REPORT

issued by an FCC listed Laboratory Reg. no. 93866.
The test site complies with RSS Gen, Issue 2, file no: IC 3482A/2.

Date	Reference	Page
2010-04-30	FX006697-4	1 (2)

1002
ISO/IEC 17025

Handled by, department
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EMC tests of Precise 250 MC
(3 appendices)

Test object

Product name: Combined Fingerprint and Smart Card reader
Product number: Precise 250 MC
Serial number: 0-50009

Summary

Standard	Compliant	Appendix	Remarks
FCC 47 CFR part 15 B	**Yes**		
15.107 Conducted emission, class B	Yes	2	Note 1
15.109 Radiated emission, class B	Yes	3	Note 1

Note 1: The EUT was connected to a minimal system during the measurements.

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Purpose of test

The tests were performed to verify that the electromagnetic emission from the test object meet the requirements of FCC Part 15 B.

Test facility

The used anechoic chamber (15:115) is compliant with the requirements of section 2.948 of the FCC rules and listed, registration number 96866, as a facility accepted for certification under parts 15 and 18. The site complies with RSS Gen, Issue 2 and is accepted by Industry Canada for the performance of radiated measurements, file number IC 3482A-2.

Measurement equipment

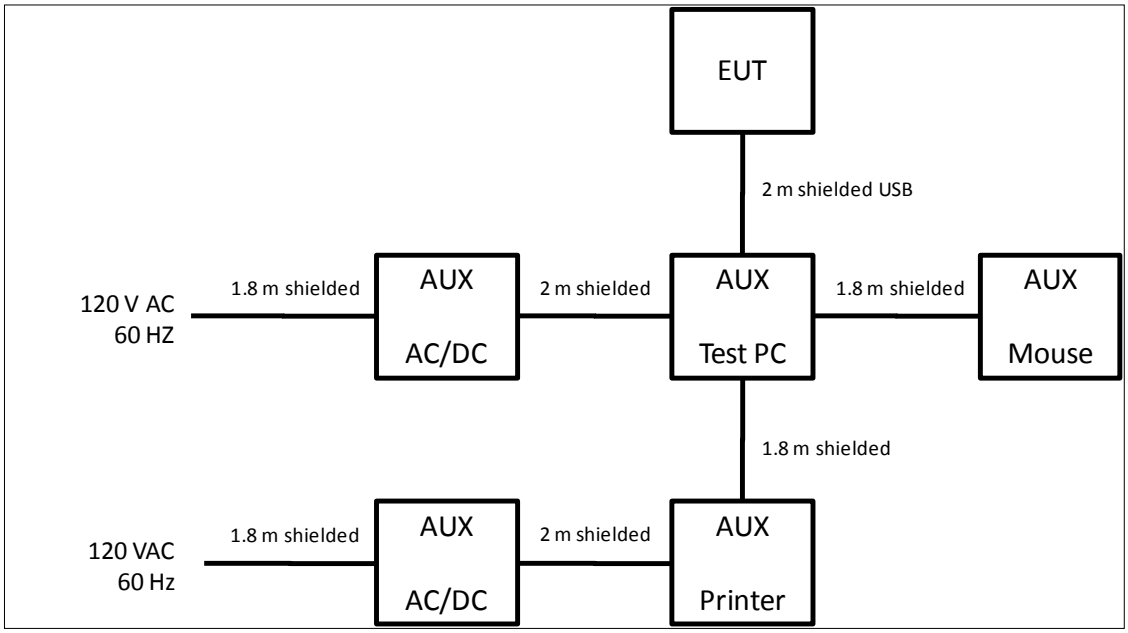
Measurement equipment	Calibration Due	SP number
Test site Tesla	2010-10	503 881
Test site Edison	2009-07	504 114
R&S EMI test receiver ESIB 26	2009-07	503 292
R&S EMI test receiver ESIB 26	2009-07	503 885
LISN Schwarzbeck NNLA 8120	2011-04	500 574
LISN Schwartzbeck NNLK 8121	2011-02	502 112
LISN Schwarzbeck NSLK 8126	2011-04	503 114
Chase Bilog antenna CBL 6111A	2011-11	503 182
Antenna Schaffner CBL 6143	2010-03	504 079
EMCO Horn Antenna 3115	2011-02	501 548
EMCO Horn Antenna 3115	2011-01	502 175
EMCO Horn Antenna 3115	2012-03	504 194
Flann Standard gain horn 16240-25	-	503 939
Flann Standard gain horn 18240-25	-	503 900
Flann Standard gain horn 20240-20	-	503 674
MITEQ Low Noise Amplifier	2009-06	503 277
MITEQ Low Noise Amplifier	2009-06	503 285
MITEQ Low Noise Amplifier	2009-08	504 160
Temperature and humidity meter Testo 615	2009-11	503 505
Temperature and humidity meter Testo 625	2009-08	504 117

