

**Clause 15.407(a)(6) The Ratio of Peak Excursion**

The ratio of the peak excursion of the modulation envelope (measured using a peak hold function) to the maximum conducted output power (measured as specified above) shall not exceed 13 dB across any 1 MHz bandwidth or the emission bandwidth whichever is less.

**Test Results:** Pass

**Additional Observations:**

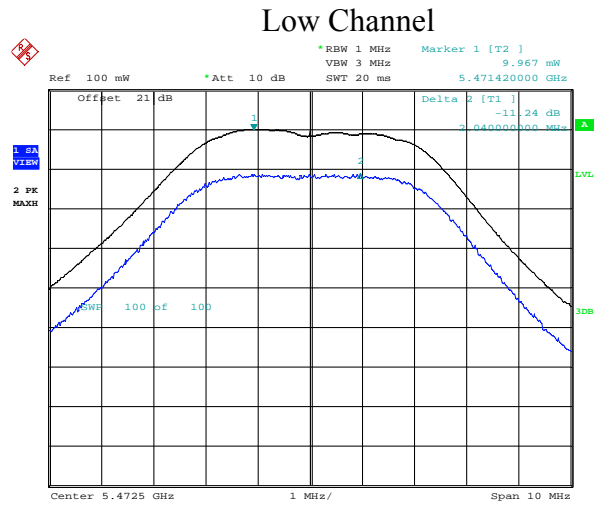
The peak excursion was measured on the antenna ports by means of a spectrum analyzer and following the procedure from the FCC Public Notice Ref: DA: 02-2138, Measurement Procedure for Peak Transmit Power in UNII Band.

Two antenna ports and all modulations were investigated, only the worst case data is presented.

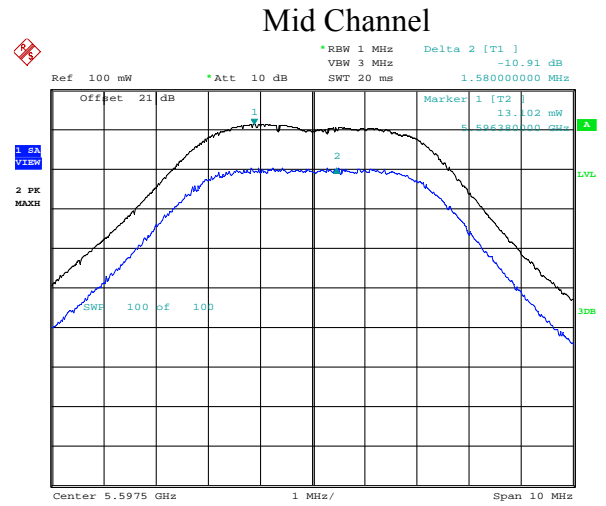
Channel Bandwidth (MHz)	Channel Setting	Peak Excursion (dB)	Limit (dB)	Margin (dB)
5	Low	11.24	13.00	1.76
	Mid	10.91	13.00	2.09
	High	10.77	13.00	2.23
10	Low	9.75	13.00	3.25
	Mid	10.27	13.00	2.73
	High	10.38	13.00	2.62
20	Low	9.19	13.00	3.81
	Mid	9.74	13.00	3.26
	High	9.43	13.00	3.57

Peak excursion sample plot:

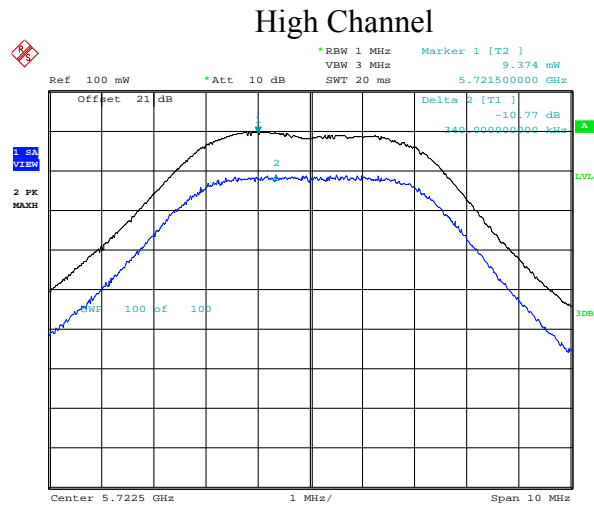
**5 MHz Channel**



Date: 25.OCT.2010 12:35:27



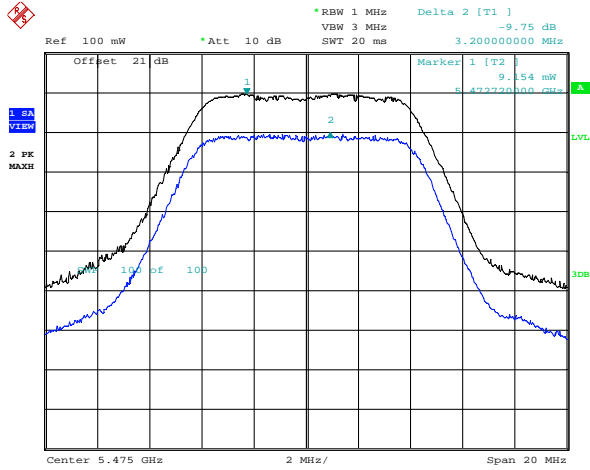
Date: 25.OCT.2010 12:37:01



Date: 25.OCT.2010 12:38:15

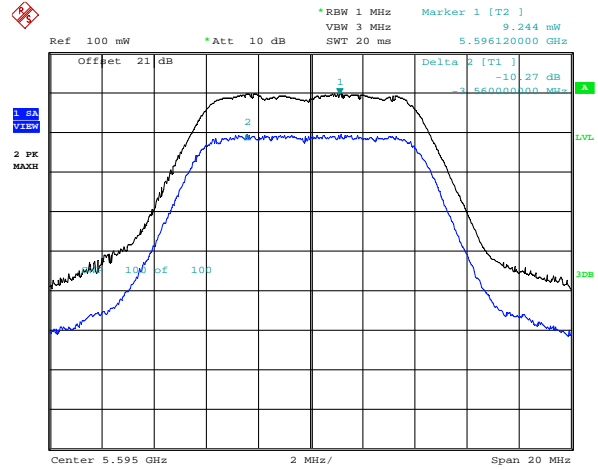
**10 MHz Channel**

**Low Channel**



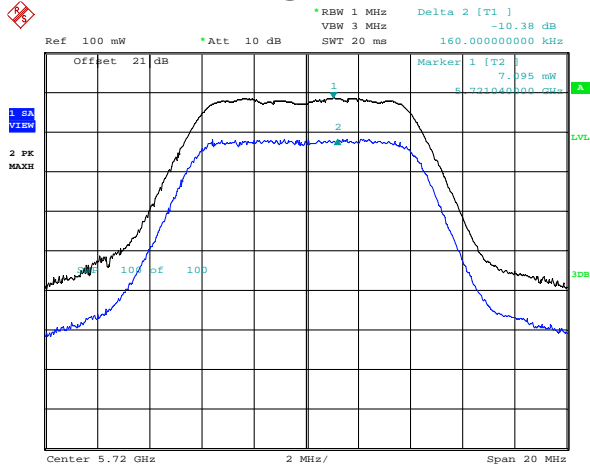
Date: 25.OCT.2010 12:39:24

**Mid Channel**



Date: 25.OCT.2010 12:40:19

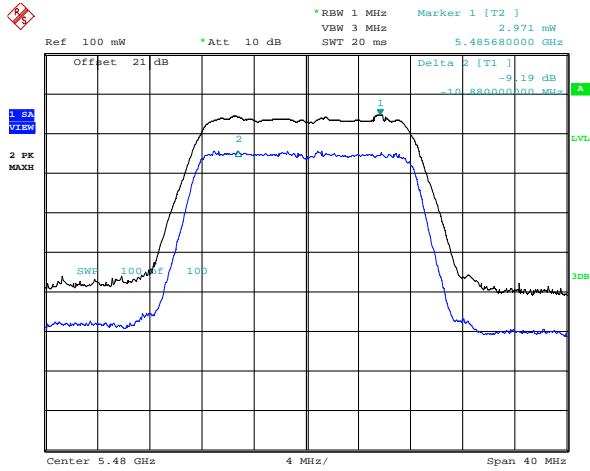
**High Channel**



Date: 25.OCT.2010 12:41:19

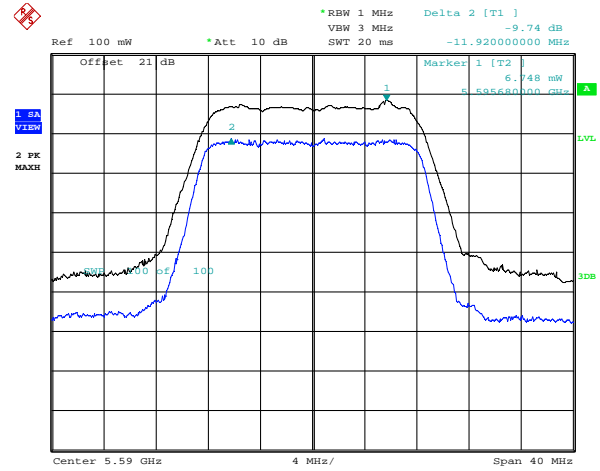
**20 MHz Channel**

**Low Channel**



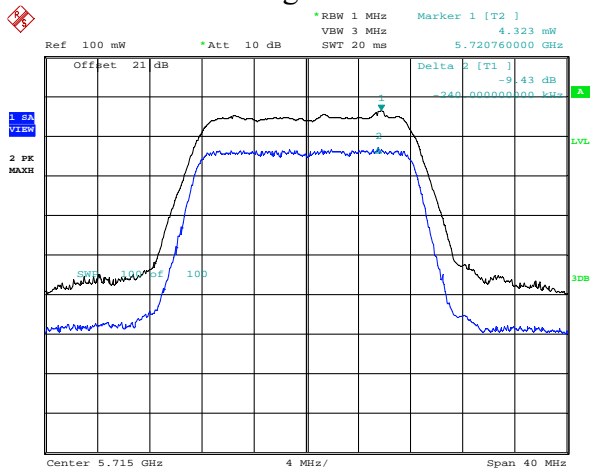
Date: 25.OCT.2010 12:43:08

**Mid Channel**



Date: 25.OCT.2010 12:44:10

**High Channel**



Date: 25.OCT.2010 12:45:16

---

**Clause 15.407(b)(3) Undesirable emission limits for transmitters in the 5.47–5.725 GHz band**

For transmitters operating in the 5.47–5.725 GHz band: all emissions outside of the 5.47–5.725 GHz band shall not exceed an EIRP of  $-27$  dBm/MHz.

**Test Results:** Pass

**Additional Observations:**

The spectrum was searched from 30 MHz to the 40 GHz for low mid and high channels.

