

5. Test of Radiated Emission

5.1. Test Limit

Radiated emissions from 30 MHz to 25 GHz were measured according to the methods defines in ANSI C63.4-2001. The EUT was placed, 0.8 meter above the ground plane, as shown in section 5.6.3. The interface cables and equipment positions were varied within limits of reasonable applications to determine the positions producing maximum radiated emissions

For unintentional device, according to § 15.109(a), except for Class A digital devices, the field strength of radiated emissions from unintentional radiators at a distance of 3 meters shall not exceed the following values:

Frequency (MHz)	Distance Meters	Radiated (μ V / M)	Radiated (dB μ V/M)
30-88	3	100	40.0
88-216	3	150	43.5
216-960	3	200	46.0
Above 960	3	500	54.0

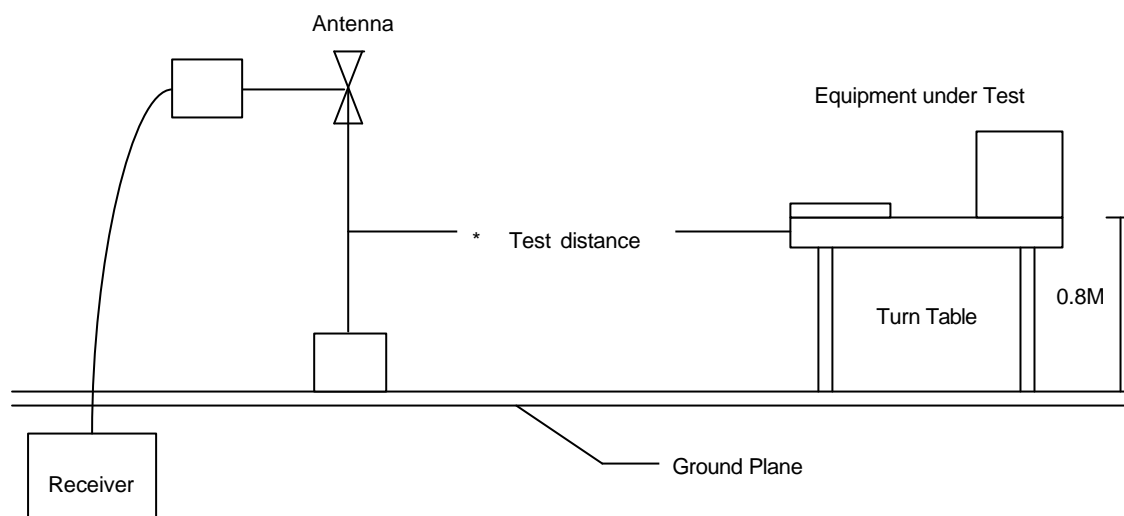
For unintentional device, according to CISPR PUB.22, for Class B digital devices, the general requirement of field strength of radiated emissions from intentional radiators at a distance of 10 meters shall not exceed the above table.

Frequency (MHz)	Distance Meters	Radiated (dB μ V/M)
30-230	10	30
230-1000	10	37

5.2. Test Procedures

1. The EUT was placed on a rotatable table top 0.8 meter above ground.
2. The EUT was set 3 meters from the interference receiving antenna which was mounted on the top of a variable height antenna tower.
3. The table was rotated 360 degrees to determine the position of the highest radiation.
4. The antenna is a broadband antenna and its height is varied between one meter and four meters above ground to find the maximum value of the field strength both horizontal polarization and vertical polarization of the antenna are set to make the measurement.
5. For each suspected emission the EUT was arranged to its worst case and then tune the antenna tower (from 1 M to 4 M) and turn table (from 0 degree to 360 degrees) to find the maximum reading.
6. Set the test-receiver system to Peak or CISPR quasi-peak Detect Function and specified bandwidth with Maximum Hold Mode.
7. If the emission level of the EUT in peak mode was 3 dB lower than the limit specified, then testing will be stopped and peak values of EUT will be reported, otherwise, the emissions which do not have 3 dB margin will be repeated one by one using the quasi-peak method and reported.
8. For testing above 1GHz, the emission level of the EUT in peak mode was 20dB lower than average limit (that means the emission level in peak mode also complies with the limit in average mode), then testing will be stopped and peak values of EUT will be reported, otherwise, the emissions will be measured in average mode again and reported.

