# Testing and Evaluation Protocol for Spectroscopic Personal Radiation Detectors (SPRDs) for Homeland Security

T&E Protocol N42.48, 2010

Version 1.02

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TEST AND EVALUATION PROTOCOL	<b>TEP NO.</b> N42.48	PREPAR DIV682	ED BY:
TITLE: Spectroscopic Personal Radiation Detectors (SPRDs) for Homeland Security.	<b>EFF. DATE</b> 2010-11-09	<b>REV.</b> 1.02	<b>PAGE</b> 1 of 94

# Testing and Evaluation Protocol Alarming Personal Radiation Detectors for use in Homeland Security

#### 1. Scope

This document establishes the protocol for testing alarming personal radiation detectors based on the performance requirements established in ANSI N42.48, "American National Standard Performance Criteria for Spectroscopic Personal Radiation Detectors (SPRDs) for Homeland Security."

#### 2. References

This protocol shall be used in conjunction with the following documents:

[R1] ANSI/IEEE N42.48, "American National Standard Performance Criteria for Spectroscopic Personal Radiation Detectors (SPRDs) for Homeland Security."

[R2] ANSI/IEEE N42.42, "Data format standard for radiation detectors used for homeland security."

[R3] NIST Handbook 150:2006, NVLAP Procedures and General Requirements

[R4] NIST Handbook 150-23:2007 (DRAFT) NVLAP Radiation Detection Instruments

#### **3.** Compliance Level Information

Instrument under test might meet all the requirements listed in the ANSI/IEEE N42.48 standard. Therefore, different agencies developed documents describing the compliance levels required for particular applications of the instruments under test. Examples of such compliance level requirements are those required by the Graduated Rad/Nuc Detector Evaluation and Reporting (GRaDER<sup>SM</sup>) program. For this program, information can be found in the "Compliance Level for GRaDER Instrument Performance" document located at <a href="http://www.dhs.gov/GRaDER">http://www.dhs.gov/GRaDER</a> .

#### 4. Test and evaluation steps

It is recommended that testing laboratories perform the tests listed in this protocol in the following order:

- Check all items listed in the general requirements
- Perform the radiological tests
- Perform the temperature and humidity tests
- Perform the entire electrical and electromagnetic test except the Electrostatic Discharge (ESD) test
- Perform the impact and the vibration tests
- Perform the moisture and dust test
- Perform the ESD test
- Perform the drop test, as required

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Excel template sheets are provided by NIST to the testing laboratory to guarantee that all data required is being provided in the test report.

#### 5. Recording test results

This Test and Evaluation protocol contains data sheets that shall be used to record and report all test results. Each data sheet is associated with a specific section(s) of the referenced ANSI standard, N42.48. An electronic version of the data sheets is provided in the form of spreadsheets that may be used to record and report the results of the tests. These spreadsheets were verified and validated (V&V) using Microsoft Excel 2007 (compatibility mode).

Instrument status shall be recorded on the "Test Summary" sheet as testing is performed. The comment section in each data sheet shall be used to record changes to the test requirements and methods listed in the ANSI standard. The comment section shall also include the rational of the changes.

#### 6. Test report

A test report summarizing the results of the test shall include the following sections:

- a. Laboratory equipment information:
  - 1. Identify all participating laboratory facilities. Include points of contact names, mailing address, telephone number, and electronic mail addresses.
  - 2. Identify the tests performed in the different facilities.
  - 3. List all supporting equipment name, model number and last day of calibration used for each test.
- b. Test equipment information :
  - 1. Include manufacturer name, instrument model, instrument serial number, software and firmware version identification, and last day of calibration.
  - 2. List the operating modes and parameter setting of the instrument and accessory kit(s) used in each test.
- c. Data sheets:
  - 1. The data sheets listed in this document shall be completed and provided as part of the report.
  - 2. Include changes to the ANSI standard test requirements or methods and rational to the changes.

#### 7. Guidance for testing ANSI N42.42 data format requirements

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The standard associated with this Test and Evaluation Protocol requires verification that an output data file is created that complies with ANSI/IEEE N42.42 standard requirements. The range of complexity of the N42.42 compliant instrument output file is extremely broad. Data output files from these instruments are simple files that can be checked manually using a text editor such as Notepad or WordPad. These files can also be verified using additional tools. In principle, all data output files that meet ANSI N42.42 can be verified manually using a text editor as these files are XML files. File reading software, such as Altova XMLSpy® 2009 Standard Edition can also be used for manual viewing and validating of structure and content.

N42.42 schemas can be used to validate the file format as specified in the ANSI/IEEE N42.42 standard. These schemas are available at the NIST web site <a href="http://physics.nist.gov/Divisions/Div846/Gp4/ANSIN4242/xml.html">http://physics.nist.gov/Divisions/Div846/Gp4/ANSIN4242/xml.html</a>.

There are several XML validators that can be used to verify the XML structure of the N42.42 compliant instrument output file. Examples of these validators can be found at <u>http://www.xmlvalidation.com/</u> or http://validator.w3.org/.

#### 8. Considerations

The standard establishes exposure rates for test in Roentgen per hour (R/h). When testing instruments that read in rem per hour, the test field shall be in rem/h instead of R/h. Refer to the "Units and Uncertainties" section in the standard for additional information.



TEST AND EVALUATION TROTOCOL	N42.48	DIV682	
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			ANSI N42.48			
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Manufacturer:					_	
Model:						
	Serial#		Serial#		Serial#	
est Number	Date	Status	Date	Status	Date	Status
5.1						
5.2						
5.3						
5.4						
5.5						
5.6						
5.7						
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Security.

Data Sheet and Report         Manufacturer:				Pre	e-Test					
Instrument:       Serial Number:         Date Performed:       Test Location:         Requirement:       Verify that the manufacturer supplied an operation and maintenance manual containing the information listed below.         Test Protocol:       Review the information provided and indicate whether the required information has been provided. Also verify that the documentation is complete and understandable. The documentation should not be in draft form with incomplete sections.         Note:       Comments are required when the requirement is not verified.         Total Requirement       Yes         Note:       Comments are required when the requirement is not verified.         Operating instructions and restrictions       L         Electrical connection schematic       L         Spare parts list       Total Performets         Totolbeshooting guide.       L         Description and protocol for communication methods of transmitting and receiving data       L         Contact information for the manufacturer including name, address, tet.       L         Power supply requirements       L         Recommended operational parameters such as: detector response and L       L         Inclusion of any hazardous material that may require additional regulation       L         Description of operation and performance of the system or unit       L         Description of operation and performance of the system			Da	ta She	et and F	Report				
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		Cor	ntrols			
	Dat	a Sheet	Section 5	.1		
Manufacturer:						
Instrument:						
Model:					Serial	Number:
ate Performed:						Location:
Requirement:	Controls shall be of expected use, and on/off button or an function as expect operation.	d adequately y other cont	protected from rol that could ca	accidental operat	tion. The nt not to	
Note:	Comments are red	quired when	the requirement	is not verified.		
			•			
					Ve	
	1st Surface		<b></b>		Yes	No
			Did the ins	trument turn off?		
	Did the instrumen	t change mo	de of operation	of configuration?		
	Did the motion	t enange me		or configuration		
					Ve	rifv
	2nd Surface				Yes	No
			Did the ins	trument turn off?		
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	3rd Surface		Did the in-	trumont turn off	Yes	No
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					Ve	Verify	
	4th Surface				Yes	No	
			Did the ins	strument turn off?			
	Did the instrumen	it change mo	ode of operation	of configuration?			
					Ve	rify	
	5th Surface			F	Yes	No	
			Did the ins	strument turn off?			
	Did the instrumen	t change mo	ode of operation	of configuration?			
		<u> </u>	•				
					Ve	rify	
	6th Surface			ŀ	Yes	No	
			Did the ins	strument turn off?			
						ļ	
	Did the instrumen	t change mo	de of operation	of configuration?		1	
						1	
						1	
Comments:							
Performed by:				Date:			
i chonned by.				Date.			
Reviewed by:				Date:			
itevieweu Dy.				Date.			



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Documentation Data Sheet Section 5.2									
Manufacturer:									
Instrument:									
					<u> </u>				
Model:	Model: Serial Number:								
Date Performed:					Test Loc	ation:			
Rea	uiromont:	Manufactu	rers shall provide instr	uctions to verify or	oner onerat	ion of	the instrum	ent	
Ney	unement.	Manuactu		uctions to verify pi	oper operat			ent.	
								_	
		Requireme	ents are listed in Claus	e 10 (Documentat	ion) of the <i>i</i>	ANSI/II	EEE N42.4	8	
	Note:	Comments	are required when the	e requirement is no	ot verified				

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	Requirement	Yes	No						
	The manufacturer provides report for type test results?								
	Verify that manufacturer contact information is available								
	Vorify that the detector types are described in the reserved								
	Verify that the detector types are described in the manual								
	Verify that the type of instrument is described in the manual								
Verif	y that the exposure rate information is available in the manual								
Verify that r	eference point and reference orientation is describe in manual								
	Verify that the radiation energy region is described in manual								
Verify that i	nformation on accuracy, linearity and lower limit of detections								
	Verify that results of calibration tests are available		_						
Verify that in	formation on weight and dimensions of instrument is available								
Verify that	at information power supply (battery) requirements is available	_							
Verify that information	on that test results under environmental conditions is available								
	Verify that results of electrical tests are available								
	Verify that results of mechanical tests are available								
	The manufacturer provides operating instructions?								
	The operating manual provides electrical diagrams?								
	The operating manual provides list of spare parts?								
	The operating manual provides instrument specifications?								
	The operating manual provides instrument specifications?								
	The operating manual provides a troubleshooting guide?								
Comments:		I							
Performed by:		Datas							
Ferrormed by:		Date:							
Reviewed by:		Date:							

NIST
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				Displa	ays				
			Data S	heet S	ection 5.3				
Manufacturer:									
Instrument:									-
Model:					Serial N	lumber:			
Date Performed:						ocation:			-
	Requirement:								
		radiolog Radion viewed	trument shall directly dia gical unit (e.g., μR/h, μG uclide identification resu via a wireless or networh of affect the operation of	by/h, or μ lits shall i k link on a	S√h). De displayed on the a secondary device	instrume	ent. If measurement rest	ults can t	De
	Note:	Comm	ents are required when t	he require	ement is not verified				-
								Ve	erify
								Yes	No
									-
							Is the display backlit?		<b> </b>
		Is the display continuously lit?							
	Is the display readable in low light level (Verified in section 5.13)?								
	Is the display readable in high light level (Verified in section 5.13)?								
							y a secondary device?		
							device is switched off?		
			Are rad	lionuclide	identification resul	ts display	yed on the instrument?	_	
			1.00		0.1	1			
Display	LED		LCD		Other				
	<b>–</b> .				0.11				
Display type	Exposure rate		Dose-equivalent rate		Other				
Display range									
	1.1								
Display units	Units								
0									
Comments:									
									-
	Performed by:						Date:		
	Performed by: Reviewed by:						Date: Date:		



Security.

		Effe		ge of Meas			on			
			Da	ata Sheet S	ection 5.4					
Manufacturar										
Manufacturer: Instrument									_	
Model: Date Performed:						erial Number: Fest Location:			_	
bate i chonned						Col Location.			_	
	Requirement:		n ronge of moo	ourono ont or india	otion chall be a	nonified by the	monufo otu	ner and aball	he frem	
		less than 2		surement or indic	ation shall de s	pecified by the	manutactu	rer and shall	be from	i 5 µR/n to n
				over the effective r eater than the effe						
	Note:	Comments	are required wh	nen the requireme	ent is not verifie	d			1	
									Verify	/
								Yes		No
									-	-
		_	For	gammas; is the e	ffective range a	t least 5 µR/h t	o 2 mR/h?	_		
							a di a ati a a O			
				Ine	instrument has	an over-range i	ndication?			
E										
1		is the effect	tive range of me	asurement as st	ated by the mar	oufacturer? (inc	lude units)			
	or gammas; what	is the effect	tive range of me	asurement as sta	ated by the mar	nufacturer? (inc	lude units)			
	or gammas; what						·			
	or gammas; what			easurement as sta			·		_	
For neutrons (	if available); what	For gam	nmas; what is tl	he display range	shown by the ir	nstrument? (inc	lude units)			
For neutrons (		For gam	nmas; what is tl	he display range	shown by the ir	nstrument? (inc	lude units)			
For neutrons (	if available); what	For gam	nmas; what is th	he display range	shown by the ir ated by the mar	nstrument? (inc	lude units) lude units)			
For neutrons (	if available); what	For gam	nmas; what is th	he display range asurement as sta	shown by the ir ated by the mar	nstrument? (inc	lude units) lude units)			
	if available); what For neut	For gan is the effect trons (if avail	nmas; what is th	he display range asurement as sta	shown by the ir ated by the mar	nstrument? (inc	lude units) lude units)			
	if available); what	For gan is the effect trons (if avail	nmas; what is th	he display range asurement as sta	shown by the ir ated by the mar	nstrument? (inc	lude units) lude units)			
	if available); what For neut	For gan is the effect trons (if avail	nmas; what is th	he display range asurement as sta	shown by the ir ated by the mar	nstrument? (inc	lude units) lude units)			
Describe ove	if available); what For neut r-range display:	For gan is the effect trons (if avail	nmas; what is th	he display range asurement as sta	shown by the ir ated by the mar	nstrument? (inc	lude units) lude units)			
	if available); what For neut r-range display:	For gan is the effect trons (if avail	nmas; what is th	he display range asurement as sta	shown by the ir ated by the mar	nstrument? (inc	lude units) lude units)			
Describe ove	if available); what For neut r-range display:	For gan is the effect trons (if avail	nmas; what is th	he display range asurement as sta	shown by the ir ated by the mar	nstrument? (inc	lude units) lude units)			
Describe ove	if available); what For neut r-range display:	For gan is the effect trons (if avail	nmas; what is th	he display range asurement as sta	shown by the ir ated by the mar	nstrument? (inc	lude units) lude units)			
Describe ove	if available); what For neut r-range display:	For gam	nmas; what is th	he display range asurement as sta	shown by the ir ated by the mar	nstrument? (inc	lude units) lude units)			
Describe ove	if available); what For neut r-range display:	For gan	nmas; what is th	he display range asurement as sta	shown by the ir ated by the mar	nstrument? (inc	lude units) lude units) lude units)			



#### TEST AND EVALUATION PR

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t		ient shall p	provide an a		Serial Numbe Test Location:	rease in the radia		•
Instrument: Model: Pate Performed: Requirements:	than the ala	•			Test Location:			•
Instrument: Model: Pate Performed: Requirements:	than the ala	•			Test Location:			•
Model: nate Performed: Requirements:	than the ala	•			Test Location:			•
ate Performed: Requirements:	than the ala	•			Test Location:			•
Requirements:	than the ala	•						•
	than the ala	•		audible alarr				•
	than the ala	•		audible alarr				•
	least 80 dB It shall not t except throu the display	(A) and sh be possible ugh the re- to inform t e connect	e to disable stricted mo the user of	eed 100 dB e both the vi ode. When b this conditio	bration and audible both alarm signals a	alarm indications are off, an indicati	s simultanec on shall be	ously, provided
Ambient Co	onditions:		°C		%RH	in HG		
Test Equipment:								
Instrument Mode of c	operation							
	operation							
Note: Comments	are required	d when the	e requireme	ent is not ve	rified.			_

