RF ENERGY EMISSION TEST REPORT

OF THE

Caring Technologies Inc.

Fall Alert 313

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12/9/99
HWI1ex6

FCC ID: NKM313

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SUMMARY

The testing was performed under the provisions of ANSI C63.4/1992 and the OATS was calibrated in accordance with ANSI C63.4/1992.

The Fall Alert 313, is hereafter referred to as the UUT. The UUT, with test setup as described in the block diagram of Appendix II, **PASSES** all the radiated requirements of the FCC Part 15, Subpart C regulations for a low power transmitter operating at 313.52 MHz pursuant to Section 15.231 of the Rules.

Conducted Emissions are not required since this unit runs only on batteries which cannot be re-charged while inserted into the unit.

The maximum field strength of the fundamental, measured with an "average" detector, was 56 dbμv/m versus a specification of 75.5 db. With the "peak" detector selected. the maximum field strength of the fundamental was 79 dbμv/m versus a specification of 95.5 db.

The bandwidth of the intentional emission was .012% versus a specification of .25%.

The spurious radiated emissions which came closest to the limit are as follows, rounded to the nearest db:

FREQUENCY (MHz)	EMISSION LEVEL (dbμv/meter)	Polarization	MARGIN(db)	TABLES Appendix I
940.54	32	Horizontal	-23.5	1
1254.1	49	Horizontal	-24.5	1
1567.05	43	Vertical	-4.5	2
1881	40	Vertical	-13.5	2

For more details, see Appendix I, Tables 1 - 6 and GRAPHS 1 - 2. A negative margin means that the emissions are under the specified limit by the indicated amount.

The antenna is internal to the unit and not accessible to the user and meets the requirements of 15.203 of the Rules.

INFORMATION SUPPLIED TO THE USER

The manual contains a cautionary statement required by Section 15.21 of the FCC rules for an intentional radiator."

> ***CAUTION: Changes or modifications not expressly approved or authorized by the manufacturer may violate the compliance of this equipment to the Class B limits for a digital device and could, thereby, void the users authority to operate the equipment.***

The label on the outside of the equipment enclosure contains the FCC ID and the following text:

> **FCC ID:** NKM313
> This device complies with Part 15 of the FCC Rules.
> Operation is subject to the following two conditions:
> (1) this device may not cause harmful interference,
> and (2) This device must accept any interference
> received, including interference that may cause
> undesired operation.

Caring Technologies shall maintain records listed in Section 2.938 of the FCC rules.

1.0 SCOPE AND OBJECTIVE OF TEST

To determine the degree of compliance of products to the Federal Communications Commission Part 15 Subpart C requirements for intentional radiators which limit emissions of Low Power Transmitter Devices pursuant to pp 15.231 through the certification process.

2.0 UNIT TESTED

The Fall Alert Security System, manufactured by Caring Technologies Inc, 5910 N Central Expressway, Dallas, Texas 75206, hereafter referred to as the UUT, is intended to be worn by persons at risk of falling. If a fall or other alarm condition is detected, the unit transmits an alarm signal to a wall receiver and then into an existing Emergency Response Center.

3.0 FACILITY REQUIREMENTS

3.1 Site Attenuation

The radiated testing described herein was accomplished on the METRUM OATS which is located at 4800 E. Dry Creek Road, Littleton, CO 80122. This site meets the requirements of FCC 47 CFR rules, Section 2.948. Refer to FCC File # 31040/SIT/1300F2 for a detailed description of the site. The test area is free of reflecting objects in an area as defined in Figure 1, Appendix III.

3.2 Instrumentation

Polarad ESV Receiver, #6003594, calibrated 2/10/99, calibration due 2/10/2000

Polarad ESH2 Receiver, #6003696, calibrated 3/8/99, calibration due 3/8/2000.

Rhode & Schwarz HFH2-Z2 Magnetic Field Active Loop Antenna, 10 KHz - 30 MHz.

HP 8565A Spectrum Analyzer, s/n 2210A02349, 100 MHz - 18 GHz, Calibrated 9/27/99, Calibration Due 3/27/2000.

