

TEST REPORT FROM RFI GLOBAL SERVICES LTD

Test of: CCB00-010BT



FCC ID: LW5BT010M

IC Certification Number: 3114A-BT-010M

To: FCC Part 15.247(d), FCC 15.209(a), RSS-Gen 4.9 and RSS-210
A8.5

Test Report Serial No:
RFI-RPT-RP83519JD21B V2.0

Version 2.0 Supersedes All Previous Versions

This Test Report Is Issued Under The Authority Of John Newell, Group Quality Manager:		 pp
Checked By:	Ian Watch	
Signature:		
Date of Issue:	26 March 2012	

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1. Customer Information




Company Name:	Honeywell International Inc
Address:	Honeywell Scanning and Mobility 9680 Old Bailes Road Fort Mill SC 29707 United States

2. Summary of Testing

2.1. General Information

Specification Reference:	47CFR15.247
Specification Title:	Code of Federal Regulations Volume 47 (Telecommunications) 2011: Part 15 Subpart C (Intentional Radiators) - Section 15.247
Specification Reference:	47CFR15.209
Specification Title:	Code of Federal Regulations Volume 47 (Telecommunications) 2011: Part 15 Subpart C (Intentional Radiators) – Section 15.209
Specification Reference:	RSS-Gen Issue 3 December 2010
Specification Title:	General Requirements and Information for the Certification of Radio Apparatus
Specification Reference:	RSS-210 Issue 8 December 2010
Specification Title:	Licence-exempt Radio Apparatus (All Frequency Bands): Category I Equipment.
Site Registration:	FCC: 209735; Industry Canada: 3245B-2
Location of Testing:	RFI Global Services Ltd, Wade Road, Basingstoke, Hampshire, RG24 8AH.
Test Dates:	05 March 2012 to 12 March 2012

2.2. Summary of Test Results

FCC Reference (47CFR)	IC Reference	Measurement	Result
Part 15.247(d)/ 15.209(a)	RSS-Gen 4.9 RSS-210 A8.5	Transmitter Radiated Emissions	
Key to Results  = Complied  = Did not comply			

2.3. Methods and Procedures

Reference:	ANSI C63.4 (2009)
Title:	American National Standard for Methods of Measurement of Radio-Noise Emissions from Low-Voltage Electrical and Electronic Equipment in the Range of 9 kHz to 40 GHz
Reference:	ANSI C63.10 (2009)
Title:	American National Standard for Testing Unlicensed Wireless Devices

2.4. Deviations from the Test Specification

For the measurements contained within this test report, there were no deviations from, additions to, or exclusions from the test specification identified above.

3. Equipment Under Test (EUT)

3.1. Identification of Equipment Under Test (EUT)

Brand Name:	Honeywell
Model Name or Number:	CCB00-010BT
Serial Number:	2T11511761
Hardware Version Number:	50105627-001
Software Version Number:	AK000032DAA
FCC ID:	LW5BT010M
IC Certification Number:	3114A-BT-010M

Description:	120 VAC to 5VDC Power supply
Brand Name:	Intertek
Model Name or Number:	3A-052WP05
Serial Number:	Not Stated

3.2. Description of EUT

The equipment under test was a Charge-Communication Base. The EUT was powered via a 120 VAC to 5 VDC power supply.

3.3. Modifications Incorporated in the EUT

The customer modified the EUT prior to testing. An external PCB was fitted in order to put the EUT into test mode. This allowed RFI to measure the unit on different channels and modulation schemes.

3.4. Additional Information Related to Testing

Tested Technology:	Bluetooth		
Power Supply Requirement:	Nominal	120 V	
Type of Unit:	Transceiver		
Channel Spacing:	1 MHz		
Mode:	Basic Rate	Enhanced Data Rate	
Modulation:	GFSK	π/4-DQPSK	8DQPSK
Packet Type: (Maximum Payload)	DH5	2DH5	3DH5
Data Rate (Mbit/s):	1	2	3
Transmit Frequency Range:	2402 MHz to 2480 MHz		
Transmit Channels Tested:	Channel ID	Channel Number	Channel Frequency (MHz)
	Bottom	0	2402
	Middle	39	2441
	Top	78	2480
Receive Frequency Range:	2402 MHz to 2480 MHz		
Receive Channels Tested:	Channel ID	Channel Number	Channel Frequency (MHz)
	Bottom	0	2402
	Middle	39	2441
	Top	78	2480

