






**TEST REPORT
FROM
RADIO FREQUENCY
INVESTIGATION LTD.**

Test Of: IPWireless U.K. Ltd.
UE PCMCIA Card Model: FD

To: FCC Part 15, Part 21 & Part 74

Test Report Serial No:
RFI/MPTB1/RP46199JD01A

Supersedes Test Report Serial No.:
RFI/MPTB1/RP45219JD01A

This Test Report Is Issued Under The Authority Of Richard Jacklin, Operations Director: 	Checked By: Tony Henriques 
Tested By: Steven Wong 	Release Version No: PDF01
Issue Date: 08 June 2004	Test Dates: 26 January 2004 to 10 February 2004 & 25 May 2004

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RADIO FREQUENCY INVESTIGATION LTD.

Operations Department

Test Of: IPWireless U.K. Ltd.

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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:	IPWireless Broadband Modem
Model Name or Number:	UE PCMCIA V1
Unique Type Identification:	FD
Serial Number:	FD5D34100F213
Country of Manufacture:	UK
FCC ID Number:	PKTPCMCIAFD
Date of Receipt:	26 January 2004

2.2. Accessories

The following accessory was supplied with the EUT:

Description:	External Stick Antenna (for connection to external antenna port)
Part Number:	WSI-3025
Serial Number:	None
Country of Manufacture:	Sweden

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2.3. Description Of EUT

The equipment under test is a wireless broadband modem PCMCIA card intended for use for in notebook and desktop PCs. It is fitted with an integral antenna and an external antenna port, which allows the attachment of an external stick antenna. On attachment of this external stick antenna the integral antenna is disabled.

2.4. Modifications Incorporated In EUT

During the course of testing the EUT has not been modified.

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2.5. Additional Information Related To Testing

Power Supply Requirement:	3.3 VDC supplied via PCMCIA interface of host PC		
Power Supply Requirement: (Host Notebook PC)	Nominal 110 V 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		
Interface Ports:	PCMCIA interface		
Chip Rate:	High: 7.68 Mcps; Low: 3.84 Mcps		
Transmit & Receive Frequency Ranges	High Chip Rate: 2506 MHz to 2680 MHz Low Chip Rate: 2503 MHz to 2683 MHz		
Transmit/Receive Channels Tested (High Chip Rate: 7.68 Mcps):	Channel ID	Channel Number	Channel Frequency (MHz)
	Bottom	N/A	2506
	Middle	N/A	2596
	Top	N/A	2680
Transmit/Receive Channels Tested (Low Chip Rate: 3.84 Mcps):	Channel ID	Channel Number	Channel Frequency (MHz)
	Bottom	N/A	2503
	Middle	N/A	2596
	Top	N/A	2683
Highest Fundamental Frequency	2683 MHz		
Highest Unintentionally Generated Frequency	2303 MHz		
Maximum Power Output (Conducted)	High Chip Rate: 21.0 dBm per 6 MHz channel* Low Chip Rate: 21.1 dBm per 6 MHz channel**		
Maximum Power Output (EIRP)	High Chip Rate: 23.9 dBm per 6 MHz channel Low Chip Rate: 24.0 dBm per 6 MHz channel		

*This was the conducted output power measured for all three channels tested (2506 MHz, 2596 MHz & 2680 MHz)

**This was the conducted output power measured for all three channels tested (2503 MHz, 2596 MHz & 2683 MHz)

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2.6. Support Equipment

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

Description:	Notebook PC
Brand Name:	Sony Vaio
Model Name or Number:	PCG-5201
Serial Number:	28308530 3101633
Cable Length and Type	Direct Connection
Connected to Port:	PCMCIA Connector of EUT

Description:	Notebook PC
Brand Name:	UMAX
Model Name or Number:	2000
Serial Number:	PD0402096
Cable Length and Type	Direct Connection
Connected to Port:	PCMCIA Connector of EUT

Description:	Notebook PC
Brand Name:	ACER
Model Name or Number:	BY25
Serial Number:	LXT180A03224616447EB00
Cable Length and Type	Direct Connection
Connected to Port:	PCMCIA Connector of EUT

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3. Test Specification, Methods And Procedures

3.1. Test Specification

Reference:	FCC Part 74: 2003: 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: 2003 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: 2003 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: 2003 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 Conditions

The EUT was tested in a normal laboratory environment.

During testing, the EUT was powered by a host laptop PC which was powered by a nominal 110 V, 60 Hz AC Mains power supply (13 Amp max)

5.2. Operating Modes

The EUT was tested in the following operating modes:

Preliminary radiated emissions scans up to 4 GHz of both chip rates were performed on the EUT fitted and operating in each of the three host notebook PCs stated in section 2.5 of this report. The combination that exhibited the worse case mode of operation was then used to perform final measurements. This was found to be with the EUT fitted and operating in the ACER BY25 notebook PC.

Full tests were performed on both the high and low chip rates on the bottom, middle and top channels of each associated frequency range.

Transmitter Modes:

For all conducted antenna port tests, the EUT was transmitting on bottom, middle and top channels on all 15 timeslots.

For radiated tests, the EUT was transmitting on bottom, middle and top channels on 5 timeslots and receiving on 10 timeslots, i.e. normal operating conditions.

Tests of EIRP were performed with the EUT transmitting via its integral antenna and via the fitted external stick antenna (integral antenna is disabled).

Tests of radiated emissions were performed with the EUT transmitting via its integral antenna i.e. the worst case.

All other transmit mode tests were performed at the external antenna port of the EUT.

Receive/Idle Modes:

Testing was performed with the EUT in idle mode without the external antenna fitted i.e. the integral antenna being the active antenna (the worst case).

5.3. Configuration and Peripherals

The EUT was tested in the following configuration:

Plugged into the PCMCIA port of the established worst case host notebook PC (ACER BY25).

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6. Summary Of Test Results

Transmit Mode

Range Of Measurements	Specification Reference	Port Type	Compliance Status
Effective Isotropic Radiated Power (EIRP)	CFR 47: 2003 FCC Part 2.1046, Part 21.904, Part 74.935	Integral & External Antenna	Complied
Frequency Stability (Temperature Variation)	CFR 47: 2003 FCC Part 2.1055, Part 21.101, Part 74.961	Antenna Terminals	Complied
Frequency Stability (Voltage Variation)	CFR 47: 2003 FCC Part 2.1055, Part 21.101, Part 74.961	Antenna Terminals	Complied
Occupied Bandwidth	CFR 47: 2003 FCC Part 2.1049, Part 21.908, Part 74.936	Antenna Terminals	Complied
Conducted Spurious Emissions at Band Edges	CFR 47: 2003 FCC Part 2.1051, Part 21.908, Part 74.936	Antenna Terminals	Complied
Conducted Spurious Emissions	CFR 47: 2003 FCC Part 2.1051, Part 21.908, Part 74.936	Antenna Terminals	Complied
Radiated Spurious Emissions	CFR 47: 2003 FCC Part 2.1053, Part 21.908, Part 74.936	Integral Antenna	Complied
Radiated Emissions at Band Edges	CFR 47: 2003 FCC Part 2.1053, Part 21.908, Part 74.936	Integral Antenna	Complied

Receive/ Idle Mode

Range Of Measurements	Specification Reference	Port Type	Compliance Status
AC Conducted Spurious Emissions (150 kHz to 30 MHz)	CFR 47: 2003 FCC Part 15 Section 15.107	AC Mains Input	Complied
Idle Mode Spurious Emissions	CFR 47: 2003 FCC Part 15 Section 15.109	Enclosure	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 Section 3 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. Effective Isotropic Radiated Power (EIRP)

7.2.1. The EUT was configured as for Effective Isotropic Radiated Power (EIRP) as described in Appendix 2 of this report.

Results (High Chip Rate with Integral Antenna)

Channel	Measured Frequency (MHz)	EIRP (dBm)*	EIRP (dBW)*	Limit EIRP (dBW)	Margin (dB)	Result
Bottom	2506	21.9	-8.1	33.0	41.1	Complied
Middle	2596	22.7	-7.3	33.0	40.3	Complied
Top	2680	23.6	-6.4	33.0	39.4	Complied

Results (Low Chip Rate with Integral Antenna)

Channel	Measured Frequency (MHz)	EIRP (dBm)	EIRP (dBW)	Limit EIRP (dBW)	Margin (dB)	Result
Bottom	2503	22.0	-8.0	33.0	41.0	Complied
Middle	2596	22.9	-7.1	33.0	40.1	Complied
Top	2683	23.7	-6.3	33.0	39.3	Complied

*per 6 MHz channel

Note 1: 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 EIRP measurements were performed in the OATS using a spectrum analyser 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 2: These results determine that the EUT output power falls in the “≤-6 dBW per 6 MHz channel” category of FCC Parts 21.908(d) and 74.936(f) with regard to out of band power.

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Effective Isotropic Radiated Power (EIRP) (Continued)

7.2.2. The EUT was configured as for Effective Isotropic Radiated Power (EIRP) as described in Appendix 2 of this report.

Results (High Chip Rate with External Stick Antenna)

Channel	Measured Frequency (MHz)	EIRP (dBm)*	EIRP (dBW)*	Limit EIRP (dBW)	Margin (dB)	Result
Bottom	2506	23.6	-6.4	33.0	39.4	Complied
Middle	2596	23.9	-6.1	33.0	39.1	Complied
Top	2680	23.4	-6.6	33.0	39.6	Complied

Results (Low Chip Rate with External Stick Antenna)

Channel	Measured Frequency (MHz)	EIRP (dBm)	EIRP (dBW)	Limit EIRP (dBW)	Margin (dB)	Result
Bottom	2503	24.0	-6.0	33.0	39.0	Complied
Middle	2596	22.9	-7.1	33.0	40.1	Complied
Top	2683	23.5	-6.5	33.0	39.5	Complied

*per 6 MHz channel

Note 1: 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 EIRP measurements were performed in the OATS using a spectrum analyser 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 2: These results determine that the EUT output power falls in the “≤-6 dBW per 6 MHz channel” category of FCC Parts 21.908(d) and 74.936(f) with regard to out of band power.

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7.3. Transmitter Frequency Stability: (Temperature Variation)

7.3.1. The EUT was configured as for frequency stability measurements as described in Appendix 2 of this report.

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

Results Bottom Channel (2506 MHz) – High Chip Rate

Temp (°C)	Measured Frequency (MHz)	Frequency Error (kHz)	0.001% Limit (kHz)	Margin (kHz)	Result
-30	2505.99986	0.14	25.06	24.92	Complied
-20	2506.00010	0.10	25.06	24.96	Complied
-10	2506.00007	0.07	25.06	24.99	Complied
0	2506.00049	0.49	25.06	24.57	Complied
10	2506.00042	0.42	25.06	24.64	Complied
20	2506.00022	0.22	25.06	24.84	Complied
30	2506.00046	0.46	25.06	24.60	Complied
40	2506.00132	1.32	25.06	23.74	Complied
50	2506.00170	1.70	25.06	23.36	Complied

Results Bottom Channel (2503 MHz) – Low Chip Rate

Temp (°C)	Measured Frequency (MHz)	Frequency Error (kHz)	0.001% Limit (kHz)	Margin (kHz)	Result
-30	2502.99937	0.63	25.03	24.40	Complied
-20	2503.00011	0.11	25.03	24.94	Complied
-10	2503.00004	0.04	25.03	24.99	Complied
0	2503.00046	0.46	25.03	24.57	Complied
10	2503.00041	0.41	25.03	24.62	Complied
20	2503.00021	0.21	25.03	24.82	Complied
30	2503.00046	0.46	25.03	24.57	Complied
40	2503.00135	1.35	25.03	23.68	Complied
50	2503.00170	1.70	25.03	23.33	Complied

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Transmitter Frequency Stability: (Temperature Variation) - Continued**Results Middle Channel (2596 MHz) – High Chip Rate**

Temp (°C)	Measured Frequency (MHz)	Frequency Error (kHz)	0.001% Limit (kHz)	Margin (kHz)	Result
-30	2595.99983	0.17	25.96	25.79	Complied
-20	2596.00008	0.08	25.96	25.88	Complied
-10	2596.00006	0.06	25.96	25.90	Complied
0	2596.00050	0.50	25.96	25.46	Complied
10	2596.00044	0.44	25.96	25.52	Complied
20	2596.00021	0.21	25.96	25.75	Complied
30	2596.00045	0.45	25.96	25.51	Complied
40	2596.00140	1.40	25.96	24.56	Complied
50	2596.00175	1.75	25.96	24.21	Complied

Results Middle Channel (2596 MHz) – Low Chip Rate

Temp (°C)	Measured Frequency (MHz)	Frequency Error (kHz)	0.001% Limit (kHz)	Margin (kHz)	Result
-30	2595.99966	0.37	25.96	25.59	Complied
-20	2596.00012	0.12	25.96	25.84	Complied
-10	2596.00007	0.07	25.96	25.89	Complied
0	2596.00048	0.48	25.96	25.48	Complied
10	2596.00042	0.42	25.96	25.54	Complied
20	2596.00023	0.23	25.96	25.73	Complied
30	2596.00050	0.50	25.96	25.46	Complied
40	2596.00137	1.37	25.96	24.59	Complied
50	2596.00176	1.76	25.96	24.20	Complied

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Transmitter Frequency Stability: (Temperature Variation) - Continued**Results Top Channel (2680 MHz) – High Chip Rate**

Temp (°C)	Measured Frequency (MHz)	Frequency Error (kHz)	0.001% Limit (kHz)	Margin (kHz)	Result
-30	2679.99976	0.24	26.80	26.56	Complied
-20	2680.00007	0.07	26.80	26.73	Complied
-10	2680.00003	0.03	26.80	26.77	Complied
0	2680.00051	0.51	26.80	26.29	Complied
10	2680.00039	0.39	26.80	26.41	Complied
20	2680.00020	0.20	26.80	26.60	Complied
30	2680.00036	0.36	26.80	26.44	Complied
40	2680.00145	1.45	26.80	25.35	Complied
50	2680.00171	1.71	26.80	25.09	Complied

Results Top Channel (2683 MHz) – Low Chip Rate

Temp (°C)	Measured Frequency (MHz)	Frequency Error (kHz)	0.001% Limit (kHz)	Margin (kHz)	Result
-30	2682.99979	0.21	26.83	26.62	Complied
-20	2683.00013	0.13	26.83	26.70	Complied
-10	2683.00009	0.09	26.83	26.74	Complied
0	2683.00047	0.47	26.83	26.36	Complied
10	2683.00041	0.41	26.83	26.42	Complied
20	2683.00021	0.21	26.83	26.62	Complied
30	2683.00053	0.53	26.83	26.30	Complied
40	2683.00132	1.32	26.83	25.51	Complied
50	2683.00176	1.76	26.83	25.07	Complied

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7.4. Transmitter Frequency Stability: (Voltage Variation)

7.4.1. The EUT was configured as for frequency stability measurements as described in Appendix 2 of this report.

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

Results Bottom Channel (2506 MHz) - High Chip Rate

Supply Voltage (VAC)	Measured Frequency (MHz)	Frequency Error (kHz)	0.001% Limit (kHz)	Margin (kHz)	Result
93.5	2506.00184	1.84	25.06	23.22	Complied
126.5	2506.00168	1.68	25.06	23.38	Complied

Results Middle Channel (2596 MHz) – High Chip Rate

Supply Voltage (VAC)	Measured Frequency (MHz)	Frequency Error (kHz)	0.001% Limit (kHz)	Margin (kHz)	Result
93.5	2596.000154	1.54	25.96	24.42	Complied
126.5	2596.000129	1.59	25.96	24.37	Complied

Results Top Channel (2680 MHz) – High Chip Rate

Supply Voltage (VAC)	Measured Frequency (MHz)	Frequency Error (kHz)	0.001% Limit (kHz)	Margin (kHz)	Result
93.5	2680.00192	1.92	26.80	24.88	Complied
126.5	2680.00172	1.72	26.80	25.08	Complied

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Transmitter Frequency Stability: (Voltage Variation) - Continued**Results Bottom Channel (2503 MHz) – Low Chip Rate**

Supply Voltage (VAC)	Measured Frequency (MHz)	Frequency Error (kHz)	0.001% Limit (kHz)	Margin (kHz)	Result
93.5	2503.00197	1.97	25.03	23.06	Complied
126.5	2503.00178	1.78	25.03	23.25	Complied

Results Middle Channel (2596 MHz) – Low Chip Rate

Supply Voltage (VAC)	Measured Frequency (MHz)	Frequency Error (kHz)	0.001% Limit (kHz)	Margin (kHz)	Result
93.5	2596.00169	1.69	25.96	24.27	Complied
126.5	2596.00184	1.84	25.96	24.12	Complied

Results Top Channel (2683 MHz) – Low Chip Rate

Supply Voltage (VAC)	Measured Frequency (MHz)	Frequency Error (kHz)	0.001% Limit (kHz)	Margin (kHz)	Result
93.5	2683.00205	2.05	26.83	24.78	Complied
126.5	2683.00198	1.98	26.83	24.85	Complied

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7.5. Transmitter Occupied Bandwidth

7.5.1. The EUT was configured as for Occupied Bandwidth measurements as described in Appendix 2 of this report.

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

Results: (High Chip Rate)

Channel	Frequency (MHz)	Resolution Bandwidth (kHz)	Video Bandwidth (kHz)	Occupied Bandwidth (MHz)
Bottom	2506	200	1000	8.311
Middle	2596	200	1000	8.357
Top	2680	200	1000	8.357

Results: (Low Chip Rate)

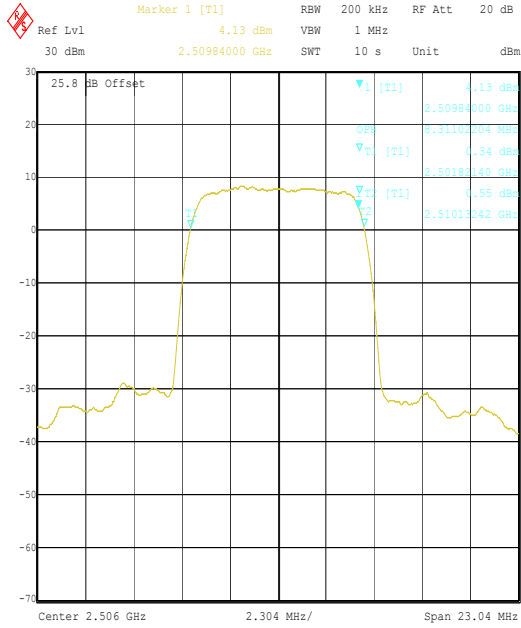
Channel	Frequency (MHz)	Resolution Bandwidth (kHz)	Video Bandwidth (kHz)	Occupied Bandwidth (MHz)
Bottom	2503	100	300	4.168
Middle	2596	100	300	4.168
Top	2683	100	300	4.168

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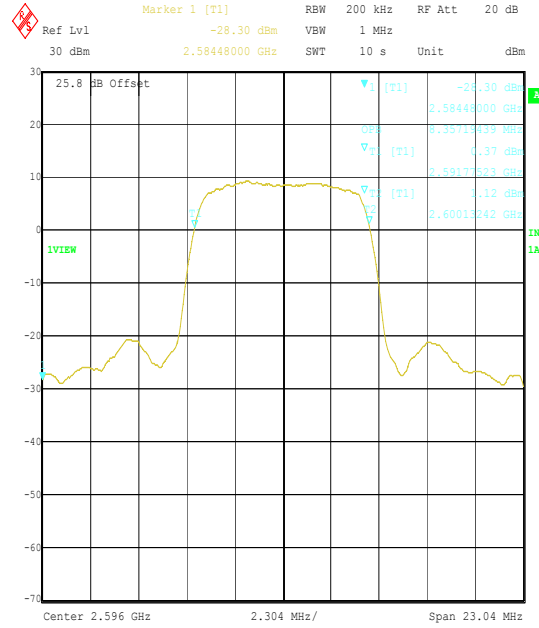
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To: FCC Part 15, Part 21 & Part 74

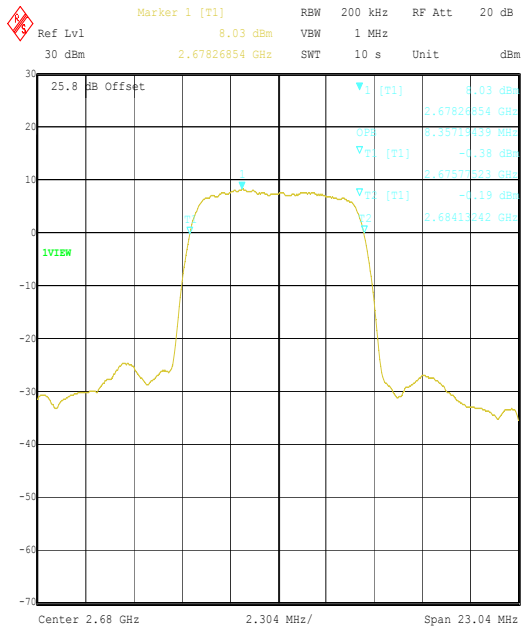
Transmitter Occupied Bandwidth (High Chip Rate) - Continued



Title: IPWireless EUT: FD, FCC P15/21/74, Occupied Bandwidth
 Comment A: 45219JD01 Bottom Channel 7.68 Mcps.
 Date: 5.FEB.2004 14:13:20



Title: IPWireless EUT: FD, FCC P15/21/74, Occupied Bandwidth
 Comment A: 45219JD01 Middle Channel 7.68 Mcps.
 Date: 5.FEB.2004 14:14:38



Title: IPWireless EUT: FD, FCC P15/21/74, Occupied Bandwidth
 Comment A: 45219JD01 Top Channel 7.68 Mcps.
 Date: 5.FEB.2004 14:15:41

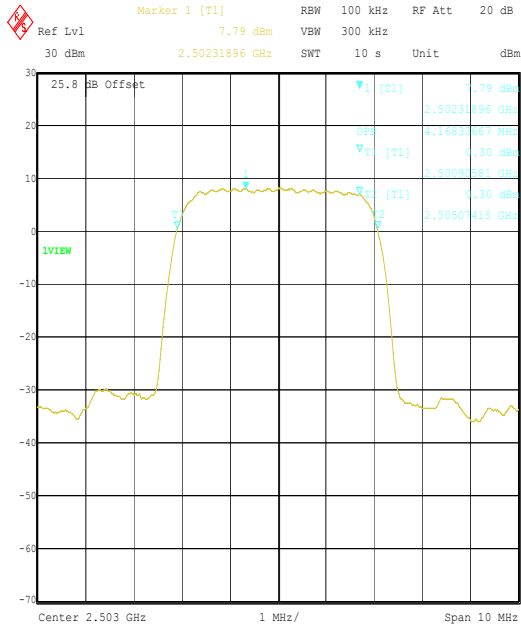
Note: The occupied bandwidth is measured using the internal OBW function of the measurement analyser. The analyser automatically configures the measurement bandwidths to make an accurate measurement.

Test Of: IPWireless U.K. Ltd.

UE PCMCIA Card Model: FD

To: FCC Part 15, Part 21 & Part 74

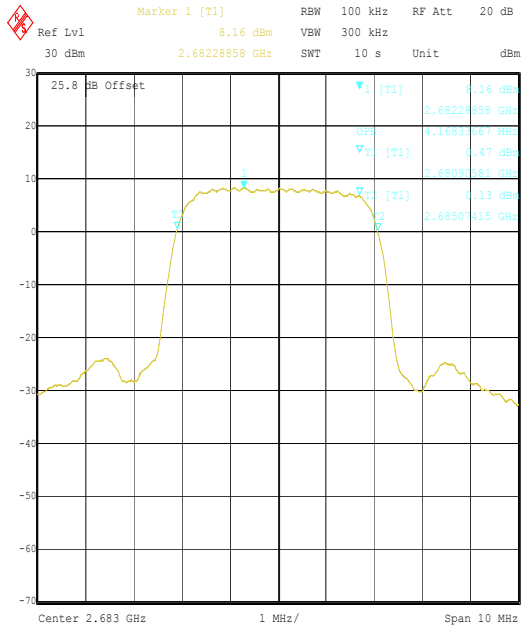
Transmitter Occupied Bandwidth (Low Chip Rate) - Continued



Title: IPWireless EUT: FD, FCC P15/21/74, Occupied Bandwidth
 Comment A: 45219JD01 Bottom Channel 3.84 Mcps.
 Date: 5.FEB.2004 12:09:49



Title: IPWireless EUT: FD, FCC P15/21/74, Occupied Bandwidth
 Comment A: 45219JD01 Middle Channel 3.84 Mcps.
 Date: 5.FEB.2004 12:12:08



Title: IPWireless EUT: FD, FCC P15/21/74, Occupied Bandwidth
 Comment A: 45219JD01 Top Channel 3.84 Mcps.
 Date: 5.FEB.2004 12:13:05

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 PCMCIA Card Model: FD

To: FCC Part 15, Part 21 & Part 74

7.6. Transmitter Conducted Emissions (Spectrum Mask)

7.6.1. The EUT was configured as for conducted emissions measurements as described in Appendix 2 of this report.

7.6.2. 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:

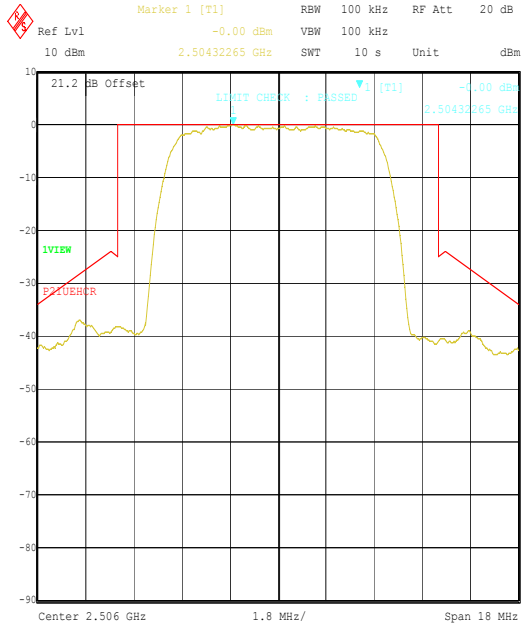
Results are presented graphically in the following graphs. As can be seen from the plots the EUT complies with the requirements of relevant parts of the regulations.

Test Of: IPWireless U.K. Ltd.

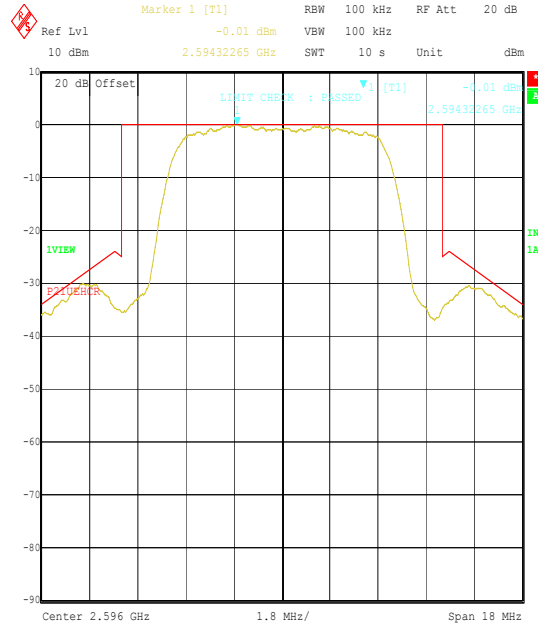
UE PCMCIA Card Model: FD

To: FCC Part 15, Part 21 & Part 74

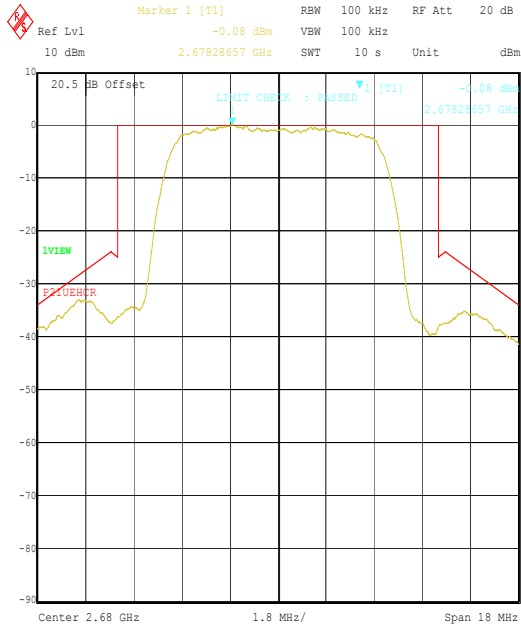
Transmitter Conducted Emissions (Spectrum Mask): High Chip Rate – Continued



Title: IPWireless EUT: FD. FCC P15/21/74. Spectrum Mask.
 Comment A: 45219JD01 Bottom Channel 7.68 Mcps.
 Date: 5.FEB.2004 14:23:52



Title: IPWireless EUT: FD. FCC P15/21/74. Spectrum Mask.
 Comment A: 45219JD01 Middle Channel 7.68 Mcps.
 Date: 5.FEB.2004 14:22:10



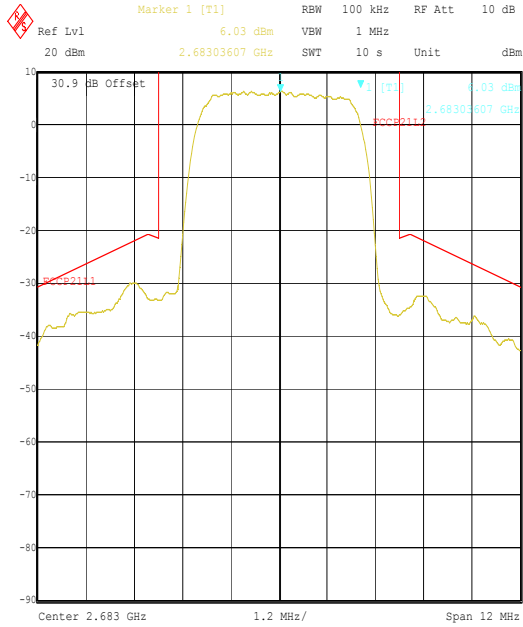
Title: IPWireless EUT: FD. FCC P15/21/74. Spectrum Mask.
 Comment A: 45219JD01 Top Channel 7.68 Mcps.
 Date: 5.FEB.2004 14:19:49

Test Of: IPWireless U.K. Ltd.

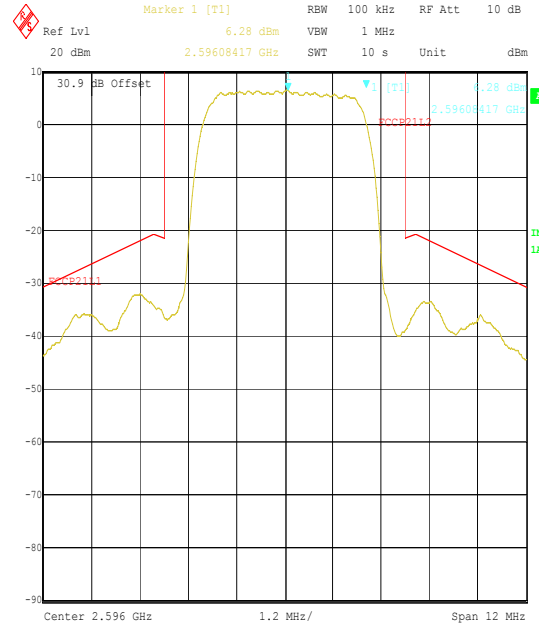
UE PCMCIA Card Model: FD

To: FCC Part 15, Part 21 & Part 74

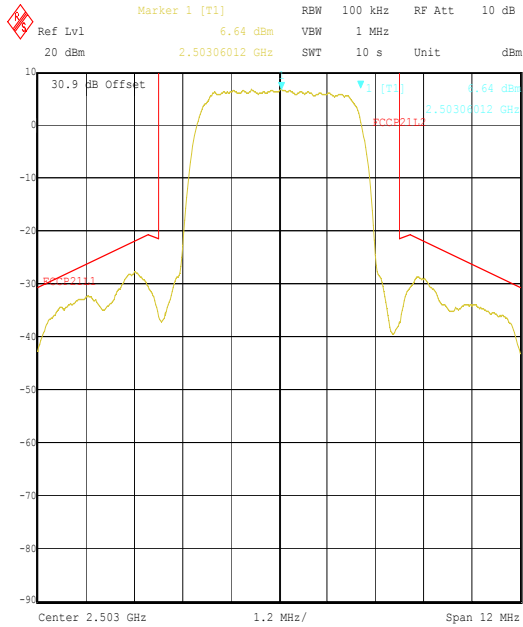
Transmitter Conducted Emissions (Spectrum Mask): Low Chip Rate – Continued



Title: IPWireless EUT: FD, FCC P15/21/74, Spectrum Mask
 Comment A: 46199JD01 Bottom Channel 3.84 Mcps
 Date: 24.MAY.2004 18:17:53



Title: IPWireless EUT: FD, FCC P15/21/74, Spectrum Mask
 Comment A: 46199JD01 Middle Channel 3.84 Mcps
 Date: 24.MAY.2004 18:20:02



Title: IPWireless EUT: FD, FCC P15/21/74, Spectrum Mask
 Comment A: 46199JD01 Top Channel 3.84 Mcps
 Date: 24.MAY.2004 18:22:21

Test Of: IPWireless U.K. Ltd.

