R051-24-09-104439-1/A Ed. 2

"This report cancels and replaces the test report N° R051-24-09-104439-1/A Edition 1"

FCC CERTIFICATION
RADIO Measurement Technical Report
Limited Modular Approval

standard to apply:
FCC Part 15.247

Equipment under test:
WIRELESS DATALOGGER FOR PHYSICAL PARAMETERS
COBALT 2 MODULE

FCC ID :
XTL-COB

Company:
OCEASOFT

DISTRIBUTION: Mr RAMI **Company: CORONIS SAS**

FOR TRANSMISSION TO: Mr ROUSSEAU **Company: OCEASOFT**

Number of pages: 54 including 5 annexes

Ed.	Date	Modified pages	Written by Name	Written by Visa	Technical Verification Quality Approval Name	Technical Verification Quality Approval Visa
2	28-Apr-10	11	M. DUMESNIL	M. D.	P. BONNENFANT	

Duplication of this test report is only permitted for an integral photographic facsimile. It includes the number of pages referenced here above.

This document is the result of testing a specimen or a sample of the product submitted. It does not imply an assessment of the conformity of the whole manufactured products of the tested sample.

PRODUCT:	**WIRELESS DATALOGGER FOR PHYSICAL PARAMETERS**
Reference / model:	COBALT 2 MODULE
Trade mark:	COBALT
Serial number:	05170860061F (radio address)
MANUFACTURER:	OCEASOFT

COMPANY SUBMITTING THE PRODUCT:

Company:	OCEASOFT
Address:	Bât 4, Parc club du millénaire 1025 rue Henri Becquerel 34000 MONTPELLIER FRANCE
Responsible:	Mr ROUSSEAU

TECHNICAL SUPPORT:

Company:	CORONIS SAS
Address:	Parc d'Activité Aéroport Espace Concorde Bât B 120 impasse Jean-Baptiste Say 34470 PEROLS FRANCE
Responsible:	Mr RAMI
DATE(S) OF TEST:	18 and 19 December 2009
TESTING LOCATION:	EMITECH ATLANTIQUE laboratory at ANGERS (49) FRANCE EMITECH ATLANTIQUE open area test site in LA POUEZE (49) FRANCE Registration Number by FCC: 101696/FRN: 0006 6490 08
TESTED BY:	M. DUMESNIL
TUTOR:	P. BONNENFANT

CONTENTS

TITLE **PAGE**

1. INTRODUCTION

This document presents the result of RADIO test carried out on the following equipment: WIRELESS DATALOGGER FOR PHYSICAL PARAMETERS-COBALT 2 MODULE in accordance with normative reference.

2. PRODUCT DESCRIPTION

Class: B

Antenna type: integral antenna

Operating frequency range: from 902 MHz to 928 MHz

Number of channels: 57

Channel spacing: 57.6 kHz

Frequency generation: O SAW Resonator O Crystal ⊙ Synthesizer

Modulation: O Amplitude O Digital ⊙ Frequency O Phase

Power source: 3.6 Vd.c (lithium battery) or 115 Va.c

Power level, frequency range and channels characteristics are not user adjustable.

The details pictures of the product and the circuit boards are joined with this file.

3. NORMATIVE REFERENCE

The standards and testing methods related throughout this report are those listed below.
They are applied on the whole test report even though the extensions (version, date and amendment) are not repeated.

FCC Part 15 (2008)	Code of Federal Regulations Title 47 – Telecommunication Chapter 1 – Federal Communications Commission Part 15 – Radio frequency devices Subpart C – Intentional Radiators
ANSI C63.10 (2009)	Methods of Measurement of Radio-Noise Emissions from Low-voltage Electrical and Electronics Equipment in the range of 9 kHz to 40 GHz.
Public Notice DA 00-705	Filing and Measurement Guideline for Frequency Hopping Spread Spectrum Systems.

4. 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 107: conducted limits
Paragraph 109: radiated emission limits
Paragraph 111: antenna power conducted limits for receivers
Paragraph 203: antenna requirement
Paragraph 205: restricted bands of operation
Paragraph 207: conducted limits
Paragraph 209: radiated emission limits; general requirements
Paragraph 247: operation within the bands 902-928 MHZ, 2400-2483.5 MHz and 5725-5850 MHz

5. ADD ATTACHMENTS FILES

"Synoptic"
"Block diagram"
"External photos and Product labeling"
"Assembly of components"
"Internal photos"
"Layout pcb"
"Bil of materials"
"Schematics"
"Product description"
"User guide"

6. TESTS AND CONCLUSIONS

6.1 intentional radiator (subpart C)

Test procedure	Description of test	Respected criteria?				Comment
		Yes	No	NAp	NAs	
FCC Part 15.203	ANTENNA REQUIREMENT	X				*Note 1*
FCC Part 15.205	RESTRICTED BANDS OF OPERATION	X				
FCC Part 15.207	CONDUCTED LIMITS			X		
FCC Part 15.209	RADIATED EMISSION LIMITS; general requirements	X				*Note 2*
FCC Part 15.247	OPERATION WITHIN THE BAND 902-928 MHZ, 2400-2483.5 MHz and 5725-5850 MHz					
	(a) (1) *hopping systems*	X				*Note 3*
	(a) (1) (i) 902 – 928 MHz	X				*Note 4*
	(a) (1) (ii) 5725 – 5850 MHz			X		
	(a) (1) (iii) 2400 – 2483.5 MHz			X		
	(a) (2) *digital modulation techniques*			X		
	(b) *maximum peak output power*	X				*Note 5*
	(c) *operation with directional antenna gains > 6 dBi*			X		*Note 6*
	(d) *intentional radiator*	X				*Note 7*
	(e) *peak power spectral density*			X		
	(f) *hybrid system*			X		
	(g)			X		
	(h)			X		
	(i) *RF exposure compliance*	X				*Note 8*
DA 00-705	BAND EDGE COMPLIANCE	X				

NAp: Not Applicable NAs: Not Asked

Note 1: incorporated antenna, see photos in annex 4

Note 2: see FCC part 15.247 (d).

Note 3: the system hops to channel frequencies from a pseudo randomly ordered list of hopping frequencies. Each frequency is used equally on the average by the transmitter, and separated by a minimum of 20 dB bandwidth of the hopping channel (40.38 kHz; see annex 1).

Note 4: the frequency hopping system uses 57 channels (see annex 3). The timing by channel is 1141.026 µs. During 20 s, any channel is used 290 times, then 290 x 1141.026 µs = 330.9 ms, thus the average time of occupancy on any channel is less than 400 ms within a period of 0.4 s multiplied by the number of hopping channels employed, in normal operating mode (see annex 2).

Note 5: conducted measurement is not possible (integral antenna), so we used the radiated method in open field.

Note 6: the antenna gain is less than 6 dBi.

Note 7: Duty cycle correction factor: For average measurements a correction duty cycle is calculated. Equipment during transmit 1141.026 µs twice in a time interval of 100 ms. So the duty cycle correction factor is 20 log $\left(\frac{2 \times 1141.026 \times 10^{-6}}{100 \times 10^{-3}}\right)$ *= -32.83 dB. See curve in annex 2.*

Note 8: this type of equipment uses less than 0.5 W of output power with a high signal transmitting duty factor (section 3 from Oet 65c).

6.2 unintentional radiator (subpart B)

Test procedure	Description of test	Respected criteria?				Comment
		Yes	No	NAp	NAs	
FCC Part 15.107	CONDUCTED LIMITS			X		
FCC Part 15.109	RADIATED EMISSION LIMITS	X				
FCC Part 15.111	ANTENNA POWER CONDUCTED LIMITS FOR RECEIVER	X				

NAp: Not Applicable NAs: Not Asked

6.3 Conclusion:

The sample of WIRELESS DATALOGGER FOR PHYSICAL PARAMETERS-COBALT 2 MODULE submitted to the tests complies with the regulations of the standard FCC Part 15 in accordance with the limits defined in this report.

7. RADIATED EMISSION LIMITS

Standard: FCC Part 15

Test procedure: paragraph 109

Limit class: Class B

Test equipments:

TYPE	BRAND	EMITECH NUMBER
Test receiver	Rohde & Schwarz ESVS 10	1219
Biconical antenna	Hewlett Packard 11966 C	728
Log periodic antenna	Rohde & Schwarz HL 223	1999
Double ridged guide antenna	Electrometrics EM 6961	1204
Spectrum analyzer	Rohde & Schwarz FSU	6804
Open area test site	EMITECH	1274
Preamplifier 1 to 18 GHz	DBS Microwave DB97-1852	2648
High pass filter	Micro-tronics HPM11630	6609
Power source	Hewlett Packard E3610A	4195
Multimeter	Fluke 77-2	0812
Meteo station	Oregon scientific	1539

Test set up:

The system is tested in an open area test site (OATS).
The test unit is placed on a rotating table, 0.8 m from a ground plane. Zero degree azimuths correspond to the front of the equipment under test.

Frequency range: The highest frequency generated in the device is f = 921.4848 MHz
According the Sec.15.33 of the FCC Part 15 standard, the frequency range measured is indicated in the following table:

For unintentional radiator, including a digital device (Sec.15.33, §(b)(1) of the FCC Part 15standard) :

Highest frequency generated or used in the device or on which the device operates or tunes (MHz)	Upper frequency of measurement range (MHz)
500 – 1000	5000

Detection mode: Quasi-peak (F < 1 GHz)
Average (F > 1 GHz)

Bandwidth: 120 kHz (F < 1 GHz)
1 MHz (F > 1 GHz)

Distance of antenna: 3 meters

Antenna height: 1 to 4 meters

Antenna polarization: vertical and horizontal (only the highest level is recorded)

Equipment under test operating condition:

The equipment is blocked in continuous reception mode.

Results:

Ambient temperature (°C): 17.5
Relative humidity (%): 44

Power source: 3.6 Vdc by an external power supply

Not any spurious has been detected.

Applicable limits: for 30 MHz ≤ F < 88 MHz: 40 dBµv/m
88 MHz ≤ F < 216 MHz: 43.52 dBµv/m
216 MHz ≤ F < 960 MHz: 46.02 dBµv/m
Above 960 MHz: 53.98 dBµv/m

Note: any spurious which has more than 20 dB of margin compared to the applicable limit is not necessarily reported.

Test conclusion:

RESPECTED STANDARD

8. MAXIMUM PEAK OUTPUT POWER

Standard: FCC Part 15

Test procedure: paragraph 15.247

Test equipments:

TYPE	BRAND	EMITECH NUMBER
Test receiver ESVS10	Rohde & Schwarz	1219
Antenna RGA60	Electrometrics	1204
Open site	EMITECH	1274
Power source E3610A	Hewlett Packard	4195
Multimeter 77-2	Fluke	0812
Meteo station	Oregon scientific	1539

Test set up:

The system is tested in an open area test site (OATS).
The test unit is placed on a rotating table, 0.8 m from a ground plane. Zero degree azimuth corresponds to the front of the equipment under test.
We use for this measure outdoor test site. The measuring distance between the equipment and the test antenna is 3 m. The test antenna has been oriented in the two polarizations, we have recorded only the highest level.

Resolution bandwidth: 120 kHz

Detection : Quasi- Peak

Distance of antenna: 3 meters

Antenna height: 1 to 4 meters

Antenna polarization: vertical and horizontal

Equipment under test operating condition:

The equipment under test is blocked in continuous transmission mode, modulated by internal data signal, at the highest output power level which the transmitter is intended to operate.

Results:

Ambient temperature (°C): 15
Relative humidity (%): 55

Power source: 3.6 Vd.c by an external power supply

Sample n° 1 Low channel

		Electro-magnetic field (dBµV/m):	P* (W)	Limit (W)
Normal test conditions	Nominal power source (V): 3.6	99	0.025	1

Polarization of test antenna: vertical (height: 119 cm)
Position of equipment: vertical position (azimuth: 313 degrees)

Sample n° 1 Central channel

		Electro-magnetic field (dBµV/m):	P* (W)	Limit (W)
Normal test conditions	Nominal power source (V): 3.6	99	0.025	1

Polarization of test antenna: vertical (height: 119 cm)
Position of equipment: vertical position (azimuth: 313 degrees)

Sample n° 1 High channel

		Electro-magnetic field (dBµV/m):	P* (W)	Limit (W)
Normal test conditions	Nominal power source (V): 3.6	98.9	0.024	1

Polarization of test antenna: vertical (height: 119 cm)
Position of equipment: vertical position (azimuth: 314 degrees)

* $P = (E \times d)^2 / (30 \times Gp)$ with d = 3 m and Gp = 0.095 (-10.2 dBi ; declared by the applicant)

Test conclusion:

RESPECTED STANDARD

9. INTENTIONAL RADIATOR

Standard: FCC Part 15

Test procedure: paragraph 15.205
paragraph 15.209
paragraph 15.247

Test equipments:

TYPE	BRAND	EMITECH NUMBER
Test receiver ESH3	Rohde & Schwarz	1058
Test receiver ESVS 10	Rohde & Schwarz	1219
Spectrum analyzer FSU	Rohde & Schwarz	6804
Loop antenna	EMCO	1406
Biconical antenna HP 11966C	Hewlett Packard	728
Log periodic antenna HL 223	Rohde & Schwarz	1999
Open site	Emitech	1274
Antenna RGA-60	Electrometrics	1204
Power source E3610A	Hewlett Packard	4195
Multimeter 77-2	Fluke	0812
Meteo station AB 888	Oregon scientific	1539
Low-noise amplifier 1 to 18 GHz	ALC	2648
High pass filter HPM11630	Microtronics	6609

Test set up:

The system is tested in an open area test site (OATS).
The test unit is placed on a rotating table, 0.8 m from a ground plane. Zero degree azimuth corresponds to the front of the equipment under test.

Frequency range: from 9 kHz to harmonic 10 ($F_{carrier} \leq 10$ GHz)

Bandwidth: 120 kHz (F < 1 GHz) or 100 kHz, following 15.205 or 15.247
1 MHz (F > 1 GHz) or 100 kHz, following 15.205 or 15.247

Distance of antenna: between 30 m and 3 m according the frequencies and the limits.

Antenna height: 1 to 4 meters

Antenna polarization: vertical and horizontal, only the highest level is recorded.

Equipment under test operating condition:

The equipment under test is blocked in continuous transmission mode, modulated by internal data signal, at the highest output power level which the transmitter is intended to operate.

Results:

Ambient temperature (°C): 15
Relative humidity (%): 56

Power source: 3.6 Vd.c by an external power supply

Low channel

FREQUENCIES (MHz)	Detector P: Peak QP: Quasi-Peak Av: Average	Antenna height (cm)	Azimuth (degree)	resolution bandwidth (kHz)	Polarization H: Horizontal V: Vertical	Field strength (dBµV/m)	Limits (dBµV/m)	Margin (dB)
1815.0912	P	165	335	100	V	67.21	79	11.79
2722.6368	P	184	247	1000	H	73.31	73.98*	0.67
2722.6368	Av	184	247	1000	H	40.18(1)	53.98*	13.80
3630.1824	P	129	349	1000	V	71.82	73.98*	2.16
3630.1824	Av	129	349	1000	V	38.41(1)	53.98*	15.57
4537.728	P	149	8	1000	V	56.69	73.98*	17.29
4537.728	Av	149	8	1000	V	20.05(1)	53.98*	33.93
5445.2736	P	138	7	1000	H	60.50	73.98*	13.48
5445.2736	Av	138	7	1000	H	23.78(1)	53.98*	30.20

Central channel

FREQUENCIES (MHz)	Detector P: Peak QP: Quasi-Peak Av: Average	Antenna height (cm)	Azimuth (degree)	resolution bandwidth (kHz)	Polarization H: Horizontal V: Vertical	Field strength (dBµV/m)	Limits (dBµV/m)	Margin (dB)
1828.1088	P	204	30	100	V	68.21	79	10.79
2742.1632	P	165	14	1000	V	73.45	73.98*	0.53
2742.1632	Av	165	14	1000	V	40.22(1)	53.98*	13.76
3656.2176	P	129	19	1000	V	69.94	73.98*	4.04
3656.2176	Av	129	19	1000	V	36.41(1)	53.98*	17.57
4570.2720	P	102	331	1000	V	56.72	73.98*	17.26
4570.2720	Av	102	331	1000	V	19.94(1)	53.98*	34.04
5484.3264	P	103	328	100	V	56.39	79	22.61

High channel

FREQUENCIES (MHz)	Detector P: Peak QP: Quasi-Peak Av: Average	Antenna height (cm)	Azimuth (degree)	resolution bandwidth (kHz)	Polarization H: Horizontal V: Vertical	Field strength (dBµV/m)	Limits (dBµV/m)	Margin (dB)
1842.9696	P	166	28	100	V	68.47	79	10.53
2764.4544	P	181	16	1000	V	73.32	73.98*	0.66
2764.4544	Av	181	16	1000	V	40.21(1)	53.98*	13.77
3685.9392	P	145	0	1000	V	70.02	73.98*	3.96
3685.9392	Av	145	0	1000	V	36.38(1)	53.98*	17.60
4607.4240	P	145	0	1000	V	57.85	73.98*	16.13
4607.4240	Av	145	0	1000	V	21.37(1)	53.98*	32.61
5528.9088	P	102	351	100	V	57.19	79	21.81

* restricted bands of operation in 15.205, this limit corresponding at the 15.209 section.

(1)All average value were taken using peak detector function with VBW=10 Hz and the duty cycle correction factor (see § 15.35; pulsed modulated device).

For average measurements a correction duty cycle is calculated.
Equipment during transmit 1141.026 µs twice in a time interval of 100 ms.
So the duty cycle correction factor is 20 log (2 x 1141.026 x 10^{-6})= -32.83 dB.

100×10^{-3}

See curve in annex 2.

Note: any spurious which has more than 20 dB of margin compared to the applicable limit is not necessarily reported.

Applicable limits : In any 100 kHz bandwidth outside the frequency band in which the spread spectrum or digitally modulated intentional radiator is operating, the radio frequency power that is produced by the intentional radiator shall be at least 20 dB below that in the 100 kHz bandwidth within the band that contains the highest level of the desired power.

The highest level recorded in a 100 kHz bandwidth is 99 dBµV/m on low and central channel.
So the applicable limit is 79 dBµV/m.
In addition, radiated emissions which fall in the restricted band, as defined in section 15.205 (a), must also comply with the radiated emission limits specified in section 15.209 (a) (see section 15.205 (c)).

Test conclusion:

RESPECTED STANDARD

10. BAND EDGE COMPLIANCE

Standard: FCC Part 15.247

Test procedure: Public Notice DA 00-705, Delta Marker method

Test equipments:

TYPE	MANUFACTURER	EMITECH NUMBER
Spectrum analyzer FSU	Rohde & Schwarz	6804
Power source E3610A	Hewlett Packard	4195
Multimeter 77-2	fluke	0812

Test set up:

Test realized in near field. All field strength measurements are correlated with the radiated maximum peak output power

Test operating condition of the equipment:

The equipment is blocked in frequency hopping mode.

Results:

Lower Band Edge: from 900 MHz to 902 MHz, Curve N°1

Upper Band Edge: from 928 MHz to 930 MHz, Curve N°2

Sample n°1:

Fundamental frequency (MHz)	Field Strength Level of fundamental (dBµV/m)	Detector (Peak or Average)	Frequency of maximum Band-edges Emission (MHz)	Delta Marker (dB)*	Calculated Max Out of Band Emission Level (dBµV/m)**	Limit (dBµV/m)	Margin (dB)
907.5269	99	Peak	901.9609	-47.31	51.69 (1)	73.98	22.29
921.4965	98.9	Peak	928.6362	-44.29	54.61	73.98	19.37

* according to step 2 of Marker-Delta Method DA 00-705.

