

TEST REPORT FROM RFI GLOBAL SERVICES LTD

Test of: Tempus IC 00-1001

Contains FCC IDs: ROSTEMPUSIC-2, P5T-WL54SDIO & ROSTEMPUSIC-BT

To: FCC Parts 15.209, 15.247, 22.917 & 24.238

Test Report Serial No:
RFI-RPT-RP87862JD02A V4.0

Version 4.0 Supersedes All Previous Versions

This Test Report Is Issued Under The Authority
Of John Newell, Group Quality Manager:

pp



Checked By:	Steven White
Signature:	
Date of Issue:	13 April 2013

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1. Customer Information

Company Name:	Remote Diagnostic Technologies Ltd
Address:	The Old Coach House The Avenue Farleigh Wallop Hampshire RG25 2HT United Kingdom

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:	47CFR22
Specification Title:	Code of Federal Regulations Volume 47 (Telecommunications) 2011: Part 22 Subpart H (Public Mobile Services)
Specification Reference:	47CFR24
Specification Title:	Code of Federal Regulations Volume 47 (Telecommunications) 2011: Part 24 Subpart E (Personal Communication Services)
Site Registration:	209735
Location of Testing:	RFI Global Services Ltd, Wade Road, Basingstoke, Hampshire, RG24 8AH
Test Dates:	7 June 2012 to 12 June 2012

2.2. Summary of Test Results

FCC Reference (47CFR)	Measurement	Result
Transmit Mode; Wi-Fi, Bluetooth & Cellular (850) Band		
15.209/15.24/22.917	Transmitter Out of Band Radiated Emissions	
Transmit Mode; Wi-Fi, Bluetooth & Cellular (1900) Band		
15.209/15.247/24.238	Transmitter Out of Band 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

Transmitter emissions was performed with the device's Wi-Fi & Bluetooth transmitters operating simultaneously with its Cellular (850 band) transmitter and then with its PCS (1900 band) transmitter, in order to determine the intermodulation product emissions levels of these transmitters which are co-located within the EUT.

3. Equipment Under Test (EUT)

3.1. Identification of Equipment Under Test (EUT)

Brand Name:	Tempus IC
Model Name or Number:	00-1001
IMEI:	353681045991114
Hardware Version Number:	DMRI issue 59 (with AmbiCom WiFi card)
Software Version Number:	V 02.07.005

Brand Name:	Cincon Electronics
Description:	AC Charger
Model Name or Number:	TR60M12

3.2. Description of EUT

The equipment under test was a Patient Monitor, including MC55i GSM, *Bluetooth* and WLAN modules, which could transmit simultaneously.

A 120 VAC 60 Hz to 12 VDC power supply was used to provide the power.

The EUT contains three pre-approved modules with the following FCC IDs:

GSM module: ROSTEMPUSIC-2

WLAN module: P5T-WL54SDIO

Bluetooth module: ROSTEMPUSIC-BT.

3.3. Modifications Incorporated in the EUT

No modifications were applied to the EUT during testing.

3.4. Additional Information Related to Testing

Technology Tested:	GSM 850		
Modulation Type:	GMSK		
Technology Tested:	GSM850		
Maximum Output Power (EIRP):	Circuit switched	24.6 dBm	
Transmit Frequency Range:	824 to 849 MHz		
Transmit Channels Tested:	Channel ID	Channel Number	Channel Frequency (MHz)
	Middle	190	836.6
Technology Tested:	PCS 1900		
Maximum Output Power (EIRP):	Circuit switched	19.4 dBm	
Transmit Frequency Range:	1850 to 1910 MHz		
Transmit Channels Tested:	Channel ID	Channel Number	Channel Frequency (MHz)
	Bottom	660	1879.8

Technology Tested:	Bluetooth		
Mode:	Basic Rate		
Maximum Output Power (EIRP):	12.9 dBm		
Transmit Frequency Range:	2400 to 2483.5 MHz		
Transmit Channels Tested:	Channel ID	Channel Number	Channel Frequency (MHz)
	Top	78	2480

