Certification

of the

Zirkon Ltd/Furon 315 MHz Stairlift Transceiver Unit

under

FCC ID : NRC4161315H

as a

Periodic Intentional Radiator

under

Title 47 of the CFR, Part 15, Subpart C

MET REPORT EMC11064

October 2, 2001

PREPARED FOR:

Zirkon Ltd/Furon
Butlers Leap
Rugny, Warwickshire CV213RQ
United Kingdom

PREPARED BY:

MET Laboratories, Inc.
914 West Patapsco Avenue
Baltimore, Maryland 21230-3432

October 2, 2001

Federal Communications Commission
Authorization and Evaluation Division
7435 Oakland Mills Road
Columbia, MD 21046

Attention: Application Examiner

Reference: FCC ID: NRC4161315H
Zirkon Ltd/Furon 315 MHz FM Stairlift Transceiver Unit

Dear Examiner:

The following equipment authorization application is presented on behalf of Zirkon Ltd/Furon for the certification of their 315 MHz Transmitter. Enclosed, please find a complete data and documentation package demonstrating that this device complies with the technical requirements of 47 CFR, Part 15, Subpart C for a Periodic Intentional Transmitter. The manufacturer seeks authorization under the identifier: NRC4161315H

We look forward to an expeditious review of the report presented and a granting of the certification for Zirkon Ltd/Furon. If you have any questions or we can be of assistance, in this matter, please call us at (410) 354-3300.

Sincerely,

MET Laboratories, Inc.

Joanna A. Kolasinski

Joanna Agnieszka Kolasinski
Documentation Manager

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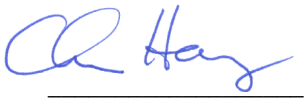
Liming Xu
Project Engineer

Joanna A. Kolasinski
Technical Writer

Joanna A. Kolasinski
Documentation Manager



Chris Harvey
EMC Lab Director

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LEGAL STATEMENT

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EXHIBIT 1

MANUFACTURER & PRODUCT INFORMATION

ENGINEERING STATEMENT

MANUFACTURER & PRODUCT INFORMATION

TYPE OF Certification:	Certification of a Periodic Intentional Radiator
FCC IDENTIFIER:	NRC4161315H
APPLICABLE FCC RULES:	2.907; 2.103 to 2.1045; 15.231 (a - c)
CLIENT:	Zirkon Ltd/Furon Butlers Leap Rugny, Warwickshire CV213RQ United Kingdom
EQUIPMENT:	315 MHz Stairlift Transceiver Unit
TESTING DATE(S):	7/11/01
MANUFACTURER'S REPRESENTATIVE:	David Cox

ENGINEERING STATEMENT

I ATTEST: the measurements shown in this report were made in accordance with the procedures indicated, and that the Emissions from this equipment were found to be within the limits applicable. I assume full responsibility for the accuracy and completeness of these measurements, and for the qualifications of all persons taking them.

I FURTHER ATTEST: on the basis of the measurements made, the equipment tested is capable of operation in accordance with the requirements of Part 15 of the FCC Rules under normal use and maintenance.

Liming Xu
Project Engineer

EXHIBIT 2

INTRODUCTION

TEST SITE

MEASUREMENT PROCEDURES

INSTRUMENTATION

TEST CONFIGURATION

MODIFICATIONS STATEMENT

INTRODUCTION

An EMI evaluation to determine compliance of the Furon Ltd. 315MHz Transmitter with the requirements of Part 15, Subpart C for Periodic Intentional Radiators was conducted. (All references are to the most current version of Title 47 of the Code of Federal Regulations in effect.) In accordance with §2.1033(b), the following test report is presented in support of the application for grant of certification of the Furon Ltd. 315MHz Transmitter. Furon Ltd. should retain a copy of this document for at least one year after the manufacturing of the Furon Ltd.315MHz Transmitter has been **permanently** discontinued, as per §2.938(c).

TEST SITE

All testing was conducted at MET Laboratories, Inc., 914 West Patapsco Avenue, Baltimore, Maryland 21230-3432.

MEASUREMENT PROCEDURES

Measurement of the variation of the radiated signal level of the fundamental frequency component, as required by §15.31(e), was not required due to battery operation. The unit was tested with a new battery.

