

TEST REPORT FROM RFI GLOBAL SERVICES LTD

Test of: OmiScan Gas Handset OM4720/2

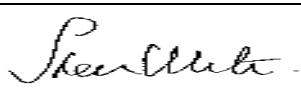
To: FCC Part 15: 2007 Subpart B Clause 15.109 Radiated Emissions and
Clause 15.107 Conducted Emissions

Test Report Serial No:
RFI/EMC2/RP74085JD01B

Supersedes Test Report Serial No:
RFI/EMC1/RP74085JD01B

This Test Report Is Issued Under The Authority
Of Scott D'Adamo, EMC Service Leader:



Checked By:	Steve White
Signature:	
Date of Issue:	18 December 2008

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1. Customer Information

Company Name:	Omitec Ltd
Address:	Hopton Industrial Estate London Road Devizes Wiltshire SN10 2EU

2. Summary of Testing

2.1. General Information

Specification Reference:	FCC Part 15: 2007 Subpart B Clause 15.109 Radiated Emissions and Clause 15.107 Conducted 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:	209735 (FCC)
Location of Testing:	RFI Global Services Ltd, Wade Road, Basingstoke, Hampshire, RG24 8AH.
Test Dates:	09 October 2008

2.2. Summary of Test Results

Clause	Measurement	Applicability	Result
15.107	Conducted Emissions	Y ¹	✓
15.109	Radiated Emissions Electric Field Strength	Y	✓
Key to Results			
✓ = Complied ⚠ = Complied, within uncertainty ⚠ = Did not comply, within uncertainty ✖ = Did not comply			

Note(s):

1. The EUT is powered by an internal battery, conducted emissions were however performed with the EUT located and charging in the supporting Base station powered by the charger PSU.

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:	Handset
Brand Name:	Omitec
Model Name or Number:	OM4720/2
Serial Number:	0001
Hardware Version Number:	Issue 1
Software Version Number:	Issue 1.0.0
FCC ID Number:	SV4-OM4720
Country of Manufacture:	UK

3.2. Description of EUT

The equipment under test was an OM4720/2 Handset, which along with the OM4720/1 Base Station forms the Portable 5 Gas Analyser system used for automotive emissions testing.

The Base Station draws in a sample of emissions Gas from the Car exhaust were Gas concentrations of CO2, CO, O2, NOX and Hydro Carbons are measured by either electro chemical cell or in the Infra Red Spectrum. Gas readings are transmitted to a controlling handset over a *Bluetooth* link. The handset displays gas readings on a LCD screen and can record gas readings up to 65 minutes. Both base station and Handset are battery powered by HimH re chargeable cells. The product is supplied with a standalone charger PSU which plugs into the Base Station, which itself has a dedicated charging slot for the handset. Stored results can be down loaded to a PC for analysis on application specific software.

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:	Commercial and Light industry
Equipment Category:	<i>Bluetooth</i>
Equipment Class:	Class B
Type of Unit:	Mobile
Highest Operating Frequency:	2.480 GHz
Power Supply Requirement:	Internal battery supply of 2.4V
Dimensions:	180x106x35mm

3.5. Port Identification

Port	Description	Type	Applicable
1	Enclosure	-	Y
2	Charging Port	2 Pin	Y

3.6. Support Equipment

The following support equipment was used to exercise the EUT during testing:

Description:	Base Station
Brand Name:	Omitec
Model Name or Number:	OM4720/1
Serial Number:	0001
Cable Length and Type:	2 Pin
Connected to Port:	Charging Port

Description:	Charger PSU
Brand Name:	Omitec
Model Name or Number:	OM4700/6
Serial Number:	None Stated
Cable Length and Type:	None Stated
Connected to Port:	5 Pin Socket Base Station

4. Operation and Monitoring of the EUT during Testing

4.1. Operating Modes

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

- Live Gas Readings –During which the handset displays received from the base station as gas samples measured through a probe and then transmitted to the handset.

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):

- Stand Alone Mode – During which the Handset was powered by its internal batteries.
- Charging mode – During which the Handset was located in the Base station powered by the charger PSU

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
Operating Mode:	Charging

Environmental Conditions:

Temperature Variation (°C):	21 to 21
Relative Humidity Variation (%):	32 to 32
Atmospheric Pressure Variation (mb):	1008 to 1008

Results:

Frequency (MHz)	Line	Quasi Peak Level (dB μ V)	Limit (dB μ V)	Margin (dB)	Note(s)	Result
0.172	Neutral	47.5	64.8	17.3	-	Complied
0.231	Live	40.0	62.4	22.4	-	Complied
0.262	Live	35.1	61.4	26.3	-	Complied
0.343	Live	32.0	59.1	27.1	-	Complied
0.577	Neutral	27.6	56.0	28.4	-	Complied
1.621	Live	27.0	56.0	29.0	-	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
Operating Mode:	Charging

Environmental Conditions:

Temperature Variation (°C):	21 to 21
Relative Humidity Variation (%):	32 to 32
Atmospheric Pressure Variation (mb):	1008 to 1008

Results:

Frequency (MHz)	Line	Average Level (dB μ V)	Limit (dB μ V)	Margin (dB)	Note(s)	Result
0.172	Neutral	39.5	54.8	15.3	-	Complied
0.231	Neutral	32.4	52.4	20.0	-	Complied
0.348	Live	29.7	49.0	19.3	-	Complied
0.460	Live	24.8	46.7	21.9	-	Complied
0.636	Live	24.5	46.0	21.5	-	Complied
0.753	Live	25.1	46.0	20.9	-	Complied

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
Operating Mode:	Stand Alone Mode

Environmental Conditions:

Temperature Variation (°C):	24 to 24
Relative Humidity Variation (%):	41 to 41
Atmospheric Pressure Variation (mb):	1025 to 1025

Results:

Frequency (MHz)	Antenna Polarity	Quasi Peak Level (dB μ V/m)	Limit (dB μ V/m)	Margin (dB)	Note(s)	Result
30.447	Vertical	14.5	40.00	25.50	-	Complied
42.949	Vertical	23.7	40.00	16.30	-	Complied
100.006	Vertical	23.6	43.50	19.90	-	Complied
128.026	Vertical	22.8	43.50	20.70	-	Complied
186.004	Horizontal	23.8	43.50	19.70	-	Complied
366.788	Vertical	9.7	46.00	36.30	-	Complied
390.531	Vertical	8.0	46.00	38.00	-	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 12.75 GHz
Operating Mode:	Standalone Mode

Environmental Conditions:

Temperature Variation (°C):	24 to 24
Relative Humidity Variation (%):	41 to 41
Atmospheric Pressure Variation (mb):	1025 to 1025

Results:

Frequency (GHz)	Antenna Polarity	Average Level (dB μ V/m)	Limit (dB μ V/m)	Margin (dB)	Note(s)	Result
1.629	Horizontal	43.5	54	10.5	-	Complied
1.629	Vertical	46.0	54	8.0	-	Complied
2.400			See Note 1			
2.400						

Note(s):

1. This Frequency was not measured as this is the operating frequency of the transmitter

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:	30 MHz to 1 GHz
Operating Mode:	Charging

Environmental Conditions:

Temperature Variation (°C):	24 to 24
Relative Humidity Variation (%):	41 to 41
Atmospheric Pressure Variation (mb):	1025 to 1025

Results:

Frequency (MHz)	Antenna Polarity	Quasi Peak Level (dB μ V/m)	Limit (dB μ V/m)	Margin (dB)	Note(s)	Result
31.837	Vertical	31.1	40.000	8.900	-	Complied
100.013	Vertical	31.7	43.500	11.800	-	Complied
186.025	Horizontal	34.3	43.500	9.200	-	Complied
372.408	Vertical	27.6	46.000	18.400	-	Complied
458.795	Vertical	26.3	46.000	19.700	-	Complied
554.662	Horizontal	29.8	46.000	16.200	-	Complied

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:	1 GHz to 12.75 GHz
Operating Mode:	Charging

Environmental Conditions:

Temperature Variation (°C):	24 to 24
Relative Humidity Variation (%):	41 to 41
Atmospheric Pressure Variation (mb):	1025 to 1025

Results:

Frequency (GHz)	Antenna Polarity	Average Level (dB μ V/m)	Limit (dB μ V/m)	Margin (dB)	Note(s)	Result
2.400				See Note 1		
2.400						

Note(s):

1. This frequency was not measured as this is the operating frequency of the transmitter.

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 measurement and (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
Radiated Emissions Electric Field Strength	30 to 1000 MHz	95%	± 4.68 dB
	1 GHz to 40 GHz	95%	± 4.93 dB
Conducted Emissions	150KHz to 30 MHz	95%	± 3.99 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

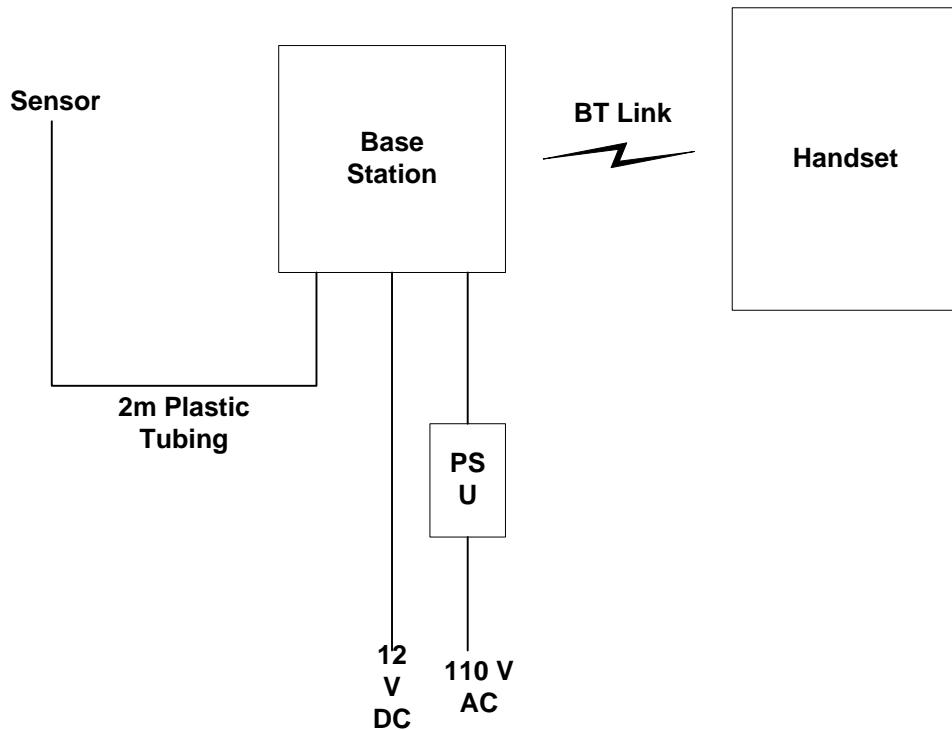
RFI No.	Instrument	Manufacturer	Type No.	Serial No.	Date Last Calibrated	Cal. Interval (Months)
A1792	Pre Amplifier	A.H. Systems Inc	PAM-0118	182	Calibrated as part of system	12
A1817	Antenna	EMCO	3115	00075694	06 Oct 2006	36
A259	Antenna	Chase	CBL6111	1513	25 Jul 2008	12
A276	OATS Positioning Controller	Rohde & Schwarz	HCC	-	Calibration not required	12
C1116	Cable	UtiFlex	ufa 210A-1-0360-50x50	1409	20 th Apr 2008	12
C1302	Cable	Rosenberger	FA210A1030005050	59153-01	04 Aug 2008	12
C1303	Cable	Rosenberger	FA210A1080005050	59155-01	01 Aug 2008	12
C1306	Cable	Rosenberger	FA210A0015005050	59152-01	01 Aug 2008	12
K0001	5m Semi Anechoic Chamber	Rainford EMC	N/A	N/A	12 Aug 2008	12
M1273	Test Receiver	Rohde & Schwarz	ESIB 26	100275	26 Feb 2008	12
M1391	Thermometer/ Hygrometer	Oregon Scientific	BAR629HGU	N/A	18 Jun 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 drawing:

Drawing Reference Number	Title
DRG\74085JD01\001	Schematic diagram of the EUT, support equipment and interconnecting cables used for the test.

