

**TEST REPORT**  
of the accredited test laboratory

TÜV Nr.:M/FG-02/113

**Applicant:** TÜV Rheinland Product Safety GmbH  
Am Grauen Stein  
D-51105 Köln

**Tested Product:** Hand held Computer

**Type:** Dolphin 7300

**Manufacturer:** Hand Held Products Inc.  
Skaneateles Falls, NY 13153-0187; 4619 Jordan Road

**Output power** 0,1 W      **power supply:** 3,6 VDC  
**nom.**

**Frequency range:** 2412 – 2462      **Channel separation:** 5 MHz  
MHz

**Standard:** FCC: 47 CFR 15.247

Geschäftsbereich  
Medizintechnik,  
Nachrichtentechnik  
und EMV

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Nachrichtentechnik  
und EMV

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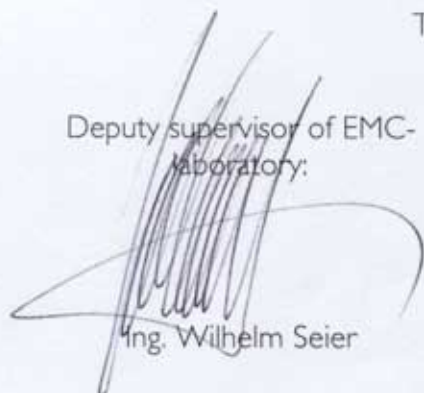
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Notified Body 0408

TÜV Österreich  
Test laboratory for EMC

Deputy supervisor of EMC-  
laboratory:

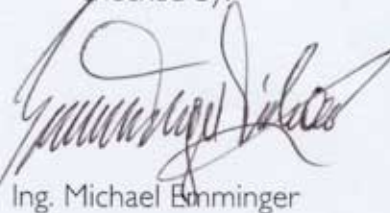
  
Ing. Wilhelm Seier



10. 9. 2002

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checked by:

  
Ing. Michael Emminger

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The results of this test report only refer to the provided equipment.

## LIST OF MEASUREMENTS

The complete list of measurements called for in 47 CFR 15.247 is given below.

| SUBCLAUSE     | PARAMETER TO BE MEASURED                                             | PAGE                         |
|---------------|----------------------------------------------------------------------|------------------------------|
|               | <b>Intentional Radiators</b>                                         |                              |
|               | Test object data                                                     | 3                            |
| 15.247 (b)    | Output power                                                         | 4                            |
| 15.247 (a)(2) | 6 dB Bandwidth                                                       | 5                            |
| 15.247 (d)    | Power density                                                        | 6                            |
| 15.247 (c)    | Out-of-band Antenna Conducted Emission                               | 7                            |
| 15.247 (c)    | Out-of-band Radiated Emission (except emissions in restricted bands) | 8                            |
| 15.35 (b)(c)  | Radiated Emission in Restricted bands                                | 9                            |
| 15.207        | AC Line-conducted Emission                                           | 10                           |
| 15.109        | Radiated Emission from digital part                                  | 11                           |
| 15.109        | Radiated Emission from Receiver L.O.                                 | 12                           |
| 15.247(c)     | Processing Gain                                                      | See exhibit „Procesing gain“ |
| 2.1091        | RF exposure requirement                                              | See exhibit „RF exposure“    |
| 15.203        | Antenna requirement                                                  | passed                       |

## TEST OBJECT DATA

### General EUT Description

The HHP Dolphin 7300 is a handheld Computer which has an integrated barcodescanner and transmits decoded barcodes through a WLAN Compact Flash Card module produced by Intel to a server. The module already has FCC Certification, some parts of the tests were not done because HHP has no influence on these parameters inside the module and the test results were so copied from the original test report which is attached to this report. The transmitter conducted RF output power was measured to verify the test results.