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			Meas	uremen	t Results			
	AI	arm volur	ne				Frequency	/
		dB(A)	1				Hz	
	1					1		
	2					2		
	3					3		
	4					4		
	5					5		
	6					6		
	8					8		
	9					9		
	10					10		
	Mean		dB(A)			Mean	#DIV/0!	Hz
	STD		dB(A)			STD		Hz
	COV %	#DIV/0!				COV %	#DIV/0!	
			Į					
								rify
							Yes	No
			ls the ala	m froquon	ov within 100			
			13 110 414	in nequent		0 to 4000 Hz?		
			13 110 010			0 10 4000 HZ ?		<u> </u>
	Where an interm	ittent alarr						
	Where an interm	ittent alarr						
			n is provideo	d, is the int	erval less tha	in 2 seconds?		
	Where an interm		n is provideo	d, is the int	erval less tha	in 2 seconds?		
If the audible	Is the alarm vol	ume at a d	n is provided listance of 3	d, is the int	erval less tha n 85 dB(A) ar	n 2 seconds? nd 100 dB(A)?		
If the audible		ume at a d	n is provided listance of 3	d, is the int	erval less tha n 85 dB(A) ar	n 2 seconds? nd 100 dB(A)?		
If the audible	Is the alarm vol	ume at a d	n is provided listance of 3	d, is the int 0 cm within ment have	rerval less than n 85 dB(A) ar a vibration or	n 2 seconds? nd 100 dB(A)?		
	Is the alarm vol	ume at a d sabled, doe	n is provided listance of 3 es the instru	d, is the int 0 cm within ment have Is an earp	n 85 dB(A) ar a vibration or hone connect	n 2 seconds? nd 100 dB(A)? visual alarm? tion available?		
Alarms are	Is the alarm vol e alarm can be dis e distinguishable f	ume at a d sabled, doe	n is provided listance of 3 es the instru	d, is the int 0 cm within ment have Is an earp	n 85 dB(A) ar a vibration or hone connect	n 2 seconds? nd 100 dB(A)? visual alarm? tion available?		
	Is the alarm vol e alarm can be dis e distinguishable f	ume at a d sabled, doe	n is provided listance of 3 es the instru	d, is the int 0 cm within ment have Is an earp	n 85 dB(A) ar a vibration or hone connect	n 2 seconds? nd 100 dB(A)? visual alarm? tion available?		
Alarms are	Is the alarm vol e alarm can be dis e distinguishable f aces:	ume at a d sabled, doe or different	n is provided listance of 3 es the instru types of rad	d, is the int i0 cm within ment have Is an earp diation (gar	erval less than n 85 dB(A) ar a vibration or hone connect mma, neutron	n 2 seconds? nd 100 dB(A)? visual alarm? tion available? i, over-range)?		
Alarms are If yes, describe differen	Is the alarm vol e alarm can be dis e distinguishable f	ume at a d sabled, doe or different	n is provided listance of 3 es the instru types of rad	d, is the int i0 cm within ment have Is an earp diation (gar	erval less than n 85 dB(A) ar a vibration or hone connect mma, neutron	n 2 seconds? nd 100 dB(A)? visual alarm? tion available? i, over-range)?		
Alarms are	Is the alarm vol e alarm can be dis e distinguishable f aces:	ume at a d sabled, doe or different	n is provided listance of 3 es the instru types of rad	d, is the int i0 cm within ment have Is an earp diation (gar	erval less than n 85 dB(A) ar a vibration or hone connect mma, neutron	n 2 seconds? nd 100 dB(A)? visual alarm? tion available? i, over-range)?		
Alarms are If yes, describe differen	Is the alarm vol e alarm can be dis e distinguishable f aces:	ume at a d sabled, doe or different	n is provided listance of 3 es the instru types of rad	d, is the int i0 cm within ment have Is an earp diation (gar	erval less than n 85 dB(A) ar a vibration or hone connect mma, neutron	n 2 seconds? nd 100 dB(A)? visual alarm? tion available? i, over-range)?		
Alarms are If yes, describe differen	Is the alarm vol e alarm can be dis e distinguishable f aces:	ume at a d sabled, doe or different	n is provided listance of 3 es the instru types of rad	d, is the int i0 cm within ment have Is an earp diation (gar	erval less than n 85 dB(A) ar a vibration or hone connect mma, neutron	n 2 seconds? nd 100 dB(A)? visual alarm? tion available? i, over-range)?		
Alarms are If yes, describe differen If yes, describe:	Is the alarm vol e alarm can be dis e distinguishable f aces:	ume at a d sabled, doe for different ment have	n is provided listance of 3 es the instru types of rad	d, is the int 0 cm within ment have Is an earp diation (gar measures f	erval less than n 85 dB(A) ar a vibration or hone connect mma, neutron	n 2 seconds? nd 100 dB(A)? visual alarm? tion available? , over-range)?		
Alarms are If yes, describe differen If yes, describe:	Is the alarm vol e alarm can be dis e distinguishable f ices: Does the instru	ume at a d sabled, doe for different ment have	n is provided listance of 3 es the instru types of rad	d, is the int 0 cm within ment have Is an earp diation (gar measures f	erval less than n 85 dB(A) ar a vibration or hone connect mma, neutron	n 2 seconds? nd 100 dB(A)? visual alarm? tion available? , over-range)?		
Alarms are If yes, describe differen If yes, describe: Record in	Is the alarm vol	ume at a d sabled, doe for different ment have	n is provided listance of 3 es the instru types of rad	d, is the int 0 cm within ment have Is an earp diation (gar measures f	erval less than n 85 dB(A) ar a vibration or hone connect mma, neutron	n 2 seconds? nd 100 dB(A)? visual alarm? tion available? , over-range)?		
Alarms are If yes, describe differen If yes, describe:	Is the alarm vol	ume at a d sabled, doe for different ment have	n is provided listance of 3 es the instru types of rad	d, is the int 0 cm within ment have Is an earp diation (gar measures f	erval less than n 85 dB(A) ar a vibration or hone connect mma, neutron	n 2 seconds? nd 100 dB(A)? visual alarm? tion available? , over-range)?		
Alarms are If yes, describe differen If yes, describe: Record in	Is the alarm vol	ume at a d sabled, doe for different ment have	n is provided listance of 3 es the instru types of rad	d, is the int 0 cm within ment have Is an earp diation (gar measures f	erval less than n 85 dB(A) ar a vibration or hone connect mma, neutron	n 2 seconds? nd 100 dB(A)? visual alarm? tion available? , over-range)?		
Alarms are If yes, describe differen If yes, describe: Record in	Is the alarm vol	ume at a d sabled, doe for different ment have	n is provided listance of 3 es the instru types of rad	d, is the int 0 cm within ment have Is an earp diation (gar measures f	erval less than n 85 dB(A) ar a vibration or hone connect mma, neutron	n 2 seconds? nd 100 dB(A)? visual alarm? tion available? , over-range)?		
Alarms are If yes, describe differen If yes, describe: Record in	Is the alarm vol	ume at a d sabled, doe for different ment have	n is provided listance of 3 es the instru types of rad	d, is the int 0 cm within ment have Is an earp diation (gar measures f	erval less than n 85 dB(A) ar a vibration or hone connect mma, neutron	n 2 seconds? nd 100 dB(A)? visual alarm? tion available? , over-range)?		
Alarms are If yes, describe differen If yes, describe: Record in	Is the alarm vol	ume at a d sabled, doe for different ment have	n is provided listance of 3 es the instru types of rad	d, is the int 0 cm within ment have Is an earp diation (gar measures f	erval less than n 85 dB(A) ar a vibration or hone connect mma, neutron	n 2 seconds? nd 100 dB(A)? visual alarm? tion available? , over-range)?		
Alarms are If yes, describe differen If yes, describe: Record in Comm	Is the alarm vol	ume at a d sabled, doe for different ment have	n is provided listance of 3 es the instru types of rad	d, is the int 0 cm within ment have Is an earp diation (gar measures f	erval less than n 85 dB(A) ar a vibration or hone connect mma, neutron	In 2 seconds? Ind 100 dB(A)? Visual alarm? tion available? I, over-range)? II the alarms?		
Alarms are If yes, describe differen If yes, describe: Record in	Is the alarm vol	ume at a d sabled, doe for different ment have	n is provided listance of 3 es the instru types of rad	d, is the int 0 cm within ment have Is an earp diation (gar measures f	erval less than n 85 dB(A) ar a vibration or hone connect mma, neutron	n 2 seconds? nd 100 dB(A)? visual alarm? tion available? , over-range)?		
Alarms are If yes, describe differen If yes, describe: Record in Comm	Is the alarm vol	ume at a d sabled, doe for different ment have	n is provided listance of 3 es the instru types of rad	d, is the int 0 cm within ment have Is an earp diation (gar measures f	erval less than n 85 dB(A) ar a vibration or hone connect mma, neutron	In 2 seconds? Ind 100 dB(A)? Visual alarm? tion available? I, over-range)? II the alarms?		



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		١	Vibrati	ion Ala	arm					
		Data	a Shee	et Sec	tion 5	6				
Manufacturar										
Manufacturer: Instrument:								-	_	
Model: 						al Number: t Location:				
								<b>-</b>	<u> </u>	
Requirem						arm signai c 'an alarm co		The ubratic	on alarm sha	li nave
	u	sed) sh	all be grea		.8 g. The v				: pouch or ho ment should	
	Note: C	Commer	its are req	uired when	the require	ement is not	verified.			
Test Equip	ment:				_					
Instrument Mode	of oper	ration:						_		
`						·	•	v	erify	
	Instru	iment	and Mo	tor Veri	fication			Yes	No	
								_	1	
				Verity	y that new	batteries are	e installed	?		
			М	otor rotatio	on betweer	n 9000 and 1	1000 rpm	?		
			М	otor rotatio				-		
			Μ	otor rotatio		n 9000 and 1 What is the r		-		

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	Measure	ement R	<u>esults</u>			
				Intens	sity (g)	
			1			
			2			
			3			
			4			
			5			
			6			
			7			
			8			
			9			
			10			
		Mean	intensity	#DI\	//01	
		Wiedi	Intensity	#01	v/0:	
				Vei	rify	
				Yes	No	
	measured reading	greater th	an 0.8 g?			
	Is the vibration	signal inte	ermittent?			
Comments:						
Performed by:					Date:	
r enormed by.					Date.	



			Sect	tions 5	.7-5.10				
Manufacturer:									
Instrument:									
Model:					9	Serial Number:			
Date Performed:				_		Test Location:			-
				_					
	The overall dim					to that of a perso vidth, and 5 cm i			`
	provided to sec	curely fix	the instrum	nent to the u	iser (for exam	nple, a clip, ring,	or lanya	rd), with atter	ntion giv
	to the necessa	ary orienta	ation of the	detector an	d display.				
	5.8 Mass								
	The mass of th	e comple	ete instrum	ent should r	not exceed 40	)0 g.			
	5.9 Reference	e point m	arking						
	The instrument center of the d		ve reference	e points on	both the front	, or back, and si	de indic	ating the effe	ctive
	The instrument	t shall ha	ve an additi	ional referer	ice point india	cating its orienta	tion with	respect to th	e weare
					•	to indicate prope		•	
	All reference p	oints sha	ll be descri	ibed in the i	nstrument ma	anual.			
	5.10 Explosive	•		or the instr	umant is cost	ified for use is e	(nlooi) n	atmoonharaa	IE
						ified for use in exertification should	•	•	

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							÷	Ve	rifv
							F	Yes	No
What are	the dimensio	ons (length	x width x o	depth in cm	)?				
	Are	the dimensi	ions within	20 cm in le	ength, 10 cm i	in width, and	5 cm in depth?		
				O are the	·				
				Can the	instrument be	e securely fixe	ed to the user?		
		Wha	at is the m	ass (grams	)?				
				uee (graine	/·				
					Was	s the mass le	ss than 400 g?		
Are the reference poi	nts marked of	on the front	or back a	nd side indi	cating the effe	ctive center c	of the detector?		
Doeg	the manufa	cturer state	a if the inst	trument is c	artified for use	a in explosive	atmospheres?		
Dues							atmospheres		
						ls a certif	icate provided?		
					e certification	based on UL	-913 standard?		
ot, specify against w	hich standa	rd is the ins	strument c	ertified to:					
Comments:									
Common to .				_					
				_					
	ormed by:						Date:		
Perfe									
	iewed by:						Date:		



			Section	า 5.11 B	Battery L	ifetime		
			Data	a Sheet	and Re	port		
Manufacturer:								
Instrument:								
Model:						Serial Number:		
Date Performed:						Test Location:		
Requirement:	replaceabl be made t The batter µR/h (0.5	e in the fiel o permit rec ies shall be µGy/h) field	d without th charging fro capable of . The batter	ne use of sp m ac or dc powering th ries shall be	ecial tools. V (12 V) power he instrumen e capable of p	-	e batteries are use	ed, provisions shall n of 16 h in a 50
	The instru	ment shall I	have a low l	battery indic	cator			
Net	Commont	are require	d when the	requiremen	t is not verified	4		
Note:	Comments	s are require		requiremen		J.		
				Test	Results			
								Non-
							Rechargeable	Rechargeable
					В	attery type used	L	
		ī	1					
							Yes	No
						cations provided?		
The batteries power	ed the inst	rument for 1	16 h in a no	n-alarming	condition in a	a field of 50 µR/h? rming operation?		
-						ming condition?		
						vas displayed?		
	1	1	1		1			
Comments:								
Completed by:						Date:		
Reviewed by:						Date:		

TEST AND EVALUATION PROTOCOL	<b>TEP NO.</b> N42.48	<b>PREPARED BY:</b> DIV682	
TITLE: Spectroscopic Personal Radiation Detectors (SPRDs) for Homeland Security.	<b>EFF. DATE</b> 2010-11-09	<b>REV.</b> 1.02	<b>PAGE</b> 20 of 94



TITLE: Spectroscopic Personal Radiation	EFF. DAT
Detectors (SPRDs) for Homeland	2010-11-09
Security.	

