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# TEST REPORT

N° 97990-594794C

FCC REGISTRATION NUMBER: 888863  
INDUSTRY CANADA NUMBER 6230B-1

**ISSUED TO** : **TROPHY**  
4 rue F. Peloutier  
Croissy-Beaubourg  
77437 Marne la Vallée Cedex 2 - FRANCE

**SUBJECT** : **ELECTROMAGNETIC COMPATIBILITY TESTS ACCORDING TO  
THE STANDARD 47 CFR PART 15, SUBPART C, 15.225 and RSS-  
GEN, RSS-102, RSS-210**

**Apparatus under test** :  
Product : WIRELESS SENSOR INTRA ORAL  
Trade mark : KODAK  
Manufacturer : TROPHY  
Model : KODAK RVG6500 IPS \*  
Serial number : -

FCC ID : **U72RVG00002**  
IC : **7027A-RVG00002**  
**Test date** : April and May 2010

Composition of document : 22 pages

\* Information given by the customer

Fontenay-Aux-Roses, September 29<sup>th</sup>, 2010

Written by  
**Gilles DE BUYSER**

The technical manager,  
**Philippe SISSOKO**



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## 1 – GENERAL

### 1.1 – Summary of test results

Radiated emissions are made on open area test site located “rue Théo Bonhomme, Moret-Sur-Loing (77, France)”.

A description of the test facility is on file with the FCC (FCC registration number 888863)

47 CFR Part 15 & RSS 210			
Paragraph No.	Name of test	Remarks	Result
§ 15.203	Antenna requirement	Internal antenna	Pass
§ 15.205	Restricted band operation		Pass
§ 15.207 (a) & RSS GEN §7.2.2	Power line conducted limits		Pass
§ 15.209 (a) (b) (c) (d) & table 3 RSS 210	Radiated measurement of spurious emissions		Pass
§15.225 (a) (b) (c) & RSS 210	Field strength within the band 13.110-14.010 MHz		Pass
§15.225 (d) & A2.6 of RSS 210	Field strength outside of the bands 13.110-14.010 MHz		Pass
§15.225 (e) & A.2 of RSS 210	Frequency stability over extreme temperature and voltage conditions		Pass

NA : Not Applicable

Note 1: Field strength measured at a distance of 3 meters.

Note 2: The extreme low temperature is -20 °C during the frequency stability test. The low temperature of -30 °C is out of the specifications of the equipment.



## 1.2 – References

Measurements were performed in accordance with the following standards:

- **47 CFR Part 15 of October, 2009:** Code of federal regulations – Telecommunication – Radiofrequency devices
- **RSS-Gen of June 2007:** General Requirements and Information for the Certification of Radiocommunication Equipment
- **RSS-102 of Mars 2010:** Radio Frequency Exposure Compliance of Radiocommunication Apparatus
- **RSS-210 of June 2007:** Low-power Licence-exempt Radiocommunication Devices (All Frequency Bands): Category I Equipment
- **ANSI C63.4 of December 11, 2003:** American national standard for methods of measurement of radio noise emissions from low-voltage electrical and electronic equipment in the range of 9 kHz to 40 GHz.
- **CISPR 16-4-2 of November, 2003:** International electrotechnical commission - Specification for radio disturbance and immunity measuring apparatus and methods – Uncertainties, statistics and limit modeling – Uncertainty in EMC measurements.

## 1.3 – test methodology

- **Radio performance tests procedures given in part 15:**
- Paragraph 33: frequency range of radiated measurements
- Paragraph 35: measurement detector functions and bandwidths
- Paragraph 203: antenna requirement
- Paragraph 205: restricted bands of operation
- Paragraph 207: conducted limits
- Paragraph 209: radiated emission limits; general requirements
- Paragraph 225: radiated emission limits; general requirements

FCC ID : U72RVG00002  
IC : 7027A-RVG00002**1.4 - Equipment under test specification****1.4.1 – General equipment information**

**Applicant** : **CARESTREAM HEALTH INC**  
150 Verona Street  
ROCESTER, NEW YORK  
14608 - USA

**Manufacturer** : **TROPHY**  
4 rue F. Peloutier  
Croissy-Beaubourg  
77437 Marne la Vallée Cedex 2 - FRANCE

**Dimensions** : 8.5cm long, 5cm large, 1.5cm high  
**Frequency band** : 13.110-14.010MHz  
**Number of channel** : -  
**Channel spacing** : -  
**Power supply** : 5v-DC power source Model: MW172KB0500F02 or by an internal battery 3.7V

**User frequency adjustment** : NO  
**User power adjustment** : set to the maximum for tests.  
**Type of antenna** : Integrated  
**Is the operation point to point?** NO

**Label identification** : No label identification during the test

**Cables**

:

Type	EUT port	Long (m)	Shielded	Number of wire
Power	AC	2m	NO	2
Input/output	sensor	3m	YES	-

**1.4.2 – Description of modifications**

The equipment has not been modified during tests.

