
REPORT ON

Limited FCC CFR 47: Parts 15 B and C and
Industry Canada Radio Standard RSS-210 and RSS-Gen Testing
in Support of an Application for Grant of Equipment Authorisation
of a Bartec MC9060G ex and MC9060K ex

FCC ID: TBUMC9060K ex and TBUMC9060G ex and IC ID: 5736C-MC9060EX

Report No OR614655/01 Issue 2

November 2005



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IC ID: 5736C-MC9060EX

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DATED 27th October 2005

This report has been re-issued as Issue 2 to update additional information supplied by the customer

ENGINEERING STATEMENT

The measurements shown in this report were made in accordance with the procedures described on test pages. All reported testing was carried out on a sample equipment to demonstrate limited compliance with FCC CFR 47: Parts 15 B, C & E and Industry Canada Radio Standarda RSS-210 and RSS-Gen. The sample tested was found to comply with the requirements defined in the applied rules.

Test Engineers;


S Hartley


J Holcombe




A Guy

CONTENTS

Section		Page No
1	REPORT SUMMARY	
1.1	Status.....	4
1.2	Introduction.....	5
1.3	Product Information.....	6
1.4	Brief Summary of Results.....	8
1.5	Test Conditions.....	8
1.6	Deviations from the Standard.....	8
1.7	Modification Record.....	8
2	TEST DETAILS Part 15 B/RSS-Gen	
2.1	Spurious Radiated Emissions (Enclosure Port).....	10
2	TEST DETAILS Part 15 C/RSS-210 and RSS-Gen	
2.2	Maximum Peak Output Power (Radiated) (Enclosure Port).....	13
2.3	Spurious Radiated Emissions (Enclosure Port).....	15
3	TEST EQUIPMENT USED	
3.1	Table of Test Equipment Used.....	35
3.2	Measurement Uncertainty.....	36
4	ACCREDITATION, DISCLAIMERS AND COPYRIGHT	
4.1	Accreditation, Disclaimers and Copyright.....	38

SECTION 1

REPORT SUMMARY

Limited FCC CFR 47: Parts 15 B and C and
Industry Canada Radio Standards RSS-210 and RSS-Gen
Testing in Support of an Application for Grant of Equipment Authorisation
of a Bartec MC9060G ex and MC9060K ex

1.1 STATUS

Equipment Under Test	MC9060G ex and MC9060K ex
Objective	To undertake measurements to determine the Equipment Under Test's (EUT's) compliance with the specification.
Name and Address of Client	Bartec GmbH Team Automation Max-Eyth-Strasse 16 97980 Bad Mergentheim Germany
Type Number	MC9060G ex and MC9060K ex
Part Number	17-A1260GJ0HBAEA700, 17-A1260KH0HBAEA700
Serial Number	40A63C66W, 40A63C67G
Declared Variants	None
Test Specification/Issue/Date	FCC CFR 47: Part 15, Subparts B and C, October 2003 RSS-Gen, Issue 1, September 2005 and RSS-210 Issue 6, September 2005
Number of Items Tested	Two
Security Classification of EUT	Commercial in Confidence
Incoming Release Date	Declaration of Build Status 14 th September 2005
Disposal Reference Number Date	Held pending disposal Not Applicable Not Applicable
Order Number Date	005-759967 29 th August 2005
Start of Test	12 th September 2005
Finish of Test	24 th September 2005
Related Documents	ANSI C63.4: 2001 RSS-212: 1999

1.2 INTRODUCTION

The information contained within this report is intended to show limited verification of compliance of the Bartec GmbH Inc MC9060 to the requirements of FCC Specification Parts 15 B and C and Industry Canada Radio Specifications RSS-210 and RSS-Gen.

Testing was carried out in support of an application for Grant of Equipment Authorisation in the name of Bartec GmbH Inc.

Testing has been performed under the following site accreditations

FCC Accreditation
90987 Octagon House, Fareham Test Laboratory

Industry Canada Accreditation
IC5208 Octagon House, Fareham Test Laboratory

1.3 PRODUCT INFORMATION

1.3.1 Technical Description

The units supplied for testing were Bartec MC9060G ex and MC9060K ex Mobile Computers, which offer 2.4GHz 802.11b Wireless LAN and Bluetooth connectivity.

The terminal utilizes the approved Symbol 21-64436 Main Terminal Module with embedded RLAN Radio and the approved Symbol 21-64381 Bluetooth Module. FCC ID numbers are detailed in Section 1.2.1 "Declaration of Build Status".

Bartec have declared that the changes they have made to these units have not affected the radio parts either mechanically or electrically. Therefore limited testing has been performed to demonstrate continuing compliance.

1.3.2 Modes of Operation

Modes of operation of the EUT during testing were as follows:

Applicable testing was carried out with the EUT transmitting at maximum power or receiving as detailed in Section 1.3.3 "Test Configuration".

The Client has declared that the Symbol 21-64436 and the Symbol 21-64381 Modules are Co-Located, but that they are not capable of Simultaneously Transmitting.

1.3.3 Test Configuration

RLAN Mode

RLAN Transmitting on the following channels and frequencies;

Channel 1: 2412MHz

Channel 6: 2437MHz

Channel 11: 2462MHz

The Output Power level (controlled by application software) was set to maximum.

RLAN Receiving on the following channels and frequencies;

Channel 1: 2412MHz

Channel 6: 2437MHz

Channel 11: 2462MHz

Bluetooth Mode

Bluetooth Transmitting on the following channels and frequencies;

Channel 2: 2402MHz

Channel 41: 2442MHz

Channel 80: 2480MHz

The Output Power level (controlled by application software) was set to maximum.

