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dB Technology
|----- (Cambridge Ltd.) -----|

EMC
Testing

EMC
Consultancy

EMC
Training

23, Headington Drive,
Cambridge.
CB1 9HE
Tel : 01954 251974 (test site)
or : 01223 241140 (accounts)
Fax : 01954 251907
web : www.dbtechnology.co.uk
email: mail@dbtechnology.co.uk

REPORT ON ELECTROMAGNETIC COMPATIBILITY TESTS

Performed at:
TWENTY PENCE TEST SITE

**Twenty Pence Road,
Cottenham,
Cambridge
U.K.
CB24 8PS**

on

AlertMe.com Ltd

REP800/REP130

(FCC Part 15.249 measurements only)

dated


24th July 2012

Document History

Issue	Date	Affected page(s)	Description of modifications	Revised by	Approved by
1	01/08/12		Initial release		

Based on report template:
v090319

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	Report No: R3125	FCC ID: WJHRP11	
	Issue No: 1		
	Test No: T4335	Test Report	Page: 2 of 19

Equipment Under Test (EUT): REP800/REP130

Test Commissioned by: AlertMe.com Ltd
Compass House
80 Newmarket Road
Cambridge
CB5 8DZ

Representative: Bruce Benson

Test Started: 23rd July 2012

Test Completed: 23rd July 2012

Test Engineer: Dave Smith

Date of Report: 24th July 2012

Written by: Dave Smith Checked by: Derek Barlow

Signature:  Signature: 

Date: 24th July 2012 Date: 1st August 2012

dB Technology can only report on the specific unit(s) tested at its site. The responsibility for extrapolating this data to a product line lies solely with the manufacturer.


Test Standards Applied

CFR 47	<i>Code of Federal Regulations: Pt 15 Subpart C - Radio Frequency Devices - Intentional Radiators</i>
---------------	---

In particular, the rules of part 15.249 were applied.

This product has previously been fully tested to CFR47 15.249 (dB Technology report R3094). This report covers a modified version of the product which has a more efficient antenna.


This report is to support a permissive change submission and only covers carrier power, band edge and radiated spurious measurements.

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Device operating in the 902-928MHz band (part 15.249)


FCC Part	Parameter	
15.207	Conducted Emissions	Not tested #1
15.249	Radiated Emissions Carrier (50mV/m @3m)	PASS
15.249	Radiated Emissions Harmonics (500uV/m @3m)	PASS
15.209	Radiated Emissions Other	PASS

#1 This product has previously been fully tested to CFR47 15.249. This report covers a modified version of the product which has a more efficient antenna. This report is to support a permissive change submission and only covers carrier power, band edge and radiated spurious measurements.

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1 EUT Details

1.1 General

The EUT was an AlertMe Repeater. The device incorporates two intentional radiators:


- (a) Zigbee: operating in the 2.4GHz to 2.4835GHz band. Operates on 15 equally spaced channels starting at 2.405GHz (channel 11) and ending at 2.475GHz (channel 25). O-QPSK (digital) modulation. Integral antenna. Gain of the antenna declared to be 1dBi.
- (b) Z-wave: operating in the 902MHz to 928MHz band. The device operates on 908.42 MHz. GFSK modulation. Integral antenna.

This report only covers the operation of the device as an intentional radiator in the 902MHz to 928MHz band. This product has previously been fully tested to CFR47 15.249. This report covers a modified version of the product which has a more efficient antenna. This report is to support a permissive change submission and only covers carrier power, band edge and radiated spurious measurements.

The device is powered from ac mains or an internal battery.

Details of the EUT and associated peripherals used during the tests are listed below. Figure 1 shows the interconnections between the EUT and peripherals.

Item	Manufacturer	Model	Description	Serial No:	Notes
3	Alertme	REP800/REP130	Sample 1 - with integral antennas. Z-wave constantly transmitting modulated signal		

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1.2 Modifications to EUT and Peripherals


Details of any modifications that were required to achieve compliance are listed below. The modification numbers are referred to in the results sections as appropriate.

Mod No:	Details	Implemented for
1	As supplied for testing with improved antenna efficiency. No modifications were made during the course of testing.	

1.3 EUT Operating Modes

The EUT was tested in the following operating mode or modes. Generally, operating modes are chosen that will exercise the functions of the EUT as fully as possible and in a manner likely to produce maximum emission levels or susceptibility. Individual test result sheets reference the operating mode of the EUT.

Operating Mode	Details
1	Z-wave transmit - modulated. Continuously transmitting modulated carrier at 908.42MHz. Output power set to 0.5dBm.

