Report On

FCC and Industry Canada Testing of the
Elebia Autohooks,SLU EVO
In accordance with FCC CFR 47 Part 15C, Industry Canada RSS-210 and Industry Canada RSS-GEN

COMMERCIAL-IN-CONFIDENCE

FCC ID: 2ACLHEVO
IC: 12039A-EVO

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July 2014

PREPARED FOR

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APPROVED BY

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Authorised Signatory

DATED 07 July 2014

ENGINEERING STATEMENT

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

Test Engineer(s);

G Lawler N Rousell

Product Service

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Product Service

SECTION 1

REPORT SUMMARY

FCC and Industry Canada Testing of the
Elebia Autohooks,SLU EVO
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1.1 INTRODUCTION

The information contained in this report is intended to show the verification of FCC and Industry Canada Testing of the Elebia Autohooks,SLU EVO to the requirements of FCC CFR 47 Part 15C, Industry Canada RSS-210 and Industry Canada RSS-GEN.

Objective	To perform FCC and Industry Canada Testing to determine the Equipment Under Test's (EUT's) compliance with the Test Specification, for the series of tests carried out.
Manufacturer	Elebia Autohooks,SLU
Model Number(s)	EVO
Serial Number(s)	TXB TXC
Number of Samples Tested	2
Test Specification/Issue/Date	FCC CFR 47 Part 15C (2013) Industry Canada RSS-210 (2010) Industry Canada RSS-GEN (2010)
Incoming Release Date	Application Form 25 March 2014
Disposal Reference Number Date	Held Pending Disposal Not Applicable Not Applicable
Order Number Date	14025 05 March 2014
Start of Test	10 April 2014
Finish of Test	14 May 2014
Name of Engineer(s)	G Lawler N Rousell
Related Document(s)	ANSI C63.10: 2009 KDB 558074 D01 V03 R01

Product Service

1.2 BRIEF SUMMARY OF RESULTS

A brief summary of the tests carried out in accordance with FCC CFR 47 Part 15C, Industry Canada RSS-210 and Industry Canada RSS-GEN is shown below.

Section	Spec Clause			Test Description	Result	Comments/Base Standard
	Pt15C	RSS-210	RSS-GEN			
Transmit						
2.1	15.247 (b)(4)	A8.4 (4)	-	EIRP Peak Power	Pass	
2.2	15.247 (e)	-	-	Power Spectral Density	Pass	
2.3	15.247 (d)	A8.5	2.2	Spurious and Band Edge Emissions	Pass	
2.4	15.247 (a)(2)	-	-	6dB Bandwidth	Pass	

Product Service

1.3 APPLICATION FORM

APPLICANT'S DETAILS

COMPANY NAME : ELEBIA AUTOHOOKS SLU
ADDRESS : C/PARÍS 45 ENTLO 3ª 08029 BARCELONA SPAIN
NAME FOR CONTACT PURPOSES : OSCAR FILLOL

TELEPHONE NO: +34 608545212 FAX NO: .....
E-MAIL: OFILLOL@ELEBIA.COM

EQUIPMENT INFORMATION

Model name/number EVO..... Identification/Part number .....
Hardware Version ..... Software Version .....
Manufacturer APLIC. ELEC Y DE RAD SL Country of Origin SPAIN
FCC ID ..... Industry Canada ID .....
Technical description (a brief description of the intended use and operation)
RF TRANSCEIVER TRANSMITTER TO OPERATE WITH A CRANE HOOK

Supply Voltage:
[ ] AC mains State AC voltage ..... V and AC frequency ..... Hz
[ ] DC (external) State DC voltage ..... V and DC current ..... A
[X] DC (internal) State DC voltage ...24V and Battery type LITHIUM ION 24V/CR2032 3V

Frequency characteristics:
Transmitter Frequency range 904 MHz to 910 MHz Channel spacing .....
(if channelized)
Receiver Frequency range ..... MHz to ..... MHz Channel spacing .....
(if different) (if channelized)
Designated test frequencies:
Bottom: 904MHz Middle: ..... MHz Top: 910 MHz
Intermediate Frequencies : ..... MHz
Highest Internally Generated Frequency : ..... MHz

Power characteristics:
Maximum transmitter power 0 dBm Minimum transmitter power ..... W
(if variable)
[ ] Continuous transmission
[x] Intermittent transmission State duty cycle 6,25% default
If intermittent, can transmitter be set to continuous transmit test mode? N

Antenna characteristics:
[ ] Antenna connector State impedance ..... ohm
[ ] Temporary antenna connector State impedance ..... ohm
[X] Integral antenna Type ..... State gain -10dBi
[ ] External Antenna Type ..... State gain ..... dBi

NOTE: We use a Power of 10dBm but we have a antenna gain of -10dBm as result that we have a power of 0dBm

Modulation characteristics:
[ ] Amplitude [ ] Other
[x] Frequency Details: GFSK
[ ] Phase

Can the transmitter operate un-modulated? N
ITU Class of emission: .....

Battery/Power Supply TX
Model name/number CR2032 Identification/Part number .....
Manufacturer RENATA S.A Country of Origin Switzerland

Battery/Power Supply RX
Model name/number ..... Identification/Part number .....
Manufacturer ..... Country of Origin .....

Ancillaries (if applicable)
Model name/number ..... Identification/Part number .....
Manufacturer ..... Country of Origin .....

Extreme conditions:

Product Service

Maximum temperature	+55 ºC	Minimum temperature	-20 ºC
Maximum supply voltage	3V(TX)-24V(RX)	Minimum supply voltage	3V(TX)-24V(RX)

I hereby declare that I am entitled to sign on behalf of the applicant and that the information supplied is correct and complete.

Signature :

Name : Oscar Fidel Vidal

Position held : CEO

Date : 25, March, 2014

ELEBIA AUTOHOOKS, S.L.U.
N.I.F. B65770265
C/PARÍS 45-47 ENTRESUELO 3ª
08029, BARCELONA
Tel. 934441707 - Fax. 934102303

1.4 PRODUCT INFORMATION

1.4.1 Technical Description

The Equipment Under Test (EUT) was a Elebia Autohooks,SLU EVO. A full technical description can be found in the manufacturer's documentation.

