



FCC
Test Report
for
Detect IV
Metal Detector

Report Number 08-431B/2643/7/04
(replaces report number 08-431A/2643/7/04)
Report Produced by: -

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2. Summary of Test Results

The Detect IV Metal Detector was tested to the following standards: -

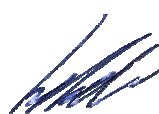
FCC Part 15C (effective date March 17, 2004); Class DCD Intentional Transmitter

Title	Reference	Results
1. Conducted Emissions	FCC Part 15 Intentional Radiator	NOT APPLICABLE
2. Radiated Emissions	FCC Part 15 Intentional Radiator	PASSED

Date of Test:

6th and 19th August 2004

Test Engineer:

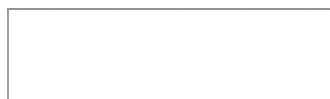


Approved By:

Paul
Darragh

Digitally signed by Paul
Darragh
DN: CN = Paul Darragh, C =
GB, OU = RN Electronics
Date: 2005.04.08 13:20:46
+01'00'

Customer Representative:



Barry Stephen

3. Information about Equipment Under Test

Manufacture of EUT	Audiotel International Ltd Corby Road Weldon Corby NN17 3AR
Full name of EUT	Detect IV
Model Number of EUT	Metal Detector
Serial Number of EUT	015397-8
FCC ID (if applicable):	Not available at present
Date when equipment was received by RN Electronics Limited	2nd August 2004
Date of test:	6th and 19th August 2004
Customer order number:	026168
A visual description of EUT is as follows:	Grey Moulded enclosure with extendable & swivelling detector head. The unit has a single hand grip with adjustable touch screen L.C.D Display, On switch, headphones, speaker, internal charger and connection ports towards the rear.
The main function of the EUT is to:	Detection and location of electronic eavesdropping devices.

Equipment Under Test Information specification

Height	660mm
Width	50mm
Depth	280mm
Weight	3.2kg
Voltage	7.2V battery
Current required from above voltage source	5A

Description of ancillary equipment connected to the equipment under test, for the purpose of tests, can be found in Section 11.

Any modifications made to the **Detect IV Metal Detector**, whilst under test, can be found in Section 12.

This report was printed on: 08 April 2005

Notes: The EUT is a composite device with multiple transmit / receive functions. This test report relates only to the metal detector function.

4. Specifications

The tests were performed by RN Electronics Engineer Lee Chandler who set up the tests, the test equipment, and operated it in accordance with the **R.N. Electronics Ltd** procedures manual and FCC Part 15.

5. Tests, Methods and Results

5.1 Conducted Emissions

5.1.1 Test Methods

Test Requirements FCC Part 15C, Reference (15.207)

Test Method: FCC Part 15C, Reference (15.207)

5.1.1.1 Configuration of EUT

The EUT was connected to the LISN, and operated in the mode found to produce the highest emissions.

5.1.1.2 Test Procedure

Tests were made in accordance with FCC Part 15 using the measuring equipment noted in the 'Test Equipment' Section. The equipment under test was powered via a mains LISN with a mains lead of 1 metre. Any excess mains lead was placed in a 400mm bundle.

5.1.1.3 Test results

Tests were performed using Test Site .

Temperature of test Environment: 0°C

Analyser plots for the Quasi-Peak Values and any table of signals within 20dB of the limit line can be found in Section 6.1 of this report.

Analyser plots for the Average values and any table of signals within 20dB of the limit line can be found in Section 6.1 of this report.

These results show that the **Detect IV Metal Detector** is **NOT APPLICABLE** to this test.

5.1.1.4 Test Equipment used

See Section 10 for more details.

5.2 Radiated Emissions

5.2.1 Test Methods

Test Requirements FCC Part 15C, Reference (15.209)

Test Method: FCC Part 15C, Reference (15.209)

5.2.1.1 Configuration of EUT

The EUT was placed on a 0.8 metres high turntable. The front edge of the EUT was initially positioned facing the antenna. The EUT was measured at a distance of 3 metres. The EUT was rotated in all three orthogonal planes, and the antenna scanned from 1 - 4 metres in height to maximise all emissions. This was repeated for both vertical and horizontal polarisation.

The EUT was powered from a fully charged battery.

5.2.1.2 Test Procedure

Tests were made in accordance with FCC Part 15 using the measuring equipment noted below.

Measurements were made in a semi-anechoic chamber / on an OATS.