Technology Tested:	WiFi		
Mode:	802.11b		
Data Rates:	1 Mbps		
Maximum Output Power (EIRP):	7.8 dBm		
Transmit Frequency Range:	2412 to 2462 MHz		
Transmit Channels Tested:	Channel ID	Channel Number	Channel Frequency (MHz)
	Bottom	1	2412

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:	Latitude D610
Serial Number:	None Stated

Description:	USB Keyboard
Brand Name:	None Stated
Model Name or Number:	None Stated
Serial Number:	None Stated

Description:	USB Mouse
Brand Name:	None Stated
Model Name or Number:	None Stated
Serial Number:	None Stated

4. Operation and Monitoring of the EUT during Testing

4.1. Operating Modes

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

- Cellular GSM, Bluetooth and WLAN Transmitters configured to simultaneously transmit at maximum power.

4.2. Configuration and Peripherals

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

- For GSM 850, 802.11b 1 Mbps and *Bluetooth* DH5 co-location tests. The EUT was configured to simultaneously transmit three signals transmitting at maximum output power (one GSM850 circuit switched carrier on the middle channel 190 / 836.6 MHz, one 802.11b 1 Mbps carrier on bottom channel 1 / 2412 MHz and one DH5 carrier top channel 78 / 2480 MHz).
- For GSM 1900, 802.11b 1 Mbps and *Bluetooth* DH5 co-location tests. The EUT was configured to simultaneously transmit three signals transmitting at maximum output power (one GSM 1900 circuit switched carrier on the middle channel 660 / 1879.8 MHz, one 802.11b 1 Mbps carrier on bottom channel 1 / 2412 MHz and one DH5 carrier top channel 78 / 2480 MHz).
- The GSM Radio link was established to a Rhode & Schwarz CMU 200 GSM System Simulator and the EUT mode, power and frequency were controlled by the System Simulator.
- The WLAN Radio link was established to a Anritus MT8860C System Simulator and the EUT mode, power and frequency were controlled by the System Simulator.
- *Bluetooth* was configured using a bespoke application on a laptop PC, which was supplied by the Customer.

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* for details.

5.2. Test Results

Transmit Mode; Wi-Fi, Bluetooth & Cellular (850 Band)

5.2.1. Transmitter Radiated Emissions

Test Summary:

Test Engineer:	Nick Steele	Test Dates:	07 June 2012 & 08 June 2012
Test Sample IMEI:	353681045991114		

FCC Part:	15.209, 15.247 & 22.917
Test Method Used:	As detailed in ANSI C63.10 Sections 6.3 and 6.5 referencing ANSI C63.4 and FCC Part 2.1053
Frequency Range:	30 MHz to 25 GHz
Configuration:	GSM packet Switched / 802.11b 1 Mbps / Bluetooth DH5

Environmental Conditions:

Temperature (°C):	24
Relative Humidity (%):	44

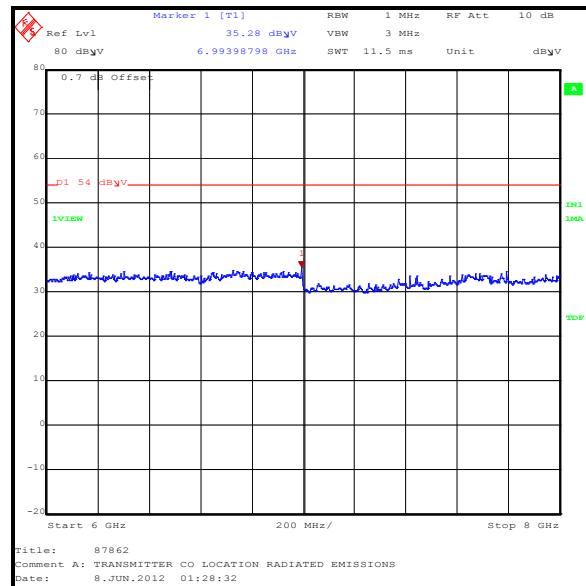
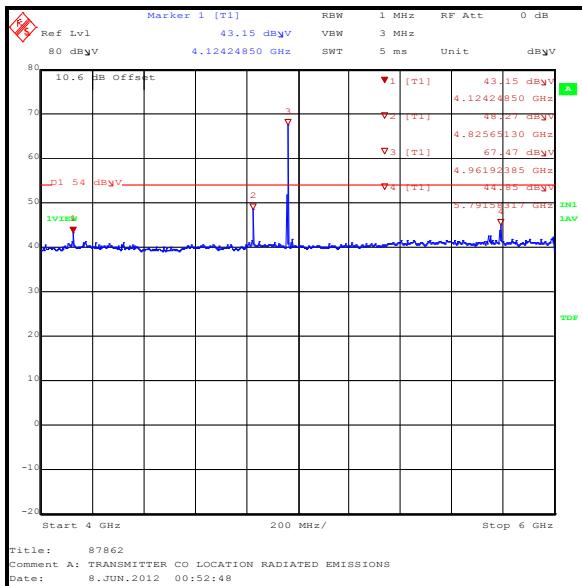
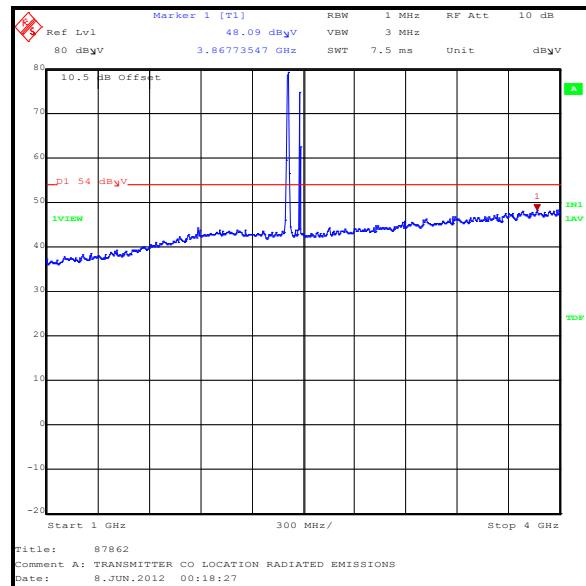
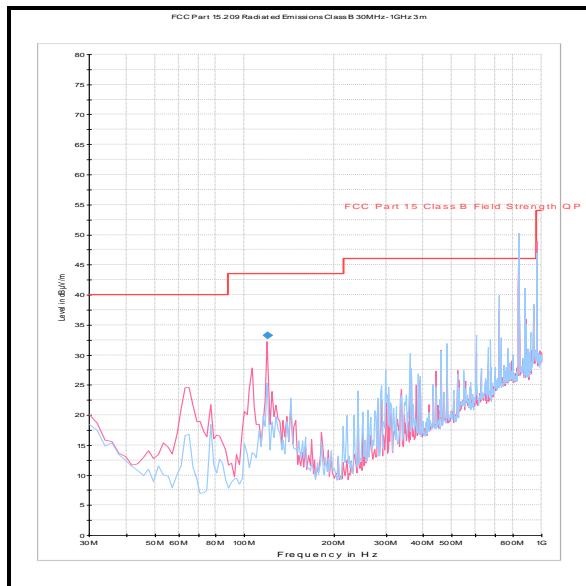
Results: GSM 850 Middle Channel / 802.11b 1 Mbps Bottom Channel / Bluetooth DH5 Top Channel