Operational test mode

The EUT was connected to the minimal system through a USB connection.

The highest frequencies generated in the EUT is a 12 MHz clock signal.

The EUT was exercised by a test program called CE-TEST 250 MC running on the test PC.



Connected equipment during the test ("minimum system")

Laptop Computer IBM 2545-4BG S/N: 5528TVC 02/99	Clients equipment
AC/DC Adapter for Laptop computer IBM 02K6543 S/N: 2M04T7792PF	Clients equipment
Printer HP Deskjet 895 CXi (C6410A) S/N: HU0151N087	Clients equipment
AC/DC Adapter for Printer HP C6409-60014 S/N: T5844428252	Clients equipment
Mouse X05-51692 8851-576-0304842-00000	Clients equipment

Uncertainties

Measurement and test instrument uncertainties are described in the quality assurance documentation ”EL-QD 8.2”. The measurement uncertainties can be found in the table below. The uncertainties are calculated with a coverage factor k=2 (95% level of confidence).

The measurement uncertainties can be found in the table below:

Method	**Uncertainty**
Radiated emission, 30 – 1000 MHz	4.9/5.6 dB (V/H-pol) 4.8/5.6 dB (V/H-pol)
Radiated emission, 1 – 40 GHz	2.6 dB
Conducted emission	3.5 dB

Reservation

The test results in this report apply only to the particular test object as declared in the report.

Delivery of test object

The test object was delivered 2010-04-08

Test participant

Dick Ström

Test engineer

Martin Forsberg

Conducted emission measurements according to FCC 47 CFR part 15.107, class B

Date	Temperature	Humidity
2010-04-09	22 °C ± 3 °C	29 % ± 5 %

Test set-up and procedure

The measurements were performed according to ANSI C63.4-2003.
Measurements were performed on the 120 V AC/60 Hz, phase and neutral conductors of the test PC.

Test set-up during the tests can be found on page 2.

Measurement equipment	SP number
Semi anechoic chamber, Edison	504 114
EMI measurement computer	-
R&S EMI test receiver ESIB 26	503 885
Software: R&S EMC32, ver. 6.10.10	503 897
LISN Schwarzbeck NNLA 8120	500 574
Temperature and humidity meter Testo 625	504 117

Result

The conducted emission spectra can be found in Appendix 2.1.

Diagram 1:	Phase conductor
Diagram 2:	Neutral conductor

The limit lines indicated as EN 55022 in the diagrams are the same limit lines as of FCC part 15.

