

FCC TEST REPORT

 REPORT NO.:
 RF130709D15

 MODEL NO.:
 IOVU-572M

 FCC ID:
 RFHIOVU-572M

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RELEASE CONTROL RECORD

ISSUE NO.	REASON FOR CHANGE	DATE ISSUED
RF130709D15	Original release	Aug. 12, 2013



1. CERTIFICATION

PRODUCT: PANEL PC MODEL NO .: IOVU-572M BRAND: iEi **APPLICANT:** IEI Integration Corp. **TESTED:** Aug. 5 ~ 12, 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 : Jessica Charg , DATE: Aug. 12, 2013 (Jessica Cheng / Specialist)

APPROVED BY : Ken Liu / Senior Manager), DATE: Aug. 12, 2013



2. SUMMARY OF TEST RESULTS

6 6 1							
APPLIED STANDARD: FCC PART 15, SUBPART C (SECTION 15.247)							
STANDARD SECTION	TEST TYPE	RESULT	REMARK				
15.207	AC Power Conducted Emission	PASS	Meet the requirement of limit. Minimum passing margin is -11.95dB at 11.75000MHz.				
15.247(d) 15.209	Radiated Emissions	PASS	Meet the requirement of limit. Minimum passing margin is -3.3dB at 2483.50MHz.				
15.247(d)	Band Edge Measurement	PASS	Meet the requirement of limit.				
15.247(a)(2)	6dB bandwidth	PASS	Meet the requirement of limit.				
15.247(b)	Conducted power	PASS	Meet the requirement of limit.				
15.247(e)	15.247(e) Power Spectral Density		Meet the requirement of limit.				
15.203	Antenna Requirement	PASS	No antenna connector is used.				

The EUT has been tested according to the following specifications:

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	150kHz~30MHz	2.41 dB
Radiated emissions	30MHz ~ 1GHz	4.00 dB
Raulaleu emissions	Above 1GHz	3.36 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	PANEL PC
MODEL NO.	IOVU-572M
POWER SUPPLY	12Vdc from Power Adapter
MODULATION TYPE	CCK, DQPSK, DBPSK for DSSS 64QAM, 16QAM, QPSK, BPSK for OFDM
MODULATION TECHNOLOGY	DSSS, OFDM
TRANSFER RATE	802.11b:11.0/ 5.5/ 2.0/ 1.0Mbps 802.11g: 54.0/ 48.0/ 36.0/ 24.0/ 18.0/ 12.0/ 9.0/ 6.0Mbps
OPERATING FREQUENCY	2412 ~ 2462MHz
NUMBER OF CHANNEL	11 for 802.11b, 802.11g
OUTPUT POWER	147.9mW
ANTENNA TYPE	PIFA antenna with 2dBi gain
ANTENNA CONNECTOR	N/A
DATA CABLE	Refer to user's manual
I/O PORTS	Refer to user's manual
ACCESSORY DEVICES	Refer to note below

Note:

1. 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

2. The EUT consumes power from a switching power as follows:

Item	Brand	Model	Spec.
Power Adapter	FSP	FSP060-DBAB1	AC I/P: 100-240V, 1.5A DC O/P: 12V, 2.0A, (60W MAX) Non-shielded AC 3-Pin (1.8m). Non-shielded DC cable (1.2m) with one ferrite core

3. 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:

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	APPLICABLE TO			то				
CONFIGURE MODE	RE ³ 1G	RE<1G	PLC	APCM	ОВ	DESCRIPTION		
-	\checkmark	\checkmark	\checkmark	\checkmark	\checkmark	-		
Where RE ³ 1G: Radiated Emission above 1GHz RE<1G: Radiated Emission below 1GHz								
1	PLC: Power L	ine Conduct	na Port Conducted Measurement					

OB: Conducted Out-Band Emission Measurement

NOTE: The EUT had been pre-tested on the positioned of each X, Z axis. The worst case was found when positioned on **X-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).

MODE	AVAILABLE CHANNEL	TESTED CHANNEL	MODULATION TECHNOLOGY	MODULATION TYPE	DATA RATE (Mbps)
802.11b	1 to 11	1, 6, 11	DSSS	DBPSK	1.0
802.11g	1 to 11	1, 6, 11	OFDM	BPSK	6.0

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

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.

