

4.5 Out-of-Band Radiated Emissions
FCC Rule 15.247(c):

For out of band emissions that are close to or less than the 20 dB attenuation requirement described in the section 4.4, radiated measurements were performed at a 3 m separation distance to determine whether these emissions complied with the 20 dB attenuation requirement.

Not required, all out-of-band conducted emissions more than 20 dB below fundamental

4.6 Transmitter Radiated Emissions in Restricted Bands

FCC Rules: 15.247 (c), 15.205, 15.209, 15.35

Radiated emission measurements were performed from 30 MHz to 24000 MHz.

For radiated emission tests, the analyzer setting was as followings:

| | <u>RES BW</u> | <u>VID BW</u> |
|------------------|---------------|------------------------|
| Frequency <1 GHz | 100 kHz | 100 kHz |
| Frequency >1 GHz | 1 MHz 1 MHz | (Peak measurements) |
| | 1 MHz 10 Hz | (Average measurements) |

Data is included of the worst case configuration (the configuration which resulted in the highest emission levels).

The data on the following pages list the significant emission frequencies, the limit and the margin of compliance.

The field strength at the Bandedge frequencies was calculated as $E_F = E_o - \Delta$.

Where:

E_F = Field Strength at bandedge frequency, dBuV/m

E_o = Field Strength at fundamental frequency , dBuV/m

Δ = Delta between output power at fundamental frequency and at band-edge frequency

Refer to following data sheets and plots 4a4, 4a5, 4b4, 4b5 for details.

| Fundamental Frequency, MHz | Average FS at fundamental frequency, dBuV/m | Minimum Delta, dB * | Calculated Average FS in restricted bands 2.31-2.39 GHz and 2.4835-2.5 GHz, dBuV/m * | Average FS Limit in restricted bands, dBuV/m | Plot number |
|----------------------------|---|---------------------|--|--|-------------|
| 2412 | 98.9 | 62.8 | 36.1 | 54.0 | 4a3, 4a5 |
| 2437 | 93.9 | 58.3 | 35.6 | 54.0 | 4b3, 4b4 |
| 2462 | 100.8 | 49.5 | 51.3 | 54.0 | 4c3, 4c4 |

* Worst case calculated

FS – Field Strength

Radiated Emissions Test Data

| | | | | | |
|-------------------|---------------------|-------------------|---------------|------------------------|----------------------------|
| Company: | Symbol | Model #: | LA4137 | Standard | FCC § 15.247 (R.B.) |
| EUT: | Compact Flash | S/N #: | | Limit | 11 |
| Project #: | J20036369I | Test Date: | April13, 2001 | Test Distance | 3 meters |
| Test Mode: | Transmitter@2412MHz | Engineer: | Suresh K | Duty relaxation | 0 dB |

| | Antenna Used | | | Pre-Amp Used | | | Cable Used | | | Transducer Used |
|----------------|--------------|---------------|--------|---------------|----------|---------|-------------|------|------|-----------------|
| Number: | 8 | 7 | 21 | 8 | 10 | 13 | 21 | 0 | 0 | 0 |
| Model: | EMCO 3115 | EM LPA- 25 | 3160-9 | CDI_P10 00 | AFT18855 | ACO/400 | Grn_ M+L | None | None | None |