** according to step 3 of Marker-Delta Method:

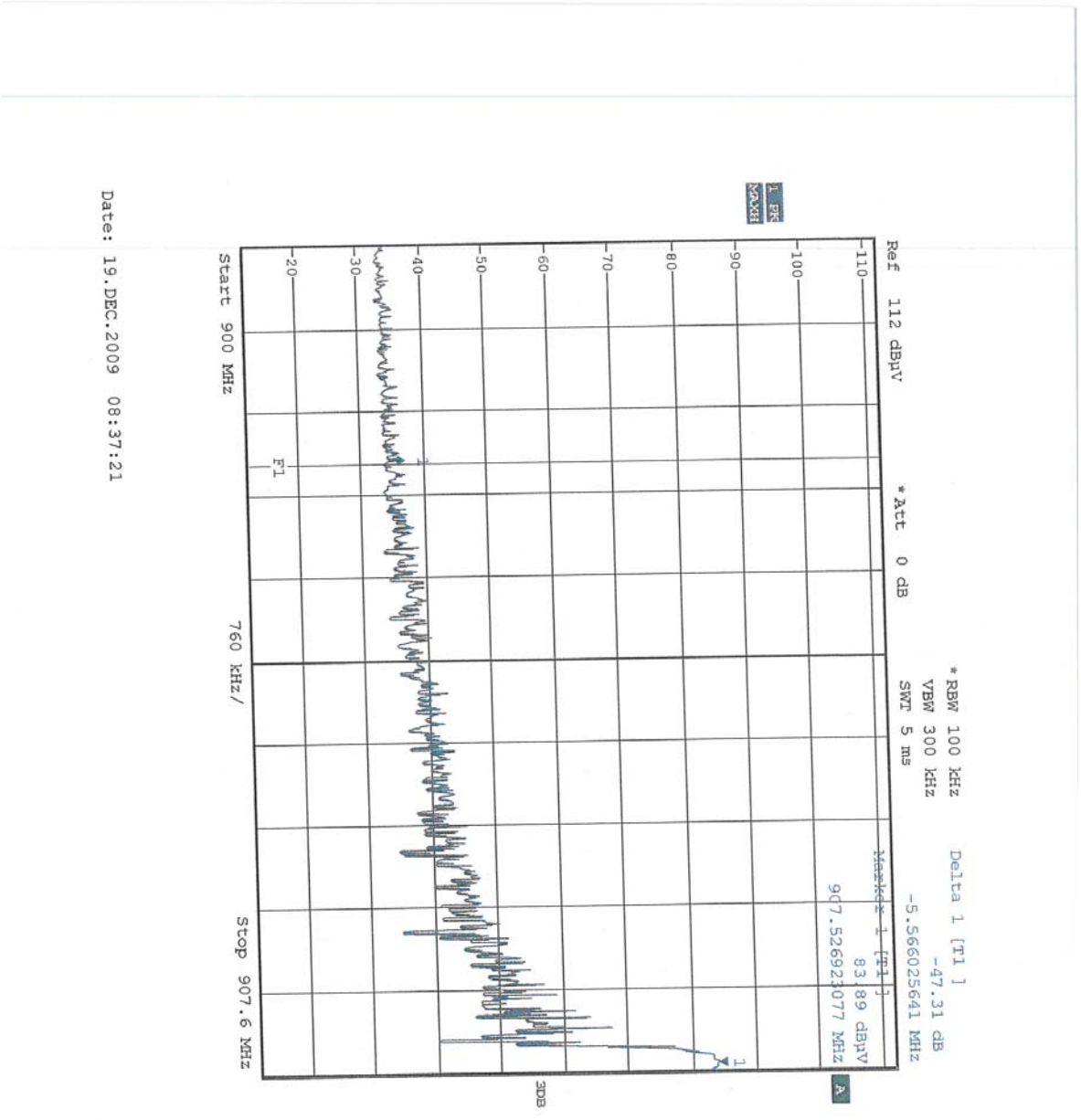
Calculated Emission Level = Field Strength Level – Delta Marker Level

(1) the peak level is lower than the average limit (53.98 dBµV/m).

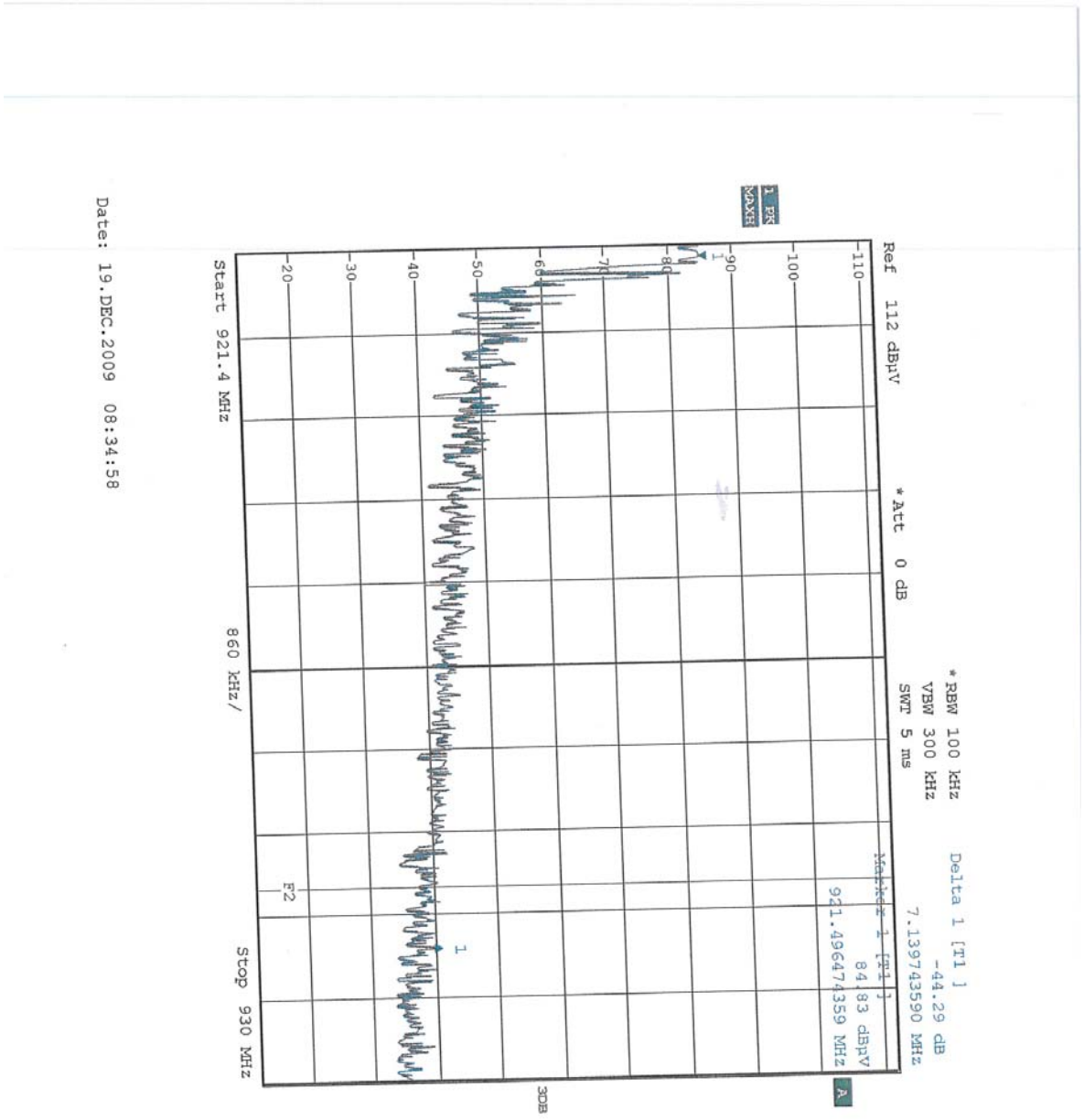
Test conclusion:

RESPECTED PUBLIC NOTICE

CURVE N°: 1.

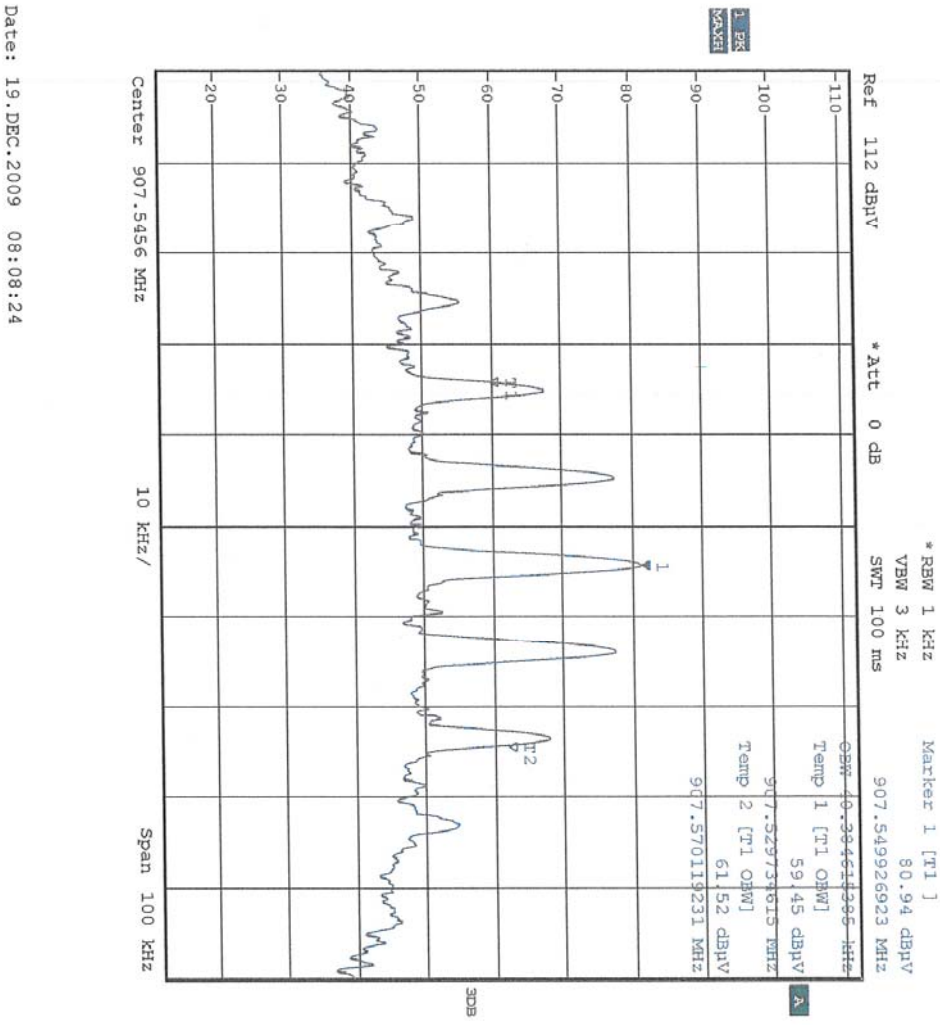

Ref 112 dBµV
*Att 0 dB
*RBW 100 kHz
VBW 300 kHz
SWT 5 ms
Delta 1 [T1]
-47.31 dB
-5.566025641 MHz
Marker 1 [T1]
83.89 dBµV
907.52692308 MHz
1 PK
MAXH
Start 900 MHz
760 kHz/
Stop 907.6 MHz
3DB
Date: 19.DEC.2009 08:37:21

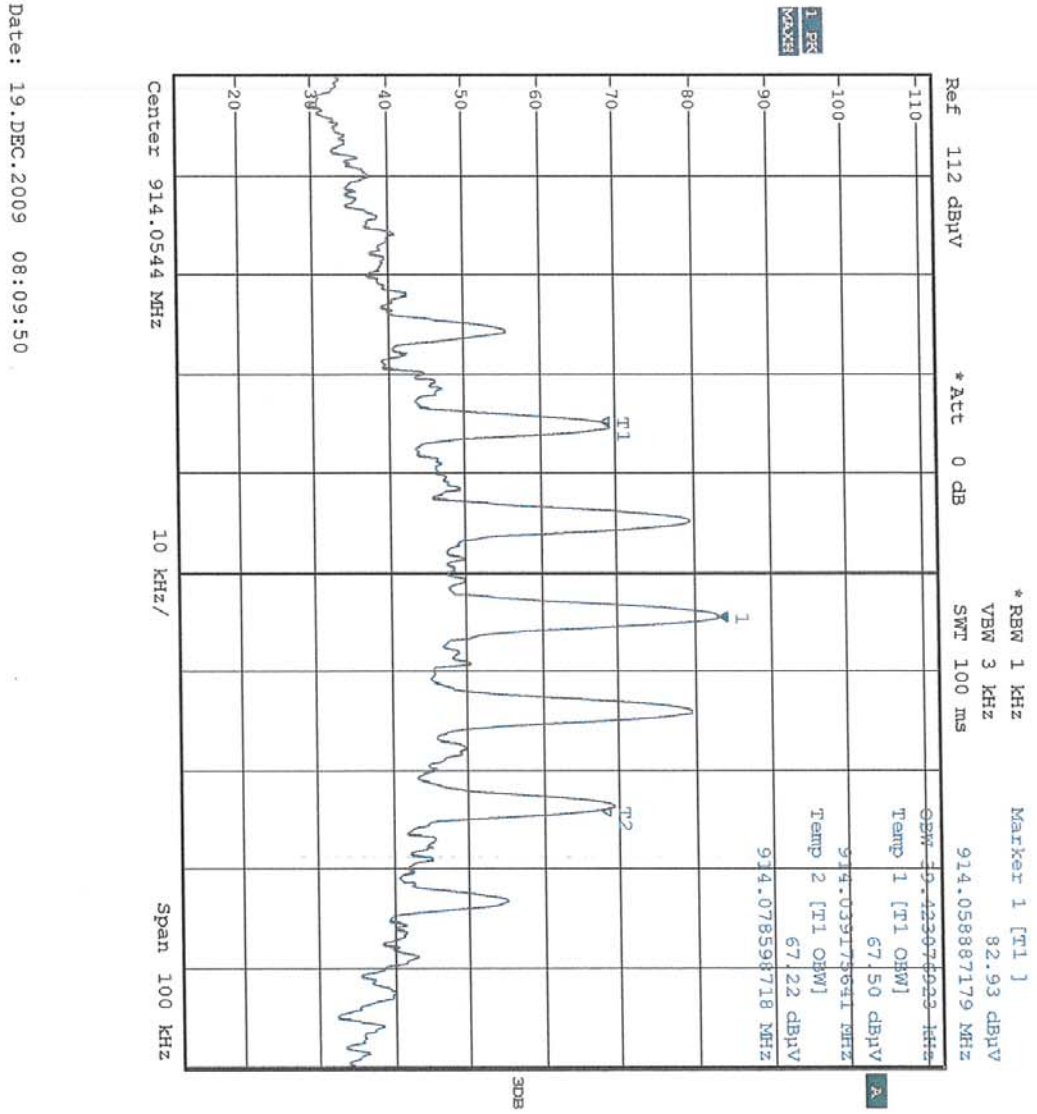
CURVE N°: 2.

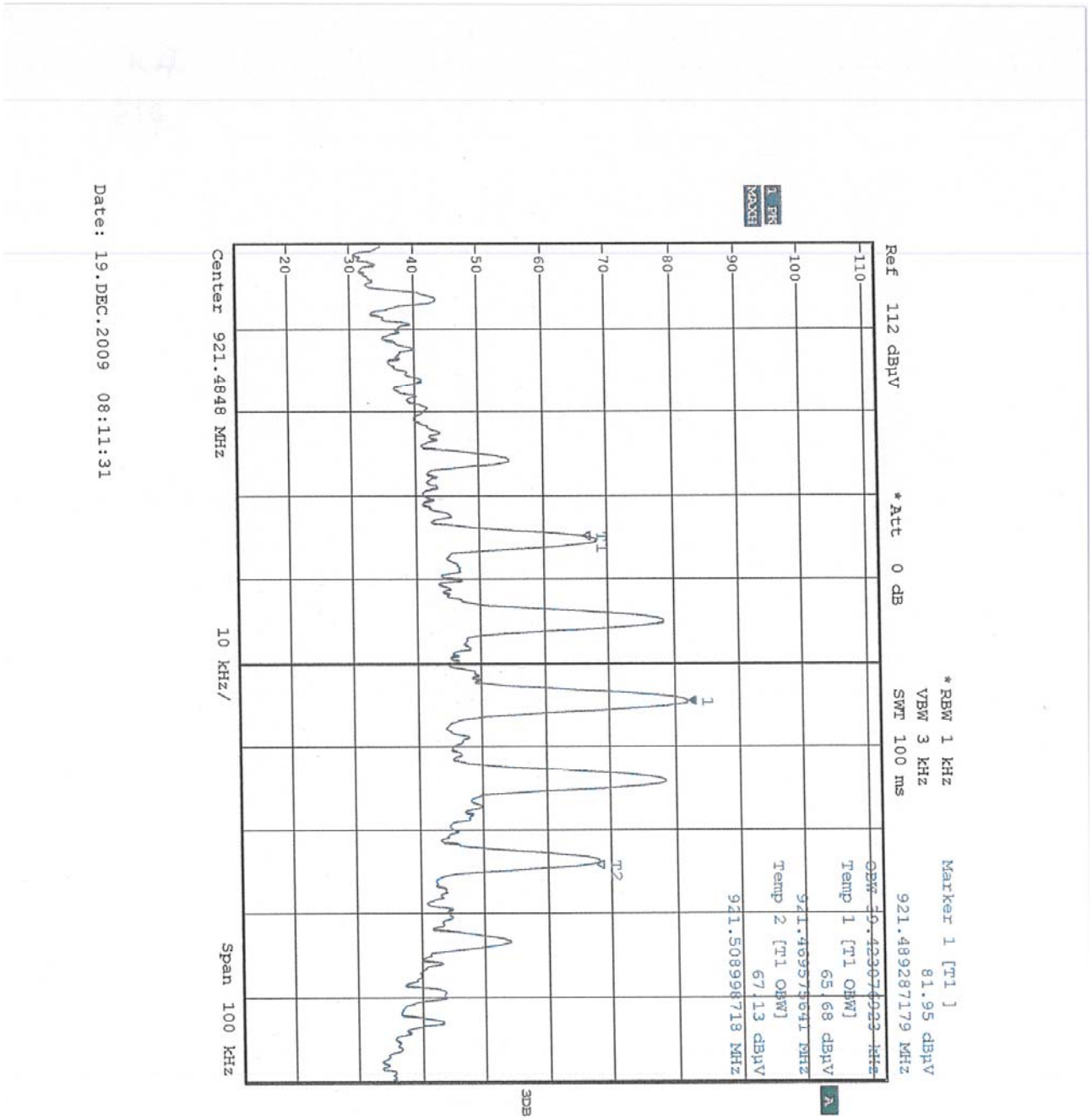


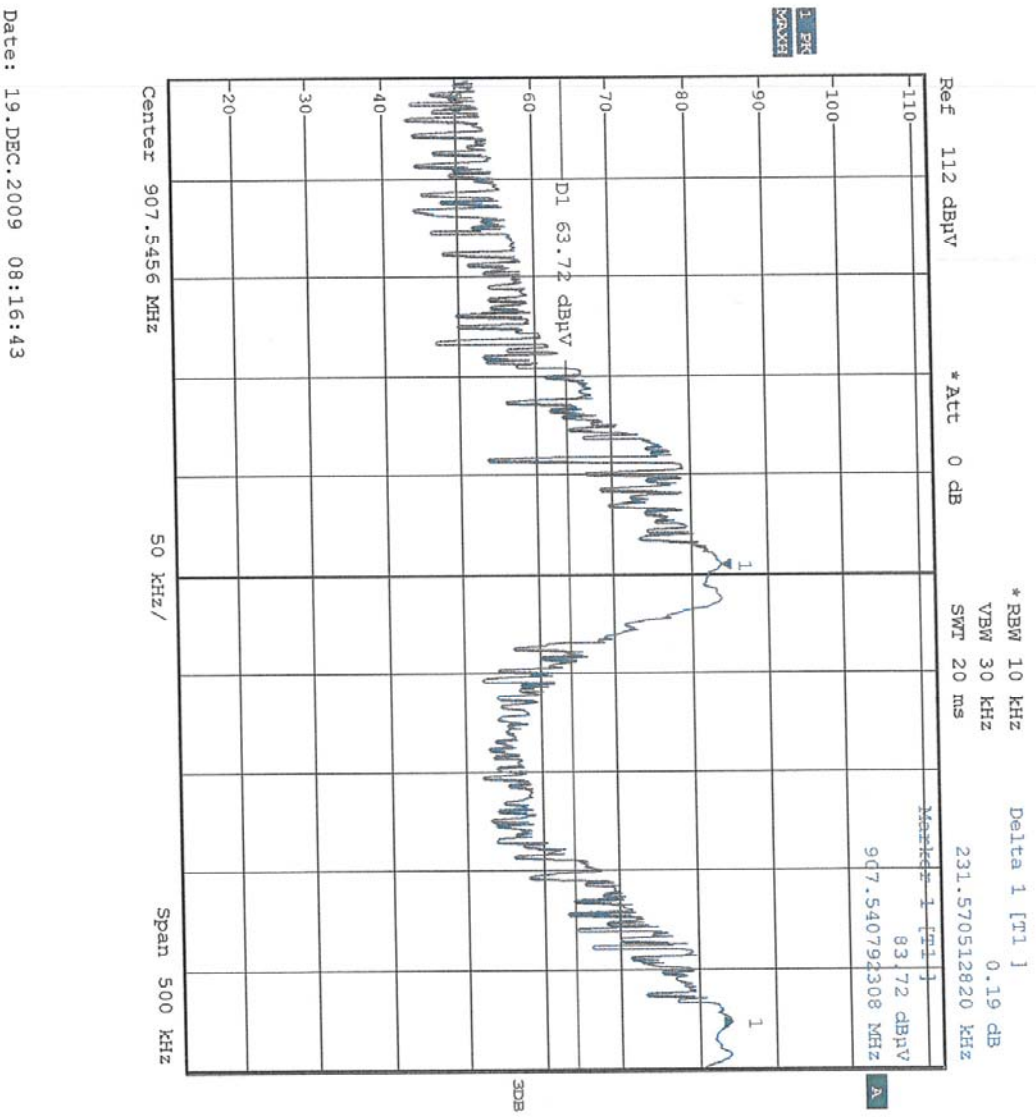
□□□ End of report, 5 annexes to be forwarded □□□

