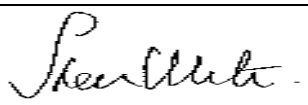
TEST REPORT
FROM
RFI GLOBAL SERVICES LTD

Test of: CarieScan PRO

To: FCC Part 15: 2007 Subpart B Clause 15.107 Conducted Emissions
and Clause 15.109 Radiated Emissions

Test Report Serial No:
RFI/EMC3/RP73706JD01A

Supersedes Test Report Serial No:
RFI/EMC1/RP73706JD01A and RFI/EMC2/RP73706JD01A

This Test Report Is Issued Under The Authority Of Steve Flooks, Service Leader:	
Checked By:	Steve White
Signature:	
Date of Issue:	28 October 2008

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1. Customer Information

Company Name:	CarieScan Ltd
Address:	Prospect Business Centre The Technology Park Dundee Tayside DD2 1SW

2. Summary of Testing

2.1. General Information

Specification Reference:	FCC Part 15: 2007 Subpart B Clause 15.107 Conducted Emissions and Clause 15.109 Radiated Emissions
Specification Title:	Code of Federal Regulations, Part 15 (47CFR15) Radio Frequency Devices: Digital Devices.
Comments:	A description of the test facility used for this test is on file with, and has been accepted by, the Federal Communications Commission as required by Section 2.948 of Federal Rules.
Site Registration No:	• 90895 (FCC) Frequency covered 30 MHz to 1 GHz • 209735 (FCC) Frequency covered 1 GHz to 12.75 GHz
Location of Testing:	RFI Global Services Ltd, Ewhurst Park, Basingstoke, Hampshire, RG26 5RQ. and Wade Road, Basingstoke, Hampshire, RG24 8AH
Test Dates:	15 August 2008 to 27 August 2008 and 08 October 2008

2.2. Summary of Test Results

Clause	Measurement	Applicability	Result
15.107	Conducted Emissions	Y	
15.109	Radiated Emissions Electric Field Strength	Y	

Key to Results

= Complied = Complied, within uncertainty = Did not comply, within uncertainty = Did not comply

2.3. Deviations from the Test Specification

For the measurements contained within this test report, there were no deviations from, additions to, or exclusions from the test specification identified above, nor from the requirements defined in the basic standards called up within it.

3. Equipment Under Test (EUT)

3.1. Identification of Equipment Under Test (EUT)

Description:	Dental Diagnostic Probe
Brand Name:	CarieScan Ltd
Model Name or Number:	PRO
Serial Number:	06110146-IC
Hardware Version Number:	None Stated
Software Version Number:	None Stated
FCC ID Number:	TTZ0002
Country of Manufacture:	None Stated

Description:	Base Charger
Brand Name:	CarieScan Ltd
Model Name or Number:	PRO
Serial Number:	06110146-IC
Hardware Version Number:	None Stated
Software Version Number:	None Stated
Country of Manufacture:	None Stated

Description:	PSU
Brand Name:	FRIWO
Model Name or Number:	FW75550/06
Serial Number:	06110146-IC
Hardware Version Number:	None Stated
Software Version Number:	None Stated
Country of Manufacture:	Germany

3.2. Description of EUT

The equipment under test was is a *Bluetooth* Dental Diagnostic Probe and base unit charger.

3.3. Modifications Incorporated in the EUT

No modifications were applied to the EUT during testing.

3.4. Additional Information Related to Testing

Intended Operating Environment:	Residential and Commercial
Equipment Category:	*Bluetooth*
Equipment Class:	Class B
Type of Unit:	Portable (Standalone Battery Powered Device)
Highest Operating Frequency:	2.480 GHz
Power Supply Requirement:	Nominal 110 V, 60 Hz AC Mains Supply
Weight:	Approx. 100g
Dimensions:	240 x 100 x 100

3.5. Port Identification

Port	Description	Type	Applicable
1	Enclosure	-	Y
2	AC Mains	-	Y
3	DC Input	2.5m, 2-Core	N

3.6. Support Equipment

No support equipment was used to exercise the EUT during testing.

4. Operation and Monitoring of the EUT during Testing

4.1. Operating Modes

The EUT was tested in the following operating mode(s):

- Charging in cradle.

This mode was chosen because it was defined by the customer as being typical of normal use and likely to be a worst case with regard to EMC.

4.2. Configuration and Peripherals

The EUT was tested in the following configuration(s):

- Dental Diagnostic Probe in the cradle with the cradle plugged into 110 V AC Mains at 60 Hz.

This configuration was chosen because it was defined by the customer as being typical of normal use and likely to be a worst case with regard to EMC.

Please refer to *Appendix 2. Test Configuration Drawing* for a schematic drawing(s) of the test configuration(s) employed in the course of testing.

5. Measurements, Examinations and Derived Results

5.1. General Comments

Measurement uncertainties are evaluated in accordance with current best practice. Our reported expanded uncertainties are based on standard uncertainties, which are multiplied by an appropriate coverage factor to provide a statistical confidence level of approximately 95%. Please refer to *Section 6. Measurement Uncertainty* for details.

