# FCC
# Test Report
## for
## IEEE 802.15.4 wireless controller module
## JN5148-001-M00R2

Report Number 07-366a/4014/1/09
Report Produced by: -

***R.N. Electronics Ltd.***
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## 1. Contents

## 2. Summary of Test Results

The IEEE 802.15.4 wireless controller module JN5148-001-M00R2 was tested to the following standards: -

**FCC Part 15C (effective date October, 2008); Class DTS 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 complinace, where measurements were made, do not include the measurement uncertainty.

| Title | Reference | Results |
|---|---|---|
| 1. Conducted Emissions | FCC Part 15C §15.207 | NOT APPLICABLE[1] |
| 2. Radiated Emissions | FCC Part 15C §15.205, §15.209 & §15.247(d) | PASSED |
| 3. Modulation Bandwidth | FCC Part 15C §15.215(c), §15.247(a)(2) | PASSED |
| 4. Intentional Radiator Field Strength | FCC Part 15C §15.247(b) | PASSED |
| 5. Power Spectral Density | FCC Part 15C §15.247(e) | PASSED |

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: 8th July to 13th July 2009

Test Engineer: Peter Finley — Digitally signed by Peter Finley DN: CN = Peter Finley, C = GB, O = RN Electronics Date: 2009.07.27 11:26:37 +01'00'

Approved By: Technical Director — Roger Ray — Digitally signed by Roger Ray DN: CN = Roger Ray, C = GB, O = RN Electronics Date: 2009.07.27 11:24:52 +01'00'

Customer Representative:

[1] The digital device tested is intended to be powered from 3V dc supply (battery) and intended for modular approval. Any third party device it is incorporated into with a connection to the AC power line will require demonstration of compliance with the limits. Refer to §15.207(c) "Measurements to demonstrate compliance with the conducted limits are not required for devices which only employ battery power for operation and which do not operate from the AC power lines or contain provisions for operation while connected to AC power lines".

## 3. Information about Equipment Under Test
## 3.1 General

| | |
|---|---|
| Applicant | Jennic Ltd<br>Furnival Street<br>Sheffield<br>S1 4QT |
| Manufacturer/Brand Name | Jennic Ltd |
| Full name of EUT | IEEE 802.15.4 wireless controller module |
| Model Number of EUT<br>Model Number of alternative sample | JN5148-001-M00R2<br>JN5148-001-M03R2 |
| Serial Number of EUT<br>Serial Number of alternative sample | 0922000087<br>0922600013 |
| FCC ID (if applicable): | TYOJN5148M0 |
| Date when equipment was received by RN Electronics Limited | 1st July 2009 |
| Date of test: | 8th July to 13th July 2009 |
| Customer order number: | PO005383/CF |
| A visual description of EUT is as follows: | A small metal canned enclosure mounted on a PCB with an integral track antenna. For the purpose of test the PCB was mounted onto a battery powered motherboard. |
| The main function of the EUT is: | A 2.4GHz (IEE802.15.4) wireless microcontroller module. |
| Antenna: | Integral |

Equipment Under Test Information specification:

| | |
|---|---|
| Height | 6.9mm |
| Width | 20mm |
| Depth | 30.8mm |
| Weight | 0.002kg |
| Voltage | 3V DC |
| Current required from above voltage source | 0.05A |
| Highest Frequencies used / generated | 2.405 – 2.480GHz |

| | |
|---|---|
| Purpose of Test: | To demonstrate compliance with FCC OET regulations for intentional radiators. |

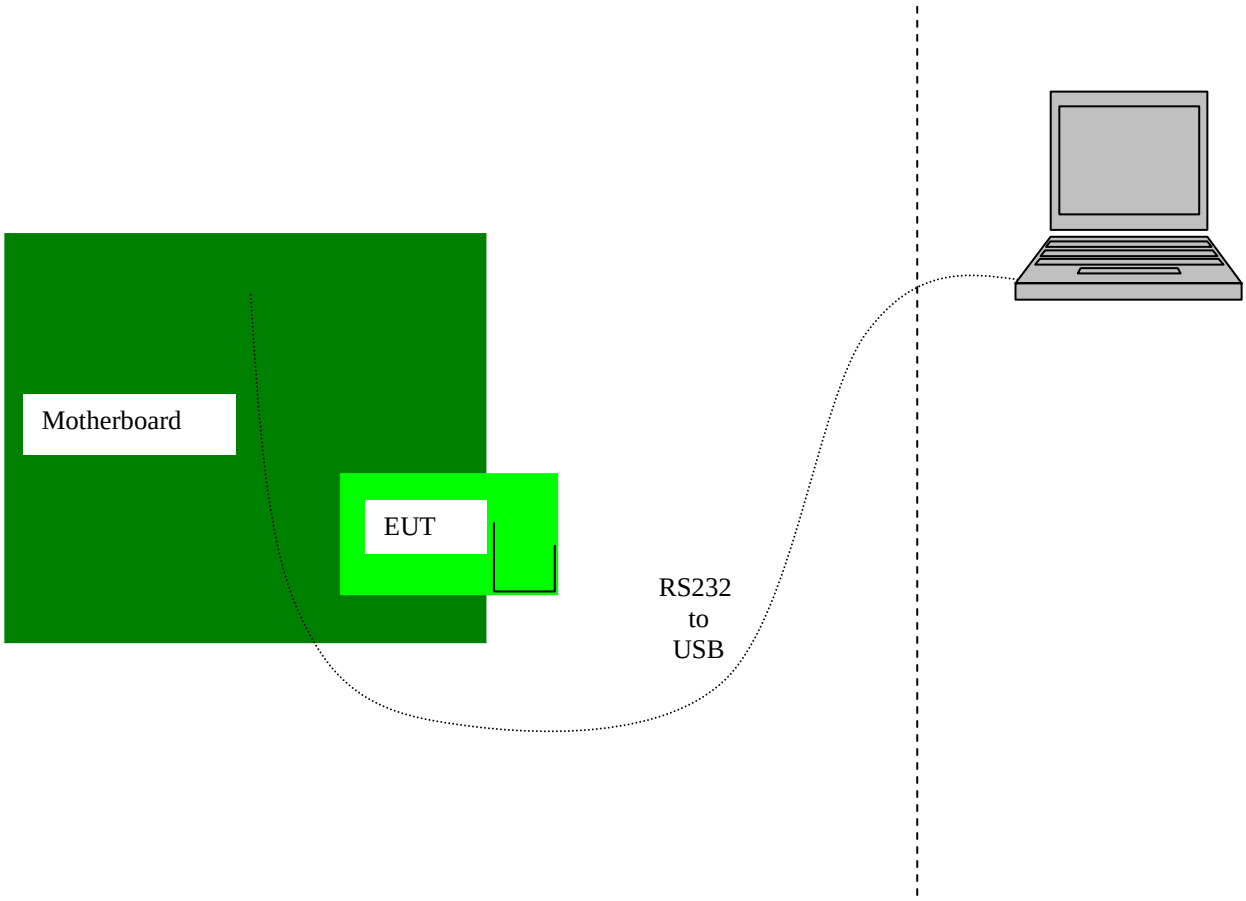
Modes of operation:

| Mode | Description of mode | Used for Testing |
|---|---|---|
| Continuous TX 2.405GHz | Unit continuously transmitting on bottom channel | YES |
| Continuous TX 2.440GHz | Unit continuously transmitting on Middle channel | YES |
| Continuous TX 2.480GHz | Unit continuously transmitting on Top channel | YES |

Any modifications made to the **EUT**, whilst under test, can be found in Section 12.

This report was printed on: 27 July 2009

## 3.2 Emissions configuration




The equipment under test was supplied by 3V DC from two new Batteries situated on the provided host PCB board. The battery levels were monitored throughout tests to ensure the levels did not drop below the +/- 10% required. The unit was provided with an integral antenna. To change channels and select the correct modes for test a programming lead was connected and the unit programmed. The programming lead was removed for tests. Application programming software was provided by Jennic Ltd. and would not normally be available to the user.

Top, Middle & Bottom channels were tested in both Transmit and Receive modes using the 16MHz clock option. All power levels were left at maximum (default setting).

Bottom channel = 2.405GHz
Middle channel = 2.440GHz
Top channel = 2.480GHz

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

## 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, 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

None.

## 5. Tests, Methods and Results
## 5.1 Conducted Emissions

NOT APPLICABLE.
The digital device tested is intended to be powered from 3V DC supply (battery) and intended for modular approval. Any third party device it is incorporated into with a connection to the AC power line will require demonstration of compliance with the limits. Refer to §15.207(c) "Measurements to demonstrate compliance with the conducted limits are not required for devices which only employ battery power for operation and which do not operate from the AC power lines or contain provisions for operation while connected to AC power lines"

## 5.2 Radiated Emissions

### 5.2.1 Test Methods

Test Requirements FCC Part 15C, Reference (15.209)

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

#### 5.2.1.1 Configuration of EUT

The EUT was placed on a 0.8 metres high turntable. The front edge of the EUT was initially positioned facing the antenna. The EUT was measured at a distance of 3 metres. The transmitter was operated continuously to measure the emissions which would normally have a duty cycle <= 1%. Radiated Emissions testing was performed with a new battery. The EUT was rotated in all three orthogonal planes.

#### 5.2.1.2 Test Procedure

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

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 1.5m above the ground in line with the EUT, which was rotated through 360° to record the worst case emissions.

Above 6.5GHz, the measurement antenna was moved to a distance of 1 metre.

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, B and Q**.**

**Test Environment:**
**M, B & Q**

Temperature: 20-21°C Humidity: 51-64%

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.

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

#### 5.2.2.1 Test Equipment used

E001,TMS933,E268,E342,TMS79,TMS82,E429,E250,E251,E252

See Section 10 for more details

## 5.3 Intentional Radiator Field Strength

### 5.3.1 Test Methods

Test Requirements FCC Part 15C, Reference (15.)

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

#### 5.3.1.1 Configuration of EUT

The EUT was placed on a 1.5 metres high turntable. The front edge of the EUT was initially positioned facing the antenna. The EUT was rotated in all three orthogonal planes. The EUT was measured at a distance of 3 metres.

#### 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.

The measurement antenna was used in both horizontal and vertical planes to record the maximised emission.

### 5.3.2 Test results

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

**Test Environment:**
Temperature: 21°C Humidity: 64 %

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

The maximised field strengths measured were:-

| Frequency (MHz) | Power (1MHz RBW) (dBuV/m @ 3 metres) | Power (100kHz RBW) (dBuV/m @ 3 metres) |
|---|---|---|
| 2405 | 92.67 | 89.50 |
| 2440 | 93.00 | 89.84 |
| 2480 | 90.00 | 88.50 |

Limits: 1Watt (+30dBm)
@3m 1Watt from an isotropic radiator would produce 125dBuV.

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

#### 5.3.2.1 Test Equipment used

E342, E268, E82, E250,E251,E252

See Section 10 for more details

## 5.4 Maximum Spectral Power Density

### 5.4.1 Test Methods

Test Requirements FCC Part 15C, Reference (15.247(e))

Test Method: FCC Part 15C, Reference (15.247)

#### 5.4.1.1 Configuration of EUT

An alternative sample with a 50ohm uFL connector instead of the track antenna was checked for maximum spectral power density at the antenna port. A test jig/lead was provided to adapt from the uFL to SMA 50ohm coaxial connection.

#### 5.4.1.2 Test Procedure

Tests were made in accordance with FCC Part 15 using the measuring equipment noted below and taking due consideration of the loss of the antenna port adaptor.

### 5.4.2 Test results

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

Temperature of test Environment: 24°C

| Frequency (MHz) | Peak Power (dBm/3kHz) |
|---|---|
| 2405 | -18.0 |
| 2440 | -17.6 |
| 2480 | -16.7 |

Limit: +8dBm/3kHz

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

#### 5.4.2.1 Test Equipment used

E003, E005, E290, E397

See Section 10 for more details.

## 5.5 6dB Bandwidth

### 5.5.1 Test Methods

Test Requirements FCC Part 15C, Reference (15.215)

Test Method: FCC Part 15C, Reference (15.215)

#### 5.5.1.1 Configuration of EUT

The EUT was placed on a 1.5 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.

#### 5.5.1.2 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.

### 5.5.2 Test results

Tests were performed using Test Site B.

Temperature of test Environment: 15°C

Analyser plots for the 6dB bandwidth can be found in Section 6.6 of this report.

| Frequency (MHz) | 6dB Bandwidth (MHz) | Plot Reference |
|---|---|---|
| 2405 | 1.088333MHz | Plot 004 |
| 2440 | 1.110000MHz | Plot 005 |
| 2480 | 1.131667MHz | Plot 006 |

Limits: Must be >500kHz.

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

#### 5.5.2.1 Test Equipment used

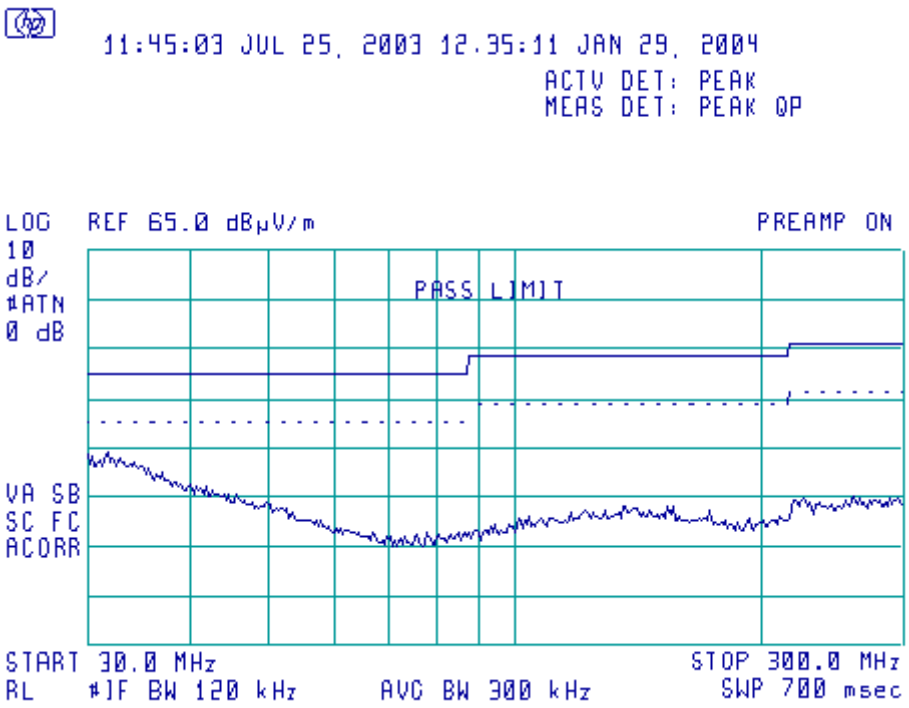
TMS342,TMS82,E251,E252

See Section 10 for more details.

