	Report No: <b>R3232</b> Issue No: <b>1</b>	FCC ID: SEASENSOR30 IC: 8673A-SENSOR30	
	Test No: <b>T5014</b>	<b>Test Report</b>	Page: 1 of 71



**dB Technology**

( Cambridge Ltd. )

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## REPORT ON ELECTROMAGNETIC COMPATIBILITY TESTS

Performed at:  
**TWENTY PENCE TEST SITE**

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

on

**Ubisense**

**Ubisensor 3.0**

dated


**19th June 2013**

### Document History

Issue	Date	Affected page(s)	Description of modifications	Revised by	Approved by
1	08/07/13		Initial release		

Based on report template:  
v090319

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dB Technology (Cambridge) Ltd.*

	Report No: <b>R3232</b>	FCC ID: SEASENSOR30	
	Issue No: <b>1</b>	IC: 8673A-SENSOR30	
	Test No: <b>T5014</b>	<b>Test Report</b>	Page: 2 of 71

Equipment Under Test (EUT):

Ubisensor 3.0

Test Commissioned by:

Ubisense  
St. Andrews House  
90 St. Andrews Road  
Chesterton  
Cambridge  
CB4 1DL

Representative:

Ben Campbell

Test Started:

26th March 2013

Test Completed:

14th May 2013

Test Engineer:

Dave Smith

Date of Report:

19th June 2013

Written by: Dave Smith

Checked by: Derek Barlow

Signature:

*D. A. Smith*


Signature:

*D. Barlow*

Date: 19th June 2013

Date: 8th July 2013

**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.**

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## Test Standards Applied

<b>CFR 47</b>	<i>Code of Federal Regulations: Pt 15 Subpart C - Radio Frequency Devices - Intentional Radiators</i>
<b>RSS-210 Issue 8</b>	<i>Licence-exempt Radio Apparatus (All Frequency Bands): Category I Equipment</i>

In particular, the specific rules of

- o CFR 47 part 15.249 were applied for FCC
- o RSS-210 section A2.9 were applied for Industry Canada

The methods and limits are effectively the same for both FCC and Industry Canada.

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## Emissions Test Results Summary

### CFR 47

**PASS**

Test	Port	Method	Limit	PASS/FAIL	Notes
Conducted Emissions	ac power	ANSI C63.4:2003	15.207	PASS	
Radiated Emissions		ANSI C63.4:2003	15.249 15.209	PASS	


specs\_fccv100412

### RSS-210

**PASS**


Test	Port	Method	Limit	PASS/FAIL	Notes
Radiated Emissions	enclosure	ANSI C63.4:2003	RSS 210 A2.9	PASS	

specs\_canadav111211


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## 1 EUT Details

### 1.1 General

The EUT was a Ubisensor v3.0. The Ubisensor v3.0 is a base station used by the Ubisense Location System, which supports the real-time location of objects. It detects ultra-wideband (UWB) pulses emitted by wireless tags, allowing the 3D position of the tag to be found. The Ubisensor v3.0 is a composite device consisting of a conventional radio transceiver operating in the range 2400-2483.5MHz, a UWB receiver and an associated networked sensor processing node. This report covers the 2400-2483.5MHz transmitter.

The device has two internal antennas for diversity (Antenna A and Antenna B). Only one antenna is ever active at any one time.

Tests were performed on the following channels:

- o low: 2.40175GHz
- o mid: 2.442GHz
- o high: 2.48175GHz

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
1	Ubisense	Ubisensor V3	EUT		#1
2	TP-LINK	TL-SF1008P	PoE Ethernet switch	11794400325	
3	Leader Electronics	NU60-F480125-I1	PSU for ethernet switch		
4	Dell	Lattitude E-6420	Laptop PC	E29HSR1	
5	Dell	DA130PEI-00	PSU for laptop		
6	PowerSolve	PS60POE-L	PoE Injector	37854	
7	Netgear	FS108P	8 Port 10/100 Switch with 4 port PoE	1DL2933V000A4	
8	Netgear	DSA-0421S-50	PSU for Netgear	330-10142-1	

#1 The following samples were used:

Sensor 12: MAC address 00:11:CE:FF:00:12 - main EUT

Sensor 16: MAC address 00:11:CE:FF:00:16 - peripheral for timing connection.

Sensor 14: MAC address 00:11:CE:FF:00:14 - with temporary antenna connector - just used for occupied bandwidth measurement..

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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
0	As received. No modifications were made during the course of testing.	

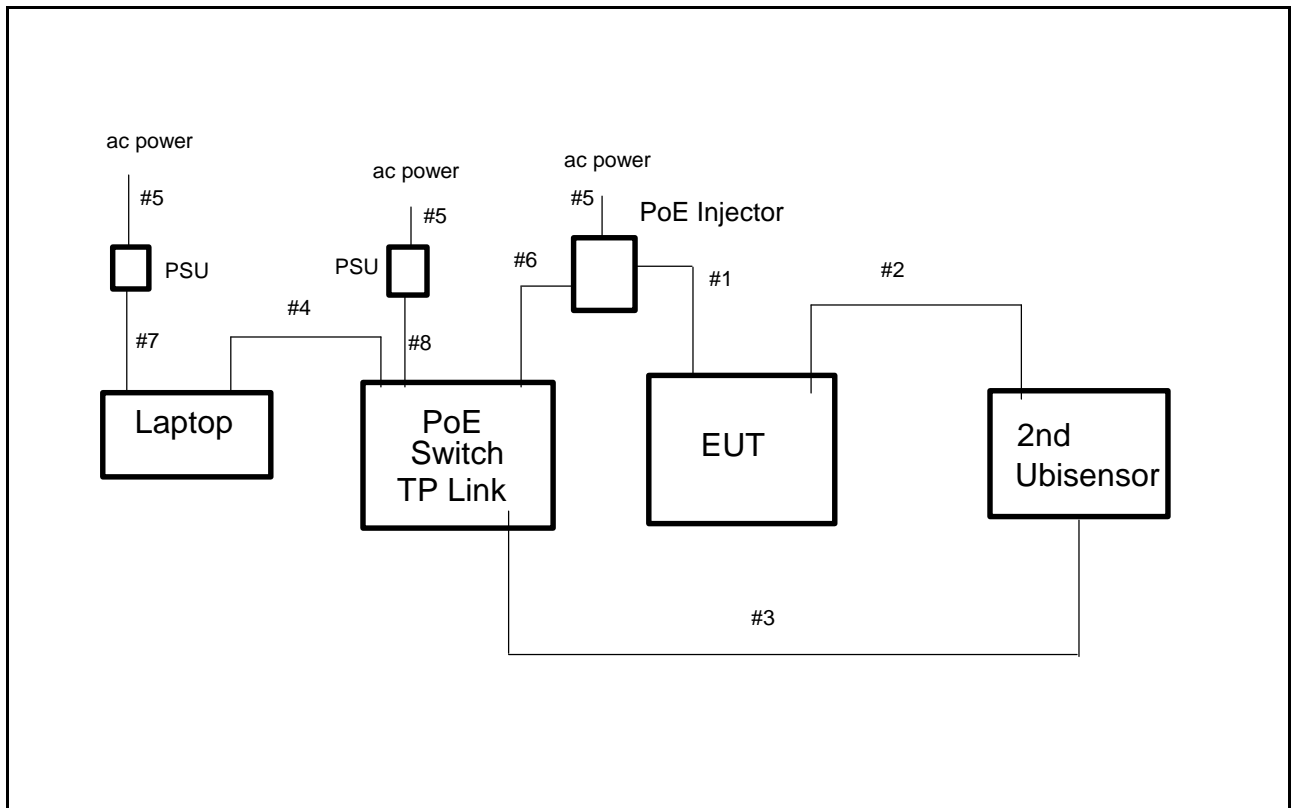
## 1.3 EUT Operating Modes

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	Transmitter Emissions: Transmitting continuously on selected channel with modulation.

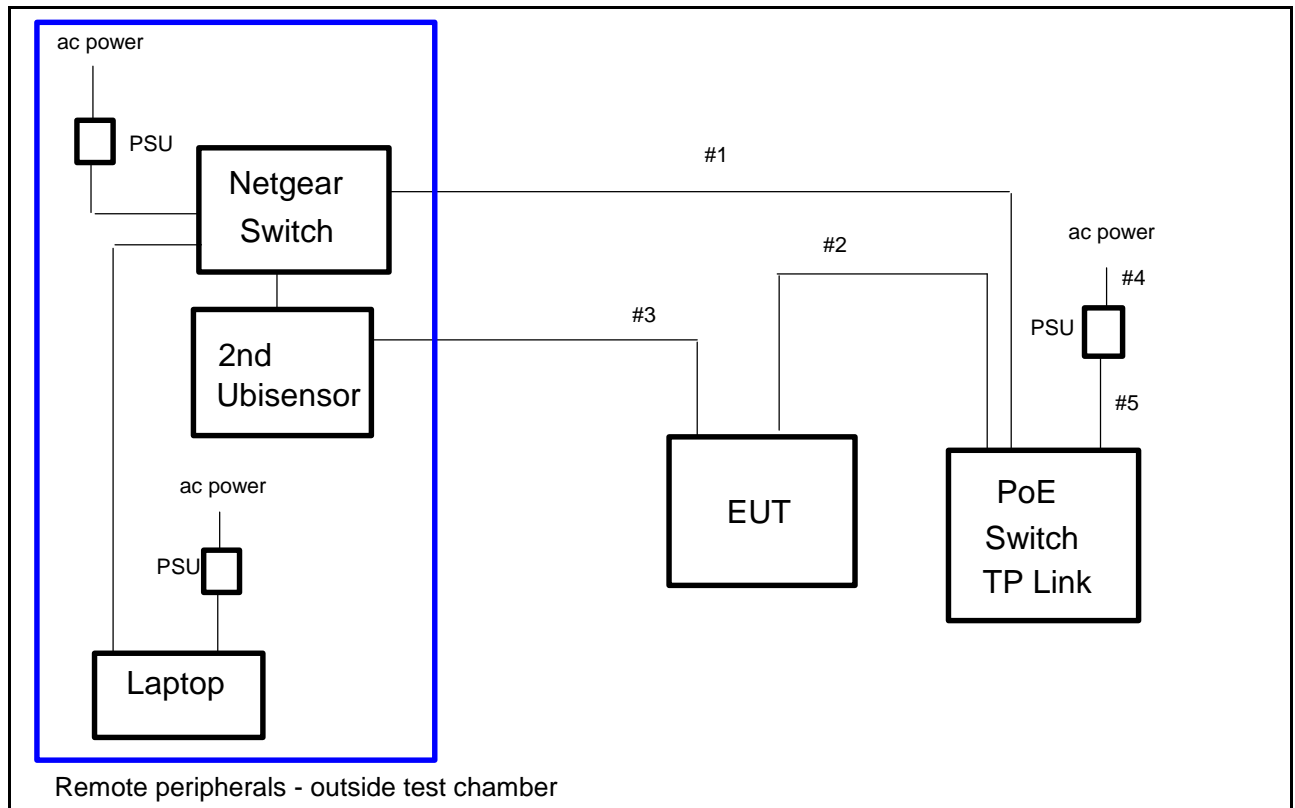


**Figure 1 General Arrangement of EUT and Peripherals - Conducted Emissions**




	Description	Type	Length	Notes
#1	Ethernet/Power to EUT	Unscreened (UTP)	1.8m	
#2	Timing cable	Unscreened (UTP)	1.8m	
#3	Ethernet/Power to 2nd Sensor	Unscreened (UTP)	1.8m	
#4	Ethernet/ Switch to laptop	Unscreened (UTP)	1.8m	
#5	AC power cable	Unscreened	2m	
#6	Ethernet to PoE Injector	Unscreened (UTP)	1.8m	
#7	DC power to Laptop	Unscreened	1.5m	
#8	DC power to switch	Unscreened	1.5m	

**Figure 2 General Arrangement of EUT and Peripherals - Radiated Emissions**



	Description	Type	Length	Notes
#1	Ethernet to switch	Screened Ethernet	2m	
#2	Ethernet/Power to EUT	Unscreened (UTP)	1.8m	
#3	Timing cable	Unscreened (UTP)	1.8m	
#4	AC power cable	Unscreened	2m	
#5	DC power to switch	Unscreened	1.5m	

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**Photograph 1 Conducted Emissions - Front**



**Photograph 2 Conducted Emissions - Back**




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**Photograph 3 Radiated Emissions - Front**



**Photograph 4 Radiated Emissions - Back**

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## 2 Duty Cycle - Average Correction Factors

The EUT is normally operated with a duty cycle which limits the transmit time in any 100msec period. This allows radiated emissions average measurement to be reduced by a factor based on this duty cycle.

The following information has been provided by the manufacturer:

### **Declaration of maximum 2.4GHz transmitter duty cycle for Ubisensor V3.0**

Andy Ward  
Chief Technology Officer  
Ubisense Limited

13th June 2013

#### Overview

This document describes the maximum possible duty cycle of transmissions of the Ubisensor V3.0 device via its 2.4GHz transceiver, which is to be certified under FCC Part 15.249.

#### Device operation

As part of its operation, the Ubisensor V3.0 device utilises a 2.4GHz conventional radio link which is to be certified under FCC Part 15.249. The device transmits only infrequently on the 2.4GHz radio link.


#### Worst Case Example

Figure 1 shows a worst case example of 2.4GHz transmitter duty cycle of the Ubisensor V3.0. The transmitter is 'on' for 4.288ms each cycle. The transmitter is cycled at 61.51059Hz. This leads to a maximum transmitter 'on' time of 4.288ms every 16.25736ms. In 100ms, the transmitter can complete six full cycles with 2.45582ms remaining ( $6 \times 16.25736 = 97.54418\text{ms}$ .  $100\text{ms} - 97.54418\text{ms} = 2.45582\text{ms}$ ). 2.45582ms equates to 0.57272 of the transmitter 'on' time ( $2.45582/4.288 = 0.57272$ ). The maximum transmitter 'on' time in any 100ms period is therefore  $0.57272 \times 4.288\text{ms} = 28.18382\text{ms}$ .

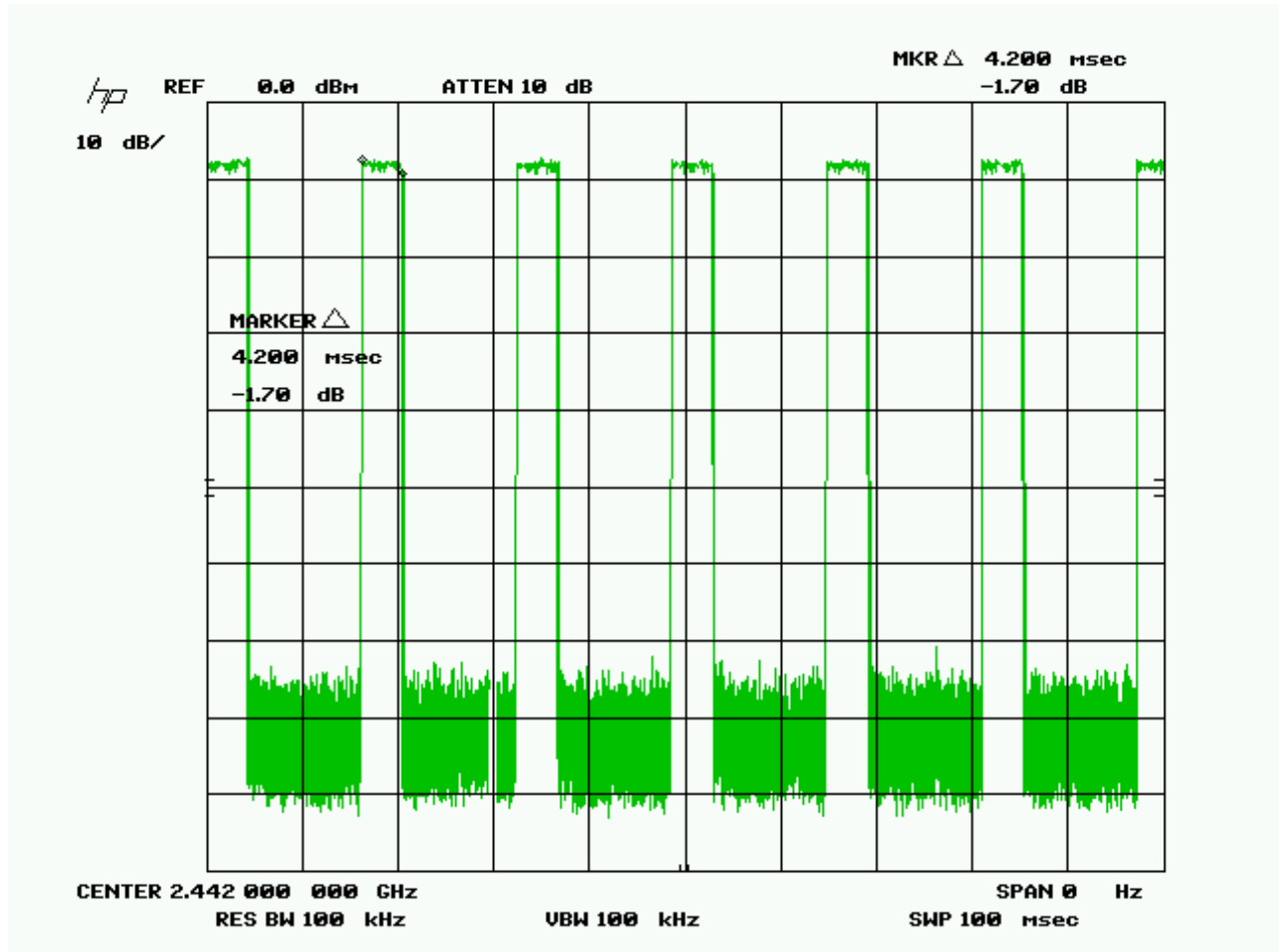
#### Conclusion


The maximum possible transmitter on time of the Ubisensor V3.0 is 28.18382ms in any 100ms period.

Therefore the duty cycle correction factor which should be applied to measurements of a continuous signal during testing =  $20\log(28.18382/100) = -11\text{ dB}$

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The following timing plot has also been supplied by the manufacturer:



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### 3 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 Date	Cal Interval
A12	Chase Bilog CBL6111A	1012	30/01/2013	1 year
A20	Alpha 61932500 Horn Antenna (18-26GHz)	50	#1	
A22	Alpha 61932400 Horn Antenna (12.4-18GHz)	55	#1	
A24	Chase X-wing Bilog CBL6144 26MHz-3GHz	27590	30/10/2012	1 year
A8	EMCO 3115 DR Guide	6070	30/01/2013	1 year
L1	EMCO 3825/2 LISN	1358	12/03/2013	1 year
L2	R&S ESH3-Z5 LISN	843862/9	13/03/2013	1 year
PRE10	LUCIX 100M-20G pre-amp	10	26/06/2013	1 year
PRE12	LUCIX 100M-20G pre-amp	12	26/06/2013	1 year
PRE15	LUCIX 18GHz to 26.5GHz	15	26/06/2013	1 year
R10	Narda PMM 9010 Receiver (10Hz-30MHz)	595WX11003	30/01/2013	1 year
R4	R&S ESVS10	421872	17/12/2012	1 year
R8	Agilent E7405A Spectrum Analyser	MY44212494	24/09/2012	1 year
R9	Agilent E7405A Spectrum Analyser	MY45110758	19/11/2012	1 year
RFF01	High Pass RF Filter 3GHz to 12.75GHz	1	10/03/2013	1 year
RFF04	Low Pass RF Filter 0MHz to 2GHz	4	10/03/2013	1 year
RFF15	Band Pass Filter 1GHz to 2GHz	15	10/03/2013	1 year

#1 Standard gain horns - correction factor determined by physical dimensions.



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## 4 Test Methods

### 4.1 Conducted Emissions - ac power

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.

Bench top EUTs and peripheral equipment are normally placed on a 0.8m high non-conducting bench, positioned 0.4m from one of the metallic walls of a screened room. Floor standing EUTs are normally placed 0.1m above the metallic floor of the screened room. Mains leads are bundled so as not to exceed 1m.

The EUT is powered using a 50ohm/50uH Line Impedance Stabilisation Network (LISN). Peripherals are powered using a second a 50ohm/50uH LISN. These LISNs are bonded to the screened room floor.

With the correct supply voltage applied to the EUT scans are performed on both the live and neutral line outputs of the LISN using quasi-peak detection over the specified frequency range. The results of these scans are shown in the plots section at the end of the report.

Significant emissions identified by the scans are measured and the results tabulated. The table of results is shown in the conducted emissions results section.

Final Level (dBuV) = Receiver Reading (dBuV) + Combined Cable & Attenuator Correction Factor (dB)

Example:

@ 20.258MHz Final Level = 21.7 + 10.3 = 32 dBuV

### 4.2 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 1m 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 875MHz receiver reading was 3.2dBuV and combined correction factor = 29.1 (dB/m).

Total field strength = 3.2 + 29.1 = 32.3dBuV/m.



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### 4.3 Antenna Conducted Measurements

Antenna conducted measurements were made in order to assess the occupied bandwidth of the transmission. For the purposes of this test a sample of the EUT was provided with a 50 ohm connector attached. This was connected directly to the spectrum analyser in order to make a direct measurement.

The results table and plots are contained in the following section.

## 5 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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## 5.1 Conducted Emissions (Power) - Results

Factor Set 1: L1\_12A AB002\_CBL005\_CBL039\_12A - -  
Factor Set 2: - - - -  
Factor Set 3: - - - -  
Test Equipment: R10 L1 L2

### Conducted Emissions (Power)

Company: Ubisense					Product: Ubisensor 3.0								
Date: 14/05/2013					Test Eng: Dave Smith								
Ports: ac power													
Test: ANSI C63.4:2003					using limits of 15.207								
Ports:													
Test:					using limits of								
Plot	Op Mode	Mod State	Line (L/N)	Fact Set	Freq. MHz	Det qp/av	Rec. Level dBuV	Corr'n Factor dB	Total Level dBuV	Limit 15.207 dBuV	Margin 15.207 dB	Notes	
1	1	0	L	1	0.160	qp	32.1	10.0	42.1	65.5	23.4		
1	1	0	L	1	0.160	av	22.4	10.0	32.4	55.5	23.1		
1	1	0	L	1	0.195	qp	25.7	10.0	35.7	63.8	28.1		
1	1	0	L	1	0.195	av	2.4	10.0	12.4	53.8	41.4		
1	1	0	L	1	20.258	qp	21.7	10.3	32.0	60.0	28.0		
1	1	0	L	1	20.258	av	16.8	10.3	27.1	50.0	22.9		
2	1	0	N	1	0.160	qp	32.4	10.0	42.4	65.5	23.0		
2	1	0	N	1	0.160	av	17.0	10.0	27.0	55.5	28.4		
2	1	0	N	1	12.220	qp	27.2	10.3	37.5	60.0	22.5		
2	1	0	N	1	12.220	av	23.4	10.3	33.7	50.0	16.3		
2	1	0	N	1	12.505	qp	25.2	10.3	35.5	60.0	24.5		
2	1	0	N	1	12.505	av	22.2	10.3	32.5	50.0	17.5		
Results										Minimum Margin PASS/FAIL			16.3 dB PASS
Notes	Comments and Observations												
Results of scans are shown in plots 1 and 2. Measurements were made on ac power port of PoE injector.													


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## 5.2 Radiated Emissions Results - Fundamental - Antenna A

Factor Set 1: A8\_3m\_12B CBL059\_CBL018\_CBL065\_CBL060\_10A PRE10\_12A 10dB\_PAD\_1  
Factor Set 2: - - - -  
Factor Set 3: - - - -  
Test Equipment: R9 A8

### Radiated Emissions

Company: Ubisense					Product: Ubisensor 3.0								
Date: 10/05/2013					Test Eng: Dave Smith								
Ports:													
Test: ANSI C63.4:2003					using limits of					15.249			
Ports: enclosure													
Test: ANSI C63.4:2003					using limits of					RSS 210 A2.9			
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_B dBuV/m	Margin FCC_B dB	Notes
15	Lo	0	3	1	2401.755	V	94.1	4.6		98.7	114.0	15.3	pk
15	Lo	0	3	1	2401.755	V	93.9	4.6	-11.0	87.5	94.0	6.5	avg
19	Lo	0	3	1	2401.755	H	98.0	4.6		102.6	114.0	11.4	pk
19	Lo	0	3	1	2401.755	H	97.8	4.6	-11.0	91.4	94.0	2.6	avg
15	Mid	0	3	1	2441.980	V	95.4	4.9		100.3	114.0	13.7	pk
15	Mid	0	3	1	2441.980	V	95.2	4.9	-11.0	89.0	94.0	5.0	avg
19	Mid	0	3	1	2441.980	H	99.4	4.9		104.2	114.0	9.8	pk
19	Mid	0	3	1	2441.980	H	99.2	4.9	-11.0	93.0	94.0	1.0	avg
15	Hi	0	3	1	2481.750	V	95.9	5.0		100.9	114.0	13.1	pk
15	Hi	0	3	1	2481.750	V	95.7	5.0	-11.0	89.7	94.0	4.3	avg
19	Hi	0	3	1	2481.970	H	99.1	5.0		104.1	114.0	9.9	pk
19	Hi	0	3	1	2481.970	H	98.9	5.0	-11.0	92.9	94.0	1.1	avg
Results											Minimum Margin		
											PASS/FAIL		
											1.0 dB		
											PASS		
Notes		Comments and Observations											
		Results of scans shown in plots 15 and 19.											
		Second correction factor is the duty cycle average factor.											
Key:		qp - quasi-peak, av - average, pk - peak											


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### 5.3 Radiated Emissions Results - Fundamental - Antenna B

Factor Set 1: A8\_3m\_12B CBL059\_CBL018\_CBL065\_CBL060\_10A PRE10\_12A 10dB PAD\_10  
Factor Set 2: - - -  
Factor Set 3: - - -  
Test Equipment: R9 A8

#### Radiated Emissions

Company: Ubisense					Product: Ubisensor 3.0								
Date: 10/05/2013					Test Eng: Dave Smith								
Ports:													
Test: ANSI C63.4:2003					using limits of					15.249			
Ports: enclosure													
Test: ANSI C63.4:2003					using limits of					RSS 210 A2.9			
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_B dBuV/m	Margin FCC_B dB	Notes
17	Lo	0	3	1	2401.755	V	97.6	4.6		102.1	114.0	11.9	pk
17	Lo	0	3	1	2401.755	V	97.2	4.6	-11.0	90.7	94.0	3.3	avg
21	Lo	0	3	1	2401.755	H	96.9	4.6		101.5	114.0	12.5	pk
21	Lo	0	3	1	2401.755	H	96.5	4.6	-11.0	90.1	94.0	3.9	avg
17	Mid	0	3	1	2441.980	V	95.5	4.9		100.3	114.0	13.7	pk
17	Mid	0	3	1	2441.980	V	95.2	4.9	-11.0	89.1	94.0	4.9	avg
21	Mid	0	3	1	2441.980	H	95.5	4.9		100.4	114.0	13.6	pk
21	Mid	0	3	1	2441.980	H	94.9	4.9	-11.0	88.7	94.0	5.3	avg
17	Hi	0	3	1	2481.750	V	93.9	5.0		98.9	114.0	15.1	pk
17	Hi	0	3	1	2481.750	V	94.0	5.0	-11.0	88.0	94.0	6.0	avg
21	Hi	0	3	1	2481.750	H	94.9	5.0		99.9	114.0	14.1	pk
21	Hi	0	3	1	2481.750	H	94.7	5.0	-11.0	88.7	94.0	5.3	avg
Results											Minimum Margin		
											PASS/FAIL		
Notes		Comments and Observations											
Results of scans shown in plots 17 and 21.													
Second correction factor is the duty cycle average factor.													
Key: qp - quasi-peak, av - average, pk - peak													


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## 5.4 Radiated Emissions Results - Spurious Emissions Below 1GHz - Vertical

Factor Set 1: A12\_FS\_12C CBL015\_11A - -  
Factor Set 2: - - - -  
Factor Set 3: - - - -  
Test Equipment: R4 A12 A24 R9 RFF04

### Radiated Emissions

Company: Ubisense					Product: Ubisensor 3.0										
Date: 14/05/2013					Test Eng: Dave Smith										
Ports:															
Test: ANSI C63.4:2003					using limits of				15.249						
Ports: enclosure															
Test: ANSI C63.4:2003					using limits of				RSS 210 A2.9						
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 15.209 dBuV/m	Margin 15.209 dB	Notes		
3	1	0	3	1	43.800	V	10.8	11.8		22.6	40.0	17.4			
3	1	0	3	1	48.475	V	13.4	9.4		22.8	40.0	17.2			
3	1	0	3	1	87.490	V	13.3	9.8		23.1	40.0	16.9			
3	1	0	3	1	98.696	V	14.5	11.2		25.7	43.5	17.8			
3	1	0	3	1	102.114	V	20.7	11.6		32.3	43.5	11.2			
3	1	0	3	1	104.700	V	23.2	11.9		35.1	43.5	8.4			
3	1	0	3	1	108.800	V	22.2	12.3		34.5	43.5	9.0			
3	1	0	3	1	110.800	V	21.0	12.6		33.6	43.5	9.9			
3	1	0	3	1	200.000	V	13.1	10.4		23.5	43.5	20.0			
3	1	0	3	1	250.000	V	24.8	15.0		39.8	46.0	6.2			
7	1	0	3	1	325.008	V	15.2	17.2		32.4	46.0	13.6			
7	1	0	3	1	350.020	V	14.7	17.9		32.6	46.0	13.4			
7	1	0	3	1	375.020	V	12.8	18.5		31.3	46.0	14.7			
7	1	0	3	1	500.000	V	7.1	22.2		29.2	46.0	16.8			
7	1	0	3	1	875.000	V	3.2	29.1		32.3	46.0	13.8			
Results											Minimum Margin		6.2 dB		
											PASS/FAIL		PASS		
Notes															
Comments and Observations															
Results of scans shown in plots 3 to 10. Results tabulated above were with EUT transmitting on Mid Channel on antenna A. The prescans show that emission levels in this band were not affected by changes in operating channel or transmit antenna. All measurements were made using a 120kHz QP detector.															


