

# FCC TEST REPORT

**REPORT NO.:** RF910617R01

**MODEL NO.:** RFMO-0201

**RECEIVED:** June 17, 2002

**TESTED:** August 13 ~ August 15, 2002

**APPLICANT:** AMELEKS CORP.

**ADDRESS:** 6F, 48, KEELUNG ROAD, SEC.2, TAIPEI,  
TAIWAN, R.O.C.

**ISSUED BY:** Advance Data Technology Corporation

**LAB LOCATION:** 47 14th Lin, Chia Pau Tsuen, Linkou Hsiang,  
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0528  
ILAC MRA



Lab Code: 200102-0

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## 1 CERTIFICATION

**PRODUCT :** RF Module  
**BRAND NAME :** Ameleks  
**MODEL NO :** RFMO-0201  
**APPLICANT :** AMELEKS CORP.  
**STANDARDS :** 47 CFR Part 15, Subpart C(15.231)  
ANSI C63.4-1992

We, **Advance Data Technology Corporation**, hereby certify that one sample of the designation has been tested in our facility from August 13 ~ August 15, 2002. The test record, data evaluation and Equipment Under Test (EUT) configurations represented herein are true and accurate accounts of the measurements of the sample's EMC characteristics under the conditions herein specified.

**CHECKED BY:** Rennie Wang, **DATE:** August 20, 2002  
Rennie Wang  
**APPROVED BY:** Dr. Alan Lane, **DATE:** August 20, 2002  
Dr. Alan Lane  
Manager

## 2 SUMMARY OF TEST RESULTS

The EUT has been tested according to the following specifications:

| APPLIED STANDARD: 47 CFR Part 15, Subpart C |                         |        |  |
|---|-------------------------|--------|--|
| STANDARD PARAGRAPH                          | TEST TYPE               | RESULT | REMARK   |
| 15.207                                      | Conducted Emission Test | N/A    | Power supply is 3VDC from batteries                |
| 15.231                                      | Radiated Emission Test  | PASS   | Minimum passing margin is -11.10dBuV at 1301.00MHz |
| 15.231(c)                                   | Occupied Bandwidth Test | PASS   | NA   |

**NOTE:** The receiver part to communicate with the EUT has been verified to comply with FCC Part 15, Subpart B, Class B (DoC).

### 3 GENERAL INFORMATION

#### 3.1 GENERAL DESCRIPTION OF EUT

|  |                   |
|--|-------------------|
| <b>PRODUCT</b>                           | RF Module         |
| <b>MODEL NO.</b>                         | RFMO-0201         |
| <b>POWER SUPPLY</b>                      | 3VDC from battery |
| <b>MODULATION TYPE</b>                   | FSK               |
| <b>CARRIER FREQUENCY OF EACH CHANNEL</b> | 433.92MHz         |
| <b>BANDWIDTH OF EACH CHANNEL</b>         | +/-125kHz         |
| <b>NUMBER OF CHANNEL</b>                 | 1                 |
| <b>ANTENNA TYPE</b>                      | Integral antenna  |
| <b>DATA CABLE</b>                        | NA                |
| <b>I/O PORTS</b>                         | RS-232            |
| <b>ASSOCIATED DEVICES</b>                | NA                |

**NOTE:**

1. Devices operated under the provisions of this paragraph shall be provided with a means for automatically limiting operation so that the duration of each transmission shall not be greater than one second and the silent period between transmissions shall be at least 30 times the duration of the transmission but in no case less than 10 seconds.
2. For more detailed features description of the EUT, please refer to the manufacturer's specifications or the User's Manual.

### 3.2 DESCRIPTION OF TEST MODES

One channel was provided to this EUT.

| Channel | Frequency |
|---------|-----------|
| 1       | 433.92MHz |

### 3.3 GENERAL DESCRIPTION OF APPLIED STANDARDS

The EUT is the transmitter part of a RF Module. According to the specifications of the manufacturer, it must comply with the requirements of the following standards:

**FCC CFR 47 Part 15, Subpart C (15.231)**

**ANSI C63.4-1992**

All tests have been performed and recorded as per the above standards.

