FCC TEST REPORT (WLAN - 15.247)

REPORT NO.:	RF980729H05
MODEL NO.:	MC3190
RECEIVED:	July 29, 2009
TESTED:	Aug. 25 to 31, 2009
ISSUED:	Sep. 16, 2009

APPLICANT:	Motorola Inc.
ADDRESS:	One Motorola Plaza Holtsville NY 11742-1300 USA

ISSUED BY:	Bureau Veritas Consumer Products Services (H.K.) Ltd., Taoyuan Branch Hsin Chu Laboratory
ADDRESS:	No. 81-1, Lu Liao Keng, 9th Ling, Wu Lung Tsuen, Chiung Lin Hsiang, Hsin Chu Hsien 307, Taiwan

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1. CERTIFICATION

PRODUCT:	Mobile Computer
BRAND NAME:	MOTOROLA
MODEL NO.:	MC3190
TEST SAMPLE:	ENGINEERING SAMPLE
TESTED:	Aug. 25 to 31, 2009
APPLICANT:	Motorola Inc.
STANDARDS:	FCC Part 15, Subpart C (Section 15.247), ANSI C63.4-2003

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 : Carol Liao , **DATE:** Sep. 16, 2009
(Carol Liao, Specialist)

TECHNICAL ACCEPTANCE : , **DATE:** Sep. 16, 2009
Responsible for RF
(Hank Chung, Deputy Manager)

APPROVED BY : , **DATE:** Sep. 16, 2009
(May Chen, Deputy Manager)

2. SUMMARY OF TEST RESULTS

The EUT has been tested according to the following specifications:

For 802.11b & g, 2412~2462MHz Band

APPLIED STANDARD: FCC Part 15, Subpart C (Section 15.247)			
Standard Section	**Test Type and Limit**	**Result**	**Remark**
15.207	AC Power Conducted Emission	PASS	Meet the requirement of limit. Minimum passing margin is –12.04dB at 0.162MHz
15.247(a)(2)	Spectrum Bandwidth of a Direct Sequence Spread Spectrum System Limit: min. 500kHz	PASS	Meet the requirement of limit.
15.247(b)	Maximum Peak Output Power Limit: max. 30dBm	PASS	Meet the requirement of limit.
15.247(d)	Radiated Emissions Limit: Table 15.209	PASS	Meet the requirement of limit. Minimum passing margin is –3.66dB at 2390.00MHz
15.247(e)	Power Spectral Density Limit: max. 8dBm	PASS	Meet the requirement of limit.
15.247(d)	Conducted Out-Band Emission Measurement Limit: 20dB less than the peak value of fundamental frequency	PASS	Meet the requirement of limit.

For 802.11a, 5725~5850MHz Band

APPLIED STANDARD: FCC Part 15, Subpart C (Section 15.247)			
Standard Section	**Test Type and Limit**	**Result**	**Remark**
15.207	AC Power Conducted Emission	PASS	Meet the requirement of limit. Minimum passing margin is –12.66dB at 0.164MHz
15.247(a)(2)	Spectrum Bandwidth of a Direct Sequence Spread Spectrum System Limit: min. 500kHz	PASS	Meet the requirement of limit.
15.247(b)	Maximum Peak Output Power Limit: max. 30dBm	PASS	Meet the requirement of limit.
15.247(d)	Radiated Emissions Limit: Table 15.209	PASS	Meet the requirement of limit. Minimum passing margin is –3.71 at 11570.00
15.247(e)	Power Spectral Density Limit: max. 8dBm	PASS	Meet the requirement of limit.
15.247(d)	Conducted Out-Band Emission Measurement Limit: 20dB less than the peak value of fundamental frequency	PASS	Meet the requirement of limit.

NOTE:

1. There are Bluetooth technology and WLAN technology used for the EUT.
2. For Bluetooth technology, the test data please refer "RF980729H05-2 ".
3. For WLAN technology, the EUT was operating in 2400 ~ 2483.5MHz, 5.15~5.35GHz, 5.47~5.725GHz and 5.725~5.850GHz frequencies band. This report was recorded the RF parameters including 2400 ~ 2483.5MHz and 5.725~5.850GHz. For the 5.15~5.35GHz and 5.47~5.725GHz RF parameters was recorded in another test report "RF980729H05-1 ".

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	Value
Conducted emissions	2.44 dB
Radiated emissions (30MHz-1GHz)	3.94 dB
Radiated emissions (1GHz -18GHz)	2.44 dB
Radiated emissions (18GHz -40GHz)	2.67 dB

3. GENERAL INFORMATION

3.1 GENERAL DESCRIPTION OF EUT

PRODUCT	Mobile Computer
MODEL NO.	MC3190
FCC ID	UZ7MC3190
POWER SUPPLY	DC 12V to cradle, DC 5.4V from power adapter or DC 3.7V from battery
MODULATION TYPE	For WLAN : CCK, DQPSK, DBPSK for DSSS 64QAM, 16QAM, QPSK, BPSK for OFDM
	For Bluetooth : GFSK, π /4 – DQPSK, 8DPSK
MODULATION TECHNOLOGY	For WLAN : DSSS, OFDM
	For Bluetooth : FHSS
TRANSFER RATE	For WLAN : 802.11b: 11 / 5.5 / 2 / 1Mbps 802.11g: 54 / 48 / 36 / 24 / 18 / 12 / 9 / 6Mbps 802.11a: 54 / 48 / 36 / 24 / 18 / 12 / 9 / 6Mbps
	For Bluetooth : DH 1, DH 3, DH 5
FREQUENCY RANGE	For WLAN : **For 15.407** 802.11a: 5.18 ~ 5.32GHz, 5.50 ~ 5.70GHz **For 15.247(2.4GHz)** 802.11b & 802.11g: 2412 ~ 2462MHz **For 15.247(5GHz)** 802.11a: 5.745 ~ 5.825GHz
	For Bluetooth :2402MHz ~ 2480MHz
NUMBER OF CHANNEL	For WLAN : **For 15.407** 19 for 802.11a **For 15.247(2.4GHz)** 11 for 802.11b, 802.11g **For 15.247(5GHz)** 5 for 802.11a
	For Bluetooth : 79

MAXIMUM OUTPUT POWER	For WLAN : **For 15.407** 802.11a: 28.510mW **For 15.247(2.4GHz)** 802.11b: 52.360mW 802.11g: 165.959mW **For 15.247(5GHz)** 802.11a: 127.644mW
	For Bluetooth : GFSK: 1.445 mW 8DPSK: 2.449 mW π /4 – DQPSK: 2.265 mW
ANTENNA TYPE	Please see note 4
DATA CABLE	RS232 Cable x 1 (Part No.: 25-67866-03R) USB Cable x 1 (Part No.: 25-67868-03R) (only for test, not for sale together)
I/O PORTS	USB port x 1, SD slot port x 1, Audio port x 1
ASSOCIATED DEVICES	Battery x 1 for MC3190 (S & G) (Model No.: 82-127909-02) Battery x 1 for MC3190(R) (Model No.: 82-127912-01)

NOTE:

1. There are Bluetooth technology (BT2.1+EDR) and WLAN technology used for the EUT. <the Bluetooth test data please refer "RF980729H05-2>
2. There are different types in MC3190, which with identical WLAN module and Bluetooth module in inside.
3. The EUT was pre-tested under the following modes:

Test Mode	Description
Mode A	X-Y plane
Mode B	Z-X plane
Mode C	**Z-Y plane**

From the above modes, the worst emission level was found in **Mode C**. Therefore only the test data of the modes were recorded in this report individually.

4. There are nine antennas provided to this EUT, please refer to the following table:

For WLAN								
No.	**Brand**	**Model**	**Antenna Type**	**Gain (dBi)**	**Connecter Type**	**Frequency range (MHz)**	**Cable Loss(dB)**	**Cable Length**
1	Laird (R Type)	Rot main	PIFA	0.37(2.4G) 4.81(5G)	Hirose U.FL	2400~2500 4900~5850	0.1~0.15	25 ± 0.5mm
2	Laird (R Type)	Rot aux	PIFA	1.63(2.4G) 4.93(5G)	Hirose U.FL	2400~2500 4900~5850	0.1~0.15	61 +2/-1mm
3	Laird (S Type)	Str main	PIFA	0.89(2.4G) 4.34(5G)	Hirose U.FL	2400~2500 4900~5850	0.1~0.15	25 ± 0.5mm
4	Laird (S Type)	Str aux	PIFA	1.09(2.4G) 4.52(5G)	Hirose U.FL	2400~2500 4900~5850	0.1~0.15	61 +2/-1mm
5	Laird (G Type)	Gun main	PIFA	2.16(2.4G) 5.83(5G)	Hirose U.FL	2400~2500 4900~5850	0.1~0.15	25 ± 0.5mm
6	Laird (G Type)	Gun aux	PIFA	2.46(2.4G) 5.69(5G)	Hirose U.FL	2400~2500 4900~5850	0.1~0.15	61 +2/-1mm
Note : 1. For 2.4G: The antenna 6 was selected as representative antenna for the test. 2. For 5G: The antenna 5 was selected as representative antenna for the test.								
For Bluetooth								
No.	**Brand**	**Model**	**Antenna Type**	**Gain (dBi)**	**Connecter Type**	**Frequency range (MHz)**	**Cable Loss(dB)**	**Cable Length**
1	Motorola	Rot type	PIFA	3.08	Hirose U.FL	2400~2480	0.1~0.15	35 ± 0.5mm
2	Motorola	Str type	PIFA	2.481	Hirose U.FL	2400~2480	0.1~0.15	35 ± 0.5mm
3	Motorola	Gun type	PIFA	2.885	Hirose U.FL	2400~2480	0.1~0.15	35 ± 0.5mm

5. EUT Configuration:

	Straight type	Gun Type	Rotating type
	Type1	Type2_2	Type3
OS	WM6.1	WM6.1	WM6.1
CPU	624MHZ	624MHZ	624MHZ
RAM	128MB	128MB	128MB
Flash	512MB	512MB	512MB
Keypad	48keys	28keys	38keys
Battery	(Motorola)	(Motorola)	(Motorola)
Scan Engine	SE4500 SRBB (imager)	SE950	SE4500 HDBB DPM (imager)
wifi ANT	Str main/Str aux	Gun main/Gun aux	Rot main/Rot aux
WLAN (a/b/g)	V	V	V
BT	V	V	V

6. The EUT could be supplied with the a charger, power adapter and Li-ion battery as below:

Cradle 1 (1-slot) (only for test, not for sale together)	
Brand:	SYMBOL
Part No.:	CRD3000-1001RR
Input power :	+12V-----3.3A
I/O Ports:	USB Port x 1 RJ-45(console) Port x 1
Associated devices:	USB cable x 1 (Part No.: 25-68596-01R) (1.6m, Unshielded without core) RJ-45(console) cable x 1 (Part No.: 25-63852-01R) (1.8m, Unshielded without core) Adapter x 1 (Part No.: 50-14000-148R)
Cradle 2 (4-slot) (only for test, not for sale together)	
Brand:	SYMBOL
Part No.:	CRD3000-4001ER
Input power :	+12V-----9A
I/O Ports:	RJ-45(LAN) Port x 2
Associated devices:	Power cable x 2 (Part No.: 50-16002-042R) (1.8m, Shielded with two cores) Adapter x 2 (Part No.: 50-14000-241R)
Adapter 1 (only for Cradle 1 use, not for sale together)	
Brand:	HIPRO
Model No.:	HP-O2040D43
Part No.:	50-14000-148R
Input power :	100-240V, 50-60Hz, 1.5A
Output power :	+12V-----3.33A DC output cable (1.8m, Unshielded)
Adapter 2 (only for Cradle 2 use, not for sale together)	
Brand:	SYMBOL
Model No.:	SYM04-1
Part No.:	50-14000-241R
Input power :	100-120/200-240V, 50-60Hz, 3.0/1.5A
Output power :	+12V-----9.0A

Adapter 3 (only for test, not for sale together)	
Brand:	DELTA
Model No.:	ADP-16GB A
Part No.:	50-14000-147
Input power :	100-240V, 50-60Hz, 0.4A
Output power :	+5.4V-----3.0A DC output cable (1.8m, Unshielded, with one core)
Adapter 4 (only for test, not for sale together)	
Brand:	MOTOROLA
Model No.:	EADP-16BB A
Part No.:	50-14000-249R
Input power :	100-240V, 50-60Hz, 0.4A
Output power :	+5.4V-----3.0A DC output cable (1.8m, Unshielded)

7. The EUT operates in both the 5GHz and 2.4GHz Bands and compatibility with 802.11a, 802.11b, 802.11g and Bluetooth technology.
8. The above EUT information was 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

Operated in 2400 ~ 2483.5MHz band:

Eleven 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		

Operated in 5725 ~ 5850MHz band:

Five channels are provided for 802.11a:

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

3.2.1 TEST MODE APPLICABILITY AND TESTED CHANNEL DETAIL

The device has several types and different accessory, therefore the worst case base on investigation by different combination for each test item and its data was recorded in this report.

EUT CONFIGURE MODE	APPLICABLE TO				DESCRIPTION
	PLC	RE < 1G	RE ³ 1G	APCM	
A	√		√	√	USB Mode: Type3 MC3190+Battery+Adapter(motorola)
B	√				cradle mode: (1-slot)Type3 MC3190+Battery+Adapter
C	√	√			cradle mode: (4-slot) 2*(Type3 MC3190+Battery) +2*(Type2_2 MC3190+Battery)+Adapter

Where **PLC:** Power Line Conducted Emission **RE < 1G:** Radiated Emission below 1GHz

RE ³ 1G: Radiated Emission above 1GHz **APCM:** Antenna Port Conducted Measurement

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 CHANNEL	TESTED CHANNEL	MODULATION TECHNOLOGY	MODULATION TYPE	DATA RATE (Mbps)	EUT CONFIGURE MODE
For 2.4 GHz 802.11g	1 to 11	6	OFDM	BPSK	6	A, B, C
For 5 GHz 802.11a	149 to 165	149	OFDM	BPSK	6	A, B, C

RADIATED EMISSION TEST (BELOW 1 GHz):

☒ 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)	EUT CONFIGURE MODE
For 2.4 GHz 802.11b	1 to 11	1	DSSS	DBPSK	1	C
For 5 GHz 802.11a	149 to 165	149	OFDM	BPSK	6	C

RADIATED EMISSION TEST (ABOVE 1 GHz):

☒ 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)	EUT CONFIGURE MODE
802.11b	1 to 11	1, 6, 11	DSSS	DBPSK	1	A
802.11g	1 to 11	1, 6, 11	OFDM	BPSK	6	A
802.11a	149 to 165	149, 157, 165	OFDM	BPSK	6	A

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)	EUT CONFIGURE MODE
802.11b	1 to 11	1, 11	DSSS	DBPSK	1	A
802.11g	1 to 11	1, 11	OFDM	BPSK	6	A
802.11a	149 to 165	149, 165	OFDM	BPSK	6	A

ANTENNA PORT CONDUCTED 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)	EUT CONFIGURE MODE
802.11b	1 to 11	1, 6, 11	DSSS	DBPSK	1	A
802.11g	1 to 11	1, 6, 11	OFDM	BPSK	6	A
802.11a	149 to 165	149, 157, 165	OFDM	BPSK	6	A

3.3 GENERAL DESCRIPTION OF APPLIED STANDARDS

The EUT is a Mobile Computer. 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 C63.4-2003

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.

3.4 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.

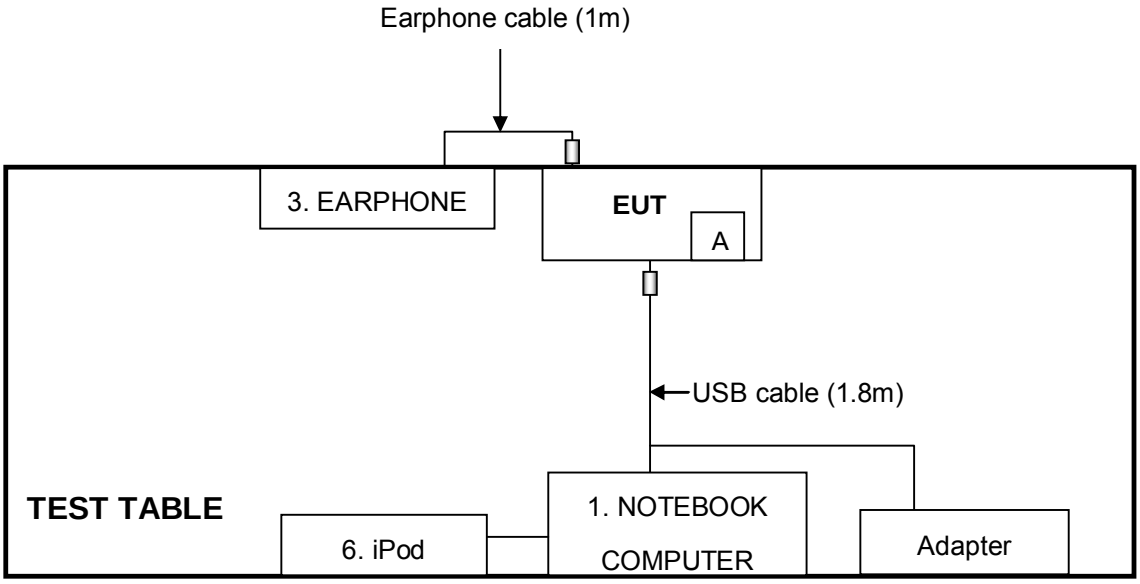
NO.	PRODUCT	BRAND	MODEL NO.	SERIAL NO.	FCC ID
1	NOTEBOOK COMPUTER	DELL	PP19L	CN-OHC416-70166-5CA-0448	PIW632500516610
2	NOTEBOOK COMPUTER	DELL	PP17L	CN-ONF743-48643-7AV-0124	FCC DoC
3	EARPHONE	SYMBOL	NA	NA	NA
4	SD CARD	Transcend	NA	NA	NA
5	BETTERY	SYMBOL	55-060112-05	N/A	NA
6	IPOD	APPLE	A1137	6U6078FMUPR	FCC DOC

No.	Signal cable description
1	NA
2	NA
3	1.3 m wrapped unshielded wire, terminated via drain wire, with 3.5 mm phone plug, w/o core.
4	NA
5	NA
6	1.2 m foil shielded wire, USB connector, w/o core.

Note: 1. All power cords of the above support units are unshielded (1.8m).

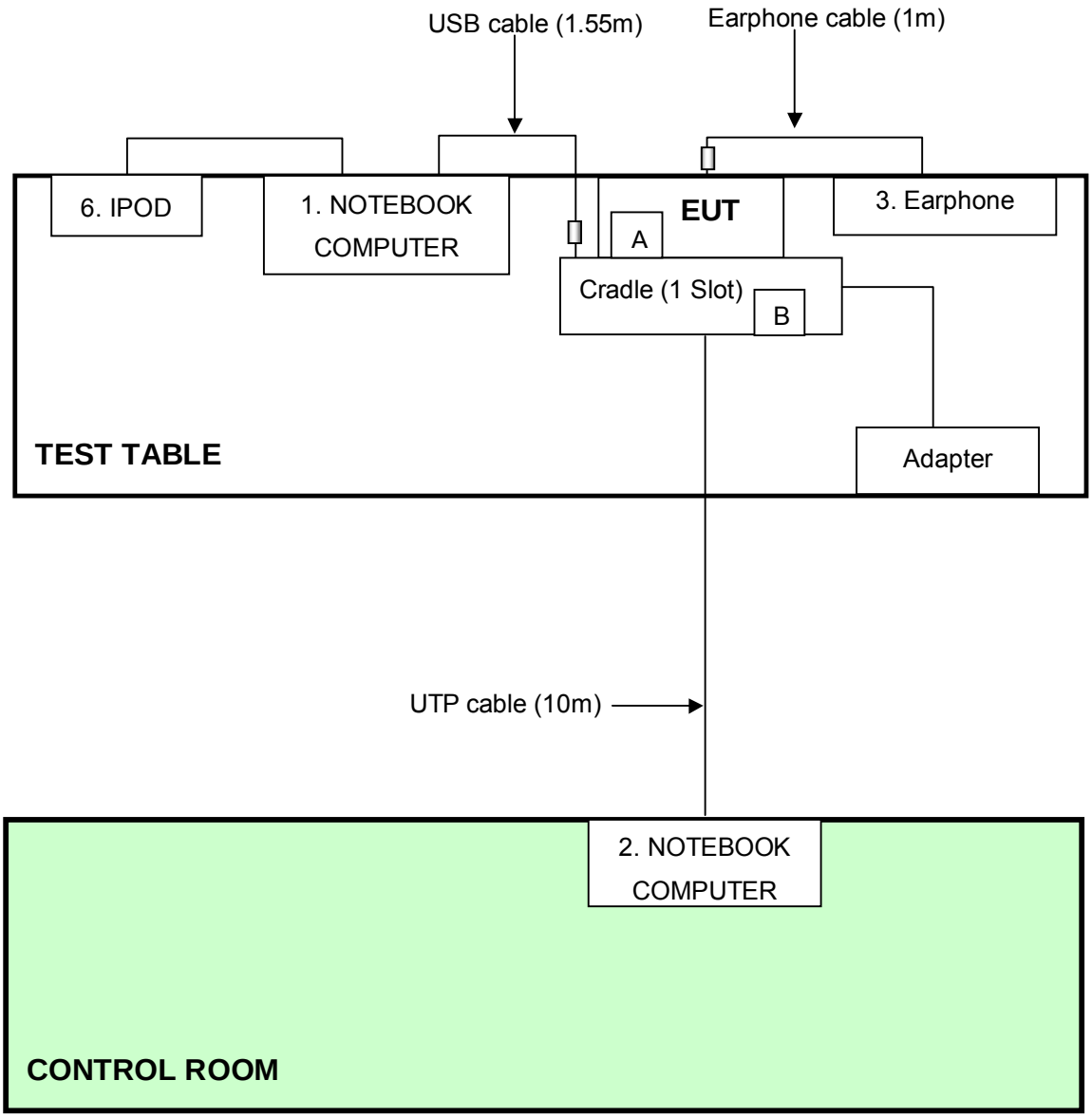
3.5 CONFIGURATION OF SYSTEM UNDER TEST

For USB Mode:



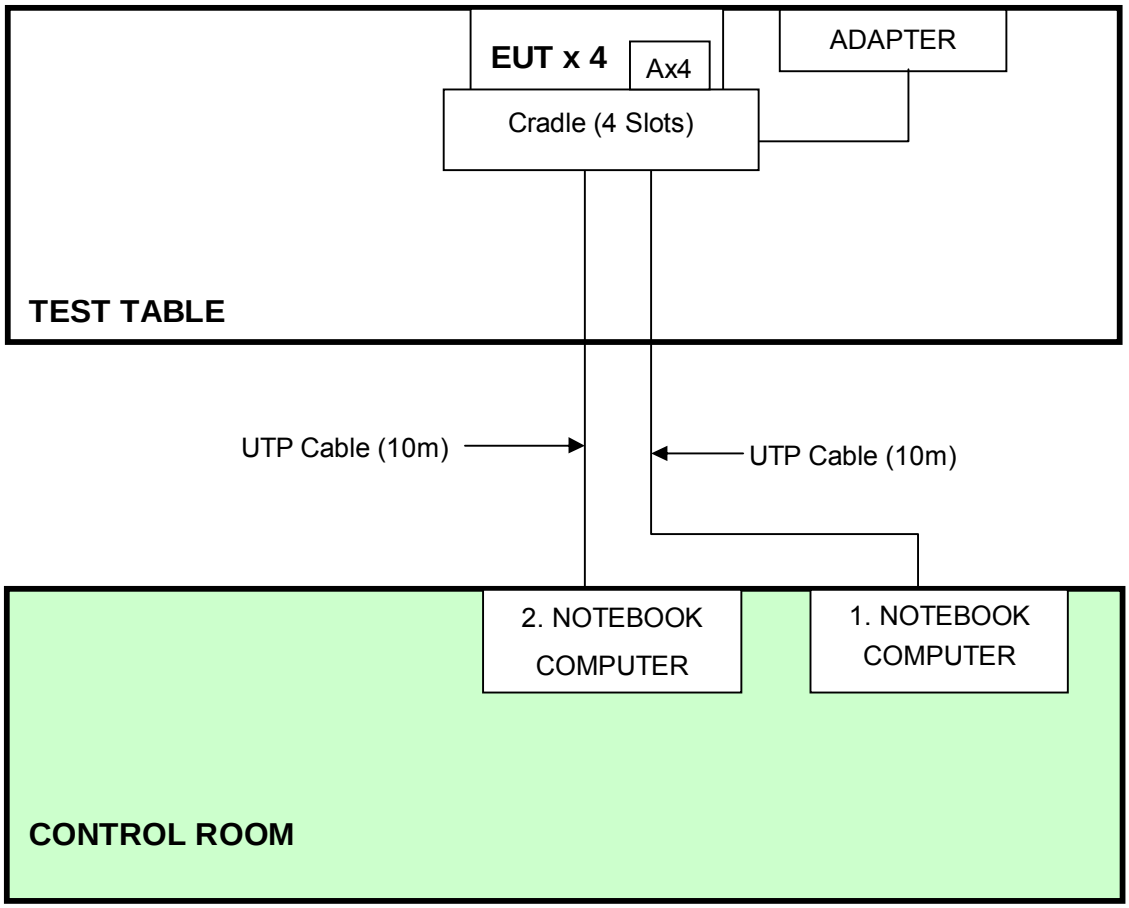
NOTE: 1. Item A is the SD Card (Support unit 4).

For Cradle (1 Slot) Mode:



NOTE: 1. Item A is the SD Card (Support unit 4).
2. Item B is the Battery (Support unit 5).

For Cradle (4 Slot) Mode:



NOTE: 1. Item A is the SD Card (Support unit 4).

4. TEST TYPES AND RESULTS (802.11b & g, 2400 ~ 2483.5MHz Band)

4.1 CONDUCTED EMISSION MEASUREMENT

4.1.1 LIMITS OF CONDUCTED EMISSION MEASUREMENT

FREQUENCY OF EMISSION (MHz)	CONDUCTED LIMIT (dBμV)	
	Quasi-peak	Average
0.15-0.5	66 to 56	56 to 46
0.5-5	56	46
5-30	60	50

NOTE:
1. The lower limit shall apply at the transition frequencies.
2. The limit decreases in line with the logarithm of the frequency in the range of 0.15 to 0.50 MHz.
3. All emanations from a class A/B digital device or system, including any network of conductors and apparatus connected thereto, shall not exceed the level of field strengths specified above.

4.1.2 TEST INSTRUMENTS

DESCRIPTION & MANUFACTURER	MODEL NO.	SERIAL NO.	CALIBRATED DATE	CALIBRATED UNTIL
Test Receiver	ESCS 30	100375	Mar. 23, 2009	Mar. 22, 2010
Line-Impedance Stabilization Network(for Peripheral)	ENV-216	100071	Nov. 26, 2008	Nov. 25, 2009
Line-Impedance Stabilization Network (for EUT)	ESH3-Z5	848773/004	Nov. 05, 2008	Nov. 04, 2009
RF Cable (JYEBAO)	5DFB	COBCAB-001	Dec 15, 2008	Dec 14, 2009
50 ohms Terminator	50	3	Nov. 05, 2008	Nov. 04, 2009
Software	BV ADT_ Cond_V7.3.7	NA	NA	NA

Note:
1. The calibration interval of the above test instruments is 12 months and the calibrations are traceable to NML/ROC and NIST/USA.
2. The test was performed in Shielded Room No. B.
3 The VCCI Con B Registration No. is C-2193.

4.1.3 TEST PROCEDURES

a. The EUT was placed 0.4 meters from the conducting wall of the shielded room with EUT being connected to the power mains through a line impedance stabilization network (LISN). Other support units were connected to the power mains through another LISN. The two LISNs provide 50 ohm/ 50uH of coupling impedance for the measuring instrument.

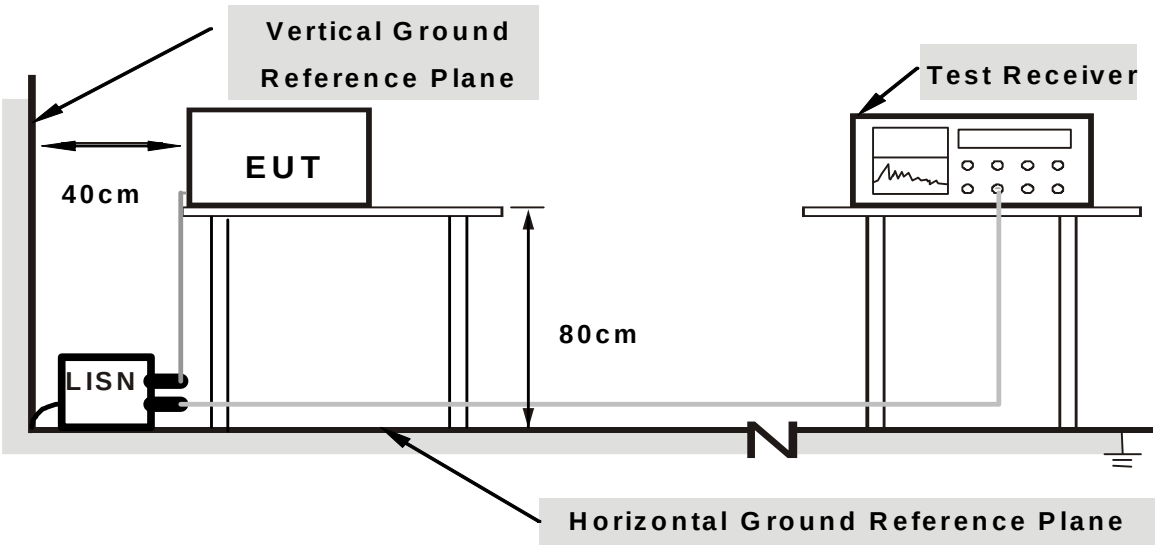
b. Both lines of the power mains connected to the EUT were checked for maximum conducted interference.

c. The frequency range from 150kHz to 30MHz was searched. Emission levels under (Limit - 20dB) were not recorded.

