

TEST REPORT FROM RFI GLOBAL SERVICES LTD

Test of: Pro Tech Monitoring Inc, MTD (ISM 433 MHz)

Test Report Serial No: RFI-EMC-RP74737JD13A

This test report supersedes version 1.0 of RFI-EMC-RP74737JD13A

This test report is issued under the authority
of Scott D'Adamo, Group Service Manager:

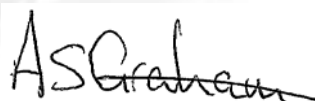


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Checked By:

Andy Graham

Signature:



Date of Issue:

02 October 2009

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1. CUSTOMER DETAILS

Company Name:	Pro Tech Monitoring inc.
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Address:	2549 Success Dr Odessa, Fl 33556
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2. SUMMARY OF TESTING

2.1. Test Specification

Reference:	47CFR15.107 and 47CFR15.109
Title:	Code of Federal Regulations Volume 47 (Telecommunications) 2008: Part 15 Subgroup C (Radio Frequency Devices) – Section 15.107 and Section 15.109

2.2. Summary of Test Results

Clause	Measurement Type	Applicability	Result
EMISSIONS			
15.107	Radiated Emissions (Enclosure)	Y	
15.109	Conducted Emissions (AC Mains Input/Output Ports)	Y	

Notes

1. Not applicable for the selected Test Standard.

KEY:  = Complied  = Did not comply

2.3. Location of Testing

All the measurements described in this report were performed at the premises of RFI Global Services Ltd, Unit 3 Horizon, Wade Road, Kingsland Business Park, Basingstoke, Hampshire RG24 8AH.

2.4. 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. Description of EUT

The equipment under test was a GSM, GPS and ISM tracking device designed for monitoring the location of prisoners. The EUT operated at a frequency of 433 MHz

The full system consisted of the tracking device (MTD) and a base unit. The base unit communicated with the MTD via an ISM band radio and then relayed the data via a landline to a data centre.

3.2. Identification of Equipment Under Test (EUT)

ID#	Description	Brand Name	Model No	Serial No	IMEI
E1	Miniature Tracking Device	Pro Tech	MTD-8000	33592709	011312001080353
E2	Base Unit	Pro Tech	MCS 1000	50354727	Not Applicable
E3	AC Adaptor for Cradle	CUI Inc	DSA-0151A-05	Not Stated	Not Applicable

3.3. Port Identification

Port	Description	Type
P1	Enclosure (MTD)	-
P2	Battery Charger Port	3-Pin
P3	Enclosure (Base Unit)	-
P4	DC Power Supply Socket	DC Barrel Jack Socket
P5	Phone Line Socket	US Phone Socket

3.4. Operating Modes

Mode Reference	Definition
Receive	The EUT was synchronised to a GSM test set in the PCS 1900 operating band, but not allocated a channel. The ISM radio was switched to receive mode during testing.

NOTE: The reason for choosing this operating mode was that it has been defined by the customer as being typical of normal use and likely to be a worst case with regards to EMC.

GSM Radio characteristics

GSM Bands supported (Tick as appropriate):	Rated Output Power (dBm)	Transmit Frequency range (MHz)	ARFCN	Transmit Frequency (MHz)	Receive Frequency range (MHz)	ARFCN	Receive Frequency (MHz)
✓ GSM 850	33	824 – 849	190	836.6	869 – 894	190	881.6
✓ GSM 900	33	880 -915	63	902.6	925 - 960	63	947.6
✓ DCS 1800	30	1710 – 1785	700	1747.8	1805 – 1880	700	1842.8
✓ PCS 1900	30	1850 – 1910	660	1879.8	1930 – 1990	660	1959.8

Supported Technologies e.g. Circuit Switched Voice/Data, Packet Switched Data GPRS/ EDGE	Circuit Switched Data/Voice
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3.5. Configuration and Peripherals

Description:	The MTD was tested whilst being synchronised with a GSM test set. The MTD was placed in its charging port on the base unit. The base unit was powered by an AC/DC adapter with 120V AC, 60Hz source.
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3.6. Modifications

NOTE: No modifications were made to the EUT during the course of testing.

3.7. Additional Information Related to Testing

Equipment Category:	GSM Mobile Station and Short Range Device (SRD)		
FCC ID:	NC3MTD3433		
ISM Equipment Group:	2		
Equipment Class:	B		
ISM operating frequency	433 MHz		
Type of Group 2 equipment	Radio Transceiver		
Intended Operating Environment:	Residential		
Cycle Time:	< s		
Power Supply Requirement(s):	3.7 VDC (Li-ion battery)		
Weight (Approx):	< 1 kg (MTD and base unit combined)		
Dimensions (Approx):	58 x 116 x 88 mm for MTD; 58 x 16 x 82 mm for Base Unit		
Antenna Type	Integral		
Echo Cancellation deactivated:	Not Applicable		
For products with audio capability, but not fitted with microphone or speakers, stated voltage levels at the output/input port:			
Audio Input Value (mV)	Not Applicable	Audio Output Value (mV)	Not Applicable

4. SUPPORT EQUIPMENT

4.1. Identification of Support Equipment

Description	Manufacturer	Model No	Serial No
Infra-red transceiver	ACTiSYS	ACT-IR220LN57	001851
Infra-red transceiver	ACTiSYS	ACT-IR220LN57	001248
Laptop (Dell Latitude D600)	Dell	PP05L	CN-0X2034-4863-3AG-5302

Note: The support equipment shown above was used only for setting up the EUT before testing.