As required by §15.231(b) of CFR 47, *radiated emissions measurements* were made in accordance with the general procedures of §2.947 and §15.31, and ANSI C63.4-1992 "Methods of Measurement of Radio-Noise Emissions from Low-Voltage Electrical and Electronic Equipment in the Range of 9 kHz to 40 GHz". The measurements were performed over the frequency range of 30 MHz to the tenth harmonic of the carrier, and the EUT was tested in 3 orthogonal planes, using the following equipment:

Frequency Range	Input Transducer	Measurement Instrumentation
30 MHz to 300MHz	Biconical Antenna	Spectrum Analyzer
300 MHz to 1 GHz	Log-Perodic Antenna	Spectrum Analyzer
above 1 GHz	Double Ridged Guide Horn	Spectrum Analyzer

The measurements were made with the detector set for "quasi-peak" with a bandwidth of 120 kHz (for measurements made between 30 MHZ and 1 GHz). In general, all radiated emissions measurements were made with the quasi-peak detector unless otherwise noted. For measurements above 1 GHz, a 1 MHz detector was used with either a "peak" detector or an "average" detector. In general, all radiated emissions above 1 GHz measurements were made with the peak detector unless otherwise noted. Additionally, it was verified that the peak levels of the emissions did not to exceed the radiated emission limit by more than 20 dB (reference §15.35(b)).

As required by §15.231 (c) of CFR 47, the *occupied bandwidth measurements* were made by placing a log periodic antenna 3m from the radiating source. The antenna was connected to a spectrum analyzer and the result was stored.

MODIFICATIONS STATEMENT

No modifications were made during testing.

INSTRUMENTATION

Radiated Emissions and Occupied bandwidth measurements were made using the following equipment:

Nomenclature	Manufacturer	Model	MET #	Cal Date	Cal Due
EMC Receiver	Hewlett Packard	85462A	1T4302	8/23/00	8/23/01
Antenna	Schaffner	CBL6140B	1T4303	3/26/01	3/26/02
Test Room	Chamber 1	n/a	1T4300	7/13/00	7/13/01

Description of EUT

The Stairlift Transceiver Unit was configured in accordance with the manufacturer's instructions and operated in a manner representative of the typical usage of the equipment. During all testing, system components were manipulated within the confines of typical usage to maximize each emission. The EUT is programmed in continuous transmitting mode monitored by a spectrum analyzer to verify signal from the transceiver unit.
In accordance with Section 15.203 of the FCC Rules, the antenna structure of the EUT is trace on pcb.

