

Prüfbericht-Nr.: <i>Test Report No.:</i>	50078741 001	Auftrags-Nr.: <i>Order No.:</i>	164086131	Seite 1 von 16 <i>Page 1 of 16</i>	
Kunden-Referenz-Nr.: <i>Client Reference No.:</i>	661087	Auftragsdatum: <i>Order date.:</i>	14 Apr. 2017		
Auftraggeber: <i>Client:</i>	QUARTA-RAD LTD 2 Building, 3, Podol' skikh Kursantov, Moscow, 117545 Russian Fed.				
Prüfgegenstand: <i>Test item:</i>	Radon Gas Detector				
Bezeichnung / Typ-Nr.: <i>Identification / Type No.:</i>	MR107				
Auftrags-Inhalt: <i>Order content:</i>	TUV Rheinland - EMC service				
Prüfgrundlage: <i>Test specification:</i>	EN 61000-6-1:2007 EN 61000-6-3:2007+A1				
Wareneingangsdatum: <i>Date of receipt:</i>	14 April 2017				
Prüfmuster-Nr.: <i>Test sample No.:</i>	A000529258-001				
Prüfzeitraum: <i>Testing period:</i>	Refer to test report				
Ort der Prüfung: <i>Place of testing:</i>	Refer to section 2.1				
Prüflaboratorium: <i>Testing laboratory:</i>	TÜV Rheinland (Shenzhen) Co., Ltd.				
Prüfergebnis*: <i>Test result*:</i>	Pass				
geprüft von / tested by:		kontrolliert von / reviewed by:			
<p>27.04.2017 Gary Chen Senior Project Engineer</p> 		<p>27.04.2017 Tongle Lee Technical Certifier</p> 			
Datum <i>Date</i>	Name/Stellung <i>Name/Position</i>	Unterschrift <i>Signature</i>	Datum <i>Date</i>	Name/Stellung <i>Name/Position</i>	Unterschrift <i>Signature</i>
Sonstiges / Other:					
Zustand des Prüfgegenstandes bei Anlieferung: <i>Condition of the test item at delivery:</i>		Prüfmuster vollständig und unbeschädigt Test item complete and undamaged			
<p>* Legende: 1 = sehr gut 2 = gut 3 = befriedigend 4 = ausreichend 5 = mangelhaft P(ass) = entspricht o.g. Prüfgrundlage(n) F(ail) = entspricht nicht o.g. Prüfgrundlage(n) N/A = nicht anwendbar N/T = nicht getestet Legend: 1 = very good 2 = good 3 = satisfactory 4 = sufficient 5 = poor P(ass) = passed a.m. test specifications(s) F(ail) = failed a.m. test specifications(s) N/A = not applicable N/T = not tested</p>					
<p>Dieser Prüfbericht bezieht sich nur auf das o.g. Prüfmuster und darf ohne Genehmigung der Prüfstelle nicht auszugsweise vervielfältigt werden. Dieser Bericht berechtigt nicht zur Verwendung eines Prüfzeichens. <i>This test report only relates to the a. m. test sample. Without permission of the test center this test report is not permitted to be duplicated in extracts. This test report does not entitle to carry any test mark.</i></p>					

v04

TEST SUMMARY

5.1.1 RADIATED EMISSION (30-1000MHz)

RESULT: Pass

6.2.1 RADIO-FREQUENCY ELECTROMAGNETIC FIELDS SUSCEPTIBILITY (RS)

RESULT: Pass

6.3.1 ELECTROSTATIC DISCHARGES (ESD) IMMUNITY

RESULT: Pass

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1. General Remarks

1.1 Complementary Materials

All attachments are integral parts of this test report. This applies especially to the following appendix:

Appendix 1: Test Result

Appendix 2: Measurement Uncertainties

2. Test Sites

2.1 Test Facilities

Accurate Technology Co., Ltd (ATC)
F1, Bldg. A, Changyuan New Material Port, Keyuan Road,
Science & Industry Park, Nanshan 518057 Shenzhen, P.R. China
and

Shenzhen Academy of Metrology and Quality Inspection (SMQ)
NETC Building, No. 4 Tongfa Rd., Xili, Nanshan, Shenzhen, China

The tests at the test sites have been conducted under the supervision of a TÜV engineer.

