

R051-24-11-100203-3/A Ed. 1

« This report cancel and replace test report N° R051-24-11-100203-3/A Ed.0 »

1 |

RADIO test report

**according to standard:
FCC Part 15**

**Equipment under test:
RFID MODULE HF-AM1-OMNII**

**FCC ID:
GM3HFAM1XT10**

**Company:
PSION TEKLOGIX**

DISTRIBUTION: Mr FORNIER

Company: PSION TEKLOGIX

Number of pages: 29 including 4 annexes

Ed.	Date	Modified pages	Written by		Technical Verification Quality Approval	
			Name	Visa	Name	Visa
1	20-Apr-11	1	L. BERTHAUD	LB		

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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: **RFID MODULE HF-AM1-OMNII**

Reference / model: ST9210 HF RFID Slim Pod

Serial number: not communicated

MANUFACTURER: PSION TEKLOGIX

COMPANY SUBMITTING THE PRODUCT:

Company: PSION TEKLOGIX

Address: 135 rue René Descartes
Parc de la Duranne
13591 AIX EN PROVENCE
FRANCE

Responsible: Mr FORNIER

DATE(S) OF TEST: 24, 25 and 26 January 2011

TESTING LOCATION: EMITECH ATLANTIQUE laboratory at ANGERS (49) FRANCE
EMITECH ATLANTIQUE open area test site in LA POUEZE (49)
FRANCE
FCC Registration Number: 101696/FRN: 0006 6490 08

TESTED BY: L. BERTHAUD

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1. INTRODUCTION

This report presents the results of radio test carried out on the following equipment: RFID MODULE HF-AM1-OMNII, in accordance with normative reference.

2. PRODUCT DESCRIPTION

Class: B (residential environment)

Utilization: 13.56 MHz RFID reader

Antenna type and gain: integral antenna

Operating frequency range: 13.56 MHz

Number of channels: 1

Channel spacing: not concerned

Power source: 3.7 Vd.c Li-ion rechargeable battery / 115 Va.c charging dock

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 (2009) Radio Frequency Devices

ANSI C63.4 (2003) Methods of Measurement of Radio-Noise Emissions from Low-voltage Electrical and Electronics Equipment in the range of 9 kHz to 40 GHz.

4. TEST METHODOLOGY

Radio performance tests procedures given in part 15:

Subpart B –Unintentional Radiators

Paragraph 107: Conducted limits

Paragraph 109: Radiated emission limits

Paragraph 111: Antenna power conduction limits for receivers

Subpart C – Intentional Radiators

Paragraph 203: Antenna requirement

Paragraph 205: Restricted bands of operation

Paragraph 207: Conducted limits

Paragraph 209: Radiated emission limits; general requirements

Paragraph 212: Modular transmitter

Paragraph 215: Additional provisions to the general radiated emission limitations

Paragraph 225: Operation within the band 13.110-14.010 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 RESULTS SUMMARY

6.1 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

6.2 intentional radiator (subpart C)

Test procedure	Description of test	Respected criteria?				Comment
		Yes	No	NAP	NAs	
FCC Part 15.203	ANTENNA REQUIREMENT	X				<i>Note 1</i>
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				
FCC Part 15.212	MODULAR TRANSMITTERS			X		
FCC part 15.215	ADDITIONAL PROVISIONS TO THE GENERAL RADIATED EMISSION LIMITATIONS					
	(a) Alternative to general radiated emission limits	X				
	(b) Unwanted emissions outside of §15.225 frequency bands	X				<i>Note 2</i>
	(c) 20 dB bandwidth and band-edge compliance	X				<i>Note 3</i>
FCC Part 15.225	OPERATION WITHIN THE BAND 13.110-14.010 MHZ					
	(a) Field strength within the band 13.553-13.567 MHz	X				
	(b) Field strength within the bands 13.410-13.553 MHz and 13.567-13.710 MHz	X				
	(c) Field strength within the bands 13.110-13.410 MHz and 13.710-14.010 MHz	X				
	(d) Field strength outside the band 13.110-14.010 MHz	X				<i>Note 4</i>
	(e) Carrier frequency tolerance	X				
	(f) Powered tags			X		

NAP: Not Applicable

NAs: Not Asked

Note 1: Integral antenna.