TEST CONFIGURATION

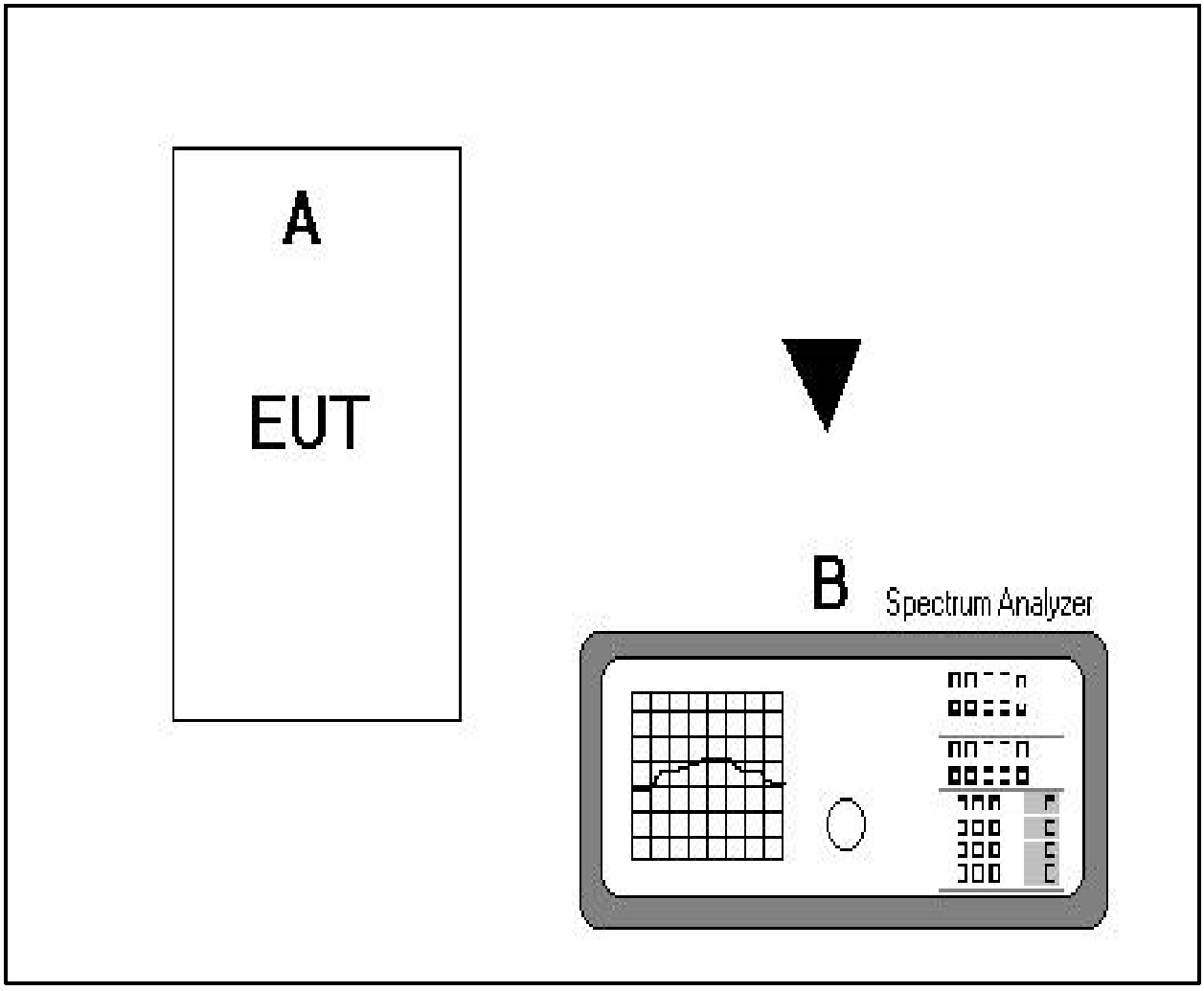


Figure 1. Test Configuration Block Diagram

DEVICE, PERIPHERALS, AND CABLES USED

Ref	Description	Manufacturer	Model#	Serial#
A	Transciever	Zirkon LTD/Furon	4051-315T	N/A
B	Spectrum Analyzer	HP	8563-A	N/A

EXHIBIT 3

TEST DATA

SUBJECT:	Transmitter Duty Cycle	**MET REPORT:**	EMC11064
		MFG:	Zirkon Ltd/Furon
	FCC Part 15.231	**TESTED BY:**	Liming Xu
	Periodic Intentional Radiator	**TEST DATE:**	9/6/01

EUT: Zirkon Ltd/Furon 315 MHz Stairlift Transceiver Unit

TECHNICAL SPECIFICATION: 15.35(c)

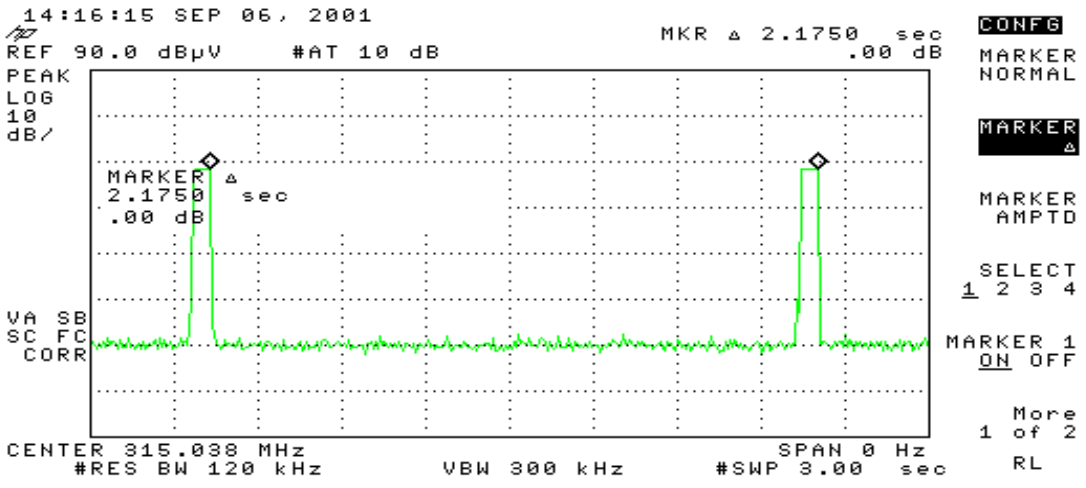
Comment:

The duty cycle of one pulsed cycle was found to be 0.605 or -4.365dB. This pulse train is 2.175 seconds in duration, which is greater than 0.1 sec. The maximum "on" time was determined to be 60.5 msec in duration within any 100 msec period of the pulse train.