Bluetooth Receiving on the following channels and frequencies;

Channel 2: 2402MHz

Channel 41: 2442MHz

Channel 80: 2480MHz

1.3 PRODUCT INFORMATION

1.3.4 DECLARATION OF BUILD STATUS

MAIN EUT		
MANUFACTURING DESCRIPTION	Mobile Computer	
MANUFACTURER	BARTEC GmbH	
TYPE	MC9060ex	
PART NUMBER	17-A126-0GJ0HBAEA700 , 17-A126-0KH0HBAEA700	
SERIAL NUMBER	40A63C66W, 40A63C67G, EU and EU	
HARDWARE VERSION	Rev 6	
COUNTRY OF ORIGIN	Germany	
FCC ID	TBUMC9060ex	
INDUSTRY CANADA ID	5736C-MC9060ex	
TECHNICAL DESCRIPTION	The unit supplied for testing is a BARTEC MC9060ex Mobile Computer certified for Class I Div 1 Groups C,D , which offers 2.4GHz 802.11b Wireless LAN and Bluetooth connectivity with the following options: Scanner; Colour (touch) display; 128/64 memory option; 28 Key Keyboard; PPC2003; Audio; Bluetooth	
BATTERY/POWER SUPPLY		
MANUFACTURING DESCRIPTION	Lithium Battery	
MANUFACTURER	BARTEC	
TYPE	N/A	
PART NUMBER	17-A1Z0-0002	
VOLTAGE	7.2V	
COUNTRY OF ORIGIN	Germany	
MODULES		
MANUFACTURING DESCRIPTION	Main Terminal Module with Embedded RLAN Radio	Bluetooth Module
MANUFACTURER	Symbol Technologies Inc	Symbol Technologies Inc
COUNTRY OF ORIGIN	USA	USA
TYPE	21-64436	21-64381
POWER	7 - 16V	3.3V
TRANSMITTER OPERATING RANGE	2400 – 2483.5MHz	2400 – 2483.5MHz
TRANSMITTER POWER	100mW (+20dBm)	10mW (+2dBm)
RECEIVER OPERATING RANGE	2400 – 2483.5MHz	2400 – 2483.5MHz
INTERMEDIATE FREQUENCIES	374MHz	Direct Conversion
EMISSION DESIGNATOR	11M0F1D	1M00F1D
DHSS/FHSS/COMBINED	DSSS	FHSS
FCC ID	H9P2164436	H9P2164381
INDUSTRY CANADA ID	1549D-2164436	1549D-2164381

Signature



Date
D of B S Serial No

11 October 2005
 OR614655-01

BABT formally certifies that the manufacturer's declaration as reproduced in this report is a true and accurate record of the original received from the applicant.

1.4 BRIEF SUMMARY OF RESULTS

This report relates only to the actual item/items tested.

A brief summary of the tests carried out is shown below.

Test	Spec Clause		Test Description	Result		Comments
	FCC	Industry Canada		RLAN	Bluetooth	
2.1	15.109(a) or (b)	RSS-Gen, 6.0	Spurious Radiated Emissions	Pass	Pass	See Section 2.1.5
2.2	15.247(b)(2)	RSS-210, A8.4	Maximum Peak Output Power (Radiated)	Pass	Pass	
2.3	15.247(c)	RSS-210, A8.5	Spurious Radiated Emissions	Pass	Pass	

1.5 TEST CONDITIONS

The EUT was set-up simulating a typical user installation and was tested in accordance with the applicable specification.

For all tests, the Bartec MC9060G ex and MC9060K ex were powered by their own internal batteries.

1.6 DEVIATIONS FROM THE STANDARD

Limited tests were applied in accordance with Bartec requirements.

1.7 MODIFICATION RECORD

Not Applicable.

SECTION 2

TEST DETAILS

Limited FCC CFR 47: Part 15 B and Industry Canada Radio Standard RSS-Gen
Testing in Support of an Application for Grant of Equipment Authorisation
of a Bartec MC9060

2.1 SPURIOUS RADIATED EMISSIONS – ENCLOSURE PORT

2.1.1 Specification Reference

FCC CFR 47: Part 15 Subpart B, Section 15.109(a) and
Industry Canada Radio Standard RSS-Gen, 6.0

2.1.2 Equipment Under Test

MC9060G ex and MC9060K ex

2.1.3 Date of Test

13th September 2005

2.1.4 Test Equipment Used

The major items of test equipment used for the above tests are identified as “Section 2.1” within the Test Equipment Used table shown in Section 3.1.

2.1.5 Test Procedure

Test Performed in accordance with ANSI C63.4 and RSS-212.

A preliminary profile of the Spurious Radiated Emissions was obtained by operating the EUT on a remotely controlled turntable within an anechoic chamber. Measurements of emissions from the EUT were obtained with the Measurement Antenna in both Horizontal and Vertical Polarisation. The profiling produced a list of the worst-case emissions together with the EUT azimuth and antenna polarisation.

Using the information from the preliminary profiling of the EUT. The list of emissions was then confirmed or updated under anechoic chamber (3 metres) conditions. Emission levels were maximised by adjusting the antenna height, antenna polarisation and turntable azimuth.

Emissions identified within the range 30MHz – 1GHz were then formally measured using a CISPR Quasi-Peak detector.

The measurements were performed at a 3m distance and the results extrapolated to 10m.

This test was performed in Idle mode only, therefore both RLAN and Bluetooth were in Idle mode at the same time.

