

## 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 (dB $\mu$ 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.

#### 5.1.2 TEST INSTRUMENTS

DESCRIPTION & MANUFACTURER	MODEL NO.	SERIAL NO.	CALIBRATED UNTIL
Test Receiver	ESCS 30	847124/029	Mar. 01, 2008
Line-Impedance Stabilization Network(for EUT)	ENV-216	100071	Nov. 26, 2007
Line-Impedance Stabilization Network(for Peripheral)	ESH3-Z5	848773/004	Oct. 26, 2007
RF Cable (JETBAO)	RG233/U	Cable_CB_01	Dec. 09, 2007
Terminator	50	2	Oct. 30, 2007
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.
  4. The test was performed in ADT Shielded Room No. B.
  5. The VCCI Con B Registration No. is C-2193.

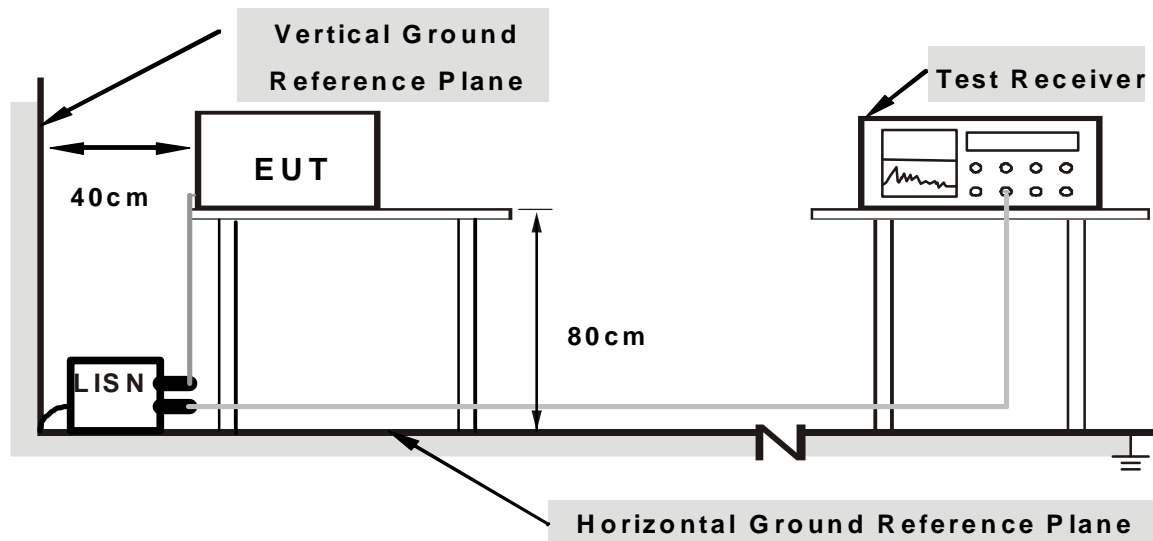
### 5.1.3 TEST PROCEDURES

- 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

- a. Connect the EUT with the support unit 1 (Notebook computer) which placed on a testing table.
- b. The support unit 1 (Notebook computer) ran a test program “Prism Engineering” to enable EUT under transmission condition continuously.

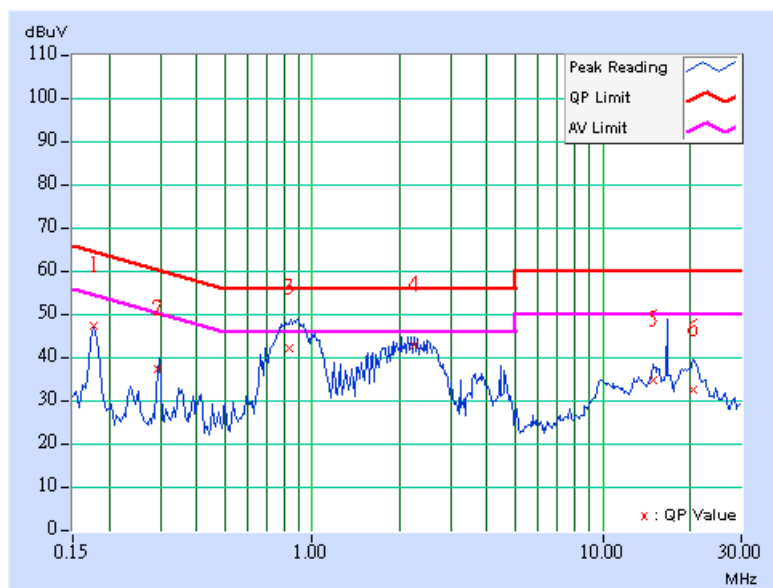
### 5.1.7 TEST RESULTS

#### Conducted Worst-Case Data

<b>MODULATION TYPE</b>	BPSK	<b>6dB BANDWIDTH</b>	9 kHz
<b>INPUT POWER</b>	DC 3.3V	<b>TRANSFER RATE</b>	6Mbps
<b>ENVIRONMENTAL CONDITIONS</b>	20deg. C, 60%RH, 972hPa	<b>PHASE</b>	Positive
<b>TESTED BY</b>	Eric Lee		