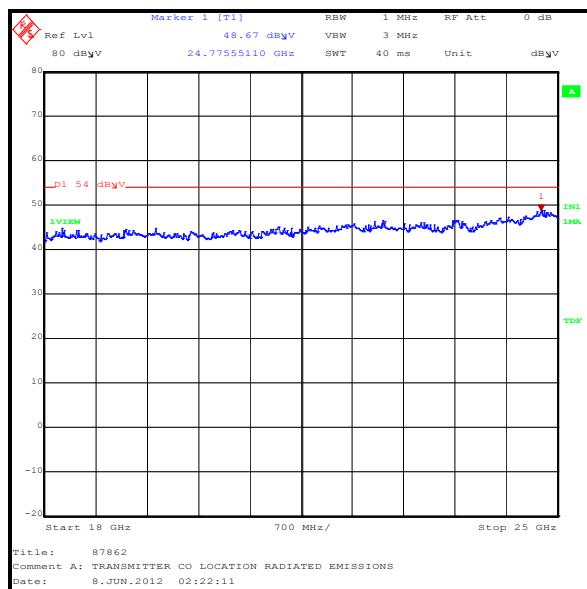
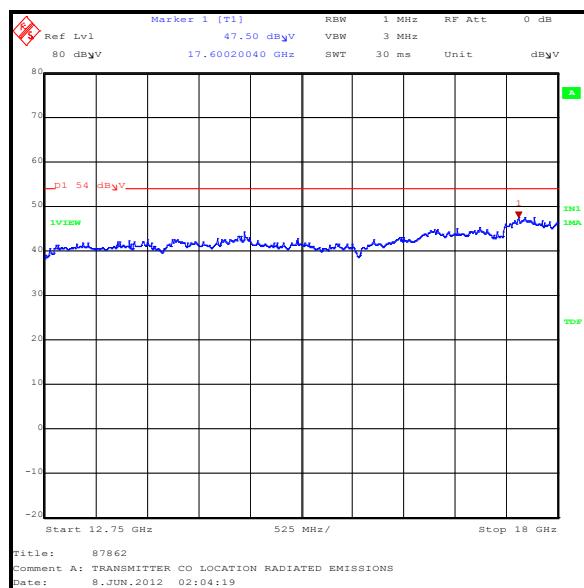
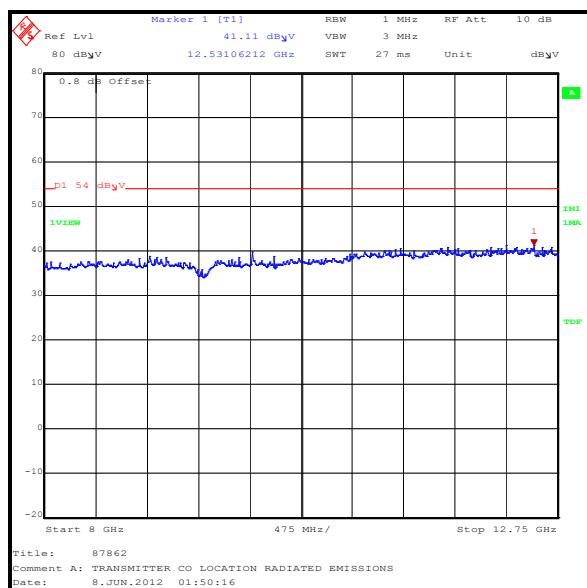
Emission Frequency (MHz)	Emission Level	Applicable Limit	Margin (dB)	Result
4123.278	-40.9 dBm	-13.0 dBm	27.9	Complied
5788.378	-38.8 dBm	-13.0 dBm	25.8	Complied

Note(s):

1. The uplink and downlink GSM 850 traffic channels are shown on the 30 MHz to 1 GHz plot.
2. The 802.11b and Bluetooth carriers are shown on the 1 GHz to 4 GHz plot.
3. Pre-scans were made against the FCC Part 15 general limits for radiated emissions. Further investigation was made on each emission noted during the pre-scans and the appropriate limit applied during the final measurements.
4. Emission at 4123.278 MHz was an intermod product produced by the second harmonic of the Bluetooth carrier plus the GSM 850 carrier. This was measured against the limits of Part 22, therefore -13.0dBm limit was applied.
5. Emission at 5788.378MHz was an intermod product produced by the fourth harmonic of the Bluetooth carrier minus the fifth harmonic of the GSM 850 carrier. This was measured against the limits of Part 22, therefore -13.0dBm limit was applied.
6. Emission at 4825.651 MHz is the second harmonic of the WLAN signal and was therefore not measured.
7. Emission at 4961.924 MHz is the second harmonic of the Bluetooth signal and was therefore not measured.
8. Final measurements were made using appropriate RF attenuators and filters where required.