MODE	AVAILABLE	TESTED	MODULATION	MODULATION	DATA RATE
	CHANNEL	CHANNEL	TECHNOLOGY	TYPE	(Mbps)
802.11g	1 to 11	6	OFDM	BPSK	6.0

POWER LINE CONDUCTED EMISSION TEST:

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

MODE AVAILABLE		TESTED MODULATION		MODULATION	DATA RATE
CHANNEL		CHANNEL TECHNOLOGY		TYPE	(Mbps)
802.11g	1 to 11	6	OFDM	BPSK	6.0



CONDUCTED OUT-BAND EMISSION MEASUREMENT:

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

MODE	AVAILABLE CHANNEL	TESTED CHANNEL	MODULATION TECHNOLOGY	MODULATION TYPE	DATA RATE (Mbps)	
802.11b	1 to 11	1, 6, 11	DSSS	DBPSK	1.0	
802.11g	1 to 11	1, 6, 11	OFDM	BPSK	6.0	

ANTENNA PORT CONDUCTED MEASUREMENT:

- This item includes all test value of each mode, but only includes spectrum plot of worst value of each mode.
- 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).

MODE	AVAILABLE CHANNEL	TESTED CHANNEL	MODULATION TECHNOLOGY	MODULATION TYPE	DATA RATE (Mbps)
802.11b	1 to 11	1, 6, 11	DSSS	DBPSK	1.0
802.11g	1 to 11	1, 6, 11	OFDM	BPSK	6.0

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

TEST CONDITION:

APPLICABLE TO	APPLICABLE TO ENVIRONMENTAL CONDITIONS		TESTED BY
RE ³ 1G	26deg. C, 73%RH	120Vac, 60Hz	Dalen Dai
RE<1G	RE<1G 26deg. C, 73%RH		Dalen Dai
PLC	PLC 26deg. C, 76%RH		Joyce Liu
OB	25deg. C, 60%RH	120Vac, 60Hz	Chad Lee
APCM	APCM 25deg. C, 60%RH		Chad Lee



3.3 DESCRIPTION OF SUPPORT UNITS

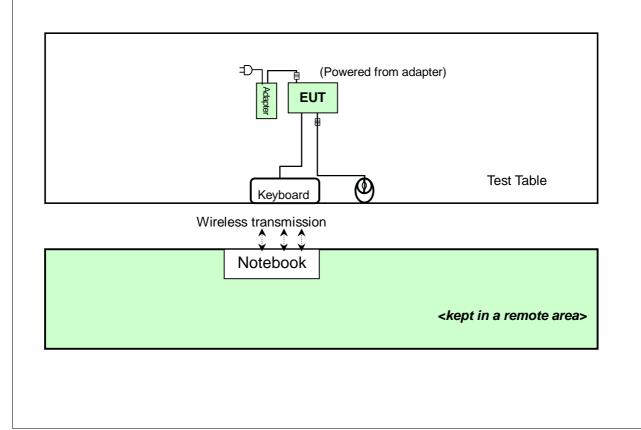
The EUT has been tested as an independent unit together with other necessary accessories or support units. The following support units or accessories were used to form a representative test configuration during the tests.

NO.	PRODUCT	BRAND	MODEL NO.	SERIAL NO.	FCC ID
1	NOTEBOOK COMPUTER	DELL	PP27L	8SNZ12S	FCC DoC Approved
2	USB Mouse	Microsoft	1113	9170515772221	FCC DoC Approved
3	USB KEYBOARD	втс	5200U	G09302046486	E5XKB5122U

NO.	SIGNAL CABLE DESCRIPTION OF THE ABOVE SUPPORT UNITS				
1	Wireless transmission				
2	1.5 m braid shielded wire, terminated with USB connector via drain wire, with 1 core.				
3	1.5 m braid shielded wire, terminated with USB connector via drain wire, w/o core.				

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) 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.



4.1.2TEST 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. 19, 2012	Aug. 18, 2013
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
ROHDE & SCHWARZ Spectrum Analyzer	FSP 40	100036	May. 17, 2013	May. 16, 2014
Anritsu Power Sensor	MA2411B	0738404	Apr. 24, 2013	Apr. 23, 2014
Anritsu Power Meter	ML2495A	0842014	Apr. 25, 2013	Apr. 24, 2014

NOTE: 1. The calibration interval of the above test instruments is 12/24 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 height of 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:

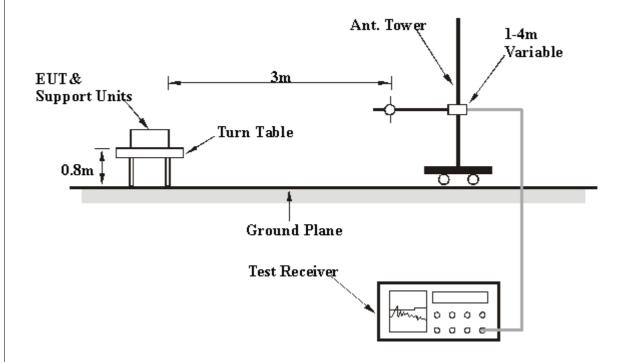
- 1. The resolution bandwidth and video bandwidth of test receiver/spectrum analyzer is 120kHz for Quasi-peak detection at frequency below 1GHz.
- 2. The resolution bandwidth of test receiver/spectrum analyzer is 100kHz and video bandwidth is 300kHz for Peak detection at frequency above 1GHz.
- 3. The resolution bandwidth of test receiver/spectrum analyzer is 1MHz and the video bandwidth is 1kHz 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.



