






TEST REPORT FROM RADIO FREQUENCY INVESTIGATION LTD.

Test Of: IPWireless U.K. Ltd.
UE P1D Model: KF


To: FCC Part 15: 2001,
Part 21: 2001 & Part 74: 2001

Test Report Serial No:
RFI/MPTB3/RP45298JD05

Supersedes Test Report Serial No:
RFI/MPTB2/RP45298JD05

This Test Report Is Issued Under The Authority Of Richard Jacklin, Operations Director: 	Checked By: 
Tested By:  pp	Release Version No: PDF01
Issue Date: 17 December 2003	Test Dates: 08 September 2003 to 12 September 2003

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Radio Frequency Investigation Ltd, Ewhurst Park, Ramsdell, Basingstoke, Hampshire, RG26 5RQ, ENGLAND. Tel: +44 (0) 1256 851193 Fax: +44 (0) 1256 851192	Registered in England, No. 211 7901. Registered Office: Ewhurst Park, Ramsdell, Basingstoke, Hampshire RG26 5RQ	 0644
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Operations Department

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Test Of: IPWireless U.K. Ltd.

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To: FCC Part 15: 2001, Part 21: 2001 & Part 74: 2001

1. Client Information

Company Name:	IPWireless UK Ltd.
Address:	Units 3-6 Charlton Business Park Crudwell Road Malmesbury SN16 9RU
Contact Name:	Mr P Warburg

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2. Equipment Under Test (EUT)

The following information has been supplied by the client:

2.1. Identification Of Equipment Under Test (EUT)

Brand Name:	Wireless Broadband Modem
Model Name or Number:	KF
Unique Type Identification:	None stated
Serial Number:	None stated
Country of Manufacture:	UK
FCC ID Number:	PKTP1DKF
Date of Receipt:	08 September 2003

Brand Name:	Phihong PSU
Model Name or Number:	PSC05R-050 (IP)
Unique Type Identification:	None stated
Serial Number:	None stated
Country of Manufacture:	Taiwan
Date of Receipt:	08 September 2003

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2.2. Description Of EUT

The equipment under test is a wireless broadband modem; the modem provides high-speed internet access when used with a host computer.

2.3. Modifications Incorporated In EUT

The EUT has not been modified from what is described by the Model Number and Unique Type Identification stated above.

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2.4. Additional Information Related To Testing

Power Supply Requirement:	Nominal 110V, 60 Hz, AC Mains Supply		
Intended Operating Environment:	Residential, Commercial, Light Industry		
Equipment Category:	Multipoint Distribution Service / Instructional Television Fixed Service Response Station		
Type of Unit:	Wireless Broadband Modem		
Weight:	105 g without battery		
Dimensions:	125 x 85 x 20 mm		
Interface Ports:	USB Port Mains 110 VAC Input Antenna Port		
Transmit Frequency Range	2.506 GHz to 2.680 GHz		
Band Edges	2.500 GHz and 2.690 GHz		
Transmit Channels Tested	Channel ID	Channel Number	Channel Frequency (MHz)
	Bottom	N/A	2506
	Middle	N/A	2596
	Top	N/A	2680
Receive Frequency Range	2.506 GHz to 2.680 GHz		
Receive Channels Tested	Channel ID	Channel Number	Channel Frequency (MHz)
	Bottom	N/A	2506
	Middle	N/A	2596
	Top	N/A	2680
Highest Fundamental Frequency	2680 MHz		
Highest Oscillator Frequency	2300 MHz		
Maximum Power Output (EIRP)	26.0 dBm (24 dBm conducted, 2.0 dBi antenna gain)		

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2.5. Support Equipment

The following support equipment was supplied by the applicant and used to exercise the EUT during testing:

Description:	Laptop PC
Brand Name:	Sony Vaio
Model Name or Number:	PCG-Z505HSK
Serial Number:	28305733 3350053
Cable Length and Type	2 m
Connected to Port:	USB

Description:	External Power supply for Laptop	
Brand Name:	Sony	
Model Name or Number:	PCGA-ACX1	
Serial Number:	0004-A-0632772P	
Cable Length and Type	2 m Mains Cable	1.8 m 2 core
Connected to Port:	AC I/P	DC O/P

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3. Test Specification, Methods And Procedures

3.1. Test Specification

Reference:	FCC Part 74: 2001: Sections 74.935, 74.936 and 74.961
Title:	Code of Federal Regulations, Part 74 (47CFR) Subpart I Instructional Television Fixed Service
Comments:	None.
Purpose of Test:	To determine whether the equipment complied with the requirements of the specification for the purposes of certification.

Reference:	FCC Part 21: 2001 Sections 21.101, 21.904 and 21.908,
Title:	Code of Federal Regulations, Part 21 (47CFR) Subpart K Multipoint Distribution Service
Comments:	None.
Purpose of Test:	To determine whether the equipment complied with the requirements of the specification for the purposes of certification.

Reference:	FCC Part 15: 2001 Class B, Sections: 15.107 and 15.109
Title:	Code of Federal Regulations, Part 15 (47CFR) Radio Frequency Devices: Digital Devices.
Comments:	A description of the test facility used for this test is on file with, and has been accepted by, the Federal Communications Commission as required by Section 2.948 of Federal Rules.
Purpose of Test:	To determine whether the equipment complied with the requirements of the specification for the purposes of certification.

Reference:	FCC Part 2: 2001 Sections 2.1046, 2.1049, 2.1051, 2.1053 and 2.1055
Title:	Code of Federal Regulations, Part 2 (47CFR) Frequency allocations and radio treaty matters; General Rules and Regulations
Comments:	None.
Purpose of Test:	To determine whether the equipment complied with the requirements of the specification for the purposes of certification.

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3.2. Methods And Procedures

The methods and procedures used were as detailed in:

ANSI/TIA-603-B-2002

Land Mobile Communications Equipment, Measurements and performance Standards.

ANSI C63.2 (1996)

Title: American National Standard for Instrumentation - Electromagnetic noise and field strength.

ANSI C63.4 (2001)

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 (1998)

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.

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4. Deviations From The Test Specification

None

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5. Operation Of The EUT During Testing

5.1. Operating Modes

The EUT was tested in the following operating modes:

Transmitter Modes:

For all conducted antenna port tests, except the Spurious emission band edge, the EUT was transmitting at full power on bottom, middle and top channels on all 15 timeslots. For the Spurious emissions band edge the transmitter was at full power for 5 of the 15 time slots, typical of a very heavy use. In normal use the transmitter would not exceed 5 of the 15 time slots used, as being a TDD system, it must receive information in order to maintain the link.

For radiated tests, the EUT was transmitting at full power on bottom, middle and top channels on 15 timeslots.

Receiver Modes:

Testing was performed with the EUT receiving on all timeslots.

5.2. Configuration and Peripherals

The EUT was tested in the following configuration:

All tests were performed with an external AC adaptor connected to 110 VAC, 60 Hz, AC Mains supply, and the USB port connected to a laptop PC

Appendix 3 contains a schematic diagram of the test configuration.

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6. Summary Of Test Results

Range Of Measurements	Specification Reference	Mode of Operation	Port Type	Compliance Status
AC Conducted Spurious Emissions (150 kHz to 30 MHz)	Part 15 of CFR 47: 2001, Section 15.107	Standby	AC Mains Input	Complied
Radiated Spurious Emissions (30 MHz to 1 GHz)	Part 15 of CFR 47: 2001, Section 15.109	Standby	Enclosure	Complied
Radiated Spurious Emissions (1 GHz to 20 GHz)	Part 15 of CFR 47: 2001, Section 15.109	Standby	Enclosure	Complied
Effective Isotropic Radiated Power (EIRP)	Part 2.1046, Part 21.904 Part 74.935 of CFR 47: 2001	Transmit	Antenna	Complied
Frequency Stability (Temperature Variation)	Part 2.1055, Part 21.101 Part 74.961 of CFR 47: 2001	Transmit	Antenna Terminals	Complied
Frequency Stability (Voltage Variation)	Part 2.1055, Part 21.101 Part 74.961 of CFR 47: 2001	Transmit	Antenna Terminals	Complied
Occupied Bandwidth	Part 2.1049, Part 21.908 Part 74.936 of CFR 47: 2001	Transmit	Antenna Terminals	Complied
Transmitter Spectrum Mask	Part 2.1051, 21.908 and 74.936	Transmit	Antenna	Complied
Conducted Emissions at Band Edges	Part 2.1051, Part 21.908 Part 74.936 of CFR 47: 2001	Transmit	Antenna Terminals	Complied
Conducted Emissions	Part 2.1051, Part 21.908 Part 74.936 of CFR 47: 2001	Transmit	Antenna Terminals	Complied
Radiated Spurious Emissions	Part 2.1053, Part 21.908 Part 74.936 of CFR 47: 2001	Transmit	Antenna	Complied
Radiated Emissions at Band Edges	Part 2.1053, Part 21.908 Part 74.936 of CFR 47: 2001	Transmit	Antenna	Complied

6.1. Location Of Tests

All the measurements described in this report were performed at the premises of Radio Frequency Investigation Ltd, Ewhurst Park, Ramsdell, Basingstoke, Hampshire, RG26 5RQ, England.

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7. Measurements, Examinations And Derived Results

7.1. General Comments

7.1.1. This section contains test results only. Details of the test methods and procedures can be found in Appendix 2 of this report.

7.1.2. 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.

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7.2. Standby AC Conducted Spurious Emissions: Part 15.107

7.2.1. The EUT was configured as for AC conducted emissions measurements as described in section 9 of this report.

7.2.2. Tests were performed to identify the maximum emissions levels on the AC mains line of the EUT.

Results: Quasi-Peak Detector Measurements On Live And Neutral Lines

Frequency (MHz)	Line	Q-P Level (dB μ V)	Q-P Limit (dB μ V)	Margin (dB)	Result
0.164	Live	45.22	65.24	20.02	Complied
0.170	Neutral	43.43	64.94	21.51	Complied
0.521	Neutral	39.06	56.00	16.94	Complied
0.529	Live	38.15	56.00	17.85	Complied
2.485	Neutral	33.14	56.00	22.86	Complied

Results: Average Detector Measurements On Live And Neutral Lines

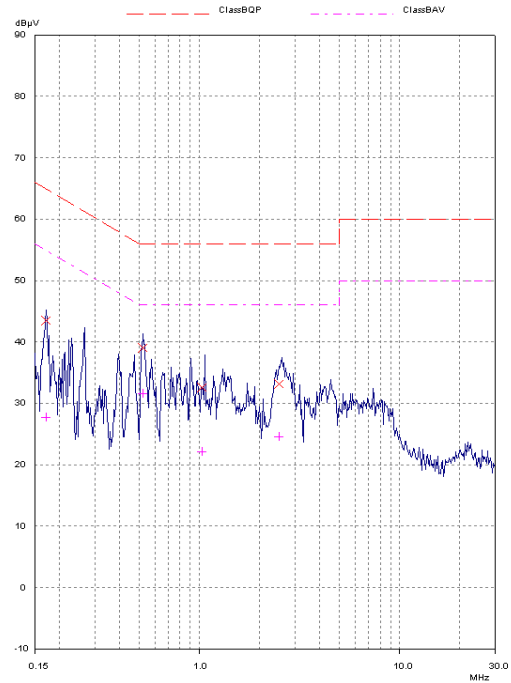
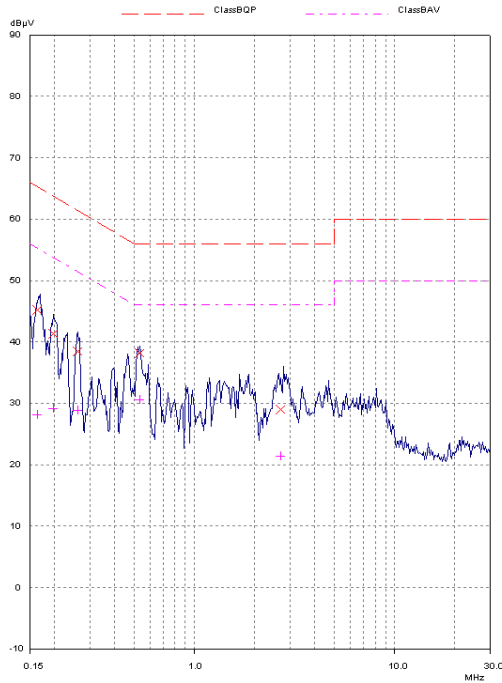
Frequency (MHz)	Line	Av. Level (dB μ V)	Av. Limit (dB μ V)	Margin (dB)	Result
0.164	Live	28.07	55.24	27.17	Complied
0.170	Neutral	27.68	54.94	27.26	Complied
0.521	Neutral	31.54	46.00	14.46	Complied
0.529	Live	30.63	46.00	15.37	Complied
2.485	Neutral	24.54	46.00	21.46	Complied

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Receive AC Conducted Spurious Emissions (Continued)



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

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7.3. Receiver Radiated Emission - 30 MHz to 1.0 GHz: Part 15.109

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

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

Results:

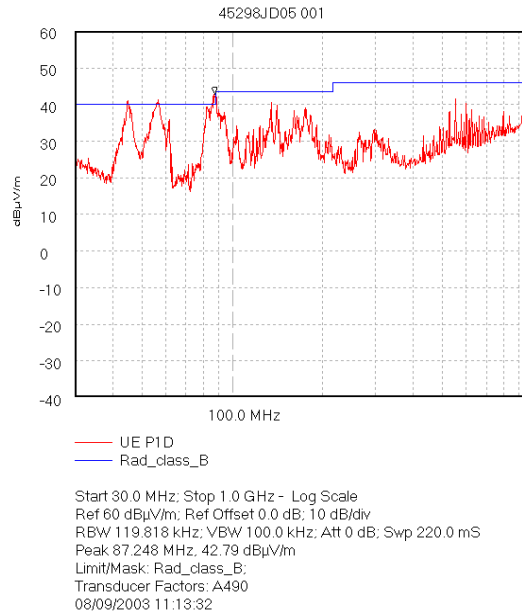
Frequency (MHz)	Ant. Pol.	Q-P Level (dBμV/m)	Limit (dBμV/m)	Margin (dB)	Result
44.970	Vert.	26.2	40.0	13.8	Complied
45.319	Vert.	23.6	40.0	16.4	Complied
57.240	Vert.	23.1	40.0	16.9	Complied
54.800	Vert.	23.4	40.0	16.6	Complied
85.69	Vert.	20.9	40.0	19.1	Complied
87.18	Vert.	19.2	40.0	20.8	Complied
88.64	Vert.	23.5	40.0	16.5	Complied
134.98	Vert.	25.3	43.5	18.2	Complied
552.94	Vert.	39.0	43.5	4.5	Complied

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Receiver Radiated Emission - 30 MHz to 1.0 GHz: Part 15.109 (Continued)



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

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7.4. Receiver Radiated Emission – 1 GHz to 12.5 GHz: Part 15.109

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

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

Results:**Highest Average Level:**

Frequency (MHz)	Antenna Polarity (H/V)	Average Detector level (dB μ V)	Antenna factor (dB)	Cable loss (dB)	Actual Average Level (dB μ V/m)	Average Limit (dB μ V/m)	Average Margin (dB)	Result
2067.0	Vert.	14.2	20.5	1.4	36.1	54.0	17.9	Complied

Highest Peak Level:

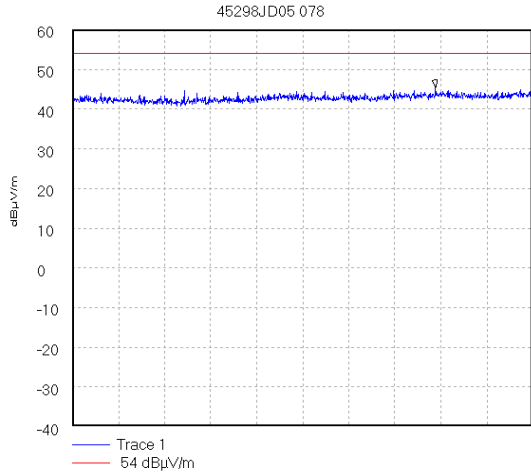
Frequency (MHz)	Antenna Polarity (H/V)	Peak Detector level (dB μ V)	Antenna factor (dB)	Cable loss (dB)	Actual Peak Level (dB μ V/m)	Peak Limit (dB μ V/m)	Peak Margin (dB)	Result
2067.0	Vert.	5.2	20.5	1.4	46.9	74.0	27.1	Complied

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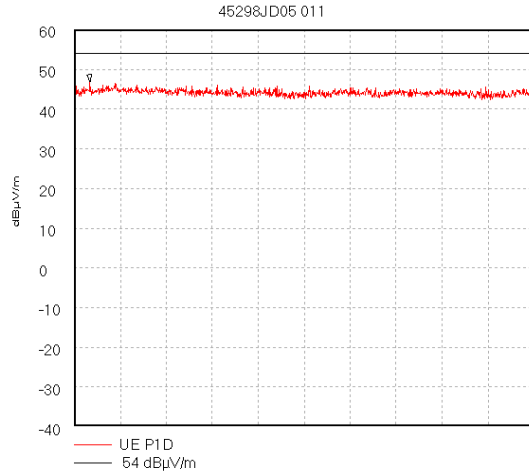
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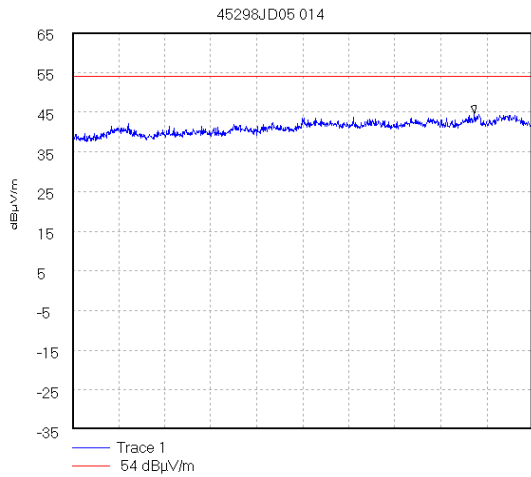
Receiver Radiated Emission – 1 GHz to 12.5 GHz (Continued): Part 15.109



