TEST REPORT
FROM
RFI GLOBAL SERVICES LTD

Test of: Psion Teklogix UK Ltd.
7535 + RA3020

To: FCC Part 22: 2004 (Subpart H) and FCC Part 24: 2004 (Subpart E)

Test Report Serial No:
RFI\MPTE1\RP47892JD02A

This Test Report Is Issued Under The Authority Of Andrew Brown, Operations Manager:  pp	
Tested By: Fara Razally  **pp**	**Checked By: Nigel Davison** 
Report Copy No: PDF01	
Issue Date: 31 January 2006	**Test Dates: 15 December 2005 to 19 January 2006**

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This report may be copied in full. The results in this report apply only to the sample(s) tested.

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Registered in England and Wales. Company number:2117901

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1. Client Information

Company Name:	Psion Teklogix UK Ltd.
Address:	Unit Q Bourne End Business Park Cores End Road Bourne End Bucks SL8 5AS
Contact Name:	Mr S Lucas

2. Equipment Under Test (EUT)

The following information (with the exception of the Date of Receipt) has been supplied by the client:

2.1. Identification of Equipment Under Test (EUT)

Brand Name:	Psion Teklogix
Model Name or Number:	7535 + RA3020
Serial Number:	None Stated
Hardware Version:	7535RA3020A
Software Version:	None Stated
Software Version Number:	01
Hardware Rev. of GSM Module	B
Software Rev. of GSM Module	0.6.1 (SVN11)
FCC ID Number:	GM37535GSMA
Country of Manufacture:	Canada
Date of Receipt:	15 December 2005

Brand Name:	Psion Teklogix
Model Name or Number:	HU1005
Unique Type Identification:	None Stated
Serial Number:	0000524420
Country of Manufacture:	Canada
Date of Receipt:	15 December 2005

2.2. Accessories

The following accessories were supplied with the EUT:

Description:	AC/DC Adaptor
Brand Name:	Sino-American
Model Name or Number:	SA150A-1533U-3
Serial Number:	None Stated
Cable Length and Type:	None Stated
Connected to Port:	None Stated

Description:	128M MMC Card
Brand Name:	Fulifilm
Model Name or Number:	None Stated
Serial Number:	None Stated
Cable Length and Type:	None Stated
Connected to Port:	None Stated

2.3. Description of EUT

The equipment under test is a 7535 rugged handheld terminal (i.e. a PC) running Windows CE.net 4.2 Pro. The RA3020 is dual band (850 MHz/1900 MHz) PCS radio option that is integrated inside the 7535 to offer the user the ability to access/send data in real time. The 7535 + RA3020 is used for logistic support, inventory, warehousing, etc.

2.4. Modifications Incorporated in EUT

During the course of testing the EUT was not modified.

2.5. Additional Information Related to Testing FCC Part 22

Power Supply Requirement:	Nominal 115 V 60 Hz AC Mains supply and Internal battery supply of 7.4 V nominal.		
Intended Operating Environment:	Residential, Commercial, Light Industry and within PCS coverage.		
Equipment Category:	GSM 850/GSM 1900		
Type of Unit:	Base Station (Fixed Use), Portable (Standalone battery powered device) and Ancillary (Radio)		
Transmit Frequency Range:	824.2 MHz to 848.8 MHz		
Transmit Channels Tested:	**Channel ID**	**Channel Number**	**Channel Frequency (MHz)**
	Bottom	128	824.2
	Middle	190	836.6
	Top	251	848.8
Receive Frequency Range:	869.2 MHz to 893.8 MHz		
Receive Channels Tested:	**Channel ID**	**Channel Number**	**Channel Frequency (MHz)**
	Bottom	128	869.2
	Middle	190	881.6
	Top	251	893.8
Maximum Peak Power Output (ERP)	31.2 dBm		

Additional Information Related to Testing FCC Part 24 (Continued)

Power Supply Requirement:	Nominal 115 V 60 Hz AC Mains supply and Internal battery supply of 7.4 V nominal.		
Intended Operating Environment:	Residential, Commercial, Light Industry and within PCS coverage.		
Equipment Category:	GSM 850/GSM 1900		
Type of Unit:	Base Station (Fixed Use), Portable (Standalone battery powered device) and Ancillary (Radio)		
Transmit Frequency Range:	1850.2 MHz to 1909.8 MHz		
Transmit Channels Tested:	**Channel ID**	**Channel Number**	**Channel Frequency (MHz)**
	Bottom	512	1850.2
	Middle	660	1879.8
	Top	810	1909.8
Receive Frequency Range:	1930.2 MHz to 1989.8 MHz		
Receive Channels Tested:	**Channel ID**	**Channel Number**	**Channel Frequency (MHz)**
	Bottom	512	1930.2
	Middle	660	1960.0
	Top	810	1989.8
Maximum Peak Power Output (EIRP)	30.9		

2.6. Port Identification

Port	Description	Type/Length	Applicable
1	Portable Docking Module	0 Metres (clip onto the base of the terminal)	Y
2	Tether Port	1.8m Screened	Y

2.7. Support Equipment

The following support equipment was used to exercise the EUT during testing:

Description:	Laptop
Brand Name:	Dell
Model Name or Number:	Latitude C PPX
Serial Number:	INDS 00372
Cable Length and Type:	None Stated
Connected to Port:	None Stated

Description:	Optical USB Mouse
Brand Name:	Microsoft
Model Name or Number:	X08-71118-PID56180-576-2143156-1
Serial Number:	None Stated
Cable Length and Type:	None Stated
Connected to Port:	None Stated

Description:	AC/DC Adaptor for the Laptop
Brand Name:	Dell
Model Name or Number:	ADP-70EB PA-6 Family 09364U-C/O TH
Serial Number:	None Stated
Cable Length and Type:	None Stated
Connected to Port:	None Stated

3. Test Specification, Methods and Procedures

3.1. Test Specifications

Reference:	FCC Part 22: 2004 Subpart H (Cellular Radiotelephone Service)
Title:	Code of Federal Regulations, Part 22 (47CFR22) Personal Communication Services.

Reference:	FCC Part 24 Subpart E: 2004 (Broadband PCS)
Title:	Code of Federal Regulations, Part 24 (47CFR24) Personal Communication Services.

3.2. Methods and Procedures

The methods and procedures used were as detailed in:

ANSI/TIA-603-B-2003
Land Mobile Communications Equipment, Measurements and performance Standards

ANSI C63.2 (1987)
Title: American National Standard for Instrumentation - Electromagnetic noise and field strength.

ANSI C63.4 (2003)
Title: American National Standard Methods of Measurement of Electromagnetic Emissions from Low Voltage Electrical and Electronic Equipment in the Range of 9 kHz to 40 GHz.

ANSI C63.5 (1988)
Title: American National Standard for the Calibration of antennas used for Radiated Emission measurements in Electromagnetic Interference (EMI) control.

ANSI C63.7 (1988)
Title: American National Standard Guide for Construction of Open Area Test Sites for performing Radiated Emission Measurements.

CISPR 16-1: (1999)
Title: Specification For Radio Disturbance and Immunity Measuring Apparatus and Methods. Part 1: Radio Disturbance and Immunity Measuring Apparatus.

3.3. Definition of Measurement Equipment

The measurement equipment used complied with the requirements of the standards referenced in the methods & procedures section above. Appendix 1 contains a list of the test equipment used.

4. Deviations from the Test Specification

None.

5. Operation of the EUT during Testing

5.1. Operating Modes

The EUT was tested in the following operating modes, unless otherwise stated.

Preliminary radiated scans were performed on the EUT with the accessories stated in section 2.5 of this report connected and then disconnected. The combination that exhibited the worst-case mode of operation was then used to perform final measurements.

In transmit mode with GSM Active

In idle mode

Transmitter Modes:
For carrier output power, occupied bandwidth and final transmitter radiated measurements, testing was performed at full power on top, middle and bottom channels of the assigned frequency block. For frequency stability testing, measurements were performed at full power on the top and bottom channel of the assigned frequency block at -30ºC through to +50ºC in 10º increments.

All transmitter radiated spurious pre-scan tests were performed at full power on the top channel of the assigned frequency block. Final measurements were then performed on the top, middle and bottom channels if an emission was identified.

Receiver/Idle Modes:
Testing was performed with the call terminated from the GSM Test Simulator and the phone left in its Idle mode.

5.2. Configuration and Peripherals

The EUT was tested in the following configuration:

Configured with its portable docking module (PDM) connected, which contains USB, RS232 and AC mains charger port. The PDM port was connected a USB mouse, USB cable, RS232 cable and AC Mains supply

6. Summary of Test Results

FCC Part 22 (Subpart H)

Range of Measurements	Specification Reference	Port Type	Compliancy Status
Receiver/Idle AC Conducted Spurious Emissions (150 kHz to 30 MHz)	C.F.R. 47 FCC Part 15: 2004 Section 15.107	AC Mains Input	Complied
Receiver/Idle Radiated Emissions	C.F.R. 47 FCC Part 15: 2004 Section 15.109	Enclosure	Complied
Transmitter Effective Radiated Power (ERP)	C.F.R. 47 FCC Part 22: 2004 Section 22.913(a)	Antenna	Complied
Transmitter Frequency Stability (Temperature Variation)	C.F.R. 47 FCC Part 22: 2004 Section 22.355	Antenna Terminals	Complied
Transmitter Frequency Stability (Voltage Variation)	C.F.R. 47 FCC Part 22: 2004 Section 22.355	Antenna Terminals	Complied
Transmitter Occupied Bandwidth	C.F.R. 47 FCC Part 22: 2004 Section 2.1049	Antenna Terminals	Complied
Transmitter Out of Band Radiated Emissions	C.F.R. 47 FCC Part 22: 2004 Section 2.1053/22.917	Antenna	Complied
Transmitter Band Edge Radiated Emissions	C.F.R. 47 FCC Part 22: 2004 Section 2.1053/22.917	Antenna	Complied

Summary of Test Results (Continued)

FCC Part 24 (Subpart E)

Range of Measurements	Specification Reference	Port Type	Compliancy Status
Idle Mode AC Conducted Spurious Emissions (150 kHz to 30 MHz)	C.F.R. 47 FCC Part 15: 2004 Section 15.107	AC Mains Input	Complied
Idle Mode Radiated Spurious Emissions	C.F.R. 47 FCC Part 15: 2004 Section 15.109	Enclosure	Complied
Transmitter Effective Isotropic Radiated Power (EIRP)	C.F.R. 47 FCC Part 24: 2004 Section 24.232	Antenna	Complied
Transmitter Frequency Stability (Temperature Variation)	C.F.R. 47 FCC Part 24: 2004 Section 24.235	Antenna Terminals	Complied
Transmitter Frequency Stability (Voltage Variation)	C.F.R. 47 FCC Part 24: 2004 Section 24.235	Antenna Terminals	Complied
Transmitter Occupied Bandwidth	C.F.R. 47 FCC Part 24: 2004 Section 24.238	Antenna Terminals	Complied
Transmitter Out of Band Radiated Emissions	C.F.R. 47 FCC Part 24: 2004 Section 2.1053/24.238	Antenna	Complied
Transmitter Band Edge Radiated Emissions	C.F.R. 47 FCC Part 2: 2004 Section 2.1053/24.238	Antenna	Complied

6.1. Location of Tests

All the measurements described in this report were performed at the premises of
RFI Global Services Ltd, Ewhurst Park, Ramsdell, Basingstoke, Hampshire, RG26 5RQ, England
and RFI Global Services Ltd, Pavilion, Ashwood Park, Ashwood Way, Basingstoke, Hampshire
RG23 8BG.

7. Measurements, Examinations and Derived Results

7.1. General Comments

This section contains test results only.

Measurement uncertainties are evaluated in accordance with current best practice. Our reported expanded uncertainties are based on standard uncertainties, which are multiplied by an appropriate coverage factor to provide a statistical confidence level of approximately 95%.
Please refer to section 8 for details of measurement uncertainties.

7.2. Test Results FCC Part 22 (Subpart H)

7.2.1. Receiver/Idle Mode AC Conducted Spurious Emissions: Section 15.107

The EUT was configured as for ac conducted emission measurements as described in section 9 of this report.

Tests were performed to identify the maximum emission levels present on the ac mains line of the EUT.

Results:

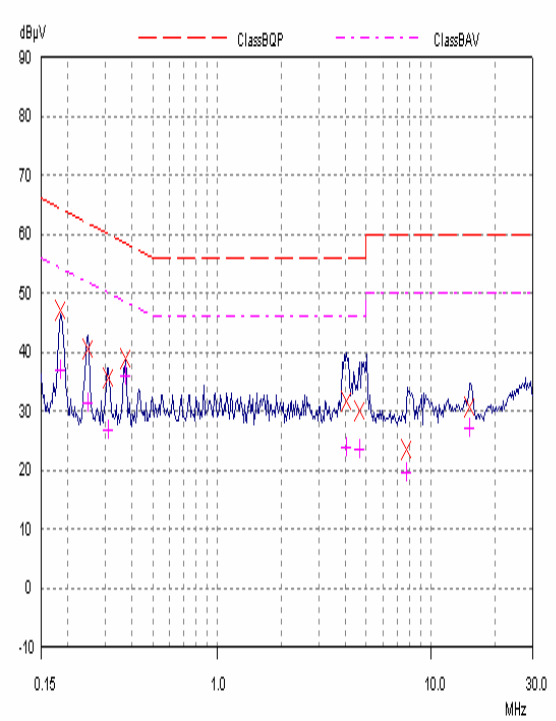
Quasi-Peak Detector Measurements on Live and Neutral Lines

Frequency (MHz)	Line	Level (dBμV)	Limit (dBμV)	Margin (dB)	Result
0.18544	Neutral	47.03	64.24	17.21	Complied
0.24844	Neutral	40.61	62.81	21.20	Complied
0.31018	Neutral	35.66	59.97	24.31	Complied
0.37234	Neutral	38.91	58.45	19.54	Complied
4.05928	Live	31.67	56.00	24.33	Complied
4.68739	Live	30.02	56.00	25.93	Complied
7.75216	Live	23.60	60.00	36.40	Complied
15.19546	Live	30.55	60.00	29.45	Complied

Average Detector Measurements on Live and Neutral Lines

Frequency (MHz)	Line	Level (dBμV)	Limit (dBμV)	Margin (dB)	Result
0.18544	Neutral	36.80	54.24	17.44	Complied
0.24844	Neutral	31.21	51.81	20.60	Complied
0.31018	Neutral	26.64	49.97	23.33	Complied
0.37234	Neutral	36.06	48.45	12.39	Complied
4.05928	Live	23.72	46.00	22.28	Complied
4.68739	Live	23.42	46.00	22.58	Complied
7.75216	Neutral	19.38	50.00	30.62	Complied
15.19546	Neutral	26.97	50.00	23.03	Complied

Receiver/Idle Mode AC Conducted Spurious Emissions: Section 15.107 (Continued)



Note: This plot is a pre-scan and for indication purposes only. For final measurements, see accompanying tables.

