FCC
Test Report
for
Bounce communicator
Issue 2

Report Number 11-150/3230/4/06A
Supersedes Report Number 11-150/3230/4/06

Report Produced by: -

R.N. Electronics Ltd.
1 Arnolds Court
Arnolds Farm Lane
Mountnessing
ESSEX
CM13 1UT

www.rnelectronics.com

Telephone 01277 352219
Facsimile 01277 352968

1. Contents

2. Summary of Test Results

The Bounce communicatorIssue 2 was tested to the following standards: -

FCC Part 15C (effective date October 1st , 2006); Class DXT Intentional Radiator

Title	Reference	Results
1. Conducted Emissions	FCC Part 15C §15.207	PASSED
2. Radiated Emissions	FCC Part 15C §15.205, §15.209 & §15.249	PASSED
3. Modulation Bandwidth	FCC Part 15C §15.215(c), §15.249	PASSED
4. Intentional Radiator Field Strength	FCC Part 15C §15.249	PASSED
5. Frequency Tolerance	FCC Part 15C §15.225, §15.229, §15.233, §15.249(b)	NOT APPLICABLE[1]
6. Duty Cycle	FCC Part 15C §15.231, §15.240	NOT APPLICABLE[1]
7. Power Spectral Density	FCC Part 15C §15.247	NOT APPLICABLE[1]
8. Frequency separation	FCC Part 15C §15.247	NOT APPLICABLE[1]
9. No. of hopping channels	FCC Part 15C §15.247	NOT APPLICABLE[1]

[1] No specification requirement for this type of equipment.

Date of Test: 29th & 30th November 2006

Test Engineer: Daniel Sims — Digitally signed by Daniel Sims, DN: CN = Daniel Sims, C = GB, O = RN Electronics, Date: 2007.06.11 10:42:29 +01'00'

Approved By: Roger Ray — Digitally signed by Roger Ray, DN: CN = Roger Ray, C = GB, O = RN Electronics, Date: 2007.06.11 13:52:27 +01'00'

Customer Representative:

3. Information about Equipment Under Test

Manufacture of EUT	TTP Group plc Melbourn Science Park Cambridge Road Melbourn Royston Hertfordshire SG8 6EE
Full name of EUT	Bounce communicator
Model Number of EUT	Issue 2
Serial Number of EUT	Prototype 1
FCC ID (if applicable):	
Date when equipment was received by RN Electronics Limited	29th November 2006
Date of test:	29th & 30th November 2006
Customer order number:	ET1127/SRT
A visual description of EUT is as follows:	small plastic enclosure with a USB connection & two status L.E.Ds on the underside.
The main function of the EUT is:	Data communication with shelf edge label unit.
Antenna:	Integral

Equipment Under Test Information specification:

Height	140mm
Width	120mm
Depth	35mm
Weight	0.5kg
Voltage	5V DC from USB
Current required from above voltage source	0.1A
Highest Frequencies used / generated	902.5 – 927.5MHz

Modes of operation:

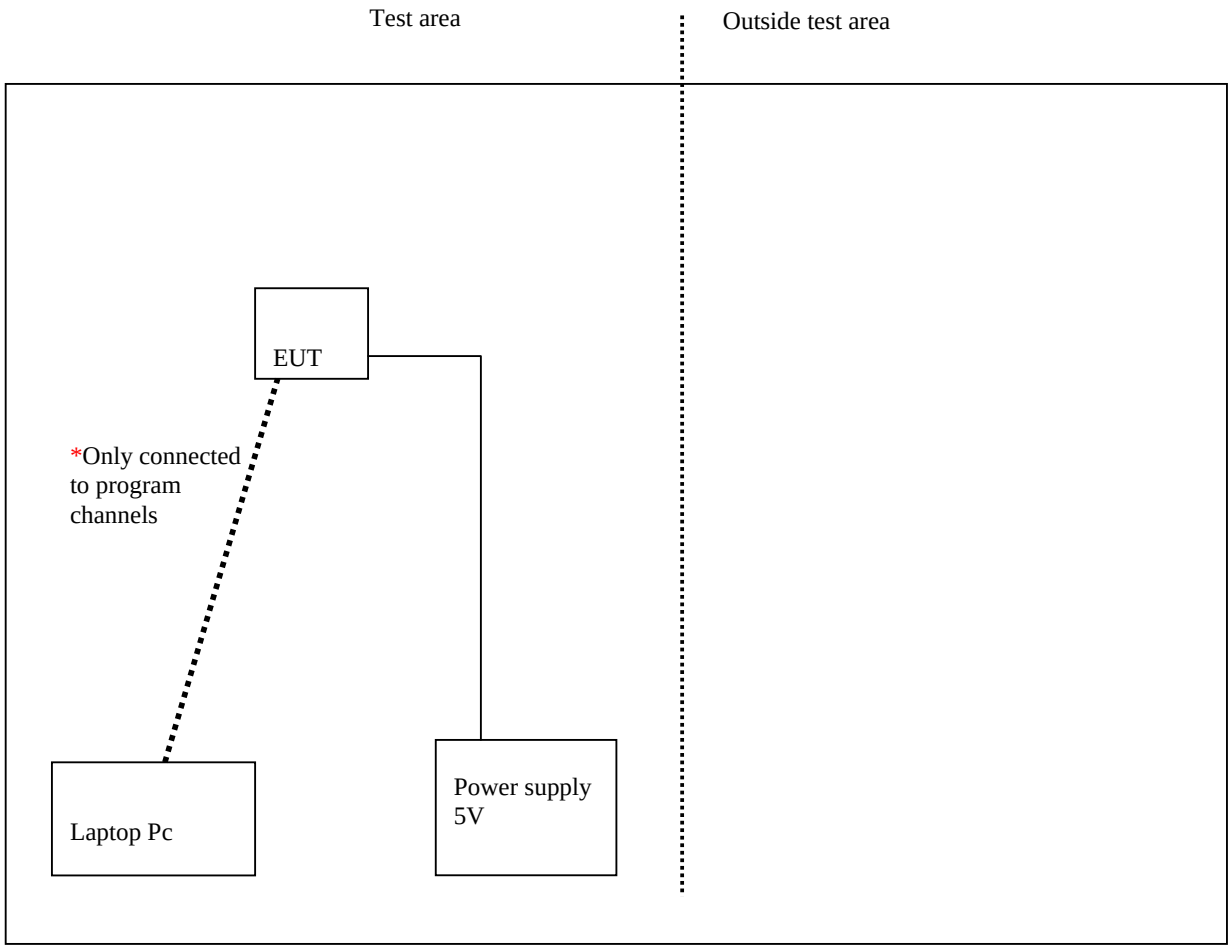
Mode	Description
TX Continuous Wave	Unmodulated continuous transmit.
TX continuous Data	Continuous Transmit with Modulation.
RX	Receive mode
Standby	Unit on and not programmed to do anything
V3 Mode	Unit operating pre-programmed data communications sequence with shelf edge label unit

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

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

This report was printed on: 11 June 2007

3.1 Configuration Diagram.



*The Bounce communicator was only connected via the laptop for programming of channels and modes. Except for the Conducted Emissions test & the ERP test, for which the laptop USB port was used as a host supply.

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 and FCC Part 15.

5. Tests, Methods and Results

5.1 Conducted Emissions

5.1.1 Test Methods

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

5.1.1.1 Configuration of EUT

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

5.1.1.2 Test Procedure

Tests were made in accordance with FCC Part 15 using the measuring equipment noted in the 'Test Equipment' Section. The equipment under test was powered via an AC supply line LISN with a supply lead of 1 metre. Any excess supply lead was placed in a 400mm bundle. At least 6 signals within 20dB and all signals within 10dB of the limit were investigated.

5.1.2 Test results

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

Temperature of test Environment: 21°C

Analyser plots for the Quasi-Peak Values and any table of signals within 10dB of the limit line can be found in Section 6.1 of this report.

Analyser plots for the Average values and any table of signals within 10dB 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

E1, E10, E35

See Section 10 for more details.

5.2 Radiated Emissions

5.2.1 Test Methods

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

5.2.1.1 Configuration of EUT

The EUT was placed on a 0.8 metres high turntable. The front edge of the EUT was initially positioned facing the antenna. The EUT was measured at a distance of 3 metres. The EUT was rotated in all three orthogonal planes.

5.2.1.2 Test Procedure

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

Above 30MHz, measurements were made in a semi-anechoic chamber (pre-scan) with final measurements on an OATS. Test sites 'M' and 'OATS' have been 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.
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.
Radiated Emissions testing was performed with a new battery.
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.**

Test Environment:
Temperature: 16-18°C Humidity: 50-61%

Analyser plots for the Quasi-Peak / Average values as applicable and any table of signals within 10dB 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

E1, TMS933, E266, E136, E268, E3, TMS77, TMS82, E319, E320, E238, E239, N438, E131

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 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.

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 and/ or on an OATS.

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

5.3.2 Test results

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

Test Environment:
Temperature: 16°C Humidity: 50 %

Any Analyser plots can be found in Section 6.3 of this report.
The unit under test was powered from a typical host laptop PC via its USB port. The AC supply to the laptop was varied from 93.5 – 126.5 V AC 50Hz & the signal strength monitored.

The maximised field strength measured using a software power setting of **P9** was:

902.5 MHz channel = 89.7dBuV/m @ 3m.
915 MHz channel = 92.6 dBuV/m @ 3m.
927.5 MHz channel = 92.08 dBuV/m @ 3m.

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

5.3.2.1 Test Equipment used

E1 TMS933

See Section 10 for more details

5.4 Frequency Tolerance

This test was not performed as there are no specified Limits.

5.5 Duty Cycle

This test is not applicable. Only applicable for Frequency Hopping Spread Spectrum equipment.

5.6 Maximum Spectral Power Density

This test is not applicable. Only applicable for Frequency Hopping Spread Spectrum equipment.

5.7 Modulation Bandwidth

5.7.1 Test Methods

Test Requirements FCC Part 15C, Reference (15.215)

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

5.7.1.1 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.

5.7.1.2 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.

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

5.7.2 Test results

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

Temperature of test Environment: 16°C

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

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

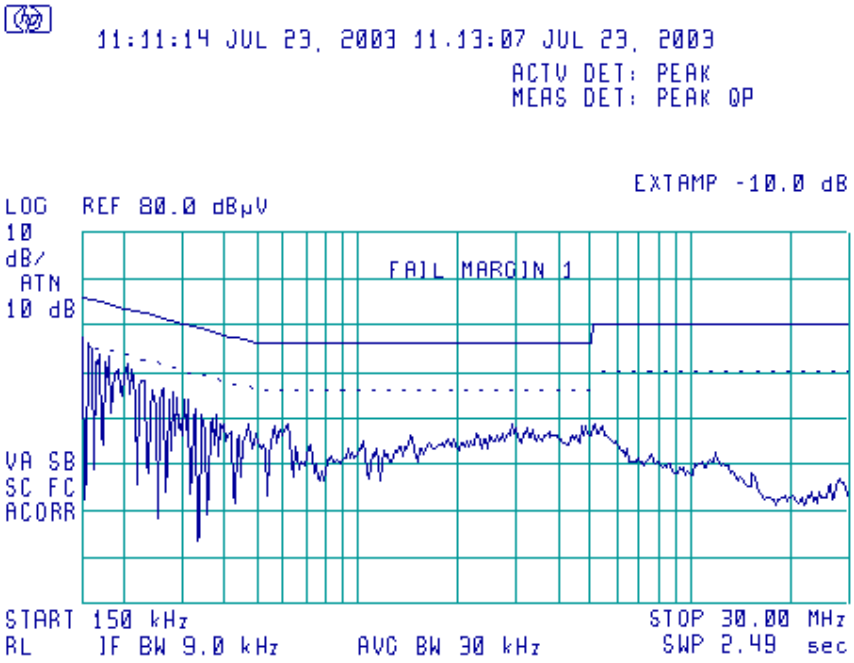
5.7.2.1 Test Equipment used

E1, E285, TMS933

See Section 10 for more details.

6. Plots and Results
6.1 Conducted Emissions

All channels were checked for worst case emissions. Regardless of channel setting the emissions remained the same and therefore the middle channel 915 MHz was used for this test.



Quasi-peak values of AC Supply live feed

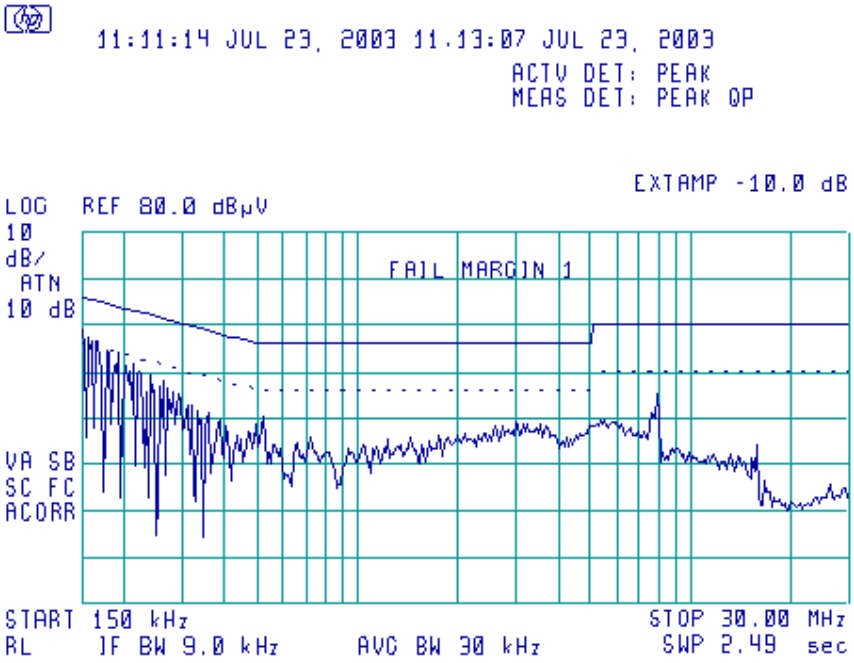
The plot shows a swept response of peak values using the quasi-peak limit line

(Any peaks within 10dB of the limit line have been calculated and appear in the table on following page of this report)

Table of signals within 10dB of the limit line for Quasi-Peak Live

Signal	Freq (MHz)	Peak Amp (dBuV)	Peak - Lim1 (dB)	QP Amp (dBuV)	QP - Lim1 (dB)
1	0.188896	56.34	-7.76	46.88	-17.22
2	0.293002	45.14	-15.34	37.82	-22.66
3	0.478644	41.25	-15.15	35.12	-21.28
4	0.600778	39.25	-16.75	35.15	-20.85
5	0.733240	37.77	-18.23	32.64	-23.36
6	3.182029	37.24	-18.76	34.04	-21.96
7	5.414838	38.79	-21.21	34.71	-25.29

Measurement Uncertainty of ± 3.6dB Applies



Quasi-peak values of AC Supply neutral feed

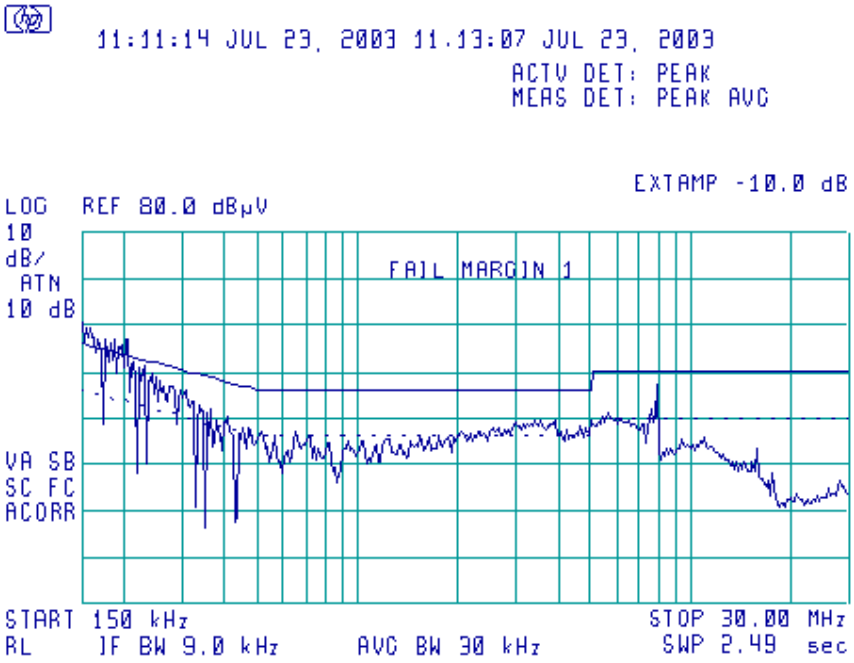
The plot shows a swept response of peak values using the quasi-peak limit line