**1.4.3 – Description of operation**

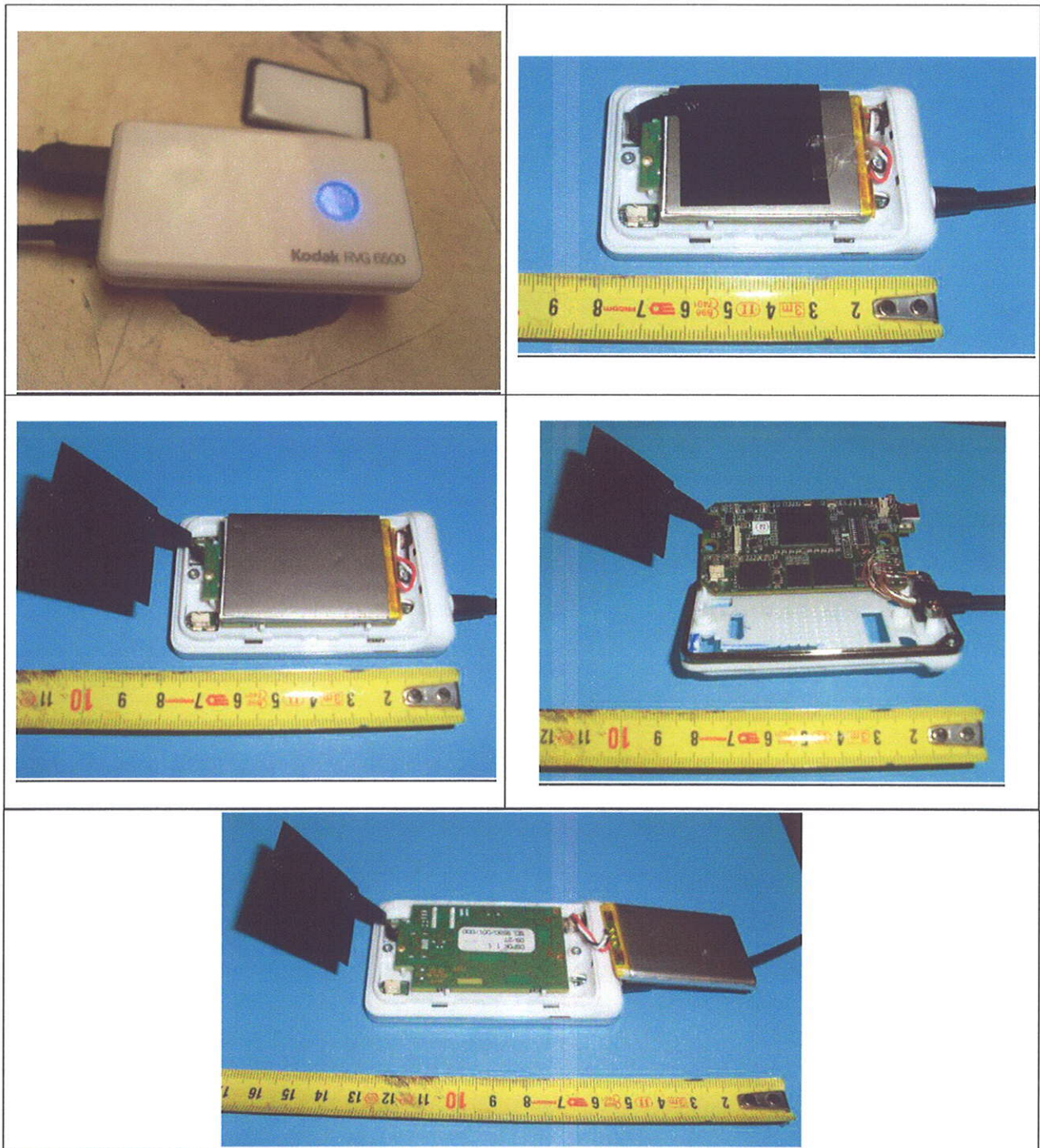
The apparatus was equipped with the following elements:

- Card IPS reference CJ836 with firmware KDK V1.B
- Card main reference CJ825 V.4 with references U-BOOT : v1.0.3.0 ; U Image : v1.0.4.0 and FFS : v1.0.10.0
- Antenna RFID reference CJ851 V.2
- Sensor reference CIA12 (size 2)

The equipment was configured in the following operation mode:

- **Maximum transmission power at 13.56 MHz with modulation.**
- **IPS is activated during the test**

1.4.4 – Photographs of the sample





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## 2 – TEST RESULTS

### 2.1 – Power line conducted emission test

#### 2.1.1 - General

The product has been tested with 120V/60Hz power line voltage and compared to the FCC part 15 subpart C §15.207 limits and the RSS-GEN Table 2

The 6dB resolution bandwidth was 9 kHz from 150 kHz to 30 MHz.

#### 2.1.2 – Test setup

The EUT is placed on a table at 0.8 m height and at 40cm of a vertical ground plane (metallic wall). The cable of the power port has been shorted to 1 meter length. The EUT is powered through the LISN.



#### 2.1.3 – Equipment list

Description	Manufacturer	Model	Identifier	Cal. Date	Cal. Due
Receiver	RHODE & SCHWARZ	ESU	A2642018	07/2009	07/2010
V ISLN	RHODE & SCHWARZ	ESH2-Z5	C2322001	10/2009	10/2010





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#### 2.1.4 – Uncertainty

The uncertainty values calculated by the laboratory are lower than limit uncertainty values defined by the CISPR 16-4-2. The conformity of the sample is directly established by the applicable limits values.

Kind of measurement	Wide uncertainty laboratory (k=2) $\pm x$	CISPR uncertainty limit $\pm y$
Measurement of conducted disturbances in voltage on the power port	3.57 dB	3.6 dB