4.2. Interconnecting Cables

Cable Type	Shielded	Length (m)	Ferrite	Connection 1	Connection 2
Multi-core	N	1.2	N	IR interface module	Laptop serial port
2xCORE	N	1.8	N	AC/DC Adapter	Base unit power pocket

5. MONITORING PERFORMANCE

5.1. Overview

Only emissions tests were performed during which the communication status between the EUT and the GSM test was monitored to ensure, the EUT was functioning as intended.

5.2. Monitoring EUT Performance During Testing

For the purposes of testing, the term “ <i>operate as intended</i> ” was defined as:	The EUT remained synchronised with the GSM test set whilst the ISM radio was set to receive mode.
For the purposes of testing, an “ <i>unintentional response</i> ” was defined as:	Not Applicable
Method used to determine whether user control functions and stored data were lost after the EMC exposure:	Not Applicable
Method used to verify that a communications link was established and maintained (if appropriate):	The status of the communication link was displayed on the GSM test set.
Method of assessment of level of performance or degradation of performance during and/or after EMC exposure:	Not Applicable

6. MEASUREMENT UNCERTAINTY

6.1. Overview

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 regarding the uncertainty of approximation.

The measurement uncertainty may need to be taken into account when interpreting the test results included within this test report.

6.2. Method of calculation

The methods used to calculate the uncertainties included within this test report 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 United Kingdom Accreditation Service (UKAS) is followed.

7. MEASUREMENTS, EXAMINATIONS AND DERIVED RESULTS

7.1. General Comments

7.1.1. This section contains the test result sheets for the measurements listed in Section 2.2.
Summary of Test Results (above).

7.1.2. The measurement uncertainties stated in the test result sheets were calculated in accordance with documented best practice and represent a confidence level of 95%. Please refer to Section 6.
Measurement Uncertainty on page 11 for details of our treatment of measurement uncertainty.

RADIATED EMISSIONS - TEST RESULTS

This test is covered by the scope of RFI's UKAS Accreditation under ISO/IEC 17025: 2005.

GENERAL INFORMATION

RFI JOB NUMBER:	74737JD13	TEST SITE ID:	Site 1
EUT:	MTD (ISM 433 MHz)	TEMPERATURE:	23 °C to 23.6 °C
TEST ENGINEER:	Eric Phiri	RELATIVE HUMIDITY:	27 % to 27 %
DATE OF TEST:	30 Mar 2009	ATMOSPHERIC PRESSURE:	1013mb to 1013 mb
FIELD TYPE:	Electric Field	MEASUREMENT DISTANCE:	3 Metres
UNCERTAINTY (±):	±4.68 dB	EQUIPMENT CLASS:	Class B
MEASUREMENT UNITS:	dBµV/m	TEST ENVIRONMENT:	Test Site

TEST SPECIFICATION DETAILS

The EUT has been configured and tested in accordance with the methods and procedures detailed within the following basic standard:

REFERENCE:	47CFR15.109
TITLE:	Code of Federal Regulations Volume 47 (Telecommunications) 2008: Part 15 Subpart C (Radio Frequency Devices) - Section 15.109

COMMENTS

None

DEVIATIONS FROM TEST SPECIFICATION

There were no deviations from the test configuration and measurement arrangements defined in the test specification (identified above).

EUT RELATED

OPERATING MODE:	Receive
FUNCTION(S) MONITORED:	The status of the communication link was monitored on the GSM test set.

MEASUREMENT RESULTS

No.	Frequency (MHz)	Polarity	Detector	Level (dBµV/m)	Limit (dBµV/m)	Margin (dB)	Graph No.	Result
1	32.057	Vertical	Quasi-Peak	25.6	40.0	14.4	001	Complied
2	43.753	Vertical	Quasi-Peak	19.7	40.0	20.3	001	Complied
3	96.022	Vertical	Quasi-Peak	17.9	43.5	25.6	001	Complied
4	309.633	Horizontal	Quasi-Peak	22.6	46.0	23.4	001	Complied
5	657.199	Horizontal	Quasi-Peak	28.0	46.0	18.0	001	Complied
6	933.314	Horizontal	Quasi-Peak	23.6	46.0	22.4	001	Complied
7	1000 to 4000	Refer to Note 1					002	Complied
8	4000 to 7000	Refer to Note 1					003	Complied
9	9901.523	Horizontal	Average (CISPR)	45.3	54.0	8.7	004	Complied
10	11815.311	Horizontal	Average (CISPR)	45.9	54.0	8.1	005	Complied
11	12496.553	Horizontal	Average (CISPR)	46.2	54.0	7.8	005	Complied