### 3.4 DESCRIPTION OF SUPPORT UNITS

NA

## 4 TEST PROCEDURE AND RESULT

### 4.1 CONDUCTED EMISSION MEASUREMENT

NA

### 4.2 RADIATED EMISSION MEASUREMENT

#### 4.2.1 LIMITS OF RADIATED EMISSION MEASUREMENT

According to 15.231 the field strength of emissions from intentional radiators operated under these frequencies bands shall not exceed the following:

| Fundamental Frequency (MHz)         | Field strength of fundamental (microvolts/meter) | Field Strength of spurious emission (microvolts/meter) |
|-------------------------------------|--|--|
| 40.66-40.70                         | 1,000  | 100  |
| 70-130                              | 500  | 50   |
| 130-174                             | 500 to 1,500 <sup>1</sup>                        | 50 to 150 <sup>1</sup>                                 |
| 174-260                             | 1,500  | 150  |
| 260-470                             | 1,500 to 5,000 <sup>1</sup>                      | 150 to 500 <sup>1</sup>                                |
| Above 470                           | 5,000  | 500  |
| <sup>1</sup> Linear interpolations. |  |  |

The above field strength limits are specified at a distance of 3 meters. The tighter limits apply at the band edges.

## 4.2.2 TEST INSTRUMENT

| DESCRIPTION & MANUFACTURER         | MODEL NO.            | SERIAL NO.               | CALIBRATED UNTIL |
|------------------------------------|----------------------|--------------------------|------------------|
| * HP Spectrum Analyzer             | 8590L                | 3544A01176               | May 13, 2003     |
| * HP Preamplifier                  | 8447D                | 2944A08485               | Oct. 30, 2002    |
| * HP Preamplifier                  | 8449B                | 3008A01201               | Dec. 06, 2002    |
| * HP Preamplifier                  | 8449B                | 3008A01292               | Aug. 21, 2002    |
| * ROHDE & SCHWARZ TEST RECEIVER    | ESMI                 | 839013/007<br>839379/002 | Jan. 27, 2003    |
| SCHWARZBECK Tunable Dipole Antenna | VHA 9103<br>UHA 9105 | E101051<br>E101055       | Nov. 23, 2002    |
| * CHASE BILOG Antenna              | CBL6112A             | 2221                     | Aug. 2, 2003     |
| * SCHWARZBECK Horn Antenna         | BBHA9120-D1          | D130                     | Jul. 3, 2003     |
| * EMCO Horn Antenna                | 3115                 | 9312-4192                | Apr. 9, 2003     |
| * EMCO Turn Table                  | 1060                 | 1115                     | NA               |
| * SHOSHIN Tower                    | AP-4701              | A6Y005                   | NA               |
| * Software                         | AS61D4               | NA                       | NA               |
| * ANRITSU RF Switches              | MP59B                | M35046                   | Jan. 25, 2003    |
| * TIMES RF cable                   | LMR-600              | CABLE-ST5-01             | Jul. 12, 2003    |
| Open Field Test Site               | Site 5               | ADT-R05                  | Jul. 19, 2003    |
| VCCI Site Registration No.         | Site 5               | R-1039                   | NA               |

- NOTE:** 1. The measurement uncertainty is less than +/- 3.0dB, 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.
3. "\*" = These equipment are used for the final measurement.
4. The horn antenna and HP preamplifier (model: 8449B) are used only for the measurement of emission frequency above 1GHz if tested.
5. The test was performed in ADT Open Site No. 5.