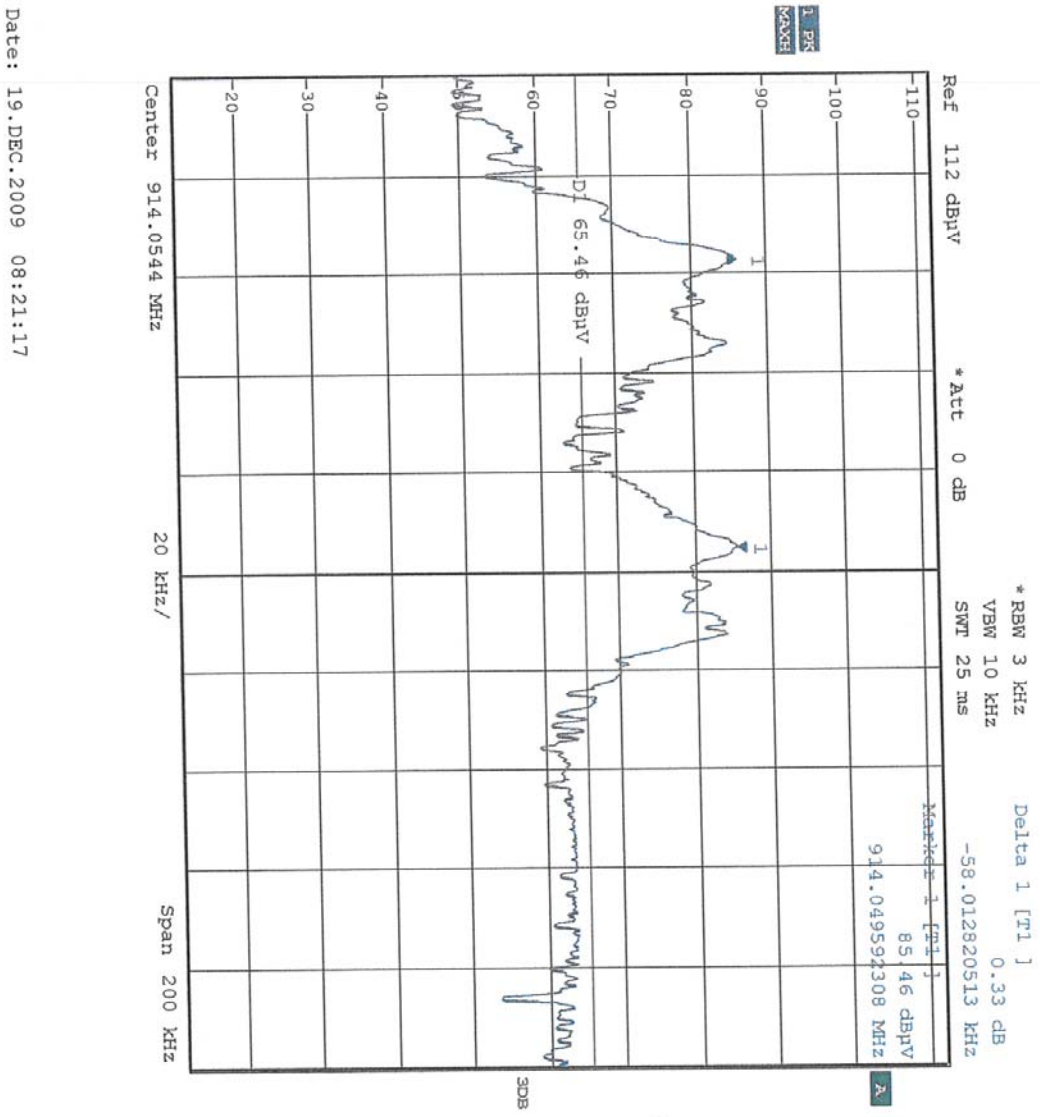
ANNEX 1: OCCUPIED POWER BANDWIDTH AND CHANNEL SEPARATION

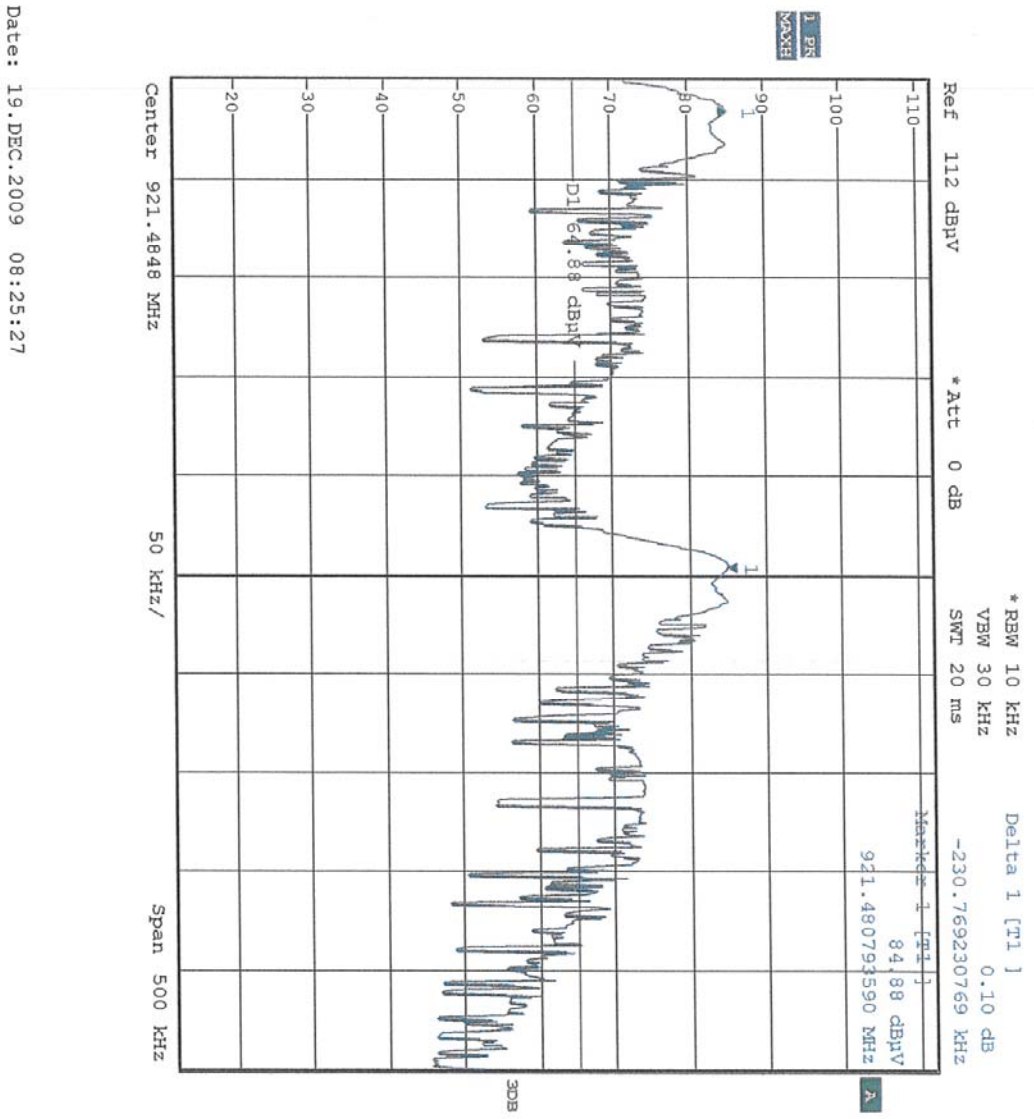



*RBW 1 kHz
VBW 3 kHz
SWT 100 ms
Marker 1 [T1]
82.93 dBµV
914.05887179 MHz
Ref 112 dBµV
*Att 0 dB
OBW 19.42307923 kHz
Temp 1 [T1 OBW]
67.50 dBµV
914.03917561 MHz
Temp 2 [T1 OBW]
67.22 dBµV
914.07859718 MHz
1 PK MAXH
A
30DB
Center 914.0544 MHz
10 kHz/
Span 100 kHz
Date: 19.DEC.2009 08:09:50

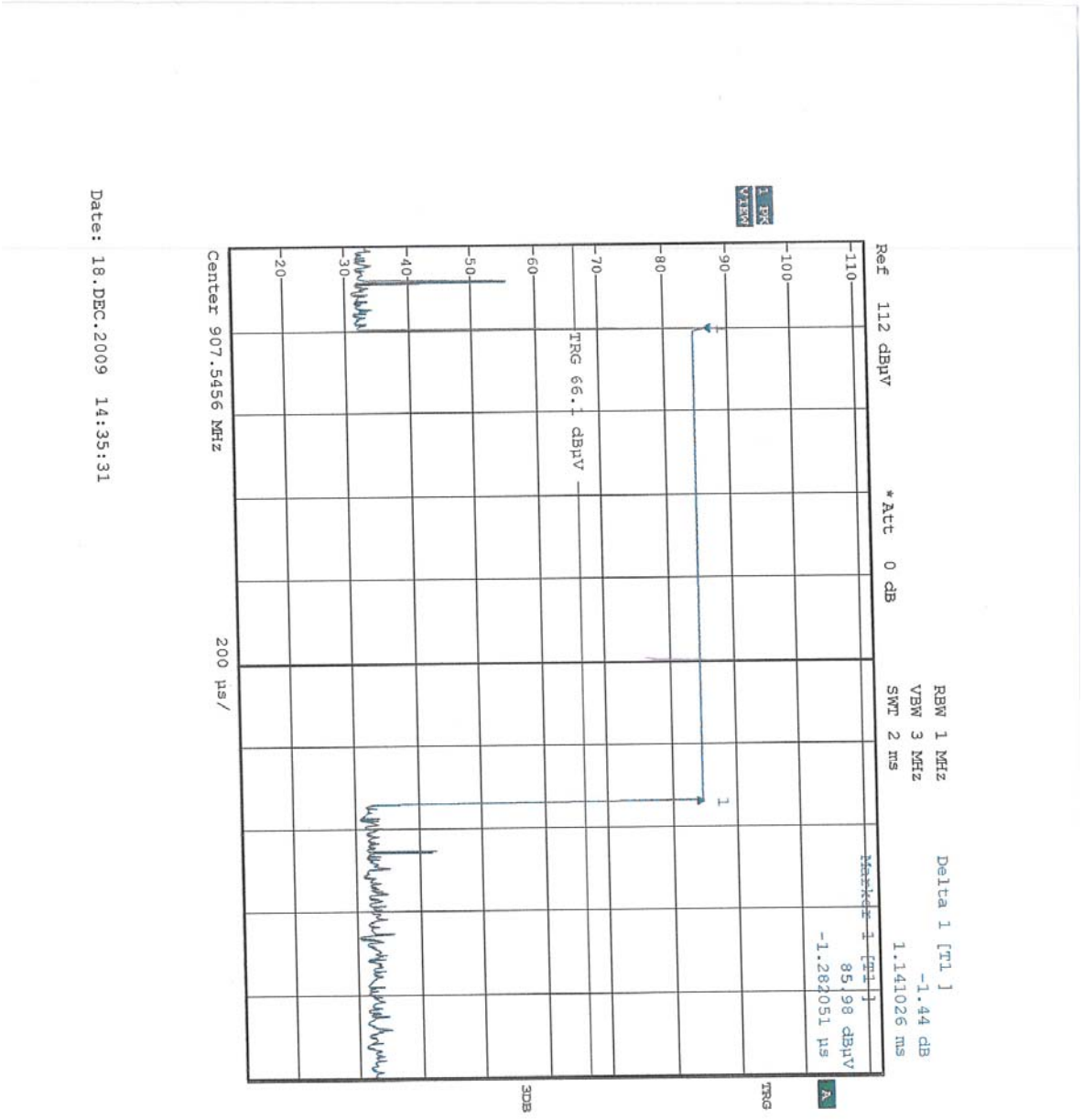

*RBW 1 kHz
VBW 3 kHz
SWT 100 ms
Marker 1 [T1]
81.95 dBµV
921.48928717 MHz
Ref 112 dBµV
*Att 0 dB
OBW 99.42307023 kHz
Temp 1 [T1 OBW]
65.68 dBµV
921.48957941 MHz
Temp 2 [T1 OBW]
67.13 dBµV
921.50899871 MHz
1 PK
MAXH
A
3DB
Center 921.4848 MHz
10 kHz/
Span 100 kHz
Date: 19.DEC.2009 08:11:31

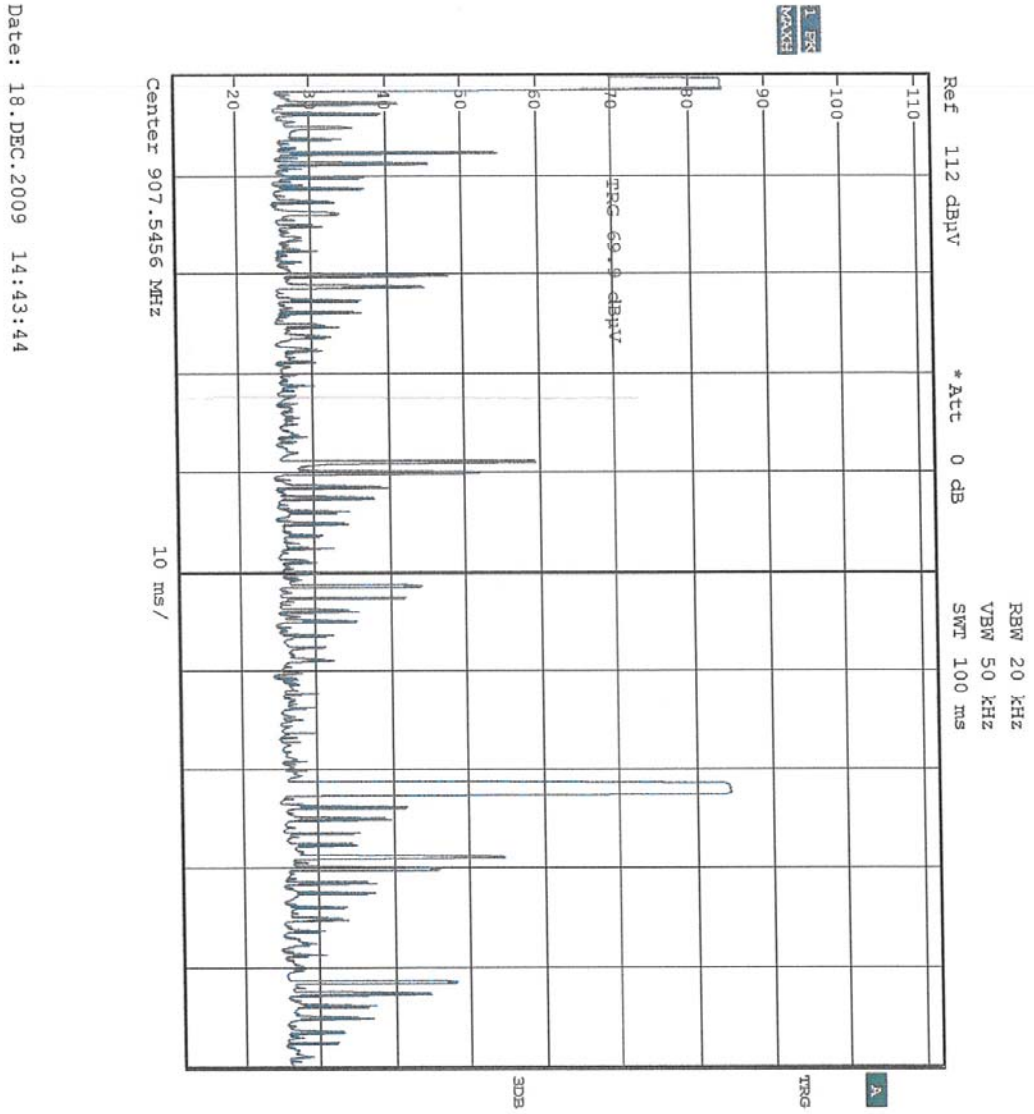

*RBW 10 kHz
VBW 30 kHz
SWT 20 ms
Delta 1 [T1]
0.19 dB
231.570512820 kHz
Ref 112 dBµV
*Att 0 dB
1 PK
MAXH
Marker 1 [T1]
83.72 dBµV
907.540792308 MHz
D1 63.72 dBµV
Center 907.5456 MHz
50 kHz/
Span 500 kHz
3DB
A
Date: 19.DEC.2009 08:16:43

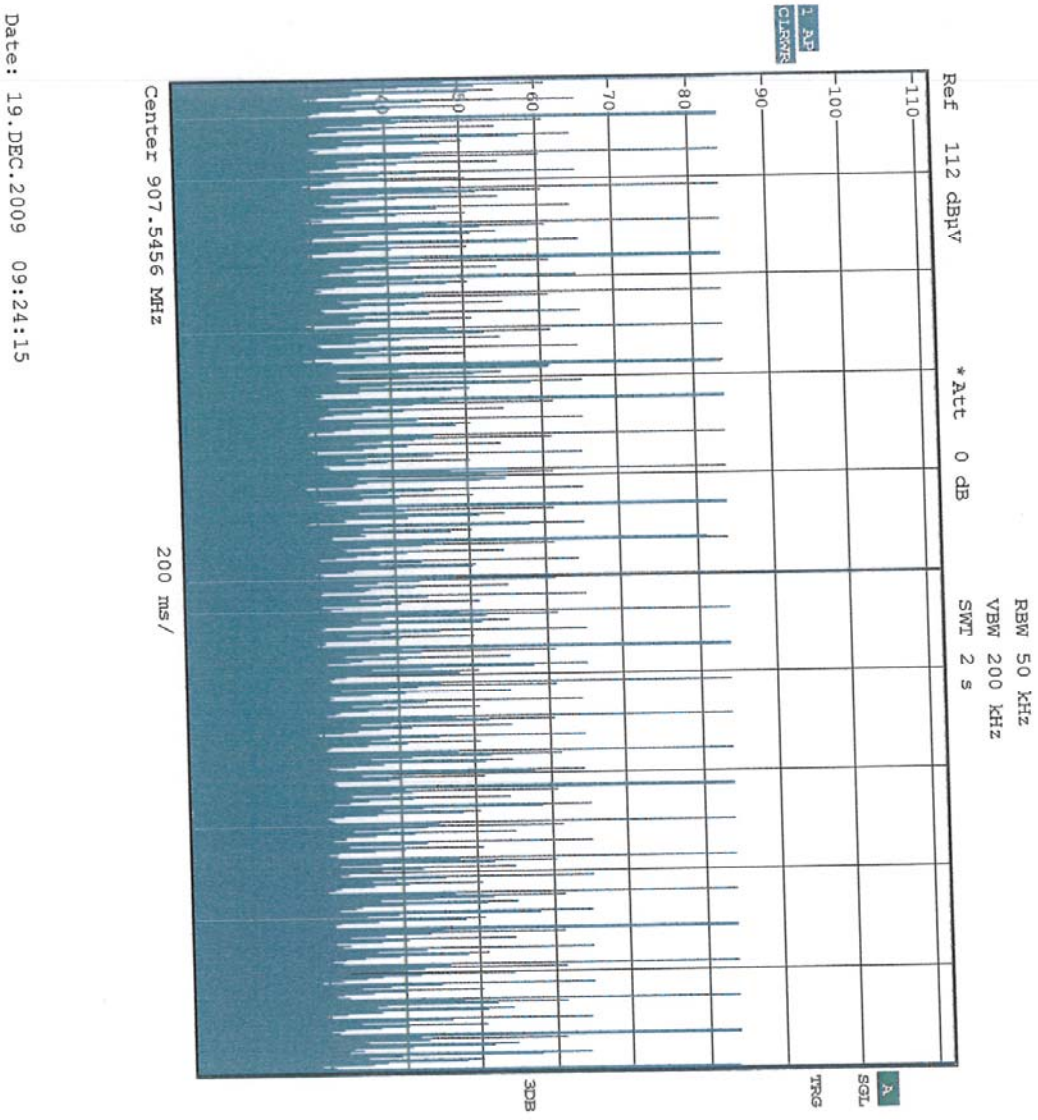

1 PK
MAXH
Ref 112 dBµV
*Att 0 dB
*RBW 3 kHz
VBW 10 kHz
SWT 25 ms
Delta 1 [T1]
0.33 dB
-58.012820513 kHz
Marker 1 [T1]
85.46 dBµV
914.049592308 MHz
D1 65.46 dBµV
3DB
Center 914.0544 MHz
20 kHz/
Span 200 kHz
Date: 19.DEC.2009 08:21:17