NOTES

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

TEST EQUIPMENT USED

RFI ID	INSTRUMENT DESCRIPTION	MODEL NUMBER	CALIBRATION DUE	INTERVAL
K0001	Site Reference 4420	N/A	13 Aug 2009	12
M1379	Test Receiver	ESIB7	14 Aug 2009	12
C1116	UtiFlex	ufa 210A-1-0360-50x50	20 Apr 2009	12
A1516	Universal Radio Communications Tester	CMU200	Calibration not required	N/A
C1305	3m Cable	FA210A1030005050	04 Aug 2009	12
A1792	Pre Amplifier	PAM-0118	28 Nov 2009	12
C1306	15m Cable	FA210A0015005050	01 Aug 2009	12
C1303	8m Cable	FA210A1080005050	01 Aug 2009	12
A259	Antenna	CBL6111	25 Jul 2009	12
A1817	Antenna	3115	25 Oct 2009	12
C1016	Cable	None	20 Apr 2009	12
C1305	3m Cable	FA210A1030005050	04 Aug 2009	12
C1160	Cable	FA210A1050005050	20 Apr 2009	12

CONDUCTED EMISSIONS - TEST RESULTS

This test is not covered by the scope of RFI's UKAS Accreditation under ISO/IEC 17025: 2005.

GENERAL INFORMATION

RFI JOB NUMBER:	74737JD13	TEST SITE ID:	Site 1
EUT:	MTD (ISM 433 MHz)	TEMPERATURE:	22 °C to 22.1 °C
TEST ENGINEER:	Andrew Broad	RELATIVE HUMIDITY:	27 % to 28 %
DATE OF TEST:	26 Mar 2009	ATMOSPHERIC PRESSURE:	1013 mb to 1013 mb
UNCERTAINTY (±):	±3.99 dB	EQUIPMENT CLASS:	Class B
CATEGORY:	Not applicable	MEASUREMENT METHOD:	LISN (AC)

TEST SPECIFICATION DETAILS

The EUT has been configured and tested in accordance with the methods and procedures detailed within the following basic standard:

REFERENCE:	47CFR15.107
TITLE:	Code of Federal Regulations Volume 47 (Telecommunications) 2008: Part 15 Subpart C (Radio Frequency devices) - Section 15.107

COMMENTS

No comments were noted by the engineer at the time of the test.

DEVIATIONS FROM TEST SPECIFICATION

There were no deviations from the test configuration and measurement arrangements defined in the test specification (identified above).

EUT RELATED

OPERATING MODE:	Receive
FUNCTION(S) MONITORED:	The status of the communication link was monitored on the GSM test set

MEASUREMENT RESULTS

No.	Frequency (MHz)	Line	Detector	Level (dBμV)	Limit (dBμV)	Margin (dB)	Graph No.	Result
1	0.267	Live	Quasi-Peak	50.1	61.2	11.1	006	Complied
2	0.402	Live	Quasi-Peak	47.2	57.8	10.6	006	Complied
3	0.537	Live	Quasi-Peak	43.0	56.0	13.0	006	Complied
4	0.798	Live	Quasi-Peak	44.2	56.0	11.8	006	Complied
5	0.933	Live	Quasi-Peak	44.8	56.0	11.2	006	Complied
6	1.068	Live	Quasi-Peak	41.8	56.0	14.2	006	Complied
7	2.076	Live	Quasi-Peak	45.8	56.0	10.2	006	Complied
8	2.184	Live	Quasi-Peak	43.3	56.0	12.7	006	Complied
9	2.378	Live	Quasi-Peak	42.6	56.0	13.4	006	Complied
10	2.468	Live	Quasi-Peak	39.2	56.0	16.8	006	Complied
11	0.267	Live	Average (CISPR)	49.5	51.2	1.7	006	Complied*

MEASUREMENT RESULTS

No.	Frequency (MHz)	Line	Detector	Level (dBμV)	Limit (dBμV)	Margin (dB)	Graph No.	Result
12	0.402	Live	Average (CISPR)	42.0	47.8	5.8	006	Complied
13	0.533	Live	Average (CISPR)	41.5	46.0	4.5	006	Complied
14	0.663	Live	Average (CISPR)	33.2	46.0	12.8	006	Complied
15	0.798	Live	Average (CISPR)	38.1	46.0	7.9	006	Complied
16	0.933	Live	Average (CISPR)	40.6	46.0	5.4	006	Complied
17	1.064	Live	Average (CISPR)	38.0	46.0	8.0	006	Complied
18	1.208	Live	Average (CISPR)	23.8	46.0	22.2	006	Complied
19	1.460	Live	Average (CISPR)	29.2	46.0	16.8	006	Complied
20	1.599	Live	Average (CISPR)	31.2	46.0	14.8	006	Complied

NOTES

N/A During measurement the engineer did not record any specific notes relevant to report.