TX_{ON} = 60.5 ms
TX_{OFF} = 2175 ms
Duty cycle = 0.605 (or 60.5%)
20 log (0.605) = -4.365dB duty cycle correction factor

Please see the following plots of pulse train and "on" time measurements.

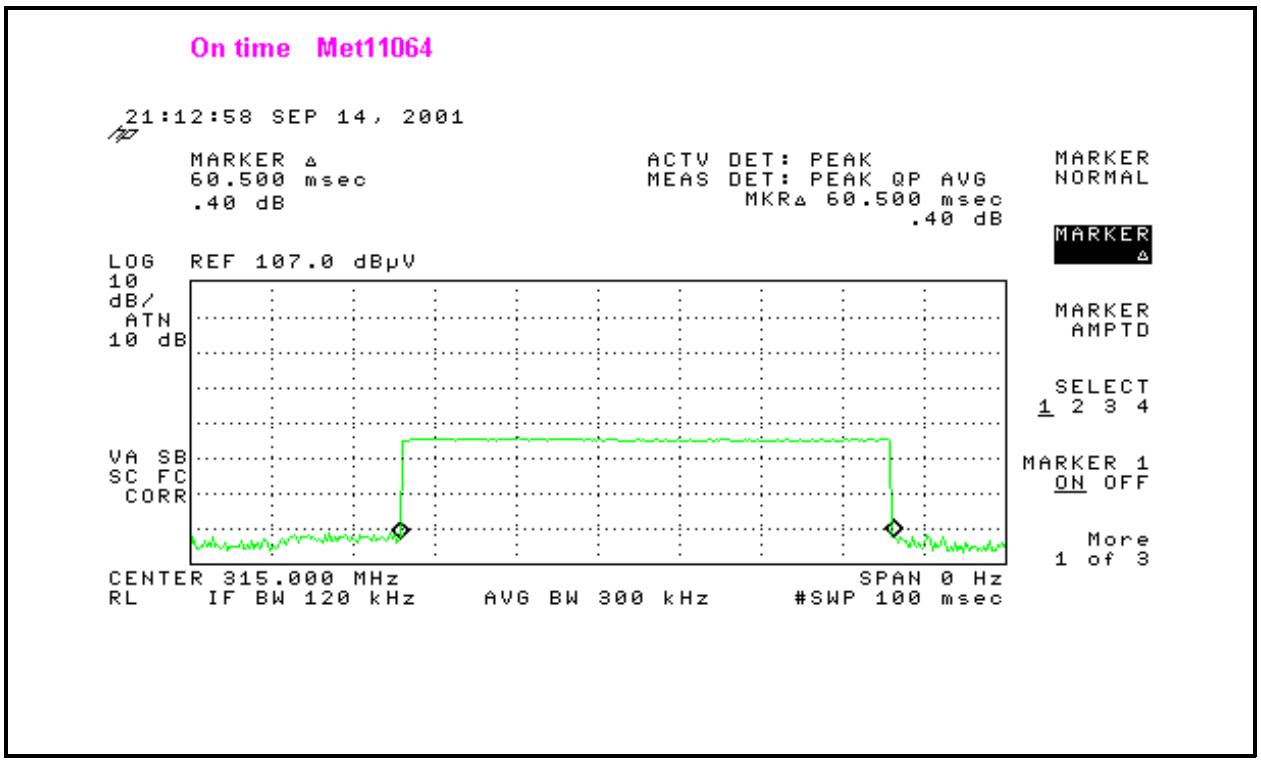
Period of pulse = 2.175 sec **Met 11064**



SUBJECT:	Transmitter Duty Cycle	**MET REPORT:**	EMC11064
		MFG:	Zirkon Ltd/Furon
	FCC Part 15.231	**TESTED BY:**	Liming Xu
	Periodic Intentional Radiator	**TEST DATE:**	9/6/01

EUT: Zirkon Ltd/Furon 315 MHz Stairlift Transceiver Unit

TECHNICAL SPECIFICATION: 15.35(c)



SUBJECT:	Conducted Emissions	**MET REPORT:**	EMC11064
		MFG:	Zirkon Ltd/Furon
	FCC Part 15	**TESTED BY:**	Liming Xu
	Periodic Intentional Radiator	**TEST DATE:**	9/7/01