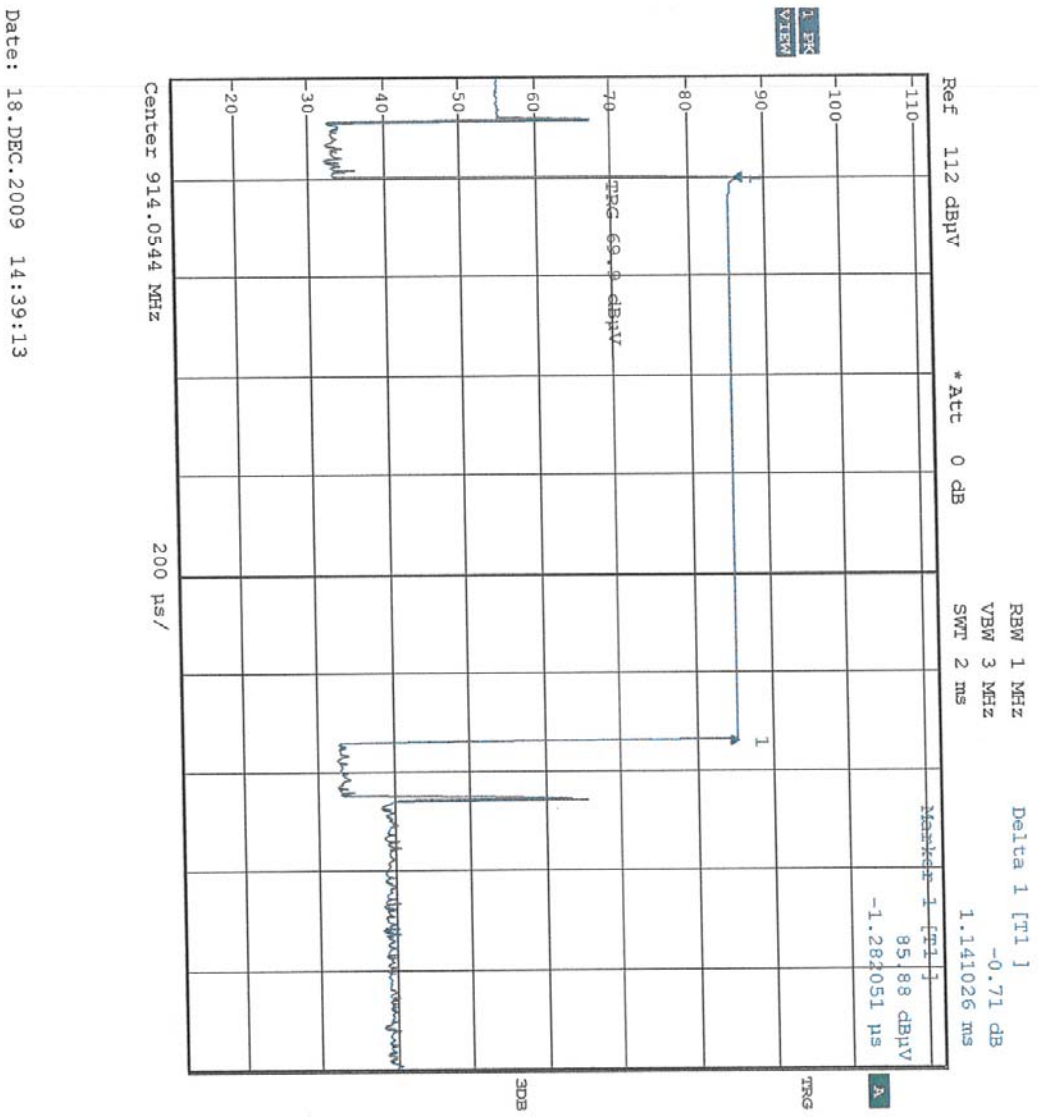

Ref 112 dBµV
*Att 0 dB
*RBW 10 kHz
VBW 30 kHz
SWT 20 ms
Delta 1 [T1]
0.10 dB
-230.769230769 kHz
Marker 1 [T1]
84.88 dBµV
921.480793590 MHz
1 PK
MAXH
D1
64.88 dBµV
3DB
A
Center 921.4848 MHz
50 kHz/
Span 500 kHz
Date: 19.DEC.2009 08:25:27

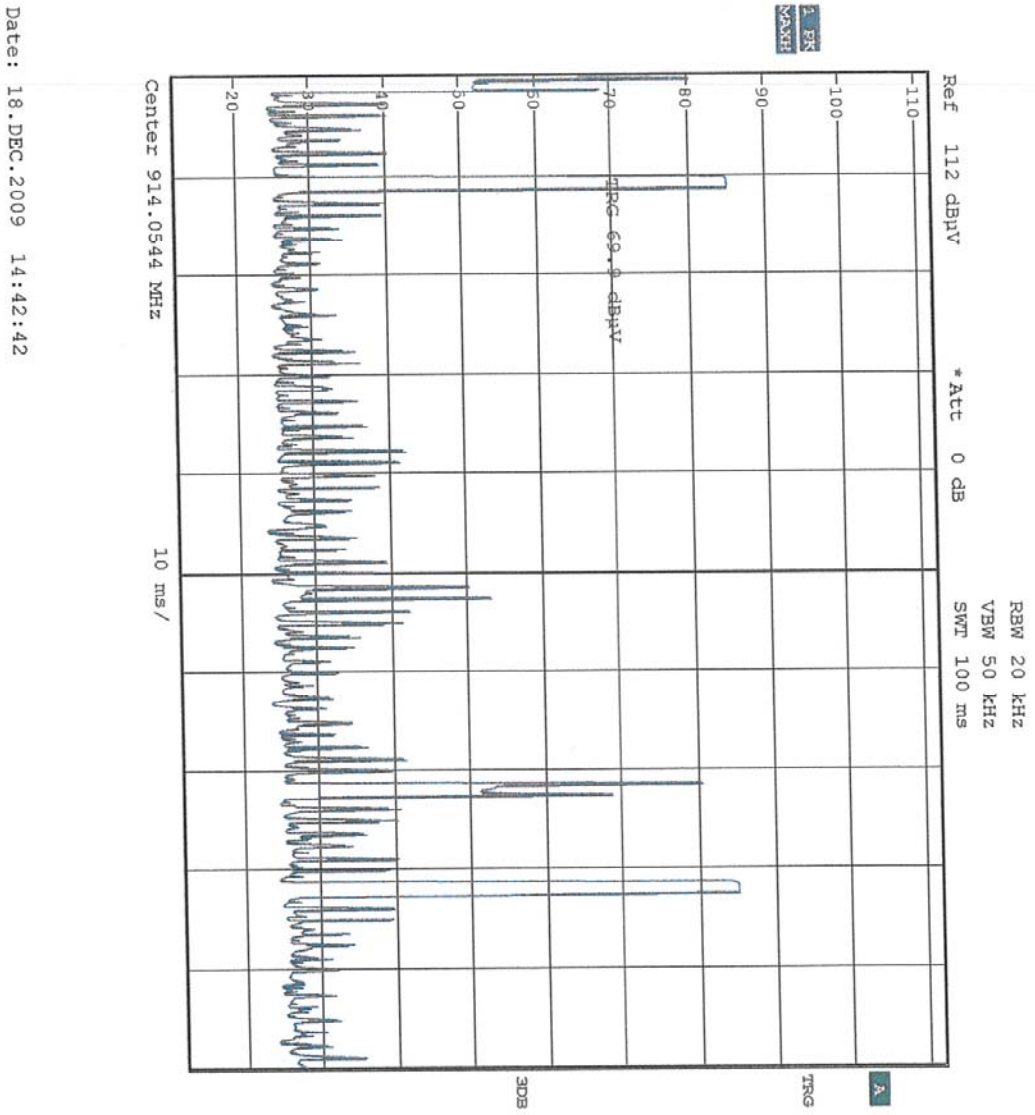
ANNEX 2: AVERAGE TIME OF OCCUPANCY ON ANY FREQUENCY

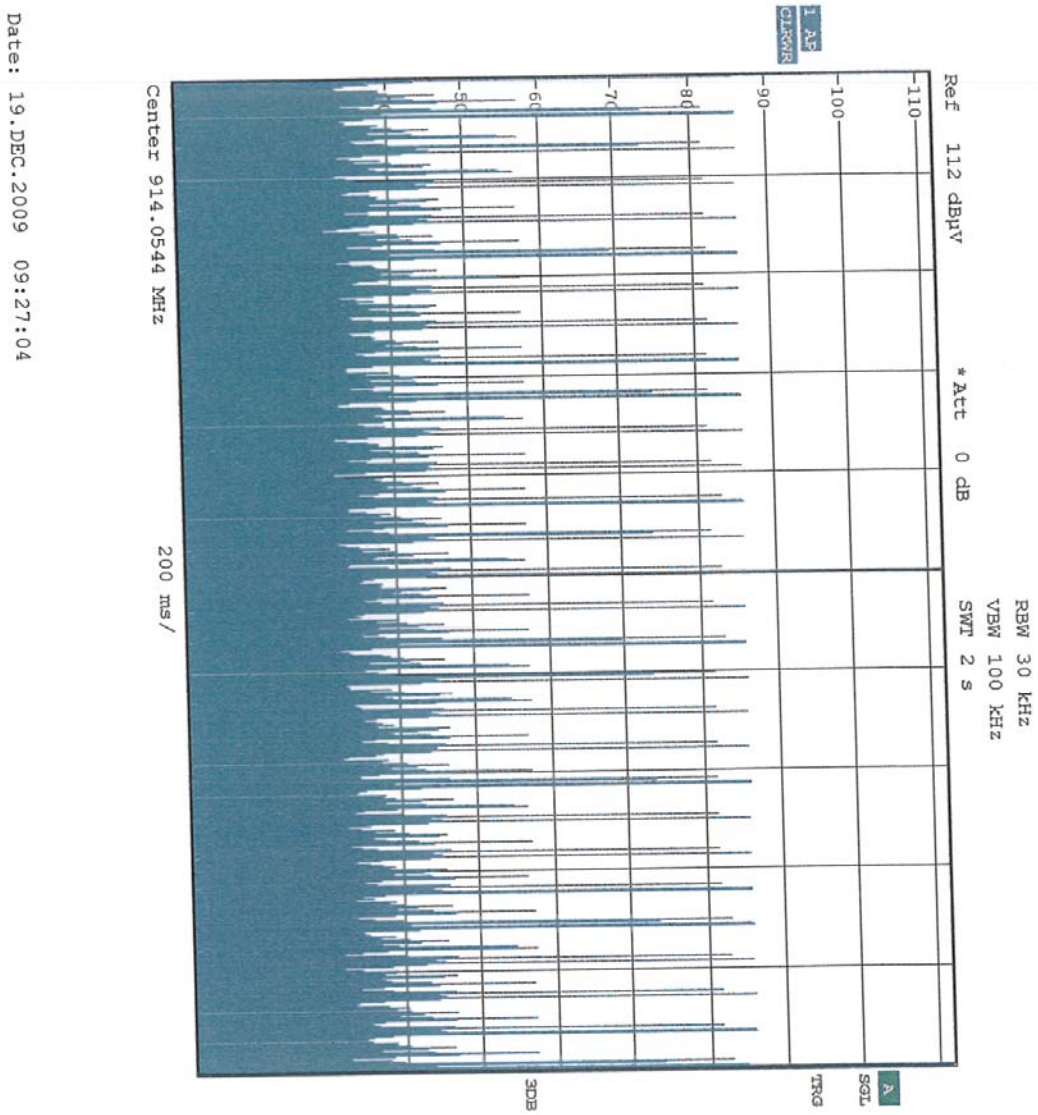


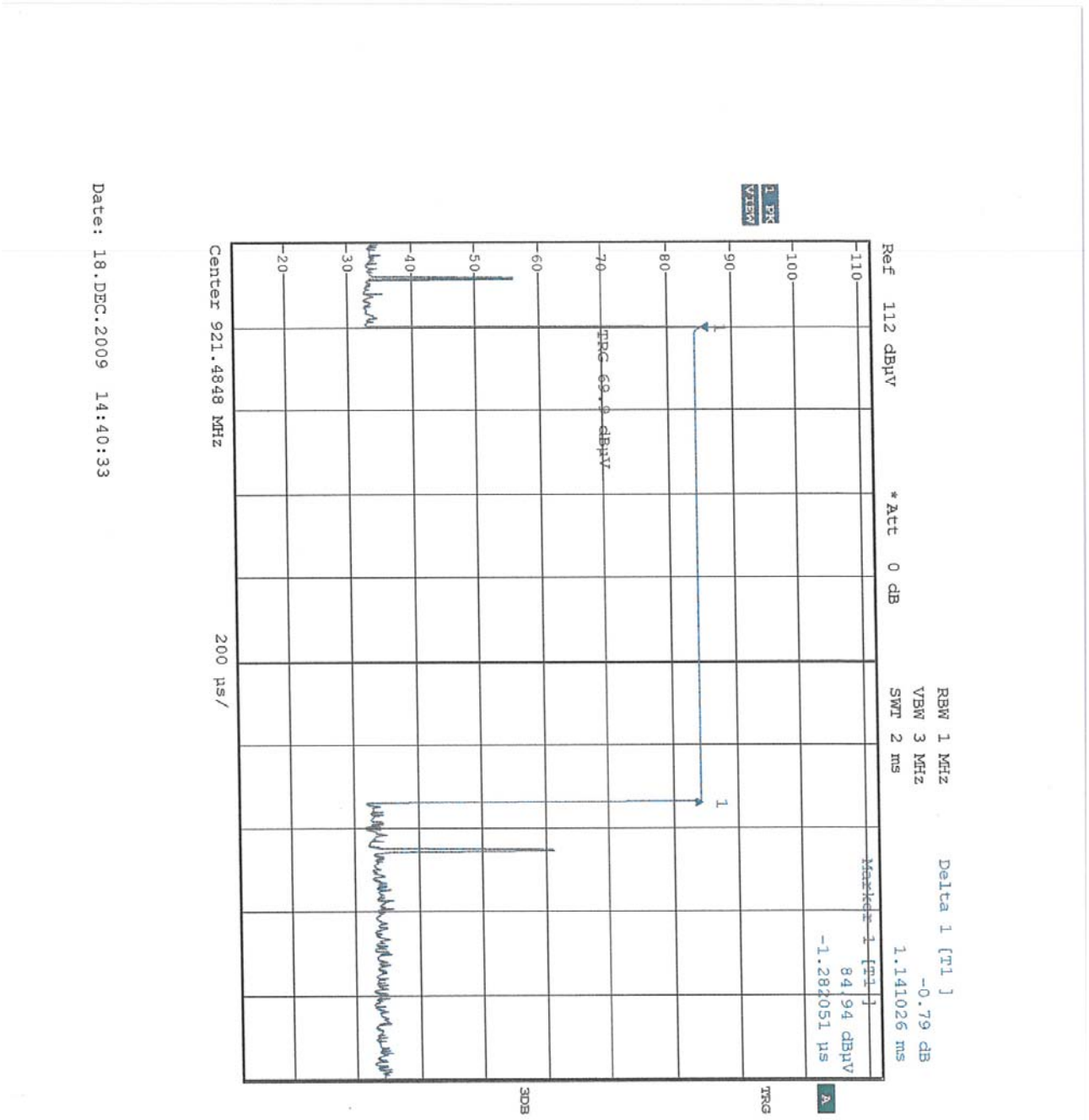

1 PK
MAXH
Ref 112 dBµV
*Att 0 dB
RBW 20 kHz
VBW 50 kHz
SWT 100 ms
TRG 69.9 dBµV
Center 907.5456 MHz
10 ms/
3DB
TRG
A
Date: 18.DEC.2009 14:43:44

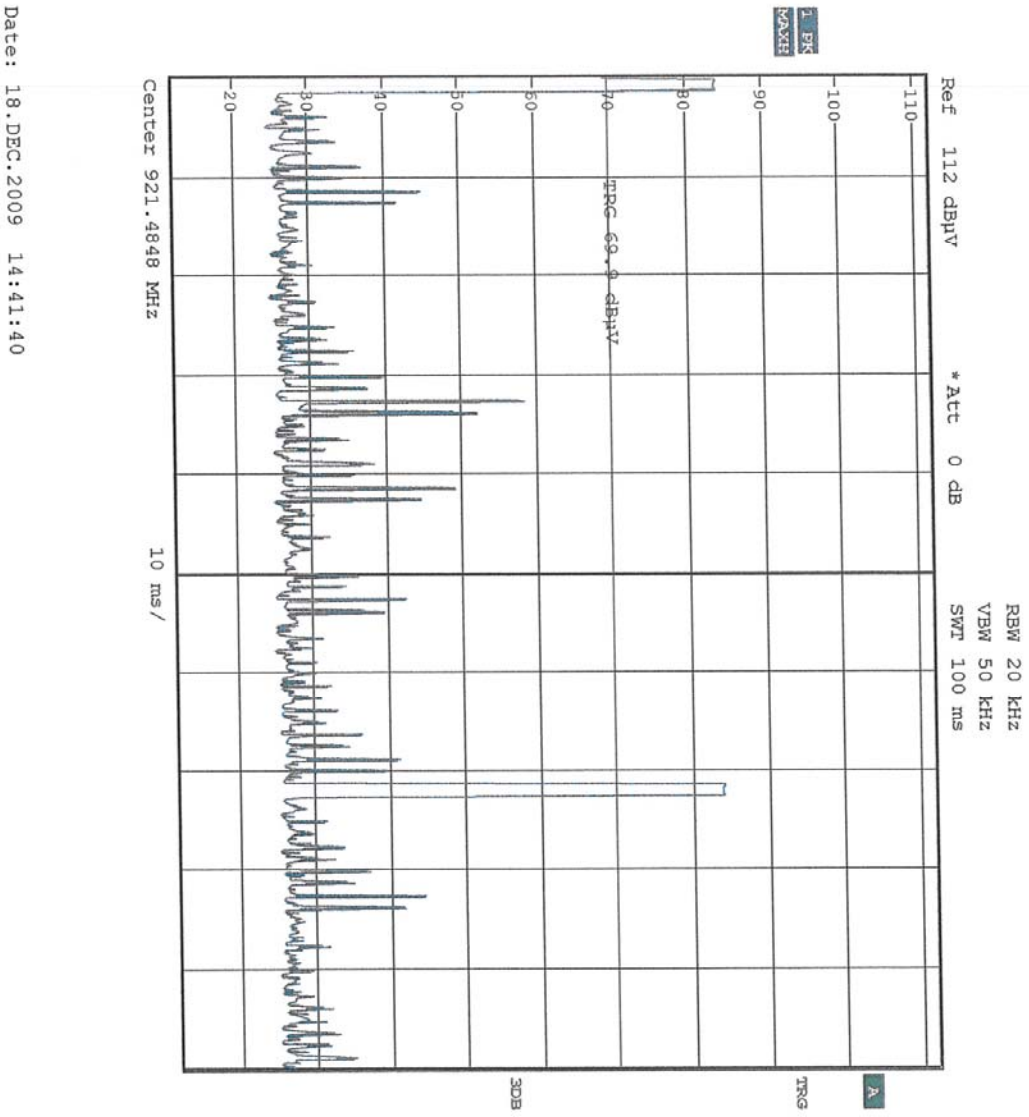

RBW 50 kHz
VBW 200 kHz
SWT 2 s
Ref 112 dBµV
*Att 0 dB
1 AP
CLRWR
A
SGL
TRG
3DB
110
100
90
80
70
60
50
40
Center 907.5456 MHz
200 ms/
Date: 19.DEC.2009 09:24:15