2.1 SPURIOUS RADIATED EMISSIONS – ENCLOSURE PORT

2.1.6 Test Results

Equipment Designation: Unintentional Radiator.

The EUT met the requirements of FCC CFR 47: Part 15 Subpart B, Section 15.109 (a) and Industry Canada Radio Standard RSS-Gen, 6.0 for Spurious Radiated Emissions (30MHz – 1GHz).

Measurements were made with the EUT in Idle Mode.

MC9060G ex

The levels of the highest emissions measured in accordance with the specification are presented below: -

Emission Frequency MHz	Polarisation Horizontal/ Vertical	Height cm	Azimuth degree	Field Strength		Limit	
				dB μ V/m	μ V/m	dB μ V/m	μ V/m
285.99	Horizontal	100	190	30.7	34.3	46.0	200.0
388.51	Horizontal	100	331	27.7	24.3	46.0	200.0
395.18	Horizontal	100	328	27.5	23.7	46.0	200.0
407.21	Horizontal	100	335	27.8	24.5	46.0	200.0
527.30	Horizontal	182	200	34.3	51.9	46.0	200.0

MC9060K ex

The levels of the six highest emissions measured in accordance with the specification are presented below: -

Emission Frequency MHz	Polarisation Horizontal/ Vertical	Height cm	Azimuth degree	Field Strength		Limit	
				dB μ V/m	μ V/m	dB μ V/m	μ V/m
286.00	Horizontal	100	070	32.5	42.6	46.0	200.0
307.99	Horizontal	100	073	28.6	26.9	46.0	200.0
383.88	Horizontal	100	117	26.2	20.4	46.0	200.0
413.40	Horizontal	100	250	29.8	30.9	46.0	200.0
432.00	Horizontal	100	251	29.2	28.8	46.0	200.0
447.90	Horizontal	100	251	32.3	41.2	46.0	200.0

SECTION 2

TEST DETAILS

Limited FCC CFR 47: Part 15 C and
Industry Canada Radio Standards RSS-210 and RSS-Gen
Testing in Support of an Application for Grant of Equipment Authorisation
Of a a Bartec MC9060G ex and MC9060K ex

2.2 MAXIMUM PEAK OUTPUT POWER (Radiated Method) – ENCLOSURE PORT

2.2.1 Specification Reference

FCC CFR 47: Part 15 Subpart C, Section 15.247(b)(2) and Industry Canada Radio Standard RSS-210, A8.4

2.2.2 Equipment Under Test

MC9060G ex and MC9060K ex

2.2.3 Date of Test

14th September 2005

18th September 2005

20th September 2005

2.2.4 Test Equipment Used

The major items of test equipment used for the above tests are identified as “Section 2.2” within the Test Equipment Used table shown in Section 3.1.

2.2.5 Test Procedure

Test Performed in accordance with ANSI C63.4 and RSS-212.

The EUT contains an integral antenna and therefore the Maximum Peak Output Power was made using the EIRP method.

The Spectrum Analyser was tuned to the test frequency. The device Output Power setting was controlled as specified in the Product Information, Section 1.5 of this document. The device was then rotated through 360 degrees until the highest power level was observed in both horizontal and vertical polarisation. The device was then replaced with a substitution antenna, whose input signal level into the antenna was adjusted until the received level matched that of the previously detected emission.

2.2 MAXIMUM PEAK OUTPUT POWER (Radiated Method) – ENCLOSURE PORT

2.2.6 Test Results - continued

The EUT met the requirements of FCC CFR 47: Part 15 Subpart C, Section 15.247(b)(2) and Industry Canada Radio Standard RSS-210, A8.4 for Maximum Peak Output Power.

Measurements were made with the EUT in RLAN Mode (see Section 1.3.3 for details).

MC9060G ex

Frequency (MHz)	Result EIRP (dBm)	Result EIRP (mW)
2412	16.3	42.66
2437	15.8	38.02
2462	15.5	35.48
Limit	<+36dBm or <4W	

MC9060K ex

Frequency (MHz)	Result EIRP (dBm)	Result EIRP (mW)
2412	12.8	19.05
2437	15.0	31.62
2462	15.6	36.31
Limit	<+36dBm or <4W	

Measurements were made with the EUT in Bluetooth Mode (see Section 1.3.3 for details).

MC9060G ex

Frequency (MHz)	Result EIRP (dBm)	Result EIRP (mW)
2402	3.2	2.09
2442	2.3	1.70
2480	0.1	1.00
Limit	<+36dBm or <4W	

MC9060K ex

Frequency (MHz)	Result EIRP (dBm)	Result EIRP (mW)
2402	-4.5	0.35
2442	1.9	1.55
2480	-0.7	0.85
Limit	<+36dBm or <4W	

2.3 SPURIOUS RADIATED EMISSIONS – ENCLOSURE PORT

2.3.1 Specification Reference

FCC CFR 47: Part 15 Subpart C, Section 15.247(c) and Industry Canada Radio Standard RSS-210, A8.5

2.3.2 Equipment Under Test

MC9060G ex and MC9060K ex

2.3.3 Date of Test

12th September 2005 to 15th September 2005
18th September 2005
20th September 2005
24th September 2005

2.3.4 Test Equipment Used

The major items of test equipment used for the above tests are identified as “Section 2.3” within the Test Equipment Used table shown in Section 3.1.

2.3.5 Test Procedure

Test Performed in accordance with ANSI C63.4 and RSS-212.

FCC CFR 47: Part 15 Subpart C, Section 15.247(c) and Industry Canada Radio Standard RSS-210, A8.5, for Radiated Emissions also requires Sections 15.205, 15.209 and RSS-210, 2.7, Table 2 to be applied.