2.2 List of Test and Measurement Instruments

Table 1: List of Test and Measurement Equipment

Kind of Equipment	Manufacturer	Type	S/N	Calibrated until
Radiated Emission (ATC)				
Spectrum Analyzer	Agilent	E7405A	MY45115511	2018-01-06
Test Receiver	R&S	ESCS30	100307	2018-01-06
Bilog Antenna	Schwarzbeck	VULB9163	9163-323	2018-01-09
50 Coaxial Switch	Anritsu Corp	MP59B	6200506474	2018-01-06
RF Coaxial Cable	Schwarzbeck	N-5m	No.1	2018-01-06
RF Coaxial Cable	Schwarzbeck	N-1m	No.6	2018-01-06
Radio-Frequency Electromagnetic Field Amplitude Modulated (SMQ)				
Signal Generator	R&S	SMT03	100059	2017-08-15
Voltage Probe	R&S	URV5-Z2	100012	2017-08-15
Voltage Probe	R&S	URV5-Z2	100013	2017-08-15
Field Probe	ETS	HI-6005	121578	2017-08-15
Power Amplifier	AR	250W1000A	335304	2017-08-15
Power Amplifier	MILMEGA	AS0860-75/45	1040084	2017-08-15
Power Meter	R&S	NRVD	100041	2017-08-15
Antenna	AR	AT1080	28568	2017-08-15
Horn Antenna	AR	AT4002A	305754	2017-08-15
ESD (ATC)				
ESD Tester	TESEQ	NSG 437	823	2018-01-06

3. General Product Information

3.1 Product Function and Intended Use

The **EUT** (Equipments Under Test) is radon gas detector used for detecting the radon in the air. For more information refer to the circuit diagram & instruction manual.

3.2 Ratings and System Details

EUT rated input:	DC 5V, 200mA (via micro USB port)
Rated Battery Capacity:	900mAh, 3.3Wh
EUT rated output:	DC 3.7
Protection class:	III

3.3 Independent Operation Modes

The basic operation modes are:

- A. On
 - 1. Detecting
 - 2. Charging & Transfer data with PC
- B. Off

3.4 Noise Generating and Noise Suppressing Parts

Refer to the Circuit Diagram.

3.5 Submitted Documents

- Rating Label

- User Manual

4. Test Set-up and Operation Modes

4.1 Principle of Configuration Selection

Emission: The equipment under test (EUT) was configured to measure its highest possible radiation level. The test modes were adapted accordingly in reference to the instructions for use.

Immunity: The equipment under test (EUT) was configured to have its highest possible susceptibility against the tested phenomena. The test modes were adapted accordingly in reference to the instructions for use.

4.2 Test Operation and Test Software

Test operation refers to test setup in section 5 & 6.

4.3 Special Accessories and Auxiliary Equipment

During the test, the EUT was tested together with the following accessories:

Item	Manufacturer	M/N	S/N
Notebook PC	Lenovo	X240	N/A
Printer	HP	HP laserjet 1015	CNFG30424

4.4 Countermeasures to achieve EMC Compliance

The test sample which has been tested contained the noise suppression parts as described in the Constructional Data Form or the Technical Construction File. No additional measures were employed to achieve compliance.

5. Test Results EMISSION

5.1 Emission in the Frequency Range above 30 MHz

5.1.1 Radiated Emission (30-1000MHz)

RESULT:**Pass**

Date of testing : 2017-04-21
Test standard : EN 61000-6-3:2007+A1
Frequency range : 30 - 1000MHz
Limits : Table 1 of EN 61000-6-3:2007+A1
Kind of test site : 3m semi-anechoic chamber

Test setup:

Input Voltage : DC 5V (via micro USB port) or DC 3.7V (via built-in battery)
Operation Condition : According to Clause 4 of EN 61000-6-3:2007+A1
Operation mode : A
Earthing : Not connected

Refer to attached Appendix 1.

6. Test Results IMMUNITY

6.1 Classification of apparatus

According to EN 61000-6-1:2007, the EUTs shall be tested in accordance with clause 2, 5 & 8, and comply with the performance criterion in table 1 of clause 8.

Continuous Disturbance

Radio-Frequency Radio Frequency Electromagnetic Fields Susceptibility (RS)	Criterion A
Power-Frequency Magnetic Fields*	Criterion A*

Transient Disturbance

Electrostatic Discharges (ESD)	Criterion B
--------------------------------	--------------------

Remark: *-The EUTs do not contain devices susceptible to magnetic fields; therefore the Power-Frequency Magnetic Fields test is not necessary.

6.2 Continuous Disturbances

6.2.1 Radio-Frequency Electromagnetic Fields Susceptibility (RS)

RESULT:**Pass**

Date of Testing	:	2017-04-24
Test Specification	:	EN 61000-6-1:2007
Basic Standard	:	IEC 61000-4-3:2006
Criterion	:	A
Frequency Range	:	80 – 1,000MHz 1.4 – 2.0GHz 2.0 – 2.7GHz
Test Level	:	3V/m (Unmodulated, rms) 3V/m (Unmodulated, rms) 1V/m (Unmodulated, rms)
Modulation	:	AM 80%, 1kHz sine-wave
Tested Port	:	Enclosure

Test setup

Input Voltage	:	DC 5V (via micro USB port) or DC 3.7V (via built-in battery)
Operation Mode	:	A
Earthing	:	Not connected
Ambient temperature	:	Refer to Appendix 1
Relative humidity	:	Refer to Appendix 1
Atmospheric pressure	:	Refer to Appendix 1

Refer to attached Appendix 1.