7.2.2. Receiver/Idle Mode Radiated Spurious Emissions: Section 15.109 - Electric Field Strength Measurements (Frequency Range: 30 to 1000 MHz)

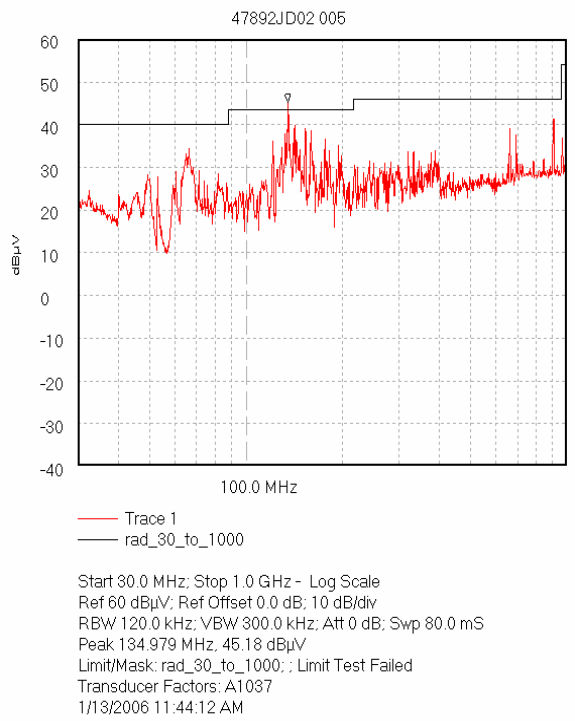
The EUT was configured as for radiated emission – Part 22 testing as described in section 9 of this report.

Tests were performed to identify the maximum receiver or standby radiated emission levels.

Results:

Frequency (MHz)	Antenna Polarity	Quasi Peak Level (dBμV/m)	Limit (dBμV/m)	Margin (dB)	Result
40.126	Vertical	21.4	40.0	18.6	Complied
49.327	Vertical	18.6	40.0	21.4	Complied
52.830	Vertical	21.8	40.0	18.2	Complied
65.266	Vertical	17.1	40.0	22.9	Complied
66.283	Vertical	20.8	40.0	19.2	Complied
120.841	Vertical	28.8	43.5	14.7	Complied
134.779	Vertical	28.1	43.5	15.4	Complied
135.786	Vertical	18.4	43.5	25.1	Complied
152.742	Vertical	27.9	43.5	15.6	Complied
159.751	Vertical	21.4	43.5	22.1	Complied
176.695	Vertical	24.8	43.5	18.7	Complied
194.692	Vertical	29.5	43.5	14.0	Complied
388.151	Vertical	19.4	46.0	26.6	Complied
697.011	Vertical	26.2	46.0	19.8	Complied

Receiver/Idle Mode Radiated Spurious Emissions: Section 15.109 - Electric Field Strength Measurements (Frequency Range: 30 to 1000 MHz) (Continued)



Note: This plot is a pre-scan and for indication purposes only. For final measurements, see accompanying tables.

7.2.3. Receiver/Idle Mode Radiated Spurious Emissions: Section 15.109 - Electric Field Strength Measurements (Frequency Range: 1 to 10 GHz)

Results:

Highest Peak Level

Frequency (MHz)	Antenna Polarity	Detector Level (dBμV)	Transducer Factor (dB)	Actual Level (dBμV/m)	Limit (dBμV/m)	Margin (dB)	Result
4245.017	Vertical	53.0	-17.2	35.8	74.0	38.2	Complied
9358.470	Horizontal	59.7	-13.4	46.3	74.0	27.7	Complied

Highest Average Level

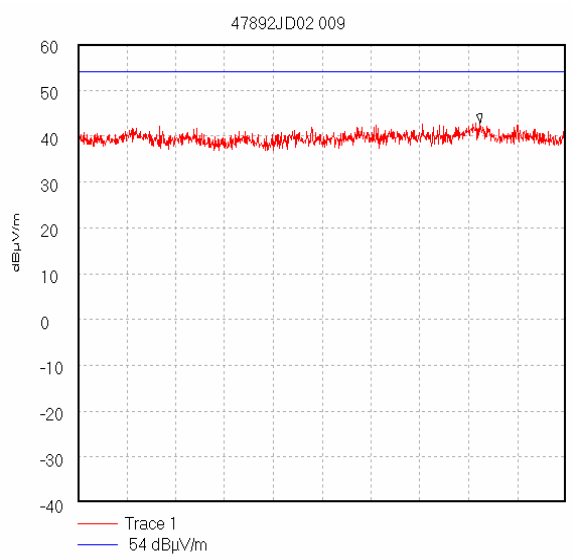
Frequency (MHz)	Antenna Polarity	Detector Level (dBμV)	Transducer Factor (dB)	Actual Level (dBμV/m)	Limit (dBμV/m)	Margin (dB)	Result
4245.017	Vertical	35.5	-17.2	18.3	54.0	35.7	Complied
9358.470	Horizontal	31.2	-13.4	17.8	54.0	36.2	Complied

Note(s):

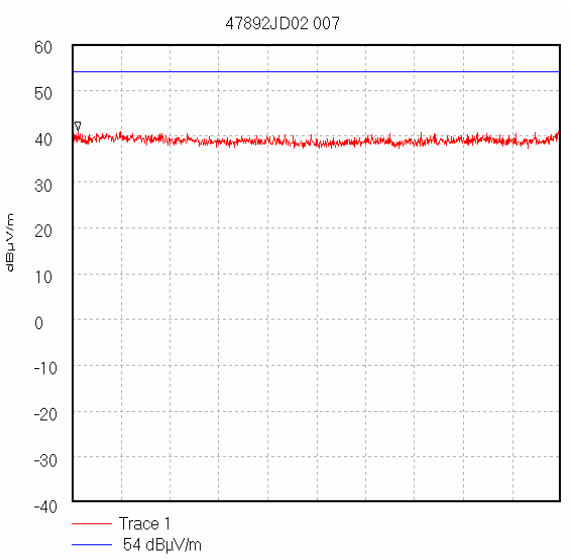
1. The transducer factor incorporates the antenna factor, cable losses, pre-amplifier gain and attenuations.

Test of: **Psion Teklogix UK Ltd.**
7535 + RA3020
To: **FCC Part 22: 2004 (Subpart H) and FCC Part 24: 2004 (Subpart E)**

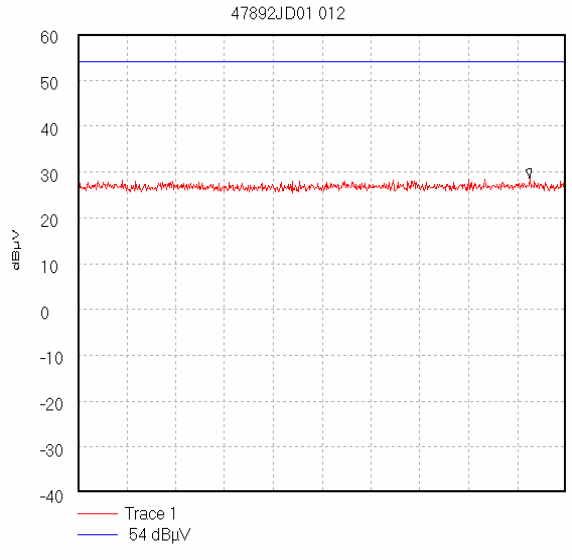
Receiver/Idle Mode Radiated Spurious Emissions: Section 15.109 - Electric Field Strength Measurements (Frequency Range: 1 to 10 GHz) (Continued)



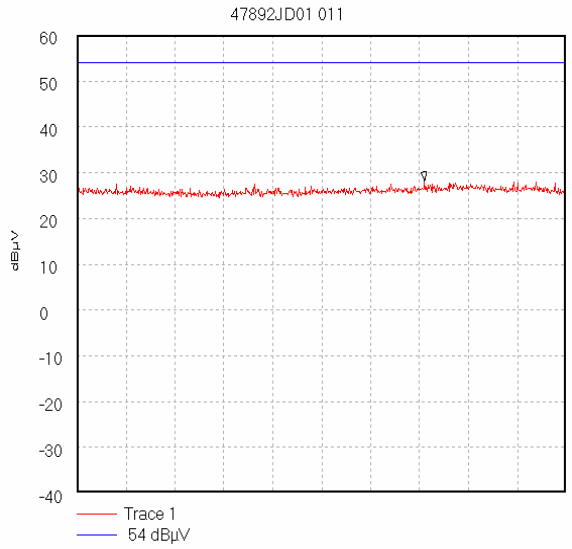
Start 1.0 GHz; Stop 2.0 GHz
Ref 60 dBµV/m; Ref Offset 1.2 dB; 10 dB/div
RBW 1000.0 kHz; VBW 1.0 MHz; Att 0 dB; Swp 20.0 mS
Peak 1.824 GHz, 42.79 dBµV/m
Display Line: 54 dBµV/m; ; Limit Test Passed
Transducer Factors: 1 to 2
1/13/2006 1:30:33 PM



Start 2.0 GHz; Stop 4.0 GHz
Ref 60 dBµV/m; Ref Offset 0.0 dB; 10 dB/div
RBW 1000.0 kHz; VBW 1.0 MHz; Att 0 dB; Swp 20.0 mS
Peak 2.024 GHz, 41.09 dBµV/m
Limit/Mask: ; Limit Test Passed
Transducer Factors: 2 to 4
1/13/2006 12:49:44 PM



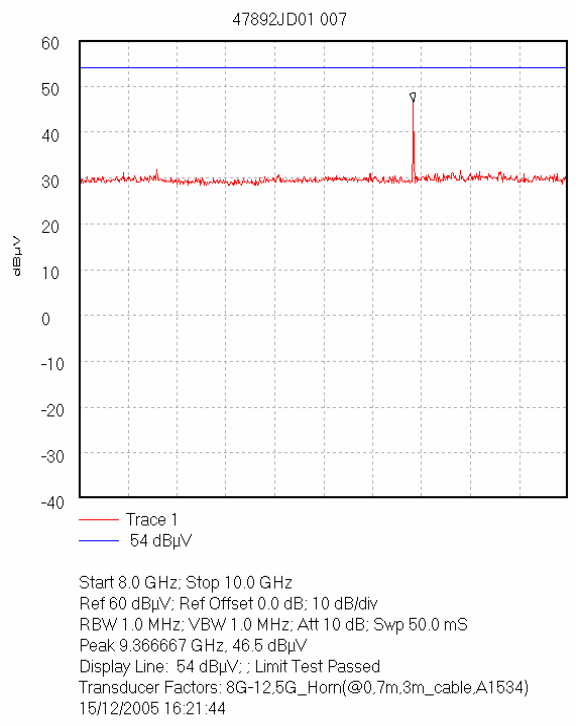
Start 4.0 GHz; Stop 6.0 GHz
Ref 60 dBµV; Ref Offset 0.0 dB; 10 dB/div
RBW 1.0 MHz; VBW 1.0 MHz; Att 10 dB; Swp 50.0 mS
Peak 5.85 GHz, 28.67 dBµV
Display Line: 54 dBµV; ; Limit Test Passed
Transducer Factors: 4G-6G_Horn(@1m,3m_cable,A1534)
15/12/2005 16:56:07



Start 6.0 GHz; Stop 8.0 GHz
Ref 60 dBµV; Ref Offset 0.0 dB; 10 dB/div
RBW 1.0 MHz; VBW 1.0 MHz; Att 10 dB; Swp 50.0 mS
Peak 7.42 GHz, 28.17 dBµV
Display Line: 54 dBµV; ; Limit Test Passed
Transducer Factors: 6G-8G_Horn(@0.7m,3m_cable,A1534)
15/12/2005 16:54:24

Note: These plots are pre-scans and for indication purposes only. For final measurements, see accompanying tables.

Receiver/Idle Mode Radiated Spurious Emissions: Section 15.109 - Electric Field Strength Measurements (Frequency Range: 1 to 10 GHz) (Continued)



Note: This plot is a pre-scan and for indication purposes only. For final measurements, see accompanying tables.

7.2.4. Transmitter Effective Radiated Power (ERP): Section 22.913(a)

The EUT was configured as for effective radiated power as described in section 9 of this report.

Tests were performed to identify the maximum effective radiated power (ERP).

Results:

Channel	Frequency (MHz)	Level (dBm)	Limit (dBm)	Margin (dB)	Result
Bottom	824.2	31.2	38.4	7.2	Complied
Middle	836.6	31.1	38.4	7.3	Complied
Top	848.8	29.8	38.4	8.6	Complied

7.2.5. Transmitter Frequency Stability (Temperature Variation): Section 22.355

The EUT was configured as for Part 2.1055 - frequency stability measurements as described in section 9 of this report.

Tests were performed to identify the maximum frequency error of the EUT with variations in ambient temperature.

Results:

Bottom Channel (824.2 MHz)

Temperature (°C)	Measured Frequency (MHz)	Frequency Error (Hz)	Frequency Error (ppm)	Limit (ppm)	Margin (ppm)	Result
-30	824.200020	20	0.02	2.5	2.48	Complied
-20	824.200020	20	0.02	2.5	2.48	Complied
-10	824.200014	14	0.02	2.5	2.48	Complied
0	824.200015	15	0.02	2.5	2.48	Complied
10	824.200019	19	0.02	2.5	2.48	Complied
20	824.200013	13	0.02	2.5	2.48	Complied
30	824.200020	20	0.02	2.5	2.48	Complied
40	824.199994	6	0.01	2.5	2.49	Complied
50	824.200017	17	0.02	2.5	2.48	Complied

Transmitter Frequency Stability (Temperature Variation): Section 22.355 (Continued)

Results:

Top Channel (848.8 MHz)

Temperature (°C)	Measured Frequency (MHz)	Frequency Error (Hz)	Frequency Error (ppm)	Limit (ppm)	Margin (ppm)	Result
-30	848.799990	10	0.01	2.5	2.49	Complied
-20	848.800011	11	0.01	2.5	2.49	Complied
-10	848.800017	17	0.02	2.5	2.48	Complied
0	848.800012	12	0.01	2.5	2.49	Complied
10	848.800010	10	0.01	2.5	2.49	Complied
20	848.800013	13	0.02	2.5	2.48	Complied
30	848.800011	11	0.01	2.5	2.49	Complied
40	848.800015	15	0.02	2.5	2.48	Complied
50	848.800010	10	0.01	2.5	2.49	Complied

7.2.6. Transmitter Frequency Stability (Voltage Variation): Section 22.355

The EUT was configured as for Part 2.1055 frequency stability measurements as described in section 9 of this report.

Tests were performed to identify the maximum frequency error of the EUT with variations in nominal operating voltage.

Results:

Bottom Channel (824.2 MHz

Supply Voltage (V)	Measured Frequency (MHz)	Frequency Error (Hz)	Frequency Error (ppm)	Limit (ppm)	Margin (ppm)	Result
7.1	824.200029	29	0.04	2.5	2.46	Complied
8.4	824.200022	22	0.03	2.5	2.47	Complied

Top Channel (848.8 MHz)

Supply Voltage (V)	Measured Frequency (MHz)	Frequency Error (Hz)	Frequency Error (ppm)	Limit (ppm)	Margin (ppm)	Result
7.1	848.800014	14	0.02	2.5	2.48	Complied
8.4	848.800016	16	0.02	2.5	2.48	Complied

7.2.7. Transmitter Occupied Bandwidth: Section 2.1049

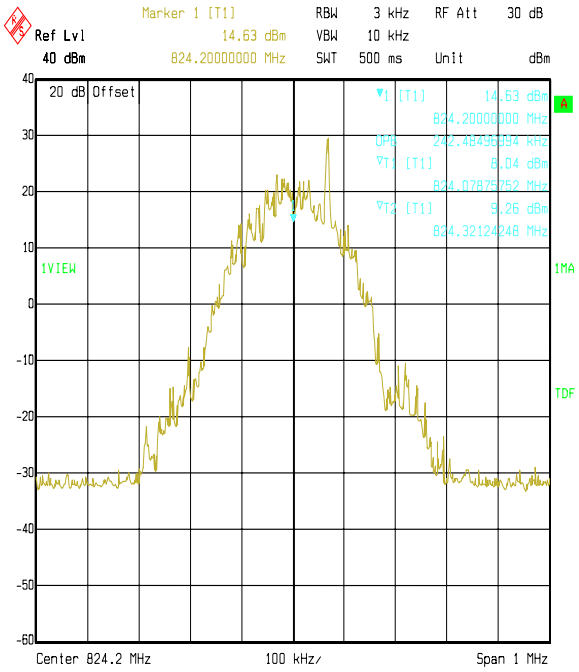
The EUT was configured as for occupied bandwidth measurements as described in section 9 of this report.

