



FCC SUPPLEMENTARY TEST REPORT

REPORT NO.: RF960806H04A

MODEL NO.: RTU7300 USB

RECEIVED: June 16, 2008

TESTED: June 24 to July 01, 2008

ISSUED: July 07, 2008

APPLICANT: Realtek Semiconductor Corp.

ADDRESS: No. 2, Innovation Road II, Hsinchu Science
Park, Hsinchu 300, Taiwan

ISSUED BY: Advance Data Technology Corporation

TEST LOCATION: No. 81-1, Lu Liao Keng, 9 Ling, Wu Lung
Tsuen, Chiung Lin Hsiang, Hsin Chu Hsien,
Taiwan, R.O.C.

This test report consists of 53 pages in total. It may be duplicated completely for legal use with the approval of the applicant. It should not be reproduced except in full, without the written approval of our laboratory. The test results in the report only apply to the tested sample.



Table of Contents

1	CERTIFICATION	4
2	SUMMARY OF TEST RESULTS	5
2.1	MEASUREMENT UNCERTAINTY	5
3	GENERAL INFORMATION	6
3.1	GENERAL DESCRIPTION OF EUT.....	6
3.2	DESCRIPTION OF TEST MODES.....	7
3.2.1	TEST MODE APPLICABILITY AND TESTED CHANNEL DETAIL	8
3.3	GENERAL DESCRIPTION OF APPLIED STANDARDS	11
3.4	DESCRIPTION OF SUPPORT UNITS.....	12
3.5	CONFIGURATION OF SYSTEM UNDER TEST	12
3.6	OPERATIONAL LIMITATIONS.....	13
4	TEST TYPES AND RESULTS	14
4.1	CONDUCTED EMISSION MEASUREMENT	14
4.1.1	LIMITS OF CONDUCTED EMISSION MEASUREMENT	14
4.1.2	TEST INSTRUMENTS	14
4.1.3	TEST PROCEDURES.....	15
4.1.4	DEVIATION FROM TEST STANDARD	15
4.1.5	TEST SETUP	16
4.1.6	EUT OPERATING CONDITIONS.....	16
4.1.7	TEST RESULTS.....	17
4.2	RADIATED EMISSION MEASUREMENT (FOR 15.519 (c))	19
4.2.1	LIMITS OF RADIATED EMISSION MEASUREMENT	19
4.2.2	INSTRUMENT SETUP VALUE AND MEASUREMENT DISTANCE.....	20
4.2.3	TEST INSTRUMENTS	21
4.2.4	TEST PROCEDURES.....	22
4.2.5	DEVIATION FROM TEST STANDARD	22
4.2.6	TEST SETUP.....	23
4.2.7	EUT OPERATING CONDITIONS.....	23
4.2.8	TEST RESULTS.....	24
4.3	RADIATED EMISSION MEASUREMENT (FOR 15.519 (d))	29
4.3.1	LIMITS OF RADIATED EMISSION MEASUREMENT	29
4.3.2	INSTRUMENT SETUP VALUE AND MEASUREMENT DISTANCE.....	30
4.3.3	TEST INSTRUMENTS	31
4.3.4	TEST PROCEDURES.....	32
4.3.5	DEVIATION FROM TEST STANDARD	32
4.3.6	TEST SETUP	33



4.3.7	EUT OPERATING CONDITIONS.....	33
4.3.8	TEST RESULTS.....	34
4.4	UWB BANDWIDTH MEASUREMENT.....	37
4.4.1	LIMITS OF UWB BANDWIDTH MEASUREMENT.....	37
4.4.2	INSTRUMENT SETUP VALUE AND MEASUREMENT DISTANCE.....	37
4.4.3	TEST INSTRUMENT.....	37
4.4.4	TEST PROCEDURE.....	37
4.4.5	DEVIATION FROM TEST STANDARD.....	37
4.4.6	TEST SETUP.....	38
4.4.7	EUT OPERATING CONDITIONS.....	38
4.4.8	TEST RESULTS.....	39
4.5	PEAK EMISSION WITHIN A 50MHz BANDWIDTH.....	47
4.5.1	LIMITS OF PEAK EMISSION.....	47
4.5.2	INSTRUMENT SETUP VALUE AND MEASUREMENT DISTANCE.....	47
4.5.3	TEST INSTRUMENTS.....	48
4.5.4	TEST PROCEDURE.....	48
4.5.5	DEVIATION FROM TEST STANDARD.....	48
4.5.6	TEST SETUP.....	48
4.5.7	EUT OPERATING CONDITIONS.....	48
4.5.8	TEST RESULTS.....	49
4.6	ANTENNA REQUIREMENT.....	51
4.6.1	STANDARD APPLICABLE.....	51
4.6.2	ANTENNA CONNECTED CONSTRUCTION.....	51
5	INFORMATION ON THE TESTING LABORATORIES.....	52
6	APPENDIX-A - MODIFICATIONS RECORDERS FOR ENGINEERING CHANGES TO THE EUT BY THE LAB.....	53



1 CERTIFICATION

PRODUCT: UWB USB Dongle
MODEL: RTU7300 USB
BRAND: Realtek
APPLICANT: Realtek Semiconductor Corp.
TESTED: June 24 to July 01, 2008
TEST SAMPLE: ENGINEERING SAMPLE
STANDARDS: **FCC Part 15, Subpart F (Section 15.519)**
ANSI C63.4-2003

The above equipment (model: RTU7300 USB) have been tested by **Advance Data Technology Corporation**, 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 : Claire Kuan , **DATE:** July 07, 2008
(Claire Kuan, Specialist)

TECHNICAL ACCEPTANCE : Hank Chung , **DATE:** July 07, 2008
Responsible for RF (Hank Chung, Deputy Manager)

APPROVED BY : May Chen , **DATE:** July 07, 2008
(May Chen, Deputy Manager)

2 SUMMARY OF TEST RESULTS

The EUT has been tested according to the following specifications:

APPLIED STANDARD: FCC Part 15, Subpart F			
Standard Section	Test Type and Limit	Result	REMARK
15.207	AC Power Conducted Emission	PASS	Meet the requirement of limit. Minimum passing margin is -27.24dB at 0.212MHz.
15.519(b)	UWB Bandwidth	PASS	Meet the requirement of limit.
15.209 15.519(c)	Radiated Emissions	PASS	Meet the requirement of limit. Minimum passing margin is -0.05dB at 13440.00MHz..
15.209 15.519(d)	Radiated Emissions in GPS Band	PASS	Meet the requirement of limit. Minimum passing margin is -24.09dB at 1188.00MHz..
15.519(e)	Peak Emissions within a 50MHz Bandwidth	PASS	Meet the requirement of limit. Minimum passing margin is -0.22dB at 4488.00MHz.

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:

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)	2.33 dB
Radiated emissions (18GHz -40GHz)	2.56 dB

3 GENERAL INFORMATION

3.1 GENERAL DESCRIPTION OF EUT

PRODUCT	UWB USB Dongle
MODEL NO.	RTU7300 USB
FCC ID	TX2RTU7300-UWB
POWER SUPPLY	DC 5V from host equipment
MODULATION TECHNOLOGY	MOFDM
FREQUENCY RANGE	3.1 to 4.8GHz (Supporting up to 3 MBOA sub-bands, 528MHz each)
MAXIMUM OUTPUT POWER	-24.66dBm (70.54 dBuV/m)
ANTENNA TYPE	Dipole antenna with 1dBi (ACON peak) & 1.68dBi (WNC Peak)
I/O PORTS	USB
DATA CABLE	NA
ASSOCIATED DEVICES	NA

NOTE:

1. This report is prepared for FCC class II permissive change. The difference compared with the Report No.: RF960806H04 design is as the following:

- ◆ Change antenna type from chip antenna to dipole antenna as following:

Antenna	Brand Name	Gain(dBi)	Connector
Antenna 1	ACON	1	Reverse SMA
Antenna 2	WNC	1.68	Reverse SMA

- ◆ Move LED component position, and change the size from 0402 to 0603.
- ◆ Change different color of the appearance.

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

3.2 DESCRIPTION OF TEST MODES

Four transmission modes are provided to this EUT.

MODE	SUB-BAND	FREQUENCY (MHZ)
1	1	3432
2	2	3960
3	3	4488
4	1, 2, 3	3432, 3960, 4488

NOTE:

After pre-testing each mode, the combination mode (sub-band 1, 2, 3) was the worst situation and only the data was presented in the following sections<Except for UWB Bandwidth Measurement and Peak Emission Measurement>.

3.2.1 TEST MODE APPLICABILITY AND TESTED CHANNEL DETAIL

EUT configure mode	Applicable to					Description
	PLC	RE<1G	RE [≥] 1G	UB	PE	
A	√	√	√	√	√	Sub-band 1, 2, 3
B	-	-	-	√	√	Sub-band 1
C	-	-	-	√	√	Sub-band 2
D	-	-	-	√	√	Sub-band 3

Where **PLC**: Power Line Conducted Emission **RE<1G**: Radiated Emission below 1GHz
RE[≥]1G: Radiated Emission above 1GHz **UB**:UBW Bandwidth
PE: Peak Emission

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.

EUT configure mode	Available Sub-band	Tested Sub-band	Modulation Technology
A	1 to 3	1, 2, 3	MOFDM

- For conducted emissions, the EUT was tested as the following test modes:

Test Mode	Description
Mode A	Antenna 1
Mode B	Antenna 2

From above modes, Mode B was chosen for final test

RADIATED EMISSION TEST (BELOW 960 MHz):

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

EUT configure mode	Available Sub-band	Tested Sub-band	Modulation Technology
A	1 to 3	1, 2, 3	MOFDM

- For conducted emissions, the EUT was tested as the following test modes:

Test Mode	Description
Mode A	Antenna 1
Mode B	Antenna 2

From above modes, Mode B was chosen for final test

RADIATED EMISSION TEST (ABOVE 960 MHz):

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

EUT configure mode	Available Sub-band	Tested Sub-band	Modulation Technology
A	1 to 3	1, 2, 3	MOFDM

- For conducted emissions, the EUT was tested as the following test modes:

Test Mode	Description
Mode A	Antenna 1
Mode B	Antenna 2

From above modes, Mode B was chosen for final test

UWB BANDWIDTH 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.

EUT configure mode	Available Sub-band	Tested Sub-band	Modulation Technology
A	1 to 3	1, 2, 3	MOFDM
B	1 to 3	1	MOFDM
C	1 to 3	2	MOFDM
D	1 to 3	3	MOFDM

PEAK 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.

EUT configure mode	Available Sub-band	Tested Sub-band	Modulation Technology
A	1 to 3	1, 2, 3	MOFDM
B	1 to 3	1	MOFDM
C	1 to 3	2	MOFDM
D	1 to 3	3	MOFDM



3.3 GENERAL DESCRIPTION OF APPLIED STANDARDS

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

FCC Part 15, Subpart F. (15.519)

ANSI C63.4-2003

THE EVOLUTION OF MODERN UWB TECHNOLOGY

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

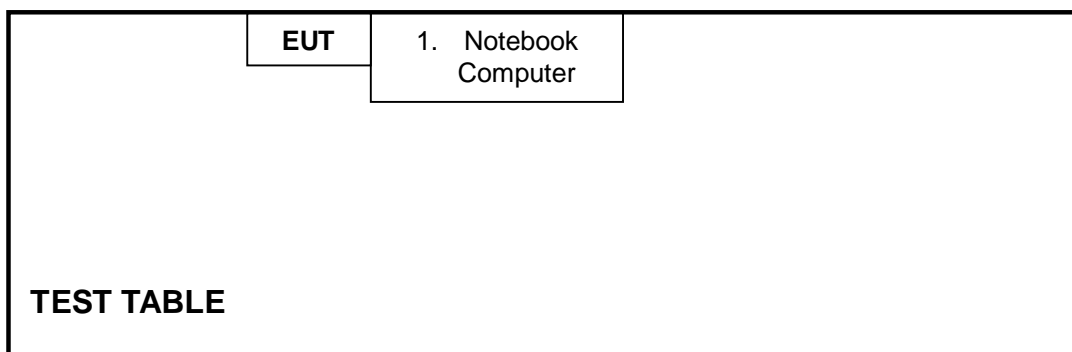
The EUT has been tested as an independent unit together with other necessary accessories or support units. The following support units or accessories were used to form a representative test configuration during the tests.