Emission below limit?	Yes

Appendix 2

Test set-up, Conducted emission

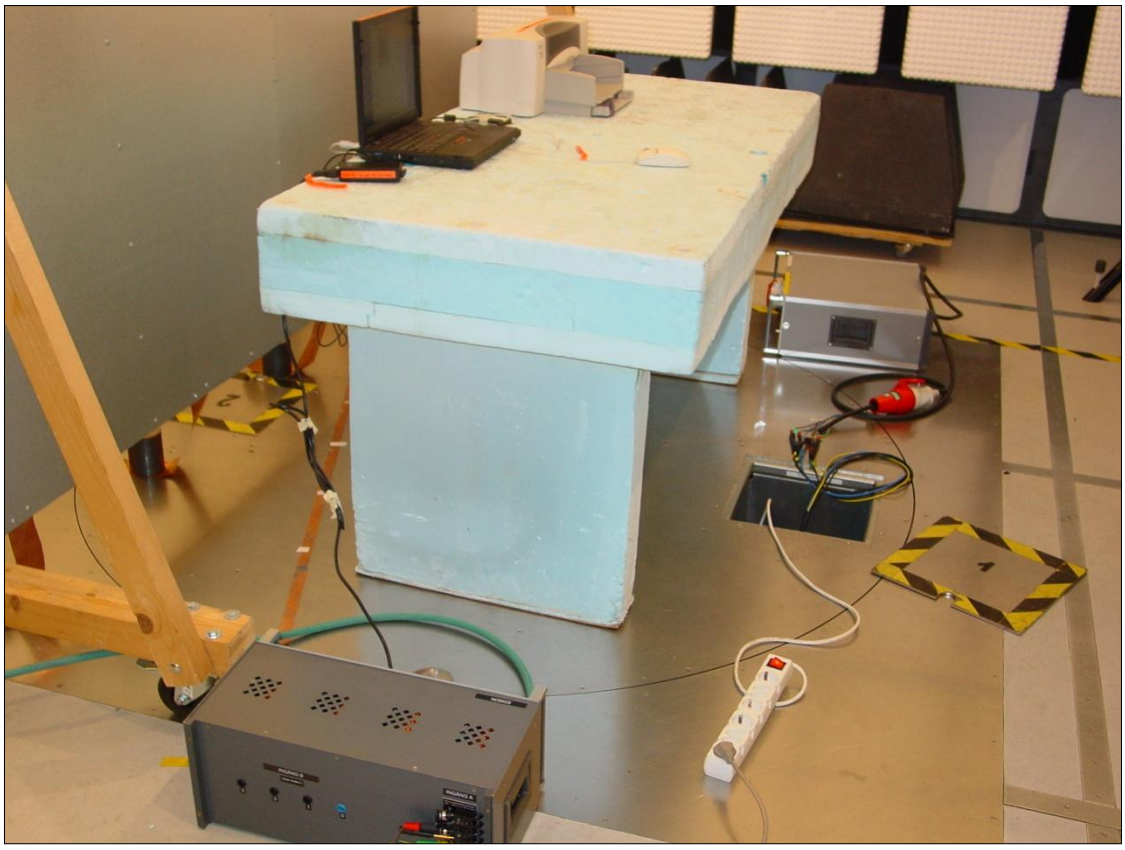
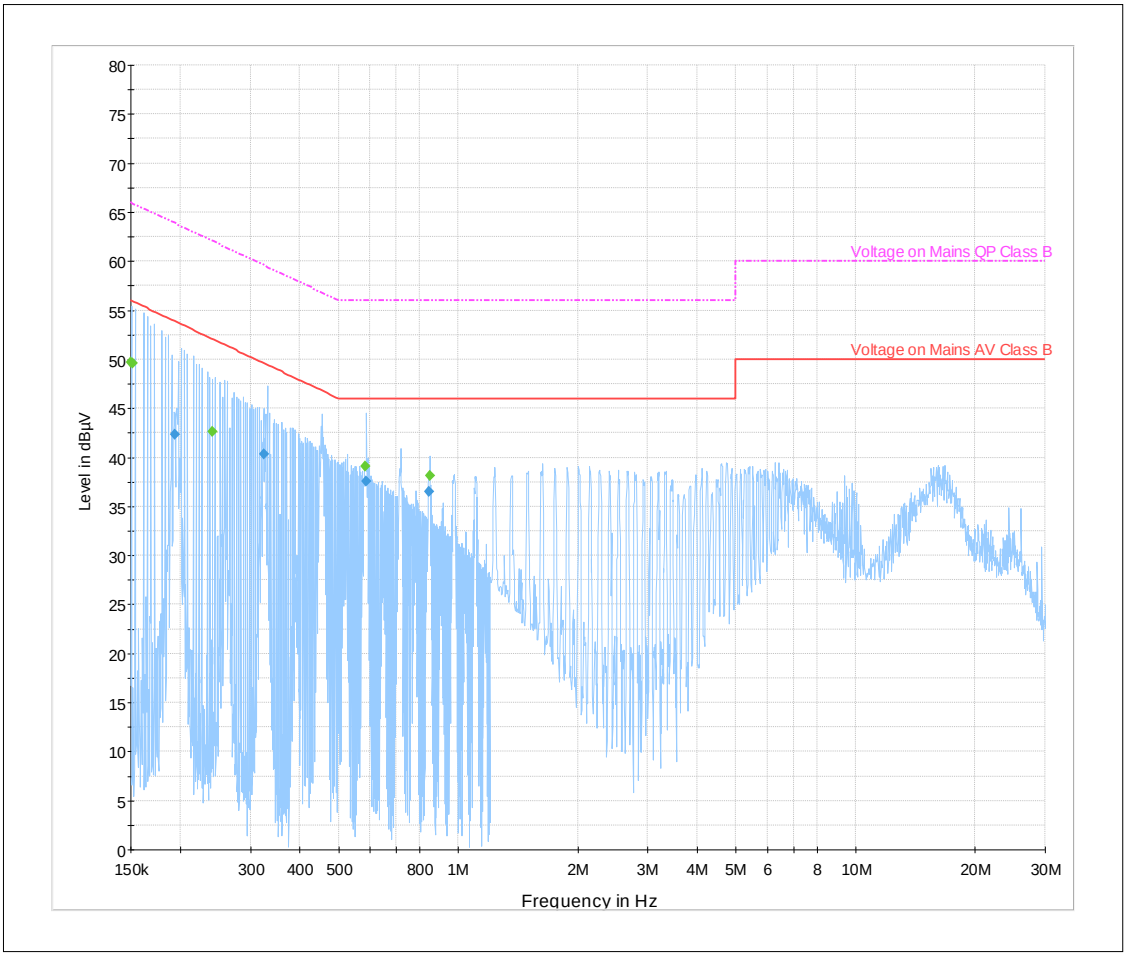