Tests were performed to identify the maximum bandwidth occupied by the fundamental frequency of the EUT.

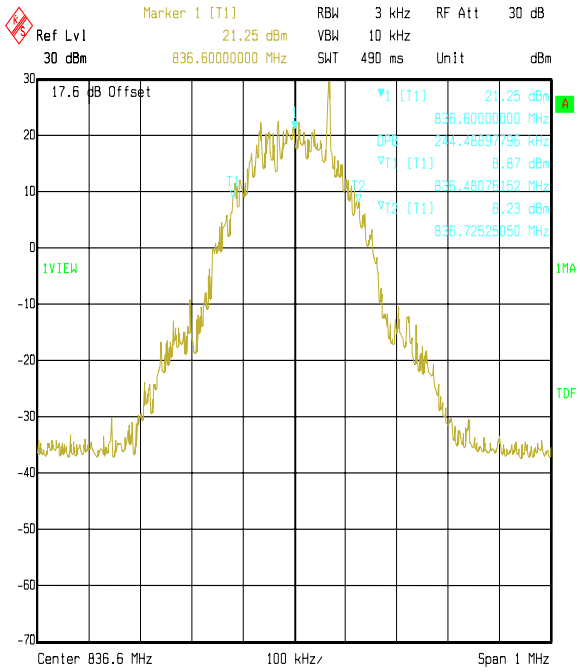
Results:

Channel	Frequency (MHz)	Resolution Bandwidth (kHz)	Video Bandwidth (kHz)	Occupied Bandwidth (kHz)
Bottom	824.2	3.0	10.0	242.485
Middle	836.6	3.0	10.0	244.489
Top	848.8	3.0	10.0	236.473

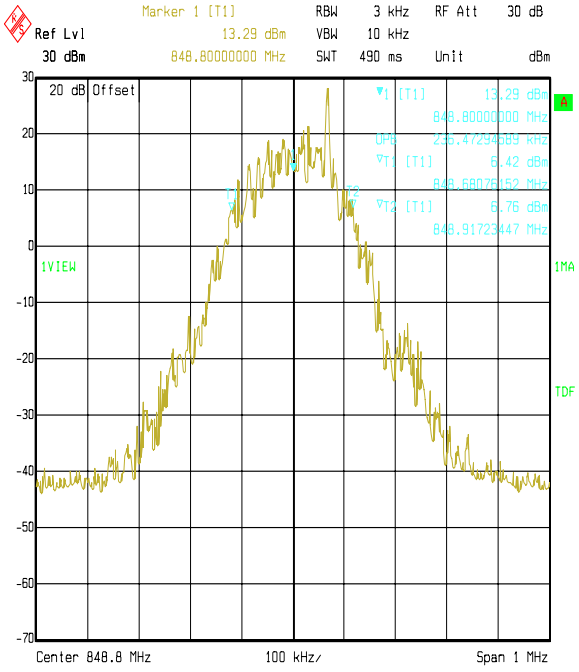
Transmitter Occupied Bandwidth: Section 2.1049 (Continued)



Title: 47892JD02 Psion Teklogix EUT: 7535 FCC Part 22&24
Comment A: Transmitter Occupied Bandwidth Bottom Channel
Date: 18.JAN.2006 12:29:20



Title: 47892JD02 Psion Teklogix EUT: 7535 FCC Part 22&24
Comment A: Transmitter Occupied Bandwidth Middle Channel
Date: 18.JAN.2006 12:33:00



Title: 47892JD02 Psion Teklogix EUT: 7535 FCC Part 22&24
Comment A: Transmitter Occupied Bandwidth Top Channel
Date: 18.JAN.2006 12:38:18

Note: The occupied bandwidth is measured using the internal OBW function of the measurement analyser. The analyser automatically configures the measurement bandwidths to make an accurate measurement. The results can be observed in the right hand corner of the graphs.

7.2.8. Transmitter Out of Band Radiated Emissions: Section 2.1053 & 22.917

The EUT was configured as for transmitter radiated emission – Part 22 testing as described in section 9 of this report.

Tests were performed to identify the maximum transmitter radiated emission levels.

Results:

Bottom Channel

Frequency (MHz)	Peak Emission Level (dBm)	Limit (dBm)	Margin (dB)	Result
1648.199	-31.2	-13.0	18.2	Complied

Middle Channel

Frequency (MHz)	Peak Emission Level (dBm)	Limit (dBm)	Margin (dB)	Result
1673.280	-27.6	-13.0	14.6	Complied

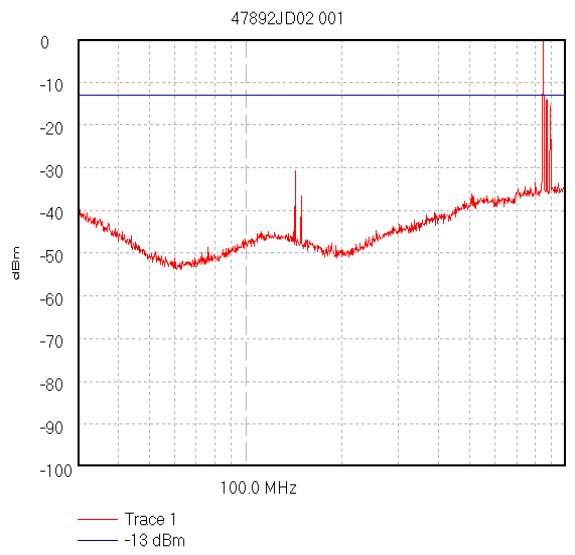
Top Channel

Frequency (MHz)	Peak Emission Level (dBm)	Limit (dBm)	Margin (dB)	Result
1697.505	-25.5	-13.0	12.5	Complied

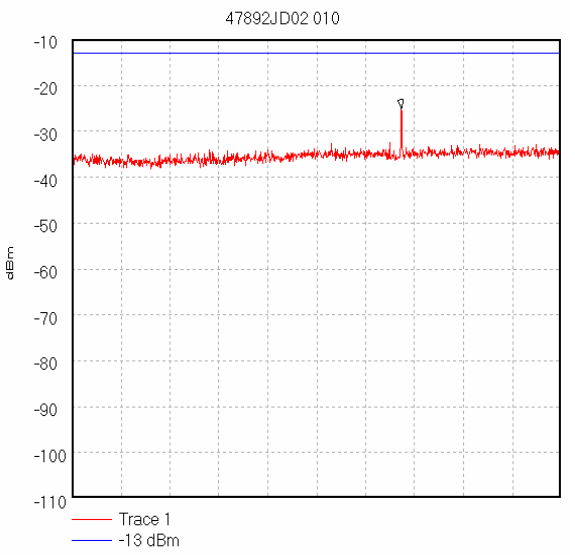
Note(s):

1. *The emission shown in plot 47892JD02 001 at 881.600 MHz and 893.800 MHz emanates from the GSM test Set and not the EUT, because the emission is not from the EUT, no level has been rewarded in the preceding results table.*

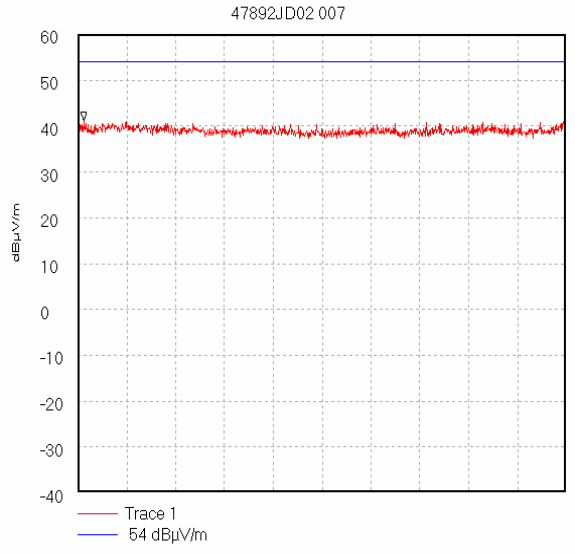
Transmitter Out of Band Radiated Emissions: Section 2.1053 & 22.917 (Continued)



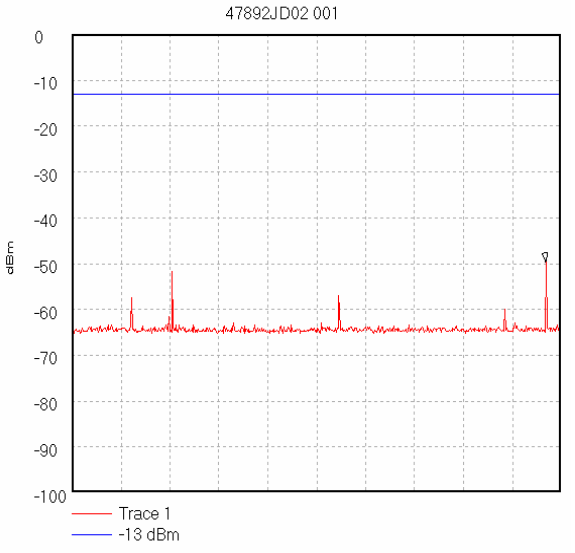
Start 30.0 MHz; Stop 1.0 GHz - Log Scale
Ref 0 dBm; Ref Offset 11.8 dB; 10 dB/div
RBW 120.0 kHz; VBW 100.0 kHz; Att 30 dB; Swp 480.0 mS
Marker 849.048 MHz, 3.98 dBm
Display Line: -13 dBm; ; Limit Test Failed
Transducer Factors: A1037
1/13/2006 10:19:57 AM



Start 1.0 GHz; Stop 2.0 GHz
Ref -10 dBm; Ref Offset 13.0 dB; 10 dB/div
RBW 1.0 MHz; VBW 1.0 MHz; Att 10 dB; Swp 60.0 mS
Peak 1.673 GHz, -25.15 dBm
Display Line: -13 dBm;
Transducer Factors: 1 to 2
1/13/2006 1:41:40 PM



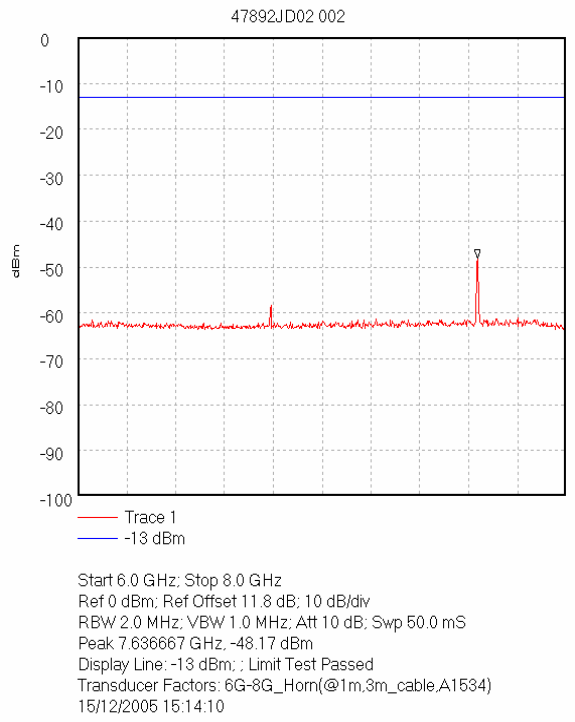
Start 2.0 GHz; Stop 4.0 GHz
Ref 60 dBµV/m; Ref Offset 0.0 dB; 10 dB/div
RBW 1000.0 kHz; VBW 1.0 MHz; Att 0 dB; Swp 20.0 mS
Peak 2.024 GHz, 41.09 dBµV/m
Limit/Mask: ; Limit Test Passed
Transducer Factors: 2 to 4
1/13/2006 12:49:44 PM

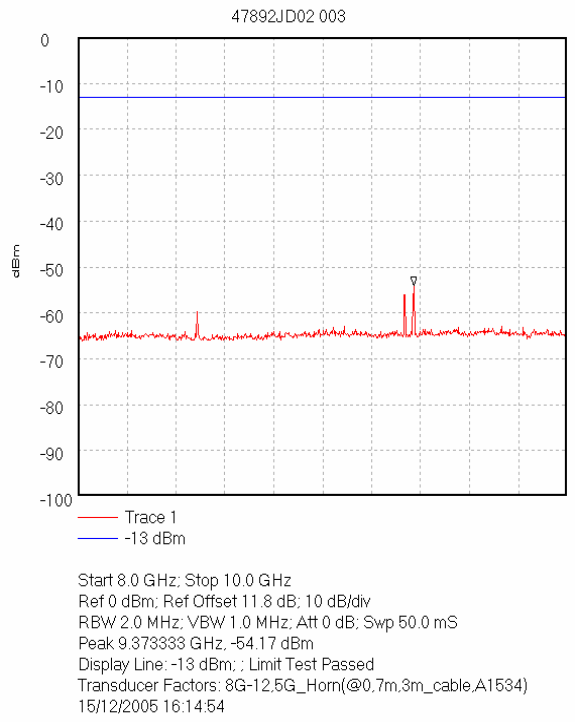


Centre 5.0 GHz; Span 2.0 GHz
Ref 0 dBm; Ref Offset 11.8 dB; 10 dB/div
RBW 2.0 MHz; VBW 1.0 MHz; Att 10 dB; Swp 50.0 mS
Peak 5.936667 GHz, -49.67 dBm
Display Line: -13 dBm; ; Limit Test Passed
Transducer Factors: 4G-6G_Horn(@1m,3m_cable.A1534)
15/12/2005 14:39:34

Note: These plots are pre-scans and for indication purposes only. For final measurements, see accompanying tables.

Transmitter Out of Band Radiated Emissions: Section 2.1053 & 22.917 (Continued)





Note: These plots are pre-scans and for indication purposes only. For final measurements, see accompanying tables.

7.2.9. Transmitter Radiated Emissions at Band Edges: Section 2.1053/22.917

The EUT was configured as for transmitter radiated emission – Part 22 testing described in section 9 of this report.

Tests were performed to identify the maximum emission level at the band edges of the frequency block that the EUT will operate over.

