EMITECH GROUPE

R041-12-106857-1A - DM / CV

RADIO TEST REPORT

According to the standard(s):

FCC Part 15 Radio part 15.249
RSS-210:2010

Equipment under test:

SEARCH COIL
(∅ 22, 28 and 28/34 cm)

FCC ID: XFJ228
IC:8392A-XP228

Company:

XPLORER

Diffusion: Mr LOUBET (Company: XPLORER)

Number of pages: 45 including 1 annex

Ed.	Date	Modified page(s)	Written by Name / Visa	Technical verification Quality approval Name / Visa
1	16 jan 2014	1, 2, 5 and 6	David MONTAULON 	Olivier HEYER 

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NAME OF THE EQUIPMENT UNDER TEST (E.U.T.)	:	SEARCH COIL
Serial number	:	/
P/N	:	FCC ID: XFJ228 IC:8392A-XP228
Software version	:	
MANUFACTURER'S NAME	:	XPLORER

APPLICANT'S ADDRESS:

Company	:	XPLORER
Address	:	40 Chemin de Moulin 31320 MERVILLA FRANCE
Person(s) present during the tests	:	Nobody
Responsible	:	Mr LOUBET

DATE(S) OF TESTS	:	February 13th to 20th and February 25th to march 1st of 2013
TESTS LOCATION(S)	:	Emitech Montpellier laboratory in Vendargues – FRANCE Open Area Test Site in Salinelles FCC Registration number: 8127-19 IC Filling number : 4379C-1
TESTS SUPERVISOR(S)	:	None
TESTS OPERATOR(S)	:	David MONTAULON

CONTENTS

1. INTRODUCTION

This document submits the results of Radio tests performed on the equipment SEARCH COIL (denominated hereafter E.U.T.: equipment under test) according to document(s) listed below.

2. REFERENCE DOCUMENT(S)

FCC part 15	Code of federal regulations. Title 47- Telecommunication Chapter 1- Federal Communication Commission. Part 15- Radio frequency devices Subpart B- Unintentional Radiators. Limits and methods of measurement of radio disturbance. Characteristic of information technology equipment.
FCC part 15.249	Operation within the bands 902–928 MHz, 2400–2483.5 MHz, and 5725–5850MHz and 24.0–24.25 GHz
ANSI C 63.4:2003	American National Standard for Methods of measurement of Radio-Noise from low-voltage. Electrical and Electronic Equipment in the Range of 9 kHz to 40 GHz
RSS-210:2010 Issue 8, December 2010	Dispositifs de radio communication de faible puissance, exempts de licence (pour toutes les bandes de fréquences) : matériel de catégorie I
RSS-Gen: 2010 Issue 3, December 2010	Exigences générales et information relatives à la certification du matériel de radiocommunication

3. EQUIPMENT UNDER TEST CONFIGURATION

Equipment under test (E.U.T.) description:

The E.U.T. is a magnetic search coil wich is able to detect metallic objets in the ground. The search coil is a part of a system including a remote control and an headphone.

The search coil metal detection system works at 4 different frequencies: 4kHz, 8kHz , 12kHz and 18kHz.
Link between search coil , remote control and headphone is established by an RF signal operating between the frequency band : 2400-2483.5MHz.

A specific test program is used with the remote control wich allow to use a permanent emission modulated mode on the search coil. This program also allow selection of different chanel used by the RF module (2400-2483.5MHz)

Search coil have already been tested according to test report N°560101-CC-1-a made at GYL TECHNOLOGIE LABORATORY in JUIGNE SUR LOIRE (FRANCE)

Search coil is declined in 3 versions with diameters: 22cm, 28cm and 28/34cm.

FCC ID: XFJ228
Standard frequency range: 2400-2483.5MHz
Number of tested channels: 3
Tested frequencies: 2404MHz, 2440MHz & 2476MHz

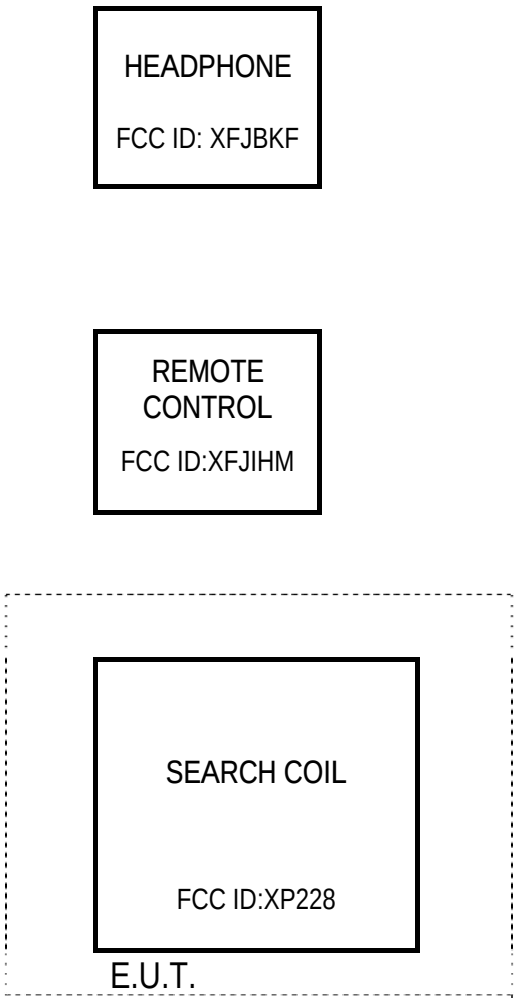
Power supply: internal batteries
Consumption: /
Operating temperatures: Not provided
Mounting: hand-held

Antennas: integrated

Cycle and operating mode during emission tests: Permanent emission mode

Equipment modifications applied during tests: No

4. EQUIPMENT UNDER TEST CONFIGURATION SCHEME



5. SUMMARY OF TEST RESULTS

Tests designation	Results satisfying?	Comments
Conducted power lines FCC part 15.107 and 15.207	N.A.	Powered by internal batteries
Field strength of fundamental and harmonics FCC part 15 Radio part 15.249 a)	YES	
Unwanted emissions outside of §15.249 frequency bands FCC part 15.209 and 15.215 b) and c)	YES	

N.P.: Not Performed. N.A.: Not Applicable.

- In emission:

Sample subject to the test complies with prescriptions of the standard(s) FCC Part 15 Radio part 15.249 & RSS 210:2010 according to limits, specified in this test report for tests made only

6. FIELD STRENGTH OF FUNDAMENTAL AND HARMONICS

Standards: FCC part 15 Radio part 15.249 & RSS 210:2010

Test methods: FCC part 15.249 a) c) d) e) & RSS 210:2010

Test configuration: Measurement is done on an Open Area Test Site. For each measured frequencies, E.U.T. is set via a turntable in order to find the highest level. Test antenna is set between 1m and 4m in order to find the highest level in vertical and horizontal polarization. Only highest levels are recorded.

Frequency band	Initial position (0°)	Resolution bandwidth	Measuring distance	Detection mode	E.U.T. height
1GHz-25GHz	Front side	1MHz	3m	Peak and Average	80cm

Test method deviation: No

Test equipment list:

CATEGORY	BRAND	TYPE	N° EMITECH	CAL DATE	DUE DATE
Antenna	ETS LINDGREN	3117	5456	17-aug-2012	17-oct-2016
Antenna	IMC	WR42	1940	20-apr-2012	20-jun-2016
Antenna mast	Heinrich Deisel	MA240	4037	-	-
Cable	Cables & Connetiques	N-1.5m	4203	27-oct-2011	27-dec-2013
Cable	Huber Sumner	N-14m	8146	09-mar-2011	09-may-2013
Cable	N-7m	N-7m	9243	04-apr-2012	04-jun-2014
Cable	HP	SMA-1m	8955	10-jan-2013	10-mar-2015
Filter	Micro-Tronics	HPM 15162	5457	19-jan-2012	19-mar-2014
Mast controller	Heinrich Deisel	HD100	4036	-	-
Open area test site	Emitech	Salinelles	3482	04-mar-2011	04-may-2014
Preamplifier	IMPULSE	CA118-546ACN	9169	27-fev-2012	27-apr-2013
Receiver	Agilent	E4440A	5824	24-aug-2011	24-aug-2013
Turntable	Heinrich Deisel	D4420	4038	-	-

Results: See Boards hereafter.

Search coil ∅22:

Search coil ∅22 - FUNDAMENTAL

Frequency (MHz)	Polarization	Azimut (degree)	Antenna Height (cm)	Measure (dBµV/m)	Limit (dBµV/m)	Comments
2404 Low channel	Horizontal	16	230	89.18	94	C
2440 Middle channel	Horizontal	20	230	88.80	94	C
2476 High channel	Vertical	20	155	88.01	94	C

Search coil ∅22 - HARMONICS (Low channel)

Frequency (MHz)	Polarization	Azimut (degree)	Antenna Height (cm)	Measure (dBµV/m)		Limit (dBµV/m)		Comments
				Peak	Average	Peak	Average	
4808	Horizontal	-	-	<54	<34	74	54	C
4808	Vertical	35	230	<54	37.5	74	54	C

All other radiated spurious are at least 20 dB below specified limits

Search coil ∅22 - HARMONICS (Middle channel)

Frequency (MHz)	Polarization	Azimut (degree)	Antenna Height (cm)	Measure (dBµV/m)		Limit (dBµV/m)		Comments
				Peak	Average	Peak	Average	
4880	Horizontal	-	-	<54	<34	74	54	C
4880	Vertical	35	230	<54	38.4	74	54	C

All other radiated spurious are at least 20 dB below specified limits

Search coil ∅22 - HARMONICS (High channel)

Frequency (MHz)	Polarization	Azimut (degree)	Antenna Height (cm)	Measure (dBµV/m)		Limit (dBµV/m)		Comments
				Peak	Average	Peak	Average	
4952	Horizontal	-	-	<54	<34	74	54	C
4952	Vertical	-	-	<54	<34	74	54	C

All other radiated spurious are at least 20 dB below specified limits

Search coil ∅28:

Search coil ∅28- FUNDAMENTAL

Frequency (MHz)	Polarization	Azimut (degree)	Antenna Height (cm)	Measure (dBµV/m)	Limit (dBµV/m)	Comments
2404 Low channel	Horizontal	22	230	91.63	94	C
2440 Middle channel	Vertical	60	225	93.00	94	C
2476 High channel	Vertical	60	240	91.47	94	C

Search coil ∅28 - HARMONICS (Low channel)

Frequency (MHz)	Polarization	Azimut (degree)	Antenna Height (cm)	Measure (dBµV/m)		Limit (dBµV/m)		Comments
				Peak	Average	Peak	Average	
4808	Horizontal	-	-	<54	<34	74	54	C
4808	Vertical	-	-	<54	<34	74	54	C

All other radiated spurious are at least 20 dB below specified limits

Search coil ∅28 - HARMONICS (Middle channel)

Frequency (MHz)	Polarization	Azimut (degree)	Antenna Height (cm)	Measure (dBµV/m)		Limit (dBµV/m)		Comments
				Peak	Average	Peak	Average	
4880	Horizontal	-	-	<54	<34	74	54	C
4880	Vertical	55	230	<54	36.32	74	54	C

All other radiated spurious are at least 20 dB below specified limits

Search coil ∅28 - HARMONICS (High channel)

Frequency (MHz)	Polarization	Azimut (degree)	Antenna Height (cm)	Measure (dBµV/m)		Limit (dBµV/m)		Comments
				Peak	Average	Peak	Average	
4952	Horizontal	-	-	<54	<34	74	54	C
4952	Vertical	55	230	<54	42.40	74	54	C

All other radiated spurious are at least 20 dB below specified limits

Search coil ∅28/34:

Search coil ∅28/34- FUNDAMENTAL

Frequency (MHz)	Polarization	Azimut (degree)	Antenna Height (cm)	Measure (dBµV/m)	Limit (dBµV/m)	Comments
2404 Low channel	Horizontal	0	215	92.21	94	C
2440 Middle channel	Vertical	30	230	93.45	94	C
2476 High channel	Vertical	40	230	93.81	94	C

Search coil ∅28/34 - HARMONICS (Low channel)

Frequency (MHz)	Polarization	Azimut (degree)	Antenna Height (cm)	Measure (dBµV/m)		Limit (dBµV/m)		Comments
				Peak	Average	Peak	Average	
4808	Horizontal	-	-	<54	<34	74	54	C
4808	Vertical	-	-	<54	<34	74	54	C

All other radiated spurious are at least 20 dB below specified limits

Search coil ∅28/34 - HARMONICS (Middle channel)

Frequency (MHz)	Polarization	Azimut (degree)	Antenna Height (cm)	Measure (dBµV/m)		Limit (dBµV/m)		Comments
				Peak	Average	Peak	Average	
4880	Horizontal	-	-	<54	<34	74	54	C
4880	Vertical	32	230	<54	34.32	74	54	C

All other radiated spurious are at least 20 dB below specified limits

Search coil ∅28/34 - HARMONICS (High channel)

Frequency (MHz)	Polarization	Azimut (degree)	Antenna Height (cm)	Measure (dBµV/m)		Limit (dBµV/m)		Comments
				Peak	Average	Peak	Average	
4952	Horizontal	-	-	<54	<34	74	54	C
4952	Vertical	40	230	<54	39.60	74	54	C

All other radiated spurious are at least 20 dB below specified limits

7. UNWANTED EMISSIONS OUTSIDE OF §15.249 FREQUENCY BANDS

Standards: FCC part 15 Radio part 15.249 & RSS 210:2010

Test methods: FCC part 15.109, 15.209, 15.215 b), ANSI C63.4:2003 & RSS 210:2010

a) Pre-measurement in semi anechoic chamber:

Frequency band	Tested side	Resolution bandwidth	Video bandwidth	Detection mode	E.U.T. height
9kHz-150kHz	Front side	200Hz	1kHz	Peak	80cm
150kHz-30MHz	Front side	10kHz	30kHz	Peak	80cm
30MHz-1GHz	Front side	100kHz	300kHz	Peak	80cm
1GHz-25GHz	Front side	1MHz	3MHz	Peak	80cm

E.U.T. was tested from the lowest frequency generated or used (without going below 9kHz) up to the 10th harmonics of fundamental emission in emission mode and in receiver mode.
Measurements below 30MHz are done with a loop antenna as describe in the standard.
Measurements are done in semi anechoic chamber at 3m. E.U.T. is set on a wooden table.
Measurements are done in max-hold peak detection.

Limits:

From 9 kHz to 30MHz: Limit indicated on the curves is calculated with 40 dB/decade extrapolation factor and 51.5 dB conversion factor.

From 30MHz to 1GHz Quasi peak limit provided is the limit given in 15.209.

Above 1GHz average limits in restricted bands §15.205 and general limits §15.209 are 54dBµV/m. However, the peak field strength of any emission shall not exceed the maximum permitted average limits specified above by more than 20dB under any condition of modulation.

Test method deviation:

From 9 kHz to 30MHz measurements are made in peak detection instead of average mode in frequency band 9 kHz-500 kHz

- Measurements are given in dBµA/m instead of µV/m
- Measuring distance is 3 meters instead of 30 and 300 meters

Radiated emissions limits in this frequency band are specified at 30 or 300 meters. Measurement distance used during the test, subject of this report, is 3 meters. Then published limits come from a theorical conversion using an extrapolation factor of 40dB / decade.

Measuring distance: 3 meters

Test equipment list:

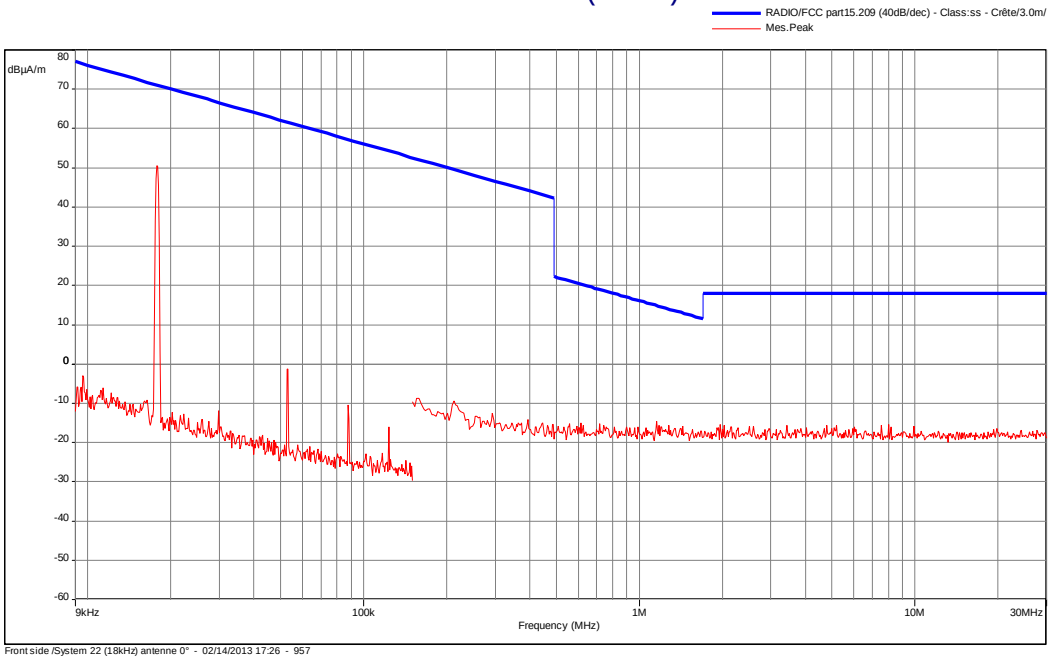
CATEGORY	BRAND	TYPE	N° EMITECH	CAL DATE	DUE DATE
Antenna	Rohde & Schwarz	HFH2-Z2	5825	22-oct-2012	22-dev-2014
Antenna	Emco	3115	1053	17-aug-2012	17-oct-2016
Antenna	Electro-Metrics	BIA-30HF	0824	03-mar-2011	03-may-2015
Antenna	Electro-Metrics	LPA-30	0855	03-mar-2011	03-may-2015
Antenna	IMC	WR42	1940	20-apr-2012	20-jun-2016
Cable	C&C	N-1.5m	5016	05-dec-2011	05-fev-2014
Cable		N-1m	2701	27-dec-2012	27-fev-2015
Cable	C&C	N-6m	5015	27-dec-2012	27-fev-2015
Cable	N-7m	N-7m	9243	04-apr-2012	04-jun-2014
Cable	HP	SMA-1m	8955	10-jan-2013	10-mar-2015
Filter	Micro-Tronics	HPM 15162	5457	19-jan-2012	19-mar-2014
Preamplifier	IMPULSE	CA118-546ACN	9169	27-fev-2012	27-avr-2013
Receiver	Agilent Technologies	E4440A	5824	24-aug-2011	24-oct-2013
Shielded enclosure	RAY PROOF	C.GS3	1123	-	-
Software	Nexio	BAT EMC	0000	-	-

BAT-EMC software version: V3.6.0.24

Results: See Graphs hereafter.