UE PCMCIA Card Model: FD

To: FCC Part 15, Part 21 & Part 74

7.7. Transmitter Conducted Emissions at Band Edges

7.7.1. The EUT was configured as for conducted emissions measurements as described in Appendix 2 of this report.

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

Results: (High Chip Rate)**Bottom Band Edge**

Frequency (MHz)	Emission Level (dBm)	Carrier Level (dBm)*	Spurious Emission (dBc)	Limit (dBc)	Margin (dB)	Result
2500	-44.1	21.0	-65.1	-45.8	19.3	Complied

Top Band Edge

Frequency (MHz)	Emission Level (dBm)	Carrier Level (dBm)*	Spurious Emission (dBc)	Limit (dBc)	Margin (dB)	Result
2686	-44.4	21.0	-65.4	-45.8	19.6	Complied

*per 6 MHz channel

Note: The limit is calculated according to FCC Section 21.908(e) for absolute power measurements as follows: $A + 10\log(C_{BW}/R_{BW})$ where $C_{BW} = 12$ MHz and $R_{BW} = 100$ kHz.

Results: (Low Chip Rate)**Bottom Band Edge**

Frequency (MHz)	Emission Level (dBm)	Carrier Level (dBm)*	Spurious Emission (dBc)	Limit (dBc)	Margin (dB)	Result
2500	-36.1	21.1	-57.2	-42.8	14.4	Complied

Top Band Edge

Frequency (MHz)	Emission Level (dBm)	Carrier Level (dBm)*	Spurious Emission (dBc)	Limit (dBc)	Margin (dB)	Result
2686	-40.0	21.1	-61.1	-42.8	18.3	Complied

*per 6 MHz channel

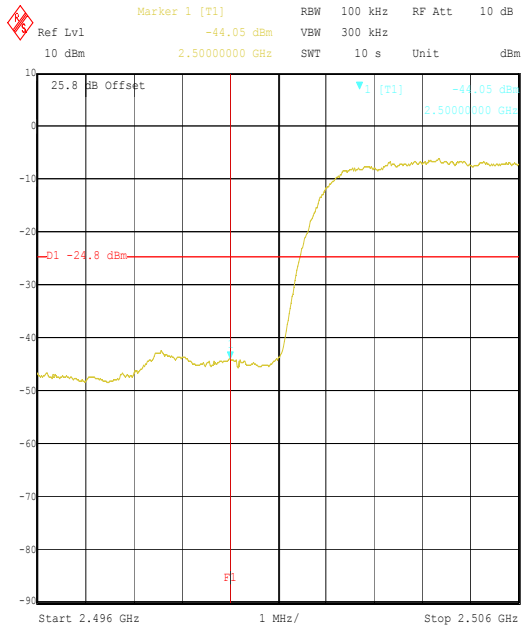
Note: The limit is calculated according to FCC Section 21.908(e) for absolute power measurements as follows: $A + 10\log(C_{BW}/R_{BW})$ where $C_{BW} = 6$ MHz and $R_{BW} = 100$ kHz.

Test Of: IPWireless U.K. Ltd.

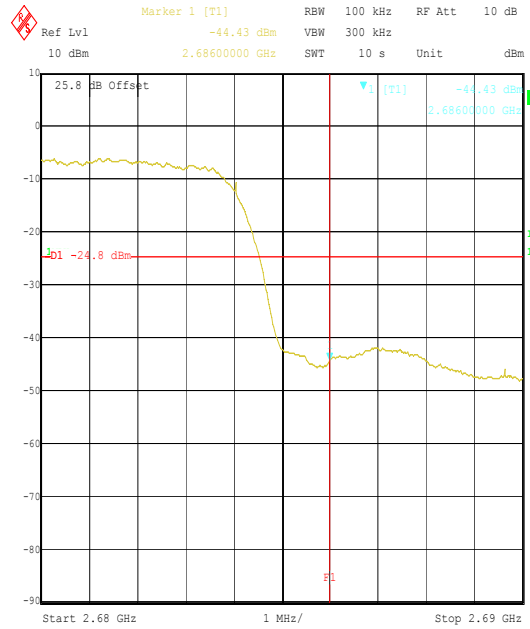
UE PCMCIA Card Model: FD

To: FCC Part 15, Part 21 & Part 74

Transmitter Conducted Emissions at Band Edges (High Chip Rate) – Continued



Title: IPWireless EUT: FD, FCC P15/21/74, Lower BandEdge
Comment A: 45219JD01 Bottom Channel 7.68 Mcps.
Date: 5.FEB.2004 15:10:18



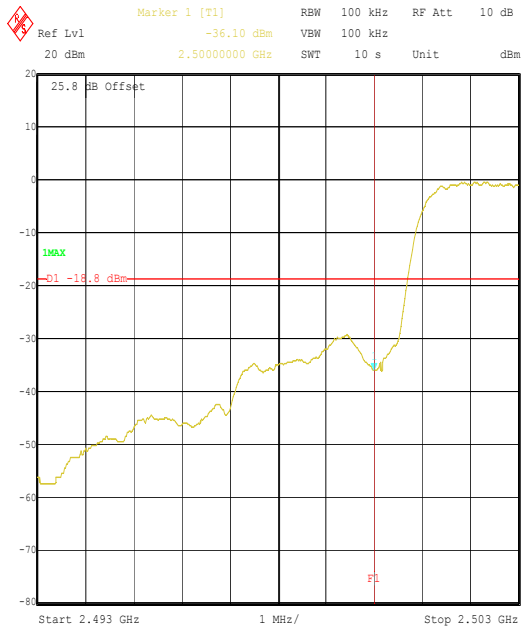
Title: IPWireless EUT: FD, FCC P15/21/74, Upper BandEdge
Comment A: 45219JD01 Top Channel 7.68 Mcps.
Date: 5.FEB.2004 15:08:20

Test Of: IPWireless U.K. Ltd.

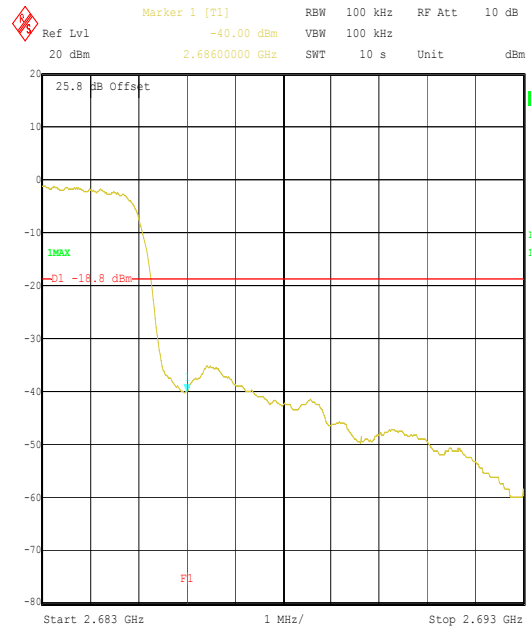
UE PCMCIA Card Model: FD

To: FCC Part 15, Part 21 & Part 74

Transmitter Conducted Emissions at Band Edges (Low Chip Rate)



Title: IPWireless EUT: FD, FCC P15/21/74, Lower Band Edge
 Comment A: 45219JD01 Bottom Channel 3.84 Mcps.
 Date: 5.FEB.2004 11:26:17



Title: IPWireless EUT: FD, FCC P15/21/74, Upper Band Edge
 Comment A: 45219JD01 Top Channel 3.84 Mcps.
 Date: 5.FEB.2004 11:24:52

Note: The band edge plots above, of the EUT operating in low chip rate mode, incorrectly show the band edge spurious emissions absolute limit line as -18.8 dBm, they should have been -21.8 dBm. It is confirmed that the positioning of the limit line has no bearing on the measurement and the levels recorded at the band edge are correct.

Test Of: IPWireless U.K. Ltd.

UE PCMCIA Card Model: FD

To: FCC Part 15, Part 21 & Part 74

7.8. Transmitter Conducted Emissions

7.8.1. The EUT was configured as for conducted emissions measurements as described in Appendix 2 of this report.

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

Result: Bottom Channel (High Chip Rate)

Frequency (MHz)	Emission Level (dBm)	Carrier Level (dBm)*	Spurious Emission (dBc)	Limit (dBc)	Margin (dB)	Result
2497	-26.9	21.0	-47.9	-44.8	3.1	Complied
2515	-27.3	21.0	-48.3	-44.8	3.5	Complied
5012	-46.1	21.0	-67.1	-44.8	22.3	Complied

Result: Middle Channel (High Chip Rate)

Frequency (MHz)	Emission Level (dBm)	Carrier Level (dBm)*	Spurious Emission (dBc)	Limit (dBc)	Margin (dB)	Result
2587	-27.2	21.0	-48.2	-44.8	3.4	Complied
2605	-32.4	21.0	-53.4	-44.8	8.6	Complied
5192	-44.5	21.0	-65.5	-44.8	20.7	Complied

Result: Top Channel (High Chip Rate)

Frequency (MHz)	Emission Level (dBm)	Carrier Level (dBm)*	Spurious Emission (dBc)	Limit (dBc)	Margin (dB)	Result
2671	-24.7	21.0	-45.7	-44.8	0.9	Complied
2689	-25.0	21.0	-46.0	-44.8	1.2	Complied
5360	-46.5	21.0	-67.5	-44.8	22.7	Complied

*per 6 MHz channel

Note: The limit is calculated according to FCC Section 21.908(e) for absolute power measurements as follows: $A + 10\log(C_{BW}/R_{BW})$ where $C_{BW} = 12$ MHz and $R_{BW} = 1$ MHz.

Test Of: IPWireless U.K. Ltd.

UE PCMCIA Card Model: FD

To: FCC Part 15, Part 21 & Part 74

Transmitter Conducted Emissions (Continued)**Result: Bottom Channel (Low Chip Rate)**

Frequency (MHz)	Emission Level (dBm)	Carrier Level (dBm)	Spurious Emission (dBc)	Limit (dBc)	Margin (dB)	Result
2497	-28	21.1	-49.1	-41.9	7.2	Complied
2509	-27.4	21.1	-48.5	-41.9	6.6	Complied
5006	-42.9	21.1	-64.0	-41.9	22.1	Complied

Result: Middle Channel (Low Chip Rate)

Frequency (MHz)	Emission Level (dBm)	Carrier Level (dBm)	Spurious Emission (dBc)	Limit (dBc)	Margin (dB)	Result
2590	-25.8	21.1	-46.9	-41.9	5.0	Complied
2602	-21.2	21.1	-42.3	-41.9	0.4	Complied
5192	-41	21.1	-62.1	-41.9	20.2	Complied

Result: Top Channel (Low Chip Rate)

Frequency (MHz)	Emission Level (dBm)	Carrier Level (dBm)	Spurious Emission (dBc)	Limit (dBc)	Margin (dB)	Result
2677	-28.3	21.1	-49.4	-41.9	7.5	Complied
2689	-23.7	21.1	-44.8	-41.9	2.9	Complied
5366	-38.6	21.1	-59.7	-41.9	17.8	Complied

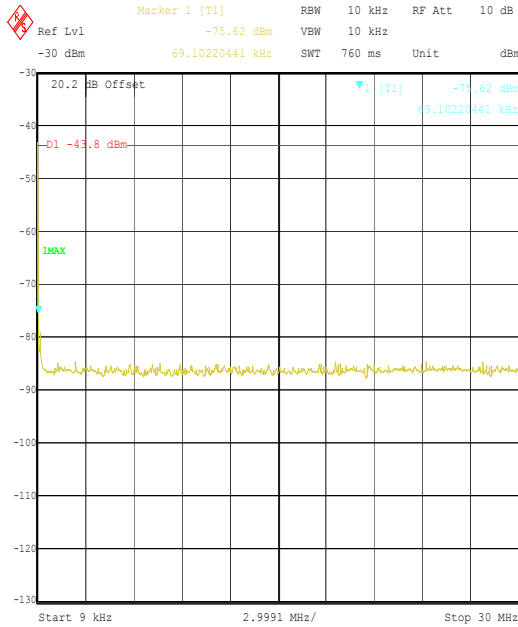
Note: The limit is calculated according to FCC Section 21.908(e) for absolute power measurements as follows: $A + 10\log(C_{BW}/R_{BW})$ where $C_{BW} = 6$ MHz and $R_{BW} = 1$ MHz.

Test Of: IPWireless U.K. Ltd.

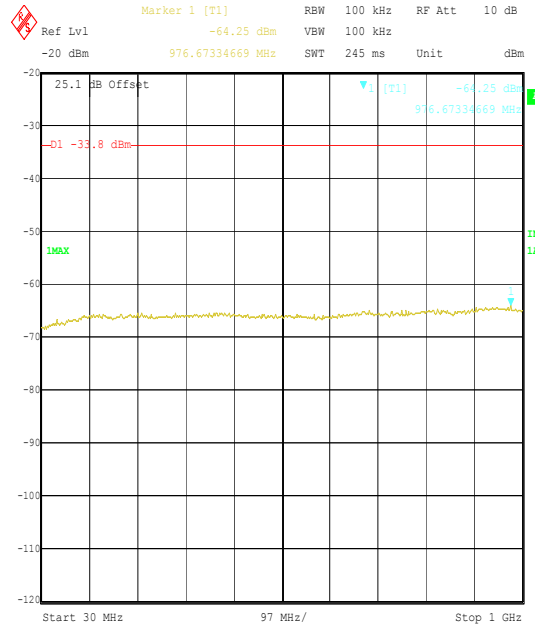
UE PCMCIA Card Model: FD

To: FCC Part 15, Part 21 & Part 74

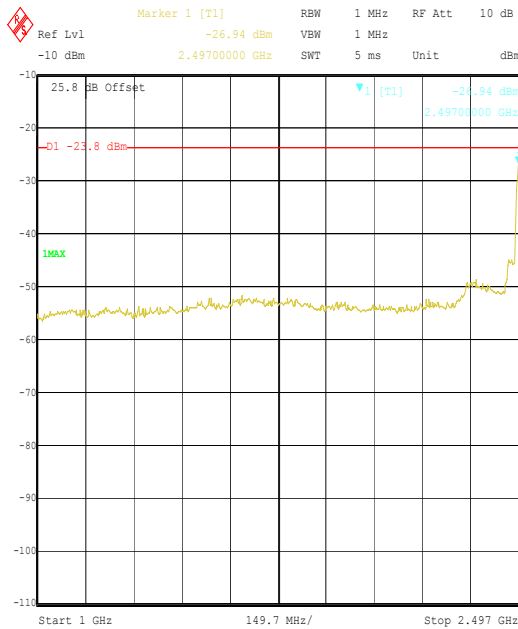
Transmitter Conducted Emissions Bottom Channel (High Chip Rate) – Continued



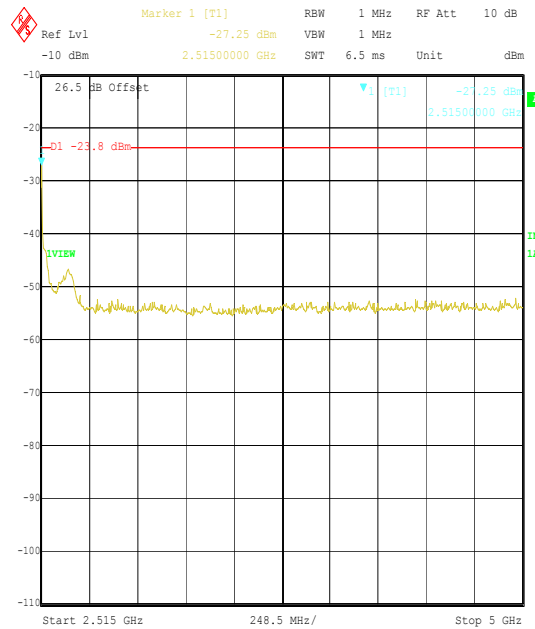
Title: IPWireless EUT: FD, FCC P15/21/74, Conducted Spurious
 Comment A: 45219JD01 Bottom Channel 7.68 Mcps. 001
 Date: 5.FEB.2004 14:35:18



Title: IPWireless EUT: FD, FCC P15/21/74, Conducted Spurious
 Comment A: 45219JD01 Bottom Channel 7.68 Mcps. 002
 Date: 5.FEB.2004 14:38:09



Title: IPWireless EUT: FD, FCC P15/21/74, Conducted Spurious
 Comment A: 45219JD01 Bottom Channel 7.68 Mcps. 003
 Date: 5.FEB.2004 14:38:55



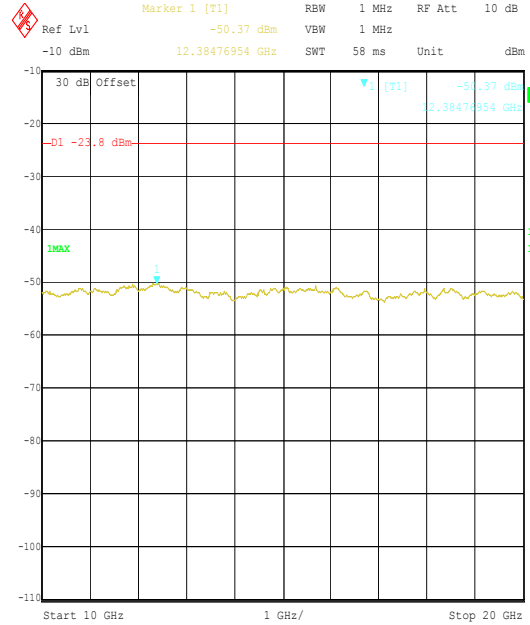
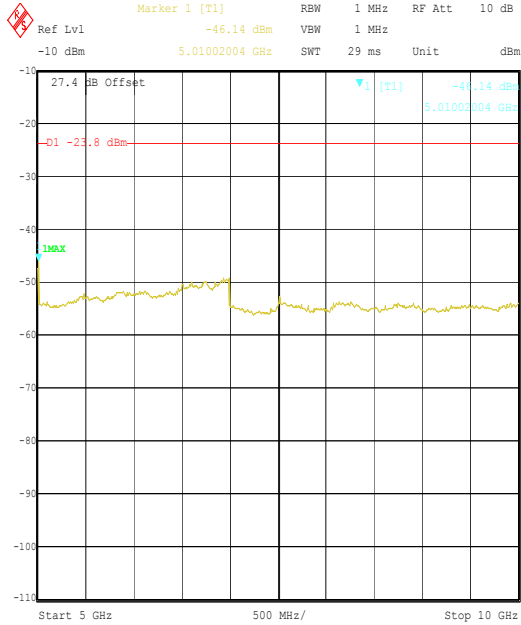
Title: IPWireless EUT: FD, FCC P15/21/74, Conducted Spurious
 Comment A: 45219JD01 Bottom Channel 7.68 Mcps. 004
 Date: 5.FEB.2004 14:50:00

Test Of: IPWireless U.K. Ltd.

UE PCMCIA Card Model: FD

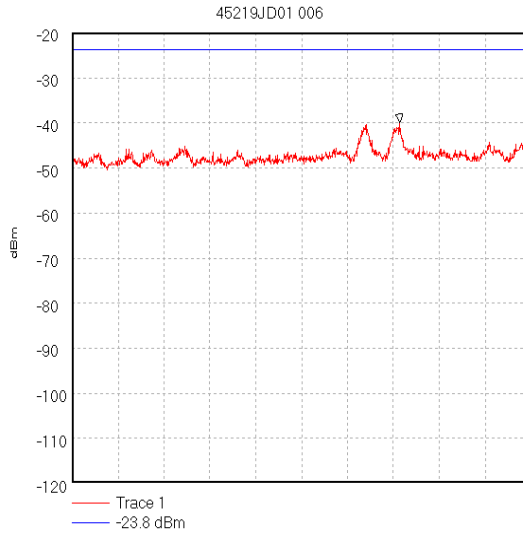
To: FCC Part 15, Part 21 & Part 74

Transmitter Conducted Emissions Bottom Channel (High Chip Rate) – Continued

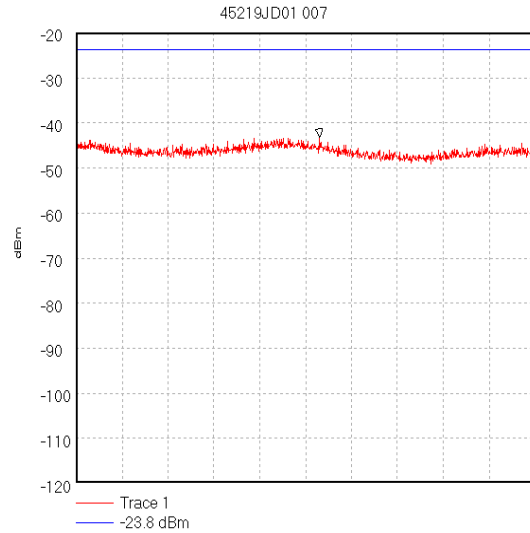


Title: IPWireless EUT: FD, FCC P15/21/74, Conducted Spurious
 Comment A: 45219JD01 Bottom Channel 7.68 Mcps, 005
 Date: 5.FEB.2004 14:50:54

Title: IPWireless EUT: FD, FCC P15/21/74, Conducted Spurious
 Comment A: 45219JD01 Bottom Channel 7.68 Mcps, 006
 Date: 5.FEB.2004 14:54:04



Start 20.0 GHz; Stop 26.5 GHz
 Ref -20 dBm; Ref Offset 34.6 dB; 10 dB/div
 RBW 1.0 MHz; VBW 1.0 MHz; Att 0 dB; Swp 40.0 mS
 Peak 24.643889 GHz, -39.95 dBm
 Display Line: -23.8 dBm;
 10/02/2004 10:06:39



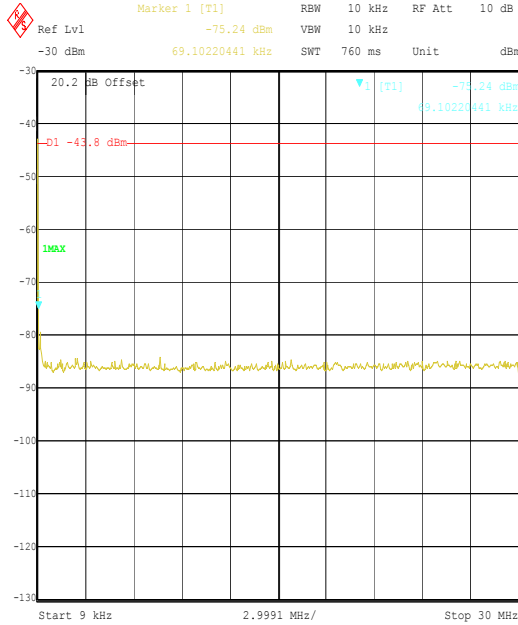
Start 26.5 GHz; Stop 27.0 GHz
 Ref -20 dBm; Ref Offset 50.0 dB; 10 dB/div
 RBW 1.0 MHz; VBW 1.0 MHz; Att 0 dB; Swp 20.0 mS
 Peak 26.765556 GHz, -43.13 dBm
 Display Line: -23.8 dBm;
 10/02/2004 10:20:45

Test Of: IPWireless U.K. Ltd.

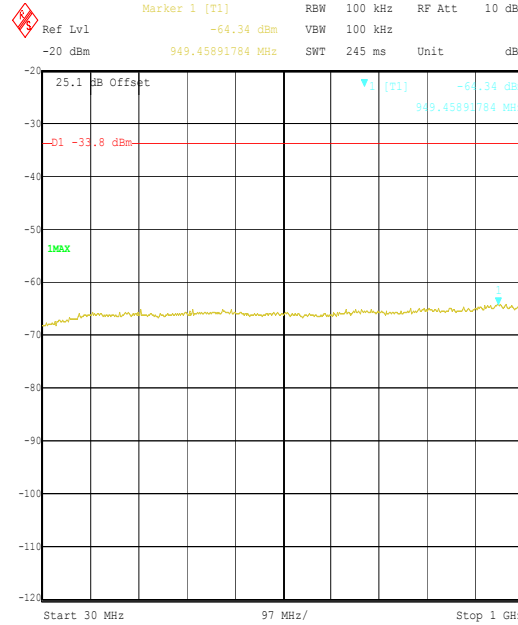
UE PCMCIA Card Model: FD

To: FCC Part 15, Part 21 & Part 74

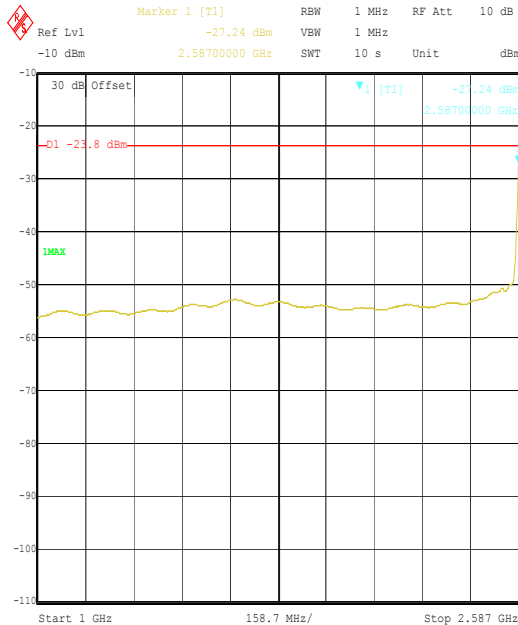
Transmitter Conducted Emissions Middle Channel (High Chip Rate) – Continued



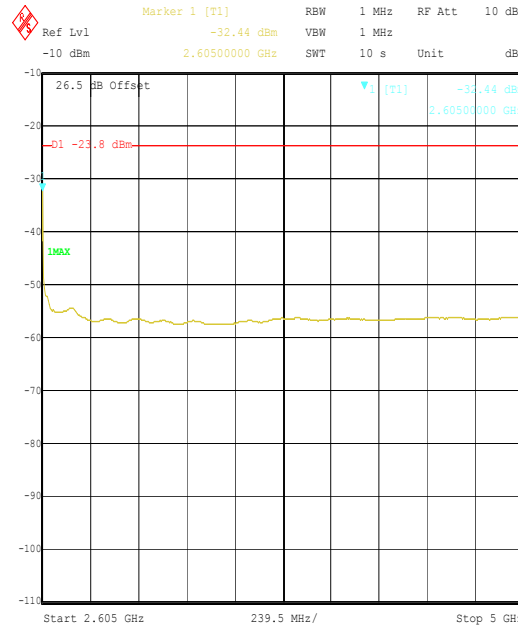
Title: IPWireless EUT: FD, FCC P15/21/74, Conducted Spurious
 Comment A: 45219JD01 Middle Channel 7.68 Mcps. 001
 Date: 5.FEB.2004 14:34:48



Title: IPWireless EUT: FD, FCC P15/21/74, Conducted Spurious
 Comment A: 45219JD01 Middle Channel 7.68 Mcps. 002
 Date: 5.FEB.2004 14:37:15



Title: IPWireless EUT: FD, FCC P15/21/74, Conducted Spurious
 Comment A: 45219JD01 Middle Channel 7.68 Mcps. 003
 Date: 5.FEB.2004 14:57:47



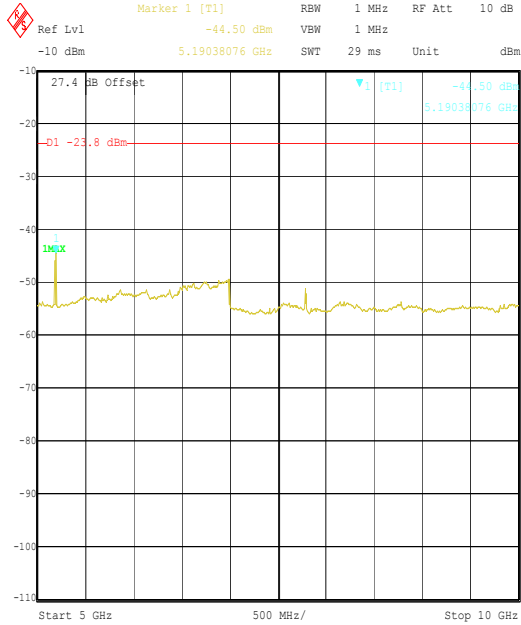
Title: IPWireless EUT: FD, FCC P15/21/74, Conducted Spurious
 Comment A: 45219JD01 Middle Channel 7.68 Mcps. 004
 Date: 5.FEB.2004 14:59:13

Test Of: IPWireless U.K. Ltd.

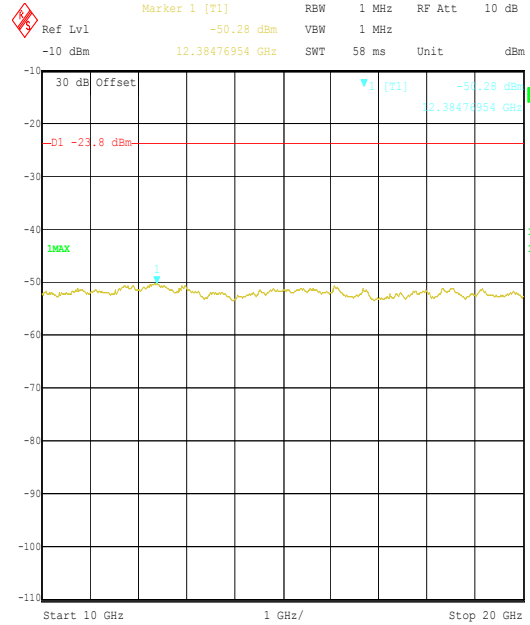
UE PCMCIA Card Model: FD

To: FCC Part 15, Part 21 & Part 74

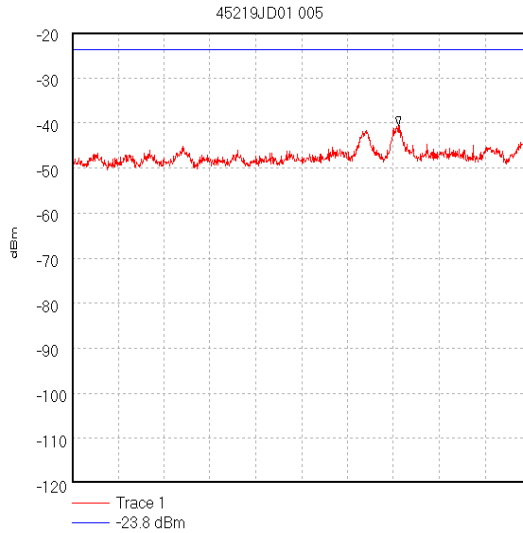
Transmitter Conducted Emissions Middle Channel (High Chip Rate) – Continued



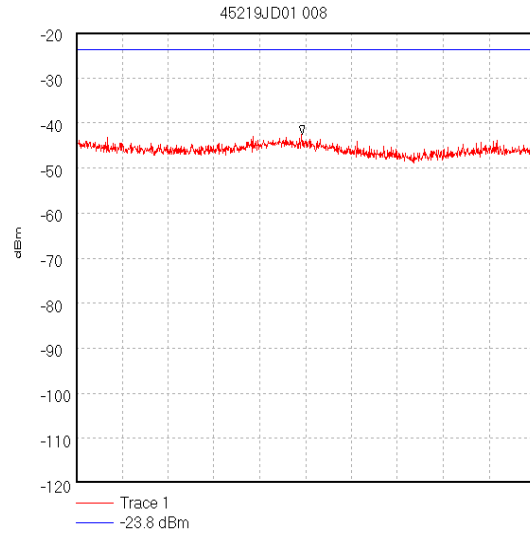
Title: IPWireless EUT: FD, FCC P15/21/74, Conducted Spurious
 Comment A: 45219JD01 Middle Channel 7.68 Mcps. 005
 Date: 5.FEB.2004 14:51:36



Title: IPWireless EUT: FD, FCC P15/21/74, Conducted Spurious
 Comment A: 45219JD01 Middle Channel 7.68 Mcps. 006
 Date: 5.FEB.2004 14:53:37



Start 20.0 GHz; Stop 26.5 GHz
 Ref -20 dBm; Ref Offset 34.6 dB; 10 dB/div
 RBW 1.0 MHz; VBW 1.0 MHz; Att 0 dB; Swp 40.0 mS
 Peak 24.622222 GHz, -40.54 dBm
 Display Line: -23.8 dBm;
 10/02/2004 10:05:28



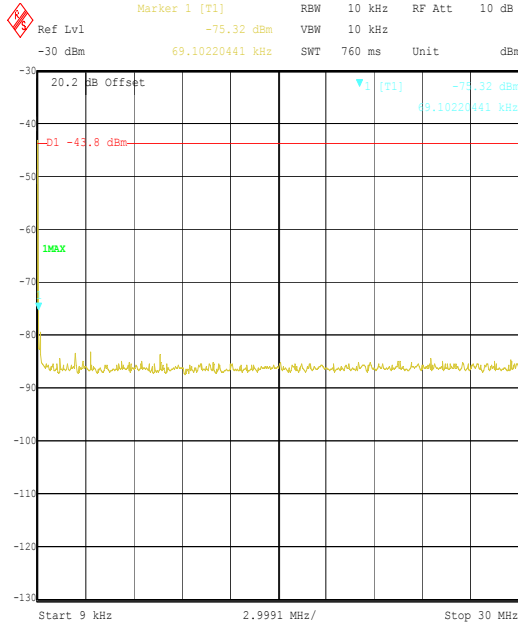
Start 26.5 GHz; Stop 27.0 GHz
 Ref -20 dBm; Ref Offset 50.0 dB; 10 dB/div
 RBW 1.0 MHz; VBW 1.0 MHz; Att 0 dB; Swp 20.0 mS
 Peak 26.746111 GHz, -42.54 dBm
 Display Line: -23.8 dBm;
 10/02/2004 10:21:48

Test Of: IPWireless U.K. Ltd.