A preliminary profile of the Spurious Radiated Emissions was obtained by operating the EUT on a remotely controlled turntable within a semi-anechoic chamber. Measurements of emissions from the EUT were obtained with the Measurement Antenna in both Horizontal and Vertical Polarisations. The profiling produced a list of the worst-case emissions together with the EUT azimuth and antenna polarisation.

Using the information from the preliminary profiling of the EUT. The list of emissions was then confirmed or updated under Anechoic Chamber (3 metres) conditions. Emission levels were maximised by adjusting the antenna height, antenna polarisation and turntable azimuth.

Emissions identified within the range 30MHz – 1GHz were then formally measured using a CISPR Quasi-Peak detector.

Emissions identified within the range 1GHz – 26GHz were then formally measured using Peak and Average Detectors, as appropriate.

The measurements were performed at a 3m distance unless otherwise stated.



2.3 SPURIOUS RADIATED EMISSIONS - ENCLOSURE PORT

2.3.5 Test Procedure - continued

The limits for Spurious Emissions Outside the Restricted Bands have been measured and calculated as shown in the table below:

Test Mode	Carrier Frequency GHz	Carrier Field Strength dB μ V/m	Limit for Spurious Outside Restricted Band (Carrier F S -20dB) dB μ V/m
Mode 1 (RLAN), MC9060G ex	2412	102.5	82.5
Mode 1 (RLAN), MC9060G ex	2437	102.2	82.2
Mode 1 (RLAN), MC9060G ex	2462	101.7	81.7
Mode 1 (RLAN), MC9060K ex	2412	99.7	79.7
Mode 1 (RLAN), MC9060K ex	2437	99.9	79.9
Mode 1 (RLAN), MC9060K ex	2462	100.8	80.8
Mode 2 (Bluetooth), MC9060G ex	2402	101.9	81.9
Mode 2 (Bluetooth), MC9060G ex	2442	101.5	81.5
Mode 2 (Bluetooth), MC9060G ex	2480	100.3	80.3
Mode 2 (Bluetooth), MC9060K ex	2402	102.4	82.4
Mode 2 (Bluetooth), MC9060K ex	2442	101.1	81.1
Mode 2 (Bluetooth), MC9060K ex	2480	99.5	79.5

The limits for Spurious Emissions Inside the Restricted Bands are in accordance with 15.205 (a) & (b) and RSS-210, A8.5, which call up the limits in 15.209 (a) and RSS-210, 2.7, Table 2.

Frequency Range MHz	Field Strength μ V/m	Quasi Peak Field Strength dB μ V/m	
30-88	100	40.0	
88-216	150	43.5	
216-960	200	46.0	
960-1000	500	54.0	
Above 1000	500	Average Field Strength dB μ V/m	Peak Field Strength dB μ V/m
		54.0	74.0



2.3 SPURIOUS RADIATED EMISSIONS - ENCLOSURE PORT

2.3.5 Test Procedure - continued

In accordance with FCC Public Notice DA 00-705, Released 30th March 2000, Section 15.247(c) Spurious Radiated Emissions "If the dwell time per channel of the hopping signal is less than 100ms, then the reading obtained with the 10Hz VBW may be further adjusted by a "duty cycle correction factor", derived from $20\log(\text{dwell time}/100\text{ms})$, in an effort to demonstrate compliance with the 15.209 limit the following adjustment has been calculated for use with Average Measurements only;

Dwell Time = 5.81ms this is derived from;

Total slot time per time slot for DH5 packet $625\mu\text{s} \times 5 = 3.125\text{ms}$

Actual transmit time during this time slot is 2.905ms and the reply time slot after each DH5 packet is 625 μs .

Total time slot length per channel $3.125 + 0.625 = 3.75\text{ms}$.

Multiply Total time slot length per channel by 32 channels per hop sequence
 $32 \times 3.75 = 120\text{ms}$

It is therefore possible to have a maximum of two hop sequences in any given 100ms period, a single channel could occur twice within any 100ms time window. $2 \times 2.905 = 5.81\text{ms}$

Therefore; the Bluetooth Duty Cycle Correction Factor for the EUT is $20 \log (5.81/100) = -24.7\text{dB}$

2.3 SPURIOUS RADIATED EMISSIONS - ENCLOSURE PORT

2.3.5 Test Procedure - continued

30MHz - 1GHz Frequency Range

Equipment Designation: Intentional Radiator.

The EUT met the requirements of FCC CFR 47: Part 15 Subpart C, Section 15.247(c), 15.205 and 15.209 and Industry Canada Radio Standard RSS-210, 2.7, Table 2 for Radiated Emissions (30MHz – 1GHz).

Measurements were made with the EUT in RLAN Mode (see Section 1.3.3 for details).

MC9060G EX Tx on Bottom Channel (2412MHz)

Emission Frequency	Pol	Height	Azimuth	Field Strength at 3m		Specification Limit	
				MHz		cm	deg
526.9	Vertical	100	145	32.6	42.7	46.0	200.0
623.0	Vertical	100	000	34.5	53.1	46.0	200.0
630.3	Vertical	100	000	33.6	47.9	46.0	200.0
637.7	Vertical	100	000	33.5	47.3	46.0	200.0
645.1	Vertical	100	000	33.2	45.7	46.0	200.0
659.0	Vertical	100	000	32.1	40.3	46.0	200.0

MC9060G EX Tx on Middle Channel (2437MHz)

Emission Frequency	Pol	Height	Azimuth	Field Strength at 3m		Specification Limit	
				MHz		cm	deg
527.0	Vertical	100	145	32.3	41.2	46.0	200.0
623.0	Vertical	100	000	34.5	53.1	46.0	200.0
630.4	Vertical	100	000	34.2	51.3	46.0	200.0
637.7	Vertical	100	000	33.7	48.4	46.0	200.0
645.1	Vertical	100	000	33.0	44.7	46.0	200.0
659.8	Vertical	100	000	32.1	40.3	46.0	200.0

* Any emissions which are related to the EUT's transmitter circuitry, that are outside of the Restricted Band of Operation, table (15.205 and Table 2) are compared against the Carrier F S –20dB limit as shown in 2.3.5.