5.3. Typical Test Setup



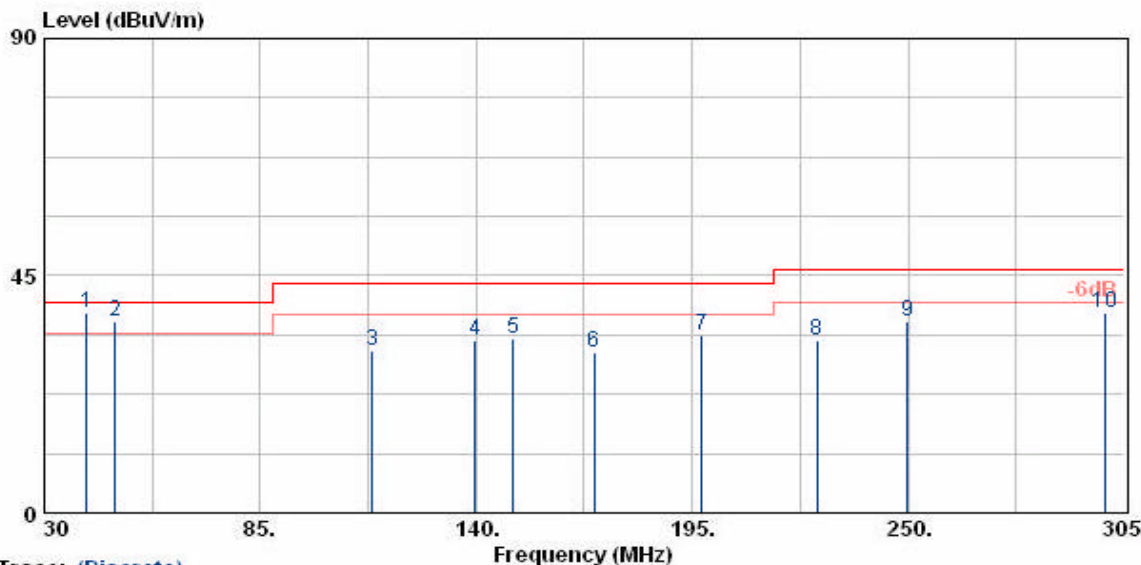
5.4. Measurement equipment

Instrument/Ancillary	Type	Manufacturer	Valid Date
EMI Receiver	8546A	HP	2006/04/13
Spectrum Analyzer	FSP40	R&S	2005/12/28
Horn Antenna	3115	EMCO	2006/02/21
Horn Antenna	3116	EMCO	2006/02/21
Bilog Antenna	CBL6112B	Schaffner	2006/04/12
Amplifier	8447D	Agilent	2006/02/14
Amplifier	8449B	Agilent	2005/12/27

5.5. Test Result and Data

Antenna type 1:external panel antenna (Model:MP24008XFPTRPC)

EUT	: Razor	Pol/Phase	: HORIZONTAL
Power	: 120V	Temperature	: 31 °C
Test Mode	: Transmit/Receive	Humidity	: 65 %
Operation Channel	: 11	Atmospheric Pressure	: 1016 mmHg
Modulation Type	: 802.11b/g		
Rate	: 11/6 Mbps		
Memo	: MP24008XFPTRPC(8dBi)		



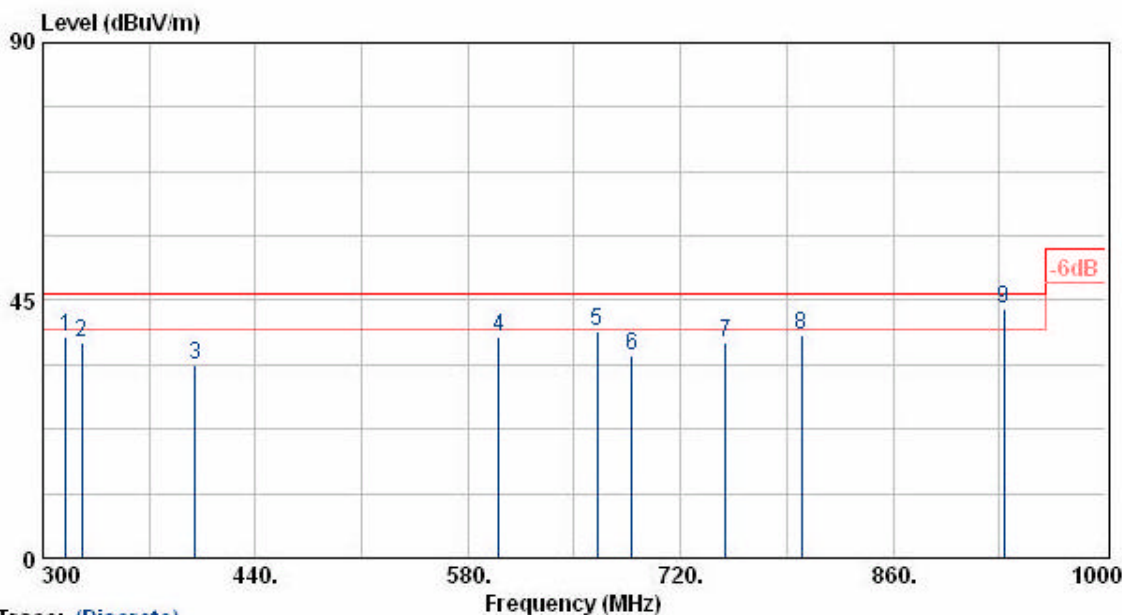
Trace: (Discrete)

Frequency (MHz)	Meter Reading (dBuV)	Corrected Factor (dBuV/m)	Result (dBuV/m)	Limit (dB)	Margin (dB)	Remark	Table Deg.	Ant High (cm)
40.73	47.45	-9.62	37.83	40.00	-2.17	QP	360	200
48.15	50.32	-13.85	36.47	40.00	-3.53	QP	250	200
113.60	47.77	-17.12	30.65	43.50	-12.85	Peak	200	200
139.73	47.35	-14.47	32.88	43.50	-10.62	Peak	50	200
149.35	47.57	-14.40	33.17	43.50	-10.33	Peak	80	200
169.98	47.24	-16.74	30.50	43.50	-13.00	Peak	50	200
197.48	50.83	-17.02	33.81	43.50	-9.69	Peak	60	200
226.90	48.89	-16.24	32.65	46.00	-13.35	Peak	160	200
249.73	49.55	-13.22	36.33	46.00	-9.67	Peak	360	200
300.05	49.20	-11.10	38.10	46.00	-7.90	Peak	40	200

Notes:

1. Result = Meter Reading + Corrected Factor
2. Corrected Factor = Antenna Factor + Cable Loss - Amplifier
3. The resolution bandwidth of test receiver/spectrum analyzer is 120KHz and video bandwidth is 300kHz for Peak detection and Quasi-peak detection at frequency below 1GHz.
4. The resolution bandwidth of test receiver/spectrum analyzer is 1MHz and video bandwidth is 3MHz for Peak detection at frequency above 1GHz.
5. The resolution bandwidth of test receiver/spectrum analyzer is 1MHz and video bandwidth is 10Hz for Average detection at frequency above 1GHz.
6. The other emissions is too below to be measured.