## 6. Plots and Results
## 6.1 Conducted Emissions

NONE - TEST NOT APPLICABLE

## 6.2 Radiated Emissions

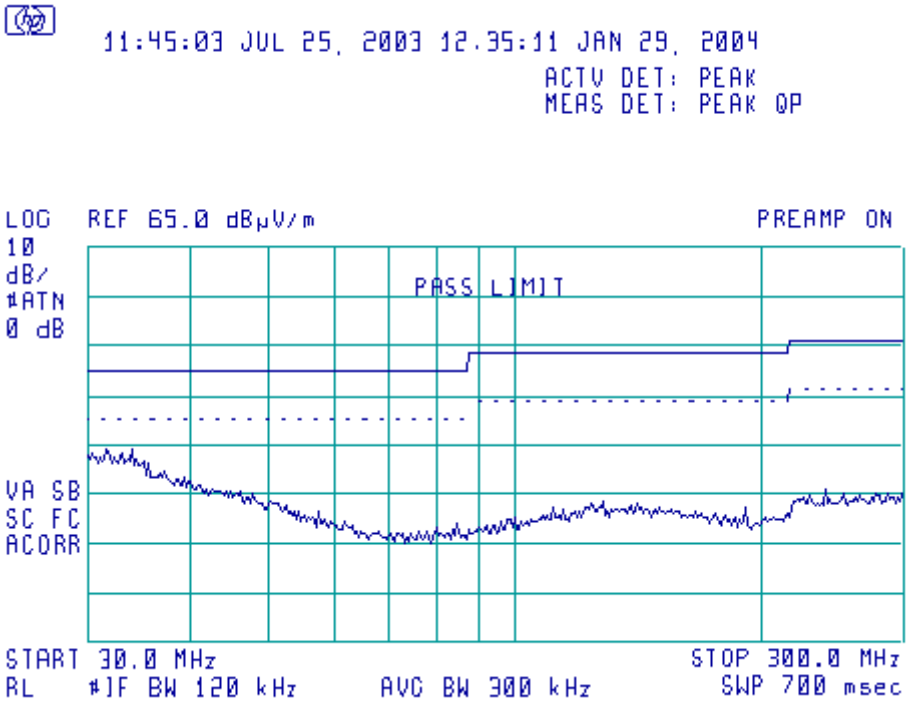



# Quasi-Peak Values of 30 MHz. to 300 MHz.

# Horizontal Polarisation

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

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

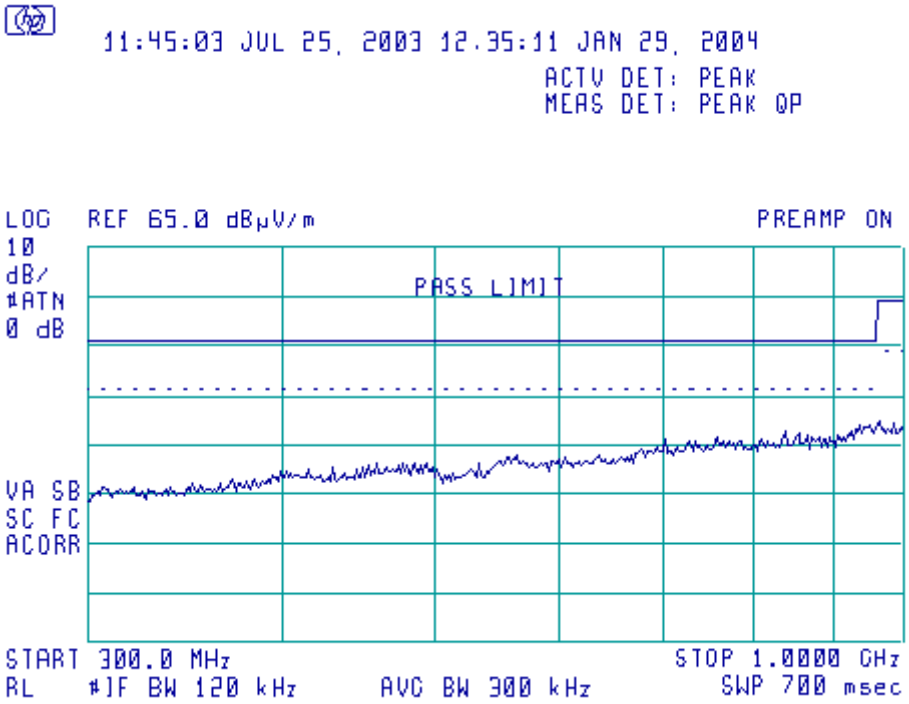



# Quasi-Peak Values of 30 MHz. to 300 MHz.

# Vertical Polarisation

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

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

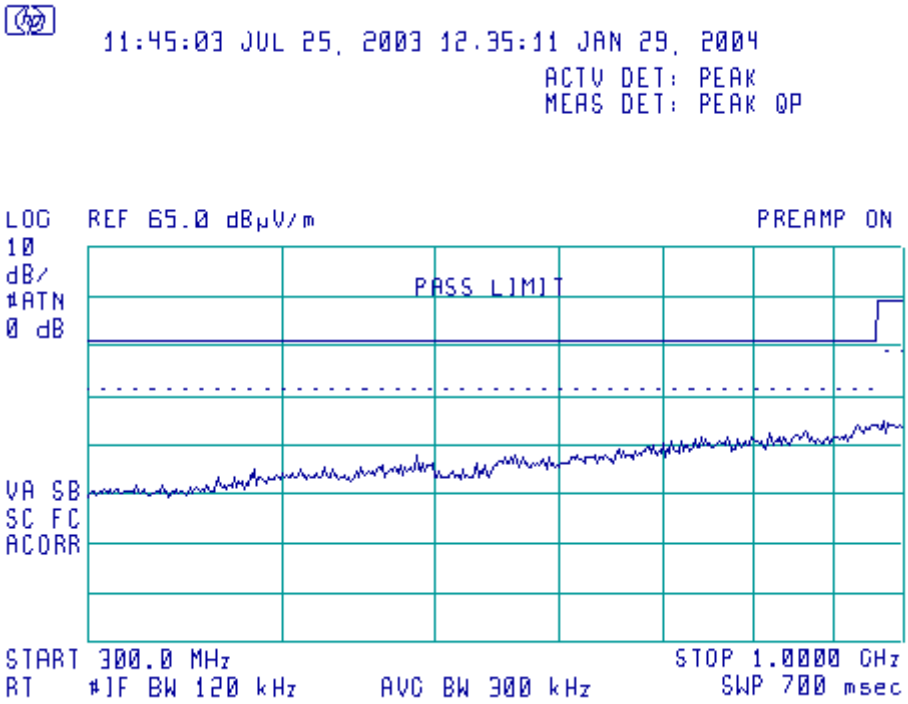



# Quasi-Peak Values of 300 MHz. to 1 GHz.

# Horizontal Polarisation

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

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




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

# Vertical Polarisation

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

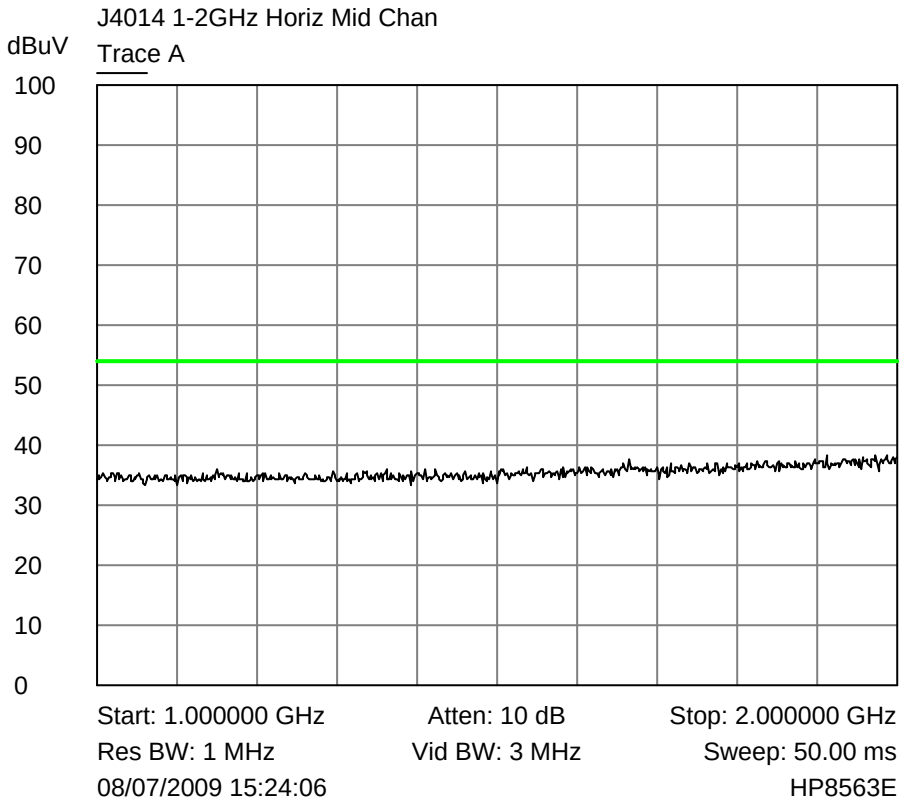
(Any peaks within 20dB of the limit line have been calculated and appear in the table on following page of this report)