Radiated magnetic field emission (measurement) — EMI957

Front side /Search coil ∅22 (18kHz) antenne 0°



Front side /System 22 (18kHz) antenne 0° - 02/14/2013 17:26 - 957

Date: 14/02/2013 17:26:40

Technician: DM

Class: ss of the standard

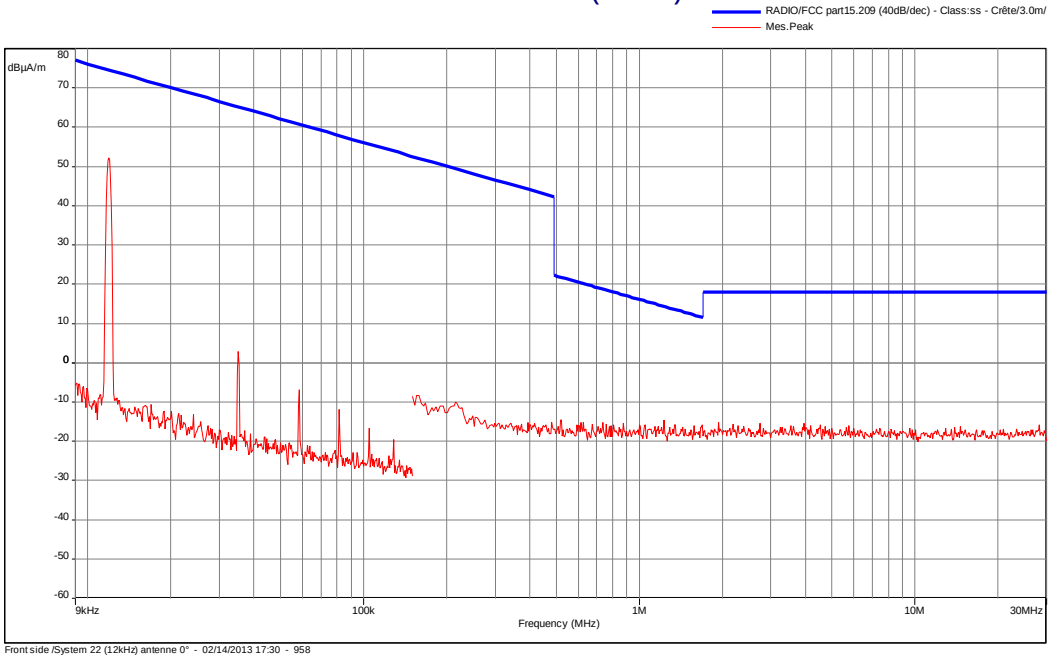
Detection:
Peak

T (°C): 25
H (%): 20.1
P (hpa): /

Modification(s) during test:

Radiated magnetic field emission (measurement) — EMI958

Front side / Search coil ∅22 (12kHz) antenna 0°



Front side /System 22 (12kHz) antenne 0° - 02/14/2013 17:30 - 958

Date: 14/02/2013 17:30:05

Technician: DM

Class: ss of the standard

Detection:
Peak

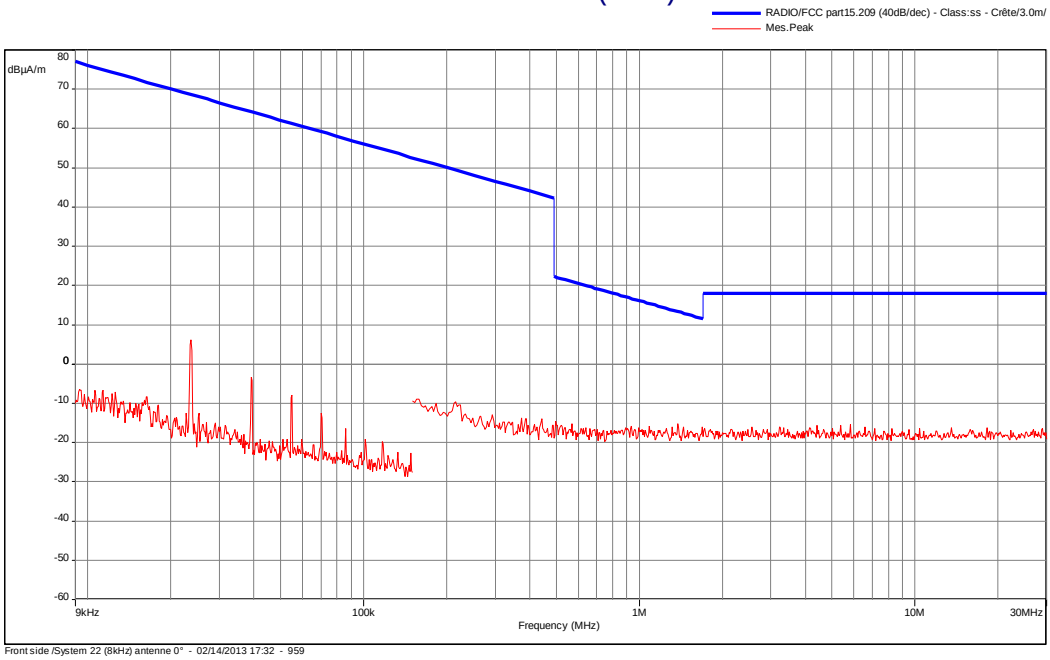
T (°C): 25
H (%): 20.1
P (hpa): /

Modification(s) during test:

Limit indicated on this plot is calculated with 40 dB/decade extrapolation factor and 51.5 dB conversion factor.

Radiated magnetic field emission (measurement) — EMI959

Front side / Search coil Ø22 (8kHz) antenna 0°



Front side /System 22 (8kHz) antenne 0° - 02/14/2013 17:32 - 959

Date: 14/02/2013 17:32:13

Technician: DM

Class: ss of the standard

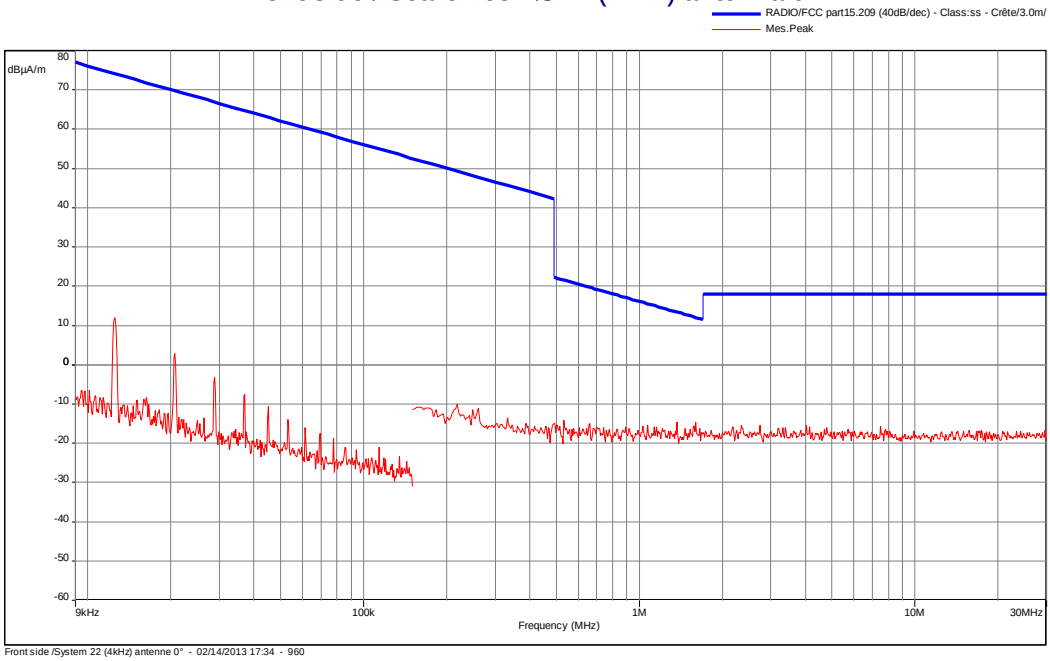
Detection:
Peak

T (°C): 25
H (%): 20.1
P (hpa): /

Modification(s) during test:

Radiated magnetic field emission (measurement) — EMI960

Front side / Search coil Ø22 (4kHz) antenna 0°



Front side /System 22 (4kHz) antenne 0° - 02/14/2013 17:34 - 960

Date: 14/02/2013 17:34:59

Technician: DM

Class: ss of the standard

Detection:
Peak

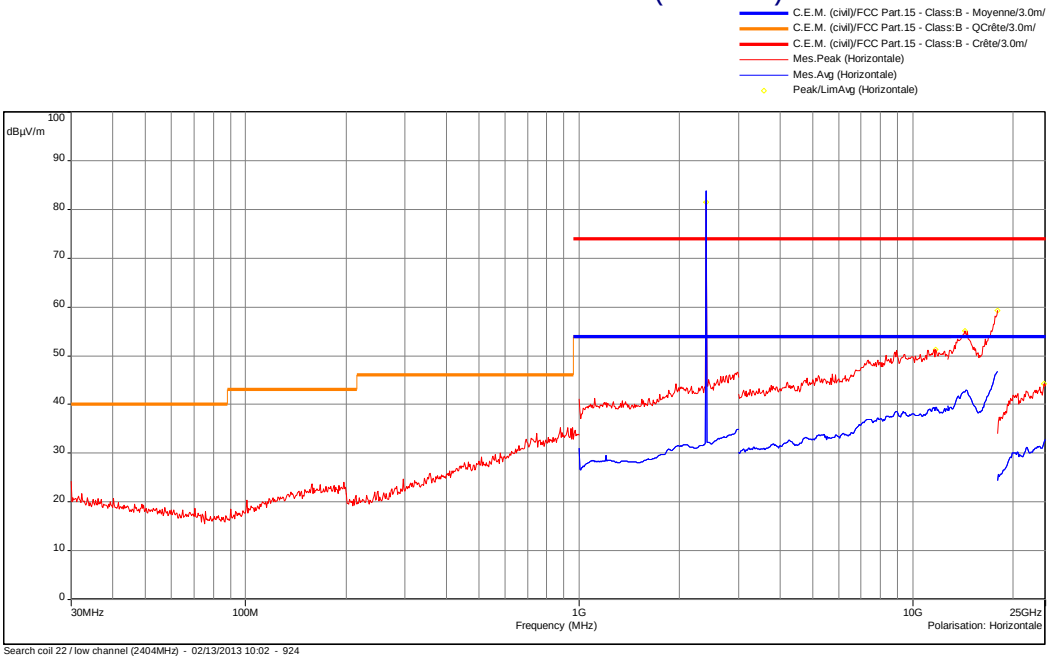
T (°C): 25
H (%): 20.1
P (hpa): /

Modification(s) during test:

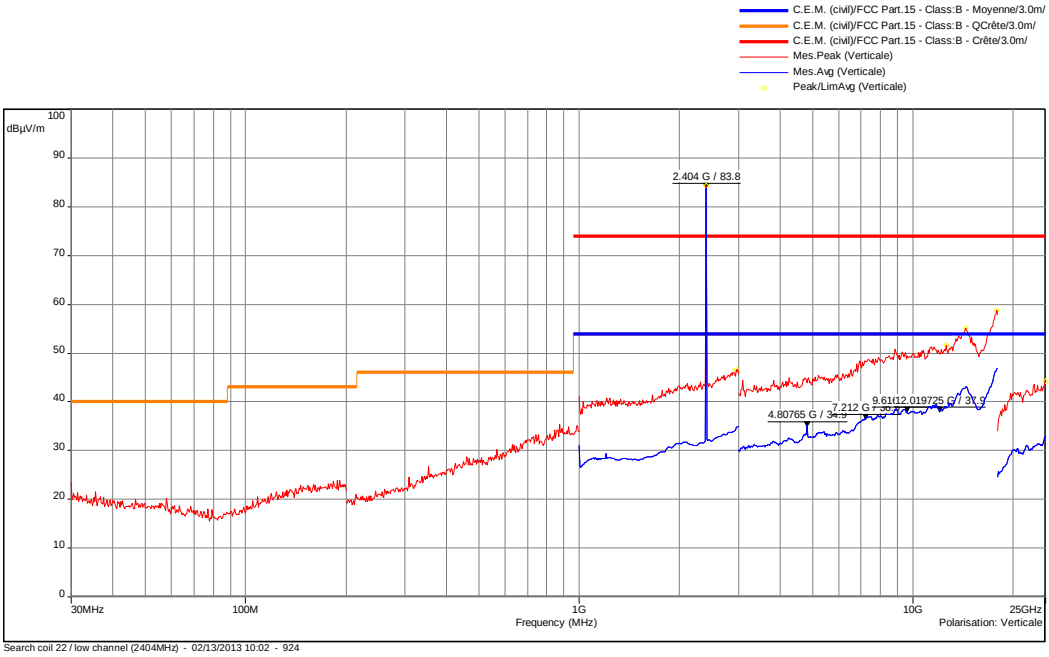
Limit indicated on this plot is calculated with 40 dB/decade extrapolation factor and 51.5 dB conversion factor.

Radiated electric emission (measurement) | EMI924

Search coil Ø22 / low channel (2404MHz)



Search coil 22 / low channel (2404MHz) - 02/13/2013 10:02 - 924



Search coil 22 / low channel (2404MHz) - 02/13/2013 10:02 - 924

Date: 13/02/2013 10:02:48

Technician: DM + RB

Class: B of the standard

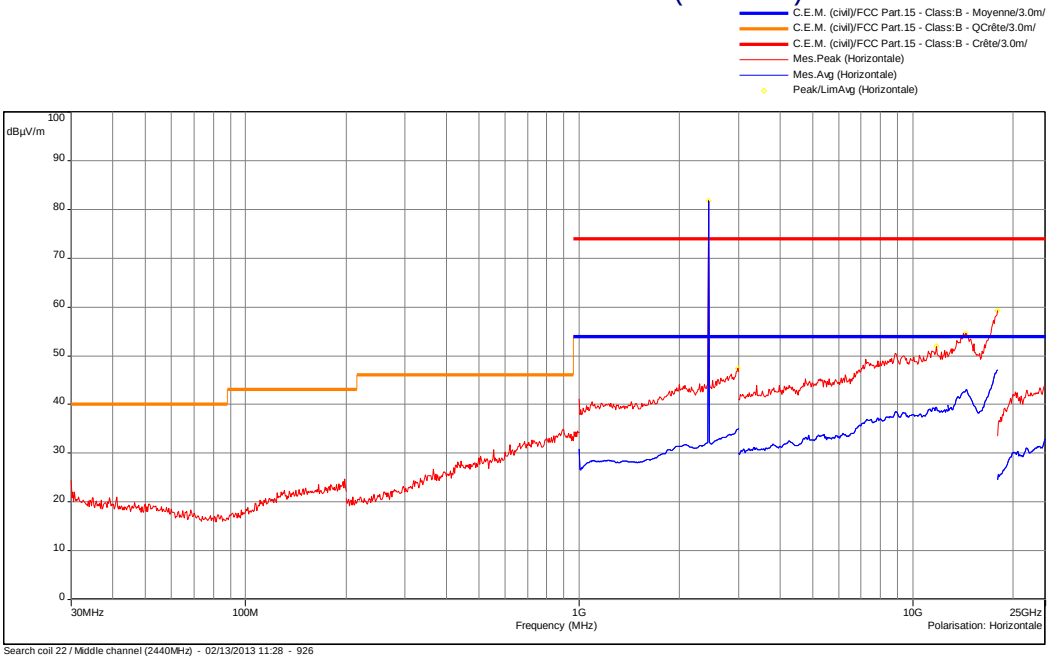
Detection:
Peak and average

T (°C): 24.1
H (%): 25
P (hpa): /

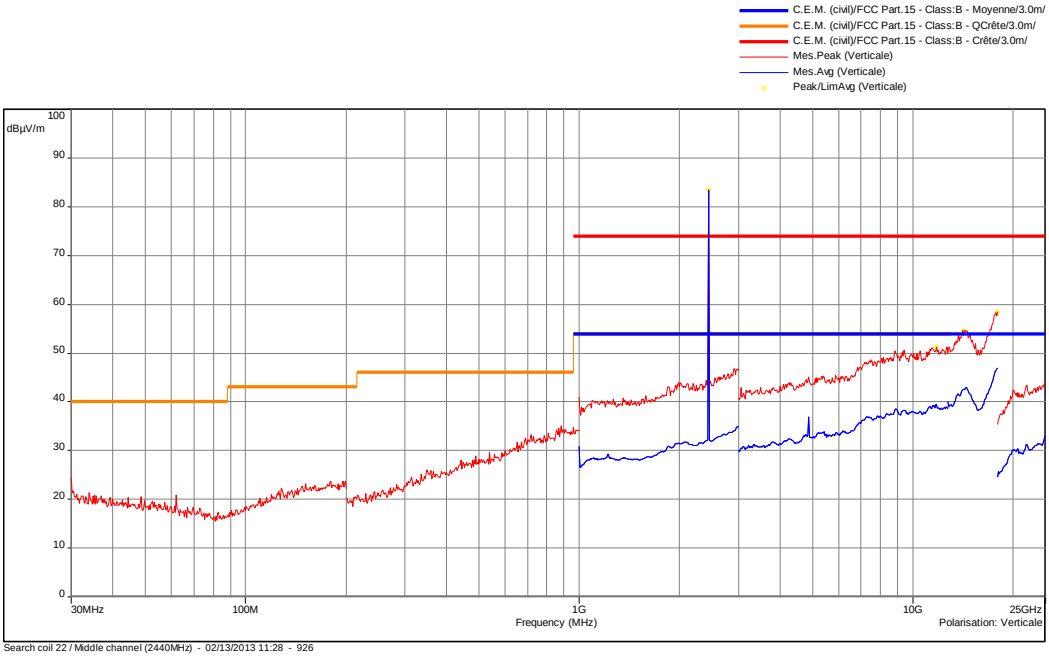
Modification(s) during test:

Radiated electric emission (measurement) — EMI926

Search coil ∅22 / Middle channel (2440MHz)



