APPLICANT
Fomotech International Corporation
2F-1, 286-3, Hsin Ya Road
Chein, Chen District, Kaoshing, Taiwan

### MANUFACTURER

SAME AS APPLICANT

TEST SPECIFICATION: FCC Rules and Regulations Part 15, Subpart C, Para. 15.231

TEST PROCEDURE: ANSI C63.4:1992

## TEST SAMPLE DESCRIPTION

BRAN <u>DNAME:</u>	Fomotech International Corporation	MODEL:	Alpha 3000				
TYPE:	301 MHz RF Remote Transmitter						
POWER REQUIREMENTS: 4 " <u>AA" Batteries</u>							
FREQUENCY OF OF	PERATION: 301.4 MHz						

### TESTS PERFORMED

Para. 15.231(b), Radiated Emissions, Fundamental and Harmonics

Para. 15.209(c), Radiated Emissions, Spurious Case

Para. 15.231(c), Occupied Bandwidth

Para. 15.35(b), Duty Cycle Determination

### **REPORT OF MEASUREMENTS**

Applicant:

Fomotech International Corporation

Device:

301 MHz RF Remote Transmitter

4 "AA" Batteries

FCC ID:

LZ6ALPHA3000MODEL

Power Requirements:

Applicable Rule Section: Part 15.

Part 15, Subpart

 $\sum_{n=1}^{\infty} Retlif Testing Laboratories$ 







## REPORT OF MEASUREMENTS (continued)

## TEST RESULTS

15.231 (a) -	The device is used as a transmitter for Remote Control purposes.
15.231 (a)(1) & - 15.231(2)	The transmitter is manually operated and ceases transmission within 5 seconds after deactivation.
15.231 (a)(3) -	The transmitter does not perform periodic transmissions.
15.231 (a)(4)-	Not applicable
15.231 (b) -	The fundamental field strength did not exceed 5,460 $\mu$ V/M (Average) at a test distance of 3 meters. In addition, the requirements of section 15.35 for averaging pulsed emissions and for limiting peak emissions were met.
	The field strength of harmonic and spurious emissions did not exceed 546 $\mu$ V/M (AVERAGE).
15.231 (c) -	The device operates at 301.4 MHz. The bandwidth of emissions did not exceed 0.25% of the operating frequency (754 kHz).

## DETERMINATION OF FIELD STRENGTH LIMITS

The field strength limits shown below are found in Section 15.231.

	Freq	uency		Limit
F1	=	260	3750 =	L1
Fo	=	301.4		Lo
F2	=	470	12500 =	L2

The formula below was utilized to determine the limits:

Limit = L1 + [(Fo-F1)(L2-L1)/(F2-F1)]

Solving yields:

Fundamental Limit = 5,460  $\mu$ V/M (AVERAGE) @ 3 Meters

Harmonic Limit = 546  $\mu$ V/M (AVERAGE) @ 3 Meters



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### REPORT OF MEASUREMENTS (continued)

### DETERMINATION OF DUTY CYCLE

The unit's RF output was directly coupled to the input of the spectrum analyzer. The analyzer was set for a frequency span of 0Hz. The sweep time was then adjusted in order to display one full pulse train. The transmitter on time was then summed and compared to the time for one full cycle in order to obtain the duty cycle. (See plots for additional information)

Transmitter On Time	=	92.3 milliseconds (maximum- worst case in 100 ms)
Transmitter Cycle Time	=	245 milliseconds
Transmitter Duty Cycle	=	92.3 %

## SPECTRUM ANALYZER DESENSITIZATION CONSIDERATIONS

Due to the nature of the emissions being measured, care was taken to ensure that the resolution bandwidth of the spectrum analyzer was adequate to provide accurate measurements. The following formula was utilized:

Setting pulse desensitization equal to zero and utilizing the minimum observed pulse width of 92.3 milliseconds yields a minimum required bandwidth of 7.2 Hz. FCC specified bandwidths of 100kHz and 1MHz were utilized below and above 1GHz, respectively.