EUT	: Razor	Pol/Phase	: HORIZONTAL
Power	: 120V	Temperature	: 31 °C
Test Mode	: Transmit/Receive	Humidity	: 65 %
Operation Channel	: 11	Atmospheric Pressure	: 1016 mmHg
Modulation Type	: 802.11b/g		
Rate	: 11/6 Mbps		
Memo	: MP24008XFPTRPC(8dBi)		



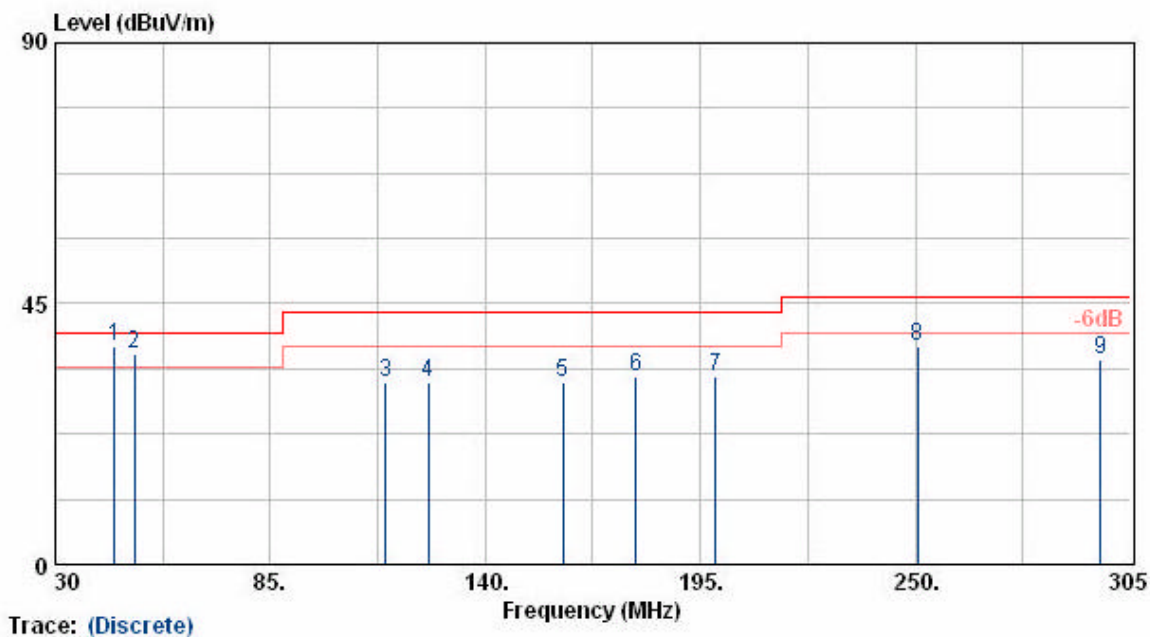
Trace: (Discrete)

Frequency (MHz)	Meter Reading (dBUV)	Corrected Factor (dBUV/m)	Result (dBUV/m)	Limit (dB)	Margin (dB)	Remark	Table Deg.	Ant High (cm)
315.40	49.29	-10.81	38.48	46.00	-7.52	Peak	96	400
325.90	48.13	-10.63	37.50	46.00	-8.50	Peak	96	400
400.10	42.21	-8.59	33.62	46.00	-12.38	Peak	120	400
600.30	43.16	-4.39	38.77	46.00	-7.23	Peak	200	400
665.40	42.92	-3.41	39.51	46.00	-6.49	Peak	150	400
687.80	38.42	-3.03	35.39	46.00	-10.61	Peak	200	400
749.40	38.63	-1.07	37.56	46.00	-8.44	Peak	100	400
799.80	39.86	-0.86	39.00	46.00	-7.00	Peak	80	400
932.80	41.11	2.39	43.50	46.00	-2.50	QP	96	400

Notes:

1. Result = Meter Reading + Corrected Factor
2. Corrected Factor = Antenna Factor + Cable Loss - Amplifier
3. The resolution bandwidth of test receiver/spectrum analyzer is 120KHz and video bandwidth is 300kHz for Peak detection and Quasi-peak detection at frequency below 1GHz.
4. The resolution bandwidth of test receiver/spectrum analyzer is 1MHz and video bandwidth is 3MHz for Peak detection at frequency above 1GHz.
5. The resolution bandwidth of test receiver/spectrum analyzer is 1MHz and video bandwidth is 10Hz for Average detection at frequency above 1GHz.
6. The other emissions is too below to be measured.