Test sites 'M' and 'OATS' have been listed with the FCC. For emissions above 30MHz, the equipment was rotated 360° and the antenna scanned 1 – 4 metres to record the worst case emissions. For emissions below 30MHz, the equipment was rotated 360° and the active loop antenna was positioned vertically at a height of 1m and rotated to maximise emissions.

5.2.1.3 Test results

Tests were performed using Test Site **M**. Measurements below 30MHz were repeated at Test Site **OATS** without a ground plane.

Test environment:

Temperature: 28°C

Humidity: 51 %

M

Temperature: 22°C

Humidity: 60 %

OATS

Analyser plots for the Quasi-Peak values and any table of signals within 20dB of the limit line can be found in Section 6.2 of this report. Plots show measurements made at 3m.

An extrapolation factor of 40dB/decade is used for measurements closer than that specified. e.g. 0.009 MHz limit 2400/F[kHz] (uV/m) at 300m = 48.5dBuV/m at 300m; extrapolates to 128.5dBuV/m at 3m.

These show that the **Detect IV Metal Detector** has **PASSED** this test.

5.2.1.4 Test Equipment used

E226, TMS81, TMS933

See Section 10 for more details

6. Plots and Results

6.1 Conducted Emissions

NONE

Quasi-peak values of mains live feed

The plot shows a swept response of peak values using the quasi-peak limit line

(Any peaks within 20dB of the limit line have been calculated and appear in the table on following page of this report)

Table of signals within 20dB of the limit line for Quasi-Peak Live

NONE

Measurement Uncertainty of $\pm 3.6\text{dB}$ Applies

NONE

Quasi-peak values of mains neutral feed

The plot shows a swept response of peak values using the quasi-peak limit line

(Any peaks within 20dB of the limit line have been calculated and appear in the table on following page of this report)

Table of signals within 20dB of the limit line for Quasi-peak Neutral

NONE

Measurement Uncertainty of $\pm 3.6\text{dB}$ Applies

NONE

Average values of mains live feed

The plot shows a swept response of peak values using the average limit line

(Any peaks within 20dB of the limit line have been calculated and appear in the table on following page of this report)

Table of signals within 20dB of the limit line for Average Live

NONE

Measurement Uncertainty of $\pm 3.6\text{dB}$ Applies

NONE

Average values of mains neutral feed

The plot shows a swept response of peak values using the average limit line

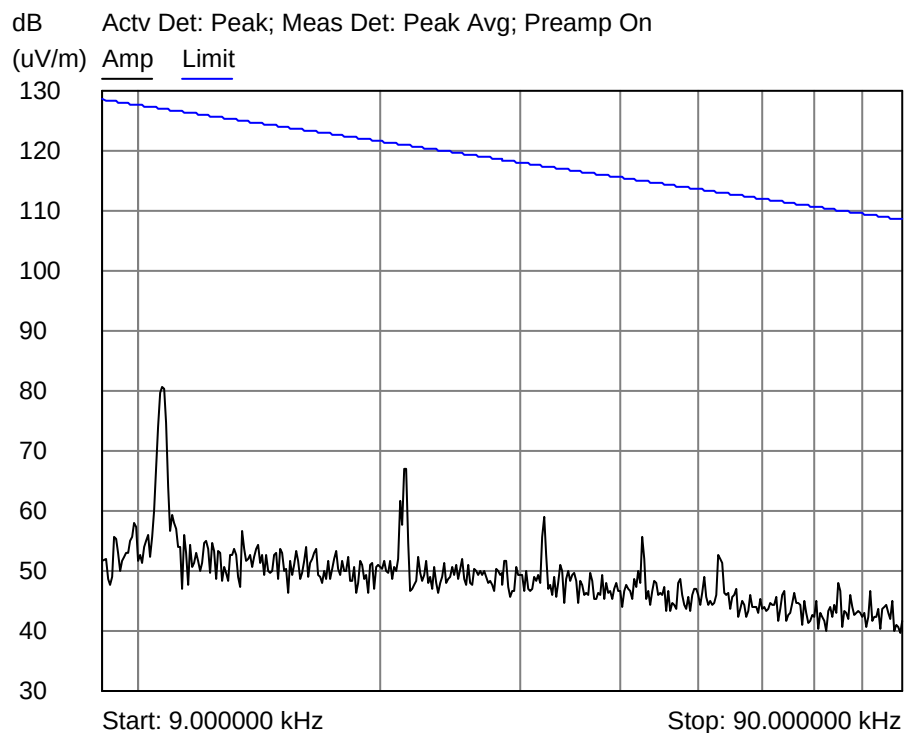
(Any peaks within 20dB of the limit line have been calculated and appear in the table on following page of this report)

Table of signals within 20dB of the limit line for Average Neutral

NONE

Measurement Uncertainty of $\pm 3.6\text{dB}$ Applies

6.2 Radiated Emissions



Average Values of 9 kHz. to 90 kHz.