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		Sectio	n 5.12 L	Data tran	smissio	n		
		Da	ata She	et and Re	eport			
Manufacturer:								
Instrument:								
Model:						I Number:		
Date Performed:					lest	Location:		
Requirement:	Communic computer. requireme media dev transferred When use Communic to the use Proprietan	The transfernts of Ethe ice. The tee d data shall d, wireless cation proto ation forma r. y software s	er should be rnet, USB, v chnique use l be in the X techniques pcols shall t ats\ shall no should not t	ility to transfe e based on a wireless, or o ed shall confo ML format foll s shall have th be described i ot be used and be required for shall be prov	bi-directiona ther electror rm to applica lowing the fo le ability to b n the techni d any require r remote dat	I port that r nic means, able IEEE p ormat define be encrypte cal manual ed drivers s a interpreta	meets the such as a r protocols. T ed in ANSI I ed. . Proprietar hall be mad	removable he N42.42. y le availab
Note:	Comments	are require	ed when the	requirement is	s not verified.	-		
Note:	Comments	s are require		requirement is st Results	s not verified.			
Note :	Comments	are require		-	s not verified.		Yes	No
Note:			Tes	-			Yes	No
Note :		l data trans	Tes	st Results	rified in 5.13	and 5.14?		No
	Additiona	l data trans Does the i	Tes fer requirem	st Results nents were ve ransmit data Is the	rified in 5.13	and 5.14? al device?		No
	Additiona	l data trans Does the i g. Ethernet	<u>Tes</u> fer requirem instrument t	st Results nents were ve rransmit data ls the less, other)?	rified in 5.13 to an extern transfer bidi	and 5.14? al device? irectional?		No L-J
	Additiona	l data trans Does the i g. Ethernet	<u>Tes</u> fer requirem instrument t , USB, wire e output file	t Results nents were ve ransmit data ls the less, other)? meets ANSI	rified in 5.13 to an extern transfer bidi N42.42 requ	and 5.14? al device? irectional? irements?		No La La
	Additiona	I data trans Does the i g. Ethernet The	Tes fer requirem instrument t , USB, wire e output file Is the da	et Results nents were ve ransmit data Is the less, other)? meets ANSI ata format des	rified in 5.13 to an extern transfer bidi N42.42 requ cribed in the	and 5.14? al device? irectional? irements? e manual?		
	Additiona	I data trans Does the i g. Ethernet The	Tes fer requirem instrument t , USB, wire e output file Is the da mmunicatior	et Results nents were ve transmit data ls the less, other)? meets ANSI ata format des n protocol des	rified in 5.13 to an extern transfer bidi N42.42 requ scribed in the scribed in the	and 5.14? al device? irectional? irements? e manual? e manual?		
	Additiona	I data trans Does the i g. Ethernet The	Tes fer requirem instrument t , USB, wire e output file Is the da mmunicatior	at Results nents were ve transmit data ls the less, other)? meets ANSI ata format des n protocol des etary commun	rified in 5.13 to an extern transfer bidi N42.42 requ scribed in the scribed in the	and 5.14? al device? irectional? irements? e manual? e manual? ats used?		
	Additiona	I data trans Does the i g. Ethernet The	Tes fer requirem instrument t , USB, wire e output file Is the da nmunication Are proprie	at Results nents were ve transmit data ls the less, other)? meets ANSI ata format des n protocol des etary commun Are drivers ls prop	rified in 5.13 to an extern transfer bidi N42.42 requ scribed in the scribed in the incation form provided to t rietary softw	and 5.14? al device? irectional? irements? e manual? e manual? ats used? he users? rare used?		
	Additiona	I data trans Does the i g. Ethernet The	Tes fer requirem instrument t , USB, wire e output file Is the da nmunication Are proprie	at Results nents were ve transmit data ls the less, other)? meets ANSI ata format des n protocol des etary commun Are drivers	rified in 5.13 to an extern transfer bidi N42.42 requ scribed in the scribed in the incation form provided to t rietary softw	and 5.14? al device? irectional? irements? e manual? e manual? ats used? he users? rare used?		
	Additiona	I data trans Does the i g. Ethernet The	Tes fer requirem instrument t , USB, wire e output file Is the da nmunication Are proprie	at Results nents were ve transmit data ls the less, other)? meets ANSI ata format des n protocol des etary commun Are drivers ls prop	rified in 5.13 to an extern transfer bidi N42.42 requ scribed in the scribed in the incation form provided to t rietary softw	and 5.14? al device? irectional? irements? e manual? e manual? ats used? he users? rare used?		
What type of port	Additiona is used (e.s	I data trans Does the i g. Ethernet The	Tes fer requirem instrument t , USB, wire e output file Is the da nmunication Are proprie	at Results nents were ve transmit data ls the less, other)? meets ANSI ata format des n protocol des etary commun Are drivers ls prop	rified in 5.13 to an extern transfer bidi N42.42 requ scribed in the scribed in the incation form provided to t rietary softw	and 5.14? al device? irectional? irements? e manual? e manual? ats used? he users? rare used?		
	Additiona is used (e.s	I data trans Does the i g. Ethernet The	Tes fer requirem instrument t , USB, wire e output file Is the da nmunication Are proprie	at Results nents were ve transmit data ls the less, other)? meets ANSI ata format des n protocol des etary commun Are drivers ls prop	rified in 5.13 to an extern transfer bidi N42.42 requ scribed in the scribed in the incation form provided to t rietary softw	and 5.14? al device? irectional? irements? e manual? e manual? ats used? he users? rare used?		No Lad Lad Lad Lad Lad Lad Lad Lad Lad Lad
What type of port	Additiona is used (e.s	I data trans Does the i g. Ethernet The	Tes fer requirem instrument t , USB, wire e output file Is the da nmunication Are proprie	at Results nents were ve transmit data ls the less, other)? meets ANSI ata format des n protocol des etary commun Are drivers ls prop	rified in 5.13 to an extern transfer bidi N42.42 requ scribed in the scribed in the incation form provided to t rietary softw	and 5.14? al device? irectional? irements? e manual? e manual? ats used? he users? rare used?		
What type of port	Additiona is used (e.s	I data trans Does the i g. Ethernet The	Tes fer requirem instrument t , USB, wire e output file Is the da nmunication Are proprie	at Results nents were ve transmit data ls the less, other)? meets ANSI ata format des n protocol des etary commun Are drivers ls prop	rified in 5.13 to an extern transfer bidi N42.42 requ scribed in the scribed in the incation form provided to t rietary softw	and 5.14? al device? irectional? irements? e manual? e manual? ats used? he users? rare used?		
What type of port	Additiona is used (e.e	I data trans Does the i g. Ethernet The	Tes fer requirem instrument t , USB, wire e output file Is the da nmunication Are proprie	at Results nents were ve transmit data ls the less, other)? meets ANSI ata format des n protocol des etary commun Are drivers ls prop	rified in 5.13 to an extern transfer bidi N42.42 requ scribed in the scribed in the incation form provided to t rietary softw	and 5.14? al device? irectional? irements? e manual? e manual? ats used? he users? rare used?		
What type of port	Additiona is used (e.e	I data trans Does the i g. Ethernet The	Tes fer requirem instrument t , USB, wire e output file Is the da nmunication Are proprie	at Results nents were ve transmit data ls the less, other)? meets ANSI ata format des n protocol des etary commun Are drivers ls prop	rified in 5.13 to an extern transfer bidi N42.42 requ scribed in the scribed in the incation form provided to t rietary softw	and 5.14? al device? irectional? irements? e manual? e manual? ats used? he users? rare used?		
What type of port	Additiona is used (e.s	I data trans Does the i g. Ethernet The	Tes fer requirem instrument t , USB, wire e output file Is the da nmunication Are proprie	at Results nents were ve transmit data ls the less, other)? meets ANSI ata format des n protocol des etary commun Are drivers ls prop	rified in 5.13 to an extern transfer bidi N42.42 requ scribed in the scribed in the incation form provided to t rietary softw	and 5.14? al device? irectional? irements? e manual? e manual? e manual? ats used? he users? rare used? provided?		



Security.

I

	User Interface			
	Data Sheet Section 5.13			
Manufacturer:				
Instrument				
Model	-		I Number:	
Date Performed		Test	Location:	
	<ul> <li>a) A display that is easily readable over the required temperature ran</li> <li>b) Controls that are user-friendly for routine operation.</li> <li>c) Controls and switches that are designed in a way to minimize acc</li> <li>d) A menu structure that is simple and easy to be followed intuitively</li> <li>e) Detect, search/localize, and identification functions.</li> <li>f) The capability to operate if the user is wearing gloves.</li> </ul>	idental operat	0 0	conditions.
	<ul> <li>g) A method to inform the user of the expected time required to colle to extend or reduce the collection time.</li> <li>h) An automated mode of operation that would automatically start sp radionuclide.</li> <li>i) Provide a status indicator, such as a flashing LED or LCD heartbear functioning properly, including visual indication of an alarm condition.</li> </ul>	ectrum collec at, to inform th	tion and attempt	to identify th

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USER 1		
	Yes	No
ithout Gloves in a low level light <150 lux		-
It is possible to turn on the instrument?		
It is possible to calibrate the instrument?		
It is possible to go over the menu as described in the manual?		
It is possible to make an exposure rate measurement?		
It is possible to make an identification measurement?		
It is possible to save the data?		
Make a 137Cs identification measurement, was the collection time displayed?		
It is possible to extend the collection time?		
Is this extended time displayed?		
It is possible to reduce the collection time?		
Is this reduced time displayed?		
It is possible to transfer the data to an external device following the manufacturer provided information?		
Is wireless communication used?		
If wireless communication is used, is encryption available?		
It is possible to turn off the instrument?		
/ithout Gloves in a high level light > 10000 lux and < 32000 lux		
/ithout Gloves in a high level light > 10000 lux and < 32000 lux It is possible to turn on the instrument?		
It is possible to turn on the instrument?		
It is possible to turn on the instrument? It is possible to calibrate the instrument?		
It is possible to turn on the instrument? It is possible to calibrate the instrument? It is possible to go over the menu as described in the manual?		
It is possible to turn on the instrument? It is possible to calibrate the instrument? It is possible to go over the menu as described in the manual? It is possible to make an exposure rate measurement?		
It is possible to turn on the instrument? It is possible to calibrate the instrument? It is possible to go over the menu as described in the manual? It is possible to make an exposure rate measurement? It is possible to make an identification measurement?		
It is possible to turn on the instrument? It is possible to calibrate the instrument? It is possible to go over the menu as described in the manual? It is possible to make an exposure rate measurement? It is possible to make an identification measurement? It is possible to save the data? It is possible to turn off the instrument?		
It is possible to turn on the instrument? It is possible to calibrate the instrument? It is possible to go over the menu as described in the manual? It is possible to make an exposure rate measurement? It is possible to make an identification measurement? It is possible to save the data? It is possible to turn off the instrument?		
It is possible to turn on the instrument? It is possible to calibrate the instrument? It is possible to go over the menu as described in the manual? It is possible to make an exposure rate measurement? It is possible to make an identification measurement? It is possible to make an identification measurement? It is possible to save the data? It is possible to turn off the instrument? /ith Gloves It is possible to turn on the instrument?		
It is possible to turn on the instrument? It is possible to calibrate the instrument? It is possible to go over the menu as described in the manual? It is possible to make an exposure rate measurement? It is possible to make an identification measurement? It is possible to make an identification measurement? It is possible to save the data? It is possible to turn off the instrument? <b>/ith Gloves</b> It is possible to turn on the instrument? It is possible to calibrate the instrument?		
It is possible to turn on the instrument? It is possible to calibrate the instrument? It is possible to go over the menu as described in the manual? It is possible to make an exposure rate measurement? It is possible to make an identification measurement? It is possible to make an identification measurement? It is possible to save the data? It is possible to turn off the instrument? //ith Gloves It is possible to turn on the instrument? It is possible to calibrate the instrument? It is possible to go over the menu as described in the manual?		
It is possible to turn on the instrument? It is possible to calibrate the instrument? It is possible to go over the menu as described in the manual? It is possible to make an exposure rate measurement? It is possible to make an identification measurement? It is possible to make an identification measurement? It is possible to save the data? It is possible to turn off the instrument? It is possible to turn on the instrument? It is possible to calibrate the instrument? It is possible to go over the menu as described in the manual? It is possible to make an exposure rate measurement?		
It is possible to turn on the instrument? It is possible to go over the menu as described in the manual? It is possible to go over the menu as described in the manual? It is possible to make an exposure rate measurement? It is possible to make an identification measurement? It is possible to save the data? It is possible to turn off the instrument? /ith Gloves It is possible to turn on the instrument? It is possible to calibrate the instrument? It is possible to go over the menu as described in the manual? It is possible to make an exposure rate measurement? It is possible to make an exposure rate measurement? It is possible to make an identification measurement? It is possible to make an identification measurement?		
It is possible to turn on the instrument? It is possible to calibrate the instrument? It is possible to go over the menu as described in the manual? It is possible to make an exposure rate measurement? It is possible to make an identification measurement? It is possible to make an identification measurement? It is possible to save the data? It is possible to turn off the instrument? It is possible to turn on the instrument? It is possible to calibrate the instrument? It is possible to go over the menu as described in the manual? It is possible to make an exposure rate measurement?		

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USER 2		
	Yes	No
/ithout Gloves in a low level light <150 lux		· · ·
It is possible to turn on the instrument?		
It is possible to calibrate the instrument?		
It is possible to go over the menu as described in the manual?		
It is possible to make an exposure rate measurement?		
It is possible to make an identification measurement?		
It is possible to save the data?		
Make a 137Cs identification measurement, was the collection time displayed?		
It is possible to extend the collection time?		
Is this extended time displayed?		
It is possible to reduce the collection time?		
Is this reduced time displayed?		
It is possible to transfer the data to an external device following the manufacturer		
provided information?		
Is wireless communication used?		
If wireless communication is used, is encryption available?		
It is possible to turn off the instrument?		
/ithout Gloves in a high level light > 10000 lux and < 32000 lux		1 1
It is possible to turn on the instrument?		
It is possible to calibrate the instrument?		
It is possible to go over the menu as described in the manual?		
It is possible to make an exposure rate measurement?		
It is possible to make an identification measurement?		
It is possible to save the data?		
It is possible to turn off the instrument?		
/ith Gloves		
It is possible to turn on the instrument?		
It is possible to calibrate the instrument?		
It is possible to go over the menu as described in the manual?		
It is possible to make an exposure rate measurement?		
It is possible to make an identification measurement?		
It is possible to save the data?		┥───
It is possible to turn off the instrument?		

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USER 3		
	Yes	No
ithout Gloves in a low level light <150 lux	T	-
It is possible to turn on the instrument?		
It is possible to calibrate the instrument?		
It is possible to go over the menu as described in the manual?		
It is possible to make an exposure rate measurement?		
It is possible to make an identification measurement?		
It is possible to save the data?		
Make a 137Cs identification measurement, was the collection time displayed?		
It is possible to extend the collection time?		
Is this extended time displayed?		
It is possible to reduce the collection time?		
Is this reduced time displayed?		
It is possible to transfer the data to an external device following the manufacturer provided information?		
Is wireless communication used?		
If wireless communication is used, is encryption available?		
It is possible to turn off the instrument?		
It is possible to turn off the instrument?		
ithout Gloves in a high level light > 10000 lux and < 32000 lux		
ithout Gloves in a high level light > 10000 lux and < 32000 lux It is possible to turn on the instrument?		
ithout Gloves in a high level light > 10000 lux and < 32000 lux It is possible to turn on the instrument? It is possible to calibrate the instrument?		
/ithout Gloves in a high level light > 10000 lux and < 32000 lux It is possible to turn on the instrument? It is possible to calibrate the instrument? It is possible to go over the menu as described in the manual?		
/ithout Gloves in a high level light > 10000 lux and < 32000 lux It is possible to turn on the instrument? It is possible to calibrate the instrument? It is possible to go over the menu as described in the manual? It is possible to make an exposure rate measurement?		
/ithout Gloves in a high level light > 10000 lux and < 32000 lux It is possible to turn on the instrument? It is possible to calibrate the instrument? It is possible to go over the menu as described in the manual? It is possible to make an exposure rate measurement? It is possible to make an identification measurement?		
/ithout Gloves in a high level light > 10000 lux and < 32000 lux It is possible to turn on the instrument? It is possible to go over the menu as described in the manual? It is possible to make an exposure rate measurement? It is possible to make an identification measurement? It is possible to make an identification measurement? It is possible to save the data? It is possible to turn off the instrument?		
/ithout Gloves in a high level light > 10000 lux and < 32000 lux It is possible to turn on the instrument? It is possible to go over the menu as described in the manual? It is possible to make an exposure rate measurement? It is possible to make an identification measurement? It is possible to make an identification measurement? It is possible to save the data? It is possible to turn off the instrument?		
Vithout Gloves in a high level light > 10000 lux and < 32000 lux It is possible to turn on the instrument? It is possible to go over the menu as described in the manual? It is possible to make an exposure rate measurement? It is possible to make an identification measurement? It is possible to make an identification measurement? It is possible to save the data? It is possible to turn off the instrument? Vith Gloves It is possible to turn on the instrument?		
/ithout Gloves in a high level light > 10000 lux and < 32000 lux It is possible to turn on the instrument? It is possible to go over the menu as described in the manual? It is possible to go over the menu as described in the manual? It is possible to make an exposure rate measurement? It is possible to make an identification measurement? It is possible to make an identification measurement? It is possible to save the data? It is possible to turn off the instrument? /ith Gloves It is possible to turn on the instrument? It is possible to turn on the instrument?		
/ithout Gloves in a high level light > 10000 lux and < 32000 lux		
/ithout Gloves in a high level light > 10000 lux and < 32000 lux It is possible to turn on the instrument? It is possible to go over the menu as described in the manual? It is possible to go over the menu as described in the manual? It is possible to make an exposure rate measurement? It is possible to make an identification measurement? It is possible to make an identification measurement? It is possible to save the data? It is possible to turn off the instrument? /ith Gloves It is possible to turn on the instrument? It is possible to calibrate the instrument? It is possible to go over the menu as described in the manual? It is possible to make an exposure rate measurement?		
/ithout Gloves in a high level light > 10000 lux and < 32000 lux It is possible to turn on the instrument? It is possible to go over the menu as described in the manual? It is possible to make an exposure rate measurement? It is possible to make an identification measurement? It is possible to make an identification measurement? It is possible to save the data? It is possible to turn off the instrument? /ith Gloves It is possible to turn on the instrument? It is possible to calibrate the instrument? It is possible to go over the menu as described in the manual?		
/ithout Gloves in a high level light > 10000 lux and < 32000 lux It is possible to turn on the instrument? It is possible to go over the menu as described in the manual? It is possible to go over the menu as described in the manual? It is possible to make an exposure rate measurement? It is possible to make an identification measurement? It is possible to make an identification measurement? It is possible to save the data? It is possible to turn off the instrument? /ith Gloves It is possible to turn on the instrument? It is possible to calibrate the instrument? It is possible to go over the menu as described in the manual? It is possible to make an exposure rate measurement?		