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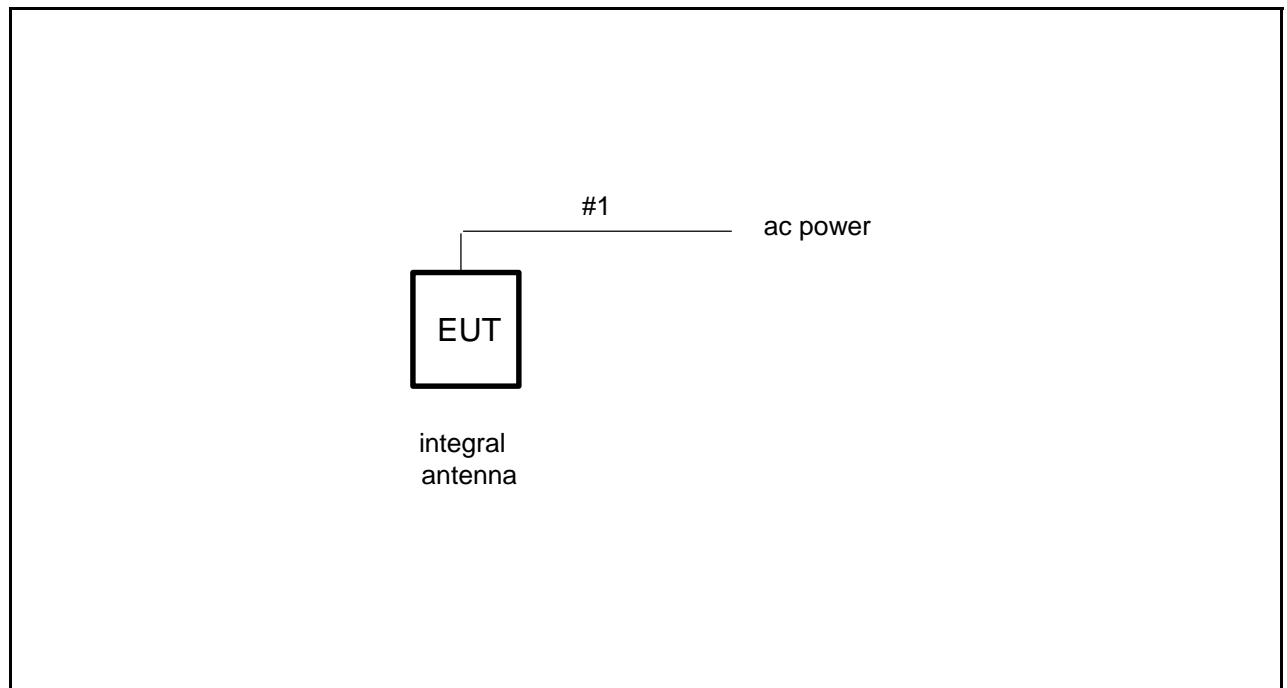



Figure 1 EUT and Peripherals

	Description	Type	Length	Notes
#1	Mains extension lead	Unscreened	1.5m	


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Photograph 1 Radiated Emissions - Flat - Front




Photograph 2 Radiated Emissions - Upright - Side

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2 Test Equipment

The test equipment used during the tests was one or more of the items listed below. Individual test result sheets indicate which items were used.

Ref No:	Details	Serial Number	Cal Dat	Cal Interval
A15	Chase X-wing Bilog CBL6140 20MHz-2GHz	1047	18/11/2011	1 year
A23	EMCO 3115 DR Guide (1-18GHz)	4982	31/01/2012	1 year
A5	Chase Bilog CBL6111A	1760	31/01/2012	1 year
PRE10	LUCIX 100M-20G pre-amp	10	26/06/2012	1 year
R4	R&S ESVS10	421872	16/10/2011	1 year
R8	Agilent E7405A Spectrum Analyser	MY44212494	19/09/2011	1 year
R9	Agilent E7405A Spectrum Analyser	MY45110758	21/11/2011	1 year
RFF15	Band Pass Filter 1GHz to 2GHz	15	08/02/2012	1 year
RFF22	High Pass Filter - 1.35GHz (10GHz) MicroTronics HPM13017	33	08/02/2012	1 year

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3 Test Methods

3.1 Radiated Emissions

This section describes the general method of performing this test. The specific method used and any deviations from this general method are listed in the appropriate results section.

Initial scans are performed in a semi-anechoic screened room at a distance of up to 3m. Scans are performed over the frequency range specified in the test standard with the antenna both horizontally and vertically polarised. During these scans the EUT and peripherals are rotated through 360°. Bench top EUTs are placed on a non-conducting bench at a height of 0.8m above the ground plane. Floor standing EUTs are placed 0.1m above the ground plane. The results of the scans are shown in the plots included at the end of the report. Attempts are made to identify the layout of cables that give highest readings.

Significant emissions identified by the scans are measured on an open area test site at the appropriate test distance using the specified detector function. Maximised readings are obtained by rotating the EUT through 360° and adjusting the height of the antenna from 1 m to 4m. Measurements are made with the antenna both horizontally and vertically polarised and the results tabulated.

Tabulated results show levels based on the following calculation:

Field Strength (dBuV) = receiver reading (dBuV) + CF (dB/m)

CF is the correction factor for the antenna and cable.


For example:

if at 434.478MHz receiver reading was 57.8dBuV and combined correction factor = 20.4 (dB/m).

Total field strength = 57.8 + 20.4 = 78.2dBuV/m.

4 Test Results

The following sections contain tabulated test results. Plots of various scans are included at the back of this section.


