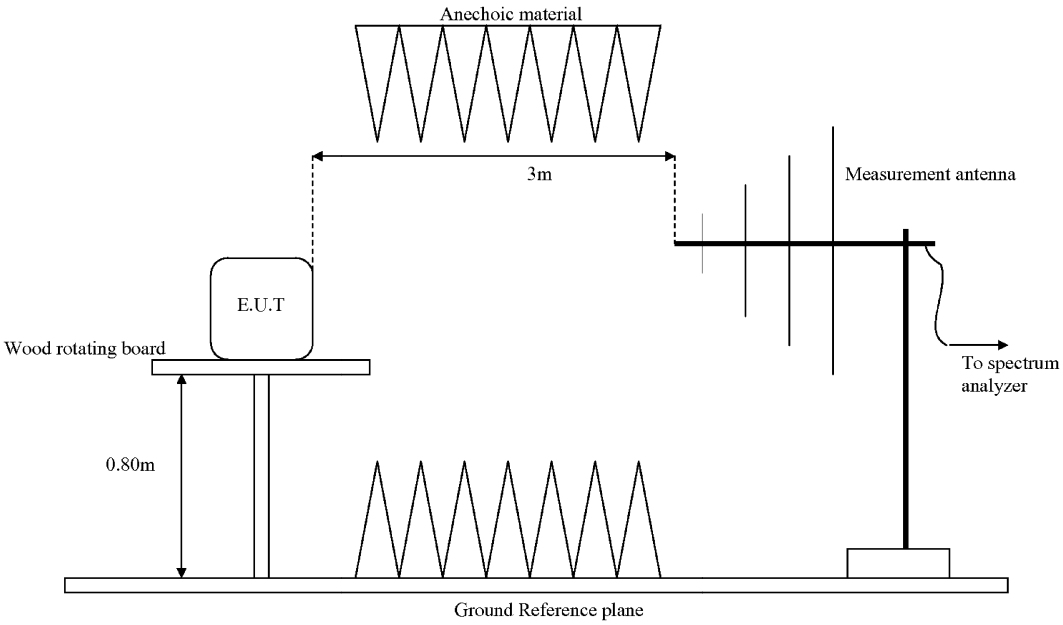
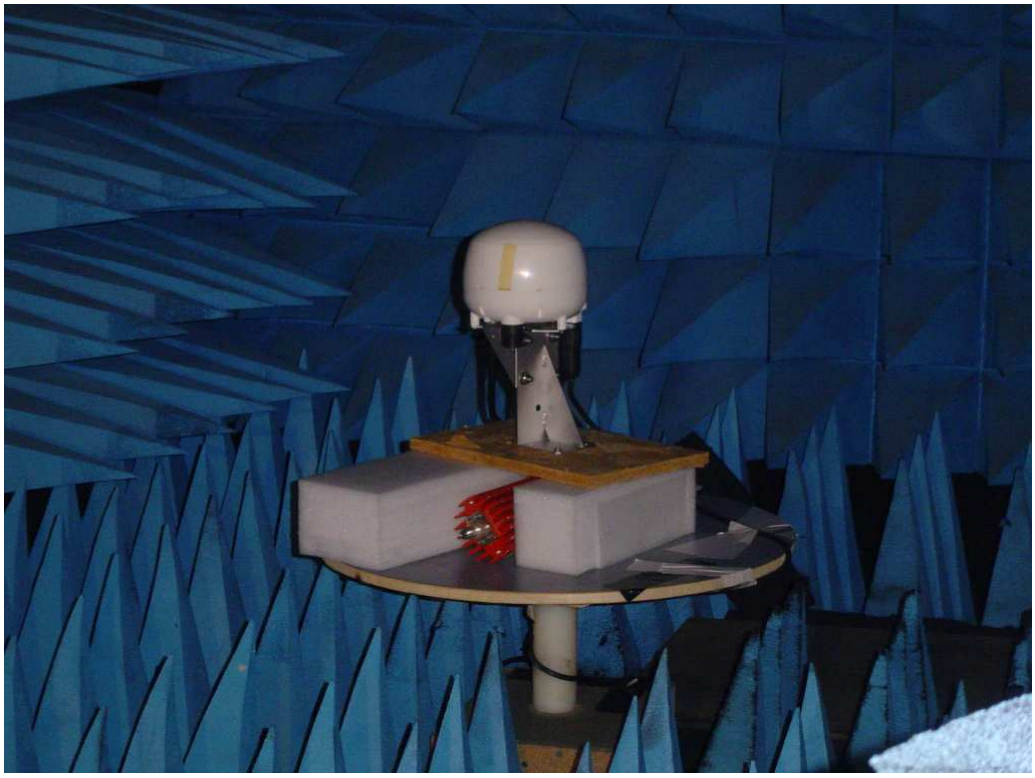
13.8. RADIATED EMISSIONS FROM ENCLOSURE PORT

TESTS CONDITIONS



The result is obtained by calculation.

Result = Spectrum result + cable attenuation - Antenna factor + Space attenuation



Position of EUT for radiated emissions measurement

13.8.1. RECEIVER 161.975MHZ : ON 12 VDC POWER LINE

FREQUENCY BAND : 150kHz – 30MHz SPURIOUS EMISSION LEVELS DBµV/m AT 3m		
Frequency (KHz)	**Results**	**Limits**
6.9	13.21	**80 – 52** **52 – 34**

HORIZONTAL POLARIZATION

FREQUENCY BAND : 30MHz – 2GHz SPURIOUS EMISSION LEVELS DBµV/m AT 3m		
Frequency (MHz)	**Results**	**Limits**
256.9	32.51	**54**
1471.1	48.62	

FREQUENCY BAND : 156MHz – 165MHz SPURIOUS EMISSION LEVELS DBµV/m AT 3m		
Frequency (MHz)	**Results**	**Limits**
159.0	15.05	**30**

VERTICAL POLARIZATION

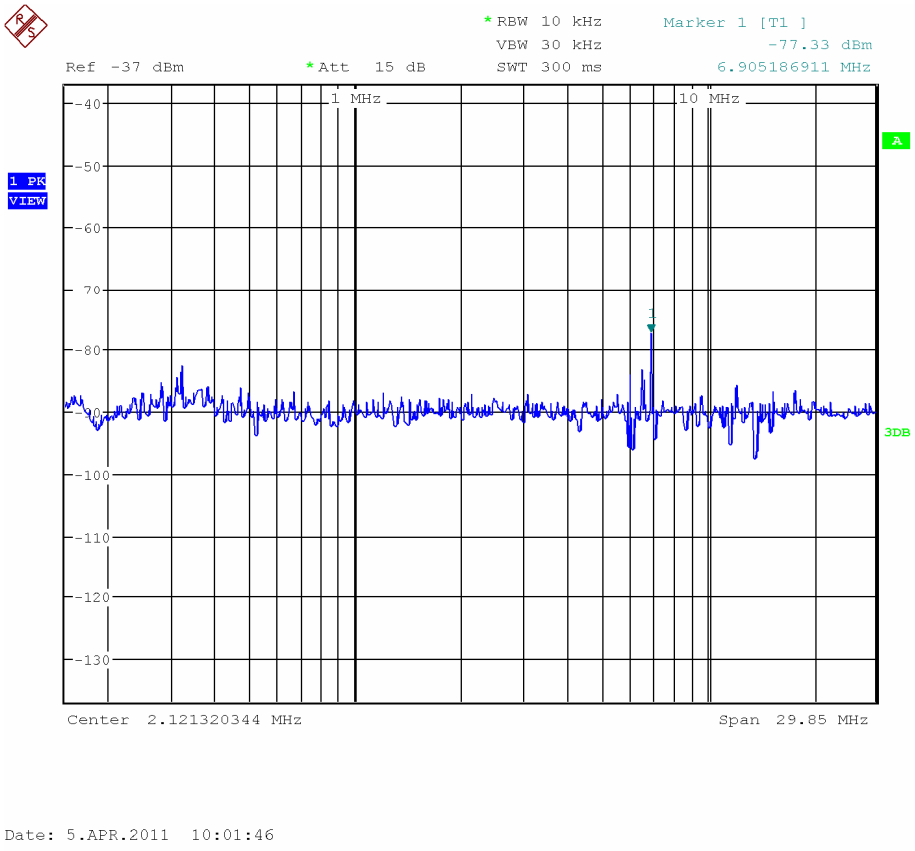
FREQUENCY BAND : 30MHz – 2GHz SPURIOUS EMISSION LEVELS DBµV/m AT 3m		
Frequency (MHz)	**Results**	**Limits**
50.2	38.95	**54**
1541.7	48.61	

FREQUENCY BAND : 156MHz – 165MHz SPURIOUS EMISSION LEVELS DBµV/m AT 3m		
Frequency (MHz)	**Results**	**Limits**
160.3	15.23	**30**

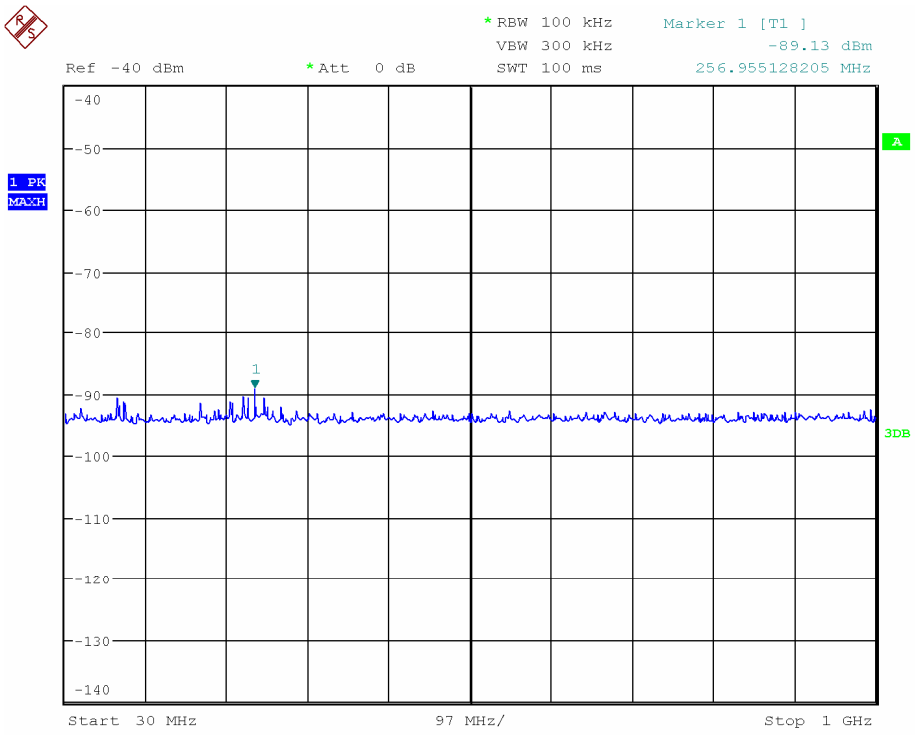
Result :	COMPLIANT

Comments :

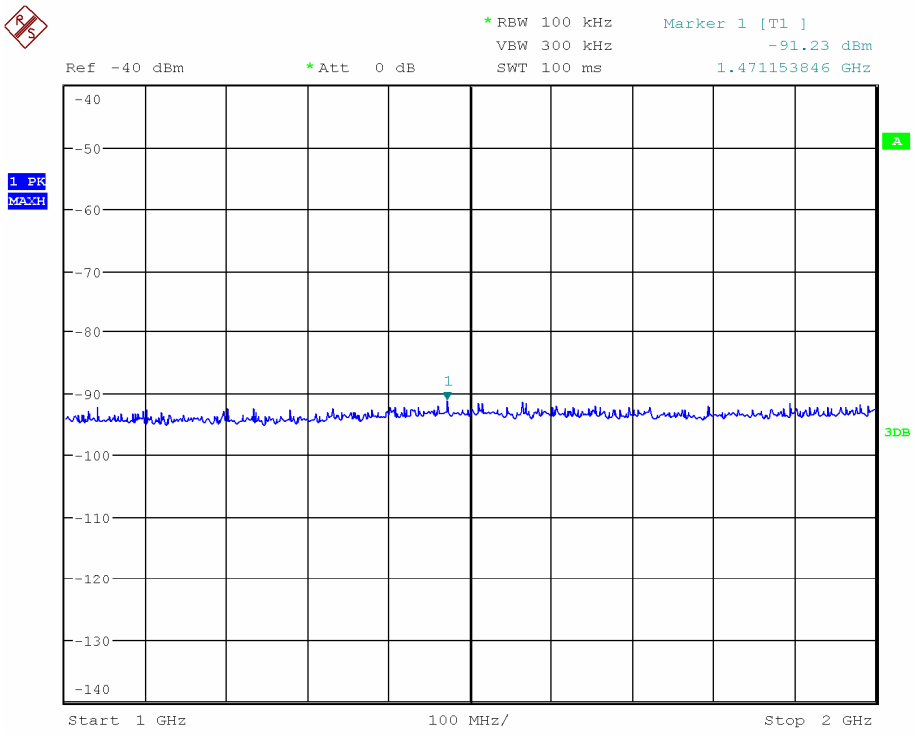
13.8.2. RADIATION GRAPHS



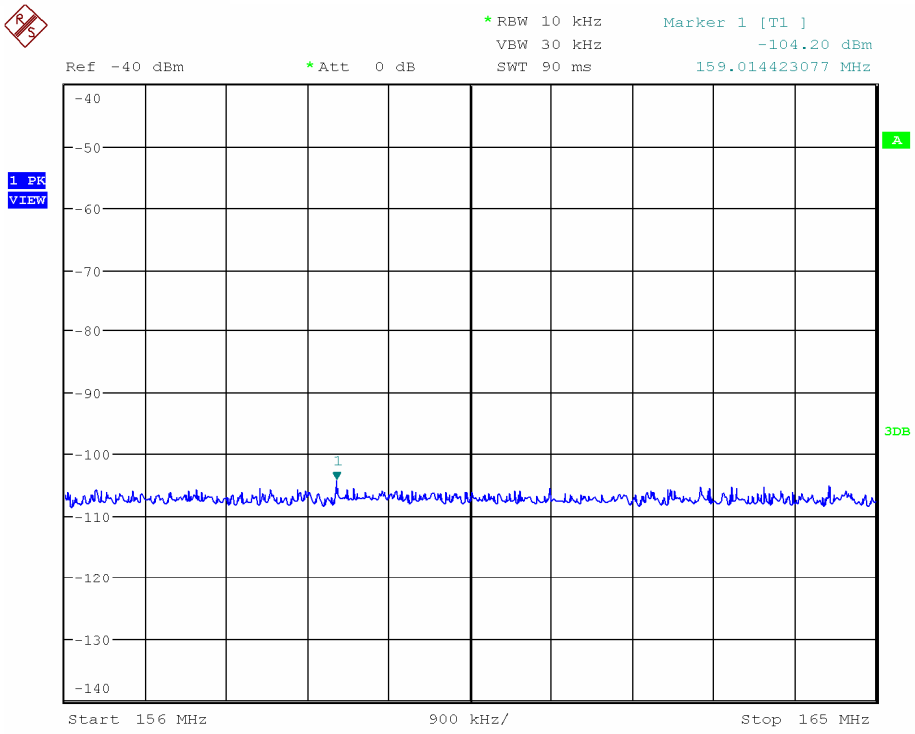
HORIZONTAL POLARIZATION



Date: 22.MAR.2011 11:43:07

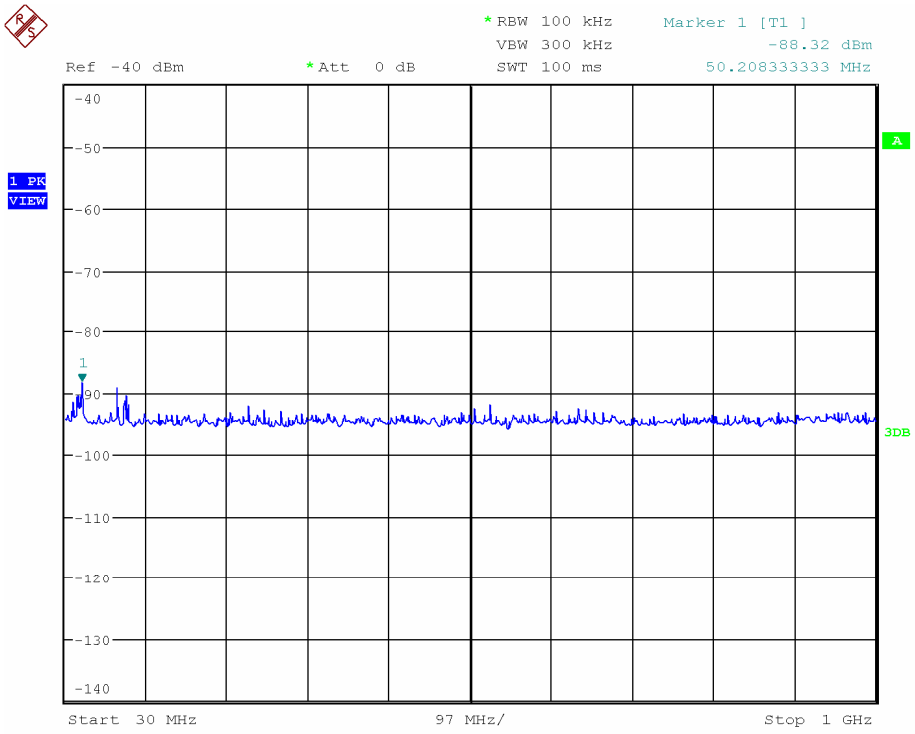


Date: 22.MAR.2011 13:50:20

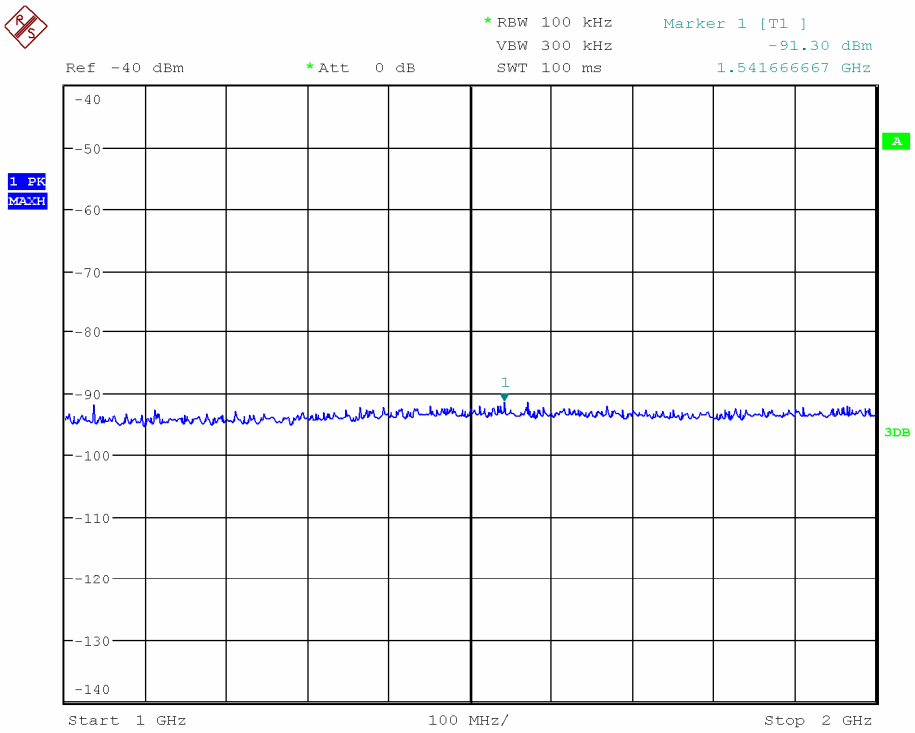


Date: 22.MAR.2011 11:24:14

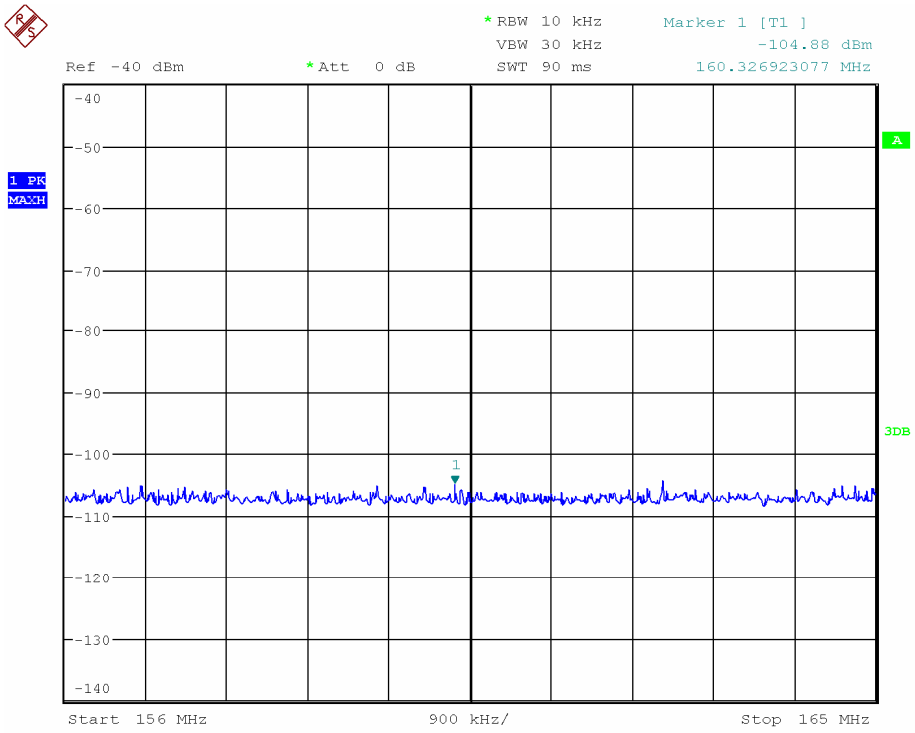
VERTICAL POLARIZATION



Date: 22.MAR.2011 11:45:33



Date: 22.MAR.2011 13:42:01



Date: 22.MAR.2011 11:47:03

13.8.3. RECEIVER 161.975MHZ : ON 24 VDC POWER LINE

FREQUENCY BAND : 150kHz – 30MHz SPURIOUS EMISSION LEVELS DBµV/m AT 3m		
Frequency (KHz)	**Results**	**Limits**
6.9	**12.55**	**80 – 52** **52 – 34**

HORIZONTAL POLARIZATION

FREQUENCY BAND : 30MHz – 2GHz SPURIOUS EMISSION LEVELS DBµV/m AT 3m		
Frequency (MHz)	**Results**	**Limits**
191.7	**28.84**	**54**
1814.1	**49.20**	

FREQUENCY BAND : 156MHz – 165MHz SPURIOUS EMISSION LEVELS DBµV/m AT 3m		
Frequency (MHz)	**Results**	**Limits**
160.6	**15.55**	**30**

VERTICAL POLARIZATION

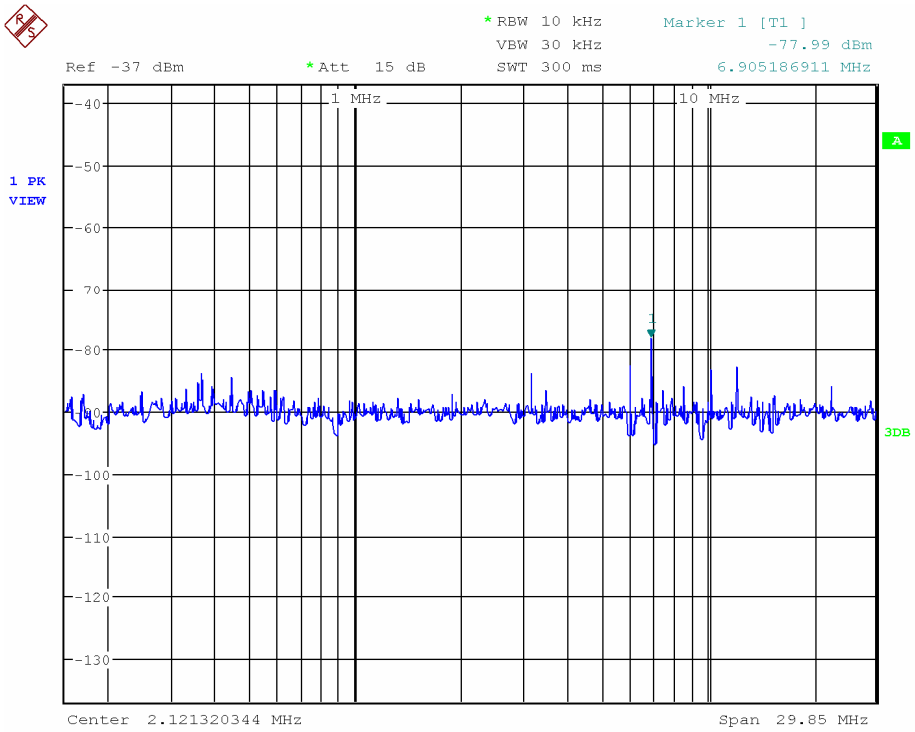
FREQUENCY BAND : 30MHz – 2GHz SPURIOUS EMISSION LEVELS DBµV/m AT 3m		
Frequency (MHz)	**Results**	**Limits**
249.2	**31.03**	**54**
1653.8	**49.24**	