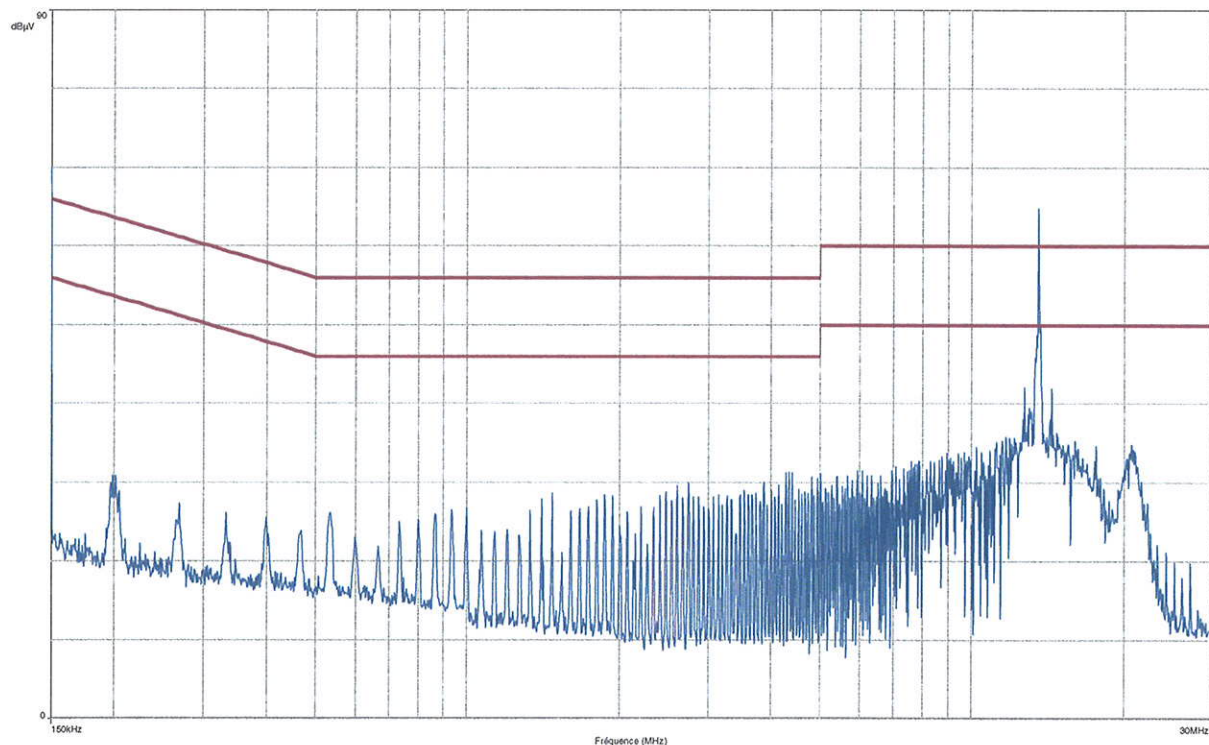
#### 2.1.5 – Test results

##### Power line 1

FCC Part.15 CLASS B

KODAK  
WIRELESS INTRA ORAL SENSOR  
MODEL : KODAK RVG 6500 IPS  
CONDUCTOR 1 ; 120V-60Hz

##### Peak measurement



##### Remark:

Conducted measurement with the RFID antenna



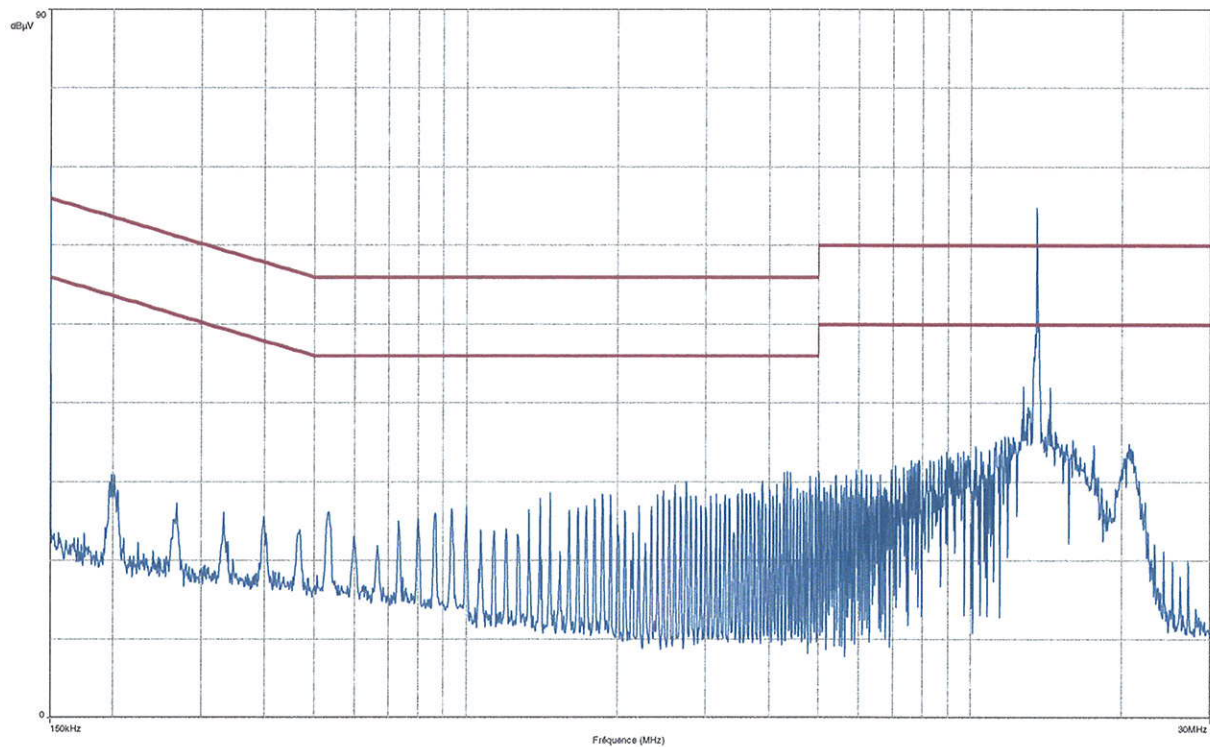
FCC ID : U72RVG00002  
IC : 7027A-RVG00002