(Any peaks within 10dB of the limit line have been calculated and appear in the table on following page of this report)

Table of signals within 10dB of the limit line for Quasi-peak Neutral

Signal	Freq (MHz)	Peak Amp (dBuV)	Peak - Lim1 (dB)	QP Amp (dBuV)	QP - Lim1 (dB)
1	0.190511	57.77	-6.25	48.95	-15.07
2	0.283741	47.80	-12.97	38.96	-21.81
3	0.394728	41.65	-16.32	32.60	-25.37
4	0.492063	40.07	-16.08	33.51	-22.64
5	0.728570	37.16	-18.84	34.80	-21.20
6	3.277540	39.66	-16.34	35.63	-20.37
7	5.621208	39.59	-20.41	36.00	-24.00
8	7.910583	49.20	-10.80	46.53	-13.47
9	7.910853	48.86	-11.14	46.48	-13.52

Measurement Uncertainty of ± 3.6dB Applies



Average values of AC Supply live feed

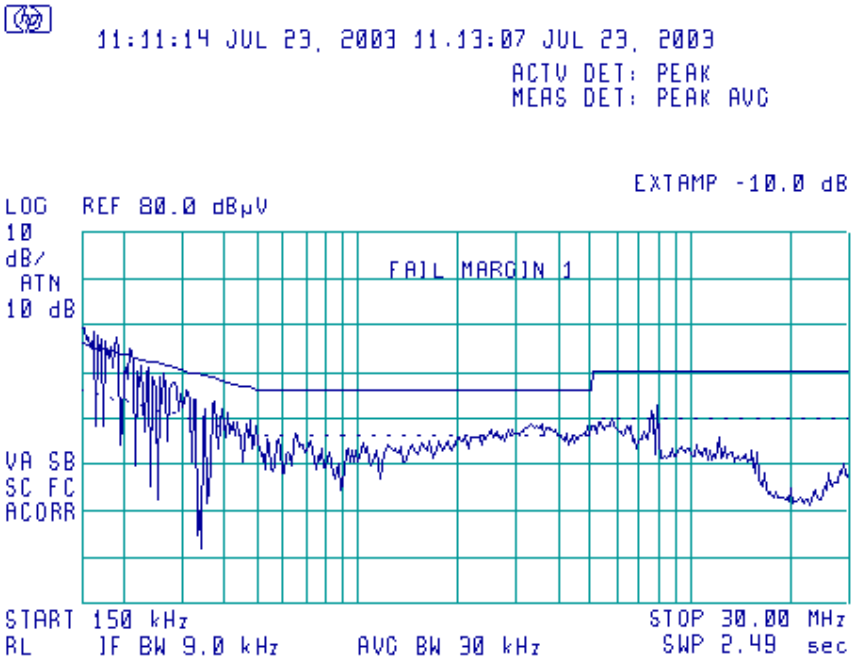
The plot shows a swept response of peak values using the average limit line

(Any peaks within 10dB of the limit line have been calculated and appear in the table on following page of this report)

Table of signals for Average Live

Signal	Freq (MHz)	Peak Amp (dBuV)	Peak - Lim1 (dB)	Avg Amp (dBuV)	Avg - Lim1 (dB)
1	0.153635	59.92	4.10	23.65	-32.17
2	0.187834	57.89	3.74	35.10	-19.05
3	0.190840	57.34	3.33	37.27	-16.74
4	0.226988	51.60	-1.02	16.68	-35.94
5	0.257691	49.49	-2.06	13.24	-38.31
6	0.294799	46.98	-3.45	28.64	-21.79
7	0.361859	43.12	-5.62	13.75	-34.99
8	0.388663	41.98	-6.12	26.05	-22.05
9	0.496406	38.77	-7.30	25.69	-20.38
10	0.520975	39.64	-6.36	31.75	-14.25
11	3.258438	40.85	-5.15	31.87	-14.13
12	3.580581	40.10	-5.90	30.89	-15.11
13	5.698169	40.25	-9.75	29.88	-20.12
14	7.903540	49.00	-1.00	25.51	-24.49

Measurement Uncertainty of ± 3.6dB Applies



Average values of AC Supply neutral feed

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

(Any peaks within 10dB of the limit line have been calculated and appear in the table on following page of this report)

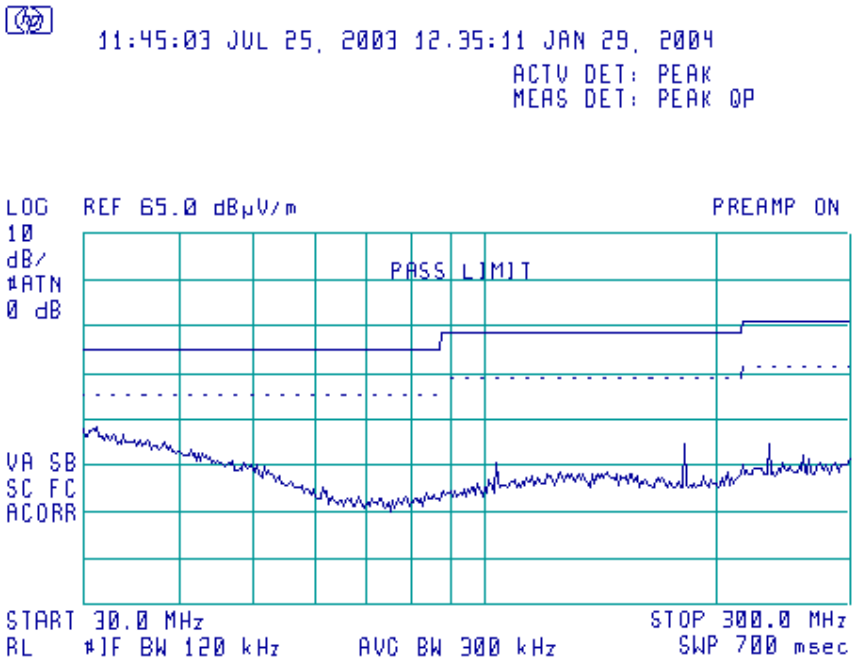
Table of signals for Average Neutral

Signal	Freq (MHz)	Peak Amp (dBuV)	Peak - Lim1 (dB)	Avg Amp (dBuV)	Avg - Lim1 (dB)
1	0.168454	58.61	3.51	22.24	-32.86
2	0.187026	58.73	4.54	33.71	-20.48
3	0.211148	55.49	2.26	32.31	-20.92
4	0.229851	53.32	0.81	16.59	-35.92
5	0.272053	48.69	-2.43	18.97	-32.15
6	0.293994	48.18	-2.27	28.35	-22.10
7	0.314035	47.78	-2.10	27.99	-21.89
8	0.342664	43.98	-5.22	8.85	-40.35
9	0.393738	42.27	-5.72	18.03	-29.96
10	0.381788	44.62	-3.65	27.13	-21.14
11	0.502909	41.58	-4.42	31.79	-14.21
12	0.518188	41.42	-4.58	28.18	-17.82
13	0.565063	38.85	-7.15	24.24	-21.76
14	2.416744	37.72	-8.28	30.78	-15.22
15	3.047570	37.12	-8.88	28.90	-17.10
16	3.680905	37.46	-8.54	30.55	-15.45
17	4.845689	39.27	-6.73	30.67	-15.33

Measurement Uncertainty of ± 3.6dB Applies

6.2 Radiated Emissions

Bottom Channel 902.5MHz.



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

Horizontal Polarisation

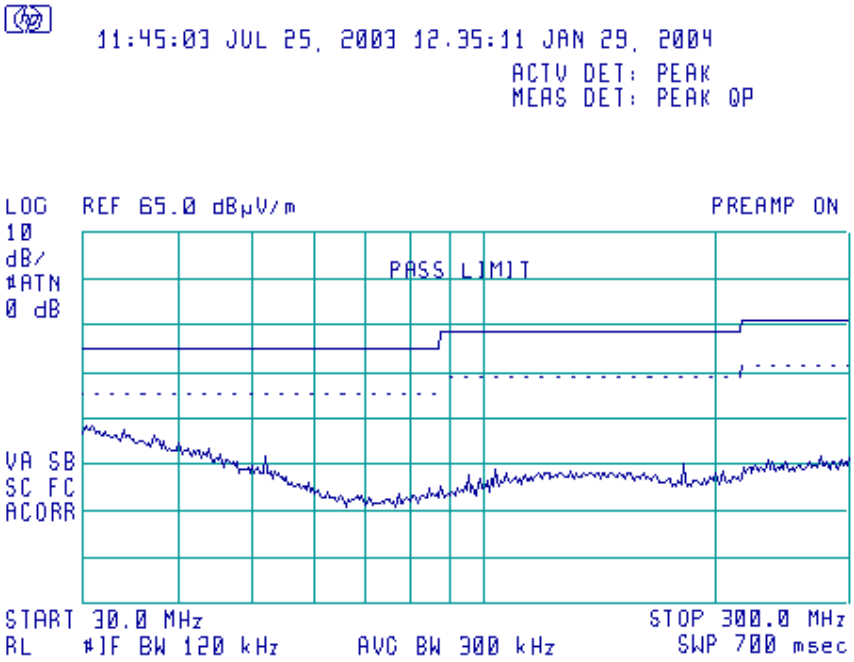
The plot shows a swept response of peak values using the quasi-peak limit line

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

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

NONE.

Measurement Uncertainty of ± 5.2dB Applies



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

Vertical Polarisation

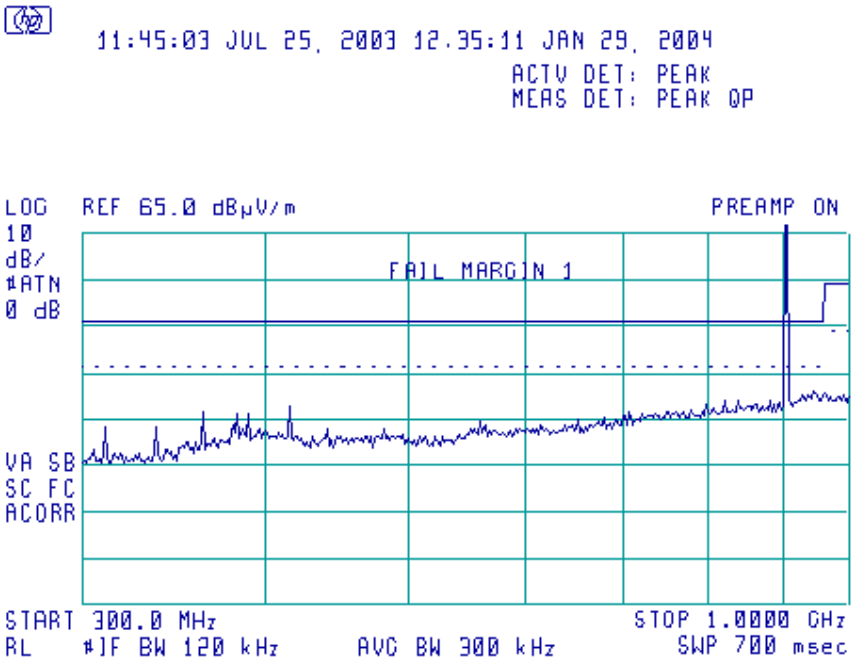
The plot shows a swept response of peak values using the quasi-peak limit line

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

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

NONE.

Measurement Uncertainty of ± 5.2dB Applies



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

Horizontal Polarisation

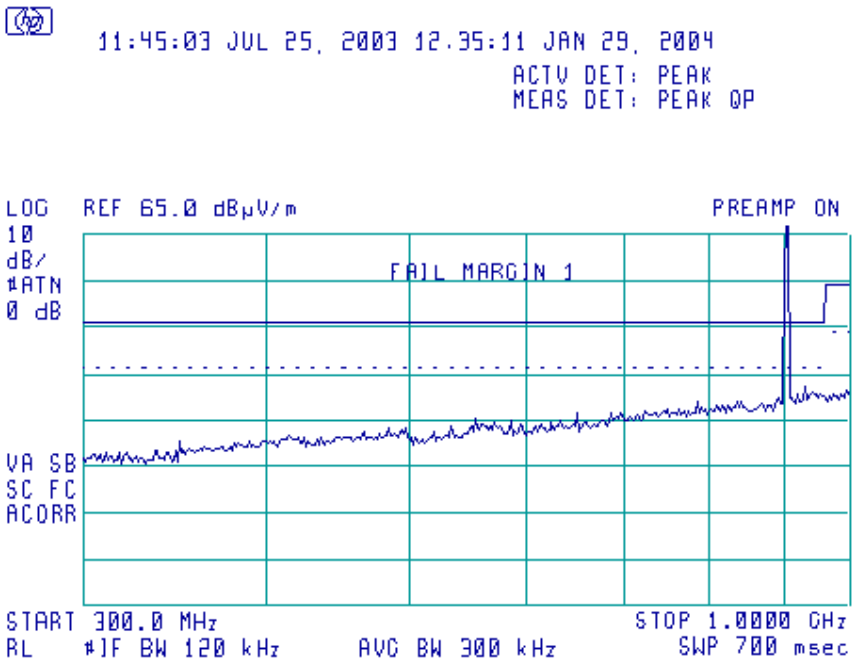
The plot shows a swept response of peak values using the quasi-peak limit line

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

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

Signal	Freq (MHz)	Peak Amp (dBuV/m)	Peak - Lim1 (dB)	QP Amp (dBuV/m)	QP - Lim1 (dB)
1	364.008000	28.90	-17.10	26.62	-19.38
2	384.078550	28.66	-17.34	24.24	-21.76
3	390.015050	28.74	-17.26	25.90	-20.10
4	416.002300	30.38	-15.62	27.87	-18.13

Measurement Uncertainty of ± 5.2dB Applies



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

Vertical Polarisation

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

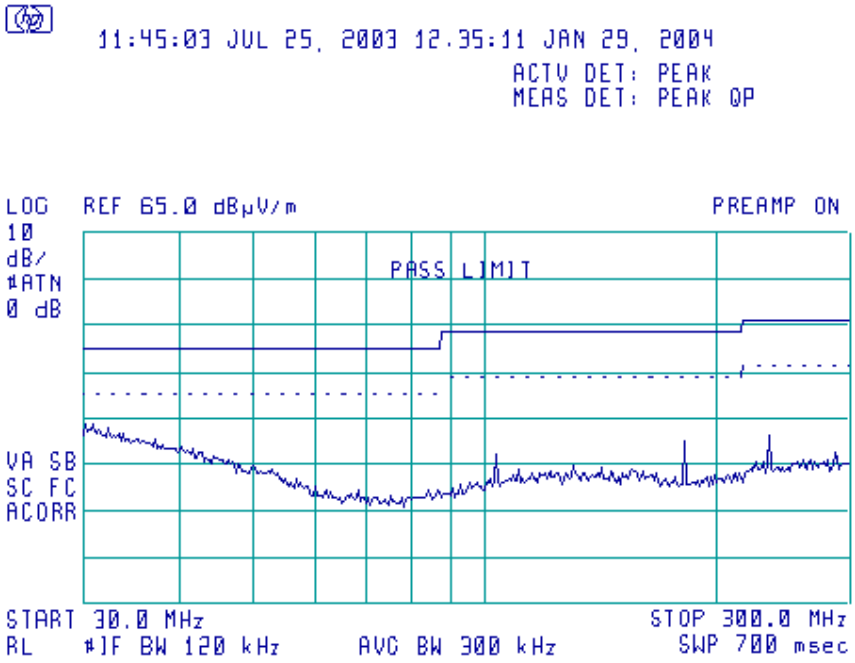
(Any peaks within 20dB of the limit line have been calculated and appear in the table on following page of this report)

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

NONE.

Measurement Uncertainty of ± 5.2dB Applies

Middle Channel 915MHz.