1.5 TEST CONDITIONS

For all tests the EUT was set up in accordance with the relevant test standard and to represent typical operating conditions. Tests were applied with the EUT situated in a shielded enclosure.

The EUT was powered from a 24 V DC supply.

FCC Measurement Facility Registration Number
90987 Octagon House, Fareham Test Laboratory

Industry Canada Company Address Code
IC2932B-1 Octagon House, Fareham Test Laboratory

1.6 DEVIATIONS FROM THE STANDARD

No deviations from the applicable test standard were made during testing.

1.7 MODIFICATION RECORD

Modification 0 - No modifications were made to the test sample during testing.

SECTION 2

TEST DETAILS

FCC and Industry Canada Testing of the
Elebia Autohooks,SLU EVO
In accordance with FCC CFR 47 Part 15C, Industry Canada RSS-210 and Industry Canada RSS-GEN

2.1 EIRP PEAK POWER

2.1.1 Specification Reference

FCC CFR 47 Part 15C, Clause 15.247 (b)(3)
Industry Canada RSS-210, Clause A8.4 (4)

2.1.2 Equipment Under Test and Modification State

EVO S/N: TXB - Modification State 0

2.1.3 Date of Test

3 May 2014

2.1.4 Test Equipment Used

The major items of test equipment used for the above tests are identified in Section 3.1.

2.1.5 Test Procedure

The EUT was placed on a non-conducting platform at a distance of 3 m from the measuring antenna. The Analyser settings were adjusted to display the resultant trace on screen and a resolution bandwidth and video bandwidth of 100 kHz and 300 kHz respectively were used to perform the measurement. The level on the spectrum analyser was maximised by rotating the EUT through 360° and a height search of the measuring antenna. A substitution was then performed using a suitable calibrated antenna and signal generator.

This level was maximised by adjusting the height of the measuring antenna once more. The level from the signal generator was then adjusted to achieve the same raw result as with the EUT. This level was then corrected to account for cable loss and antenna factor. A peak power analyser was also used to obtain a correction factor for the wideband signal.

A calculation was then performed to obtain the final figure.

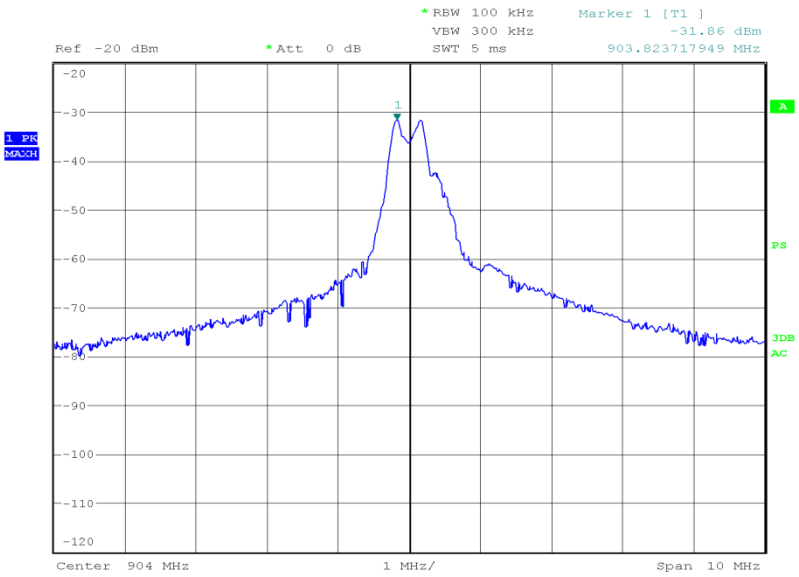
2.1.6 Environmental Conditions

Ambient Temperature	21.4°C
Relative Humidity	32.0%

2.1.7 Test Results

904 MHz

EIRP (dBm)	EIRP (mW)
3.50	2.24



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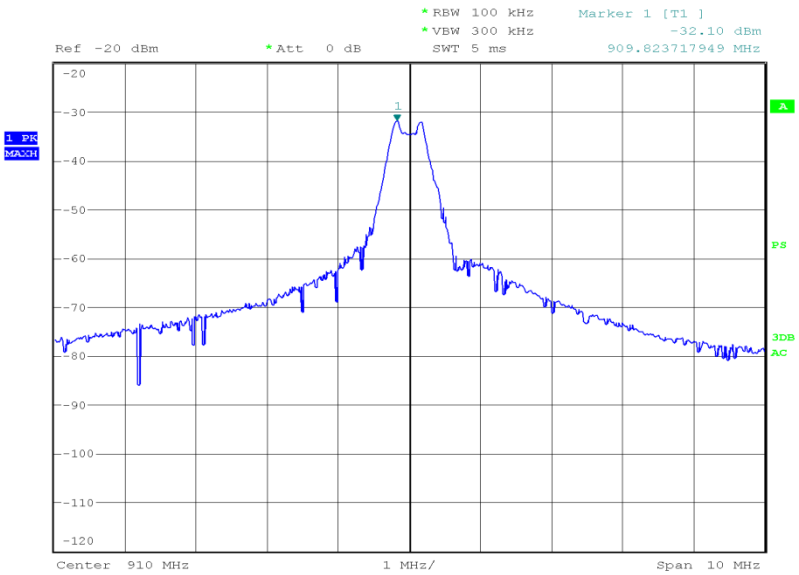
910 MHz

EIRP (dBm)	EIRP (mW)
3.74	2.37



Date: 3.MAY.2014 13:34:36

Limit

Limit EIRP (dBm)	Limit EIRP(mW)
36.0	4000

2.2 POWER SPECTRAL DENSITY

2.2.1 Specification Reference

FCC CFR 47 Part 15C, Clause 15.247 (e)

2.2.2 Equipment Under Test and Modification State

EVO S/N: TXC - Modification State 0

2.2.3 Date of Test

10 April 2014

2.2.4 Test Equipment Used

The major items of test equipment used for the above tests are identified in Section 3.1.