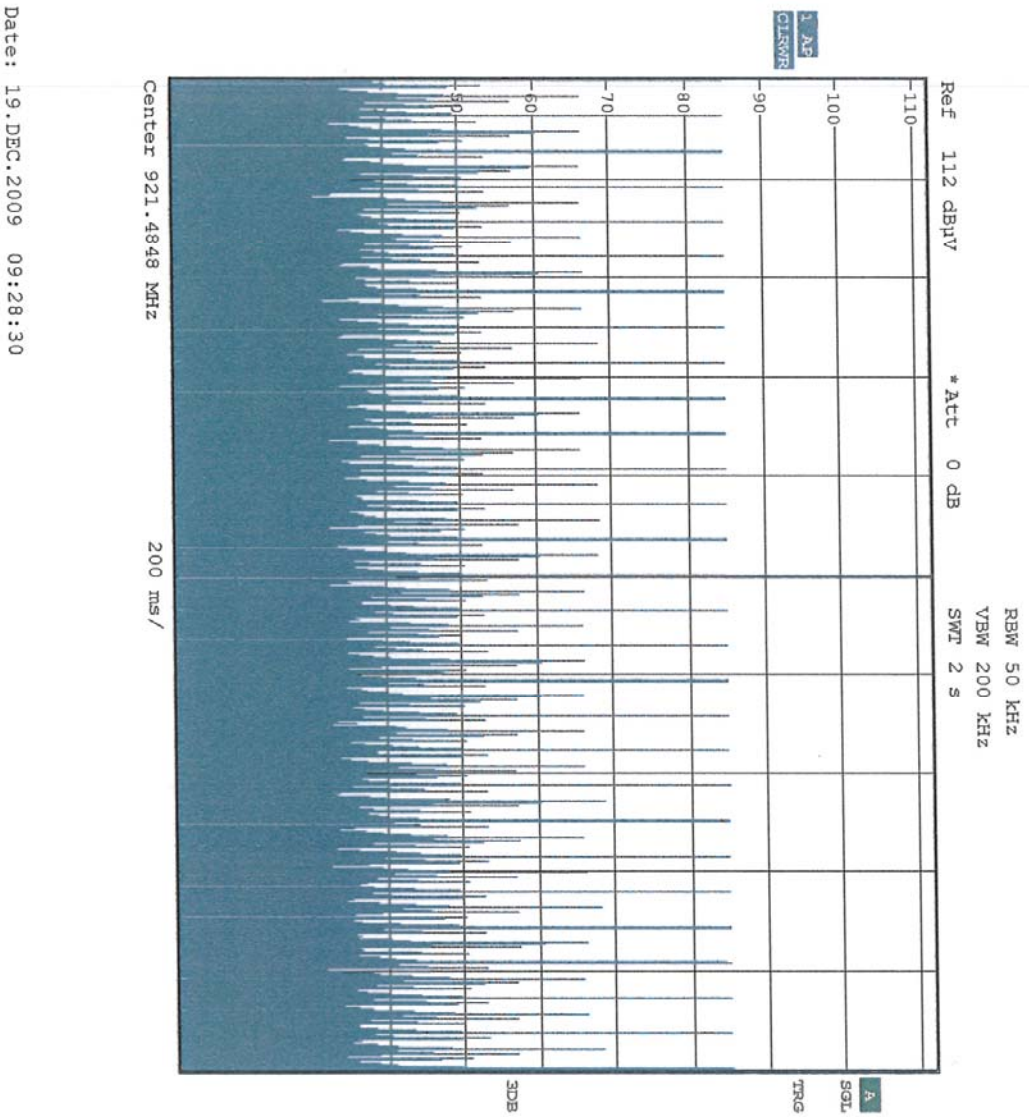

RBW 1 MHz
VBW 3 MHz
SWT 2 ms
Delta 1 [T1]
-0.71 dB
1.141026 ms
Marker 1 [T1]
85.88 dBµV
-1.282051 µs
Ref 112 dBµV
*Att 0 dB
TRG 69.0 dBµV
Center 914.0544 MHz
200 µs/
1 PK
VIEW
TRG
A
3DB
Date: 18.DEC.2009 14:39:13


Ref 112 dBµV
*Att 0 dB
RBW 20 kHz
VBW 50 kHz
SWT 100 ms
TRG 69.9 dBµV
Center 914.0544 MHz
10 ms/
Date: 18.DEC.2009 14:42:42
A
TRG
3DB

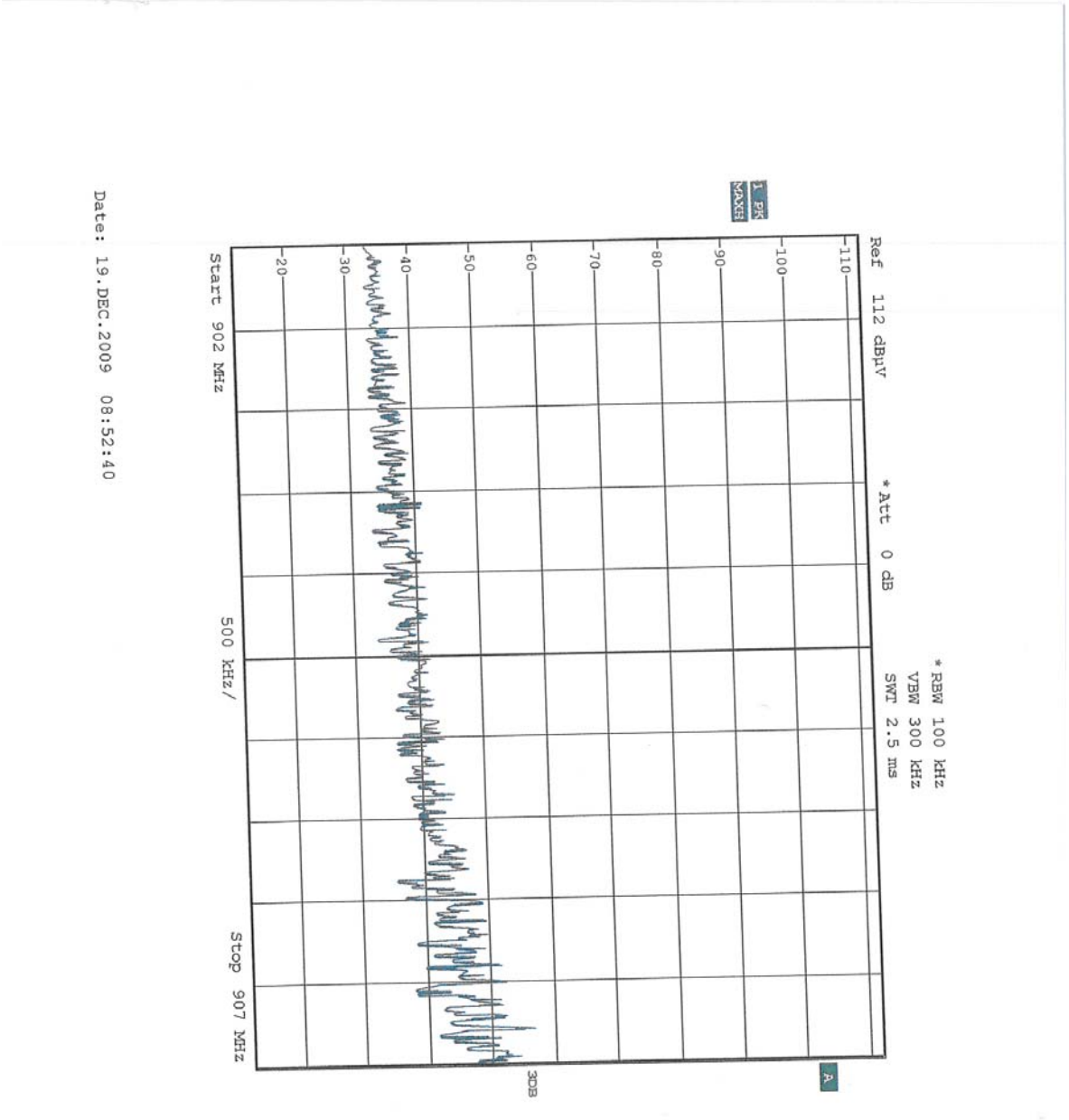

RBW 30 kHz
VBW 100 kHz
SWT 2 s
Ref 112 dBµV
*Att 0 dB
1 AP
CLRWR
A
SGL
TRG
3DB
Center 914.0544 MHz
200 ms/
Date: 19.DEC.2009 09:27:04

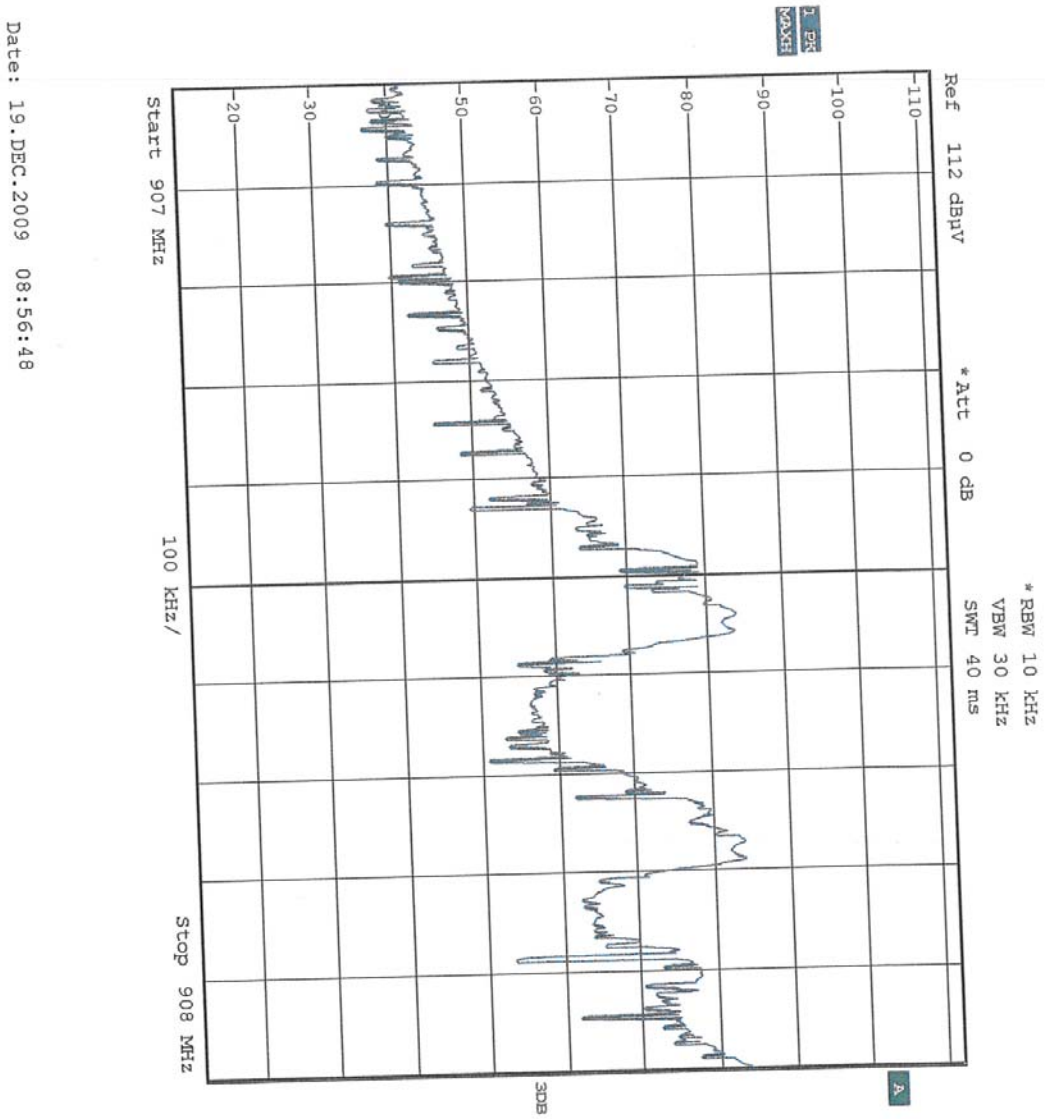

RBW 1 MHz
VBW 3 MHz
SWT 2 ms
Delta 1 [T1]
-0.79 dB
1.141026 ms
Marker 1 [T1]
84.94 dBµV
-1.282051 µs
Ref 112 dBµV
*Att 0 dB
1 PK VIEW
TRG 69.9 dBµV
Center 921.4848 MHz
200 µs/
TRG
3DB
A
Date: 18.DEC.2009 14:40:33

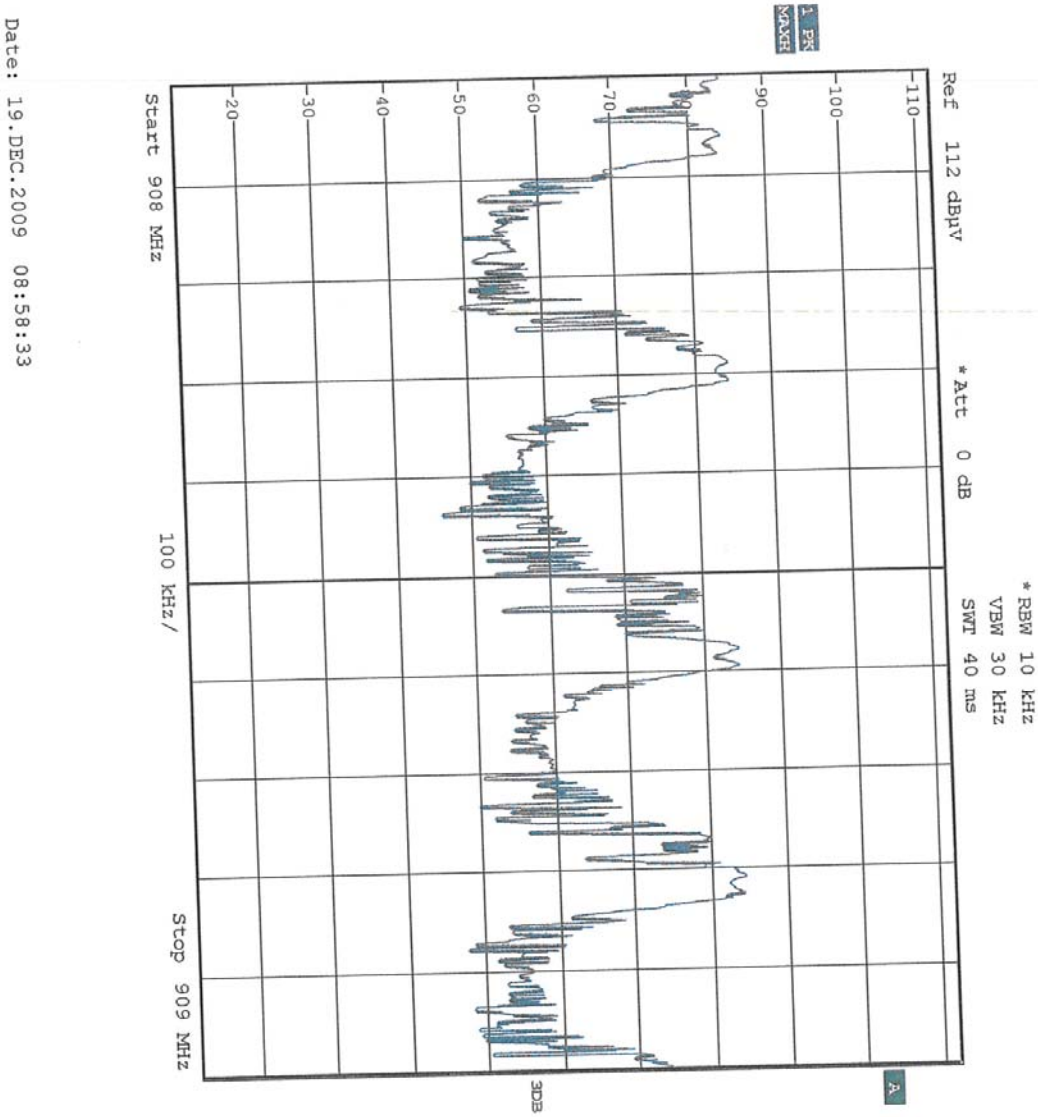

1 PK
MAXH
Ref 112 dBµV
*Att 0 dB
MRG 69.9 dBµV
RBW 20 kHz
VBW 50 kHz
SWT 100 ms
Center 921.4848 MHz
10 ms/
3DB
TRG
A
Date: 18.DEC.2009 14:41:40

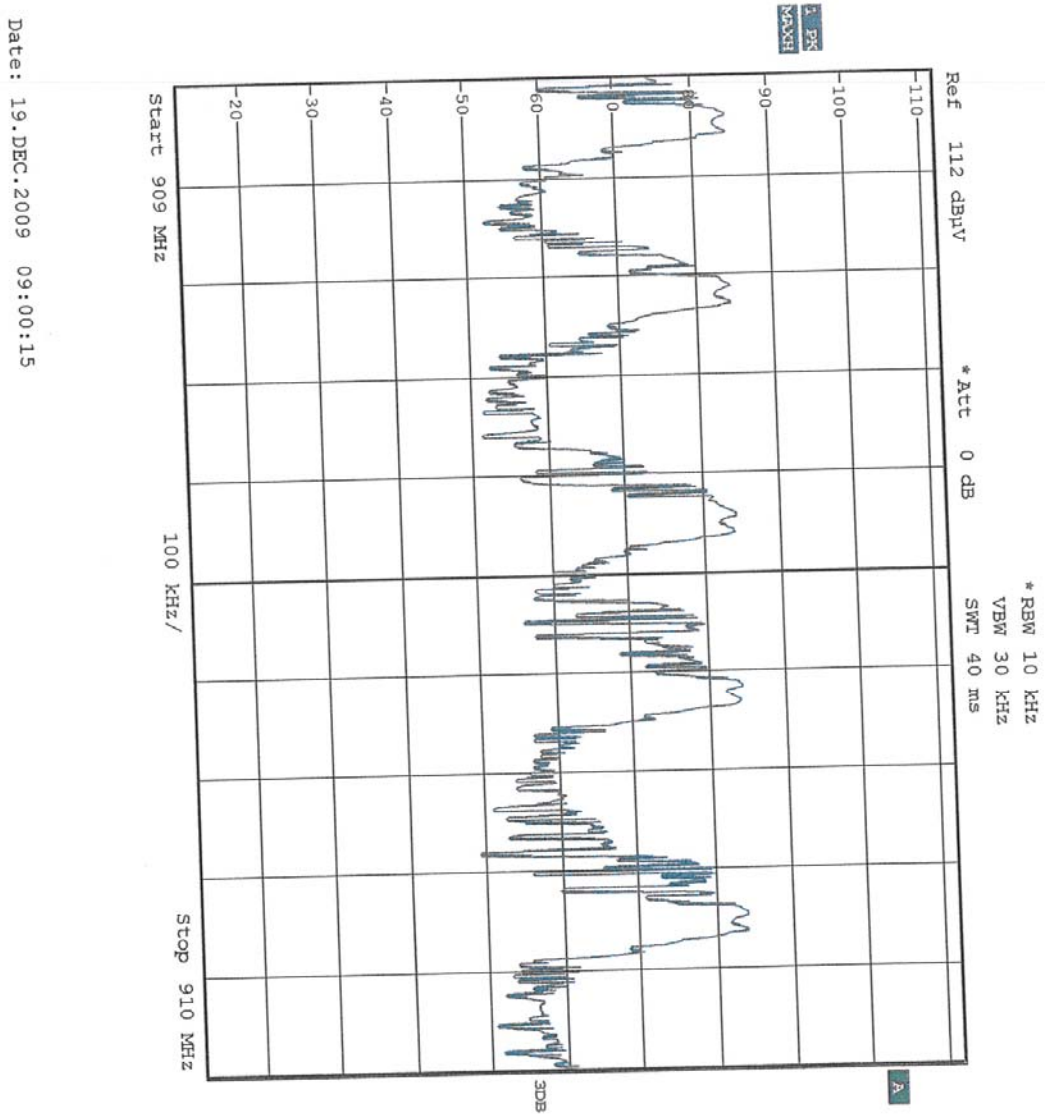

RBW 50 kHz
VBW 200 kHz
SWT 2 s
Ref 112 dBµV
*Att 0 dB
1 AP
CLRWR
A
SGL
TRG
3DB
110
100
90
80
70
60
50
Center 921.4848 MHz
200 ms/
Date: 19.DEC.2009 09:28:30