## Tables of signals within 20dB of the limit line for Quasi-peak

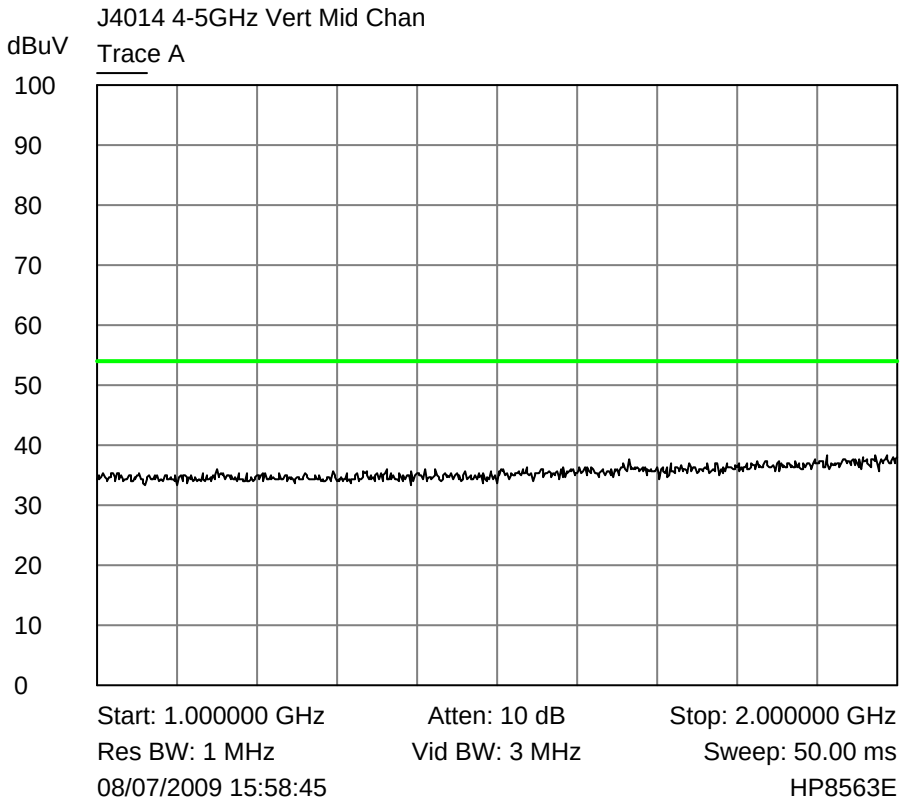
## Top, Middle & Bottom Channels

NONE

**Measurement Uncertainty of ± 5.2dB Applies**

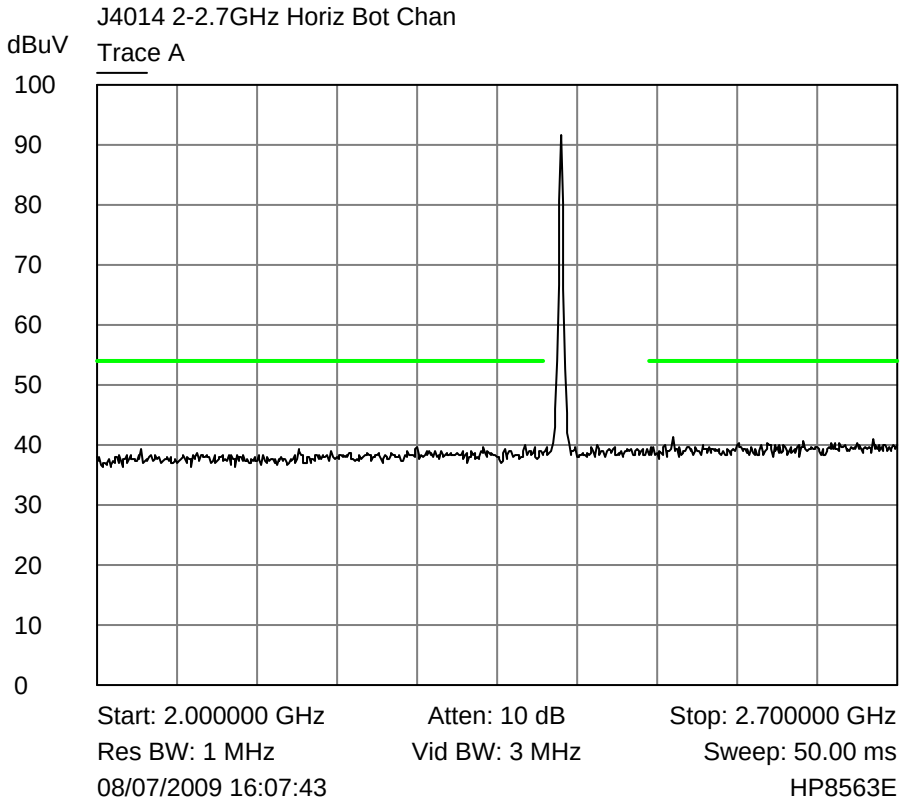



# Average Values of 1 to 2GHz.
# Horizontal Polarisation

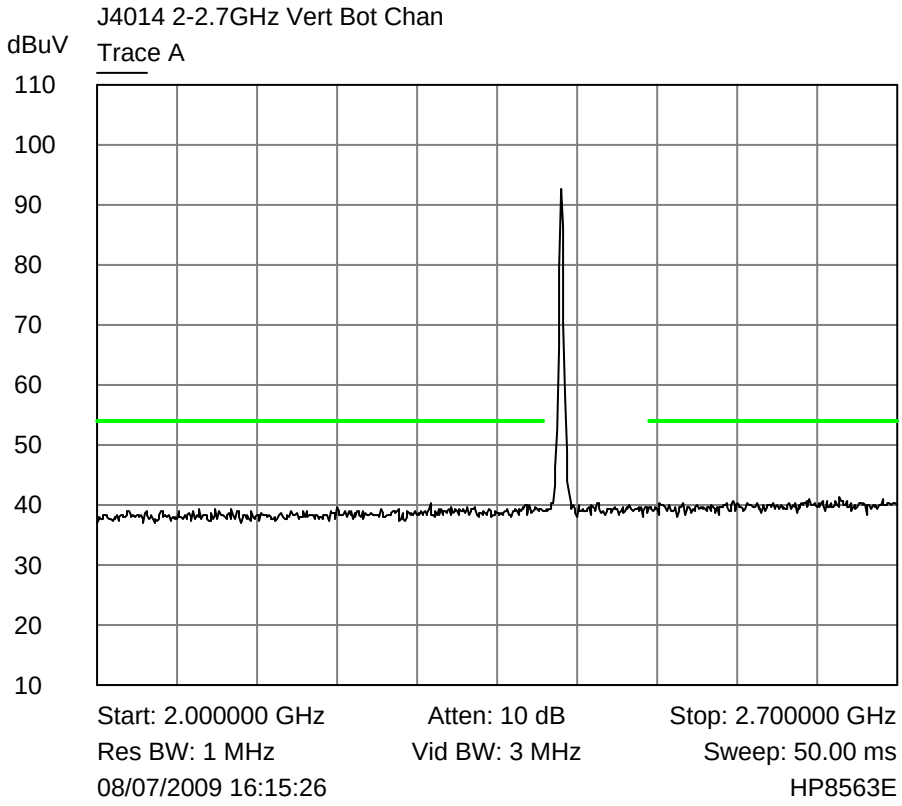



# Average Values of 1 to 2GHz.

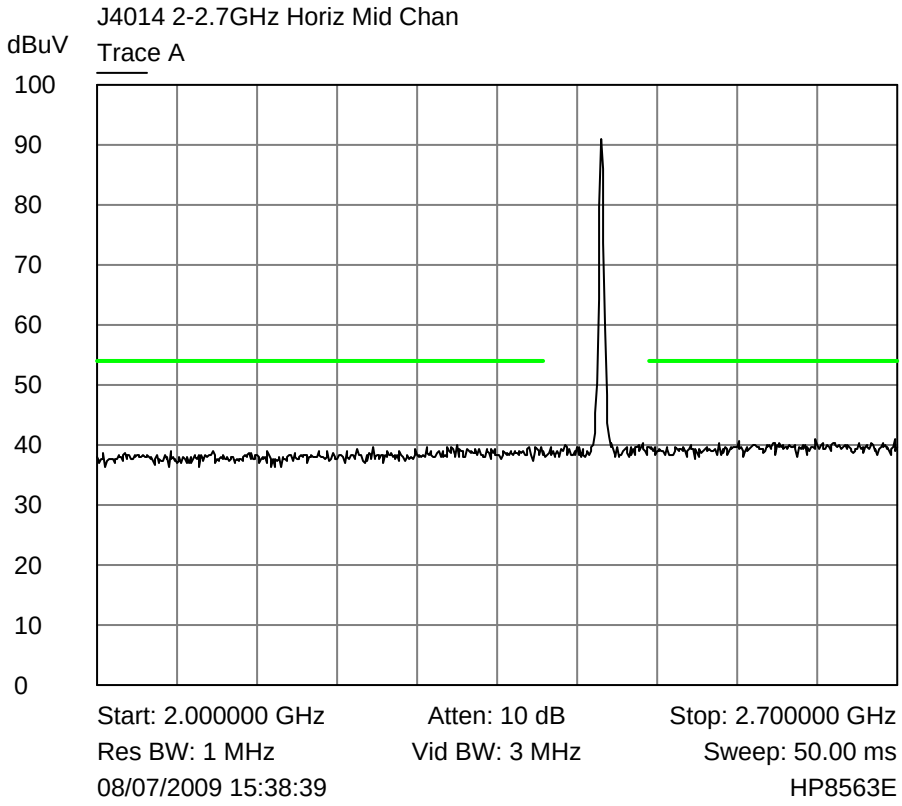
# Vertical Polarisation



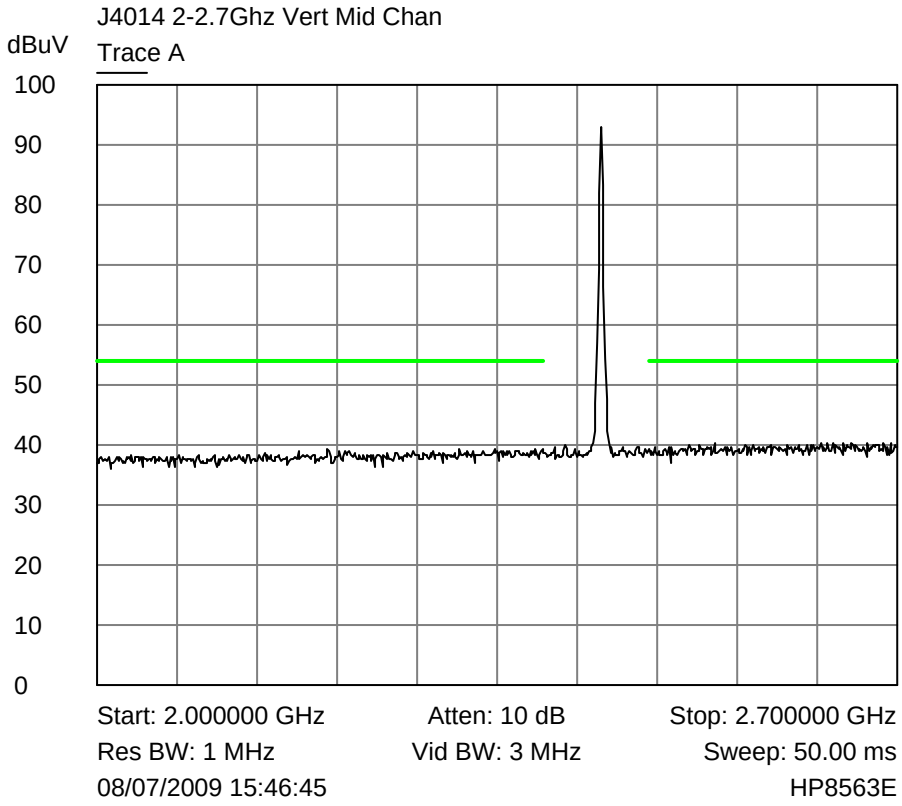

# Average Values of 2 – 2.7 GHz.
## Bottom Channel
## Horizontal Polarisation



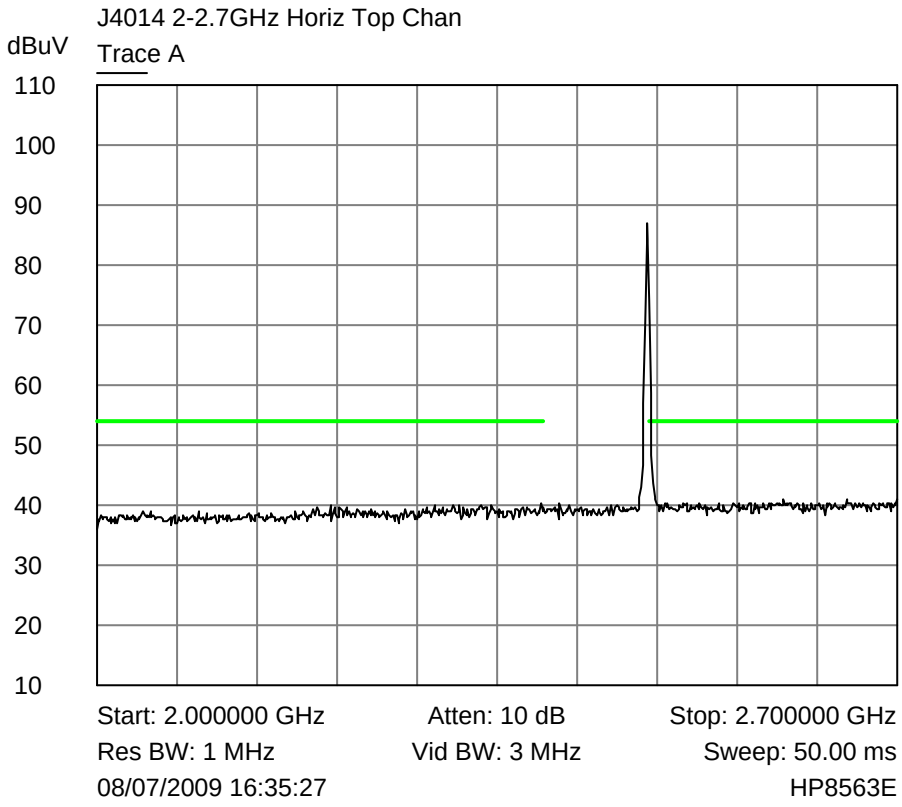

# Average Values of 2 - 2.7 GHz.
## Bottom Channel
## Vertical Polarisation



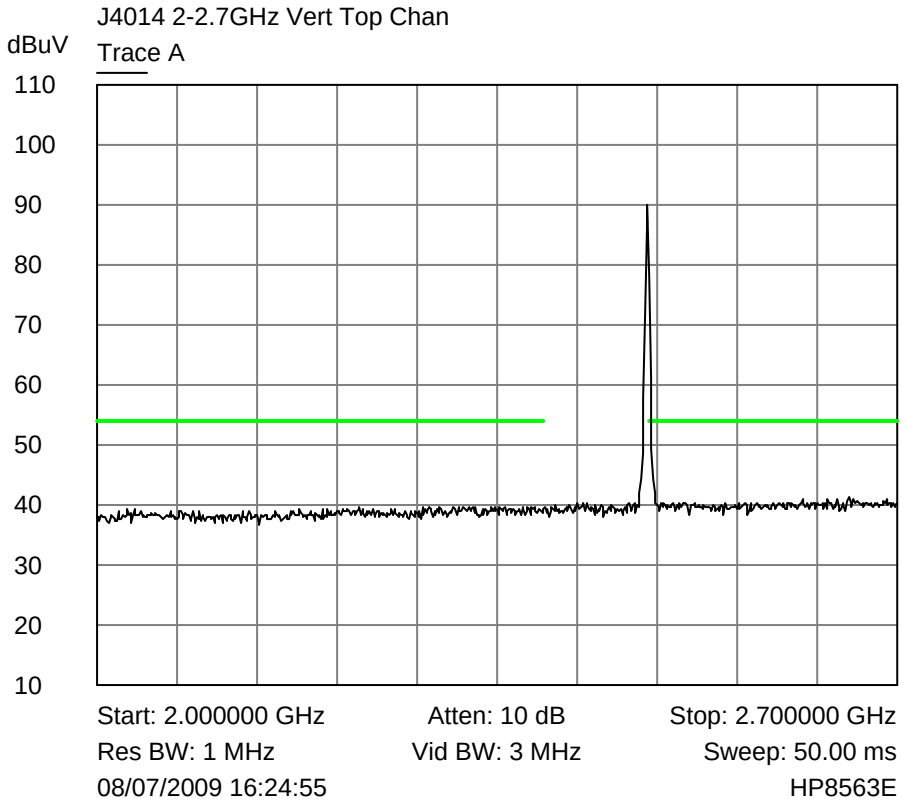

# Average Values of 2 – 2.7 GHz.
## Middle Channel
## Horizontal Polarisation



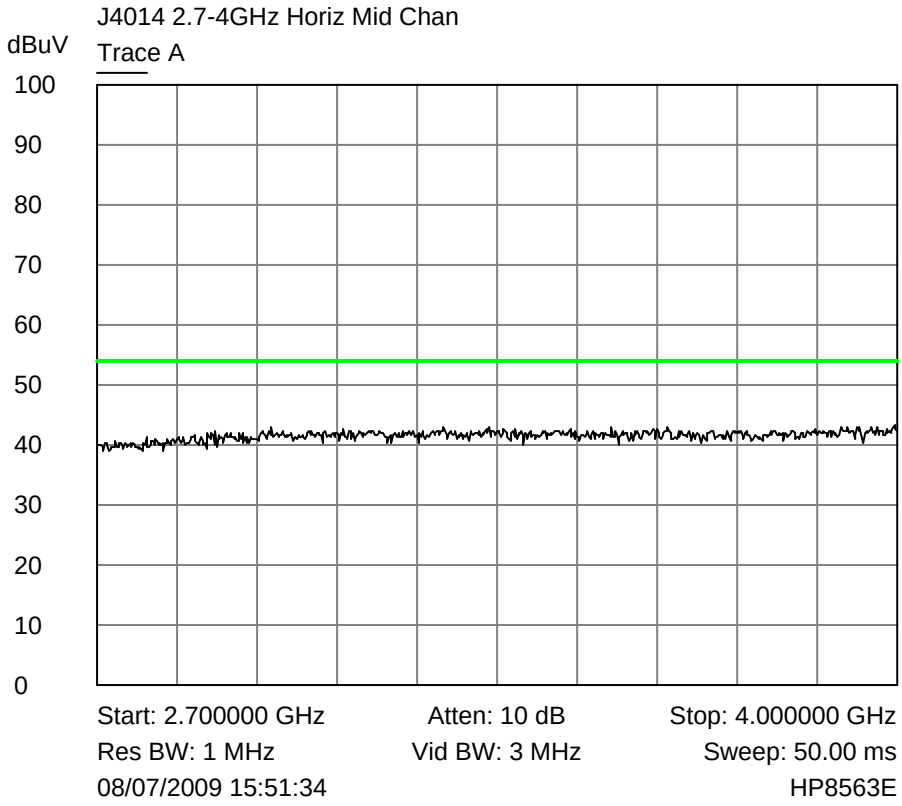

# Average Values of 2 - 2.7 GHz.
## Middle Channel
## Vertical Polarisation



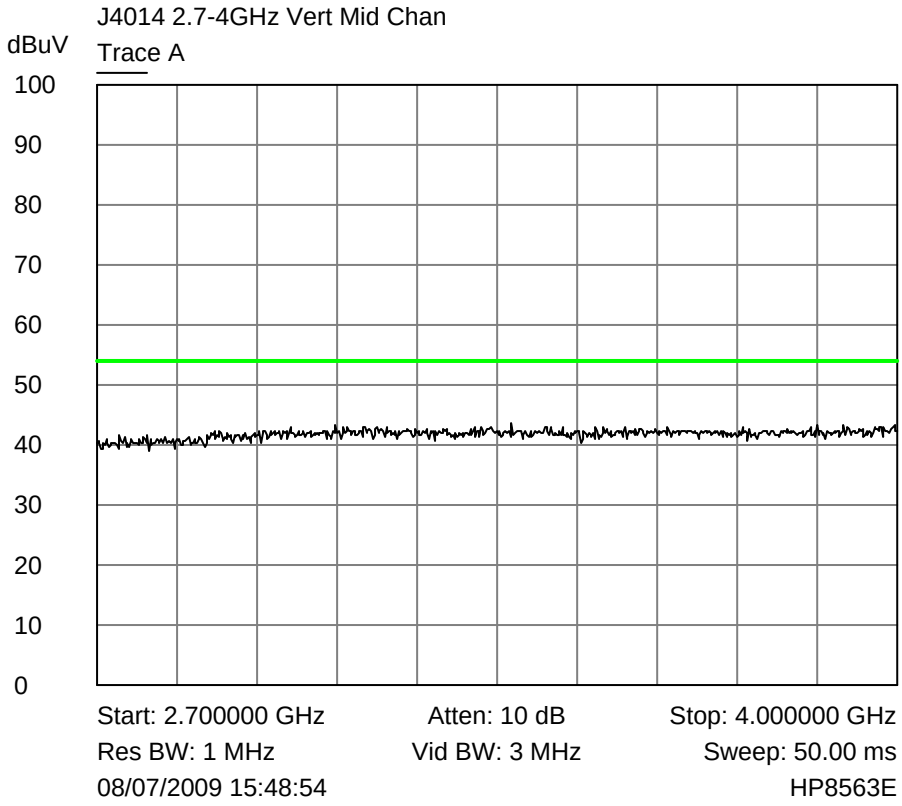