2.2.5 Test Procedure

The test was applied in accordance with the test method requirements of FCC CFR 47 Part 15.247 (e) and KDB 558074.

The EUT was connected to a spectrum analyser via a cable and attenuator. The EUT was transmitting at maximum power, for bottom and top channels on the supported data rate. The path loss was measured between the EUT and the spectrum analyser and entered as a reference level offset. The trace was set to max hold and using a peak detector and the maximum response was established with the spectrum analyser set to an RBW of 3 kHz and VBW of 10 kHz, the power spectral density in a 3 kHz bandwidth was measured.

2.2.6 Environmental Conditions

Ambient Temperature	23.3°C
Relative Humidity	32.2%

Product Service

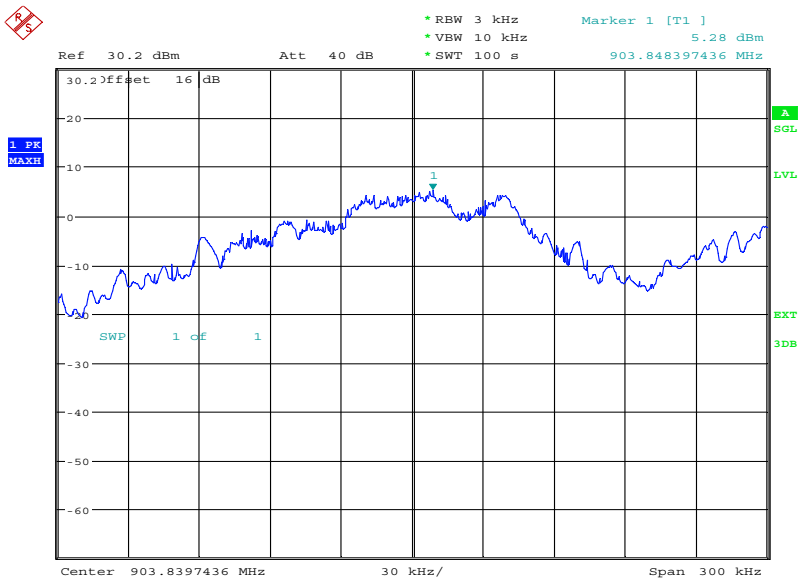
2.2.7 Test Results

24 V DC Supply

Frequency	Data Rate (kbps)	Power Spectral Density in 3 kHz Bands (dBm)
904 MHz	250	5.28
910 MHz	250	6.91

904 MHz

250 kbps



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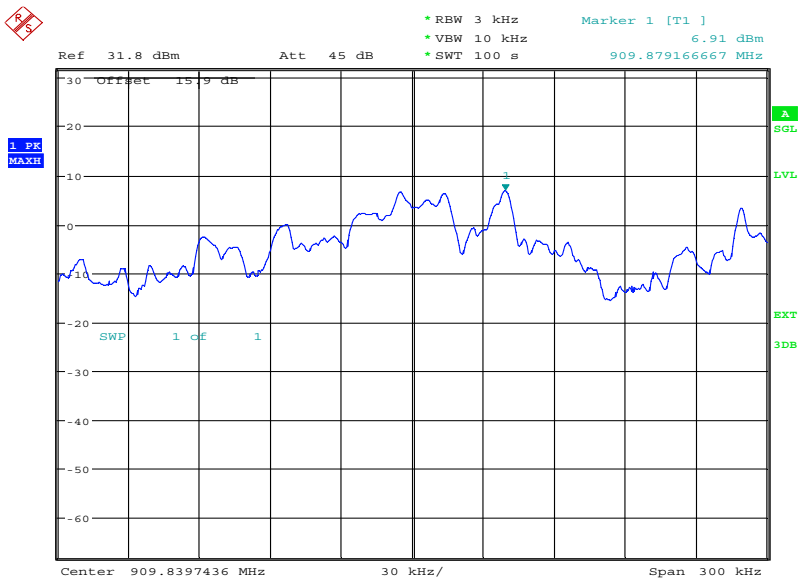
910 MHz

250 kbps



Limit Clause

The power spectral density conducted from the intentional radiator to the antenna shall not be greater than 8 dBm in any 3 kHz band during any time interval of continuous transmission.

2.3 SPURIOUS AND BAND EDGE EMISSIONS

2.3.1 Specification Reference

FCC CFR 47 Part 15C, Clause 15.247 (d)
Industry Canada RSS-210, Clause A8.5
Industry Canada RSS-GEN, Clause 2.2

2.3.2 Equipment Under Test and Modification State

EVO S/N: TXB - Modification State 0

2.3.3 Date of Test

14 May 2014

2.3.4 Test Equipment Used

The major items of test equipment used for the above tests are identified in Section 3.1.

2.3.5 Test Procedure

The test was applied in accordance with the test method requirements of FCC CFR 47 Part 15.247 (d) and KDB 558074.

For radiated emissions, the EUT was set to operate at maximum output power on the supported data rate. The power of the fundamental on the bottom and top channels was measured in an 100 kHz RBW and the resultant limit line was set at -20 dBc. In addition, the guidelines specified for measurements in restricted bands as specified in KDB 558074.

Measurements were performed from 30 MHz to 25 GHz and the path loss is incorporated as a transducer factor and entered into the spectrum analyser.

Band edge measurements were performed in accordance with the method specified in ANSI C63.10, Clause 6.9.2. The results were analysed to ensure compliance with restricted bands. The EUT was set to the lowest and highest operating frequencies.

