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FCC TEST REPORT (WLAN 15.247)

REPORT NO.: RF110830D08C

MODEL NO.: INWL01c

FCC ID: EHA-INWL01C

RECEIVED: Sep. 12, 2013

TESTED: Sep. 23, 2013

ISSUED: Nov. 19, 2013

APPLICANT: Intermec Technologies Corporation

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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
RF110830D08C	Original release	Nov. 19, 2013



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1. CERTIFICATION

PRODUCT: WLAN/BT board
BRAND NAME: Intermec
MODEL NO.: INWL01c
APPLICANT: Intermec Technologies Corporation
TESTED: Sep. 23, 2013
TEST SAMPLE: ENGINEERING SAMPLE
STANDARDS: **FCC Part 15, Subpart C (Section 15.247)**
ANSI C63.10-2009

The above equipment 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 : Celia Chen , **DATE:** Nov. 19, 2013
(Celia Chen / Senior Specialist)

APPROVED BY : Rex Lai , **DATE:** Nov. 19, 2013
(Rex Lai / Assistant Manager)

2. SUMMARY OF TEST RESULTS

The EUT has been tested according to the following specifications:

APPLIED STANDARD: FCC PART 15, SUBPART C (SECTION 15.247)			
STANDARD SECTION	TEST TYPE	RESULT	REMARK
15.207	AC Power Conducted Emission	NA	Refer to NOTE below
15.247(d) 15.209	Radiated Emissions	PASS	Meet the requirement of limit. Minimum passing margin is -7.0dB at 665.59MHz.
15.247(d)	Band Edge Measurement	NA	Refer to NOTE below
15.247(a)(2)	6dB bandwidth	NA	Refer to NOTE below
15.247(b)	Conducted power	NA	Refer to NOTE below
15.247(e)	Power Spectral Density	NA	Refer to NOTE below
15.203	Antenna Requirement	PASS	Antenna connector is SMA (MALE-RP) not a standard connector.

NOTE: Test item for Radiated Emission Test was performed for this addendum. Other testing data refer to original report.

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	Frequency	Uncertainty
Radiated emissions	30MHz ~ 1GHz	4.30 dB
	Above 1GHz	3.36 dB



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3. GENERAL INFORMATION

3.1 GENERAL DESCRIPTION OF EUT

EUT	WLAN/BT board
MODEL NO.	INWL01c
POWER SUPPLY	5Vdc
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: up to 72.2Mbps
OPERATING FREQUENCY	2412.0 ~ 2462.0MHz
NUMBER OF CHANNEL	11
OUTPUT POWER	251.2mW
ANTENNA TYPE	Refer to note below
ANTENNA CONNECTOR	Refer to note below
DATA CABLE	Refer to User's manual
I/O PORTS	Refer to User's manual
ACCESSORY DEVICES	NA

NOTE:

1. This report is a supplementary report of the original one (BV CPS report no.: RF110830D08) issued on Oct. 7, 2011 to verify test result for the new antenna source (additional as shaded area):

Brand name	Model name	Type	Connector	Gain (dBi)	Remark
Amphenol	Kilimanjro	Dipole	IPEX U.FL	2	Original
KINSUN INDUSTRIES INC.	6603A03081	Dipole	SMA (MALE-RP)	2.32	Additional

2. The changes are meeting the antenna changes of the permissive changes rules; therefore this report is prepared for FCC class II permissive change.
3. The EUT is a WLAN/BT board, the WLAN & Bluetooth function can't transmit simultaneously.

4. The EUT incorporates a SISO function. Physically, the EUT provides one completed transmitter and one receiver.

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

5. 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

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		

3.2.1 TEST MODE APPLICABILITY AND TESTED CHANNEL DETAIL

EUT CONFIGURE MODE	APPLICABLE TO				DESCRIPTION
	RE ³ 1G	RE<1G	PLC	APCM	
-	√	√	Note	Note	-

Where **RE³1G**: Radiated Emission above 1GHz

RE<1G: Radiated Emission below 1GHz

PLC: Power Line Conducted Emission

APCM: Antenna Port Conducted Measurement

NOTE: No need to re-test the test item due to the change should not influence test result.