5.2. Conducted Emissions

5.2.1. Quasi Peak Detector Measurements

Plots of the initial scans can be found in *Appendix 3. Graphical Test Results*.

Test Summary:

Port:	AC Mains
Basic Standard:	FCC Part 15.107
Test Method:	ANSI C63.4 Section 7

Environmental Conditions:

Temperature Variation (°C):	20 to 20
Relative Humidity Variation (%):	65 to 65

Results:

Frequency (MHz)	Line	Quasi Peak Level (dBμV)	Limit (dBμV)	Margin (dB)	Note(s)	Result
0.163	Live	21.8	65.3	43.5	-	Complied
0.186	Live	21.2	64.2	43.0	-	Complied
0.204	Neutral	20.8	63.4	42.6	-	Complied
0.235	Live	19.0	62.3	43.3	-	Complied
0.276	Live	16.5	60.9	44.4	-	Complied
0.285	Live	17.3	60.7	43.4	-	Complied

5.2.2. Average Detector Measurements

Following the initial scans and quasi peak measurements, further measurements were made at the relevant frequencies using an average detector. The measured levels were as follows:

Test Summary:

Port:	AC Mains
Basic Standard:	FCC Part 15.107
Test Method:	ANSI C63.4 Section 7

Environmental Conditions:

Temperature Variation (°C):	20 to 20
Relative Humidity Variation (%):	65 to 65

Results:

Frequency (MHz)	Line	Average Level (dBμV)	Limit (dBμV)	Margin (dB)	Note(s)	Result
Note 1						

Note(s):

1. No emissions were found to be within 20dB of the limit line; therefore no further measurements were made.

5.3. Radiated Emissions

5.3.1. Electric Field Strength Measurements

Plots of the initial scans can be found in *Appendix 3. Graphical Test Results*.

Test Summary:

Port:	Enclosure
Basic Standard:	FCC Part 15.109
Test Method:	ANSI C63.4 Section 8
Measurement Distance:	3 metres
Frequency Range:	30 MHz to 1 GHz

Environmental Conditions:

Temperature Variation (°C):	20 to 20
Relative Humidity Variation (%):	65 to 64

Results:

Frequency (MHz)	Antenna Polarity	Quasi Peak Level (dBμV/m)	Limit (dBμV/m)	Margin (dB)	Note(s)	Result
49.209	Vertical	15.3	40	24.7	-	Complied
49.209	Horizontal	8.8	40	31.2	-	Complied
83.875	Vertical	11.3	40	28.7	-	Complied
83.875	Horizontal	8.6	40	31.4	-	Complied
114.333	Vertical	20.2	43	22.8	-	Complied
114.333	Horizontal	20.0	43	23.0	-	Complied
128.339	Vertical	15.3	43	27.7	-	Complied
128.339	Horizontal	12.5	43	27.7	-	Complied
155.146	Vertical	16.0	43	27.0	-	Complied
155.146	Horizontal	12.7	43	30.3	-	Complied
176.854	Vertical	21.1	43	29.5	-	Complied
176.854	Horizontal	13.5	43	21.9	-	Complied

5.3.2. Electric Field Strength Measurements

Plots of the initial scans can be found in *Appendix 3. Graphical Test Results*.

Test Summary:

Port:	Enclosure
Basic Standard:	FCC Part 15.109
Test Method:	ANSI C63.4 Section 8
Measurement Distance:	3 metres
Frequency Range:	1 GHz to 4 GHz

Environmental Conditions:

Temperature Variation (°C):	22 to 22
Relative Humidity Variation (%):	40 to 40

Results:

Frequency (MHz)	Antenna Polarity	Quasi Peak Level (dBμV/m)	Limit (dBμV/m)	Margin (dB)	Note(s)	Result
Note 1						

Note(s):

1. No emissions were noted above the noise floor of the measurement system. Therefore no further measurements were made.

5.3.3. Electric Field Strength Measurements

Plots of the initial scans can be found in *Appendix 3. Graphical Test Results*.

Test Summary:

Port:	Enclosure
Basic Standard:	FCC Part 15.109
Test Method:	ANSI C63.4 Section 8
Measurement Distance:	3 metres
Frequency Range:	4 GHz to 7 GHz

Environmental Conditions:

Temperature Variation (°C):	22 to 22
Relative Humidity Variation (%):	40 to 40

Results:

Frequency (MHz)	Antenna Polarity	Quasi Peak Level (dBμV/m)	Limit (dBμV/m)	Margin (dB)	Note(s)	Result
Note 1						

Note(s):

1. No emissions were noted above the noise floor of the measurement system. Therefore no further measurements were made.

5.3.4. Electric Field Strength Measurements

Plots of the initial scans can be found in *Appendix 3. Graphical Test Results*.

