



**FCC 47CFR part 15C
Test Report
For
Installation Tool**

Reference Standard: FCC 47CFR part 15C
Manufacturer: Guidance Monitoring Ltd
For type of equipment and serial number, refer to section 3
Report Number: 01-451/4529/1/11
Report Produced by: -

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2. Summary of test results

The Installation Tool was tested to the following standards: -

FCC 47CFR Part 15C (effective date October 1st, 2010); Class DSC 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 C63.4 §7.	PASSED
2. Radiated emissions	ANSI C63.4 §8.	PASSED
3. Intentional radiator field strength	ANSI C63.10 §6.5.	PASSED
4. Occupied bandwidth and band edge	ANSI C63.10 §6.9.	PASSED
5. Frequency stability	ANSI C63.10 §6.8.	NOT APPLICABLE ¹
6. Periodic operation and emissions	ANSI C63.10 §7.4. – 7.6.	PASSED

¹ EUT is not operating in the 40.66 – 40.70 MHz band, therefore no limits are specified.

This report relates to the equipment tested as identified by a unique serial number and 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.

Date of Test:

7th-8th December 2010 & 28th January
2011

Test Engineer:

Approved By:

Customer Representative:

3. Equipment Under Test (EUT)

3.1 Equipment Specification

Applicant	Guidance Monitoring Ltd 4 Dominus Way Meridian Business park Leicester Leicestershire LE19 1RP
Manufacturer of EUT	Guidance Monitoring Ltd
Brand name of EUT	Guidance Monitoring Ltd
Model Number of EUT	Installation Tool
Serial Number of EUT	FITGML010596
Date when equipment was received by RN Electronics	7th December 2011
Date of test:	7th-8th December 2010 & 28th January 2011
Customer order number:	4555
Visual description of EUT:	Curved red plastic enclosure with IR window on the inside. On the outside are several push buttons and status LED's along with a locking handle.
Main function of the EUT:	OPID fitting tool, used to assist an officer when fitting an OPID tag to an offender.
Height	72mm
Width	55mm
Depth	127mm
Weight	0.143kg
Voltage	AC 100-240V@ 0.4A, DC 6V @ 2.5A Internal battery 3.7V @ 0.72A
Current required from above voltage source	As above

3.2 EUT Configurations for testing

Frequency range	433.92 MHz
Normal use position	Briefly placed next to leg when fitting OPID tag
Normal test signals	FSK
Declared power level	-15dBm
Declared channel bandwidth	74 kHz
Highest frequency generated / used	433.92MHz
Lowest frequency generated / used	3.6864MHz

3.3 EUT Modes

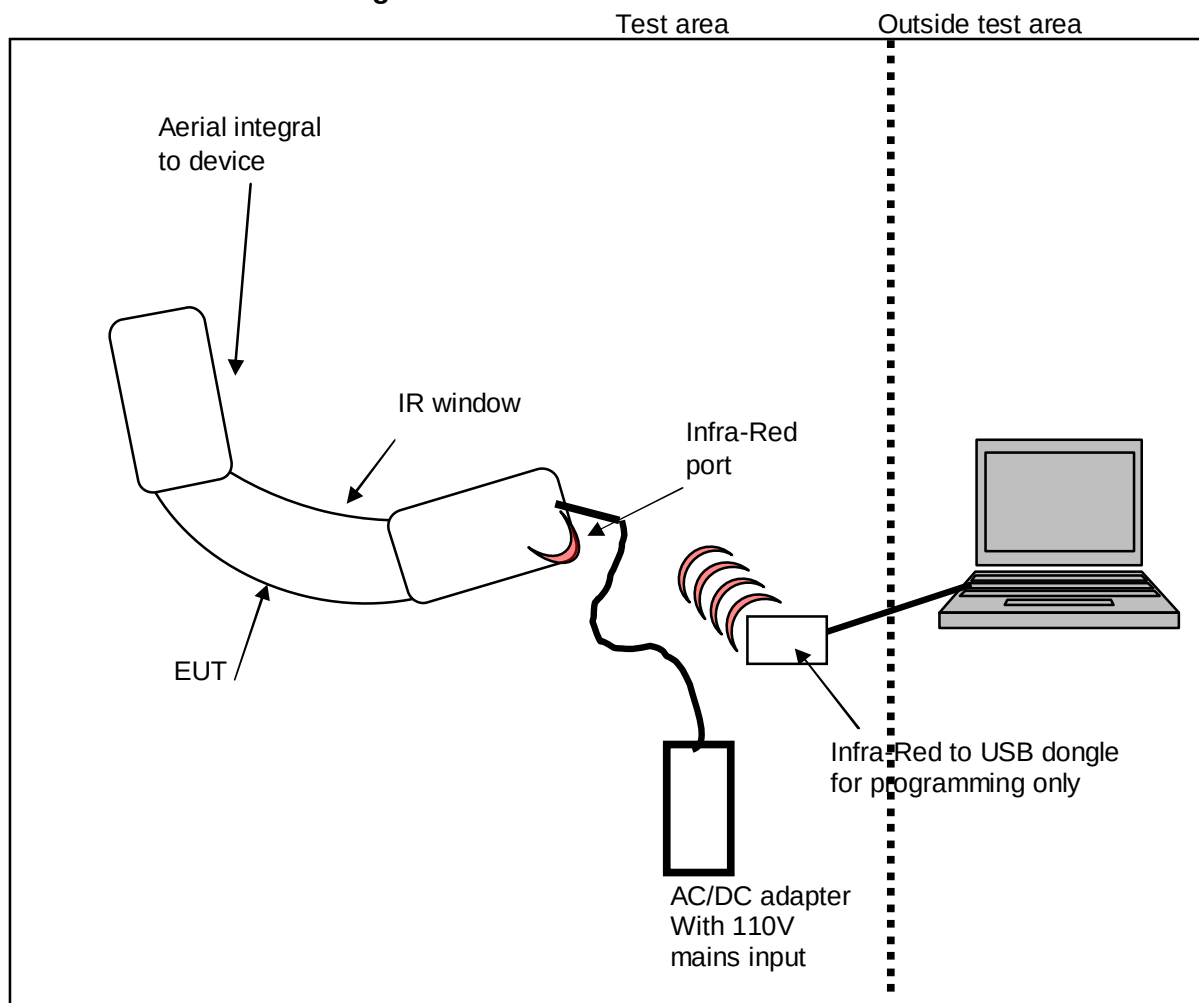
Mode	Description of mode	Used for Testing
CW Mode	Constant Transmit mode without modulation	YES
Modulated Constant TX	Constant Transmit mode with modulation	YES
Normal mode	Unit transmitting once every 15 seconds	YES

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: 26 April 2011

3.4 Emissions Configuration



The EUT was powered via an AC/DC supply provided with the unit and also had an internal rechargeable battery. The unit could be operated with or without the AC/DC supply connected. An ancillary laptop was used together with an Infra-red to USB dongle, to set and change operational modes. See section 3.3 modes.

AC/DC charging supply details:

- Manufacturer: Stontronics
- Part: T4101ST
- Model: 3A-161WE06
- Input 100-240V, 50-60Hz 0.4A
- Output 6V DC 2.5A

4. Specifications

The tests were performed by RN Electronics Engineer Daniel Sims who set up the tests, the test equipment, and operated it in accordance with the **R.N. Electronics Ltd** procedures manual, FCC Part 15 and those specifications incorporated by reference into 47CFR15 (e.g. ANSI C63.4-2003). In addition reference is made to ANSI C63.10-2009, where no other incorporated standard exists.

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

4.1 Deviations

None.

4.2 Tests at Extremes of Temperature & Voltage

Testing at extremes of temperature & voltage were not required.

- ☐ A permanent internal RF port was used for testing.
- ☐ A test fixture was used for testing.
- ☐ A temporary RF port was created for testing.
- ☒ The equipment Integral Antenna was used for testing.

4.3 Measurement Uncertainties

Parameter	Uncertainty
Transmitter Tests	
Bandwidth	<± 1.9 %
Radiated RF Power	<± 3.5 dB
Radiated Spurious Emissions	<± 3.4 dB
Attack & Release times	<± 5.1 ms
Tx time	<± 0.4 s

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 C63.4, Reference (7.)

5.1.1.1 Configuration of EUT

The EUT and AC/DC adapter were placed on a wooden table 0.8m above the ground plane and 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.

The EUT was operated in **Normal mode**, which was the standard operational mode available (other modes provided are for engineering/test purposes only) see section 3.3.

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: 21°C

Analyser plots for the Quasi-Peak / Average values as applicable and a table of signals within 20dB of the limit line can be found in Section 6.1 of this report.

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 Radiated emissions

5.2.1 Test Methods

Test Requirements	FCC Part 15C, Reference (15.209)
Test Method:	ANSI C63.4, Reference (8.)

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. Radiated Emissions testing was performed with a fully charged battery. The EUT was operated in **CW TX** mode.

5.2.1.2 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 1m above the ground 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.

5.2.2 Test results

Tests were performed using Test Site M.

Test Environment: M Temperature: 18°C Humidity: 33-53%

Analyser plots for the Quasi-Peak / Average values as applicable and any table of signals within 20dB of the limit line can be found in Section 6.2 of this report. Band Edge Compliance plots can be found in section 6.6 of this report.

Note: EUT tested in a continuous transmit mode for ease of test. Duty cycle correction then applied from FCC 15.35. TX on time in 100mS period. See section 5.5 Periodic operation and emissions within this report.

The EUT was checked with and without the charger connected and maximum emissions were found to be with the device connected to the charger. This worst case data is presented in this report.

Spurious emissions relating to the Transmitter were not present within 20dB of the limit, However, general radiated emissions were present and these are shown and tested to the General 15.209 limits.

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

5.2.2.1 Test Equipment used

E410, E411, E412, TMS933, TMS81, TMS82, TMS342, E268

See Section 10 for more details

5.3 Intentional radiator field strength

5.3.1 Test Methods

Test Requirements FCC Part 15C, Reference (15.231e)
Test Method: ANSI C63.10, Reference (6.5)

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 antenna. 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 was rotated in all three orthogonal planes. The EUT was operated in **CW TX** mode.

5.3.1.2 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.

NOTE: The EUT was checked with and without the charger connected and maximum emissions were found to be with the device connected to the charger. This worst case data is presented in this report.

5.3.2 Test results

Test Environment:

Temperature: 18°C Humidity: 54 %

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

Channel	Measured result	Duty cycle	Total
433.92MHz	PK (dBuV/m @3m)	adjustment (dB)	AV (dBuV/m @3m)
Vertical	74.0	-6.2dB	67.8
Horizontal	77.6	-6.2dB	71.4

Note: EUT tested in a continuous transmit mode for ease of test. Duty cycle correction then applied from FCC 15.35. TX on time in 100mS period. See section 5.5 Duty cycle within this report.

Limits: Average = 72.87dBuV/m @ 3m.

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

5.3.2.1 Test Equipment used

E410, E411, E412, TMS933

See Section 10 for more details

5.4 Frequency stability

Test not applicable. Limits are not specified under this rule part except for devices that operate in 40.66 – 40.70 MHz band.

5.5 Duty cycle and periodic operation

5.5.1 Test Methods

Test Requirements FCC Part 15C, Reference (15.231e)

Test Method: ANSI C63.10, Reference (7.4 – 7.6)

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 antenna. The EUT was measured at a distance of 3 metres. The EUT was operated in **Normal mode**.

5.5.1.2 Test Procedure

Tests were made in accordance with FCC Part 15 using the measuring equipment noted below. The centre frequency of the analyser was set to that of the transmitter, and the span set to zero. The sweep time was adjusted so that either the pulse width or the periodic operation could be observed.

Test site 'M' has been listed with the FCC.