Ailtech 94455-1 Biconical Antenna, 30 -200 MHz, Cal'd 8/3/99, Cal Due 8/3/2000.

Ailtech 96005 Log Periodic Antenna, 200 MHz - 1 GHz, Cal'd 8/3/99, Cal Due 8/3/2000.

AH Systems Horn Antenna, model SAS-200/571, s/n 339, 1-18 GHz, Calibrated 4/14/99, No re-calibration required.

Avantek UTC 10-220-1 25 db Preamp, #211.093, Calibrated 3/8/99, calibration due 3/8/2000.

JCA Technology JCA 15-416, 40 db preamp, # 6010088, 1-5 GHz, Calibrated 9/3/99, Calibration Due 9/3/2000.

4.0 SPURIOUS RADIATED TEST PROCEDURE AND RESULTS

4.1 Procedure

4.1.1 Setup of equipment on the test site, for detailed measurements, was according to Figure 2, Appendix III and the block diagram of Appendix II. **The ANSI C63.4/1992 measurement procedure was followed.**

4.1.2 The UUT was placed in a special test mode which caused it to transmit continuously for ease of making the measurements. In reality the transmission would occur infrequently. During the transmissions, there are bursts of data lasting 12.5 msec, spaced about 125 msec apart which automatically stop after 3 seconds. This results in a 10% duty cycle. See Figures 3 & 4 of Appendix III. Over 100 msec, this produces an "average factor of 18 db. (See 4.1.9)

Initially, two conditions were tested:

4.1.2.1 UUT Flat on its back, top at 0◦ with the measuring antenna - horizontally polarized and vertically polarized.

4.1.2.2 The UUT standing up with the keypad facing the measuring antenna which was horizontally and vertically polarized.

4.1.3 Perform all measurements at 3 meters at the METRUM OATS. Adjust the antenna height between 1 - 4 meters and the UUT rotated to maximize the emissions during the survey. Perform a preliminary survey with each antenna and polarization (2 setups as in 4.1.2) while tuning the ESV receiver in the 'Average" detection mode with 120 kHz bandwidth) from 30 MHz - 1 GHz in accordance with ANSI C63.4-1992, Appendix D procedure. From 1-5 GHz, tune the HP 8565A spectrum analyzer at 1 MHz bandwidth to find the harmonics of the fundamental and any other spurious components. There were no interface cables to adjust. Also perform preliminary measurements of the magnetic field strength inside a shielded room from 32.768 KHz to 30 MHz.

4.1.4 At the conclusion of the preliminary survey for each antenna/polarization combination at the two UUT orientations, record the maximum field strength at each significant frequency found with the height of the antennas remotely and automatically varied between 1 and 4 meters off the ground plane. The orientation of the UUT which produced the maximum field strength was obtained by remotely rotating an automatic turntable and recording the angle as indicated in Tables 1 - 2. Only the frequencies which produced the highest emissions are reported.

4.1 Procedure (cont)

UUT orientation in Tables 1 & 2 is defined as follows:

TOP
0
LEFT 90 270 RIGHT
180
BOTTOM

4.1.7 The specified limit is 55.5 db from 32.768 KHz to 3.135 GHz

Separation (Meters) is 3.

4.1.8 The radiated signal level, in dbμV vs. frequencies found, was determined from the correction factors found in Appendix II. The receiver reads directly in dbμV.

Below 1000 MHz

Emission level = Receiver reading (dbμV) + antenna factor + cable loss - Preamp Gain.

Above 1000 MHz

Emission level = Analyzer Peak reading (dbμV) + antenna factor + cable loss - Preamp Gain - AV.

AV is the average factor from 4.1.2

4.1.9 Calculation

Above 1000 MHz

As an example in Table 1 of Appendix I, the 49 dbμV/m level at 1.254 GHz was calculated using the formula in paragraph 4.1.5. From Appendix II, the antenna factor is 23.8 db. From Appendix II, the cable loss is 3.6 db. The analyzer reading was 66 dbμV. The preamp gain is 44.7 db. AV = -18

Emission Level (1254 MHz) = 66 + 23.8 + 3.7 - 44.7 - 18 db = 29 dbμV/m.