Test Summary:

Port:	Enclosure
Basic Standard:	FCC Part 15.109
Test Method:	ANSI C63.4 Section 8
Measurement Distance:	3 metres
Frequency Range:	7 GHz to 10 GHz

Environmental Conditions:

Temperature Variation (°C):	22 to 22
Relative Humidity Variation (%):	40 to 40

Results:

Frequency (MHz)	Antenna Polarity	Quasi Peak Level (dBμV/m)	Limit (dBμV/m)	Margin (dB)	Note(s)	Result
Note 1						

Note(s):

1. No emissions were noted above the noise floor of the measurement system. Therefore no further measurements were made.

5.3.5. Electric Field Strength Measurements

Plots of the initial scans can be found in *Appendix 3. Graphical Test Results*.

Test Summary:

Port:	Enclosure
Basic Standard:	FCC Part 15.109
Test Method:	ANSI C63.4 Section 8
Measurement Distance:	3 metres
Frequency Range:	10 GHz to 12.75 GHz

Environmental Conditions:

Temperature Variation (°C):	22 to 22
Relative Humidity Variation (%):	40 to 40

Results:

Frequency (MHz)	Antenna Polarity	Quasi Peak Level (dBμV/m)	Limit (dBμV/m)	Margin (dB)	Note(s)	Result
Note 1						

Note(s):

1. No emissions were noted above the noise floor of the measurement system. Therefore no further measurements were made.

6. Measurement Uncertainty

No measurement or test can ever be perfect and the imperfections give rise to error of measurement in the results. Consequently, the result of a measurement is only an approximation to the value of the measurand (the specific quantity subject to measurement) and is only complete when accompanied by a statement of the uncertainty of the approximation.

The expression of uncertainty of a measurement result allows realistic comparison of results with reference values and limits given in specifications and standards.

The uncertainty of the result may need to be taken into account when interpreting the measurement results.

The reported expanded uncertainties below are based on a standard uncertainty multiplied by an appropriate coverage factor, such that a confidence level of approximately 95% is maintained. For the purposes of this document “approximately” is interpreted as meaning “effectively” or “for most practical purposes”.

Measurement Type	**Range**	**Confidence Level**	**Calculated Uncertainty**
Conducted Emissions	150 kHz to 30 MHz	95%	± 3.72 dB
Radiated Emissions Electric Field Strength	30 to 1000 MHz	95%	± 4.68 dB

The methods used to calculate the above uncertainties are in line with those recommended within the various measurement specifications. Where measurement specifications do not include guidelines for the evaluation of measurement uncertainty, the published guidance of the appropriate accreditation body is followed.

Appendix 1. Test Equipment Used

RFI No.	Instrument	Manufacturer	Type No.	Serial No.	Date Last Calibrated	Cal. Interval (Months)
A1037	Antenna	Chase EMC Ltd	CBL6112B	2413	29 May 2008	12
A1069	Single Phase LISN	Rohde & Schwarz	ESH3-Z5	837469/012	07 Mar 2008	12
A1792	Pre Amplifier	A.H.Systems Inc	PAM-0118	182	Internal	-
A1817	Antenna	EMCO	3115	00075694	06 Oct 2006	36
A1830	Pulse Limiter	Rhode & Schwarz	ESH3-Z2	100668	16 Jan 2008	12
A553	Antenna	Chase	CBL6111A	1593	04 Jun 2008	12
C1070	Cable	Rosenberger	FA210A1030 M5050	Not Stated	20 Apr 2008	12
C1116	UtiFlex	UtiFlex	ufa 210A-1-0360-50x50	1409	Internal	-
C1160	Cable	Rosenberger	FA210A1050 005050	3305 42449-2	20 Apr 2008	12
C1268	Cable	Rosenberger	FA210A0075 008080	49356-1	20 Apr 2008	12
C1302	3m Cable	Rosenberger	FA210A1030 005050	59153-01	04 Aug 2008	12
C151	Cable	Rosenberger	UFA210A-1-1181-70x70	None	20 Apr 2008	12
C160	Cable	Rosenberger	UFA210A-1-1181-70x70	None	20 Apr 2008	12
C341	Cable	Andrews	None	None	24 Apr 2008	12
C363	Cable	Rosenberger	RG142	None	20 Apr 2008	12
C461	Cable	Rosenberger	UFA210A-1-1182-704704	98H0305	20 Apr 2008	12
M003	Spectrum Monitor	Rohde & Schwarz	EZM	883 580/008	Calibration not required (monitor only)	-
M023	Test Receiver	Rohde & Schwarz	ESVP	872 991/027	28 May 2008	12
M1263	Test Receiver	Rohde & Schwarz	ESIB7	100265	06 Feb 2008	12
M1273	Test Receiver	Rhode & Schwarz	ESIB 26	100275	26 Feb 2008	12
M1391	Thermometer/ Hygrometer	Oergon Scientific	BAR629HGU	N/A	18 Jun 2008	12
M173	Turntable Controller	R.H.Electrical Services	RH351	3510020	Calibration not required	-
S201	Open Area Test Site	RFI	1	None	09 May 2008	12
S212	Emissions Screened Room	RFI	12	None	Calibration not required	-

