

FCC TEST REPORT (15.247)

REPORT NO.: RF930507H06F

MODEL NO.: BR5811b, BR5811bE

RECEIVED: Nov. 15, 2006

TESTED: Nov. 20, 2006 to March 08, 2007

ISSUED: March 23, 2007

APPLICANT: Microelectronics Technology Inc.

ADDRESS: 1, Innovation Road II, Hsinchu Science-based
Industrial Park, Hsinchu, Taiwan, R.O.C.

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 56 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 client should not use it to claim product endorsement by CNLA, A2LA or any government agencies. The test results in the report only apply to the tested sample.



No. 2177-01

Table of Contents

| | | |
|-------|--|----|
| 1. | CERTIFICATION | 4 |
| 2. | SUMMARY OF TEST RESULTS | 5 |
| 2.1 | MEASUREMENT UNCERTAINTY..... | 6 |
| 3. | GENERAL INFORMATION | 7 |
| 3.1 | GENERAL DESCRIPTION OF EUT..... | 7 |
| 3.2 | DESCRIPTION OF TEST MODES..... | 9 |
| 3.2.1 | TEST MODE APPLICABILITY AND TESTED CHANNEL DETAIL:..... | 10 |
| 3.3 | GENERAL DESCRIPTION OF APPLIED STANDARDS | 12 |
| 3.4 | DESCRIPTION OF SUPPORT UNITS..... | 13 |
| 3.5 | CONFIGURATION OF SYSTEM UNDER TEST..... | 14 |
| 4. | TEST TYPES AND RESULTS (802.11a, 5725~5850MHz BAND)..... | 16 |
| 4.1 | CONDUCTED EMISSION MEASUREMENT | 16 |
| 4.1.1 | LIMITS OF CONDUCTED EMISSION MEASUREMENT | 16 |
| 4.1.2 | TEST INSTRUMENTS | 16 |
| 4.1.3 | TEST PROCEDURES..... | 17 |
| 4.1.4 | DEVIATION FROM TEST STANDARD | 17 |
| 4.1.5 | TEST SETUP | 18 |
| 4.1.6 | EUT OPERATING CONDITIONS | 18 |
| 4.1.7 | TEST RESULTS..... | 19 |
| 4.2 | RADIATED EMISSION MEASUREMENT | 21 |
| 4.2.1 | LIMITS OF RADIATED EMISSION MEASUREMENT | 21 |
| 4.2.2 | TEST INSTRUMENTS | 22 |
| 4.2.3 | TEST PROCEDURES..... | 23 |
| 4.2.4 | DEVIATION FROM TEST STANDARD | 23 |
| 4.2.5 | TEST SETUP | 24 |
| 4.2.6 | EUT OPERATING CONDITIONS | 24 |
| 4.2.7 | TEST RESULTS..... | 25 |
| 4.2.8 | TEST RESULTS – ANTENNA A | 26 |
| 4.3 | 6dB BANDWIDTH MEASUREMENT | 31 |
| 4.3.1 | LIMITS OF 6DB BANDWIDTH MEASUREMENT | 31 |
| 4.3.2 | TEST INSTRUMENTS | 31 |
| 4.3.3 | TEST PROCEDURE | 32 |
| 4.3.4 | DEVIATION FROM TEST STANDARD | 32 |
| 4.3.5 | TEST SETUP | 32 |
| 4.3.6 | EUT OPERATING CONDITIONS | 32 |
| 4.3.7 | TEST RESULTS - ANTENNA A | 33 |
| 4.4 | MAXIMUM PEAK OUTPUT POWER | 37 |
| 4.4.1 | LIMITS OF MAXIMUM PEAK OUTPUT POWER MEASUREMENT..... | 37 |



| | | |
|-------|--|-----|
| 4.4.2 | INSTRUMENTS | 37 |
| 4.4.3 | TEST PROCEDURES..... | 38 |
| 4.4.4 | DEVIATION FROM TEST STANDARD | 38 |
| 4.4.5 | TEST SETUP | 38 |
| 4.4.6 | EUT OPERATING CONDITIONS | 38 |
| 4.4.7 | TEST RESULTS - ANTENNA A | 39 |
| 4.5 | POWER SPECTRAL DENSITY MEASUREMENT | 41 |
| 4.5.1 | LIMITS OF POWER SPECTRAL DENSITY MEASUREMENT | 41 |
| 4.5.2 | TEST INSTRUMENTS | 41 |
| 4.5.3 | TEST PROCEDURE | 42 |
| 4.5.4 | DEVIATION FROM TEST STANDARD | 42 |
| 4.5.5 | TEST SETUP | 42 |
| 4.5.6 | EUT OPERATING CONDITION..... | 42 |
| 4.5.7 | TEST RESULTS - ANTENNA A | 43 |
| 4.6 | BAND EDGES MEASUREMENT | 47 |
| 4.6.1 | LIMITS OF BAND EDGES MEASUREMENT | 47 |
| 4.6.2 | TEST INSTRUMENTS | 47 |
| 4.6.3 | TEST PROCEDURE | 48 |
| 4.6.4 | DEVIATION FROM TEST STANDARD | 48 |
| 4.6.5 | EUT OPERATING CONDITION..... | 48 |
| 4.6.6 | TEST RESULTS -ANTENNA A | 49 |
| 4.7 | ANTENNA REQUIREMENT | 54 |
| 4.7.1 | STANDARD APPLICABLE..... | 54 |
| 4.7.2 | ANTENNA CONNECTED CONSTRUCTION..... | 54 |
| 5. | INFORMATION ON THE TESTING LABORATORIES | 55 |
| | APPENDIX-A..... | A-1 |



1. CERTIFICATION

PRODUCT: 802.11a Outdoor Bridge With Internal Antenna,
802.11a Outdoor Bridge With External Antenna

BRAND NAME: MTI

MODEL NO.: BR5811b, BR5811bE

TEST SAMPLE: MASS-PRODUCTION

TESTED: Nov. 20, 2006 to March 08, 2007

APPLICANT: Microelectronics Technology Inc.

STANDARDS: FCC Part 15, Subpart C (Section 15.247),
ANSI C63.4-2003

The above equipment (Model: BR5811b, BR5811bE) 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 : Midoli Peng , **DATE:** March 23, 2007
(Midoli Peng)

TECHNICAL ACCEPTANCE : Moris Lin , **DATE:** March 23, 2007
Responsible for RF (Moris Lin)

APPROVED BY : Hank Chung , **DATE:** March 23, 2007
(Hank Chung, Deputy Manager)

2. SUMMARY OF TEST RESULTS

The EUT has been tested according to the following specifications:

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 -19.18dB at 0.209MHz |
| 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 -0.7dB at 550.00MHz |
| 15.247(e) | Power Spectral Density Limit: max. 8dBm | PASS | Meet the requirement of limit. |
| 15.247(d) | Band Edge Measurement Limit: 20dB less than the peak value of fundamental frequency | PASS | Meet the requirement of limit. |

NOTE:

1. The EUT was operating in 5.25~5.35GHz, 5.47~5.725GHz and 5.725~5.850GHz frequencies band. This report was recorded the RF parameters 5.725 ~ 5.850GHz. For the 5.25~5.35GHz, 5.47~5.725GHz RF parameters was recorded in another test report.

2.1 MEASUREMENT UNCERTAINTY

Where relevant, the following measurement uncertainty levels have been estimated for tests performed on the EUT as specified in CISPR 16-4:

This uncertainty represents an expanded uncertainty expressed at approximately the 95% confidence level using a coverage factor of $k=2$.

| Measurement | Value |
|-----------------------------------|---------|
| Conducted emissions | 2.41 dB |
| Radiated emissions (30MHz-1GHz) | 3.89 dB |
| Radiated emissions (1GHz ~18GHz) | 2.21 dB |
| Radiated emissions (18GHz ~40GHz) | 1.88 dB |

3. GENERAL INFORMATION

3.1 GENERAL DESCRIPTION OF EUT

| | |
|------------------------------|---|
| EUT | 802.11a Outdoor Bridge With Internal Antenna, 802.11a Outdoor Bridge With External Antenna |
| MODEL NO. | BR5811b, BR5811bE |
| FCC ID | MAD-BR5811B |
| POWER SUPPLY | 48VDC from AC Adapter |
| MODULATION TYPE | OFDM(16QAM, 4QAM, QPSK, BPSK) |
| MODULATION TECHNOLOGY | OFDM |
| TRANSFER RATE | 54/48/36/24/18/12/9/6Mbps (Turbo mode: up to 108Mbps *see Note 1) |
| FREQUENCY RANGE | 5.25~5.35GHz, 5.47~5.725GHz and 5.725~5.850GHz |
| NUMBER OF CHANNEL | 802.11a: 20 |
| CHANNEL SPACING | 20MHz for Normal mode / 40MHz for Turbo mode |
| OUTPUT POWER | For FCC15.247: 305.492mW For FCC15.407: 52.360mW |
| ANTENNA TYPE | Please see note 3 (on next page) |

NOTE:

1. This EUT is capable of providing data rates of up to 108Mbps in Turbo Mode depending upon reception quality.
2. The EUT has two model names which are identical to each other in all aspects except for the followings:

| Brand Name | Model Name | Product Name | Description |
|------------|------------|--|------------------|
| MTI | BR5811b | 802.11a Outdoor Bridge With Internal Antenna | Internal Antenna |
| | BR5811bE | 802.11a Outdoor Bridge With External Antenna | External Antenna |

3. This report is prepared for FCC class II permissive change. The difference compared with the Report No.:RF930507H06 design is as the following:

U Add one external antenna for model : BR5811bE as below:

| Original Report (Report No.:RF930507H06) | | | | |
|---|-----------------------|------------|---|-------------------|
| For 5GHz | | | | |
| No. | Model No. | Gain (dBi) | Antenna Type | Antenna Connector |
| 1 | ANT05535 | 17.0dBi | Directional, Patch Panel (Internal Antenna) | Probe Pin |
| 2 | R0420-058 | 8.0dBi | Dipole, Omni (External Antenna) | N (Plug) |
| 3 | MTI09009 (4C10021) | 23.0dBi | Directional, Patch Panel (External Antenna) | N (Jack) |
| U Add one new antenna | | | | |
| For 5GHz(5250~5850MHz): | | | | |
| 'No. | Model No. | Gain (dBi) | Antenna Type | Antenna Connector |
| A | 1GP-51809 | 9.0dBi | Dipole, Omni (External Antenna) | N female(Plug) |
| U Add 5470~5725MHz (new band) | | | | |
| 'No. | Model No. | Gain (dBi) | Antenna Type | Antenna Connector |
| 1 | ANT05535 | 17.0dBi | Directional, Patch Panel (Internal Antenna) | Probe Pin |

4. The EUT was powered by the following adapter:

| | |
|-----------------------|-------------------------------|
| Brand: | MICROELECTRONICS TECH. INC. |
| Model No.: | TR60A-POE-L(0640-0086) |
| Input power : | INPUT: 100-240V~ 1.5A 47-63Hz |
| Output power : | OUTPUT: 48V, 1.2A |

5. The EUT was tested with following modes:

| Model No. | Description |
|-----------|--|
| BR5811b | With antenna 1 (test band:5470~5725MHz) |
| BR5811bE | With antenna A (test band: 5250~5850MHz) |

6. 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 5725 ~ 5850MHz band:

Five channels are provided to this EUT.

| Channel | Frequency |
|---------|-----------|
| 1 | 5745 MHz |
| 2 | 5765 MHz |
| 3 | 5785 MHz |
| 4 | 5805 MHz |
| 5 | 5825 MHz |