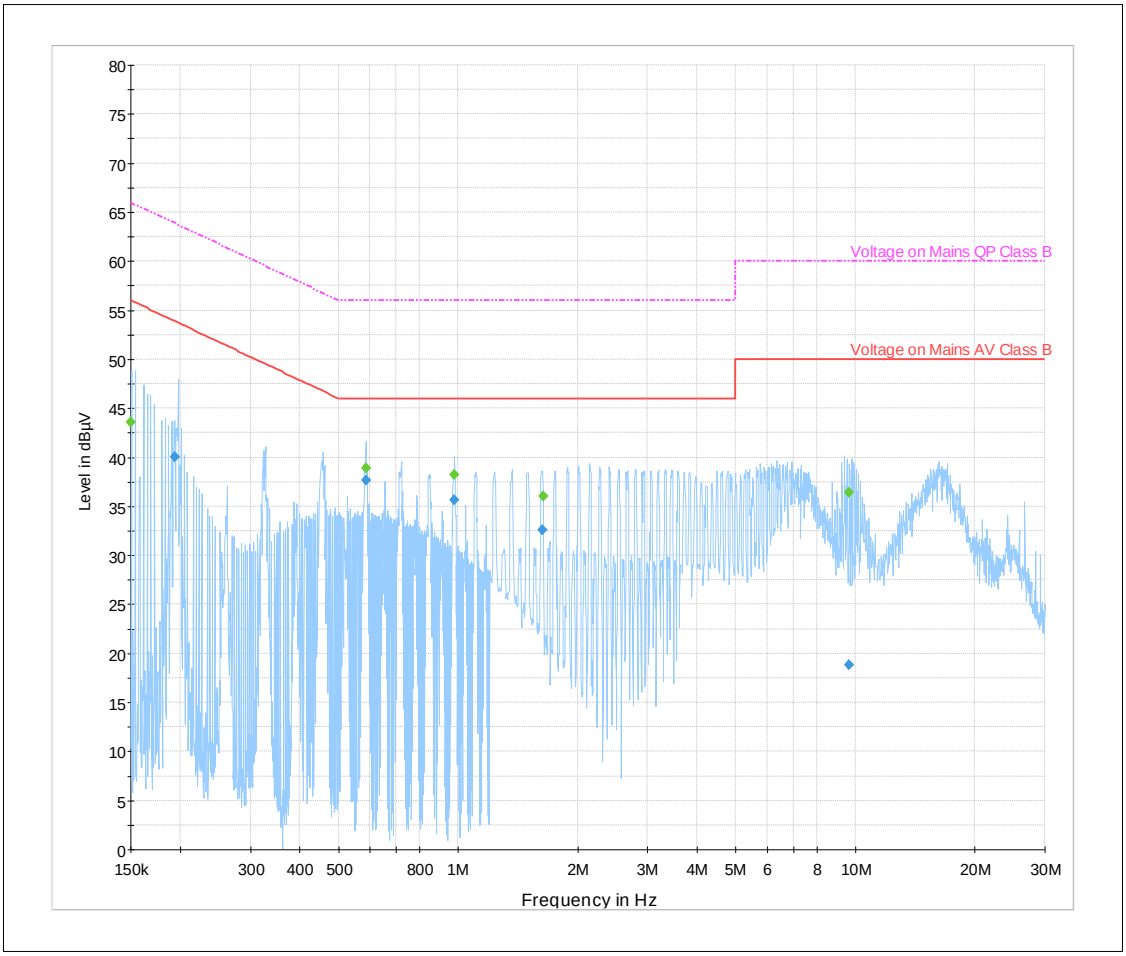
Diagram 1



Frequency MHz	Average dBµV	Meas. Time ms	Bandwidth kHz	Margin dB	Limit dBµV
0.194	42.32	1000	9	11.60	53.86
0.325	40.32	1000	9	9.30	49.58
0.586	37.60	1000	9	8.40	46.00
0.845	36.48	1000	9	9.50	46.00

Frequency MHz	QuasiPeak dBµV	Meas. Time ms	Bandwidth kHz	Margin dB	Limit dBµV
0.150	49.70	1000	9	16.30	66.00
0.152	49.58	1000	9	16.30	65.89
0.241	42.63	1000	9	19.50	62.07
0.584	39.13	1000	9	16.90	56.00
0.849	38.14	1000	9	17.90	56.00

Diagram 2



Frequency MHz	Average dBµV	Meas. Time ms	Bandwidth kHz	Margin dB	Limit dBµV
0.194	40.02	1000	9	13.90	53.86
0.586	37.67	1000	9	8.30	46.00
0.976	35.64	1000	9	10.40	46.00
1.629	32.58	1000	9	13.40	46.00
9.656	18.85	1000	9	31.20	50.00

Frequency MHz	QuasiPeak dBµV	Meas. Time ms	Bandwidth kHz	Margin dB	Limit dBµV
0.150	43.56	1000	9	22.40	66.00
0.588	38.93	1000	9	17.10	56.00
0.976	38.19	1000	9	17.80	56.00
1.635	35.99	1000	9	20.00	56.00
9.632	36.42	1000	9	23.60	60.00

Radiated emission measurements according to FCC 47 CFR part 15.109, class B

Date	Temperature	Humidity
2010-04-08	22 °C ± 3 °C	29 % ± 5 %

Test set-up and procedure

The measurements were performed according to ANSI C63.4-2003.

