ITS Intertek Testing Services

FCC Part 22 Type Acceptance

Performed on the

Monitoring Device
Model Nos.: 1701/1702
for
Advanced Business Sciences Inc.

FCC ID: OAM170102

Date of Test: October 19, 1998

Report #: J98018957

Total No. of Pages Contained in this Report: 22

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1.0 Introduction

1.1 Test Summary

FCC RULE	DESCRIPTION OF TEST	RESULT	PAGE
2.985	RF Power Output	Pass	3
22.913	Effective Radiated Power	N/A	7
2.987	Modulation Requirements	N/A	8
22.915(d)(1)	Audio Filter Characteristics	N/A	9
2.989© 22.917(b)(d)	Emission Limitation, Occupied Bandwidth	N/A	11
22.917(e) 22.917(f)	Out of Band Emissions at Antenna Terminals Mobile Emissions In Base Frequency Range	N/A	13
2.993	Field Strength of Spurious Radiation	Pass	14
15.107	Line Conducted Emissions	Pass	20
2.995(a)	Frequency Stability vs. Temperature	N/A	22
2.995(d)(2)	Frequency Stability vs. Voltage	N/A	23
2.1091, 2.1093	Specific Absorption Rate	Pass	See SAR Report

Tested By:		11/2/99
	Ollie Moyrong Test Engineer	Date
Approved By:		11/2/99
	David Chernomordik EMC Site Manager	Date

1.2 Product Description

The ABS 1701 is a device that provides law enforcement institutions and other authorities the tools which enable the monitoring of their client's real time compliance to defined limits of time and location.

Whether quantity (>1) production is planned	[X] Yes
Frequency Range	824 - 849 MHZ
Antenna(e) & Gain	Monopole, 0 dBi
Detachable antenna ?	[X] No
External input	[X] Digital Data

1.3 Related Submittal(s) Grants

[X] Cell module certified already certified.
Applicant: Ericsson, Inc.
FCC ID: AXATR-324-A2
Date of Grant: July 30, 1993

[X] DOC for computer section, a separate DOC is prepared.

2.0 **RF Power Output**, FCC §2.985(a), §22.913

2.1 Test Procedure

The transmitter output was connected to a calibrated coaxial attenuator, the other end of which was connected to a spectrum analyzer. Transmitter output was read off the spectrum analyzer in dBm. The power output at the transmitter antenna port was determined by adding the value of the attenuator to the spectrum analyzer reading. An HP power meter was also used to measure the RF power.

Tests were performed at three frequencies (low, middle, and high channels) and on all power levels which can be setup on the transmitters.