Note 2: See FCC part 15.225 (d)

Note 3: see FCC part 15.225 (a) (the 20 dB bandwidth plot is given in annex 2).

Note 4: See FCC part 15.209. Unwanted emissions levels are all below the fundamental emission field strength level.

Conclusion:

The sample of RFID MODULE HF-AM1-OMNII submitted to the tests complies with the regulations of the standard FCC Part 15 in accordance with the limits or criteria defined in this report.

7. MEASUREMENT OF THE CONDUCTED DISTURBANCES

Standard: FCC Part 15

Test procedure: Paragraph 15.107

Limits: Class B

Test equipments:

TYPE	BRAND	EMITECH NUMBER
AC Power supply ALT 2000	K. SERRAS	2441
Test receiver ESH3	Rohde & Schwarz	1058
Pulse limiter ESH3-Z2	Rohde & Schwarz	0976
Artificial main network L3-25	PMM	0834
Spectrum analyzer FSBS	Rohde & Schwarz	3133
Meteo Station AB888	Oregon Scientific	1539

Software used: BAT-EMC V3.5.0.2

Test set up:

The test unit is placed on a wooden table, 0.8 m over an horizontal reference plane and 0.4 m from a vertical reference plane. It is powered by an artificial main network placed on the ground reference plane.

The equipment is powered with the AC power operating voltage of 115 V / 60 Hz.

See photos in annex 4.

Frequency range: 150 kHz - 30 MHz

Detection mode: Peak

Bandwidth: 10 kHz (Peak)

Equipment under test operating condition:

The equipment is blocked in standby / reception mode.

Results:

Ambient temperature (°C):	22
Relative humidity (%):	34

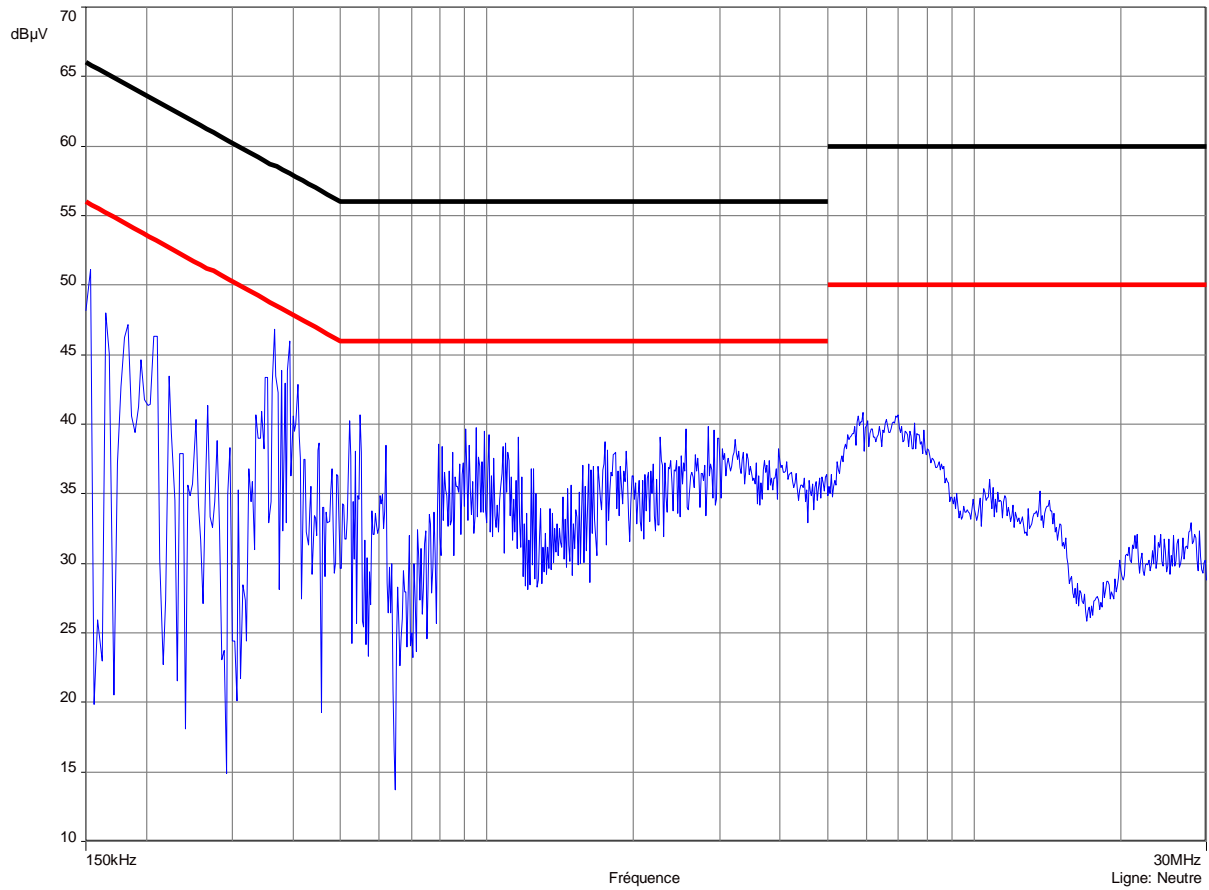
Measurement on the mains power supply:

The measurement is made with peak detector.

Curve N° 1: measurement on the Neutral with peak detector
Curve N° 2: measurement on the Line with peak detector

CURVE N° 1.

Measurement on the Neutral with peak detection



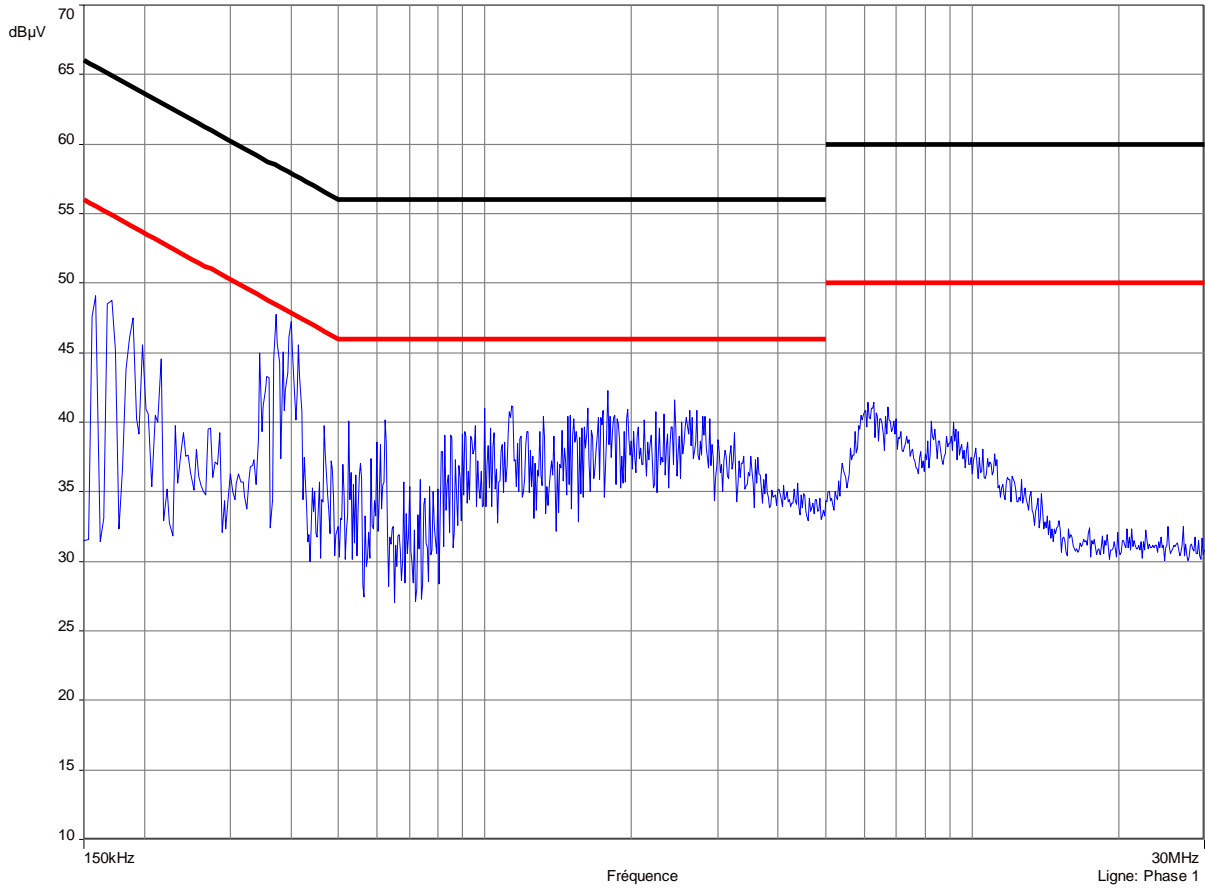
RBW filter: 10 kHz

VBW filter: 10 kHz

Sweep time: 500 ms/MHz

CURVE N° 2.

Measurement on the Line with peak detection



RBW filter: 10 kHz

VBW filter: 10 kHz

Sweep time: 500 ms/MHz

Test conclusion:

RESPECTED STANDARD

8. 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 ESH3	1058
Test receiver	Rohde & Schwarz ESVS10	1219
Spectrum analyzer	Rohde & Schwarz FSP40	4088
Loop antenna	EMCO 6502	1406
Biconical antenna	Hewlett Packard 11966 C	0728
Log periodic antenna	Rohde & Schwarz HL 223	1999
Open area test site	EMITECH	1274
Multimeter	Fluke 77-2	0812
Variac	Dereix R213	1419
Meteo Station meteostar	Bioblock Scientific	0943

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: From 9 kHz to 1000 MHz.

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 standby / reception mode.

Results:

Ambient temperature (°C):	19
Relative humidity (%):	50

Power source: 115 Va.c through a variac + battery in charging mode

Not any spurious has been detected.

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

Test conclusion:

RESPECTED STANDARD

9. MEASUREMENT OF THE CONDUCTED DISTURBANCES

Standard: FCC Part 15

Test procedure: Paragraph 15.207

Test equipments:

TYPE	BRAND	EMITECH NUMBER
AC Power supply ALT 2000	K. SERRAS	2441
Test receiver ESH3	Rohde & Schwarz	1058
Pulse limiter ESH3-Z2	Rohde & Schwarz	0976
Artificial main network L3-25	PMM	0834
Spectrum analyzer FSBS	Rohde & Schwarz	3133
Meteo Station AB888	Oregon Scientific	1539

Software used: BAT-EMC V3.5.0.2

Test set up:

The test unit is placed on a wooden table, 0.8 m over an horizontal reference plane and 0.4 m from a vertical reference plane. It is powered by an artificial main network placed on the ground reference plane.

The equipment is powered with the AC power operating voltage of 115 V / 60 Hz.

See photos in annex 4.

Frequency range: 150 kHz - 30 MHz

Detection mode: Peak

Bandwidth: 10 kHz (Peak)

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):	22
Relative humidity (%):	34