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## REPORT OF MEASUREMENTS (continued)

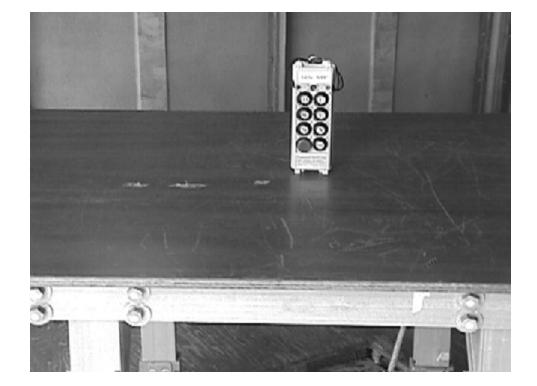
### GENERAL NOTES

- 1. All readings were taken utilizing a peak detector function at a test distance of 3 meters.
- 2. The duty cycle was applied to the peak readings in order to determine the average value of the emissions.
- 3. All measurements were made with 4 "AA" Batteries.
- 4. The frequency range was scanned from 30 MHz to 3.1 GHz. All emissions not reported were more than 20 dB below the specified limit.



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## TEST SETUP PHOTOGRAPH RADIATED EMISSIONS



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## EQUIPMENT LIST

## Radiated Emissions, Transmitter, 30MHz to 3.1GHz

EN	Туре	Manufacturer	Description	Model No.	Cal Date	Due Date
032F	H.P. Filter	Microlab/FXR	2 GHz - 3 GHz	HD-20N	08/20/2001	08/20/2002
032G	H.P. Filter	Microlab/FXR	3 GHz - 6 GHz	HA-30N	04/11/2001	04/11/2002
067	Open Area Test Site	Retlif	3 Meter	RNY	09/20/2000	09/20/2003
128C	Double Ridge Guide	Eaton Corporation	1 GHz - 18 GHz	96001	09/18/2000	09/18/2001
133	Broadband Pre-Amplifier	Electro-Metrics	10 kHz - 1 GHz, 26dB	BPA-1000	06/13/2001	06/13/2002
141	Spectrum Analyzer	Hewlett Packard	100 Hz - 40 GHz	8566B	07/02/2001	01/02/2002
141A	Graphics Plotter	Hewlett Packard	N/A	7470A	03/05/2001	03/05/2002
141B	Quasi-Peak Adaptor	Hewlett Packard	100 Hz - 1 GHz	85650A	02/20/2001	01/02/2002
206B	6.0 dB Attenuator	Texscan	0 - 1.0 GHz	FP-50 - 6 dB	06/13/2001	06/13/2002
3116	Pre-Amplifier	Miteq	0.1 GHz - 18 GHz	AFS42-35	11/07/2000	11/07/2001
523	Biconilog	Electro-Mechanics	26 - 2000 MHz	3142B	06/08/2000	10/08/2001
617	Interference Analyzer	Electro-Metrics	10 kHz - 1 GHz	EMC-30	02/27/2001	02/27/2002



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## FCC 15.231(b) and FCC 15.231(c)

## RADIATED EMISSIONS

(Please see separate e-file attachment named REfundharm.pdf and REspur.pdf)



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## FCC 15.231(c)

## OCCUPIED BANDWIDTH

(Please see separate e-file attachment named Occbw.pdf)



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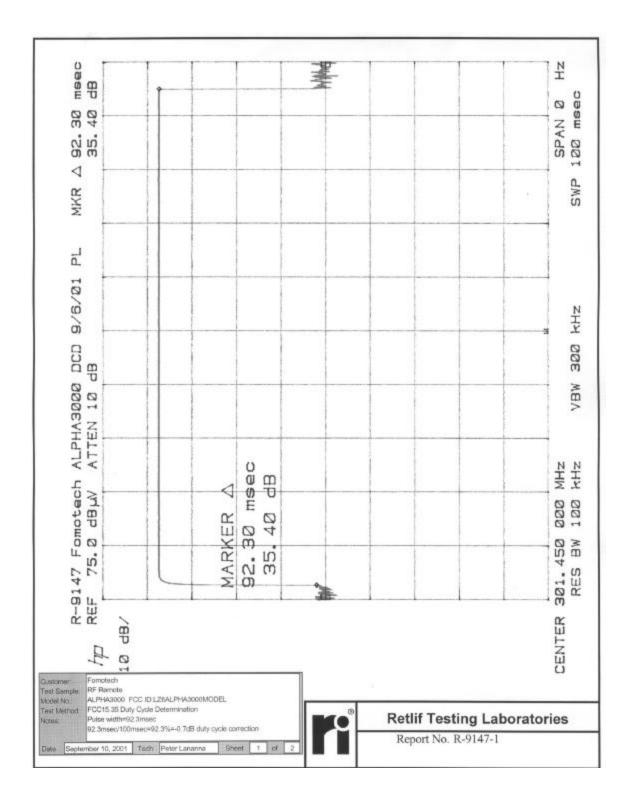
FCC 15.35(b)

