



**FCC 47CFR part 15C
Test Report
For
IDS-Controller
SLC**

Reference Standard: FCC 47CFR part 15C

Manufacturer: CNIGuard LLC

For type of equipment and serial number, refer to section 3

Report Number: 03-564/5019/1/12

Report Produced by: -

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Certificate of Test 5019/1

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:	IDS-Controller
Model Number:	SLC
Proposed FCC ID:	ZRE3A001-0B1
Unique Serial Number:	11100003
Manufacturer:	CNIGuard LLC PO Box 465 214 West Main Street Ligonier PA 15658-0465 United States
Customer Purchase Order Number:	Not stated
Full measurement results are detailed in Report Number:	03-564/5019/1/12
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. Certain other requirements are subject to manufacturer declaration only and have not been tested/verified. For details refer to section 3 of this report.

DEVIATIONS:

Deviations from the standards have been applied. For details refer to section 4.2 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: 23/Mar/2012 to 24/Apr/2012

Test Engineer:

Approved By:
Technical Director

Customer Representative:

File name CNIGUARD.5019.1.PUBLIC.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.

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2. Summary of test results

The IDS-Controller SLC 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.

Title	Reference	Results
1. Conducted emissions	ANSI C63.10 §6.2.	PASSED
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 ¹
5. Occupied bandwidth and band edge	ANSI C63.10 §6.9.	PASSED
6. Duty cycle	ANSI C63.10 §7.5.	Not Applicable ²

¹ EUT is not for fixed, point-to-point operation, therefore no limits are specified.

² Not applicable, EUT operates below 1GHz where no averaging is allowed.

3. Equipment Under Test (EUT)

3.1 Equipment Specification

Applicant	CNIguard LLC PO Box 465 214 West Main Street Ligonier PA 15658-0465 United States
Manufacturer of EUT	CNIguard LLC
Brand name of EUT	CNIguard LLC
Model Number of EUT	SLC
Proposed FCC ID	ZRE3A001-0B1
Serial Number of EUT	11100003
Date when equipment was received by RN Electronics	15-Feb-12
Date of test:	23/Mar/2012 to 24/Apr/2012
Customer order number:	Not stated
Visual description of EUT:	A grey rectangular casing with 12 large push button data entry keys on the cover. One side incorporates a hole for wiring to peripherals, the other side has an sma connector for an antenna connection.
Main function of the EUT:	To poll detector units for any alarm reports.
Height	130 mm
Width	220 mm
Depth	70 mm
Weight	1.6 kg
Voltage	7.2 V DC
Current required from above voltage source	200mA

3.2 EUT Configurations for testing

Frequency range	902.0625 – 927.9375
Normal use position	Fixed installation, e.g. on wall
Normal test signals	Internally generated GMSK
Declared power level	0dBm (power level pre-set to 18 of 24)
Declared channel bandwidth	25kHz
Highest frequency generated / used	1.9098 GHz (from GSM module)
Lowest frequency generated / used	32kHz

3.3 EUT Modes

Mode	Description	Used for test
Transmit low ¹	Transmitting continuously on the lowest channel 902.0625 MHz	Yes
Transmit high ¹	Transmitting continuously on the highest channel 927.9375 MHz	Yes
Receive	Receiving continuously on the chosen rx channel	Yes
Transmit mid ¹	Transmitting continuously on the middle channel 915.0000 MHz	Yes
Alarm	Transmitting alarm information on the GSM channel either upon alarm condition or use of the attached switch	Yes
Normal	Transmitting periodically polling detectors on the chosen ISM channels (902-928MHz) and sending alarm information on the GSM channel upon alarm conditions.	No

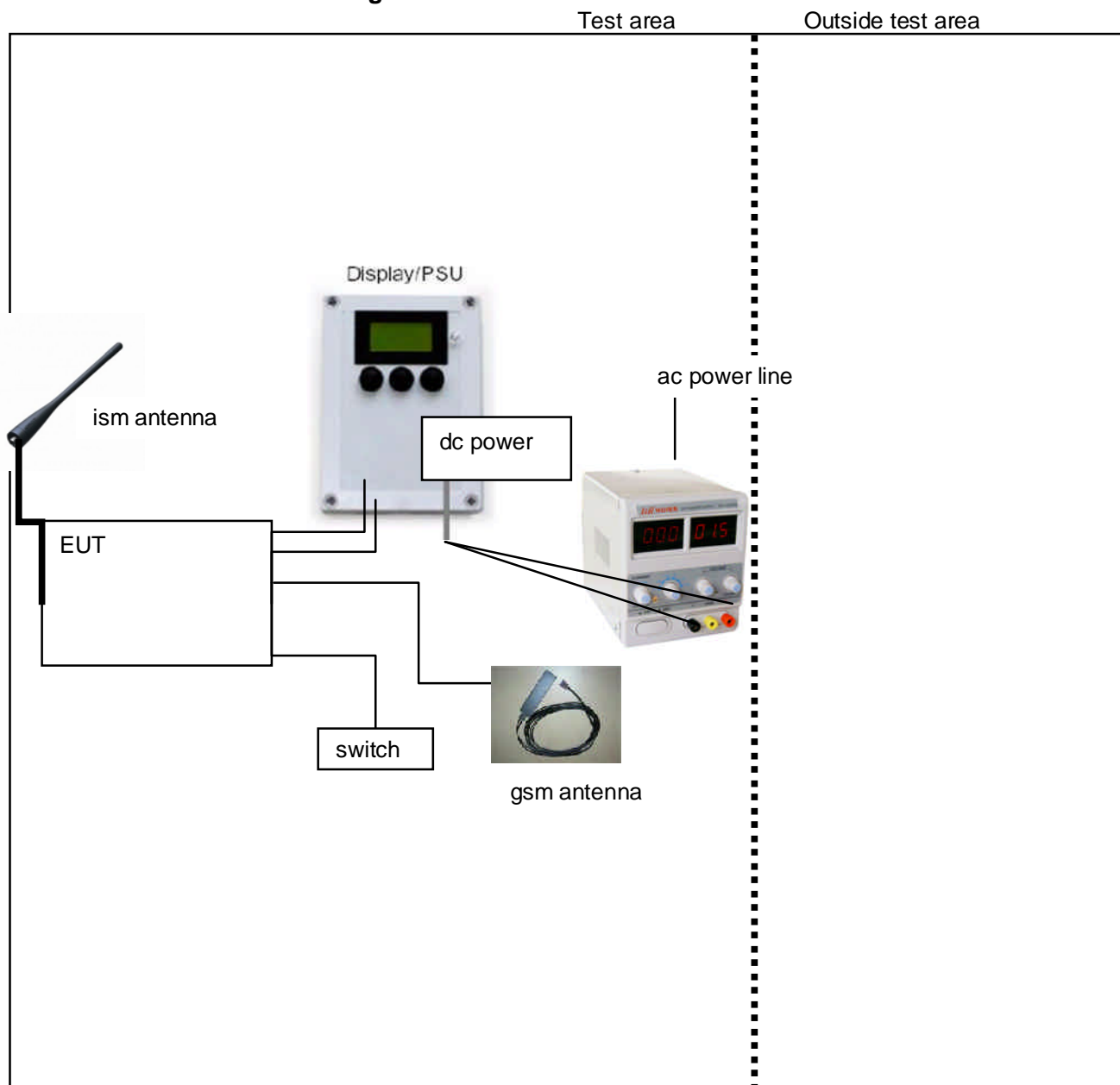
Description of ancillary equipment connected to the equipment under test, for the purpose of tests, can be found in Section 10.

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

This report was printed on: 24 May 2012

¹ Alarm mode was also enabled during tests on this mode for worst case operation.

3.4 Emissions Configuration



The EUT RS232 and SCADA ports were connected to a display unit which provided the DC power to the EUT. The sma antenna port was connected to the minimum length of cable before a whip antenna to maximise the EIRP. The display unit was powered from an off-the-shelf dc supply connected back to the ac powerline. A GSM antenna was connected for alarm transmissions from the pre-approved GPRS module upon either alarm condition or use of the switch.

4. Specifications

The tests were performed by RN Electronics Engineer 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 at extremes were required. The EUT was powered via a regulated dc supply.

4.3 Measurement Uncertainties

Parameter	Uncertainty
Transmitter Tests	
Conducted RF power	<± 1.0 dB
Occupied bandwidth	± 1.9 %
Radiated RF power	± 3.5 dB
Radiated spurious emissions	30MHz - 1000MHz ±5.1dB
	1000MHz - 2000MHz ±4.5dB
	1 – 18 GHz ±3.5dB
	18 – 26.5 GHz ±3.9dB
Conducted spurious emissions	± 2.8 dB
AC line conducted emissions	(For LISN) 150kHz to 30MHz ±3.6dB
	(For Voltage Probe) 150kHz to 30MHz ±4.2dB

5. Tests, Methods and Results

5.1 Conducted emissions

5.1.1 Test Methods

Test Requirements FCC Part 15C, Reference (15.207)

Test Method: ANSI C63.10, Reference (6.2.)

5.1.1.1 Configuration of EUT

The EUT was placed on a wooden table 0.8m above the ground plane and connected to a display unit providing the dc power. The display unit was powered from an off-the-shelf dc supply. The dc supply was connected to a LISN via a 1m mains cable.

Details of the Peripheral and Ancillary Equipment connected for this test is listed in section 11.

During the initial scan, mode transmit mid (refer to section 2.2) was found to be worst case mode of operation.

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. Measurements were made on the live and neutral conductors using both average and quasi-peak detection. At least 6 signals within 20dB and/or all signals within 10dB of the limit were investigated.

Tests were performed in Test Site F.

5.1.2 Test results

Temperature of test Environment: 19°C

Analyser plots for the Quasi-Peak / Average values as applicable can be found in Section 6.1 of this report.

Quasi-Peak and Average Live

Signal No.	Freq (MHz)	Peak Amp (dBuV)	QP Amp (dBuV)	QP - Lim1 (dB)	AV Amp (dBuV)	AV - Lim1 (dB)
1	0.232	47.6	39.3	-23.1	11.5	-40.9
2	0.294	43.6	37.1	-23.3	10.0	-40.4
3	0.324	42.7	36.4	-23.2	9.9	-39.7
4	0.366	43.4	35.0	-23.6	9.1	-39.5
5	0.483	38.3	32.0	-24.3	9.3	-37.0
6	0.528	38.1	30.8	-25.2	10.9	-35.1

Quasi-Peak and Average Neutral

Signal No.	Freq (MHz)	Peak Amp (dBuV)	QP Amp (dBuV)	QP - Lim1 (dB)	AV Amp (dBuV)	AV - Lim1 (dB)
1	0.214	46.6	40.1	-22.9	12.2	-40.8
2	0.271	46.9	38.1	-23.0	10.6	-40.5
3	0.325	43.8	36.3	-23.3	10.4	-39.2
4	0.368	44.7	35.0	-23.5	10.7	-37.8
5	0.407	42.6	34.6	-23.1	10.9	-36.8
6	0.444	41.6	33.3	-23.7	11.9	-35.1

File name CNIGUARD.5019.1.PUBLIC.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.

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

5.1.2.1 Test Equipment used

E035, E150, E410, E411, E412

See Section 10 for more details.

5.2 Intentional radiator field strength

5.2.1 Test Methods

Test Requirements	FCC Part 15C, Reference (15.249 a)
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. The EUT was measured at a distance of 3 metres. The EUT external antenna was supported by styrofoam blocks above the table and connected to the EUT via a short length of coax. The antenna was scanned 1-4m in height in both Horizontal and Vertical polarisations. The EUT was operated in transmit low, mid and high modes having been set to power level 18.