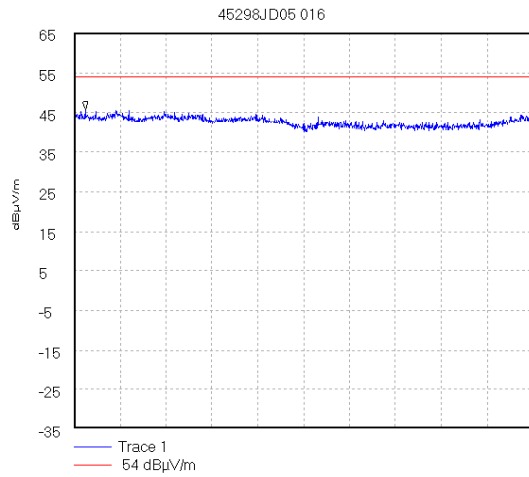
Start 1.0 GHz; Stop 2.0 GHz
 Ref 60 dBµV/m; Ref Offset 0.0 dB; 10 dB/div
 RBW 1.0 MHz; VBW 1.0 MHz; Att 0 dB; Swp 20.0 mS
 Peak 1.78889 GHz, 45.38 dBµV/m
 Display Line: 54 dBµV/m;
 Transducer Factors: A027_1to2horn_3m
 10/09/2003 14:24:17



Start 2.0 GHz; Stop 4.0 GHz
 Ref 60 dBµV/m; Ref Offset 0.0 dB; 10 dB/div
 RBW 1.0 MHz; VBW 1.0 MHz; Att 0 dB; Swp 20.0 mS
 Peak 2.067 GHz, 46.88 dBµV/m
 Display Line: 54 dBµV/m;
 Transducer Factors: 2 to 4
 08/09/2003 14:36:16



Start 4.0 GHz; Stop 6.0 GHz
 Ref 65 dBµV/m; Ref Offset 0.0 dB; 10 dB/div
 RBW 1.0 MHz; VBW 1.0 MHz; Att 0 dB; Swp 20.0 mS
 Peak 5.747 GHz, 44.59 dBµV/m
 Display Line: 54 dBµV/m;
 Transducer Factors: 4to6horn_1m
 08/09/2003 16:45:40



Start 6.0 GHz; Stop 8.0 GHz
 Ref 65 dBµV/m; Ref Offset 0.0 dB; 10 dB/div
 RBW 1.0 MHz; VBW 1.0 MHz; Att 0 dB; Swp 20.0 mS
 Peak 6.049 GHz, 45.73 dBµV/m
 Display Line: 54 dBµV/m;
 Transducer Factors: 6to8horn_1m
 08/09/2003 16:52:33

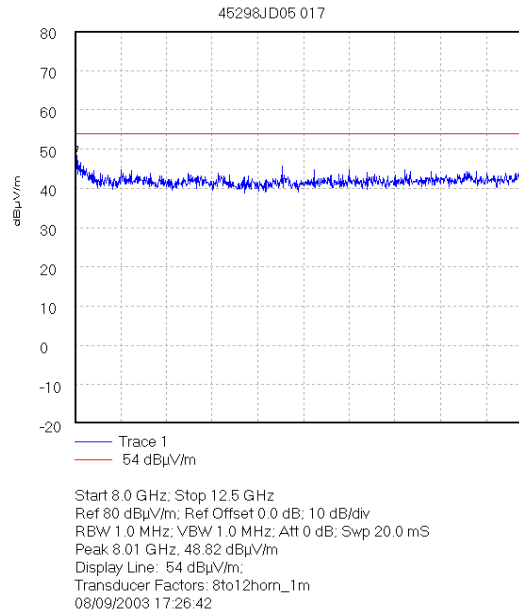
Note: these plots are pre-scans and for indication purposes only. For final measurements, see accompanying tables.

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Receiver Radiated Emission – 1 GHz to 12.5 GHz: Part 15.109 (Continued)



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

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7.5. Transmitter Carrier Output Power and Effective Isotropic Radiated Power (EIRP); Part; 2.1046, 21.904 and 74.935

7.5.1. The EUT was configured as for conducted RF output power and Effective Isotropic Radiated Power (EIRP) as described in section 9 of this report.

7.5.2. The effective isotropic radiated power (EIRP) was calculated by adding the manufacturer's declared antenna gain to the figure measured for conducted RF output power.

Results EIRP.

Channel	Measured Frequency (MHz)	Conducted RF O/P Power (dBm)	Antenna Gain (dBi)	EIRP (dBm)	EIRP (dBW)	Limit EIRP (dBW)	Margin (dB)	Result
Bottom	2506.00	23.9	2.0	25.9	-3.1	15.2	18.3	Complied
Middle	2596.00	23.9	2.0	25.9	-3.1	15.2	18.3	Complied
Top	2680.00	23.7	2.0	25.7	-3.3	15.2	18.5	Complied

Note 1: It should be noted that EIRP has been calculated by adding the manufacturer's declared antenna gain to the measured conducted power. Thus the stated measurement uncertainty in section 8 of this report is for conducted measurement only.

Note 2: FCC Parts 21.904 and 74.935 state that the EIRP limit is 33.3 W (15.2 dBW) referenced to a 100 kHz bandwidth. The measurements were performed using a wideband power meter as stated in Appendix 2 of this report. Since the total EIRP is less than the power limit in a 100 kHz bandwidth further spectral analysis was not necessary.

Note 3: These results determine that the EUT output power falls in the "<-6dBW per 6MHz channel" category of FCC Parts 21.908(d) and 74.936(f) with regard to out-of-band power.

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7.6. Transmitter Frequency Stability: (Temperature Variation)
Parts 2.1055, 21.101 and 74.961

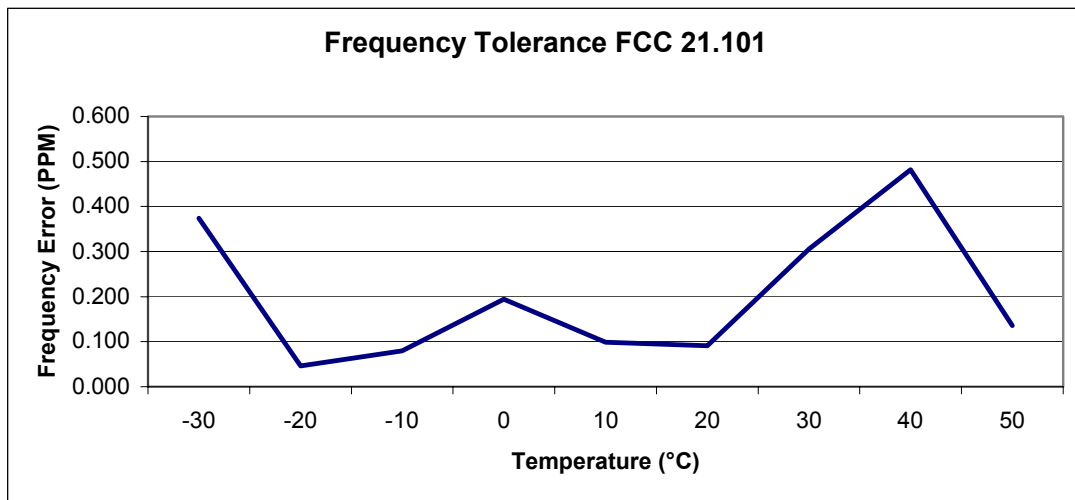
7.6.1. The EUT was configured as for frequency stability measurements as described in Section 9 of this report.

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

Results Bottom Channel (2506.00 MHz)

Temp (°C)	Measured Frequency (MHz)	Frequency Error (Hz)	Frequency Error (ppm)	Limit (ppm)	Margin (ppm)	Result
-30	2506.000937	937	0.274	10.0	9.626	Complied
-20	2506.000115	115	0.046	10.0	9.954	Complied
-10	2506.000200	200	0.080	10.0	9.920	Complied
0	2506.000487	487	0.194	10.0	9.806	Complied
10	2506.000247	247	0.099	10.0	9.901	Complied
20	2506.000227	227	0.091	10.0	9.909	Complied
30	2506.000767	767	0.306	10.0	9.694	Complied
40	2506.001207	1207	0.482	10.0	9.518	Complied
50	2506.000340	340	0.136	10.0	9.864	Complied

Frequency Variation From 2506.00 MHz



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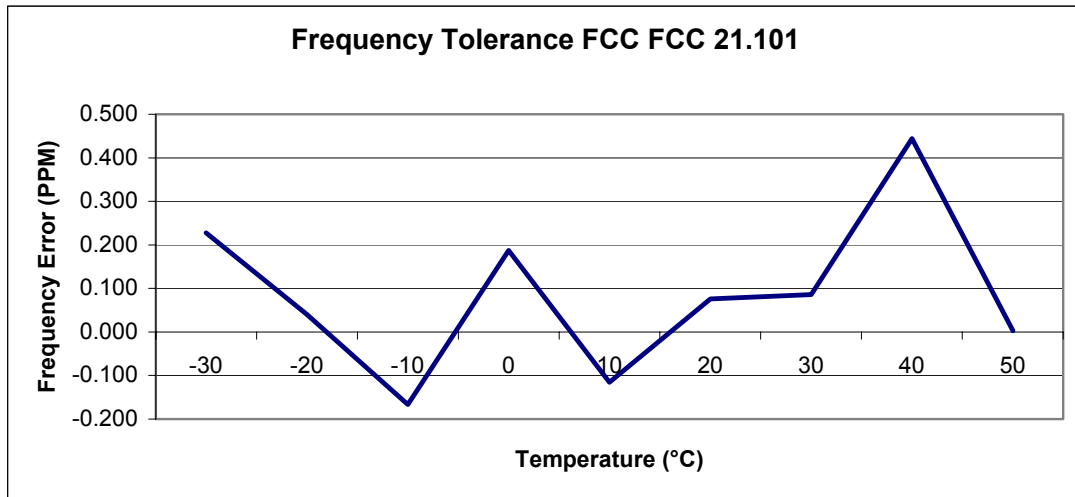
To: FCC Part 15: 2001, Part 21: 2001 & Part 74: 2001

Transmitter Frequency Stability: (Temperature Variation) (continued)
Parts 2.1055, 21.101 and 74.961

Results Middle Channel (2596.00 MHz)

Temp (°C)	Measured Frequency (MHz)	Frequency Error (Hz)	Frequency Error (ppm)	Limit (ppm)	Margin (ppm)	Result
-30	2596.000590	590	0.227	10.0	9.773	Complied
-20	2596.000103	103	0.040	10.0	9.960	Complied
-10	2595.999567	-433	-0.167	10.0	9.833	Complied
0	2596.000487	487	0.188	10.0	9.812	Complied
10	2595.999700	-300	-0.116	10.0	9.884	Complied
20	2596.000197	197	0.076	10.0	9.924	Complied
30	2596.000223	223	0.086	10.0	9.914	Complied
40	2596.001152	1152	0.444	10.0	9.556	Complied
50	2596.000007	007	0.003	10.0	9.997	Complied

Frequency Variation From 2596.00 MHz



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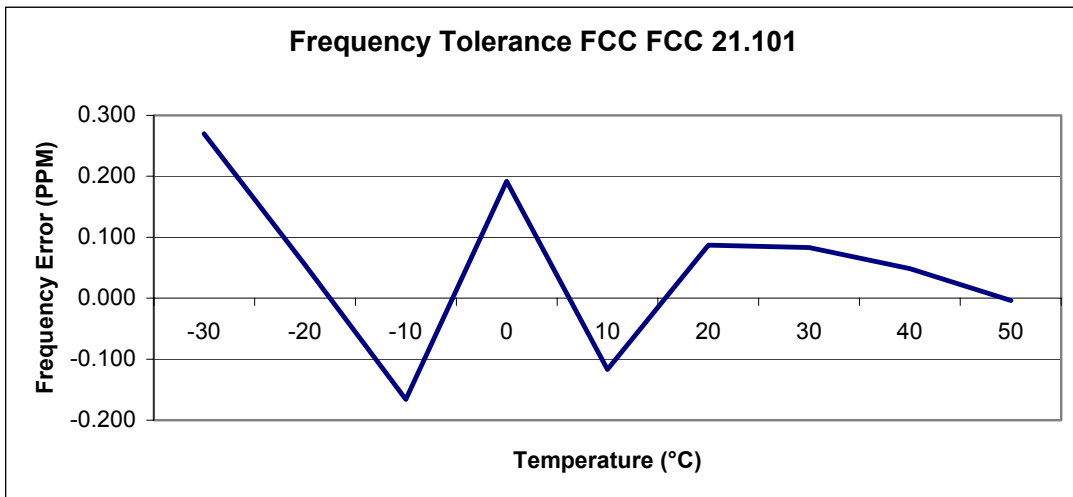
To: FCC Part 15: 2001, Part 21: 2001 & Part 74: 2001

Transmitter Frequency Stability: (Temperature Variation) (continued)
Parts 2.1055, 21.101 and 74.961

Results Top Channel (2680.00 MHz)

Temp (°C)	Measured Frequency (MHz)	Frequency Error (Hz)	Frequency Error (ppm)	Limit (ppm)	Margin (ppm)	Result
-30	2680.000723	723	0.670	10.0	9.730	Complied
-20	2680.000147	147	0.055	10.0	9.945	Complied
-10	2679.999556	-444	-0.166	10.0	9.834	Complied
0	2680.000514	514	0.192	10.0	9.808	Complied
10	2679.999687	-313	-0.117	10.0	9.883	Complied
20	2680.000233	233	0.087	10.0	9.913	Complied
30	2680.000223	223	0.083	10.0	9.917	Complied
40	2680.0001302	130.2	0.049	10.0	9.951	Complied
50	2679.999990	-10	0.004	10.0	9.996	Complied

Frequency Variation From 2680.00 MHz



Test Of: IPWireless U.K. Ltd.

UE P1D Model: KF

To: FCC Part 15: 2001, Part 21: 2001 & Part 74: 2001

7.7. Transmitter Frequency Stability: (Voltage Variation)
Parts 2.1055, 21.101 and 74.961

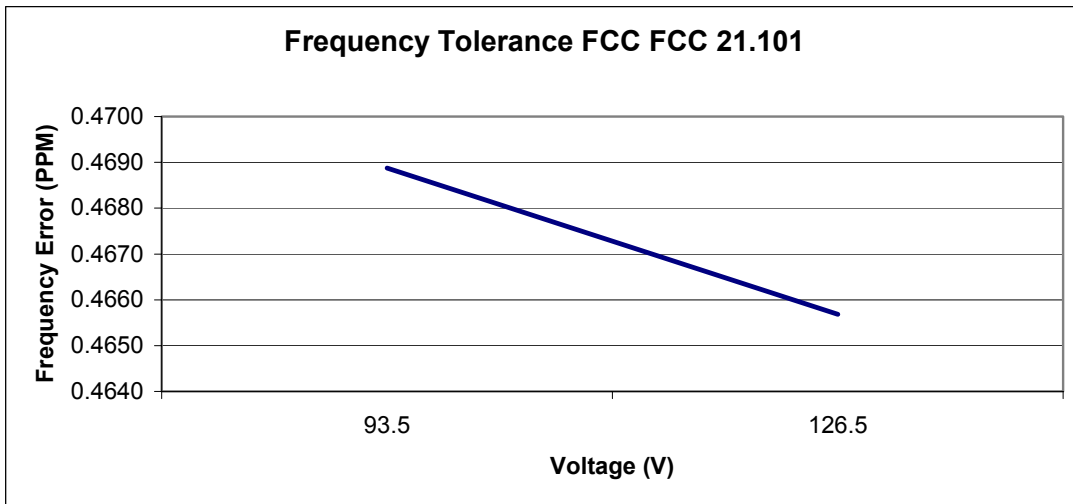
7.7.1. The EUT was configured as for frequency stability measurements as described in section 9 of this report.

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

Results Bottom Channel

Supply Voltage (VAC 60 Hz)	Measured Frequency (MHz)	Frequency Error (Hz)	Frequency Error (ppm)	Limit (ppm)	Margin (ppm)	Result
93.5	2506.001175	1175	0.469	10.0	9.531	Complied
126.5	2506.001167	1167	0.466	10.0	9.534	Complied

Frequency Variation From 2506.00 MHz



Test Of: IPWireless U.K. Ltd.

UE P1D Model: KF

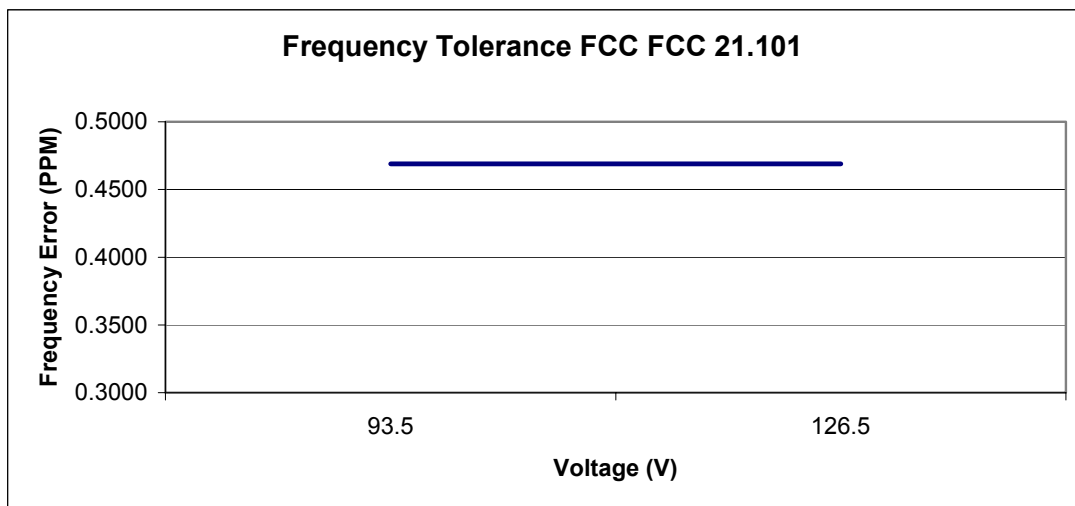
To: FCC Part 15: 2001, Part 21: 2001 & Part 74: 2001

Transmitter Frequency Stability: (Voltage Variation) (Continued)
Parts 2.1055, 21.101 and 74.961

Results Middle Channel

Supply Voltage (VAC 60 Hz)	Measured Frequency (MHz)	Frequency Error (Hz)	Frequency Error (ppm)	Limit (ppm)	Margin (ppm)	Result
93.5	2596.001217	1217	0.469	10.0	9.531	Complied
126.5	2596.001217	1217	0.469	10.0	9.531	Complied

Frequency Variation From 2596.00 MHz



Test Of: IPWireless U.K. Ltd.