There were no other factors involved such as external attenuators which would modify the calculations. The internal RF attenuation of the ESV receiver and the analyzer were kept at 10 db minimum, but both instruments take this into account so it does not enter into the calculation.

4.2 Results

Preliminary tests showed the 4.1.2.1 orientation of the UUT to be the noisiest. Therefore only this horizontal orientation was reported.

Also, the magnetic field survey from 32 KHz to 30 MHz, inside the shielded room, detected NO measurable emissions. As a result, no detailed measurements were performed outside at the OATS over this frequency range.

See Appendix I, Tables 1 - 2 and GRAPHS 1 - 2.

Table 1/Graph 1:	UUT on its back(horizontal) and the receive antenna horizontal.(condition 4.1.2.1).
Table 2/Graph 2:	UUT on its back(horizontal) and the receive antenna vertical.(condition 4.1.2.1)

See photographs of Exhibit 7.

The temperature at the time the final radiated measurements were taken was around 75 ◦F.

The measurement bandwidth was 120 KHz with the average detector selected from 30 MHz - 1 GHz. Above 1 GHz, the measurement bandwidth was 1 MHz.

5.0 TRANSMIT FREQUENCY & OCCUPIED BANDWIDTH

5.1 PROCEDURE

5.1.1 Setup the UUT on the OATS as in pp 4.0 of this procedure. The photographs of Exhibit 7 are also applicable to these measurements. Perform measurements with each antenna polarization combination of pp 4.1.2. plus two more measurements with the cross polarization configurations at a distance of 3 meters.

5.1.2 When measuring the maximum transmit field strength, set the ESV receiver detector function to "average" and the resolution bandwidth to 120 KHz. Repeat the measurement in "peak" mode with 120 KHz bandwidth.

5.1.3 When measuring the field strength at the 20 db down frequencies on either side of the main 313.52 MHz emission, set the ESV receiver detector function to "average" and the resolution bandwidth to 12 KHz. Slowly tune up and down from the main carrier and determine the emissions level which is 20 db lower than the maximum carrier level.

5.1.4 During the measurements of 5.1.2 to 5.1.3, the antenna is raised between 1 & 4 meters and the turntable is rotated 360◦ in order to maximize the emissions.

5.2 RESULTS

The "average" and "peak" level of all four polarization combinations are reported in Appendix I, Tables 3 - 6. The UUT met these requirements. When the center of the transmit frequency was measured in "peak" mode, the level was 16 db under the peak limit of 95.5 db.

The sample calculations of pp 4.1.9 apply here as well.

Appendix I

TABLE 1

Polarization: Horizontal
Antennas: AilTech Biconical & Log Periodic
Test Distance: 3 Meters
Product: Fall Alert 313 with the unit on its back.
Mode: Transmitting Continuously with data and carrier.
Date: 10/21/99; spurious radiated

		degrees	dbuv	dbuv/m	FCC 15.231
Freq(MHz)	Uncorrected Level (db)	Azimuth	Correction Factor(db)b	Corrected Level(db)	Margin (db)
627.016a	35	142	-3	32	-23.5
940.54a	31	146	2	33	-22.5
1254.1c	72	146	-(17+18)	35	-18.5
1567.05c	71	55	-(17+18)	34	-19.5
1881c	53	180	-(15+18)	18	-35.5
2194.5c	47	182	-(13+18)	14	-39.5
2508d	44	360	-(11+18)	12	-41.5
2821.5d	33	0	-(10+18)	3	-50.5
3135.2d	33	0	-(8+18)	5	-48.5

a Average - 120 KHz bandwidth

b Where 20 db is added to the correction factor, this is the average factor for the 10% duty cycle calculated in 4.1.2 when making peak measurements with the 8565A analyzer. Otherwise, the only factor is from the tables in Appendix 2.

c Peak, 1 MHz Bandwidth.
d Peak, 100 KHz bandwidth

Negative Margin means the emissions are that much under the limit.