Parallel Polarisation

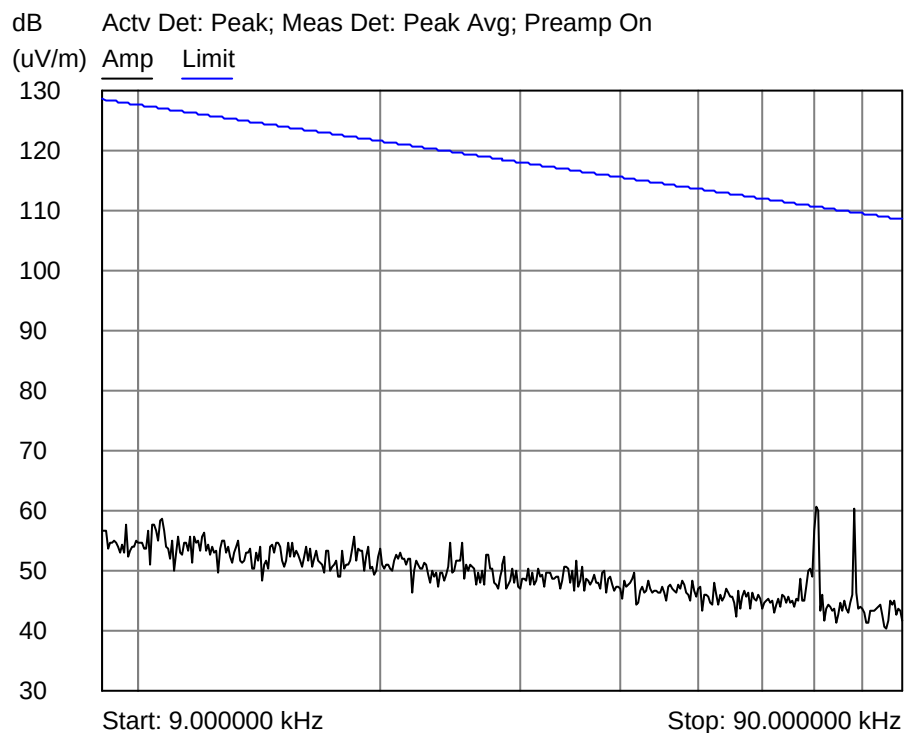
The plot shows a swept response of peak values using the average limit line

(Any peaks within 20dB of the limit line have been calculated and appear in the table on following page of this report)

Table of signals within 20dB of the limit line for Average Parallel

NONE

Measurement Uncertainty of $\pm 5.2\text{dB}$ Applies



Average Values of 9 kHz. to 90 kHz.

Perpendicular Polarisation

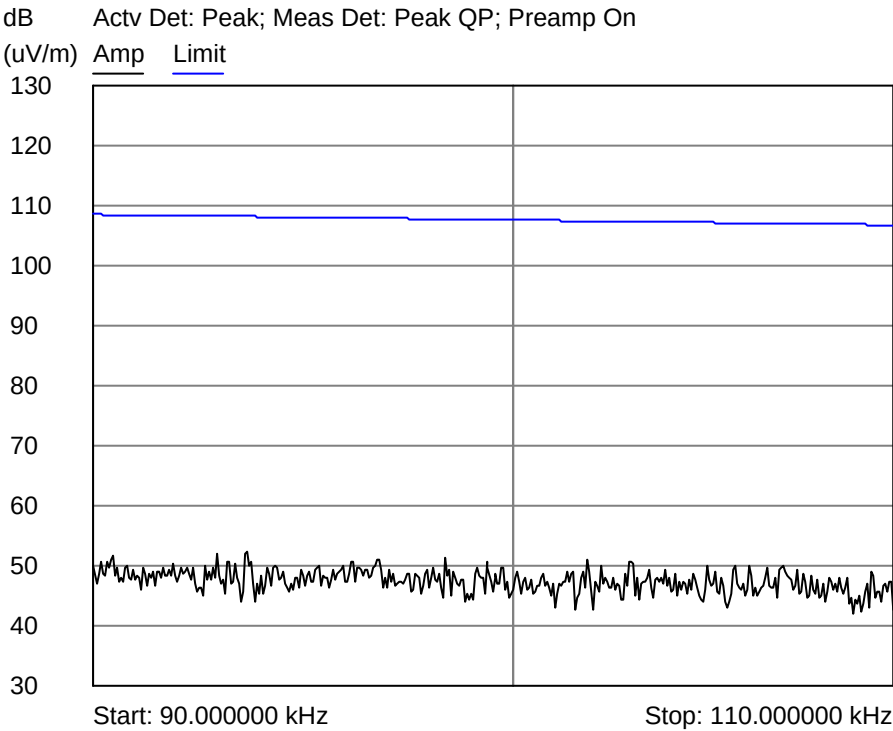
The plot shows a swept response of peak values using the average limit line