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. This site is 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: 15 °C

Humidity: 46%

Any Analyser plots can be found in Section 6.3 of this report.

Channel	Measured result PK (dBuV/m @3m)	Measured result QP (dBuV/m @ 3m)	EUT polarisation	Measurement polarisation
Low	90.8	90.5	V	V
Mld	92.7	92.4	V	V
High	91.7	91.4	V	V

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

LIMITS:

15.249(a) 50 mV/m @ 3m (94 dBuV/m @ 3m).

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

5.2.2.1 Test Equipment used

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

File name CNIGUARD.5019.1.PUBLIC.DOCX

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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 and examined in 3 orthogonal planes. The EUT was measured at a distance of 3 metres. The EUT external antenna was supported by styrofoam blocks above the table and connected to the EUT via a short length of coax. The measurement antenna was scanned 1-4m in height in both Horizontal and Vertical polarisations. The EUT was operated in transmit low, mid and high modes as well as receive 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 measurement 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.

Test Environment:

Temperature: 15-20°C

Humidity: 42-46%

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.

Emissions below 30MHz.
None observed.

Horizontal emissions 30MHz-1GHz

Signal No.	Freq (MHz)	Peak Amp (dBuV)	QP Amp (dBuV)	QP - Lim1 (dB)
1	148.772	36.3	34.7	-8.8
2	173.569	42.9	41.5	-2.0
3	223.159	40.7	39.1	-6.9
4	223.159	39.6	37.9	-8.1
5	272.745	40.4	39.2	-6.8
6	297.538	40.0	39.2	-6.8
7	322.363	34.3	32.6	-13.4
8	421.531	35.0	32.6	-13.4
9	570.288	38.7	36.8	-9.2
10	644.718	40.5	37.9	-8.1
11	669.488	43.3	41.2	-4.8
12	719.049	39.4	36.6	-9.4
13	942.249	43.8	41.2	-4.8

Vertical emissions 30MHz-1GHz

Signal No.	Freq (MHz)	Peak Amp (dBuV)	QP Amp (dBuV)	QP - Lim1 (dB)
1	35.471	32.7	28.3	-11.7
2	115.140	35.8	32.4	-11.1
3	173.571	36.4	34.7	-8.8
4	223.168	37.1	35.2	-10.8
5	322.350	36.5	35.3	-10.7
6	421.571	36.4	34.3	-11.7
7	520.689	37.5	35.4	-10.6
8	619.898	39.8	37.9	-8.1
9	669.554	42.0	40.2	-5.8
10	694.283	41.0	38.1	-7.9
11	867.884	38.9	34.4	-11.6

Emissions 1-26.5GHz

Signal No.	Freq (MHz)	Polar'n	Peak Amp (dBuV)	Peak - Lim1 (dB)	AV Amp (dBuV)	AV - Lim1 (dB)
1	1830.000	V	49.4	-24.6	47.7	-6.3
2	1830.000	V	52.0	-22.0	50.7	-3.3
3	2745.000	V	44.7	-29.3	40.3	-13.7
4	2745.000	V	42.9	-31.1	37.2	-16.8

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 $\mu\text{V/m}$ (54 dB $\mu\text{V/m}$) @ 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 as drawn on the respective plots.

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

5.3.2.1 Test Equipment used

File name CNIGUARD.5019.1.PUBLIC.DOCX

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TMS81, TMS82, TMS933, E410, E411, E412, E342, E268

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 tests were performed following eirp maximisation – refer to intentional radiator field strength configuration details.

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 for the 20dB bandwidth.

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 band edge plots.

Channel	Result	Plot reference
Bottom	22.0kHz	J5019-1-001
Middle	26.5kHz	J5019-1-002
Top	22.8 kHz	J5019-1-003

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.

5.5.2.1 Test Equipment used

TMS933, E410, E411, E412

See Section 10 for more details.

5.6 Duty cycle

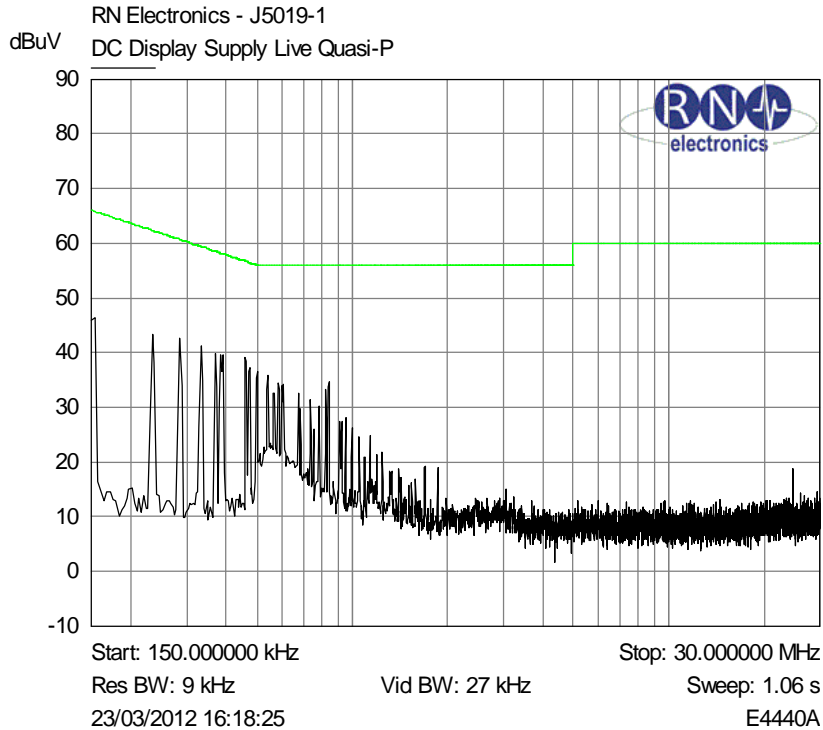
Not applicable.

No duty cycle measurements were required as no duty correction is to be applied.

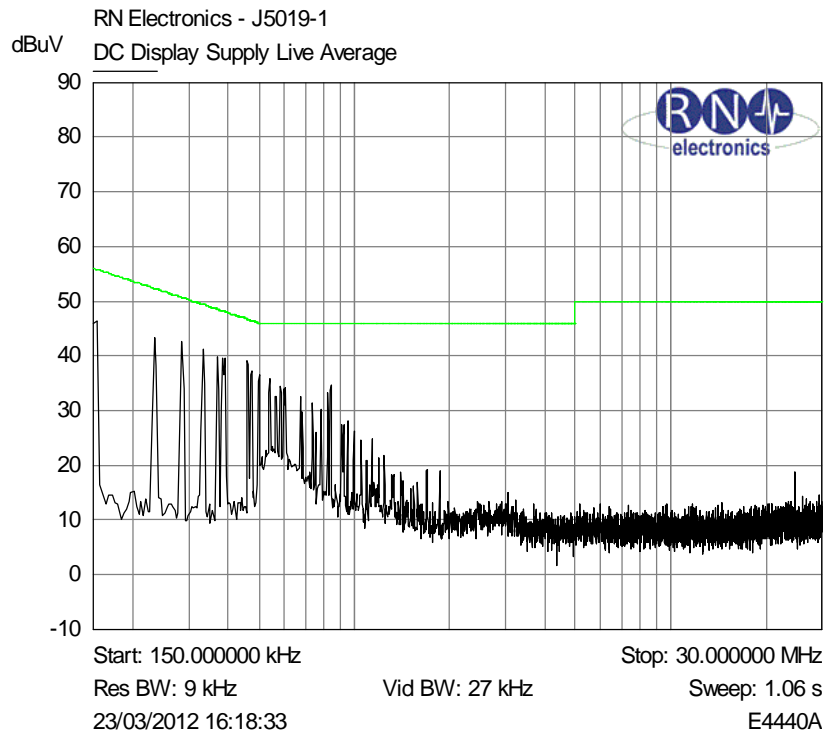
6. Plots and Results

n.b. plots are provided for reference only. Final results have been tabulated in the main body of this report. Plots shown are representative of worst case. Other than the fundamental and harmonics, no significant differences were observed between channels.

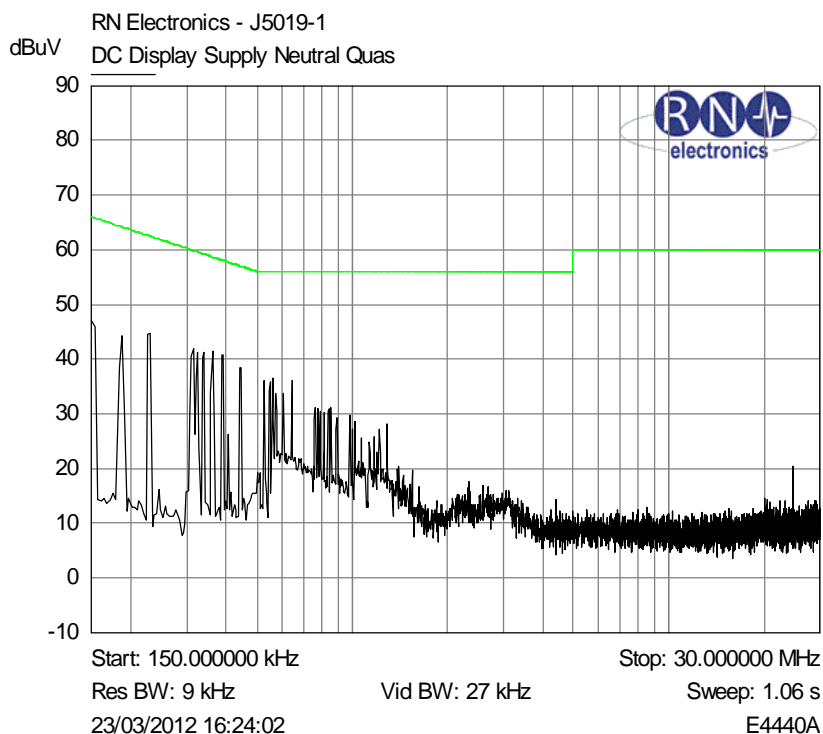
6.1 Conducted Emissions



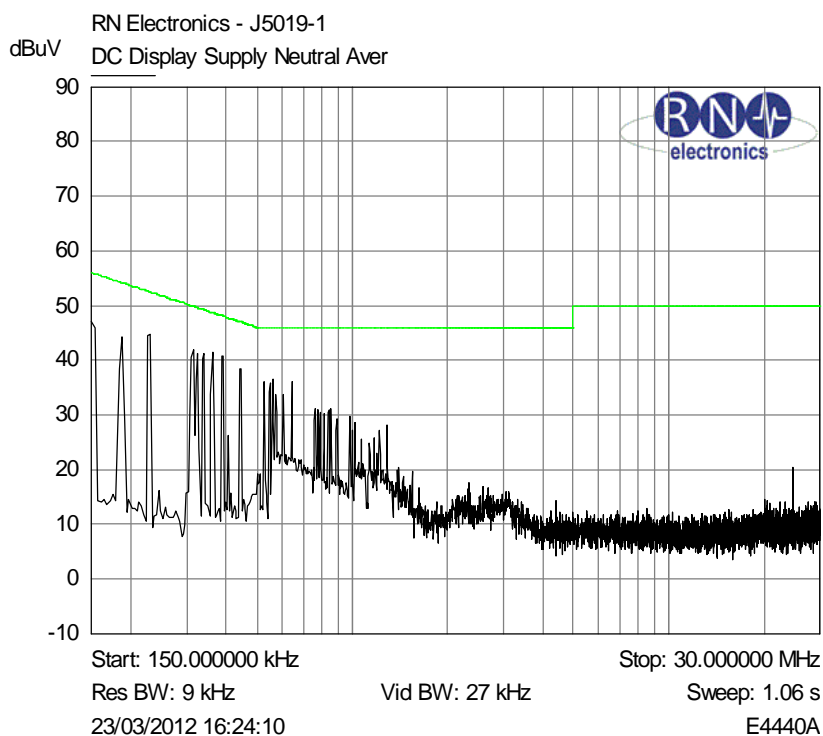
**Plot of peak emissions 150kHz - 30MHz on the mains live terminal
against the quasi-peak limit line.**