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, XYZ axis 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)	AXIS
802.11b	1 to 11	1, 6, 11	DSSS	DBPSK	1.0	Z
802.11g	1 to 11	1, 6, 11	OFDM	BPSK	6.0	Z
802.11n (20MHz)	1 to 11	1, 6, 11	OFDM	BPSK	6.5	Z

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, XYZ axis 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)	AXIS
802.11g	1 to 11	11	OFDM	BPSK	6.0	Z

TEST CONDITION:

APPLICABLE TO	ENVIRONMENTAL CONDITIONS	INPUT POWER (SYSTEM)	TESTED BY
RE ³ 1G	25deg. C, 75% RH	120Vac, 60Hz	Joey Liu
RE <1G	25deg. C, 75% RH	120Vac, 60Hz	Joey Liu

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.

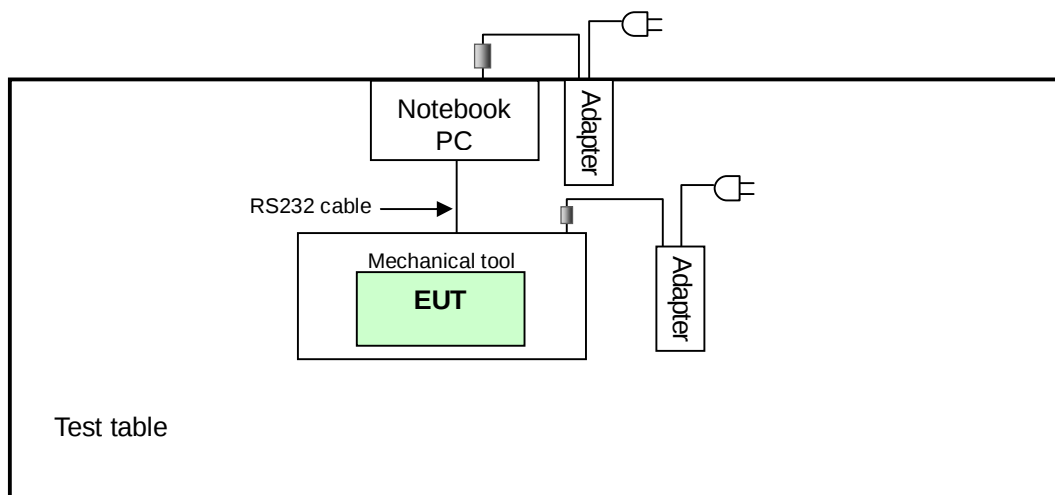
NO.	PRODUCT	BRAND	MODEL NO.	SERIAL NO.	FCC ID
1	NOTEBOOK COMPUTER	DELL	510m	1KZ1G1S	FCC DoC Approved
2	Mechanical tool	N/A	N/A	N/A	N/A
3	Mechanical tool's Adapter	FSP	FSP070-RAA	N/A	Verification

NO.	SIGNAL CABLE DESCRIPTION OF THE ABOVE SUPPORT UNITS
1	N/A
2	One RS232 cable (1.8m)
3	Non-shielded DC cable (1.8m)

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

(2) The support units 2 & 3 were provided by client.

3.3.1 CONFIGURATION OF SYSTEM UNDER TEST





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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)

558074 D01 DTS Meas Guidance v03r01

ANSI C63.10-2009

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

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. 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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4.1.2 TEST INSTRUMENTS

DESCRIPTION & MANUFACTURER	MODEL NO.	SERIAL NO.	CALIBRATED DATE	CALIBRATED UNTIL
HP Preamplifier	8447D	2432A03504	Feb. 26, 2013	Feb. 25, 2014
HP Preamplifier	8449B	3008A01201	Feb. 26, 2013	Feb. 25, 2014
Agilent TEST RECEIVER	N9038A	MY51210129	Jan. 03, 2013	Jan. 02, 2014
Schwarzbeck Antenna	VULB 9168	137	Mar. 20, 2013	Mar. 19, 2014
Schwarzbeck Antenna	VHBA 9123	480	May 29, 2013	May 28, 2014
ADT. Turn Table	TT100	0306	NA	NA
ADT. Tower	AT100	0306	NA	NA
Software	ADT_Radiated_V 7.6.15.9.2	NA	NA	NA
SUHNER RF cable	SF102	CABLE-CH6	Aug. 16, 2013	Aug. 15, 2014
Schwarzbeck Horn Antenna	BBHA 9120-D1	D130	May 13, 2013	May 12, 2014
Highpass filter Wainwright Instruments	WHK 3.1/18G-10SS	SN 8	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 and HP preamplifier (model: 8449B) are used only for the measurement of emission frequency above 1GHz if tested.
3. The test was performed in Chamber No. 6.
4. The Industry Canada Reference No. IC 7450E-6.
5. The FCC Site Registration No. is 447212.