(Any peaks within 20dB of the limit line have been calculated and appear in the table on following page of this report)

Table of signals within 20dB of the limit line for Average Perpendicular

NONE

Measurement Uncertainty of $\pm 5.2\text{dB}$ Applies



Quasi-Peak Values of 90 kHz. to 110 kHz.

Parallel Polarisation

The plot shows a swept response of peak values using the quasi-peak limit line

(Any peaks within 20dB of the limit line have been calculated and appear in the table on following page of this report)

Table of signals within 20dB of the limit line for Quasi-Peak Parallel

NONE

Measurement Uncertainty of $\pm 5.2\text{dB}$ Applies

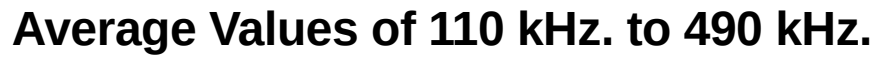


(Any peaks within 20dB of the limit line have been calculated and appear in the table on following page of this report)

Table of signals within 20dB of the limit line for Quasi-peak Perpendicular

NONE

Measurement Uncertainty of $\pm 5.2\text{dB}$ Applies

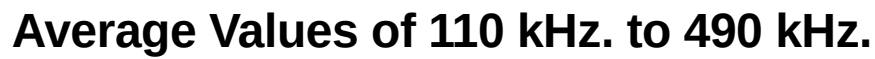


(Any peaks within 20dB of the limit line have been calculated and appear in the table on following page of this report)

Table of signals within 20dB of the limit line for Average Parallel

NONE

Measurement Uncertainty of $\pm 5.2\text{dB}$ Applies



(Any peaks within 20dB of the limit line have been calculated and appear in the table on following page of this report)

Table of signals within 20dB of the limit line for Average perpendicular

NONE

Measurement Uncertainty of $\pm 5.2\text{dB}$ Applies

Table of signals within 20dB of the limit line for Quasi-Peak parallel

NONE

Measurement Uncertainty of $\pm 5.2\text{dB}$ Applies



(Any peaks within 20dB of the limit line have been calculated and appear in the table on following page of this report)