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

Horizontal Polarisation

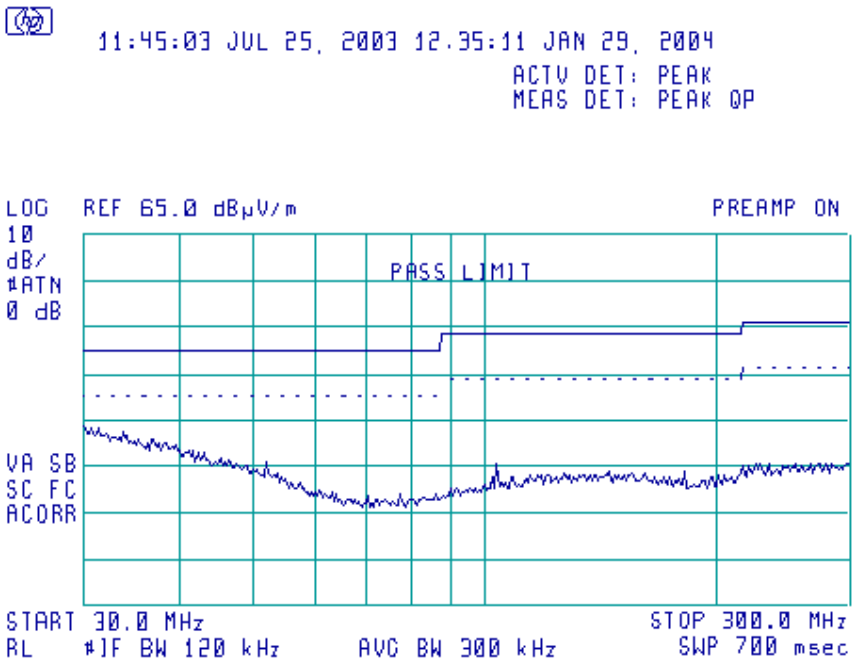
The plot shows a swept response of peak values using the quasi-peak limit line

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

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

NONE.

Measurement Uncertainty of ± 5.2dB Applies



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

Vertical Polarisation

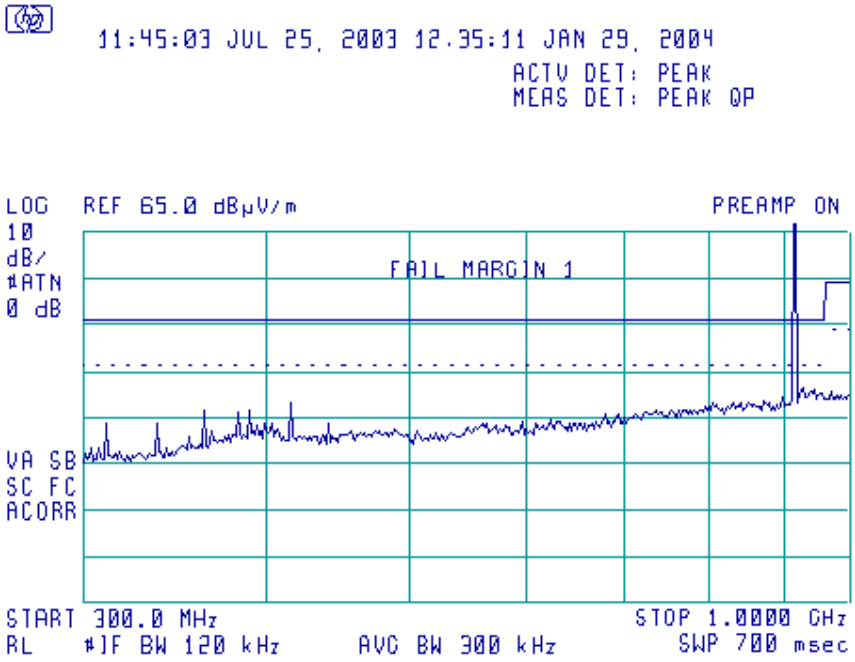
The plot shows a swept response of peak values using the quasi-peak limit line

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

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

NONE.

Measurement Uncertainty of ± 5.2dB Applies



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

Horizontal Polarisation

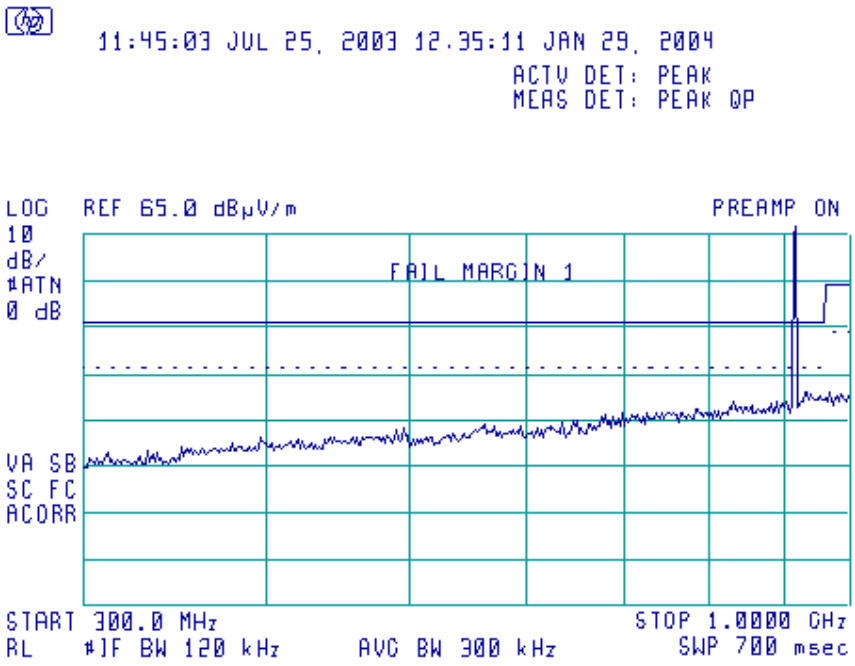
The plot shows a swept response of peak values using the quasi-peak limit line

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

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

Signal	Freq (MHz)	Peak Amp (dBuV/m)	Peak - Lim1 (dB)	QP Amp (dBuV/m)	QP - Lim1 (dB)
1	364.001288	29.14	-16.86	26.52	-19.48
2	383.970675	28.51	-17.49	24.79	-21.21
3	390.014963	28.94	-17.06	25.74	-20.26
4	415.986113	30.16	-15.84	27.30	-18.70

Measurement Uncertainty of ± 5.2dB Applies



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

Vertical Polarisation

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

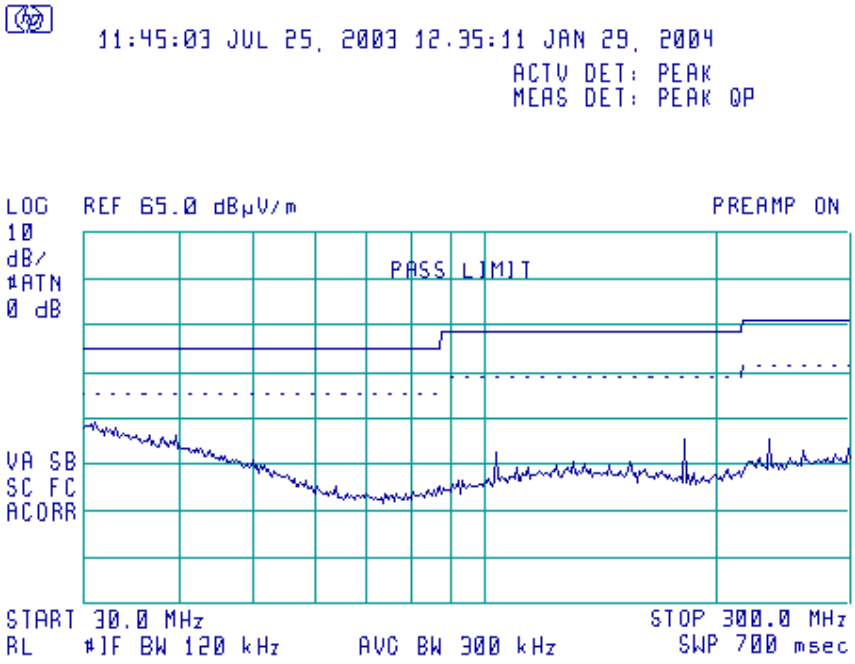
(Any peaks within 20dB of the limit line have been calculated and appear in the table on following page of this report)

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

NONE.

Measurement Uncertainty of ± 5.2dB Applies

Top Channel 927.5MHz.



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

Horizontal Polarisation

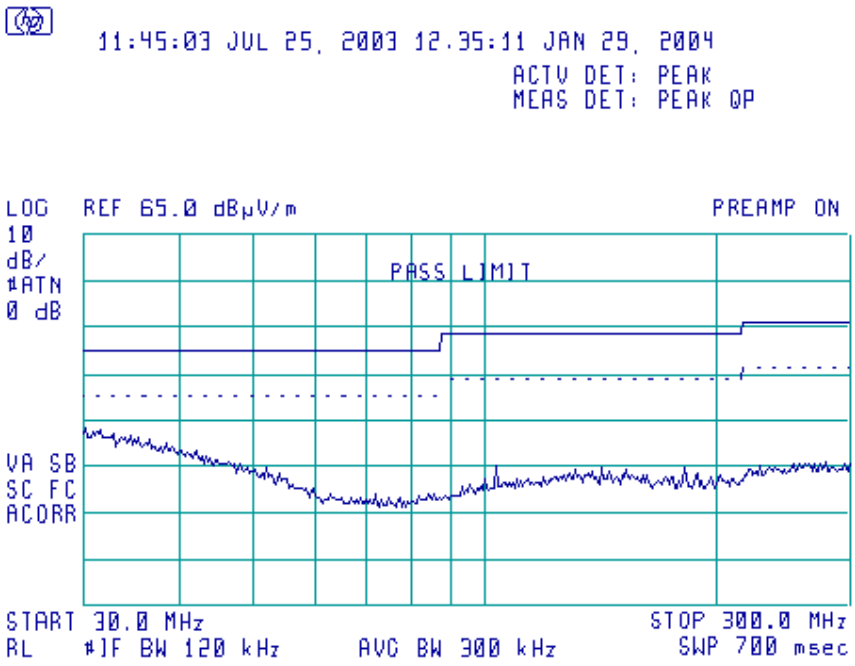
The plot shows a swept response of peak values using the quasi-peak limit line

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

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

NONE.

Measurement Uncertainty of ± 5.2dB Applies



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

Vertical Polarisation

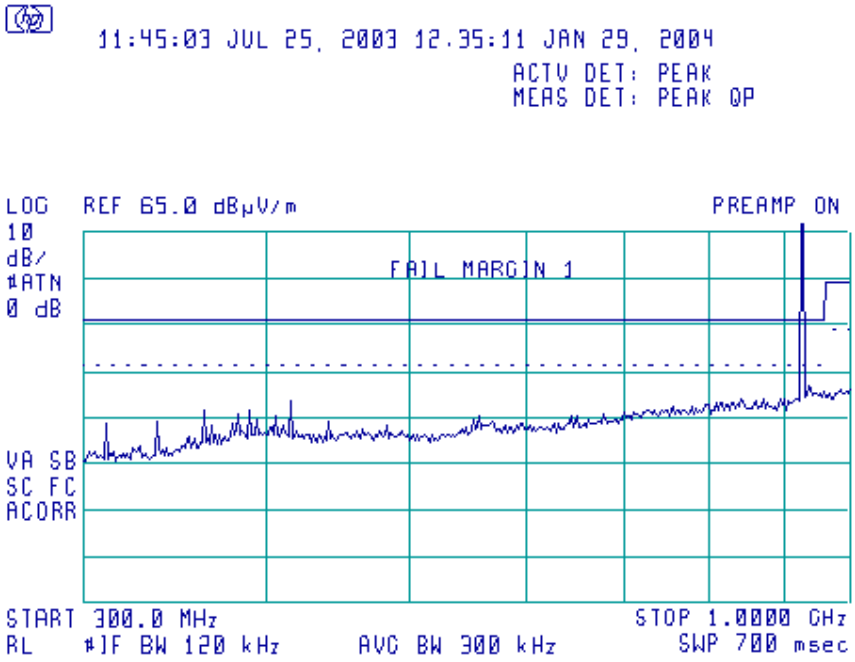
The plot shows a swept response of peak values using the quasi-peak limit line

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

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

NONE.

Measurement Uncertainty of ± 5.2dB Applies



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

Horizontal Polarisation

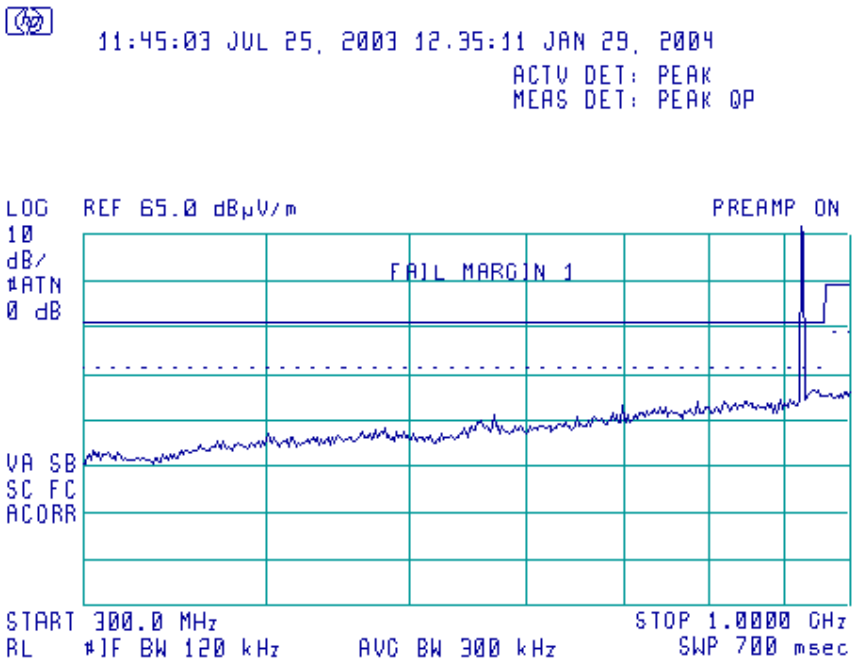
The plot shows a swept response of peak values using the quasi-peak limit line

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

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

Signal	Freq (MHz)	Peak Amp (dBuV/m)	Peak - Lim1 (dB)	QP Amp (dBuV/m)	QP - Lim1 (dB)
1	364.020913	28.04	-17.96	25.35	-20.65
2	390.000300	29.06	-16.94	26.09	-19.91
3	383.985406	29.02	-16.98	25.23	-20.77
4	416.004456	30.37	-15.63	27.67	-18.33

Measurement Uncertainty of ± 5.2dB Applies



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

Vertical Polarisation

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

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

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

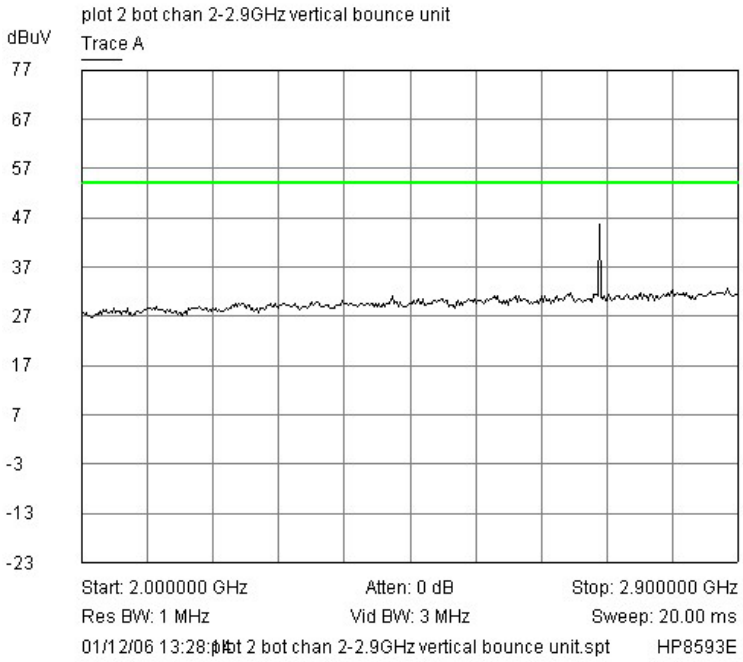
NONE.