**Plot of peak emissions 150kHz - 30MHz on the mains live terminal
against the average limit line.**

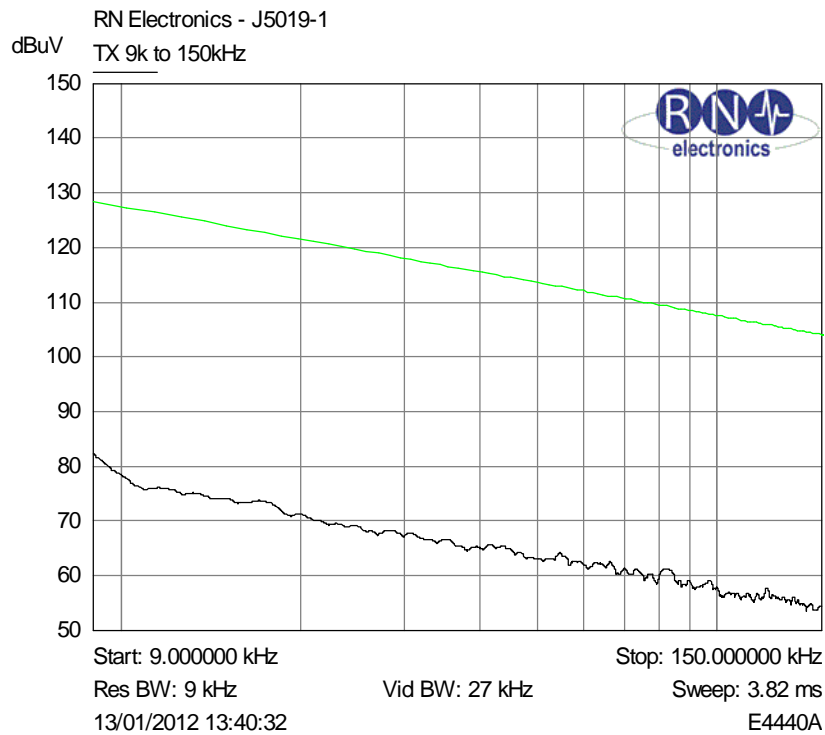


**Plot of peak emissions 150kHz - 30MHz on the mains neutral terminal
against the quasi-peak limit line.**

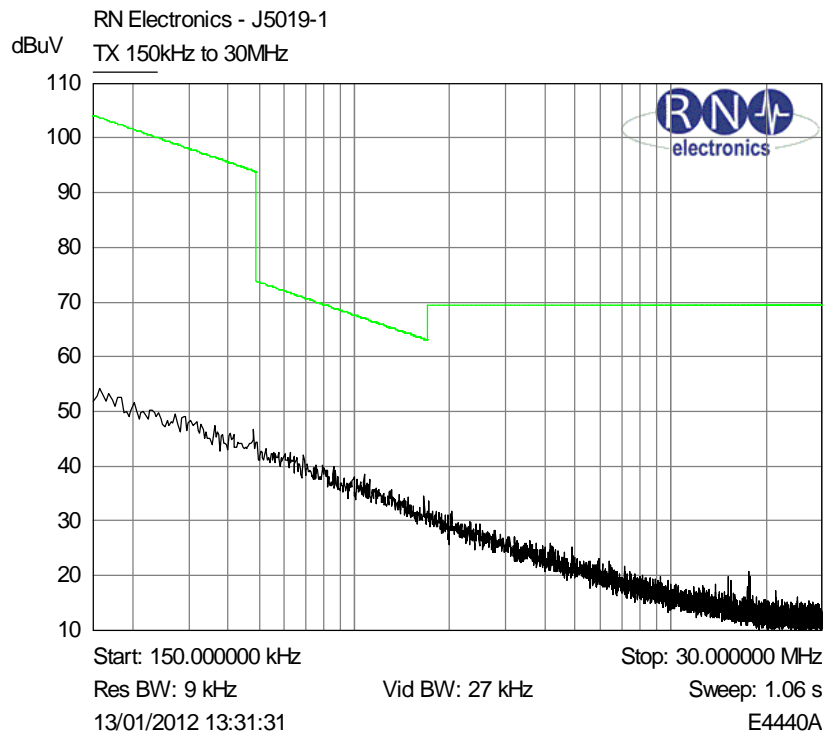


**Plot of peak emissions 150kHz - 30MHz on the mains neutral terminal
against the average limit line.**

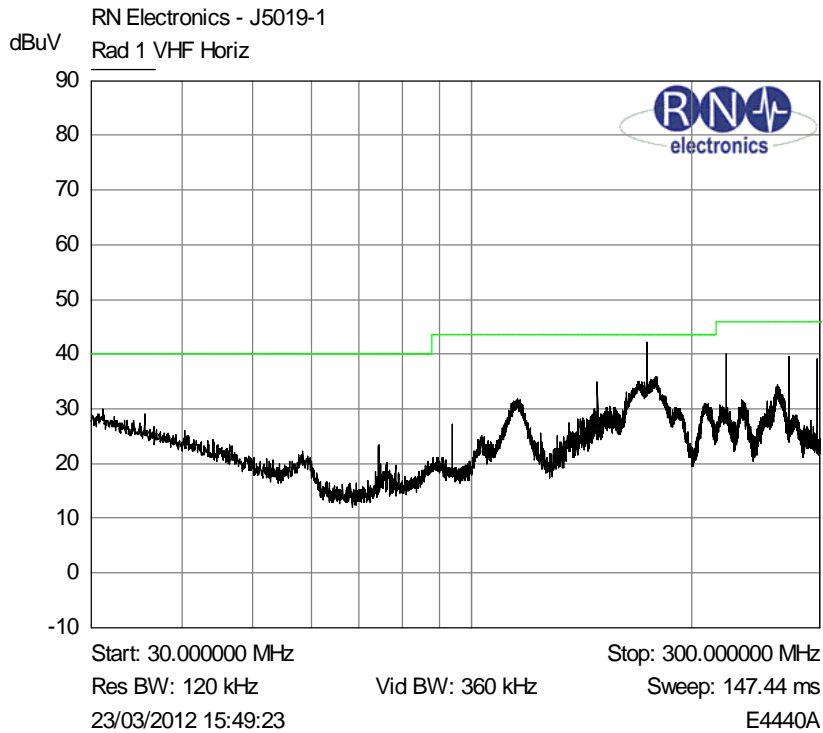
6.2 Radiated Emissions 9kHz – 1GHz



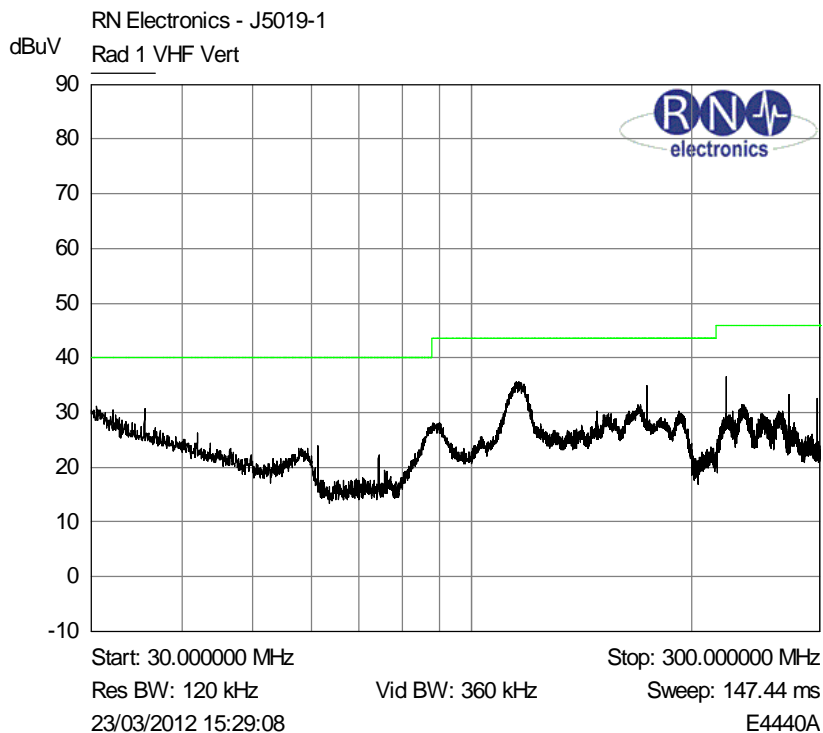
Plot of peak emissions 9 - 150kHz against the quasi-peak limit line.



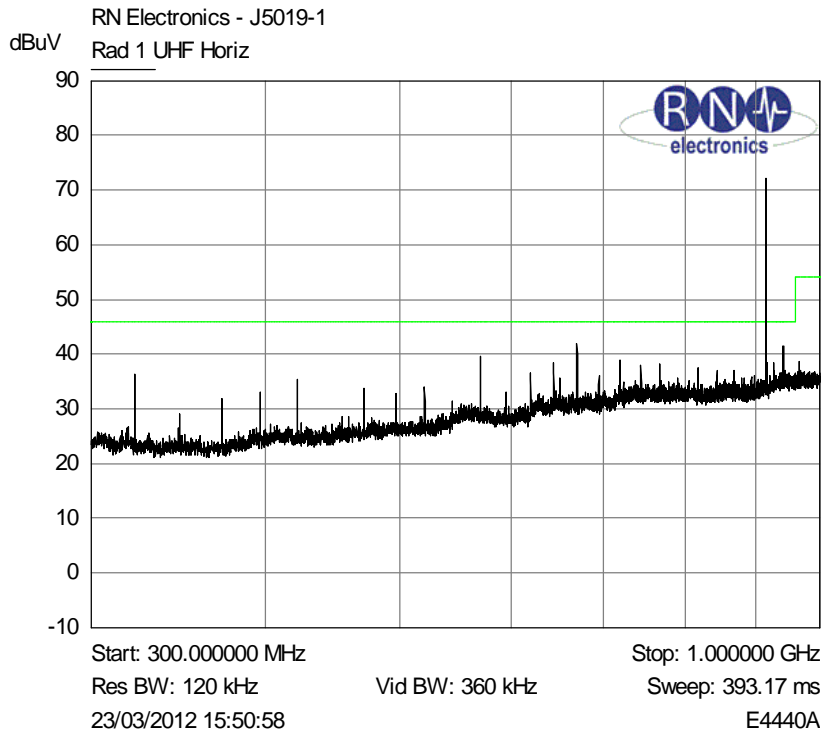
Plot of peak emissions 150kHz - 30MHz against the quasi-peak limit line.