EUT: Zirkon Ltd/Furon 315 MHz Stairlift Transceiver Unit

TECHNICAL SPECIFICATION: 15.107(b))

SUMMARY OF SPURIOUS EMISSIONS AT AC MAINS TERMINAL

Line Under Test	FREQ. (MHz)	RAW (dBuV) QP	Limit (dBuV) QP	Pass/Fail QP	Margin (dB) QP
Phase A	0.476	38.7	48	Pass	-9.3
Phase A	0.509	36.4	48	Pass	-11.6
Phase A	0.52	35.7	48	Pass	-12.3
Phase A	0.523	35.5	48	Pass	-12.5
Phase A	0.552	33.6	48	Pass	-14.4
Phase A	0.572	32.5	48	Pass	-15.5
Neutral	0.476	37.8	48	Pass	-10.2
Neutral	0.488	36.9	48	Pass	-11.1
Neutral	0.491	36.8	48	Pass	-11.2
Neutral	0.505	35.7	48	Pass	-12.3
Neutral	0.517	34.9	48	Pass	-13.1
Neutral	0.551	32.9	48	Pass	-15.1

TEST EQUIPMENT USED

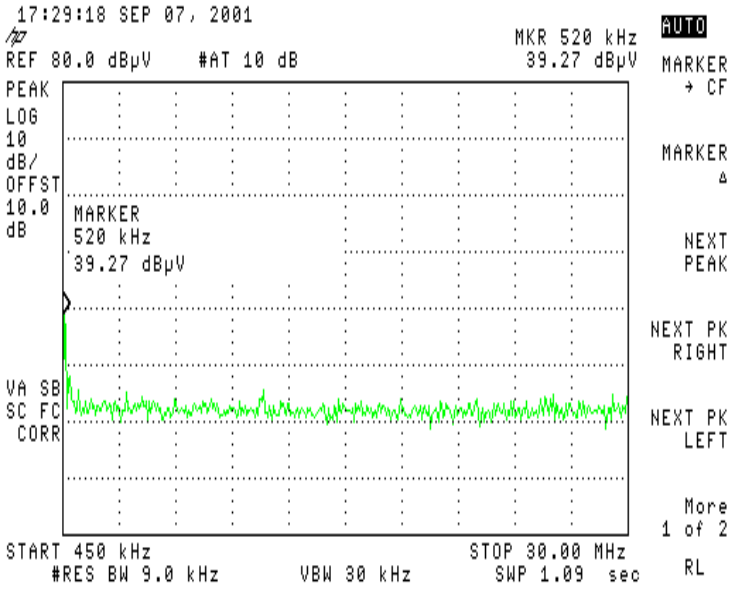
Equipment	Manufacturer	Model	MET #	Cal Date	Cal Due
Test Room	chamber #1		1T4300	8/17/01	8/17/02
Spectrum Analyzer	Hewlett Packard	8591E	1T4192	9/15/00	9/15/01
LISN	Solar	9252-5-R-24-BNC	1T4212	8/22/00	8/22/01
Transient Limiter	Hewlett Packard	11947A	1T4146	1/17/01	1/17/02

SUBJECT:	Conducted Emissions	**MET REPORT:**	EMC11064
		MFG:	Zirkon Ltd/Furon
	FCC Part 15	**TESTED BY:**	Liming Xu
	Periodic Intentional Radiator	**TEST DATE:**	9/7/01