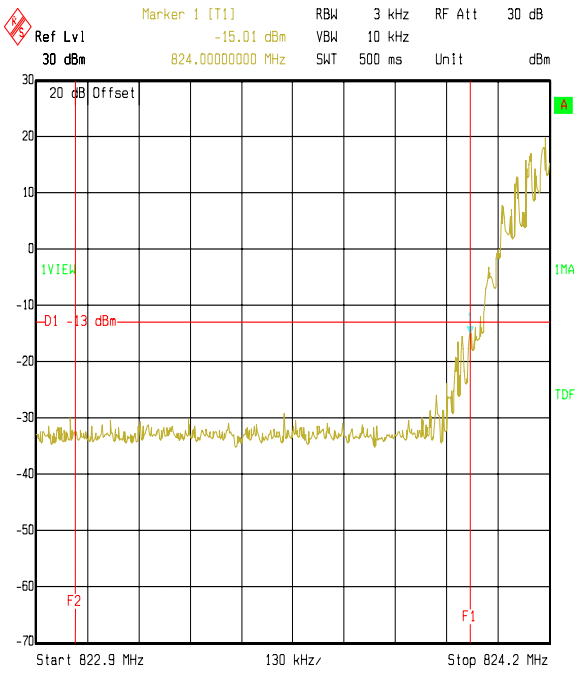
Results:

Bottom Band Edge

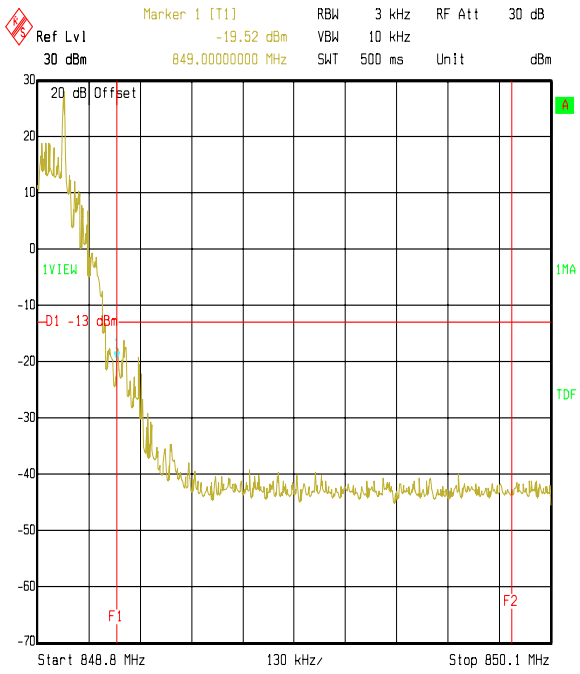
Frequency (MHz)	Peak Emission Level (dBm)	Limit (dBm)	Margin (dB)	Result
824	-15.0	-13.0	2.0	Complied

Top Band Edge

Frequency (MHz)	Peak Emission Level (dBm)	Limit (dBm)	Margin (dB)	Result
849	-19.5	-13.0	6.5	Complied



Title: 47892JD02 Psion Teklogix EUT: 7535 FCC Part 22&24
Comment A: Transmitter Radiated Emissions at Bottom Band Edge
Date: 18.JAN.2006 12:22:45



Title: 47892JD02 Psion Teklogix EUT: 7535 FCC Part 22&24
Comment A: Transmitter Radiated Emissions at Top Band Edge
Date: 18.JAN.2006 12:16:23

7.3. Test Results FCC Part 24 (Subpart E)

7.3.1. Idle Mode AC Conducted Spurious Emissions: Section 15.107

The EUT was configured as for ac conducted emission measurements as described in section 9 of this report.

Tests were performed to identify the maximum emissions levels present on the ac mains line of the EUT.

Results:

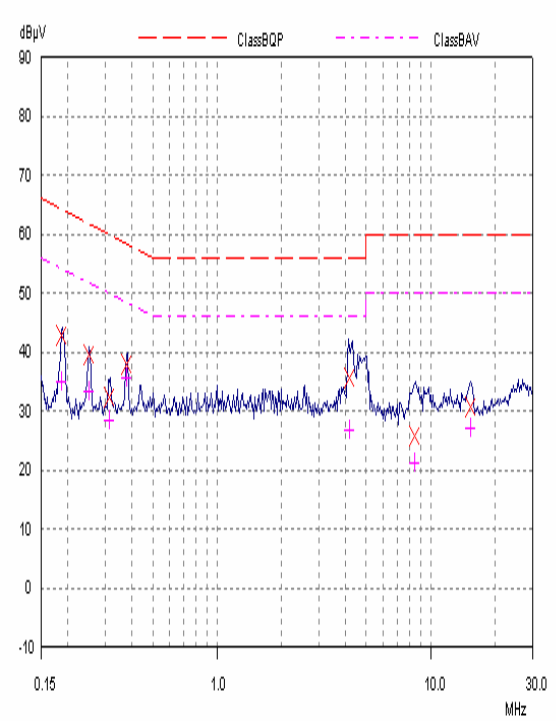
Quasi-Peak Detector Measurements on Live and Neutral Lines

Frequency (MHz)	Line	Level (dBμV)	Limit (dBμV)	Margin (dB)	Result
0.18782	Neutral	42.67	64.13	21.46	Complied
0.25141	Neutral	39.57	61.71	22.14	Complied
0.31454	Neutral	32.31	59.85	27.54	Complied
0.37685	Neutral	37.99	58.35	20.36	Complied
4.19565	Live	35.71	56.00	20.26	Complied
8.39425	Neutral	35.83	60.00	34.17	Complied
15.35108	Neutral	30.81	60.00	29.19	Complied

Average Detector Measurements on Live and Neutral Lines

Frequency (MHz)	Line	Level (dBμV)	Limit (dBμV)	Margin (dB)	Result
0.18782	Neutral	34.82	54.13	19.31	Complied
0.25141	Neutral	33.19	51.71	18.52	Complied
0.31454	Live	28.52	49.85	21.33	Complied
0.37685	Neutral	35.48	48.35	12.87	Complied
4.19565	Live	26.74	46.00	19.26	Complied
8.39425	Neutral	31.13	50.00	28.87	Complied
15.35108	Neutral	27.10	50.00	22.90	Complied

Idle Mode AC Conducted Spurious Emissions: Section 15.107 (Continued)



Note: This plot is a pre-scan and for indication purposes only. For final measurements, see accompanying tables.

7.3.2. Idle Mode Radiated Spurious Emissions: Section 15.109 - Electric Field Strength Measurements (Frequency Range: 30 to 1000 MHz)

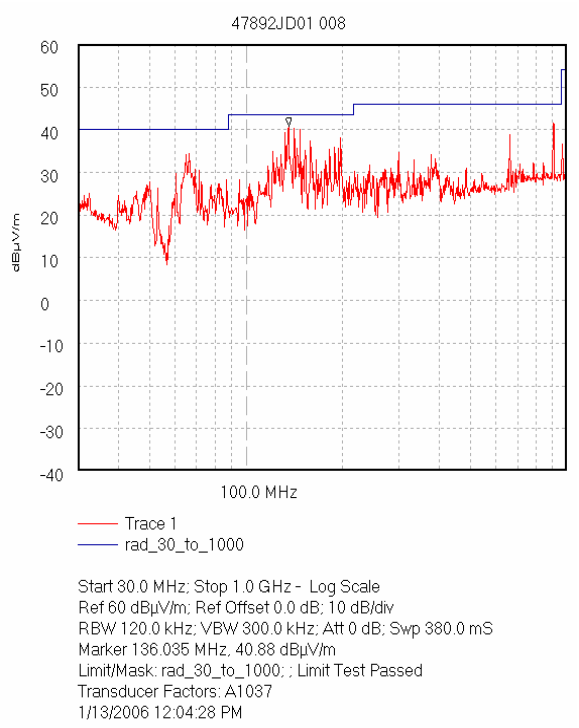
The EUT was configured as for receiver radiated emission – Part 24 testing as described in section 9 of this report.

Tests were performed to identify the maximum receiver or standby radiated emission levels.

Results:

Frequency (MHz)	Antenna Polarity	Quasi Peak Level (dBμV/m)	Limit (dBμV/m)	Margin (dB)	Result
40.155	Vertical	18.3	40.0	21.7	Complied
49.344	Vertical	16.3	40.0	23.7	Complied
52.842	Vertical	14.6	40.0	25.4	Complied
66.302	Vertical	13.1	40.0	26.9	Complied
71.176	Vertical	12.7	40.0	27.3	Complied
120.841	Vertical	26.8	43.5	16.7	Complied
134.777	Vertical	24.1	43.5	19.4	Complied
136.396	Vertical	14.8	43.5	28.7	Complied
152.738	Vertical	27.5	43.5	16.0	Complied
158.745	Vertical	26.6	43.5	16.9	Complied
182.712	Vertical	24.4	43.5	19.1	Complied
190.204	Vertical	14.0	43.5	29.5	Complied
320.508	Vertical	17.7	46.0	28.3	Complied
378.390	Vertical	22.0	46.0	24.0	Complied
483.362	Horizontal	27.8	46.0	18.2	Complied

Idle Mode Radiated Spurious Emissions: Section 15.109 - Electric Field Strength Measurements (Frequency Range: 30 to 1000 MHz) (Continued)



Note: This plot is a pre-scan and for indication purposes only. For final measurements, see accompanying tables.

7.3.3. Idle Mode Radiated Spurious Emissions: Section 15.109 - Electric Field Strength Measurements (Frequency Range: 1 to 10 GHz)

Results:

Peak Level:

Frequency (MHz)	Antenna Polarity	Detector Level (dBμV)	Transducer (dB)	Actual Level (dBμV/m)	Limit (dBμV/m)	Margin (dB)	Result
4245.017	Vertical	53.0	-17.2	35.8	74.00	38.2	Complied
9358.470	Horizontal	59.7	-13.4	46.3	74.00	27.7	Complied

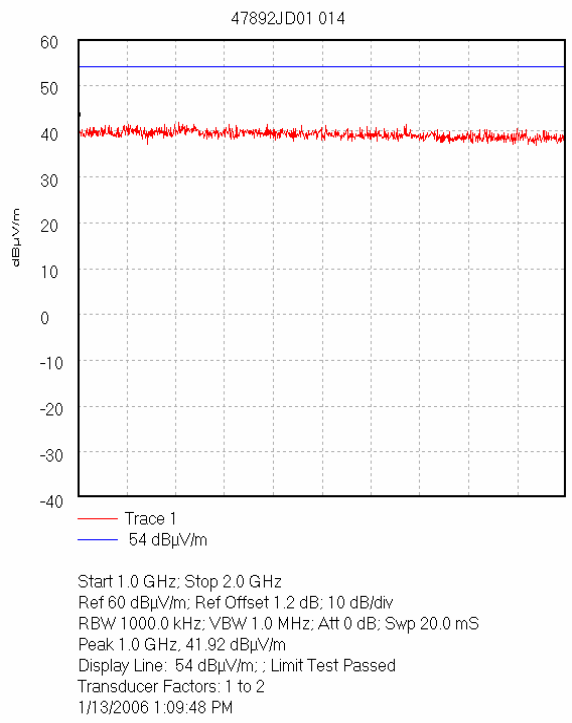
Average Level:

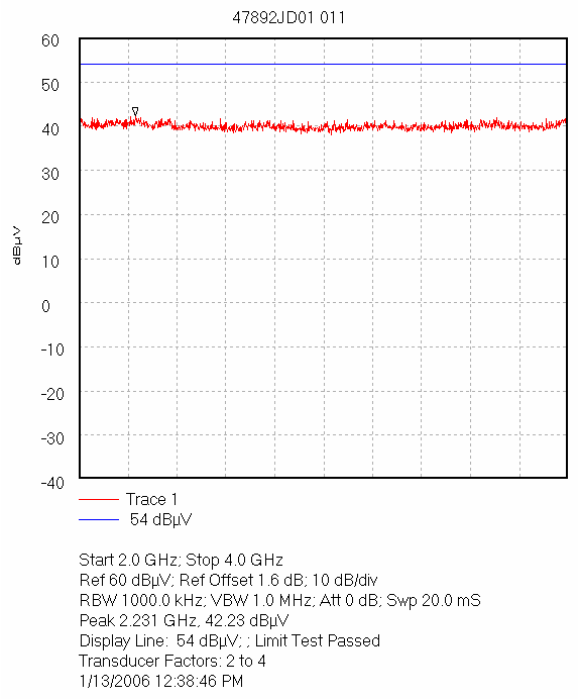
Frequency (MHz)	Antenna Polarity	Detector Level (dBμV)	Transducer (dB)	Actual Level (dBμV/m)	Limit (dBμV/m)	Margin (dB)	Result
4245.017	Vertical	35.5	-17.2	18.3	54.00	35.7	Complied
9358.470	Horizontal	31.2	-13.4	17.8	54.00	36.2	Complied

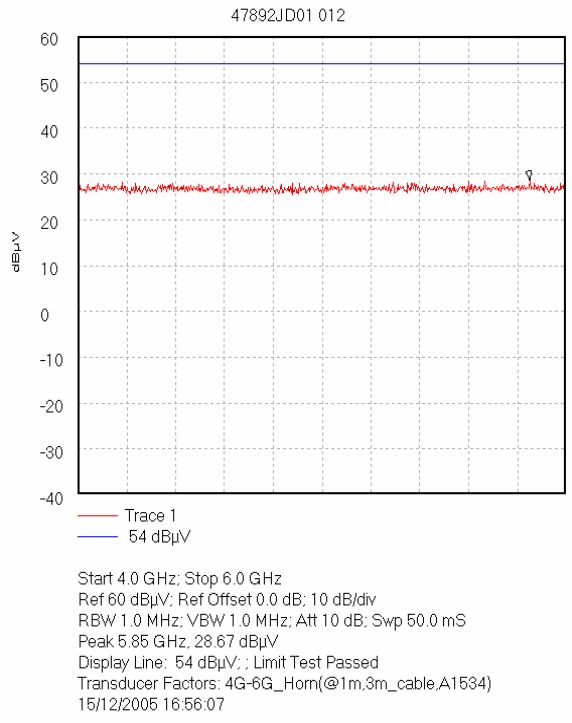
Note(s):

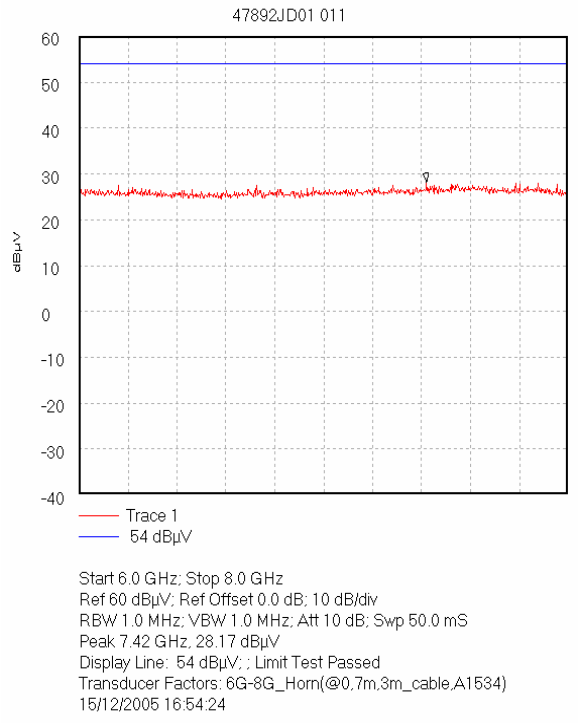
1. The transducer factor incorporates the antenna factor, cables losses, pre-amplifier gain and attenuations.

Idle Mode Radiated Spurious Emissions: Section 15.109 - Electric Field Strength Measurements (Frequency Range: 1 to 10 GHz) (Continued)





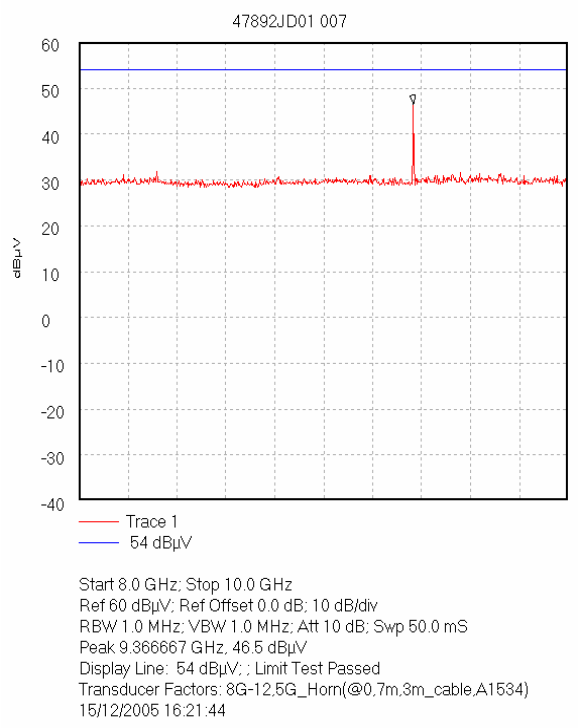




Note: These plots are pre-scans and for indication purposes only. For final measurements, see accompanying tables.

