

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

BRANDNAME: Fomotech International Corporation MODEL: Alpha 3000

TYPE: 301 MHz RF Remote Transmitter

POWER REQUIREMENTS: 4 "AA" Batteries

FREQUENCY OF OPERATION: 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

FCC ID: LZ6ALPHA3000MODEL

Power Requirements: 4 "AA" Batteries

Applicable Rule Section: Part 15, Subpart C, Para. 15.231



Retlif Testing Laboratories

Test Report No. R-9147-1
FCC ID: LZ6ALPHA3000MODEL



Retlif Testing Laboratories

Test Report No. R-9147-1
FCC ID: LZ6ALPHA3000MODEL

REPORT OF MEASUREMENTS (continued)

TEST RESULTS

- 15.231 (a) - The device is used as a transmitter for Remote Control purposes.
- 15.231 (a)(1) & - The transmitter is manually operated and ceases transmission within 5
15.231(2) 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 $\mu\text{V/M}$ (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 $\mu\text{V/M}$ (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.

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

The formula below was utilized to determine the limits:

$$\text{Limit} = L1 + [(Fo-F1)(L2-L1)/(F2-F1)]$$

Solving yields:

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

Harmonic Limit = 546 $\mu\text{V/M}$ (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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**Test Report No. R-9147-1
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REPORT OF MEASUREMENTS (continued)

GENERAL NOTES

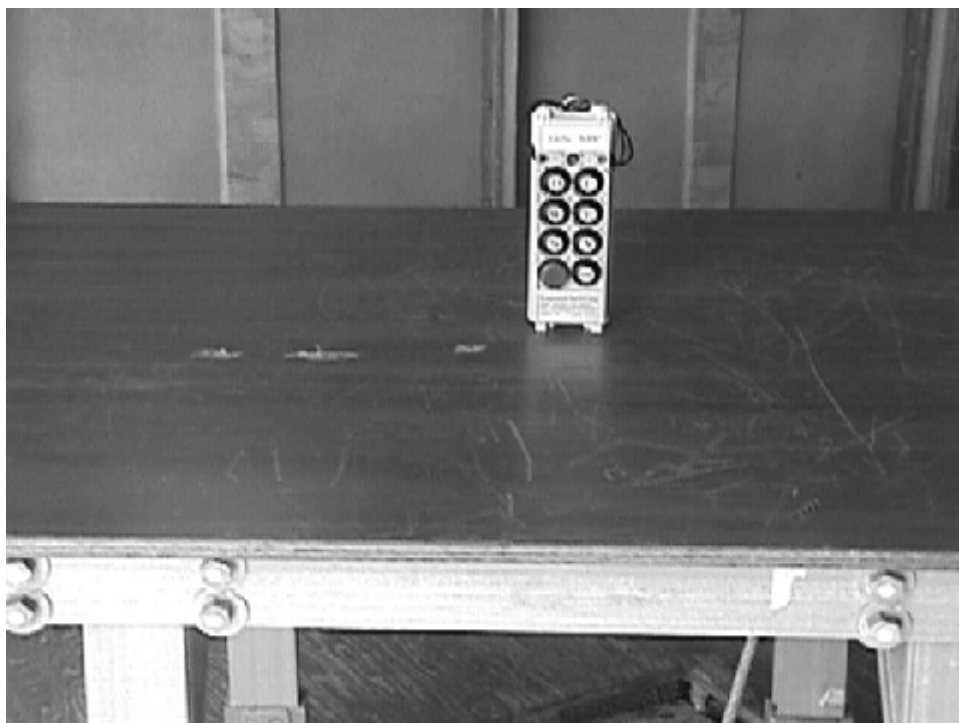
1. All readings were taken utilizing a peak detector function at a test distance of 3 meters.
2. The duty cycle was applied to the peak readings in order to determine the average value of the emissions.
3. All measurements were made with 4 "AA" Batteries.
4. The frequency range was scanned from 30 MHz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



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**Test Report No. R-9147-1
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TEST SETUP PHOTOGRAPH
RADIATED EMISSIONS



Retlif Testing Laboratories

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FCC ID: LZ6ALPHA3000MODEL

EQUIPMENT LIST

Radiated Emissions, Transmitter, 30MHz to 3.1GHz

EN	Type	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



Retlif Testing Laboratories

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FCC ID: LZ6ALPHA3000MODEL

FCC 15.231(b) and FCC 15.231(c)