3.5. Support Equipment

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

Description:	Laptop
Brand Name:	Dell
Model Name or Number:	D600
Serial Number:	RFI Asset No. PC401NT

Description:	Serial to RJ45
Brand Name:	Not Stated
Model Name or Number:	Not Stated
Serial Number:	Not Stated

Support Equipment (continued)

Description:	Ribbon cable
Brand Name:	Not Stated
Model Name or Number:	Not Stated
Serial Number:	Not Stated

Description:	120 VAC to 5VDC Power supply
Brand Name:	Intertek
Model Name or Number:	3A-052WP05
Serial Number:	Not Stated

4. Operation and Monitoring of the EUT during Testing

4.1. Operating Modes

The EUT was tested in the following operating mode(s):

- Transmit mode with Basic Rate (DH5 packets) or EDR (2DH5 or 3DH5 packets) as required.

4.2. Configuration and Peripherals

The EUT was tested in the following configuration(s):

- Transmit tests: Connected via a radio link to a Bluetooth tester in order to place the EUT into Bluetooth test mode, An RFI laptop with the Client's bespoke application controlled the modified EUT. Two cables were connected between the laptop and the external PCB of the modified EUT.
- Transmit tests: Connected via a radio link to a Bluetooth tester in order to place the EUT into Bluetooth test mode. The laptop PC with the Client's bespoke application was used to place the EUT into Bluetooth test mode
- Both EDR/Basic rate modes were compared and tests were performed with the mode that presented the worst case result.

5. Measurements, Examinations and Derived Results

5.1. General Comments

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 6. Measurement Uncertainty* for details.

5.2. Test Results

5.2.1. Transmitter Radiated Emissions

Test Summary:

Test Engineer:	Andrew Edwards	Test Date:	12 March 2012
Test Sample Serial No:	2T11511761		

FCC Part:	15.247(d) & 15.209(a)
Test Method Used:	As detailed in ANSI C63.10 Sections 6.3 and 6.5 referencing ANSI C63.4
Frequency Range	30 MHz to 1000 MHz

Environmental Conditions:

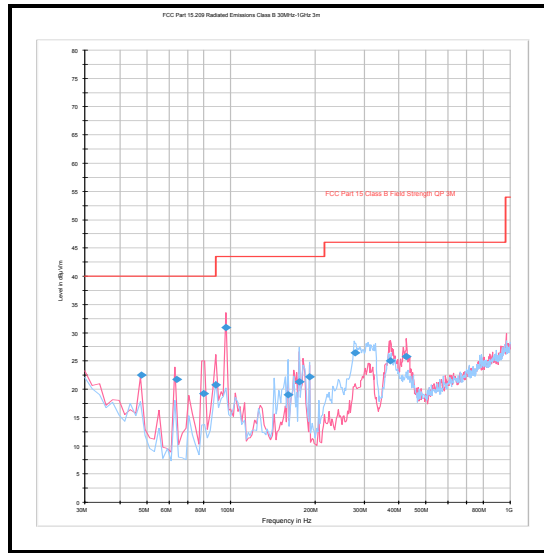
Temperature (°C):	25
Relative Humidity (%):	31

Results: Quasi-Peak DH5

Frequency (MHz)	Antenna Polarity	Level (dB μ V/m)	Limit (dB μ V/m)	Margin (dB)	Result
47.971	Vertical	22.5	40.0	17.5	Complied
64.003	Vertical	21.7	40.0	18.3	Complied
80.064	Vertical	19.2	40.0	20.8	Complied
88.013	Vertical	20.8	43.5	22.7	Complied
96.000	Vertical	30.9	43.5	12.6	Complied
175.988	Horizontal	21.3	43.5	22.2	Complied
192.011	Horizontal	22.2	43.5	21.3	Complied
278.100	Horizontal	26.4	46.0	19.6	Complied
373.090	Vertical	25.0	46.0	21.0	Complied
424.460	Vertical	25.8	46.0	20.2	Complied

Note(s):

1. The final measured value, for the given emission, in the table above incorporates the calibrated antenna factor and cable loss
2. The preliminary scans showed similar emission levels below 1 GHz, for each channel of operation. Therefore final radiated emissions measurements were performed with the EUT set to the top channel only.
3. All other emissions shown on the pre-scan plot were investigated and found to be ambient or >20 dB below the applicable limit or below the measurement system noise floor.
4. Measurements below 1 GHz were performed in a semi-anechoic chamber (RFI Asset Number K0001) at a distance of 3 metres. The EUT was placed at a height of 80 cm above the reference ground plane in the centre of the chamber turntable. Maximum emission levels were determined by height searching the measurement antenna over the range 1 metre to 4 metres.