# Average Values of 2 – 2.7 GHz.
## Top Channel
## Horizontal Polarisation




# Average Values of 2 - 2.7 GHz.
## Top Channel
## Vertical Polarisation

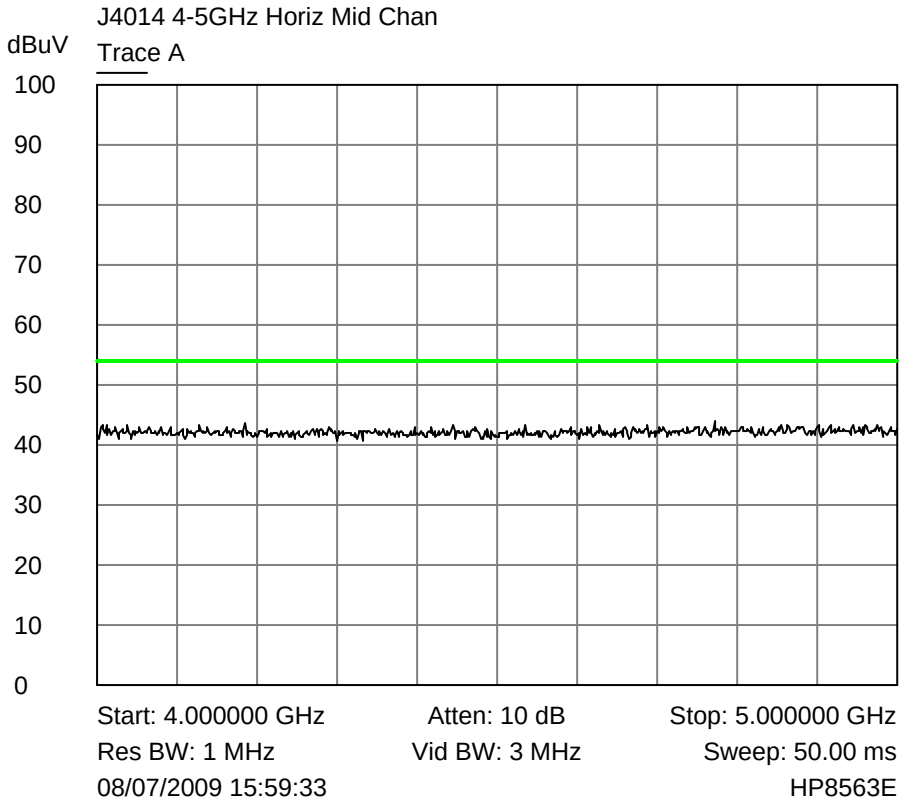



# Average Values of 2.7 to 4 GHz.
# Horizontal Polarisation



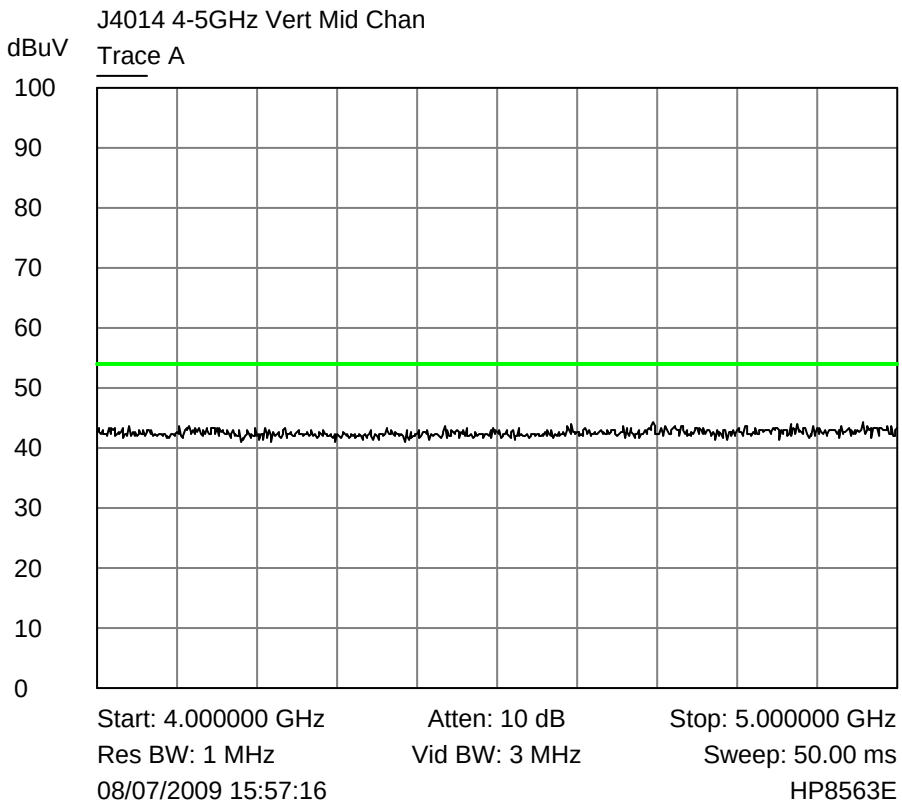

# Average Values of 2.7 to 4 GHz.

# Vertical Polarisation

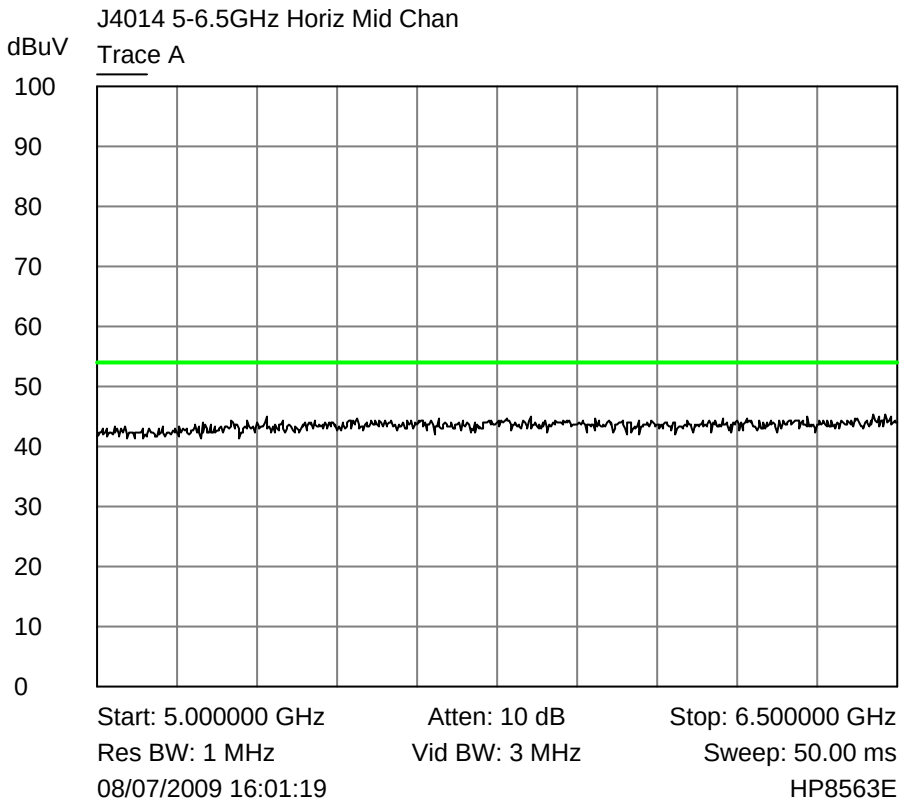



# Average Values of 4 – 5 GHz.

# Horizontal Polarisation

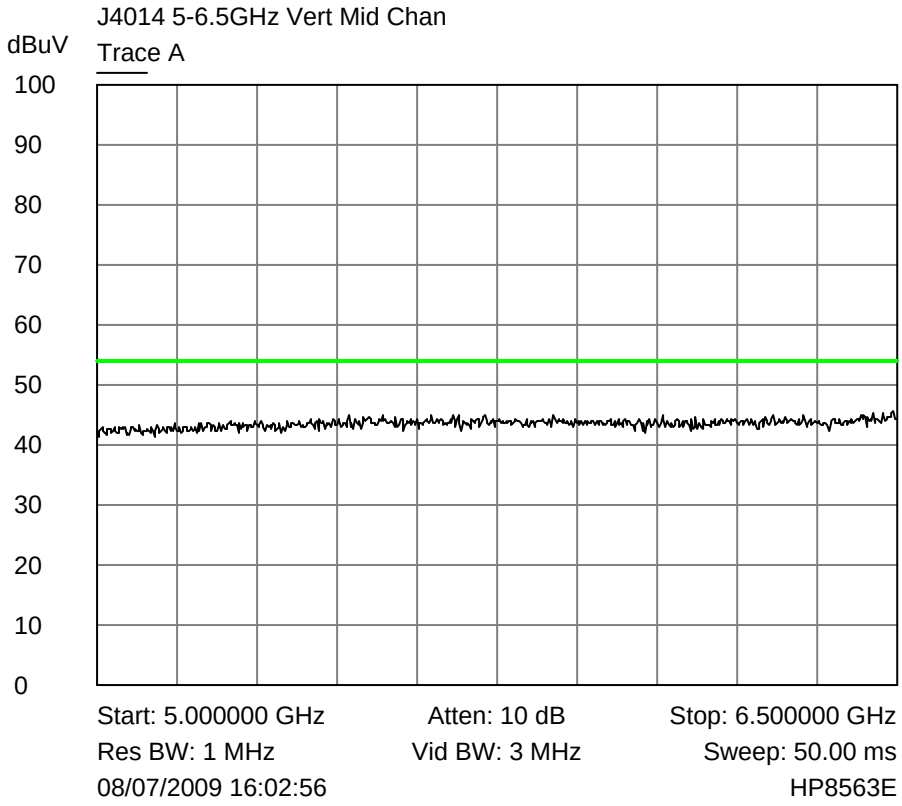



# Average Values of 4 – 5 GHz.
# Vertical Polarisation

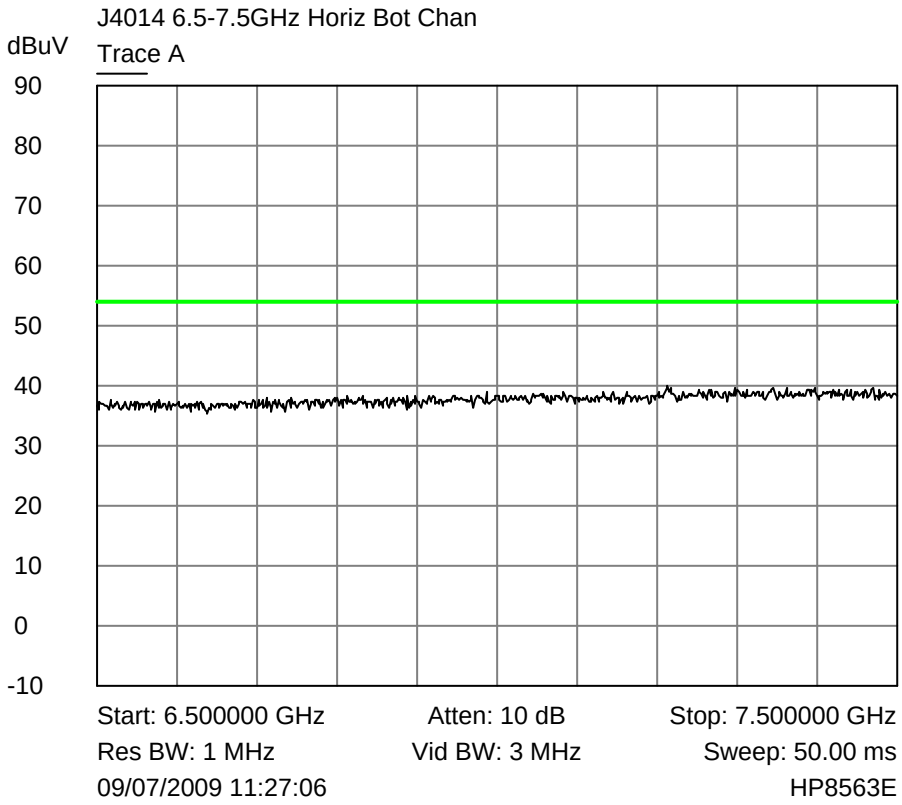



# Average Values of 5 - 6.5 GHz.

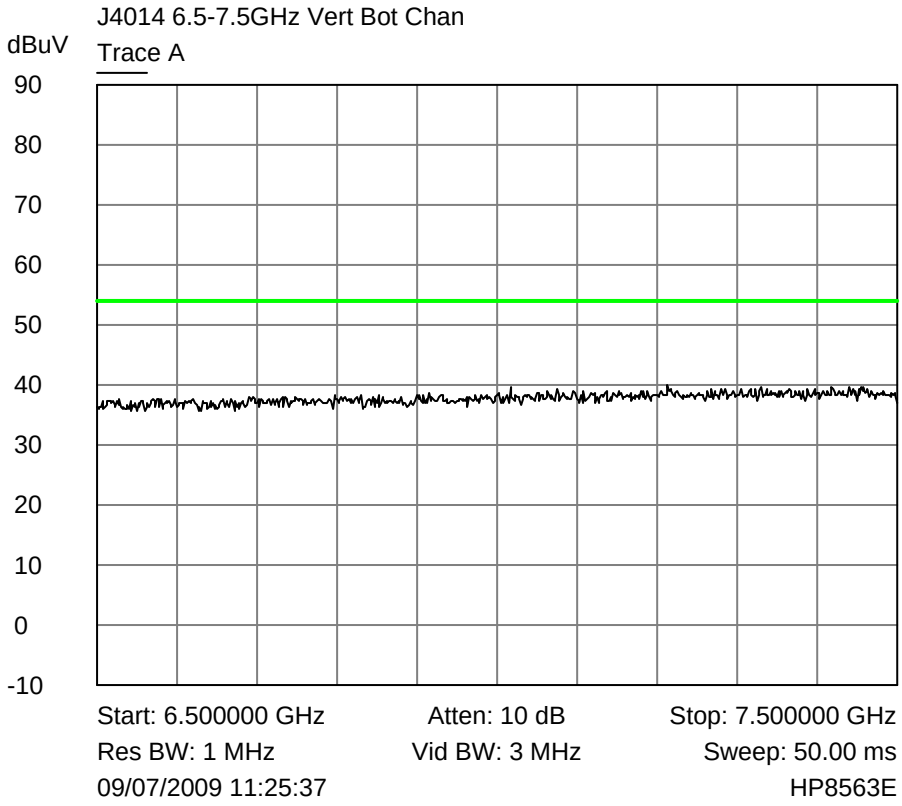
# Horizontal Polarisation



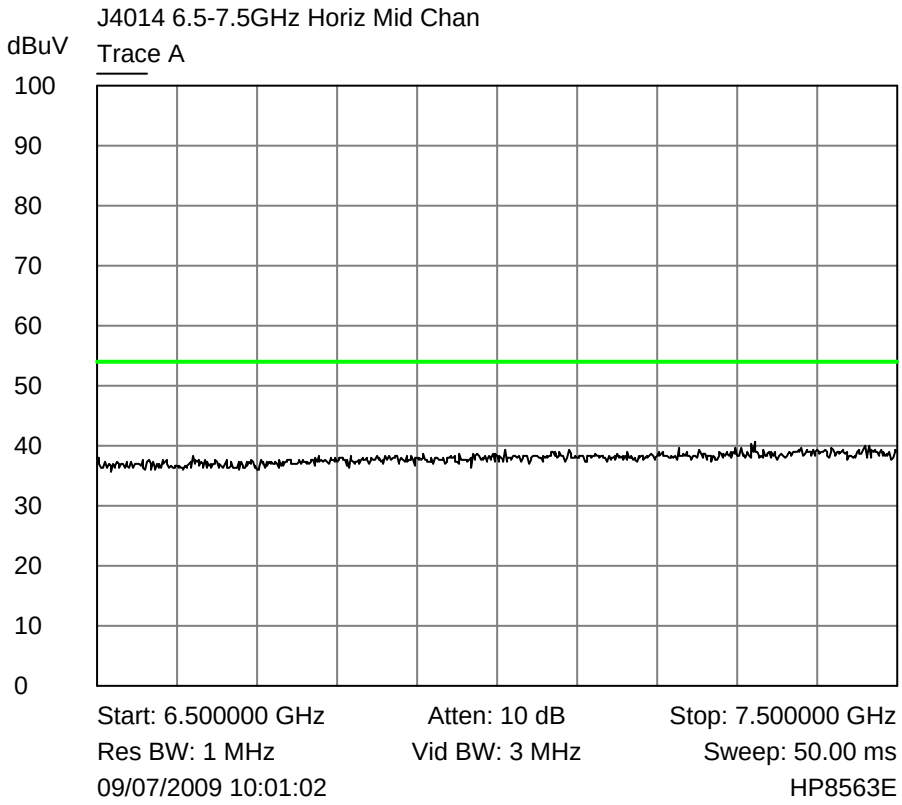

# Average Values of 5 - 6.5 GHz.
# Vertical Polarisation



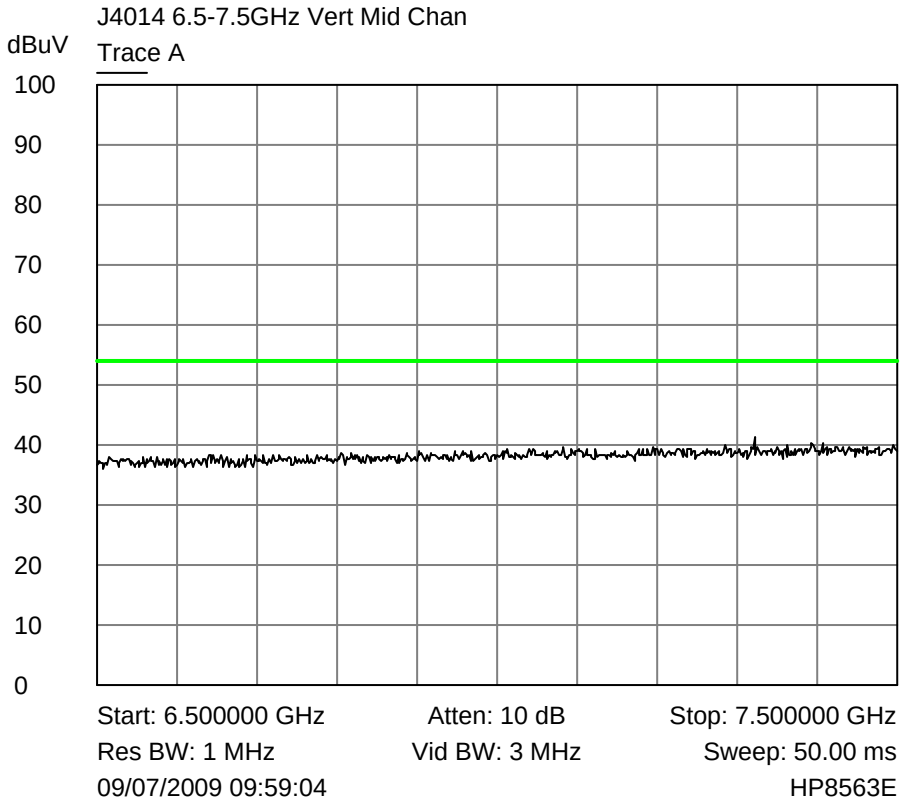

# Average Values of 6.5 – 7.5 GHz.
## Bottom Channel
## Horizontal Polarisation



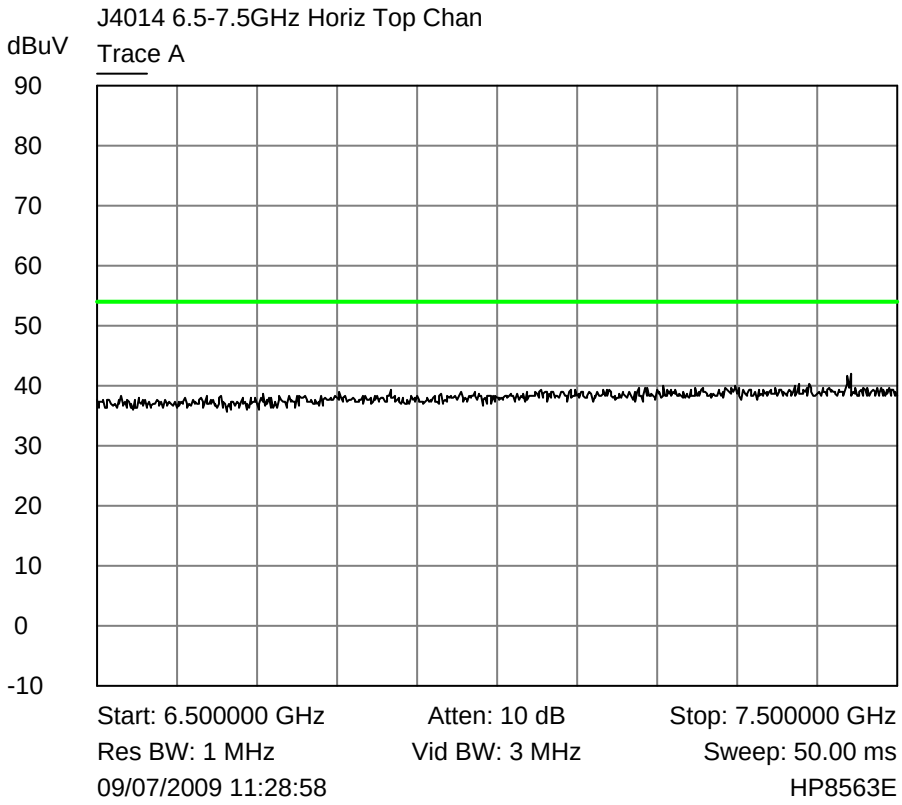

# Average Values of 6.5 – 7.5 GHz.
## Bottom Channel
## Vertical Polarisation



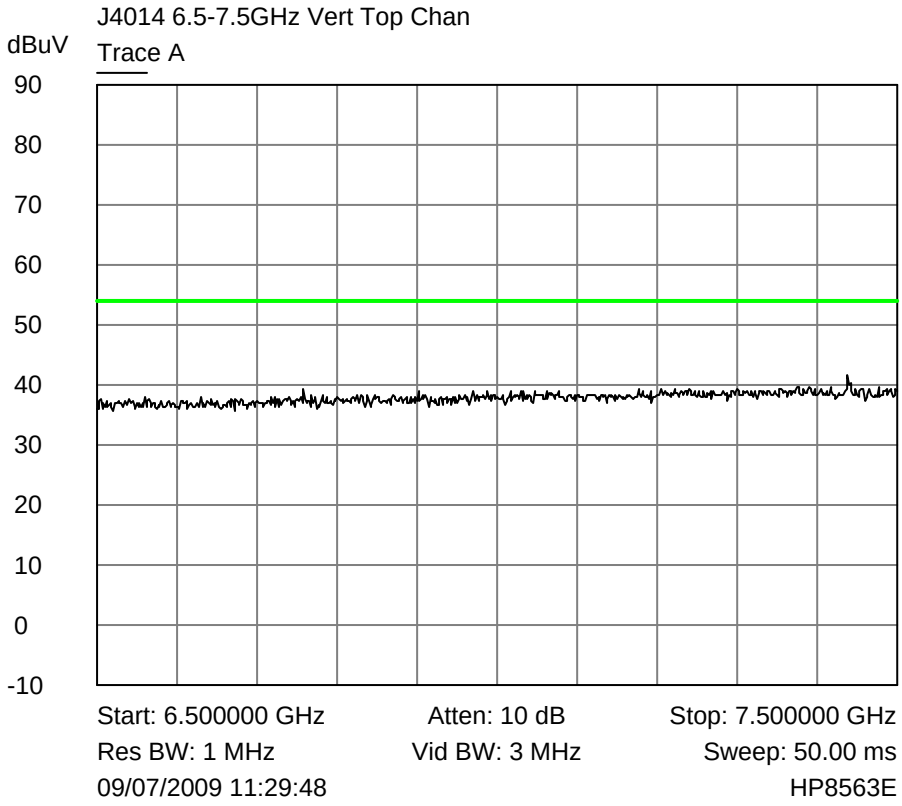