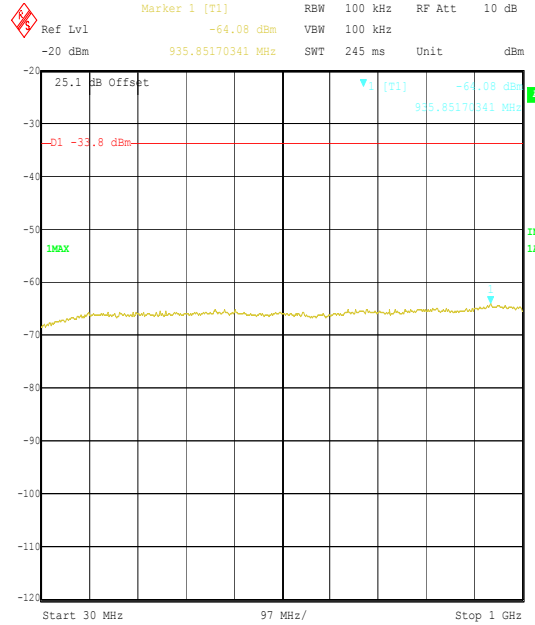
UE PCMCIA Card Model: FD

To: FCC Part 15, Part 21 & Part 74

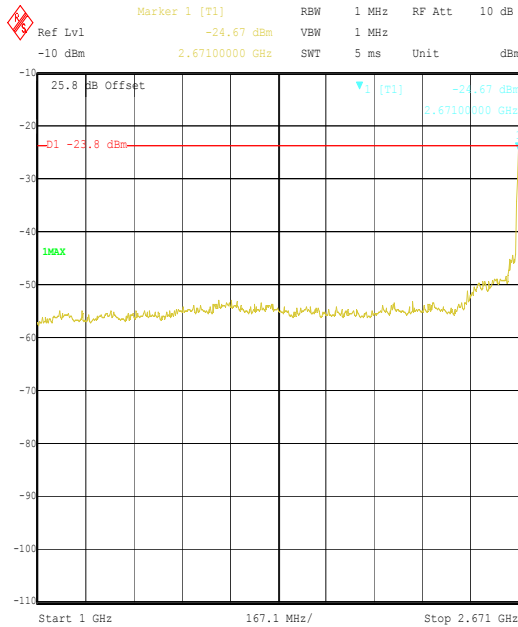
Transmitter Conducted Emissions Top Channel (High Chip Rate) – Continued



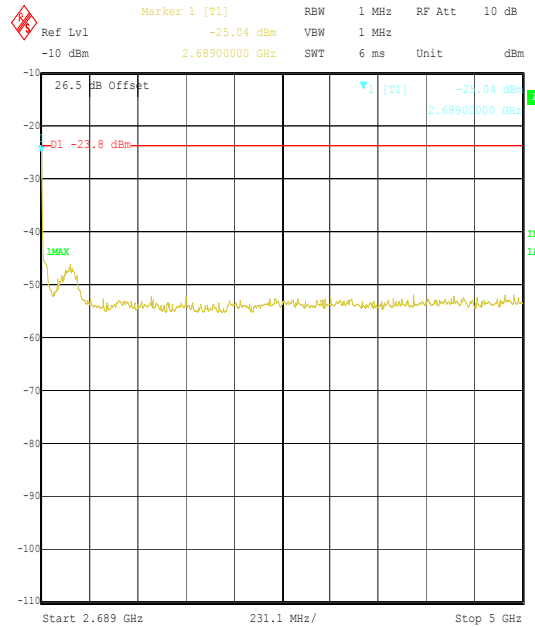
Title: IPWireless EUT: FD, FCC P15/21/74, Conducted Spurious
 Comment A: 45219JD01 Top Channel 7.68 Mcps. 001
 Date: 5.FEB.2004 14:35:50



Title: IPWireless EUT: FD, FCC P15/21/74, Conducted Spurious
 Comment A: 45219JD01 Top Channel 7.68 Mcps. 002
 Date: 5.FEB.2004 14:36:30



Title: IPWireless EUT: FD, FCC P15/21/74, Conducted Spurious
 Comment A: 45219JD01 Top Channel 7.68 Mcps. 003
 Date: 5.FEB.2004 14:47:58



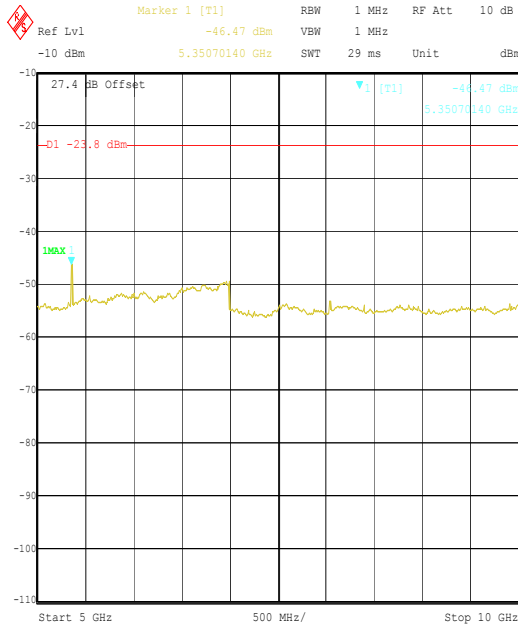
Title: IPWireless EUT: FD, FCC P15/21/74, Conducted Spurious
 Comment A: 45219JD01 Top Channel 7.68 Mcps. 004
 Date: 5.FEB.2004 14:48:32

Test Of: IPWireless U.K. Ltd.

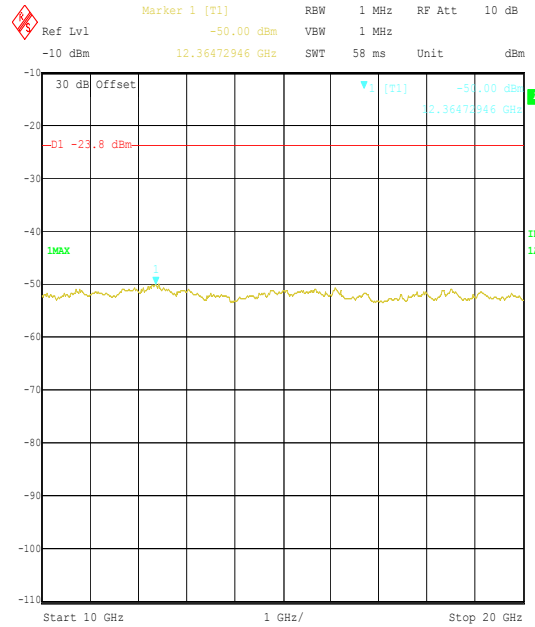
UE PCMCIA Card Model: FD

To: FCC Part 15, Part 21 & Part 74

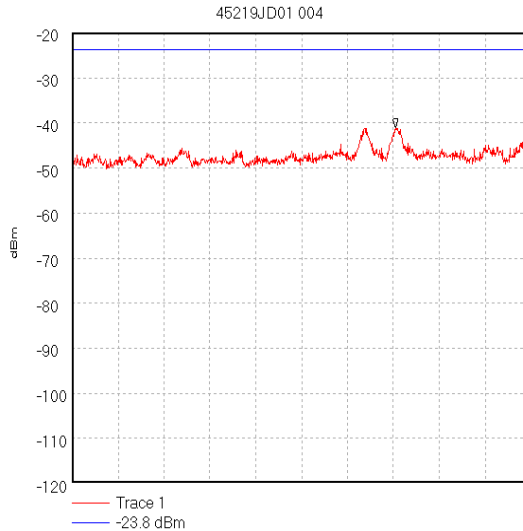
Transmitter Conducted Emissions Top Channel (High Chip Rate) – Continued



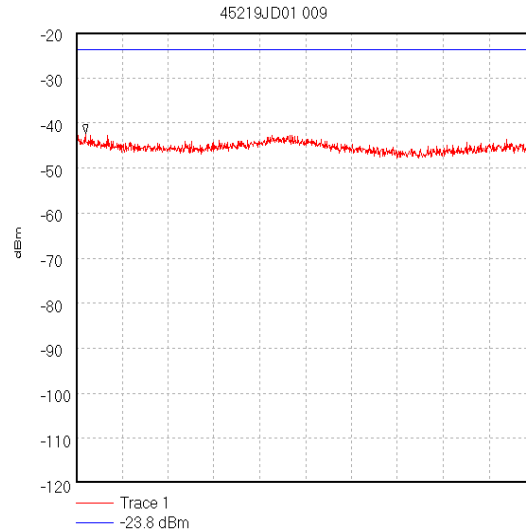
Title: IPWireless EUT: FD, FCC P15/21/74, Conducted Spurious
 Comment A: 45219JD01 Top Channel 7.68 Mcps, 005
 Date: 5.FEB.2004 14:52:20



Title: IPWireless EUT: FD, FCC P15/21/74, Conducted Spurious
 Comment A: 45219JD01 Top Channel 7.68 Mcps, 006
 Date: 5.FEB.2004 14:53:10



Start 20.0 GHz; Stop 26.5 GHz
 Ref -20 dBm; Ref Offset 34.6 dB; 10 dB/div
 RBW 1.0 MHz; VBW 1.0 MHz; Att 0 dB; Swp 40.0 mS
 Peak 24.586111 GHz, -41.1 dBm
 Display Line: -23.8 dBm;
 10/02/2004 10:03:59



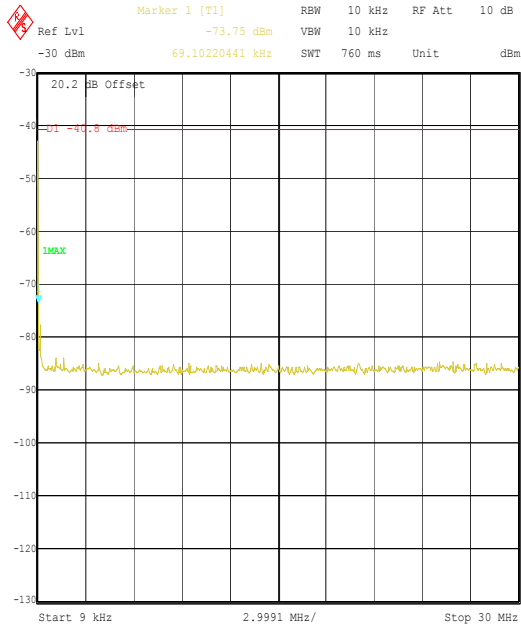
Start 26.5 GHz; Stop 27.0 GHz
 Ref -20 dBm; Ref Offset 50.0 dB; 10 dB/div
 RBW 1.0 MHz; VBW 1.0 MHz; Att 0 dB; Swp 20.0 mS
 Peak 26.51 GHz, -42.39 dBm
 Display Line: -23.8 dBm;
 10/02/2004 10:22:45

Test Of: IPWireless U.K. Ltd.

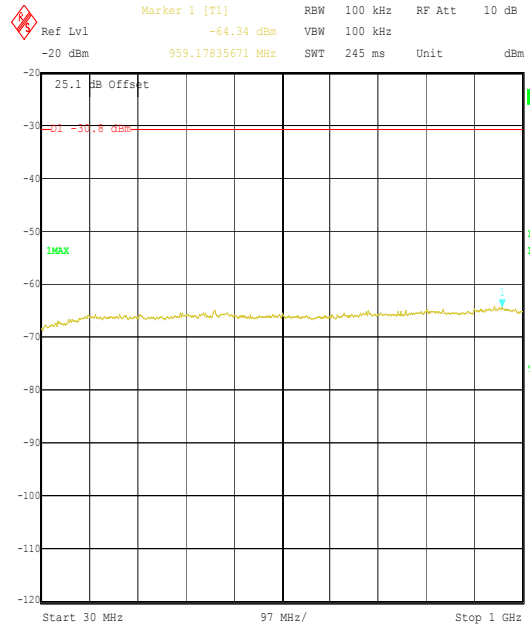
UE PCMCIA Card Model: FD

To: FCC Part 15, Part 21 & Part 74

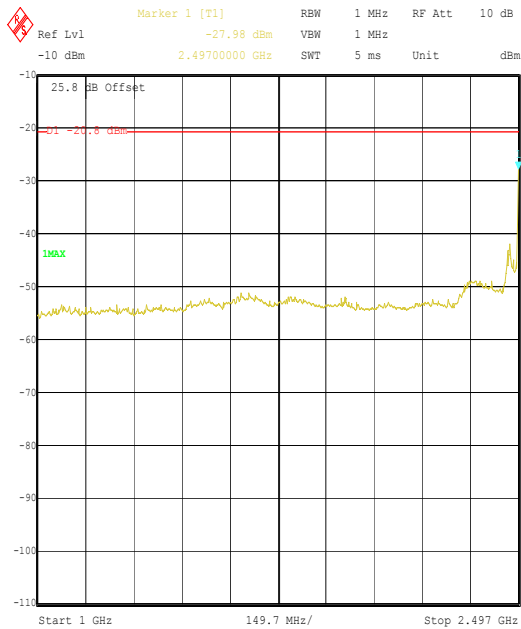
Transmitter Conducted Emissions Bottom Channel (Low Chip Rate) – Continued



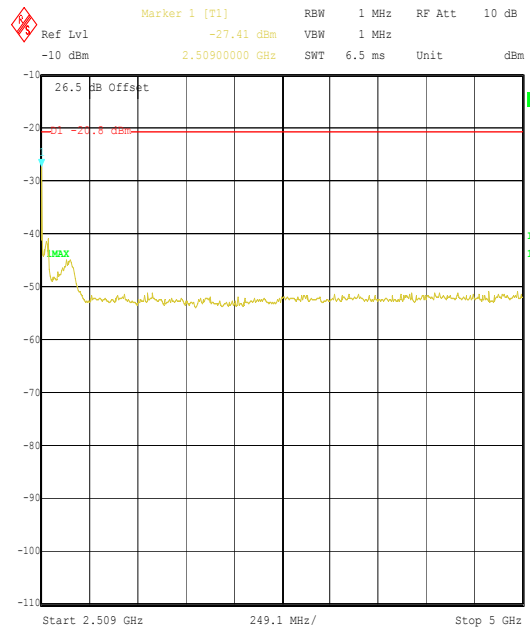
Title: IPWireless EUT: FD. FCC P15/21/74. Conducted Spurious
 Comment A: 45219JD01 Bottom Channel 3.84 Mcps. 001
 Date: 5.FEB.2004 10:27:21



Title: IPWireless EUT: FD. FCC P15/21/74. Conducted Spurious
 Comment A: 45219JD01 Bottom Channel 3.84 Mcps. 002
 Date: 5.FEB.2004 10:30:13



Title: IPWireless EUT: FD. FCC P15/21/74. Conducted Spurious
 Comment A: 45219JD01 Bottom Channel 3.84 Mcps. 003
 Date: 5.FEB.2004 10:41:20



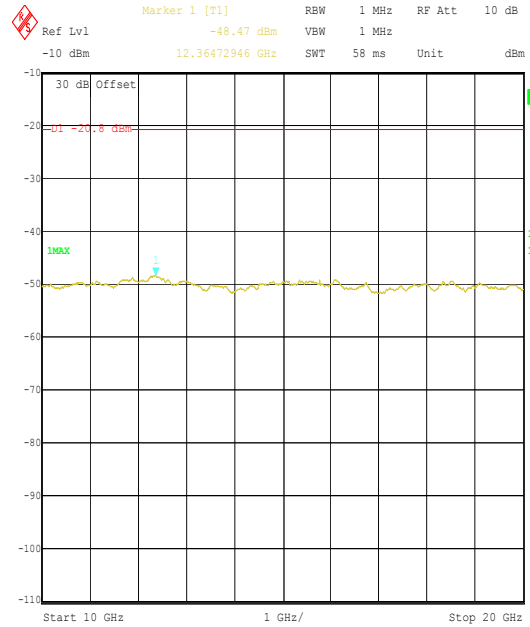
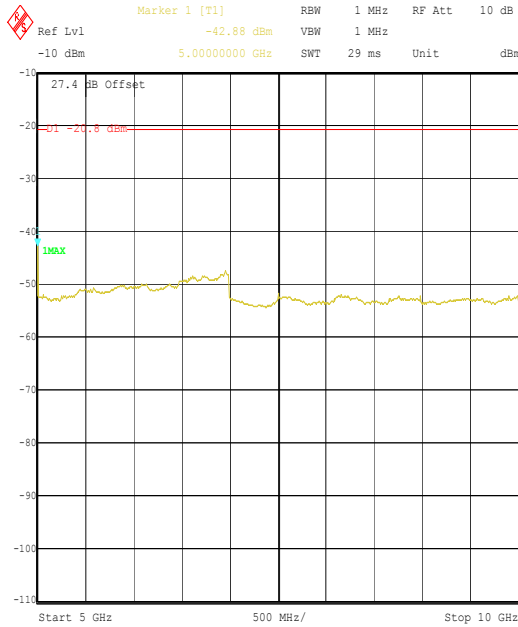
Title: IPWireless EUT: FD. FCC P15/21/74. Conducted Spurious
 Comment A: 45219JD01 Bottom Channel 3.84 Mcps. 004
 Date: 5.FEB.2004 10:47:00

Test Of: IPWireless U.K. Ltd.

UE PCMCIA Card Model: FD

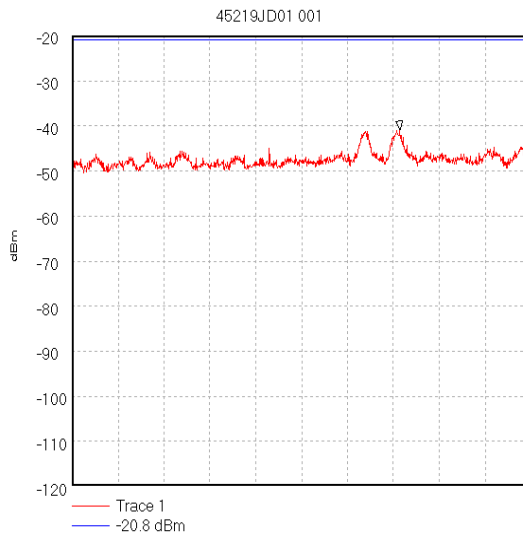
To: FCC Part 15, Part 21 & Part 74

Transmitter Conducted Emissions Bottom Channel (Low Chip Rate) – Continued

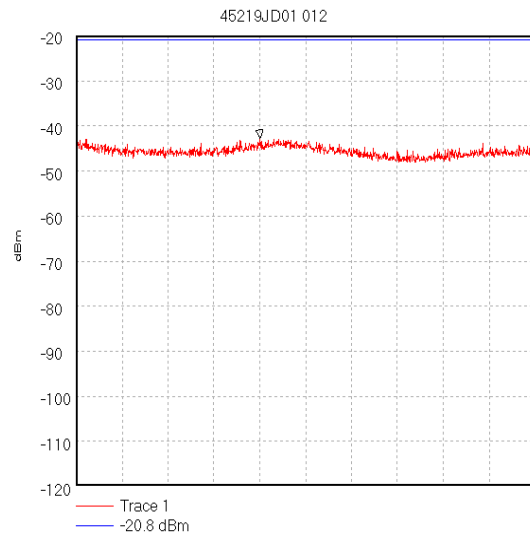


Title: IPWireless EUT: FD, FCC P15/21/74, Conducted Spurious
 Comment A: 45219JD01 Bottom Channel 3.84 Mcps. 005
 Date: 5.FEB.2004 10:48:04

Title: IPWireless EUT: FD, FCC P15/21/74, Conducted Spurious
 Comment A: 45219JD01 Bottom Channel 3.84 Mcps. 006
 Date: 5.FEB.2004 10:56:24



Start 20.0 GHz; Stop 26.5 GHz
 Ref -20 dBm; Ref Offset 34.6 dB; 10 dB/div
 RBW 1.0 MHz; VBW 1.0 MHz; Att 0 dB; Swp 40.0 mS
 Peak 24.643889 GHz, -40.92 dBm
 Display Line: -20.8 dBm;
 10/02/2004 09:57:33



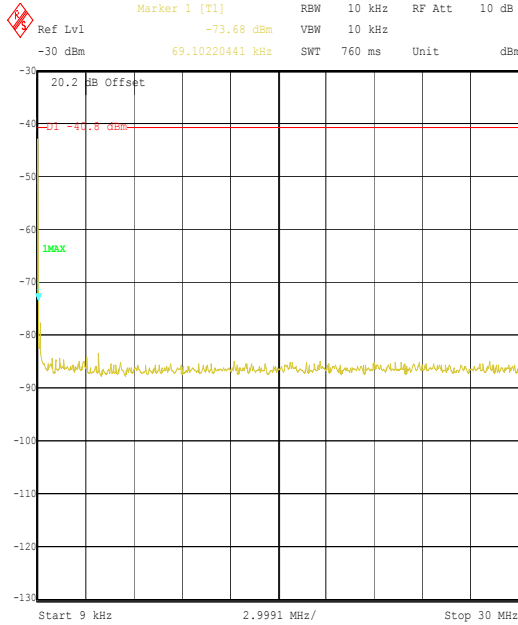
Start 26.5 GHz; Stop 27.0 GHz
 Ref -20 dBm; Ref Offset 50.0 dB; 10 dB/div
 RBW 1.0 MHz; VBW 1.0 MHz; Att 0 dB; Swp 20.0 mS
 Peak 26.700556 GHz, -42.82 dBm
 Display Line: -20.8 dBm;
 10/02/2004 10:25:58

Test Of: IPWireless U.K. Ltd.

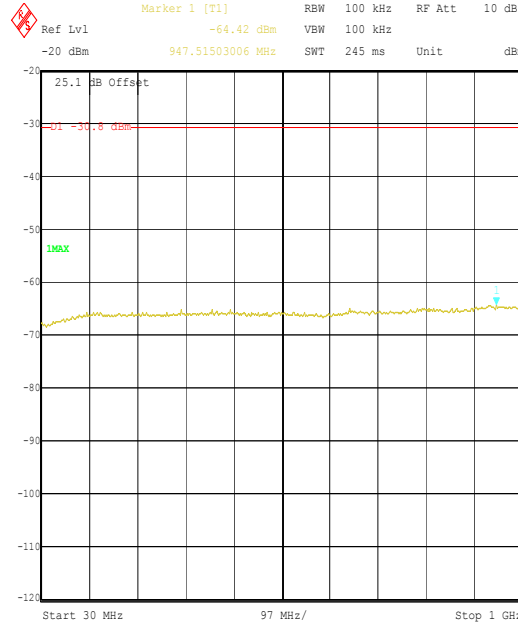
UE PCMCIA Card Model: FD

To: FCC Part 15, Part 21 & Part 74

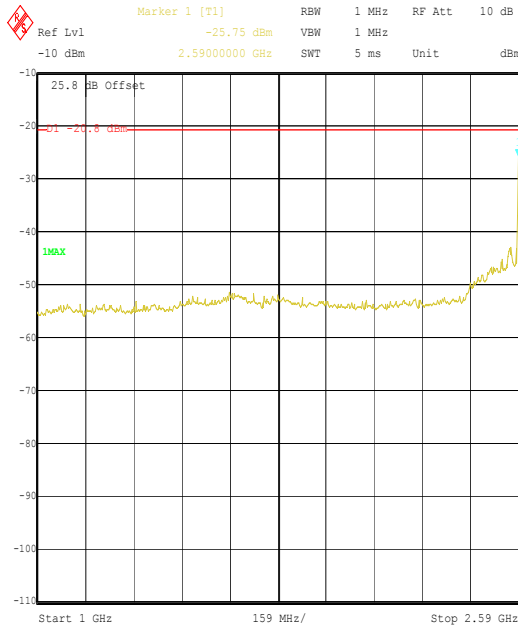
Transmitter Conducted Emissions Middle Channel (Low Chip Rate) – Continued



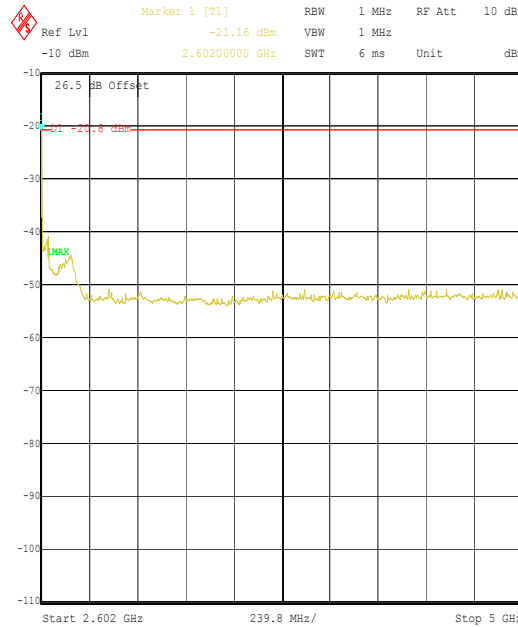
Title: IPWireless EUT: FD. FCC P15/21/74. Conducted Spurious
 Comment A: 45219JD01 Middle Channel 3.84 Mcps. 001
 Date: 5.FEB.2004 10:27:49



Title: IPWireless EUT: FD. FCC P15/21/74. Conducted Spurious
 Comment A: 45219JD01 Middle Channel 3.84 Mcps. 002
 Date: 5.FEB.2004 10:29:40



Title: IPWireless EUT: FD. FCC P15/21/74. Conducted Spurious
 Comment A: 45219JD01 Middle Channel 3.84 Mcps. 003
 Date: 5.FEB.2004 10:43:08



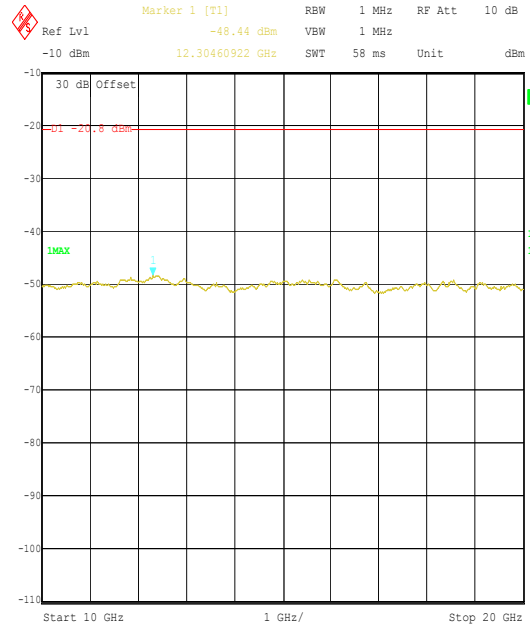
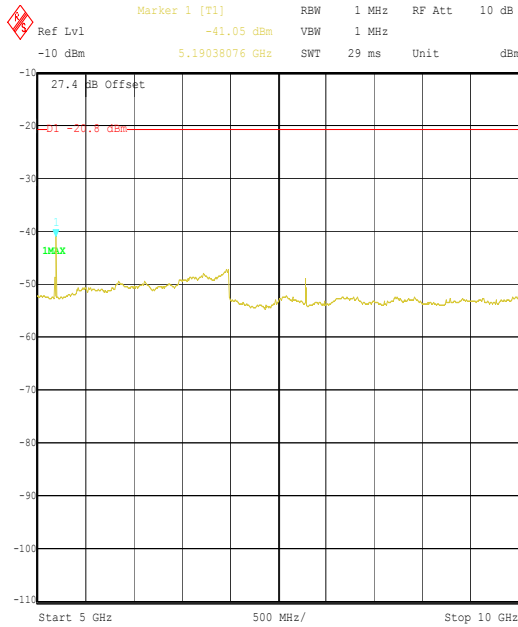
Title: IPWireless EUT: FD. FCC P15/21/74. Conducted Spurious
 Comment A: 45219JD01 Middle Channel 3.84 Mcps. 004
 Date: 5.FEB.2004 10:45:55

Test Of: IPWireless U.K. Ltd.

UE PCMCIA Card Model: FD

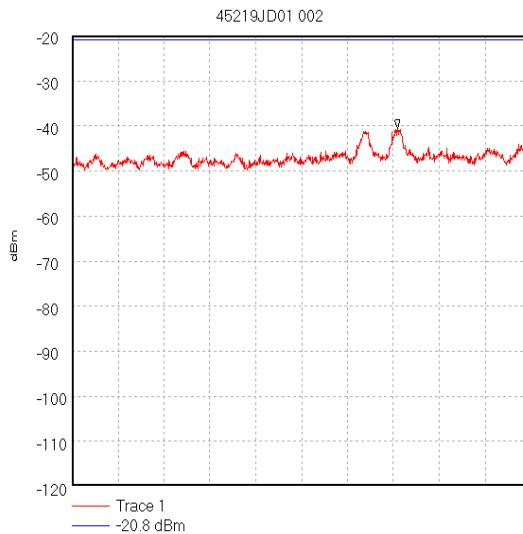
To: FCC Part 15, Part 21 & Part 74

Transmitter Conducted Emissions Middle Channel (Low Chip Rate) – Continued

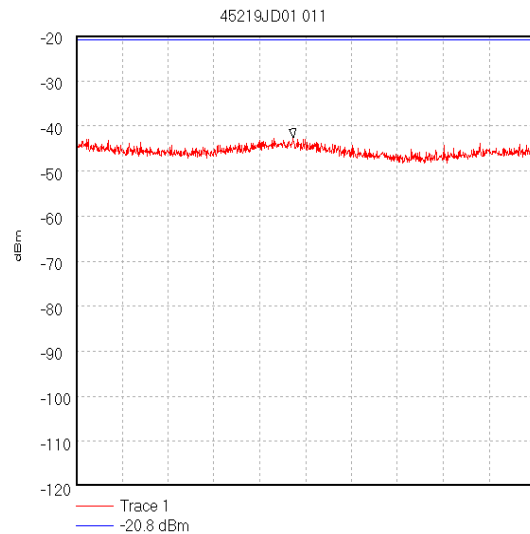


Title: IPWireless EUT: FD, FCC P15/21/74, Conducted Spurious
 Comment A: 45219JD01 Middle Channel 3.84 Mcps. 005
 Date: 5.FEB.2004 10:48:39

Title: IPWireless EUT: FD, FCC P15/21/74, Conducted Spurious
 Comment A: 45219JD01 Middle Channel 3.84 Mcps. 006
 Date: 5.FEB.2004 10:55:05



Start 20.0 GHz; Stop 26.5 GHz
 Ref -20 dBm; Ref Offset 34.6 dB; 10 dB/div
 RBW 1.0 MHz; VBW 1.0 MHz; Att 0 dB; Swp 40.0 mS
 Peak 24.615 GHz, -40.61 dBm
 Display Line: -20.8 dBm;
 10/02/2004 09:59:45



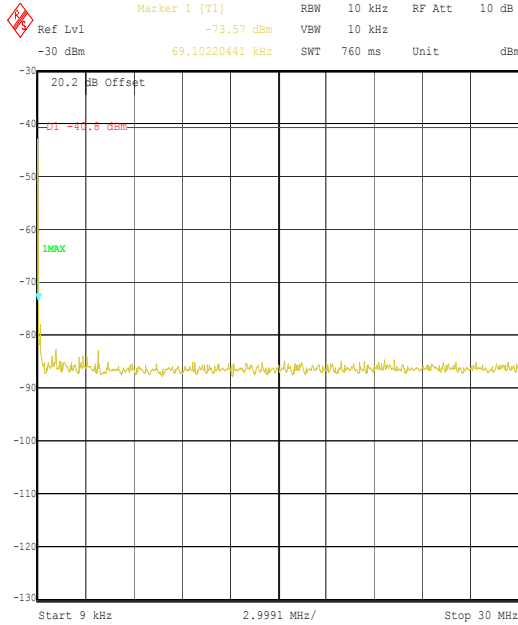
Start 26.5 GHz; Stop 27.0 GHz
 Ref -20 dBm; Ref Offset 50.0 dB; 10 dB/div
 RBW 1.0 MHz; VBW 1.0 MHz; Att 0 dB; Swp 20.0 mS
 Peak 26.736667 GHz, -42.67 dBm
 Display Line: -20.8 dBm;
 10/02/2004 10:24:28

Test Of: IPWireless U.K. Ltd.