4.1.4 DEVIATION FROM TEST STANDARD

No deviation

4.1.5 TEST SETUP



Note: 1.Support units were connected to second LISN.
2.Both of LISNs (AMN) are 80 cm from EUT and at least 80 from other units and other metal planes

For the actual test configuration, please refer to the related item – Photographs of the Test Configuration.

4.1.6 EUT OPERATING CONDITIONS

For USB Mode:

1. Set the EUT under charger condition via USB charging cable.
2. EUT runs the test program " CEcTxRx.v1.5.0.0" to transmission/receiving condition continuously.

For Cradle Mode:

1. Set the EUT under charger condition via cradle.
2. EUT runs the test program " CEcTxRx.v1.5.0.0" to transmission/receiving condition continuously.

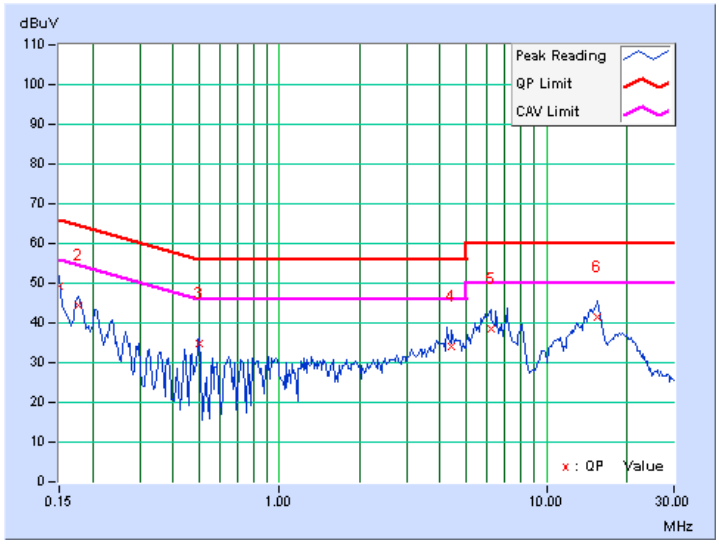
4.1.7 TEST RESULTS

802.11g OFDM MODULATION: For USB Mode

EUT TEST CONDITION		MEASUREMENT DETAIL	
CHANNEL	Channel 6	**PHASE**	Line (L)
MODULATION TYPE	BPSK	**6dB BANDWIDTH**	9 kHz
TRANSFER RATE	6Mbps	**INPUT POWER (SYSTEM)**	120Vac, 60 Hz
ENVIRONMENTAL CONDITIONS	26deg. C, 63%RH, 965hPa	**TESTED BY**	Wen Yu

No	Freq.	Corr. Factor	Reading Value [dB (uV)]		Emission Level [dB (uV)]		Limit [dB (uV)]		Margin (dB)	
	[MHz]	(dB)	Q.P.	AV.	Q.P.	AV.	Q.P.	AV.	Q.P.	AV.
1	0.150	0.17	48.97	-	49.14	-	66.00	56.00	-16.86	-
2	0.177	0.18	44.09	-	44.27	-	64.61	54.61	-20.34	-
3	0.502	0.23	34.71	-	34.94	-	56.00	46.00	-21.06	-
4	4.402	0.65	33.59	-	34.24	-	56.00	46.00	-21.76	-
5	6.180	0.76	37.68	-	38.44	-	60.00	50.00	-21.56	-
6	15.492	1.19	40.36	-	41.55	-	60.00	50.00	-18.45	-

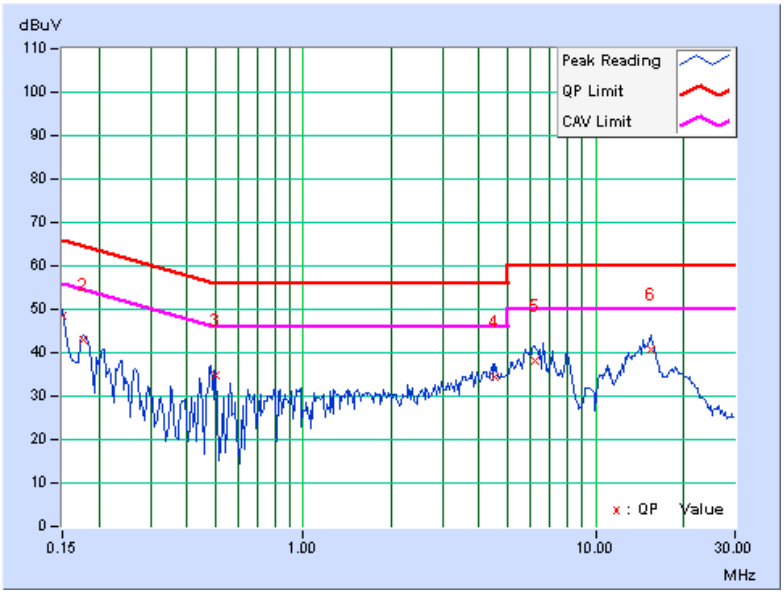
REMARKS: 1. Q.P. and AV. are abbreviations of quasi-peak and average individually.
2. "-": The Quasi-peak reading value also meets average limit and measurement with the average detector is unnecessary.
3. The emission levels of other frequencies were very low against the limit.
4. Margin value = Emission level - Limit value
5. Correction factor = Insertion loss + Cable loss
6. Emission Level = Correction Factor + Reading Value.



EUT TEST CONDITION		MEASUREMENT DETAIL	
CHANNEL	Channel 6	PHASE	Neutral (N)
MODULATION TYPE	BPSK	6dB BANDWIDTH	9 kHz
TRANSFER RATE	6Mbps	INPUT POWER (SYSTEM)	120Vac, 60 Hz
ENVIRONMENTAL CONDITIONS	26deg. C, 63%RH, 965hPa	TESTED BY	Wen Yu

No	Freq.	Corr. Factor	Reading Value [dB (uV)]		Emission Level [dB (uV)]		Limit [dB (uV)]		Margin (dB)	
	[MHz]	(dB)	Q.P.	AV.	Q.P.	AV.	Q.P.	AV.	Q.P.	AV.
1	0.150	0.10	48.30	-	48.40	-	66.00	56.00	-17.60	-
2	0.177	0.11	42.85	-	42.96	-	64.61	54.61	-21.65	-
3	0.502	0.17	34.57	-	34.74	-	56.00	46.00	-21.26	-
4	4.523	0.58	33.73	-	34.31	-	56.00	46.00	-21.69	-
5	6.199	0.66	37.47	-	38.13	-	60.00	50.00	-21.87	-
6	15.426	0.98	39.87	-	40.85	-	60.00	50.00	-19.15	-

REMARKS: 1. Q.P. and AV. are abbreviations of quasi-peak and average individually.
2. "-": The Quasi-peak reading value also meets average limit and measurement with the average detector is unnecessary.
3. The emission levels of other frequencies were very low against the limit.
4. Margin value = Emission level - Limit value
5. Correction factor = Insertion loss + Cable loss
6. Emission Level = Correction Factor + Reading Value.

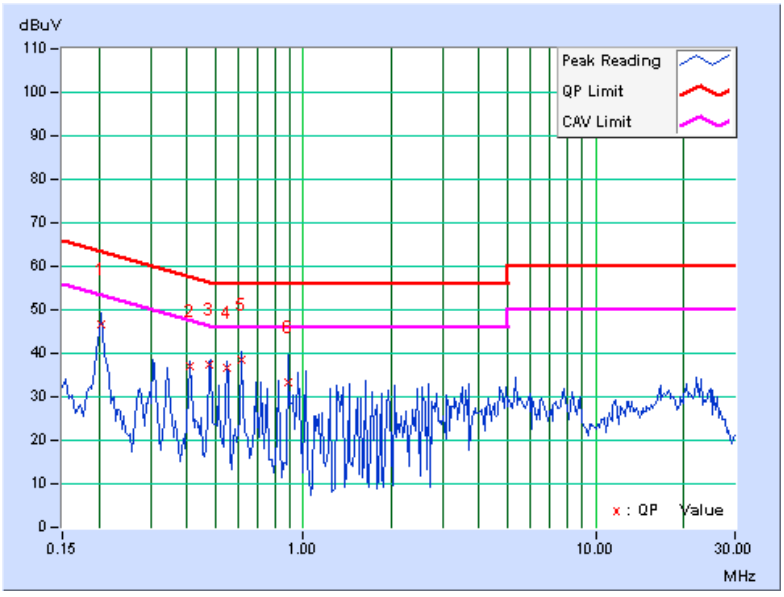


802.11g OFDM MODULATION: For Cradle (1 Slot) Mode

EUT TEST CONDITION		MEASUREMENT DETAIL	
CHANNEL	Channel 6	PHASE	Line (L)
MODULATION TYPE	BPSK	6dB BANDWIDTH	9 kHz
TRANSFER RATE	6Mbps	INPUT POWER (SYSTEM)	120Vac, 60 Hz
ENVIRONMENTAL CONDITIONS	26deg. C, 63%RH, 965hPa	TESTED BY	Wen Yu

No	Freq.	Corr. Factor	Reading Value [dB (uV)]		Emission Level [dB (uV)]		Limit [dB (uV)]		Margin (dB)	
	[MHz]	(dB)	Q.P.	AV.	Q.P.	AV.	Q.P.	AV.	Q.P.	AV.
1	0.205	0.18	46.45	-	46.63	-	63.42	53.42	-16.79	-
2	0.408	0.19	36.77	-	36.96	-	57.69	47.69	-20.73	-
3	0.478	0.22	37.04	-	37.26	-	56.37	46.37	-19.11	-
4	0.548	0.25	36.52	-	36.77	-	56.00	46.00	-19.23	-
5	0.615	0.28	38.18	-	38.46	-	56.00	46.00	-17.54	-
6	0.884	0.39	32.97	-	33.36	-	56.00	46.00	-22.64	-

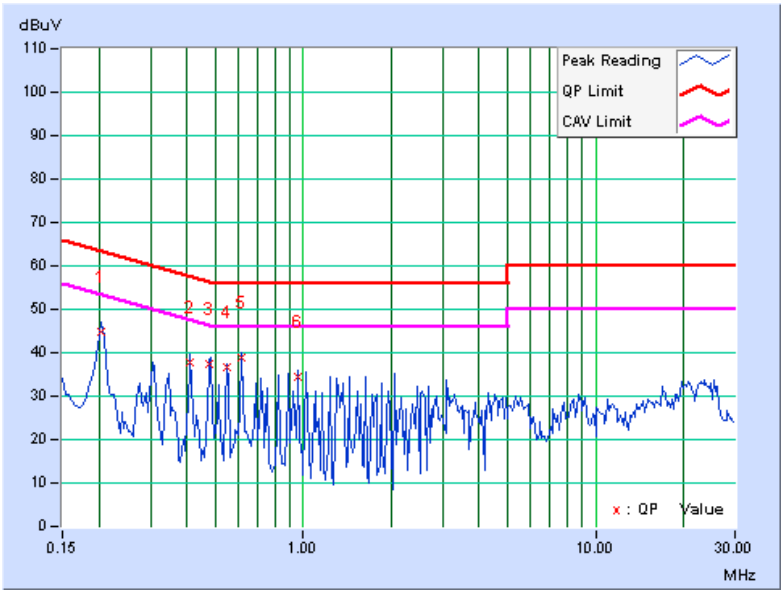
REMARKS: 1. Q.P. and AV. are abbreviations of quasi-peak and average individually.
2. "-": The Quasi-peak reading value also meets average limit and measurement with the average detector is unnecessary.
3. The emission levels of other frequencies were very low against the limit.
4. Margin value = Emission level - Limit value
5. Correction factor = Insertion loss + Cable loss
6. Emission Level = Correction Factor + Reading Value.



EUT TEST CONDITION		MEASUREMENT DETAIL	
CHANNEL	Channel 6	PHASE	Neutral (N)
MODULATION TYPE	BPSK	6dB BANDWIDTH	9 kHz
TRANSFER RATE	6Mbps	INPUT POWER (SYSTEM)	120Vac, 60 Hz
ENVIRONMENTAL CONDITIONS	26deg. C, 63%RH, 965hPa	TESTED BY	Wen Yu

No	Freq.	Corr. Factor	Reading Value [dB (uV)]		Emission Level [dB (uV)]		Limit [dB (uV)]		Margin (dB)	
	[MHz]	(dB)	Q.P.	AV.	Q.P.	AV.	Q.P.	AV.	Q.P.	AV.
1	0.205	0.11	44.60	-	44.71	-	63.42	53.42	-18.71	-
2	0.412	0.13	37.63	-	37.76	-	57.61	47.61	-19.85	-
3	0.478	0.16	37.32	-	37.48	-	56.37	46.37	-18.89	-
4	0.548	0.18	36.56	-	36.74	-	56.00	46.00	-19.26	-
5	0.615	0.21	38.64	-	38.85	-	56.00	46.00	-17.15	-
6	0.959	0.33	33.97	-	34.30	-	56.00	46.00	-21.70	-

REMARKS: 1. Q.P. and AV. are abbreviations of quasi-peak and average individually.
2. "-": The Quasi-peak reading value also meets average limit and measurement with the average detector is unnecessary.
3. The emission levels of other frequencies were very low against the limit.
4. Margin value = Emission level - Limit value
5. Correction factor = Insertion loss + Cable loss
6. Emission Level = Correction Factor + Reading Value.

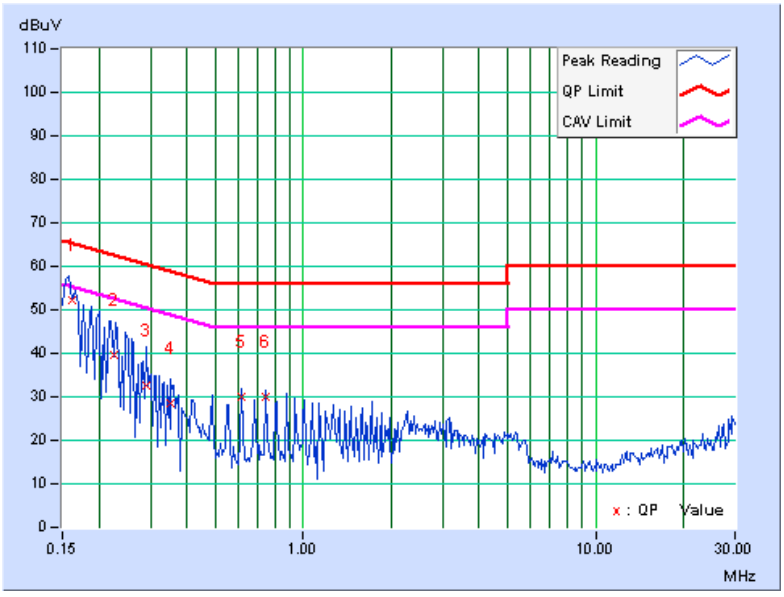


802.11g OFDM MODULATION: For Cradle (4 Slot) Mode

EUT TEST CONDITION		MEASUREMENT DETAIL	
CHANNEL	Channel 6	PHASE	Line (L)
MODULATION TYPE	BPSK	6dB BANDWIDTH	9 kHz
TRANSFER RATE	6Mbps	INPUT POWER (SYSTEM)	120Vac, 60 Hz
ENVIRONMENTAL CONDITIONS	26deg. C, 63%RH, 965hPa	TESTED BY	Wen Yu

No	Freq.	Corr. Factor	Reading Value [dB (uV)]		Emission Level [dB (uV)]		Limit [dB (uV)]		Margin (dB)	
	[MHz]	(dB)	Q.P.	AV.	Q.P.	AV.	Q.P.	AV.	Q.P.	AV.
1	0.162	0.17	52.05	-	52.22	-	65.37	55.37	-13.15	-
2	0.227	0.18	39.36	-	39.54	-	62.57	52.57	-23.03	-
3	0.291	0.18	32.54	-	32.72	-	60.51	50.51	-27.78	-
4	0.353	0.19	28.48	-	28.67	-	58.89	48.89	-30.22	-
5	0.615	0.28	29.59	-	29.87	-	56.00	46.00	-26.13	-
6	0.744	0.33	29.49	-	29.82	-	56.00	46.00	-26.18	-

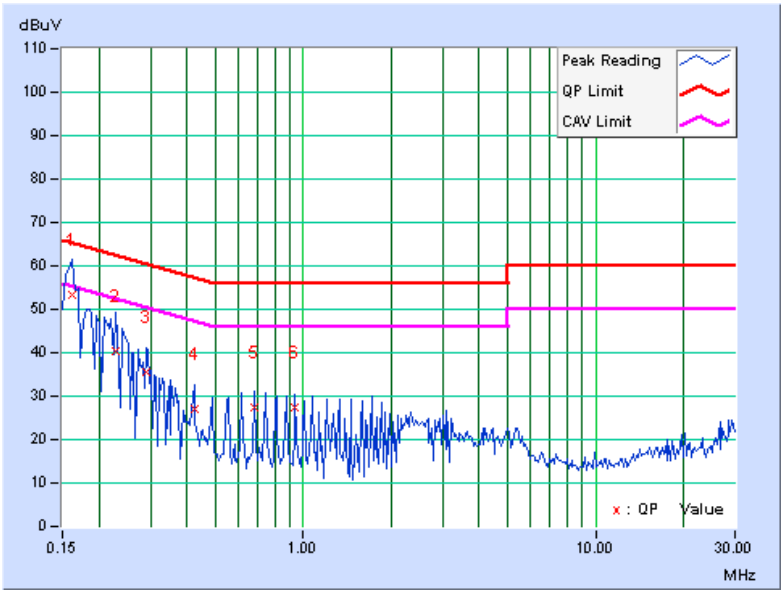
REMARKS: 1. Q.P. and AV. are abbreviations of quasi-peak and average individually.
2. "-": The Quasi-peak reading value also meets average limit and measurement with the average detector is unnecessary.
3. The emission levels of other frequencies were very low against the limit.
4. Margin value = Emission level - Limit value
5. Correction factor = Insertion loss + Cable loss
6. Emission Level = Correction Factor + Reading Value.



EUT TEST CONDITION		MEASUREMENT DETAIL	
CHANNEL	Channel 6	PHASE	Neutral (N)
MODULATION TYPE	BPSK	6dB BANDWIDTH	9 kHz
TRANSFER RATE	6Mbps	INPUT POWER (SYSTEM)	120Vac, 60 Hz
ENVIRONMENTAL CONDITIONS	26deg. C, 63%RH, 965hPa	TESTED BY	Wen Yu

No	Freq.	Corr. Factor	Reading Value [dB (uV)]		Emission Level [dB (uV)]		Limit [dB (uV)]		Margin (dB)	
	[MHz]	(dB)	Q.P.	AV.	Q.P.	AV.	Q.P.	AV.	Q.P.	AV.
1	**0.162**	**0.10**	**53.23**	**-**	**53.33**	**-**	**65.38**	**55.38**	**-12.04**	**-**
2	0.228	0.11	40.18	-	40.29	-	62.52	52.52	-22.23	-
3	0.291	0.12	35.27	-	35.39	-	60.51	50.51	-25.12	-
4	0.423	0.14	27.04	-	27.18	-	57.38	47.38	-30.20	-
5	0.681	0.23	27.17	-	27.40	-	56.00	46.00	-28.60	-
6	0.939	0.33	26.90	-	27.23	-	56.00	46.00	-28.77	-

REMARKS: 1. Q.P. and AV. are abbreviations of quasi-peak and average individually.
2. "-": The Quasi-peak reading value also meets average limit and measurement with the average detector is unnecessary.
3. The emission levels of other frequencies were very low against the limit.
4. Margin value = Emission level - Limit value
5. Correction factor = Insertion loss + Cable loss
6. Emission Level = Correction Factor + Reading Value.



4.2 RADIATED EMISSION MEASUREMENT

4.2.1 LIMITS OF RADIATED EMISSION MEASUREMENT

Emissions radiated outside of the specified bands, shall be according to the general radiated limits in 15.209 as following:

Frequencies (MHz)	Field strength (microvolts/meter)	Measurement distance (meters)
0.009-0.490	2400/F(kHz)	300
0.490-1.705	24000/F(kHz)	30
1.705-30.0	30	30
30-88	100	3
88-216	150	3
216-960	200	3
Above 960	500	3

NOTE:

1. The lower limit shall apply at the transition frequencies.
2. Emission level (dBuV/m) = 20 log Emission level (uV/m).
3. As shown in 15.35(b), for frequencies above 1000MHz, the field strength limits are based on average detector, however, the peak field strength of any emission shall not exceed the maximum permitted average limits, specified above by more than 20dB under any condition of modulation.

4.2.2 TEST INSTRUMENTS

For radiated emission test (Below 1 GHz):

DESCRIPTION & MANUFACTURER	MODEL NO.	SERIAL NO.	CALIBRATED DATE	CALIBRATED UNTIL
ROHDE & SCHWARZ Spectrum Analyzer	FSP40	100036	Dec. 9, 2008	Dec. 8, 2009
HP Pre_Amplifier	8449B	3008A01923	Nov. 10, 2008	Nov. 9, 2009
ROHDE & SCHWARZ Test Receiver	ESCS30	847124/029	Sep. 9, 2008	Sep. 8, 2009
SCHWARZBECK TRILOG Broadband Antenna	VULB 9168	138	April 29, 2009	April 28, 2010
Schwarzbeck Horn_Antenna	BBHA9120	D124	Dec. 09, 2008	Dec. 08, 2009
Schwarzbeck Horn_Antenna	BBHA 9170	BBHA9170153	Jan. 22, 2009	Jan. 21, 2010
RF Switches	EMH-011	08009	Oct. 07, 2008	Oct. 06, 2009
RF CABLE (Chaintek)	Sucoflex 106	28077	Aug. 14, 2009	Aug. 13, 2010
RF Cable	8DFB	STCCAB-30M-1GHz	Oct. 07, 2008	Oct. 06, 2009
Software	ADT_Radiated_V7.6.15.9.2	NA	NA	NA
CT Antenna Tower & Turn Table	NA	NA	NA	NA

Note: 1. The calibration interval of the above test instruments is 12 months and the calibrations are traceable to NML/ROC and NIST/USA.
2. The horn antenna, HP preamplifier (model: 8449B) and Spectrum Analyzer (model: FSP40) are used only for the measurement of emission frequency above 1GHz if tested.
3. The test was performed in Open Site No. C.
4. The FCC Site Registration No. is 656396.
5. The VCCI Site Registration No. is R-1626.
6. The CANADA Site Registration No. is IC 7450G-3.

For radiated emission test (Above 1 GHz):

DESCRIPTION & MANUFACTURER	MODEL NO.	SERIAL NO.	CALIBRATED DATE	CALIBRATED UNTIL
ADVANTEST Spectrum Analyzer	U3751	170100022	Nov. 17, 2008	Nov. 16, 2009
ADVANTEST Spectrum Analyzer	U3772	160100280	July 25, 2009	July 24, 2010
HP Pre_Amplifier	8449B	3008A01922	Sep. 25, 2008	Sep. 24, 2009
ROHDE & SCHWARZ Test Receiver	ESVS 30	841977/002	Nov. 03, 2008	Nov. 02, 2009
SCHAFFNER(CHASE) Broadband Antenna	CBL6112B	2798	April 29, 2009	April 28, 2010
Schwarzbeck Horn_Antenna	BBHA9120-D1	D123	Sep. 30, 2008	Sep. 29, 2009
Schwarzbeck Horn_Antenna	BBHA 9170	BBHA9170153	Jan. 23, 2009	Jan. 22, 2010
RF Switches	MP59B	6100175593	Sep. 02, 2008	Sep. 01, 2009
RF Cable	8DFB	STBCAB-30M-1GHz	Sep. 02, 2008	Sep. 01, 2009
Software	ADT_Radiated_V7.6.15.9.2	NA	NA	NA
CT Antenna Tower & Turn Table	NA	NA	NA	NA
CORCOM AC Filter	MRI2030	024/019	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, HP preamplifier (model: 8449B) and Spectrum Analyzer (model: U3772) are used only for the measurement of emission frequency above 1GHz if tested.
3. The test was performed in Open Site No. B.
4. The VCCI Site Registration No. is R-847.
5. The FCC Site Registration No. is 92753.
6. The CANADA Site Registration No. is IC 7450G-2.

4.2.3 TEST PROCEDURES

a. The EUT was placed on the top of a rotating table 0.8 meters above the ground at a 10 meter open area test site. The table was rotated 360 degrees to determine the position of the highest radiation.

b. The EUT was set 3 meters away from the interference-receiving antenna, which was mounted on the top of a variable-height antenna tower.

c. The antenna is a broadband antenna, and its height is varied from one meter to four meters above the ground to determine the maximum value of the field strength. Both horizontal and vertical polarizations of the antenna are set to make the measurement.

d. For each suspected emission, the EUT was arranged to its worst case and then the antenna was tuned to heights from 1 meter to 4 meters and the rotatable table was turned from 0 degrees to 360 degrees to find the maximum reading.

e. The test-receiver system was set to Peak Detect Function and Specified Bandwidth with Maximum Hold Mode.

f. If the emission level of the EUT in peak mode was 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.

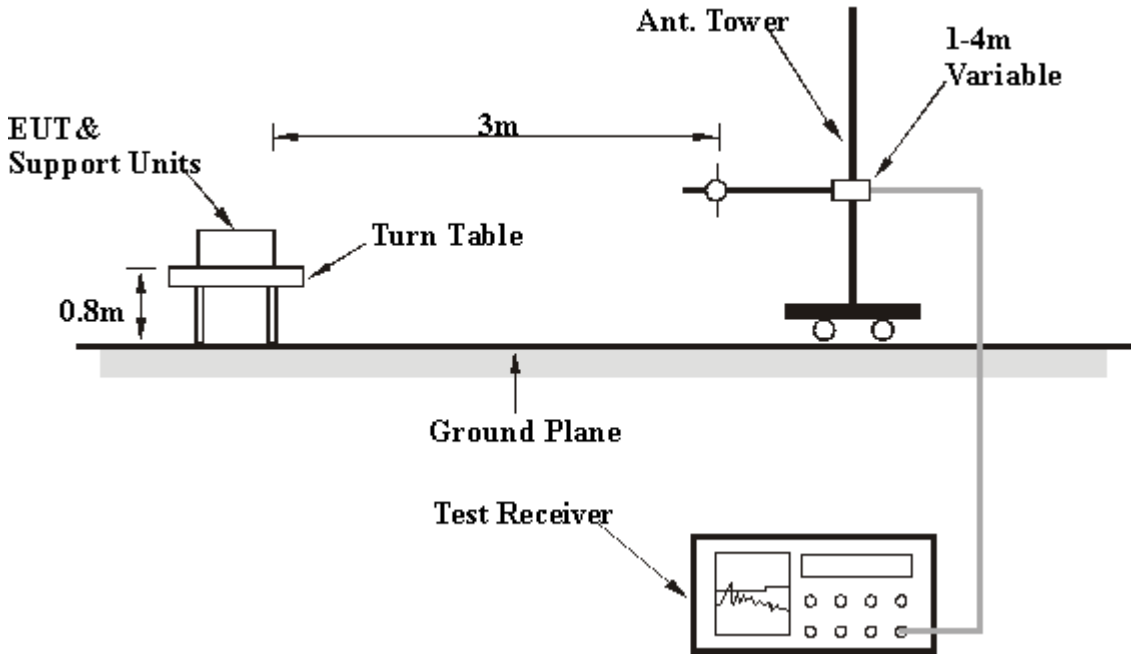
NOTE:

1. The resolution bandwidth and video bandwidth of test receiver/spectrum analyzer is 120kHz for Peak detection (PK) and Quasi-peak detection (QP) at frequency below 1GHz.
2. The resolution bandwidth of test receiver/spectrum analyzer is 1 MHz and the video bandwidth is 3 MHz for Peak detection (PK) at frequency above 1GHz.
3. The resolution bandwidth of test receiver/spectrum analyzer is 1 MHz and the video bandwidth is 10 Hz for Average detection (AV) at frequency above 1GHz.

4.2.4 DEVIATION FROM TEST STANDARD

No deviation

4.2.5 TEST SETUP



For the actual test configuration, please refer to the related item – Photographs of the Test Configuration.

4.2.6 EUT OPERATING CONDITIONS

Same as the 4.1.6.