Transmitter Radiated Emissions (continued)

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

Transmitter Radiated Emissions (continued)**Test Summary:**

Test Engineer:	Andrew Edwards	Test Date:	05 March 2012
Test Sample Serial No:	2T11511761		

FCC Part:	15.247(d) & 15.209(a)
Test Method Used:	As detailed in ANSI C63.10 Sections 6.3 and 6.6 referencing ANSI C63.4
Frequency Range	1 GHz to 26.5 GHz

Environmental Conditions:

Temperature (°C):	21
Relative Humidity (%):	23

Results: Peak Bottom Channel DH5

Frequency (MHz)	Antenna Polarity	Level (dB μ V/m)	Limit (dB μ V/m)	Margin (dB)	Result
1601.904	Vertical	51.7	74.0	22.3	Complied
4803.700	Vertical	62.8	74.0	11.2	Complied
7206.118	Vertical	47.5	74.0	26.5	Complied

Results: Average Bottom Channel DH5

Frequency (MHz)	Antenna Polarity	Level (dB μ V/m)	Limit (dB μ V/m)	Margin (dB)	Result
1601.904	vertical	46.3	54.0	7.7	Complied
4803.700	Vertical	53.8	54.0	0.2	Complied
7206.118	Vertical	36.7	54.0	17.3	Complied

Results: Peak Middle Channel DH5

Frequency (MHz)	Antenna Polarity	Level (dB μ V/m)	Limit (dB μ V/m)	Margin (dB)	Result
1627.978	Vertical	46.9	66.9*	20.0	Complied
4881.707	Vertical	61.3	74.0	12.7	Complied
7323.018	Vertical	47.0	74.0	27.0	Complied

Results: Average Middle Channel DH5

Frequency (MHz)	Antenna Polarity	Level (dB μ V/m)	Limit (dB μ V/m)	Margin (dB)	Result
4881.707	Vertical	52.5	54.0	1.5	Complied
7323.018	Vertical	37.0	54.0	17.0	Complied

Transmitter Radiated Emissions (continued)**Results: Peak Top Channel DH5**

Frequency (MHz)	Antenna Polarity	Level (dB μ V/m)	Limit (dB μ V/m)	Margin (dB)	Result
1654.031	Horizontal	44.7	67.2*	22.5	Complied
4959.724	Vertical	57.4	74.0	16.6	Complied
7440.486	Horizontal	46.5	74.0	27.5	Complied

Results: Average Top Channel DH5

Frequency (MHz)	Antenna Polarity	Level (dB μ V/m)	Limit (dB μ V/m)	Margin (dB)	Result
4959.724	Vertical	49.0	54.0	5.0	Complied
7440.486	Horizontal	35.6	54.0	18.4	Complied