5.5.2 Test results

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

Temperature of test Environment: 18°C

Analyser plots for the dwell time and duty cycle can be found in Section 6.4 of this report.

State	Result (ms)	Plot reference
TX on 100mS period	49.0	J4529-1, TX ON (duty)
Repetition rate	22.1 seconds	J4529-1, TX Duty repetition J4529-1, TX Duty repetition 100secs

Limits: > 10second interval between transmissions.

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

The duty cycle correction factor for peak to average emissions is therefore $20\log(49/100) = -6.2$ dB.

5.5.2.1 Test Equipment used

E410, E411, E412, TMS933

See Section 10 for more details.

5.6 Occupied bandwidth and band edge

5.6.1 Test Methods

Test Requirements	FCC Part 15C, Reference (15.231c)
Test Method:	ANSI C63.10, Reference (6.9)

5.6.1.1 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 tested whilst connected to the AC power for maximised emissions. The EUT was operated in **normal & constant modulated TX** modes. Worst case data is presented.

5.6.1.2 Test Procedure

Tests were made in accordance with FCC Part 15 using the measuring equipment noted below. A 120kHz RBW, 3x VBW, auto sweep time and max hold settings were used for band edge and a 3kHz RBW, 3x VBW, auto sweep time and max hold settings for 20dB Bandwidth.

5.6.2 Test results

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

Temperature of test Environment: 18°C

Analyser plots for the 20dB bandwidth can be found in Section 6.5 of this report.

Channel	Result	Plot reference
Single channel	90.46 kHz	J4529-1, 20dB Bandwidth (3k RBW) J4529-1, Band Edge compliance

Limits: must be <0.25% of centre frequency.
 $F_c = 433.92\text{MHz} = 1.085\text{MHz}$.

Band edge compliance applies only to 40.66 – 40.70 MHz band.

The restricted band edges closest to the EUT frequency of 433.92MHz are 410 & 608MHz. Further wider span plots have been taken to show the fact that there are no spurious emissions above the restricted limits of 15.209. See section 6.5 of this report.

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

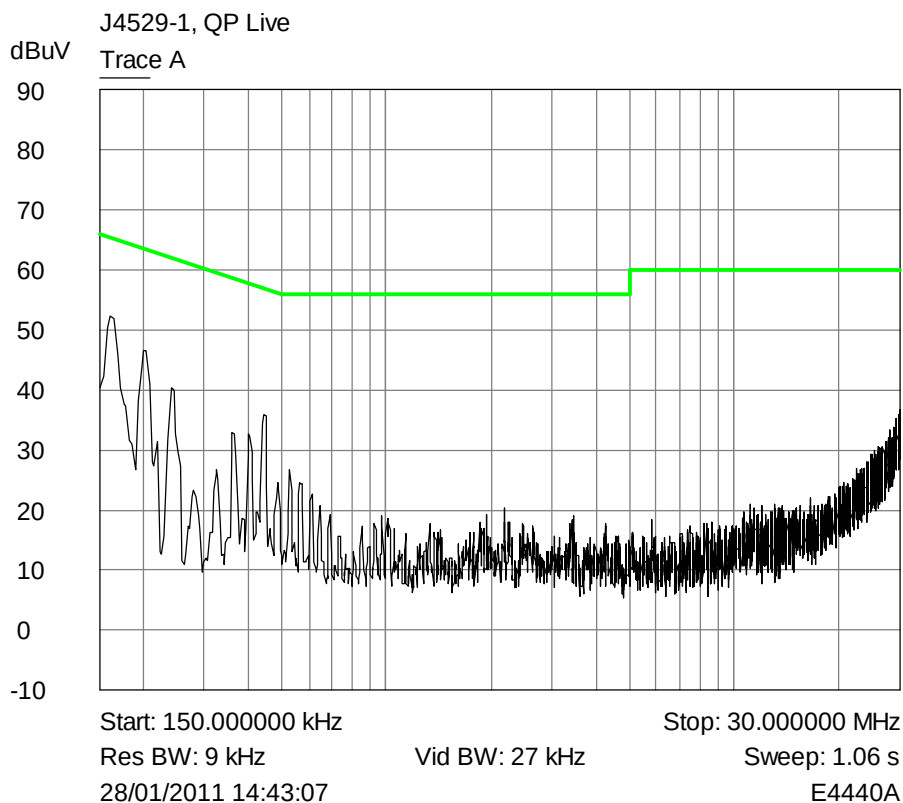
5.6.2.1 Test Equipment used

E410, E411, E412, TMS933

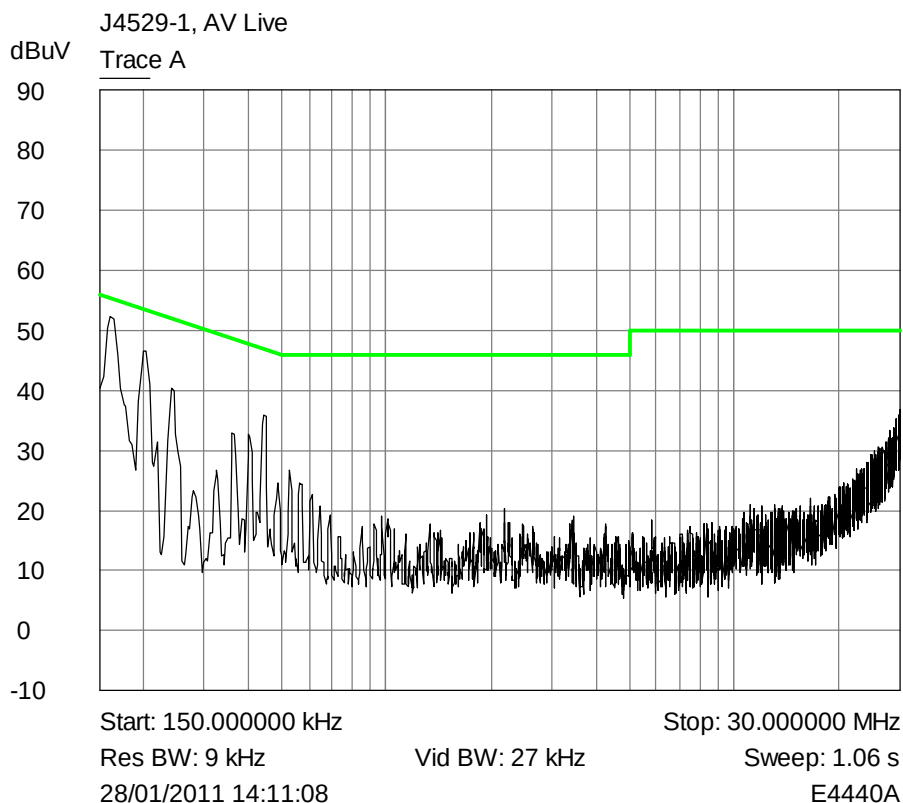
See Section 10 for more details.

6. Plots and Results

6.1 Conducted Emissions



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

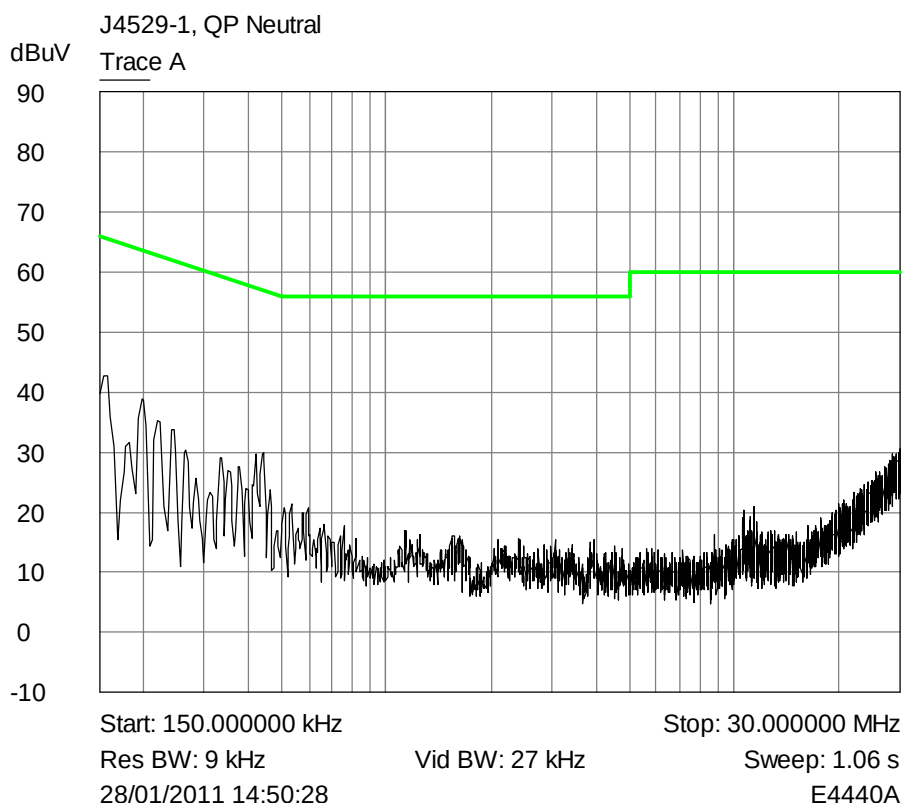


**Plot of peak emissions 150kHz - 30MHz on the mains live terminal
against the average limit line.**

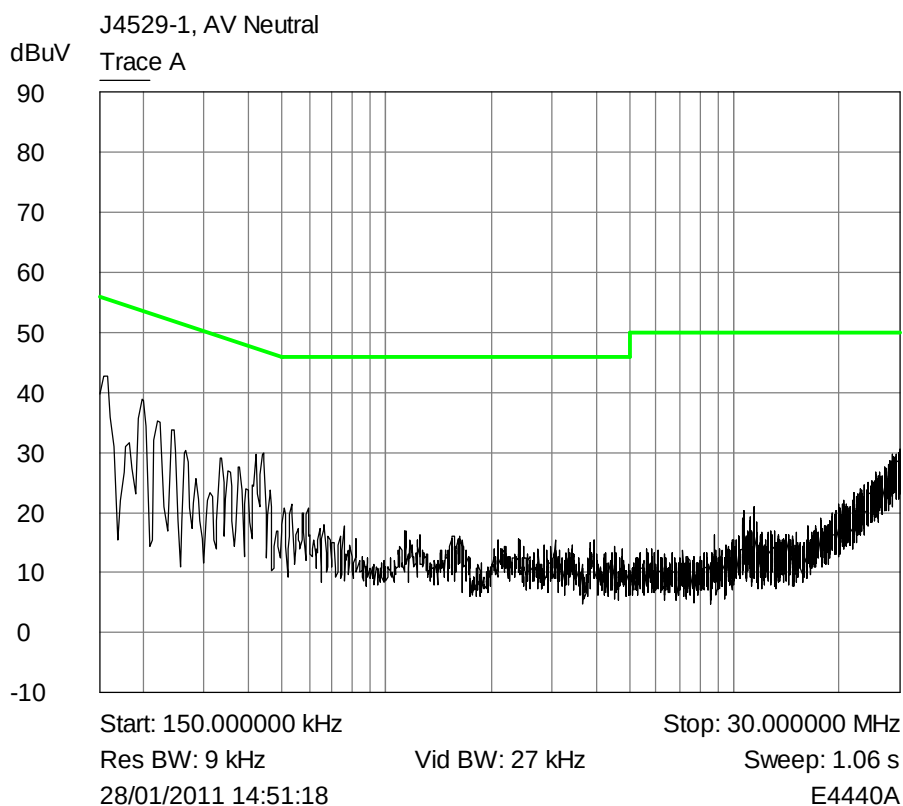
Table of signals measured.

