FCC 47CFR part 15C
Test Report
For
CNIguard IDS Detector Unit

Reference Standard: FCC 47CFR part 15C
Manufacturer: CNIguard Ltd
For type of equipment and serial number, refer to section 3
Report Number: 01-487/4751/1A/12
Supersedes report # 01-487/4751/1/12
Report Produced by: -

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Certificate of Test 4751/1A

The unit noted below has been tested by **R.N. Electronics Limited** and, where appropriate, conforms to the relevant subpart of FCC 47CFR Part 15. This is a certificate of test only and should not be confused with an equipment authorisation. Other standards may also apply.

Equipment:	CNIguard IDS Detector Unit
Model Number:	SLD
Proposed FCC ID:	ZRE3A004-0B1
Unique Serial Number(s):	D11050008, D11050009
Manufacturer:	CNIguard Ltd Jubilee House Merrion Ave Stanmore HA7 4RY UK
Customer Purchase Order Number:	RN 004
Full measurement results are detailed in Report Number:	01-487/4751/1A/12
Test Standards:	FCC 47CFR Part 15C effective date **October 1st 2011,** Class DXT Intentional Radiator

NOTE:
Certain tests were not performed based upon manufacturer's declarations. For details refer to section 3 of this report.

This certificate relates only to the unit tested as identified by a unique serial number and in the condition 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. Whilst every effort is made to assure quality of testing, type tests are not exhaustive and although no non-conformances may be found, this doesn't exclude the possibility of unit not meeting the intentions of the standard or the requirements of the Directive, particularly under different conditions to those during testing. Any compliance statements are made reliant on (a) the application of the product and use of the assigned band being acceptable to one or more national authorities within the EU and (b) the modes of operation as instructed to us by the Customer based on their specific knowledge of the application and functionality of the EUT. Statements of compliance, where measurements were made, do not include the measurement uncertainty. The measurement uncertainty, where stated, is the expanded uncertainty based on a standard uncertainty multiplied by a coverage factor of k=2, providing a level of confidence of approximately 95%.

Date of Test: 6-Jul-11 to 24-Apr-12

Test Engineer:

Approved By:
Technical Director

Customer Representative:

File name CNIGUARD.4751-1.PUBLICREPORT.DOCX
The contents of this report, apart from the referenced ANSI C63.4-2003, are beyond the scope of UKAS Testing Laboratory No. 2360 accreditation.

1. Contents

2. Summary of test results

The Detector Unit was tested to the following standards: -

FCC 47CFR Part 15.249 (effective date October 1st, 2011);
Class DXT Intentional Radiator

Any compliance statements are made reliant on the modes of operation as instructed to us by the Manufacturer based on their specific knowledge of the application and functionality of the equipment tested. Whilst every effort is made to assure quality of testing, type tests are not exhaustive and although no non-conformances may be found, this doesn't exclude the possibility of equipment not meeting the intentions of the standard, particularly under different conditions to those during testing. Statements of compliance, where measurements were made, do not include the measurement uncertainty.

Title	Reference	Results
1. Conducted emissions	ANSI C63.10 §6.2.	Not Applicable[1]
2. Intentional radiator field strength	ANSI C63.10 §6.10.	PASSED
3. Radiated emissions	ANSI C63.10 §6.4 – 6.6.	PASSED
4. Frequency stability	ANSI C63.10 §6.8.	Not Applicable[2]
5. Occupied bandwidth and band edge	ANSI C63.10 §6.9.	PASSED

[1] EUT does not operate from the AC power lines nor contain provisions for operation while connected to AC power lines.
[2] EUT is not for fixed, point-to-point operation, therefore no limits are specified.

3. Equipment Under Test (EUT)

3.1 Equipment Specification

Applicant	CNIguard Ltd Jubilee House Merrion Ave Stanmore HA7 4RY UK
Manufacturer of EUT	CNIguard Ltd
Brand name of EUT	CNIguard Ltd
Model Number of EUT	SLD
Proposed FCC ID	ZRE3A004-0B1
Serial Numbers of EUT	D11050008, D11050009
Date when equipment was received by RN Electronics	5-Jul-11 & 30-Nov-11
Date of test:	06/Jul/2011 to 24/Apr/2012
Customer order number:	RN 004
Visual description of EUT:	Grey metal enclosure with keypad push buttons on the top and a cable harness port on the side. The cable harness provided incorporated a patch antenna, alarm sensors and a DC battery box input.
Main function of the EUT:	Transmits polling and alarm signals to a control unit.
Height	100mm
Width	210mm
Depth	140mm
Weight	<5kg
Voltage	7.2V DC
Current required from above voltage source	150mA

3.2 EUT Configurations for testing

Frequency range	902.0625 – 927.9375 MHz
Normal use position	Inside metal hatch at water reservoir
Normal test signals	Internally generated alarm signals
Declared power level	0dBm
Declared channel bandwidth	25kHz
Highest frequency generated / used	1.88 GHz
Lowest frequency generated / used	14.7456MHz

3.3 EUT Modes

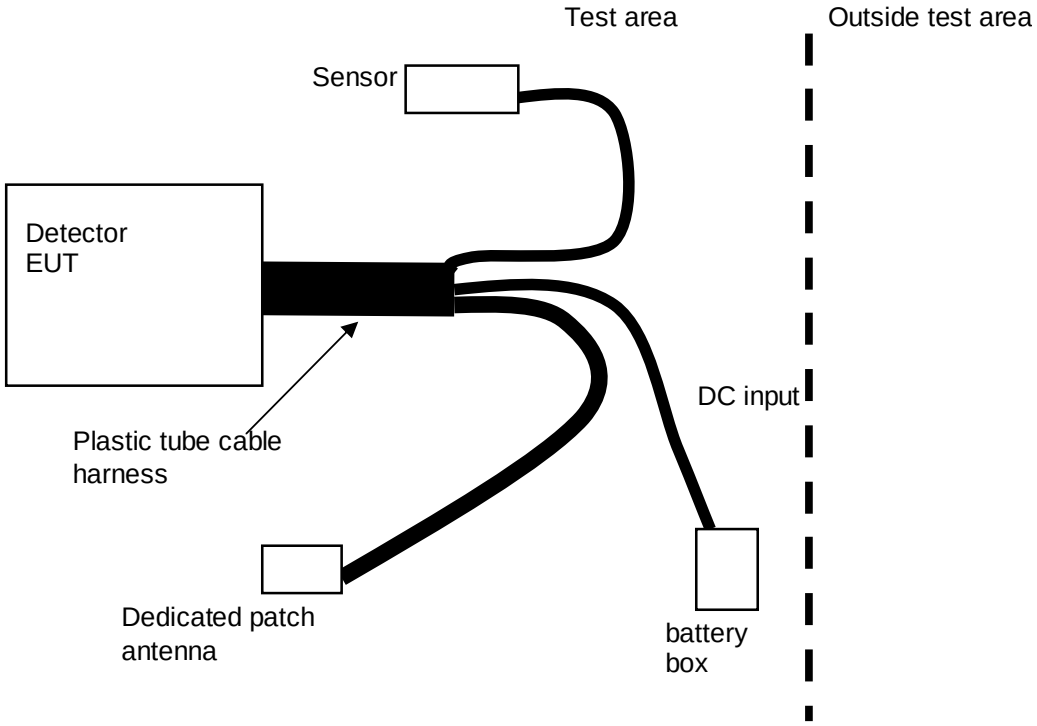
Mode	Description of mode	Used for Testing
Transmit modulated	S/N D11050008 was pre-programmed to continuously transmit a modulated signal	YES
Transmit CW	S/N D11050009 was pre-programmed to continuously transmit a CW signal	YES
Receive	S/N D10101029 was pre-programmed to receive only	NO

Description of ancillary equipment connected to the equipment under test, for the purpose of tests, can be found in Section 10.

Any modifications made to the EUT, whilst under test, can be found in Section 11.

This report was printed on: 27 April 2012

3.4 Emissions Configuration



The EUT was powered via new batteries. The manufacturer provided a laptop and an alternative harness for programming output power level and transmit channel prior to test via RS232.

4. Specifications

The tests were performed by RN Electronics Engineers Lee Chandler & Peter Finley who set up the tests, the test equipment, and operated it in accordance with the ***R.N. Electronics Ltd*** procedures manual, ANSI C63.10-2009, FCC Part 15 and those specifications incorporated by reference into 47CFR15 (e.g. ANSI C63.4-2003).

R.N. Electronics Ltd sites M and OATS are listed with the FCC. Registration Number 293246

4.1 Deviations

ANSI C63-10-2009 deviations:
The reference standard ANSI C63.4-2003 was used, not the latest ANSI C63.4-2009

FCC Part 15 deviations:
None.

4.2 Tests at Extremes of Temperature & Voltage

No tests were required at extremes of temperature or voltage.

4.3 Measurement Uncertainties

Parameter	Uncertainty
Transmitter Tests	
Bandwidth	<± 1.9 %
Radiated RF Power	<± 3.5 dB
Radiated Spurious Emissions	<± 3.4 dB

5. Tests, Methods and Results

5.1 Conducted emissions

Not applicable.
The manufacturer has declared that the EUT does not operate from the AC power lines nor contain provisions for operation while connected to AC power lines.

5.2 Intentional radiator field strength

5.2.1 Test Methods

Test Requirements FCC Part 15C, Reference (15.249a)

Test Method: ANSI C63.10, Reference (6.3 / 6.5)

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 measurement antenna, with the attached antenna under test supported by a styrofoam block above the table and vertically polarized. The EUT was measured at a distance of 3 metres. The measurement antenna was scanned 1-4m in height in both Horizontal and Vertical polarisations. The EUT was operated in transmit modulated mode.

5.2.1.2 Test Procedure

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

Measurements were made on a site listed with the FCC.

Both the equipment and the antenna were rotated 360° to record the maximised emission.

5.2.2 Test results

Tests were performed using Test Site **M.**

Test Environment:
Temperature: 17-19°C Humidity: 42-58%

Channel	Measured result PK (dBuV/m @3m)	Measured result QP (dBuV/m @3m)
902.0625	87.4	87.4
915.0000	90.0	90.0
927.9375	85.9	85.9

Note: EUT tested in a continuous transmit mode for ease of test.

LIMITS:
15.249(a) 50 mV/m @ 3m (94 dBµV/m @ 3m).

These results show that the EUT has **PASSED** this test.

5.2.2.1 Test Equipment used

E410, E411, E412, TMS933
See Section 10 for more details

5.3 Radiated emissions

5.3.1 Test Methods

Test Requirements FCC Part 15C, Reference (15.209)

Test Method: ANSI C63.10, Reference (6.4 – 6.6.)

5.3.1.1 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 measurement antenna, with the attached antenna under test supported by a styrofoam block above the table. The EUT was measured at a distance of 3 metres. The antenna was scanned 1-4m in height in both Horizontal and Vertical polarisations. The EUT and its antenna were rotated in all three orthogonal planes. The EUT was operated in transmit modulated mode.

5.3.1.2 Test Procedure

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

Below 30MHz, measurements were made in a semi-anechoic chamber (pre-scan) with final measurements on an OATS without a ground plane. The antenna was placed 1m above the ground. The equipment and the antenna were rotated 360° to record the worst case emissions.

30MHz - 1GHz, measurements were made on a site listed with the FCC. The equipment was rotated 360° and the antenna scanned 1 – 4 metres in both horizontal and vertical polarisations to record the worst case emissions.

Above 1GHz, measurements were made in a semi-anechoic chamber with appropriate absorbing material for use in this range. The antenna was placed in line with the EUT, which was rotated through 360° to record the worst case emissions.

At least 6 signals within 20dB and all signals within 10dB of the limit were investigated.

5.3.2 Test results

Tests were performed using Test Site M and OATS**.**

Test Environment:
M and OATS

Temperature: 17-19°C Humidity: 42-58%

Analyser plots for the Quasi-Peak / Average values as applicable can be found in Section 6.2 and 6.3 of this report.

Note: EUT tested in a continuous transmit mode for ease of test.

N.b. the following tables represent the worst case emissions on all 3 channels. There was no significant difference in emissions between the 3 channels other than the fundamental. Emissions more than 20dB below the limit are not necessarily reported.

Horizontal

Signal No.	Freq (MHz)	Peak Amp (dBuV)	QP Amp (dBuV)	QP - Lim1 (dB)
1	124.255	35.8	33.4	-10.1
2	173.962	27.9	26.4	-17.1
3	223.642	41.2	39.6	-6.4
4	273.358	37.9	34.4	-11.6
5	323.086	38.5	37.4	-8.6
6	745.584	44.9	43.2	-2.8
7	770.388	41.5	38.9	-7.1
8	795.303	42.3	40.3	-5.7
9	994.082	42.4	39.3	-14.7

Vertical

Signal No.	Freq (MHz)	Peak Amp (dBuV)	QP Amp (dBuV)	QP - Lim1 (dB)
1	124.271	27.4	25.4	-18.1
2	173.973	27.5	25.8	-17.7
3	223.680	32.9	31.5	-14.5
4	273.396	30.4	28.1	-17.9
5	323.105	38.5	37.4	-8.6
6	621.360	43.5	42.3	-3.7
7	671.100	39.3	37.1	-8.9
8	745.611	43.1	41.2	-4.8
9	770.474	42.3	39.9	-6.1
10	994.207	41.1	37.7	-16.3

Horizontal

Signal No.	Freq (MHz)	Peak Amp (dBuV)	AV Amp (dBuV)	AV - Lim1 (dB)
1	1093.715	39.9	34.3	-19.7
2	1342.317	42.2	37.9	-16.1
3	1441.732	41.0	36.1	-17.9
4	1855.875	43.7	40.0	-14.0

Vertical

Signal No.	Freq (MHz)	Peak Amp (dBuV)	AV Amp (dBuV)	AV - Lim1 (dB)
1	1093.756	42.2	38.7	-15.3
2	1441.659	42.4	38.0	-16.0
3	1491.383	40.8	36.4	-17.6
4	1690.257	41.6	37.4	-16.6

LIMITS:
15.209 limits are applicable in the restricted bands of 15.205 with the relevant detector.
15.249(a) harmonics must not exceed 500 (54dB) µV/m @ 3m.
15.249(d) other emissions, outside the intentional band, must be attenuated by at least 50dB from the level of the fundamental / meet the general limits of 15.209.
n.b. the general limits of 15.209 are quoted in the above tables and as drawn on the respective plots.

These show that the EUT has PASSED this test.

5.3.2.1 Test Equipment used

E410, E411, E412, TMS903, E003, E268, TMS82, TMS81, TMS78, TMS79
See Section 10 for more details

5.4 Frequency stability

Not applicable.
EUT is not for fixed, point-to-point operation, therefore no limits are specified.