RFI No.	Instrument	Manufacturer	Type No.	Serial No.	Date Last Calibrated	Cal. Interval (Months)
K0001	5m Semi Anechoic chamber	RFI	4420	None	13 August 2008	12

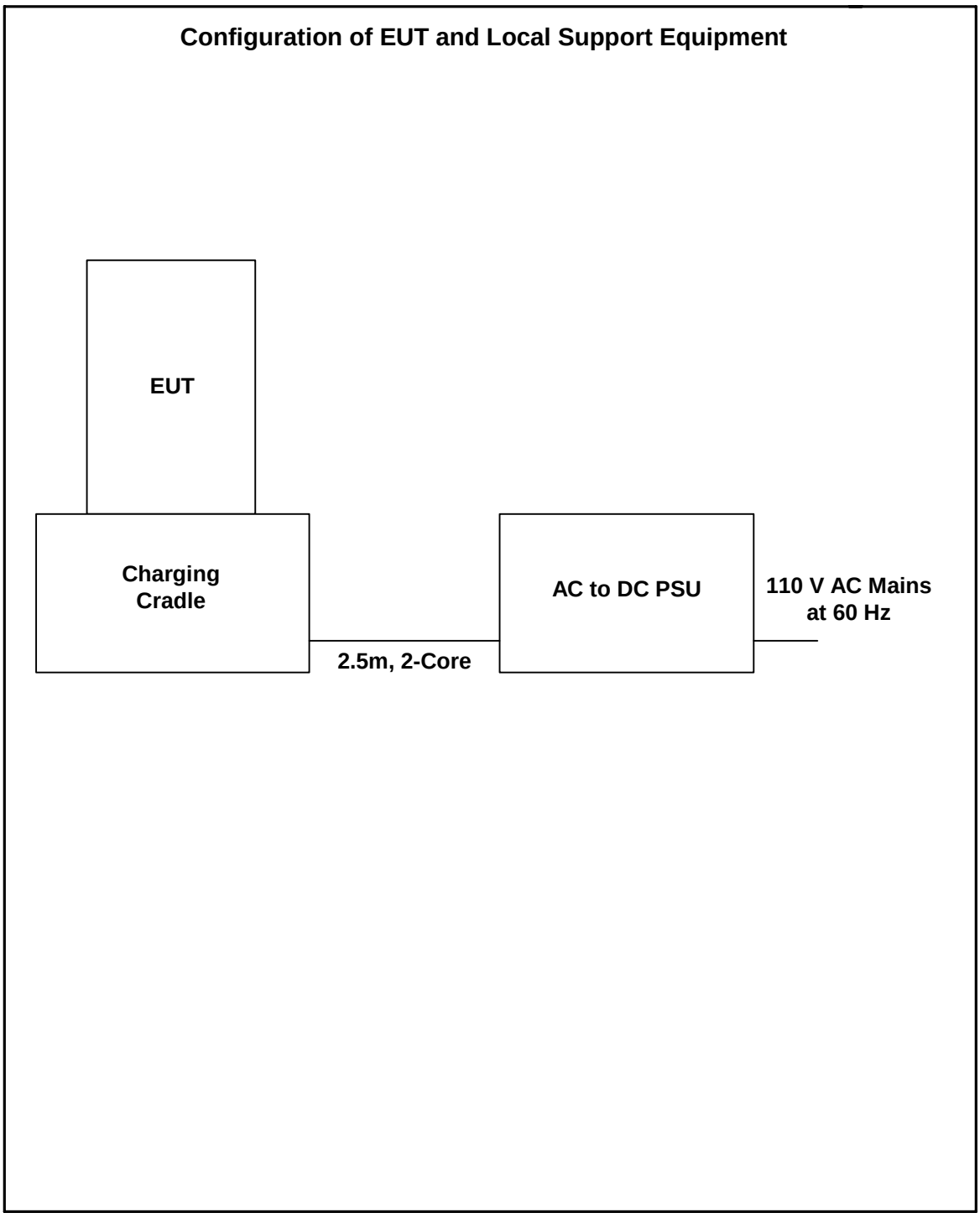
NB In accordance with UKAS requirements, all the measurement equipment is on a calibration schedule.

Appendix 2. Test Configuration Drawing

This Appendix contains the following drawings:

Drawing Reference Number	Title
DRG\73706JD01\001	Schematic diagram of the EUT, support equipment and interconnecting cables used for the test.