FREQUENCY BAND : 156MHz – 165MHz SPURIOUS EMISSION LEVELS DBµV/m AT 3m		
Frequency (MHz)	**Results**	**Limits**
164.3	**15.31**	**30**

Result :	**COMPLIANT**

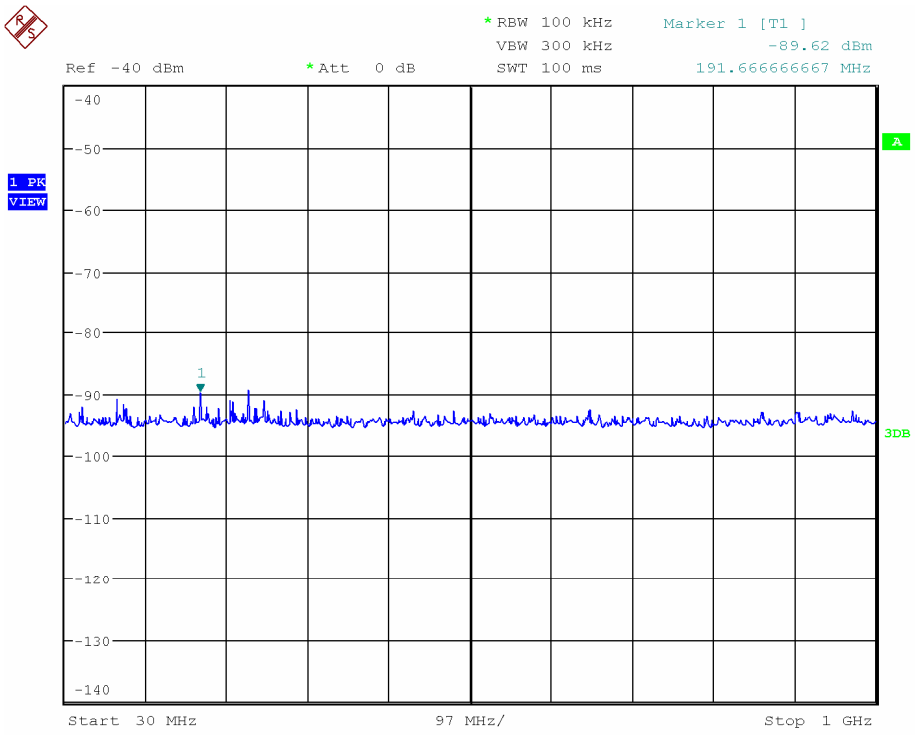
Comments :

13.8.4. RADIATION GRAPHS



Date: 5.APR.2011 10:03:59

HORIZONTAL POLARIZATION



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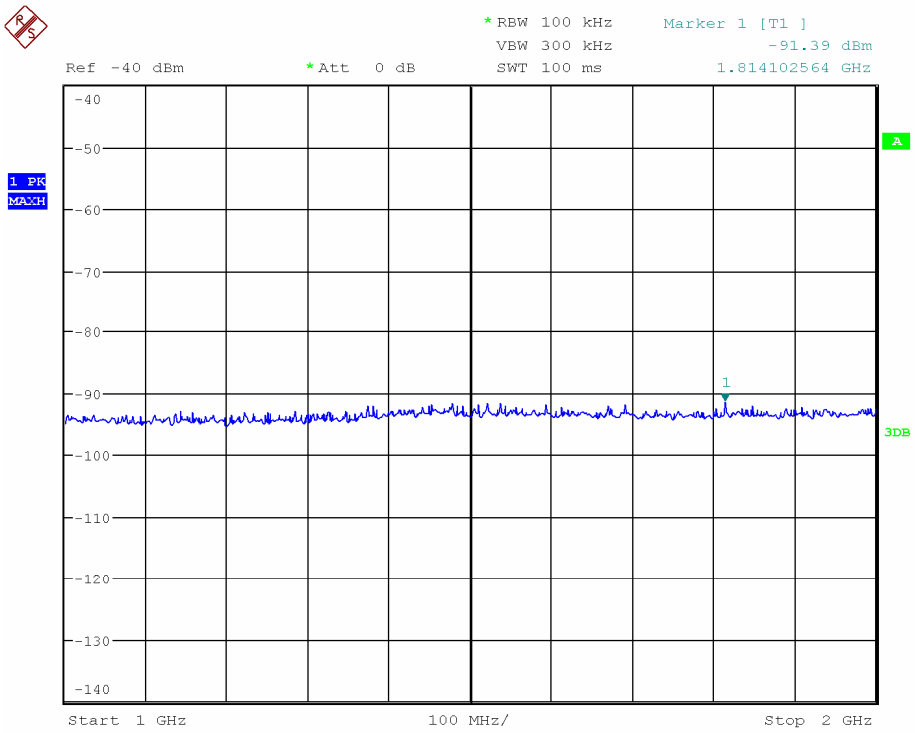
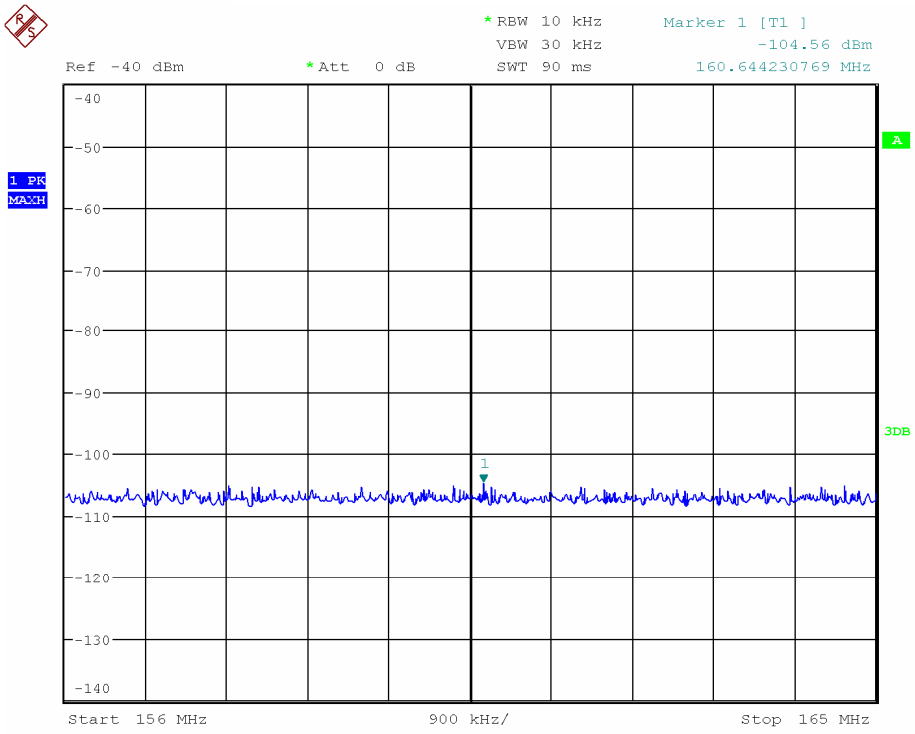
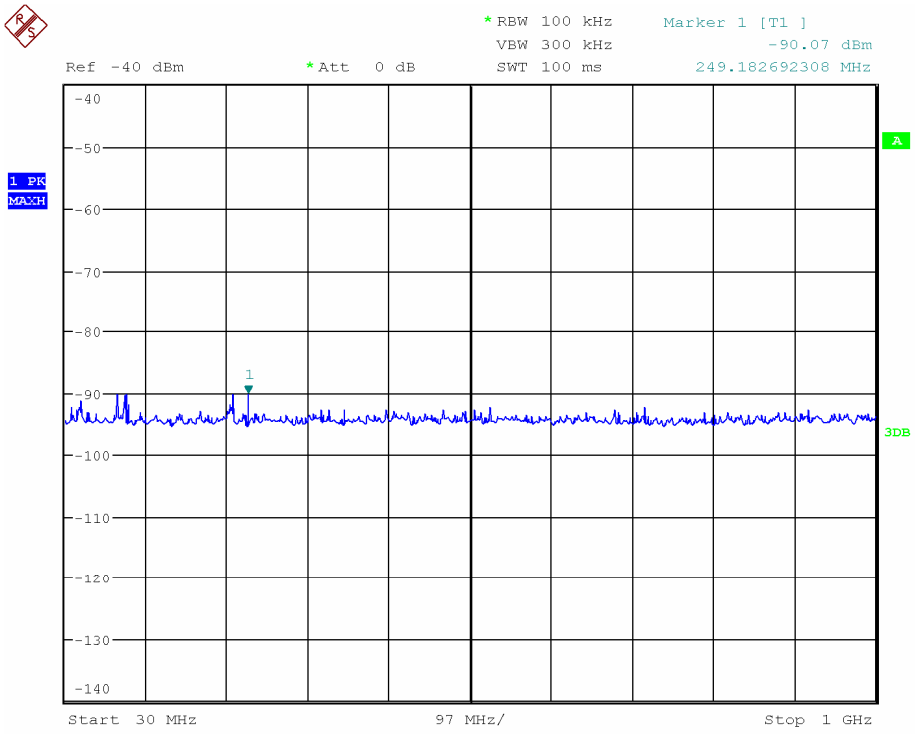


Date: 22.MAR.2011 13:45:55

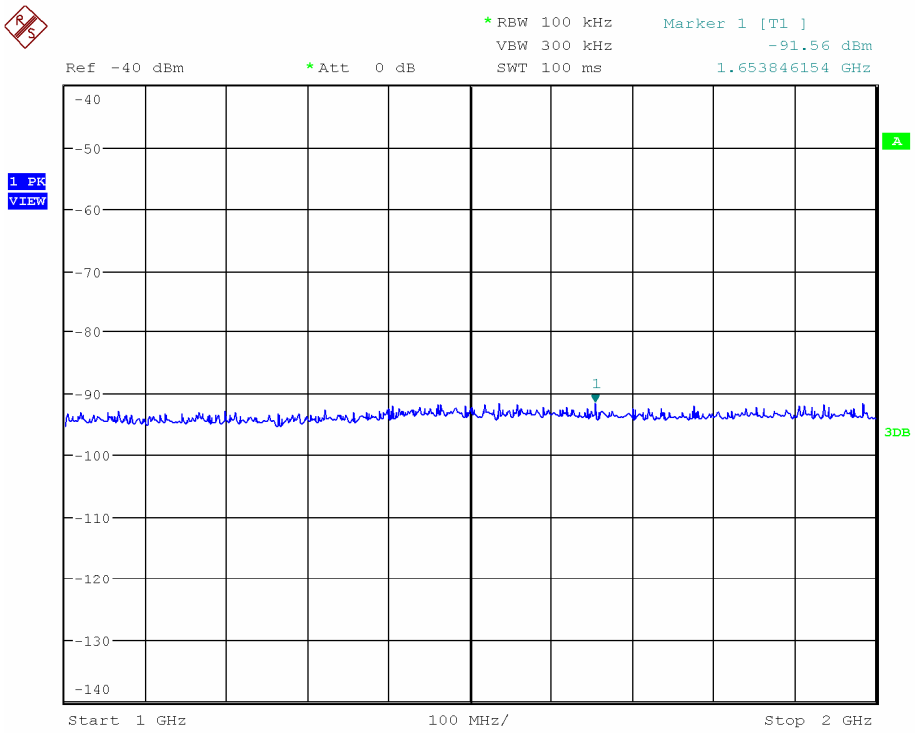


Date: 22.MAR.2011 11:36:46

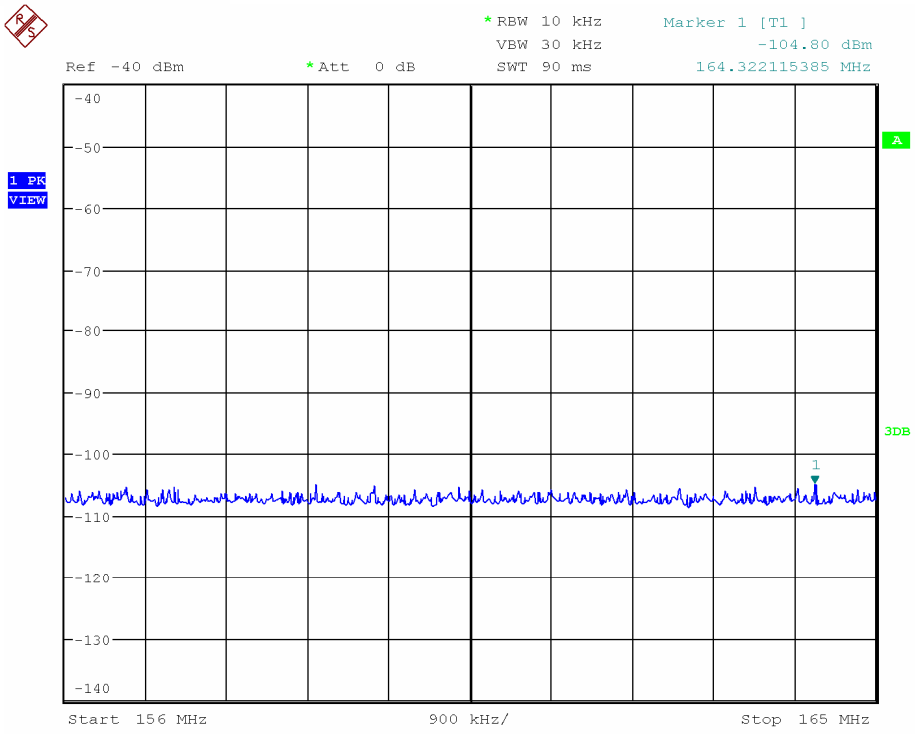
VERTICAL POLARIZATION



Date: 22.MAR.2011 11:50:45



Date: 22.MAR.2011 13:40:08


* RBW 10 kHz
VBW 30 kHz
SWT 90 ms
Marker 1 [T1]
-104.80 dBm
164.322115385 MHz
Ref -40 dBm
* Att 0 dB
1 PK
VIEW
A
3DB
-40
-50
-60
-70
-80
-90
-100
-110
-120
-130
-140
Start 156 MHz
900 kHz/
Stop 165 MHz
Date: 22.MAR.2011 11:49:09

13.8.5. RECEIVER 162.025MHZ : ON 12 VDC POWER LINE

FREQUENCY BAND : 150kHz – 30MHz SPURIOUS EMISSION LEVELS DBµV/m AT 3m		
Frequency (KHz)	**Results**	**Limits**
11.99	**14.50**	**80 – 52** **52 – 34**

HORIZONTAL POLARIZATION

FREQUENCY BAND : 30MHz – 2GHz SPURIOUS EMISSION LEVELS DBµV/m AT 3m		
Frequency (MHz)	**Results**	**Limits**
183.9	**28.73**	**54**
1471.1	**48.62**	

FREQUENCY BAND : 156MHz – 165MHz SPURIOUS EMISSION LEVELS DBµV/m AT 3m		
Frequency (MHz)	**Results**	**Limits**
159.0	**15.05**	**30**

VERTICAL POLARIZATION

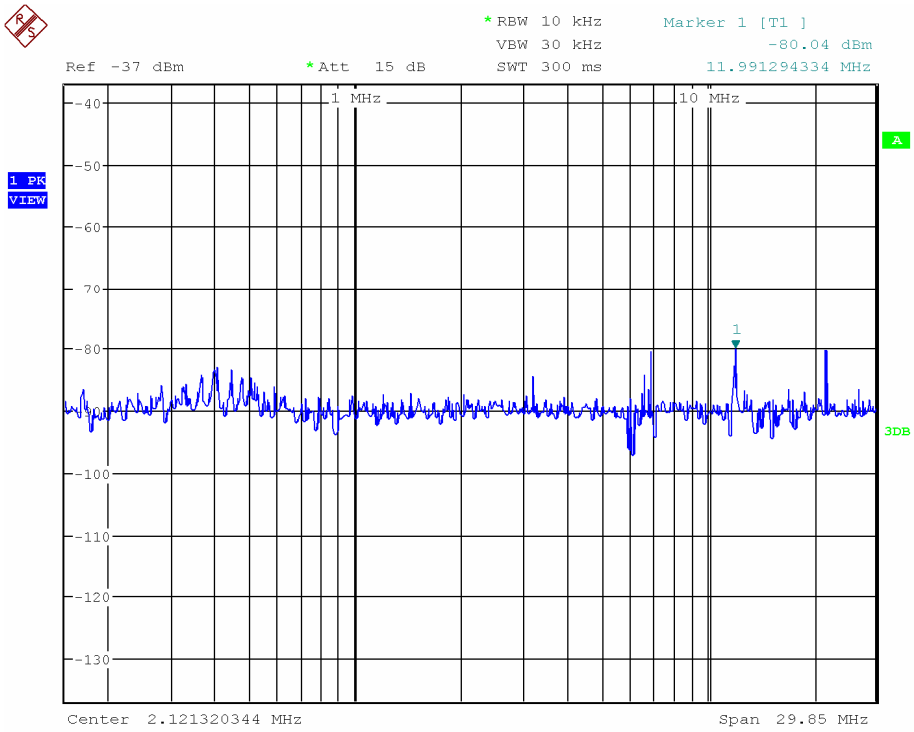
FREQUENCY BAND : 30MHz – 2GHz SPURIOUS EMISSION LEVELS DBµV/m AT 3m		
Frequency (MHz)	**Results**	**Limits**
51.8	**38.15**	**54**
1554.5	**48.59**	

FREQUENCY BAND : 156MHz – 165MHz SPURIOUS EMISSION LEVELS DBµV/m AT 3m		
Frequency (MHz)	**Results**	**Limits**
164.4	**14.97**	**30**

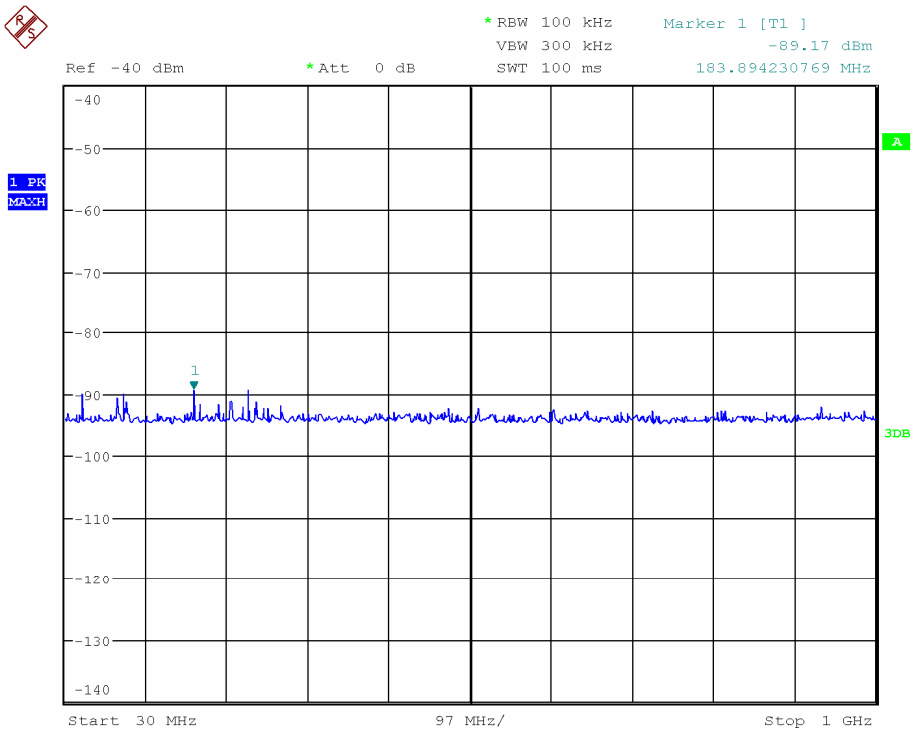
Result :	**COMPLIANT**

Comments :