Results: Peak Hopping Mode DH5

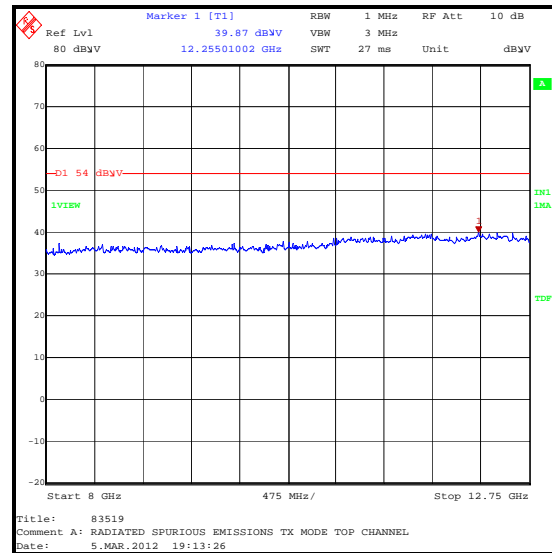
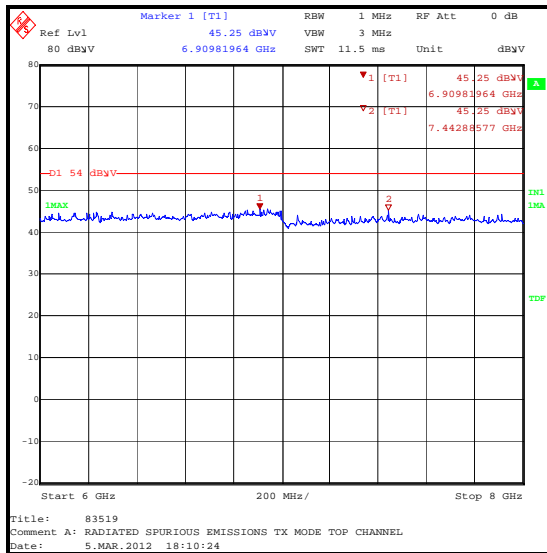
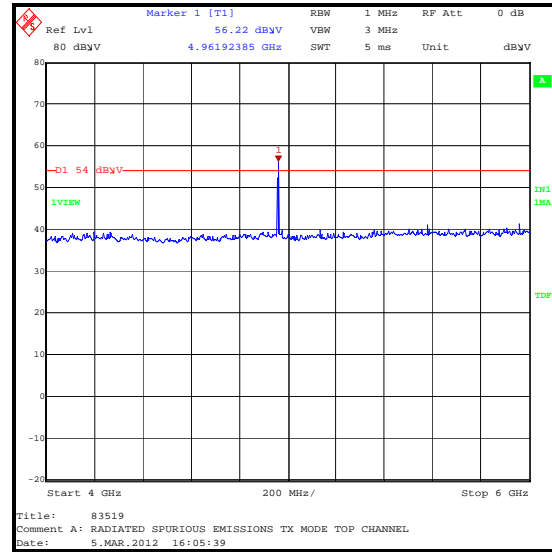
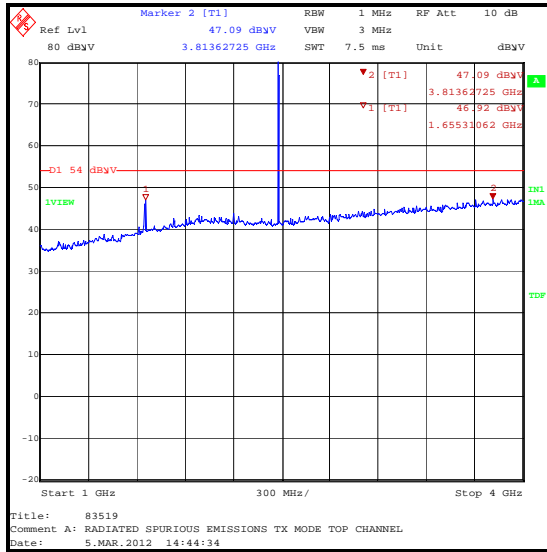
Frequency (MHz)	Antenna Polarity	Level (dB μ V/m)	Limit (dB μ V/m)	Margin (dB)	Result
1599.323	Horizontal	51.1	74.0	22.9	Complied
4805.703	Vertical	62.3	74.0	11.7	Complied