| Frequency | Reading | Detector | Ant | Amp | Ant. Pol. | Ant. Factor | Pre-Amp | Insert Loss | D. C. F. | Net | Limit @3m | Margin |
|-----------|---------|----------|-----|-----|-----------|-------------|---------|-------------|----------|----------|-----------|--------|
| MHz | dB(µV) | P/A/Q | # | # | H/V | dB(1/m) | dB | dB | dB | dB(µV/m) | dB(µV/m) | dB |
| 2412.0 | 69.0 | Peak | 8 | 0 | V | 29.1 | 0.0 | 2.3 | 0.0 | 100.4 | - | - |
| 2412.0 | 59.8 | Ave. | 8 | 0 | V | 29.1 | 0.0 | 2.3 | 0.0 | 91.2 | - | - |
| 4824.0 | 43.3 | Peak | 8 | 8 | V | 34.0 | 28.1 | 3.2 | 0.0 | 52.4 | 74.0 | -21.6 |
| 4824.0 | 30.4 | Ave. | 8 | 8 | V | 34.0 | 28.1 | 3.2 | 0.0 | 39.5 | 54.0 | -14.5 |
| 7236.0 | 32.5 | Peak | 8 | 8 | V | 37.0 | 28.0 | 4.3 | 0.0 | 45.8 | 74.0 | -28.2 |
| 7236.0 | 20.7 | Ave. | 8 | 8 | V | 37.0 | 28.0 | 4.3 | 0.0 | 34.0 | 54.0 | -20.0 |
| 9648.0 | 33.7 | Peak | 8 | 8 | V | 38.5 | 27.3 | 5.0 | 0.0 | 49.9 | 74.0 | -24.1 |
| 9648.0 | 21.4 | Ave. | 8 | 8 | V | 38.5 | 27.3 | 5.0 | 0.0 | 37.6 | 54.0 | -16.4 |
| 12060 | 39.8 | Peak | 8 | 10 | V | 41.6 | 39.1 | 5.9 | 0.0 | 48.2 | 74.0 | -25.8 |
| 12060 | 29.1 | Ave. | 8 | 10 | V | 41.6 | 39.1 | 5.9 | 0.0 | 37.5 | 54.0 | -16.5 |
| 14472 | 39.4 | Peak | 8 | 10 | V | 40.7 | 37.8 | 6.5 | 0.0 | 48.8 | 74.0 | -25.2 |
| 14472 | 27.3 | Ave. | 8 | 10 | V | 40.7 | 37.8 | 6.5 | 0.0 | 36.7 | 54.0 | -17.3 |
| 16884 | 38.4 | Peak | 8 | 10 | V | 40.8 | 39.4 | 7.2 | 0.0 | 47.0 | 74.0 | -27.0 |
| 16884 | 27.5 | Ave. | 8 | 10 | V | 40.8 | 39.4 | 7.2 | 0.0 | 36.1 | 54.0 | -17.9 |
| 19296 | 34.1 | Peak | 21 | 13 | V | 40.2 | 23.3 | 7.7 | 0.0 | 58.7 | 74.0 | -15.3 |
| 19296 | 22.5 | Ave. | 21 | 13 | V | 40.2 | 23.3 | 7.7 | 0.0 | 47.1 | 54.0 | -6.9 |
| 21708 | 32.1 | Peak | 21 | 13 | V | 40.3 | 23.3 | 7.9 | 0.0 | 57.0 | 74.0 | -17.0 |
| 21708 | 22.4 | Ave. | 21 | 13 | V | 40.3 | 23.3 | 7.9 | 0.0 | 47.3 | 54.0 | -6.7 |
| 24120 | 33.3 | Peak | 21 | 13 | V | 40.4 | 24.2 | 8.5 | 0.0 | 58.0 | 74.0 | -16.0 |
| 24120 | 22.7 | Ave. | 21 | 13 | V | 40.4 | 24.2 | 8.5 | 0.0 | 47.4 | 54.0 | -6.6 |

| | |
|---------------|---|
| Notes: | a) D.C.F.:Distance Correction Factor |
| | b) Insert. Loss (dB) = Cable A + Cable B + Cable C . |
| | c) Net (dB) = Reading + Antenna Factor - Pre-amp + Insert. Loss. - Transducer Loss; - Duty Relaxation (transmitter only). |
| | d) Negative signs (-) in Margin column signify levels below the limits. |
| | e) All other emissions not reported are below the equipment noise floor which is at least 10 dB below the limits. |

Radiated Emissions Test Data

| | | | | | |
|-------------------|---------------------|-------------------|----------------|------------------------|---------------------|
| Company: | Symbol | Model #: | LA4137 | Standard | FCC § 15.247 (R.B.) |
| EUT: | Compact Flash | S/N #: | | Limits | 11 |
| Project #: | J20036369I | Test Date: | April 13, 2001 | Test Distance | 3 meters |
| Test Mode: | Transmitter@2437MHz | Engineer: | Suresh K | Duty Relaxation | 0 dB |