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## 5.5 Radiated Emissions Results - Spurious Emissions Below 1GHz - Horizontal

Factor Set 1: A12\_FS\_12C CBL015\_11A - -  
Factor Set 2: - - - -  
Factor Set 3: - - - -  
Test Equipment: R4 A12 A24 R9 RFF04

### Radiated Emissions

Company: Ubisense					Product: Ubisensor 3.0								
Date: 14/05/2013					Test Eng: Dave Smith								
Ports:													
Test: ANSI C63.4:2003					using limits of					15.209			
Ports: enclosure													
Test: ANSI C63.4:2003					using limits of					RSS 210 A2.9			
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 15.209 dBuV/m	Margin 15.209 dB	Notes
5	1	0	3	1	43.800	H	7.5	11.8		19.3	40.0	20.7	#1
5	1	0	3	1	48.475	H	9.7	9.4		19.1	40.0	20.9	
5	1	0	3	1	87.490	H	9.1	9.8		18.9	40.0	21.1	
5	1	0	3	1	98.696	H	18.4	11.2	7.0	36.6	43.5	6.9	
5	1	0	3	1	102.114	H	15.5	11.6		27.1	43.5	16.4	
5	1	0	3	1	104.700	H	22.6	11.9		34.5	43.5	9.0	
5	1	0	3	1	108.800	H	22.4	12.3		34.7	43.5	8.8	
5	1	0	3	1	110.783	H	20.2	12.6		32.8	43.5	10.7	
5	1	0	3	1	200.010	H	14.0	10.4		24.4	43.5	19.1	
5	1	0	3	1	250.000	H	29.0	15.0		44.0	46.0	2.0	
9	1	0	3	1	325.008	H	16.7	17.2		33.9	46.0	12.1	
9	1	0	3	1	350.020	H	19.0	17.9		36.9	46.0	9.1	
9	1	0	3	1	375.020	H	12.3	18.5		30.8	46.0	15.2	
9	1	0	3	1	500.000	H	11.9	22.2		34.1	46.0	11.9	
9	1	0	3	1	875.000	H	5.4	29.1		34.5	46.0	11.6	
Results											Minimum Margin		
											PASS/FAIL		
											2.0 dB		
											PASS		
Notes		Comments and Observations											
#1		<p>Results of scans shown in plots 3 to 10. Results tabulated above were with EUT transmitting on Mid Channel on antenna A. The prescans show that emission levels in this band were not affected by changes in operating channel or transmit antenna.</p> <p>This measurement was made with a 9kHz bandwidth average detector because of the presence of a high ambient. Measurements in the screened room showed a difference of 7dB between a 120kHz QP detector and a 9kHz average detector at this frequency so this was added as the second correction factor.</p> <p>All other measurements were made using a 120kHz QP detector</p>											


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## 5.6 Radiated Emissions Results - Spurious Above 1GHz - Low Channel

Factor Set 1:	A8_3m_12B PRE10_12A RFF01_12A BLUECABLES_13A	1 m cable
Factor Set 2:	- - - -	
Factor Set 3:	- - - -	
Test Equipment:	R9 A8 RFF15 RFF01 PRE10 A20 A22 PRE12 PRE15	

### Radiated Emissions

Company: Ubisense					Product: Ubisensor 3.0								
Date: 14/05/2013					Test Eng: Dave Smith								
Ports:													
Test: ANSI C63.4:2003					using limits of					15.249			
Ports: enclosure													
Test: ANSI C63.4:2003					using limits of					RSS 210 A2.9			
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 15.249 dBuV/m	Margin 15.249 dB	Notes
23	1	0	3	1	4803.410	V	61.3	-0.3		61.0	74.0	13.0	A, pk
23	1	0	3	1	4803.410	V	59.2	-0.3	-11.0	47.9	54.0	6.1	A, avg
25	1	0	3	1	4803.410	H	55.6	-0.3		55.3	74.0	18.7	A, pk
25	1	0	3	1	4803.410	H	52.9	-0.3	-11.0	41.6	54.0	12.4	A, avg
27	1	0	3	1	7205.300	V	48.5	3.2		51.7	74.0	22.3	A, pk
27	1	0	3	1	7205.300	V	42.8	3.2	-11.0	35.0	54.0	19.0	A, avg
29	1	0	3	1	7205.300	H	47.4	3.2		50.5	74.0	23.5	A, pk
29	1	0	3	1	7205.300	H	40.9	3.2	-11.0	33.1	54.0	20.9	A, avg
27	1	0	3	1	9607.715	V	47.0	7.1		54.0	74.0	20.0	A, pk
27	1	0	3	1	9607.715	V	36.2	7.1	-11.0	32.3	54.0	21.7	A, avg
29	1	0	3	1	9607.715	H	49.1	7.1		56.2	74.0	17.8	A, pk
29	1	0	3	1	9607.715	H	43.8	7.1	-11.0	39.9	54.0	14.1	A, avg
24	1	0	3	1	4803.410	V	59.7	-0.3		59.4	74.0	14.6	B, pk
24	1	0	3	1	4803.410	V	57.4	-0.3	-11.0	46.1	54.0	7.9	B, avg
26	1	0	3	1	4803.410	H	53.9	-0.3		53.7	74.0	20.3	B, pk
26	1	0	3	1	4803.410	H	50.9	-0.3	-11.0	39.6	54.0	14.4	B, avg
28	1	0	3	1	7205.300	V	49.2	3.2		52.4	74.0	21.6	B, pk
28	1	0	3	1	7205.300	V	43.4	3.2	-11.0	35.6	54.0	18.4	B, avg
30	1	0	3	1	7205.300	H	46.8	3.2		49.9	74.0	24.1	B, pk
30	1	0	3	1	7205.300	H	39.9	3.2	-11.0	32.1	54.0	21.9	B, avg
28	1	0	3	1	9607.715	V	48.7	7.1		55.8	74.0	18.2	B, pk
28	1	0	3	1	9607.715	V	42.3	7.1	-11.0	38.4	54.0	15.6	B, avg
30	1	0	3	1	9607.715	H	48.7	7.1		55.8	74.0	18.2	B, pk
30	1	0	3	1	9607.715	H	42.6	7.1	-11.0	38.6	54.0	15.4	B, avg
Results											Minimum Margin		
											PASS/FAIL		
											6.1 dB		
											PASS		
Notes		Comments and Observations											
		Results of scans shown in plots 11 to 34. A = antenna A: B = Antenna B Second correction factor is the duty cycle average factor. Key: qp - quasi-peak, av - average, pk - peak											

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## 5.7 Radiated Emissions Results - Spurious Above 1GHz - Mid Channel

Factor Set 1:	A8_3m_12B PRE10_12A RFF01_12A BLUECABLES_13A	1 m cable
Factor Set 2:	- - - -	
Factor Set 3:	- - - -	
Test Equipment:	R9 A8 RFF15 RFF01 PRE10 A20 A22 PRE12 PRE15	

### Radiated Emissions

Company: Ubisense					Product: Ubisensor 3.0								
Date: 14/05/2013					Test Eng: Dave Smith								
Ports:													
Test: ANSI C63.4:2003					using limits of				15.249				
Ports: enclosure													
Test: ANSI C63.4:2003					using limits of				RSS 210 A2.9				
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 15.249 dBuV/m	Margin 15.249 dB	Notes
23	1	0	3	1	4884.037	V	58.7	0.1		58.8	74.0	15.2	A ,pk
23	1	0	3	1	4884.037	V	55.5	0.1	-11.0	44.6	54.0	9.4	A, avg
25	1	0	3	1	4884.037	H	54.7	0.1		54.8	74.0	19.2	A ,pk
25	1	0	3	1	4884.037	H	51.5	0.1	-11.0	40.6	54.0	13.4	A, avg
27	1	0	3	1	7326.000	V	47.1	3.6		50.7	74.0	23.3	A ,pk
27	1	0	3	1	7326.000	V	39.1	3.6	-11.0	31.7	54.0	22.3	A, avg
29	1	0	3	1	7326.000	H	45.7	3.6		49.2	74.0	24.8	A ,pk
29	1	0	3	1	7326.000	H	36.8	3.6	-11.0	29.4	54.0	24.6	A, avg
27	1	0	3	1	9768.055	V	46.6	7.2		53.8	74.0	20.2	A ,pk
27	1	0	3	1	9768.055	V	41.3	7.2	-11.0	37.4	54.0	16.6	A, avg
29	1	0	3	1	9768.055	H	48.3	7.2		55.5	74.0	18.5	A ,pk
29	1	0	3	1	9768.055	H	41.2	7.2	-11.0	37.3	54.0	16.7	A, avg
24	1	0	3	1	4884.037	V	58.5	0.1		58.6	74.0	15.4	B, pk
24	1	0	3	1	4884.037	V	56.0	0.1	-11.0	45.2	54.0	8.8	B, avg
26	1	0	3	1	4884.037	H	53.2	0.1		53.3	74.0	20.7	B, pk
26	1	0	3	1	4884.037	H	50.1	0.1	-11.0	39.2	54.0	14.8	B, avg
28	1	0	3	1	7326.000	V	48.3	3.6		51.8	74.0	22.2	B, pk
28	1	0	3	1	7326.000	V	37.6	3.6	-11.0	30.2	54.0	23.8	B, avg
30	1	0	3	1	7326.000	H	46.2	3.6		49.8	74.0	24.2	B, pk
30	1	0	3	1	7326.000	H	39.2	3.6	-11.0	31.7	54.0	22.3	B, avg
28	1	0	3	1	9768.055	V	48.2	7.2		55.3	74.0	18.7	B, pk
28	1	0	3	1	9768.055	V	42.2	7.2	-11.0	38.4	54.0	15.6	B, avg
30	1	0	3	1	9768.055	H	48.2	7.2		55.4	74.0	18.6	B, pk
30	1	0	3	1	9768.055	H	42.3	7.2	-11.0	38.5	54.0	15.5	B, avg
Results											Minimum Margin		
											PASS/FAIL		
											8.8 dB		
											PASS		
Notes		Comments and Observations											
		Results of scans shown in plots 11 to 34. A = antenna A: B = Antenna B Second correction factor is the duty cycle average factor. Key: qp - quasi-peak, av - average, pk - peak											




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## 5.8 Radiated Emissions Results - Spurious Above 1GHz - High Channel

Factor Set 1:	A8_3m_12B PRE10_12A RFF01_12A BLUECABLES_13A	1 m cable
Factor Set 2:	- - - -	
Factor Set 3:	- - - -	
Test Equipment:	R9 A8 RFF15 RFF01 PRE10 A20 A22 PRE12 PRE15	

### Radiated Emissions

Company: Ubisense					Product: Ubisensor 3.0								
Date: 14/05/2013					Test Eng: Dave Smith								
Ports:													
Test: ANSI C63.4:2003					using limits of					15.249			
Ports: enclosure													
Test: ANSI C63.4:2003					using limits of					RSS 210 A2.9			
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 15.249 dBuV/m	Margin 15.249 dB	Notes
23	1	0	3	1	4963.486	V	54.4	0.4		54.9	74.0	19.1	A ,pk
23	1	0	3	1	4963.486	V	51.6	0.4	-11.0	41.0	54.0	13.0	A, avg
25	1	0	3	1	4963.486	H	51.7	0.4		52.1	74.0	21.9	A ,pk
25	1	0	3	1	4963.486	H	48.2	0.4	-11.0	37.7	54.0	16.3	A, avg
27	1	0	3	1	7445.260	V	45.9	4.0		49.9	74.0	24.1	A ,pk
27	1	0	3	1	7445.260	V	38.9	4.0	-11.0	31.9	54.0	22.1	A, avg
29	1	0	3	1	7445.260	H	41.7	4.0		45.7	74.0	28.3	A ,pk
29	1	0	3	1	7445.260	H	31.0	4.0	-11.0	24.0	54.0	30.0	A, avg
27	1	0	3	1	9926.960	V	46.3	7.9		54.2	74.0	19.8	A ,pk
27	1	0	3	1	9926.960	V	39.4	7.9	-11.0	36.3	54.0	17.7	A, avg
29	1	0	3	1	9926.960	H	46.2	7.9		54.1	74.0	19.9	A ,pk
29	1	0	3	1	9926.960	H	39.7	7.9	-11.0	36.6	54.0	17.4	A, avg
24	1	0	3	1	4963.486	V	55.2	0.4		55.7	74.0	18.3	B, pk
24	1	0	3	1	4963.486	V	52.3	0.4	-11.0	41.8	54.0	12.2	B, avg
26	1	0	3	1	4963.486	H	51.3	0.4		51.8	74.0	22.2	B, pk
26	1	0	3	1	4963.486	H	47.7	0.4	-11.0	37.2	54.0	16.8	B, avg
28	1	0	3	1	7445.260	V	45.2	4.0		49.2	74.0	24.8	B, pk
28	1	0	3	1	7445.260	V	38.3	4.0	-11.0	31.3	54.0	22.7	B, avg
30	1	0	3	1	7445.260	H	45.1	4.0		49.0	74.0	25.0	B, pk
30	1	0	3	1	7445.260	H	37.4	4.0	-11.0	30.4	54.0	23.6	B, avg
28	1	0	3	1	9926.960	V	48.1	7.9		56.0	74.0	18.0	B, pk
28	1	0	3	1	9926.960	V	41.4	7.9	-11.0	38.3	54.0	15.7	B, avg
30	1	0	3	1	9926.960	H	48.1	7.9		56.0	74.0	18.0	B, pk
30	1	0	3	1	9926.960	H	41.4	7.9	-11.0	38.3	54.0	15.7	B, avg
Results											Minimum Margin		
											PASS/FAIL		
											12.2 dB		
											PASS		
Notes		Comments and Observations											
		Results of scans shown in plots 11 to 34. A = antenna A: B = Antenna B Second correction factor is the duty cycle average factor. Key: qp - quasi-peak, av - average, pk - peak											


	Report No: <b>R3232</b>	FCC ID: SEASENSOR30	
	Issue No: <b>1</b>	IC: 8673A-SENSOR30	
	Test No: <b>T5014</b>	<b>Test Report</b>	
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## 5.9 Radiated Emissions Results - Band Edges

Factor Set 1:	A8_3m_12B CBL059_CBL018_CBL065_CBL060_10A PRE10_12A SEL_ANTENNA	1 m cable
Factor Set 2:	- - - -	
Factor Set 3:	- - - -	
Test Equipment:	R9 A8	

### Radiated Emissions

Company: Ubisense					Product: Ubisensor 3.0								
Date: 10/05/2013					Test Eng: Dave Smith								
Ports:													
Test: ANSI C63.4:2003					using limits of			15.249		=FCC B			
Ports: enclosure													
Test: ANSI C63.4:2003					using limits of			RSS 210 A2.9					
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_B dBuV/m	Margin FCC_B dB	Notes
35	1	0	3	1	2400.000	V	46.9	4.6		51.4	74.0	22.6	A, pk
35	1	0	3	1	2400.000	V	46.6	4.6	-11.0	40.2	54.0	13.8	A, avg
36	1	0	3	1	2400.000	H	50.1	4.6		54.6	74.0	19.4	A, pk
36	1	0	3	1	2400.000	H	49.9	4.6	-11.0	43.4	54.0	10.6	A, avg
37	1	0	3	1	2399.900	V	50.2	4.6		54.8	74.0	19.2	B, pk
37	1	0	3	1	2399.900	V	49.8	4.6	-11.0	43.4	54.0	10.6	B, avg
38	1	0	3	1	2400.000	H	52.9	4.6		57.5	74.0	16.5	B, pk
38	1	0	3	1	2400.000	H	52.5	4.6	-11.0	46.1	54.0	7.9	B, avg
39	1	0	3	1	2484.220	V	50.5	5.0		55.5	74.0	18.5	A, pk
39	1	0	3	1	2484.220	V	50.2	5.0	-11.0	44.2	54.0	9.8	A, avg
40	1	0	3	1	2483.775	H	52.8	5.0		57.8	74.0	16.2	A, pk
40	1	0	3	1	2483.775	H	52.6	5.0	-11.0	46.6	54.0	7.4	A, avg
41	1	0	3	1	2484.175	V	53.0	5.0		58.0	74.0	16.0	B, pk
41	1	0	3	1	2484.175	V	53.0	5.0	-11.0	47.0	54.0	7.0	B, avg
42	1	0	3	1	2481.750	H	49.1	5.0		54.1	74.0	19.9	B, pk
42	1	0	3	1	2481.750	H	48.9	5.0	-11.0	42.9	54.0	11.1	B, avg
Results											Minimum Margin		
											PASS/FAIL		
											7.0 dB		
											PASS		
Notes		Comments and Observations											
		Results of scans shown in plots 35 to 42.											
		These measurements were made using the delta technique of KDB913591. Peak and average measurements were made at the fundamental with a 1 MHz bw detector. Measurements were then made at the fundamental and bandedge with a 30kHz bw peak detector to establish the delta. The delta was applied to the fundamental frequency readings to give the values recorded above. The second correction factor is the duty cycle average factor.											
Key:		qp - quasi-peak, av - average, pk - peak											

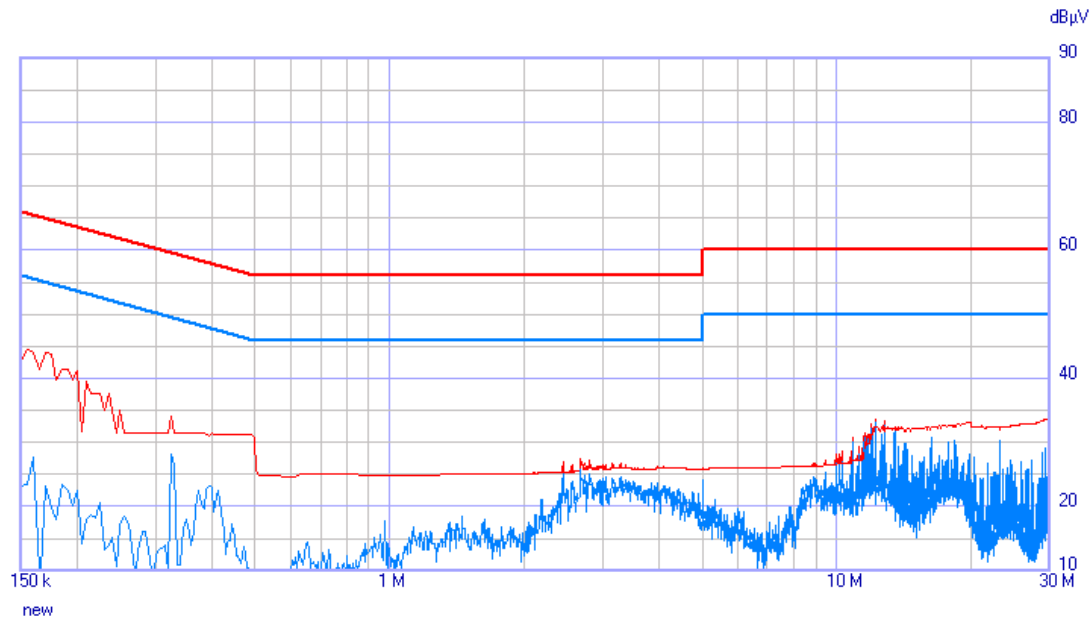
	Report No: <b>R3232</b> Issue No: <b>1</b>	FCC ID: SEASENSOR30 IC: 8673A-SENSOR30	
	Test No: <b>T5014</b>	<b>Test Report</b>	Page: 27 of 71

## 5.10 Occupied Bandwidth

Occupied bandwidth measurements were made as shown in Plots 43 and 44.

Lower channel occupied bandwidth = 746kHz

Upper channel occupied bandwidth = 777kHz



	Start [MHz]	Stop [MHz]	Step	Detector	Hold Time	RBW	Min Att	Pre Amp	Pre Sel	Prompt start	Ancillary
1	0.15	30	AUTO (5 kHz)	P Q A pwr_B_QP Margin 5 dB	20 ms	9 kHz	10	OFF	ON	...	...
2	0.15	0.151	500 Hz	P pwr_B_Avg Margin 0 dB	1.9 ms	9 kHz	10	OFF	ON	...	...

Ancillary = General

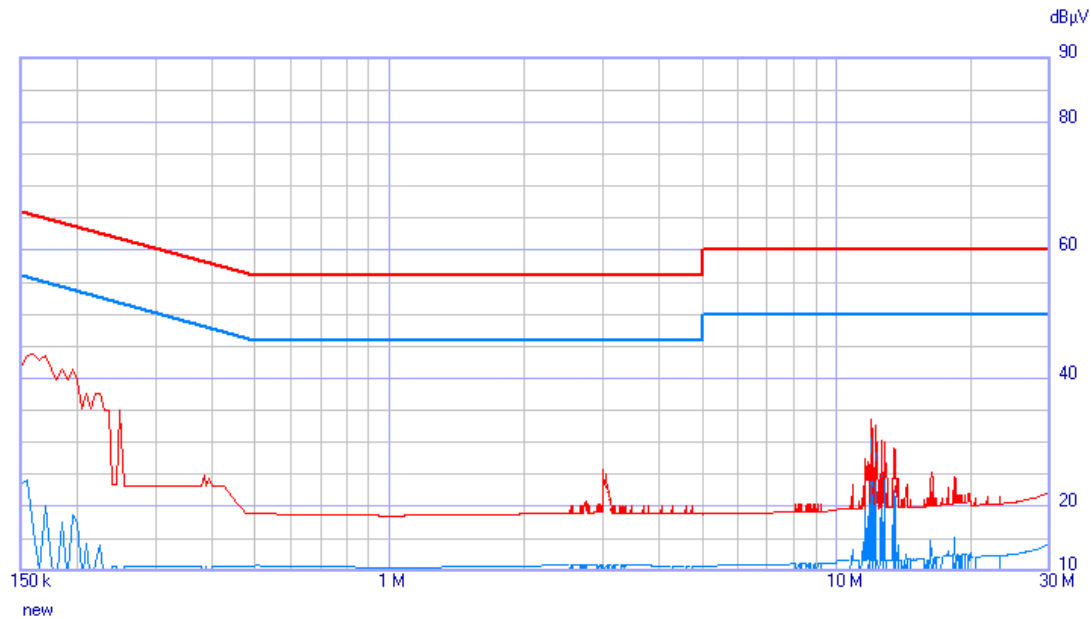
Limits:  
pwr\_B\_QP  
pwr\_B\_Avg

Factors:  
L1  
AB002\_CBL005\_CBL039

QPeak —  
Avg —

## PLOT 1 Conducted Emissions - Live Line

Company:	Ubisense	Product:	Ubisensor V3.0
Date:	14 May 13	Test Engineer:	Dave Smith
Test:	FCC part 15	Limit:	Class B
Notes:			
Sensor 12 configured as a timing source. Timing port 3 connected to sensor 16 configured as a timing sink (which takes timing signal from it's timing port). Sensor 12 connected to PoE ethernet switch (via PoE injector). USB stick connected to sensor 12.			
Transmitting on mid channel with modulation at power level 191			
Line:	Live	Attenuator:	10dB PAD
Detector:	Q/Avg	Operating Mode:	1
LISN:	EMCO	Mod. State:	0
		Filename:	C351440E.png
		Receiver	R10



	Start [MHz]	Stop [MHz]	Step	Detector	Hold Time	RBW	Min Att	Pre Amp	Pre Sel	Prompt start	Ancillary
1	0.15	30	AUTO (5 kHz)	P Q A pwr_B_QP Margin 5 dB	20 ms	9 kHz	10	OFF	ON	...	...
2	0.15	0.151	500 Hz	P pwr_B_Avg Margin 0 dB	1.9 ms	9 kHz	10	OFF	ON	...	...

Ancillary = General

Limits:

pwr\_B\_QP  
pwr\_B\_Avg

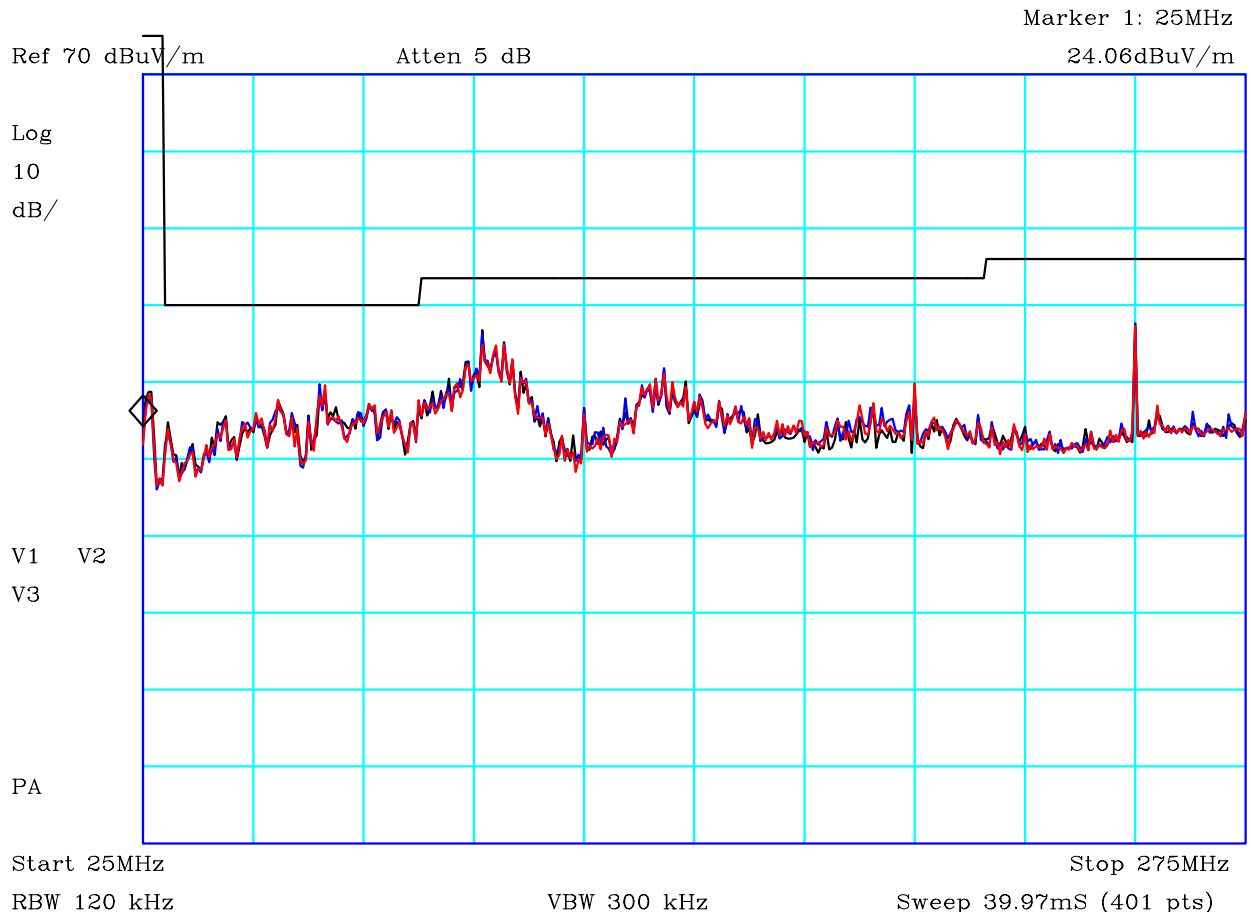
Factors:

L1  
AB002\_CBL005\_CBL039

QPeak —  
Avg —

## PLOT 2 Conducted Emissions - Neutral Line


Company:	Ubisense	Product:	Ubisensor V3.0
Date:	14 May 13	Test Engineer:	Dave Smith
Test:	FCC part 15	Limit:	Class B
Notes:			
Sensor 12 configured as a timing source. Timing port 3 connected to sensor 16 configured as a timing sink (which takes timing signal from it's timing port). Sensor 12 connected to PoE ethernet switch (via PoE injector). USB stick connected to sensor 12.			
Transmitting on mid channel with modulation at power level 191			
Line:	Neutral	Attenuator:	10dB PAD
Detector:	Q/Avg	Operating Mode:	1
LISN:	EMCO	Mod. State:	0
		Receiver	R10
		Filename:	C3514428.png

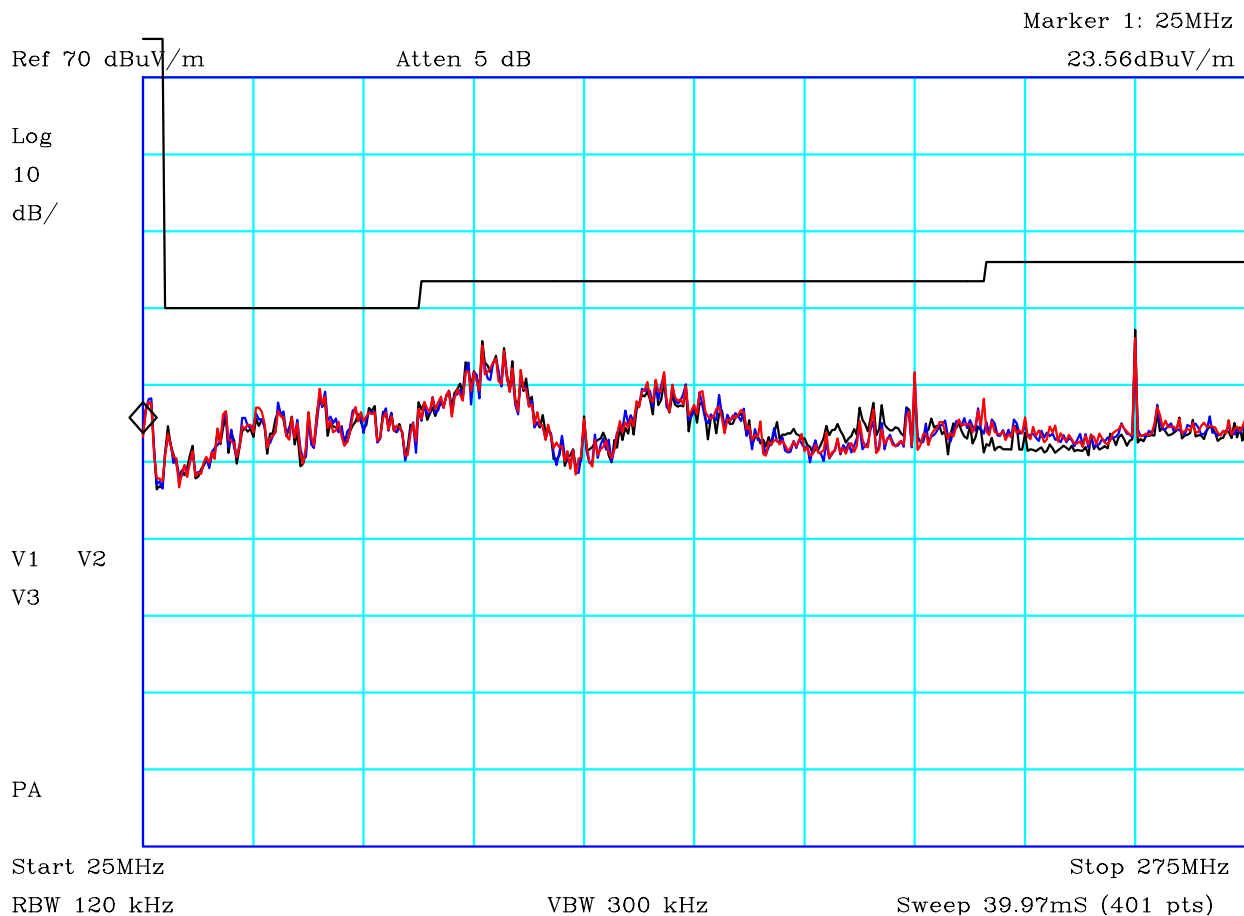


CF1:A24\_3m\_130215   CF2:CBL059\_CBL018\_CBL065\_CBL060\_100806   CF3:RFF04\_120716

### PLOT 3 Radiated Emissions - Antenna A - Vertical - 25MHz to 275MHz

Company:	Ubisense	Product:	Ubisensor V3
Date:	10/05/2013	Test Eng:	Dave Smith
Method:	ANSI C63.4	Method:	
Limit1:(BLK)	FCC(B)@3m	Limit2:	
Limit3:		Limit4:	
<p>Black: Low Channel Blue: Middle Channel Red: high Channel</p> <p>Sensor 12 in room, configured as a timing source. Timing port 3 connected to remote sensor 16 configured as a timing sink (which takes timing signal from it's timing port). Sensor 12 connected to PoE ethernet switch (also in room). PoE switch connected to remote switch. USB stick connected to sensor 12.</p> <p>Transmitting on antenna A. Continuous transmission with modulation at power level 191.</p>			
Facility:	Anech_2	Height	1.5m
Distance	3m	Polarisation	Vertical
Angle	0-360	File:	H341051B
		Mode:	1
		Modification State:	0
		Analysar:	R9