4.2.7 TEST RESULTS

BELOW 1GHz WORST-CASE DATA：802.11b DSSS MODULATION

EUT TEST CONDITION		MEASUREMENT DETAIL	
CHANNEL	Channel 1	FREQUENCY RANGE	Below 1000MHz
INPUT POWER (SYSTEM)	120Vac, 60 Hz	DETECTOR FUNCTION	Quasi-Peak
ENVIRONMENTAL CONDITIONS	25.0deg. C, 66.0%RH 965hPa	TESTED BY	Frank Liu

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	40.67	23.74 QP	40.00	-16.26	1.49 H	177	9.14	14.60
2	65.74	28.20 QP	40.00	-11.80	1.37 H	96	14.71	13.49
3	139.24	29.56 QP	43.50	-13.94	1.15 H	92	15.03	14.53
4	173.32	29.62 QP	43.50	-13.88	1.00 H	198	14.53	15.09
5	250.00	27.84 QP	46.00	-18.16	1.00 H	196	13.59	14.25
6	375.00	37.53 QP	46.00	-8.47	1.00 H	174	18.72	18.81
ANTENNA POLARITY & TEST DISTANCE: VERTICAL AT 3 M								
NO.	FREQ. (MHz)	EMISSION LEVEL (dBuV/m)	LIMIT (dBuV/m)	MARGIN (dB)	ANTENNA HEIGHT (m)	TABLE ANGLE (Degree)	RAW VALUE (dBuV)	CORRECTION FACTOR (dB/m)
1	39.56	30.73 QP	40.00	-9.27	1.00 V	222	16.25	14.48
2	79.95	26.58 QP	40.00	-13.42	1.00 V	272	15.69	10.89
3	135.24	27.43 QP	43.50	-16.07	1.00 V	148	13.31	14.12
4	151.56	28.29 QP	43.50	-15.21	1.00 V	13	12.55	15.74
5	250.00	25.43 QP	46.00	-20.57	1.00 V	20	11.18	14.25
6	375.00	35.74 QP	46.00	-10.26	1.00 V	127	16.93	18.81

REMARKS: 1. Emission level (dBuV/m) = Raw Value (dBuV) + Correction Factor (dB/m).

2. Correction Factor (dB/m) = Antenna Factor (dB/m) + Cable Factor (dB).

3. The other emission levels were very low against the limit.

4. Margin value = Emission level – Limit value.

ABOVE 1GHz WORST-CASE DATA

802.11b DSSS MODULATION

EUT TEST CONDITION		MEASUREMENT DETAIL	
CHANNEL	Channel 1	FREQUENCY RANGE	1 ~ 25GHz
INPUT POWER (SYSTEM)	120Vac, 60 Hz	DETECTOR FUNCTION	Peak (PK) Average (AV)
ENVIRONMENTAL CONDITIONS	25.0deg. C, 66.0%RH 965hPa	TESTED BY	Frank Liu

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	55.32 PK	74.00	-18.68	1.07 H	120	23.39	31.93
2	2390.00	45.79 AV	54.00	-8.21	1.07 H	120	13.86	31.93
3	*2412.00	104.50 PK			1.06 H	102	72.48	32.02
4	*2412.00	102.00 AV			1.06 H	102	69.98	32.02
5	4824.00	49.10 PK	74.00	-24.90	1.39 H	274	13.13	35.97
6	4824.00	46.70 AV	54.00	-7.30	1.39 H	274	10.73	35.97
7	#7236.00	47.90 PK	84.50	-36.60	1.21 H	20	5.66	42.24
8	#7236.00	35.70 AV	82.00	-46.30	1.21 H	20	-6.54	42.24
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	57.63 PK	74.00	-16.37	1.22 V	202	25.70	31.93
2	2390.00	46.05 AV	54.00	-7.95	1.22 V	202	14.12	31.93
3	*2412.00	104.90 PK			1.04 V	121	72.88	32.02
4	*2412.00	102.40 AV			1.04 V	121	70.38	32.02
5	4824.00	48.00 PK	74.00	-26.00	1.00 V	263	12.03	35.97
6	4824.00	44.30 AV	54.00	-9.70	1.00 V	263	8.33	35.97
7	#7236.00	47.30 PK	84.90	-37.60	1.02 V	157	5.06	42.24
8	#7236.00	35.40 AV	82.40	-47.00	1.02 V	157	-6.84	42.24

REMARKS: 1. Emission level (dBuV/m) = Raw Value (dBuV) + Correction Factor (dB/m).

2. Correction Factor (dB/m) = Antenna Factor (dB/m) + Cable Factor (dB).
3. The other emission levels were very low against the limit.
4. Margin value = Emission level – Limit value.
5. " * ": Fundamental frequency.
6. "#":The radiated frequency is out the restricted band.

EUT TEST CONDITION		MEASUREMENT DETAIL	
CHANNEL	Channel 6	FREQUENCY RANGE	1 ~ 25GHz
INPUT POWER (SYSTEM)	120Vac, 60 Hz	DETECTOR FUNCTION	Peak (PK) Average (AV)
ENVIRONMENTAL CONDITIONS	25.0deg. C, 66.0%RH 965hPa	TESTED BY	Frank Liu

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	103.20 PK			1.04 H	109	71.09	32.11
2	*2437.00	101.10 AV			1.04 H	109	68.99	32.11
3	4874.00	49.60 PK	74.00	-24.40	1.44 H	275	13.52	36.08
4	4874.00	46.30 AV	54.00	-7.70	1.44 H	275	10.22	36.08
5	7311.00	48.30 PK	74.00	-25.70	1.26 H	39	5.78	42.52
6	7311.00	36.40 AV	54.00	-17.60	1.26 H	39	-6.12	42.52
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	103.70 PK			1.02 V	129	71.59	32.11
2	*2437.00	101.40 AV			1.02 V	129	69.29	32.11
3	4874.00	47.60 PK	74.00	-26.40	1.00 V	264	11.52	36.08
4	4874.00	44.20 AV	54.00	-9.80	1.00 V	264	8.12	36.08
5	7311.00	47.60 PK	74.00	-26.40	1.04 V	127	5.08	42.52
6	7311.00	35.90 AV	54.00	-18.10	1.04 V	127	-6.62	42.52

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

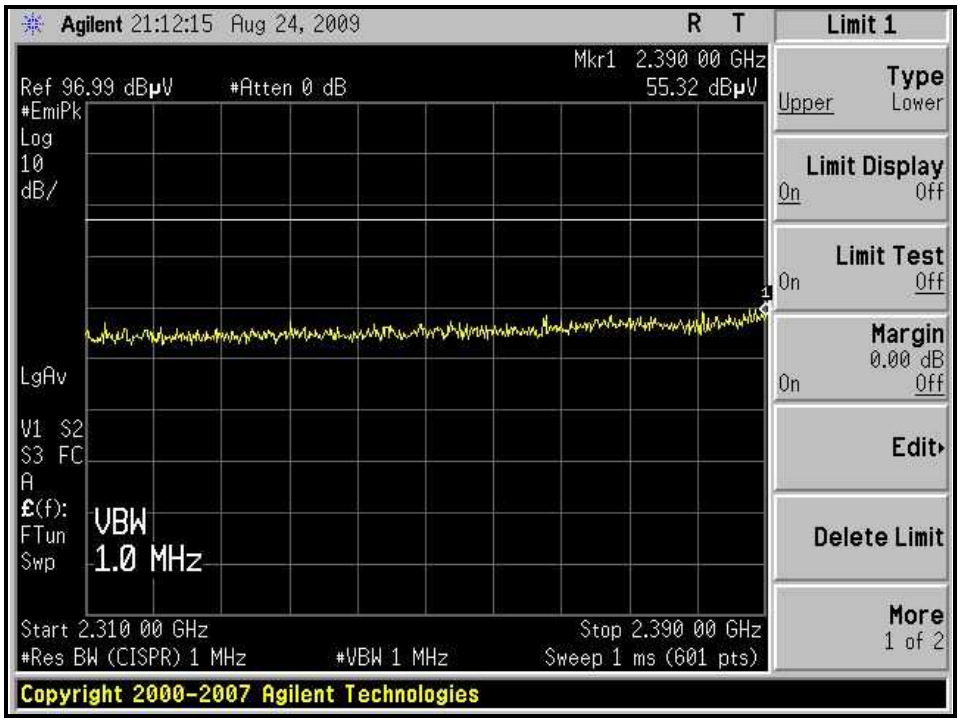
EUT TEST CONDITION		MEASUREMENT DETAIL	
CHANNEL	Channel 11	FREQUENCY RANGE	1 ~ 25GHz
INPUT POWER (SYSTEM)	120Vac, 60 Hz	DETECTOR FUNCTION	Peak (PK) Average (AV)
ENVIRONMENTAL CONDITIONS	25.0deg. C, 66.0%RH 965hPa	TESTED BY	Frank Liu

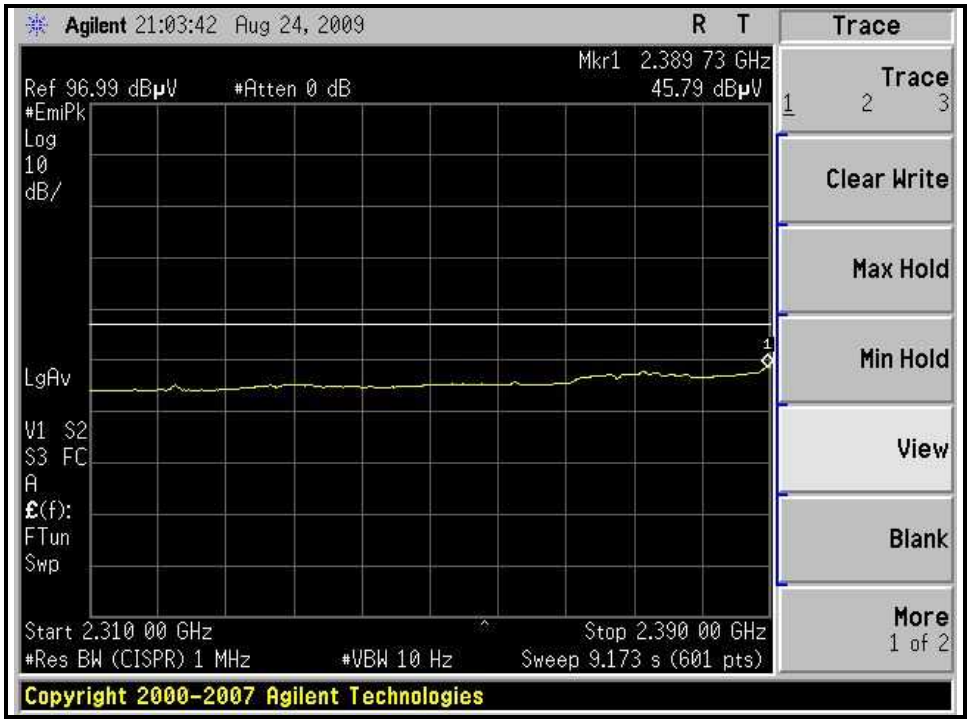
ANTENNA POLARITY & TEST DISTANCE: HORIZONTAL AT 3 M								
NO.	FREQ. (MHz)	EMISSION LEVEL (dBuV/m)	LIMIT (dBuV/m)	MARGIN (dB)	ANTENNA HEIGHT (m)	TABLE ANGLE (Degree)	RAW VALUE (dBuV)	CORRECTION FACTOR (dB/m)
1	*2462.00	101.13 PK			1.00 H	302	68.92	32.21
2	*2462.00	98.24 AV			1.00 H	302	66.03	32.21
3	2483.50	53.25 PK	74.00	-20.75	1.00 H	302	20.96	32.29
4	2483.50	42.37 AV	54.00	-11.63	1.00 H	302	10.08	32.29
5	4924.00	49.45 PK	74.00	-24.55	1.40 H	273	13.26	36.19
6	4924.00	46.00 AV	54.00	-8.00	1.40 H	273	9.81	36.19
7	7386.00	49.30 PK	74.00	-24.70	1.24 H	37	6.50	42.80
8	7386.00	38.20 AV	54.00	-15.80	1.24 H	37	-4.60	42.80
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	102.30 PK			1.18 V	202	70.09	32.21
2	*2462.00	99.00 AV			1.18 V	202	66.79	32.21
3	2483.58	55.14 PK	74.00	-18.86	1.16 V	204	22.85	32.29
4	2483.58	42.98 AV	54.00	-11.02	1.16 V	204	10.69	32.29
5	4924.00	47.20 PK	74.00	-26.80	1.06 V	247	11.01	36.19
6	4924.00	44.00 AV	54.00	-10.00	1.06 V	247	7.81	36.19
7	7386.00	46.30 PK	74.00	-27.70	1.01 V	136	3.50	42.80
8	7386.00	36.20 AV	54.00	-17.80	1.01 V	136	-6.60	42.80

REMARKS: 1. Emission level (dBuV/m) = Raw Value (dBuV) + Correction Factor (dB/m).

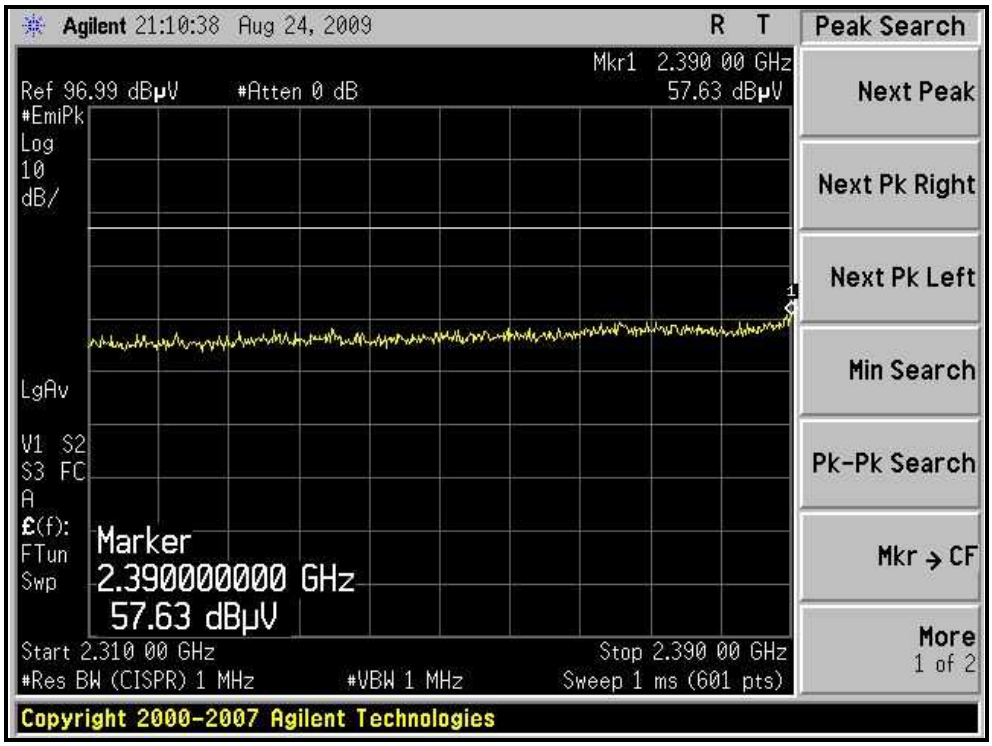
2. Correction Factor (dB/m) = Antenna Factor (dB/m) + Cable Factor (dB).
3. The other emission levels were very low against the limit.
4. Margin value = Emission level – Limit value.
5. " * ": Fundamental frequency.

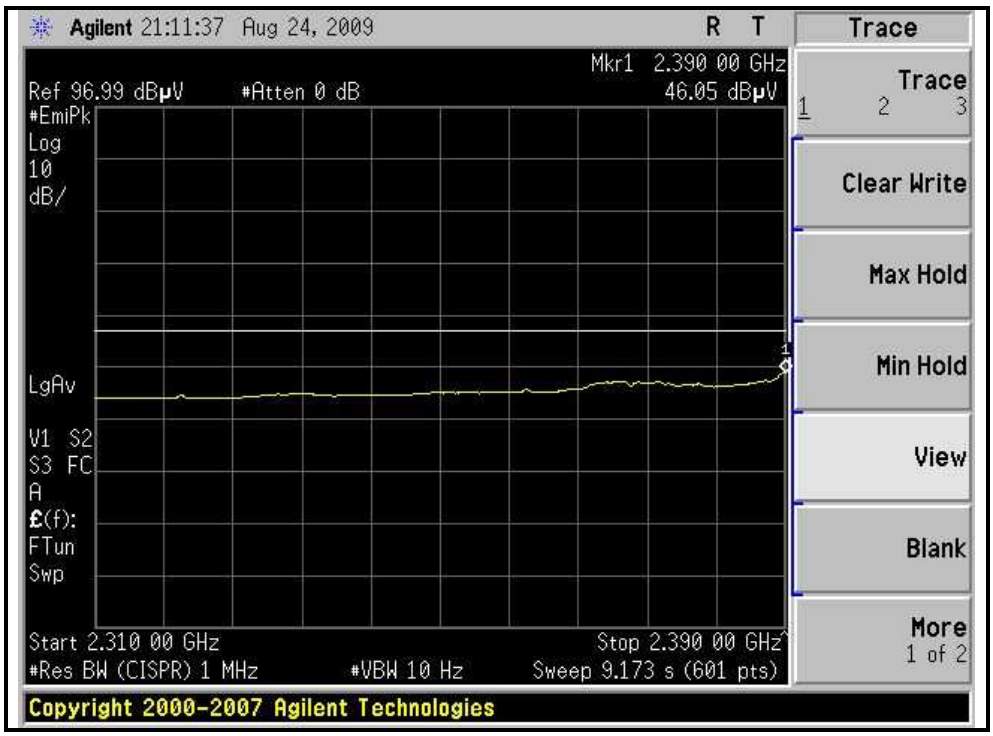
RESTRICTED BANDEDGE (802.11b MODE,CH1, HORIZONTAL)



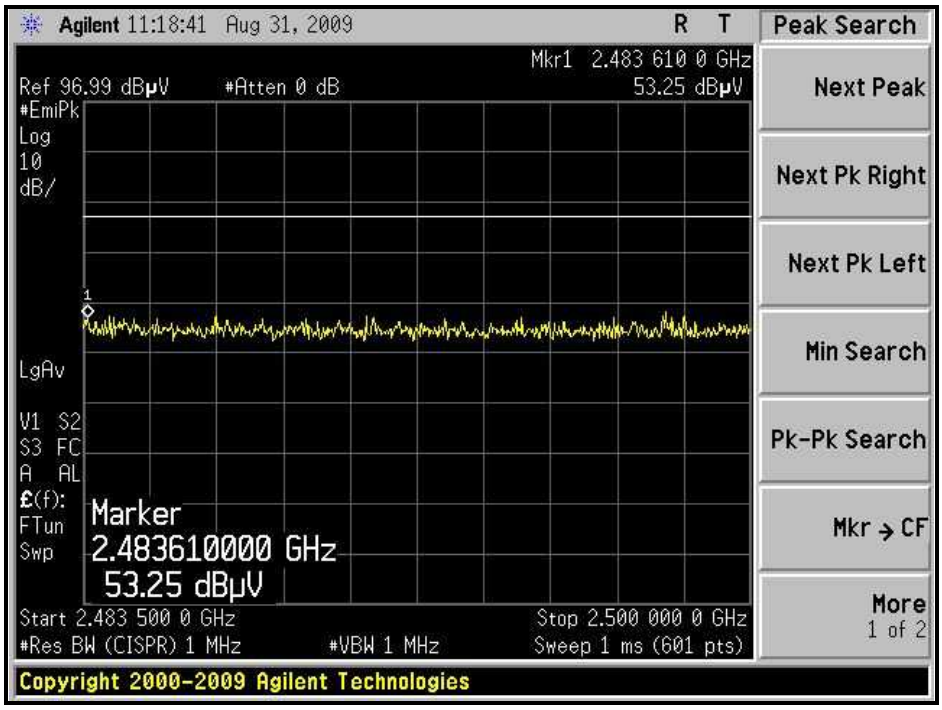


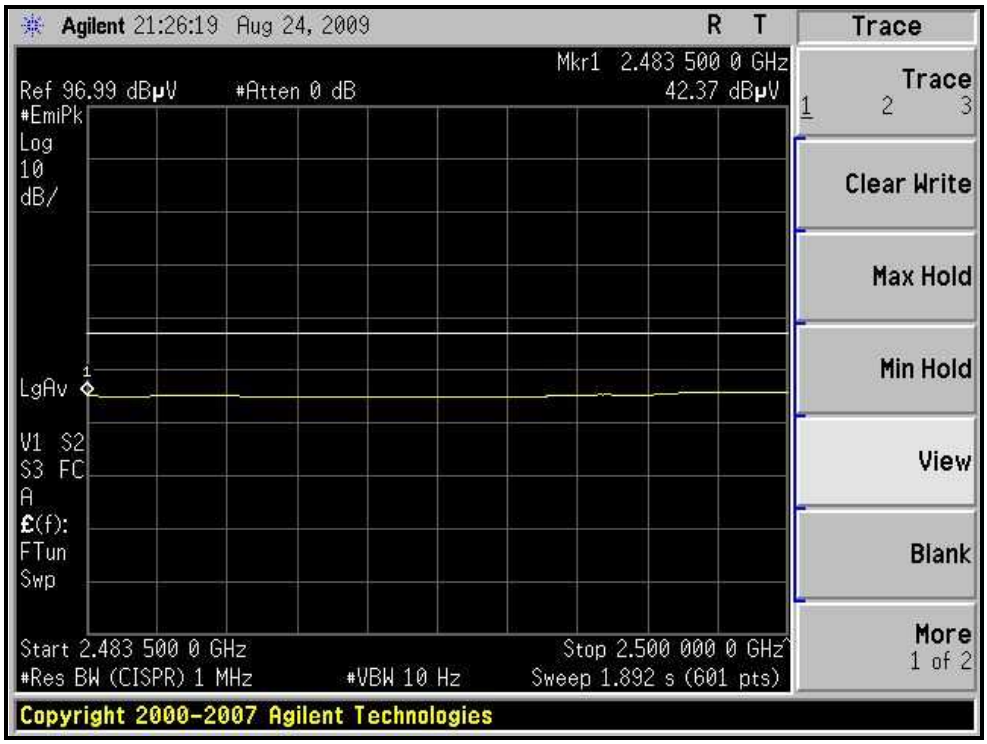
RESTRICTED BANDEDGE (802.11b MODE,CH1, VERTICAL)



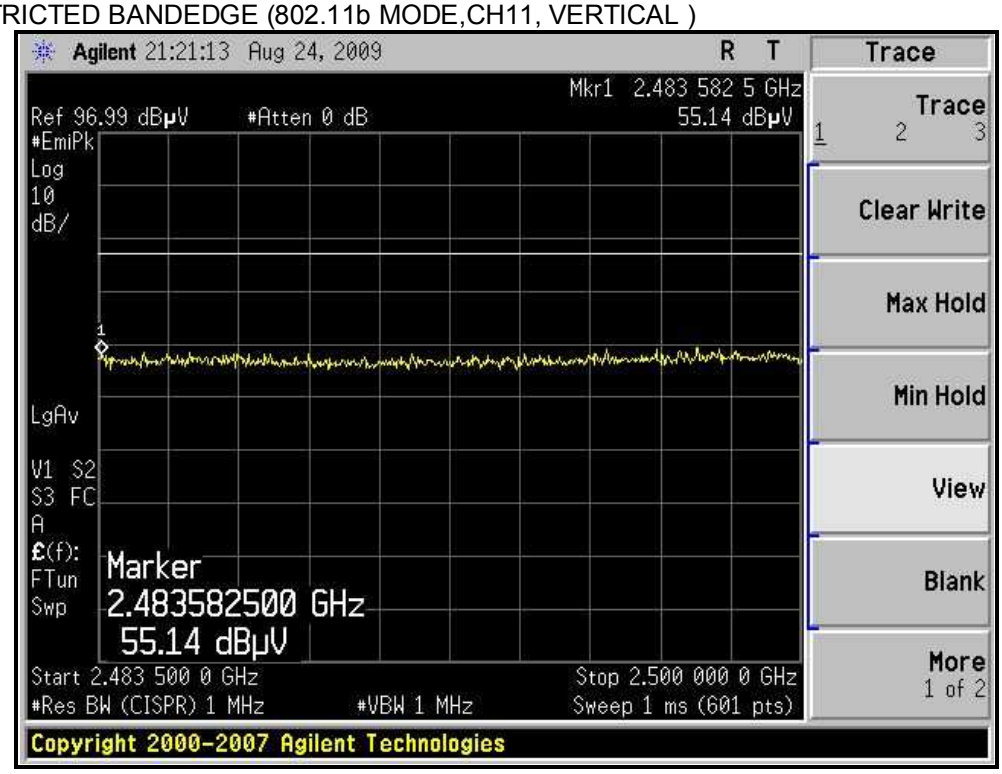


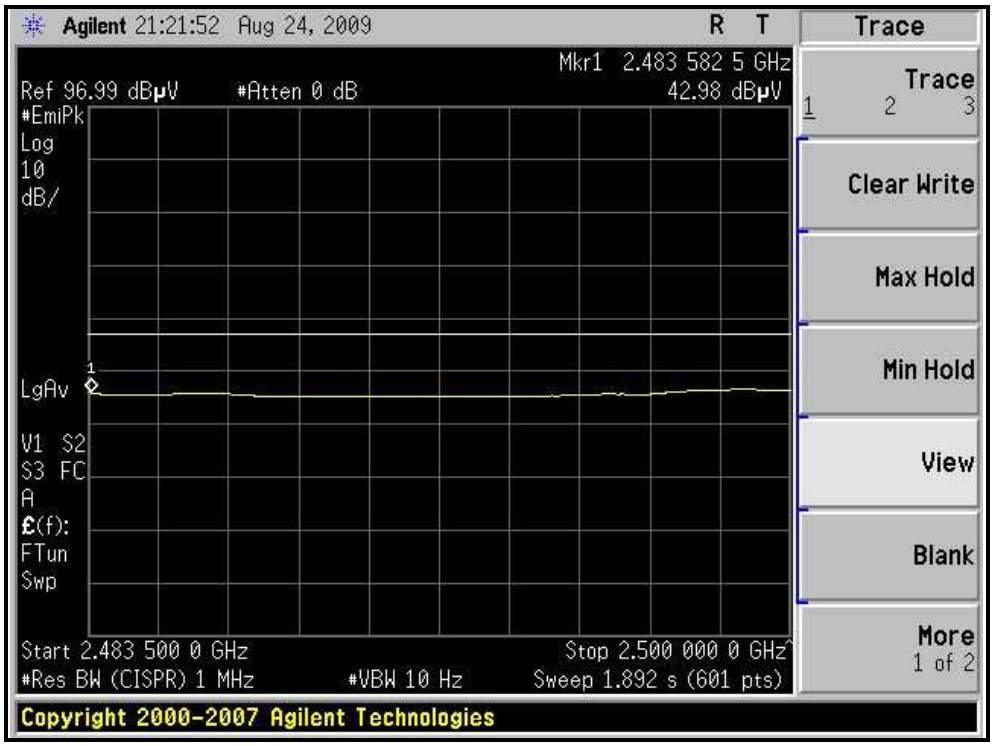
RESTRICTED BANDEDGE (802.11b MODE,CH11, HORIZONTAL)





RESTRICTED BANDEDGE (802.11b MODE,CH11, VERTICAL)





802.11g OFDM MODULATION

EUT TEST CONDITION		MEASUREMENT DETAIL	
CHANNEL	Channel 1	FREQUENCY RANGE	1 ~ 25GHz
INPUT POWER (SYSTEM)	120Vac, 60 Hz	DETECTOR FUNCTION	Peak (PK) Average (AV)
ENVIRONMENTAL CONDITIONS	25.0deg. C, 66.0%RH 965hPa	TESTED BY	Frank Liu

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**	**70.34 PK**	**74.00**	**-3.66**	**1.06 H**	**294**	**38.41**	**31.93**
2	2390.00	49.01 AV	54.00	-4.99	1.06 H	294	17.08	31.93
3	*2412.00	105.24 PK			1.06 H	311	73.22	32.02
4	*2412.00	96.30 AV			1.06 H	311	64.28	32.02
5	4824.00	49.30 PK	74.00	-24.70	1.44 H	272	13.33	35.97
6	4824.00	37.84 AV	54.00	-16.16	1.44 H	272	1.87	35.97
7	#7236.00	47.60 PK	85.24	-37.64	1.13 H	129	5.36	42.24
8	#7236.00	34.70 AV	76.30	-41.60	1.13 H	129	-7.54	42.24
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	69.18 PK	74.00	-4.82	1.14 V	229	37.25	31.93
2	2390.00	50.29 AV	54.00	-3.71	1.14 V	229	18.36	31.93
3	*2412.00	108.90 PK			1.14 V	231	76.88	32.02
4	*2412.00	99.42 AV			1.14 V	231	67.40	32.02
5	4824.00	48.10 PK	74.00	-25.90	1.00 V	244	12.13	35.97
6	4824.00	34.90 AV	54.00	-19.10	1.00 V	244	-1.07	35.97
7	#7236.00	46.90 PK	88.90	-42.00	1.02 V	39	4.66	42.24
8	#7236.00	34.50 AV	79.42	-44.92	1.02 V	39	-7.74	42.24

REMARKS: 1. Emission level (dBuV/m) = Raw Value (dBuV) + Correction Factor (dB/m).
2. Correction Factor (dB/m) = Antenna Factor (dB/m) + Cable Factor (dB).
3. The other emission levels were very low against the limit.
4. Margin value = Emission level – Limit value.
5. " * ": Fundamental frequency.
6. "#":The radiated frequency is out the restricted band.