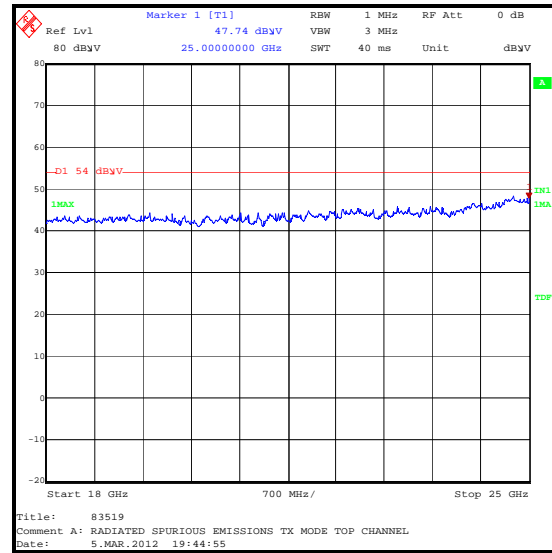
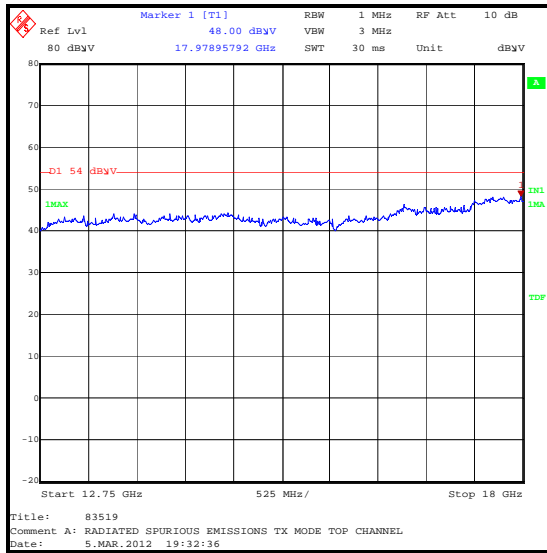
Results: Average Hopping Mode DH5

Frequency (MHz)	Antenna Polarity	Level (dB μ V/m)	Limit (dB μ V/m)	Margin (dB)	Result
1599.323	Horizontal	46.9	54.0	7.1	Complied
4805.703	Vertical	33.3	54.0	20.7	Complied

Note(s):

1. The final measured value, for the given emission, in the table above incorporates the calibrated antenna factor and cable loss
2. The emission shown on the 1 GHz to 4 GHz plot is the EUT fundamental at 2480 MHz
3. All other emissions shown on the pre-scan plot were investigated and found to be ambient or >20 dB below the applicable limit or below the measurement system noise floor.
4. Pre-scans above 1 GHz were performed in a fully anechoic chamber (RFI Asset Number K0002) at a distance of 3 metres. The EUT was placed at a height of 1.5 metres above the test chamber floor in the centre of the chamber turntable. All measurement antennas were placed at a fixed height of 1.5 metres above the test chamber floor, in line with the EUT. Final measurements above 1 GHz were performed in a semi-anechoic chamber (RFI Asset Number K0001) at a distance of 3 metres. The EUT was placed at a height of 80 cm above the reference ground plane in the centre of the chamber turntable. Maximum emission levels were determined by height searching the measurement antenna over the range 1 metre to 4 metres.
5. * -20 dBc limit

Transmitter Radiated Emissions (continued)

Transmitter Radiated Emissions (continued)

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

6. 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 measured (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	30 MHz to 26.5 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.

Appendix 1. Test Equipment Used

RFI No.	Instrument	Manufacturer	Type No.	Serial No.	Date Calibration Due	Cal. Interval (months)
A1534	Pre Amplifier	Hewlett Packard	8449B	3008A00405	09 Oct 2012	12
A1818	Antenna	EMCO	3115	00075692	09 Oct 2012	12
A1834	Attenuator	Hewlett Packard	8491B	10444	29 Jan 2013	12
A1975	High Pass Filter	AtlanTecRF	AFH-03000	090424010	28 Feb 2012	12
A253	Antenna	Flann Microwave	12240-20	128	09 Oct 2012	12
A254	Antenna	Flann Microwave	14240-20	139	09 Oct 2012	12
A255	Antenna	Flann Microwave	16240-20	519	09 Oct 2012	12
A256	Antenna	Flann Microwave	18240-20	400	09 Oct 2012	12
A436	Antenna	Flann	20240-20	330	09 Oct 2012	12
A553	Antenna	Chase	CBL6111A	1593	15 Feb 2013	12
K0001	5m Semi-Anechoic Chamber	Rainford EMC	N/A	N/A	29 May 2012	12
K0002	3m RSE Chamber	Rainford EMC	N/A	N/A	09 Oct 2012	12
M1124	Spectrum Analyser	Rohde & Schwarz	ESI26	100046K	29 Jun 2012	12
M1273	Test Receiver	Rohde & Schwarz	ESIB 26	100275	03 Feb 2013	12

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