| | Antenna Used | | | Pre-Amp Used | | | Cable Used | | | Transducer Used |
|----------------|--------------|-----------|--------|--------------|----------|---------|------------|------|------|-----------------|
| Number: | 8 | 7 | 21 | 8 | 10 | 13 | 21 | 0 | 0 | 0 |
| Model: | EMCO 3115 | EM LPA-25 | 3160-9 | CDI_P100 0 | AFT18855 | ACO/400 | Gm_M+L | None | None | None |

| Frequency | Reading | Detector | Ant | Amp. | Ant. Pol. | Ant. Factor | Pre-Amp | Insert. Loss | D. C. F. | Net | Limit @3m | Margin |
|-----------|---------|----------|-----|------|-----------|-------------|---------|--------------|----------|----------|-----------|--------|
| MHz | dB(µV) | P/A/Q | # | # | H/V | dB(1/m) | dB | dB | dB | dB(µV/m) | dB(µV/m) | dB |
| 2437.0 | 71.8 | Peak | 8 | 0 | V | 29.1 | 0.0 | 2.3 | 0.0 | 103.2 | - | - |
| 2437.0 | 62.5 | Ave. | 8 | 0 | V | 29.1 | 0.0 | 2.3 | 0.0 | 93.9 | - | - |
| 4874.0 | 49.3 | Peak | 8 | 8 | V | 34.0 | 28.1 | 3.2 | 0.0 | 58.4 | 74.0 | -15.6 |
| 4874.0 | 40.1 | Ave. | 8 | 8 | V | 34.0 | 28.1 | 3.2 | 0.0 | 49.2 | 54.0 | -4.8 |
| 7311.0 | 34.5 | Peak | 8 | 8 | V | 37.0 | 28.0 | 4.3 | 0.0 | 47.8 | 74.0 | -26.2 |
| 7311.0 | 21.8 | Ave. | 8 | 8 | V | 37.0 | 28.0 | 4.3 | 0.0 | 35.1 | 54.0 | -18.9 |
| 9748.0 | 33.8 | Peak | 8 | 8 | V | 38.5 | 27.3 | 5.0 | 0.0 | 50.0 | 74.0 | -24.0 |
| 9748.0 | 21.4 | Ave. | 8 | 8 | V | 38.5 | 27.3 | 5.0 | 0.0 | 37.6 | 54.0 | -16.4 |
| 12185 | 40.4 | Peak | 8 | 10 | V | 41.6 | 39.1 | 5.9 | 0.0 | 48.8 | 74.0 | -25.2 |
| 11185 | 29.2 | Ave. | 8 | 10 | V | 41.6 | 39.1 | 5.9 | 0.0 | 37.6 | 54.0 | -16.4 |
| 14622 | 39.4 | Peak | 8 | 10 | V | 41.3 | 37.4 | 6.8 | 0.0 | 50.1 | 74.0 | -23.9 |
| 14622 | 27.3 | Ave. | 8 | 10 | V | 41.3 | 37.4 | 6.8 | 0.0 | 38.0 | 54.0 | -16.0 |
| 17059 | 38.6 | Peak | 8 | 10 | V | 42.0 | 38.8 | 7.5 | 0.0 | 49.3 | 74.0 | -24.7 |
| 17059 | 27.5 | Ave. | 8 | 10 | V | 42.0 | 38.8 | 7.5 | 0.0 | 38.2 | 54.0 | -15.8 |
| 19496 | 34.2 | Peak | 21 | 13 | V | 40.2 | 23.3 | 7.7 | 0.0 | 58.8 | 74.0 | -15.2 |
| 19496 | 22.5 | Ave. | 21 | 13 | V | 40.2 | 23.3 | 7.7 | 0.0 | 47.1 | 54.0 | -6.9 |
| 21933 | 32.1 | Peak | 21 | 13 | V | 40.3 | 23.3 | 7.9 | 0.0 | 57.0 | 74.0 | -17.0 |
| 21933 | 22.4 | Ave. | 21 | 13 | V | 40.3 | 23.3 | 7.9 | 0.0 | 47.3 | 54.0 | -6.7 |
| 24370 | 33.3 | Peak | 21 | 13 | V | 40.4 | 24.2 | 8.5 | 0.0 | 58.0 | 74.0 | -16.0 |
| 24370 | 22.7 | Ave. | 21 | 13 | V | 40.4 | 24.2 | 8.5 | 0.0 | 47.4 | 54.0 | -6.6 |

Notes:

- a) D.C.F.: Distance Correction Factor
- b) Insert. Loss (dB) = Cable A + Cable B + Cable C .
- c) Net (dB) = Reading + Antenna Factor - Pre-amp + Insert. Loss. - Transducer Loss - Duty Relaxation (transmitter only).
- d) Negative signs (-) in Margin column signify levels below the limits.
- e) All other emissions not reported are below the equipment noise floor which is at least 10 dB below the limits.