TABLE 2

Polarization: Vertical
Antennas: AilTech Biconical & Log Periodic, AH Systems Horn
Test Distance: 3 Meters
Product: Fall Alert 313 Reader with the unit on its back.
Mode: Transmitting Continuously with data and carrier.
Date: 10/21/99; spurious radiated

		degrees	dbuv	dbuv/m	FCC 15.209
Freq(MHz)	Uncorrected	Azimuth	CorrectionFactor(db) b	Corrected Level(db)	Margin (db)
64a	18	0	-18	0	-55.5
66a	18	0	-18	0	-55.5
134a	17	148	-10	7	-48.5
627.06a	28	0,360	-2	26	-29.5
940.54a	20	49	3	23	-32.5
1254.1c	69	275	-(17+18)	32	-21.5
1567.05c	86	87	-(17+18)	49	-4.5
1881c	75	87	-(15+18)	40	-13.5
2194.5c	63	212	-(13+18)	30	-23.5
2508c	64	180	-(11+18)	33	-20.5
2821.8c	53	180	-(10+18)	23	-30.5
3135.2c	54	90	-(8+18)	26	-27.5

a Average - 120 KHz bandwidth
b See Table 1.
c Peak, 1 MHz bandwidth

Negative margin indicates emission is under the specified limit.

Table 3

Polarization: Horizontal Receive, Horizontal UUT (flat on its back)
Antennas: AilTech
Test Distance: 3 Meters
Product: Fall Alert 313
Mode: Transmitting Continuously with data and carrier bursts.
Date: 10/21/99; Fundamental level and bandwidth.

		degrees	dbuv	dbuv/m	FCC 15.231
Freq(MHz)	Uncorrected	Azimuth	Correction Factor(db)	Corrected Level(db)	Limit (db)
313.52a	65	98,270	-9	56	75.5
313.52b	88	98	-9	79	95.5
313.537c**	45	98	-9	36	55.5
313.498d**	45	98	-9	36	55.5

** Upper and Lower Bandwidth Points

a ESV Receiver set to 120 KHz Bandwidth, Average Detector
b ESV Receiver set to 120 KHz Bandwidth, Peak Detector
c ESV Receiver set to 12 KHz Bandwidth, Average Detector, Upper Bandedge
d ESV Receiver set to 12 KHz Bandwidth, Average Detector, Lower Bandedge

The above table shows that the bandwidth is +17 KHz and - 22 KHz or .012% of the center frequency verses a spec of .25%.

Table 4

Polarization: Horizontal Receive, Vertical UUT (on end)
Antennas: AilTech
Test Distance: 3 Meters
Product: Fall Alert 313
Mode: Transmitting Continuously with data and carrier bursts.
Date: 10/21/99; Fundamental level.

	degrees	dbuv	dbuv/m	FCC 15.231
Freq(MHz)	Uncorrected	Azimuth	Correction Factor(db)	Corrected Level(db)	Limit (db)
313.52 a	61	250	-9	52	75.5

a ESV Receiver set to 120 KHz Bandwidth, Average Detector

Table 5

Polarization: Horizontal Receive, Vertical UUT (on end)
Antennas: AilTech
Test Distance: 3 Meters
Product: Fall Alert 313
Mode: Transmitting Continuously with data and carrier bursts.
Date: 10/21/99; Fundamental level.

		degrees	dbuv	dbuv/m	FCC 15.231
Freq(MHz)	Uncorrected	Azimuth	Correction Factor(db)	Corrected Level(db)	Limit (db)
313.52 a	51	318	-9	42	75.5