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	0.177	9.60	37.23	-	46.83	-	64.63
2	0.296	9.60	27.21	-	36.81	-	60.36	50.36	-23.55	-
3	0.830	9.60	32.23	-	41.83	-	56.00	46.00	-14.17	-
<b>4</b>	<b>2.245</b>	<b>9.70</b>	<b>32.77</b>	-	<b>42.47</b>	-	<b>56.00</b>	<b>46.00</b>	<b>-13.53</b>	-
5	14.941	10.00	24.56	-	34.56	-	60.00	50.00	-25.44	-
6	20.381	10.10	22.46	-	32.56	-	60.00	50.00	-27.44	-

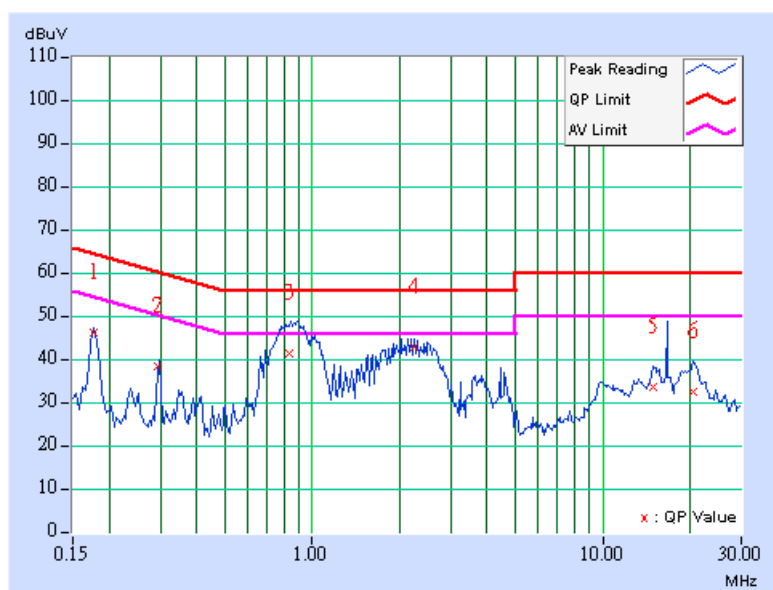
- REMARKS:**
1. Q.P. and AV. are abbreviations of quasi-peak and average individually.
  2. "-": The Quasi-peak reading value also meets average limit and measurement with the average detector is unnecessary.
  3. The emission levels of other frequencies were very low against the limit.
  4. Margin value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



<b>MODULATION TYPE</b>	BPSK	<b>6dB BANDWIDTH</b>	9 kHz
<b>INPUT POWER</b>	DC 3.3V	<b>TRANSFER RATE</b>	6Mbps
<b>ENVIRONMENTAL CONDITIONS</b>	20deg. C, 60%RH, 972hPa	<b>PHASE</b>	Negative
<b>TESTED BY</b>	Eric Lee		

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	0.177	9.60	36.32	-	45.92	-	64.64
2	0.296	9.60	28.32	-	37.92	-	60.36	50.36	-22.44	-
3	0.830	9.60	31.54	-	41.14	-	56.00	46.00	-14.86	-
<b>4</b>	<b>2.245</b>	<b>9.70</b>	<b>32.77</b>	-	<b>42.47</b>	-	<b>56.00</b>	<b>46.00</b>	<b>-13.53</b>	-
5	14.941	10.10	23.54	-	33.64	-	60.00	50.00	-26.36	-
6	20.380	10.10	22.46	-	32.56	-	60.00	50.00	-27.44	-