Radiated Emissions Test Data

| | | | | | |
|-------------------|---------------------|-------------------|---------------|------------------------|----------------------------|
| Company: | Symbol | Model #: | LA4137 | Standard | FCC § 15.247 (R.B.) |
| EUT: | Compact Flash | S/N #: | | Limits | 11 |
| Project #: | J20036369I | Test Date: | April13, 2001 | Test Distance | 3 meters |
| Test Mode: | Transmitter@2462MHz | Engineer: | Suresh K | Duty Relaxation | 0 dB |

| | Antenna Used | | | Pre-Amp Used | | | Cable Used | | | Transducer Used |
|----------------|--------------|---------------|--------|---------------|----------|---------|------------|------|------|-----------------|
| Number: | 8 | 7 | 21 | 8 | 10 | 13 | 21 | 0 | 0 | 0 |
| Model: | EMCO 3115 | EM LPA- 25 | 3160-9 | CDI_P1 000 | AFT18855 | ACO/400 | Grn_M+L | None | None | None |

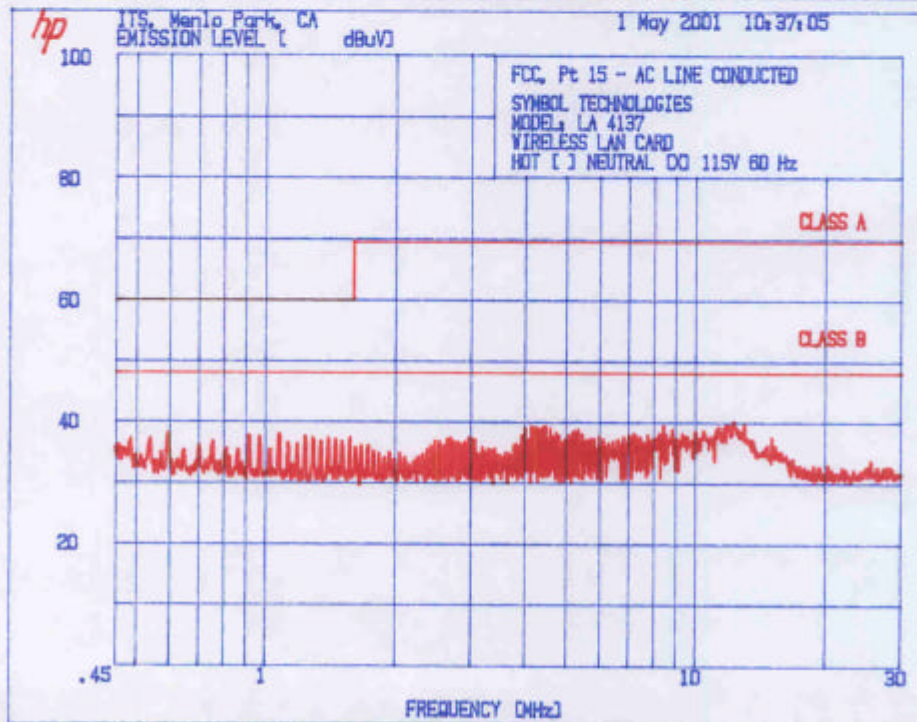
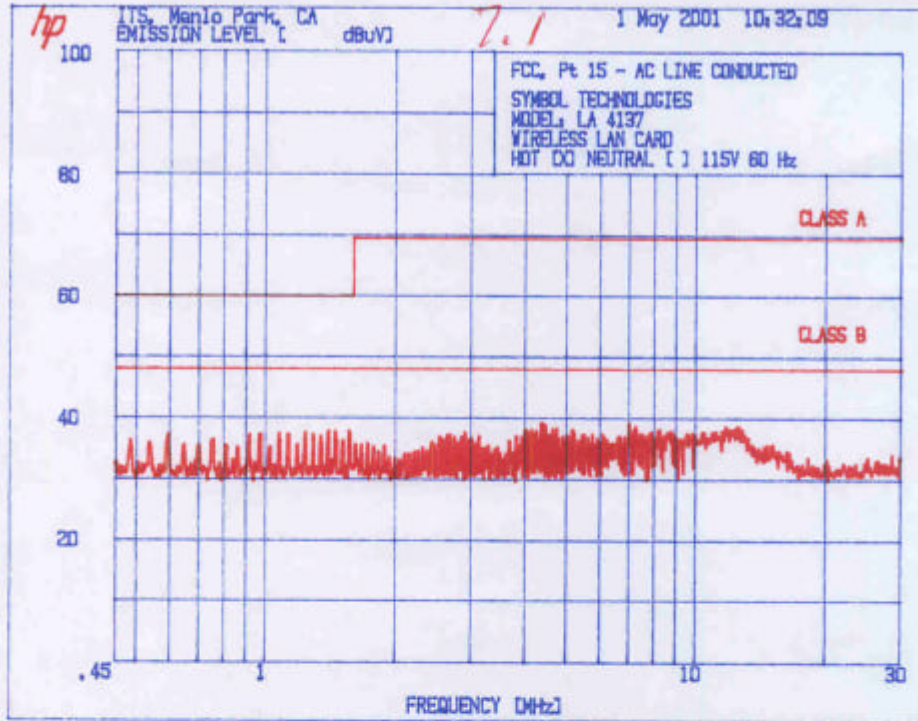
| Frequency | Reading | Detector | Ant | Amp | Ant. Pol. | Ant. Factor | Pre-Amp | Insert. Loss | D. C. F. | Net | Limit @3m | Margin |
|-----------|---------|----------|-----|-----|-----------|-------------|---------|--------------|----------|----------|-----------|--------|
| MHz | dB(µV) | P/A/Q | # | # | H/V | dB(1/m) | dB | dB | dB | dB(µV/m) | dB(µV/m) | dB |
| 2462.0 | 74.7 | Peak | 8 | 0 | V | 29.1 | 0.0 | 2.3 | 0.0 | 106.1 | - | - |
| 2462.0 | 63.4 | Ave. | 8 | 0 | V | 29.1 | 0.0 | 2.3 | 0.0 | 94.8 | - | - |