Transmitter Out of Band Radiated Emissions (continued)





Transmit Mode; Wi-Fi, Bluetooth & Cellular (1900 Band)**5.2.2. Transmitter Radiated Emissions****Test Summary:**

Test Engineers:	Nick Steele & Andrew Edwards	Test Dates:	07 June 2012, 08 June 2012 & 12 June 2012
Test Sample IMEI:	353681045991114		

FCC Parts:	15.209, 15.247 & 24.238
Test Method Used:	As detailed in ANSI C63.10 Sections 6.3 and 6.5 referencing ANSI C63.4 and FCC Part 2.1053
Frequency Range:	30 MHz to 25 GHz
Configuration:	GSM packet Switched / 802.11b 1 Mbps / Bluetooth DH5

Environmental Conditions:

Temperature (°C):	23 to 26
Relative Humidity (%):	40 to 44

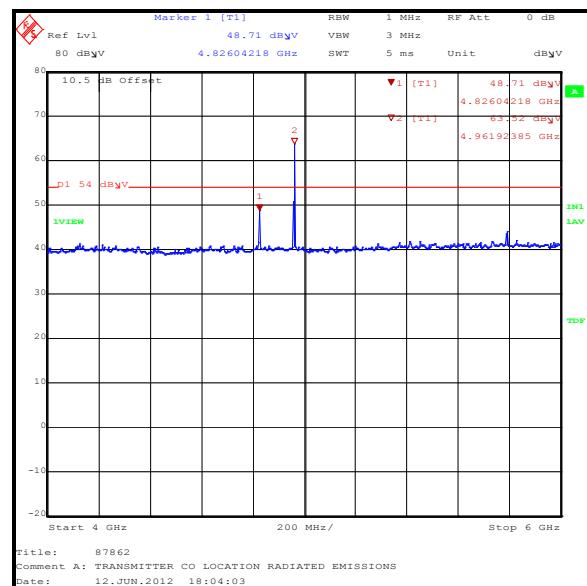
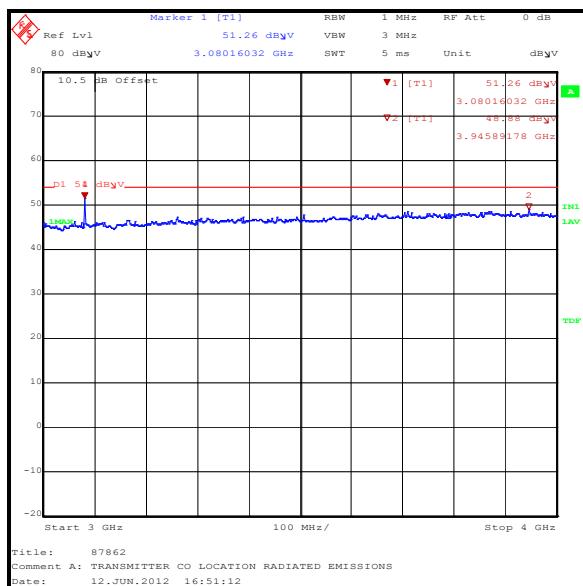
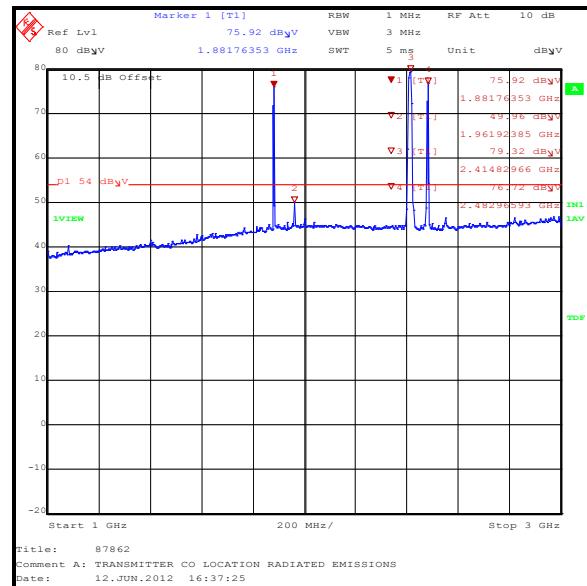
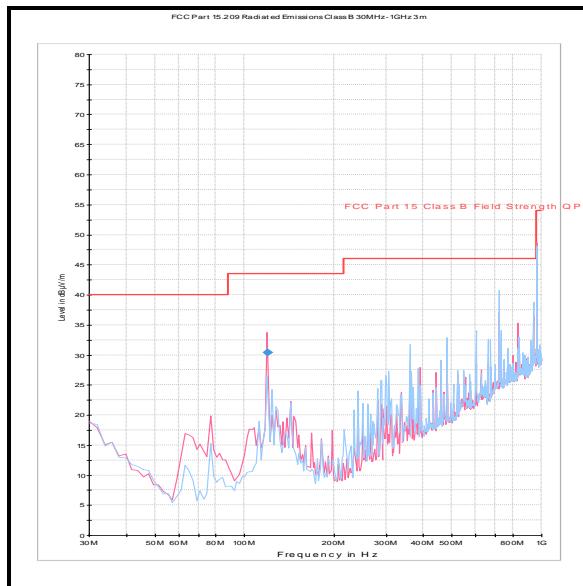
Results: PCS 1900 Bottom Channel / 802.11b 1 Mbps Bottom Channel / Bluetooth DH5 Top Channel