Test of: **Psion Teklogix UK Ltd.**
7535 + RA3020
To: **FCC Part 22: 2004 (Subpart H) and FCC Part 24: 2004 (Subpart E)**

Idle Mode Radiated Spurious Emissions: Section 15.109 - Electric Field Strength Measurements (Frequency Range: 1 to 10 GHz) (Continued)



Note: These plots are pre-scans and for indication purposes only. For final measurements, see accompanying tables.

7.3.4. Transmitter Effective Isotropic Radiated Power (EIRP): Section 24.232

The EUT was configured as for effective isotropic radiated power as described in section 9 of this report.

Tests were performed to identify the maximum effective isotropic radiated power (EIRP).

Results:

Channel	Measured Frequency (MHz)	Antenna Polarity	Maximum Transmitter EIRP (dBm)	Limit EIRP (dBm)	Margin (dB)	Result
Bottom	1850.20	Vertical	30.7	33.0	2.3	Complied
Middle	1879.80	Vertical	30.5	33.0	2.5	Complied
Top	1909.80	Vertical	30.9	33.0	2.1	Complied

Note(s):

1. *Testing was performed with the EUT operating on GPRS and PCS 1900 mode. The EIRP measured for GPRS mode (Top Channel) was 30.4 dBm and EIRP measured for PCS 1900 mode (Top Channel was 30.9 dBm. As the EIRP for PCs 1900 mode is higher than GPRS mode, all the results recorded in the preceding table present the EIRP measurement for PCS 1900 mode.*

7.3.5. Transmitter Frequency Stability (Temperature Variation): Section 24.235

The EUT was configured as for frequency stability – Part 24 measurements as described in section 9 of this report.

Tests were performed to identify the maximum frequency error of the EUT with variations in ambient temperature.

Results:

Bottom Channel (1850.2 MHz)

Temperature (ºC)	Frequency Error (Hz)	Measured Frequency (MHz)	Lower Band Edge Limit (MHz)	Margin (MHz)	Result
-30	11	1850.200011	1850.00	0.200011	Complied
-20	17	1850.199983	1850.00	0.199983	Complied
-10	20	1850.200020	1850.00	0.200020	Complied
0	30	1850.199970	1850.00	0.199970	Complied
10	7	1850.199993	1850.00	0.1999993	Complied
20	7	1850.200007	1850.00	0.200007	Complied
30	27	1850.199973	1850.00	0.199973	Complied
40	42	1850.199958	1850.00	0.199958	Complied
50	53	1850.199947	1850.00	0.199947	Complied

Transmitter Frequency Stability (Temperature Variation): Section 24.235 (Continued)

Results:

Top Channel (1909.8 MHz)

Temperature (ºC)	Frequency Error (Hz)	Measured Frequency (MHz)	Upper Band Edge Limit (MHz)	Margin (MHz)	Result
-30	20	1909.800020	1910.00	0.199980	Complied
-20	11	1909.799989	1910.00	0.200011	Complied
-10	13	1909.799987	1910.00	0.200013	Complied
0	20	1909.799980	1910.00	0.200020	Complied
10	27	1909.799973	1910.00	0.200027	Complied
20	2	1909.800002	1910.00	0.199998	Complied
30	25	1909.799975	1910.00	0.200025	Complied
40	23	1909.799977	1910.00	0.200023	Complied
50	31	1909.799969	1910.00	0.200031	Complied

7.3.6. Transmitter Frequency Stability (Voltage Variation): Section 24.235

The EUT was configured as for frequency stability – Part 24 measurements as described in section 9 of this report.

Tests were performed to identify the maximum frequency error of the EUT with variations in nominal operating voltage.

Results:

Bottom Channel (1850.2 MHz)

Supply Voltage (V)	Frequency Error (Hz)	Measured Frequency (MHz)	Lower Band Edge Limit (MHz)	Margin (MHz)	Result
7.1	25	1850.199975	1850	0.199975	Complied
8.4	22	1850.199978	1850	0.199978	Complied

Top Channel (1909.8 MHz)

Supply Voltage (V)	Frequency Error (Hz)	Measured Frequency (MHz)	Lower Band Edge Limit (MHz)	Margin (MHz)	Result
7.1	27	1909.799973	1910.0	0.200027	Complied
8.4	2	1909.799998	1910.0	0.200002	Complied

7.3.7. Transmitter Occupied Bandwidth: Section 24.238

The EUT was configured as for occupied bandwidth measurements as described in section 9 of this report.

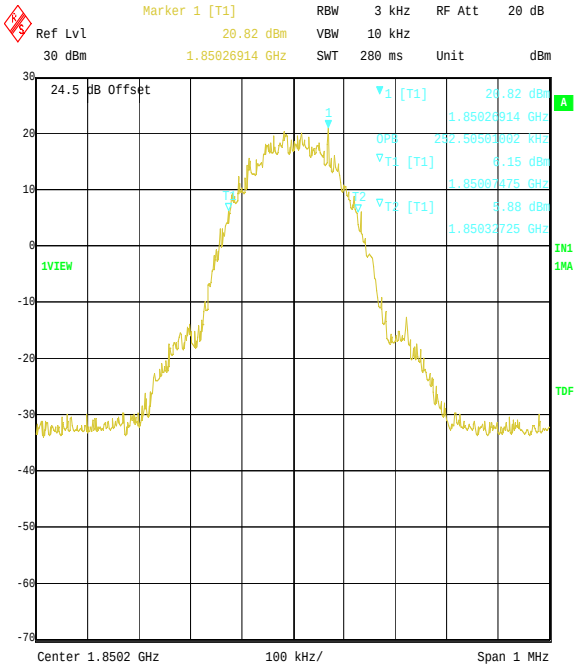
Tests were performed to identify the maximum bandwidth occupied by the fundamental frequency of the EUT.

Results:

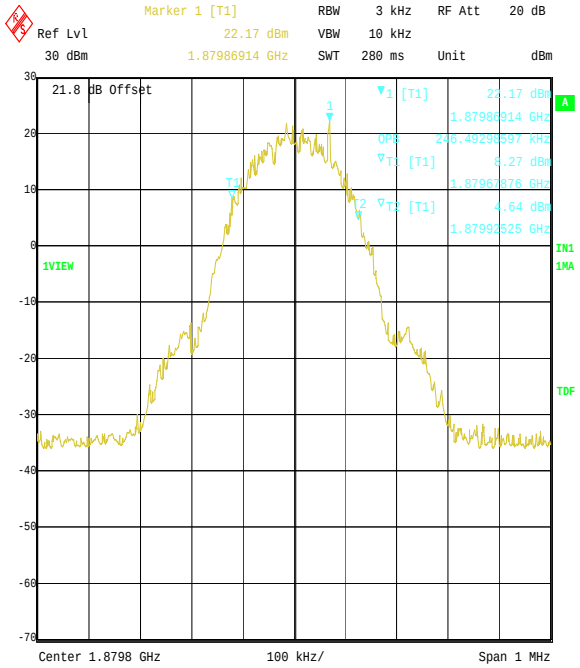
Channel	Frequency (MHz)	Resolution Bandwidth (kHz)	Video Bandwidth (kHz)	Occupied Bandwidth (kHz)
Bottom	1850.2	3.0	10.0	252.505
Middle	1879.8	3.0	10.0	246.493
Top	1909.8	3.0	10.0	250.501

Test of: **Psion Teklogix UK Ltd.**
7535 + RA3020
To: **FCC Part 22: 2004 (Subpart H) and FCC Part 24: 2004 (Subpart E)**

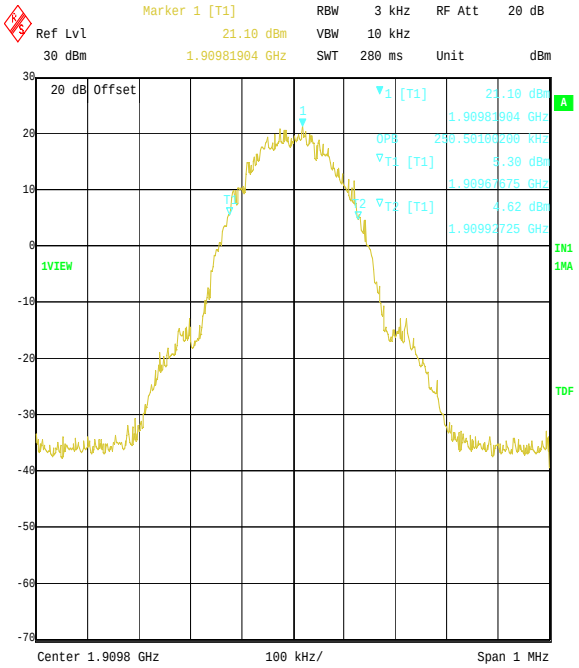
Transmitter Occupied Bandwidth: Section 24.238 (Continued)



Title: 47892JD01 Psion Teklogik EUT:7535
Comment A: Transmitter Occupied Bandwidth Bottom Channel
Date: 16.JAN.2006 16:17:26



Title: 47892JD01 Psion Teklogik EUT:7535
Comment A: Transmitter Occupied Bandwidth Middle Channel
Date: 16.JAN.2006 16:13:56



Title: 47892JD01 Psion Teklogik EUT:7535
Comment A: Transmitter Occupied Bandwidth Top Channel
Date: 16.JAN.2006 16:08:01

Note: The occupied bandwidth is measured using the internal OBW function of the measurement analyser. The analyser automatically configures the measurement bandwidths to make an accurate measurement. The results can be observed in the right hand corner of the graphs.

7.3.8. Transmitter Out of Band Radiated Emissions: Section 2.1053 & 24.238

The EUT was configured as for transmitter radiated emission – Part 24 testing as described in section 9 of this report.

Tests were performed to identify the maximum transmitter radiated emission levels.

Results:

Bottom Channel

Frequency (MHz)	Peak Emission Level (dBm)	Limit (dBm)	Margin (dB)	Result
3700.530	-31.4	-13.0	18.4	Complied

Middle Channel

Frequency (MHz)	Peak Emission Level (dBm)	Limit (dBm)	Margin (dB)	Result
3759.463	-29.2	-13.0	16.2	Complied

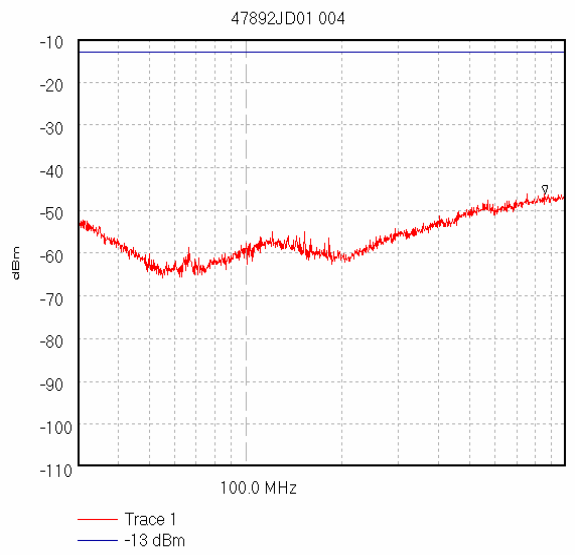
Top Channel

Frequency (MHz)	Peak Emission Level (dBm)	Limit (dBm)	Margin (dB)	Result
3819.609	-28.4	-13.0	15.4	Complied

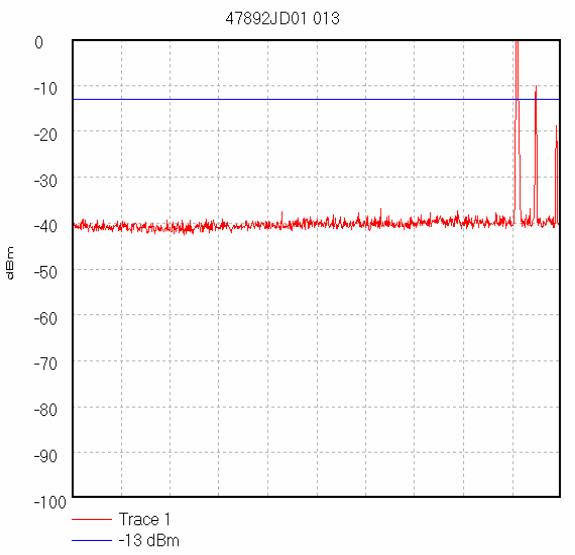
Note(s):

1. *The emission shown in plot 47892JD01 013 at 1948.8 MHz and 1991.1 MHz emanates from the GSM test set and not the EUT. Because the emission is not from the EUT, no level has been recorded in the preceding results table/.*

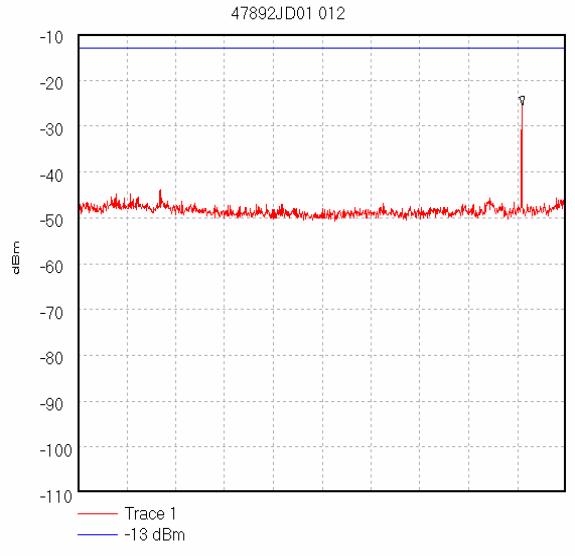
Transmitter Out of Band Radiated Emissions: Section 2.1053 & 24.238 (Continued)



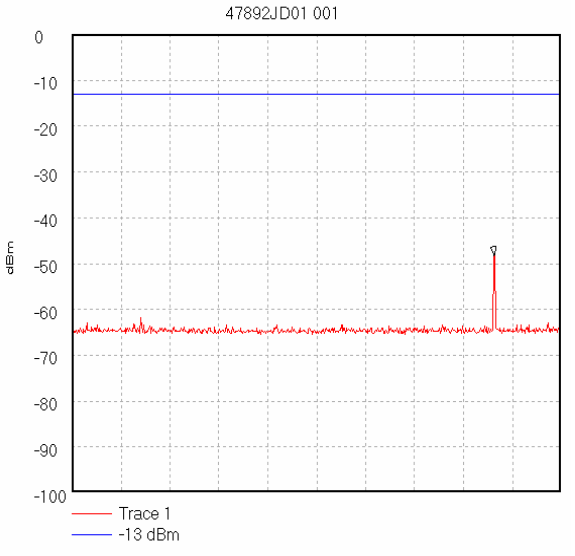
Start 30.0 MHz; Stop 1.0 GHz - Log Scale
Ref -10 dBm; Ref Offset 11.8 dB; 10 dB/div
RBW 120.0 kHz; VBW 300.0 kHz; Att 10 dB; Swp 380.0 mS
Peak 859.03 MHz, -46.18 dBm
Display Line: -13 dBm; ; Limit Test Passed
Transducer Factors: A1037
1/13/2006 11:00:03 AM



Start 1.0 GHz; Stop 2.0 GHz
Ref 0 dBm; Ref Offset 13.0 dB; 10 dB/div
RBW 1.0 MHz; VBW 1.0 MHz; Att 0 dB; Swp 20.0 mS
Peak 1.911 GHz, 3.98 dBm
Display Line: -13 dBm;
Transducer Factors: 1 to 2
1/13/2006 1:02:06 PM