4.1.5TEST SETUP



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

4.1.6EUT OPERATING CONDITIONS

Set the EUT under transmission/receiving condition continuously at specific channel frequency.



4.1.7 TEST RESULTS

BELOW 1GHz WORST-CASE DATA

802.11g

CHANNEL	TX Channel 6	DETECTOR FUNCTION	Quesi Besk (QD)
FREQUENCY RANGE	30MHz ~ 1GHz		Quasi-Peak (QP)

	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	144.46	31.2 QP	43.5	-12.3	1.33 H	110	44.51	-13.32
2	233.70	38.5 QP	46.0	-7.6	1.08 H	76	53.34	-14.89
3	286.08	33.3 QP	46.0	-12.7	1.49 H	10	45.15	-11.89
4	493.66	33.4 QP	46.0	-12.6	1.66 H	208	40.98	-7.59
5	649.83	36.9 QP	46.0	-9.1	1.17 H	262	41.38	-4.49
6	909.79	35.6 QP	46.0	-10.4	1.32 H	79	35.79	-0.22
		ANTENNA		/ & TEST DI	STANCE: V	ERTICAL A	Т 3 М	
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	68.80	32.3 QP	40.0	-7.7	1.09 V	9	47.63	-15.31
2	233.70	37.6 QP	46.0	-8.4	1.06 V	29	52.51	-14.89
3	286.08	34.0 QP	46.0	-12.0	1.19 V	103	45.90	-11.89
4	442.25	35.8 QP	46.0	-10.2	1.85 V	113	44.29	-8.51
5	649.83	37.2 QP	46.0	-8.8	1.22 V	124	41.68	-4.49
6	779.81	32.6 QP	46.0	-13.4	1.42 V	167	34.67	-2.09

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



ABOVE 1GHz DATA

802.11b

CHANNEL	TX Channel 1	DETECTOR	Peak (PK)
FREQUENCY RANGE	1GHz ~ 25GHz	FUNCTION	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	60.6 PK	74.0	-13.4	1.00 H	18	64.33	-3.75
2	2390.00	47.3 AV	54.0	-6.7	1.00 H	18	51.02	-3.75
3	*2412.00	102.1 PK			1.00 H	18	105.73	-3.64
4	*2412.00	98.4 AV			1.00 H	18	102.02	-3.64
5	4824.00	45.6 PK	74.0	-28.4	1.00 H	332	41.91	3.73
6	4824.00	31.2 AV	54.0	-22.8	1.00 H	332	27.48	3.73
		ANTENNA		/ & TEST DI	STANCE: V	ERTICAL A	T 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	60.5 PK	74.0	-13.5	1.43 V	319	64.22	-3.75
2	2390.00	46.9 AV	54.0	-7.1	1.43 V	319	50.61	-3.75
3	*2412.00	97.1 PK			1.43 V	319	100.72	-3.64
4	*2412.00	93.3 AV			1.43 V	319	96.91	-3.64
5	4824.00	46.0 PK	74.0	-28.0	1.00 V	136	42.29	3.73
6	4824.00	31.9 AV	54.0	-22.1	1.00 V	136	28.13	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



CHANNEL	TX Channel 6	DETECTOR	Peak (PK)
FREQUENCY RANGE	1GHz ~ 25GHz	FUNCTION	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	102.4 PK			1.00 H	18	105.89	-3.53		
2	*2437.00	98.8 AV			1.00 H	18	102.32	-3.53		
3	4874.00	45.5 PK	74.0	-28.5	1.00 H	336	41.73	3.75		
4	4874.00	31.8 AV	54.0	-22.2	1.00 H	336	28.06	3.75		
		ANTENNA		/ & TEST DI	STANCE: V	ERTICAL A	Т 3 М			
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	98.6 PK			1.07 V	330	102.17	-3.53		
2	*2437.00	94.9 AV			1.07 V	330	98.39	-3.53		
3	4874.00	46.1 PK	74.0	-27.9	1.00 V	133	42.31	3.75		
4	4874.00	32.0 AV	54.0	-22.0	1.00 V	133	28.25	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