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. 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 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:

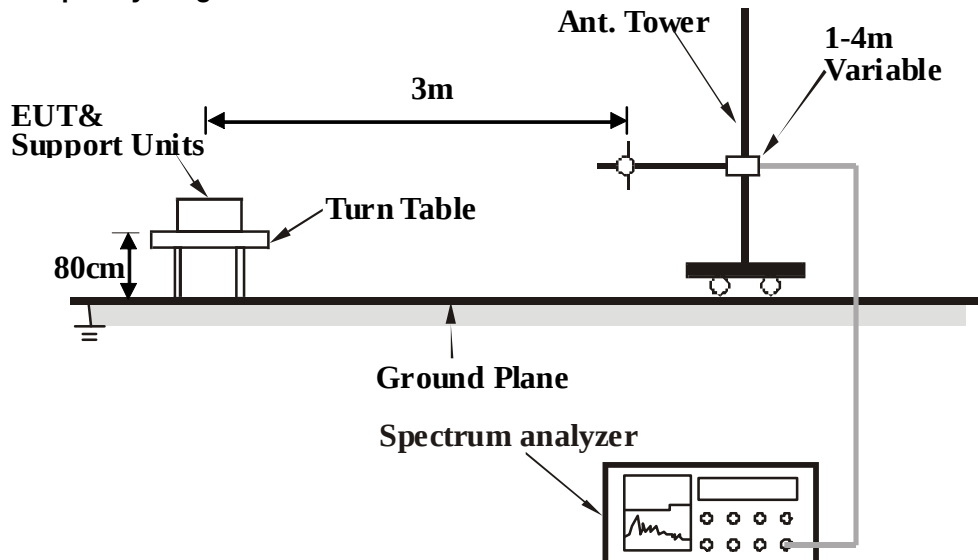
1. The resolution bandwidth and video bandwidth of test receiver/spectrum analyzer is 120kHz for Quasi-peak detection at frequency below 1GHz.
2. The resolution bandwidth of test receiver/spectrum analyzer is 1MHz and video bandwidth is 3MHz for Peak detection at frequency above 1GHz.
3. The resolution bandwidth of test receiver/spectrum analyzer is 1MHz and the video bandwidth is $\geq 1/T$ (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.

4.1.4 DEVIATION FROM TEST STANDARD

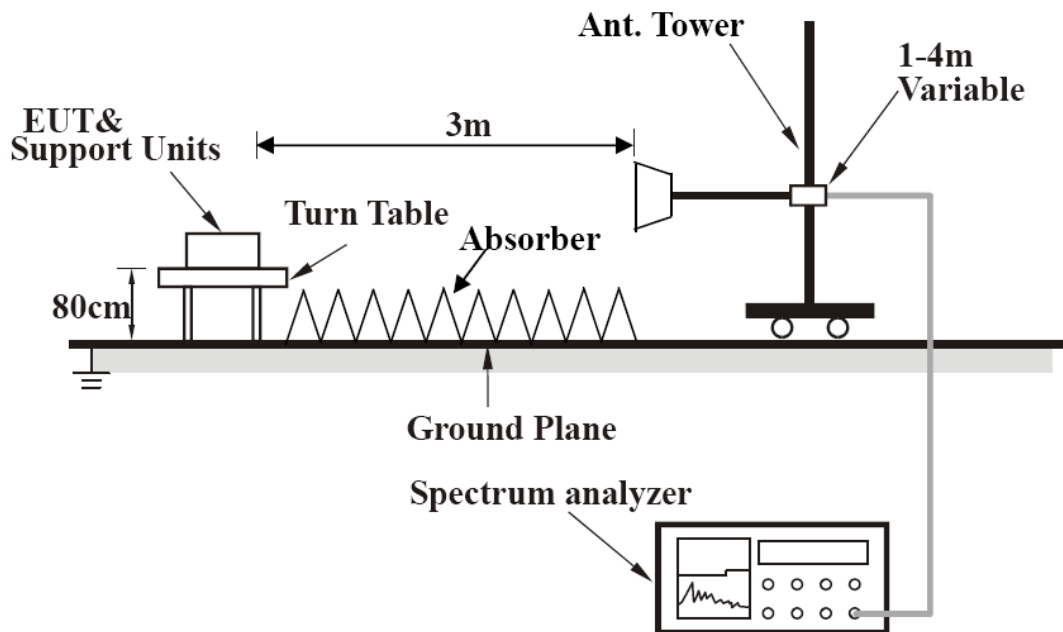
No deviation.