- 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

DESCRIPTION & MANUFACTURER	MODEL NO.	SERIAL NO.	CALIBRATED UNTIL
ADVANTEST Spectrum Analyzer	R3271A	85060311	July 03, 2007
HP Pre_Amplifier	8449B	3008A01922	Sep. 18, 2007
ROHDE & SCHWARZ Test Receiver	ESCS30	100375	Sep. 20, 2007
CHASE Broadband Antenna	VULB9168	138	Dec. 10, 2007
Schwarzbeck Horn_Antenna	BBHA9120	D124	Jan. 01, 2008
Schwarzbeck Horn_Antenna	BBHA 9170	BBHA9170153	Jan. 04, 2008
SCHWARZBECK Biconical Antenna	VHBA9123	459	Jun. 08, 2009
SCHWARZBECK Periodic Antenna	UPA6108	1148	Jun. 08, 2009
R&S Loop Antenna	HFH2-Z2	881058/15	Nov. 29, 2007
RF Switches (ARNITSU)	CS-201	1565157	NA
RF CABLE (Chaintek)	SF102	22054-2	Nov. 14, 2007
RF Cable(RICHTEC)	9913-30M N-N Cable	STCCAB-30M-1 GHz	Jul. 15, 2007
Software	ADT_Radiated_V 5.14	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 (36 months for Biconical and Periodic Antenna) 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 4824A-3.
7. Loop antenna was used for all emissions below 30 MHz.

### 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 3 meter semi-anechoic chamber. The table was rotated 360 degrees to determine the position of the highest radiation.
- b. The EUT was set 3 meters away from the interference-receiving antenna, which was mounted on the top of a variable-height antenna tower.
- c. The antenna is a broadband antenna, and its height is varied from one meter to four meters above the ground to determine the maximum value of the field strength. Both horizontal and vertical polarizations of the antenna are set to make the measurement.
- d. For each suspected emission, the EUT was arranged to its worst case and then the antenna was tuned to heights from 1 meter to 4 meters and the rotatable table was turned from 0 degrees to 360 degrees to find the maximum reading.
- e. The test-receiver system was set to Peak Detect Function and Specified Bandwidth with Maximum Hold Mode.
- f. If the emission level of the EUT in peak mode was 10dB lower than the limit specified, then testing could be stopped and the peak values of the EUT would be reported. Otherwise the emissions that did not have 10dB margin would be re-tested one by one using peak, quasi-peak or average method as specified and then reported in a data sheet.

**NOTE:**

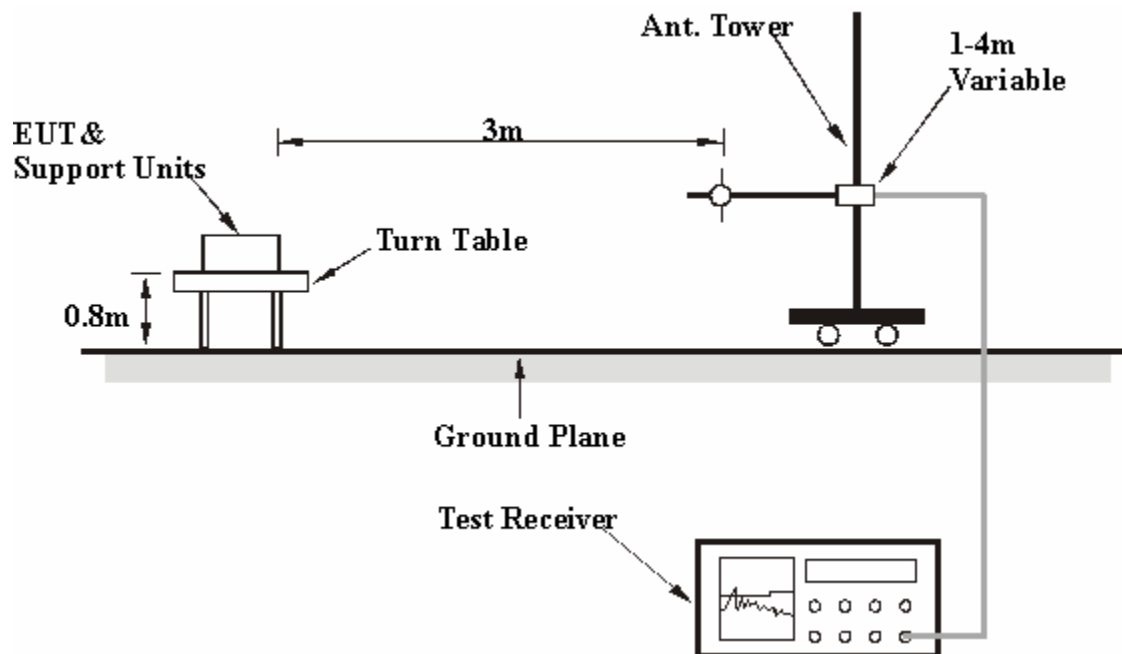
1. The resolution bandwidth and video bandwidth of test receiver/spectrum analyzer is 120kHz for Peak detection (PK) and Quasi-peak detection (QP) at frequency below 1GHz.
2. The resolution bandwidth of test receiver/spectrum analyzer is 1 MHz and the video bandwidth is 3 MHz for Peak detection (PK) 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 4.1.6