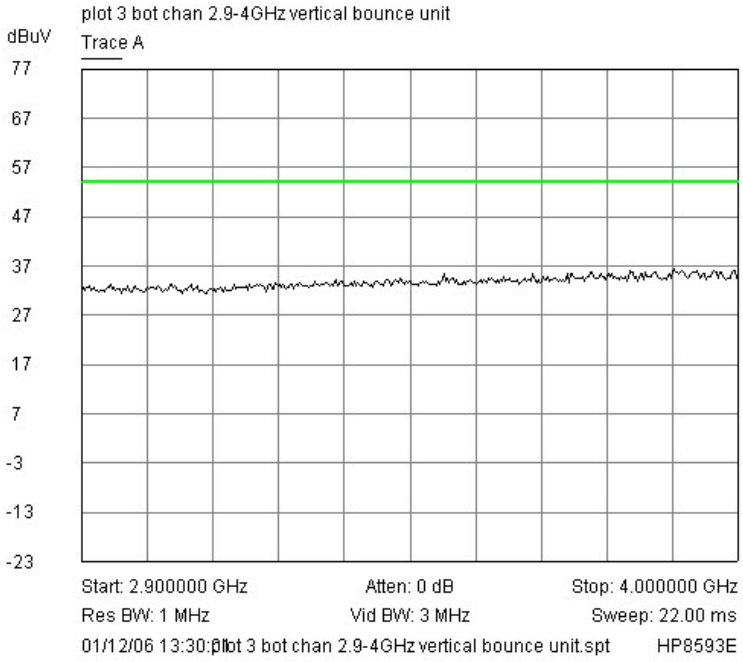
Measurement Uncertainty of ± 5.2dB Applies

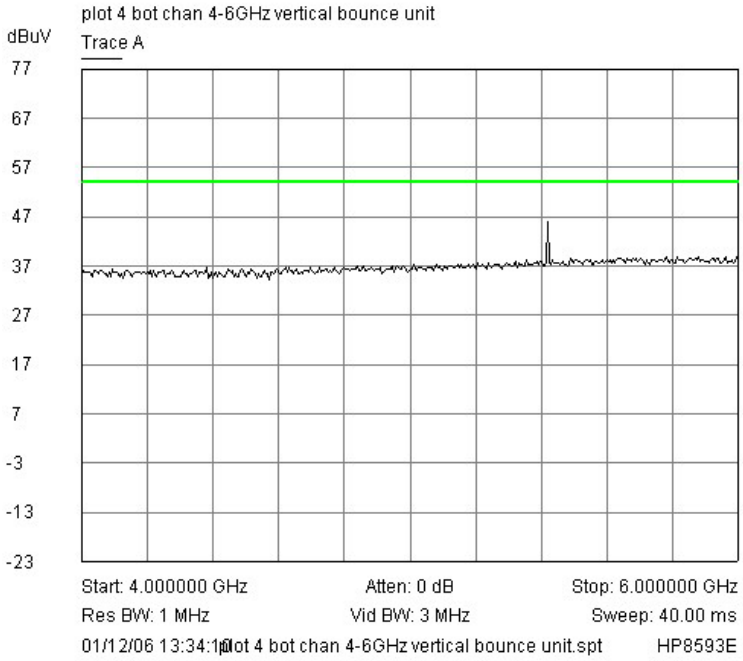
Radiated emissions >1GHz

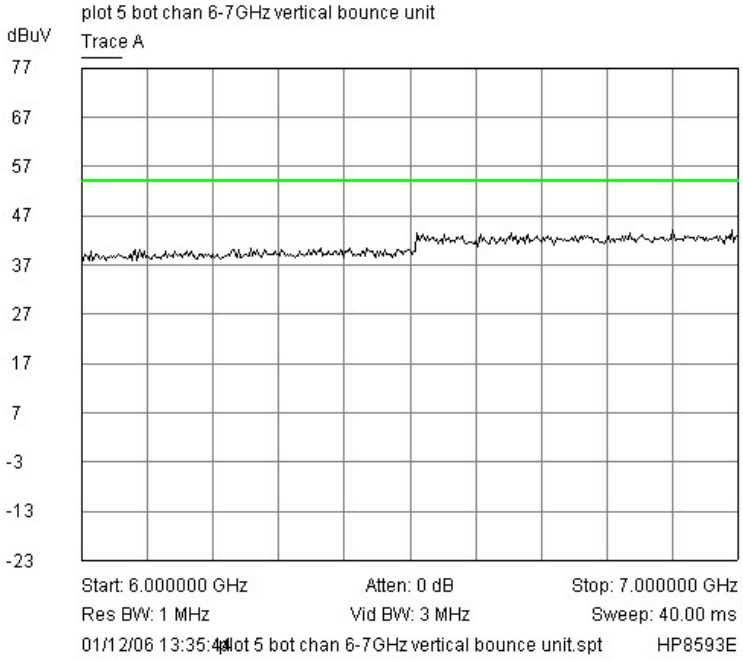
Average Plots

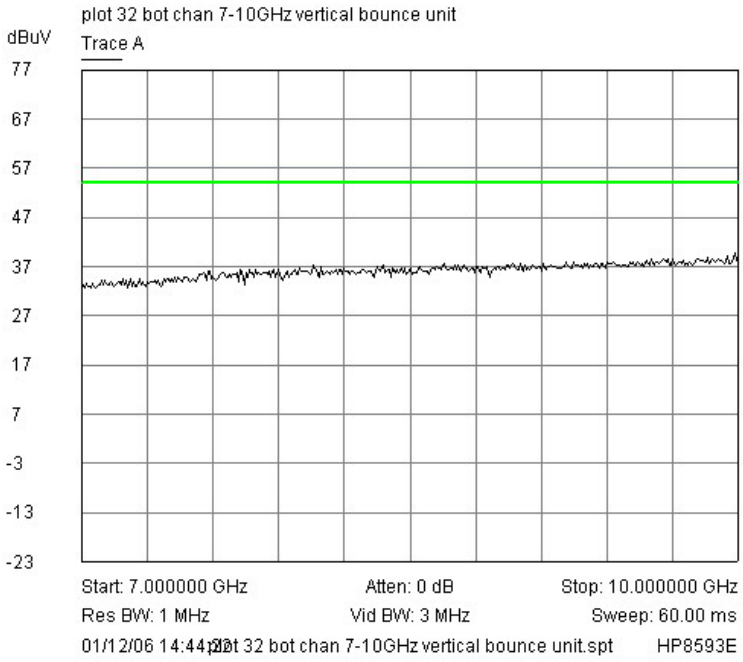
Bottom Channel.
Vertical.



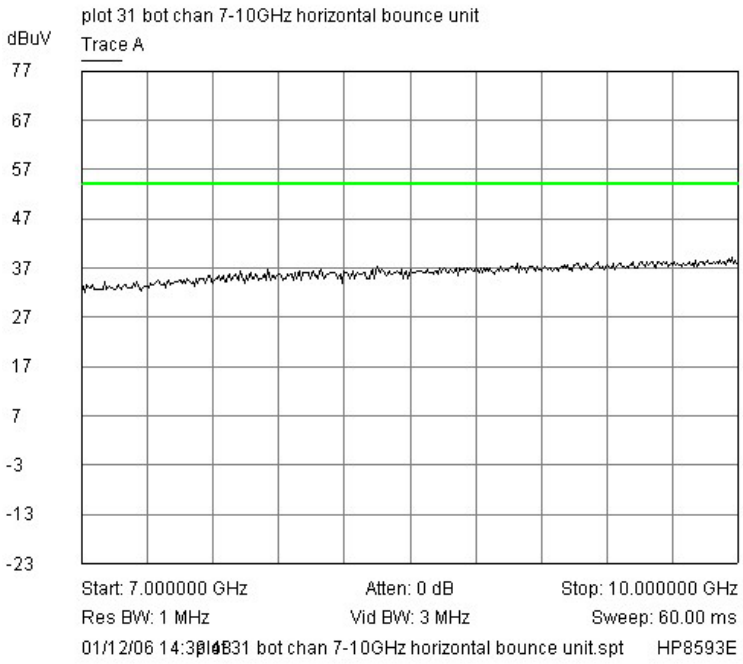


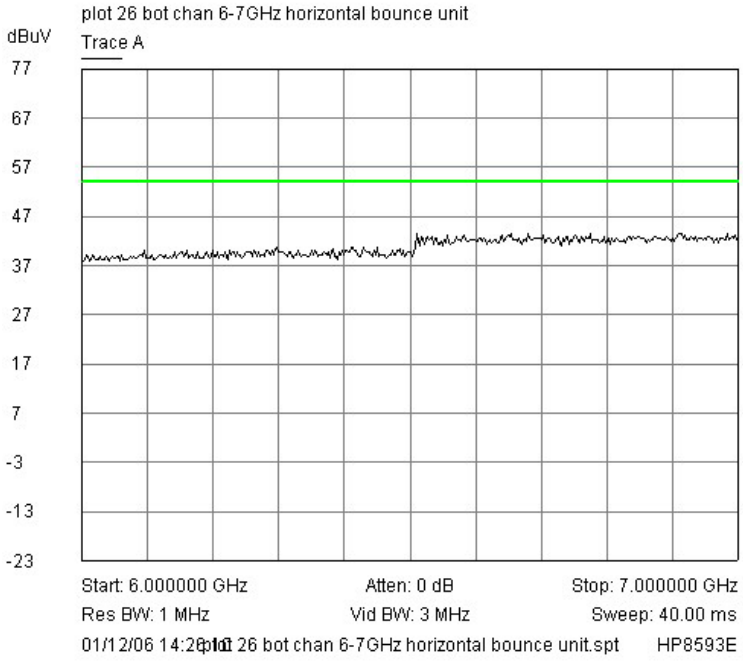

plot 4 bot chan 4-6GHz vertical bounce unit
dBuV
Trace A
77
67
57
47
37
27
17
7
-3
-13
-23
Start: 4.000000 GHz
Atten: 0 dB
Stop: 6.000000 GHz
Res BW: 1 MHz
Vid BW: 3 MHz
Sweep: 40.00 ms
01/12/06 13:34:1plot 4 bot chan 4-6GHz vertical bounce unit.spt
HP8593E

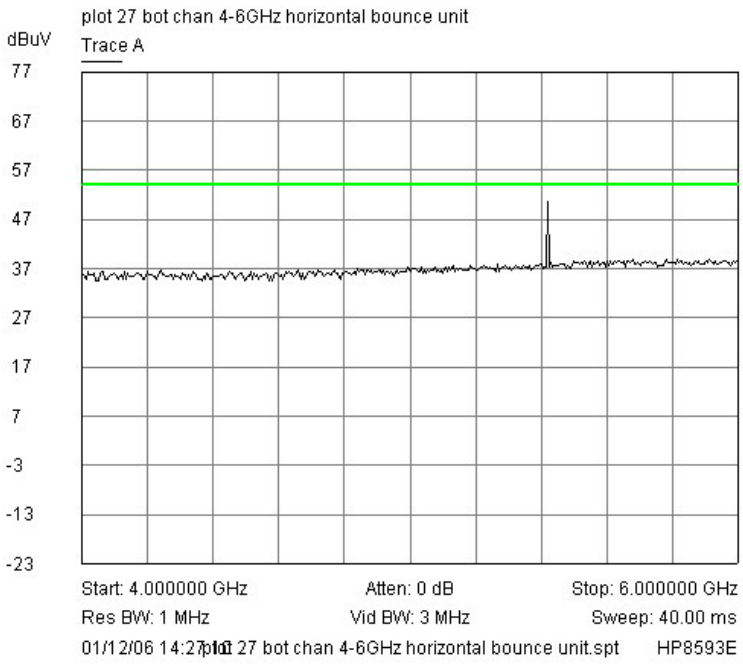

plot 5 bot chan 6-7GHz vertical bounce unit
dBuV
Trace A
77
67
57
47
37
27
17
7
-3
-13
-23
Start: 6.000000 GHz
Atten: 0 dB
Stop: 7.000000 GHz
Res BW: 1 MHz
Vid BW: 3 MHz
Sweep: 40.00 ms
01/12/06 13:35:4plot 5 bot chan 6-7GHz vertical bounce unit.spt
HP8593E

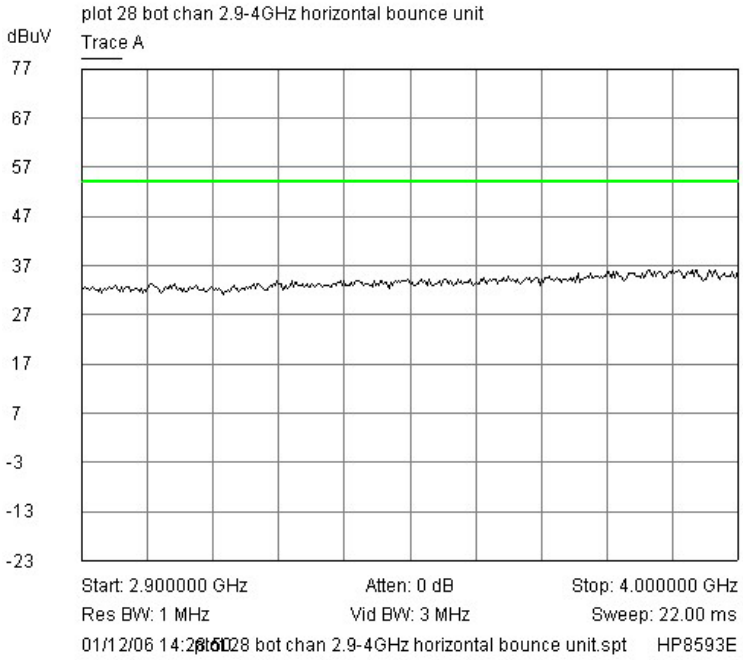

plot 32 bot chan 7-10GHz vertical bounce unit
dBuV
Trace A
77
67
57
47
37
27
17
7
-3
-13
-23
Start: 7.000000 GHz
Atten: 0 dB
Stop: 10.000000 GHz
Res BW: 1 MHz
Vid BW: 3 MHz
Sweep: 60.00 ms
01/12/06 14:44:22
plot 32 bot chan 7-10GHz vertical bounce unit.spt
HP8593E

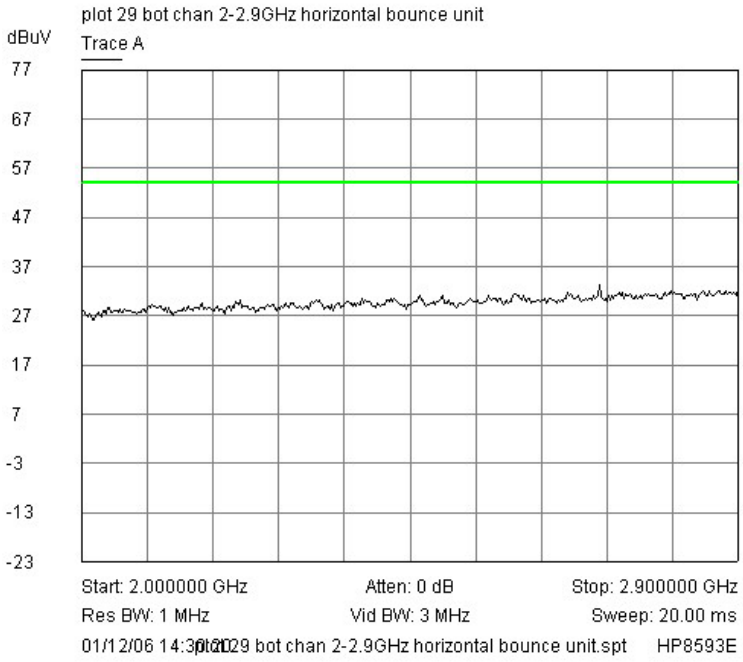
Bottom Channel.
Horizontal.