TEST EQUIPMENT USED

RFI ID	INSTRUMENT DESCRIPTION	MODEL NUMBER	CALIBRATION DUE	INTERVAL
K0001	Site Reference 4420	N/A	13 Aug 2009	12
M1391	Thermometer/Hygrometer	BAR629HGU	18 Jun 2009	12
A1829	Pulse Limiter	ESH3-Z2	28 Nov 2009	12
A067	Line Impedance Stabilization Network	ESH3-Z5	19 May 2009	12
C1262	Cable	FA210A0075008080	20 Apr 2009	12
C1304	3m Cable	FA210A1030005050	04 Aug 2009	12
M1379	Test Receiver	ESIB7	14 Aug 2009	12

8. PHOTOGRAPHS OF EUT

This section contains the following photographs:

Photo Reference Number	Title
PHT\74737JD13\001	Test Configuration Photograph Radiated Emissions
PHT\74737JD13\002	Test Configuration Photograph Conducted Emissions

PHT\74737JD13\001 - Test Configuration Photograph Radiated Emissions



PHT\74737JD13\002 - Test configuration Photograph Conducted Emissions



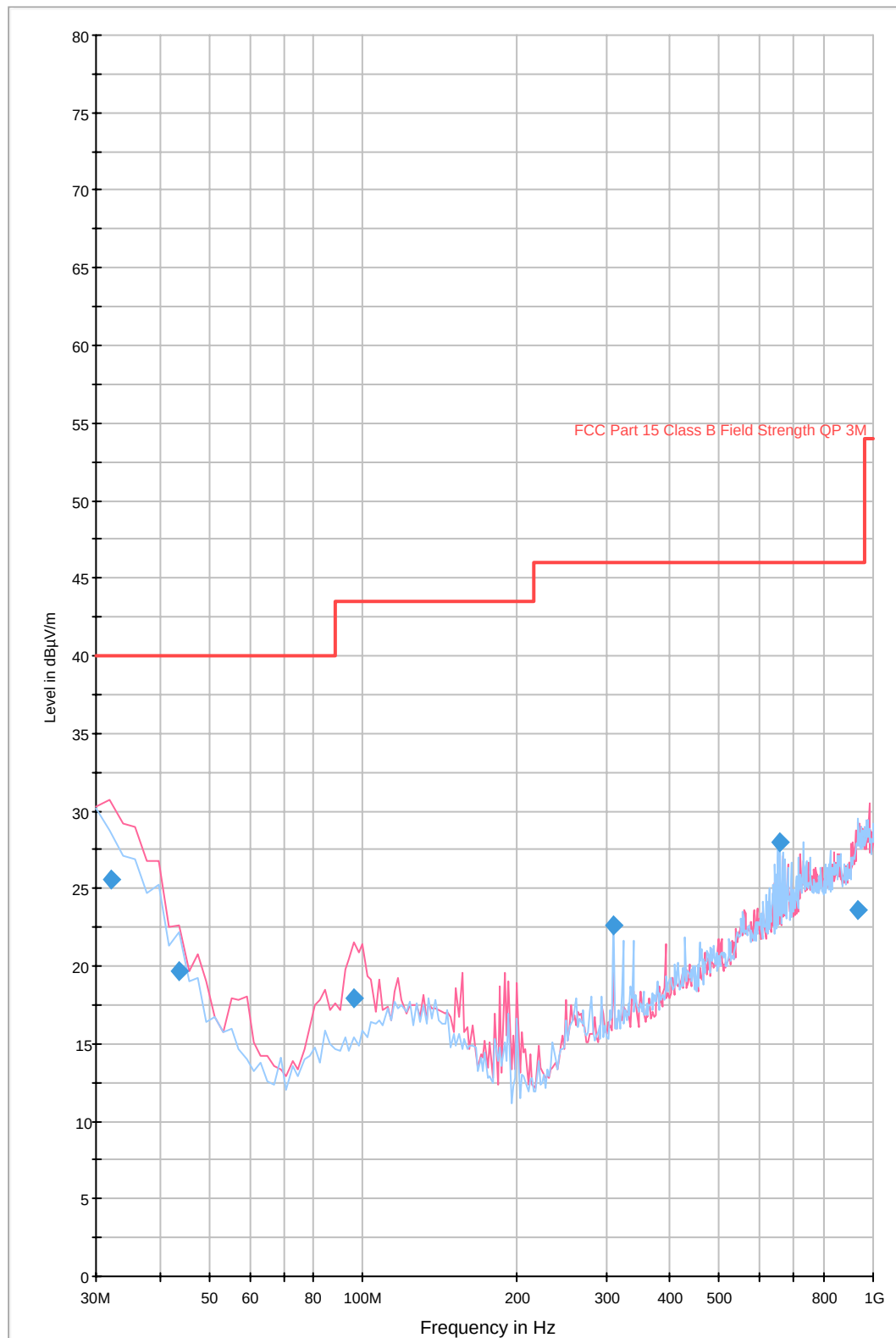
9. GRAPHICAL TEST RESULTS

9.1. This section contains the graphical results for the measurements listed in Section 2.2. *Summary of Test Results* (above).

