



TEST REPORT NO: RU1180/6213

COPY NO: 2

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FCC ID: S6T-377A

**REPORT ON THE CERTIFICATION TESTING OF A  
TEKELEK EUROPE Ltd  
TEK 377A TANK MONITORING EQUIPMENT  
WITH RESPECT TO  
THE FCC RULES CFR 47, PART 15.249 January 2005  
INTENTIONAL RADIATOR SPECIFICATION**

TEST DATE: 20<sup>th</sup> March 2005 – 21<sup>st</sup> March 2005

TESTED BY: \_\_\_\_\_ D WINSTANLEY

APPROVED BY: \_\_\_\_\_ P GREEN  
EMC PRODUCT  
MANAGER

DATE: 6<sup>th</sup> May 2005

Distribution:

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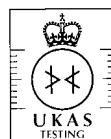
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**Notes:**

1. Component failure during test	YES [ ]	NO [X]
2. If Yes, details of failure:		
3. The facilities used for the testing of the product contain in this report are FCC Listed.		
4. The contents of the attached applicants declarations and other supplied information are not covered by the scope of this laboratory's UKAS or FCC accreditations' and is provided in good faith.		



## **CERTIFICATE OF CONFORMITY & COMPLIANCE**

FCC IDENTITY:	S6T-377A				
PURPOSE OF TEST:	Certification				
TEST SPECIFICATION:	FCC RULES CFR 47, Part 15.249 January 2005				
TEST RESULT:	Compliant to Specification				
EQUIPMENT UNDER TEST:	TEK 377A Tank Monitoring Equipment				
EQUIPMENT SERIAL No:	Engineering Sample				
ITU: EMISSION CODE:	150kF1D				
EQUIPMENT TYPE:	Ultrasonic Level Monitoring Equipment				
PRODUCT USE:	Level Indication				
CARRIER EMISSION:	19952.62 $\mu$ V/m @ 3m				
ANTENNA TYPE:	Integral				
ALTERNATIVE ANTENNA:	Not applicable				
FREQUENCY OF OPERATION:	914.4445MHz				
CHANNEL SPACING:	Not applicable, Wideband				
NUMBER OF CHANNELS:	Not applicable				
FREQUENCY GENERATION:	SAW Resonator	[ ]	Crystal	[X]	Synthesiser [ ]
MODULATION METHOD:	Amplitude	[ ]	Digital	[X]	Angle [ ]
POWER SOURCE(s):	+3Vdc				
TEST DATE(s):	20 <sup>th</sup> march 2005 – 21 <sup>st</sup> March 2005				
ORDER No(s):	TE-6624				
APPLICANT:	Tekelek Europe Ltd				
ADDRESS:	Bay 118 Shannon Free Zone Shannon County Clare Ireland				