UE P1D Model: KF

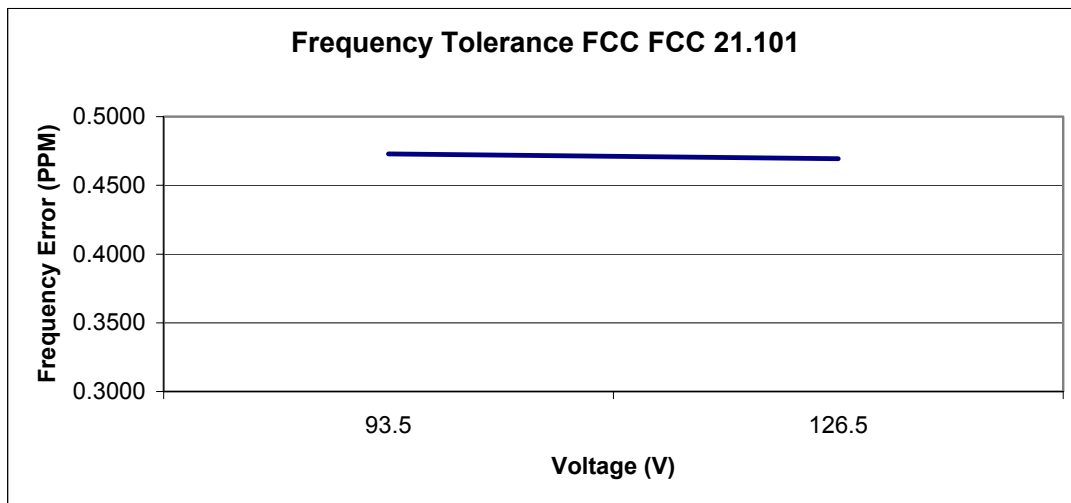
To: FCC Part 15: 2001, Part 21: 2001 & Part 74: 2001

Transmitter Frequency Stability: (Voltage Variation) (Continued)
Parts 2.1055, 21.101 and 74.961

Results Top Channel

Supply Voltage (VAC 60 Hz)	Measured Frequency (MHz)	Frequency Error (Hz)	Frequency Error (ppm)	Limit (ppm)	Margin (ppm)	Result
93.5	2680.001267	1267	0.473	10.0	9.527	Complied
126.5	2680.001258	1258	0.469	10.0	9.531	Complied

Frequency Variation From 2680.00 MHz



Test Of: IPWireless U.K. Ltd.

UE P1D Model: KF

To: FCC Part 15: 2001, Part 21: 2001 & Part 74: 2001

7.8. Transmitter Occupied Bandwidth
Parts 2.1049, 21.908 and 74.936

7.8.1. The EUT was configured as for Occupied Bandwidth measurements as described in section 9 of this report.

7.8.2. 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 (MHz)
Bottom	2506.00	300	1000	8.280
Middle	2596.00	300	1000	8.280
Top	2680.00	300	1000	8.360

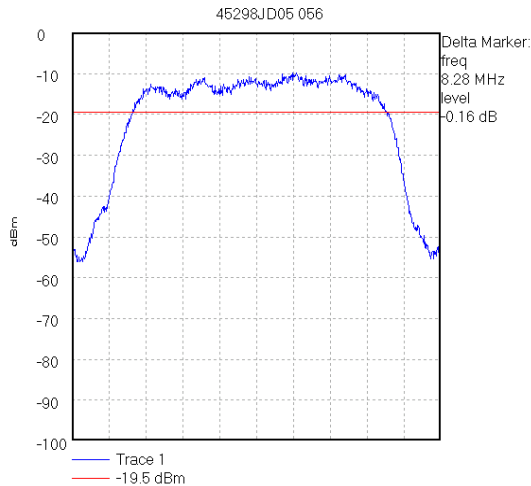
Test Of: IPWireless U.K. Ltd.

UE P1D Model: KF

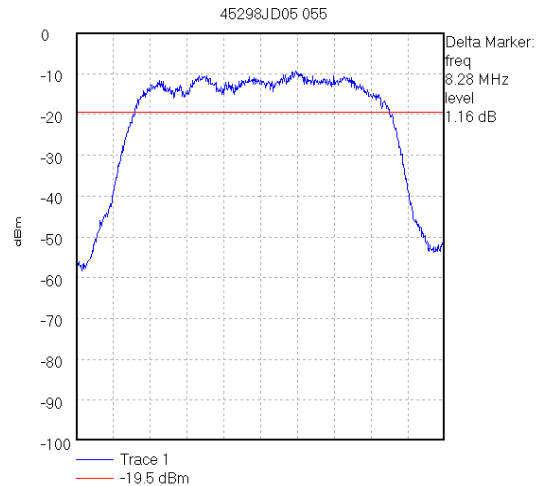
To: FCC Part 15: 2001, Part 21: 2001 & Part 74: 2001

Transmitter Occupied Bandwidth (Continued); Parts 2.1049, 21.908 and 74.936

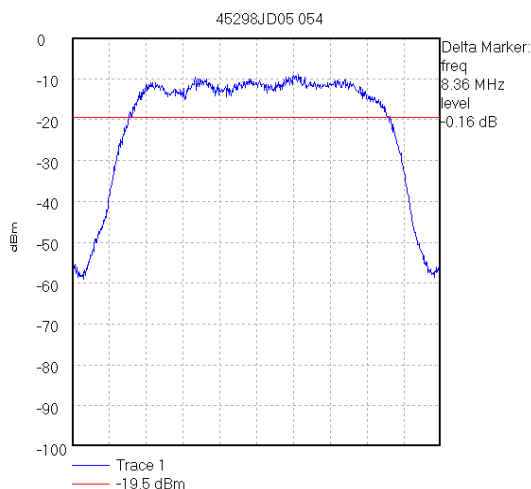
Plot 45298JD05 56, bottom channel, Plot 45298JD05 55 middle channel, Plot 45298JD05 54 top channel



Start 2.5 GHz; Stop 2.512 GHz
Ref 0 dBm; Ref Offset 0.0 dB; 10 dB/div
RBW 300.0 kHz; VBW 1.0 MHz; Att 10 dB; Swp 50.0 mS
Marker .
Delta 8.28 MHz, -0.16 dBm
Display Line: -19.5 dBm; : Limit Test Passed
09/09/2003 17:14:43



Start 2.59 GHz; Stop 2.602 GHz
Ref 0 dBm; Ref Offset 0.0 dB; 10 dB/div
RBW 300.0 kHz; VBW 1.0 MHz; Att 10 dB; Swp 50.0 mS
Marker .
Delta 8.28 MHz, 1.16 dBm
Display Line: -19.5 dBm; : Limit Test Passed
09/09/2003 17:00:25



Start 2.674 GHz; Stop 2.686 GHz
Ref 0 dBm; Ref Offset 0.0 dB; 10 dB/div
RBW 300.0 kHz; VBW 1.0 MHz; Att 10 dB; Swp 50.0 mS
Marker .
Delta 8.36 MHz, -0.16 dBm
Display Line: -19.5 dBm; : Limit Test Passed
09/09/2003 16:57:16

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.

Test Of: IPWireless U.K. Ltd.

UE P1D Model: KF

To: FCC Part 15: 2001, Part 21: 2001 & Part 74: 2001

7.9. Transmitter Spectrum Mask Part 2.1051, 21.908 and 74.936

7.9.1. The EUT was configured as for Spectrum Mask measurements as described in section 9 of this report.

7.9.2. Tests were performed to determine compliance with the out-of band power requirements at frequencies adjacent to the channel occupied by the fundamental frequency of the EUT.

Results:

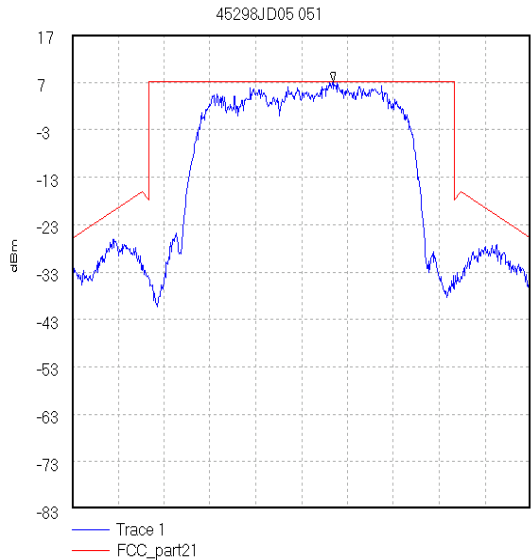
Graphs GPH\45298JD05 051 bottom channel, GPH\45298JD05 052 middle channel and GPH\45298JD05 053 top channel, indicating compliance with the out-of band power requirements within the frequency bands defined by the nominal channel frequency +/- 9 MHz.

Test Of: IPWireless U.K. Ltd.

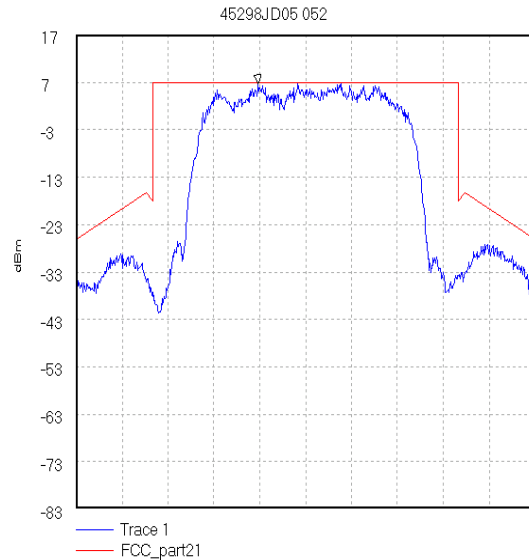
UE P1D Model: KF

To: FCC Part 15: 2001, Part 21: 2001 & Part 74: 2001

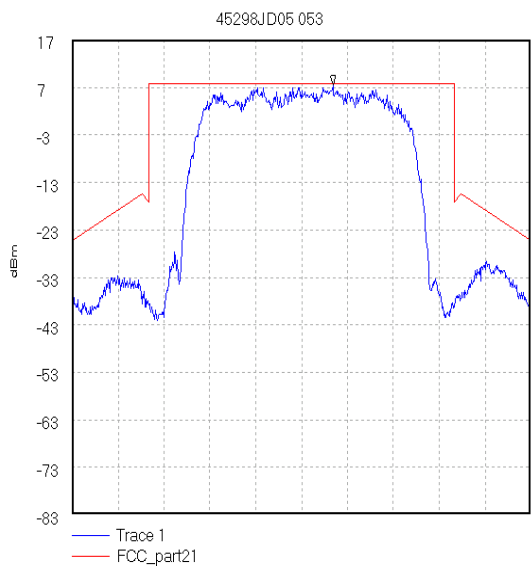
Transmitter Spectrum Mask (Continued)



Start 2.497 GHz; Stop 2.515 GHz
Ref 17 dBm; Ref Offset 22.0 dB; 10 dB/div
RBW 100.0 kHz; VBW 100.0 kHz; Att 10 dB; Swp 50.0 mS
Peak 2.50723 GHz, 7.17 dBm
Limit/Mask: FCC_part21; Limit Test Passed
09/09/2003 15:51:35



Start 2.587 GHz; Stop 2.605 GHz
Ref 17 dBm; Ref Offset 22.0 dB; 10 dB/div
RBW 100.0 kHz; VBW 100.0 kHz; Att 10 dB; Swp 50.0 mS
Peak 2.59414 GHz, 6.67 dBm
Limit/Mask: FCC_part21; Limit Test Passed
09/09/2003 15:53:42



Start 2.671 GHz; Stop 2.689 GHz
Ref 17 dBm; Ref Offset 22.0 dB; 10 dB/div
RBW 100.0 kHz; VBW 100.0 kHz; Att 10 dB; Swp 50.0 mS
Peak 2.68123 GHz, 7.67 dBm
Limit/Mask: FCC_part21; Limit Test Passed
09/09/2003 15:55:29

Test Of: IPWireless U.K. Ltd.

UE P1D Model: KF

To: FCC Part 15: 2001, Part 21: 2001 & Part 74: 2001

7.10. Transmitter Conducted Emissions at Band Edges **Part 2.1051, 21.908 and 74.936**

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

7.10.2. Tests were performed to identify the maximum emissions level at the edges of the 2500 – 2690 MHz frequency band that the EUT will operate over.

Results:

Bottom Band Edge

Frequency (MHz)	Peak Emission Level (dBm)	Carrier Level (dBm)	Spurious Emission (dBc)	Limit (dBc)	Margin (dB)	Result
2498.5	-39.9	23.9	-63.8	-51.7	12.1	Complied

Top Band Edge

Frequency (MHz)	Peak Emission Level (dBm)	Carrier Level (dBm)	Spurious Emission (dBc)	Limit (dBc)	Margin (dB)	Result
2690.25	-50.8	23.7	-74.5	-51.5	23.0	Complied

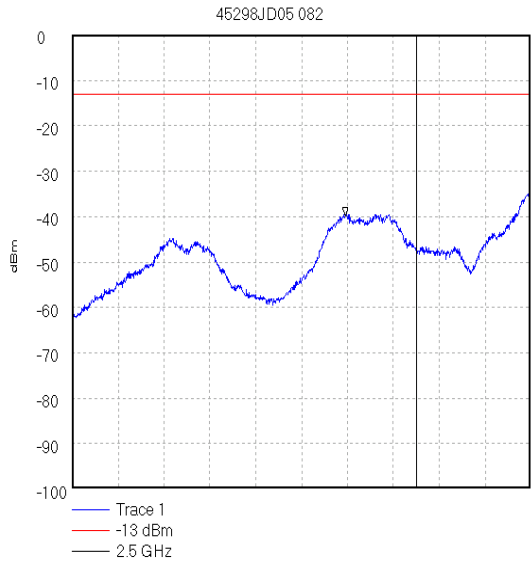
Note: The carrier level in the table above is measured on a 12 MHz channel and therefore is reduced by 3 dB for the 6 MHz channel power as referred to in FCC Section 21.908(d). The limit is calculated according to FCC Section 21.908(e) for absolute power measurements ($A + 10\log(C_{BW}/R_{BW})$) where $C_{BW} = 6$ MHz and $R_{BW} = 100$ kHz).

Test Of: IPWireless U.K. Ltd.

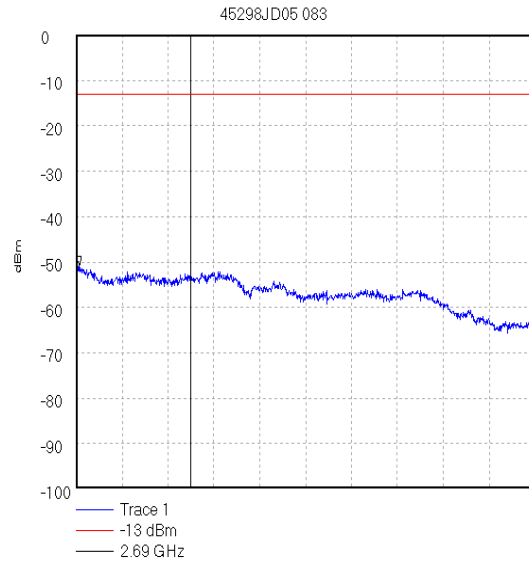
UE P1D Model: KF

To: FCC Part 15: 2001, Part 21: 2001 & Part 74: 2001

Transmitter Conducted Emissions at Band Edges (Continued)
Part 2.1051, 21.908 and 74.936



Start 2.4925 GHz; Stop 2.5025 GHz
 Ref 0 dBm; Ref Offset 22.0 dB; 10 dB/div
 RBW 100.0 kHz; VBW 300.0 kHz; Att 10 dB; Swp 20.0 mS
 Marker 2.49846 GHz, -39.89 dBm
 Display Line: -13 dBm; : Limit Test Passed
 22/09/2003 09:52:41



Start 2.6875 GHz; Stop 2.6975 GHz
 Ref 0 dBm; Ref Offset 22.0 dB; 10 dB/div
 RBW 100.0 kHz; VBW 300.0 kHz; Att 10 dB; Swp 20.0 mS
 Peak 2.68757 GHz, -50.78 dBm
 Display Line: -13 dBm; : Limit Test Passed
 22/09/2003 09:55:25

Test Of: IPWireless U.K. Ltd.

UE P1D Model: KF

To: FCC Part 15: 2001, Part 21: 2001 & Part 74: 2001

7.11. Transmitter Conducted Emissions; Part 2.1051, 21.908 and 74.936

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

7.11.2. Tests were performed to identify the maximum transmitter conducted emission levels.

Result: Bottom Channel

Frequency (MHz)	Peak Emission Level (dBm)	Carrier Level (dBm)	Spurious Emission (dBc)	Limit (dBc)	Margin (dB)	Result
5000.0	-31.8	23.9	-55.7	-44.7	11.0	Complied

Result: Middle Channel

Frequency (MHz)	Peak Emission Level (dBm)	Carrier Level (dBm)	Spurious Emission (dBc)	Limit (dBc)	Margin (dB)	Result
5182.0	-28.0	23.9	-51.9	-44.7	7.2	Complied

Result: Top Channel

Frequency (MHz)	Peak Emission Level (dBm)	Carrier Level (dBm)	Spurious Emission (dBc)	Limit (dBc)	Margin (dB)	Result
5344.0	-25.3	23.7	-49.0	-44.5	4.5	Complied

Note: The carrier level in the table above is measured on a 12 MHz channel and therefore is reduced by 3 dB for the 6 MHz channel power as referred to in FCC Section 21.908(d). The limit is calculated according to FCC Section 21.908(e) for absolute power measurements ($A + 10\log(C_{BW}/R_{BW})$) where $C_{BW} = 6$ MHz and $R_{BW} = 1$ MHz).

Test Of: IPWireless U.K. Ltd.