Table of signals within 20dB of the limit line for Quasi-peak Perpendicular

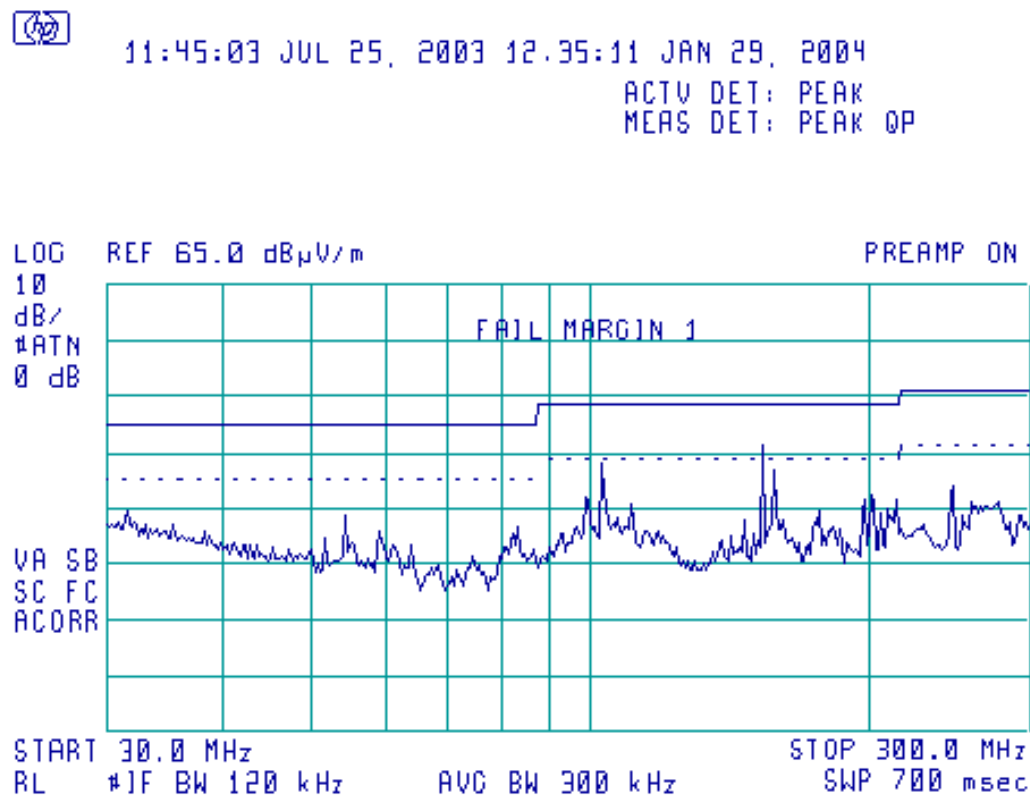
NONE

Measurement Uncertainty of $\pm 5.2\text{dB}$ Applies

Table of signals within 20dB of the limit line for Quasi-Peak Horizontal

NONE

Measurement Uncertainty of $\pm 5.2\text{dB}$ Applies



Quasi-Peak Values of 30 MHz. to 300 MHz.

Vertical Polarisation

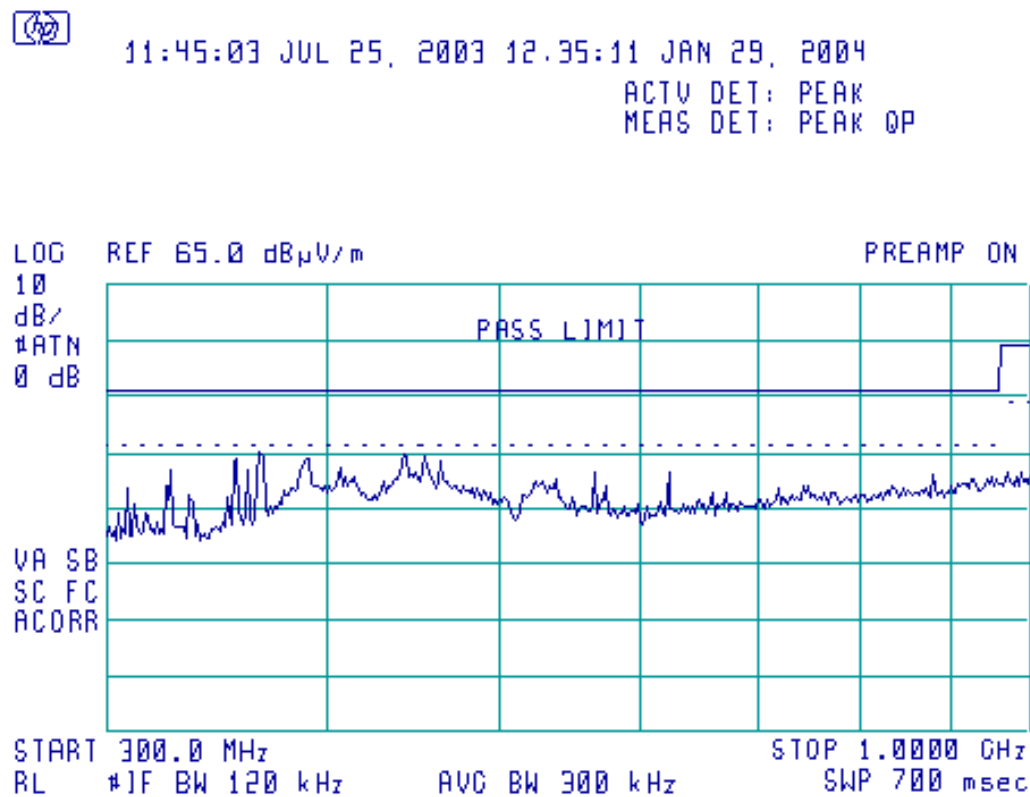
The plot shows a swept response of peak values using the quasi-peak limit line

(Any peaks within 20dB of the limit line have been calculated and appear in the table on following page of this report)

Table of signals within 20dB of the limit line for Quasi-peak Vertical

Signal	Freq (MHz)	Peak Amp (dBuV/m)	Peak - Lim1 (dB)	QP Amp (dBuV/m)	QP - Lim1 (dB)
1	154.847775	37.57	-5.93	36.58	-6.92

Measurement Uncertainty of ± 5.2 dB Applies



Quasi-Peak Values of 300 MHz. to 1 GHz.