TESTED BY: D WINSTANLEY

APPROVED BY: \_\_\_\_\_ P GREEN  
EMC PRODUCT  
MANAGER

## APPLICANT'S SUMMARY

EQUIPMENT UNDER TEST (EUT): TEK 377A Tank Monitoring Equipment

EQUIPMENT TYPE: Ultrasonic Level Monitoring Equipment

SERIAL NUMBER OF EUT: Engineering Sample

PURPOSE OF TEST: Certification

TEST SPECIFICATION(s): FCC RULES CFR 47, Part 15.249 January 2005

TEST RESULT: COMPLIANT Yes  No

APPLICANT'S CATEGORY: MANUFACTURER   
IMPORTER   
DISTRIBUTOR   
TEST HOUSE   
AGENT

APPLICANT'S ORDER No(s): TE-6624

APPLICANT'S CONTACT PERSON(s): Mr M Lintzgy

E-mail address: martin.lintzgy@tekelek.ie

APPLICANT: Tekelek Europe Ltd

ADDRESS: Bay 118  
Shannon Free Zone  
Shannon  
County Clare  
Ireland

TEL: +353-61-471511

FAX: +353-61-471685

MANUFACTURER: Tekelek Europe Ltd

EUT(s) COUNTRY OF ORIGIN: Eire

TEST LABORATORY: TRL EMC

UKAS ACCREDITATION No: 0728

TEST DATE(s): 20<sup>th</sup> March 2005 – 21<sup>st</sup> March 2005

TEST REPORT No: RU1180/6213

## EQUIPMENT TEST / EXAMINATIONS REQUIRED

1.	TEST/EXAMINATION	RULE PART	DETECTOR	APPLICABILITY
	Intentional Emission Frequency:	15.249(a)	Quasi Peak	YES
	Intentional Emission Field Strength:	15.249(a)	Quasi Peak	YES
	Intentional Emission Band Occupancy:	15.215	Peak	YES
	Intentional Emission ERP (mW):	N/A	-	NO
	Spurious Emissions – Conducted:	15.207	-	NO
	Spurious Emissions – Radiated <1000MHz:	15.209	Quasi Peak	YES
	Spurious Emissions – Radiated >1000MHz:	15.209 15.249(a)	Average	YES
	Maximum Frequency of Search:	15.33	-	YES
	Antenna Arrangements Integral:	15.203	-	YES
	Antenna Arrangements External Connector:	15.204	-	YES
	Restricted Bands	15.205	-	YES
	Extrapolation Factor	15.31(f)	-	YES

2. Product Use: Level Indication

3. Emission Designator: 150kF1D

4. Duty Cycle: <100%

5. Transmitter bit or pulse rate and level: 1000bps

6. Temperatures: Ambient (T<sub>nom</sub>) 8°C

7. Supply Voltages: V<sub>nom</sub> +3Vdc

Note: V<sub>nom</sub> voltages are as stated above unless otherwise shown on the test report page

8. Equipment Category: Single channel [X]  
Two channel [ ]  
Multi-channel [ ]

9. Channel spacing: Narrowband [ ]  
Wideband [X]

## TRANSMITTER TESTS

### TRANSMITTER SPURIOUS EMISSIONS – RADIATED – PART 15.209

Ambient temperature	=	8°C(<1GHz)	3m measurements <1GHz	[X]
Relative humidity	=	36% (<1GHz),	0.3m measurements >1GHz	[X]
Conditions	=	Open Area Test Site (OATS)	3m extrapolated from 0.3m	[X]
Supply voltage	=	+3Vdc		
Channel number	=	1		

	FREQ. (MHz)	MEAS. Rx. (dB $\mu$ V)	CABLE LOSS (dB)	ANT FACT	FIELD STRENGTH (dB $\mu$ V/m)	EXTRAP. FACTOR (dB)	FIELD STRENGTH ( $\mu$ V/m)	LIMIT ( $\mu$ V/m)
30MHz - 88MHz								
88MHz - 216MHz								
216MHz - 960MHz								
960MHz - 1GHz								
1GHz - 5GHz	2743.29(R) 3657.72(R) 4572.50(R)	26.64 29.91 28.12	1.85 2.15 2.36	29.9 32.0 32.8	58.39 64.06 63.28	-20 -20 -20	83.01 159.58 145.88	500 500 500
Limits	1.705MHz to 30MHz				30 $\mu$ V/m	@ 30m		
	30MHz to 88MHz				100 $\mu$ V/m	@ 3m		
	88MHz to 216MHz				150 $\mu$ V/m	@ 3m		
	216MHz to 960MHz				200 $\mu$ V/m	@ 3m		
	960MHz to 1GHz				500 $\mu$ V/m	@ 3m		
	1GHz to 5GHz				500 $\mu$ V/m	@ 3m		

#### Notes:

- 1 Results quoted are extrapolated as indicated
- 2 Emissions were searched to: (x) 1000MHz inclusive, as per Part 15.33a
- 3 Extrapolation factor 20dB from 0.3m to 3m, as per Part 15.31f
- 4 Measurements >1GHz @ 0.3m as per Part 15.31f(1)
- 5 Receiver detector <1GHz = CISPR, Quasi-Peak, 120kHz bandwidth
- 6 Receiver detector >1GHz = Average, 1MHz resolution bandwidth
- 7 New batteries used for battery powered products.
- 8 (R) Indicates restricted bands, as per Part 15.205
- 9 Results not within 10 dB's of limit are not necessarily recorded
- 10 See annex D for scan data
- 11 Unit transmitting at a rate of once per 300ms. Measurement times adjusted accordingly.