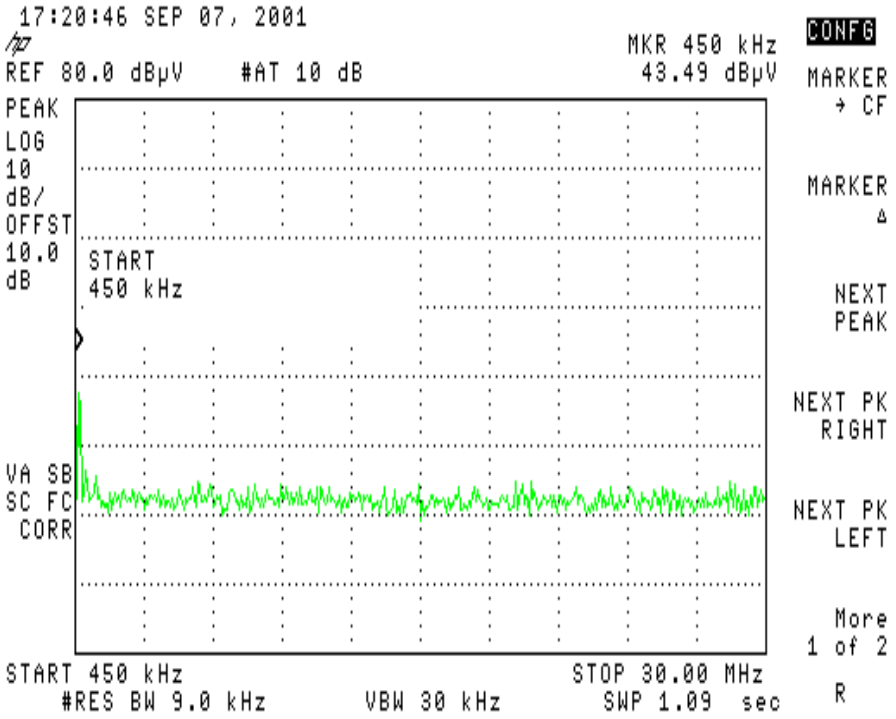
EUT: Zirkon Ltd/Furon 315 MHz Stairlift Transceiver Unit

TECHNICAL SPECIFICATION: 15.107(b)

Neutral Met11064



Neutral Met 11064



SUBJECT:	Radiated Emissions	**MET REPORT:**	EMC11064
		MFG:	Zirkon Ltd/Furon
	FCC Part 15	**TESTED BY:**	Liming Xu
	Periodic Intentional Radiator	**TEST DATE:**	9/7/01

EUT: Zirkon Ltd/Furon 315 MHz Stairlift Transceiver Unit

TECHNICAL SPECIFICATION: 15.109, 15.205(a), 15.209(a) 15.231(b)

CARRIER EMISSIONS LIMIT:
260 - 470 MHZ : 3750 to 12500 µV/m (linearly interpolated) = 6041.7 µV/m = 75.67 dBµV/m @ 3m

DUTY CYCLE CORRECTION:
Pulse train =TX_{ON} = 60.5 ms per 100 ms
FCC Part 15.35(c) :
Duty Cycle Correction = 20 Log(60.5/100) = -4.365 dB

Corrected carrier amplitud:
@ 3m with carrier = 315 MHz: 61.94dB µV -4.365dBuv = 57.58 dBµV (Horizont)
315 MHz: 42.86 dBuV - 4.365dBuv = 38.5 dBuV (Vertical)

SUBJECT:	Radiated Emissions	**MET REPORT:**	EMC11064
		MFG:	Zirkon Ltd/Furon
	FCC Part 15	**TESTED BY:**	Liming Xu
	Periodic Intentional Radiator	**TEST DATE:**	9/7/01

EUT: Zirkon Ltd/Furon 315 MHz Stairlift Transceiver Unit

Frequency (MHz)	Azimuth (°CCW - 0°=EUT facing ant.)	Polar-ity	Height (m)	Raw Amplitude (dBμV) @ 3m	Ant. Cor. Factor (dB)	Cable Loss (dB)	Corrected Amplitude (dBμV/m) @ 3m	Limit (dBμV/m) @3m	Margin (dB)
315	320	H	1	57.58	12.19	3.092	72.862	75.5	-2.638
315	360	V	2.3	38.5	12.075	3.092	53.67	75.5	-21.833
305.148	320	H	1	22.42	11.594	3.058	37.072	55.6	-18.527
305.148	320	V	1	23.95	11.402	3.058	38.4108	55.6	-17.189
295.3	360	H	1	25.56	11.638	3.005	40.204	55.6	-15.395
295.3	282	V	1	12.78	11.007	3.005	26.793	55.6	-28.806
285.45	300	H	1	3.8	11.450	2.933	18.184	55.6	-37.415
285.45	300	V	1	3.7	10.760	2.933	17.394	55.6	-38.205
324.8	234	H	1	19.26	12.973	3.126	35.36	55.6	-20.24
324.8	186	V	1	10.95	12.542	3.126	26.619	55.6	-28.980
334.66	198	H	1	22.1	13.168	3.161	38.429	55.6	-17.170
334.66	360	V	1	3.9	12.926	3.161	19.987	55.6	-35.612
354.34	360	H	1	6.38	13.411	3.230	23.021	55.6	-32.578
354.34	360	V	1	3.9	13.537	3.230	20.668	55.6	-34.931