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6.3 Transient Disturbances

6.3.1 Electrostatic Discharges (ESD) Immunity

RESULT:**Pass**

Date of testing	:	2017-04-24
Test Standard	:	EN 61000-6-1:2007
Basic Standard	:	IEC 61000-4-2:2008
Criterion	:	B
Test level	:	±2.0kV, ±4.0kV, ±8.0kV (air discharge) ±4.0kV (contact discharge)
Number of discharges	:	>10 times per point each setting
Tested Port	:	Enclosure

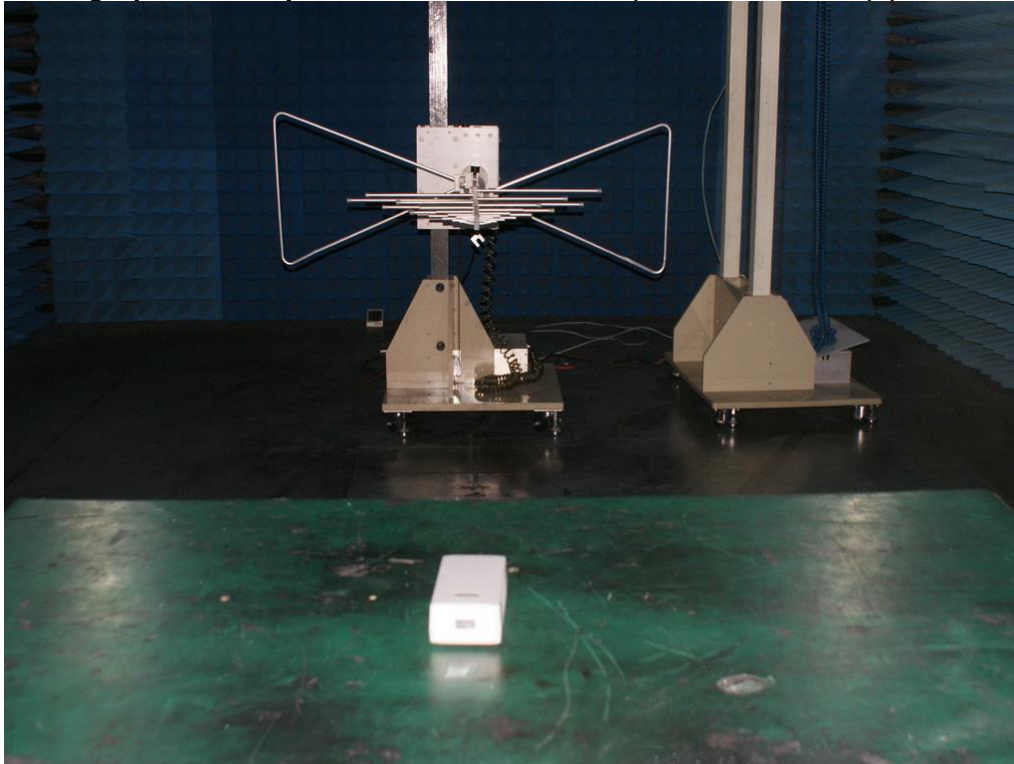
Test Setup

Input Voltage	:	DC 5V (via micro USB port) or DC 3.7V (via built-in battery)
Operation Mode	:	A
Earthing	:	Not connected
Ambient temperature	:	Refer to Appendix 1
Relative humidity	:	Refer to Appendix 1
Atmospheric pressure	:	Refer to Appendix 1

