS

ABOVE 1GHz DATA :

MODE A

802.11a

EUT TEST CONDITION		MEASUREMENT DETAIL	
CHANNEL	Channel 36	FREQUENCY RANGE	1GHz ~ 40GHz
INPUT POWER (SYSTEM)	120Vac, 60 Hz	DETECTOR FUNCTION	Peak (PK) Average (AV)
ENVIRONMENTAL CONDITIONS	25deg. C, 65%RH	TESTED BY	Peter Weng

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
5150	49.62	50.33	54	-4.38	31.32	5.29	37.32	133	252	Average
5150	67.22	67.93	74	-6.78	31.32	5.29	37.32	133	252	Peak
5180	95.87	96.55			31.35	5.31	37.34	133	252	Average
5180	105.12	105.8			31.35	5.31	37.34	133	252	Peak
5350	39.38	39.69	54	-14.62	31.48	5.39	37.18	133	252	Average
5350	58.12	58.43	74	-15.88	31.48	5.39	37.18	133	252	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
5150	51.93	52.64	54	-2.07	31.32	5.29	37.32	100	208	Average
5150	69.52	70.23	74	-4.48	31.32	5.29	37.32	100	208	Peak
5180	98.62	99.3			31.35	5.31	37.34	100	208	Average
5180	108.47	109.15			31.35	5.31	37.34	100	208	Peak
5350	39.08	39.39	54	-14.92	31.48	5.39	37.18	100	208	Average
5350	56.72	57.03	74	-17.28	31.48	5.39	37.18	100	208	Peak

REMARKS:

- Emission Level = Read Level + Antenna Factor + Cable Loss - Preamp Factor
Margin Value = Emission Level - Limit Value
- 5180MHz: Fundamental frequency.

EUT TEST CONDITION		MEASUREMENT DETAIL	
CHANNEL	Channel 64	FREQUENCY RANGE	1GHz ~ 40GHz
INPUT POWER (SYSTEM)	120Vac, 60 Hz	DETECTOR FUNCTION	Peak (PK) Average (AV)
ENVIRONMENTAL CONDITIONS	25deg. C, 65%RH	TESTED BY	Peter Weng

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
5150	37.36	38.07	54	-16.64	31.32	5.29	37.32	100	28	Average
5150	57.29	58	74	-16.71	31.32	5.29	37.32	100	28	Peak
5320	95.68	96.04			31.45	5.38	37.19	100	28	Average
5320	104.64	105			31.45	5.38	37.19	100	28	Peak
5350	40.41	40.72	54	-13.59	31.48	5.39	37.18	100	28	Average
5350	61.42	61.73	74	-12.58	31.48	5.39	37.18	100	28	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
5150	37.5	38.21	54	-16.5	31.32	5.29	37.32	113	68	Average
5150	56.88	57.59	74	-17.12	31.32	5.29	37.32	113	68	Peak
5320	94.04	94.4			31.45	5.38	37.19	113	68	Average
5320	103.24	103.6			31.45	5.38	37.19	113	68	Peak
5350	45.82	46.13	54	-8.18	31.48	5.39	37.18	113	68	Average
5350	58.7	59.01	74	-15.3	31.48	5.39	37.18	113	68	Peak

REMARKS:

- Emission Level = Read Level + Antenna Factor + Cable Loss - Preamp Factor
Margin Value = Emission Level - Limit Value
- 5320MHz: Fundamental frequency.

EUT TEST CONDITION		MEASUREMENT DETAIL	
CHANNEL	Channel 100	FREQUENCY RANGE	1GHz ~ 40GHz
INPUT POWER (SYSTEM)	120Vac, 60 Hz	DETECTOR FUNCTION	Peak (PK) Average (AV)
ENVIRONMENTAL CONDITIONS	25deg. C, 65%RH	TESTED BY	Peter Weng

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
5460	39.01	39.09	54	-14.99	31.56	5.44	37.08	100	177	Average
5460	58.53	58.61	74	-15.47	31.56	5.44	37.08	100	177	Peak
5470	59.23	59.29	68.3	-9.07	-9.07	5.45	37.08	100	177	Peak
5500	91.59	91.56			31.6	5.46	37.03	100	177	Average
5500	100.93	100.9			31.6	5.46	37.03	100	177	Peak
5725	60.13	60.01	68.3	-8.17	-8.17	5.59	37.43	100	177	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
5460	46.17	46.25	54	-7.83	31.56	5.44	37.08	100	234	Average
5460	62.23	62.31	74	-11.77	-11.77	5.44	37.08	100	234	Peak
5470	61.57	61.63	68.3	-6.73	31.57	5.45	37.08	100	234	Peak
5500	96.53	96.5			31.6	5.46	37.03	100	234	Average
5500	105.56	105.53			31.6	5.46	37.03	100	234	Peak
5725	58.03	57.91	68.3	-10.27	-10.27	5.59	37.43	100	234	Peak

REMARKS:

- Emission Level = Read Level + Antenna Factor + Cable Loss - Preamp Factor
Margin Value = Emission Level - Limit Value
- 5500MHz: Fundamental frequency.