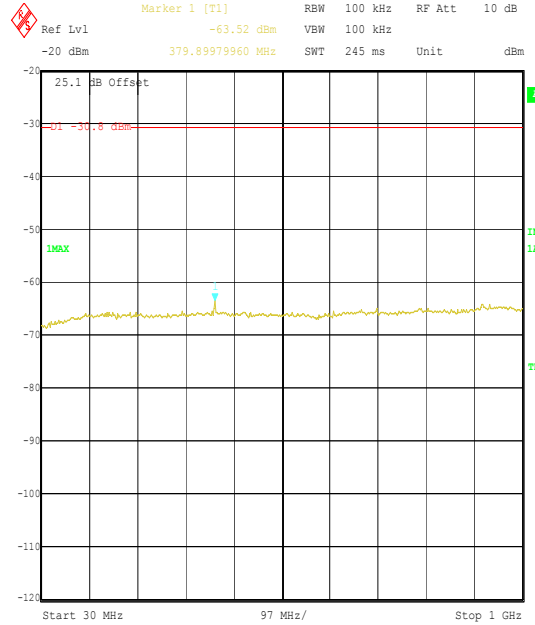
UE PCMCIA Card Model: FD

To: FCC Part 15, Part 21 & Part 74

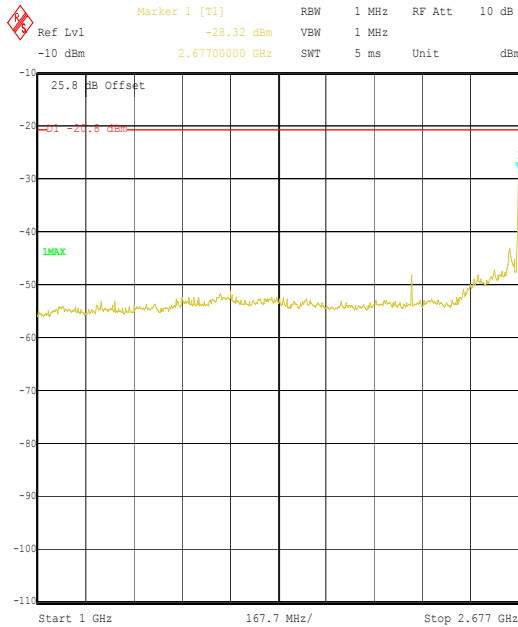
Transmitter Conducted Emissions Top Channel (Low Chip Rate) – Continued



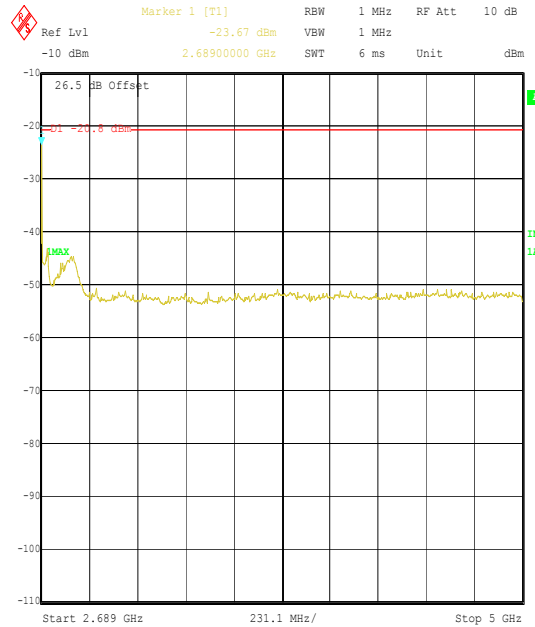
Title: IPWireless EUT: FD, FCC P15/21/74, Conducted Spurious
 Comment A: 45219JD01 Top Channel 3.84 Mcps. 001
 Date: 5.FEB.2004 10:28:17



Title: IPWireless EUT: FD, FCC P15/21/74, Conducted Spurious
 Comment A: 45219JD01 Top Channel 3.84 Mcps. 002
 Date: 5.FEB.2004 10:28:55



Title: IPWireless EUT: FD, FCC P15/21/74, Conducted Spurious
 Comment A: 45219JD01 Top Channel 3.84 Mcps. 003
 Date: 5.FEB.2004 10:44:09



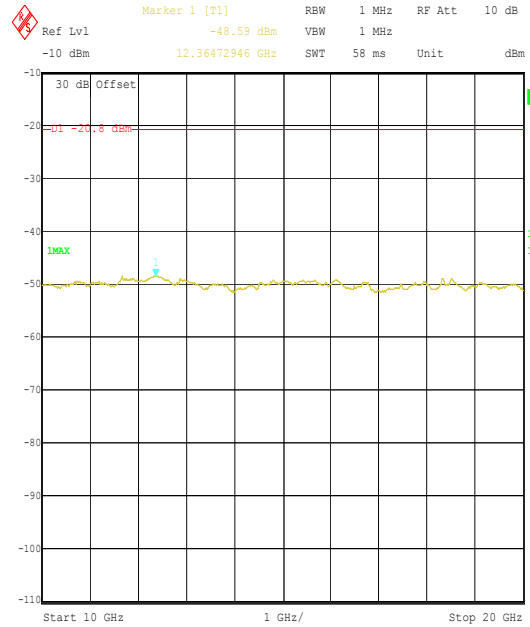
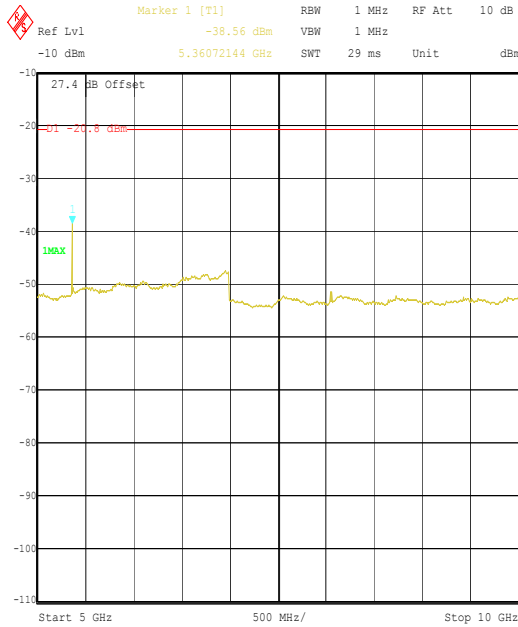
Title: IPWireless EUT: FD, FCC P15/21/74, Conducted Spurious
 Comment A: 45219JD01 Top Channel 3.84 Mcps. 004
 Date: 5.FEB.2004 10:45:00

Test Of: IPWireless U.K. Ltd.

UE PCMCIA Card Model: FD

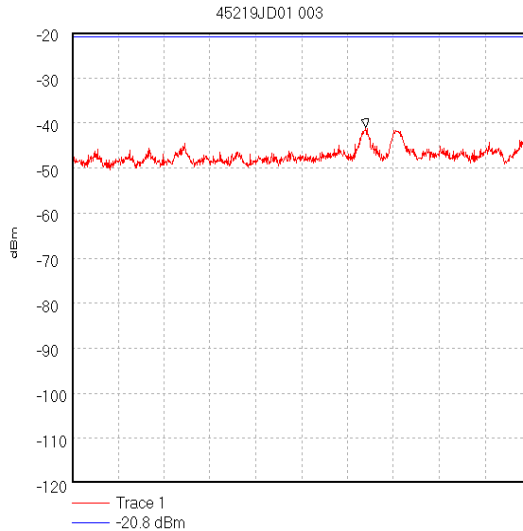
To: FCC Part 15, Part 21 & Part 74

Transmitter Conducted Emissions Top Channel (Low Chip Rate) – Continued

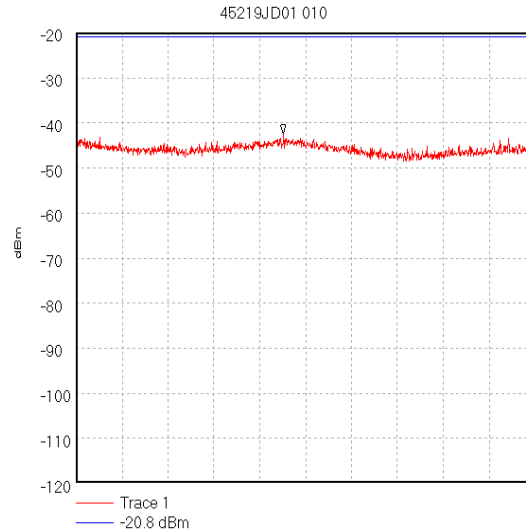


Title: IPWireless EUT: FD, FCC P15/21/74, Conducted Spurious
 Comment A: 45219JD01 Top Channel 3.84 Mcps, 005
 Date: 5.FEB.2004 10:49:18

Title: IPWireless EUT: FD, FCC P15/21/74, Conducted Spurious
 Comment A: 45219JD01 Top Channel 3.84 Mcps, 006
 Date: 5.FEB.2004 10:54:19



Start 20.0 GHz; Stop 26.5 GHz
 Ref -20 dBm; Ref Offset 34.6 dB; 10 dB/div
 RBW 1.0 MHz; VBW 1.0 MHz; Att 0 dB; Swp 40.0 mS
 Peak 24.16 GHz, -41.02 dBm
 Display Line: -20.8 dBm;
 10/02/2004 10:01:44



Start 26.5 GHz; Stop 27.0 GHz
 Ref -20 dBm; Ref Offset 50.0 dB; 10 dB/div
 RBW 1.0 MHz; VBW 1.0 MHz; Att 0 dB; Swp 20.0 mS
 Peak 26.726111 GHz, -42.42 dBm
 Display Line: -20.8 dBm;
 10/02/2004 10:23:35

Test Of: IPWireless U.K. Ltd.

UE PCMCIA Card Model: FD

To: FCC Part 15, Part 21 & Part 74

7.9. Transmitter Radiated Emissions

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

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

Results:- Bottom Channel (High Chip Rate)

Frequency (MHz)	Spurious Emission (dBm)	Carrier EIRP (dBm)	Spurious Emission (dBc)	Limit (dBc)	Margin (dB)	Result
85.874	-64.2	21.9	-86.1	-55.7	30.4	Complied
132.423	-52.0	21.9	-73.9	-55.7	18.2	Complied
111.208	-67.1	21.9	-89.0	-55.7	33.3	Complied
163.033	-62.2	21.9	-84.1	-55.7	28.4	Complied
195.409	-57.9	21.9	-79.8	-55.7	24.1	Complied
260.557	-49.1	21.9	-71.0	-55.7	15.3	Complied
325.707	-49.2	21.9	-71.1	-55.7	15.4	Complied
390.836	-58.4	21.9	-80.3	-55.7	24.6	Complied
458.265	-53.2	21.9	-75.1	-55.7	19.4	Complied
716.565	-50.2	21.9	-72.1	-55.7	16.4	Complied
911.977	-52.6	21.9	-74.5	-55.7	18.8	Complied
977.156	-51.7	21.9	-73.6	-55.7	17.9	Complied
1042.249	-52.9	21.9	-74.8	-45.7	29.1	Complied
1060.837	-44.8	21.9	-66.7	-45.7	21.0	Complied
1107.817	-47.2	21.9	-69.1	-45.7	23.4	Complied
1172.600	-55.7	21.9	-77.6	-45.7	31.9	Complied
1197.831	-64.0	21.9	-85.9	-45.7	40.2	Complied
1592.651	-61.8	21.9	-83.7	-45.7	38.0	Complied
1133.352	-54.6	21.9	-76.5	-45.7	30.8	Complied
2493.100	-36.6	21.9	-58.5	-45.7	12.8	Complied
2497.000	-31.8	21.9	-53.7	-45.7	8.0	Complied
2515.000	-33.9	21.9	-55.8	-45.7	10.1	Complied

Test Of: IPWireless U.K. Ltd.

UE PCMCIA Card Model: FD

To: FCC Part 15, Part 21 & Part 74

Transmitter Radiated Emissions (Continued)**Results:- Bottom Channel (High Chip Rate)**

Frequency (MHz)	Spurious Emission (dBm)	Carrier EIRP (dBm)	Spurious Emission (dBc)	Limit (dBc)	Margin (dB)	Result
2662.535	-46.6	21.9	-68.5	-45.7	22.8	Complied
5008.297	-39.5	21.9	-61.4	-45.7	15.7	Complied
7510.335	-52.5	21.9	-74.4	-45.7	28.7	Complied
12246.824	-47.9	21.9	-69.8	-45.7	24.1	Complied
14529.349	-44.8	21.9	-66.7	-45.7	21.0	Complied
25546.994	-35.7	21.9	-57.6	-45.7	11.9	Complied
26534.070	-48.5	21.9	-70.4	-45.7	24.7	Complied

Note: The limit is calculated according to FCC Section 21.908(e) for absolute power measurements operating at a chip rate of 7.68 Mcps in a 12 MHz channel as follows:

$A + 10\log(C_{BW}/R_{BW})$ where $C_{BW} = 12$ MHz and $R_{BW} = 1$ MHz (above 1 GHz) and $R_{BW} = 100$ kHz (below 1 GHz).

Test Of: IPWireless U.K. Ltd.

UE PCMCIA Card Model: FD

To: FCC Part 15, Part 21 & Part 74

Transmitter Radiated Emissions (Continued)**Results:- Middle Channel (High Chip Rate)**

Frequency (MHz)	Spurious Emission (dBm)	Carrier EIRP (dBm)	Spurious Emission (dBc)	Limit (dBc)	Margin (dB)	Result
85.843	-65.5	22.7	-88.2	-56.5	31.7	Complied
111.731	-69.5	22.7	-92.2	-56.5	35.7	Complied
132.403	-51.8	22.7	-74.5	-56.5	18.0	Complied
163.346	-61.4	22.7	-84.1	-56.5	27.6	Complied
195.403	-57.7	22.7	-80.4	-56.5	23.9	Complied
260.575	-49.2	22.7	-71.9	-56.5	15.4	Complied
390.845	-57.5	22.7	-80.2	-56.5	23.7	Complied
325.705	-49.0	22.7	-71.7	-56.5	15.2	Complied
458.245	-53.7	22.7	-76.4	-56.5	19.9	Complied
716.565	-48.8	22.7	-71.5	-56.5	15.0	Complied
911.973	-52.5	22.7	-75.2	-56.5	18.7	Complied
977.126	-51.7	22.7	-74.4	-56.5	17.9	Complied
1042.730	-53.4	22.7	-76.1	-46.5	29.6	Complied
1059.650	-44.1	22.7	-66.8	-46.5	20.3	Complied
1107.135	-47.3	22.7	-70.0	-46.5	23.5	Complied
1133.076	-48.7	22.7	-71.4	-46.5	24.9	Complied
1172.665	-55.3	22.7	-78.0	-46.5	31.5	Complied
1195.667	-63.2	22.7	-85.9	-46.5	39.4	Complied
1590.927	-62.9	22.7	-85.6	-46.5	39.1	Complied
2475.872	-49.5	22.7	-72.2	-46.5	25.7	Complied
2587.000	-29.6	22.7	-52.3	-46.5	5.8	Complied
2605.000	-29.6	22.7	-52.3	-46.5	5.8	Complied
3776.740	-58.5	22.7	-81.2	-46.5	34.7	Complied
5188.096	-33.8	22.7	-56.5	-46.5	10.0	Complied
6998.046	-54.1	22.7	-76.8	-46.5	30.3	Complied

Test Of: IPWireless U.K. Ltd.

UE PCMCIA Card Model: FD

To: FCC Part 15, Part 21 & Part 74

Transmitter Radiated Emissions (Continued)**Results:- Middle Channel (High Chip Rate)**

Frequency (MHz)	Spurious Emission (dBm)	Carrier EIRP (dBm)	Spurious Emission (dBc)	Limit (dBc)	Margin (dB)	Result
12389.494	-47.3	22.7	-70.0	-46.5	23.5	Complied
12980.752	-41.6	22.7	-64.3	-46.5	17.8	Complied
25554.008	-35.5	22.7	-58.2	-46.5	11.7	Complied
26504.650	-49.0	22.7	-71.7	-46.5	25.2	Complied

Note: The limit is calculated according to FCC Section 21.908(e) for absolute power measurements operating at a chip rate of 7.68 Mcps in a 12 MHz channel as follows:

$A + 10\log(C_{BW}/R_{BW})$ where $C_{BW} = 12$ MHz and $R_{BW} = 1$ MHz (above 1 GHz) and $R_{BW} = 100$ kHz (below 1 GHz).

Test Of: IPWireless U.K. Ltd.

UE PCMCIA Card Model: FD

To: FCC Part 15, Part 21 & Part 74

Transmitter Radiated Emissions (Continued) - High Chip Rate**Results:- Top Channel (High Chip Rate)**

Frequency (MHz)	Spurious Emission (dBm)	Carrier EIRP (dBm)	Spurious Emission (dBc)	Limit (dBc)	Margin (dB)	Result
85.873	-64.8	23.6	-88.4	-57.4	31.0	Complied
111.269	-67.8	23.6	-91.4	-57.4	34.0	Complied
132.425	-53.0	23.6	-76.6	-57.4	19.2	Complied
162.846	-64.5	23.6	-88.1	-57.4	30.7	Complied
195.423	-58.1	23.6	-81.7	-57.4	24.3	Complied
260.557	-49.5	23.6	-73.1	-57.4	15.7	Complied
390.855	-57.6	23.6	-81.2	-57.4	23.8	Complied
325.707	-49.2	23.6	-72.8	-57.4	15.4	Complied
458.247	-53.6	23.6	-77.2	-57.4	19.8	Complied
716.559	-50.6	23.6	-74.2	-57.4	16.8	Complied
911.987	-51.5	23.6	-75.1	-57.4	17.7	Complied
977.140	-50.6	23.6	-74.2	-57.4	16.8	Complied
1043.136	-51.2	23.6	-74.8	-47.4	27.4	Complied
1059.670	-45.1	23.6	-68.7	-47.4	21.3	Complied
1107.411	-50.5	23.6	-74.1	-47.4	26.7	Complied
1133.131	-54.1	23.6	-77.7	-47.4	30.3	Complied
1172.520	-55.7	23.6	-79.3	-47.4	31.9	Complied
1196.874	-63.6	23.6	-87.2	-47.4	39.8	Complied
1590.752	-62.0	23.6	-85.6	-47.4	38.2	Complied
2671.000	-23.9	23.6	-47.5	-47.4	0.1	Complied
2689.000	-23.9	23.6	-47.5	-47.4	0.1	Complied
2830.618	-52.2	23.6	-75.8	-47.4	28.4	Complied
5356.052	-41.3	23.6	-64.9	-47.4	17.5	Complied
6723.497	-49.3	23.6	-72.9	-47.4	25.5	Complied

Test Of: IPWireless U.K. Ltd.

UE PCMCIA Card Model: FD

To: FCC Part 15, Part 21 & Part 74

Transmitter Radiated Emissions (Continued)**Results:- Top Channel (High Chip Rate)**

Frequency (MHz)	Spurious Emission (dBm)	Carrier EIRP (dBm)	Spurious Emission (dBc)	Limit (dBc)	Margin (dB)	Result
12351.804	-47.3	23.6	-70.9	-47.4	23.5	Complied
12997.064	-44.2	23.6	-67.8	-47.4	20.4	Complied
25545.792	-35.5	23.6	-59.1	-47.4	11.7	Complied
26518.720	-48.5	23.6	-72.1	-47.4	24.7	Complied

Note: The limit is calculated according to FCC Section 21.908(e) for absolute power measurements operating at a chip rate of 7.68 Mcps in a 12 MHz channel as follows:

$A + 10\log(C_{BW}/R_{BW})$ where $C_{BW} = 12$ MHz and $R_{BW} = 1$ MHz (above 1 GHz) and $R_{BW} = 100$ kHz (below 1 GHz).

Test Of: IPWireless U.K. Ltd.

UE PCMCIA Card Model: FD

To: FCC Part 15, Part 21 & Part 74

Transmitter Radiated Emissions (Continued) - Low Chip Rate**Results:- Bottom Channel (Low Chip Rate)**

Frequency (MHz)	Spurious Emission (dBm)	Carrier EIRP (dBm)	Spurious Emission (dBc)	Limit (dBc)	Margin (dB)	Result
85.839	-63.1	22.0	-85.1	-52.8	32.3	Complied
132.164	-57.0	22.0	-79.0	-52.8	26.2	Complied
195.417	-57.3	22.0	-79.3	-52.8	26.5	Complied
260.572	-48.9	22.0	-70.9	-52.8	18.1	Complied
325.692	-48.2	22.0	-70.2	-52.8	17.4	Complied
458.236	-53.5	22.0	-75.5	-52.8	22.7	Complied
716.585	-53.3	22.0	-75.3	-52.8	22.5	Complied
911.962	-50.7	22.0	-72.7	-52.8	19.9	Complied
977.136	-51.2	22.0	-73.2	-52.8	20.4	Complied
1059.068	-49.0	22.0	-71.0	-42.8	28.2	Complied
2493.434	-36.6	22.0	-58.6	-42.8	15.8	Complied
2497.000	-34.0	22.0	-56.0	-42.8	13.2	Complied
2509.000	-34.7	22.0	-56.7	-42.8	13.9	Complied
2646.600	-47.2	22.0	-69.2	-42.8	26.4	Complied
5007.786	-41.7	22.0	-63.7	-42.8	20.9	Complied
12294.899	-46.9	22.0	-68.9	-42.8	26.1	Complied
16161.573	-44.9	22.0	-66.9	-42.8	24.1	Complied
25516.693	-36.6	22.0	-58.6	-42.8	15.8	Complied
26526.570	-48.8	22.0	-70.8	-42.8	28.0	Complied

Note: The limit is calculated according to FCC Section 21.908(e) for absolute power measurements operating at a chip rate of 3.84 Mcps in a 6 MHz channel as follows:

$A + 10\log(C_{BW}/R_{BW})$ where $C_{BW} = 6$ MHz and $R_{BW} = 1$ MHz (above 1 GHz) and $R_{BW} = 100$ kHz (below 1 GHz).

Test Of: IPWireless U.K. Ltd.

UE PCMCIA Card Model: FD

To: FCC Part 15, Part 21 & Part 74

Transmitter Radiated Emissions (Continued) - Low Chip Rate**Results:- Middle Channel (Low Chip Rate)**

Frequency (MHz)	Spurious Emission (dBm)	Carrier EIRP (dBm)	Spurious Emission (dBc)	Limit (dBc)	Margin (dB)	Result
85.892	-64.6	22.9	-87.5	-53.7	33.8	Complied
132.432	-51.6	22.9	-74.5	-53.7	20.8	Complied
195.402	-57.4	22.9	-80.3	-53.7	26.6	Complied
260.556	-49.6	22.9	-72.5	-53.7	18.8	Complied
325.692	-48.2	22.9	-71.1	-53.7	17.4	Complied
458.245	-53.4	22.9	-76.3	-53.7	22.6	Complied
716.537	-53.5	22.9	-76.4	-53.7	22.7	Complied
911.982	-50.7	22.9	-73.6	-53.7	19.9	Complied
977.136	-51.1	22.9	-74.0	-53.7	20.3	Complied
1059.188	-45.4	22.9	-68.3	-43.7	24.6	Complied
2479.759	-49.0	22.9	-71.9	-43.7	28.2	Complied
2590.000	-33.8	22.9	-56.7	-43.7	13.0	Complied
2602.000	-33.0	22.9	-55.9	-43.7	12.2	Complied
3776.439	-58.5	22.9	-81.4	-43.7	37.7	Complied
5189.960	-36.1	22.9	-59.0	-43.7	15.3	Complied
12398.682	-47.9	22.9	-70.8	-43.7	27.1	Complied
12974.599	-39.2	22.9	-62.1	-43.7	18.4	Complied
25555.491	-35.7	22.9	-58.6	-43.7	14.9	Complied
26502.500	-48.6	22.9	-71.5	-43.7	27.8	Complied

Note: The limit is calculated according to FCC Section 21.908(e) for absolute power measurements operating at a chip rate of 3.84 Mcps in a 6 MHz channel as follows:

$A + 10\log(C_{BW}/R_{BW})$ where $C_{BW} = 6$ MHz and $R_{BW} = 1$ MHz (above 1 GHz) and $R_{BW} = 100$ kHz (below 1 GHz).

Test Of: IPWireless U.K. Ltd.

UE PCMCIA Card Model: FD

To: FCC Part 15, Part 21 & Part 74

Transmitter Radiated Emissions (Continued) - Low Chip Rate**Results:- Top Channel (Low Chip Rate)**

Frequency (MHz)	Spurious Emission (dBm)	Carrier EIRP (dBm)	Spurious Emission (dBc)	Limit (dBc)	Margin (dB)	Result
85.861	-64.6	23.7	-88.3	-54.5	33.8	Complied
132.932	-54.9	23.7	-78.6	-54.5	24.1	Complied
195.421	-57.6	23.7	-81.3	-54.5	26.8	Complied
260.586	-47.6	23.7	-71.3	-54.5	16.8	Complied
325.690	-47.3	23.7	-71.0	-54.5	16.5	Complied
458.260	-53.6	23.7	-77.3	-54.5	22.8	Complied
716.558	-52.8	23.7	-76.5	-54.5	22.0	Complied
912.016	-51.3	23.7	-75.0	-54.5	20.5	Complied
977.139	-51.4	23.7	-75.1	-54.5	20.6	Complied
1058.888	-44.7	23.7	-68.4	-44.5	23.9	Complied
2677.000	-27.4	23.7	-51.1	-44.5	6.6	Complied
2689.000	-28.4	23.7	-52.1	-44.5	7.6	Complied
2782.578	-51.7	23.7	-75.4	-44.5	30.9	Complied
5363.868	-38.8	23.7	-62.5	-44.5	18.0	Complied
6946.603	-48.8	23.7	-72.5	-44.5	28.0	Complied
12314.479	-46.8	23.7	-70.5	-44.5	26.0	Complied
13420.391	-37.9	23.7	-61.6	-44.5	17.1	Complied
25545.631	-35.5	23.7	-59.2	-44.5	14.7	Complied
26568.830	-49.0	23.7	-72.7	-44.5	28.2	Complied

Note: The limit is calculated according to FCC Section 21.908(e) for absolute power measurements operating at a chip rate of 3.84 Mcps in a 6 MHz channel as follows:

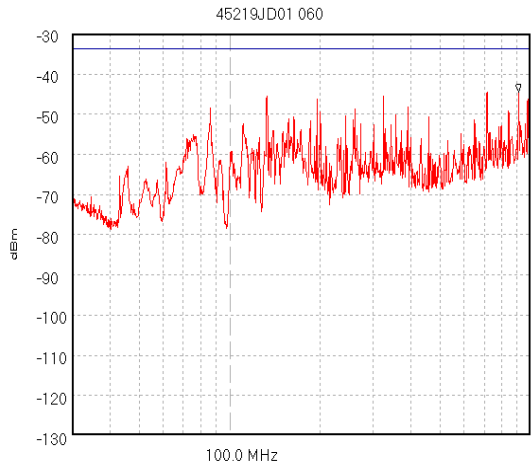
$A + 10\log(C_{BW}/R_{BW})$ where $C_{BW} = 6$ MHz and $R_{BW} = 1$ MHz (above 1 GHz) and $R_{BW} = 100$ kHz (below 1 GHz).

Test Of: IPWireless U.K. Ltd.

UE PCMCIA Card Model: FD

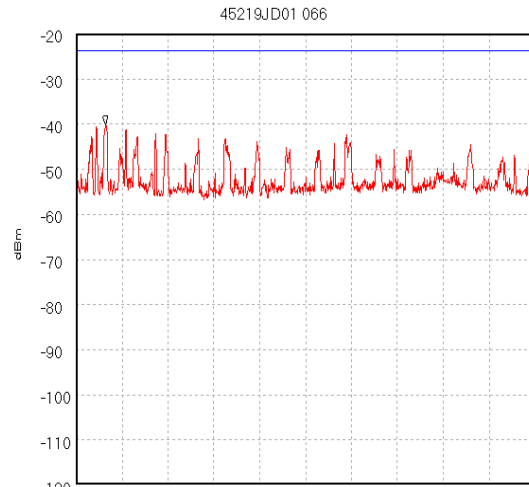
To: FCC Part 15, Part 21 & Part 74

Transmitter Radiated Emissions, Bottom Channel - High Chip Rate



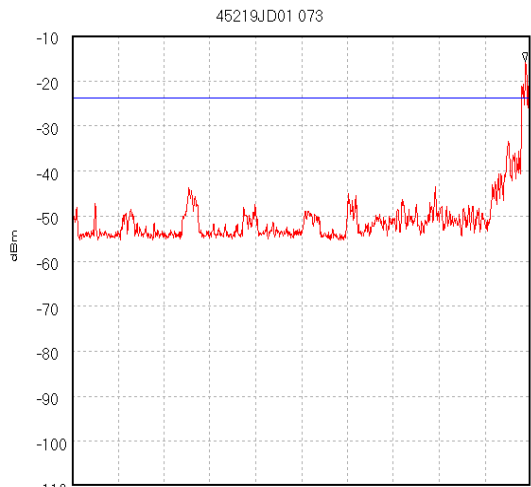
Trace 1
-33.8 dBm

Start 30.0 MHz; Stop 1.0 GHz - Log Scale
Ref -30 dBm; Ref Offset 11.8 dB; 10 dB/div
RBW 100.0 kHz; VBW 100.0 kHz; Att 0 dB; Swp 540.0 mS
Peak 910.731 MHz, -44.47 dBm
Display Line: -33.8 dBm; ; Limit Test Passed
Transducer Factors: A490
27/01/2004 14:56:19



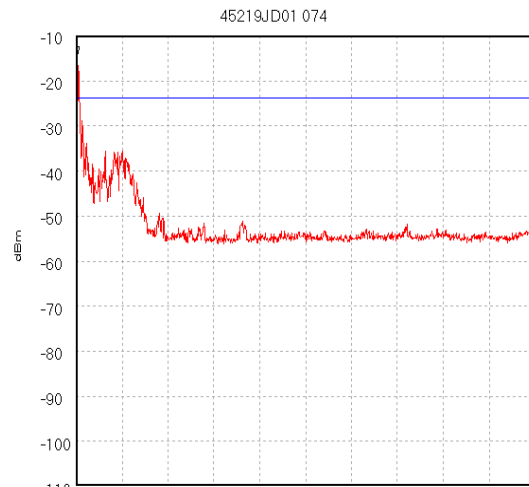
Trace 1
-23.8 dBm

Start 1.0 GHz; Stop 2.0 GHz
Ref -20 dBm; Ref Offset 37.0 dB; 10 dB/div
RBW 1000.0 kHz; VBW 1.0 MHz; Att 0 dB; Swp 20.0 mS
Peak 1.064 GHz, -40.13 dBm
Display Line: -23.8 dBm; ; Limit Test Passed
27/01/2004 15:32:14



Trace 1
-23.8 dBm

Start 1.995 GHz; Stop 2.497 GHz
Ref -10 dBm; Ref Offset 36.0 dB; 10 dB/div
RBW 1000.0 kHz; VBW 1.0 MHz; Att 0 dB; Swp 20.0 mS
Peak 2.491 GHz, -15.66 dBm
Display Line: -23.8 dBm; ; Limit Test Failed
27/01/2004 15:58:57



Trace 1
-23.8 dBm

Start 2.515 GHz; Stop 4.0 GHz
Ref -10 dBm; Ref Offset 36.0 dB; 10 dB/div
RBW 1000.0 kHz; VBW 1.0 MHz; Att 0 dB; Swp 20.0 mS
Peak 2.518 GHz, -14.39 dBm
Display Line: -23.8 dBm; ; Limit Test Failed
27/01/2004 16:01:32

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

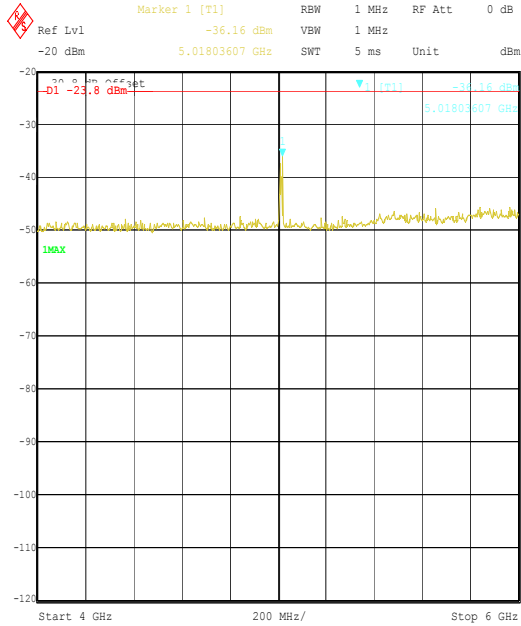
Operations Department

Test Of: IPWireless U.K. Ltd.