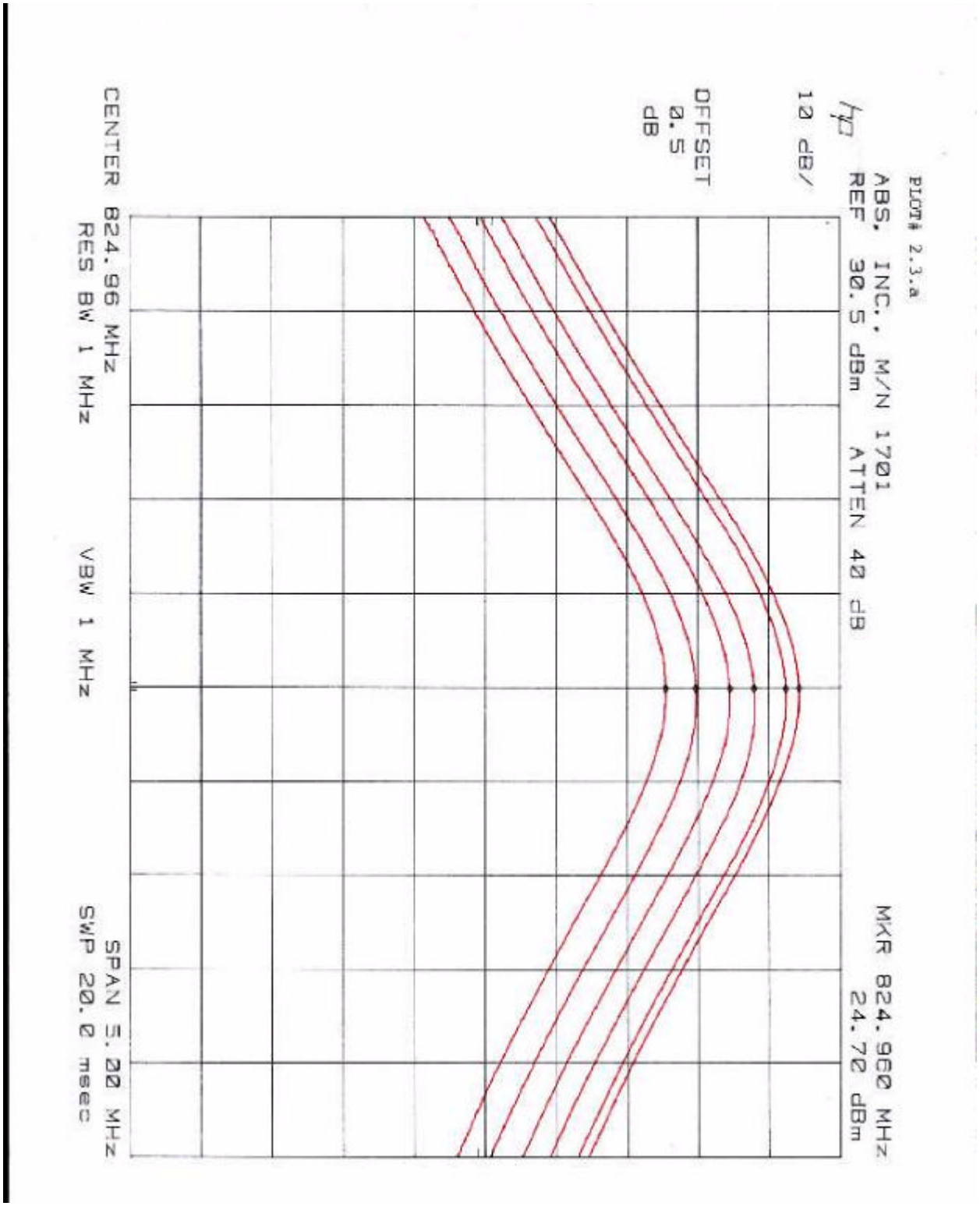
2.2 Test Equipment

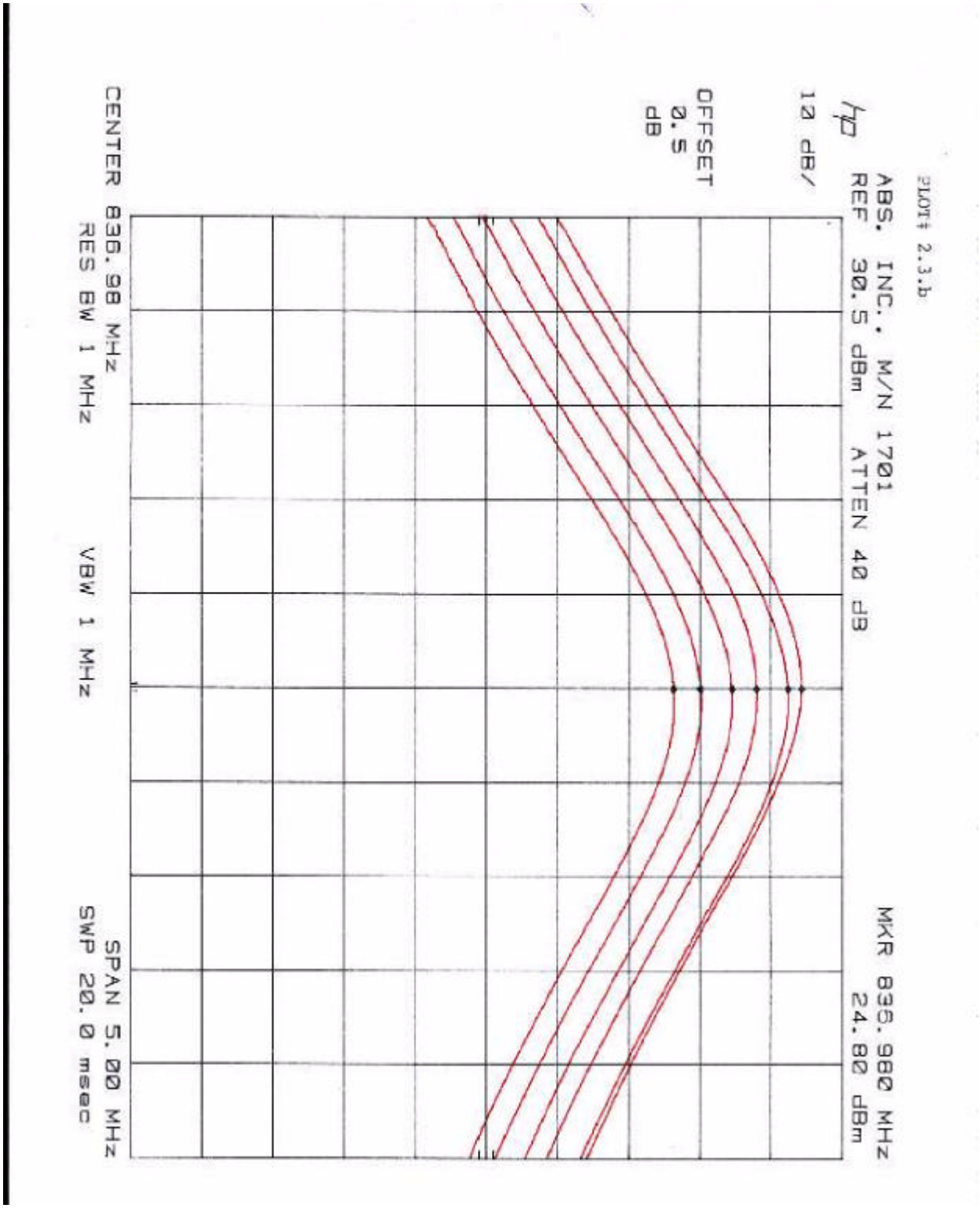
Hewlett Packard 8481A Power Sensor, 435B Power Meter
Hewlett Packard HP8566B Spectrum Analyzer, 100 Hz - 22 GHz
Tektronix 2782