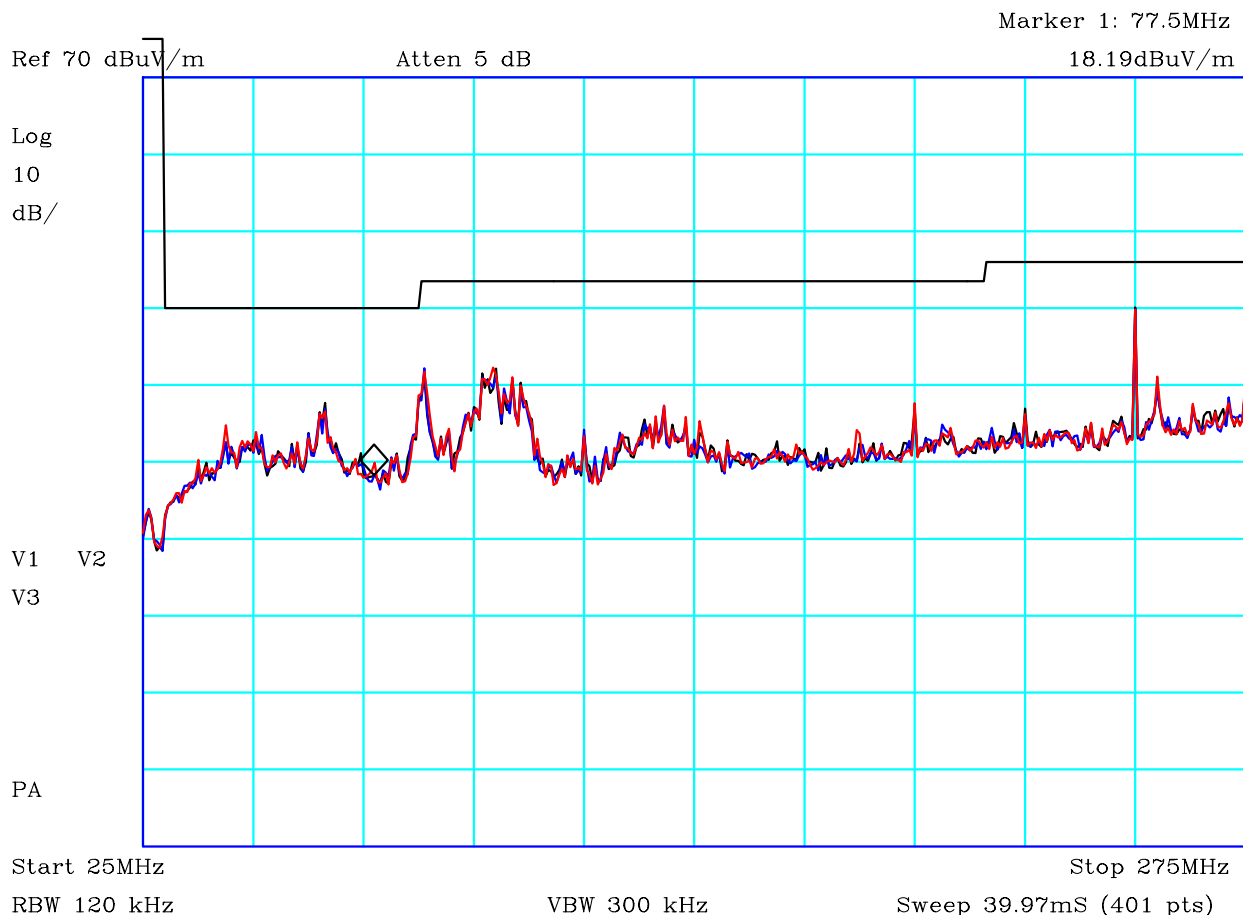
	Report No: <b>R3232</b>	FCC ID: SEASENSOR30	
	Issue No: <b>1</b>	IC: 8673A-SENSOR30	
	Test No: <b>T5014</b>	<b>Test Report</b>	
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CF1:A24\_3m\_130215 CF2:CBL059\_CBL018\_CBL065\_CBL060\_100806 CF3:RFF04\_120716

#### PLOT 4 Radiated Emissions - Antenna B - Vertical - 25MHz to 275MHz

Company:	Ubisense	Product:	Ubisensor V3
Date:	10/05/2013	Test Eng:	Dave Smith
Method:	ANSI C63.4	Method:	
Limit1:(BLK)	FCC(B)@3m	Limit2:	
Limit3:		Limit4:	
<p>Black: Low Channel Blue: Middle Channel Red: high Channel</p> <p>Sensor 12 in room, configured as a timing source. Timing port 3 connected to remote sensor 16 configured as a timing sink (which takes timing signal from it's timing port). Sensor 12 connected to PoE ethernet switch (also in room). PoE switch connected to remote switch. USB stick connected to sensor 12.</p> <p>Transmitting on antenna B. Continuous transmission with modulation at power level 191.</p>			
Facility:	Anech_2	Height	1.5m
Distance	3m	Polarisation	Vertical
Angle	0-360	File:	H3410522
		Mode:	1
		Modification State:	0
		Analyser:	R9

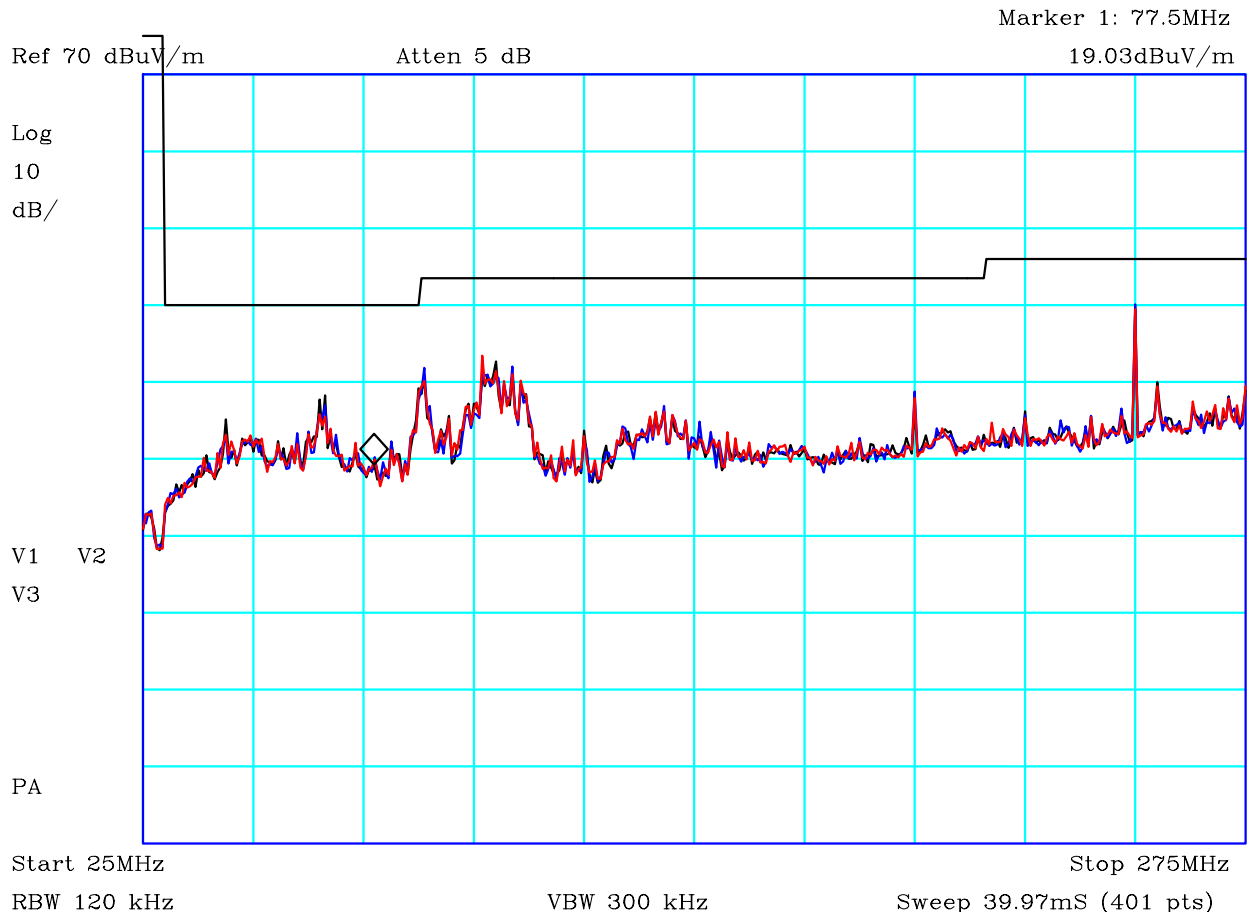


CF1:A24\_3m\_130215   CF2:CBL059\_CBL018\_CBL065\_CBL060\_100806   CF3:RFF04\_120716

## PLOT 5 Radiated Emissions - Antenna A - Horizontal - 25MHz to 275MHz

Company:	Ubisense	Product:	Ubisensor V3
Date:	10/05/2013	Test Eng:	Dave Smith
Method:	ANSI C63.4	Method:	
Limit1:(BLK)	FCC(B)@3m	Limit2:	
Limit3:		Limit4:	
<p>Black: Low Channel Blue: Middle Channel Red: high Channel</p> <p>Sensor 12 in room, configured as a timing source. Timing port 3 connected to remote sensor 16 configured as a timing sink (which takes timing signal from it's timing port). Sensor 12 connected to PoE ethernet switch (also in room). PoE switch connected to remote switch. USB stick connected to sensor 12.</p> <p>Transmitting on antenna A. Continuous transmission with modulation at power level 191.</p>			
Facility:	Anech_2	Height	1.5m
Distance	3m	Polarisation	Horizontal
Angle	0-360	File:	H3410528
		Mode:	1
		Modification State:	0
		Analysar:	R9






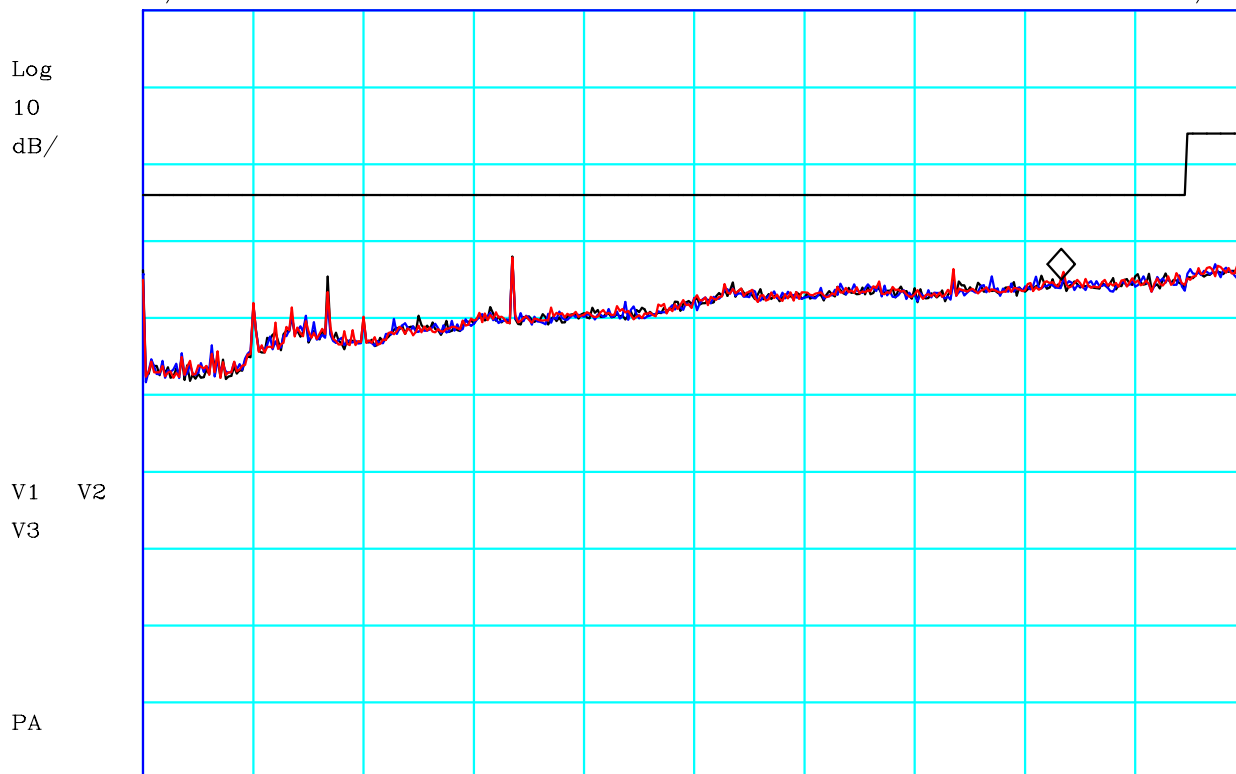
CF1:A24\_3m\_130215 CF2:CBL059\_CBL018\_CBL065\_CBL060\_100806 CF3:RFF04\_120716

## PLOT 6 Radiated Emissions - Antenna B - Horizontal - 25MHz to 275MHz

Company:	Ubisense	Product:	Ubisensor V3
Date:	10/05/2013	Test Eng:	Dave Smith
Method:	ANSI C63.4	Method:	
Limit1:(BLK)	FCC(B)@3m	Limit2:	
Limit3:		Limit4:	
<p>Black: Low Channel Blue: Middle Channel Red: high Channel</p> <p>Sensor 12 in room, configured as a timing source. Timing port 3 connected to remote sensor 16 configured as a timing sink (which takes timing signal from it's timing port). Sensor 12 connected to PoE ethernet switch (also in room). PoE switch connected to remote switch. USB stick connected to sensor 12.</p> <p>Transmitting on antenna B. Continuous transmission with modulation at power level 191.</p>			
Facility:	Anech_2	Height	1.5m
Distance	3m	Polarisation	Horizontal
Angle	0-360	File:	H341052D
		Mode:	1
		Modification State:	0
		Analysar:	R9

	Report No: <b>R3232</b>	FCC ID: SEASENSOR30 IC: 8673A-SENSOR30	
	Issue No: <b>1</b>		
	Test No: <b>T5014</b>	<b>Test Report</b>	Page: <b>34 of 71</b>

Ref 70 dBuV/m      Atten 5 dB      Marker 1: 876.3MHz      34.92dBuV/m




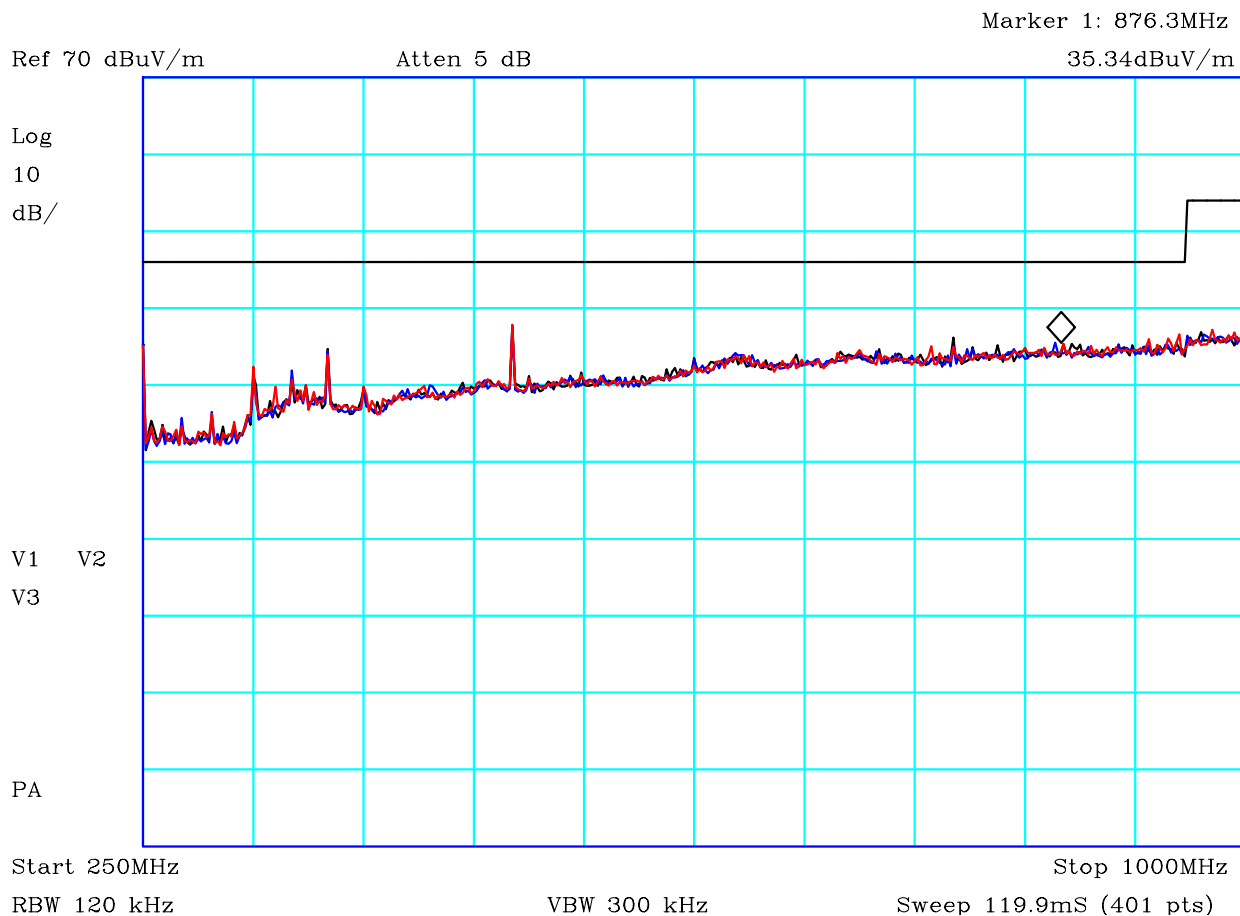
Start 250MHz      Stop 1000MHz  
RBW 120 kHz      VBW 300 kHz      Sweep 119.9mS (401 pts)

CF1:A24\_3m\_130215   CF2:CBL059\_CBL018\_CBL065\_CBL060\_100806   CF3:RFF04\_120716

## PLOT 7 Radiated Emissions - Antenna A - Vertical - 250MHz to 1GHz

Company:	Ubisense	Product:	Ubisensor V3
Date:	10/05/2013	Test Eng:	Dave Smith
Method:	ANSI C63.4	Method:	
Limit1:(BLK)	FCC(B)@3m	Limit2:	
Limit3:		Limit4:	
<p>Black: Low Channel Blue: Middle Channel Red: high Channel</p> <p>Sensor 12 in room, configured as a timing source. Timing port 3 connected to remote sensor 16 configured as a timing sink (which takes timing signal from it's timing port). Sensor 12 connected to PoE ethernet switch (also in room). PoE switch connected to remote switch. USB stick connected to sensor 12.</p> <p>Transmitting on antenna A. Continuous transmission with modulation at power level 191.</p>			
Facility:	Anech_2	Height	1.5m
Distance	3m	Polarisation	Vertical
Angle	0-360	File:	H3410545
		Mode:	1
		Modification State:	0
		Analyser:	R9


	Report No: <b>R3232</b>	FCC ID: SEASENSOR30 IC: 8673A-SENSOR30	
	Issue No: <b>1</b>		
	Test No: <b>T5014</b>	<b>Test Report</b>	Page: 35 of 71

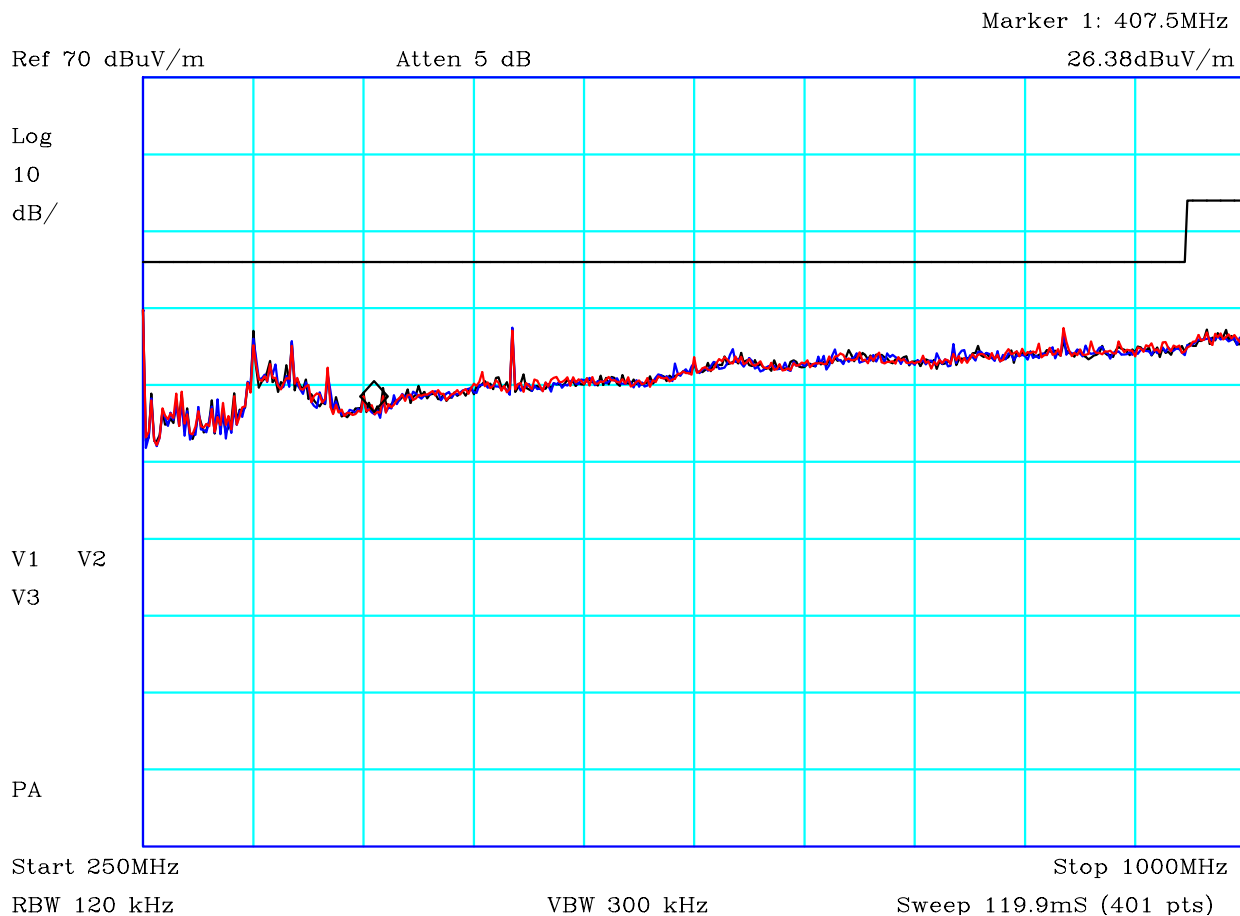


CF1:A24\_3m\_130215   CF2:CBL059\_CBL018\_CBL065\_CBL060\_100806   CF3:RFF04\_120716

## PLOT 8 Radiated Emissions - Antenna B - Vertical - 250MHz to 1GHz

Company:	Ubisense	Product:	Ubisensor V3
Date:	10/05/2013	Test Eng:	Dave Smith
Method:	ANSI C63.4	Method:	
Limit1:(BLK)	FCC(B)@3m	Limit2:	
Limit3:		Limit4:	
<p>Black: Low Channel Blue: Middle Channel Red: high Channel</p> <p>Sensor 12 in room, configured as a timing source. Timing port 3 connected to remote sensor 16 configured as a timing sink (which takes timing signal from it's timing port). Sensor 12 connected to PoE ethernet switch (also in room). PoE switch connected to remote switch. USB stick connected to sensor 12.</p> <p>Transmitting on antenna B. Continuous transmission with modulation at power level 191.</p>			
Facility:	Anech_2	Height	1.5m
Distance	3m	Polarisation	Vertical
Angle	0-360	File:	H341054A
		Mode:	1
		Modification State:	0
		Analyser:	R9


	Report No: <b>R3232</b>	FCC ID: SEASENSOR30 IC: 8673A-SENSOR30	
	Issue No: <b>1</b>		
	Test No: <b>T5014</b>	<b>Test Report</b>	Page: 36 of 71



CF1:A24\_3m\_130215 CF2:CBL059\_CBL018\_CBL065\_CBL060\_100806 CF3:RFF04\_120716

## PLOT 9 Radiated Emissions - Antenna A - Horizontal - 250MHz to 1GHz

Company:	Ubisense	Product:	Ubisensor V3
Date:	10/05/2013	Test Eng:	Dave Smith
Method:	ANSI C63.4	Method:	
Limit1:(BLK)	FCC(B)@3m	Limit2:	
Limit3:		Limit4:	
<p>Black: Low Channel Blue: Middle Channel Red: high Channel</p> <p>Sensor 12 in room, configured as a timing source. Timing port 3 connected to remote sensor 16 configured as a timing sink (which takes timing signal from it's timing port). Sensor 12 connected to PoE ethernet switch (also in room). PoE switch connected to remote switch. USB stick connected to sensor 12.</p> <p>Transmitting on antenna A. Continuous transmission with modulation at power level 191.</p>			
Facility:	Anech_2	Height	1.5m
Distance	3m	Polarisation	Horizontal
Angle	0-360	File:	H3410539
		Mode:	1
		Modification State:	0
		Analysar:	R9

	Report No: <b>R3232</b>	FCC ID: SEASENSOR30	
	Issue No: <b>1</b>	IC: 8673A-SENSOR30	
	Test No: <b>T5014</b>	<b>Test Report</b>	
			Page: 37 of 71

Marker 1: 407.5MHz

Ref 70 dBuV/m

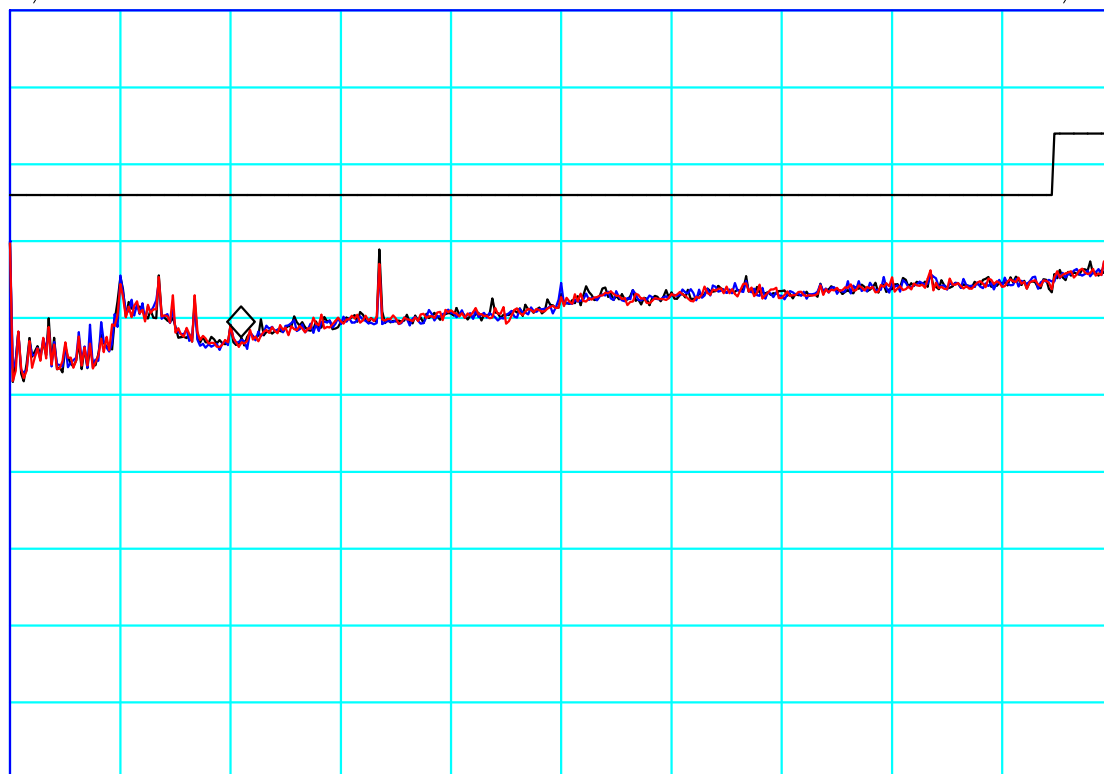
Atten 5 dB

27.38dBuV/m

Log  
10  
dB/

V1 V2  
V3

PA



Start 250MHz

Stop 1000MHz

RBW 120 kHz


VBW 300 kHz

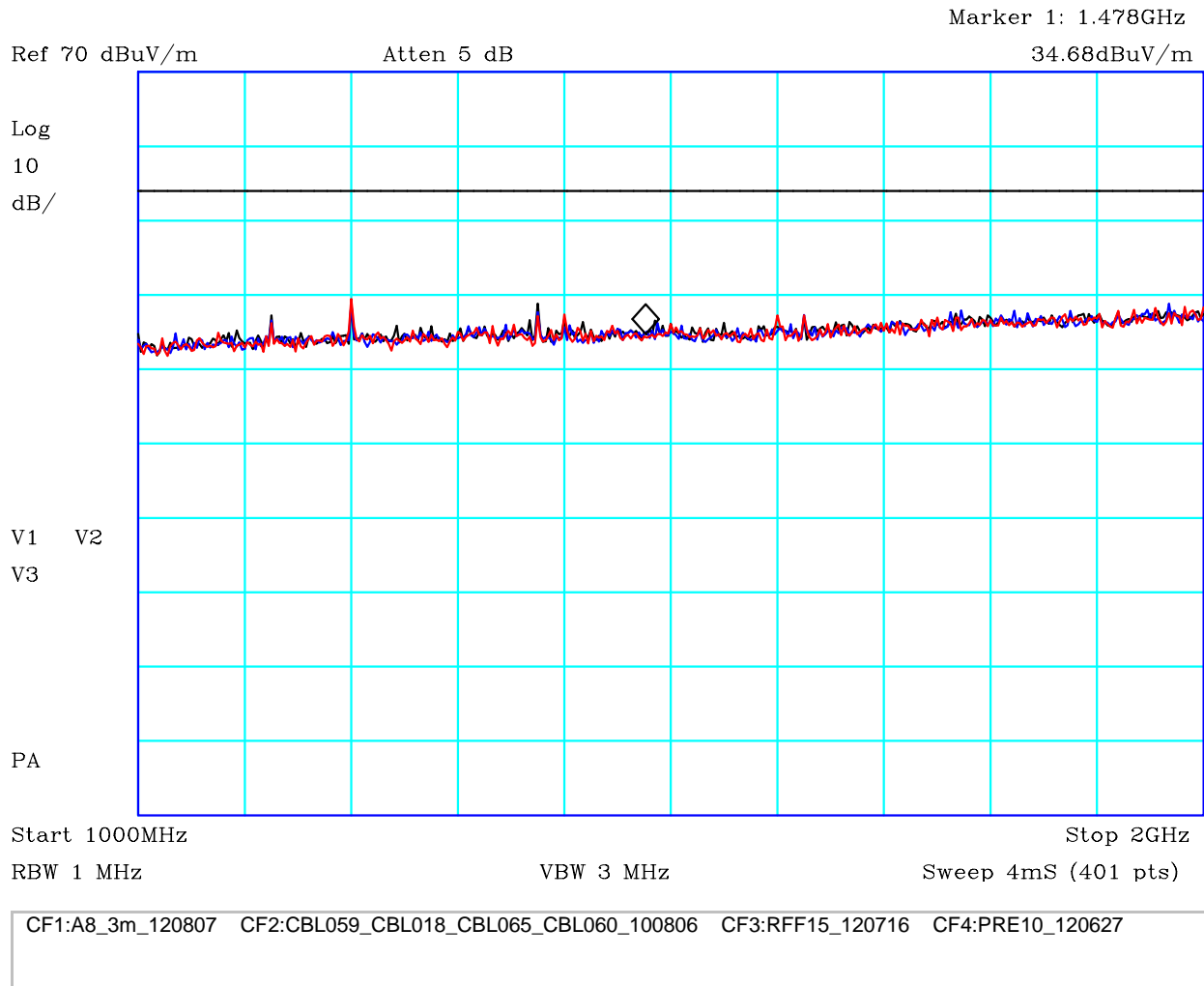
Sweep 119.9mS (401 pts)

CF1:A24\_3m\_130215 CF2:CBL059\_CBL018\_CBL065\_CBL060\_100806 CF3:RFF04\_120716

## PLOT 10 Radiated Emissions - Antenna B - Horizontal - 250MHz to 1GHz


Company:	Ubisense	Product:	Ubisensor V3
Date:	10/05/2013	Test Eng:	Dave Smith
Method:	ANSI C63.4	Method:	
Limit1:(BLK)	FCC(B)@3m	Limit2:	
Limit3:		Limit4:	
<p>Black: Low Channel Blue: Middle Channel Red: high Channel</p> <p>Sensor 12 in room, configured as a timing source. Timing port 3 connected to remote sensor 16 configured as a timing sink (which takes timing signal from it's timing port). Sensor 12 connected to PoE ethernet switch (also in room). PoE switch connected to remote switch. USB stick connected to sensor 12.</p> <p>Transmitting on antenna B. Continuous transmission with modulation at power level 191.</p>			
Facility:	Anech_2	Height	1.5m
Distance	3m	Polarisation	Horizontal
Angle	0-360	File:	H341053F
		Mode:	1
		Modification State:	0
		Analyser:	R9