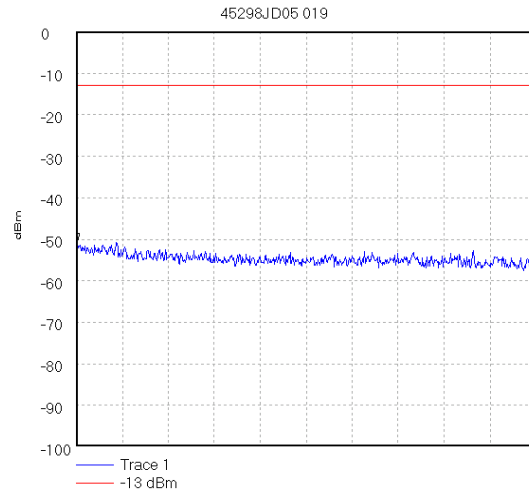
UE P1D Model: KF

To: FCC Part 15: 2001, Part 21: 2001 & Part 74: 2001

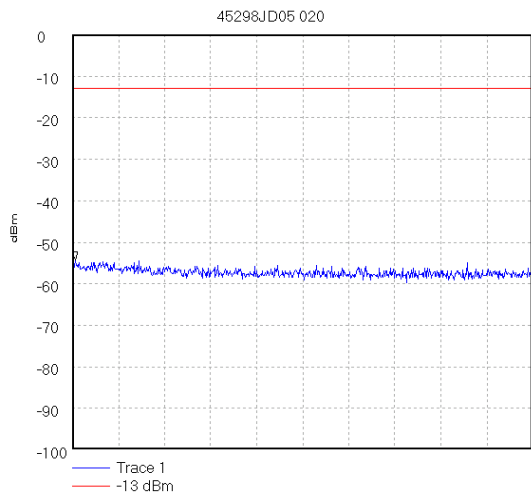
Transmitter Conducted Emissions (Continued) Part 2.1051, 21.908 and 74.936



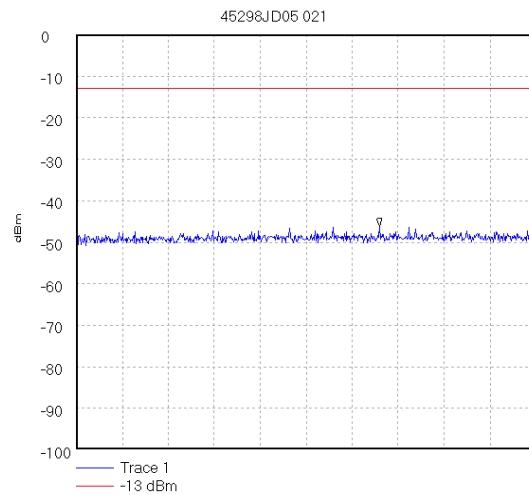
Start 9.0 kHz; Stop 150.0 kHz
Ref 0 dBm; Ref Offset 22.0 dB; 10 dB/div
RBW 1.0 kHz; VBW 1.0 kHz; Att 20 dB; Swp 360.0 mS
Peak 9.0 kHz; -48.83 dBm
Display Line: -13 dBm; ; Limit Test Passed
09/09/2003 13:35:42



Start 150.0 kHz; Stop 1.0 MHz
Ref 0 dBm; Ref Offset 22.0 dB; 10 dB/div
RBW 10.0 kHz; VBW 30.0 kHz; Att 20 dB; Swp 50.0 mS
Peak 151.417 kHz; -50.67 dBm
Display Line: -13 dBm; ; Limit Test Passed
09/09/2003 13:38:51



Start 1.0 MHz; Stop 30.0 MHz
Ref 0 dBm; Ref Offset 22.0 dB; 10 dB/div
RBW 10.0 kHz; VBW 30.0 kHz; Att 20 dB; Swp 730.0 mS
Peak 1.193 MHz; -54.33 dBm
Display Line: -13 dBm; ; Limit Test Passed
09/09/2003 13:39:41



Start 30.0 MHz; Stop 1.0 GHz
Ref 0 dBm; Ref Offset 22.0 dB; 10 dB/div
RBW 100.0 kHz; VBW 300.0 kHz; Att 20 dB; Swp 250.0 mS
Peak 670.2 MHz; -46.17 dBm
Display Line: -13 dBm; ; Limit Test Passed
09/09/2003 13:40:54

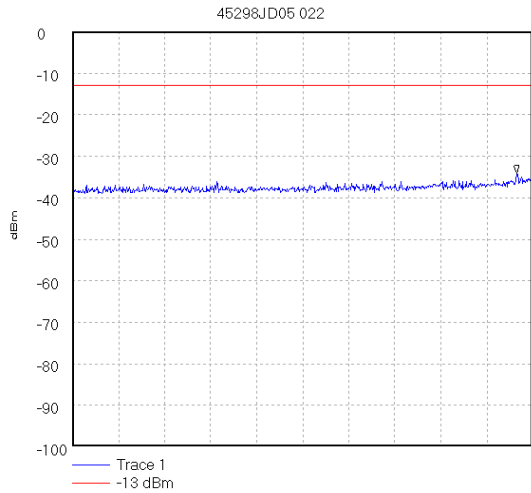
Note: these plots are pre-scans and for indication purposes only. For final measurements, see accompanying tables. Please note, the limit line shown on the plots is not relevant to the overall result and was for the test engineer's benefit only.

Test Of: IPWireless U.K. Ltd.

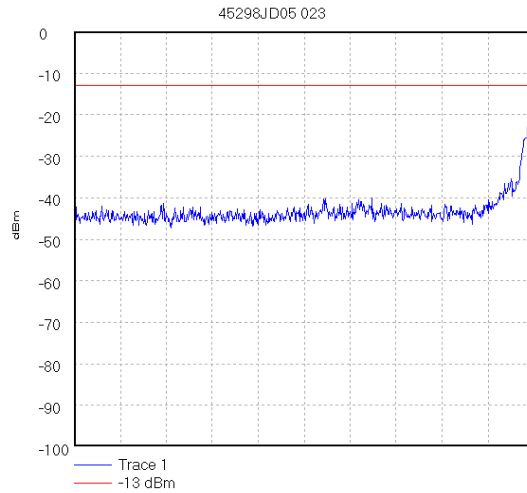
UE P1D Model: KF

To: FCC Part 15: 2001, Part 21: 2001 & Part 74: 2001

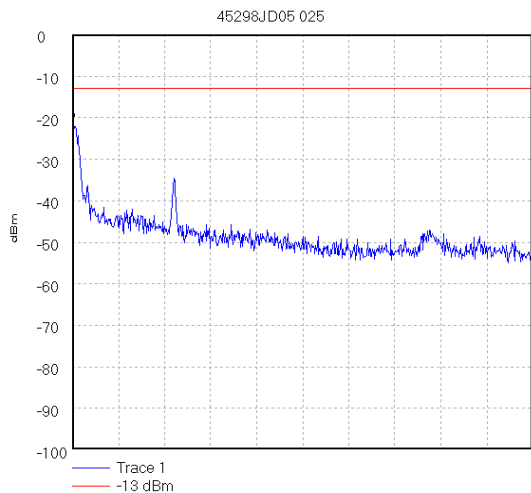
Transmitter Conducted Emissions (Continued) Part 2.1051, 21.908 and 74.936



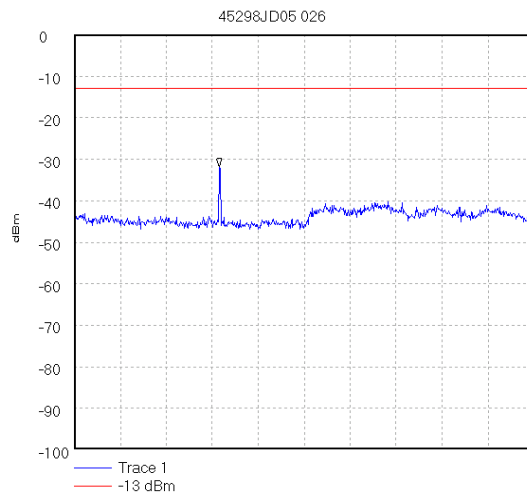
Start 1.0 GHz; Stop 2.4 GHz
Ref 0 dBm; Ref Offset 22.2 dB; 10 dB/div
RBW 1.0 MHz; VBW 3.0 MHz; Att 20 dB; Swp 50.0 mS
Peak 2.351 GHz; -34.17 dBm
Display Line: -13 dBm; : Limit Test Passed
09/09/2003 13:43:19



Start 2.4 GHz; Stop 2.497 GHz
Ref 0 dBm; Ref Offset 22.2 dB; 10 dB/div
RBW 1.0 MHz; VBW 3.0 MHz; Att 20 dB; Swp 50.0 mS
Peak 2.497 GHz; -19.67 dBm
Display Line: -13 dBm; : Limit Test Passed
09/09/2003 13:45:18



Start 2.515 GHz; Stop 2.7 GHz
Ref 0 dBm; Ref Offset 22.8 dB; 10 dB/div
RBW 1.0 MHz; VBW 3.0 MHz; Att 10 dB; Swp 50.0 mS
Peak 2.515 GHz; -21.0 dBm
Display Line: -13 dBm; : Limit Test Passed
09/09/2003 13:49:48



Start 2.7 GHz; Stop 10.0 GHz
Ref 0 dBm; Ref Offset 22.8 dB; 10 dB/div
RBW 1.0 MHz; VBW 3.0 MHz; Att 10 dB; Swp 150.0 mS
Peak 5.0 GHz; -31.83 dBm
Display Line: -13 dBm; : Limit Test Passed
09/09/2003 13:52:55

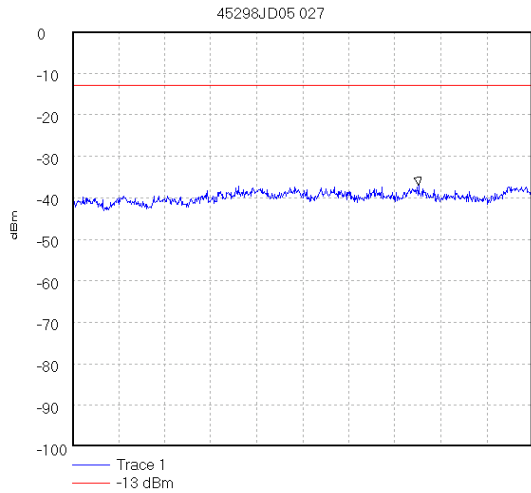
Note: these plots are pre-scans and for indication purposes only. For final measurements, see accompanying tables. Please note, the limit line shown on the plots is not relevant to the overall result and was for the test engineer's benefit only.

Test Of: IPWireless U.K. Ltd.

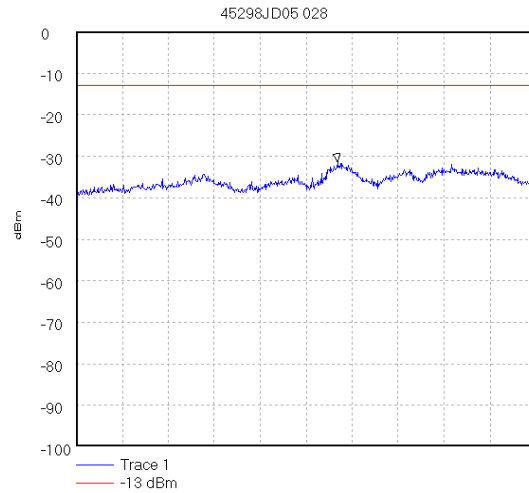
UE P1D Model: KF

To: FCC Part 15: 2001, Part 21: 2001 & Part 74: 2001

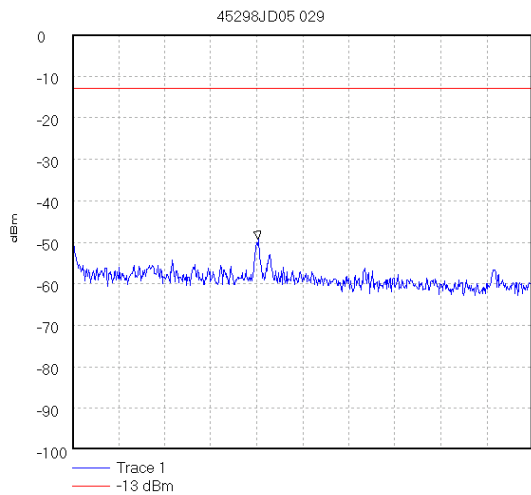
Transmitter Conducted Emissions (Continued) Part 2.1051, 21.908 and 74.936



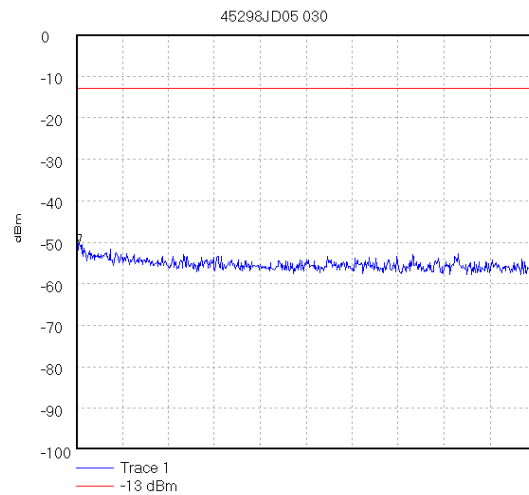
Start 10.0 GHz; Stop 20.0 GHz
Ref 0 dBm; Ref Offset 24.6 dB; 10 dB/div
RBW 1.0 MHz; VBW 3.0 MHz; Att 10 dB; Swp 200.0 mS
Peak 17.517 GHz; -37.0 dBm
Display Line: -13 dBm; : Limit Test Passed
09/09/2003 13:55:14



Start 20.0 GHz; Stop 27.0 GHz
Ref 0 dBm; Ref Offset 25.0 dB; 10 dB/div
RBW 1.0 MHz; VBW 3.0 MHz; Att 10 dB; Swp 140.0 mS
Peak 23.978 GHz; -31.33 dBm
Display Line: -13 dBm; : Limit Test Passed
09/09/2003 13:56:36



Start 9.0 kHz; Stop 150.0 kHz
Ref 0 dBm; Ref Offset 22.0 dB; 10 dB/div
RBW 1.0 kHz; VBW 1.0 kHz; Att 20 dB; Swp 360.0 mS
Peak 65.87 kHz; -49.17 dBm
Display Line: -13 dBm; : Limit Test Passed
09/09/2003 13:59:55



Start 150.0 kHz; Stop 1.0 MHz
Ref 0 dBm; Ref Offset 22.0 dB; 10 dB/div
RBW 10.0 kHz; VBW 30.0 kHz; Att 20 dB; Swp 50.0 mS
Peak 155.667 kHz; -50.17 dBm
Display Line: -13 dBm; : Limit Test Passed
09/09/2003 14:00:36

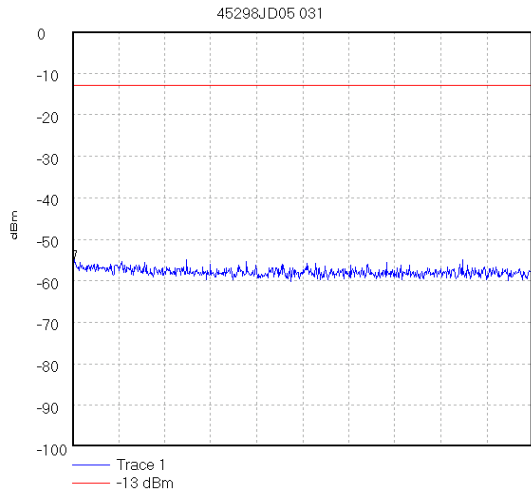
Note: these plots are pre-scans and for indication purposes only. For final measurements, see accompanying tables. Please note, the limit line shown on the plots is not relevant to the overall result and was for the test engineer's benefit only.

Test Of: IPWireless U.K. Ltd.

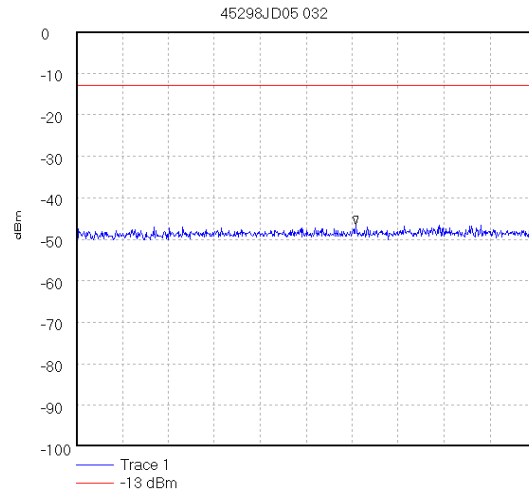
UE P1D Model: KF

To: FCC Part 15: 2001, Part 21: 2001 & Part 74: 2001

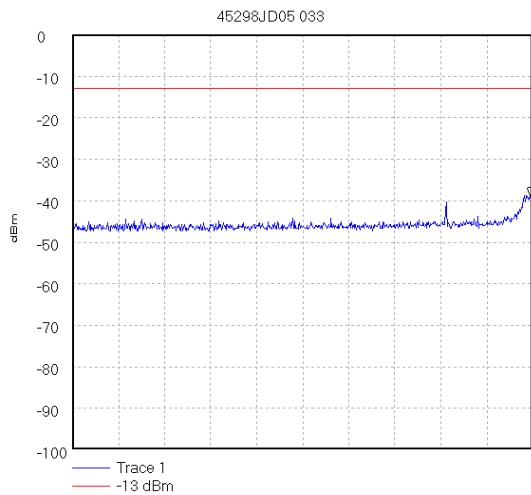
Transmitter Conducted Emissions (Continued) Part 2.1051, 21.908 and 74.936



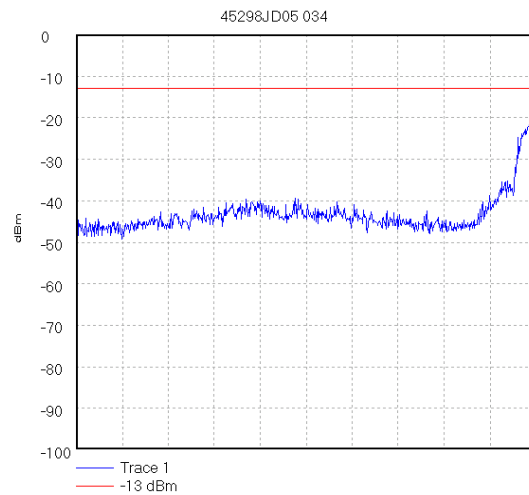
Start 1.0 MHz; Stop 30.0 MHz
 Ref 0 dBm; Ref Offset 22.0 dB; 10 dB/div
 RBW 10.0 kHz; VBW 30.0 kHz; Att 20 dB; Swp 730.0 mS
 Peak 1.097 MHz; -54.83 dBm
 Display Line: -13 dBm; ; Limit Test Passed
 09/09/2003 14:01:10



Start 30.0 MHz; Stop 1.0 GHz
 Ref 0 dBm; Ref Offset 22.0 dB; 10 dB/div
 RBW 100.0 kHz; VBW 300.0 kHz; Att 20 dB; Swp 250.0 mS
 Peak 620.083 MHz; -46.5 dBm
 Display Line: -13 dBm; ; Limit Test Passed
 09/09/2003 14:02:28



Start 1.0 GHz; Stop 2.5 GHz
 Ref 0 dBm; Ref Offset 22.2 dB; 10 dB/div
 RBW 1.0 MHz; VBW 3.0 MHz; Att 10 dB; Swp 50.0 mS
 Peak 2.49 GHz; -38.67 dBm
 Display Line: -13 dBm; ; Limit Test Passed
 09/09/2003 14:03:41



Start 2.5 GHz; Stop 2.587 GHz
 Ref 0 dBm; Ref Offset 22.2 dB; 10 dB/div
 RBW 1.0 MHz; VBW 3.0 MHz; Att 10 dB; Swp 50.0 mS
 Peak 2.587 GHz; -19.17 dBm
 Display Line: -13 dBm; ; Limit Test Passed
 09/09/2003 14:04:27

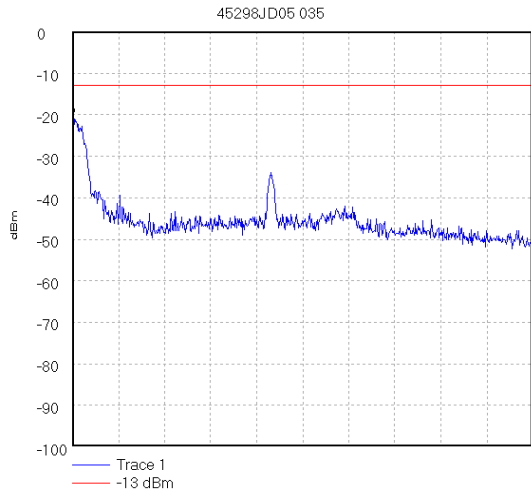
Note: these plots are pre-scans and for indication purposes only. For final measurements, see accompanying tables. Please note, the limit line shown on the plots is not relevant to the overall result and was for the test engineer's benefit only.