Radiated emissions measurements were performed by using RBW/VBW of 1 MHz/3 MHz detector at the distance of 3 m.

Radiated spurious emissions were measured by using substitution method.

For type of sector flat panel antenna, the highest gain (15.5 dBi) antenna was chosen for the test.

All modulations were investigated, only worst-case emissions reported.

**Band Edge Check:**

**5 MHz Channel**

Antenna	Channel MHz	Frequency, MHz	FS Level, dB $\mu$ V/m	Signal substitution correction, dB	EIRP, dBm/MHz	EIRP Limit, dBm/MHz	Margin, dB
Sector flat panel 15.5 dBi	5472.5	5470.00	28.49	-56.20	-27.71	-27.00	0.71
	5722.5	5725.00	27.90	-55.94	-28.04	-27.00	1.04
Flat panel 23 dBi	5472.5	5470.00	27.69	-56.20	-28.51	-27.00	1.51
	5722.5	5725.00	28.36	-55.94	-27.58	-27.00	0.58
Parabolic 29 dBi	5472.5	5470.00	24.56	-56.20	-31.64	-27.00	4.64
	5722.5	5725.00	24.22	-55.94	-31.72	-27.00	4.72
Parabolic 32 dBi	5472.5	5470.00	27.48	-56.20	-28.72	-27.00	1.72
	5722.5	5725.00	26.61	-55.94	-29.33	-27.00	2.33