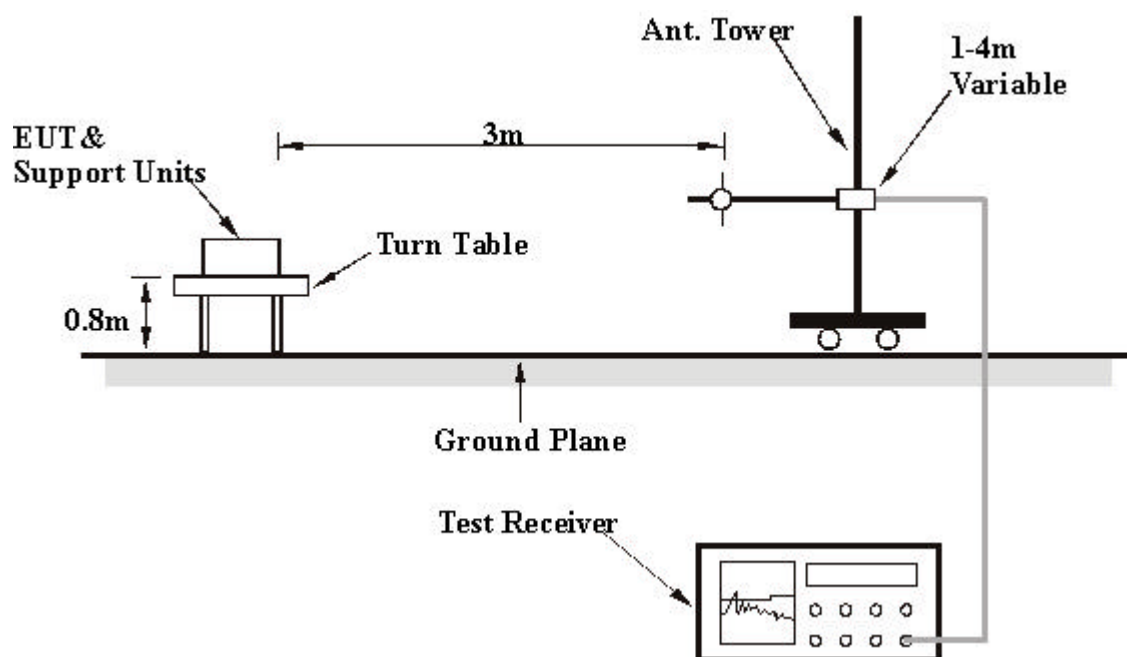
#### 4.2.3 TEST PROCEDURE

- a. The EUT was placed on the top of a rotating table 0.8 meters above the ground at a 10 meter open area test site. The table was rotated 360 degrees to determine the position of the highest radiation.
- b. The EUT was set 3 meters away from the interference-receiving antenna, which was mounted on the top of a variable-height antenna tower.
- c. The antenna is a broadband antenna, and its height is varied from one meter to four meters above the ground to determine the maximum value of the field strength. Both horizontal and vertical polarizations of the antenna are set to make the measurement.
- d. For each suspected emission, the EUT was arranged to its worst case and then the antenna was tuned to heights from 1 meter to 4 meters and the rotatable table was turned from 0 degrees to 360 degrees to find the maximum reading.
- e. The test-receiver system was set to Peak Detect Function and Specified Bandwidth with Maximum Hold Mode.
- f. If the emission level of the EUT in peak mode was 10 dB 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 10 dB margin would be re-tested one by one using the quasi-peak method or average method as specified and then reported in Data sheet peak mode and QP mode.

**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 and video bandwidth of test receiver/spectrum analyzer is 1 MHz for Peak detection at frequency above 1GHz.
3. The resolution bandwidth of test receiver/spectrum analyzer is 1 MHz and the video bandwidth is 300 Hz for Average detection (AV) at frequency above 1GHz.

#### 4.2.4 TEST SETUP



For the actual test configuration, please refer to the related item in this test report - Photographs of the Test Configuration.

#### 4.2.5 EUT OPERATING CONDITION

Set the transmitter part of EUT under transmission condition continuously at specific channel frequency.

#### 4.2.6 TEST RESULT

|                                 |                                 |                             |                   |
|---------------------------------|---------------------------------|-----------------------------|-------------------|
| <b>EUT</b>                      | RF Module                       | <b>MODEL</b>                | RFMO-0201         |
| <b>INPUT POWER</b>              | 3VDC                            | <b>DETECTOR FUNCTION</b>    | Peak / Quasi-Peak |
| <b>ENVIRONMENTAL CONDITIONS</b> | 35 deg. C, 50 % RH,<br>1050 hPa | <b>TESTED BY:</b> Bunny Yao |                   |