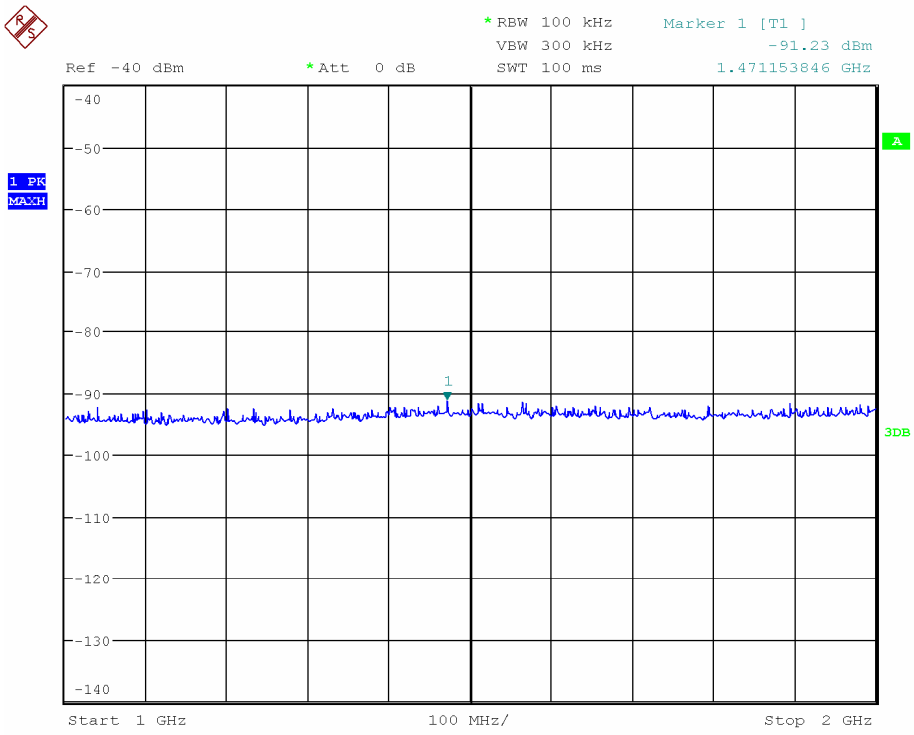
13.8.6. RADIATION GRAPHS



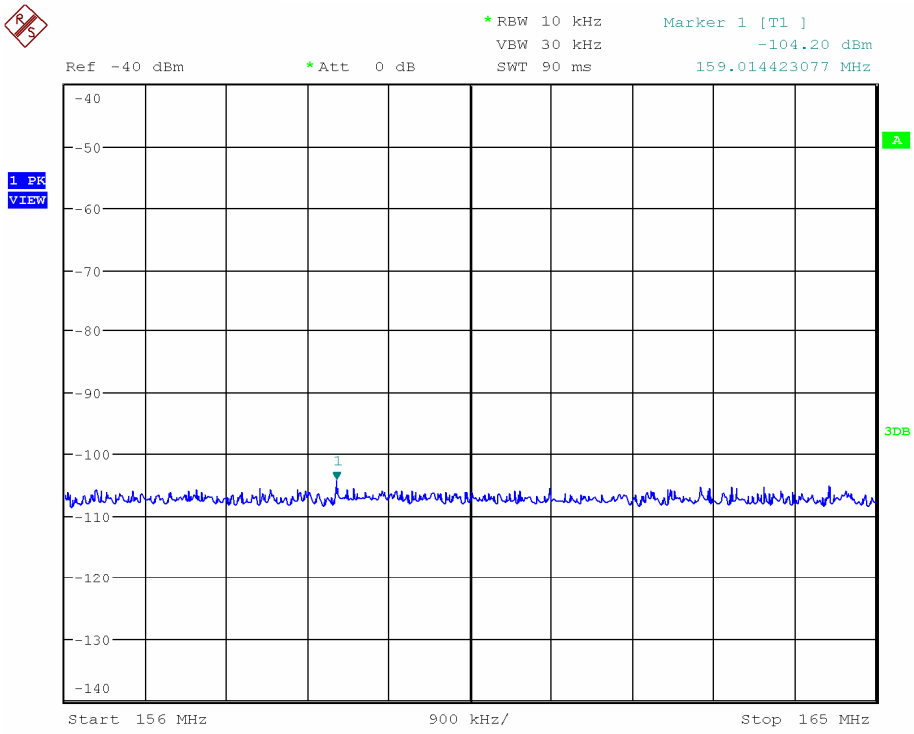
HORIZONTAL POLARIZATION



Date: 22.MAR.2011 11:19:59

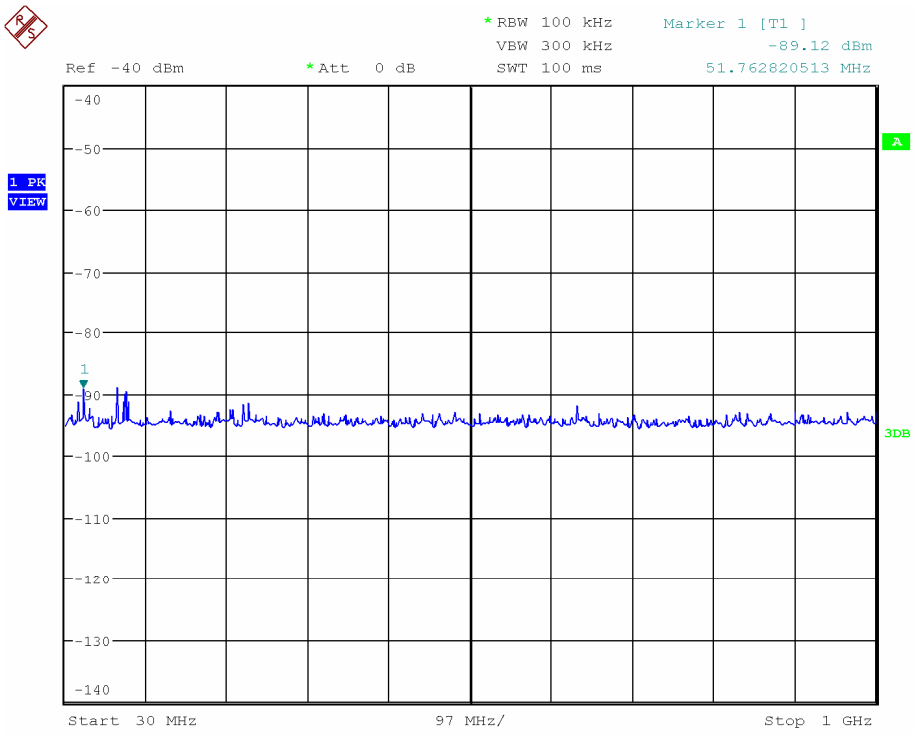


Date: 22.MAR.2011 13:50:20

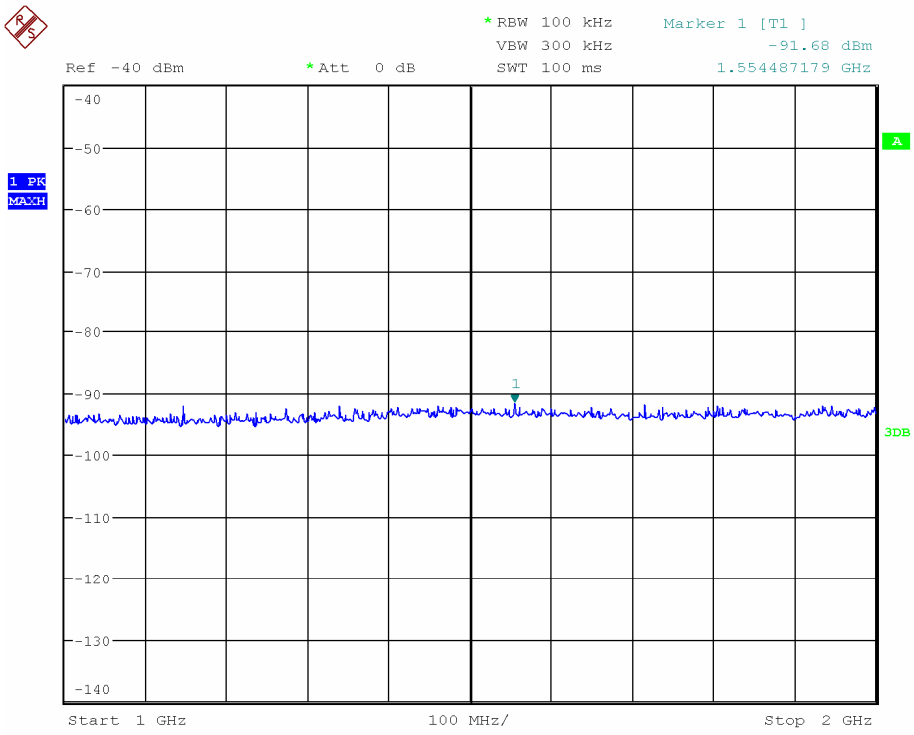


Date: 22.MAR.2011 11:24:14

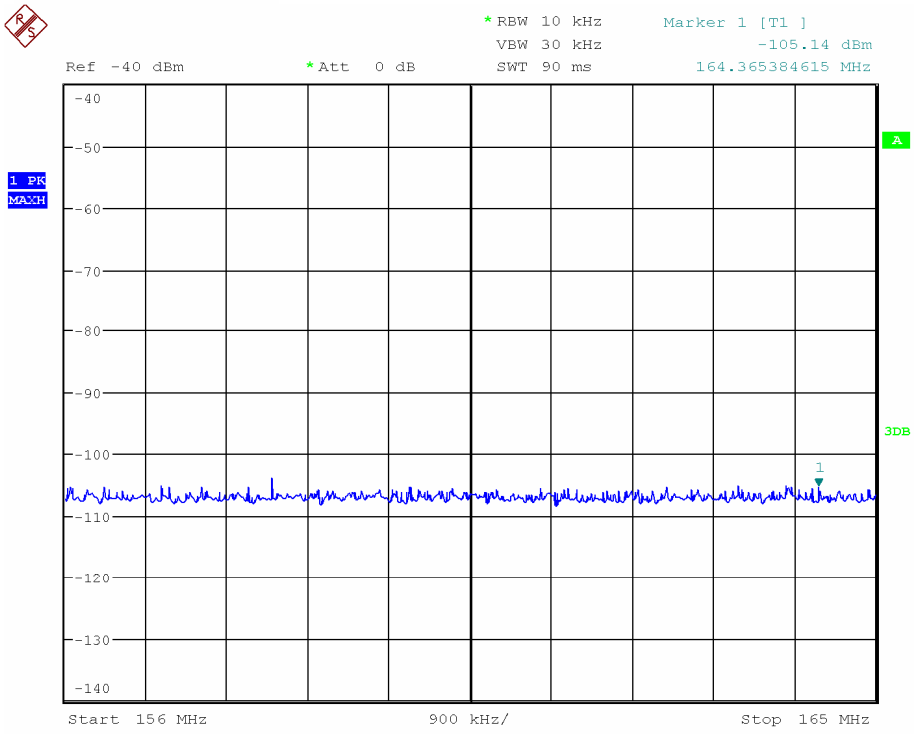
VERTICAL POLARIZATION



Date: 22.MAR.2011 11:59:47



Date: 22.MAR.2011 13:34:48



Date: 22.MAR.2011 11:58:16

13.8.7. RECEIVER 162.025MHZ : ON 24 VDC POWER LINE

FREQUENCY BAND : 150kHz – 30MHz SPURIOUS EMISSION LEVELS DBµV/m AT 3m		
Frequency (KHz)	**Results**	**Limits**
12.1	**11.24**	**80 – 52** **52 – 34**

HORIZONTAL POLARIZATION

FREQUENCY BAND : 30MHz – 2GHz SPURIOUS EMISSION LEVELS DBµV/m AT 3m		
Frequency (MHz)	**Results**	**Limits**
227.4	**28.76**	**54**
1557.7	**48.71**	

FREQUENCY BAND : 156MHz – 165MHz SPURIOUS EMISSION LEVELS DBµV/m AT 3m		
Frequency (MHz)	**Results**	**Limits**
156.5	**14.91**	**30**

VERTICAL POLARIZATION

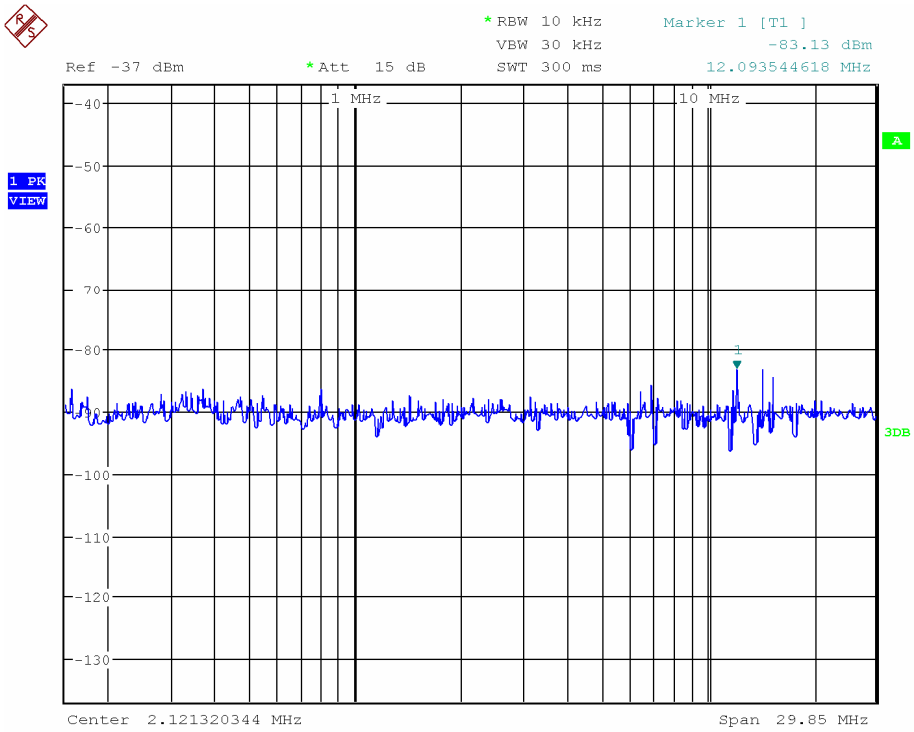
FREQUENCY BAND : 30MHz – 2GHz SPURIOUS EMISSION LEVELS DBµV/m AT 3m		
Frequency (MHz)	**Results**	**Limits**
43.99	**46.12**	**54**
1543.3	**48.32**	

FREQUENCY BAND : 156MHz – 165MHz SPURIOUS EMISSION LEVELS DBµV/m AT 3m		
Frequency (MHz)	**Results**	**Limits**
159.5	**14.96**	**30**

Result :	**COMPLIANT**

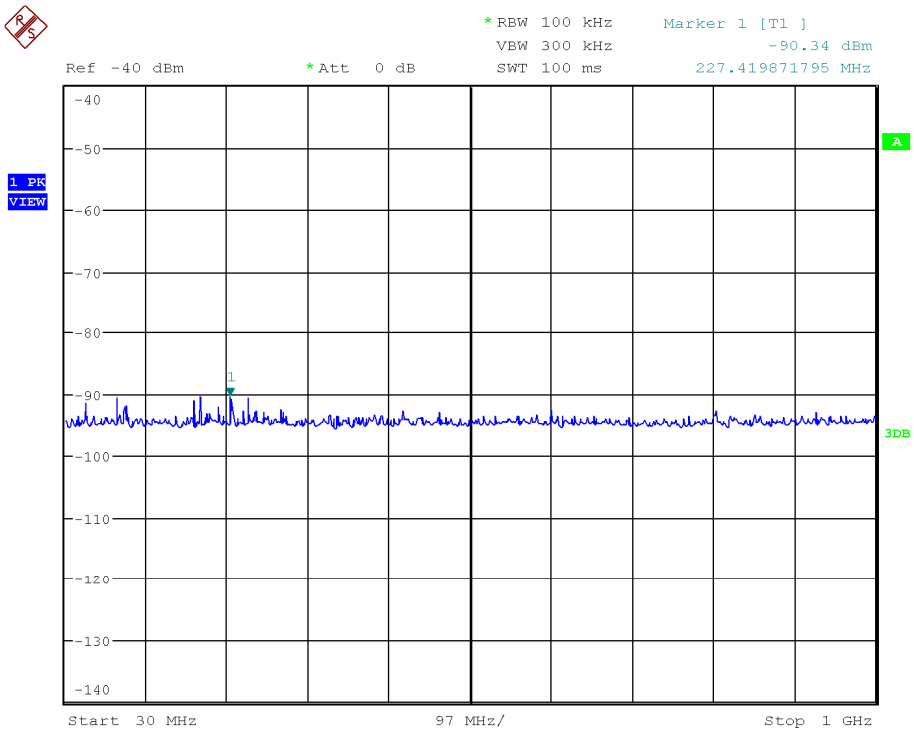
Comments :

13.8.8. RADIATION GRAPHS

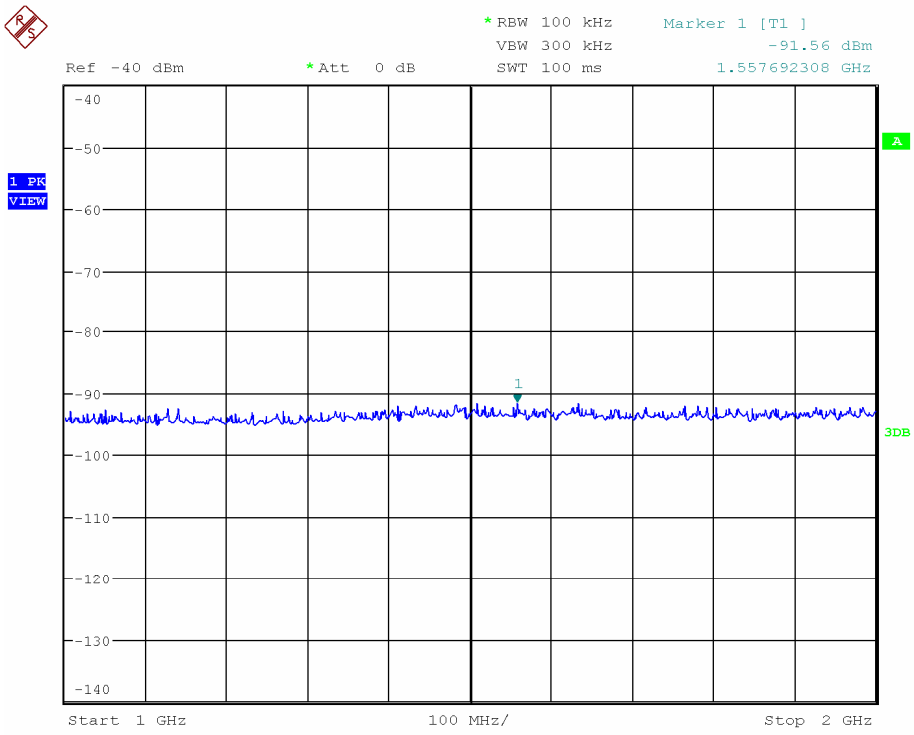


Date: 5.APR.2011 09:53:42

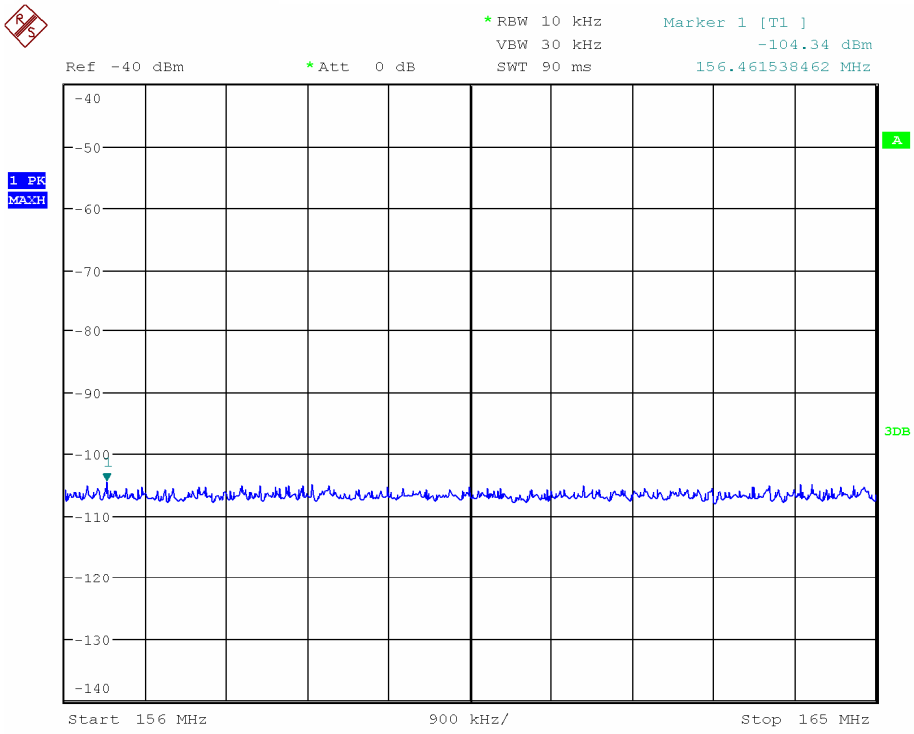
HORIZONTAL POLARIZATION



Date: 22.MAR.2011 11:29:24

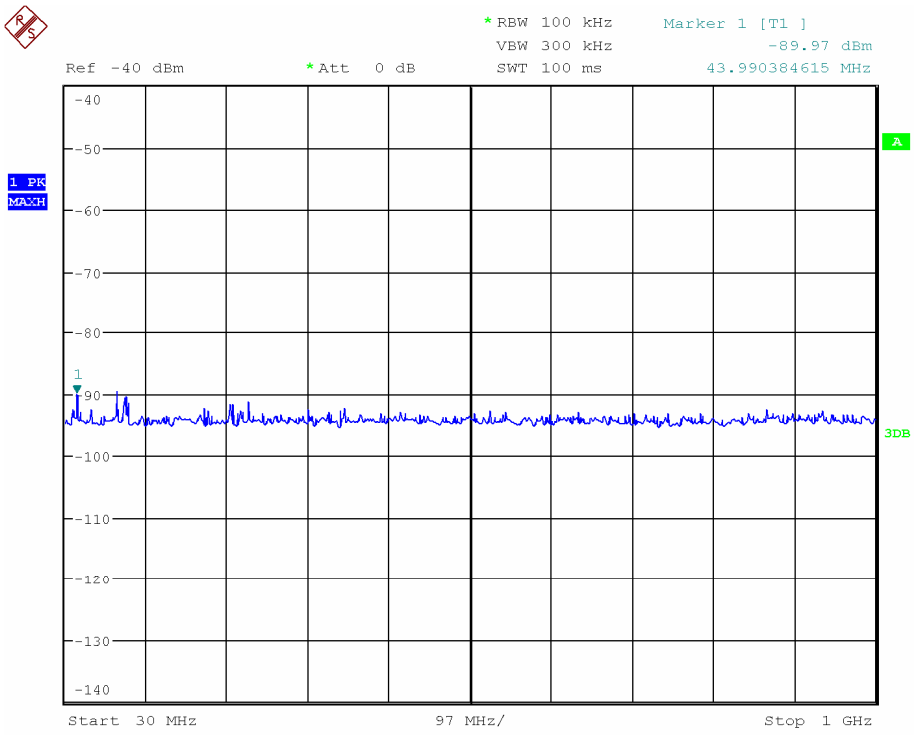


Date: 22.MAR.2011 13:47:52

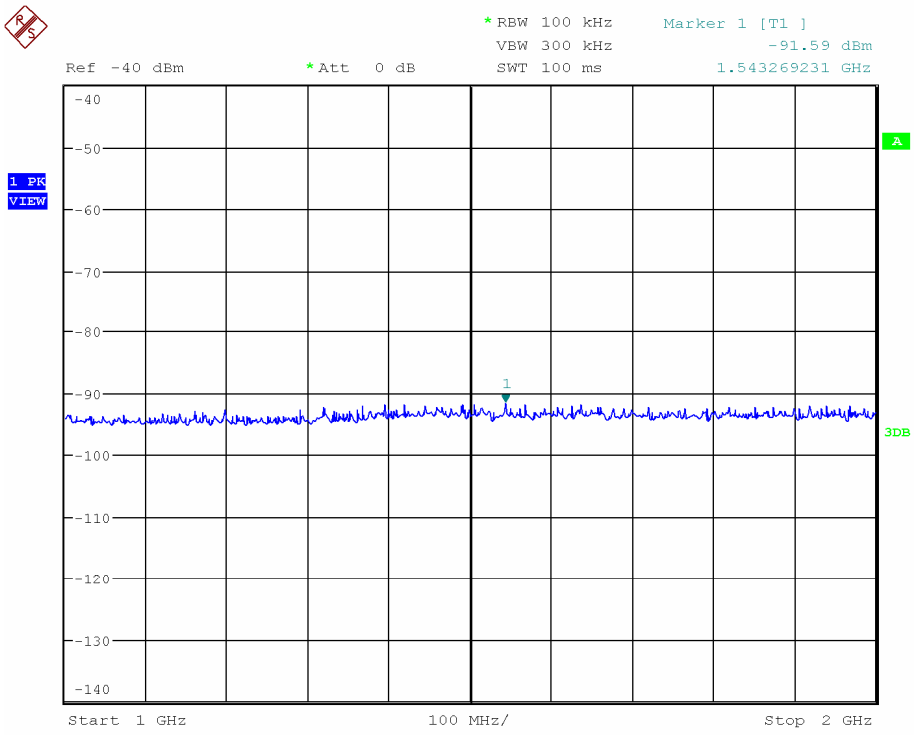


Date: 22.MAR.2011 11:27:49

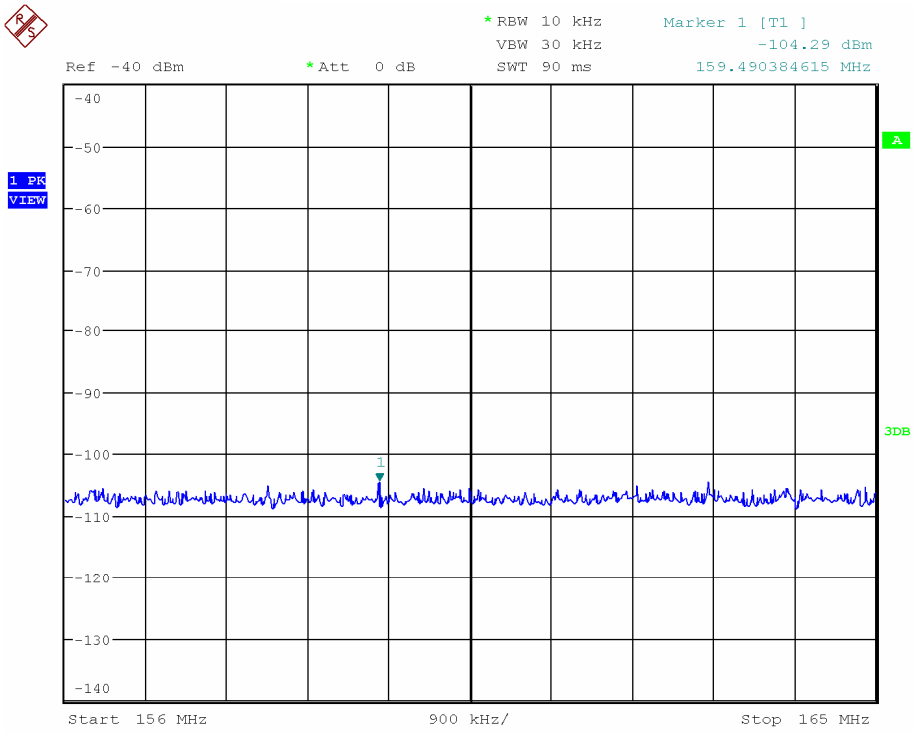
VERTICAL POLARIZATION



Date: 22.MAR.2011 11:54:27



Date: 22.MAR.2011 13:36:47



Date: 22.MAR.2011 11:55:57

13.8.9. TRANSMITTER 161.975MHZ – 2W: ON 12 VDC POWER LINE

FREQUENCY BAND : 150kHz – 30MHz SPURIOUS EMISSION LEVELS DBµV/m AT 3m		
Frequency (KHz)	**Results**	**Limits**
7.27	**9.37**	**80 – 52** **52 – 34**