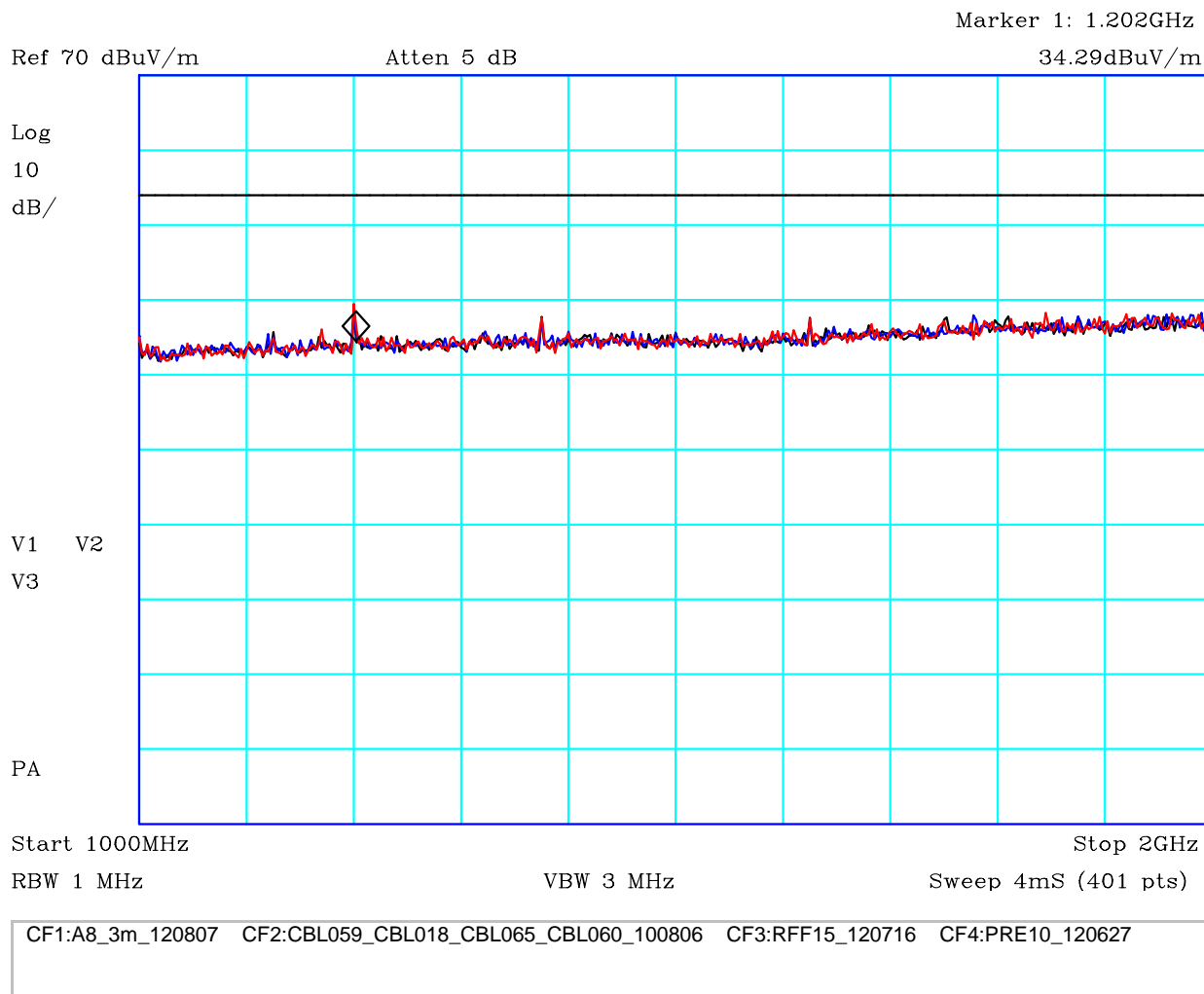
	Report No: <b>R3232</b>	FCC ID: SEASENSOR30 IC: 8673A-SENSOR30	
	Issue No: <b>1</b>		
	Test No: <b>T5014</b>	<b>Test Report</b>	Page: <b>38 of 71</b>



## PLOT 11 Radiated Emissions - Antenna A - Vertical - 1GHz to 2GHz


Company:	Ubisense	Product:	Ubisensor V3
Date:	10/05/2013	Test Eng:	Dave Smith
Method:	ANSI C63.4	Method:	
Limit1:(BLK)	FCC(B)@3m	Limit2:	
Limit3:		Limit4:	
<p>Black: Low Channel Blue: Middle Channel Red: high Channel</p> <p>Sensor 12 in room, configured as a timing source. Timing port 3 connected to remote sensor 16 configured as a timing sink (which takes timing signal from it's timing port). Sensor 12 connected to PoE ethernet switch (also in room). PoE switch connected to remote switch. USB stick connected to sensor 12.</p> <p>Transmitting on antenna A. Continuous transmission with modulation at power level 191.</p>			
Facility:	Anech_2	Height	1m
Distance	3m	Polarisation	Vertical
Angle	0-360	File:	H34105CE
		Mode:	1
		Modification State:	0
		Analysers:	R9

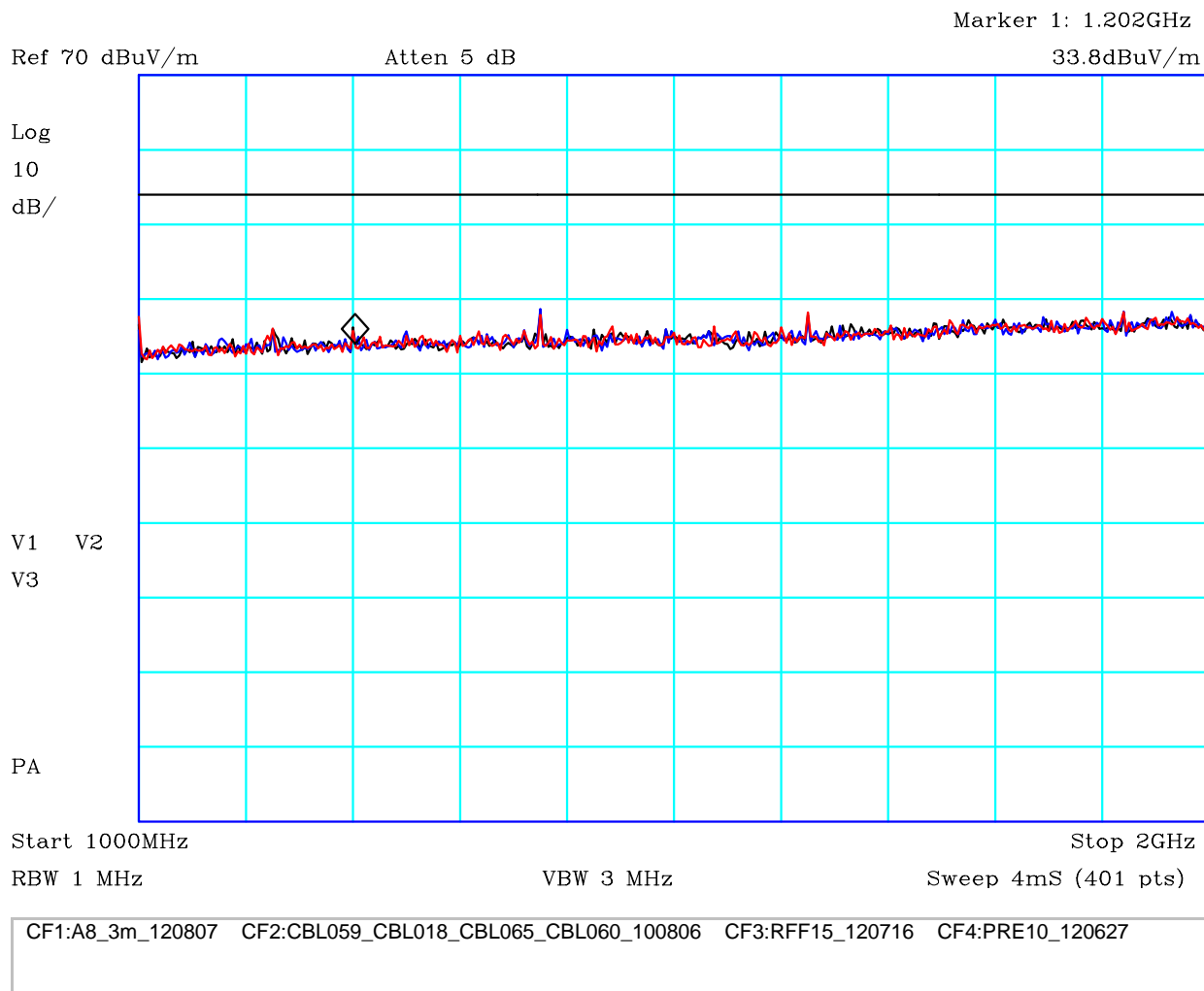
	Report No: <b>R3232</b>	FCC ID: SEASENSOR30 IC: 8673A-SENSOR30	
	Issue No: <b>1</b>		
	Test No: <b>T5014</b>	<b>Test Report</b>	Page: 39 of 71



## PLOT 12 Radiated Emissions - Antenna B - Vertical - 1GHz to 2GHz

Company:	Ubisense	Product:	Ubisensor V3
Date:	10/05/2013	Test Eng:	Dave Smith
Method:	ANSI C63.4	Method:	
Limit1:(BLK)	FCC(B)@3m	Limit2:	
Limit3:		Limit4:	
<p>Black: Low Channel Blue: Middle Channel Red: high Channel</p> <p>Sensor 12 in room, configured as a timing source. Timing port 3 connected to remote sensor 16 configured as a timing sink (which takes timing signal from it's timing port). Sensor 12 connected to PoE ethernet switch (also in room). PoE switch connected to remote switch. USB stick connected to sensor 12.</p> <p>Transmitting on antenna B. Continuous transmission with modulation at power level 191.</p>			
Facility:	Anech_2	Height	1m
Distance	3m	Polarisation	Vertical
Angle	0-360	File:	H34105D4
		Mode:	1
		Modification State:	0
		Analysers:	R9


	Report No: <b>R3232</b>	FCC ID: SEASENSOR30	
	Issue No: <b>1</b>	IC: 8673A-SENSOR30	
	Test No: <b>T5014</b>	<b>Test Report</b>	
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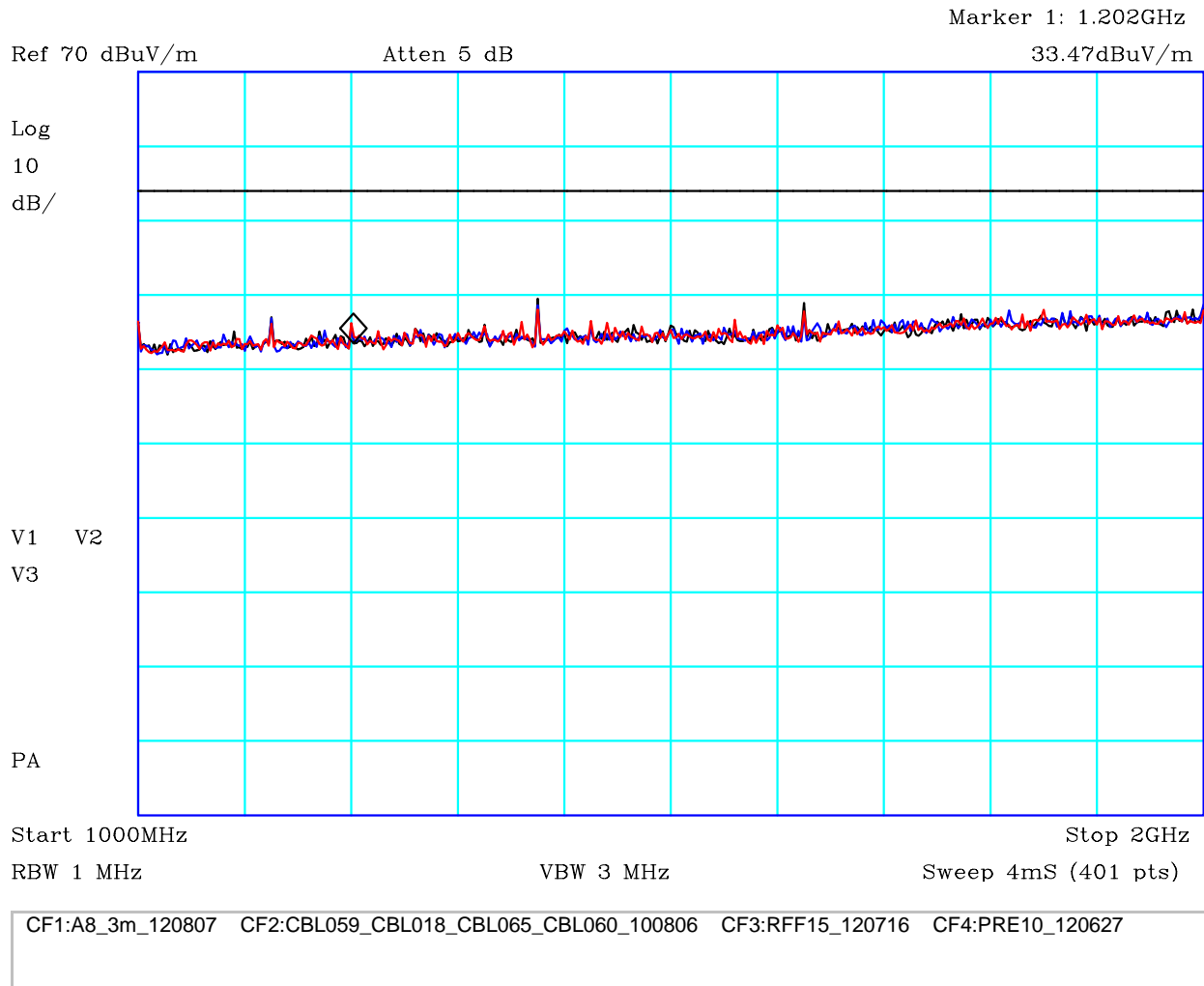


### PLOT 13 Radiated Emissions - Antenna A - Horizontal - 1GHz to 2GHz

Company:	Ubisense	Product:	Ubisensor V3
Date:	10/05/2013	Test Eng:	Dave Smith
Method:	ANSI C63.4	Method:	
Limit1:(BLK)	FCC(B)@3m	Limit2:	
Limit3:		Limit4:	
<p>Black: Low Channel Blue: Middle Channel Red: high Channel</p> <p>Sensor 12 in room, configured as a timing source. Timing port 3 connected to remote sensor 16 configured as a timing sink (which takes timing signal from it's timing port). Sensor 12 connected to PoE ethernet switch (also in room). PoE switch connected to remote switch. USB stick connected to sensor 12.</p> <p>Transmitting on antenna A. Continuous transmission with modulation at power level 191.</p>			
Facility:	Anech_2	Height	1m
Distance	3m	Polarisation	Horizontal
Angle	0-360	File:	H34105E0
		Mode:	1
		Modification State:	0
		Analyser:	R9



	Report No: <b>R3232</b>	FCC ID: SEASENSOR30	
	Issue No: <b>1</b>	IC: 8673A-SENSOR30	
	Test No: <b>T5014</b>	<b>Test Report</b>	Page: <b>41 of 71</b>




#### PLOT 14 Radiated Emissions - Antenna B - Horizontal - 1GHz to 2GHz

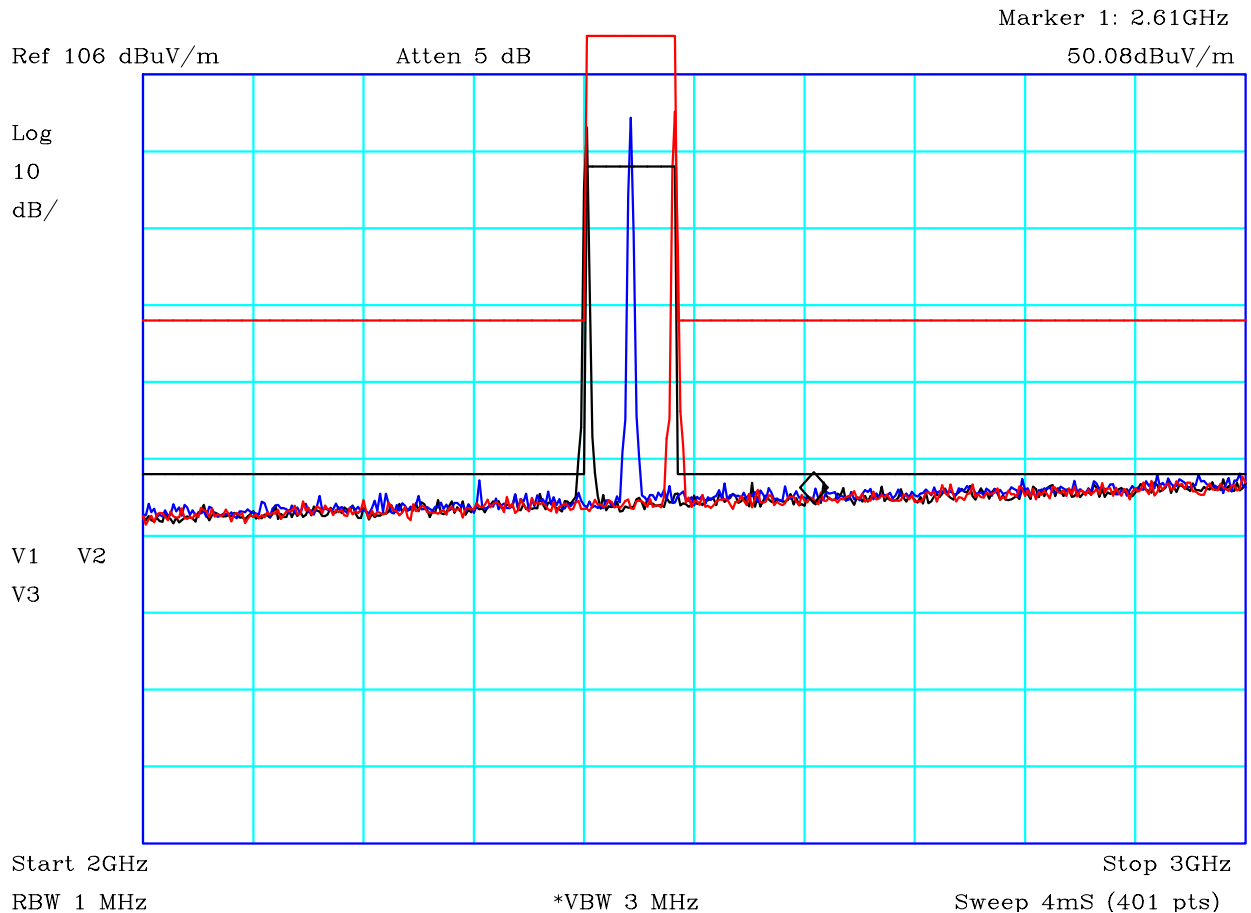
Company:	Ubisense	Product:	Ubisensor V3
Date:	10/05/2013	Test Eng:	Dave Smith
Method:	ANSI C63.4	Method:	
Limit1:(BLK)	FCC(B)@3m	Limit2:	
Limit3:		Limit4:	

Black: Low Channel Blue: Middle Channel Red: high Channel  
 Sensor 12 in room, configured as a timing source. Timing port 3 connected to remote sensor 16 configured as a timing sink (which takes timing signal from it's timing port). Sensor 12 connected to PoE ethernet switch (also in room). PoE switch connected to remote switch. USB stick connected to sensor 12.

Transmitting on antenna B. Continuous transmission with modulation at power level 191.

Facility:	Anech_2	Height	1m	Mode:	1
Distance	3m	Polarisation	Horizontal	Modification State:	0
Angle	0-360	File:	H34105E6	Analyser:	R9


	Report No: <b>R3232</b>	FCC ID: SEASENSOR30	
	Issue No: <b>1</b>	IC: 8673A-SENSOR30	
	Test No: <b>T5014</b>	<b>Test Report</b>	
			Page: 42 of 71

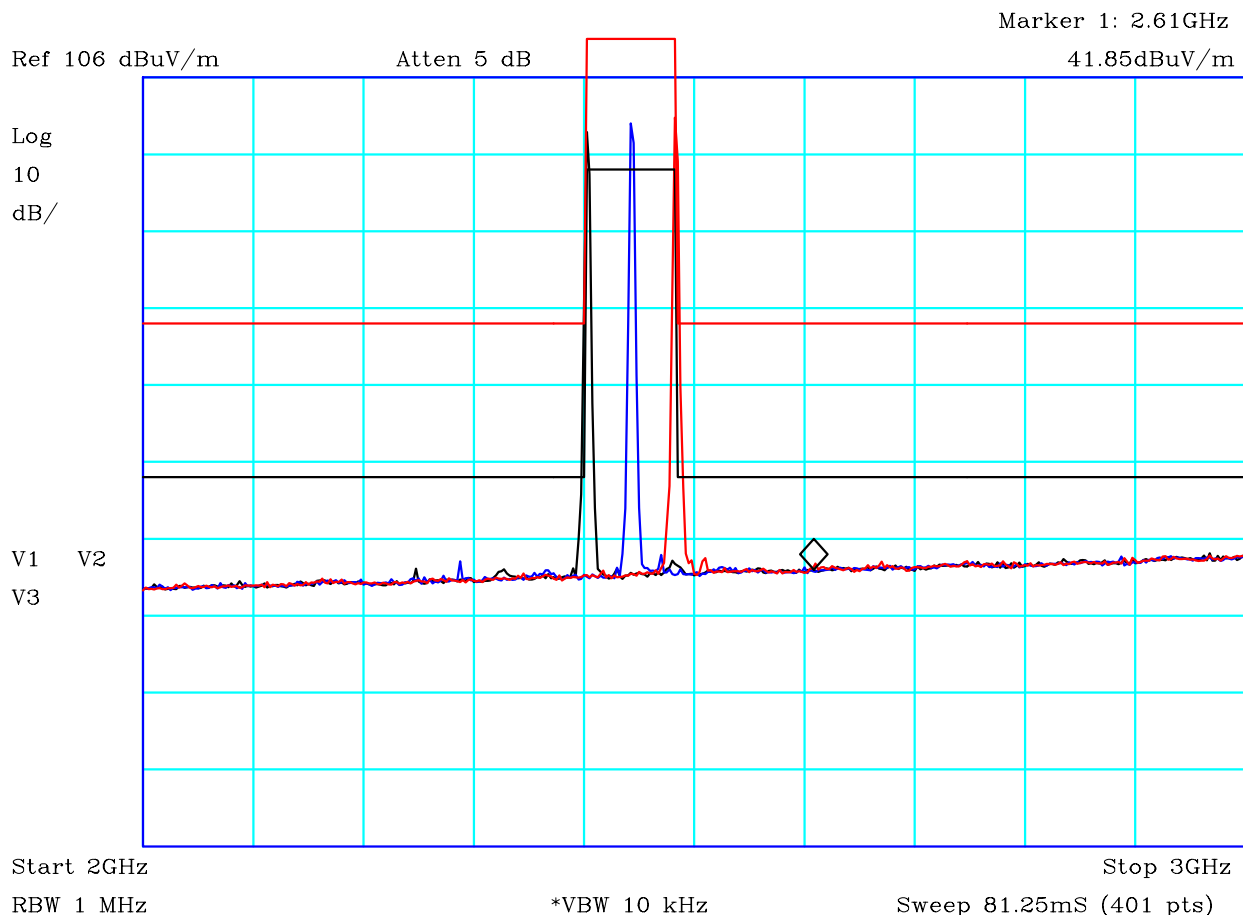


CF1:A8\_3m\_120807   CF2:CBL059\_CBL018\_CBL065\_CBL060\_100806   CF3:PRE10\_120627   CF4:10dBPAD

## PLOT 15 Radiated Emissions - Antenna A - Vertical - 2GHz to 3GHz

Company:	Ubisense	Product:	Ubisensor V3
Date:	13/05/2013	Test Eng:	Dave Smith
Method:	ANSI C63.4	Method:	
Limit1:(BLK)	FCC(B)@3m	Limit2:(RED)	FCC(B)@3m_peak
Limit3:		Limit4:	
<p>Black: Low Channel Blue: Middle Channel Red: high Channel</p> <p>Sensor 12 in room, configured as a timing source. Timing port 3 connected to remote sensor 16 configured as a timing sink (which takes timing signal from it's timing port). Sensor 12 connected to PoE ethernet switch (also in room). PoE switch connected to remote switch. USB stick connected to sensor 12.</p> <p>Transmitting on antenna A. Continuous transmission with modulation at power level 191.</p>			
Facility:	Anech_2	Height	1m
Distance	3m	Polarisation	Vertical
Angle	0-360	File:	H34134DD
		Mode:	1
		Modification State:	0
		Analyser:	R9


	Report No: <b>R3232</b>	FCC ID: SEASENSOR30 IC: 8673A-SENSOR30	
	Issue No: <b>1</b>		
	Test No: <b>T5014</b>	<b>Test Report</b>	Page: <b>43 of 71</b>

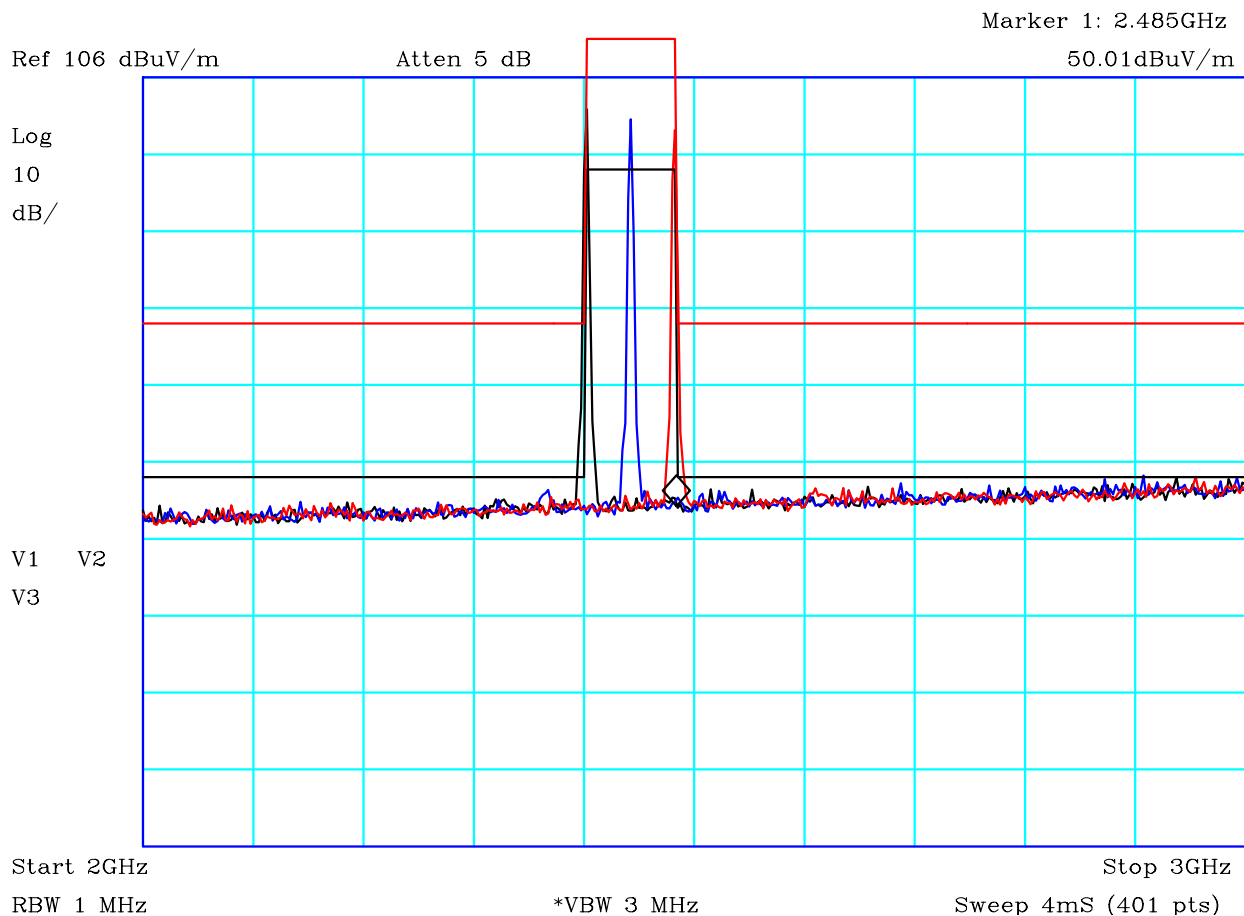


CF1:A8\_3m\_120807 CF2:CBL059\_CBL018\_CBL065\_CBL060\_100806 CF3:PRE10\_120627 CF4:10dBPAD

## PLOT 16 Radiated Emissions - Antenna A - Vertical - 2GHz to 3GHz - 10kHz VBW

Company:	Ubisense	Product:	Ubisensor V3
Date:	13/05/2013	Test Eng:	Dave Smith
Method:	ANSI C63.4	Method:	
Limit1:(BLK)	FCC(B)@3m	Limit2:(RED)	FCC(B)@3m_peak
Limit3:		Limit4:	
<p>Black: Low Channel Blue: Middle Channel Red: high Channel</p> <p>Sensor 12 in room, configured as a timing source. Timing port 3 connected to remote sensor 16 configured as a timing sink (which takes timing signal from it's timing port). Sensor 12 connected to PoE ethernet switch (also in room). PoE switch connected to remote switch. USB stick connected to sensor 12.</p> <p>Transmitting on antenna A. Continuous transmission with modulation at power level 191.</p>			
Facility:	Anech_2	Height	1m
Distance	3m	Polarisation	Vertical
Angle	0-360	File:	H34134E3
		Mode:	1
		Modification State:	0
		Analysers:	R9


	Report No: <b>R3232</b>	FCC ID: SEASENSOR30 IC: 8673A-SENSOR30	
	Issue No: <b>1</b>		
	Test No: <b>T5014</b>	<b>Test Report</b>	Page: <b>44 of 71</b>

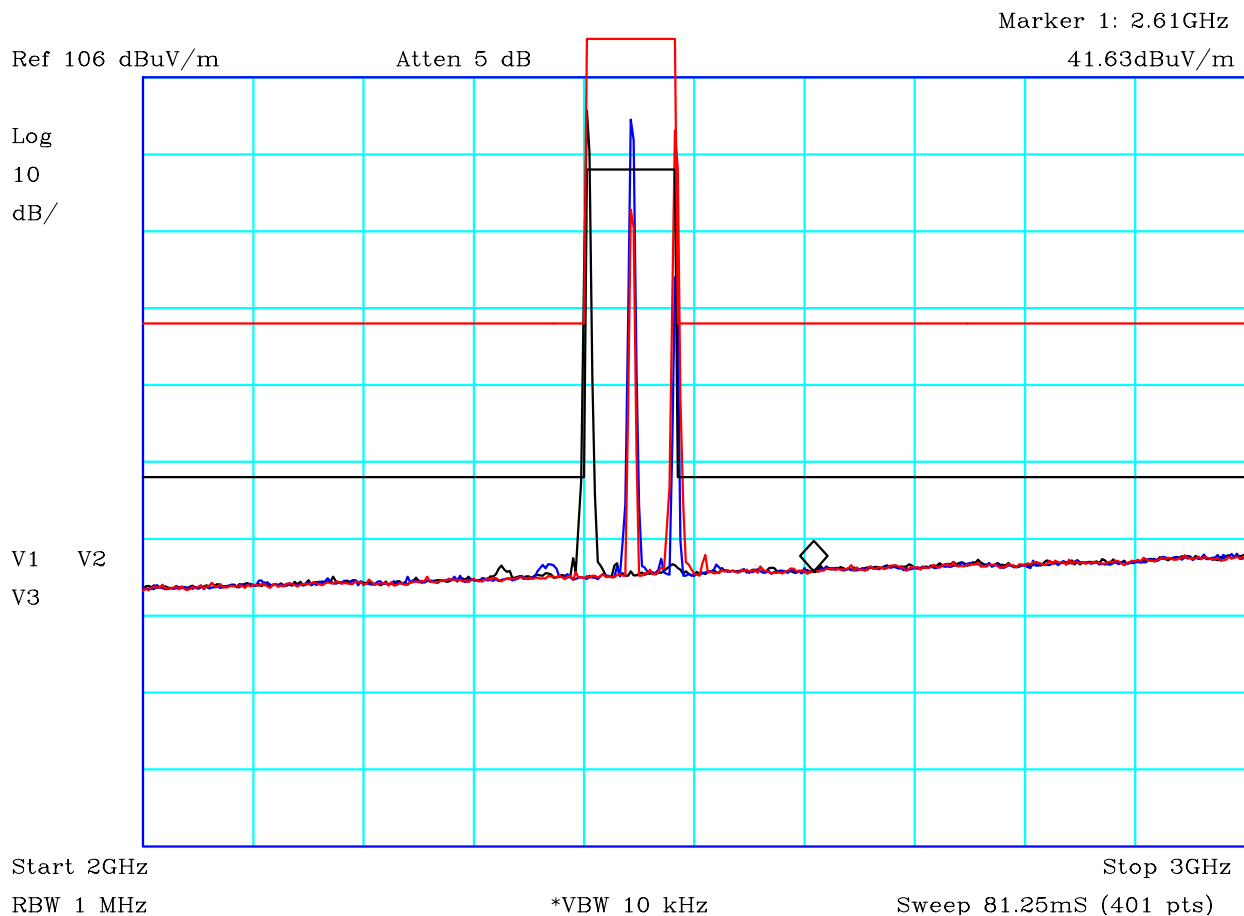


CF1:A8\_3m\_120807   CF2:CBL059\_CBL018\_CBL065\_CBL060\_100806   CF3:PRE10\_120627   CF4:10dBPAD

## PLOT 17 Radiated Emissions - Antenna B - Vertical - 2GHz to 3GHz

Company:	Ubisense	Product:	Ubisensor V3
Date:	10/05/2013	Test Eng:	Dave Smith
Method:	ANSI C63.4	Method:	
Limit1:(BLK)	FCC(B)@3m	Limit2:(RED)	FCC(B)@3m_peak
Limit3:		Limit4:	
<p>Black: Low Channel Blue: Middle Channel Red: high Channel</p> <p>Sensor 12 in room, configured as a timing source. Timing port 3 connected to remote sensor 16 configured as a timing sink (which takes timing signal from it's timing port). Sensor 12 connected to PoE ethernet switch (also in room). PoE switch connected to remote switch. USB stick connected to sensor 12.</p> <p>Transmitting on antenna B. Continuous transmission with modulation at power level 191.</p>			
Facility:	Anech_2	Height	1m
Distance	3m	Polarisation	Vertical
Angle	0-360	File:	H34107F7
		Mode:	1
		Modification State:	0
		Analyser:	R9