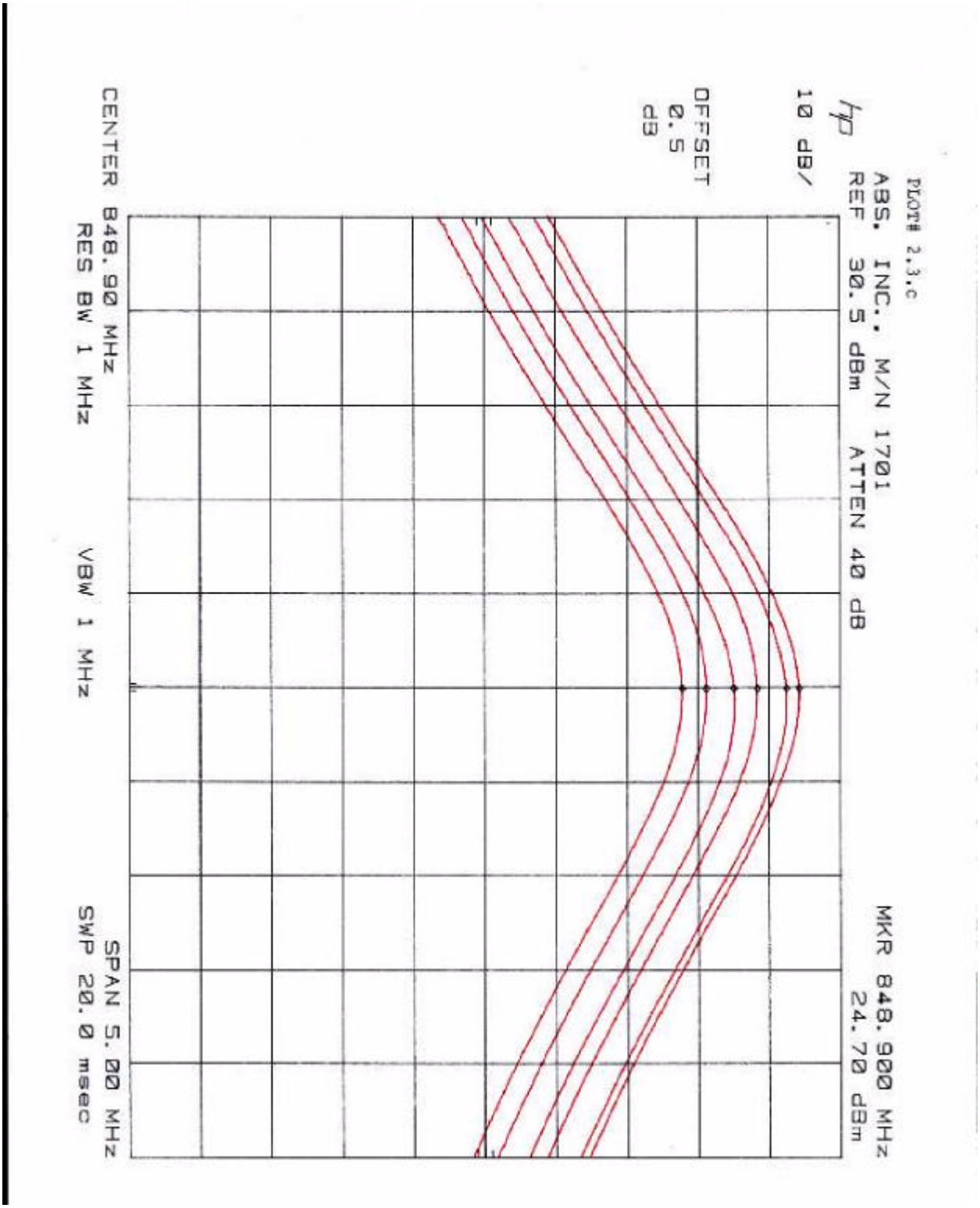
2.3 Test Results

Refer to the attached plots:

Plot Number	2.3.a	2.3.b	2.3.c
Frequency (MHz)	824.96	836.98	848.90
Maximum RF Power Output, W	0.3	0.3	0.3


PLOT# 2.3.a
ABS. INC., M/N 1701
REF 30.5 dBm
ATTEN 40 dB
10 dB/
OFFSET
0.5
dB
CENTER 824.96 MHz
RES BW 1 MHz
VBW 1 MHz
SPAN 5.00 MHz
SWP 20.0 msec
MKR 824.960 MHz
24.72 dBm


PLOT# 2.3.b
ABS. INC., M/N 1701
REF 30.5 dBm
ATTEN 40 dB
12 dB/
OFFSET
2.5
dB
CENTER 836.98 MHz
RES BW 1 MHz
VBW 1 MHz
SPAN 5.00 MHz
SWP 20.0 msec
MKR 836.960 MHz
24.80 dBm


PLOT# 2.3.c
ABS. INC.. M/N 1701
REF 30.5 dBm
ATTEN 40 dB
10 dB/
OFFSET
0.5
dB
MKR 848.900 MHz
24.70 dBm
CENTER 848.90 MHz
RES BW 1 MHz
VBW 1 MHz
SPAN 5.00 MHz
SWP 20.0 msec

3.0 **Effective Radiated Power**, FCC § 22.913

The Effective Radiated Power (ERP) of mobile transmitters and auxiliary test transmitters must not exceed 7 Watts.

3.1 Test Procedure

The EUT was positioned on a non-conductive turntable, 0.8m above the ground plane on an open test site.

The radiated emission at the fundamental frequency was measured at 3m distance with a test antenna and spectrum analyzer. During the measurement, the resolution and video bandwidths of the spectrum analyzer were set to 100 kHz. Worst case emission was recorded with the rotation of the turntable and the raising and lowering of the test antenna. The spectrum analyzer reading (R_{EUT}) was recorded.

The ERP was calculated as follows:

ERP(dBm) = E(dBuV/m) + 20 log D - 10 log 30 - 10 log G - 90

where D = 3m, distance
G = 1.64, gain of half-wave dipole

The test was performed at three frequencies (low, middle, and high channels).

3.2 Test Equipment

Rhode & Schwartz SMH Signal Generator
Hewlett Packard HP8566B Spectrum Analyzer
Attenuator 20 dB

3.3 Test Results

The ERP do not exceed 0.24 Watt.

4.0 **Modulation Deviation Limiting**, FCC § 2.987, § 22.915(c)s

4.1 Test Procedure

The RF output of the transceiver was connected to the input of an FM deviation meter through sufficient attenuation so as not to overload the meter or distort the readings. An audio signal generator with a variable attenuator on the output was coupled into the external microphone jack of the transceiver, or alternatively, the microphone element was removed and the generator output was connected to the microphone wires by clip leads.

At three different modulating frequencies, the output level of the audio generator was varied and the FM deviation level was recorded.

4.2 Test Equipment

Marconi 2955A Radio Communication Test Set
Leader LFG-1300S Function Generator
LMV-182 AC Millivoltmeter

4.3 Test Results

Test was not performed. Cell module already certified. FCC ID: KXGAC101 and
FCC ID: AXATR-324-A2.

5.0 **Audio Filter Characteristics**, FCC § 22.915(d)

For mobile stations, these signals must be attenuated, relative to the level at 1 kHz, as follows:

(I) In the frequency ranges of 3.0 to 5.9 kHz and 6.1 to 15.0 kHz, signals must be attenuated by at least 40 log (f/3) dB, where f is the frequency of the signal in kHz.

(ii) In the frequency range of 5.9 to 6.1 kHz, signals must be attenuated at least 35 dB.

(iii) In the frequency range above 15 kHz, signals must be attenuated at least 28 dB.

5.1 Test Procedure

The RF output of the transceiver was connected to the input of an FM deviation meter through sufficient attenuation so as not to overload the meter or distort the readings. An audio signal generator with a variable attenuator on the output was coupled into the external microphone jack of the transceiver, or alternatively, the microphone element was removed and the generator output was connected to the microphone wires by clip leads.

The audio signal at the transceiver audio input was adjusted to obtain 8-9 kHz deviation at the more sensitive modulation frequency (approximately 2.7 kHz). The audio frequency was varied from 300 Hz to 30 kHz and the deviation was measured while maintaining a constant input level. Using the level measured at 1 kHz as a reference (0 dB), the audio filter response was calculated.