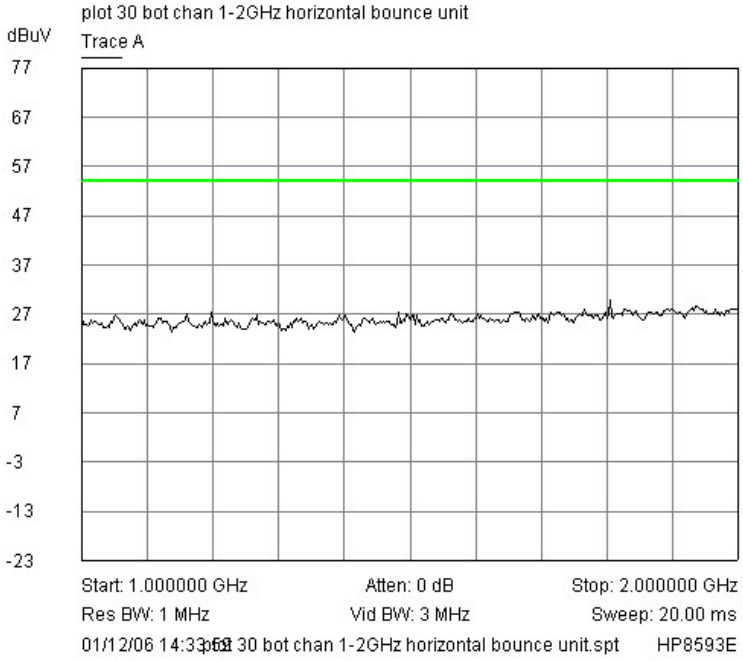




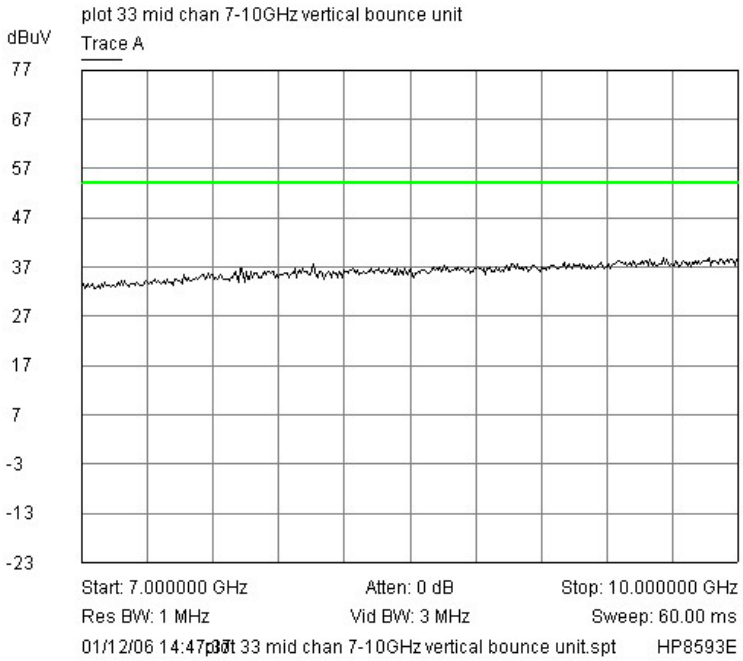

plot 27 bot chan 4-6GHz horizontal bounce unit
dBuV
Trace A
77
67
57
47
37
27
17
7
-3
-13
-23
Start: 4.000000 GHz
Atten: 0 dB
Stop: 6.000000 GHz
Res BW: 1 MHz
Vid BW: 3 MHz
Sweep: 40.00 ms
01/12/06 14:27:01 plot 27 bot chan 4-6GHz horizontal bounce unit.spt
HP8593E

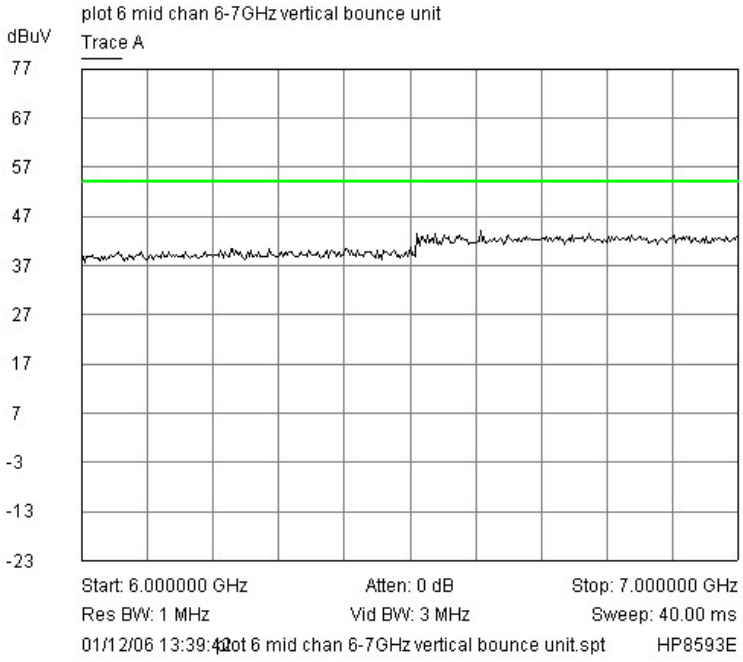

plot 28 bot chan 2.9-4GHz horizontal bounce unit
dBuV
Trace A
77
67
57
47
37
27
17
7
-3
-13
-23
Start: 2.900000 GHz
Atten: 0 dB
Stop: 4.000000 GHz
Res BW: 1 MHz
Vid BW: 3 MHz
Sweep: 22.00 ms
01/12/06 14:28:50 plot 28 bot chan 2.9-4GHz horizontal bounce unit.spt
HP8593E

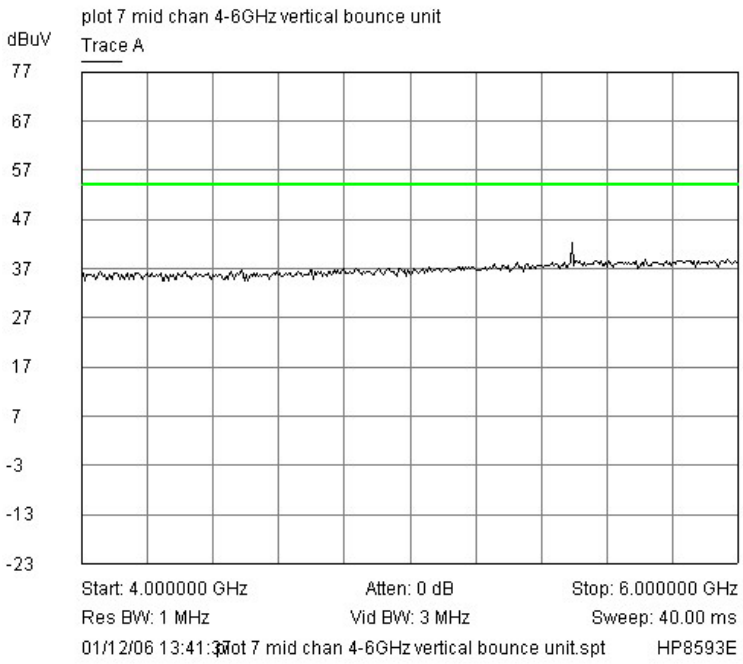

plot 29 bot chan 2-2.9GHz horizontal bounce unit
dBuV
Trace A
77
67
57
47
37
27
17
7
-3
-13
-23
Start: 2.000000 GHz
Atten: 0 dB
Stop: 2.900000 GHz
Res BW: 1 MHz
Vid BW: 3 MHz
Sweep: 20.00 ms
01/12/06 14:30:02 plot 29 bot chan 2-2.9GHz horizontal bounce unit.spt
HP8593E

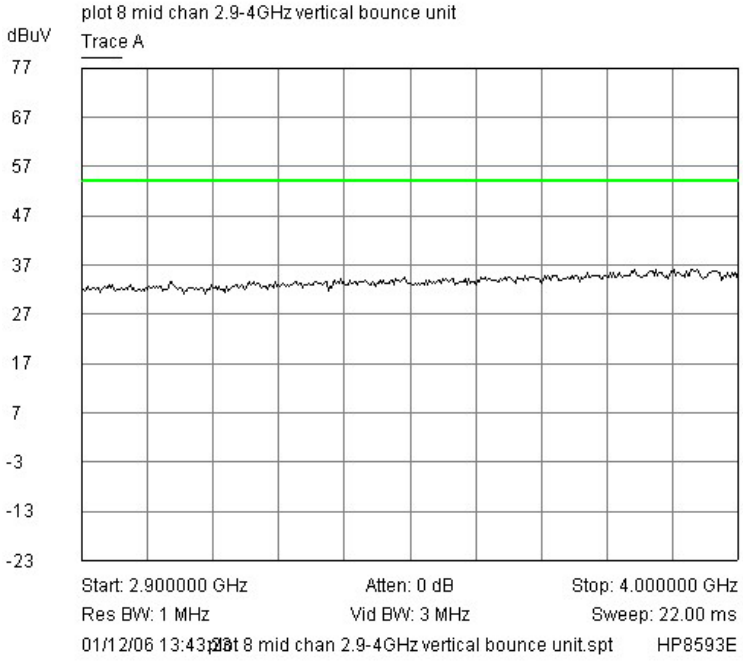

plot 30 bot chan 1-2GHz horizontal bounce unit
dBuV
Trace A
77
67
57
47
37
27
17
7
-3
-13
-23
Start: 1.000000 GHz
Atten: 0 dB
Stop: 2.000000 GHz
Res BW: 1 MHz
Vid BW: 3 MHz
Sweep: 20.00 ms
01/12/06 14:33:51 plot 30 bot chan 1-2GHz horizontal bounce unit.spt
HP8593E

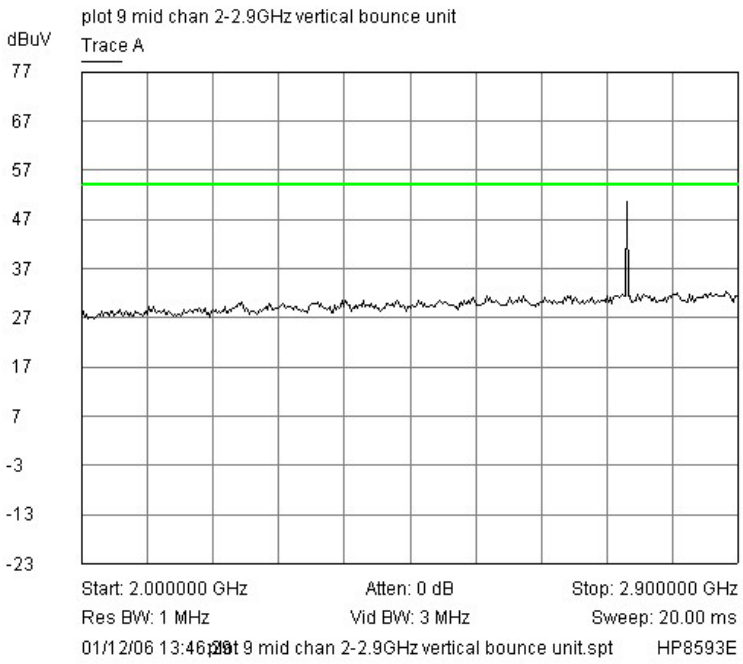
Middle Channel.
Vertical.

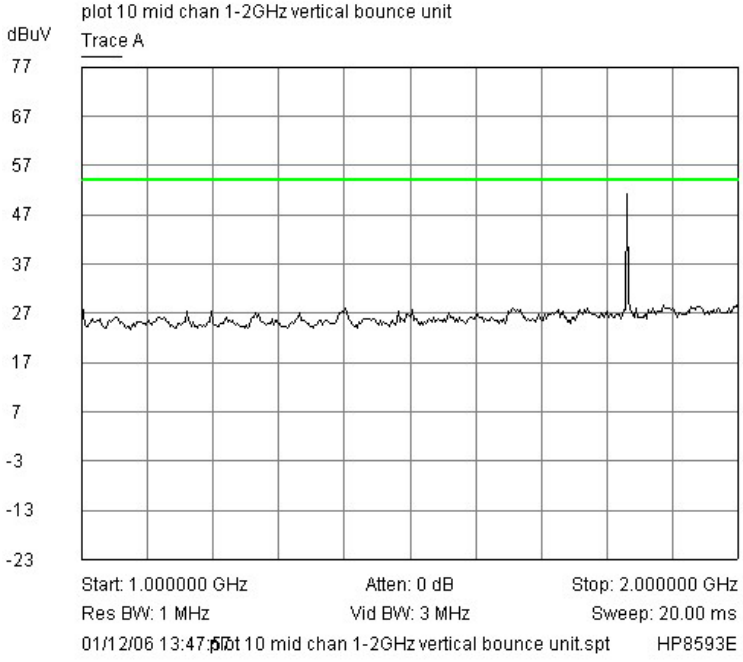




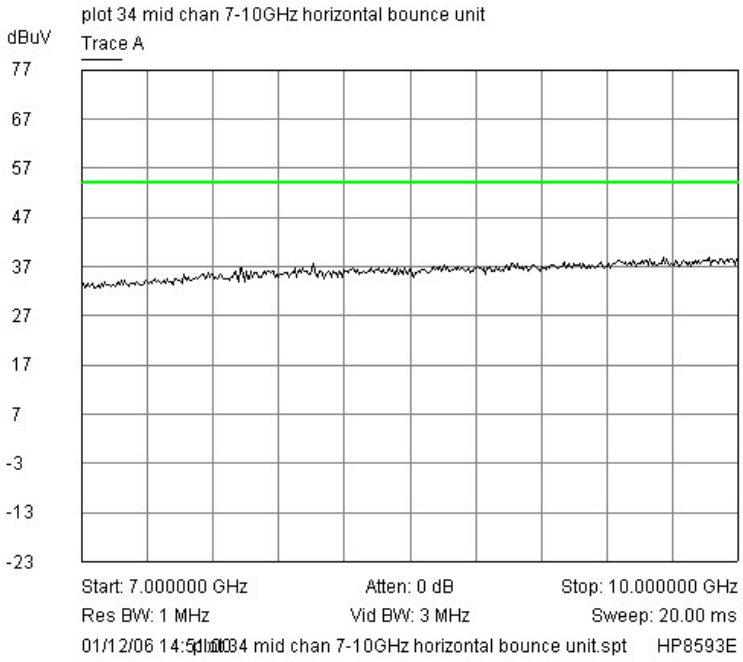

plot 7 mid chan 4-6GHz vertical bounce unit
dBuV
Trace A
77
67
57
47
37
27
17
7
-3
-13
-23
Start: 4.000000 GHz
Atten: 0 dB
Stop: 6.000000 GHz
Res BW: 1 MHz
Vid BW: 3 MHz
Sweep: 40.00 ms
01/12/06 13:41:37 plot 7 mid chan 4-6GHz vertical bounce unit.spt
HP8593E

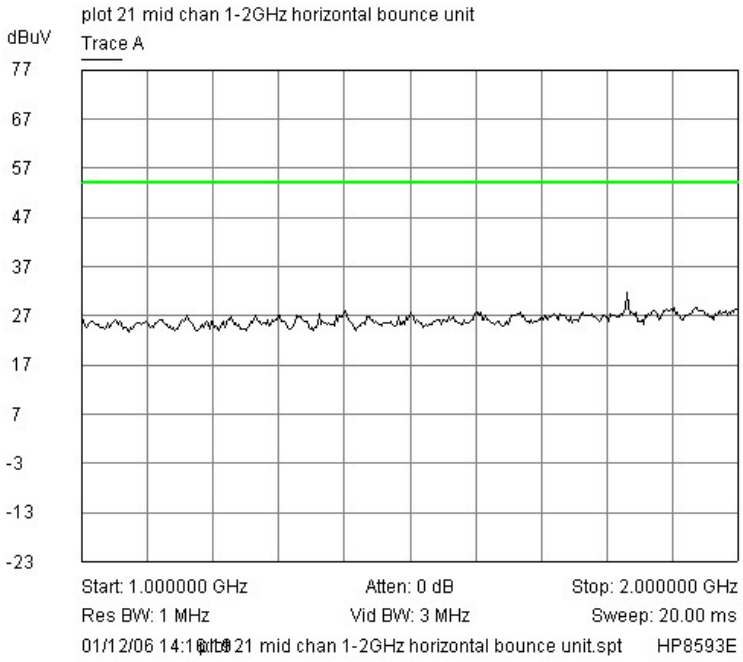

plot 8 mid chan 2.9-4GHz vertical bounce unit
dBuV
Trace A
77
67
57
47
37
27
17
7
-3
-13
-23
Start: 2.900000 GHz
Atten: 0 dB
Stop: 4.000000 GHz
Res BW: 1 MHz
Vid BW: 3 MHz
Sweep: 22.00 ms
01/12/06 13:43:23 plot 8 mid chan 2.9-4GHz vertical bounce unit.spt
HP8593E