Power line 2

FCC Part.15 CLASS B

KODAK  
WIRELESS INTRA ORAL SENSOR  
MODEL : KODAK RVG 6500 IPS  
CONDUCTOR 2 ; 120V-60Hz

Peak measurement



**Remark:**

Conducted measurement with the RFID antenna



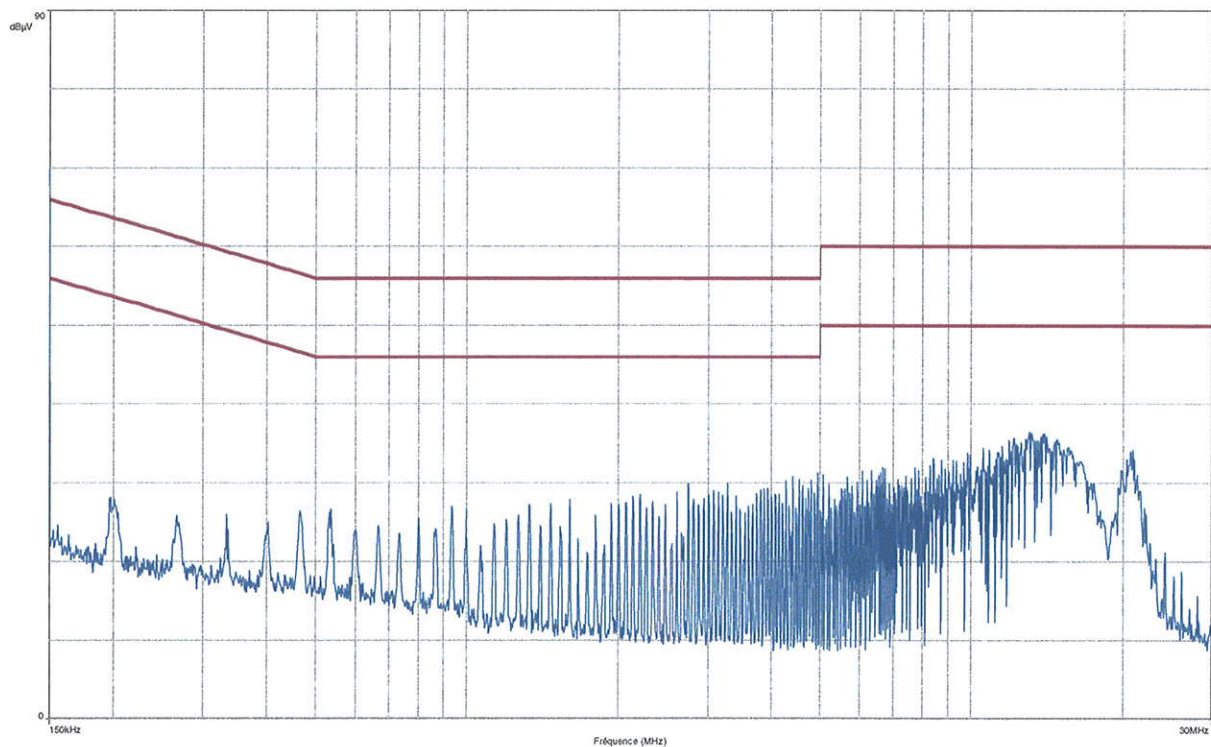
FCC ID : U72RVG00002  
IC : 7027A-RVG00002

Power line 1

FCC Part.15 CLASS B

KODAK  
WIRELESS INTRA ORAL SENSOR  
MODEL : KODAK RVG 6500 IPS  
CONDUCTOR 1 ; 120V-60Hz

Peak measurement



**Remark:**

Conducted measurement with the antenna removed and replaced by a dummy load.



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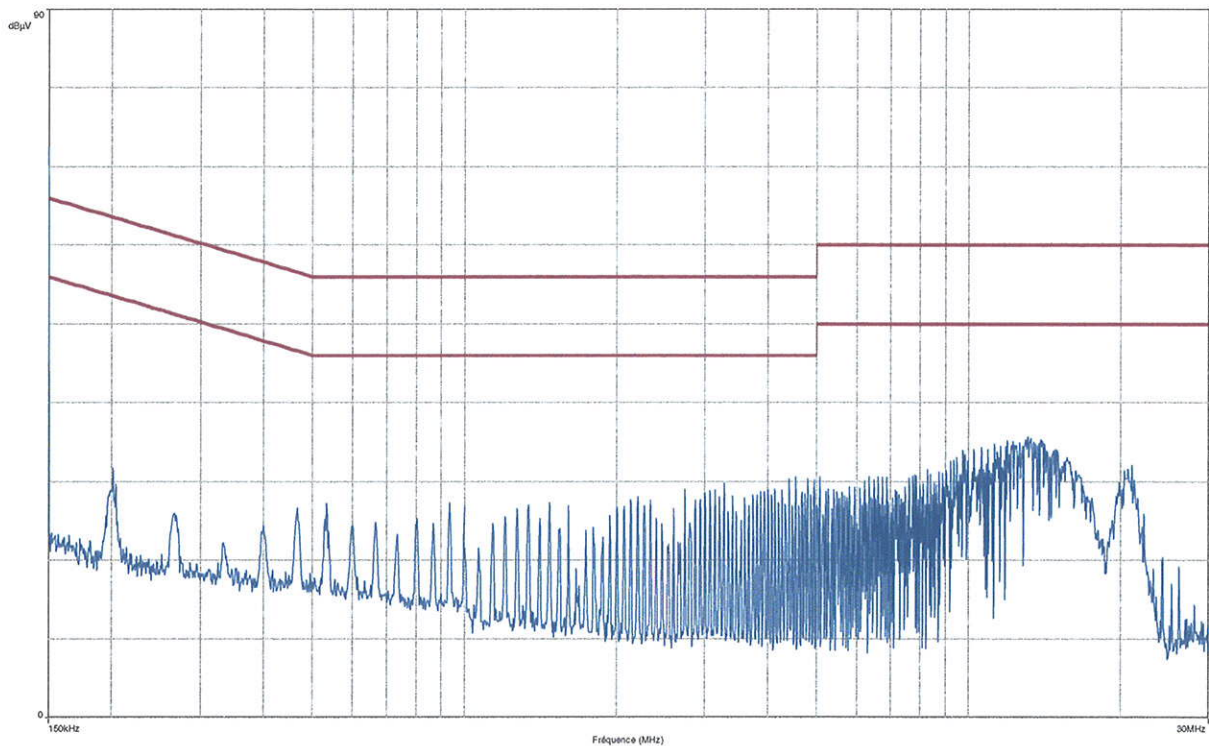
FCC ID : U72RVG00002  
IC : 7027A-RVG00002

Power line 2

FCC PART.15 CLASS B

KODAK  
WIRELESS INTRA ORAL SENSOR  
MODEL : KODAK RVG 6500 IPS  
CONDUCTOR 2 ; 120V-60Hz

Peak measurement



**Remark:**

Conducted measurement with the antenna removed and replaced by a dummy load.





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## 2.2 – Field strength within the band 13.110-14.010MHz

### 2.2.1 – General

The product has been tested with 110V/60Hz power line voltage and compared to the FCC part 15 subpart C §15.225 (a) (b) and (c) limits.