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4.1 Z-wave Radiated Emissions - Carrier and Band Edges - 15.249

Factor Set 1: A5_FS_10C CBL015_11A - -
Factor Set 2: - - - -
Factor Set 3: - - - -
Test Equipment: R4 A5

Radiated Emissions

Company: AlertMe.com Ltd					Product: REP800/REP130								
Date: 23/07/2012					Test Eng: Dave Smith								
Ports:													
Test: ANSI C63.4:2003					using limits of				15.249				
Ports:													
Test: ANSI C63.4:2003					using limits of				15.209				
Plot	Op Mode	Mod State	Dist m	Fact Set	Freq. MHz	Ant Pol	Rec. Level dBuV	Corr'n Factor dB/m	Corr'n Factor dB	Total Level dBuV/m	Limit FCC dBuV/m	Margin FCC dB	Notes
	carrier												
3	1	1	3	1	908.410	V	54.1	29.8		83.9	94.0	10.1	
3	1	1	3	1	908.410	H	53.1	29.8		82.9	94.0	11.1	
	band edge												
3	1	1	3	1	902.000	V	-2.0	29.5		27.5	46.0	18.5	
3	1	1	3	1	902.000	H	-1.9	29.5		27.6	46.0	18.4	
3	1	1	3	1	928.000	V	-1.9	30.6		28.7	46.0	17.3	
3	1	1	3	1	928.000	H	-1.8	30.6		28.8	46.0	17.2	
Results											Minimum Margin		
											PASS/FAIL		
											10.1 dB		
											PASS		
Notes													
Comments and Observations													
Results of scans shown in plots 2 and 3.													
Carrier: limit of 15.249. Band edge: general emissions limit of 15.209													
Maximum of flat and upright.													
Maximised readings using quasi peak detector													


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4.2 Z-wave Radiated Emissions - Tx Spurious Below 1GHz - 15.249

Factor Set 1: A5_FS_10C CBL015_11A - -
Factor Set 2: - - - -
Factor Set 3: - - - -
Test Equipment: R4 A5

Radiated Emissions

Company: AlertMe.com Ltd					Product: REP800/REP130									
Date: 23/07/2012					Test Eng: Dave Smith									
Ports:														
Test: ANSI C63.4:2003					using limits of				15.209					
Ports:														
Test:					using limits of									
Plot	Op Mode	Mod State	Dist m	Fact Set	Freq. MHz	Ant Pol	Rec. Level dBuV	Corr'n Factor dB/m	Corr'n Factor dB	Total Level dBuV/m	Limit FCC dBuV/m	Margin FCC dB	Notes	
1	1	1	3	1	32.500	V	9.6	17.5		27.1	40.0	12.9	qp	
1	1	1	3	1	32.500	H	-3.9	17.5		13.6	40.0	26.4	qp	
1	1	1	3	1	57.500	V	23.6	6.6		30.2	40.0	9.8	qp	
1	1	1	3	1	57.500	H	11.5	6.6		18.1	40.0	21.9	qp	
1	1	1	3	1	82.500	V	7.0	8.8		15.8	40.0	24.2	qp	
1	1	1	3	1	82.500	H	0.8	8.8		9.6	40.0	30.4	qp	
1	1	1	3	1	265.333	V	3.2	16.1		19.3	46.0	26.7	qp	
1	1	1	3	1	265.333	H	2.7	16.1		18.8	46.0	27.2	qp	
2	1	1	3	1	283.370	V	3.2	15.7		18.9	46.0	27.1	qp	
2	1	1	3	1	283.370	H	3.7	15.7		19.4	46.0	26.6	qp	
2	1	1	3	1	412.300	V	8.7	20.3		29.0	46.0	17.0	qp	
2	1	1	3	1	412.300	H	10.1	20.3		30.4	46.0	15.6	qp	
Results											Minimum Margin		9.8 dB	PASS
											PASS/FAIL			
Notes		Comments and Observations												
		Results of scans shown in plots 1 and 2.												
		General limits of 15.209 applied.												
Key:		qp - quasi-peak, av - average, pk - peak												


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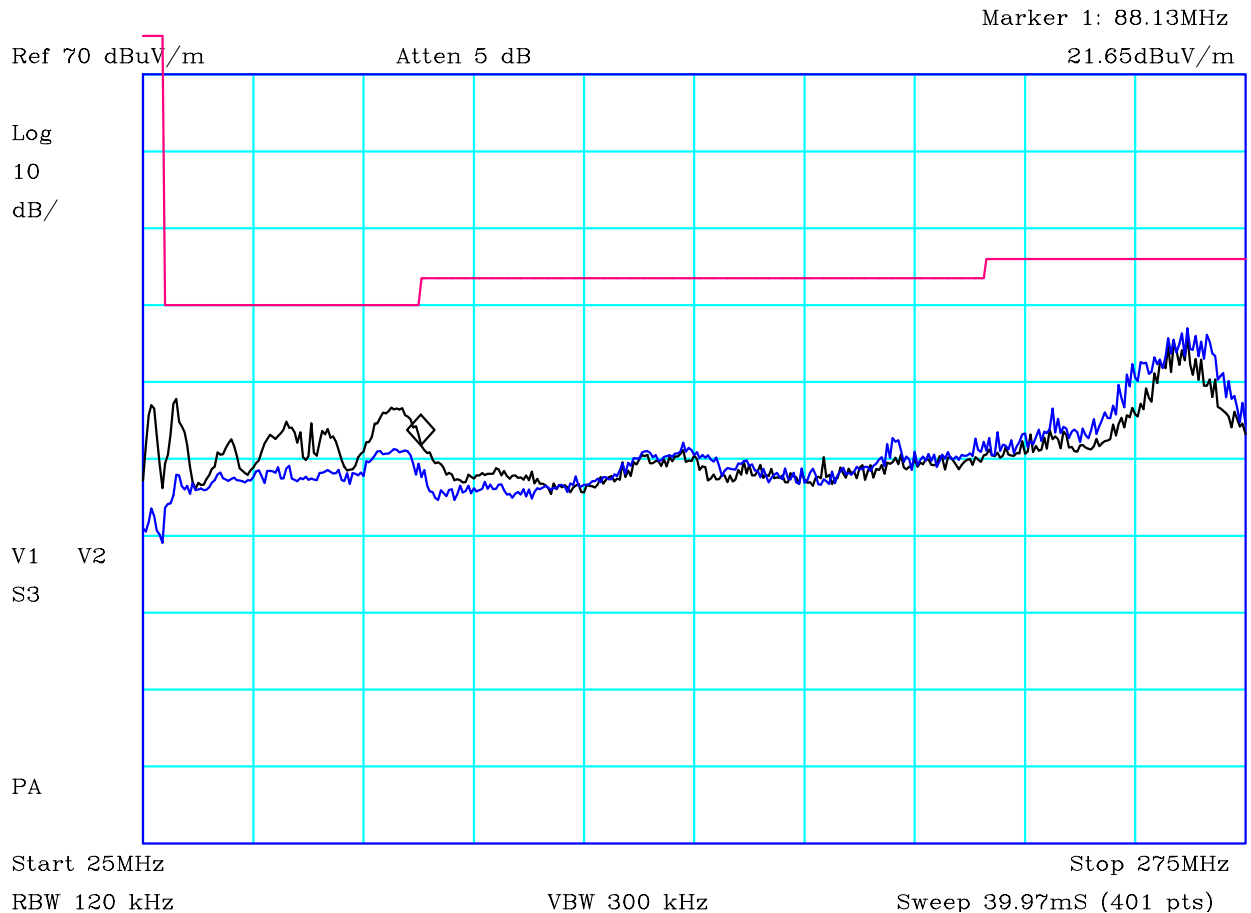
4.3 Z-wave Radiated Emissions - Tx Spurious Above 1GHz - 15.249