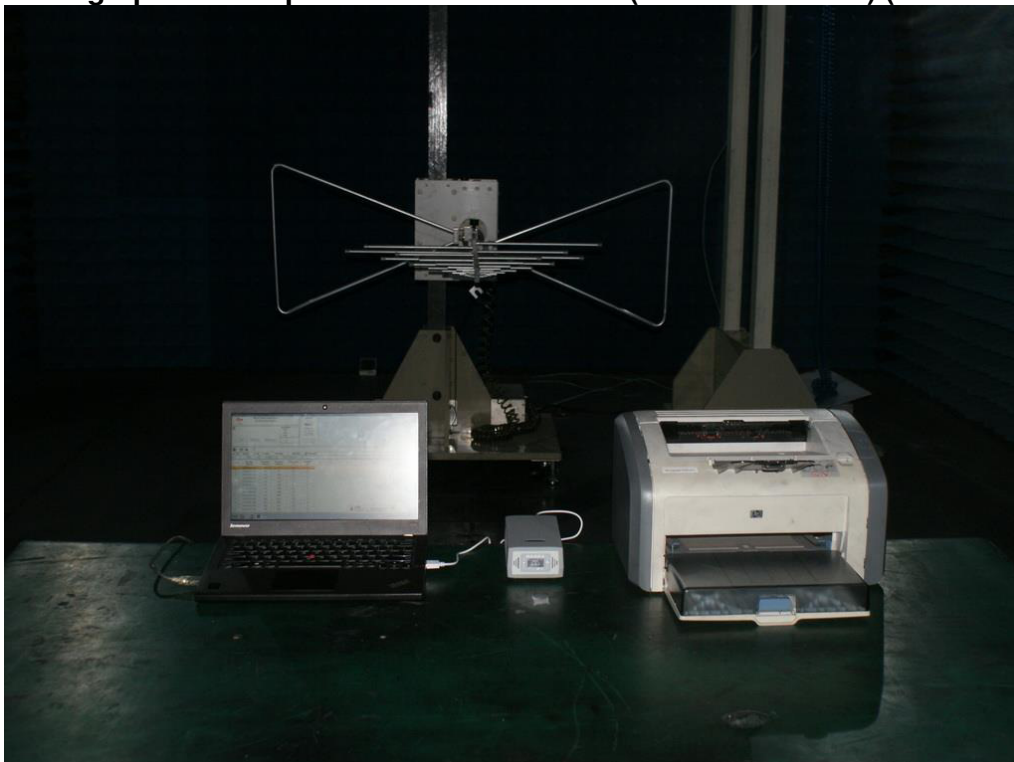
Refer to attached Appendix 1.

7. Photographs of the Test Set-Up

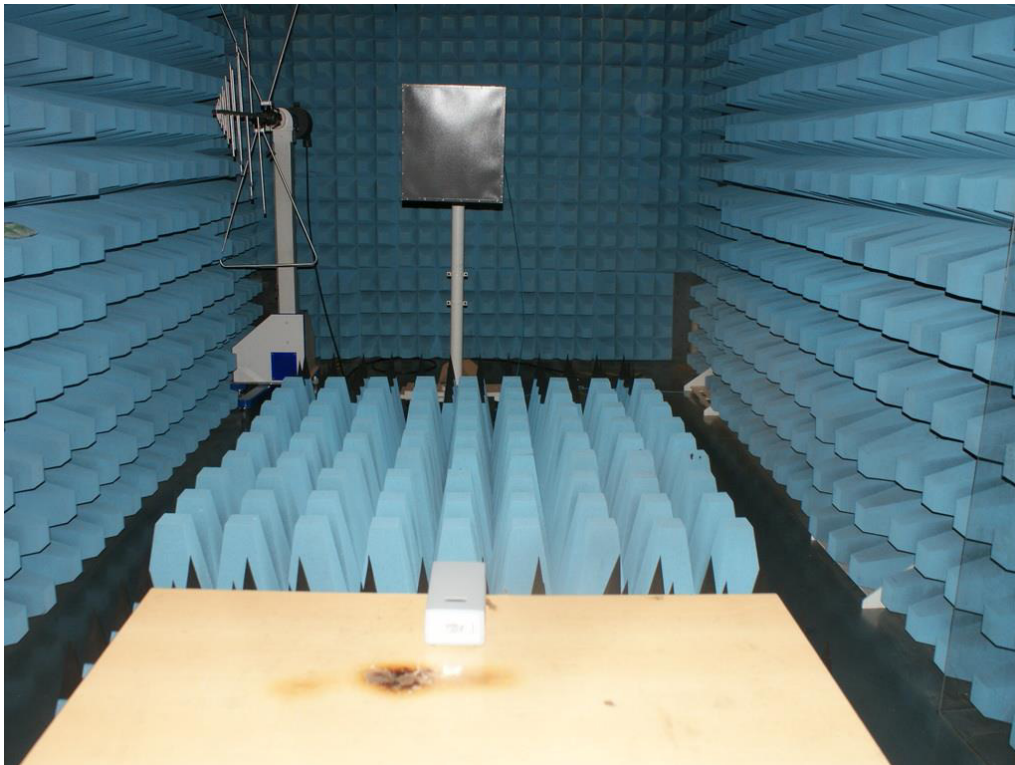
Photograph 1: Set-up for Radiated Emission (30MHz-1000MHz) (Mode: A.1)