NO.	PRODUCT	BRAND	MODEL NO.	SERIAL NO.	FCC ID
1	Notebook Computer	COMPAQ	SENES PPPO9L	CT:557C40CCC NPT10	NA

NO.	SIGNAL CABLE DESCRIPTION OF THE ABOVE SUPPORT UNITS
1	NA

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

3.5 CONFIGURATION OF SYSTEM UNDER TEST





3.6 OPEARTIONAL LIMITATIONS

FCC 47 CFR Section 15.519(a)(1)

(1) A UWB device operating under the provisions of this section shall transmit only when it is sending information to an associated receiver. The UWB intentional radiator shall cease transmission within 10 seconds unless it receives an acknowledgement from the associated receiver that its transmission is being received. An acknowledgment of reception must continue to be received by the UWB intentional radiator at least every 10 seconds or the UWB device must cease transmitting.

Client has been advised

FCC 47 CFR Section 15.519(a)(2)

(2) The use of antennas mounted on outdoor structures, e.g., antennas mounted on the outside of a building or on a telephone pole, or any fixed outdoors infrastructure is prohibited. Antennas may be mounted only on the hand held UWB device.

Client has been advised

4 TEST TYPES AND RESULTS

4.1 CONDUCTED EMISSION MEASUREMENT

4.1.1 LIMITS OF CONDUCTED EMISSION MEASUREMENT

FREQUENCY OF EMISSION (MHz)	CONDUCTED LIMIT (dB μ V)	
	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 UNTIL
Test Receiver	ESCS 30	847124/029	Feb. 28, 2009
Line-Impedance Stabilization Network(for EUT)	ESH3-Z5	848773/004	Nov. 08, 2008
Line-Impedance Stabilization Network(for Peripheral)	ENV-216	100071	Nov. 26, 2008
RF Cable (JETBAO)	RG233/U	Cable_CB_01	Dec. 09, 2008
50 ohms Terminator	50	3	Nov. 15, 2008
Software	ADT_Cond_V7.3.2	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 ADT Shielded Room No. B.
3. The VCCI Con B Registration No. is C-2193.

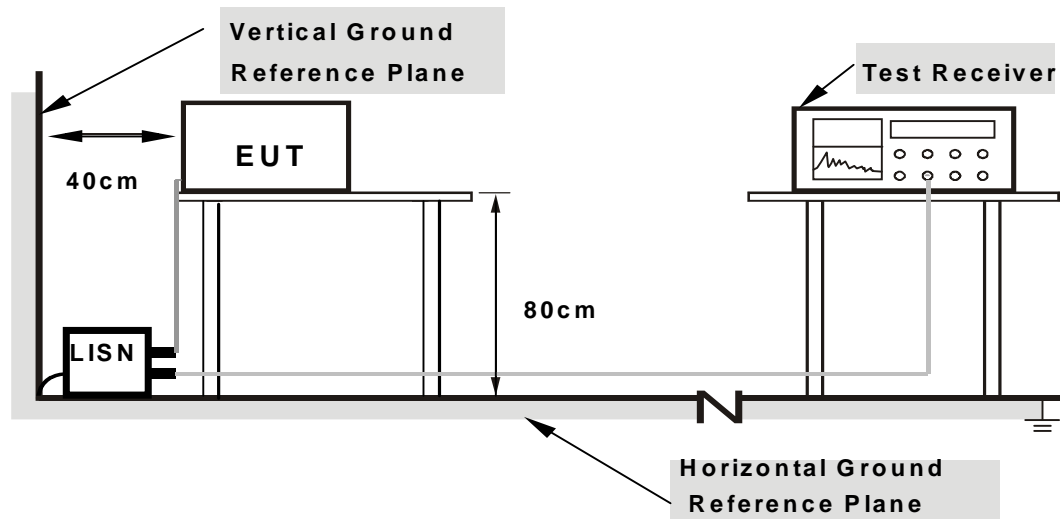
4.1.3 TEST PROCEDURES

- 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 was 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 attached file (Test Setup Photo).

4.1.6 EUT OPERATING CONDITIONS

- a. Plug the EUT into the support unit 1 (Notebook computer) and placed it on the testing table.
- b. The support unit 1 (Notebook computer) ran a test program "RTU7300" to enable EUT under transmission condition continuously at specific channel frequency.

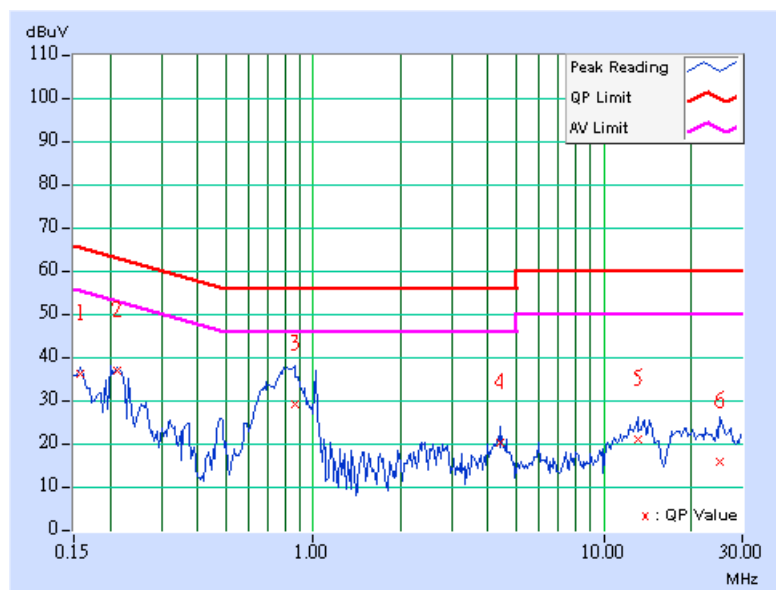
4.1.7 TEST RESULTS

CONDUCTED WORST-CASE DATA

EUT TEST CONDITION		MEASUREMENT DETAIL	
SUB-BAND	1, 2, 3	PHASE	Line 1
MODULATION TECHNOLOGY	MOFDM	6dB BANDWIDTH	9 kHz
ENVIRONMENTAL CONDITIONS	25deg. C, 60%RH, 955hPa	INPUT POWER (SYSTEM)	120Vac, 60 Hz
TESTED BY	Rex Huang		

No	Freq. [MHz]	Corr. Factor (dB)	Reading Value [dB (uV)]		Emission Level [dB (uV)]		Limit [dB (uV)]		Margin (dB)	
			Q.P.	AV.	Q.P.	AV.	Q.P.	AV.	Q.P.	AV.
1	0.158	0.15	34.78	-	34.93	-	65.58	55.58	-30.65	-
2	0.213	0.16	35.46	-	35.62	-	63.11	53.11	-27.49	-
3	0.861	0.25	27.82	-	28.07	-	56.00	46.00	-27.93	-
4	4.426	0.39	18.83	-	19.22	-	56.00	46.00	-36.78	-
5	13.168	1.08	19.68	-	20.76	-	60.00	50.00	-39.24	-
6	25.051	1.49	14.57	-	16.06	-	60.00	50.00	-43.94	-

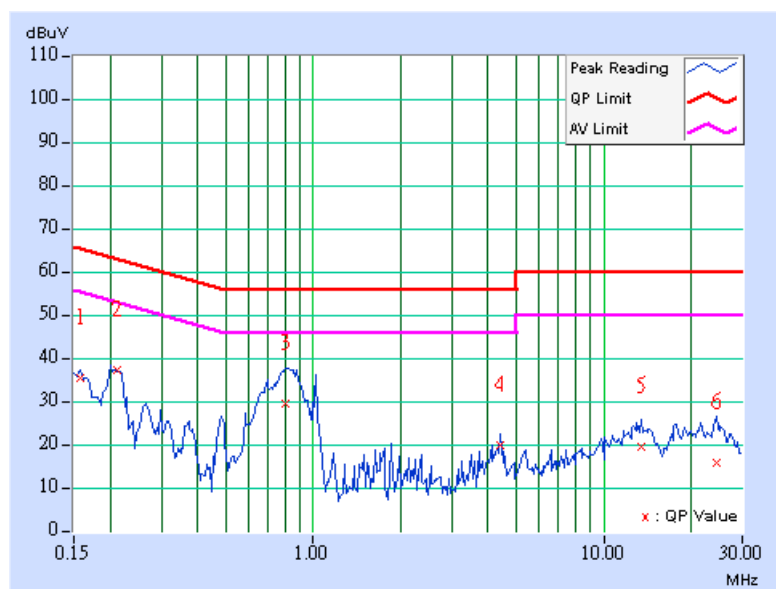
- REMARKS:**
1. Q.P. and AV. are abbreviations of quasi-peak and average individually.
 2. "-": The Quasi-peak reading value also meets average limit and measurement with the average detector is unnecessary.
 3. The emission levels of other frequencies were very low against the limit.
 4. Margin value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



EUT TEST CONDITION		MEASUREMENT DETAIL	
SUB-BAND	1, 2, 3	PHASE	Line 2
MODULATION TECHNOLOGY	MOFDM	6dB BANDWIDTH	9 kHz
ENVIRONMENTAL CONDITIONS	25deg. C, 60%RH, 955hPa	INPUT POWER (SYSTEM)	120Vac, 60 Hz
TESTED BY	Rex Huang		

No	Freq. [MHz]	Corr. Factor (dB)	Reading Value [dB (uV)]		Emission Level [dB (uV)]		Limit [dB (uV)]		Margin (dB)	
			Q.P.	AV.	Q.P.	AV.	Q.P.	AV.	Q.P.	AV.
			1	0.158	0.08	34.04	-	34.12	-	65.58
2	0.212	0.08	35.80	-	35.88	-	63.12	53.12	-27.24	-
3	0.806	0.15	28.16	-	28.31	-	56.00	46.00	-27.69	-
4	4.410	0.31	18.47	-	18.78	-	56.00	46.00	-37.22	-
5	13.430	1.02	18.03	-	19.05	-	60.00	50.00	-40.95	-
6	24.543	1.42	14.49	-	15.91	-	60.00	50.00	-44.09	-

- 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 (FOR 15.519 (c))

4.2.1 LIMITS OF RADIATED EMISSION MEASUREMENT

The radiated emissions at or below 960MHz from a device operating under the provisions of this section shall not exceed the emission levels in Section 15.209.

FREQUENCIES (MHz)	FIELD STRENGTH (mV/m)	MEASUREMENT DISTANCE (m)
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

NOTE: 1. The lower limit shall apply at the transition frequencies.
 2. Emission level (dBuV/m) = 20 log Emission level (uV/m).

The radiated emissions above 960MHz from a device operating under the provisions of this section shall not exceed the following average limits when measured using a resolution bandwidth of 1MHz:

FREQUENCY IN MHz	EIRP IN dBm	dBuV/m@3m	dBuV/m@1m
960 ~ 1,610	-75.3	19.9	29.44
1,610 ~ 1,990	-63.3	31.9	41.44
1,990 ~ 3,100	-61.3	33.9	43.44
3,100 ~ 10,600	-41.3	53.9	63.44
Above 10600	-61.3	33.9	43.44

Transfer rules follow 15.521(g),15.31(f)(1).

15.521(c) Emissions from digital circuitry used to enable the operation of the UWB transmitter shall comply with the limits in Section 15.209 of this chapter, rather than the limits specified in this subpart.

NOTE: Use conducted measurement to determine emissions is from digital circuitry or not.

Emissions from digital circuitry follow 15.209 else 15.519

The radiated emissions from a device operating under the provisions of this section shall not exceed the emission levels in Section 15.209.