Factor Set 1:	A23_3m_10A RFF15_12A PRE10_12A CBL002_CBL069_10A	1 m cable
Factor Set 2:	A23_3m_10A PRE10_12A RFF22_12A CBL052_11A	1 m cable
Factor Set 3:	- - -	
Test Equipment: R8 A23 PRE10 RFF22 RFF15		

Radiated Emissions

Company: AlertMe.com Ltd											Product: REP800/REP130				
Date: 23/07/2012											Test Eng: Dave Smith				
Ports:															
Test: ANSI C63.4:2003											using limits of 15.209				
Ports:															
Test:											using limits of				
Plot	Op Mode	Mod State	Dist m	Fact Set	Freq. MHz	Ant Pol	Rec. Level dBuV	Corr'n Factor dB/m	Corr'n Factor dB	Total Level dBuV/m	Limit FCC dBuV/m	Margin FCC dB	Notes		
4	1	1	3	1	1816.784	V	54.2	-5.9		48.3	54.0	5.7	pk		
4	1	1	3	1	1816.784	H	53.3	-5.9		47.4	54.0	6.6	pk		
5	1	1	3	2	2725.180	V	46.6	-7.1		39.5	54.0	14.5	pk		
5	1	1	3	2	2725.180	H	46.0	-7.1		38.9	54.0	15.1	pk		
Results											Minimum Margin		5.7 dB		
											PASS/FAIL		PASS		
Notes		Comments and Observations													
		Results of scans shown in plots 4 to 6. Peak measurement are comfortably below average limit so no average measurement performed.													
Key:		qp - quasi-peak, av - average, pk - peak													


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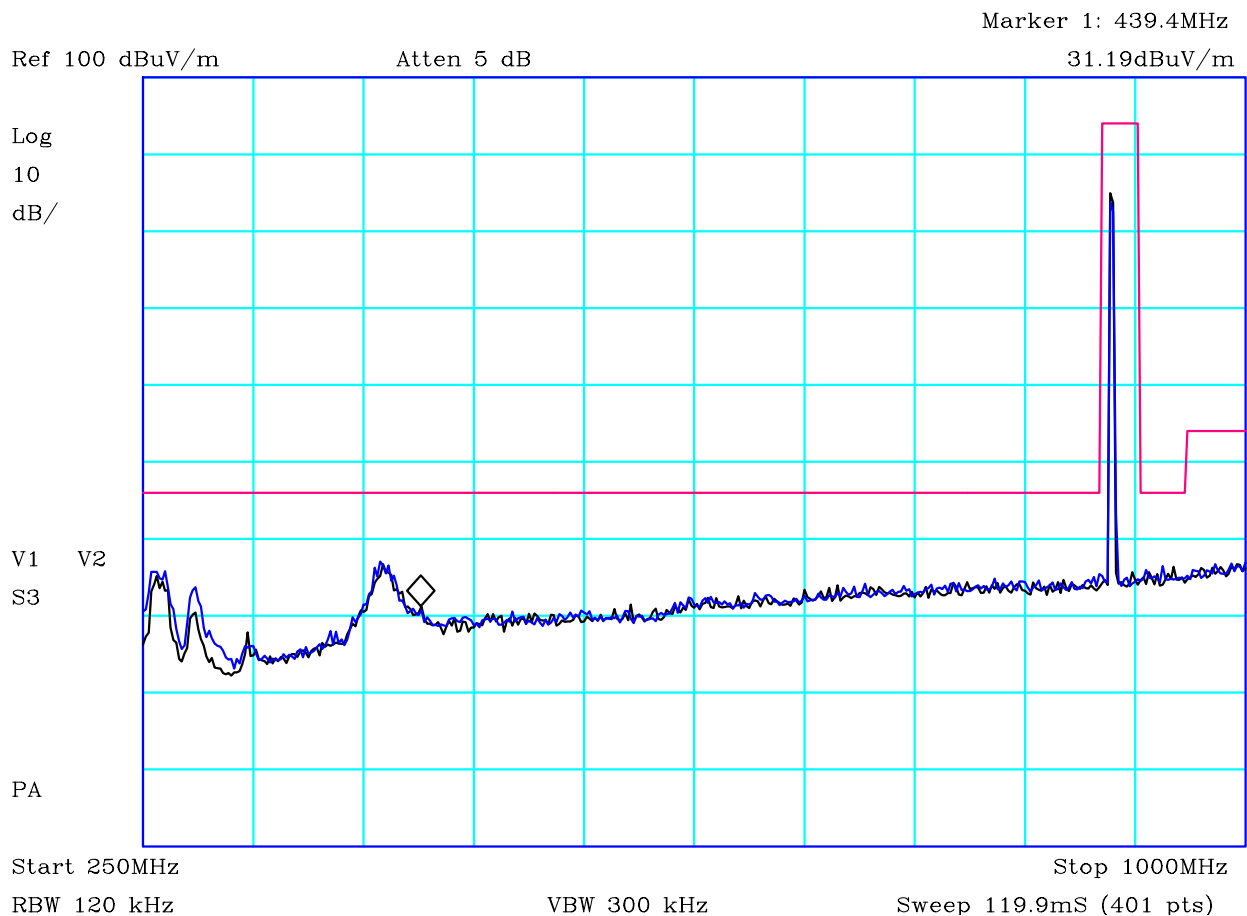