#### Test Method:

- 1 As per Radio – Noise Emissions, ANSI C63.4: 2003
- 2 Measuring distances as Notes 1 to 4 above
- 3 EUT 0.8 metre above ground plane
- 4 Emissions maximised by rotation of EUT, on an automatic turntable.  
Raising and lowering the receiver antenna between 1m & 4m.  
Horizontal and vertical polarisations, of the receive antenna.  
EUT orientation in three orthogonal planes.  
Maximum results recorded.

The test equipment used for the Transmitter Spurious Emissions – Radiated – Part 15.209 tests is shown overleaf:

TYPE OF EQUIPMENT	MAKER/ SUPPLIER	MODEL No	SERIAL No	TRL No	ACTUAL EQUIPMENT USED
AE, LOOP, Z2, 9kHz - 30MHz	ROHDE & SCHWARZ	HFH2	881058 - 53	07	
HORN ANTENNA	EMCO	3115	9010-3580	138	X
HORN ANTENNA	EMCO	3115	9010-3581	139	
SPECTRUM ANALYSER	TEKTRONIX	2756P	B010109	164	
BICONIC ANTENNA	CHASE	BBA9106	N/A	193	
ANTENNA, LOG PERIODIC 300MHz – 1GHz	CHASE	UPA6108	1061	203	
RECEIVER	ROHDE & SCHWARZ	ESHS20	837960/003	237	
ANTENNA, BICONIC 20MHz - 300MHz	CHASE	VBA6106A	1193	251	
BILOG ANTENNA	CHASE	CBL6112	2098	274	
RECEIVER	ROHDE & SCHWARZ	ESVS10	837948/003	317	
RECEIVER	ROHDE & SCHWARZ	ESVS10	844594/003	352	
RECEIVER	ROHDE & SCHWARZ	ESHS10	844077/019	353	
V / UHF RECEIVER 20MHz - 1GHz	ROHDE & SCHWARZ	ESVS 20	838804 / 005	415	
BILOG ANTENNA	SCHAFFNER	CBL6112B	2761	431	
RECEIVER	ROHDE & SCHWARZ	ESHS 10	830051/001	UH03	
RECEIVER	ROHDE & SCHWARZ	ESVS 10	825892/003	UH04	X
RANGE 1	TRL	3 METRE	N/A	UH06	X
AE, LOOP, Z2, 9kHz - 30MHz	ROHDE & SCHWARZ	HFH2	881058 - 53	07	
BILOG ANTENNA	CHASE	CBL6112	2129	UH93	X
SPECTRUM ANALYSER	MARCONI	2386/2380	152076/004	UH120	X

## TRANSMITTER TESTS

### TRANSMITTER INTENTIONAL EMISSION – RADIATED – Part 15.249 January 2005

Ambient temperature	=	8°C(<1GHz),	3m measurements @ fc	[X]
Relative humidity	=	36%(<1GHz),	10m measurements @ fc	[ ]
Conditions	=	Open Area Test Site (OATS)	30m measurements @ fc	[ ]
Supply voltage	=	+3Vdc	30m extrapolated from 3m	[ ]
Channel number	=	1	30m extrapolated from 10m	[ ]

FREQ. (MHz)	MEASUREMENT Rx. READING (dB $\mu$ V)	CABLE LOSS (dB)	ANT FACTOR	FIELD STRENGTH (dB $\mu$ V/m)	EXTRAP. FACTOR (dB)	FIELD STRENGTH (mV/m)
914.4445	58.0	3.6	24.4	86.0	-	19.95
Limit value @ fc			50 (mV/m)			
Band occupancy @ -20dBc			f lower		f higher	
			914.4330MHz		914.5820MHz	

See spectrum analyser plot – Annex D

#### Notes:

- 1 Results quoted are extrapolated as indicated
- 2 Receiver detector @ fc = Quasi Peak, 120kHz bandwidth
- 3 When battery powered the EUT was powered with new batteries
- 4 Unit transmitting at a rate of once per 300ms. Measurement times adjusted accordingly.