5.5 Occupied bandwidth and band edge

5.5.1 Test Methods

Test Requirements FCC Part 15C, Reference (15.215)

Test Method: ANSI C63.10, Reference (6.9)

5.5.1.1 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 measurement antenna, with the attached antenna under test supported by a styrofoam block above the table. The EUT was measured at a distance of 3 metres. The antenna was scanned 1-4m in height in both Horizontal and Vertical polarisations. The EUT and its antenna were rotated in all three orthogonal planes. The EUT was operated in transmit modulated mode.

5.5.1.2 Test Procedure

Tests were made in accordance with FCC Part 15 using the measuring equipment noted below. A 1kHz RBW, 3x VBW, auto sweep time and max hold settings were used.

5.5.2 Test results

Tests were performed using Test Site **M**.

Temperature of test Environment: 17°C

Analyser plots for the 20dB bandwidth can be found in Section 6.4 of this report. See also section 6.5 of this report for delta marker plots at the band edge.

Channel	Result	Plot reference
Bottom	25.4kHz	J4751-1-031
Middle	26.4kHz	J4751-1-032
Top	26.6kHz	J4751-1-033

LIMITS: 15.215(c) The 20dB bandwidth of the emission must be contained within the designated frequency band.

The restricted band edges closest to the EUT frequency of 902-928MHz are 614 & 960MHz. Further wider span plots have been taken to show the fact that there are no spurious emissions above the restricted limits of 15.209.

These results show that the EUT has **PASSED** this test.

5.6.2.1 Test Equipment used

E410, E411, E412, TMS933
See Section 10 for more details.

6. Plots and Results

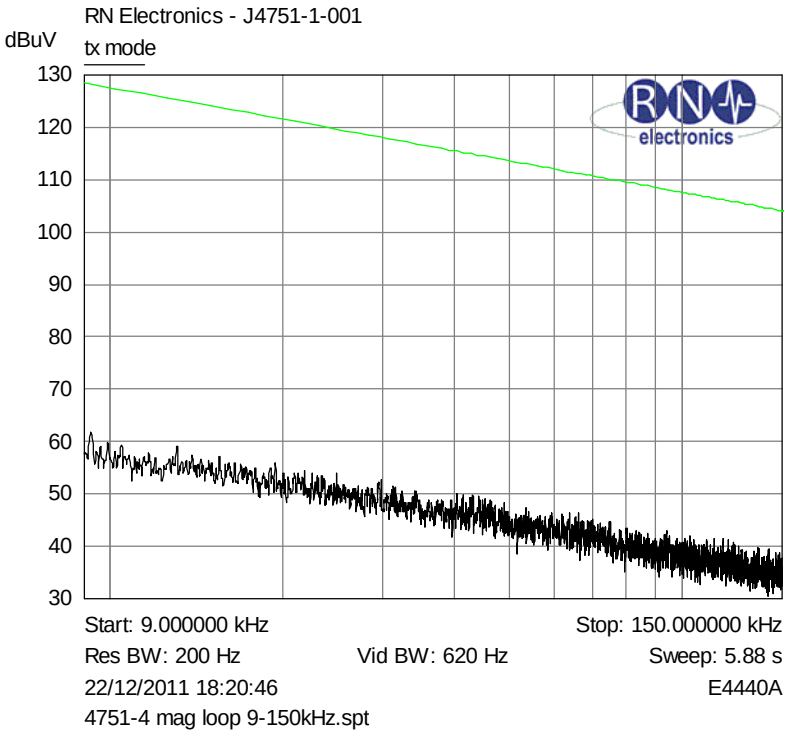
6.1 Conducted Emissions

Not applicable.

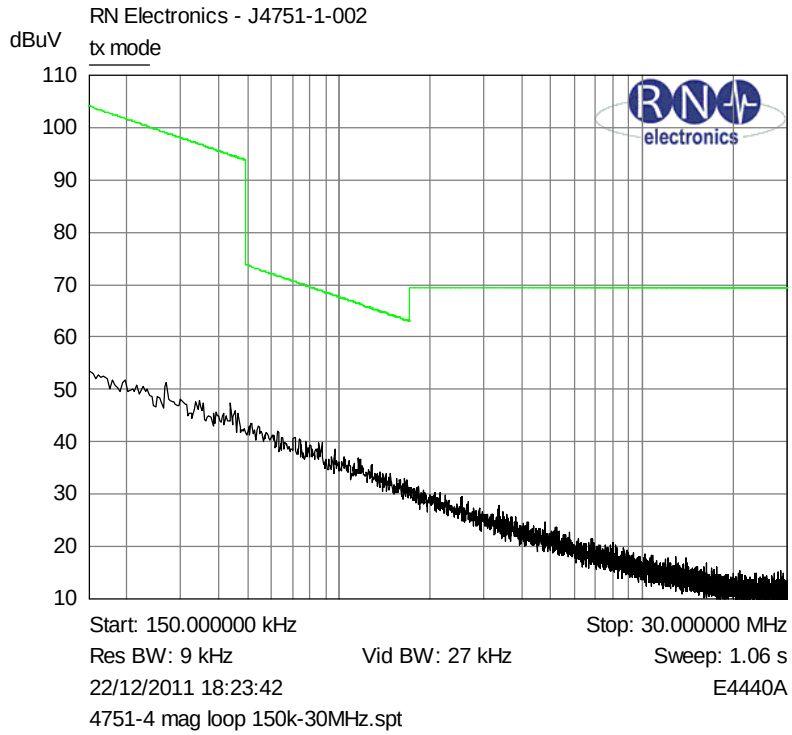
The manufacturer has declared that the EUT does not operate from the AC power lines nor contain provisions for operation while connected to AC power lines.

6.2 Radiated Emissions 9kHz – 1GHz

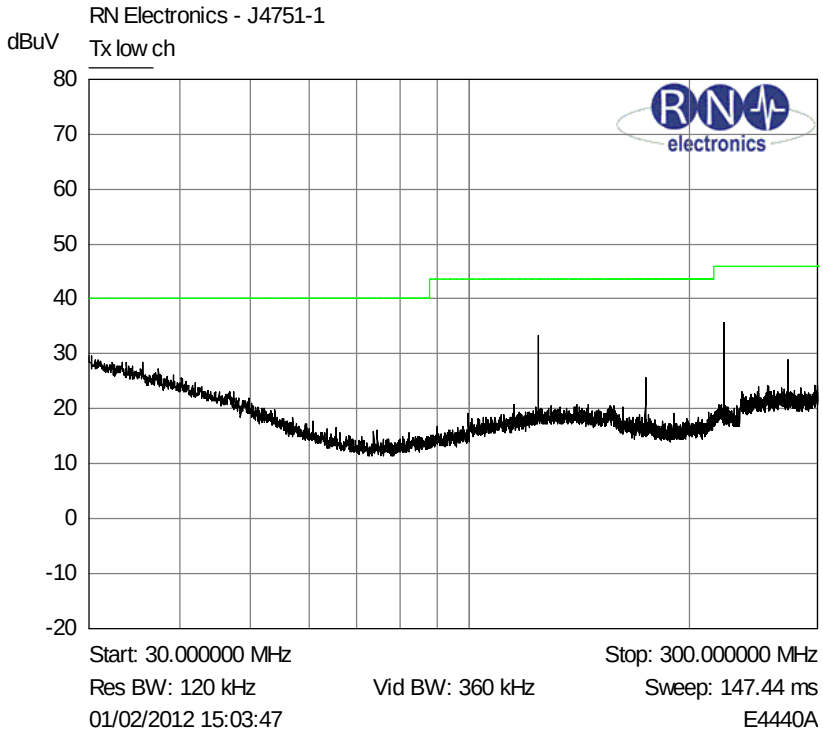
Worst case (low channel transmit) plots only shown. There were no other significant emissions in the other modes, except for the fundamental.



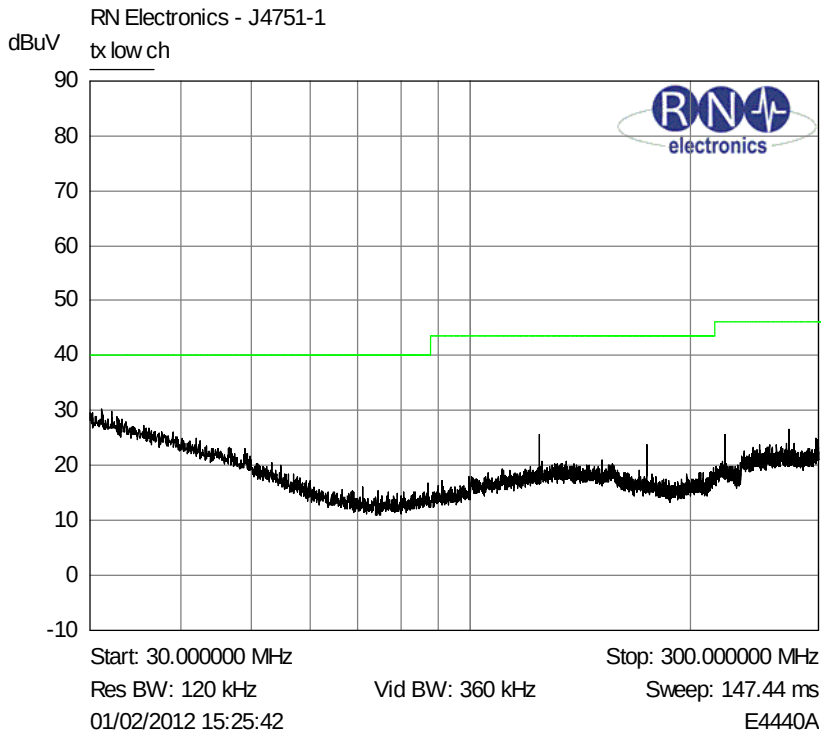
Plot of peak emissions 9kHz – 150kHz against the quasi-peak limit line.



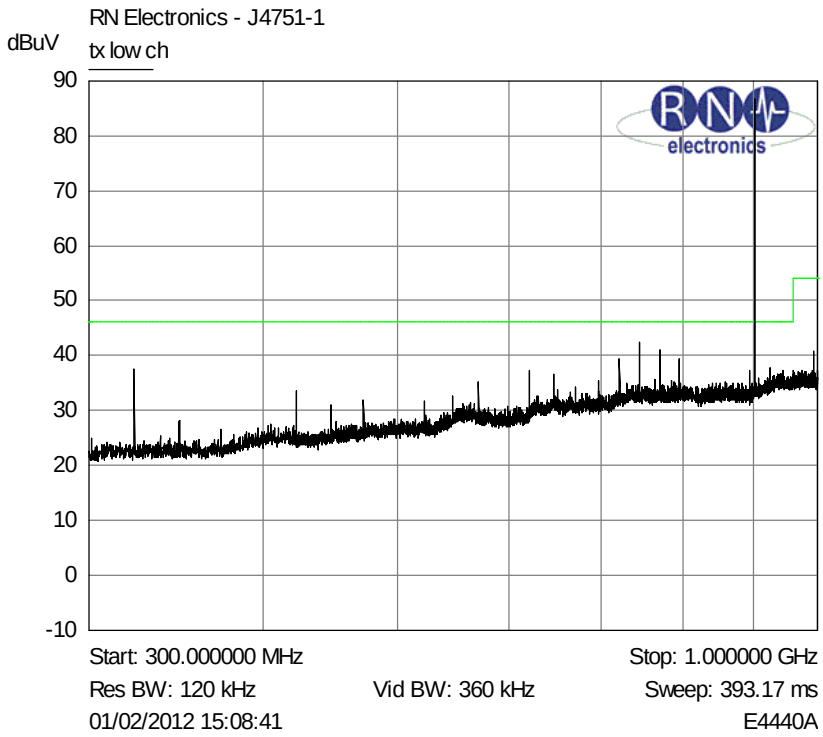
Plot of peak emissions 150kHz - 30MHz against the quasi-peak limit line.



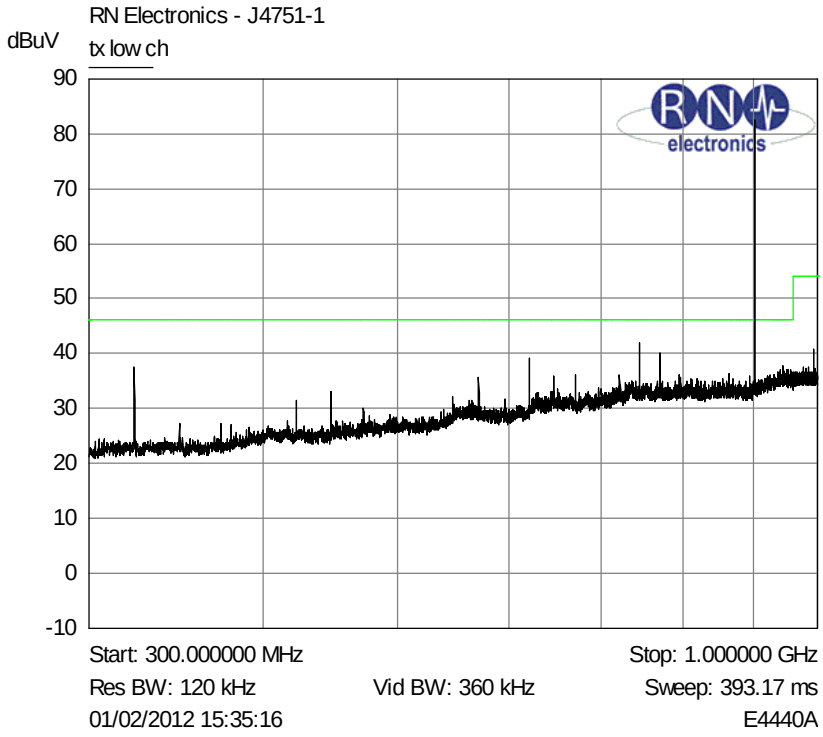
Plot of peak horizontal emissions 30MHz - 300MHz against the quasi-peak limit line.



Plot of peak vertical emissions 30MHz - 300MHz against the quasi-peak limit line.



Plot of peak horizontal emissions 300MHz - 1GHz against the quasi-peak limit line.