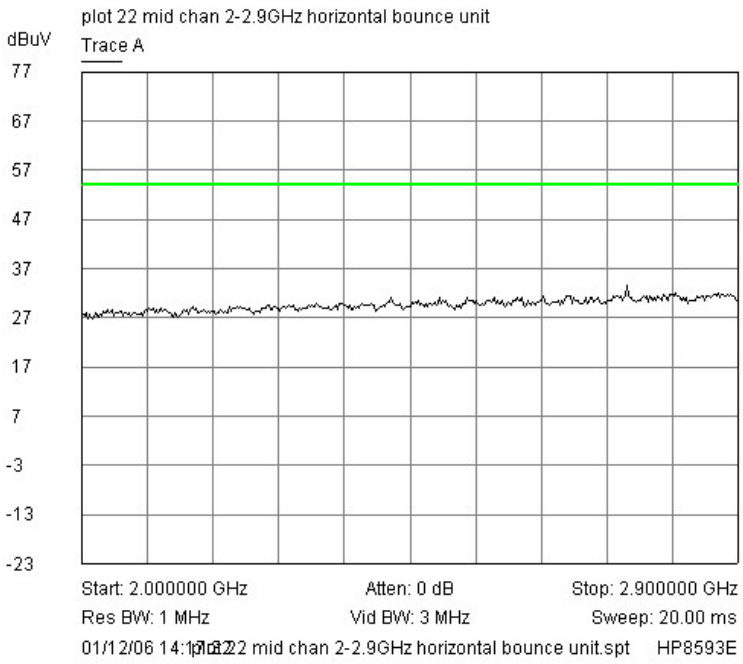

plot 9 mid chan 2-2.9GHz vertical bounce unit
dBuV
Trace A
77
67
57
47
37
27
17
7
-3
-13
-23
Start: 2.000000 GHz
Atten: 0 dB
Stop: 2.900000 GHz
Res BW: 1 MHz
Vid BW: 3 MHz
Sweep: 20.00 ms
01/12/06 13:46:29
plot 9 mid chan 2-2.9GHz vertical bounce unit.spt
HP8593E

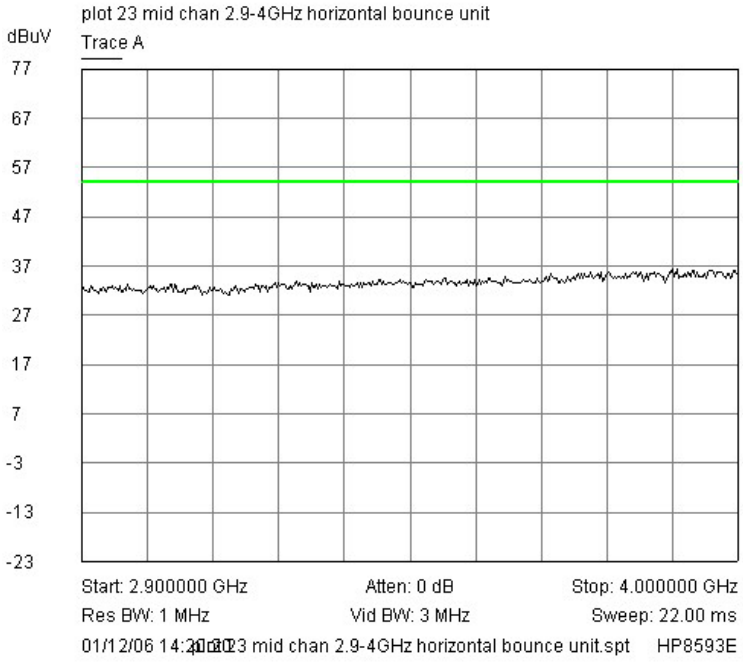

plot 10 mid chan 1-2GHz vertical bounce unit
dBuV
Trace A
77
67
57
47
37
27
17
7
-3
-13
-23
Start: 1.000000 GHz
Atten: 0 dB
Stop: 2.000000 GHz
Res BW: 1 MHz
Vid BW: 3 MHz
Sweep: 20.00 ms
01/12/06 13:47:57
plot 10 mid chan 1-2GHz vertical bounce unit.spt
HP8593E

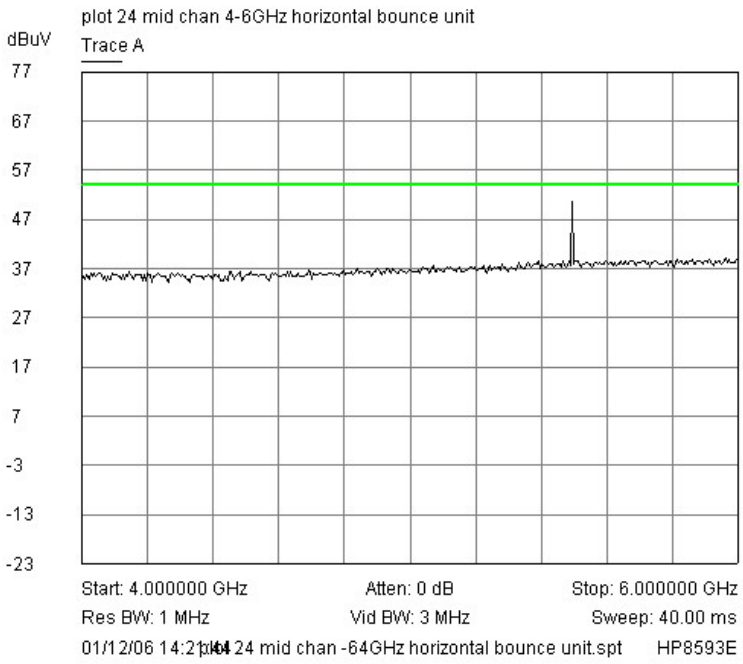
Horizontal.

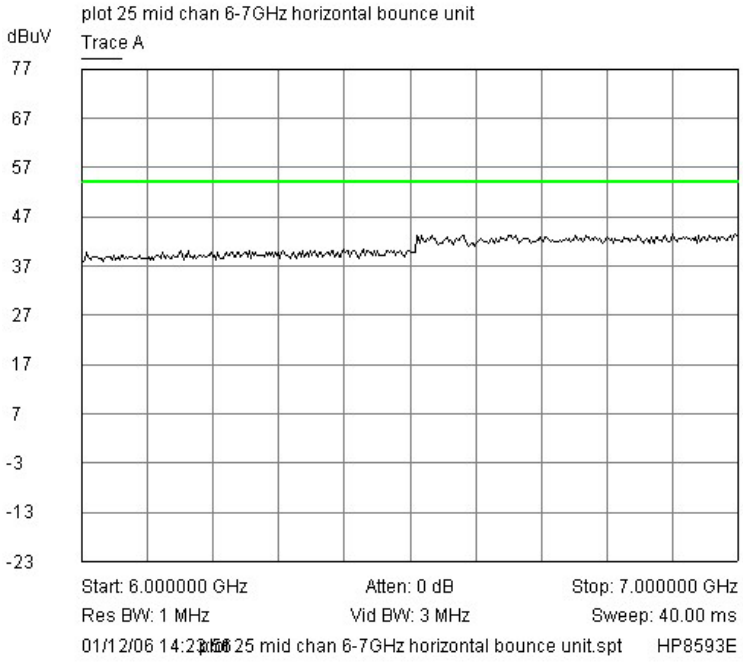




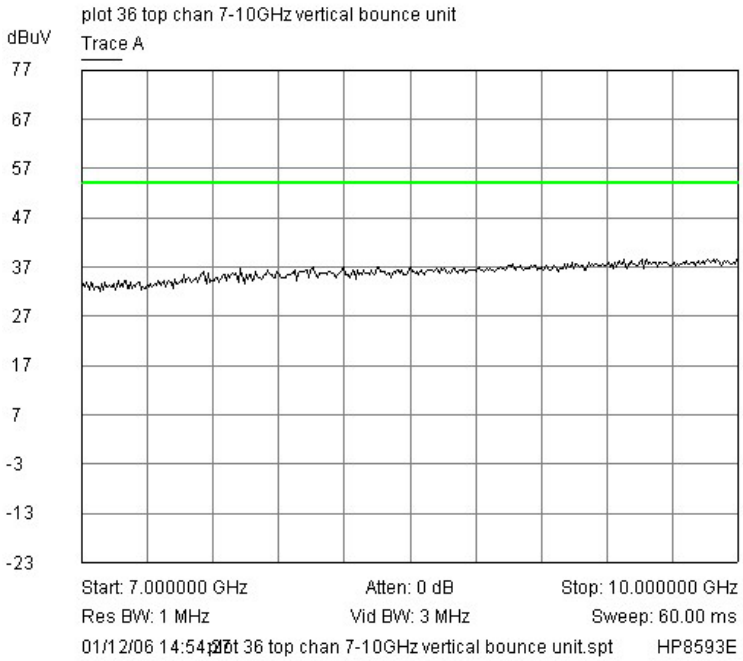

plot 22 mid chan 2-2.9GHz horizontal bounce unit
dBuV
Trace A
77
67
57
47
37
27
17
7
-3
-13
-23
Start: 2.000000 GHz
Atten: 0 dB
Stop: 2.900000 GHz
Res BW: 1 MHz
Vid BW: 3 MHz
Sweep: 20.00 ms
01/12/06 14:17:22 plot 22 mid chan 2-2.9GHz horizontal bounce unit.spt
HP8593E

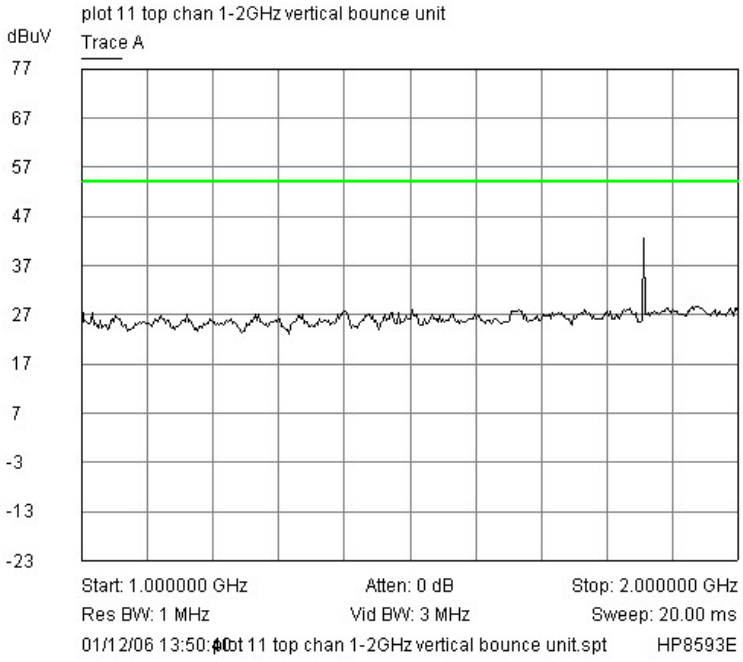

plot 23 mid chan 2.9-4GHz horizontal bounce unit
dBuV
Trace A
77
67
57
47
37
27
17
7
-3
-13
-23
Start: 2.900000 GHz
Atten: 0 dB
Stop: 4.000000 GHz
Res BW: 1 MHz
Vid BW: 3 MHz
Sweep: 22.00 ms
01/12/06 14:20:02 plot 23 mid chan 2.9-4GHz horizontal bounce unit.spt
HP8593E

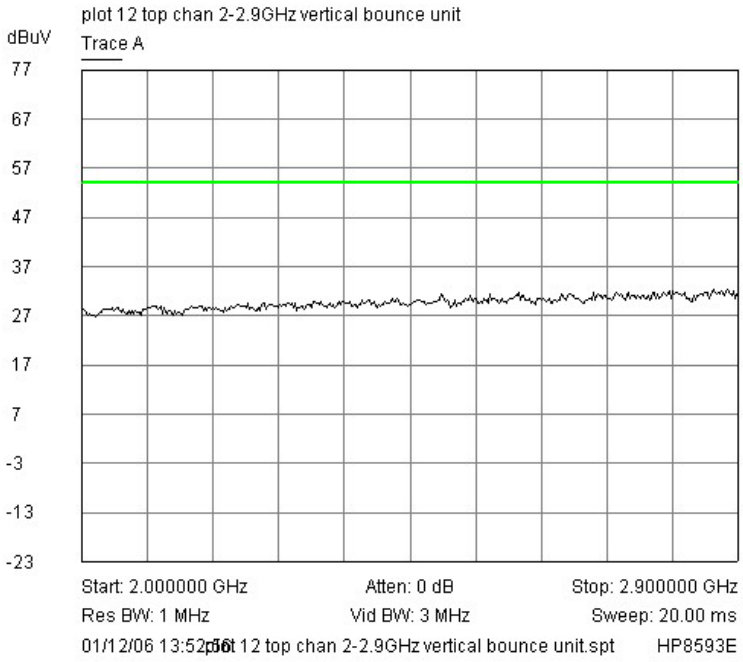

plot 24 mid chan 4-6GHz horizontal bounce unit
dBuV
Trace A
77
67
57
47
37
27
17
7
-3
-13
-23
Start: 4.000000 GHz
Atten: 0 dB
Stop: 6.000000 GHz
Res BW: 1 MHz
Vid BW: 3 MHz
Sweep: 40.00 ms
01/12/06 14:21 plot 24 mid chan -64GHz horizontal bounce unit.spt
HP8593E

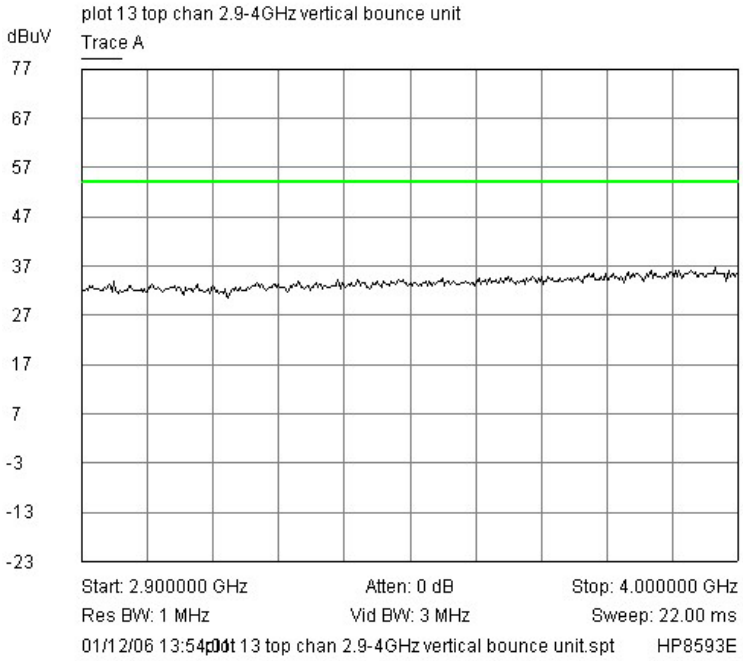

plot 25 mid chan 6-7GHz horizontal bounce unit
dBuV
Trace A
77
67
57
47
37
27
17
7
-3
-13
-23
Start: 6.000000 GHz
Atten: 0 dB
Stop: 7.000000 GHz
Res BW: 1 MHz
Vid BW: 3 MHz
Sweep: 40.00 ms
01/12/06 14:23 plot 25 mid chan 6-7GHz horizontal bounce unit.spt
HP8593E

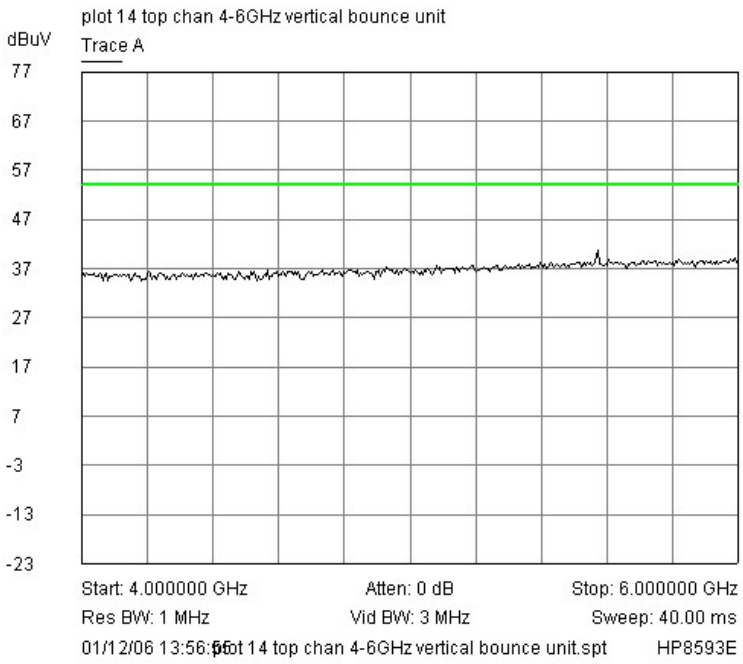
Top Channel.
Vertical.