4.1.5 TEST SETUP

Frequency range 30MHz~1GHz



Frequency range above 1GHz



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



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4.1.6 EUT OPERATING CONDITIONS

- a. Turn on the power of all equipment.
- b. Connected the EUT with Notebook PC via Mechanical tool placed on testing table.
- c. Notebook PC ran a test program (provided by manufacture) to enable EUT under transmitting condition at specific channel continuously.

4.1.7 TEST RESULTS

BELOW 1GHz WORST-CASE DATA

802.11g

CHANNEL	TX Channel 11	DETECTOR FUNCTION	Quasi-Peak (QP)
FREQUENCY RANGE	30MHz ~ 1GHz		

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	133.11	29.5 QP	43.5	-14.0	1.43 H	79	43.80	-14.31
2	199.74	34.9 QP	43.5	-8.6	1.58 H	263	50.85	-15.93
3	397.39	33.8 QP	46.0	-12.2	1.07 H	354	43.41	-9.60
4	589.69	35.7 QP	46.0	-10.3	1.88 H	201	41.24	-5.50
5	665.59	39.0 QP	46.0	-7.0	1.63 H	242	43.27	-4.27
6	997.14	38.2 QP	54.0	-15.8	1.24 H	84	37.53	0.69
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	79.71	31.7 QP	40.0	-8.3	1.12 V	227	49.37	-17.67
2	200.14	34.6 QP	43.5	-8.9	1.37 V	2	50.53	-15.95
3	589.84	34.2 QP	46.0	-11.8	1.46 V	237	39.71	-5.49
4	665.63	38.7 QP	46.0	-7.3	1.18 V	1	42.93	-4.27
5	830.26	36.8 QP	46.0	-9.2	1.33 V	40	38.32	-1.50
6	993.18	37.3 QP	54.0	-16.7	1.23 V	64	36.70	0.64

REMARKS:

1. Emission Level(dBuV/m) = Raw Value(dBuV) + Correction Factor(dB/m)
2. Correction Factor(dB/m) = Antenna Factor(dB/m) + Cable Factor(dB) – Pre-Amplifier Factor(dB)
3. The other emission levels were very low against the limit.
4. Margin value = Emission Level – Limit value



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ABOVE 1GHz DATA

802.11b

CHANNEL	TX Channel 1	DETECTOR FUNCTION	Peak (PK)
FREQUENCY RANGE	1GHz ~ 25GHz		Average (AV)

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	2390.00	42.9 PK	74.0	-31.1	1.00 H	352	46.68	-3.75
2	2390.00	31.7 AV	54.0	-22.3	1.00 H	352	35.45	-3.75
3	*2412.00	102.5 PK			1.00 H	352	106.13	-3.64
4	*2412.00	99.0 AV			1.00 H	352	102.59	-3.64
5	4824.00	45.0 PK	74.0	-29.0	1.00 H	354	41.25	3.73
6	4824.00	36.5 AV	54.0	-17.5	1.00 H	354	32.80	3.73
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	2390.00	44.8 PK	74.0	-29.2	1.06 V	133	48.52	-3.75
2	2390.00	35.5 AV	54.0	-18.6	1.06 V	133	39.20	-3.75
3	*2412.00	104.1 PK			1.06 V	133	107.72	-3.64
4	*2412.00	99.8 AV			1.06 V	133	103.46	-3.64
5	4824.00	45.4 PK	74.0	-28.6	1.00 V	132	41.67	3.73
6	4824.00	36.5 AV	54.0	-17.5	1.00 V	132	32.77	3.73

REMARKS:

1. Emission Level(dBuV/m) = Raw Value(dBuV) + Correction Factor(dB/m)
2. Correction Factor(dB/m) = Antenna Factor(dB/m) + Cable Factor(dB) – Pre-Amplifier Factor(dB)
3. The other emission levels were very low against the limit.
4. Margin value = Emission Level – Limit value
5. " * ": Fundamental frequency.