Two channels are provided to this EUT for turbo mode.

| Channel | Frequency |
|---------|-----------|
| 1 | 5760 MHz |
| 2 | 5800 MHz |

3.2.1 TEST MODE APPLICABILITY AND TESTED CHANNEL DETAIL:

| EUT configure mode | Applicable to | | | | Description |
|--------------------|---------------|-------|-------|------|-------------|
| | PLC | RE<1G | RE≥1G | APCM | |
| - | √ | √ | √ | √ | NA |

Where PLC: Power Line Conducted Emission RE<1G RE: Radiated Emission below 1GHz
 RE≥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) |
|---------|-------------------|----------------|-----------------------|-----------------|------------------|
| 802.11a | 1 to 5 | 5 | OFDM | BPSK | 6 |

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) |
|---------|-------------------|----------------|-----------------------|-----------------|------------------|
| 802.11a | 1 to 5 | 5 | OFDM | BPSK | 6 |

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) |
|---------------|-------------------|----------------|-----------------------|-----------------|------------------|
| 802.11a | 1 to 5 | 1, 3, 5 | OFDM | BPSK | 6 |
| 802.11a turbo | 1, 2 | 1, 2 | OFDM | BPSK | 12 |

Bandedge Measurement:

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

| Mode | Available Channel | Tested Channel | Modulation Technology | Modulation Type | Data Rate (Mbps) |
|---------------|-------------------|----------------|-----------------------|-----------------|------------------|
| 802.11a | 1 to 5 | 1, 5 | OFDM | BPSK | 6 |
| 802.11a turbo | 1, 2 | 1, 2 | OFDM | BPSK | 12 |

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) |
|---------------|-------------------|----------------|-----------------------|-----------------|------------------|
| 802.11a | 1 to 5 | 1, 3, 5 | OFDM | BPSK | 6 |
| 802.11a turbo | 1, 2 | 1, 2 | OFDM | BPSK | 12 |



3.3 GENERAL DESCRIPTION OF APPLIED STANDARDS

The EUT is an 802.11a Outdoor Bridge With Internal Antenna and 802.11a Outdoor Bridge With External Antenna. 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.

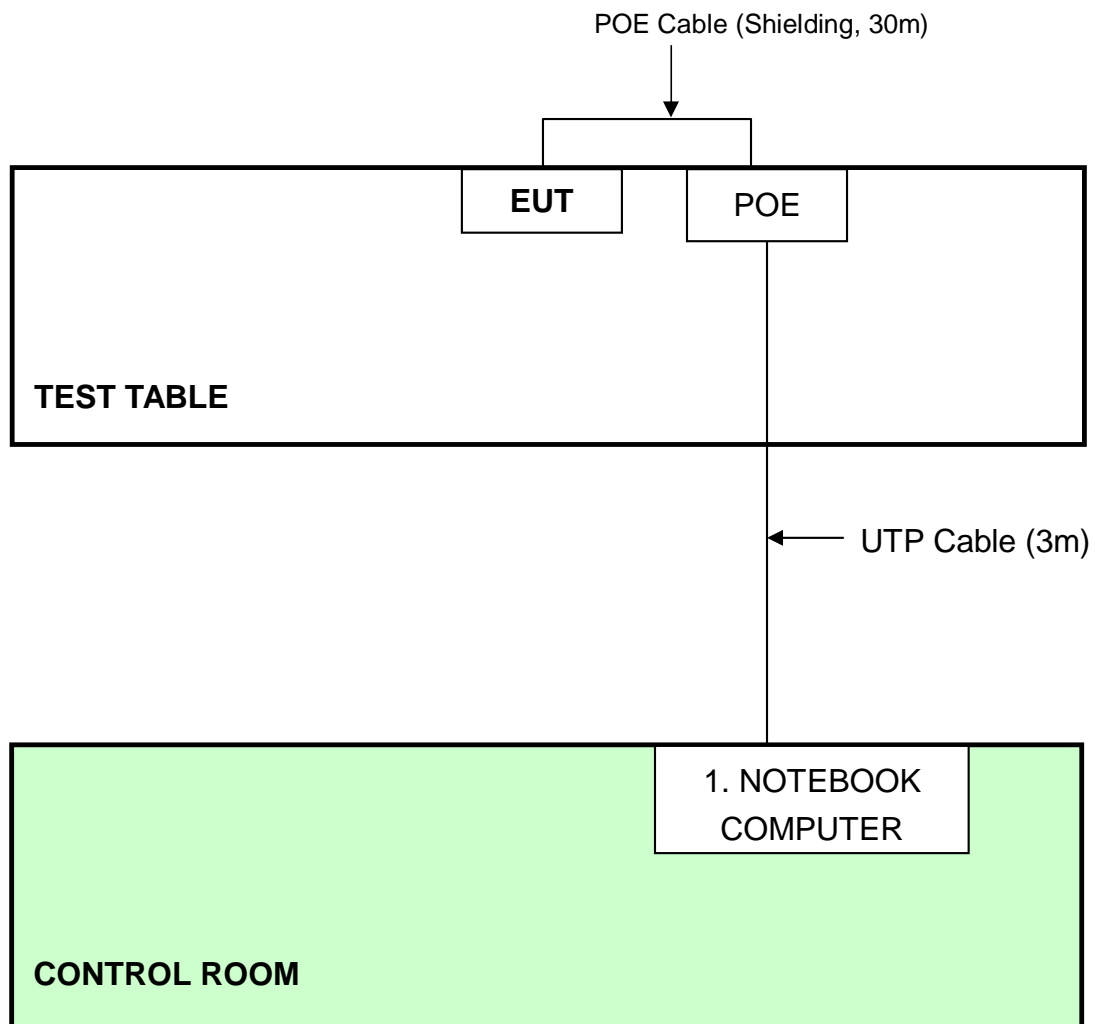
| No. | Product | Brand | Model No. | Serial No. | FCC ID |
|-----|----------------------|-------|-----------|------------------------------|-----------------|
| 1 | NOTEBOOK COMPUTER | DELL | PP19L | CN-OHC416-70166- 5CA-0448 | PIW632500516610 |

| No. | Signal cable description |
|-----|--------------------------|
| 1 | NA |

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

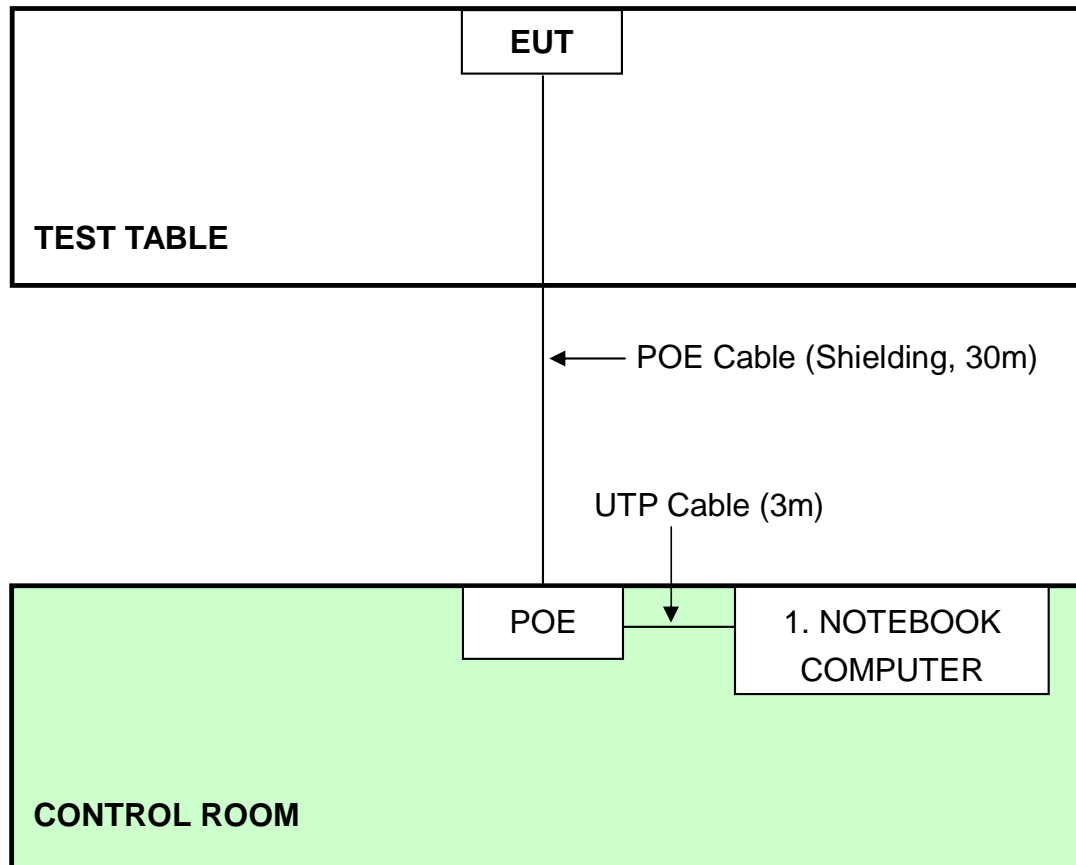
3.5 CONFIGURATION OF SYSTEM UNDER TEST

For conducted test :



- NOTE:** 1. Support unit 1 was kept in the control room during the test.
2. Please refer to the photos of test configuration.

For radiated test :



- NOTE:** 1. Support unit 1 was kept in the control room during the test.
2. Please refer to the photos of test configuration.



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

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 |
|---|-----------------|-------------|------------------|
| ROHDE & SCHWARZ Test Receiver | ESCS 30 | 100287 | Mar. 06, 2008 |
| Line-Impedance Stabilization Network(for EUT) | ENV-216 | 100072 | Oct. 20, 2007 |
| Line-Impedance Stabilization Network(for Peripheral) | KNW-407 | 8-1395-12 | Aug. 15, 2007 |
| RF Cable (JETBAO) | RG233/U | Cable_CA_01 | Jul. 19, 2007 |
| Terminator | 50 | 1 | 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.
 2. The test was performed in ADT Shielded Room No. A.
 3. The VCCI Con A Registration No. is C-817.

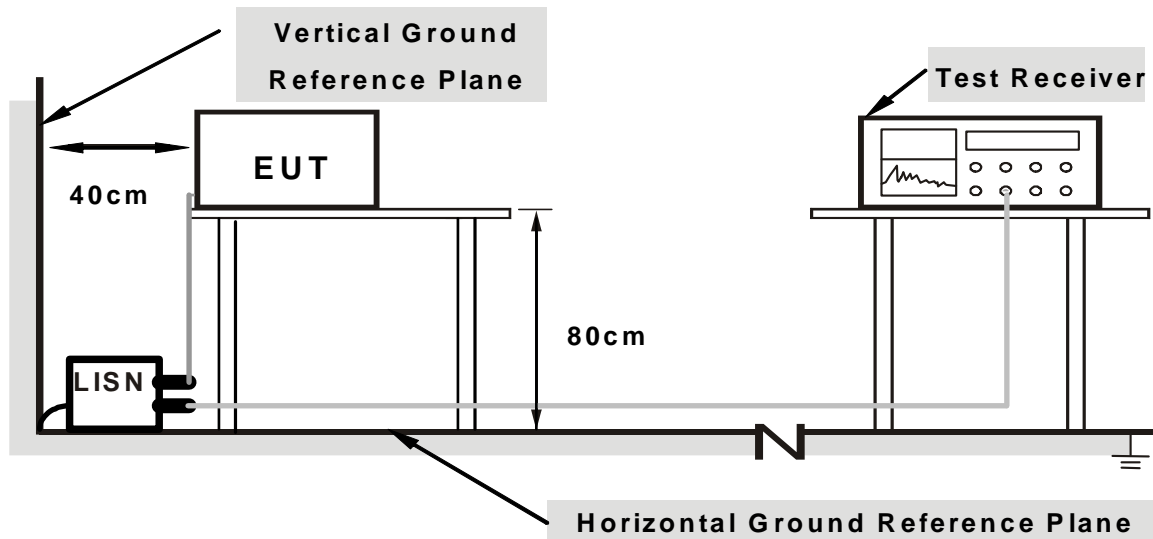
4.1.3 TEST PROCEDURES

- 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
- b. provide 50 ohm/ 50uH of coupling impedance for the measuring instrument.
- c. Both lines of the power mains connected to the EUT were checked for maximum conducted interference.
- d. The frequency range from 150kHz to 30MHz was searched. Emission level 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 related item – Photographs of the Test Configuration.