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	0.172	43.4	42.0	-22.9	24.5	-30.4
2	0.195	39.5	37.0	-26.8	19.9	-33.9
3	0.22	33.5	30.1	-32.7	12.8	-40.0
4	0.248	25.5	19.1	-42.7	6.9	-44.9
5	0.273	22.7	16.9	-44.1	6.6	-44.4
6	0.299	24.7	21.1	-39.2	10.5	-39.8
7	0.325	30.4	28.3	-31.3	17.0	-32.6
8	0.344	29.3	26.9	-32.2	17.3	-31.8
9	0.397	28.5	26.2	-31.7	14.9	-33.0
10	0.428	32.4	30.8	-26.5	23.2	-24.1
11	0.444	33.5	24.4	-32.6	9.1	-37.9
12	28.685	29.4	26.5	-33.5	19.0	-31.0
13	29.159	30.3	27.1	-32.9	19.9	-30.1
14	29.26	29.5	26.4	-33.6	19.1	-30.9



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



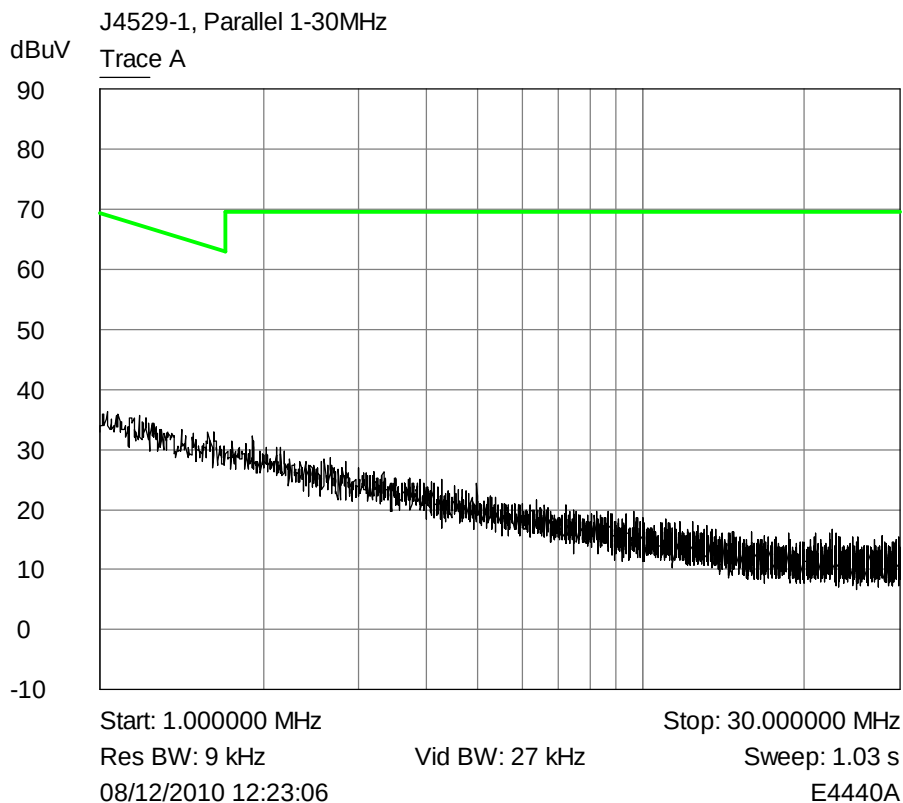
**Plot of peak emissions 150kHz - 30MHz on the mains neutral terminal
against the average limit line.**

Table of signals measured.

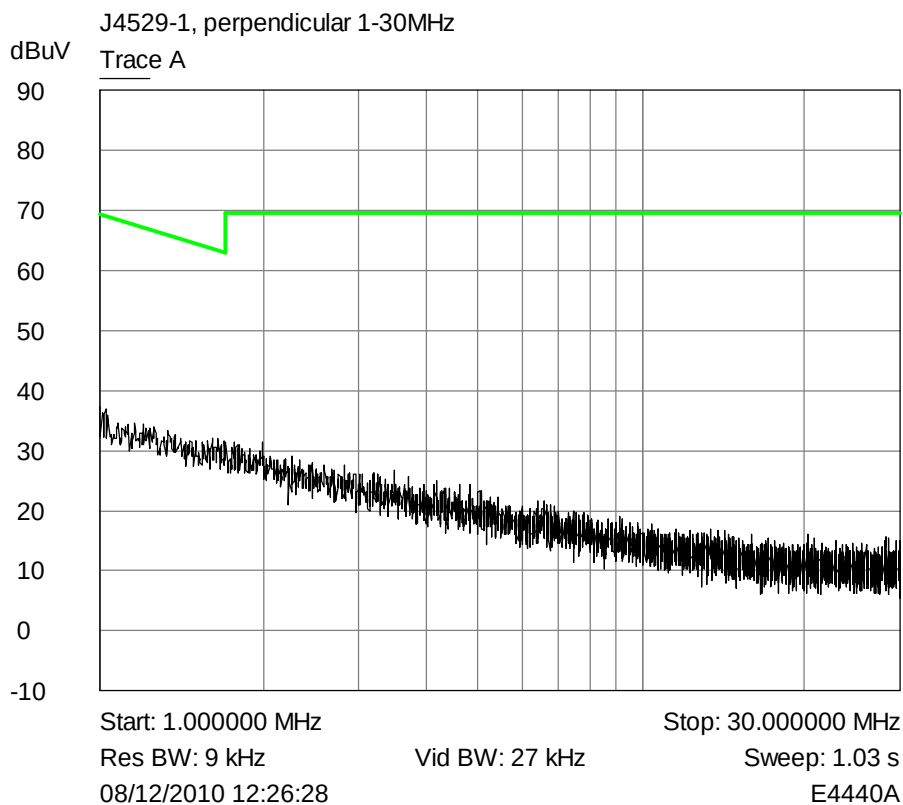
Quasi-Peak and Average Neutral

Signal No.	Freq (MHz)	Peak Amp (dBuV)	QP Amp (dBuV)	QP - Lim1 (dB)	AV Amp (dBuV)	AV - Lim1 (dB)
1	0.162	40.9	39.3	-26.1	22.3	-33.1
2	0.183	38.7	37.2	-27.1	21.7	-32.6
3	0.203	37.0	35.4	-28.1	21.4	-32.1
4	0.223	34.9	33.4	-29.3	21.2	-31.5
5	0.244	32.9	31.2	-30.8	20.7	-31.3
6	0.264	31.5	29.7	-31.6	19.7	-31.6
7	0.304	29.0	26.6	-33.5	16.5	-33.6
8	0.406	29.6	27.6	-30.1	20.7	-27.0
9	0.426	32.2	30.9	-26.4	25.0	-22.3
10	0.447	32.4	31.4	-25.5	25.9	-21.0
11	29.868	30.2	26.5	-33.5	19.7	-30.3

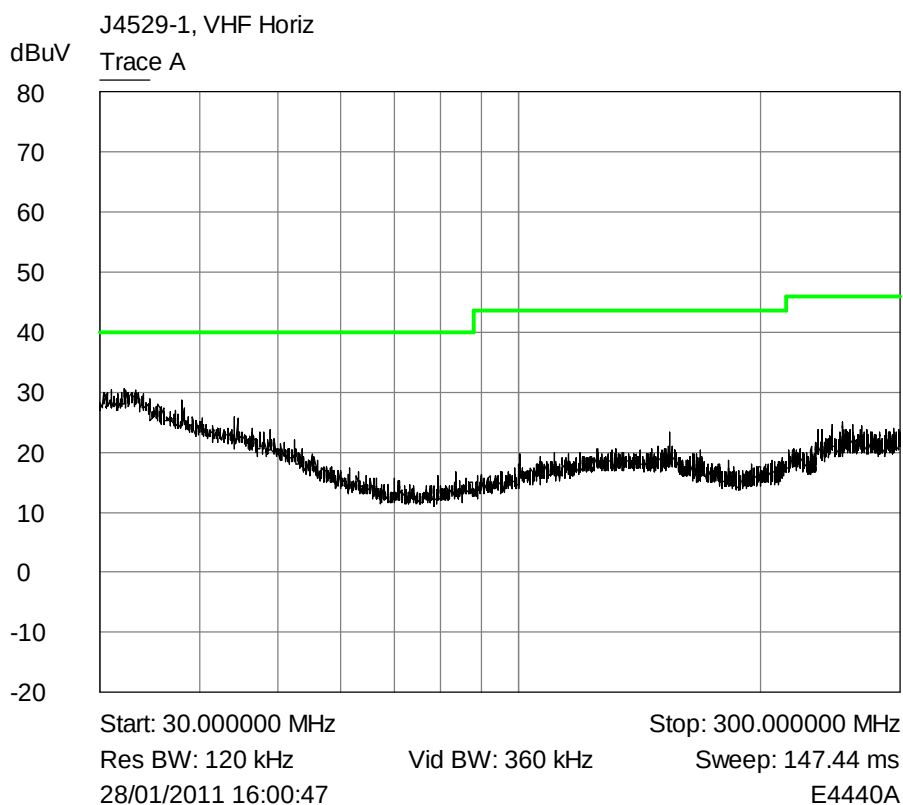
6.2 Radiated Emissions



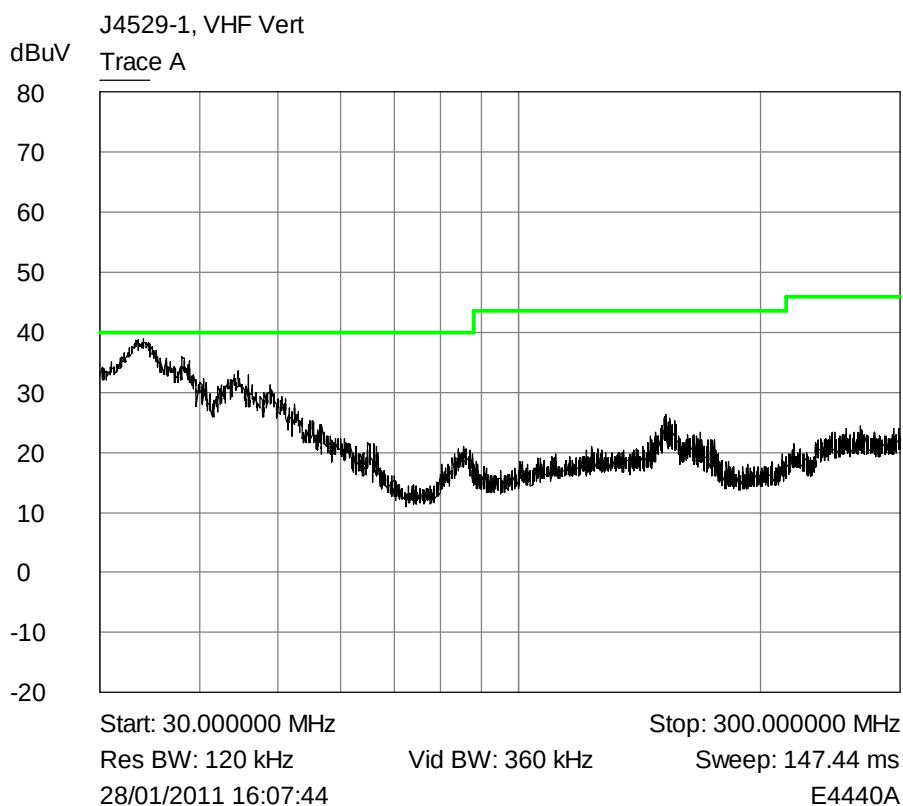
Plot of peak Parallel emissions 1 - 30MHz against the quasi-peak limit line.