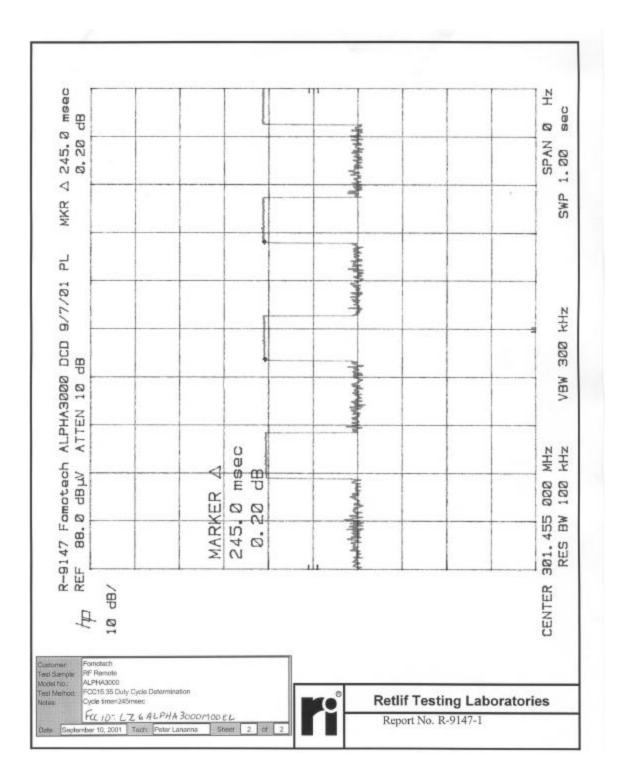
## DUTY CYCLE

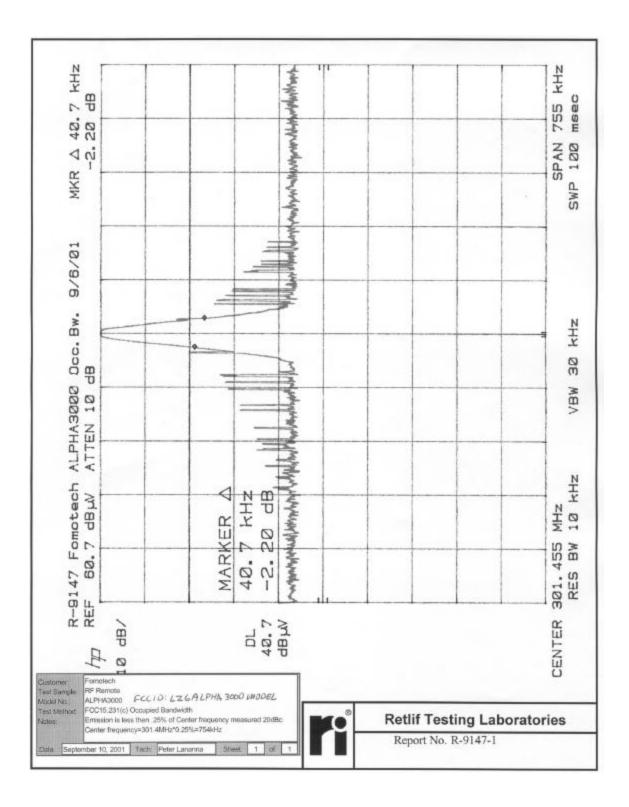
(Please see separate e-file attachment named Dutycycle.pdf)