EUT TEST CONDITION		MEASUREMENT DETAIL	
CHANNEL	Channel 6	FREQUENCY RANGE	1 ~ 25GHz
INPUT POWER (SYSTEM)	120Vac, 60 Hz	DETECTOR FUNCTION	Peak (PK) Average (AV)
ENVIRONMENTAL CONDITIONS	25.0deg. C, 66.0%RH 965hPa	TESTED BY	Frank Liu

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	104.20 PK			1.04 H	304	72.09	32.11
2	*2437.00	95.30 AV			1.04 H	304	63.19	32.11
3	4874.00	49.40 PK	74.00	-24.60	1.40 H	283	13.32	36.08
4	4874.00	37.53 AV	54.00	-16.47	1.40 H	283	1.45	36.08
5	7311.00	48.70 PK	74.00	-25.30	1.10 H	124	6.18	42.52
6	7311.00	34.60 AV	54.00	-19.40	1.10 H	124	-7.92	42.52
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	107.30 PK			1.17 V	227	75.19	32.11
2	*2437.00	98.50 AV			1.17 V	227	66.39	32.11
3	4874.00	47.20 PK	74.00	-26.80	1.00 V	247	11.12	36.08
4	4874.00	34.60 AV	54.00	-19.40	1.00 V	247	-1.48	36.08
5	7311.00	47.00 PK	74.00	-27.00	1.00 V	23	4.48	42.52
6	7311.00	34.20 AV	54.00	-19.80	1.00 V	23	-8.32	42.52

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

EUT TEST CONDITION		MEASUREMENT DETAIL	
CHANNEL	Channel 11	FREQUENCY RANGE	1 ~ 25GHz
INPUT POWER (SYSTEM)	120Vac, 60 Hz	DETECTOR FUNCTION	Peak (PK) Average (AV)
ENVIRONMENTAL CONDITIONS	25.0deg. C, 66.0%RH 965hPa	TESTED BY	Frank Liu

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	101.70 PK			1.02 H	302	69.49	32.21
2	*2462.00	92.70 AV			1.02 H	302	60.49	32.21
3	2483.58	59.82 PK	74.00	-14.18	1.01 H	302	27.53	32.29
4	2483.58	43.79 AV	54.00	-10.21	1.01 H	302	11.50	32.29
5	4924.00	47.20 PK	74.00	-26.80	1.37 H	274	11.01	36.19
6	4924.00	35.40 AV	54.00	-18.60	1.37 H	274	-0.79	36.19
7	7386.00	48.40 PK	74.00	-25.60	1.10 H	126	5.60	42.80
8	7386.00	34.10 AV	54.00	-19.90	1.10 H	126	-8.70	42.80
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	103.40 PK			1.18 V	202	71.19	32.21
2	*2462.00	94.00 AV			1.18 V	202	61.79	32.21
3	2483.50	61.75 PK	74.00	-12.25	1.16 V	228	29.46	32.29
4	2483.50	45.51 AV	54.00	-8.49	1.16 V	228	13.22	32.29
5	4924.00	47.00 PK	74.00	-27.00	1.00 V	244	10.81	36.19
6	4924.00	34.10 AV	54.00	-19.90	1.00 V	244	-2.09	36.19
7	7386.00	47.20 PK	74.00	-26.80	1.00 V	29	4.40	42.80
8	7386.00	34.40 AV	54.00	-19.60	1.00 V	29	-8.40	42.80

REMARKS: 1. Emission level (dBuV/m) = Raw Value (dBuV) + Correction Factor (dB/m).

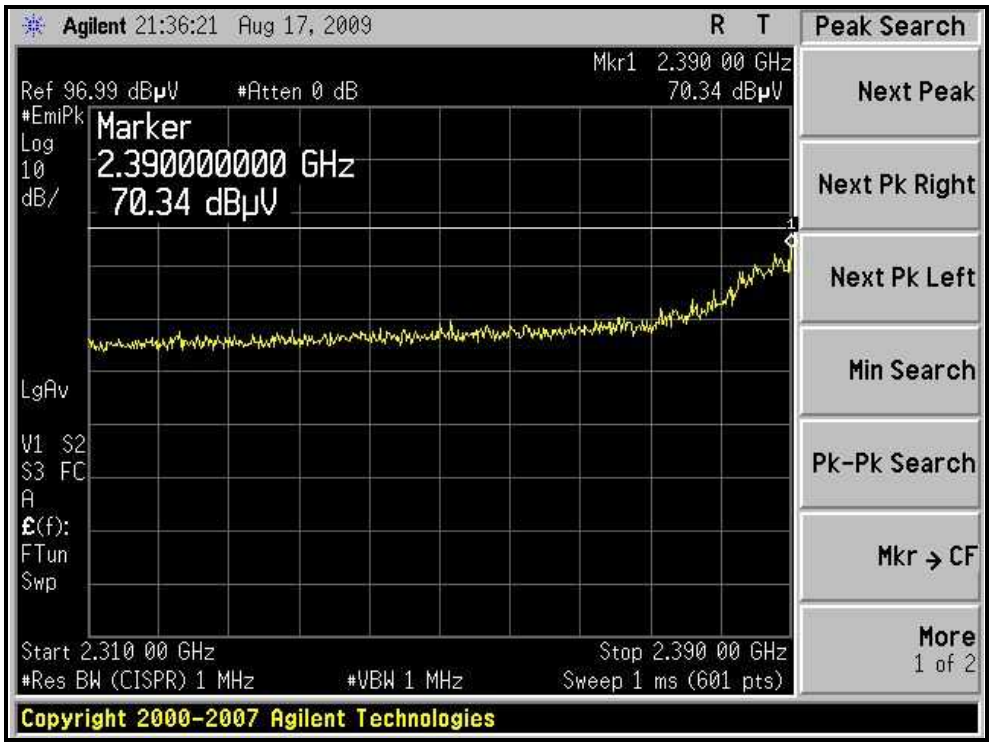
2. Correction Factor (dB/m) = Antenna Factor (dB/m) + Cable Factor (dB).

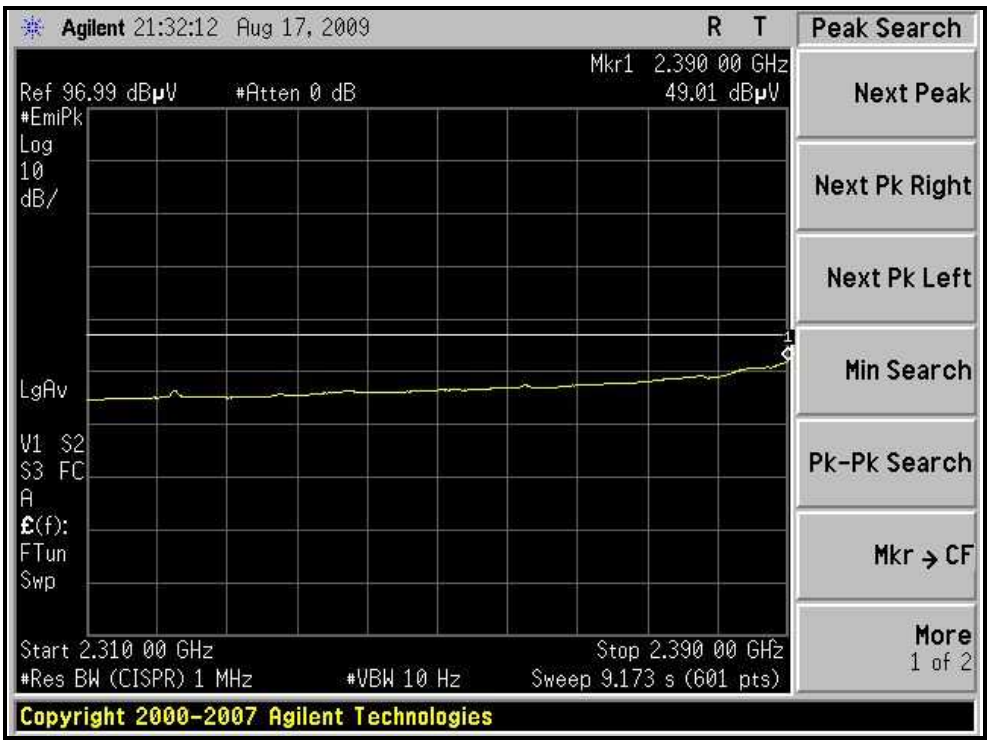
3. The other emission levels were very low against the limit.

4. Margin value = Emission level – Limit value.

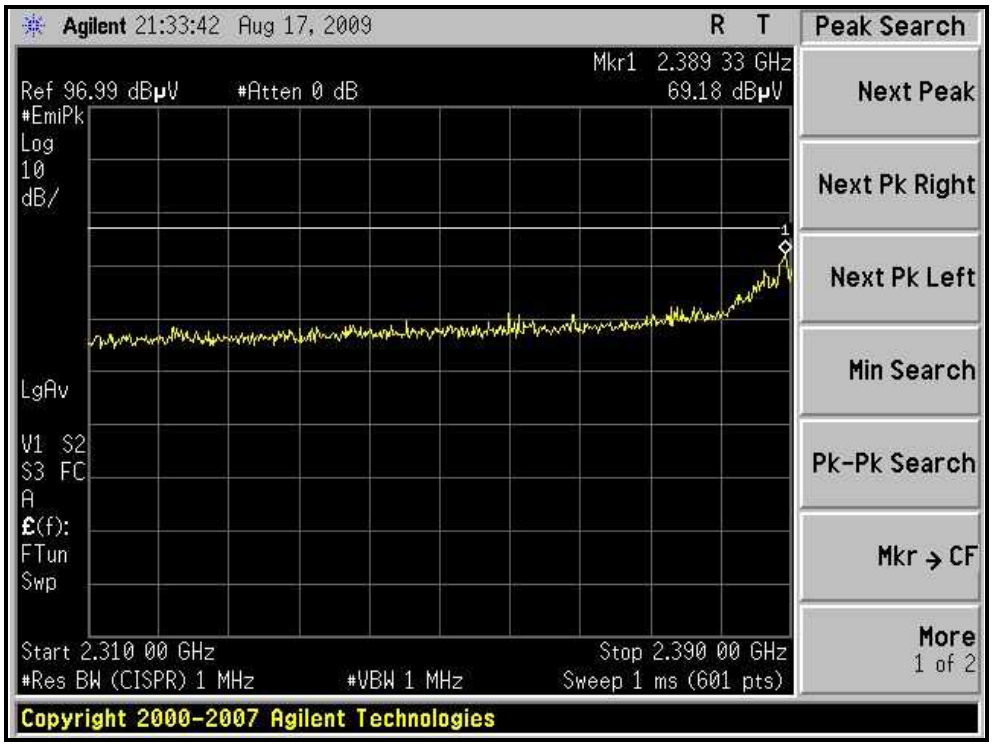
5. " * ": Fundamental frequency.

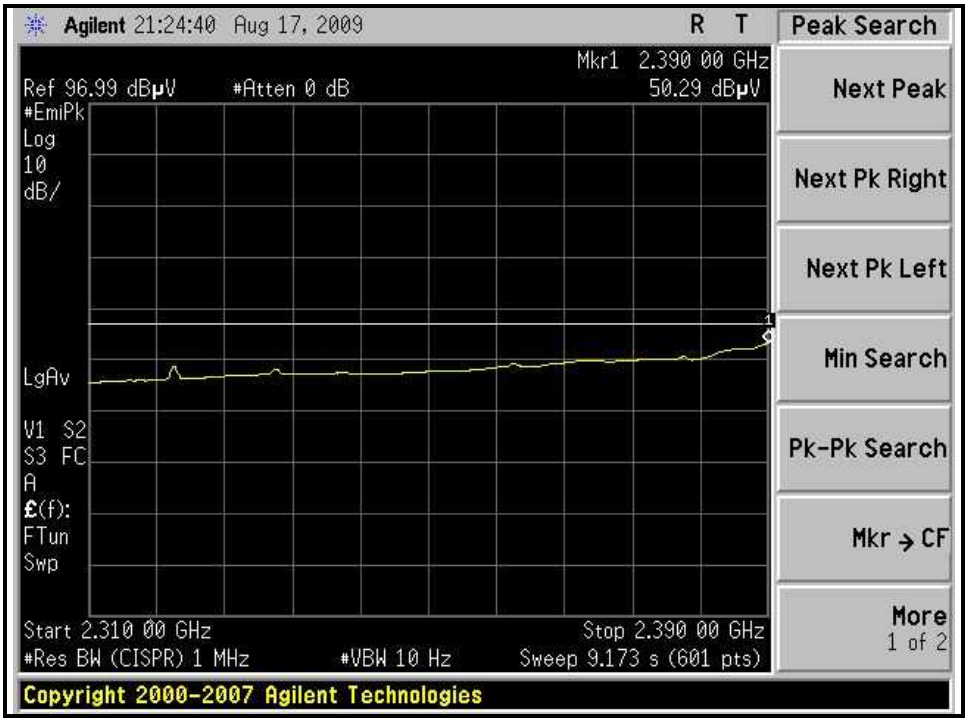
RESTRICTED BANDEDGE (802.11g MODE,CH1, HORIZONTAL)





RESTRICTED BANDEDGE (802.11g MODE,CH1, VERTICAL)





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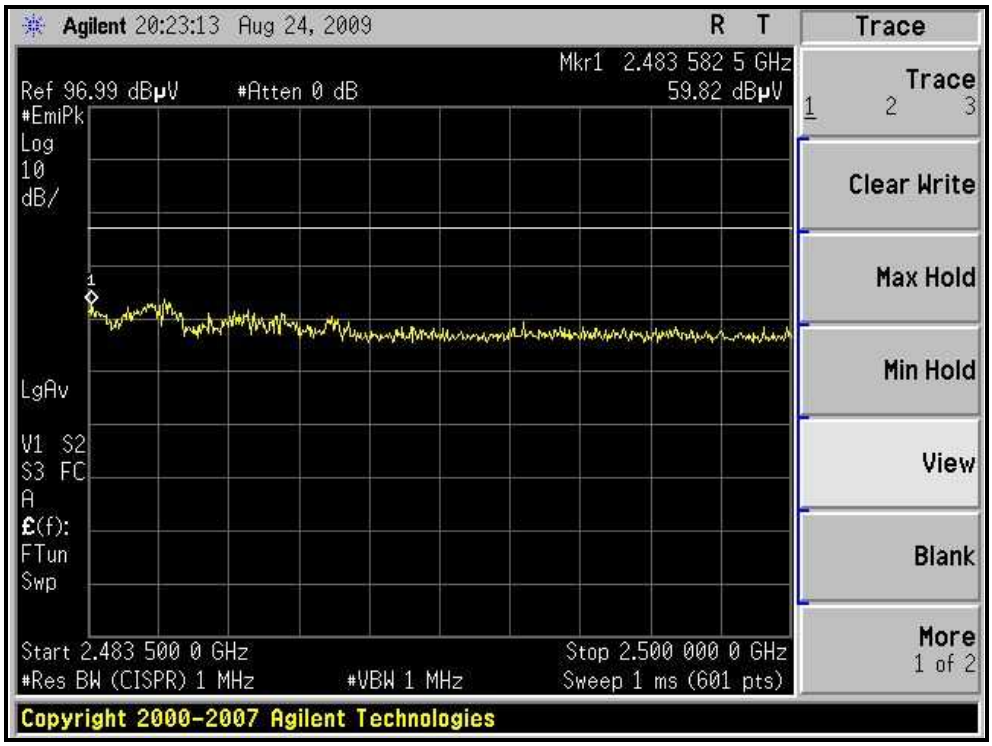
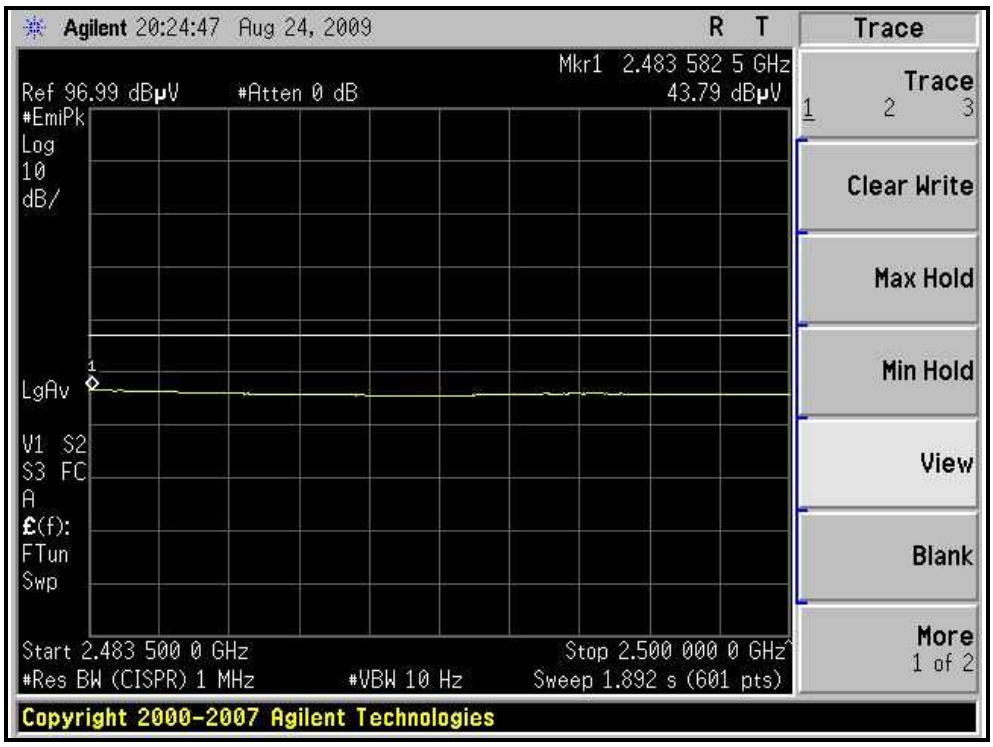
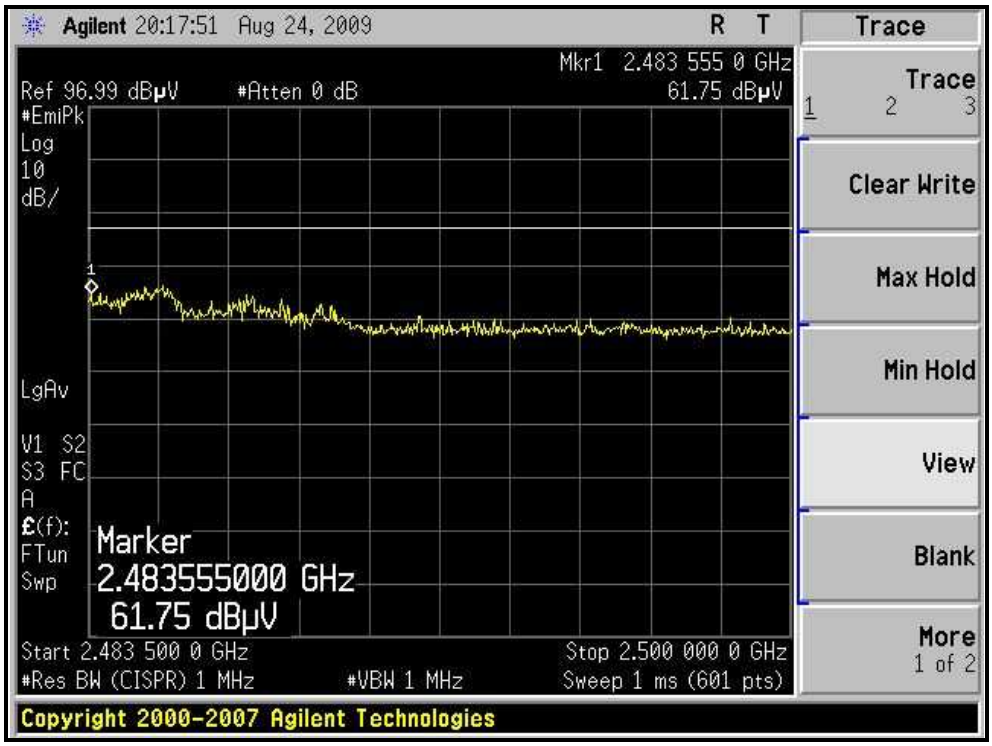
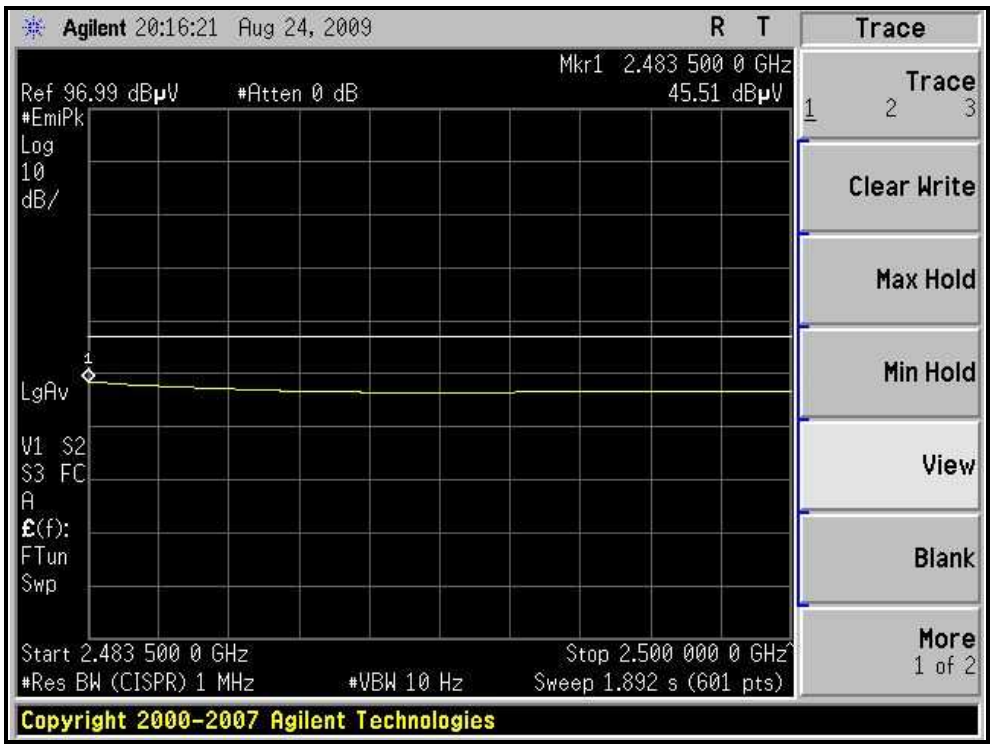




RESTRICTED BANDEDGE (802.11g MODE,CH11, VERTICAL)





4.3 6dB BANDWIDTH MEASUREMENT

4.3.1 LIMITS OF 6dB BANDWIDTH MEASUREMENT

The minimum of 6dB Bandwidth Measurement is 0.5 MHz.

4.3.2 TEST INSTRUMENTS

DESCRIPTION & MANUFACTURER	MODEL NO.	SERIAL NO.	CALIBRATED DATE	CALIBRATED UNTIL
R&S SPECTRUM ANALYZER	FSP40	100037	Aug. 03, 2009	Aug. 02, 2010

NOTE:

1. The calibration interval of the above test instruments is 12 months and the calibrations are traceable to NML/ROC and NIST/USA.

4.3.3 TEST PROCEDURE

The transmitter output was connected to the spectrum analyzer through an attenuator. The bandwidth of the fundamental frequency was measured by spectrum analyzer with 100kHz RBW and 100kHz VBW. The 6dB bandwidth is defined as the total spectrum the power of which is higher than peak power minus 6dB.

4.3.4 DEVIATION FROM TEST STANDARD

No deviation

4.3.5 TEST SETUP

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.

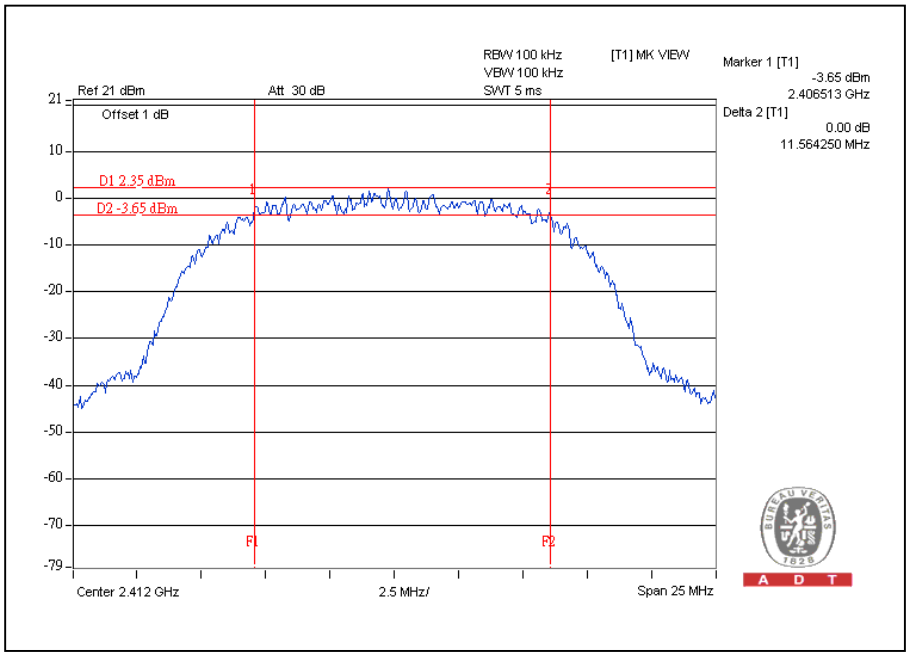
4.3.7 TEST RESULTS

802.11b DSSS MODULATION:

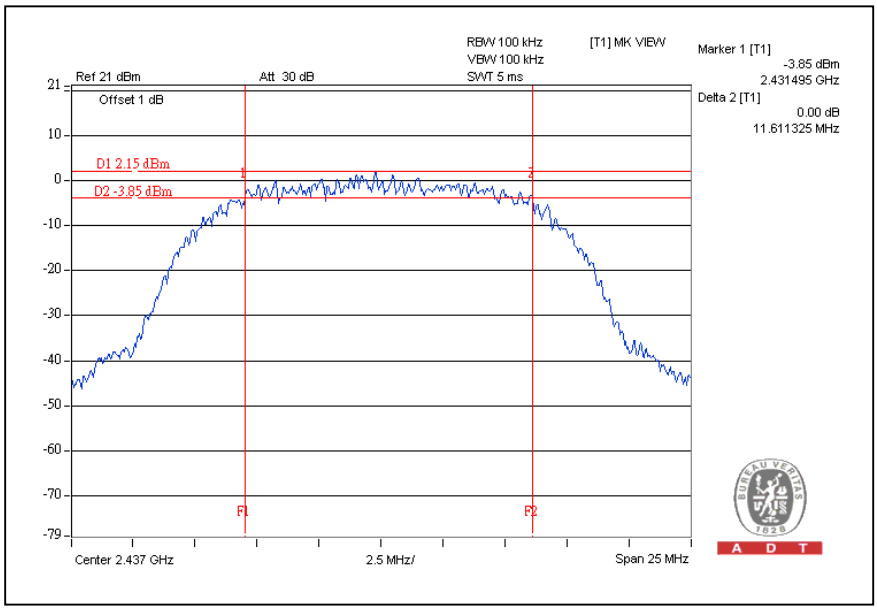
MODULATION TYPE	DBPSK	TRANSFER RATE	1Mbps
INPUT POWER (SYSTEM)	120Vac, 60 Hz	ENVIRONMENTAL CONDITIONS	25deg.C, 60%RH, 965hPa
TESTED BY	Wen Yu		

CHANNEL	CHANNEL FREQUENCY (MHz)	6dB BANDWIDTH (MHz)	MINIMUM LIMIT (MHz)	PASS / FAIL
1	2412	11.56	0.5	PASS
6	2437	11.61	0.5	PASS
11	2462	11.61	0.5	PASS

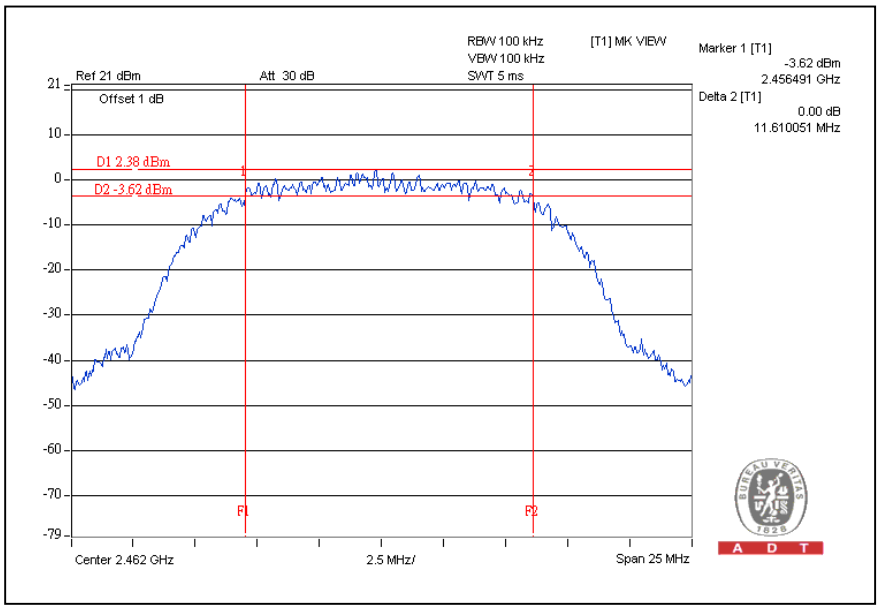
CH1



CH6


RBW 100 kHz
VBW 100 kHz
SWT 5 ms
[T1] MK VIEW
Marker 1 [T1]
-3.85 dBm
2.431495 GHz
Delta 2 [T1]
0.00 dB
11.611325 MHz
Ref 21 dBm
Att 30 dB
Offset 1 dB
D1 2.15 dBm
D2 -3.85 dBm
21
10
0
-10
-20
-30
-40
-50
-60
-70
-79
F1
F2
Center 2.437 GHz
2.5 MHz/
Span 25 MHz