CHANNEL	TX Channel 11	DETECTOR	Peak (PK)
FREQUENCY RANGE	1GHz ~ 25GHz	FUNCTION	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	102.4 PK			1.00 H	20	105.83	-3.41		
2	*2462.00	98.7 AV			1.00 H	20	102.12	-3.41		
3	2483.50	61.1 PK	74.0	-12.9	1.00 H	20	64.39	-3.32		
4	2483.50	47.3 AV	54.0	-6.7	1.00 H	20	50.64	-3.32		
5	4924.00	45.4 PK	74.0	-28.6	1.00 H	333	41.69	3.74		
6	4924.00	31.1 AV	54.0	-22.9	1.00 H	333	27.33	3.74		
		ANTENNA		/ & TEST DI	STANCE: V	ERTICAL A	Т 3 М			
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	100.5 PK			1.08 V	333	103.87	-3.41		
2	*2462.00	96.8 AV			1.08 V	333	100.23	-3.41		
3	2483.50	61.0 PK	74.0	-13.0	1.08 V	333	64.31	-3.32		
4	2483.50	47.1 AV	54.0	-6.9	1.08 V	333	50.45	-3.32		
5	4924.00	45.7 PK	74.0	-28.3	1.00 V	134	41.98	3.74		
6	4924.00	32.3 AV	54.0	-21.8	1.00 V	134	28.51	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



802.11g

CHANNEL	TX Channel 1	DETECTOR	Peak (PK)
FREQUENCY RANGE	1GHz ~ 25GHz	FUNCTION	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	66.3 PK	74.0	-7.7	1.00 H	17	70.02	-3.75		
2	2390.00	50.2 AV	54.0	-3.8	1.00 H	17	53.96	-3.75		
3	*2412.00	103.6 PK			1.00 H	17	107.28	-3.64		
4	*2412.00	93.3 AV			1.00 H	17	96.93	-3.64		
5	4824.00	45.8 PK	74.0	-28.2	1.00 H	294	42.03	3.73		
6	4824.00	32.0 AV	54.0	-22.0	1.00 H	294	28.31	3.73		
		ANTENNA		/ & TEST DI	STANCE: V	ERTICAL A	Т 3 М			
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	63.9 PK	74.0	-10.1	1.37 V	330	67.65	-3.75		
2	2390.00	48.7 AV	54.0	-5.3	1.37 V	330	52.49	-3.75		
3	*2412.00	99.6 PK			1.37 V	330	103.26	-3.64		
4	*2412.00	89.4 AV			1.37 V	330	93.06	-3.64		
5	4824.00	47.4 PK	74.0	-26.6	1.00 V	115	43.70	3.73		
6	4824.00	32.6 AV	54.0	-21.4	1.00 V	115	28.91	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



CHANNEL	TX Channel 6	DETECTOR	Peak (PK)
FREQUENCY RANGE	1GHz ~ 25GHz	FUNCTION	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	104.9 PK			1.00 H	17	108.46	-3.53		
2	*2437.00	95.2 AV			1.00 H	17	98.69	-3.53		
3	4874.00	45.9 PK	74.0	-28.1	1.00 H	289	42.15	3.75		
4	4874.00	31.5 AV	54.0	-22.5	1.00 H	289	27.72	3.75		
		ANTENNA		/ & TEST DI	STANCE: V	ERTICAL A	Т 3 М			
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			1.38 V	327	104.32	-3.53		
2	*2437.00	91.1 AV			1.38 V	327	94.58	-3.53		
3	4874.00	47.4 PK	74.0	-26.6	1.00 V	121	43.66	3.75		
4	4874.00	32.8 AV	54.0	-21.2	1.00 V	121	29.03	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



CHANNEL	TX Channel 11	DETECTOR	Peak (PK)
FREQUENCY RANGE	1GHz ~ 25GHz	FUNCTION	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	104.1 PK			1.24 H	17	107.55	-3.41		
2	*2462.00	94.4 AV			1.24 H	17	97.84	-3.41		
3	2483.50	68.2 PK	74.0	-5.8	1.24 H	17	71.55	-3.32		
4	2483.50	50.7 AV	54.0	-3.3	1.24 H	17	53.98	-3.32		
5	4924.00	46.1 PK	74.0	-27.9	1.00 H	277	42.36	3.74		
6	4924.00	31.7 AV	54.0	-22.3	1.00 H	277	27.96	3.74		
		ANTENNA		/ & TEST DI	STANCE: V	ERTICAL A	Т 3 М			
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	99.6 PK			1.03 V	315	102.96	-3.41		
2	*2462.00	89.8 AV			1.03 V	315	93.17	-3.41		
3	2483.50	64.9 PK	74.0	-9.2	1.03 V	315	68.17	-3.32		
4	2483.50	48.7 AV	54.0	-5.3	1.03 V	315	52.03	-3.32		
5	4924.00	46.9 PK	74.0	-27.1	1.00 V	117	43.19	3.74		
6	4924.00	32.5 AV	54.0	-21.5	1.00 V	117	28.78	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



4.2 CONDUCTED EMISSION MEASUREMENT

4.2.1 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.

