

**TEST REPORT CONCERNING THE COMPLIANCE OF  
A PART 15 LOW POWER  
COMMUNICATIONS DEVICE TRANSMITTER,  
OPERATING ON 13.56 MHz  
ELECTROMECHANICAL AUTO INJECTOR DEVICE,  
MANUFACTURER  
UCB MEDICAL DEVICES SA - SWITZERLAND  
BRAND UCB, MODEL ava  
WITH 47 CFR PART 15 (10-1-14 EDITION)**

FCC listed : 90828  
Industry Canada : 2932G-2  
R&TTE and EMC Notified Body : 1856

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## MEASUREMENT/TECHNICAL REPORT

**Manufacturer: UCB Medical Devices SA - Switzerland**  
**Brand: UCB**  
**Model: ava**

This report concerns: Original grant/certification ~~Class 2 Permissive Change~~ ~~Verification~~  
Equipment type: DXX: Part1 5 LOW POWER COMMUNICATIONS DEVICE TRANSMITTER

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The data taken for this test and report herein was done in accordance with 47 CFR Part 15 (10-1-14 Edition), and the measurement procedures of ANSI C63.10-2013. TÜV Rheinland Nederland B.V. at Leek, The Netherlands, certifies that the data is accurate and contains a true representation of the emission profile of the Equipment Under Test (EUT) on the date of the test as noted in the test report. I have reviewed the test report and find it to be an accurate description of the test(s) performed and the EUT so tested.

Date: October 27, 2015

Signature:



P. de Beer  
Technical Manager TÜV Rheinland Nederland B.V.

### Summary

The device under test does:

- fulfill the general approval requirements as identified in this test report
- not fulfill the general approval requirements as identified in this test report

### Description of test item

Test item : Electromechanical auto injector device  
Manufacturer : UCB Medical Devices SA - Switzerland  
Brand : UCB  
Model : ava  
Serial number. : 451401C2 (155)  
Receipt date : June 25, 2015

### Applicant information


Applicant's representative : Mr. Arnaldo Citterio  
Company : Flextronics Design S.R.L.  
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City : Milano  
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Telephone number : +39 02 87329304  
Telefax number : +39 02 87329236  
Email : Arnaldo.citterio@flextronics.com


### Test(s) performed

Location : Leek  
Test(s) started : June 29, 2015  
Test(s) completed : July 07, 2015  
Purpose of test(s) : Equipment Authorization (Original grant/certification)

Test specification(s) : 47 CFR Part 15 (10-1-14 Edition)

Compliance statement : The test has demonstrated that this unit complies with stipulated standards.

Test engineer(s) : R. van der Meer 

Report written by : R. van der Meer 

Report date : October 27, 2015

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The test results relate only to the item(s) tested.

## Table of contents

1	General information.....	5
1.1	Product description.....	5
1.1.1	Introduction.....	5
1.2	Related submittal(s) and/or Grant(s).....	5
1.2.1	General.....	5
1.3	Tested system details.....	5
1.3.1	Description of input and output ports.....	6
1.3.2	Special Accessories and Auxiliary Equipment.....	6
1.4	Test Summary.....	7
1.5	Test methodology.....	8
1.6	Test facility.....	8
1.7	Test conditions.....	8
2	System test configuration.....	9
2.1	Justification.....	9
2.2	EUT mode of operation.....	9
2.3	Special accessories.....	9
2.4	Equipment modifications.....	9
2.5	Product Labeling.....	9
2.6	Block diagram of the EUT.....	9
2.7	Schematics of the EUT.....	9
2.8	Part list of the EUT.....	9
3	Radiated emission data.....	10
3.1	Requirements.....	10
3.1.1	Limit.....	10
3.1.2	Measuring instrument and setting.....	10
3.1.3	Test procedures.....	10
3.2	Radiated field strength measurements (30 MHz – 1 GHz, E-field).....	11
3.2.1	Test equipment used (for reference see test equipment listing).....	11
3.3	Radiated field strength measurements (frequency range of 0.009-30 MHz, H-field).....	12
3.3.1	Test equipment used (for reference see test equipment listing).....	12
4	AC Power Line Conducted Emissions Data.....	13
4.1	Requirements.....	13
4.1.1	Limit.....	13
4.1.2	Measuring instrument and setting.....	13
4.1.3	Test procedures.....	13
4.2	AC Power line Conducted Emission data of the EUT.....	14
4.2.1	Test equipment used (for reference see test equipment listing).....	14
5	Carrier stability under special conditions.....	15
5.1	Frequency stability (on 13.56 MHz) in accordance with 47 CFR Part 15, section 15.225 (e):.....	15
5.1.1	At 85% and 115% of rated voltage supply level.....	15
5.1.2	Test equipment used (for reference see test equipment listing).....	15
6	Plots of measurement data.....	16
6.1	Bandwidth of the emission.....	16
7	List of utilized test equipment.....	17