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		FCC Par	t 15 Subpart C Ra	diated Emission	s, Fundamental	& Harmonic En	nissions	
Customer:		Fomotec	h			Job No.	R-9147-1	
Test Sample:		RF remo	te			Paragraph:	15.231(b)	
Model No.:		ALPHA				FCC ID:	LZ6ALPHA3000M	10DEL
Operating M			ously Transmittin	g a 301 MHz Si	gnal			
Technician:		Peter La	*	6	6	Date:	September 7, 2001	
	Test Distan						~- <b>r</b> ,,	
			ess otherwise spe	cified				
	Anter	nna	EUT	Meter	Correction	Corrected	Converted	Peak
Test Freq.	Pol./He		Orientation	Reading	Factor	Reading	Reading	Limit
MHz	(V/H)/M	leters	X/Y/Z	dBuV	dB	dBuV/m	uV/m	uV/m
301.4	H / 1	.0	X	63.3	-4.4	58.9	881.0	54600
	H/1	.0	Y	65.6	-4.4	61.2	1148.2	
	H/1	.0	Z	68.9	-4.4	64.5	1678.8	
	V / 2	0.0	Х	63.5	-4.4	59.1	901.6	
	V / 2	.0	Y	59.8	-4.4	55.4	588.8	
301.4	V / 1	.0	Z	55.2	-4.4	50.8	346.7	54600
602.9	H/1	0	Х	21.0	3.1	24.1	16.0*	5460
602.9	H/1		X Y	21.0	3.1	24.1	16.0*	3400
	H/1		I Z	21.0	3.1	24.1	16.0*	
	V/1		X	21.0	3.1	24.1	16.0*	
	V / 1		Y	21.0	3.1	24.1	16.0*	
602.9	V / 1		Z	21.0	3.1	24.1	16.0*	5460
904.4	H/1		Х	19.7	8.2	27.9	24.8*	5460
	H / 1		Y	19.7	8.2	27.9	24.8*	
	H/1		Z	19.7	8.2	27.9	24.8*	
	V / 1		X	19.7	8.2	27.9	24.8*	
001.1	V / 1		Y	19.7	8.2	27.9	24.8*	5100
904.4	V / 1	.0	Z	19.7	8.2	27.9	24.8*	5460
1205.8	H/1	.0	Х	42.0	-7.1	34.9	55.6*	5000
	H/1	.0	Y	42.0	-7.1	34.9	55.6*	
	H/1	.0	Z	42.0	-7.1	34.9	55.6*	
	V /1		Х	42.0	-7.1	34.9	55.6*	
	V / 1	.0	Y	42.0	-7.1	34.9	55.6*	
1205.8	V / 1	.0	Z	42.0	-7.1	34.9	55.6*	5000
1507.3	H/1	0	X	42.0	-4.5	37.5	75.0*	5000
	H/1		Y	42.0	-4.5	37.5	75.0*	
	H/1		Z	42.0	-4.5	37.5	75.0*	
	V /1		X	42.0	-4.5	37.5	75.0*	
 	V / 1		Y	42.0	-4.5	37.5	75.0*	
1507.3	V / 1		Z	42.0	-4.5	37.5	75.0*	5000
	The freque	ency rang	ge was scanned fr	om 30 MHz to 3	3.1 GHz. All em		rded were more	•
			the specified limit					
	*=Noise F	Floor Mea	asurements (Mini	mum system se	nsitivity)			