### Overview of WLAN Compact Flash Card

|                       |                                 |
|-----------------------|---------------------------------|
| FCC Identifier        | PD9WCF2011BE                    |
| Use of Product        | Wireless LAN communications     |
| Type of transmission  | Direct Sequence Spread Spectrum |
| Rated RF Output power | 89 mW, 19,5 dBm                 |
| Frequency range       | 2412 - 2462 MHz                 |
| Number of Channels    | 11                              |

### Overview of the HHP Dolphin 7300

|                                                                   |                |
|-------------------------------------------------------------------|----------------|
| FCC Identifier                                                    | HD5-7300-2011B |
| Compact Flash Card used with other antenna than in original grant |                |

### Mode of operation during the test:

The HHP Dolphin 7300 was in a test mode scanning about 5 to 10 times a second and transmits every scanned barcode.

Test site used: For the radiated measurements the anechoic chamber located at TÜV Österreich was used.

Conducted output power at antenna terminals

§ 15.247(b)

#### Requirements

For antennae with gains of 6 dBi or less, maximum allowed transmitter output is 1 watt (+30 dBm). For antennae with gains greater than 6 dBi, transmitter output level must be decreased by an amount equal to (GAIN -6) dBm.

Test results (taken from original report and verified at TÜV Österreich)

| Frequency (MHz) | Output (dBm) | Output (mW) |
|-----------------|--------------|-------------|
| 2412            | 17,6         | 58          |
| 2437            | 19,5         | 89          |
| 2462            | 19,1         | 81          |

6 dB RF Bandwidth

§ 15.247(a)(2)

#### Requirements

The minimum 6 dB bandwidth shall be at least 500 kHz

Test results (taken from original report)

| Frequency (MHz) | 6 dB Bandwidth |
|-----------------|----------------|
| 2412            | 9,44 MHz       |
| 2437            | 9,62 MHz       |
| 2462            | 9,60 MHz       |

Power density

§ 15.247(d)

#### Requirements

The peak power spectral density shall not be greater than 8 dBm in any 3 kHz band during any time interval of continuous transmission.

Test result (taken from original report)

| Frequency (MHz) | Power Density (dBm) |
|-----------------|---------------------|
| 2463            | -8,7                |

Frequency Span      600 kHz

Sweep time       $\text{Frequency Span} / 3\text{kHz} = 200 \text{ seconds}$

Out-of-band Conducted Emissions

§ 15.247(c)

Requirements

In any 100 kHz bandwidth outside the EUT passband, the RF power shall be at least 20 dB below that of the maximum in-band 100 kHz emission.

Test result: Refer to the plots in the original report.

## Out-of-band Radiated Emissions

§ 15.247(c)

### Requirements

In any 100 kHz bandwidth outside the EUT passband, the RF power shall be at least 20 dB below that of the maximum in-band 100 kHz emission.

### Result:

See measurement diagrams 1 to 4 for the frequency range 9 kHz to 3 GHz.

### Results above 3 GHz:

| CH 1 ( 2412 MHz) |                        | CH 11 ( 2462 MHz) |                        |
|------------------|------------------------|-------------------|------------------------|
| Frequency        | Level PK @ 3m distance | Frequency         | Level PK @ 3m distance |
| 4,824            | 40,42                  | 4,924             | 40,27                  |
| 7,326            | 37,48                  | 7,386             | 39,49                  |
| 9,648            | 41,07                  | 9,848             | 44,64                  |
| 12,060           | 43,14                  | 12,310            | 45,92                  |
| 14,472           | 46,27                  | 14,772            | 48,80                  |
| 16,884           | 49,01                  | 17,234            | 50,27                  |
| 19,296           | 50,93                  | 19,696            | 51,14                  |
| 21,708           | 51,47                  | 22,158            | 52,47                  |
| 24,120           | 52,26                  | 24,620            | 53,47                  |

Results summary: All measured peak values are below 15.209 limit outside of restricted bands.

Transmitter Radiated Emissions in Restricted bands      § 15.247(c)  
                                                                                         § 15.205  
                                                                                         § 15.209  
                                                                                         § 15.35

#### Requirements

In restricted bands the 15.209 limit must be kept.