The 6dB resolution bandwidth was 9 kHz from 150kHz to 30MHz, and 120 kHz from 30MHz to 1GHz.

### 2.2.2 – Test setup

The EUT is placed 3 m distance of the loop antenna on a table 80cm height. The level has been maximised by turning the EUT in different positions and azimuths. The antenna was set up perpendicular and parallel to the EUT.

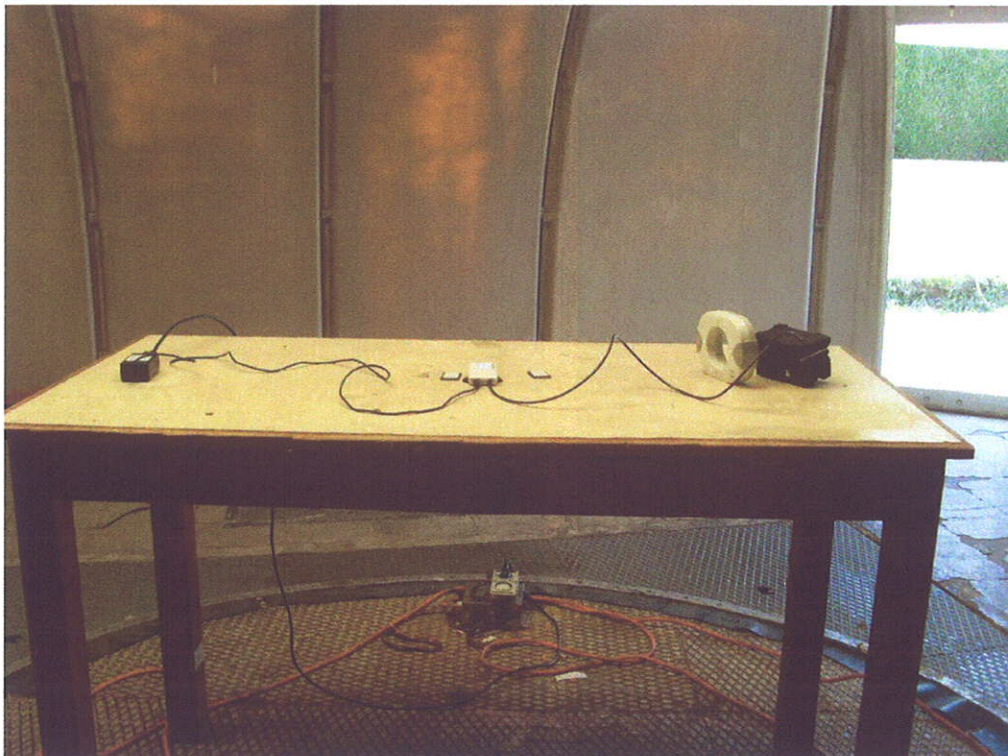
The measuring value has been extrapolated to a 30m distance measured level according to §15.31 (f) (2) by the following formula:

$$E_{30m} = E_d \times \left( \frac{d}{30} \right)^2$$

$E_{30m}$  is the field strength at 30m in  $\mu\text{V/m}$

$E_d$  is the field strength at the measured distance in  $\mu\text{V/m}$

D is the used distance between antenna and EUT in m





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2.2.3 – Equipment list

Description	Manufacturer	Model	Identifier	Cal. Date	Cal. Due
Receiver	RHODE & SCHWARZ	ESU	A2642018	07/2009	07/2010
Loop antenna	RHODE & SCHWARZ	HFH2-Z2	C2040007	10/03/2010	03/2011

2.2.4 – Uncertainty

Kind of measurement	Wide uncertainty laboratory (k=2) $\pm x$	CISPR uncertainty limit $\pm y$
E field measurement	4.75 dB	Not defined

2.2.5 – Test results

The measure result at 3 m is 48 dB $\mu$ V/m for 13.56 MHz  
The 30 m measure corrected is M@3m - 40dB

Frequency MHz	Maximum field strength(30m) dB $\mu$ V/m	Limit(30m) dB $\mu$ V/m
13.56	8	84