FREQUENCY IN MHz	dBuV/m@3m	dBuV/m@1m
	Quasi Peak	Quasi Peak
216 ~ 960	46.00	55.54
960 ~ 1000	54.00	63.54

FREQUENCY IN MHz	dBuV/m@3m		dBuV/m@1m	
Above 1000	Peak	Average	Peak	Average
	74.00	54.00	83.54	63.54

4.2.2 INSTRUMENT SETUP VALUE AND MEASUREMENT DISTANCE

FREQUENCY RANGE	RESOLUTION BANDWIDTH	VIDEO BANDWIDTH	DETECTOR	MEASUREMENT DISTANCE
Below 960MHz	120kHz	120kHz	Quasi Peak	3 meters
Above 960MHz	1MHz	3MHz	RMS	1 meter



4.2.3 TEST INSTRUMENTS

DESCRIPTION & MANUFACTURER	MODEL NO.	SERIAL NO.	CALIBRATED UNTIL
ADVANTEST Spectrum Analyzer	R3271A	85060311	July 15, 2008
HP Pre_Amplifier	8449B	3008A01922	Oct. 04, 2008
ROHDE & SCHWARZ Test Receiver	ESCS30	100375	Mar. 31, 2009
SCHWARZBECK TRILOG Broadband Antenna	VULB 9168	138	July 26, 2008
Schwarzbeck Horn_Antenna	BBHA9120	D124	Dec. 16, 2008
Schwarzbeck Horn_Antenna	BBHA 9170	BBHA9170153	Jan. 27, 2009
R&S Loop Antenna	HFH2-Z2	100070	Jan. 13, 2009
RF Switches (ARNITSU)	CS-201	1565157	Aug. 13, 2008
RF CABLE (Chaintek)	SF102	22054-2	Dec. 06. 2008
RF Cable(RICHTEC)	9913-30M N-N Cable	STCCAB-30M-1 GHz	Aug. 13, 2008
Software	ADT_Radiated_V 7.6.15.8	NA	NA
CHANCE MOST Antenna Tower	AT-100	0203	NA
CHANCE MOST Turn Table	TT-100	0203	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: R3271A) are used only for the measurement of emission frequency above 1GHz if tested.
 3. The test was performed in ADT 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 3789C-3.

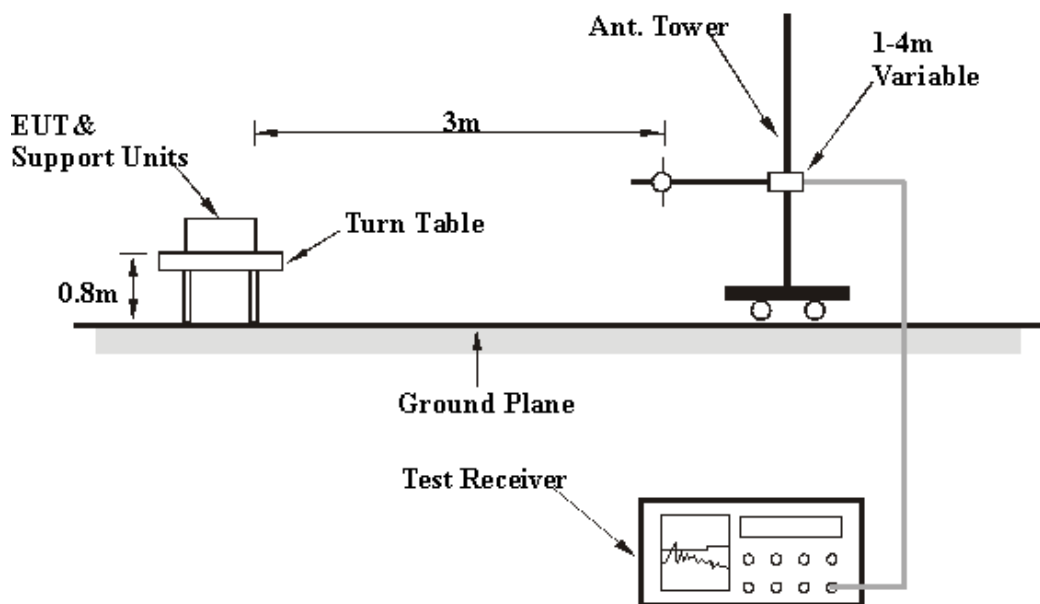
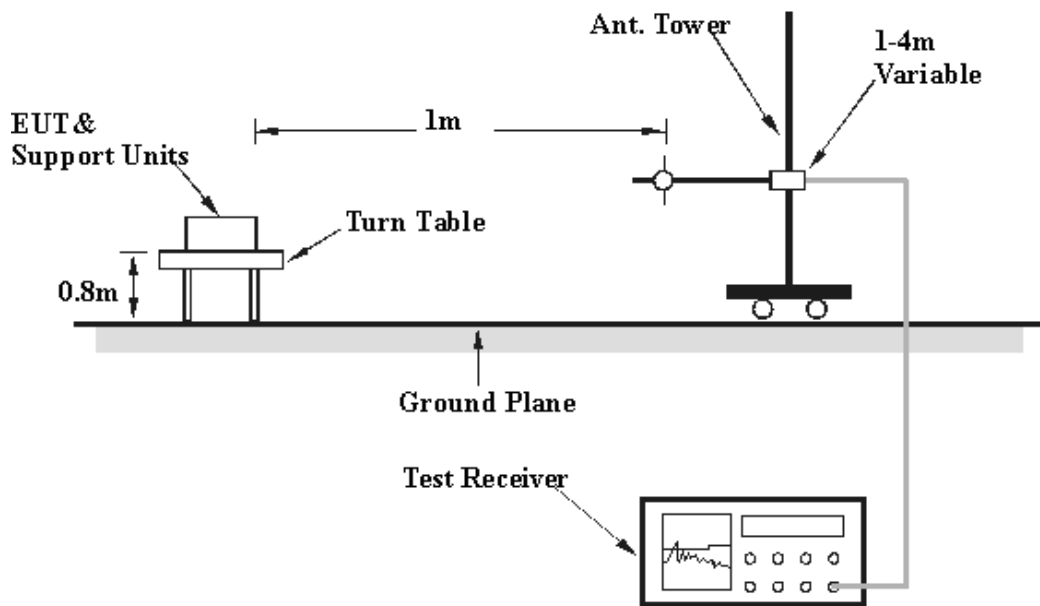
4.2.4 TEST PROCEDURES

- a. The EUT was placed on the top of a rotating table 0.8 meters above the ground at a 3 meters semi-anechoic chamber. The table was rotated 360 degrees to determine the position of the highest radiation.
- b. The EUT was set 1, 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.

4.2.5 DEVIATION FROM TEST STANDARD

No deviation

4.2.6 TEST SETUP



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

4.2.7 EUT OPERATING CONDITIONS

Same as 4.1.6

4.2.8 TEST RESULTS

RADIATED BELOW 960MHz WORST-CASE DATA

EUT TEST CONDITION		MEASUREMENT DETAIL	
SUB-BAND	1, 2, 3	FREQUENCY RANGE	Below 960MHz
MODULATION TECHNOLOGY	MOFDM	DETECTOR FUNCTION	Quasi-Peak
ENVIRONMENTAL CONDITIONS	25deg. C, 66%RH, 955hPa	INPUT POWER (SYSTEM)	120Vac, 60 Hz
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	153.73	30.00 QP	43.50	-13.50	1.84 H	82	15.04	14.96
2	200.00	29.26 QP	43.50	-14.24	1.65 H	139	17.23	12.03
3	352.00	33.36 QP	46.00	-12.64	1.00 H	263	16.40	16.96
4	464.90	39.65 QP	46.00	-6.35	1.95 H	257	19.42	20.23
5	660.01	31.16 QP	46.00	-14.84	1.22 H	201	6.69	24.47
6	720.01	35.97 QP	46.00	-10.03	1.17 H	309	10.35	25.62
7	800.01	31.39 QP	46.00	-14.61	1.70 H	195	3.34	28.05
8	960.00	35.62 QP	54.00	-18.38	1.56 H	288	5.95	29.67

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	200.00	29.22 QP	43.50	-14.28	1.00 V	211	17.19	12.03
2	240.00	26.85 QP	46.00	-19.15	1.07 V	1	14.18	12.67
3	400.00	33.44 QP	46.00	-12.56	1.00 V	216	15.39	18.05
4	480.00	35.87 QP	46.00	-10.13	1.89 V	222	15.29	20.58
5	720.02	30.41 QP	46.00	-15.59	2.00 V	181	4.79	25.62
6	800.02	32.58 QP	46.00	-13.42	1.29 V	290	4.53	28.05
7	960.00	35.28 QP	54.00	-18.72	1.18 V	0	5.61	29.67

- 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.

RADIATED ABOVE 960MHz DATA

EUT TEST CONDITION		MEASUREMENT DETAIL	
SUB-BAND	1, 2, 3	FREQUENCY RANGE	960MHz ~ 40GHz
MODULATION TECHNOLOGY	MOFDM	DETECTOR FUNCTION	RMS
INPUT POWER (SYSTEM)	120Vac, 60 Hz	ENVIRONMENTAL CONDITIONS	28deg. C, 60%RH, 955hPa
TESTED BY	Frank Liu		

ANTENNA POLARITY & TEST DISTANCE: HORIZONTAL AT 1 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	6864.00	38.60 AV	63.44	-24.84	1.41 H	16	-2.39	40.99
2	7920.00	41.10 AV	63.44	-22.34	1.33 H	21	-2.05	43.15
3	8960.00	40.60 AV	63.44	-22.84	1.21 H	6	-3.50	44.10
4	10296.00	42.10 AV	63.44	-21.34	1.27 H	3	-3.72	45.82
5	11880.00	42.90 AV	43.44	-0.54	1.21 H	4	-3.80	46.70
6	13440.00	43.10 AV	43.44	-0.34	1.13 H	10	-4.00	47.10

ANTENNA POLARITY & TEST DISTANCE: VERTICAL AT 1 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	6864.00	39.30 AV	63.44	-24.14	1.07 V	21	-1.69	40.99
2	7920.00	41.70 AV	63.44	-21.74	1.09 V	32	-1.45	43.15
3	8960.00	41.10 AV	63.44	-22.34	1.21 V	7	-3.00	44.10
4	10296.00	42.40 AV	63.44	-21.04	1.13 V	5	-3.42	45.82
5	11880.00	43.10 AV	43.44	-0.34	1.47 V	9	-3.60	46.70
6	13440.00	43.39 AV	43.44	-0.05	1.21 V	12	-3.71	47.10

- 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.