2.3 SPURIOUS RADIATED EMISSIONS - ENCLOSURE PORT

2.3.5 Test Procedure - continued

30MHz - 1GHz Frequency Range

MC9060G ex Tx on Top Channel (2462MHz)

Emission Frequency	Pol	Height	Azimuth	Field Strength at 3m		Specification Limit	
				MHz		dB μ V/m	μ V/m
526.80	Vertical	100	147	35.5	59.6	46.0	200.0
622.90	Vertical	100	000	34.1	50.7	46.0	200.0
630.10	Vertical	100	000	33.9	49.5	46.0	200.0
638.00	Vertical	100	000	33.3	46.2	46.0	200.0
645.10	Vertical	100	000	33.1	45.2	46.0	200.0
659.90	Vertical	100	000	32.8	43.7	46.0	200.0

* Any emissions which are related to the EUT's transmitter circuitry, that are outside of the Restricted Band of Operation, table (15.205 and Table 2) are compared against the Carrier F S -20 dB limit as shown in 2.3.5.

ABBREVIATIONS FOR ABOVE TABLES

Pol Polarisation

deg degree

2.3 SPURIOUS RADIATED EMISSIONS – ENCLOSURE PORT

2.3.5 Test Procedure - continued

30MHz - 1GHz Frequency Range

Equipment Designation: Intentional Radiator.

The EUT met the requirements of FCC CFR 47: Part 15 Subpart C, Section 15.247(c), 15.205 and 15.209 and Industry Canada Radio Standard RSS-210, 2.7, Table 2 for Radiated Emissions (30MHz – 1GHz).

Measurements were made with the EUT in RLAN Mode (see Section 1.3.3 for details).

MC9060K ex Tx on Bottom Channel (2412MHz)

Emission Frequency	Pol	Height	Azimuth	Field Strength at 3m		Specification Limit	
				MHz		cm	deg
426.10	Vertical	100	281	32.9	44.2	46.0	200.0
432.30	Vertical	100	259	33.8	49.0	46.0	200.0
438.50	Vertical	100	304	34.3	51.9	46.0	200.0
444.70	Vertical	100	274	34.4	52.5	46.0	200.0
457.10	Vertical	100	315	33.5	47.3	46.0	200.0
469.60	Vertical	100	314	33.0	44.7	46.0	200.0

MC9060K ex Tx on Middle Channel (2437MHz)

Emission Frequency	Pol	Height	Azimuth	Field Strength at 3m		Specification Limit	
				MHz		cm	deg
413.60	Vertical	100	312	31.6	38.0	46.0	200.0
419.80	Vertical	100	332	31.6	38.0	46.0	200.0
426.10	Vertical	100	293	32.5	42.2	46.0	200.0
438.50	Vertical	100	345	33.7	48.4	46.0	200.0
444.70	Vertical	100	318	34.4	52.5	46.0	200.0
457.10	Vertical	100	325	33.1	42.2	46.0	200.0

* Any emissions which are related to the EUT's transmitter circuitry, that are outside of the Restricted Band of Operation, table (15.205 and Table 2) are compared against the Carrier F S –20dB limit as shown in 2.3.5.

2.3 SPURIOUS RADIATED EMISSIONS - ENCLOSURE PORT

2.3.5 Test Procedure - continued

1GHz - 26GHz Frequency Range

Equipment Designation: Intentional Radiator.

The EUT met the requirements of FCC CFR 47: Part 15 Subpart C, Section 15.247(c), 15.205 and 15.209 and Industry Canada Radio Standard RSS-210, 2.7, Table 2 for Radiated Emissions (1GHz – 26GHz).

Measurements were made with the EUT in RLAN Mode (see Section 1.3.3 for details).

MC9060G ex Tx on Bottom Channel (2412MHz)

Frequency	Antenna		Turntable	Peak Field Strength	Peak Limit	Average Field Strength	Average Limit
	Pol	Height	Azimuth				
GHz		cm	deg	dB μ V/m	dB μ V/m	dB μ V/m	dB μ V/m
4.076	Vertical	100	236	48.9	74.0	44.1	54.0
4.824	Horizontal	100	223	53.8	74.0	39.2	54.0

EIRP Results are only taken for frequencies that fall Outside the Restricted Band in accordance 15.247(c.)

MC9060G exTx on Middle Channel (2437MHz)

Frequency	Antenna		Turntable	Peak Field Strength	Peak Limit	Average Field Strength	Average Limit
	Pol	Height	Azimuth				
GHz		cm	deg	dB μ V/m	dB μ V/m	dB μ V/m	dB μ V/m
4.126	Vertical	100	229	47.0	74.0	40.7	54.0
4.874	Horizontal	100	220	54.5	74.0	40.5	54.0
7.311	Vertical	100	231	56.9	74.0	45.0	54.0

EIRP Results are only taken for frequencies that fall Outside the Restricted Band in accordance 15.247(c.)