A D T

MODE B

802.11n (40MHz)

EUT TEST CONDITION		MEASUREMENT DETAIL	
CHANNEL	Channel 38	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
5146	49.87	50.58	54	-4.13	31.32	5.29	37.32	100	118	Average
5146	66.55	67.26	74	-7.45	31.32	5.29	37.32	100	118	Peak
5190	89.81	90.48			31.35	5.32	37.34	100	118	Average
5190	100.8	101.47			31.35	5.32	37.34	100	118	Peak
5456	38.27	38.35	54	-15.73	31.56	5.44	37.08	100	118	Average
5456	59.94	60.02	74	-14.06	31.56	5.44	37.08	100	118	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
5150	52.44	53.15	54	-1.56	31.32	5.29	37.32	100	207	Average
5150	69.99	70.7	74	-4.01	31.32	5.29	37.32	100	207	Peak
5190	95.21	95.88			31.35	5.32	37.34	100	207	Average
5190	104.54	105.21			31.35	5.32	37.34	100	207	Peak
5442	38.25	38.39	54	-15.75	31.55	5.44	37.13	100	207	Average
5442	59.44	59.58	74	-14.56	31.55	5.44	37.13	100	207	Peak

REMARKS:

- Emission Level = Read Level + Antenna Factor + Cable Loss - Preamp Factor
Margin Value = Emission Level - Limit Value
- 5190MHz: Fundamental frequency.

802.11n (20MHz)

EUT TEST CONDITION		MEASUREMENT DETAIL	
CHANNEL	Channel 64	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
5076	38.47	39.21	54	-15.53	31.27	5.26	37.27	103	204	Average
5076	59.73	60.47	74	-14.27	31.27	5.26	37.27	103	204	Peak
5320	97.36	97.72			31.45	5.38	37.19	103	204	Average
5320	107.06	107.42			31.45	5.38	37.19	103	204	Peak
5350	50.9	51.21	54	-3.1	31.48	5.39	37.18	103	204	Average
5350	70.15	70.46	74	-3.85	31.48	5.39	37.18	103	204	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
5024	37.69	38.46	54	-16.31	31.23	5.24	37.24	121	22	Average
5024	60.12	60.89	74	-13.88	31.23	5.24	37.24	121	22	Peak
5320	94.64	95			31.45	5.38	37.19	121	22	Average
5320	104.43	104.79			31.45	5.38	37.19	121	22	Peak
5350	45.4	45.71	54	-8.6	31.48	5.39	37.18	121	22	Average
5350	61.35	61.66	74	-12.65	31.48	5.39	37.18	121	22	Peak

REMARKS:

- Emission Level = Read Level + Antenna Factor + Cable Loss - Preamp Factor
Margin Value = Emission Level - Limit Value
- 5320MHz: Fundamental frequency.

802.11n (40MHz)

EUT TEST CONDITION		MEASUREMENT DETAIL	
CHANNEL	Channel 102	FREQUENCY RANGE	1GHz ~ 40GHz
INPUT POWER (SYSTEM)	120Vac, 60 Hz	DETECTOR FUNCTION	Peak (PK) Average (AV)
ENVIRONMENTAL CONDITIONS	25deg. C, 65%RH	TESTED BY	Peter Weng

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
5460	50.26	50.34	54	-3.74	31.56	5.44	37.08	119	130	Average
5460	65.38	65.46	74	-8.62	31.56	5.44	37.08	119	130	Peak
5470	66.47	66.53	68.3	-1.83	31.57	5.45	37.08	119	130	Peak
5510	91.01	91.01			31.6	5.46	37.06	119	130	Average
5510	101.19	101.19			31.6	5.46	37.06	119	130	Peak
5725	60.12	60	68.3	-8.18	31.96	5.59	37.43	119	130	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
5460	50.52	50.6	54	-3.48	31.56	5.44	37.08	124	234	Average
5460	65.24	65.32	74	-8.76	31.56	5.44	37.08	124	234	Peak
5470	66.23	66.29	68.3	-2.07	31.57	5.45	37.08	124	234	Peak
5510	93.76	93.76			31.6	5.46	37.06	124	234	Average
5510	103.81	103.81			31.6	5.46	37.06	124	234	Peak
5725	57.72	57.6	68.3	-10.58	31.96	5.59	37.43	124	234	Peak