# Average Values of 6.5 – 7.5 GHz.
## Middle Channel
## Horizontal Polarisation



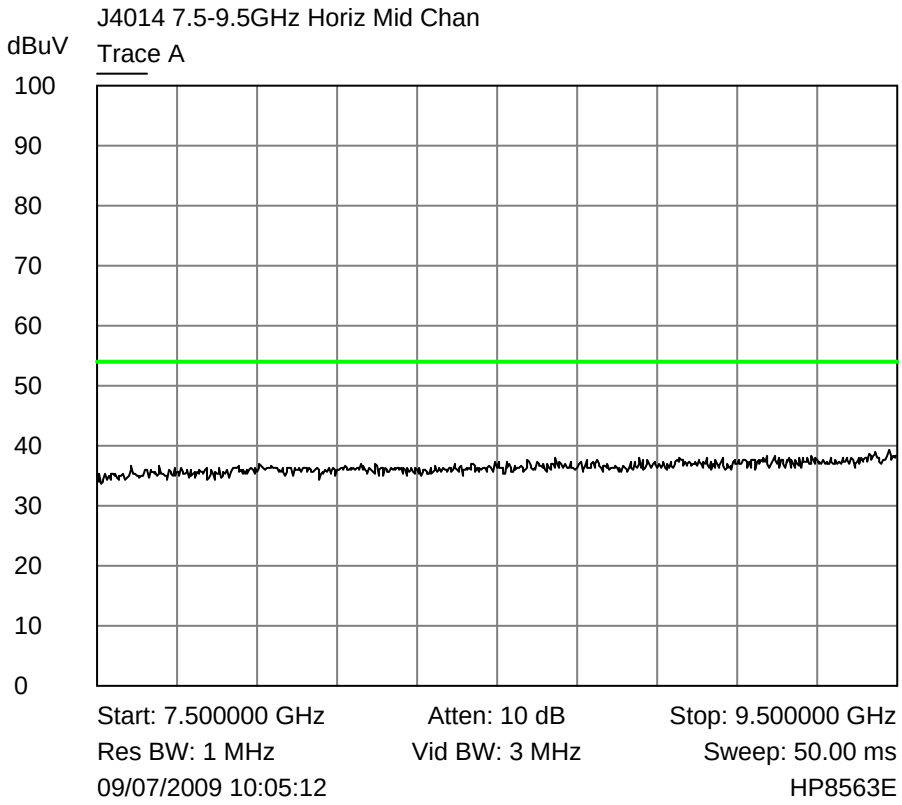

# Average Values of 6.5 – 7.5 GHz.
## Middle Channel
## Vertical Polarisation



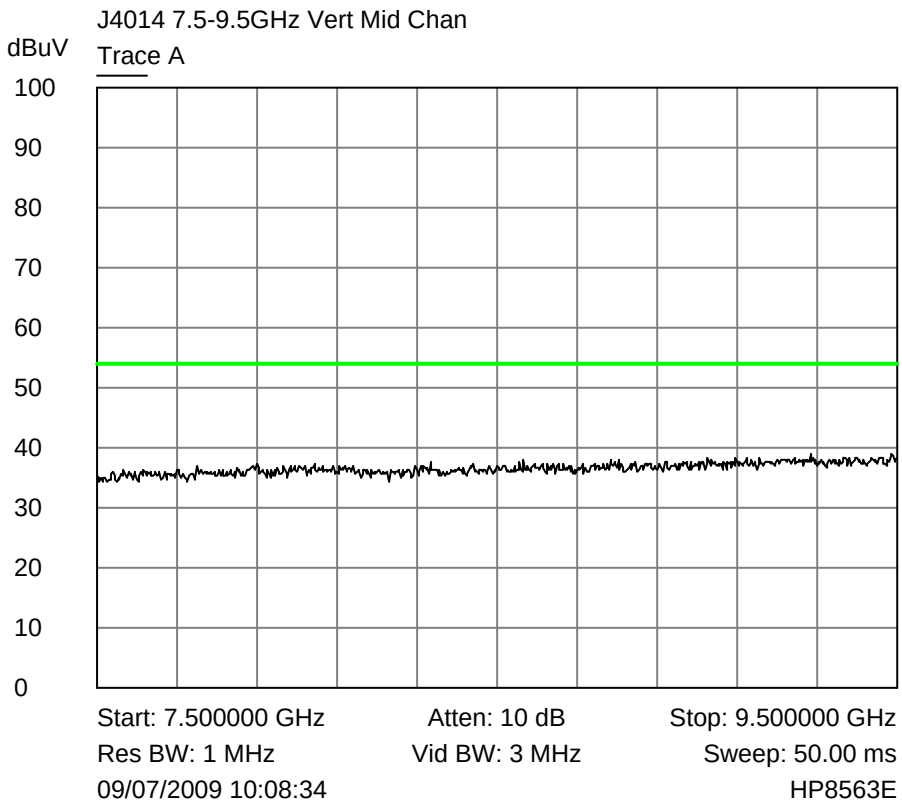

# Average Values of 6.5 – 7.5 GHz.
## Top Channel
## Horizontal Polarisation




# Average Values of 6.5 – 7.5 GHz.
## Top Channel
## Vertical Polarisation

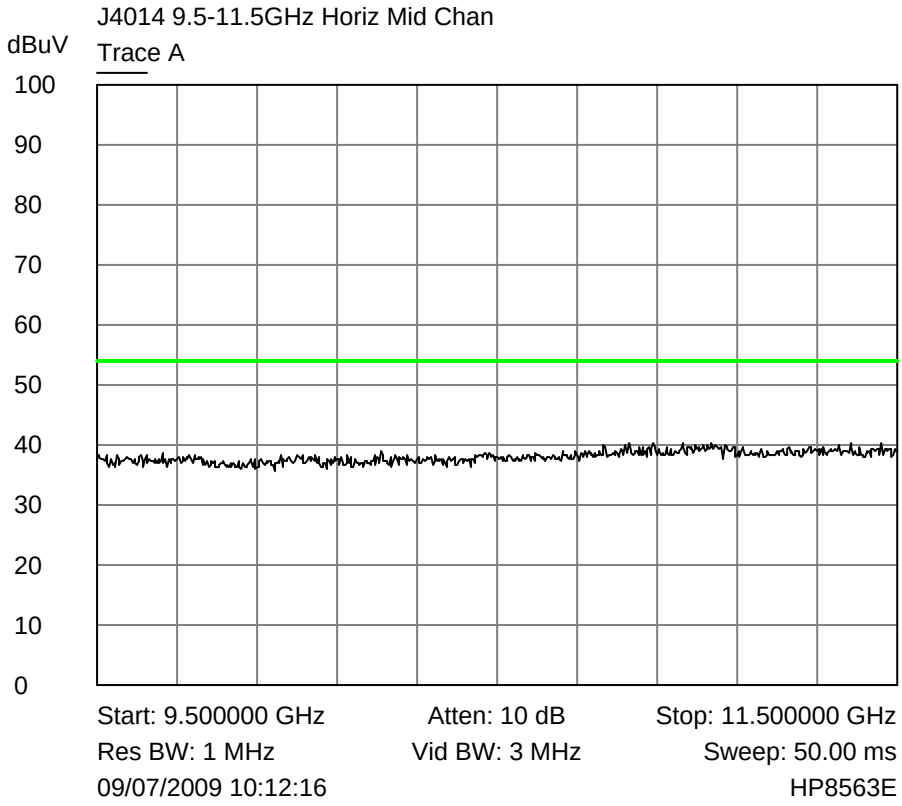



# Average Values of 7.5 - 9.5 GHz.
# Horizontal Polarisation



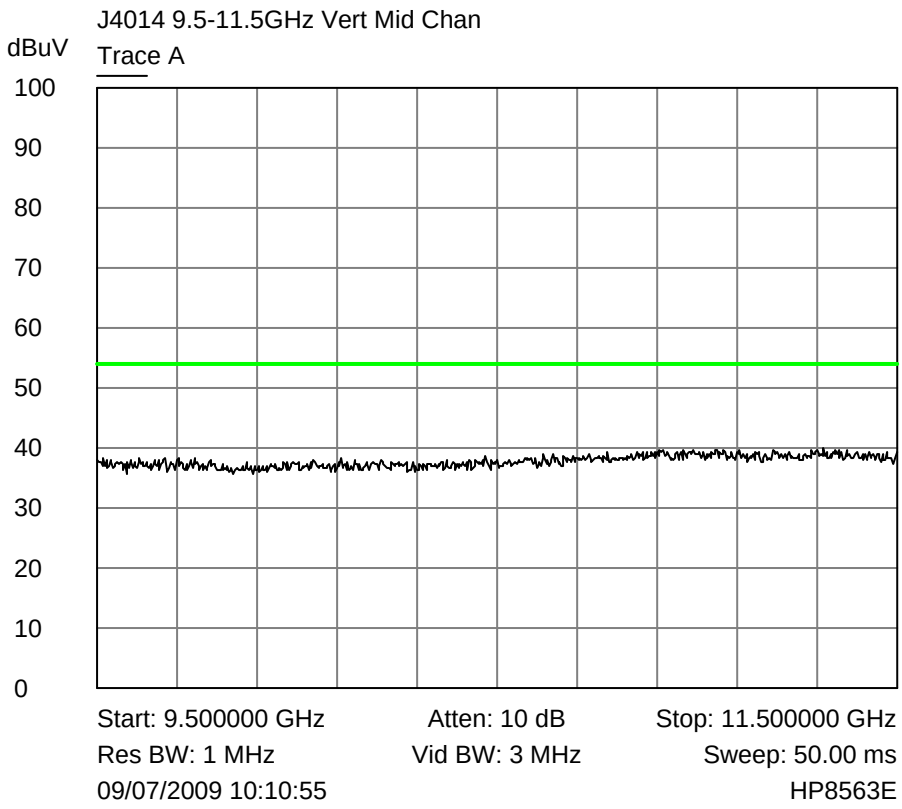

# Average Values of 7.5 - 9.5 GHz.

# Vertical Polarisation



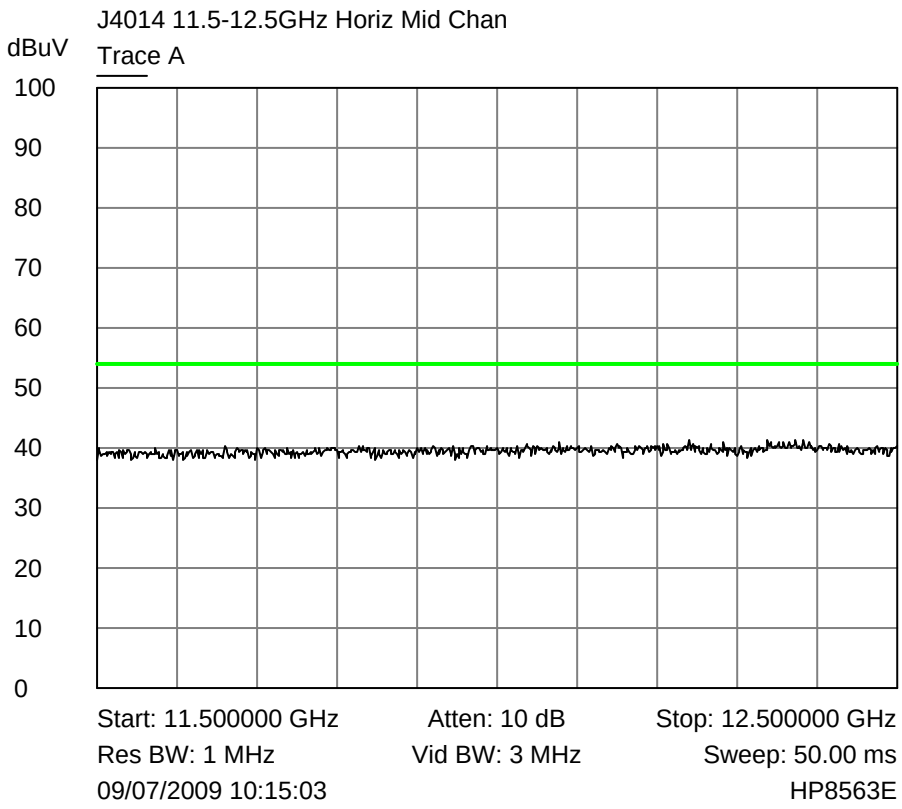

# Average Values of 9.5 - 11.5 GHz.

# Horizontal Polarisation



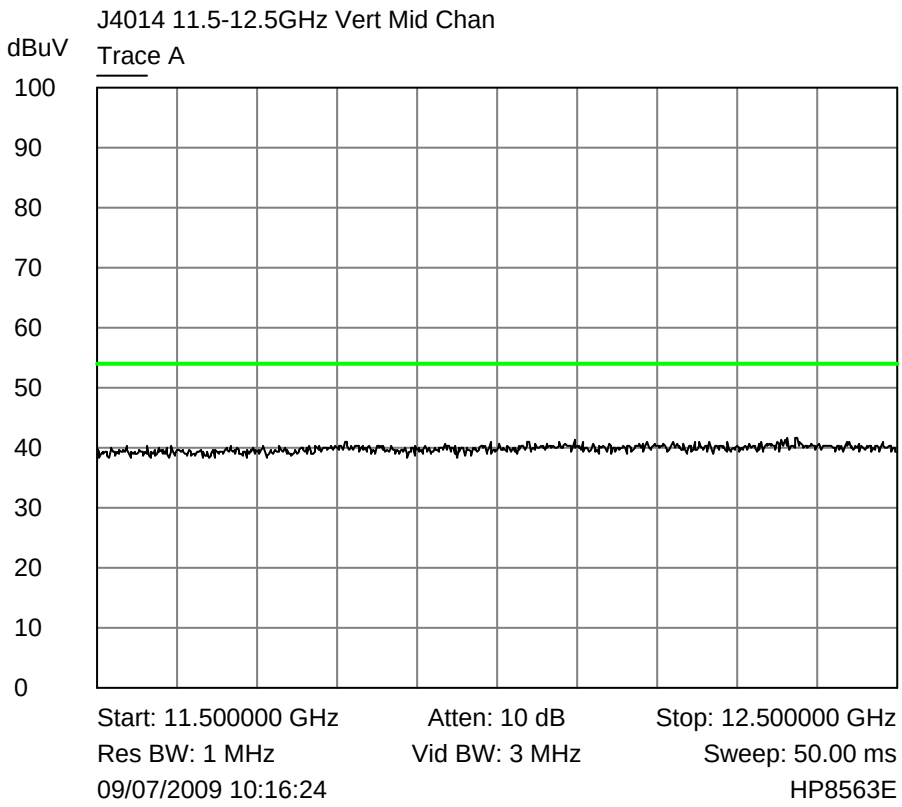

# Average Values of 9.5 - 11.5 GHz.

# Vertical Polarisation



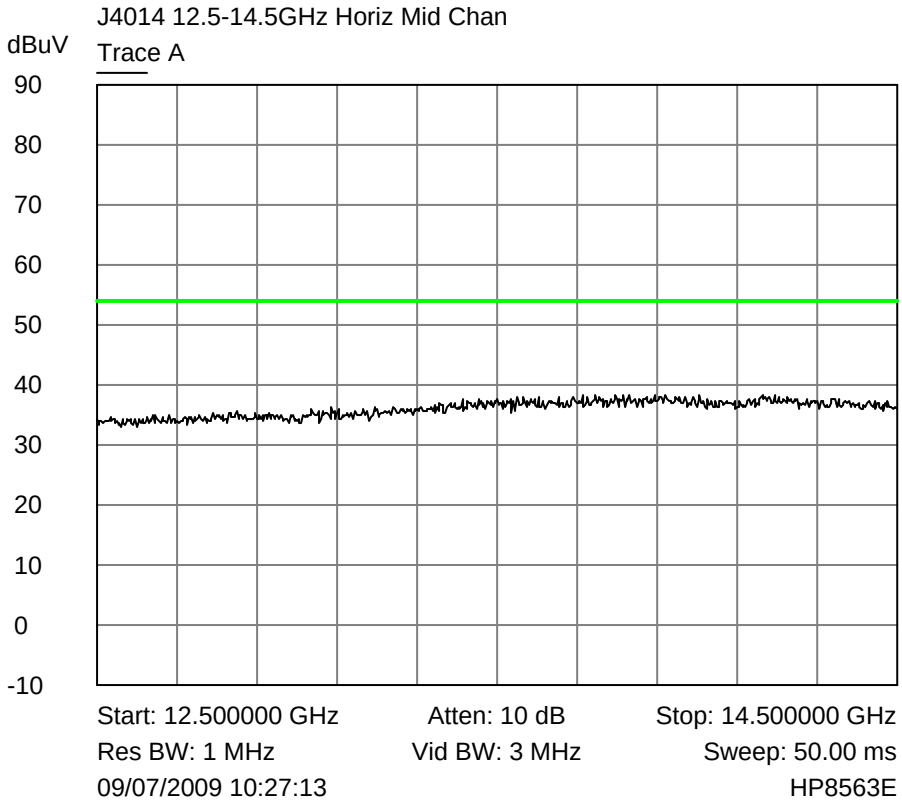

# Average Values of 11.5 - 12.5 GHz.

# Horizontal Polarisation



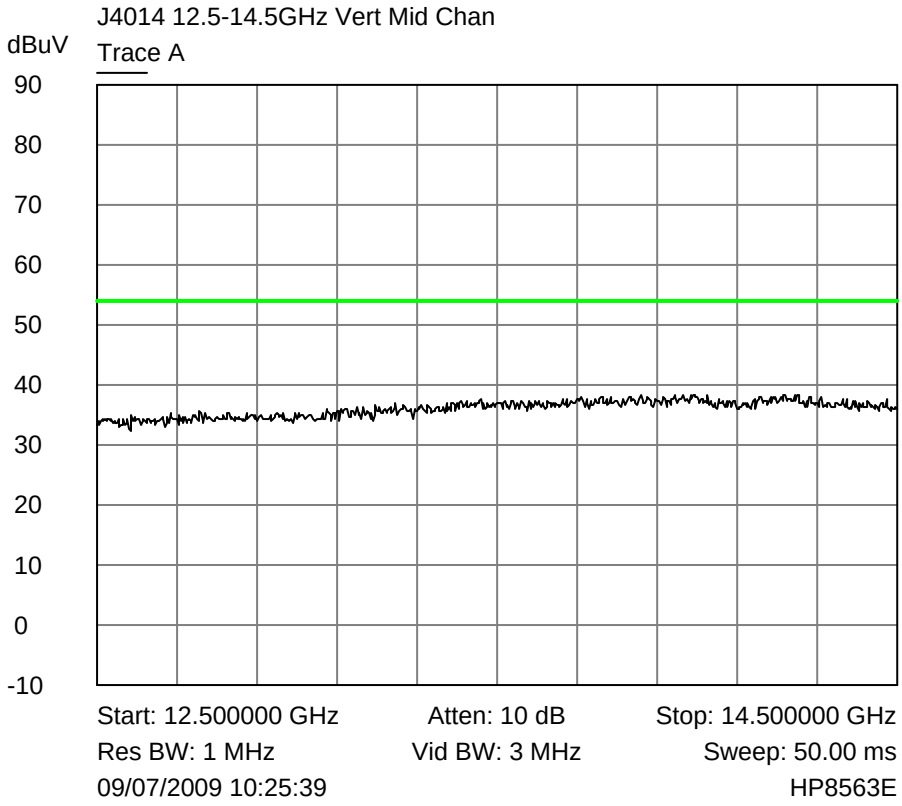

# Average Values of 11.5 - 12.5 GHz.

# Vertical Polarisation



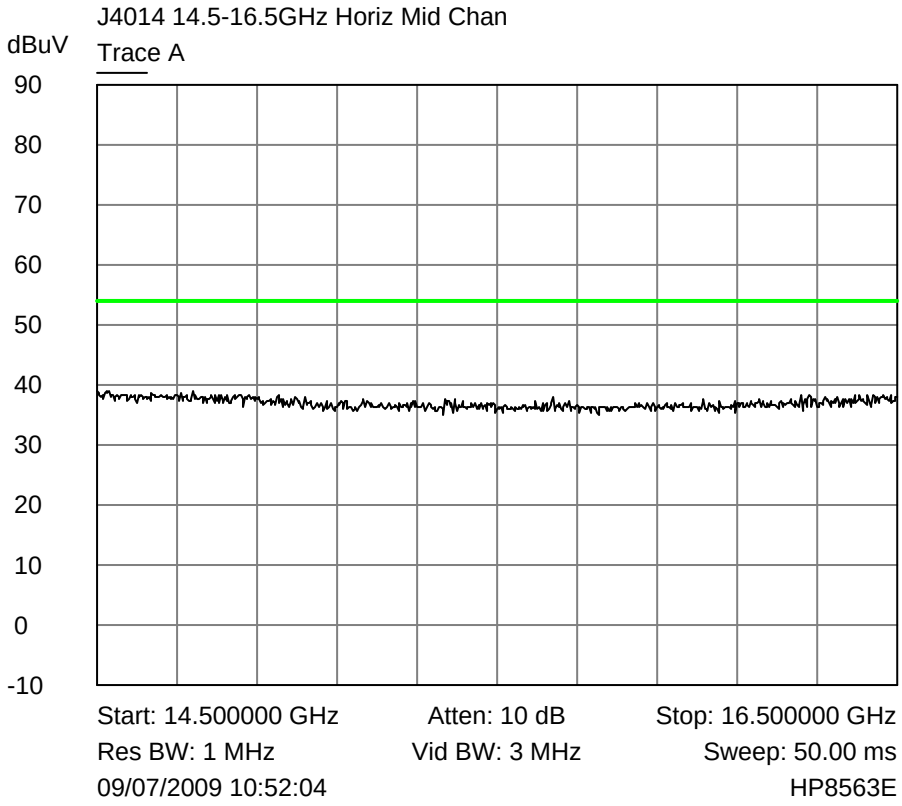