4.2.2 TEST INSTRUMENTS

DESCRIPTION & MANUFACTURER	MODEL NO.	SERIAL NO.	CALIBRATED DATE	CALIBRATED UNTIL
	F000 00	400070	law 07 0040	
SCHWARZ TEST RECEIVER	ESCS 30	100276	Jan. 07, 2013	Jan. 06, 2014
ROHDE & SCHWARZ				
Artificial Mains Network (for EUT)	ESH3-Z5	100219	Nov. 28, 2012	Nov. 27, 2013
LISN With Adapter	AD10	C10Ada-001	Nov. 28, 2012	Nov. 27, 2013
(for EUT)				
ROHDE & SCHWARZ Artificial Mains Network (for peripherals)	ESH3-Z5	100218	Dec. 05, 2012	Dec. 04, 2013
Software	ADT_Cond_V7.3.7	NA	NA	NA
Software	ADT_ISN_V7.3.7	NA	NA	NA
RF cable (JYEBAO)	5D-FB	Cable-C10.01	Feb. 19, 2013	Feb. 18, 2014
SUHNER Terminator (For ROHDE & SCHWARZ LISN)	65BNC-5001	E1-010773	Feb. 06, 2013	Feb. 05, 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 test was performed in Shielded Room No. 10.
- 3. The VCCI Site Registration No. C-1852.

^{2.} The limit decreases in line with the logarithm of the frequency in the range of 0.15 to 0.50MHz.



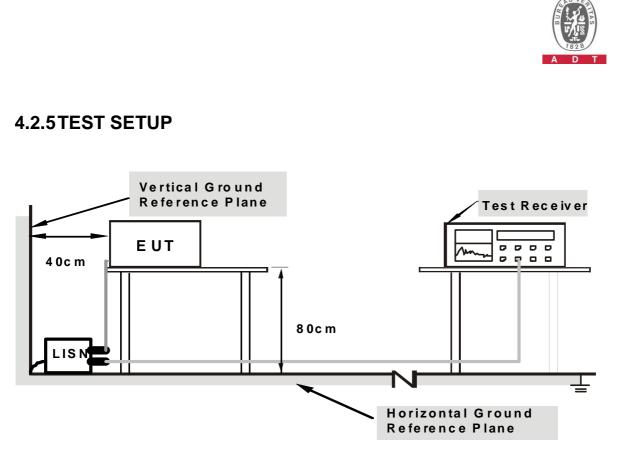
4.2.3TEST PROCEDURES

- 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) was not recorded.

NOTE: All modes of operation were investigated and the worst-case emissions are reported.

4.2.4 DEVIATION FROM TEST STANDARD

No deviation.



Note: Support units were connected to second LISN.

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

4.2.6 EUT OPERATING CONDITIONS

Same as item 4.1.6.



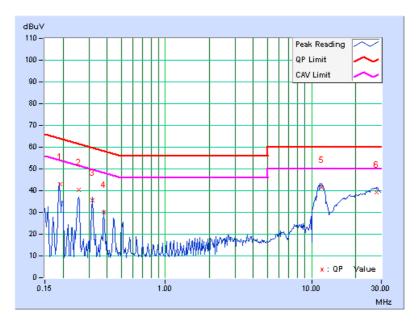
4.2.7 TEST RESULTS

CONDUCTED WORST-CASE DATA: 802.11g

PHASE Li			_ine 1		6dB	6dB BANDWIDTH		9kHz			
	Freq.	Corr.	Readin	g Value	Emissic	on Level	Lir	nit	Mai	rgin	
No		Factor	[dB	[dB (uV)]		[dB (uV)]		[dB (uV)]		(dB)	
	[MHz]	(dB)	Q.P.	AV.	Q.P.	AV.	Q.P.	AV.	Q.P.	AV.	
1	0.19034	0.14	42.99	34.44	43.13	34.58	64.02	54.02	-20.89	-19.44	
2	0.25418	0.15	40.06	34.56	40.21	34.71	61.62	51.62	-21.41	-16.91	
3	0.31797	0.16	35.44	28.77	35.60	28.93	59.76	49.76	-24.16	-20.83	
4	0.38047	0.17	29.82	24.40	29.99	24.57	58.27	48.27	-28.28	-23.70	
5	11.75000	0.73	40.87	37.32	41.60	38.05	60.00	50.00	-18.40	-11.95	
6	27.81649	1.37	38.03	34.29	39.40	35.66	60.00	50.00	-20.60	-14.34	

