FCC ID: QVJSAP300
Access Point 300

Exhibit 2f

Engineering Report on

Radiated Emissions Spurious (15.247(c))
& Restricted Bands (15.205 (a)/15.209)

Section F, Test: Spurious Emissions & Restricted Bands

FCC ID: QVJSAP300
Client: FleetMind Solutions
Product: Access Point 300, Model: S-AP-300

Test: Spurious Emissions & Restricted Bands

FCC ID: QVJSAP300
Client: FleetMind Solutions
Product: Access Point 300, Model: S-AP-300

Ref.: FCC Part 15.247 (c), 15.205

Criteria: 1) In any 100 kHz bandwidth outside the frequency band in which the spread spectrum intentional radiator is operating, the radio frequency power that is produced by the intentional radiator shall be at least 20 dB below that in the 100 kHz bandwidth within the band that contains the highest level of the desired power, based on either an RF conducted or a radiated measurement. Attenuation below the general limits specified in § 15.209(a) is not required.

2) **Restricted Bands**: In addition, radiated emissions which fall in the restricted bands, as defined in § 15.205(a), must also comply with the radiated emission limits specified in § 15.209(a) (see § 15.205(c)).

Condition: Conducted & Radiated Tests

Set-up: See Figure 1 and figure 2

Equipment: See Appendix A

Methodology: 1) **RF Antenna Conducted Test**: The DUI was configured to operate at maximum power and with the frequency which has the highest emission level. The DUI antenna port was connected to the spectrum analyser via RF cable.

Set the spectrum analyser as following: RBW = 100KHz, VBW = 300KHz, scan up through 10th harmonic. Record observable harmonics and spurs.

2) **Tests for Restricted Bands**: The preliminary radiated emission measurement was performed according to the description of ANSI C63.4 – 1992 Sec.8.3.1.1 in a semi anechoic shielded room in order to determine the characteristic frequencies of the radiation and record all frequencies that fall into the restricted bands.

Based on this information, measurements were performed in the open area test site at these characteristic frequencies. APREL Open Area Test Site is calibrated to ANSI C63.4-1992 and is filed with FCC. The test site is characteristically flat, free of reflecting structures. All reflecting objects,

including test personnel, lie outside the perimeter of the ellipse (defined in ANSI C63.4-1992) or below the ground plane level. The horizontal and vertical site attenuation measurements are within ± 4 dB of the theoretical site attenuation of an ideal site. The DUI was placed on a turntable positioned 3 meters away from the receiving antenna, which in turn was connected to the spectrum analyzer. The DUI was operated in a manner that produced the highest emissions.

For each characteristic frequency, the received signal was maximized by appropriate positioning of the turntable and the height of the receiving antenna. The height of the antenna was adjusted between 1 m and 4 m in height above the ground plane. The turntable was rotated 360° from a remote control to maximize the emissions. The process was repeated for both horizontal and vertical polarization. All cables were arranged for maximum emission.

Radiated RF emission levels measured were identified as having been emitted by the DUI. Measurements were performed using the spectrum analyzer employing a CISPR quasi-peak detector function and 120 kHz bandwidth on frequencies from 30 MHz to 960 MHz, and for frequencies above 960 MHz employing an average detector function and 1 MHz resolution bandwidth. All measurements were performed at discrete frequencies.

Block Diagram:

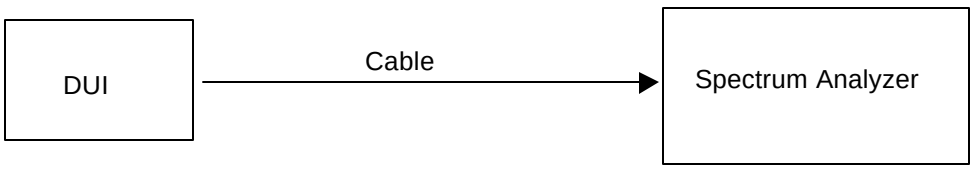

Figure 1 Conducted Test set-up

Table 1: Restricted Bands per §15.205

MHz	MHz	MHz	GHz
0.090 - 0.110	16.42 - 16.423	399.9 - 410	4.5 - 5.15
0.495 - 0.505	16.69475 - 16.69525	608 - 614	5.35 - 5.46
2.1735 - 2.1905	16.80425 - 16.80475	960 - 1240	7.25 - 7.75
4.125 - 4.128	25.5 - 25.67	1300 - 1427	8.025 - 8.5
4.17725 - 4.17775	37.5 - 38.25	1435 - 1626.5	9.0 - 9.2
4.20725 - 4.20775	73 - 74.6	1645.5 - 1646.5	9.3 - 9.5
6.215 - 6.218	74.8 - 75.2	1660 - 1710	10.6 - 12.7
6.26775 - 6.26825	108 - 121.94	1718.8 - 1722.2	13.25 - 13.4
6.31175 - 6.31225	123 - 138	2200 - 2300	14.47 - 14.5
8.291 - 8.294	149.9 - 150.05	2310 - 2390	15.35 - 16.2
8.362 - 8.366	156.52475 -	2483.5 - 2500	17.7 - 21.4
8.37625 - 8.38675	156.52525	2655 - 2900	22.01 - 23.12
8.41425 - 8.41475	156.7 - 156.9	3260 - 3267	23.6 - 24.0
12.29 - 12.293	162.0125 - 167.17	3332 - 3339	31.2 - 31.8
12.51975 - 12.52025	167.72 - 173.2	3345.8 - 3358	36.43 - 36.5
12.57675 - 12.57725	240 - 285	3600 - 4400	Above 38.6
13.36 - 13.41	322 - 335.4		

Table 2: Radiated Emission Limits per §15.209

Frequency (MHz)	Field Strength (µV/m)	Field Strength (dBµV/m)	**(meters)**
0.009 – 0.490	$2400/F_{(kHz)}$	$20 \cdot \log_{10}(2400/F_{kHz})$	300
0.490 – 1.705	$24000/F_{(kHz)}$	$20 \cdot \log_{10}(24000/F_{kHz})$	30
1.705 – 30.00	30	29.5	30
30.0 – 88.0	100	40.0	3
88.0 – 216.0	150	43.5	3
216 - 960	200	46.0	3
Above 960	500	54.0	3

Note: The emissions from an intentional radiator, which fall in the restricted bands as shown in table 1, shall not exceed the field strength levels specified in table 2.