EMISSIONS FROM DIGITAL CIRCUITRY

EUT TEST CONDITION		MEASUREMENT DETAIL	
SUB-BAND	1, 2, 3	FREQUENCY RANGE	Above 1GHz
MODULATION TECHNOLOGY	MOFDM	DETECTOR FUNCTION	Peak / Average
INPUT POWER (SYSTEM)	120Vac, 60 Hz	ENVIRONMENTAL CONDITIONS	25deg. C, 60%RH, 955hPa
TESTED BY	Frank Liu		

ANTENNA POLARITY & TEST DISTANCE: HORIZONTAL AT 1 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	1056.00	53.60 PK	83.54	-29.94	1.00 H	221	26.43	27.17
2	1056.00	37.20 AV	63.54	-26.34	1.00 H	221	10.03	27.17
3	1188.00	58.10 PK	83.54	-25.44	1.08 H	214	30.66	27.44
4	1188.00	39.45 AV	63.54	-24.09	1.08 H	214	12.01	27.44
5	1200.00	40.67 PK	83.54	-42.87	1.03 H	204	13.21	27.46
6	1200.00	30.29 AV	63.54	-33.25	1.03 H	204	2.83	27.46
7	1460.00	51.75 PK	83.54	-31.79	1.00 H	214	23.77	27.98
8	1460.00	32.40 AV	63.54	-31.14	1.00 H	214	4.42	27.98
9	1584.00	38.96 PK	83.54	-44.58	1.00 H	25	10.82	28.14
10	1584.00	25.66 AV	63.54	-37.88	1.00 H	25	-2.48	28.14
11	1590.00	46.00 PK	83.54	-37.54	1.00 H	146	17.85	28.15
12	1590.00	34.20 AV	63.54	-29.34	1.00 H	146	6.05	28.15
13	1600.80	39.33 PK	83.54	-44.21	1.10 H	351	11.17	28.16
14	1600.80	25.84 AV	63.54	-37.70	1.10 H	351	-2.32	28.16

REMARKS:

1. Emission source vs. possible corresponding spurious:

Emission Source	Frequency (MHz)	Possible corresponding spurious CW tones (MHz) (X times harmonic)
PLL	1056.00	1056 (x1)
PLL	528.00	1056 (x2), 1584 (x3)
PLL	264.00	1056 (x4)
XTAL of PHY	66.00	1056 (x16), 1188 (x18)
XTAL of MAC	30.00	1590 (x53)
XTAL of MAC	12.00	1200 (x100)

2. Emission level(dBuV/m)=Raw Value(dBuV) + Correction Factor(dB/m)

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

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

5. Margin value = Emission level – Limit value.

6. Frequency 1460MHz and 1600MHz are the emission from notebook computer.

EUT TEST CONDITION		MEASUREMENT DETAIL	
SUB-BAND	1, 2, 3	FREQUENCY RANGE	Above 1GHz
MODULATION TECHNOLOGY	MOFDM	DETECTOR FUNCTION	Peak / Average
INPUT POWER (SYSTEM)	120Vac, 60 Hz	ENVIRONMENTAL CONDITIONS	25deg. C, 60%RH, 955hPa
TESTED BY	Frank Liu		

ANTENNA POLARITY & TEST DISTANCE: VERTICAL AT 1 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	1056.00	56.00 PK	83.54	-27.54	1.45 V	174	28.83	27.17
2	1056.00	46.13 AV	63.54	-17.41	1.45 V	174	18.96	27.17
3	1188.00	50.48 PK	83.54	-33.06	1.00 V	288	23.04	27.44
4	1188.00	35.10 AV	63.54	-28.44	1.00 V	288	7.66	27.44
5	1200.00	43.49 PK	83.54	-40.05	1.00 V	357	16.03	27.46
6	1200.00	33.88 AV	63.54	-29.66	1.00 V	357	6.42	27.46
7	1460.00	45.20 PK	83.54	-38.34	1.00 V	113	17.22	27.98
8	1460.00	37.70 AV	63.54	-25.84	1.00 V	113	9.72	27.98
9	1584.00	43.26 PK	83.54	-40.28	1.11 V	180	15.12	28.14
10	1584.00	29.96 AV	63.54	-33.58	1.11 V	180	1.82	28.14
11	1590.00	48.20 PK	83.54	-35.34	1.07 V	164	20.05	28.15
12	1590.00	38.60 AV	63.54	-24.94	1.07 V	164	10.45	28.15
13	1600.80	44.45 PK	83.54	-39.09	1.00 V	189	16.29	28.16
14	1600.80	33.96 AV	63.54	-29.58	1.00 V	189	5.80	28.16

REMARKS:

1. Emission source vs. possible corresponding spurious:

Emission Source	Frequency (MHz)	Possible corresponding spurious CW tones (MHz) (X times harmonic)
PLL	1056.00	1056 (x1)
PLL	528.00	1056 (x2), 1584 (x3)
PLL	264.00	1056 (x4)
XTAL of PHY	66.00	1056 (x16), 1188 (x18)
XTAL of MAC	30.00	1590 (x53)
XTAL of MAC	12.00	1200 (x100)

2. Emission level(dBuV/m)=Raw Value(dBuV) + Correction Factor(dB/m)

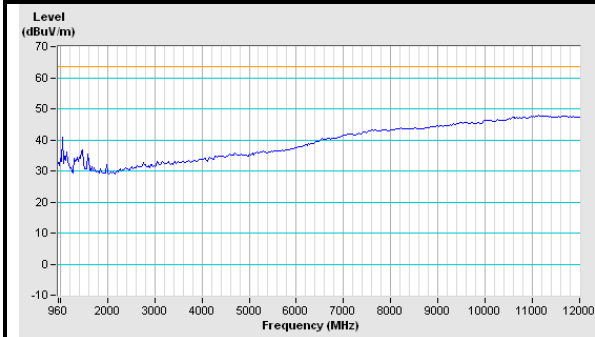
3. Correction Factor(dB/m) = Antenna Factor (dB/m) + Cable Factor (dB)

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

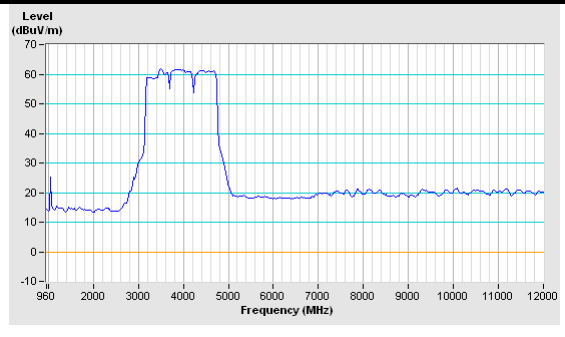
5. Margin value = Emission level – Limit value.

6. Frequency 1460MHz and 1600MHz are the emission from notebook computer.

TERMINATED ANTENNA PORT



CONDUCTED ANTENNA PORT



4.3 RADIATED EMISSION MEASUREMENT (FOR 15.519 (d))

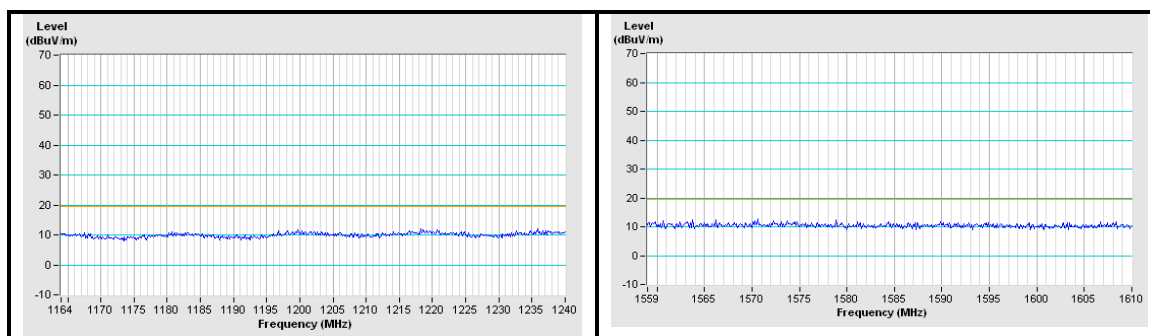
4.3.1 LIMITS OF RADIATED EMISSION MEASUREMENT

FREQUENCY IN MHz	EIRP IN dBm	dBuV/m@3m	dBuV/m@1m
1,164 ~ 1,240	-85.3	9.9	19.44
1,559 ~ 1,610	-85.3	9.9	19.44

Transfer rules follow 15.521(g), 15.31(f)(1).

- NOTE:**
- 15.521(g) converted to a peak field strength level at 3 meters using $E(\text{dBuV/m}) = P(\text{dBmEIRP}) + 95.2$.
 - 15.31(f)(1) When performing measurements at a distance other than that specified, the results shall be extrapolated to the specified distance using an extrapolation factor of 20 dB/decade, Measurement distance moves from 3m to 1m, $\text{Limit (1m)} = \text{Limit (3m)} + 20\text{Log (3/1)} = \text{Limit (3m)} + 9.54$.

Instrument Noise Floor



15.521(c) Emissions from digital circuitry used to enable the operation of the UWB transmitter shall comply with the limits in Section 15.209 of this chapter, rather than the limits specified in this subpart.

- NOTE:** Use conducted measurement to determine emissions is from digital circuitry or not.
Emissions from digital circuitry follow 15.209 else 15.519

The radiated emissions above 1000MHz from a device operating under the provisions of this section shall not exceed the emission levels in Section 15.209.

FREQUENCY IN MHz	dBuV/m@3m		dBuV/m@1m	
	Peak	Average	Peak	Average
Above 1000	74.00	54.00	83.54	63.54

4.3.2 INSTRUMENT SETUP VALUE AND MEASUREMENT DISTANCE

UWB transmitters operating under the provisions of this section shall not exceed the following average limits when measured using a resolution bandwidth of no less than 1 kHz:

FREQUENCY RANGE	RESOLUTION BANDWIDTH	VIDEO BANDWIDTH	DETECTOR	MEASUREMENT DISTANCE
1,164 ~ 1,240	*10kHz	30kHz	RMS	1 meter
1,559 ~ 1,610	*10kHz	30kHz	RMS	1 meter

NOTE: *reference The Evolution of Modern UWB Technology.



4.3.3 TEST INSTRUMENTS

DESCRIPTION & MANUFACTURER	MODEL NO.	SERIAL NO.	CALIBRATED UNTIL
ADVANTEST Spectrum Analyzer	R3271A	85060311	July 15, 2008
HP Pre_Amplifier	8449B	3008A01922	Oct. 04, 2008
ROHDE & SCHWARZ Test Receiver	ESCS30	100375	Mar. 31, 2009
SCHWARZBECK TRILOG Broadband Antenna	VULB 9168	138	July 26, 2008
Schwarzbeck Horn_Antenna	BBHA9120	D124	Dec. 16, 2008
Schwarzbeck Horn_Antenna	BBHA 9170	BBHA9170153	Jan. 27, 2009
R&S Loop Antenna	HFH2-Z2	100070	Jan. 13, 2009
RF Switches (ARNITSU)	CS-201	1565157	Aug. 13, 2008
RF CABLE (Chaintek)	SF102	22054-2	Dec. 06. 2008
RF Cable(RICHTEC)	9913-30M N-N Cable	STCCAB-30M-1 GHz	Aug. 13, 2008
Software	ADT_Radiated_V 7.6.15.8	NA	NA
CHANCE MOST Antenna Tower	AT-100	0203	NA
CHANCE MOST Turn Table	TT-100	0203	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: R3271A) are used only for the measurement of emission frequency above 1GHz if tested.
 3. The test was performed in ADT 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 3789C-3.

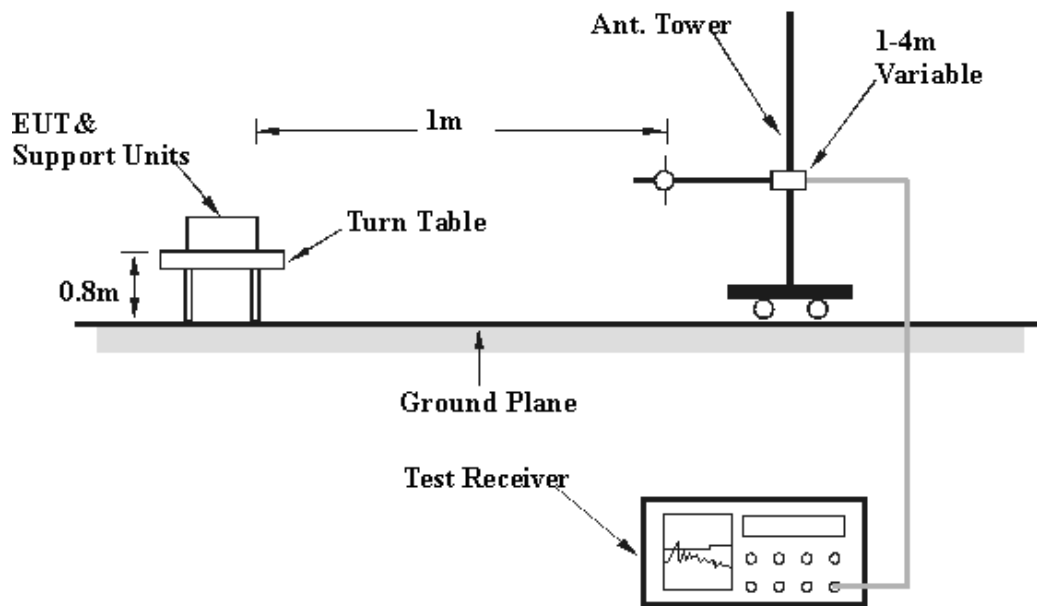
4.3.4 TEST PROCEDURES

- e. The EUT was placed on the top of a rotating table 0.8 meters above the ground at a 1 meters semi-anechoic chamber. The table was rotated 360 degrees to determine the position of the highest radiation.
- f. The EUT was set 1 meter away from the interference-receiving antenna, which was mounted on the top of a variable-height antenna tower.
- g. 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.
- h. 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.