Graph Number	Title
GPH\74737JD13\001 to 005	Radiated Emissions Pre-Scan (30 MHz to 12750 MHz)
GPH\74737JD13\006	Conducted Emissions Pre-Scan (0.15 MHz to 30 MHz)

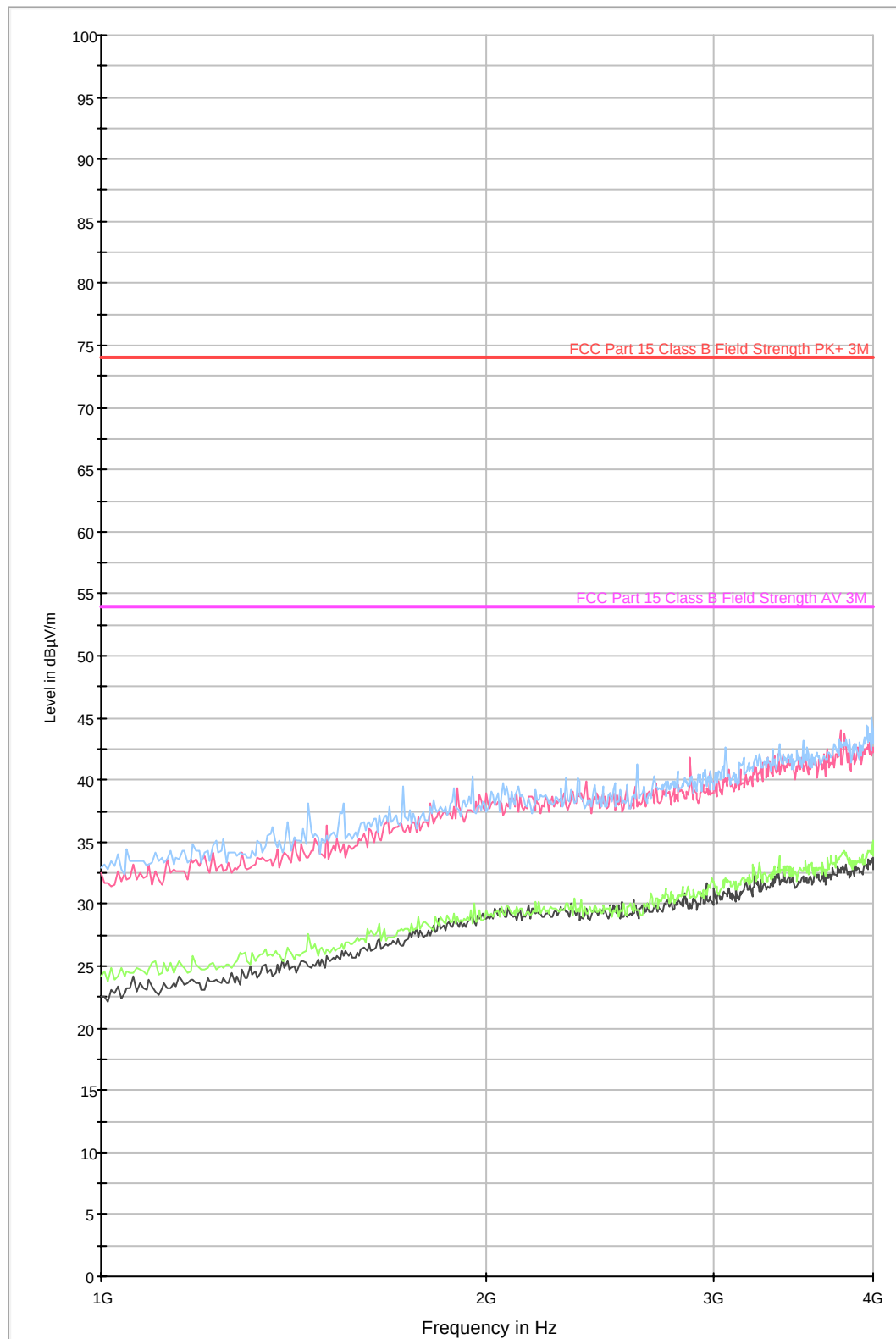
GPH\74737JD13\001

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



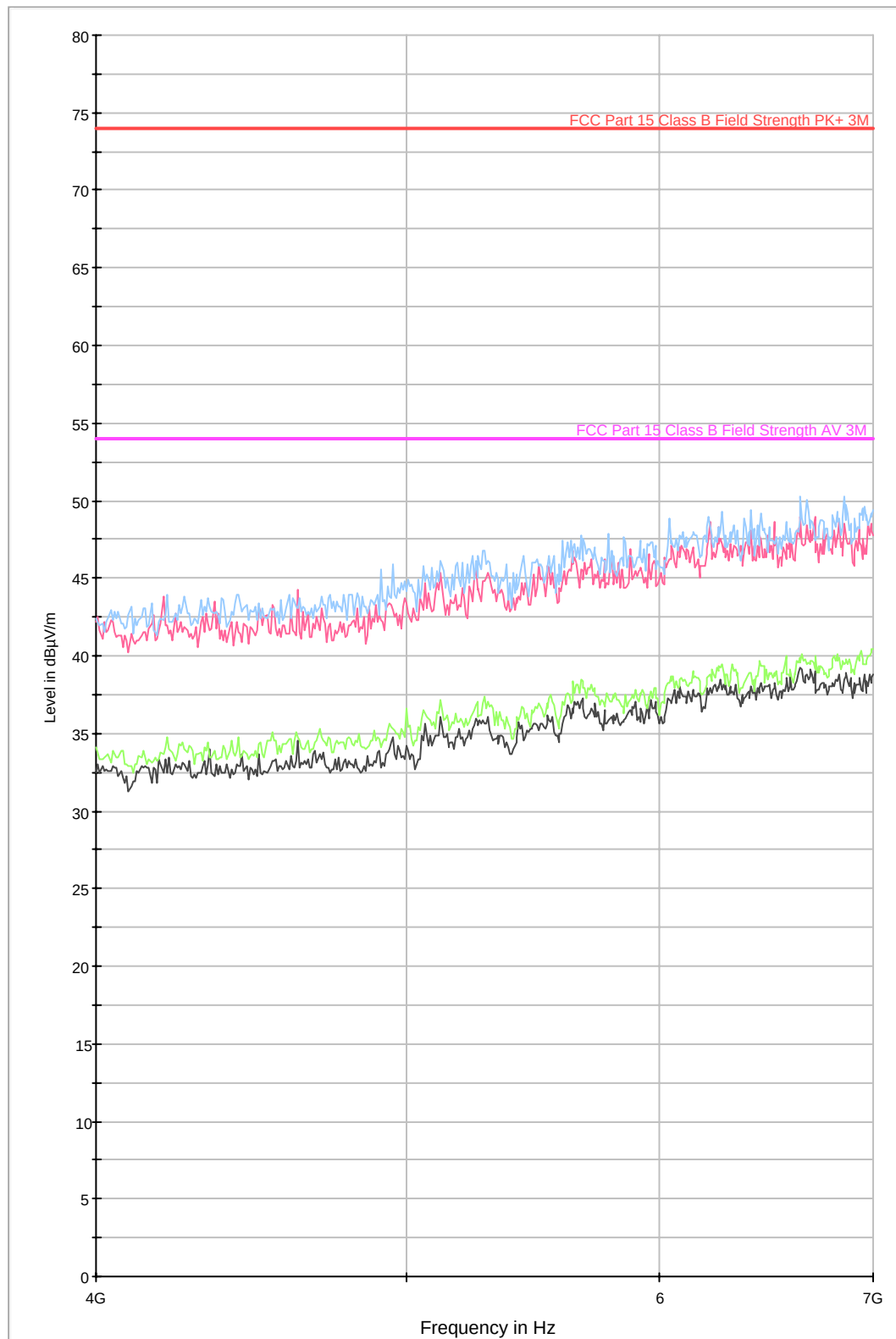