CH11

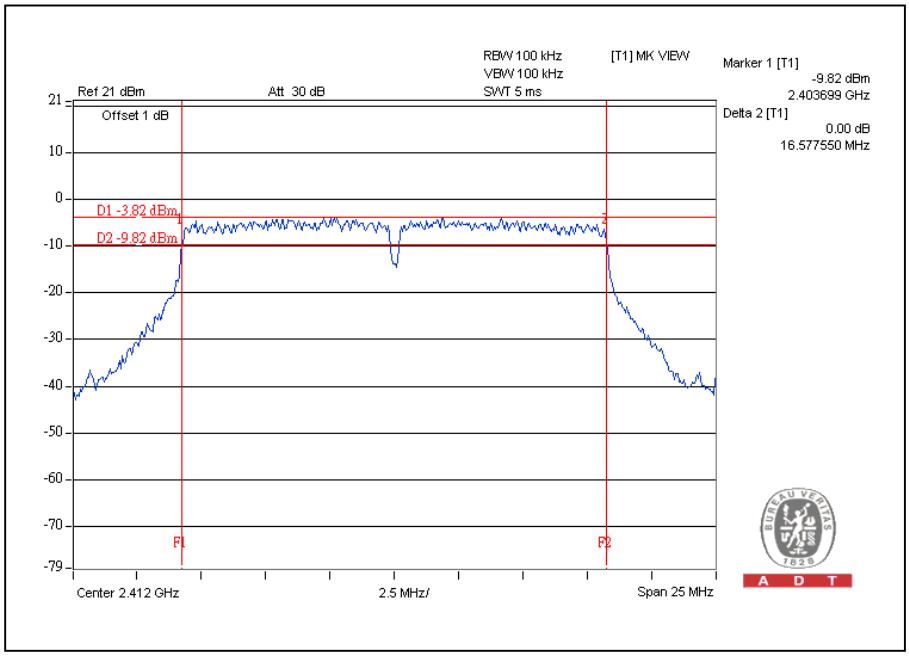

RBW 100 kHz
VBW 100 kHz
SWT 5 ms
[T1] MK VIEW
Marker 1 [T1]
-3.62 dBm
2.456491 GHz
Delta 2 [T1]
0.00 dB
11.610051 MHz
Ref 21 dBm
Att 30 dB
Offset 1 dB
D1 2.38 dBm
D2 -3.62 dBm
21
10
0
-10
-20
-30
-40
-50
-60
-70
-79
F1
F2
Center 2.462 GHz
2.5 MHz/
Span 25 MHz

802.11g OFDM MODULATION:

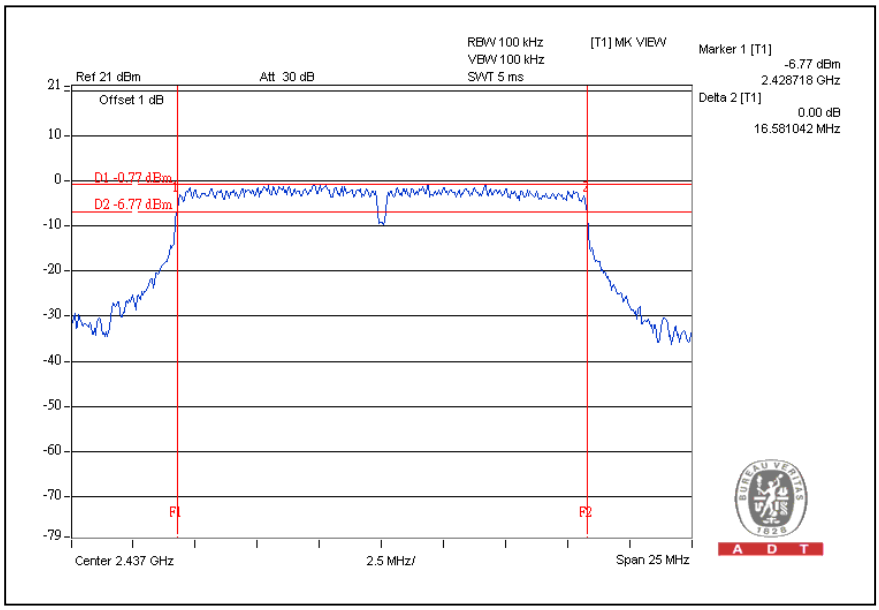
MODULATION TYPE	BPSK	TRANSFER RATE	6Mbps
INPUT POWER (SYSTEM)	120Vac, 60 Hz	ENVIRONMENTAL CONDITIONS	25deg.C, 60%RH, 965hPa
TESTED BY	Wen Yu		

CHANNEL	CHANNEL FREQUENCY (MHz)	6dB BANDWIDTH (MHz)	MINIMUM LIMIT (MHz)	PASS / FAIL
1	2412	16.58	0.5	PASS
6	2437	16.58	0.5	PASS
11	2462	16.56	0.5	PASS

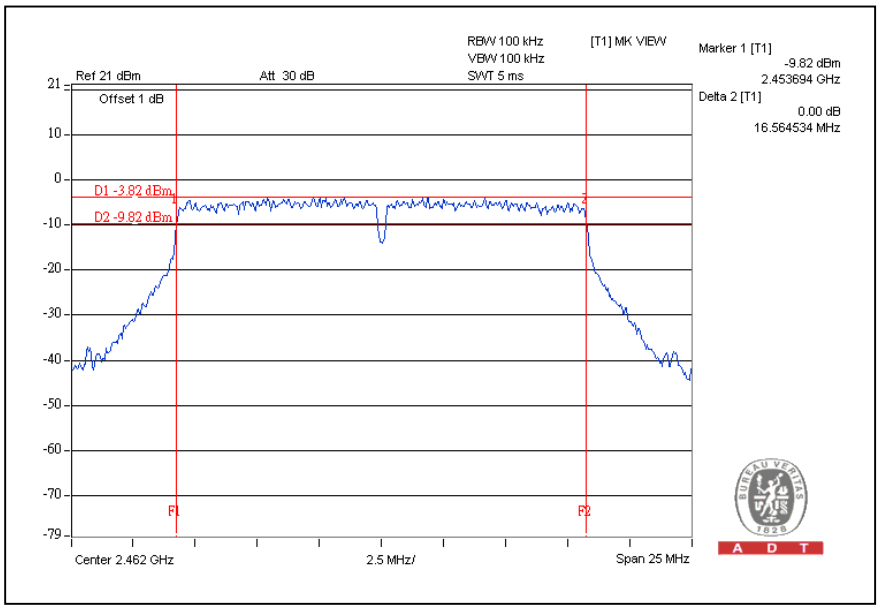
CH1



CH6


RBW 100 kHz
VBW 100 kHz
SWT 5 ms
[T1] MK VIEW
Marker 1 [T1]
-6.77 dBm
2.428718 GHz
Delta 2 [T1]
0.00 dB
16.581042 MHz
Ref 21 dBm
Att 30 dB
Offset 1 dB
D1 -0.77 dBm
D2 -6.77 dBm
21
10
0
-10
-20
-30
-40
-50
-60
-70
-79
F1
F2
Center 2.437 GHz
2.5 MHz/
Span 25 MHz

CH11


RBW 100 kHz
VBW 100 kHz
SWT 5 ms
[T1] MK VIEW
Marker 1 [T1]
-9.82 dBm
2.453694 GHz
Delta 2 [T1]
0.00 dB
16.564534 MHz
Ref 21 dBm
Att 30 dB
Offset 1 dB
D1 -3.82 dBm
D2 -9.82 dBm
21
10
0
-10
-20
-30
-40
-50
-60
-70
-79
F1
F2
Center 2.462 GHz
2.5 MHz/
Span 25 MHz

4.4 MAXIMUM PEAK OUTPUT POWER

4.4.1 LIMITS OF MAXIMUM PEAK OUTPUT POWER MEASUREMENT

The Maximum Peak Output Power Limit is 30dBm.

4.4.2 INSTRUMENTS

DESCRIPTION & MANUFACTURER	MODEL NO.	SERIAL NO.	CALIBRATED DATE	CALIBRATED UNTIL
Anritsu Power Meter	ML2495A	0824006	April 25, 2009	April 24, 2010
Pulse Power Sensor	MA2411B	0738172	April 25, 2009	April 24, 2010

NOTE:
The calibration interval of the above test instruments is 12 months and the calibrations are traceable to NML/ROC and NIST/USA.

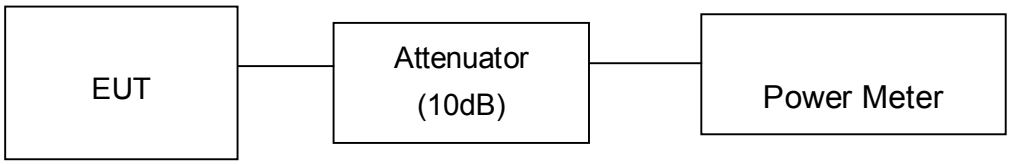
4.4.3 TEST PROCEDURES

1. The transmitter output was connected to the power meter through an attenuator; the bandwidth of the fundamental frequency was measured with the power meter.
2. Record the power level.

4.4.4 DEVIATION FROM TEST STANDARD

No deviation

4.4.5 TEST SETUP



4.4.6 EUT OPERATING CONDITIONS

Same as Item 4.3.6

4.4.7 TEST RESULTS

802.11b DSSS MODULATION:

MODULATION TYPE	DBPSK	TRANSFER RATE	1Mbps
INPUT POWER (SYSTEM)	120Vac, 60 Hz	ENVIRONMENTAL CONDITIONS	25deg.C, 60%RH, 965hPa
TESTED BY	Wen Yu		

CHANNEL	CHANNEL FREQUENCY (MHz)	PEAK POWER OUTPUT (dBm)	PEAK POWER OUTPUT (mW)	PEAK POWER LIMIT (dBm)	PASS / FAIL
1	2412	17.19	52.360	30	PASS
6	2437	17.11	51.404	30	PASS
11	2462	17.15	51.880	30	PASS

802.11g OFDM MODULATION:

MODULATION TYPE	BPSK	TRANSFER RATE	6Mbps
INPUT POWER (SYSTEM)	120Vac, 60 Hz	ENVIRONMENTAL CONDITIONS	25deg.C, 60%RH, 965hPa
TESTED BY	Wen Yu		

CHANNEL	CHANNEL FREQUENCY (MHz)	PEAK POWER OUTPUT (dBm)	PEAK POWER OUTPUT (mW)	PEAK POWER LIMIT (dBm)	PASS / FAIL
1	2412	21.70	147.911	30	PASS
6	2437	22.20	165.959	30	PASS
11	2462	21.50	141.254	30	PASS

4.5 POWER SPECTRAL DENSITY MEASUREMENT

4.5.1 LIMITS OF POWER SPECTRAL DENSITY MEASUREMENT

The Maximum of Power Spectral Density Measurement is 8dBm.

4.5.2 TEST INSTRUMENTS

DESCRIPTION & MANUFACTURER	MODEL NO.	SERIAL NO.	CALIBRATED DATE	CALIBRATED UNTIL
R&S SPECTRUM ANALYZER	FSP40	100037	Aug. 03, 2009	Aug. 02, 2010

NOTE:

1. The calibration interval of the above test instruments is 12 months and the calibrations are traceable to NML/ROC and NIST/USA.

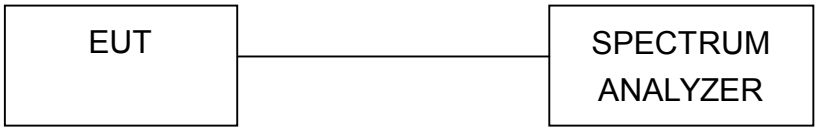
4.5.3 TEST PROCEDURE

The transmitter output was connected to the spectrum analyzer through an attenuator, the bandwidth of the fundamental frequency was measured with the spectrum analyzer using 3kHz RBW and 30kHz VBW, set sweep time = span/3kHz. The power spectral density was measured and recorded.
The sweep time is allowed to be longer than span/3kHz for a full response of the mixer in the spectrum analyzer.

4.5.4 DEVIATION FROM TEST STANDARD

No deviation

4.5.5 TEST SETUP



4.5.6 EUT OPERATING CONDITION

Same as Item 4.3.6

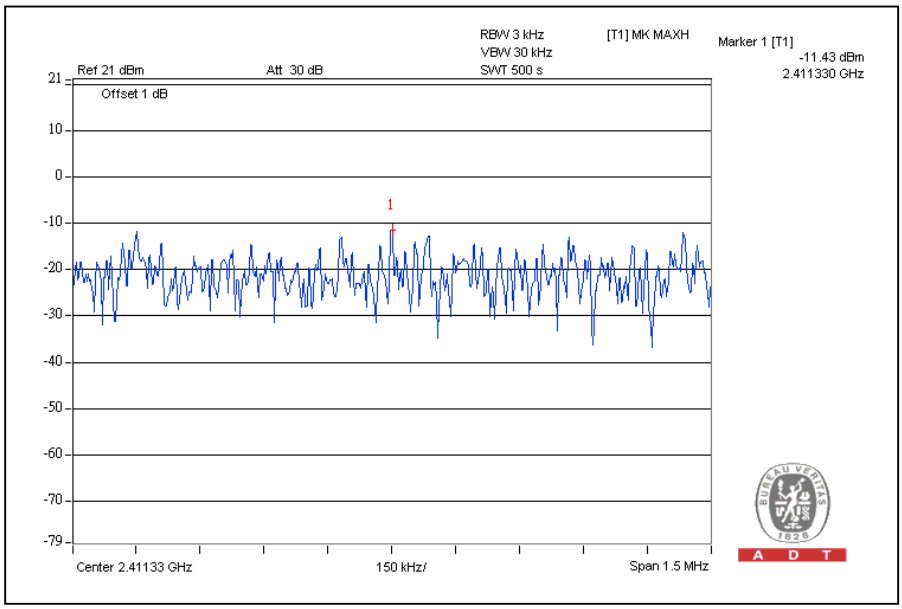
4.5.7 TEST RESULTS

802.11b DSSS MODULATION:

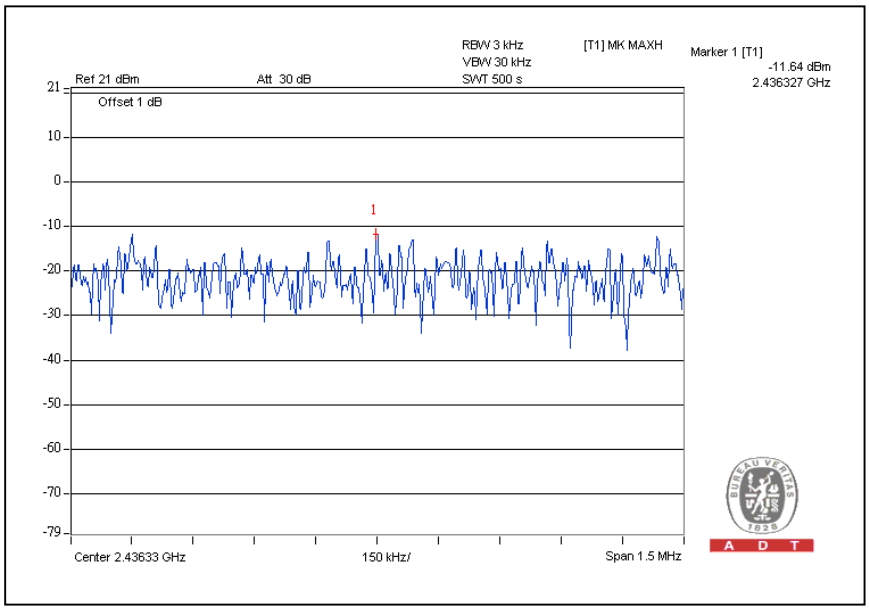
MODULATION TYPE	DBPSK	TRANSFER RATE	1Mbps
INPUT POWER (SYSTEM)	120Vac, 60 Hz	ENVIRONMENTAL CONDITIONS	25deg.C, 60%RH, 965hPa
TESTED BY	Wen Yu		

CHANNEL	CHANNEL FREQUENCY (MHz)	RF POWER LEVEL IN 3kHz BW (dBm)	MAXIMUM LIMIT (dBm)	PASS / FAIL
1	2412	-11.43	8	PASS
6	2437	-11.64	8	PASS
11	2462	-11.38	8	PASS

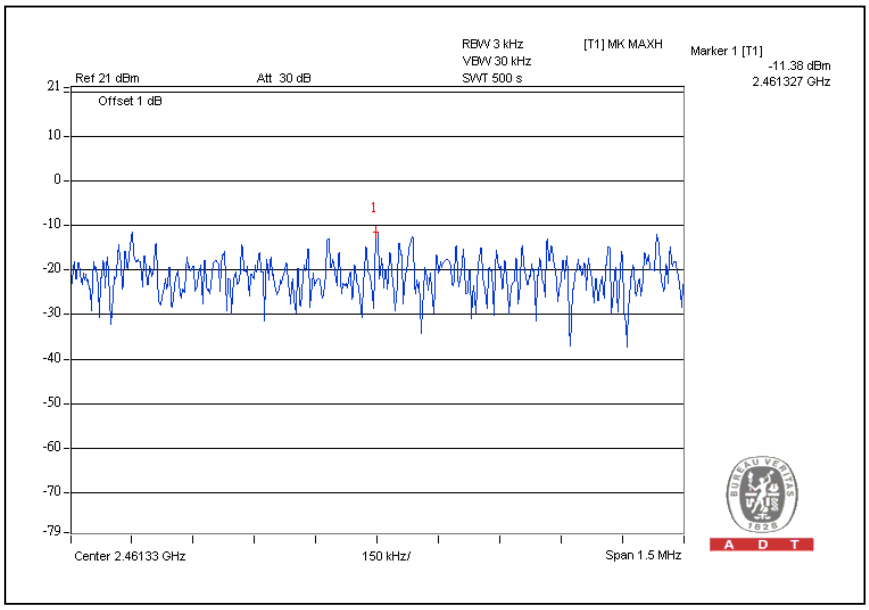
CH1



CH6


RBW 3 kHz
VBW 30 kHz
SWT 500 s
[T1] MK MAXH
Marker 1 [T1]
-11.64 dBm
2.436327 GHz
Ref 21 dBm
Att 30 dB
Offset 1 dB
21
10
0
-10
-20
-30
-40
-50
-60
-70
-79
Center 2.43633 GHz
150 kHz/
Span 1.5 MHz

CH11

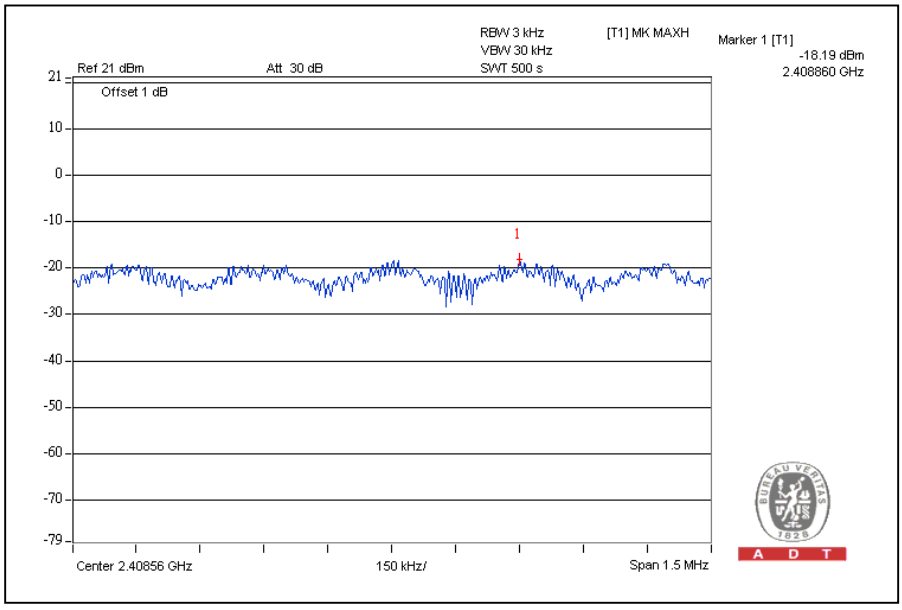

RBW 3 kHz
VBW 30 kHz
SWT 500 s
[T1] MK MAXH
Marker 1 [T1]
-11.38 dBm
2.461327 GHz
Ref 21 dBm
Att 30 dB
Offset 1 dB
21
10
0
-10
-20
-30
-40
-50
-60
-70
-79
Center 2.46133 GHz
150 kHz/
Span 1.5 MHz

802.11g OFDM MODULATION:

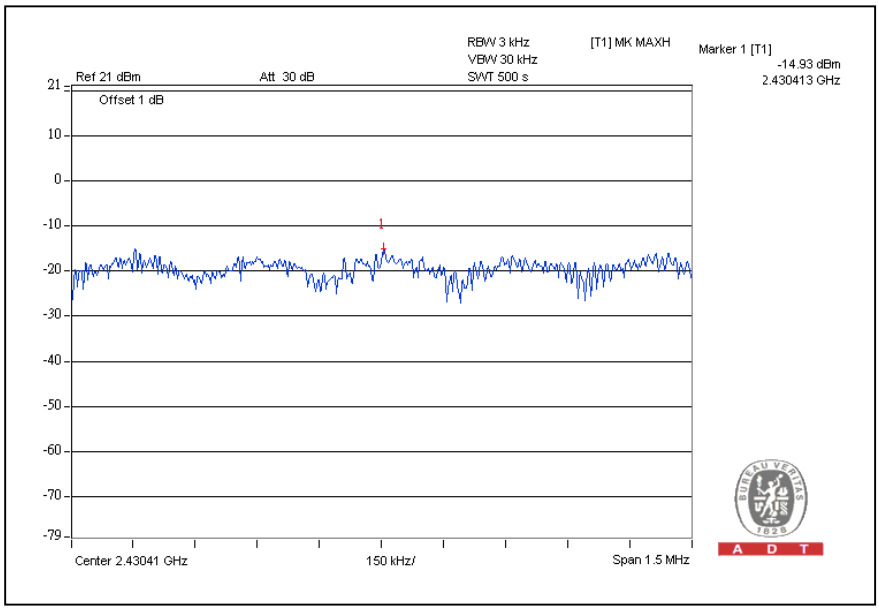
MODULATION TYPE	BPSK	TRANSFER RATE	6Mbps
INPUT POWER (SYSTEM)	120Vac, 60 Hz	ENVIRONMENTAL CONDITIONS	25deg.C, 60%RH, 965hPa
TESTED BY	Wen Yu		

CHANNEL	CHANNEL FREQUENCY (MHz)	RF POWER LEVEL IN 3kHz BW (dBm)	MAXIMUM LIMIT (dBm)	PASS / FAIL
1	2412	-18.19	8	PASS
6	2437	-14.93	8	PASS
11	2462	-18.12	8	PASS

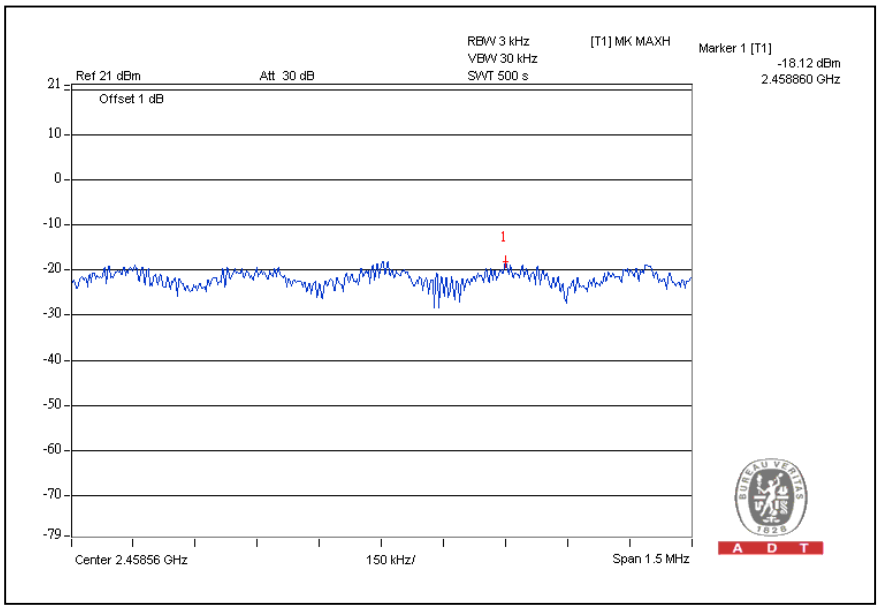
CH1



CH6


RBW 3 kHz
VBW 30 kHz
SWT 500 s
[T1] MK MAXH
Marker 1 [T1]
-14.93 dBm
2.430413 GHz
Ref 21 dBm
Att 30 dB
Offset 1 dB
21
10
0
-10
-20
-30
-40
-50
-60
-70
-79
Center 2.43041 GHz
150 kHz/
Span 1.5 MHz

CH11


RBW 3 kHz
VBW 30 kHz
SWT 500 s
[T1] MK MAXH
Marker 1 [T1]
-18.12 dBm
2.458860 GHz
Ref 21 dBm
Att 30 dB
Offset 1 dB
21
10
0
-10
-20
-30
-40
-50
-60
-70
-79
Center 2.45856 GHz
150 kHz/
Span 1.5 MHz

4.6 CONDUCTED OUT-BAND EMISSION MEASUREMENT

4.6.1 LIMITS OF CONDUCTED OUT-BAND EMISSION MEASUREMENT

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

4.6.2 TEST INSTRUMENTS

DESCRIPTION & MANUFACTURER	MODEL NO.	SERIAL NO.	CALIBRATED DATE	CALIBRATED UNTIL
R&S SPECTRUM ANALYZER	FSP40	100037	Aug. 03, 2009	Aug. 02, 2010

NOTE:

1.The calibration interval of the above test instruments is 12 months and the calibrations are traceable to NML/ROC and NIST/USA.

4.6.3 TEST PROCEDURE

The transmitter output was connected to the spectrum analyzer via a low lose cable. Set RBW of spectrum analyzer to 100kHz and VBW of spectrum analyzer to 300kHz with suitable frequency span including 100 MHz bandwidth from band edge. The band edges was measured and recorded.

The spectrum plots (RBW = 100kHz, VBW = 300kHz) are attached on the following pages.

4.6.4 DEVIATION FROM TEST STANDARD

No deviation

4.6.5 EUT OPERATING CONDITION

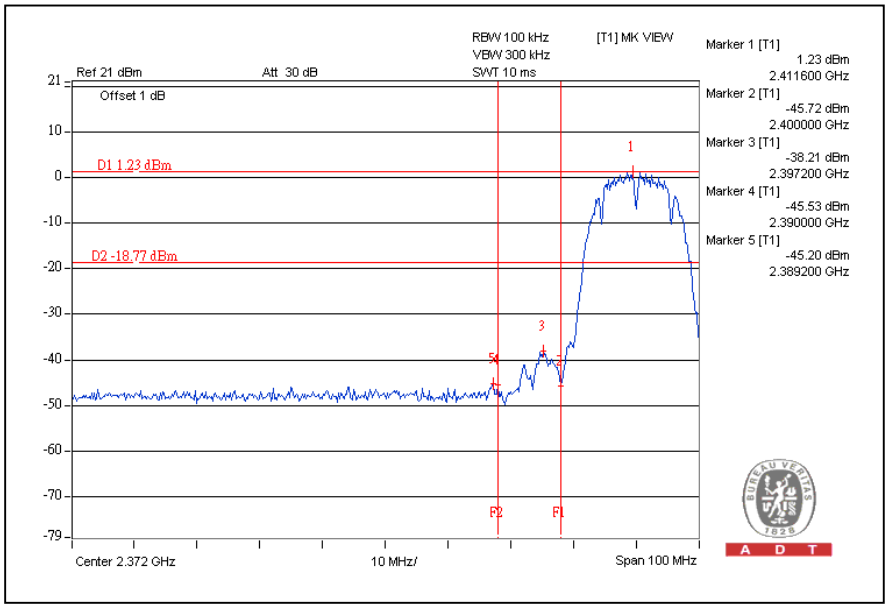
Same as Item 4.3.6

4.6.6 TEST RESULTS

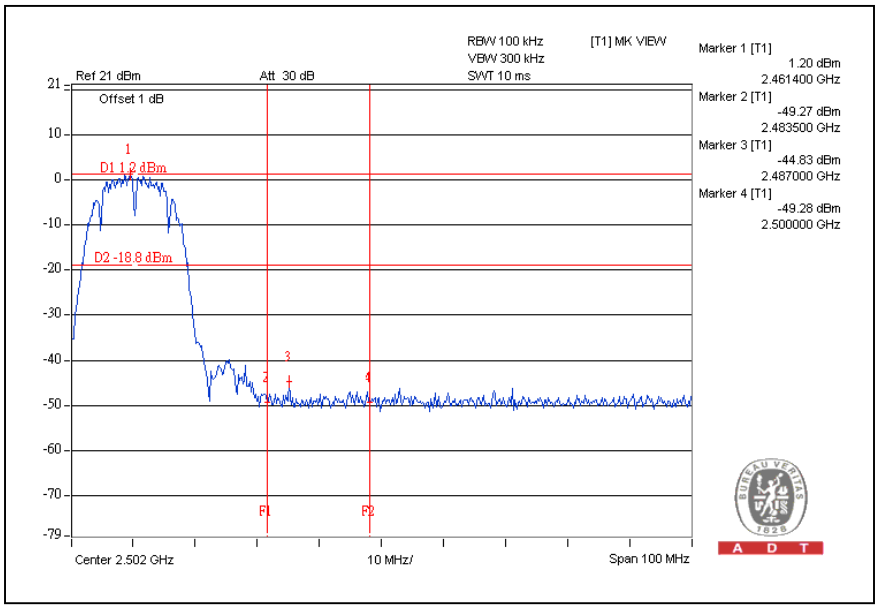
The spectrum plots are attached on the following images. D1 line indicates the highest level, and D2 line indicates the 20dB offset below D1. It shows compliance with the requirement in part 15.247(d).