Test Of: IPWireless U.K. Ltd.

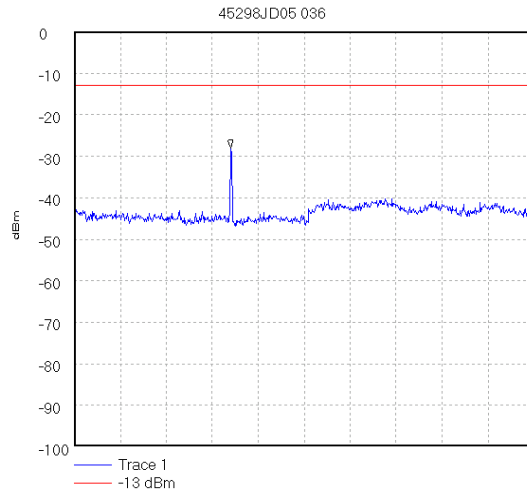
UE P1D Model: KF

To: FCC Part 15: 2001, Part 21: 2001 & Part 74: 2001

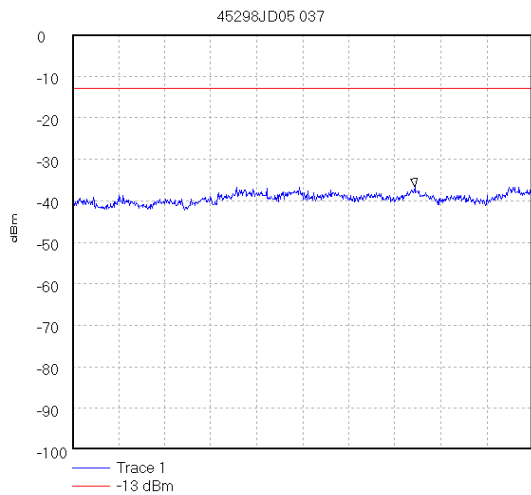
Transmitter Conducted Emissions (Continued) Part 2.1051, 21.908 and 74.936



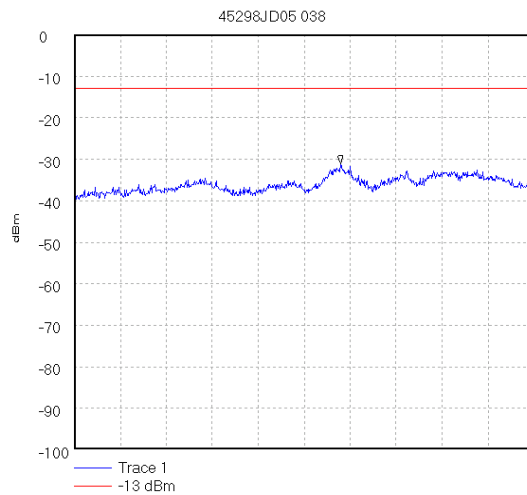
Start 2.605 GHz; Stop 2.7 GHz
Ref 0 dBm; Ref Offset 22.2 dB; 10 dB/div
RBW 1.0 MHz; VBW 3.0 MHz; Att 10 dB; Swp 50.0 mS
Peak 2.605 GHz; -20.67 dBm
Display Line: -13 dBm; Limit Test Passed
09/09/2003 14:05:40



Start 2.7 GHz; Stop 10.0 GHz
Ref 0 dBm; Ref Offset 23.0 dB; 10 dB/div
RBW 1.0 MHz; VBW 3.0 MHz; Att 10 dB; Swp 150.0 mS
Peak 5.182 GHz; -28.0 dBm
Display Line: -13 dBm; Limit Test Passed
09/09/2003 14:07:14



Start 10.0 GHz; Stop 20.0 GHz
Ref 0 dBm; Ref Offset 25.0 dB; 10 dB/div
RBW 1.0 MHz; VBW 3.0 MHz; Att 10 dB; Swp 200.0 mS
Peak 17.433 GHz; -36.67 dBm
Display Line: -13 dBm; Limit Test Passed
09/09/2003 14:09:27



Start 20.0 GHz; Stop 27.0 GHz
Ref 0 dBm; Ref Offset 25.4 dB; 10 dB/div
RBW 1.0 MHz; VBW 3.0 MHz; Att 10 dB; Swp 140.0 mS
Peak 24.06 GHz; -31.0 dBm
Display Line: -13 dBm; Limit Test Passed
09/09/2003 14:10:29

Note: these plots are pre-scans and for indication purposes only. For final measurements, see accompanying tables. Please note, the limit line shown on the plots is not relevant to the overall result and was for the test engineer's benefit only.

Test Of: IPWireless U.K. Ltd.

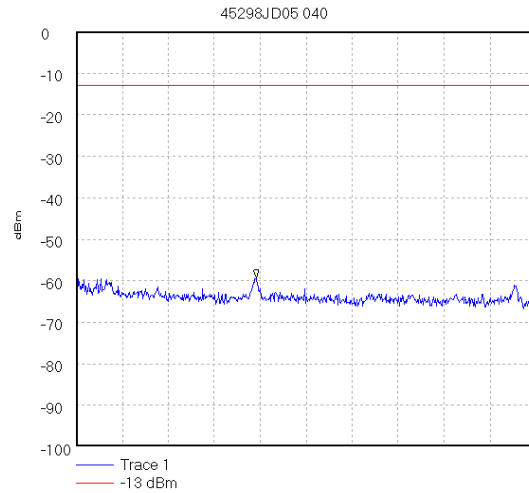
UE P1D Model: KF

To: FCC Part 15: 2001, Part 21: 2001 & Part 74: 2001

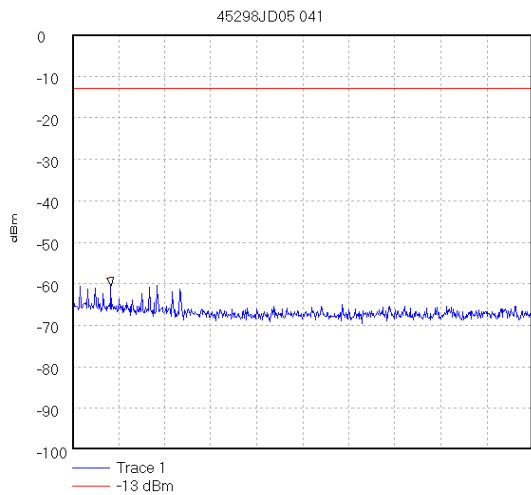
Transmitter Conducted Emissions (Continued) Part 2.1051, 21.908 and 74.936



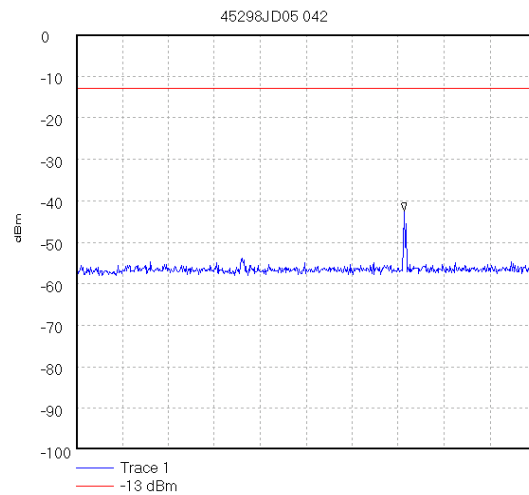
Start 9.0 kHz; Stop 150.0 kHz
Ref 0 dBm; Ref Offset 22.0 dB; 10 dB/div
RBW 1.0 kHz; VBW 1.0 kHz; Att 20 dB; Swp 360.0 mS
Peak 9.0 kHz; -49.5 dBm
Display Line: -13 dBm; Limit Test Passed
09/09/2003 14:12:27



Start 150.0 kHz; Stop 1.0 MHz
Ref 0 dBm; Ref Offset 22.0 dB; 10 dB/div
RBW 10.0 kHz; VBW 30.0 kHz; Att 10 dB; Swp 50.0 mS
Peak 482.917 kHz; -59.33 dBm
Display Line: -13 dBm; Limit Test Passed
09/09/2003 14:13:46



Start 1.0 MHz; Stop 30.0 MHz
Ref 0 dBm; Ref Offset 22.0 dB; 10 dB/div
RBW 10.0 kHz; VBW 30.0 kHz; Att 10 dB; Swp 730.0 mS
Peak 3.417 MHz; -60.5 dBm
Display Line: -13 dBm; Limit Test Passed
09/09/2003 14:14:47



Start 30.0 MHz; Stop 1.0 GHz
Ref 0 dBm; Ref Offset 22.0 dB; 10 dB/div
RBW 100.0 kHz; VBW 300.0 kHz; Att 10 dB; Swp 250.0 mS
Peak 721.933 MHz; -42.5 dBm
Display Line: -13 dBm; Limit Test Passed
09/09/2003 14:17:03

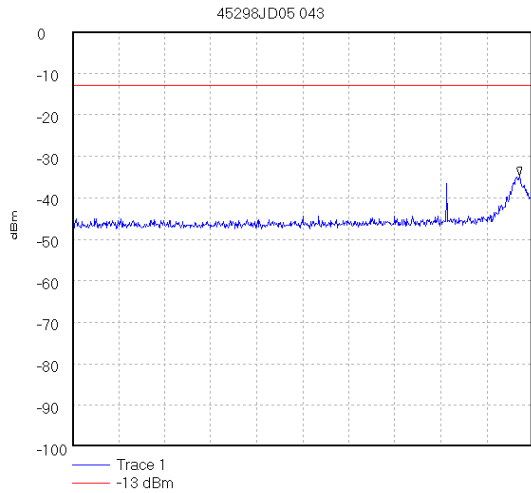
Note: these plots are pre-scans and for indication purposes only. For final measurements, see accompanying tables. Please note, the limit line shown on the plots is not relevant to the overall result and was for the test engineer's benefit only.

Test Of: IPWireless U.K. Ltd.

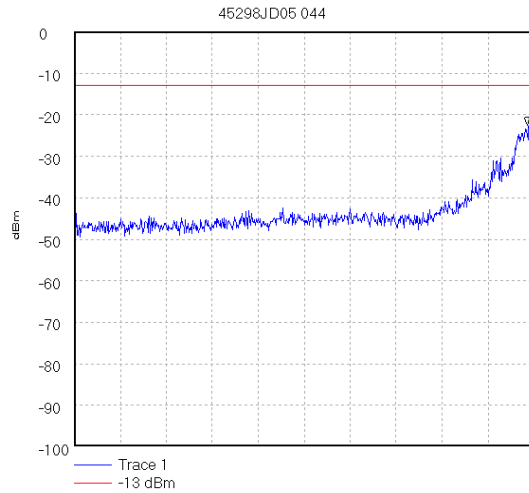
UE P1D Model: KF

To: FCC Part 15: 2001, Part 21: 2001 & Part 74: 2001

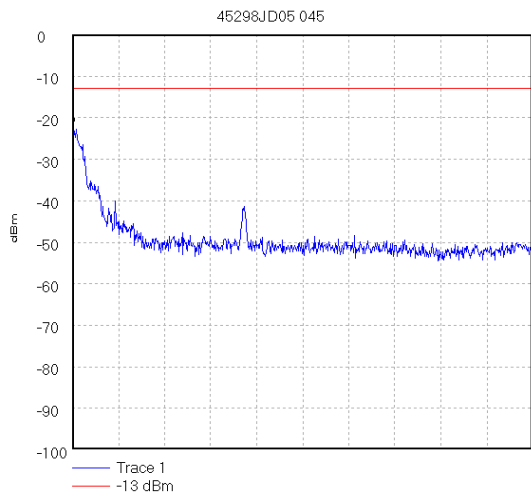
Transmitter Conducted Emissions (Continued) Part 2.1051, 21.908 and 74.936



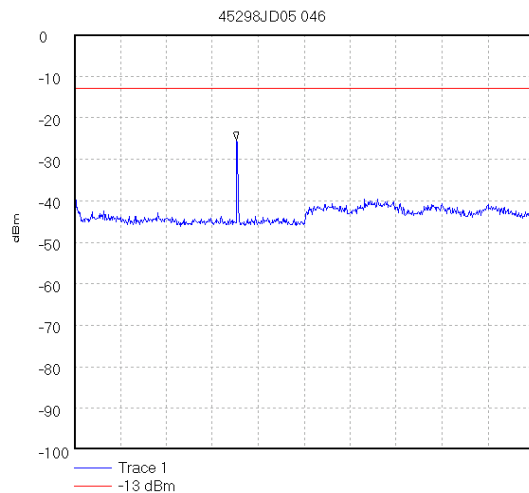
Start 1.0 GHz; Stop 2.6 GHz
Ref 0 dBm; Ref Offset 22.2 dB; 10 dB/div
RBW 1.0 MHz; VBW 3.0 MHz; Att 10 dB; Swp 50.0 mS
Peak 2.555 GHz; -34.67 dBm
Display Line: -13 dBm; Limit Test Passed
09/09/2003 14:18:26



Start 2.6 GHz; Stop 2.671 GHz
Ref 0 dBm; Ref Offset 22.2 dB; 10 dB/div
RBW 1.0 MHz; VBW 3.0 MHz; Att 10 dB; Swp 50.0 mS
Peak 2.67 GHz; -22.5 dBm
Display Line: -13 dBm; Limit Test Passed
09/09/2003 14:19:17



Start 2.689 GHz; Stop 2.8 GHz
Ref 0 dBm; Ref Offset 22.2 dB; 10 dB/div
RBW 1.0 MHz; VBW 3.0 MHz; Att 10 dB; Swp 50.0 mS
Peak 2.689 GHz; -22.17 dBm
Display Line: -13 dBm; Limit Test Passed
09/09/2003 14:20:08



Start 2.8 GHz; Stop 10.0 GHz
Ref 0 dBm; Ref Offset 22.8 dB; 10 dB/div
RBW 1.0 MHz; VBW 3.0 MHz; Att 10 dB; Swp 150.0 mS
Peak 5.344 GHz; -25.33 dBm
Display Line: -13 dBm; Limit Test Passed
09/09/2003 14:21:22

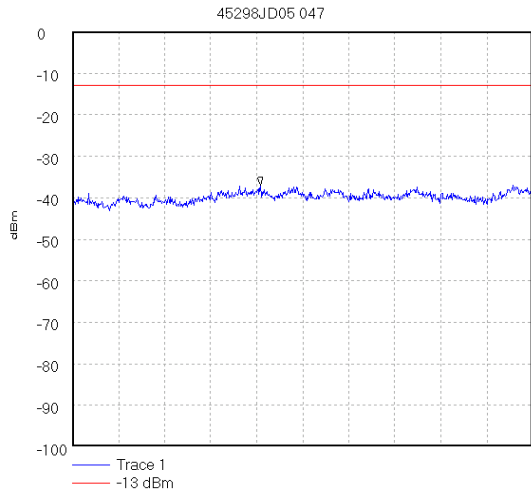
Note: these plots are pre-scans and for indication purposes only. For final measurements, see accompanying tables. Please note, the limit line shown on the plots is not relevant to the overall result and was for the test engineer's benefit only.

Test Of: IPWireless U.K. Ltd.