## 1 General information.

### 1.1 Product description.

#### 1.1.1 Introduction.

The Electromechanical auto injector device, brand UCB, model ava (hereafter referred to as EUT), is equipped with a RFID R/W circuit, operating on passive tags at a frequency of 13.56 MHz. The device is battery powered and can be recharged.

The content of this report and measurement results have not been changed other than the way of presenting the data.

### 1.2 Related submittal(s) and/or Grant(s).

#### 1.2.1 General.

This test report supports the original grant/certification in equipment authorization.

### 1.3 Tested system details.

Details and an overview of the system and all of its components, as it has been tested, may be found below.

Manufacturer	:	UCB Medical Devices SA - Switzerland
Brand	:	UCB
Model	:	ava
Serial number	:	451401C2 (155)
Operating voltage	:	3.7 Vdc
Voltage output rating	:	--
Current input rating	:	--
Antenna	:	Integral
Operating frequency	:	13.56 MHz
Modulation method	:	OOK (On Off Keying)

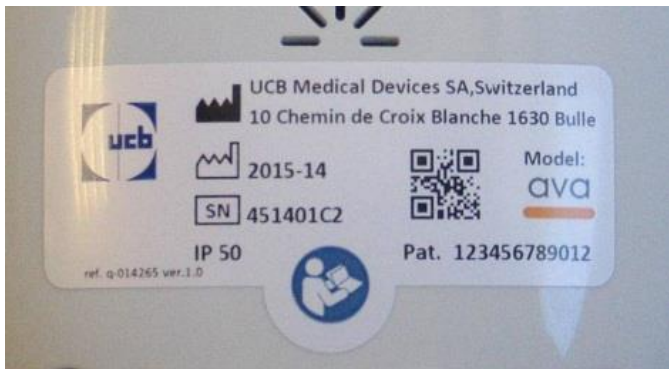


Photo 1a: EUT identification plate



Photo 1b: EUT

### 1.3.1 Description of input and output ports.

EUT has an USB input/output port. Tests involving communication connectivity are provided in a separate Part 15B testreport. The EUT was tested with battery operation, except for AC Power Line Conducted Emission, whereas it was connected to AUX1 an external powersupply.

No.	Port	From	To	Remarks
1.	Mains	Mains	AUX1	--
2.	DC power	AUX1	EUT	--

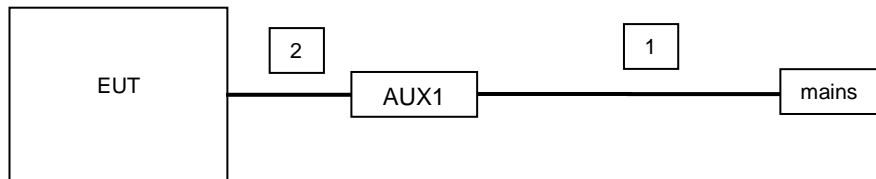


Figure 1. Basic set-up

### 1.3.2 Special Accessories and Auxiliary Equipment

The product has been tested with no additional accessories:

- AUX1
  - Product: Power Supply/charger
  - Brand: Emerson
  - Model: DA-12-050MP-M (SVT-PA-130218-05)
  - Serial Number: 10
  - Input Voltage: 100 – 240 Vac 50/60 Hz
  - Output Voltage: 5 Vdc
  - Remark: --



#### 1.4 Test Summary

The EUT was tested in accordance with the specifications given in Table 1 below.