DRG\74085JD01\001**Configuration of EUT and Local Support Equipment**

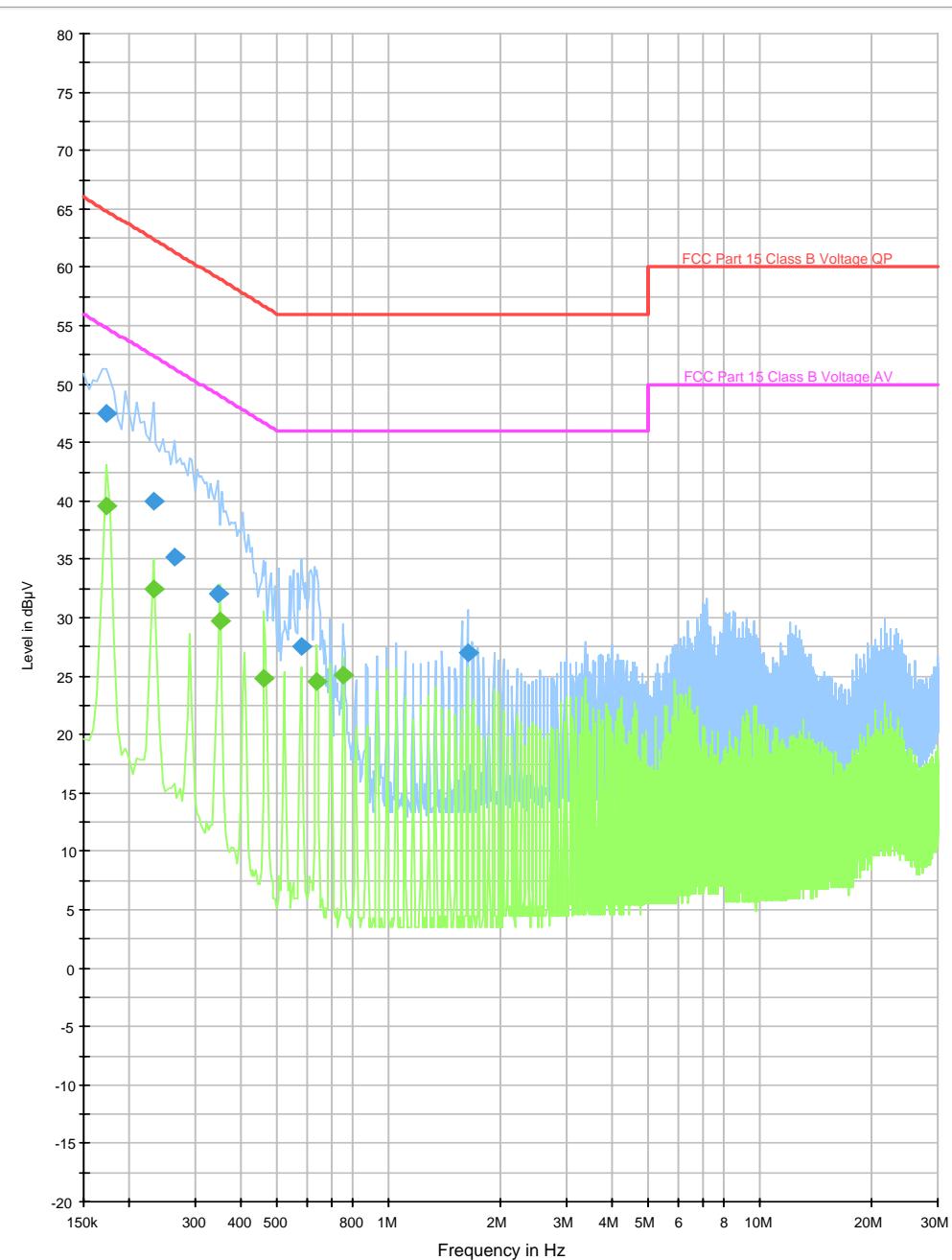
Appendix 3. Graphical Test Results

This Appendix contains the following graphs:

Graph Reference Number	Title
GPH\74085JD01\001	Conducted Emissions - Charging Pre-Scan (0.15 MHz to 30 MHz)
GPH\74085JD01\002	Radiated Emissions - Standalone Pre-Scan (30 MHz to 1000 MHz)
GPH\74085JD01\003	Radiated Emissions - Standalone Pre-Scan (1000 MHz to 4000 MHz)
GPH\74085JD01\004	Radiated Emissions - Standalone Pre-Scan (4000 MHz to 7000 MHz)
GPH\74085JD01\005	Radiated Emissions - Standalone Pre-Scan (7000 MHz to 10000 MHz)
GPH\74085JD01\006	Radiated Emissions - Standalone Pre-Scan (10000 MHz to 12750 MHz)
GPH\74085JD01\007	Radiated Emissions - Charging Pre-Scan (30 MHz to 1000 MHz)
GPH\74085JD01\008	Radiated Emissions - Charging Pre-Scan (1000 MHz to 4000 MHz)
GPH\74085JD01\009	Radiated Emissions - Charging Pre-Scan (4000 MHz to 7000 MHz)
GPH\74085JD01\010	Radiated Emissions - Charging Pre-Scan (7000 MHz to 10000 MHz)
GPH\74085JD01\011	Radiated Emissions - Charging Pre-Scan (10000 MHz to 12750 MHz)

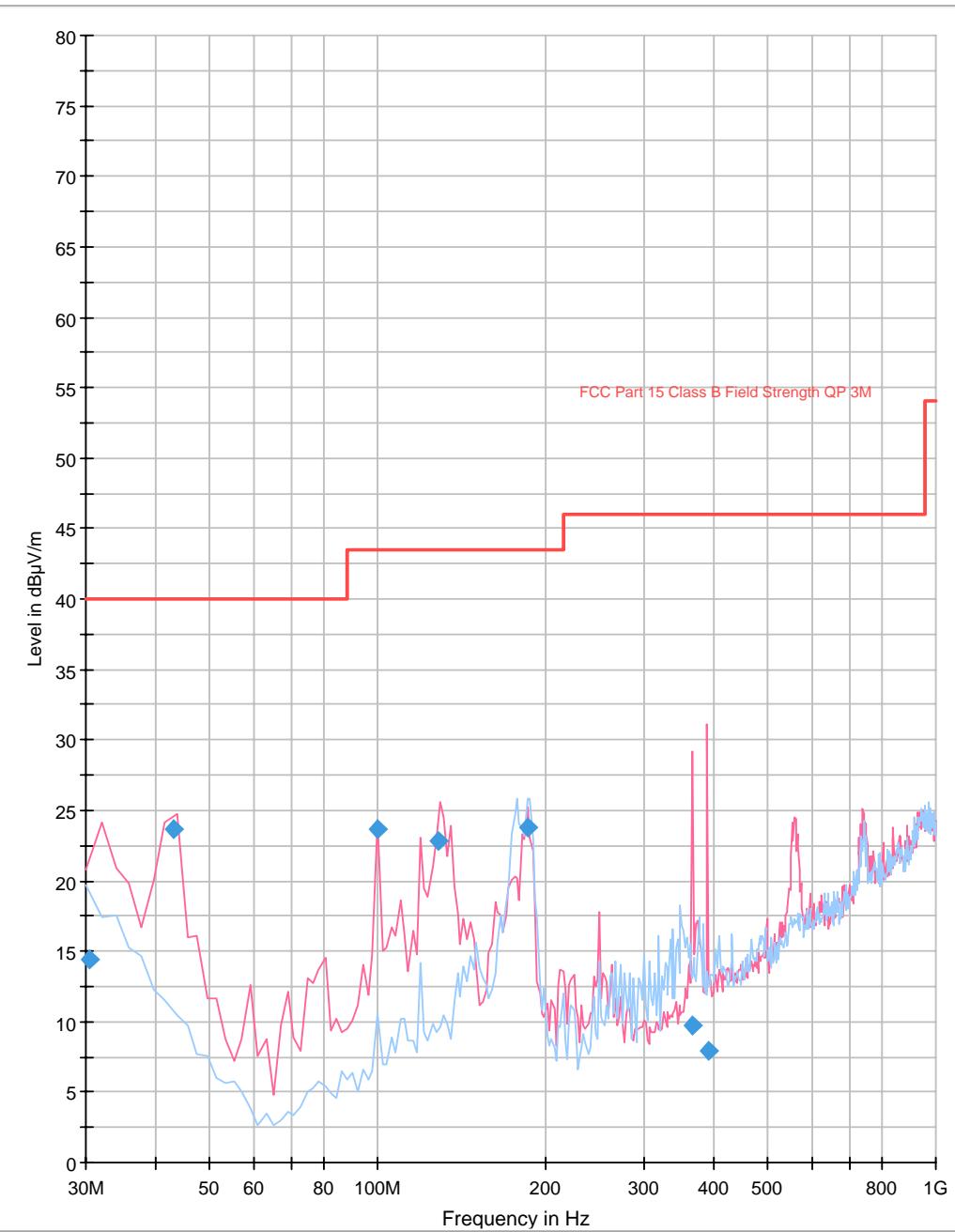
GPH\74085JD01\001
Conducted Emissions - Charging
Pre-Scan (150 KHz to 30MHz)