802.11b DSSS MODULATION:

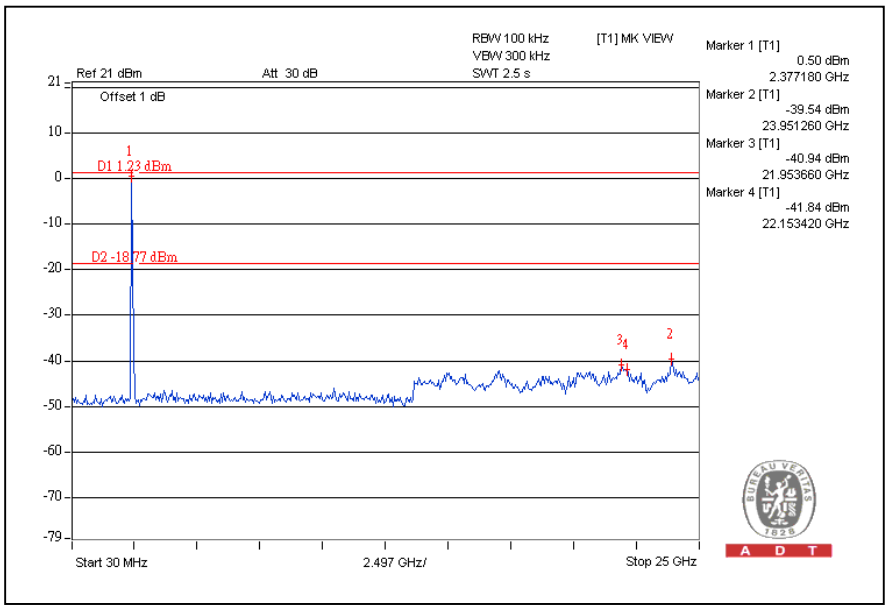
CH1



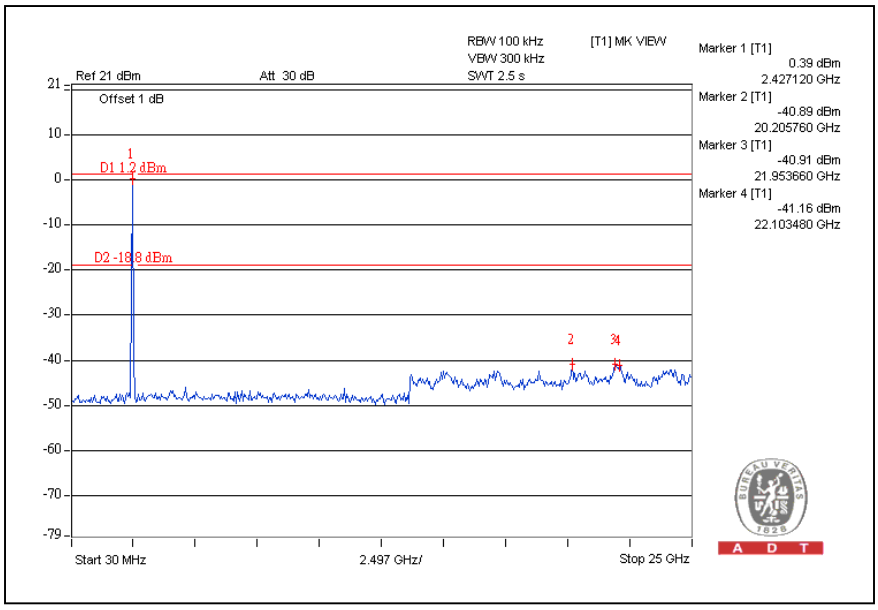
CH11



CH1

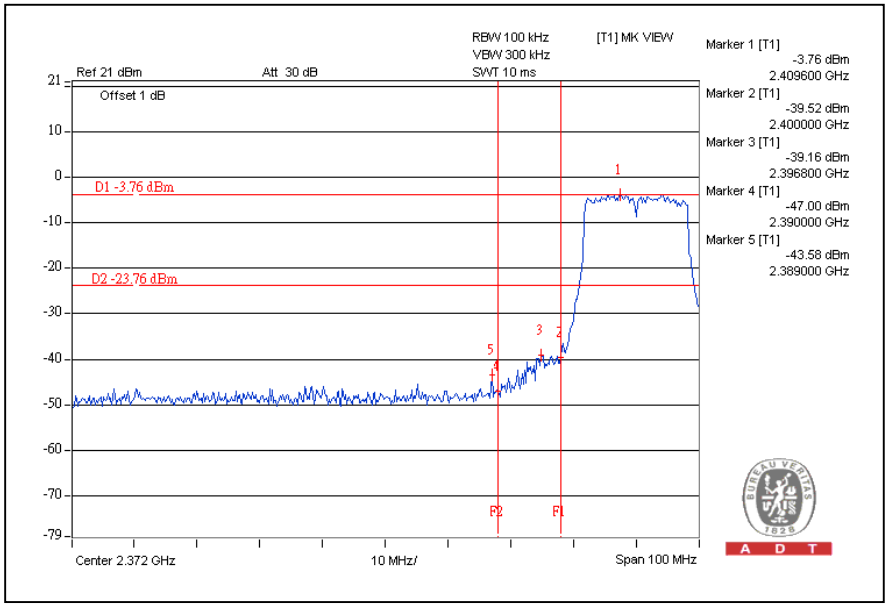

RBW 100 kHz
VBW 300 kHz
SWT 2.5 s
[T1] MK VIEW
Ref 21 dBm
Att 30 dB
Offset 1 dB
D1 1.23 dBm
D2 -18.77 dBm
Marker 1 [T1]
0.50 dBm
2.377180 GHz
Marker 2 [T1]
-39.54 dBm
23.951260 GHz
Marker 3 [T1]
-40.94 dBm
21.953660 GHz
Marker 4 [T1]
-41.84 dBm
22.153420 GHz
Start 30 MHz
2.497 GHz/
Stop 25 GHz

CH11

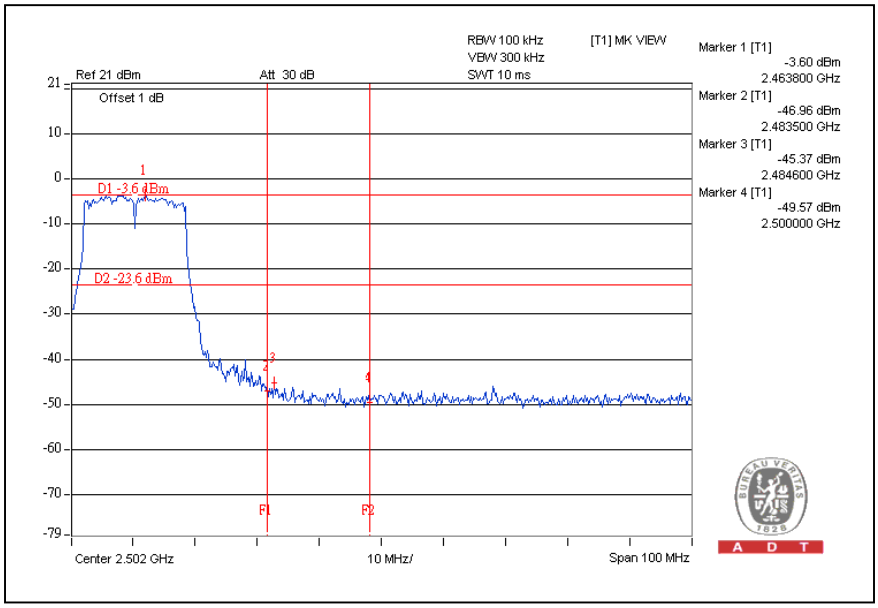

RBW 100 kHz
VBW 300 kHz
SWT 2.5 s
[T1] MK VIEW
Ref 21 dBm
Att 30 dB
Offset 1 dB
D1 1.2 dBm
D2 -18.8 dBm
Marker 1 [T1]
0.39 dBm
2.427120 GHz
Marker 2 [T1]
-40.89 dBm
20.205760 GHz
Marker 3 [T1]
-40.91 dBm
21.953660 GHz
Marker 4 [T1]
-41.16 dBm
22.103480 GHz
Start 30 MHz
2.497 GHz/
Stop 25 GHz

802.11g OFDM MODULATION::

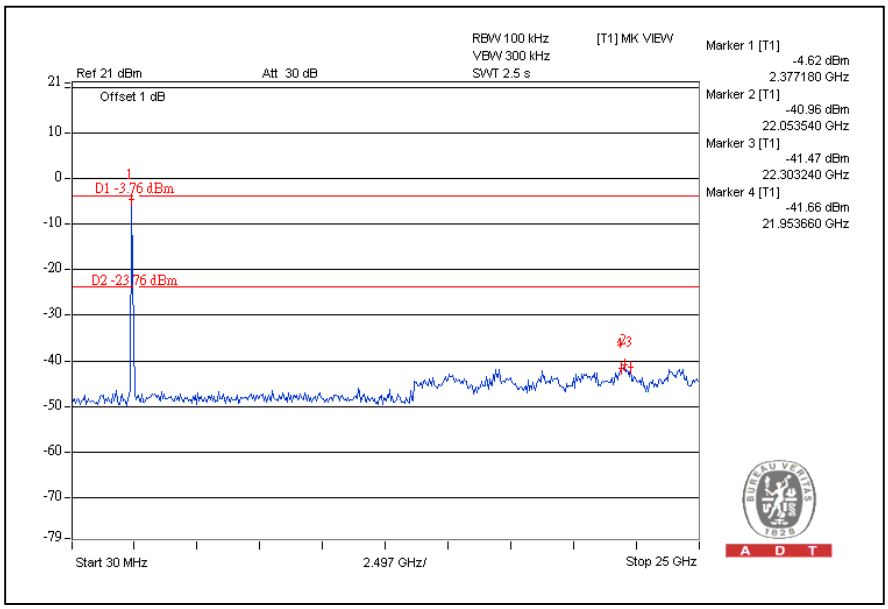
CH1



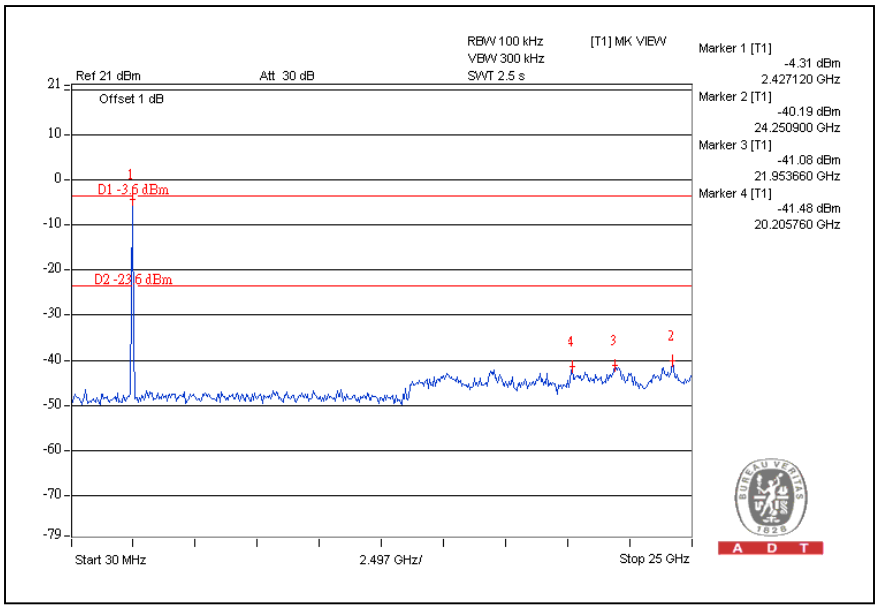
CH11



CH1


RBW 100 kHz
VBW 300 kHz
SWT 2.5 s
[T1] MK VIEW
Ref 21 dBm
Att 30 dB
Offset 1 dB
D1 -3.76 dBm
D2 -23.76 dBm
Marker 1 [T1]
-4.62 dBm
2.377180 GHz
Marker 2 [T1]
-40.96 dBm
22.053540 GHz
Marker 3 [T1]
-41.47 dBm
22.303240 GHz
Marker 4 [T1]
-41.66 dBm
21.953660 GHz
Start 30 MHz
2.497 GHz/
Stop 25 GHz

CH11


RBW 100 kHz
VBW 300 kHz
SWT 2.5 s
[T1] MK VIEW
Ref 21 dBm
Att 30 dB
Offset 1 dB
D1 -3.6 dBm
D2 -23.6 dBm
Marker 1 [T1]
-4.31 dBm
2.427120 GHz
Marker 2 [T1]
-40.19 dBm
24.250900 GHz
Marker 3 [T1]
-41.08 dBm
21.953660 GHz
Marker 4 [T1]
-41.48 dBm
20.205760 GHz
Start 30 MHz
2.497 GHz/
Stop 25 GHz

4.7 ANTENNA REQUIREMENT

4.7.1 STANDARD APPLICABLE

For intentional device, according to FCC 47 CFR Section 15.203, an intentional radiator shall be designed to ensure that no antenna other than that furnished by the responsible party shall be used with the device. And according to FCC 47 CFR Section 15.247 (b), if transmitting antennas of directional gain greater than 6dBi are used, the power shall be reduced by the amount in dB that the directional gain of the antenna exceeds 6dBi.

4.7.2 ANTENNA CONNECTED CONSTRUCTION

There are nine antennas provided to this EUT, please refer to the following table:

For WLAN

No.	Brand	Model	Antenna Type	Gain (dBi)	Connecter Type	Frequency range (MHz)	Cable Loss(dB)	Cable Length
1	Laird (R Type)	Rot main	PIFA	0.37(2.4G) 4.81(5G)	Hirose U.FL	2400~2500 4900~5850	0.1~0.15	25 ± 0.5mm
2	Laird (R Type)	Rot aux	PIFA	1.63(2.4G) 4.93(5G)	Hirose U.FL	2400~2500 4900~5850	0.1~0.15	61 +2/-1mm
3	Laird (S Type)	Str main	PIFA	0.89(2.4G) 4.34(5G)	Hirose U.FL	2400~2500 4900~5850	0.1~0.15	25 ± 0.5mm
4	Laird (S Type)	Str aux	PIFA	1.09(2.4G) 4.52(5G)	Hirose U.FL	2400~2500 4900~5850	0.1~0.15	61 +2/-1mm
5	Laird (G Type)	Gun main	PIFA	2.16(2.4G) 5.83(5G)	Hirose U.FL	2400~2500 4900~5850	0.1~0.15	25 ± 0.5mm
6	Laird (G Type)	Gun aux	PIFA	2.46(2.4G) 5.69(5G)	Hirose U.FL	2400~2500 4900~5850	0.1~0.15	61 +2/-1mm

Note :
1. For 2.4G: The antenna 6 was selected as representative antenna for the test.
2. For 5G: The antenna 5 was selected as representative antenna for the test.

For Bluetooth

No.	Brand	Model	Antenna Type	Gain (dBi)	Connecter Type	Frequency range (MHz)	Cable Loss(dB)	Cable Length
1	Motorola	Rot type	PIFA	3.08	Hirose U.FL	2400~2480	0.1~0.15	35 ± 0.5mm
2	Motorola	Str type	PIFA	2.481	Hirose U.FL	2400~2480	0.1~0.15	35 ± 0.5mm
3	Motorola	Gun type	PIFA	2.885	Hirose U.FL	2400~2480	0.1~0.15	35 ± 0.5mm

5. TEST TYPES AND RESULTS (802.11a, 5725~5850MHz Band)

5.1 CONDUCTED EMISSION MEASUREMENT

5.1.1 LIMITS OF CONDUCTED EMISSION MEASUREMENT

FREQUENCY OF EMISSION (MHz)	CONDUCTED LIMIT (dBμV)	
	Quasi-peak	Average
0.15-0.5	66 to 56	56 to 46
0.5-5	56	46
5-30	60	50

NOTE: 1. The lower limit shall apply at the transition frequencies.
2. The limit decreases in line with the logarithm of the frequency in the range of 0.15 to 0.50 MHz.
3. All emanations from a class A/B digital device or system, including any network of conductors and apparatus connected thereto, shall not exceed the level of field strengths specified above.

5.1.2 TEST INSTRUMENTS

DESCRIPTION & MANUFACTURER	MODEL NO.	SERIAL NO.	CALIBRATED DATE	CALIBRATED UNTIL
Test Receiver	ESCS 30	100375	Mar. 23, 2009	Mar. 22, 2010
Line-Impedance Stabilization Network(for Peripheral)	ENV-216	100071	Nov. 26, 2008	Nov. 25, 2009
Line-Impedance Stabilization Network (for EUT)	ESH3-Z5	848773/004	Nov. 05, 2008	Nov. 04, 2009
RF Cable (JYEBAO)	5DFB	COBCAB-001	Dec 15, 2008	Dec 14, 2009
50 ohms Terminator	50	3	Nov. 05, 2008	Nov. 04, 2009
Software	BV ADT_ Cond_V7.3.7	NA	NA	NA

Note:

1. The calibration interval of the above test instruments is 12 months and the calibrations are traceable to NML/ROC and NIST/USA.
2. The test was performed in Shielded Room No. B.
3 The VCCI Con B Registration No. is C-2193.

5.1.3 TEST PROCEDURES

a. The EUT was placed 0.4 meters from the conducting wall of the shielded room with EUT being connected to the power mains through a line impedance stabilization network (LISN). Other support units were connected to the power mains through another LISN. The two LISNs provide 50 ohm/ 50uH of coupling impedance for the measuring instrument.

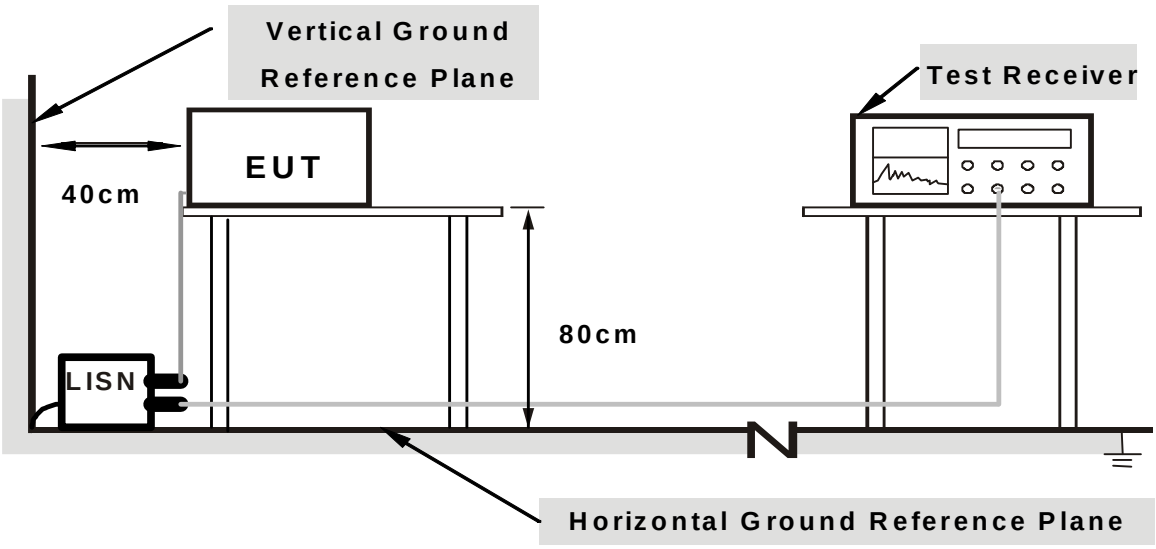
b. Both lines of the power mains connected to the EUT were checked for maximum conducted interference.

c. The frequency range from 150kHz to 30MHz was searched. Emission levels under (Limit – 20dB) were not recorded.

5.1.4 DEVIATION FROM TEST STANDARD

No deviation

5.1.5 TEST SETUP



Note: 1.Support units were connected to second LISN.
2.Both of LISNs (AMN) are 80 cm from EUT and at least 80 from other units and other metal planes

For the actual test configuration, please refer to the related item – Photographs of the Test Configuration.

5.1.6 EUT OPERATING CONDITIONS

Same as the 4.1.6

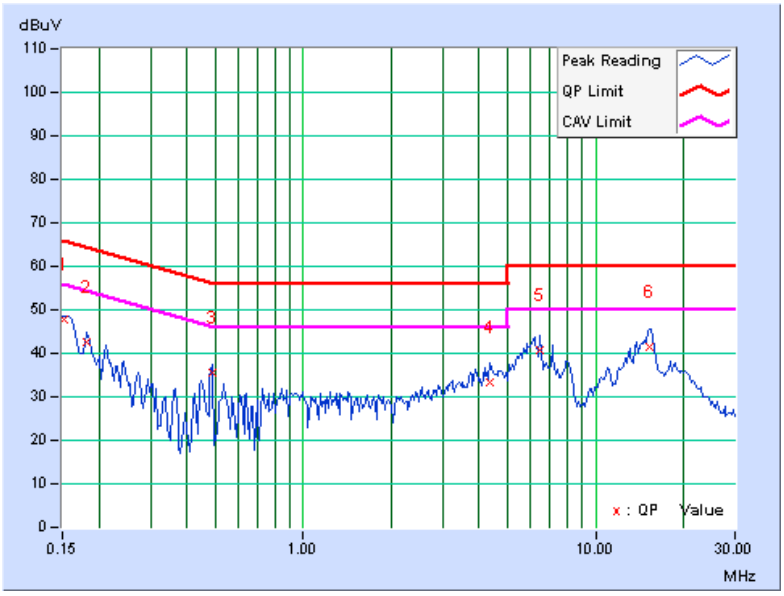
5.1.7 TEST RESULTS

802.11a OFDM MODULATION: For USB Mode

EUT TEST CONDITION		MEASUREMENT DETAIL	
CHANNEL	Channel 149	PHASE	Line (L)
MODULATION TYPE	BPSK	6dB BANDWIDTH	9 kHz
TRANSFER RATE	6bps	INPUT POWER	120Vac, 60 Hz
ENVIRONMENTAL CONDITIONS	26eg. C, 63RH, 965hPa	TESTED BY	Wen Yu

No	Freq.	Corr. Factor	Reading Value [dB (uV)]		Emission Level [dB (uV)]		Limit [dB (uV)]		Margin (dB)	
	[MHz]	(dB)	Q.P.	AV.	Q.P.	AV.	Q.P.	AV.	Q.P.	AV.
1	0.153	0.10	47.61	-	47.71	-	65.86	55.86	-18.15	-
2	0.181	0.11	42.65	-	42.76	-	64.43	54.43	-21.67	-
3	0.486	0.16	35.26	-	35.42	-	56.24	46.24	-20.82	-
4	4.348	0.57	32.65	-	33.22	-	56.00	46.00	-22.78	-
5	6.488	0.68	40.00	-	40.68	-	60.00	50.00	-19.32	-
6	15.297	0.97	40.51	-	41.48	-	60.00	50.00	-18.52	-

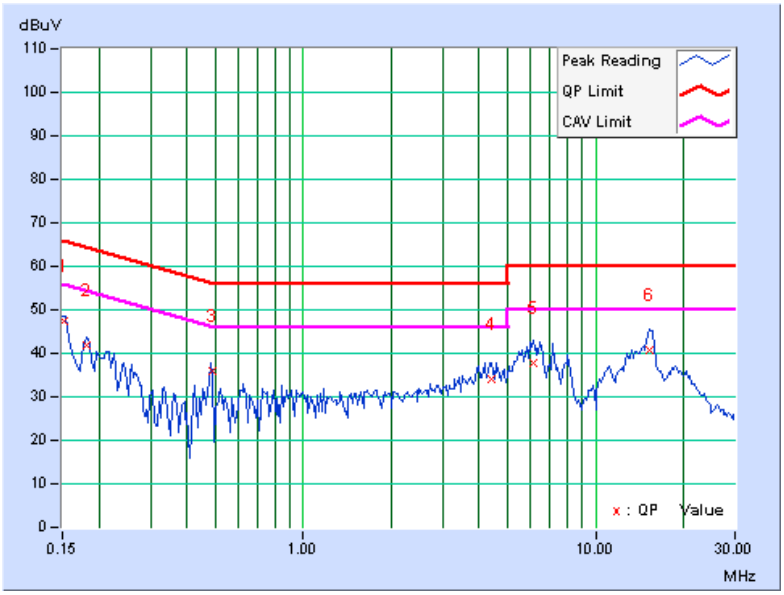
REMARKS: 1. Q.P. and AV. are abbreviations of quasi-peak and average individually.
2. "-": The Quasi-peak reading value also meets average limit and measurement with the average detector is unnecessary.
3. The emission levels of other frequencies were very low against the limit.
4. Margin value = Emission level - Limit value
5. Correction factor = Insertion loss + Cable loss
6. Emission Level = Correction Factor + Reading Value.



EUT TEST CONDITION		MEASUREMENT DETAIL	
CHANNEL	Channel 149	PHASE	Neutral (N)
MODULATION TYPE	BPSK	6dB BANDWIDTH	9 kHz
TRANSFER RATE	6bps	INPUT POWER	120Vac, 60 Hz
ENVIRONMENTAL CONDITIONS	26eg. C, 63RH, 965hPa	TESTED BY	Wen Yu

No	Freq.	Corr. Factor	Reading Value [dB (uV)]		Emission Level [dB (uV)]		Limit [dB (uV)]		Margin (dB)	
	[MHz]	(dB)	Q.P.	AV.	Q.P.	AV.	Q.P.	AV.	Q.P.	AV.
1	0.153	0.10	47.42	-	47.52	-	65.86	55.86	-18.34	-
2	0.181	0.11	41.61	-	41.72	-	64.43	54.43	-22.71	-
3	0.486	0.16	35.71	-	35.87	-	56.24	46.24	-20.37	-
4	4.402	0.57	33.58	-	34.15	-	56.00	46.00	-21.85	-
5	6.117	0.66	37.24	-	37.90	-	60.00	50.00	-22.10	-
6	15.230	0.96	39.78	-	40.74	-	60.00	50.00	-19.26	-

REMARKS: 1. Q.P. and AV. are abbreviations of quasi-peak and average individually.
2. "-": The Quasi-peak reading value also meets average limit and measurement with the average detector is unnecessary.
3. The emission levels of other frequencies were very low against the limit.
4. Margin value = Emission level - Limit value
5. Correction factor = Insertion loss + Cable loss
6. Emission Level = Correction Factor + Reading Value.