2.3.6 Environmental Conditions

Ambient Temperature	19.8°C
Relative Humidity	37.0%

Product Service

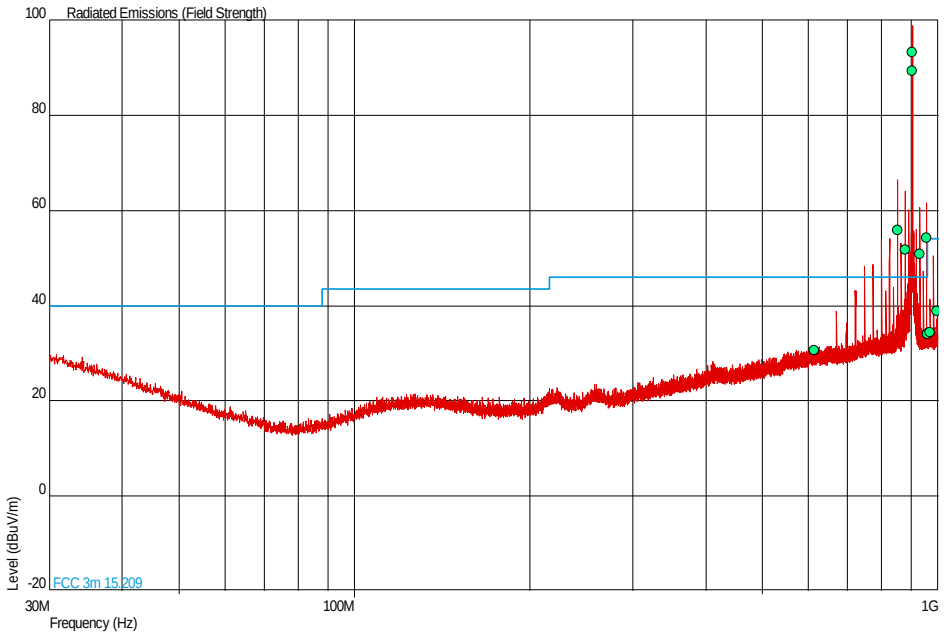
2.3.7 Test Results

24 V DC Supply

Spurious Radiated Emissions

904 MHz

30 MHz to 1 GHz

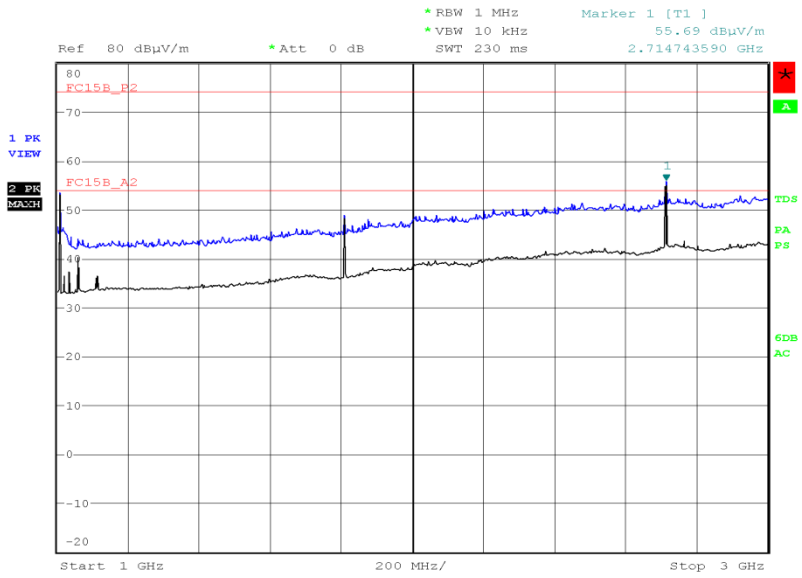


Frequency (MHz)	QP Level (dBuV/m)	QP Level (uV/m)	QP Limit (dBuV/m)	QP Limit (uV/m)	QP Margin (dBuV/m)	QP Margin (uV/m)	Angle (Deg)	Height (m)	Polarity
614.000	30.6	33.9	46.0	200	-15.4	-166.1	85	1.00	Horizontal
851.842	55.8	616.6	73.2	4571	-17.4	-3954.4	13	1.00	Horizontal
877.829	51.7	384.6	73.2	4571	-21.5	-4186.4	360	1.00	Horizontal
929.820	50.8	346.7	73.2	4571	-22.4	-4224.3	360	1.00	Horizontal
955.819	54.2	512.9	73.2	4571	-19.0	-4058.1	1	2.02	Horizontal
960.000	34.0	50.1	46.0	200	-12.0	-149.9	360	1.00	Horizontal
968.842	34.4	52.5	54.0	501	-19.6	-448.5	63	1.16	Vertical
995.184	38.8	87.1	54.0	501	-15.2	-413.9	350	2.03	Horizontal

1 GHz to 25 GHz

Frequency (GHz)	Antenna Polarisation	Antenna Height (cm)	EUT Arc (degrees)	Final Peak (dBµV/m)	Final Average (dBµV/m)
1.008	Horizontal	100	345	58.13	45.51
5.423	Vertical	345	296	67.00	42.92
9.038	Horizontal	265	131	64.57	40.49

1 GHz to 3 GHz



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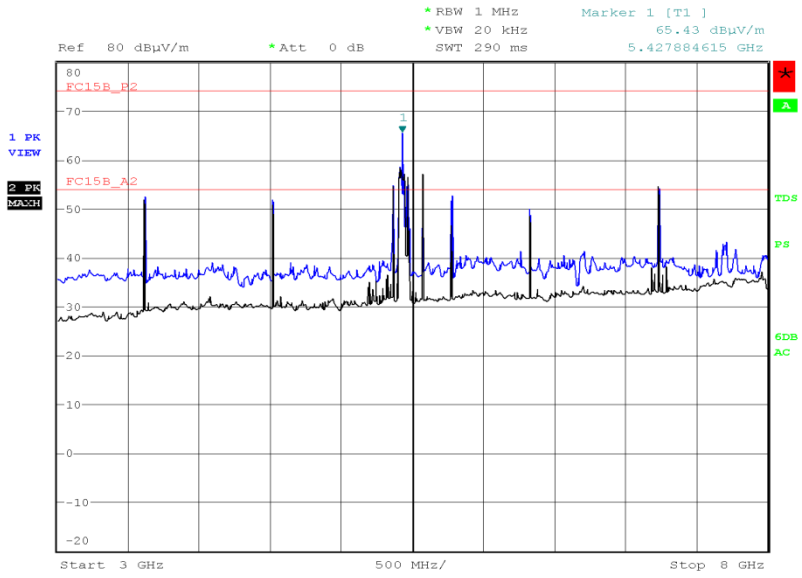
3 GHz to 8 GHz