Test Standard		Description	Page	Pass / Fail
47 CFR Part 15 (10-1-14 Edition)				
15.207(a)		AC Power line conducted emissions	13 – 14	Pass
15.225(a)		Emissions in the band 13.553-13.567 MHz	10 – 12	Pass
15.225(d), 15.209		Emissions outside the band 13.110-14.010 MHz	10 – 12	Pass
15.225(e)		Frequency stability	15 – 15	Pass
15.215(c)		Occupied bandwidth	16 - 16	Pass

Table 1: Test specifications

Test methods: ANSI C63.10-2013

## 1.5 Test methodology.

The test methodology used is based on the requirements of 47 CFR Part 15 (10-1-14 Edition), sections 15.31, 15.35, 15.205, 15.209, 15.209 and 15.225.

The test methods, which have been used, are based on ANSI C63.10-2013.

Radiated emission tests above 30 MHz were performed at a measurement distance of 3 meters.  
Radiated emission tests below 30 MHz were performed at a measurement distance of 3 meters.  
To calculate the field strength level from these results to the appropriate distance at which the limit is specified, the appropriate extrapolation factor is used.

The receivers are switching automatically to the right bandwidth in accordance with CISPR 16. This is implemented in the receiver. The antenna factors are programmed in the test receiver. The receiver automatically calculates the appropriate correction factor for the utilized antenna and also the appropriate antenna factor for the cable loss. The total correction is automatically added to the measured value.

## 1.6 Test facility.

The Federal Communications Commission and Industry Canada has reviewed the technical characteristics of the test facilities at TÜV Rheinland Nederland B.V., located at Eiberkamp 10, 9351 VT Leek, The Netherlands, and has found these test facilities to be in compliance with the requirements of 47 CFR Part 15, section 2.948.

The description of the test facilities has been filed at the Office of the Federal Communications Commission under registration number 90828. The facility has been added to the list of laboratories performing these test services for the public on a fee basis.

The description of the test facilities has been filed to Industry Canada under registration number 2932G-2. The facility has been added to the list of laboratories performing these test services for the public on a fee basis.

## 1.7 Test conditions.

Normal test conditions:

Temperature (*)	: +15°C to +35°C
Relative humidity(*)	: 20 % to 75 %
Supply voltage	: 5 Vdc for charging / 3.7 Vdc in normal battery operation
Air pressure	: 950 – 1050 hPa

When it was impracticable to carry out the tests under these conditions, a note to this effect stating the ambient temperature and relative humidity during the tests are stated separately.



## **2 System test configuration.**

### **2.1 Justification.**

The system was configured for testing in a typical situation as a customer would normally use it.

The justification and manipulation of cables and equipment in order to simulate a worst-case behavior of the test setup has been carried out as prescribed in ANSI C63.10-2013.

### **2.2 EUT mode of operation.**

The EUT has been modified to transmit continuously.

### **2.3 Special accessories.**

No special accessories are used and/or needed to achieve compliance.

### **2.4 Equipment modifications.**

No modifications have been made to the equipment.

### **2.5 Product Labeling**

The product labeling information is available in the technical documentation package.

### **2.6 Block diagram of the EUT.**

The block diagram is available in the technical documentation package.

### **2.7 Schematics of the EUT.**

The schematics are available in the technical documentation package.

### **2.8 Part list of the EUT.**

The part list is available in the technical documentation package.

## 3 Radiated emission data.

### 3.1 Requirements:

FCC 15.205, 15.209

Radiated emissions which fall in the restricted bands, as defined in FCC 15.205(a), must comply with the radiated emission limits specified in FCC 15.209(a).

Radiated emissions which fall outside the operation frequency band and outside restricted bands shall either meet the limit specified in FCC 15.209(a) or be attenuated at least 20dB below the power level in the 100kHz bandwidth within the band that contains the highest level of the desired power (the less severe limit applies).