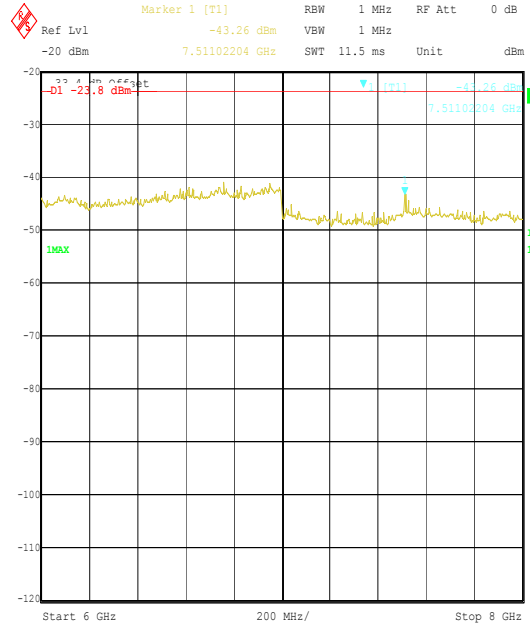
UE PCMCIA Card Model: FD

To: FCC Part 15, Part 21 & Part 74

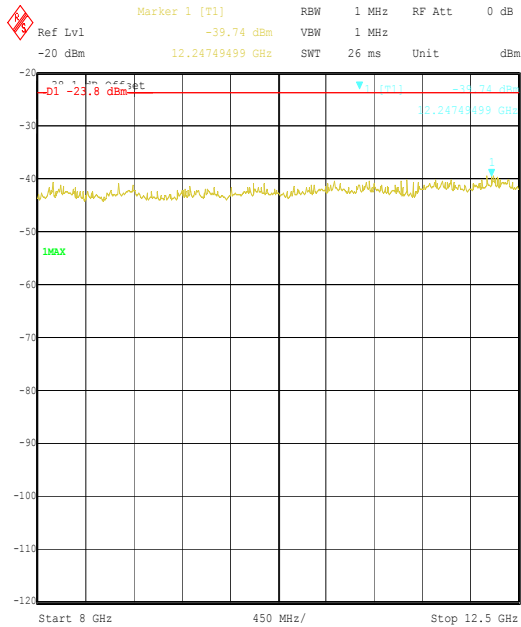
Transmitter Radiated Emissions, Bottom Channel - High Chip Rate



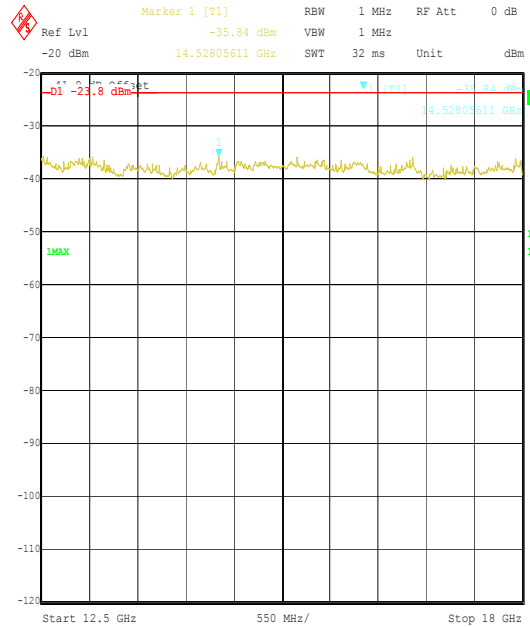
Title: IPWireless EUT: UE PCMCIA FD. FCC P15/21/74. Rad Spurious.
 Comment A: 45219JD01 Bottom Channel 7.68 Mcps. 4-6 GHz
 Date: 4.FEB.2004 12:30:55



Title: IPWireless EUT: UE PCMCIA FD. FCC P15/21/74. Rad Spurious.
 Comment A: 45219JD01 Bottom Channel 7.68 Mcps. 6-8 GHz
 Date: 4.FEB.2004 12:34:59



Title: IPWireless EUT: UE PCMCIA FD. FCC P15/21/74. Rad Spurious.
 Comment A: 45219JD01 Bottom Channel 7.68 Mcps. 8-12.5 GHz
 Date: 4.FEB.2004 12:47:36



Title: IPWireless EUT: UE PCMCIA FD. FCC P15/21/74. Rad Spurious.
 Comment A: 45219JD01 Bottom Channel 7.68 Mcps. 12.5-18 GHz
 Date: 4.FEB.2004 13:47:36

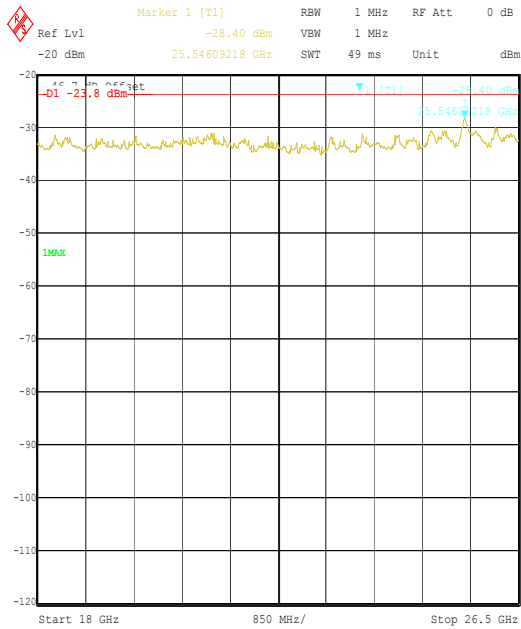
Note: these plots are pre-scans and for indication purposes only. For final measurements, see accompanying tables.

Test Of: IPWireless U.K. Ltd.

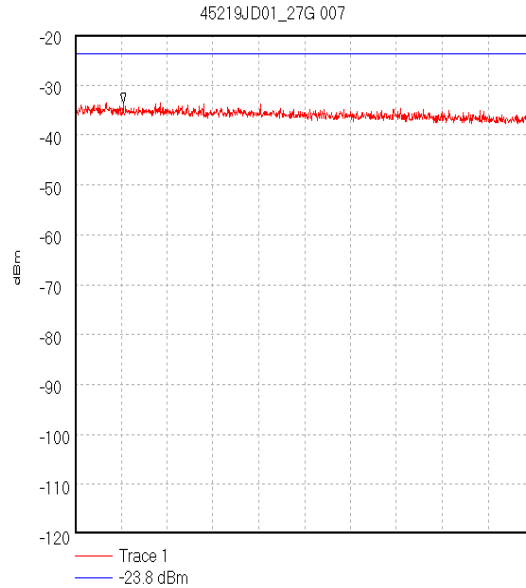
UE PCMCIA Card Model: FD

To: FCC Part 15, Part 21 & Part 74

Transmitter Radiated Emissions, Bottom Channel - High Chip Rate



Title: IPWireless EUT: UE PCMCIA FD, FCC P15/21/74, Rad Spurious.
 Comment A: 45219JD01 Bottom Channel 7.68 Mcps, 18-26.5 GHz
 Date: 4.FEB.2004 13:57:42



Start 26.5 GHz; Stop 27.0 GHz
 Ref -20 dBm; Ref Offset 38.0 dB; 10 dB/div
 RBW 1.0 MHz; VBW 1.0 MHz; Att 0 dB; Swp 40.0 mS
 Peak 26.552222 GHz, -33.53 dBm
 Display Line: -23.8 dBm;
 04/02/2004 15:51:40

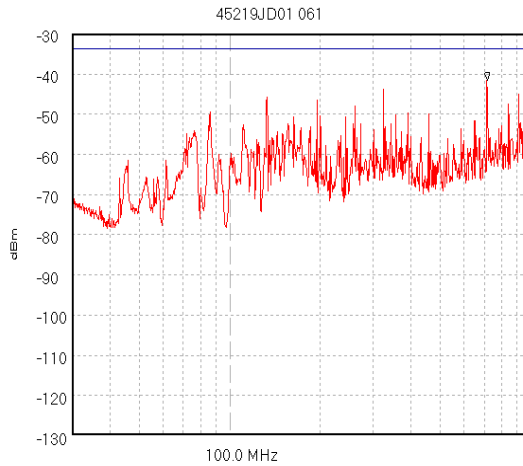
Note: these plots are pre-scans and for indication purposes only. For final measurements, see accompanying tables.

Test Of: IPWireless U.K. Ltd.

UE PCMCIA Card Model: FD

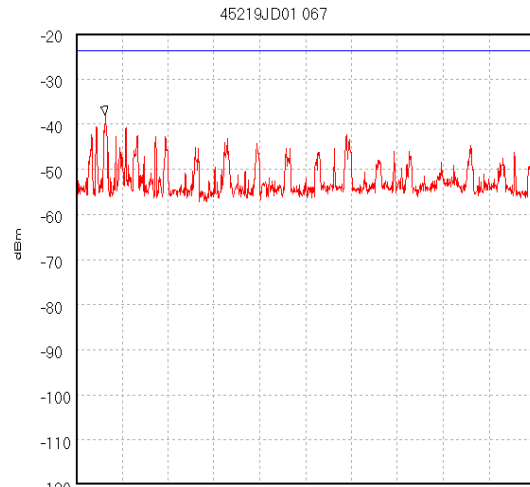
To: FCC Part 15, Part 21 & Part 74

Transmitter Radiated Emissions, Middle Channel - High Chip Rate



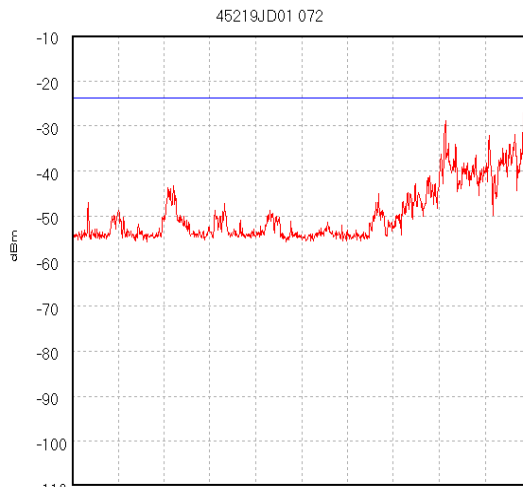
Trace 1
-33.8 dBm

Start 30.0 MHz; Stop 1.0 GHz - Log Scale
Ref -30 dBm; Ref Offset 11.8 dB; 10 dB/div
RBW 100.0 kHz; VBW 100.0 kHz; Att 0 dB; Swp 540.0 mS
Peak 715.287 MHz, -41.52 dBm
Display Line: -33.8 dBm; ; Limit Test Passed
Transducer Factors: A490
27/01/2004 15:04:16



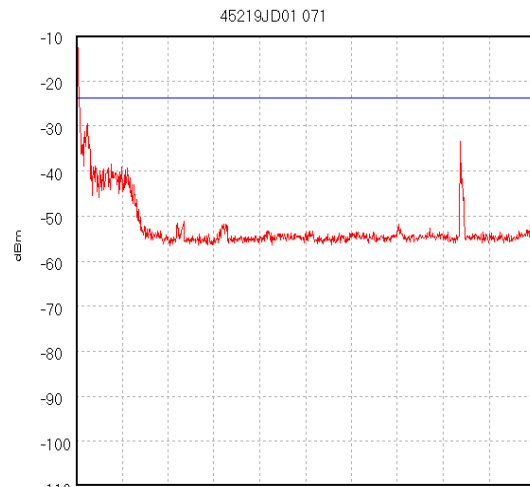
Trace 1
-23.8 dBm

Start 1.0 GHz; Stop 2.0 GHz
Ref -20 dBm; Ref Offset 37.0 dB; 10 dB/div
RBW 1000.0 kHz; VBW 1.0 MHz; Att 0 dB; Swp 20.0 mS
Peak 1.063 GHz, -37.95 dBm
Display Line: -23.8 dBm; ; Limit Test Passed
27/01/2004 15:40:10



Trace 1
-23.8 dBm

Start 2.0 GHz; Stop 2.587 GHz
Ref -10 dBm; Ref Offset 36.0 dB; 10 dB/div
RBW 1000.0 kHz; VBW 1.0 MHz; Att 0 dB; Swp 20.0 mS
Peak 2.587 GHz, -10.17 dBm
Display Line: -23.8 dBm; ; Limit Test Failed
27/01/2004 15:55:51



Trace 1
-23.8 dBm

Start 2.605 GHz; Stop 4.0 GHz
Ref -10 dBm; Ref Offset 36.0 dB; 10 dB/div
RBW 1000.0 kHz; VBW 1.0 MHz; Att 0 dB; Swp 20.0 mS
Peak 2.605 GHz, -10.5 dBm
Display Line: -23.8 dBm; ; Limit Test Failed
27/01/2004 15:54:11

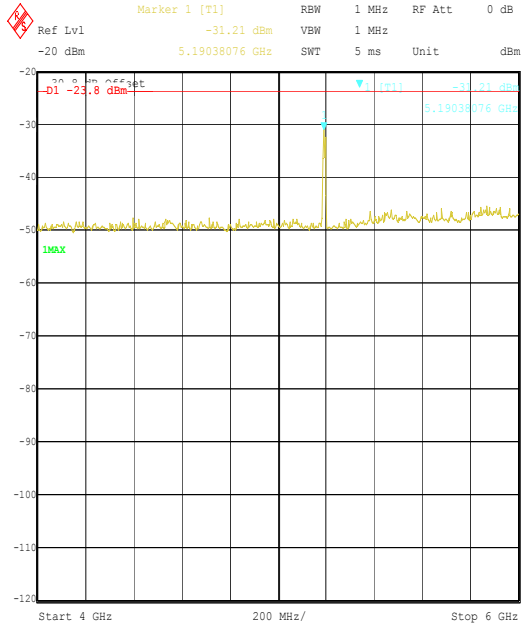
Note: these plots are pre-scans and for indication purposes only. For final measurements, see accompanying tables.

Test Of: IPWireless U.K. Ltd.

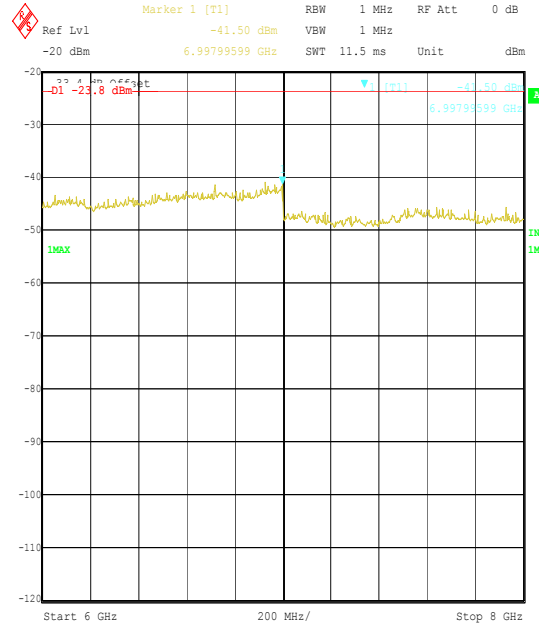
UE PCMCIA Card Model: FD

To: FCC Part 15, Part 21 & Part 74

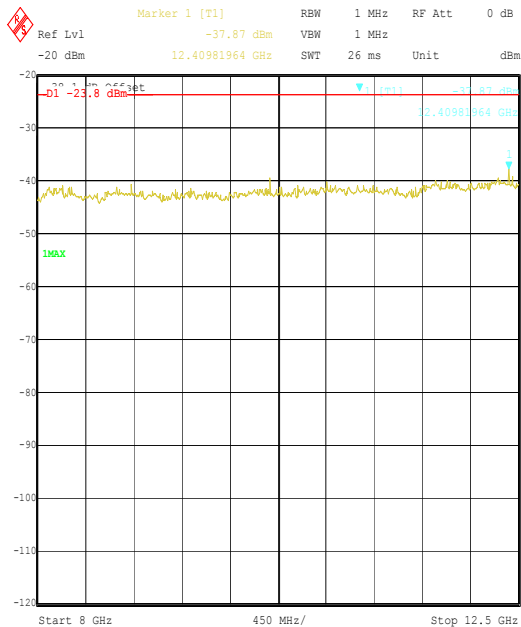
Transmitter Radiated Emissions, Middle Channel - High Chip Rate



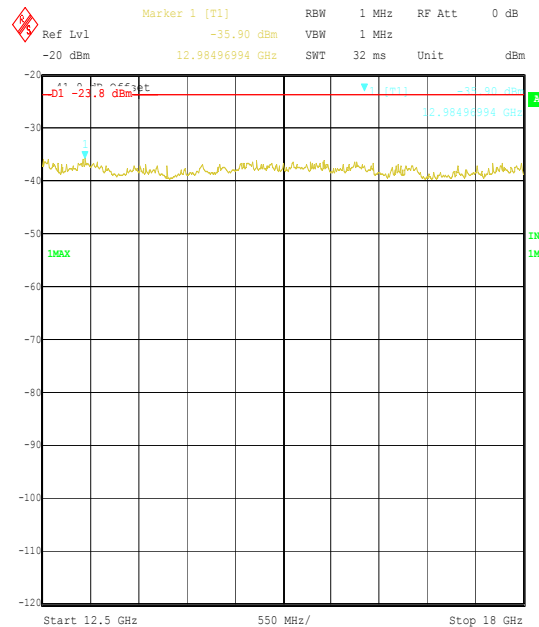
Title: IPWireless EUT: UE PCMCIA FD. FCC P15/21/74. Rad Spurious.
 Comment A: 45219JD01 Middle Channel 7.68 Mcps. 4-6 GHz
 Date: 4.FEB.2004 12:29:46



Title: IPWireless EUT: UE PCMCIA FD. FCC P15/21/74. Rad Spurious.
 Comment A: 45219JD01 Middle Channel 7.68 Mcps. 6-8 GHz
 Date: 4.FEB.2004 12:38:05



Title: IPWireless EUT: UE PCMCIA FD. FCC P15/21/74. Rad Spurious.
 Comment A: 45219JD01 Middle Channel 7.68 Mcps. 8-12.5 GHz
 Date: 4.FEB.2004 12:47:03



Title: IPWireless EUT: UE PCMCIA FD. FCC P15/21/74. Rad Spurious.
 Comment A: 45219JD01 Middle Channel 7.68 Mcps. 12.5-18 GHz
 Date: 4.FEB.2004 13:49:37

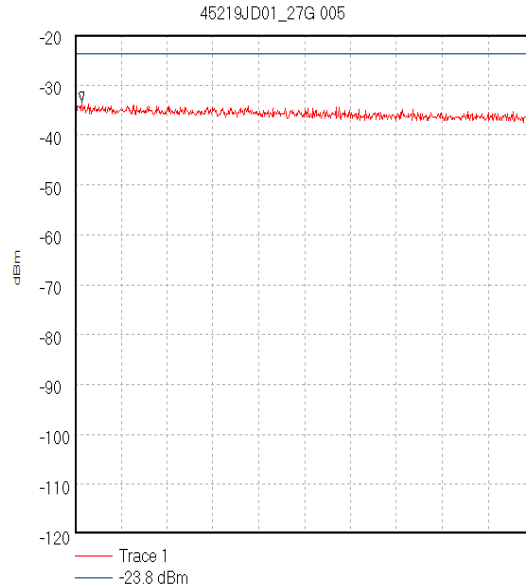
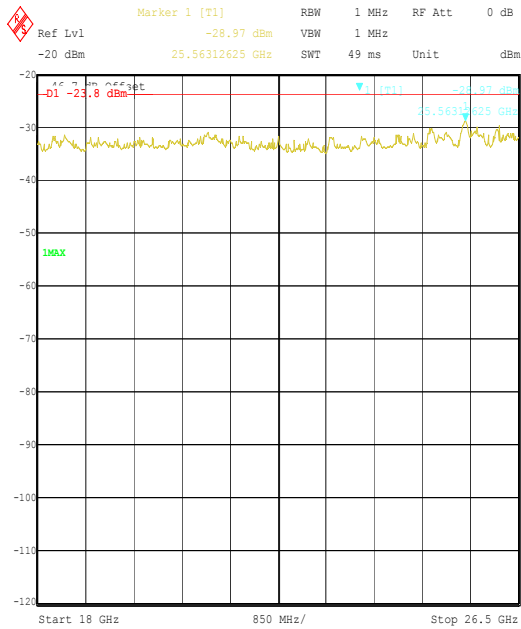
Note: these plots are pre-scans and for indication purposes only. For final measurements, see accompanying tables.

Test Of: IPWireless U.K. Ltd.

UE PCMCIA Card Model: FD

To: FCC Part 15, Part 21 & Part 74

Transmitter Radiated Emissions, Middle Channel - High Chip Rate



Title: IPWireless EUT: UE PCMCIA FD. FCC P15/21/74. Rad Spurious.
 Comment A: 45219JD01 Middle Channel 7.68 Mcps. 18-26.5 GHz
 Date: 4.FEB.2004 13:55:59

Start 26.5 GHz; Stop 27.0 GHz
 Ref -20 dBm; Ref Offset 38.0 dB; 10 dB/div
 RBW 1.0 MHz; VBW 1.0 MHz; Att 0 dB; Swp 50.0 mS
 Peak 26.5075 GHz, -33.33 dBm
 Display Line: -23.8 dBm;
 04/02/2004 15:31:18

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

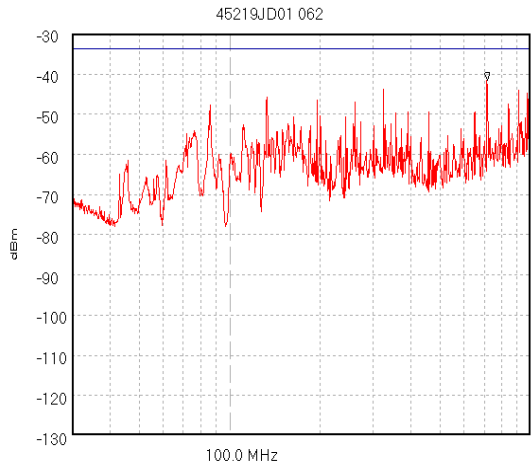
Operations Department

Test Of: IPWireless U.K. Ltd.

UE PCMCIA Card Model: FD

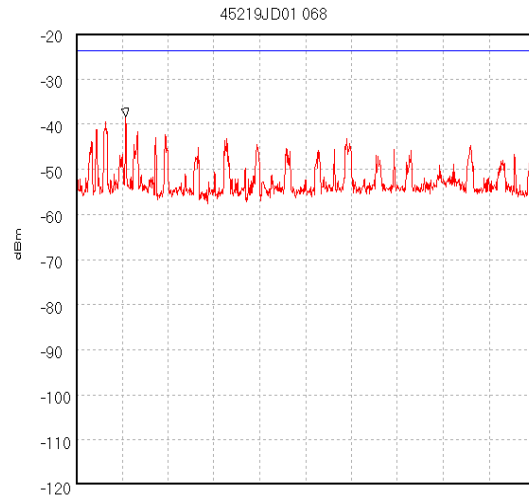
To: FCC Part 15, Part 21 & Part 74

Transmitter Radiated Emissions, Top Channel - High Chip Rate



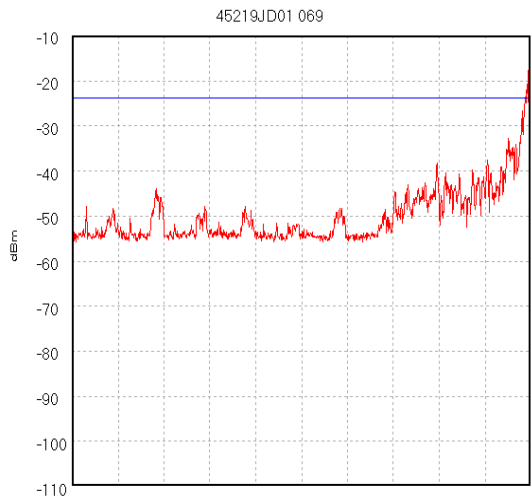
Trace 1
-33.8 dBm

Start 30.0 MHz; Stop 1.0 GHz - Log Scale
Ref -30 dBm; Ref Offset 11.8 dB; 10 dB/div
RBW 100.0 kHz; VBW 100.0 kHz; Att 0 dB; Swp 540.0 mS
Peak 715.287 MHz, -41.52 dBm
Display Line: -33.8 dBm; ; Limit Test Passed
Transducer Factors: A490
27/01/2004 15:06:27



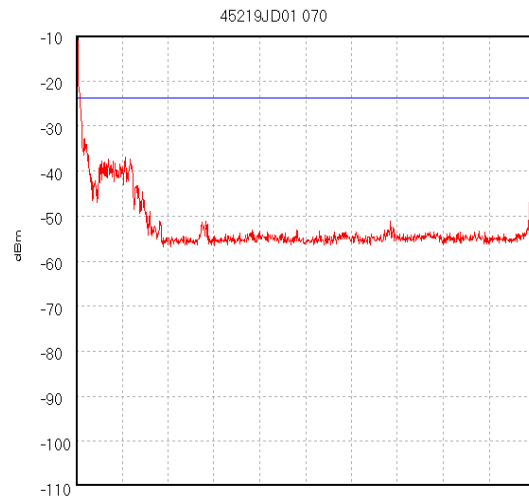
Trace 1
-23.8 dBm

Start 1.0 GHz; Stop 2.0 GHz
Ref -20 dBm; Ref Offset 37.0 dB; 10 dB/div
RBW 1000.0 kHz; VBW 1.0 MHz; Att 0 dB; Swp 20.0 mS
Peak 1.108 GHz, -38.35 dBm
Display Line: -23.8 dBm; ; Limit Test Passed
27/01/2004 15:42:25



Trace 1
-23.8 dBm

Start 2.0 GHz; Stop 2.671 GHz
Ref -10 dBm; Ref Offset 36.0 dB; 10 dB/div
RBW 1000.0 kHz; VBW 1.0 MHz; Att 0 dB; Swp 20.0 mS
Peak 2.67 GHz, -6.91 dBm
Display Line: -23.8 dBm; ; Limit Test Failed
27/01/2004 15:47:55



Trace 1
-23.8 dBm

Start 2.689 GHz; Stop 4.0 GHz
Ref -10 dBm; Ref Offset 36.0 dB; 10 dB/div
RBW 1000.0 kHz; VBW 1.0 MHz; Att 0 dB; Swp 20.0 mS
Peak 2.693 GHz, -11.01 dBm
Display Line: -23.8 dBm; ; Limit Test Failed
27/01/2004 15:49:36

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

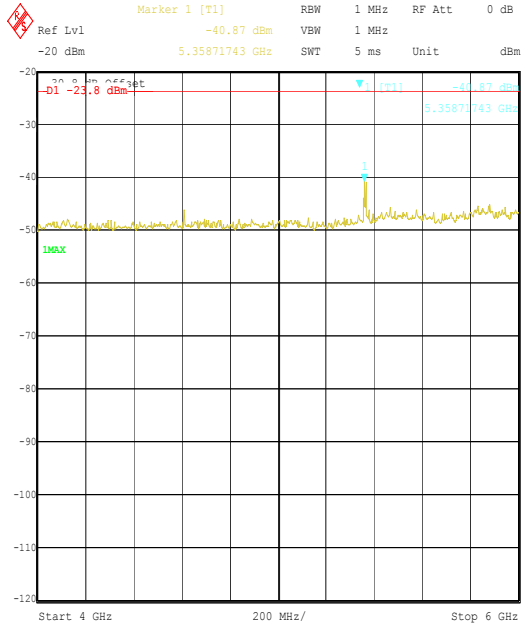
Operations Department

Test Of: IPWireless U.K. Ltd.

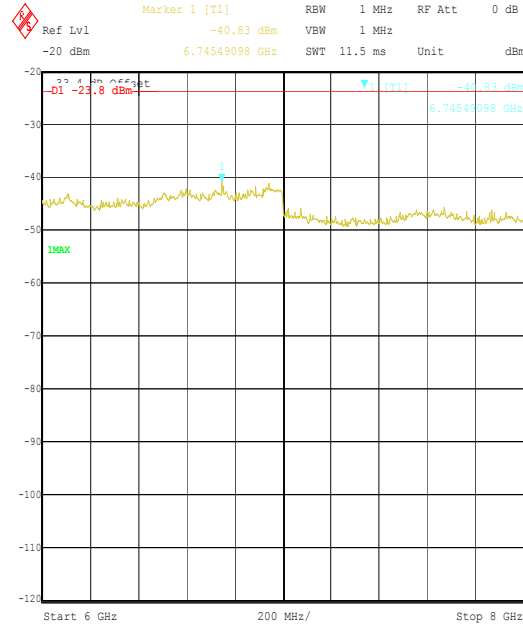
UE PCMCIA Card Model: FD

To: FCC Part 15, Part 21 & Part 74

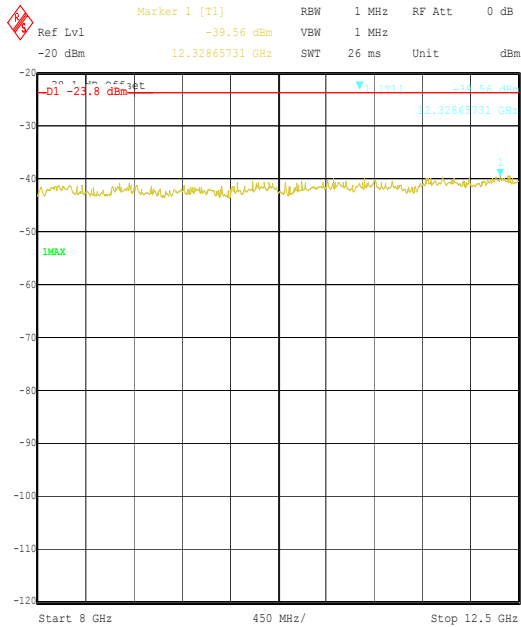
Transmitter Radiated Emissions, Top Channel - High Chip Rate



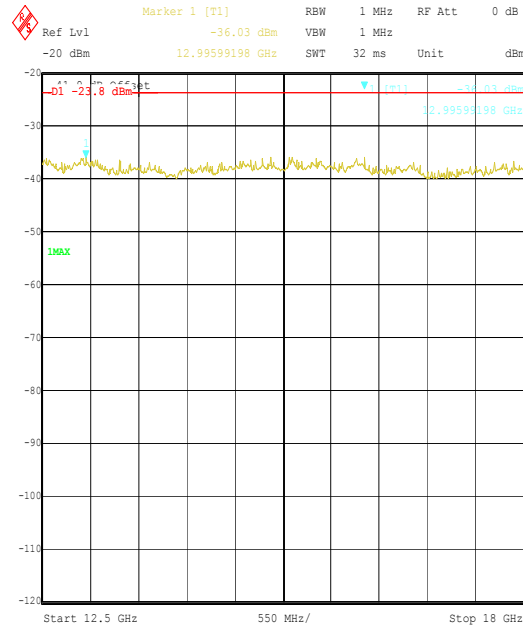
Title: IPWireless EUT: UE PCMCIA FD. FCC P15/21/74. Rad Spurious.
 Comment A: 45219JD01 Top Channel 7.68 Mcps. 4-6 GHz
 Date: 4.FEB.2004 12:28:39



Title: IPWireless EUT: UE PCMCIA FD. FCC P15/21/74. Rad Spurious.
 Comment A: 45219JD01 Top Channel 7.68 Mcps. 6-8 GHz
 Date: 4.FEB.2004 12:40:30



Title: IPWireless EUT: UE PCMCIA FD. FCC P15/21/74. Rad Spurious.
 Comment A: 45219JD01 Top Channel 7.68 Mcps. 8-12.5 GHz
 Date: 4.FEB.2004 12:43:55



Title: IPWireless EUT: UE PCMCIA FD. FCC P15/21/74. Rad Spurious.
 Comment A: 45219JD01 Top Channel 7.68 Mcps. 12.5-18 GHz
 Date: 4.FEB.2004 13:51:19

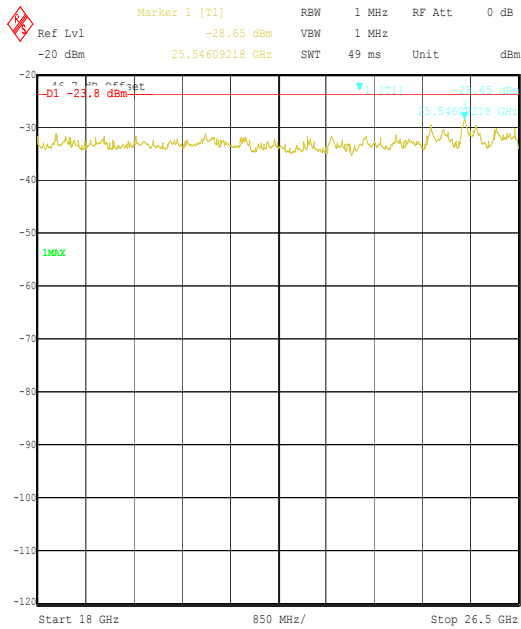
Note: these plots are pre-scans and for indication purposes only. For final measurements, see accompanying tables.