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	For addi	tional users add more tables as needed.			
Comments:					
Performed by:				Date:	
Reviewed by:			 	 Date:	



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TEP NO.

PREPARED BY:

			Spectral Identification				
		C	ata Sheet Section 5.14				
Manufacturer: Instrument:							
modument.							
Model:					Seria	I Number:	
Date Performed:					Test	Location:	
Reg	uirement	a) The inst	rument shall have the ability to store and trans	fer at leas	t fifty co	mplete	
(unp idem idem iTir ins ins ins ins ins ins ins ins ins ins		identificati • Time and • Instrume • Hardware • Identified • Spectrum • Measure • Neutron b) An indic "unknown c) The mai	nt type and serial number e and software version radionuclides and associated confidence indic n collection time interval d gamma-ray exposure rate count rate at the time of measurement, if provide ration shall be displayed or otherwise provided radionuclide") if a radionuclide cannot be idention fundacturer shall describe the meaning of confid rument shall indicate if the exposure rate is to	at includin cations ded (e.g., "not fied. ence indic	g: identifie ations.		
	Note	Comments	are required when the requirement is not verif	ied.			
				Yes		No	
ls ti	he instrum	ent capable	of storing 50 complete unprocessed spectra?				
is the in	strument c	capable of th	ansferring 50 complete unprocessed spectra?				
		ls	each spectral save in an ANSI N42.42 format?				
		.5					
	provides in	dication suc	h as "not identified" or "unknown radionuclide"				
The instrument			when a radionuclide cannot be identified?				
The instrument	<b>A</b> 1.						
The instrument p	(Note- use	e data from	test in section 6.10.5 to answer this question)				
The instrument p	·		, ,				
The instrument p	·		test in section 6.10.5 to answer this question) es the meaning of the confidence indications?				
	The mar	nual describ	es the meaning of the confidence indications?				
	The mar	nual describ des an indio	es the meaning of the confidence indications? cation when the exposure rate is too high for a radionuclide identification?				
	The mar	nual describ des an indio	es the meaning of the confidence indications? cation when the exposure rate is too high for a				

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	The Outer	rt Eilo Ca	ontains the Following:	Yes	No	
	The Outpu		ontains the Following:	fes	NO	
			Time and date information?	?		
		In:	strument type and serial number information?	>		
			Hardware and software version information?	, ,		
			Identified radionuclide?	> >		
		Confidera	ce indications for the radionuclides identified?			
		Comident				
			Measured gamma-ray exposure rate?	> 		
	lf provide	d, neutro	n count rate at the time of the measurement?	2		
			Spectrum collection time interval?	·		
Comments:						
Perf	ormed by:					Date:
Rev	/iewed by:					Date:

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		Rate of	False	Alarm	S				
		Data	Sheet	Sectio	n 6.2				
Manufacturer:									_
Instrument:									-
Model:						ial Number:			
Date Performed:					Te	st Location:			
Requi	rements:								
		The false alar						ss or equa	al than
		alarm per 10	nours when	operated	n a stable da	ackground en	wronment.		
		The alarm thr	eshold sha	I be the sa	me as that u	sed for the "ti	ime to alarm	n" test	
Note:	Comments	are required	when the re	auirement	is not verified	1.			
				<u></u>					
Ambient C	onditions:		°C		%RH		in HG		
Gamma Alarm	Threshold:				Instrum	ent Mode of	operation		
Neutron Alarm	Threshold:								
Gamma B	ackground	measurement		µR/h					
Neutron R	ackground	measurement		(Add Units	•)				
Neution B	ackyrounu	measurement	-						
					Yes	No			
For gammas; did the instrum	ent alarm m	ore than once	e over the te	st period ?					
If applicable, did the neu	tron alarm r	nore than onc	e over the t	est period?					
Record the numb	er of gamm	a alarms durir	ng the test:						
Record the numb	er of neutro	n alarms durir	na the test:						
Ĺ	omments:								
Perf	ormed by:						Date:		
	<u> </u>								
Day	viewed by:						Date:		

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	Т	ime to Ala	rm: Phot	ons			
		Data Sheet	Section 6.	3			
Manufacturer:							
Instrument:							
Model:				S	erial Number:		
Date Performed:					Fest Location:		
Requirement:			2 s after exposure eriod of not more	to an increase in the ambi than 0.5 s.	ent radiation lev	/el of 50 µR/h	
Note:	Comments are	required when the	e requirement is i	not verified.			
Ambie	ent Conditions:		°C		%RH		in HG
Test Equipment:							
Sources Data:							
		Mea	asurement Res	<u>sults</u>			
Background	l Field (Cs-137)		µR/h	Alarm Threshold		µR/h	
	Field (Am-241)		μR/h				
•	d Field (Co-60)		μR/h	Instrument Mode	e of operation		
not 50 μR/h enter:							<u> </u>
Testing	Field (Cs-137)		µR/h	Instrument rea	ading (Cs-137)		µR/h
Testing	Field (Am-241)		µR/h	Instrument rea	ding (Am-241)		µR/h
	g Field (Co-60)		µR/h	Instrument re	ading (Co-60)		µR/h

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		Cs-137	Am-241	Co-60		
		time to alarm ≤2s	time to alarm ≤2s	time to alarm ≤2s		
OPERATIONAL	1				(Yes/No entry)	
NOTE:	2					
	3					
If there is no alarm	4					
hen a "No alarm"	5					
message needs to be recorded in the table	6					
	7					
	8					
	9					
	10					
				Yes	No	
	Did the instru	ment alarm within 2 (	seconds for Cs-137?		NO	
	Dia the matrix					
	Did the instrum	nent alarm within 2 s	econds for Am-241?			
	Did the motion					
				T		
	Did the instr	ument alarm within 2	seconds for Co-607			
	Did the instr	ument alarm within 2	seconds for Co-60?			
	Did the instr	ument alarm within 2	seconds for Co-60?			
	Did the instr	ument alarm within 2	seconds for Co-60?			
	Did the instr	ument alarm within 2	seconds for Co-60?			
<b>0</b>	Did the instr	ument alarm within 2	eseconds for Co-60?			
Comments:	Did the instr	ument alarm within 2	seconds for Co-60?			
Comments:	Did the instr	ument alarm within 2	seconds for Co-60?			
Comments:	Did the instr	ument alarm within 2	seconds for Co-60?			
Comments:	Did the instr	ument alarm within 2	seconds for Co-60?			
Comments: Performed by:	Did the instr	ument alarm within 2	Date:			
	Did the instr	ument alarm within 2				

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			ne to alarm					
		D	ata Sheet Se	ction 6	.4			
Manufacturer:								
Instrument:								
Model: Date Performed:						Number: Location:		
Date Performed:					lest	Location:		
Re	quirement:	The neutron alarm shall a period of not more tha		er exposure	to an unmo	derated net	utron field that or	curs over
Note:	Comments a	are required when the re	equirement is not ver	ified.				
Ambient	Conditions:		°C		%RH		in HG	
Test Equipment:								
Source Data:					Instrume	nt Mode o	f operation	
Backg	round Field		(add units)	Alarm	Threshold		(add units)	
			Measurement	Results				
Record in table if ins	strument alar	med or not within 5 sec	conds.					
			Cf-252					
			time to alarm ≤5s					
OPERATIONAL NO	TE:	1		(Yes/No e	ntry)			
If there is no alarm	then a "No	2						
llarm" message nee		3						
ecorded in the table		5						
		6		1				
		7		]				
		8						
		8 9 10						

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				N/			L
				Yes	No		
	Did the inst	trument alarm within 5 s	seconds for neutron?				
Comments:							
Performed by:			Date:				
Reviewed by:			Date:				

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			Data Sheet	Section 6.5				
Manufacturer:								
Instrument:								
Model:						Serial Number:		
ate Performed:						Test Location:		
	Requirement:	when a wearer is	slowly approaching	I not be affected by s or is being approache nds after the instrume	d by a radiation s	ource.	may be caused	
Note:	Comments are req	uired when the re-	quirement is not verif	ied.				
Am	bient Conditions:		°C	%	(RH		in HG	
			°C	9/	/RH		in HG	
			℃ 	<u> </u>	(RH		in HG	
est Equipment: Source Data:			°C		æH ckground Field:		in HG	
'est Equipment: Source Data: Gamma E				Neutron Ba				
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			Me	asurement Res	ults			
Record in table if ins	trument alarmed o	r not within 2 seco	nds for gammas ar	nd 5 seconds for ne	utrons.			
			Cs-137	Cf-252				
			time to alarm ≤2s	time to alarm ≤5s				
PERATIONAL NOT	TE:	1			(Yes/No entry)			
		2						
there is no alarm t		3						
nessage needs to b	e recorded in the	4						
able		5			1			
		6						
		7						
		7						
		8						
		9						
		10						
			Yes	No				
Did the instrument	alarm within 2 sec	conds for gamma?						
Did the instrument	olorm within 5 oos	anda fan nautran						
Dia the instrument	alarm within 5 sec	conds for neutron?		I				
Comments:								
Comments:						_		
Comments:								
Comments:						_		
Comments: Performed by:			Date:					
Performed by:								
			Date: Date:					
Performed by:								

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			Accura	cy - Photor	าร			
				et Section (				
Manufacturer:								
Instrument:								
Model:						Serial Number:		
Date Performed:						Test Location:		
Re	equirement:	Displayed ex	posure rates, when pr e using Am-241, Cs-13		thin ±30 % of the co	nventionally true valu	ue of the applied	
Note:	Comments a	are required w	hen the requirement is	not verified.				
Ambient	Conditions:		°C		%RH		in HG	
Test Equipment:								
s-137 Measureme	ents							
Source Data:					Instrument	Mode of operation		
		Background		µR/h	at test location			
0-								
Ga	imma Alarm	Threshold:		µR/h				
Maximum in	istrument ra	nge display		mR/h				
				For 400 µR/h	For 1 mR/h	For 80% max rate		
		Rad	iation fields in mR/h	0.40	1.00	0.00		
Act	ual Radiatio	on fieldsuse	d in the test in mR/h					
			1				(add instrument units	s)
			2				l	
			4				4	
			5		1			
			6		1		1	
			7					
			8					
			9					
			10 Moon	#DN//01	#DN//01	#DN//01	4	
			Mean Std dev	#DIV/0! #DIV/0!	#DIV/0! #DIV/0!	#DIV/0! #DIV/0!	4	
			COV %	#DIV/0!	#DIV/0!	#DIV/0!	l	
			001/10					
			low (-30%)	0.28	0.70	0.00		
			high (+30%)	0.52	1.30	0.00		
			<b>U</b> ( <b>U</b> )					

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241 Measureme	<u>nts</u>						
Source Data:					Instrument	Node of operation	
		Pookaround		µR/h	at test location		
		Background			at test location		
Gan	nma Alarm	Threshold:		µR/h			
Maximum ins	trument ra	nge display		mR/h			
				<b>—</b> (00 <b>— —</b> "			
	D 11	- (1 (1	l fan faat in mDik	For 400 µR/h	For 1 mR/h	For 80% max rate	
A - 41			for test in mR/h the test in mR/h	0.40	1.00	0.00	
Aciu		n neids used in	1				(add instrument units)
			2				
			3				
			4				
			5				
			6				
			7				
			8				
			9				
			10				
			Mean	#DIV/0!	#DIV/0!	#DIV/0!	
			Std dev	#DIV/0!	#DIV/0!	#DIV/0!	
			COV %	#DIV/0!	#DIV/0!	#DIV/0!	
			low (-30%)	0.28	0.70	0.00	
			high (+30%)	0.52	1.30	0.00	
0 Measurement							
	<u>~</u>						
Source Data:					Instrument I	Node of operation	
	I	Background		µR/h	at test location		
Gan	nma Alarm	Threshold:		µR/h			
				5.4			
Maximum ins	trument ra	nge display		mR/h			

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			For 400 µR/h	For 1 mR/h	For 80% max rate		
	Radiation fie	lds used for test in mR/h	0.40	1.00	0.00		
Actua		used in the test in mR/h					
		1				(add instrument ur	nits)
		2					,
		3					
		4					
		5					
		6					
		7					
		8					
		9					
		10					
		Mean	#DIV/0!	#DIV/0!	#DIV/0!		
		Std dev	#DIV/0!	#DIV/0!	#DIV/0!		
		COV %	#DIV/0!	#DIV/0!	#DIV/0!		
		low (-30%)	0.28	0.70	0.00		
		high (+30%)	0.52	1.30	0.00		
Comments:							
comments:							
					-		
Performed by:		Date:					
i chonned by.		Date.			-		
Reviewed by:		Date:					
no no no u by.		Date.			_		

NIST
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	P	ersonal Rad	diation Alarn	n			
		Data Sheet	Section 6.7	1			
Manufacturer:							
Instrument:							
Model:				Se	rial Number:		
Date Performed:				Te	est Location:		
Requirement:	radiation fie	eld. The alarm shall l	alarm that will alert be audible and visible escribed in step 6.3.	e, and be different th			
	shall be ac	tivated within 2 s of	rument to a 10 mR/h the exposure. Reduc of three trials. The al	(100 µGy/h) radiation field	and repeat the	e exposure	
Note:	shall be ac two additio each trial.	tivated within 2 s of nal times for a total	the exposure. Reduc	(100 µGy/h) radiatio e the radiation field arm shall activate w	and repeat the	e exposure	
	shall be ac two additio each trial.	tivated within 2 s of nal times for a total	the exposure. Reduc of three trials. The al	(100 µGy/h) radiatio e the radiation field arm shall activate w	and repeat the	e exposure	in HG
	shall be ac two additio each trial. Comments	tivated within 2 s of nal times for a total	the exposure. Reduc of three trials. The al- he requirement is no	(100 µGy/h) radiatio e the radiation field arm shall activate w	and repeat the	e exposure	in HG

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		Measu	urement Results				
Backgrou	und Field		µR/h	Alarm Threshold		µR/h	
			•				
Instrument Mode of	operation						
If not 10 mR/h enter:							
Testing Fiel	d (Cs-137)		mR/h	Instrument read	ling (Cs-137)		mR/h
Record in table if instru	ment alarm	ed or not within 2 sec	conds.				
		Cs-137		OPERATIONAL NC	DTE:		
		time to alarm ≤2s		If there is no alarm	then a "No		
	1		(Yes/No entry)	alarm" message ne			
	2			recorded in the tabl			
	3				-		
				Yes		No	
Dio		ment alarm within 2 s					
		has an audible perso					
Is the alarm audible ala	arm different	t to that of the radiation	on indication alarm?				
If yes, then describe:							
		t has an visible name	nal radiation alorm?	- 1			
la tha alarma siaibla ala		t has an visible perso					
Is the alarm visible ala If yes, then describe:	arm ameren		on indication alarm?				
ir yes, then describe.							
For Cs-137:		Record may	imum time to alarm:			seconds	
101 03 137.			innenn tinne to aiainn.			3000103	_
		Record min	imum time to alarm:			seconds	
Comments:							
Comments:							
			Date:				
Comments: Performed by: Reviewed by:			Date: Date:				