4.1.6 EUT OPERATING CONDITIONS

- a. Placed the EUT on the testing table.
- b. Prepared another computer system to act as a communication partner and placed it outside of testing area.
- c. The communication partner run a test program “Art 48 b 5” to enable EUT under transmission/receiving condition continuously at specific channel frequency via RJ 45 cable and wireless.

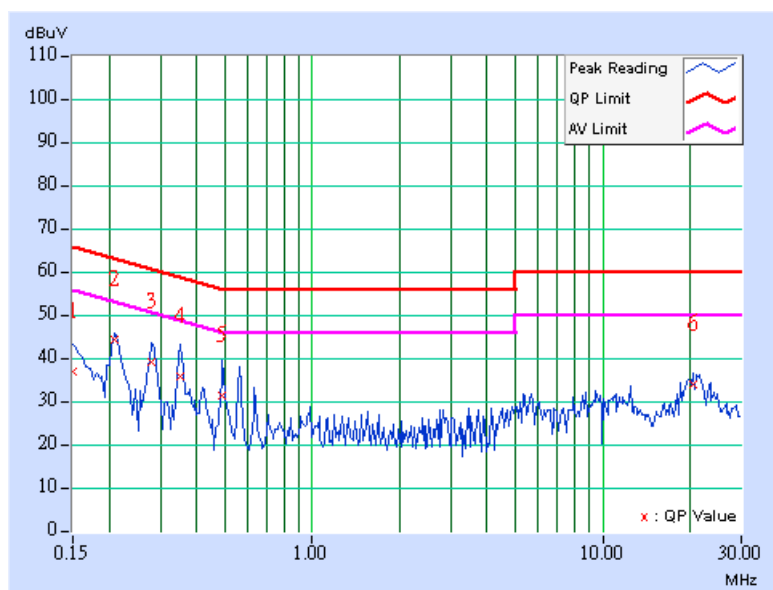
4.1.7 TEST RESULTS

Conducted Worst-Case Data

| | | | |
|---------------------------------|-------------------------|----------------------|----------|
| MODULATION TYPE | BPSK | 6dB BANDWIDTH | 9 kHz |
| INPUT POWER (SYSTEM) | 120Vac, 60 Hz | TRANSFER RATE | 6Mbps |
| ENVIRONMENTAL CONDITIONS | 15deg. C, 60%RH, 972hPa | PHASE | Line (L) |
| TESTED BY | Wen Yu | | |

| 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 | 0.150 | 9.75 | 26.87 | - | 36.62 | - | 66.00 |
| 2 | 0.209 | 9.80 | 34.28 | - | 44.08 | - | 63.26 | 53.26 | -19.18 | - |
| 3 | 0.279 | 9.80 | 29.15 | - | 38.95 | - | 60.85 | 50.85 | -21.90 | - |
| 4 | 0.349 | 9.80 | 25.79 | - | 35.59 | - | 58.98 | 48.98 | -23.39 | - |
| 5 | 0.490 | 9.81 | 21.32 | - | 31.13 | - | 56.17 | 46.17 | -25.04 | - |
| 6 | 20.444 | 10.11 | 24.15 | - | 34.26 | - | 60.00 | 50.00 | -25.74 | - |

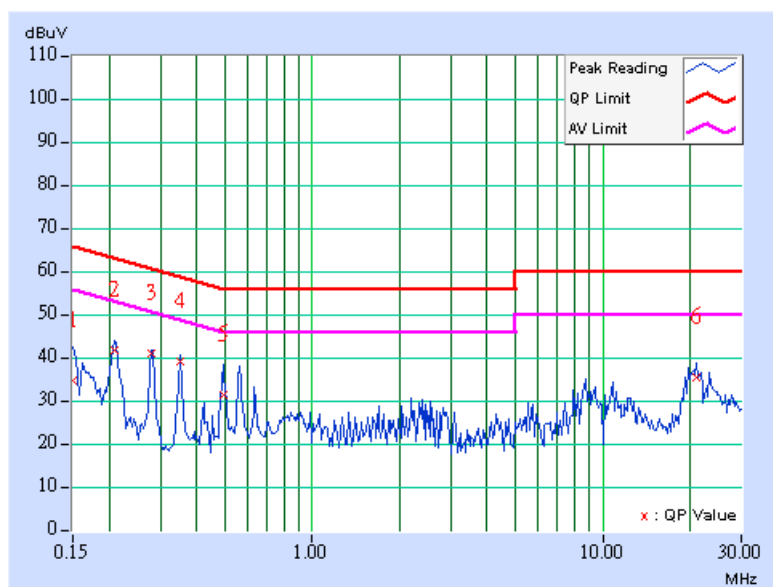
- REMARKS:**
1. Q.P. and AV. are abbreviations of quasi-peak and average individually.
 2. "-": The Quasi-peak reading value also meets average limit and measurement with the average detector is unnecessary.
 3. The emission levels of other frequencies were very low against the limit.
 4. Margin value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



| | | | |
|---------------------------------|-------------------------|----------------------|-------------|
| MODULATION TYPE | BPSK | 6dB BANDWIDTH | 9 kHz |
| INPUT POWER (SYSTEM) | 120Vac, 60 Hz | TRANSFER RATE | 6Mbps |
| ENVIRONMENTAL CONDITIONS | 15deg. C, 60%RH, 972hPa | PHASE | Neutral (N) |
| TESTED BY | Wen Yu | | |

| No | Freq. [MHz] | Corr. Factor (dB) | Reading Value | | Emission Level | | Limit | | Margin | |
|----|----------------|-------------------------|---------------|-----|----------------|-----|-----------|-------|--------|-----|
| | | | [dB (uV)] | | [dB (uV)] | | [dB (uV)] | | (dB) | |
| | | | Q.P. | AV. | Q.P. | AV. | Q.P. | AV. | Q.P. | AV. |
| 1 | 0.150 | 9.80 | 24.21 | - | 34.01 | - | 66.00 | 56.00 | -31.99 | - |
| 2 | 0.209 | 9.80 | 31.42 | - | 41.22 | - | 63.26 | 53.26 | -22.04 | - |
| 3 | 0.279 | 9.80 | 30.60 | - | 40.40 | - | 60.85 | 50.85 | -20.45 | - |
| 4 | 0.353 | 9.80 | 28.94 | - | 38.74 | - | 58.89 | 48.89 | -20.15 | - |
| 5 | 0.494 | 9.82 | 21.20 | - | 31.02 | - | 56.10 | 46.10 | -25.09 | - |
| 6 | 21.074 | 10.42 | 25.24 | - | 35.66 | - | 60.00 | 50.00 | -24.34 | - |

- 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

| 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.

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 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.

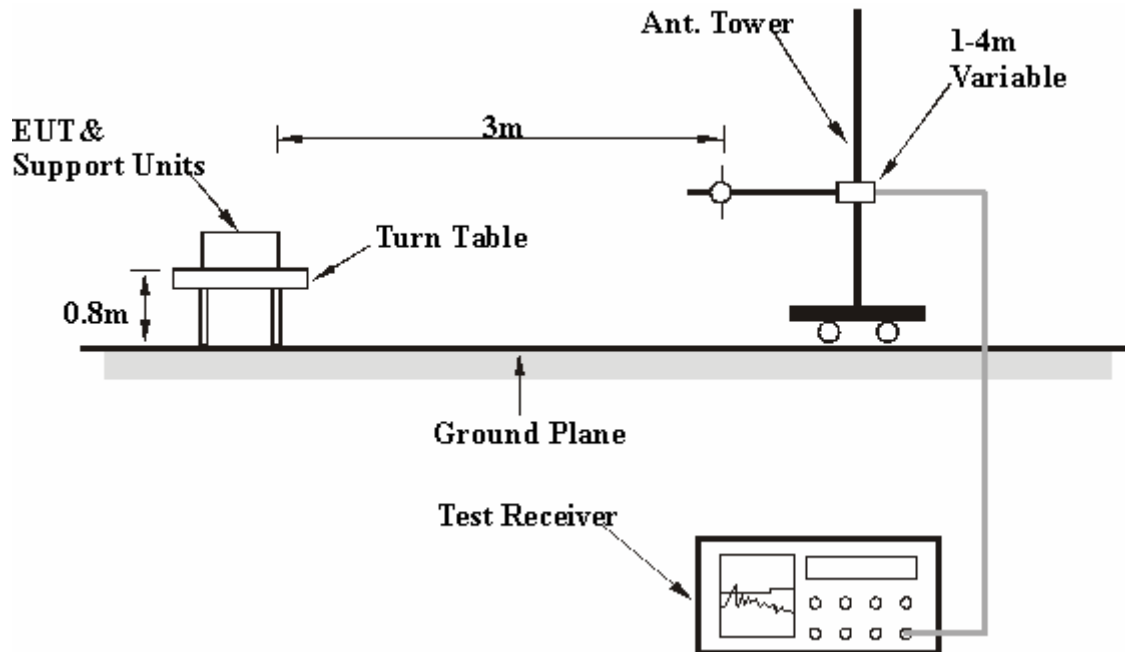
NOTE:

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 is 1MHz and video bandwidth of test receiver/spectrum analyzer is 3MHz for Peak detection 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

- a. Placed the EUT on the testing table.
- b. Prepared another computer system to act as a communication partner and placed it outside of testing area.
- c. The communication partner run a test program “Art 48 b 5” to enable EUT under transmission/receiving condition continuously at specific channel frequency via RJ 45 cable and wireless.