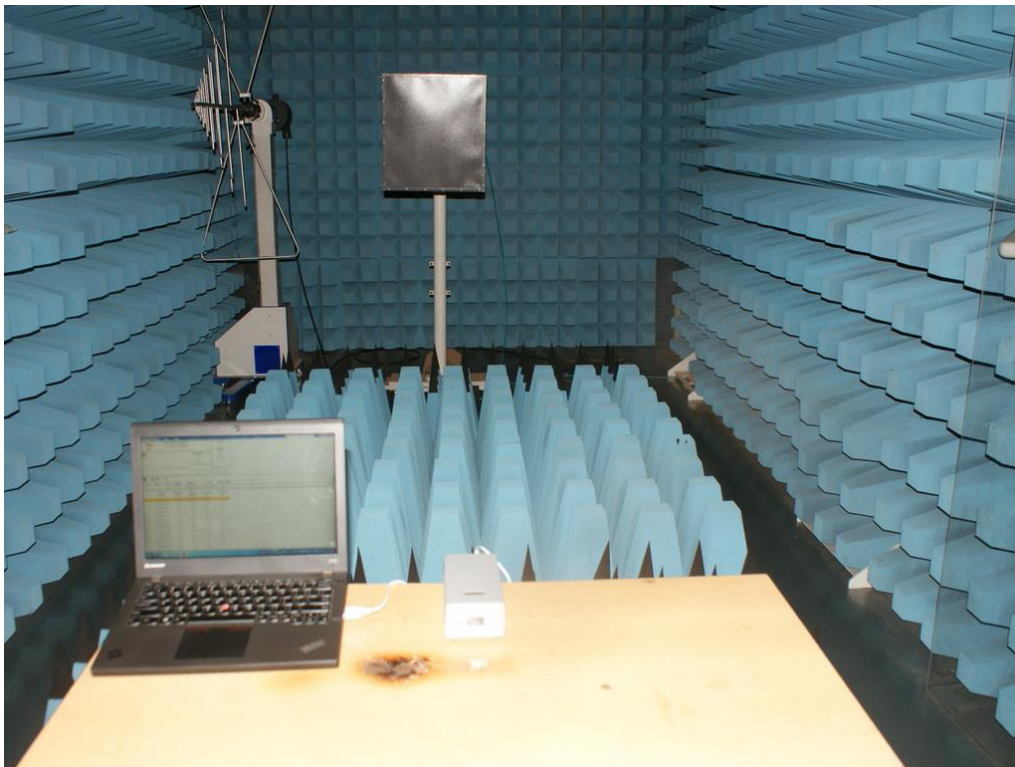
Photograph 2: Set-up for Radiated Emission (30MHz-1000MHz) (Mode: A.2)



**Photograph 3: Set-up for Radio-Frequency Electromagnetic Fields Susceptibility (RS)
(Mode: A.1)**



**Photograph 4: Set-up for Radio-Frequency Electromagnetic Fields Susceptibility (RS)
(Mode: A.2)**



Photograph 5: Set-up for Electrostatic Discharge (ESD) (Mode: A.1)



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Appendix 1

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Produkte
Products



ACCURATE TECHNOLOGY CO., LTD.

F1,Bldg.A,Changyuan New Material Port Keyuan Rd,
Science & Industry Park,Nanshan Shenzhen,P.R.China