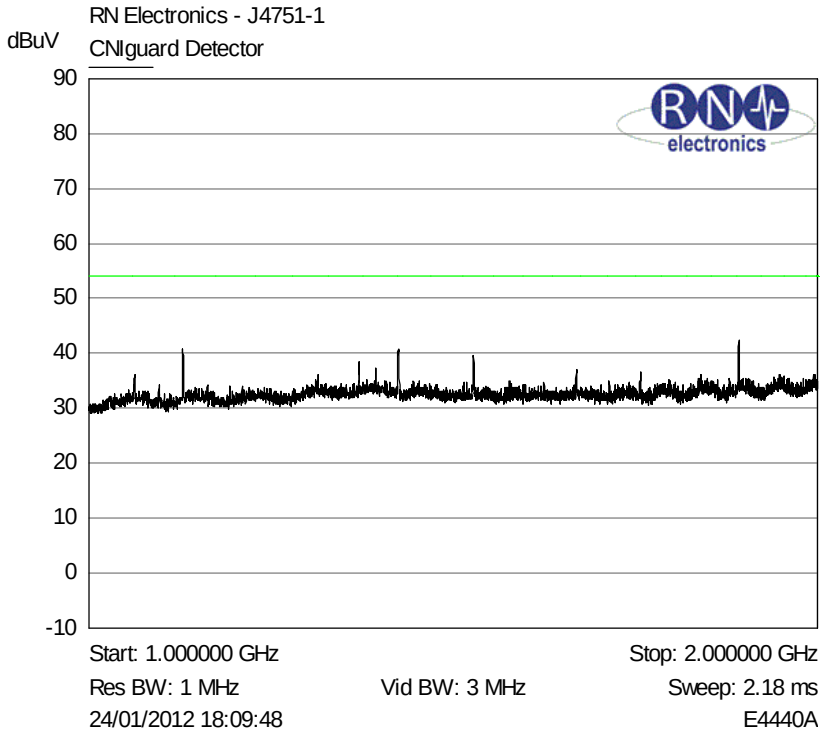


Plot of peak vertical emissions 300MHz - 1GHz against the quasi-peak limit line.

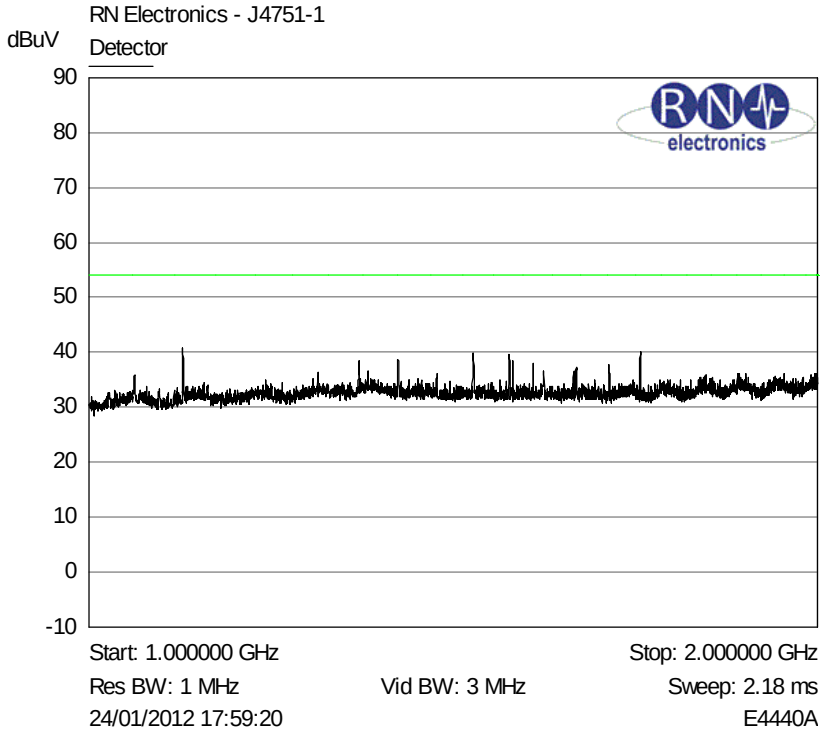
6.3 Radiated Emissions above 1GHz

Worst case (low channel transmit) plots only shown. There were no other significant emissions in the other modes, except for the fundamental.

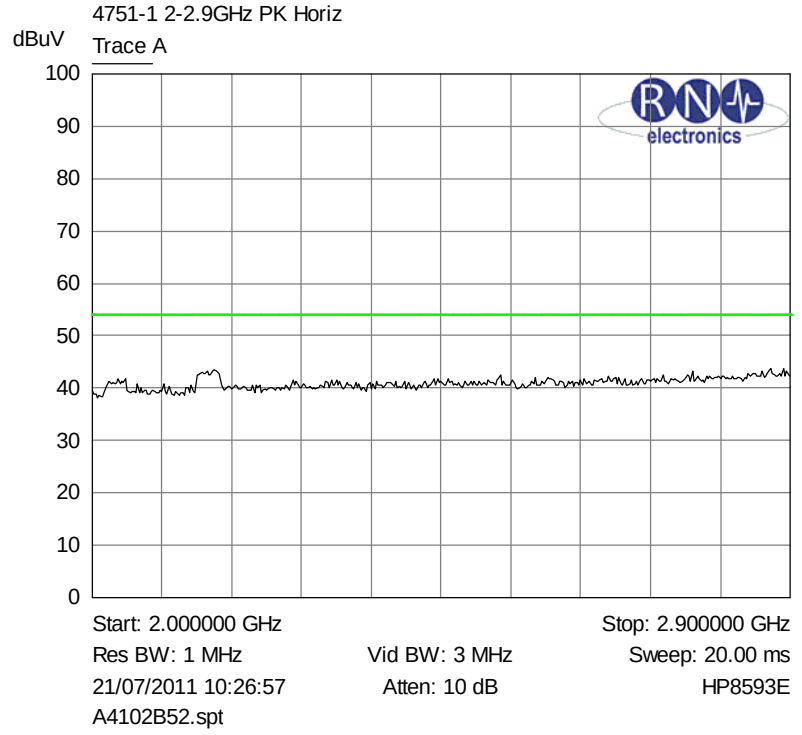
Horizontal peak plot against avg limit line:



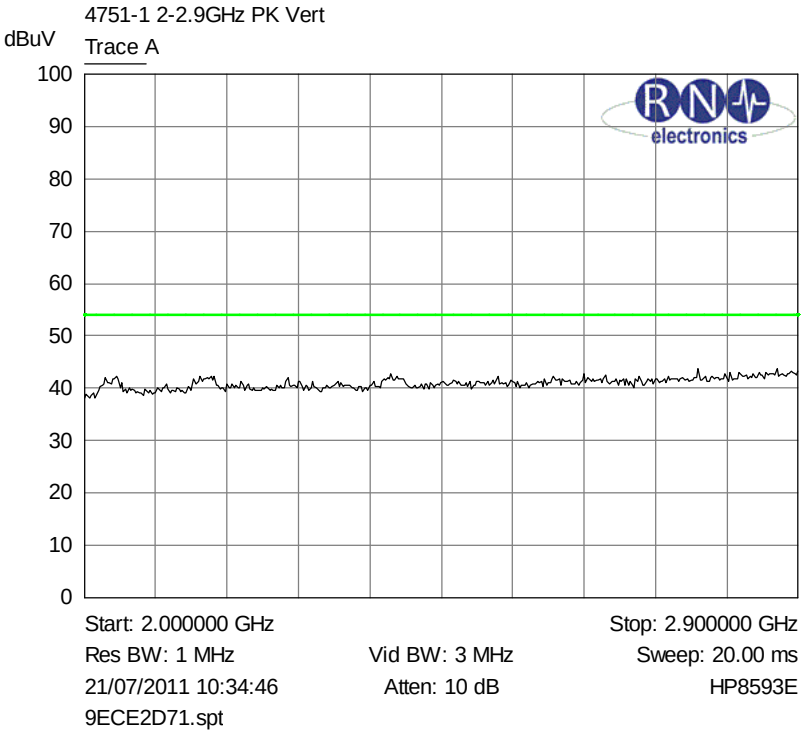
Vertical peak plot against avg limit line:



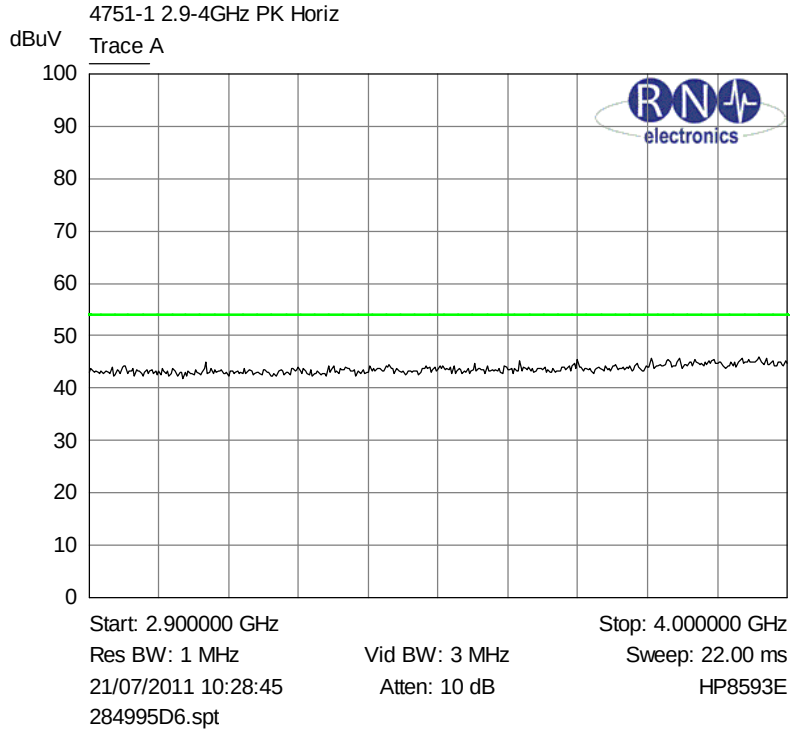
Horizontal peak plot against avg limit line:



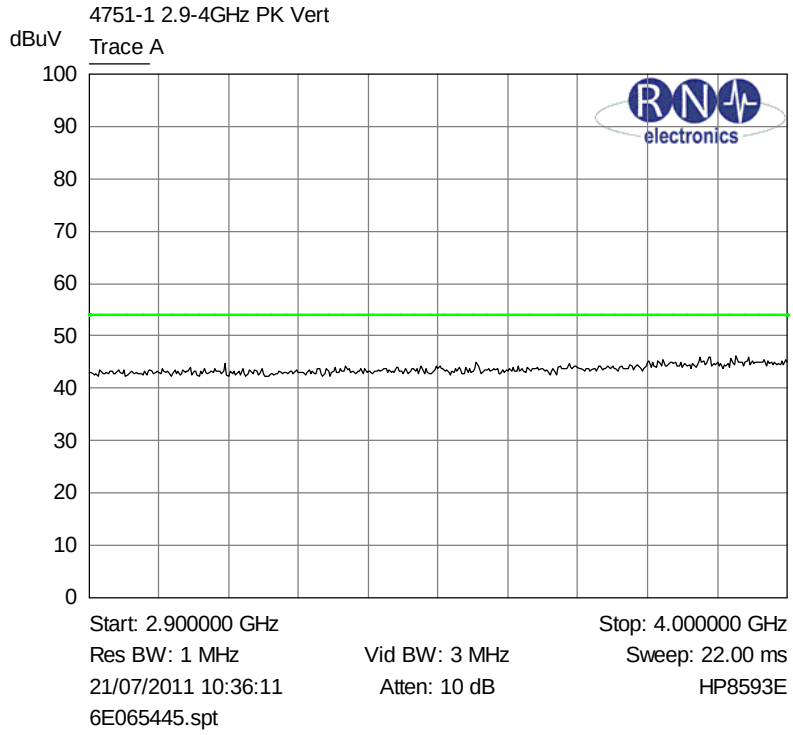
Vertical peak plot against avg limit line:

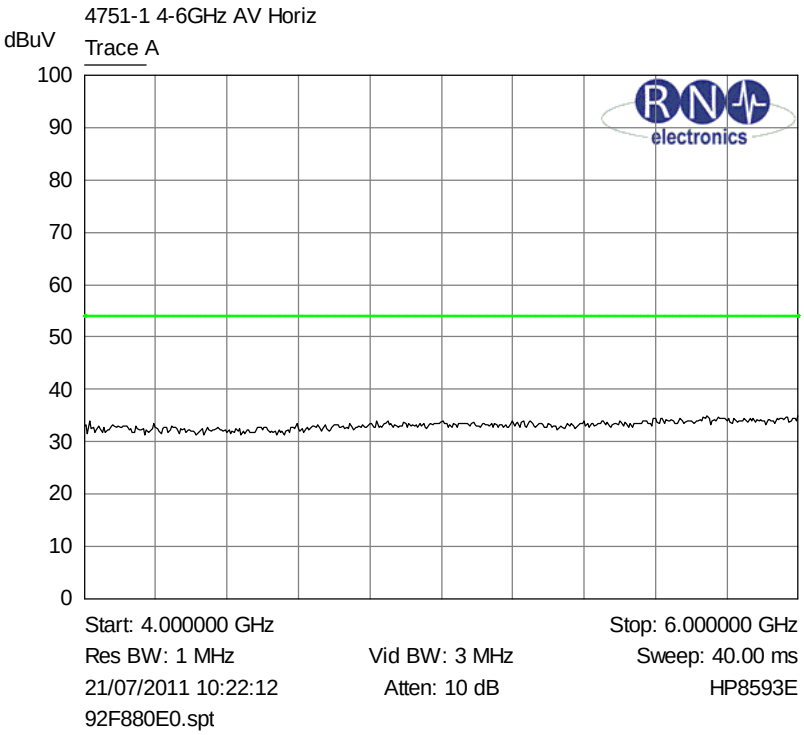


Horizontal peak plot against avg limit line:



Vertical peak plot against avg limit line:




4751-1 4-6GHz AV Horiz
Trace A
dBuV
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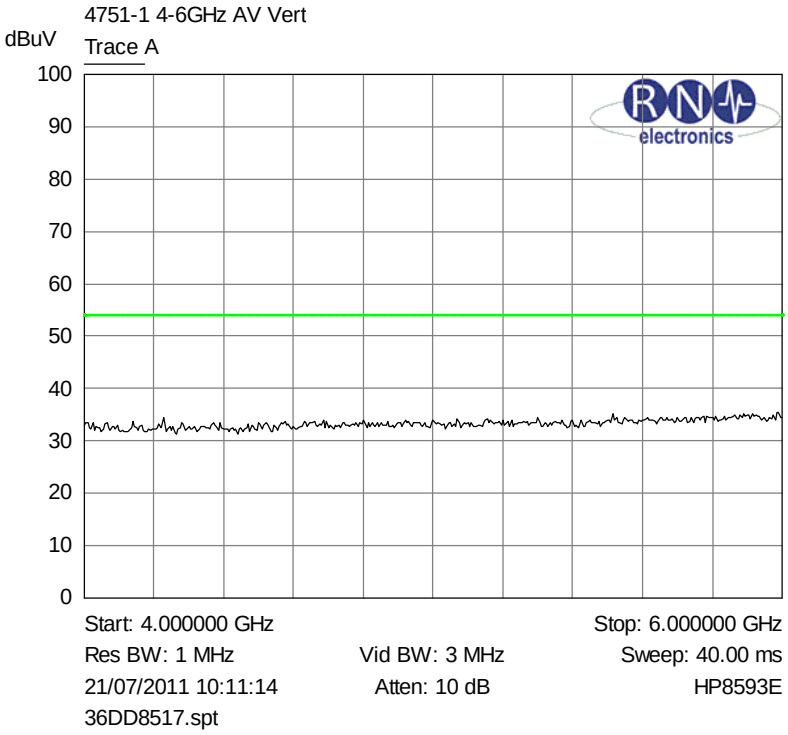
30
20
10
0
Start: 4.000000 GHz
Res BW: 1 MHz
21/07/2011 10:22:12
92F880E0.spt
Vid BW: 3 MHz
Atten: 10 dB
Stop: 6.000000 GHz
Sweep: 40.00 ms
HP8593E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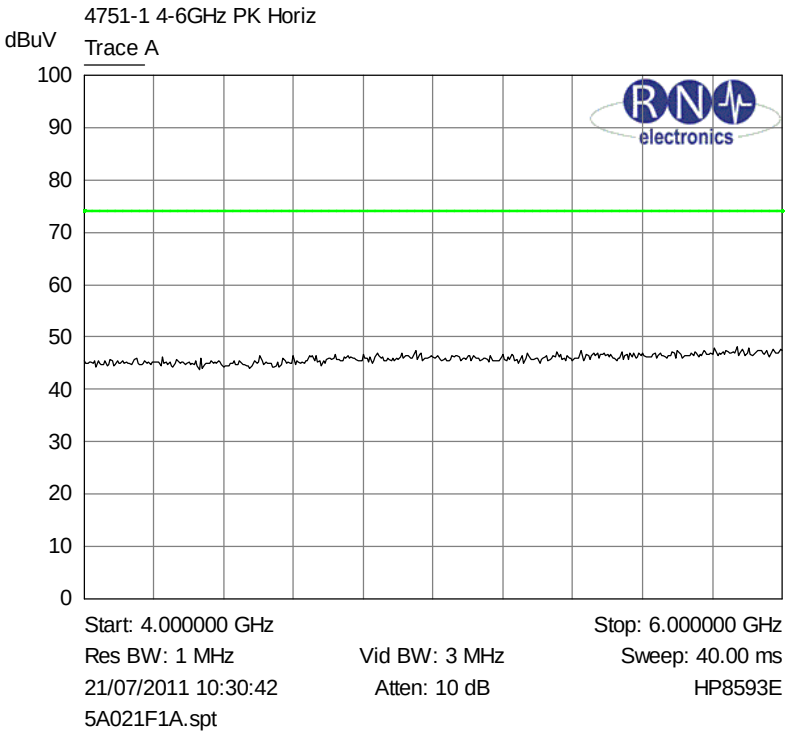
36DD8517.spt
Vid BW: 3 MHz
Atten: 10 dB
Stop: 6.000000 GHz
Sweep: 40.00 ms
HP8593E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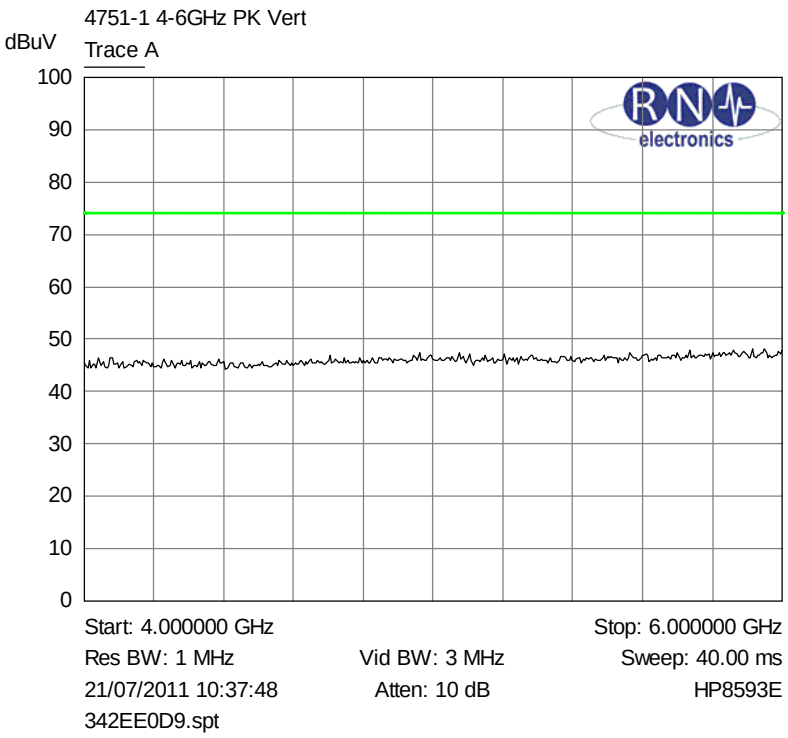
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Stop: 6.000000 GHz
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Sweep: 40.00 ms
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Atten: 10 dB
HP8593E
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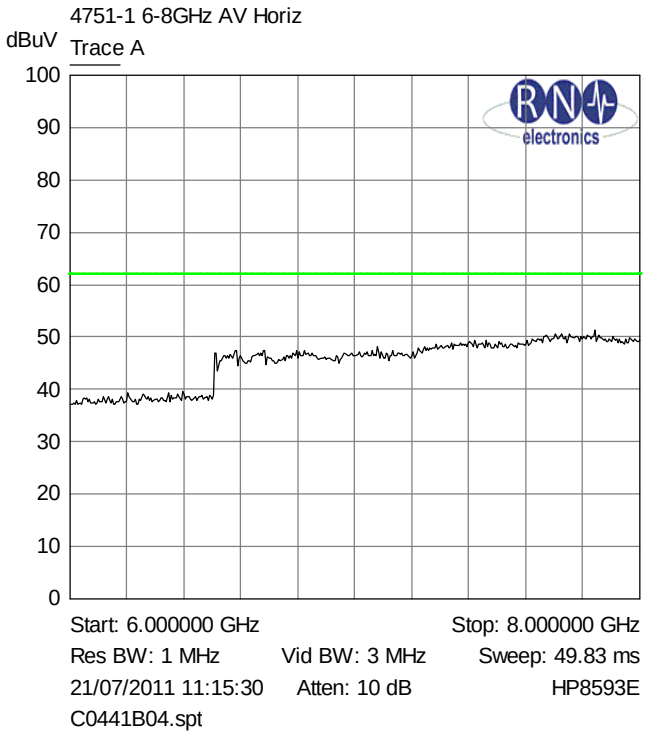
4751-1 6-8GHz AV Horiz
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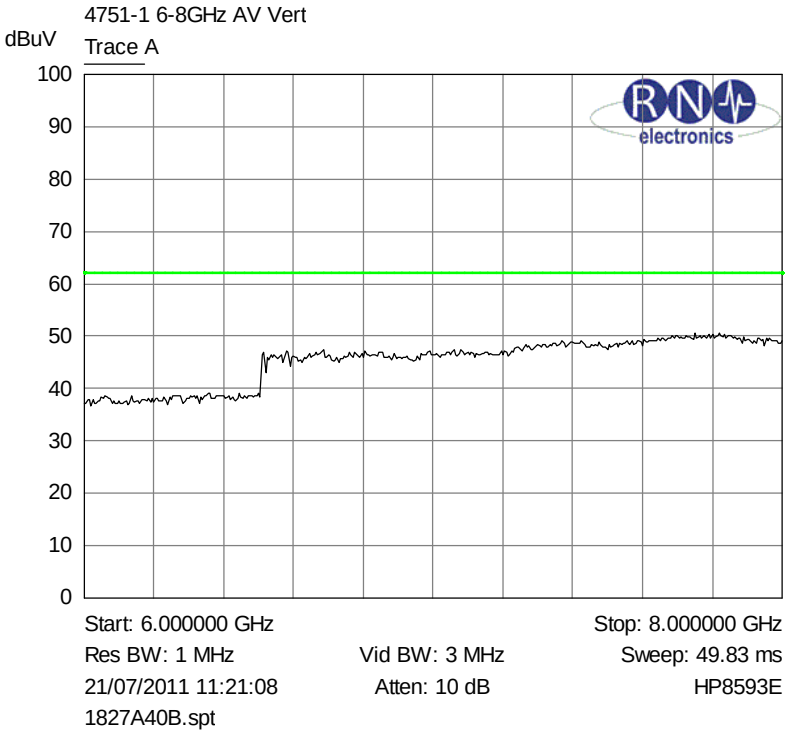
electronics
Start: 6.000000 GHz
Stop: 8.000000 GHz
Res BW: 1 MHz
Vid BW: 3 MHz
Sweep: 49.83 ms
21/07/2011 11:15:30
Atten: 10 dB
HP8593E
C0441B04.spt