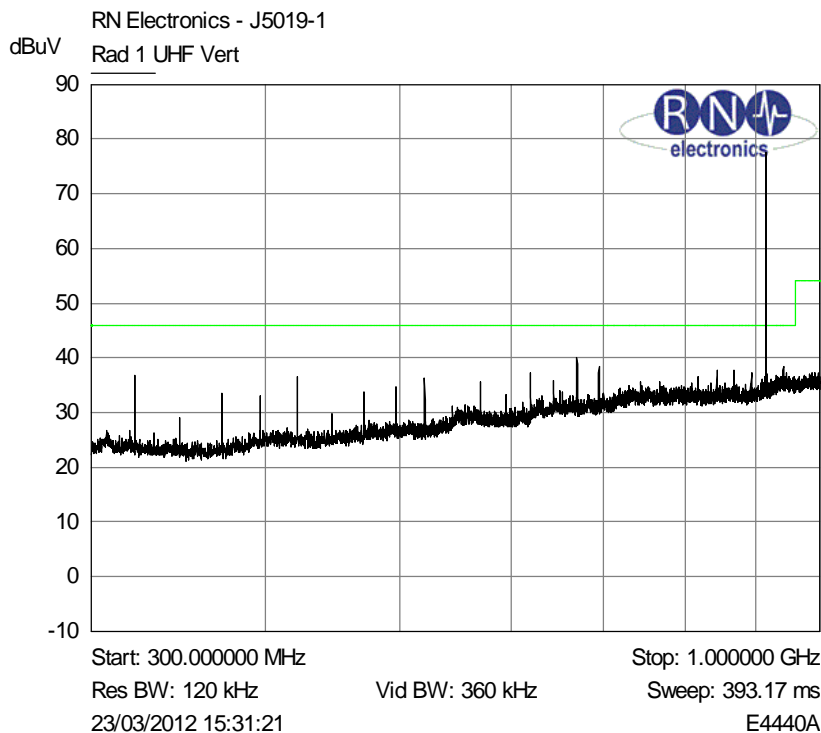
Plot of peak horizontal emissions 30MHz - 300MHz against the quasi-peak limit line.



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

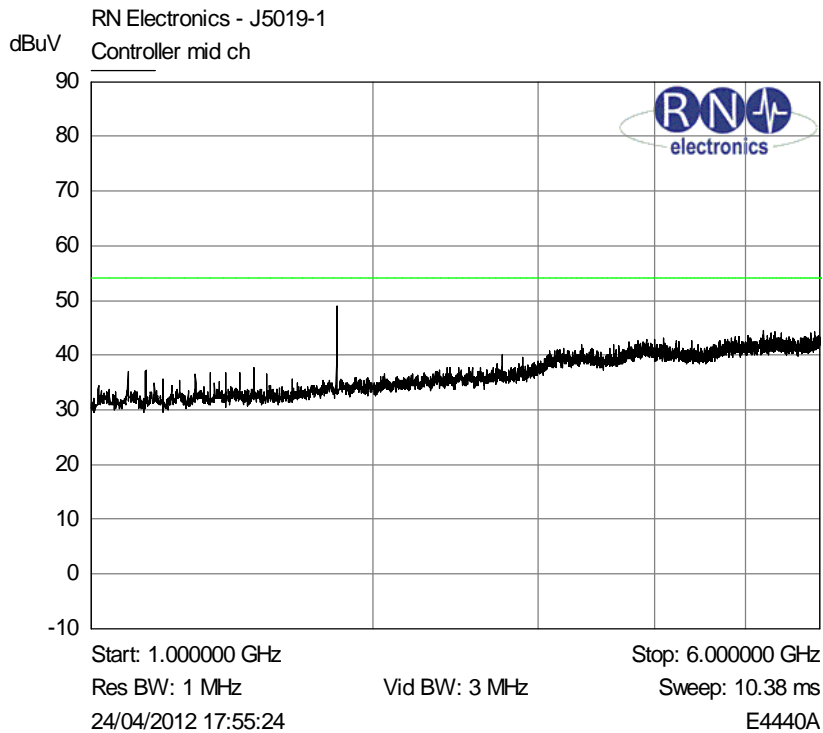


Plot of peak horizontal emissions 300MHz - 1GHz against the quasi-peak limit line.

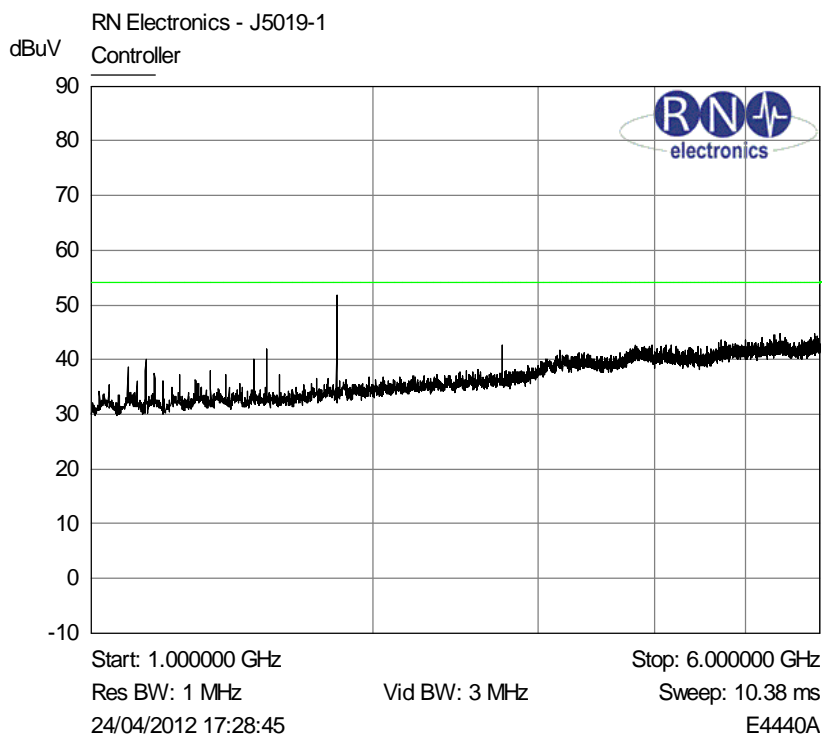


Plot of peak vertical emissions 300MHz - 1GHz against the quasi-peak limit line.

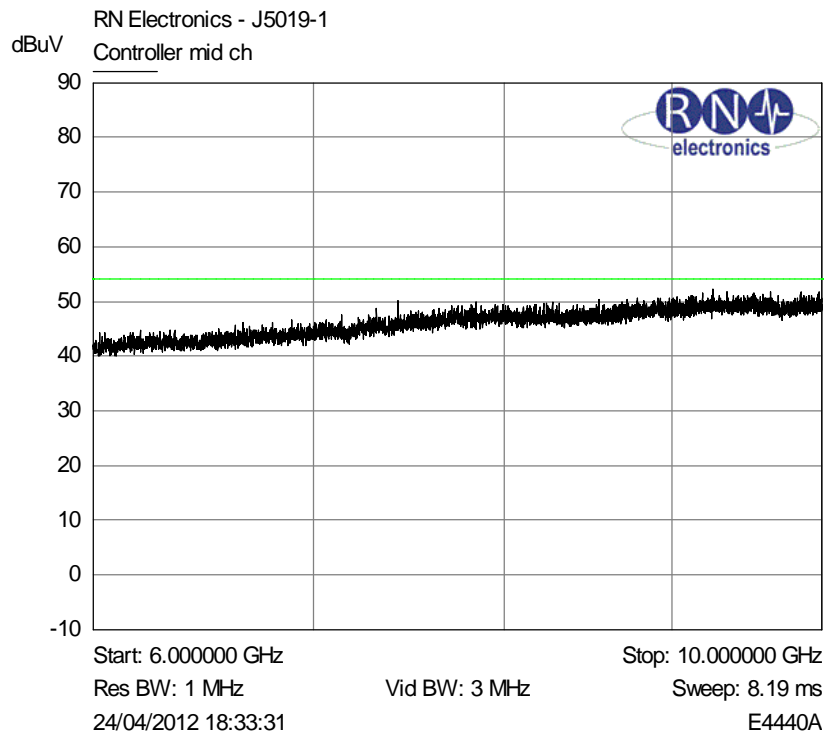
6.3 Radiated Emissions above 1GHz



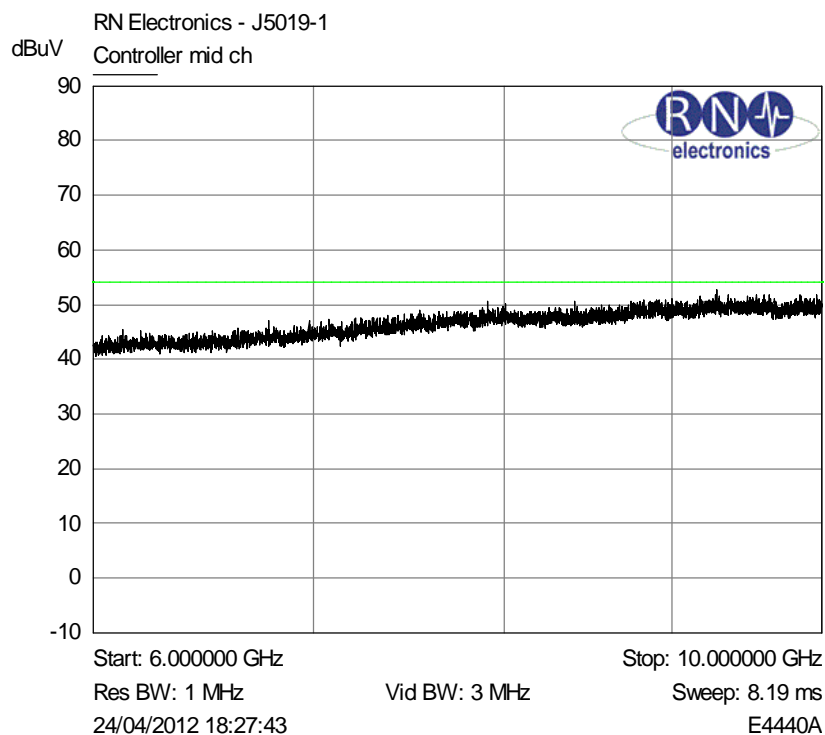
Horizontal, peak emissions, avg limit line, 3m distance



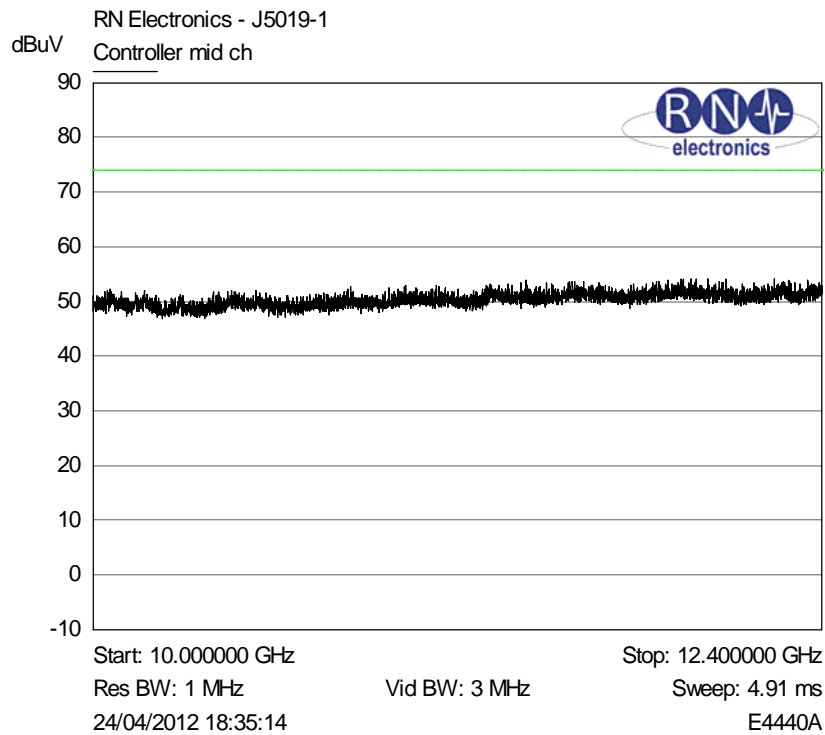
Vertical, peak emissions, avg limit line, 3m distance