2.3 SPURIOUS RADIATED EMISSIONS - ENCLOSURE PORT

2.3.5 Test Procedure - continued

1GHz - 26GHz Frequency Range

MC9060G ex Tx on Top Channel (2462MHz)

Frequency	Antenna		Turntable	Peak Field Strength	Peak Limit	Average Field Strength	Average Limit
	Pol	Height	Azimuth				
GHz		cm	deg	dB μ V/m	dB μ V/m	dB μ V/m	dB μ V/m
4.176	Vertical	100	230	45.4	74.0	37.9	54.0
4.924	Horizontal	100	217	55.1	74.0	41.0	54.0
7.386	Vertical	100	213	58.6	74.0	46.1	54.0

EIRP Results are only taken for frequencies that fall Outside the Restricted Band in accordance 15.247(c.)

ABBREVIATIONS FOR ABOVE TABLES

Pol Polarisation deg degree

2.3 SPURIOUS RADIATED EMISSIONS - ENCLOSURE PORT

2.3.5 Test Procedure - continued

1GHz - 26GHz Frequency Range

Equipment Designation: Intentional Radiator.

The EUT met the requirements of FCC CFR 47: Part 15 Subpart C, Section 15.247(c), 15.205 and 15.209 and Industry Canada Radio Standard RSS-210, 2.7, Table 2 for Radiated Emissions (1GHz – 26GHz).

Measurements were made with the EUT in RLAN Mode (see Section 1.3.3 for details).

MC9060K ex Tx on Bottom Channel (2412MHz)

Frequency	Antenna		Turntable	Peak Field Strength	Peak Limit	Average Field Strength	Average Limit
	Pol	Height	Azimuth				
GHz		cm	deg	dB μ V/m	dB μ V/m	dB μ V/m	dB μ V/m
4.076	Vertical	100	240	49.4	74.0	44.9	54.0
7.236	Vertical	100	002	49.6	79.7	N/A	N/A

EIRP Results are only taken for frequencies that fall Outside the Restricted Band in accordance 15.247(c.)

MC9060K ex Tx on Middle Channel (2437MHz)

Frequency	Antenna		Turntable	Peak Field Strength	Peak Limit	Average Field Strength	Average Limit
	Pol	Height	Azimuth				
GHz		cm	deg	dB μ V/m	dB μ V/m	dB μ V/m	dB μ V/m
4.126	Vertical	100	236	50.3	74.0	43.6	54.0

EIRP Results are only taken for frequencies that fall Outside the Restricted Band in accordance 15.247(c.)



2.3 SPURIOUS RADIATED EMISSIONS - ENCLOSURE PORT

2.3.5 Test Procedure - continued

1GHz - 26GHz Frequency Range

MC9060K ex Tx on Top Channel (2462MHz)

Frequency	Antenna		Turntable	Peak Field Strength	Peak Limit	Average Field Strength	Average Limit
	Pol	Height	Azimuth				
GHz		cm	deg	dBµV/m	dBµV/m	dBµV/m	dBµV/m
4.176	Vertical	100	238	50.4	74.0	45.9	54.0

EIRP Results are only taken for frequencies that fall Outside the Restricted Band in accordance 15.247(c.)

ABBREVIATIONS FOR ABOVE TABLES

Pol Polarisation deg degree

2.3 SPURIOUS RADIATED EMISSIONS - ENCLOSURE PORT

2.3.5 Test Procedure - continued

30MHz - 1GHz Frequency Range

Equipment Designation: Intentional Radiator.

The EUT met the requirements of FCC CFR 47: Part 15 Subpart C, Section 15.247(c), 15.205 and 15.209 and Industry Canada Radio Standard RSS-210, 2.7, Table 2 for Radiated Emissions (30MHz – 1GHz).

Measurements were made with the EUT in Bluetooth Mode (see Section 1.3.3 for details).

MC9060G ex Tx on Bottom Channel (2402MHz)

Emission Frequency	Pol	Height	Azimuth	Field Strength at 3m		Specification Limit	
				MHz		cm	deg
239.11	Horizontal	100	351	25.3	18.4	46.0	200.0
394.68	Horizontal	100	360	26.3	20.65	46.0	200.0
527.15	Horizontal	192	151	36.7	68.4	46.0	200.0
575.07	Vertical	100	333	30.4	33.1	46.0	200.0
623.02	Vertical	100	000	33.7	48.4	46.0	200.0

MC9060G ex Tx on Middle Channel (2441MHz)

Emission Frequency	Pol	Height	Azimuth	Field Strength at 3m		Specification Limit	
				MHz		cm	deg
239.14	Horizontal	106	000	23.9	15.7	46.0	200.0
398.13	Horizontal	100	035	30.0	31.6	46.0	200.0
527.14	Horizontal	183	170	38.0	79.4	46.0	200.0
575.04	Vertical	100	000	30.6	33.9	46.0	200.0
623.00	Vertical	100	001	34.4	52.5	46.0	200.0

* Any emissions which are related to the EUT's transmitter circuitry, that are outside of the Restricted Band of Operation, table (15.205 and Table 2) are compared against the Carrier F S –20dB limit as shown in 2.3.5.