EUT	: Razor	Pol/Phase	: VERTICAL
Power	: 120V	Temperature	: 31 °C
Test Mode	: Transmit/Receive	Humidity	: 65 %
Operation Channel	: 11	Atmospheric Pressure	: 1016 mmHg
Modulation Type	: 802.11b/g		
Rate	: 11/6 Mbps		
Memo	: MP24008XFPTRPC(8dBi)		

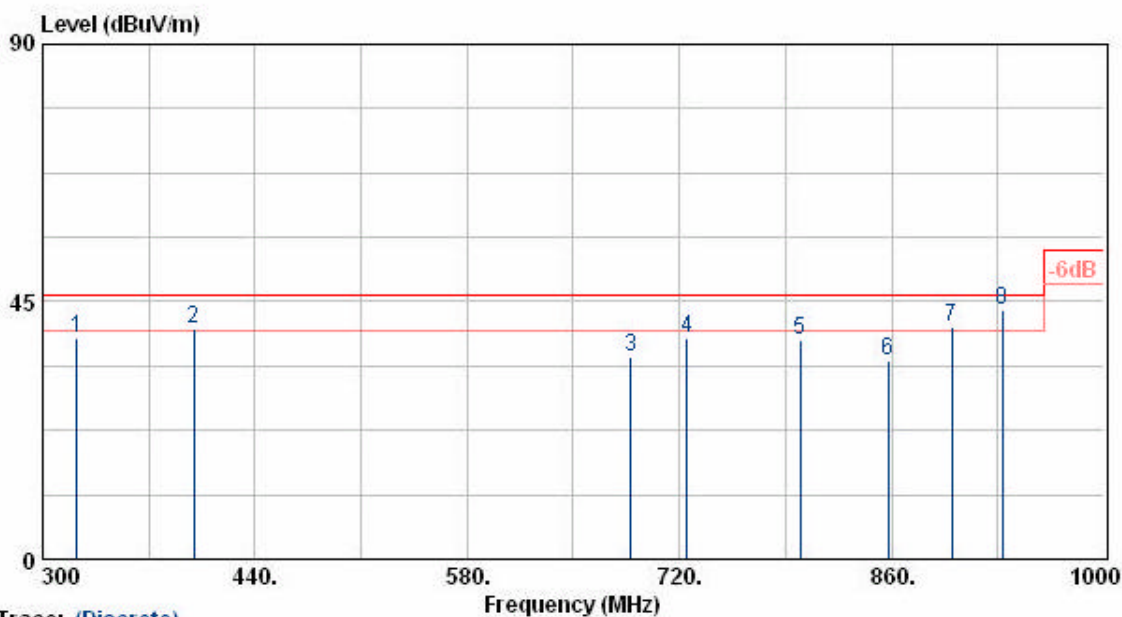


Frequency (MHz)	Meter Reading (dBUV)	Corrected Factor (dBUV/m)	Result (dBUV/m)	Limit (dB)	Margin (dB)	Remark	Table Deg.	Ant High (cm)
45.13	50.22	-12.48	37.74	40.00	-2.26	QP	360	100
50.35	51.22	-14.97	36.25	40.00	-3.75	QP	60	100
114.43	48.42	-17.08	31.34	43.50	-12.16	Peak	60	100
125.43	47.19	-15.87	31.32	43.50	-12.18	Peak	110	100
159.80	47.12	-15.65	31.47	43.50	-12.03	Peak	40	100
178.50	49.63	-17.30	32.33	43.50	-11.17	Peak	260	100
198.85	49.49	-17.02	32.47	43.50	-11.03	Peak	220	100
250.55	50.64	-13.13	37.51	46.00	-8.49	Peak	70	100
297.30	46.46	-11.11	35.35	46.00	-10.65	Peak	360	100

Notes:

1. Result = Meter Reading + Corrected Factor
2. Corrected Factor = Antenna Factor + Cable Loss - Amplifier
3. The resolution bandwidth of test receiver/spectrum analyzer is 120kHz and video bandwidth is 300kHz for Peak detection and Quasi-peak detection at frequency below 1GHz.
4. The resolution bandwidth of test receiver/spectrum analyzer is 1MHz and video bandwidth is 3MHz for Peak detection at frequency above 1GHz.
5. The resolution bandwidth of test receiver/spectrum analyzer is 1MHz and video bandwidth is 10Hz for Average detection at frequency above 1GHz.
6. The other emissions is too below to be measured.

EUT	: Razor	Pol/Phase	: VERTICAL
Power	: 120V	Temperature	: 31 °C
Test Mode	: Transmit/Receive	Humidity	: 65 %
Operation Channel	: 11	Atmospheric Pressure	: 1016 mmHg
Modulation Type	: 802.11b/g		
Rate	: 11/6 Mbps		
Memo	: MP24008XFPTRPC(8dBi)		