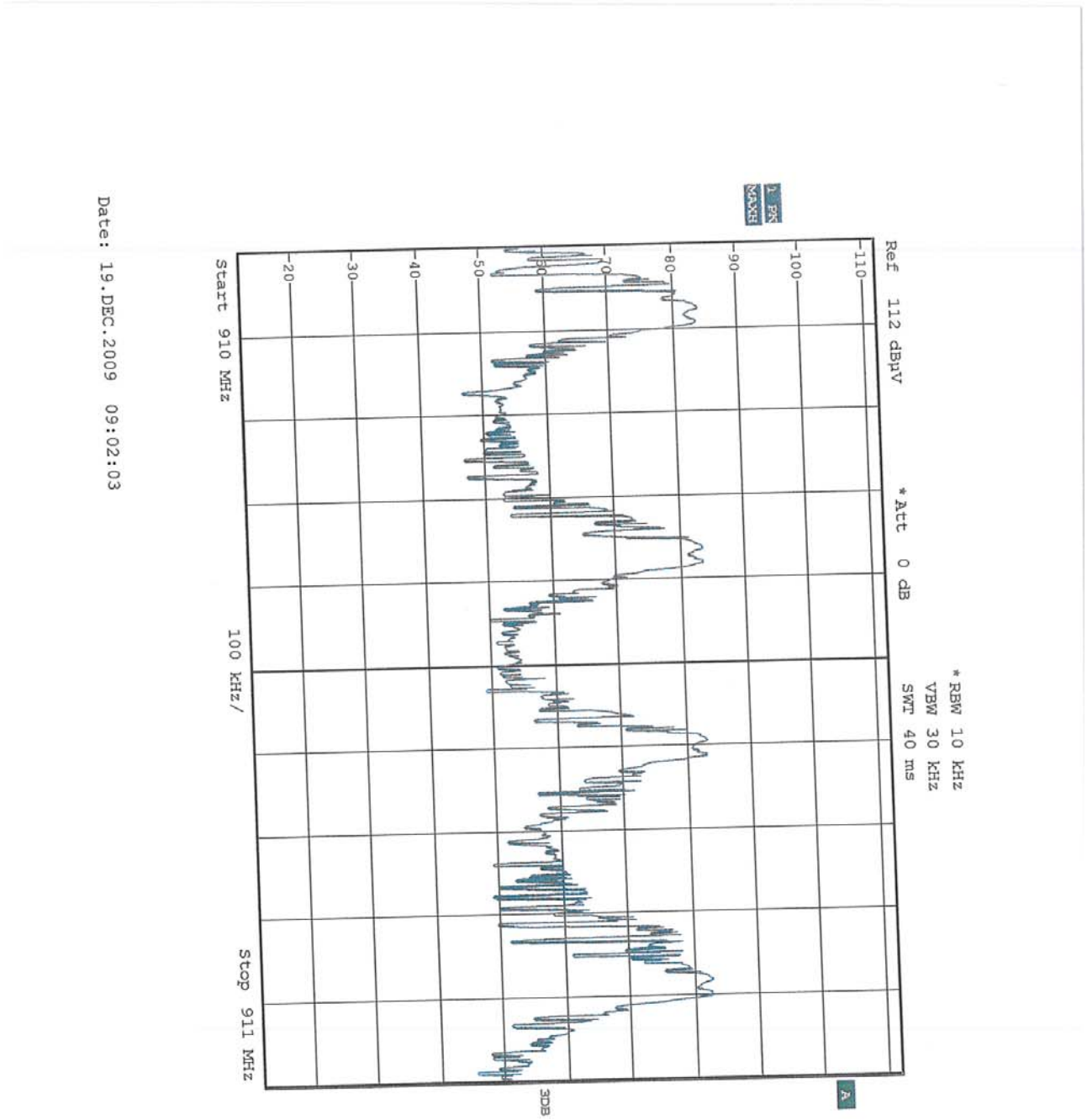
ANNEX 3: NUMBER OF HOPPING FREQUENCIES

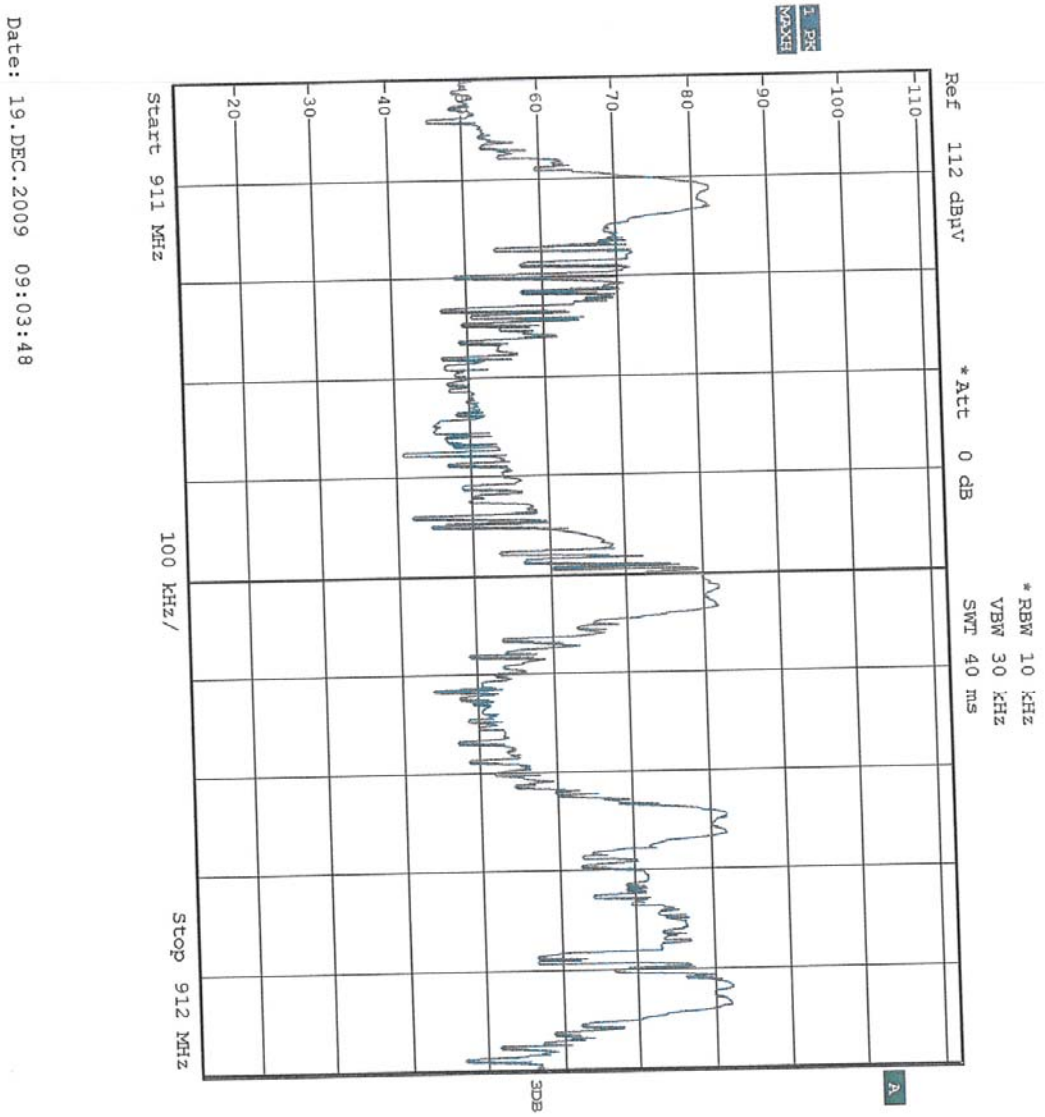


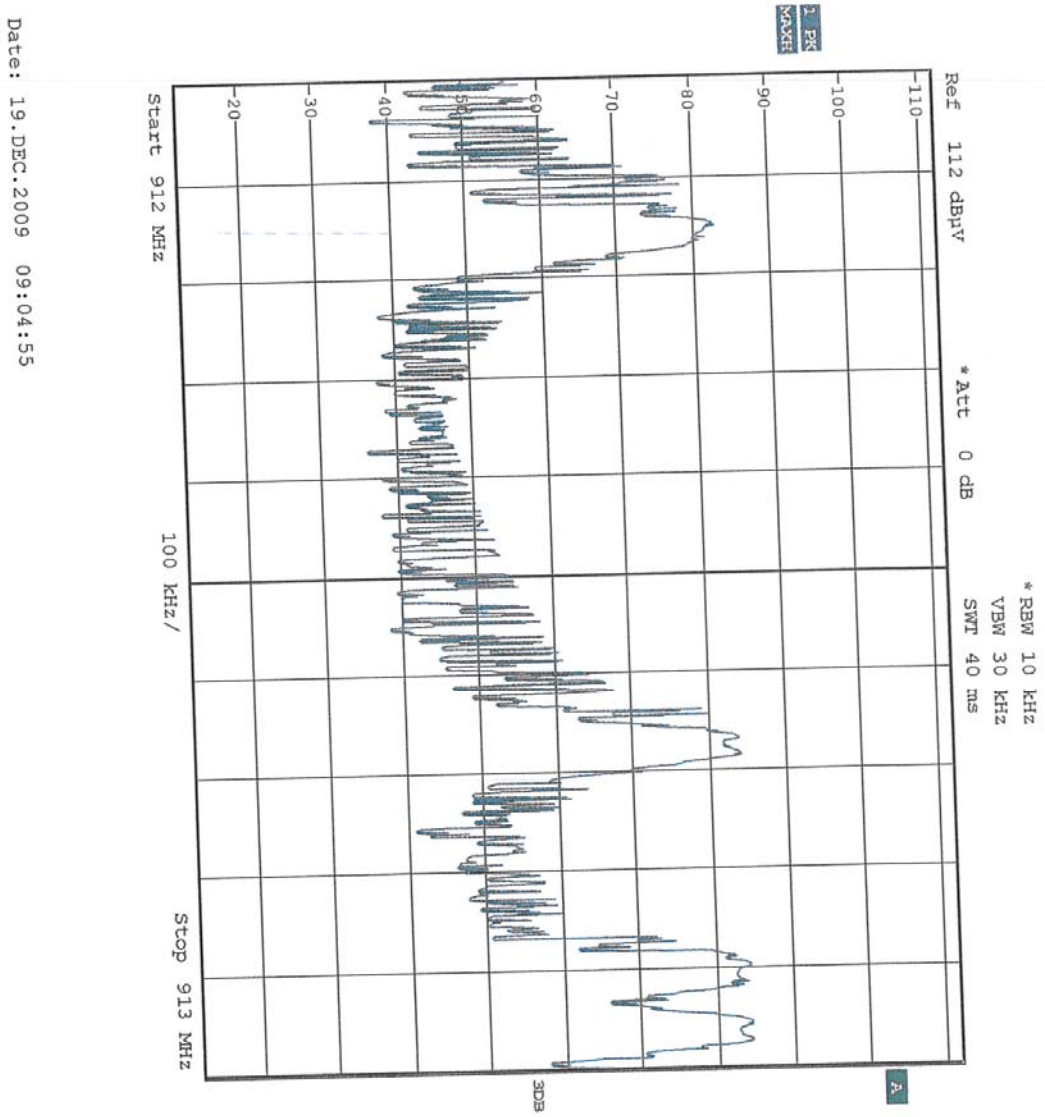

1 PK
MAXH
Ref 112 dBµV
*Att 0 dB
*RBW 10 kHz
VBW 30 kHz
SWT 40 ms
110
100
90
80
70
60
50
30
20
A
3DB
Start 907 MHz
100 kHz/
Stop 908 MHz
Date: 19.DEC.2009 08:56:48

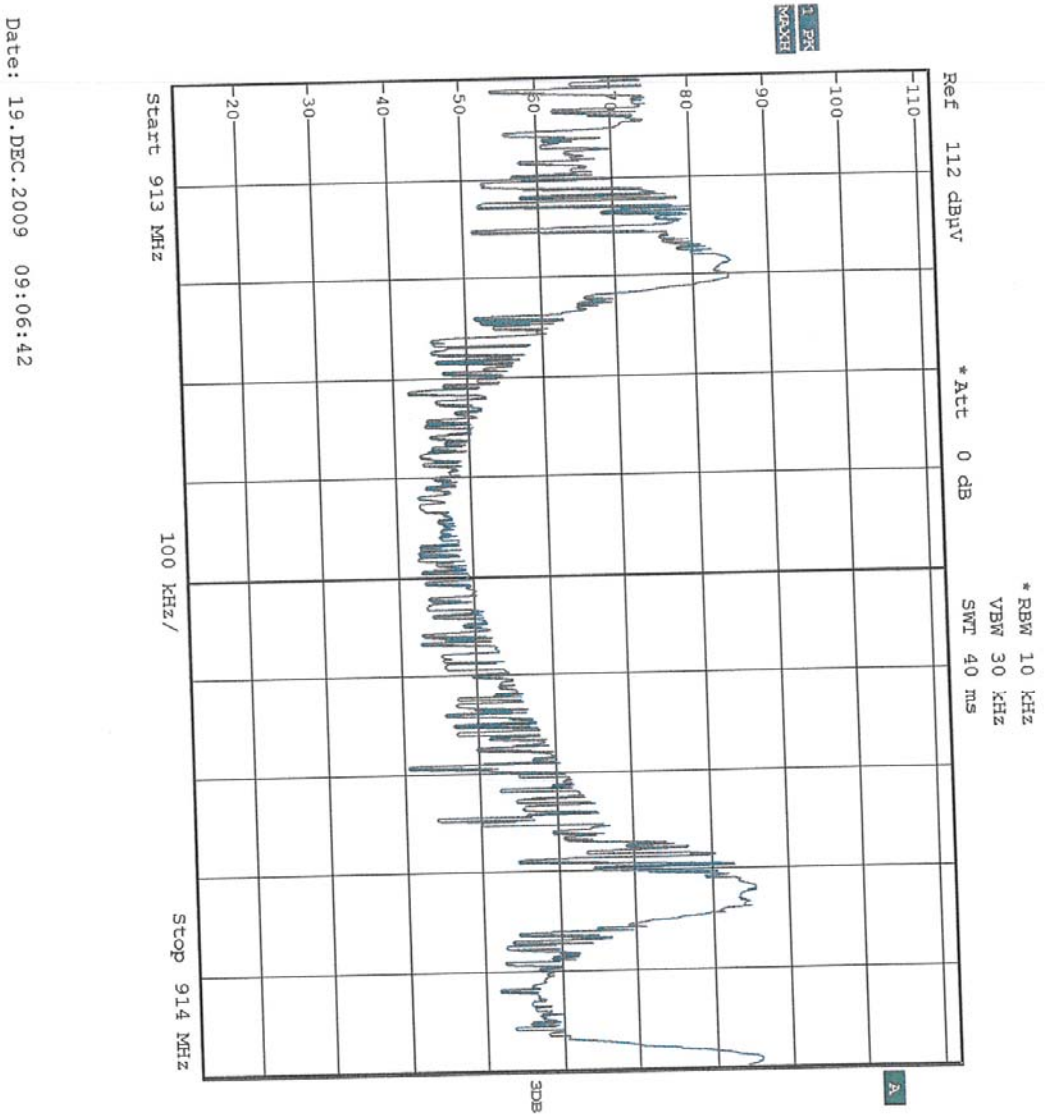

Ref 112 dBµV
*Att 0 dB
*RBW 10 kHz
VBW 30 kHz
SWT 40 ms
1 PK
MAXH
110
100
90
80
70
60
50
40
30
20
Start 908 MHz
100 kHz/
Stop 909 MHz
3DB
A
Date: 19.DEC.2009 08:58:33

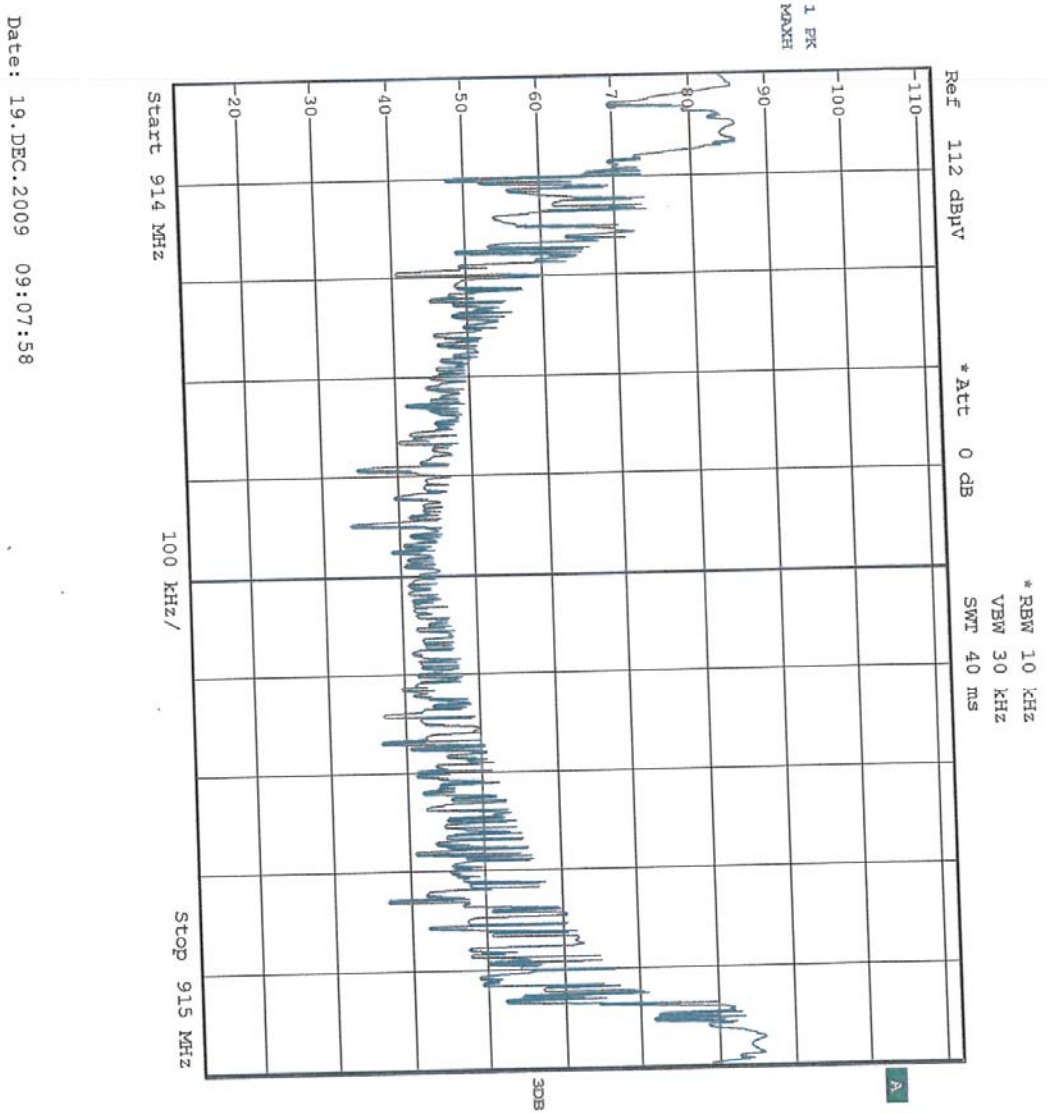

1 PK
MAXH
Ref 112 dBµV
*Att 0 dB
*RBW 10 kHz
VBW 30 kHz
SWT 40 ms
110
100
90
80
60
50
40
30
20
Start 909 MHz
100 kHz/
Stop 910 MHz
3DB
A
Date: 19.DEC.2009 09:00:15