2.3 SPURIOUS RADIATED EMISSIONS - ENCLOSURE PORT

2.3.5 Test Procedure - continued

30MHz - 1GHz Frequency Range

MC9060G ex Tx on Top Channel (2480MHz)

Emission Frequency	Pol	Height	Azimuth	Field Strength at 3m		Specification Limit	
				MHz		dB μ V/m	μ V/m
239.16	Vertical	114	000	25.5	18.8	46.0	200.0
431.30	Vertical	100	174	30.0	31.6	46.0	200.0
527.15	Vertical	185	170	34.8	55.0	46.0	200.0
575.07	Vertical	100	000	29.5	29.9	46.0	200.0
622.99	Vertical	100	360	33.6	47.9	46.0	200.0

* Any emissions which are related to the EUT's transmitter circuitry, that are outside of the Restricted Band of Operation, table (15.205 and Table 2) are compared against the Carrier F S -20dB limit as shown in 2.3.5.

ABBREVIATIONS FOR ABOVE TABLES

Pol Polarisation deg degree

2.3 SPURIOUS RADIATED EMISSIONS - ENCLOSURE PORT

2.3.5 Test Procedure - continued

30MHz - 1GHz Frequency Range

Equipment Designation: Intentional Radiator.

The EUT met the requirements of FCC CFR 47: Part 15 Subpart C, Section 15.247(c), 15.205 and 15.209 and Industry Canada Radio Standard RSS-210, 2.7, Table 2 for Radiated Emissions (30MHz – 1GHz).

Measurements were made with the EUT in Bluetooth Mode (see Section 1.3.3 for details).

MC9060K ex Tx on Bottom Channel (2402MHz)

Emission Frequency	Pol	Height	Azimuth	Field Strength at 3m		Specification Limit	
				MHz		cm	deg
215.90	Horizontal	100	084	21.1	11.35	43.5	150.0
232.90	Horizontal	100	266	25.5	18.8	46.0	200.0
286.00	Horizontal	100	235	32.7	43.2	46.0	200.0
308.00	Horizontal	100	234	29.7	30.5	46.0	200.0
330.00	Horizontal	100	238	28.2	25.7	46.0	200.0
425.78	Horizontal	100	282	32.1	40.3	46.0	200.0

MC9060K ex Tx on Middle Channel (2441MHz)

Emission Frequency	Pol	Height	Azimuth	Field Strength at 3m		Specification Limit	
				MHz		cm	deg
215.90	Horizontal	100	090	20.6	10.7	43.5	150.0
232.80	Horizontal	100	262	25.4	18.6	46.0	200.0
286.00	Horizontal	100	234	32.2	40.7	46.0	200.0
308.00	Horizontal	100	232	29.8	30.9	46.0	200.0
330.00	Horizontal	100	235	27.8	24.5	46.0	200.0
398.13	Horizontal	100	099	33.5	47.3	46.0	200.0

* Any emissions which are related to the EUT's transmitter circuitry, that are outside of the Restricted Band of Operation, table (15.205 and Table 2) are compared against the Carrier F S –20dB limit as shown in 2.3.5.

2.3 SPURIOUS RADIATED EMISSIONS - ENCLOSURE PORT

2.3.5 Test Procedure - continued

30MHz - 1GHz Frequency Range

MC9060K EX Tx on Top Channel (2480MHz)

Emission Frequency MHz	Pol	Height cm	Azimuth deg	Field Strength at 3m		Specification Limit	
				dBμV/m	μV/m	dBμV/m	μV/m
216.00	Horizontal	100	087	21.9	12.4	43.5	150.0
232.90	Horizontal	100	261	25.0	17.8	46.0	200.0
286.00	Horizontal	100	235	32.7	43.2	46.0	200.0
308.00	Horizontal	100	237	29.9	32.3	46.0	200.0
330.00	Horizontal	100	233	27.9	24.8	46.0	200.0
398.32	Horizontal	100	099	33.0	44.7	46.0	200.0

* Any emissions which are related to the EUT's transmitter circuitry, that are outside of the Restricted Band of Operation, table (15.205 and Table 2) are compared against the Carrier F S -20dB limit as shown in 2.3.5.

ABBREVIATIONS FOR ABOVE TABLES

Pol Polarisation deg degree

2.3 SPURIOUS RADIATED EMISSIONS - ENCLOSURE PORT

2.3.5 Test Procedure - continued

1GHz - 26GHz Frequency Range

Equipment Designation: Intentional Radiator.

The EUT met the requirements of FCC CFR 47: Part 15 Subpart C, Section 15.247(c), 15.205 and 15.209 and Industry Canada Radio Standard RSS-210, 2.7, Table 2 for Radiated Emissions (1GHz – 26GHz).

Measurements were made with the EUT in Bluetooth Mode (see Section 1.3.3 for details).

MC9060G ex Tx on Bottom Channel (2402MHz)

Frequency	Antenna		Turntable	Peak Field Strength	Peak Limit	Average Field Strength	Average Limit
	Pol	Height	Azimuth				
GHz		cm	deg	dB μ V/m	dB μ V/m	dB μ V/m	dB μ V/m
4.804	Horizontal	130	231	72.8	74.0	38.6*	54.0
7.205	Vertical	100	348	58.4	81.9	N/A	N/A

EIRP Results are only taken for frequencies that fall Outside the Restricted Band in accordance 15.247(c.)

MC9060G ex Tx on Middle Channel (2441MHz)

Frequency	Antenna		Turntable	Peak Field Strength	Peak Limit	Average Field Strength	Average Limit
	Pol	Height	Azimuth				
GHz		cm	deg	dB μ V/m	dB μ V/m	dB μ V/m	dB μ V/m
4.885	Horizontal	100	234	71.0	74.0	37.1*	54.0
7.328	Horizontal	132	207	58.1	74.0	33.4*	54.0

EIRP Results are only taken for frequencies that fall Outside the Restricted Band in accordance 15.247(c.)