The HP 3885A spectrum analyzer having the tracing generator, and the Marconi 2955A Radio Communication Test Set having an output of a demodulator, are used. After the calibration was made (the -20 dBm reading of the spectrum analyzer corresponds to the 9 kHz deviation) the spectrum analyzer was set to scan the frequency from 300 Hz to 30 kHz, with the same audio input level as described above, and with compressor OFF and expander OFF.

5.2 Test Equipment

Marconi Instruments 2955A Radio Communications Test Set
HP 3588A Spectrum Analyzer
HP 7470A Plotter
Leader LFG-1300S Function Generator
LMV-182 AC Millivoltmeter

5.3 Test Results

Test was not performed. Cell module already certified. FCC ID: KXGAC101 and FCC ID: AXATR-324-A2.

6.0 **Emission Limitations, Occupied Bandwidth**, FCC § 22.917(b)(d), FCC § 2.989(b)(1)

For F3E/F3D emission mask uses with audio filter, the mean power of emissions must be attenuated below the mean power of the unmodulated carrier wave (P) as follows:

(1) On any frequency removed from the carrier frequency by more than 20 kHz but not more than 45 kHz: at least 26 dB;

(2) On any frequency removed from the carrier frequency by more than 45 kHz, up to the first multiple of the carrier frequency: at least 60 dB or 43 + 10 log P dB, whichever is the lesser attenuation.

For F1D emission mask, the mean power of emissions must be attenuated below the mean power of the unmodualted carrier (P) as follows:

(1) On any frequency removed from the carrier frequency by more than 20 kHz but no more than 45 kHz: at least 26 dB;

(2) On any frequency removed from the carrier frequency by more than 45 kHz but not more than 90 kHz: at least 45 dB;

(2) On any frequency removed from the carrier frequency by more than 90 kHz, up to the first multiple of the carrier frequency: at least 60 dB or 43 +10 log P dB, whichever is the lesser attenuation.

6.1 Test Procedure

The RF output of the transceiver was connected to the input of the spectrum analyzer through sufficient attenuation. The audio generator was connected to the audio input of the transceiver.

The spectrum with no modulation was recorded. The audio input signal was adjusted to obtain the frequencies deviation equal 6 kHz at the audio frequency of maximum response which was determined measuring deviation versus frequency from 300 Hz to 3.5 kHz and was found 2.8 kHz. The audio input level was increased by 16 dB. The audio frequency was set to the frequency 2.5 kHz.

The resolution bandwidth of the spectrum analyzer was set at 300 Hz and the spectrum was recorded in the frequency band ±50 kHz and ±100 kHz from the carrier frequency. The same plots has been done for wideband emissions, SAT, ST, DTMF9, Voice, and some of the combinations of these modulating signals and in NAMPS mode.

6.2 Test Equipment

HP 8566B Spectrum Analyzer
Leader LFG-1300S Function Generator
Leader LMV-182 AC Millivoltmeter
Marconi 2955A Radio Communication Test Set
HP 7470A Plotter

6.3 Test Results

Test was not performed. Cell module already certified. FCC ID: KXGAC101 and FCC ID: AXATR-324-A2.

7.0 **Out of Band Emissions at Antenna Terminals** , FCC § 22.917(e), FCC § 22.917(f)

Out of Band Emissions:

The mean power of emissions must be attenuated below the mean power of the unmodulated carrier (P) on any frequency twice or more than twice the fundamental frequency by at least 43 + 10 log P dB.

Mobile Emissions in Base Frequency Range:

The mean power of any emissions appearing in the base station frequency range from cellular mobile transmitters operated must be attenuated to a level not to exceed -80 dBm at the transmit antenna connector.

7.1 Test Procedure

The RF output of the transceiver was connected to a spectrum analyzer through appropriate attenuation. The resolution bandwidth of the spectrum analyzer was set at 30 kHz. The audio modulating signal was adjusted like it is described in Section 6.1 of this report. Sufficient scans were taken to show the outband emissions if any up to 10th harmonic.

7.2 Test Equipment

HP 8566B Spectrum Analyzer
Leader LFG-1300S Function Generator
Leader LMV-182 AC Millivoltmeter

7.3 Test Results

Test was not performed. Cell module already certified. FCC ID: KXGAC101 and
FCC ID: AXATR-324-A2.

8.0 **Field Strength of Spurious Radiation**, FCC § 2.993, § 22.917(e)

8.1 Test Procedure

The measurement antenna was placed at a distance of 3 meters from the EUT. During the tests, the antenna height and polarization as well as EUT azimuth were varied in order to identify the maximum level of emissions from the EUT.

The frequency range up to tenth harmonic of each of the three fundamental frequency (low, middle, and high channels) was investigated.

The spurious emissions attenuation was calculated as the difference between Field Strength in dB(uV/m) at the fundamental frequency (See Section 3) and at the spurious emissions frequency.