| 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) | Antenna Factor (dB) | Cable Factor (dB) | Pre-Amp. Factor (dB) | Correction Factor (dB) |
| 1   | *433.78     | 63.4 PK                 | 92.87          | -29.47      | 1.00H              | 227                  | 40.31            | 16.29               | 6.80              | 0.00                 | -23.08                 |
| 2   | *433.78     | 60.8 QP                 | 72.87          | -12.07      | 1.00H              | 227                  | 37.70            | 16.29               | 6.80              | 0.00                 | -23.08                 |
| 3   | 867.53      | 34.0 QP                 | 46.00          | -12.00      | 1.00H              | 39                   | 2.25             | 20.59               | 11.16             | 0.00                 | -31.75                 |
| 4   | 1301.00     | 32.9 AV                 | 54.00          | -21.10      | 1.04H              | 106                  | 4.00             | 25.39               | 3.49              | 0.00                 | -28.89                 |
| 5   | 1301.00     | 42.9 PK                 | 54.00          | -11.10      | 1.04H              | 106                  | 14.00            | 25.39               | 3.49              | 0.00                 | -28.89                 |

**NOTE:**

1. Emission level = Raw Value – Correction Factor
2. Correction Factor = Pre-Amplifier Factor - Antenna Factor - Cable Factor  
(Pre-Amplifier Factor = 0, when a Pre-Amplifier is not used for the test.)
3. The other emission levels were very low against the limit.
4. Margin value = Emission level – Limit value.
5. "\*" = Fundamental frequency.

|                                 |                                 |                             |                   |
|---------------------------------|---------------------------------|-----------------------------|-------------------|
| <b>EUT</b>                      | RF Module                       | <b>MODEL</b>                | RFMO-0201         |
| <b>INPUT POWER</b>              | 3VDC                            | <b>DETECTOR FUNCTION</b>    | Peak / Quasi-Peak |
| <b>ENVIRONMENTAL CONDITIONS</b> | 35 deg. C, 50 % RH,<br>1050 hPa | <b>TESTED BY:</b> Bunny Yao |                   |

**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) | Antenna Factor (dB) | Cable Factor (dB) | Pre-Amp. Factor (dB) | Correction Factor (dB) |
|-----|-------------|-------------------------|----------------|-------------|--------------------|----------------------|------------------|---------------------|-------------------|----------------------|------------------------|
| 1   | *433.77     | 49.5 QP                 | 72.87          | -23.37      | 2.52V              | 258                  | 26.40            | 16.29               | 6.80              | 0.00                 | -23.08                 |
| 2   | *433.77     | 53.1 PK                 | 92.87          | -39.77      | 2.52V              | 258                  | 30.05            | 16.29               | 6.80              | 0.00                 | -23.08                 |
| 3   | 867.55      | 31.6 QP                 | 46.00          | -14.40      | 1.23V              | 111                  | -0.17            | 20.59               | 11.16             | 0.00                 | -31.75                 |
| 4   | 1301.00     | 31.2 AV                 | 54.00          | -22.80      | 1.11V              | 101                  | 2.31             | 25.39               | 3.49              | 0.00                 | -28.89                 |
| 5   | 1301.00     | 42.0 PK                 | 54.00          | -12.00      | 1.11V              | 101                  | 13.11            | 25.39               | 3.49              | 0.00                 | -28.89                 |

**NOTE:**

1. Emission level = Raw Value – Correction Factor
2. Correction Factor = Pre-Amplifier Factor - Antenna Factor - Cable Factor  
(Pre-Amplifier Factor = 0, when a Pre-Amplifier is not used for the test.)
3. The other emission levels were very low against the limit.
4. Margin value = Emission level – Limit value.
5. "\*" = Fundamental frequency.

### 4.3 OCCUPIED BANDWIDTH

#### 4.3.1 LIMITS OF OCCUPIED BANDWIDTH MEASUREMENT

The bandwidth of the emission shall be no wider than 0.25% of the center frequency for devices operating above 70MHz and below 900MHz.