REMARKS:

- 1. Q.P. and AV. are abbreviations of quasi-peak and average individually.
- 2. The emission levels of other frequencies were very low against the limit.
- 3. Margin value = Emission Level Limit value
- 4. Correction Factor = Insertion loss + Cable loss
- 5. Emission Level = Correction Factor + Reading Value



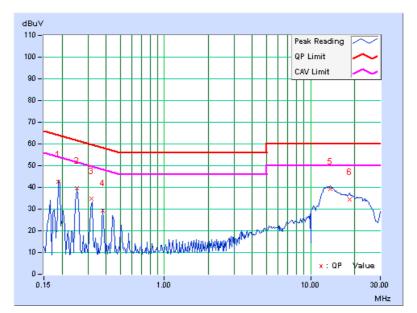


PHASE Line 2 6dB BANDWIDTH 9kHz	
---	--

	Freq. Corr. Reading Value		Emission Level		Limit		Margin			
No		Factor	[dB (uV)]		[dB (uV)]		[dB (uV)]		(dB)	
	[MHz]	(dB)	Q.P.	AV.	Q.P.	AV.	Q.P.	AV.	Q.P.	AV.
1	0.18906	0.11	42.30	33.16	42.41	33.27	64.08	54.08	-21.67	-20.81
2	0.25412	0.12	39.48	34.41	39.60	34.53	61.62	51.62	-22.02	-17.09
3	0.31805	0.13	34.73	28.16	34.86	28.29	59.76	49.76	-24.90	-21.47
4	0.38047	0.14	29.23	23.63	29.37	23.77	58.27	48.27	-28.90	-24.50
5	13.65234	0.60	38.74	35.99	39.34	36.59	60.00	50.00	-20.66	-13.41
6	18.41797	0.75	33.83	29.89	34.58	30.64	60.00	50.00	-25.42	-19.36

REMARKS:

- 1. Q.P. and AV. are abbreviations of quasi-peak and average individually.
- 2. The emission levels of other frequencies were very low against the limit.
- 3. Margin value = Emission Level Limit value
- 4. Correction Factor = Insertion loss + Cable loss
- 5. Emission Level = Correction Factor + Reading Value





4.3 6dB BANDWIDTH MEASUREMENT

4.3.1 LIMITS OF 6dB BANDWIDTH MEASUREMENT

The minimum of 6dB Bandwidth Measurement is 0.5 MHz.

4.3.2TEST SETUP



4.3.3TEST INSTRUMENTS

Refer to section 4.1.2 to get information of above instrument.

4.3.4 TEST PROCEDURE

- a. Set resolution bandwidth (RBW) = 100kHz
- b. Set the video bandwidth (VBW) \ge 3 x RBW, Detector = Peak.
- c. Trace mode = max hold.
- d. Sweep = auto couple.
- e. Measure the maximum width of the emission that is constrained by the frequencies associated with the two amplitude points (upper and lower) that are attenuated by 6 dB relative to the maximum level measured in the fundamental emission

4.3.5 DEVIATION FROM TEST STANDARD

No deviation.

4.3.6 EUT OPERATING CONDITIONS

The software provided by client to enable the EUT under transmission condition continuously at lowest, middle and highest channel frequencies individually.



4.3.7 TEST RESULTS

CHANNEL	CHANNEL FREQUENCY (MHz)	6dB BANDWIDTH (MHz)	MINIMUM LIMIT (MHz)	PASS / FAIL	
802.11b					
1	2412	9.83	0.5	PASS	
6	2437	9.96	0.5	PASS	
11 2462		10.03	0.5	PASS	
802.11g					
1	2412	16.63	0.5	PASS	
6	2437	16.64	0.5	PASS	
11	2462	16.61	0.5	PASS	

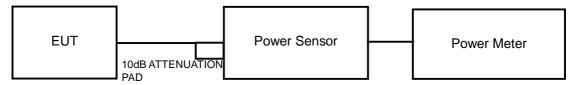


4.4 CONDUCTED OUTPUT POWER

4.4.1 LIMITS OF CONDUCTED OUTPUT POWER MEASUREMENT

For systems using digital modulation in the 2400–2483.5 MHz bands: 1 Watt (30dBm)

4.4.2TEST SETUP



4.4.3TEST INSTRUMENTS

Refer to section 4.1.2 to get information of above instrument.