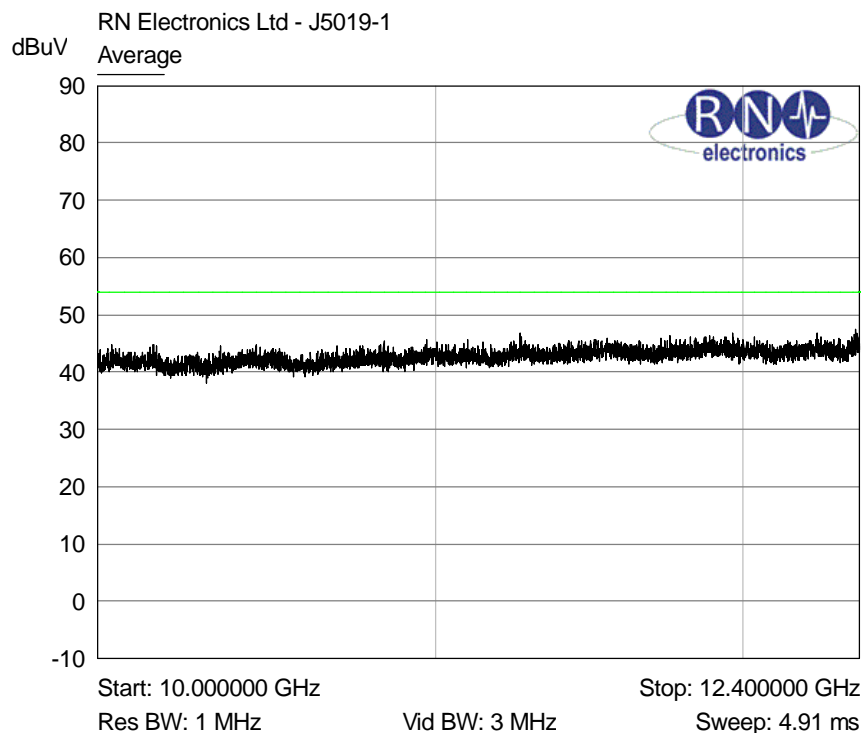
Horizontal, peak emissions, avg limit line, 3m distance



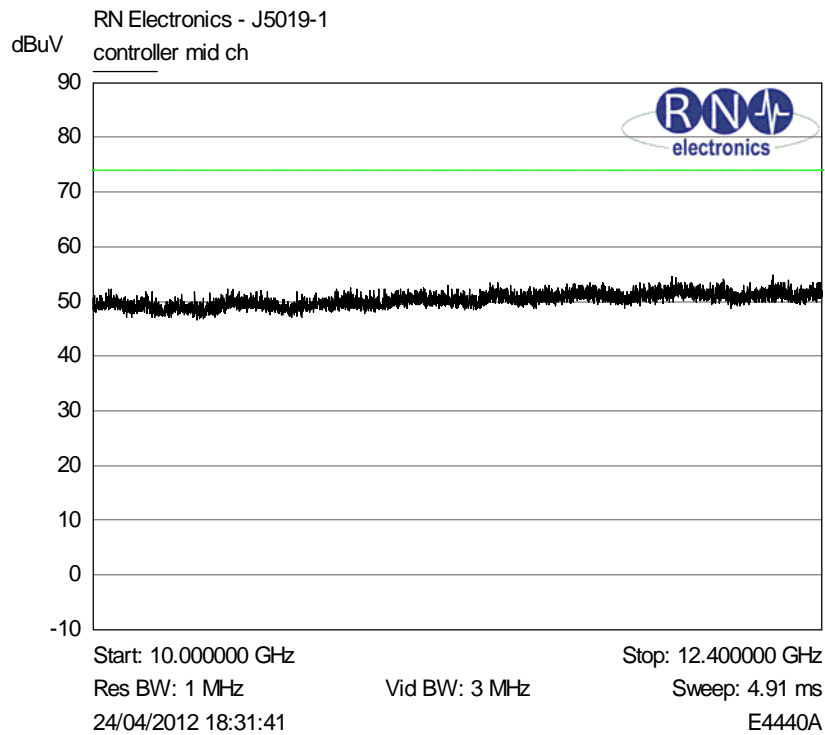
Vertical, peak emissions, avg limit line, 3m distance



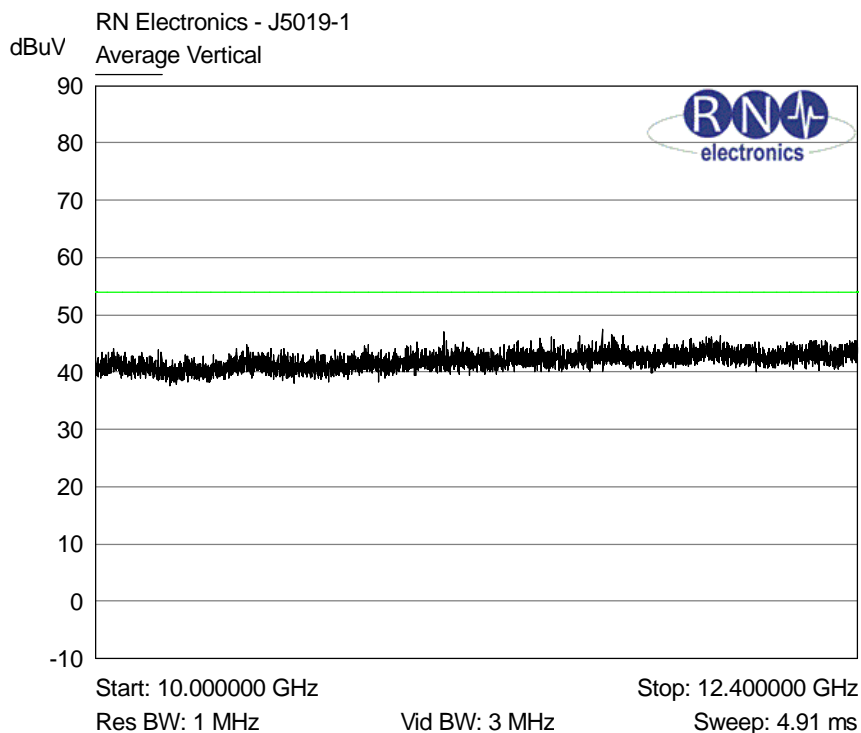
Horizontal, Peak emissions, peak limit line, 3m distance



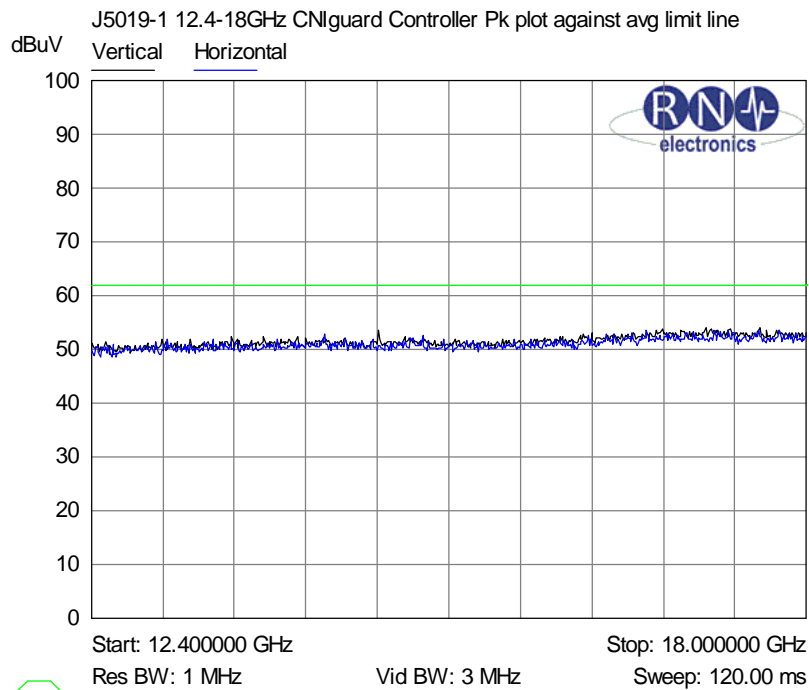
Horizontal, Average emissions, avg limit line, 3m distance