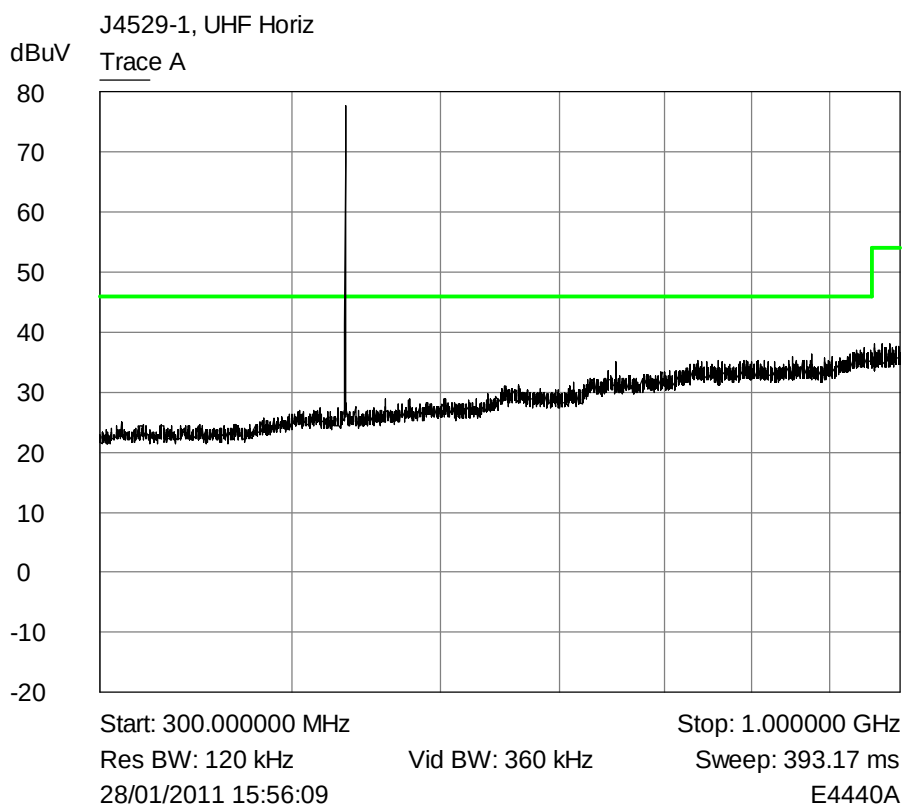
Plot of peak Perpendicular emissions 1 - 30MHz against the quasi-peak limit line.



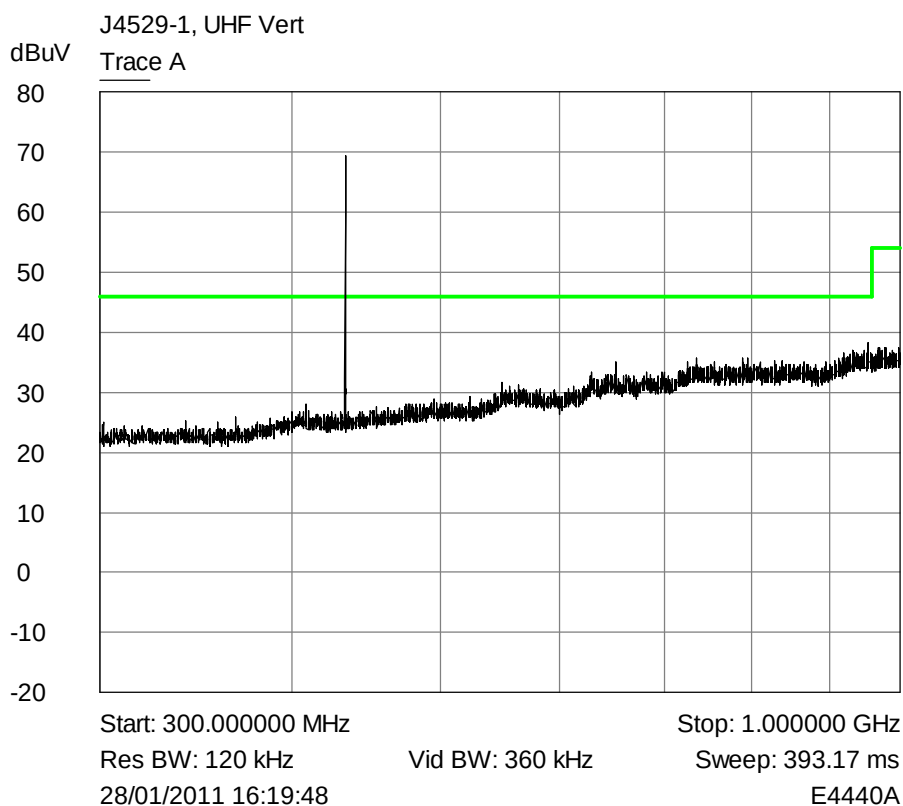
Plot of peak horizontal emissions 30MHz - 300MHz against the quasi-peak limit line.



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.

Table of signals measured below 1GHz.

Horizontal

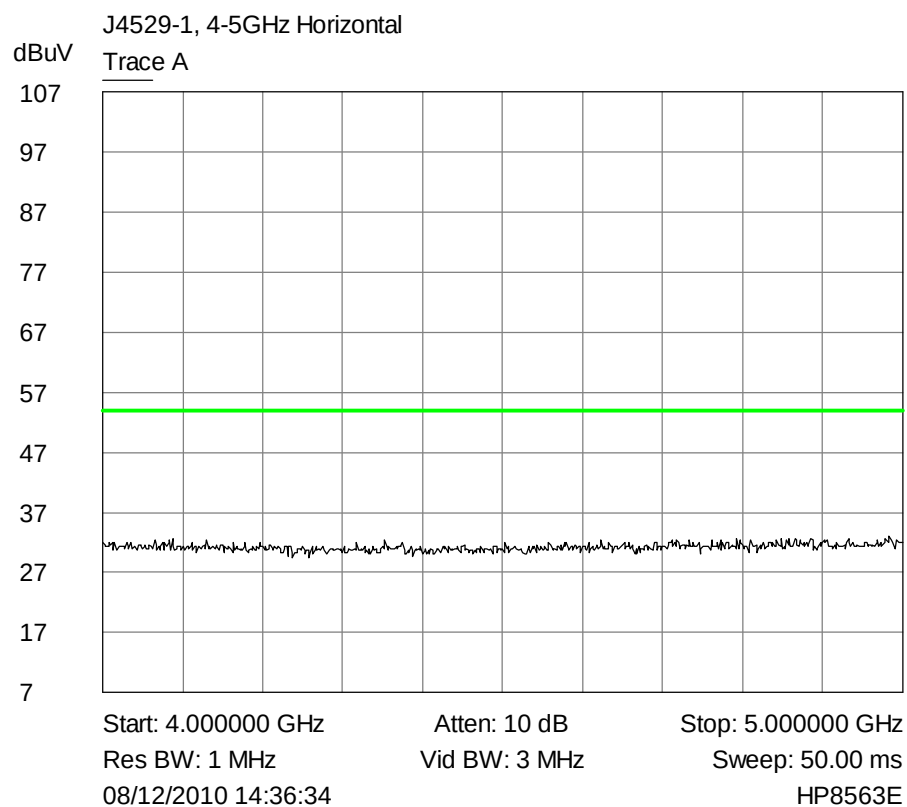
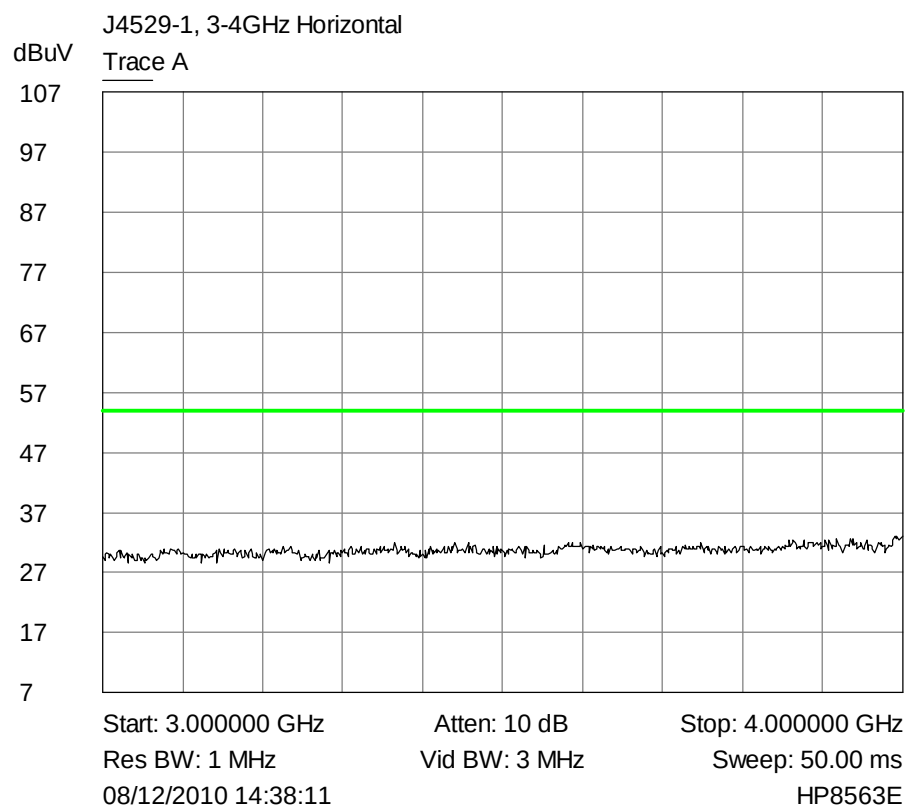
Signal No.	Freq (MHz)	Peak Amp (dBuV)	QP Amp (dBuV)	QP - Lim1 (dB)
1	154.501	20.1	13.4	-30.1
2	246.996	26.0	21.3	-24.7
3	651.512	35.6	30.2	-15.8

Vertical

Signal No.	Freq (MHz)	Peak Amp (dBuV)	QP Amp (dBuV)	QP - Lim1 (dB)
1	32.971	38.6	33.3	-6.7
2	34.051	39.1	33.7	-6.3
3	35.310	37.8	31.8	-8.2
4	38.270	35.5	29.3	-10.7
5	44.701	34.4	29.0	-11.0
6	48.890	32.1	26.5	-13.5
7	152.691	26.7	19.8	-23.7
8	651.568	35.3	29.9	-16.1

Plots of Average horizontal emissions 1GHz - 5GHz against the Average limit line.