RADIATED EMISSIONS

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



Retlif Testing Laboratories

Test Report No. R-9147-1
FCC ID: LZ6ALPHA3000MODEL

FCC 15.231(c)

OCCUPIED BANDWIDTH

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



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Test Report No. R-9147-1
FCC ID: LZ6ALPHA3000MODEL

FCC 15.35(b)

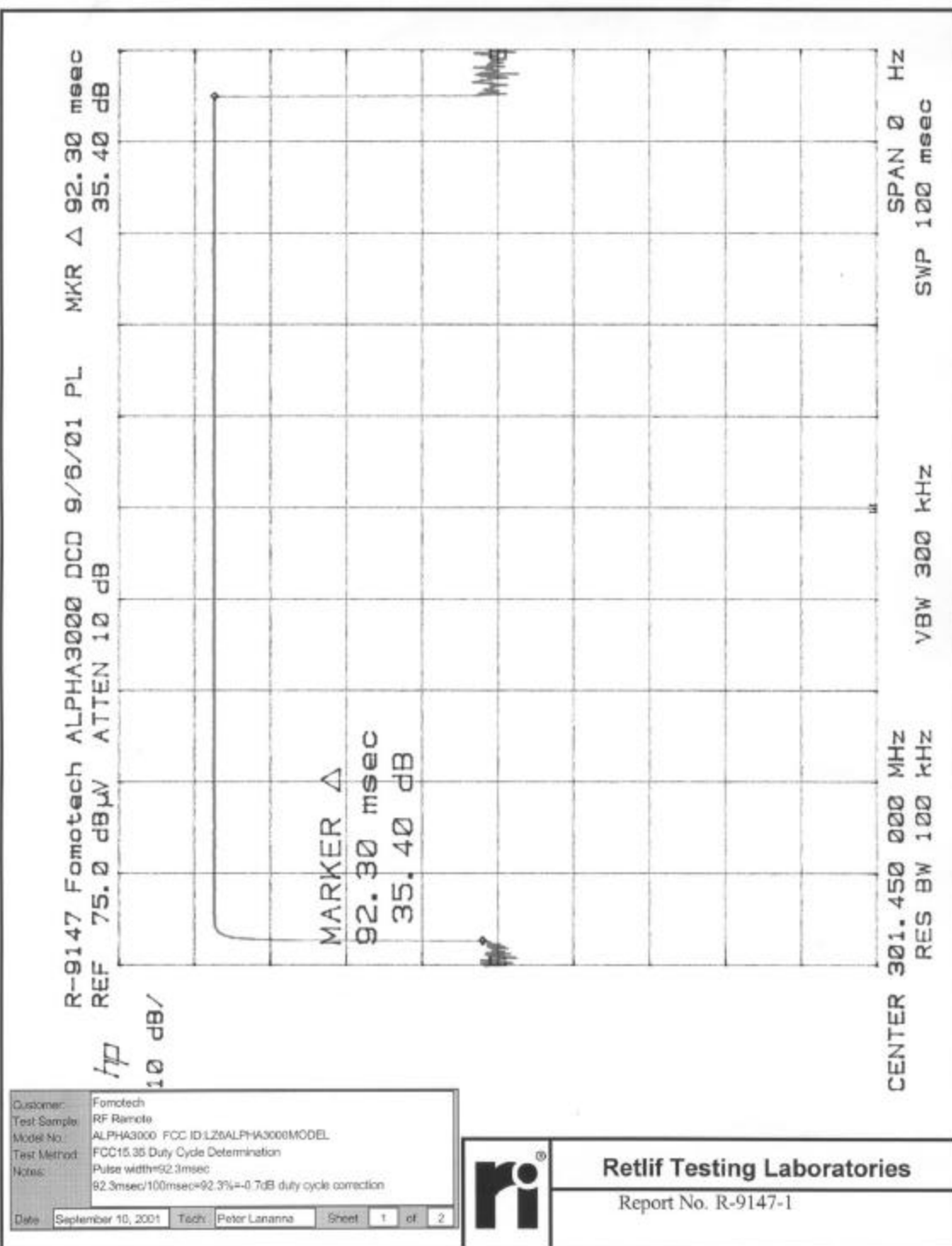
DUTY CYCLE

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



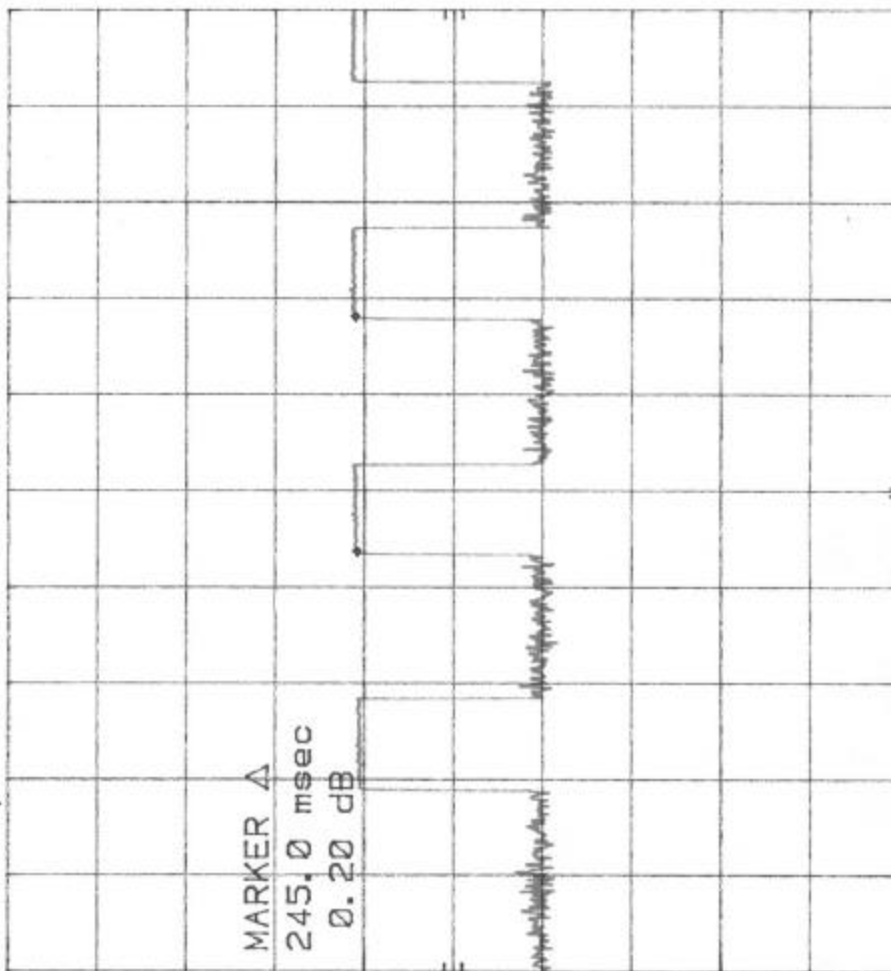
Retlif Testing Laboratories

Test Report No. R-9147-1
FCC ID: LZ6ALPHA3000MODEL



R-9147 Fomotech ALPHA3000 DCD 9/7/01 PL MKR Δ 245.0 msec
 REF 88.0 dB μ V ATTN 10 dB

hp
 10 dB/



CENTER 301.455 000 MHz SPAN 0 Hz
 RES BW 100 kHz SWP 1.00 sec
 VBW 300 kHz

Customer: Fomotech
 Test Sample: RF Remote
 Model No.: ALPHA3000
 Test Method: FCC15.35 Duty Cycle Determination
 Notes: Cycle time: 245 msec
 File ID: LZ6ALPHA3000MODEL
 Date: September 10, 2001 Tech: Peter Lananna Sheet: 2 of 2