## 5.2.7 TEST RESULTS

### Below 1GHz Worst-Case Data

<b>MODULATION TYPE</b>	BPSK	<b>FREQUENCY RANGE</b>	Below 1000MHz
<b>INPUT POWER (SYSTEM)</b>	120Vac, 60 Hz	<b>TRANSFER RATE</b>	6Mbps
<b>ENVIRONMENTAL CONDITIONS</b>	23deg. C, 67%RH, 972hPa	<b>DETECTOR FUNCTION</b>	Quasi-Peak
<b>TESTED BY</b>	Rex Huang		

### ANTENNA POLARITY & TEST DISTANCE: HORIZONTAL AT 3 M

No.	Freq. (MHz)	Emission Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Antenna Height (m)	Table Angle (Degree)	Raw Value (dBuV)	Correction Factor (dB/m)
1	133.48	25.41 QP	43.50	-18.09	1.95 H	267	12.50	12.91
2	200.07	30.49 QP	43.50	-13.01	1.72 H	347	18.89	11.60
3	233.44	38.56 QP	46.00	-7.44	1.42 H	353	25.50	13.06
4	366.56	40.91 QP	46.00	-5.09	1.00 H	352	22.99	17.92
5	433.36	38.29 QP	46.00	-7.71	1.00 H	346	18.30	19.99
6	533.39	39.35 QP	46.00	-6.65	1.76 H	345	16.60	22.75
7	633.36	35.29 QP	46.00	-10.71	1.57 H	235	10.44	24.85
8	800.01	39.56 QP	46.00	-6.44	1.07 H	238	12.00	27.56
9	800.01	40.93 QP	46.00	-5.07	1.07 H	245	13.37	27.56
10	933.21	38.32 QP	46.00	-7.68	1.30 H	278	8.79	29.53

### 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	69.15	26.74 QP	40.00	-13.26	1.00 V	293	14.07	12.67
2	133.48	29.81 QP	43.50	-13.69	1.00 V	268	16.90	12.91
3	200.24	30.13 QP	43.50	-13.37	1.00 V	300	18.52	11.61
4	233.30	32.68 QP	46.00	-13.32	1.00 V	269	19.63	13.05
5	366.78	36.16 QP	46.00	-9.84	1.00 V	253	18.23	17.93
6	433.38	37.32 QP	46.00	-8.68	1.00 V	241	17.33	19.99
7	533.36	37.58 QP	46.00	-8.42	1.30 V	280	14.83	22.75
8	633.50	34.52 QP	46.00	-11.48	1.76 V	245	9.67	24.85
9	800.00	36.69 QP	46.00	-9.31	1.41 V	289	9.13	27.56
10	933.41	38.24 QP	46.00	-7.76	1.32 V	297	8.70	29.54

- 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

### 802.11a OFDM modulation

<b>CHANNEL</b>	Channel 1	<b>FREQUENCY RANGE</b>	1 ~ 40 GHz
<b>MODULATION TYPE</b>	BPSK	<b>TRANSFER RATE</b>	6Mbps
<b>INPUT POWER (SYSTEM)</b>	120Vac, 60 Hz	<b>DETECTOR FUNCTION</b>	Peak(PK) Average (AV)
<b>ENVIRONMENTAL CONDITIONS</b>	15deg. C, 60%RH, 972hPa	<b>TESTED BY</b>	Wen Yu

#### 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	100.70 PK			1.80 H	280	63.10	37.60
1	*5745.00	90.00 AV			1.80 H	280	52.40	37.60
2	#11490.00	60.10 PK	74.00	-13.90	1.80 H	59	13.10	47.00
2	#11490.00	46.40 AV	54.00	-7.60	1.80 H	59	-0.60	47.00

#### 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	116.70 PK			1.29 V	276	79.10	37.60
1	*5745.00	106.60 AV			1.29 V	276	69.00	37.60
2	#11490.00	64.40 PK	74.00	-9.60	1.22 V	268	17.40	47.00
2	#11490.00	51.40 AV	54.00	-2.60	1.22 V	268	4.40	47.00

- NOTE:**
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 falling in the restricted band.
  7. The limit value is defined as per 15.247

<b>CHANNEL</b>	Channel 3	<b>FREQUENCY RANGE</b>	1 ~ 40 GHz
<b>MODULATION TYPE</b>	BPSK	<b>TRANSFER RATE</b>	6Mbps
<b>INPUT POWER (SYSTEM)</b>	120Vac, 60 Hz	<b>DETECTOR FUNCTION</b>	Peak(PK) Average (AV)
<b>ENVIRONMENTAL CONDITIONS</b>	15deg. C, 60%RH, 972hPa	<b>TESTED BY</b>	Wen Yu