8.2 Test Equipment

EMCO 3115 Horn Antenna
HP 8566B Spectrum Analyzer
Tektronix 2782 Spectrum Analyzer
Low Pass Filter
Preamplifier

8.3 Test Results

Refer to the attached data sheets.

Test Result:	Passes

INTERTEK TESTING SERVICES

Company:	Advanced Business Sciences, Inc.	Project #:	J980
EUT:	Monitoring Device	Date of Test:	10/19/98
Model:	1701	Test Site #:	1
Test Mode:	Tx at Low Channel	Engineer:	Ollie Moyrong

FCC Part 22 Radiated Emissions

Frequency (MHz)	Antenna Location (m)	Antenna Polariz. (H=0/V=1)	Reading (dBuV)	Antenna Factor (dB/m)	Preamp (dB)	Correction Factor (dB)	Cable Loss (dB)	Corrected Reading (dBuV/m)	Spurious Attenuation (dB)	Margin (dB)	
825.0	3.0	1	98.6	22.0	0.0	0.0	0.5	121.1	N/A	N/A	
1650.0	3.0	1	49.8	24.7	0.0	0.0	1.5	76.0	45.1	-7.4	
2475.0	3.0	1	32.7	28.1	0.0	0.0	2.3	63.1	58.0	-20.3	
3300.0	3.0	1	47.9	30.2	-27.9	0.0	2.5	52.7	68.4	-30.7	
4125.0	3.0	1	35.5	32.4	-27.9	0.0	2.9	42.9	78.2	-40.5	
4950.2	3.0	1	38.3	32.2	-28.1	0.0	3.2	45.6	75.5	-37.8	
5775.2	3.0	1	30.1	34.4	-28.3	0.0	3.7	39.9	81.2	-43.5	*
6600.2	3.0	1	36.9	34.0	-28.0	0.0	4.2	47.1	74.0	-36.3	*
7425.2	3.0	1	36.2	35.8	-28.0	0.0	4.3	48.3	72.8	-35.1	*
8250.2	3.0	0	36.3	37.0	-27.2	0.0	4.8	50.9	70.2	-32.5	*

Note: Negative signs (-) in the Margin column signify levels below the limit.
'*' indicates noise floor measurements.

INTERTEK TESTING SERVICES

Company:	Advanced Business Sciences, Inc.	Project #:	J980
EUT:	Monitoring Device	Date of Test:	10/19/98
Model:	1701	Test Site #:	1
Test Mode:	Tx at Middle Channel	Engineer:	Ollie Moyrong

FCC Part 22 Radiated Emissions

Frequency (MHz)	Antenna Location (m)	Antenna Polariz. (H=0/V=1)	Reading (dBuV)	Antenna Factor (dB/m)	Preamp (dB)	Correction Factor (dB)	Cable Loss (dB)	Corrected Reading (dBuV/m)	Spurious Attenuation (dB)	Margin (dB)	
837.0	3.0	1	98.0	22.3	0.0	0.0	0.5	120.8	N/A	N/A	
1674.0	3.0	0	50.4	24.7	0.0	0.0	1.5	76.6	44.2	-6.4	
2511.0	3.0	1	30.5	28.1	0.0	0.0	2.3	60.9	59.9	-22.1	
3348.0	3.0	0	44.0	30.2	-27.9	0.0	2.5	48.8	72.0	-34.2	
4185.0	3.0	1	31.3	32.4	-27.9	0.0	2.9	38.7	82.1	-44.3	
5022.0	3.0	1	37.4	32.2	-28.1	0.0	3.2	44.7	76.1	-38.3	
5859.0	3.0	1	36.9	34.4	-28.3	0.0	3.7	46.7	74.1	-36.3	*
6696.0	3.0	1	37.0	34.0	-28.0	0.0	4.2	47.2	73.6	-35.8	*
7533.0	3.0	1	36.8	35.8	-28.0	0.0	4.3	48.9	71.9	-34.1	*
8370.0	3.0	1	36.5	37.0	-27.2	0.0	4.8	51.1	69.7	-31.9	*

Note: Negative signs (-) in the Margin column signify levels below the limit.
'*' indicates noise floor measurements.