HORIZONTAL POLARIZATION

FREQUENCY BAND : 30MHz – 2GHz SPURIOUS EMISSION LEVELS DBµV/m AT 3m		
Frequency (MHz)	**Results**	**Limits**
323.8	**51.70**	**54**
1650.6	**49.21**	

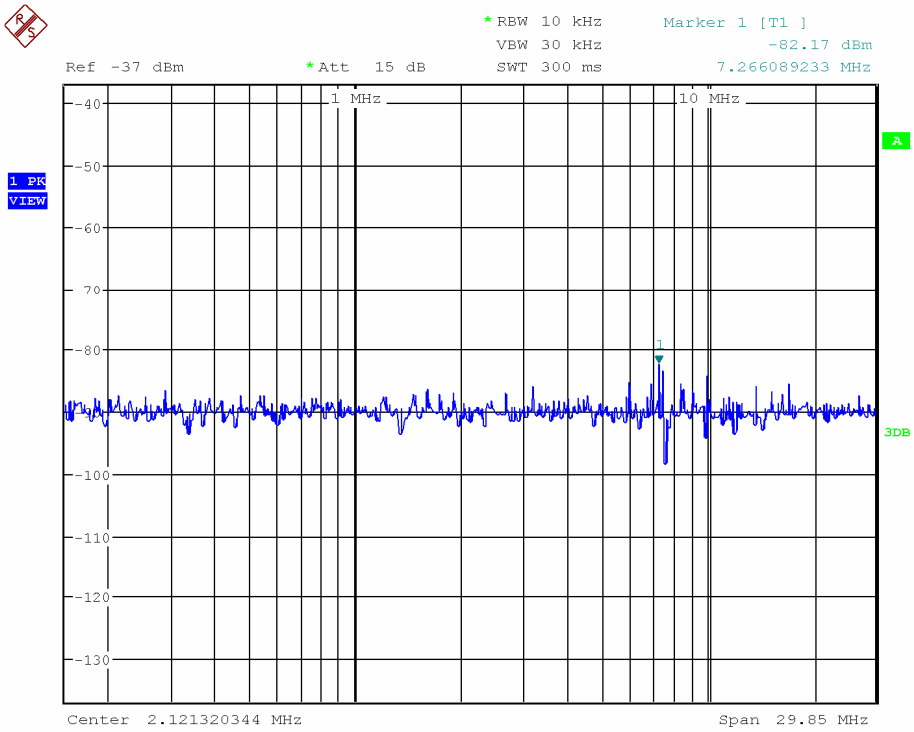
VERTICAL POLARIZATION

FREQUENCY BAND : 30MHz – 2GHz SPURIOUS EMISSION LEVELS DBµV/m AT 3m		
Frequency (MHz)	**Results**	**Limits**
323.8	**50.34**	**54**
1552.9	**48.75**	

Result :	**COMPLIANT**

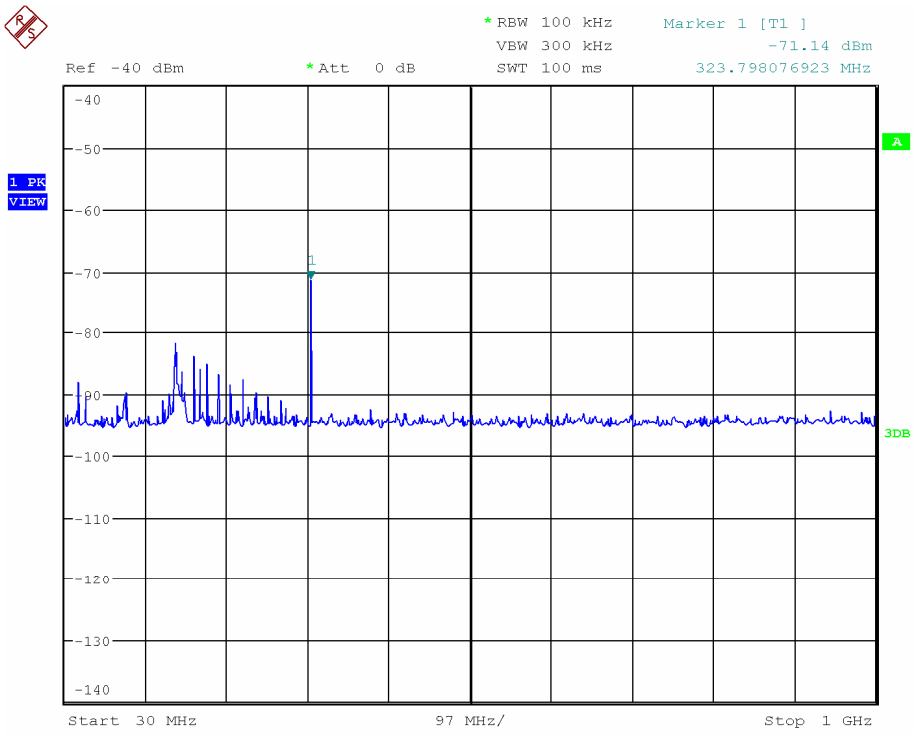
Comments :

13.8.10. RADIATION GRAPHS

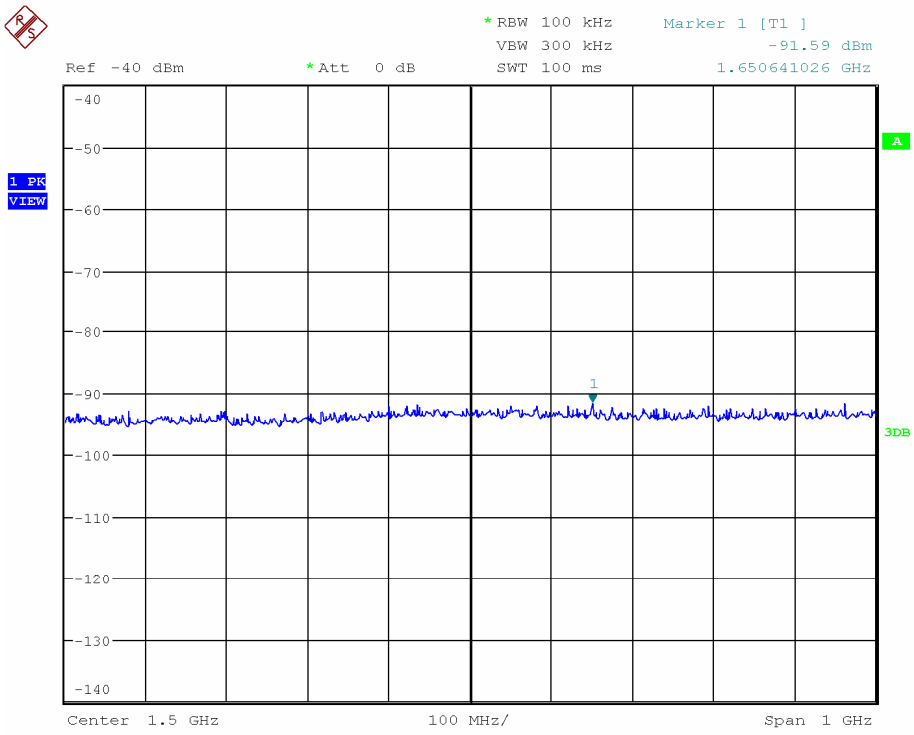


Date: 5.APR.2011 09:06:54

HORIZONTAL POLARIZATION

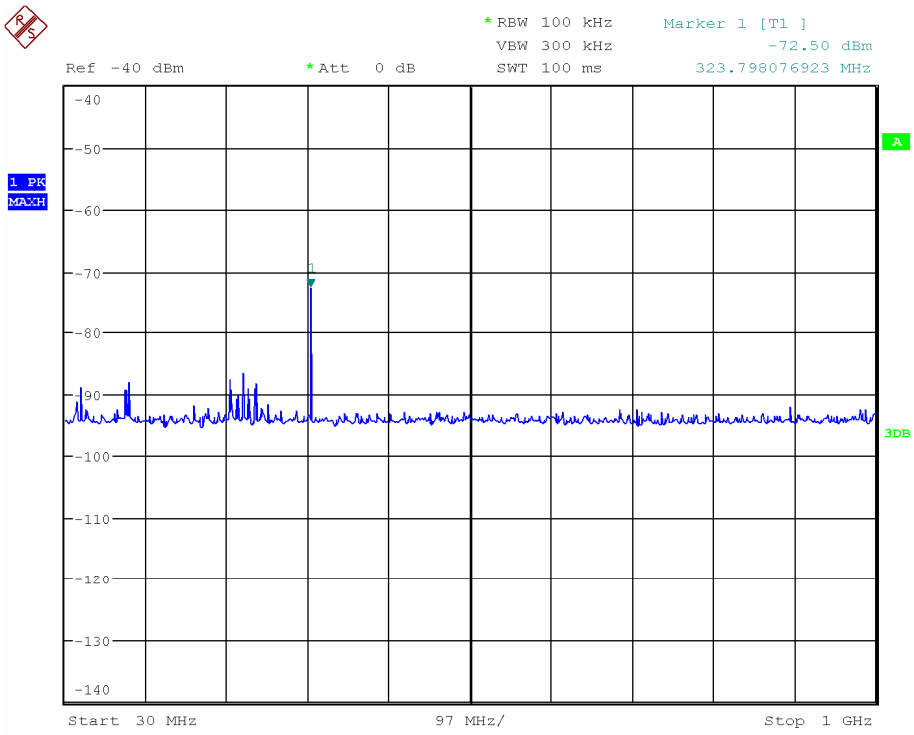


Date: 29.MAR.2011 14:56:26

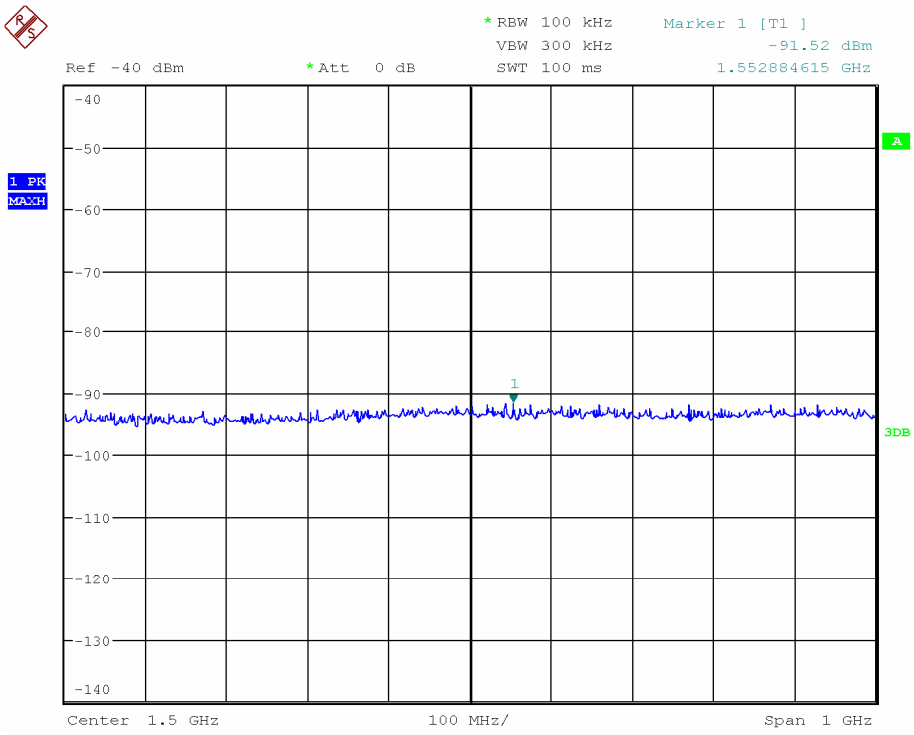


Date: 23.MAR.2011 09:30:44

VERTICAL POLARIZATION



Date: 29.MAR.2011 14:54:12



Date: 23.MAR.2011 09:24:22

13.8.11. TRANSMITTER 161.975MHZ – 2W: ON 24 VDC POWER LINE

FREQUENCY BAND : 150kHz – 30MHz SPURIOUS EMISSION LEVELS DBµV/m AT 3m		
Frequency (KHz)	**Results**	**Limits**
7.5	**12.94**	**80 – 52** **52 – 34**

HORIZONTAL POLARIZATION

FREQUENCY BAND : 30MHz – 2GHz SPURIOUS EMISSION LEVELS DBµV/m AT 3m		
Frequency (MHz)	**Results**	**Limits**
323.8	**47.18**	**54**
1418.3	**47.01**	

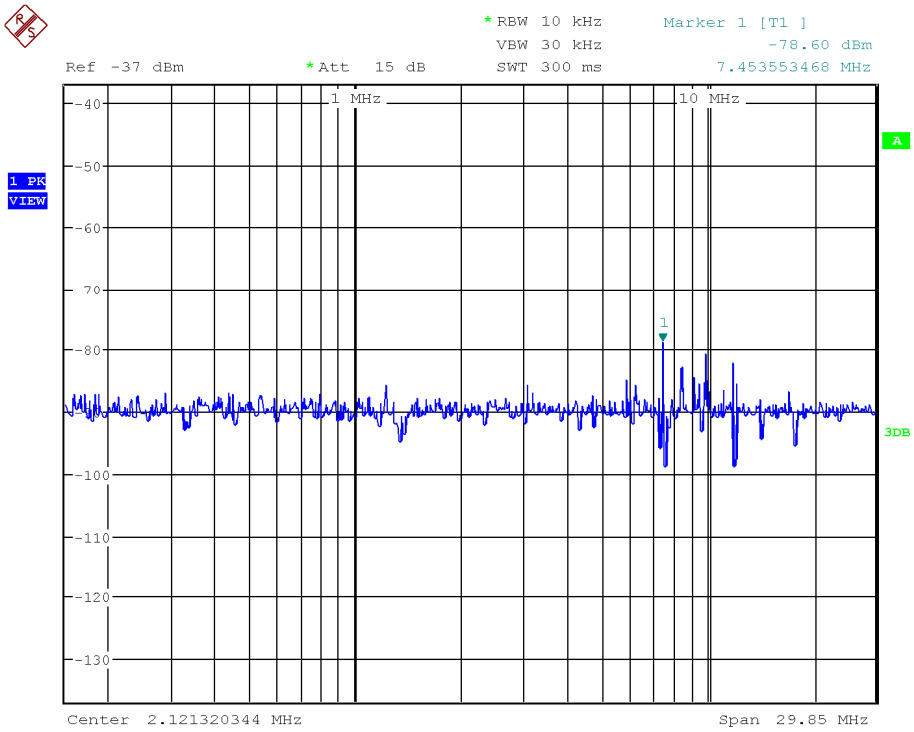
VERTICAL POLARIZATION

FREQUENCY BAND : 30MHz – 2GHz SPURIOUS EMISSION LEVELS DBµV/m AT 3m		
Frequency (MHz)	**Results**	**Limits**
323.8	**53.49**	**54**
1415.1	**46.88**	

Result :	**COMPLIANT**

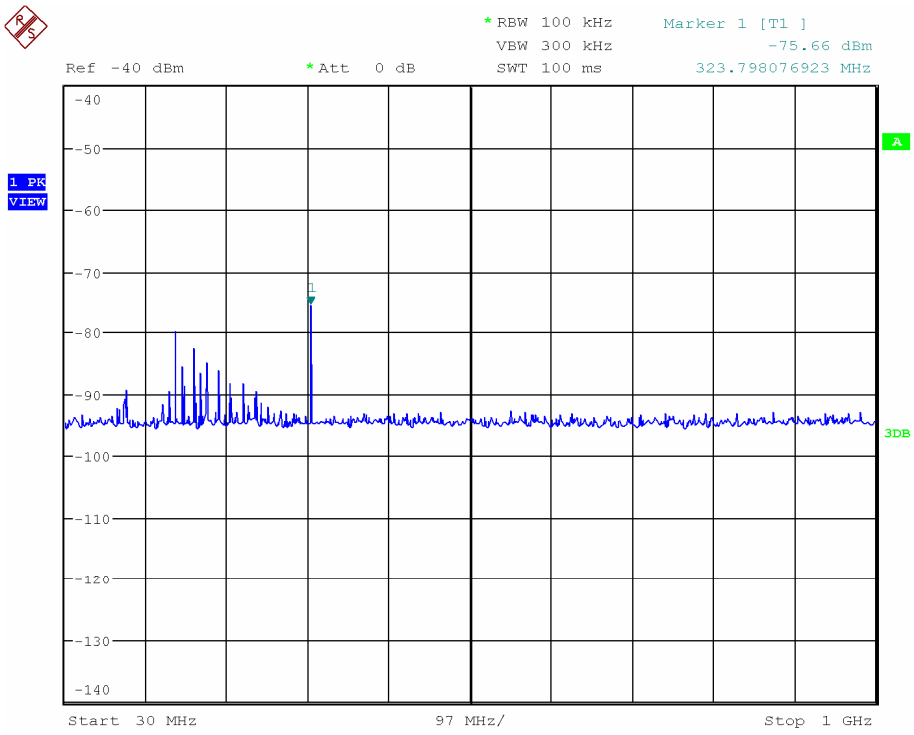
Comments :

13.8.12. RADIATION GRAPHS

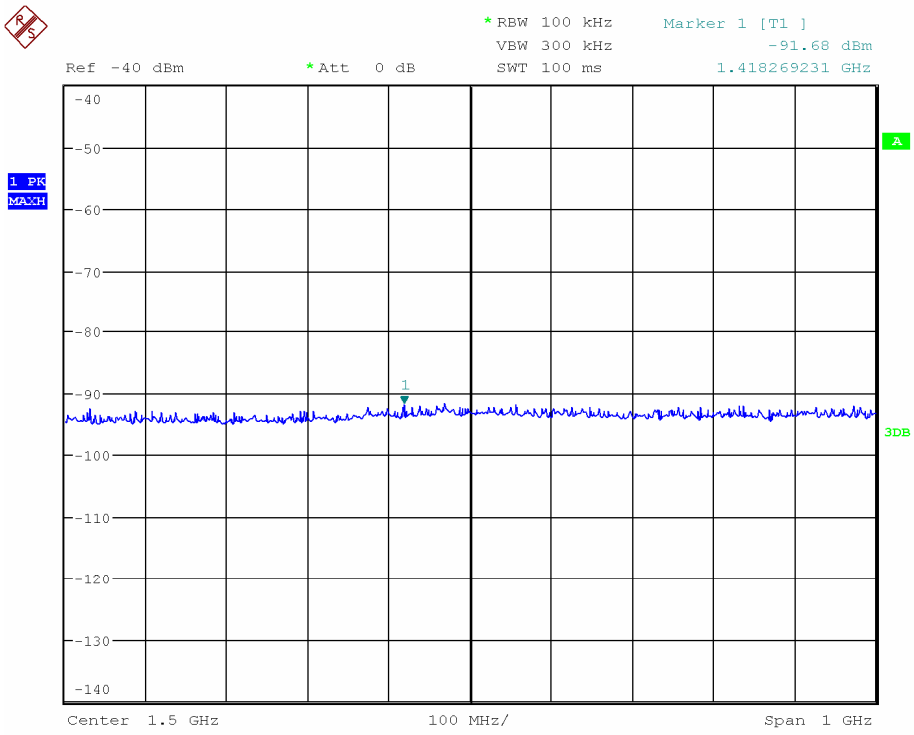


Date: 5.APR.2011 09:10:34

HORIZONTAL POLARIZATION

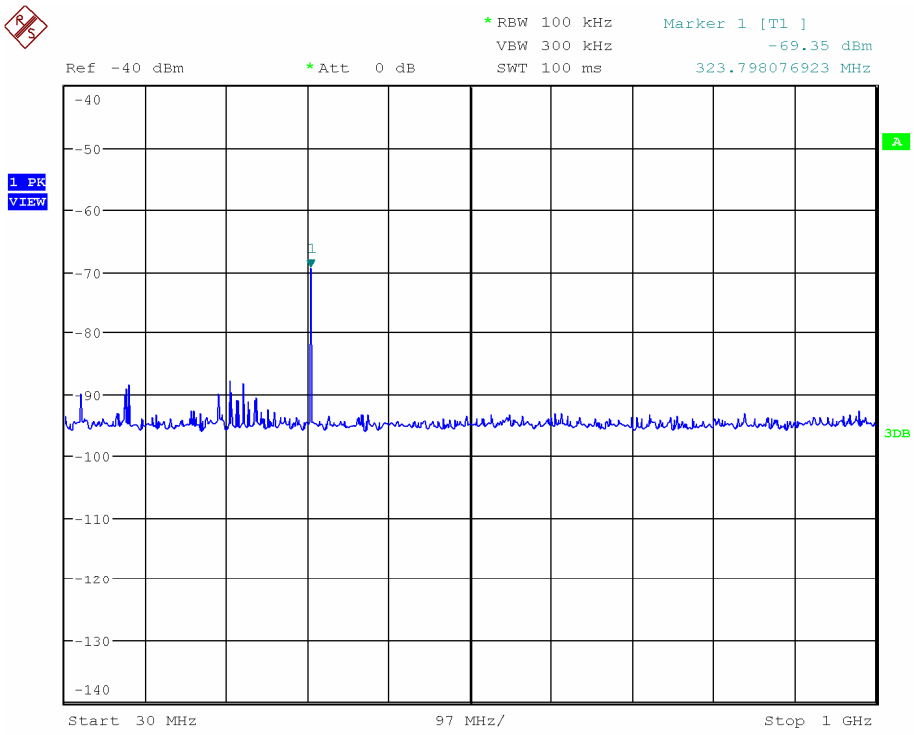


Date: 29.MAR.2011 14:58:28

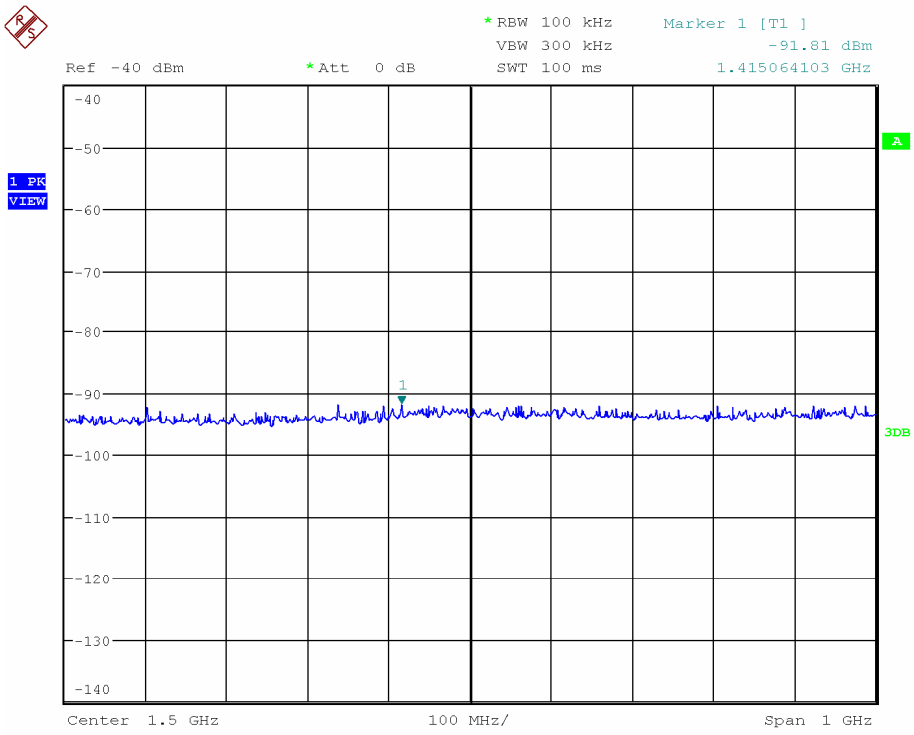


Date: 23.MAR.2011 09:28:44

VERTICAL POLARIZATION



Date: 29.MAR.2011 14:50:10



Date: 23.MAR.2011 09:26:18

13.8.13. TRANSMITTER 161.975MHZ – 12W: ON 12 VDC POWER LINE

FREQUENCY BAND : 150kHz – 30MHz SPURIOUS EMISSION LEVELS DBµV/m AT 3m		
Frequency (KHz)	**Results**	**Limits**
1.46	**11.68**	**80 – 52** **52 – 34**