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CHANNEL	TX Channel 6	DETECTOR FUNCTION	Peak (PK)
FREQUENCY RANGE	1GHz ~ 25GHz		Average (AV)

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	*2437.00	102.1 PK			1.00 H	353	105.62	-3.53
2	*2437.00	98.5 AV			1.00 H	353	101.99	-3.53
3	4874.00	44.0 PK	74.0	-30.0	1.00 H	345	40.21	3.75
4	4874.00	34.9 AV	54.0	-19.1	1.00 H	345	31.12	3.75
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	*2437.00	105.1 PK			1.03 V	133	108.67	-3.53
2	*2437.00	100.9 AV			1.03 V	133	104.39	-3.53
3	4874.00	45.2 PK	74.0	-28.8	1.03 V	133	41.45	3.75
4	4874.00	36.9 AV	54.0	-17.1	1.03 V	133	33.18	3.75

REMARKS:

1. Emission Level(dBuV/m) = Raw Value(dBuV) + Correction Factor(dB/m)
2. Correction Factor(dB/m) = Antenna Factor(dB/m) + Cable Factor(dB) – Pre-Amplifier Factor(dB)
3. The other emission levels were very low against the limit.
4. Margin value = Emission Level – Limit value
5. " * ": Fundamental frequency.



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CHANNEL	TX Channel 11	DETECTOR FUNCTION	Peak (PK)
FREQUENCY RANGE	1GHz ~ 25GHz		Average (AV)

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	*2462.00	100.7 PK			1.00 H	353	104.07	-3.41
2	*2462.00	97.0 AV			1.00 H	353	100.44	-3.41
3	2483.50	40.5 PK	74.0	-33.6	1.00 H	354	43.77	-3.32
4	2483.50	26.9 AV	54.0	-27.1	1.00 H	354	30.25	-3.32
5	4924.00	46.4 PK	74.0	-27.6	1.00 H	355	42.67	3.74
6	4924.00	35.5 AV	54.0	-18.5	1.00 H	355	31.72	3.74
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	*2462.00	105.1 PK			1.00 V	169	108.47	-3.41
2	*2462.00	101.3 AV			1.00 V	169	104.74	-3.41
3	2483.50	41.0 PK	74.0	-33.1	1.00 V	169	44.27	-3.32
4	2483.50	27.6 AV	54.0	-26.4	1.00 V	169	30.91	-3.32
5	4924.00	45.3 PK	74.0	-28.7	1.00 V	172	41.52	3.74
6	4924.00	37.1 AV	54.0	-16.9	1.00 V	172	33.34	3.74

REMARKS:

1. Emission Level(dBuV/m) = Raw Value(dBuV) + Correction Factor(dB/m)
2. Correction Factor(dB/m) = Antenna Factor(dB/m) + Cable Factor(dB) – Pre-Amplifier Factor(dB)
3. The other emission levels were very low against the limit.
4. Margin value = Emission Level – Limit value
5. " * ": Fundamental frequency.



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802.11g

CHANNEL	TX Channel 1	DETECTOR FUNCTION	Peak (PK)
FREQUENCY RANGE	1GHz ~ 25GHz		Average (AV)

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	2390.00	44.0 PK	74.0	-30.0	1.00 H	351	47.72	-3.75
2	2390.00	27.3 AV	54.0	-26.7	1.00 H	351	31.01	-3.75
3	*2412.00	102.9 PK			1.00 H	351	106.58	-3.64
4	*2412.00	92.2 AV			1.00 H	351	95.82	-3.64
5	4824.00	45.1 PK	74.0	-29.0	1.00 H	355	41.32	3.73
6	4824.00	35.5 AV	54.0	-18.5	1.00 H	355	31.76	3.73
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	2390.00	44.6 PK	74.0	-29.4	1.00 V	135	48.37	-3.75
2	2390.00	27.7 AV	54.0	-26.3	1.00 V	135	31.43	-3.75
3	*2412.00	105.3 PK			1.00 V	135	108.90	-3.64
4	*2412.00	94.0 AV			1.00 V	135	97.68	-3.64
5	4824.00	44.4 PK	74.0	-29.6	1.00 V	137	40.63	3.73
6	4824.00	35.2 AV	54.0	-18.8	1.00 V	137	31.46	3.73