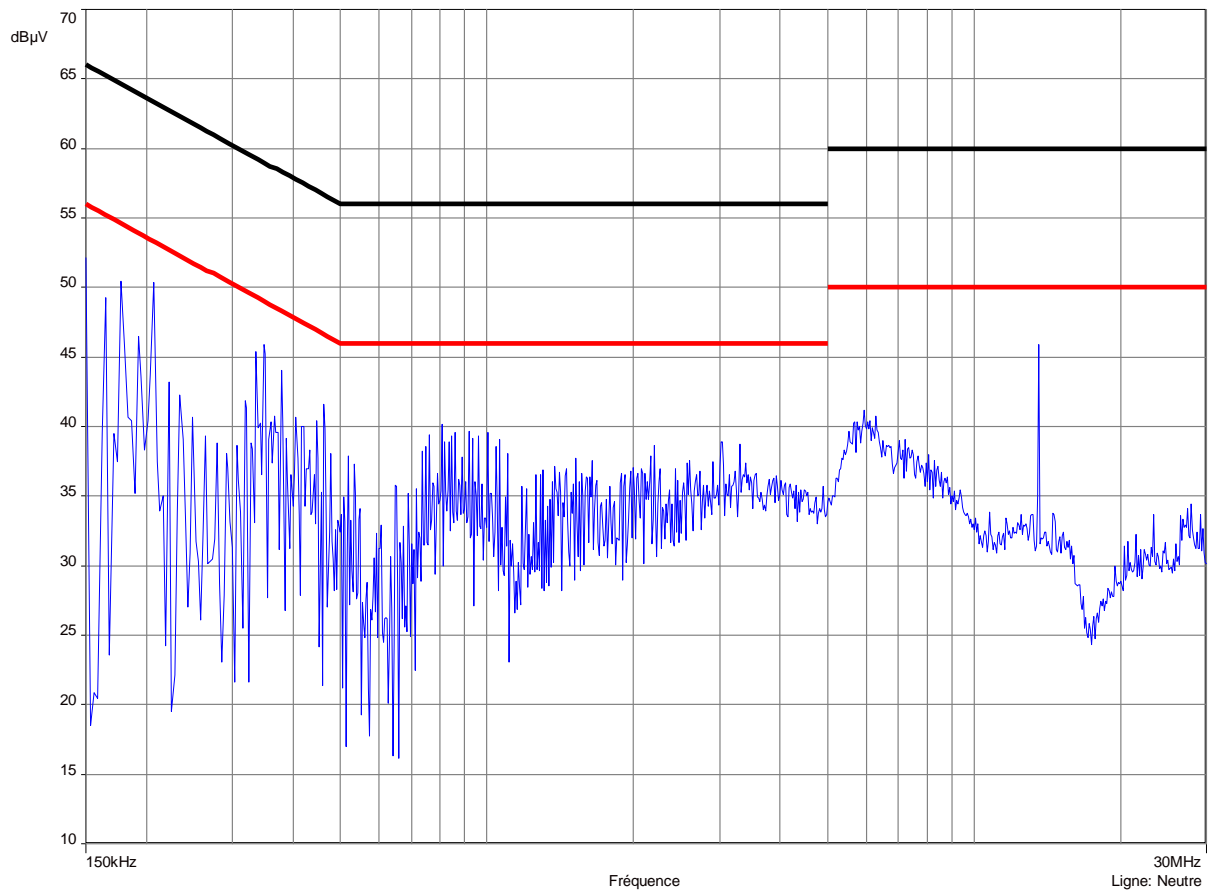
Measurement on the mains power supply:

The measurement is made with peak detector.

Curve N° 3: measurement on the Neutral with peak detector
Curve N° 4: measurement on the Line with peak detector

CURVE N° 3.