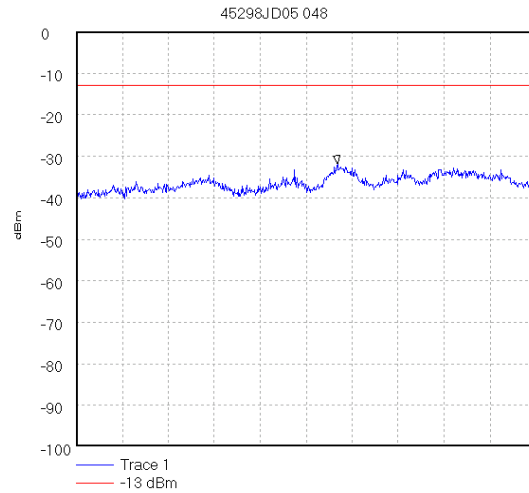
UE P1D Model: KF

To: FCC Part 15: 2001, Part 21: 2001 & Part 74: 2001

Transmitter Conducted Emissions (Continued) Part 2.1051, 21.908 and 74.936



Start 10.0 GHz; Stop 20.0 GHz
 Ref 0 dBm; Ref Offset 24.6 dB; 10 dB/div
 RBW 1.0 MHz; VBW 3.0 MHz; Att 10 dB; Swp 200.0 mS
 Peak 14.083 GHz; -37.0 dBm
 Display Line: -13 dBm; : Limit Test Passed
 09/09/2003 14:22:48



Start 20.0 GHz; Stop 27.0 GHz
 Ref 0 dBm; Ref Offset 25.4 dB; 10 dB/div
 RBW 1.0 MHz; VBW 3.0 MHz; Att 10 dB; Swp 140.0 mS
 Peak 23.978 GHz; -31.83 dBm
 Display Line: -13 dBm; : Limit Test Passed
 09/09/2003 14:23:28

Note: these plots are pre-scans and for indication purposes only. For final measurements, see accompanying tables. Please note, the limit line shown on the plots is not relevant to the overall result and was for the test engineer's benefit only.

Test Of: IPWireless U.K. Ltd.

UE P1D Model: KF

To: FCC Part 15: 2001, Part 21: 2001 & Part 74: 2001

7.12. Transmitter Radiated Emissions Part 2.1053, 21.908 and 74.936

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

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

Results:- Bottom Channel

Frequency (MHz)	Spurious Emission (dBm)	Carrier EIRP (dBm)	Spurious Emission (dBc)	Limit (dBc)	Margin (dB)	Result
1092.0	-37.1	25.9	-63.0	-46.7	16.3	Complied
2532.8	-24.1	25.9	-49.9	-46.7	3.2	Complied
5015.6	-39.2	25.9	-65.1	-41.9	23.2	Complied
7528.9	-44.2	25.9	-70.1	-41.9	28.2	Complied

Results:- Middle Channel

Frequency (MHz)	Spurious Emission (dBm)	Carrier EIRP (dBm)	Spurious Emission (dBc)	Limit (dBc)	Margin (dB)	Result
1096.0	-38.0	25.9	-62.9	-46.7	16.2	Complied
2643.7	-25.1	25.9	-51.0	-46.7	4.3	Complied
5195.6	-33.6	25.9	-59.5	-41.9	17.6	Complied

Results:- Top Channel

Frequency (MHz)	Spurious Emission (dBm)	Carrier EIRP (dBm)	Spurious Emission (dBc)	Limit (dBc)	Margin (dB)	Result
1091.0	-35.7	25.7	-61.4	-46.5	14.9	Complied
2544.4	-25.8	25.7	-51.5	-46.5	5.0	Complied
5362.2	-31.2	25.7	-56.9	-41.7	15.2	Complied

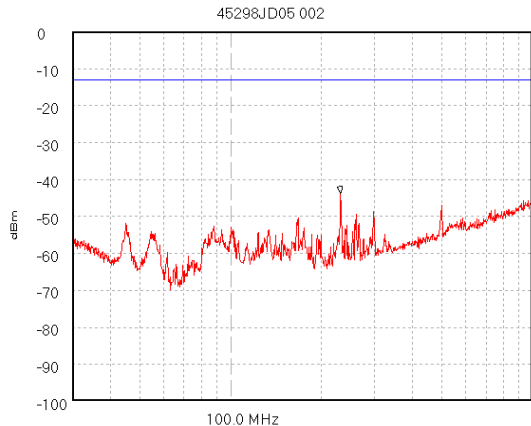
Note: The carrier level in the table above is measured on a 12 MHz channel and therefore is reduced by 3 dB for the 6 MHz channel power as referred to in FCC Section 21.908(d). The limit is calculated according to FCC Section 21.908(e) for absolute power measurements ($A + 10\log(C_{BW}/R_{BW})$ where $C_{BW} = 6$ MHz and $R_{BW} =$ as stated on the plot).

Test Of: IPWireless U.K. Ltd.

UE P1D Model: KF

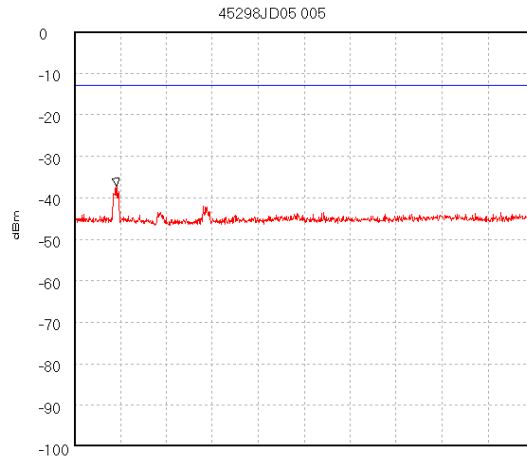
To: FCC Part 15: 2001, Part 21: 2001 & Part 74: 2001

Transmitter Radiated Emissions (Continued) Part 2.1053, 21.908 and 74.936



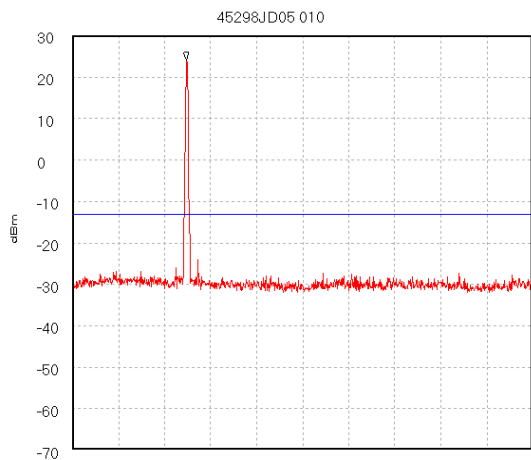
— UE P1D
— -13 dBm

Start 30.0 MHz; Stop 1.0 GHz - Log Scale
Ref 0 dBm; Ref Offset 10.0 dB; 10 dB/div
RBW 119.818 kHz; VBW 100.0 kHz; Att 10 dB; Swp 40.0 mS
Peak 231.087 MHz; -43.75 dBm
Display Line: -13 dBm;
Transducer Factors: A490
08/09/2003 11:44:32



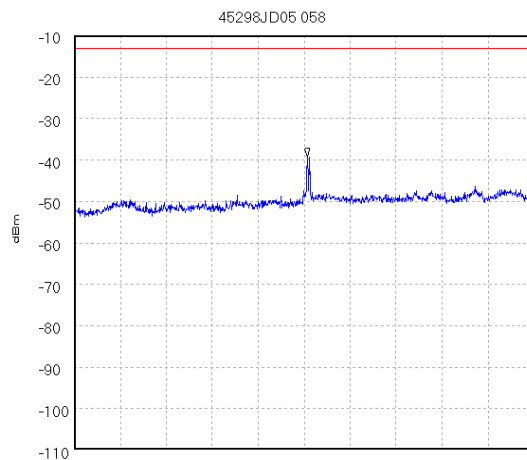
— UE P1D
— -13 dBm

Start 1.0 GHz; Stop 2.0 GHz
Ref 0 dBm; Ref Offset 30.2 dB; 10 dB/div
RBW 1.0 MHz; VBW 1.0 MHz; Att 10 dB; Swp 20.0 mS
Peak 1.092 GHz; -37.15 dBm
Display Line: -13 dBm;
08/09/2003 13:23:00



— UE P1D
— -13 dBm

Start 2.0 GHz; Stop 4.0 GHz
Ref 30 dBm; Ref Offset 37.7 dB; 10 dB/div
RBW 1.0 MHz; VBW 1.0 MHz; Att 10 dB; Swp 20.0 mS
Peak 2.496 GHz; 24.11 dBm
Display Line: -13 dBm;
08/09/2003 14:19:12



— Trace 1
— -13 dBm

Start 4.0 GHz; Stop 6.0 GHz
Ref -10 dBm; Ref Offset 30.3 dB; 10 dB/div
RBW 3.0 MHz; VBW 1.0 MHz; Att 0 dB; Swp 20.0 mS
Peak 5.01556 GHz; -39.22 dBm
Display Line: -13 dBm; : Limit Test Passed
10/09/2003 09:20:58

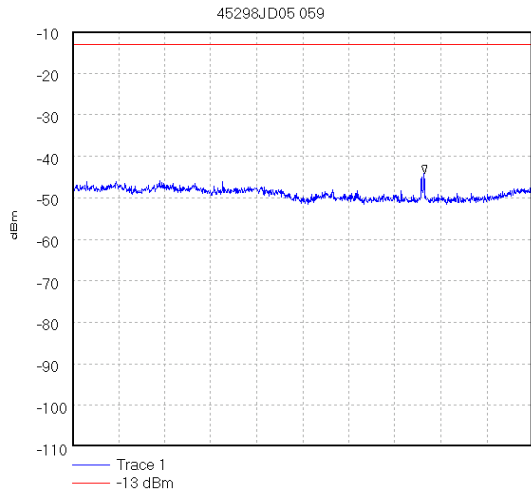
Note: these plots are pre-scans and for indication purposes only. For final measurements, see accompanying tables. Please note, the limit line shown on the plots is not relevant to the overall result and was for the test engineer's benefit only.

Test Of: IPWireless U.K. Ltd.

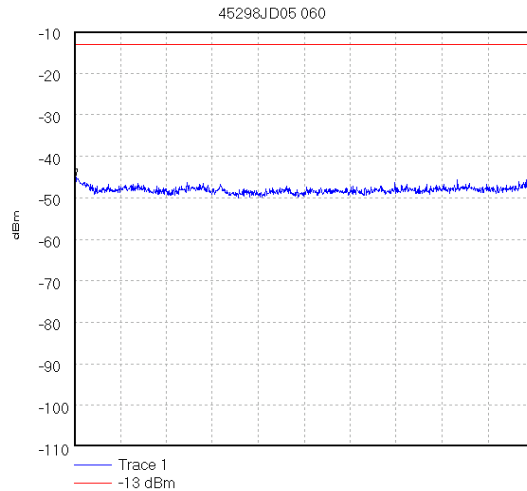
UE P1D Model: KF

To: FCC Part 15: 2001, Part 21: 2001 & Part 74: 2001

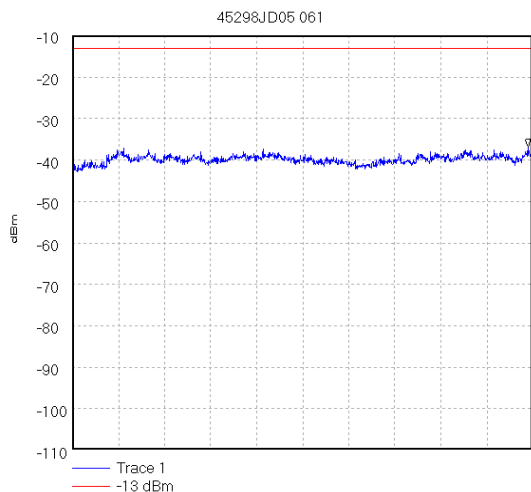
Transmitter Radiated Emissions (Continued) Part 2.1053, 21.908 and 74.936



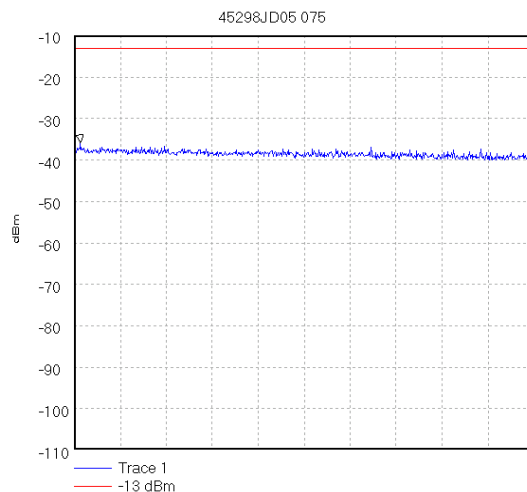
Start 6.0 GHz; Stop 8.0 GHz
 Ref -10 dBm; Ref Offset 32.8 dB; 10 dB/div
 RBW 3.0 MHz; VBW 1.0 MHz; Att 0 dB; Swp 20.0 mS
 Peak 7.52889 GHz; -44.2 dBm
 Display Line: -13 dBm; : Limit Test Passed
 10/09/2003 09:25:51



Start 8.0 GHz; Stop 12.5 GHz
 Ref -10 dBm; Ref Offset 36.1 dB; 10 dB/div
 RBW 3.0 MHz; VBW 1.0 MHz; Att 0 dB; Swp 20.0 mS
 Peak 8.01 GHz; -44.94 dBm
 Display Line: -13 dBm; : Limit Test Passed
 10/09/2003 09:29:39



Start 12.5 GHz; Stop 18.0 GHz
 Ref -10 dBm; Ref Offset 41.0 dB; 10 dB/div
 RBW 3.0 MHz; VBW 1.0 MHz; Att 0 dB; Swp 40.0 mS
 Peak 17.945 GHz; -36.94 dBm
 Display Line: -13 dBm; : Limit Test Passed
 10/09/2003 09:33:02



Centre 26.75 GHz; Span 500.0 MHz
 Ref -10 dBm; Ref Offset 35.0 dB; 10 dB/div
 RBW 1.0 MHz; VBW 1.0 MHz; Att 0 dB; Swp 50.0 mS
 Peak 26.50667 GHz; -35.83 dBm
 Display Line: -13 dBm; : Limit Test Passed
 10/09/2003 11:51:22

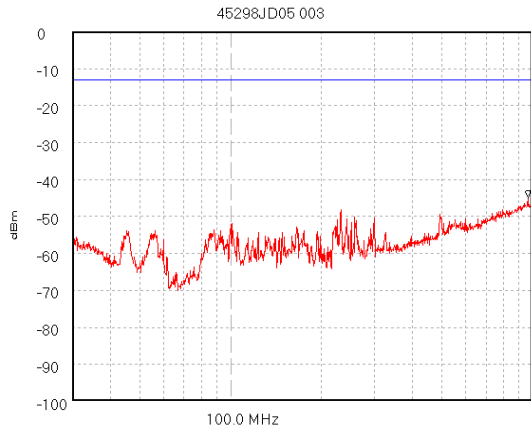
Note: these plots are pre-scans and for indication purposes only. For final measurements, see accompanying tables. Please note, the limit line shown on the plots is not relevant to the overall result and was for the test engineer's benefit only.

Test Of: IPWireless U.K. Ltd.

UE P1D Model: KF

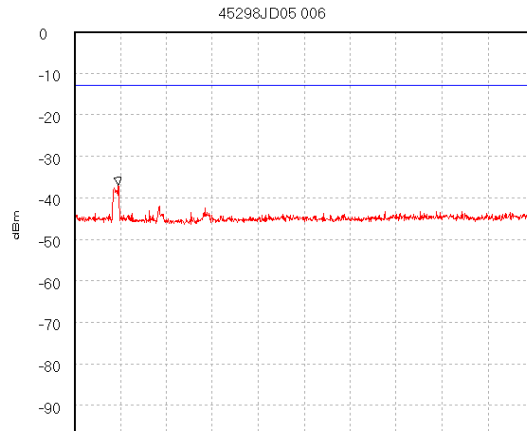
To: FCC Part 15: 2001, Part 21: 2001 & Part 74: 2001

Transmitter Radiated Emissions (Continued) Part 2.1053, 21.908 and 74.936



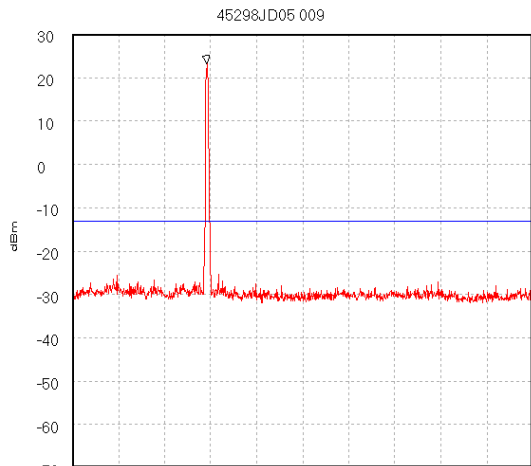
— UE P1D
— -13 dBm

Start 30.0 MHz; Stop 1.0 GHz - Log Scale
Ref 0 dBm; Ref Offset 10.0 dB; 10 dB/div
RBW 119.818 kHz; VBW 100.0 kHz; Att 10 dB; Swp 40.0 mS
Peak 965.542 MHz; -44.92 dBm
Display Line: -13 dBm;
Transducer Factors: A490
08/09/2003 11:50:55



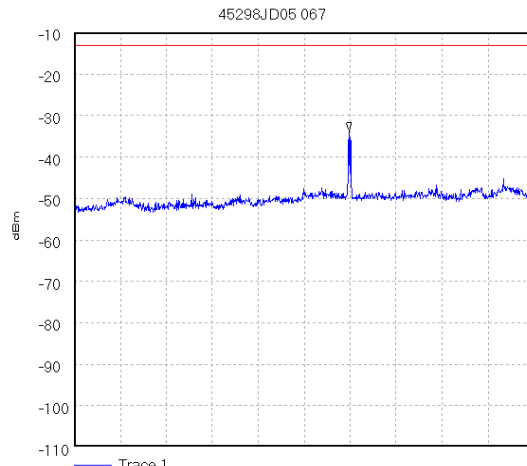
— UE P1D
— -13 dBm

Start 1.0 GHz; Stop 2.0 GHz
Ref 0 dBm; Ref Offset 30.2 dB; 10 dB/div
RBW 1.0 MHz; VBW 1.0 MHz; Att 10 dB; Swp 20.0 mS
Peak 1.096 GHz; -37.02 dBm
Display Line: -13 dBm;
08/09/2003 13:32:42



— UE P1D
— -13 dBm

Start 2.0 GHz; Stop 4.0 GHz
Ref 30 dBm; Ref Offset 37.7 dB; 10 dB/div
RBW 1.0 MHz; VBW 1.0 MHz; Att 10 dB; Swp 20.0 mS
Peak 2.584 GHz; 23.22 dBm
Display Line: -13 dBm;
08/09/2003 14:09:44



— Trace 1
— -13 dBm

Start 4.0 GHz; Stop 6.0 GHz
Ref -10 dBm; Ref Offset 30.3 dB; 10 dB/div
RBW 3.0 MHz; VBW 1.0 MHz; Att 0 dB; Swp 20.0 mS
Peak 5.19566 GHz; -33.64 dBm
Display Line: -13 dBm; : Limit Test Passed
10/09/2003 09:56:36

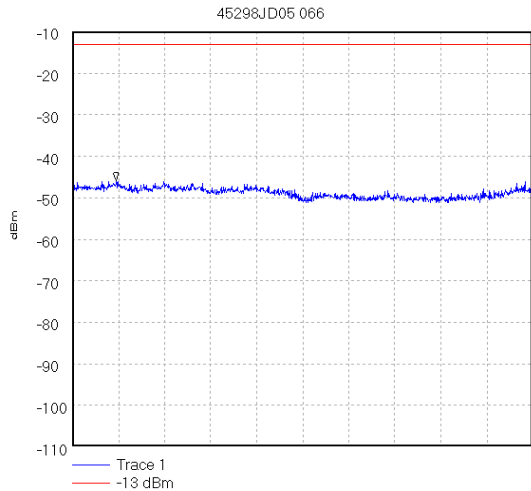
Note: these plots are pre-scans and for indication purposes only. For final measurements, see accompanying tables. Please note, the limit line shown on the plots is not relevant to the overall result and was for the test engineer's benefit only.