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		UVE	Data C	10 1103	ponse ction 6.	0				
			Data 5	neet Se	ction 6.	0				
Manufacturer:										
Instrument:										
marament.										
Model:				Seria	al Number:					
Date Performed:					t Location:					
Rec	quirement:	\A/h				1				4
						times the maxir shall remain at the				
						tion of the expos				
		5 minute w								
Note:	Comments	are required	when the r	equirement	is not verified	d.				
Ambient C	onditions:		°C		%RH	in F	lG			
Test E	quipment:									
So	urce Data:									
		• • • • • • • • •								
Instrume	nt Mode of	f operation								
Monufr	oturor Ctot	ad May Eyra	aaura Datai		mR/h					
Manula	cturer-State	ed Max Exp	osure Rale.		mr/n					
	Ourse Done	an Toot Eve	aaura Datai		mR/h					
	Over-Rang	ge Test Exp	osure Rate.		mr/n					
	Over-Ra	nge Exposu	re Duration:		min.					
			le Daration.							
								Veri	ifv	
								Yes	No	
				Was	an over-rang	e indication disp	olayed?			
				Did the ir	strument re	cover within 5 m	inutes?			
				Dia tric il	istrument rec		indico :			
	<b>D r</b> -	corded reco	Voru time -			(a-1-	d units)			
	Kec	Joraea reco	overy time:	-		(add	a units)			
	comments:									
C										
C										
c										
	ormed bv:			Date:						
	ormed by:			Date:						

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		lr	nterferi	ng lonizing Data Sheet So	Radiation			
			[	Data Sheet So	ection 6.9			
Manufacturer:								
Instrument:								
Model:					Serial Number:			
Date Performed:					Test Location:			
Re	quirement:	lf the instant					ton nodiotion	
		If the Instru	ment nas a	neutron detector, the	e neutron detector shall	be insensitive to pho	ton radiation.	
		The instrum	ont chall by	a avecaged to a $137$ Ca	radiation field of 10 mF	)/h for 1 min The ine	trumont chall	aat
		indicate a r						IOL
Note:	Comments	are required	when the r	equirement is not ve	rified.			
Ambient	Conditions:		°C		%RH	in HG		
Test F	Equipment:							
1031	_quipinent.							
Gamma So	urce Data:							
Califina Oc								
Instrume	ant Mode o	f operation						
matume								
							Ve	rif.,
							Yes	No
							Tes	NO
			Did th		1	14-44-0-407	- 0	1
			Dia th	e neutron alarm wen	t off when only exposed			
					Were neutrons indicate	ed during the exposure	<u>3?</u>	
If neutron	s are indica	ited record r	eutron indi	cation (include units)	1			
intection								
	Comments:							
Por	formed by:			Date:				
rei	ionneu by.			Date.				
Re	viewed by:			Date				



TEP NO.

# Section 6.10.1 Radionuclide Categorization **Data Sheet and Report**

Manufacturer:								
Instrument:								
Model:				Seria	I Number:			
Date Performed:				Test	Location:			
Requirement:	by category - Special N - Medical ra (1231, 1251,	v. The cate uclear Mate adionuclide , 131I), 153	gories selec erials: Urani es: 18F, 67G Sm, 201TI, 7	ted should b um (used to ba, 51Cr, 75S 133Xe.	e based on indicate 233 e, 89Sr, 99N	the followi 3U, 235U), <i>I</i> lo, 99mTc	ng list: 237Np, Pu. , 103Pd, 11	1In, lodine
- Naturally occurring radioactive materials (NORM): 40K, 226Ra, 2321 and daughters. - Industrial radionuclides: 57Co, 60Co, 133Ba, 137Cs, 192Ir, 204Tl, 2								
Nota	Commonte		ad when the	requiremen	tio notvorifi	od		

			Toct	Poculto				
			105	<u>Results</u>				
							Yes	No
The manufacturer s category.	states the ra	adionuclide	s that the ir	nstrument c	an identify	by		
	e instrument can identify (at a minimum) the four different categories of ionuclides listed in the requirement.							
Comments:								
Completed by:						Date:		
Reviewed by:						Date:		



Security.

# Section 6.10.2.2 Single Radionuclide Identification **Data Sheet and Report** Manufacturer: Instrument: Model: Serial Number: **Date Performed:** Test Location: Requirement: The instrument shall be able to identify the following radionuclides within the time specified by the manufacturer with a maximum of 5 min. The manufacturer shall provide radionuclide-specific test results. Medical radionuclides: 67Ga, 99mTc, lodine (123I, 131I), 201Tl NORM: 40K, 226Ra, 232Th Industrial radionuclides: 22Na, 57Co, 60Co, 133Ba, 137Cs, 152Eu, 192Ir, and 241Am Special nuclear materials: HEU (highly enriched uranium, 235U >90%), Pu [Reactor grade plutonium (> 6% 240Pu)l Note: Comments are required when the requirement is not verified.

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	<u>Si</u>	ngle Radionu	lide Identification Test I	<u>Data</u>		
Date Performed:	22	Na	Date Pe	rformed:	40	ΪK
	Shielded	Unshielded		1	Shielded	Unshielded
 2				2		
 3				3		
 4				4		
5				5		
6				6		
7				7		
 8				8		
 9				9		
 10				10		
 Corr				Corr		
	57				60	
 Date Performed:		Co	Date Pe	rformed:		
 1	Shielded	Unshielded		1	Shielded	Unshielded
 1				1		
3				3		
4				4		
 5				5		
6				6		
7				7		
8				8		
 9				9		
 10				10		
 Corr				Corr		
Date Performed:	67	Ga	Date Pe	rformed:	99m	Тс
	Shielded	Unshielded			Shielded	Unshielded
1				1		
 2				2		
 3				3		
 4				4		
 5				5 6		
 7				7		
8				8		
9				9		
10				10		
Corr				Corr		

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Date Performed:	1:	<sup>23</sup>	Date Performed:	13	<sup>M</sup> I
	Shielded	Unshielded		Shielded	Unshielded
1	Silleided	Unshielded	1	Shielded	Unshielded
2			2		
3			3		
4			4		
5			5		
6			6		
7			7		
8			8		
9		∦	9 10		<b> </b>
Corr		╏────┤	Corr		<b> </b>
		<u> </u> _			<u> </u>
Date Performed:	133	Ba	Date Performed:	137	Cs
	Shielded	Unshielded		Shielded	Unshielded
1	oniciaca	Unshielded	1	oniciaca	Unshielded
2			2		
3			3		
4			4		
5			5		
6			6		
7			7		
8			8		
9			9 10		
Corr			Corr		
		<u> </u>			
Date Performed:	152	Eu	Date Performed:	19	²lr
	Shielded	Unshielded		Shielded	Unshielded
1			1		
2			2		
3			3		<b></b>
4		╏─────┤	4		╏─────┤
5		╏─────┤	5		<b> </b>
7		╏────┤	7		
8		╏─────┤	8		
9		┟────┤	9		
10			10		
Corr			Corr		

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Date Pe	rformed:	20	<sup>1</sup> TI	Date Pe	rformed:	226	Ra
		Shielded	Unshielded			Shielded	Unshielded
	1				1		
	3				3		
	4				4		
	5				5		
	7				7		
	8				8		
	9				9		
	10 Corr				10 Corr		
	0011		<b>ب</b> ا		0011		<u>"</u>
Date Pe	rformed:	232	Th	Date Pe	rformed:	H	EU
		Shielded	Unshielded			Shielded	Unshielded
	1				1 2		
	3				3		
	4				4		
	5				5		
	6 7				6 7		
	8				8		
	9				9		
	10 Corr				10 Corr		
	Con				Con		
Date Pe	rformed:	RC	Pu	Date Pe	erformed:	241	Am
		Shielded	Unshielded			Shielded	Unshielded
	1				1		
	2.3				2		
	4				4		
	5				5		
	6				6 7		
	7				8		
	9				9		
	10				10		
	Corr				Corr		

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	Unshie	l d a d						
		laea				Shiel	ded	
Date of Test	Radionuclide	Yes	No		Date of Test	Radionuclide	Yes	No
	<sup>22</sup> Na					<sup>22</sup> Na		
	<sup>40</sup> K					<sup>40</sup> K		
	<sup>57</sup> Co					<sup>57</sup> Co		
	<sup>60</sup> Co					<sup>60</sup> Co		
	<sup>67</sup> Ga					<sup>67</sup> Ga		
	<sup>99m</sup> Tc					<sup>99m</sup> Tc		
	<sup>123</sup>	<u> </u>				123	<u> </u>	
	131			-		131		
	<sup>133</sup> Ba					<sup>133</sup> Ba		
	<sup>137</sup> Cs					<sup>137</sup> Cs		
	<sup>152</sup> Eu	<u> </u>				<sup>152</sup> Eu	<u> </u>	
	<sup>192</sup> lr					<sup>192</sup> lr		
┠─────┤	<sup>201</sup> TI					<sup>201</sup> TI	<u> </u>	
<u> </u>	<sup>226</sup> Ra					<sup>226</sup> Ra		
	<sup>232</sup> Th			-		<sup>232</sup> Th	<u>L</u>	
	HEU					HEU		
	RGPu			-		RGPu		
	<sup>241</sup> Am					<sup>241</sup> Am		
i	Source Inf	ormation		1		Source In	formation	
	Unshie					Shiel		
			Exposure					Exposure
Date	Radionuclide	Activity	rate	(add units)	Date	Radionuclide	Activity	rate
	<sup>22</sup> Na			(		<sup>22</sup> Na		
	40K					<sup>40</sup> K		
	57Co					<sup>57</sup> Co		+
┣────┤	<sup>60</sup> Co		ł			<sup>60</sup> Co		+
┣────┤	<sup>67</sup> Ga		<u> </u>			<sup>67</sup> Ga		+
	<sup>99m</sup> Tc					<sup>99m</sup> Tc		
<b>├</b> ───┤	<sup>123</sup>			-		<sup>123</sup>		+
	<sup>131</sup>					<sup>131</sup>		
	<sup>133</sup> Ba					<sup>133</sup> Ba		
	<sup>137</sup> Cs		ļ			<sup>137</sup> Cs		<b>_</b>
	<sup>152</sup> Eu					<sup>152</sup> Eu		
	<sup>192</sup> lr					<sup>192</sup> lr		
	<sup>201</sup> TI					<sup>201</sup> TI		
	<sup>226</sup> Ra					<sup>226</sup> Ra		
	<sup>232</sup> Th		1			<sup>232</sup> Th		1
	HEU					HEU		1
	RGPu					RGPu		
	<sup>241</sup> Am					<sup>241</sup> Am		
				-1				
Comments:								
comments:								_
								-
-								_
								_
			1		Det			
a man late d be					Date:			
completed by:								-



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Sectio	on 6.10.3	Simultane	eous Rad	lionucli	ide Ident	ification	
		Data Sh	eet and	Report			
				-			
Manufacturer							
Instrumen	it:						
Mode	1:			Seri	ial Number:		
Date Performed	d:			Те	st Location:		
Requiremen	t: The instrum	ent shall be able	to identify at l	east two rad	ionuclides sir	nultaneously.	
	Use <sup>99m</sup> Tc +	<sup>137</sup> Cs for the test.					
Note	e: Comments	are required whe	n the requirer	nent is not v	erified.	`	
	_	Simultane	ous Radion	uclide Iden	tification Te	est Data	
Date P	erformed:	<sup>99m</sup> Tc + <sup>13</sup>	<sup>7</sup> Cs		<sup>99m</sup> Tc S	ource data:	
Duto I	l						
		Unshield	led				
	1						
	2						
	3				127		
	4				<sup>13</sup> 'Cs S	ource data:	
	5						
	7						
	8						
	9						
	10						
	Corr						

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	Dia trie instru	ment categorized co		
	Date of Test	Radionuclide	Yes	No
		<sup>99m</sup> Tc <sup>+ 137</sup> Cs		
	Did the i	nstrument ID correctl	y 8 out of 10 tir	ne?
	Date of Test	Radionuclide	Yes	No
		<sup>99m</sup> Tc <sup>+ 137</sup> Cs	H	L.J
Comments:				
Completed by:			Date:	
Reviewed by:			Date:	



		Section		Masking	-	cation	
			Test D	ata and I	Report		
M	anufacturer:						
	Instrument:						
	Model:					rial Number:	
Date	Performed:				Te	est Location:	
Re	auirement:	The instrume	nt shall provi	de an indicati	ion (e.a., the	correct identific	ation, "unknown,"
		"unable to ide	ntify") when ted in the lib	exposed to a	radionuclide	masked by and	other radionuclide tensity than the
	Note:	Comments ar	e required w	hen the requi	rement is not	verified.	
	Ambien	t Conditions:		°C		%RH	in HG
	Test Equi	pment Used:					
			t <del>(</del>	070 a and 54m			
			est using:	<sup>57</sup> Ga and <sup>54</sup> M			
Date Performed:		<sup>67</sup> Ga + <sup>54</sup> Mn			<sup>67</sup> Ga \$	Source data:	
	1						
	2						
	3						
	5						
	6				<sup>54</sup> Mn s	Source data:	
	7						
	8						
	9					ļ	
	10				54		
Nun	nber Correct					n the instrumen it radionuclide f	t library, if in librar or this test)
	Did th	e instrument	ID correctl	y 8 out of 10	time?		
	Date of Test	Radion	uclide	Yes	No		
		<sup>67</sup> Ga +	<sup>54</sup> Mn				
		- Ou :					

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		Test using: HEU	+ ( <sup>67</sup> Ga or <sup>9</sup>	<sup>9m</sup> Tc)	
Date Performed:		(enter sourc	es used)	<sup>99m</sup> T	rc or <sup>67</sup> Ga Source data:
	1				
	3				
	5			<sup>137</sup> Ce 9	Source data:
	7				
	8				
Nim	10 nber Correct				
	Did the	instrument ID correctly	y 8 out of 10	time?	
	Date of Test	Radionuclide	Yes	No	
		( <sup>99m</sup> Tc or <sup>67</sup> Ga) + <sup>137</sup> Cs	L		

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		<u>Te</u>	st using: Pu + <sup>137</sup> (	<u>Cs</u>		
Date Performed:	P	u + <sup>137</sup> Cs		Pu	Source data:	
	1					
	2					
	3					
	4					
	5					
	6			<sup>137</sup> Cs	Source data:	
	7					
	8					
	9					
	10					
Num	nber Correct					
	Did the i	nstrument ID	correctly 8 out of	10 time?		
	Date of Test	Radionucli	de Yes	No		
		Pu + <sup>137</sup> Cs				
	Comments:					
	Comments:					
	Comments:				Date:	

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			Fest Data		vn Radionu rt	
Ма	nufacturer: Instrument:					
	instrument.					
	Model:				Serial Number:	
Date	Performed:				Test Location:	
Re	quirement:				, "unknown," "unal e not in the library	
	Note:	Comments are	required when t	ne requirement	is not verified.	
	Ambient	Conditions:	°C		%RH	in H
	7411010111		0		///	
	Test Equip	omentUsed:				
				_		
		Isoto	pe Identificatio	on Results		
			(onto			
Data Ba	erformed:	1	lente	r source used)		
	enonnea:	2				
		3				
		4		5	<sup>54</sup> Mn or <sup>166m</sup> Ho So	ource data:
		5				
		6				
		7				
		8		(check	that one of these	sources is not in
		10		•	ent library, if both	
	Num	ber Correct			a different radionu	
		Did the i	nstrument ID c	orrectly 8 out	of 10 time?	
		Date of Test	Radionuclid	e Yes	s No	
			( <sup>54</sup> Mn or <sup>166m</sup> H	o) <b>L</b>		
	Comments:					
Со	mpleted by:				Date:	