4.4.4TEST PROCEDURES

A peak / average power sensor were used on the output port of the EUT. A power meter was used to read the response of the peak / average power sensor. Record the peak power level.

4.4.5 DEVIATION FROM TEST STANDARD

No deviation.

4.4.6 EUT OPERATING CONDITIONS

Same as Item 4.3.6.



4.4.7 TEST RESULTS

FOR PEAK POWER

CHAN.	CHAN. FREQ. (MHz)	POWER OUTPUT (dBm)	POWER OUTPUT (mW)	POWER LIMIT (dBm)	PASS / FAIL				
802.11b	802.11b								
1	2412	15.94	39.3	30	PASS				
6	2437	15.52	35.6	30	PASS				
11	2462	15.06	32.1	30	PASS				
802.11g	802.11g								
1	2412	21.44	139.3	30	PASS				
6	2437	21.70	147.9	30	PASS				
11	2462	21.14	130.0	30	PASS				



FOR AVERAGE POWER

CHAN.	CHAN. FREQ. (MHz)	AVERAGE POWER (dBm)	
802.11b			
1	2412	13.39	
6	2437	13.01	
11	2462	12.48	
802.11g			
1	2412	13.58	
6	2437	13.59	
11	2462	13.04	

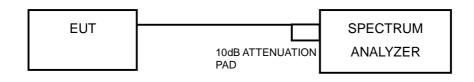


4.5 POWER SPECTRAL DENSITY MEASUREMENT

4.5.1 LIMITS OF POWER SPECTRAL DENSITY MEASUREMENT

The Maximum of Power Spectral Density Measurement is 8dBm.

4.5.2TEST SETUP



4.5.3TEST INSTRUMENTS

Refer to section 4.1.2 to get information of above instrument.

4.5.4 TEST PROCEDURE

- a. Set the RBW = 3 kHz, VBW =10 kHz, Detector = peak.
- b. Sweep time = auto couple, Trace mode = max hold, allow trace to fully stabilize.
- c. Use the peak marker function to determine the maximum power level in any 100 kHz band segment within the fundamental EBW.

4.5.5 DEVIATION FROM TEST STANDARD

No deviation.

4.5.6 EUT OPERATING CONDITION

Same as Item 4.3.6



4.5.7 TEST RESULTS

Channel	Freq. (MHz)	PSD (dBm/3kHz)	Limit (dBm/3kHz)	PASS /FAIL				
802.11b								
1	2412	-15.37	8	PASS				
6	2437	-16.32	8	PASS				
11 2462		-16.36	8	PASS				
802.11g	802.11g							
1	2412	-13.89	8	PASS				
6	2437	-14.51	8	PASS				
11	2462	-15.78	8	PASS				



4.6 CONDUCTED OUT OF BAND EMISSION MEASUREMENT

4.6.1 LIMITS OF CONDUCTED OUT OF BAND EMISSION MEASUREMENT

Below –20dB of the highest emission level of operating band (in 100kHz Resolution Bandwidth).

4.6.2TEST SETUP



4.6.3TEST INSTRUMENTS

Refer to section 4.1.2 to get information of above instrument.

4.6.4TEST PROCEDURE

MEASUREMENT PROCEDURE REF

- 1. Set the RBW = 100 kHz.
- 2. Set the VBW \geq 300 kHz.
- 3. Detector = peak.
- 4. Sweep time = auto couple.
- 5. Trace mode = max hold.
- 6. Allow trace to fully stabilize.
- 7. Use the peak marker function to determine the maximum power level in any 100 kHz band segment within the fundamental EBW.



MEASUREMENT PROCEDURE OOBE

- 1. Set RBW = 100 kHz.
- 2. Set VBW ≥ 300 kHz.
- 3. Set span to encompass the spectrum to be examined.
- 4. Detector = peak.
- 5. Trace Mode = max hold.
- 6. Sweep = auto couple.

4.6.5 DEVIATION FROM TEST STANDARD

No deviation.

4.6.6 EUT OPERATING CONDITION

Same as Item 4.3.6

4.6.7 TEST RESULTS

The spectrum plots are attached on the following pages. D1 line indicates the highest level, and D2 line indicates the 20dB offset below D1. It shows compliance with the requirement.