#### 3.1.1 Limit

Frequency (MHz)	Field strength (μV/meter)	Field strength (dBμV/m)	Measurement distance (meters)
30-88	100	40.0	3
88-216	150	43.5	3
216-960	200	46.0	3
Above 960	500	54.0	3

Table of applicable limits

#### 3.1.2 Measuring instrument and setting

Radiated emissions test settings	
Frequency range	30 MHz – 1000 MHz
Test distance	3 m
Receive antenna scan height	1 m - 4 m
Receive antenna polarization	Vertical / Horizontal
Test instrument detector and bandwidth	<1GHz Quasi-peak (Qp) 120 kHz *unless otherwise noted

#### 3.1.3 Test procedures

ANSI C63.10-2013.

The EUT was placed on a nonconductive turntable 0.8m above the ground plane. Before final measurements of radiated emissions were performed, the EUT was scanned to determine its emission spectrum profile. The physical arrangement of the test system, the associated cabling and the EUT orientation (X, Y, Z) were varied in order to ensure that maximum emission amplitudes were attained.

The spectrum was examined from 30MHz to 1 GHz. Final radiated emission measurements were made at 3m distance. At each frequency where a spurious emission was found, the EUT was rotated 360° and the antenna was raised and lowered from 1 to 4m in order to determine the emission's maximum level. Measurements were taken using both horizontal and vertical antenna polarizations.

The six highest emission amplitudes relative to the appropriate limit were recorded in this report. Field strength values of radiated emissions at frequencies not listed in the tables are more than 20 dB below the applicable limit.

### 3.2 Radiated field strength measurements (30 MHz – 1 GHz, E-field)

Frequency (MHz)	Antenna orientation	Measurement results @3m (dBμV)	Limits @3m (dBμV/m)	Pass/Fail
41.640	Vertical	26.8	40.0	Pass
130.88 <sup>*R</sup>	Vertical	26.7	43.5	Pass
156.100	Vertical	25.0	43.5	Pass
439.340	Vertical	31.5	46.0	Pass
547.980	Vertical	30.4	46.0	Pass
625.580	Horizontal	32.0	46.0	Pass

Table 2 Radiated emissions of the EUT

The results of the radiated emission tests, carried out in accordance with 47 CFR Part 15 section 15.205, 15.209 are depicted in Table 2.

#### Notes:

1. Measurement uncertainty is  $\pm 5.0$ dB.
2. The EUT was tested in constant transmit mode, as specially programmed by the applicant. Worst case values noted.
3. <sup>\*R</sup> denotes to a frequency in a restricted band.

#### 3.2.1 Test equipment used (for reference see test equipment listing).

A00257	A00258	A00314	A00447	A00235	A00466	
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#### Test engineer

Signature :



Name : R. van der Meer

Date : July 03, 2015

### 3.3 Radiated field strength measurements (frequency range of 0.009-30 MHz, H-field).

Frequency (MHz)	Measurement results	Detector	Antenna factor	Cable loss	Extrapolation factor	Measurement results (calculated)	Limits	Pass/Fail
	$\text{dB}\mu\text{V} @ 3\text{m}$		$\text{dB}$	$\text{dB}$	$\text{dB}$	$\text{dB}\mu\text{V/m}@30\text{m}$ (unless otherwise stated)	$\text{dB}\mu\text{V/m}@30\text{m}$ (unless otherwise stated)	
5.814	25.3	Qp	19.5	1	40	5.8	29.5	Pass
13.110-13.410	4.7	Qp	19.7	1	40	-14.6	40.5	Pass
13.410-13.553 *note7	15.94	Qp	19.7	1	40	-3.4	40.5	Pass
13.560 fundamental	30.5	Qp	19.7	1	40	11.2	84.0	Pass
13.567-13.710	21.0	Qp	20.0	1	40	1.7	29.5	Pass
13.710-14.010	4.6	Qp	20.0	1	40	-14.7	29.5	Pass
20.894	22.5	Qp	20.0	1	40	3.5	29.5	Pass
27.120 harmonic	2.1	Qp	19.7	1	40	-17.2	29.5	Pass

Table 3 Radiated emissions of the EUT, in the frequency range 0.009 – 30 MHz

The results of the radiated emission tests in the frequency range 0.009 – 30 MHz, carried out in accordance with 47 CFR Part 15 section 15.209, 15.225 are depicted in Table 3.