REMARKS:

1. Emission Level(dBuV/m) = Raw Value(dBuV) + Correction Factor(dB/m)
2. Correction Factor(dB/m) = Antenna Factor(dB/m) + Cable Factor(dB) – Pre-Amplifier Factor(dB)
3. The other emission levels were very low against the limit.
4. Margin value = Emission Level – Limit value
5. " * ": Fundamental frequency.



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CHANNEL	TX Channel 6	DETECTOR FUNCTION	Peak (PK)
FREQUENCY RANGE	1GHz ~ 25GHz		Average (AV)

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	*2437.00	102.0 PK			1.00 H	360	105.48	-3.53
2	*2437.00	91.4 AV			1.00 H	360	94.92	-3.53
3	4874.00	44.8 PK	74.0	-29.2	1.00 H	360	41.01	3.75
4	4874.00	35.3 AV	54.0	-18.7	1.00 H	360	31.51	3.75
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	*2437.00	105.2 PK			1.00 V	270	108.76	-3.53
2	*2437.00	94.7 AV			1.00 V	270	98.20	-3.53
3	4874.00	44.6 PK	74.0	-29.4	1.00 V	273	40.82	3.75
4	4874.00	35.2 AV	54.0	-18.8	1.00 V	273	31.44	3.75

REMARKS:

1. Emission Level(dBuV/m) = Raw Value(dBuV) + Correction Factor(dB/m)
2. Correction Factor(dB/m) = Antenna Factor(dB/m) + Cable Factor(dB) – Pre-Amplifier Factor(dB)
3. The other emission levels were very low against the limit.
4. Margin value = Emission Level – Limit value
5. " * ": Fundamental frequency.



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CHANNEL	TX Channel 11	DETECTOR FUNCTION	Peak (PK)
FREQUENCY RANGE	1GHz ~ 25GHz		Average (AV)

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	*2462.00	101.3 PK			1.00 H	352	104.75	-3.41
2	*2462.00	89.7 AV			1.00 H	352	93.07	-3.41
3	2483.50	42.1 PK	74.0	-31.9	1.00 H	352	45.46	-3.32
4	2483.50	27.0 AV	54.0	-27.0	1.00 H	352	30.32	-3.32
5	4924.00	44.8 PK	74.0	-29.2	1.00 H	355	41.10	3.74
6	4924.00	34.9 AV	54.0	-19.2	1.00 H	355	31.11	3.74
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	*2462.00	105.7 PK			1.00 V	171	109.07	-3.41
2	*2462.00	95.0 AV			1.00 V	171	98.45	-3.41
3	2483.50	47.6 PK	74.0	-26.4	1.00 V	177	50.92	-3.32
4	2483.50	28.2 AV	54.0	-25.8	1.00 V	177	31.52	-3.32
5	4924.00	45.5 PK	74.0	-28.5	1.00 V	177	41.77	3.74
6	4924.00	35.2 AV	54.0	-18.8	1.00 V	177	31.45	3.74

REMARKS:

1. Emission Level(dBuV/m) = Raw Value(dBuV) + Correction Factor(dB/m)
2. Correction Factor(dB/m) = Antenna Factor(dB/m) + Cable Factor(dB) – Pre-Amplifier Factor(dB)
3. The other emission levels were very low against the limit.
4. Margin value = Emission Level – Limit value
5. " * ": Fundamental frequency.