**10 MHz Channel**

Antenna	Channel MHz	Frequency, MHz	FS Level, dB $\mu$ V/m	Signal substitution correction, dB	EIRP, dBm/MHz	EIRP Limit, dBm/MHz	Margin, dB
Sector flat panel 15.5 dBi	5475.0	5470.00	28.15	-56.20	-28.05	-27.00	1.05
	5720.0	5725.00	27.33	-55.94	-28.61	-27.00	1.61
Flat panel 23 dBi	5475.0	5470.00	27.83	-56.20	-28.37	-27.00	1.37
	5720.0	5725.00	27.84	-55.94	-28.10	-27.00	1.10
Parabolic 29 dBi	5475.0	5470.00	25.40	-56.20	-30.80	-27.00	3.80
	5720.0	5725.00	25.59	-55.94	-30.35	-27.00	3.35
Parabolic 32 dBi	5475.0	5470.00	25.33	-56.20	-30.87	-27.00	3.87
	5720.0	5725.00	24.53	-55.94	-31.41	-27.00	4.41

**20 MHz Channel**

Antenna	Channel MHz	Frequency, MHz	FS Level, dB $\mu$ V/m	Signal substitution correction, dB	EIRP, dBm/MHz	EIRP Limit, dBm/MHz	Margin, dB
Sector flat panel 15.5 dBi	5480.0	5470.00	27.95	-56.20	-28.25	-27.00	1.25
	5715.0	5725.00	27.16	-55.94	-28.78	-27.00	1.78
Flat panel 23 dBi	5480.0	5470.00	27.75	-56.20	-28.45	-27.00	1.45
	5715.0	5725.00	26.96	-55.94	-28.98	-27.00	1.98
Parabolic 29 dBi	5480.0	5470.00	28.04	-56.20	-28.16	-27.00	1.16
	5715.0	5725.00	26.40	-55.94	-29.54	-27.00	2.54
Parabolic 32 dBi	5480.0	5470.00	24.62	-56.20	-31.58	-27.00	4.58
	5715.0	5725.00	24.03	-55.94	-31.91	-27.00	4.91

**Spurious emissions except band edge:**

**5 MHz Channel**

Antenna	Channel MHz	Frequency, MHz	FS Level, dBµV	Signal substitution correction, dB	EIRP, dBm/MHz	EIRP Limit, dBm/MHz	Margin, dB
Sector flat panel 15.5 dBi	5472.5	5453.30	22.68	-56.18	-33.50	-27.00	6.50
	5722.5	5743.10	20.84	-55.92	-35.08	-27.00	8.08
Flat panel 23 dBi	5472.5	5451.50	23.12	-56.17	-33.05	-27.00	6.05
	5722.5	5742.50	21.34	-55.92	-34.58	-27.00	7.58
Parabolic 29 dBi	5472.5	5453.60	17.92	-56.18	-38.26	-27.00	11.26
	5722.5	5741.80	16.36	-55.92	-39.56	-27.00	12.56
Parabolic 32 dBi	5472.5	5452.50	20.53	-56.18	-35.65	-27.00	8.65
	5722.5	5740.40	19.82	-55.92	-36.10	-27.00	9.10

**10 MHz Channel**

Antenna	Channel MHz	Frequency, MHz	FS Level, dBµV	Signal substitution correction, dB	EIRP, dBm/MHz	EIRP Limit, dBm/MHz	Margin, dB
Sector flat panel 15.5 dBi	5475.0	5457.50	20.26	-56.18	-35.92	-27.00	8.92
	5720.0	5738.00	22.71	-55.93	-33.22	-27.00	6.22
Flat panel 23 dBi	5475.0	5457.70	21.57	-56.18	-34.61	-27.00	7.61
	5720.0	5736.00	20.73	-55.93	-35.20	-27.00	8.20
Parabolic 29 dBi	5475.0	5459.30	18.73	-56.19	-37.46	-27.00	10.46
	5720.0	5741.10	20.82	-56.17	-35.35	-27.00	8.35
Parabolic 32 dBi	5475.0	5460.20	17.43	-56.19	-38.76	-27.00	11.76
	5720.0	5745.50	16.92	-56.17	-39.25	-27.00	12.25