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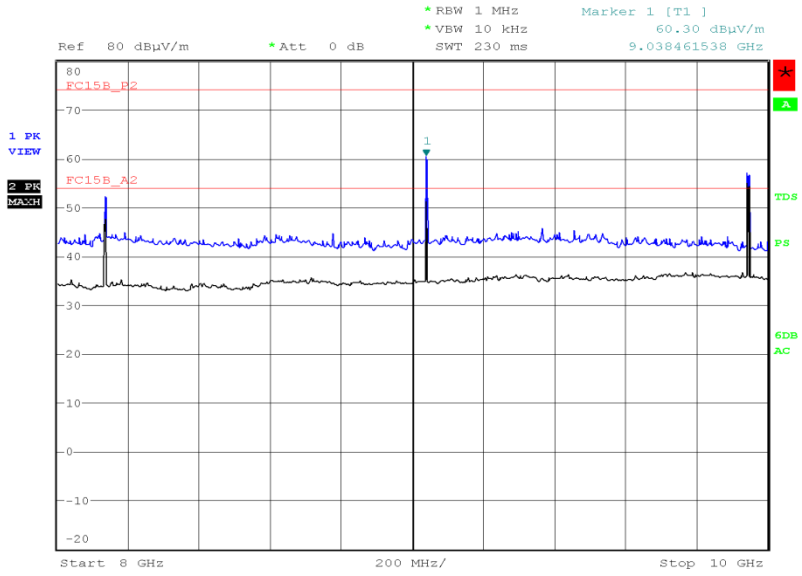
Product Service

8 GHz to 10 GHz



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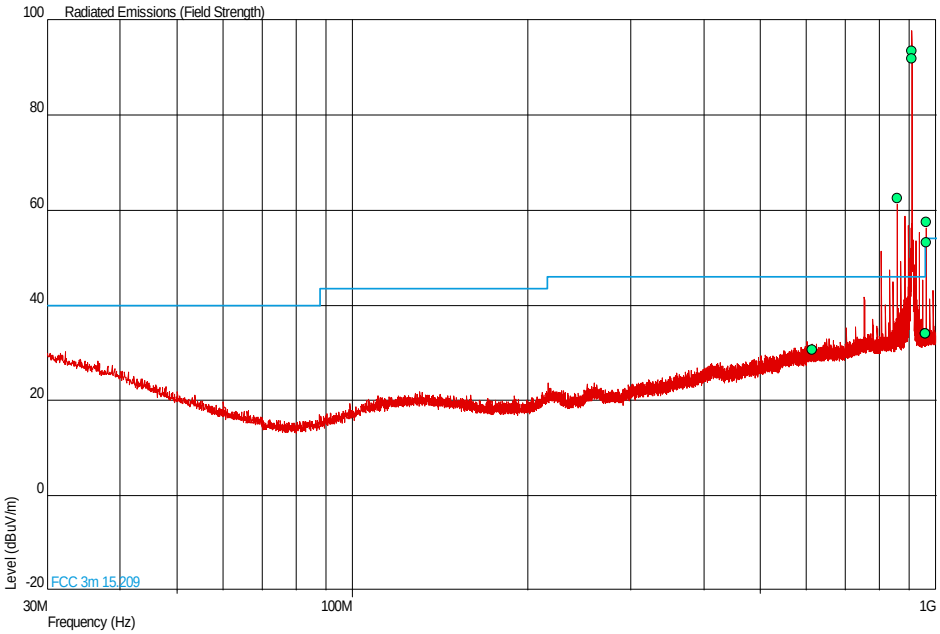
910 MHz

30 MHz to 1 GHz

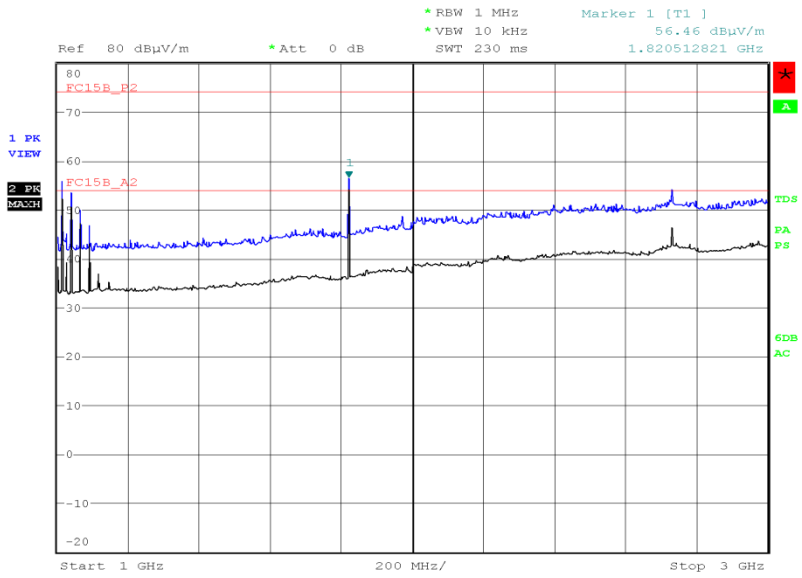


Frequency (MHz)	QP Level (dBuV/m)	QP Level (uV/m)	QP Limit (dBuV/m)	QP Limit (uV/m)	QP Margin (dBuV/m)	QP Margin (uV/m)	Angle (Deg)	Height (m)	Polarity
614.000	30.6	33.9	46.0	200	-15.4	-166.1	275	2.43	Horizontal
857.825	62.5	1333.5	73.5	4732	-11.0	-3398.5	185	1.00	Horizontal
960.000	34.0	50.1	46.0	200	-12.0	-149.9	360	1.00	Horizontal
960.000	33.9	49.5	46.0	200	-12.1	-150.5	346	3.94	Vertical
961.811	36.0	63.1	54.0	501	-18.0	-437.9	176	1.00	Horizontal
961.811	31.7	38.5	54.0	501	-22.3	-462.5	130	1.00	Vertical