The test of radiated emission was performed in a semi anechoic chamber. The measurements were performed with both horizontal and vertical polarizations of the antenna. The antenna distance was 3 m.

The measurement procedure is as the following:

1. A pre-measurement is performed with peak detector. The test object is measured in eight directions with the antenna at three heights, 1.0 m, 1.5 m and 2.0 m.
2. If the emission is close or above the limit during the pre-measurement, the test object is scanned 360 degrees and the antenna height scanned from 1 to 4 m for maximum response. Then the emission is measured with the quasi-peak detector on frequencies below 1 GHz and with the average detector above 1 GHz.

Test set-up during the tests can be found on page 2.

Measurement equipment	SP number
Anechoic chamber, Edison	504 114
R&S EMI test receiver ESIB 26	503 885
Control computer, Fujitsu Siemens	-
Software: R&S EMC32, ver. 6.10.10	503 899
Antenna Schaffner CBL 6143	504 079
Temperature and humidity meter Testo 615	503 505

Result

The emission spectrum/spectra can be found appendix 3.1.

Diagram 1	Radiated emission 30-1000 MHz vertical and horizontal polarizations.

Emission below limit?	Yes

Appendix 3

Test set-up, Radiated emission

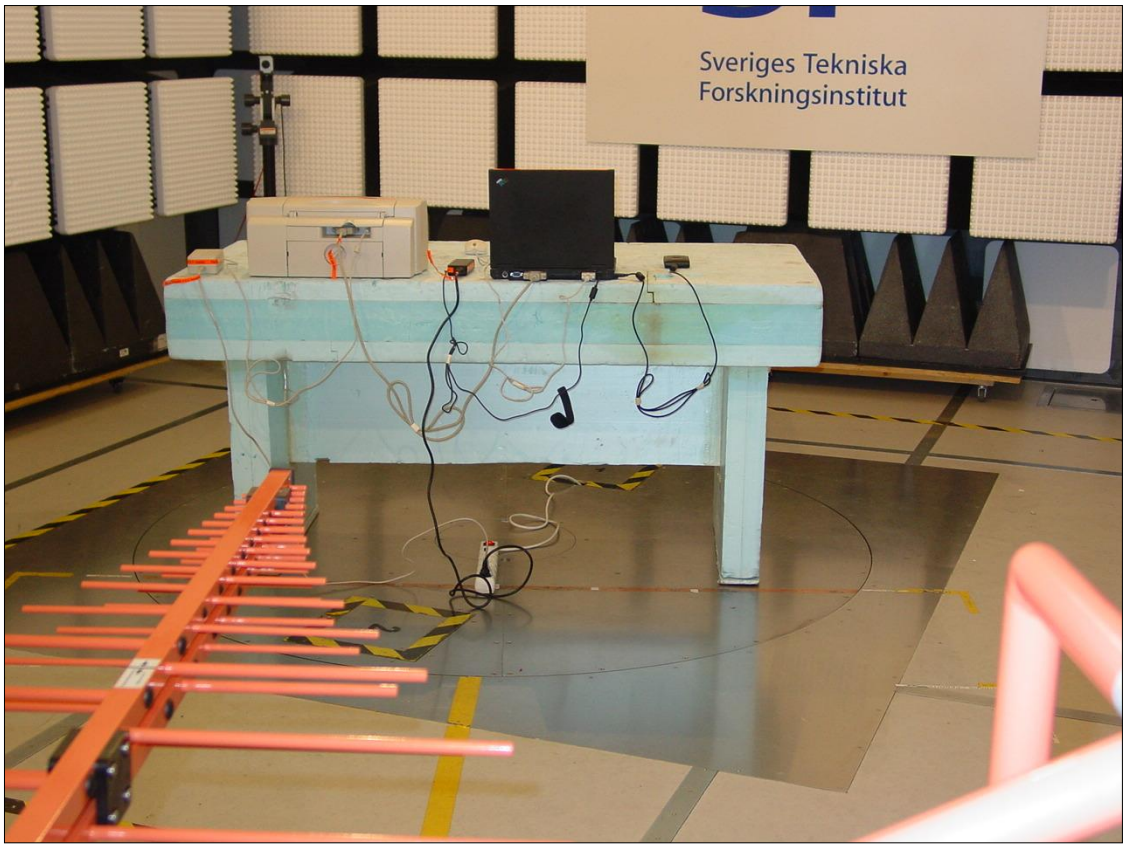
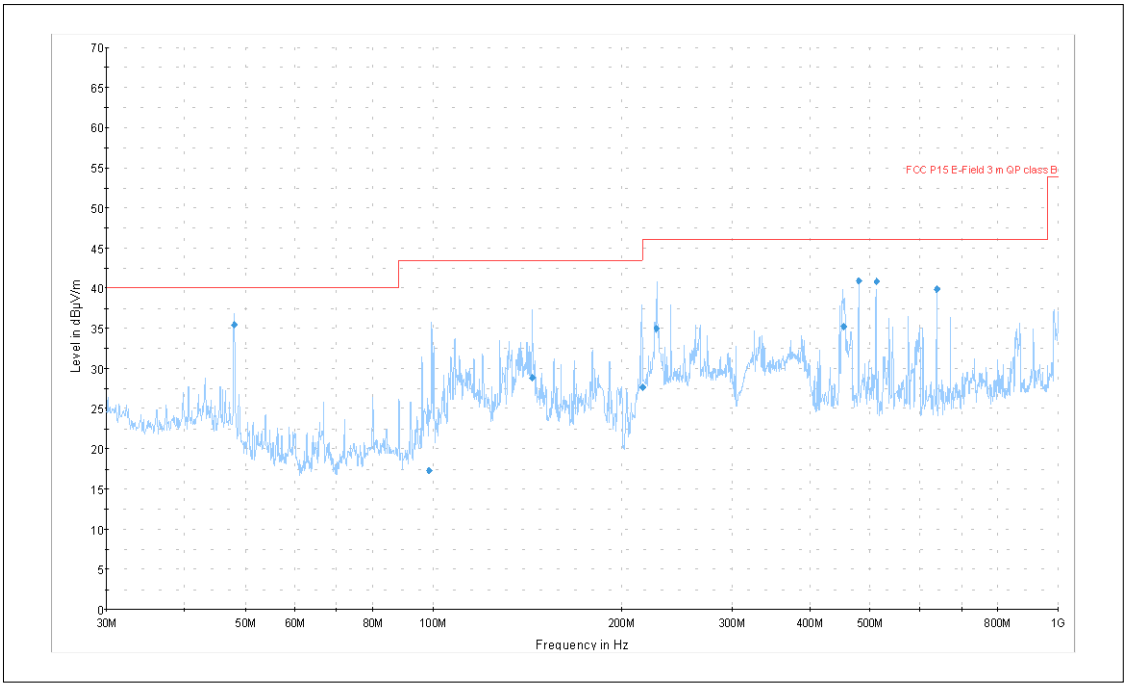


Diagram 1



Frequency	QuasiPeak	Antenna height	Polarity	Turntable position	Margin	Limit
MHz	dBµV/m	cm		deg	dB	dBµV/m
48.00	35.4	100	V	300	4.6	40.0
98.36	17.3	143	V	134	26.2	43.5
143.77	28.9	120	V	333	14.6	43.5
216.26	27.7	175	H	14	18.3	46.0
227.74	35.0	108	H	10	11.0	46.0
453.25	35.3	115	V	14	10.7	46.0
479.30	40.9	100	H	329	5.1	46.0
511.26	40.8	100	H	325	5.2	46.0
639.09	39.8	108	H	322	6.2	46.0