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802.11n (20MHz)

CHANNEL	TX Channel 1	DETECTOR FUNCTION	Peak (PK)
FREQUENCY RANGE	1GHz ~ 25GHz		Average (AV)

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	2390.00	45.1 PK	74.0	-28.9	1.00 H	353	48.83	-3.75
2	2390.00	27.5 AV	54.0	-26.5	1.00 H	353	31.26	-3.75
3	*2412.00	102.1 PK			1.00 H	353	105.69	-3.64
4	*2412.00	91.2 AV			1.00 H	353	94.85	-3.64
5	4824.00	45.4 PK	74.0	-28.6	1.00 H	357	41.71	3.73
6	4824.00	35.0 AV	54.0	-19.0	1.00 H	357	31.30	3.73
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	2390.00	48.1 PK	74.0	-25.9	1.00 V	270	51.83	-3.75
2	2390.00	28.2 AV	54.0	-25.8	1.00 V	270	31.95	-3.75
3	*2412.00	105.3 PK			1.00 V	270	108.89	-3.64
4	*2412.00	95.0 AV			1.00 V	270	98.68	-3.64
5	4824.00	45.1 PK	74.0	-28.9	1.00 V	273	41.33	3.73
6	4824.00	34.8 AV	54.0	-19.3	1.00 V	273	31.02	3.73

REMARKS:

1. Emission Level(dBuV/m) = Raw Value(dBuV) + Correction Factor(dB/m)
2. Correction Factor(dB/m) = Antenna Factor(dB/m) + Cable Factor(dB) – Pre-Amplifier Factor(dB)
3. The other emission levels were very low against the limit.
4. Margin value = Emission Level – Limit value
5. " * ": Fundamental frequency.

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CHANNEL	TX Channel 6	DETECTOR FUNCTION	Peak (PK)
FREQUENCY RANGE	1GHz ~ 25GHz		Average (AV)

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	*2437.00	100.8 PK			1.00 H	360	104.31	-3.53
2	*2437.00	90.2 AV			1.00 H	360	93.68	-3.53
3	4874.00	45.3 PK	74.0	-28.7	1.00 H	360	41.54	3.75
4	4874.00	35.1 AV	54.0	-18.9	1.00 H	360	31.36	3.75
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	*2437.00	105.6 PK			1.00 V	270	109.15	-3.53
2	*2437.00	95.2 AV			1.00 V	270	98.74	-3.53
3	4874.00	45.5 PK	74.0	-28.5	1.00 V	275	41.73	3.75
4	4874.00	35.0 AV	54.0	-19.0	1.00 V	275	31.23	3.75

REMARKS:

1. Emission Level(dBuV/m) = Raw Value(dBuV) + Correction Factor(dB/m)
2. Correction Factor(dB/m) = Antenna Factor(dB/m) + Cable Factor(dB) – Pre-Amplifier Factor(dB)
3. The other emission levels were very low against the limit.
4. Margin value = Emission Level – Limit value
5. " * ": Fundamental frequency.



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CHANNEL	TX Channel 11	DETECTOR FUNCTION	Peak (PK)
FREQUENCY RANGE	1GHz ~ 25GHz		Average (AV)

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	*2462.00	99.4 PK			1.00 H	189	102.79	-3.41
2	*2462.00	87.9 AV			1.00 H	189	91.33	-3.41
3	2483.50	44.3 PK	74.0	-29.7	1.00 H	189	47.66	-3.32
4	2483.50	27.1 AV	54.0	-26.9	1.00 H	189	30.38	-3.32
5	4924.00	45.1 PK	74.0	-28.9	1.00 H	193	41.33	3.74
6	4924.00	34.8 AV	54.0	-19.2	1.00 H	193	31.09	3.74
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	*2462.00	106.6 PK			1.00 V	271	110.03	-3.41
2	*2462.00	96.1 AV			1.00 V	271	99.54	-3.41
3	2483.50	52.5 PK	74.0	-21.5	1.00 V	271	55.84	-3.32
4	2483.50	28.5 AV	54.0	-25.5	1.00 V	271	31.78	-3.32
5	4924.00	45.2 PK	74.0	-28.8	1.00 V	267	41.49	3.74
6	4924.00	35.0 AV	54.0	-19.0	1.00 V	267	31.30	3.74

REMARKS:

1. Emission Level(dBuV/m) = Raw Value(dBuV) + Correction Factor(dB/m)
2. Correction Factor(dB/m) = Antenna Factor(dB/m) + Cable Factor(dB) – Pre-Amplifier Factor(dB)
3. The other emission levels were very low against the limit.
4. Margin value = Emission Level – Limit value
5. " * ": Fundamental frequency.



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5. PHOTOGRAPHS OF THE TEST CONFIGURATION

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



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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.

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

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Web Site: www.bureauveritas-adt.com

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



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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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