Measurement on the Neutral with peak detection



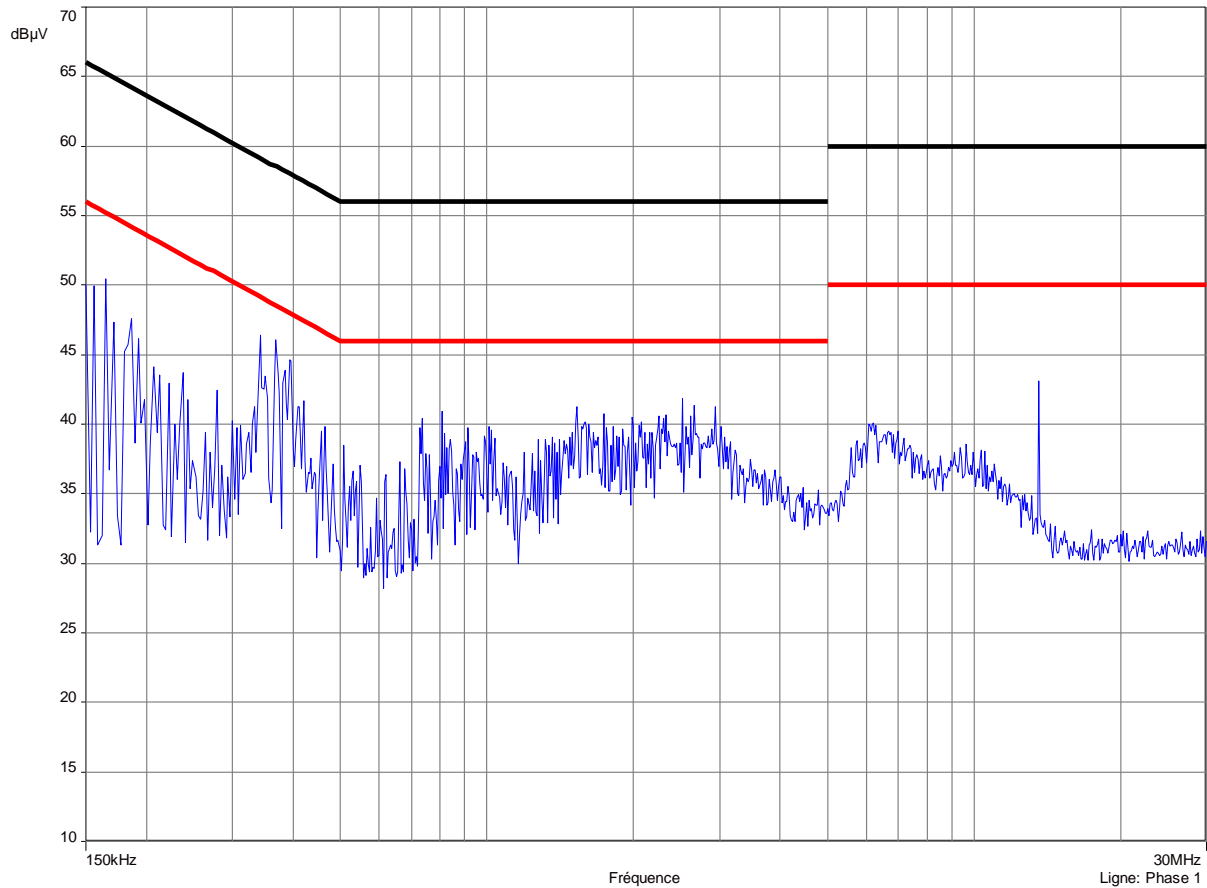
RBW filter: 10 kHz

VBW filter: 10 kHz

Sweep time: 500 ms/MHz

CURVE N° 4.

Measurement on the Line with peak detection



RBW filter: 10 kHz

VBW filter: 10 kHz

Sweep time: 500 ms/MHz

Test conclusion:

RESPECTED STANDARD

10. RADIATED EMISSION LIMITS; GENERAL REQUIREMENTS

Standard: FCC Part 15

Test procedure: paragraph 209

Test equipments:

TYPE	BRAND	EMITECH NUMBER
Test receiver	Rohde & Schwarz ESH3	1058
Test receiver	Rohde & Schwarz ESVS10	1219
Spectrum analyzer	Rohde & Schwarz FSP40	4088
Loop antenna	EMCO 6502	1406
Biconical antenna	Hewlett Packard 11966 C	0728
Log periodic antenna	Rohde & Schwarz HL 223	1999
Open area test site	EMITECH	1274
Multimeter	Fluke 77-2	0812
Variac	Dereix R213	1419
Meteo Station meteostar	Bioblock Scientific	0943

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: From 9 kHz to 10th harmonic of the highest fundamental frequency.

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 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):	19
Relative humidity (%):	50

Power source: 115 Va.c through a variac + battery in charging mode

Not any spurious has been detected.

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

Test conclusion:

RESPECTED STANDARD

11. OPERATION WITHIN THE BAND 13.110 – 14.010 MHz

Standard: FCC Part 15

Test procedure: paragraph 15.225

Test equipment:

TYPE	BRAND	EMITECH NUMBER
Test receiver	Rohde & Schwarz ESH3	1058
Spectrum analyzer	Rohde & Schwarz FSP40	4088
Loop antenna	EMCO 6502	1406
Open area test site	EMITECH	1274
Multimeter	Fluke 77-2	0812
Variac	Dereix R213	1419
Modulation analyzer HP 8901B	Hewlett Packard	1211
Climatic chamber	MPC	2593
Power source E3610A	Hewlett Packard	4195
Meteo station AB888	Oregon Scientific	1539
Meteo station meteostar	Bioblock Scientific	0943

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.

The frequency tolerance measure is realized in near-field.