1 GHz to 25 GHz

Frequency (GHz)	Antenna Polarisation	Antenna Height (cm)	EUT Arc (degrees)	Final Peak (dBµV/m)	Final Average (dBµV/m)
1.014	Horizontal	100	212	58.45	47.46
5.459	Vertical	117	0	70.07	45.99
9.098	Vertical	330	82	65.64	41.56

1 GHz to 3 GHz



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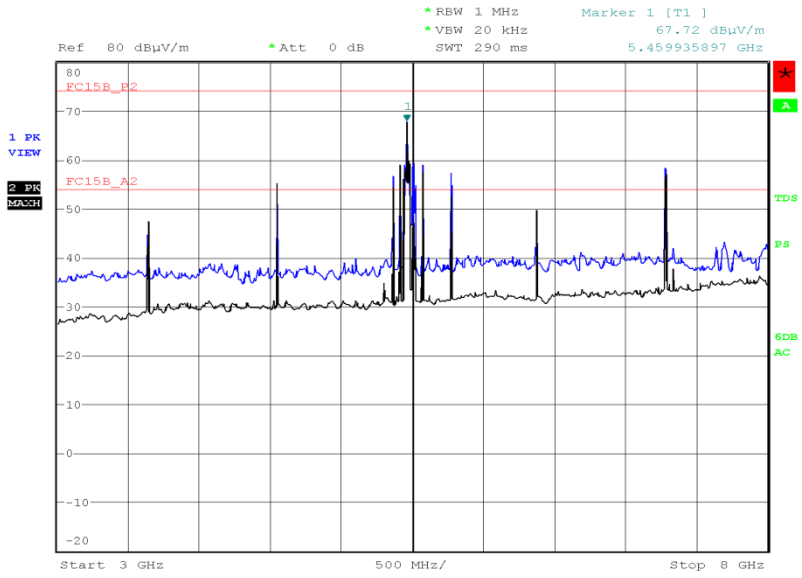
3 GHz to 8 GHz



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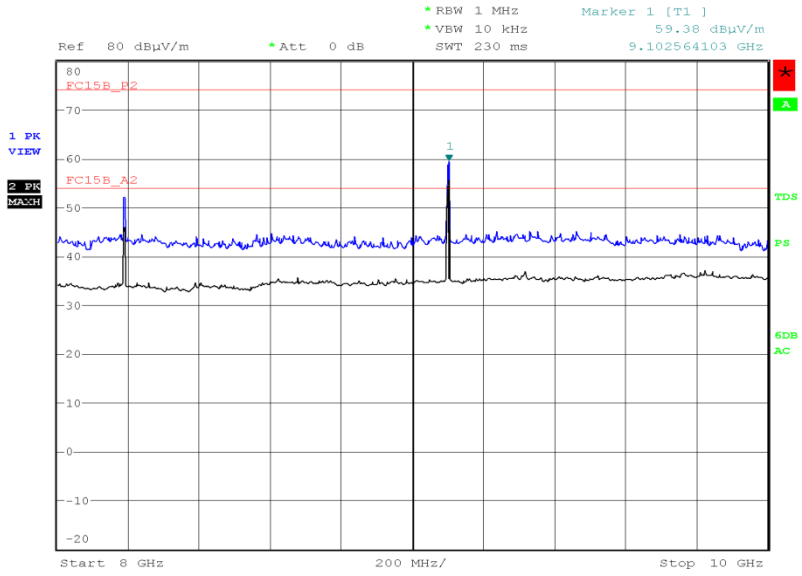
Product Service

8 GHz to 10 GHz



Date: 3.MAY.2014 17:19:21

Limit

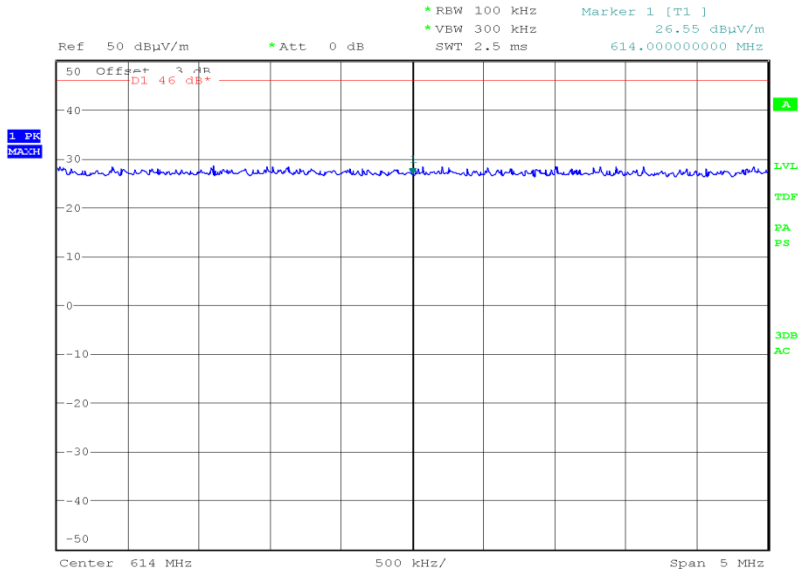
Peak (dBµV/m)	Average (dBµV/m)
74.0	54.0

Band Edge Emissions

904 MHz

Polarisation	Final Peak (dBµV/m)*
Horizontal	30.6

* This measurement was performed using a quasi-peak detector as per the requirements of clause 15.35 (a) and 15.205 (b).