4.2.7 TEST RESULTS

Below 1GHz Worst-Case Data

| | | | |
|---------------------------------|-------------------------|--------------------------|---------------|
| MODULATION TYPE | BPSK | FREQUENCY RANGE | Below 1000MHz |
| INPUT POWER (SYSTEM) | 120Vac, 60 Hz | TRANSFER RATE | 6Mbps |
| ENVIRONMENTAL CONDITIONS | 20deg. C, 65%RH, 972hPa | DETECTOR FUNCTION | Quasi-Peak |
| TESTED BY | Phoenix 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 | 133.62 | 30.20 QP | 43.50 | -13.30 | 1.00 H | 203 | 17.30 | 12.90 |
| 2 | 187.56 | 29.90 QP | 43.50 | -13.60 | 1.00 H | 207 | 17.50 | 12.50 |
| 3 | 440.20 | 31.50 QP | 46.00 | -14.50 | 1.00 H | 42 | 11.30 | 20.20 |
| 4 | 550.00 | 45.30 QP | 46.00 | -0.70 | 1.22 H | 259 | 22.10 | 23.20 |
| 5 | 660.10 | 34.10 QP | 46.00 | -11.90 | 1.11 H | 108 | 8.90 | 25.20 |
| 6 | 770.00 | 36.50 QP | 46.00 | -9.50 | 1.43 H | 247 | 9.10 | 27.40 |
| 7 | 880.00 | 32.00 QP | 46.00 | -14.00 | 1.00 H | 105 | 3.40 | 28.70 |

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 | 57.73 | 26.00 QP | 40.00 | -14.00 | 1.00 V | 1 | 11.90 | 14.00 |
| 2 | 187.50 | 26.40 QP | 43.50 | -17.10 | 1.00 V | 98 | 14.00 | 12.50 |
| 3 | 250.25 | 29.40 QP | 46.00 | -16.60 | 1.00 V | 287 | 15.70 | 13.80 |
| 4 | 440.40 | 31.40 QP | 46.00 | -14.60 | 1.00 V | 357 | 11.20 | 20.20 |
| 5 | 550.00 | 39.20 QP | 46.00 | -6.80 | 1.00 V | 310 | 16.00 | 23.20 |
| 6 | 660.10 | 32.20 QP | 46.00 | -13.80 | 1.37 V | 54 | 7.00 | 25.20 |
| 7 | 770.10 | 38.00 QP | 46.00 | -8.00 | 1.35 V | 216 | 10.60 | 27.40 |
| 8 | 880.10 | 35.70 QP | 46.00 | -10.30 | 1.30 V | 165 | 7.10 | 28.70 |

- 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



4.2.8 TEST RESULTS – ANTENNA A 802.11a OFDM modulation

| | | | |
|---------------------------------|----------------------------|--------------------------|--------------------------|
| CHANNEL | Channel 1 | FREQUENCY RANGE | 1 ~ 40 GHz |
| MODULATION TYPE | BPSK | TRANSFER RATE | 6Mbps |
| INPUT POWER (SYSTEM) | 120Vac, 60 Hz | DETECTOR FUNCTION | Peak(PK) Average (AV) |
| ENVIRONMENTAL CONDITIONS | 23deg. C, 56%RH, 972hPa | TESTED BY | Phoenix 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 | *5745.00 | 108.90 PK | | | 1.23 H | 253 | 71.30 | 37.60 |
| 1 | *5745.00 | 97.30 AV | | | 1.23 H | 253 | 59.70 | 37.60 |
| 2 | #11490.00 | 61.60 PK | 74.00 | -12.40 | 1.47 H | 292 | 14.60 | 47.00 |
| 2 | #11490.00 | 47.40 AV | 54.00 | -6.60 | 1.47 H | 292 | 0.40 | 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 | 123.50 PK | | | 1.25 V | 90 | 85.90 | 37.60 |
| 1 | *5745.00 | 112.70 AV | | | 1.25 V | 90 | 75.10 | 37.60 |
| 2 | #11490.00 | 60.50 PK | 74.00 | -13.50 | 1.14 V | 231 | 13.50 | 47.00 |
| 2 | #11490.00 | 46.40 AV | 54.00 | -7.60 | 1.14 V | 231 | -0.70 | 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



| | | | |
|---------------------------------|----------------------------|--------------------------|--------------------------|
| CHANNEL | Channel 3 | FREQUENCY RANGE | 1 ~ 40 GHz |
| MODULATION TYPE | BPSK | TRANSFER RATE | 6Mbps |
| INPUT POWER (SYSTEM) | 120Vac, 60 Hz | DETECTOR FUNCTION | Peak(PK) Average (AV) |
| ENVIRONMENTAL CONDITIONS | 23deg. C, 56%RH, 972hPa | TESTED BY | Phoenix 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 | *5785.00 | 108.10 PK | | | 1.11 H | 247 | 70.40 | 37.70 |
| 1 | *5785.00 | 96.80 AV | | | 1.11 H | 247 | 59.10 | 37.70 |
| 2 | #11570.00 | 67.50 PK | 74.00 | -6.50 | 1.35 H | 295 | 20.50 | 47.00 |
| 2 | #11570.00 | 47.70 AV | 54.00 | -6.30 | 1.35 H | 295 | 0.70 | 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 | 123.40 PK | | | 1.24 V | 90 | 85.70 | 37.70 |
| 1 | *5785.00 | 112.80 AV | | | 1.24 V | 90 | 75.10 | 37.70 |
| 2 | #11570.00 | 60.00 PK | 74.00 | -14.00 | 1.08 V | 97 | 13.10 | 47.00 |
| 2 | #11570.00 | 46.50 AV | 54.00 | -7.50 | 1.08 V | 97 | -0.50 | 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



| | | | |
|---------------------------------|----------------------------|--------------------------|--------------------------|
| CHANNEL | Channel 5 | FREQUENCY RANGE | 1 ~ 40 GHz |
| MODULATION TYPE | BPSK | TRANSFER RATE | 6Mbps |
| INPUT POWER (SYSTEM) | 120Vac, 60 Hz | DETECTOR FUNCTION | Peak(PK) Average (AV) |
| ENVIRONMENTAL CONDITIONS | 23deg. C, 56%RH, 972hPa | TESTED BY | Phoenix 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 | *5825.00 | 107.80 PK | | | 1.16 H | 236 | 70.00 | 37.80 |
| 1 | *5825.00 | 95.20 AV | | | 1.16 H | 236 | 57.40 | 37.80 |
| 2 | #11650.00 | 60.70 PK | 74.00 | -13.30 | 1.42 H | 181 | 13.90 | 46.90 |
| 2 | #11650.00 | 47.60 AV | 54.00 | -6.40 | 1.42 H | 181 | 0.80 | 46.90 |

| 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 | 123.30 PK | | | 1.26 V | 92 | 85.50 | 37.80 |
| 1 | *5825.00 | 112.10 AV | | | 1.26 V | 92 | 74.30 | 37.80 |
| 2 | #11650.00 | 60.00 PK | 74.00 | -14.00 | 1.33 V | 127 | 13.10 | 46.90 |
| 2 | #11650.00 | 46.30 AV | 54.00 | -7.70 | 1.33 V | 127 | -0.60 | 46.90 |

- 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

802.11a Turbo OFDM modulation

| | | | |
|---------------------------------|----------------------------|--------------------------|--------------------------|
| CHANNEL | Channel 1 | FREQUENCY RANGE | 1 ~ 40 GHz |
| MODULATION TYPE | BPSK | TRANSFER RATE | 12Mbps |
| INPUT POWER (SYSTEM) | 120Vac, 60 Hz | DETECTOR FUNCTION | Peak(PK) Average (AV) |
| ENVIRONMENTAL CONDITIONS | 23deg. C, 56%RH, 972hPa | TESTED BY | Phoenix 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 | *5760.00 | 105.20 PK | | | 1.19 H | 244 | 67.50 | 37.70 |
| 1 | *5760.00 | 93.40 AV | | | 1.19 H | 244 | 55.70 | 37.70 |
| 2 | #11520.00 | 60.00 PK | 74.00 | -14.00 | 1.36 H | 293 | 13.00 | 47.00 |
| 2 | #11520.00 | 47.20 AV | 54.00 | -6.80 | 1.36 H | 293 | 0.20 | 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 | *5760.00 | 121.20 PK | | | 1.22 V | 89 | 83.50 | 37.70 |
| 1 | *5760.00 | 110.50 AV | | | 1.22 V | 89 | 72.80 | 37.70 |
| 2 | #11520.00 | 59.80 PK | 74.00 | -14.20 | 1.42 V | 316 | 12.80 | 47.00 |
| 2 | #11520.00 | 46.30 AV | 54.00 | -7.70 | 1.42 V | 316 | -0.70 | 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



| | | | |
|---------------------------------|----------------------------|--------------------------|--------------------------|
| CHANNEL | Channel 2 | FREQUENCY RANGE | 1 ~ 40 GHz |
| MODULATION TYPE | BPSK | TRANSFER RATE | 12Mbps |
| INPUT POWER (SYSTEM) | 120Vac, 60 Hz | DETECTOR FUNCTION | Peak(PK) Average (AV) |
| ENVIRONMENTAL CONDITIONS | 23deg. C, 56%RH, 972hPa | TESTED BY | Phoenix 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 | *5800.00 | 105.30 PK | | | 1.17 H | 245 | 67.50 | 37.80 |
| 1 | *5800.00 | 93.20 AV | | | 1.17 H | 245 | 55.40 | 37.80 |
| 2 | #11600.00 | 60.90 PK | 74.00 | -13.10 | 1.40 H | 294 | 13.90 | 46.90 |
| 2 | #11600.00 | 47.30 AV | 54.00 | -6.70 | 1.40 H | 294 | 0.40 | 46.90 |

| 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 | *5800.00 | 121.10 PK | | | 1.28 V | 95 | 83.30 | 37.80 |
| 1 | *5800.00 | 110.30 AV | | | 1.28 V | 95 | 72.50 | 37.80 |
| 2 | #11600.00 | 59.40 PK | 74.00 | -14.60 | 1.25 V | 42 | 12.50 | 46.90 |
| 2 | #11600.00 | 45.70 AV | 54.00 | -8.30 | 1.25 V | 42 | -1.20 | 46.90 |

- 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



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 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.

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.