4751-1 6-8GHz AV Vert
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Start: 6.000000 GHz
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Atten: 10 dB
HP8593E
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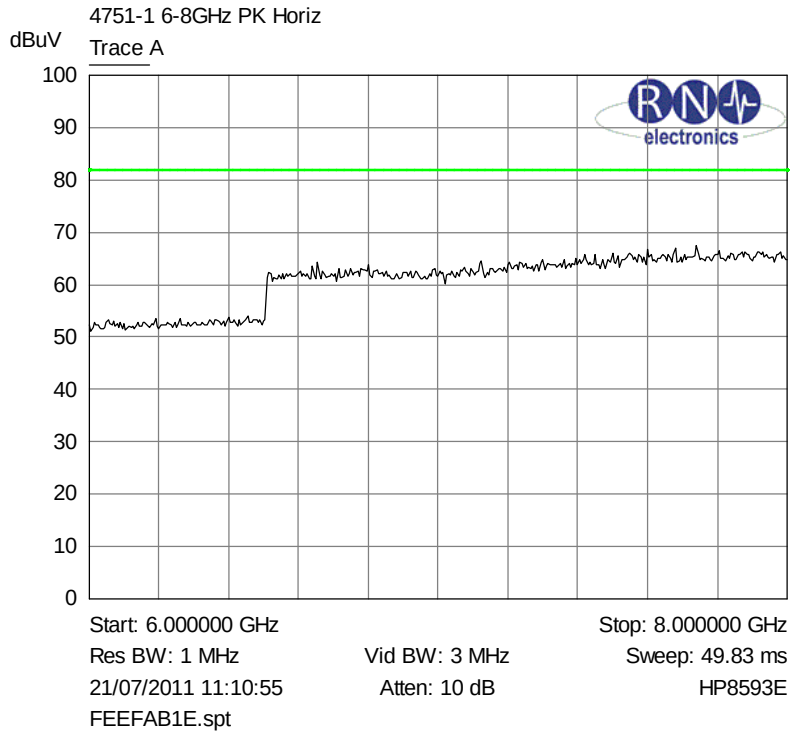
4751-1 6-8GHz PK Horiz
Trace A
dBuV
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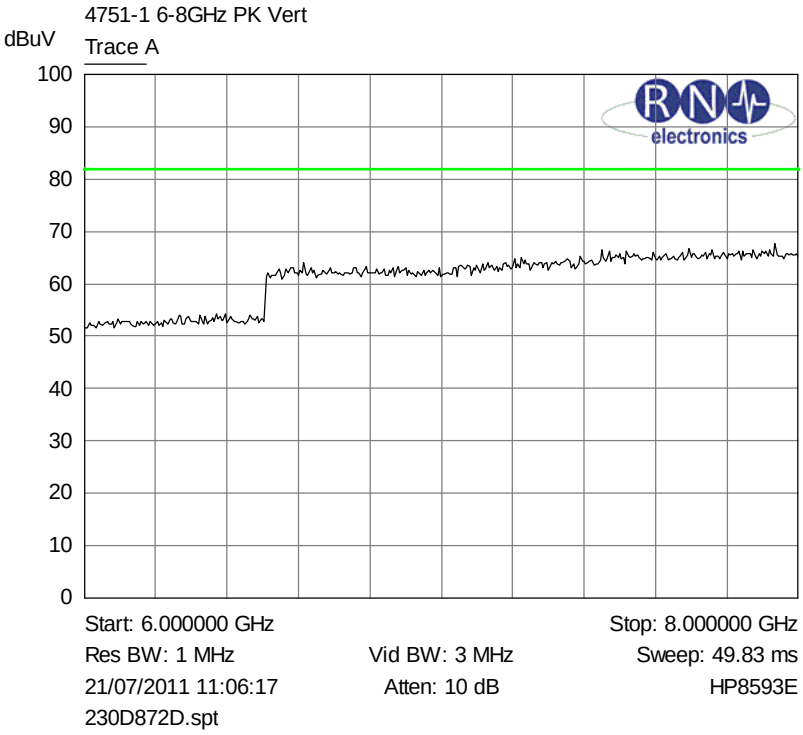
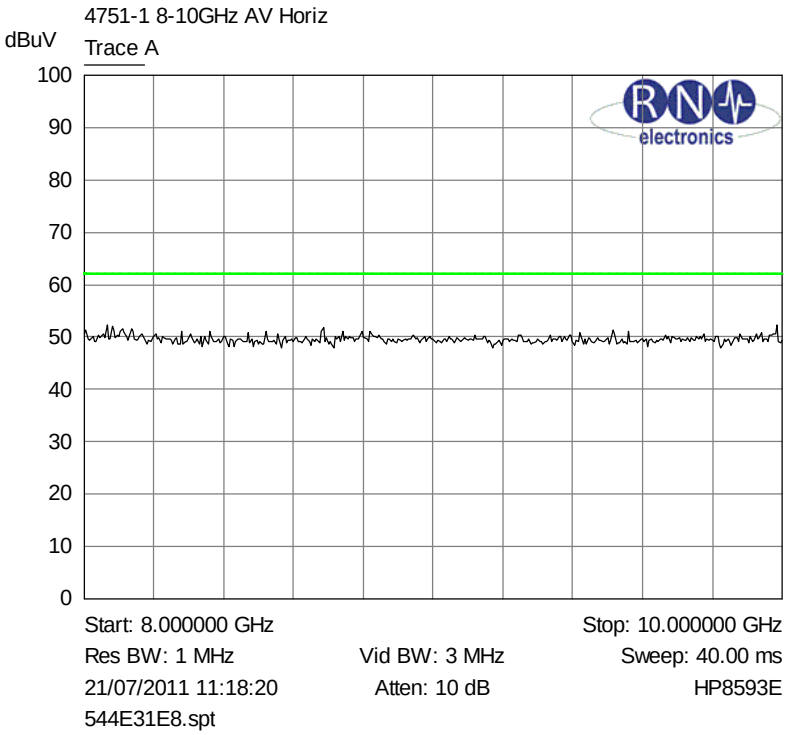
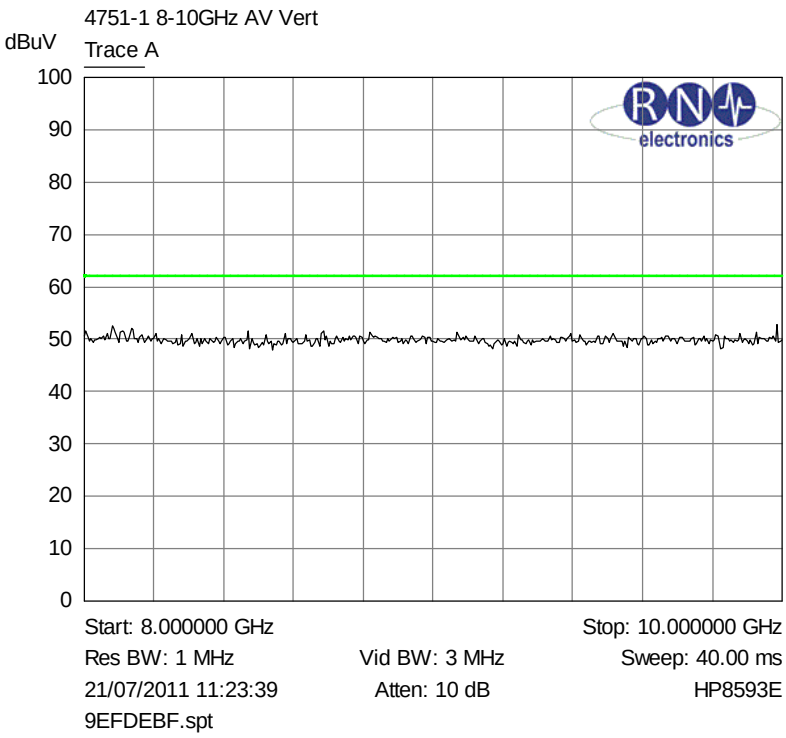
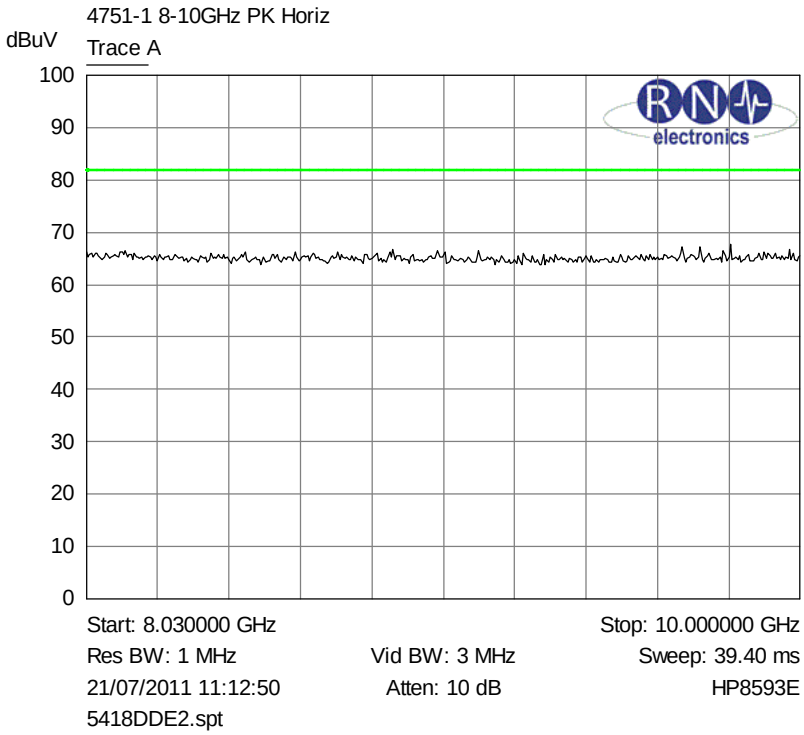
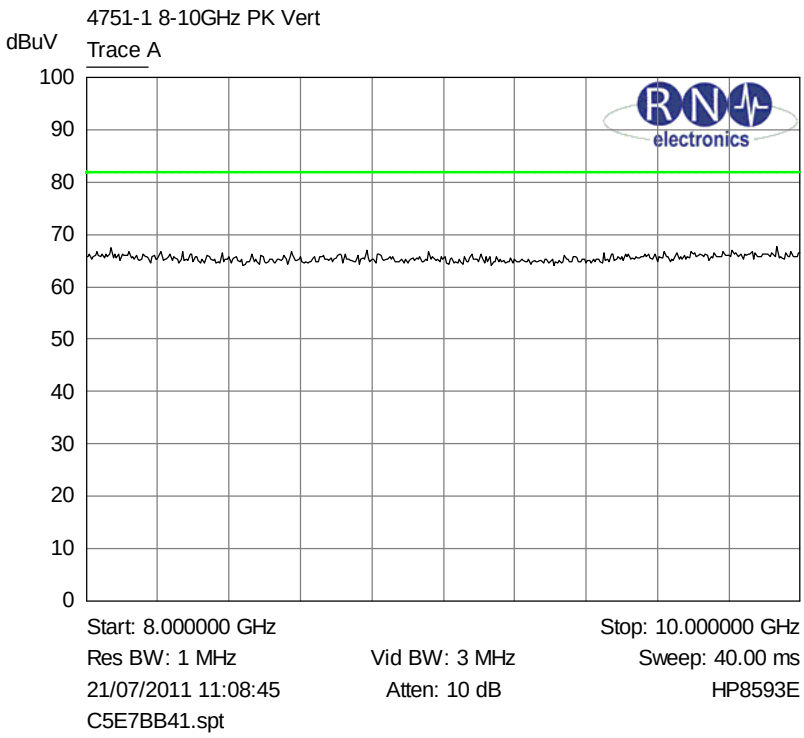
Start: 6.000000 GHz
Res BW: 1 MHz
21/07/2011 11:10:55
FEEFAB1E.spt
Vid BW: 3 MHz
Atten: 10 dB
Stop: 8.000000 GHz
Sweep: 49.83 ms
HP8593E

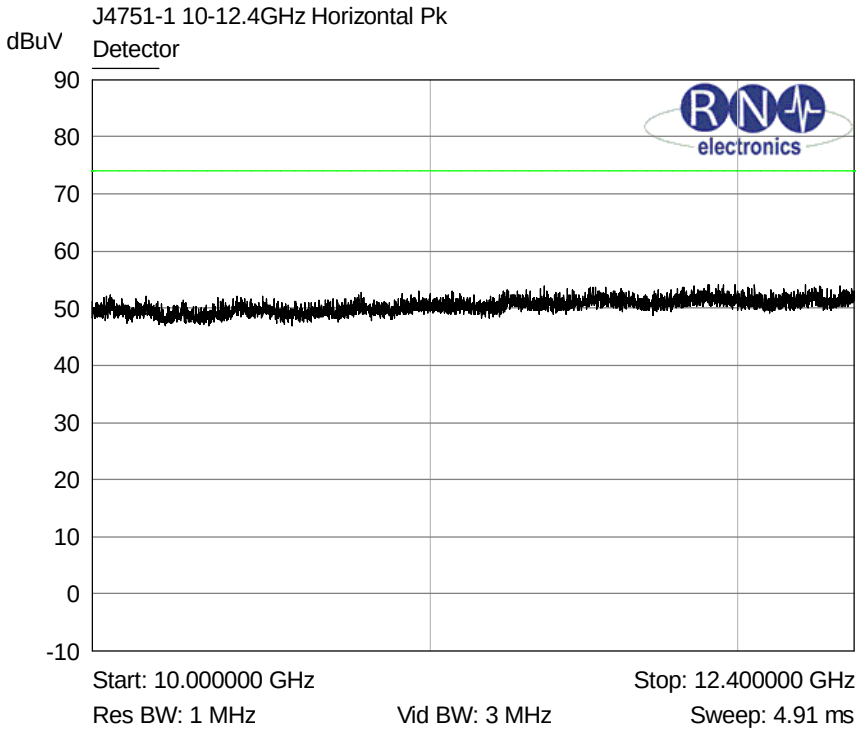

4751-1 6-8GHz PK Vert
Trace A
dBuV
100
90
80
70
60
50
40
30
20
10
0
Start: 6.000000 GHz
Res BW: 1 MHz
21/07/2011 11:06:17
230D872D.spt
Vid BW: 3 MHz
Atten: 10 dB
Stop: 8.000000 GHz
Sweep: 49.83 ms
HP8593E

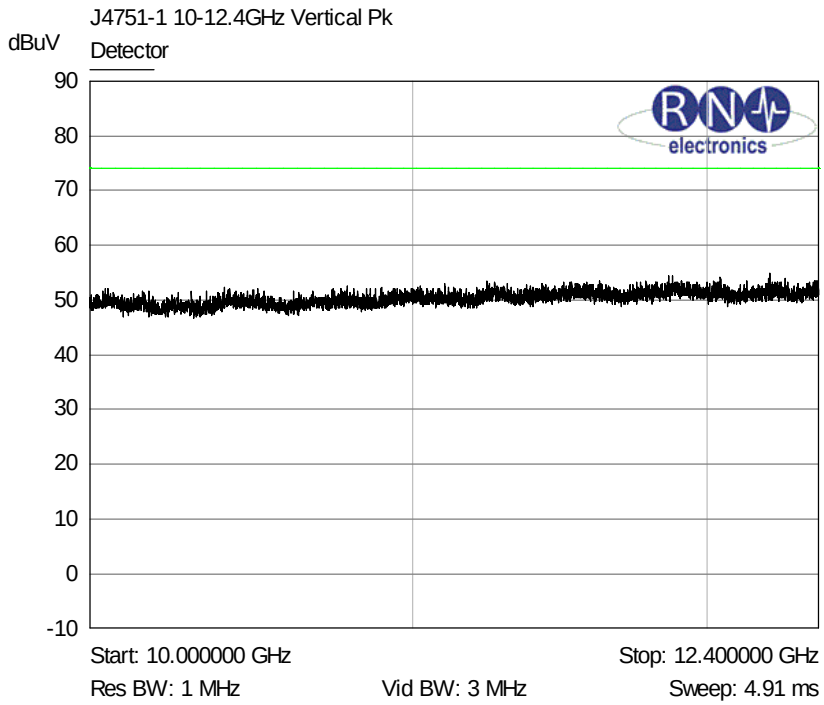

4751-1 8-10GHz AV Horiz
Trace A
dBuV
100
90
80
70
60
50
40
30
20
10
0
Start: 8.000000 GHz
Stop: 10.000000 GHz
Res BW: 1 MHz
Vid BW: 3 MHz
Sweep: 40.00 ms
21/07/2011 11:18:20
Atten: 10 dB
HP8593E
544E31E8.spt

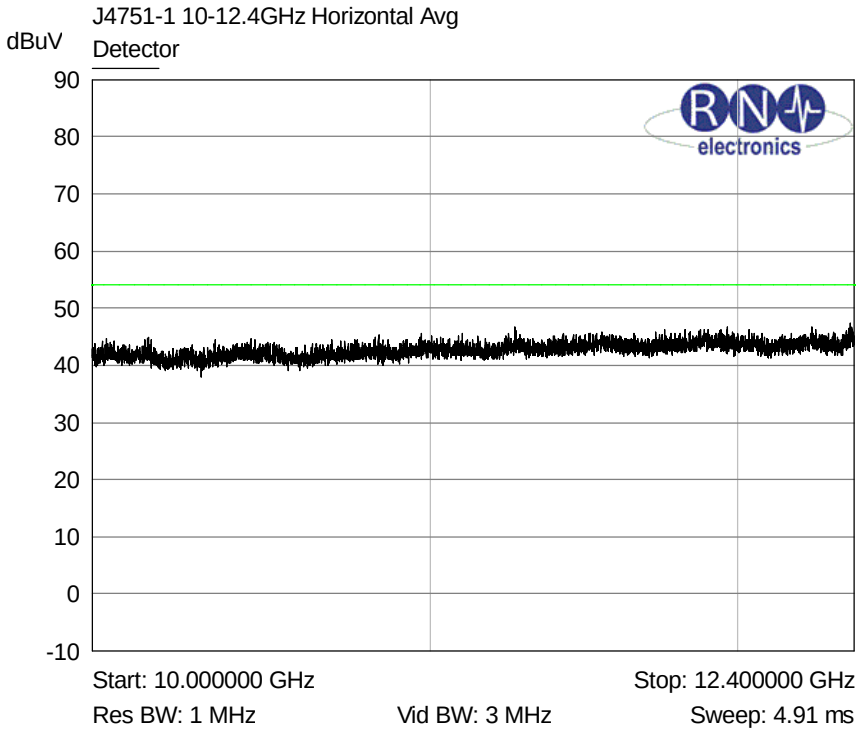

4751-1 8-10GHz AV Vert
Trace A
dBuV
100
90
80
70
60
50
40
30
20
10
0
Start: 8.000000 GHz
Stop: 10.000000 GHz
Res BW: 1 MHz
Vid BW: 3 MHz
Sweep: 40.00 ms
21/07/2011 11:23:39
Atten: 10 dB
HP8593E
9EFDEBF.spt