HORIZONTAL POLARIZATION

FREQUENCY BAND : 30MHz – 2GHz SPURIOUS EMISSION LEVELS DBµV/m AT 3m		
Frequency (MHz)	**Results**	**Limits**
323.8	**44.48**	**54**
1500.0	**48.05**	

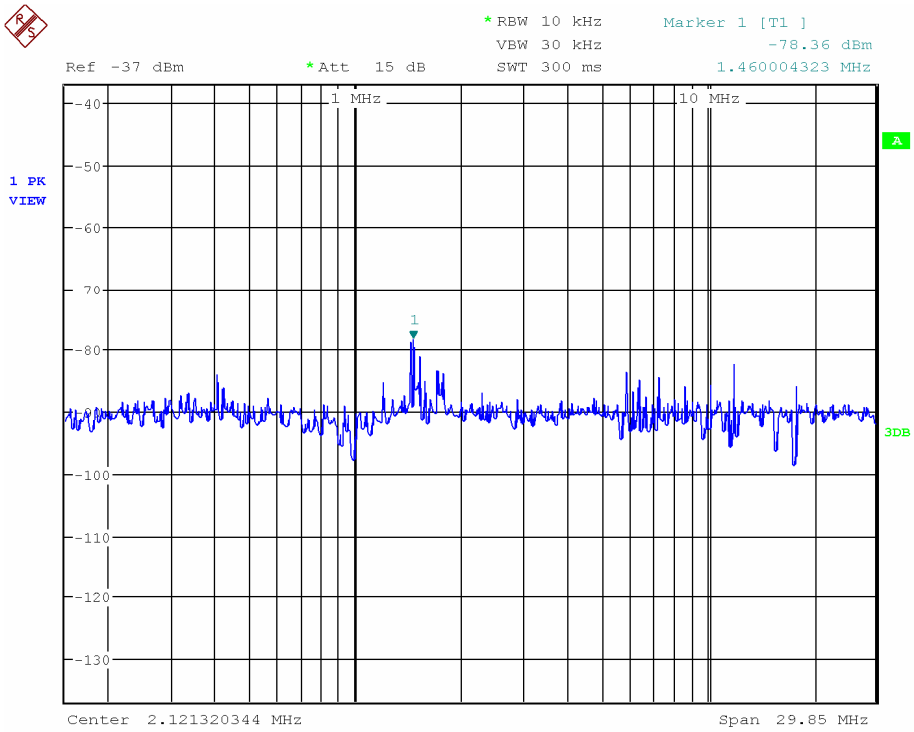
VERTICAL POLARIZATION

FREQUENCY BAND : 30MHz – 2GHz SPURIOUS EMISSION LEVELS DBµV/m AT 3m		
Frequency (MHz)	**Results**	**Limits**
323.8	**47.50**	**54**
1102.5	**43.96**	

Result :	**COMPLIANT**

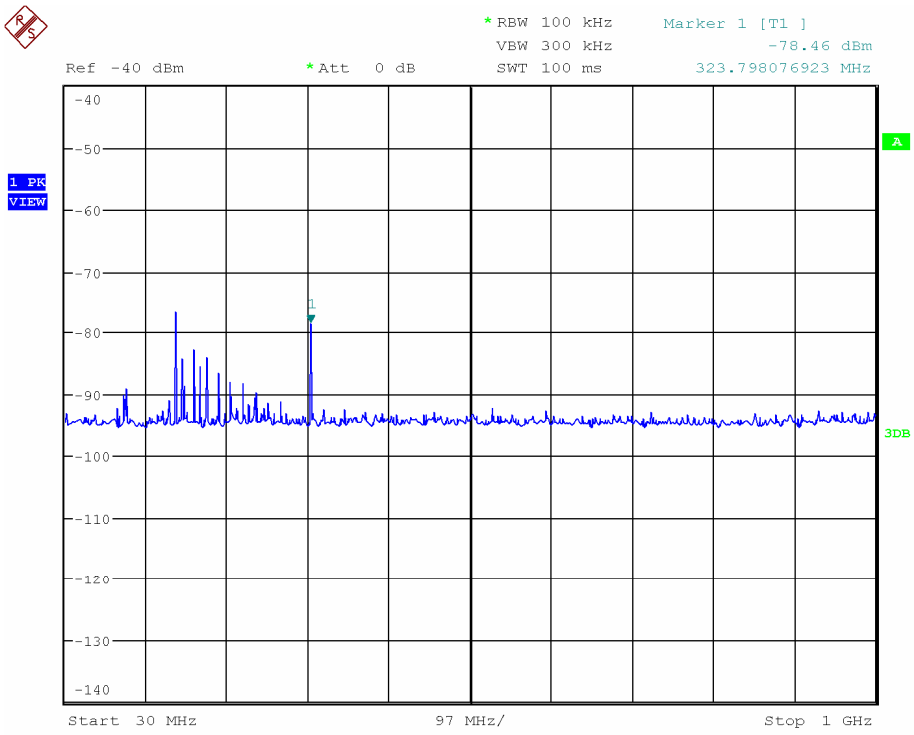
Comments :

13.8.14. RADIATION GRAPHS



Date: 5.APR.2011 09:01:26

HORIZONTAL POLARIZATION



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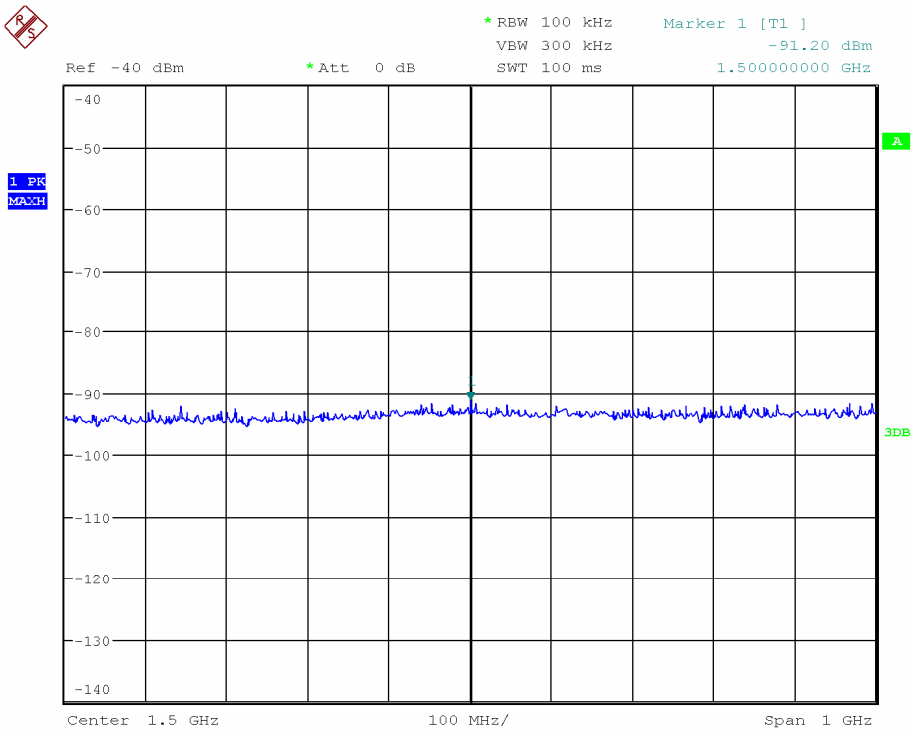
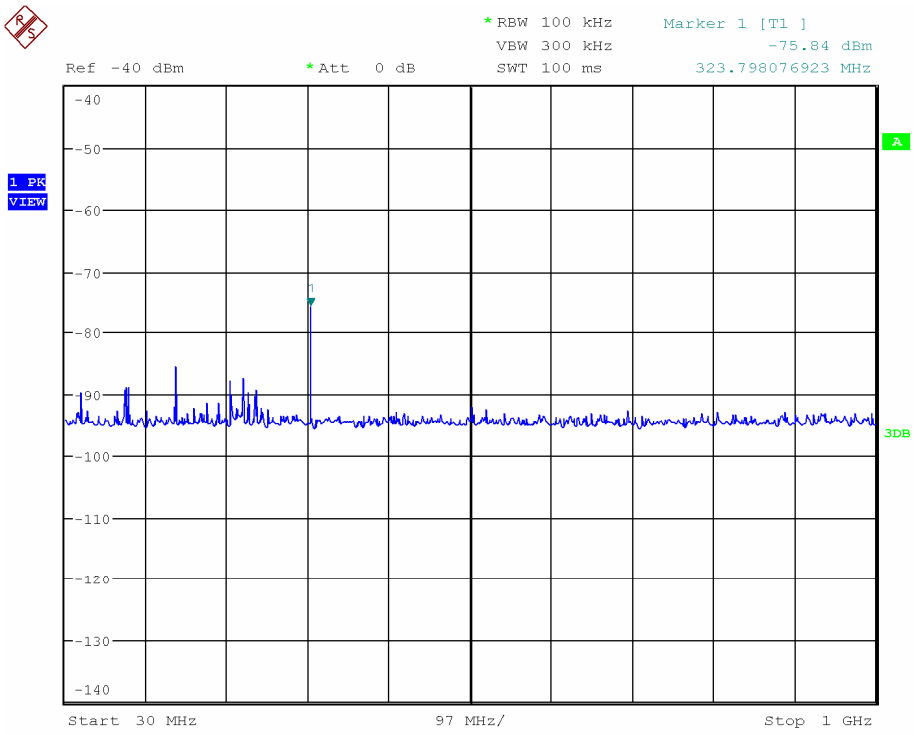


Date: 23.MAR.2011 09:09:05

VERTICAL POLARIZATION



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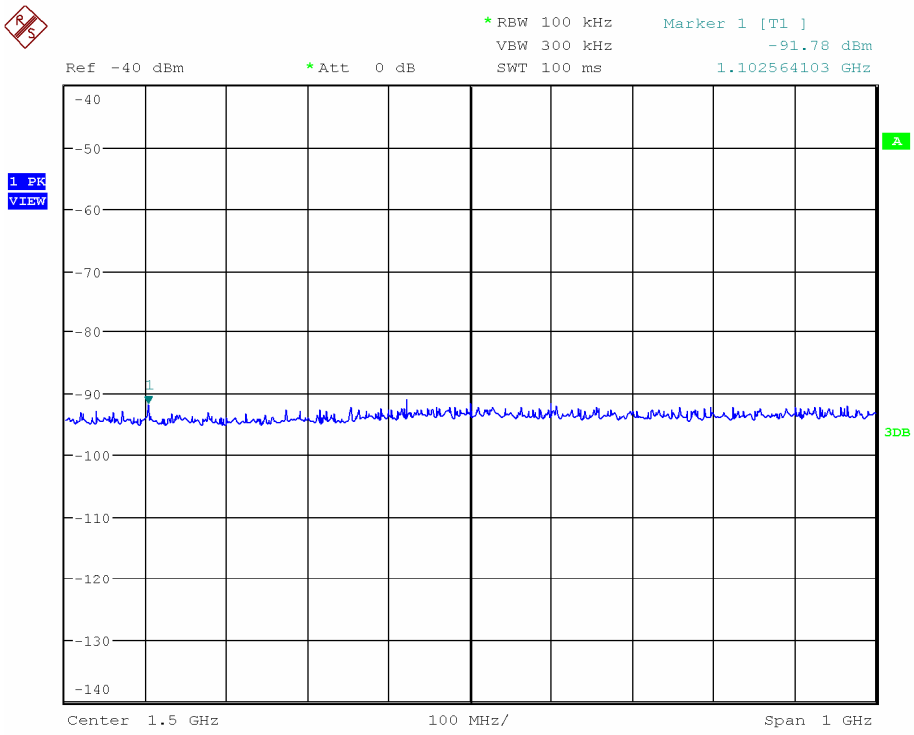


Date: 23.MAR.2011 09:21:24

13.8.15. TRANSMITTER 161.975MHZ – 12W: ON 24 VDC POWER LINE

FREQUENCY BAND : 150kHz – 30MHz SPURIOUS EMISSION LEVELS DBµV/m AT 3m		
Frequency (KHz)	**Results**	**Limits**
11.9	**14.19**	**80 – 52** **52 – 34**

HORIZONTAL POLARIZATION

FREQUENCY BAND : 30MHz – 2GHz SPURIOUS EMISSION LEVELS DBµV/m AT 3m		
Frequency (MHz)	**Results**	**Limits**
323.8	**40.82**	**54**
1477.5	**49.03**	

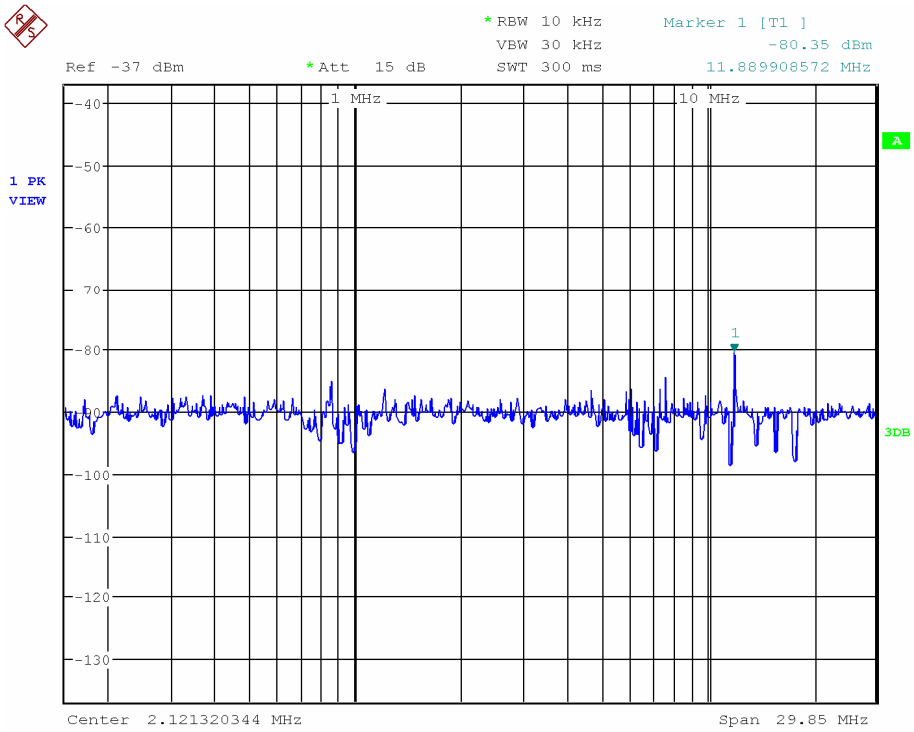
VERTICAL POLARIZATION

FREQUENCY BAND : 30MHz – 2GHz SPURIOUS EMISSION LEVELS DBµV/m AT 3m		
Frequency (MHz)	**Results**	**Limits**
323.8	**47.53**	**54**
1709.9	**49.27**	

Result :	**COMPLIANT**

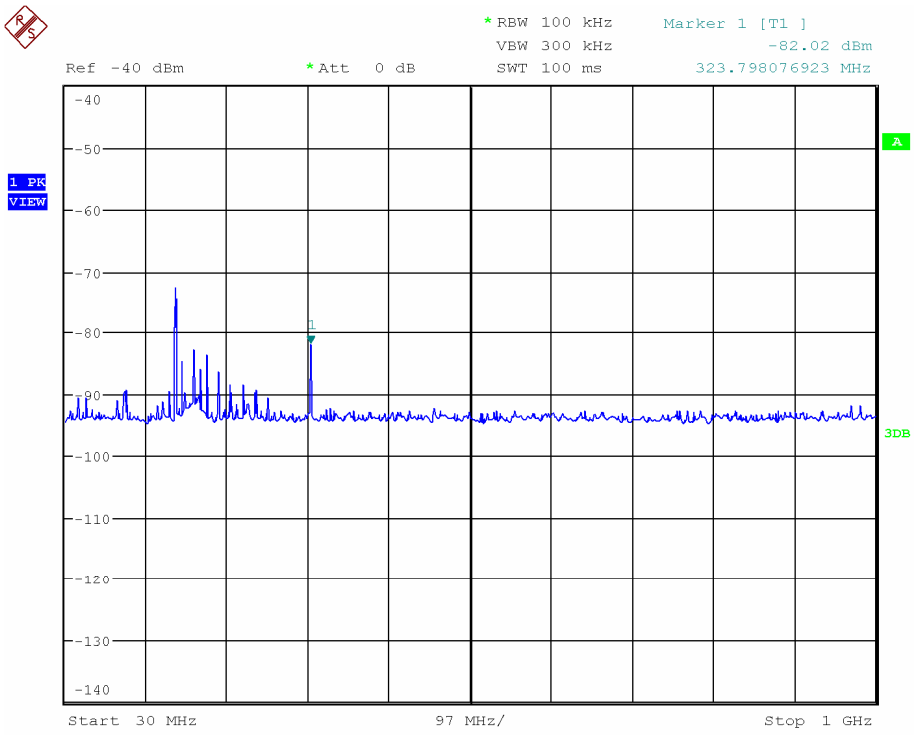
Comments :

13.8.16. RADIATION GRAPHS



Date: 5.APR.2011 08:57:12

HORIZONTAL POLARIZATION



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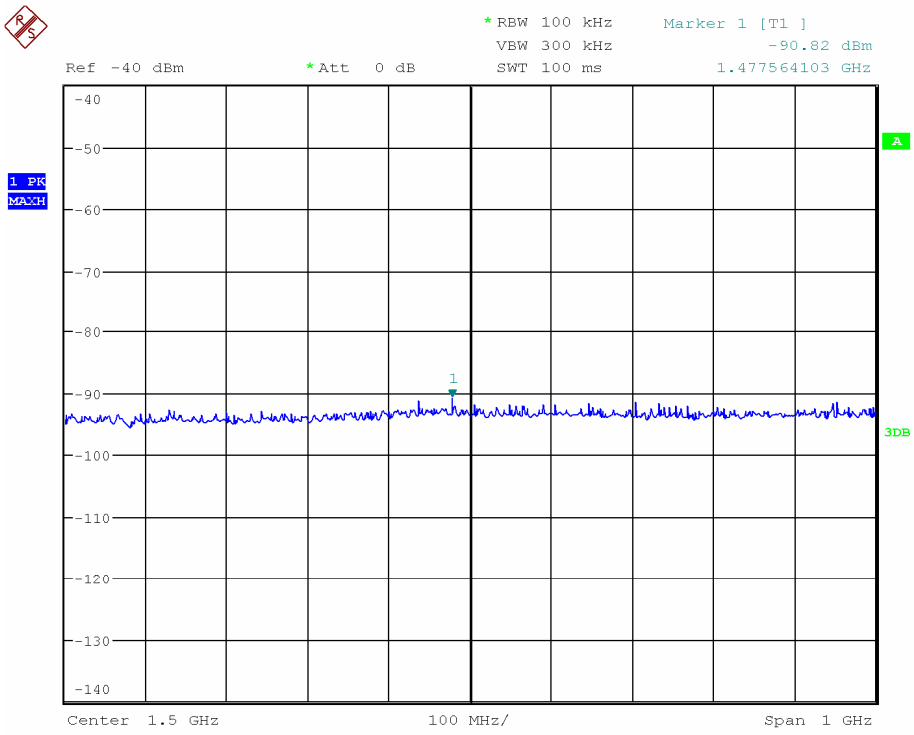
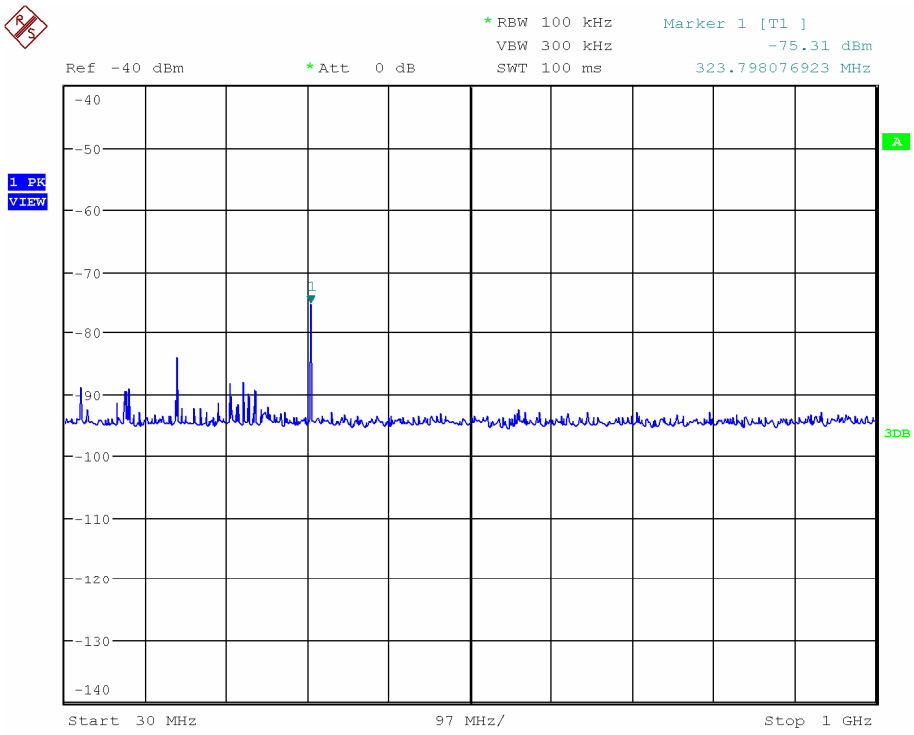
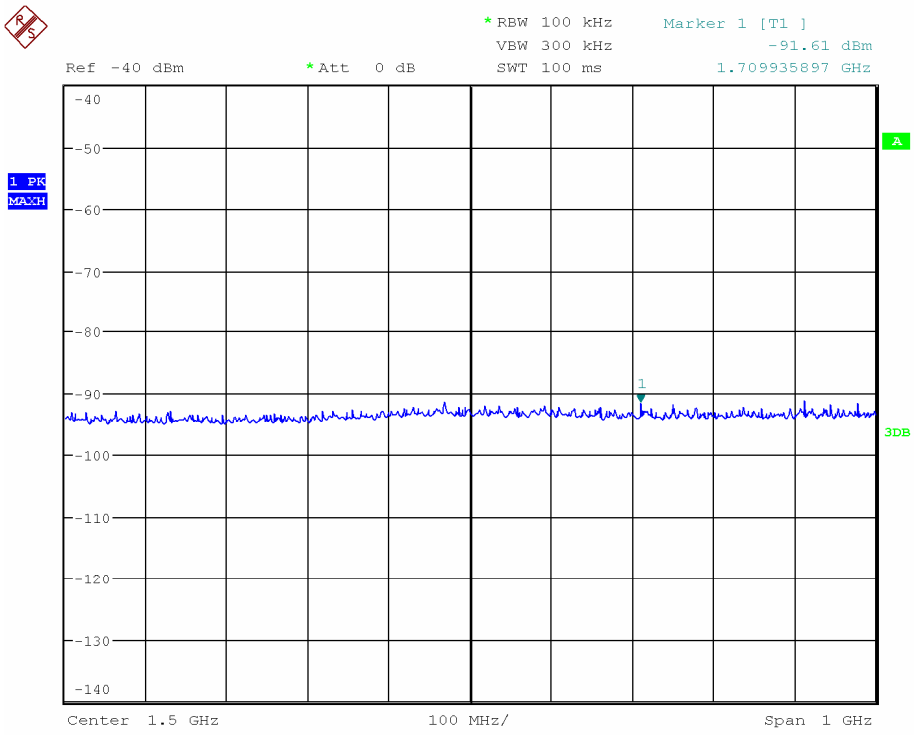