Vertical, Peak emissions, peak limit line, 3m distance

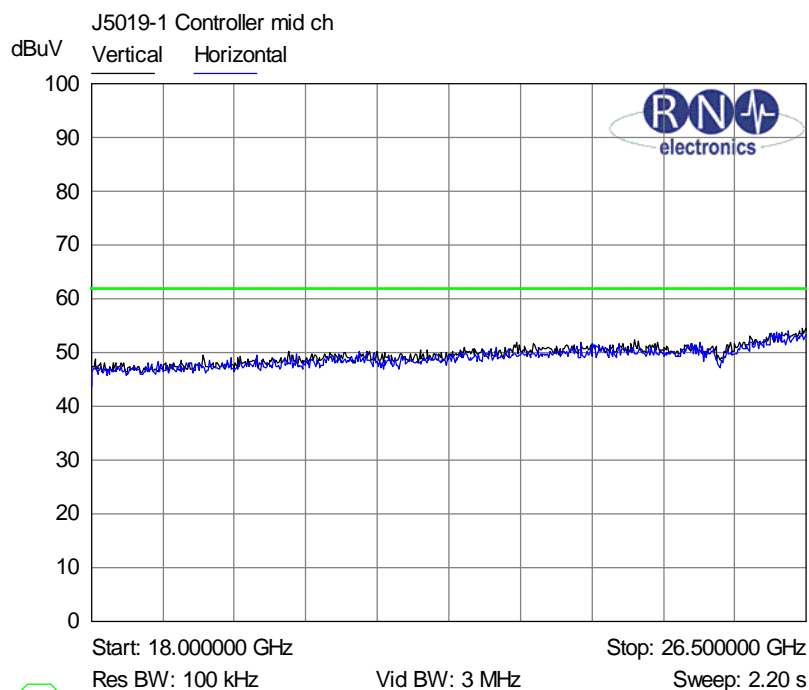


Vertical, Average emissions, avg limit line, 3m distance



PASS

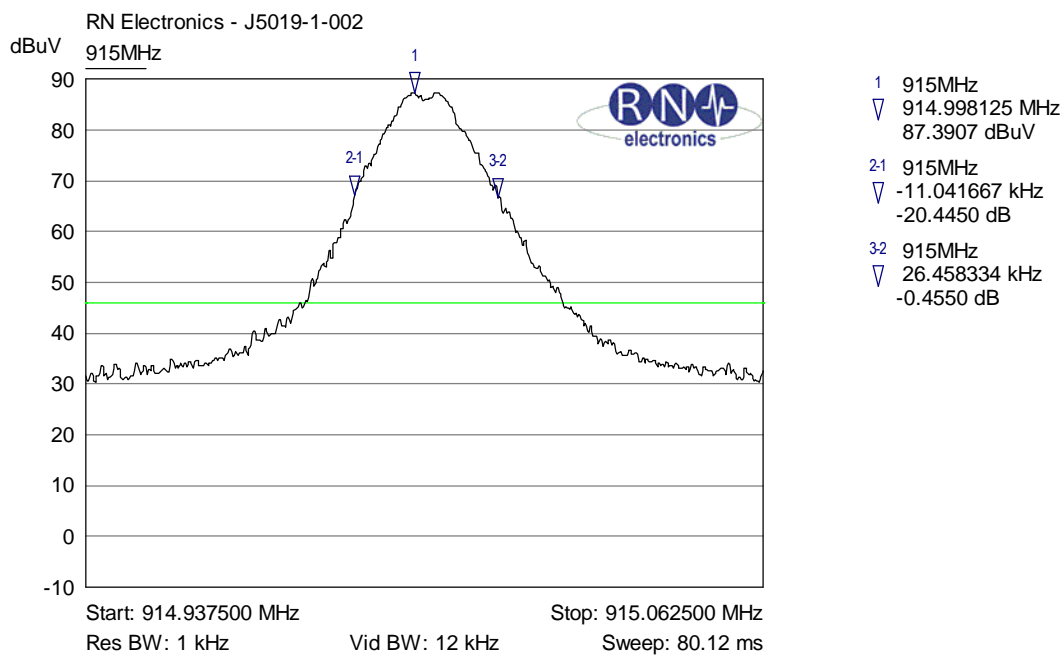
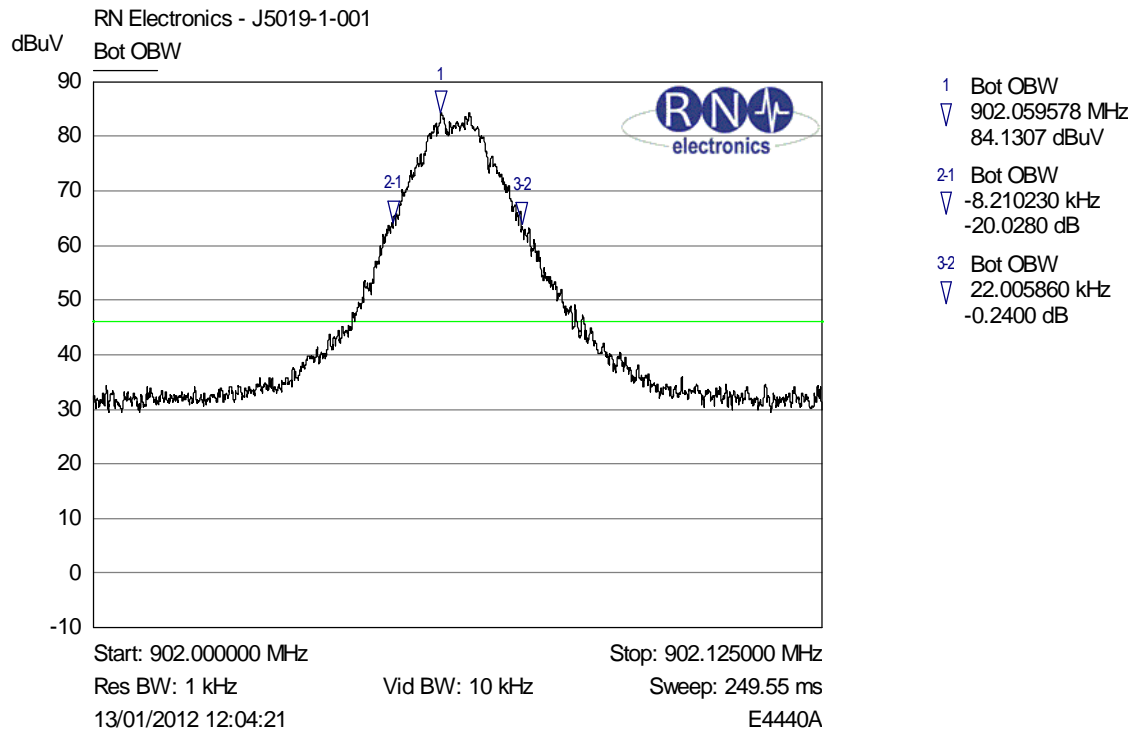
Peak emissions, avg limit line, 1.2m distance.



PASS

Peak emissions, avg limit line, 1.2m distance.

6.4 20dB Bandwidth

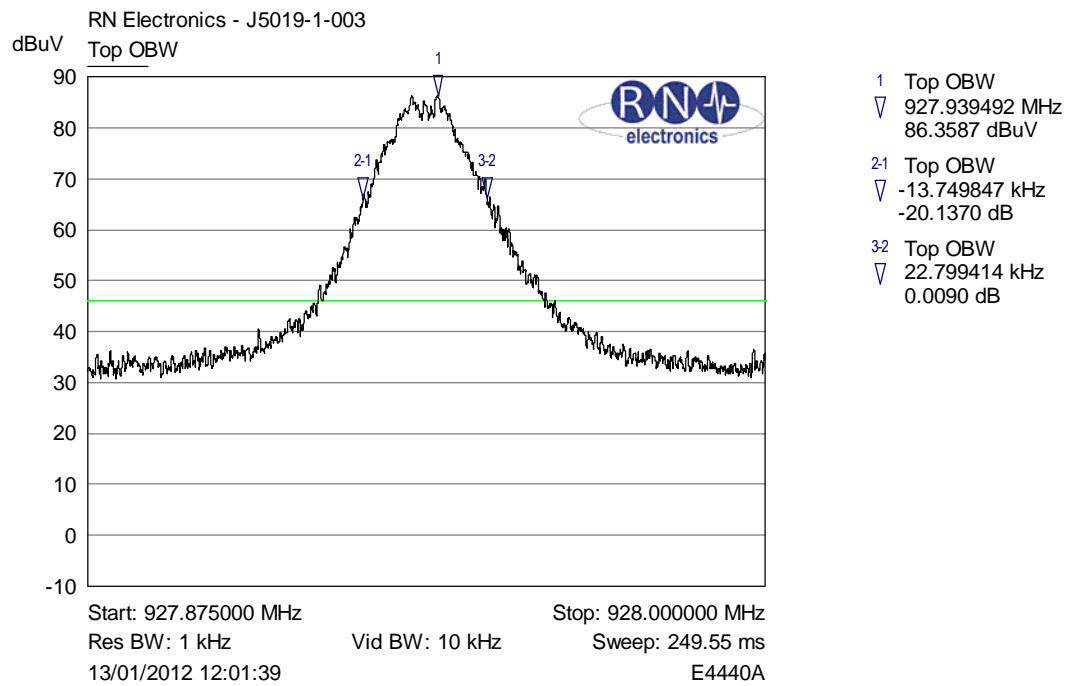


File name CNIGUARD.5019.1.PUBLIC.DOCX

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File name CNIGUARD.5019.1.PUBLIC.DOCX

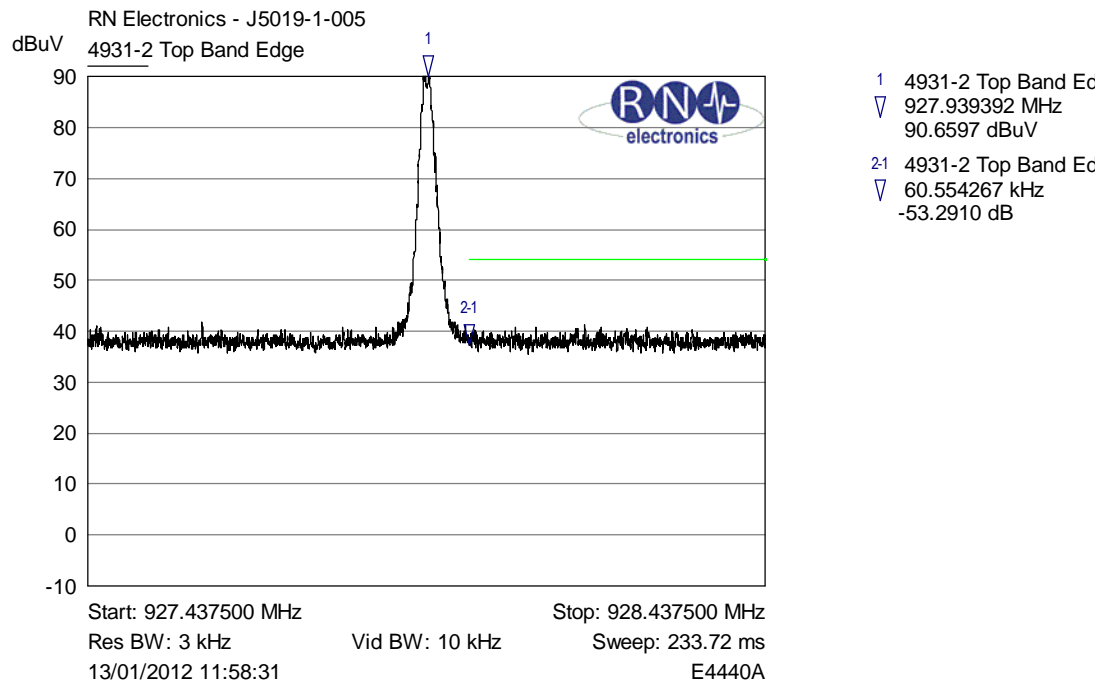
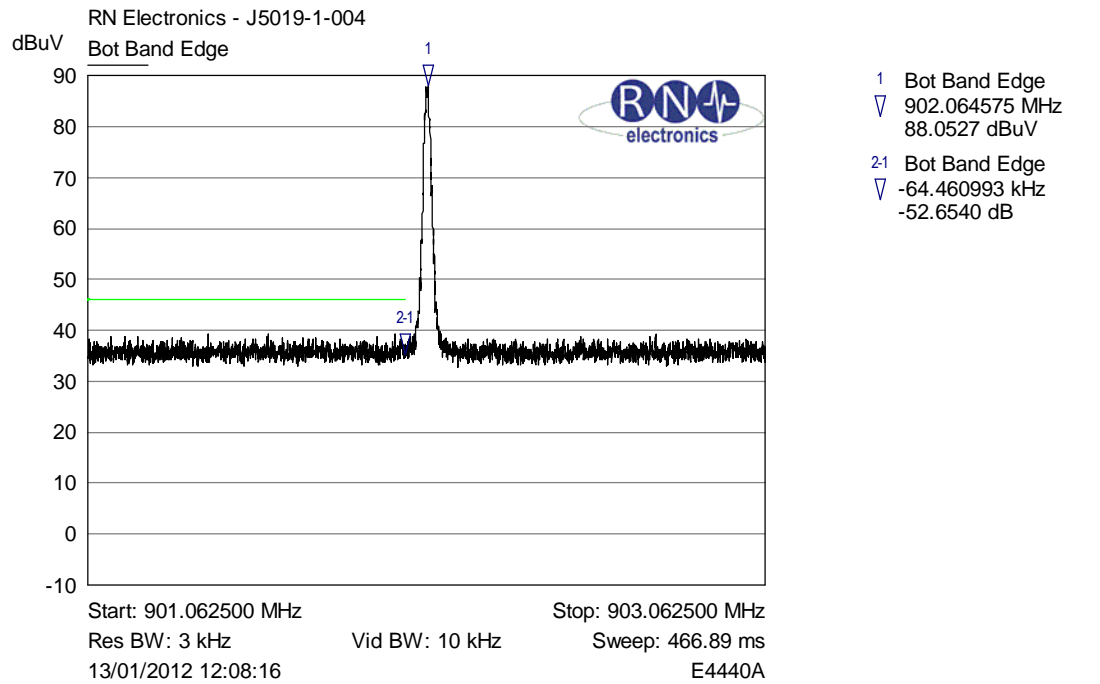
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6.5 Band Edge Compliance

Band Edge.



Restricted band edge.

The restricted band edges closest to the EUT frequency of 902-928MHz are 614 & 960MHz.