#### Notes:

1. Calculated measurement results are obtained by using the 40dB/decade factor (antenna factor and cable loss is included). i.e at 13.560 MHz:  $30.5 \text{ dB}\mu\text{V} + 19.7 \text{ dB} + 1 \text{ dB} - 40 \text{ dB} = 11.2 \text{ dB}\mu\text{V/m}$ .
2. A resolution bandwidth of 9 kHz was used during testing
3. Field strength values of radiated emissions at frequencies not listed in Table 3 are more than 20 dB below the applicable limit
4. The loop antenna was varied in horizontal and vertical orientations and also around it's axis. The reported value is the worst case found at the reported frequency.
5. The EUT was tested in horizontal and vertical orientations. Worst case values noted.
6. Measurement uncertainty is  $\pm 5.0 \text{ dB}$ .
7. Highest value noted in the restrictedband: 13.36 – 13.41 MHz.

#### 3.3.1 Test equipment used (for reference see test equipment listing).

A01491	A00726	A00444	A00450	A00447		
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Test engineer

Signature :



Name : R. van der Meer

Date : June 25, 2015

## 4 AC Power Line Conducted Emissions Data.

### 4.1 Requirements

47 CFR Part 15 Section 15.207, for equipment that is designed to be connected to the public utility (AC) power line, the radio frequency voltage that is conducted back onto the AC power line on any frequency or frequencies within the band 150 kHz to 30 MHz shall not exceed the limits in the following table, as measured using a 50  $\mu$ H/50 ohms line impedance stabilization network (LISN). Compliance with the provisions of this paragraph shall be based on the measurement of the radio frequency voltage between each power line and ground at the power terminal. The lower limit applies at the band edges.

#### 4.1.1 Limit

47 CFR Part 15 Section 15.207

Frequency of Emission (MHz)	Conducted Limit Quasi-Peak (dB $\mu$ V)	Conducted Limit Average (dB $\mu$ V)
0.15 – 0.5	66 to 56*	56 to 46*
0.5 – 5	56	46
5 - 30	60	50

\*Decreases with the logarithm of the frequency. The lower limit applies at the band edges.

#### 4.1.2 Measuring instrument and setting

A Quasi-peak and Average detector were used with a bandwidth of 9 kHz.

#### 4.1.3 Test procedures

ANSI C63.10-2013.

Each phase and neutral of the AC power line were measured with respect to ground. Measurements were performed using a 50  $\mu$ H / 50  $\Omega$  LISN. The frequency range from 150kHz to 30MHz was searched.

The six highest EUT emissions relative to the limit were noted for three supply voltages. The EUT is placed on a 1.0m x 1.5m non-conductive table 80cm above the ground plane and 40cm from a vertical ground reference plane. The rear of the EUT was positioned flush with the backside of the table and directly over the LISNs. The power and I/O cables were routed over the edge of the table and bundled approximately 40cm from the ground plane. The EUT was positioned at least 80cm from the LISN.

## 4.2 AC Power line Conducted Emission data of the EUT.

Frequency (MHz)	Measurement results dB(μV) Neutral		Measurement results dB(μV) Line 1		Limits dB(μV)		Pass/Fail
	QP	AV	QP	AV	QP	AV	
0.150	50.1	27.2	50.1	27.4	66.0	56.0	Pass
0.193	54.1	38.3	54.0	39.5	63.9	53.9	Pass
0.209	52.0	35.2	52.0	37.0	63.2	53.2	Pass
0.255	45.6	29.3	45.2	30.9	61.6	52.6	Pass
0.584	34.9	20.5	31.5	18.5	56.0	46.0	Pass
3.197	31.4	19.5	30.4	19.2	56.0	46.0	Pass

Table 4 AC power line conducted emission measurements

The results of the AC power line conducted emission tests, carried out in accordance with 47 CFR Part 15 section 15.207, at the 120 Volts AC mains connection terminals of the AC/DC power supply (AUX1) which was connected to the EUT, are depicted in Table 4.