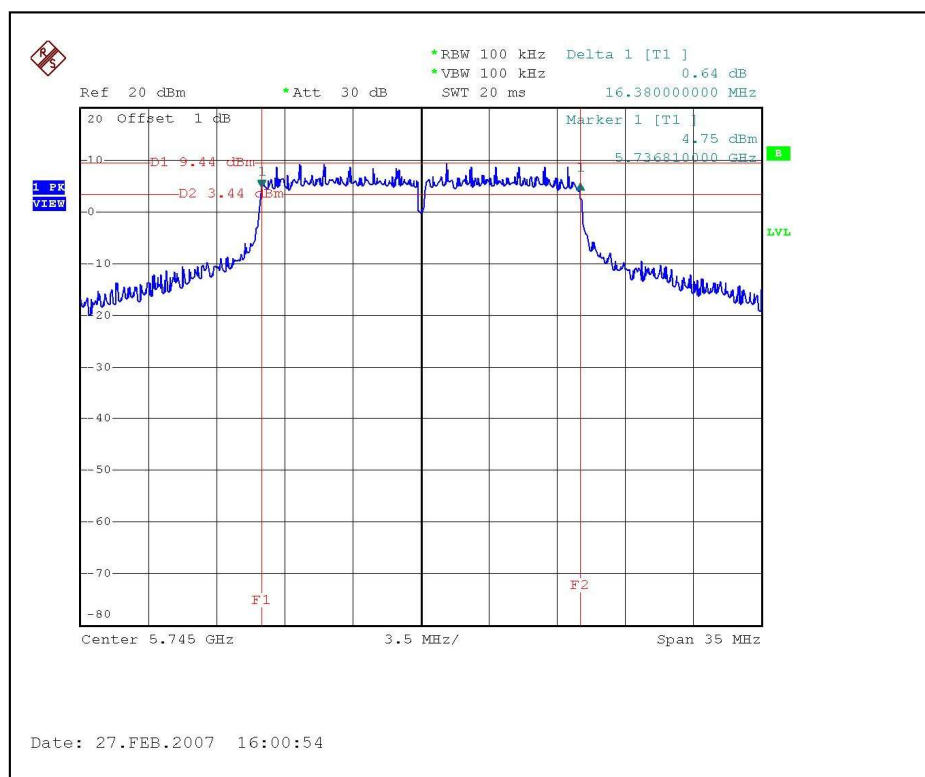
4.3.7 TEST RESULTS - ANTENNA A

802.11a OFDM modulation

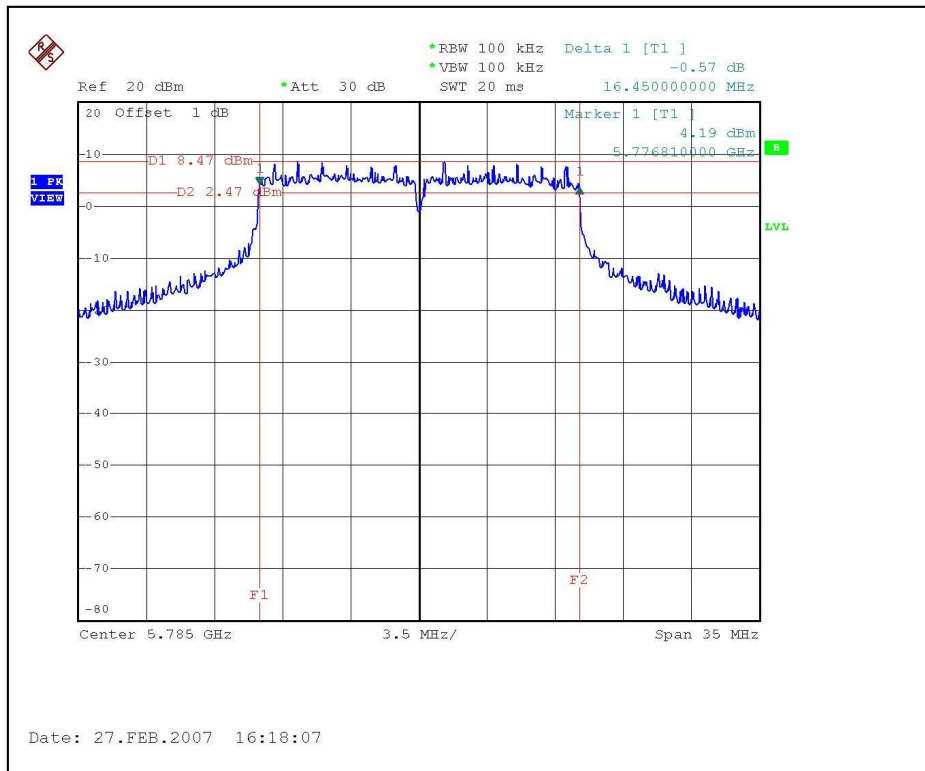
| | | | |
|-----------------------------|---------------|---------------------------------|-------------------------|
| MODULATION TYPE | BPSK | TRANSFER RATE | 6Mbps |
| INPUT POWER (SYSTEM) | 120Vac, 60 Hz | ENVIRONMENTAL CONDITIONS | 23deg. C, 56%RH, 972hPa |
| TESTED BY | Wen Yu | | |

| CHANNEL | CHANNEL FREQUENCY (MHz) | 6dB BANDWIDTH (MHz) | MINIMUM LIMIT (MHz) | PASS/FAIL |
|---------|-------------------------|---------------------|---------------------|-----------|
| 1 | 5745 | 16.38 | 0.5 | PASS |
| 3 | 5785 | 16.45 | 0.5 | PASS |
| 5 | 5825 | 16.38 | 0.5 | PASS |

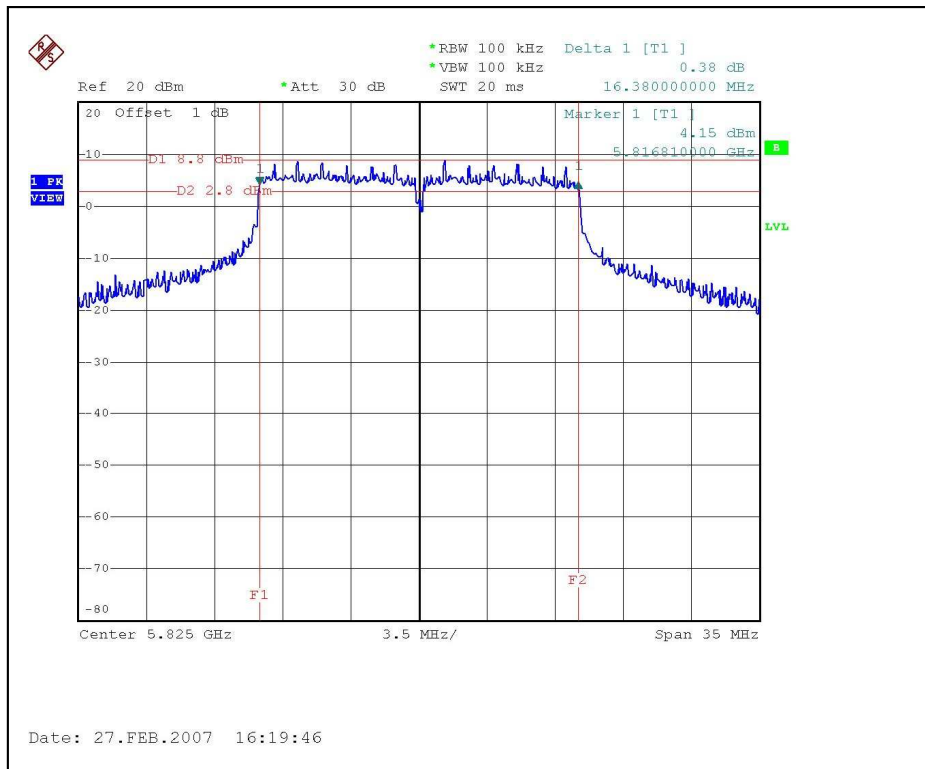
CH1



CH3



CH5



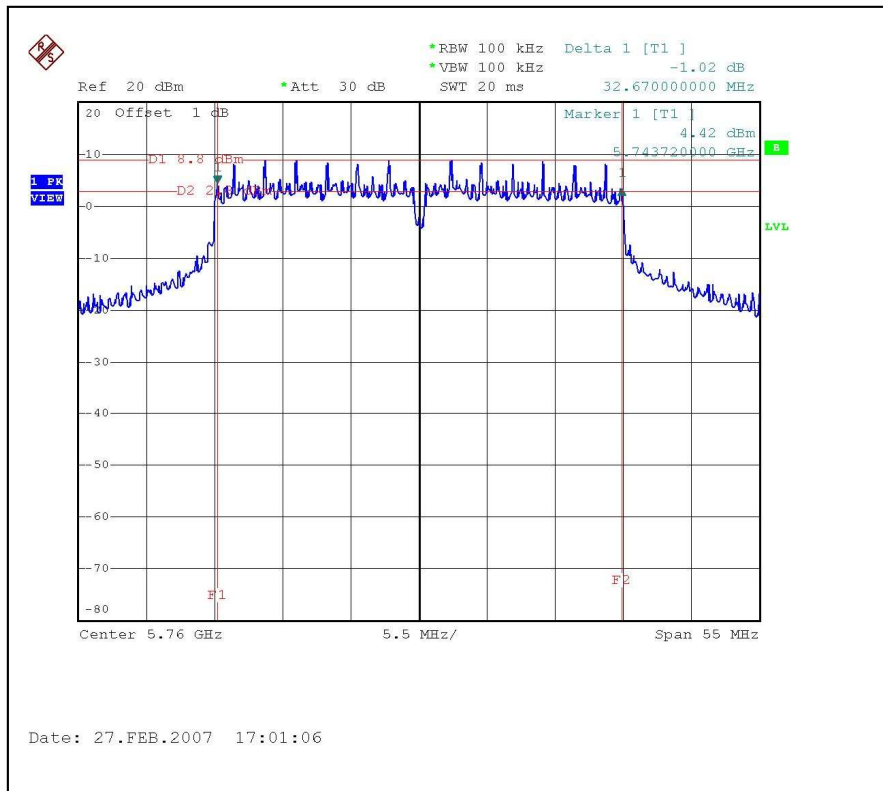


802.11a Turbo OFDM modulation

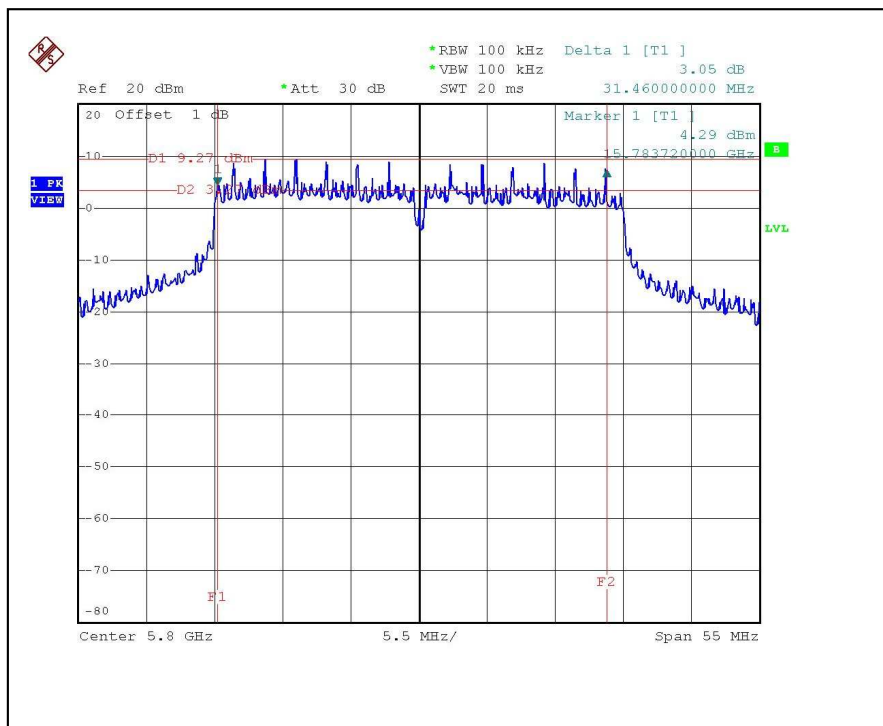
| | | | |
|-----------------------------|---------------|---------------------------------|-------------------------|
| MODULATION TYPE | BPSK | TRANSFER RATE | 12Mbps |
| INPUT POWER (SYSTEM) | 120Vac, 60 Hz | ENVIRONMENTAL CONDITIONS | 23deg. C, 56%RH, 972hPa |
| TESTED BY | Wen Yu | | |

| CHANNEL | CHANNEL FREQUENCY (MHz) | 6dB BANDWIDTH (MHz) | MINIMUM LIMIT (MHz) | PASS/FAIL |
|----------------|--------------------------------|----------------------------|----------------------------|------------------|
| 1 | 5760 | 32.67 | 0.5 | PASS |
| 2 | 5800 | 31.46 | 0.5 | PASS |

CH1



CH2





4.4 MAXIMUM PEAK OUTPUT POWER

4.4.1 LIMITS OF MAXIMUM PEAK OUTPUT POWER MEASUREMENT

The Maximum Peak Output Power Measurement is 30dBm.

4.4.2 INSTRUMENTS

| Description & Manufacturer | Model No. | Serial No. | Calibrated Until |
|----------------------------|-----------|------------|------------------|
| R&S SPECTRUM ANALYZER | FSP40 | 100037 | Aug. 15, 2007 |
| Agilent SIGNAL GENERATOR | E8257C | MY43321031 | July 26, 2007 |
| TEKTRONIX OSCILLOSCOPE | TDS380 | B016335 | Jun. 21, 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.

4.4.3 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.