# Average Values of 12.5 - 14.5 GHz.

# Horizontal Polarisation



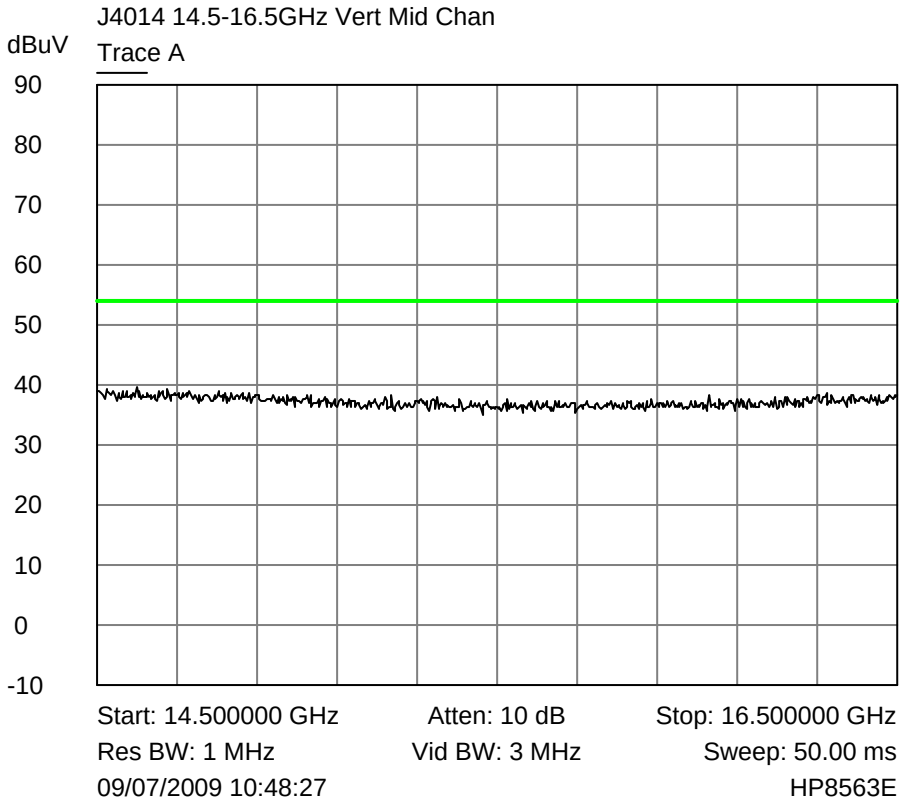

# Average Values of 12.5 - 14.5 GHz.

# Vertical Polarisation



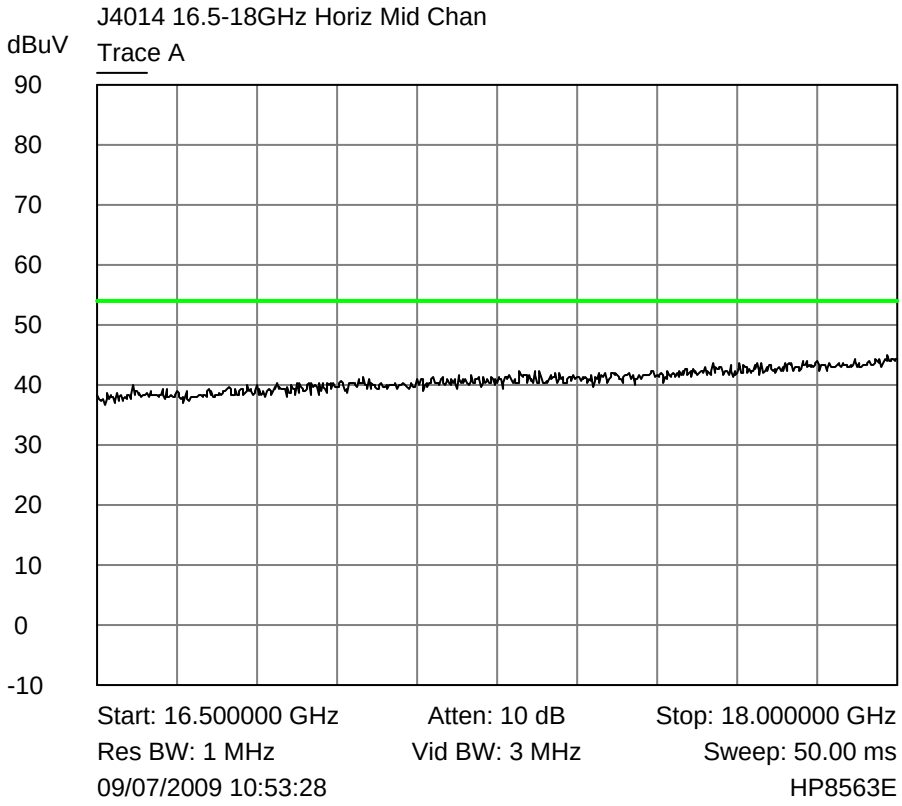

# Average Values of 14.5 - 16.5 GHz.

# Horizontal Polarisation



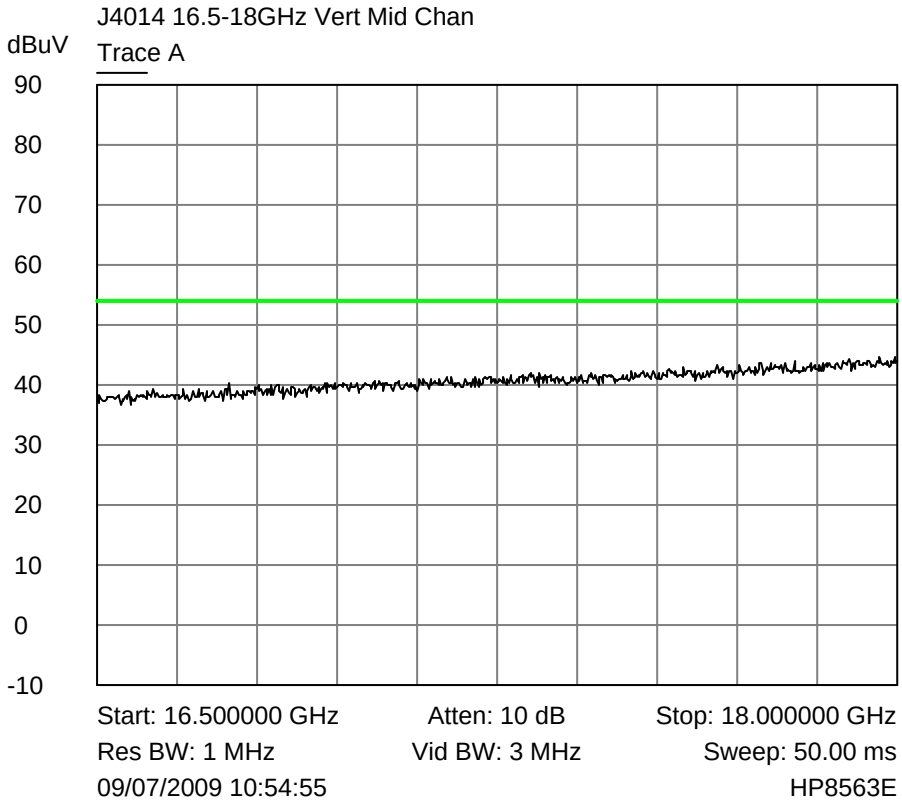

# Average Values of 14.5 - 16.5 GHz.

# Vertical Polarisation



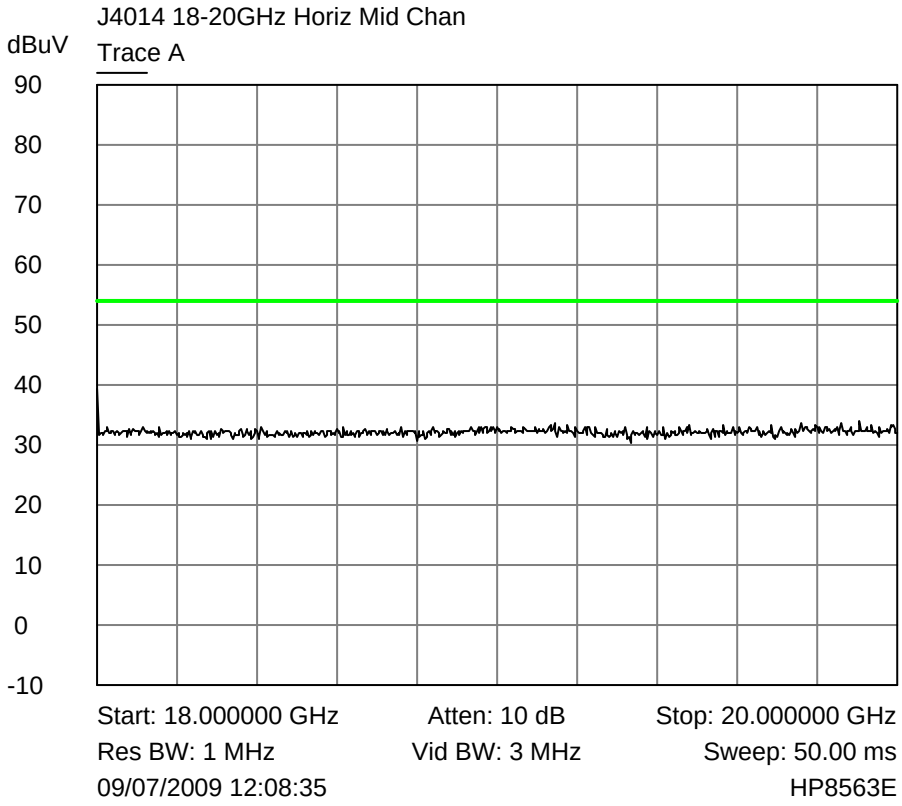

# Average Values of 16.5 – 18.0 GHz.

# Horizontal Polarisation



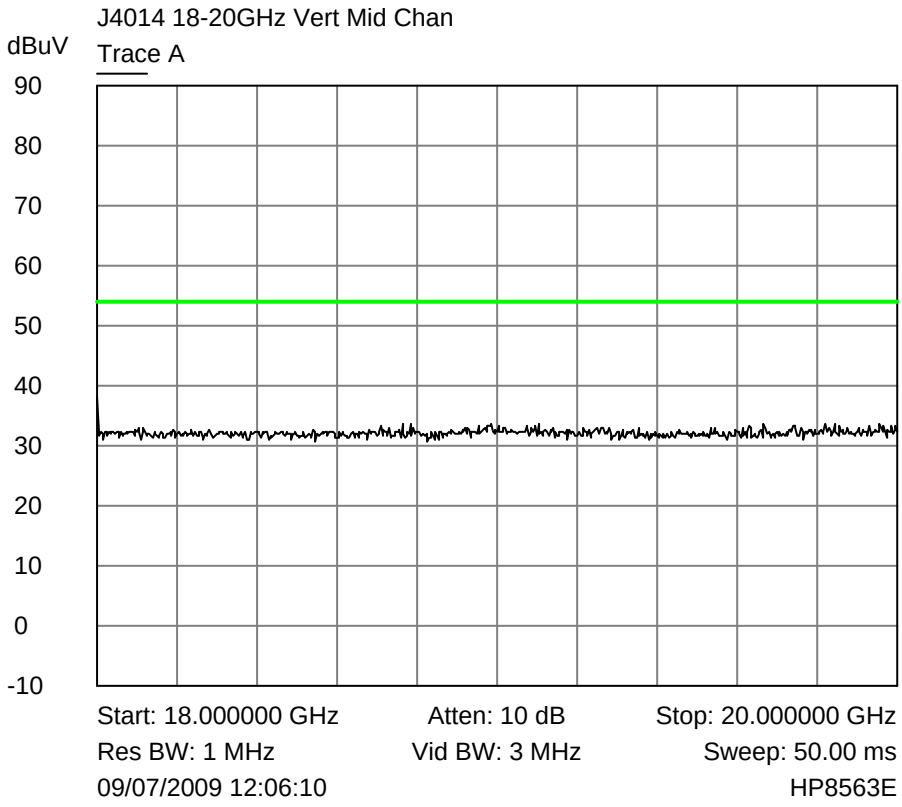

# Average Values of 16.5 – 18.0 GHz.

# Vertical Polarisation



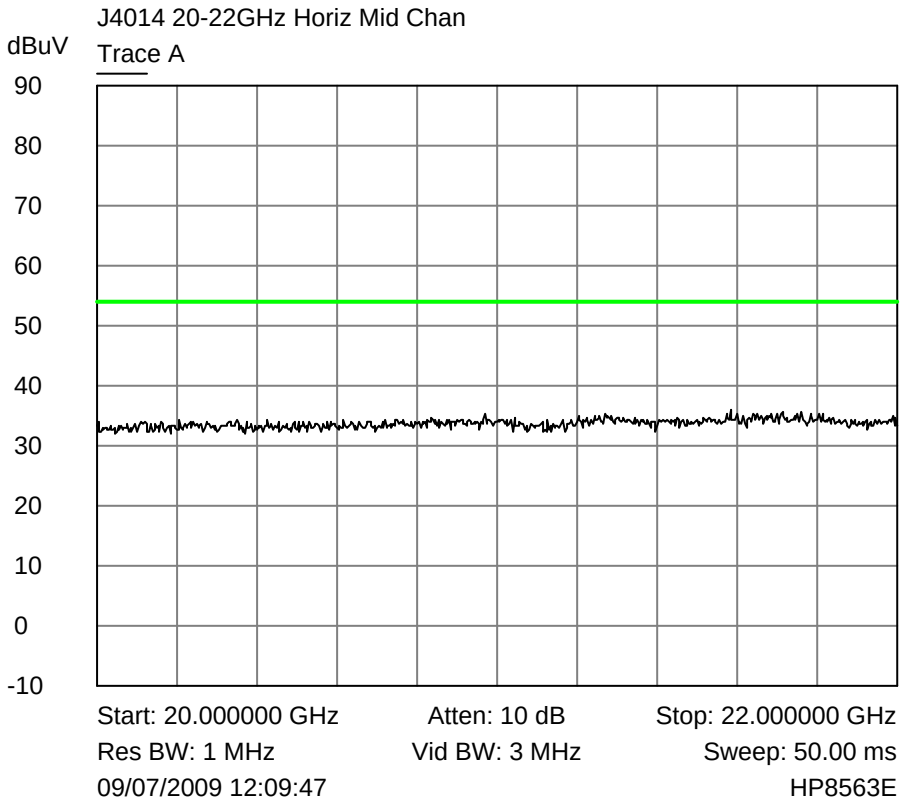

# Average Values of 18 - 20 GHz.

# Horizontal Polarisation

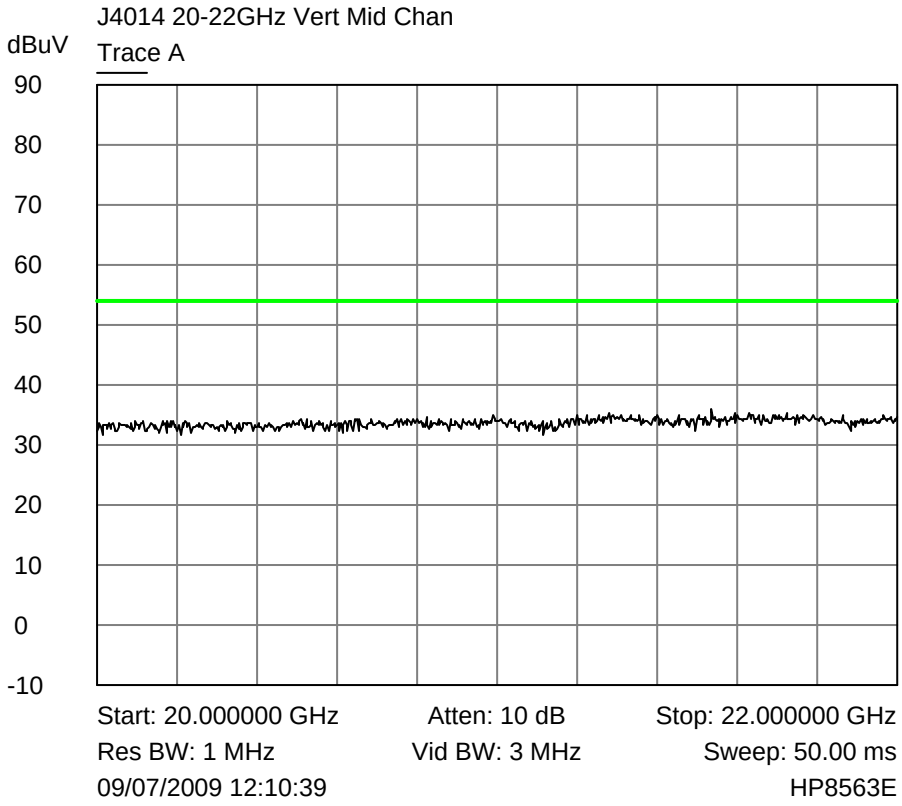



# Average Values of 18 - 20 GHz.

# Vertical Polarisation

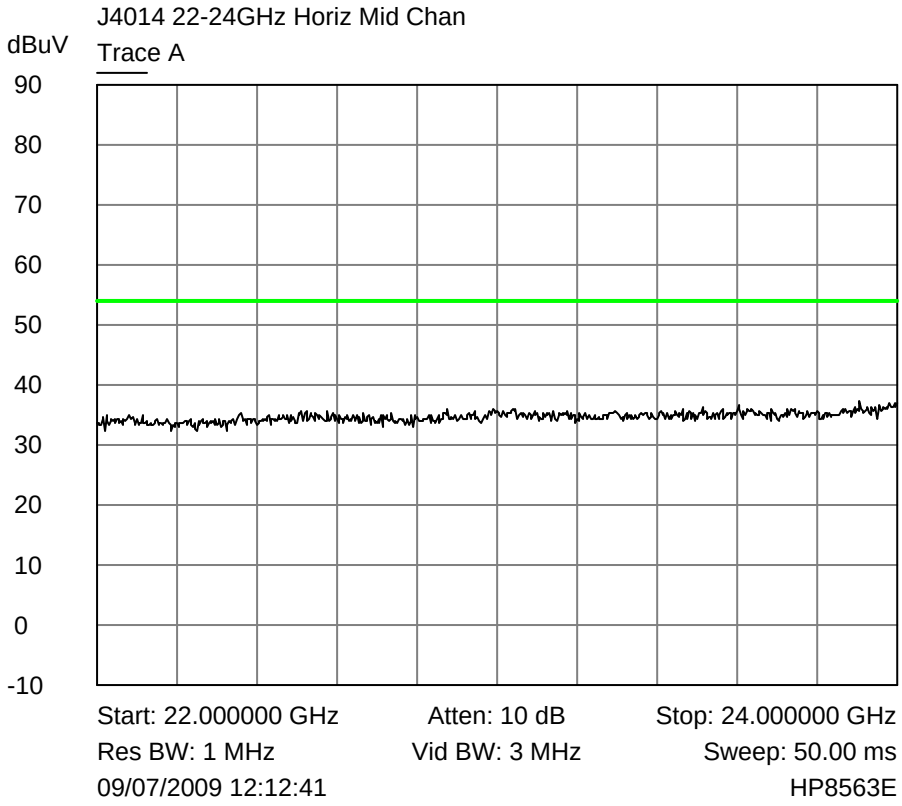



# Average Values of 20 - 22 GHz.
# Horizontal Polarisation



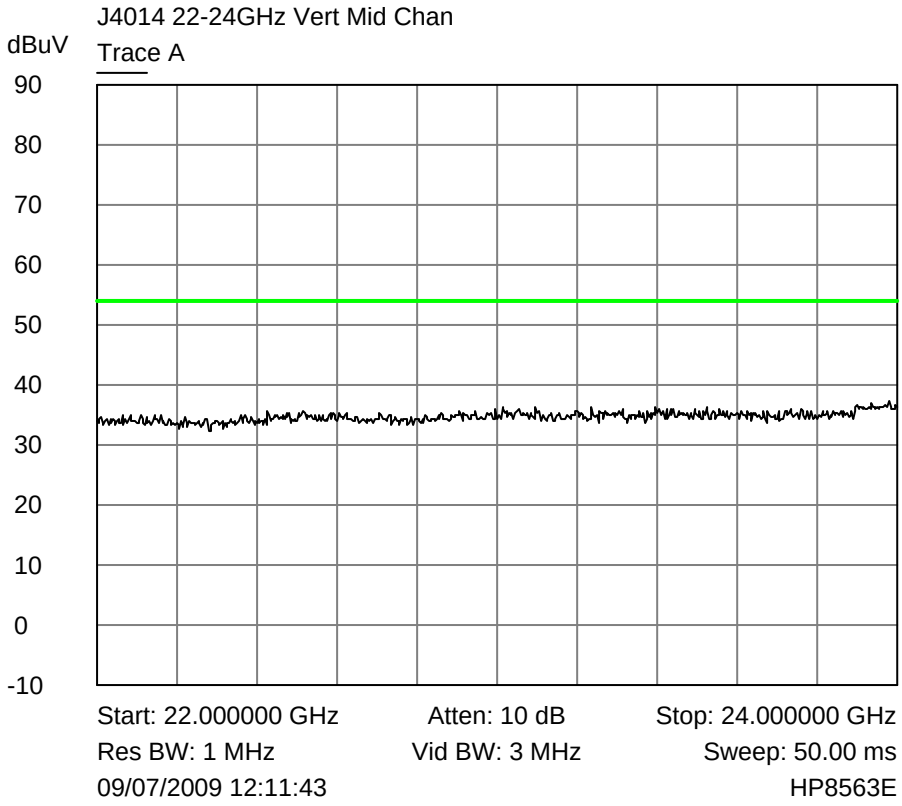

# Average Values of 20 - 22 GHz.

# Vertical Polarisation



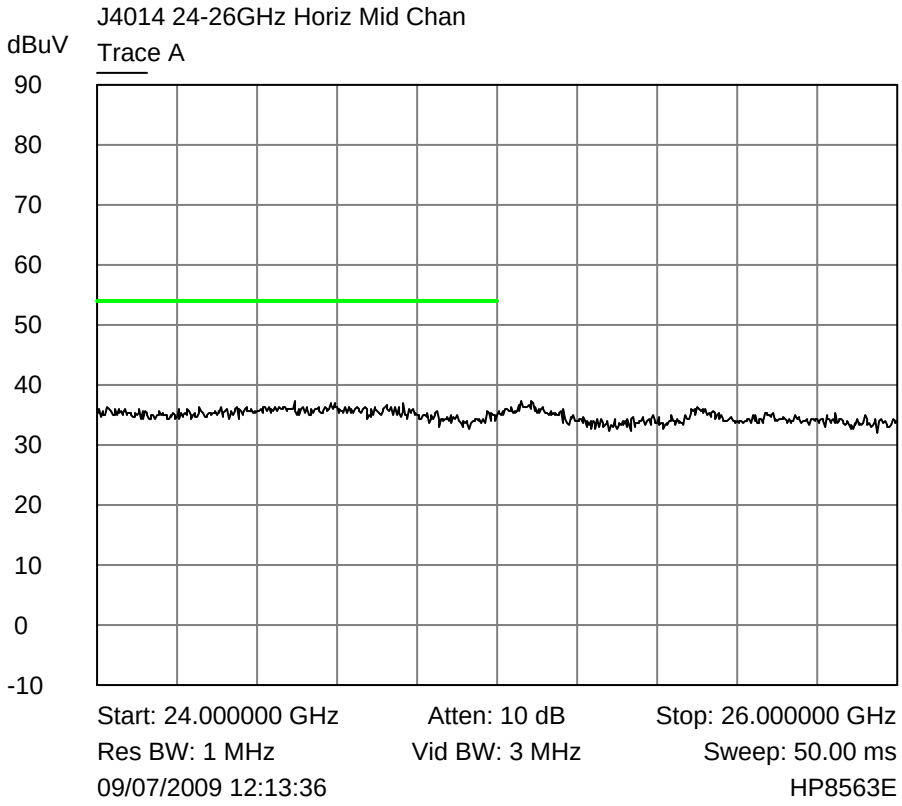