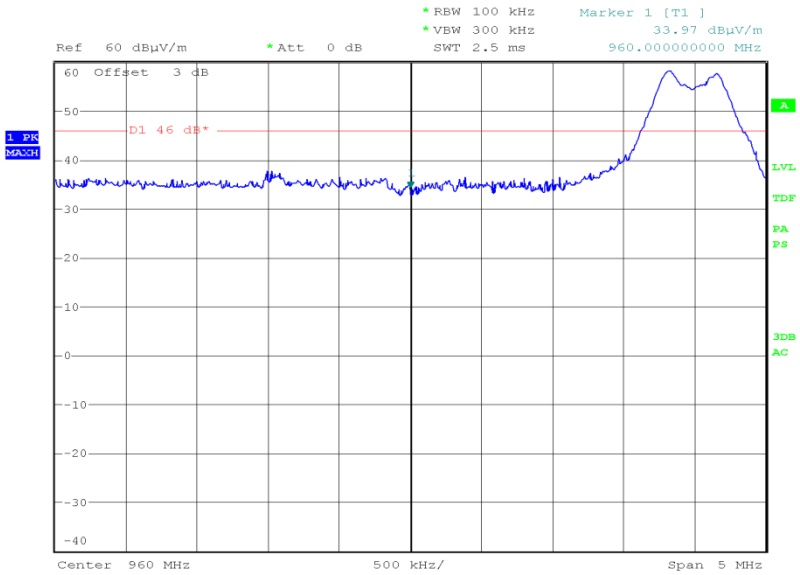


Date: 14.MAY.2014 17:55:45

910 MHz

Polarisation	Final Peak (dBµV/m)*
Horizontal	34.0

* This measurement was performed using a quasi-peak detector as per the requirements of clause 15.35 (a) and 15.205 (b).



Limit

Peak (dBµV/m)	Average (dBµV/m)
74.0	54.0

2.4 6dB BANDWIDTH

2.4.1 Specification Reference

FCC CFR 47 Part 15C, Clause 15.247 (a)(2)

2.4.2 Equipment Under Test and Modification State

EVO S/N: TXC - Modification State 0

2.4.3 Date of Test

10 April 2014

2.4.4 Test Equipment Used

The major items of test equipment used for the above tests are identified in Section 3.1.

2.4.5 Test Procedure

The test was applied in accordance with the test method requirements of FCC CFR 47 Part 15.247 (a) and KDB 558074.

The EUT was transmitting at maximum power, for bottom and top channels on the supported data rate. The EUT was connected to a spectrum analyser via a cable and attenuator. The Analyser settings were adjusted to an RBW of 100 kHz, video bandwidth of 3 x RBW with peak detector and trace set to max hold. The peak point of the trace was measured and the markers positioned to give the -6 dBc points of the displayed spectrum.

The plots on the following pages show the resultant display from the Spectrum Analyser.

2.4.6 Environmental Conditions

Ambient Temperature	23.3°C
Relative Humidity	32.2%

Product Service

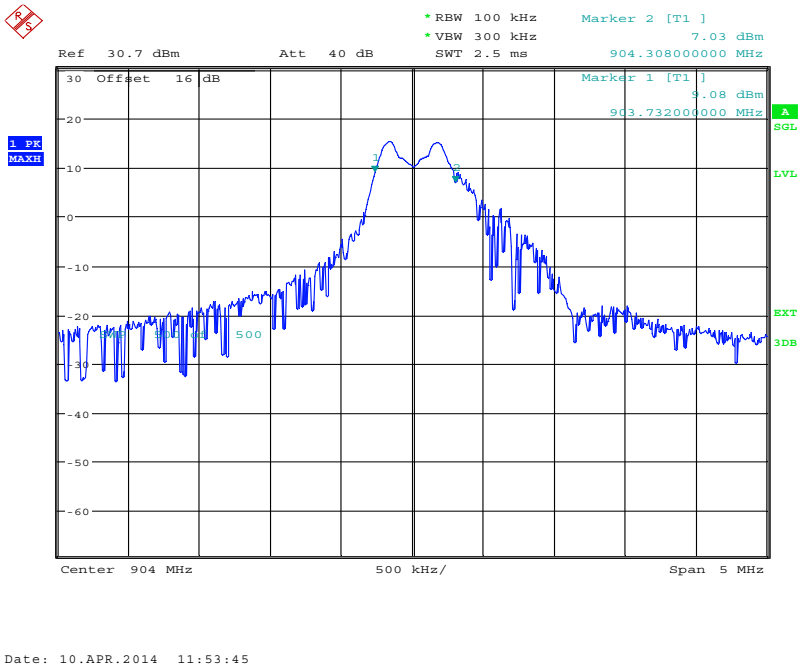
2.4.7 Test Results

24 V DC Supply

Frequency (MHz)	Data Rate (kbps)	6dB Bandwidth (kHz)
904 MHz	250	576
910 MHz	250	568

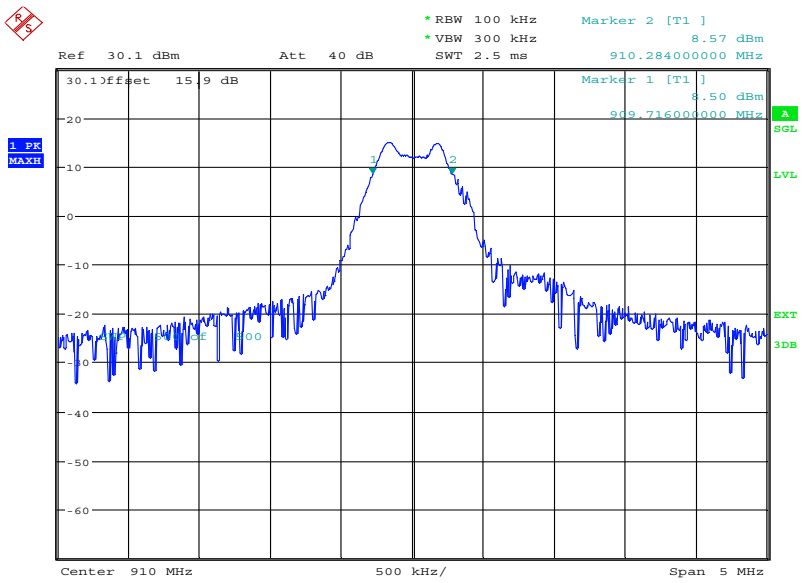
904 MHz

250 kbps



910 MHz

250 kbps



Date: 10.APR.2014 13:39:29

Limit Clause

The minimum 6 dB Bandwidth shall be at least 500 kHz.