2.2.6 – Band-edge compliance

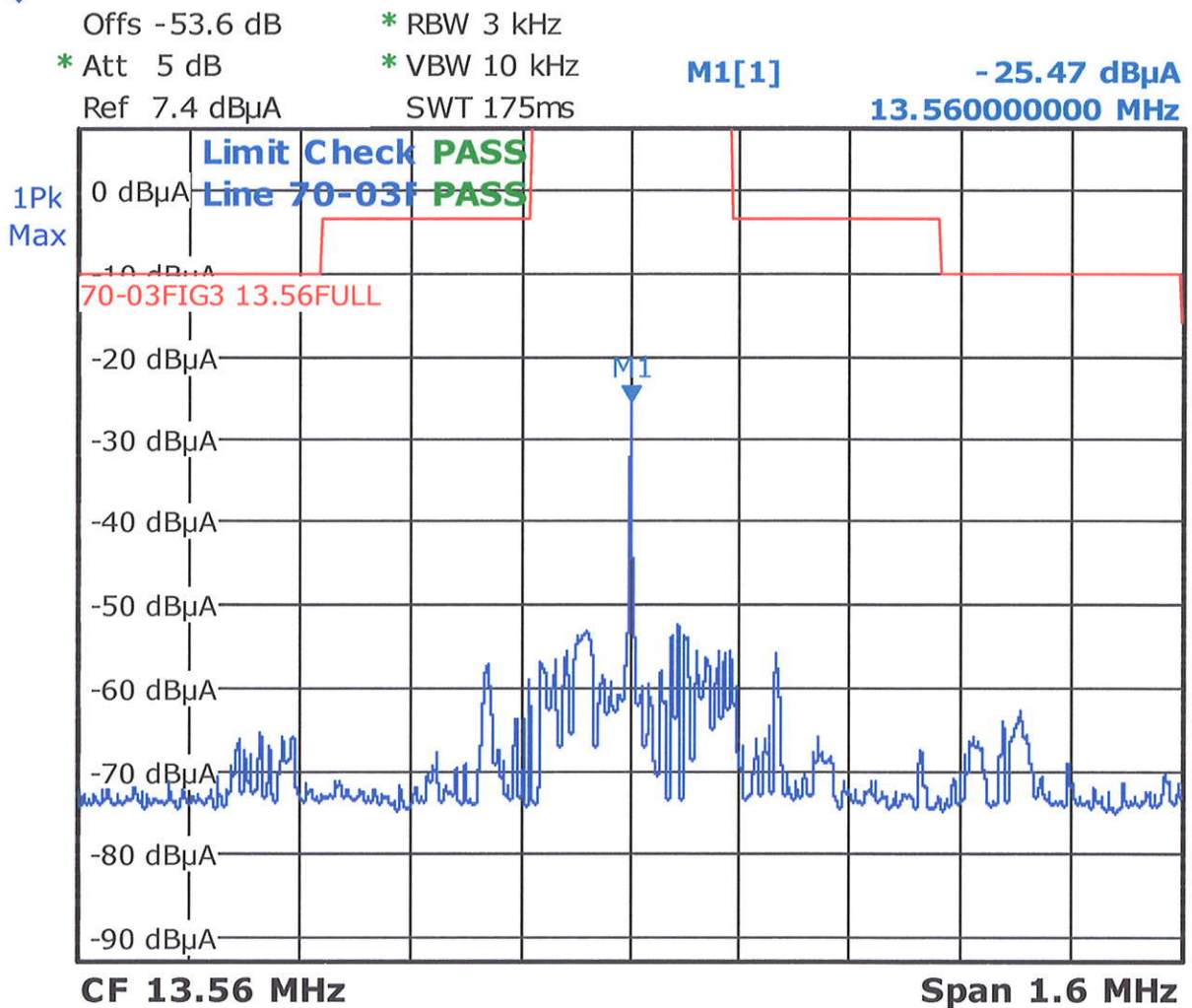
Frequency (MHz)	Field strength ( $\mu$ V/m)	Measurement distance (m)
13.553-13.567	15848 84 dB $\mu$ V/m	30
13.410-13.553 13.567-13.710	334 50.5 dB $\mu$ V/m	30
13.110-13.410 13.710-14.010	106 40.5 dB $\mu$ V/m	30
Outside 13.110-14.010	30 29.5 dB $\mu$ V/m	30



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Graph from 12.5 to 14.5 MHz with RBW=3kHz and VBW=10kHz (measurement @ 10m from ETSI 300330 standard)

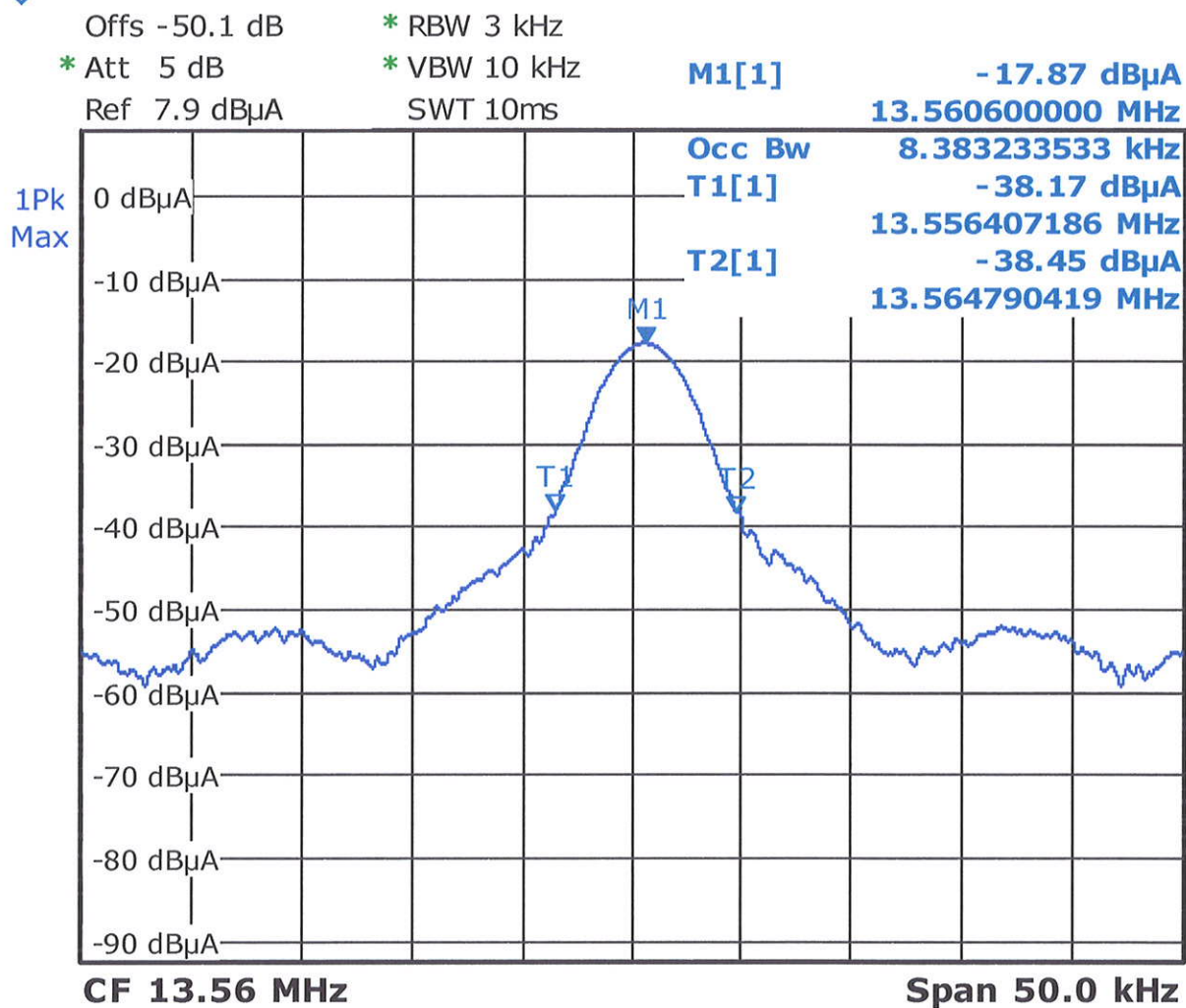
With the low level of 8 dB $\mu$ V/m at 13.56 MHz (30 m measurement) this transmitter complies with all the band edge limits.