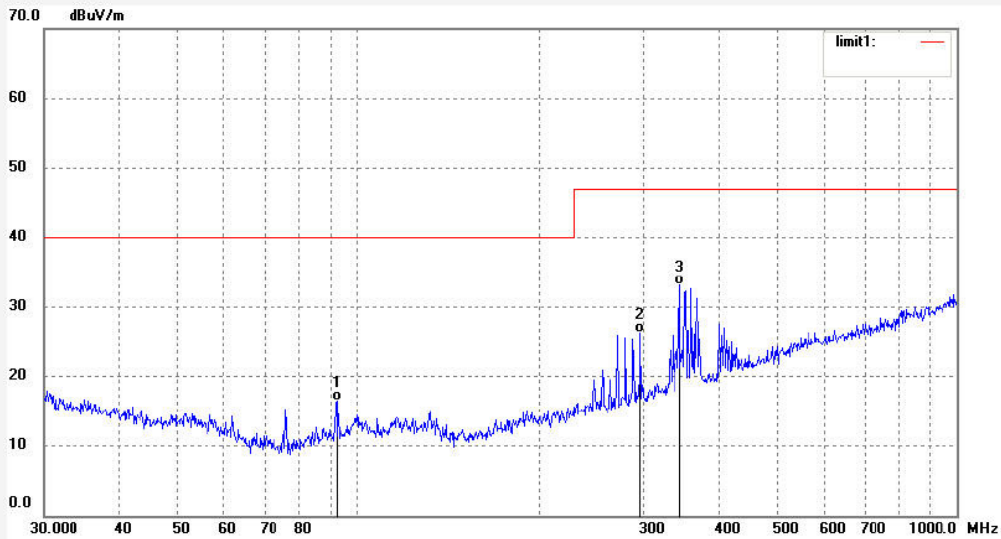
Site: 2# Chamber

Tel:+86-0755-26503290

Fax:+86-0755-26503396

Job No.: PING #2875	Polarization: Horizontal
Standard: EN 61000-6-3	Power Source: DC 3.7V
Test item: Radiation Test	Date: 2017-4-21
Temp.(C)/Hum.(%) 23 C / 48 %	Time:
EUT: Radon Gas Detector	Engineer Signature: PING
Mode: Detecting	Distance: 3m
Model: MR107	
Manufacturer: Quarta-Rad Ltd	

Note:



No.	Freq. (MHz)	Reading (dBuV/m)	Factor (dB)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Detector	Height (cm)	Degree (deg.)	Remark
1	92.1388	31.49	-14.90	16.59	40.00	-23.41	QP			
2	296.1836	35.49	-9.09	26.40	47.00	-20.60	QP			
3	344.3854	40.76	-7.57	33.19	47.00	-13.81	QP			

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ACCURATE TECHNOLOGY CO., LTD.

F1,Bldg.A,Changyuan New Material Port Keyuan Rd,
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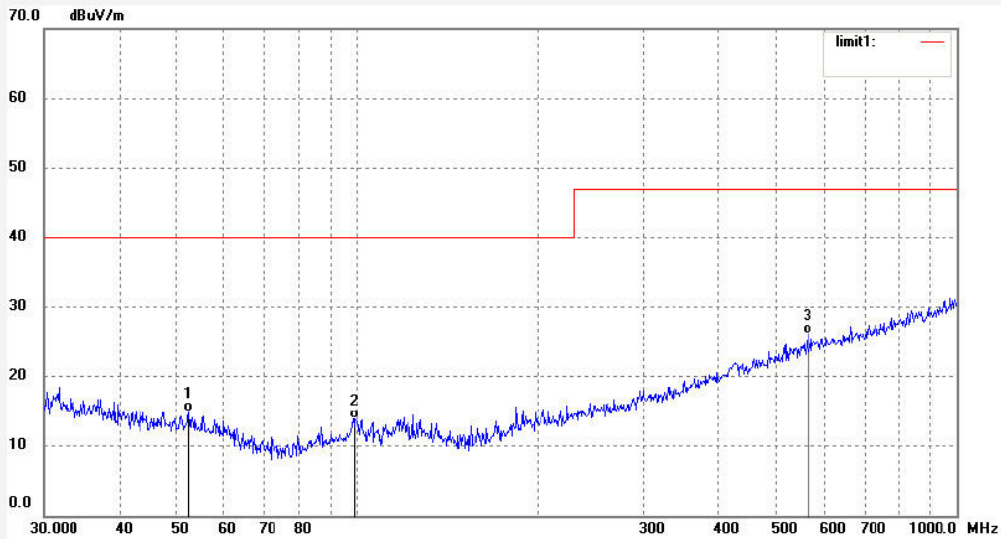
Site: 2# Chamber

Tel:+86-0755-26503290

Fax:+86-0755-26503396

Job No.: PING #2876	Polarization: Vertical
Standard: EN 61000-6-3	Power Source: DC 3.7V
Test item: Radiation Test	Date: 2017-4-21
Temp.(C)/Hum.(%) 23 C / 48 %	Time:
EUT: Radon Gas Detector	Engineer Signature: PING
Mode: Detecting	Distance: 3m
Model: MR107	
Manufacturer: Quarta-Rad Ltd	

Note:



No.	Freq. (MHz)	Reading (dBuV/m)	Factor (dB)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Detector	Height (cm)	Degree (deg.)	Remark
1	52.2079	27.68	-12.74	14.94	40.00	-25.06	QP			
2	99.1796	27.25	-13.33	13.92	40.00	-26.08	QP			
3	562.6624	29.07	-2.87	26.20	47.00	-20.80	QP			

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ACCURATE TECHNOLOGY CO., LTD.