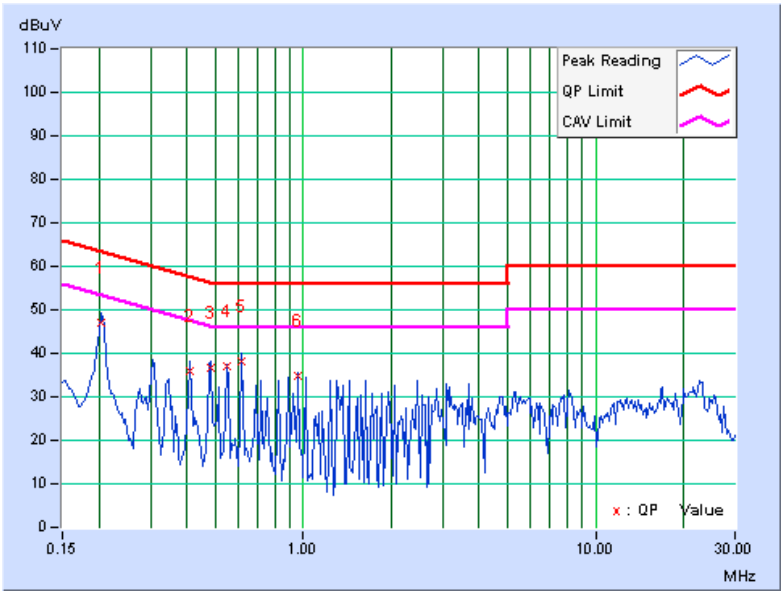


802.11a OFDM MODULATION: For Cradle (1 Slot) Mode

EUT TEST CONDITION		MEASUREMENT DETAIL	
CHANNEL	Channel 149	PHASE	Line (L)
MODULATION TYPE	BPSK	6dB BANDWIDTH	9 kHz
TRANSFER RATE	6bps	INPUT POWER	120Vac, 60 Hz
ENVIRONMENTAL CONDITIONS	26eg. C, 63RH, 965hPa	TESTED BY	Wen Yu

No	Freq.	Corr. Factor	Reading Value [dB (uV)]		Emission Level [dB (uV)]		Limit [dB (uV)]		Margin (dB)	
	[MHz]	(dB)	Q.P.	AV.	Q.P.	AV.	Q.P.	AV.	Q.P.	AV.
1	0.205	0.18	46.83	-	47.01	-	63.42	53.42	-16.41	-
2	0.412	0.19	35.91	-	36.10	-	57.61	47.61	-21.51	-
3	0.482	0.22	36.37	-	36.59	-	56.30	46.30	-19.71	-
4	0.548	0.25	36.88	-	37.13	-	56.00	46.00	-18.87	-
5	0.615	0.28	38.02	-	38.30	-	56.00	46.00	-17.70	-
6	0.959	0.42	34.41	-	34.83	-	56.00	46.00	-21.17	-

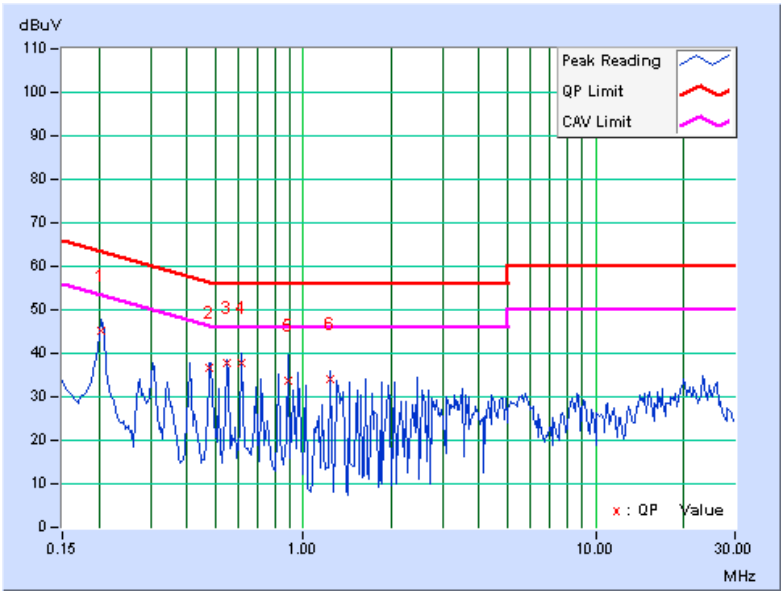
REMARKS: 1. Q.P. and AV. are abbreviations of quasi-peak and average individually.
2. "-": The Quasi-peak reading value also meets average limit and measurement with the average detector is unnecessary.
3. The emission levels of other frequencies were very low against the limit.
4. Margin value = Emission level - Limit value
5. Correction factor = Insertion loss + Cable loss
6. Emission Level = Correction Factor + Reading Value.



EUT TEST CONDITION		MEASUREMENT DETAIL	
CHANNEL	Channel 149	PHASE	Neutral (N)
MODULATION TYPE	BPSK	6dB BANDWIDTH	9 kHz
TRANSFER RATE	6bps	INPUT POWER	120Vac, 60 Hz
ENVIRONMENTAL CONDITIONS	26eg. C, 63RH, 965hPa	TESTED BY	Wen Yu

No	Freq.	Corr. Factor	Reading Value [dB (uV)]		Emission Level [dB (uV)]		Limit [dB (uV)]		Margin (dB)	
	[MHz]	(dB)	Q.P.	AV.	Q.P.	AV.	Q.P.	AV.	Q.P.	AV.
1	0.205	0.11	45.21	-	45.32	-	63.42	53.42	-18.10	-
2	0.478	0.16	36.40	-	36.56	-	56.37	46.37	-19.81	-
3	0.548	0.18	37.46	-	37.64	-	56.00	46.00	-18.36	-
4	0.615	0.21	37.74	-	37.95	-	56.00	46.00	-18.05	-
5	0.884	0.31	33.23	-	33.54	-	56.00	46.00	-22.46	-
6	1.230	0.37	33.73	-	34.10	-	56.00	46.00	-21.90	-

REMARKS: 1. Q.P. and AV. are abbreviations of quasi-peak and average individually.
2. "-": The Quasi-peak reading value also meets average limit and measurement with the average detector is unnecessary.
3. The emission levels of other frequencies were very low against the limit.
4. Margin value = Emission level - Limit value
5. Correction factor = Insertion loss + Cable loss
6. Emission Level = Correction Factor + Reading Value.

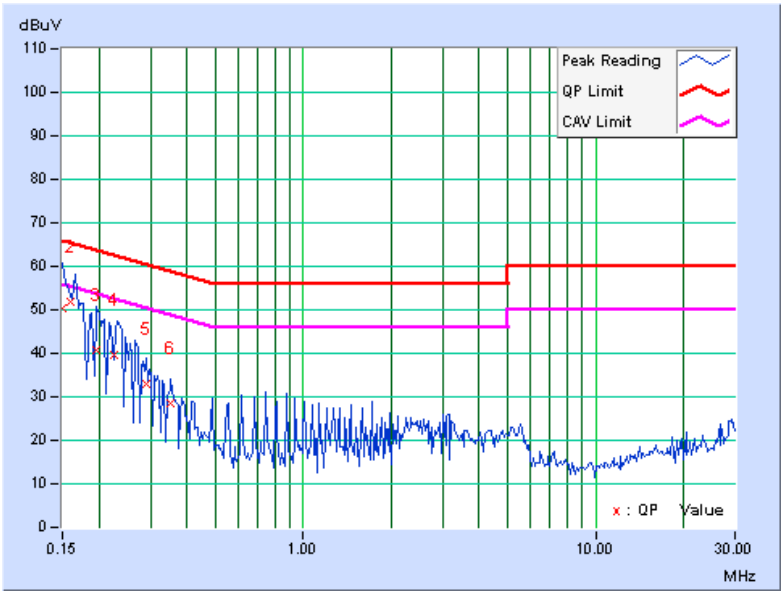


802.11a OFDM MODULATION: For Cradle (4 Slot) Mode

EUT TEST CONDITION		MEASUREMENT DETAIL	
CHANNEL	Channel 149	PHASE	Line (L)
MODULATION TYPE	BPSK	6dB BANDWIDTH	9 kHz
TRANSFER RATE	6bps	INPUT POWER	120Vac, 60 Hz
ENVIRONMENTAL CONDITIONS	26eg. C, 63RH, 965hPa	TESTED BY	Wen Yu

No	Freq.	Corr. Factor	Reading Value [dB (uV)]		Emission Level [dB (uV)]		Limit [dB (uV)]		Margin (dB)	
	[MHz]	(dB)	Q.P.	AV.	Q.P.	AV.	Q.P.	AV.	Q.P.	AV.
1	0.150	0.17	50.06	-	50.23	-	66.00	56.00	-15.77	-
2	0.160	0.17	51.83	-	52.00	-	65.46	55.46	-13.45	-
3	0.197	0.18	40.63	-	40.81	-	63.74	53.74	-22.93	-
4	0.226	0.18	39.42	-	39.60	-	62.58	52.58	-22.98	-
5	0.292	0.18	32.86	-	33.04	-	60.48	50.48	-27.44	-
6	0.353	0.19	28.18	-	28.37	-	58.89	48.89	-30.52	-

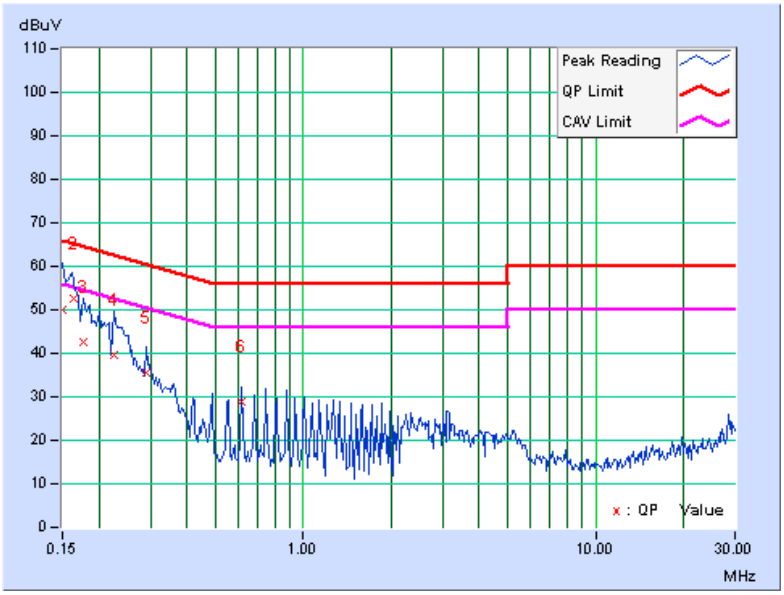
REMARKS: 1. Q.P. and AV. are abbreviations of quasi-peak and average individually.
2. "-": The Quasi-peak reading value also meets average limit and measurement with the average detector is unnecessary.
3. The emission levels of other frequencies were very low against the limit.
4. Margin value = Emission level - Limit value
5. Correction factor = Insertion loss + Cable loss
6. Emission Level = Correction Factor + Reading Value.



EUT TEST CONDITION		MEASUREMENT DETAIL	
CHANNEL	Channel 149	PHASE	Neutral (N)
MODULATION TYPE	BPSK	6dB BANDWIDTH	9 kHz
TRANSFER RATE	6bps	INPUT POWER	120Vac, 60 Hz
ENVIRONMENTAL CONDITIONS	26eg. C, 63RH, 965hPa	TESTED BY	Wen Yu

No	Freq.	Corr. Factor	Reading Value [dB (uV)]		Emission Level [dB (uV)]		Limit [dB (uV)]		Margin (dB)	
	[MHz]	(dB)	Q.P.	AV.	Q.P.	AV.	Q.P.	AV.	Q.P.	AV.
1	0.150	0.10	50.00	-	50.10	-	66.00	56.00	-15.90	-
2	**0.164**	**0.10**	**52.48**	**-**	**52.58**	**-**	**65.24**	**55.24**	**-12.66**	**-**
3	0.177	0.11	42.63	-	42.74	-	64.61	54.61	-21.87	-
4	0.224	0.11	39.54	-	39.65	-	62.66	52.66	-23.01	-
5	0.291	0.12	35.51	-	35.63	-	60.51	50.51	-24.88	-
6	0.615	0.21	28.80	-	29.01	-	56.00	46.00	-26.99	-

REMARKS: 1. Q.P. and AV. are abbreviations of quasi-peak and average individually.
2. "-": The Quasi-peak reading value also meets average limit and measurement with the average detector is unnecessary.
3. The emission levels of other frequencies were very low against the limit.
4. Margin value = Emission level - Limit value
5. Correction factor = Insertion loss + Cable loss
6. Emission Level = Correction Factor + Reading Value.



5.2 RADIATED EMISSION MEASUREMENT

5.2.1 LIMITS OF RADIATED EMISSION MEASUREMENT

Emissions radiated outside of the specified bands, shall be according to the general radiated limits in 15.209 as following:

Frequencies (MHz)	Field strength (microvolts/meter)	Measurement distance (meters)
0.009-0.490	2400/F(kHz)	300
0.490-1.705	24000/F(kHz)	30
1.705-30.0	30	30
30-88	100	3
88-216	150	3
216-960	200	3
Above 960	500	3

NOTE:

1. The lower limit shall apply at the transition frequencies.
2. Emission level (dBuV/m) = 20 log Emission level (uV/m).
3. As shown in 15.35(b), for frequencies above 1000MHz, the field strength limits are based on average detector, however, the peak field strength of any emission shall not exceed the maximum permitted average limits, specified above by more than 20dB under any condition of modulation.

5.2.2 TEST INSTRUMENTS

For radiated emission test (Below 1 GHz):

DESCRIPTION & MANUFACTURER	MODEL NO.	SERIAL NO.	CALIBRATED DATE	CALIBRATED UNTIL
ROHDE & SCHWARZ Spectrum Analyzer	FSP40	100036	Dec. 9, 2008	Dec. 8, 2009
HP Pre_Amplifier	8449B	3008A01923	Nov. 10, 2008	Nov. 9, 2009
ROHDE & SCHWARZ Test Receiver	ESCS30	847124/029	Sep. 9, 2008	Sep. 8, 2009
SCHWARZBECK TRILOG Broadband Antenna	VULB 9168	138	April 29, 2009	April 28, 2010
Schwarzbeck Horn_Antenna	BBHA9120	D124	Dec. 09, 2008	Dec. 08, 2009
Schwarzbeck Horn_Antenna	BBHA 9170	BBHA9170153	Jan. 22, 2009	Jan. 21, 2010
RF Switches	EMH-011	08009	Oct. 07, 2008	Oct. 06, 2009
RF CABLE (Chaintek)	Sucoflex 106	28077	Aug. 14, 2009	Aug. 13, 2010
RF Cable	8DFB	STCCAB-30M-1GHz	Oct. 07, 2008	Oct. 06, 2009
Software	ADT_Radiated_V7.6.15.9.2	NA	NA	NA
CT Antenna Tower & Turn Table	NA	NA	NA	NA

Note: 1. The calibration interval of the above test instruments is 12 months and the calibrations are traceable to NML/ROC and NIST/USA.
2. The horn antenna, HP preamplifier (model: 8449B) and Spectrum Analyzer (model: FSP40) are used only for the measurement of emission frequency above 1GHz if tested.
3. The test was performed in Open Site No. C.
4. The FCC Site Registration No. is 656396.
5. The VCCI Site Registration No. is R-1626.
6. The CANADA Site Registration No. is IC 7450G-3.

For radiated emission test (Above 1 GHz):

DESCRIPTION & MANUFACTURER	MODEL NO.	SERIAL NO.	CALIBRATED DATE	CALIBRATED UNTIL
ADVANTEST Spectrum Analyzer	U3751	170100022	Nov. 17, 2008	Nov. 16, 2009
ADVANTEST Spectrum Analyzer	U3772	160100280	July 25, 2009	July 24, 2010
HP Pre_Amplifier	8449B	3008A01922	Sep. 25, 2008	Sep. 24, 2009
ROHDE & SCHWARZ Test Receiver	ESVS 30	841977/002	Nov. 03, 2008	Nov. 02, 2009
SCHAFFNER(CHASE) Broadband Antenna	CBL6112B	2798	April 29, 2009	April 28, 2010
Schwarzbeck Horn_Antenna	BBHA9120-D1	D123	Sep. 30, 2008	Sep. 29, 2009
Schwarzbeck Horn_Antenna	BBHA 9170	BBHA9170153	Jan. 23, 2009	Jan. 22, 2010
RF Switches	MP59B	6100175593	Sep. 02, 2008	Sep. 01, 2009
RF Cable	8DFB	STBCAB-30M-1GHz	Sep. 02, 2008	Sep. 01, 2009
Software	ADT_Radiated_V7.6.15.9.2	NA	NA	NA
CT Antenna Tower & Turn Table	NA	NA	NA	NA
CORCOM AC Filter	MRI2030	024/019	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, HP preamplifier (model: 8449B) and Spectrum Analyzer (model: U3772) are used only for the measurement of emission frequency above 1GHz if tested.
3. The test was performed in Open Site No. B.
4. The VCCI Site Registration No. is R-847.
5. The FCC Site Registration No. is 92753.
6. The CANADA Site Registration No. is IC 7450G-2.

5.2.3 TEST PROCEDURES

a. The EUT was placed on the top of a rotating table 0.8 meters above the ground at a 10 meter open area test site. The table was rotated 360 degrees to determine the position of the highest radiation.

b. The EUT was set 3 meters away from the interference-receiving antenna, which was mounted on the top of a variable-height antenna tower.

c. The antenna is a broadband antenna, and its height is varied from one meter to four meters above the ground to determine the maximum value of the field strength. Both horizontal and vertical polarizations of the antenna are set to make the measurement.

d. For each suspected emission, the EUT was arranged to its worst case and then the antenna was tuned to heights from 1 meter to 4 meters and the rotatable table was turned from 0 degrees to 360 degrees to find the maximum reading.

e. The test-receiver system was set to Peak Detect Function and Specified Bandwidth with Maximum Hold Mode.

f. If the emission level of the EUT in peak mode was 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.

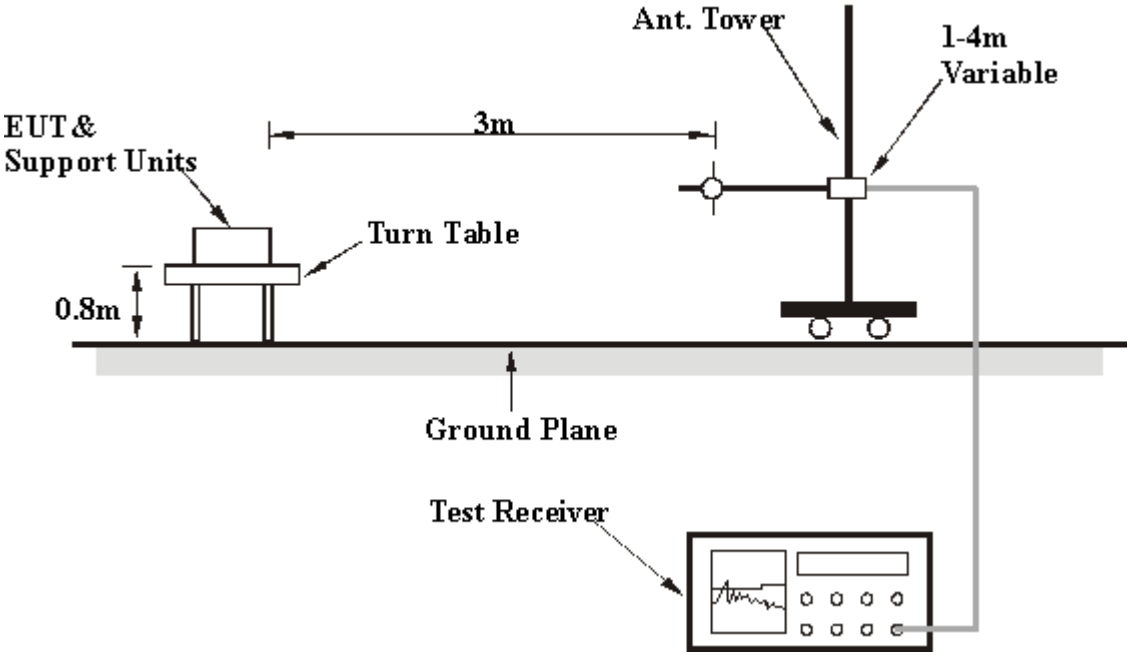
NOTE:

1. The resolution bandwidth and video bandwidth of test receiver/spectrum analyzer is 120kHz for Peak detection (PK) and Quasi-peak detection (QP) at frequency below 1GHz.
2. The resolution bandwidth of test receiver/spectrum analyzer is 1 MHz and the video bandwidth is 3 MHz for Peak detection (PK) at frequency above 1GHz.
3. The resolution bandwidth of test receiver/spectrum analyzer is 1 MHz and the video bandwidth is 10 Hz for Average detection (AV) at frequency above 1GHz.

5.2.4 DEVIATION FROM TEST STANDARD

No deviation

5.2.5 TEST SETUP



For the actual test configuration, please refer to the related item – Photographs of the Test Configuration.

5.2.6 EUT OPERATING CONDITIONS

Same as the 4.1.6

5.2.7 TEST RESULTS

BELOW 1GHz WORST-CASE DATA：802.11a OFDM MODULATION

EUT TEST CONDITION		MEASUREMENT DETAIL	
CHANNEL	Channel 149	FREQUENCY RANGE	Below 1000MHz
INPUT POWER (SYSTEM)	120Vac, 60 Hz	DETECTOR FUNCTION	Quasi-Peak
ENVIRONMENTAL CONDITIONS	25.0deg. C, 66.0%RH 965hPa	TESTED BY	Frank Liu

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	40.67	22.42 QP	40.00	-17.58	1.44 H	121	7.82	14.60
2	65.74	27.46 QP	40.00	-12.54	1.41 H	129	13.97	13.49
3	139.24	31.22 QP	43.50	-12.28	1.24 H	74	16.69	14.53
4	173.32	29.67 QP	43.50	-13.83	1.00 H	133	14.58	15.09
5	250.00	26.74 QP	46.00	-19.26	1.00 H	172	12.49	14.25
6	375.00	36.13 QP	46.00	-9.87	1.00 H	184	17.32	18.81
ANTENNA POLARITY & TEST DISTANCE: VERTICAL AT 3 M								
NO.	FREQ. (MHz)	EMISSION LEVEL (dBuV/m)	LIMIT (dBuV/m)	MARGIN (dB)	ANTENNA HEIGHT (m)	TABLE ANGLE (Degree)	RAW VALUE (dBuV)	CORRECTION FACTOR (dB/m)
1	39.56	30.49 QP	40.00	-9.51	1.00 V	241	16.01	14.48
2	79.95	26.87 QP	40.00	-13.13	1.00 V	244	15.98	10.89
3	135.24	27.63 QP	43.50	-15.87	1.00 V	153	13.51	14.12
4	151.56	28.21 QP	43.50	-15.29	1.00 V	130	12.47	15.74
5	250.00	25.16 QP	46.00	-20.84	1.00 V	166	10.91	14.25
6	375.00	36.43 QP	46.00	-9.57	1.00 V	144	17.62	18.81

REMARKS: 1. Emission level (dBuV/m) = Raw Value (dBuV) + Correction Factor (dB/m).

2. Correction Factor (dB/m) = Antenna Factor (dB/m) + Cable Factor (dB).

3. The other emission levels were very low against the limit.

4. Margin value = Emission level – Limit value.

ABOVE 1GHz DATA

802.11a OFDM MODULATION

EUT TEST CONDITION		MEASUREMENT DETAIL	
CHANNEL	Channel 149	FREQUENCY RANGE	1 ~ 40GHz
INPUT POWER (SYSTEM)	120Vac, 60 Hz	DETECTOR FUNCTION	Peak (PK) Average (AV)
ENVIRONMENTAL CONDITIONS	28.0deg. C, 62.0%RH 965hPa	TESTED BY	Duke Tseng

ANTENNA POLARITY & TEST DISTANCE: HORIZONTAL AT 3 M								
NO.	FREQ. (MHz)	EMISSION LEVEL (dBuV/m)	LIMIT (dBuV/m)	MARGIN (dB)	ANTENNA HEIGHT (m)	TABLE ANGLE (Degree)	RAW VALUE (dBuV)	CORRECTION FACTOR (dB/m)
1	*5745.00	97.04 PK			1.02 H	57	59.99	37.05
2	*5745.00	88.26 AV			1.02 H	57	51.21	37.05
3	11490.00	55.21 PK	74.00	-18.79	1.00 H	149	8.15	47.06
4	11490.00	43.44 AV	54.00	-10.56	1.00 H	149	-3.62	47.06
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	*5745.00	106.85 PK			1.10 V	81	69.80	37.05
2	*5745.00	98.27 AV			1.10 V	81	61.22	37.05
3	11490.00	57.51 PK	74.00	-16.49	1.14 V	89	10.45	47.06
4	11490.00	45.24 AV	54.00	-8.76	1.14 V	89	-1.82	47.06

REMARKS: 1. Emission level (dBuV/m) = Raw Value (dBuV) + Correction Factor (dB/m).
2. Correction Factor (dB/m) = Antenna Factor (dB/m) + Cable Factor (dB).
3. The other emission levels were very low against the limit.
4. Margin value = Emission level – Limit value.
5. " * ": Fundamental frequency.
6. The limit value is defined as per 15.247.

EUT TEST CONDITION		MEASUREMENT DETAIL	
CHANNEL	Channel 157	FREQUENCY RANGE	1 ~ 40GHz
INPUT POWER (SYSTEM)	120Vac, 60 Hz	DETECTOR FUNCTION	Peak (PK) Average (AV)
ENVIRONMENTAL CONDITIONS	28.0deg. C, 62.0%RH 965hPa	TESTED BY	Duke Tseng

ANTENNA POLARITY & TEST DISTANCE: HORIZONTAL AT 3 M								
NO.	FREQ. (MHz)	EMISSION LEVEL (dBuV/m)	LIMIT (dBuV/m)	MARGIN (dB)	ANTENNA HEIGHT (m)	TABLE ANGLE (Degree)	RAW VALUE (dBuV)	CORRECTION FACTOR (dB/m)
1	*5785.00	96.81 PK			1.01 H	64	59.69	37.12
2	*5785.00	87.64 AV			1.01 H	64	50.52	37.12
3	11570.00	57.15 PK	74.00	-16.85	1.17 H	227	10.20	46.95
4	11570.00	45.81 AV	54.00	-8.19	1.17 H	227	-1.14	46.95
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	*5785.00	106.45 PK			1.08 V	83	69.33	37.12
2	*5785.00	97.72 AV			1.08 V	83	60.60	37.12
3	11570.00	62.99 PK	74.00	-11.01	1.17 V	253	16.04	46.95
4	**11570.00**	**50.29 AV**	**54.00**	**-3.71**	**1.17 V**	**253**	**3.34**	**46.95**

REMARKS: 1. Emission level (dBuV/m) = Raw Value (dBuV) + Correction Factor (dB/m).

2. Correction Factor (dB/m) = Antenna Factor (dB/m) + Cable Factor (dB).
3. The other emission levels were very low against the limit.
4. Margin value = Emission level – Limit value.
5. " * ": Fundamental frequency.
6. The limit value is defined as per 15.247.

EUT TEST CONDITION		MEASUREMENT DETAIL	
CHANNEL	Channel 165	FREQUENCY RANGE	1 ~ 40GHz
INPUT POWER (SYSTEM)	120Vac, 60 Hz	DETECTOR FUNCTION	Peak (PK) Average (AV)
ENVIRONMENTAL CONDITIONS	28.0deg. C, 62.0%RH 965hPa	TESTED BY	Duke Tseng

ANTENNA POLARITY & TEST DISTANCE: HORIZONTAL AT 3 M								
NO.	FREQ. (MHz)	EMISSION LEVEL (dBuV/m)	LIMIT (dBuV/m)	MARGIN (dB)	ANTENNA HEIGHT (m)	TABLE ANGLE (Degree)	RAW VALUE (dBuV)	CORRECTION FACTOR (dB/m)
1	*5825.00	98.41 PK			1.07 H	71	61.20	37.21
2	*5825.00	89.30 AV			1.07 H	71	52.09	37.21
3	11650.00	56.08 PK	74.00	-17.92	1.00 H	143	9.27	46.81
4	11650.00	44.69 AV	54.00	-9.31	1.00 H	143	-2.12	46.81
ANTENNA POLARITY & TEST DISTANCE: VERTICAL AT 3 M								
NO.	FREQ. (MHz)	EMISSION LEVEL (dBuV/m)	LIMIT (dBuV/m)	MARGIN (dB)	ANTENNA HEIGHT (m)	TABLE ANGLE (Degree)	RAW VALUE (dBuV)	CORRECTION FACTOR (dB/m)
1	*5825.00	107.19 PK			1.06 V	77	69.98	37.21
2	*5825.00	98.37 AV			1.06 V	77	61.16	37.21
3	11650.00	62.15 PK	74.00	-11.85	1.21 V	264	15.34	46.81
4	11650.00	50.26 AV	54.00	-3.74	1.21 V	264	3.45	46.81

REMARKS: 1. Emission level (dBuV/m) = Raw Value (dBuV) + Correction Factor (dB/m).

2. Correction Factor (dB/m) = Antenna Factor (dB/m) + Cable Factor (dB).
3. The other emission levels were very low against the limit.
4. Margin value = Emission level – Limit value.
5. " * ": Fundamental frequency.
6. The limit value is defined as per 15.247.

5.3 6dB BANDWIDTH MEASUREMENT

5.3.1 LIMITS OF 6dB BANDWIDTH MEASUREMENT

The minimum of 6dB Bandwidth Measurement is 0.5 MHz.

5.3.2 TEST INSTRUMENTS

DESCRIPTION & MANUFACTURER	MODEL NO.	SERIAL NO.	CALIBRATED DATE	CALIBRATED UNTIL
R&S SPECTRUM ANALYZER	FSP40	100037	Aug. 03, 2009	Aug. 02, 2010

NOTE:

1. The calibration interval of the above test instruments is 12 months and the calibrations are traceable to NML/ROC and NIST/USA.

5.3.3 TEST PROCEDURE

The transmitter output was connected to the spectrum analyzer through an attenuator. The bandwidth of the fundamental frequency was measured by spectrum analyzer with 100kHz RBW and 100kHz VBW. The 6dB bandwidth is defined as the total spectrum the power of which is higher than peak power minus 6dB.