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 - ANTENNA A

802.11a OFDM modulation

| | | | |
|-----------------------------|---------------|---------------------------------|-------------------------|
| MODULATION TYPE | BPSK | TRANSFER RATE | 6Mbps |
| INPUT POWER (SYSTEM) | 120Vac, 60 Hz | ENVIRONMENTAL CONDITIONS | 23deg. C, 56%RH, 972hPa |
| TESTED BY | Wen Yu | | |

| CHANNEL | CHANNEL FREQUENCY (MHz) | PEAK POWER OUTPUT (mW) | PEAK POWER OUTPUT (dBm) | PEAK POWER LIMIT (dBm) | PASS/FAIL |
|---------|-------------------------|------------------------|-------------------------|------------------------|-----------|
| 1 | 5745 | 305.492 | 24.85 | 27 | PASS |
| 3 | 5785 | 283.139 | 24.52 | 27 | PASS |
| 5 | 5825 | 275.423 | 24.40 | 27 | PASS |



802.11a Turbo OFDM modulation

| | | | |
|-----------------------------|---------------|---------------------------------|-------------------------|
| MODULATION TYPE | BPSK | TRANSFER RATE | 12Mbps |
| INPUT POWER (SYSTEM) | 120Vac, 60 Hz | ENVIRONMENTAL CONDITIONS | 23deg. C, 56%RH, 972hPa |
| TESTED BY | Wen Yu | | |

| CHANNEL | CHANNEL FREQUENCY (MHz) | PEAK POWER OUTPUT (mW) | PEAK POWER OUTPUT (dBm) | PEAK POWER LIMIT (dBm) | PASS/FAIL |
|----------------|--------------------------------|-------------------------------|--------------------------------|-------------------------------|------------------|
| 1 | 5760 | 289.068 | 24.61 | 27 | PASS |
| 2 | 5800 | 274.157 | 24.38 | 27 | 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 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.
- 2.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

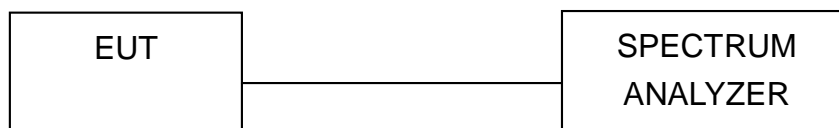
The transmitter output was connected to the spectrum analyzer through an attenuator, the bandwidth of the fundamental frequency was measured with the spectrum analyzer using 3 kHz RBW and 30 kHz VBW, set sweep time = span/3 kHz. The power spectral density was measured and recorded.

The sweep time is allowed to be longer than span/3 kHz for a full response of the mixer in the spectrum analyzer.

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



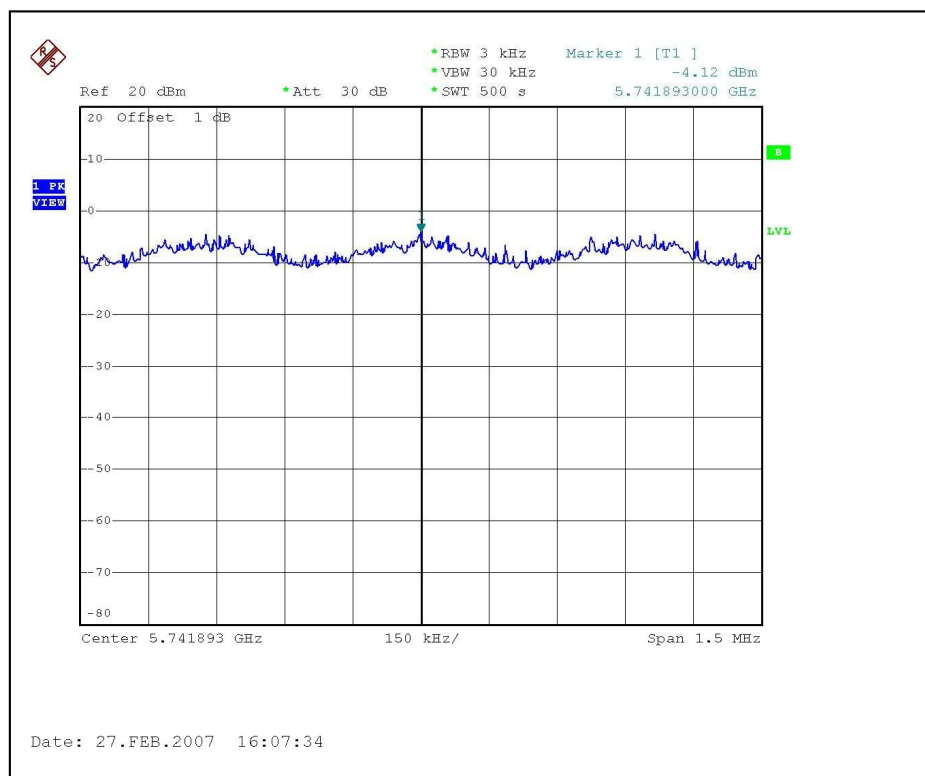
4.5.7 TEST RESULTS - ANTENNA A

802.11a OFDM modulation

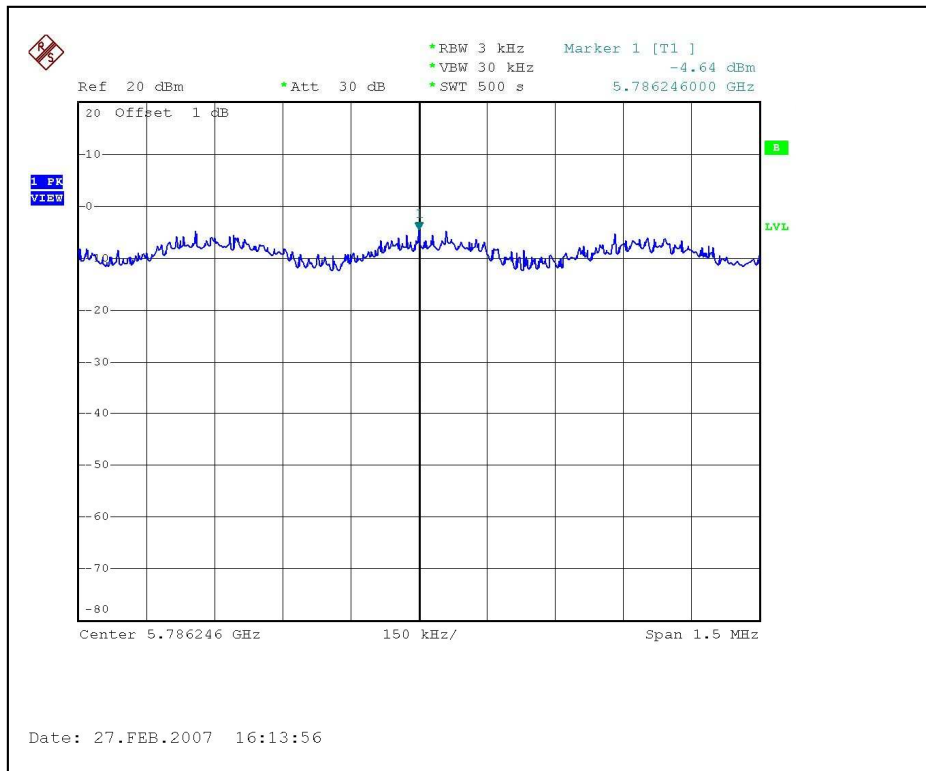
| | | | |
|-----------------------------|---------------|---------------------------------|-------------------------|
| MODULATION TYPE | BPSK | TRANSFER RATE | 6Mbps |
| INPUT POWER (SYSTEM) | 120Vac, 60 Hz | ENVIRONMENTAL CONDITIONS | 23deg. C, 56%RH, 972hPa |
| TESTED BY | Wen Yu | | |

| CHANNEL | CHANNEL FREQUENCY (MHz) | RF POWER LEVEL IN 3 kHz BW (dBm) | MAXIMUM LIMIT (dBm) | PASS/FAIL |
|---------|-------------------------|----------------------------------|---------------------|-----------|
| 1 | 5745 | -4.12 | 5 | PASS |
| 3 | 5785 | -4.64 | 5 | PASS |
| 5 | 5825 | -2.86 | 5 | PASS |