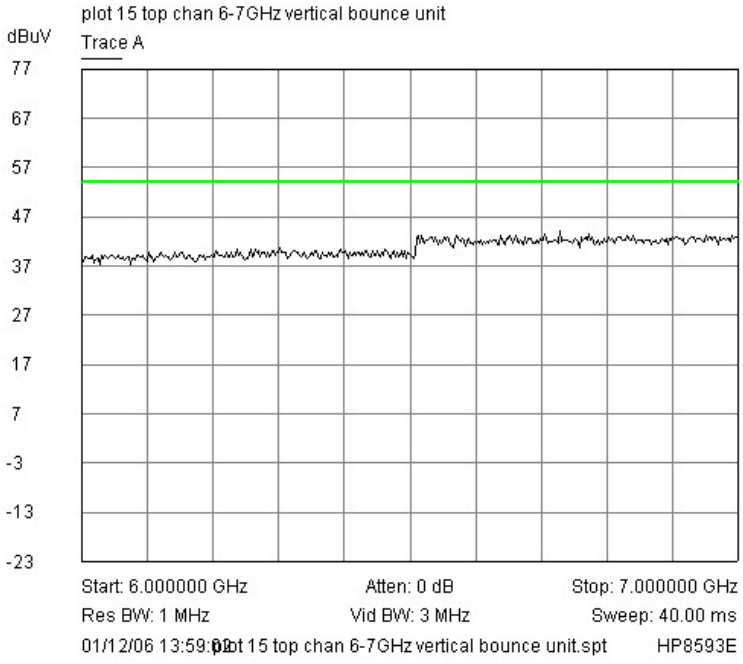




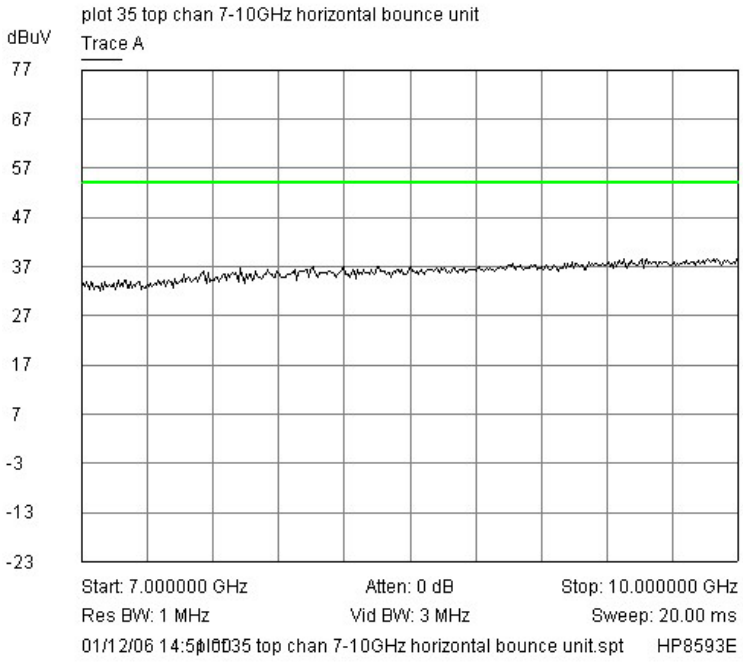

plot 12 top chan 2-2.9GHz vertical bounce unit
dBuV
Trace A
77
67
57
47
37
27
17
7
-3
-13
-23
Start: 2.000000 GHz
Atten: 0 dB
Stop: 2.900000 GHz
Res BW: 1 MHz
Vid BW: 3 MHz
Sweep: 20.00 ms
01/12/06 13:52:56 plot 12 top chan 2-2.9GHz vertical bounce unit.spt
HP8593E

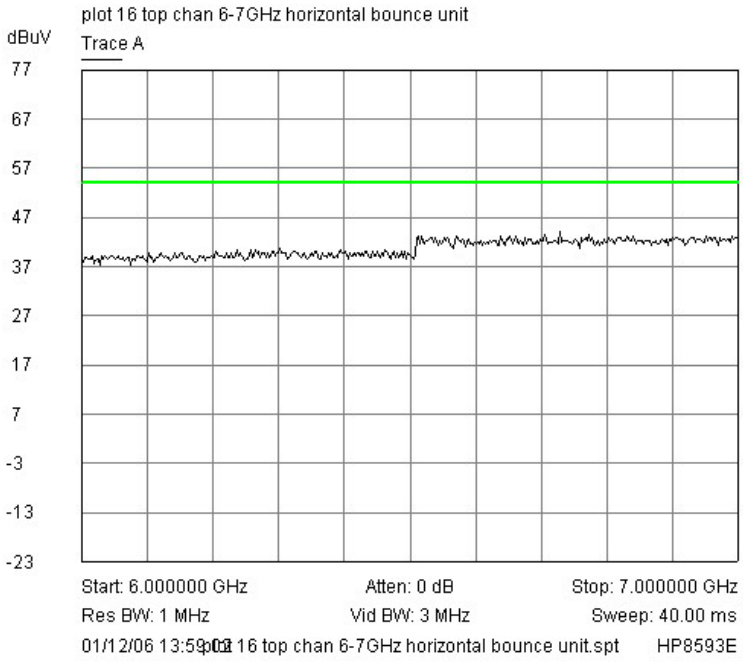

plot 13 top chan 2.9-4GHz vertical bounce unit
dBuV
Trace A
77
67
57
47
37
27
17
7
-3
-13
-23
Start: 2.900000 GHz
Atten: 0 dB
Stop: 4.000000 GHz
Res BW: 1 MHz
Vid BW: 3 MHz
Sweep: 22.00 ms
01/12/06 13:54:01 plot 13 top chan 2.9-4GHz vertical bounce unit.spt
HP8593E

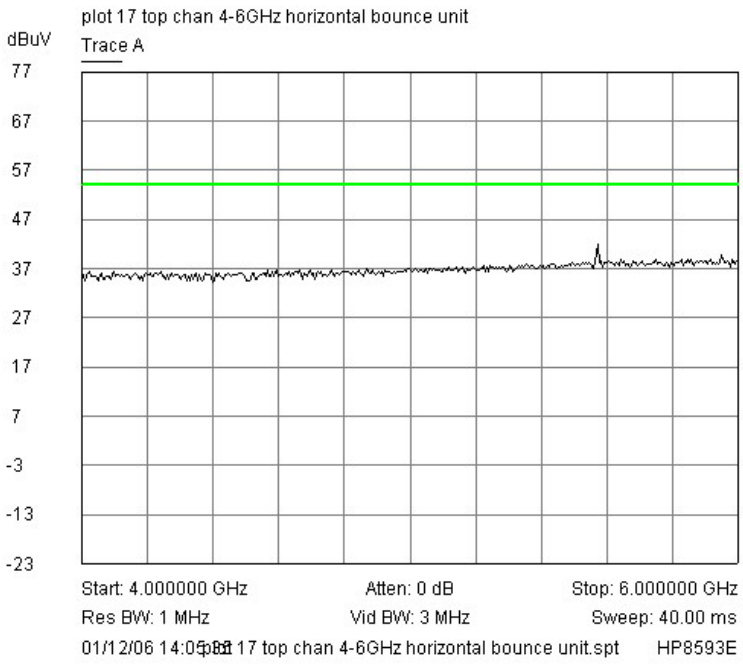

plot 14 top chan 4-6GHz vertical bounce unit
dBuV
Trace A
77
67
57
47
37
27
17
7
-3
-13
-23
Start: 4.000000 GHz
Atten: 0 dB
Stop: 6.000000 GHz
Res BW: 1 MHz
Vid BW: 3 MHz
Sweep: 40.00 ms
01/12/06 13:56:55
plot 14 top chan 4-6GHz vertical bounce unit.spt
HP8593E

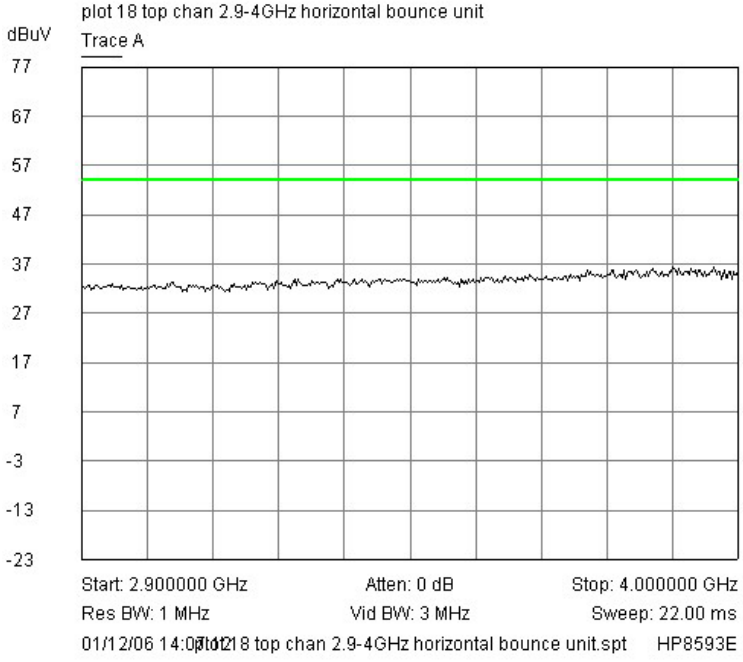

plot 15 top chan 6-7GHz vertical bounce unit
dBuV
Trace A
77
67
57
47
37
27
17
7
-3
-13
-23
Start: 6.000000 GHz
Atten: 0 dB
Stop: 7.000000 GHz
Res BW: 1 MHz
Vid BW: 3 MHz
Sweep: 40.00 ms
01/12/06 13:59:02
plot 15 top chan 6-7GHz vertical bounce unit.spt
HP8593E

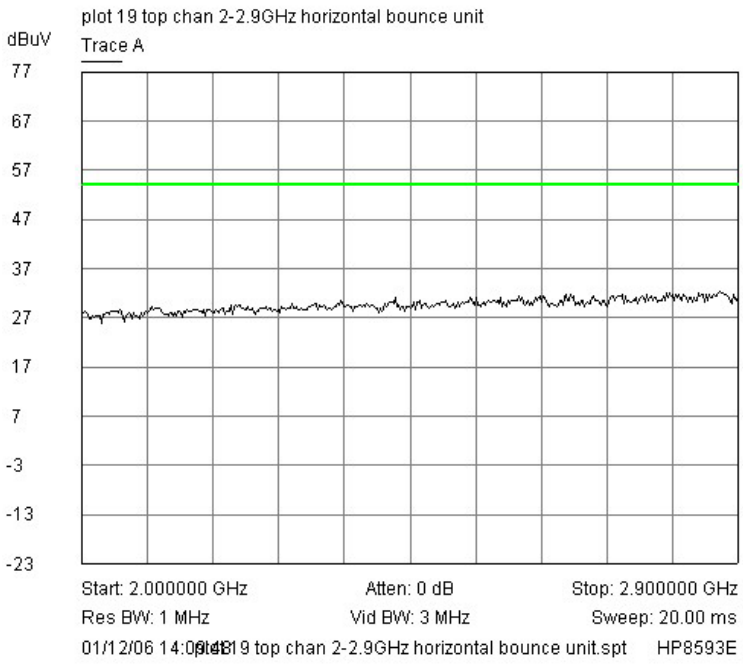
Horizontal.

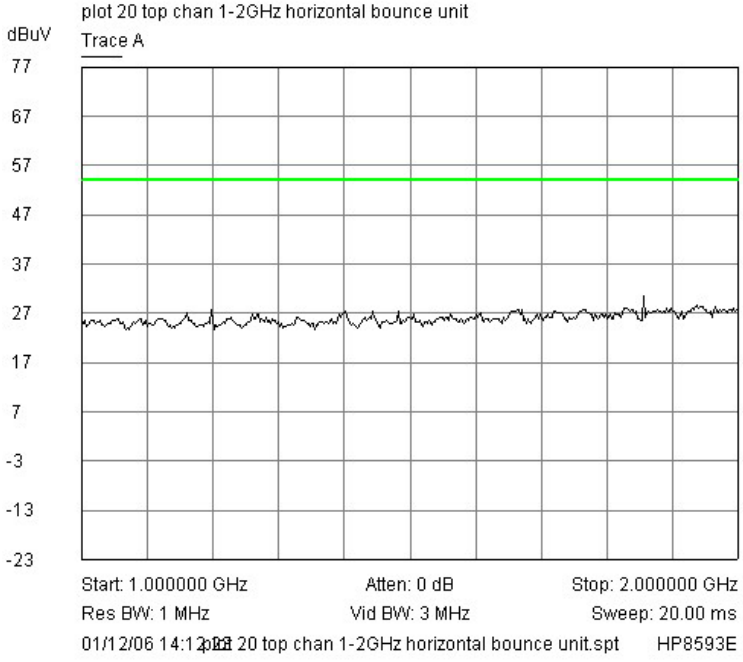





plot 17 top chan 4-6GHz horizontal bounce unit
dBuV
Trace A
77
67
57
47
37
27
17
7
-3
-13
-23
Start: 4.000000 GHz
Atten: 0 dB
Stop: 6.000000 GHz
Res BW: 1 MHz
Vid BW: 3 MHz
Sweep: 40.00 ms
01/12/06 14:05:33 plot 17 top chan 4-6GHz horizontal bounce unit.spt
HP8593E


plot 18 top chan 2.9-4GHz horizontal bounce unit
dBuV
Trace A
77
67
57
47
37
27
17
7
-3
-13
-23
Start: 2.900000 GHz
Atten: 0 dB
Stop: 4.000000 GHz
Res BW: 1 MHz
Vid BW: 3 MHz
Sweep: 22.00 ms
01/12/06 14:07:12 plot 18 top chan 2.9-4GHz horizontal bounce unit.spt
HP8593E


plot 19 top chan 2-2.9GHz horizontal bounce unit
dBuV
Trace A
77
67
57
47
37
27
17
7
-3
-13
-23
Start: 2.000000 GHz
Atten: 0 dB
Stop: 2.900000 GHz
Res BW: 1 MHz
Vid BW: 3 MHz
Sweep: 20.00 ms
01/12/06 14:09:48 plot 19 top chan 2-2.9GHz horizontal bounce unit.spt
HP8593E


plot 20 top chan 1-2GHz horizontal bounce unit
dBuV
Trace A
77
67
57
47
37
27
17
7
-3
-13
-23
Start: 1.000000 GHz
Atten: 0 dB
Stop: 2.000000 GHz
Res BW: 1 MHz
Vid BW: 3 MHz
Sweep: 20.00 ms
01/12/06 14:12:23 plot 20 top chan 1-2GHz horizontal bounce unit.spt
HP8593E

Emissions >1 GHz Average Signal Lists.

Vertical
Bottom channel.

Signal	Frequency MHz	Measured Average	Average limit -margin
1	1805	49	-5.0
2	5415	48	-6.0

Middle Channel

Signal	Frequency MHz	Measured Average	Average limit -margin
1	1830	48	-6.0
2	2745	46	-8.0
3	5490	50.8	-3.2

Top Channel

Signal	Frequency MHz	Measured Average	Average limit -margin
1	1855	45	-9.0
2	2782	40.5	-13.5
3	5565	50.3	-3.7

Horizontal
Bottom channel.