#### Results

The measurement results in diagrams 5 and 6 are measured with Dolphin 7300 operating on channel 1 and 11 respectively. All measurements were made with peak detector. Measured like this all emissions keep the 15.209 limit + 20dB. The average value lies far below the peak value because the TX on time is very short, lower than 1 millisecond. Measured with an averaging time of 100ms the average value lies about 40dB below the peak value and is so far below 15.209 limit.

Test Report Reference:  
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Ambient temperature: 22°C

Relative humidity: 58%

AC Line Conducted Emission

§ 15.207

Test result see in the attached original test report.

Radiated Emissions from Digital Section of Transceiver (Transmitter) § 15.109

The transmitter cannot be operated without the digital section, so we measured both during measurements described on pages 8 and 9 of this report.

Radiated Emissions from Receiver Section of Transceiver (L.O. Radiation) § 15.109  
§ 15.111

Not required - EUT operation above 960 MHz only.

# Appendix 1

## Test equipment used

| Used or not                         | Measuring device                       | Internal number | Last calibration | Calibration interval (in years) |
|-------------------------------------|----------------------------------------|-----------------|------------------|---------------------------------|
| <input checked="" type="checkbox"/> | Anechoic Chamber with 3m               | NT-100          | 28.11.2001       | 1                               |
| <input checked="" type="checkbox"/> | MA 240 - Antenna mast                  | NT-110          | xxx              | xxx                             |
| <input checked="" type="checkbox"/> | DS 412 - Turntable 0 - 400 ° Azimuth   | NT-111          | xxx              | xxx                             |
| <input checked="" type="checkbox"/> | HD 100 Controller Mast+Turntable       | NT-112          | xxx              | xxx                             |
| <input checked="" type="checkbox"/> | HFH-Z2 - Loop Antenna                  | NT-122          | 25.04.2001       | 3                               |
| <input checked="" type="checkbox"/> | 3115 - Horn Antenna 1-18 GHz           | NT-125          | 24.04.2001       | 3                               |
| <input checked="" type="checkbox"/> | HK-116 - bicon. Ant. 20 MHz - 300 MHz  | NT-129          | 25.04.2001       | 3                               |
| <input checked="" type="checkbox"/> | 3146 - Log. Per. Ant. 200 - 1000MHz    | NT-131          | 25.04.2001       | 3                               |
| <input type="checkbox"/>            | Log. per. Antenna 800 MHz - 2500       | NT-134          | 17.12.2001       | 3                               |
| <input checked="" type="checkbox"/> | HZ-1 Antenna tripod                    | NT-150          | xxx              | xxx                             |
| <input type="checkbox"/>            | BN 1500 Antenna tripod                 | NT-151          | xxx              | xxx                             |
| <input checked="" type="checkbox"/> | ES126 - Test receiver 20 Hz - 26,5 GHz | NT-207          | 28.05.2001       | 2                               |
| <input type="checkbox"/>            | ESH2-Z5 Artificial mains network       | NT-300          | 18.02.2002       | 3                               |
| <input type="checkbox"/>            | ESH3-Z5 Artificial mains network       | NT-301          | 18.02.2002       | 3                               |
| <input type="checkbox"/>            | ESH3-Z6 Artificial mains network       | NT-302          | 18.02.2002       | 3                               |
| <input type="checkbox"/>            | PHE 4500/B Power amplifier             | NT-304          | xxx              | xxx                             |
| <input type="checkbox"/>            | PHE 4500 - Mains impedance network     | NT-401          | 18.07.2001       | 3                               |
| <input type="checkbox"/>            | ESH3-Z2 - Pulse limiter                | NT-441          | 11.01.2002       | 1                               |
| <input checked="" type="checkbox"/> | PC P450 - Test computer                | NT-500          | xxx              | xxx                             |
| <input checked="" type="checkbox"/> | ES-K1 Test software                    | NT-520          | xxx              | xxx                             |
| <input checked="" type="checkbox"/> | Test cables                            | NT-550          | xxx              | xxx                             |
| <input type="checkbox"/>            | Test cable #3 for conducted            | NT-554          | 11.01.2002       | 1                               |