GPH\74737JD13\002

FCC Part 15.109 Radiated Emissions Class B 1-4GHz



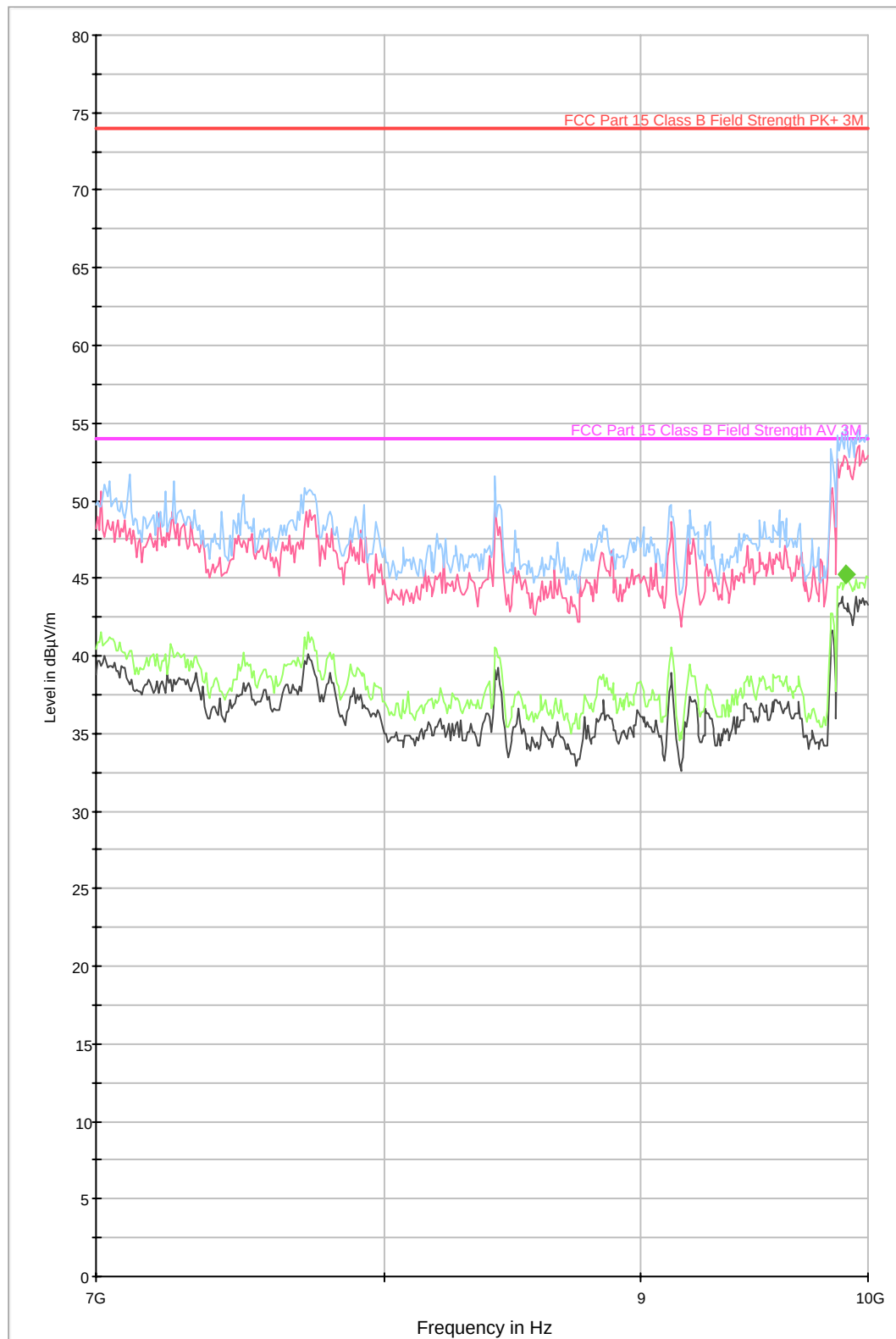
GPH\74737JD13\003

FCC Part 15.109 Radiated Emissions Class B 4-7GHz



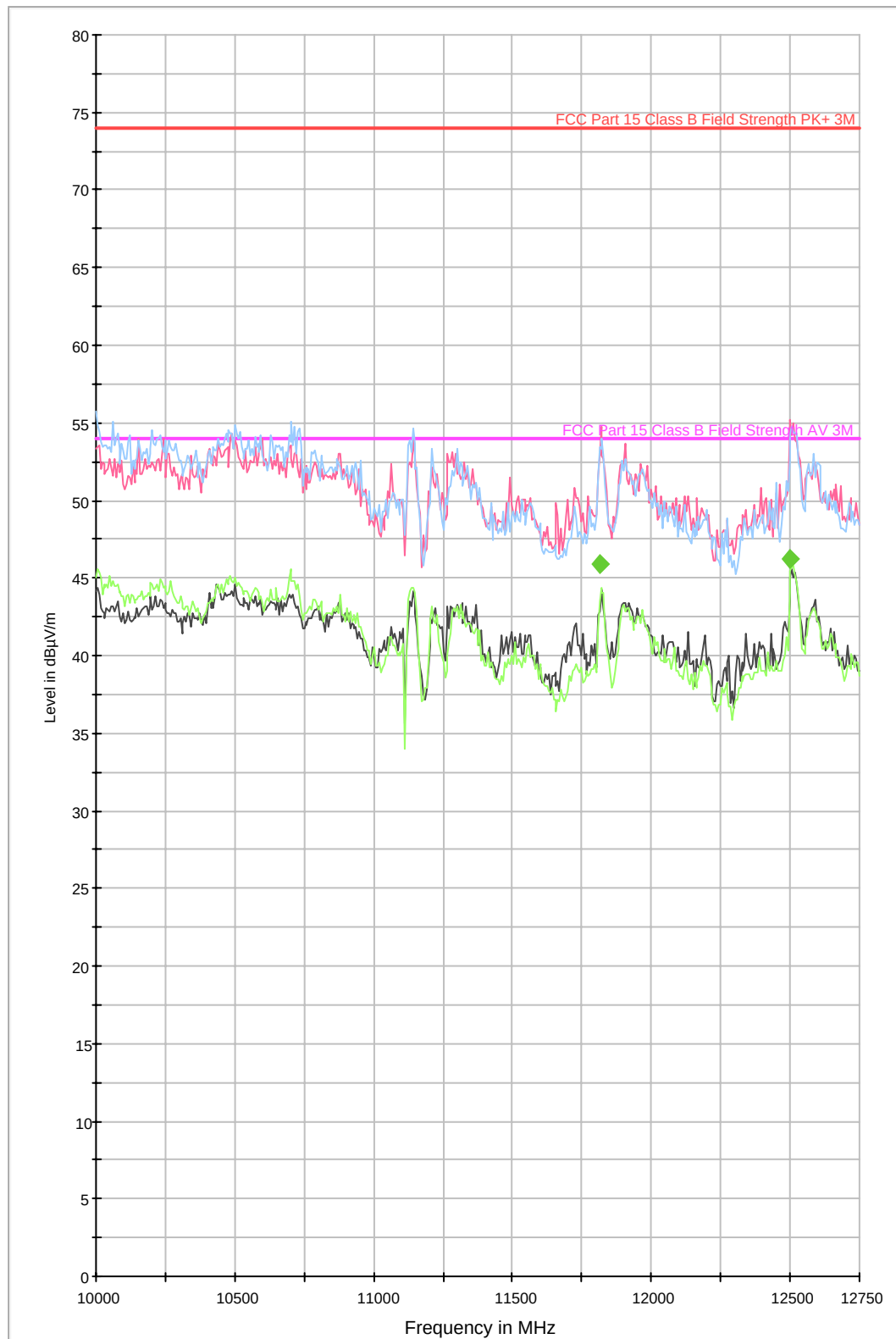
GPH\74737JD13\004

FCC Part 15.109 Radiated Emissions Class B 7-10GHz