Horizontal Polarisation

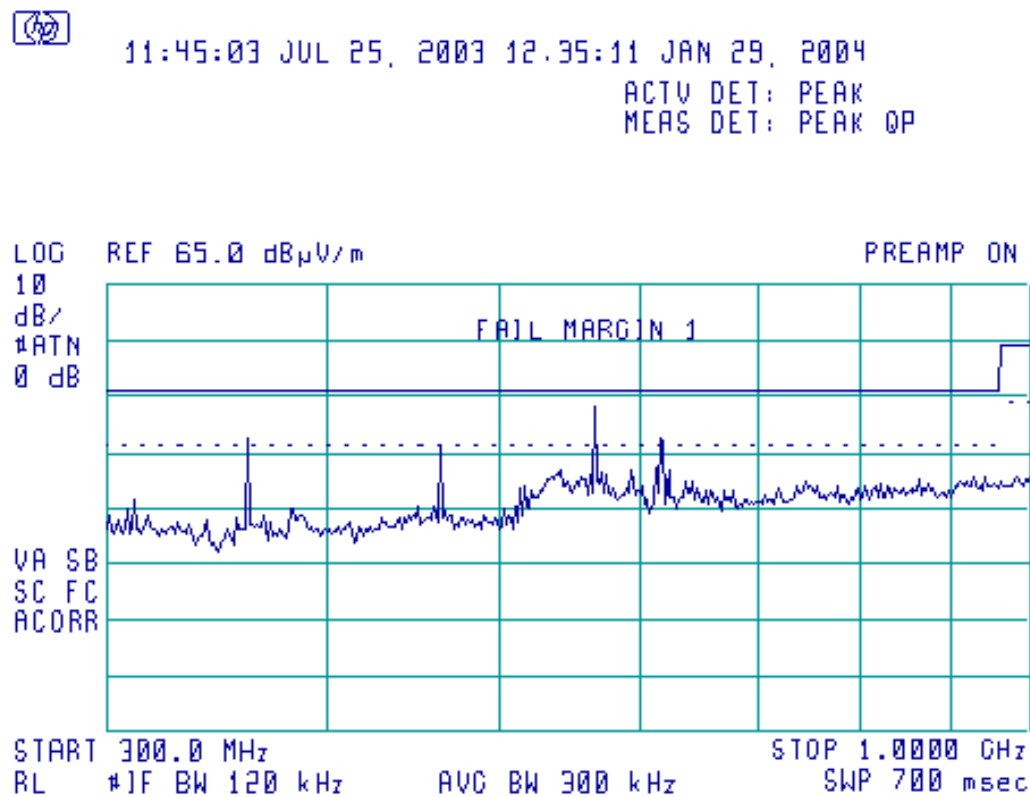
The plot shows a swept response of peak values using the quasi-peak limit line

(Any peaks within 20dB of the limit line have been calculated and appear in the table on following page of this report)

Table of signals within 20dB of the limit line for Quasi-Peak Horizontal

NONE

Measurement Uncertainty of $\pm 5.2\text{dB}$ Applies



Quasi-Peak Values of 300 MHz. to 1 GHz.

Vertical Polarisation

The plot shows a swept response of peak values using the quasi-peak limit line

(Any peaks within 20dB of the limit line have been calculated and appear in the table on following page of this report)

Table of signals within 20dB of the limit line for Quasi-peak Vertical

Signal	Freq (MHz)	Peak Amp (dBuV/m)	Peak - Lim1 (dB)	QP Amp (dBuV/m)	QP - Lim1 (dB)
1	361.304638	42.42	-3.58	41.09	-4.91
2	464.533413	41.33	-4.67	39.45	-6.55
3	567.754306	42.80	-3.20	41.19	-4.81
4	924.890513	38.60	-7.40	31.19	-14.81

Measurement Uncertainty of ± 5.2 dB Applies

7. Explanatory Notes

7.1 Explanation of FAIL LIMIT 1 Statement

The **FAIL MARGIN 1** statement(s) may appear on the graphical plots when the receiver used to measure your equipment detects a signal that exceeds the dashed line. This does not mean that the Detect IV Metal Detector, has failed the test only that the 10 dB calculation margin set, has been exceeded on a peak measurement.