**Plot of Average Vertical emissions 1GHz - 5GHz against the Average
limit line.**



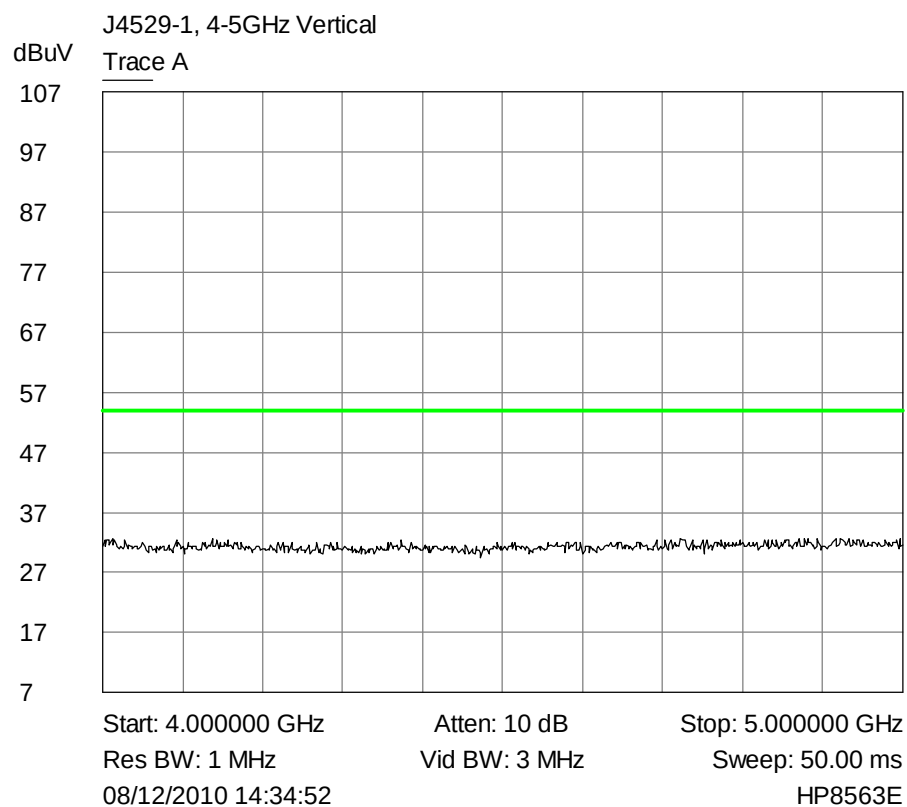
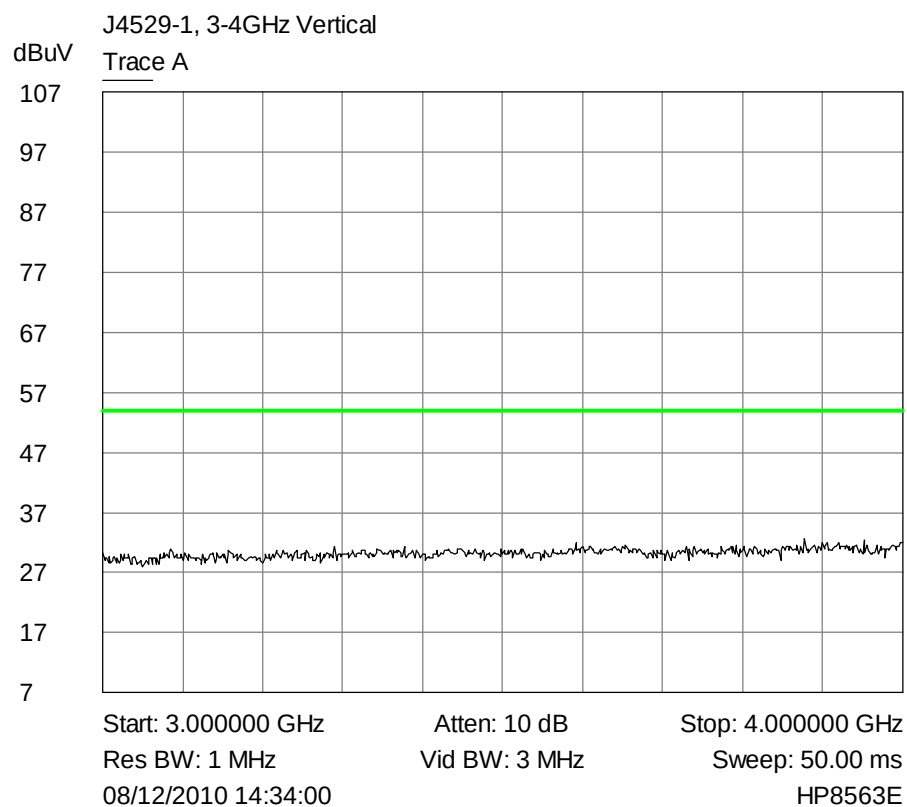
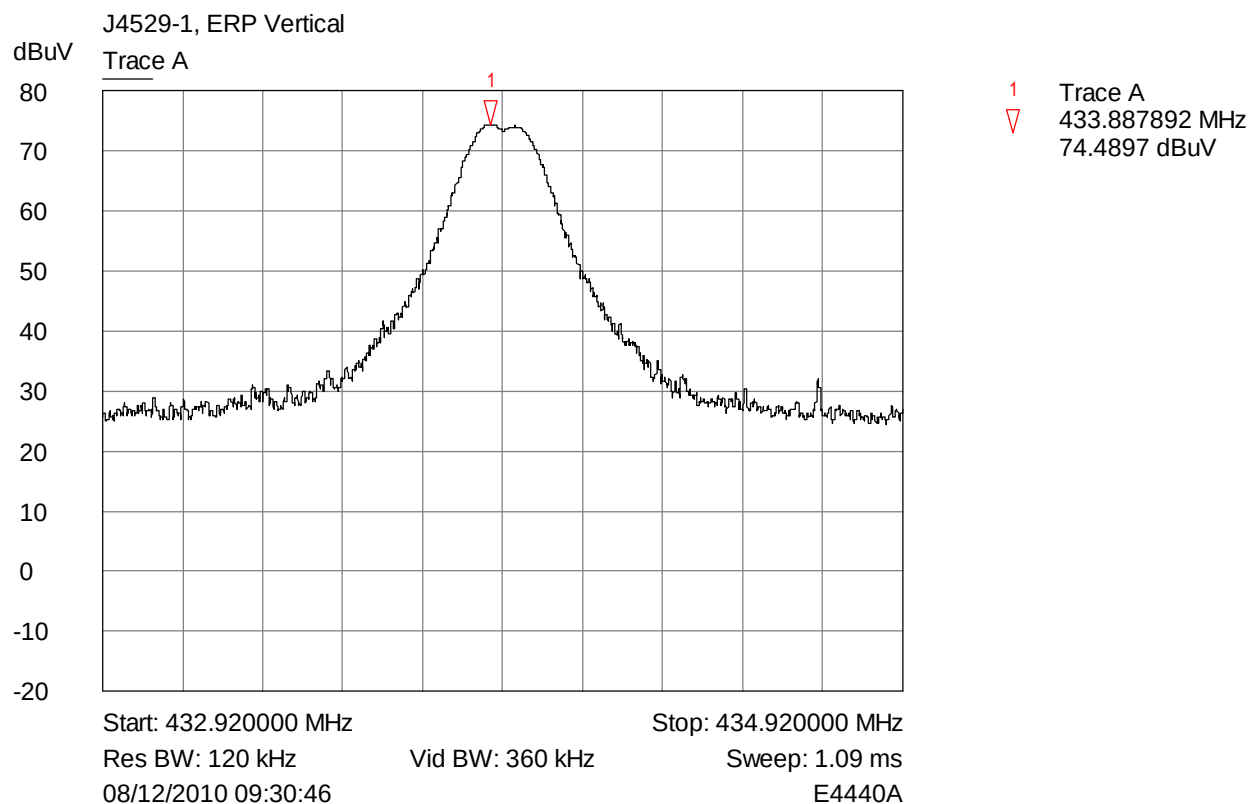
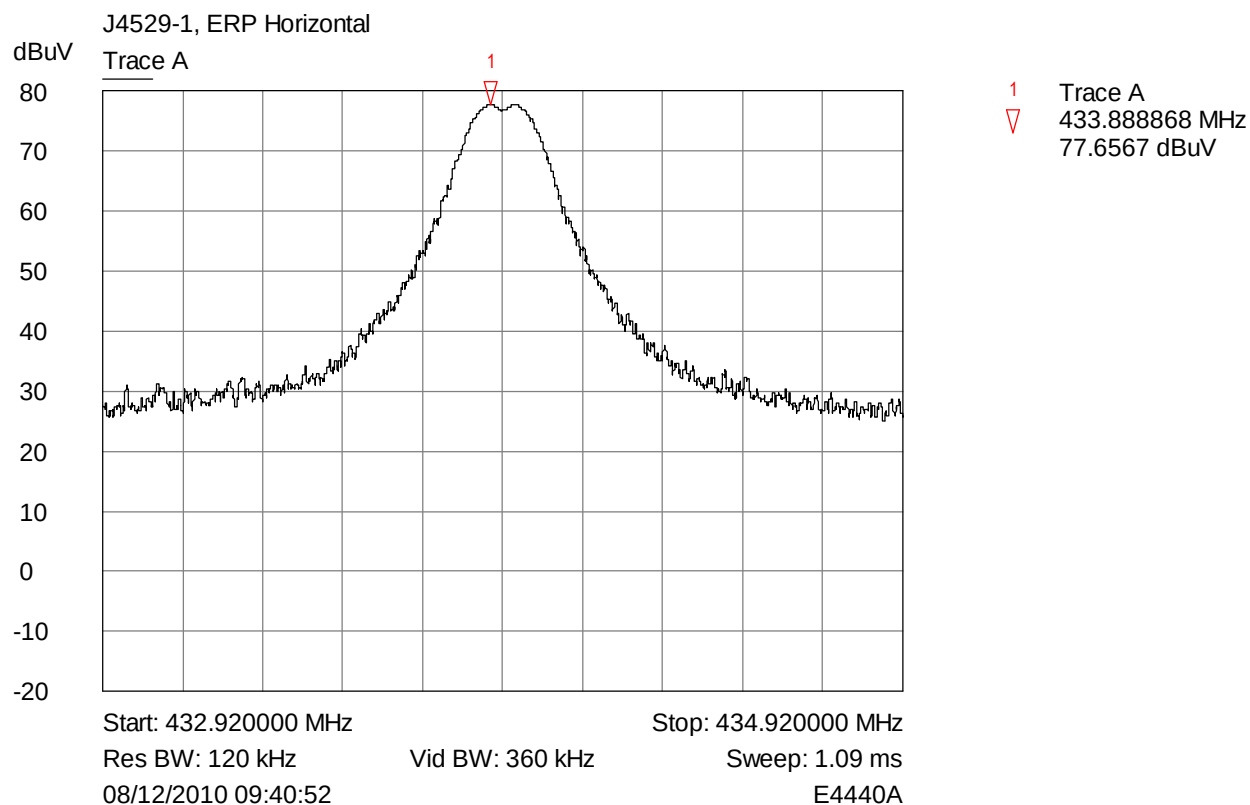


Table of signals measured above 1GHz.

