

TEST REPORT FROM RFI GLOBAL SERVICES LTD

Partial Test of: PTP49600

To: CFR 47 FCC Part 15: 2008 Section 15.109,
RSS-111 Issue 2 June 2007 Section 4.5

Test Report Serial No:
RFI/RPT3/RP74379JD02A

Supersedes Test Report Serial No:
RFI/RPT2/RP74379JD02A

This Test Report Is Issued Under The Authority
Of Brian Watson, Operations director:


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Issue Date: 27 January 2009	Test Dates: 10 December 2008

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1. Customer Information

Company Name:	Motorola Point to Point Fixed Wireless Solutions Group
Address:	Unit A1 Linhay Business Park Eastern Road Ashburton Devon TQ13 7UP
Contact Name:	Mr Clem Fisher
Contact Number:	01364 655509
E-Mail Address:	clem.fisher@motorola.com

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2. Equipment Under Test (EUT)

2.1. Identification of Equipment Under Test (EUT)

Description:	Wireless Ethernet Bridge - ODU
Brand Name:	Motorola
Model Name or Number:	PTP49600
Serial Number:	000456805E9E
Hardware Version:	Rev. 04
Software Version:	08.00
FCC ID Number:	QWP49100
Industry Canada ID Number:	109AO-49100
Country of Manufacture:	Germany
Date of Receipt:	10 December 2008

2.2. Description of EUT

The equipment under test was a 4.9 GHz band Wireless Ethernet Bridge.

2.3. Modifications Incorporated in the EUT

During the course of testing the EUT was not modified.

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2.4. Support Equipment

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

Description:	Power In Door Unit - PIDU for Master ODU (EUT)
Brand Name:	Motorola
Model Name or Number:	PTP49600
Serial Number:	0827291768
Cable Length and Type:	2 metres / CAT 5 and 2 metre mains cable
Connected to Port:	Ethernet on master Wireless Ethernet Bridge and Ethernet to laptop PC

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2.5. Additional Information Related to Testing

Intended Operating Environment:	Residential, Commercial and Light Industry			
Equipment Category:	Microwave fixed radio link			
Type of Unit:	Base Station (Fixed used) Transceiver			
Power Supply Requirement:	Nominal 120 V, 60 Hz AC Mains Supply			
Transmit/Receive Frequency Range:	4940 MHz to 4990 MHz			
Transmit/Receive Channel Description:	Channel Bandwidth (MHz)	Bottom Channel frequency (MHz)	Middle Channel (MHz)	Top channel frequency (MHz)
	5	4942.5	4965	4987.5
	10	4945	4965	4985
	20	4950	4965	4950

2.6. Port Identification

Port	Description	Type/Length
1	RF output (Vertical)	N type male
2	RF output (Horizontal)	N type male
3	Data port	RJ45 Ethernet

2.7. Interface Ports on EUT (if applicable)

Port	Description	Type / Length
1	ODU to PIDU interface	CAT5 terminated in RJ45
2	PIDU Mains	C8
3	PIDU LAN	RJ45
4	Vertical and horizontal RF ports	N type

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3. Test Specification, Methods and Procedures

3.1. Test Specification

Reference:	CFR 47 FCC Part 15 Section 15.109
Title:	Code Of Federal Regulations, Part 15 (47CFR15) Radio Frequency Devices

Reference:	RSS-111 Issue 2 June 2007 Section 4.5
Title:	Broadband Public Safety Equipment Operating in the Band 4940-4990 MHz

3.2. Methods and Procedures

The methods and procedures used were as detailed in:

ANSI/TIA-603-B-2003

Land Mobile Communications Equipment, Measurements and performance Standards

ANSI C63.2 (1987)

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

ANSI C63.4 (2003)

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

ANSI C63.5 (1988)

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

ANSI C63.7 (1988)

Title: American National Standard Guide for Construction of Open Area Test Sites for performing Radiated Emission Measurements.

CISPR 16-1: (1999)

Title: Specification For Radio Disturbance and Immunity Measuring Apparatus and Methods. Part 1: Radio Disturbance and Immunity Measuring Apparatus.