F1,Bldg.A,Changyuan New Material Port Keyuan Rd,
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Site: 2# Chamber

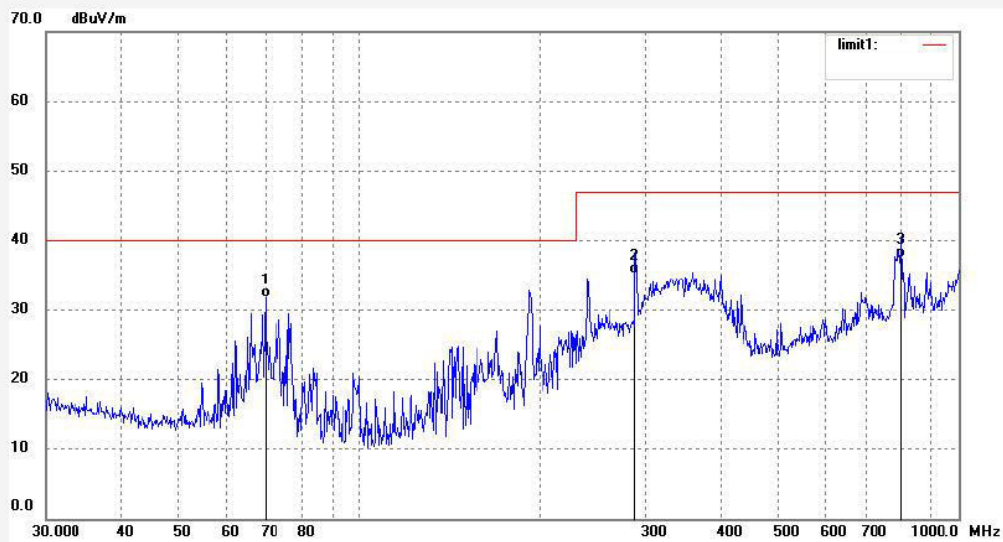
Tel:+86-0755-26503290

Fax:+86-0755-26503396

Job No.: PING #2877
Standard: EN 61000-6-3
Test item: Radiation Test
Temp.(C)/Hum.(%) 23 C / 48 %
EUT: Radon Gas Detector
Mode: Charging & Transfer data
Model: MR107
Manufacturer: Quarta-Rad Ltd

Polarization: Horizontal
Power Source: DC 5V
Date: 2017-4-21
Time:
Engineer Signature: PING
Distance: 3m

Note:



No.	Freq. (MHz)	Reading (dBuV/m)	Factor (dB)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Detector	Height (cm)	Degree (deg.)	Remark
1	69.6004	47.83	-16.04	31.79	40.00	-8.21	QP			
2	287.9904	44.60	-9.34	35.26	47.00	-11.74	QP			
3	801.7862	36.62	0.87	37.49	47.00	-9.51	QP			

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ACCURATE TECHNOLOGY CO., LTD.

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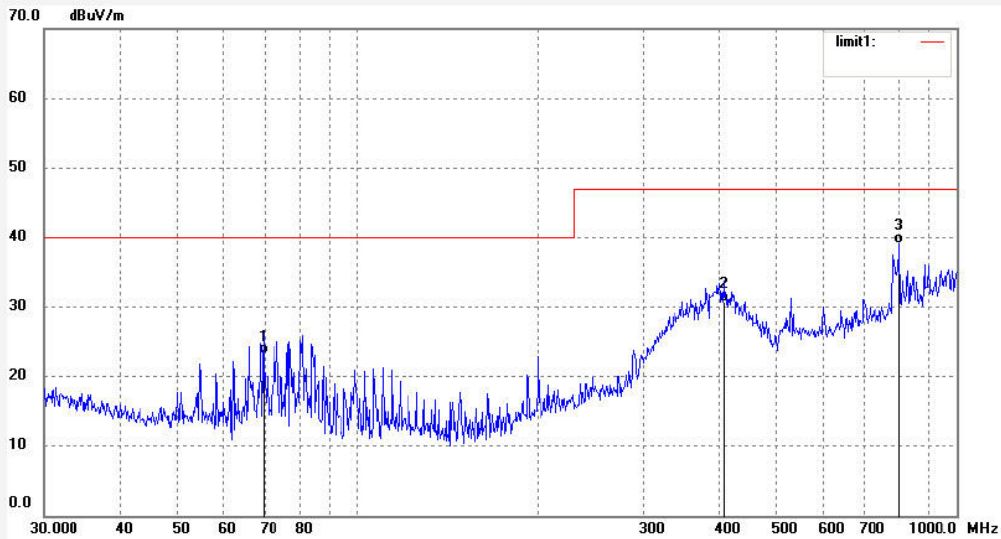
Site: 2# Chamber

Tel:+86-0755-26503290

Fax:+86-0755-26503396

Job No.: PING #2878	Polarization: Vertical
Standard: EN 61000-6-3	Power Source: DC 5V
Test item: Radiation Test	Date: 2017-4-21
Temp.(C)/Hum.(%) 23 C / 48 %	Time:
EUT: Radon Gas Detector	Engineer Signature: PING
Mode: Charging & Transfer data	Distance: 3m
Model: MR107	
Manufacturer: Quarta-Rad Ltd	