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Section 6.10.6 Over-Range Characteristics for Identification **Test Data and Report** Manufacturer: Instrument: Model: Serial Number: Date Performed: Test Location: Requirement: The manufacturer shall state the maximum exposure rate (relative to <sup>137</sup>Cs) for identification. Note: Comments are required when the requirement is not verified. °C **Ambient Conditions:** %RH in HG Test Equipment Used: Source Data: Manufacturer stated maximum exposure rate: (add units) Measurement Results Exposure rate used in the test: Cs-137 0 (add units) 2 3 Yes No 4 Did instrument provide indication that exposure 5 rate was too high? 6 7 8 Did the instrument ID correctly 8 out of 10 time? 9 10 Number Correct Date of Test Radionuclide Yes No <sup>137</sup>Cs Comments: Performed by: Date: Reviewed by: Date:

|--|

## TEST AND EVALUATION P

TEST AND EVALUATION PROTOCOL	<b>TEP NO.</b> N42.48	<b>PREPAR</b> DIV682	ED BY:
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			Femperature			
		Test Data a	na Report			
Manufacturer:						
Instrument:						_
marument.						_
Model:			Serial Number:			
Date Performed:			Test Location:			
Require			ctly at temperatures fror			
	occur as a resu	ult of the temperature	e conditions alone. If the	e manufacture	r specifies	a broader
	operating temp	erature range, the in	strument shall be teste	d at the broad	er tempera	ture range as
						U
	specified by the	e manufacturer				
	specified by the	e manufacturer.				
			o rongo onooifod in Tob	lo 1		
			e range specified in Tab	le 1.		
	Relative humidi	ty shall be within the		le 1.		
	Relative humidi			le 1.		
	Relative humidi	ty shall be within the		le 1.		
	Relative humidi	ty shall be within the units displayed by in	nstrument			
	Relative humidi	ty shall be within the units displayed by in				
	Relative humidi	ty shall be within the units displayed by in	nstrument			
Ambient Conc	Relative humidi NOTE: Record Note: Comments are	ty shall be within the units displayed by in required when the re	equirement is not verifie	d.	in HG	
Ambient Conc	Relative humidi NOTE: Record Note: Comments are	ty shall be within the units displayed by in	nstrument	d.	in HG	
	Relative humidi NOTE: Record Note: Comments are ditions:	ty shall be within the units displayed by in required when the re	equirement is not verifie	d.	in HG	
	Relative humidi NOTE: Record Note: Comments are	ty shall be within the units displayed by in required when the re	equirement is not verifie	d.	in HG	

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				Mea	surement F	<u>Results</u>							
	Exposure rate	e <sup>137</sup> Cs	22° C	30° C	40° C	50° C	10° C	0° C	-10° C	-20° C			
			as read	as read	as read	as read	as read	as read	as read	as read			
		1									(add units)		
		2											
		3											
		4											
		5											
		6											
		8		1									
		9											
		10											
		Mean	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	1		
		STD	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!			
		COV %	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!			
Readings	within acceptance												
reauilys	range?	Yes No		ł – – – – –									
		NO											
	Gamma alarm (within 2s)	Yes											
	(within 28)	No											
	Neutron alarm	Yes											
	(within 5s)	No											
	ID Trial 1	<sup>133</sup> Ba+ <sup>137</sup> Cs									Reco	rd all	
	ID Trial 2	<sup>133</sup> Ba+ <sup>137</sup> Cs									Radion		
	ID Trial 3	<sup>133</sup> Ba+ <sup>137</sup> Cs									Ident	tified	
				(± 15%) Accep	otance Range:	#DIV/0!	to	#DIV/0!					
				(,.,	ge	-15%		+ 15 %					
	Gamma alarm:	6	ecord maximu	m time to alarm:			seconds						
		г					0000100						
			Record minimu	im time to alarm:			seconds						
	Neutron alarm:	R	ecord maxim	m time to alarm:			seconds						
	(if appplicable)												
		1	Record minimu	im time to alarm:			seconds						
	Comments:												
	Cor	npleted by:					Date:						
	Re	viewed by:					Date:						

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						Section	on 7.3 Ter	nperatur	e Shoc	K						
						-	Test Data	and Rep	ort							
																Т
	Manufacturer:											_				t
	Instrument:								· · · · ·							t
	instrument.										 					⊢
	Model:					Caria	al Number:				 		_			┝
											 		_			+
	Date Performed:					Tes	t Location:				 	_	_	_	_	-
lequiremen	nt: The instrument s made in less that No alarms shall	n 5 min.										, and 50 °	C to 22 °C	, with eac	h change	e be
equiremen	made in less tha	n 5 min. occur as a	result of t	he chang	ing temper	rature condit	ions alone. Rela					, and 50 °	°C to 22 °C	, with eac	h change	e be
Requiremen	made in less that	n 5 min. occur as a	result of t	he chang	ing temper	rature condit						c, and 50 °	°C to 22 °C	, with eac	h change	be
lequiremen	No alarms shall	n 5 min. occur as a Comment:	result of t s are req	he chang	ing temper	rature condit	ions alone. Rela not verified.	ative humidity s				, and 50 °	°C to 22 °C	, with eac	h change	e be
lequiremen	made in less tha	n 5 min. occur as a Comment:	result of t s are req	he chang	ing temper	rature condit	ions alone. Rela					; and 50 °	C to 22 °C	, with eac	h change	e be
	No alarms shall	n 5 min. occur as a Commente	result of t s are req	he chang	ing temper	rature condit	ions alone. Rela not verified.	ative humidity s				;, and 50 °	C to 22 °C	c, with eac	h change	be
	No alarms shall Note: Ambient C	n 5 min. occur as a Comment: onditions:	result of t s are req	he chang	ing temper	rature condit	ions alone. Rela not verified.	ative humidity s				;, and 50 °	C to 22 °C	, with eac	h change	be

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								Mea	asureme	nt Res	ults												
	22° C	Exposure	e rate <sup>137</sup> C	s			22 to	-20° C			- 20 to	o 22° C			22 to	50° C			50 to	22° C			
						15	30	45	60	15	30	45	60	15	30	45	60	15	30	45	60	(add units)	
1			ominal Me																				
2			eptance R																				
3		#DIV/0!		#DIV/0!																			
4		low		high																			
5		(-15%)		(+15%)																			
6																							
8																							
9																							
10														<u> </u>									
	#DIV/0!				Mean	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/01	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!		
STD					STD	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!		#DIV/0!	#DIV/0!		
	#DIV/0!				COV%	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!		#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!		#DIV/0!	#DIV/0!		
				Co	onf-Int (-)	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!		#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!		#DIV/0!	#DIV/0!		
				Co	nf-Int (+)	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!		
						_																	
			Reading	gs within	Yes																		
			acceptance		No																		
			1																				
			Gamma	alarm	V-					_													
			(within		Yes																		
					No					——													
			Neutron		Yes																		
			(within	5S)	No																		
			ID Trial	1 <sup>133</sup> Ba+	<sup>137</sup> Cs																	Recor	rd all
																						Recor Radionu	
			ID Trial	1 <sup>133</sup> Ba+ 2 <sup>133</sup> Ba+ 3 <sup>133</sup> Ba+	<sup>137</sup> Cs																		uclide
			ID Trial	2 <sup>133</sup> Ba+	<sup>137</sup> Cs																	Radionu	uclide
			ID Trial	2 <sup>133</sup> Ba+	<sup>137</sup> Cs																	Radionu	uclide
			ID Trial	2 <sup>133</sup> Ba+	<sup>137</sup> Cs																	Radionu	uclide
			ID Trial ID Trial	2 <sup>133</sup> Ba+ 3 <sup>133</sup> Ba+	<sup>137</sup> Cs	teria:										Ba-133	, Cs-137					Radionu	uclide
			ID Trial ID Trial	2 <sup>133</sup> Ba+ 3 <sup>133</sup> Ba+ D Accep Correct F	<sup>137</sup> Cs <sup>137</sup> Cs tance Cri Radionucli	ides ID: (A	is correct								A: B:	Ba-133	, Cs-137					Radionu	uclide
			ID Trial ID Trial	2 <sup>133</sup> Ba+ 3 <sup>133</sup> Ba+ ID Accep Correct F Temperat	<sup>137</sup> Cs <sup>137</sup> Cs tance Cri Radionucli	ides ID: (A k Pass/Fa	iil: Compar	ison of ID r	esults at	test poin	ts with th	ie ID resu	Its at		B: C:	Ba-133	, Cs-137					Radionu	uclide
			ID Trial ID Trial	2 <sup>133</sup> Ba+ 3 <sup>133</sup> Ba+ ID Accep Correct F Temperat	<sup>137</sup> Cs <sup>137</sup> Cs tance Cri Radionucli	ides ID: (A k Pass/Fa		ison of ID r	esults at	test poin	ts with th	ne ID resu	Its at		B:	Ba-133	, Cs-137					Radionu	uclide
			ID Trial ID Trial	2 <sup>133</sup> Ba+ 3 <sup>133</sup> Ba+ ID Accep Correct F Temperat	<sup>137</sup> Cs <sup>137</sup> Cs tance Cri Radionucli	ides ID: (A k Pass/Fa	iil: Compar	ison of ID r	esults at	test poin	ts with th	e ID resu	Its at		B: C:	Ba-133	, Cs-137					Radionu	uclide
			ID Trial ID Trial	2 <sup>133</sup> Ba+ 3 <sup>133</sup> Ba+ ID Accep Correct F Temperat	<sup>137</sup> Cs <sup>137</sup> Cs tance Cri Radionucli	ides ID: (A k Pass/Fa	iil: Compar	ison of ID r	esults at	test poin	ts with th	ne ID resu	Its at		B: C:	Ba-133	, Cs-137					Radionu	uclide
			ID Trial ID Trial	2 <sup>133</sup> Ba+ 3 <sup>133</sup> Ba+ ID Accep Correct F Temperat	<sup>137</sup> Cs <sup>137</sup> Cs tance Cri Radionucli	ides ID: (A k Pass/Fa	iil: Compar	ison of ID r	esults at	test poin	ts with th	e ID resu	Its at		B: C:	Ba-133	, Cs-137					Radionu	uclide
2mm2	alarm		ID Trial ID Trial	2 <sup>133</sup> Ba+ 3 <sup>133</sup> Ba+ D Accep Correct F Temperat ambient t	137Cs 137Cs tance Cri Radionucli ture shoc temperatu	ides ID: (A k Pass/Fa ure being t	iil: Compar	ison of ID r		test poin	ts with th	e ID resu	Its at		B: C:	Ba-133	, Cs-137					Radionu	uclide
amma	alarm:		ID Trial ID Trial	2 <sup>133</sup> Ba+ 3 <sup>133</sup> Ba+ D Accep Correct F Temperat ambient t	137Cs 137Cs tance Cri Radionucli ture shoc temperatu	ides ID: (A k Pass/Fa	iil: Compar	ison of ID r	esults at seconds	test poin	ts with th	ie ID resu	lts at		B: C:	Ba-133	, Cs-137					Radionu	uclide
amma	alarm:		ID Trial ID Trial	2 <sup>133</sup> Ba+ 3 <sup>133</sup> Ba+ D Accep Correct F Temperat ambient 1	1 <sup>37</sup> Cs 1 <sup>37</sup> Cs tance Cri Radionucli ture shoc temperatu	ides ID: (A k Pass/Fa ure being t to alarm:	iil: Compar	ison of ID r	seconds		ts with th	ne ID resu	Its at		B: C:	Ba-133	, Cs-137					Radionu	uclide
amma	alarm:		ID Trial ID Trial	2 <sup>133</sup> Ba+ 3 <sup>133</sup> Ba+ D Accep Correct F Temperat ambient 1	1 <sup>37</sup> Cs 1 <sup>37</sup> Cs tance Cri Radionucli ture shoc temperatu	ides ID: (A k Pass/Fa ure being t	iil: Compar	ison of ID r			ts with th	ne ID resu	Its at		B: C:	Ba-133	Cs-137					Radionu	uclide
amma	alarm:		ID Trial ID Trial	2 <sup>133</sup> Ba+ 3 <sup>133</sup> Ba+ D Accep Correct F Temperat ambient 1	1 <sup>37</sup> Cs 1 <sup>37</sup> Cs tance Cri Radionucli ture shoc temperatu	ides ID: (A k Pass/Fa ure being t to alarm:	iil: Compar	ison of ID r	seconds		ts with th	ne ID resu	Its at		B: C:	Ba-133	, Cs-137					Radionu	uclide
Veutro	n alarm:		ID Trial ID Trial	2 <sup>133</sup> Ba+ 3 <sup>133</sup> Ba+ D Accep Correct F Temperat ambient 1 ord maxir ord minir	1 <sup>37</sup> Cs <sup>137</sup> Cs tance Cri Radionucli ture shoc temperatu num time num time	ides ID: (A k Pass/Fa ure being t to alarm:	iil: Compar	ison of ID r	seconds		ts with th	ie ID resu	Its at		B: C:	Ba-133	Cs-137					Radionu	uclide
leutro			ID Trial ID Trial Reco Reco	2 <sup>133</sup> Ba+ 3 <sup>133</sup> Ba+ D Accep Correct F Temperat ambient t ord maxir ord minir	1 <sup>37</sup> Cs 1 <sup>37</sup> Cs tance Cri tadionucli ture shoc temperatu num time num time	ides ID: (A k Pass/Fa ire being t to alarm: to alarm:	iil: Compar	ison of ID r	seconds seconds seconds		ts with th	e ID resu	its at		B: C:	Ba-133	Cs-137					Radionu	uclide
leutro	n alarm:		ID Trial ID Trial Reco Reco	2 <sup>133</sup> Ba+ 3 <sup>133</sup> Ba+ D Accep Correct F Temperat ambient t ord maxir ord minir	1 <sup>37</sup> Cs 1 <sup>37</sup> Cs tance Cri tadionucli ture shoc temperatu num time num time	ides ID: (A k Pass/Fa ure being t to alarm: to alarm:	iil: Compar	ison of ID r	seconds		ts with th	e ID resu	its at		B: C:	Ba-133	Cs-137					Radionu	uclide
leutro	n alarm:		ID Trial ID Trial Reco Reco	2 <sup>133</sup> Ba+ 3 <sup>133</sup> Ba+ D Accep Correct F Temperat ambient t ord maxir ord minir	1 <sup>37</sup> Cs 1 <sup>37</sup> Cs tance Cri tadionucli ture shoc temperatu num time num time	ides ID: (A k Pass/Fa ire being t to alarm: to alarm:	iil: Compar	ison of ID r	seconds seconds seconds		ts with th	e ID resu	its at		B: C:	Ba-133	Cs-137					Radionu	uclide
leutro	n alarm:		ID Trial ID Trial Reco Reco	2 <sup>133</sup> Ba+ 3 <sup>133</sup> Ba+ D Accep Correct F Temperat ambient t ord maxir ord minir	1 <sup>37</sup> Cs 1 <sup>37</sup> Cs tance Cri tadionucli ture shoc temperatu num time num time	ides ID: (A k Pass/Fa ire being t to alarm: to alarm:	iil: Compar	ison of ID r	seconds seconds seconds		ts with th	e ID resu	Its at		B: C:	Ba-133	Cs-137					Radionu	uclide
leutro	n alarm:		ID Trial ID Trial Reco Reco	2 <sup>133</sup> Ba+ 3 <sup>133</sup> Ba+ D Accep Correct F Temperat ambient t ord maxir ord minir	1 <sup>37</sup> Cs 1 <sup>37</sup> Cs tance Cri tadionucli ture shoc temperatu num time num time	ides ID: (A k Pass/Fa ire being t to alarm: to alarm:	iil: Compar	ison of ID r	seconds seconds seconds		ts with th	e ID resu			B: C:	Ba-133	Cs-137					Radionu	uclide
leutro	n alarm:	Comments:	ID Trial ID Trial Reco Reco	2 <sup>133</sup> Ba+ 3 <sup>133</sup> Ba+ D Accep Correct F Temperat ambient t ord maxir ord minir	1 <sup>37</sup> Cs 1 <sup>37</sup> Cs tance Cri tadionucli ture shoc temperatu num time num time	ides ID: (A k Pass/Fa ire being t to alarm: to alarm:	iil: Compar	ison of ID r	seconds seconds seconds		ts with th	e ID resu			B: C:	Ba-133	Cs-137					Radionu	uclid
leutro	n alarm:	Comments:	ID Trial ID Trial Reco Reco	2 <sup>133</sup> Ba+ 3 <sup>133</sup> Ba+ D Accep Correct F Temperat ambient t ord maxir ord minir	1 <sup>37</sup> Cs 1 <sup>37</sup> Cs tance Cri tadionucli ture shoc temperatu num time num time	ides ID: (A k Pass/Fa ire being t to alarm: to alarm:	iil: Compar	ison of ID r	seconds seconds seconds		ts with th	e ID resu	its at		B: C:	Ba-133	Cs-137					Radionu	uclid
leutro	n alarm:	Comments:	ID Trial ID Trial Reco Reco	2 <sup>133</sup> Ba+ 3 <sup>133</sup> Ba+ D Accep Correct F Temperat ambient t ord maxir ord minir	1 <sup>37</sup> Cs 1 <sup>37</sup> Cs tance Cri tadionucli ture shoc temperatu num time num time	ides ID: (A k Pass/Fa ire being t to alarm: to alarm:	iil: Compar	ison of ID r	seconds seconds seconds		ts with th	e ID resu	its at		B: C:	Ba-133	Cs-137					Radionu	uclide
leutro	n alarm:	Comments:	ID Trial ID Trial Reco Reco	2 <sup>133</sup> Ba+ 3 <sup>133</sup> Ba+ D Accep Correct F Temperat ambient t ord maxir ord minir	1 <sup>37</sup> Cs 1 <sup>37</sup> Cs tance Cri tadionucli ture shoc temperatu num time num time	ides ID: (A k Pass/Fa ire being t to alarm: to alarm:	iil: Compar	ison of ID r	seconds seconds seconds		ts with th	e ID resu	its at		B: C:	Ba-133	Cs-137					Radionu	uclide
leutro	n alarm: licable)		ID Trial ID Trial Reco Reco	2 <sup>133</sup> Ba+ 3 <sup>133</sup> Ba+ D Accep Correct F Temperat ambient t ord maxir ord minir	1 <sup>37</sup> Cs 1 <sup>37</sup> Cs tance Cri tadionucli ture shoc temperatu num time num time	ides ID: (A k Pass/Fa ire being t to alarm: to alarm:	iil: Compar	ison of ID r	seconds seconds seconds		ts with th	e ID resu				Ba-133	Cs-137					Radionu	uclide
leutro	n alarm: licable)	Comments:	ID Trial ID Trial Reco Reco	2 <sup>133</sup> Ba+ 3 <sup>133</sup> Ba+ D Accep Correct F Temperat ambient t ord maxir ord minir	1 <sup>37</sup> Cs 1 <sup>37</sup> Cs tance Cri tadionucli ture shoc temperatu num time num time	ides ID: (A k Pass/Fa ire being t to alarm: to alarm:	iil: Compar	ison of ID r	seconds seconds seconds		ts with th	e ID resu			B: C:	Ba-133	Cs-137					Radionu	uclide
leutro	n alarm: licable)		ID Trial ID Trial Reco Reco	2 <sup>133</sup> Ba+ 3 <sup>133</sup> Ba+ D Accep Correct F Temperat ambient t ord maxir ord minir	1 <sup>37</sup> Cs 1 <sup>37</sup> Cs tance Cri tadionucli ture shoc temperatu num time num time	ides ID: (A k Pass/Fa ire being t to alarm: to alarm:	iil: Compar	ison of ID r	seconds seconds seconds		ts with th	e ID resu				Ba-133	Cs-137					Radionu	uclide