Test Method:	FCC Pa	rt 15 Subpart C Ra	diated Emission	s, Fundamental	& Harmonic Er	nissions	
Customer:	Fomote	ch			Job No.	R-9147-1	
Test Sample:	RF rem	ote			Paragraph:	15.231(b)	
Model No.:	ALPHA	3000			FCC ID:	LZ6ALPHA3000M	ODEL
Operating Mo		ously Transmitting	g a 301 MHz Si	gnal			
Technician:	Peter L	•	5	6	Date:	September 7, 2001	
	Test Distance: 3 M					~	
	Detector: Peak, un		rified				
	Antenna	EUT	Meter	Correction	Corrected	Converted	Peak
Test Freq.	Pol./Height	Orientation	Reading	Factor	Reading	Reading	Limit
MHz	(V/H)-Meters	X/Y/Z	dBuV	dB	dBuV/m	uV/m	uV/m
1808.7	H / 1.0	X	40.4	-0.7	39.7	96.6*	5460
	H / 1.0	Y	40.4	-0.7	39.7	96.6*	. 1400
	H / 1.0	Z	40.4	-0.7	39.7	96.6*	
	V/1.0	X	40.4	-0.7	39.7	96.6*	
	V / 1.0	Y Y	40.4	-0.7	39.7	96.6*	
1808.7	V / 1.0 V / 1.0	Z	40.4	-0.7	39.7	96.6*	5460
1000.7	v / 1.0	L	40.4	-0.7	39.7	30.0	5400
2110.2	H / 1.0	X	50.4	-5.0	45.4	186.2	5460
2110.2	H / 1.3	Y	51.1	-5.0	46.1	201.8	5400
	H / 1.3	Z	48.6	-5.0	43.6	151.4	
	V /2.0	X	47.8	-5.0	42.8	138.0	
	V / 2.0	Y	47.8	-5.0	43.4	147.9	
2110.2	V / 2.0	Z	48.3	-5.0	39.7	96.6	5460
2110.2	V / 2.0	L	-0.5	-5.0	00.1	50.0	5400
2411.6	H / 1.0	X	40.2	-1.6	38.6	85.1*	5460
2411.0	H / 1.0	Y	40.2	-1.6	38.6	85.1*	5-00
	H / 1.0	Z	40.2	-1.6	38.6	85.1*	
	V /1.0	X	40.2	-1.6	38.6	85.1*	
	V / 1.0	Y	40.2	-1.6	38.6	85.1*	
2411.6	V / 1.0	Z	40.2	-1.6	38.6	85.1*	5460
2111.0	11.0		10.2	1.0	00.0		5100
2713.1	H / 1.0	Х	38.0	-0.3	37.7	76.7*	5000
	H / 1.0	Y	38.0	-0.3	37.7	76.7*	
	H / 1.0	Z	38.0	-0.3	37.7	76.7*	
	V /1.0	X	38.0	-0.3	37.7	76.7*	
	V / 1.0	Y	38.0	-0.3	37.7	76.7*	
2713.1	V / 1.0	Z	38.0	-0.3	37.7	76.7*	5000
	. , 110		2010	0.0			2000
3014.5	H / 1.0	X	39.4	1.5	40.9	110.9*	5460
	H / 1.0	Y	39.4	1.5	40.9	110.9*	
	H / 1.0	Z	39.4	1.5	40.9	110.9*	
	V /1.0	X	39.4	1.5	40.9	110.9*	
	V / 1.0	Y	39.4	1.5	40.9	110.9*	
3014.5	V / 1.0	Z	39.4	1.5	40.9	110.9*	5460
		ige was scanned from					
	· · ·	the specified limit					
		easurements ( Min					