**20 MHz Channel**

Antenna	Channel MHz	Frequency, MHz	FS Level, dBµV	Signal substitution correction, dB	EIRP, dBm/MHz	EIRP Limit, dBm/MHz	Margin, dB
Sector flat panel 15.5 dBi	5480.0	3106.00	23.10	-60.93	-37.83	-27.00	10.83
	5715.0	3158.00	24.45	-60.68	-36.23	-27.00	9.23
Flat panel 23 dBi	5480.0	3070.00	22.67	-61.10	-38.43	-27.00	11.43
	5715.0	3102.00	21.42	-60.95	-39.53	-27.00	12.53
Parabolic 29 dBi	5480.0	3160.00	25.56	-60.67	-35.11	-27.00	8.11
	5715.0	3192.00	23.30	-60.51	-37.21	-27.00	10.21
Parabolic 32 dBi	5480.0	3268.00	24.11	-60.16	-36.05	-27.00	9.05
	5715.0	3305.00	23.40	-59.96	-36.56	-27.00	9.56



**Nemko Canada Inc.**

---

**Clause 15.407(b)(6) Unwanted emissions below 1 GHz**

Unwanted emissions below 1 GHz must comply with the general field strength limits set forth in §15.209. Further, any U-NII devices using an AC power line are required to comply also with the conducted limits set forth in §15.207.

**Test Results:** Pass

**Additional Observations:**

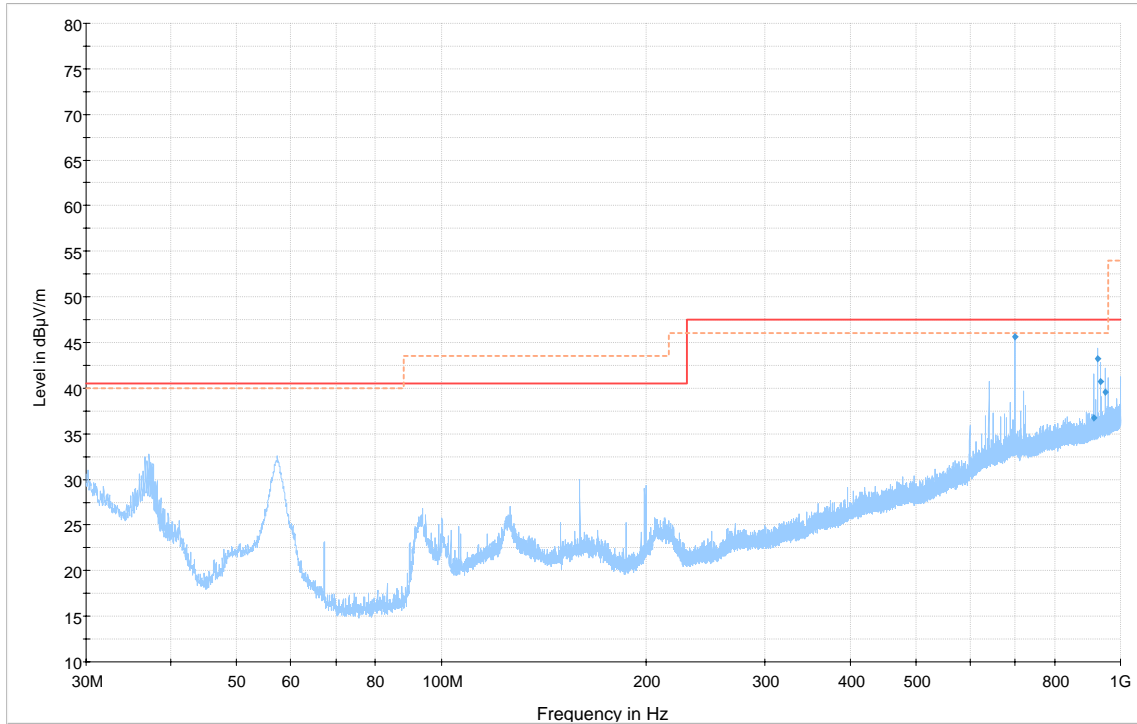
The spectrum was searched from 30 MHz to 1 GHz for low mid and high channels.

All unwanted emissions measurements were performed using a Peak Detector with 100 kHz RBW below 1 GHz at a distance of 3 m.

All modulations, channel bandwidth settings combined with all antennas were investigated, only worst-case emissions reported.