Retlif Testing Laboratories

Report No. R-9147-1

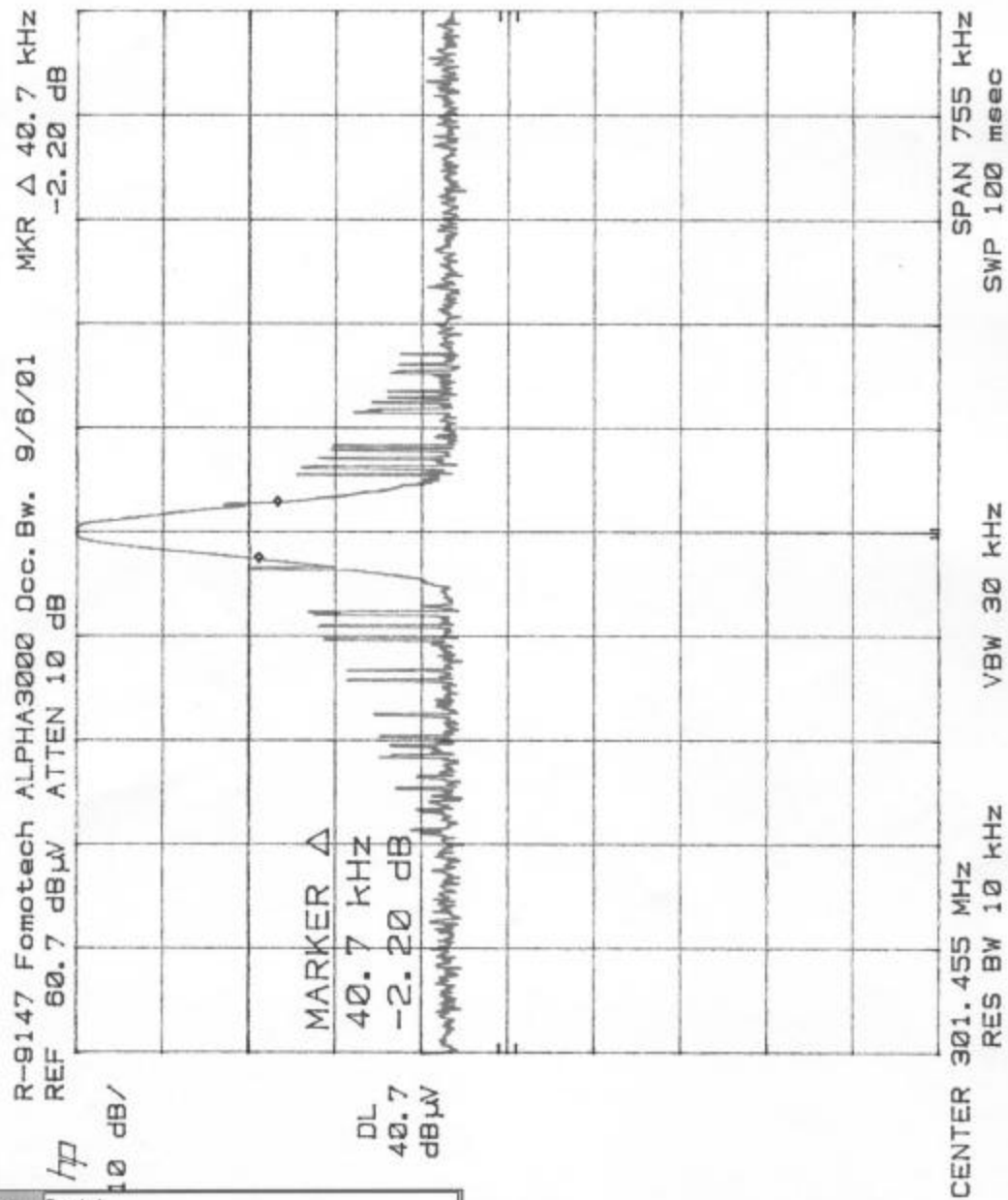
Customer: Fomotech
 Test Sample: RF Remota
 Model No.: ALPHA3000
 Test Method: FCC15.231(c) Occupied Bandwidth
 Notes: Emission is less than 25% of Center frequency measured 20dBc
 Center frequency=301.4MHz*0.25%=754kHz