CF1:A24_3m_120112 CF2:CBL002_CBL069_100809

PLOT 1 Radiated Emissions - 25MHz to 275MHz

Company:	Alertme	Product:	Repeater
Date:	23/07/2012	Test Eng:	Dave Smith
Method:	ANSI C63.4	Method:	
Limit1:(VIO)	FCC(B)@3m	Limit2:	
Limit3:		Limit4:	
Black: vertical, Blue: Horizontal Continuous transmit on 908MHz. Maximum of flat and upright positions. Improved antenna efficiency.			
Facility:	Anech_1	Height	1m,1.5m,2m
Distance	3m	Polarisation	V+H
Angle	0-360	File:	H2623535
Mode:	1	Modification State:	1

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	Issue No: 1		
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CF1:A24_3m_120112 CF2:CBL002_CBL069_100809


PLOT 2 Radiated Emissions - 250MHz to 1GHz

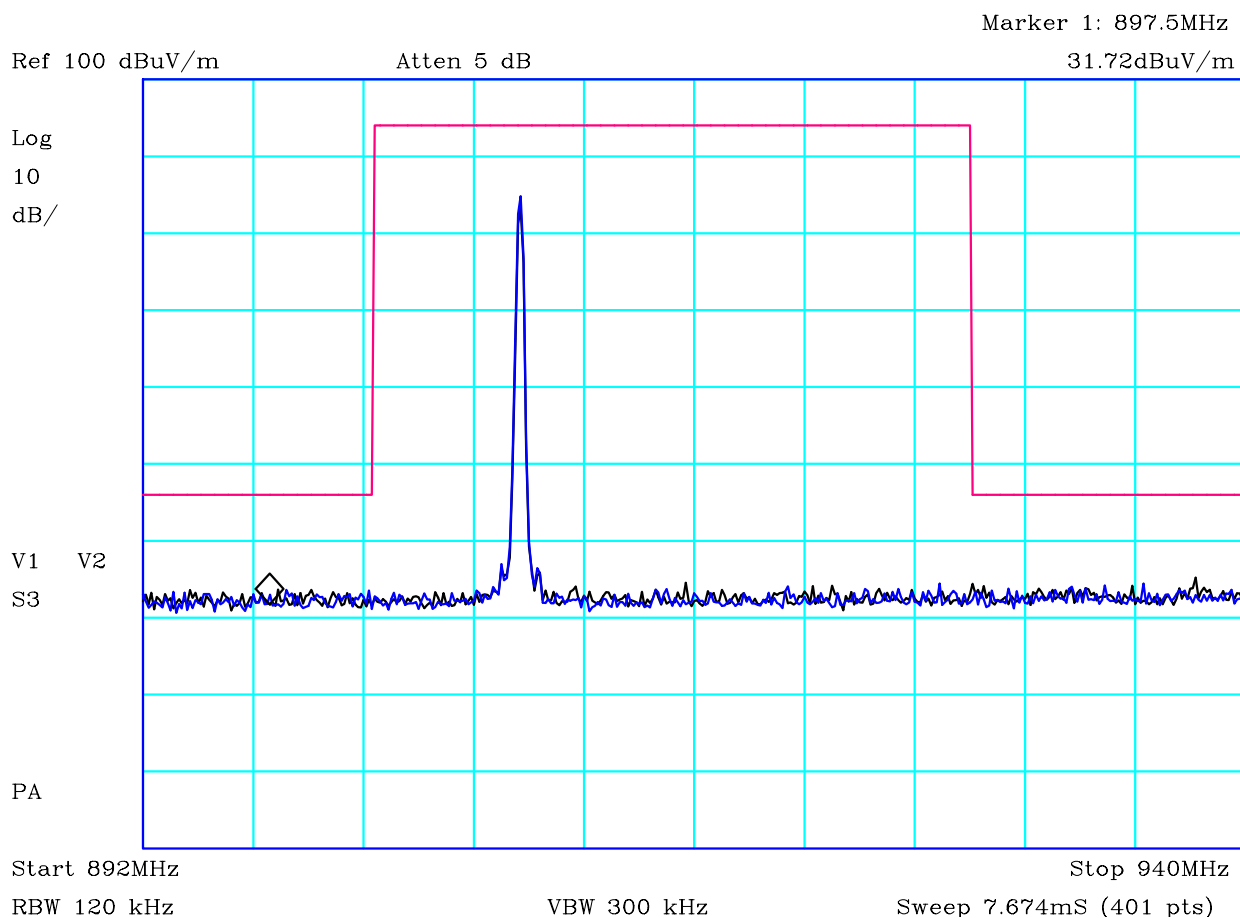
Company:	Alertme	Product:	Repeater
Date:	23/07/2012	Test Eng:	Dave Smith
Method:	ANSI C63.4	Method:	
Limit1:(VIO)	FCC(B)@3m	Limit2:	
Limit3:		Limit4:	