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	100.10 PK			1.87 H	277	62.40	37.70
1	*5785.00	89.10 AV			1.87 H	277	51.40	37.70
2	#11570.00	60.90 PK	74.00	-13.10	1.65 H	307	14.00	47.00
2	#11570.00	47.40 AV	54.00	-6.60	1.65 H	307	0.50	47.00

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	115.10 PK			1.18 V	270	77.40	37.70
1	*5785.00	104.90 AV			1.18 V	270	67.20	37.70
2	#11570.00	64.70 PK	74.00	-9.30	1.15 V	272	17.70	47.00
2	#11570.00	52.10 AV	54.00	-1.90	1.15 V	272	5.10	47.00

- NOTE:**
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 falling in the restricted band.
  7. The limit value is defined as per 15.247

<b>CHANNEL</b>	Channel 5	<b>FREQUENCY RANGE</b>	1 ~ 40 GHz
<b>MODULATION TYPE</b>	BPSK	<b>TRANSFER RATE</b>	6Mbps
<b>INPUT POWER (SYSTEM)</b>	120Vac, 60 Hz	<b>DETECTOR FUNCTION</b>	Peak(PK) Average (AV)
<b>ENVIRONMENTAL CONDITIONS</b>	15deg. C, 60%RH, 972hPa	<b>TESTED BY</b>	Wen Yu

<b>ANTENNA POLARITY &amp; TEST DISTANCE: HORIZONTAL AT 3 M</b>								
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	99.00 PK			1.89 H	254	61.20	37.80
1	*5825.00	88.30 AV			1.89 H	254	50.50	37.80
2	#11650.00	62.10 PK	74.00	-11.90	1.62 H	56	15.30	46.90
2	#11650.00	48.50 AV	54.00	-5.50	1.62 H	56	1.70	46.90

<b>ANTENNA POLARITY &amp; TEST DISTANCE: VERTICAL AT 3 M</b>								
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	113.70 PK			1.26 V	253	75.90	37.80
1	*5825.00	103.10 AV			1.26 V	253	65.30	37.80
2	#11650.00	66.20 PK	74.00	-7.80	1.20 V	268	19.30	46.90
<b>2</b>	<b>#11650.00</b>	<b>53.50 AV</b>	<b>54.00</b>	<b>-0.50</b>	<b>1.20 V</b>	<b>268</b>	<b>6.60</b>	<b>46.90</b>

- NOTE:**
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 falling in the restricted band.
  7. 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 Until
R&S SPECTRUM ANALYZER	FSP40	100037	Aug. 15, 2007

**NOTE:**

- 1.The measurement uncertainty is less than +/- 2.6dB, which is calculated as per the NAMAS document NIS81. This uncertainty represents an expanded uncertainty expressed at approximately the 95% confidence level using a coverage factor of k=2.
- 2.The calibration interval of the above test instruments is 12 months and the calibrations are traceable to NML/ROC and NIST/USA.