**Plots:**



— CISPR22 Class B QP 3m.LimitLine - - - FCC Part 15 Class B 3m QP+AV.LimitLine — Preview Result 1 ♦ Final Result 1

Tabular data									
Frequency MHz	Quasi Peak dBµV/m	Meas. Time ms	Bandwidth kHz	Height cm	Polarization	Azimuth deg	Corr. dB	Margin dB	Limit dBµV/m
699.99000	45.6	100.0	120.000	120.0	H	157.0	22.9	0.4	46.0
912.48000	36.7	100.0	120.000	100.0	H	316.0	25.7	9.3	46.0
924.99000	43.3	100.0	120.000	100.0	H	324.0	25.7	2.7	46.0
933.33000	40.7	100.0	120.000	99.9	H	331.0	25.9	5.3	46.0
949.98000	39.6	100.0	120.000	100.0	H	324.0	26.0	6.4	46.0

**Clause 15.407(g) Frequency stability**

Manufacturers of U-NII devices are responsible for ensuring frequency stability such that an emission is maintained within the band of operation under all conditions of normal operation as specified in the users manual.

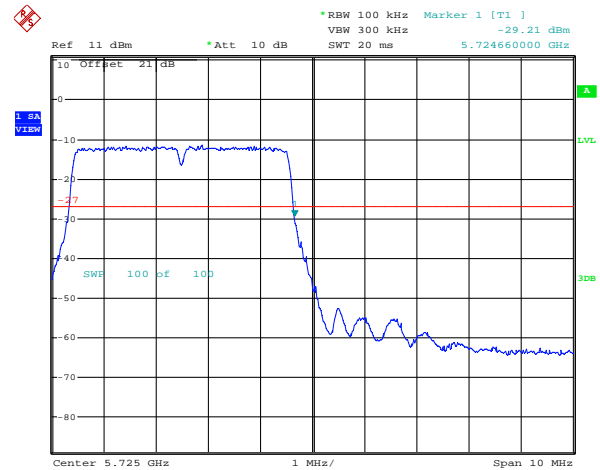
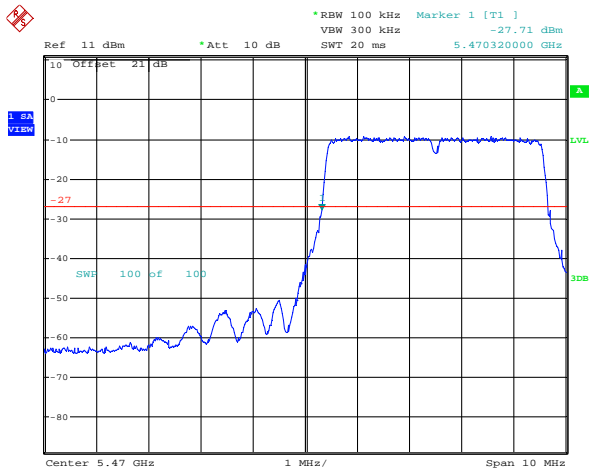
**Test Results:** Pass

**Additional Observations:**

The frequency stability test was performed in the  $-40$  to  $+60$  °C temperature range at 5.47–5.725 GHz frequency range. The input voltage was varied  $\pm 15$  % at the room temperature.

All modulations and both antenna ports were investigated, only the worst-case results were presented.