Black: vertical, Blue: Horizontal
Continuous transmit on 908MHz.
Maximum of flat and upright positions.

Improved antenna efficiency.

Facility:	Anech_1	Height	1m,1.5m,2m	Mode:	1
Distance	3m	Polarisation	V+H	Modification State:	1
Angle	0-360	File:	H2623520		


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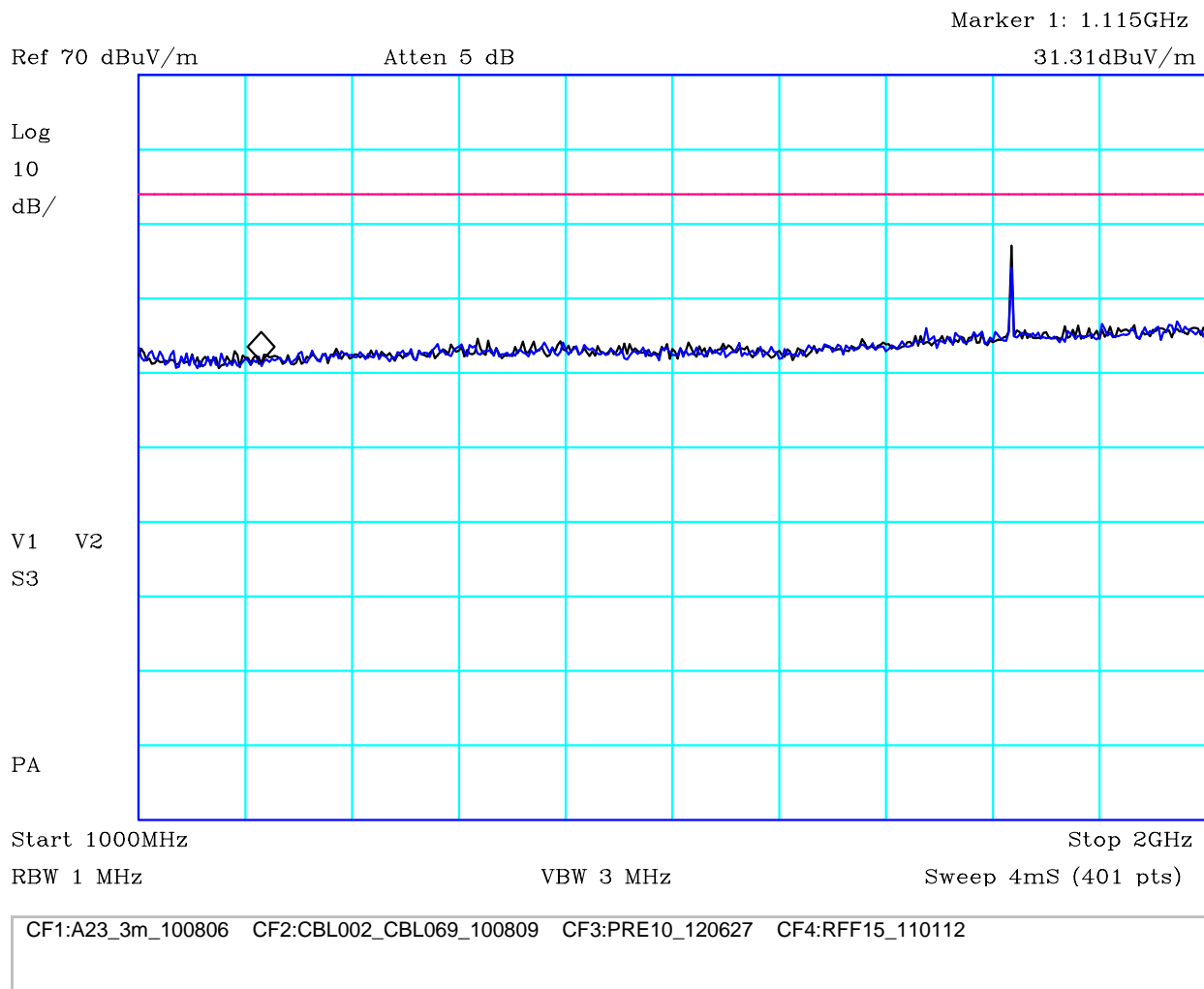