Frequency (GHz)	RAW (dBuv)	A.C.F. (dB) (+)	Preamp/Cable (dB) (-)	Distance Corr. (dB) 1m to 3m	Corrected Amplitude (dBuv)	Limit (dBuv)	Pass /Fail	Margin (dB)
1.258	51.33	23.9772	32.1086	9.54	33.6586	53.98	pass	-20.3214
1.258	58.67	23.7256	32.1086	9.54	40.747	53.98	pass	-13.233
1.575	57.17	25.19	30.595	9.54	42.225	53.9	pass	-11.675
1.575	58.67	24.905	30.595	9.54	43.44	53.9	pass	-10.46
3.15	37	30.49	28.65	9.54	29.3	53.98	pass	-24.68
3.15	37.33	30.35	28.65	9.54	29.49	53.98	pass	-24.49

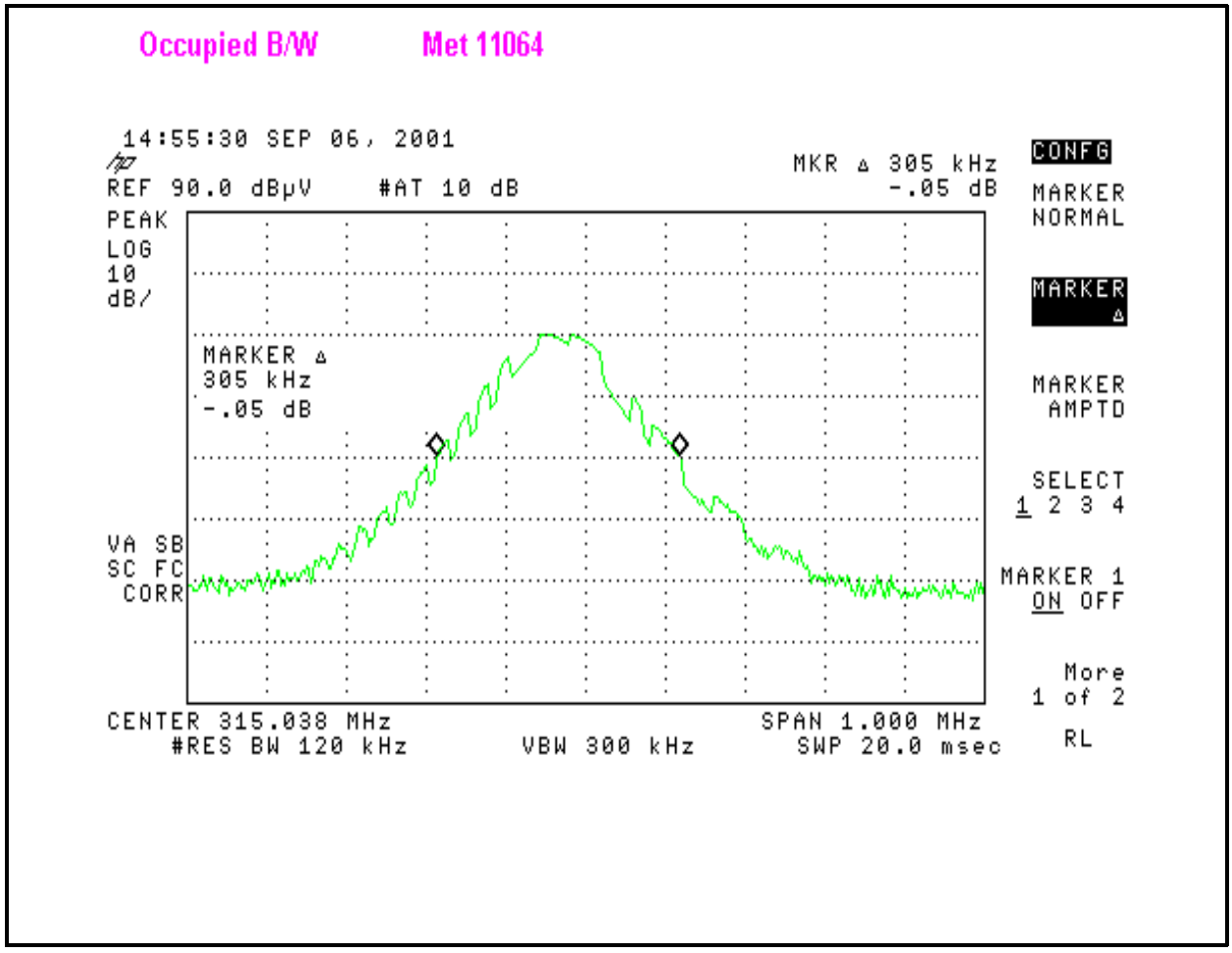
Equipment meets the specifications of Part 15.205 (a), 15.209 (a), and 15.231 (b)