Emission Frequency (MHz)	Emission Level	Applicable Limit	Margin (dB)	Result
3080.542	-39.7 dBm	-13.0 dBm	26.7	Complied

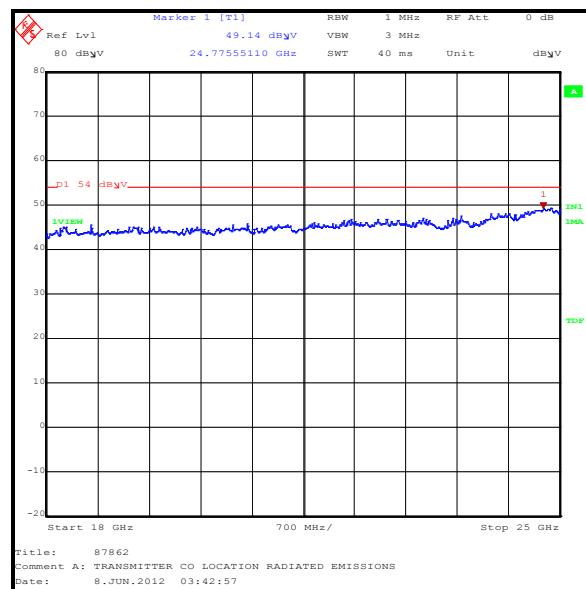
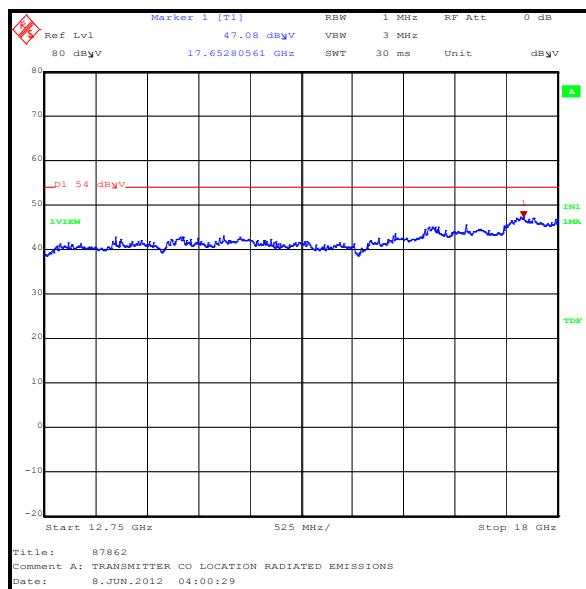
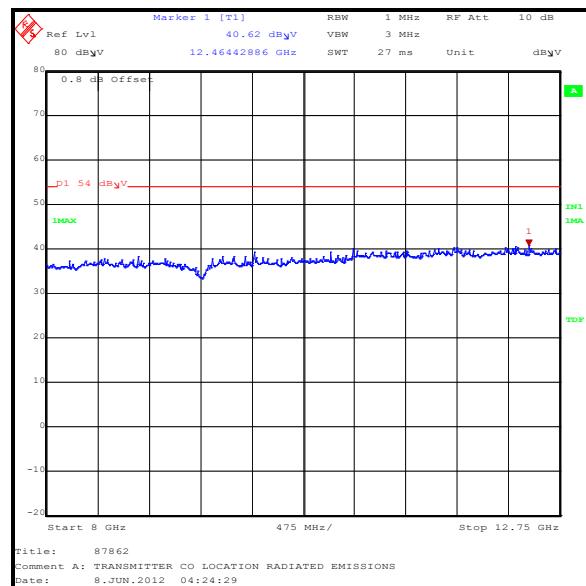
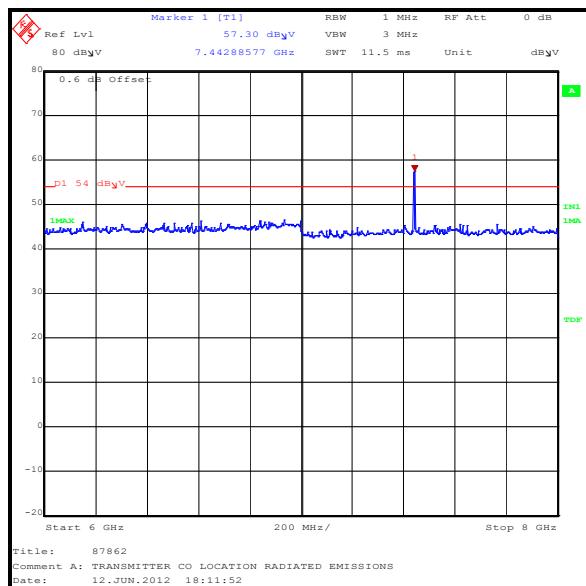
Note(s):