# Average Values of 22 - 24 GHz.

# Horizontal Polarisation



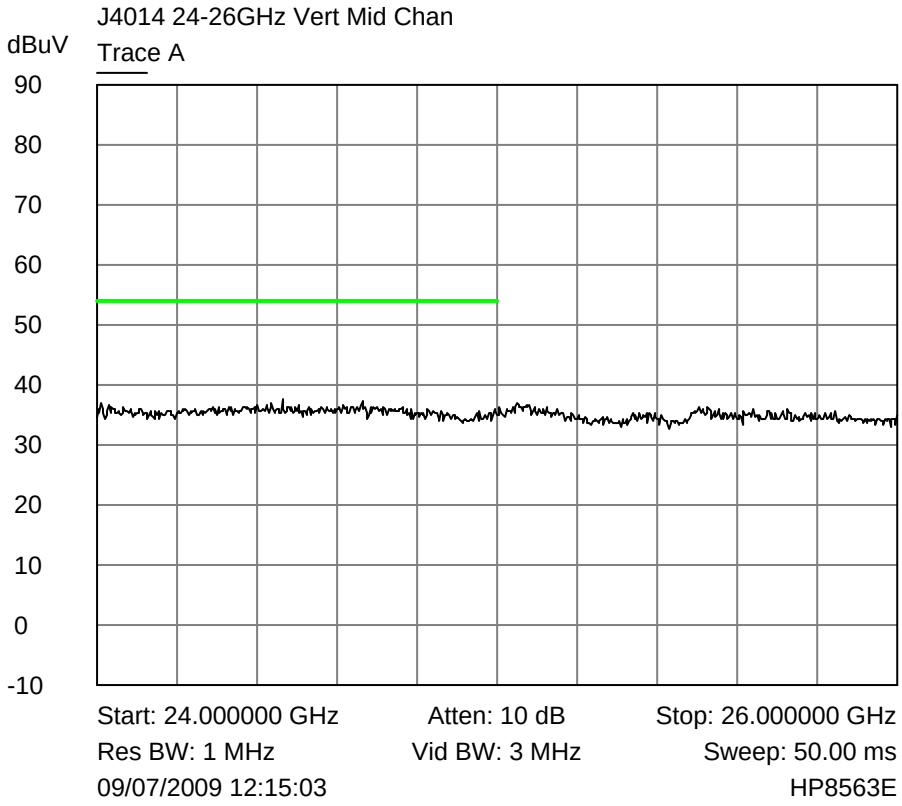

# Average Values of 22 - 24 GHz.

# Vertical Polarisation




# Average Values of 24 - 26 GHz.

# Horizontal Polarisation




# Average Values of 24 - 26 GHz.

# Vertical Polarisation

## Tables of signals within 20dB of the limit line for 1GHz - 25GHz

EUT Transmitting on Low Channel

NONE

EUT Transmitting on Middle Channel

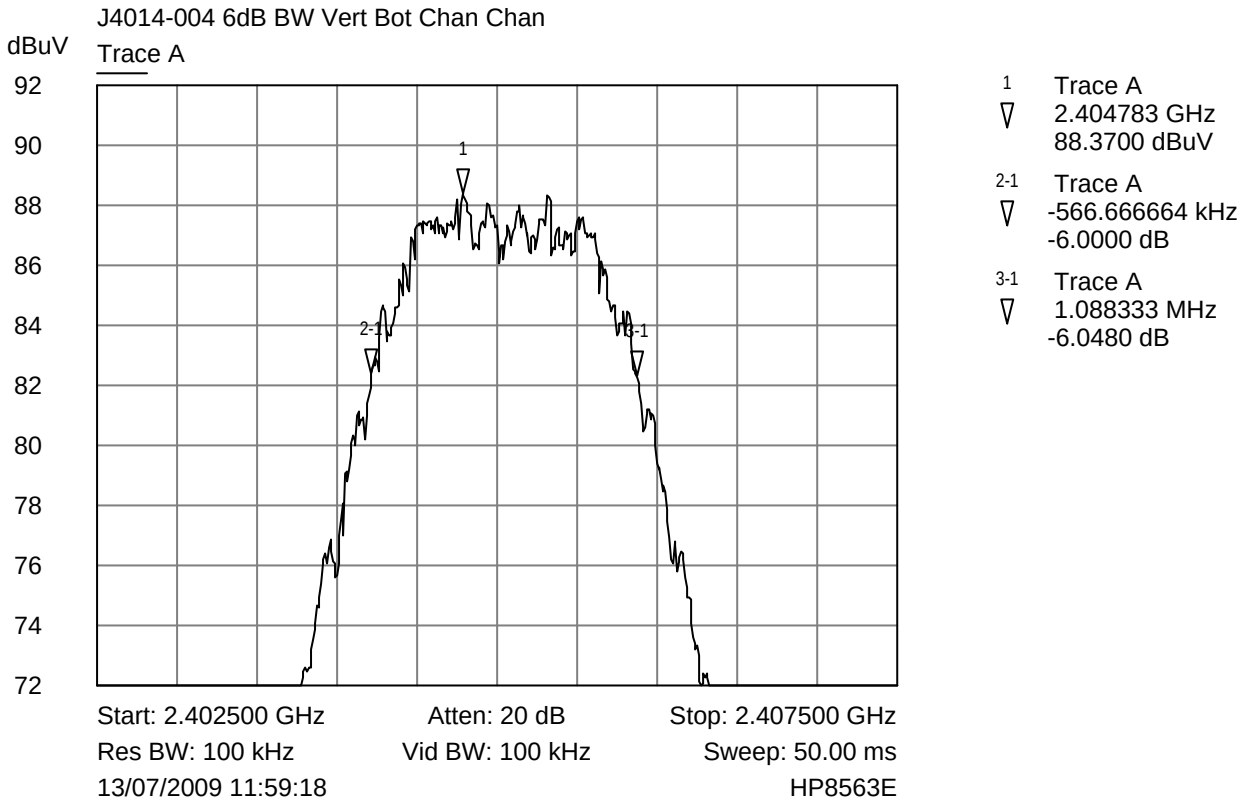
| Signal | Freq (MHz) | Polaris-ation | Avg Amp (dBuV/m) | Avg -Limit[1] (dBuV/m) | Comments |
|---|---|---|---|---|---|
| 1 | 7320 | V | 41.17 | -13.33 | |
| 2 | 7320 | H | 40.67 | -12.83 | |

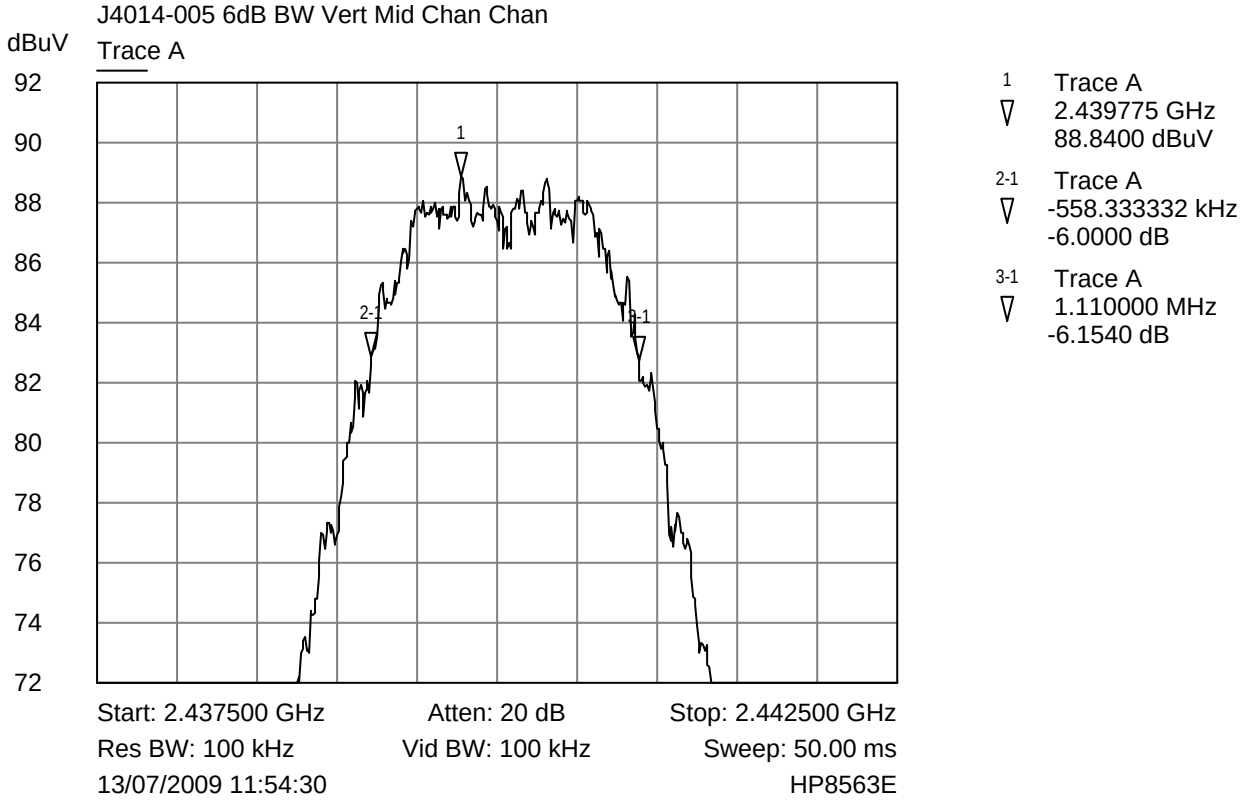
EUT Transmitting on High channel

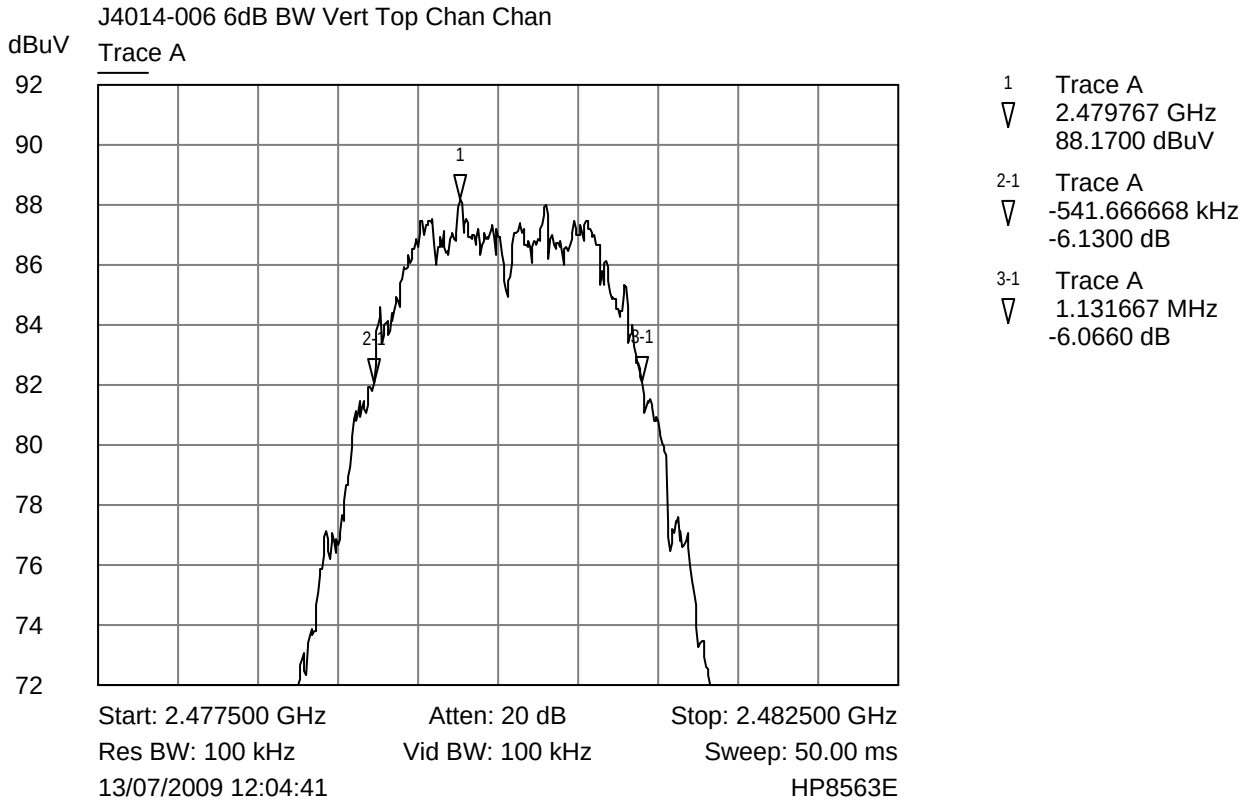
| Signal | Freq (MHz) | Polaris-ation | Avg Amp (dBuV/m) | Avg -Limit[1] (dBuV/m) | Comments |
|---|---|---|---|---|---|
| 3 | 7440 | V | 41.67 | -12.33 | |
| 4 | 7440 | H | 42.00 | -12.00 | |

[1]Limit for emissions within the restricted bands of 15.205 comes from 15.209 = 54dBuV/m at 3m.