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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 (dB μ V)	Pk - Lim 1 (dB)	QP Amp (dB μ V)	QP - Lim1 (dB)	Av Amp (dB μ V)	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 (dB μ V) is the level of received signal that was measured in dB above 1 μ V 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 (dB μ V) is the level of received signal that was measured in dB above 1 μ V 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 (dB μ V) is the level of received signal that was measured in dB above 1 μ V 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 μ V/m at a specified distance), whereas the measured values are expressed as peak, quasi peak or average values in dB μ V/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 μ V/m equates to $20.\log(500) = 54$ dB μ V/m.
- (b) limit of 300 μ V/m at 10m equates to $20.\log(300 \cdot 10/3) = 60$ dB μ V/m at 3m
- (c) limit of 30 μ V/m at 30m, but below 30MHz, equates to $20.\log(30) + 40.\log(30/3) = 69.5$ dB μ V/m at 3m, as extrapolation factor below 30MHz is 40dB/decade per 15.31(f)(2).

File name CNIGUARD.5019.1.PUBLIC.DOCX

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8. Photographs



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

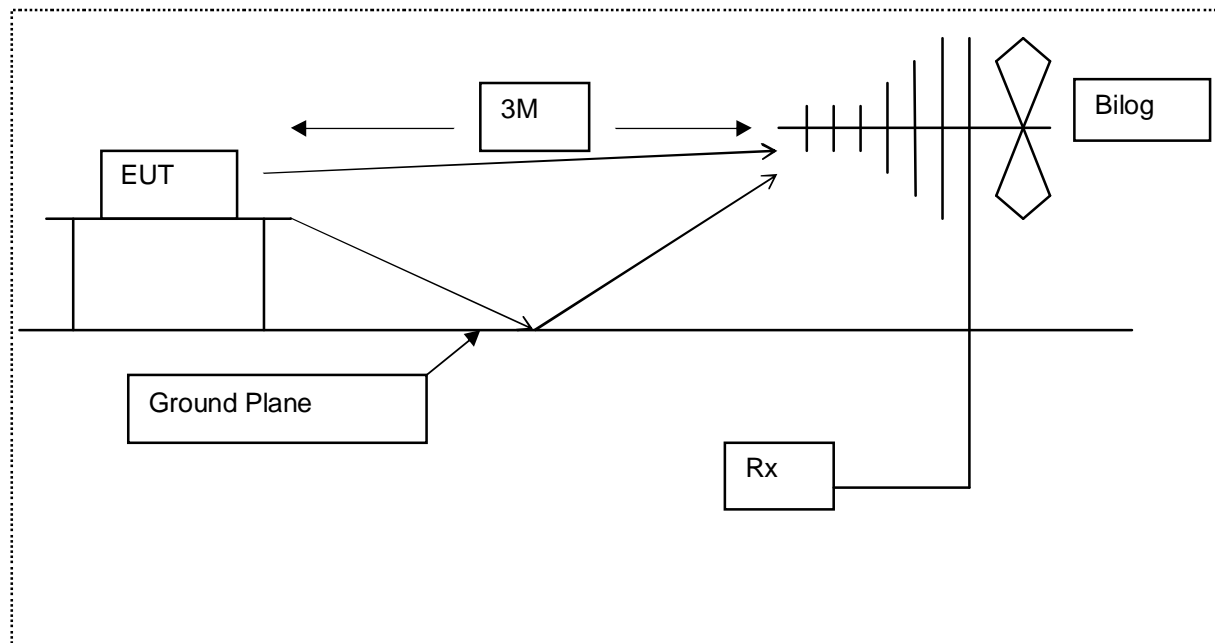


Diagram of the radiated emissions test setup.



Photograph of the EUT as viewed from screened room (conducted emissions)

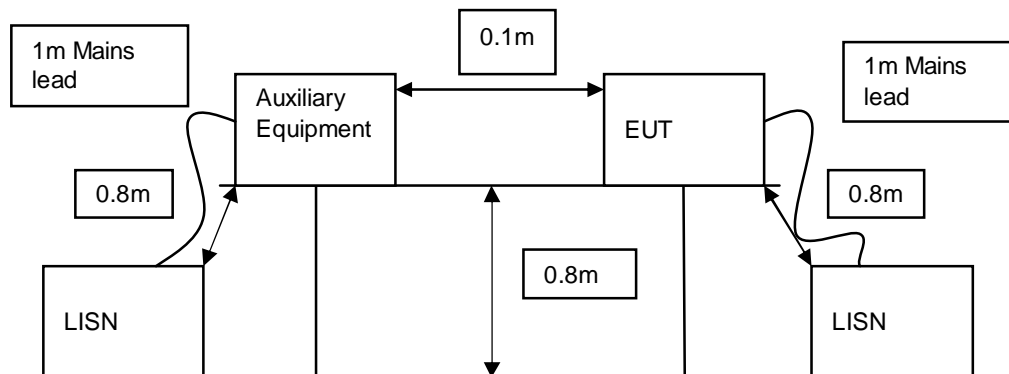
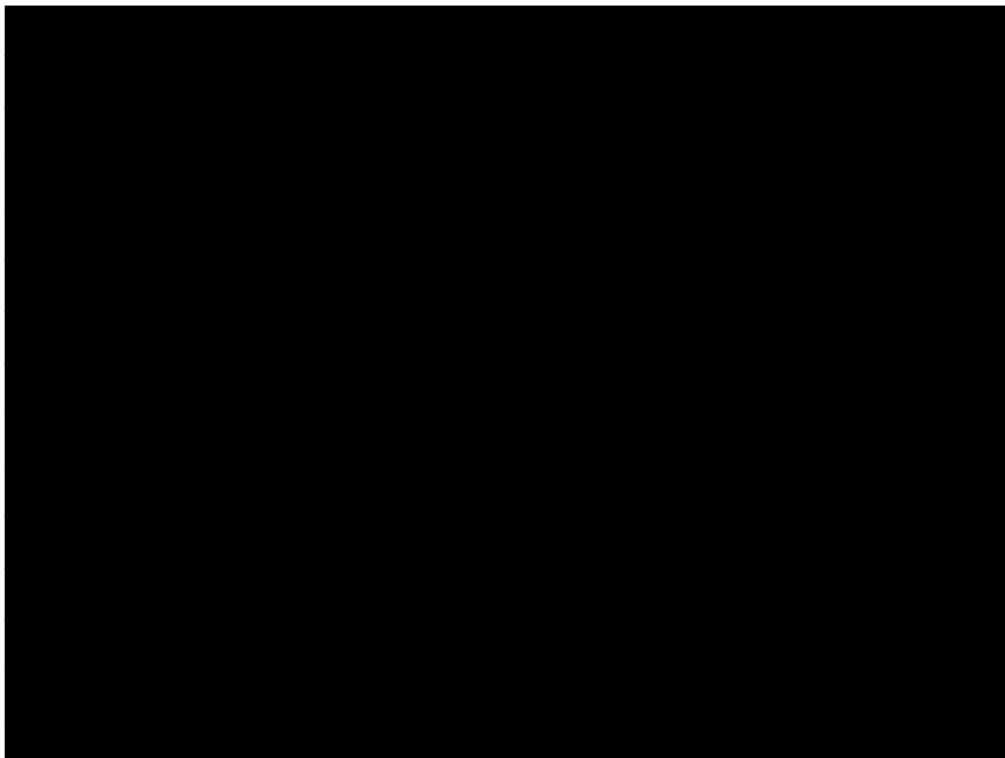


Diagram of the conducted emissions test setup.