4.3.5 DEVIATION FROM TEST STANDARD

No deviation

4.3.6 TEST SETUP



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

4.3.7 EUT OPERATING CONDITIONS

Same as 4.1.6

4.3.8 TEST RESULTS

EMISSIONS FROM DIGITAL CIRCUITRY

EUT TEST CONDITION		MEASUREMENT DETAIL	
SUB-BAND	1, 2, 3	FREQUENCY RANGE	Above 1GHz
MODULATION TECHNOLOGY	MOFDM	DETECTOR FUNCTION	Peak / Average
INPUT POWER (SYSTEM)	120Vac, 60 Hz	ENVIRONMENTAL CONDITIONS	25deg. C, 60%RH, 955hPa
TESTED BY	Frank Liu		

ANTENNA POLARITY & TEST DISTANCE: HORIZONTAL AT 1 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	1188.00	58.10 PK	83.54	-25.44	1.08 H	214	30.66	27.44
1	1188.00	39.45 AV	63.54	-24.09	1.08 H	214	12.01	27.44
2	1200.00	40.67 PK	83.54	-42.87	1.03 H	204	13.21	27.46
2	1200.00	30.29 AV	63.54	-33.25	1.03 H	204	2.83	27.46
3	1460.00	51.75 PK	83.54	-31.79	1.00 H	214	23.77	27.98
3	1460.00	32.40 AV	63.54	-31.14	1.00 H	214	4.42	27.98
4	1584.00	38.96 PK	83.54	-44.58	1.00 H	25	10.82	28.14
4	1584.00	25.66 AV	63.54	-37.88	1.00 H	25	-2.48	28.14
5	1590.00	46.00 PK	83.54	-37.54	1.00 H	146	17.85	28.15
5	1590.00	34.20 AV	63.54	-29.34	1.00 H	146	6.05	28.15

ANTENNA POLARITY & TEST DISTANCE: VERTICAL AT 1 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	1188.00	50.48 PK	83.54	-33.06	1.00 V	288	23.04	27.44
1	1188.00	35.10 AV	63.54	-28.44	1.00 V	288	7.66	27.44
2	1200.00	43.49 PK	83.54	-40.05	1.00 V	357	16.03	27.46
2	1200.00	33.88 AV	63.54	-29.66	1.00 V	357	6.42	27.46
3	1460.00	45.20 PK	83.54	-38.34	1.00 V	113	17.22	27.98
3	1460.00	37.70 AV	63.54	-25.84	1.00 V	113	9.72	27.98
4	1584.00	43.26 PK	83.54	-40.28	1.11 V	180	15.12	28.14
4	1584.00	29.96 AV	63.54	-33.58	1.11 V	180	1.82	28.14
5	1590.00	48.20 PK	83.54	-35.34	1.07 V	164	20.05	28.15
5	1590.00	38.60 AV	63.54	-24.94	1.07 V	164	10.45	28.15

REMARKS:

1. Emission source vs. possible corresponding spurious:

Emission Source	Frequency (MHz)	Possible corresponding spurious CW tones (MHz) (X times harmonic)
PLL	528.00	1584 (x3)
XTAL of PHY	66.00	1188 (x18)
XTAL of MAC	30.00	1590 (x57)
XTAL of MAC	12.00	1200 (x100)

2. Emission level(dBuV/m)=Raw Value(dBuV) + Correction Factor(dB/m)

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

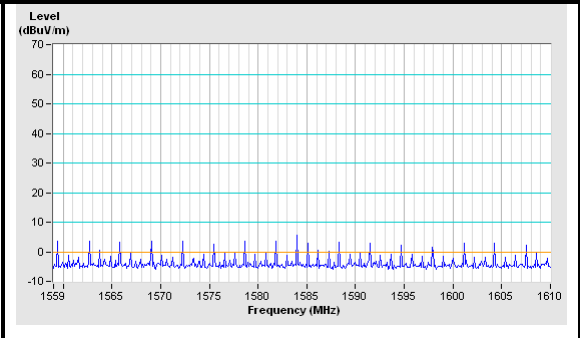
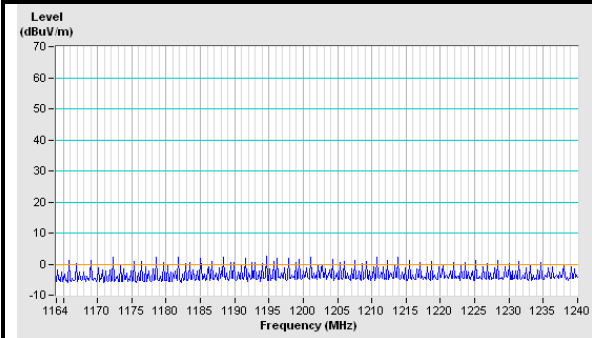
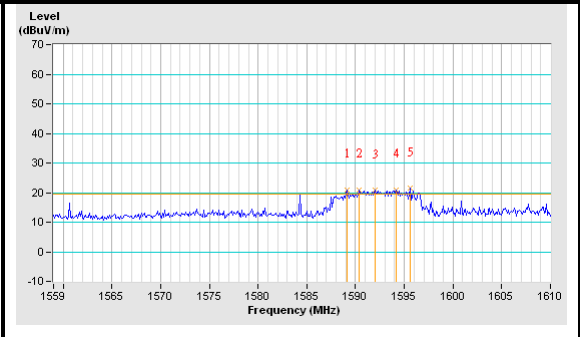
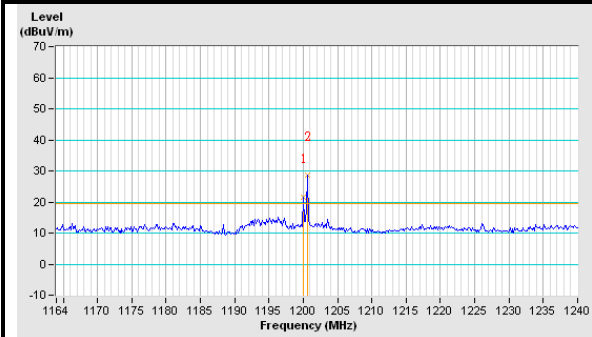
4. The other emission levels were very low against the limit.

5. Margin value = Emission level – Limit value.

6. Frequency 1460MHz is the emission from notebook computer.

TERMINATED ANTENNA PORT

CONDUCTED ANTENNA PORT



4.4 UWB BANDWIDTH MEASUREMENT

4.4.1 LIMITS OF UWB BANDWIDTH MEASUREMENT

The UWB bandwidth of a UWB system operating under the provisions of this section must be contained between 3100 MHz and 10,600 MHz.

4.4.2 INSTRUMENT SETUP VALUE AND MEASUREMENT DISTANCE

FREQUENCY RANGE	RESOLUTION BANDWIDTH	VIDEO BANDWIDTH	DETECTOR	MEASUREMENT DISTANCE
3,100 ~ 10,600	1MHz	3MHz	Peak	3 meters

4.4.3 TEST INSTRUMENT

Same as Item 4.2.3

4.4.4 TEST PROCEDURE

- a. The EUT was placed on the top of a rotating table 0.8 meters above the ground at a 3 meters semi-anechoic chamber. The table was rotated 360 degrees to determine the position of the highest radiation.
- b. The EUT was set 3 meters away from the interference-receiving antenna, which was mounted on the top of a variable-height antenna tower.
- c. The antenna is a broadband antenna, and its height is varied from one meter to four meters above the ground to determine the maximum value of the field strength. Both horizontal and vertical polarizations of the antenna are set to make the measurement.
- d. For each suspected emission, the EUT was arranged to its worst case and then the antenna was tuned to heights from 1 meter to 4 meters and the rotatable table was turned from 0 degrees to 360 degrees to find the maximum reading.
- e. The Spectrum Analyzer system was set to Peak Detect Function and Specified Bandwidth with Maximum Hold Mode.
- f. The UWB Bandwidth is measured at the 10 dB point (F_L , F_H).

4.4.5 DEVIATION FROM TEST STANDARD

No deviation

4.4.6 TEST SETUP

Same as Item 4.2.6

4.4.7 EUT OPERATING CONDITIONS

The software provided by client to enable the EUT under transmission condition continuously.

4.4.8 TEST RESULTS

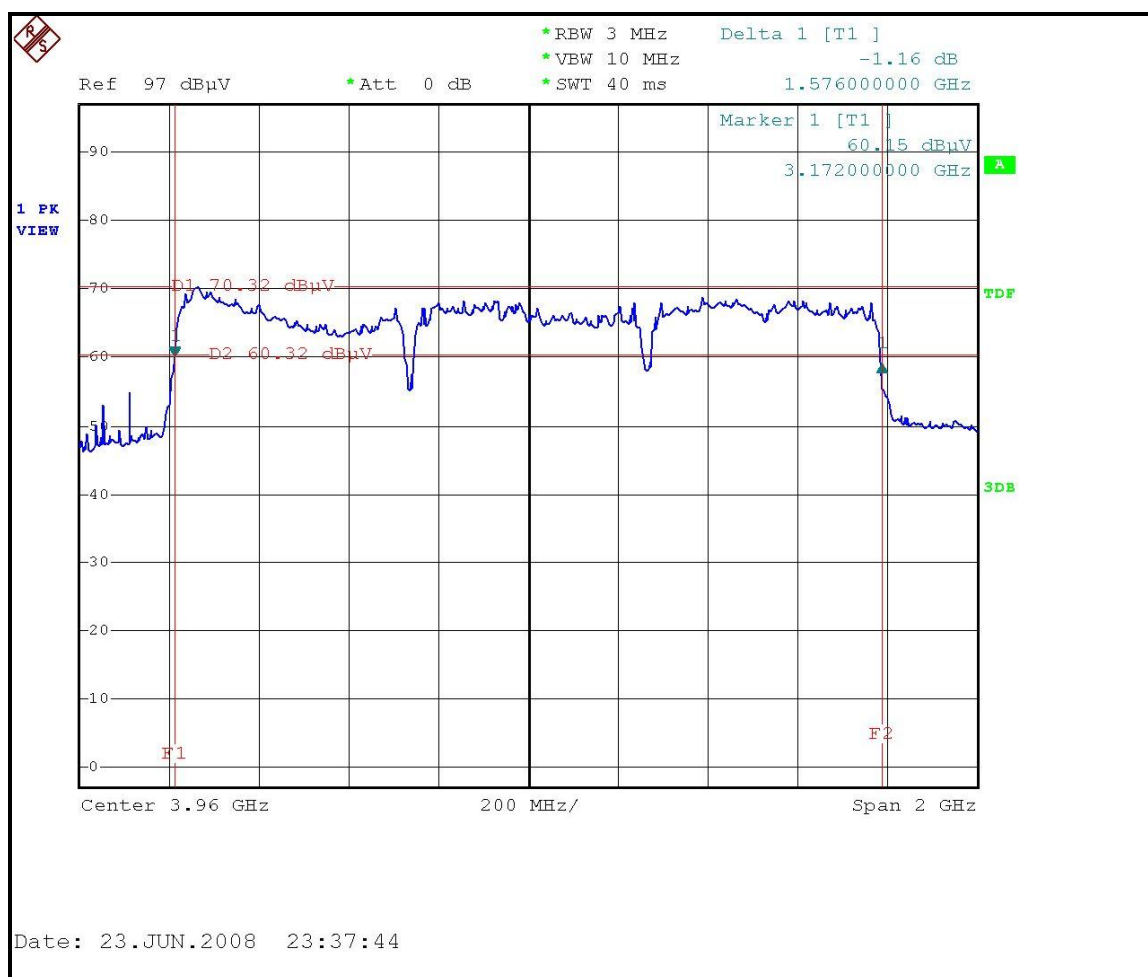
ANTENNA 1

TEST MODE A (SUB-BAND 1, 2, 3)