Product Service

SECTION 3

TEST EQUIPMENT USED

Product Service

3.1 TEST EQUIPMENT USED

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

Instrument	Manufacturer	Type No.	TE No.	Calibration Period (months)	Calibration Due
Section 2.1- EIRP Peak Power					
Antenna (Double Ridge Guide, 1GHz-18GHz)	EMCO	3115	234	12	2-May-2015
Antenna (Double Ridge Guide, 1GHz-18GHz)	EMCO	3115	235	12	8-Nov-2014
Signal Generator (10MHz to 40GHz)	Rohde & Schwarz	SMR40	1002	12	18-Sep-2014
Screened Room (5)	Rainford	Rainford	1545	24	10-Jan-2015
Turntable Controller	Inn-Co GmbH	CO 1000	1606	-	TU
EMI Test Receiver	Rohde & Schwarz	ESU40	3506	12	22-Oct-2014
7m Armoured RF Cable	SSI Cable Corp.	1501-13-13-7m WA(-)	3600	-	TU
9m RF Cable (N Type)	Rhophase	NPS-2303-9000-NPS	3791	-	TU
Tilt Antenna Mast	maturo Gmbh	TAM 4.0-P	3916	-	TU
Mast Controller	maturo Gmbh	NCD	3917	-	TU
Section 2.2 - Power Spectral Density					
Rubidium Standard	Rohde & Schwarz	XSRM	1316	6	22-Jul-2014
Attenuator (10dB, 50W)	Aeroflex / Weinschel	47-10-34	3166	12	12-Sep-2014
Hygrometer	Rotronic	I-1000	3220	12	16-Jul-2014
Signal Analyser	Rohde & Schwarz	FSQ 26	3545	12	4-Jul-2014
Network Analyser	Rohde & Schwarz	ZVA 40	3548	12	13-Sep-2014
1m N-Type Cable	Rhophase		4233	12	11-Mar-2015
Calibration Unit	Rohde & Schwarz	ZV-Z54	4368	12	18-Sep-2014
Frequency Standard	Spectracom	Secure Sync 1200-0408-0601	4393	6	22-Jul-2014
Section 2.3 - Spurious and Band Edge Emissions					
Antenna (Double Ridge Guide, 1GHz-18GHz)	EMCO	3115	234	12	2-May-2015
Rubidium Standard	Rohde & Schwarz	XSRM	1316	6	22-Jul-2014
Pre-Amplifier	Phase One	PS04-0086	1533	12	19-Dec-2014
Screened Room (5)	Rainford	Rainford	1545	24	10-Jan-2015
Turntable Controller	Inn-Co GmbH	CO 1000	1606	-	TU
Filter	Daden Anthony Ass	MH-1500-7SS	2778	12	4-Feb-2015
Antenna (Bilog)	Chase	CBL6143	2904	24	10-Jun-2015
Attenuator (10dB, 50W)	Aeroflex / Weinschel	47-10-34	3166	12	12-Sep-2014
Hygrometer	Rotronic	I-1000	3220	12	16-Jul-2014
EMI Test Receiver	Rohde & Schwarz	ESU40	3506	12	22-Oct-2014
Signal Analyser	Rohde & Schwarz	FSQ 26	3545	12	4-Jul-2014
Network Analyser	Rohde & Schwarz	ZVA 40	3548	12	13-Sep-2014
9m RF Cable (N Type)	Rhophase	NPS-2303-9000-NPS	3791	-	TU
Tilt Antenna Mast	maturo Gmbh	TAM 4.0-P	3916	-	TU
Mast Controller	maturo Gmbh	NCD	3917	-	TU
1 Metre SMA Cable	Rhophase	3PS-1801A-1000-3PS	4101	12	5-Nov-2014
1m N-Type Cable	Rhophase		4233	12	11-Mar-2015
1GHz to 8GHz Low Noise Amplifier	Wright Technologies	APS04-0085	4365	12	1-Oct-2014
Calibration Unit	Rohde & Schwarz	ZV-Z54	4368	12	18-Sep-2014
Frequency Standard	Spectracom	Secure Sync 1200-0408-0601	4393	6	22-Jul-2014
Suspended Substrate Highpass Filter	Advance Power Components	11SH10-3000/X18000-O/O	4412	12	21-Mar-2015

Instrument	Manufacturer	Type No.	TE No.	Calibration Period (months)	Calibration Due
Section 2.4 - 6dB Bandwidth					
Rubidium Standard	Rohde & Schwarz	XSRM	1316	6	22-Jul-2014
Attenuator (10dB, 50W)	Aeroflex / Weinschel	47-10-34	3166	12	12-Sep-2014
Hygrometer	Rotronic	I-1000	3220	12	16-Jul-2014
Signal Analyser	Rohde & Schwarz	FSQ 26	3545	12	4-Jul-2014
Network Analyser	Rohde & Schwarz	ZVA 40	3548	12	13-Sep-2014
1m N-Type Cable	Rhophase		4233	12	11-Mar-2015
Calibration Unit	Rohde & Schwarz	ZV-Z54	4368	12	18-Sep-2014
Frequency Standard	Spectracom	Secure Sync 1200-0408-0601	4393	6	22-Jul-2014

TU – Traceability Unscheduled

3.2 MEASUREMENT UNCERTAINTY

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

Test Discipline	MU
Spurious and Band Edge Emissions	30MHz to 1GHz: ± 5.1 dB 1GHz to 40GHz: ± 6.3 dB
EIRP Peak Power	30MHz to 1GHz: ± 5.1 dB 1GHz to 40GHz: ± 6.3 dB
Power Spectral Density	± 3.0 dB
6dB Bandwidth	± 212.114 kHz

Product Service

SECTION 4

ACCREDITATION, DISCLAIMERS AND COPYRIGHT

4.1 ACCREDITATION, DISCLAIMERS AND COPYRIGHT

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

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

Results of tests not covered by our UKAS Accreditation Schedule are marked NUA (Not UKAS Accredited).