Date: September 10, 2001 Tech: Peter Lanzetta Sheet: 1 of 1



Retlif Testing Laboratories

Report No. R-9147-1



Test Method:		FCC Part 15 Subpart C Radiated Emissions, Fundamental & Harmonic Emissions					
Customer:		Fomotech			Job No.		R-9147-1
Test Sample:		RF remote			Paragraph:		15.231(b)
Model No.:		ALPHA3000			FCC ID:		LZ6ALPHA3000MODEL
Operating Mode:		Continuously Transmitting a 301 MHz Signal					
Technician:		Peter Lananna			Date:		September 7, 2001
Notes:		Test Distance: 3 Meters Detector: Peak, Unless otherwise specified					
Test Freq.	Antenna Pol./Height	EUT Orientation	Meter Reading	Correction Factor	Corrected Reading	Converted Reading	Peak Limit
MHz	(V/H)/Meters	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	X	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	X	21.0	3.1	24.1	16.0*	5460
	H / 1.0	Y	21.0	3.1	24.1	16.0*	
	H / 1.0	Z	21.0	3.1	24.1	16.0*	
	V / 1.0	X	21.0	3.1	24.1	16.0*	
	V / 1.0	Y	21.0	3.1	24.1	16.0*	
602.9	V / 1.0	Z	21.0	3.1	24.1	16.0*	5460
904.4	H / 1.0	X	19.7	8.2	27.9	24.8*	5460
	H / 1.0	Y	19.7	8.2	27.9	24.8*	
	H / 1.0	Z	19.7	8.2	27.9	24.8*	
	V / 1.0	X	19.7	8.2	27.9	24.8*	
	V / 1.0	Y	19.7	8.2	27.9	24.8*	
904.4	V / 1.0	Z	19.7	8.2	27.9	24.8*	5460
1205.8	H / 1.0	X	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 /1.0	X	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 / 1.0	Y	42.0	-4.5	37.5	75.0*	
	H / 1.0	Z	42.0	-4.5	37.5	75.0*	
	V /1.0	X	42.0	-4.5	37.5	75.0*	
	V / 1.0	Y	42.0	-4.5	37.5	75.0*	
1507.3	V / 1.0	Z	42.0	-4.5	37.5	75.0*	5000
	The frequency range was scanned from 30 MHz to 3.1 GHz. All emissions not recorded were more						
	Than 10 dB below the specified limit. Emissions from the EUT do not exceed the specified limits.						
	*=Noise Floor Measurements (Minimum system sensitivity)						



Retlif Testing Laboratories

Retlif Job Number R-9147-1

Test Method:		FCC Part 15 Subpart C Radiated Emissions, Fundamental & Harmonic Emissions						
Customer:		Fomotech			Job No.		R-9147-1	
Test Sample:		RF remote			Paragraph:		15.231(b)	
Model No.:		ALPHA3000			FCC ID:		LZ6ALPHA3000MODEL	
Operating Mode:		Continuously Transmitting a 301 MHz Signal						
Technician:		Peter Lananna			Date:		September 7, 2001	
Notes:		Test Distance: 3 Meters Detector: Peak, unless otherwise specified						
Test Freq.	Antenna Pol./Height	EUT Orientation	Meter Reading	Correction Factor	Corrected Reading	Converted Reading	Peak 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*		
	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	40.4	-0.7	39.7	96.6*		
1808.7	V / 1.0	Z	40.4	-0.7	39.7	96.6*	5460	
2110.2	H / 1.0	X	50.4	-5.0	45.4	186.2	5460	
	H / 1.3	Y	51.1	-5.0	46.1	201.8		
	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	48.4	-5.0	43.4	147.9		
2110.2	V / 2.0	Z	48.3	-5.0	39.7	96.6	5460	
2411.6	H / 1.0	X	40.2	-1.6	38.6	85.1*	5460	
	H / 1.0	Y	40.2	-1.6	38.6	85.1*		
	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	
2713.1	H / 1.0	X	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	
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	
	The frequency range was scanned from 30 MHz to 3.1 GHz. All emissions not recorded were more							
	Than 10 dB below the specified limit. Emissions from the EUT do not exceed the specified limits.							
	*=Noise Floor Measurements (Minimum system sensitivity)							



Retlif Testing Laboratories

Retlif Job Number R-9147-1

Test Method:		FCC Part 15 Subpart C Radiated Emissions, Fundamental & Harmonic Emissions						
Customer:		Fomotech			Job No.		R-9147-1	
Test Sample:		RF remote			Paragraph:		15.231(b)	
Model No.:		ALPHA3000			FCC ID:		LZ6ALPHA3000MODEL	
Operating Mode:		Continuously Transmitting a 301 MHz Signal						
Technician:		Peter Lananna			Date:		September 7, 2001	
Notes:		Test Distance: 3 Meters			Duty Cycle: 92.3%			
		Detector: Peak, unless otherwise specified			Duty Cycle Correction: - 0.7			
Test Freq.	Antenna Pol./Height	EUT Orientation	Peak Reading	Correction Factor	Corrected Reading	Converted Reading	Avg. Limit	
MHz	(V/H)-Meters	X / Y / Z	dBuV	dB	dBuV/m	uV/m	uV/m	
301.4	H / 1.0	X	58.9	-0.7	58.2	812.8	5460	
	H / 1.0	Y	61.2	-0.7	60.5	1059.3		
	H / 1.0	Z	64.5	-0.7	63.8	1548.8		
	V / 2.0	X	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	
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*		
	H / 1.0	Z	24.1	-0.7	23.4	14.8*		
	V / 1.0	X	24.1	-0.7	23.4	14.8*		
	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	X	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	
	H / 1.0	Y	34.9	-0.7	34.2	51.3*		
	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	34.9	-0.7	34.2	51.3*		
1205.8	V / 1.0	Z	34.9	-0.7	34.2	51.3*	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	X	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 range was scanned from 30 MHz to 3.1 GHz. All emissions not recorded were more							
	Than 10 dB below the specified limit. Emissions from the EUT do not exceed the specified limits.							
	*=Noise Floor Measurements (Minimum system sensitivity)							