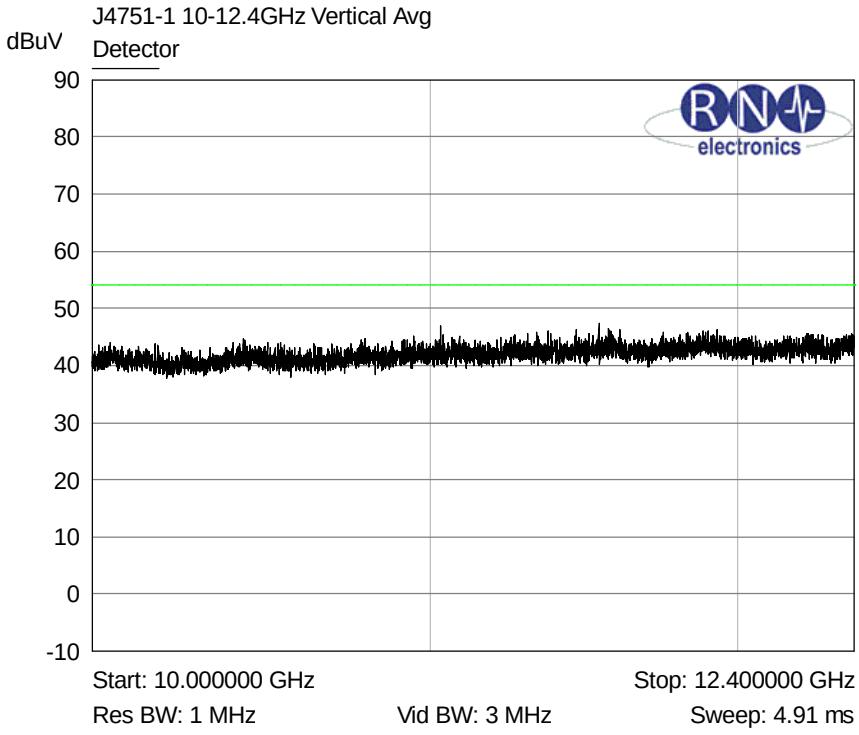

4751-1 8-10GHz PK Horiz
Trace A
dBuV
100
90
80
70
60
50
40
30
20
10
0
Start: 8.030000 GHz
Stop: 10.000000 GHz
Res BW: 1 MHz
Vid BW: 3 MHz
Sweep: 39.40 ms
21/07/2011 11:12:50
Atten: 10 dB
HP8593E
5418DDE2.spt


4751-1 8-10GHz PK Vert
Trace A
dBuV
100
90
80
70
60
50
40
30
20
10
0
Start: 8.000000 GHz
Stop: 10.000000 GHz
Res BW: 1 MHz
Vid BW: 3 MHz
Sweep: 40.00 ms
21/07/2011 11:08:45
Atten: 10 dB
HP8593E
C5E7BB41.spt

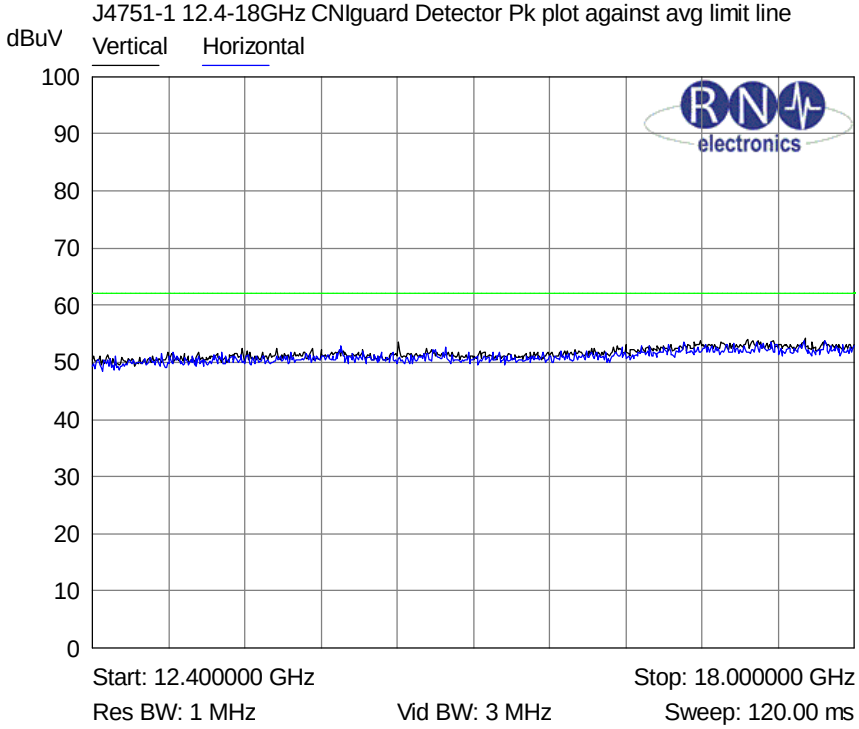

J4751-1 10-12.4GHz Horizontal Pk
Detector
dBuV
90
80
70
60
50
40
30
20
10
0
-10
Start: 10.000000 GHz
Stop: 12.400000 GHz
Res BW: 1 MHz
Vid BW: 3 MHz
Sweep: 4.91 ms


J4751-1 10-12.4GHz Vertical Pk
Detector
dBuV
90
80
70
60
50
40
30
20
10
0
-10
Start: 10.000000 GHz
Stop: 12.400000 GHz
Res BW: 1 MHz
Vid BW: 3 MHz
Sweep: 4.91 ms

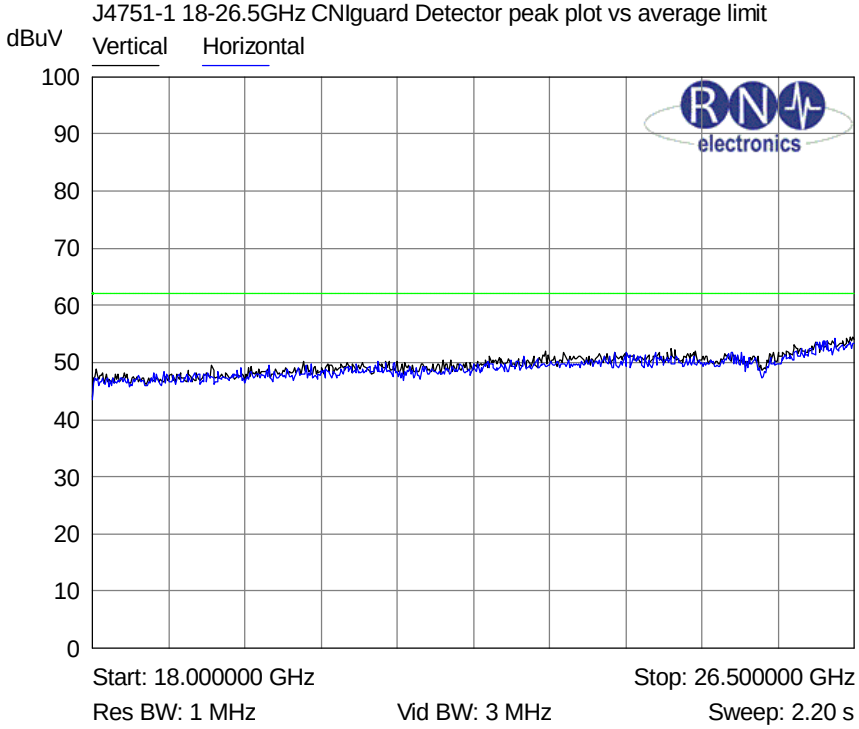

J4751-1 10-12.4GHz Horizontal Avg
Detector
dBuV
90
80
70
60
50
40
30
20
10
0
-10
Start: 10.000000 GHz
Stop: 12.400000 GHz
Res BW: 1 MHz
Vid BW: 3 MHz
Sweep: 4.91 ms


J4751-1 10-12.4GHz Vertical Avg
Detector
dBuV
90
80
70
60
50
40
30
20
10
0
-10
Start: 10.000000 GHz
Stop: 12.400000 GHz
Res BW: 1 MHz
Vid BW: 3 MHz
Sweep: 4.91 ms

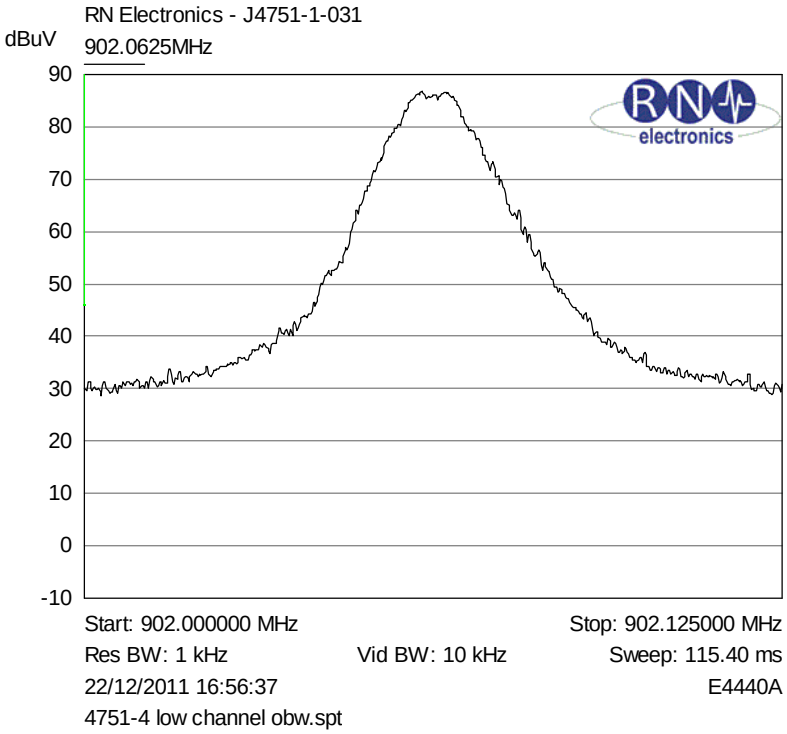
J4751-1 12.4-18GHz CNIguard Detector Pk plot against avg limit line

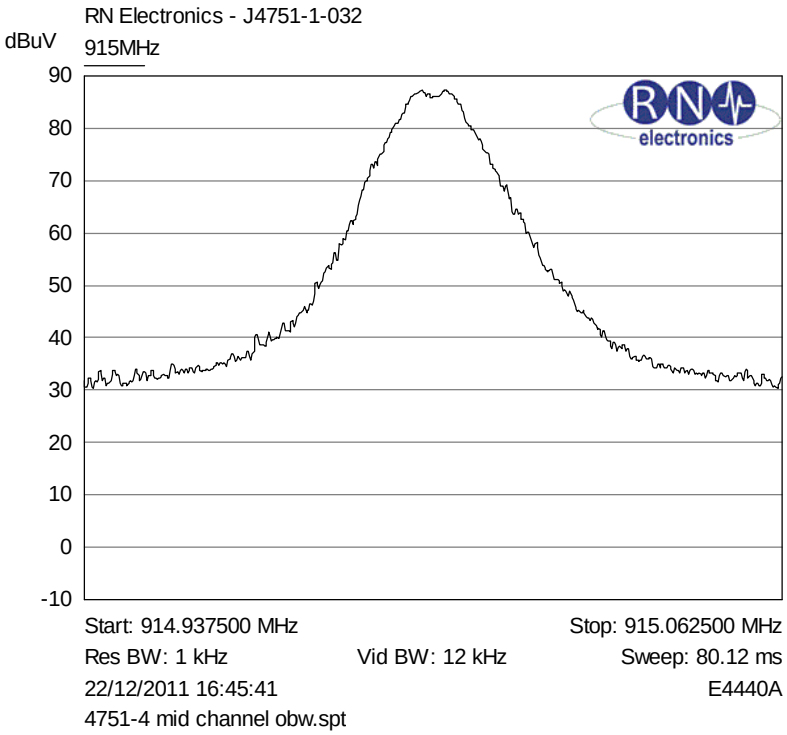


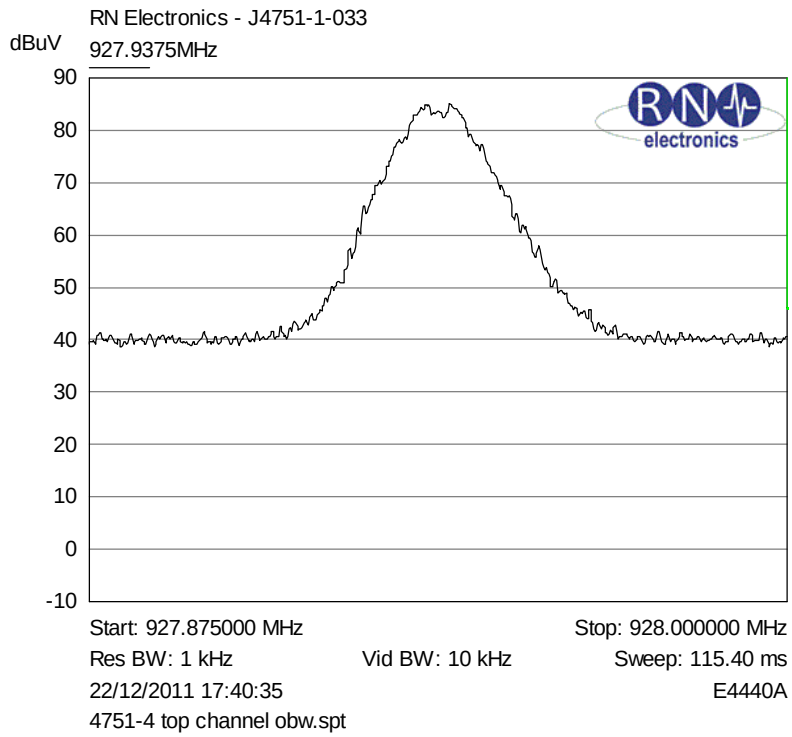
J4751-1 18-26.5GHz CNIguard Detector peak plot vs average limit



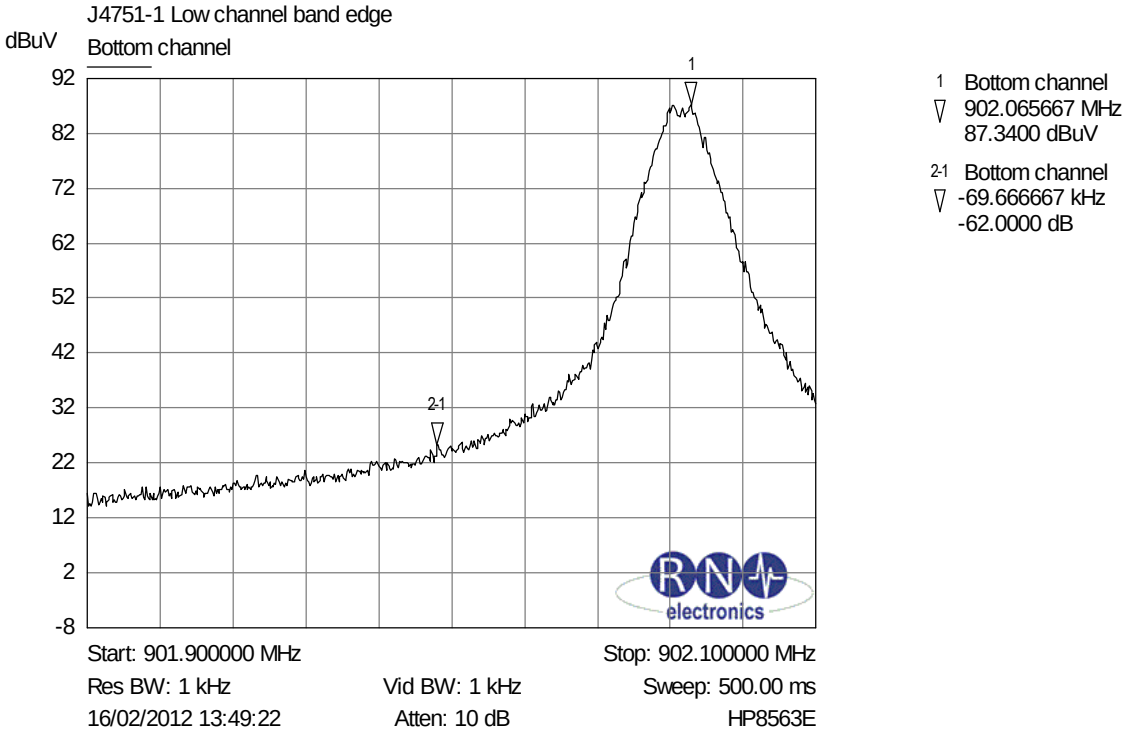
6.4 Fundamental Emissions / 20dB Bandwidth