INTERTEK TESTING SERVICES

Company:	Advanced Business Sciences, Inc.	Project #:	J980
EUT:	Monitoring Device	Date of Test:	10/19/98
Model:	1701	Test Site #:	I
Test Mode:	Tx at High Channel	Engineer:	Ollie Moyrong

FCC Part 22 Radiated Emissions

Frequency (MHz)	Antenna Location (m)	Antenna Polariz. (H=0/V=1)	Reading (dBuV)	Antenna Factor (dB/m)	Preamp (dB)	Correction Factor (dB)	Cable Loss (dB)	Corrected Reading (dBuV/m)	Spurious Attenuation (dB)	Margin (dB)	
849.0	3.0	1	97.2	22.5	0.0	0.0	0.5	120.2	N/A	N/A	
1697.9	3.0	1	51.6	24.7	0.0	0.0	1.5	77.8	42.4	-4.7	
2546.9	3.0	1	31.1	28.1	0.0	0.0	2.3	61.5	58.7	-21.0	
3395.9	3.0	1	54.3	30.2	-27.9	0.0	2.5	59.1	61.1	-23.4	
4244.9	3.0	1	33.1	32.4	-27.9	0.0	2.9	40.5	79.7	-42.0	
5093.9	3.0	1	35.6	32.2	-28.1	0.0	3.2	42.9	77.3	-39.6	
5942.9	3.0	1	36.7	34.4	-28.3	0.0	3.7	46.5	73.7	-36.0	*
6791.9	3.0	1	36.4	34.0	-28.0	0.0	4.2	46.6	73.6	-35.9	*
7640.9	3.0	1	36.6	35.8	-28.0	0.0	4.3	48.7	71.5	-33.8	*
8489.9	3.0	1	36.3	37.0	-27.2	0.0	4.8	50.9	69.3	-31.6	*

Note: Negative signs (-) in the Margin column signify levels below the limit.
'*' indicates noise floor measurements.

ITS Intertek Testing Services

Company: Advnced Business Sciences
Project #: J98018957
Model: 1701
Engineer: Xi-Ming Yang
Date of test: August 3, 1998

FCC 15 B Radiated Emissions

Frequency	Antenna Polarity	Reading	Antenna Factor	Pre-amp	Distance Factor	Corrected Reading	Limit	Margin
MHz	H/V	dB(uV)	dB(1/m)	dB	dB	dB(uV/m)	dB(uV/m)	dB
34.0	V	25.0	9.2	0.0	0.4	34.6	40.0	-5.4
118.2	H	35.7	7.0	0.0	0.6	41.3	43.5	-2.2
128.9	H	27.0	8.3	0.0	0.6	35.9	43.5	-7.6
372.3	H	13.5	13.0	0.0	1.2	27.7	46.0	-18.3
384.0	H	11.9	12.9	0.0	1.2	26.0	46.0	-20.0
400.9	H	11.6	16.3	0.0	1.3	29.2	46.0	-16.8

Note: 1. **All measurement were made at 3 meters**
2. **Negative signs (-) in the margin column signify levels below the limit.**

9.0 **Line Conducted Emissions**, FCC § 15.107

9.1 Test Procedure

Test procedure described in the ANSI C63.4 Standard was employed.

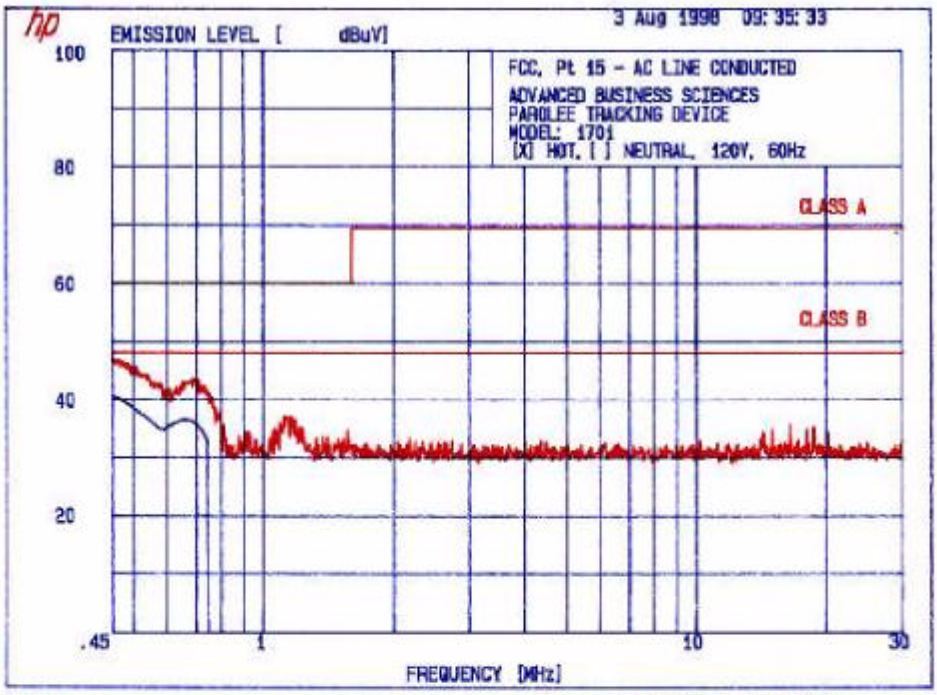
The EUT was connected to the AC line through the LISNs.