#### Test Method:

- 1 As per Radio – Noise Emissions, ANSI C63.4: 1992
- 2 Measuring distances 3m
- 3 EUT 0.8 metre above ground plane
- 4 Emissions maximised by rotation of EUT, on an automatic turntable.  
Raising and lowering the receiver antenna between 1m & 4m.  
Horizontal and vertical polarisations, of the receive antenna.  
EUT orientation in three orthogonal planes.  
Maximum results recorded

The test equipment used for the Transmitter Intentional Emission – Radiated – Part 15.249 January 2005 tests is shown overleaf:

TYPE OF EQUIPMENT	MAKER/ SUPPLIER	MODEL No	SERIAL No	TRL No	ACTUAL EQUIPMENT USED
AE, LOOP, Z2, 9kHz - 30MHz	ROHDE & SCHWARZ	HFH2	881058 - 53	07	
HORN ANTENNA	EMCO	3115	9010-3580	138	
HORN ANTENNA	EMCO	3115	9010-3581	139	
SPECTRUM ANALYSER	TEKTRONIX	2756P	B010109	164	
BICONIC ANTENNA	CHASE	BBA9106	N/A	193	
ANTENNA, LOG PERIODIC 300MHz – 1GHz	CHASE	UPA6108	1061	203	
RECEIVER	ROHDE & SCHWARZ	ESHS20	837960/003	237	
ANTENNA, BICONIC 20MHz - 300MHz	CHASE	VBA6106A	1193	251	
BILOG ANTENNA	CHASE	CBL6112	2098	274	
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RECEIVER	ROHDE & SCHWARZ	ESVS10	844594/003	352	
RECEIVER	ROHDE & SCHWARZ	ESHS10	844077/019	353	
V / UHF RECEIVER 20MHz - 1GHz	ROHDE & SCHWARZ	ESVS 20	838804 / 005	415	
BILOG ANTENNA	SCHAFFNER	CBL6112B	2761	431	
RECEIVER	ROHDE & SCHWARZ	ESHS 10	830051/001	UH03	
RECEIVER	ROHDE & SCHWARZ	ESVS 10	825892/003	UH04	X
RANGE 1	TRL	3 METRE	N/A	UH06	X
AE, LOOP, Z2, 9kHz - 30MHz	ROHDE & SCHWARZ	HFH2	881058 - 53	07	
BILOG ANTENNA	CHASE	CBL6112	2129	UH93	X
SPECTRUM ANALYSER	ANRITSU	MS2665C	MT26089	479	X