For dB $\mu$ V level add 51.5 dB

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The 99% occupied bandwidth is 8.38 kHz.



Date: 4.MAY.2010 09:56:00

For dBμV level add 51.5 dB





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## 2.3 – Field strength outside the 13.110-14010MHz band

### 2.3.1 – General

The product has been tested with 110V/60Hz power line voltage and compared to the FCC part 15 subpart C §15.209 limits and the RSS-GEN §6 (a) Table 1

The 6dB resolution bandwidth was:

- 200 Hz from 9 kHz to 150 kHz.
- 9 kHz from 150 kHz to 30 MHz.
- 120 kHz from 30 MHz to 1000 MHz.
- 1 MHz from 1 GHz to 18 GHz.

-Frequency range: 9 kHz to 30 MHz

Measuring Distance: **3 m**

Antenna:

- Loop antenna (9 KHz to 30 MHz)

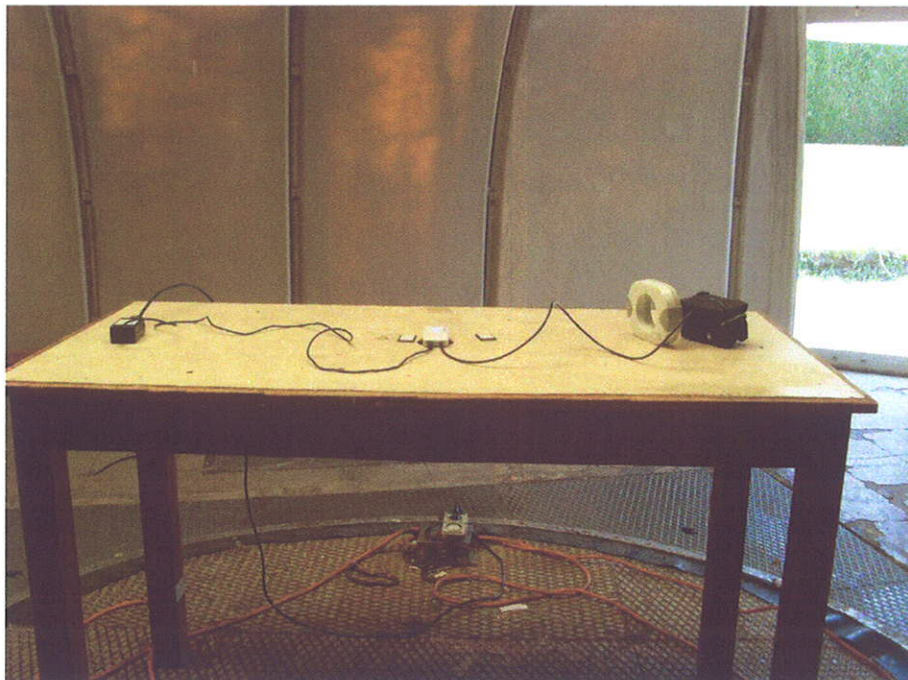
-Frequency range: 30 MHz to 18000 MHz

Measuring Distance: **10 m**

Antenna:

- Bilog (30 MHz to 1000 MHz)
- Horn (1 GHz to 18 GHz)

### 2.3.2 – Test setup





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The EUT is placed at 3m distance of the loop antenna (0.009 to 30MHz) on a table 80cm height. The level has been maximised by turning the EUT with the rotating table and with the antenna at 0° and 90° around its vertical and horizontal axes. Antenna height was 1m. Pre scans were performed on the EUT put on its three axes to determine the position with maximum radiation.

The EUT is placed at 10m distance of the Bilog (30 to 1000MHz) or horn (above 1GHz) antenna on a table 80cm height. The level has been maximised by turning the EUT with the rotating table and with the antenna in horizontal and vertical polarity. Antenna height search was performed from 1 to 4m.

### 2.3.3 – Equipment list

Description	Manufacturer	Model	Identifier	Cal. Date	Cal. Due
Receiver	RHODE & SCHWARZ	ESU	A2642018	07/2009	07/2010
Loop antenna	RHODE & SCHWARZ	HFH2-Z2	C2040007	10/03/2010	03/2011
Bilog antenna	CHASE	CBL 6112A	C2040040	04/2010	04/2011
Horn antenna	EMCO	3115	C2042016	01/2010	01/2011



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#### 2.3.4 – Uncertainty

The uncertainty values calculated by the laboratory are lower than limit uncertainty values defined by the CISPR 16-4-2. The conformity of the sample is directly established by the applicable limits values.

Kind of measurement	Wide uncertainty laboratory (k=2) $\pm x$	CISPR uncertainty limit $\pm y$
E field measurement within the band 150kHz-30MHz	4.75 dB	Not defined
Measurement of radiated electric field on the open area test site	5.07 dB	5.2 dB

#### 2.3.5 – Test results

E field measurement within the band 150 kHz-30MHz at 3m

The three modes RFID, IPS and WIFI are activated during the spurious emission tests.

<u>Frequency</u> kHz	<u>Resolution bandwidth</u> kHz	<u>Polarisation loop</u>	<u>Measured Level</u> (dB $\mu$ V /m)	<u>Limit</u> (dB $\mu$ V /m)
400k	9	//	38	95.6
622k	9	//	35	71.7
836k	9	//	32	69.16
998k	9	//	28	67.6
1.6M	9	//	24	63.5
3.2M	9	//	22	69.5
14.51M	9	//	21	69.5
27.12M	9	//	18	69.5
622k	9	$\perp$	34	71.7
998k	9	$\perp$	31	67.6
1.6M	9	$\perp$	21	63.5
27.12M	9	$\perp$	22	69.5

#### 2.3.6 – Test results on receiver

The RFID receiver works at the same time as the transmitter. Spurious emissions for transmitter already represents the receive mode.