#### 4.3.2 TEST INSTRUMENTS

| Description & Manufacturer | Model No. | Serial No. | Calibrated Until |
|----------------------------|-----------|------------|------------------|
| SPECTRUM ANALYZER          | FSEK30    | 100049     | July 24, 2003    |

**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.

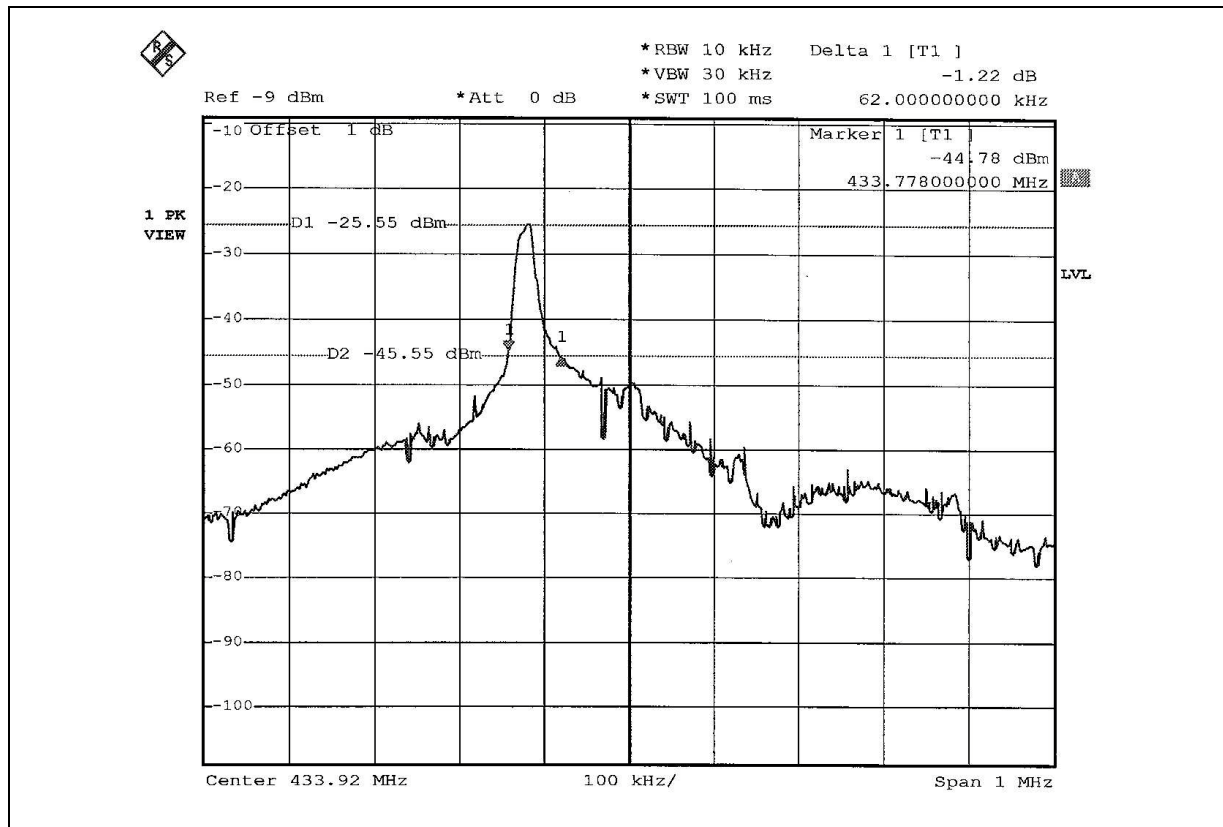
#### 4.3.3 TEST PROCEDURE

The transmitter output was coupled to the spectrum analyzer via an antenna. Set the RBW=10kHz and VBW=30kHz of spectrum analyzer. The occupied bandwidth was measured and recorded.

#### 4.3.4 EUT OPERATING CONDITION

Same as Item 4.3.5

## 4.3.5 TEST RESULTS



## 5 PHOTOGRAPHS OF THE TEST CONFIGURATION

### RADIATED EMISSION TEST





## 6 INFORMATION ON THE TESTING LABORATORIES

We, ADT Corp., were founded in 1988 to provide our best service in EMC and Safety consultation. Our laboratories are accredited and approved by the following approval agencies according to ISO/IEC 17025, Guide 25 or EN 45001:

|                    |                 |
|--------------------|-----------------|
| <b>USA</b>         | FCC, NVLAP      |
| <b>Germany</b>     | TUV Rheinland   |
| <b>Japan</b>       | VCCI            |
| <b>New Zealand</b> | MoC             |
| <b>Norway</b>      | NEMKO           |
| <b>R.O.C.</b>      | BSMI, DGT, CNLA |

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