DRG\73706JD01\001

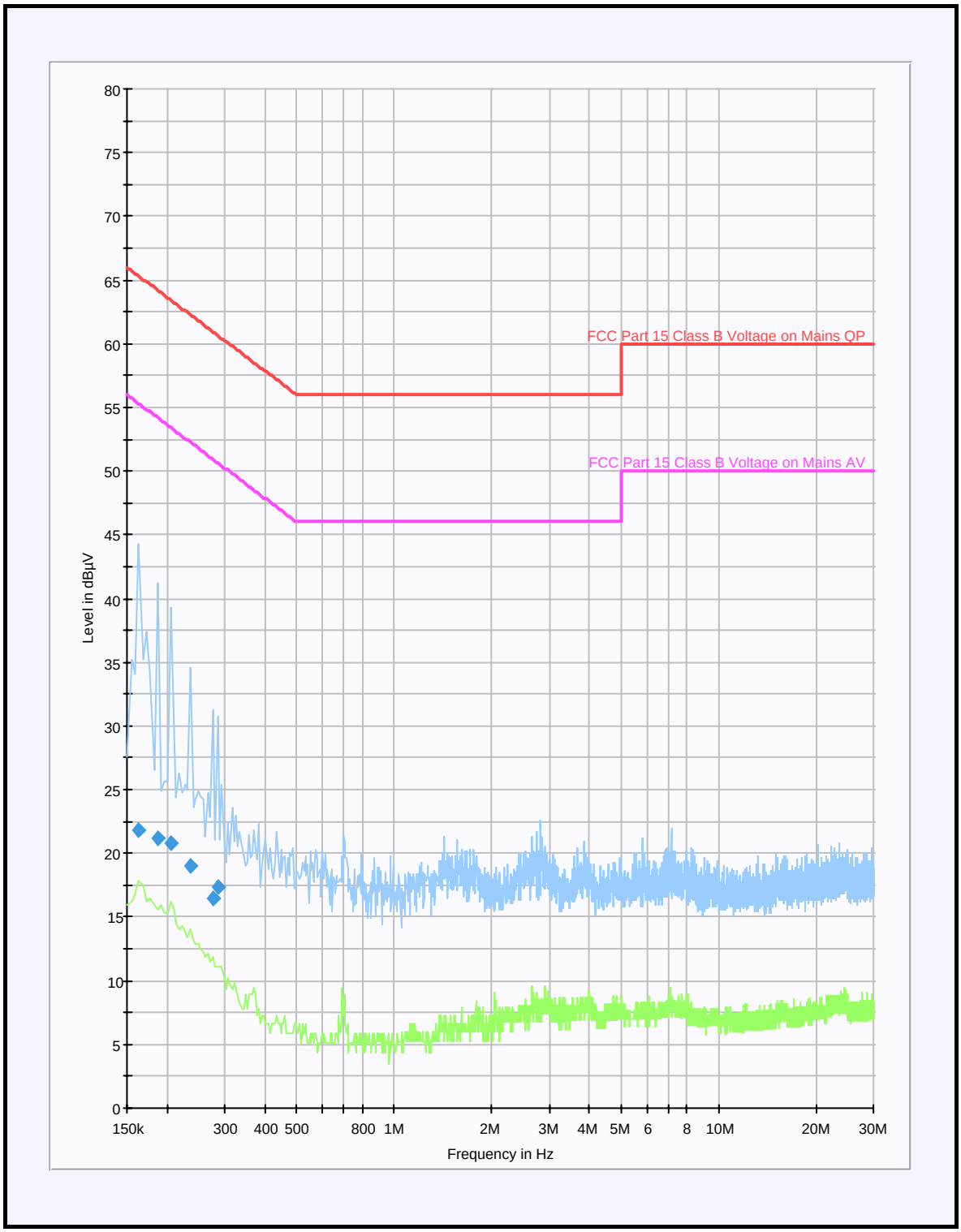


Appendix 3. Graphical Test Results

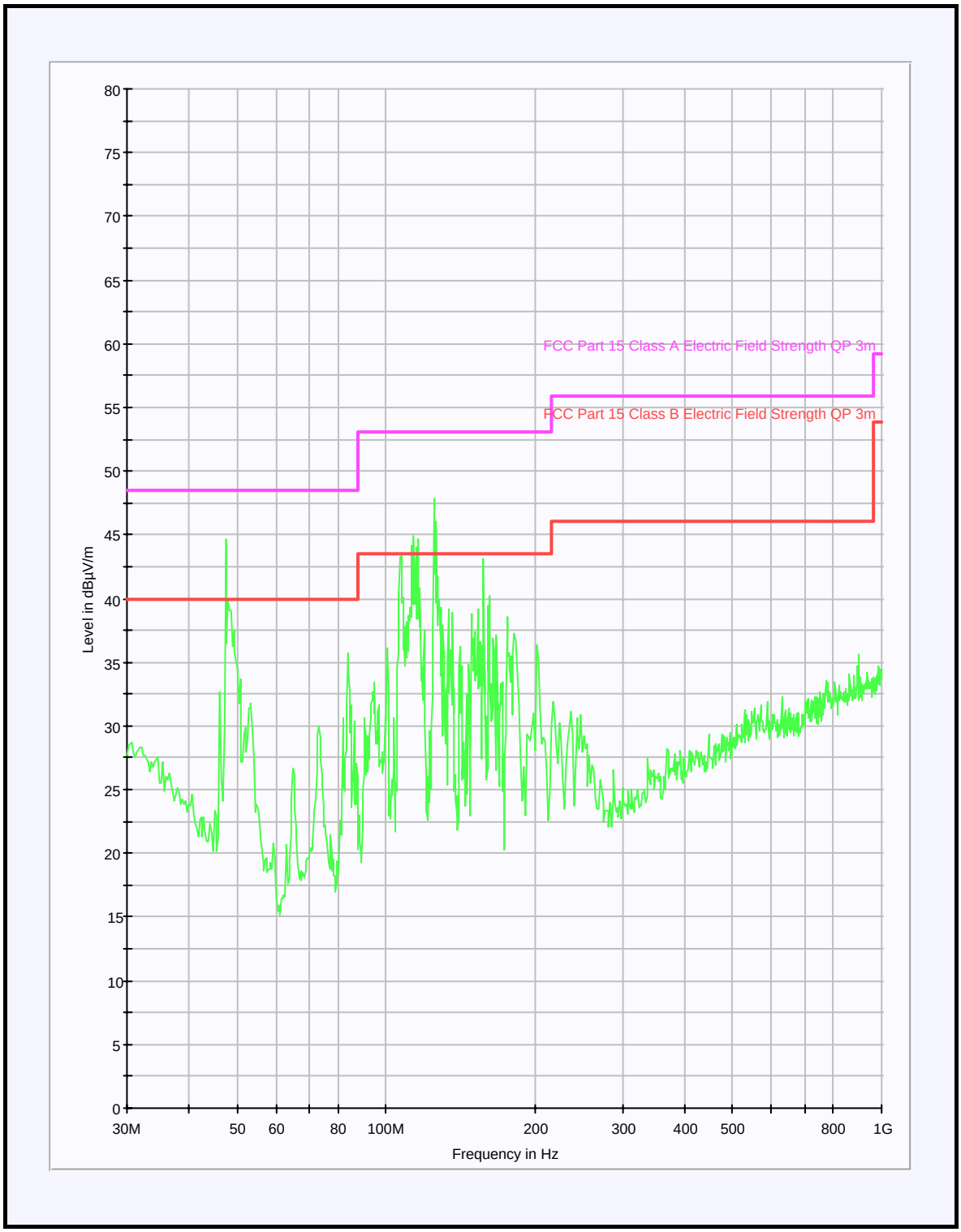
This Appendix contains the following graphs:

Graph Reference Number	Title
GPH\73706JD01\001	Conducted Emissions Pre-Scan (0.15 MHz to 30 MHz)
GPH\73706JD01\002	Radiated Emissions Pre-Scan (30 MHz to 1000 MHz)