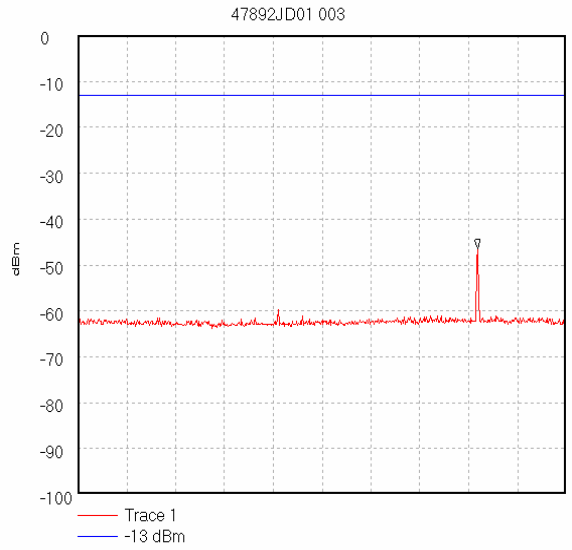
Start 2.0 GHz; Stop 4.0 GHz
Ref -10 dBm; Ref Offset 13.4 dB; 10 dB/div
RBW 1000.0 kHz; VBW 1.0 MHz; Att 0 dB; Swp 20.0 mS
Peak 3.82 GHz, -25.41 dBm
Display Line: -13 dBm; ; Limit Test Passed
Transducer Factors: 2 to 4
1/13/2006 12:55:27 PM



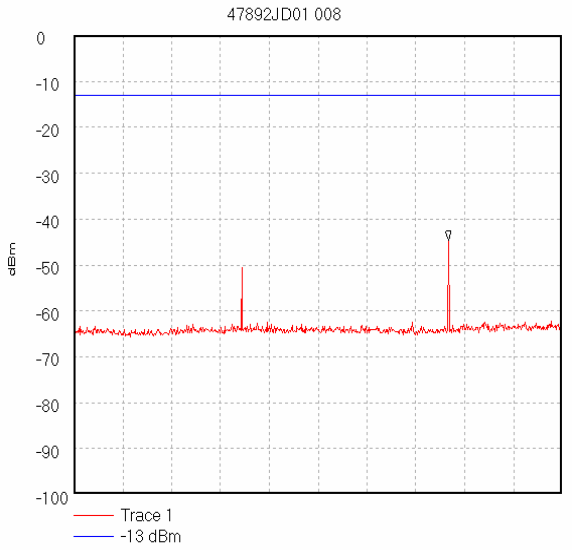
Start 4.0 GHz; Stop 6.0 GHz
Ref 0 dBm; Ref Offset 11.8 dB; 10 dB/div
RBW 2.0 MHz; VBW 1.0 MHz; Att 10 dB; Swp 50.0 mS
Peak 5.726667 GHz, -48.33 dBm
Display Line: -13 dBm; ; Limit Test Passed
Transducer Factors: 4G-6G_Horn(@1m,3m_cable,A1534)
15/12/2005 14:46:06

Note: These plots are pre-scans and for indication purposes only. For final measurements, see accompanying tables.

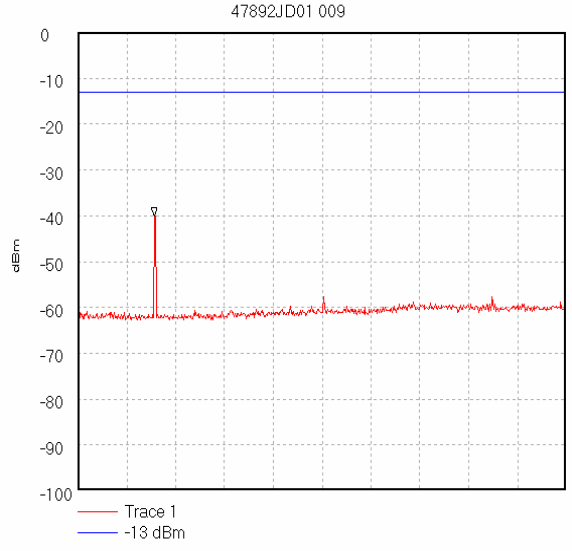
Transmitter Out of Band Radiated Emissions: Section 2.1053 & 24.238 (Continued)



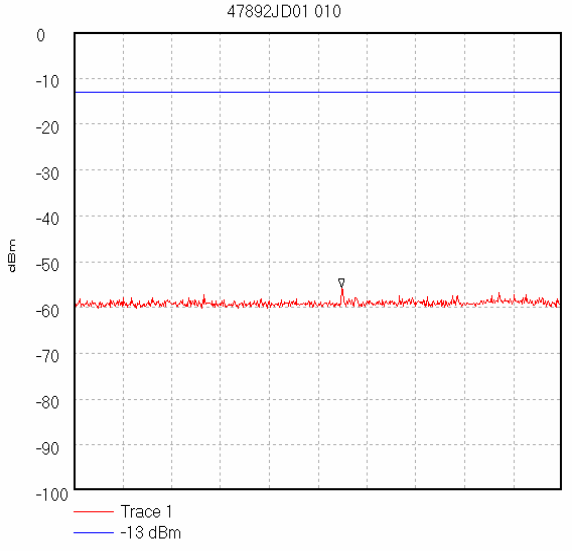
Start 6.0 GHz; Stop 8.0 GHz
Ref 0 dBm; Ref Offset 11.8 dB; 10 dB/div
RBW 2.0 MHz; VBW 1.0 MHz; Att 10 dB; Swp 50.0 mS
Peak 7.636667 GHz, -46.5 dBm
Display Line: -13 dBm; ; Limit Test Passed
Transducer Factors: 6G-8G_Horn(@1m,3m_cable,A1534)
15/12/2005 15:09:41



Start 8.0 GHz; Stop 12.5 GHz
Ref 0 dBm; Ref Offset 11.8 dB; 10 dB/div
RBW 1.0 MHz; VBW 1.0 MHz; Att 10 dB; Swp 90.0 mS
Peak 11.45 GHz, -44.67 dBm
Display Line: -13 dBm; ; Limit Test Passed
Transducer Factors: 8G-12.5G_Horn(@0.7m,3m_cable,A1534)
15/12/2005 16:40:26



Start 12.5 GHz; Stop 18.0 GHz
Ref 0 dBm; Ref Offset 11.8 dB; 10 dB/div
RBW 1.0 MHz; VBW 1.0 MHz; Att 10 dB; Swp 110.0 mS
Peak 13.361667 GHz, -40.17 dBm
Display Line: -13 dBm; ; Limit Test Passed
Transducer Factors: 12.5-18G_Horn(@0.5m,3m_cable,A1534)
15/12/2005 16:45:57



Start 18.0 GHz; Stop 20.0 GHz
Ref 0 dBm; Ref Offset 11.8 dB; 10 dB/div
RBW 1.0 MHz; VBW 1.0 MHz; Att 10 dB; Swp 50.0 mS
Peak 19.096667 GHz, -55.67 dBm
Display Line: -13 dBm; ; Limit Test Passed
Transducer Factors: 18-26.5_Horn(@0.5m,3m_cable,A1534)
15/12/2005 16:49:35

Note: These plots are pre-scans and for indication purposes only. For final measurements, see accompanying tables.

Transmitter Out of Band Radiated Emissions: Section 2.1053 & 24.238 (Continued)

Integrated Power Over 1 MHz Strip Band: 1911 to 1912 MHz

1st 1 MHz block immediately outside adjacent frequency block

100 kHz Strip Number	Peak Power (nW/100 kHz)	100 kHz Strip Number	Peak Power (nW/100 kHz)
1	1049	6	925
2	874	7	840
3	816	8	949
4	1040	9	893
5	1018	10	746
Total Peak Power:	9150 nW/MHz		

Integrated Power Over 1 MHz Strip Band: 1912 to 1913 MHz

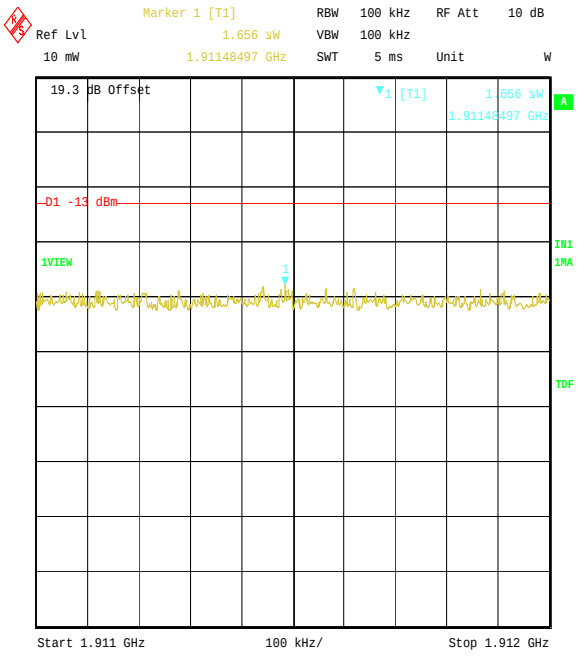
2nd 1 MHz block immediately outside adjacent frequency block

100 kHz Strip Number	Peak Power (nW/100 kHz)	100 kHz Strip Number	Peak Power (nW/100 kHz)
1	1431	6	830
2	1154	7	1156
3	886	8	1030
4	917	9	1011
5	1186	10	1487
Total Peak Power:	11070 nW/MHz		

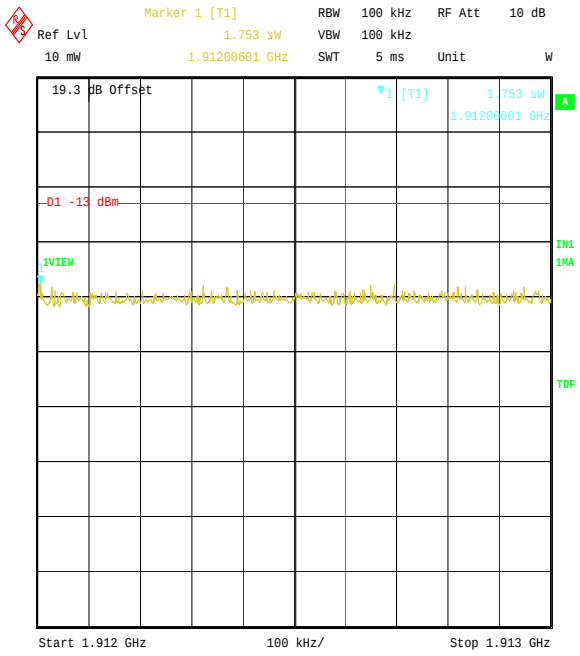
Results:

Band (MHz)	Peak Power (nW/MHz)	Peak Power (dBm/MHz)	Limit (dBm/MHz)	Margin (dB)	Status
1911 to 1912	9150	-20.4	-13.0	7.4	Complied
1912 to 1913	11070	-19.6	-13.0	6.6	Complied

Transmitter Out of Band Radiated Emissions: Section 2.1053 & 24.238 (Continued)



Title: 47892JD01 Psion Teklogik EUT:7535
Comment A: Transmitter Out of Band Radiated Emissions Integrated Power
Over 1MHz Strip Band
Date: 16.JAN.2006 15:52:55



Title: 47892JD01 Psion Teklogik EUT:7535
Comment A: Transmitter Out of Band Radiated Emissions Integrated Power
Over 1MHz Strip Band
Date: 16.JAN.2006 15:56:18

Note: These plots are pre-scans and for indication purposes only. For final measurements, see accompanying tables.

7.3.9. Transmitter Radiated Emissions at Band Edges: Section 2.1053 & 24.238

The EUT was configured as for transmitter radiated emissions testing described in section 9 of this report.

Tests were performed to identify the maximum emissions level at the band edges of the frequency block that the EUT will operate over.

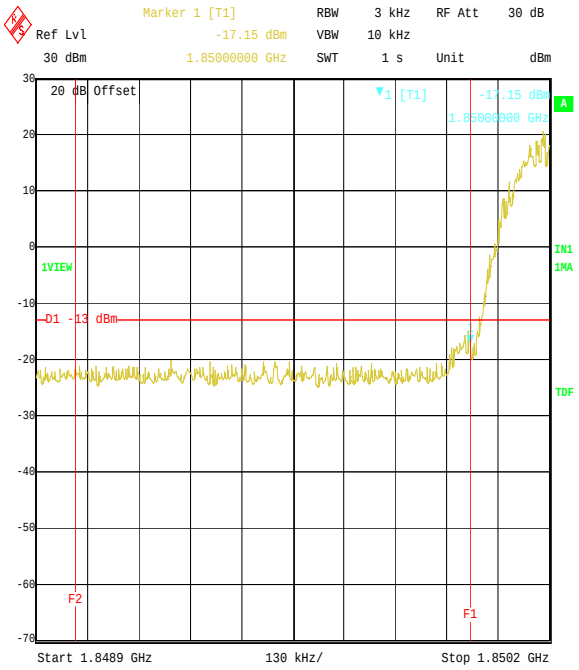
Results:

Bottom Band Edge

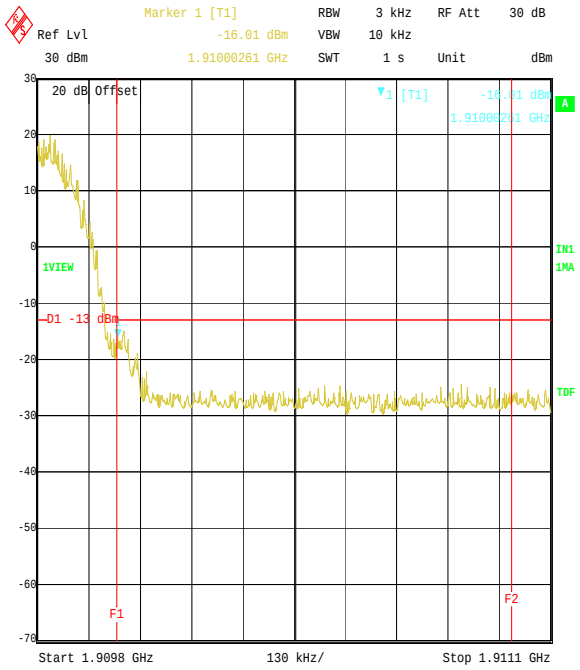
Frequency (MHz)	Spurious Emission (dBm)	Limit (dBm)	Margin (dB)	Result
1850	-17.2	-13.0	4.2	Complied

Top Band Edge

Frequency (MHz)	Peak Emission Level (dBm)	Limit (dBm)	Margin (dB)	Result
1910	-16.0	-13.0	3.0	Complied



Title: 47892JD01 Psion Teklogik EUT:7535
Comment A: Radiated Emissions at Bottom Band Edge
Date: 16.JAN.2006 15:32:40



Title: 47892JD01 Psion Teklogik EUT:7535
Comment A: Radiated Emissions at Top Band Edge
Date: 16.JAN.2006 15:24:23

8. Measurement Uncertainty

No measurement or test can ever be perfect and the imperfections give rise to error of measurement in the results. Consequently, the result of a measurement is only an approximation to the value of the measurand (the specific quantity subject to measurement) and is only complete when accompanied by a statement of the uncertainty of the approximation.

The expression of uncertainty of a measurement result allows realistic comparison of results with reference values and limits given in specifications and standards.

The uncertainty of the result may need to be taken into account when interpreting the measurement results.

The reported expanded uncertainties below are based on a standard uncertainty multiplied by an appropriate coverage factor, such that a confidence level of approximately 95% is maintained. For the purposes of this document “approximately” is interpreted as meaning “effectively” or “for most practical purposes”.