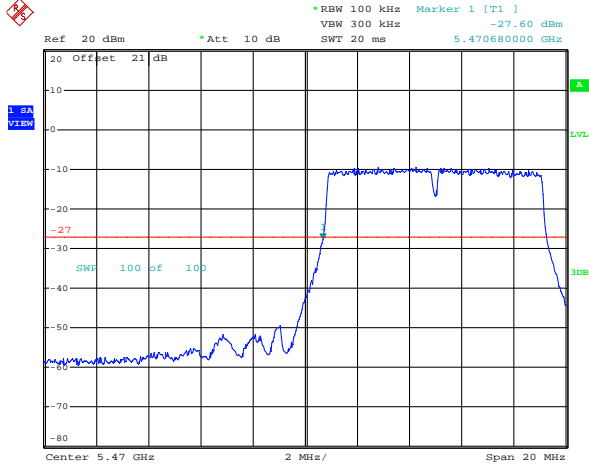
**5 MHz channel**



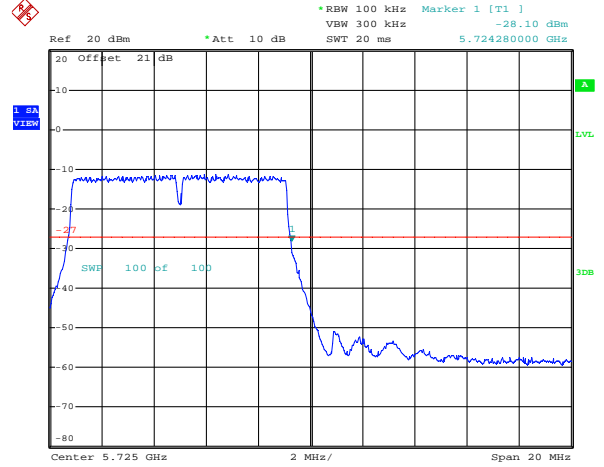
Date: 25.OCT.2010 13:17:41

Date: 25.OCT.2010 13:18:43

**10 MHz channel**

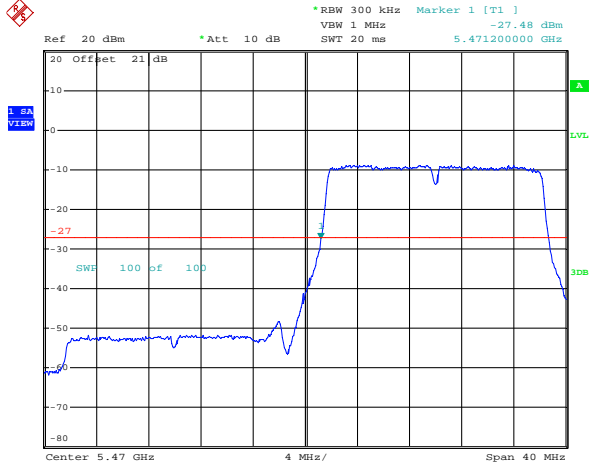


Date: 25.OCT.2010 13:16:29

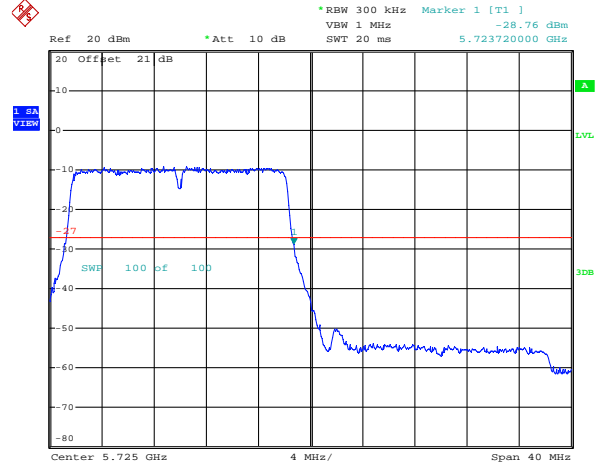


Date: 25.OCT.2010 13:15:20

**20 MHz channel**



Date: 25.OCT.2010 13:11:54



Date: 25.OCT.2010 13:13:03

**Frequency Offset:**

Condition	F <sub>NOMINAL</sub> GHz	F <sub>MEASURED</sub> GHz	Offset Hz	Offset ppm
+60°C, Nominal Voltage	5.590	5.5899978	-2200	-0.39
+50°C, Nominal Voltage	5.590	5.5899980	-2000	-0.36
+40°C, Nominal Voltage	5.590	5.5899990	-1000	-0.18
+30°C, Nominal Voltage	5.590	5.5899990	-1000	-0.18
+20°C, +15% Nominal Voltage	5.590	5.5900000	0	0
+20°C, Nominal Voltage	5.590	5.5900000	—	—
+20°C, -15% Nominal Voltage	5.590	5.5900000	0	0
+10°C, Nominal Voltage	5.590	5.5899975	-2500	-0.50
0°C, Nominal Voltage	5.590	5.5899980	-2000	-0.36
-10°C, Nominal Voltage	5.590	5.5899985	-1500	-0.27
-20°C, Nominal Voltage	5.590	5.5900020	2000	0.36
-30°C, Nominal Voltage	5.590	5.5900025	2500	0.44
-40°C, Nominal Voltage	5.590	5.5900028	2800	0.50