GPH\73706JD01\003	Radiated Emissions Pre-Scan (1 GHz to 4 GHz)
GPH\73706JD01\004	Radiated Emissions Pre-Scan (4 GHz to 7 GHz)
GPH\73706JD01\005	Radiated Emissions Pre-Scan (7 GHz to 10 GHz)
GPH\73706JD01\006	Radiated Emissions Pre-Scan (10 GHz to 12.75 GHz)

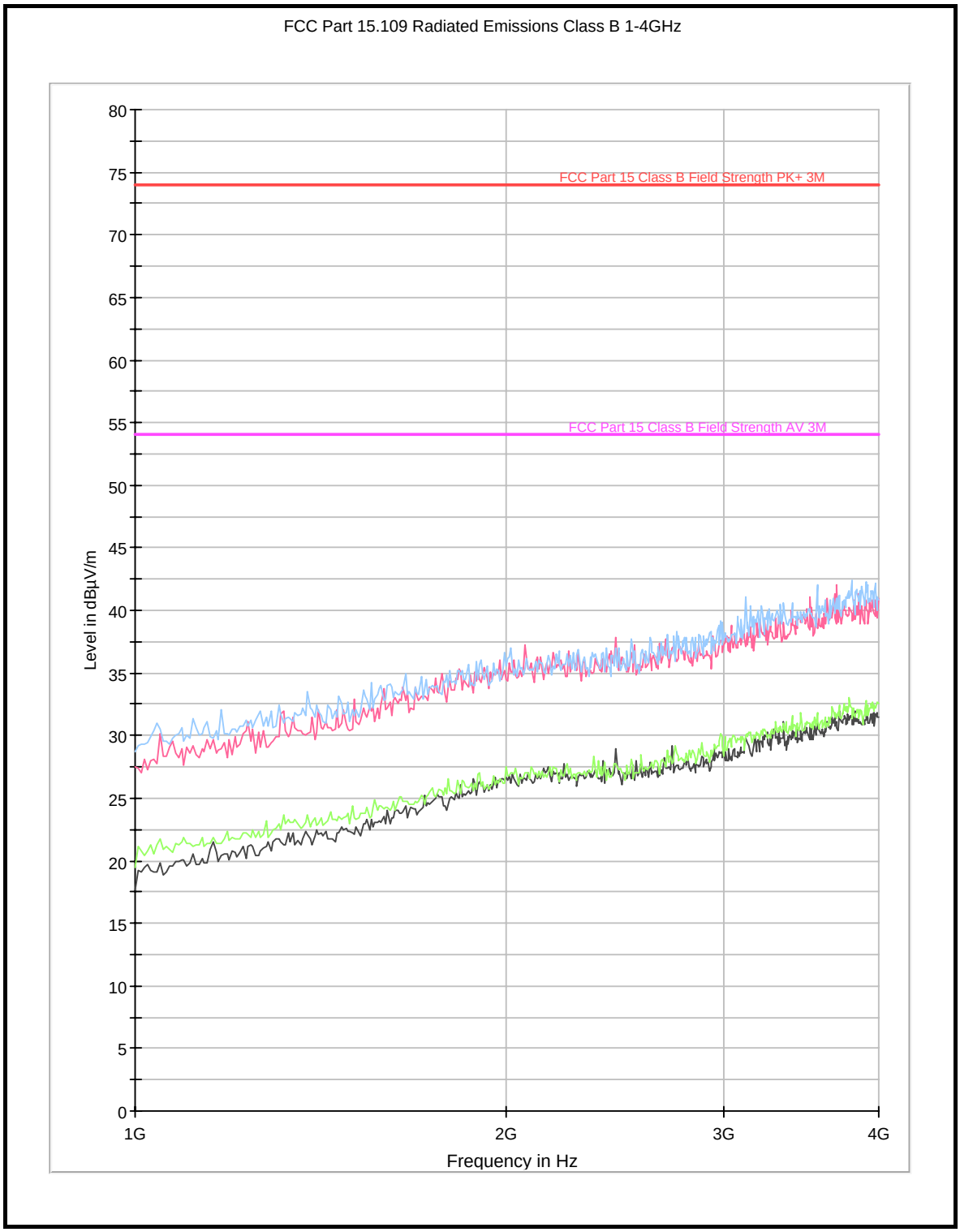
GPH\73706JD01\001
Conducted Emissions Pre-Scan (0.15 MHz to 30 MHz)



