

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.

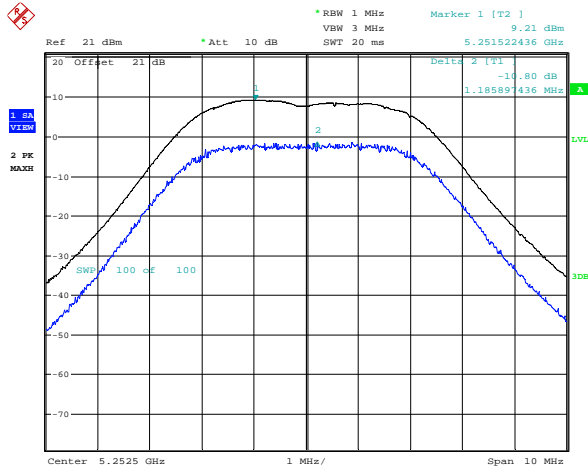
Two antenna ports and all modulations were investigated, only the worst case data is presented.

Channel Bandwidth (MHz)	Channel Setting	Peak Excursion (dB)	Limit (dB)	Margin (dB)
5	Low	10.80	13.00	2.20
	Mid	10.83	13.00	2.17
	High	11.10	13.00	1.90
10	Low	10.09	13.00	2.91
	Mid	10.16	13.00	2.84
	High	9.75	13.00	3.25
20	Low	9.61	13.00	3.39
	Mid	9.50	13.00	3.50
	High	9.48	13.00	3.52

Peak excursion sample plot:

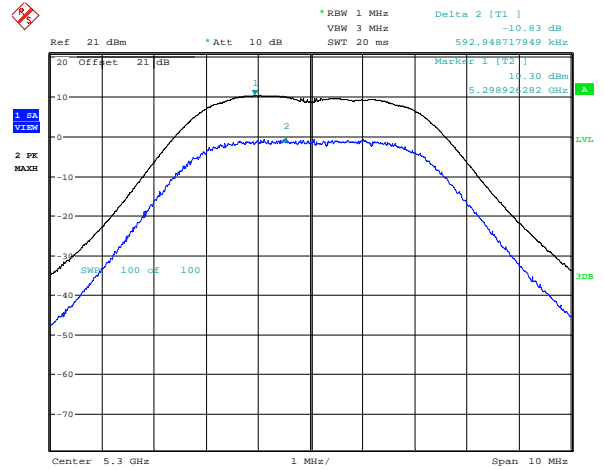
5 MHz Channel

Low Channel



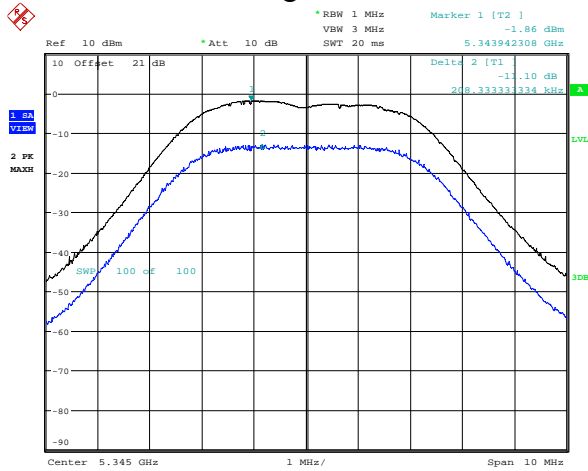
Date: 9.FEB.2011 18:54:30

Mid Channel



Date: 9.FEB.2011 18:51:28

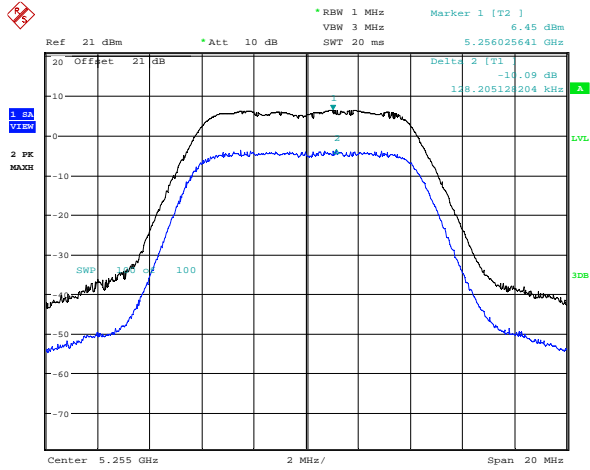
High Channel



Date: 9.FEB.2011 17:59:30

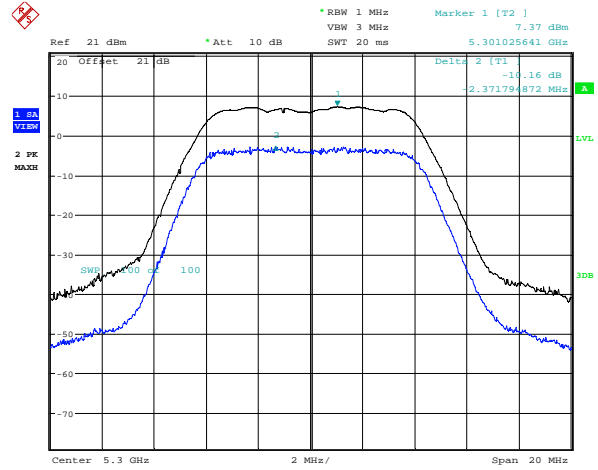
10 MHz Channel

Low Channel



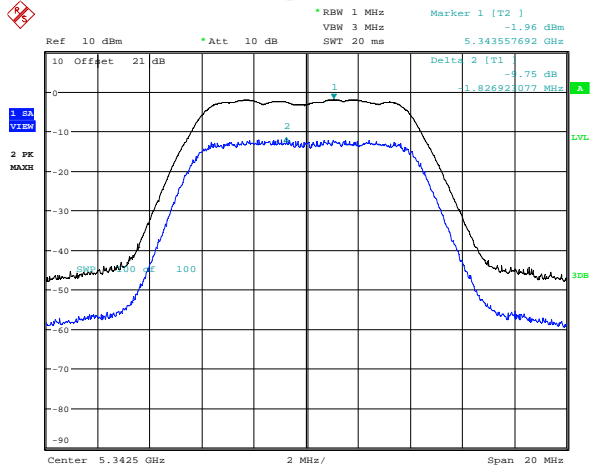
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Mid Channel



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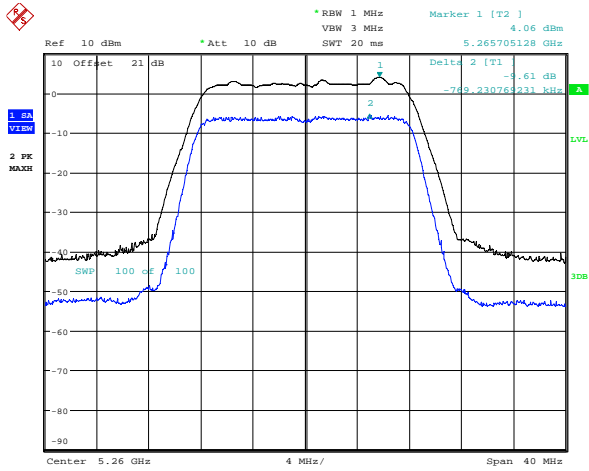
High Channel