**ANNEX A**  
**PHOTOGRAPHS**

PHOTOGRAPH No. 1

**TEST SETUP**



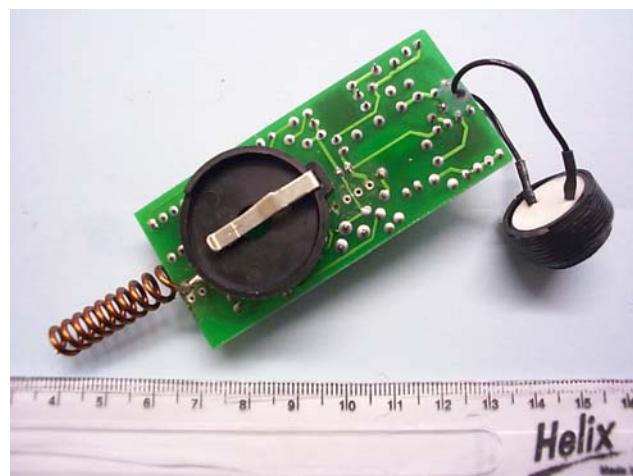
PHOTOGRAPH No. 2

**TRANSMITTER OVERVIEW**



PHOTOGRAPH No. 3

**CONTROL PCB TRACK SIDE**



PHOTOGRAPH No. 4

**CONTROL PCB COMPONENT SIDE**



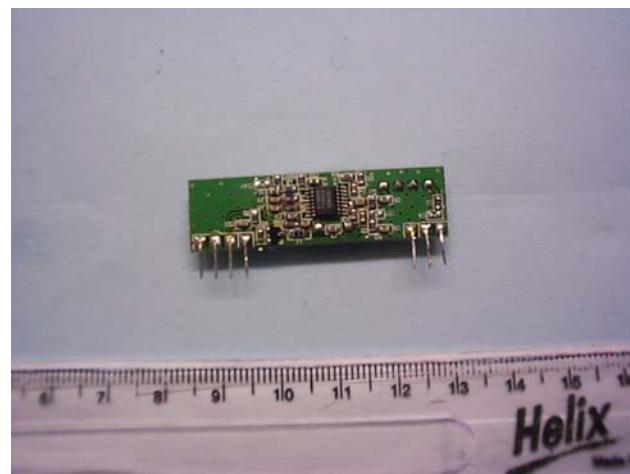
PHOTOGRAPH No. 5

**RF MODULE PCB TRACK SIDE**



PHOTOGRAPH No. 6

**RF MODULE PCB COMPONENT SIDE**



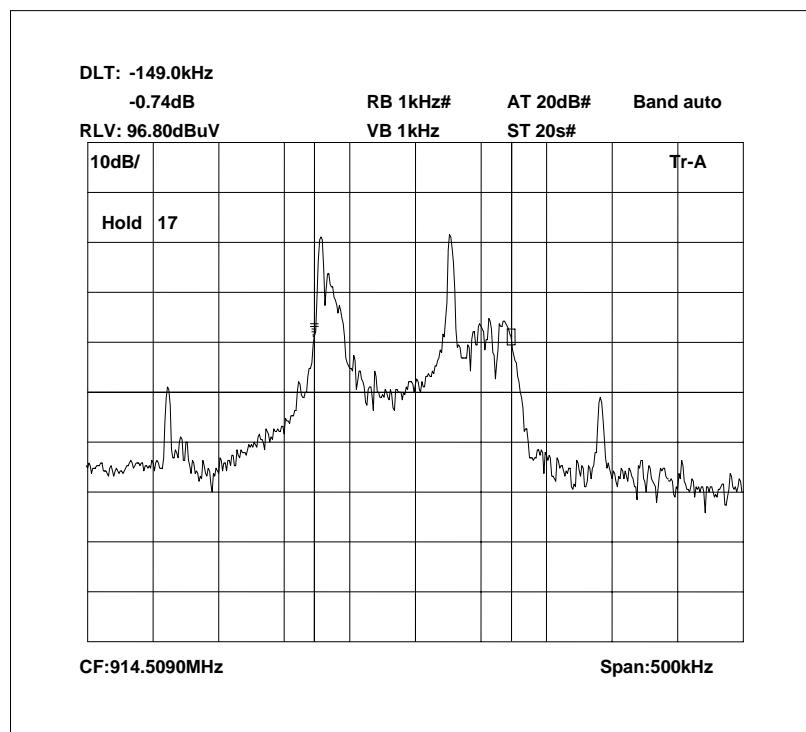
**ANNEX B**  
**APPLICANT'S SUBMISSION OF DOCUMENTATION LIST**

## APPLICANT'S SUBMISSION OF DOCUMENTATION LIST

a.	TCB	-	APPLICATION	[X]
		-	FEE	[X]
b.	AGENT'S LETTER OF AUTHORISATION	-		[X]
c.	MODEL(s) vs IDENTITY	-		[X]
d.	ALTERNATIVE TRADE P GREEN DECLARATION(s)	-		[ ]
e.	LABELLING	-	PHOTOGRAPHS	[X]
		-	DECLARATION	[X]
		-	DRAWINGS	[X]
f.	TECHNICAL DESCRIPTION	-		[X]
g.	BLOCK DIAGRAMS	-	Tx	[X]
		-	Rx	[ ]
		-	PSU	[ ]
		-	AUX	[ ]
h.	CIRCUIT DIAGRAMS	-	Tx	[X]
		-	Rx	[ ]
		-	PSU	[ ]
		-	AUX	[ ]
i.	COMPONENT LOCATION	-	Tx	[X]
		-	Rx	[ ]
		-	PSU	[ ]
		-	AUX	[ ]
j.	PCB TRACK LAYOUT	-	Tx	[X]
		-	Rx	[ ]
		-	PSU	[ ]
		-	AUX	[ ]
k.	BILL OF MATERIALS	-	Tx	[X]
		-	Rx	[ ]
		-	PSU	[ ]
		-	AUX	[ ]
l.	USER INSTALLATION / OPERATING INSTRUCTIONS	-		[X]