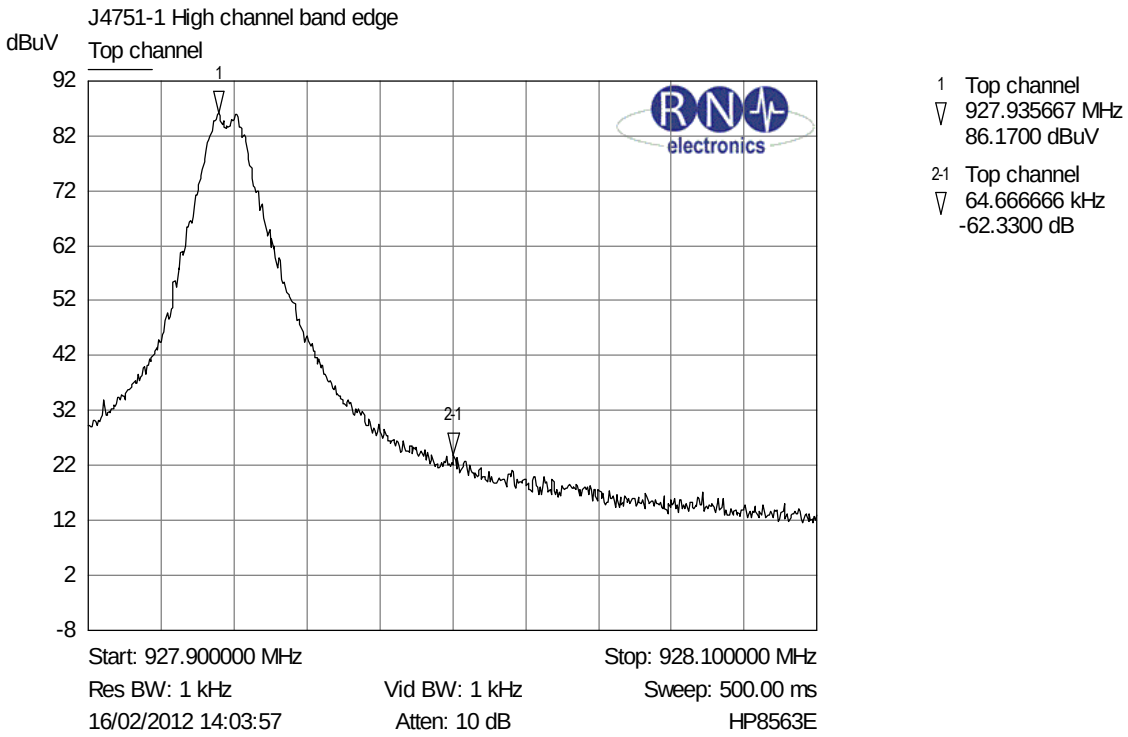






6.5 Band edge compliance





1 Top channel
927.935667 MHz
86.1700 dBuV

2-1 Top channel
64.666666 kHz
-62.3300 dB

7 Explanatory Notes

7.1 Explanation of Table of Signals Measured

Measurements are made as required by the standard. These measurements are made and recorded using detectors, either peak, quasi peak or average dependant on the test. A table of results has been given following the relevant plots. This table looks similar to the one illustrated below dependant on the measurements required by the test: -

Signal No.	Freq (MHz)	Peak Amp (dBuV)	Pk – Lim 1 (dB)	QP Amp (dBuV)	QP - Lim1 (dB)	Av Amp (dBuV)	Av - Lim1 (dB)
1	12345	54.9	-10.5	48.0	-12.6	37.6	-14.4

Column One - Labelled Signal No. is an incremental number that the receiver has given to each signal that has been measured.

Column Two - Labelled Freq (MHz) is the approximate frequency of the signal received.

Column Three - Labelled Peak Amp (dBμV) is the level of received signal that was measured in dB above 1μV using the peak detector.

Column Four - Labelled Pk - Lim1 (dB) is the difference in level from the peak signal given to the active limit line. If this column appears in the table the peak detector measurement is required by the standard for this test. The results entered in this column indicate the signal level relative to the compliance limit required. Negative numbers indicate that the product is compliant.

Column Five - Labelled QP Amp (dBμV) is the level of received signal that was measured in dB above 1μV using the quasi-peak detector.

Column Six - Labelled QP - Lim1 (dB) is the difference in level from the quasi-peak signal given to the active limit line. If this column appears in the table the quasi-peak detector measurement is required by the standard for this test. The results entered in this column indicate the signal level relative to the compliance limit required. Negative numbers indicate that the product is compliant.

Column Seven - Labelled Av Amp (dBμV) is the level of received signal that was measured in dB above 1μV using the average detector.

Column Eight - Labelled Av - Lim1 (dB) is the difference in level from the average signal given to the active limit line. If this column appears in the table the average detector measurement is required by the standard for this test. The results entered in this column indicate the signal level relative to the compliance limit required. Negative numbers indicate that the product is compliant.

Only signals highlighted in red are deemed to exceed the limit of the detector required.

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:

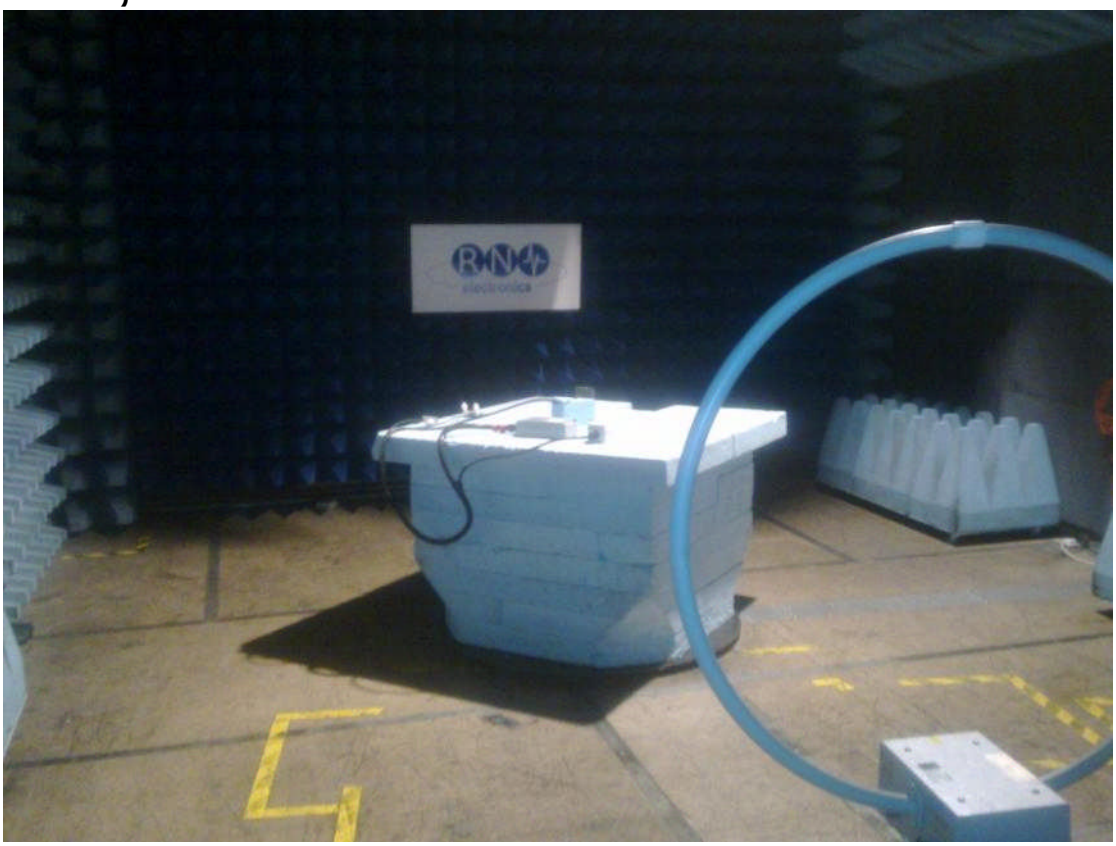
(a) limit of 500 μV/m equates to 20.log (500) = 54 dB μV/m at 3m
OR 20.log(500) * 20.log(3/1.2) = 62 dBuV/m at 1.2m.

(b) limit of 300 μV/m at 10m equates to 20.log (300 . 10/3) = 60 dB μV/m at 3m

(c) limit of 30 μV/m at 30m, but below 30MHz, equates to 20.log(30) + 40.log(30/3) = 69.5 dBμV/m at 3m, as extrapolation factor below 30MHz is 40dB/decade per 15.31(f)(2).

8. Photographs

Photographs of the EUT as viewed from in front of the antenna, site M:




RN
electronics
SCHAFFNER

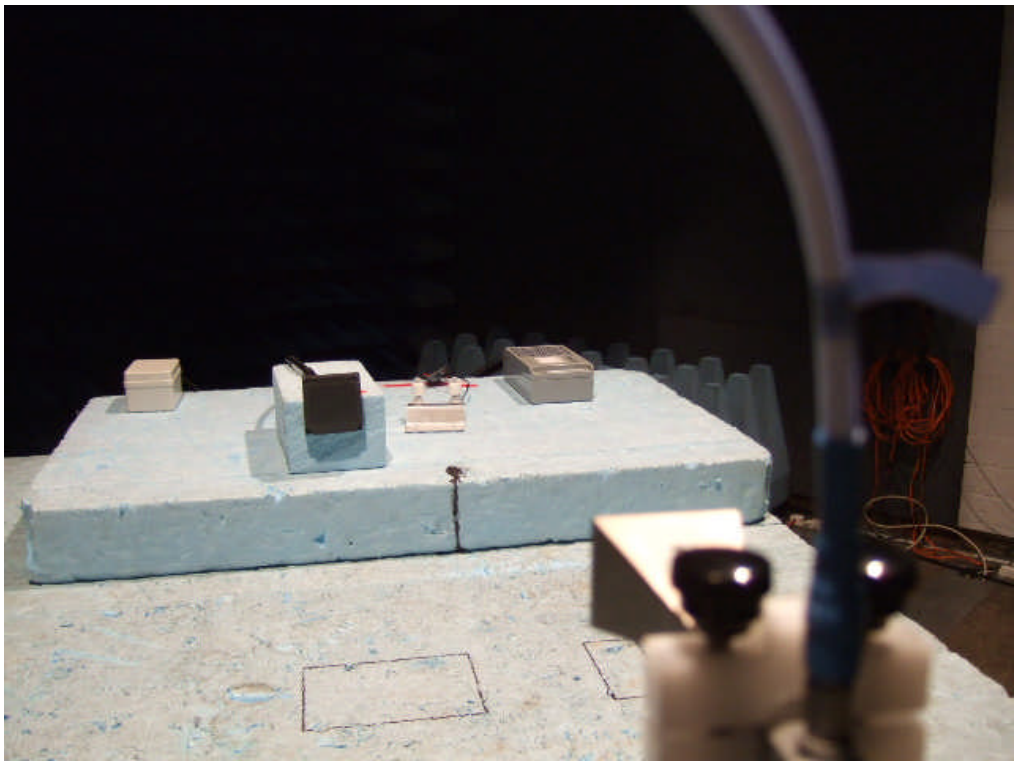
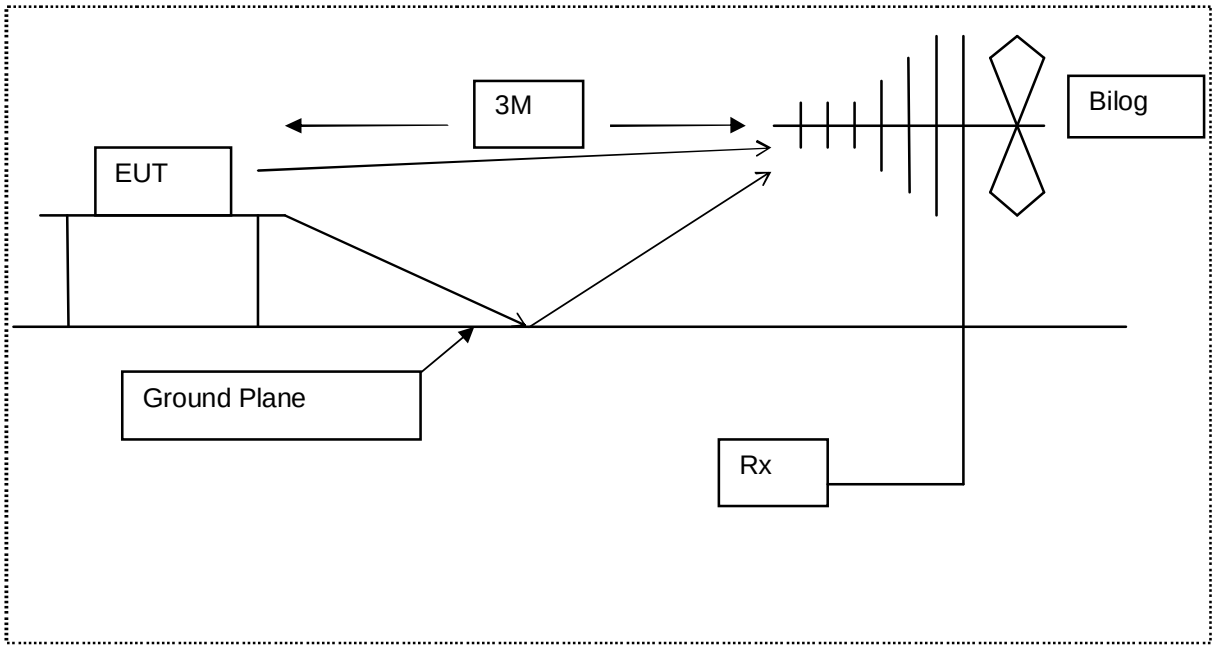
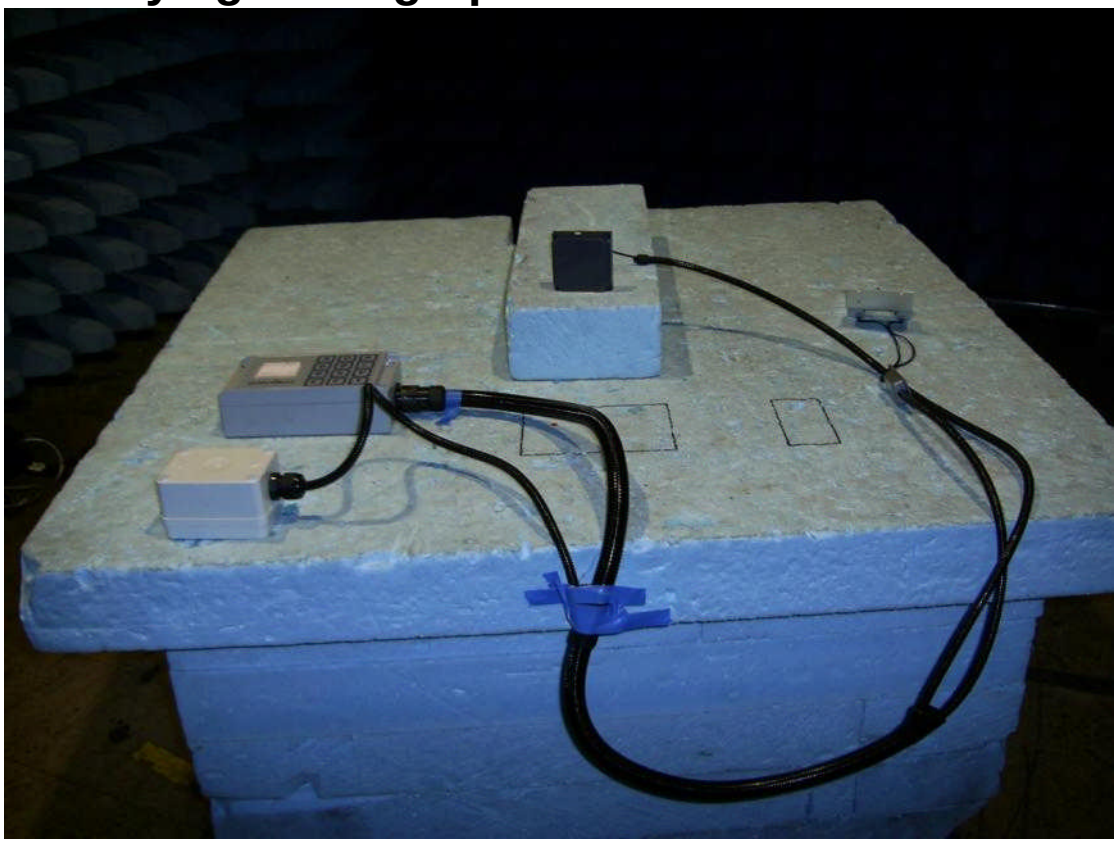