3.3. Definition of Measurement Equipment

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

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4. Deviations from the Test Specification

There were no deviations from the test specification.

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5. Operation and Configuration of the EUT during Testing

5.1. Operating Modes

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

- As a master device, transmitting in Acquisition mode on the top channel at maximum power.
- There is no receive only mode on the EUT, therefore tests were performed in Acquisition mode which includes both transmitter and receiver operation.

5.2. Configuration and Peripherals

The EUT was tested in the following configuration:

- Both RF ports on the EUT were terminated with 50 Ohm loads.
- The ODU was powered by the PIDU through the Ethernet cable. The PIDU was powered by 120V 60Hz AC.

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6. Summary of Test Results

Range of Measurements	FCC Reference	IC Reference	Port Type	Result
Idle Mode Radiated Spurious Emissions	CFR 47 FCC Part 15: Section 15.109	RSS-111 Section 4.5 RSS-Gen Section 6.0	Cabinet	Complied

6.1. Location of Tests

All the measurements described in this report were performed at the premises of RFI Global Services Ltd, Wade Road, Basingstoke, Hampshire, RG24 8AH.

6.2. Site Registration Numbers

FCC: 209735

IC: 3245B

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7. Measurements, Examinations and Derived Results

7.1. General Comments

This section contains test results only.

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

Tests were performed in support of a Class II Permissive change to the product. The customer requested the testing be limited to Radiated Spurious Emissions in accordance with the Standards listed in Section 3.1 of this test report, and only in the range 1 GHz to 40 GHz.

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To: CFR 47 FCC Part 15: 2008 Section 15.109,
RSS-111 Issue 2 June 2007 Section 4.5**7.2. Test Results****7.2.1. Idle Mode Radiated Spurious Emissions: Section 15.109****Electric Field Strength Measurements (Frequency Range: 1 GHz to 40 GHz)****Highest Peak Level: Bottom Channel**

Frequency (GHz)	Antenna Polarity	Detector Level (dB μ V)	Transducer Factor (dB)	Actual Level (dB μ V/m)	Limit (dB μ V/m)	Margin (dB)	Result
5.827034	Horizontal	53.3	0.4	53.7	74.0	20.3	Complied

Highest Average Level: Bottom Channel

Frequency (GHz)	Antenna Polarity	Detector Level (dB μ V)	Transducer Factor (dB)	Actual Level (dB μ V/m)	Limit (dB μ V/m)	Margin (dB)	Result
5.827034	Horizontal	49.5	0.4	49.9	54.0	4.1	Complied

Highest Peak Level: Middle Channel

Frequency (GHz)	Antenna Polarity	Detector Level (dB μ V)	Transducer Factor (dB)	Actual Level (dB μ V/m)	Limit (dB μ V/m)	Margin (dB)	Result
5.847044	Horizontal	52.5	0.7	53.2	74.0	20.8	Complied

Highest Average Level: Middle Channel

Frequency (GHz)	Antenna Polarity	Detector Level (dB μ V)	Transducer Factor (dB)	Actual Level (dB μ V/m)	Limit (dB μ V/m)	Margin (dB)	Result
5.847044	Horizontal	48.5	0.7	49.2	54.0	4.8	Complied

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Frequency (GHz)	Antenna Polarity	Detector Level (dB μ V)	Transducer Factor (dB)	Actual Level (dB μ V/m)	Limit (dB μ V/m)	Margin (dB)	Result
5.867069	Horizontal	50.5	0.7	51.2	74.0	22.8	Complied