Retlif Testing Laboratories

Retlif Job Number R-9147-1

Test Method:		FCC Part 15 Subpart C Radiated Emissions, Fundamental & Harmonic Emissions						
Customer:		Fomotech			Job No.		R-9147-1	
Test Sample:		RF remote			Paragraph:		15.231(b)	
Model No.:		ALPHA3000			FCC ID:		LZ6ALPHA3000MODEL	
Operating Mode:		Continuously Transmitting a 301 MHz Signal						
Technician:		Peter Lananna			Date:		September 7, 2001	
Notes:		Test Distance: 3 Meters			Duty Cycle: 92.3%			
		Detector: Peak, unless otherwise specified			Duty Cycle Correction:-0.7			
Test Freq.	Antenna Pol./Height	EUT Orientation	Peak Reading	Correction Factor	Corrected Reading	Converted Reading	Avg. Limit	
MHz	(V/H)-Meters	X / Y / Z	dBuV	dB	dBuV/m	uV/m	uV/m	
1808.7	H / 1.0	X	39.7	-0.7	39.0	89.1*	546	
	H / 1.0	Y	39.7	-0.7	39.0	89.1*		
	H / 1.0	Z	39.7	-0.7	39.0	89.1*		
	V /1.0	X	39.7	-0.7	39.0	89.1*		
	V / 1.0	Y	39.7	-0.7	39.0	89.1*		
1808.7	V / 1.0	Z	39.7	-0.7	39.0	89.1*	546	
2110.2	H / 1.0	X	45.4	-0.7	44.7	171.8	546	
	H / 1.3	Y	46.1	-0.7	45.4	186.2		
	H / 1.3	Z	43.6	-0.7	42.9	139.6		
	V /2.0	X	42.8	-0.7	42.1	127.4		
	V / 2.0	Y	43.4	-0.7	42.7	136.5		
2110.2	V / 2.0	Z	39.7	-0.7	39.0	89.1	546	
2411.6	H / 1.0	X	38.6	-0.7	37.9	78.5*	546	
	H / 1.0	Y	38.6	-0.7	37.9	78.5*		
	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	
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	X	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	
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	
	The frequency range was scanned from 30 MHz to 3.1 GHz. All emissions not recorded were more							
	Than 10 dB below the specified limit. Emissions from the EUT do not exceed the specified limits.							
	*=Noise Floor Measurements (Minimum system sensitivity)							



Retlif Testing Laboratories

Retlif Job Number R-9147-1

Test Method:	FCC Part 15 Subpart C, Spurious Case Radiated Emissions, Paragraph 15.209(a)						
Customer:	Fomotech				Job No.	R-9147-1	
Test Sample:	RF Remote						
Model No.:	ALPHA3000				FCC ID:	LZ6ALPHA3000MODEL	
Operating Mode:	Continuously Transmitting a 301.4MHz Signal.						
Technician:	Peter Lananna				Date:	September 7, 2001	
Notes:	Test Distance: 3 Meters Temp:33C Humidity: 18% Detector: Quasi-Peak Below 30 MHz to 1 GHz, Peak above 1 GHz						
Test Freq.	Antenna Position	EUT Orientation	Meter Readings	Correction Factor	Corrected Reading	Converted Reading	LIMIT
MHz	(V/H) / Meters	Degrees	dBuV	dB	dBuV/m	uV/m	uV/m
30.00							100
88.00							100
88.00							150
216.00							150
216.00							200
377.0	V/1.3	338	40	-1.7	38.3	82.2	
402.2	V1.0	045	41	-1.3	39.7	96.6	
427.4	V1.0	022	34	-1.0	33.0	44.7	
960.00							200
960.00							500
3100.0							500
	The EUT was scanned from 30 MHz to 3.1 GHz						
	The emissions observed from the EUT do not exceed the specified limits. Emissions not recorded						
	were more than 10dB under the specified limit						



Retlif Testing Laboratories

Retlif Job Number R-9147-1