Test Of: IPWireless U.K. Ltd.

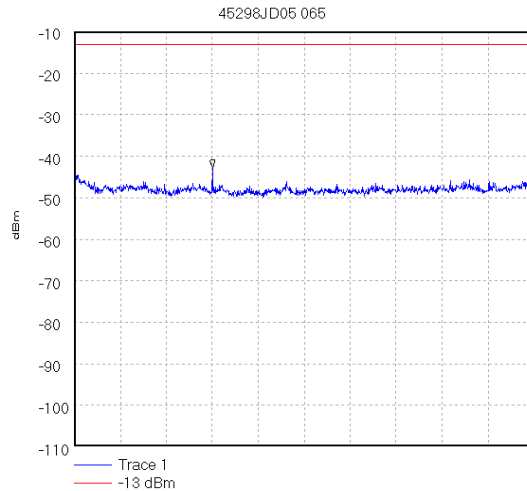
UE P1D Model: KF

To: FCC Part 15: 2001, Part 21: 2001 & Part 74: 2001

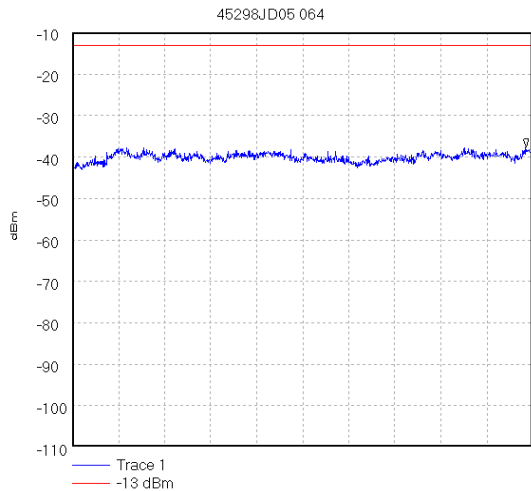
Transmitter Radiated Emissions (Continued) Part 2.1053, 21.908 and 74.936



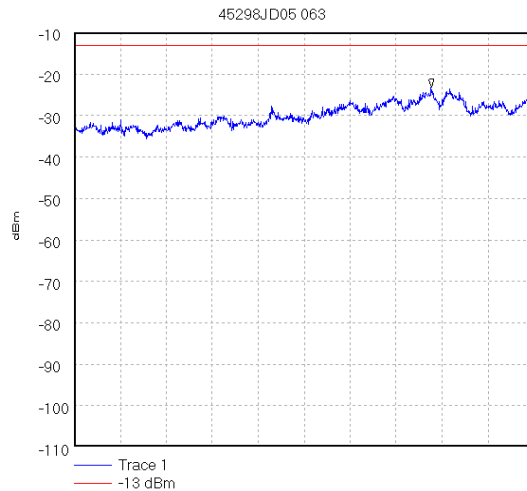
Start 6.0 GHz; Stop 8.0 GHz
Ref -10 dBm; Ref Offset 32.8 dB; 10 dB/div
RBW 3.0 MHz; VBW 1.0 MHz; Att 0 dB; Swp 20.0 mS
Peak 6.19111 GHz; -45.95 dBm
Display Line: -13 dBm; : Limit Test Passed
10/09/2003 09:53:40



Start 8.0 GHz; Stop 12.5 GHz
Ref -10 dBm; Ref Offset 36.1 dB; 10 dB/div
RBW 3.0 MHz; VBW 1.0 MHz; Att 0 dB; Swp 20.0 mS
Peak 9.355 GHz; -42.78 dBm
Display Line: -13 dBm; : Limit Test Passed
10/09/2003 09:49:26



Start 12.5 GHz; Stop 18.0 GHz
Ref -10 dBm; Ref Offset 41.0 dB; 10 dB/div
RBW 3.0 MHz; VBW 1.0 MHz; Att 0 dB; Swp 40.0 mS
Peak 17.92056 GHz; -37.62 dBm
Display Line: -13 dBm; : Limit Test Passed
10/09/2003 09:47:01



Start 18.0 GHz; Stop 26.5 GHz
Ref -10 dBm; Ref Offset 46.7 dB; 10 dB/div
RBW 3.0 MHz; VBW 1.0 MHz; Att 0 dB; Swp 40.0 mS
Peak 24.60167 GHz; -23.07 dBm
Display Line: -13 dBm; : Limit Test Passed
10/09/2003 09:44:28

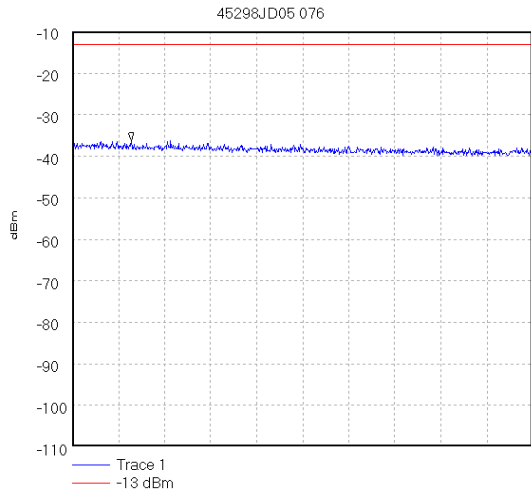
Note: these plots are pre-scans and for indication purposes only. For final measurements, see accompanying tables. Please note, the limit line shown on the plots is not relevant to the overall result and was for the test engineer's benefit only.

Test Of: IPWireless U.K. Ltd.

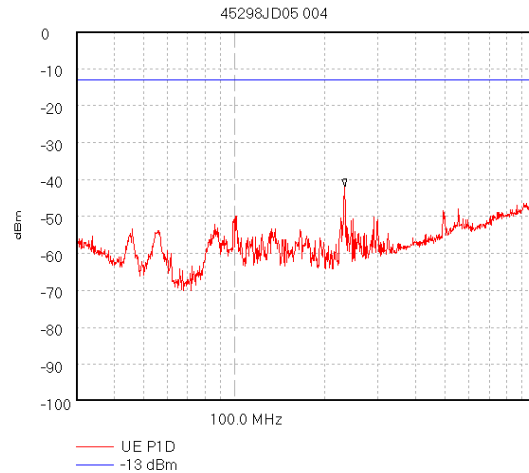
UE P1D Model: KF

To: FCC Part 15: 2001, Part 21: 2001 & Part 74: 2001

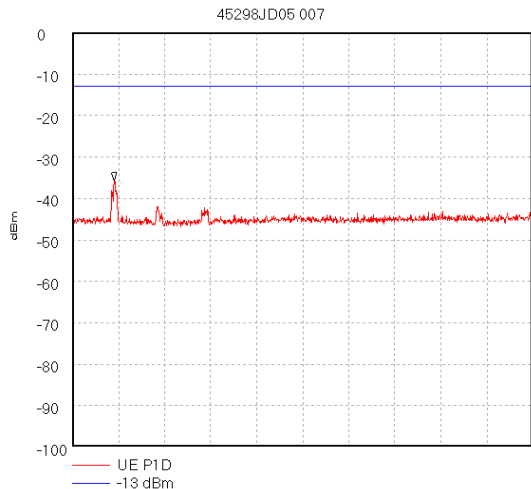
Transmitter Radiated Emissions (Continued) Part 2.1053, 21.908 and 74.936



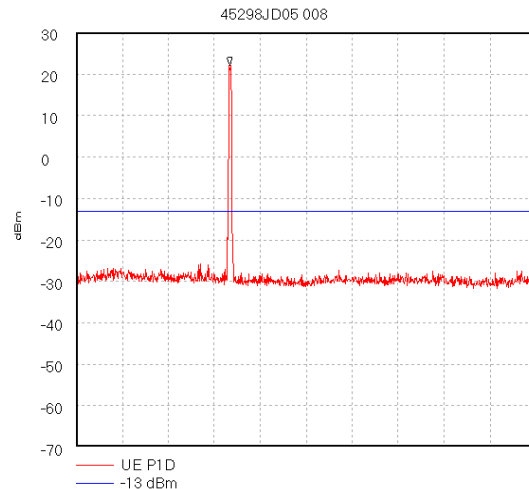
Centre 26.75 GHz; Span 500.0 MHz
Ref -10 dBm; Ref Offset 35.0 dB; 10 dB/div
RBW 1.0 MHz; VBW 1.0 MHz; Att 0 dB; Swp 50.0 mS
Peak 26.56417 GHz; -36.33 dBm
Display Line: -13 dBm; : Limit Test Passed
10/09/2003 11:53:54



Start 30.0 MHz; Stop 1.0 GHz - Log Scale
Ref 0 dBm; Ref Offset 10.0 dB; 10 dB/div
RBW 119.818 kHz; VBW 100.0 kHz; Att 10 dB; Swp 220.0 mS
Peak 232.895 MHz; -41.92 dBm
Display Line: -13 dBm;
Transducer Factors: A490
08/09/2003 11:58:23



Start 1.0 GHz; Stop 2.0 GHz
Ref 0 dBm; Ref Offset 30.2 dB; 10 dB/div
RBW 1.0 MHz; VBW 1.0 MHz; Att 10 dB; Swp 20.0 mS
Peak 1.091 GHz; -35.75 dBm
Display Line: -13 dBm;
08/09/2003 13:42:21



Start 2.0 GHz; Stop 4.0 GHz
Ref 30 dBm; Ref Offset 37.7 dB; 10 dB/div
RBW 1.0 MHz; VBW 1.0 MHz; Att 10 dB; Swp 20.0 mS
Peak 2.667 GHz; 22.11 dBm
Display Line: -13 dBm;
08/09/2003 14:00:44

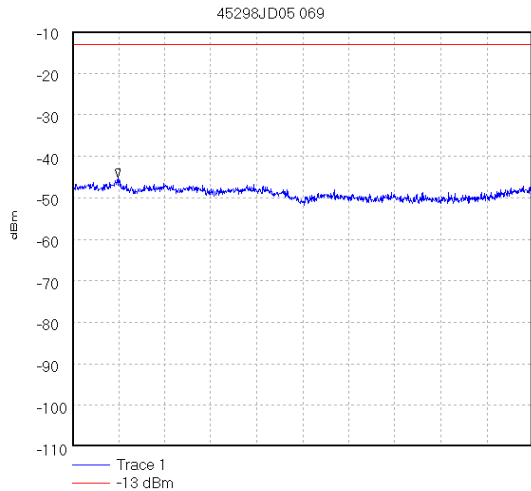
Note: these plots are pre-scans and for indication purposes only. For final measurements, see accompanying tables. Please note, the limit line shown on the plots is not relevant to the overall result and was for the test engineer's benefit only.

Test Of: IPWireless U.K. Ltd.

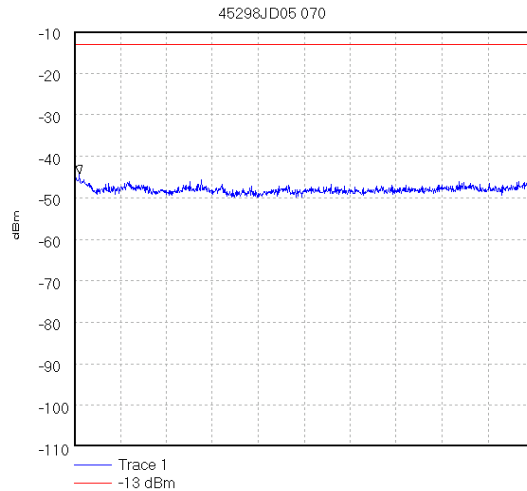
UE P1D Model: KF

To: FCC Part 15: 2001, Part 21: 2001 & Part 74: 2001

Transmitter Radiated Emissions (Continued) Part 2.1053, 21.908 and 74.936



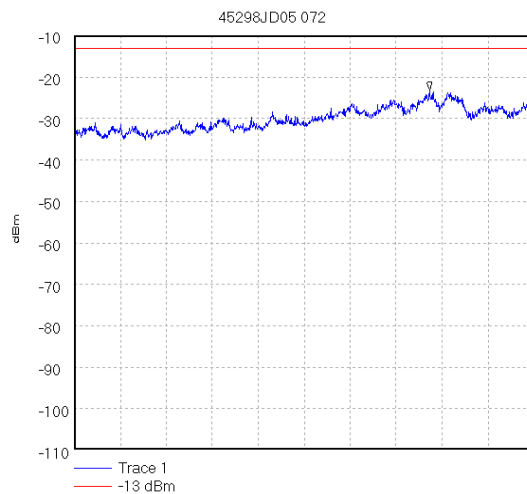
Start 6.0 GHz; Stop 8.0 GHz
Ref -10 dBm; Ref Offset 32.8 dB; 10 dB/div
RBW 3.0 MHz; VBW 1.0 MHz; Att 0 dB; Swp 20.0 mS
Peak 6.19778 GHz; -45.14 dBm
Display Line: -13 dBm; : Limit Test Passed
10/09/2003 10:02:13



Start 8.0 GHz; Stop 12.5 GHz
Ref -10 dBm; Ref Offset 36.1 dB; 10 dB/div
RBW 3.0 MHz; VBW 1.0 MHz; Att 0 dB; Swp 20.0 mS
Peak 8.05 GHz; -44.23 dBm
Display Line: -13 dBm; : Limit Test Passed
10/09/2003 10:04:18



Start 12.5 GHz; Stop 18.0 GHz
Ref -10 dBm; Ref Offset 41.0 dB; 10 dB/div
RBW 3.0 MHz; VBW 1.0 MHz; Att 0 dB; Swp 40.0 mS
Peak 13.03167 GHz; -37.45 dBm
Display Line: -13 dBm; : Limit Test Passed
10/09/2003 10:07:50



Start 18.0 GHz; Stop 26.5 GHz
Ref -10 dBm; Ref Offset 46.7 dB; 10 dB/div
RBW 3.0 MHz; VBW 1.0 MHz; Att 0 dB; Swp 40.0 mS
Peak 24.57333 GHz; -23.07 dBm
Display Line: -13 dBm; : Limit Test Passed
10/09/2003 10:11:26

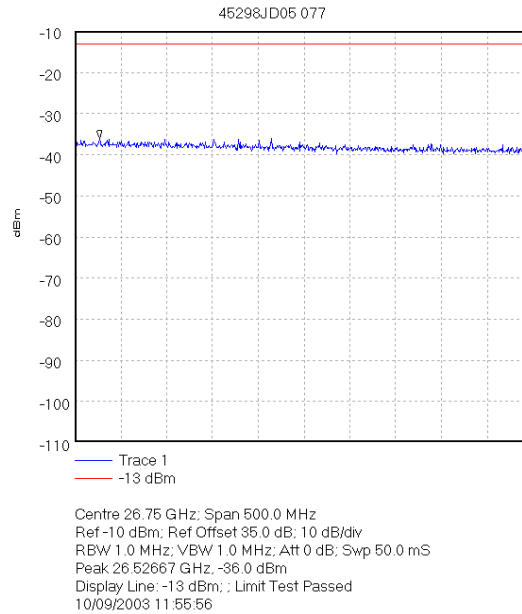
Note: these plots are pre-scans and for indication purposes only. For final measurements, see accompanying tables. Please note, the limit line shown on the plots is not relevant to the overall result and was for the test engineer's benefit only.

Test Of: IPWireless U.K. Ltd.

UE P1D Model: KF

To: FCC Part 15: 2001, Part 21: 2001 & Part 74: 2001

Transmitter Radiated Emissions (Continued) Part 2.1053, 21.908 and 74.936



Note: these plots are pre-scans and for indication purposes only. For final measurements, see accompanying tables. Please note, the limit line shown on the plots is not relevant to the overall result and was for the test engineer's benefit only.

Test Of: IPWireless U.K. Ltd.

UE P1D Model: KF

To: FCC Part 15: 2001, Part 21: 2001 & Part 74: 2001

7.13. Transmitter Radiated Emissions At Band Edges Part 2.1053, 21.908 and 74.936

7.13.1. The EUT was configured as for transmitter radiated emissions testing described in Appendix 2 of this report.

7.13.2. Tests were performed to identify the maximum emissions level at the edges of the 2500 – 2686 MHz frequency band that the EUT will operate over.

Results:**Bottom Band Edge**

Frequency (MHz)	Spurious Emission (dBm)	Carrier EIRP (dBm)	Spurious Emission (dBc)	Limit (dBc)	Margin (dB)	Result
2498.48	-27.5	25.9	-53.4	-41.9	11.5	Complied

Top Band Edge

Frequency (MHz)	Spurious Emission (dBm)	Carrier EIRP (dBm)	Spurious Emission (dBc)	Limit (dBc)	Margin (dB)	Result
2690.39	-40.2	25.7	-65.9	-41.7	24.2	Complied

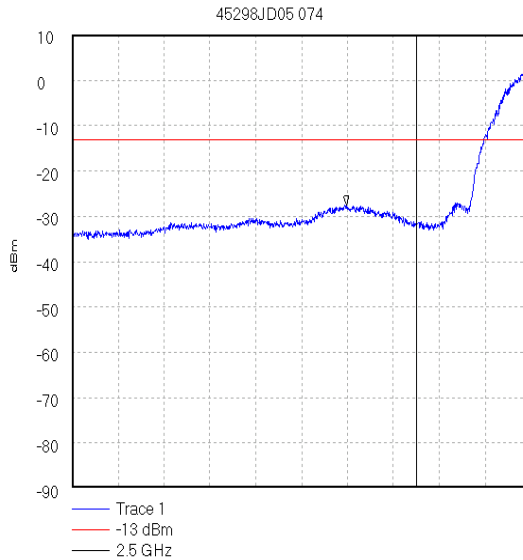
Note: The carrier level in the table above is measured on a 12 MHz channel and therefore is reduced by 3 dB for the 6 MHz channel power as referred to in FCC Section 21.908(d). The limit is calculated according to FCC Section 21.908(e) for absolute power measurements ($A + 10\log(C_{BW}/R_{BW})$ where $C_{BW} = 6$ MHz and $R_{BW} = 3$ MHz).