MODULATION TECHNOLOGY	MOFDM	ENVIRONMENTAL CONDITIONS	25deg. C, 60%RH, 955hPa
INPUT POWER (SYSTEM)	120Vac, 60 Hz	TESTED BY	Frank Liu

F_L (MHz)	F_H (MHz)	$F_C=(F_L+F_H)/2$ (MHz)	LIMIT (MHz)	PASS/FAIL
3172.00	4748.00	3960.00	Between 3100.00 ~ 10600.00	PASS

UWB Bandwidth = $F_H - F_L=1576$ MHz



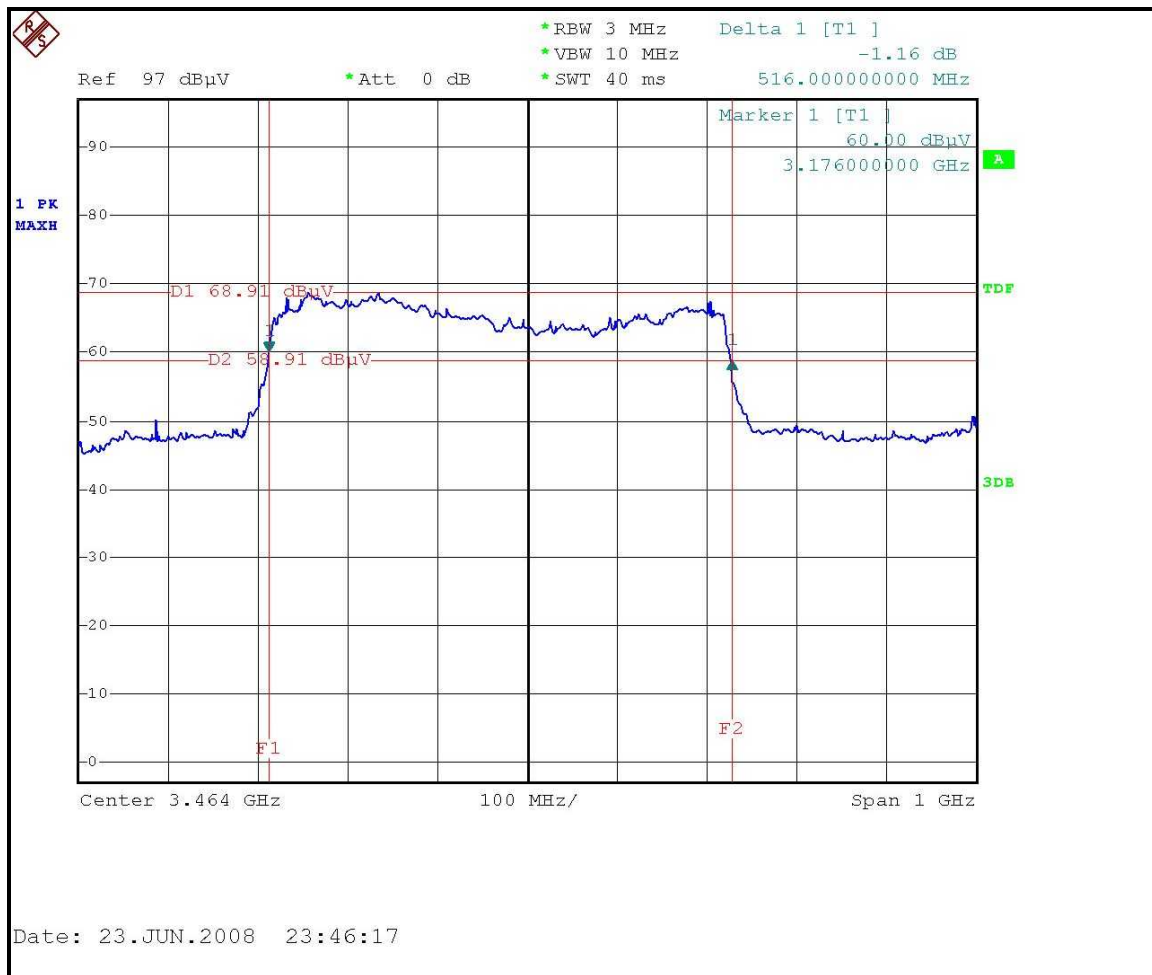


TEST MODE B (SUB-BAND 1)

MODULATION TECHNOLOGY	MOFDM	ENVIRONMENTAL CONDITIONS	25deg. C, 60%RH, 955hPa
INPUT POWER (SYSTEM)	120Vac, 60 Hz	TESTED BY	Frank Liu

F_L (MHz)	F_H (MHz)	$F_C=(F_L+F_H)/2$ (MHz)	LIMIT (MHz)	PASS/FAIL
3176.00	3692.00	3434.00	Between 3100.00 ~ 10600.00	PASS

UWB Bandwidth = $F_H - F_L = 516\text{MHz}$

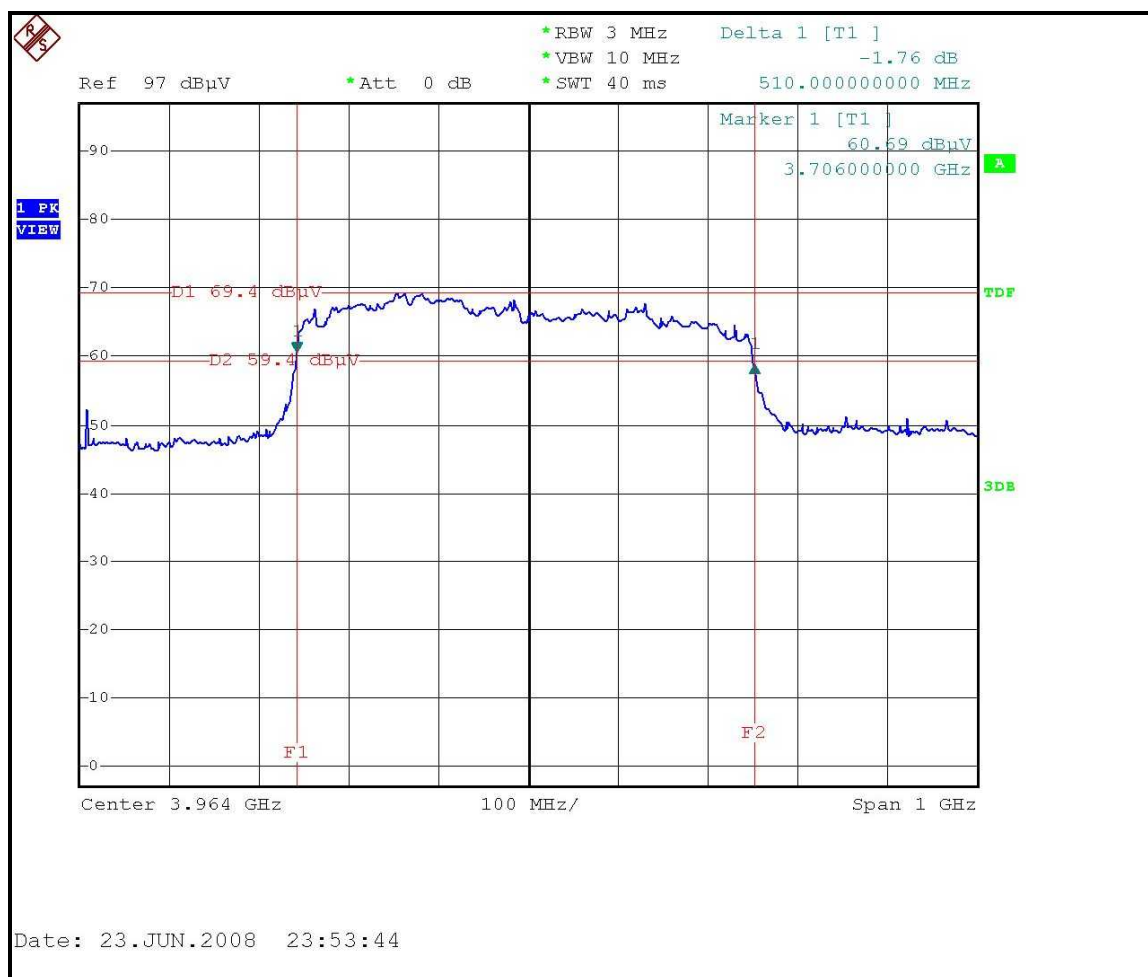


TEST MODE C (SUB-BAND 2)

MODULATION TECHNOLOGY	MOFDM	ENVIRONMENTAL CONDITIONS	25deg. C, 60%RH, 955hPa
INPUT POWER (SYSTEM)	120Vac, 60 Hz	TESTED BY	Frank Liu

F_L (MHz)	F_H (MHz)	$F_C=(F_L+F_H)/2$ (MHz)	LIMIT (MHz)	PASS/FAIL
3706.00	4216.00	3961.00	Between 3100.00 ~ 10600.00	PASS

UWB Bandwidth = $F_H - F_L = 510\text{MHz}$



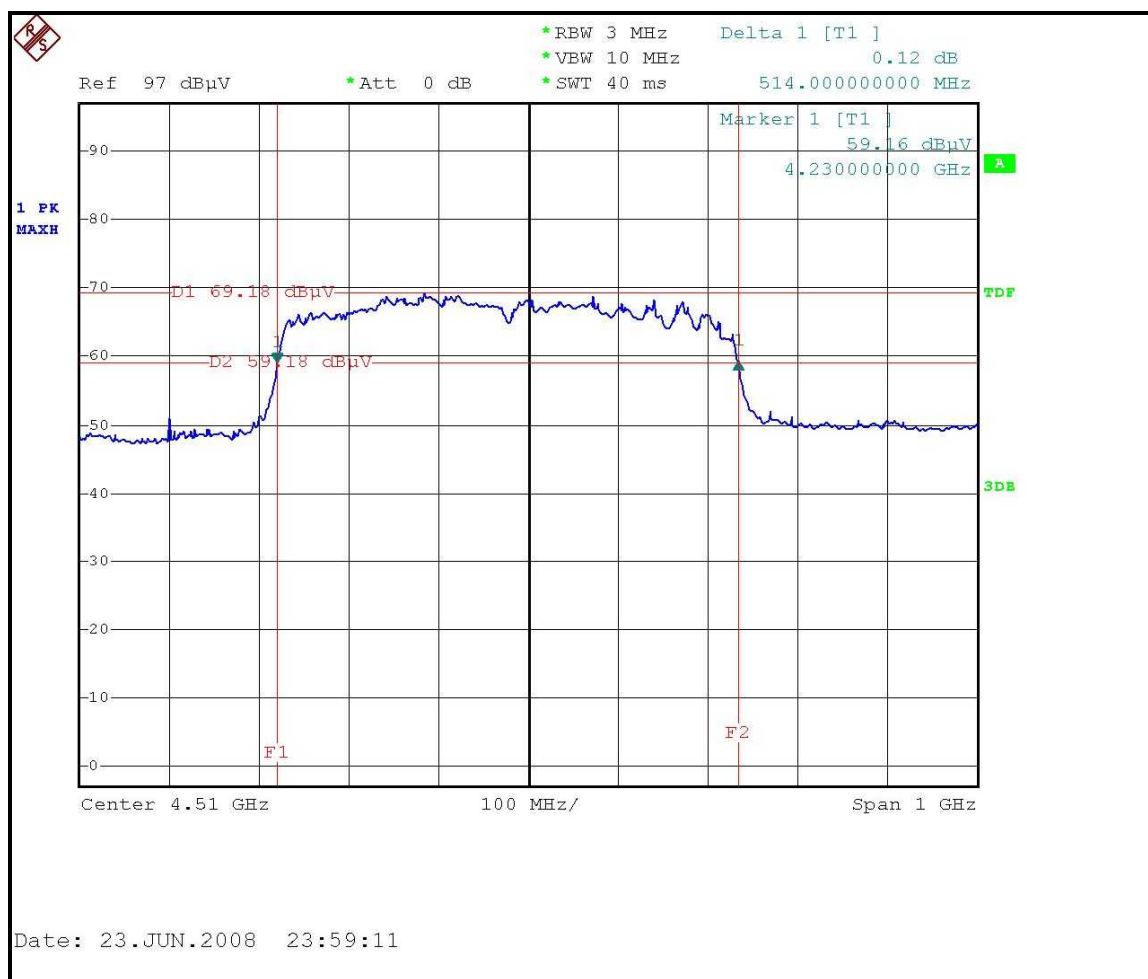


TEST MODE C (SUB-BAND 3)