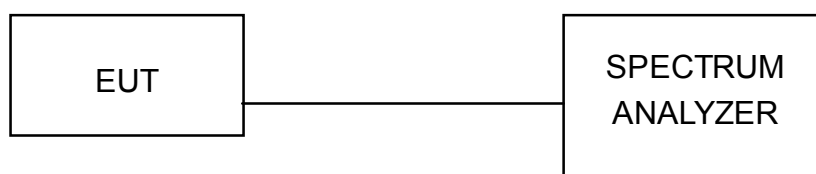
### 5.3.3 TEST PROCEDURE

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

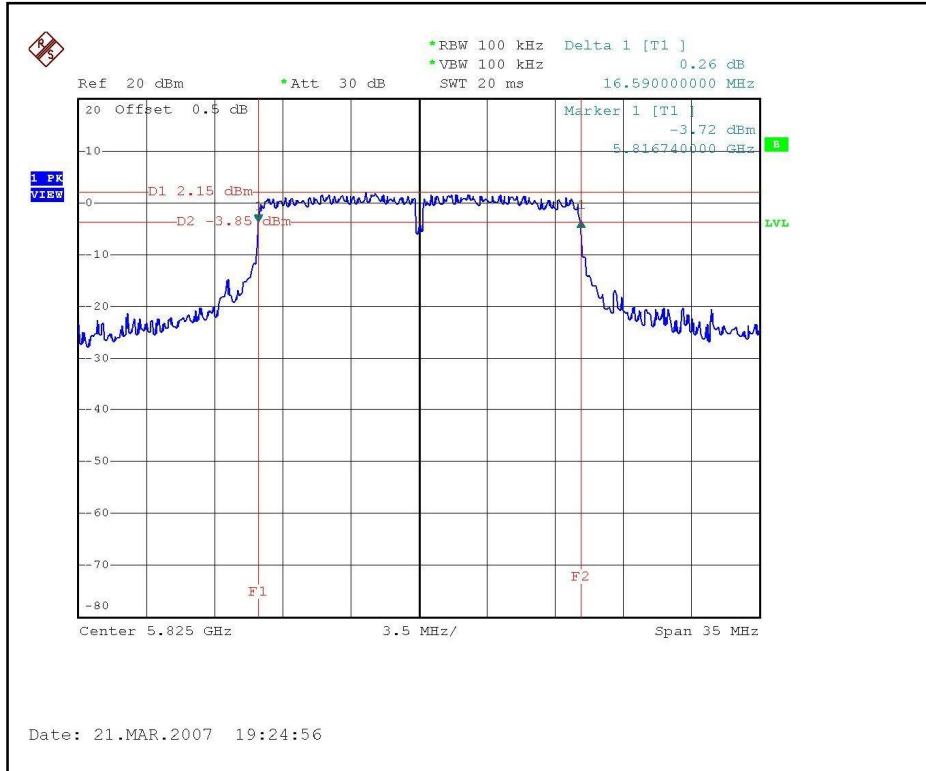
<b>MODULATION TYPE</b>	BPSK	<b>TRANSFER RATE</b>	6Mbps
<b>INPUT POWER (SYSTEM)</b>	120Vac, 60 Hz	<b>ENVIRONMENTAL CONDITIONS</b>	15deg. C, 65%RH, 972hPa
<b>TESTED BY</b>	Wen Yu		

<b>CHANNEL</b>	<b>CHANNEL FREQUENCY (MHz)</b>	<b>6dB BANDWIDTH (MHz)</b>	<b>MINIMUM LIMIT (MHz)</b>	<b>PASS/FAIL</b>
1	5745	16.59	0.5	PASS
3	5785	16.59	0.5	PASS
5	5825	16.59	0.5	PASS





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## 5.4 MAXIMUM PEAK OUTPUT POWER

### 5.4.1 LIMITS OF MAXIMUM PEAK OUTPUT POWER MEASUREMENT

The Maximum Peak Output Power Measurement is 30dBm.

### 5.4.2 INSTRUMENTS

Description & Manufacturer	Model No.	Serial No.	Calibrated Until
R&S SPECTRUM ANALYZER	FSP40	100037	Aug. 15, 2007
Agilent SIGNAL GENERATOR	E8257C	MY43320668	Dec. 07, 2007
TEKTRONIX OSCILLOSCOPE	TDS380	B016335	Jul. 04, 2007
NARDA DETECTOR	4503A	FSCM99899	NA

**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. A detector was used on the output port of the EUT. An oscilloscope was used to read the response of the detector.
2. Replaced the EUT by the signal generator. The center frequency of the S.G was adjusted to the center frequency of the measured channel.
3. Adjusted the power to have the same reading on oscilloscope. 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

<b>MODULATION TYPE</b>	BPSK	<b>TRANSFER RATE</b>	6Mbps
<b>INPUT POWER (SYSTEM)</b>	120Vac, 60 Hz	<b>ENVIRONMENTAL CONDITIONS</b>	15deg. C, 65%RH, 972hPa
<b>TESTED BY</b>	Wen Yu		

<b>CHANNEL</b>	<b>CHANNEL FREQUENCY (MHz)</b>	<b>PEAK POWER OUTPUT (mW)</b>	<b>PEAK POWER OUTPUT (dBm)</b>	<b>PEAK POWER LIMIT (dBm)</b>	<b>PASS/FAIL</b>
1	5745	102.329	20.1	30	PASS
3	5785	104.713	20.2	30	PASS
5	5825	102.329	20.1	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 Until
R&S SPECTRUM ANALYZER	FSP40	100037	Aug. 15, 2007

**NOTE:**

- 1.The measurement uncertainty is less than +/- 2.6dB, which is calculated as per the NAMAS document NIS81. This uncertainty represents an expanded uncertainty expressed at approximately the 95% confidence level using a coverage factor of k=2.
- 2.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

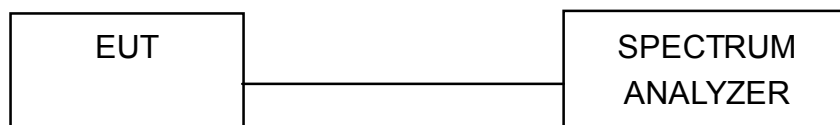
The transmitter output was connected to the spectrum analyzer through an attenuator, the bandwidth of the fundamental frequency was measured with the spectrum analyzer using 3 kHz RBW and 30 kHz VBW, set sweep time = span/3 kHz. The power spectral density was measured and recorded.