GPH\73706JD01\002
Radiated Emissions Pre-Scan (30 MHz to 1000 MHz)



GPH\73706JD01\003
Radiated Emissions Pre-Scan (1 GHz to 4000 MHz)



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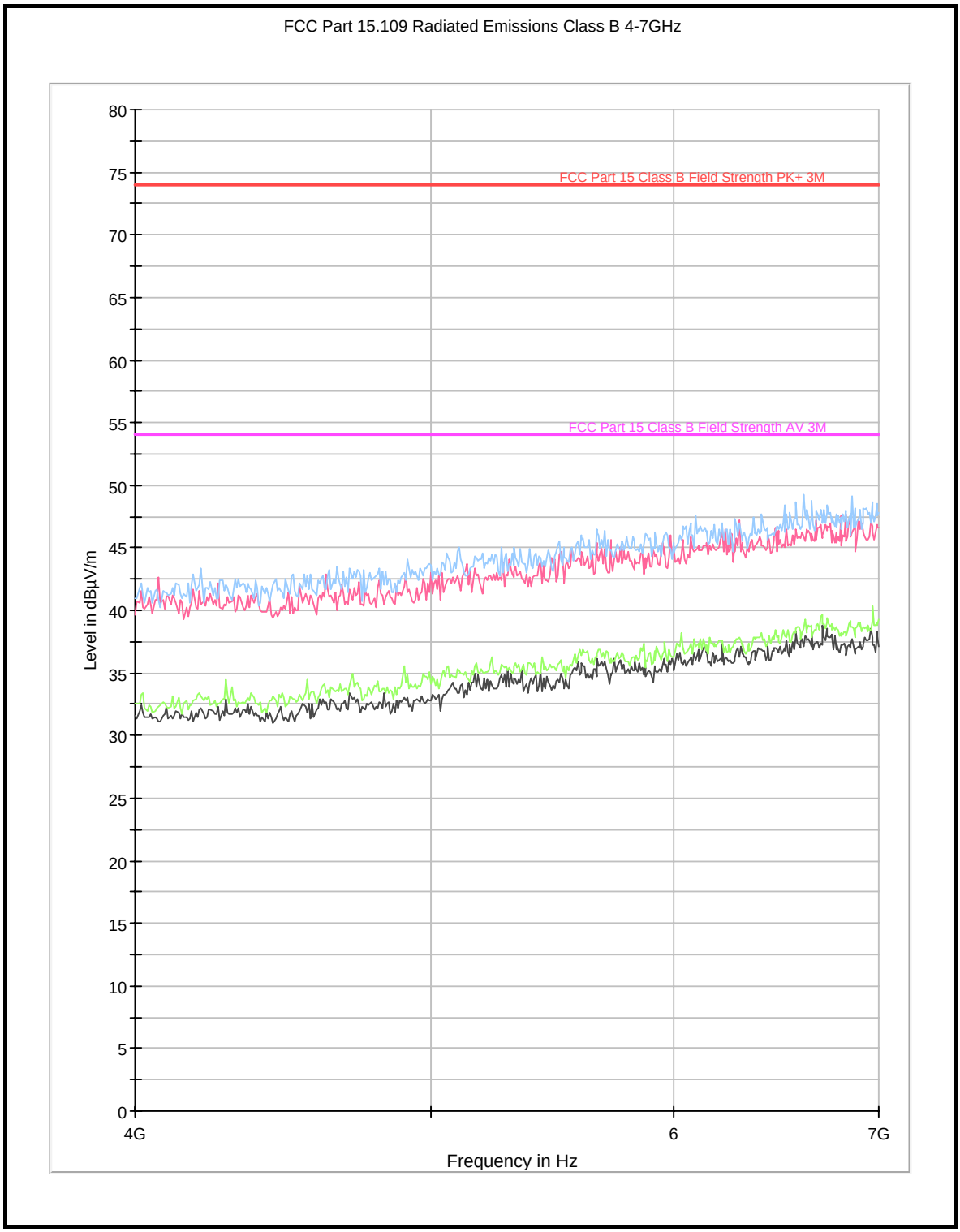
Radiated Emissions Pre-Scan (4 GHz to 7 GHz)