MODULATION TECHNOLOGY	MOFDM	ENVIRONMENTAL CONDITIONS	25deg. C, 60%RH, 955hPa
INPUT POWER (SYSTEM)	120Vac, 60 Hz	TESTED BY	Frank Liu

F_L (MHz)	F_H (MHz)	$F_C = (F_L + F_H) / 2$ (MHz)	LIMIT (MHz)	PASS/FAIL
4230.00	4744.00	4487.00	Between 3100.00 ~ 10600.00	PASS

UWB Bandwidth = $F_H - F_L = 514\text{MHz}$





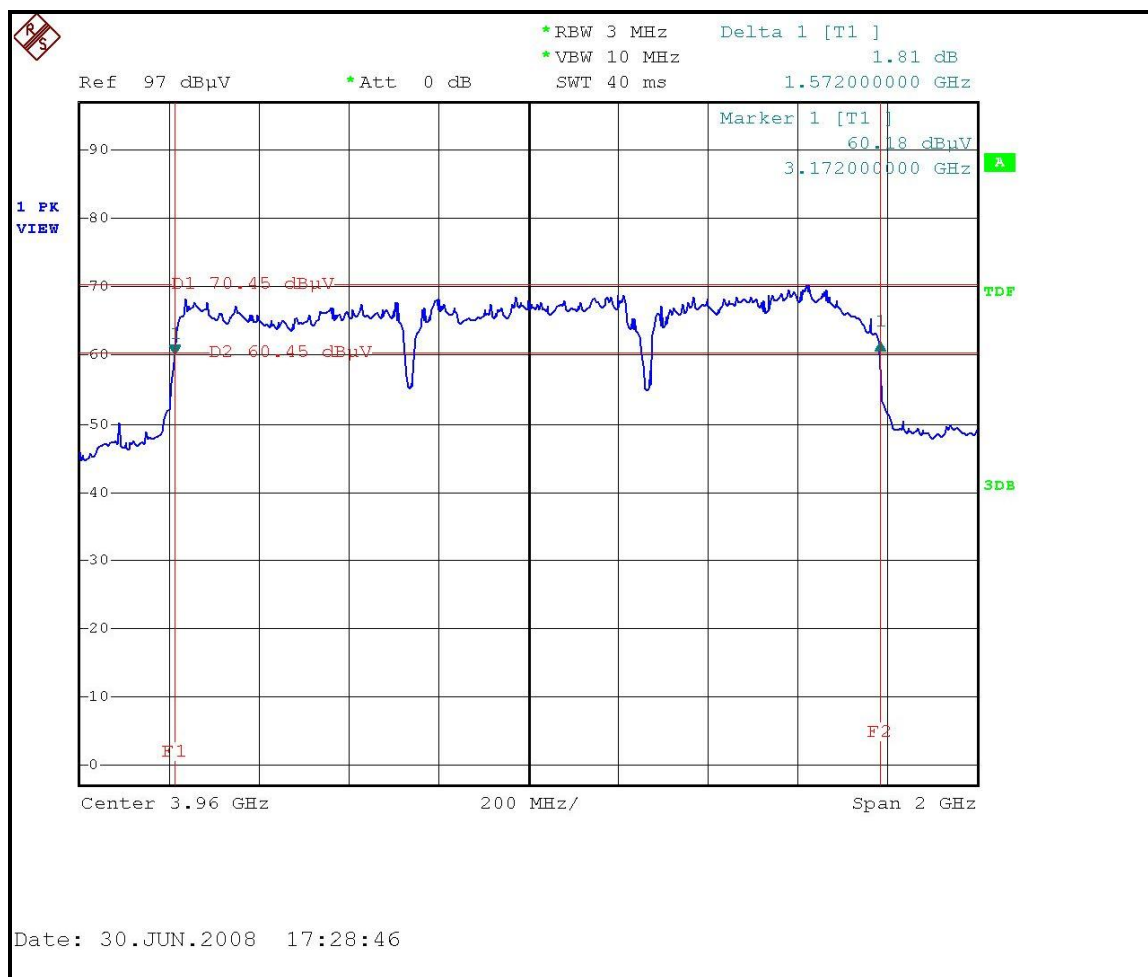
ANTENNA 2

TEST MODE A (SUB-BAND 1, 2, 3)

MODULATION TECHNOLOGY	MOFDM	ENVIRONMENTAL CONDITIONS	25deg. C, 60%RH, 955hPa
INPUT POWER (SYSTEM)	120Vac, 60 Hz	TESTED BY	Frank Liu

F_L (MHz)	F_H (MHz)	$F_C=(F_L+F_H)/2$ (MHz)	LIMIT (MHz)	PASS/FAIL
3172.00	4744.00	3958.00	Between 3100.00 ~ 10600.00	PASS

UWB Bandwidth = $F_H - F_L = 1572\text{MHz}$



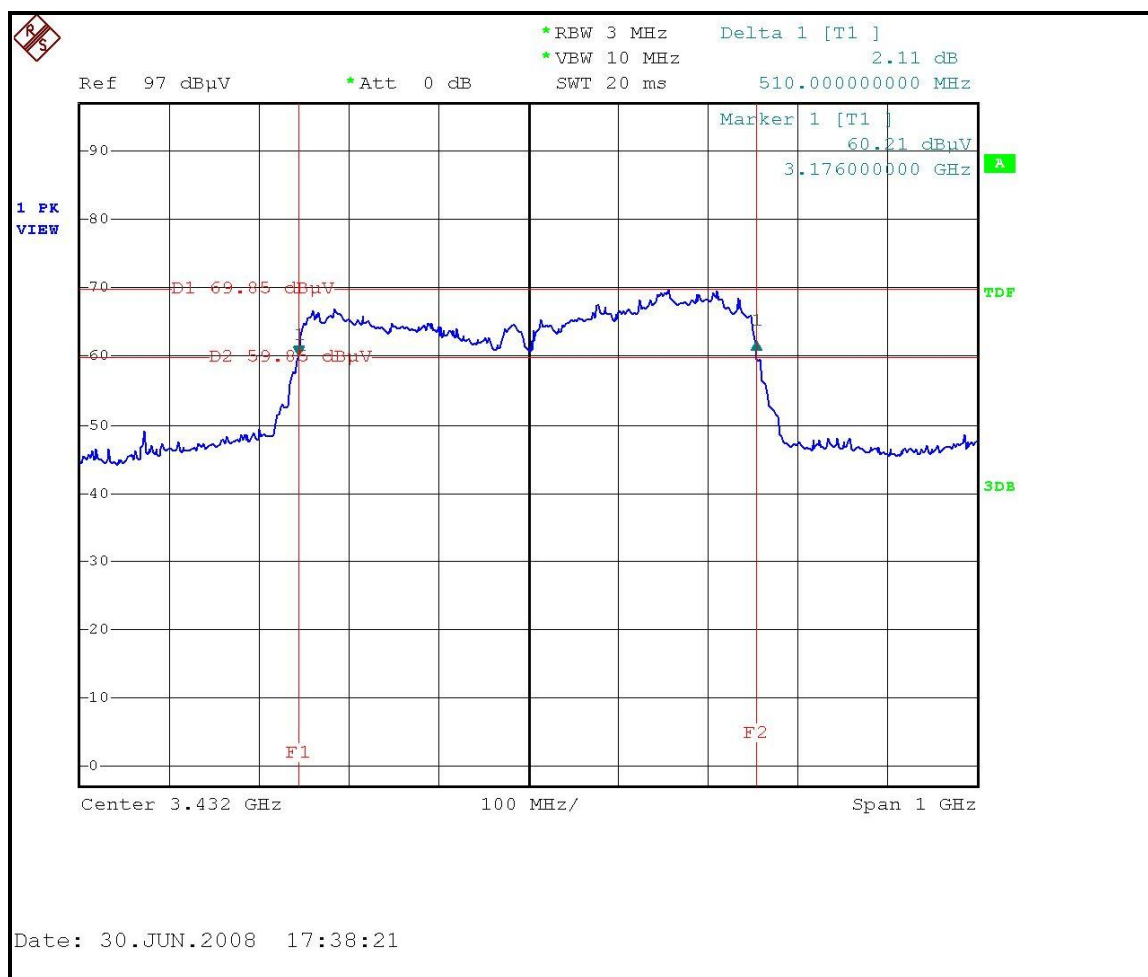


TEST MODE B (SUB-BAND 1)

MODULATION TECHNOLOGY	MOFDM	ENVIRONMENTAL CONDITIONS	25deg. C, 60%RH, 955hPa
INPUT POWER (SYSTEM)	120Vac, 60 Hz	TESTED BY	Frank Liu

F _L (MHz)	F _H (MHz)	F _C =(F _L +F _H)/2 (MHz)	LIMIT (MHz)	PASS/FAIL
3176.00	3686.00	3431.00	Between 3100.00 ~ 10600.00	PASS

UWB Bandwidth = F_H - F_L=510MHz



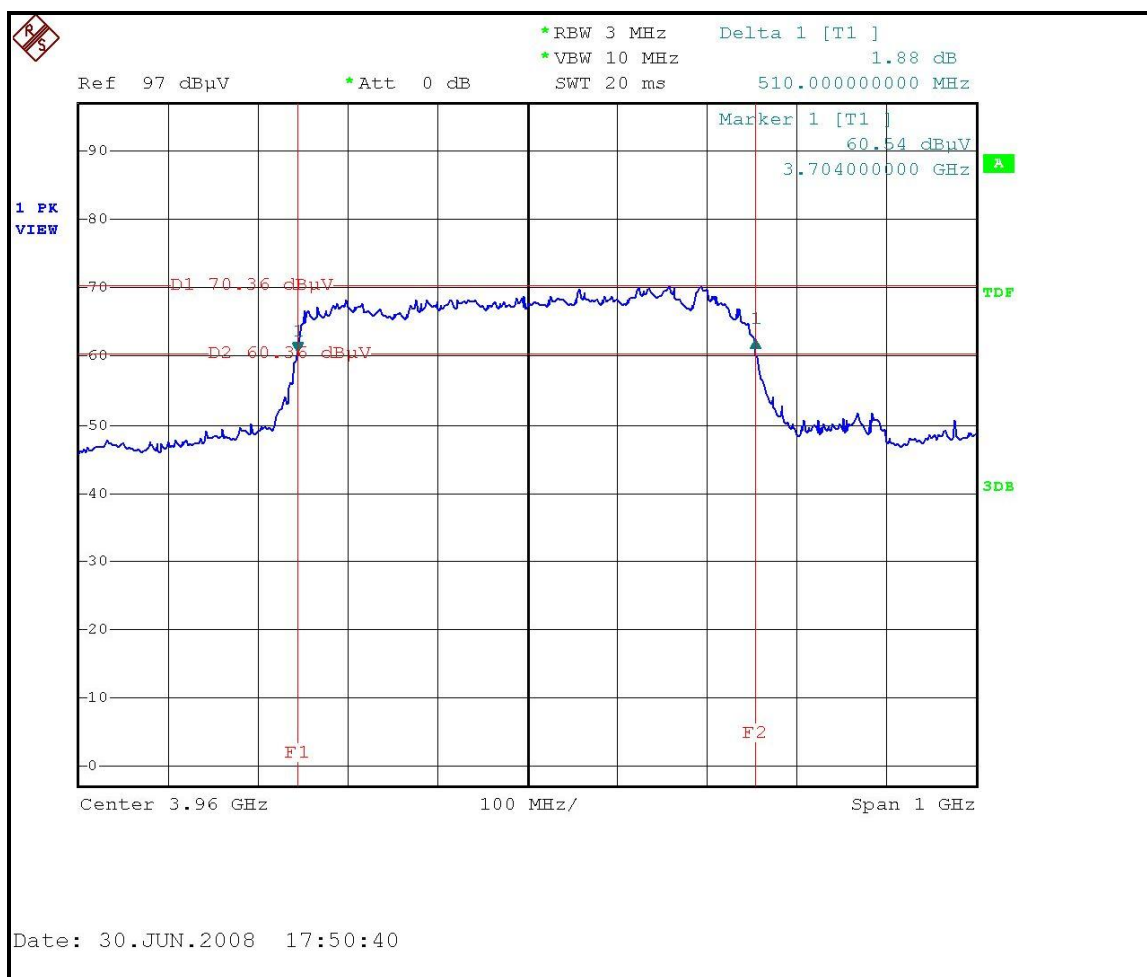


TEST MODE C (SUB-BAND 2)