	Report No: <b>R3232</b>	FCC ID: SEASENSOR30 IC: 8673A-SENSOR30	
	Issue No: <b>1</b>		
	Test No: <b>T5014</b>	<b>Test Report</b>	Page: 45 of 71

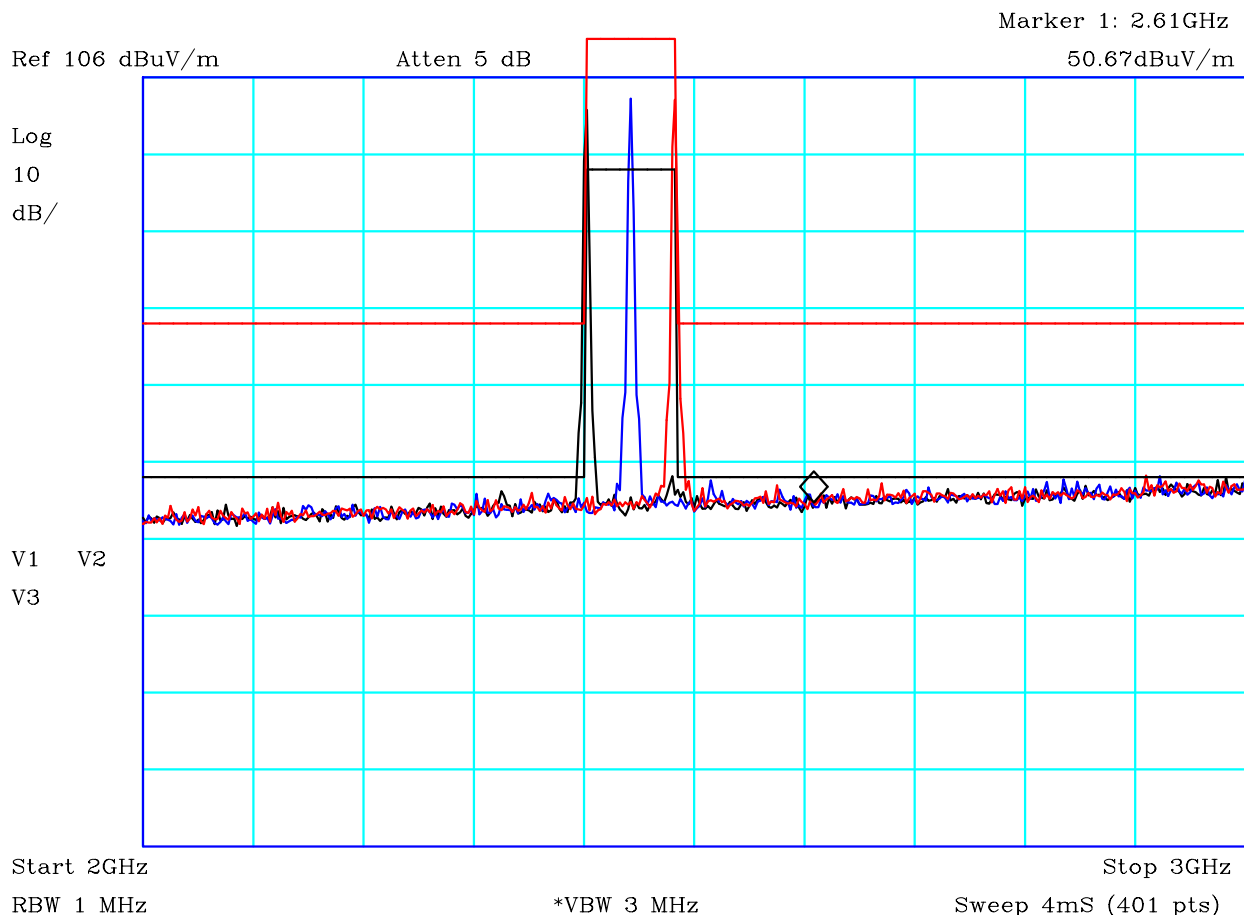


CF1:A8\_3m\_120807   CF2:CBL059\_CBL018\_CBL065\_CBL060\_100806   CF3:PRE10\_120627   CF4:10dBPAD

## PLOT 18 Radiated Emissions - Antenna B - Vertical - 2GHz to 3GHz - 10kHz VBW

Company:	Ubisense	Product:	Ubisensor V3
Date:	10/05/2013	Test Eng:	Dave Smith
Method:	ANSI C63.4	Method:	
Limit1:(BLK)	FCC(B)@3m	Limit2:(RED)	FCC(B)@3m_peak
Limit3:		Limit4:	
<p>Black: Low Channel Blue: Middle Channel Red: high Channel</p> <p>Sensor 12 in room, configured as a timing source. Timing port 3 connected to remote sensor 16 configured as a timing sink (which takes timing signal from it's timing port). Sensor 12 connected to PoE ethernet switch (also in room). PoE switch connected to remote switch. USB stick connected to sensor 12.</p> <p>Transmitting on antenna B. Continuous transmission with modulation at power level 191.</p>			
Facility:	Anech_2	Height	1m
Distance	3m	Polarisation	Vertical
Angle	0-360	File:	H34107FF
		Mode:	1
		Modification State:	0
		Analysar:	R9


	Report No: <b>R3232</b>	FCC ID: SEASENSOR30	
	Issue No: <b>1</b>	IC: 8673A-SENSOR30	
	Test No: <b>T5014</b>	<b>Test Report</b>	
			Page: 46 of 71

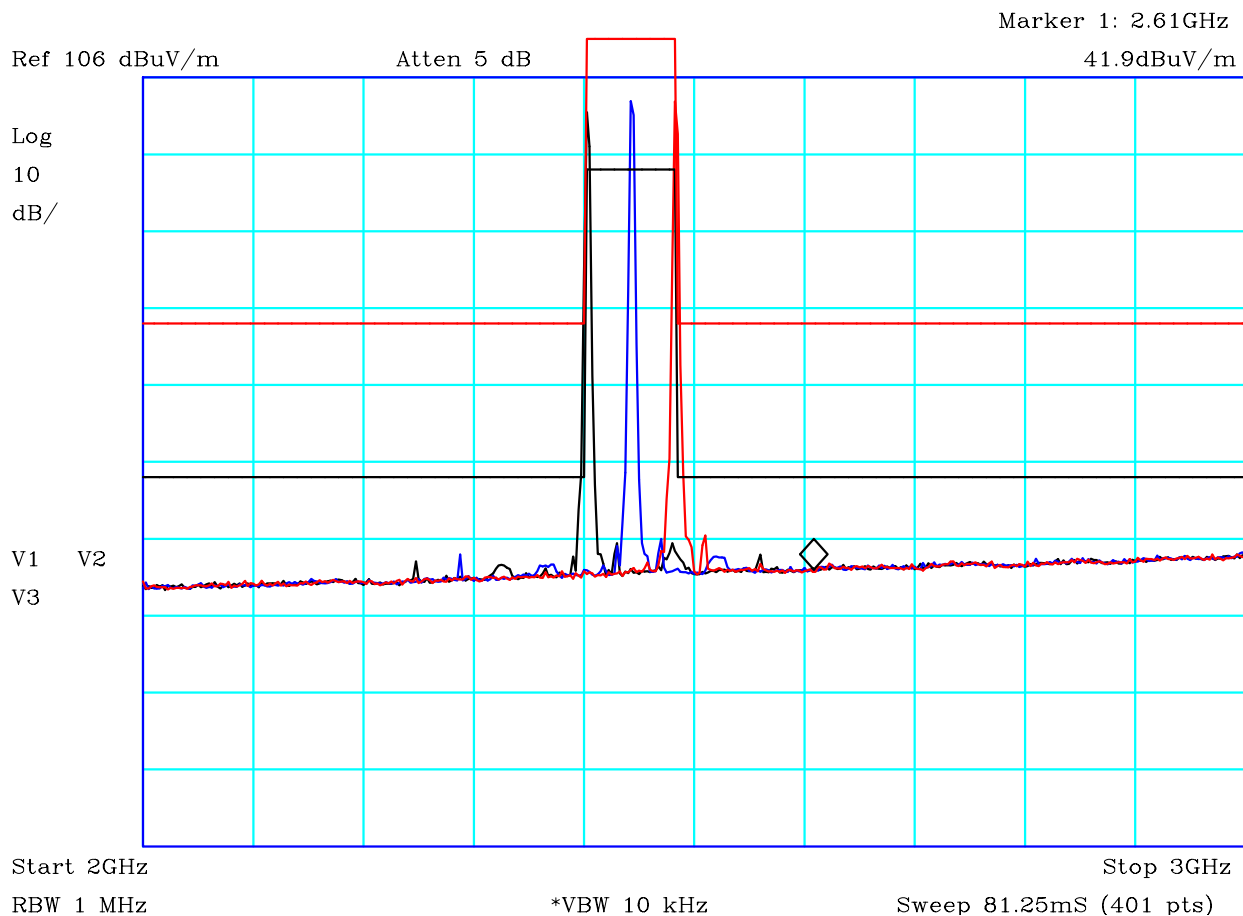


CF1:A8\_3m\_120807   CF2:CBL059\_CBL018\_CBL065\_CBL060\_100806   CF3:PRE10\_120627   CF4:10dBPAD

## PLOT 19 Radiated Emissions - Antenna A - Horizontal - 2GHz to 3GHz

Company:	Ubisense	Product:	Ubisensor V3
Date:	13/05/2013	Test Eng:	Dave Smith
Method:	ANSI C63.4	Method:	
Limit1:(BLK)	FCC(B)@3m	Limit2:(RED)	FCC(B)@3m_peak
Limit3:		Limit4:	
<p>Black: Low Channel Blue: Middle Channel Red: high Channel</p> <p>Sensor 12 in room, configured as a timing source. Timing port 3 connected to remote sensor 16 configured as a timing sink (which takes timing signal from it's timing port). Sensor 12 connected to PoE ethernet switch (also in room). PoE switch connected to remote switch. USB stick connected to sensor 12.</p> <p>Transmitting on antenna A. Continuous transmission with modulation at power level 191.</p>			
Facility:	Anech_2	Height	1m
Distance	3m	Polarisation	Horizontal
Angle	0-360	File:	H341350C
		Mode:	1
		Modification State:	0
		Analyser:	R9


	Report No: <b>R3232</b>	FCC ID: SEASENSOR30	
	Issue No: <b>1</b>	IC: 8673A-SENSOR30	
	Test No: <b>T5014</b>	<b>Test Report</b>	Page: <b>47 of 71</b>

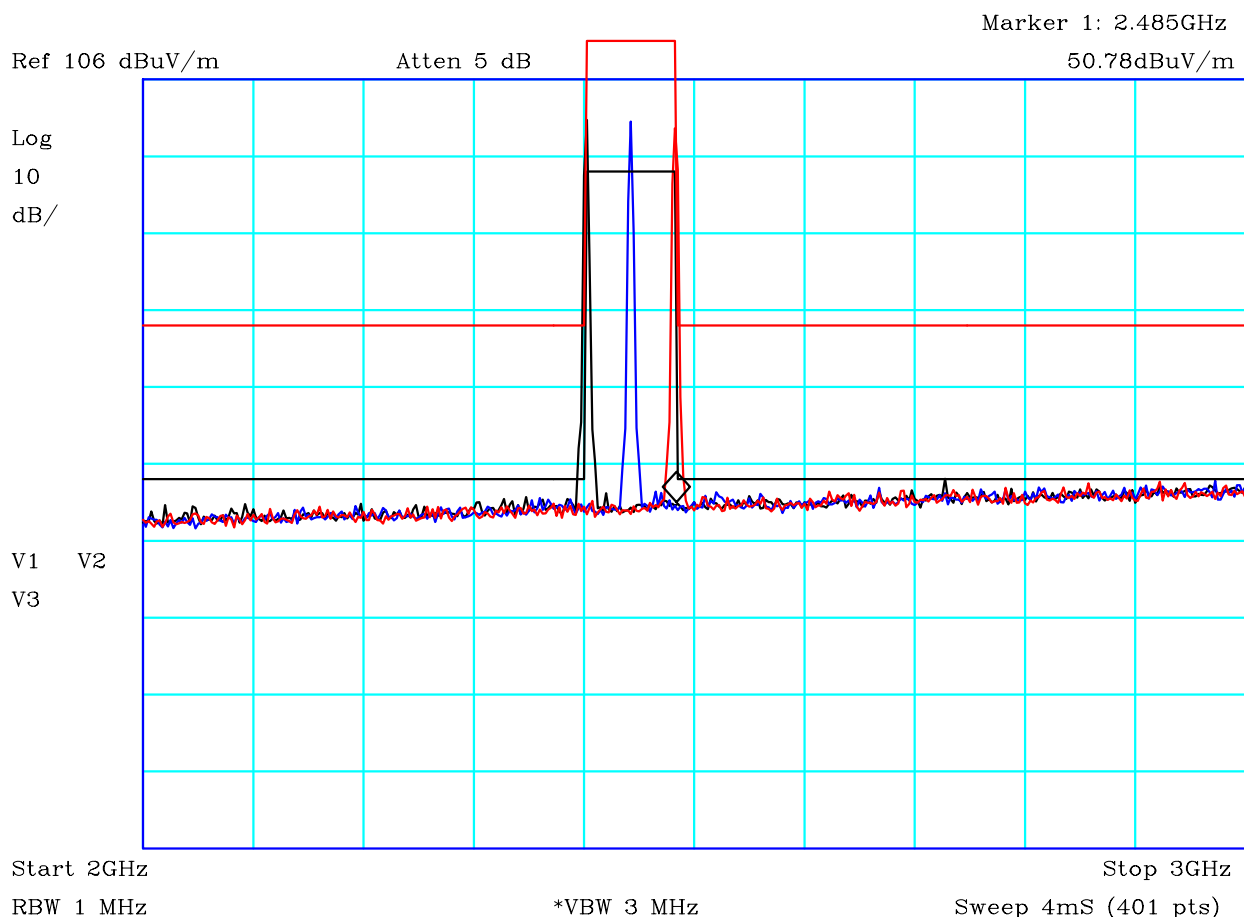


CF1:A8\_3m\_120807 CF2:CBL059\_CBL018\_CBL065\_CBL060\_100806 CF3:PRE10\_120627 CF4:10dBPAD

## PLOT 20 Radiated Emissions - Antenna A - Horizontal - 2GHz to 3GHz - 10kHz VBW

Company:	Ubisense	Product:	Ubisensor V3
Date:	13/05/2013	Test Eng:	Dave Smith
Method:	ANSI C63.4	Method:	
Limit1:(BLK)	FCC(B)@3m	Limit2:(RED)	FCC(B)@3m_peak
Limit3:		Limit4:	
<p>Black: Low Channel Blue: Middle Channel Red: high Channel</p> <p>Sensor 12 in room, configured as a timing source. Timing port 3 connected to remote sensor 16 configured as a timing sink (which takes timing signal from it's timing port). Sensor 12 connected to PoE ethernet switch (also in room). PoE switch connected to remote switch. USB stick connected to sensor 12.</p> <p>Transmitting on antenna A. Continuous transmission with modulation at power level 191.</p>			
Facility:	Anech_2	Height	1m
Distance	3m	Polarisation	Horizontal
Angle	0-360	File:	H34134EC
		Mode:	1
		Modification State:	0
		Analysar:	R9

	Report No: <b>R3232</b>	FCC ID: SEASENSOR30 IC: 8673A-SENSOR30	
	Issue No: <b>1</b>		
	Test No: <b>T5014</b>	<b>Test Report</b>	Page: <b>48 of 71</b>




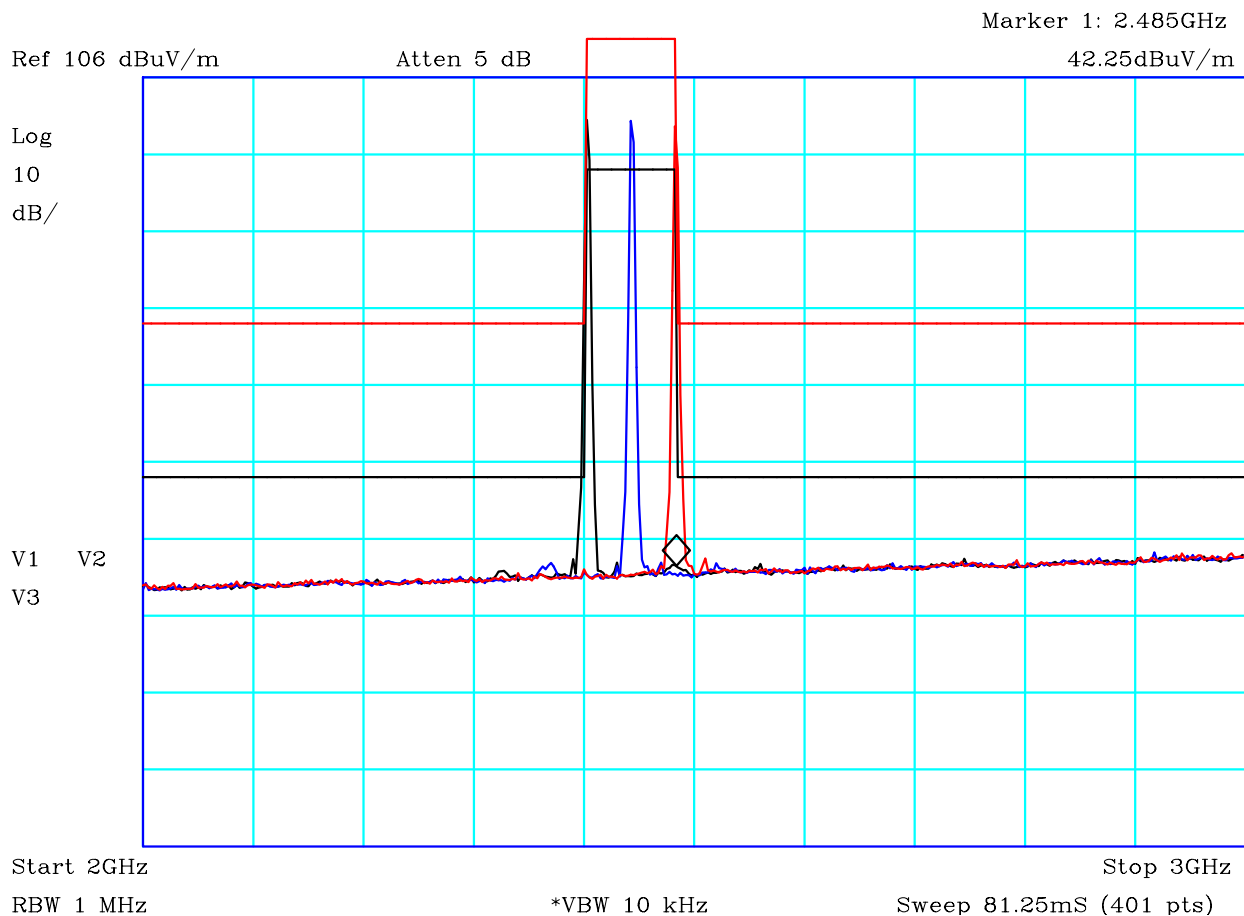
CF1:A8\_3m\_120807   CF2:CBL059\_CBL018\_CBL065\_CBL060\_100806   CF3:PRE10\_120627   CF4:10dBPAD

## PLOT 21 Radiated Emissions - Antenna B - Horizontal - 2GHz to 3GHz

Company:	Ubisense	Product:	Ubisensor V3
Date:	10/05/2013	Test Eng:	Dave Smith
Method:	ANSI C63.4	Method:	
Limit1:(BLK)	FCC(B)@3m	Limit2:(RED)	FCC(B)@3m_peak
Limit3:		Limit4:	
<p>Black: Low Channel Blue: Middle Channel Red: high Channel</p> <p>Sensor 12 in room, configured as a timing source. Timing port 3 connected to remote sensor 16 configured as a timing sink (which takes timing signal from it's timing port). Sensor 12 connected to PoE ethernet switch (also in room). PoE switch connected to remote switch. USB stick connected to sensor 12.</p> <p>Transmitting on antenna B. Continuous transmission with modulation at power level 191.</p>			
Facility:	Anech_2	Height	1m
Distance	3m	Polarisation	Horizontal
Angle	0-360	File:	H34107F0
		Mode:	1
		Modification State:	0
		Analyser:	R9




	Report No: <b>R3232</b>	FCC ID: SEASENSOR30	
	Issue No: <b>1</b>	IC: 8673A-SENSOR30	
	Test No: <b>T5014</b>	<b>Test Report</b>	
			Page: 49 of 71

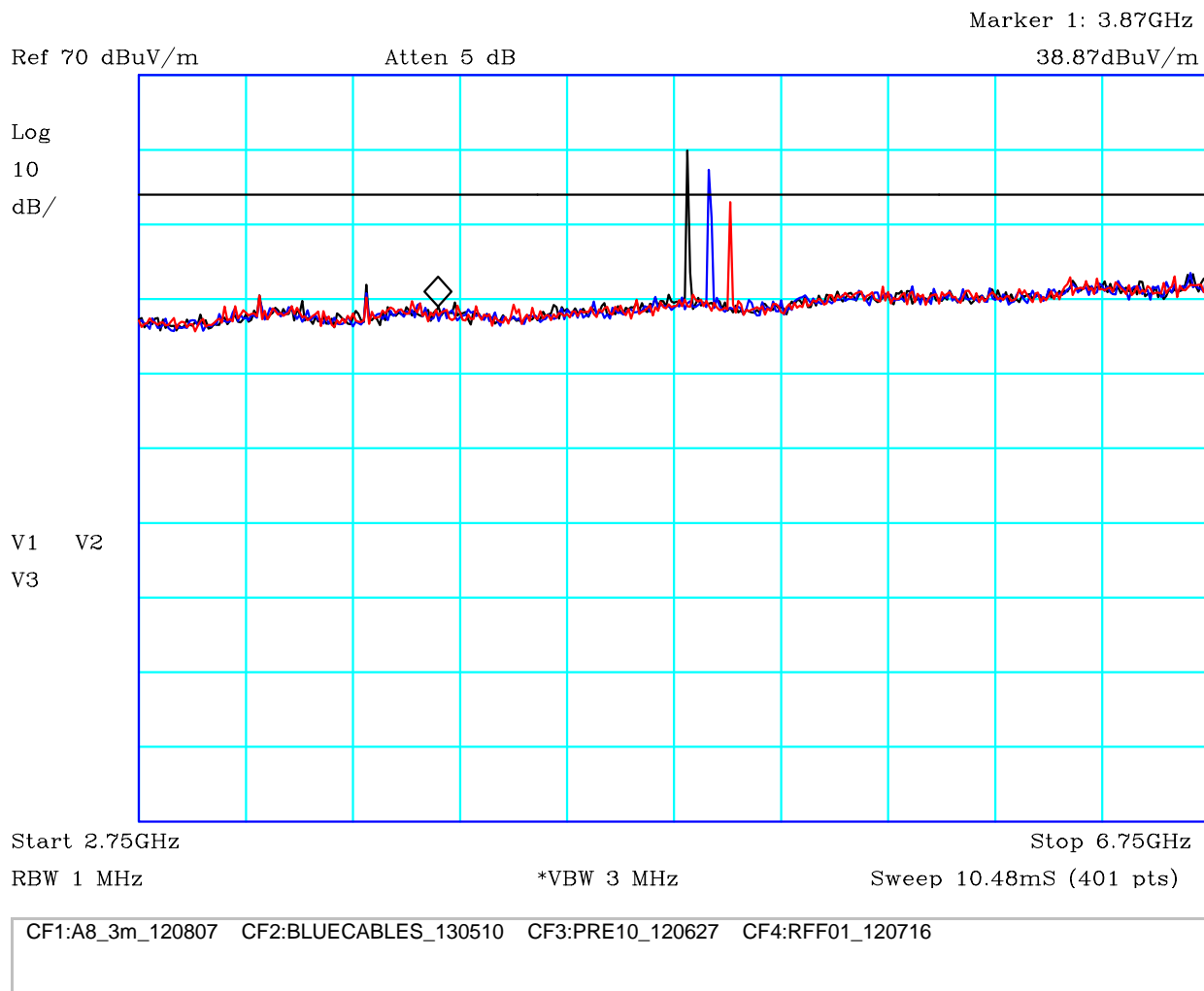


CF1:A8\_3m\_120807 CF2:CBL059\_CBL018\_CBL065\_CBL060\_100806 CF3:PRE10\_120627 CF4:10dBPAD

## PLOT 22 Radiated Emissions - Antenna B - Horizontal - 2GHz to 3GHz - 10kHz VBW


Company:	Ubisense	Product:	Ubisensor V3
Date:	10/05/2013	Test Eng:	Dave Smith
Method:	ANSI C63.4	Method:	
Limit1:(BLK)	FCC(B)@3m	Limit2:(RED)	FCC(B)@3m_peak
Limit3:		Limit4:	
<p>Black: Low Channel Blue: Middle Channel Red: high Channel</p> <p>Sensor 12 in room, configured as a timing source. Timing port 3 connected to remote sensor 16 configured as a timing sink (which takes timing signal from it's timing port). Sensor 12 connected to PoE ethernet switch (also in room). PoE switch connected to remote switch. USB stick connected to sensor 12.</p> <p>Transmitting on antenna B. Continuous transmission with modulation at power level 191.</p>			
Facility:	Anech_2	Height	1m
Distance	3m	Polarisation	Horizontal
Angle	0-360	File:	H34107EA
		Mode:	1
		Modification State:	0
		Analysar:	R9

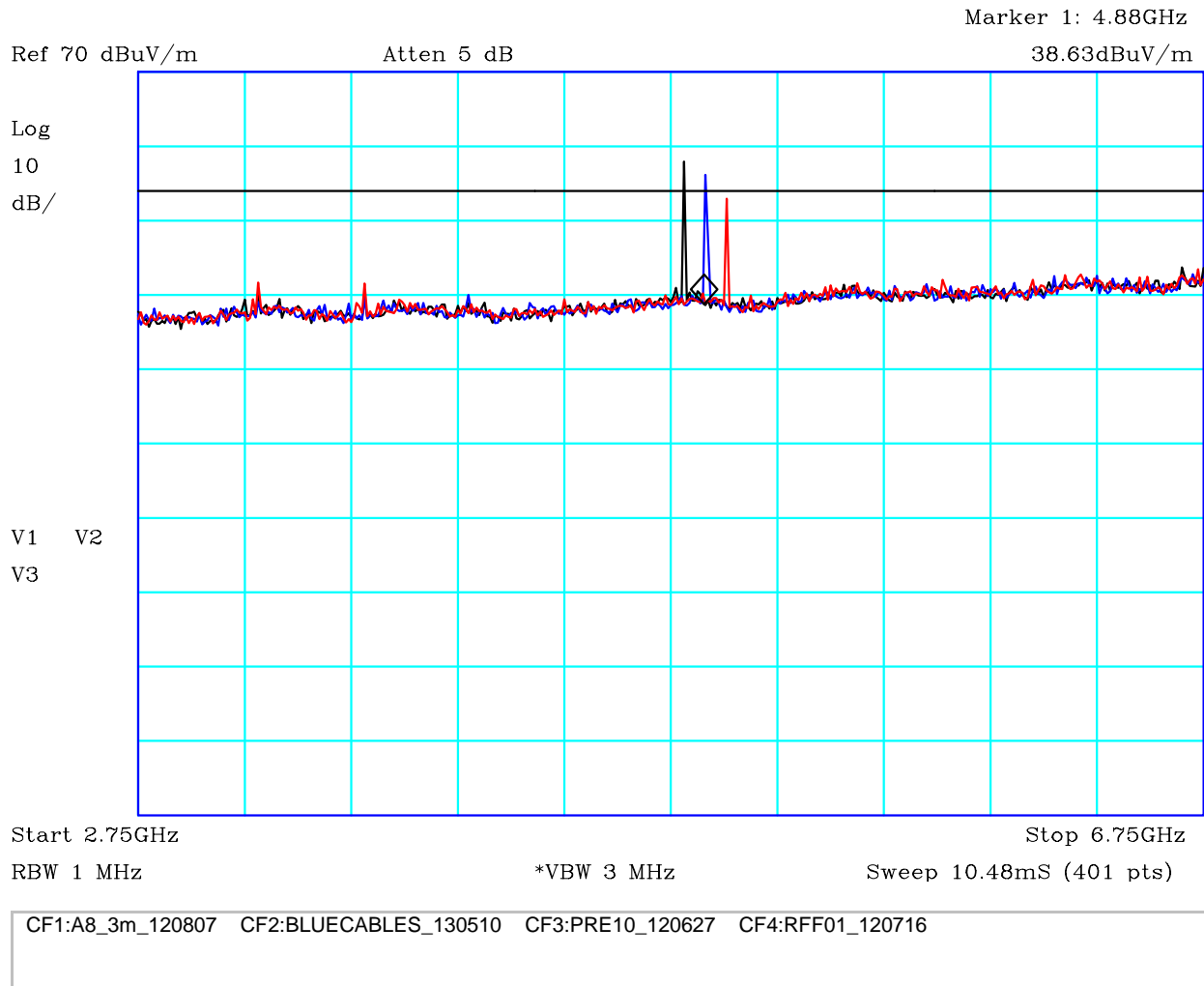
	Report No: <b>R3232</b>	FCC ID: SEASENSOR30 IC: 8673A-SENSOR30	
	Issue No: <b>1</b>		
	Test No: <b>T5014</b>	<b>Test Report</b>	Page: 50 of 71



### PLOT 23 Radiated Emissions - Antenna A - Vertical - 2.75GHz to 6.75GHz


Company:	Ubisense	Product:	Ubisensor V3
Date:	13/05/2013	Test Eng:	Dave Smith
Method:	ANSI C63.4	Method:	
Limit1:(BLK)	FCC(B)@3m	Limit2:	
Limit3:		Limit4:	
<p>Black: Low Channel Blue: Middle Channel Red: high Channel</p> <p>Sensor 12 in room, configured as a timing source. Timing port 3 connected to remote sensor 16 configured as a timing sink (which takes timing signal from it's timing port). Sensor 12 connected to PoE ethernet switch (also in room). PoE switch connected to remote switch. USB stick connected to sensor 12.</p> <p>Transmitting on antenna A. Continuous transmission with modulation at power level 191.</p> <p>NOTE: This plot shows peak readings against the average limit. Peak limit is 20dB higher.</p>			
Facility:	Anech_2	Height	1m
Distance	3m	Polarisation	V
Angle	0-360	File:	H3413551
		Mode:	1
		Modification State:	0
		Analysers:	R9