Date: 9.FEB.2011 19:03:22

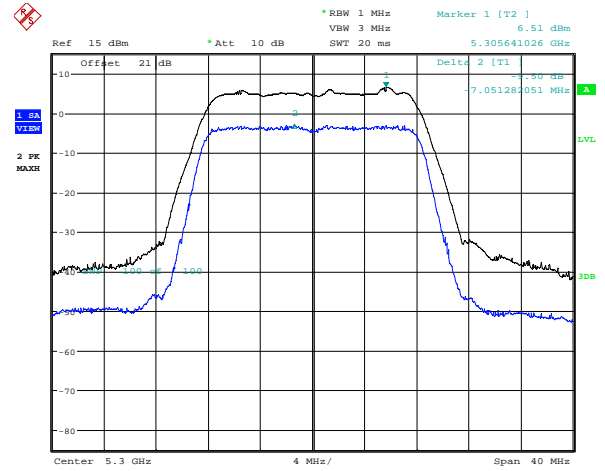
20 MHz Channel

Low Channel



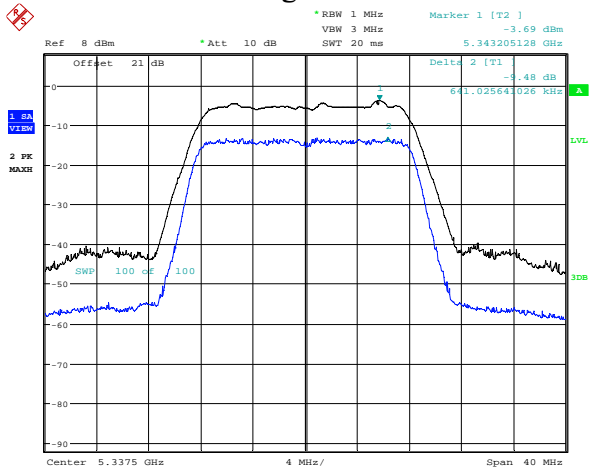
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Mid Channel



Date: 9.FEB.2011 19:08:01

High Channel



Date: 9.FEB.2011 19:11:30

Clause 15.407(b)(2) Undesirable emission limits for transmitters in the 5.25–5.35 GHz band

For transmitters operating in the 5.25–5.35 GHz band: all emissions outside of the 5.15–5.35 GHz band shall not exceed an EIRP of -27 dBm/MHz. Devices operating in the 5.25–5.35 GHz band that generate emissions in the 5.15–5.25 GHz band must meet all applicable technical requirements for operation in the 5.15–5.25 GHz band (including indoor use) or alternatively meet an out-of-band emission EIRP limit of -27 dBm/MHz in the 5.15–5.25 GHz band.

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 μ V/m	SG Output Level dBm	Antenna Gain dBi	EIRP, dBm/MHz	EIRP Limit, dBm/MHz	Margin, dB
Sector flat panel 15.5 dBi	5252.5	5250.0	26.62	-38.61	10.40	-28.21	-27.00	1.21
	5345.0	5350.0	26.23	-38.95	10.31	-28.64	-27.00	1.64
Flat panel 23 dBi	5252.5	5250.0	24.97	-39.75	10.40	-29.35	-27.00	2.35
	5345.0	5350.0	25.91	-38.97	10.31	-28.66	-27.00	1.66
Parabolic 29 dBi	5252.5	5250.0	24.08	-40.65	10.40	-30.25	-27.00	3.25
	5345.0	5350.0	25.33	-39.89	10.31	-29.58	-27.00	2.58
Parabolic 32 dBi	5252.5	5250.0	24.88	-41.48	10.40	-31.08	-27.00	4.08
	5345.0	5350.0	24.53	-41.90	10.31	-31.59	-27.00	4.59

10 MHz Channel

Antenna	Channel MHz	Frequency, MHz	FS Level, dB μ V/m	SG Output Level dBm	Antenna Gain dBi	EIRP, dBm/MHz	EIRP Limit, dBm/MHz	Margin, dB
Sector flat panel 15.5 dBi	5255.0	5250.0	26.62	-39.74	10.40	-29.34	-27.00	2.34
	5342.5	5350.0	26.23	-40.20	10.31	-29.89	-27.00	2.89
Flat panel 23 dBi	5255.0	5250.0	24.97	-41.39	10.40	-30.99	-27.00	3.99
	5342.5	5350.0	25.91	-40.52	10.31	-30.21	-27.00	3.21
Parabolic 29 dBi	5255.0	5250.0	24.08	-42.28	10.40	-31.88	-27.00	4.88
	5342.5	5350.0	25.33	-41.10	10.31	-30.79	-27.00	3.79
Parabolic 32 dBi	5255.0	5250.0	24.73	-41.63	10.40	-31.23	-27.00	4.23
	5342.5	5350.0	24.16	-42.27	10.31	-31.96	-27.00	4.96