MODULATION TECHNOLOGY	MOFDM	ENVIRONMENTAL CONDITIONS	25deg. C, 60%RH, 955hPa
INPUT POWER (SYSTEM)	120Vac, 60 Hz	TESTED BY	Frank Liu

F _L (MHz)	F _H (MHz)	F _C =(F _L +F _H)/2 (MHz)	LIMIT (MHz)	PASS/FAIL
3704.00	4214.00	3959.00	Between 3100.00 ~ 10600.00	PASS

UWB Bandwidth = F_H - F_L=510MHz



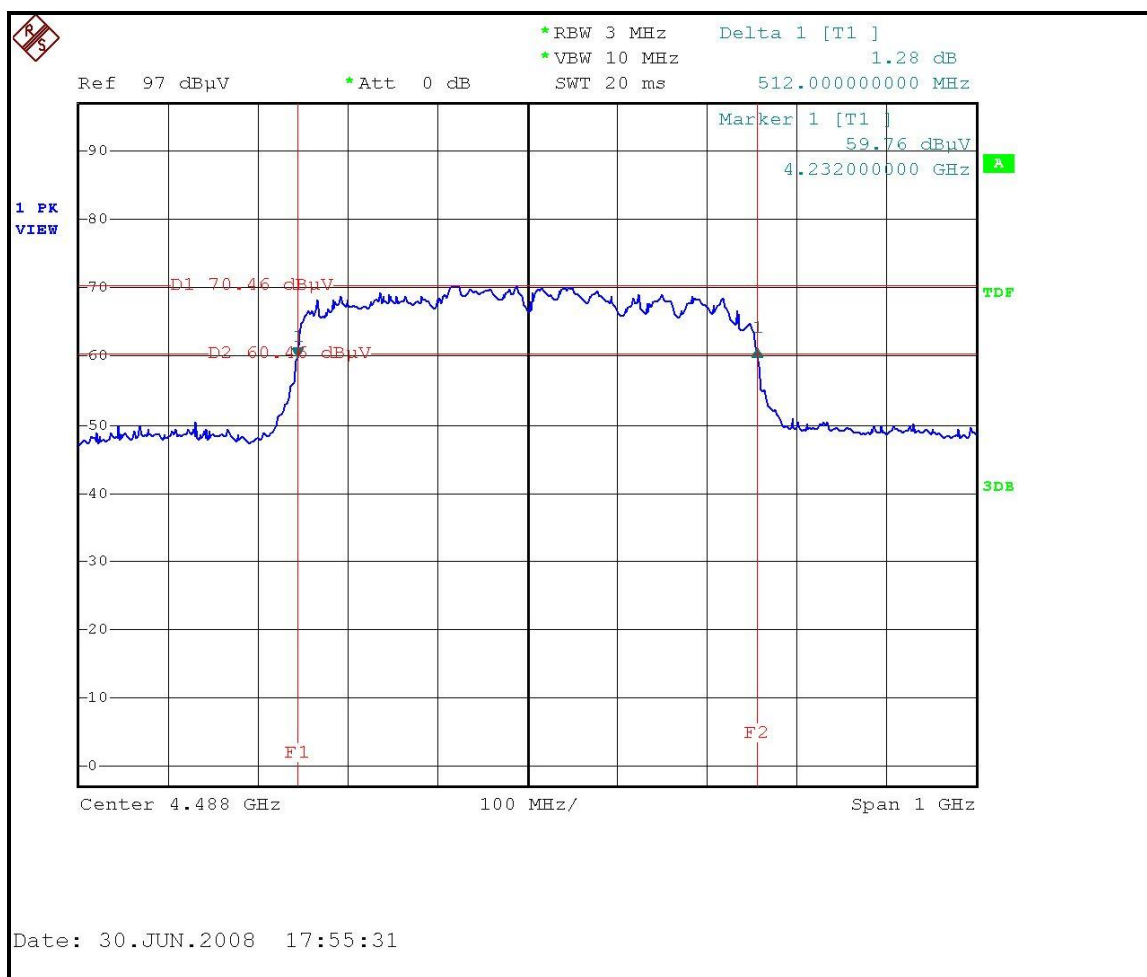


TEST MODE C (SUB-BAND 3)

MODULATION TECHNOLOGY	MOFDM	ENVIRONMENTAL CONDITIONS	25deg. C, 60%RH, 955hPa
INPUT POWER (SYSTEM)	120Vac, 60 Hz	TESTED BY	Frank Liu

F_L (MHz)	F_H (MHz)	$F_C=(F_L+F_H)/2$ (MHz)	LIMIT (MHz)	PASS/FAIL
4232.00	4744.00	4488.00	Between 3100.00 ~ 10600.00	PASS

UWB Bandwidth = $F_H - F_L=512\text{MHz}$



4.5 PEAK EMISSION WITHIN A 50MHz BANDWIDTH

4.5.1 LIMITS OF PEAK EMISSION

The Maximum Peak Output Power Measurement is 0dBm(RBW=50MHz)

If a resolution bandwidth other than 50 MHz is Employed, the peak EIRP limit shall be $20 \log (RBW/50)$ dBm where RBW is the resolution bandwidth in megahertz that is employed. The resolution bandwidth used to make the peak measurement was 3 MHz, resulting in a limit of -24.44dBm

This may be converted to a peak field strength level at 3 meters using

$$E(\text{dBuV/m}) = P(\text{dBm EIRP}) + 95.2 = -24.44 + 95.2 = 70.76.$$

4.5.2 INSTRUMENT SETUP VALUE AND MEASUREMENT DISTANCE

RADIATED EMISSIONS 15.519 (e):

FREQUENCY RANGE	RESOLUTION BANDWIDTH	VIDEO BANDWIDTH	DETECTOR	MEASUREMENT DISTANCE
3,100 ~ 10,600	3MHz	10MHz	*Peak	3 meters

NOTE: *reference The Evolution of Modern UWB Technology

4.5.3 TEST INSTRUMENTS

Same as 4.2.3

4.5.4 TEST PROCEDURE

Same as 4.2.4

4.5.5 DEVIATION FROM TEST STANDARD

No deviation

4.5.6 TEST SETUP

Same as Item 4.2.6

4.5.7 EUT OPERATING CONDITIONS

Same as 4.1.6

4.5.8 TEST RESULTS

Antenna 1

MODULATION TECHNOLOGY	MOFDM	ENVIRONMENTAL CONDITIONS	25deg. C, 60%RH, 955hPa
INPUT POWER (SYSTEM)	120Vac, 60 Hz	TESTED BY	Wen Yu

TEST MODE A(SUB-BAND 1, 2, 3)

ANTENNA POLARITY & TEST DISTANCE 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	3432.00	60.71 PK	70.76	-10.05	2.00 H	254	28.45	32.26
1	3432.00	70.45 PK	70.76	-0.31	1.20 V	69	38.19	32.26
2	3960.00	62.37 PK	70.76	-8.39	2.04 H	95	28.85	33.52
2	3960.00	68.65 PK	70.76	-2.11	1.24 V	284	35.13	33.52
3	4488.00	61.49 PK	70.76	-9.27	2.05 H	106	26.60	34.89
3	4488.00	70.46 PK	70.76	-0.30	1.42 V	192	35.57	34.89

TEST MODE A(SUB-BAND 1)

ANTENNA POLARITY & TEST DISTANCE 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	3432.00	60.58 PK	70.76	-10.18	2.02 H	258	28.32	32.26
1	3432.00	70.41 PK	70.76	-0.35	1.20 V	69	38.15	32.26

TEST MODE A(SUB-BAND 2)

ANTENNA POLARITY & TEST DISTANCE 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	3932.00	62.42 PK	70.76	-8.34	2.06 H	102	28.98	33.44
1	3960.00	69.20 PK	70.76	-1.56	1.22 V	265	35.68	33.52

TEST MODE A(SUB-BAND 3)

ANTENNA POLARITY & TEST DISTANCE 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	4488.00	61.78 PK	70.76	-8.98	2.04 H	101	26.89	34.89
1	4488.00	70.54 PK	70.76	-0.22	1.45 V	187	35.65	34.89

Antenna 2

MODULATION TECHNOLOGY	MOFDM	ENVIRONMENTAL CONDITIONS	25deg. C, 60%RH, 991hPa
INPUT POWER (SYSTEM)	120Vac, 60 Hz	TESTED BY	Wen Yu

TEST MODE A(SUB-BAND 1, 2, 3)

ANTENNA POLARITY & TEST DISTANCE 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	3432.00	60.27 PK	70.76	-10.49	1.41 H	263	28.01	32.26
1	3432.00	69.50 PK	70.76	-1.26	1.25 V	32	37.24	32.26
2	3960.00	60.96 PK	70.76	-9.80	1.29 H	86	27.44	33.52
2	3960.00	69.70 PK	70.76	-1.06	1.22 V	350	36.18	33.52
3	4488.00	61.74 PK	70.76	-9.02	1.18 H	262	26.85	34.89
3	4488.00	70.50 PK	70.76	-0.26	1.32 V	150	35.61	34.89

TEST MODE A(SUB-BAND 1)

ANTENNA POLARITY & TEST DISTANCE 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	3432.00	60.42 PK	70.76	-10.34	1.43 H	264	28.16	32.26
1	3432.00	69.90 PK	70.76	-0.86	1.28 V	20	37.64	32.26

TEST MODE A(SUB-BAND 2)

ANTENNA POLARITY & TEST DISTANCE 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	3960.00	60.93 PK	70.76	-9.83	1.34 H	93	27.41	33.52
1	3960.00	70.40 PK	70.76	-0.36	1.24 V	336	36.88	33.52

TEST MODE A(SUB-BAND 3)

ANTENNA POLARITY & TEST DISTANCE 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	4488.00	61.86 PK	70.76	-8.90	1.17 H	255	26.97	34.89
1	4488.00	70.50 PK	70.76	-0.26	1.33 V	200	35.61	34.89

4.6 ANTENNA REQUIREMENT

4.6.1 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.

4.6.2 ANTENNA CONNECTED CONSTRUCTION

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

Antenna Type	Brand Name	Gain (dBi)	Antenna Connector
Dipole	ACON	1	Reverse SMA
Dipole	WNC	1.68	Reverse SMA



5 INFORMATION ON THE TESTING LABORATORIES

We, ADT Corp., 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, UL,A2LA
Germany	TUV Rheinland
Japan	VCCI
Norway	NEMKO
Canada	INDUSTRY CANADA, CSA
R.O.C.	TAF, BSMI, NCC
Netherlands	Telefication
Singapore	PSB, 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: 886-2-26051924

Hsin Chu EMC/RF Lab:
Tel: 886-3-5935343
Fax: 886-3-5935342

Hwa Ya EMC/RF/Safety/Telecom Lab:
Tel: 886-3-3183232
Fax: 886-3-3185050

Web Site: www.adt.com.tw

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

6 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 ---