Test Of: IPWireless U.K. Ltd.

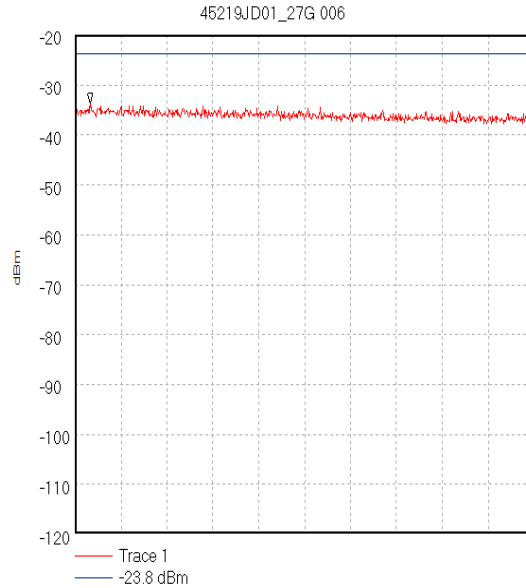
UE PCMCIA Card Model: FD

To: FCC Part 15, Part 21 & Part 74

Transmitter Radiated Emissions, Top Channel - High Chip Rate



Title: IPWireless EUT: UE PCMCIA FD. FCC P15/21/74. Rad Spurious.
 Comment A: 45219JD01 Top Channel 7.68 Mcps. 18-26.5 GHz
 Date: 4.FEB.2004 13:54:21



Start 26.5 GHz; Stop 27.0 GHz
 Ref -20 dBm; Ref Offset 38.0 dB; 10 dB/div
 RBW 1.0 MHz; VBW 1.0 MHz; Att 0 dB; Swp 50.0 mS
 Peak 26.516667 GHz, -33.67 dBm
 Display Line: -23.8 dBm;
 04/02/2004 15:41:39

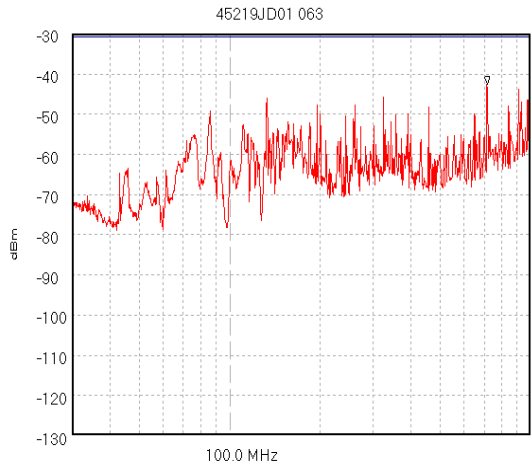
Note: these plots are pre-scans and for indication purposes only. For final measurements, see accompanying tables.

Test Of: IPWireless U.K. Ltd.

UE PCMCIA Card Model: FD

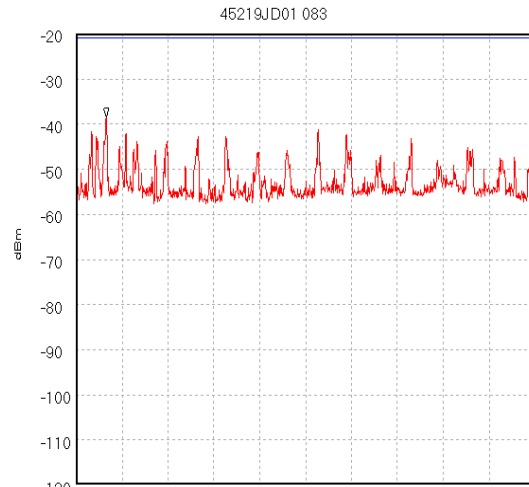
To: FCC Part 15, Part 21 & Part 74

Transmitter Radiated Emissions, Bottom Channel - Low Chip Rate



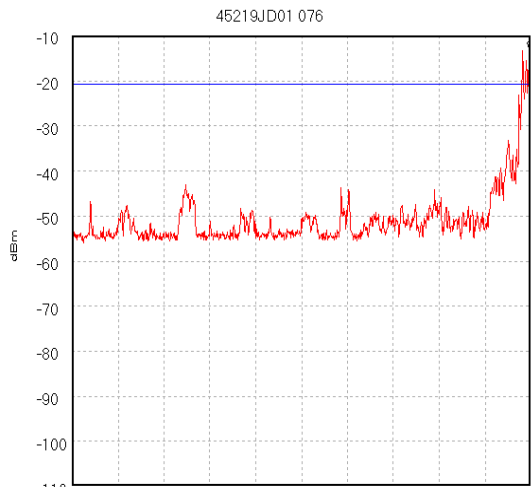
Trace 1
-30.8 dBm

Start 30.0 MHz; Stop 1.0 GHz - Log Scale
Ref -30 dBm; Ref Offset 11.8 dB; 10 dB/div
RBW 100.0 kHz; VBW 100.0 kHz; Att 0 dB; Swp 540.0 mS
Peak 715.287 MHz, -42.49 dBm
Display Line: -30.8 dBm; ; Limit Test Passed
Transducer Factors: A490
27/01/2004 15:15:25



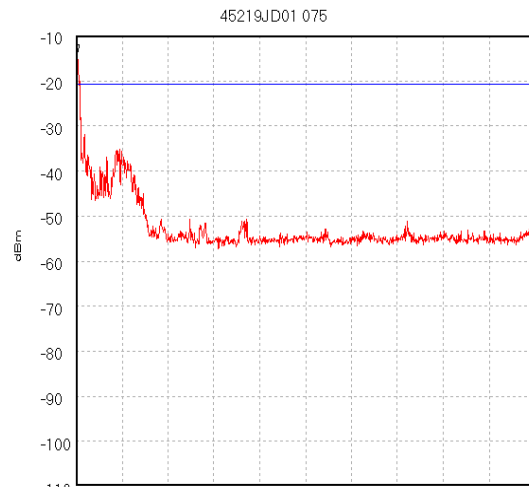
Trace 1
-20.8 dBm

Start 1.0 GHz; Stop 2.0 GHz
Ref -20 dBm; Ref Offset 37.0 dB; 10 dB/div
RBW 1000.0 kHz; VBW 1.0 MHz; Att 0 dB; Swp 20.0 mS
Peak 1.066 GHz, -38.48 dBm
Display Line: -20.8 dBm; ; Limit Test Passed
27/01/2004 16:35:04



Trace 1
-20.8 dBm

Start 2.0 GHz; Stop 2.497 GHz
Ref -10 dBm; Ref Offset 36.0 dB; 10 dB/div
RBW 1000.0 kHz; VBW 1.0 MHz; Att 0 dB; Swp 20.0 mS
Peak 2.496 GHz, -13.3 dBm
Display Line: -20.8 dBm; ; Limit Test Failed
27/01/2004 16:10:56



Trace 1
-20.8 dBm

Start 2.509 GHz; Stop 4.0 GHz
Ref -10 dBm; Ref Offset 36.0 dB; 10 dB/div
RBW 1000.0 kHz; VBW 1.0 MHz; Att 0 dB; Swp 20.0 mS
Peak 2.512 GHz, -13.91 dBm
Display Line: -20.8 dBm; ; Limit Test Failed
27/01/2004 16:07:56

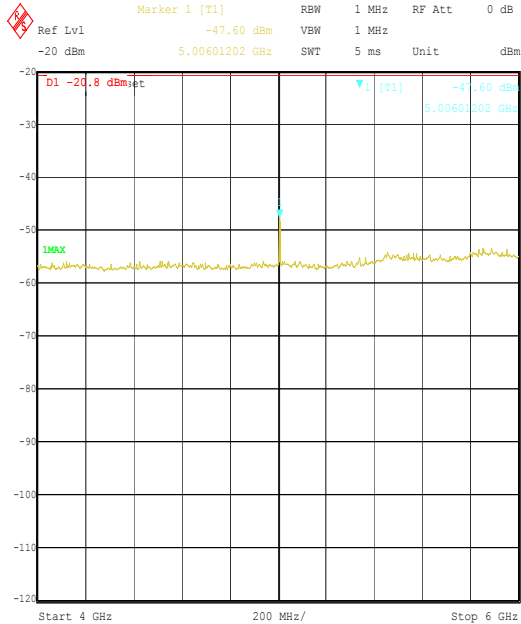
Note: these plots are pre-scans and for indication purposes only. For final measurements, see accompanying tables.

Test Of: IPWireless U.K. Ltd.

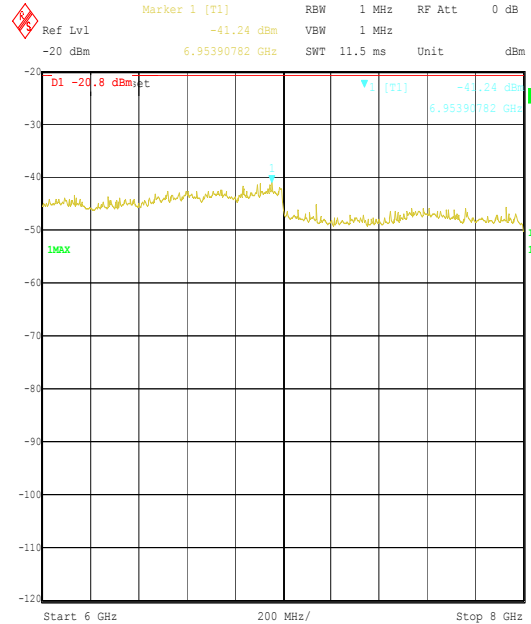
UE PCMCIA Card Model: FD

To: FCC Part 15, Part 21 & Part 74

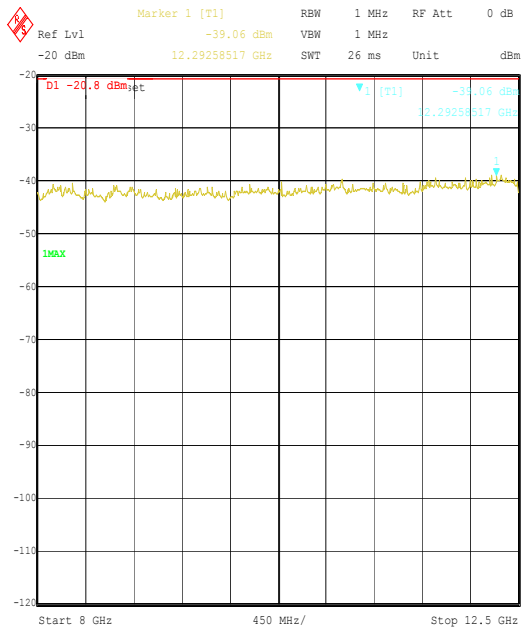
Transmitter Radiated Emissions, Bottom Channel - Low Chip Rate



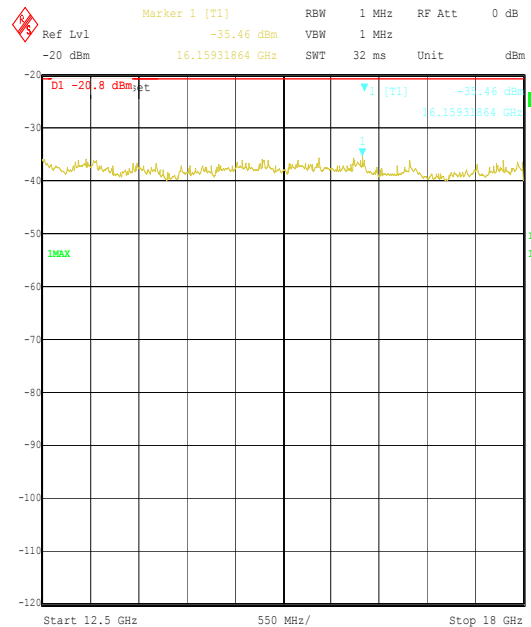
Title: IPWireless EUT: UE PCMCIA FD. FCC P15/21/74. Rad Spurious.
Comment A: 45219JD01 Bottom Channel 3.84 Mcps. 4-6 GHz
Date: 4.FEB.2004 14:32:48



Title: IPWireless EUT: UE PCMCIA FD. FCC P15/21/74. Rad Spurious.
Comment A: 45219JD01 Bottom Channel 3.84 Mcps. 6-8 GHz
Date: 4.FEB.2004 14:29:24



Title: IPWireless EUT: UE PCMCIA FD. FCC P15/21/74. Rad Spurious.
Comment A: 45219JD01 Bottom Channel 3.84 Mcps. 8-12.5 GHz
Date: 4.FEB.2004 14:20:25



Title: IPWireless EUT: UE PCMCIA FD. FCC P15/21/74. Rad Spurious.
Comment A: 45219JD01 Bottom Channel 3.84 Mcps. 12.5-18 GHz
Date: 4.FEB.2004 14:17:47

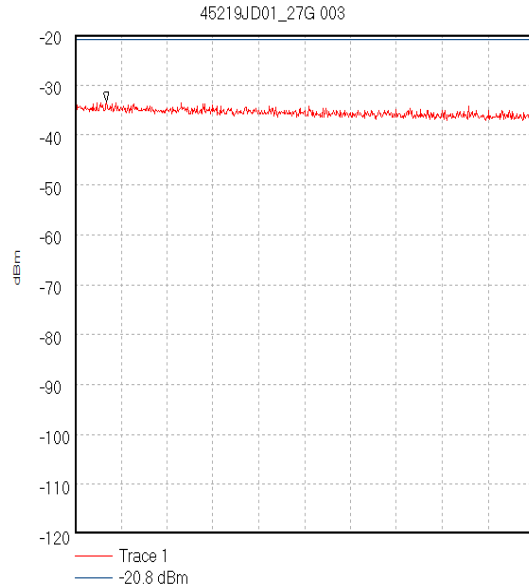
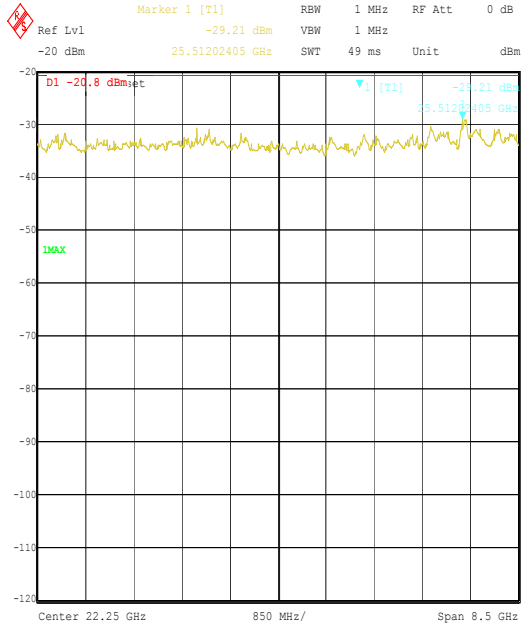
Note: these plots are pre-scans and for indication purposes only. For final measurements, see accompanying tables.

Test Of: IPWireless U.K. Ltd.

UE PCMCIA Card Model: FD

To: FCC Part 15, Part 21 & Part 74

Transmitter Radiated Emissions, Bottom Channel - Low Chip Rate



Title: IPWireless EUT: UE PCMCIA FD, FCC P15/21/74, Rad Spurious.
 Comment A: 45219JD01 Bottom Channel 3.84 Mcps, 18-26.5 GHz
 Date: 4.FEB.2004 14:08:04

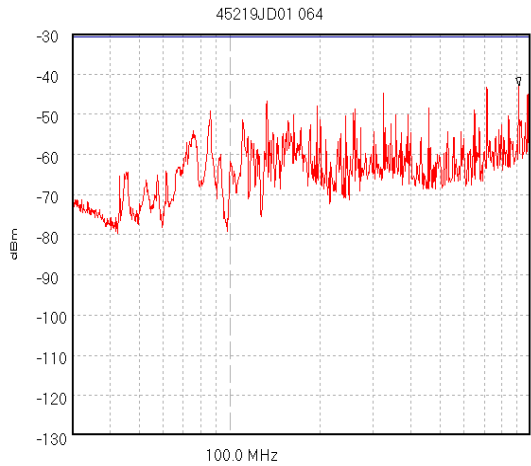
Start 26.5 GHz; Stop 27.0 GHz
 Ref -20 dBm; Ref Offset 38.0 dB; 10 dB/div
 RBW 1.0 MHz; VBW 1.0 MHz; Att 0 dB; Swp 50.0 mS
 Peak 26.534167 GHz, -33.33 dBm
 Display Line: -20.8 dBm;
 04/02/2004 15:23:07

Test Of: IPWireless U.K. Ltd.

UE PCMCIA Card Model: FD

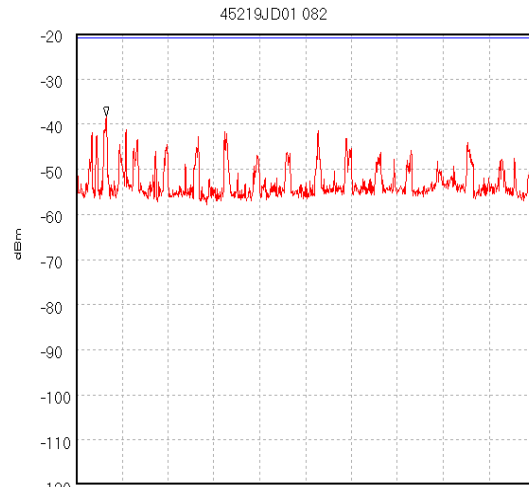
To: FCC Part 15, Part 21 & Part 74

Transmitter Radiated Emissions, Middle Channel - Low Chip Rate



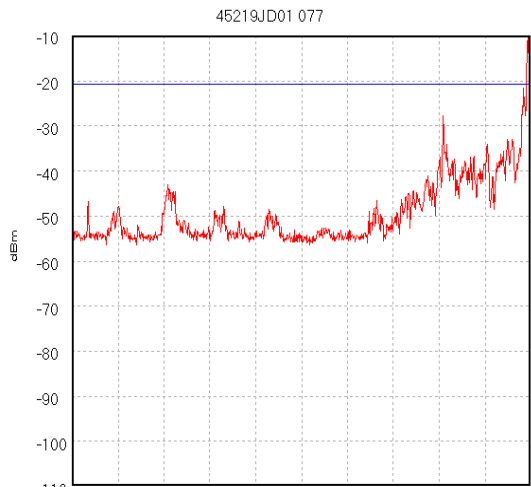
Trace 1
-30.8 dBm

Start 30.0 MHz; Stop 1.0 GHz - Log Scale
Ref -30 dBm; Ref Offset 11.8 dB; 10 dB/div
RBW 100.0 kHz; VBW 100.0 kHz; Att 0 dB; Swp 540.0 mS
Peak 914.286 MHz, -42.87 dBm
Display Line: -30.8 dBm; ; Limit Test Passed
Transducer Factors: A490
27/01/2004 15:24:02



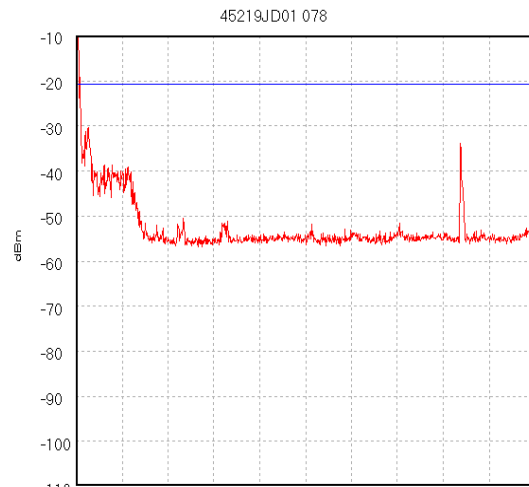
Trace 1
-20.8 dBm

Start 1.0 GHz; Stop 2.0 GHz
Ref -20 dBm; Ref Offset 37.0 dB; 10 dB/div
RBW 1000.0 kHz; VBW 1.0 MHz; Att 0 dB; Swp 20.0 mS
Peak 1.066 GHz, -38.3 dBm
Display Line: -20.8 dBm; ; Limit Test Passed
27/01/2004 16:32:48



Trace 1
-20.8 dBm

Start 2.0 GHz; Stop 2.59 GHz
Ref -10 dBm; Ref Offset 36.0 dB; 10 dB/div
RBW 1000.0 kHz; VBW 1.0 MHz; Att 0 dB; Swp 20.0 mS
Peak 2.589 GHz, -8.63 dBm
Display Line: -20.8 dBm; ; Limit Test Failed
27/01/2004 16:13:20



Trace 1
-20.8 dBm

Start 2.602 GHz; Stop 4.0 GHz
Ref -10 dBm; Ref Offset 36.0 dB; 10 dB/div
RBW 1000.0 kHz; VBW 1.0 MHz; Att 0 dB; Swp 20.0 mS
Peak 2.604 GHz, -6.02 dBm
Display Line: -20.8 dBm; ; Limit Test Failed
27/01/2004 16:14:53

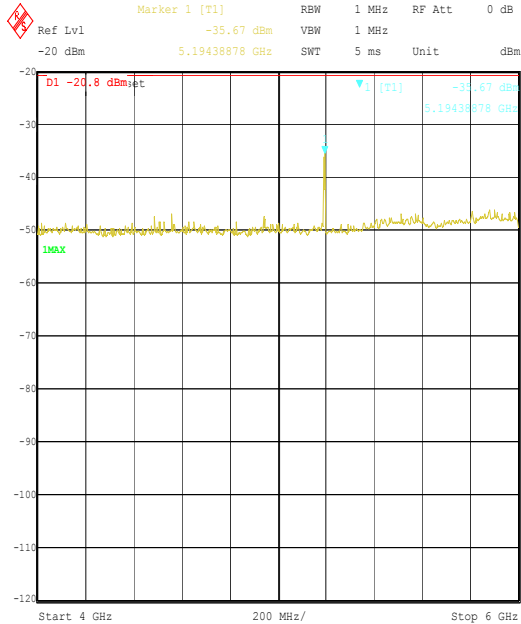
Note: these plots are pre-scans and for indication purposes only. For final measurements, see accompanying tables.

Test Of: IPWireless U.K. Ltd.

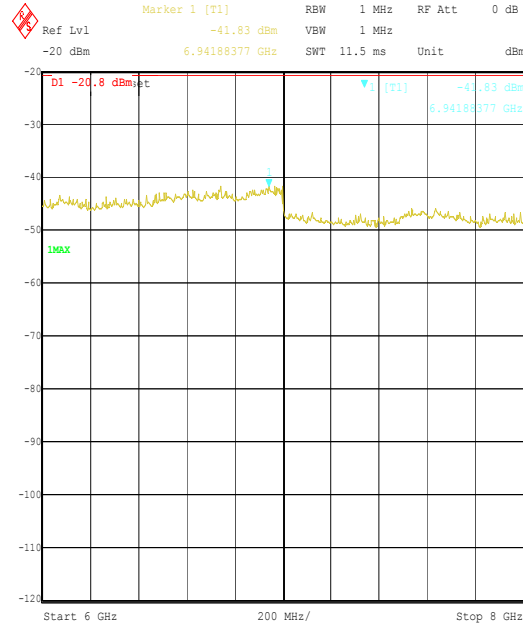
UE PCMCIA Card Model: FD

To: FCC Part 15, Part 21 & Part 74

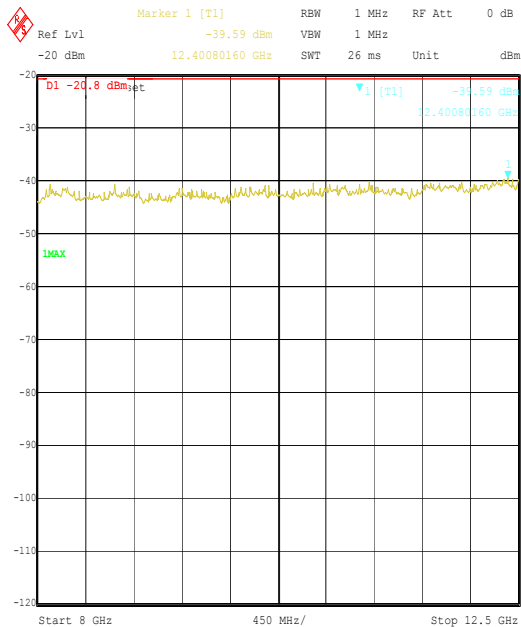
Transmitter Radiated Emissions, Middle Channel - Low Chip Rate



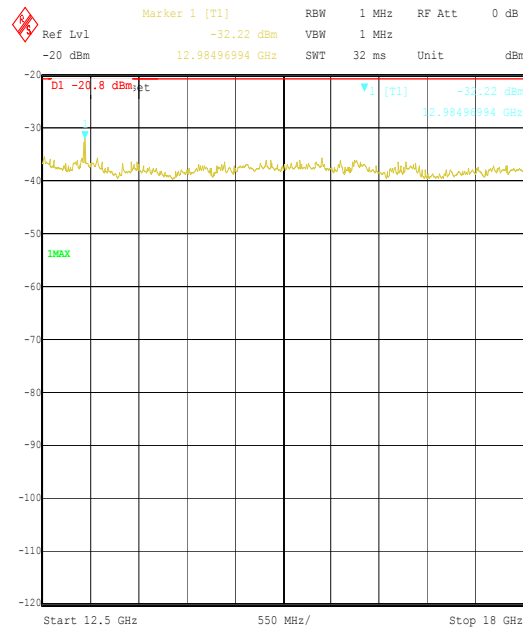
Title: IPWireless EUT: UE PCMCIA FD. FCC P15/21/74. Rad Spurious.
 Comment A: 45219JD01 Middle Channel 3.84 Mcps. 4-6 GHz
 Date: 4.FEB.2004 14:34:29



Title: IPWireless EUT: UE PCMCIA FD. FCC P15/21/74. Rad Spurious.
 Comment A: 45219JD01 Middle Channel 3.84 Mcps. 6-8 GHz
 Date: 4.FEB.2004 14:28:12



Title: IPWireless EUT: UE PCMCIA FD. FCC P15/21/74. Rad Spurious.
 Comment A: 45219JD01 Middle Channel 3.84 Mcps. 8-12.5 GHz
 Date: 4.FEB.2004 14:22:07



Title: IPWireless EUT: UE PCMCIA FD. FCC P15/21/74. Rad Spurious.
 Comment A: 45219JD01 Middle Channel 3.84 Mcps. 12.5-18 GHz
 Date: 4.FEB.2004 14:15:47

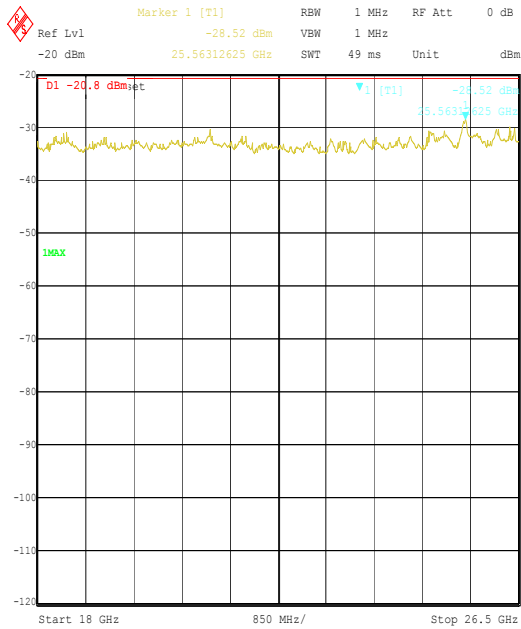
Note: these plots are pre-scans and for indication purposes only. For final measurements, see accompanying tables.

Test Of: IPWireless U.K. Ltd.

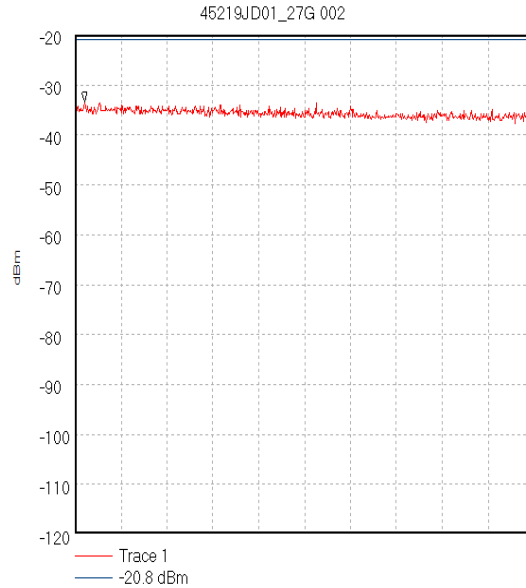
UE PCMCIA Card Model: FD

To: FCC Part 15, Part 21 & Part 74

Transmitter Radiated Emissions, Middle Channel - Low Chip Rate



Title: IPWireless EUT: UE PCMCIA FD. FCC P15/21/74. Rad Spurious.
 Comment A: 45219JD01 Middle Channel 3.84 Mcps. 18-26.5 GHz
 Date: 4.FEB.2004 14:09:27



Start 26.5 GHz; Stop 27.0 GHz
 Ref -20 dBm; Ref Offset 38.0 dB; 10 dB/div
 RBW 1.0 MHz; VBW 1.0 MHz; Att 0 dB; Swp 50.0 mS
 Peak 26.51 GHz, -33.33 dBm
 Display Line: -20.8 dBm;
 04/02/2004 15:20:46

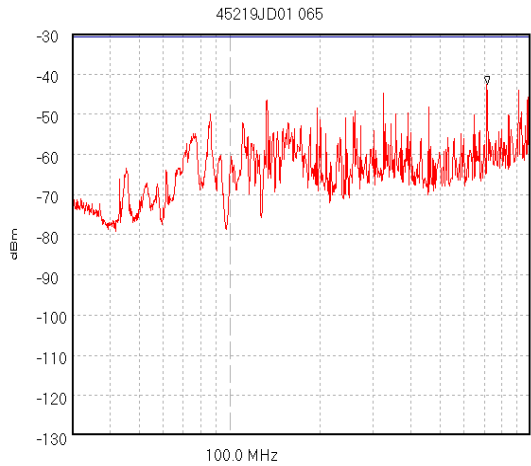
Note: these plots are pre-scans and for indication purposes only. For final measurements, see accompanying tables.

Test Of: IPWireless U.K. Ltd.