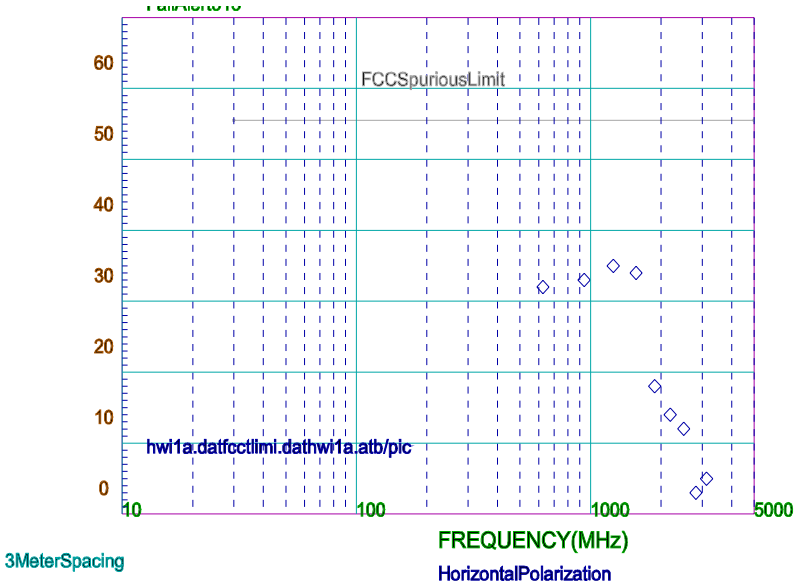
a ESV Receiver set to 120 KHz Bandwidth, Average Detector

Table 6

Polarization: Vertical Receive, Horizontal UUT
Antennas: AilTech
Test Distance: 3 Meters
Product: Fall Alert 313
Mode: Transmitting Continuously with data and carrier bursts.
Date: 10/21/99; Fundamental level.

	degrees	dbuv	dbuv/m	FCC 15.231
Freq(MHz)	Uncorrected	Azimuth	Correction Factor(db)	Corrected Level(db)	Limit (db)
313.52 a	52	0	-9	43	75.5

a ESV Receiver set to 120 KHz Bandwidth, Average Detector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3MeterSpacing
HorizontalPolarization
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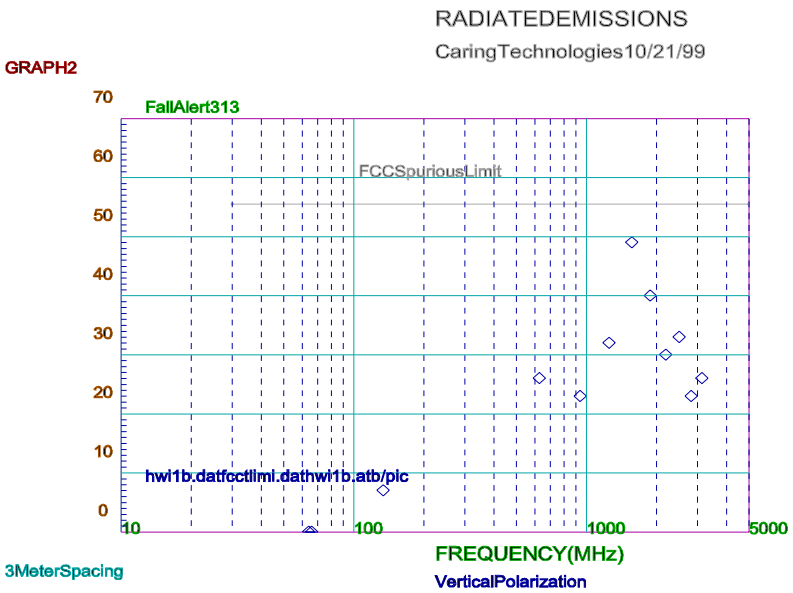
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CaringTechnologies10/21/99
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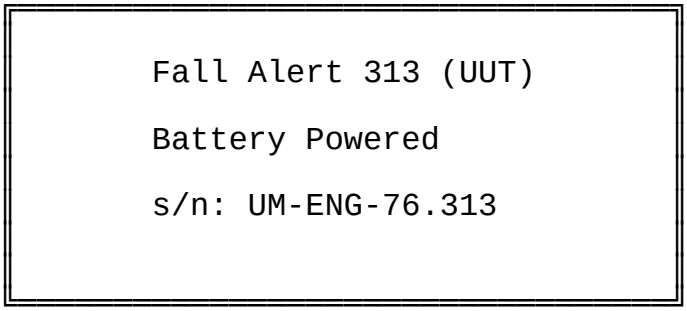
FREQUENCY(MHz)
3MeterSpacing
VerticalPolarization
FieldStrength(dbuv/m)