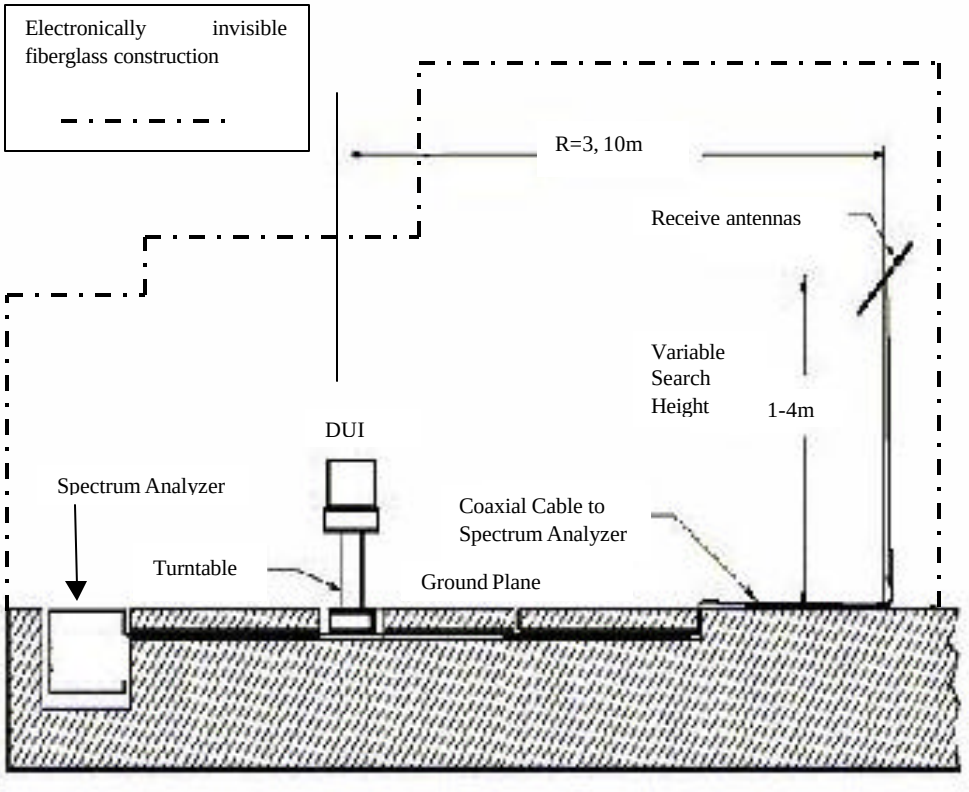

Figure 2.a: Test set up for the radiated emission measurement in OATS (not to scale)

Figure 2.b: APREL Laboratories all season Open Area Test Site (OATS)

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Test Results: Test data is tabulated in Tables 3 and 4

Table 3 RF Antenna Port Emissions: Conducted
Frequency: 915MHz (highest emissions)

Frequency (MHz)	Reading (dBm)	Cable Loss (dB)	Emissions (dBm)	Limit (dBm)	Margin (dB)
Harmonics					
915.0	15.5	0.5	16.0	----	----
1830.0	-27.8	0.5	-27.3	-4.0	23.3
2745.0	-35.0	0.5	-34.5	-4.0	30.5
3660.0	-53.4	0.5	-52.9	-4.0	48.9
4575.0	-63.6 (Noise level)	0.5	-63.1	-4.0	59.1
5490.0	-63.8 (Noise level)	0.5	-63.3	-4.0	59.3
Spurious					
64.0	-54.1	0.5	-53.6	-4.0	49.6
72.0	-52.6	0.5	-52.1	-4.0	48.1
80.0	-54.9	0.5	-54.4	-4.0	50.4
104.0	-53.1	0.5	-52.6	-4.0	48.6
120.0	-48.8	0.5	-48.3	-4.0	44.3
136.0	-47.2	0.5	-46.7	-4.0	42.7
160.0	-50.5	0.5	-50.0	-4.0	46.0
168.0	-50.7	0.5	-50.2	-4.0	46.2
240.0	-42.3	0.5	-41.8	-4.0	37.8
248.0	-43.2	0.5	-42.7	-4.0	38.7
256.0	-45.1	0.5	-44.6	-4.0	40.6
272.0	-43.4	0.5	-42.9	-4.0	38.9
296.0	-42.1	0.5	-41.6	-4.0	37.6

Note: The limit for harmonics and spurious signals is 20 dB below the fundamental signal which is 16.0 dBm. So the limit is 16.0-20.0=-4.0dBm

Test: Spurious Emissions & Restricted Bands

FCC ID: QVJSAP300
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Product: Access Point 300, Model: S-AP-300

Table 4.a Restricted Bands Emissions

FleetMind – Access Point
Radiated Emissions from Transmitter
Frequency: 915MHz , Distance: 3.0 m
Polarization: Vertical

Frequency (MHz)	Reading (dB■V)	Correction (dB/m)	Field-strength (dB■V/m)	Limit (dB■V/m)	Margin (dB)
247.998	12.0 (Noise level)	15.1	27.1	46.0	18.9
255.998	15.4	15.6	31.0	46.0	15.0
271.998	13.5	17.0	30.5	46.0	15.5
279.996	14.1	17.2	31.3	46.0	14.7

Table 4.b Restricted Bands Emissions

FleetMind – Access Point
Radiated Emissions from Transmitter
Frequency: 915MHz , Distance: 3.0 m
Polarization: Horizontal

Frequency (MHz)	Reading (dB■V)	Correction (dB/m)	Field-strength (dB■V/m)	Limit (dB■V/m)	Margin (dB)
247.998	12.0 (Noise level)	15.1	27.1	46.0	18.9
255.998	12.0 (Noise level)	15.6	27.6	46.0	18.4
271.998	13.5	17.0	30.5	46.0	15.5
279.996	12.0 (Noise level)	17.2	29.2	46.0	16.8

Test performed by: Yinghi Chen **Date:** April, 2003

Notes:

1. The spectrum was scanned from 9 kHz to 10th harmonic and the worst-case emissions are reported.
2. All conducted harmonics and spurious signals were at least 20 dB below the highest emission level within the authorized band as measured with a 100 kHz Resolution Bandwidth.
3. All radiated spurious signals in the restricted bands specified in §15.205 were below the limits listed in Table 2.
4. There were no radiated fundamental signals and harmonics observed within the restricted bands specified in §15.205.
5. The band-edge requirements are not applicable.