Date: 23.MAR.2011 09:11:23

VERTICAL POLARIZATION



Date: 29.MAR.2011 14:43:03



Date: 23.MAR.2011 09:13:37

13.8.17. TRANSMITTER 162.025MHZ – 2W: ON 12 VDC POWER LINE

FREQUENCY BAND : 150kHz – 30MHz SPURIOUS EMISSION LEVELS DBµV/m AT 3m		
Frequency (KHz)	**Results**	**Limits**
8.5	**11.50**	**80 – 52** **52 – 34**

HORIZONTAL POLARIZATION

FREQUENCY BAND : 30MHz – 2GHz SPURIOUS EMISSION LEVELS DBµV/m AT 3m		
Frequency (MHz)	**Results**	**Limits**
323.8	**44.39**	**54**
1484.0	**47.52**	

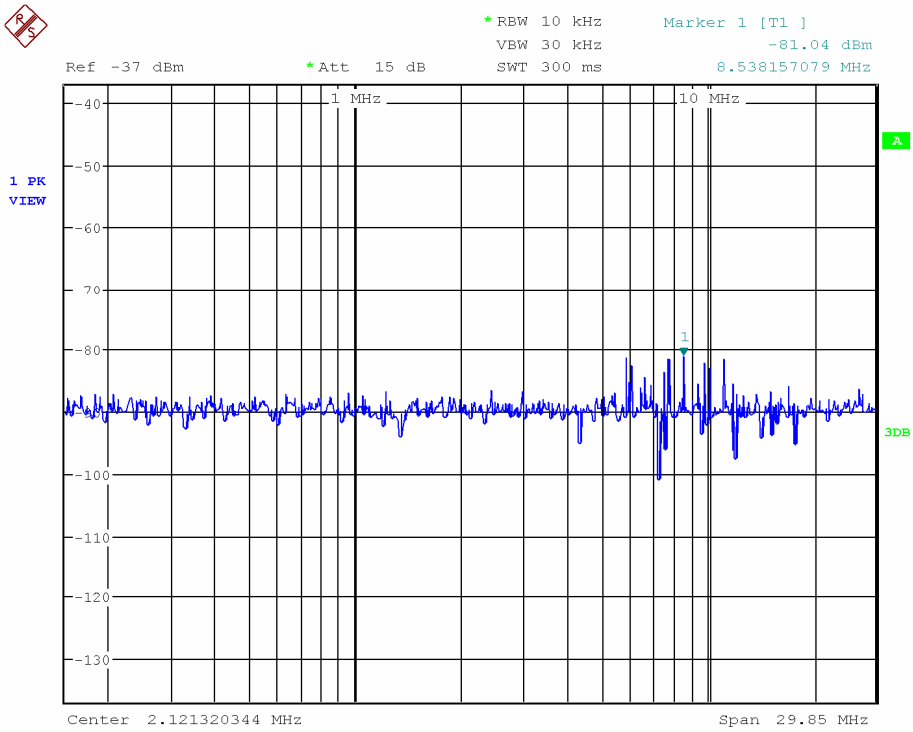
VERTICAL POLARIZATION

FREQUENCY BAND : 30MHz – 2GHz SPURIOUS EMISSION LEVELS DBµV/m AT 3m		
Frequency (MHz)	**Results**	**Limits**
323.8	**52.07**	**54**
1557.7	**49.48**	

Result :	**COMPLIANT**

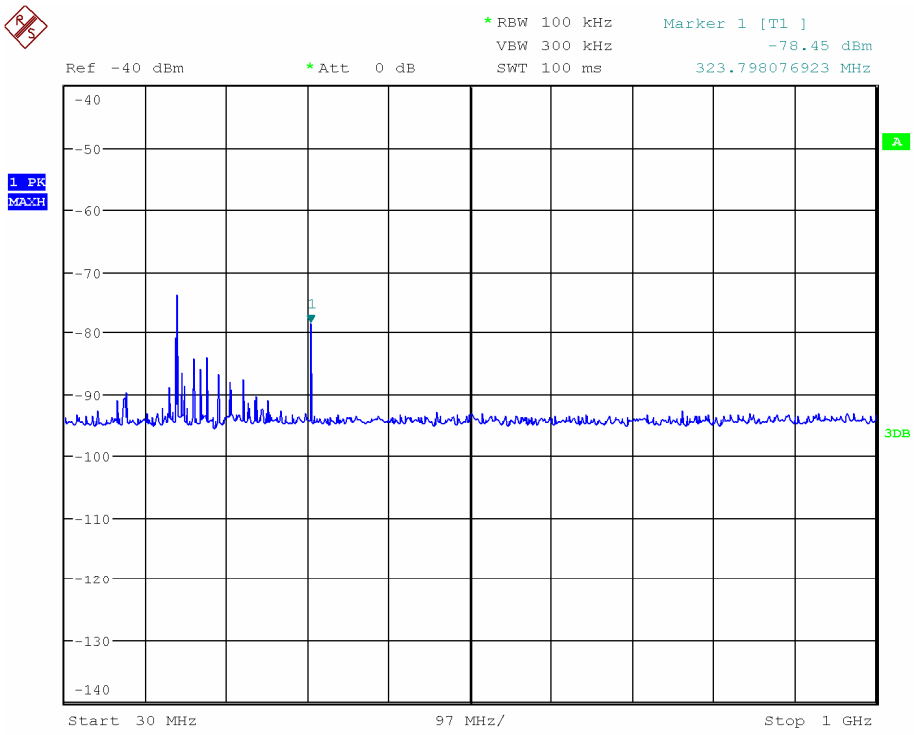
Comments :

13.8.18. RADIATION GRAPHS

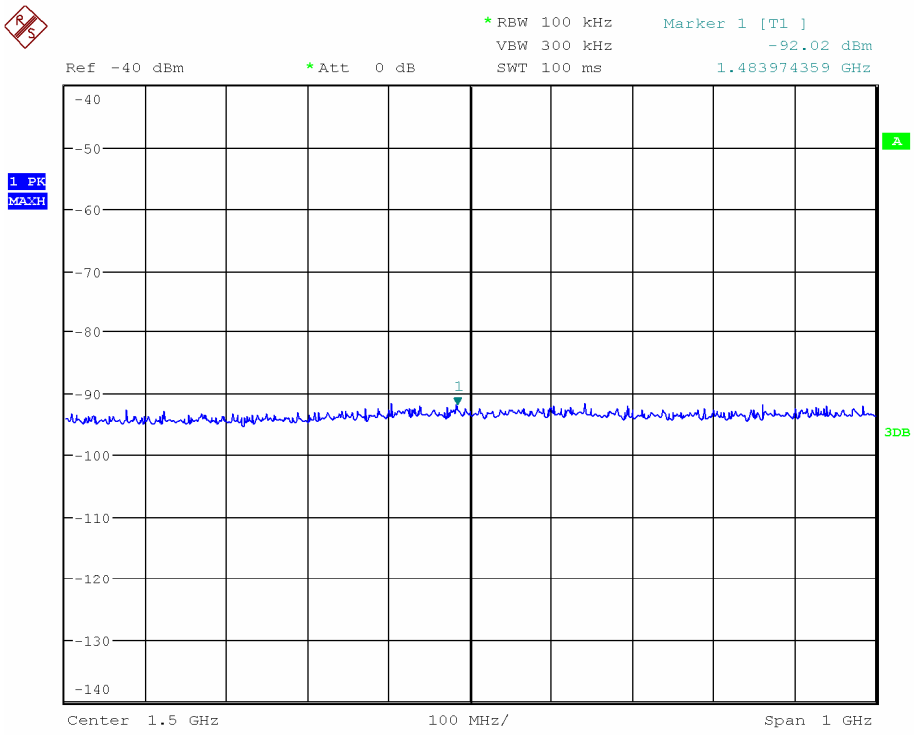


Date: 5.APR.2011 09:18:43

HORIZONTAL POLARIZATION

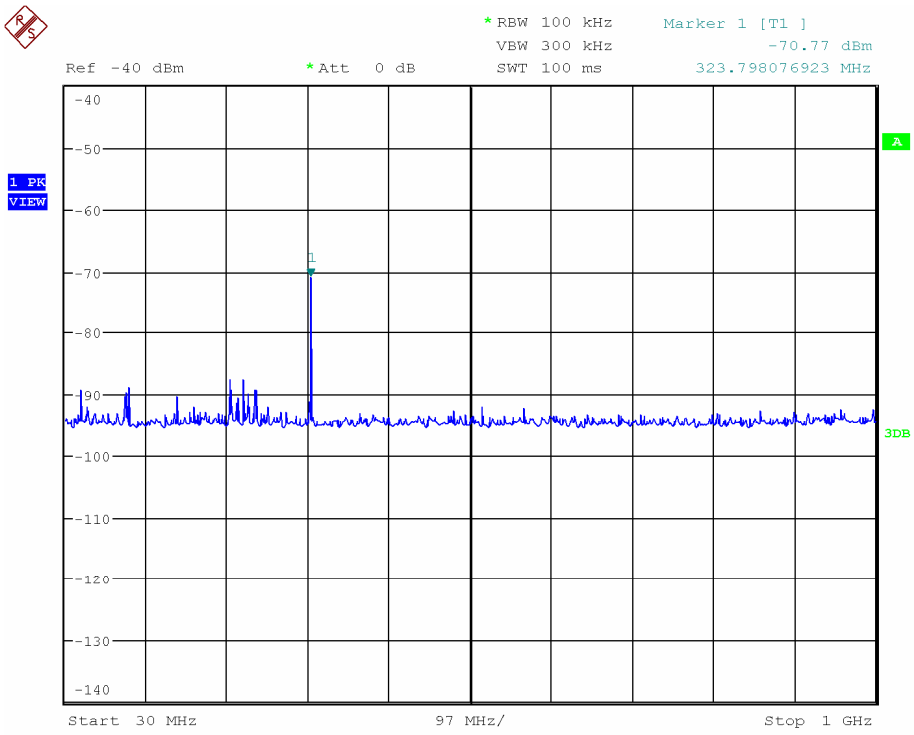


Date: 29.MAR.2011 15:03:01



Date: 23.MAR.2011 09:34:27

VERTICAL POLARIZATION



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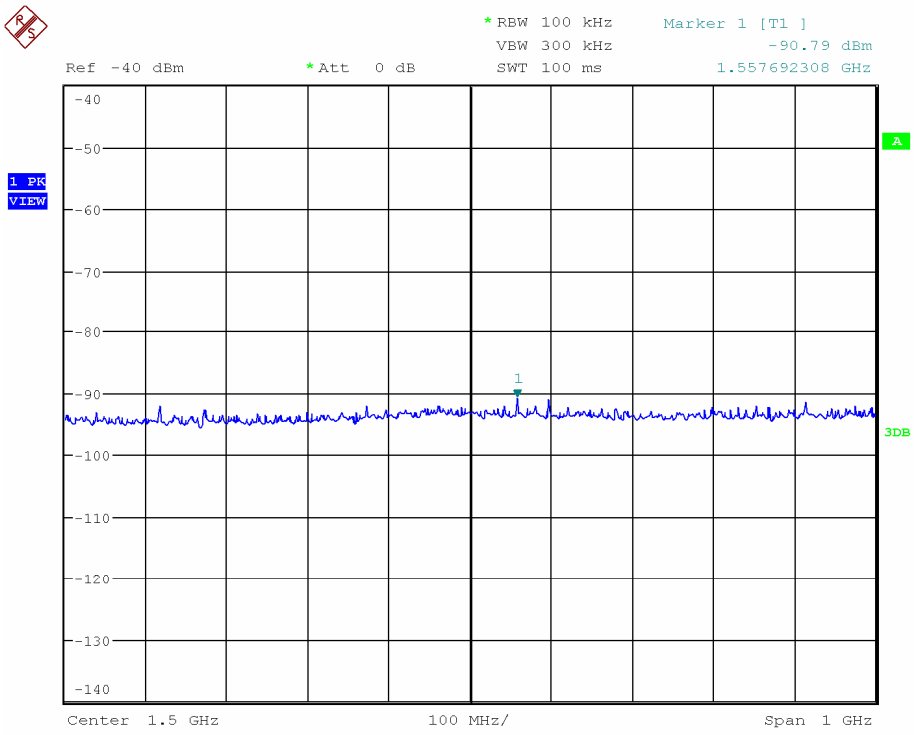


Date: 23.MAR.2011 09:41:34

13.8.19. TRANSMITTER 162.025MHZ – 2W: ON 24 VDC POWER LINE

FREQUENCY BAND : 150kHz – 30MHz SPURIOUS EMISSION LEVELS DBµV/m AT 3m		
Frequency (KHz)	**Results**	**Limits**
7.5	**10.96**	**80 – 52** **52 – 34**

HORIZONTAL POLARIZATION

FREQUENCY BAND : 30MHz – 2GHz SPURIOUS EMISSION LEVELS DBµV/m AT 3m		
Frequency (MHz)	**Results**	**Limits**
323.8	**50.14**	**54**
1929.5	**50.31**	

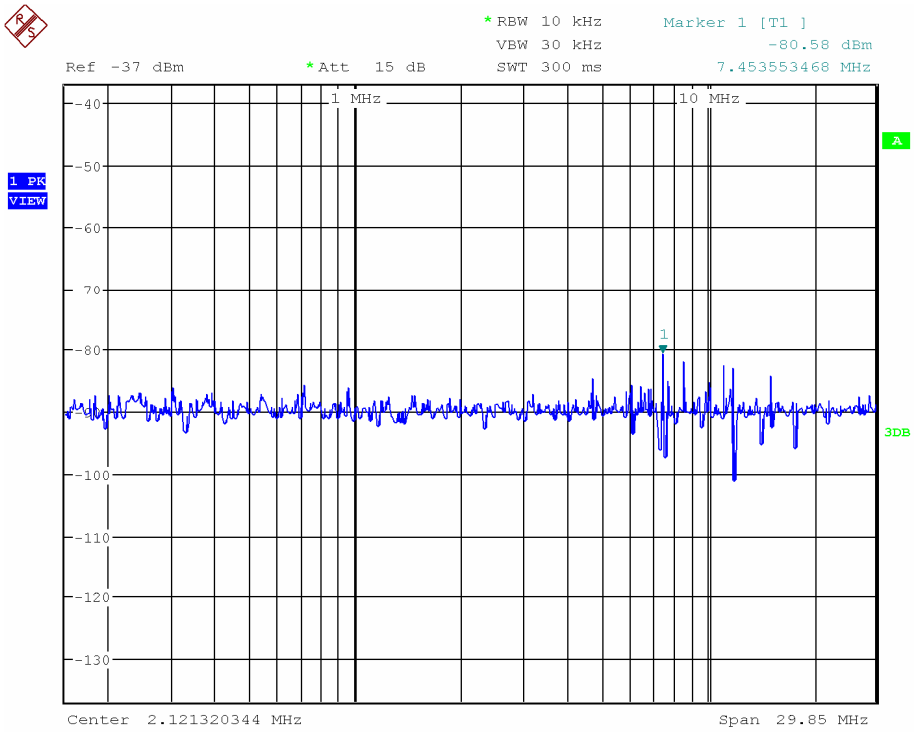
VERTICAL POLARIZATION

FREQUENCY BAND : 30MHz – 2GHz SPURIOUS EMISSION LEVELS DBµV/m AT 3m		
Frequency (MHz)	**Results**	**Limits**
323.8	**53.82**	**54**
1684.1	**49.17**	

Result :	**COMPLIANT**

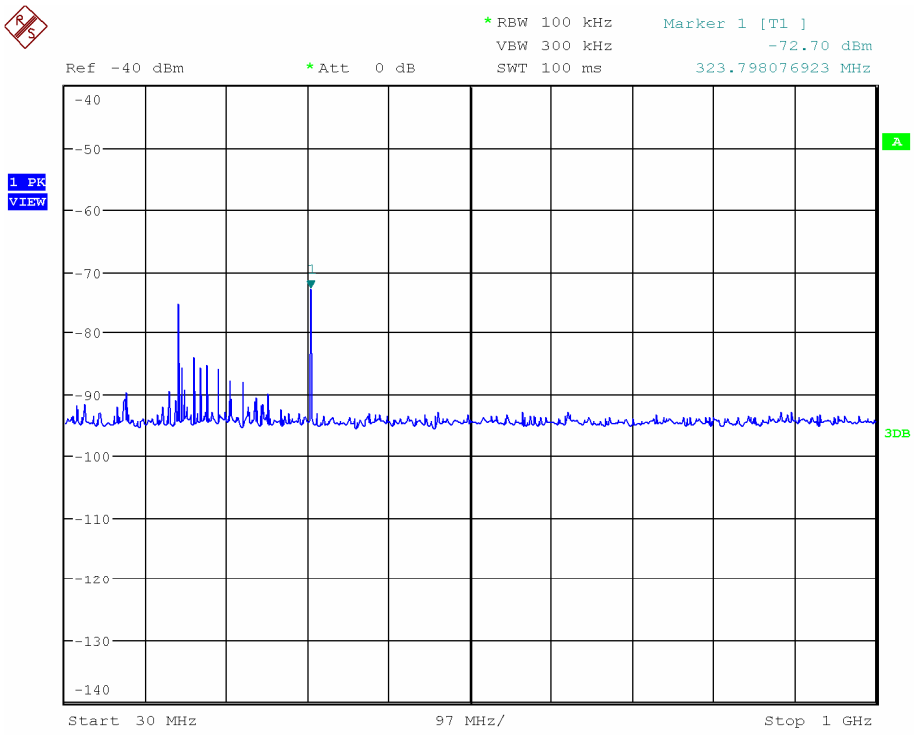
Comments :

13.8.20. RADIATION GRAPHS



Date: 5.APR.2011 09:14:03

HORIZONTAL POLARIZATION



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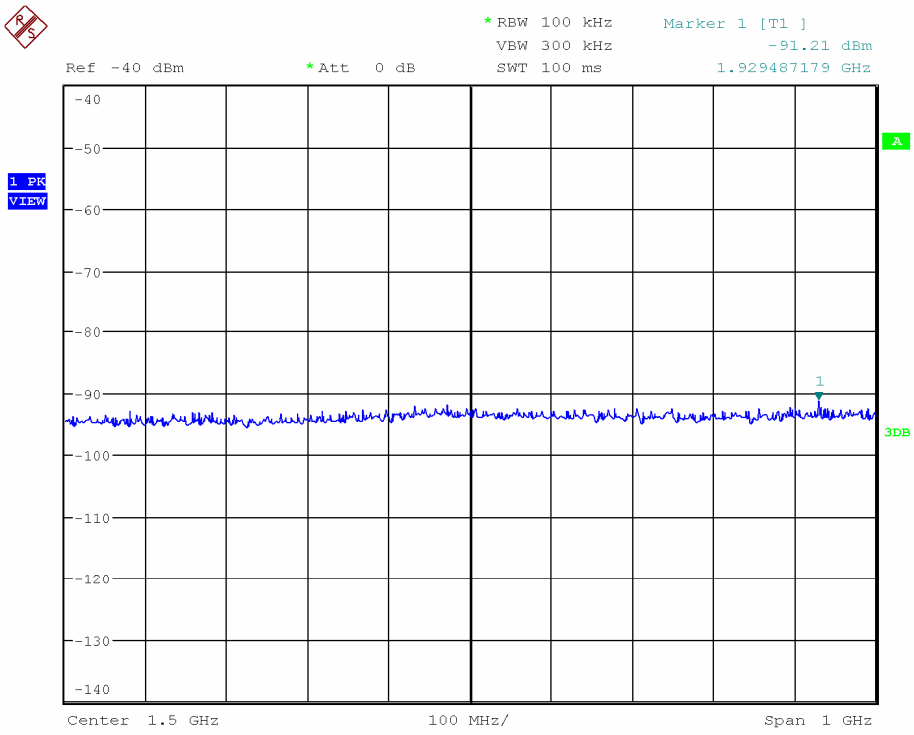
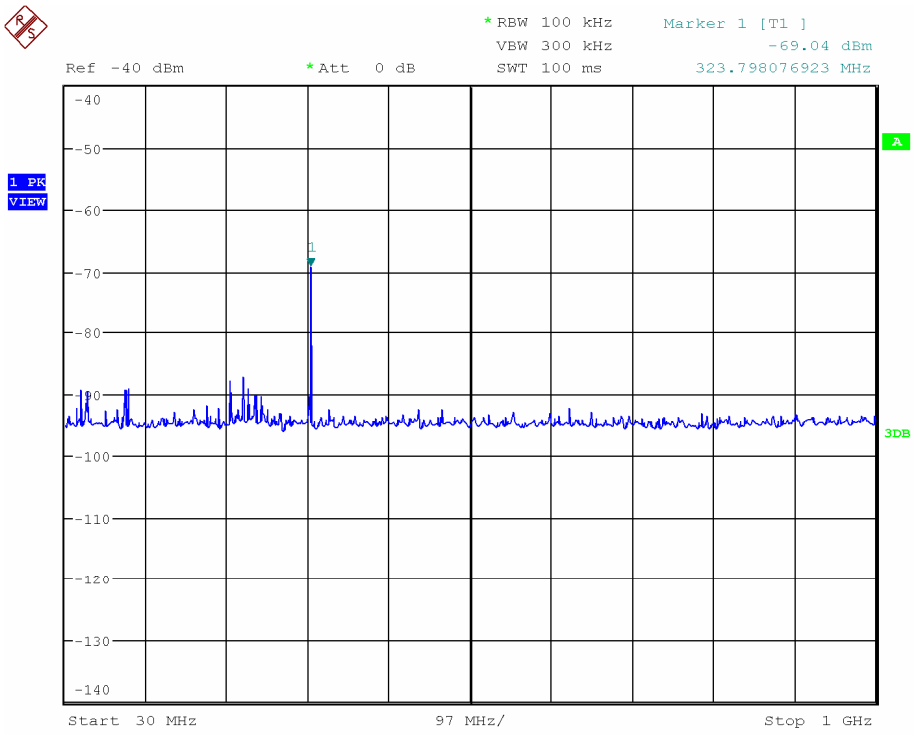


Date: 23.MAR.2011 09:37:03

VERTICAL POLARIZATION



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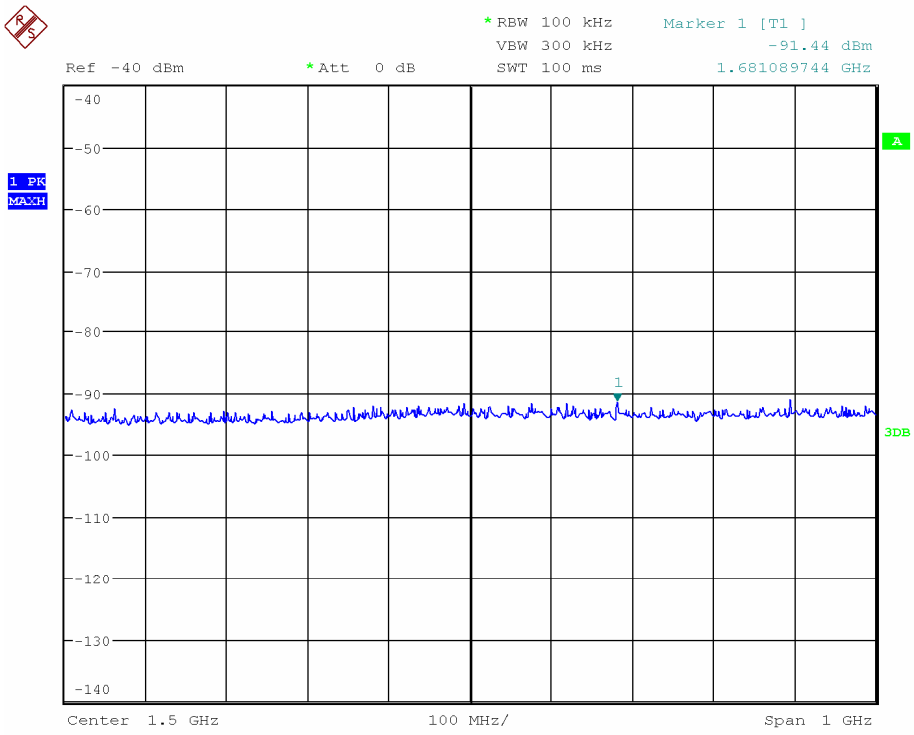