Table of Oscillator Frequencies

32.768 KHz, 4 MHz, 313.52 MHz

UUT BLOCK DIAGRAM



Appendix II

3 Meter Spacing/ AilTech Antennas 8/3/99

FREQ. (MHz)	Antenna Factor (db)	Preamp Gain(db)	Cable Loss(db)	Total Factor
30	13	25.3	.5	-11.8
35	13.3	25.3	.5	-11.5
40	13.3	25.2	.6	-11.3
45	12	25.2	.7	-12.5
50	10.7	25.2	.8	-13.7
55	9.2	25.2	.8	-15.2
60	7.8	25.2	.8	-16.6
65	6.4	25.2	.8	-18.0
70	5.8	25.2	.8	-18.6
75	6.9	25.1	.9	-17.3
80	8.3	25.1	.9	-15.9
85	9.6	25.1	.9	-14.6
90	10.8	25.1	.9	-13.4
95	10.9	25.1	1	-13.2
100	10.6	25.1	1	-13.5
105	10.8	25.1	1	-13.3
110	10.6	25.1	1	-13.5
115	10.2	25	1	-13.8
120	10.8	25	1	-13.2
125	12	25	1	-12.0
130	12.8	25	1.1	-11.1
135	13.8	25	1.1	-10.1
140	15.1	24.9	1.1	-8.7
145	15.9	24.9	1.1	-7.9
150	16.3	24.9	1.1	-7.5
155	16.8	24.9	1.2	-6.9
160	16.7	24.9	1.2	-7.0

Avantek UTC10-220-1 Preamp
106' of LDF5-50A + 20' of FSJ1 + 20' of FSJ4

FCC ID: NKM313

FREQ. (MHz)	Antenna Factor (db)	Preamp Gain(db)	Cable Loss(db)	Total Factor
165	16.1	24.9	1.2	-7.6
170	15.7	24.9	1.2	-8.0
175	15	24.8	1.2	-8.6
180	13.6	24.8	1.2	-10.0
185	13.5	24.8	1.2	-10.1
190	14	24.8	1.3	-9.5
195	16.6	24.8	1.3	-6.9
200	16.4	24.8	1.3	-7.1
200	11.2	24.8	1.3	-12.3
210	11.0	24.7	1.3	-12.4
220	10.2	24.7	1.3	-13.2
230	11.0	24.7	1.4	-12.3
240	11.4	24.6	1.4	-11.8
250	11.9	24.6	1.4	-11.3
260	12.3	24.6	1.4	-10.9
270	13.3	24.5	1.5	-9.7
280	13.9	24.5	1.5	-9.1
290	14.4	24.5	1.5	-8.6
300	15.3	24.4	1.6	-7.5
310	14.4	24.4	1.6	-8.4
320	13.9	24.4	1.6	-8.9
330	14.3	24.4	1.7	-8.4
340	14.6	24.4	1.7	-8.1
350	14.6	24.4	1.7	-8.1
360	14.5	24.4	1.8	-8.1
370	14.5	24.3	1.8	-8.0
380	14.8	24.3	1.8	-7.7