### Notes:

1. The values of conducted emissions at frequencies not listed in the table above are more than 20 dB below the applicable limit.
2. Measurement uncertainty is  $\pm 3.5$ dB.
3. Qp values already within Av limits, therefore not tested on Av.

### 4.2.1 Test equipment used (for reference see test equipment listing).

A00022	A00051	A00171	A00437	A00444	A00726	
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Test engineer

Signature : 

Name : R. van der Meer

Date : June 29, 2015

## 5 Carrier stability under special conditions.

### 5.1 Frequency stability (on 13.56 MHz) in accordance with 47 CFR Part 15, section 15.225 (e):

- 1) The frequency tolerance of the carrier signal shall be maintained within +/- 0.01% of the operating frequency over a temperature variation of -20 °C to +50 °C at normal supply voltage (see Table 5).

Stability under special conditions	Supply Voltage	Measured frequency (MHz)	Frequency deviation (limit $\pm 0.01\%$ ) (%)	PASS/FAIL
Temperature (°C)	(Vdc)			
21.0	3.7	13.560.000 (reference)	N.A.	N.A.
-20.0	3.7	13.560.594	< 0.01	PASS
50.0	3.7	13.560.072	< 0.01	PASS

Table 5 The frequency tolerance of the carrier signal

#### 5.1.1 At 85% and 115% of rated voltage supply level

The frequency tolerance of the carrier signal shall be maintained within +/- 0.01% of the operating frequency at 85% and at 115% of the rated power supply voltage (3.7 Vdc) at 20 °C environmental temperature. The results are stated in Table 6.


Stability under special conditions	Measured frequency (MHz)	Frequency deviation (limit $\pm 0.01\%$ ) (%)	PASS/FAIL
% variation U			
100.0 (3.7 Vdc)	13.560.000 (reference)	N.A.	N.A.
85.0 (3.5 Vdc)	13.560.000	< 0.01	PASS
115.0 (4.18 Vdc)	13.560.072	< 0.01	PASS

Table 6 The frequency tolerance of the carrier signal

#### 5.1.2 Test equipment used (for reference see test equipment listing).

A00049	A01634	A00309	A00207	A00446	A00465	A00266
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#### Test engineer