Conclusion: The unit complies with the requirements.

Pictures of Test Set-up

Test: Spurious Emissions & Restricted Bands

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FleetMind – Access Point (DUI)

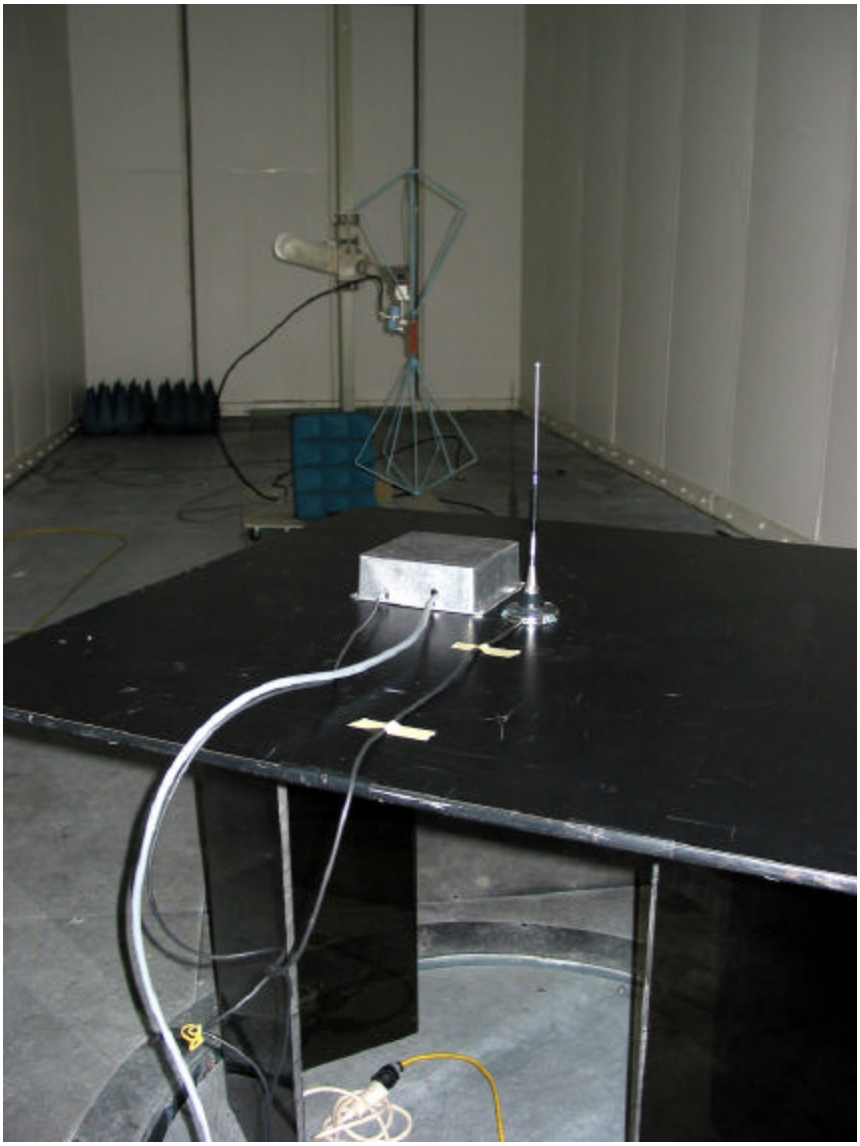
Test: Spurious Emissions & Restricted Bands

FCC ID: QVJSAP300
Client: FleetMind Solutions
Product: Access Point 300, Model: S-AP-300

FleetMind – Access Point
Spurious Emissions from Transmitter - Conducted
Frequency Range: 9KHz – 10GHz