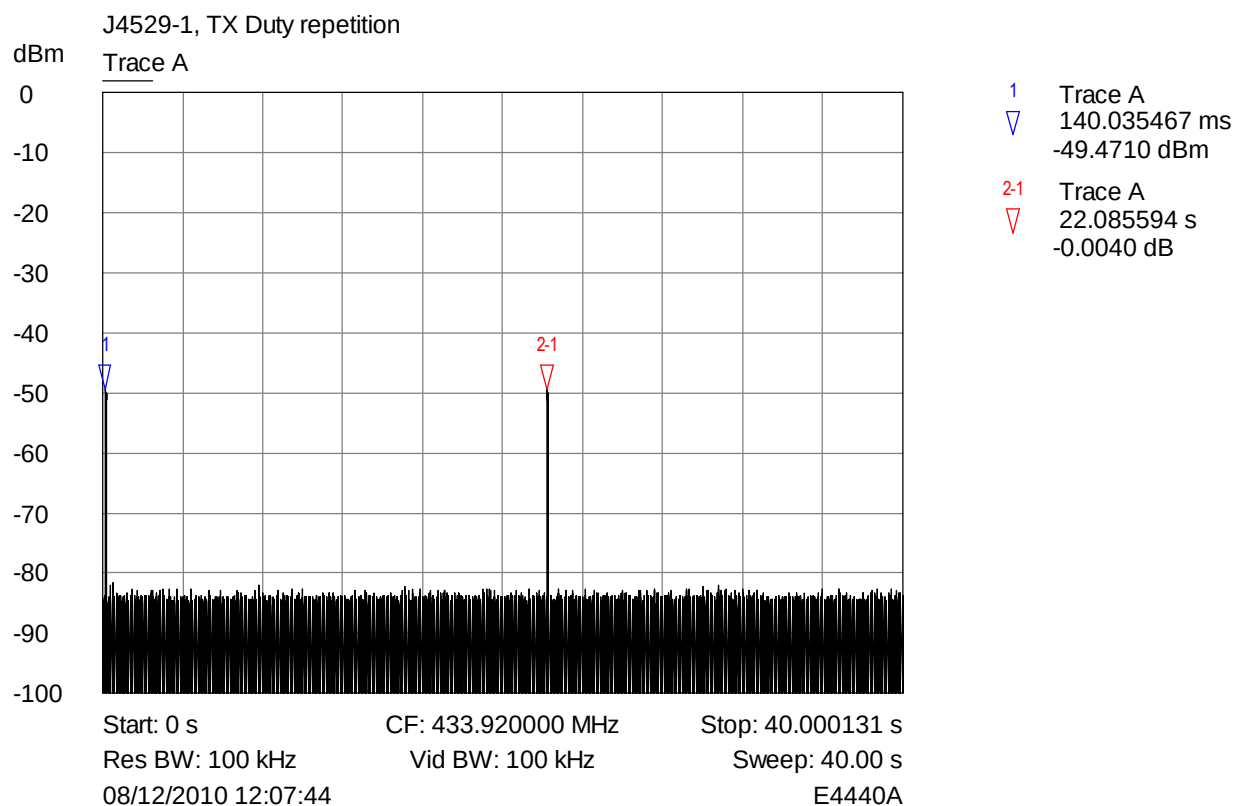
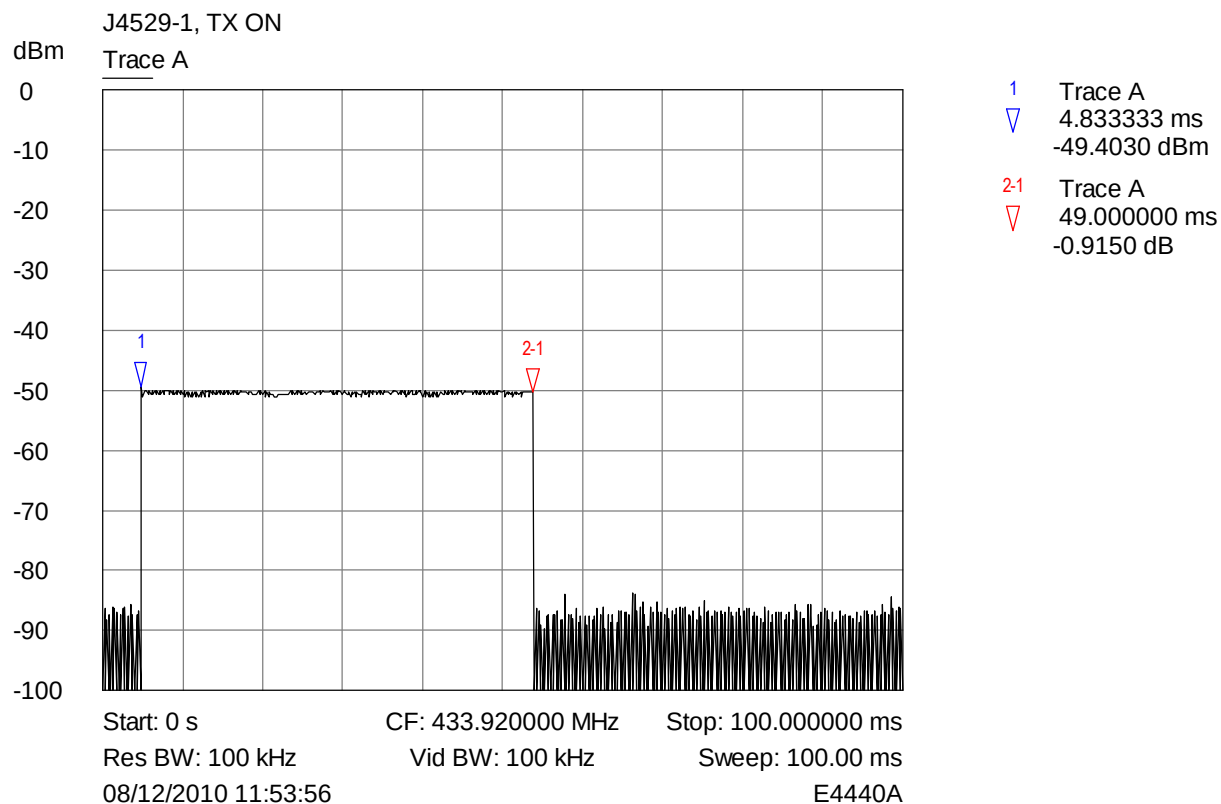
No signals were found within 20dB of the limits above 1GHz

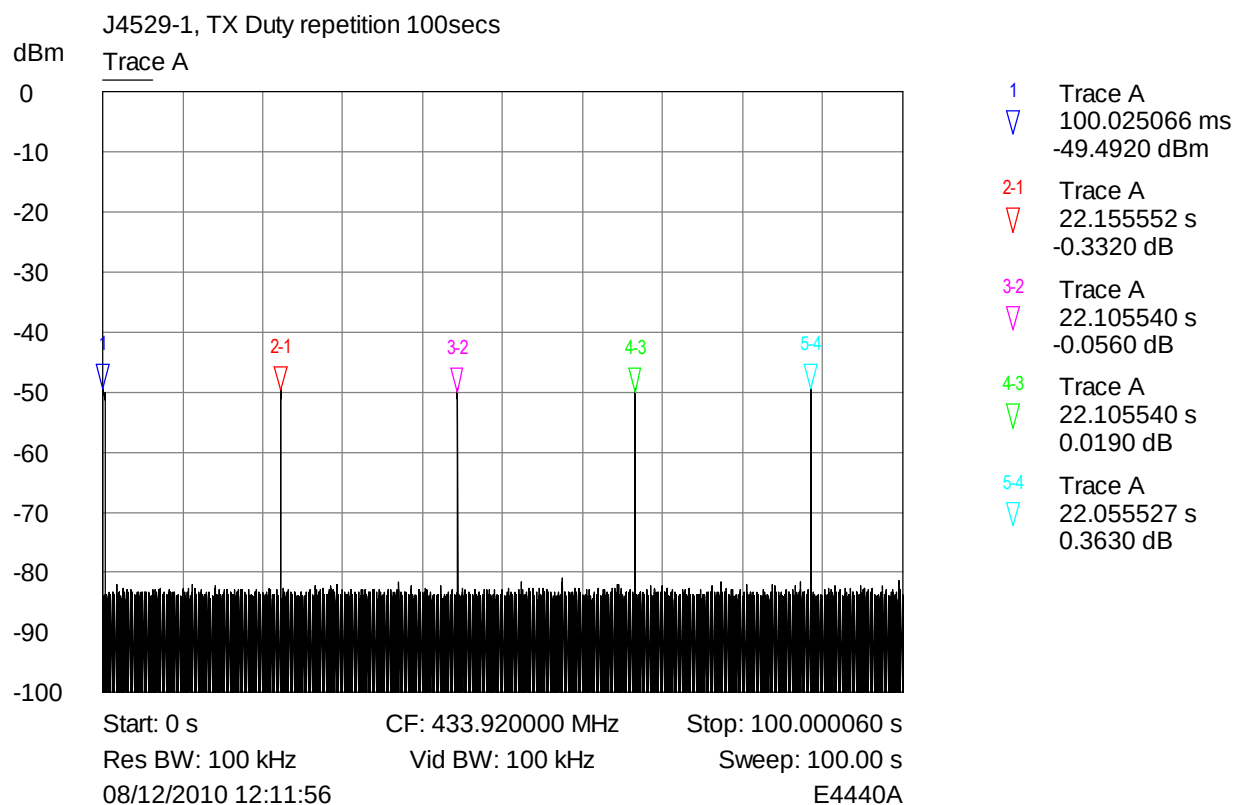
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6.3 Fundamental Emissions