FCC Part 15.107 Conducted Emissions Class B

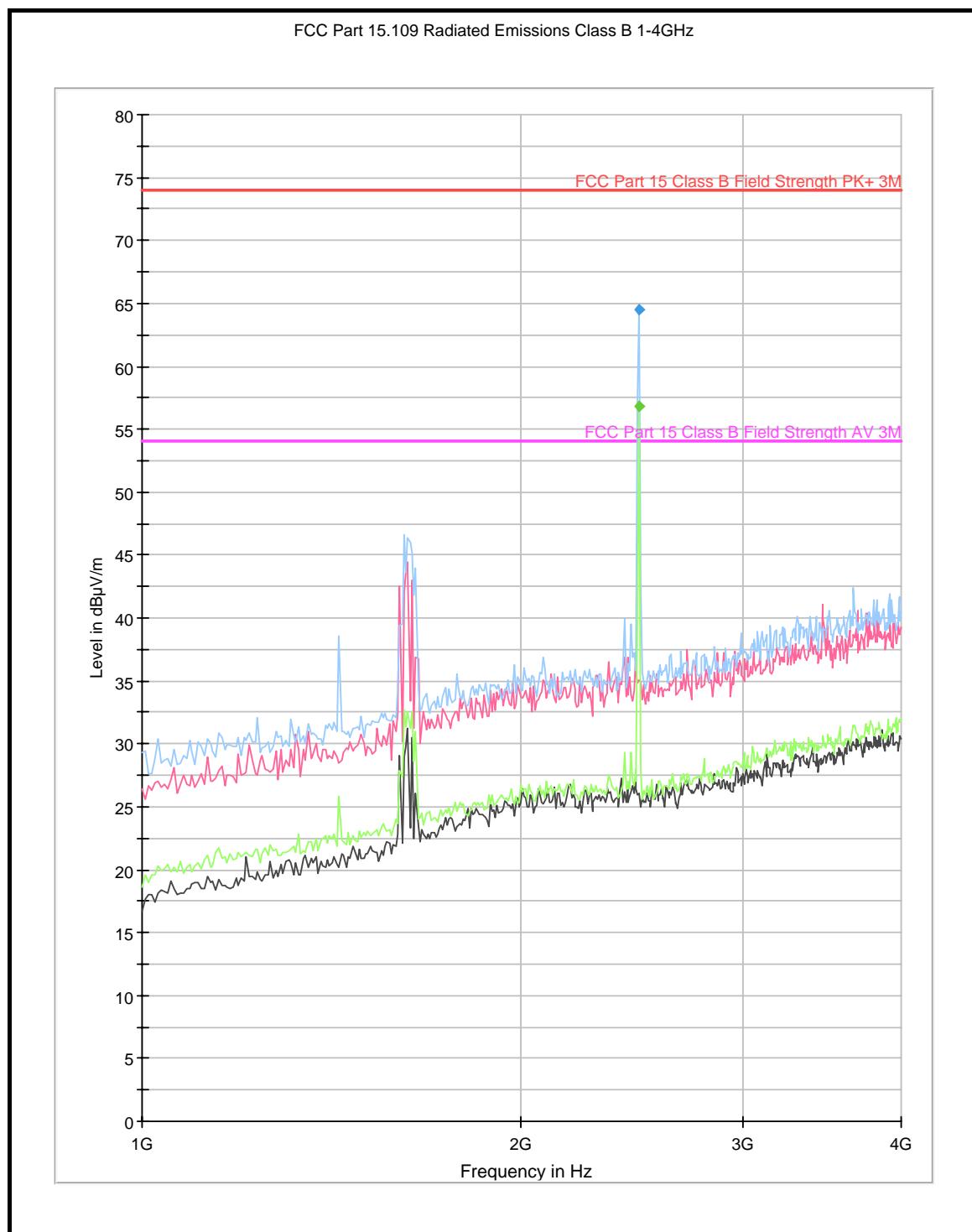


GPHV74085JD01\002
Radiated Emissions - Standalone
Pre-Scan (30 MHz to 1000 MHz)