**ANNEX C**  
**BANDWIDTH PLOT**

## BANDWIDTH PLOT



**fl** = 914.4330MHz  
**fh** = 914.5820MHz  
**Occupied Bandwidth** = 149kHz

**ANNEX C**  
**SCAN PLOT(s)**

## SCAN PLOT(s)

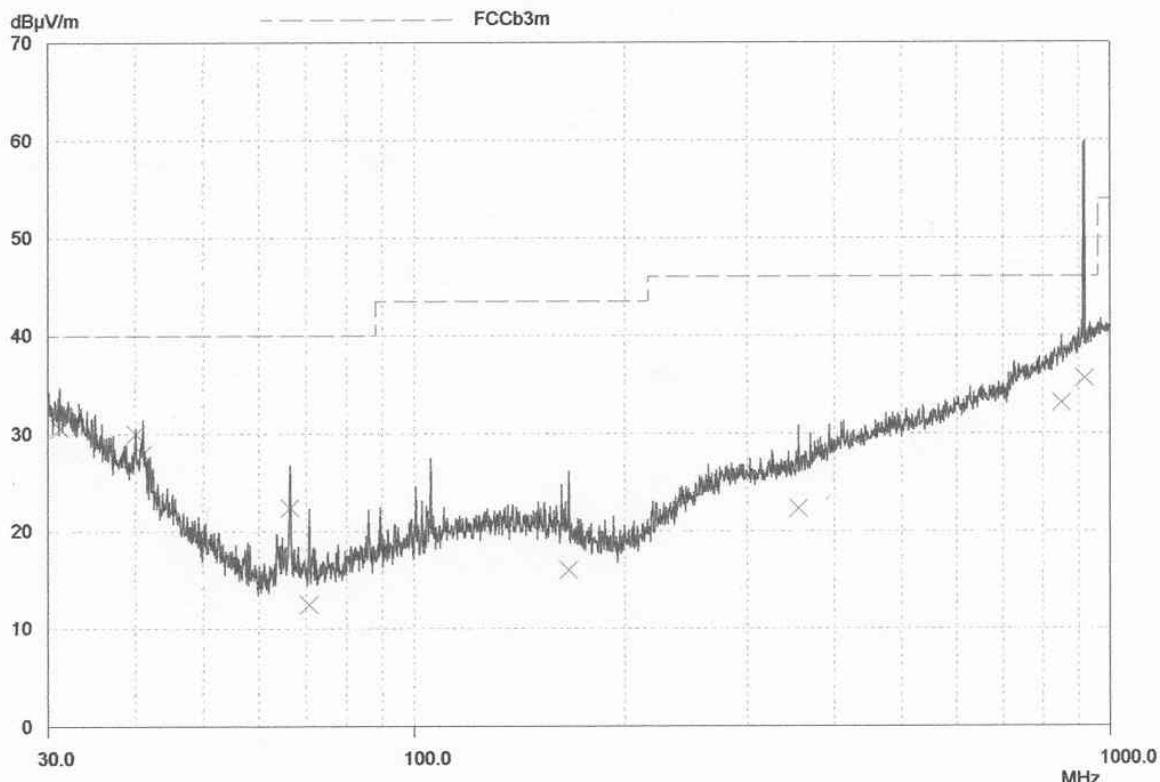
TRL Compliance Services Ltd

20 Apr 2005 16:17

### E-Field Radiation

EUT: TEK Tank Monitor  
 Manuf: Tekelk  
 Op Cond: 3m Indoor Prescan  
 Operator: D Winstanley  
 Test Spec: CFR47 FCC part 15.109 (Class B)  
 Comment: Unit On. Modulated Carrier. Plused once every 300ms.  
 RX Antenna Vertical

Scan Settings		(1 Range)			Receiver Settings					
		Frequencies			IF BW	Detector	M-Time	Atten	Preamp	OpRge
Start	Stop	Step		120kHz	PK	1msec	Auto	ON	60dB	
30MHz	1000MHz	50kHz								
Transducer	No.	Start	Stop			Name				
1	15	30MHz	1000MHz			TRLUH72				
	20	30MHz	1000MHz			UH191				
Final Measurement:		Detector:	X QP							
		Meas Time:	5sec							
		Subranges:	50							
		Acc Margin:	10 dB							



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