802.11b **CH** 1 RBW 100 kHz VBW 300 kHz SWT 2.5 ms RBW 100 kHz VBW 300 kHz SWT 2.5 s [T1] MP VIEW Marker 1 [T1] 2.79 dBm 2.41146 GHz [T1] MP VIEW Marker 1 [T1] 1.64 dBm 2.37718 GHz Ref 21.5 dBm Offset 11.5 dB 21.5. 11 11 -10 D2 -1 1 dBm month for WW -51 -51 -70 -70 -78.5 -78.5 1.277 MHz/ Center 2.412 GHz 1 2.497 GHz/ I Span 12.77 MHz I Stop 25 GHs Start 30 MHz CH 6 RBW 100 kHz VBW 300 kHz SAT 2.5 ms RBW 100 kHz VBW 300 kHz SWT 2.5 s [T1] MP VIEW [T1] MP VIEW Marker 1 [T1] Marker 1 [T1] 1] 2.41 dBm 2.43648 GHz 1.09 dBm 2.42712 GHz Ref 21.5 dBm Offset 11.5 dB Ref 21.5 dBm Offset 11.5 dB 21.5 21.5. D1 2.41 dBm -11 D2 -1 a B -21 -21 -31 -31 -40 .4 mon have the the -51 -51 -6 -71 -71 78. 78 Center 2.437 GHz 1.295 MHz/ Span 12.95 MHz Start 30 MHz 1 2.497 GHz/ Stop 25 GHz CH 11 RBW 100 kHz VBW 300 kHz SWT 2.5 ms RBW 100 kHz VBW 300 kHz SWT 2.5 s (T1) MP VIEW [T1] MP VIEW Marker 1 [T1] 1.76 dBm 2.46148 GHz Marker 1 [T1] 0.39 dBm 2.42712 GHz 21.5 - Ref 21.5 dBm Offset 11.5 dB 21.5 - Ref 21.5 dBm Offset 11.5 dB Att 20 d Att 20 dl 11 D1 1.76 dBm -21 -31 -31 -41 -5 -61 -61 (X) -70 -70 -78.5 -78.5 1 2.497 GHz/ Center 2.462 GHz 1.304 MHz/ Span 13.04 MHz I Stop 25 GHz Start 30 MHz A A



802.11g **CH** 1 RBW 100 kHz VBW 300 kHz SAVT 2.5 ms [T1] MP VIEW Marker 1 [T1] -0.78 dBm 2.40742 GHz RBW 100 kHz VBW 300 kHz SWT 2.5 s [T1] MP VIEW Marker 1 [T1] -1.39 dBm 2.37718 GHz Att 20 dE Ref 21.5 dBm Offset 11.5 dB Att 20 d 11 11 -21 . -5 -61 -61 -71 -70 -78.5 -78.5 1 2.497 GHz/ Center 2.412 GHz 1 2.162 MHz/ l Span 21.62 MHz I Stop 25 GHz Start 30 MHz CH 6 RBW 100 kHz VBW 300 kHz SWT 2.5 ms RBW 100 kHz VBW 300 kHz SWT 2.5 s [T1] MP VIEW Marker 1 [T1] -1.14 dBm ______2.44115 GHz [T1] MP VIEW Marker 1 [T1] 1.53 dBm 2.42712 GHz Att 20 dl -10 -11 -21 -21 3 n K -61 -71 -71 N. -78. 78. Center 2.437 GHz 1 2.162 MHz/ Span 21.62 MHz 1 2.497 GHz/ I Stop 25 GHz Start 30 MHz CH 11 RBW 100 kHz VBW 300 kHz SMT 2.5 ms RBW 100 kHz VBW 300 kHz SWT 2.5 s [T1] MP VIEW [T1] MP VIEW Marker 1 [T1] Marker 1 [T1] -1.67 dBm 2.45725 GHz -2.22 dBm 2.42712 GHz 21.5 - Ref 21.5 dBm Offset 11.5 dB 21.5 - Ref 21.5 dBm Offset 11.5 dB Att 20 dB Att 20 di mmmmm -11 -21 -31 .4 moundar -51 -50 -61 -61 -70 -70 -78.5 -78.5 -1 2.497 GHz/ Center 2.462 GHz 1 2.159 MHz/ l Span 21.59 MHz Start 30 MHz Stop 25 GHz A A



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:

Linko EMC/RF Lab Tel: 886-2-26052180 Fax: 886-2-26051924 Hsin Chu EMC/RF Lab Tel: 886-3-5935343 Fax: 886-3-5935342

Hwa Ya EMC/RF/Safety/Telecom Lab Tel: 886-3-3183232 Fax: 886-3-3270892

Email: <u>service.adt@tw.bureauveritas.com</u> Web Site: <u>www.bureauveritas-adt.com</u>

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.

---END----