FCC Part 15.109 Radiated Emissions Class B 30MHz-1GHz

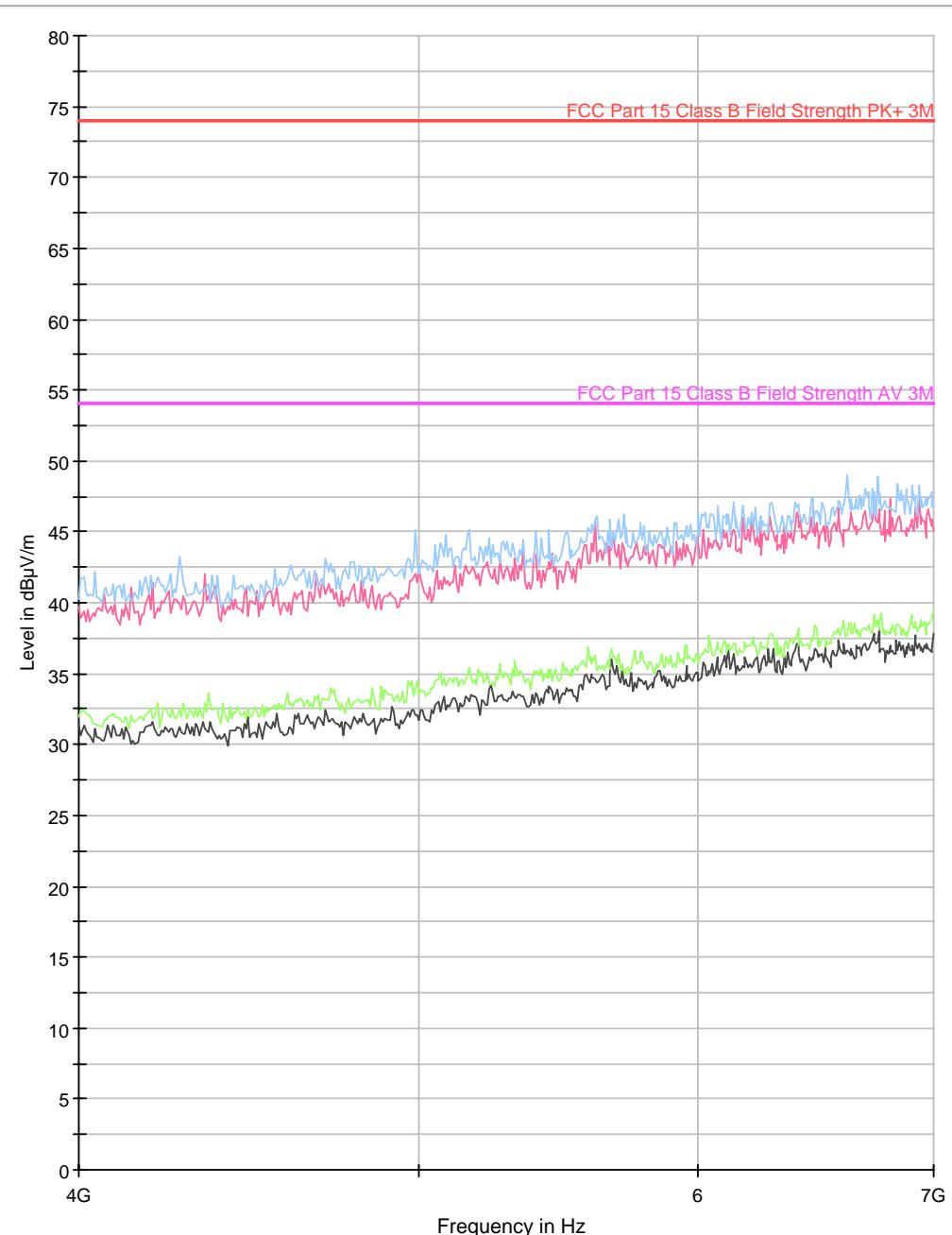


GPHV74085JD01\003
Radiated Emissions - Standalone
Pre-Scan (1000 MHz to 4000 MHz)

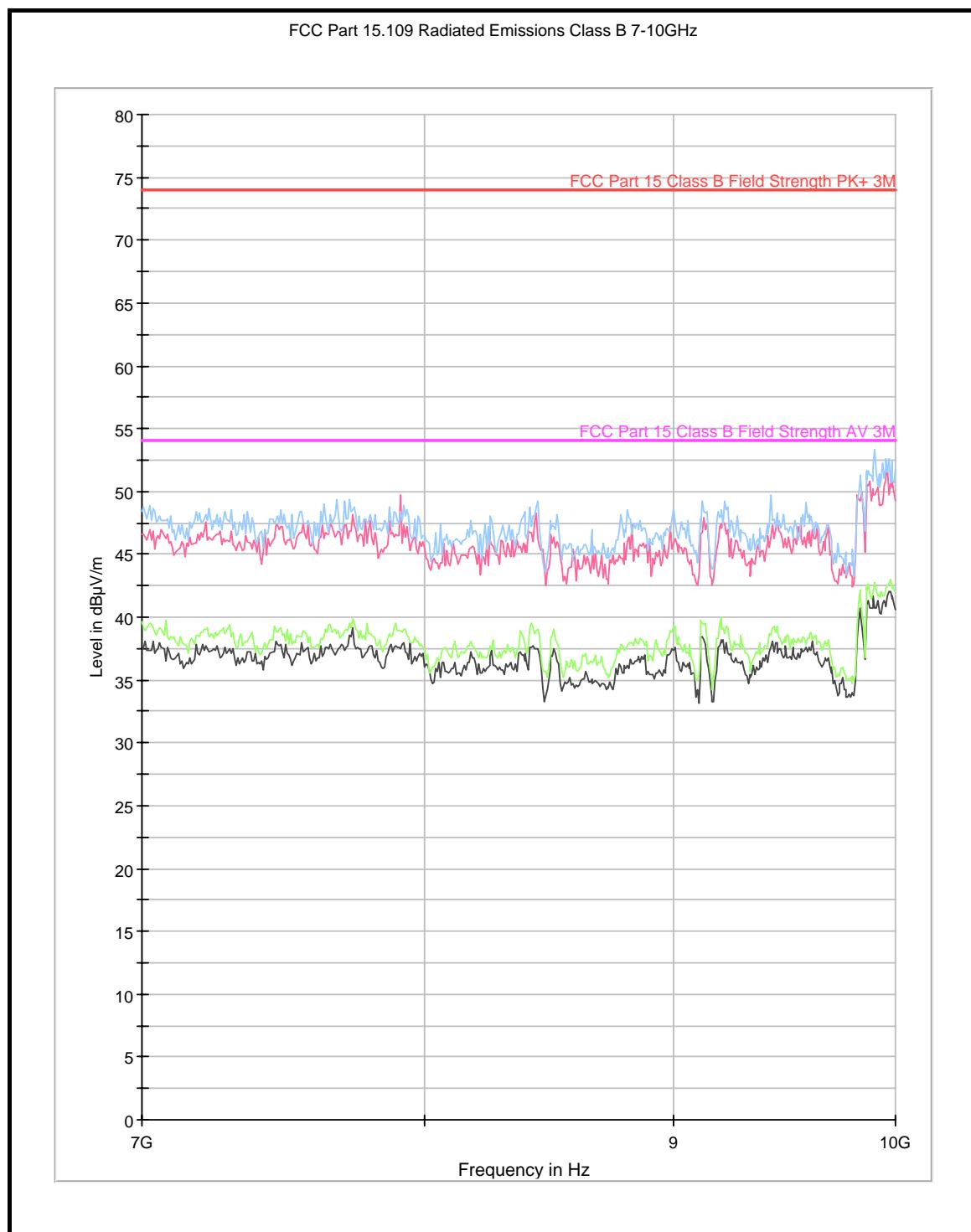


GPHV74085JD01\004
Radiated Emissions - Standalone
Pre-Scan (4000 MHz to 7000 MHz)