20 MHz Channel

Antenna	Channel MHz	Frequency, MHz	FS Level, dB μ V/m	SG Output Level dBm	Antenna Gain dBi	EIRP, dBm/MHz	EIRP Limit, dBm/MHz	Margin, dB
Sector flat panel 15.5 dBi	5260.0	5250.0	26.59	-39.77	10.40	-29.37	-27.00	2.37
	5337.5	5350.0	26.50	-39.93	10.31	-29.62	-27.00	2.62
Flat panel 23 dBi	5260.0	5250.0	25.75	-40.61	10.40	-30.21	-27.00	3.21
	5337.5	5350.0	24.54	-41.89	10.31	-31.58	-27.00	4.58
Parabolic 29 dBi	5260.0	5250.0	25.19	-41.17	10.40	-30.77	-27.00	3.77
	5337.5	5350.0	24.88	-41.55	10.31	-31.24	-27.00	4.24
Parabolic 32 dBi	5260.0	5250.0	23.27	-43.09	10.40	-32.69	-27.00	5.69
	5337.5	5350.0	24.05	-42.38	10.31	-32.07	-27.00	5.07

All other undesirable emissions were found are below the bandage emissions level.



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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

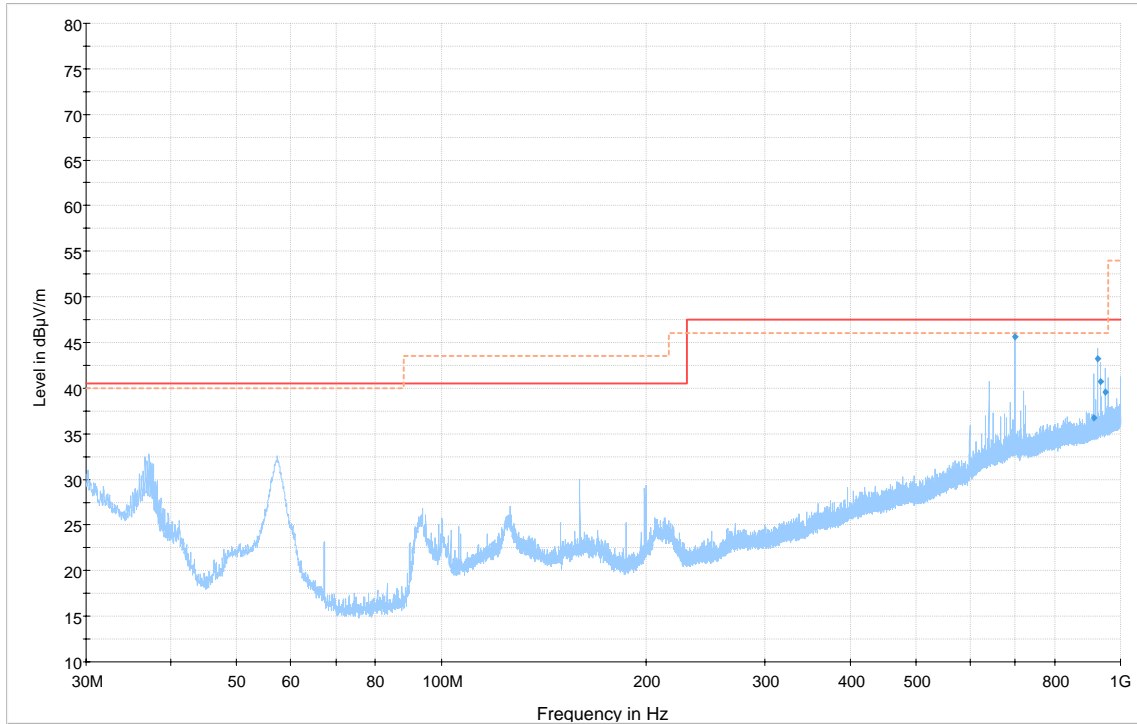
Additional Observations:

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.