Distance of antenna: 10 meters

Antenna height: 1 meter

Antenna polarization: oriented in the vertical plane. The lowest point of the loop is 1m above ground level.

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:

Carrier field strength

Ambient temperature (°C): 19.5
Relative humidity (%): 50

Power source: 115 Va.c through a variac + battery in charging mode

	Field strength (dBμV/m) at frequency: 13.56 MHz
Normal test conditions	43.8
Limits (dBμV/m)	103.08*
Margin (dB)	59.28

Polarization of test antenna: vertical (height: 100 cm)
Position of equipment: use position (azimuth: 270 degrees)

Frequency stability

			Measured frequency difference (ppm)	Limits (ppm)
Normal test conditions	Temperature (°C): 20 Humidity (%):	Minimal power source (V): 97.75	+1.5	±100
		Maximal power source (V): 132.25	+1.5	
Extreme test conditions	Minimal temperature (°C): -20	Nominal power source (V): 115	+10.3	
	Maximal temperature (°C): +50	Nominal power source (V): 115	+1	

Field strength within the band 13.110-14.010 MHz

See spectrum mask in annex 1.

Test conclusion:

RESPECTED STANDARD

12. FIELD STRENGTH OUTSIDE THE BAND 13.110-14.010 MHZ

Standard: FCC Part 15

Test procedure: paragraph 209
paragraph 15.225 (d)

Test equipments:

TYPE	BRAND	EMITECH NUMBER
Test receiver	Rohde & Schwarz ESH3	1058
Test receiver	Rohde & Schwarz ESVS10	1219
Spectrum analyzer	Rohde & Schwarz FSP40	4088
Loop antenna	EMCO 6502	1406
Biconical antenna	Hewlett Packard 11966 C	0728
Log periodic antenna	Rohde & Schwarz HL 223	1999
Open area test site	EMITECH	1274
Multimeter	Fluke 77-2	0812
Variac	Dereix R213	1419
Meteo Station meteostar	Bioblock Scientific	0943

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: From 9 kHz to 10th harmonic of the highest fundamental frequency.

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 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): 19.5
Relative humidity (%): 50

Power source: 115 V.a.c through a variac + battery in charging mode

Not any spurious has been detected.

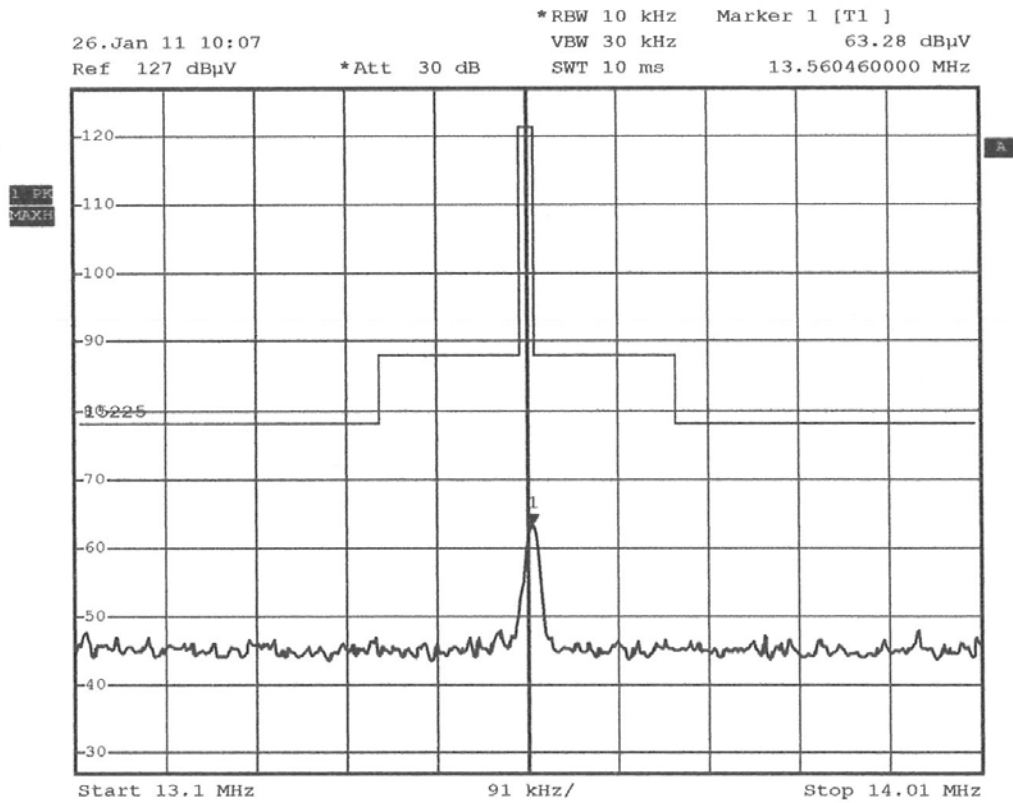
Note: any spurious which has more than 20 dB of margin compared to the applicable limit is not necessarily reported.