CF1:A24_3m_120112 CF2:CBL002_CBL069_100809

PLOT 3 Radiated Emissions - Band Edges

Company:	Alertme	Product:	Repeater
Date:	23/07/2012	Test Eng:	Dave Smith
Method:	ANSI C63.4	Method:	
Limit1:(VIO)	FCC(B)@3m	Limit2:	
Limit3:		Limit4:	
Black: vertical, Blue: Horizontal Continuous transmit on 908MHz. Maximum of flat and upright positions. Improved antenna efficiency.			
Facility:	Anech_1	Height	1m,1.5m,2m
Distance	3m	Polarisation	V+H
Angle	0-360	File:	H26235C0
		Mode:	1
		Modification State:	1

	Report No: R3125	FCC ID: WJHRP11	
	Issue No: 1		
	Test No: T4335	Test Report	Page: 17 of 19




PLOT 4 Radiated Emissions - 1GHz to 2GHz

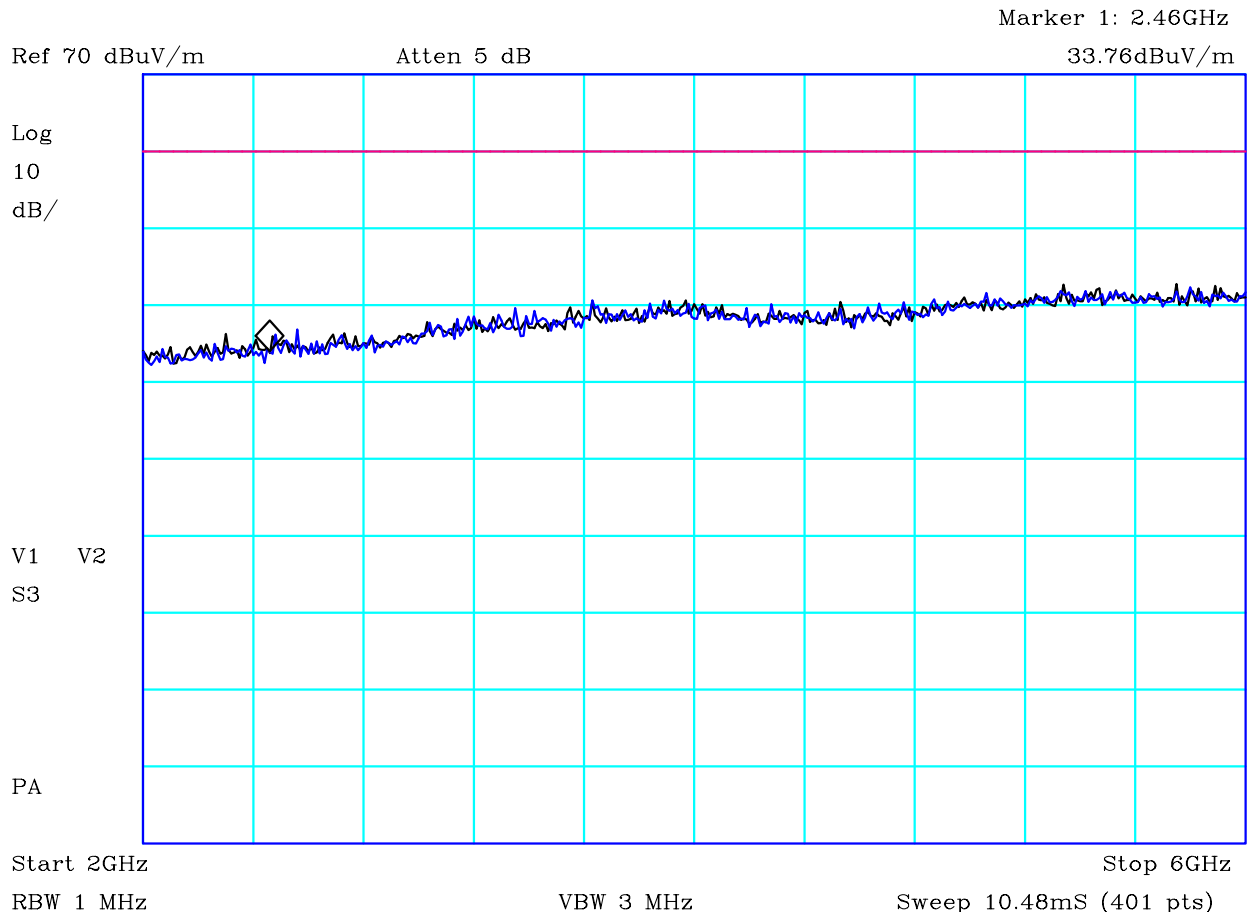
Company:	Alertme	Product:	Repeater
Date:	23/07/2012	Test Eng:	Dave Smith
Method:	ANSI C63.4	Method:	
Limit1:(VIO)	FCC(B)@3m	Limit2:	
Limit3:		Limit4:	

Black: vertical, Blue: Horizontal
Continuous transmit on 908MHz.
Maximum of flat and upright positions.

Improved antenna efficiency.