Test: Spurious Emissions & Restricted Bands

FCC ID: QVJSAP300
Client: FleetMind Solutions
Product: Access Point 300, Model: S-AP-300



FleetMind – Access Point
Testing for Radiated Emissions from Transmitter
Frequency Range: 30 MHz – 200 MHz

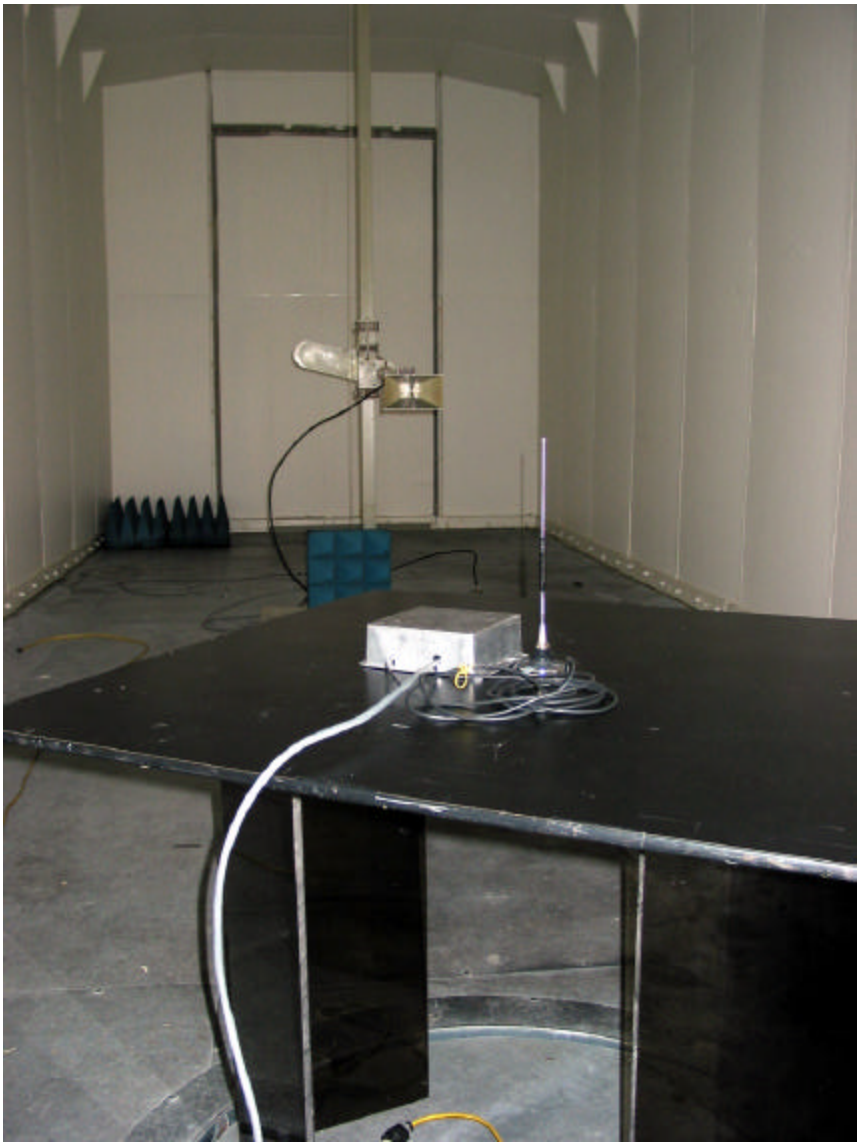
Test: Spurious Emissions & Restricted Bands

FCC ID: QVJSAP300
Client: FleetMind Solutions
Product: Access Point 300, Model: S-AP-300

FleetMind – Access Point
Testing for Radiated Emissions from Transmitter
Frequency Range: 200 MHz – 1 GHz

Test: Spurious Emissions & Restricted Bands

FCC ID: QVJSAP300
Client: FleetMind Solutions
Product: Access Point 300, Model: S-AP-300



FleetMind – Access Point
Testing for Radiated Emissions from Transmitter
Frequency Range: 1 GHz – 18 GHz