FCC Part 15.109 Radiated Emissions Class B 4-7GHz

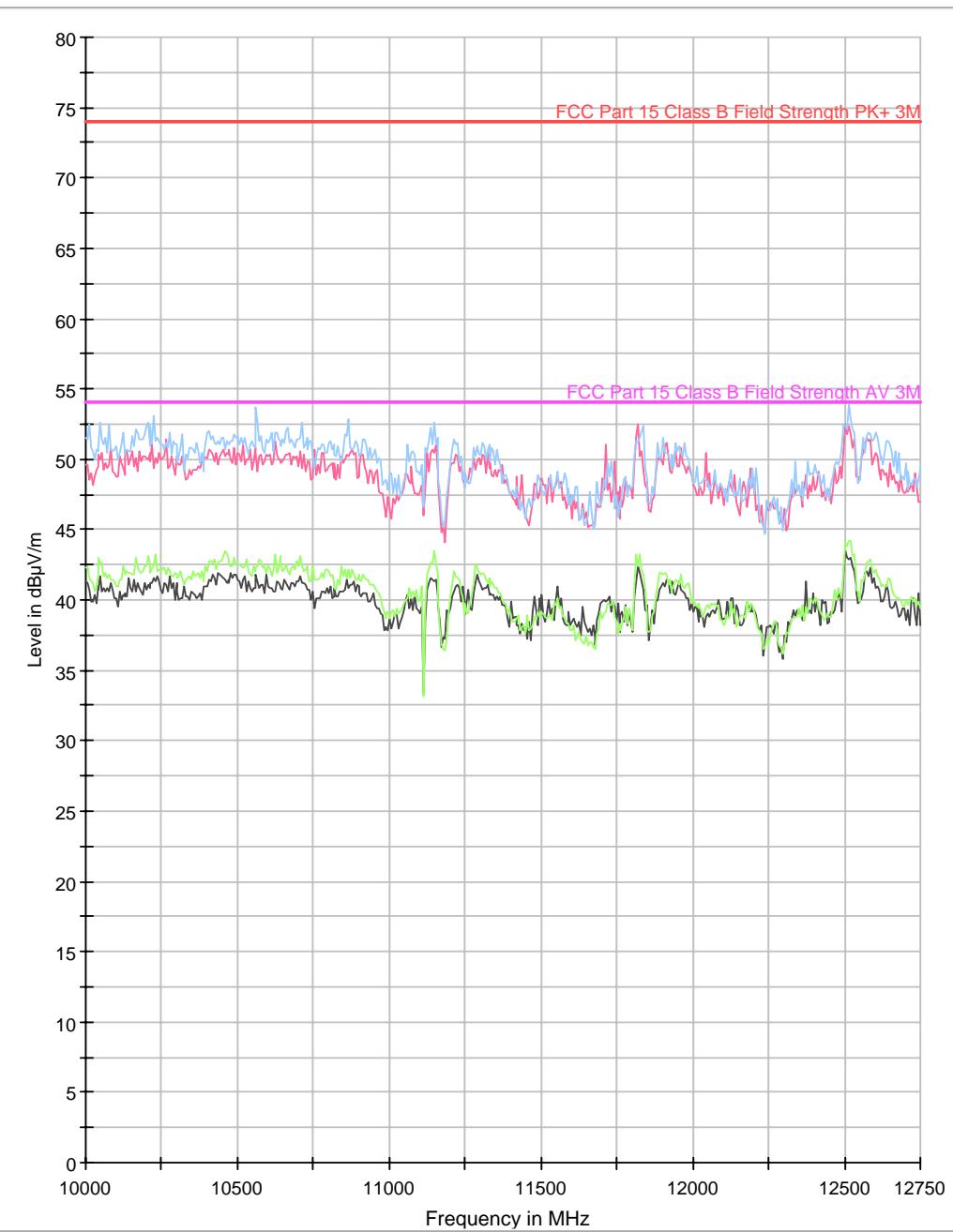


GPHV74085JD01\005
Radiated Emissions - Standalone
Pre-Scan (7000 MHz to 10000 MHz)



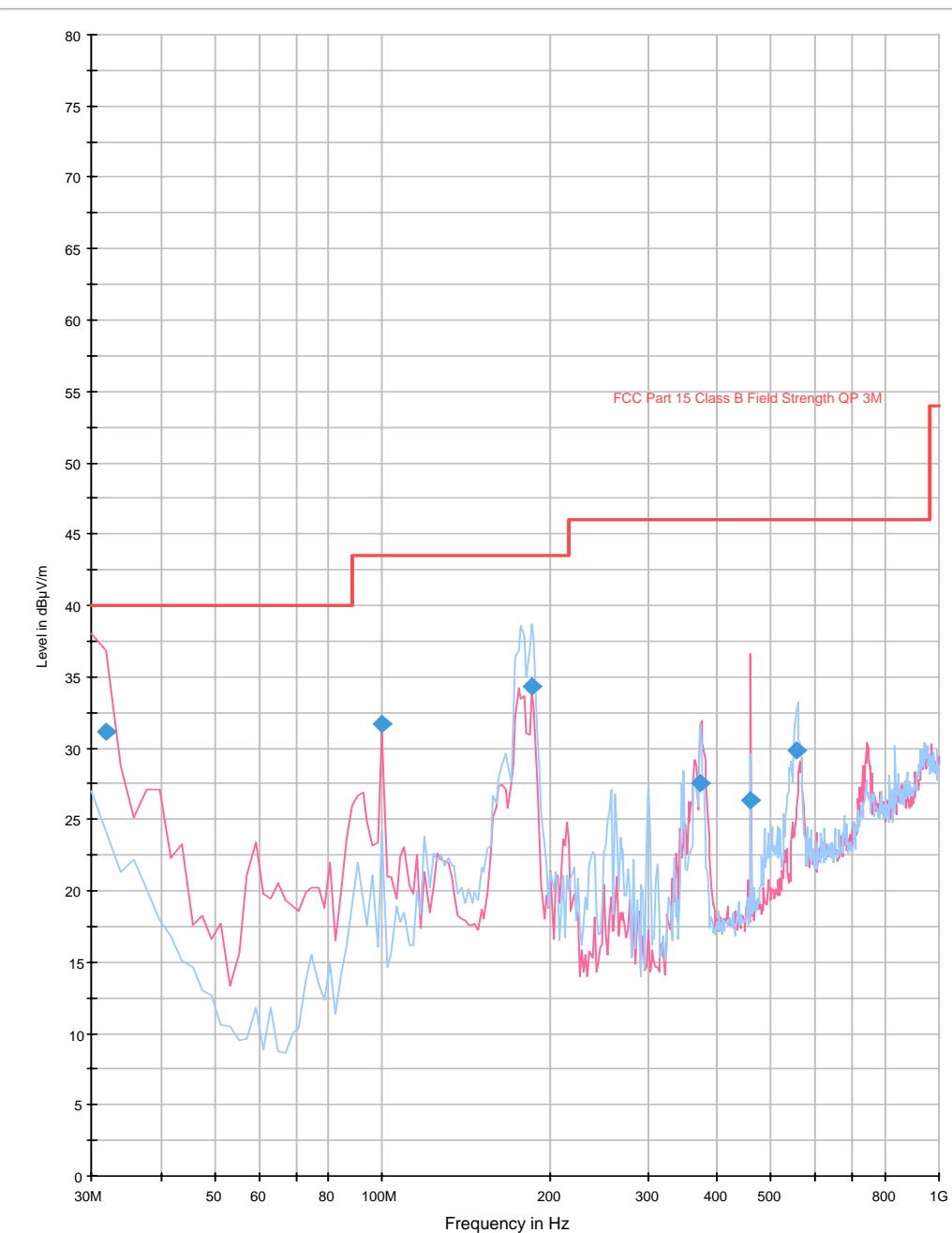
GPHV74085JD01\006
Radiated Emissions - Standalone
Pre-Scan (10000 MHz to 12750 MHz)