5.3.4 DEVIATION FROM TEST STANDARD

No deviation

5.3.5 TEST SETUP

5.3.6 EUT OPERATING CONDITIONS

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

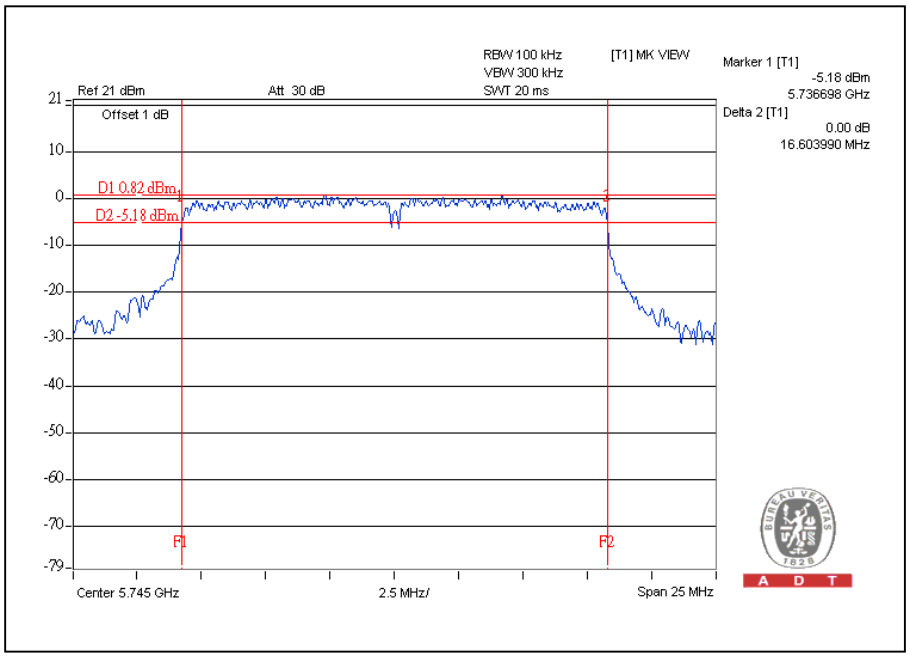
5.3.7 TEST RESULTS

802.11a OFDM MODULATION:

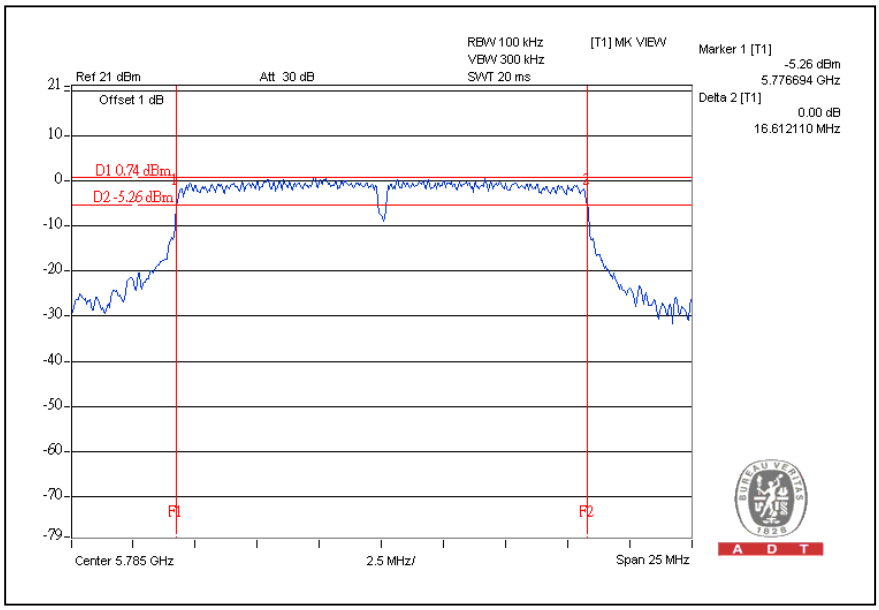
MODULATION TYPE	BPSK	TRANSFER RATE	6Mbps
INPUT POWER (SYSTEM)	120Vac, 60 Hz	ENVIRONMENTAL CONDITIONS	25deg. C, 60%RH, 965hPa
TESTED BY	Wen Yu		

CHANNEL	CHANNEL FREQUENCY (MHz)	6dB BANDWIDTH (MHz)	MINIMUM LIMIT (MHz)	PASS / FAIL
149	5745	16.60	0.5	PASS
157	5785	16.61	0.5	PASS
165	5825	16.58	0.5	PASS

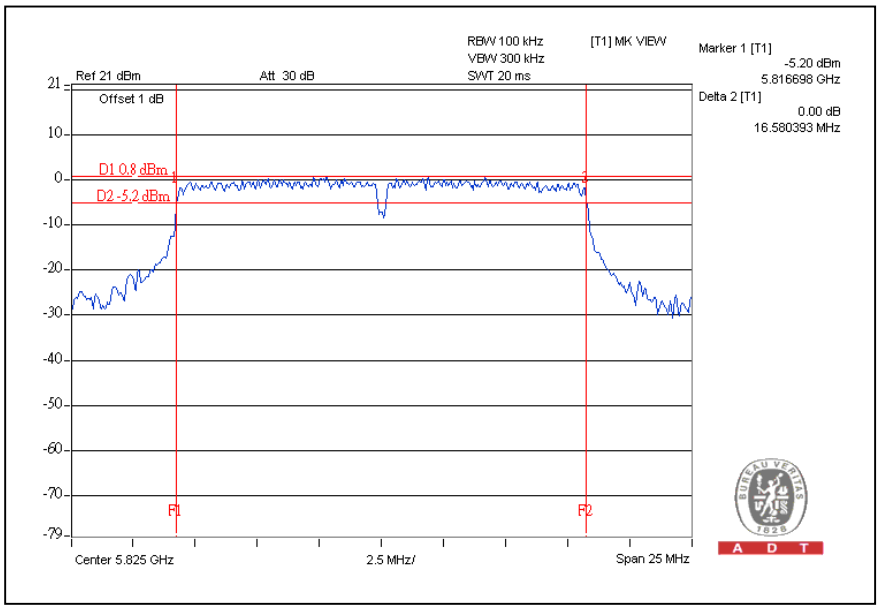
CH149



CH157


RBW 100 kHz
VBW 300 kHz
SWT 20 ms
[T1] MK VIEW
Marker 1 [T1]
-5.26 dBm
5.776694 GHz
Delta 2 [T1]
0.00 dB
16.612110 MHz
Ref 21 dBm
Att 30 dB
Offset 1 dB
D1 0.74 dBm
D2 -5.26 dBm
21
10
0
-10
-20
-30
-40
-50
-60
-70
-79
F1
F2
Center 5.785 GHz
2.5 MHz/
Span 25 MHz

CH165


RBW 100 kHz
VBW 300 kHz
SWT 20 ms
[T1] MK VIEW
Marker 1 [T1]
-5.20 dBm
5.816698 GHz
Delta 2 [T1]
0.00 dB
16.580393 MHz
Ref 21 dBm
Att 30 dB
Offset 1 dB
D1 0.8 dBm
D2 -5.2 dBm
21
10
0
-10
-20
-30
-40
-50
-60
-70
-79
F1
F2
Center 5.825 GHz
2.5 MHz/
Span 25 MHz

5.4 MAXIMUM PEAK OUTPUT POWER

5.4.1 LIMITS OF MAXIMUM PEAK OUTPUT POWER MEASUREMENT

The Maximum Peak Output Power Limit is 30dBm.

5.4.2 INSTRUMENTS

DESCRIPTION & MANUFACTURER	MODEL NO.	SERIAL NO.	CALIBRATED DATE	CALIBRATED UNTIL
Anritsu Power Meter	ML2495A	0824006	April 25, 2009	April 24, 2010
Pulse Power Sensor	MA2411B	0738172	April 25, 2009	April 24, 2010

NOTE:
The calibration interval of the above test instruments is 12 months and the calibrations are traceable to NML/ROC and NIST/USA.

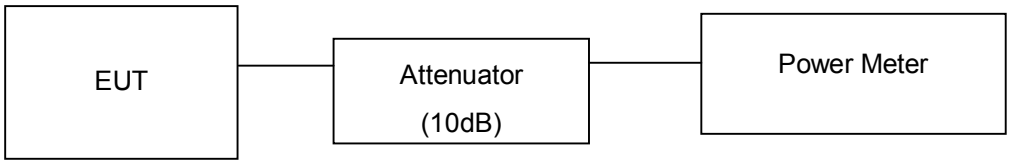
5.4.3 TEST PROCEDURES

1. The transmitter output was connected to the power meter through an attenuator; the bandwidth of the fundamental frequency was measured with the power meter.
2. Record the power level.

5.4.4 DEVIATION FROM TEST STANDARD

No deviation

5.4.5 TEST SETUP



5.4.6 EUT OPERATING CONDITIONS

Same as Item 4.3.6

5.4.7 TEST RESULTS

802.11a OFDM modulation

MODULATION TYPE	BPSK	TRANSFER RATE	6Mbps
INPUT POWER (SYSTEM)	120Vac, 60 Hz	ENVIRONMENTAL CONDITIONS	25deg. C, 60%RH, 965hPa
TESTED BY	Rex Huang		

CHANNEL	CHANNEL FREQUENCY (MHz)	PEAK POWER OUTPUT (dBm)	PEAK POWER OUTPUT (mW)	PEAK POWER LIMIT (dBm)	PASS / FAIL
149	5745	21.06	127.644	30	PASS
157	5785	20.80	120.226	30	PASS
165	5825	20.56	113.763	30	PASS

5.5 POWER SPECTRAL DENSITY MEASUREMENT

5.5.1 LIMITS OF POWER SPECTRAL DENSITY MEASUREMENT

The Maximum of Power Spectral Density Measurement is 8dBm.

5.5.2 TEST INSTRUMENTS

DESCRIPTION & MANUFACTURER	MODEL NO.	SERIAL NO.	CALIBRATED DATE	CALIBRATED UNTIL
R&S SPECTRUM ANALYZER	FSP40	100037	Aug. 03, 2009	Aug. 02, 2010

NOTE:

1. The calibration interval of the above test instruments is 12 months and the calibrations are traceable to NML/ROC and NIST/USA.

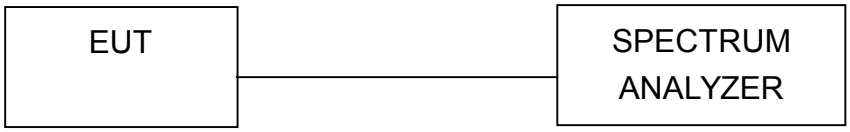
5.5.3 TEST PROCEDURE

The transmitter output was connected to the spectrum analyzer through an attenuator, the bandwidth of the fundamental frequency was measured with the spectrum analyzer using 3 kHz RBW and 30 kHz VBW, set sweep time = span/3 kHz. The power spectral density was measured and recorded.
The sweep time is allowed to be longer than span/3 kHz for a full response of the mixer in the spectrum analyzer.

5.5.4 DEVIATION FROM TEST STANDARD

No deviation

5.5.5 TEST SETUP



5.5.6 EUT OPERATING CONDITION

Same as Item 4.3.6

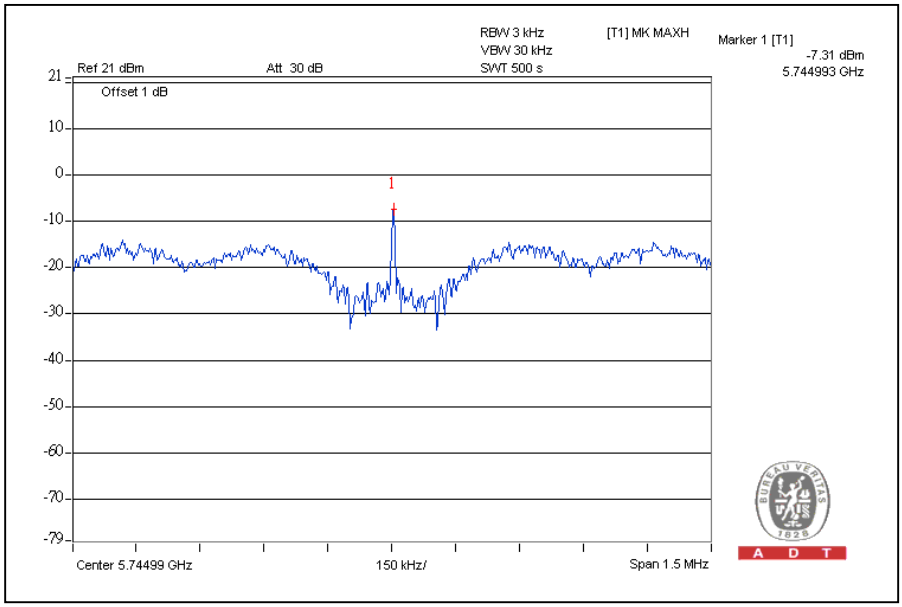
5.5.7 TEST RESULTS

802.11a OFDM modulation

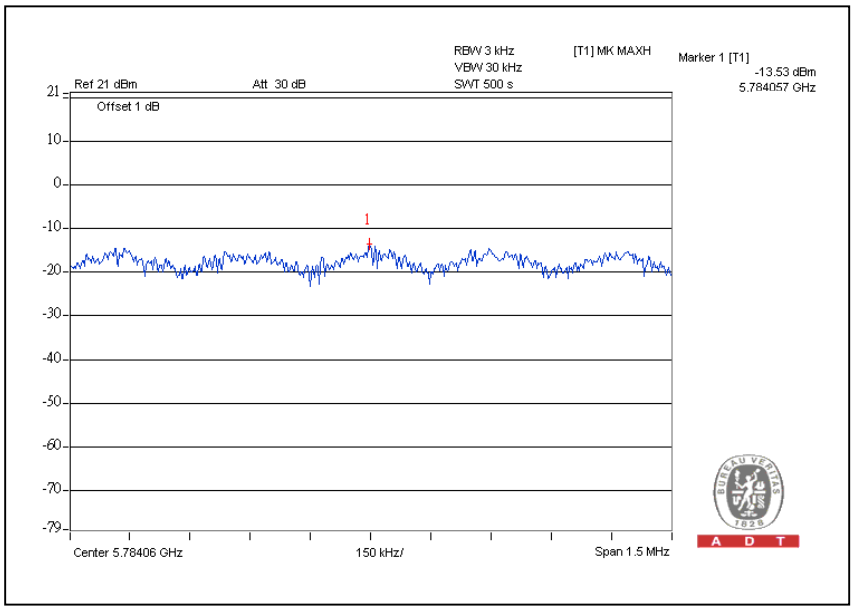
MODULATION TYPE	BPSK	TRANSFER RATE	6Mbps
INPUT POWER (SYSTEM)	120Vac, 60 Hz	ENVIRONMENTAL CONDITIONS	25deg.C, 60%RH, 965hPa
TESTED BY	Rex Huang		

CHANNEL	CHANNEL FREQUENCY (MHz)	RF POWER LEVEL IN 3kHz BW (dBm)	MAXIMUM LIMIT (dBm)	PASS / FAIL
149	5745	-7.31	8	PASS
157	5785	-13.53	8	PASS
165	5825	-13.84	8	PASS

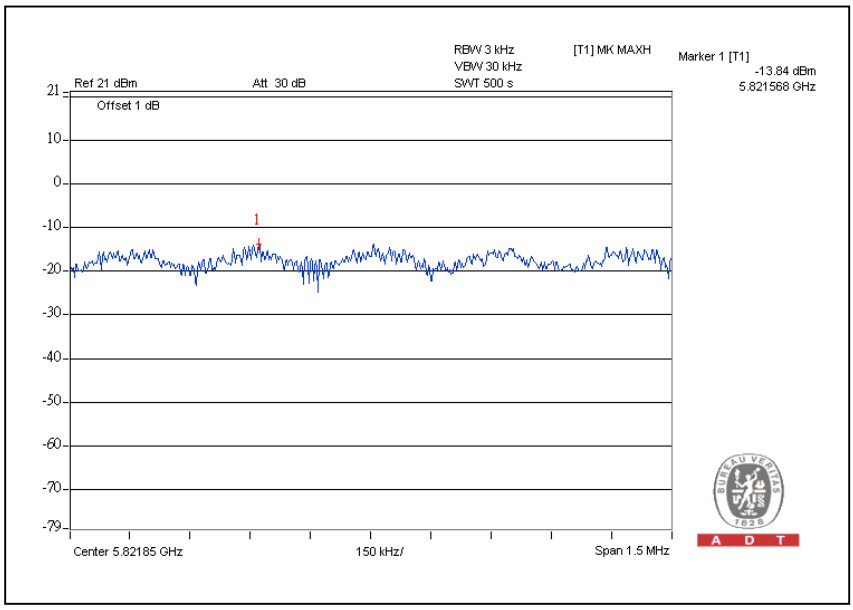
CH149



CH157


RBW 3 kHz
VBW 30 kHz
SWT 500 s
[T1] MK MAXH
Marker 1 [T1]
-13.53 dBm
5.784057 GHz
Ref 21 dBm
Att 30 dB
Offset 1 dB
21
10
0
-10
-20
-30
-40
-50
-60
-70
-79
Center 5.78406 GHz
150 kHz/
Span 1.5 MHz

CH165


RBW 3 kHz
VBW 30 kHz
SWT 500 s
[T1] MK MAXH
Marker 1 [T1]
-13.84 dBm
5.821568 GHz
Ref 21 dBm
Att 30 dB
Offset 1 dB
21
10
0
-10
-20
-30
-40
-50
-60
-70
-79
Center 5.82185 GHz
150 kHz/
Span 1.5 MHz

5.6 CONDUCTED OUT-BAND EMISSION MEASUREMENT

5.6.1 LIMITS OF CONDUCTED OUT-BAND EMISSION MEASUREMENT

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

5.6.2 TEST INSTRUMENTS

DESCRIPTION & MANUFACTURER	MODEL NO.	SERIAL NO.	CALIBRATED DATE	CALIBRATED UNTIL
R&S SPECTRUM ANALYZER	FSP40	100037	Aug. 03, 2009	Aug. 02, 2010

NOTE:

1. The calibration interval of the above test instruments is 12 months and the calibrations are traceable to NML/ROC and NIST/USA.

5.6.3 TEST PROCEDURE

The transmitter output was connected to the spectrum analyzer via a low lose cable. Set RBW of spectrum analyzer to 100 kHz with suitable frequency span including 100 MHz bandwidth from band edge. The band edges was measured and recorded.

5.6.4 DEVIATION FROM TEST STANDARD

No deviation

5.6.5 EUT OPERATING CONDITION

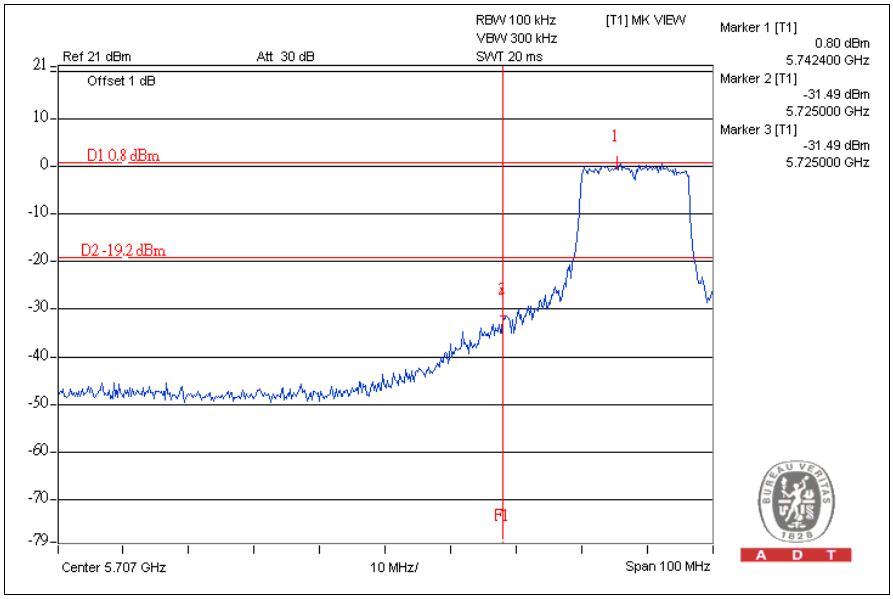
Same as Item 4.3.6

5.6.6 TEST RESULTS

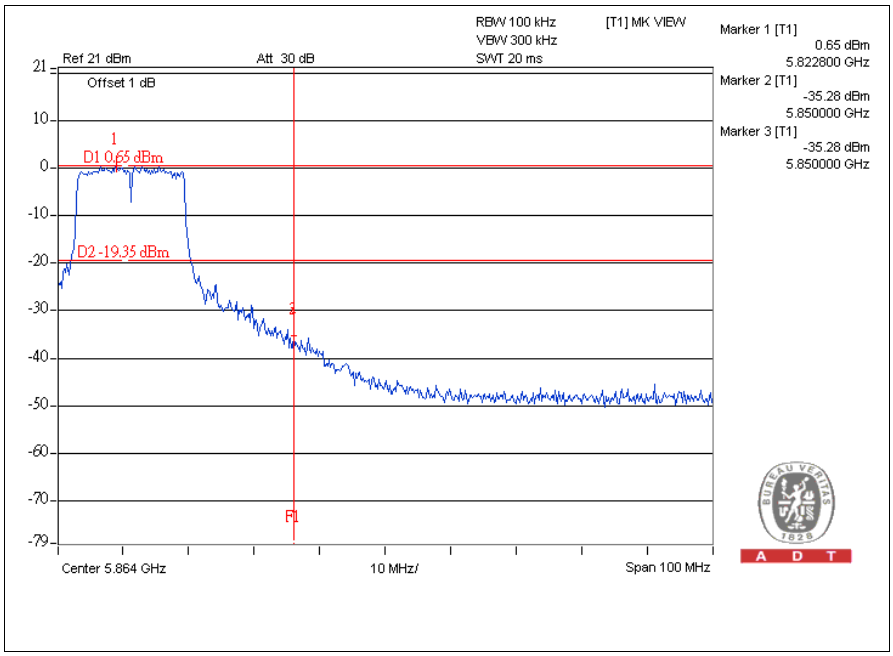
The spectrum plots are attached on the following pages. D2 line indicates the highest level, D1 line indicates the 20dB offset below D2. It shows compliance with the requirement in part 15.247(d).

802.11a OFDM modulation

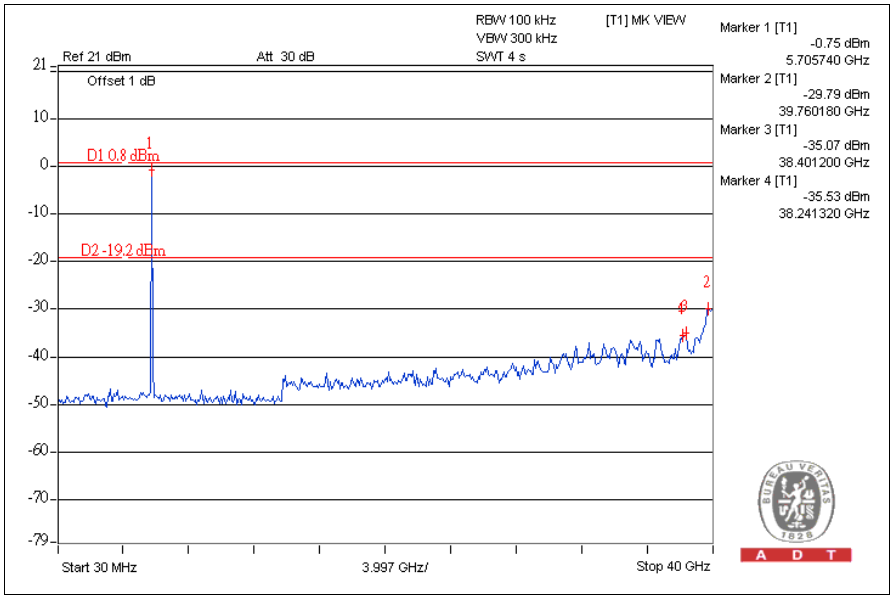
CH149



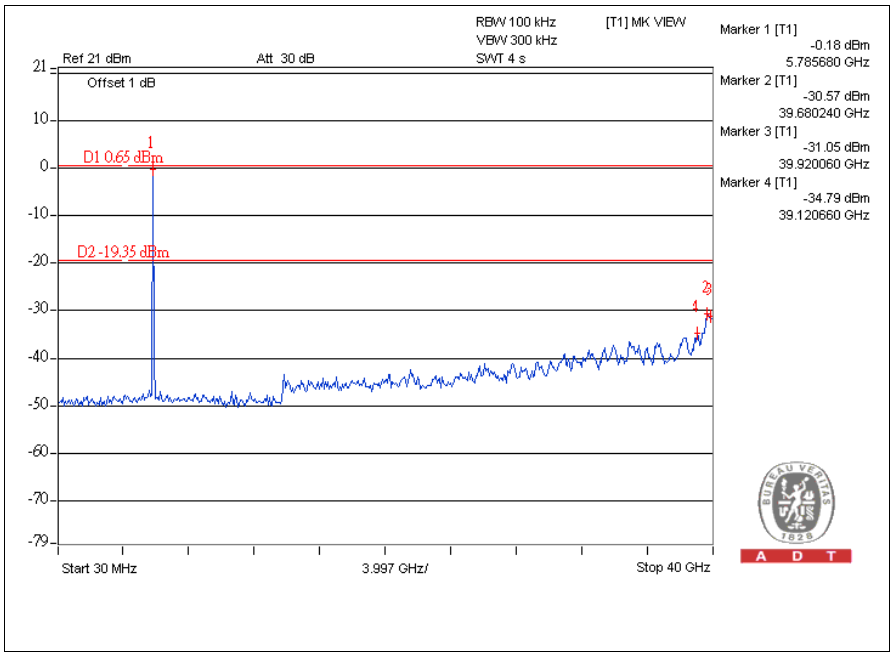
CH165



CH149


RBW 100 kHz
VBW 300 kHz
SWT 4 s
[T1] MK VIEW
Ref 21 dBm
Att 30 dB
Offset 1 dB
D1 0.8 dBm
D2 -19.2 dBm
Marker 1 [T1]
-0.75 dBm
5.705740 GHz
Marker 2 [T1]
-29.79 dBm
39.760180 GHz
Marker 3 [T1]
-35.07 dBm
38.401200 GHz
Marker 4 [T1]
-35.53 dBm
38.241320 GHz
Start 30 MHz
3.997 GHz/
Stop 40 GHz

CH165


RBW 100 kHz
VBW 300 kHz
SWT 4 s
[T1] MK VIEW
Ref 21 dBm
Att 30 dB
Offset 1 dB
D1 0.65 dBm
D2 -19.35 dBm
Marker 1 [T1]
-0.18 dBm
5.785680 GHz
Marker 2 [T1]
-30.57 dBm
39.680240 GHz
Marker 3 [T1]
-31.05 dBm
39.920060 GHz
Marker 4 [T1]
-34.79 dBm
39.120660 GHz
Start 30 MHz
3.997 GHz/
Stop 40 GHz

5.7 ANTENNA REQUIREMENT

5.7.1 STANDARD APPLICABLE

For intentional device, according to FCC 47 CFR Section 15.203, an intentional radiator shall be designed to ensure that no antenna other than that furnished by the responsible party shall be used with the device.

And according to FCC 47 CFR Section 15.247(a), if transmitting antennas of directional gain greater than 6dBi are used, the power shall be reduced by the amount in dB that the directional gain of the antenna exceeds 6dBi.

5.7.2 ANTENNA CONNECTED CONSTRUCTION

There are nine antennas provided to this EUT, please refer to the following table:

For WLAN

No.	Brand	Model	Antenna Type	Gain (dBi)	Connecter Type	Frequency range (MHz)	Cable Loss(dB)	Cable Length
1	Laird (R Type)	Rot main	PIFA	0.37(2.4G) 4.81(5G)	Hirose U.FL	2400~2500 4900~5850	0.1~0.15	25 ± 0.5mm
2	Laird (R Type)	Rot aux	PIFA	1.63(2.4G) 4.93(5G)	Hirose U.FL	2400~2500 4900~5850	0.1~0.15	61 +2/-1mm
3	Laird (S Type)	Str main	PIFA	0.89(2.4G) 4.34(5G)	Hirose U.FL	2400~2500 4900~5850	0.1~0.15	25 ± 0.5mm
4	Laird (S Type)	Str aux	PIFA	1.09(2.4G) 4.52(5G)	Hirose U.FL	2400~2500 4900~5850	0.1~0.15	61 +2/-1mm
5	Laird (G Type)	Gun main	PIFA	2.16(2.4G) 5.83(5G)	Hirose U.FL	2400~2500 4900~5850	0.1~0.15	25 ± 0.5mm
6	Laird (G Type)	Gun aux	PIFA	2.46(2.4G) 5.69(5G)	Hirose U.FL	2400~2500 4900~5850	0.1~0.15	61 +2/-1mm

Note :
1. For 2.4G: The antenna 6 was selected as representative antenna for the test.
2. For 5G: The antenna 5 was selected as representative antenna for the test.

For Bluetooth

No.	Brand	Model	Antenna Type	Gain (dBi)	Connecter Type	Frequency range (MHz)	Cable Loss(dB)	Cable Length
1	Motorola	Rot type	PIFA	3.08	Hirose U.FL	2400~2480	0.1~0.15	35 ± 0.5mm
2	Motorola	Str type	PIFA	2.481	Hirose U.FL	2400~2480	0.1~0.15	35 ± 0.5mm
3	Motorola	Gun type	PIFA	2.885	Hirose U.FL	2400~2480	0.1~0.15	35 ± 0.5mm

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 by the following approval agencies according to ISO/IEC 17025:

USA	FCC, NVLAP
Germany	TUV Rheinland
Japan	VCCI
Norway	NEMKO
Canada	INDUSTRY CANADA, CSA
R.O.C.	TAF, BSMI, NCC
Netherlands	Telefication
Singapore	GOST-ASIA (MOU)
Russia	CERTIS (MOU)

Copies of accreditation certificates of our laboratories obtained from approval agencies can be downloaded from our web site: www.adt.com.tw/index.5/phtml. If you have any comments, please feel free to contact us at the following:

Linko EMC/RF Lab:
Tel: 886-2-26052180
Fax: 886-2-26052943

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: 886-3-3185050

Web Site: www.adt.com.tw

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 any modifications are made to the EUT by the lab during the test.

---END---