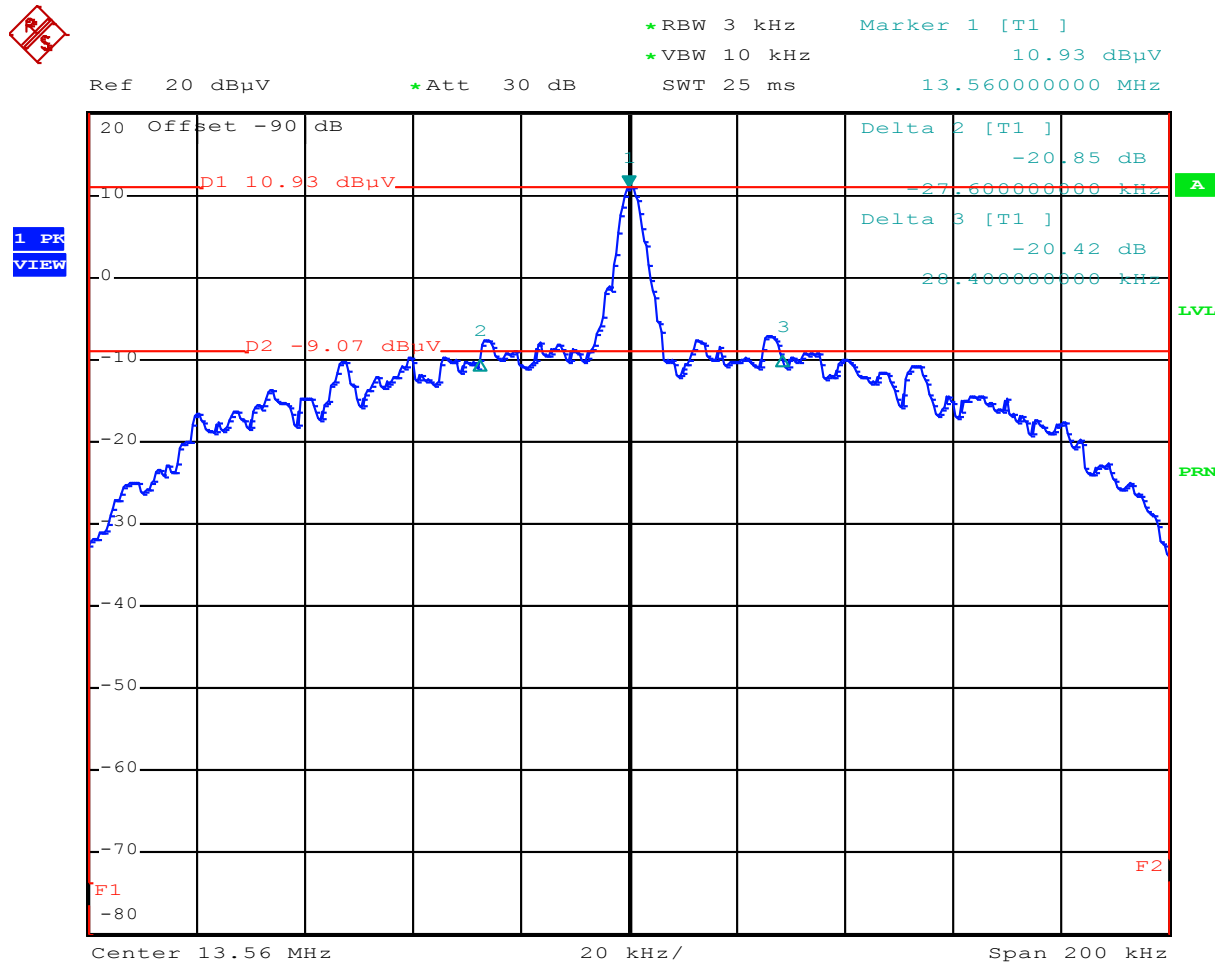
Signature : 

Name : R. van der Meer

Date : July 07, 2015

## 6 Plots of measurement data

### 6.1 Bandwidth of the emission



Plot1

Emission Bandwidth of 56.0 kHz (-20 dB down points) of the emission at 13.560 MHz (Fundamental Carrier).  
As measured with a Spectrum Analyzer



## 7 List of utilized test equipment.

Inventory number	Description	Brand	Model	Last cal.	Next cal.
A00022	LISN	EMCO	3625/2	01/2014	01/2016
A00051	Pulse Limiter	R&S	ESH3-Z2	02/2015	02/2016
A01491	Active loopant. 60 cm	Chase	HLA6120A	05/2015	05/2016
A00466	Biconilog Testantenna	Teseq	CBL 6111D	06/2015	06/2016
A00726	Measuring receiver	R&S	ESCS30	09/2014	09/2015
A00257	Controller mast	EMCS	DOC202	NA	NA
A00171	Variac 250V 6A	RFT	LTS006	NA	NA
A00207	Spectrum analyzer	R&S	FSP40	11/2014	11/2015
A00444/ A00441/ A00446	Temperature- Humiditymeter	Extech	SD500	04/2015	04/2016
A00235	Semi-Anechoic Room	Siepel	FCC listed: 90828 IC: 2932G-2	04/2014	04/2017
A00437	Shielded Room	Euroshield	RFD-100 359	NA	NA
A00450	Controller Turntable S-AR	Maturo	SCU/088/8090811	NA	NA
A00258	Antenna mast	EMCS	AP-4702C	NA	NA
A00309	Loop antenna, 6cm	NA	7405-901	09/2014	09/2015
A00314	Measuring receiver	R&S	ESCI	04/2015	04/2016
A00447	RF Cable S-AR	Gigalink	APG0500	01/2015	01/2016
A00049	Temperature cabinet	Heraeus	VEM 03/500	NA	NA
A00465	Temperature reference meter	Tempcontrol	P770	07-02/2015	07-02/2016
A00266	Power Supply	Wolfsen	EA-3005	12/2014	12/2015

NA= Not Applicable