Measurement Type	Range	Confidence Level (%)	Calculated Uncertainty
AC Conducted Spurious Emissions	0.15 MHz to 30 MHz	95%	±3.25 dB
Effective Isotropic Radiated Power (EIRP)	Not applicable	95%	±2.94 dB
Frequency Stability	Not applicable	95%	±11.37 Hz
Minimum Bandwidth	Not applicable	95%	±0.12%
Occupied Bandwidth	1850 to 1910 MHz	95%	±0.12%
Radiated Spurious Emissions	30 MHz to 1000 MHz	95%	±5.26 dB
Radiated Spurious Emissions	1 GHz to 26 GHz	95%	±2.94 dB

The methods used to calculate the above uncertainties are in line with those recommended within the various measurement specifications. Where measurement specifications do not include guidelines for the evaluation of measurement uncertainty, the published guidance of the appropriate accreditation body is followed.

9. Measurement Methods

9.1. Effective Radiated Power (ERP)

ERP measurements were performed in accordance with the standard, against appropriate limits.

The ERP was measured with the EUT arranged on a non-conducting turntable on a standard test site compliant with ANSI C63.4 – 2001 Clause 5.4. The transmitter was fitted with an integral antenna; as such all radiated tests were performed with the unit operating into the integral antenna.

The level of the ERP was measured using a spectrum analyser.

The test antenna was positioned in the horizontal plane. The EUT was oriented in the X plane. The test antenna was then raised and lowered until a maximum peak was observed. The turntable was then rotated through 360 degrees and the maximum peak reading obtained. The height search was then repeated to take into consideration the new angular position of the turntable. The maximum reading observed was then recorded. This procedure was then repeated with the EUT oriented in the Y and Z planes. The highest reading taken in all 3 planes was recorded. The entire procedure was then repeated with the test antenna set in the vertical polarity.

Once the final amplitude (maximised) had been obtained, the EUT was substituted with a substitution antenna. For ERP measurements a dipole antenna was used. The centre of the substitution antenna was set to approximately the same centre location as the EUT. The substitution antenna was set to the horizontal polarity. The substitution antenna was matched into a signal generator using a 6 dB or greater attenuator. The signal generator was tuned to the EUT's frequency under test.

The test antenna was then raised and lowered to obtain a maximum reading on the spectrum analyser. The level of the signal generator output was then adjusted until the maximum recorded EUT level was observed. The signal generator level was noted. This procedure was repeated with both test antenna and substitution antenna vertically polarised. The ERP was calculated as:-

ERP = Signal Generator Level - Cable Loss + Antenna Gain

Effective Radiated Power (ERP) (Continued)

Circumstances where the signal generator could not produce the desired power substitution was performed with the signal generator set to 0 dBm. The radiated signal was maximised as previously described. The level indicated on the measuring receiver was noted. The delta between this level and the maximum level for the EUT was calculated and also noted. The ERP of the signal generator was calculated using the above formulae. The recorded delta was added to the calculated ERP to obtain the substituted EUT ERP.

Delta (dB) = EUT – SG

Where :

EUT = spectrum analyser indicated EUT raw level

SG = spectrum analyser indicated signal generator raw level

The signal generator actual ERP is calculated as:

ERP SG= Signal Generator Level - Cable Loss + Antenna Gain

The EUT ERP is calculated as:

ERP EUT = ERP SG + Delta.

The test equipment settings for ERP measurements were as follows:

Receiver Function	Setting
Detector Type:	Peak
Mode:	Not applicable
Bandwidth:	≥ Emission Bandwidth
Amplitude Range:	100 dB
Sweep Time:	Coupled

9.2. Effective Isotropic Radiated Power (EIRP)

EIRP measurements were performed in accordance with the standard, against appropriate limits.

The EIRP was measured with the EUT arranged on a non-conducting turn table on a standard test site compliant with ANSI C63.4 – 2001 Clause 5.4. The transmitter was fitted with an integral antenna; therefore all radiated tests were performed with the unit operating into the integral antenna.

The level of the EIRP was measured using a spectrum analyser.

The test antenna was positioned in the horizontal plane. The EUT was oriented in the X plane. The test antenna was then raised and lowered until a maximum peak was observed. The turntable was then rotated through 360 degrees and the maximum peak reading obtained. The height search was then repeated to take into consideration the new angular position of the turntable. The maximum reading observed was then recorded. This procedure was then repeated with the EUT oriented in the Y and Z planes. The highest reading taken in all 3 planes was recorded. The entire procedure was then repeated with the test antenna set in the vertical polarity.

Once the final amplitude (maximised) had been obtained, the EUT was substituted with a substitution antenna. For EIRP measurements a Horn antenna whose gain was based on an isotropic antenna was used, ERP measurements were done using a dipole. The centre of the substitution antenna was set to approximately the same centre location as the EUT. The substitution antenna was set to the horizontal polarity. The substitution antenna was matched into a signal generator using a 6 dB or greater attenuator. The signal generator was tuned to the EUT's frequency under test.

The test antenna was then raised and lowered to obtain a maximum reading on the spectrum analyser. The level of the signal generator output was then adjusted until the maximum recorded EUT level was observed. The signal generator level was noted. This procedure was repeated with both test antenna and substitution antenna vertically polarised. The EIRP was calculated as:-

EIRP = Signal Generator Level - Cable Loss + Antenna Gain

All measurements were performed using broadband Horn antennas.

Effective Isotropic Radiated Power (EIRP) (Continued)

Circumstances where the signal generator could not produce the desired power substitution was performed with the signal generator set to 0 dBm. The radiated signal was maximised as previously described. The level indicated on the measuring receiver was noted. The delta between this level and the maximum level for the EUT was calculated and also noted. The EIRP of the signal generator was calculated using the above formulae. The recorded delta was added to the calculated EIRP to obtain the substituted EUT EIRP.

Delta (dB) = EUT – SG

where :

EUT = spectrum analyser indicated EUT raw level

SG = spectrum analyser indicated signal generator raw level

The signal generator actual EIRP is calculated as:

EIRP SG= Signal Generator Level - Cable Loss + Antenna Gain

The EUT EIRP is calculated as:

EIRP EUT = EIRP SG + Delta.

The test equipment settings for EIRP measurements were as follows:

Receiver Function	Setting
Detector Type:	Peak
Mode:	Not applicable
Bandwidth:	1 MHz
Amplitude Range:	100 dB
Sweep Time:	Coupled

9.3. FCC Part 2.1055: Frequency Stability

The EUT was situated within an environmental test chamber and connected directly to the GSM test set via an access port.

Measurements were performed with the EUT operating under extremes of temperature in 10 degree increments within the range -30 to 50 ºC.

Measurements were also performed at voltage extremes between the declared nominal supply voltage and at the declared endpoint voltage (for hand carried battery operated equipment) or by varying the primary supply voltage from 85% to 115% of the nominal value for all other equipment types.

The requirement was to determine the frequency stability of the device under specified environmental operating conditions.

Measurements were made on the top and bottom channels.

The EUT was switched off for a minimum of 30 minutes between each stage of testing while the environmental chamber stabilised at the next temperature within the stated temperature range.

The frequency error measured was converted to an error in ppm using the following formula as defined by TIA_EIA_603A :-

$$\text{ppm error} = \left(\frac{MCF_{MHz}}{ACF_{MHz}} - 1\right) * 10^6$$

where MCF_{MHz} is the measured carrier frequency in MHz
ACF_{MHz} is the assigned carrier frequency in MHz

The measured ppm had to be less then the relevant limits in order to comply.

9.4. Frequency Stability – Part 24

The EUT was situated within an environmental test chamber and connected directly to the GSM test set via an access port.

Measurements were performed with the EUT operating under extremes of temperature in 10 degree increments within the range -30 to 50 ºC.

Measurements were also performed at voltage extremes between the declared nominal supply voltage and at the declared endpoint voltage (for hand carried battery operated equipment) or by varying the primary supply voltage from 85% to 115% of the nominal value for all other equipment types.

The requirement was to determine the frequency stability of the device under specified environmental operating conditions and ensure they remained within specified operating parameters.

Measurements were made on the top and bottom channels.

The EUT was switched off for a minimum of 30 minutes between each stage of testing while the environmental chamber stabilised at the next temperature within the stated temperature range.

Once the environmental chamber had reached thermal equilibrium, the nominal frequency of the EUT was measured and recorded. The recorded frequency was compared to the applicants declared operating frequency band edges.

In order to show compliance, the measured frequency must remain within the declared frequency band.

The reported data shows the nominal frequency drift and its margin from the band edge. If this margin is positive, the result is compliant. If it goes negative, the result is a non-compliance. There is also a frequency graph presented offering the frequency variation around nominal frequency.

9.5. Occupied Bandwidth

The EUT was connected to a spectrum analyser enabled with an occupied bandwidth function and a GSM test set via a bi-directional coupler to its antenna port.

Measurements were performed to determine the occupied bandwidth in accordance with FCC Part 2.1049. The occupied bandwidth was measured from the fundamental emission at the bottom, middle and top channels.

As the EUT is a PCS phone, no modulation input port was available. A call was thus set up using the PCS/GSM simulator and using normal modulation. The Occupied Bandwidth was measured in this configuration.

The occupied bandwidth was measured using the built in occupied bandwidth function of the Rohde and Schwarz FSEB or ESIB spectrum analyser. It was set to measure the bandwidth where 99% of the signal power was contained. The analyser settings were set as per those outlined in the spectrum analyser user manual for this measurement, i.e., RBW $\geq$ 1% of occupied bandwidth. A value of 3 kHz was used.

9.6. AC Mains Conducted Emissions

AC mains conducted emission measurements were performed in accordance with the standard, against appropriate limits for each detector function.

The test was performed in a shielded enclosure with the equipment arranged as detailed in the standard on a wooden bench using the floor of the screened enclosure as the ground reference plane. The EUT was powered with 115V 60 Hz AC mains supplied via a line impedance stabilisation network (LISN).

Initial measurements in the form of swept scans covering the entire measurement band were performed in order to identify frequencies on which the EUT was generating interference. In order to minimise the time taken for these swept measurements, a peak detector was used in conjunction with the appropriate detector IF measuring bandwidths (see table below). Repetitive scans were performed to allow for emissions with low repetition rates, and the duty cycle of the EUT. The test configuration was the same for the initial scans as for the final measurements.

Following the initial scans, a graph was produced giving an overview of the emissions from the EUT plotted against the appropriate specification limit. A tolerance line was set 6 dB below the specification limit and levels above the tolerance line were re-tested (at individual frequencies) using the appropriate detector function.

The test equipment settings for conducted emissions measurements were as follows:

Receiver Function	Initial Scan	Final Measurements
Detector Type:	Peak	Quasi-Peak (CISPR)/Average
Mode:	Max Hold	Not applicable
Bandwidth:	10 kHz	9 kHz
Amplitude Range:	60 dB	20 dB
Measurement Time:	Not applicable	> 1 s
Observation Time:	Not applicable	> 15 s
Step Size:	Continuous sweep	Not applicable
Sweep Time:	Coupled	Not applicable

9.7. Transmitter Radiated Emissions – Part 22

Radiated emission measurements were performed in accordance with the standard, against appropriate limits for each detector function.

Initial pre-scans covering the entire measurement band from the lowest generated frequency declared up to 10 times the highest fundamental frequency. The scans were performed within a screened chamber in order to identify frequencies on which the EUT was generating spurious. This procedure identified the frequencies from the EUT, which required further examination. Repetitive scans were performed to allow for emissions with low repetition rates, and for the duty cycle of the EUT.

The initial scans were performed using an antenna height of 1.5 m and a measurement distance of 3 m. A limit line was set to the specification limit by characterising the screen room using a known signal source set at exactly the same location as the EUT. The signal source was derived from either a horn antenna or a dipole dependant on the frequency band under investigation. Any levels within 20 dB of this limit were measured where possible, on occasion; the receiver noise floor came within the 20 dB boundary. On these occasions, the system noise floor may have been recorded.

An open area test site using the appropriate test distance and measuring receiver with a peak detector was used for final measurements at each frequency recorded in the screen room.

The levels were maximised by initially rotating the turntable through 360° and then varying the antenna height between 1 m and 4 m in the vertical polarisation. At this point, any signals found to be between the limit and a level 6 dB below it were further maximised by changing the configuration of the EUT, e.g. re-routing cables to peripherals and moving peripherals with respect to the EUT. The procedure was repeated for the horizontal polarisation.

Once the final amplitude (maximised) had been obtained, the EUT was substituted with a substitution antenna. For EIRP measurements a horn antenna whose gain was based on an isotropic antenna was used, ERP measurements were done using a dipole. The centre of the substitution antenna was set to approximately the same centre location as the EUT. The substitution antenna was set to the horizontal polarity. The substitution antenna was matched into a signal generator using a 6 dB or greater attenuator. The signal generator was tuned to the EUT's frequency under test.

The test antenna was then raised and lowered to obtain a maximum reading on the spectrum analyser. The level of the signal generator output was then adjusted until the maximum recorded EUT level was observed. The signal generator level was noted. This procedure was repeated with both test antenna and substitution antenna vertically polarised. The radiated power was calculated as:-

EIRP/ERP = Signal Generator Level - Cable Loss + Antenna Gain

Transmitter Radiated Emissions – Part 22 (Continued)

The limit in the standard states that emissions shall be attenuated by at least 43+10 log (P) dB below the transmitter power (P), where (P) is the maximum measured fundamental power for the channel under test. This limit always reduces to -13dBm therefore, the limit line presented on the accompanying plots is set to -13dBm.

Any spurious measured were then compared to the -13dBm limit. The requirement is for the emission to be less than -13dBm. The margin between emission and limit is recorded and should always be positive to indicate compliance.

It should be noted that FCC Part 22.917 states that the 1st MHz band immediately adjacent to the applicants declared frequency block may be measured using a resolution bandwidth of at least 1% of the emission bandwidth. This bandwidth was found by calculating 1% of the bandwidth measured in the transmitter occupied bandwidth section of this report. The next largest available bandwidth above this calculated figure was, therefore, used i.e. 3 kHz.

9.8. Transmitter Radiated Emissions – Part 24

Radiated emission measurements were performed in accordance with the standard, against appropriate limits for each detector function.

Initial pre-scans covering the entire measurement band from the lowest generated frequency declared up to 10 times the highest fundamental frequency. The scans were performed within a screened chamber in order to identify frequencies on which the EUT was generating spurious. This procedure identified the frequencies from the EUT, which required further examination. Repetitive scans were performed to allow for emissions with low repetition rates, and for the duty cycle of the EUT.

The initial scans were performed using an antenna height of 1.5 m and a measurement distance of 3 m. A limit line was set to the specification limit by characterising the screen room using a known signal source set at exactly the same location as the EUT. The signal source was derived from either a horn antenna or a dipole dependant on the frequency band under investigation. Any levels within 20 dB of this limit were measured where possible, on occasion; the receiver noise floor came within the 20 dB boundary. On these occasions, the system noise floor may have been recorded.

An open area test site using the appropriate test distance and measuring receiver with a peak detector was used for final measurements at each frequency recorded in the screen room.

The levels were maximised by initially rotating the turntable through 360° and then varying the antenna height between 1 m and 4 m in the vertical polarisation. At this point, any signals found to be between the limit and a level 6 dB below it were further maximised by changing the configuration of the EUT, e.g. re-routing cables to peripherals and moving peripherals with respect to the EUT. The procedure was repeated for the horizontal polarisation.