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

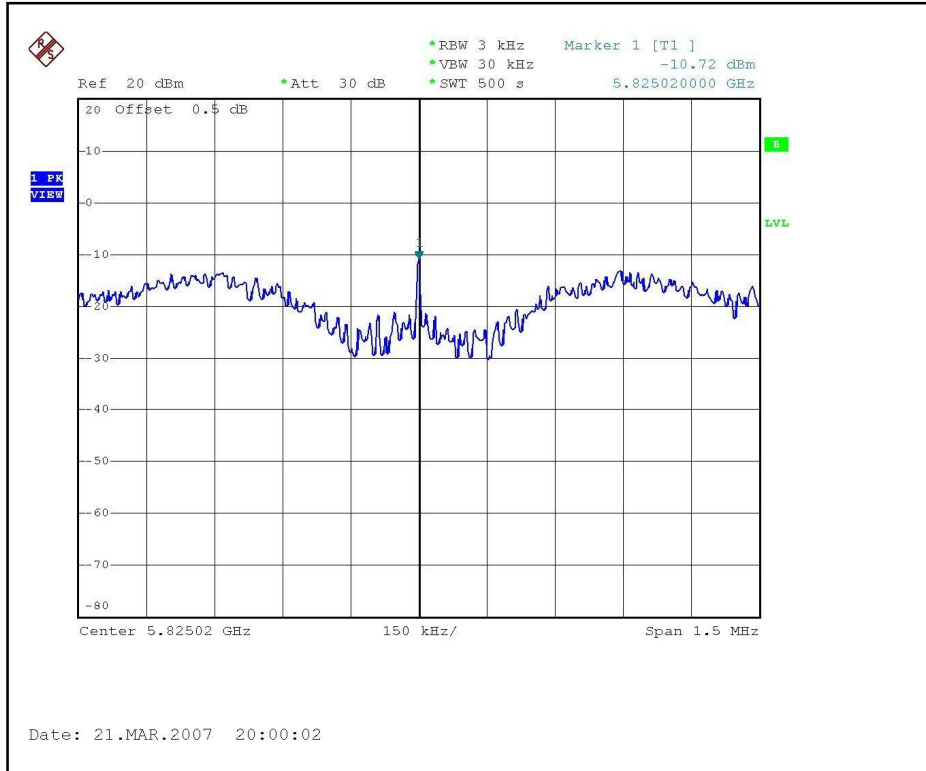
<b>MODULATION TYPE</b>	BPSK	<b>TRANSFER RATE</b>	6Mbps
<b>INPUT POWER (SYSTEM)</b>	120Vac, 60 Hz	<b>ENVIRONMENTAL CONDITIONS</b>	15deg. C, 65%RH, 972hPa
<b>TESTED BY</b>	Wen Yu		

<b>CHANNEL</b>	<b>CHANNEL FREQUENCY (MHz )</b>	<b>RF POWER LEVEL IN 3 kHz BW (dBm)</b>	<b>MAXIMUM LIMIT (dBm)</b>	<b>PASS/FAIL</b>
1	5745	-7.43	8	PASS
3	5785	-7.86	8	PASS
5	5825	-10.72	8	PASS





CH5



## 5.6 BAND EDGES MEASUREMENT

### 5.6.1 LIMITS OF BAND EDGES MEASUREMENT

Below  $-20\text{dB}$  of the highest emission level of operating band (in 100kHz Resolution Bandwidth).

### 5.6.2 TEST INSTRUMENTS

Description & Manufacturer	Model No.	Serial No.	Calibrated Until
R&S SPECTRUM ANALYZER	FSP40	100037	Aug. 15, 2007

**NOTE:**

- 1.The measurement uncertainty is less than  $\pm 2.6\text{dB}$ , which is calculated as per the NAMAS document NIS81.
- 2.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 loss cable. Set both RBW and VBW 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