1. The uplink and downlink GSM 1900 traffic channels are shown on the 1 GHz to 3 GHz plot.
2. The 802.11b uplink is shown on the 1 GHz to 3 GHz plot.
3. The Bluetooth uplink is shown on the 1 GHz to 3 GHz plot.
4. The Emission at 3080.524 MHz product produced by the second harmonic of Bluetooth – GSM 1900 carrier. This was measured against the limits of Part 24, therefore -13.0dBm limit was applied.
5. Emission at 4825.651 MHz is the second harmonic of the WLAN signal and was therefore not measured.
6. Emission at 4961.924 MHz is the second harmonic of the Bluetooth signal and was therefore not measured.
7. Emission at 7442.886 MHz is the third harmonic of the Bluetooth signal and was therefore not measured.
8. Pre-scans were made against the FCC Part 15 general limits for radiated emissions. Further investigation was made on each emission noted during the pre-scans and the appropriate limit applied during the final measurements.
9. Final measurements were made using appropriate RF attenuators and filters where required.

Transmitter Out of Band Radiated Emissions (continued)



Transmitter Out of Band Radiated Emissions (continued)



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 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	30 MHz to 25 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.

7. Report Revision History

Version Number	Revision Details		
	Page No(s)	Clause	Details
1.0	-	-	Initial Version
2.0	-	-	FCC ID Amended and added to front page
4.0	-	-	FCC IDs for all 3 modules included on front page and in sec 3.2.

Appendix 1. Test Equipment Used

RFI No.	Instrument	Manufacturer	Type No.	Serial No.	Date Calibration Due	Cal. Interval
A1396	Attenuator	HUBER + SUHNER AG	757987	6810.17.B	08 Jul 2012	12
A1436	50FP-020-H3	JFW	50FP-020-H3	None	Calibration not required	12
A1552	Ultra Stable Notch Filter	Wainright Instruments GMBH	WRCD1879.8-0.3/40-5EE	3	29 Jan 2013	12
A1818	Antenna	EMCO	3115	00075692	09 Oct 2012	12
A1834	Attenuator	Hewlett Packard	8491B	10444	29 Jan 2013	12
A1932	AtlanTecRF AFH-02000	AtlanTecRF	AFH-02000	20r-JFBD04-002	15 Mar 2013	12
A1975	High Pass Filter	AtlanTecRF	AFH-03000	090424010	15 Mar 2013	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
A553	Antenna	Chase	CBL6111A	1593	15 Feb 2013	12
G0543	Amplifier	Sonoma Instrument	310N	230801	13 Jul 2012	3
K0001	5m Semi-Anechoic Chamber	Rainford EMC	N/A	N/A	31 Aug 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.