Following the indication that the margin has been exceeded, measurements are made at the frequency (ies) of the peaks. These peaks have been calculated to either Quasi Peak or Average Peak dependant on the test. A table of results has been printed on the reverse of the page. This table looks similar to the one illustrated below: -

Signal Number	Frequency (MHz)	Peak (dBμV)	PK Delta L 1 (dB)	Avg (dBμV)	Av Delta L 1 (dB)
1	12345.0000	12.9	-2.5	10.2	-5.2

The First column, labelled Signal Number, is a number that the receiver has given to each signal, which has been calculated.

Column Two, labelled Frequency (MHz), is the frequency of the signal received.

Column Three, labelled Peak (dBμV), (can also be labelled, in the case of Quasi Peak, Peak dBμV/m) is the Level that was received at peak amount in dB above 1μV.

Column Four, labelled PK Delta L1 (dB), is the same level as Column three but is given in a level relative to the limit line required.

Column Five, labelled AVG (dBμV), (can also be labelled, in the case of Quasi Peak, QP dBμV/m) when undertaking a Quasi peak test, This is the Average or Quasi peak calculation results given in dBμV or dBμV/m above 1μV.

Column Six, labelled AV Delta L 1 (dB), (can also be labelled, in the case of Quasi Peak, QP Delta L 1 (dB)) is the Average or Quasi Peak calculation relevant to the limit line. The results entered in this column indicate the signal level relative to the compliance limit required. Negative numbers indicate that the product is compliant.

7.2 Explanation of limit line calculations for radiated measurements

The limits given in the test standard are normally expressed as absolute values (e.g. in μV/m at a specified distance), whereas the measured values are expressed as peak, quasi peak or average values in dBμV/m referenced to the measuring instrument inputs. RN Electronics calibrate the test set-up to account for any path losses, antenna gains, etc. so that the value read at the receiver relates directly to the absolute value required, except that it is expressed in dB relative to one microVolt and may need to take account of any alternative measuring distance used. Examples:

- (a) limit of 500 μV/m equates to $20.\log(500) = 54 \text{ dB } \mu\text{V/m}$.
- (b) limit of 300 μV/m at 10m equates to $20.\log(300 \cdot 10/3) = 60 \text{ dB } \mu\text{V/m at 3m}$

8. Photographs



**Photograph of the Detect IV Metal Detector as
viewed from in front of the antenna.**

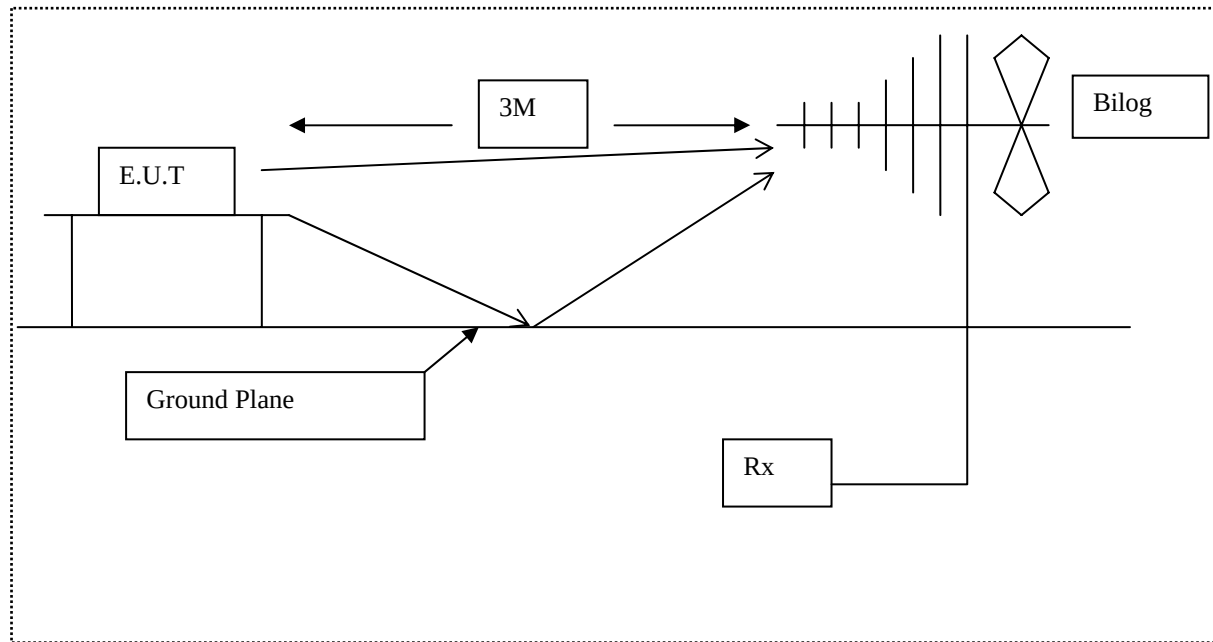


Diagram of the radiated emissions test setup.