Test Method:	FCC P	art 15 Subpart C Ra	diated Emission	s, Fundamental	& Harmonic Er	nissions	
Customer:	Fomot	-			Job No.	R-9147-1	
Test Sample:	RF ren	note			Paragraph:	15.231(b)	
Model No.:	ALPH	A3000			FCC ID:	LZ6ALPHA3000N	10DEL
Operating Mo		uously Transmittin	g a 301 MHz Si	gnal			
Technician:		_ananna	8 4 2 0 1 11112 21	5	Date:	September 7, 2001	
	Test Distance: 3 N			D	uty Cycle: 92.39		
Detector: Peak, unless otherwise specified Duty Cycle Correction: - 0.7							
	Antenna	EUT	Peak	Correction	Corrected	Converted	Avg.
Test Freq.	Pol./Height	Orientation	Reading	Factor	Reading	Reading	Limit
MHz	(V/H)-Meters	X/Y/Z	dBuV	dB	dBuV/m	uV/m	uV/m
301.4	H / 1.0	X/1/2 X	58.9	-0.7	58.2	812.8	5460
×/1.+	H / 1.0	Y	61.2	-0.7	60.5	1059.3	.)-+( k )
	H / 1.0	Z	64.5	-0.7	63.8	1548.8	
	V / 2.0		59.1	-0.7	58.4	831.8	
	V / 2.0	Y	55.4	-0.7	54.7	543.3	
301.4	V / 1.0	Z	50.8	-0.7	50.1	319.9	5460
501.4	v / 1.0		00.0	-0.7	50.1	010.0	5400
602.9	H / 1.0	X	24.1	-0.7	23.4	14.8*	546
	H / 1.0	Y	24.1	-0.7	23.4	14.8*	
İ	H / 1.0	Z	24.1	-0.7	23.4	14.8*	
	V / 1.0	X	24.1	-0.7	23.4	14.8*	
İ	V / 1.0	Y	24.1	-0.7	23.4	14.8*	
602.9	V / 1.0	Z	24.1	-0.7	23.4	14.8*	546
904.4	H / 1.0	X	27.9	-0.7	27.2	22.9*	546
	H / 1.0	Y	27.9	-0.7	27.2	22.9*	
	H / 1.0	Z	27.9	-0.7	27.2	22.9*	
	V / 1.0	Х	27.9	-0.7	27.2	22.9*	
	V / 1.0	Y	27.9	-0.7	27.2	22.9*	
904.4	V / 1.0	Z	27.9	-0.7	27.2	22.9*	546
1205.8	H / 1.0	X	34.9	-0.7	34.2	51.3*	500
1203.8	H / 1.0	Y Y	34.9	-0.7	34.2	51.3*	500
	H / 1.0	Z	34.9	-0.7	34.2	51.3*	
	V/1.0	X	34.9	-0.7	34.2	51.3*	
	V / 1.0	Y Y	34.9	-0.7	34.2	51.3*	
1205.8	V / 1.0 V / 1.0	Z	34.9	-0.7	34.2	51.3*	500
1203.0	• / 1.0		0-1.0	0.7	07.2	01.0	500
1507.3	H / 1.0	X	37.5	-0.7	36.8	69.2*	500
	H / 1.0	Y	37.5	-0.7	36.8	69.2*	
	H / 1.0	Z	37.5	-0.7	36.8	69.2*	
	V /1.0	Х	37.5	-0.7	36.8	69.2*	
	V / 1.0	Y	37.5	-0.7	36.8	69.2*	
1507.3	V / 1.0	Z	37.5	-0.7	36.8	69.2*	500
	The frequency ra	nge was scanned fr	om 30 MHz to 3	.1 GHz. All emi	ssions not recon	ded were more	
		w the specified limi					
	*=Noise Floor N	leasurements ( Min	imum system se	ensitivity)			