Note:



No.	Freq. (MHz)	Reading (dBuV/m)	Factor (dB)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Detector	Height (cm)	Degree (deg.)	Remark
1	69.6004	39.29	-16.04	23.25	40.00	-16.75	QP			
2	407.5144	36.90	-6.26	30.64	47.00	-16.36	QP			
3	801.7862	38.20	0.87	39.07	47.00	-7.93	QP			

EMC Test Protocol



Reference: Radon Gas Detector MR107	
Report:	

Immunity	ESD Electrostatic Discharge		<input checked="" type="checkbox"/> EN 61000-4-2
Air Discharge: $\pm 2, \pm 4, \pm 8$ kV	Criterion: B	Total: PASS / FAIL	
Contact: $\pm 2, \pm 4$ kV	# of discharges: 10	per test	
Ambient: 23 °C,	48 % RH,	100.4 kPa	
Test Site:			
Operation Mode: A			
Model: MR107			
Location	Kind A=Air C=Cont	Result	
All non-conducted enclosure & Seams	A	Pass	
All conducted enclosure	C	Pass	
HCP & VCP	C	Pass	

For indirect discharge: HCP = Horizontal Coupling Plane, VCP = Vertical Coupling Plane

Date: 2017-11-24
Inspector: _____

Signature: [Signature]

EMC Test Protocol



Reference: Radon Gas Detector MR107	
Report:	

Immunity Enclosure	RS Radiated Susceptibility				<input checked="" type="checkbox"/> EN 61000-4-3	
Field Strength: 3,3,1 V/m	Criterion: A	Total: PASS / FAIL				
Frequency Range: 80 MHz to 2700 MHz						
Modulation: <input type="checkbox"/> none <input checked="" type="checkbox"/> AM <input type="checkbox"/> Pulse 1 kHz, 80 %						
Ambient: 23 °C, 48 % RH, 100.4 kPa						
Test Site: Anechoic Chamber						
Operation Mode: A						
Model: MR107						
	Frequency Range 1: 3 V/m 80 – 1000 MHz		Frequency Range 2: 3 V/m 1000 – 2000 MHz		Frequency Range 3: 1V/m 2000 – 2700 MHz	
Steps	#	/	%	#	/	%
	Horizontal	Vertical		Horizontal	Vertical	
Front	Pass	Pass		Pass	Pass	
Right	Pass	Pass		Pass	Pass	
Rear	Pass	Pass		Pass	Pass	
Left	Pass	Pass		Pass	Pass	
	Frequency Range 1: - MHz		Frequency Range 2: - MHz		Frequency Range 3: - MHz	
Steps	#	/	%	#	/	%
	Horizontal	Vertical		Horizontal	Vertical	
Front						
Right						
Rear						
Left						

Date:
Inspector:

2017-10-24

Signature:

[Signature]

Measurement Uncertainties

Where relevant, the following measurement uncertainty levels have been estimated for tests performed on the apparatus.

The reported expanded uncertainty of measurement is stated as the standard uncertainty of measurement multiplied by the coverage factor of $k=2$, which for a normal distribution corresponds to a coverage probability of approximately 95%.

Table 1: Measurement Uncertainty levels

Test	Parameters	Expanded uncertainty (U_{lab})	Expanded uncertainty (U_{cispr})
Conducted Emission	Level accuracy (9kHz to 150kHz) (150kHz to 30MHz)	± 2.23 dB ± 2.23 dB	± 3.8 dB ± 3.4 dB
Power disturbance	Level accuracy (30MHz to 300MHz)	± 2.92 dB	± 4.5 dB
Electromagnetic Radiated Emission (3-loop)	Level accuracy (9kHz to 30MHz)	± 3.50 dB	N/A
Radiated Emission	Level accuracy (9kHz to 30MHz)	± 3.08 dB	N/A
Radiated Emission	Level accuracy (30MHz to 1000MHz)	± 4.42 dB	± 6.3 dB
Radiated Emission	Level accuracy (above 1000MHz)	± 4.06 dB	N/A
Mains Harmonic	Voltage	$\pm 0.512\%$	N/A
Voltage Fluctuations & Flicker	Voltage	$\pm 0.512\%$	N/A

As U_{lab} in all applicable tests listed above are less than U_{cispr} according to CISPR 16-4-2:2011,

- compliance is deemed to occur if no measured disturbance exceeds the disturbance limit;
- non-compliance is deemed to occur if any measured disturbance exceeds the disturbance limit.