NONE

**Photograph of the Detect IV Metal Detector as
viewed from screened room (conducted
emissions)**

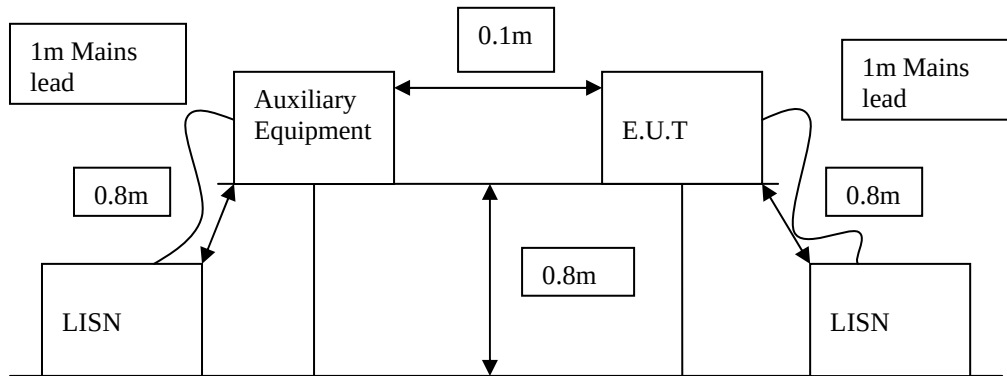


Diagram of the conducted emissions test setup.

9. Signal Leads

Port Name	Cable Type
Headphones	2.5mm jack
USB	Not Connected
Accessory	(RG316) Coax
Charging Socket	Not Connected

10. Test Equipment Calibration list

The Following is a list of the test equipment currently in use at **R.N. Electronics Ltd.** EMC test facility. In line with our procedures, to meet the requirements of ISO 9001, the equipment used will be within calibration for the period during which testing was carried out.

RNNo	Model	Description	Manufacturer
E226	8546A	EMI Receiver	Hewlett Packard
TMS81	6502	Active Loop Antenna	EMCO
TMS933	CBL6141A	Bilog Antenna 30MHz - 2GHz	York EMC

11. Auxiliary equipment

11.1 Auxiliary equipment supplied by Audiotel International Ltd

Auxiliary equipment used for the purpose of test supplied by the above has been listed below

Manufacturer	Description	Model Number	Serial Number
-	Metal Test Target	-	-
-	Headphones	-	-
-	Terminated accessory lead	-	-

11.2 Auxiliary equipment supplied by RN Electronics Limited

Auxiliary equipment used for the purpose of test supplied by the above has been listed below

RN Number	Manufacturer	Description	Model Number	Serial Number
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12. Modifications

In order for the Detect IV Metal Detector to produce the results shown within this report the following modifications, if any, were implemented.

NONE

13. Compliance information

Products subject to the Declaration of Conformity procedure are required to be supplied with a compliance information statement. A copy of this statement may be included here:



Certificate of Test

The equipment noted below has been tested by **R.N. Electronics Limited** and conforms with the relevant subpart of FCC part 15, tested.

This certificate relates to the equipment, as identified by unique serial number(s) and further detailed in the referenced report, in the condition(s) at the time it was tested. It does not relate to any other similar equipment and performance of the product before or after the test cannot be guaranteed. Furthermore, this is a certificate of test only and should not be confused with an equipment authorisation.

Equipment:	Detect IV Metal Detector
Manufacturer:	Audiotel International Ltd
Customer Purchase Order Number:	026168
R.N. Electronics Limited Report Number:	08-431B/2643/7/04
Test Standards:	FCC Part 15C: effective date March 17 th 2004. Class DCD Intentional Radiator.
Date:	6th and 19th August 2004

For and on behalf of
R.N. Electronics Limited

Signature:

Notes:

Paul Darragh	Digitally signed by Paul Darragh DN: CN = Paul Darragh, C = GB, OU = RN Electronics Date: 2005.04.08 13:22:04 +01'00'
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The EUT is a composite device with multiple transmit / receive functions. This test certificate relates only to the metal detector function.

QMF21 – 8: FCC PART 15 ISSUE 01: - AUG 04