Search coil 22 / Middle channel (2440MHz) - 02/13/2013 11:28 - 926



Search coil 22 / Middle channel (2440MHz) - 02/13/2013 11:28 - 926

Date: 13/02/2013 11:28:18

Technician: DM + RB

Class: B of the standard

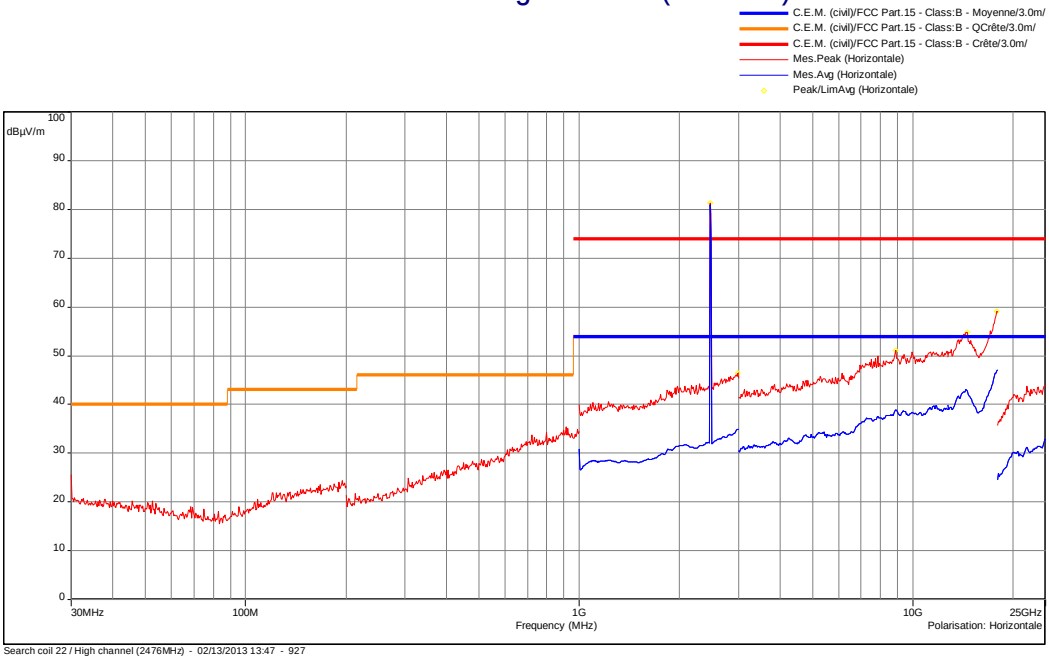
Detection:
Peak and average

T (°C): 24.1
H (%): 25
P (hpa): /

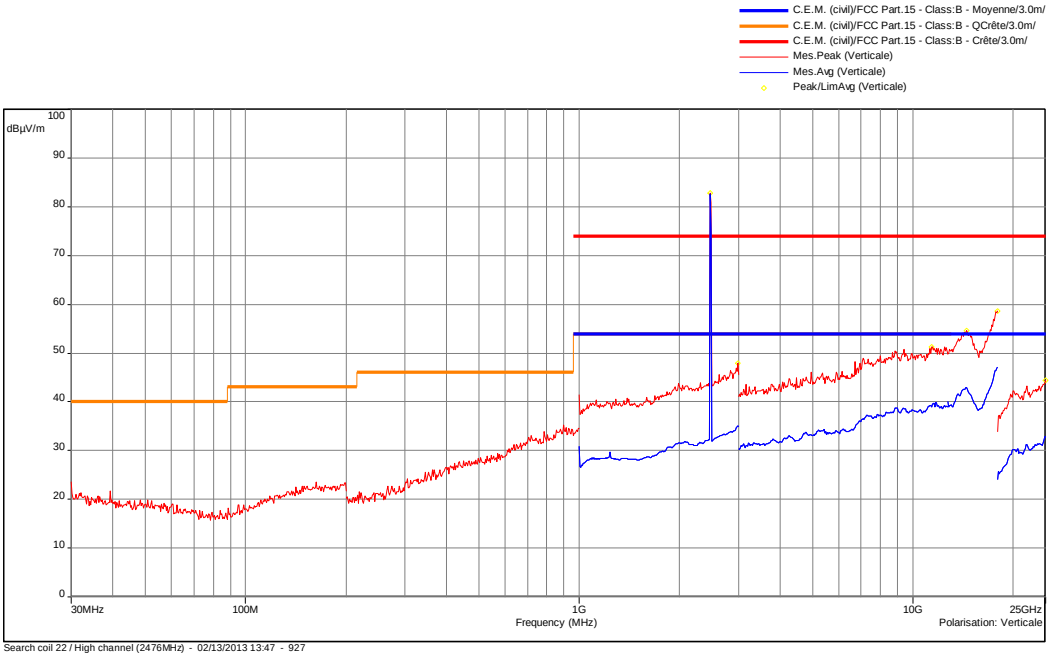
Modification(s) during test:

Radiated electric emission (measurement) — EMI927

Search coil ∅22 / High channel (2476MHz)



Search coil 22 / High channel (2476MHz) - 02/13/2013 13:47 - 927



Search coil 22 / High channel (2476MHz) - 02/13/2013 13:47 - 927

Date: 13/02/2013 13:47:32

Technician: DM + RB

Class: B of the standard

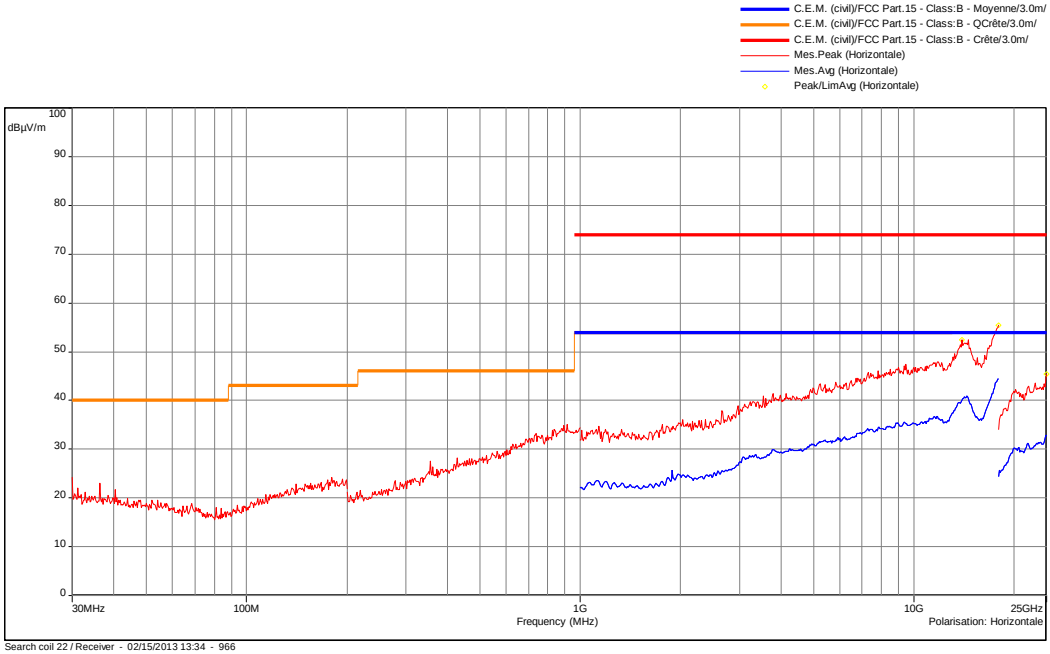
Detection:
Peak and average

T (°C): 24.1
H (%): 25
P (hpa): /

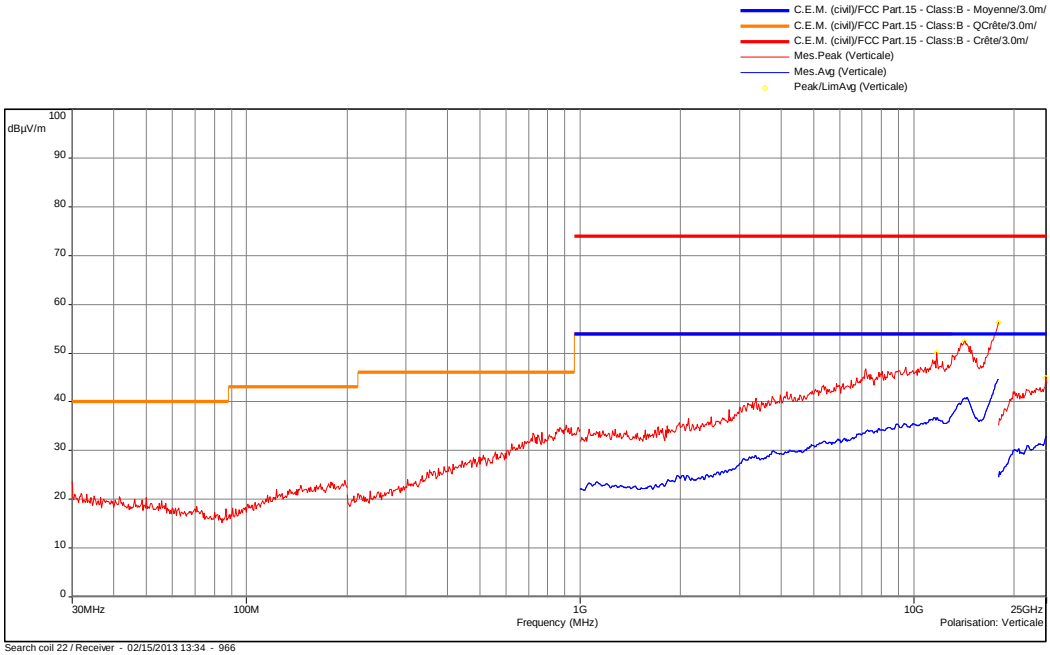
Modification(s) during test:

Radiated electric emission (measurement) — EMI966

Search coil ∅22 / Receiver



Search coil 22 / Receiver - 02/15/2013 13:34 - 966



Search coil 22 / Receiver - 02/15/2013 13:34 - 966

Date: 15/02/2013 13:34:56

Technician: DM + RB

Class: B of the standard

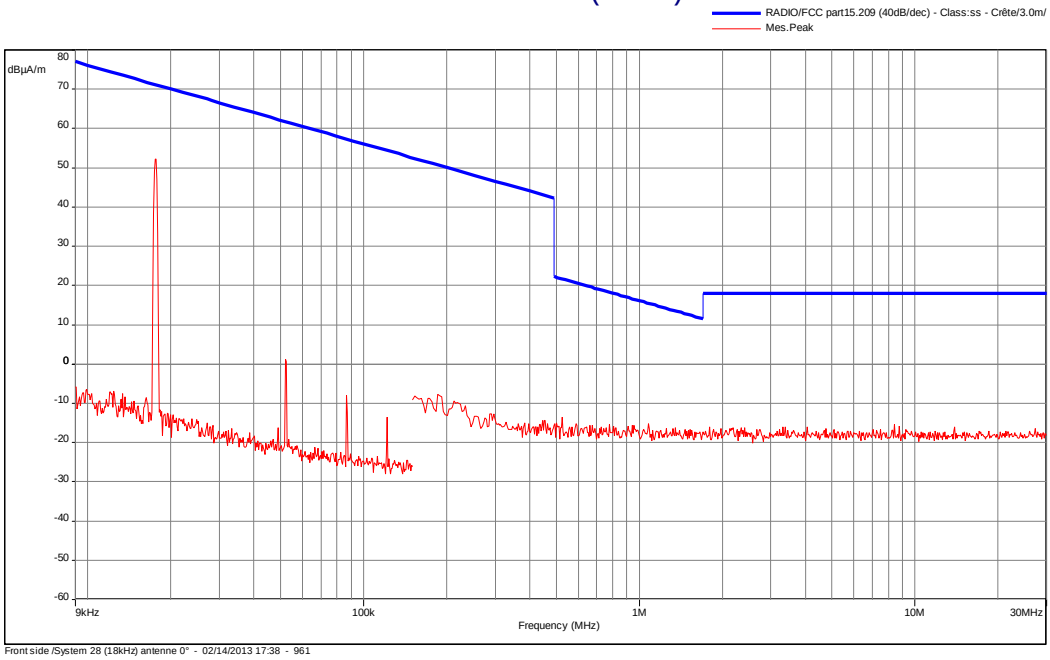
Detection:
Peak and average

T (°C): 24.1
H (%): 25
P (hpa): /

Modification(s) during test:

Radiated magnetic field emission (measurement) — EMI961

Front side / Search coil ∅28 (18kHz) antenna 0°



Front side /System 28 (18kHz) antenne 0° - 02/14/2013 17:38 - 961

Date: 14/02/2013 17:38:23

Technician: DM

Class: ss of the standard

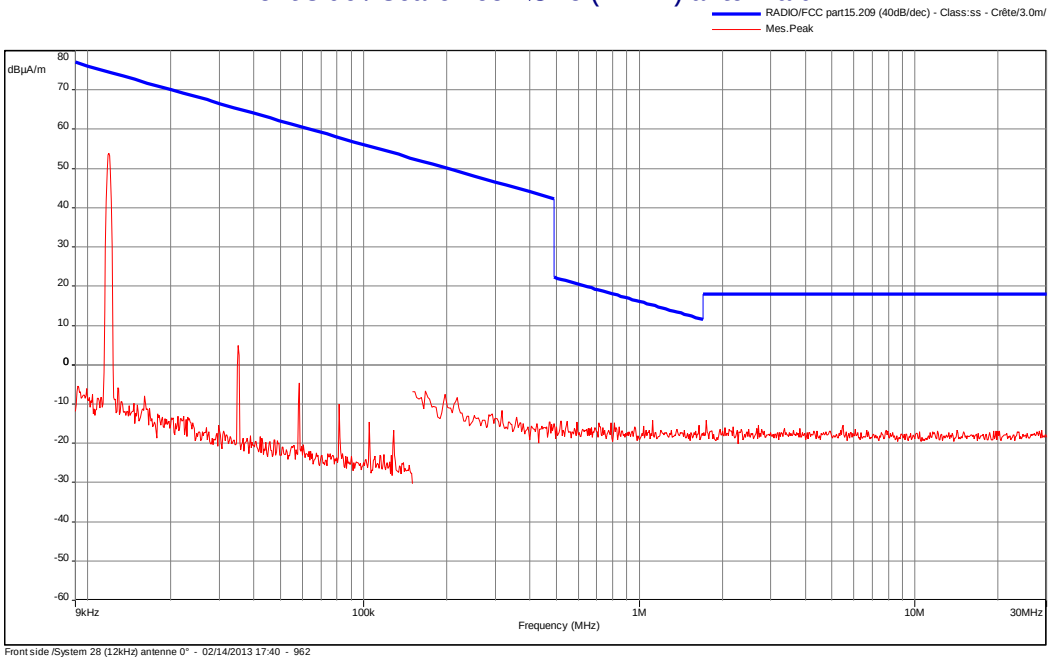
Detection:
Peak

T (°C): 25
H (%): 20.1
P (hpa): /

Modification(s) during test:

Radiated magnetic field emission (measurement) — EMI962

Front side / Search coil ∅28 (12kHz) antenna 0°



Front side /System 28 (12kHz) antenne 0° - 02/14/2013 17:40 - 962

Date: 14/02/2013 17:40:59

Technician: DM

Class: ss of the standard

Detection:
Peak

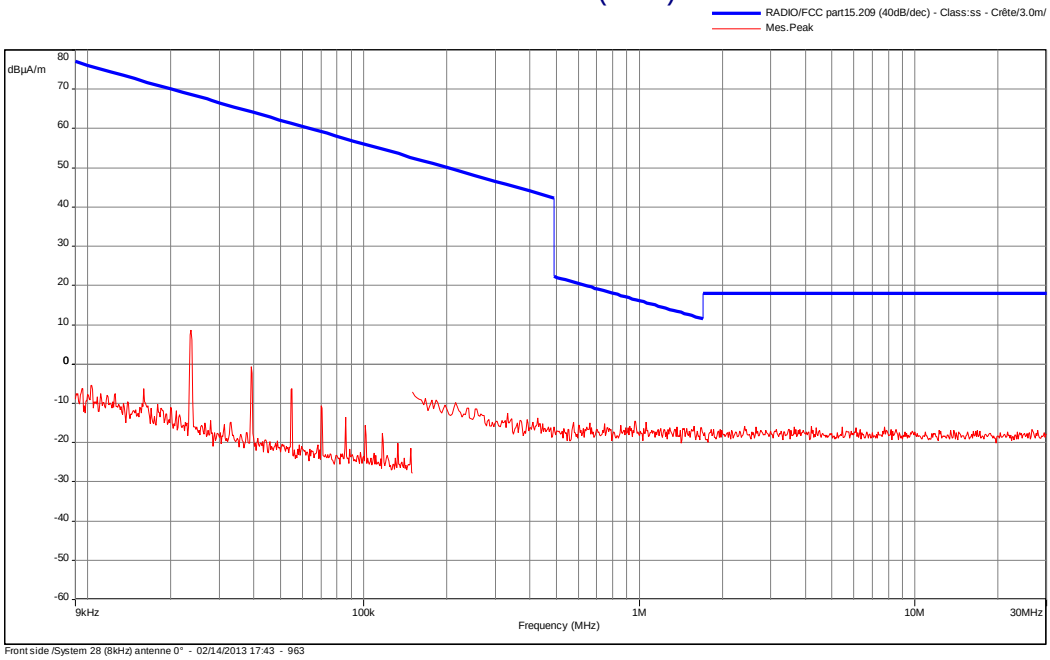
T (°C): 25
H (%): 20.1
P (hpa): /

Modification(s) during test:

Limit indicated on this plot is calculated with 40 dB/decade extrapolation factor and 51.5 dB conversion factor.