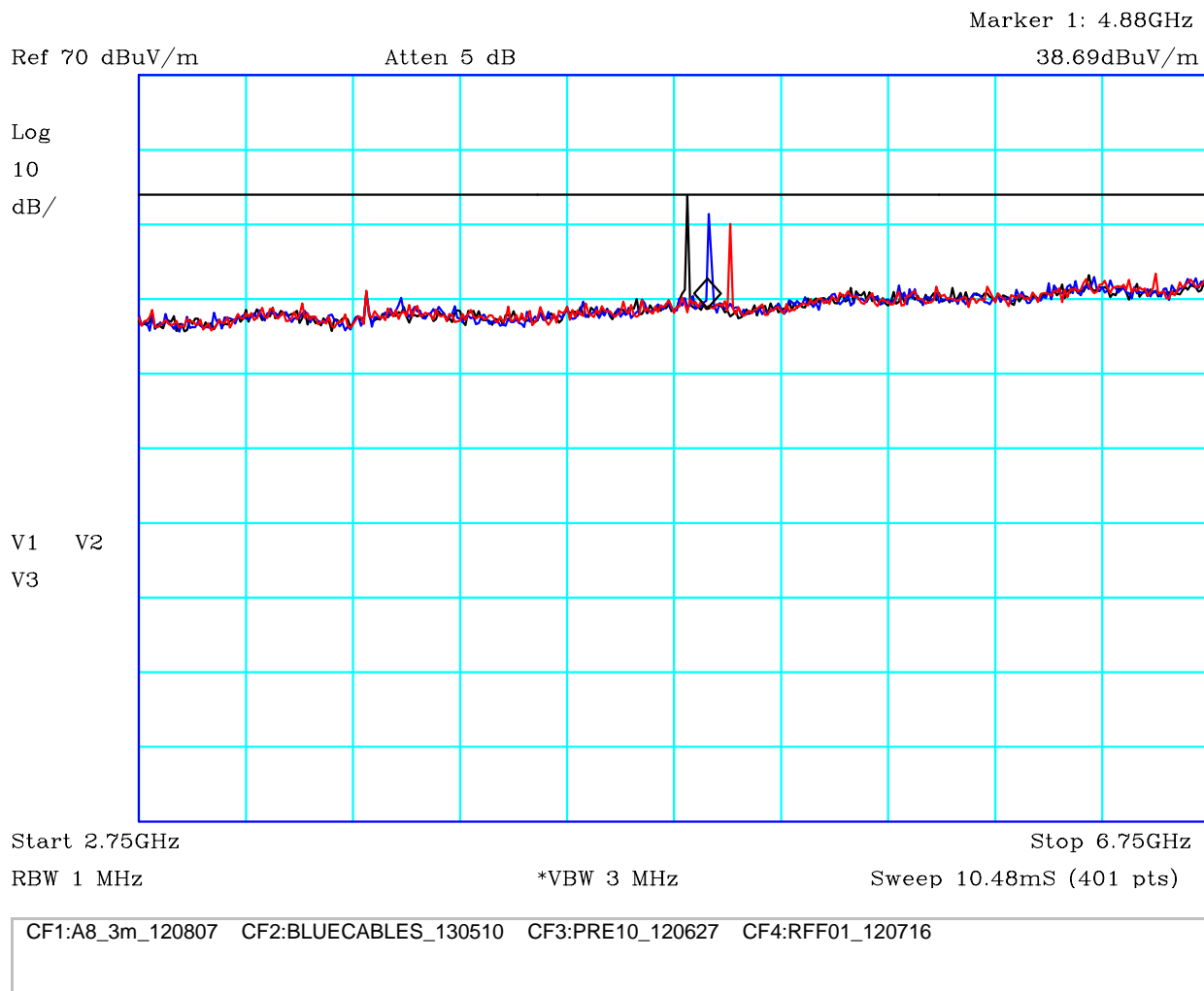
	Report No: <b>R3232</b>	FCC ID: SEASENSOR30 IC: 8673A-SENSOR30	
	Issue No: <b>1</b>		
	Test No: <b>T5014</b>	<b>Test Report</b>	Page: 51 of 71



## PLOT 24 Radiated Emissions - Antenna B - Vertical - 2.75GHz to 6.75GHz


Company:	Ubisense	Product:	Ubisensor V3
Date:	13/05/2013	Test Eng:	Dave Smith
Method:	ANSI C63.4	Method:	
Limit1:(BLK)	FCC(B)@3m	Limit2:	
Limit3:		Limit4:	
<p>Black: Low Channel Blue: Middle Channel Red: high Channel</p> <p>Sensor 12 in room, configured as a timing source. Timing port 3 connected to remote sensor 16 configured as a timing sink (which takes timing signal from it's timing port). Sensor 12 connected to PoE ethernet switch (also in room). PoE switch connected to remote switch. USB stick connected to sensor 12.</p> <p>Transmitting on antenna B. Continuous transmission with modulation at power level 191.</p> <p>NOTE: This plot shows peak readings against the average limit. Peak limit is 20dB higher.</p>			
Facility:	Anech_2	Height	1m
Distance	3m	Polarisation	V
Angle	0-360	File:	H3413559
		Mode:	1
		Modification State:	0
		Analyser:	R9

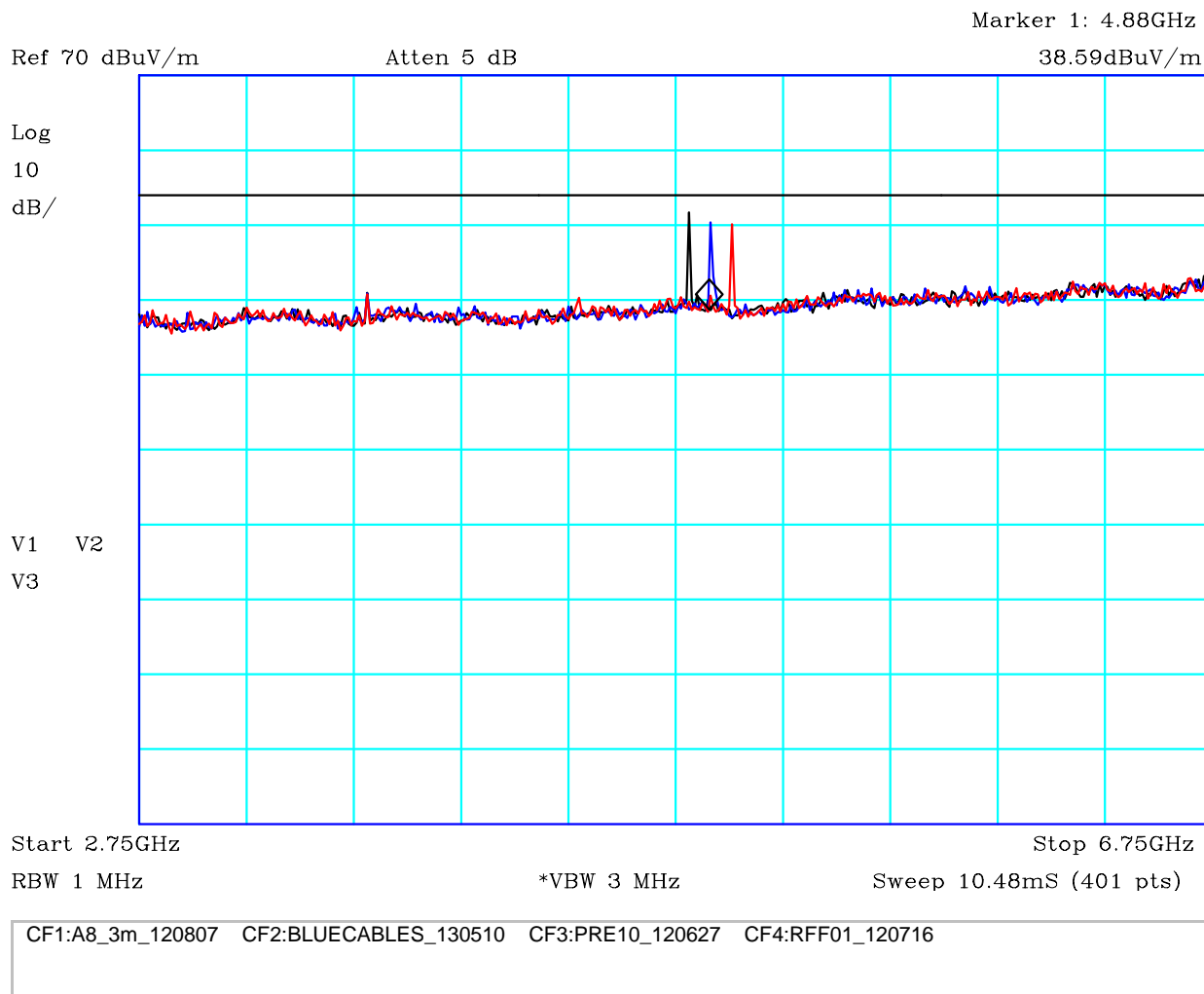
	Report No: <b>R3232</b>	FCC ID: SEASENSOR30 IC: 8673A-SENSOR30	
	Issue No: <b>1</b>		
	Test No: <b>T5014</b>	<b>Test Report</b>	Page: 52 of 71



## PLOT 25 Radiated Emissions - Antenna A - Horizontal - 2.75GHz to 6.75GHz


Company:	Ubisense	Product:	Ubisensor V3
Date:	13/05/2013	Test Eng:	Dave Smith
Method:	ANSI C63.4	Method:	
Limit1:(BLK)	FCC(B)@3m	Limit2:	
Limit3:		Limit4:	
<p>Black: Low Channel Blue: Middle Channel Red: high Channel</p> <p>Sensor 12 in room, configured as a timing source. Timing port 3 connected to remote sensor 16 configured as a timing sink (which takes timing signal from it's timing port). Sensor 12 connected to PoE ethernet switch (also in room). PoE switch connected to remote switch. USB stick connected to sensor 12.</p> <p>Transmitting on antenna A. Continuous transmission with modulation at power level 191.</p> <p>NOTE: This plot shows peak readings against the average limit. Peak limit is 20dB higher.</p>			
Facility:	Anech_2	Height	1m
Distance	3m	Polarisation	H
Angle	0-360	File:	H3413560
		Mode:	1
		Modification State:	0
		Analyser:	R9

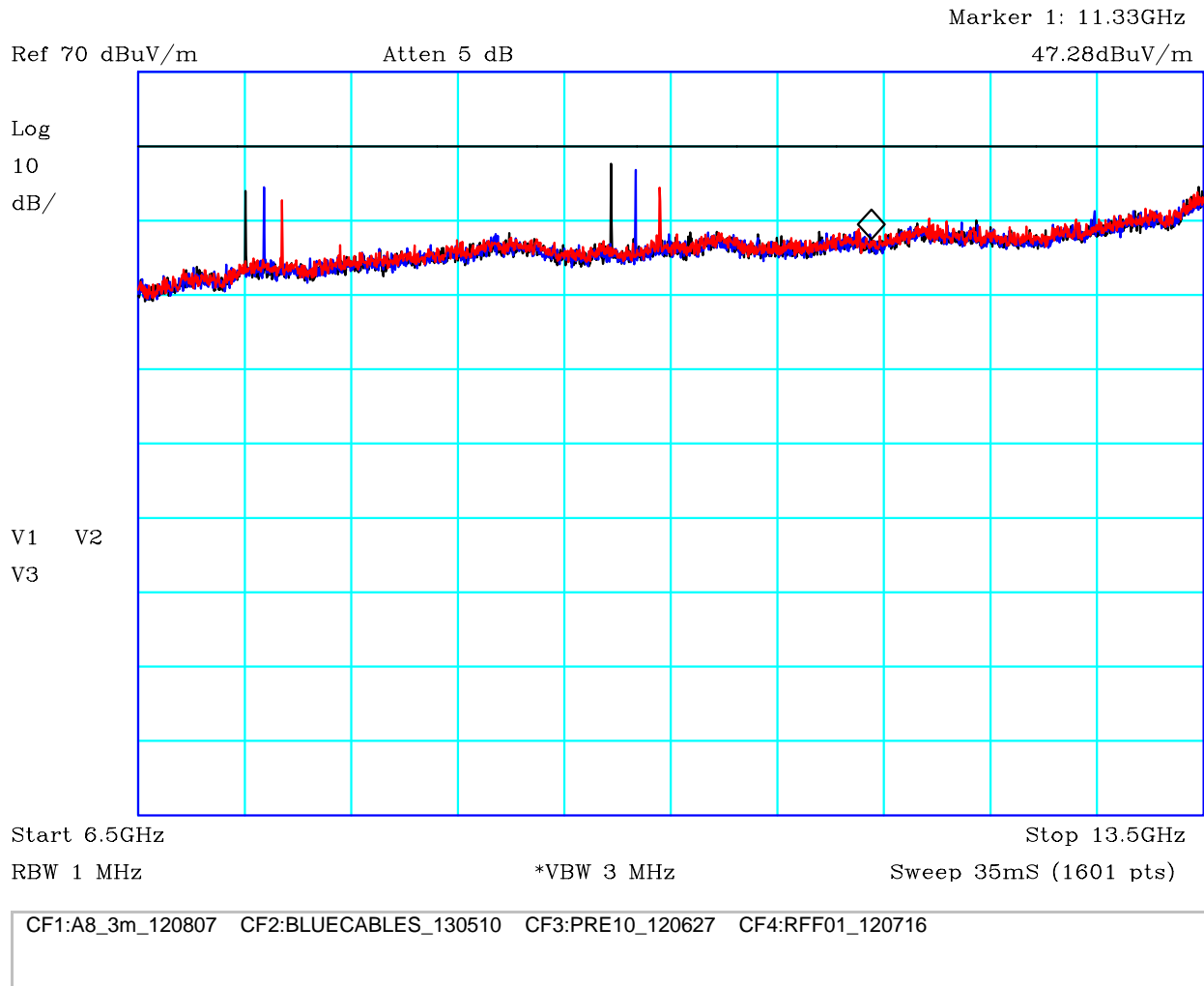
	Report No: <b>R3232</b>	FCC ID: SEASENSOR30	
	Issue No: <b>1</b>	IC: 8673A-SENSOR30	
	Test No: <b>T5014</b>	<b>Test Report</b>	Page: 53 of 71



## PLOT 26 Radiated Emissions - Antenna B - Horizontal - 2.75GGHz to 6.75GHz


Company:	Ubisense	Product:	Ubisensor V3
Date:	13/05/2013	Test Eng:	Dave Smith
Method:	ANSI C63.4	Method:	
Limit1:(BLK)	FCC(B)@3m	Limit2:	
Limit3:		Limit4:	
<p>Black: Low Channel Blue: Middle Channel Red: high Channel</p> <p>Sensor 12 in room, configured as a timing source. Timing port 3 connected to remote sensor 16 configured as a timing sink (which takes timing signal from it's timing port). Sensor 12 connected to PoE ethernet switch (also in room). PoE switch connected to remote switch. USB stick connected to sensor 12.</p> <p>Transmitting on antenna B. Continuous transmission with modulation at power level 191.</p> <p>NOTE: This plot shows peak readings against the average limit. Peak limit is 20dB higher.</p>			
Facility:	Anech_2	Height	1m
Distance	3m	Polarisation	H
Angle	0-360	File:	H3413565
		Mode:	1
		Modification State:	0
		Analysers:	R9

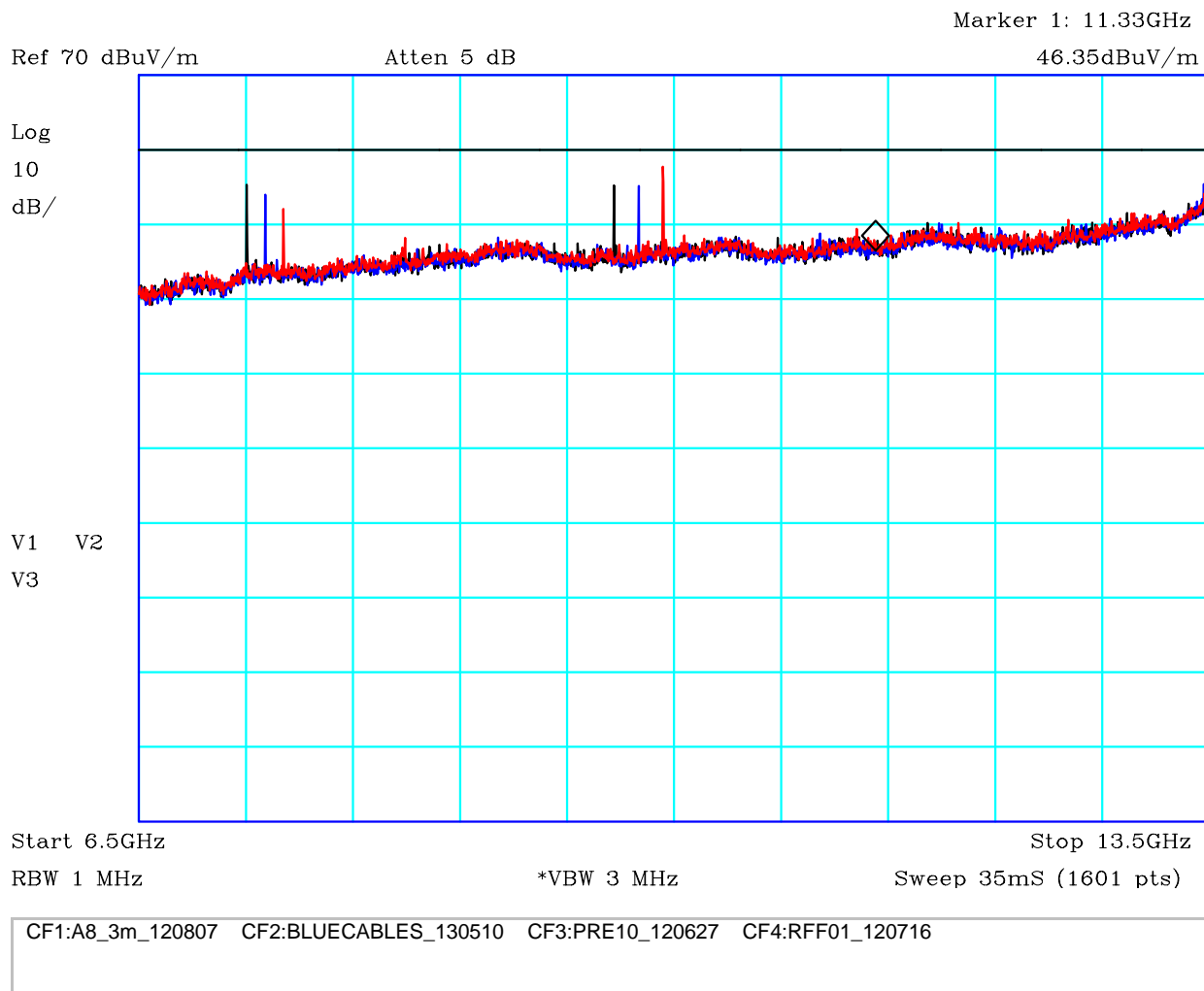
	Report No: <b>R3232</b>	FCC ID: SEASENSOR30 IC: 8673A-SENSOR30	
	Issue No: <b>1</b>		
	Test No: <b>T5014</b>	<b>Test Report</b>	Page: <b>54 of 71</b>



## PLOT 27 Radiated Emissions - Antenna A - Vertical - 6.5GHz to 13.5GHz


Company:	Ubisense	Product:	Ubisensor V3
Date:	13/05/2013	Test Eng:	Dave Smith
Method:	ANSI C63.4	Method:	
Limit1:(BLK)	FCC(B)@1.5m	Limit2:	
Limit3:		Limit4:	
<p>Black: Low Channel Blue: Middle Channel Red: high Channel</p> <p>Sensor 12 in room, configured as a timing source. Timing port 3 connected to remote sensor 16 configured as a timing sink (which takes timing signal from it's timing port). Sensor 12 connected to PoE ethernet switch (also in room). PoE switch connected to remote switch. USB stick connected to sensor 12.</p> <p>Transmitting on antenna A. Continuous transmission with modulation at power level 191.</p> <p>NOTE: This plot shows peak readings against the average limit. Peak limit is 20dB higher.</p>			
Facility:	Anech_2	Height	1m
Distance	1.5m	Polarisation	V
Angle	0-360	File:	H3413676
		Mode:	1
		Modification State:	0
		Analyser:	R9

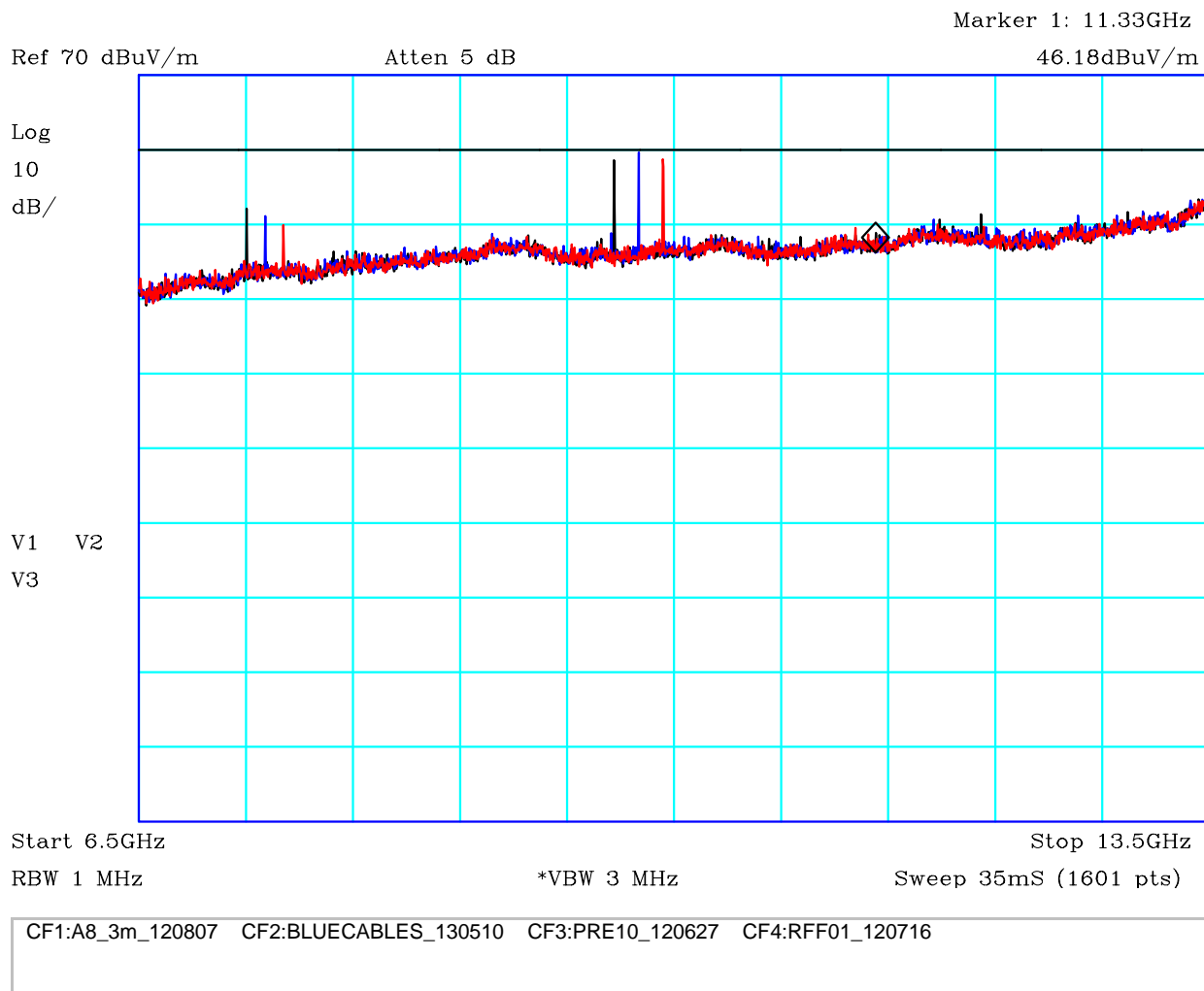
	Report No: <b>R3232</b>	FCC ID: SEASENSOR30 IC: 8673A-SENSOR30	
	Issue No: <b>1</b>		
	Test No: <b>T5014</b>	<b>Test Report</b>	Page: 55 of 71



## PLOT 28 Radiated Emissions - Antenna B - Vertical - 6.5GHz to 13.5GHz

Company:	Ubisense	Product:	Ubisensor V3
Date:	13/05/2013	Test Eng:	Dave Smith
Method:	ANSI C63.4	Method:	
Limit1:(BLK)	FCC(B)@1.5m	Limit2:	
Limit3:		Limit4:	
<p>Black: Low Channel Blue: Middle Channel Red: high Channel</p> <p>Sensor 12 in room, configured as a timing source. Timing port 3 connected to remote sensor 16 configured as a timing sink (which takes timing signal from it's timing port). Sensor 12 connected to PoE ethernet switch (also in room). PoE switch connected to remote switch. USB stick connected to sensor 12.</p> <p>Transmitting on antenna B. Continuous transmission with modulation at power level 191.</p> <p>NOTE: This plot shows peak readings against the average limit. Peak limit is 20dB higher.</p>			
Facility:	Anech_2	Height	1m
Distance	1.5m	Polarisation	V
Angle	0-360	File:	H341367C
		Mode:	1
		Modification State:	0
		Analysers:	R9


	Report No: <b>R3232</b>	FCC ID: SEASENSOR30 IC: 8673A-SENSOR30	
	Issue No: <b>1</b>		
	Test No: <b>T5014</b>	<b>Test Report</b>	Page: <b>56 of 71</b>

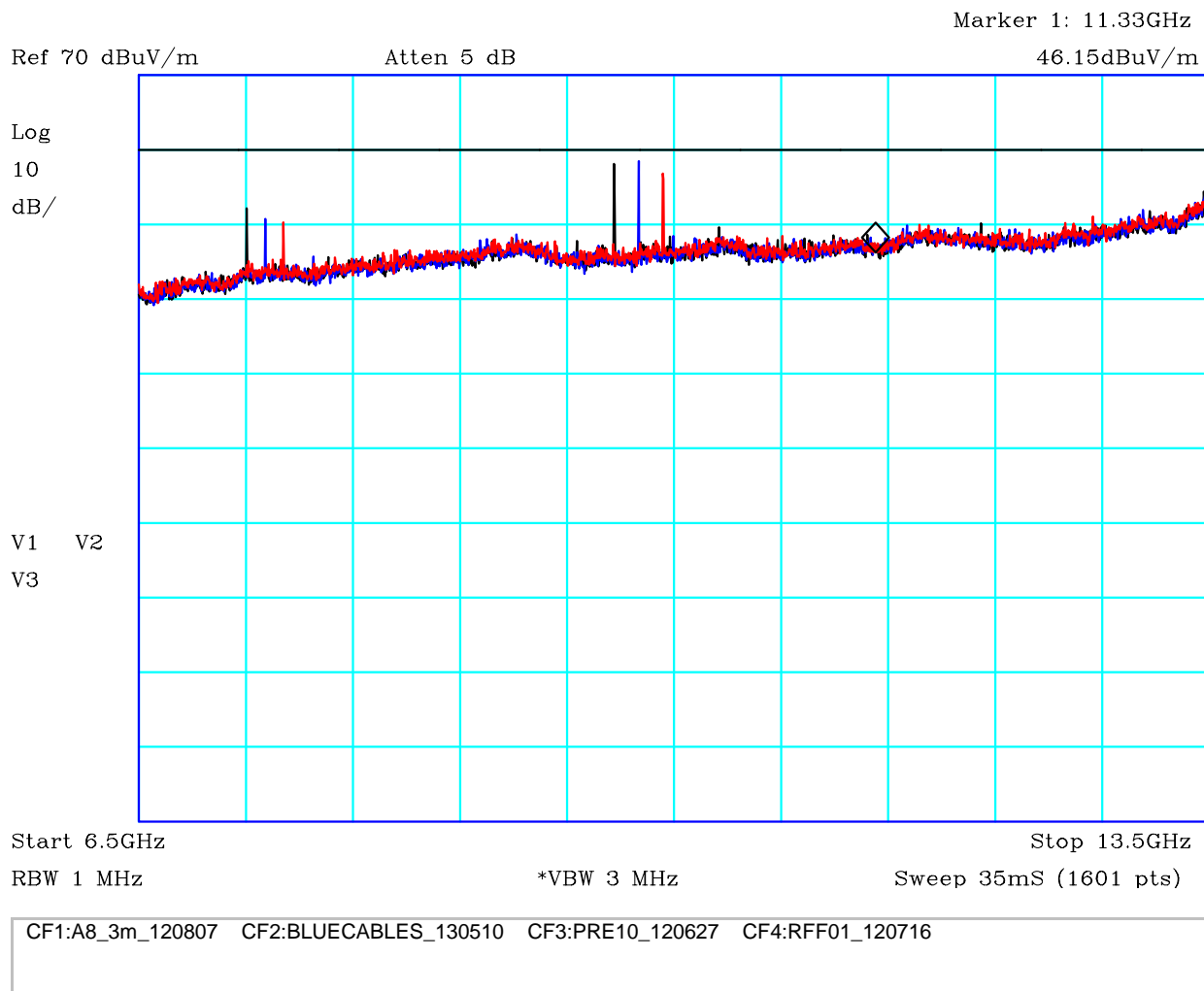


## PLOT 29 Radiated Emissions - Antenna A - Horizontal - 6.5GHz to 13.5GHz

Company:	Ubisense	Product:	Ubisensor V3
Date:	13/05/2013	Test Eng:	Dave Smith
Method:	ANSI C63.4	Method:	
Limit1:(BLK)	FCC(B)@1.5m	Limit2:	
Limit3:		Limit4:	
<p>Black: Low Channel Blue: Middle Channel Red: high Channel</p> <p>Sensor 12 in room, configured as a timing source. Timing port 3 connected to remote sensor 16 configured as a timing sink (which takes timing signal from it's timing port). Sensor 12 connected to PoE ethernet switch (also in room). PoE switch connected to remote switch. USB stick connected to sensor 12.</p> <p>Transmitting on antenna A. Continuous transmission with modulation at power level 191.</p> <p>NOTE: This plot shows peak readings against the average limit. Peak limit is 20dB higher.</p>			
Facility:	Anech_2	Height	1m
Distance	1.5m	Polarisation	H
Angle	0-360	File:	H3413667
		Mode:	1
		Modification State:	0
		Analysers:	R9