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	Se	ections 7.4	- Humidity			
	Т	est Data ar	nd Report			
Manufacturer						
Instrumen						
Mode	:			Ser	ial Number:	
Date Performed	:			Те	st Location:	
Requirement	The instrument sh	all function correct	ctly over the range	e of relative h	umidity up to	93% RH at
Requirements	The instrument sh 35 °C. No alarms					93% RH at
Requirement						93% RH at
	35 °C. No alarms	shall occur as a r	esult of the humic	lity conditior		93% RH at
		shall occur as a r	esult of the humic	lity conditior		93% RH at
	35 °C. No alarms	shall occur as a r	esult of the humic	lity conditior		93% RH at
Note	35 °C. No alarms s	shall occur as a r	equirement is not	lity conditior		93% RH at
	35 °C. No alarms s	shall occur as a r quired when the re	equirement is not	lity conditior verified.		
Note mbient Condition:	35 °C. No alarms s	shall occur as a r quired when the re	equirement is not	lity conditior verified.		
Note	35 °C. No alarms s : Comments are rec	shall occur as a r quired when the re °C	equirement is not	lity conditior verified.		

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			Meas	surement Res	<u>sults</u>					
			Nominal							
			40% RH	93% RH	40% RH					
			22° C	35° C	35° C					
			Expos	sure Rate Rea	dings					
		1				(add units)				
		2								
		3								
		4								
		5								
		6								
		7					acantanaa			lata
		8				P P				ale
		9 10					#DIV/0! low 15%	to	#DIV/0!	
				#01//01			IUW 15%		high 15%	
		Mean	#DIV/0! #DIV/0!	#DIV/0! #DIV/0!	#DIV/0! #DIV/0!					
		STD	#DIV/0! #DIV/0!	#DIV/0! #DIV/0!	#DIV/0! #DIV/0!					
		COV %	#DIV/0!	#DIV/0!	#DIV/0!					
Bood	ingo within	Yes								
	ings within nce range?	Yes No								
uccoptai	loo rango.	NO								
Gamma	alarm	Yes								
(within	2s)	No								
Neutron	alarm	Yes								
(within	5s)	No								
	ID T	rial 1 <sup>133</sup> Ba+ <sup>137</sup> Cs				Record all R	Radionuclides			
	ID T	rial 2 <sup>133</sup> Ba+ <sup>137</sup> Cs					tified			
	ID T	rial 3 <sup>133</sup> Ba+ <sup>137</sup> Cs								
Gamr	na alarm:	Re	cord maximu	n time to alarm:			seconds			
Cullin							occondo			
		R	ecord minimu	m time to alarm:			seconds			
	on alarm: ppplicable)	Re	ecora maximui	n time to alarm:			seconds			
(114	ppphoable)	R	ecord minimu	m time to alarm:			seconds			
comments:										
Com	pleted by:				Date:					
	iewed by:				Date:					
Revi	lewed by:				Date.					

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		-	Test Data	and Repor	't	
Ma	nufacturer:					
IVIA	Instrument:					
	Model:				Seri	al Number:
Date	Performed:				Tes	st Location:
			nstrument shall	I be protected from	n the ingress of dι	ust and spraying water
		quantity to interfe	ere with satisfa	ctory operation of	the instrument or	not penetrate in a to impair safety, and all have no harmful
	Note:	quantity to interfe water sprayed at	ere with satisfa an angle up to	ctory operation of 60° on either sid	the instrument or e of the vertical sh	to impair safety, and
	Note:	quantity to interfe water sprayed at effects.	ere with satisfa an angle up to	ctory operation of 60° on either sid	the instrument or e of the vertical sh	to impair safety, and
umbient	Note:	quantity to interfe water sprayed at effects.	ere with satisfa an angle up to	ctory operation of 60° on either sid	the instrument or e of the vertical sh	to impair safety, and
		quantity to interfe water sprayed at effects.	ere with satisfa an angle up to equired when th	ctory operation of 60° on either sid	the instrument or e of the vertical sh not verified.	to impair safety, and all have no harmful

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				]			
		Pre-Test Response	Post Test Response				
				/ x			_
	1	Photon F	Readings	(add units)			
	1			-			
	2						_
	3			_			_
	4			-			
	5			-	1.00	ntanaa Da	
	6				ACCE	eptance Ra	ange
	8				#DIV/0!	to	#DIV/0
	9				low 15%	to	
	10				10W 15%		high 15
		#DN//01	#DN//01	-			_
	Mean	#DIV/0!	#DIV/0!	-			
	STD	#DIV/0!	#DIV/0!				
	COV %	#DIV/0!	#DIV/0!				_
Was the post-test r	asponse within the	Yee					_
	acceptance range?	Yes		_			
<b>`</b>		No		-			
				-			
Gamma alarm	Yes			_			
(within 2s)	No			_			
Neutron alarm	Yes			_			
(within 5s)	No						
	D Trial 1 <sup>133</sup> Ba+ <sup>137</sup> Cs			Record all R	adionuclidos		
	) Trial 2 <sup>133</sup> Ba+ <sup>137</sup> Cs			Ident			
10	) Trial 3 <sup>133</sup> Ba+ <sup>137</sup> Cs			lacin	linea		
Gamma alarm	: R	ecord maximun	n time to alarm	:		seconds	
	F	Record minimun	n time to alarm	:		seconds	
Neutron alarm	• R	ecord maximun	n time to alarm	•		seconds	
(if applicable							
( - FF		Record minimun	n time to alarm	:		seconds	
						_	
Did du	et memotivete the inc	tru una a né é a éla a	a véa né vyha ra	Yes	No	-	
	st penetrate the ins	eration could					
	Op		se impacieu	<u>' I</u>	ļ		
comments:							
							_
Completed by	,			Date:			_
Completed by	•			Date:			
Reviewed by	r:			Date:			
							_



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			Test Data	and Repor	t		
	nufacturer: Instrument:						
	instrument:						
	Model:				Seria	I Number:	
Date	Performed:				Test	Location:	
			-		(see IEC 60068-2-7		
		constant durin the temperatur calculated sur	g the test. The w re of the instrume face area of the i	vater temperature ent under test. Ti instrument with a	/min ±5%, which s should not differ b ne test duration is 1 minimum duration	y more than I min/m2 of	5 °C from
		constant durin the temperatur calculated sur	g the test. The w	vater temperature ent under test. Ti instrument with a	e should not differ b ne test duration is 1 minimum duration	y more than I min/m2 of	5 °C from
Ambient		constant durin the temperatur calculated sur	g the test. The w re of the instrume face area of the i	vater temperature ent under test. Ti instrument with a	e should not differ b ne test duration is 1 minimum duration	y more than I min/m2 of	5 °C from
	Note:	constant durin the temperatur calculated sur	g the test. The w re of the instrume face area of the i	vater temperature ent under test. Ti instrument with a	e should not differ by ne test duration is 1 minimum duration s not verified.	y more than I min/m2 of	n 5 °C from the

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		Pre-Test	Post Test				
		Response	Response				
		Photon F	Readings	(add units)			
		1					
		2					
		3					
		4					
		5					
		6					
		7			Acce	eptance F	Range
		8					
		9			#DIV/0!	to	#DIV/0
		10			low 15%		high 15
	Mea		#DIV/0!				
	ST		#DIV/0!				
	COV		#DIV/0!				
Was the post-te	st response within th						
	acceptance range	e? No					
Gamma alarm	Y	es					
(within 2s)		ło					
Neutron alarm		es					
(within 5s)	N	10					
						-	
	ID Trial 1 <sup>133</sup> Ba+ <sup>137</sup>	Cs		Record all Rad	dionuclides		
	ID Trial 2 <sup>133</sup> Ba+ <sup>137</sup> (	Cs			Identified		
	ID Trial 3 <sup>133</sup> Ba+ <sup>137</sup> C	)s			-	ļ	
Gamma ala	arm:	Record maximur	n time to alarm:			seconds	
		Record minimur	n time to alarm:			seconds	
Neutron al		Record maximur	n time to alarm:			seconds	
(if applic	adie)	Record minimur	n time to alarm:			seconds	
						3000103	
			Yes	No			
	Did water penetrate	e the instrument?			]		
							_
Comme	ents:						
				Dete			_
Commo		-		Date:			



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	Sections 7.6					
	Ie	st Data	a and Repor	τ		
Manufacturer:						
Instrument:						
Model:				Serial	Number:	
Date Performed:				Test Location:		
Note:	Pre-Test and Post- Comments are req			s not verified.		
	Comments are req			%RH	in HG	
Note: Ambient Conditions: Manufacturers stat	Comments are req	uired wher °C			in HG	
Ambient Conditions: Manufacturers stat	Comments are req	°C	n the requirement is		in HG	

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			Pre-Test	Post-Test	Readings at				
			Readings	Readings	- 20 °C				
			Pl	hoton Reading	js				
		1				(add units)	)		
		2							
		3							
		4							
		5							
		6							_
		7					Accer	otance	Range
		8					Accep	Janoc	lange
		9					#DIV/0!	to	#DIV/0!
								10	
		10					low 15%		high 15%
		Mean	#DIV/0!	#DIV/0!	#DIV/0!				_
		STD	#DIV/0!	#DIV/0!	#DIV/0!		ļ		
		COV %	#DIV/0!	#DIV/0!	#DIV/0!				_
		results within the	Yes						
	accep	tance range?	No						
						1			
Gamma	alarm	Yes							_
(within		No							-
Neutron		Yes							
(within		No							_
(	00)	NO							
		133_ 137 -							
	ID	Trial 1 <sup>133</sup> Ba+ <sup>137</sup> Cs				-	ord all		_
	ID	Trial 2 <sup>133</sup> Ba+ <sup>137</sup> Cs					nuclides Itified		
	ID	Trial 3 <sup>133</sup> Ba+ <sup>137</sup> Cs				luen	tilled		
Gamr	na alarm:	Re	ecord maximum	n time to alarm:			seconds		
		R	ecord minimun	n time to alarm:			seconds		
Neutr	on alarm:	Re	ecord maximur	n time to alarm:			seconds		
	applicable)								-
, i	/	R	ecord minimur	n time to alarm:			seconds		
Comments:									-
									_
<b>^</b>					<b>D</b> -1				_
Com	oleted by:				Date:				_
					Date:		++		
Rovi	iewed by:								


Security.

			Section	8.2 Ele	ctrosta	atic Disc	harge	
				Test Da	ta and	Report		
Manufact	turer:							
Instru	ment:							
	lodel:					ial Number:		
Date Perfo	rmed:				Те	st Location:		
	De susine s		During and		4			
	Requirer	ment:						to 6 kV using the rectly. No alarms s
			occur as a	result of the	electrosta	tic discharge	alone.	-
		Note:	Comments	are required	when the	requirement	is not verified.	
	Amb	oient C	Conditions:		°C		% RH	in Hg
	Test E	quipn	nentUsed:					
		So	urce Data:					
				Meas	urement	Results		
est with sources								
	Pre-	Test						
	Resp	onse						
	1		(add units)					
	2							
	3			Acce	eptance F	lange		
	4			"BD//61		<b>"D</b> 11/(01		
	5			#DIV/0!	to	#DIV/0!	\	
	6 7			low (-15%)		high (+15%	)	
	7							
	8							
	9 10							
	Mean #DI	//01						
	STD #DI							
	COV% #DI\							
						1		

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			Pos	t-test Read	ings			
			Gamn	na Exposu	re rate			
			2 kV	4 kV	6 kV			
						(a al ala:ta)		
		1				(add units)		
		3						
		4						
		5						
		6						
		7						
		8						
		9						
		10			-			
		Mean	#DIV/0!	#DIV/0!	#DIV/0!			
Were the res		Yes						
the acceptan	ce range?	No						
0.0000	alarm							
Gamma (within		Yes						
Neutron		No Yes						
(within		No						
	,							
	ID Trial 1 <sup>1</sup>	<sup>33</sup> Ba+ <sup>137</sup> Cs				Reco	ord all	
	ID Trial 2 <sup>1</sup>	<sup>33</sup> Ba+ <sup>137</sup> Cs					uclides	
	ID Trial 3 <sup>1</sup>	<sup>33</sup> Ba+ <sup>137</sup> Cs				lden	tified	
Gamma alarm:	Record m	naximum tim	ne to alarm:			seconds		
	Booord r	ninimum tin	o to alarm:			seconds		
	Recolu I					seconus		
Neutron alarm:	Record m	naximum tim	ne to alarm:			seconds		
(if applicable)	Depard r	ninimum tin	o to olorm:			seconds		
	Recolu I		ie to alaini.			seconds		
Test without sources								
	Did the in	strument al	arm durinc	testing?				
		2 kV	4 kV	6 kV				
	Yes							
	No							
	-							
	Comments:							
Pe	rformed by:				Date:			
	wiowed h				Date -			
Re	eviewed by:				Date:			
	I					1	I	



## TEST AND EVALUATION PROTOCOL

Security.