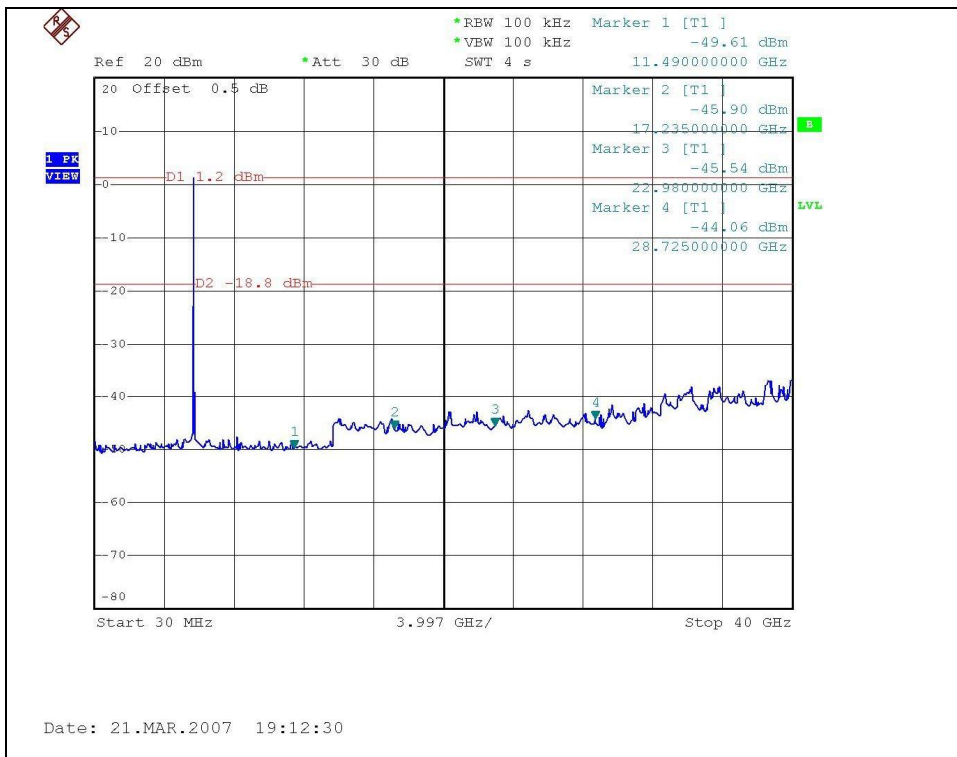
### 5.6.6 TEST RESULTS

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).

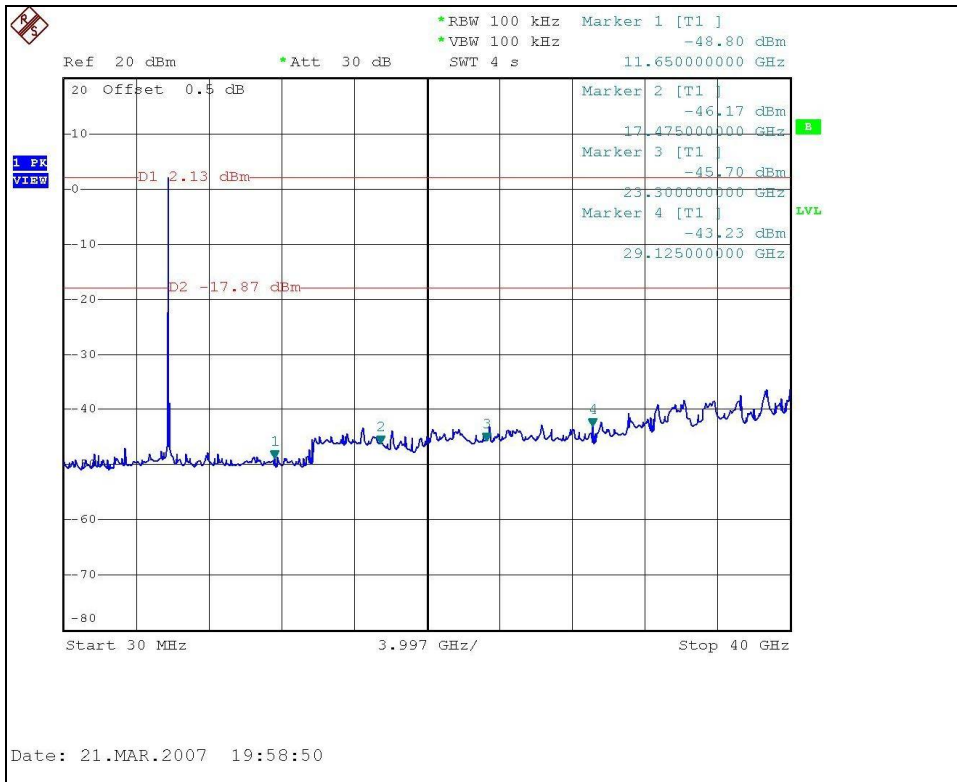


## 802.11a 10th conducted Harmonic

CH1



CH5





## **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**

The antenna used in this product is one dipole antenna with RP-SMA MALE connector. The maximum Gain of the antenna is 2.8dBi.





## 6. 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.

<b>USA</b>	FCC, UL, A2LA
<b>Germany</b>	TUV Rheinland
<b>Japan</b>	VCCI
<b>Norway</b>	NEMKO
<b>Canada</b>	INDUSTRY CANADA , CSA
<b>R.O.C.</b>	CNLA, BSMI, NCC
<b>Netherlands</b>	Telefication
<b>Singapore</b>	PSB , GOST-ASIA(MOU)
<b>Russia</b>	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](http://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](http://www.adt.com.tw)

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



## **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.