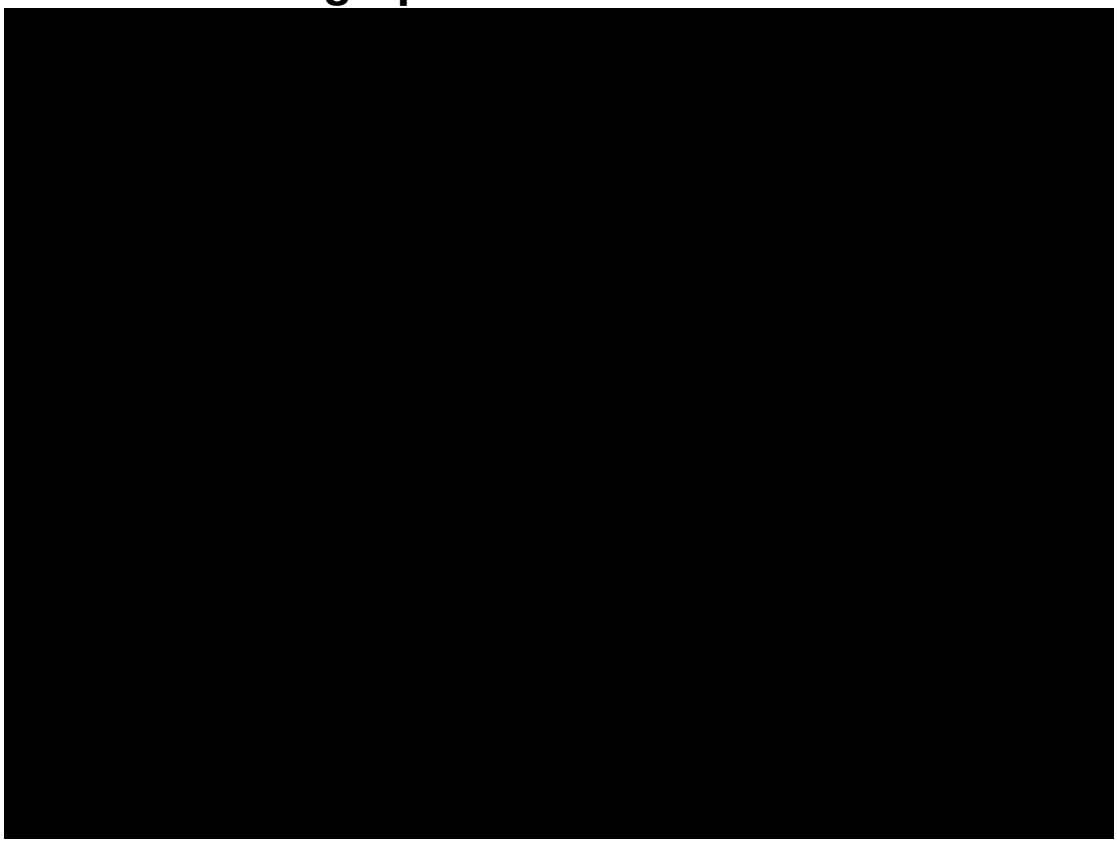
Diagram of the radiated emissions test setup 30MHz – 1GHz:



Identifying Photographs of the EUT:



Internal Photographs of the EUT:



9. Signal Leads

Port Name	Cable Type
Input	Moulded plastic tube cable harness with antenna, sensor and battery inputs

10. Test Equipment Calibration list

The following table lists the test equipment used, last calibration date and calibration interval. All test equipment used has been maintained within the calibration requirements of ***R.N. Electronics Ltd.*** test facility quality system. Calibration intervals are regularly reviewed dependent on equipment manufacturer's recommendations and actual usage of the equipment.

RNNo	Model	Description	Manufacturer	Date Calibra	Period
E268	BHA 9118	1-18 GHz Horn Antenna	Schaffner	04-Apr-11	24
E003	8593E	Spectrum Analyser	Hewlett Packard	21-Oct-10	24
E410	N5181A	3 GHz MXG Signal Generator	Agilent Technologies	26-Oct-11	12
E411	N9039A	9 kHz - 1 GHz RF Filter Section	Agilent Technologies	26-Oct-11	12
E412	E4440A	3 Hz - 26.5 GHz PSA	Agilent Technologies	26-Oct-11	12
TMS78	3160-08	Std Gain Horn Antenna 12.4-18 GH	ETS Systems	03-Nov-10	24
TMS79	3160-09	Std Gain Horn Antenna 18-26.5 GH	ETS Systems	03-Nov-10	24
TMS81	6502	Active Loop Antenna	EMCO	13-Apr-10	24
TMS82	8449B	Pre Amplifier 1 - 26 GHz	Agilent	14-Nov-11	12
TMS903	CBL6111A	Bilog Antenna 30MHz - 1GHz	Chase	12-Apr-10	36
TMS933	CBL6141A	Bilog Antenna 30MHz - 2GHz	York EMC	09-Sep-10	36

11. Auxiliary equipment

11.1 Auxiliary equipment supplied by CNIguard Ltd

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

Manufacturer	Description	Model Number	Serial Number
IBM	Laptop	-	-
CNIguard	RS232 cable harness	-	

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

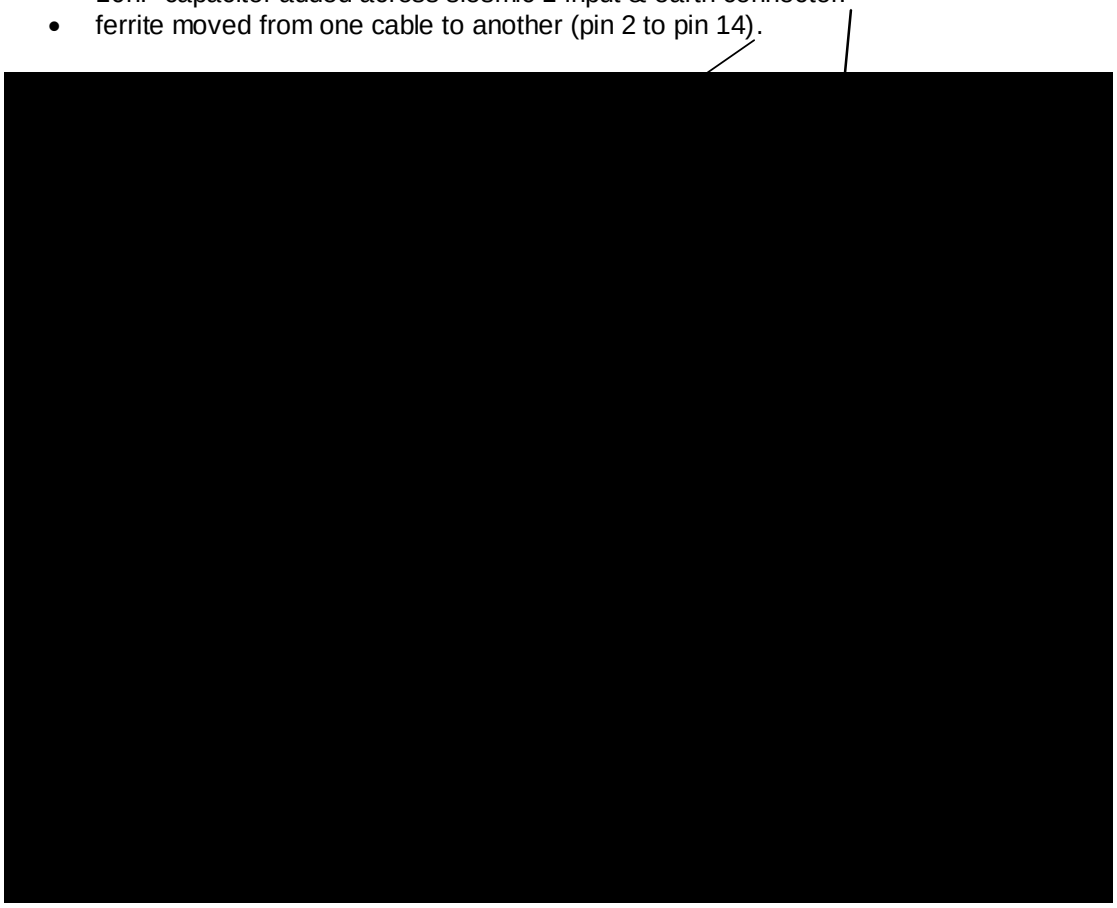
None.

12. Modifications

In order for the EUT to produce the results shown within this report the following modifications, if any, were implemented.

12.1 Modifications before test

- CNIguard Ltd. set the power level to 22 of 25.
- 10nF capacitor added across siesmic 1 input & earth connector.
- ferrite moved from one cable to another (pin 2 to pin 14).



12.2 Modifications during test

There were no modifications made by R.N. Electronics Ltd during testing.

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:

The receiver is contained within a transceiver, the transmitter portion of which is subject to certification and the remaining electronics are a Class A digital device. I.e. the non-transmitter parts are subject to verification hence a DoC is not required.

14 Description of Test Sites

Site A	Radio / Calibration Laboratory and anechoic chamber
Site B	Semi-anechoic chamber
Site B1	Control Room for Site B
Site C	Transient Laboratory
Site D	Screened Room (Conducted Immunity)
Site E	Screened Room (Control Room for Site D)
Site F	Screened Room (Conducted Emissions) VCCI Registration No. C-2823
Site K	Screened Room (Control Room for Site M)
Site M	3m Semi-anechoic chamber (indoor OATS) FCC Registration No. 293246
Site Q	Fully-anechoic chamber
Site OATS	3m and 10m Open Area Test Site FCC Registration No. 293246 IC Registration No. 5612A-1 VCCI Registration No. R-2580
Site R	Screened Room (Conducted Immunity)
Site S	Safety Laboratory
Site T	Transient Laboratory

15 Abbreviations and Units

%	Percent	Hz	Hertz
µV	microVolts	IF	Intermediate Frequency
µW	microWatts	kHz	kiloHertz
AC	Alternating Current	LO	Local Oscillator
ALSE	Absorber Lined Screened Enclosure	mA	milliAmps
		max	maximum
AM	Amplitude Modulation	mbar	milliBars
Amb	Ambient	MHz	MegaHertz
ANSI	American National Standards Institute	min	minimum
		mm	milliMetres
ºC	Degrees Celsius	ms	milliSeconds
CFR	Code of Federal Regulations	mW	milliWatts
		NA	Not Applicable
CS	Channel Spacing	nom	Nominal
CW	Continuous Wave	nW	nanoWatt
dB	deciBels	OATS	Open Area Test Site
dBµV	deciBels relative to 1µV	OFDM	Orthogonal Frequency Division Multiplexing
dBc	deciBels relative to Carrier		
dBm	deciBels relative to 1mW	ppm	Parts per million
DC	Direct Current	QAM	Quadrature Amplitude Modulation
EIRP	Equivalent Isotropic Radiated Power	QPSK	Quadrature Phase Shift Keying
ERP	Effective Radiated Power		
EUT	Equipment Under Test	Ref	Reference
FCC	Federal Communications Commission	RF	Radio Frequency
		RTP	Room Temperature and Pressure
FM	Frequency Modulation		
FSK	Frequency Shift Keying	s	Seconds
g	Grams	Tx	Transmitter
GHz	GigaHertz	V	Volts