SUBJECT:	Occupied Bandwidth	**MET REPORT:**	EMC11064
		MFG:	Zirkon Ltd/Furon
	FCC Part 15	**TESTED BY:**	Liming Xu
	Periodic Intentional Radiator	**TEST DATE:**	9/6/01

EUT: Zirkon Ltd/Furon 315 MHz Stairlift Transceiver Unit

TECHNICAL SPECIFICATION: 15.231 (c)

Comment: Equipment meets specifications of 15.231(c). The bandwidth of the emission shall be no wider than 0.25% of the center frequency for devices operating above 70 MHz and below 900 MHz. For devices operating above 900 MHz, the emission shall be no wider than 0.5% of the center frequency.



Equipment meets specifications of 15.231 (c).

SUBJECT:	Occupied Bandwidth	**MET REPORT:**	EMC11064
		MFG:	Zirkon Ltd/Furon
	FCC Part 15	**TESTED BY:**	Liming Xu
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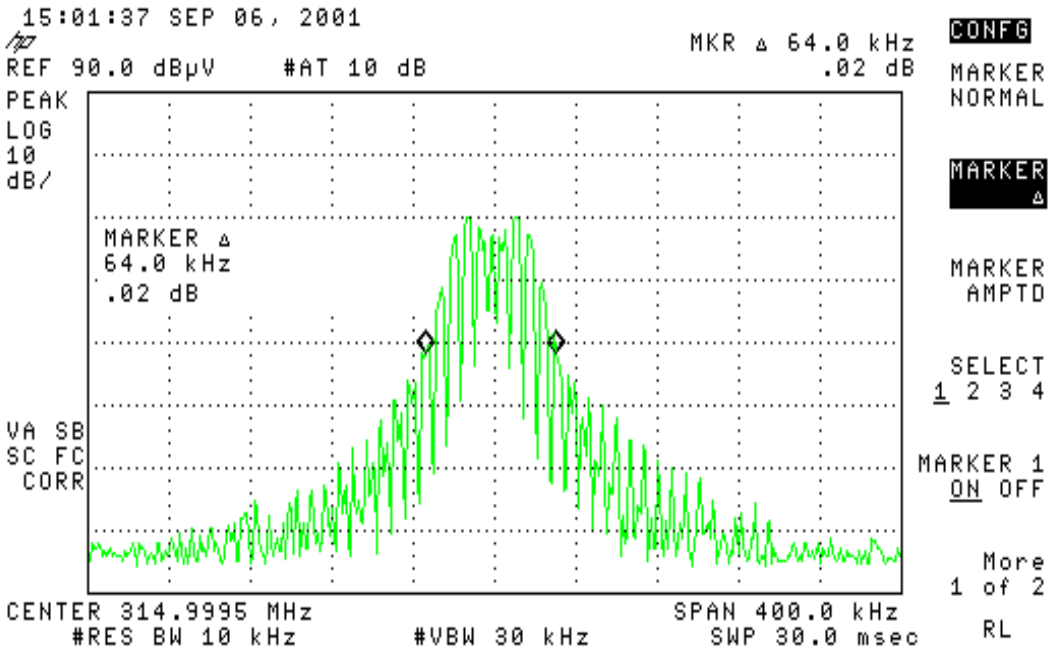
TECHNICAL SPECIFICATION: 15.231 (c)

Comment: Equipment meets specifications of 15.231(c). The bandwidth of the emission shall be no wider than 0.25% of the center frequency for devices operating above 70 MHz and below 900 MHz. For devices operating above 900 MHz, the emission shall be no wider than 0.5% of the center frequency.

Occupied B/W Met11064



Equipment meets specifications of 15.231 (c).

EXHIBIT 4

LABEL AND USER'S MANUAL INFORMATION

Label and User’s Manual information is provided in the manufacturers compliance file.

EXHIBIT 8

USER'S MANUAL

User’s manual is provided in the manufacturers compliance file.

EXHIBIT 9

BLOCK DIAGRAM

EQUIPMENT DESCRIPTION

Block diagram and equipment description is provided in the manufacturers compliance file.

EXHIBIT 10

SCHEMATIC DIAGRAM

Schematic diagrams are provided in the manufacturers compliance file.