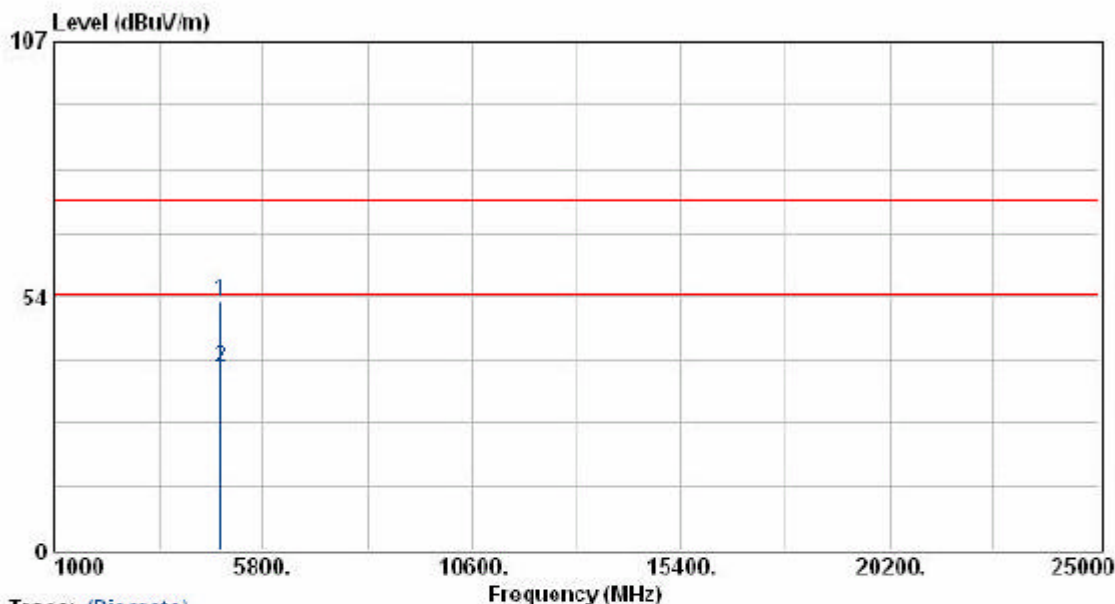
Trace: (Discrete)

Frequency (MHz)	Meter Reading (dBuV)	Corrected Factor (dBuV/m)	Result (dBuV/m)	Limit (dB)	Margin (dB)	Remark	Table Deg.	Ant High (cm)
322.40	49.13	-10.66	38.47	46.00	-7.53	Peak	90	300
399.40	49.00	-8.61	40.39	46.00	-5.61	QP	360	300
687.80	38.44	-3.03	35.41	46.00	-10.59	Peak	60	300
724.90	40.46	-1.99	38.47	46.00	-7.53	Peak	290	300
799.80	39.15	-0.86	38.29	46.00	-7.71	Peak	90	300
857.90	34.22	0.46	34.68	46.00	-11.32	Peak	200	300
899.90	39.26	1.24	40.50	46.00	-5.50	QP	200	300
932.80	41.20	2.39	43.59	46.00	-2.41	QP	360	300

Notes:

1. Result = Meter Reading + Corrected Factor
2. Corrected Factor = Antenna Factor + Cable Loss - Amplifier
3. The resolution bandwidth of test receiver/spectrum analyzer is 120KHz and video bandwidth is 300kHz for Peak detection and Quasi-peak detection at frequency below 1GHz.
4. The resolution bandwidth of test receiver/spectrum analyzer is 1MHz and video bandwidth is 3MHz for Peak detection at frequency above 1GHz.
5. The resolution bandwidth of test receiver/spectrum analyzer is 1MHz and video bandwidth is 10Hz for Average detection at frequency above 1GHz.
6. The other emissions is too below to be measured.

EVT	: Razor	Pol/Phase	: HORIZONTAL
Power	: 120V	Temperature	: 28 °C
Test Mode	: Transmit/Receive	Humidity	: 70 %
Operation Channel	: 1	Atmospheric Pressure	: 1022 mmHg
Modulation Type	: 802.11b	Memo	: MP24008XFPTRPC(
Rate	: 11 Mbps		



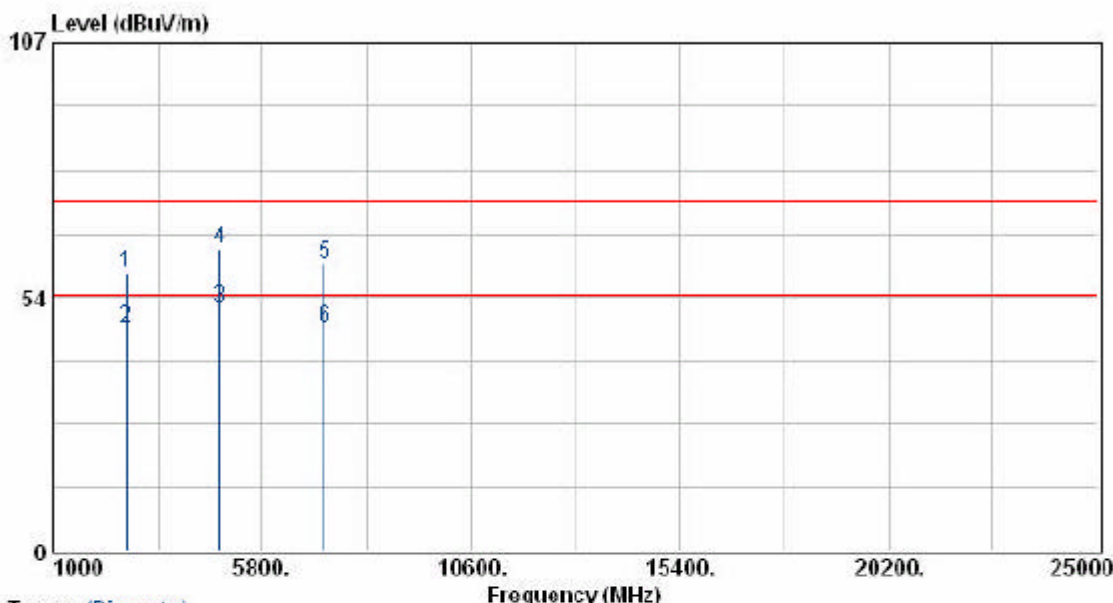
Trace: (Discrete)