Date: 23.MAR.2011 09:39:31

13.8.21. TRANSMITTER 162.025MHZ – 12W: ON 12 VDC POWER LINE

FREQUENCY BAND : 150kHz – 30MHz SPURIOUS EMISSION LEVELS DBµV/m AT 3m		
Frequency (KHz)	**Results**	**Limits**
11.9	**14.19**	**80 – 52** **52 – 34**

HORIZONTAL POLARIZATION

FREQUENCY BAND : 30MHz – 2GHz SPURIOUS EMISSION LEVELS DBµV/m AT 3m		
Frequency (MHz)	**Results**	**Limits**
323.8	**37.17**	**54**
1613.7	**48.96**	

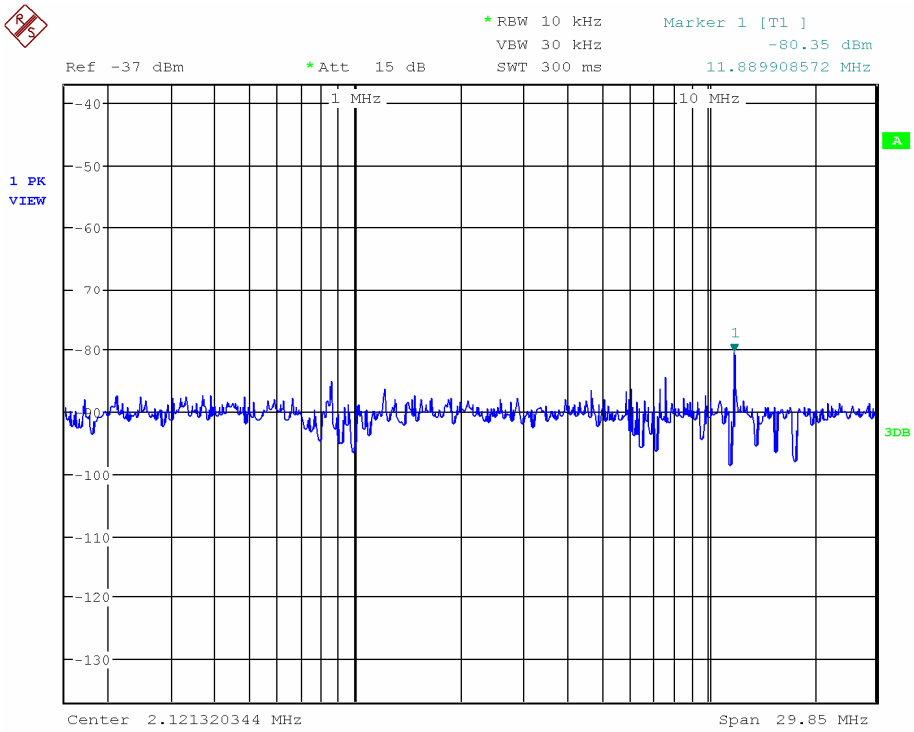
VERTICAL POLARIZATION

FREQUENCY BAND : 30MHz – 2GHz SPURIOUS EMISSION LEVELS DBµV/m AT 3m		
Frequency (MHz)	**Results**	**Limits**
323.8	**47.29**	**54**
1455.1	**47.63**	

Result :	**COMPLIANT**

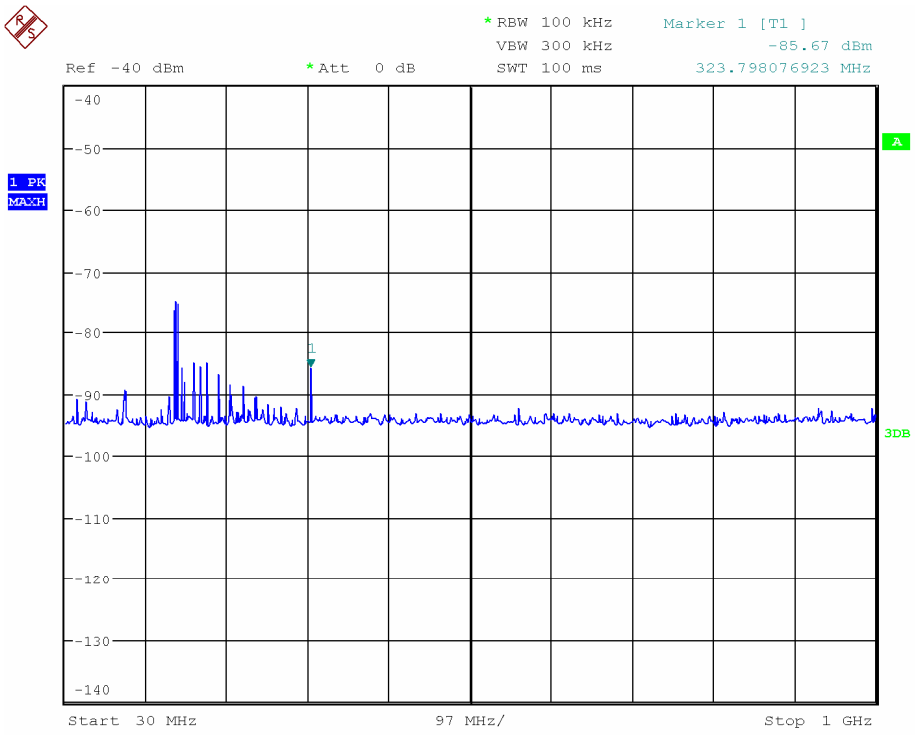
Comments :

13.8.22. RADIATION GRAPHS

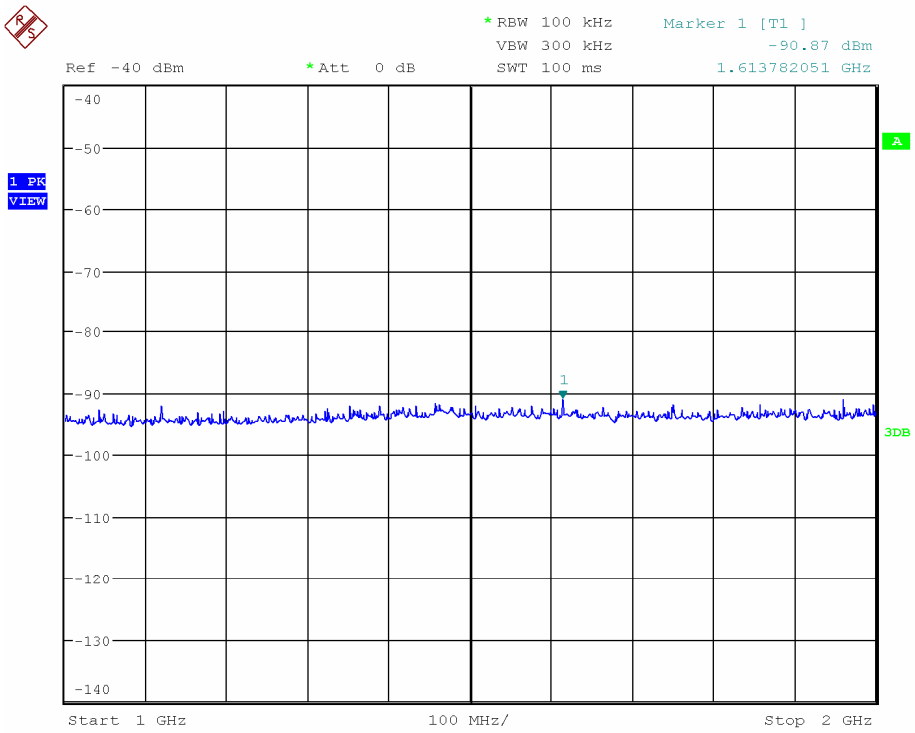


Date: 5.APR.2011 08:57:12

HORIZONTAL POLARIZATION

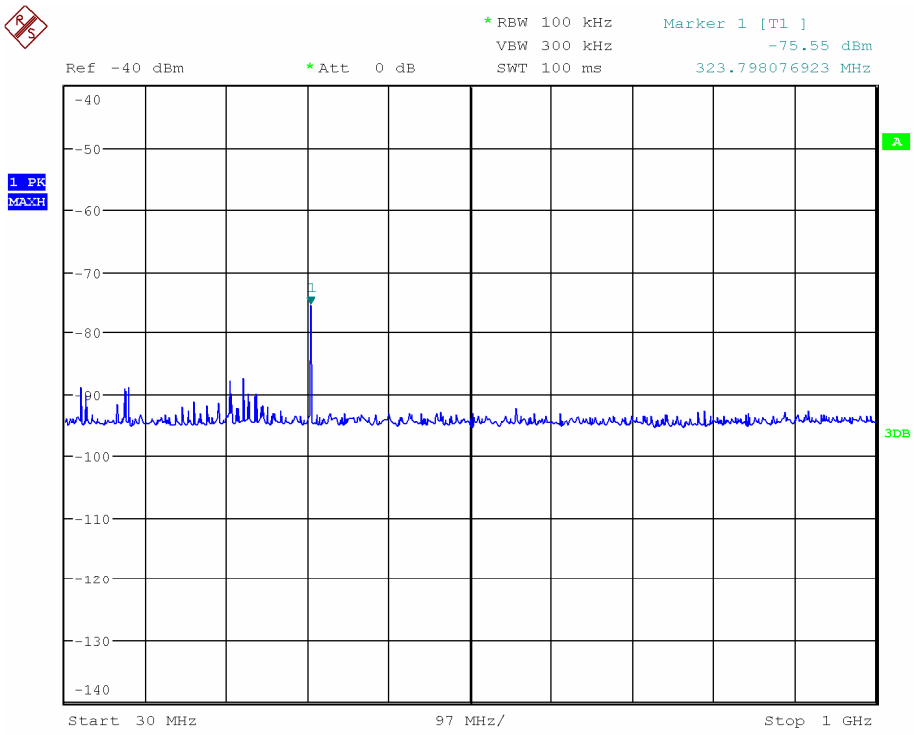


Date: 29.MAR.2011 15:14:00

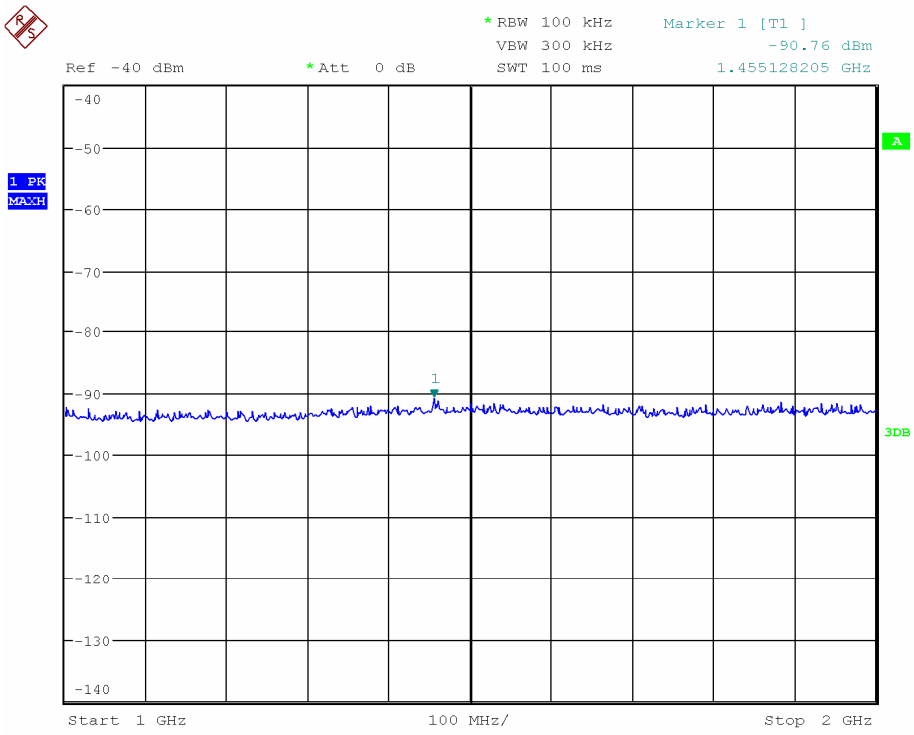


Date: 23.MAR.2011 09:05:59

VERTICAL POLARIZATION



Date: 29.MAR.2011 15:11:44



Date: 23.MAR.2011 08:58:55

13.8.23. TRANSMITTER 162.025MHZ – 12W: ON 24 VDC POWER LINE

FREQUENCY BAND : 150kHz – 30MHz SPURIOUS EMISSION LEVELS DBµV/m AT 3m		
Frequency (KHz)	**Results**	**Limits**
21.7	**16.23**	**80 – 52** **52 – 34**

HORIZONTAL POLARIZATION

FREQUENCY BAND : 30MHz – 2GHz SPURIOUS EMISSION LEVELS DBµV/m AT 3m		
Frequency (MHz)	**Results**	**Limits**
323.8	**43.68**	**54**
1846.1	**50.22**	

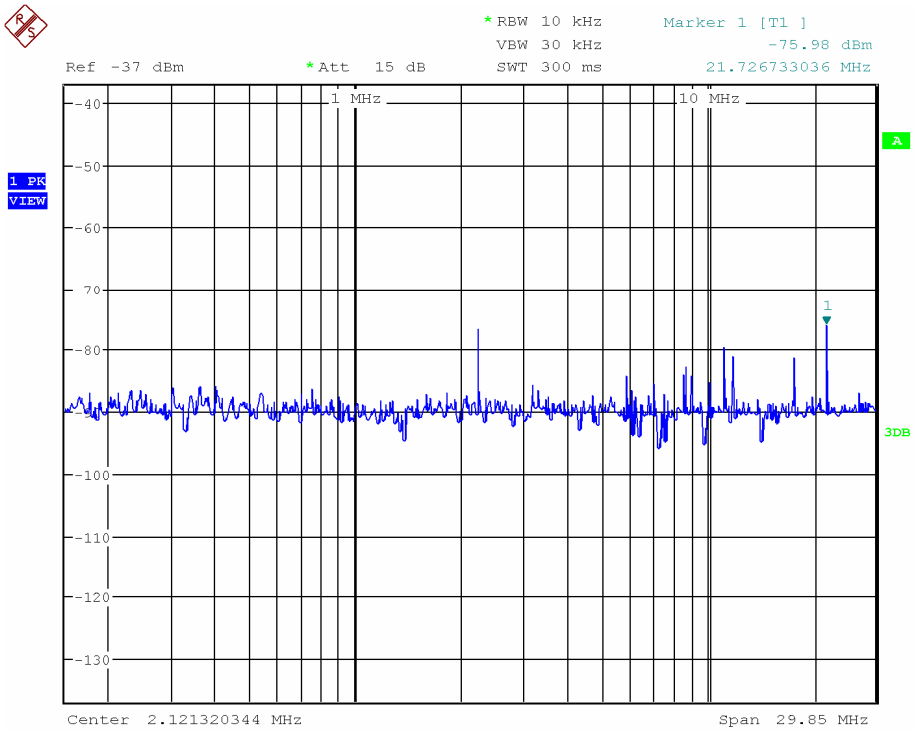
VERTICAL POLARIZATION

FREQUENCY BAND : 30MHz – 2GHz SPURIOUS EMISSION LEVELS DBµV/m AT 3m		
Frequency (MHz)	**Results**	**Limits**
323.8	**46.79**	**54**
1527.2	**48.46**	

Result :	**COMPLIANT**

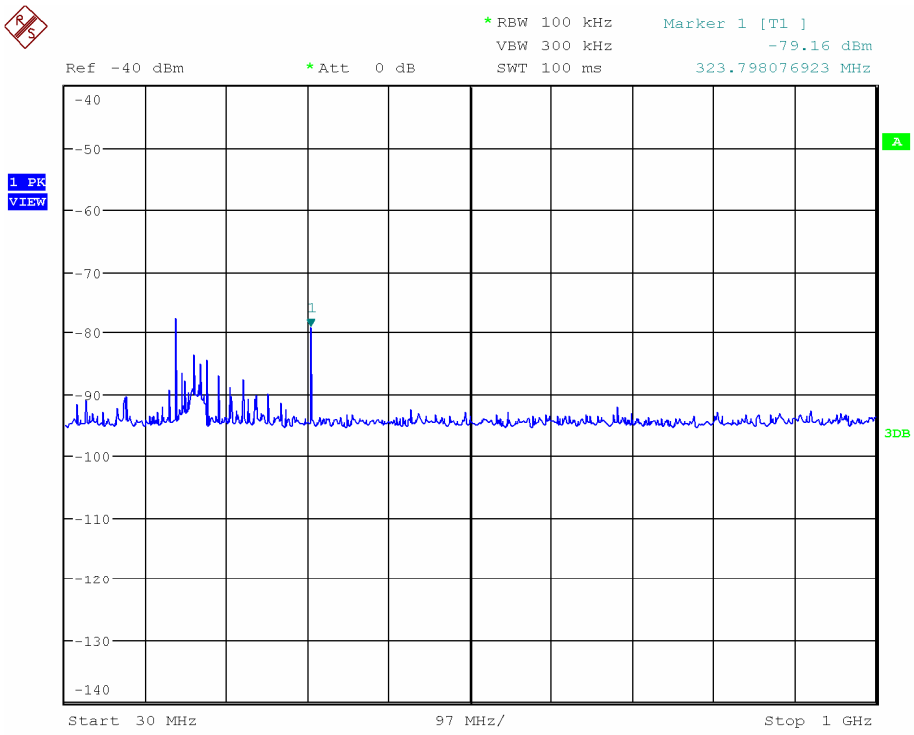
Comments :

13.8.24. RADIATION GRAPHS

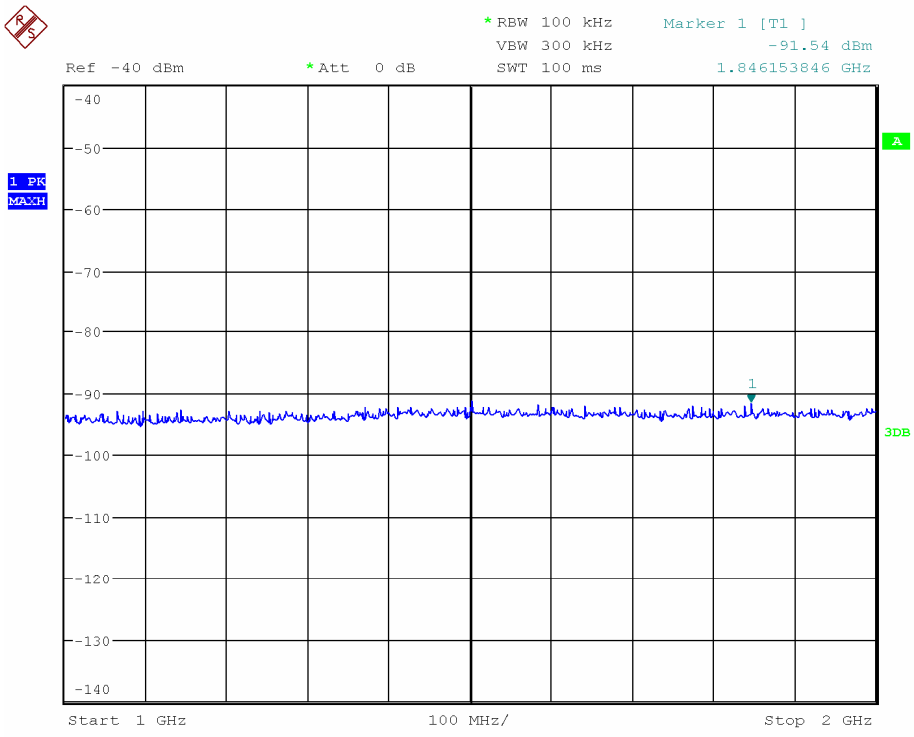


Date: 5.APR.2011 09:29:19

HORIZONTAL POLARIZATION

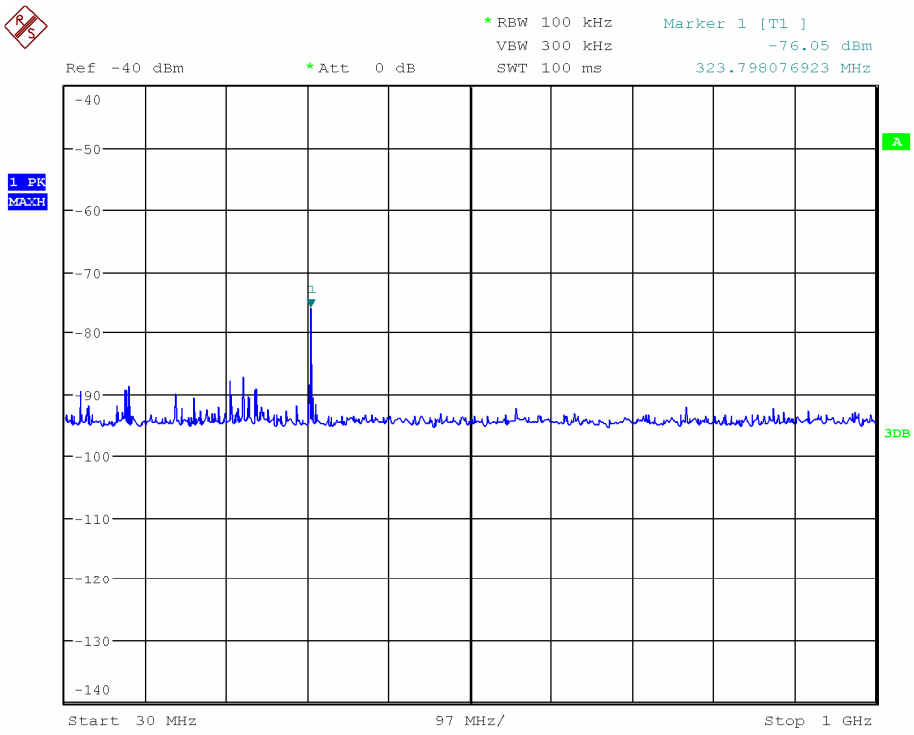


Date: 29.MAR.2011 15:15:51



Date: 23.MAR.2011 09:03:54

VERTICAL POLARIZATION



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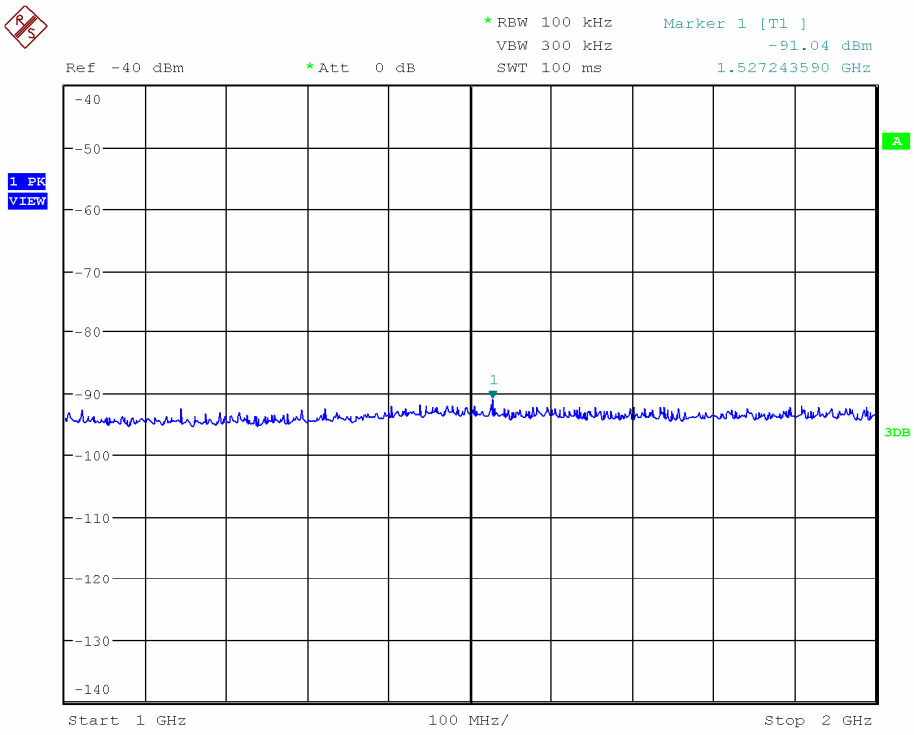


Date: 23.MAR.2011 09:01:15

14. IMMUNITY

14.1. GENERAL

For these tests the EUT shall conform to its normal operational configuration, mounting and earthing arrangements, unless otherwise stated, and shall operate under normal test conditions.
Particular interfaces of the EUT with the external electromagnetic environment are referred to as ports. The physical boundary of the EUT through which electromagnetic fields may radiate or impinge is the enclosure port.
Differential tests are those applied between electrical power, signal and control lines.
Common mode tests are those applied between groups of lines and a common reference, normally earth.
For the tests in this subclause, the results are evaluated against performance criteria relating to the operating conditions and functional specifications of the EUT, and defined as follows:

- **performance criterion A:** the EUT shall continue to operate as intended during and after the test. No degradation of performance or loss of function is allowed, as defined in the relevant equipment standard and in the technical specification published by the manufacturer;

- **performance criterion B:** the EUT shall continue to operate as intended after the test. No degradation of performance or loss of function is allowed, as defined in the relevant equipment standard and in the technical specification published by the manufacturer. During the test, degradation or loss of function or performance which is self-recoverable is however, allowed, but no change of actual operating state or stored data is allowed.