UE PCMCIA Card Model: FD

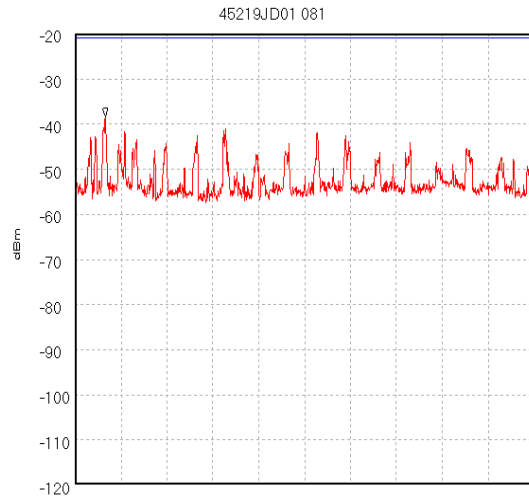
To: FCC Part 15, Part 21 & Part 74

Transmitter Radiated Emissions, Top Channel - Low Chip Rate



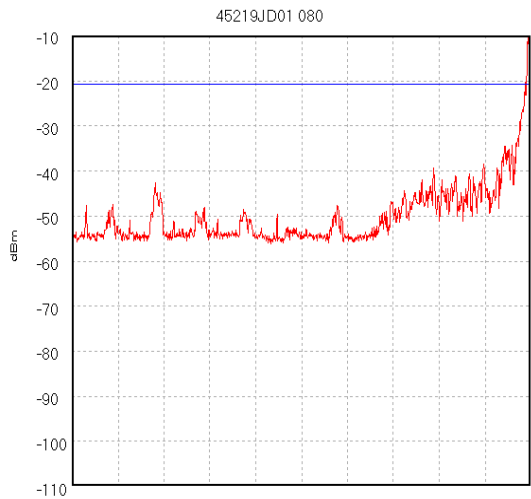
Trace 1
-30.8 dBm

Start 30.0 MHz; Stop 1.0 GHz - Log Scale
Ref -30 dBm; Ref Offset 11.8 dB; 10 dB/div
RBW 100.0 kHz; VBW 100.0 kHz; Att 0 dB; Swp 540.0 mS
Peak 715.287 MHz; -42.51 dBm
Display Line: -30.8 dBm; ; Limit Test Passed
Transducer Factors: A490
27/01/2004 15:25:58



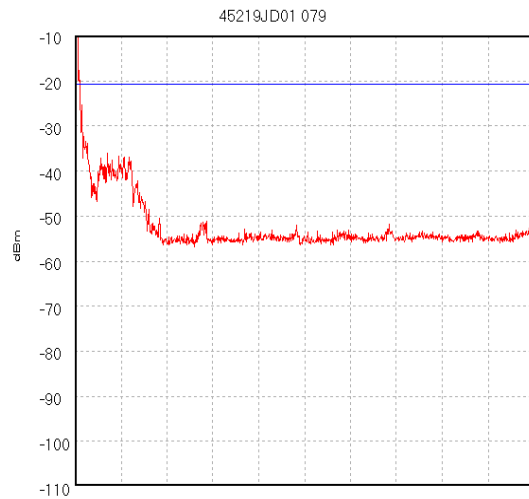
Trace 1
-20.8 dBm

Start 1.0 GHz; Stop 2.0 GHz
Ref -20 dBm; Ref Offset 37.0 dB; 10 dB/div
RBW 1000.0 kHz; VBW 1.0 MHz; Att 0 dB; Swp 20.0 mS
Peak 1.066 GHz; -38.33 dBm
Display Line: -20.8 dBm; ; Limit Test Passed
27/01/2004 16:30:29



Trace 1
-20.8 dBm

Start 2.0 GHz; Stop 2.677 GHz
Ref -10 dBm; Ref Offset 36.0 dB; 10 dB/div
RBW 1000.0 kHz; VBW 1.0 MHz; Att 0 dB; Swp 20.0 mS
Peak 2.675 GHz; -6.02 dBm
Display Line: -20.8 dBm; ; Limit Test Failed
27/01/2004 16:18:28



Trace 1
-20.8 dBm

Start 2.689 GHz; Stop 4.0 GHz
Ref -10 dBm; Ref Offset 36.0 dB; 10 dB/div
RBW 1000.0 kHz; VBW 1.0 MHz; Att 0 dB; Swp 20.0 mS
Peak 2.69 GHz; -6.02 dBm
Display Line: -20.8 dBm; ; Limit Test Failed
27/01/2004 16:17:04

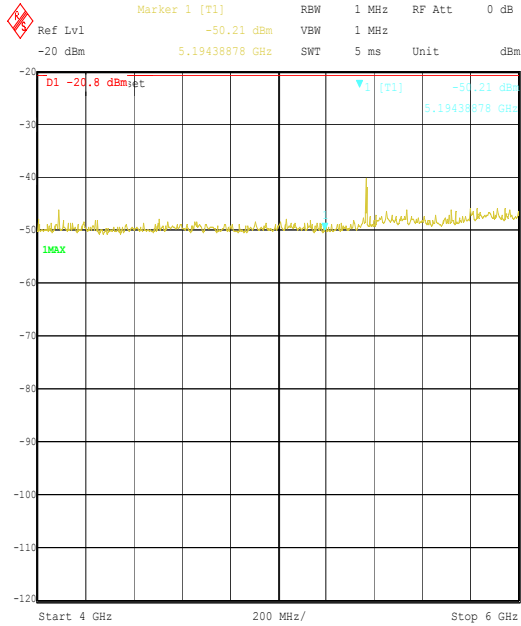
Note: these plots are pre-scans and for indication purposes only. For final measurements, see accompanying tables.

Test Of: IPWireless U.K. Ltd.

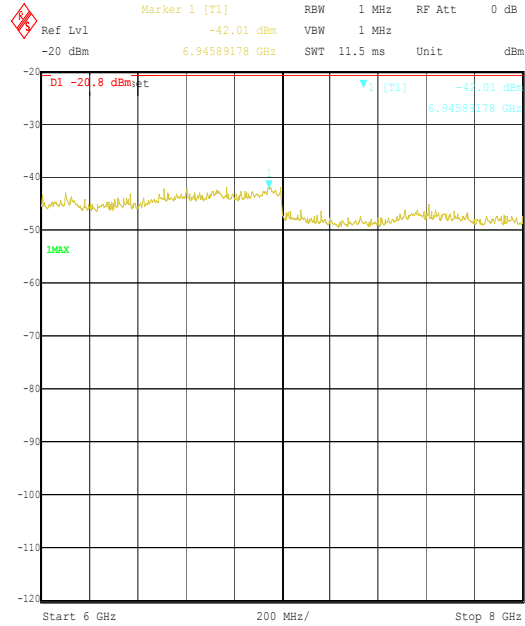
UE PCMCIA Card Model: FD

To: FCC Part 15, Part 21 & Part 74

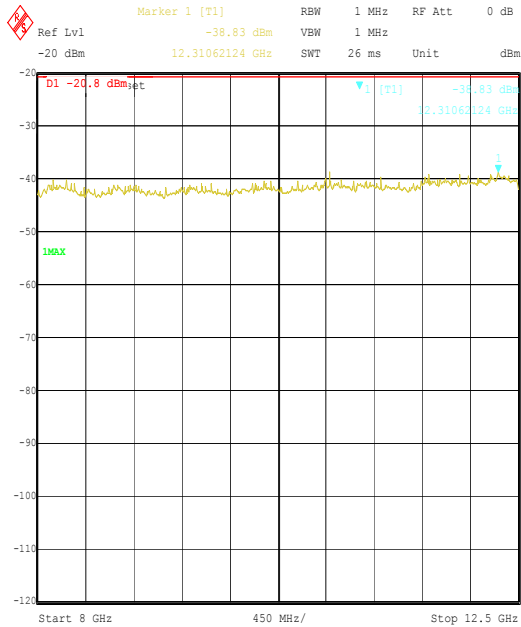
Transmitter Radiated Emissions, Top Channel - Low Chip Rate



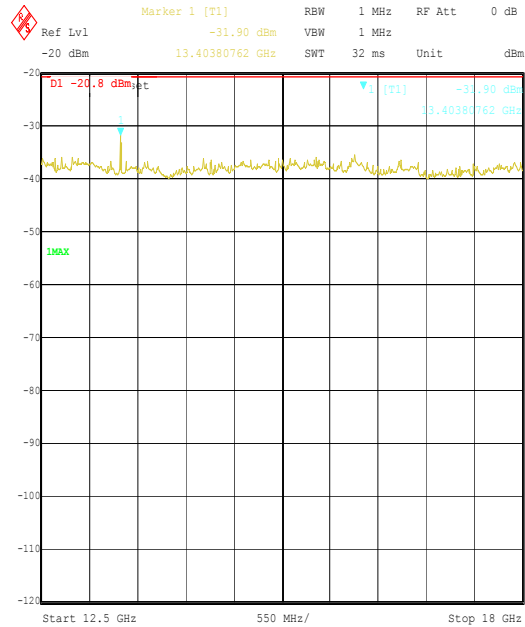
Title: IPWireless EUT: UE PCMCIA FD, FCC P15/21/74, Rad Spurious.
Comment A: 45219JD01 Top Channel 3.84 Mcps, 4-6 GHz
Date: 4.FEB.2004 14:35:15



Title: IPWireless EUT: UE PCMCIA FD, FCC P15/21/74, Rad Spurious.
Comment A: 45219JD01 Top Channel 3.84 Mcps, 6-8 GHz
Date: 4.FEB.2004 14:26:20



Title: IPWireless EUT: UE PCMCIA FD, FCC P15/21/74, Rad Spurious.
Comment A: 45219JD01 Top Channel 3.84 Mcps, 8-12.5 GHz
Date: 4.FEB.2004 14:24:02



Title: IPWireless EUT: UE PCMCIA FD, FCC P15/21/74, Rad Spurious.
Comment A: 45219JD01 Top Channel 3.84 Mcps, 12.5-18 GHz
Date: 4.FEB.2004 14:13:05

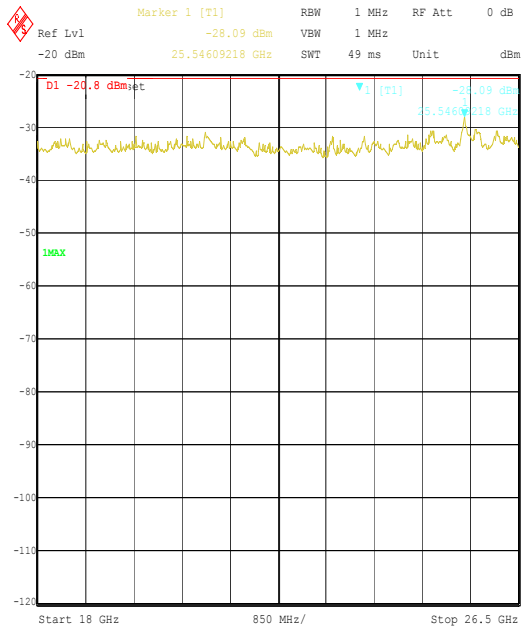
Note: these plots are pre-scans and for indication purposes only. For final measurements, see accompanying tables.

Test Of: IPWireless U.K. Ltd.

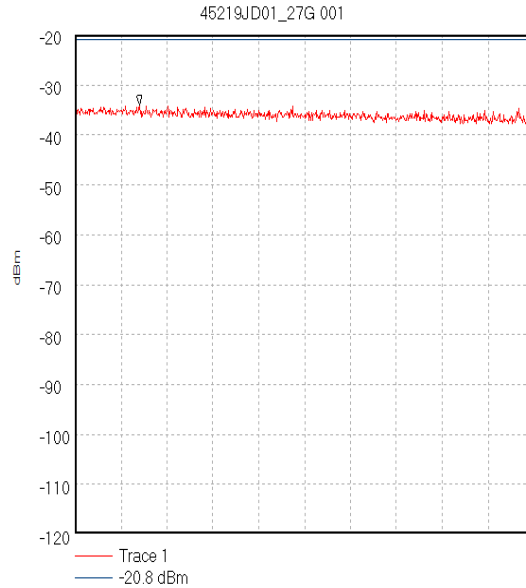
UE PCMCIA Card Model: FD

To: FCC Part 15, Part 21 & Part 74

Transmitter Radiated Emissions, Top Channel - Low Chip Rate



Title: IPWireless EUT: UE PCMCIA FD, FCC P15/21/74, Rad Spurious.
 Comment A: 45219JD01 Top Channel 3.84 Mcps, 18-26.5 GHz
 Date: 4.FEB.2004 14:10:40



Start 26.5 GHz; Stop 27.0 GHz
 Ref -20 dBm; Ref Offset 38.0 dB; 10 dB/div
 RBW 1.0 MHz; VBW 1.0 MHz; Att 0 dB; Swp 50.0 mS
 Peak 26.57 GHz, -34.0 dBm
 Display Line: -20.8 dBm;
 04/02/2004 15:16:29

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

Test Of: IPWireless U.K. Ltd.

UE PCMCIA Card Model: FD

To: FCC Part 15, Part 21 & Part 74

7.10. Transmitter Radiated Emissions At Band Edges

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

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

Results: (High Chip Rate)**Bottom Band Edge**

Frequency (MHz)	Spurious Emission (dBm)	Carrier EIRP (dBm)	Spurious Emission (dBc)	Limit (dBc)	Margin (dB)	Result
2500	-42.1	21.9	-64.0	-45.8	18.2	Complied

Top Band Edge

Frequency (MHz)	Spurious Emission (dBm)	Carrier EIRP (dBm)	Spurious Emission (dBc)	Limit (dBc)	Margin (dB)	Result
2686	-37.0	23.6	-60.6	-45.8	14.8	Complied

Note: The limit is calculated according to FCC Section 21.908(e) for absolute power measurements as follows: $A + 10\log(C_{BW}/R_{BW})$ where $C_{BW} = 12$ MHz and $R_{BW} = 100$ kHz.

Results: (Low Chip Rate)**Bottom Band Edge**

Frequency (MHz)	Spurious Emission (dBm)	Carrier EIRP (dBm)	Spurious Emission (dBc)	Limit (dBc)	Margin (dB)	Result
2500	-39.0	22.0	-61.0	-42.8	18.2	Complied

Top Band Edge

Frequency (MHz)	Spurious Emission (dBm)	Carrier EIRP (dBm)	Spurious Emission (dBc)	Limit (dBc)	Margin (dB)	Result
2686	-36.2	23.7	-59.9	-42.8	17.1	Complied

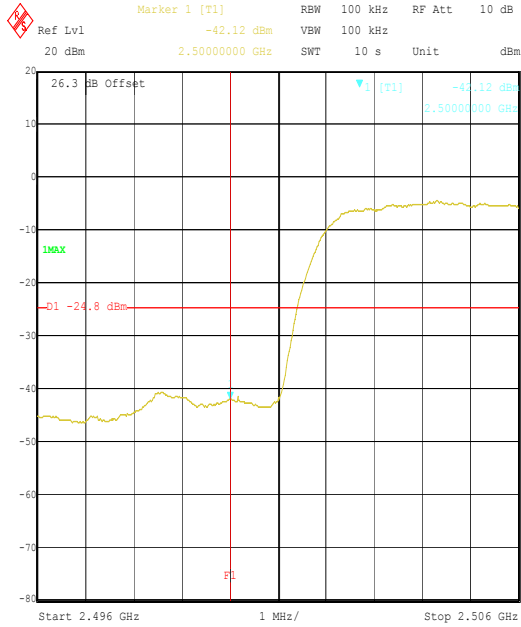
Note: The limit is calculated according to FCC Section 21.908(e) for absolute power measurements as follows: $A + 10\log(C_{BW}/R_{BW})$ where $C_{BW} = 6$ MHz and $R_{BW} = 100$ kHz.

Test Of: IPWireless U.K. Ltd.

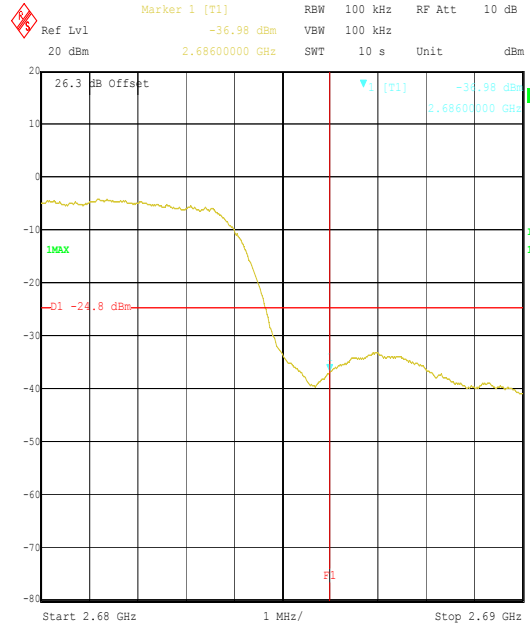
UE PCMCIA Card Model: FD

To: FCC Part 15, Part 21 & Part 74

Transmitter Radiated Emissions At Band Edges - High Chip Rate



Title: IPWireless EUT: FD, FCC P15/21/74, Radiated BandEdge
Comment A: 45219JD01 Bottom Channel 7.68 Mcps.
Date: 4.FEB.2004 14:55:29



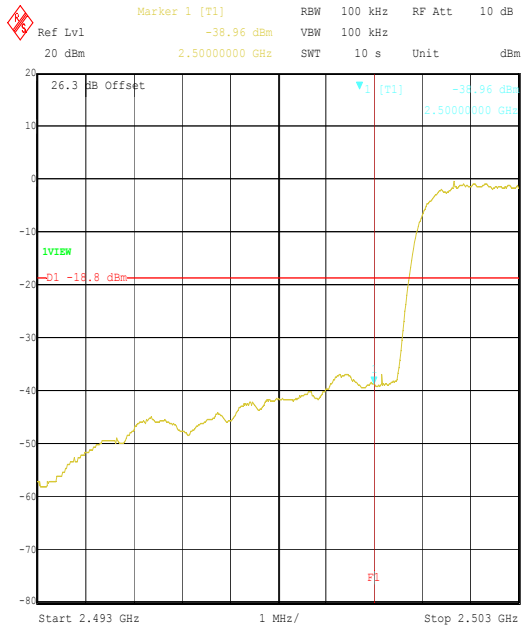
Title: IPWireless EUT: FD, FCC P15/21/74, Radiated BandEdge
Comment A: 45219JD01 Top Channel 7.68 Mcps.
Date: 4.FEB.2004 14:56:28

Test Of: IPWireless U.K. Ltd.

UE PCMCIA Card Model: FD

To: FCC Part 15, Part 21 & Part 74

Transmitter Radiated Emissions At Band Edges - Low Chip Rate



Title: IPWireless EUT: FD, FCC P15/21/74, Radiated BandEdge
 Comment A: 45219JD01 Bottom Channel 3.84 Mcps.
 Date: 4.FEB.2004 14:52:02



Title: IPWireless EUT: FD, FCC P15/21/74, Radiated BandEdge
 Comment A: 45219JD01 Top Channel 3.84 Mcps.
 Date: 4.FEB.2004 14:49:40

Note: The band edge plots above, of the EUT operating in high chip rate mode, incorrectly show the band edge spurious emissions absolute limit line as -24.8 dBm, they should have been -21.8 dBm. It is confirmed that the positioning of the limit line has no bearing on the measurement and the levels recorded at the band edge are correct.

Test Of: IPWireless U.K. Ltd.

UE PCMCIA Card Model: FD

To: FCC Part 15, Part 21 & Part 74

7.11. Idle Mode AC Conducted Spurious Emissions

7.11.1. The EUT was configured as for AC conducted emissions measurements as described in Appendix 2 of this report.

7.11.2. 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 (High Chip Rate)

Frequency (MHz)	Line	Q-P Level (dB μ V)	Q-P Limit (dB μ V)	Margin (dB)	Result
0.1502	Live	60.35	65.99	5.64	Complied
0.18762	Live	56.10	64.14	8.04	Complied
0.27598	Live	50.79	60.94	10.15	Complied
0.65495	Live	48.99	56.00	7.01	Complied
1.22208	Neutral	45.36	56.00	10.64	Complied
1.54583	Neutral	46.07	56.00	9.93	Complied
1.62621	Neutral	44.57	56.00	11.43	Complied

Results: Average Detector Measurements On Live And Neutral Lines (High Chip Rate)

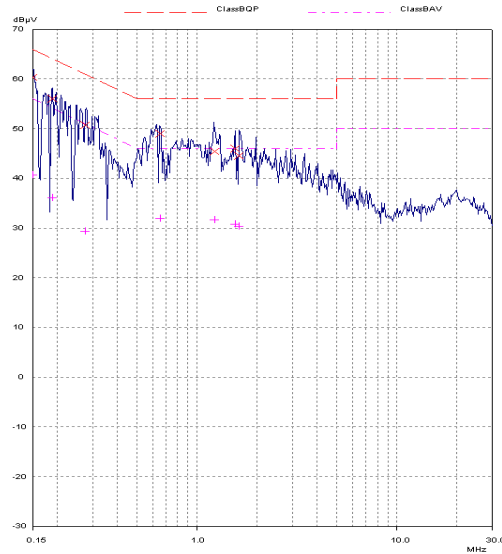
Frequency (MHz)	Line	Av. Level (dB μ V)	Av. Limit (dB μ V)	Margin (dB)	Result
0.1502	Live	40.72	55.99	15.27	Complied
0.18762	Live	36.07	54.14	18.07	Complied
0.27598	Live	29.36	50.94	21.58	Complied
0.65495	Neutral	31.93	46.00	14.07	Complied
1.22208	Neutral	31.72	46.00	14.28	Complied
1.54583	Neutral	30.81	46.00	15.19	Complied
1.62621	Neutral	30.40	46.00	15.60	Complied

Test Of: IPWireless U.K. Ltd.

UE PCMCIA Card Model: FD

To: FCC Part 15, Part 21 & Part 74

Idle Mode AC Conducted Spurious Emissions (Continued) (High Chip Rate)



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

Test Of: IPWireless U.K. Ltd.

UE PCMCIA Card Model: FD

To: FCC Part 15, Part 21 & Part 74

Idle Mode AC Conducted Spurious Emissions (Continued)**Results: Quasi-Peak Detector Measurements On Live And Neutral Lines (Low Chip Rate)**

Frequency (MHz)	Line	Q-P Level (dB μ V)	Q-P Limit (dB μ V)	Margin (dB)	Result
0.1508	Live	58.76	65.96	7.20	Complied
0.16539	Live	-57.42	65.19	7.77	Complied
0.17825	Live	56.86	64.57	7.71	Complied
0.31442	Live	50.46	59.85	9.39	Complied
0.67612	Live	48.79	56.00	7.21	Complied
1.28867	Neutral	42.97	56.00	13.03	Complied
1.68882	Neutral	45.46	56.00	10.54	Complied

Results: Average Detector Measurements On Live And Neutral Lines (Low Chip Rate)

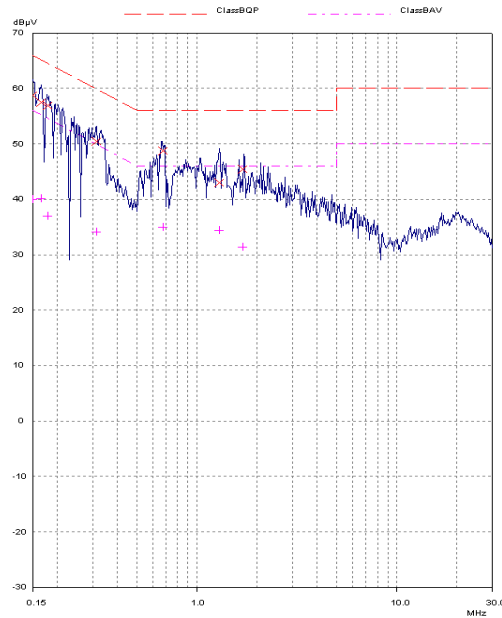
Frequency (MHz)	Line	Av. Level (dB μ V)	Av. Limit (dB μ V)	Margin (dB)	Result
0.1508	Live	40.00	55.96	15.96	Complied
0.16539	Live	40.10	55.19	15.09	Complied
0.17825	Live	36.97	54.57	17.60	Complied
0.31442	Live	34.06	49.85	15.79	Complied
0.67612	Neutral	34.95	46.00	11.05	Complied
1.28867	Neutral	34.36	46.00	11.64	Complied
1.68882	Neutral	31.44	46.00	14.56	Complied

Test Of: IPWireless U.K. Ltd.

UE PCMCIA Card Model: FD

To: FCC Part 15, Part 21 & Part 74

Idle Mode AC Conducted Spurious Emissions (Continued) (Low Chip Rate)



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

Test Of: IPWireless U.K. Ltd.

UE PCMCIA Card Model: FD

To: FCC Part 15, Part 21 & Part 74

7.12. Idle Mode Radiated Emissions – 30 MHz to 1 GHz

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

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

Results: (High Chip Rate)

Frequency (MHz)	Ant. Pol.	Q-P Level (dB μ V/m)	Limit (dB μ V/m)	Margin (dB)	Result
75.563	Vert.	18.3	40.0	21.7	Complied
85.901	Horiz.	29.8	40.0	10.2	Complied
111.491	Vert.	29.0	43.5	14.5	Complied
132.698	Vert.	37.0	43.5	6.5	Complied
162.850	Vert.	33.7	43.5	9.8	Complied
195.429	Vert.	34.6	43.5	8.9	Complied
260.575	Horiz.	36.0	46.0	10.0	Complied
325.718	Horiz.	33.4	46.0	12.6	Complied
390.861	Vert.	28.9	46.0	17.1	Complied
456.004	Vert.	37.0	46.0	9.0	Complied
651.438	Vert.	45.0	46.0	1.0	Complied
716.577	Horiz.	45.8	46.0	0.2	Complied
846.864	Vert.	40.5	46.0	5.5	Complied
912.008	Vert.	42.6	46.0	3.4	Complied
977.154	Vert.	44.0	54.0	10.0	Complied

Preliminary radiated scans up to 4 GHz of both chip rates were performed on the EUT fitted and operating in each of the three host notebook PCs stated in section 2.5 of this report. The combination that exhibited the worse case mode of operation was then used to perform the final measurements detailed in the above results table. This was found to be with the EUT fitted and operating in the ACER BY25 notebook PC.

Test Of: IPWireless U.K. Ltd.

UE PCMCIA Card Model: FD

To: FCC Part 15, Part 21 & Part 74

Idle Mode Radiated Emissions – 30 MHz to 1 GHz (Continued)**Results: (Low Chip Rate)**

Frequency (MHz)	Ant. Pol.	Q-P Level (dB μ V/m)	Limit (dB μ V/m)	Margin (dB)	Result
75.562	Vert.	18.0	40.0	22.0	Complied
85.903	Horiz.	30.6	40.0	9.4	Complied
111.513	Vert.	29.6	43.5	13.9	Complied
132.749	Vert.	37.3	43.5	6.2	Complied
162.847	Vert.	33.4	43.5	10.1	Complied
195.431	Vert.	34.6	43.5	8.9	Complied
260.574	Horiz.	35.6	46.0	10.4	Complied
325.718	Horiz.	36.1	46.0	9.9	Complied
390.861	Vert.	27.3	46.0	18.7	Complied
465.006	Vert.	37.3	46.0	8.7	Complied
651.438	Vert.	45.0	46.0	1.0	Complied
716.579	Horiz.	45.5	46.0	0.5	Complied
846.867	Vert.	42.7	46.0	3.3	Complied
912.012	Vert.	43.4	46.0	2.6	Complied
977.153	Vert.	40.8	54.0	13.2	Complied

Preliminary radiated scans up to 4 GHz of both chip rates were performed on the EUT fitted and operating in each of the three host notebook PCs stated in section 2.5 of this report. The combination that exhibited the worse case mode of operation was then used to perform the final measurements detailed in the above results table. This was found to be with the EUT fitted and operating in the ACER BY25 notebook PC.

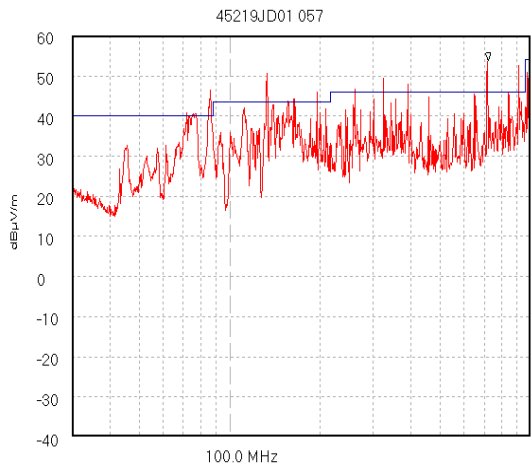
Test Of: IPWireless U.K. Ltd.

UE PCMCIA Card Model: FD

To: FCC Part 15, Part 21 & Part 74

Idle Mode Radiated Emissions – 30 MHz to 1 GHz - Continued

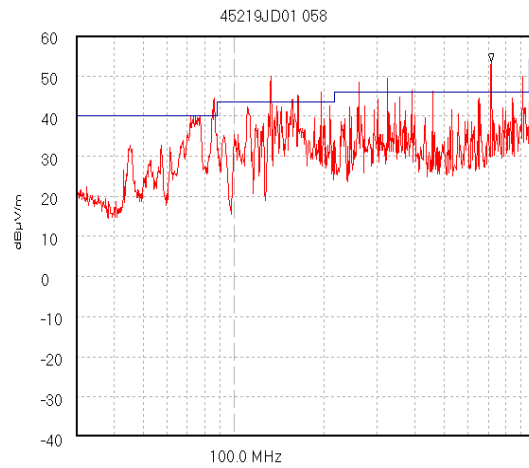
Idle Mode, High Chip Rate, Acer PC



Trace 1
15_109_Class_B

Start 30.0 MHz; Stop 1.0 GHz - Log Scale
Ref 60 dBµV/m; Ref Offset 0.0 dB; 10 dB/div
RBW 120.0 kHz; VBW 100.0 kHz; Att 0 dB; Swp 380.0 mS
Peak 720.883 MHz, 53.73 dBµV/m
Limit/Mask: 15_109_Class_B; : Limit Test Failed
Transducer Factors: A490
27/01/2004 14:44:10

Idle Mode, Low Chip Rate, Acer PC



Trace 1
15_109_Class_B

Start 30.0 MHz; Stop 1.0 GHz - Log Scale
Ref 60 dBµV/m; Ref Offset 0.0 dB; 10 dB/div
RBW 120.0 kHz; VBW 100.0 kHz; Att 0 dB; Swp 380.0 mS
Peak 718.08 MHz, 53.5 dBµV/m
Limit/Mask: 15_109_Class_B; : Limit Test Failed
Transducer Factors: A490
27/01/2004 14:45:52

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

Test Of: IPWireless U.K. Ltd.

UE PCMCIA Card Model: FD

To: FCC Part 15, Part 21 & Part 74

7.13. Idle Mode Radiated Emissions – 1 GHz to 14 GHz

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

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

Results: (High Chip Rate)**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
1107.450	Vert.	21.4	21.5	0.8	43.7	54.0	10.3	Complied
1326.518	Vert.	8.4	21.5	0.9	30.8	54.0	23.2	Complied
1563.445	Vert.	16.0	21.6	1.0	38.6	54.0	15.4	Complied
1597.150	Vert.	9.6	21.6	1.0	32.2	54.0	21.8	Complied
1995.664	Vert.	8.6	21.6	1.2	31.4	54.0	22.6	Complied
2019.425	Vert.	17.6	20.7	1.2	39.5	54.0	14.5	Complied
2122.496	Vert.	8.2	20.9	1.2	30.3	54.0	23.7	Complied
2394.536	Vert.	9.7	21.2	1.3	32.2	54.0	21.8	Complied
2523.799	Vert.	8.6	21.4	1.3	31.3	54.0	22.7	Complied
2660.045	Vert.	8.2	21.6	1.3	31.1	54.0	22.5	Complied
2781.715	Vert.	7.6	21.8	1.4	30.8	54.0	23.2	Complied

Test Of: IPWireless U.K. Ltd.

UE PCMCIA Card Model: FD

To: FCC Part 15, Part 21 & Part 74

Idle Mode Radiated Emissions – 1 GHz to 14 GHz (Continued)**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
1107.450	Vert.	30.5	21.5	0.8	52.8	74.0	21.2	Complied
1326.518	Vert.	22.0	21.5	0.9	44.4	74.0	29.6	Complied
1563.445	Vert.	21.9	21.6	1.0	44.5	74.0	29.5	Complied
1597.150	Vert.	24.5	21.6	1.0	47.1	74.0	26.9	Complied
1995.664	Vert.	21.8	21.6	1.2	44.6	74.0	29.4	Complied
2019.425	Vert.	22.2	20.7	1.2	44.1	74.0	29.9	Complied
2122.496	Vert.	21.3	20.9	1.2	43.4	74.0	30.6	Complied
2394.536	Vert.	25.3	21.2	1.3	47.8	74.0	26.2	Complied
2523.799	Vert.	22.1	21.4	1.3	44.8	74.0	29.2	Complied
2660.045	Vert.	21.3	21.6	1.3	44.2	74.0	29.8	Complied
2781.715	Vert.	19.7	21.8	1.4	42.9	74.0	31.1	Complied

Preliminary radiated scans up to 4 GHz of both chip rates were performed on the EUT fitted and operating in each of the three host notebook PCs stated in section 2.5 of this report. The combination that exhibited the worse case mode of operation was then used to perform the final measurements detailed in the above results table. This was found to be with the EUT fitted and operating in the ACER BY25 notebook PC.

Test Of: IPWireless U.K. Ltd.