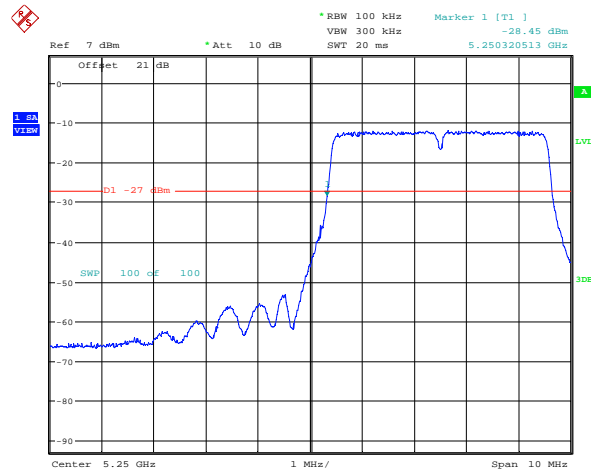
Test Results: Pass

Additional Observations:

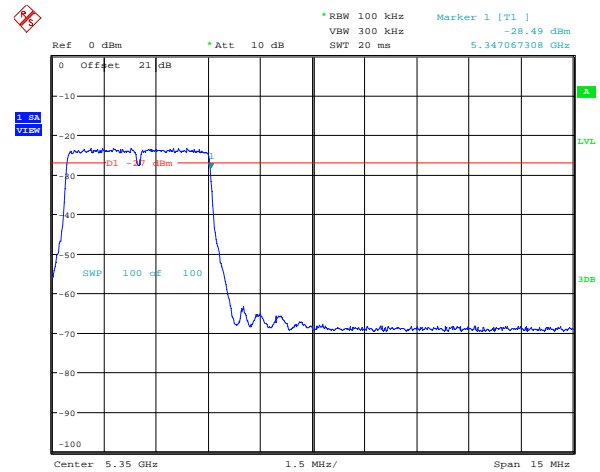
The frequency stability test was performed in the -40 to $+60$ °C temperature range at 5.25–5.35 GHz frequency range. The input voltage was varied ± 15 % at the room temperature.

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

5 MHz channel

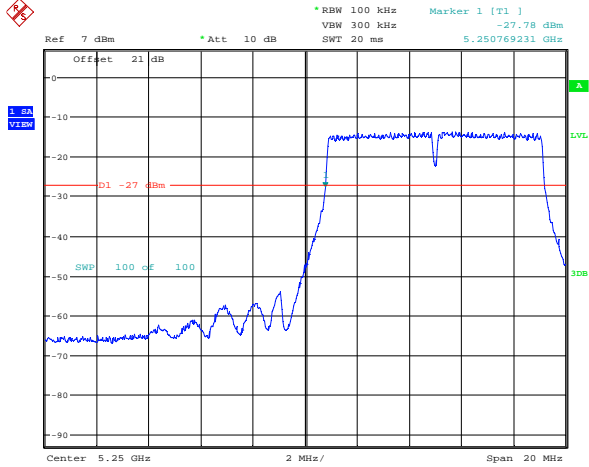


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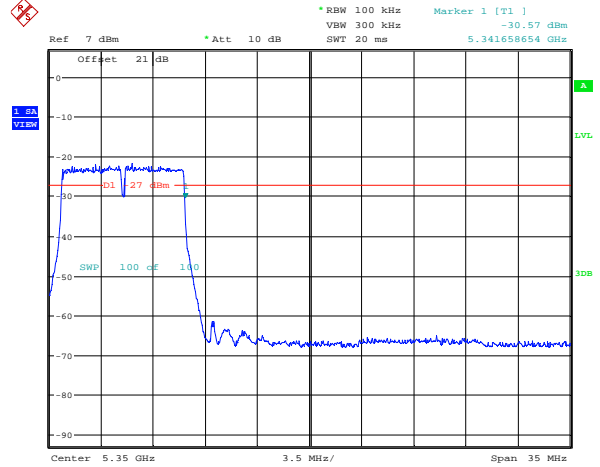