Frequency (MHz)	Meter Reading (dBUV)	Corrected Factor (dBUV/m)	Result (dBUV/m)	Limit (dB)	Margin (dB)	Remark	Table Deg.	Ant High (cm)
4824.88	44.50	8.13	52.63	74.00	-21.37	Peak	10	100
4824.88	30.31	8.13	38.44	54.00	-15.56	Average	10	100

Notes:

1. Result = Meter Reading + Corrected Factor
2. Corrected Factor = Antenna Factor + Cable Loss - Amplifier
3. The resolution bandwidth of test receiver/spectrum analyzer is 120KHz and video bandwidth is 300kHz for Peak detection and Quasi-peak detection at frequency below 1GHz.
4. The resolution bandwidth of test receiver/spectrum analyzer is 1MHz and video bandwidth is 3MHz for Peak detection at frequency above 1GHz.
5. The resolution bandwidth of test receiver/spectrum analyzer is 1MHz and video bandwidth is 10Hz for Average detection at frequency above 1GHz.
6. The other emissions is too below to be measured.

EUT	: Razor	Pol/Phase	: VERTICAL
Power	: 120V	Temperature	: 28 °C
Test Mode	: Transmit/Receive	Humidity	: 70 %
Operation Channel	: 1	Atmospheric Pressure	: 1022 mmHg
Modulation Type	: QPSK	Memo	: MP24008XFPTRPC
Rate	: 11 Mbps		



Trace: (Discrete)

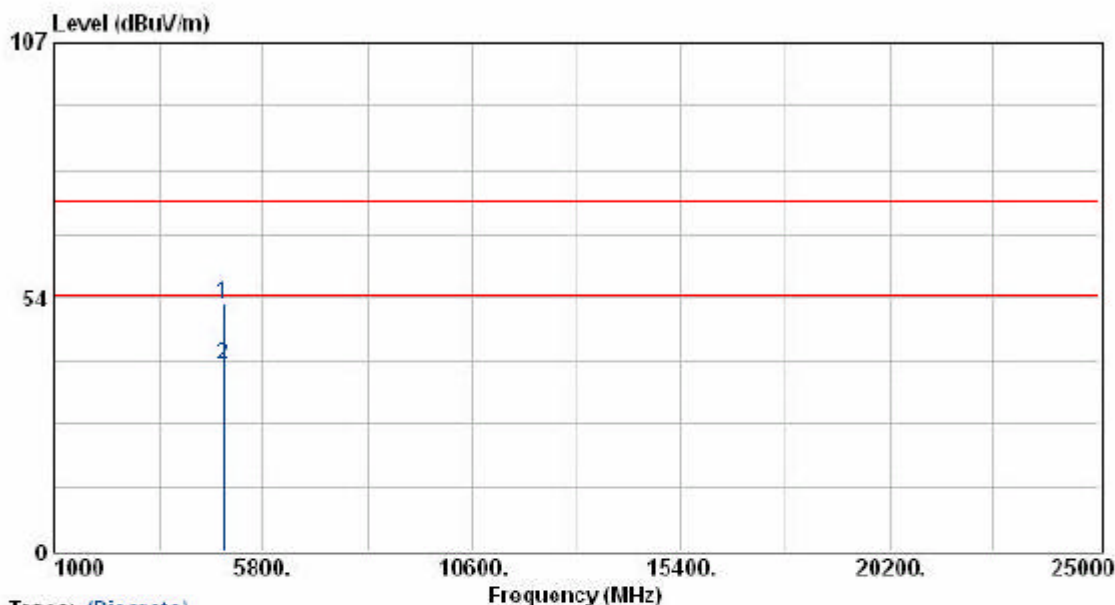
Frequency (MHz)	Meter Reading (dBuV)	Corrected Factor (dBuV/m)	Result (dBuV/m)	Limit (dB)	Margin (dB)	Remark	Table Deg.	Ant High (cm)
2689.00	57.03	1.57	58.60	74.00	-15.40	Peak	348	100
2689.00	45.53	1.57	47.11	54.00	-6.89	Average	348	100
4824.88	44.04	7.36	51.40	54.00	-2.60	Average	353	100
4824.88	56.50	7.36	63.86	74.00	-10.14	Peak	353	100
7236.63	49.56	11.06	60.61	74.00	-13.39	Peak	353	100
7236.63	35.94	11.06	46.99	54.00	-7.01	Average	353	100

Notes:

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4. The resolution bandwidth of test receiver/spectrum analyzer is 1MHz and video bandwidth is 3MHz for Peak detection at frequency above 1GHz.
5. The resolution bandwidth of test receiver/spectrum analyzer is 1MHz and video bandwidth is 10Hz for Average detection at frequency above 1GHz.
6. The other emissions is too below to be measured.