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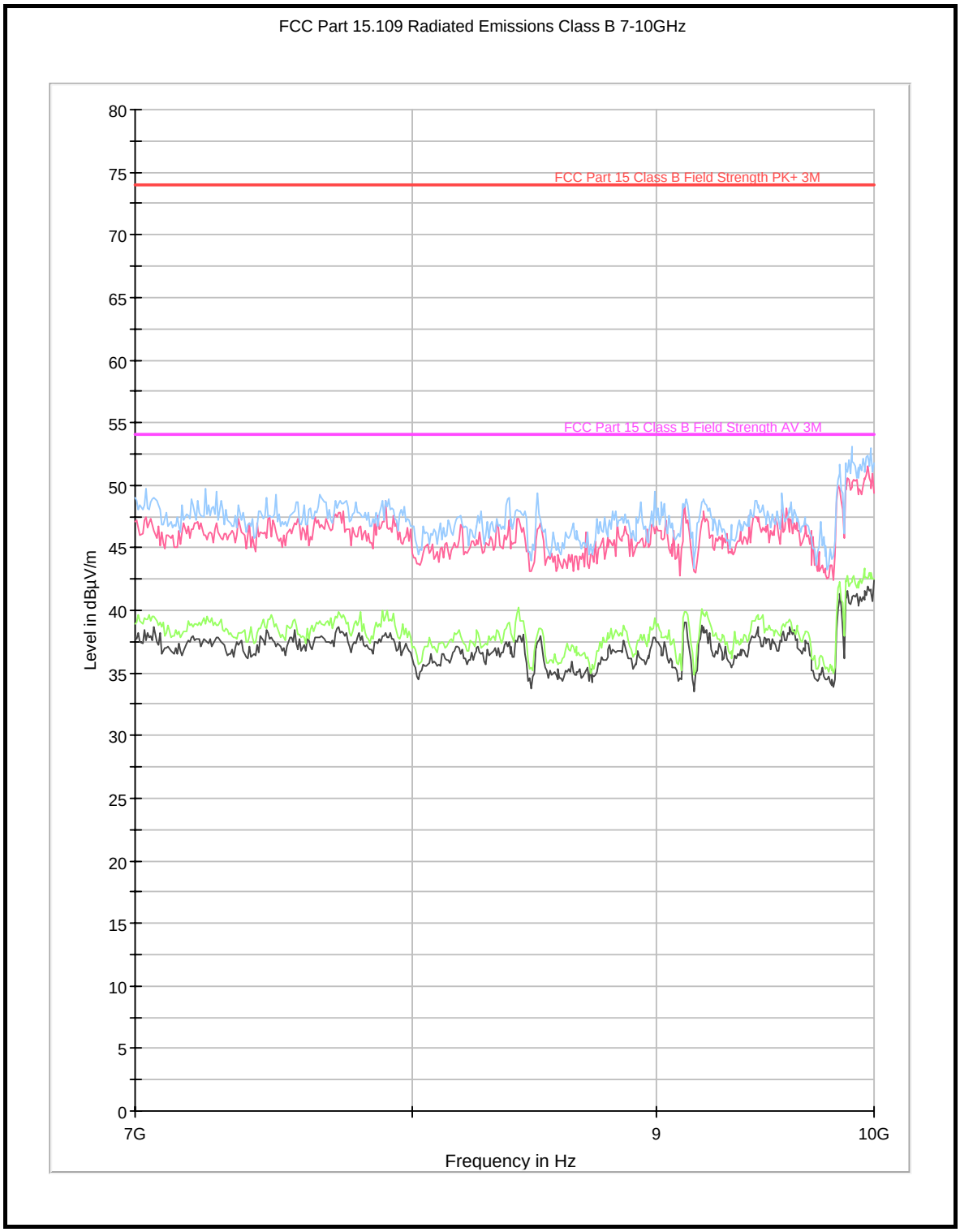
Radiated Emissions Pre-Scan (7 GHz to 10 GHz)



GPH\73706JD01\006
Radiated Emissions Pre-Scan (10 GHz to 12.75 GHz)