UE PCMCIA Card Model: FD

To: FCC Part 15, Part 21 & Part 74

Idle Mode Radiated Emissions – 1 GHz to 14 GHz (Continued)**Results: (Low Chip Rate)****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
1107.490	Vert.	20.5	21.5	0.8	42.8	54.0	11.2	Complied
1327.976	Vert.	8.9	21.5	0.9	31.3	54.0	22.7	Complied
1563.440	Vert.	19.0	21.6	1.0	41.6	54.0	12.4	Complied
1597.336	Vert.	9.7	21.6	1.0	32.3	54.0	21.7	Complied
1994.432	Vert.	8.5	21.6	1.2	31.3	54.0	22.7	Complied
2019.450	Vert.	17.8	20.7	1.2	39.7	54.0	14.3	Complied
2124.846	Vert.	8.0	20.9	1.2	30.1	54.0	13.9	Complied
2392.978	Vert.	10.1	21.2	1.3	32.6	54.0	11.4	Complied
2525.618	Vert.	8.4	21.4	1.3	31.1	54.0	12.9	Complied
2661.681	Vert.	8.4	21.6	1.3	31.3	54.0	12.7	Complied
2782.492	Vert.	7.4	21.8	1.4	30.6	54.0	13.4	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
1107.490	Vert.	24.3	21.5	0.8	46.6	74.0	27.4	Complied
1327.976	Vert.	23.6	21.5	0.9	46.0	74.0	28.0	Complied
1563.440	Vert.	23.0	21.6	1.0	45.6	74.0	28.4	Complied
1597.336	Vert.	24.6	21.6	1.0	47.2	74.0	26.8	Complied
1994.432	Vert.	19.2	21.6	1.2	42.0	74.0	32.0	Complied
2019.450	Vert.	22.3	20.7	1.2	44.2	74.0	29.8	Complied
2124.846	Vert.	20.5	20.9	1.2	42.6	74.0	31.4	Complied
2392.978	Vert.	26.4	21.2	1.3	49.0	74.0	25.0	Complied
2525.618	Vert.	21.7	21.4	1.3	44.4	74.0	29.6	Complied
2661.681	Vert.	21.1	21.6	1.3	44.0	74.0	30.0	Complied
2782.492	Vert.	19.7	21.8	1.4	42.9	74.0	31.1	Complied

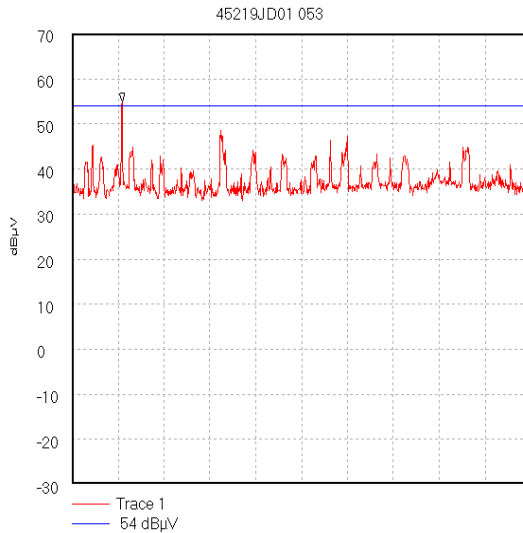
Preliminary radiated scans up to 4 GHz of both chip rates were performed on the EUT fitted and operating in each of the three host notebook PCs stated in section 2.5 of this report. The combination that exhibited the worse case mode of operation was then used to perform the final measurements detailed in the above results table. This was found to be with the EUT fitted and operating in the ACER BY25 notebook PC.

Test Of: IPWireless U.K. Ltd.

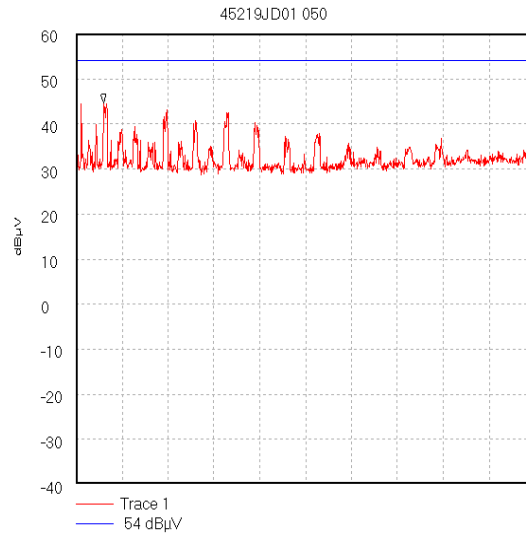
UE PCMCIA Card Model: FD

To: FCC Part 15, Part 21 & Part 74

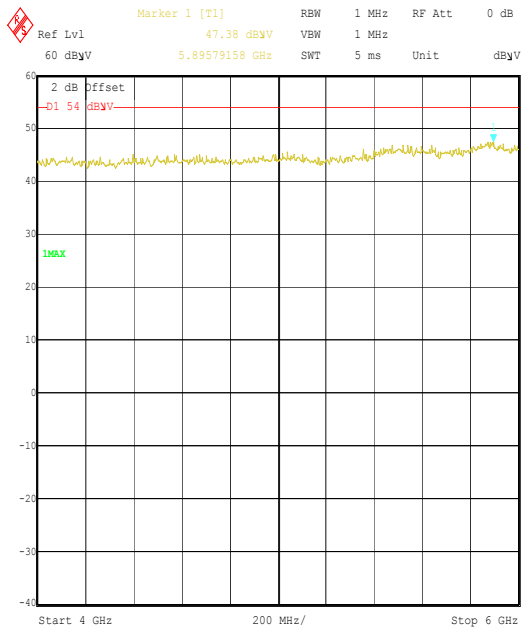
Idle Mode Radiated Emissions – 1 GHz to 14 GHz (High Chip Rate) ACER PC- Continued



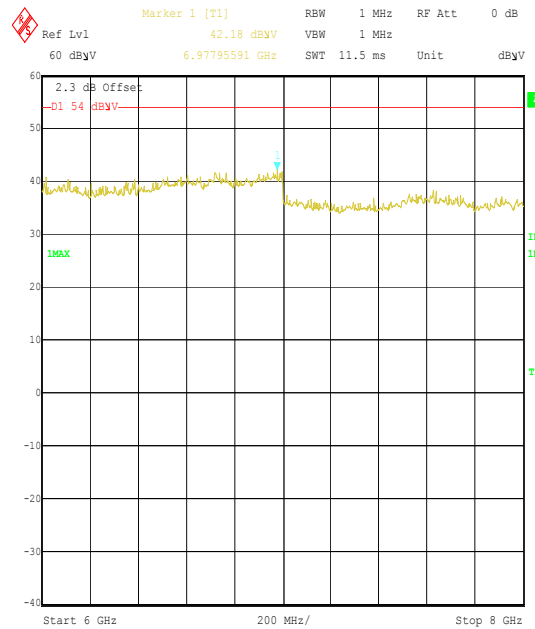
Start 1.0 GHz; Stop 2.0 GHz
Ref 70 dBµV; Ref Offset 4.0 dB; 10 dB/div
RBW 1000.0 kHz; VBW 1.0 MHz; Att 0 dB; Swp 20.0 mS
Peak 1.109 GHz; 54.97 dBµV
Display Line: 54 dBµV; ; Limit Test Failed
27/01/2004 13:59:32



Start 2.0 GHz; Stop 4.0 GHz
Ref 60 dBµV; Ref Offset 4.0 dB; 10 dB/div
RBW 1000.0 kHz; VBW 1.0 MHz; Att 0 dB; Swp 20.0 mS
Peak 2.12 GHz; 44.72 dBµV
Display Line: 54 dBµV; ; Limit Test Passed
27/01/2004 12:30:11



Title: IPWireless EUT: FD. FCC P15/21/74. Radiated Spurious
Comment A: 45219JD01 Idle Mode, 7.68 Mcps. 4-6 GHz
Date: 4.FEB.2004 16:03:02



Title: IPWireless EUT: FD. FCC P15/21/74. Radiated Spurious
Comment A: 45219JD01 Idle Mode, 7.68 Mcps. 6-8 GHz
Date: 4.FEB.2004 16:10:21

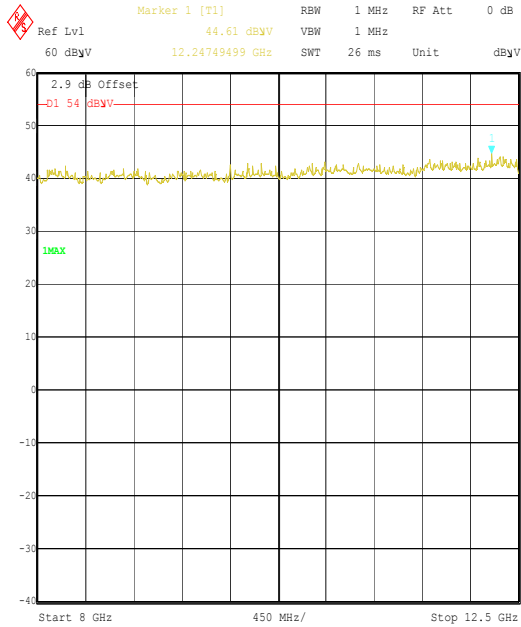
Note: these plots are pre-scans and for indication purposes only. For final measurements, see accompanying tables.

Test Of: IPWireless U.K. Ltd.

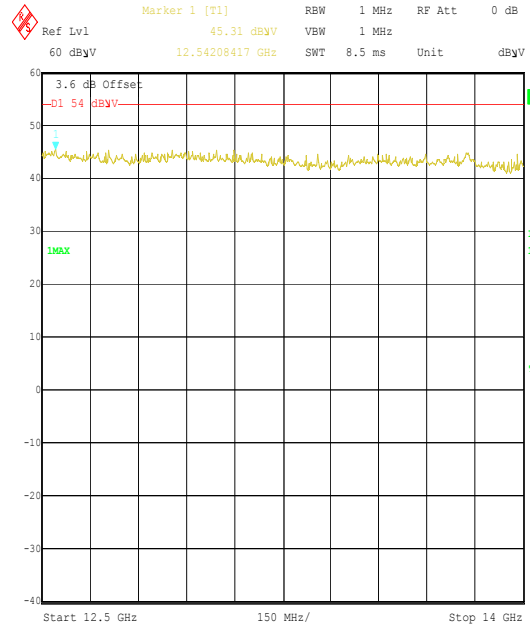
UE PCMCIA Card Model: FD

To: FCC Part 15, Part 21 & Part 74

Idle Mode Radiated Emissions – 1 GHz to 14 GHz (High Chip Rate) ACER PC- Continued



Title: IPWireless EUT: FD. FCC P15/21/74. Radiated Spurious
 Comment A: 45219JD01 Idle Mode, 7.68 Mcps. 8-12.5 GHz
 Date: 4.FEB.2004 16:14:24



Title: IPWireless EUT: FD. FCC P15/21/74. Radiated Spurious
 Comment A: 45219JD01 Idle Mode, 7.68 Mcps. 12.5-14 GHz
 Date: 4.FEB.2004 16:21:23

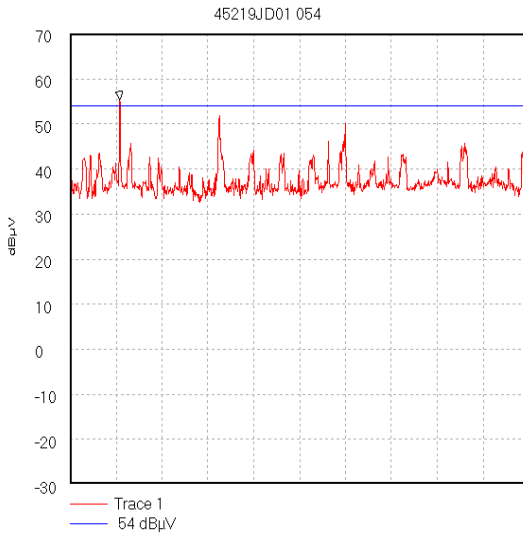
Note: these plots are pre-scans and for indication purposes only. For final measurements, see accompanying tables.

Test Of: IPWireless U.K. Ltd.

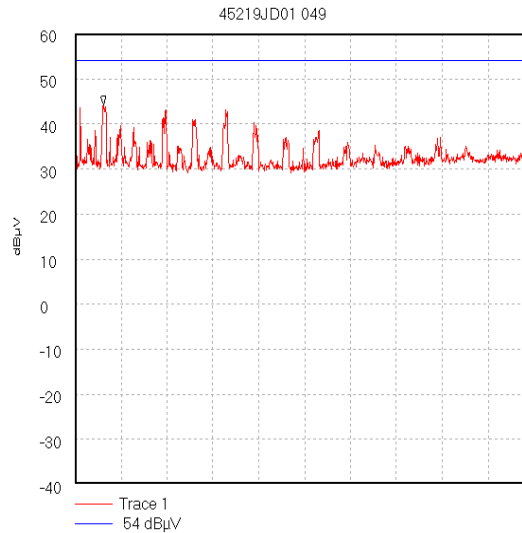
UE PCMCIA Card Model: FD

To: FCC Part 15, Part 21 & Part 74

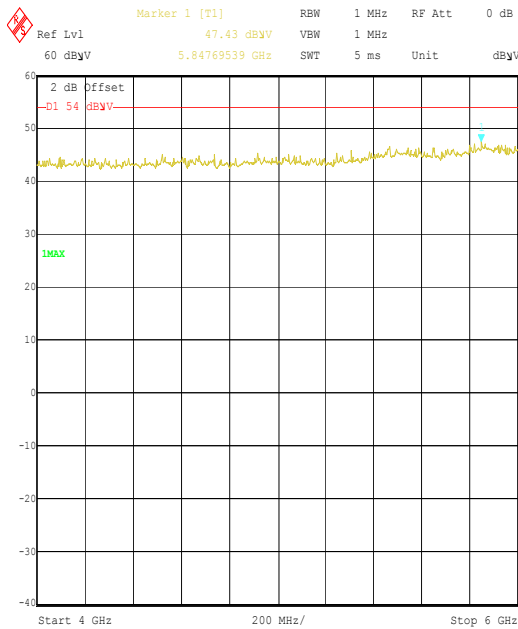
Idle Mode Radiated Emissions – 1 GHz to 14 GHz (Low Chip Rate) ACER PC- Continued



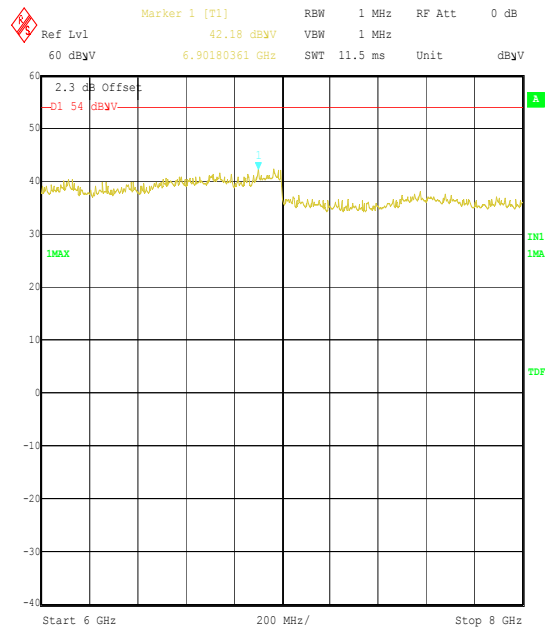
Start 1.0 GHz; Stop 2.0 GHz
Ref 70 dBµV; Ref Offset 4.0 dB; 10 dB/div
RBW 1000.0 kHz; VBW 1.0 MHz; Att 0 dB; Swp 20.0 mS
Peak 1.108 GHz; 55.28 dBµV
Display Line: 54 dBµV; Limit Test Failed
27/01/2004 14:04:53



Start 2.0 GHz; Stop 4.0 GHz
Ref 60 dBµV; Ref Offset 4.0 dB; 10 dB/div
RBW 1000.0 kHz; VBW 1.0 MHz; Att 0 dB; Swp 20.0 mS
Peak 2.124 GHz; 44.31 dBµV
Display Line: 54 dBµV; Limit Test Passed
27/01/2004 12:24:01



Title: IPWireless EUT: FD, FCC P15/21/74, Radiated Spurious
Comment A: 45219JD01 Idle Mode, 3.84 Mcps, 4-6 GHz
Date: 4.FEB.2004 16:05:10



Title: IPWireless EUT: FD, FCC P15/21/74, Radiated Spurious
Comment A: 45219JD01 Idle Mode, 3.84 Mcps, 6-8 GHz
Date: 4.FEB.2004 16:08:30

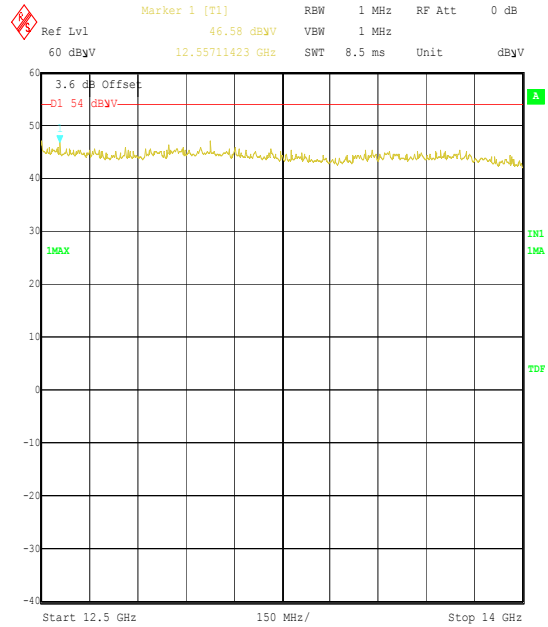
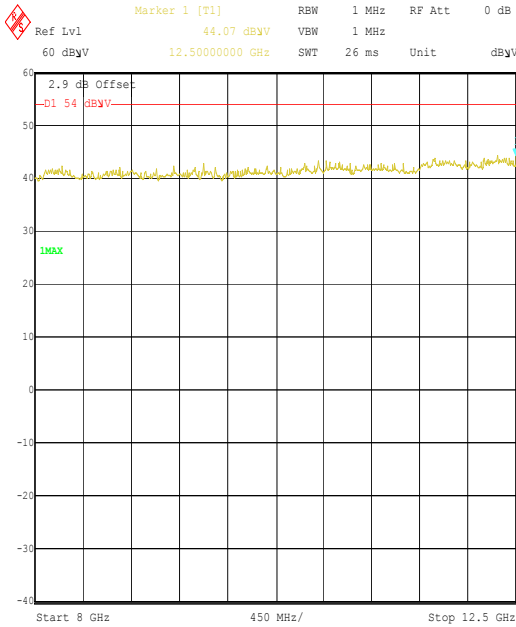
Note: these plots are pre-scans and for indication purposes only. For final measurements, see accompanying tables.

Test Of: IPWireless U.K. Ltd.

UE PCMCIA Card Model: FD

To: FCC Part 15, Part 21 & Part 74

Idle Mode Radiated Emissions – 1 GHz to 14 GHz (Low Chip Rate) ACER PC- Continued



Title: IPWireless EUT: FD, FCC P15/21/74, Radiated Spurious
Comment A: 45219JD01 Idle Mode, 3.84 Mcps, 8-12.5 GHz
Date: 4.FEB.2004 16:15:58

Title: IPWireless EUT: FD, FCC P15/21/74, Radiated Spurious
Comment A: 45219JD01 Idle Mode, 3.84 Mcps, 12.5-14 GHz
Date: 4.FEB.2004 16:19:11

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

Test Of: IPWireless U.K. Ltd.

UE PCMCIA Card Model: FD

To: FCC Part 15, Part 21 & Part 74

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
Frequency Stability	Not applicable	95%	+/- 20 Hz
Occupied Bandwidth	Not applicable	95%	+/- 0.12 %
Conducted Emissions	9 kHz to 27 GHz	95%	+/- 1.2 dB
Radiated Spurious Emissions	30 MHz to 1000 MHz	95%	+/- 5.26 dB
Radiated Spurious Emissions	1 GHz to 27 GHz	95%	+/- 1.78 dB
AC Conducted Spurious Emissions	0.15 MHz to 30 MHz	95%	+/- 3.25 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.

Test Of: IPWireless U.K. Ltd.

UE PCMCIA Card Model: FD

To: FCC Part 15, Part 21 & Part 74

Appendix 1. Test Equipment Used

RFI No.	Instrument	Manufacturer	Type No.	Serial No.
A027	Horn Antenna	Eaton	9188-2	301
A030	Step Attenuator	Narda	745-69	01544
A031	2 to 4 GHz Eaton Horn Antenna	Eaton	91889-2	557
A047	HP-470-5N High Pass Filter	AERIAL FACILITIES LTD	HP-470-5N	4015B
A059	3146 Log Periodic Antenna	EMCO	3146	8902-2378
A091	EMCO 3110 Biconical Antenna	EMCO	3110	9008-1182
A203	WG 22 Horn Antenna	Flann Microwave Ltd	22240-20	343
A259	Bilog Antenna	Chase	CBL6111	1513
A336	WG 20 Attenuator	Flann	20081-30	75
A366	WG 22 isolator	MRI	FRR-400	169
A392	3 dB attenuator	Suhner	6803.17.B	None
A427	WG 14 horn	Flann	14240-20	150
A428	WG 12 horn	Flann	12240-20	134
A429	WG 16 horn	Flann	16240-20	561
A430	WG 18 horn	Flann	18240-20	425
A436	WG 20 horn	Flann	20240-20	330
A559	Pulse Limiter	Rohde & Schwarz	ESH3-Z2	357881052
C1065	Cable r	Rosenberger	UFA210-1-7872	0985
C1078	Cable	Rosenberger	FA210A1030 M5050	28464-2
C1080	Cable	Rosenberger	FA210A1030 M5050	28464-1
C178	Cable	Rosenberger	UFA210A-1-1181-70x70	None
C436	Cable	Hewlett Packard	5061-5458	5061-5458-C436
C453	Cable	Rosenberger	RG142XX-001-RFIB	C453-10081998

Test Of: IPWireless U.K. Ltd.

UE PCMCIA Card Model: FD

To: FCC Part 15, Part 21 & Part 74

Test Equipment Used - Continued

RFI No.	Instrument	Manufacturer	Type No.	Serial No.
C457	Cable	Rosenberger	RG142XX-002-RFIB	C457-10081998
C461	Cable	Rosenberger	UFA210A-1-1182-704704	98H0305
C468	Cable	Rosenberger	UFA210A-1-3937-504504	98L0440
C499	Cable	Rosenberger	FA210A1020 M30309	001
E009	Environmental Chamber	Thermotron Corporation	S-8-E Mini Max	25-2407-0
None	Lo-Amp	Rohde & Schwarz	FNR5717	1021.0741.02
G085	Generator	Hewlett Packard	83650L	3614A00104
M003	Spectrum Monitor	Rohde & Schwarz	EZM	883 580/008
M023	ESVP Receiver	Rohde & Schwarz	ESVP	872 991/027
M069	ESMI Spectrum Analyser / Receiver	Rohde & Schwarz	ESMI	829 808/007 (DU) / 827 063/008 (RU)
M088	Receiver / Spectrum Analyser System	Rohde & Schwarz	ESBI	DU:835862/018 RU:835387/006
M1122	Peak Power Sensor	Boonton Electronics	57340	3297
M1123	RF Power Meter	Boonton	4531	138201
M1124	Spectrum Analyser	Rohde & Schwarz	ESIB26	100046K
M114	Temperature/Humidity Meter	RS Components	212-146	None
M127	Spectrum Analyser	Rohde & Schwarz	FSEB 30	842 659/016
M152	WG22 Mixer	Rohde & Schwarz	FS-Z16	None

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Test Equipment Used - Continued

RFI No.	Instrument	Manufacturer	Type No.	Serial No.
M281	Power Meter	Hewlett Packard	E4418A (EPM441A)	GB37170210-01
M283	Power Sensor	Hewlett Packard	8487A	3318A03241
M287	Transmission Analyser	Hewlett Packard	37717C	GB00003727
S201	Site 1	RFI	1	
S202	Site 2	RFI	2	S202-15011990

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

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Appendix 2. Measurement Methods

A2.1 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 transmitting either via its integral antenna or via an external stick antenna (when fitted).

The level of the EIRP was measured using the channel power function of the spectrum analyser, having its level referenced to a wideband power meter.

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 horn antenna. The centre of the substitution antenna was set to approximately the same centre location as the EUT. The substitution horn antenna was set to the horizontal polarity. The substitution horn 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:-

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

All measurements were performed using broadband Horn antennas.

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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.

$$\text{Delta (dB)} = \text{EUT} - \text{SG}$$

where :

EUT = spectrum analyser indicated EUT raw level

SG = spectrum analyser indicated signal generator raw level

The signal generator actual EIRP is calculated as:

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

The EUT EIRP is calculated as:

$$\text{EIRP EUT} = \text{EIRP SG} + \text{Delta.}$$

The test equipment settings for EIRP measurements were as follows:

Receiver Function	Setting
Detector Type:	Average
Mode:	Channel Power Function
Channel Bandwidth:	6.0 MHz
Channel Spacing:	6.0 MHz
Resolution Bandwidth:	100 kHz (automatically set by the spectrum analyser when using the channel power function)
Video Bandwidth:	300 kHz (automatically set by the spectrum analyser when using the channel power function)
Amplitude Range:	100 dB
Sweep Time:	10s

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A2.2 Frequency Stability

The EUT was situated within an environmental test chamber and connected via cables and attenuator(s) to the spectrum analyser.

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

Measurements were also performed at voltage extremes as stated in the specification.

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 using the spectrum analyser.

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 requirements of the specification.

In order to show compliance, the EUT must remain maintain a frequency tolerance not exceeding 0.005% according to Section 21.101 and 0.001% according to Section 74.961.

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

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A2.3 Occupied Bandwidth

The EUT was connected to a spectrum analyser at 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.

The EUT is a Broadband Wireless Modem; therefore no modulation input port was available. The occupied bandwidth was measured with the EUT transmitting on all timeslots and using normal modulation.

The occupied bandwidth was measured using the built in occupied bandwidth function of the Rohde and Schwarz ESI spectrum analyser. It was set to measure the bandwidth where 99% of the signal power was contained. The analyser automatically configures the measurement bandwidths to make an accurate measurement based on the channel bandwidth and channel spacing of the EUT. A value of 200 kHz was used for the high chip rate whilst a value of 100 kHz was used for the low chip rate.

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A2.4 Conducted Emissions Measurements

Spurious emission measurements at the antenna port were performed from the lowest declared frequency to 10 times the highest EUT fundamental frequency.

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 3 MHz 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(e) for absolute power measurements ($A + 10 \log(C_{\text{BW}}/R_{\text{BW}})$) where $C_{\text{BW}} = 12$ MHz (for high chip rate mode) or $C_{\text{BW}} = 6$ MHz (for low chip rate mode) whilst R_{BW} = the resolution bandwidth for the emissions measurement i.e. 100 kHz below 1 GHz and 1 MHz above 1 GHz.

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. 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 therefore 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:	1 MHz >1 GHz
Bandwidth:	100 kHz <1 GHz
Bandwidth:	10 kHz <30 MHz
Amplitude Range:	100 dB
Step Size:	Continuous sweep
Sweep Time:	Coupled

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A2.5 FCC Part 15: 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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A2.6 Transmitter 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 10 times the highest fundamental frequency were performed within a screened chamber below 4 GHz and on an open area test site above 4 GHz in order to identify frequencies on which the EUT was generating interference. This determined the frequencies from the EUT that 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, below 4 GHz; above 4 GHz a 1 m measurement distance was used. A limit line was set to the specification limit. 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 spectrum analyser with an average detector was used for final measurements.

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.

Once the final amplitude (maximised) had been obtained and noted, the EUT was replaced by a substitution antenna, and a substitution method applied.

The substitution antennas used were a horn antenna for measurements greater than or equal to 1 GHz and a dipole for measurements below 1 GHz.

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 then connected to and fed by a signal generator tuned to the EUT's frequency under test.

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Transmitter Radiated Emissions (Continued)

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 previously recorded maximum level for this set of conditions was obtained. This procedure was repeated with both antennas vertically polarised. The EIRP was then taken as:-

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

Once the EIRP was obtained, the difference between it and the level of the fundamental emission for the EIRP of the channel under test was noted at the spurious attenuation level in dBc. The following formula was used as described in TIA_EIA_603B

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

For frequencies further than 3 MHz 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(e) for absolute power measurements ($A + 10 \log(C_{BW}/R_{BW})$) where $C_{BW} = 12$ MHz (for high chip rate mode) or $C_{BW} = 6$ MHz (for low chip rate mode) whilst R_{BW} = the resolution bandwidth for the emissions measurement i.e. 100 kHz below 1 GHz and 1 MHz above 1 GHz.

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

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A2.7 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 5 times the highest unintentionally generated frequency were performed within a screened chamber below 4 GHz and on an open area test site above 4 GHz generating interference. This determined the frequencies from the EUT that 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, below 4 GHz; above 4 GHz a 1 m measurement distance was used. A limit line was set to the specification limit. 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 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 turntable 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. Final measurements were taken at a 3 m measurement distance.

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Receiver Radiated Emissions (Continued)

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

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

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

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Appendix 3. Test Configuration Drawings

This Appendix contains the following drawings:

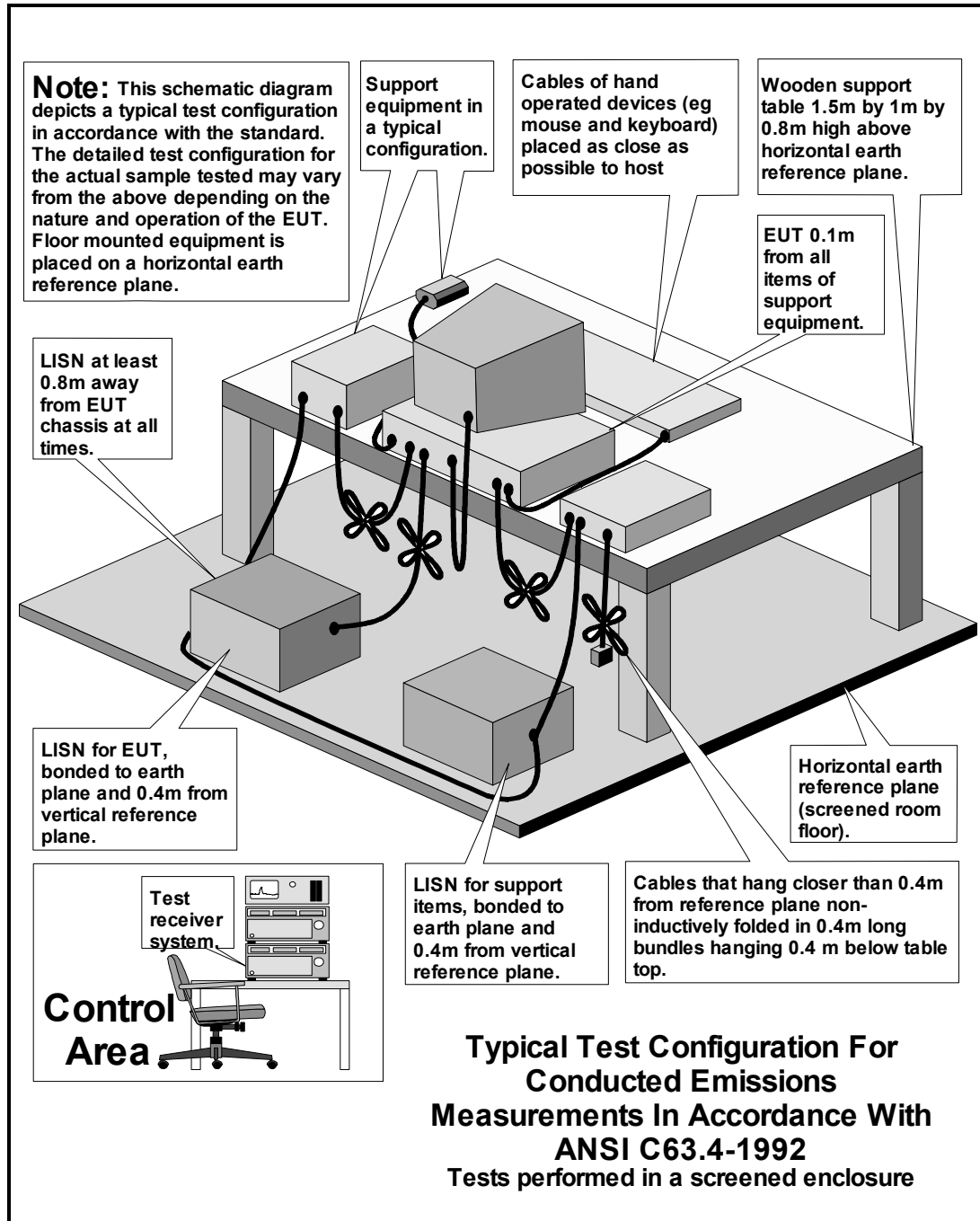
Drawing Reference Number	Title
DRG\46199JD01\EMICON	Test configuration for measurement of conducted emissions
DRG\46199JD01\EMIRAD	Test configuration for measurement of radiated emissions

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DRG\46199JD01\EMICON



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DRG\46199JD01\EMIRAD