FCC Part 15.109 Radiated Emissions Class B 10-12.75GHz



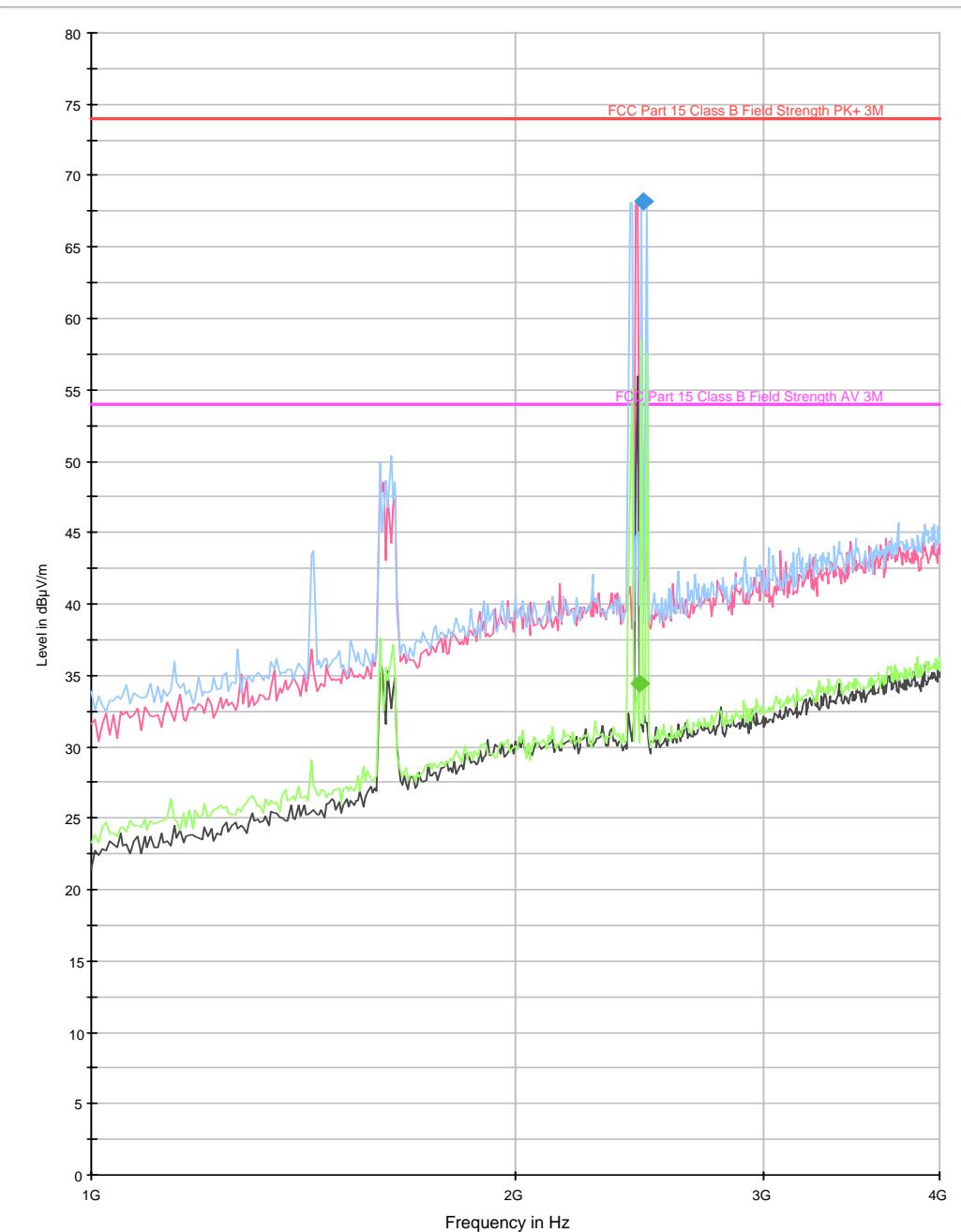
GPHV74085JD01\007
Radiated Emissions - Charging
Pre-Scan (30 MHz to 1000 Hz)