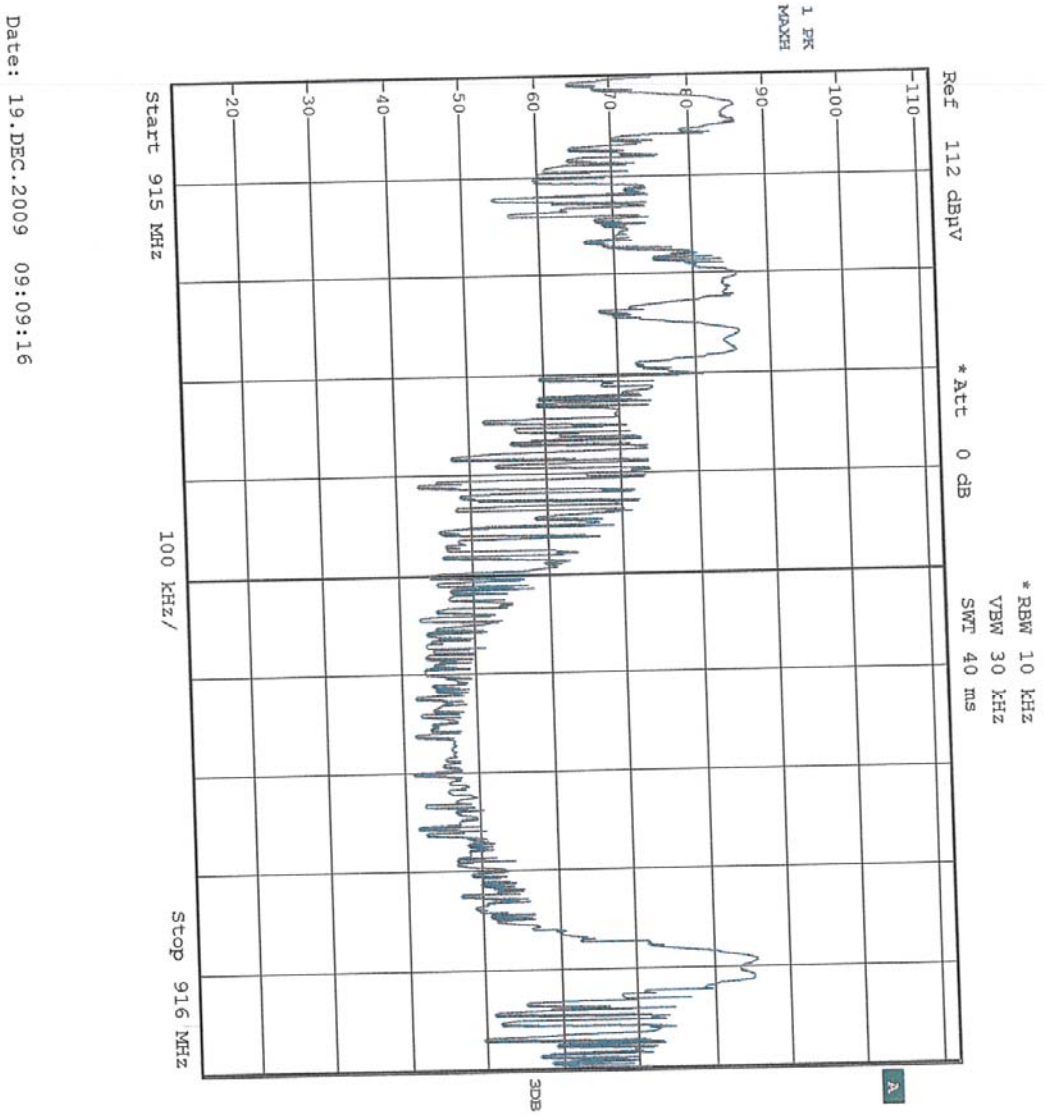

Ref 112 dBµV
*Att 0 dB
*RBW 10 kHz
VBW 30 kHz
SWT 40 ms
1 PK
MAXH
Start 910 MHz
100 kHz/
Stop 911 MHz
3DB
A
Date: 19.DEC.2009 09:02:03

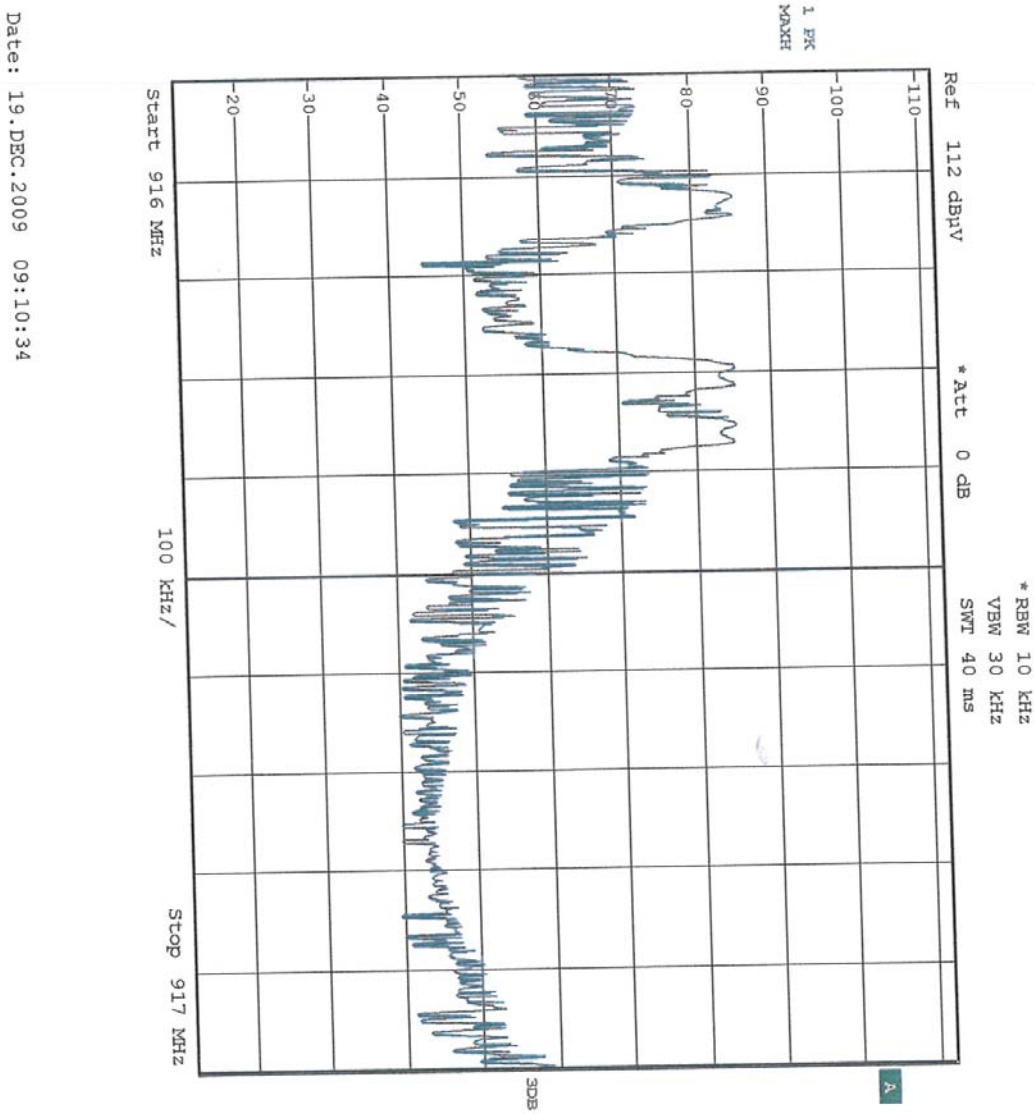

1 PK
MAXH
Ref 112 dBµV
*Att 0 dB
*RBW 10 kHz
VBW 30 kHz
SWT 40 ms
110
100
90
80
70
60
40
30
20
3DB
A
Start 911 MHz
100 kHz/
Stop 912 MHz
Date: 19.DEC.2009 09:03:48

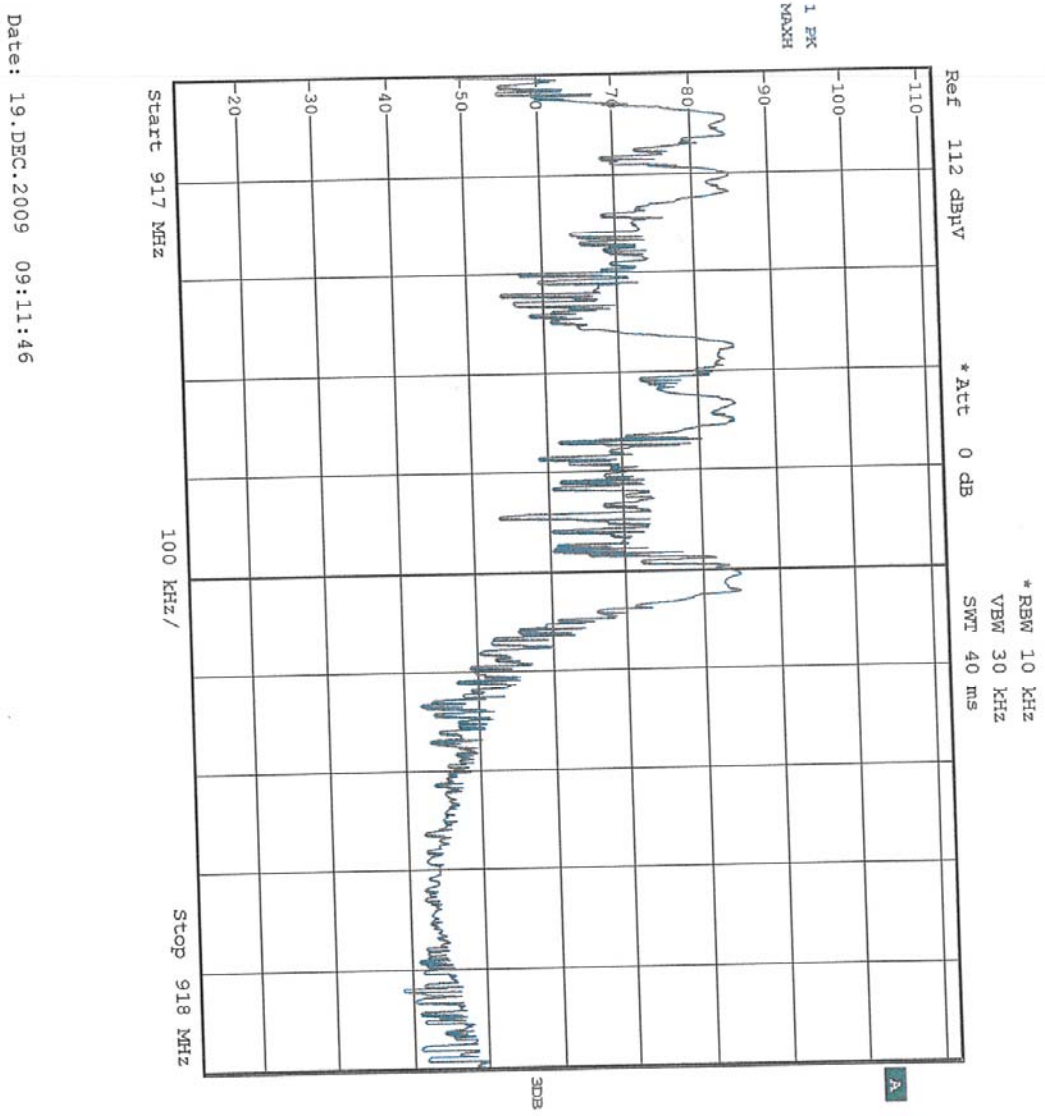

Date: 19.DEC.2009 09:04:55
Start 912 MHz
100 kHz/
Stop 913 MHz
Ref 112 dBµV
*Att 0 dB
*RBW 10 kHz
VBW 30 kHz
SWT 40 ms
1 PK
MAXH
3DB
A

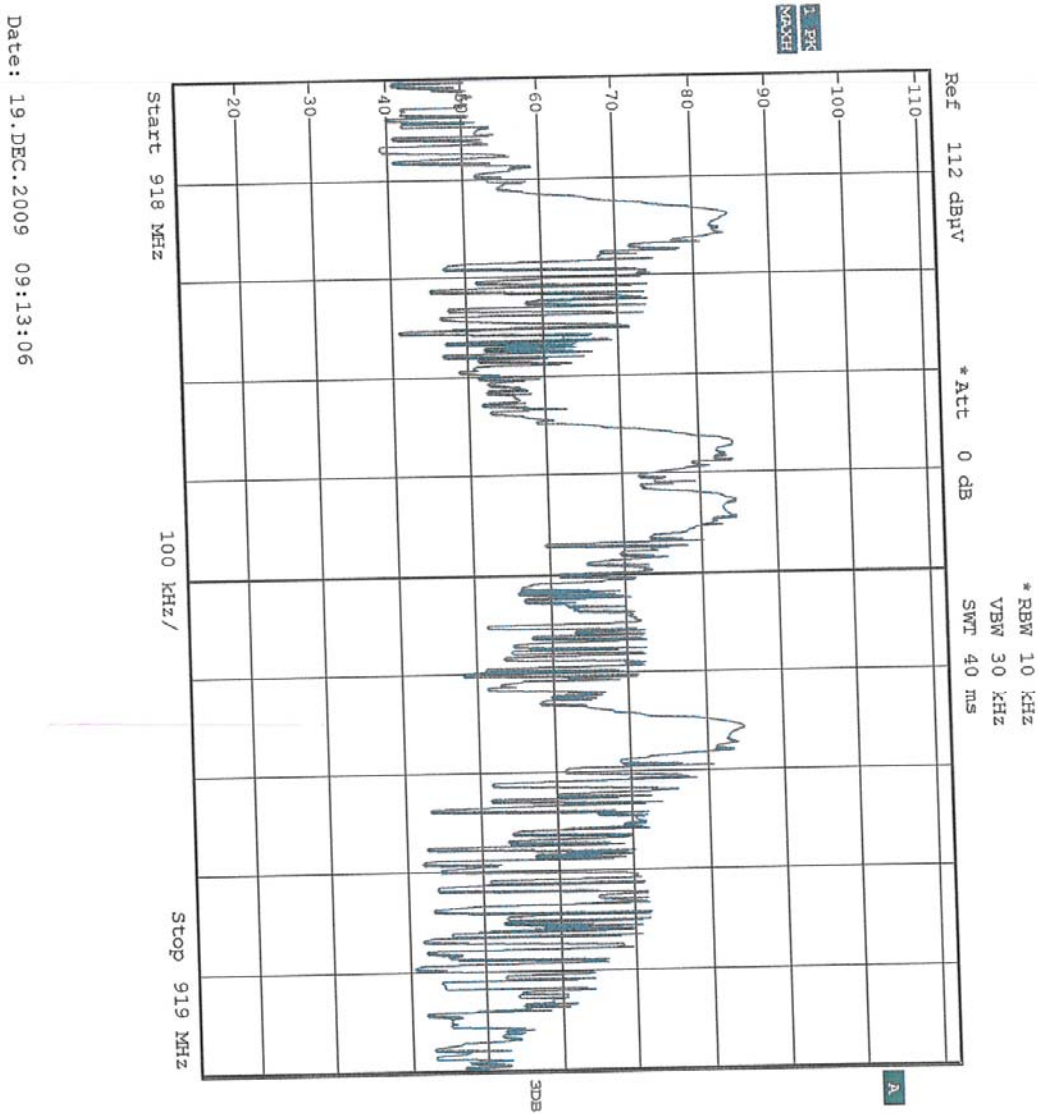

1 PK
MAXH
Ref 112 dBµV
*Att 0 dB
*RBW 10 kHz
VBW 30 kHz
SWT 40 ms
110
100
90
80
70
60
50
40
30
20
A
3DB
Start 913 MHz
100 kHz/
Stop 914 MHz
Date: 19.DEC.2009 09:06:42

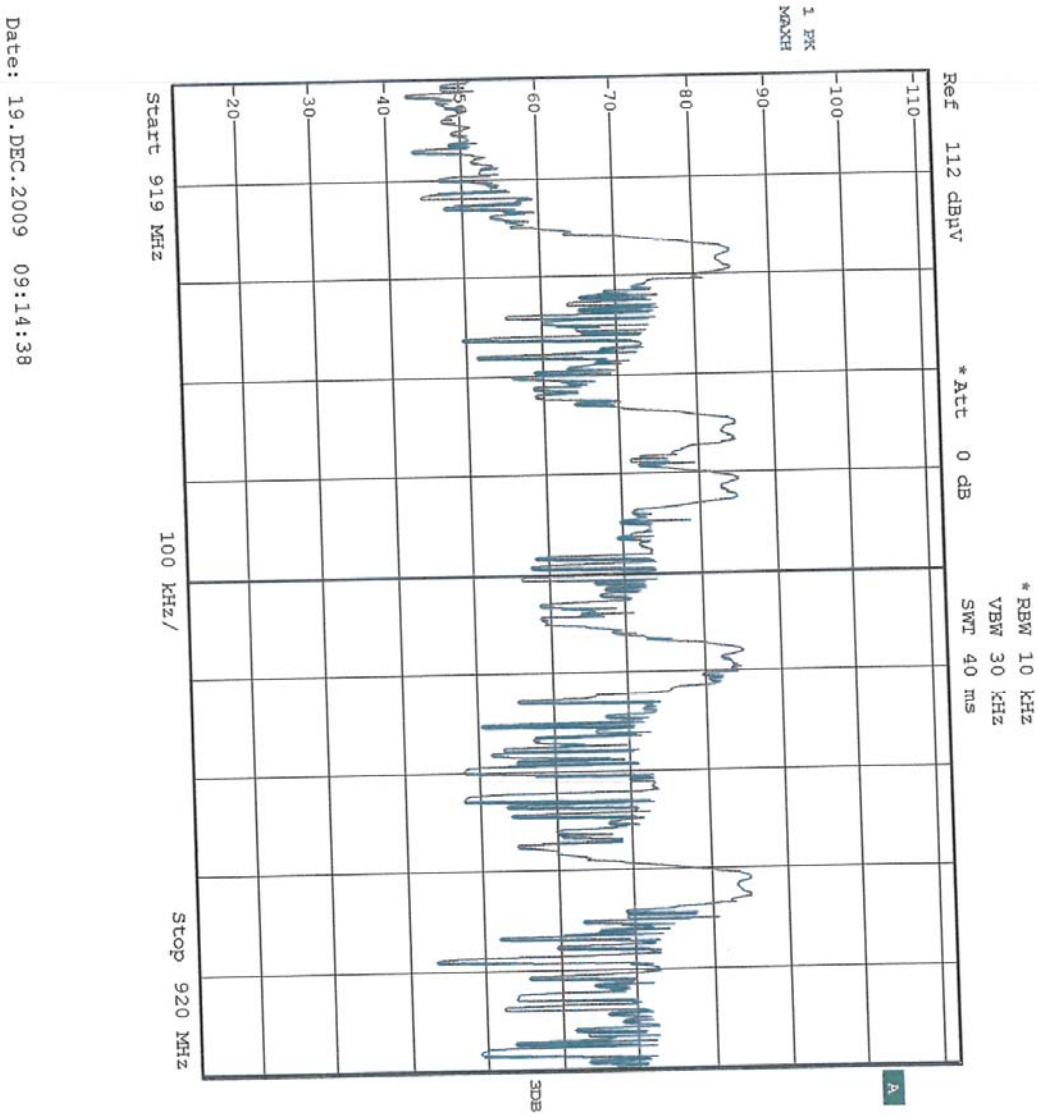

Ref 112 dBµV
*Att 0 dB
*RBW 10 kHz
VBW 30 kHz
SWT 40 ms
1 PK
MAXH
Start 914 MHz
100 kHz/
Stop 915 MHz
3DB
A
Date: 19.DEC.2009 09:07:58