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EUT           : Razor
Power         : 120V
Test Mode     : Transmit/Receive
Operation Channel: 6
Modulation Type : 802.11b
Rate         : 11 Mbps
Pol/Phase    : HORIZONTAL
Temperature   : 28 °C
Humidity      : 70 %
Atmospheric Pressure: 1022 mmHg
Memo         : MP24008XFPTRPC(
    
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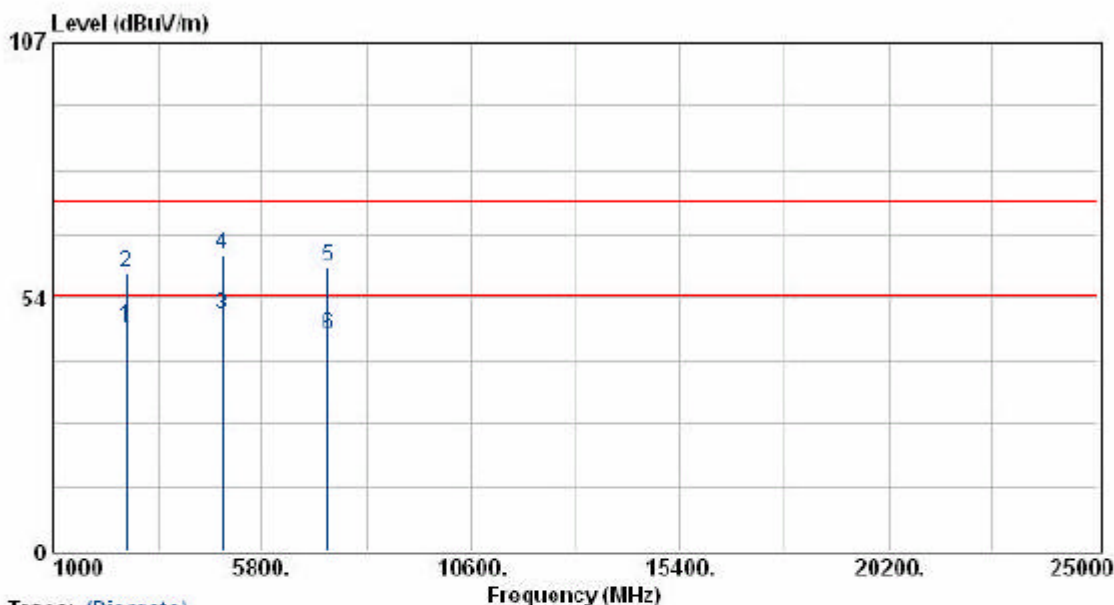
Trace: (Discrete)

Frequency (MHz)	Meter Reading (dBUV)	Corrected Factor (dBUV/m)	Result (dBUV/m)	Limit (dB)	Margin (dB)	Remark	Table Deg.	Ant High (cm)
4874.88	43.98	8.32	52.30	74.00	-21.70	Peak	10	100
4874.88	30.88	8.32	39.20	54.00	-14.80	Average	10	100

Notes:

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3. The resolution bandwidth of test receiver/spectrum analyzer is 120KHz and video bandwidth is 300kHz for Peak detection and Quasi-peak detection at frequency below 1GHz.
4. The resolution bandwidth of test receiver/spectrum analyzer is 1MHz and video bandwidth is 3MHz for Peak detection at frequency above 1GHz.
5. The resolution bandwidth of test receiver/spectrum analyzer is 1MHz and video bandwidth is 10Hz for Average detection at frequency above 1GHz.
6. The other emissions is too below to be measured.

EVT	: Razor	Pol/Phase	: VERTICAL
Power	: 120V	Temperature	: 28 °C
Test Mode	: Transmit/Receive	Humidity	: 70 %
Operation Channel	: 6	Atmospheric Pressure	: 1022 mmHg
Modulation Type	: 802.11b	Memo	: MP24008XFPTRPC (
Rate	: 11 Mbps		



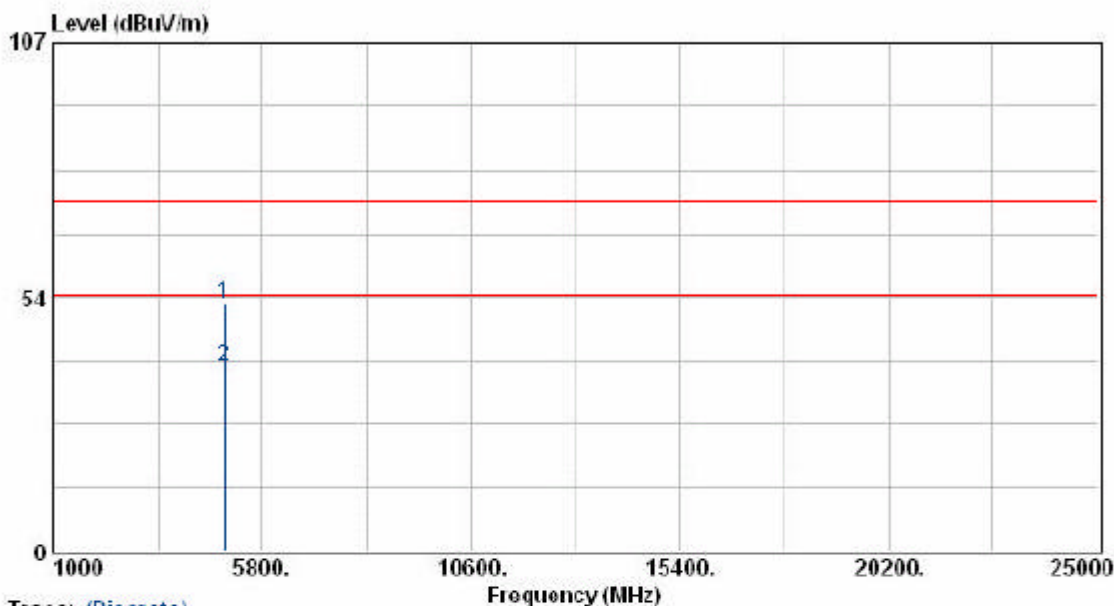
Trace: (Discrete)