## 6.3 6dB Bandwidth

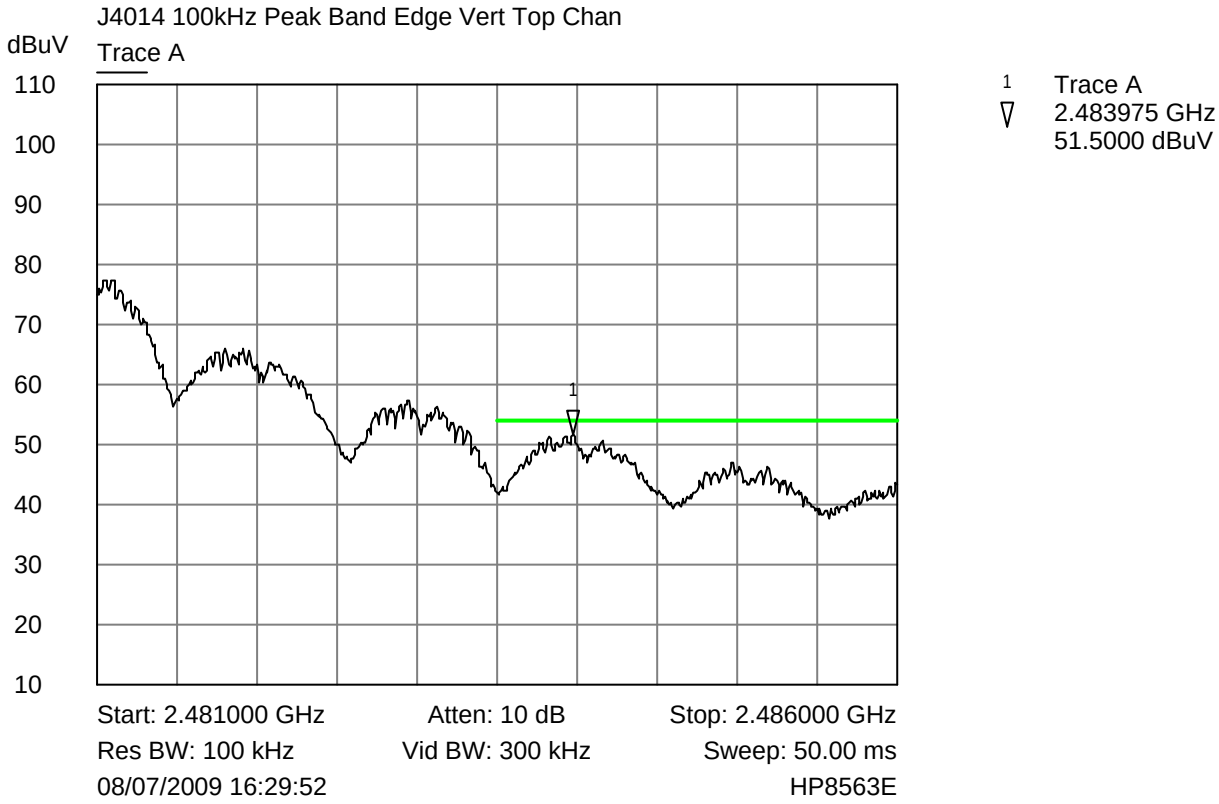



J4014-006 6dB BW Vert Top Chan Chan
dBuV
Trace A
92
90
88
86
84
82
80
78
76
74
72
1
2-1
3-1
1 Trace A
2.479767 GHz
88.1700 dBuV
2-1 Trace A
-541.666668 kHz
-6.1300 dB
3-1 Trace A
1.131667 MHz
-6.0660 dB
Start: 2.477500 GHz
Atten: 20 dB
Stop: 2.482500 GHz
Res BW: 100 kHz
Vid BW: 100 kHz
Sweep: 50.00 ms
13/07/2009 12:04:41
HP8563E

## 6.4 Band Edge Compliance

The top of the band 2483.5MHz coincides with the restricted band – see 15.205. Therefore in addition to the average limit shown previously, the peak limits of 20dB above the 15.209 average limits apply at the top band edge:



# 7 Explanatory Notes

## 7.1 Explanation of FAIL LIMIT 1 Statement

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

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

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

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

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

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

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

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

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

## 7.2 Explanation of limit line calculations for radiated measurements

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

(a) limit of 500 µV/m equates to 20.log (500) = 54 dB µV/m.
(b) limit of 300 µV/m at 10m equates to 20.log (300 . 10/3) = 60 dB µV/m at 3m

## 8. Photographs

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

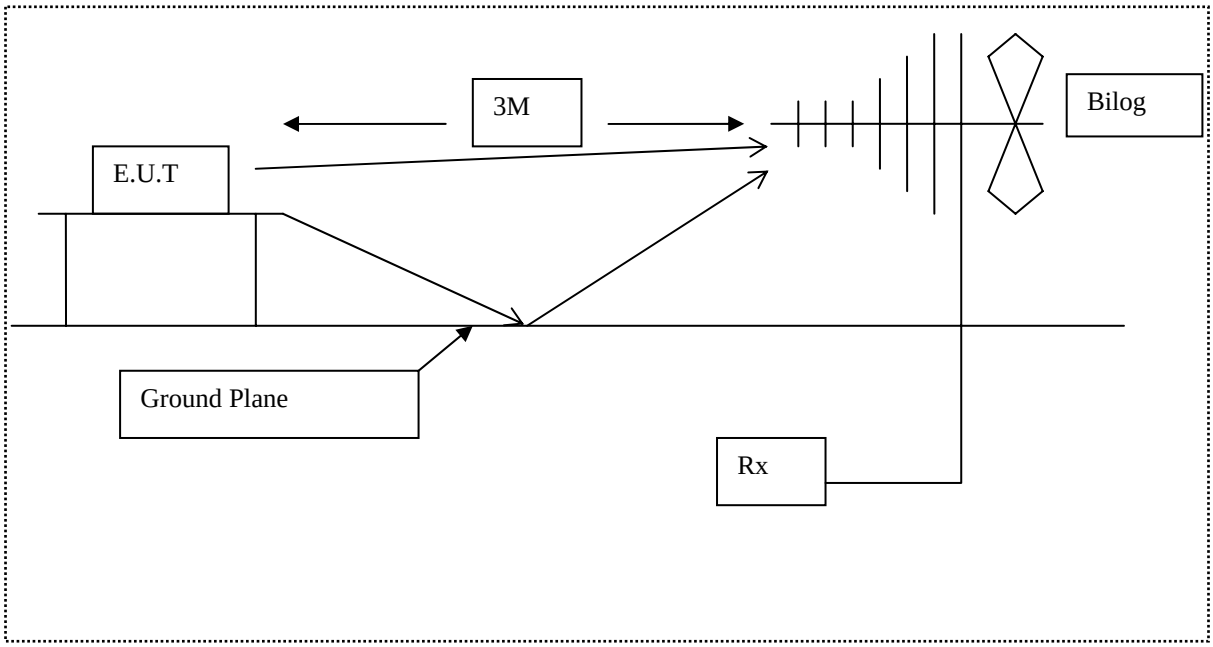
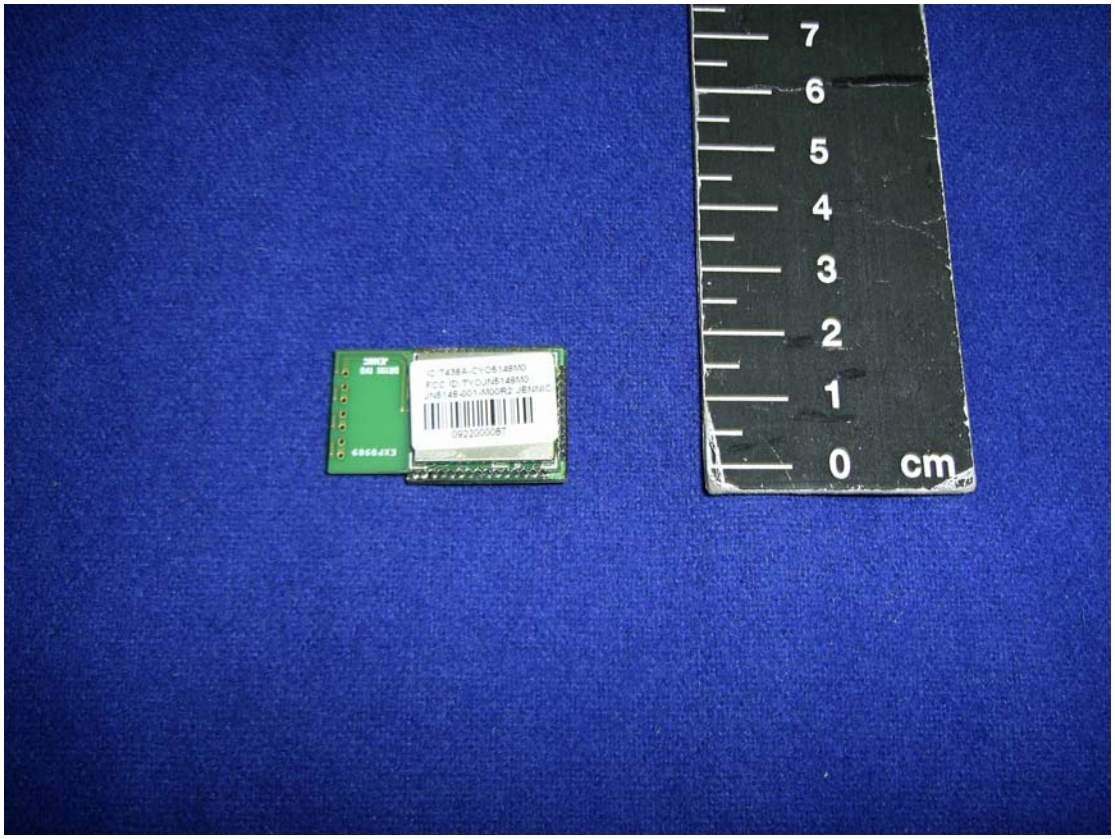
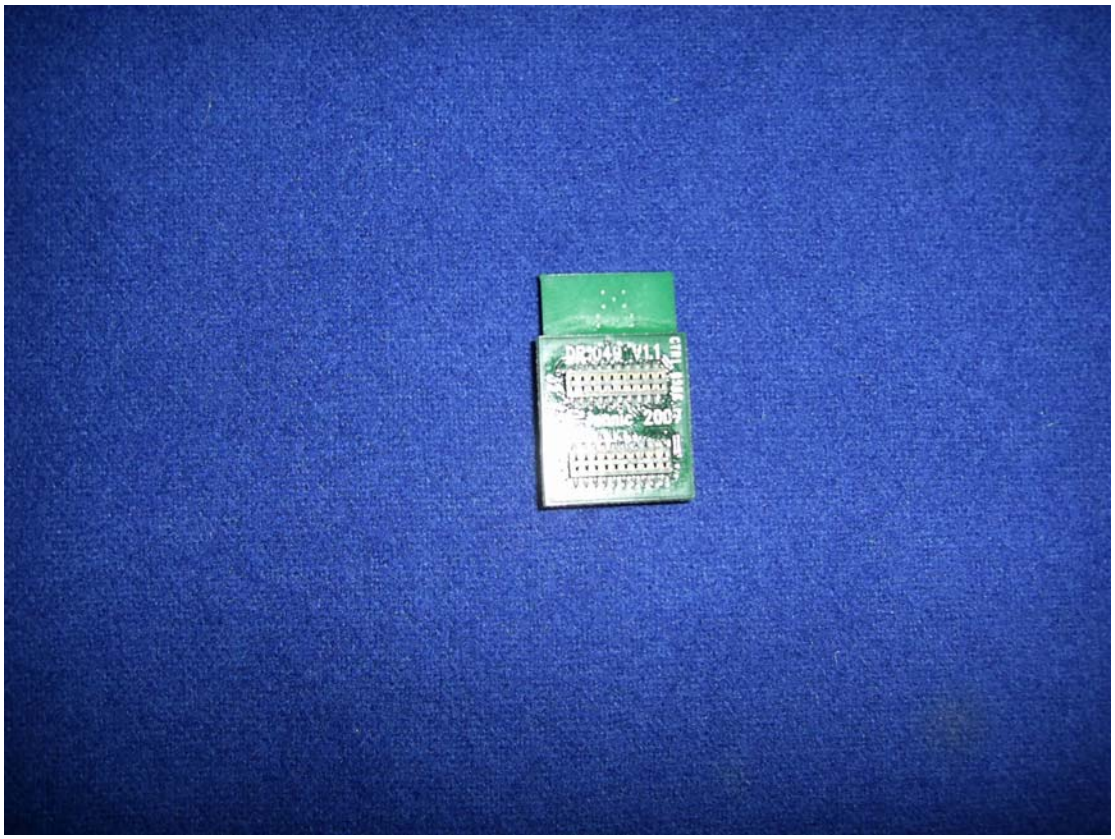


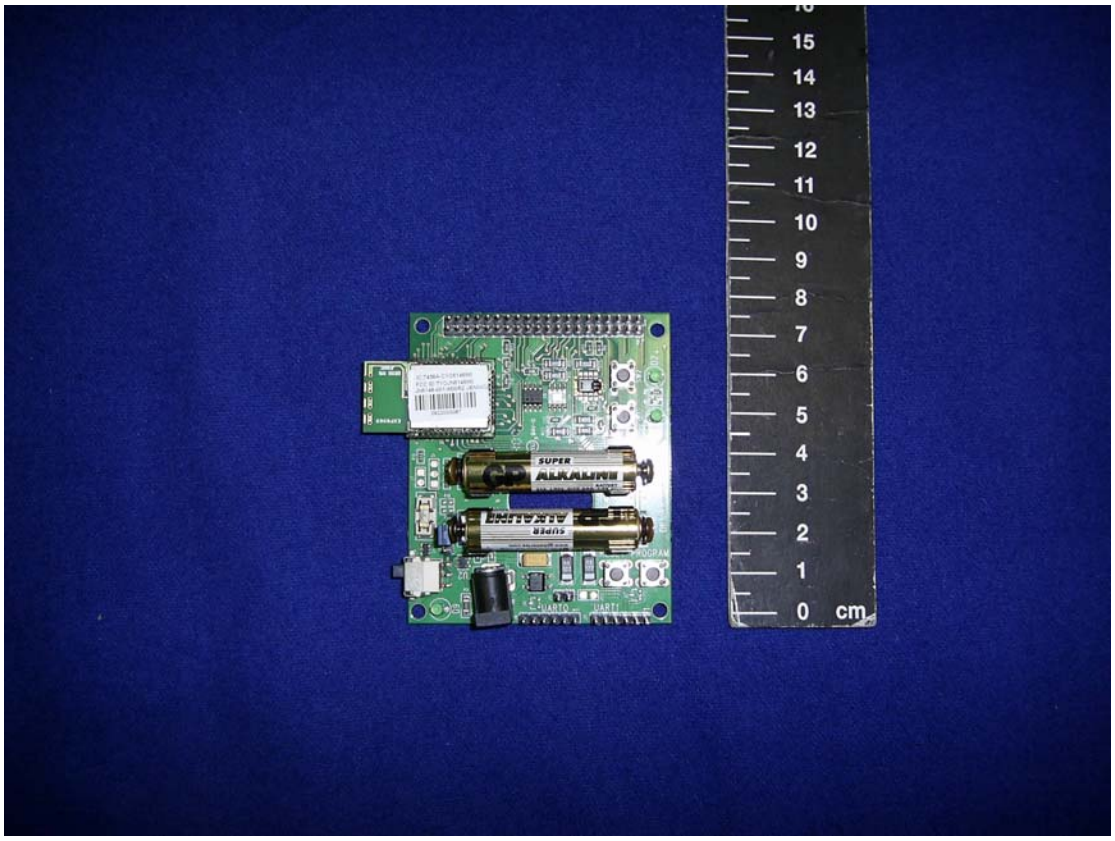

Diagram of the radiated emissions test setup.

**8.1 EUT**



## 8.2 EUT on Test Board



## 9. Signal Leads

None.
The EUT plugged directly into the test board.
The alternative sample was presented with a uFL antenna port.

## 10. Test Equipment Calibration list

The following table lists the test equipment used, last calibration date and calibration interval (in months). 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 |
|---|---|---|---|---|---|
| E001 | HP8542E | EMI Receiver & RF Filter | Hewlett Packard | 19-Jan-09 | 6 |
| E003 | HP8593E | Spectrum Analyser | Hewlett Packard | 10-Oct-08 | 24 |
| E005 | HP8447F | Pre-Amplifier | Hewlett Packard | 09-Oct-08 | 12 |
| E250 | 6806.19.A | 6dB Attenuator | Hewlett Packard | 16-Oct-08 | 12 |
| E251 | 6806.19.A | 6dB Attenuator | Suhner | 16-Oct-08 | 12 |
| E252 | 6810.19.A | 10 dB Attenuator | Suhner | 16-Oct-08 | 12 |
| E268 | BHA 9118 | 1-18 GHz Horn Antenna | Schaffner | 26-May-06 | 60 |
| E290 | 6914 | Power Sensor | Marconi Instruments | 01-Jun-09 | 24 |
| E342 | 8563E | Spectrum Analyser 26.5 GHz | HP | 23-Feb-09 | 24 |
| E397 | 6960B | RF Power Meter | Marconi Instruments | 21-Nov-08 | 12 |
| E429 | - | 5 Switch Filter Box 0.91 GHz - 16.3 GHz | RN Electronics | N/A | N/A |
| TMS79 | 460451 | Std Gain Horn Antenna 18-26.5 GHz | ETS Systems | 26-May-06 | 60 |
| TMS82 | 8449B | Pre Amplifier 1 - 26 GHz | Agilent | 28-Oct-08 | 12 |
| TMS933 | CBL6141A | Bilog Antenna 30MHz - 2GHz | York EMC | 10-Sep-07 | 36 |

## 11. Auxiliary equipment

### 11.1 Auxiliary equipment supplied by Jennic Ltd

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

| Manufacturer | Description | Model Number | Serial Number |
|---|---|---|---|
| Jennic | USB to RS232 Programming Lead | Not Available | Not Available |
| Jennic | PCB Motherboard | DR1048 | Not Available |
| Jennic | PCB Carrier/Adaptor | DR1049 | Not Available |

### 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 |
|---|---|---|---|---|
| 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.

NONE.

N.B. The settings of the device - continuous transmit, power level, frequency were set by test software not normally available to the user. The manufacturer should ensure that any OEM programming does not allow for alternative modes inconsistent with those tested.

## 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:

Not applicable.
Device to be certified.

RN Electronics
EMC & RADIO TEST SERVICES

# *Certificate of Test*

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

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

| | |
|---|---|
| Equipment: | IEEE 802.15.4 wireless controller module |
| Model Number(s): | JN5148-001-M00R2 |
| Unique Serial Number(s): | 0922000087 |
| Manufacturer: | Jennic Ltd |
| Customer Purchase Order Number: | PO005383/CF |
| R.N. Electronics Limited Report Number: | 07-366a/4014/1/09 |
| Test Standards: | FCC Part 15C: effective date October 2008 Class DTS Intentional Radiator |
| Date: | 8th July to 13th July 2009 |

For and on behalf of
R.N. Electronics Limited

Signature: Roger Ray

Digitally signed by Roger Ray
DN: CN = Roger Ray, C = GB, O = RN Electronics
Date: 2009.07.27 11:25:10 +01'00'



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