Avantek UTC 10-220-1 Preamp
106' of LDF5-50A + 20' of FSJ1 + 20' of FSJ4

FCC ID: NKM313

3 Meter Spacing/Ailtech Antennas 8/3/99

FREQ. (MHz)	Antenna Factor (db)	Preamp Gain(db)	Cable Loss(db)	Total Factor
390	15	24.3	1.9	-7.4
400	15.6	24.3	1.9	-6.8
425	15.6	24.3	2	-6.7
450	16.5	24.4	2.1	-5.8
475	17.6	24.5	2.1	-4.8
500	18.1	24.5	2.2	-4.2
525	17.7	24.6	2.2	-4.7
550	17.8	24.6	2.3	-4.5
575	18.5	24.6	2.4	-3.7
600	18.7	24.6	2.5	-3.4
625	19.1	24.7	2.5	-3.1
650	19.9	24.7	2.6	-2.2
675	20.8	24.7	2.6	-1.3
700	20.8	24.7	2.7	-1.2
725	20.6	24.8	2.7	-1.5
750	20.5	24.8	2.8	-1.5
775	20.7	24.8	2.9	-1.2
800	21.3	24.8	2.9	-0.6
825	22.1	24.7	2.9	0.3
850	22.9	24.7	3	1.2
875	23	24.6	3	1.4
900	22.8	24.6	3.1	1.3
925	22.8	24.5	3.1	1.4
950	23.3	24.5	3.1	1.9
975	23.9	24.3	3.2	2.8
1000	24.5	24.2	3.2	3.5

Avantek UTC 10-220-1 preamp
106' of LDF5-50A + 20' of FSJ1 + 20' of FSJ4

FCC ID: NKM313

3 Meter Spacing/AH Systems Antenna 8/3/99

FREQ. (GHz)	Antenna Factor (db)	Preamp Gain(db)	Cable Loss(db)	Total Factor
1.0	23.2	43.8	3.2	-17.4
1.1	23.4	44.1	3.4	-17.3
1.2	23.7	44.4	3.5	-17.2
1.3	23.8	44.6	3.7	-17.1
1.4	23.9	45	3.9	-17.2
1.5	24.2	45.2	4.1	-16.9
1.6	24.6	45.2	4.2	-16.4
1.7	25	45.3	4.4	-15.9
1.8	25.7	45.4	4.5	-15.2
1.9	26.9	45.4	4.7	-13.8
2	27.8	45.5	4.8	-12.9
2.1	27.9	45.2	4.8	-12.5
2.2	28	44.8	4.9	-11.9
2.3	28.1	44.5	5.1	-11.3
2.4	28.2	44.1	5.2	-10.7
2.5	28.2	43.8	5.3	-10.3
2.6	28.5	43.6	5.4	-9.7
2.7	28.8	43.6	5.5	-9.3
2.8	29.1	43.6	5.6	-8.9
2.9	29.4	43.5	5.8	-8.3
3.0	29.7	43.4	6	-7.7

JCA Technology JCA15-416 Preamp
106' of LDF5-50A + 20' of FSJ1 + 20' of FSJ4

3 Meter Spacing/AH Horn Antenna 8/3/99

FREQ. (GHz)	Antenna Factor (db)	Preamp Gain(db)	Cable Loss(db)	Total Factor
3.1	29.9	43.4	6.1	-7.4
3.2	30	43.3	6.2	-7.1
3.3	30.1	43.3	6.3	-6.9
3.4	30.1	43.3	6.4	-6.8
3.5	30.2	43.2	6.5	-6.5
3.6	30.6	43.2	6.6	-6.0
3.7	31	43.2	6.7	-5.5
3.8	31.4	43.2	6.8	-5.0
3.9	31.8	43.2	6.9	-4.5
4.0	32.3	43.2	7	-3.9
4.1	32.3	43.2	7.1	-3.8
4.2	32.4	43.2	7.2	-3.6
4.3	32.4	43.2	7.3	-3.5
4.4	32.5	43.2	7.5	-3.2
4.5	32.5	43.2	7.6	-3.1
4.6	32.7	43	7.7	-2.6
4.7	33	42.8	7.8	-2.0
4.8	33.2	42.7	7.9	-1.6
4.9	33.5	42.5	8	-1.0
5.0	33.7	42.4	8.1	-0.6
5.0*	33.7	46.3	13.3	0.7

JCA Technology JCA15-416 Preamp
106' of LDF5-50A + 20' of FSJ1 + 20' of FSJ4
LDF1-50 vs. LDF5-50A