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10 MHz channel

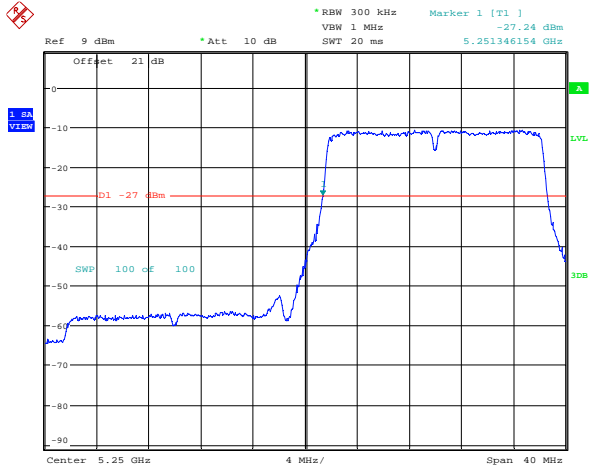


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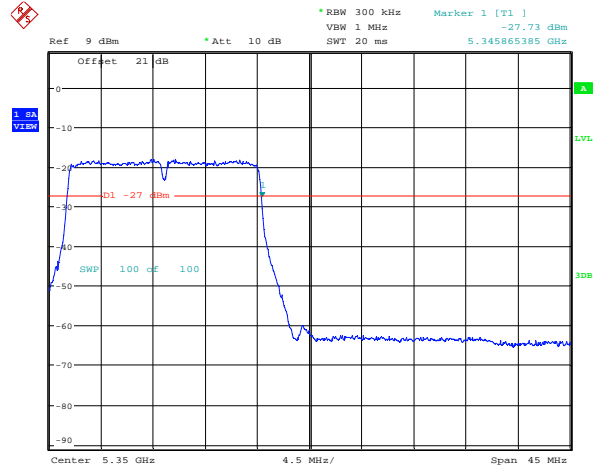


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20 MHz channel



Date: 9.FEB.2011 16:46:23



Date: 9.FEB.2011 16:48:39

Frequency Offset:

Condition	F _{NOMINAL} GHz	F _{MEASURED} GHz	Offset Hz	Offset ppm
+60°C, Nominal Voltage	5.300	5.2999975	-2500	-0.47
+50°C, Nominal Voltage	5.300	5.2999972	-2800	-0.52
+40°C, Nominal Voltage	5.300	5.2999984	-1600	-0.30
+30°C, Nominal Voltage	5.300	5.2999988	-1200	-0.22
+20°C, +15% Nominal Voltage	5.300	5.3000010	1000	0.18
+20°C, Nominal Voltage	5.300	5.3000000	—	—
+20°C, -15% Nominal Voltage	5.300	5.3000010	1000	0.18
+10°C, Nominal Voltage	5.300	5.2999975	-2500	-0.47
0°C, Nominal Voltage	5.300	5.2999983	-1700	-0.32
-10°C, Nominal Voltage	5.300	5.2999982	-1800	-0.33
-20°C, Nominal Voltage	5.300	5.3000023	2300	0.43
-30°C, Nominal Voltage	5.300	5.3000028	2800	0.52
-40°C, Nominal Voltage	5.300	5.3000031	3100	0.58

Frequency stability:

Channel	f _H & f _L (Hz)	Max. offset (Hz)	Drifted f _H & f _L (Hz)	Limits (Hz)	Margin (Hz)
5 MHz	f _L = 5250320513	-2800	5250317713	5250000000	317713
	f _H = 5347067308	3100	5347070408	5350000000	2929592
10 MHz	f _L = 5250769231	-2800	5250766431	5250000000	766431
	f _H = 5341658654	3100	5341661754	5350000000	8338246
20 MHz	f _L = 5251346154	-2800	5251343354	5250000000	1343354
	f _H = 5345865385	3100	5345868485	5350000000	4131515

Appendix B : Setup Photographs

Conducted Emissions Setup:

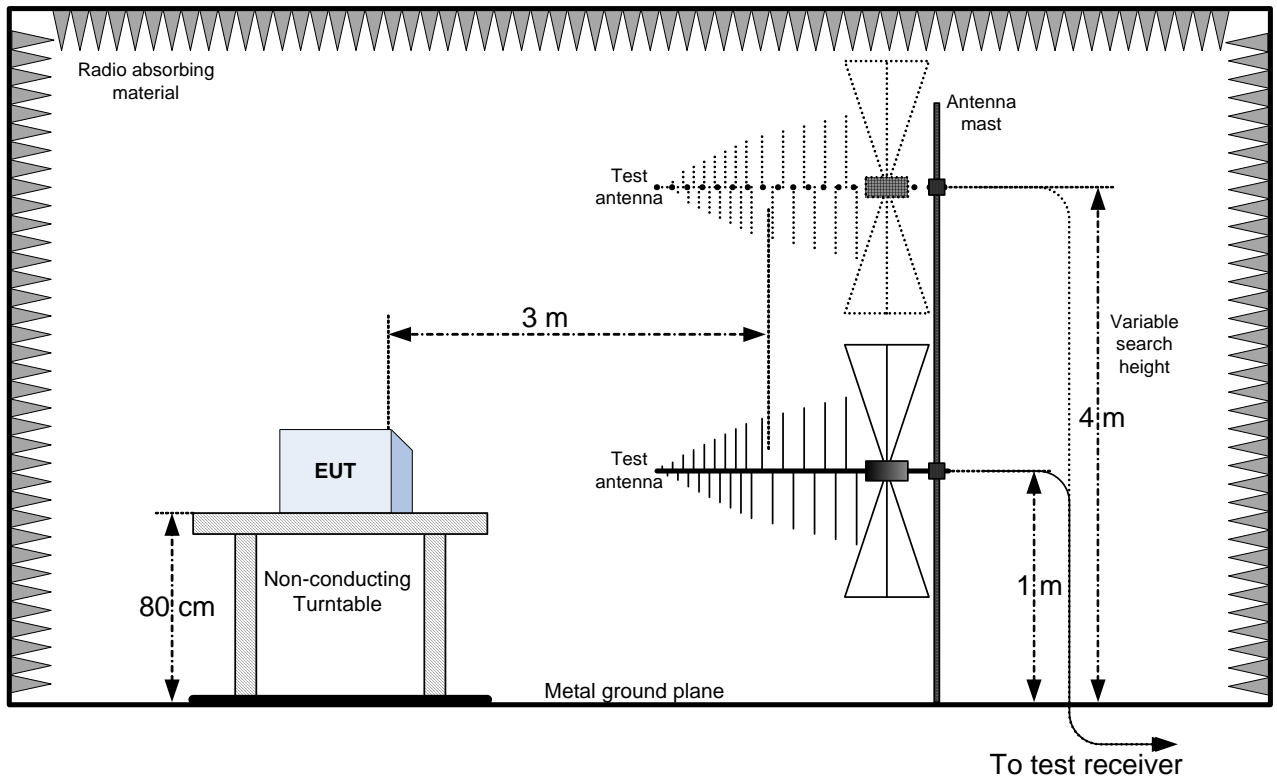


Spurious Emissions Setup:



Appendix C : Block Diagram of Test Setups

Radiated Emissions above 30 MHz Test Site



AC Power Line Conducted Emissions