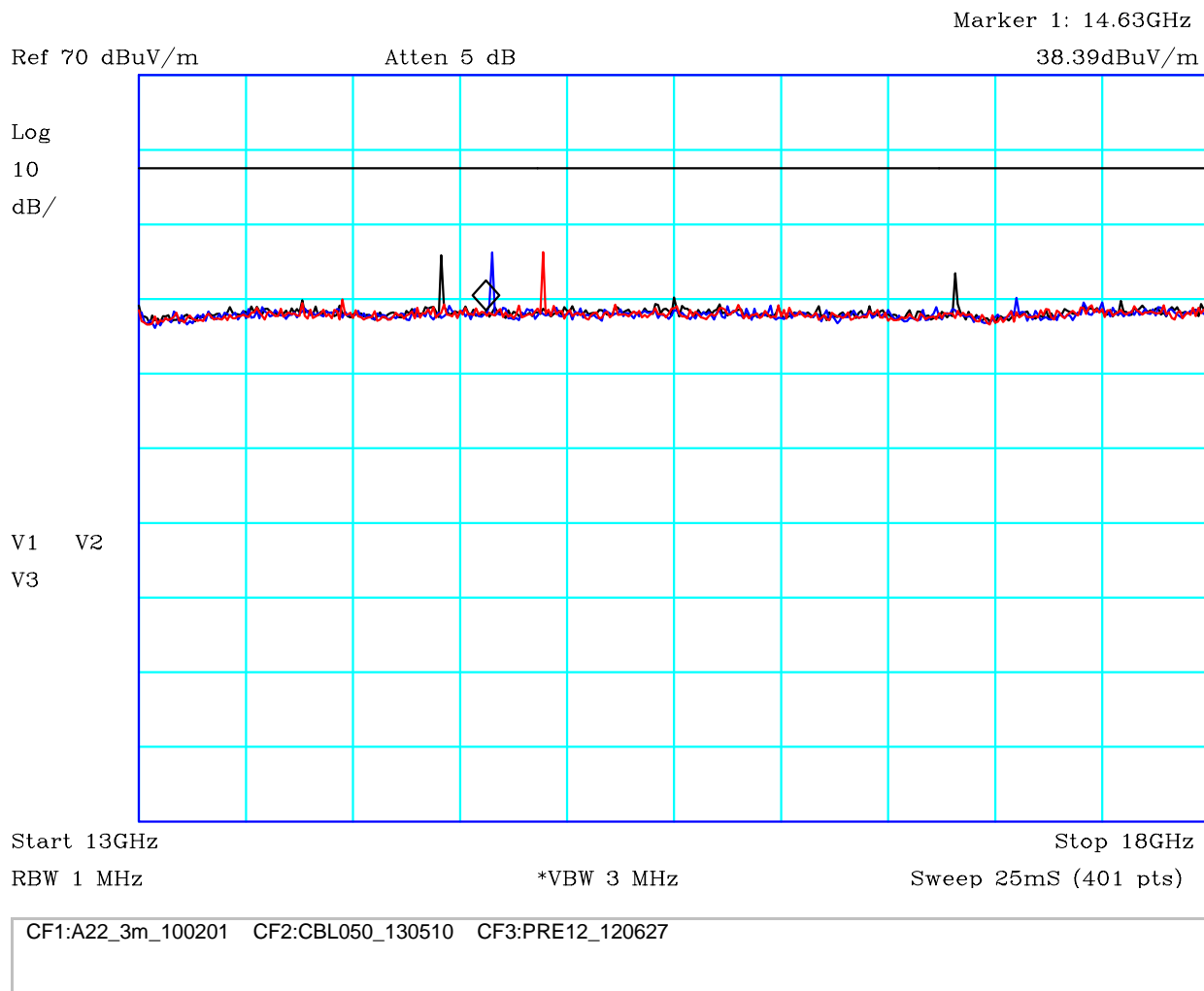
	Report No: <b>R3232</b>	FCC ID: SEASENSOR30	
	Issue No: <b>1</b>	IC: 8673A-SENSOR30	
	Test No: <b>T5014</b>	<b>Test Report</b>	
			Page: 57 of 71



### PLOT 30 Radiated Emissions - Antenna B - Horizontal - 6.5GHz to 13.5GHz


Company:	Ubisense	Product:	Ubisensor V3
Date:	13/05/2013	Test Eng:	Dave Smith
Method:	ANSI C63.4	Method:	
Limit1:(BLK)	FCC(B)@1.5m	Limit2:	
Limit3:		Limit4:	
<p>Black: Low Channel Blue: Middle Channel Red: high Channel</p> <p>Sensor 12 in room, configured as a timing source. Timing port 3 connected to remote sensor 16 configured as a timing sink (which takes timing signal from it's timing port). Sensor 12 connected to PoE ethernet switch (also in room). PoE switch connected to remote switch. USB stick connected to sensor 12.</p> <p>Transmitting on antenna B. Continuous transmission with modulation at power level 191.</p> <p>NOTE: This plot shows peak readings against the average limit. Peak limit is 20dB higher.</p>			
Facility:	Anech_2	Height	1m
Distance	1.5m	Polarisation	H
Angle	0-360	File:	H341366F
		Mode:	1
		Modification State:	0
		Analyser:	R9

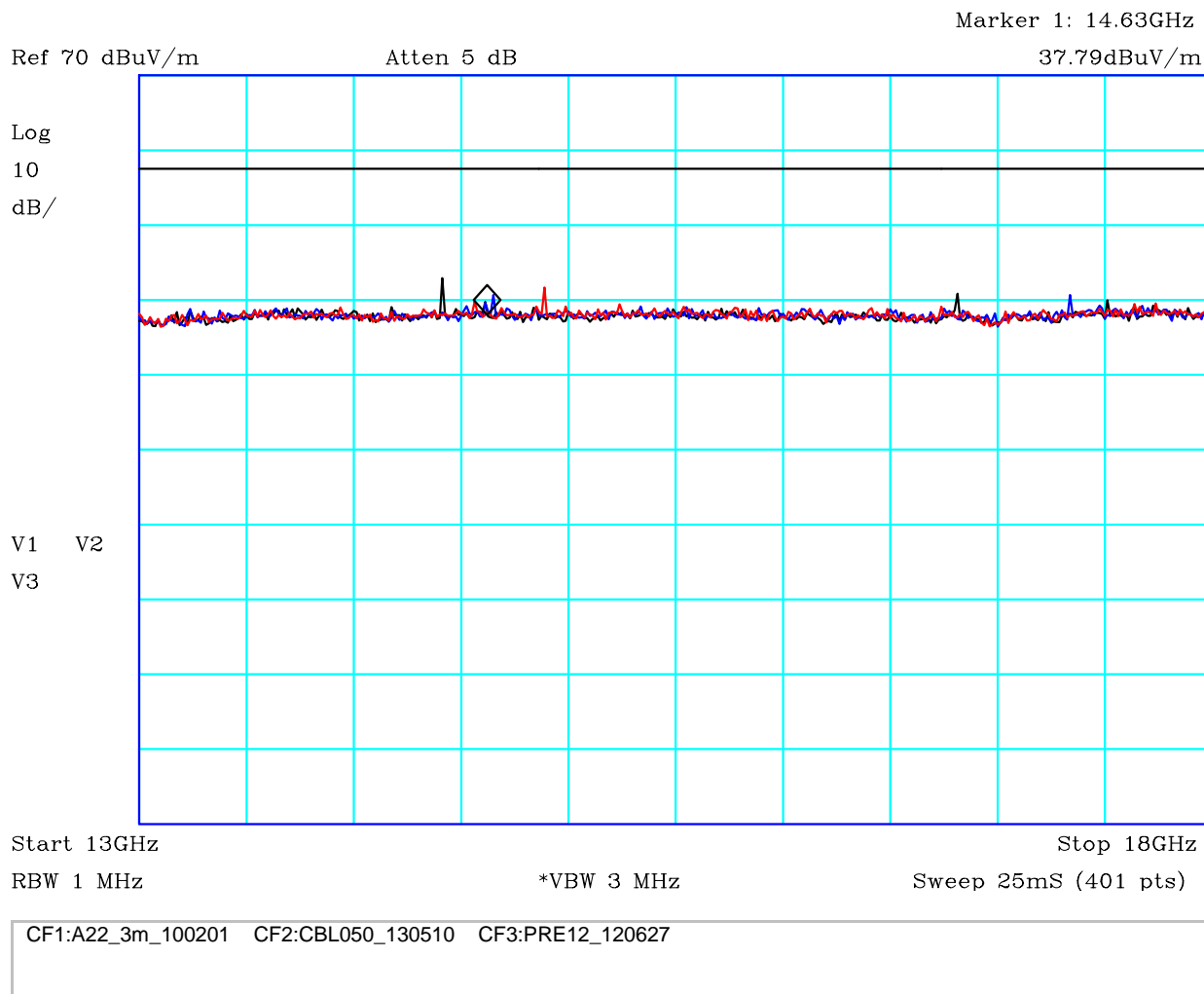
	Report No: <b>R3232</b>	FCC ID: SEASENSOR30	
	Issue No: <b>1</b>	IC: 8673A-SENSOR30	
	Test No: <b>T5014</b>	<b>Test Report</b>	
			Page: 58 of 71



### PLOT 31 Radiated Emissions - Antenna A - 13GHz to 18GHz


Company:	Ubisense	Product:	Ubisensor V3
Date:	13/05/2013	Test Eng:	Dave Smith
Method:	ANSI C63.4	Method:	
Limit1:(BLK)	FCC(B)@2m	Limit2:	
Limit3:		Limit4:	
<p>Black: Low Channel Blue: Middle Channel Red: high Channel</p> <p>Sensor 12 in room, configured as a timing source. Timing port 3 connected to remote sensor 16 configured as a timing sink (which takes timing signal from it's timing port). Sensor 12 connected to PoE ethernet switch (also in room). PoE switch connected to remote switch. USB stick connected to sensor 12.</p> <p>Transmitting on antenna A. Continuous transmission with modulation at power level 191.</p> <p>NOTE: This plot shows peak readings against the average limit. Peak limit is 20dB higher.</p>			
Facility:	Anech_2	Height	1m
Distance	2m	Polarisation	V+H
Angle	0-360	File:	H34136BD
		Mode:	1
		Modification State:	0
		Analyser:	R9

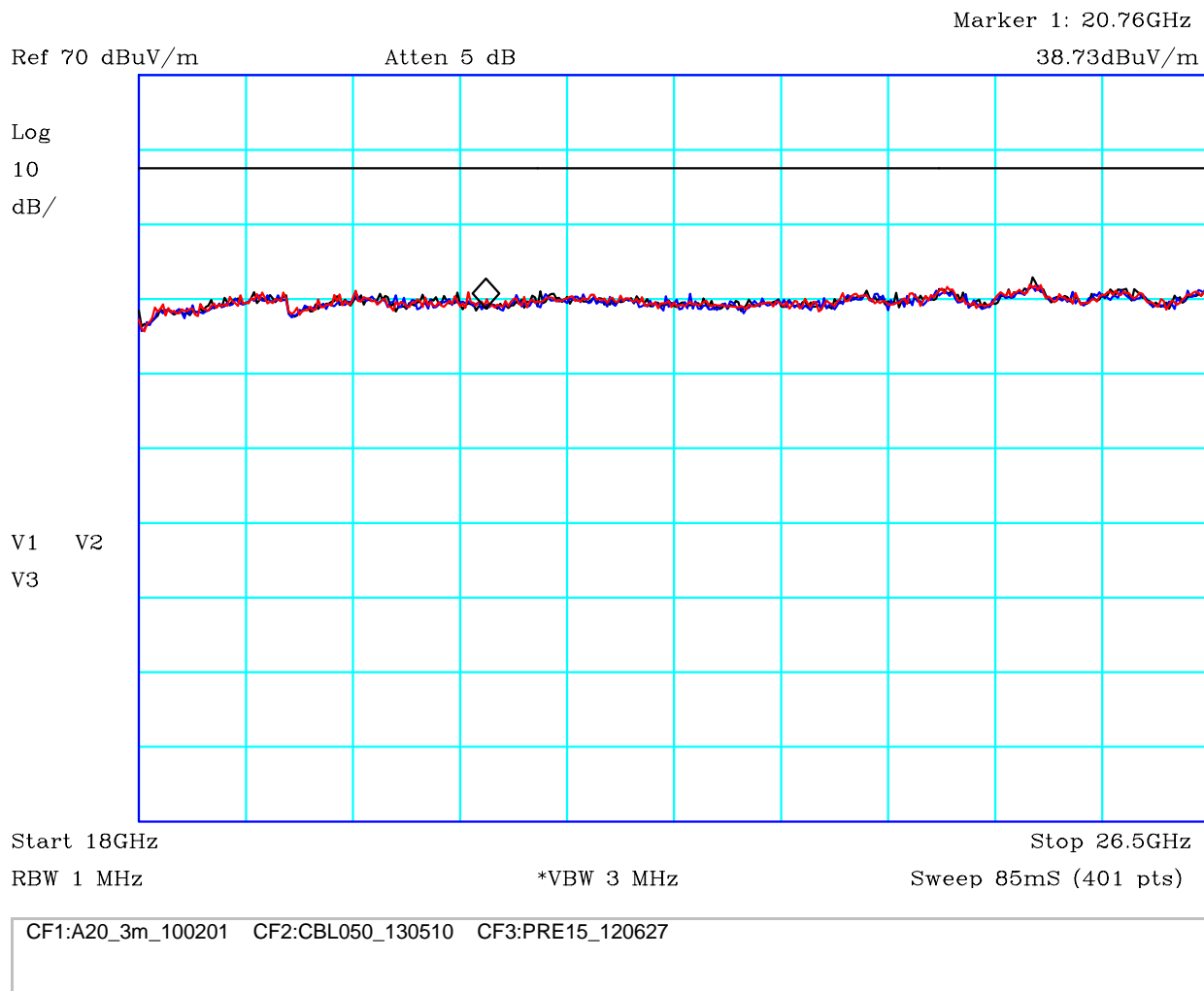
	Report No: <b>R3232</b>	FCC ID: SEASENSOR30	
	Issue No: <b>1</b>	IC: 8673A-SENSOR30	
	Test No: <b>T5014</b>	<b>Test Report</b>	
			Page: 59 of 71



## PLOT 32 Radiated Emissions - Antenna B - 13GHz to 18GHz


Company:	Ubisense	Product:	Ubisensor V3
Date:	13/05/2013	Test Eng:	Dave Smith
Method:	ANSI C63.4	Method:	
Limit1:(BLK)	FCC(B)@2m	Limit2:	
Limit3:		Limit4:	
<p>Black: Low Channel Blue: Middle Channel Red: high Channel</p> <p>Sensor 12 in room, configured as a timing source. Timing port 3 connected to remote sensor 16 configured as a timing sink (which takes timing signal from it's timing port). Sensor 12 connected to PoE ethernet switch (also in room). PoE switch connected to remote switch. USB stick connected to sensor 12.</p> <p>Transmitting on antenna B. Continuous transmission with modulation at power level 191.</p> <p>NOTE: This plot shows peak readings against the average limit. Peak limit is 20dB higher.</p>			
Facility:	Anech_2	Height	1m
Distance	2m	Polarisation	V+H
Angle	0-360	File:	H34136CC
		Mode:	1
		Modification State:	0
		Analyser:	R9

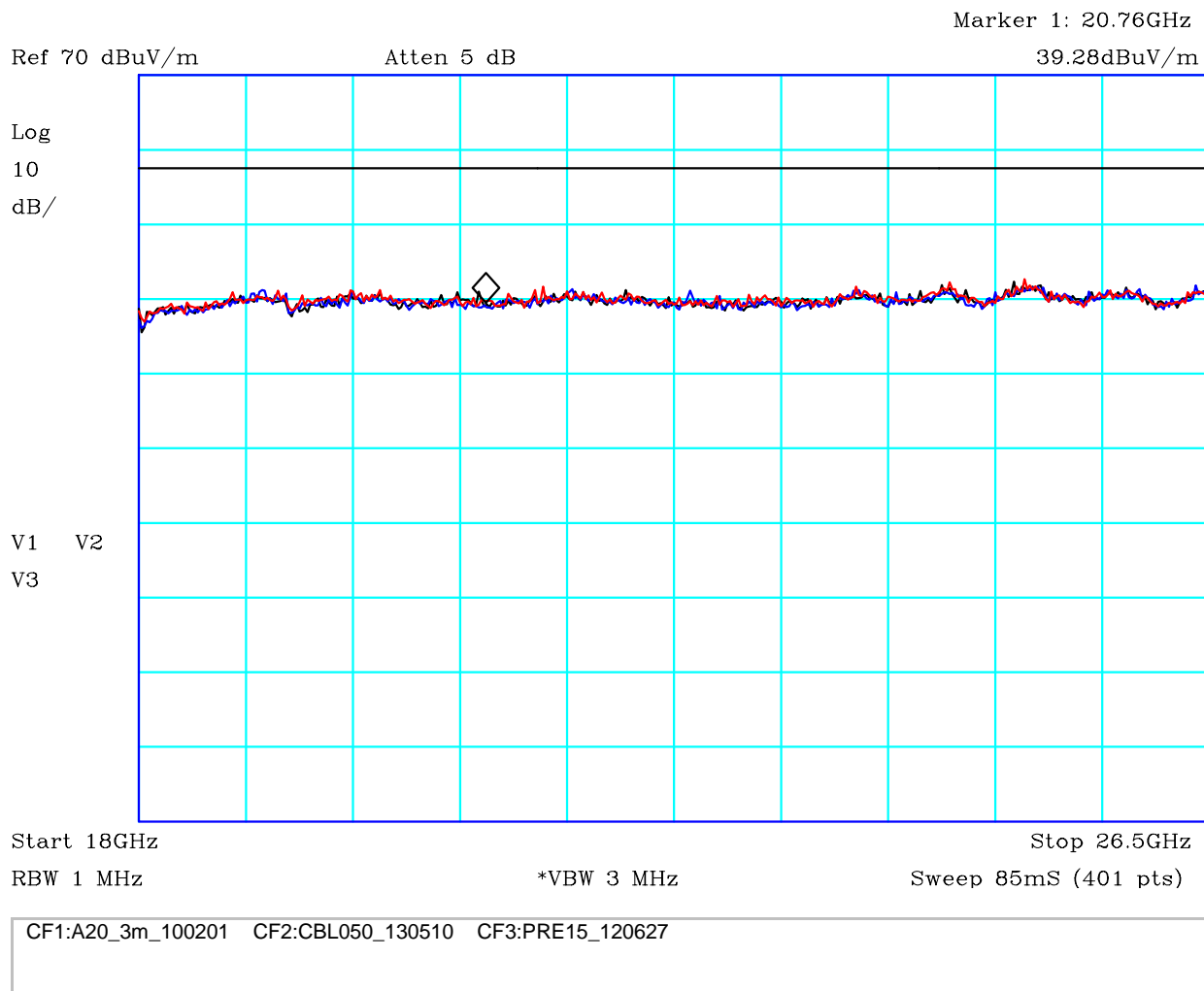
	Report No: <b>R3232</b>	FCC ID: SEASENSOR30	
	Issue No: <b>1</b>	IC: 8673A-SENSOR30	
	Test No: <b>T5014</b>	<b>Test Report</b>	
			Page: 60 of 71



### PLOT 33 Radiated Emissions - Antenna A - 18GHz to 26.5GHz


Company:	Ubisense	Product:	Ubisensor V3
Date:	13/05/2013	Test Eng:	Dave Smith
Method:	ANSI C63.4	Method:	
Limit1:(BLK)	FCC(B)@2m	Limit2:	
Limit3:		Limit4:	
<p>Black: Low Channel Blue: Middle Channel Red: high Channel</p> <p>Sensor 12 in room, configured as a timing source. Timing port 3 connected to remote sensor 16 configured as a timing sink (which takes timing signal from it's timing port). Sensor 12 connected to PoE ethernet switch (also in room). PoE switch connected to remote switch. USB stick connected to sensor 12.</p> <p>Transmitting on antenna A. Continuous transmission with modulation at power level 191.</p> <p>NOTE: This plot shows peak readings against the average limit. Peak limit is 20dB higher.</p>			
Facility:	Anech_2	Height	1m
Distance	2m	Polarisation	V+H
Angle	0-360	File:	H34136F6
		Mode:	1
		Modification State:	0
		Analyser:	R9

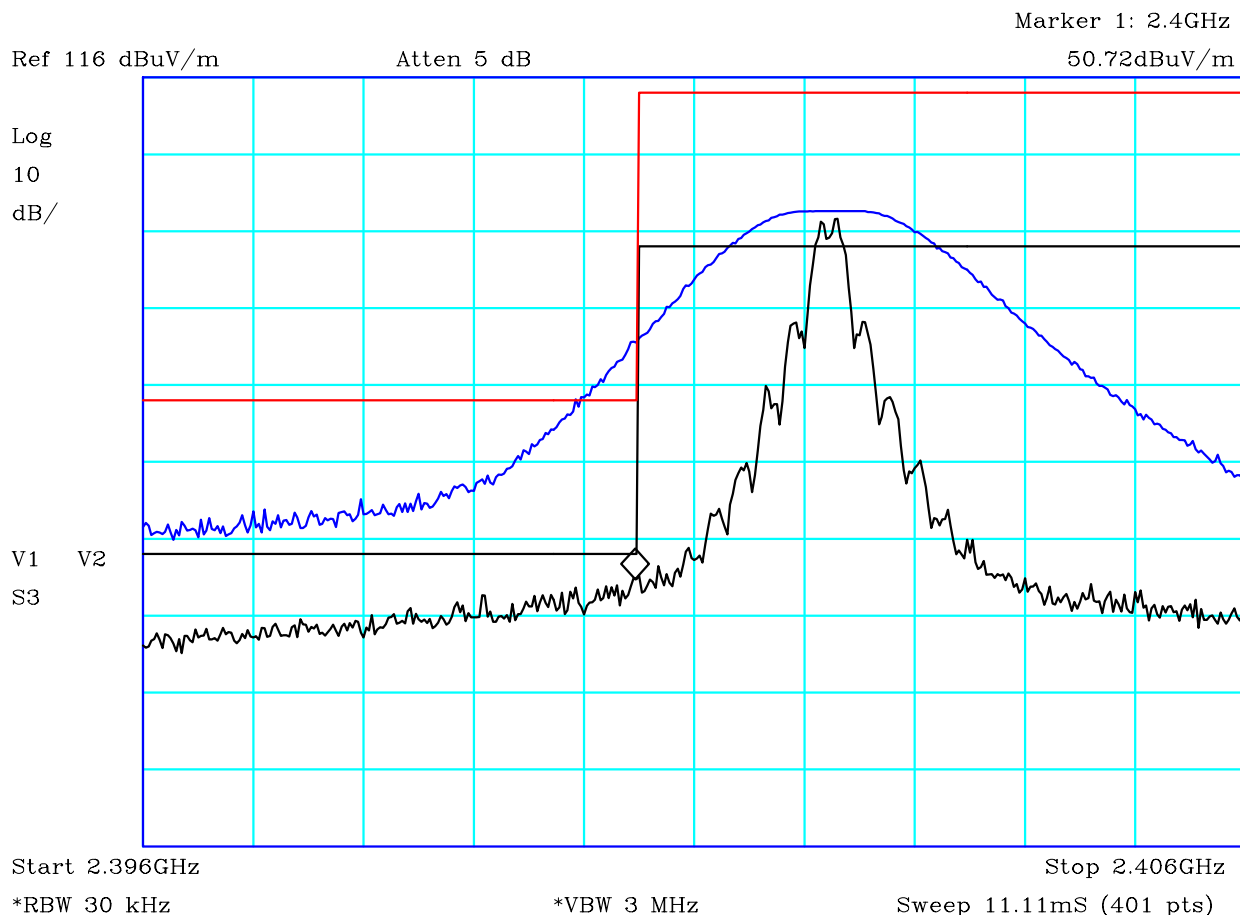
	Report No: <b>R3232</b>	FCC ID: SEASENSOR30	
	Issue No: <b>1</b>	IC: 8673A-SENSOR30	
	Test No: <b>T5014</b>	<b>Test Report</b>	
			Page: 61 of 71



#### PLOT 34 Radiated Emissions - Antenna B - 18GHz to 26.5GHz

Company:	Ubisense	Product:	Ubisensor V3
Date:	13/05/2013	Test Eng:	Dave Smith
Method:	ANSI C63.4	Method:	
Limit1:(BLK)	FCC(B)@2m	Limit2:	
Limit3:		Limit4:	
<p>Black: Low Channel Blue: Middle Channel Red: high Channel</p> <p>Sensor 12 in room, configured as a timing source. Timing port 3 connected to remote sensor 16 configured as a timing sink (which takes timing signal from it's timing port). Sensor 12 connected to PoE ethernet switch (also in room). PoE switch connected to remote switch. USB stick connected to sensor 12.</p> <p>Transmitting on antenna B. Continuous transmission with modulation at power level 191.</p> <p>NOTE: This plot shows peak readings against the average limit. Peak limit is 20dB higher.</p>			
Facility:	Anech_2	Height	1m
Distance	2m	Polarisation	V+H
Angle	0-360	File:	H34136E8
		Mode:	1
		Modification State:	0
		Analyser:	R9

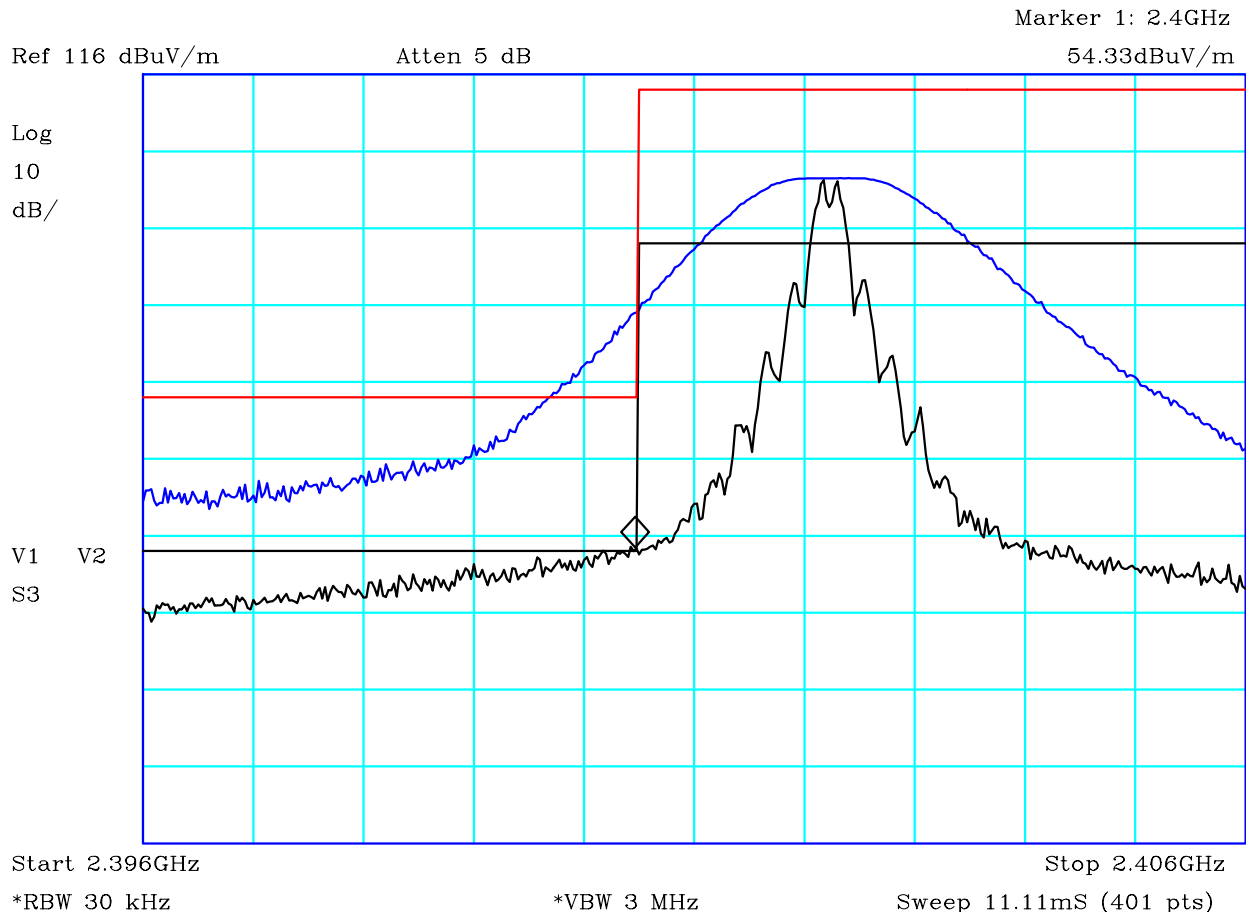
	Report No: <b>R3232</b>	FCC ID: SEASENSOR30 IC: 8673A-SENSOR30	
	Issue No: <b>1</b>		
	Test No: <b>T5014</b>	<b>Test Report</b>	Page: 62 of 71



CF1:A8\_3m\_120807 CF2:CBL059\_CBL018\_CBL065\_CBL060\_100806 CF3:PRE10\_120627 CF4:10dBPAD

### PLOT 35 Rad Emissions - Antenna A - Vertical - Lower Band Edge - 30kHz RBW


Company:	Ubisense	Product:	Ubisensor V3
Date:	13/05/2013	Test Eng:	Dave Smith
Method:	ANSI C63.4	Method:	
Limit1:(BLK)	FCC_average	Limit2:(RED)	FCC_peak
Limit3:		Limit4:	
Black: 30kHz RBW Blue; 1MHz RBW Antenna A			
Facility:	Anech_2	Height	1m
Distance	3m	Polarisation	Vertical
Angle	0-360	File:	H341348F
		Mode:	1
		Modification State:	0
		Analysers:	R9

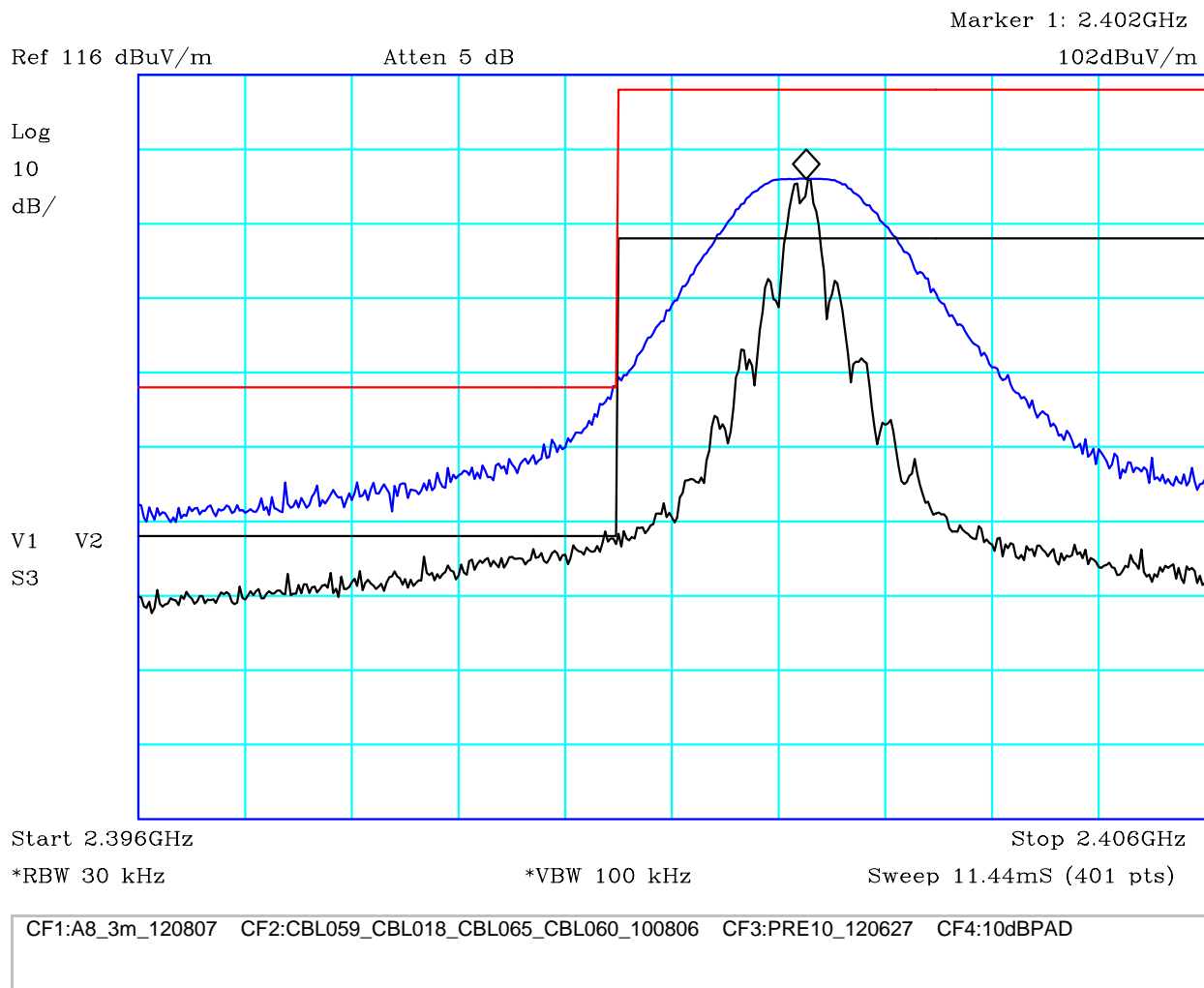


CF1:A8\_3m\_120807   CF2:CBL059\_CBL018\_CBL065\_CBL060\_100806   CF3:PRE10\_120627   CF4:10dBPAD

### PLOT 36 Rad Emissions - Antenna A - Horizontal - Lower Band Edge - 30kHz RBW

Company:	Ubisense	Product:	Ubisensor V3
Date:	13/05/2013	Test Eng:	Dave Smith
Method:	ANSI C63.4	Method:	
Limit1:(BLK)	FCC_average	Limit2:(RED)	FCC_peak
Limit3:		Limit4:	
Black: 30kHz RBW   Blue; 1MHz RBW Antenna A			
Facility:	Anech_2	Height	1m
Distance	3m	Polarisation	Horizontal
Angle	0-360	File:	H3413479
		Mode:	1
		Modification State:	0
		Analysers:	R9