Radiated magnetic field emission (measurement) — EMI963

Front side / Search coil ∅28 (8kHz) antenna 0°



Front side /System 28 (8kHz) antenne 0° - 02/14/2013 17:43 - 963

Date: 14/02/2013 17:43:01

Technician: DM

Class: ss of the standard

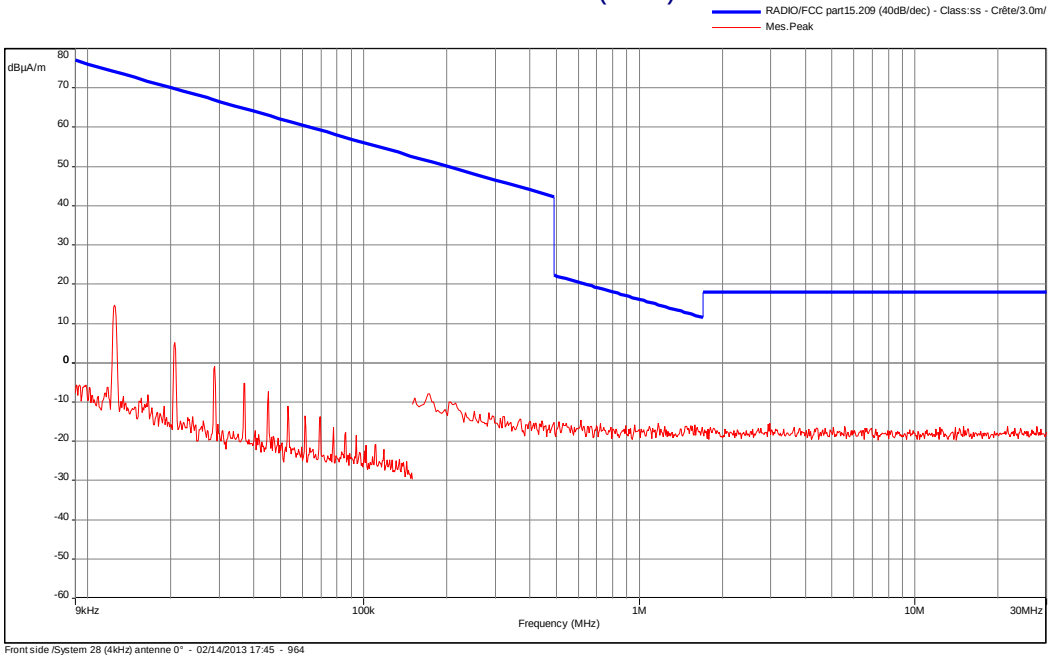
Detection:
Peak

T (°C): 25
H (%): 20.1
P (hpa): /

Modification(s) during test:

Radiated magnetic field emission (measurement) — EMI964

Front side / Search coil ∅28 (4kHz) antenna 0°



Front side /System 28 (4kHz) antenne 0° - 02/14/2013 17:45 - 964

Date: 14/02/2013 17:45:17

Technician: DM

Class: ss of the standard

Detection:
Peak

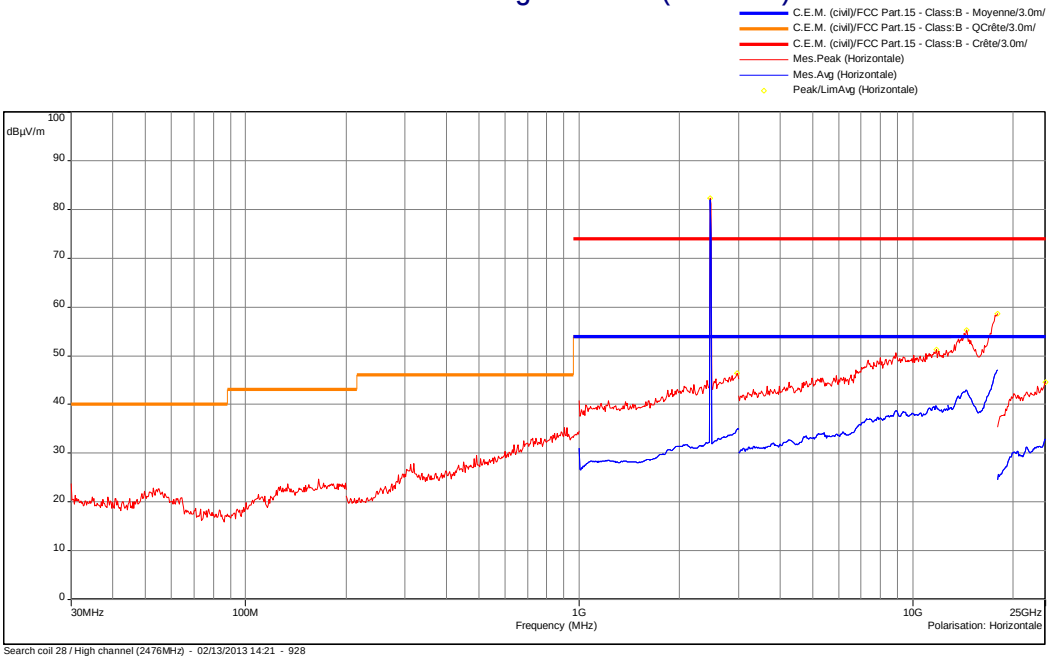
T (°C): 25
H (%): 20.1
P (hpa): /

Modification(s) during test:

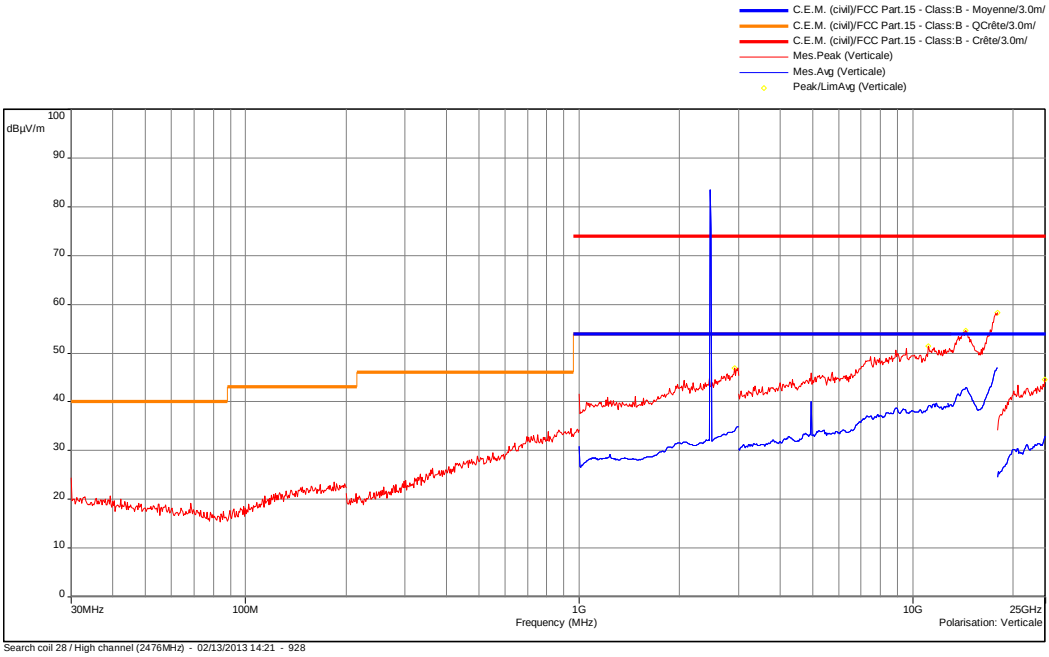
Limit indicated on this plot is calculated with 40 dB/decade extrapolation factor and 51.5 dB conversion factor.

Radiated electric emission (measurement) — EMI928

Search coil ∅28 / High channel (2476MHz)



Search coil 28 / High channel (2476MHz) - 02/13/2013 14:21 - 928



Search coil 28 / High channel (2476MHz) - 02/13/2013 14:21 - 928

Date: 13/02/2013 14:21:28

Technician: DM + RB

Class: B of the standard

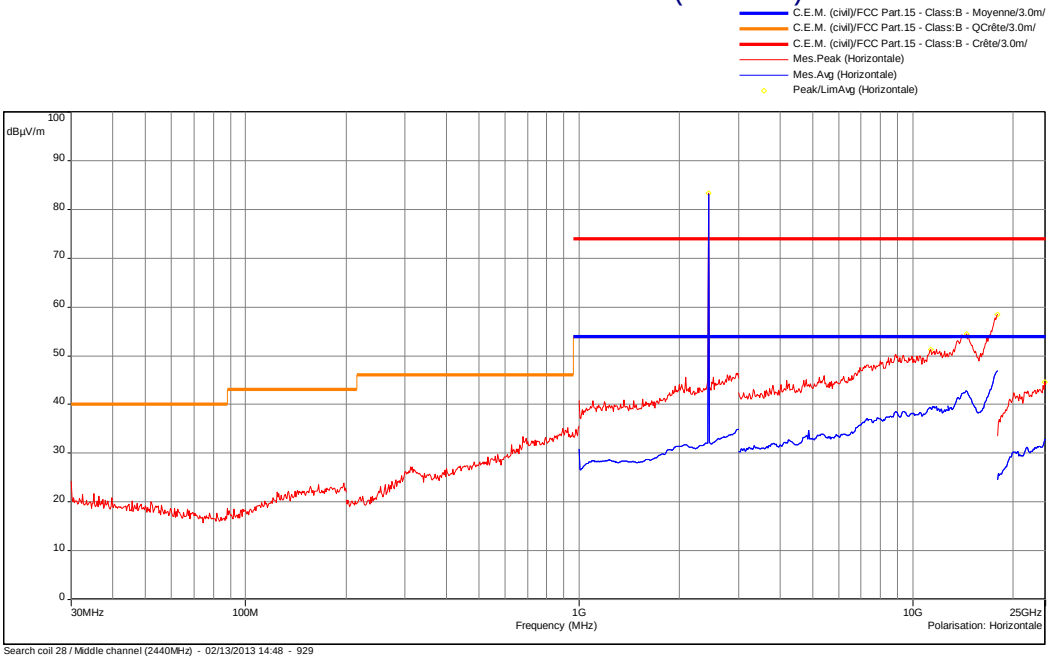
Detection:
Peak and average

T (°C): 24.1
H (%): 25
P (hpa): /

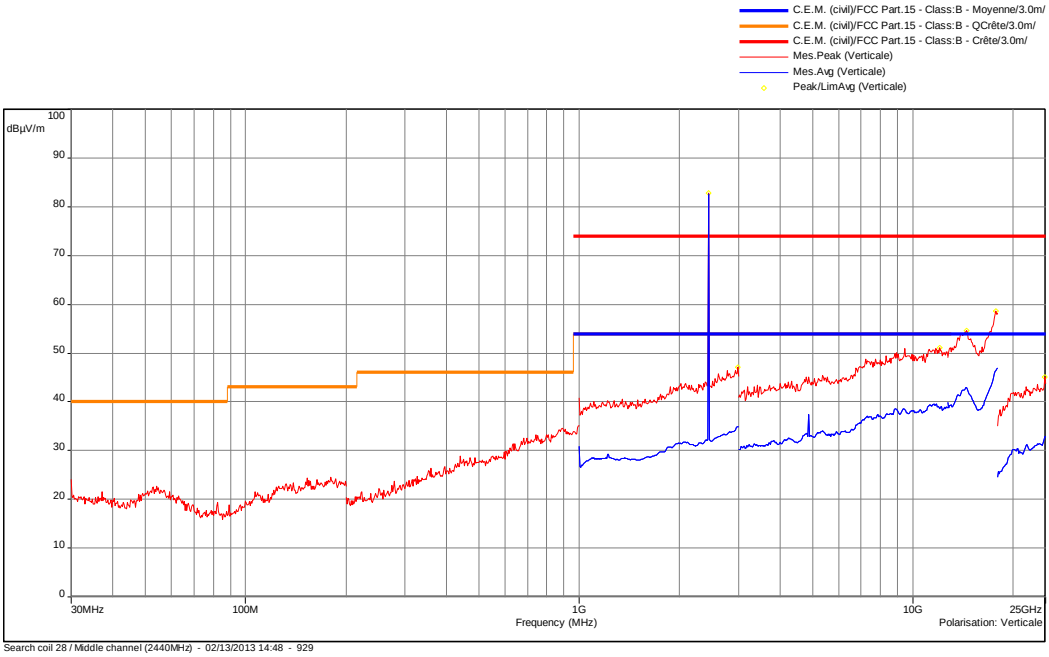
Modification(s) during test:

Radiated electric emission (measurement) | EMI929

Search coil ∅28 / Middle channel (2440MHz)



Search coil 28 / Middle channel (2440MHz) - 02/13/2013 14:48 - 929



Search coil 28 / Middle channel (2440MHz) - 02/13/2013 14:48 - 929

Date: 13/02/2013 14:48:18

Technician: DM + RB

Class: B of the standard

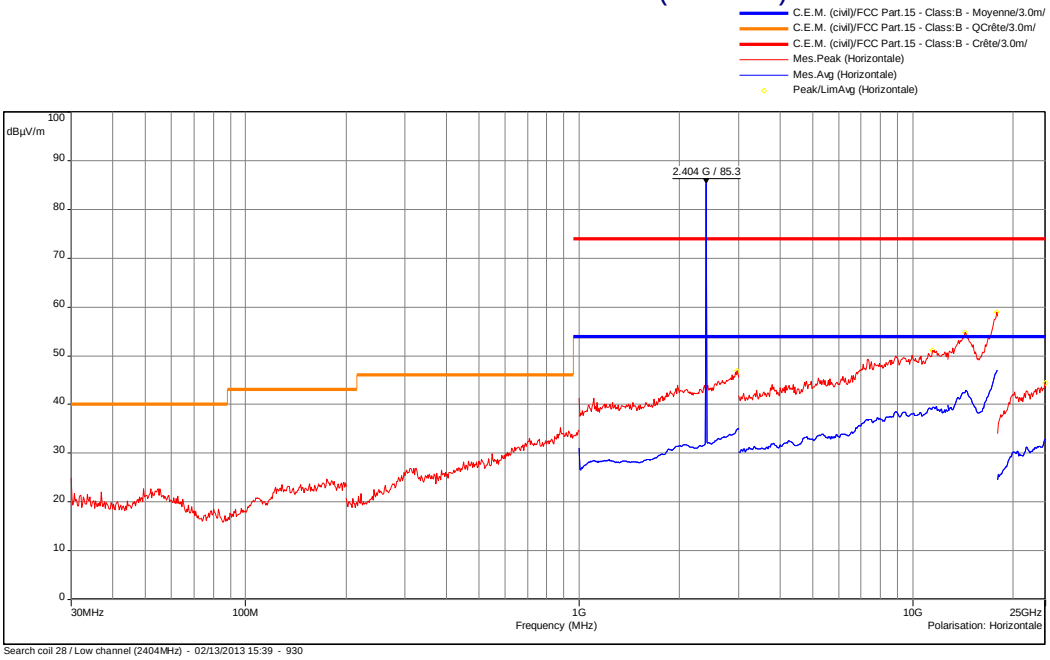
Detection:
Peak and average

T (°C): 24.1
H (%): 25
P (hpa): /

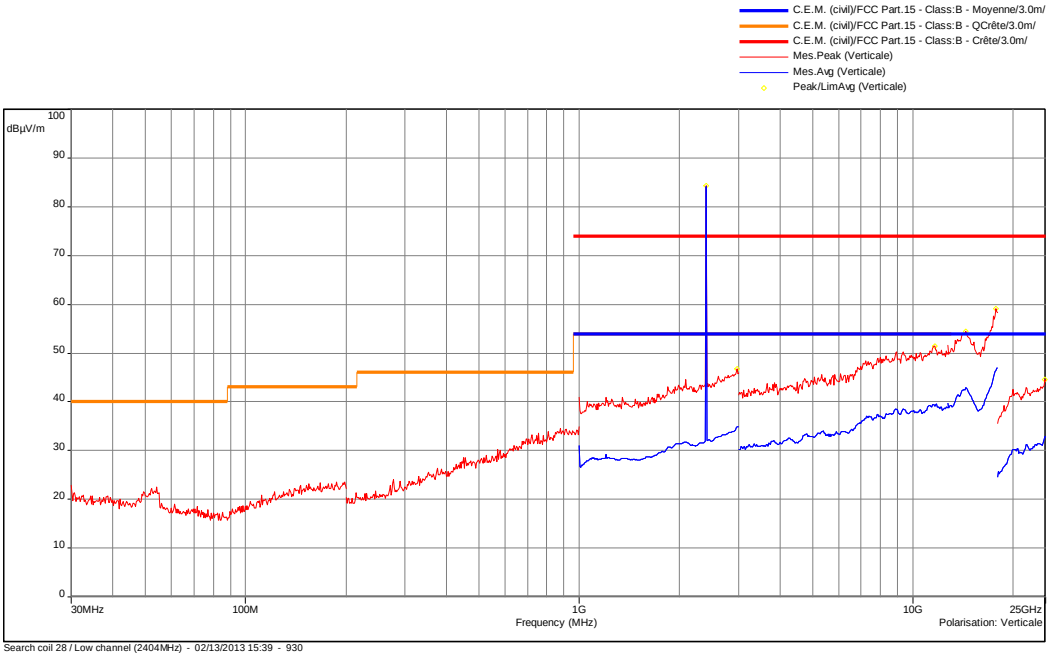
Modification(s) during test:

Radiated electric emission (measurement) — EMI930

Search coil ∅28 / Low channel (2404MHz)



Search coil 28 / Low channel (2404MHz) - 02/13/2013 15:39 - 930



Search coil 28 / Low channel (2404MHz) - 02/13/2013 15:39 - 930

Date: 13/02/2013 15:39:36

Technician: DM + RB

Class: B of the standard

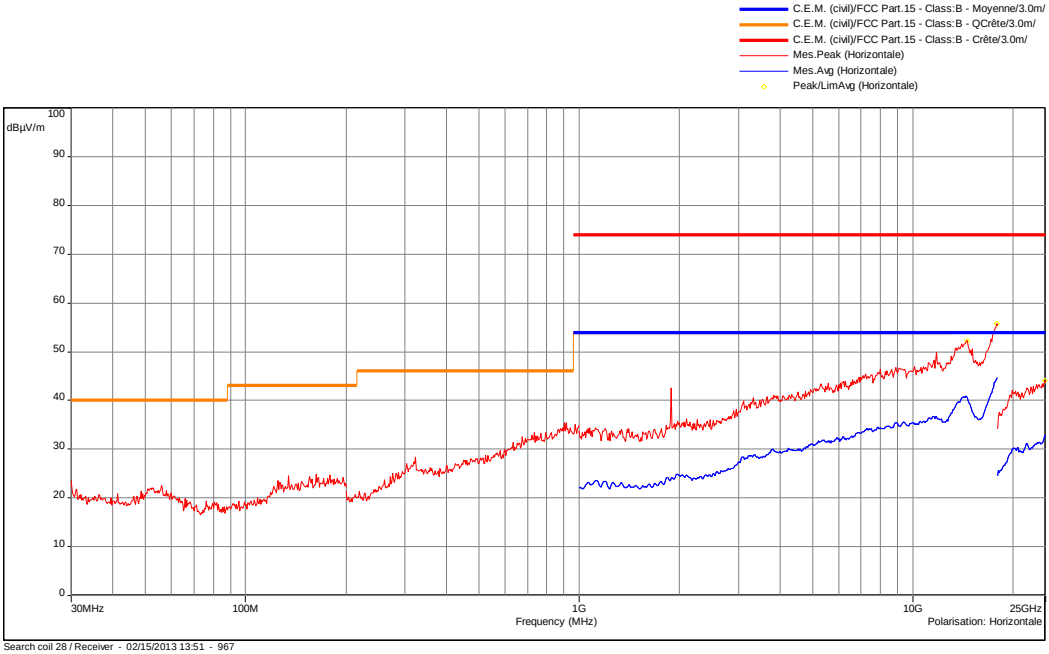
Detection:
Peak and average

T (°C): 24.1
H (%): 25
P (hpa): /

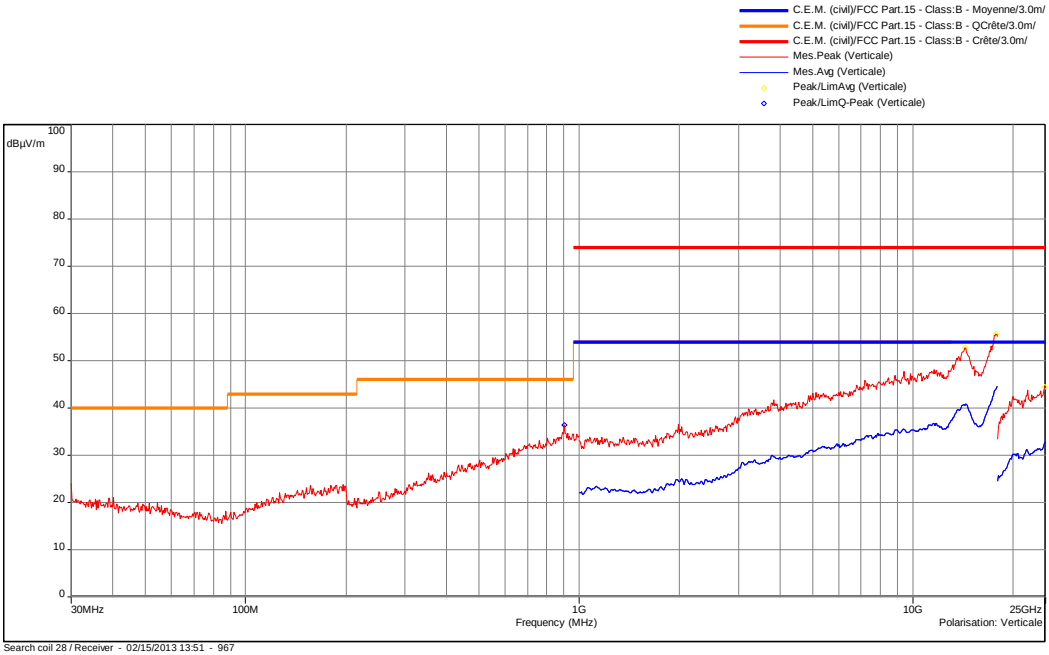
Modification(s) during test:

Radiated electric emission (measurement) — EMI967

Search coil ∅28 / Receiver



Search coil 28 / Receiver - 02/15/2013 13:51 - 967



Search coil 28 / Receiver - 02/15/2013 13:51 - 967

Date: 15/02/2013 13:51:57

Technician: DM + RB

Class: B of the standard

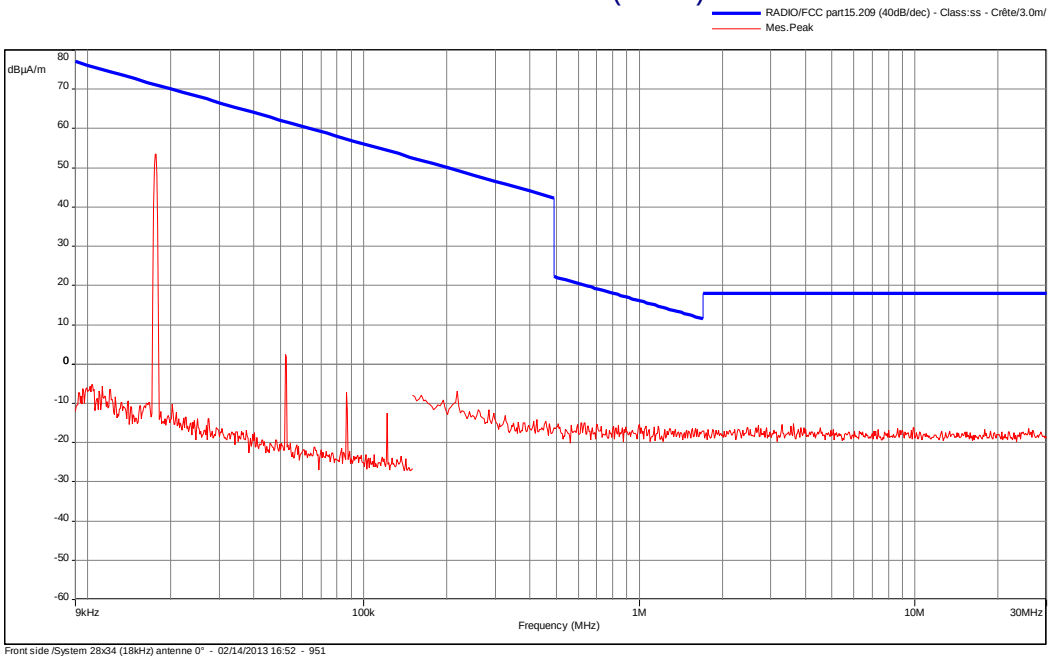
Detection:
Peak and average

T (°C): 24.1
H (%): 25
P (hpa): /

Modification(s) during test:

Radiated magnetic field emission (measurement) — EMI951

Front side / Search coil ∅28x34 (18kHz) antenna 0°



Front side /System 28x34 (18kHz) antenne 0° - 02/14/2013 16:52 - 951

Date: 14/02/2013 16:52:40

Technician: DM

Class: ss of the standard

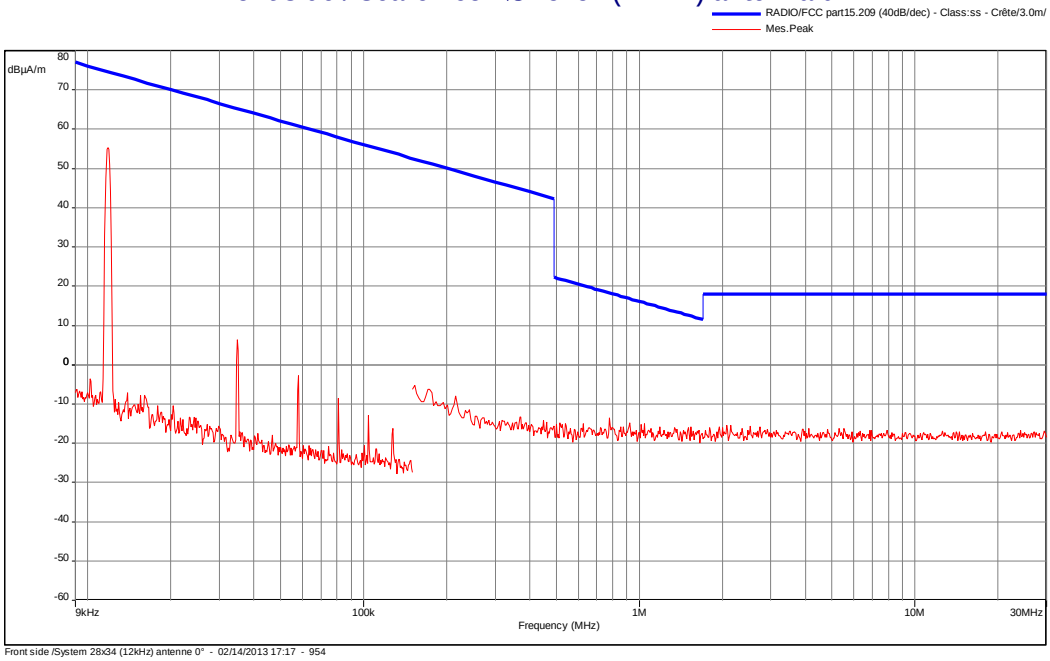
Detection:
Peak

T (°C): 25
H (%): 20.1
P (hpa): /

Modification(s) during test:

Radiated magnetic field emission (measurement) — EMI954

Front side / Search coil ∅28x34 (12kHz) antenna 0°



Front side /System 28x34 (12kHz) antenne 0° - 02/14/2013 17:17 - 954

Date: 14/02/2013 17:17:14

Technician: DM

Class: ss of the standard

Detection:
Peak

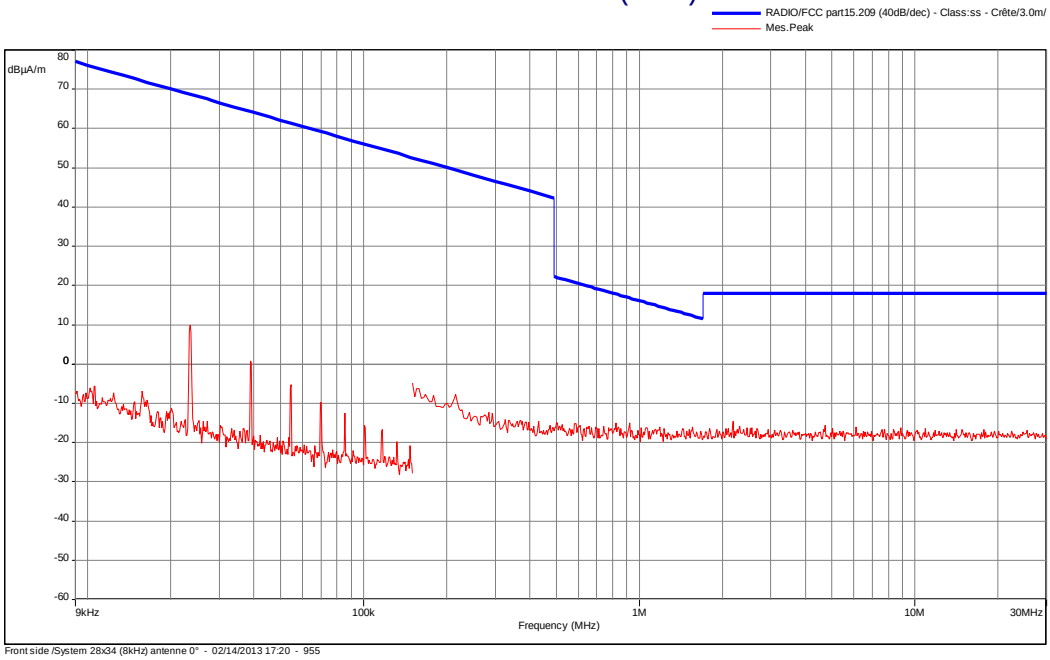
T (°C): 25
H (%): 20.1
P (hpa): /

Modification(s) during test:

Limit indicated on this plot is calculated with 40 dB/decade extrapolation factor and 51.5 dB conversion factor.

Radiated magnetic field emission (measurement) — EMI955

Front side / Search coil ∅28x34 (8kHz) antenna 0°



Front side /System 28x34 (8kHz) antenne 0° - 02/14/2013 17:20 - 955

Date: 14/02/2013 17:20:08

Technician: DM

Class: ss of the standard

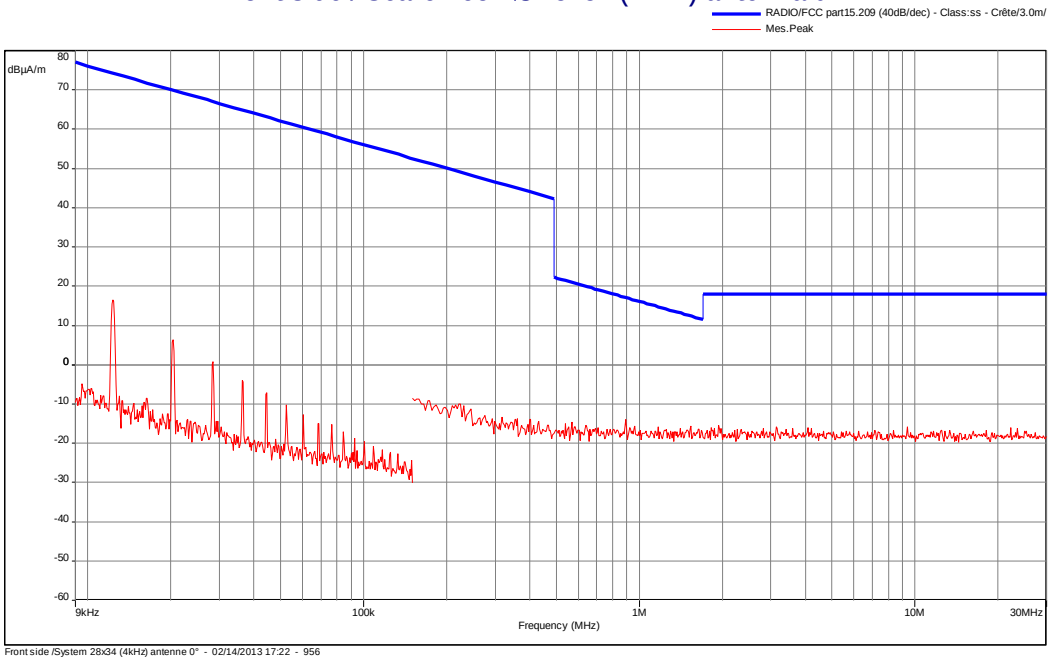
Detection:
Peak

T (°C): 25
H (%): 20.1
P (hpa): /

Modification(s) during test:

Radiated magnetic field emission (measurement) — EMI956

Front side / Search coil ∅28x34 (4kHz) antenna 0°



Front side /System 28x34 (4kHz) antenne 0° - 02/14/2013 17:22 - 956

Date: 14/02/2013 17:22:39

Technician: DM

Class: ss of the standard

Detection:
Peak

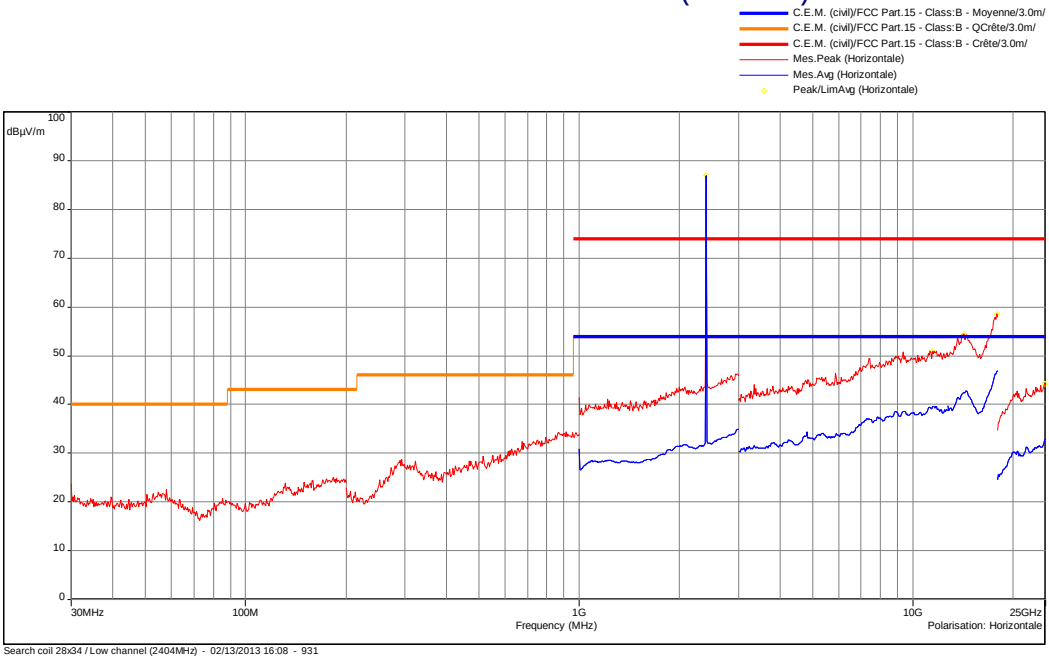
T (°C): 25
H (%): 20.1
P (hpa): /

Modification(s) during test:

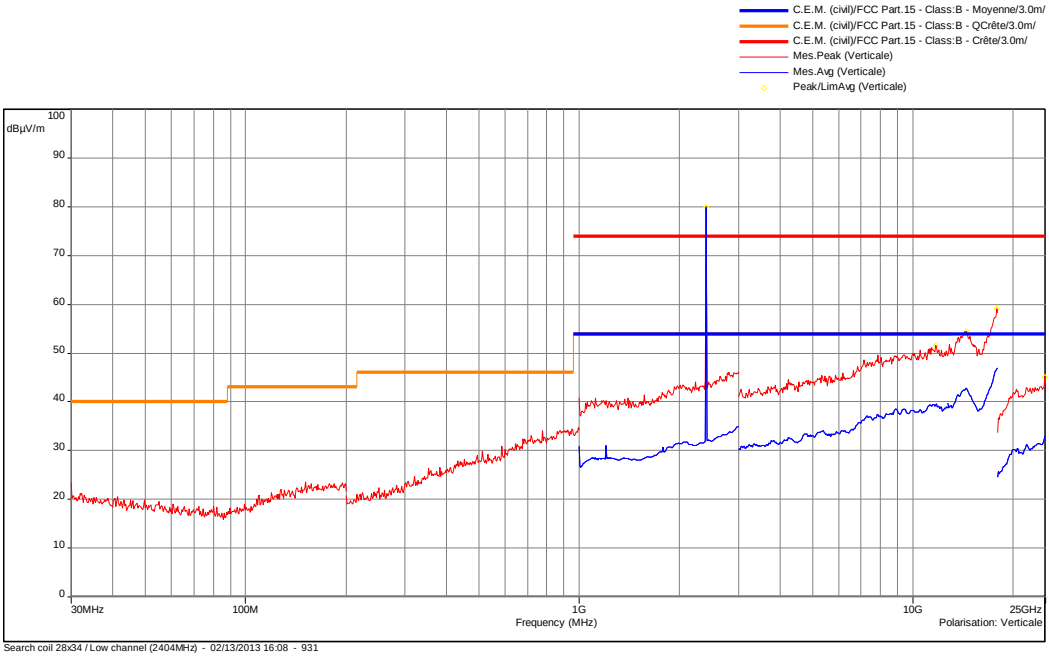
Limit indicated on this plot is calculated with 40 dB/decade extrapolation factor and 51.5 dB conversion factor.