| 4924.0 | 45.9 | Peak | 8 | 8 | V | 34.0 | 28.1 | 3.2 | 0.0 | 55.0 | 74.0 | -19.0 |
| 4924.0 | 33.2 | Ave. | 8 | 8 | V | 34.0 | 28.1 | 3.2 | 0.0 | 42.3 | 54.0 | -11.7 |
| 7386.0 | 34.7 | Peak | 8 | 8 | V | 37.0 | 28.0 | 4.3 | 0.0 | 48.0 | 74.0 | -26.0 |
| 7386.0 | 23.3 | Ave. | 8 | 8 | V | 37.0 | 28.0 | 4.3 | 0.0 | 36.6 | 54.0 | -17.4 |
| 9848.0 | 35.1 | Peak | 8 | 8 | V | 38.5 | 27.6 | 5.0 | 0.0 | 51.0 | 74.0 | -23.0 |
| 9848.0 | 23.2 | Ave. | 8 | 8 | V | 38.5 | 27.6 | 5.0 | 0.0 | 39.1 | 54.0 | -14.9 |
| 12310 | 40.2 | Peak | 8 | 10 | V | 41.6 | 39.1 | 5.9 | 0.0 | 48.6 | 74.0 | -25.4 |
| 12310 | 29.1 | Ave. | 8 | 10 | V | 41.6 | 39.1 | 5.9 | 0.0 | 37.5 | 54.0 | -16.5 |
| 14772 | 39.8 | Peak | 8 | 10 | V | 41.3 | 37.4 | 6.8 | 0.0 | 50.5 | 74.0 | -23.5 |
| 14772 | 27.6 | Ave. | 8 | 10 | V | 41.3 | 37.4 | 6.8 | 0.0 | 38.3 | 54.0 | -15.7 |
| 17234 | 38.3 | Peak | 8 | 10 | V | 42.0 | 38.8 | 7.5 | 0.0 | 49.0 | 74.0 | -25.0 |
| 17234 | 28.1 | Ave. | 8 | 10 | V | 42.0 | 38.8 | 7.5 | 0.0 | 38.8 | 54.0 | -15.2 |
| 19696 | 35.1 | Peak | 21 | 13 | V | 40.3 | 23.3 | 7.7 | 0.0 | 59.8 | 74.0 | -14.2 |
| 19696 | 22.5 | Ave. | 21 | 13 | V | 40.3 | 23.3 | 7.7 | 0.0 | 47.2 | 54.0 | -6.8 |
| 22158 | 32.1 | Peak | 21 | 13 | V | 40.3 | 23.3 | 7.9 | 0.0 | 57.0 | 74.0 | -17.0 |
| 22158 | 22.4 | Ave. | 21 | 13 | V | 40.3 | 23.3 | 7.9 | 0.0 | 47.3 | 54.0 | -6.7 |
| 24620 | 33.3 | Peak | 21 | 13 | V | 40.4 | 24.2 | 8.5 | 0.0 | 58.0 | 74.0 | -16.0 |
| 24620 | 22.7 | Ave. | 21 | 13 | V | 40.4 | 24.2 | 8.5 | 0.0 | 47.4 | 54.0 | -6.6 |