Test conclusion:

RESPECTED STANDARD

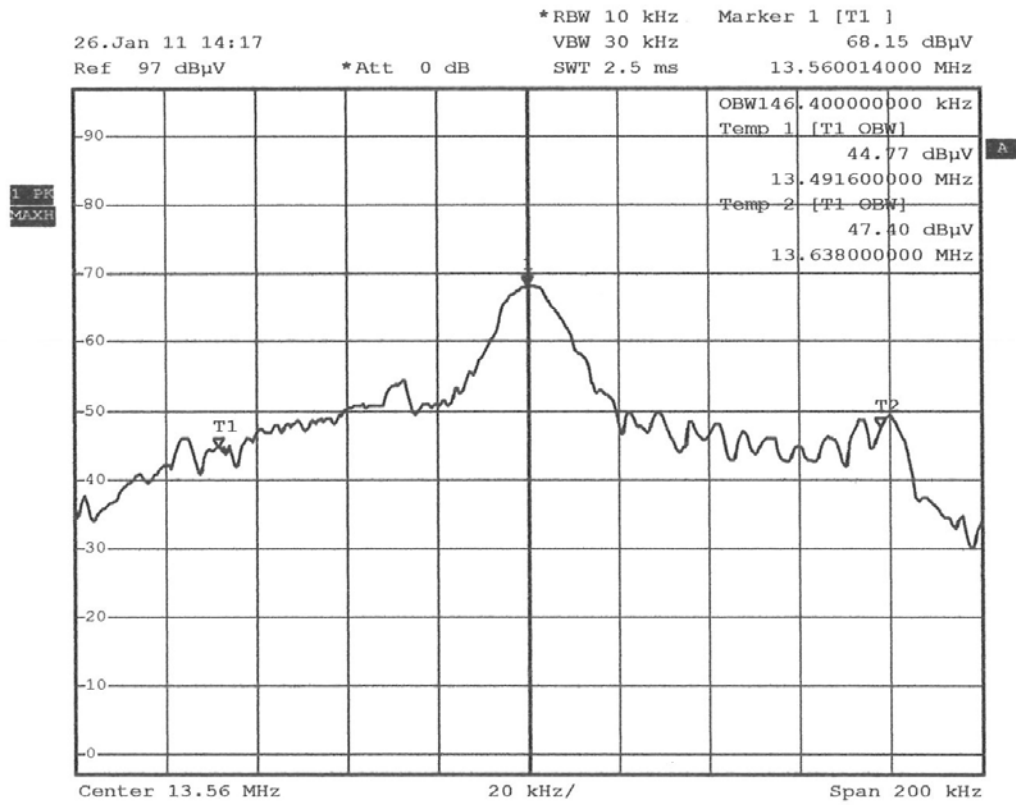
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ANNEX 1: SPECTRUM MASK



Date: 26.JAN.2011 10:07:35

ANNEX 2: 20 dB BANDWIDTH



Date: 26.JAN.2011 14:17:58

ANNEX 3: PHOTOS OF THE EQUIPMENT UNDER TEST

GENERAL VIEW



WITH CHARGING DOCK



INTERNAL VIEW



ANNEX 4: TEST SET UP AND OPEN AREA TEST SITE

RADIATED MEASUREMENTS



OPEN AREA TEST SITE



CONDUCTED MEASUREMENTS