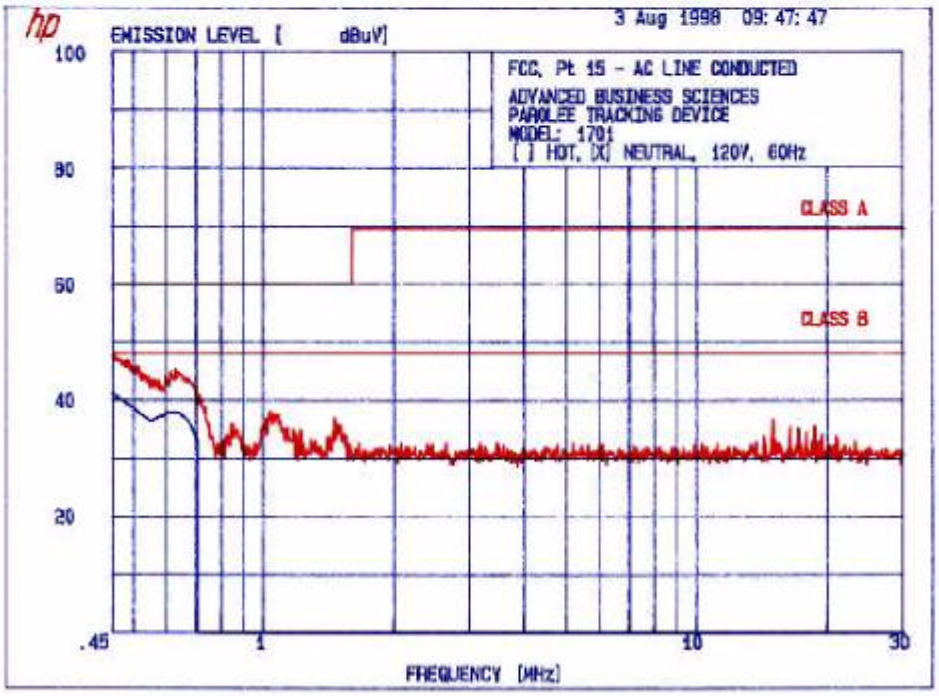
Both HOT and NEUTRAL leads were tested.

9.2 Test Results - Line Conducted Emissions

Refer to the attached data sheet.

Test Result:	Passes


hp
EMISSION LEVEL [dBuV]
3 Aug 1998 09:35:33
FCC, Pt 15 - AC LINE CONDUCTED
ADVANCED BUSINESS SCIENCES
PAROLEE TRACKING DEVICE
MODEL: 1701
[X] HOT, [ ] NEUTRAL, 120V, 60Hz
CLASS A
CLASS B
100
80
60
40
20
.45
1
10
30
FREQUENCY [MHz]


hp
EMISSION LEVEL [dBuV]
3 Aug 1998 09:47:47
FCC, Pt 15 - AC LINE CONDUCTED
ADVANCED BUSINESS SCIENCES
PAROLEE TRACKING DEVICE
MODEL: 1701
[ ] HOT, [X] NEUTRAL, 120V, 60Hz
CLASS A
CLASS B
100
80
60
40
20
.45
1
10
30
FREQUENCY [MHz]

10.0 **Frequency Stability vs Temperature**, FCC § 2.995(a), § 22.355
Frequency Tolerance: ±2.5 ppm

10.1 Test Procedure

The equipment under test was connected to an external DC power supply and the RF output was connected to a frequency counter via feedthrough attenuators. The EUT was placed inside the temperature chamber. The DC leads, RF output cable, and external PTT cable exited the chamber through an opening made for that purpose.

After the temperature stabilized for approximately 20 minutes, the external PTT switch was activated, and the frequency output was recorded from the counter.

10.2 Test Equipment

Temperature Chamber, -50C to +100C
Hewlett Packard 5383A Frequency Counter
Goldstar DC Power Supply, GR303
Rohde & Schwarz ESVP Test Receiver

10.3 Test Results

Test was not performed. Cell module already certified. FCC ID: KXGAC101 and FCC ID: AXATR-324-A2.

11.0 **Frequency Stability vs Voltage**, FCC § 2.995(d)(2), § 22.355
Frequency Tolerance: ±2.5 ppm

11.1 Test Procedure

An external variable DC power supply was connected to the battery terminals of the equipment under test. The voltage was set to 115% of the nominal value and was then decreased until the transmitter light no longer illuminates; i.e., the battery end point. The output frequency was recorded for each battery voltage.

11.2 Test Equipment

Hewlett Packard 5383A Frequency Counter
DC Power Supply
Rohde & Schwarz ESVP Test Receiver

11.3 Test Results.

Test was not performed. Cell module already certified. FCC ID: KXGAC101 and FCC ID: AXATR-324-A2.