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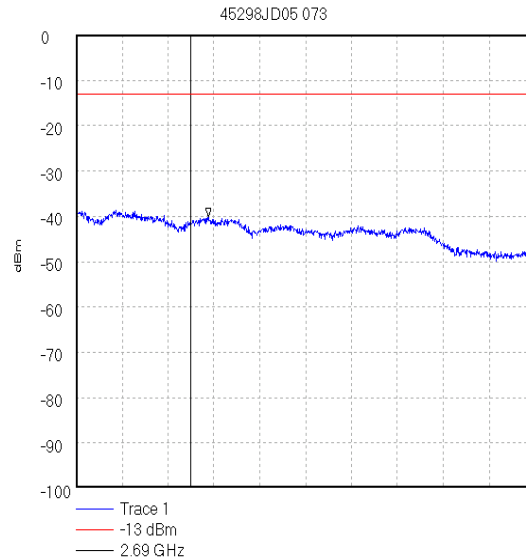
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Transmitter Radiated Emissions At Band Edges (Continued) Part 2.1053, 21.908 and 74.936



Start 2.4925 GHz; Stop 2.5025 GHz
Ref 10 dBm; Ref Offset 30.1 dB; 10 dB/div
RBW 3.0 MHz; VBW 300.0 kHz; Att 40 dB; Swp 5.0 S
Marker 2.49848 GHz, -27.48 dBm
Display Line: -13 dBm; Limit Test Passed
10/09/2003 11:34:35



Start 2.6875 GHz; Stop 2.6975 GHz
Ref 0 dBm; Ref Offset 30.1 dB; 10 dB/div
RBW 3.0 MHz; VBW 300.0 kHz; Att 25 dB; Swp 10.0 S
Marker 2.69039 GHz, -40.22 dBm
Display Line: -13 dBm; Limit Test Passed
10/09/2003 11:11:08

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UE P1D Model: KF

To: FCC Part 15: 2001, Part 21: 2001 & Part 74: 2001

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
Carrier Output Power	Not applicable	95%	+/- 0.46 dB
AC Conducted Spurious Emissions	0.15 MHz to 30.0 MHz	95%	+/- 3.25 dB
Effective Isotropic Radiated Power (EIRP)	Not applicable	95%	+/- 1.78 dB
Frequency Stability	Not applicable	95%	+/- 0.01 ppm
Occupied Bandwidth	1850 to 1910 MHz	95%	+/- 0.12 %
Radiated Spurious Emissions	30.0 MHz to 1000.0 MHz	95%	+/- 5.26 dB
Radiated Spurious Emissions	1.0 GHz to 26.0 GHz	95%	+/- 1.78 dB
Spectrum Mask	Up to 26.5 GHz (Amplitude)	95%	+2.6 / -1.9 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.

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9. Measurement Methods

9.1. Conducted RF Output Power

There is no conducted power limit specified in FCC Parts 21 and 74 for this test, it has been recorded as a requirement of FCC Part 2.1046, as such, no compliancy statement has been made for this test.

The Levels obtained are also used in conjunction with spurious attenuation measurements where the results are based on the conducted carrier power (P).

The test was performed in an indoor laboratory environment.

The EUT was connected to a power meter with an average power head, cable, and RF attenuators.

The connection was made to the EUT antenna port.

The total loss of the cables & attenuators were measured and entered as a reference level offset into the power meter to correct for the losses.

The EUT was set to a specified channel and the transmitter set to operate at full power.

This test was carried out on the bottom, middle and top channels.

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9.2. Effective Isotropic Radiated Power (EIRP)

In order to obtain an EIRP measurement the manufacturer's declared antenna gain was added to the measured conducted output power.

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9.3. Frequency Stability

The EUT was situated within an environmental test chamber and connected directly to the GSM test set via an air link radiated from the antenna.

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

Measurements were also performed at voltage extremes between the declared nominal supply voltage and at the declared endpoint voltage.

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 set described in Appendix 1.

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 allowed error in ppm (parts per million).

In order to show compliance, the measured frequency must remain within the allowed ppm limit.

The reported data shows the nominal frequency drift and its margin from the allowed ppm error. If this margin is positive, the result is compliant. If it goes negative, the result is not compliant. There is also a frequency graph presented offering the frequency variation around nominal frequency.

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9.4. Occupied Bandwidth

The EUT was connected to a spectrum analyser enabled with an occupied bandwidth function.

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.

The Occupied Bandwidth was measured using the built in occupied bandwidth function of the spectrum analyser. It was set to measure the bandwidth where 99% of the signal power was contained.

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9.5. AC Mains Conducted Emissions

AC mains conducted emissions 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.

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.

During the swept measurements (and also during subsequent final measurements on single frequencies) 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.

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

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9.6. Conducted Emissions Measurements

The test was performed in a laboratory environment.

Spurious emission measurements at the antenna port were performed from the lowest declared frequency to 10 times the highest EUT fundamental frequency as shown in Section 2.4 of this report, rounded up for convenience.

A spectrum analyser was connected to the antenna port of the EUT via a suitable cable and RF attenuator. The total loss of both the cable and the attenuator were measured and entered as a reference level offset into the measuring receiver to correct for the losses.

The frequency band described above was investigated with the transmitter operating at full power on the bottom, middle and top channels. Any spurious emissions noted were then measured.

The recorded emission level was then calculated as a spurious attenuation level using the following formula as described in TIA_EIA_603A.

$$\text{dB} = 10 \log_{10} \left(\frac{\text{TX power in watts}}{0.001} \right) - \text{spurious level (dBm)}$$

For frequencies further than 3MHz from the applicable channel edge the emissions shall be attenuated by at least $43 + 10 \log(P)$ dB below the transmitter power (P), where (P) is the average 6 MHz channel transmitter output power level measured for the channel under test. Since the transmitter output power was measured as an absolute level using a power meter the attenuation limit was adjusted according to FCC Section 21.908(d) for a reference channel bandwidth of 6 MHz (compared to the nominal 12 MHz channel) and 21.908(e) for absolute power measurements ($A + 10 \log(C_{BW}/R_{BW})$ where $C_{BW} = 6$ MHz and $R_{BW} =$ bandwidth for the emissions measurement, 100 kHz, 1MHz or 3 MHz).

The tabulated results in the results section of this report show the spurious emission in dBm and as attenuation relative to the carrier in dBc.

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Conducted Emissions Measurements (Continued)

For the frequency ranges close to and including the fundamental frequency, plots of the spectral distribution were recorded using a spectrum analyser for the EUT transmitting on bottom, middle & top channels. Plots can be found at Appendix 4. The method is in accordance with the relative power measurement method from FCC Part 21.908(e). A resolution bandwidth of 100 kHz was used throughout thus no bandwidth adjustment was required to the limits.

FCC Part 21.908(d) states that the maximum out-of-band power of an MDS response station using all or part of a 6 MHz channel, employing digital modulation and transmitting with an EIRP no greater than -6 dBW per 6 MHz channel shall be attenuated at the channel edges at least 25 dB relative to the average 6 MHz channel transmitter output power level (P), then attenuated along a linear slope to at least 40 dB or $33+10\log(P)$ dB, whichever is the lesser attenuation, at 250 kHz beyond the nearest channel edge, then attenuated along a linear slope from that level to at least 60 dB or $43+10\log(P)$ dB, whichever is the lesser attenuation, at 3 MHz above the upper and below the lower licensed channel edges, and attenuated at least 60 dB or $43+40\log(P)$ dB, whichever is the lesser attenuation, at all other frequencies.

The test equipment settings for conducted antenna port measurements were as follows:

Receiver Function	Settings
Detector Type:	Average
Mode:	Max Hold
Bandwidth:	As shown on plots
Amplitude Range:	100 dB
Step Size:	Continuous sweep
Sweep Time:	Coupled

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9.7. 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 'n' times the highest fundamental frequency stated in section 2.5 of this report where 'n' is either 5 or 10 dependant upon whether the emission was produced via a transmitter/receiver or idle mode.

The pre-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.

The initial scans were performed using an antenna height of 1.5 m and at 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 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 was then used with the EUT being set to the appropriate test distance.

A measurement 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 above procedure was repeated for the horizontal polarisation.

Once the final amplitude (maximised) had been obtained, the EUT was substituted with an antenna. For EIRP measurements a Horn antenna whose gain was based on an isotropic antenna was used, ERP measurements were done using a dipole.

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Radiated Emissions (Continued)

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 6dB or greater PAD.

The signal generator was tuned to the spurious emission frequency under investigation.

The test antenna was raised and lowered to obtain a maximum reading on the spectrum analyser.

The level of the signal generators output was then adjusted until the maximum level recorded earlier from the EUT 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:-

$$\text{EIRP/ERP} = \text{Signal Generator Level} - \text{Cable Loss} + \text{Antenna Gain}$$

The limit is calculated according to FCC Section 21.908(e) for absolute power measurements ($A + 10\log(C_{BW}/R_{BW})$ where $C_{BW} = 6 \text{ MHz}$ and $R_{BW} = \text{as stated on the plot}$).

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Appendix 1. Test Equipment Used

RFI No.	Instrument	Manufacturer	Type No.	Serial No.
A003	ESH3-Z2 Pulse Limiter	Rohde & Schwarz	ESH3-Z2	357 881/052
A027	Horn Antenna	Eaton	9188-2	301
A031	2 to 4 GHz Eaton Horn Antenna	Eaton	91889-2	557
A075	High Power Attenuator 20dB 150W	Narda	769-20	02878
A090	Narda Step Attenuator 0-60dB	Narda	743-60	01057
A1009	WG14 to SMA adapter	Flann	14094-SF40	40
A1037	Chase Bilog Antenna	Chase EMC Ltd	CBL6112B	2413
A145	10 dB Attenuator	Narda	NONE	NONE
A197	Site 2 Controller SC144	Unknown	SC144	150720
A201	WG 20 Horn Antenna	Flann Microwave Ltd	20240-20	266
A203	WG 22 Horn Antenna	Flann Microwave Ltd	22240-20	343
A253	WG 12 Microwave Horn	Flann Microwave	12240-20	128
A254	WG 14 Microwave Horn	Flann Microwave	14240-20	139
A255	WG 16 Microwave Horn	Flann Microwave	16240-20	519
A256	WG 18 Microwave Horn	Flann Microwave	18240-20	400
A259	Bilog Antenna	Chase	CBL6111	1513
A276	OATS Positioning Controller	Rohde & Schwarz	HCC	
A392	3 dB attenuator (9)	Suhner	6803.17.B	None
A435	WG 22 horn	Flann	22240-20	400
A490	Bilog Antenna	Chase	CBL6111A	1590
A649	LISN	Rohde & Schwarz	ESH3-Z5	825562/008
C1068	Rosenberger	Rosenberger	001	001
C1078	Rosenberger 3m Cable	Rosenberger	FA210A1030 M5050	28464-2

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Test Equipment Used (Continued)

RFI No.	Instrument	Manufacturer	Type No.	Serial No.
C1079	Rosenberger 1m Cable	Rosenberger	FA210A1010 M5050	28462-1
C1082	Rosenberger Cable 2m	Rosenberger	FA210A1020 M5050	28463-1
C160	Cables	Rosenberger	UFA210A-1- 1181-70x70	None
C172	Cable	Rosenberger	UFA210A-1- 1181-70x70	None
C202	Rosenberger cable	Rosenberger	UFA 210A-1- 1180-70X70	1543
C341	Cable	Andrews	None	None
C342	Cable	Andrews	None	None
C344	Cable	Rosenberger	UFA210A-1- 1181-70x70	1934
C363	BNC Cable	Rosenberger	RG142	None
C364	BNC Cable	Rosenberger	RG142	None
C457	Cable	Rosenberger	RG142XX- 002-RFIB	C457-10081998
C461	Cable	Rosenberger	UFA210A-1- 1182-704704	98H0305
C468	N-Type Coaxial Cable	Rosenberger	UFA210A-1- 3937-504504	98L0440
E011	Environmental Chamber	Design Environmental	WIR3-40	11-96-A2103
G013	SMHU Signal Generator	Rohde & Schwarz	SMHU	894 055/003
G020	Rack Power Amplifier	Spitzenberger Spies	EP4500/B	5233
G085	Generator	Hewlett Packard	83650L	3614A00104
M023	ESVP Receiver	Rohde & Schwarz	ESVP	872 991/027
M072	FSM Spectrum Analyser	Rohde & Schwarz	FSM	862 967/010 (RF) & 863 912/048 (Display)
M084	NRVS Power Meter	Rohde & Schwarz	NRVS	864268/006
M090	Receiver / Spectrum Analyser System	Rohde & Schwarz	ESBI	DU:838494/005 RU:836833/001

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Test Equipment Used (Continued)

RFI No.	Instrument	Manufacturer	Type No.	Serial No.
M127	Spectrum Analyser	Rohde & Schwarz	FSEB 30	842 659/016
M134	Temperature/Humidity/Pressure Meter	RS Components	None	None
M139	Digital Multimeter	Fluke	11	65830028
M173	Turntable Controller	R.H.Electrical Services	RH351	3510020
M212	Digital Thermometer	RS Components	RS 206-3738	70319456
M245	Thermo/hygrometer	Oregon Scientific	M245	M245
M281	Power Meter	Hewlett Packard	E4418A (EPM441A)	GB37170210-01
M283	Power Sensor	Hewlett Packard	8487A	3318A03241
S201	Site 1	RFI	1	
S202	Site 2	RFI	2	S202-15011990
S209	Site 9	RFI	9	
S216	Site 16	RFI	16	None

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

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Appendix 2. Test Configuration Drawings

This Appendix contains the following drawings:

Drawing Reference Number	Title
DRG\45298JD05\EMICON	Test configuration for measurement of conducted emissions
DRG\45298JD05\EMIRAD	Test configuration for measurement of radiated emissions

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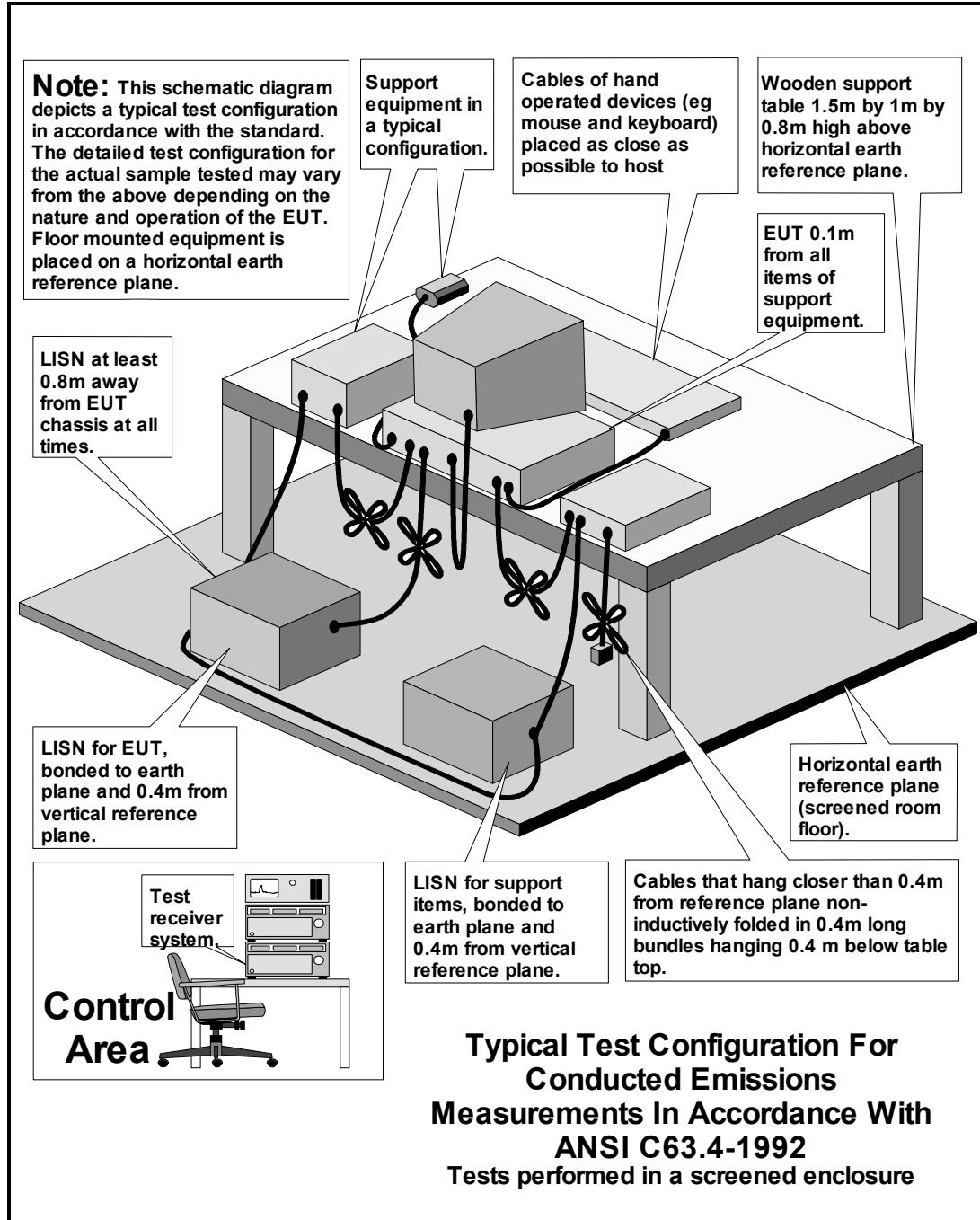
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DRG\45298JD05\EMICON



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DRG\45298JD05\EMIRAD