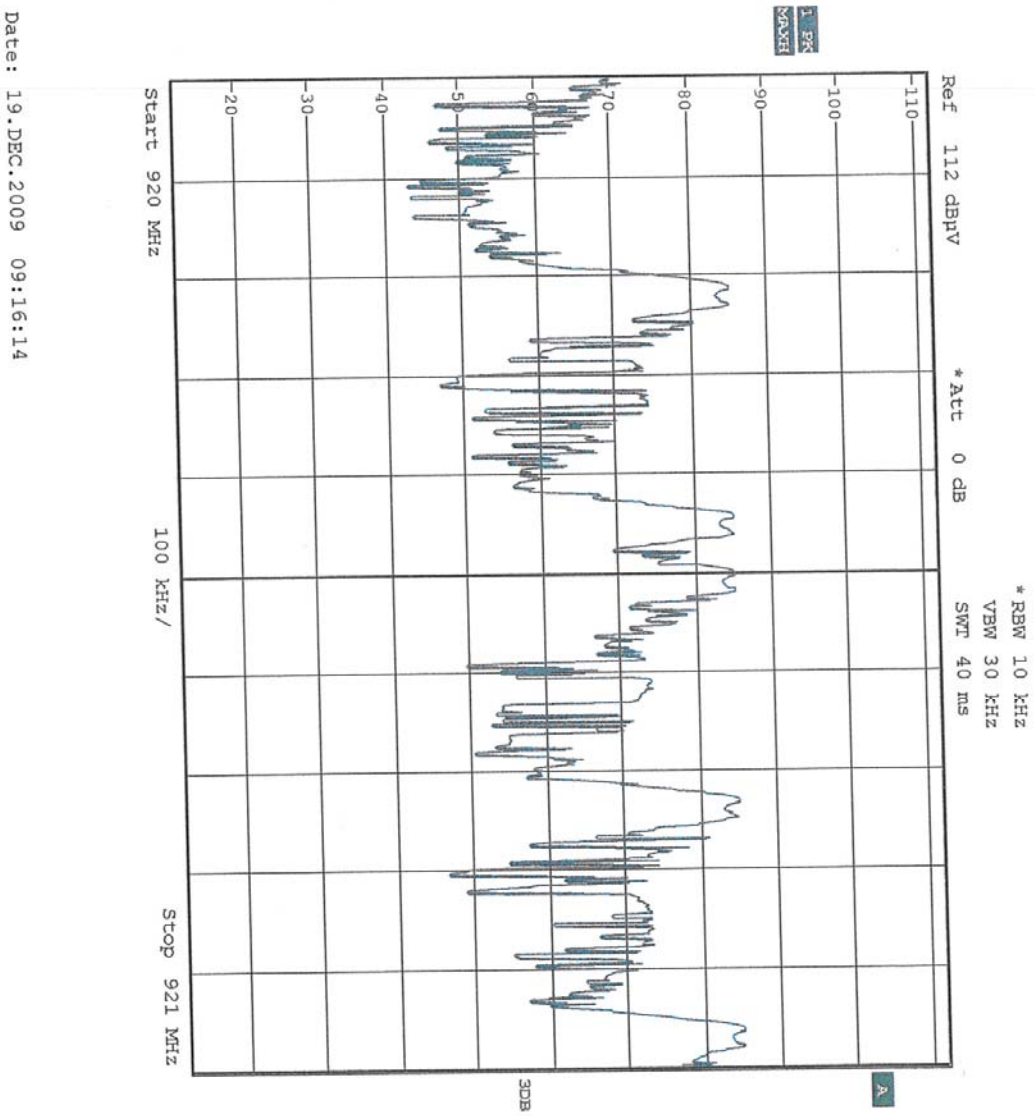

Ref 112 dBµV
*Att 0 dB
*RBW 10 kHz
VBW 30 kHz
SWT 40 ms
1 PK
MAXH
Start 915 MHz
100 kHz/
Stop 916 MHz
3DB
A
Date: 19.DEC.2009 09:09:16

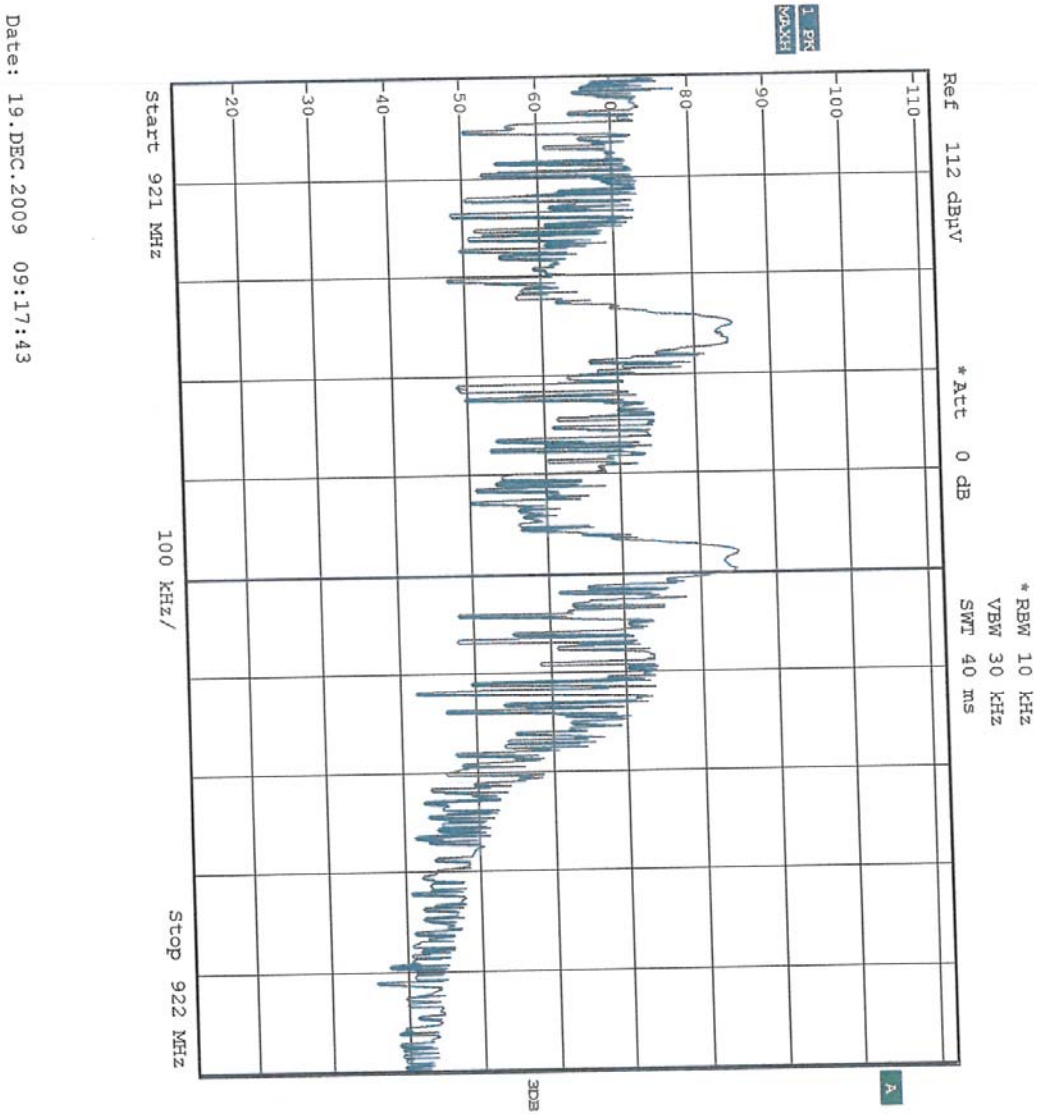

Ref 112 dBµV
*Att 0 dB
*RBW 10 kHz
VBW 30 kHz
SWT 40 ms
1 PK
MAXH
110
100
90
80
70
60
50
40
30
20
Start 916 MHz
100 kHz/
Stop 917 MHz
3DB
A
Date: 19.DEC.2009 09:10:34

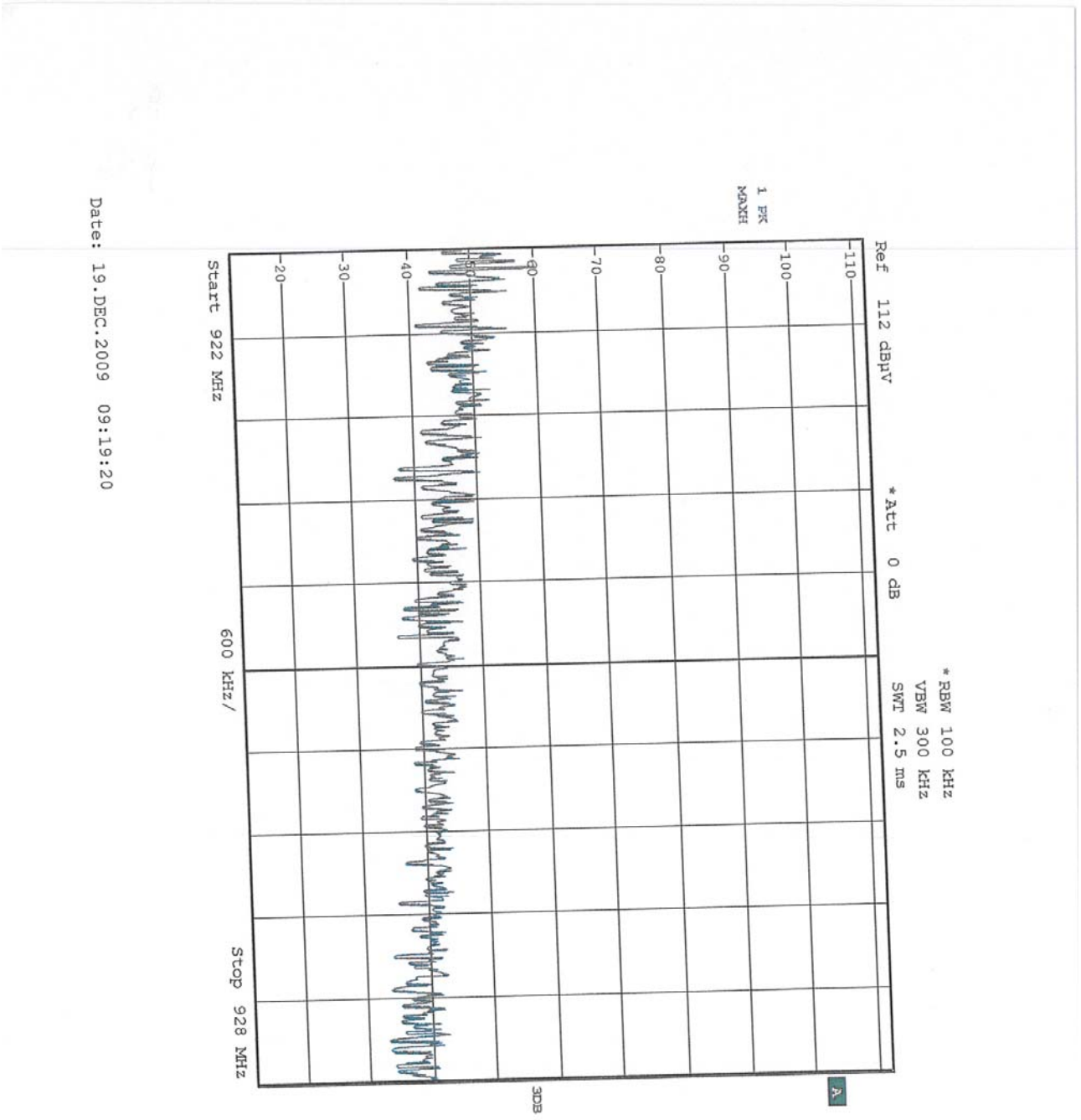

Ref 112 dBµV
*Att 0 dB
*RBW 10 kHz
VBW 30 kHz
SWT 40 ms
1 PK
MAXH
110
100
90
80
70
60
50
40
30
20
Start 917 MHz
100 kHz/
Stop 918 MHz
3DB
A
Date: 19.DEC.2009 09:11:46


1 PK
MAXH
Ref 112 dBµV
*Att 0 dB
*RBW 10 kHz
VBW 30 kHz
SWT 40 ms
110
100
90
80
70
60
50
40
30
20
3DB
A
Start 918 MHz
100 kHz/
Stop 919 MHz
Date: 19.DEC.2009 09:13:06


Ref 112 dBµV
*Att 0 dB
*RBW 10 kHz
VBW 30 kHz
SWT 40 ms
1 PK
MAXH
Start 919 MHz
100 kHz/
Stop 920 MHz
3DB
A
Date: 19.DEC.2009 09:14:38


1 PK
MAXH
Ref 112 dBµV
*Att 0 dB
*RBW 10 kHz
VBW 30 kHz
SWT 40 ms
110
100
90
80
70
60
50
40
30
20
Start 920 MHz
100 kHz/
Stop 921 MHz
3DB
A
Date: 19.DEC.2009 09:16:14


1 PK
MAXH
Ref 112 dBµV
*Att 0 dB
*RBW 10 kHz
VBW 30 kHz
SWT 40 ms
110
100
90
80
70
60
50
40
30
20
10
A
3DB
Start 921 MHz
100 kHz/
Stop 922 MHz
Date: 19.DEC.2009 09:17:43

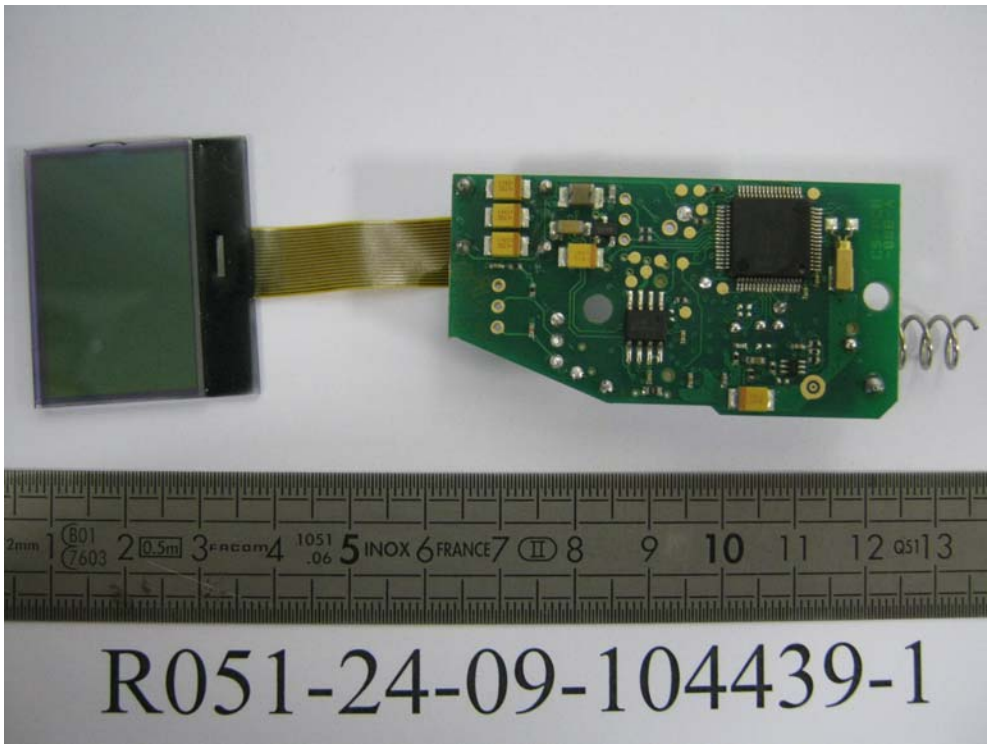

Ref 112 dBµV
*Att 0 dB
*RBW 100 kHz
VBW 300 kHz
SWT 2.5 ms
1 PK
MAXH
110
100
90
80
70
60
50
40
30
20
3DB
A
Start 922 MHz
600 kHz/
Stop 928 MHz
Date: 19.DEC.2009 09:19:20

ANNEX 4: PHOTOS OF THE EQUIPMENT UNDER TEST

GENERAL VIEW

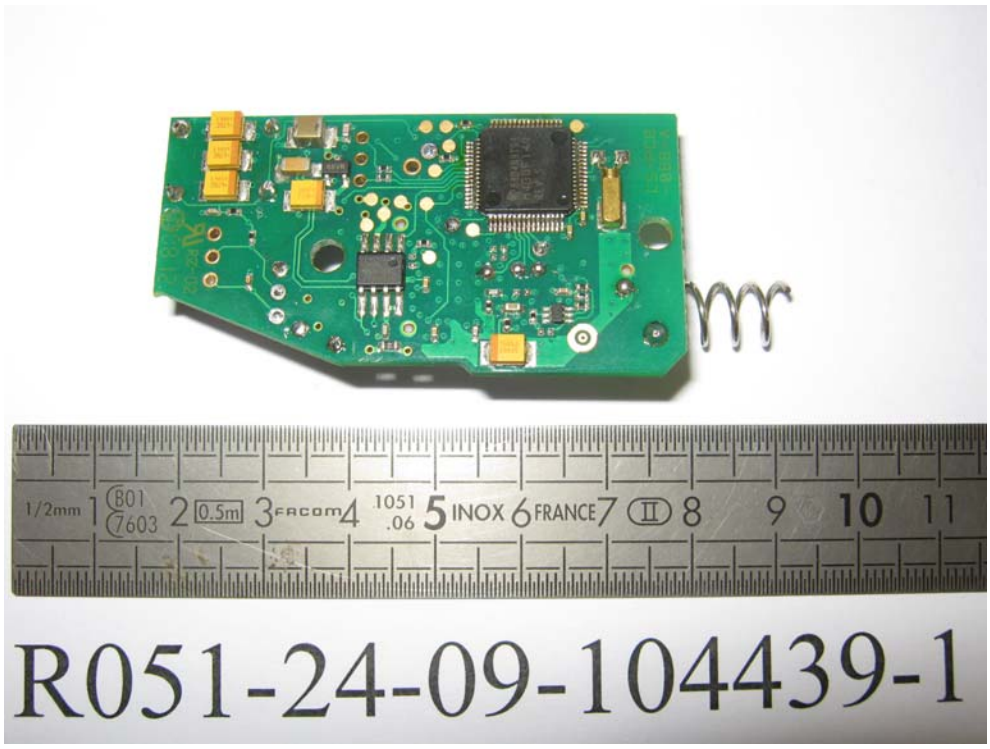
Printed circuit board: face 1 with display

Printed circuit board: face 2 with display



Printed circuit board: face 1 without display

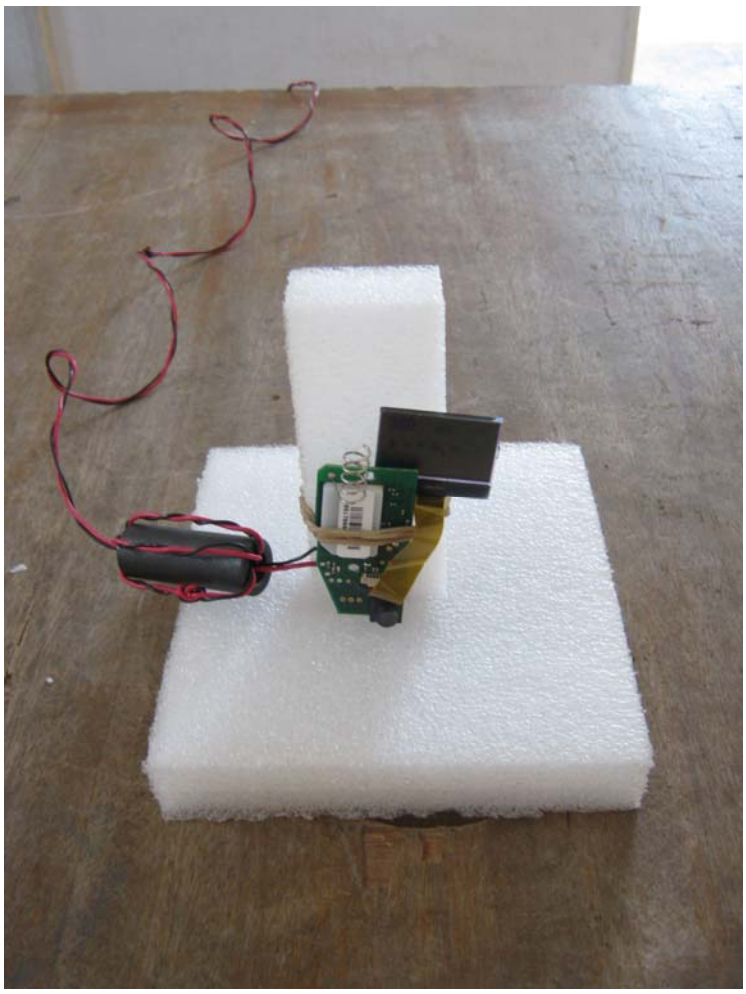
Printed circuit board: face 2 without display



ANNEX 5: TEST SET UP AND OPEN AREA TEST SITE

TEST SET UP

TEST SET UP



OPEN AREA TEST SITE