Radiated electric emission (measurement) | EMI931

Search coil ∅28x34 / Low channel (2404MHz)



Search coil 28x34 / Low channel (2404MHz) - 02/13/2013 16:08 - 931



Search coil 28x34 / Low channel (2404MHz) - 02/13/2013 16:08 - 931

Date: 13/02/2013 16:08:04

Technician: DM + RB

Class: B of the standard

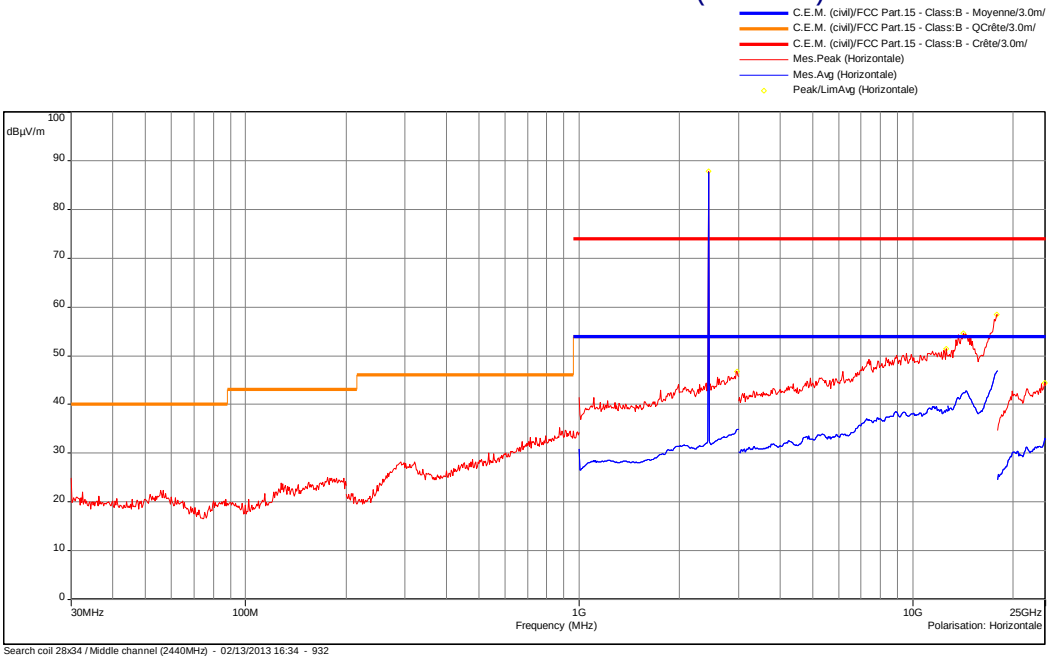
Detection:
Peak and average

T (°C): 24.1
H (%): 25
P (hpa): /

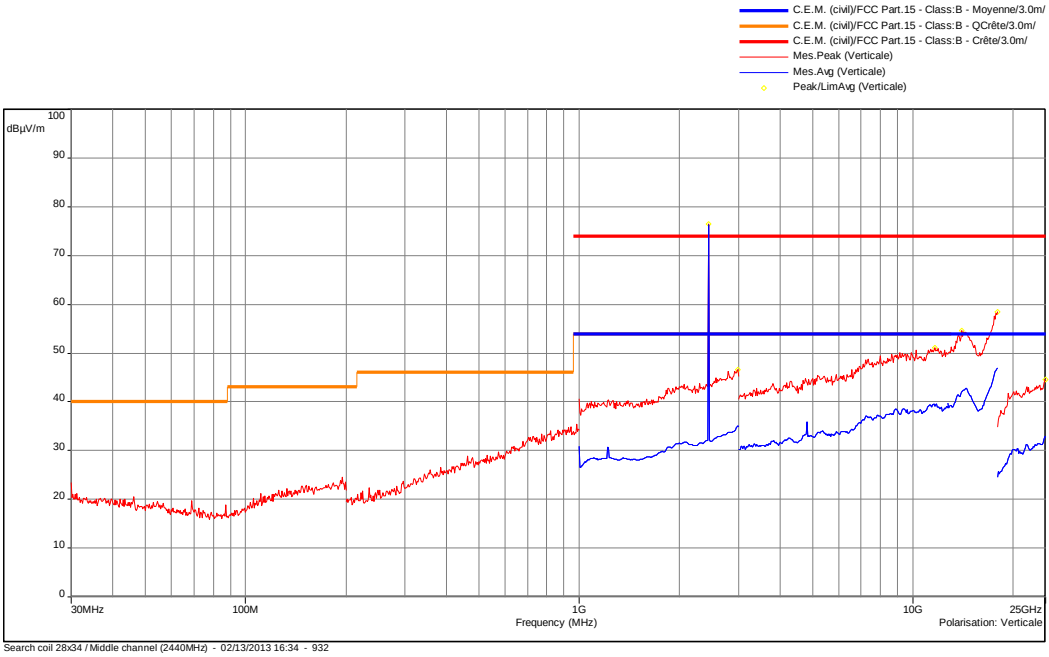
Modification(s) during test:

Radiated electric emission (measurement) | EMI932

Search coil ∅28x34 / Middle channel (2440MHz)



Search coil 28x34 / Middle channel (2440MHz) - 02/13/2013 16:34 - 932



Search coil 28x34 / Middle channel (2440MHz) - 02/13/2013 16:34 - 932

Date: 13/02/2013 16:34:48

Technician: DM + RB

Class: B of the standard

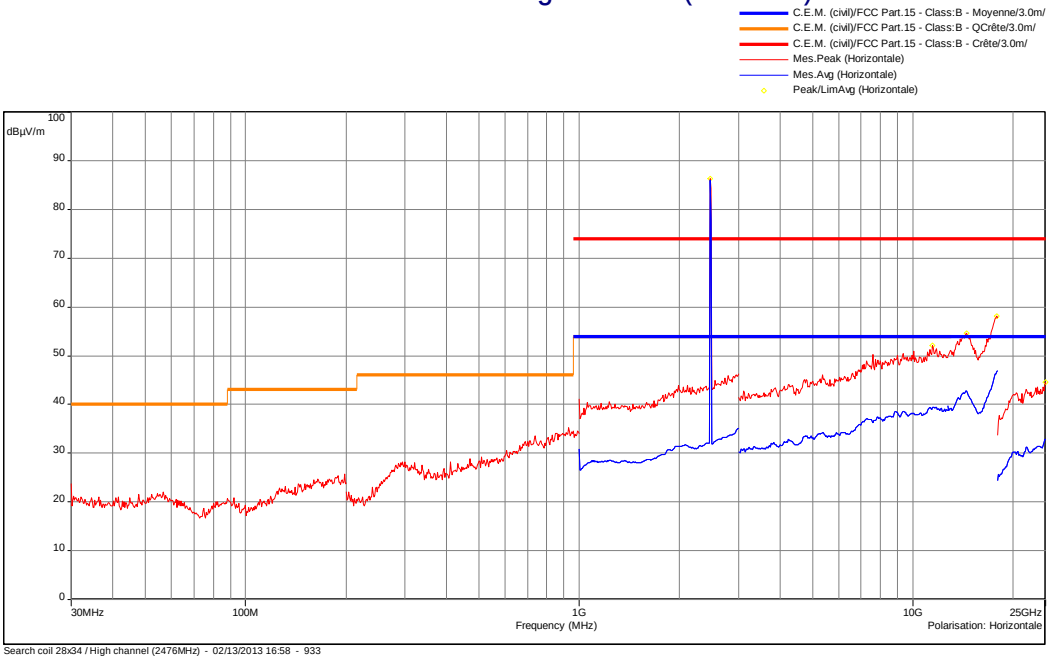
Detection:
Peak and average

T (°C): 24.1
H (%): 25
P (hpa): /

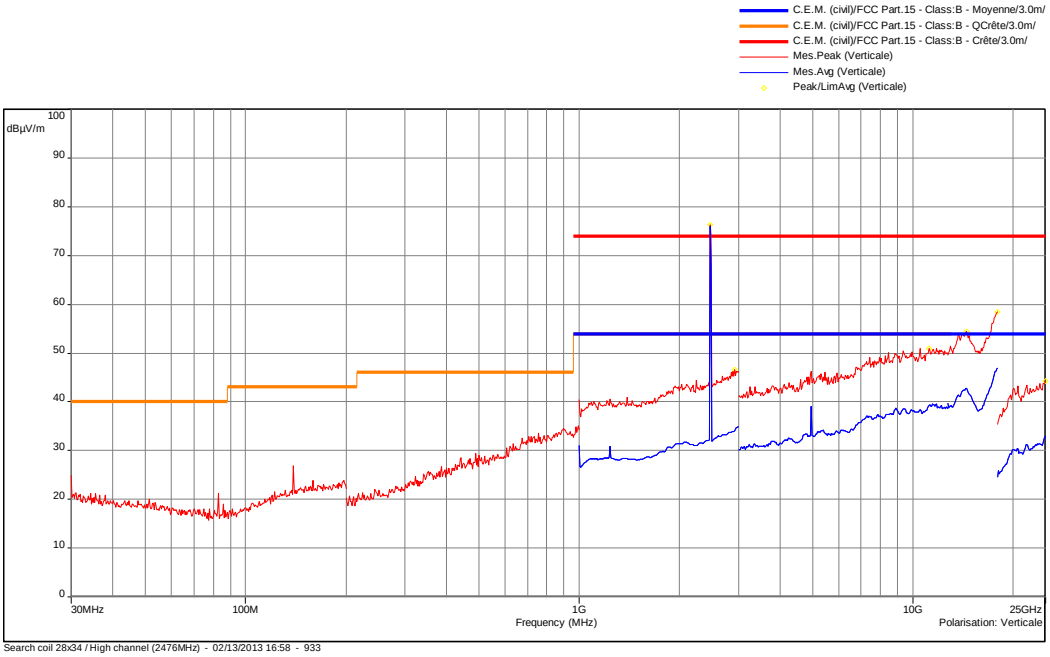
Modification(s) during test:

Radiated electric emission (measurement) | EMI933

Search coil ∅28x34 / High channel (2476MHz)



Search coil 28x34 / High channel (2476MHz) - 02/13/2013 16:58 - 933



Search coil 28x34 / High channel (2476MHz) - 02/13/2013 16:58 - 933

Date: 13/02/2013 16:58:39

Technician: DM + RB

Class: B of the standard

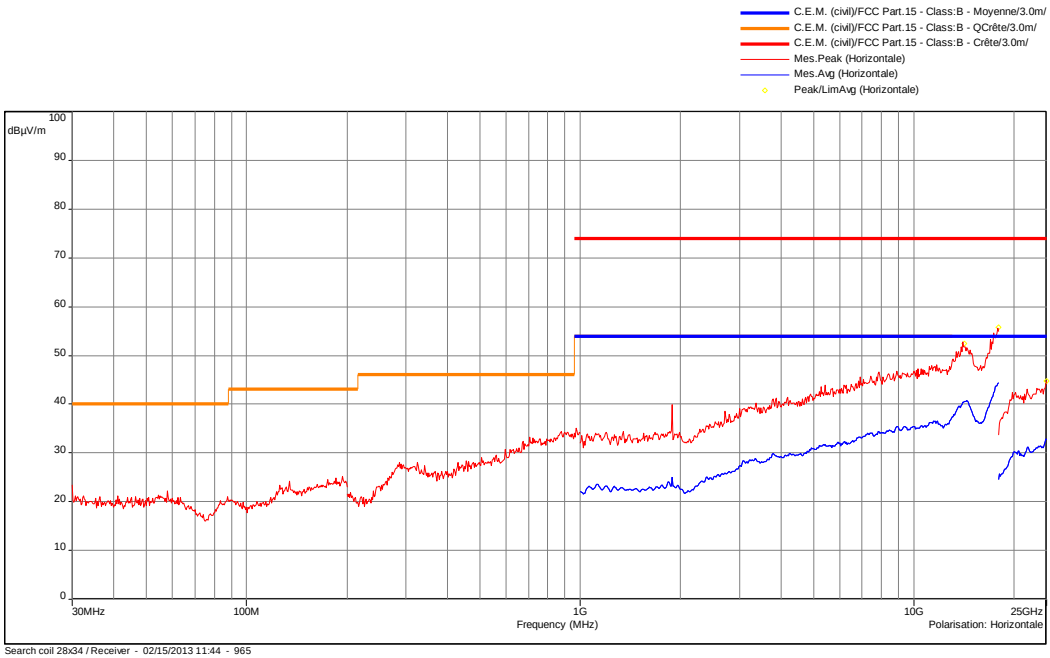
Detection:
Peak and average

T (°C): 24.1
H (%): 25
P (hpa): /

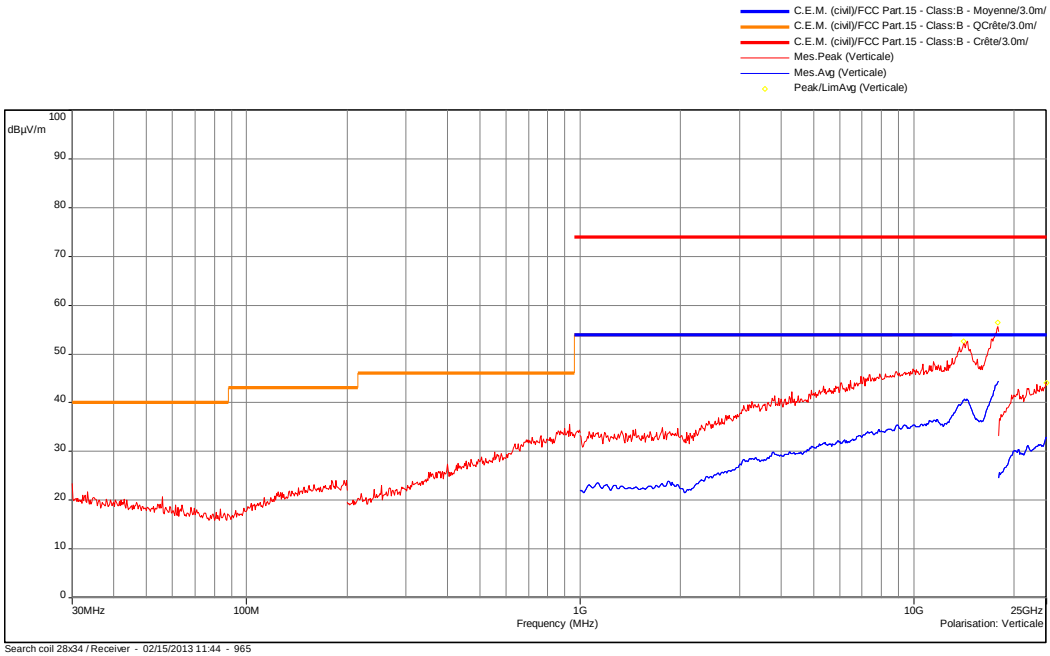
Modification(s) during test:

Radiated electric emission (measurement) — EMI965

Search coil 28x34 / Receiver



Search coil 28x34 / Receiver - 02/15/2013 11:44 - 965



Search coil 28x34 / Receiver - 02/15/2013 11:44 - 965

Date: 15/02/2013 11:44:47

Technician: DM + RB

Class: B of the standard

Detection:
Peak and average

T (°C): 24.1
H (%): 25
P (hpa): /

Modification(s) during test:

b) Measurement at 3 meters on open area test site:

Temperature (°C): 21 *Humidity (%HR):* 39 *Pressure (hPa):* 1004

Test configuration: For each measured frequencies, E.U.T. is set via a turntable in order to find the highest level. Test antenna is set between 1m and 4m in order to find the highest level in vertical and horizontal polarization. Only highest levels are recorded.

Frequency band	Initial position (0°)	Resolution bandwidth	Measuring distance	Detection mode	E.U.T. height
9kHz-150kHz	Front side	200Hz	3m	Peak	80cm
150kHz-30MHz	Front side	10kHz	3m	Peak	80cm
30MHz-1GHz	Front side	120kHz	3m	Quasi-peak	80cm
1GHz-25GHz	Front side	1MHz	3m	Average	80cm

Test method deviation: No

Test equipment list:

CATEGORY	BRAND	TYPE	N° EMITECH	CAL DATE	DUE DATE
Antenna	ETS LINDGREN	3117	5456	17-aug-2012	17-oct-2016
Antenna	Rohde & Schwarz	HL223	3126	03-mar-2011	03-may-2015
Antenna	Rohde & Schwarz	HFH2-Z2	5825	22-oct-2012	22-dec-2014
Antenna	Electro-Metrics	BIA-30HF	1107	03-mar-2011	03-may-2015
Antenna	IMC	WR42	1940	20-apr-2012	20-jun-2016
Antenna mast	Heinrich Deisel	MA240	4037	-	-
Cable	Cables & Connetiques	N-1.5m	4203	27-oct-2011	27-dec-2013
Cable	Huber Sumner	N-14m	8146	09-mar-2011	09-may-2013
Cable	N-7m	N-7m	9243	04-apr-2012	04-jun-2014
Cable	HP	SMA-1m	8955	10-jan-2013	10-mar-2015
Filter	Micro-Tronics	HPM 11630	4392	19-jan-2012	19-mar-2014
Mast controller	Heinrich Deisel	HD100	4036	-	-
Open area test site	Emitech	Salinelles	3482	04-mar-2011	04-may-2014
Preamplifier	IMPULSE	CA118-546ACN	9169	27-fev-2012	27-apr-2013
Receiver	Agilent	E4440A	5824	24-aug-2011	24-aug-2013
Turntable	Heinrich Deisel	D4420	4038	-	-

Results: In emission mode and receiver mode, all unwanted radiated spurious are at least 20 dB below specified limits

8. 20DB BANDWIDTH AND BAND EDGE COMPLIANCE

Standards: FCC part 15 Radio part 15.215 & RSS 210:2010

Test methods: FCC part 15 Radio part 15.215 c) & RSS 210:2010

Test configuration: Measurement is done on an Open Area Test Site. For each measured frequencies, E.U.T. is set via a turntable in order to find the highest level. Test antenna is set between 1m and 4m in order to find the highest level in vertical and horizontal polarization.

Test method deviation: No

Test equipment list:

CATEGORY	BRAND	TYPE	N° EMITECH	CAL DATE	DUE DATE
Antenna	ETS LINDGREN	3117	5456	17-aug-2012	17-oct-2016
Antenna mast	Heinrich Deisel	MA240	4037	-	-
Cable	Huber Sumner	N-14m	8146	09-mar-2011	09-may-2013
Mast controller	Heinrich Deisel	HD100	4036	-	-
Open area test site	Emitech	Salinelles	3482	04-mar-2011	04-may-2014
Receiver	Agilent	E4440A	5824	24-aug-2011	24-aug-2013
Turntable	Heinrich Deisel	D4420	4038	-	-

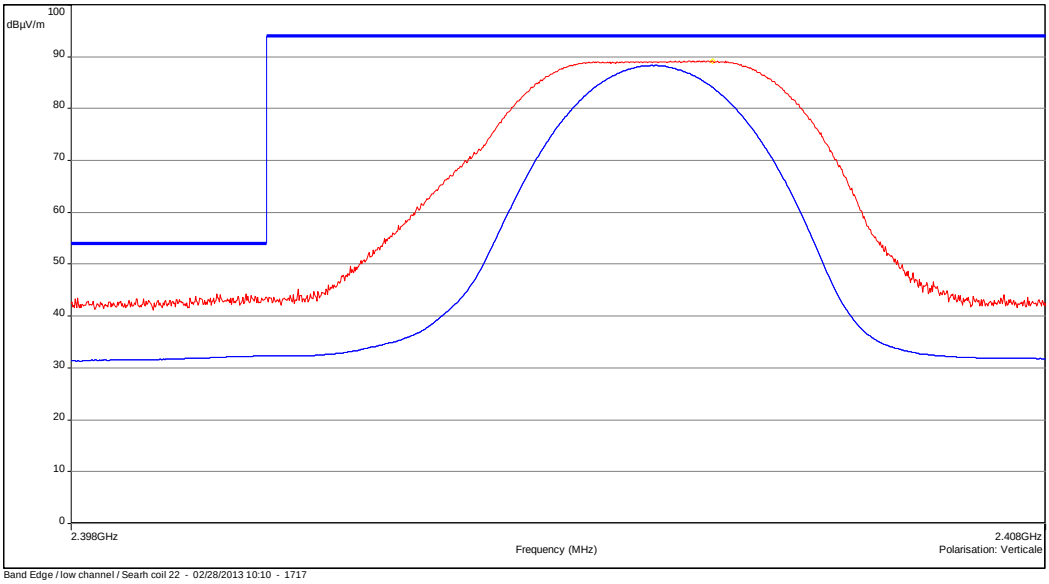
Results: See Graphs hereafter.