Test Method:	FC	C Part 15 Subpart C Ra	adiated Emission	s, Fundamental	& Harmonic Er	nissions		
Customer:	Fo	motech			Job No.	R-9147-1		
Test Sample:	RF	remote			Paragraph:	15.231(b)		
Model No.:		PHA3000			FCC ID:		LZ6ALPHA3000MODEL	
Operating Mo		ntinuously Transmittir	ng a 301 MHz Si	gnal				
Technician:		ter Lananna			Date:	September 7, 2001		
	Test Distance			D	Outy Cycle: 92.39			
	Detector: Peal	unless otherwise spe	ecified					
Detector: Peak, unless otherwise specified Duty Cycle Correction:-0.7   The peak Correction Corrected Converted							Avg.	
Test Freq.	Pol./Heigl		Reading	Factor	Reading	Reading	Limit	
MHz	(V/H)-Mete		dBuV	dB	dBuV/m	uV/m	uV/m	
1808.7	H / 1.0	X	39.7	-0.7	39.0	89.1*	546	
1000.7	H / 1.0	<u> </u>	39.7	-0.7	39.0	89.1*	.140	
	H / 1.0 H / 1.0		39.7	-0.7	39.0	89.1*		
	H / 1.0 V /1.0		39.7	-0.7	39.0	89.1*		
		X Y	39.7	-0.7	39.0	89.1*		
1000 7	V / 1.0	Y Z	<u>39.7</u> 39.7	-0.7		89.1*	546	
1808.7	V / 1.0	L	<u>১৬.</u> /	-0./	39.0	09.1	540	
2110.2	H / 1.0	X	45.4	-0.7	44.7	171.8	546	
2110.2	H / 1.0 H / 1.3	<u> </u>	45.4	-0.7	44.7	186.2	340	
	H / 1.3		43.6	-0.7	43.4	139.6		
	V /2.0		43.0	-0.7	42.9	127.4		
	V / 2.0	<u> </u>	42.0	-0.7	42.1	136.5		
2110.2	V / 2.0		39.7	-0.7	39.0	89.1	546	
2110.2	v / 2.0		59.7	-0.7	39.0	09.1	540	
2411.6	H / 1.0	X	38.6	-0.7	37.9	78.5*	546	
2411.0	H / 1.0	Y	38.6	-0.7	37.9	78.5*	540	
	H / 1.0	Z	38.6	-0.7	37.9	78.5*		
	V /1.0	X	38.6	-0.7	37.9	78.5*		
	V / 1.0	Y	38.6	-0.7	37.9	78.5*		
2411.6	V / 1.0	Z	38.6	-0.7	37.9	78.5*	546	
2411.0	v / 1.0		50.0	-0.7	57.5	70.5	540	
2713.1	H / 1.0	X	37.7	-0.7	37.0	70.8*	500	
	H / 1.0	Y	37.7	-0.7	37.0	70.8*		
	H / 1.0	Z	37.7	-0.7	37.0	70.8*		
	V /1.0		37.7	-0.7	37.0	70.8*		
	V / 1.0	Y	37.7	-0.7	37.0	70.8*		
2713.1	V / 1.0	Z	37.7	-0.7	37.0	70.8*	500	
2/13/1	7 / 1.0		0111	0.7	0,.0	. 0.0		
3014.5	H / 1.0	X	40.9	-0.7	40.2	102.3*	546	
	H / 1.0	Y	40.9	-0.7	40.2	102.3*		
	H / 1.0	Z	40.9	-0.7	40.2	102.3*		
	V /1.0	X	40.9	-0.7	40.2	102.3*		
	V / 1.0	Y	40.9	-0.7	40.2	102.3*		
3014.5	V / 1.0	Z	40.9	-0.7	40.2	102.3*	546	
501115		y range was scanned fi					510	
	· · · · ·	elow the specified limit						
		or Measurements ( Mir			ist encour the sp	control minuto.		



Test Meth	od:	FCC Part 15 Subpart C, Spurious Case Radiated Emissions, Paragraph 15.209(a)								
Customer			notech	/ I			Job No.	· · · · ·		
Test Sam	ple:	RF I	Remote							
Model No	•		HA3000				FCC ID:	LZ6ALPHA3000	MODEL	
Operating			tinuously Tran	smitting a 30	1.4MHz Signa	al.				
Technicia			er Lananna				Date:	September 7, 20	001	
Notes:			3 Meters	Temp:33	3C Hu	midity:				
			asi-Peak Below			-				
Test	Antenr		EUT	Meter	Correction		orrected	Converted		
Freq.	Positic		Orientation	Readings	Factor		Reading	Reading	LIMIT	
MHz	(V/H) / Me	ters	Degrees	dBuV	dB		BuV/m	uV/m	uV/m	
30.00									100	
<u> </u>										
88.00									100	
88.00									150	
<u> </u>										
I										
I										
216.00									150	
216.00									200	
377.0	V/1.3	5	338	40	-1.7		38.3	82.2		
402.2	V1.0		045	41	-1.3		39.7	96.6	ĺ	
427.4	V1.0		022	34	-1.0		33.0	44.7		
I										
960.00									200	
960.00									500	
<u> </u>										
<u> </u>										
1	+									
3100.0									500	
	+									
	The FUT	was	scanned from 3	30 MHz to 3	1 GHz					
						ne sner	ified limits Fr	nissions not recor	ded	
			an 10dB under							
					-					