- **performance criterion C:** temporary degradation or loss of function or performance is allowed during the test, provided the function is self-recoverable, or can be restored at the end of the test by the operation of the controls, as defined in the relevant equipment standard and in the technical specification published by the manufacturer.

Electromagnetic immunity

Conducted radio frequency disturbance	**14.3**
Radiated disturbance	**14.4**
Fast transients	**14.5**
Slow transients	**NA**
Power supply short term variation	**NA**
Power supply failure	**14.6**
Electrostatic discharge	**14.7**

NA : Not Applicable

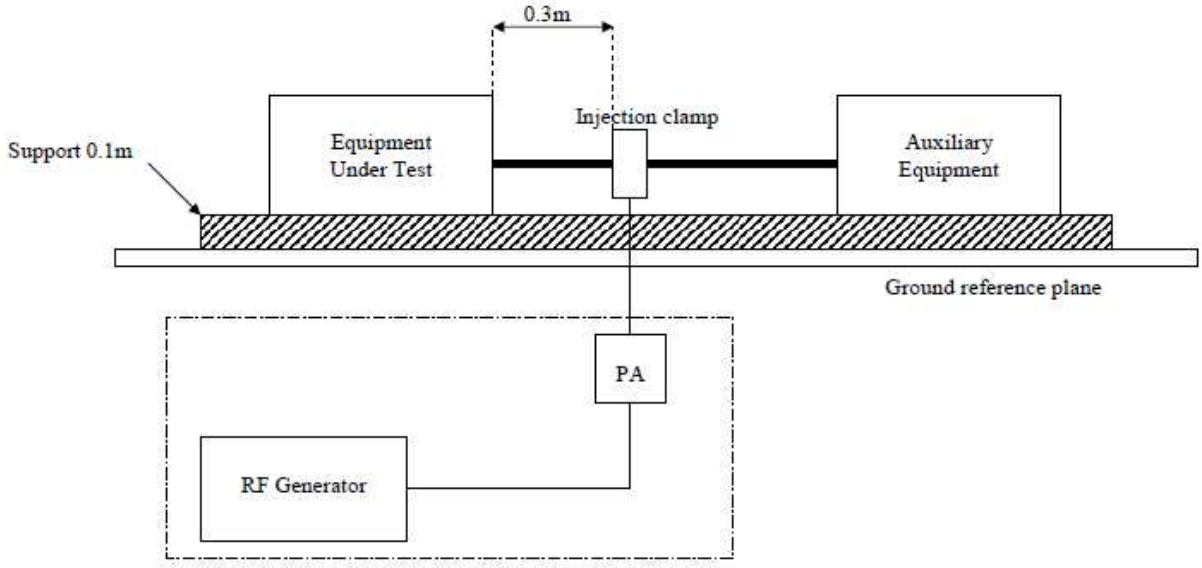
14.2. SPECIAL CONDITIONS

Exclusion band for receivers	151.975 MHz to 172.025 MHz
Exclusion band for transmitters	±50 kHz from the nominal operating frequency
Receiver RF input level	40 dBµV (emf)

14.3. IMMUNITY TO CONDUCTED RADIO FREQUENCY DISTURBANCE

TESTS SUMMARY	
Type of port	DC power cable Data cable Antenna cable
Basic standard	EN 61000-4-6
Performance criteria	A
Frequency/Levels	- 3Vrms amplitude swept over the frequency range 150KHz to 80MHz - 10Vrms amplitude at spot frequencies : 2MHz, 3MHz, 4MHz, 6.2MHz, 8.2MHz, 12.6MHz, 16.5MHz, 18.8MHz, 22MHz and 25MHz
Modulation	AM 80% / 400Hz
Sweep	1.5 x 10^{-3} decades/sec.

Test conditions:



PA : Power attenuator (6 dB)

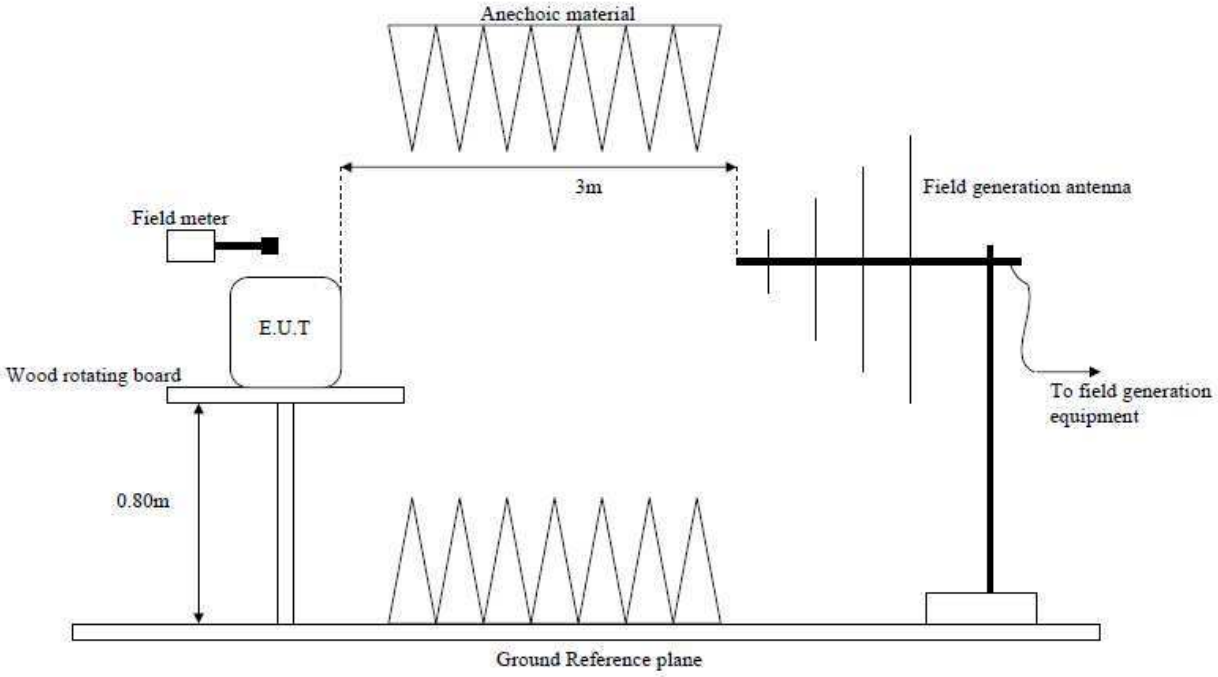
Result:

Transmitter in test operation mode		
Configuration: 161.975 MHz – 2W - 12Vdc		**COMPLIANT**
Configuration: 161.975 MHz – 12W - 12Vdc		**COMPLIANT**
Configuration: 162.025 MHz – 2W - 24Vdc		**COMPLIANT**
Configuration: 162.025 MHz – 12W - 24Vdc		**COMPLIANT**
Receiver		
Configuration: 161.975 MHz - 12Vdc	PER = 0.16%	**COMPLIANT**
Configuration: 162.025 MHz - 24Vdc	PER = 0.16%	**COMPLIANT**

14.4. IMMUNITY TO RADIATED RADIOFREQUENCIES

TESTS SUMMARY	
Basic standard	EN 61000-4-3
Performance criteria	A
Frequencies/level	80 MHz to 2 GHz 10V/m
Exclusion Band	
Modulation	AM 80% / 400Hz
Sweep rate	1.5 x 10^{-3} decade/sec. 80MHz – 1GHz 0.5x10^{-3} decades/sec. 1GHz – 2GHz

Test conditions:



Result:

Transmitter in test operation mode

N°	Configuration	Polar.	Position of EUT	Result
1	161.975 MHz - 2W - 12Vdc	V	0°	COMPLIANT
2	161.975 MHz - 2W - 12Vdc	V	90°	COMPLIANT
3	161.975 MHz - 2W - 12Vdc	V	180°	COMPLIANT
4	161.975 MHz - 2W - 12Vdc	V	270°	COMPLIANT
5	161.975 MHz - 2W - 12Vdc	H	0°	COMPLIANT
6	161.975 MHz - 2W - 12Vdc	H	90°	COMPLIANT
7	161.975 MHz - 2W - 12Vdc	H	180°	COMPLIANT
8	161.975 MHz - 2W - 12Vdc	H	270°	COMPLIANT
9	161.975 MHz - 12W - 12Vdc	V	0°	COMPLIANT
10	161.975 MHz - 12W - 12Vdc	V	90°	COMPLIANT
11	161.975 MHz - 12W - 12Vdc	V	180°	COMPLIANT
12	161.975 MHz - 12W - 12Vdc	V	270°	COMPLIANT
13	161.975 MHz - 12W - 12Vdc	H	0°	COMPLIANT
14	161.975 MHz - 12W - 12Vdc	H	90°	COMPLIANT
15	161.975 MHz - 12W - 12Vdc	H	180°	COMPLIANT
16	161.975 MHz - 12W - 12Vdc	H	270°	COMPLIANT
17	162.025 MHz - 2W - 24Vdc	V	0°	COMPLIANT
18	162.025 MHz - 2W - 24Vdc	V	90°	COMPLIANT
19	162.025 MHz - 2W - 24Vdc	V	180°	COMPLIANT
20	162.025 MHz - 2W - 24Vdc	V	270°	COMPLIANT
21	162.025 MHz - 2W - 24Vdc	H	0°	COMPLIANT
22	162.025 MHz - 2W - 24Vdc	H	90°	COMPLIANT
23	162.025 MHz - 2W - 24Vdc	H	180°	COMPLIANT
24	162.025 MHz - 2W - 24Vdc	H	270°	COMPLIANT
25	162.025 MHz - 12W - 24Vdc	V	0°	COMPLIANT
26	162.025 MHz - 12W - 24Vdc	V	90°	COMPLIANT
27	162.025 MHz - 12W - 24Vdc	V	180°	COMPLIANT
28	162.025 MHz - 12W - 24Vdc	V	270°	COMPLIANT
29	162.025 MHz - 12W - 24Vdc	H	0°	COMPLIANT
30	162.025 MHz - 12W - 24Vdc	H	90°	COMPLIANT
31	162.025 MHz - 12W - 24Vdc	H	180°	COMPLIANT
32	162.025 MHz - 12W - 24Vdc	H	270°	COMPLIANT

Receiver

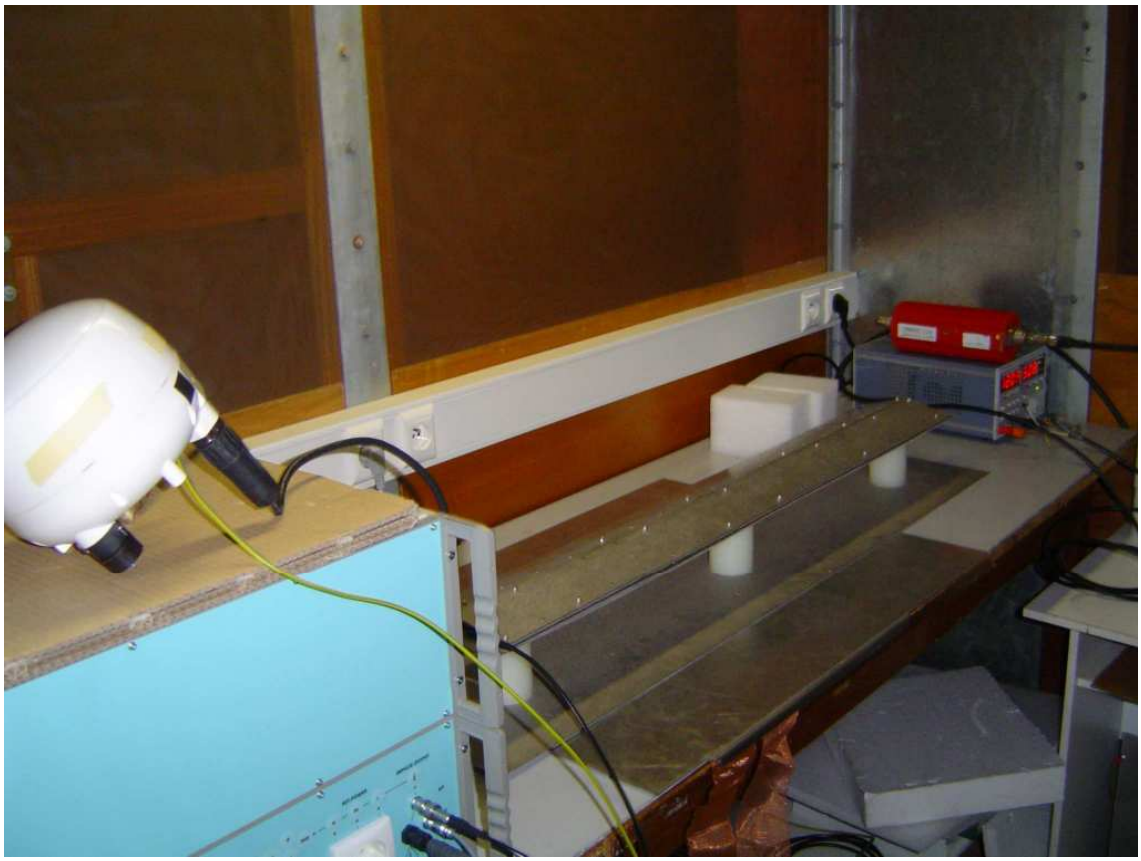
N°	Configuration	Polar.	Position of EUT	PER	Result
1	161.975 MHz - 12Vdc	V	0°	< 0.5%	COMPLIANT
2	161.975 MHz - 12Vdc	V	90°	< 0.5%	COMPLIANT
3	161.975 MHz - 12Vdc	V	180°	< 0.5%	COMPLIANT
4	161.975 MHz - 12Vdc	V	270°	< 0.5%	COMPLIANT
5	161.975 MHz - 12Vdc	H	0°	< 0.5%	COMPLIANT
6	161.975 MHz - 12Vdc	H	90°	< 0.5%	COMPLIANT
7	161.975 MHz - 12Vdc	H	180°	< 0.5%	COMPLIANT
8	161.975 MHz - 12Vdc	H	270°	< 0.5%	COMPLIANT
9	161.975 MHz - 24Vdc	V	0°	< 0.5%	COMPLIANT
10	161.975 MHz - 24Vdc	V	90°	< 0.5%	COMPLIANT
11	161.975 MHz - 24Vdc	V	180°	< 0.5%	COMPLIANT
12	161.975 MHz - 24Vdc	V	270°	< 0.5%	COMPLIANT
13	161.975 MHz - 24Vdc	H	0°	< 0.5%	COMPLIANT
14	161.975 MHz - 24Vdc	H	90°	< 0.5%	COMPLIANT
15	161.975 MHz - 24Vdc	H	180°	< 0.5%	COMPLIANT
16	161.975 MHz - 24Vdc	H	270°	< 0.5%	COMPLIANT
17	162.025 MHz - 12Vdc	V	0°	< 0.5%	COMPLIANT
18	162.025 MHz - 12Vdc	V	90°	< 0.5%	COMPLIANT
19	162.025 MHz - 12Vdc	V	180°	< 0.5%	COMPLIANT
20	162.025 MHz - 12Vdc	V	270°	< 0.5%	COMPLIANT
21	162.025 MHz - 12Vdc	H	0°	< 0.5%	COMPLIANT
22	162.025 MHz - 12Vdc	H	90°	< 0.5%	COMPLIANT
23	162.025 MHz - 12Vdc	H	180°	< 0.5%	COMPLIANT
24	162.025 MHz - 12Vdc	H	270°	< 0.5%	COMPLIANT
25	162.025 MHz - 24Vdc	V	0°	< 0.5%	COMPLIANT
26	162.025 MHz - 24Vdc	V	90°	< 0.5%	COMPLIANT
27	162.025 MHz - 24Vdc	V	180°	< 0.5%	COMPLIANT
28	162.025 MHz - 24Vdc	V	270°	< 0.5%	COMPLIANT
29	162.025 MHz - 24Vdc	H	0°	< 0.5%	COMPLIANT
30	162.025 MHz - 24Vdc	H	90°	< 0.5%	COMPLIANT
31	162.025 MHz - 24Vdc	H	180°	< 0.5%	COMPLIANT
32	162.025 MHz - 24Vdc	H	270°	< 0.5%	COMPLIANT

14.5. IMMUNITY TO FAST TRANSIENTS

TESTS SUMMARY	
Type of port	Power Supply cable Data cable Antenna cable
Basic standard	EN 61000-4-4
Basic criteria	B
Requirements	Signal / Control port +/- 1kV common mode
Duration	1 min

COMPLIANT

Test conditions:



Result:

Transmitter in test operation mode

Configuration: 161.975 MHz – 2W - 12Vdc	+1kV	**COMPLIANT**
	-1kV	**COMPLIANT**
Configuration: 161.975 MHz – 12W - 12Vdc	+1kV	**COMPLIANT**
	-1kV	**COMPLIANT**
Configuration: 162.025 MHz – 2W - 24Vdc	+1kV	**COMPLIANT**
	-1kV	**COMPLIANT**
Configuration: 162.025 MHz – 12W - 24Vdc	+1kV	**COMPLIANT**
	-1kV	**COMPLIANT**

Receiver

Configuration:

161.975 MHz - 12Vdc	+1kV	PER = 0.42%	**COMPLIANT**
	-1kV	PER = 0.42%	**COMPLIANT**
162.025 MHz - 24Vdc	+1kV	PER = 0.42%	**COMPLIANT**
	-1kV	PER = 0.42%	**COMPLIANT**

14.6. IMMUNITY TO POWER SUPPLY FAILURE

TESTS SUMMARY	
Type of port	Power ligne DC
Basic standard	EN 61000-4-11
Basic criteria	C
Requirement	Test Voltage : 24V Test duration : 3 breaks Power cut duration : 60s

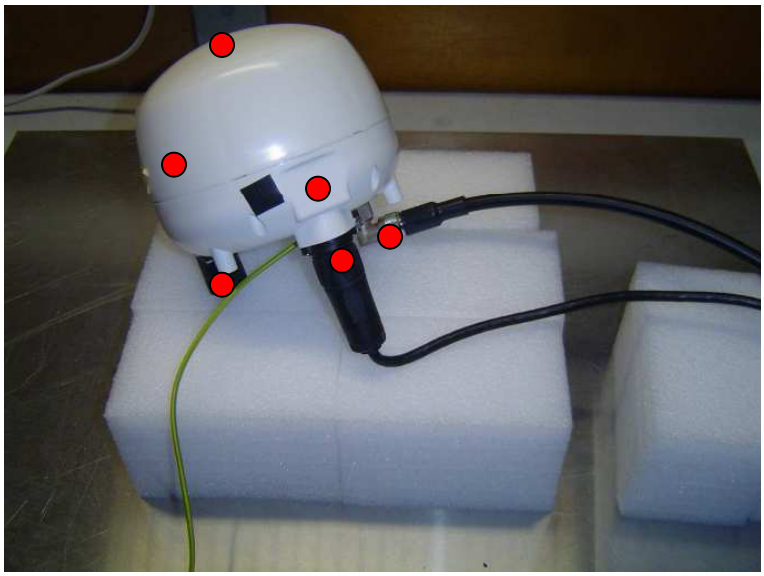
Result:

Transmitter in normal operation test **COMPLIANT**
Receiver **COMPLIANT**

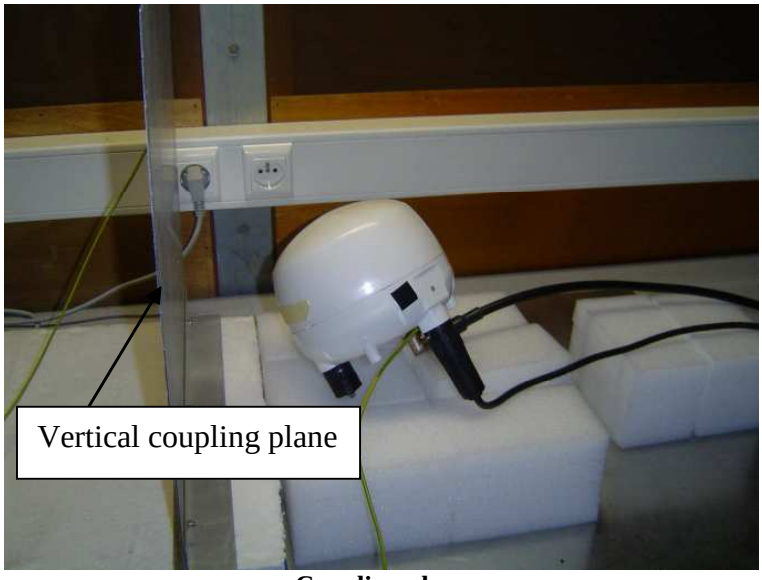
14.7. IMMUNITY TO ELECTROSTATIC DISCHARGE

TESTS SUMMARY	
Type of port	Cabinet
Basic standard	EN 61000-4-2
Basic criteria	B
Requirement	Contact +/- 6 KV Air +/- 8 KV

Test conditions:



Air and contact discharge



Coupling plane

Result

The AtoN is tested after each test during 1min

Air discharge

Transmitter in test operation mode
Configuration: 161.975 MHz – 2W - 12Vdc **COMPLIANT**
Configuration: 161.975 MHz – 12W - 12Vdc **COMPLIANT**
Configuration: 162.025 MHz – 2W - 24Vdc **COMPLIANT**
Configuration: 162.025 MHz – 12W - 24Vdc **COMPLIANT**

Receiver
Configuration: 161.975 MHz - 12Vdc After the test PER = 0.41% **COMPLIANT**
Configuration: 162.025 MHz - 24Vdc After the test PER = 0.41% **COMPLIANT**

Contact discharge

Transmitter in test operation mode
Configuration: 161.975 MHz – 2W - 12Vdc **COMPLIANT**
Configuration: 161.975 MHz – 12W - 12Vdc **COMPLIANT**
Configuration: 162.025 MHz – 2W - 24Vdc **COMPLIANT**
Configuration: 162.025 MHz – 12W - 24Vdc **COMPLIANT**

Receiver
Configuration: 161.975 MHz - 12Vdc After the test PER = 0.41% **COMPLIANT**
Configuration: 162.025 MHz - 24Vdc After the test PER = 0.41% **COMPLIANT**

Indirect discharge

Transmitter in test operation mode
Configuration: 161.975 MHz – 2W - 12Vdc **COMPLIANT**
Configuration: 161.975 MHz – 12W - 12Vdc **COMPLIANT**
Configuration: 162.025 MHz – 2W - 24Vdc **COMPLIANT**
Configuration: 162.025 MHz – 12W - 24Vdc **COMPLIANT**

Receiver
Configuration: 161.975 MHz - 12Vdc After the test PER = 0.41% **COMPLIANT**
Configuration: 162.025 MHz - 24Vdc After the test PER = 0.41% **COMPLIANT**