Note: The Measurements in the above tables marked N/A are Not Applicable because the frequency does not fall within the Restricted Band (15.205 and Table 2) and hence Average Measurements are not required.

* Note these results have been corrected using the Bluetooth Duty Cycle Correction Factor for the EUT, as calculated on page 18 of this report.

2.3 SPURIOUS RADIATED EMISSIONS - ENCLOSURE PORT

2.3.5 Test Procedure - continued

1GHz - 26GHz Frequency Range

MC9060G ex Tx on Top Channel (2480MHz)

Frequency	Antenna		Turntable	Peak Field Strength	Peak Limit	Average Field Strength	Average Limit
	Pol	Height	Azimuth				
GHz		cm	deg	dB μ V/m	dB μ V/m	dB μ V/m	dB μ V/m
4.960	Horizontal	112	235	69.0	74.0	35.5*	54.0
7.440	Horizontal	121	216	57.5	74.0	24.6*	54.0

EIRP Results are only taken for frequencies that fall Outside the Restricted Band in accordance 15.247(c.)

Note: The Measurements in the above tables marked N/A are Not Applicable because the frequency does not fall within the Restricted Band (15.205 and Table 2) and hence Average Measurements are not required.

* Note these results have been corrected using the Bluetooth Duty Cycle Correction Factor for the EUT, as calculated on page 18 of this report.

ABBREVIATIONS FOR ABOVE TABLES

Pol Polarisation

deg degree

2.3 SPURIOUS RADIATED EMISSIONS - ENCLOSURE PORT

2.3.5 Test Procedure - continued

1GHz - 26GHz Frequency Range

Equipment Designation: Intentional Radiator.

The EUT met the requirements of FCC CFR 47: Part 15 Subpart C, Section 15.247(c), 15.205 and 15.209 and Industry Canada Radio Standard RSS-210, 2.7, Table 2 for Radiated Emissions (1GHz – 26GHz).

Measurements were made with the EUT in Bluetooth Mode (see Section 1.3.3 for details).

MC9060K ex Tx on Bottom Channel (2402MHz)

Frequency	Antenna		Turntable	Peak Field Strength	Peak Limit	Average Field Strength	Average Limit
	Pol	Height	Azimuth				
GHz		cm	deg	dB μ V/m	dB μ V/m	dB μ V/m	dB μ V/m
4.804	Horizontal	144	136	65.1	74.0	32.3*	54.0

EIRP Results are only taken for frequencies that fall Outside the Restricted Band in accordance 15.247(c.)

MC9060K ex Tx on Middle Channel (2441MHz)

Frequency	Antenna		Turntable	Peak Field Strength	Peak Limit	Average Field Strength	Average Limit
	Pol	Height	Azimuth				
GHz		cm	deg	dB μ V/m	dB μ V/m	dB μ V/m	dB μ V/m
4.886	Horizontal	140	138	64.7	74.0	32.0*	54.0

EIRP Results are only taken for frequencies that fall Outside the Restricted Band in accordance 15.247(c.)

Note: The Measurements in the above tables marked N/A are Not Applicable because the frequency does not fall within the Restricted Band (15.205 and Table 2) and hence Average Measurements are not required.

* Note these results have been corrected using the Bluetooth Duty Cycle Correction Factor for the EUT, as calculated on page 18 of this report.

SECTION 3

TEST EQUIPMENT USED

3.1 TEST EQUIPMENT USED

List of absolute measuring and other principal items of test equipment.

Instrument	Manufacturer	Type No	EMC / INV No	Cal. Due
Section 2.1				
Spectrum Analyser	Hewlett Packard	8542E	2286	08/01/2006
Bilog Antenna	Schaffner	CBL6143	2965	12/11/2005
Emi Receiver	Rohde & Schwarz	ESIB 40	3138	11/08/2006
Amplifier	Miteq Corp	AMF-3d-001080-18-13P	2457	TU
Amplifier	Avantek	AWT-18036	1081	TU
Amplifier	Avantek	AMT-26177-33	2072	TU
DRG Antenna	Emco	3115	2297	01/07/2006
DRG Antenna	Emco	3115	2397	01/07/2006
DRG Horn Antenna	Link Microtek Ltd	AM180HA-K-TU2	2945	24/06/2006
4GHz High Pass Filter	Sematron	F-100-4000-5-R	3083	TU
DRG Antenna	Emco	3115	500	29/07/2006
Peak Power Analyser	Hewlett Packard	8990A	1670	24/09/2005
3GHz High Pass Filter	Rlc Electronics	F-100-3000-5-R	4969	TU
AC Power Supply	Various	ELGAR	2497	TU

TU Traceability Unscheduled

3.2 MEASUREMENT UNCERTAINTY

For a 95% confidence level, the measurement uncertainties for defined systems are: -

Test Discipline	Frequency / Parameter	MU
Radiated Emissions, Bilog Antenna, AOATS	30MHz to 1GHz Amplitude	5.1dB*
Radiated Emissions, Horn Antenna, AOATS	1GHz to 40GHz Amplitude	6.3dB*

Worst case error for both Time and Frequency measurement 12 parts in 10^6 .

- * In accordance with CISPR 16-4
- † In accordance with UKAS Lab 34

SECTION 4

ACCREDITATION, DISCLAIMERS AND COPYRIGHT

4.1 ACCREDITATION, DISCLAIMERS AND COPYRIGHT



This report relates only to the actual item/items tested.

Our UKAS Accreditation does not cover opinions and interpretations and any expressed are outside the scope of our UKAS Accreditation.

Results of tests not covered by our UKAS Accreditation Schedule are marked NUA
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