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	30		adio Freque			
I		Test Data	and Repor	t		
Manufacturer:						
Instrument:						
Model:				Seri	al Number:	
Date Performed:				Tes	st Location:	
Requirement:	The instrumen	t shall not be affe	ected by radio freq	uency (RF) fiel	ds over the fi	requency range
	of 80 MHz to 2	2.5 GHz at an inte instrument shall	ensity of 50 volts function correctly.	per meter (V/m	). When exp	osed to these
Note:	Comments are	e required when t	he requirement is	not verified.		
nt Conditions:		°C		%RH		In. Hg
Test Equ	ipment Used:					
Fre	quency Scan	Observations W	/ithout Radioact	ve Sources		
	· ·					
		1	1			
		We	ara sussantihiliti	as absorvad?		
			ere susceptibiliti			
		We Yes	ere susceptibilitio	es observed? No		
		Yes		No		
		Yes	ere susceptibilitie the unit alarm d	No		

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			<u>With <sup>137</sup>C</u>	<u>Cs Source</u>			
	Nominal Response (µR/h) - No RF			Source Data:			
1		(add units)					
2							
3			AC #DIV/0!	ceptance Range	#DIV/0!		
4			#DIV/0! low (-15%)	to	high (+15%)		
6			1000 (-1578)		nign (+ 1370)		
7			Fre	guency Scan Ob	oservations with R	adioactive	Sources
8				4			
9							
40							
10							
Mean							
Mean STD	#DIV/0!						
Mean STD							
Mean	#DIV/0!		We	re susceptibilitie	es observed?		
Mean STD	#DIV/0!		We Yes	re susceptibilitie	es observed? No		
Mean STD	#DIV/0!			re susceptibilitie			
Mean STD	#DIV/0! #DIV/0!			re susceptibilitie			
Mean STD	#DIV/0!			re susceptibilitie			
Mean STD	#DIV/0! #DIV/0!			re susceptibilitie			
Mean STD	#DIV/0! #DIV/0!			re susceptibilitie			
Mean STD	#DIV/0! #DIV/0!			re susceptibilitie	No		
Mean STD	#DIV/0! #DIV/0!			re susceptibilitie			
Mean STD	#DIV/0! #DIV/0!			re susceptibilitie	No		

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			- Magneti			
	I	est Da	ta and Rep	ort		
Manufacturer:						
Instrument:						
Model:				Se	rial Number:	
Date Performed:				Т	est Location:	
Requirements:			. ,	gnetic fields in al		
Requirements:	orientations re	elative to a	10 gauss (1 mT	) magnetic field,	the instrument	
Requirements:	orientations re	elative to a	10 gauss (1 mT	-	the instrument	
	orientations re correctly. No a	elative to a alarms sha	10 gauss (1 mT all occur as a res	) magnetic field,	the instrument tic field alone	
	orientations re correctly. No a	elative to a alarms sha	10 gauss (1 mT all occur as a res	) magnetic field, sult of the magne	the instrument tic field alone	
	orientations re correctly. No a	elative to a alarms sha	10 gauss (1 mT all occur as a res	) magnetic field, sult of the magne	the instrument tic field alone	
	orientations re correctly. No a Comments are	elative to a alarms sha	10 gauss (1 mT all occur as a res	) magnetic field, sult of the magne	the instrument tic field alone	

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		Mea	surement Res	ults Without	Source						
		rientation		Drientation	Third Ori						
	Nominal	10 Gauss	Nominal	10 Gauss	Nominal	10 Gauss					
	Zero Intensity	(DC)	Zero Intensity	(DC)	Zero Intensity	(DC)					
1							(add units)				
2							_		Acceptance		
3								Initial Orientation		to	#DIV/0! #DIV/0!
5							-	Third Orientatio		to to	#DIV/0! #DIV/0!
6								Third Orientation	low -15%	10	high +15%
7							-		1000 - 1070		night 1370
8											
9											
10											
Mean	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!					
STD	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!					
COV%	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!					
							Yes	Did the instrument alar	n		
							No	during the test?			
					Yes	No					
		Were there	any functiona	I changes?							
	C	Observations:									

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		Measuren	nent Results W	ith Sources								
	Source Data:											
		Me	easurement Re	esults With C	<u>s-137</u>							
	Initial Orie	entation	Second C	rientation	Third Ori	entation						
	Nominal	10 Gauss	Nominal	10 Gauss	Nominal	10 Gauss						
	Zero Intensity	(DC)	Zero Intensity	(DC)	Zero Intensity	(DC)						
1							(add units)					
2	┣─────┤		╂────┨					Initia	al Orientation:	Acceptance #DIV/0!	to	#DIV/0
4			11		1				d Orientation:	#DIV/0!	to	#DIV/0
5									d Orientation:	#DIV/0!	to	#DIV/0
6										low -15%		high +15
7												
8												
9												
	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!						
Mean STD		#DIV/0!	#DIV/0! #DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!						
COV%		#DIV/0!	#DIV/0! #DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!						
COV%	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!						
	Were there a	ny function	al changes?	Yes	No							
	were there a	iny functions	ai changes:									
(	Observations:											
omments:												
C	ompleted by:					Date:						
	Reviewed by:					Date:						
	veviewed by:					Date:						

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	Sec	tion 8.5 Rad	diated Er	nissions		
		Test Data	and Rep	ort		
Manufacture						
Instrumen	-					
Mode				5	Serial Number:	
Date Performe	1:			_	Test Location:	
Requiremen	other equi	ons from an instru oment located in t ss than those sho	the area of us			
		Emission F Rar		Field	Strength	
	_	(Mł			olts/meter)	
		30 - 88 -			100 150	
		216 - Above			200 500	
			5 300		500	
Not	: Comments	are required whe	en the requirer	ment is not ver	ified.	
Ambient Condition	6:	°C		%RH		in HG
est Equipment Use	1:					
				Yes	No	
	Were RF	emissions abov	ve the limits?			
Comment	5:					
Performed b	/:			Date:		

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		on 9.1 Vibrat				
	Test	Data and Rep	oort			
Manufacturer:						
Instrument:						
Model:			Serial N	umber:		
Date Performed:			Test Lo	ocation:		
Requirement:						
		Ill withstand exposu				
		eld or hand-carried e instrument shall not				
				poolaic (c.g		
	ioints shall hold, nu	its and bolts shall ne	ot come loose).			
	joints shall hold, nu	its and bolts shall n	ot come loose).			
		uired when the requi		ied.		
Note:	Comments are requ	uired when the requi	rement is not verif			
Note:					in	HG
Note: Ambient	Comments are requ	uired when the requi	rement is not verif		in	HG

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				1		r				
				After	After	After				
			Pre-test	Position A	Position B	Position C				
					ate Readings	1				
		1			Ĭ	1	(add units)			
		2								
		3								
		4								
		5								
		6								
		7								
		8								
		9							ptance R	
		10						#DIV/0!	to	#DIV/0!
		Mean	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!		-15%		15%
		STD	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!				
		COV%	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!				
Readings with	thin acceptance	Yes								
	range?	No								
Gamma	a alarm	Yes								
(withi	n 2s)	No								
Neutron	alarm	Yes								
(withir	n 5s)	No								
	ID Trial 1	<sup>133</sup> Ba+ <sup>137</sup> Cs					Recor	d all		
		<sup>133</sup> Ba+ <sup>137</sup> Cs					Radionu			
		<sup>133</sup> Ba+ <sup>137</sup> Cs					Identi			
		Ba+ Cs								
	rument controls	Yes								
fu	nction properly?	No								
Did the instrum	ent show visible	Yes								
ex	ternal damage?	No								
Comments:										
Performed by:					Date:					
r enonneu by:					Date:					
					Date:					
Reviewed by:					Dale.					

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		Section 9.2	-		
		Test Data a	and Report		
Manufacturer:					
Instrument:					
Model:			Serial Number:		
Date Performed:			Test Location:		
		•	urfaces from a height of 1.5 m onto a co		
fi e	unction correctly and ala exposure.	arm at a change in the rad	tiation field. It is acceptable if a transier		
fi e	unction correctly and ala exposure.	•	tiation field. It is acceptable if a transier		
Note: C	unction correctly and ala exposure.	arm at a change in the rad	tiation field. It is acceptable if a transier		
Note: C	unction correctly and ala exposure.	arm at a change in the rad	diation field. It is acceptable if a transier	nt alarm occurs at th	

	TEST AND EVALUATION PROTOCOL	<b>TEP NO.</b> N42.48	<b>PREPARED BY:</b> DIV682		
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		Pre-test	Drop 1	Drop 2	Drop 3	Drop 4	Drop 5	Drop 6					
				Expo	sure Rate Rea	dings	<u>I</u>		(add Units	)			
	1								ſ				
	2								-				
	4								-				
	5												
	6									Accep	otance F	Range	
	7								-	#DIV/0!	to	#DIV/0!	
	9									low (-15%)	10	high (+15%)	
	10									. , ,			
	Mean	#DIV/0!											
	STD COV %	#DIV/0! #DIV/0!											
	007 %	#DIV/0:	#01070:	#DIV/0:	#DIV/0!	#DIV/0:	#01070!	#DIV/0!					
Readings within	Yes								1				
acceptance range?	No								1				
									1				
Gamma alarm	Yes								1				
(within 2s)	No								1				
Neutron alarm	Yes												
(within 5s)	No												
ID Tria	I 1 <sup>133</sup> Ba+ <sup>137</sup> Cs								Reco	ord all			
ID Tria	l 2 <sup>133</sup> Ba+ <sup>137</sup> Cs									uclides			
ID Tria	l 3 <sup>133</sup> Ba+ <sup>137</sup> Cs								lden	tified			
Did the instrument controls	Yes								-				
function properly?	No								1				
· · · · · · · · · · · · · · · · · · ·	NO								1				
Did the instrument show	Yes								1				
visible external damage?	No								1				
									1				
Comments:													
Parformed hu			Date:										
Performed by:			Date:										
Reviewed by:			Date:										

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	S	ection 9.3 Ir	npact (Micro	ophonics)			
		Test D	ata and Rep	ort			
Manufacturer:							
Instrument:							
Model:			s	erial Number:			
Date Performed:				Test Location:			
	functionality o	•	o contact with hard nall not be affected	•			
Note:	Comments are	e required when th	e requirement is n	ot verified.			
Ambient	Conditions:	°C		%RH	i	n HG	
Tost Equir	oment Used:						
iest Equit	Sinen Osea.						

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					Measu	rement Re	esults - Wi	thout sour	ces							
					Side I		Sida	No. 2	Sido	No. 3	Sido	No. 4	Sido	No. 5	Side	No. 6
					Yes	No. 1	Yes	No. 2	Yes	No No	Yes	No. 4	Yes	No. 5	Yes	NO. 0
Did the ga	imma res	ponse rema	ain stable du	ring the test?												
		Did the	neutron reac	ling change?	2											
			ent alarm du													
were ther	e any fun	ctional cha	anges due to play spurious	the impacts?	/											
		ument uis	piay spurious	mulcations												
					Meas	urement	Results - V	Vith Source	s							
Sour	ce Data:															
			Pretest	Post-test												
			Response	Response												
					l .											
		1			(add units)											
		2														
		3														
		4			-	Acc #DIV/0	eptance R									
		5						#DIV/0! high (+15 °	<i>(</i> _)							
		7			, K	Jw (-13 78)		nigh († 15	/0)							
		. 8														
		9			1											
		10														
		Mean	#DIV/0!	#DIV/0!												
		STD	#DIV/0!	#DIV/0!	<u> </u>											
		COV%	#DIV/0!	#DIV/0!												
	igs within	Yes														
acceptanc	e range?	No														
Gamma al		Yes														
(within 2		No			Į											
Neutron al		Yes	ļ													
(within 5	s)	No			1											
	ID Trial 1 <sup>1</sup>	<sup>33</sup> Ba+ <sup>137</sup> Cs			Recor											
		<sup>33</sup> Ba+ <sup>137</sup> Cs			Radionu											
	ID Trial 3 <sup>1</sup>	<sup>33</sup> Ba+ <sup>137</sup> Cs			ldenti	fied										
Did the instrument	t controls	Yes			1											
function	properly?	No			1											
					Ĩ											
the instrument sho	ow visible	Yes			1											
external		No			1											
	-	.10			4			-								-

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## TEST AND EVALUATION PROTOCOL

			Sections 1	10 - Docume	ntation			
			Test D	ata and Rep	ort			
Manufacturer:								
Instrument:								
						-		
Model: Date Performed:	-						rial Number:	
Date Performed:						Ie	est Location:	
Requirements:	The manuf 10.2 Certif The manuf – Contacts – Type of i – Range o – Reference – Location – Respons – Results – Results – Results – Results – Results – Results – List of ra – FWHM a 10.3 Operatin	facturer shall provide	e a certificate or o er including, but r , and types of rac instrument is de nce orientation for the sensitive volu to different approp , linearity, and lo isotopes calibrati ne instrument rements onmental condition chanical tests in the instrument of 7Cs ce manuals an operation and	ther documentation not limited to, name diation the instrume signed to measure radiation source u mes of the detecto priate radiation ene ower limit of detection on with and date of ns was tested	n containing at least e, address, telephon int is designed to me sed for calibration rs rgies on i next calibration due ual containing at lea	the followin e number, fa easure e date)	ig information: ax number, e-ma	il address, et
	Only one (	data sheet per mode	l is required Co	mments are require	d when the requiren	nent is not v	verified.	
Note:	Only One (		no roquirou. Oo		a whom the requirem			

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Yes	Requirement
	Did the manufacturer provide a report on the tests performed?
	Was contact information provided in the manual?
	Did the manual describe the results of calibration tests (isotopes calibration with and date of next calibration due date)?
	Did the manual describe the type of instrument?
	Did the manual describe the type of radiation the instrument is designed to measure?
	Was the exposure rate range defined in the manual?
	Were the reference points described?
	Were the reference orientations described?
	Was information provided about the location of sensitive volume of detectors?
	Was information provided about the dimensions of sensitive volume of detectors?
	id the manual provide information about the instrument response to different radiation energies?
	Where calibration results provided?
	Was information on accuracy, linearity and lower limit of detections provided?
	Was the weight and dimensions provided?
	Did the manual contain information about battery requirements?
	Were results under environmental conditions provided?
	Were results of electrical tests provided?
	Was the list of radionuclides to which the instrument was tested provided?
	Were FWHM and efficiency for Cs-137 provided?
	Did the manufacturer provided an operation and maintenance manual?
	Did the manual contain operating instructions and restriction?
	Did the instructions contained information regarding alarm threshold adjustments?
	Was a troubleshooting guide provided?
	was a troubleshooting guide provided?

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Comments:				
Com	pleted by:		Date:	
Rev	iewed by:		Date:	

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