Once the final amplitude (maximised) had been obtained, the EUT was substituted with a substitution antenna. For EIRP measurements a Horn antenna whose gain was based on an isotropic antenna was used, ERP measurements were done using a dipole. The centre of the substitution antenna was set to approximately the same centre location as the EUT. The substitution antenna was set to the horizontal polarity. The substitution antenna was matched into a signal generator using a 6 dB or greater attenuator. The signal generator was tuned to the EUT's frequency under test.

The test antenna was then raised and lowered to obtain a maximum reading on the spectrum analyser. The level of the signal generator output was then adjusted until the maximum recorded EUT level was observed. The signal generator level was noted. This procedure was repeated with both test antenna and substitution antenna vertically polarised. The EIRP was calculated as:-

EIRP = Signal Generator Level - Cable Loss + Antenna Gain

The limit in the standard states that emissions shall be attenuated by at least 43+10 log (P) dB below the transmitter power (P), where (P) is the maximum measured fundamental power for the channel under test. This limit always reduces to -13 dBm therefore, the limit line presented on the accompanying plots is set to -13 dBm.

Any spurious measured were then compared to the -13 dBm limit. The requirement is for the emission to be less than -13 dBm. The margin between emission and limit is recorded and should always be positive to indicate compliance.

All measurements were performed using broadband horn antennas.

Transmitter Radiated Emissions – Part 24 (Continued)

It should be noted that FCC Part 24.238 states that the 1st MHz band immediately adjacent to the applicants declared frequency block may be measured using a resolution bandwidth of at least 1% of the emission bandwidth. This bandwidth was found by calculating 1% of the bandwidth measured in the transmitter occupied bandwidth section of this report. The next largest available bandwidth above this calculated figure was, therefore, used i.e. 3 kHz.

The measurements in the 2nd and 3rd 1 MHz blocks away from the adjacent 1 MHz block from 1911 MHz to 1912 MHz and 1912 MHz to 1913 MHz were carried out using an analyser span of 1 MHz and a 100 kHz receiver resolution bandwidth (RBW). 10 linear readings were taken for each 100 kHz strip across the 1 MHz band. These readings were integrated to give the emission level in an equivalent 1 MHz bandwidth.

9.9. Receiver Radiated Emissions

Radiated emissions measurements were performed in accordance with the standard, against appropriate limits for each detector function.

Initial pre-scans covering the entire measurement band from the lowest generated frequency declared up to the upper frequency detailed in Section 15.33(b) were performed within a screened chamber in order to identify frequencies on which the EUT was generating interference. This determined the frequencies from the EUT, which required further examination. In order to minimise the time taken for the swept measurements, a peak detector was used in conjunction with the appropriate detector measuring bandwidth (see table below). Repetitive scans were performed to allow for emissions with low repetition rates, and for the duty cycle of the EUT.

The initial scans were performed using an antenna height of 1.5 m and a measurement distance of 3 m. A limit line was set to the specification limit. Levels within 20dB of this limit were measured where possible, on occasion, the receiver noise floor came within the 20dB boundary. On these occasions, the system noise floor may have been recorded.

An open area test site using the appropriate test distance and measuring receiver with a quasi peak detector was used for measurements below 1000 MHz, for measurements above 1000 MHz average and peak detectors were used.

For the final measurements the EUT was arranged on a non-conducting turn table on a standard test site compliant with ANSI C63.4 – 2001 Clause 5.4.

On the open area test site, at each frequency where a signal was found, the levels were maximised by initially rotating the turntable through 360° and then varying the antenna height between 1 m and 4 m in the horizontal polarisation. At this point, any signals found to be between the limit and a level 6 dB below it were further maximised by changing the configuration of the EUT, e.g. re-routing cables to peripherals and moving peripherals with respect to the EUT. The procedure was repeated for the vertical polarisation.

The final field strength was determined as the indicated level in dBμV plus cable loss and antenna factor.

The test equipment settings for radiated emissions measurements were as follows:

Receiver Function	Initial Scan	Final Measurements <1GHz	Final Measurements ≥1 GHz
Detector Type:	Peak	Quasi-Peak (CISPR)	Peak/Average
Mode:	Max Hold	Not applicable	Not applicable
Bandwidth:	(120 kHz <1GHz) (1MHz ≥1GHz)	120 kHz	1 MHz (If applicable)
Amplitude Range:	60 dB	20 dB	20 dB (typical)
Step Size:	Continuous sweep	Not applicable	Not applicable
Sweep Time:	Coupled	Not applicable	Not applicable

Appendix 1. Test Equipment Used

RFI No.	Instrument	Manufacturer	Type No.	Serial No.
A027	Horn Antenna	Eaton	9188-2	301
A028	Horn Antenna	Eaton	91888-2	304
A031	2 to 4 GHz Eaton Horn Antenna	Eaton	91889-2	557
A059	3146 Log Periodic Antenna	EMCO	3146	8902-2378
A1037	Chase Bilog Antenna	Chase EMC Ltd	CBL6112B	2413
A1069	ESH3-Z5	Rohde & Schwarz	ESH3-Z5	837469/012
A1360	ESH3-Z2 Pulse Limiter	Rohde & Schwarz	ESH3-Z2	A1360-20112003
A1362	Horn Antenna	Stoddart Aircraft Radio Co., Inc.	91889-1	N/A
A1393	Attenuator	HUBER + SUHNER AG	757456	6820.17.B
A253	WG 12 Microwave Horn	Flann Microwave	12240-20	128
A254	WG 14 Microwave Horn	Flann Microwave	14240-20	139
A259	Bilog Antenna	Chase	CBL6111	1513
A276	OATS Positioning Controller	Rohde & Schwarz	HCC	-
A392	3 dB attenuator (9)	Suhner	6803.17.B	None
A430	WG 18 horn	Flann	18240-20	425
A436	WG 20 horn	Flann	20240-20	330
C1155	8m cable	Huber & Suhner	Sucoflex 104PA	1522/4PA
C1164	1.5m N-type Cable	Rosenberger Micro-Coax	FA210A1015007070	43188-1

Test Equipment Used (Continued)

RFI No.	Instrument	Manufacturer	Type No.	Serial No.
C1166	2m N-Type Cable	Rosenberger Micro-Coax	FA210A1020007070	43189-02
L0799	AC Power Supply	Kikusui	PCR 1000LA	JA002944
L0802	Environmental Chamber	Gallenkamp Industrial	FE300.T.R75	6974
M003	Spectrum Monitor	Rohde & Schwarz	EZM	883 580/008
M023	ESVP Receiver	Rohde & Schwarz	ESVP	872 991/027
M028	FSB Spectrum Analyser	Rohde & Schwarz	FSB	860 001/009 (RF), 860 161/007 (Display)
M090	Receiver / Spectrum Analyser System	Rohde & Schwarz	ESBI	DU:838494/005 RU:836833/001
M1008	HP 8563E	Hewlett Packard	8563E	3551A04412
M1070	IDM63 DVM	ISO-Tech	IDM63	70602324
M1124	Spectrum Analyser	Rohde & Schwarz	ESIB26	100046K
M1140	Analyser	Anritsu	MT8820A	6K0000647
M1242	FSEM30 Spectrum Analyser	Rohde & Schwarz, Inc.	FSEM30	845986_022
M165	Thermocouple Meter	RS Components	206-3738	63101536
M173	Turntable Controller	R.H.Electrical Services	RH351	3510020
S201	Site 1	RFI	1	-
S202	Site 2	RFI	2	S202-15011990
S212	Site 12	RFI	12	-
S240	Site 40	RFI	40	-
S505	PSU	Weir	4000	964214/164

NB In accordance with UKAS requirements, all the measurement equipment is on a calibration schedule.

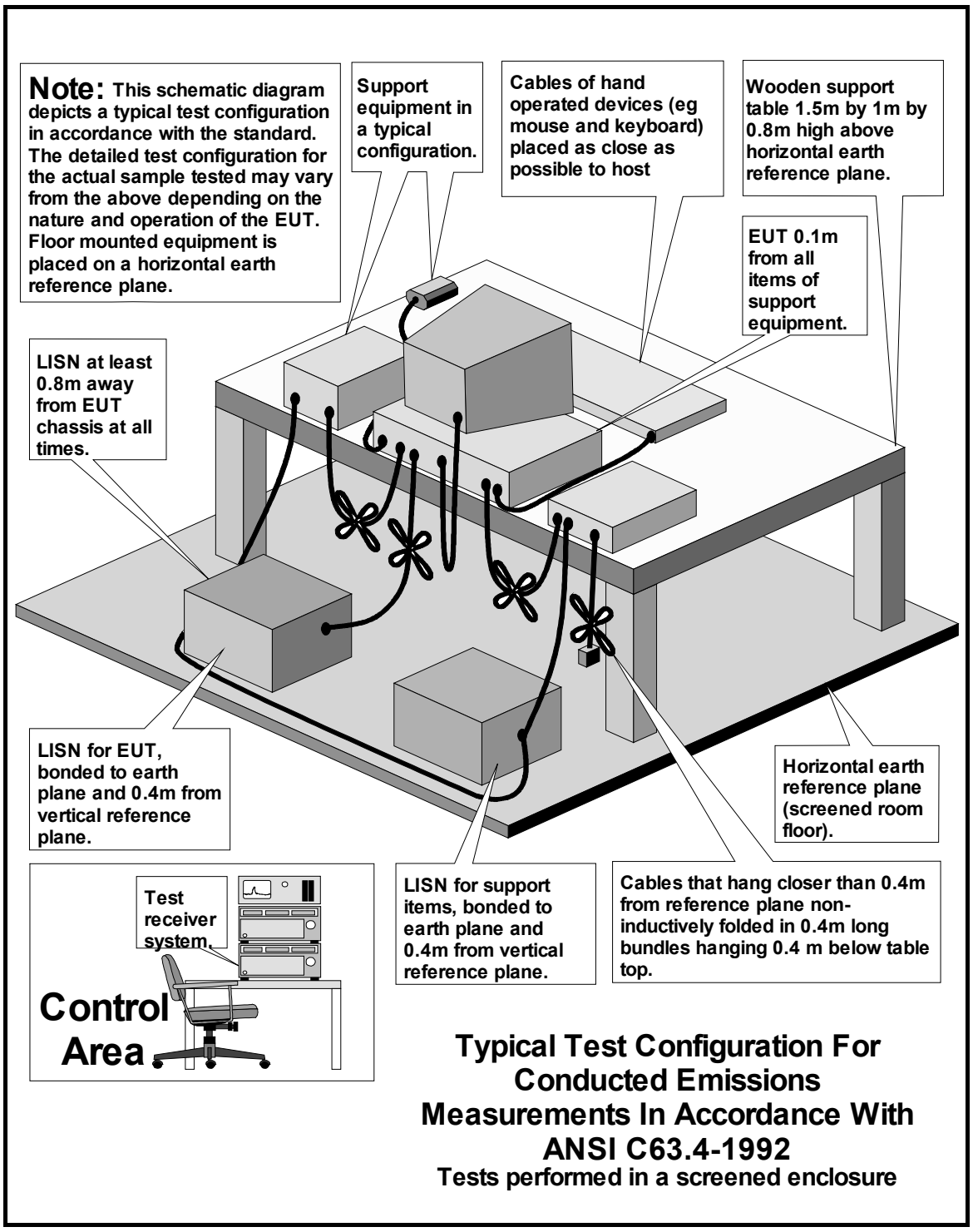
Appendix 2. Test Configuration Drawings

This appendix contains the following drawings:

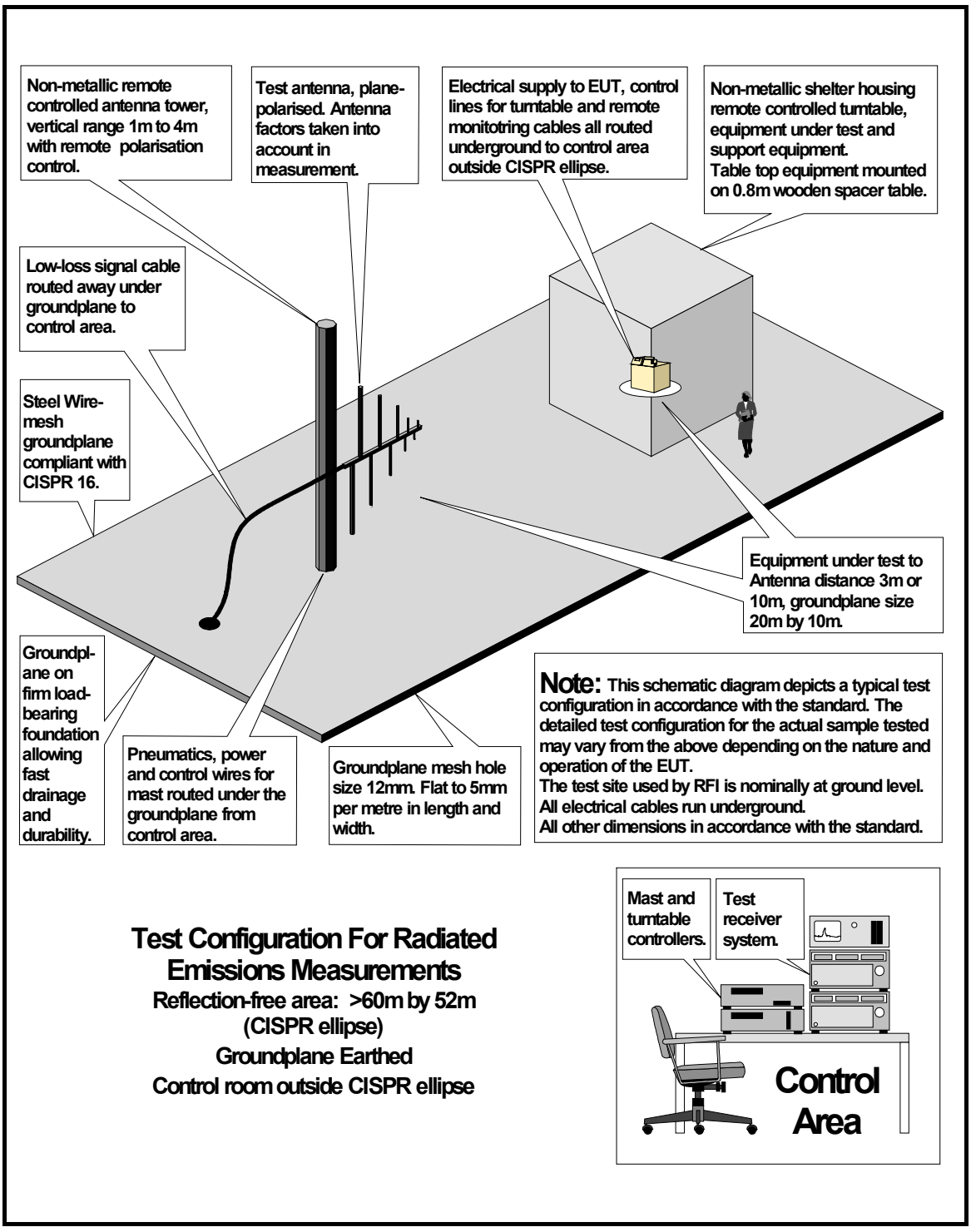
Drawing Reference Number	Title
DRG\47892\EMICON	Test configuration for measurement of conducted emissions.
DRG\47892\EMIRAD	Test configuration for measurement of radiated emissions.

Test of: Psion Teklogix UK Ltd.
7535 + RA3020
To: FCC Part 22: 2004 (Subpart H) and FCC Part 24: 2004 (Subpart E)

DRG\47892\EMICON



DRG\47892\EMIRAD



Test Configuration For Radiated Emissions Measurements
Reflection-free area: >60m by 52m (CISPR ellipse)
Groundplane Earthed
Control room outside CISPR ellipse