Frequency (MHz)	Meter Reading (dBUV)	Corrected Factor (dBUV/m)	Result (dBUV/m)	Limit (dB)	Margin (dB)	Remark	Table Deg.	Ant High (cm)
2689.00	45.47	1.57	47.05	54.00	-6.95	Average	348	100
2689.00	57.06	1.57	58.63	74.00	-15.37	Peak	348	100
4874.88	42.35	7.54	49.89	54.00	-4.11	Average	354	100
4874.88	55.02	7.54	62.56	74.00	-11.44	Peak	354	100
7311.88	48.72	11.14	59.86	74.00	-14.14	Peak	354	100
7311.88	34.21	11.14	45.35	54.00	-8.65	Average	354	100

Notes:

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EUT	: Razor	Pol/Phase	: HORIZONTAL
Power	: 120V	Temperature	: 28 °C
Test Mode	: Transmit/Receive	Humidity	: 70 %
Operation Channel	: 11	Atmospheric Pressure	: 1022 mmHg
Modulation Type	: 802.11b	Memo	: MP24008XFPTRPC
Rate	: 11 Mbps		



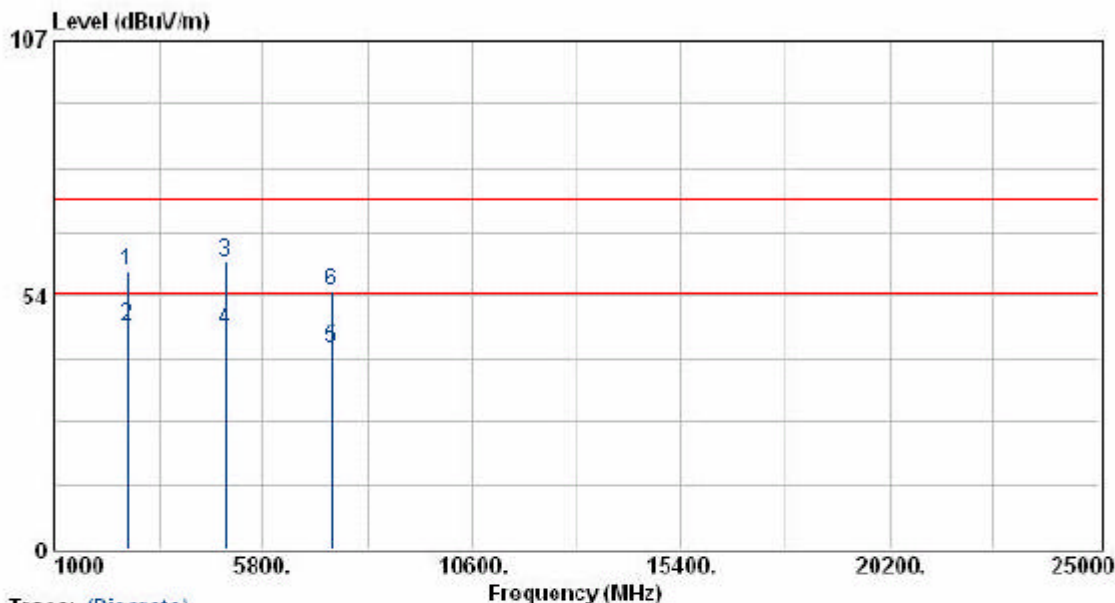
Trace: (Discrete)

Frequency (MHz)	Meter Reading (dBuV)	Corrected Factor (dBuV/m)	Result (dBuV/m)	Limit (dB)	Margin (dB)	Remark	Table Deg.	Ant High (cm)
4924.88	43.60	8.51	52.11	74.00	-21.89	Peak	10	100
4924.88	30.22	8.51	38.73	54.00	-15.27	Average	10	100

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EUT	: Razor	Pol/Phase	: VERTICAL
Power	: 120V	Temperature	: 28 °C
Test Mode	: Transmit/Receive	Humidity	: 70 %
Operation Channel	: 11	Atmospheric Pressure	: 1022 mmHg
Modulation Type	: 802.11b	Memo	: MP24008XFPTRPC(
Rate	: 11 Mbps		



Trace: (Discrete)

Frequency (MHz)	Meter Reading (dBuV)	Corrected Factor (dBuV/m)	Result (dBuV/m)	Limit (dB)	Margin (dB)	Remark	Table Deg.	Ant High (cm)
2689.00	57.22	1.57	58.79	74.00	-15.21	Peak	348	100
2689.00	45.49	1.57	47.06	54.00	-6.94	Average	348	100
4924.88	53.08	7.73	60.81	74.00	-13.19	Peak	353	100
4924.88	38.66	7.73	46.39	54.00	-7.61	Average	353	100
7384.63	31.17	11.22	42.40	54.00	-11.60	Average	353	100
7384.63	43.30	11.22	54.52	74.00	-19.48	Peak	353	100

Notes:

1. Result = Meter Reading + Corrected Factor
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