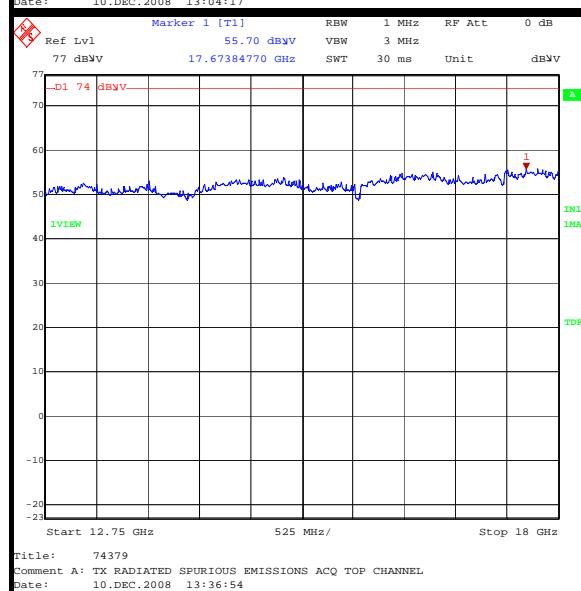
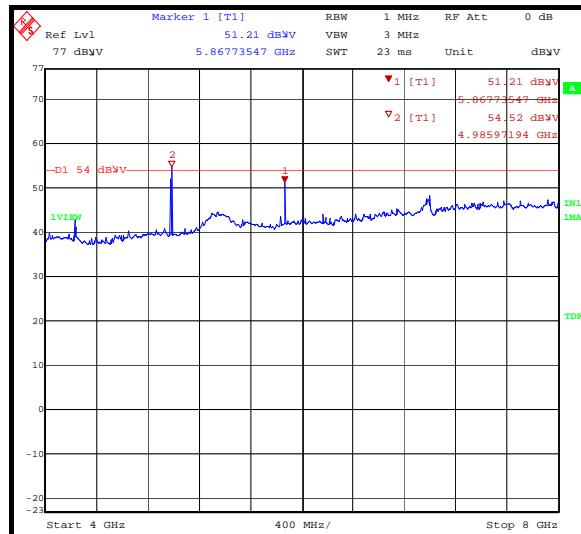
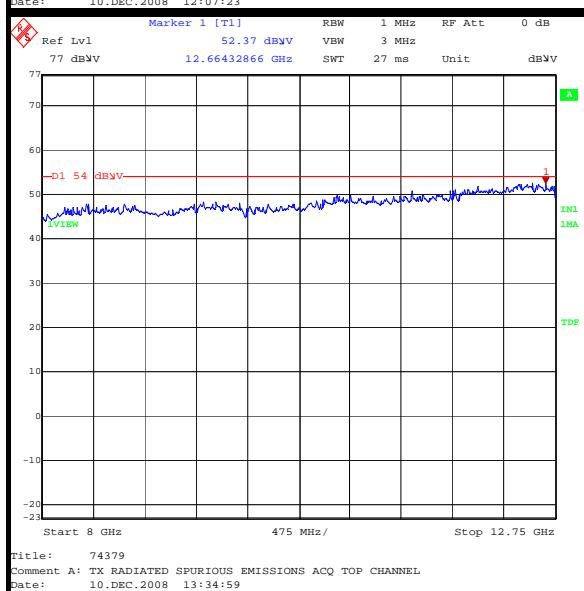
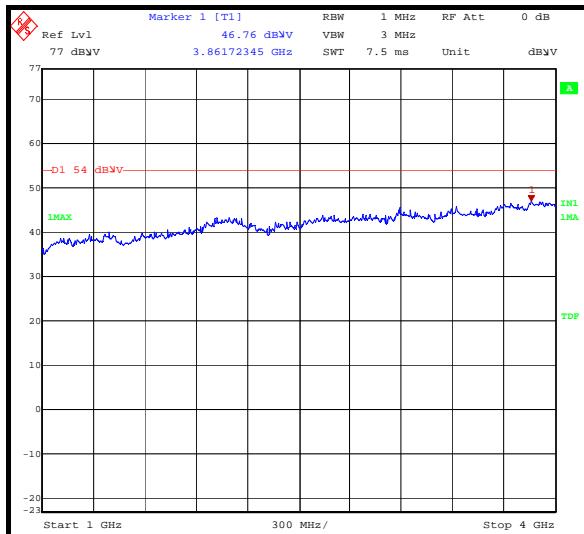
Highest Average Level: Top Channel

Frequency (GHz)	Antenna Polarity	Detector Level (dB μ V)	Transducer Factor (dB)	Actual Level (dB μ V/m)	Limit (dB μ V/m)	Margin (dB)	Result
5.867069	Horizontal	44.2	0.7	44.9	54.0	9.1	Complied

Note(s):

1. The carrier is shown at 4.985 GHz on the 4 to 8 GHz plot.
2. Pre-scans were performed on the top channel only.
3. Pre-scans and final measurements were made with the measurement antenna in both polarisations. Horizontal polarisation was found to show the highest levels and the results are recorded in the table above.