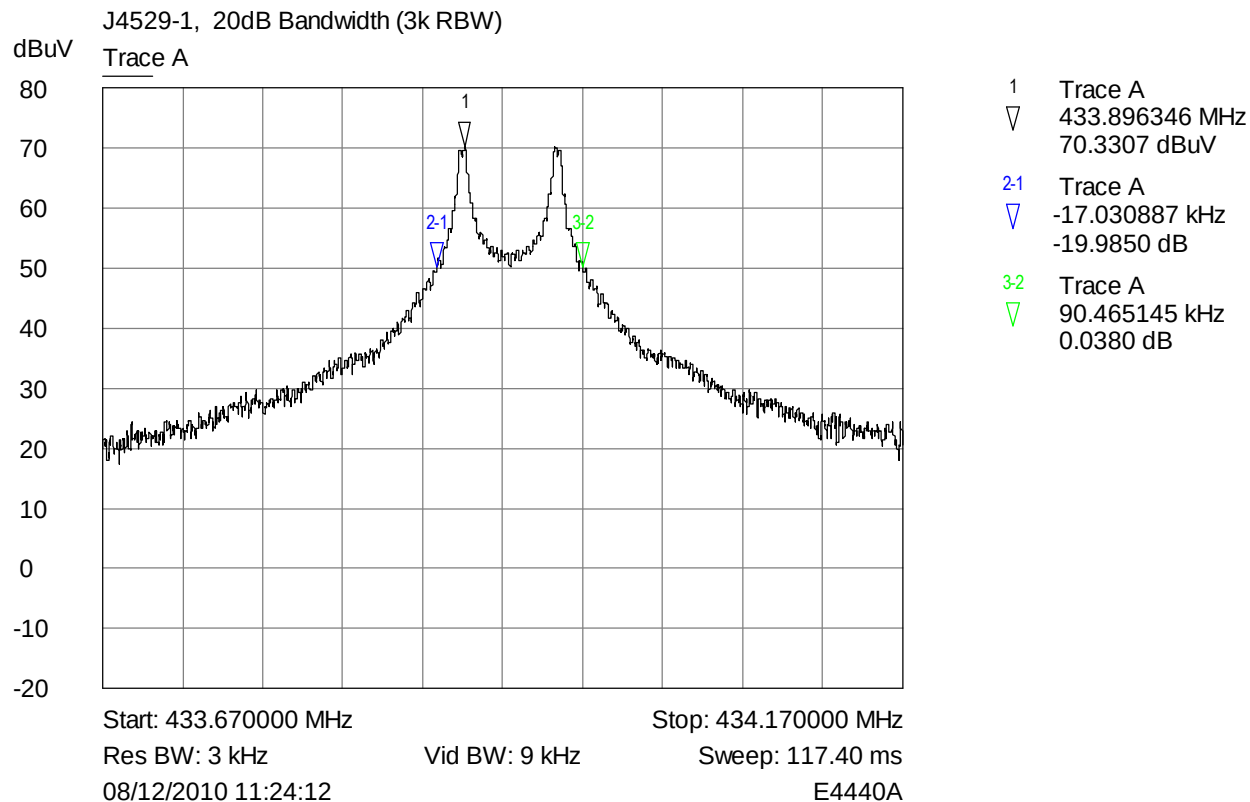


6.4 Duty Cycle



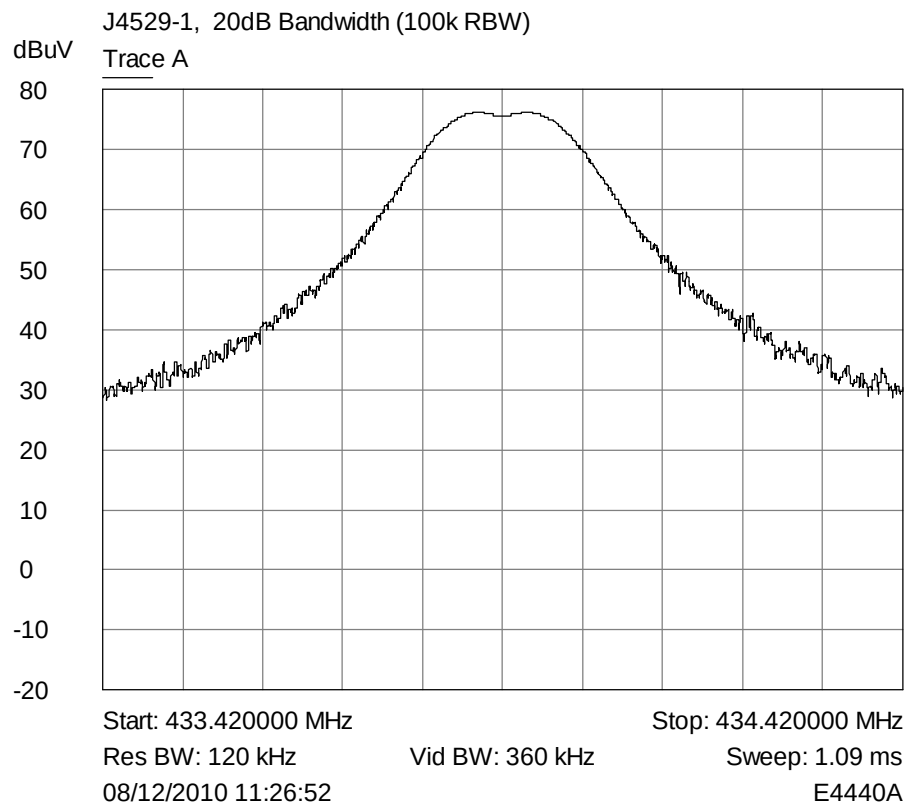


6.5 20dB Bandwidth

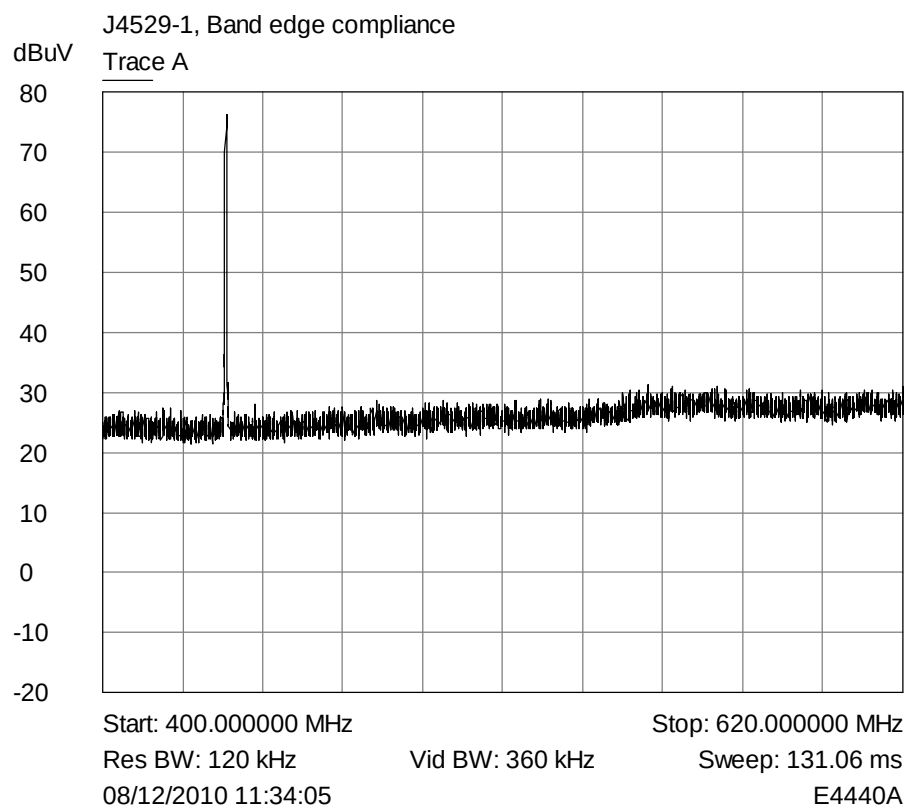


6.6 Band Edge Compliance

Band Edge.



Restricted band edge.



7 Explanatory Notes

7.1 Explanation of limit line calculations for radiated measurements

The limits given in the test standard are normally expressed as absolute values (e.g. in $\mu\text{V/m}$ at a specified distance), whereas the measured values are expressed as peak, quasi peak or average values in $\text{dB}\mu\text{V/m}$ 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 $500 \mu\text{V/m}$ equates to $20.\log(500) = 54 \text{ dB } \mu\text{V/m}$.
- (b) limit of $300 \mu\text{V/m}$ at 10m equates to $20.\log(300 \cdot 10/3) = 60 \text{ dB } \mu\text{V/m}$ at 3m

7.2 Explanation of duty cycle corrections applied

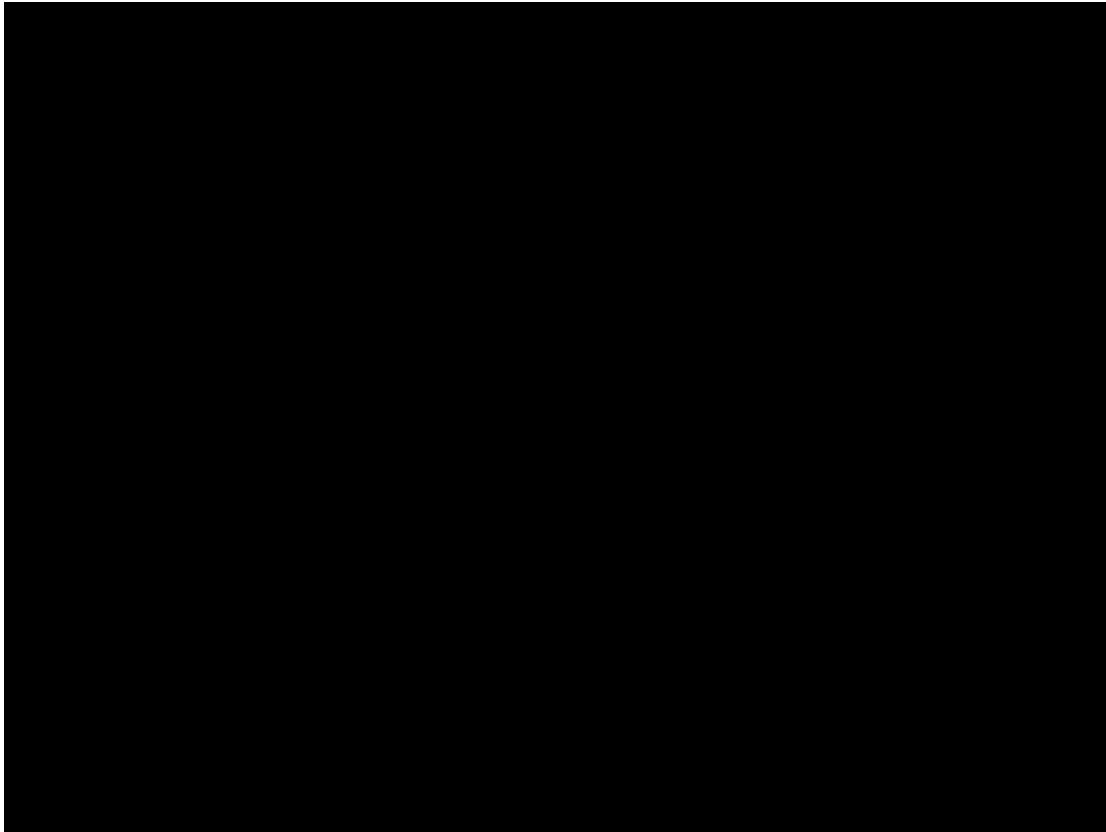
Duty cycle corrections applied have been calculated in accordance with FCC 15.35. TX on time in 100mS period.

$$20 \log (x/100) = \text{dB (correction)}.$$

$$X = \text{TX on time in 100ms period}.$$

Note: 20 Log is used for field strength measurements (Voltage).

8. Photographs



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

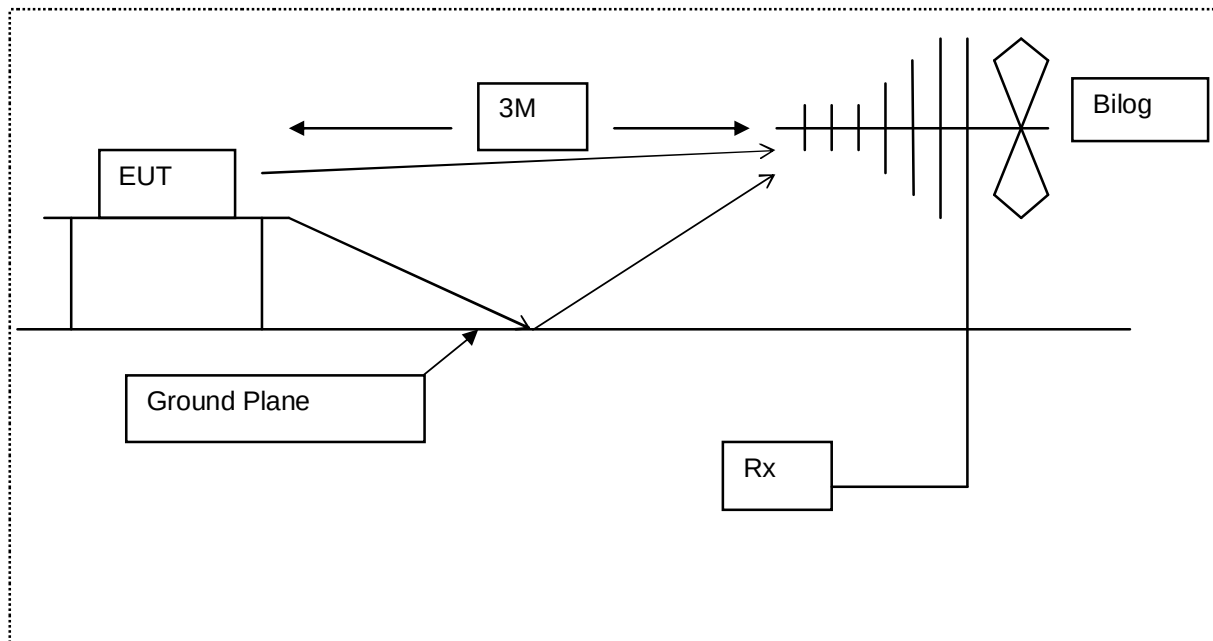
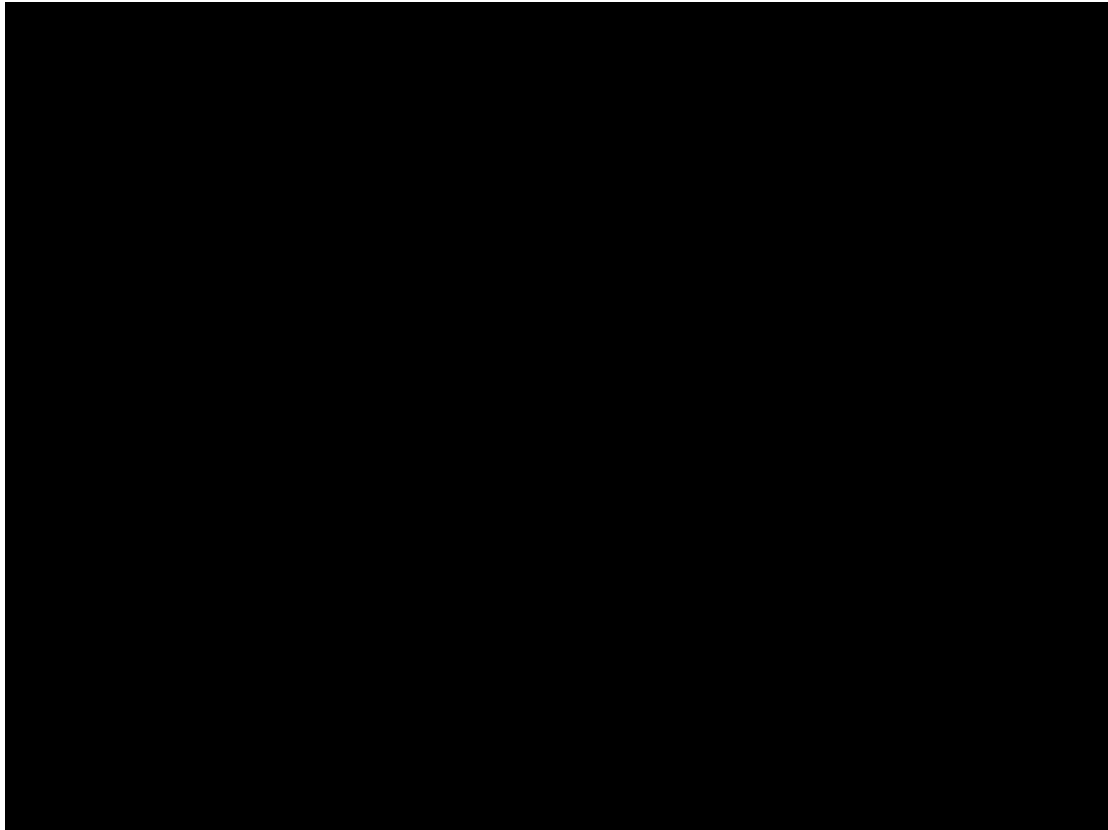


Diagram of the radiated emissions test setup.