REMARKS:

- Emission Level = Read Level + Antenna Factor + Cable Loss - Preamp Factor
Margin Value = Emission Level - Limit Value
- 5190MHz: Fundamental frequency.
- 5470MHz & 5725MHz: Out of restricted band

BELOW 1GHz WORST-CASE DATA :

MODE B

802.11n (40MHz)

EUT TEST CONDITION		MEASUREMENT DETAIL	
CHANNEL	Channel 38	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	Peter Weng

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
43.5	17.08	33.89	40	-22.92	13.59	0.71	31.11	117	196	Peak
143.13	18.85	36.7	43.5	-24.65	12.47	1.31	31.63	100	65	Peak
264.09	27.27	45.43	46	-18.73	11.88	1.88	31.92	105	18	Peak
330.1	30.09	46.08	46	-15.91	13.66	2.16	31.81	137	318	Peak
559	22.45	32.87	46	-23.55	18.66	2.97	32.05	100	109	Peak
744.5	26.36	32.74	46	-19.64	21.45	3.56	31.39	100	312	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
30.81	27.94	46.35	40	-12.06	12.14	0.57	31.12	100	331	Peak
153.93	18.59	36.23	43.5	-24.91	12.72	1.36	31.72	100	287	Peak
241.95	22.87	41.74	46	-23.13	11.15	1.8	31.82	104	256	Peak
330.1	22.13	38.12	46	-23.87	13.66	2.16	31.81	102	86	Peak
461.7	29.41	42.17	46	-16.59	16.56	2.65	31.97	111	10	Peak
659.8	26.88	35.22	46	-19.12	20.33	3.28	31.95	118	189	Peak

REMARKS:

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

802.11n (20MHz)

EUT TEST CONDITION		MEASUREMENT DETAIL	
CHANNEL	Channel 64	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	Peter Weng

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
44.85	17.72	34.53	40	-22.28	13.6	0.73	31.14	105	304	Peak
143.13	21.39	39.24	43.5	-22.11	12.47	1.31	31.63	114	12	Peak
264.09	26.02	44.18	46	-19.98	11.88	1.88	31.92	100	337	Peak
330.1	30.63	46.62	46	-15.37	13.66	2.16	31.81	100	170	Peak
572.3	23.92	34.03	46	-22.08	18.97	3.01	32.09	104	149	Peak
722.1	26.45	33.46	46	-19.55	21.13	3.5	31.64	100	346	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
30.81	27.97	46.38	40	-12.03	12.14	0.57	31.12	100	197	Peak
153.93	17.97	35.61	43.5	-25.53	12.72	1.36	31.72	122	174	Peak
241.95	23.07	41.94	46	-22.93	11.15	1.8	31.82	100	77	Peak
461.7	28.99	41.75	46	-17.01	16.56	2.65	31.97	106	89	Peak
549.9	28.07	38.61	46	-17.93	18.46	2.95	31.95	100	41	Peak
783.7	27.9	33.67	46	-18.1	22	3.65	31.42	137	110	Peak

REMARKS:

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

802.11n (40MHz)

EUT TEST CONDITION		MEASUREMENT DETAIL	
CHANNEL	Channel 102	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	Peter Weng

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	17.06	34.21	40	-22.94	13.24	0.63	31.02	113	139	Peak
165	19.29	37.43	43.5	-24.21	12.25	1.42	31.81	124	239	Peak
264.09	26	44.16	46	-20	11.88	1.88	31.92	100	113	Peak
330.1	31.3	47.29	46	-14.7	13.66	2.16	31.81	129	158	Peak
505.8	22.73	34.07	46	-23.27	17.46	2.8	31.6	100	284	Peak
671.7	25.17	33.18	46	-20.83	20.48	3.33	31.82	166	300	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
30.81	27.84	46.25	40	-12.16	12.14	0.57	31.12	100	121	Peak
153.93	18.61	36.25	43.5	-24.89	12.72	1.36	31.72	100	331	Peak
241.95	23.95	42.82	46	-22.05	11.15	1.8	31.82	101	144	Peak
374.2	22.14	37.02	46	-23.86	14.73	2.32	31.93	111	232	Peak
461.7	29.56	42.32	46	-16.44	16.56	2.65	31.97	113	133	Peak
572.3	27	37.11	46	-19	18.97	3.01	32.09	110	106	Peak

REMARKS:

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

5. PHOTOGRAPHS OF THE TEST CONFIGURATION

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

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.

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.

7. APPENDIX A – MODIFICATIONS RECORDERS FOR ENGINEERING CHANGES TO THE EUT BY THE LAB

No modifications were made to the EUT by the lab during the test.

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