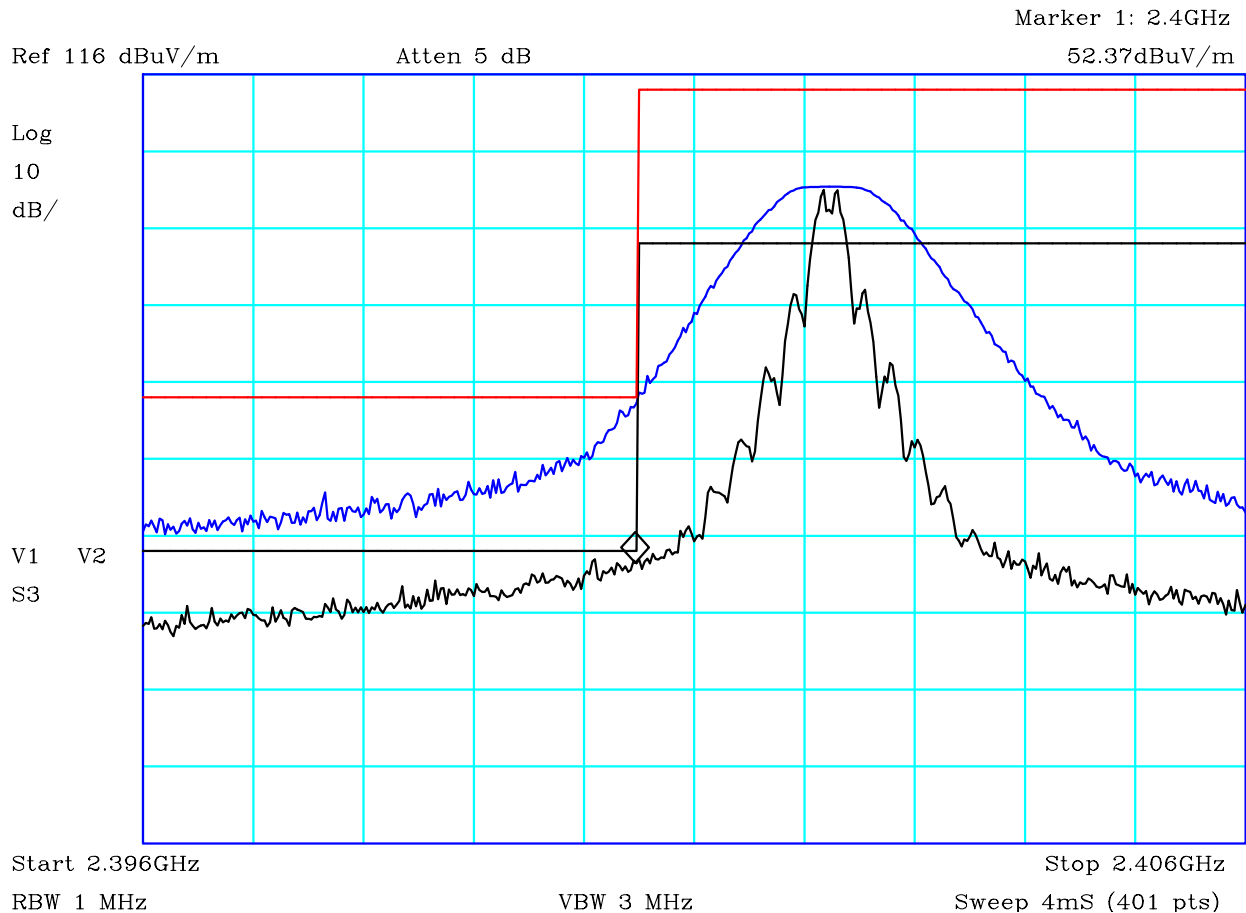
	Report No: <b>R3232</b>	FCC ID: SEASENSOR30	
	Issue No: <b>1</b>	IC: 8673A-SENSOR30	
	Test No: <b>T5014</b>	<b>Test Report</b>	Page: <b>64 of 71</b>



### PLOT 37 Rad Emissions - Antenna B - Vertical - Lower Band Edge - 30kHz RBW

Company:	Ubisense	Product:	Ubisensor V3
Date:	10/05/2013	Test Eng:	Dave Smith
Method:	ANSI C63.4	Method:	
Limit1:(BLK)	FCC_average	Limit2:(RED)	FCC_peak
Limit3:		Limit4:	
Black: 30kHz RBW   Blue; 1MHz RBW Antenna B			
Facility:	Anech_2	Height	1m
Distance	3m	Polarisation	Vertical
Angle	0-360	File:	H341071D
Mode:	1	Modification State:	0
Analysers:	R9		

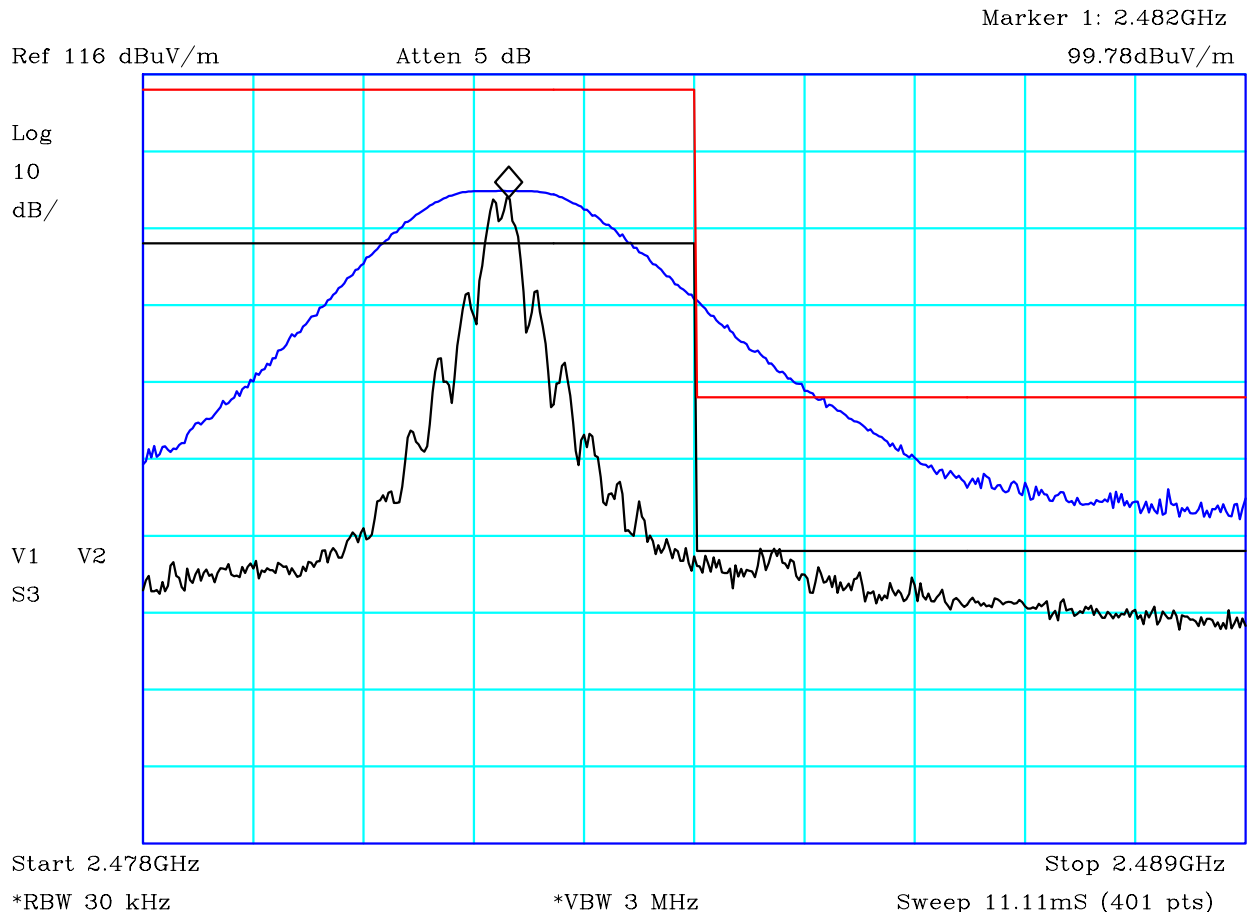




CF1:A8\_3m\_120807 CF2:CBL059\_CBL018\_CBL065\_CBL060\_100806 CF3:PRE10\_120627 CF4:10dBPAD

### PLOT 38 Rad Emissions - Antenna B - Horizontal - Lower Band Edge - 30kHz RBW

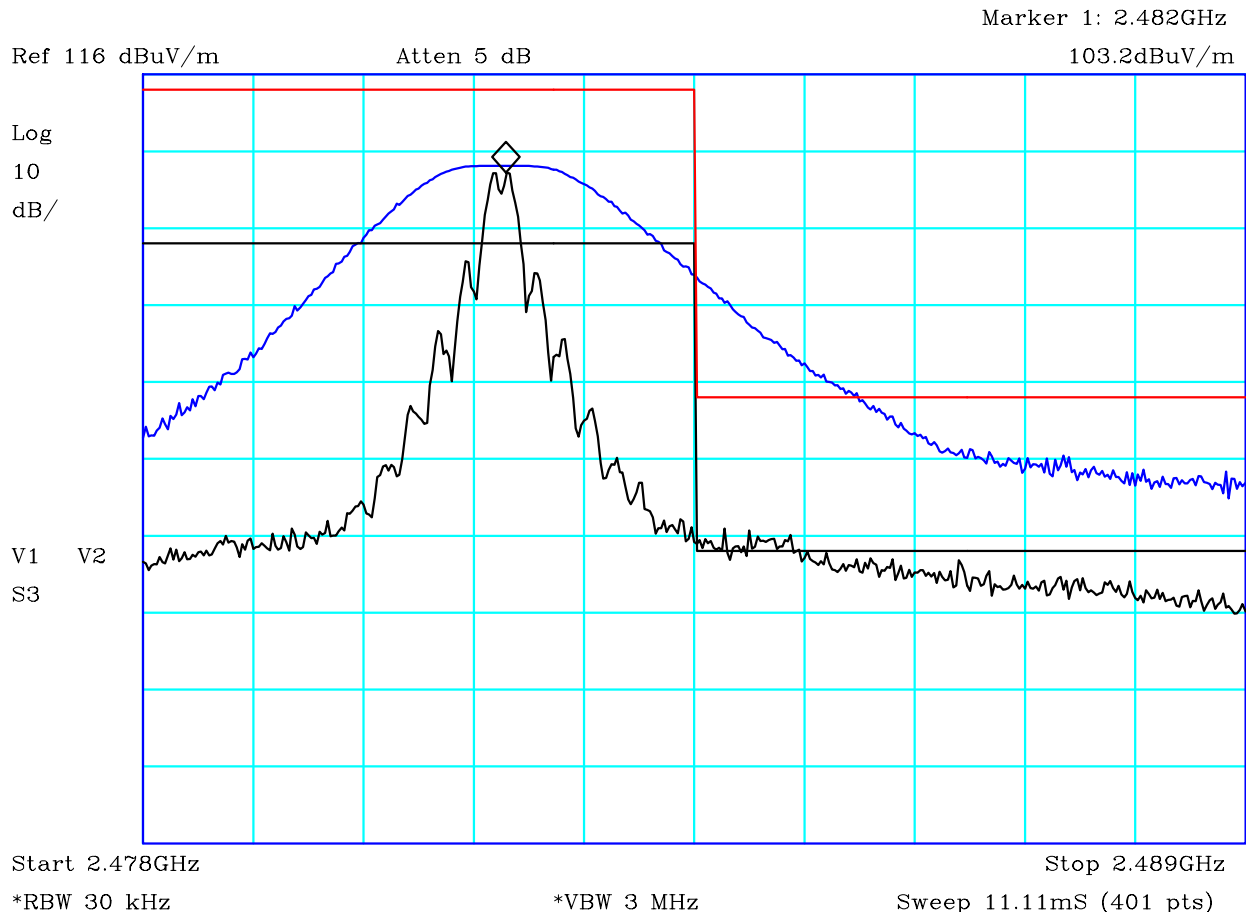
Company:	Ubisense	Product:	Ubisensor V3
Date:	10/05/2013	Test Eng:	Dave Smith
Method:	ANSI C63.4	Method:	
Limit1:(BLK)	FCC_average	Limit2:(RED)	FCC_peak
Limit3:		Limit4:	
Black: 30kHz RBW Blue; 1MHz RBW Antenna B			
Facility:	Anech_2	Height	1m
Distance	3m	Polarisation	Horizontal
Angle	0-360	File:	H34106AA
		Mode:	1
		Modification State:	0
		Analysar:	R9



CF1:A8\_3m\_120807 CF2:CBL059\_CBL018\_CBL065\_CBL060\_100806 CF3:PRE10\_120627 CF4:10dBPAD

### PLOT 39 Rad Emissions - Antenna A - Vertical - Upper Band Edge - 30kHz RBW


Company:	Ubisense	Product:	Ubisensor V3
Date:	13/05/2013	Test Eng:	Dave Smith
Method:	ANSI C63.4	Method:	
Limit1:(BLK)	FCC_average	Limit2:(RED)	FCC_peak
Limit3:		Limit4:	
Black: 30kHz RBW Blue; 1MHz RBW Antenna A			
Facility:	Anech_2	Height	1m
Distance	3m	Polarisation	Vertical
Angle	0-360	File:	H34134A6
Mode:	1	Modification State:	0
		Analysers:	R9

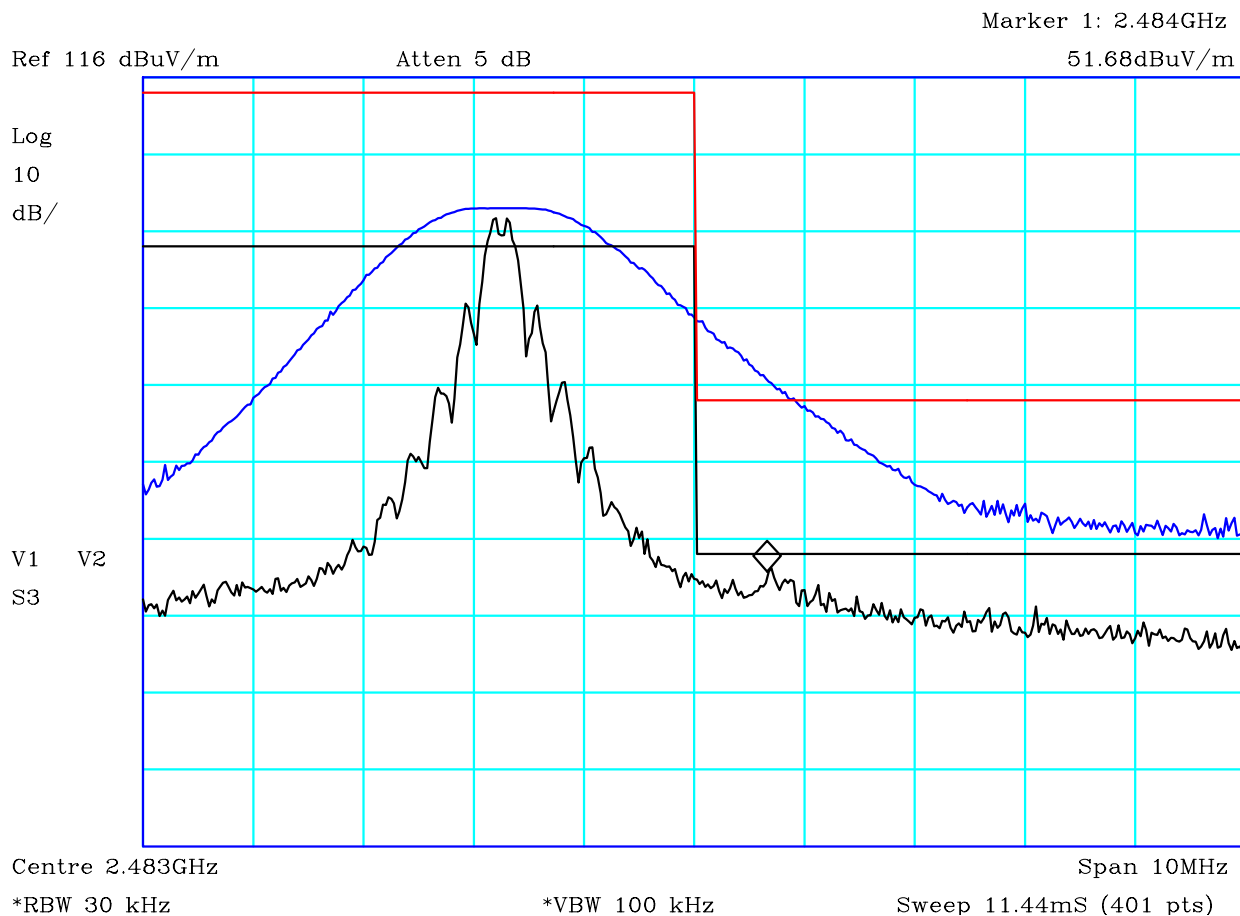


CF1:A8\_3m\_120807 CF2:CBL059\_CBL018\_CBL065\_CBL060\_100806 CF3:PRE10\_120627 CF4:10dBPAD

#### PLOT 40 Rad Emissions - Antenna A - Horizontal - Upper Band Edge - 30kHz RBW

Company:	Ubisense	Product:	Ubisensor V3
Date:	13/05/2013	Test Eng:	Dave Smith
Method:	ANSI C63.4	Method:	
Limit1:(BLK)	FCC_average	Limit2:(RED)	FCC_peak
Limit3:		Limit4:	
Black: 30kHz RBW Blue; 1MHz RBW Antenna A			
Facility:	Anech_2	Height	1m
Distance	3m	Polarisation	Horizontal
Angle	0-360	File:	H34134B6
		Mode:	1
		Modification State:	0
		Analysers:	R9


	Report No: <b>R3232</b>	FCC ID: SEASENSOR30 IC: 8673A-SENSOR30	
	Issue No: <b>1</b>		
	Test No: <b>T5014</b>	<b>Test Report</b>	Page: 68 of 71

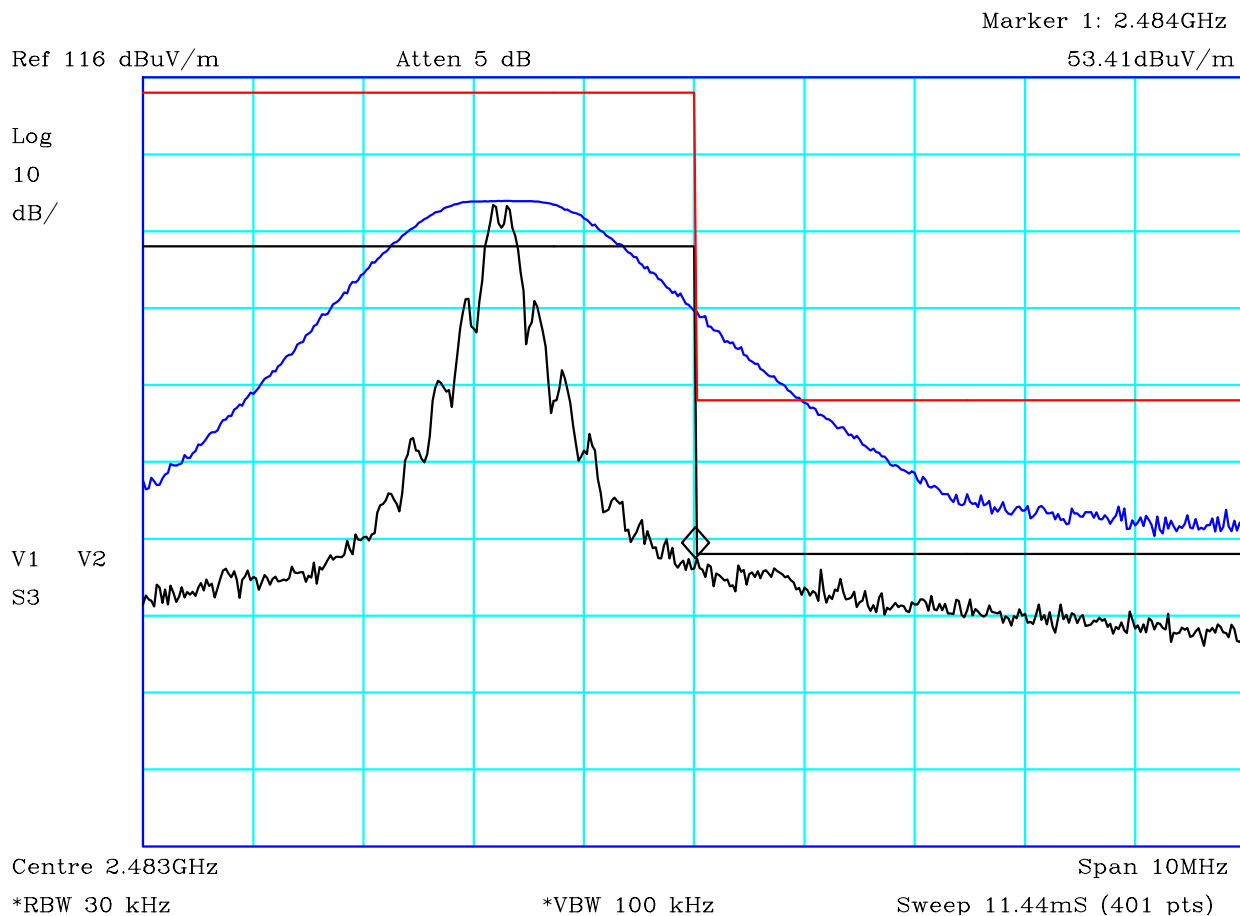


CF1:A8\_3m\_120807 CF2:CBL059\_CBL018\_CBL065\_CBL060\_100806 CF3:PRE10\_120627 CF4:10dBPAD

#### PLOT 41 Rad Emissions - Antenna B - Vertical - Upper Band Edge - 30kHz RBW

Company:	Ubisense	Product:	Ubisensor V3
Date:	10/05/2013	Test Eng:	Dave Smith
Method:	ANSI C63.4	Method:	
Limit1:(BLK)	FCC_average	Limit2:(RED)	FCC_peak
Limit3:		Limit4:	
Black: 30kHz RBW Blue; 1MHz RBW Antenna B			
Facility:	Anech_2	Height	1m
Distance	3m	Polarisation	Vertical
Angle	0-360	File:	H341078C
		Mode:	1
		Modification State:	0
		Analysers:	R9


	Report No: <b>R3232</b>	FCC ID: SEASENSOR30 IC: 8673A-SENSOR30	
	Issue No: <b>1</b>		
	Test No: <b>T5014</b>	<b>Test Report</b>	Page: 69 of 71

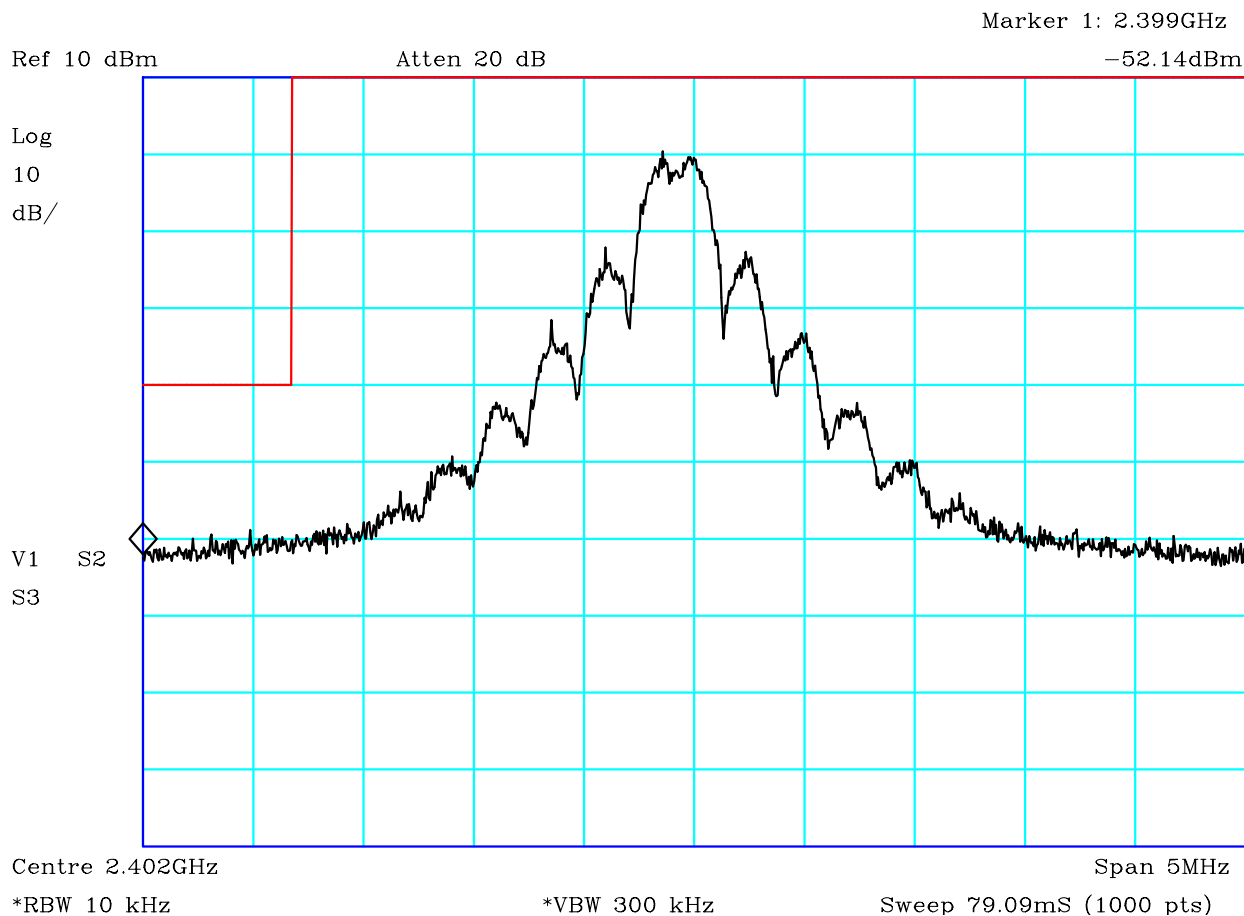


CF1:A8\_3m\_120807   CF2:CBL059\_CBL018\_CBL065\_CBL060\_100806   CF3:PRE10\_120627   CF4:10dBPAD

#### PLOT 42 Rad Emissions - Antenna B - Horizontal - Upper Band Edge - 30kHz RBW

Company:	Ubisense	Product:	Ubisensor V3
Date:	10/05/2013	Test Eng:	Dave Smith
Method:	ANSI C63.4	Method:	
Limit1:(BLK)	FCC_average	Limit2:(RED)	FCC_peak
Limit3:		Limit4:	
Black: 30kHz RBW   Blue; 1MHz RBW Antenna B			
Facility:	Anech_2	Height	1m
Distance	3m	Polarisation	Horizontal
Angle	0-360	File:	H341077A
Mode:	1	Modification State:	0
		Analysers:	R9


	Report No: <b>R3232</b>	FCC ID: SEASENSOR30 IC: 8673A-SENSOR30	
	Issue No: <b>1</b>		
	Test No: <b>T5014</b>	<b>Test Report</b>	Page: <b>70 of 71</b>

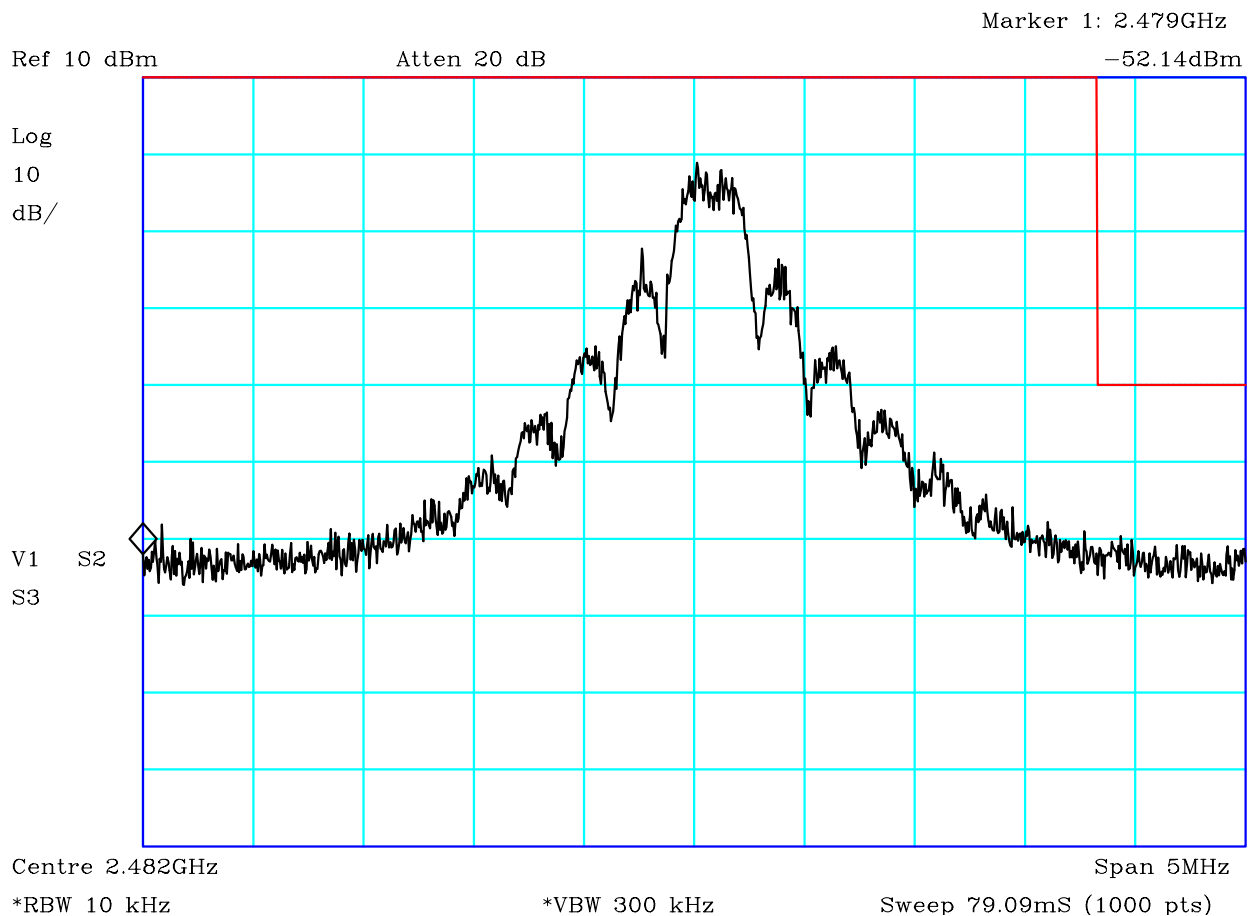


CF1:cable

### PLOT 43 Occupied Bandwidth - Lower Frequency

Company:	Ubisense	Product:	Sensor v3
Date:	26/03/2013	Test Eng:	Dave Smith
Method:	RSS_GEN	Method:	
Limit1:(RED)		Limit2:	
Limit3:		Limit4:	
<p>Occupied bandwidth. Lower channel 2.401750GHz, max modulation, level 191..</p> <p>Occupied bandwidth (99%) = 746kHz Sensor 14.</p>			
Facility:	Anech_1	Mode:	1
		Modification State:	0
File:	H32264D5	Analyser	R9

	Report No: <b>R3232</b>	FCC ID: SEASENSOR30	
	Issue No: <b>1</b>	IC: 8673A-SENSOR30	
	Test No: <b>T5014</b>	<b>Test Report</b>	Page: <b>71 of 71</b>



CF1:cable

#### PLOT 44 Occupied Bandwidth - Upper Frequency

Company:	Ubisense	Product:	Sensor v3
Date:	26/03/2013	Test Eng:	Dave Smith
Method:	RSS_GEN	Method:	
Limit1:(RED)		Limit2:	
Limit3:		Limit4:	

Occupied bandwidth. Upper channel 2.481750GHz..

Occupied bandwidth (99%) = 777kHz  
Sensor 14.

Facility:	Anech_1	Mode:	1
		Modification State:	0
File:	H32264CC	Analyser	R9