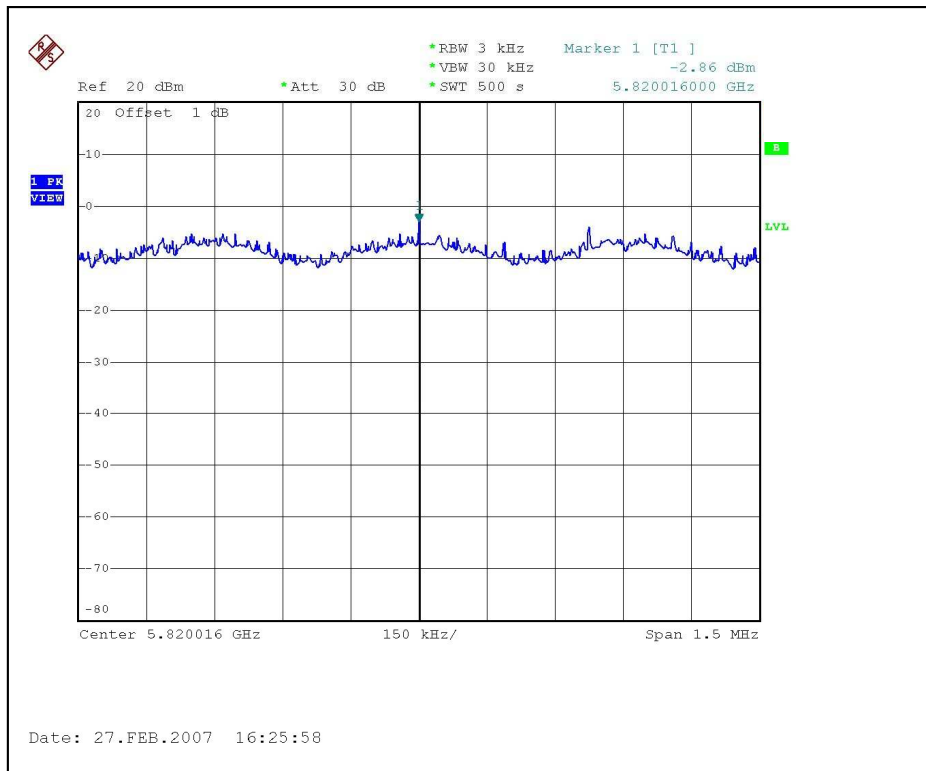
CH1



CH3



CH5



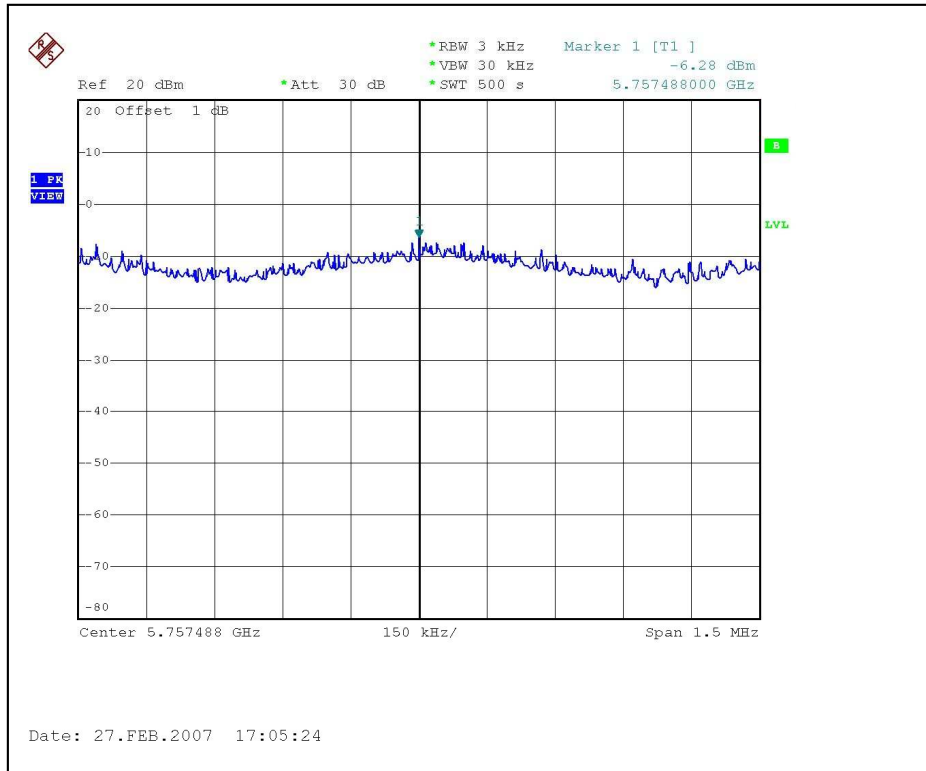


802.11a Turbo OFDM modulation

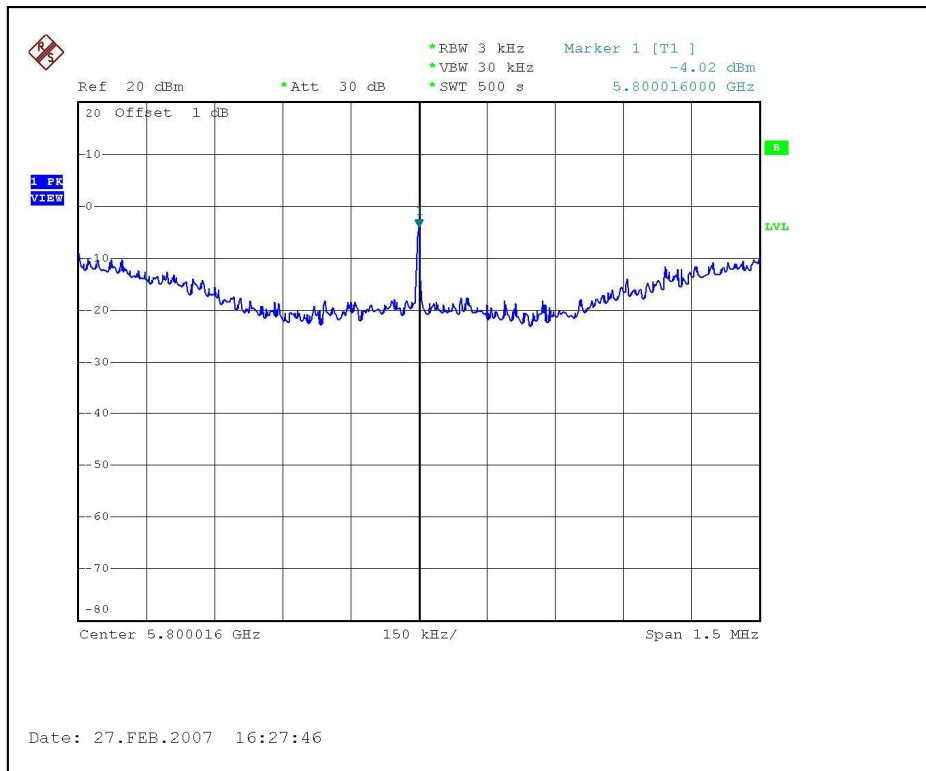
| | | | |
|-----------------------------|---------------|---------------------------------|-------------------------|
| MODULATION TYPE | BPSK | TRANSFER RATE | 12Mbps |
| INPUT POWER (SYSTEM) | 120Vac, 60 Hz | ENVIRONMENTAL CONDITIONS | 23deg. C, 56%RH, 972hPa |
| TESTED BY | Wen Yu | | |

| CHANNEL | CHANNEL FREQUENCY (MHz) | RF POWER LEVEL IN 3 kHz BW (dBm) | MAXIMUM LIMIT (dBm) | PASS/FAIL |
|----------------|---------------------------------|---|----------------------------|------------------|
| 1 | 5760 | -6.28 | 5 | PASS |
| 2 | 5800 | -4.02 | 5 | PASS |

CH1



CH2





4.6 BAND EDGES MEASUREMENT

4.6.1 LIMITS OF BAND EDGES 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 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. 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.

4.6.3 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.

4.6.4 DEVIATION FROM TEST STANDARD

No deviation

4.6.5 EUT OPERATING CONDITION

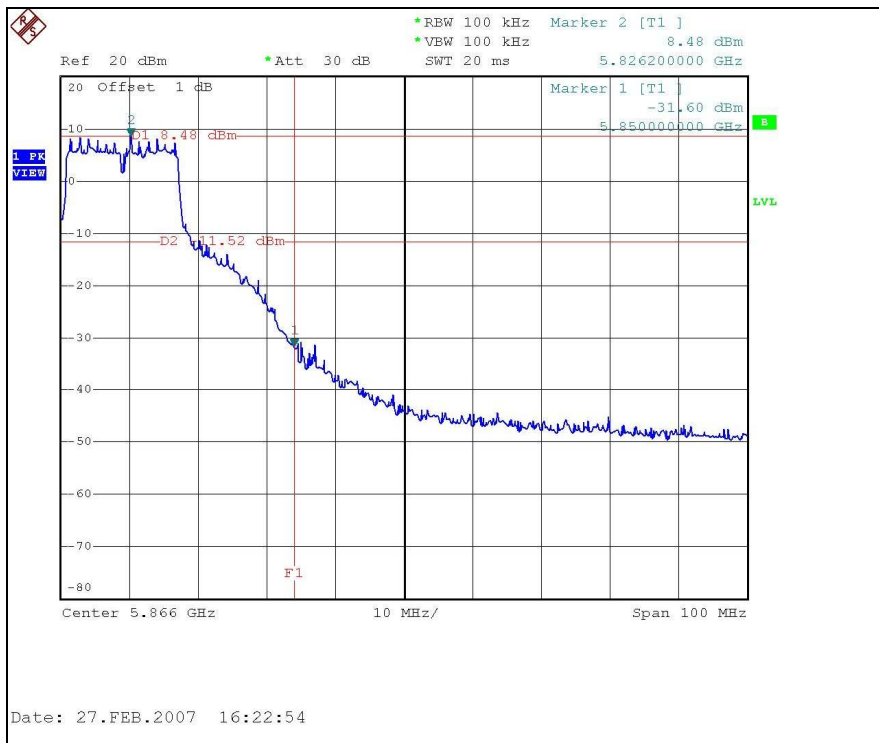
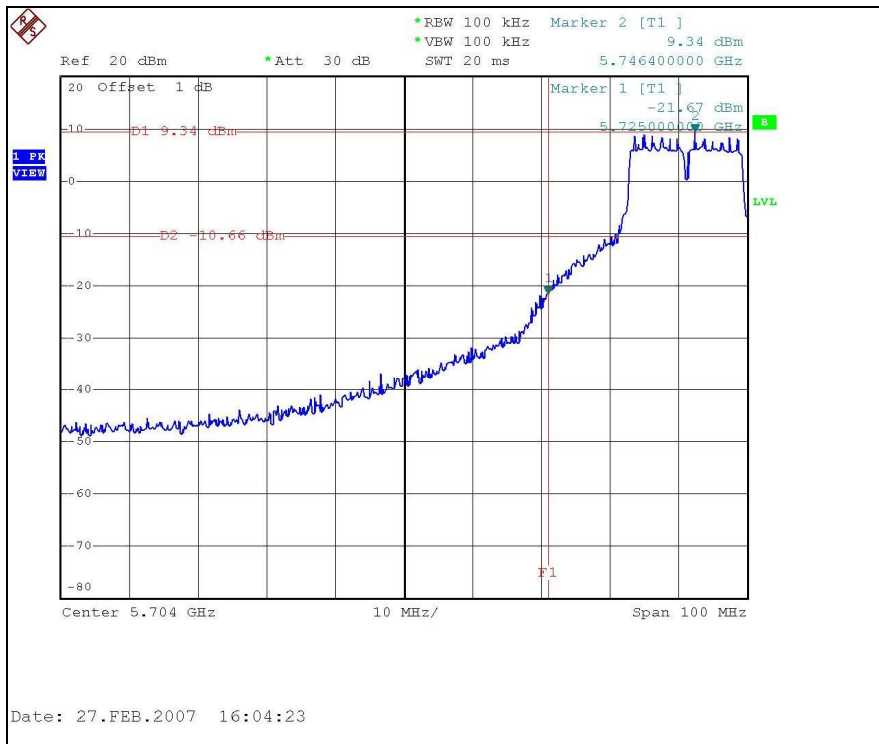
Same as Item 4.3.6



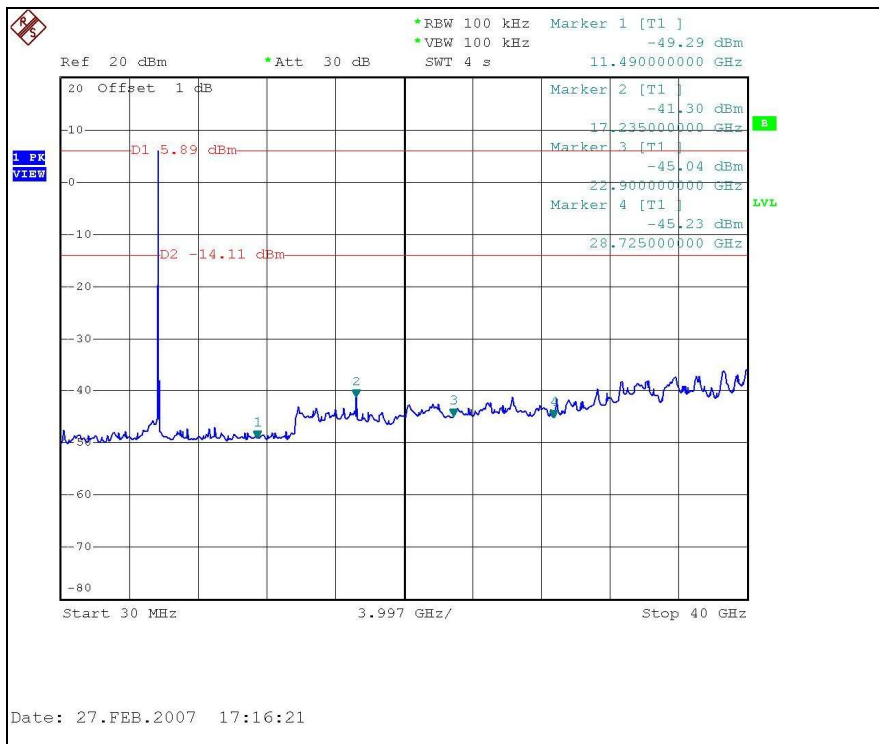
4.6.6 TEST RESULTS -ANTENNA A

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).