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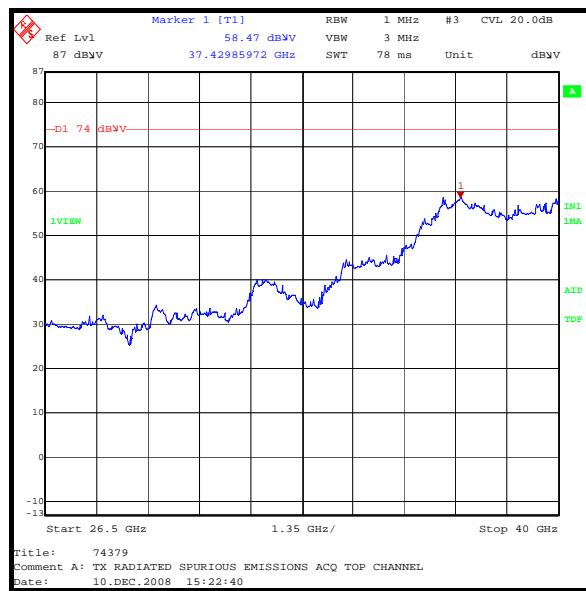
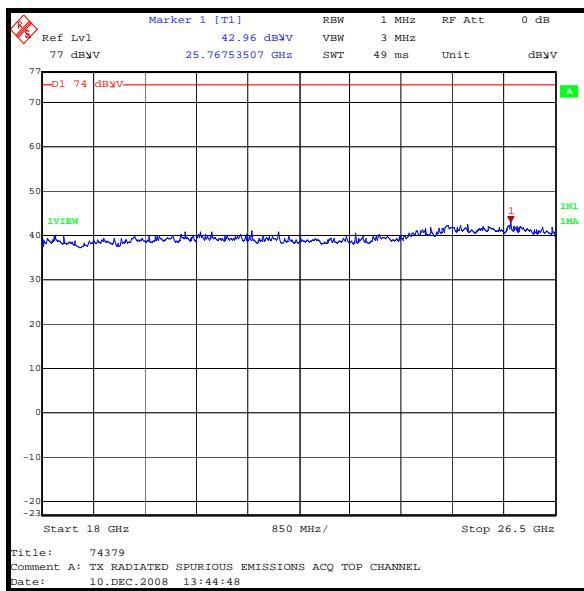
To: CFR 47 FCC Part 15: 2008 Section 15.109,
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Note: These plots are pre-scans and for indication purposes only. For final measurements, see accompanying tables.

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Receiver/Idle Mode Radiated Spurious Emissions (Continued)



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

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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
Radiated Spurious Emissions	1 GHz to 40 GHz	95%	±2.94 dB

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

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RFI No.	Instrument	Manufacturer	Type No.	Serial No.	Date Last Calibrated	Cal. Interval (Months)
A1534	Pre Amplifier	Hewlett Packard	8449B OPT H02	3008A00405	Calibrated before use	-
A1818	Antenna	EMCO	3115	00075692	25 Oct 2008	12
A203	Antenna	Flann Microwave Ltd	22240-20	343	21 Jul 2006	36
A366	Isolator	MRI	FRR-400	169	Calibration not required	-
A436	Antenna	Flann	20240-20	330	24 Apr 2006	36
C1164	Cable	Rosenberger Micro-Coax	FA210A101 5007070	43188-1	20 Apr 2008	12
C1298	10m Cable	Rosenberger	FA210A010 0005050	58941-02	Calibrated before use	-
K0002	Site Reference 4421	Rainford EMC	N/A	N/A	-	12
M1124	Spectrum Analyser	Rohde & Schwarz	ESIB26	100046K	19 Feb 2008	12
M1390	Harmonic Mixer	Farran Technology	WHMP 28	FTL1677B	Calibrated before use	-

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