Facility:	Anech_1	Height	1m	Mode:	1
Distance	3m	Polarisation	V+H	Modification State:	1
Angle	0-360	File:	H26235EB		

	Report No: R3125	FCC ID: WJHRP11	
	Issue No: 1		
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CF1:A23_3m_100806 CF2:CBL051_110107 CF3:PRE10_120627 CF4:RFF22_110221


PLOT 5 Radiated Emissions - 2GHz to 6GHz

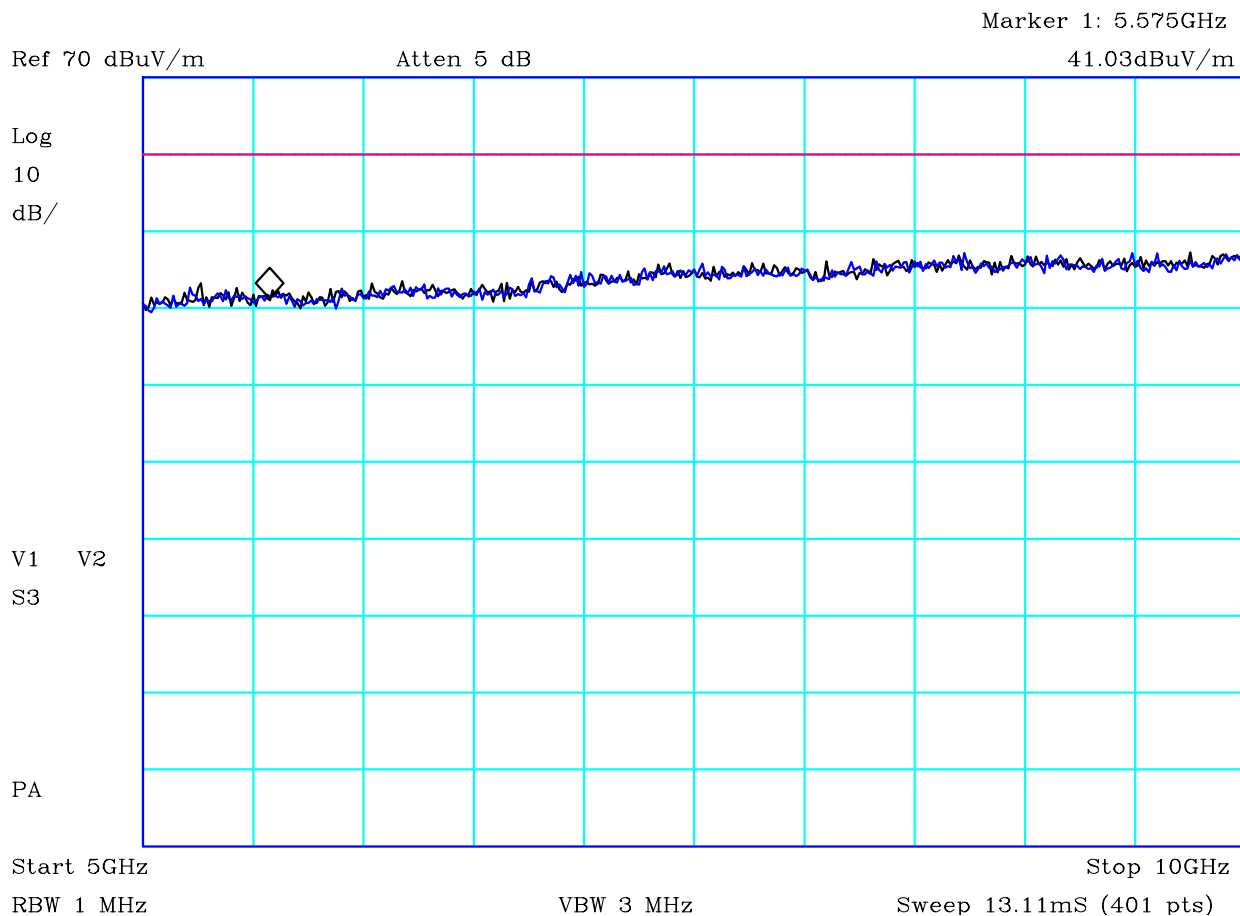
Company:	Alertme	Product:	Repeater
Date:	23/07/2012	Test Eng:	Dave Smith
Method:	ANSI C63.4	Method:	
Limit1:(VIO)	FCC(B)@1.5m	Limit2:	
Limit3:		Limit4:	

Black: vertical, Blue: Horizontal
Continuous transmit on 908MHz.
Maximum of flat and upright positions.

Improved antenna efficiency.

Facility:	Anech_1	Height	1m	Mode:	1
Distance	1.5m	Polarisation	V+H	Modification State:	1
Angle	0-360	File:	H26236CE		

	Report No: R3125	FCC ID: WJHRP11	
	Issue No: 1		
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CF1:A23_3m_100806 CF2:CBL051_110107 CF3:PRE10_120627 CF4:RFF22_110221

PLOT 6 Radiated Emissions - 5GHz to 10GHz

Company:	Alertme	Product:	Repeater
Date:	23/07/2012	Test Eng:	Dave Smith
Method:	ANSI C63.4	Method:	
Limit1:(VIO)	FCC(B)@1.5m	Limit2:	
Limit3:		Limit4:	

Black: vertical, Blue: Horizontal
Continuous transmit on 908MHz.
Maximum of flat and upright positions.

Improved antenna efficiency.

Facility:	Anech_1	Height	1m	Mode:	1
Distance	1.5m	Polarisation	V+H	Modification State:	1
Angle	0-360	File:	H2623705		