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

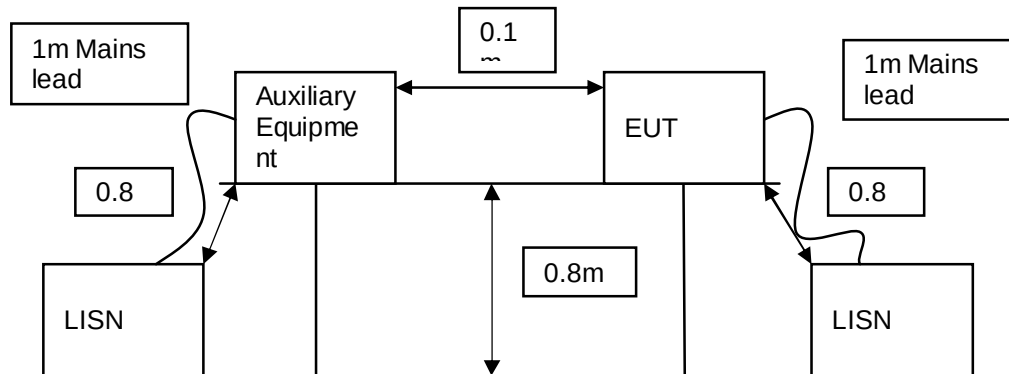
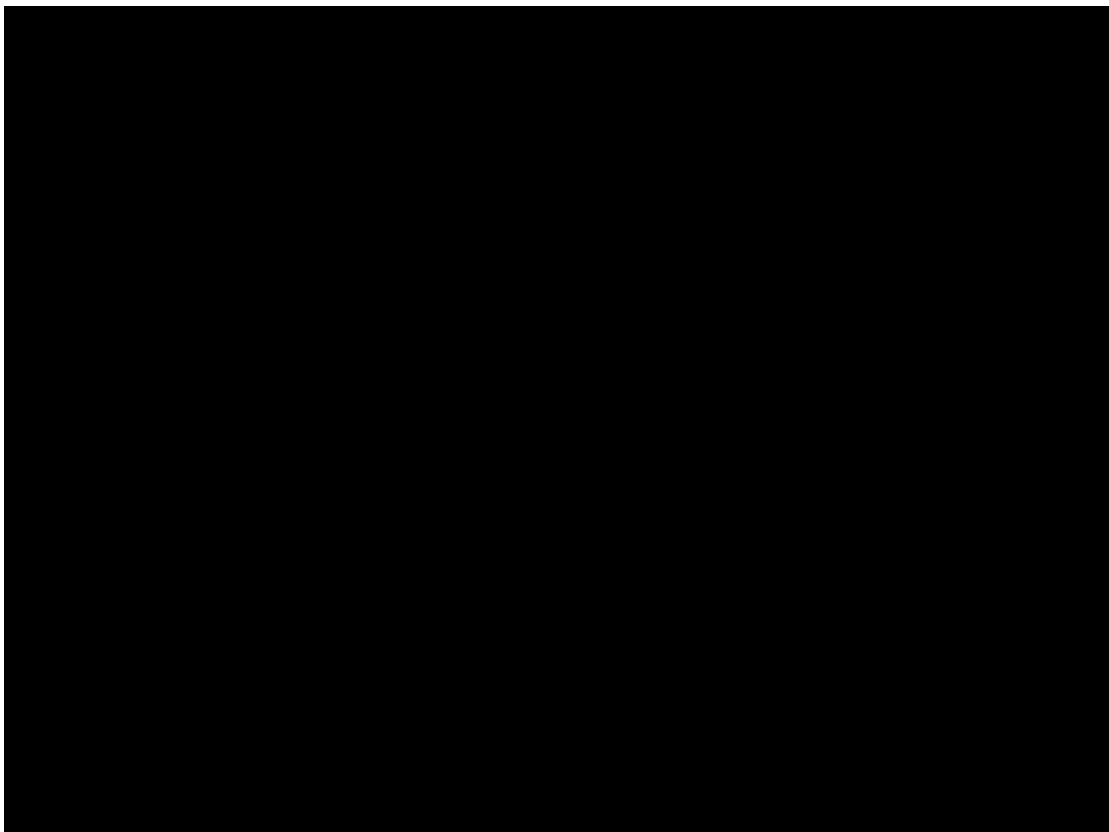
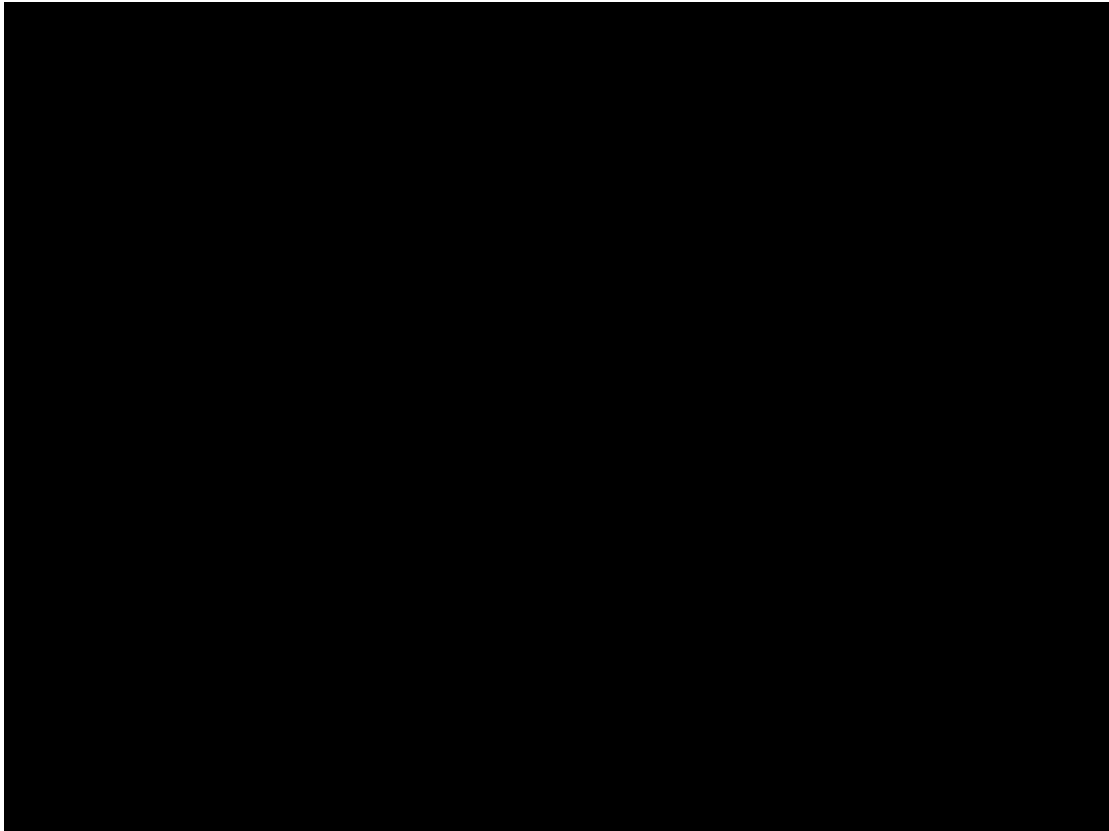


Diagram of the conducted emissions test setup.



Identifying Photograph of the EUT

9. Signal Leads

Port Name	Cable Type
Charger Input	Twin core DC from AC adapter plug

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 Calibrated	Period
E035	HP11947A	Transient Limiter + 10dB Atten.	Hewlett Packard	21-Feb-11	6
E150	MN2050	LISN 13A	Chase	29-Oct-09	24
E268	BHA 9118	1-18 GHz Horn Antenna	Schaffner	02-Mar-09	60
E342	8563E	Spectrum Analyser 26.5 GHz	HP	23-Feb-09	24
E410	N5181A	3 GHz MXG Signal Generator	Agilent Technologies	06-Oct-10	12
E411	N9039A	9 kHz - 1 GHz RF Filter Section	Agilent Technologies	05-Oct-10	12
E412	E4440A	3 Hz - 26.5 GHz PSA	Agilent Technologies	05-Oct-10	12
TMS81	6502	Active Loop Antenna	EMCO	13-Apr-10	24
TMS82	8449B	Pre Amplifier 1 - 26 GHz	Agilent	29-Oct-10	12
TMS933	CBL6141A	Bilog Antenna 30MHz - 2GHz	York EMC	09-Sep-10	36
TMS938	NSG1007	3kV AC Power Source	Schaffner	20-Apr-10	24

11. Auxiliary equipment

11.1 Auxiliary equipment supplied by Guidance Monitoring Ltd

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

Manufacturer	Description	Model Number	Serial Number
ACTISYS Ltd	IR Dongle	ACT-IR204UN	UN2:000298

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
I154	DELL	PC (Site B)	Dimension 4600	6WPHYOJ
I017	DELL	Laptop PC	Inspiron 5150	CN-0W0940-12961-44J-2047

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

Used AC/DC supply with details listed below:

- Manufacturer: Stontronics
- Part Number: T4101ST
- Model: 3A-161WE06
- Input: 100-240V, 50/60 Hz 0.4A
- Output: DC 6V 2.5A
-

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:

CERTIFIED equipment – DoC 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

15 Abbreviations and Units

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



Certificate of Test 4529/1

The equipment noted below has been tested by **R.N. Electronics Limited** and conforms with the relevant subpart of FCC 47CFR part 15, subject to deviations as detailed in this report.

This certificate relates to the unit, 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:	Installation Tool
Model Number(s):	Not specified
Unique Serial Number(s):	FITGML010596
Manufacturer:	Guidance Monitoring Ltd 4 Dominus Way Meridian Business park Leicester Leicestershire LE19 1RP
Customer Purchase Order Number:	4555
R.N. Electronics Limited Report Number:	01-451/4529/1/11
Test Standards:	FCC 47CFR Part 15C: effective date October 1st 2010 , Class DSC Intentional Radiator
Date:	7th-8th December 2010 & 28th January 2011

For and on behalf of
R.N. Electronics Limited

Signature:

Notes:

QMF21J – 3: FCC PART 15C: RNE ISSUE 02: - JUN 10