FCC Part 15.109 Radiated Emissions Class B 30MHz-1GHz



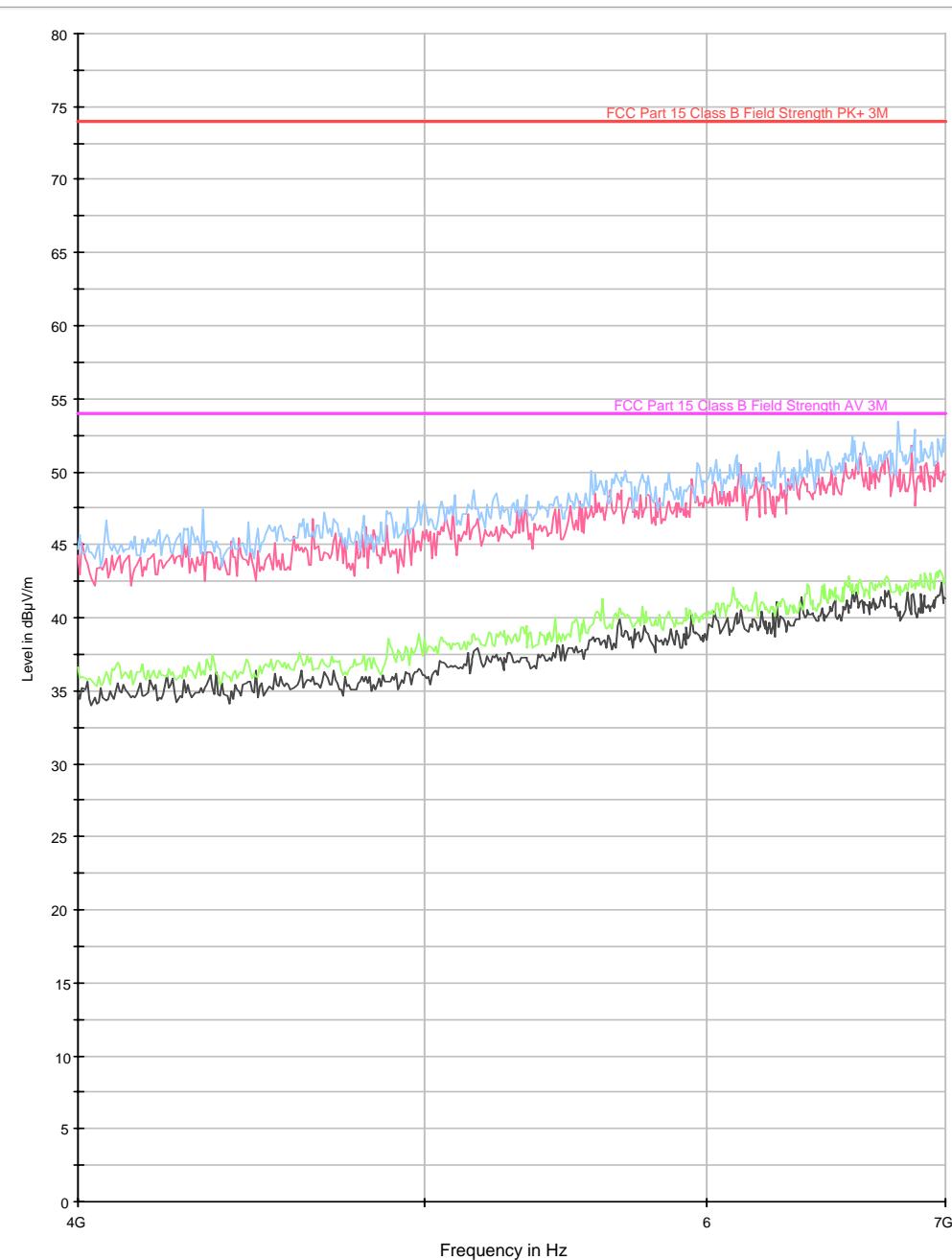
GPHV74085JD01\008
Radiated Emissions -Charging
Pre-Scan (1000 MHz to 4000 MHz)

FCC Part 15.109 Radiated Emissions Class B 1-4GHz



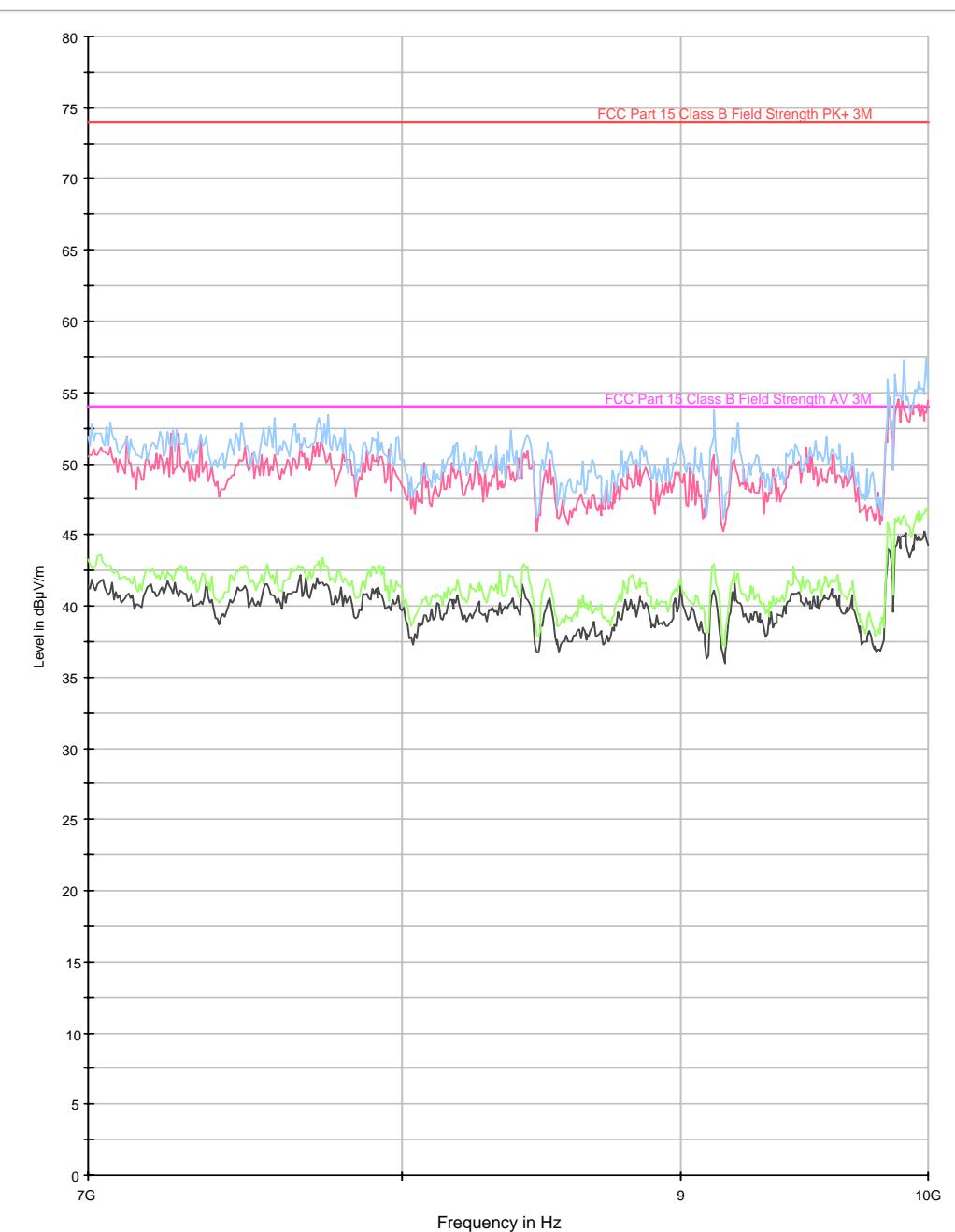
GPHV74085JD01\009
Radiated Emissions Charging
Pre-Scan (4000 MHz to 7000 MHz)

FCC Part 15.109 Radiated Emissions Class B 4-7GHz



GPHV74085JD01\010
Radiated Emissions Charging
Pre-Scan (7000 MHz to 10000 MHz)

FCC Part 15.109 Radiated Emissions Class B 7-10GHz



GPHV74085JD01\011
Radiated Emissions Charging
Pre-Scan (10000 MHz to 12750 MHz)

FCC Part 15.109 Radiated Emissions Class B 10-12.75GHz