Identifying Photograph of the EUT



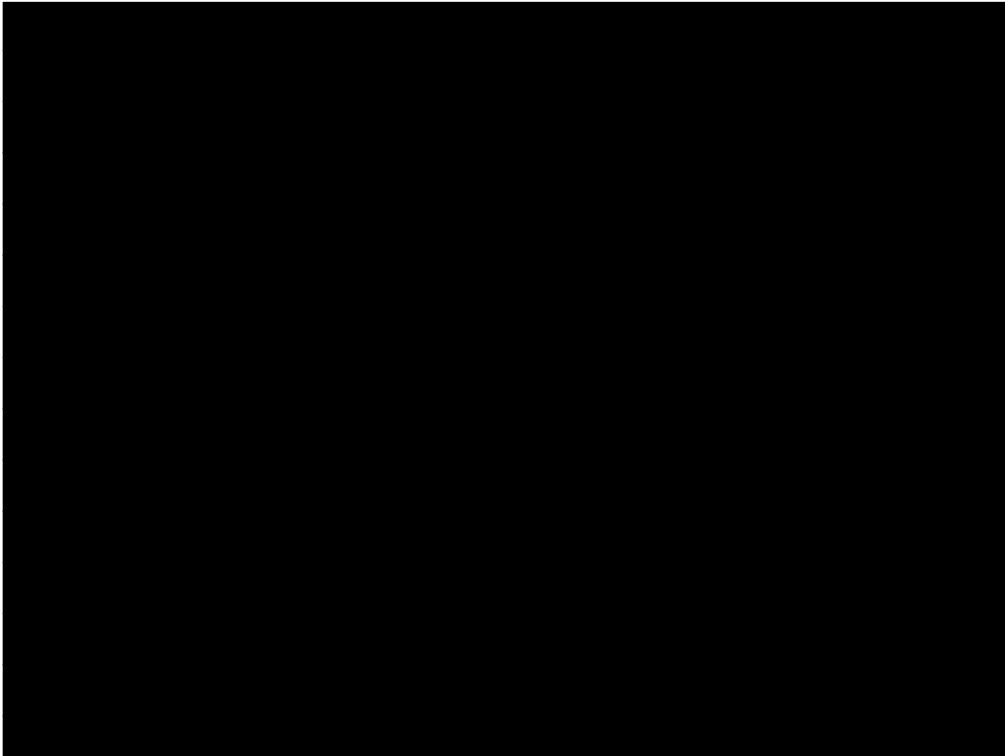
Internal Photograph of the EUT

File name CNIGUARD.5019.1.PUBLIC.DOCX

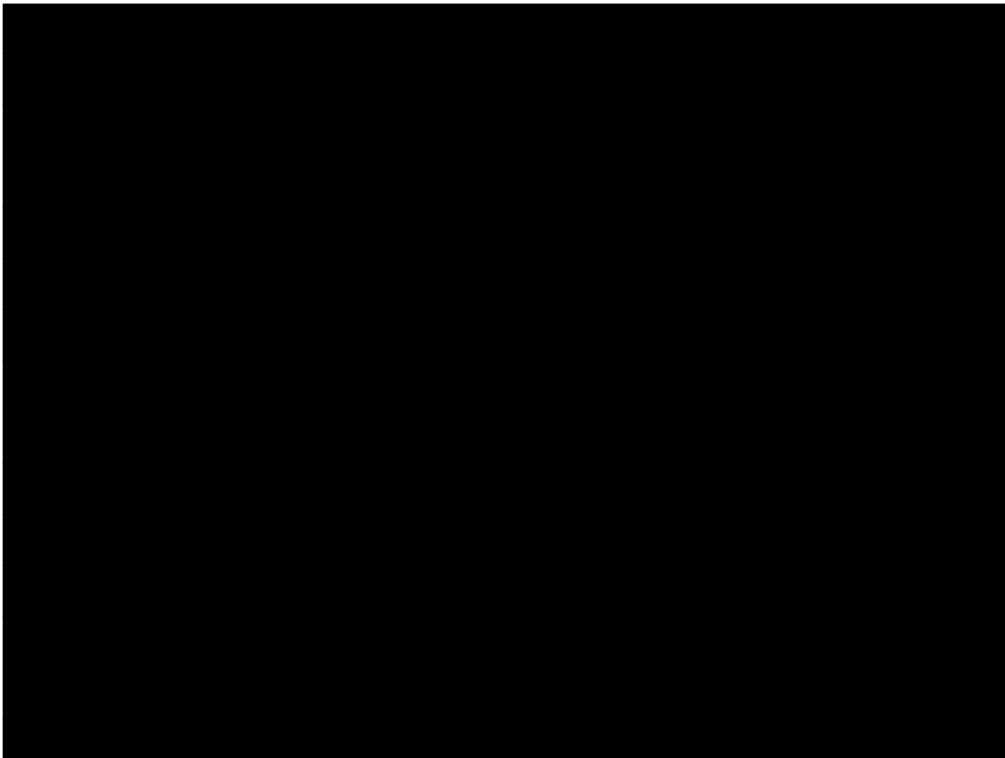
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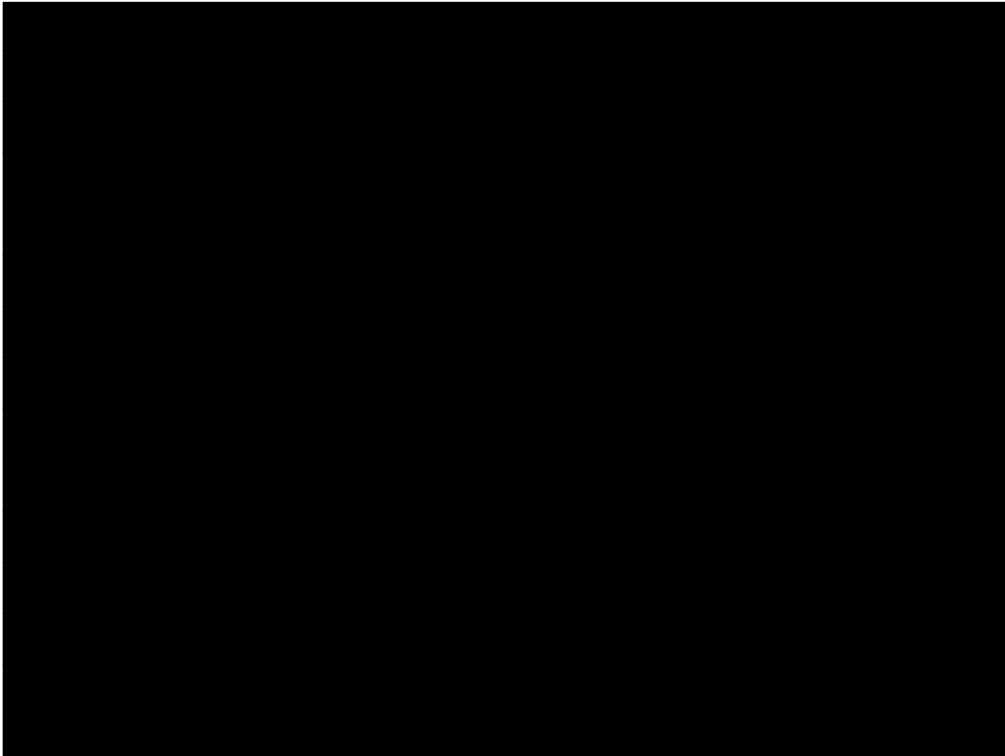
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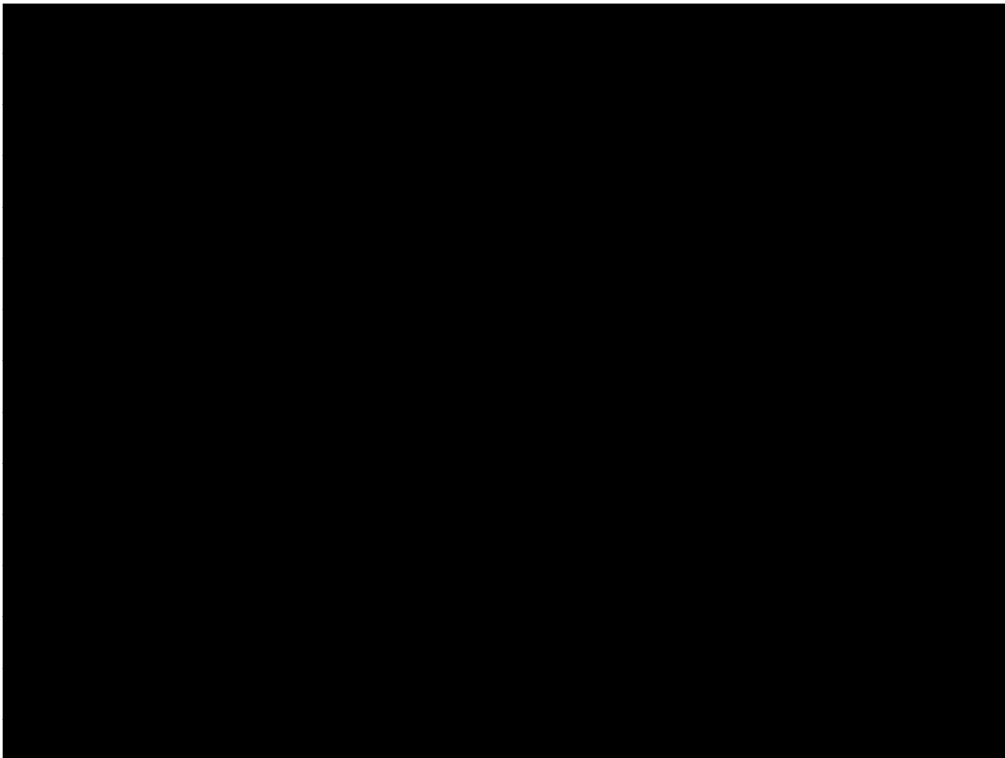
TOP MOTHER AND RF BOARDS



BOTTOM BOARD AND RS232/GPRS MODULES



GPRS MODULE



UNDERSIDE OF RF BOARD

9. Signal Leads

Port Name	Cable Type
RF SMA	coaxial to ISM antenna
GPRS (internal)	SMA coaxial to GSM antenna
RS232 (internal)	Multicore cable to RS232 peripheral
SCADA / relay (internal)	Multicore cable to display peripheral and dc power. Single core cables to switch.

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.

RN#	Model	Manufacturer	Description	Period (mths)	Cal Date
E035	HP11947A	Hewlett Packard	Transient Limiter + 10dB Atten.	6	01-Mar-12
E150	MN2050	Chase	LISN 13A	12	14-Oct-11
E268	BHA 9118	Schaffner	1-18 GHz Horn Antenna	60	14-Apr-11
E342	8563E	HP	Spectrum Analyser 26.5 GHz	24	29-Mar-11
E410	N5181A	Agilent	3 GHz MXG Signal Generator	12	26-Oct-11
E411	N9039A	Agilent	9 kHz - 1 GHz RF Filter Section	12	26-Oct-11
E412	E4440A	Agilent	3 Hz - 26.5 GHz PSA	12	26-Oct-11
TMS78	3160-08	ETS Systems	Std Gain Horn Antenna 12.4-18 GHz	24	03-Nov-10
TMS79	3160-09	ETS Systems	Std Gain Horn Antenna 18-26.5 GHz	24	03-Nov-10
TMS81	6502	EMCO	Active Loop Antenna	24	13-Apr-10 ²
TMS82	8449B	Agilent	Pre Amplifier 1 - 26 GHz	12	14-Nov-11
TMS933	CBL6141A	York EMC	Bilog Antenna 30MHz - 2GHz	36	09-Sep-10

² Item recalibrated 30-Apr-12, no adjustments required.

11. Auxiliary equipment

11.1 Auxiliary equipment supplied by CNlguard

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

Model	Manufacturer	Description
-	CNlguard	SCADA Display unit
-	-	GSM antenna

SCADA Display unit:



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#	Model	Manufacturer	Description
P166	MN2053	Farnell	PSU

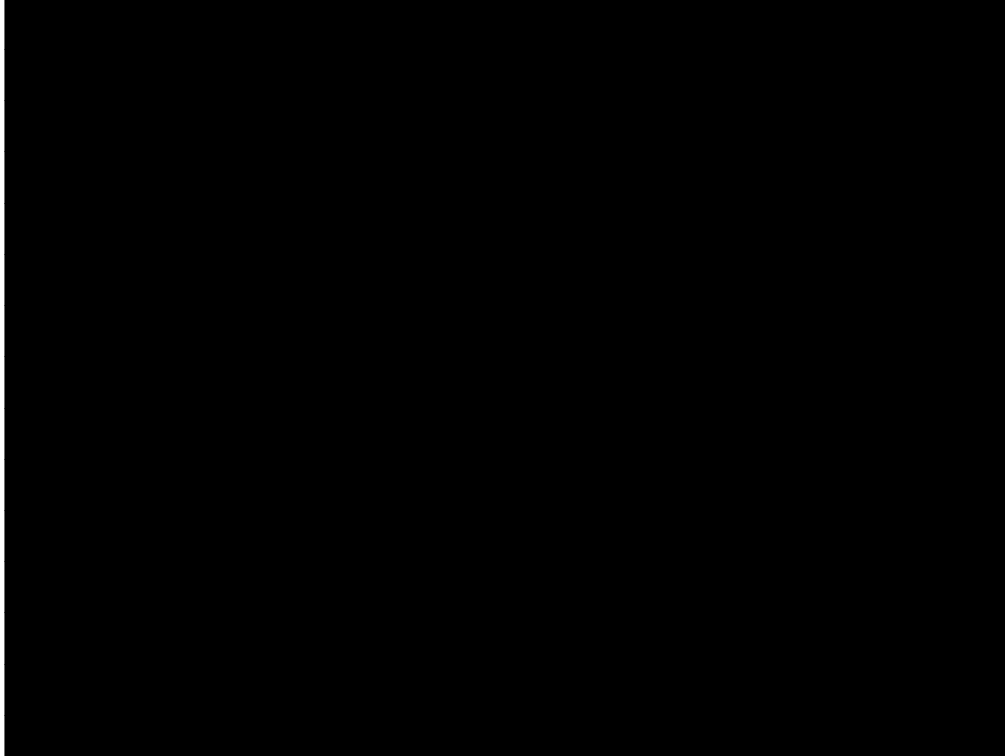
12. Modifications

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

The RF power level was reduced from the initial setting of 22 down to 18 in order to obtain the required eirp. The manufacturer has declared that this level will be used in production and that the user will not be given any utility to change the power level.

Ferrite cores with a single turn of cable were added to the RS232 output and SCADA output leads. Wurth part # 742 700 56.



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 EUT is a **Class DXT Intentional Radiator**, the receiver portion of which is verified. I.e. the EUT is not subject to DoC.

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
AM	Amplitude Modulation	max	maximum
Amb	Ambient	mbar	milliBars
ANSI	American National Standards Institute	MHz	MegaHertz
°C	Degrees Celsius	min	minimum
CFR	Code of Federal Regulations	mm	milliMetres
CS	Channel Spacing	ms	milliSeconds
CW	Continuous Wave	mW	milliWatts
dB	decibels	NA	Not Applicable
dBµV	decibels relative to 1µV	nom	Nominal
dBc	decibels relative to Carrier	nW	nanoWatt
dBm	decibels relative to 1mW	OATS	Open Area Test Site
DC	Direct Current	OFDM	Orthogonal Frequency Division Multiplexing
DoC	Declaration of Conformity	ppm	Parts per million
EIRP	Equivalent Isotropic Radiated Power	QAM	Quadrature Amplitude Modulation
ERP	Effective Radiated Power	QPSK	Quadrature Phase Shift Keying
EUT	Equipment Under Test	Ref	Reference
FCC	Federal Communications Commission	RF	Radio Frequency
FM	Frequency Modulation	RTP	Room Temperature and Pressure
FSK	Frequency Shift Keying	s	Seconds
g	Grams	Tx	Transmitter
GHz	GigaHertz	V	Volts