| | |
|---------------|--|
| Notes: | a) D.C.F.:Distance Correction Factor |
| | b) Insert. Loss (dB) = Cable A + Cable B -- Cable C . |
| | c) Net (dB) = Reading + Antenna Factor - Pre-amp + Insert. Loss. - Transducer Loss - Duty Relaxation (transmitter only). |
| | d) Negative signs (-) in Margin column signify levels below the limits. |
| | e) All other emissions not reported are below the equipment noise floor which is at least 10 dB below the limits. |

4.7 AC Line Conducted Emission
FCC Rule 15.207:

AC line conducted emission test was performed according the ANSI C63.4 standard. The EUT was connected to AC Line through the LISNs.

For the test result, see attached plot 7.1.



4.8 Radiated Emissions from Digital Section of Transceiver (Transmitter)
FCC Ref: 15.109

See separate DoC report.

- 4.9 Radiated Emissions from Receiver Section of Transceiver (L.O. Radiation)
FCC Ref: 15.109, 15.111

Not required - EUT operation above 960 MHz only.

5.0 List of test Equipment

| EQUIPMENT | MANUFACTURER | MODEL NUMBER | SERIAL NUMBER | CAL. INTERVAL | CAL. DUE |
|--------------------------------------|-----------------|--------------|--------------------------|---------------|----------|
| Spectrum Analyzer w/85650 QP Adapter | Hewlett Packard | 8566B | 2416A00317 2043A00251 | 12 | 4/6/02 |
| Spectrum Analyzer w/8650 QP Adaptor | Hewlett Packard | 8568B | 1912A0053 2521A01021 | 12 | 2/23/02 |
| Spectrum Analyzer | Tektronix | 2784 | B3020108 | 12 | 8/4/01 |
| Double-ridged Horn Antenna | EMCO | 3115 | 9107-3712 | 12 | 3/17/02 |
| Horn Antenna | EMCO | 3160-09 | Not Labeled | # | # |
| Pre-Amplifier,#5 | CDI | P950 | ITS009 | 12 | 10/6/01 |
| Pre-Amplifier | CDI | P1000 | N/A | 12 | 10/06/01 |
| Pre-Amplifier | Avantek | AFT-18855 | 8723H705 | 12 | 10/5/01 |
| Pre-amplifier | CTT | ACO/400 | 47526 | 12 | 10/5/01 |
| Power Meter | Hewlett Packard | 8900D | 3607U00673 | 12 | 7/31/01 |

No Calibration Required

6.0 Document History

| Revision/ Job Number | Writer Initials | Date | Change |
|---------------------------------|----------------------------|--------------|-------------------|
| 1.0 / J20046983D1 | OM | May 25, 2001 | Original document |
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