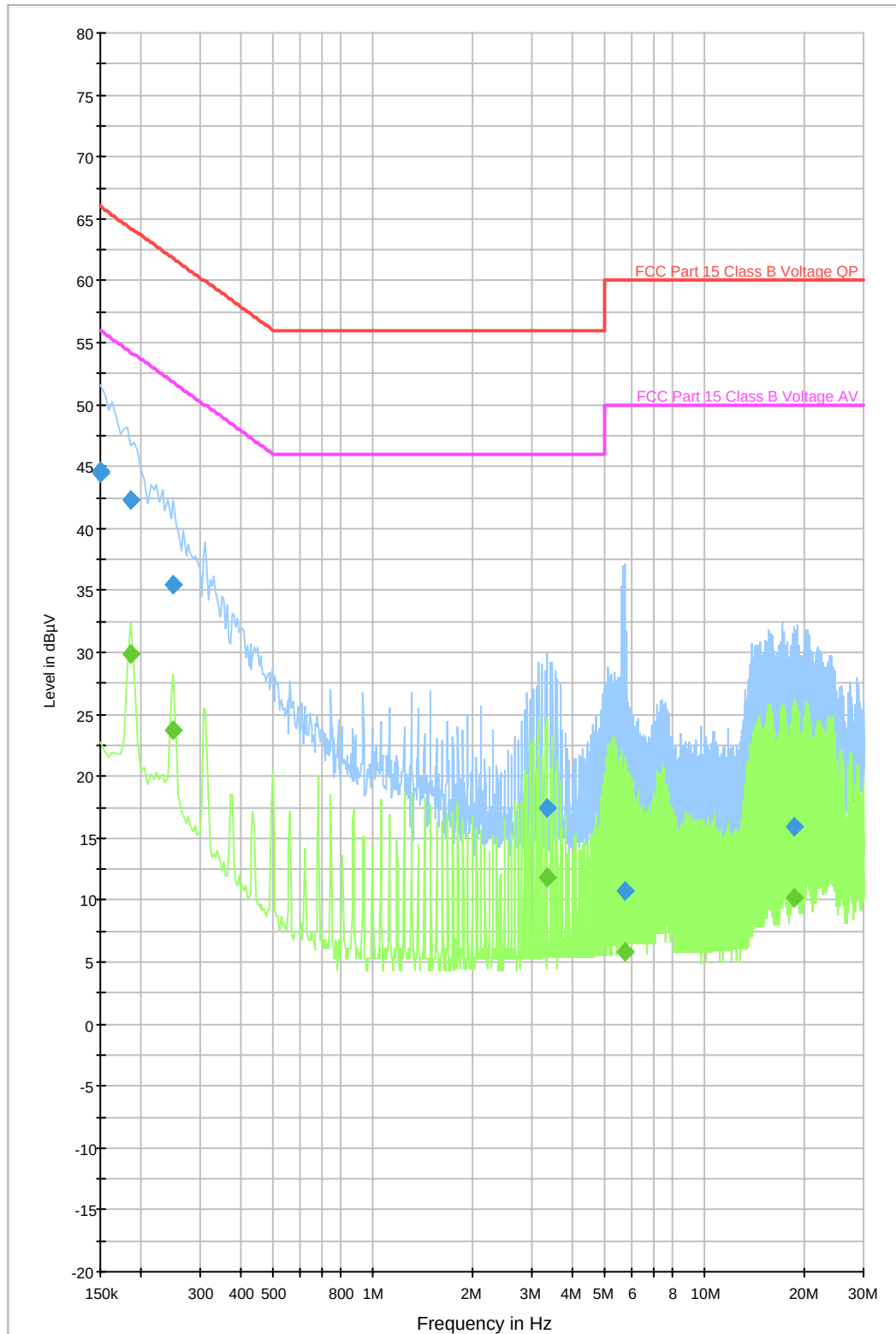
GPH\74737JD13\005

FCC Part 15.109 Radiated Emissions Class B 10-12.75GHz



GPH\74737JD13\006

FCC Part 15.107 Conducted Emissions Class B



10. TEST CONFIGURATION DRAWING

10.1. This section contains the Test Configuration Drawings for the measurements listed in Section 7: Measurements, Examinations and Derived Results.

Test Configuration Reference Number	Title
DRG\74737JD13\001	Schematic diagram of the EUT, support equipment and interconnecting cables used for the test

DRG\74737JD13\001 - Schematic diagram of the EUT, support equipment and interconnecting cables used for the test