Band edge compliance — EMI1717

Low channel / Sear coil ∅22

Frequency (MHz) : 2.398 GHz - 2.408 GHz (Analyzer mode)
Settings: RBW: 1 MHz, VBW: 1 MHz, Holding time: 1 ms/Pt, sweep count 1
Polarisation : Verticale
Distance: 3 m

RADIO/Band Edge (2400-2483.5) 15.249 - Class:Op - Moyenne/3.0m/
Mes.Peak (Verticale)
Mes.Avg (Verticale)
Peak/LimAvg (Verticale)



Band Edge / low channel / Searh coil 22 - 02/28/2013 10:10 - 1717

Date: 28/02/2013 10:10:30

Technician: DM + RB

Class: Op of the standard

Detection:
Peak and average

T (°C): 24.1
H (%): 25
P (hap): /

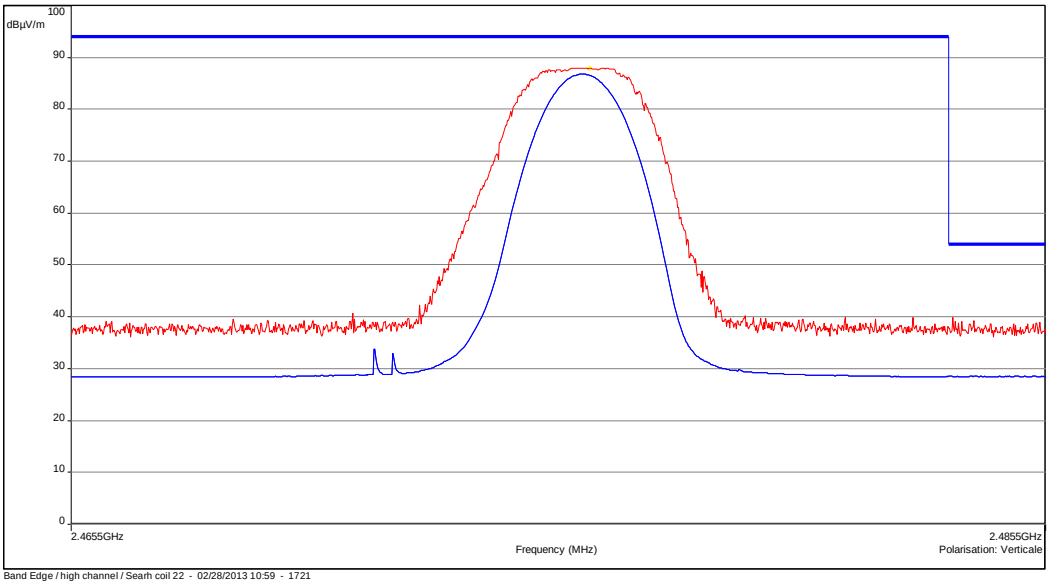
Modification(s) during test:

Radiated electric emission (measurement) — EMI1721

Band Edge / high channel / Sear coil ∅22

Frequency (MHz) : 2.4655 GHz - 2.4855 GHz (Analyzer mode)
Settings: RBW: 1 MHz, VBW: 1 MHz, Holding time: 1 ms/Pt, sweep count 1
Polarisation : Verticale
Distance: 3 m

RADIO/Band Edge (2400-2483.5) 15.249 - Class:Op - Moyenne/3.0m/
Mes.Peak (Verticale)
Mes.Avg (Verticale)
Peak/LimAvg (Verticale)



Band Edge / high channel / Searh coil 22 - 02/28/2013 10:59 - 1721

Date: 28/02/2013 10:59:09

Technician: DM + RB

Class: Op of the standard

Detection:
Peak and average

T (°C): 24.1
H (%): 25
P (hap): /

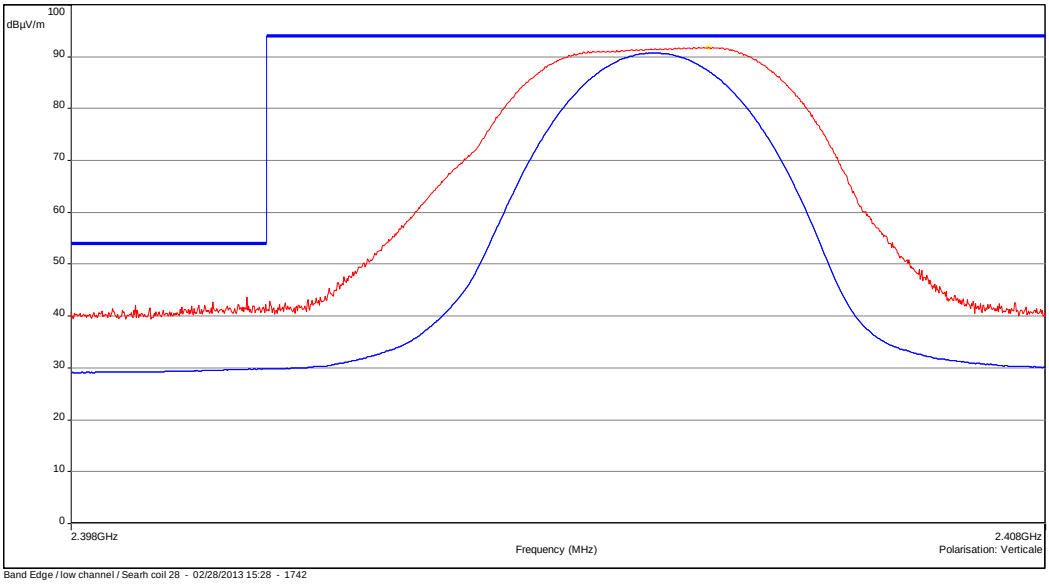
Modification(s) during test:

Radiated electric emission (measurement) — EMI1742

Band Edge / low channel / Sear coil Ø28

Frequency (MHz) : 2.398 GHz - 2.408 GHz (Analyzer mode)
Settings: RBW: 1 MHz, VBW: 1 MHz, Holding time: 1 ms/Pt, sweep count 1
Polarisation : Verticale
Distance: 3 m

RADIO/Band Edge (2400-2483.5) 15.249 - Class:Op - Moyenne/3.0m/
Mes.Peak (Verticale)
Mes.Avg (Verticale)
Peak/LimAvg (Verticale)



Band Edge / low channel / Searh coil 28 - 02/28/2013 15:28 - 1742

Date: 28/02/2013 15:28:54

Technician: DM + RB

Class: Op of the standard

Detection:
Peak and average

T (°C): 24.1
H (%): 25
P (hap): /

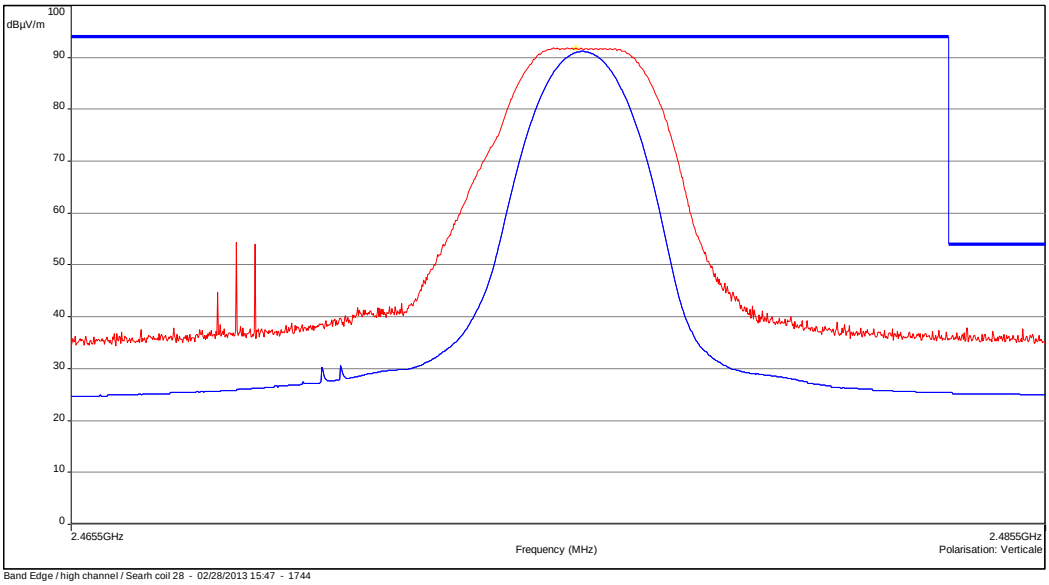
Modification(s) during test:

Radiated electric emission (measurement) — EMI1744

Band Edge / high channel / Sear coil Ø28

Frequency (MHz) : 2.4655 GHz - 2.4855 GHz (Analyzer mode)
Settings: RBW: 1 MHz, VBW: 1 MHz, Holding time: 1 ms/Pt, sweep count 1
Polarisation : Verticale
Distance: 3 m

RADIO/Band Edge (2400-2483.5) 15.249 - Class:Op - Moyenne/3.0m/
Mes.Peak (Verticale)
Mes.Avg (Verticale)
Peak/LimAvg (Verticale)



Band Edge / high channel / Searh coil 28 - 02/28/2013 15:47 - 1744

Date: 28/02/2013 15:47:17

Technician: DM + RB

Class: Op of the standard

Detection:
Peak and average

T (°C): 24.1
H (%): 25
P (hap): /

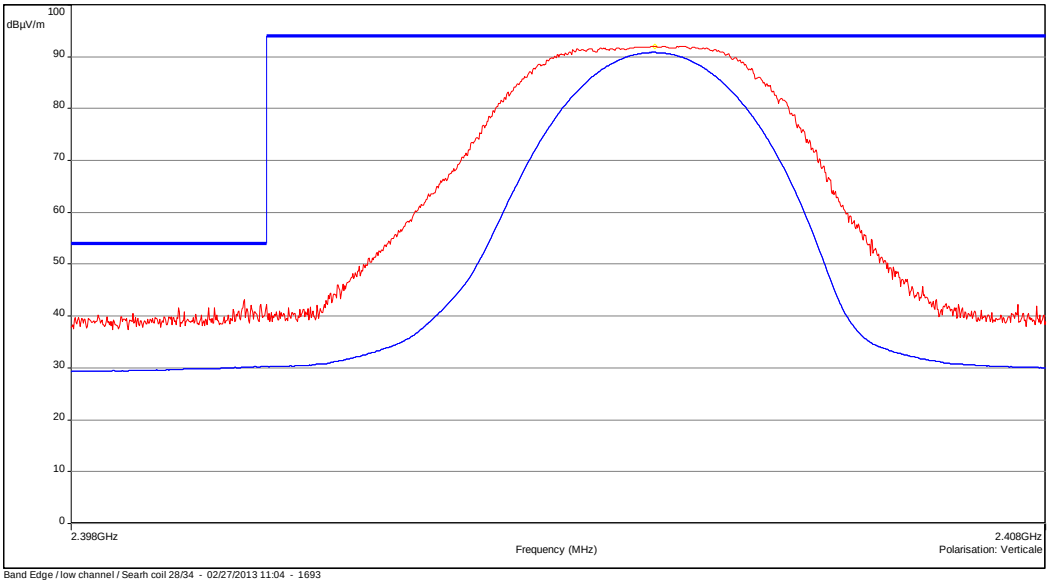
Modification(s) during test:

Radiated electric emission (measurement) — EMI1693

Band Edge / low channel / Sear coil ∅28/34

Frequency (MHz) : 2.398 GHz - 2.408 GHz (Analyzer mode)
Settings: RBW: 1 MHz, VBW: 1 MHz, Holding time: 1 ms/Pt, sweep count 1
Polarisation : Verticale
Distance: 3 m

RADIO/Band Edge (2400-2483.5) 15.249 - Class:Op - Moyenne/3.0m/
Mes.Peak (Verticale)
Mes.Avg (Verticale)
Peak/LimAvg (Verticale)



Band Edge / low channel / Searh coil 28/34 - 02/27/2013 11:04 - 1693

Date: 27/02/2013 11:04:43

Technician: DM + RB

Class: Op of the standard

Detection:
Peak and average

T (°C): 24.1
H (%): 25
P (hap): /

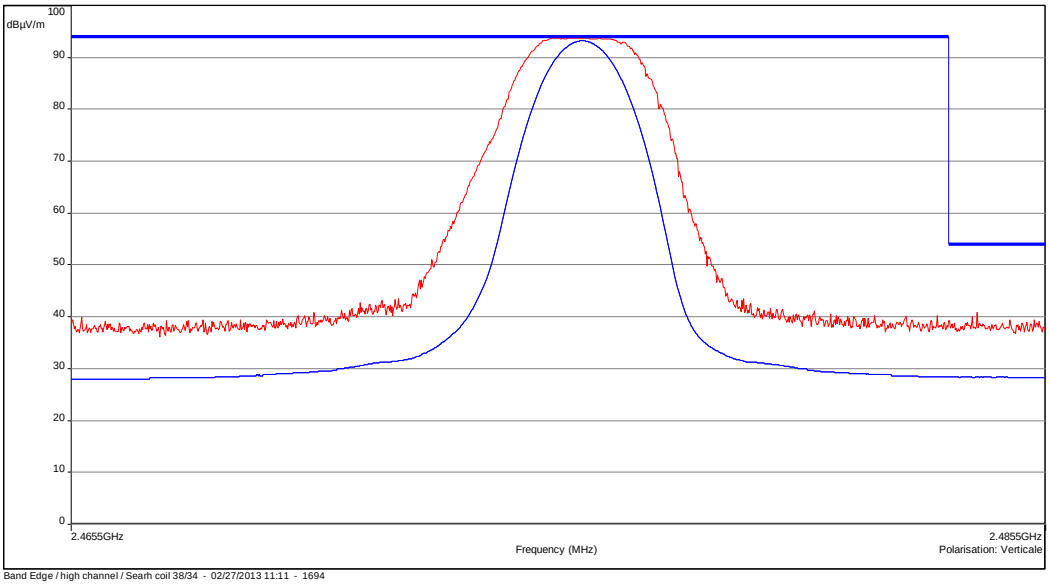
Modification(s) during test:

Radiated electric emission (measurement) — EMI1694

Band Edge / high channel / Sear coil ∅28/34

Frequency (MHz) : 2.4655 GHz - 2.4855 GHz (Analyzer mode)
Settings: RBW: 1 MHz, VBW: 1 MHz, Holding time: 1 ms/Pt, sweep count 1
Polarisation : Verticale
Distance: 3 m

RADIO/Band Edge (2400-2483.5) 15.249 - Class:Op - Moyenne/3.0m/
Mes.Peak (Verticale)
Mes.Avg (Verticale)
Peak/LimAvg (Verticale)



Band Edge / high channel / Searh coil 38/34 - 02/27/2013 11:11 - 1694

Date: 27/02/2013 11:11:10

Technician: DM + RB

Class: Op of the standard

Detection:
Peak and average

T (°C): 24.1
H (%): 25
P (hap): /

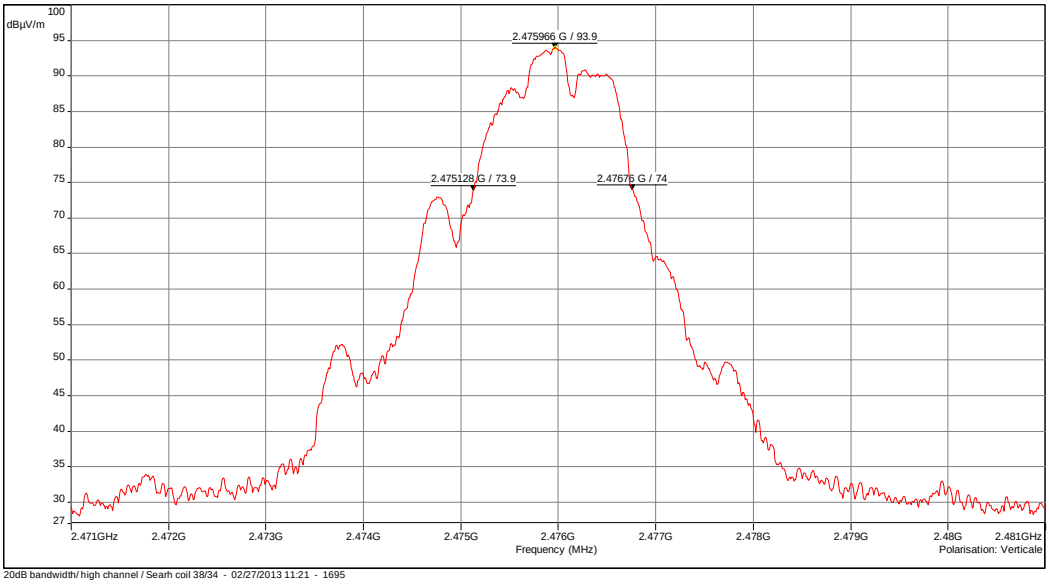
Modification(s) during test:

Radiated electric emission (measurement) — EMI1695

20dB bandwidth/ high channel / Sear coil Ø28/34

Frequency (MHz) : 2.471 GHz - 2.481 GHz (Analyzer mode)
Settings: RBW: 100 kHz, VBW: 300 kHz, Holding time: 1 ms/Pt, sweep count 1
Polarisation : Verticale
Distance: 3 m

Mes.Peak (Verticale)
Peak/LimAvg (Verticale)



20dB bandwidth/ high channel / Searh coil 38/34 - 02/27/2013 11:21 - 1695

Date: 27/02/2013 11:21:01

Technician: DM + RB

Class: Op of the standard

Detection:
Peak and average

T (°C): 24.1
H (%): 25
P (hap): /

Modification(s) during test:

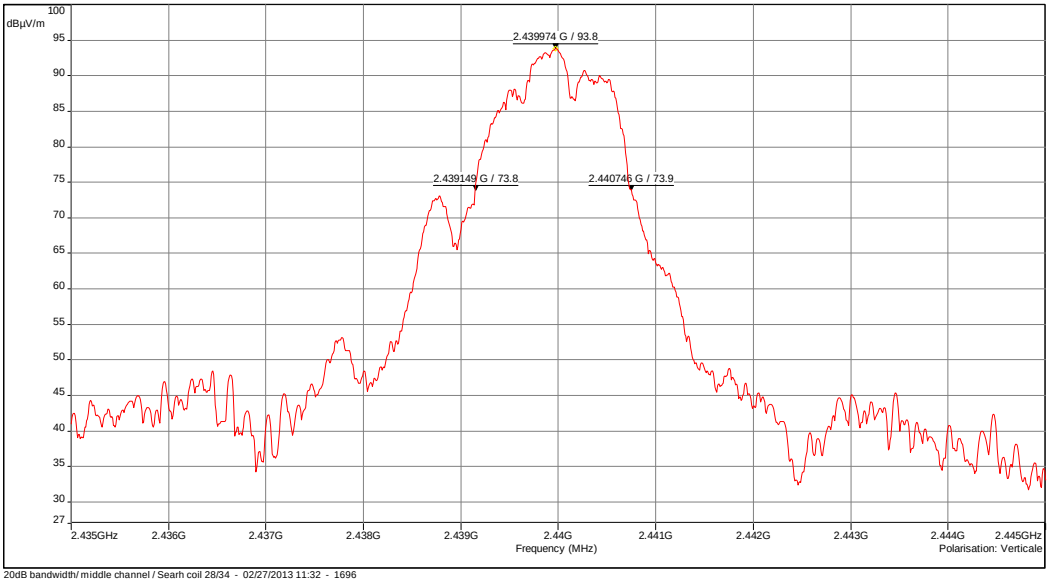
The 20dB bandwidth of fundamental is 1.63MHz (in RBW=100 kHz)

Radiated electric emission (measurement) — EMI1696

20dB bandwidth/ middle channel / Sear coil Ø28/34

Frequency (MHz) : 2.435 GHz - 2.445 GHz (Analyzer mode)
Settings: RBW: 100 kHz, VBW: 300 kHz, Holding time: 1 ms/Pt, sweep count 1
Polarisation : Verticale
Distance: 3 m

Mes.Peak (Verticale)
Peak/LimAvg (Verticale)



20dB bandwidth/ middle channel / Searh coil 28/34 - 02/27/2013 11:32 - 1696

Date: 27/02/2013 11:32:04

Technician: DM + RB

Class: Op of the standard

Detection:
Peak and average

T (°C): 24.1
H (%): 25
P (hap): /

Modification(s) during test:

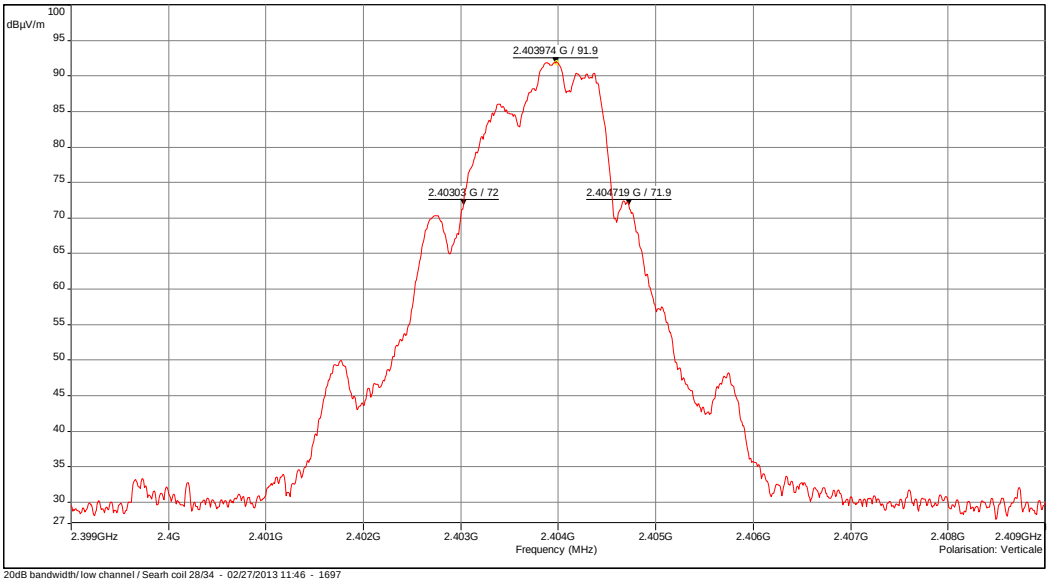
The 20dB bandwidth of fundamental is 1.60MHz (in RBW=100 kHz)

Radiated electric emission (measurement) | EMI1697

20dB bandwidth/ low channel / Sear coil ∅28/34

Frequency (MHz) : 2.399 GHz - 2.409 GHz (Analyzer mode)
Settings: RBW: 100 kHz, VBW: 300 kHz, Holding time: 1 ms/Pt, sweep count 1
Polarisation : Verticale
Distance: 3 m

Mes.Peak (Verticale)
Peak/LimAvg (Verticale)



20dB bandwidth/ low channel / Searh coil 28/34 - 02/27/2013 11:46 - 1697

Date: 27/02/2013 11:46:41

Technician: DM + RB

Class: Op of the standard

Detection:
Peak and average

T (°C): 24.1
H (%): 25
P (hap): /

Modification(s) during test:

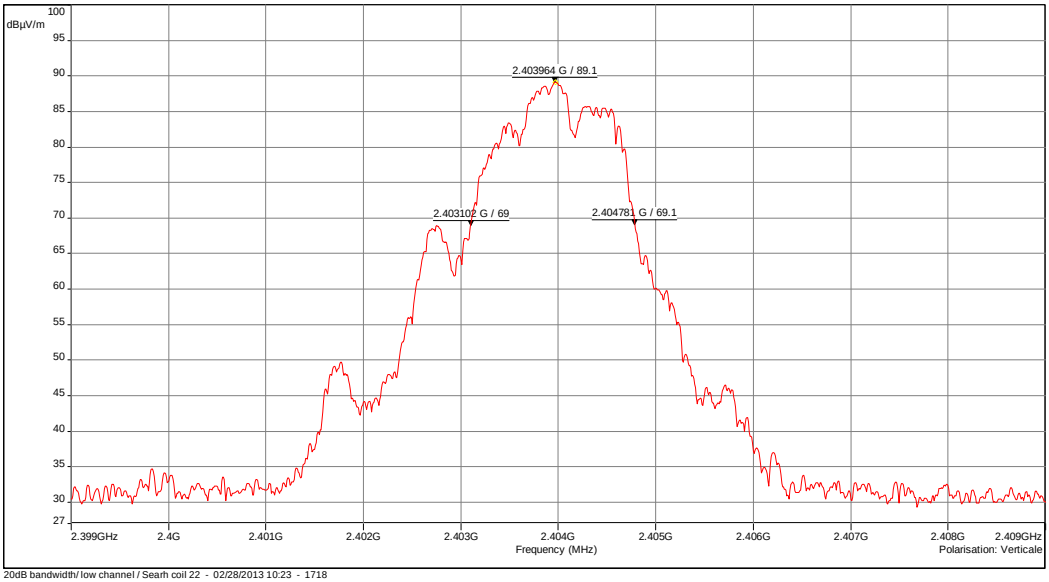
The 20dB bandwidth of fundamental is 1.69MHz (in RBW=100 kHz)

Radiated electric emission (measurement) — EMI1718

20dB bandwidth/ low channel / Sear coil Ø22

Frequency (MHz) : 2.399 GHz - 2.409 GHz (Analyzer mode)
Settings: RBW: 100 kHz, VBW: 300 kHz, Holding time: 1 ms/Pt, sweep count 1
Polarisation : Verticale
Distance: 3 m

Mes.Peak (Verticale)
Peak/LimAvg (Verticale)



20dB bandwidth/ low channel / Searh coil 22 - 02/28/2013 10:23 - 1718

Date: 28/02/2013 10:23:09

Technician: DM + RB

Class: Op of the standard

Detection:
Peak and average

T (°C): 24.1
H (%): 25
P (hap): /

Modification(s) during test:

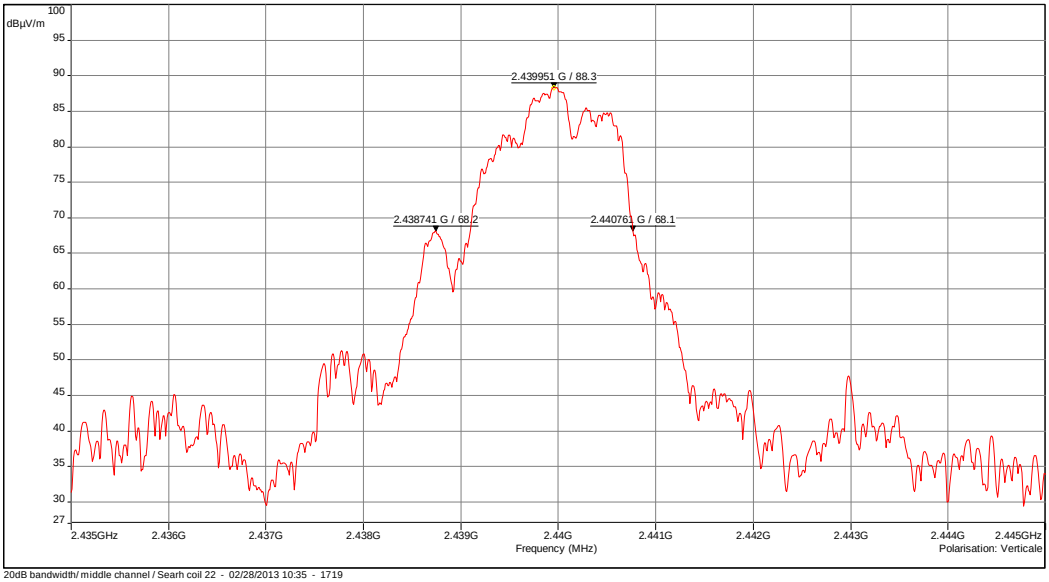
The 20dB bandwidth of fundamental is 1.68MHz (in RBW=100 kHz)

Radiated electric emission (measurement) — EMI1719

20dB bandwidth/ middle channel / Sear coil Ø22

Frequency (MHz) : 2.435 GHz - 2.445 GHz (Analyzer mode)
Settings: RBW: 100 kHz, VBW: 300 kHz, Holding time: 1 ms/Pt, sweep count 1
Polarisation : Verticale
Distance: 3 m

Mes.Peak (Verticale)
Peak/LimAvg (Verticale)



20dB bandwidth/ middle channel / Searh coil 22 - 02/28/2013 10:35 - 1719

Date: 28/02/2013 10:35:35

Technician: DM + RB

Class: Op of the standard

Detection:
Peak and average

T (°C): 24.1
H (%): 25
P (hap): /

Modification(s) during test:

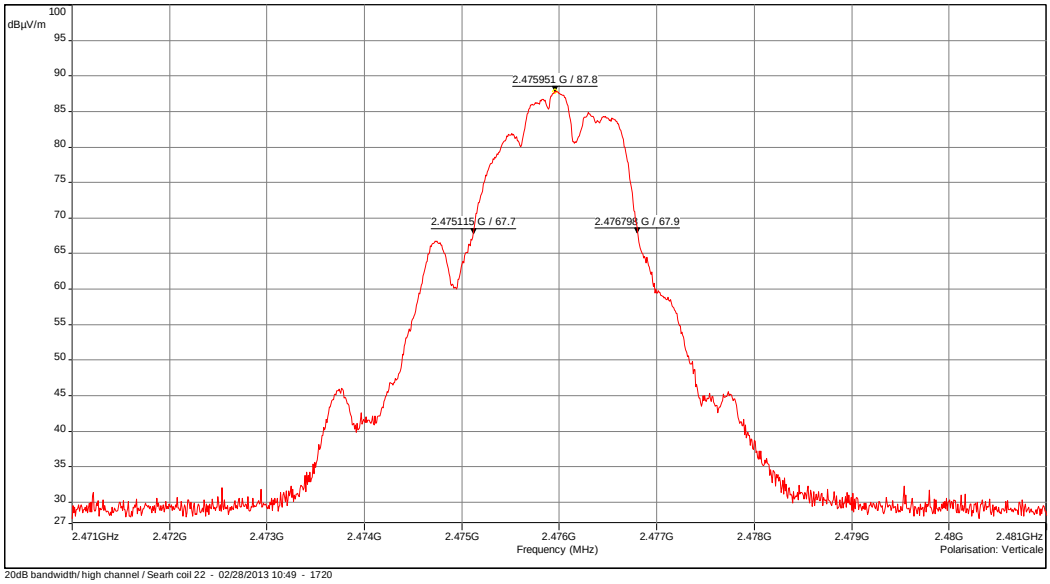
The 20dB bandwidth of fundamental is 2.02MHz (in RBW=100 kHz)

Radiated electric emission (measurement)	EMI1720

20dB bandwidth/ high channel / Sear coil ∅22

Frequency (MHz) : 2.471 GHz - 2.481 GHz (Analyzer mode)
Settings: RBW: 100 kHz, VBW: 300 kHz, Holding time: 1 ms/Pt, sweep count 1
Polarisation : Verticale
Distance: 3 m

Mes.Peak (Verticale)
Peak/LimAvg (Verticale)



20dB bandwidth/ high channel / Searh coil 22 - 02/28/2013 10:49 - 1720

Date: 28/02/2013 10:49:41

Technician: DM + RB

Class: Op of the standard

Detection:
Peak and average

T (°C): 24.1
H (%): 25
P (hap): /

Modification(s) during test:

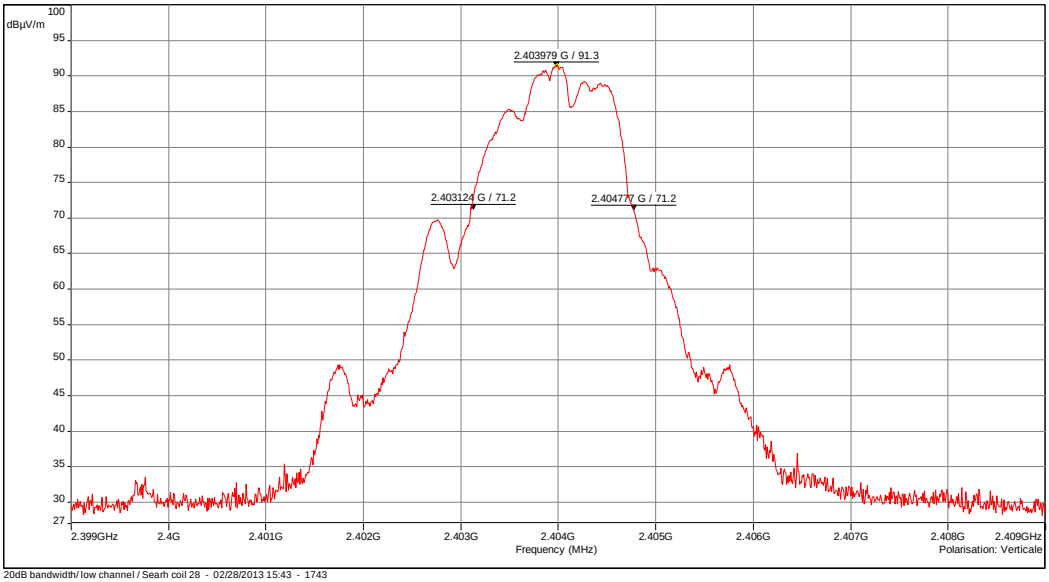
The 20dB bandwidth of fundamental is 1.68MHz (in RBW=100 kHz)

Radiated electric emission (measurement) — EMI1743

20dB bandwidth/ low channel / Sear coil Ø28

Frequency (MHz) : 2.399 GHz - 2.409 GHz (Analyzer mode)
Settings: RBW: 100 kHz, VBW: 300 kHz, Holding time: 1 ms/Pt, sweep count 1
Polarisation : Verticale
Distance: 3 m

Mes.Peak (Verticale)
Peak/LimAvg (Verticale)



20dB bandwidth/ low channel / Searh coil 28 - 02/28/2013 15:43 - 1743

Date: 28/02/2013 15:43:14

Technician: DM + RB

Class: Op of the standard

Detection:
Peak and average

T (°C): 24.1
H (%): 25
P (hap): /

Modification(s) during test:

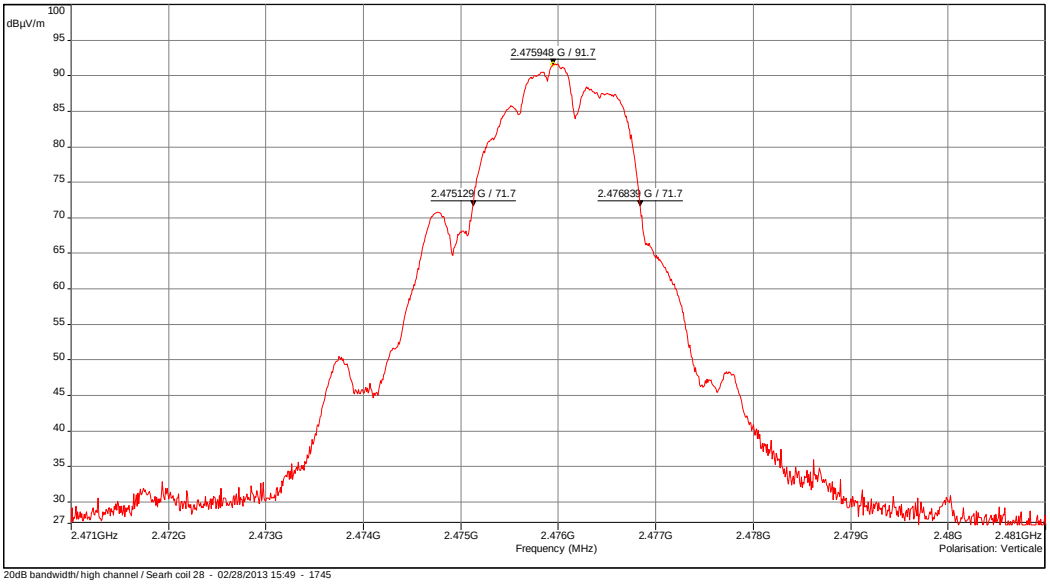
The 20dB bandwidth of fundamental is 1.65MHz (in RBW=100 kHz)

Radiated electric emission (measurement) — EMI1745

20dB bandwidth/ high channel / Sear coil Ø28

Frequency (MHz) : 2.471 GHz - 2.481 GHz (Analyzer mode)
Settings: RBW: 100 kHz, VBW: 300 kHz, Holding time: 1 ms/Pt, sweep count 1
Polarisation : Verticale
Distance: 3 m

Mes.Peak (Verticale)
Peak/LimAvg (Verticale)



20dB bandwidth/ high channel / Searh coil 28 - 02/28/2013 15:49 - 1745

Date: 28/02/2013 15:49:14

Technician: DM + RB

Class: Op of the standard

Detection:
Peak and average

T (°C): 24.1
H (%): 25
P (hap): /

Modification(s) during test:

The 20dB bandwidth of fundamental is 1.71MHz (in RBW=100 kHz)

End of report – 1 annex to be forwarded

ANNEX:
PHOTOGRAPH(S)

EQUIPMENT UNDER TEST (E.U.T.) PHOTOGRAPH(S)

SEARCH COIL

Search coil ∅28	
Search coil ∅22	

Radiated emissions Search coil ∅28/34	
Radiated emissions Search coil ∅22	

Radiated emissions Search coil ∅28