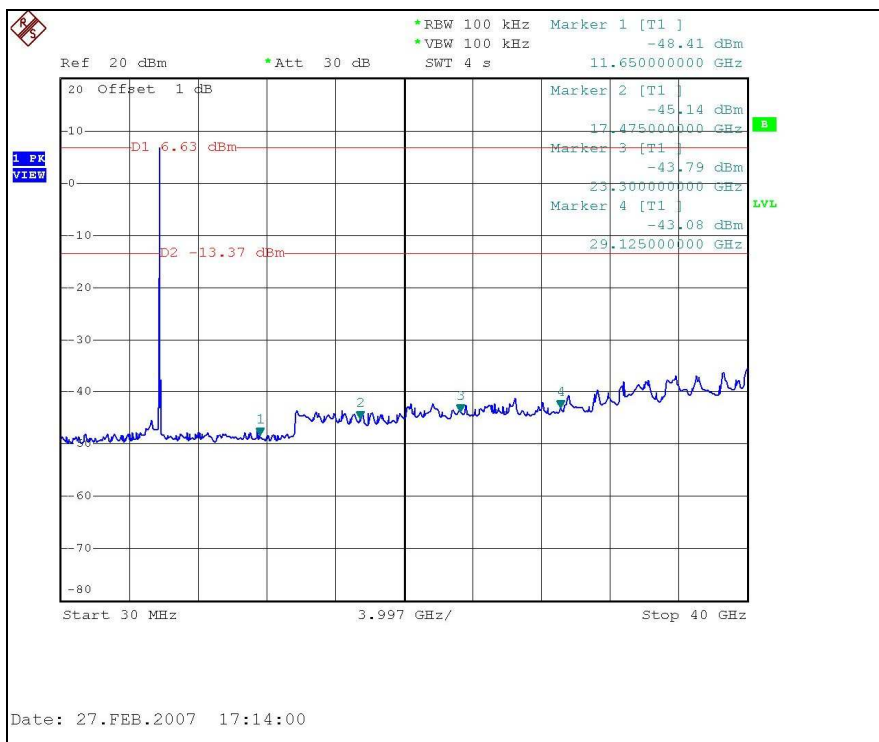
802.11a OFDM modulation



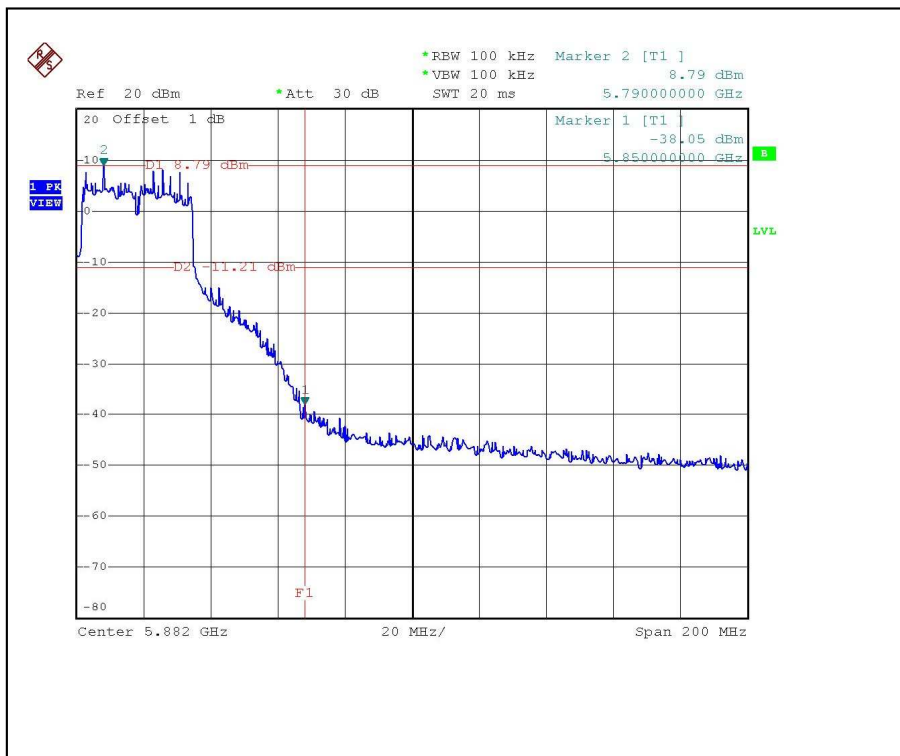
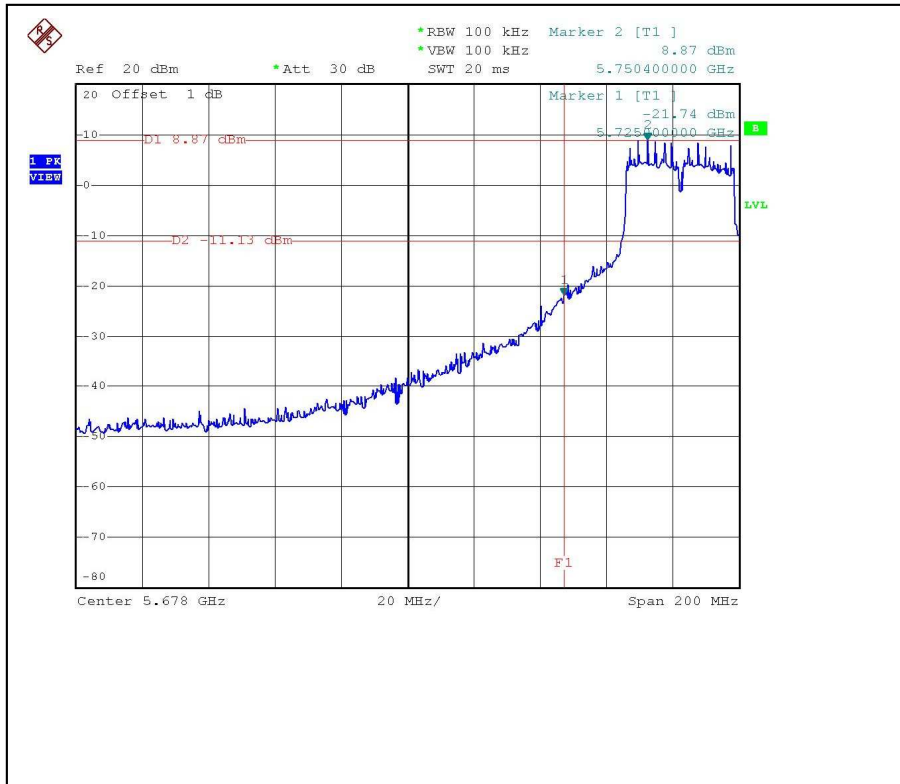
CH 1



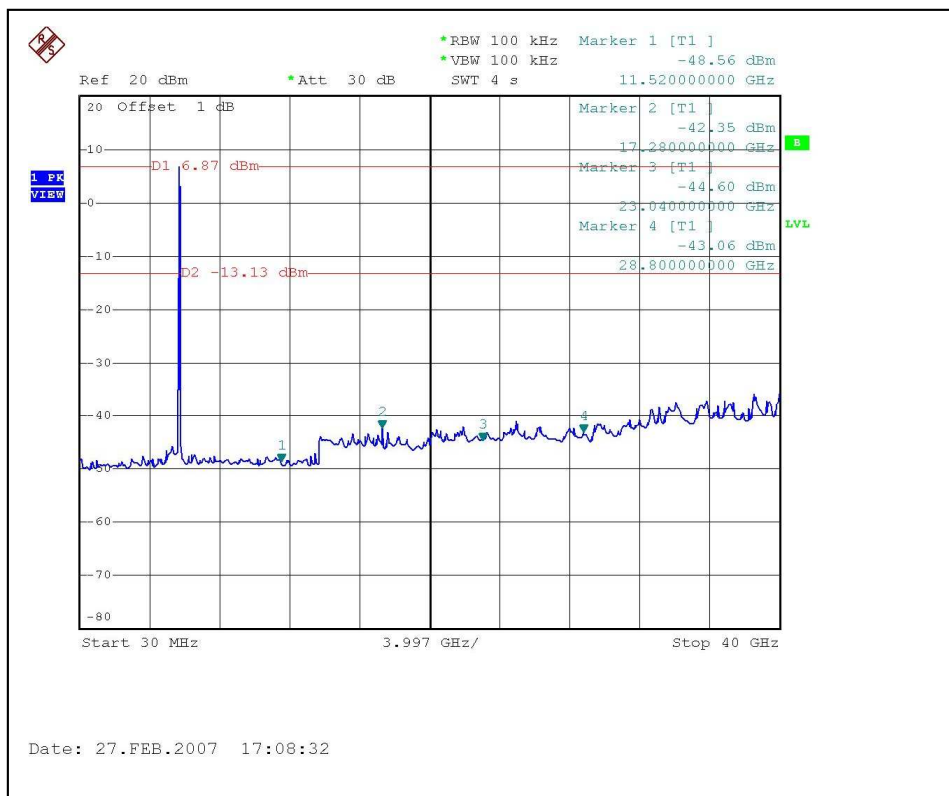
CH 5



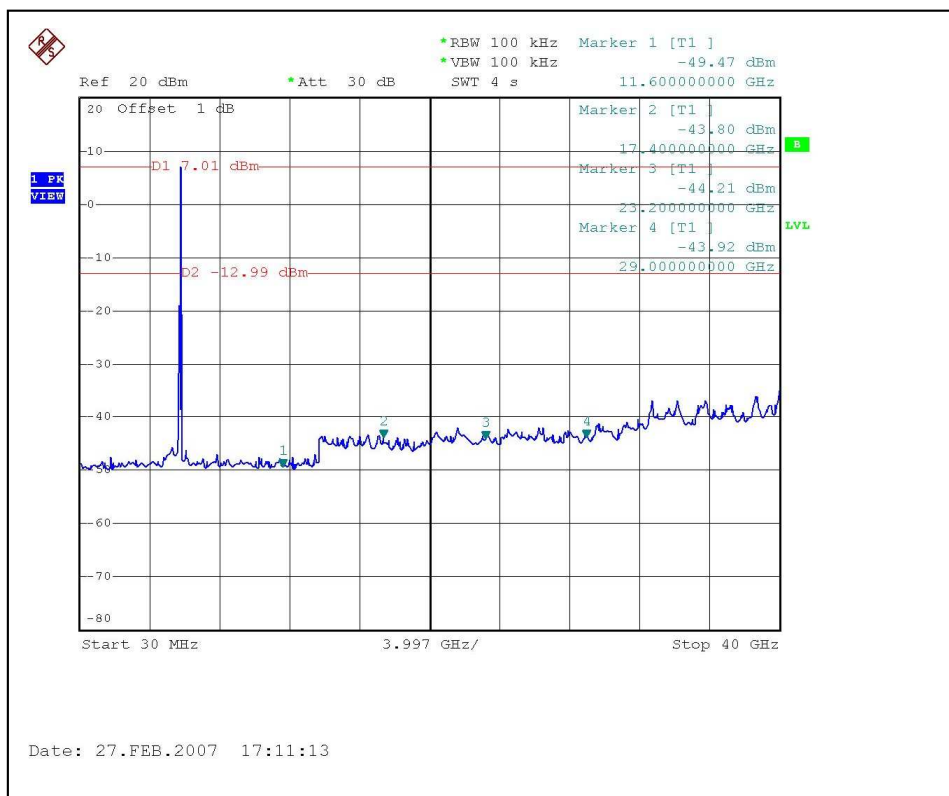
802.11a Turbo OFDM modulation



Turbo CH 1



Turbo CH 2



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(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.

4.7.2 ANTENNA CONNECTED CONSTRUCTION

The antennas used in this product are as following:

| 5GHz | | | | |
|------|-----------|------------|---|-------------------|
| No. | Model No. | Gain (dBi) | Antenna Type | Antenna Connector |
| 1 | ANT05535 | 17.0dBi | Directional, Patch Panel (Internal Antenna) | Probe Pin |
| A | 1GP-51809 | 9.0dBi | Dipole, Omni (External Antenna) | N female(Plug) |



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. | CNLA, 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: 886-2-26052943

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



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.