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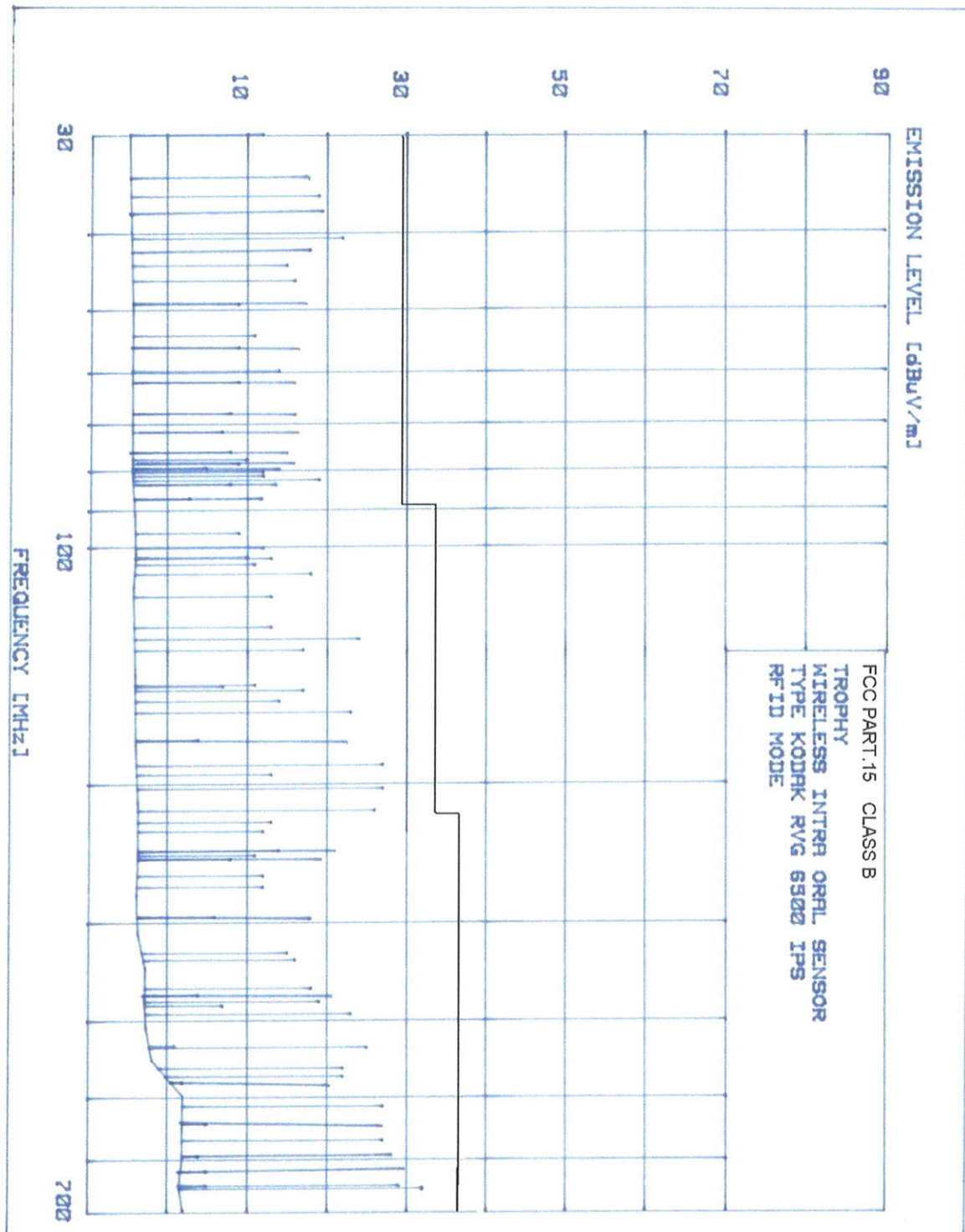
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Measurement of radiated electric field on the open area test site at 10m.

The three modes RFID, IPS and WIFI are activated during the spurious emission tests. No spurious observed above 1GHz.







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## 2.4- Frequency stability over extreme voltage and temperature condition

### 2.4.1 – General

The product has been powered with AC power supply and with battery. It was tested inside a climatic chamber and compared to the FCC part 15 subpart C § 15.225 (e) limits.

### 2.4.2 – Test setup



### 2.4.3 – Equipment list

Description	Manufacturer	Model	Identifier	Cal. Date	Cal. Due
Spectrum analyseur	ROHDE & SCHWARZ	FSL6	A4060032	08/2008	08/2010
Voltmeter	KEITHLEY	2000	A1241084	10/2009	10/1010
Climatic chamber	CLIMATS	-	D1024024	06/2009	06/2010
AC power supply	CALIFORNIA INSTRUMENT	1501L	A7042261	Inspected before test	-



#### 2.4.4 – Uncertainty

The uncertainty values calculated by the laboratory are lower than limit uncertainty values defined by the CISPR 16-4-2. The conformity of the sample is directly established by the applicable limits values.

Kind of measurement	Wide uncertainty laboratory (k=2) $\pm x$
Frequency stability	$\pm 10^{-7}$ of frequency

#### 2.4.5 – Test results

On AC power supply :

Temperature	Voltage	Frequency (MHz)	Limits
20 °C	120V	13.560600	Reference
20 °C	102V	13.560600	Fmin = 13.559244 - Fmax = 13.561956
20 °C	138 V	13.560600	
- 20 °C	120V	13.560600	
+50 °C	120V	13.560600	

On battery power supply:

Temperature	Voltage	Frequency (MHz)	Limits
20 °C	3.7V	13.560600	Reference
- 20 °C	3.7V	13.560600	Fmin = 13.559244 - Fmax = 13.561956
+50 °C	3.7V	13.560600	

The equipment is not intended for external use. The low temperature of -30 °C is out of the specifications of the equipment.

*End of test report*