Signal	Frequency MHz	Measured Average	Average limit -margin
1	1805	35	-19.0
2	2707	36	-18.0
3	5415	52.3	-1.7

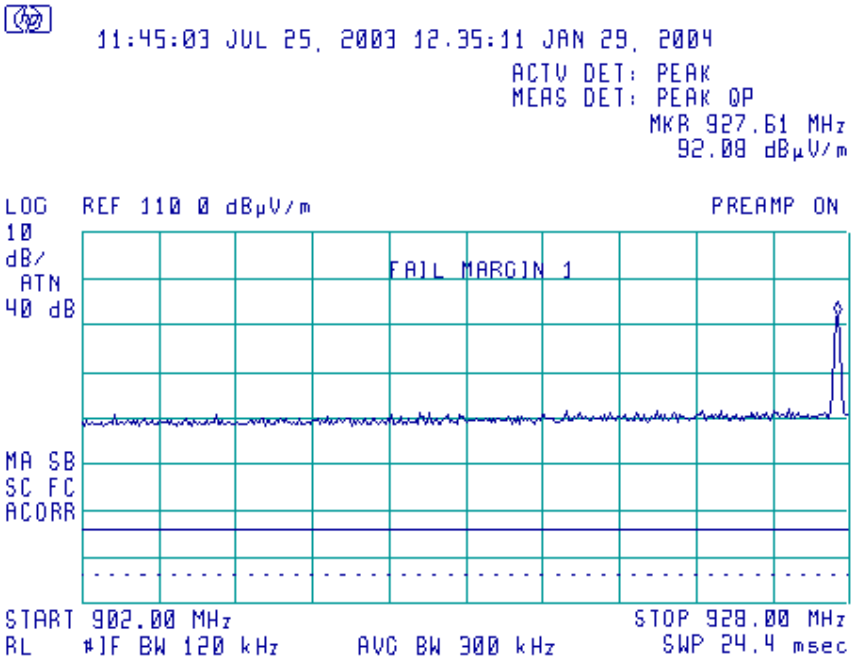
Middle Channel

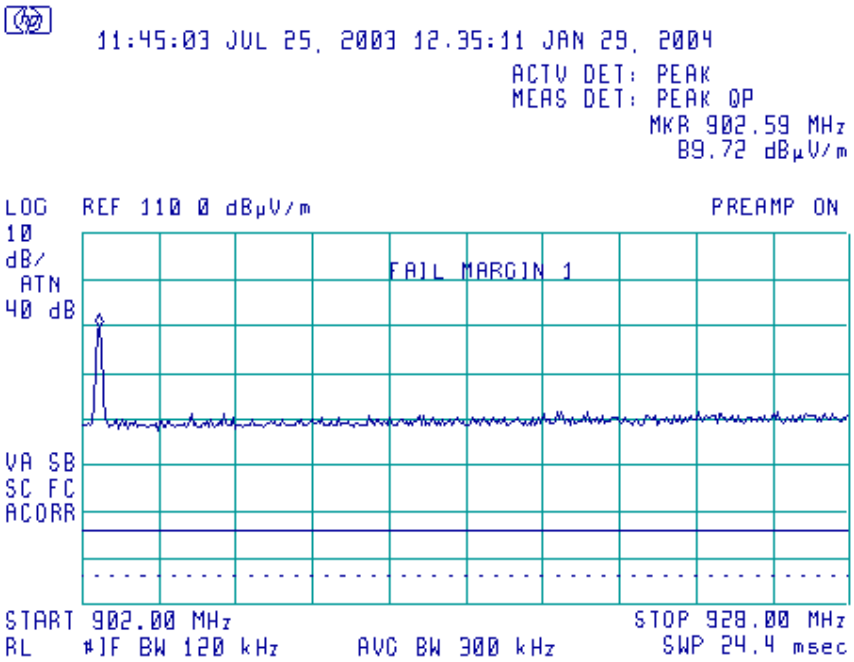
Signal	Frequency MHz	Measured Average	Average limit -margin
1	1830	42	-12.0
2	2745	33	-21.0
3	5490	53.5	-0.5

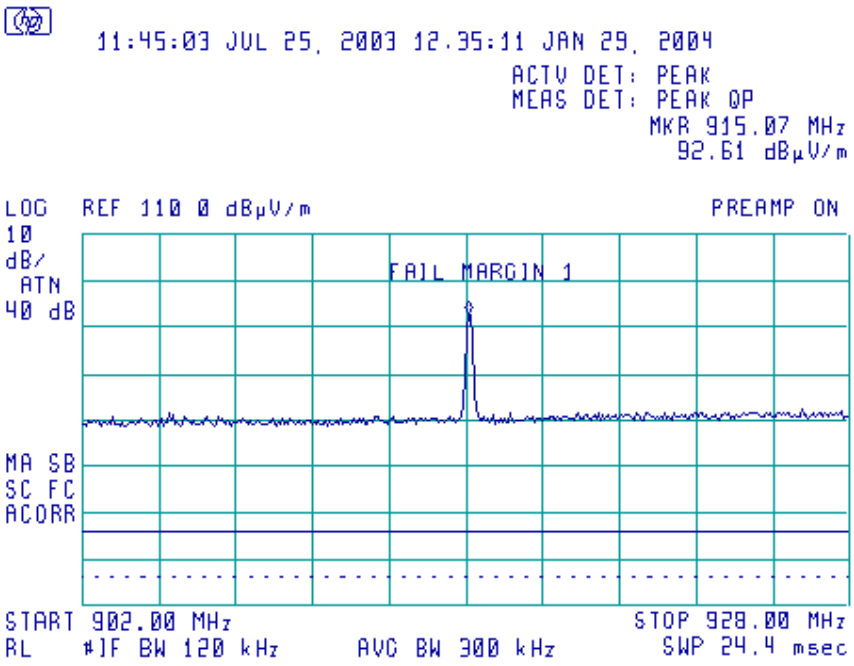
Top Channel

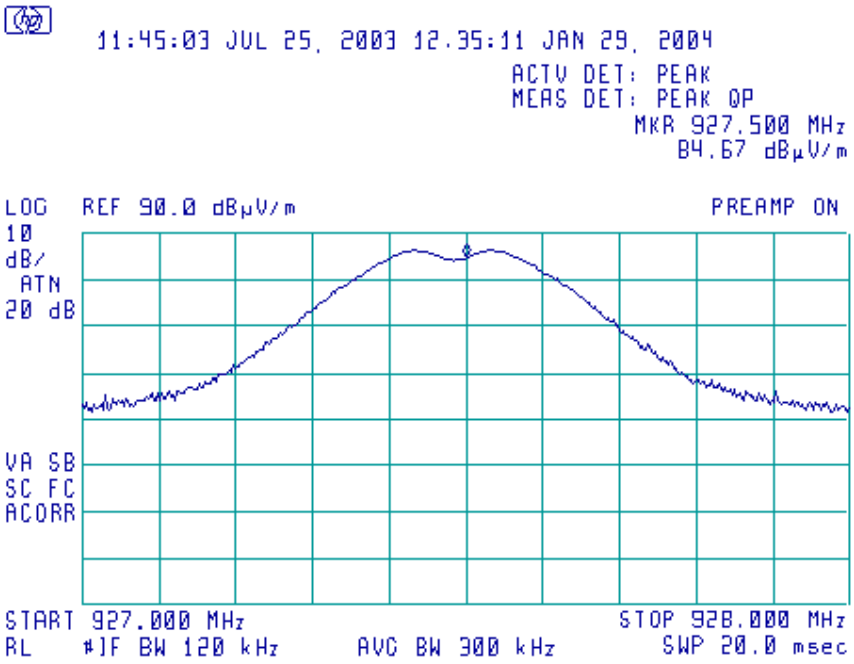
Signal	Frequency MHz	Measured Average	Average limit -margin
1	1855	52	-2.0
2	5565	33	-21

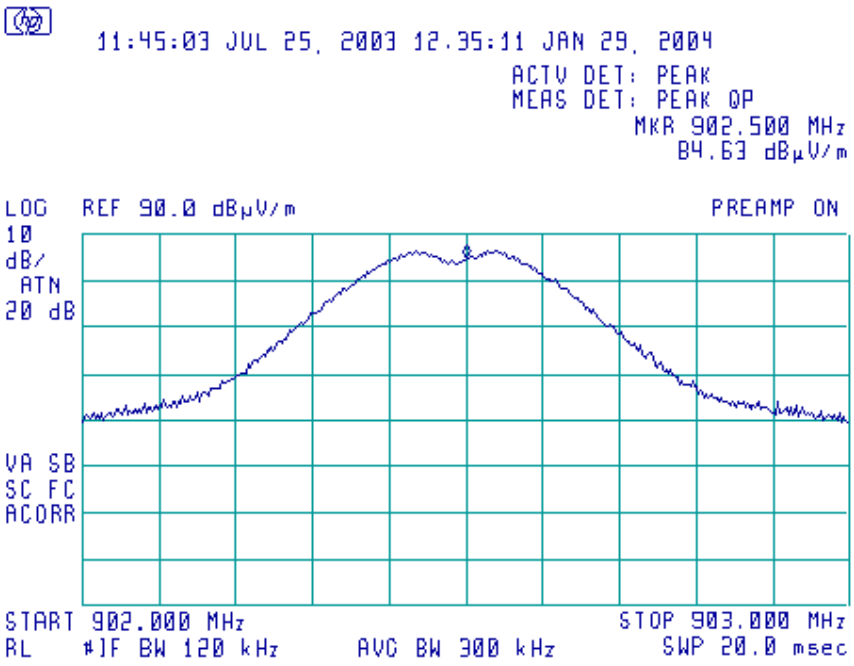
6.3 Band Edges











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.

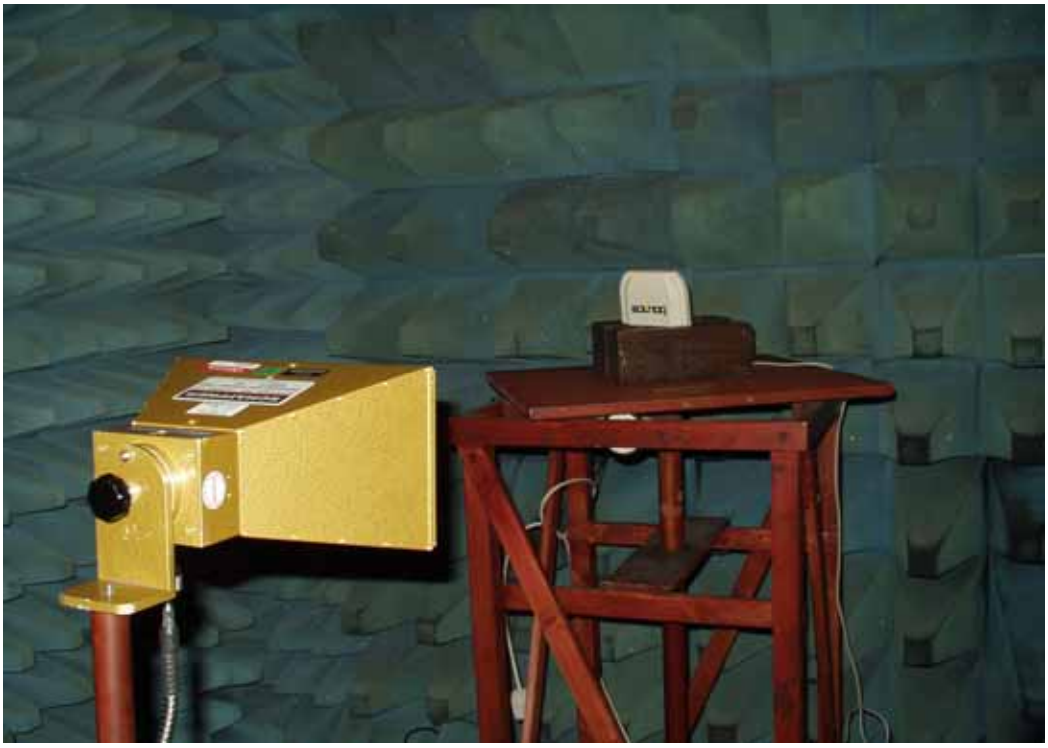
Column Six, labelled AV Delta L 1 (dB), (can also be labelled, in the case of Quasi Peak, QP Delta L 1 (dB)) is the Average or Quasi Peak calculation relevant to the limit line. The results entered in this column indicate the signal level relative to the compliance limit required. Negative numbers indicate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

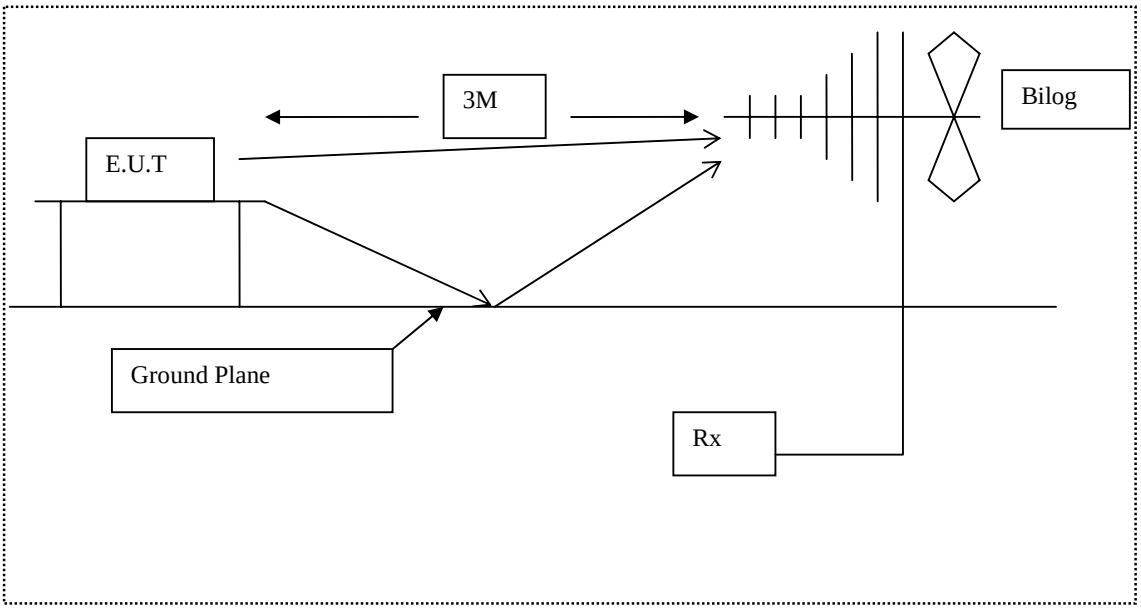


Diagram of the radiated emissions test setup.

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

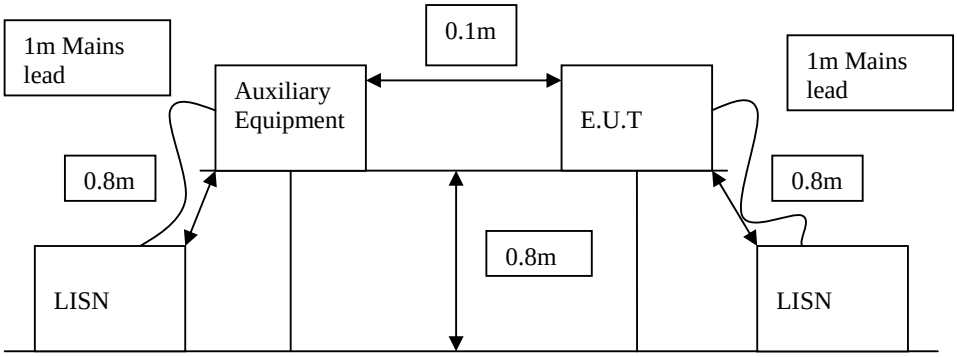


Diagram of the conducted emissions test setup.

9. Signal Leads

Port Name	Cable Type
USB	USB Screened

10. Test Equipment Calibration list

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

RNNo	Model	Description	Manufacturer
E1	HP8542E	EMI Receiver & RF Filter	Hewlett Packard
E10	MN2050	LISN 13A	Chase
E131	ESG-3000A	Signal Generator	Hewlett Packard
E136	3105	Horn Antenna	EMCO
E238	FC5343A	2.7 - 5.0 GHz BPF	IFR
E239	H-34-2720-01	2.0 - 2.9 GHz BPF	Marconi
E266	2032	5.4GHz Signal Generator	Marconi Instruments
E268	BHA 9118	1-18 GHz Horn Antenna	Schaffner
E285	8546A	EMI Receiver	Hewlett Packard
E3	HP8593E	Spectrum Analyser	Hewlett Packard
E319	H-34-2720-01	Transmit Filter 1.5-2.0 GHz	The Marconi Company Ltd
E320	8430A	Bandpass Filter 800 MHz - 2.0 GHz	HP
E35	HP11947A	Transient Limiter + 10dB Atten.	Hewlett Packard
N438	3513 172 1208	3.9 - 7.5 GHz BPF	MEL
TMS77	8673B	Synthesised Signal Generator	Hewlett Packard
TMS82	8449B	Pre Amplifier 1 - 26 GHz	Agilent
TMS933	CBL6141A	Bilog Antenna 30MHz - 2GHz	York EMC

11. Auxiliary equipment

11.1 Auxiliary equipment supplied by TTP Group plc

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

Manufacturer	Description	Model Number	Serial Number
TTP	5V Power supply	-	-

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
E2	Hewlett Packard	Spectrum Analyser + EMC S/ware	HP8594E	3351U00569
I003	DELL	Laptop	Latitude	191-744-573-95

12. Modifications

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

NONE.

13. Compliance information

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

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:	Bounce communicator
Model Number(s):	Issue 2
Unique Serial Number(s):	Prototype 1
Manufacturer:	The Technology Partnership
Customer Purchase Order Number:	ET1127/SRT
R.N. Electronics Limited Report Number:	11-150/3230/4/06A
Test Standards:	FCC Part 15C: effective date October 1st 2006 Class **DXT** Intentional Radiator
Date:	29th & 30th November 2006

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: 2007.06.11 13:52:47 +01'00'

RN Electronics Ltd www.rnelectronics.com
Arnolds Court, Arnolds Farm Lane, Mountnessing, Brentwood, Essex CM13 1UT
Tel: +44 1277 352219 E-mail: sales@rnelectronics.com Fax: +44 1277 352968