**Frequency stability:**

Channel	f <sub>H</sub> & f <sub>L</sub> (Hz)	Max. offset (Hz)	Drifted f <sub>H</sub> & f <sub>L</sub> (Hz)	Limits (Hz)	Margin (Hz)
5 MHz	f <sub>L</sub> = 5470320000	-2500	5470317500	5470000000	317500
	f <sub>H</sub> = 5724660000	2800	5724662800	5725000000	337200
10 MHz	f <sub>L</sub> = 5470680000	-2500	5470677500	5470000000	677500
	f <sub>H</sub> = 5724280000	2800	5724282800	5725000000	717200
20 MHz	f <sub>L</sub> = 5471200000	-2500	5471197500	5470000000	1197500
	f <sub>H</sub> = 5723720000	2800	5723722800	5725000000	1277200

## Appendix B : Setup Photographs

### Conducted Emissions Setup:

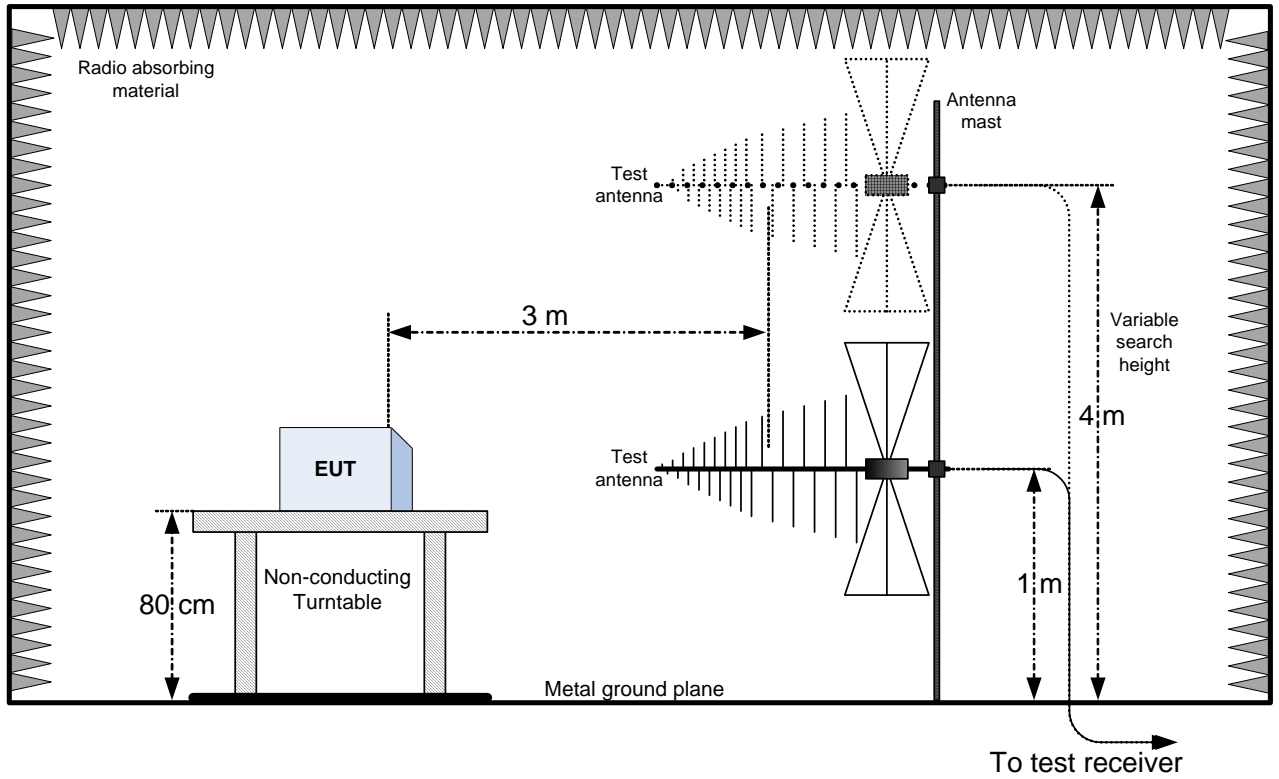


### Spurious Emissions Setup:



## Appendix C : Block Diagram of Test Setups

### Radiated Emissions above 30 MHz Test Site



### AC Power Line Conducted Emissions