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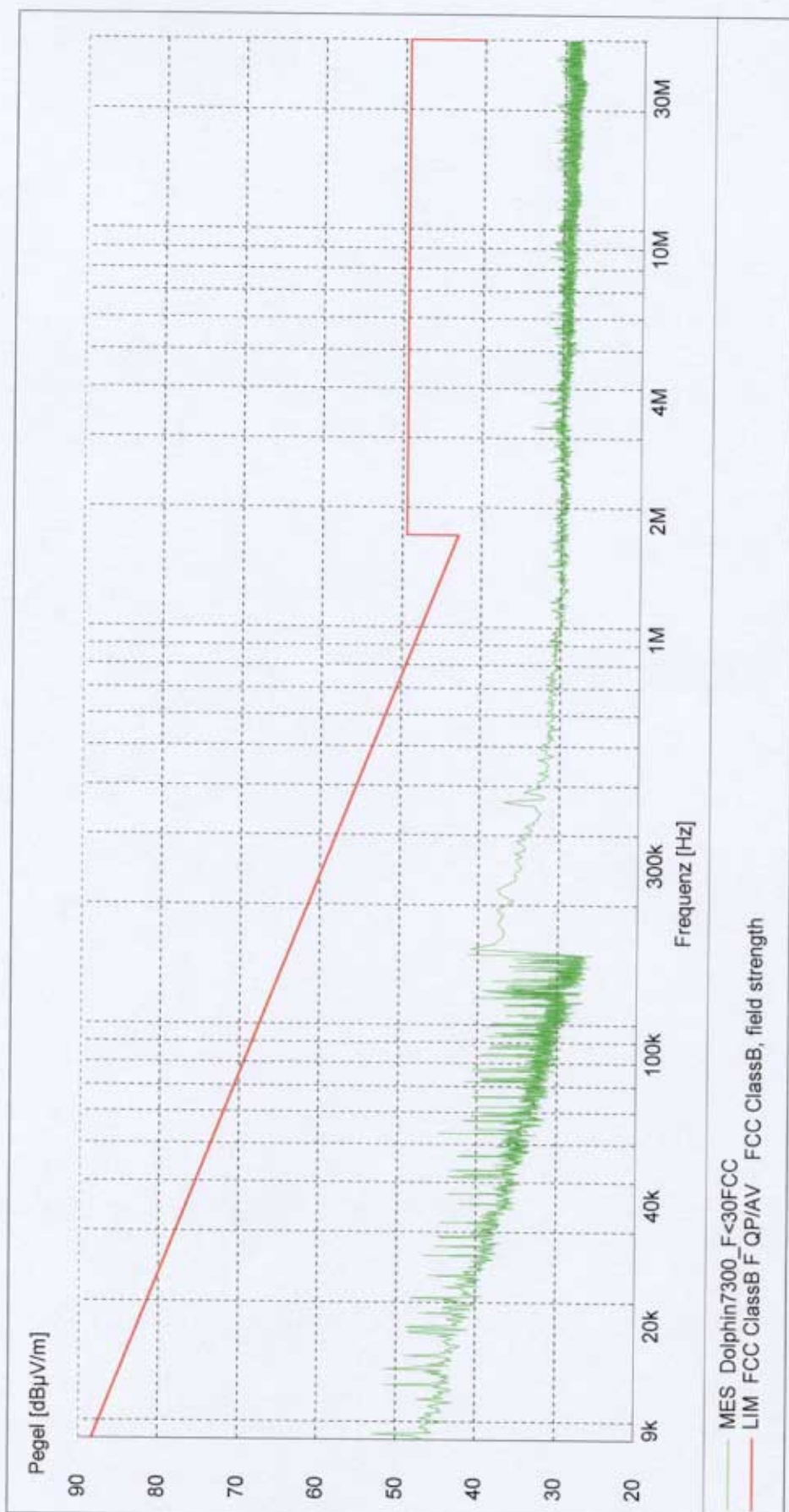
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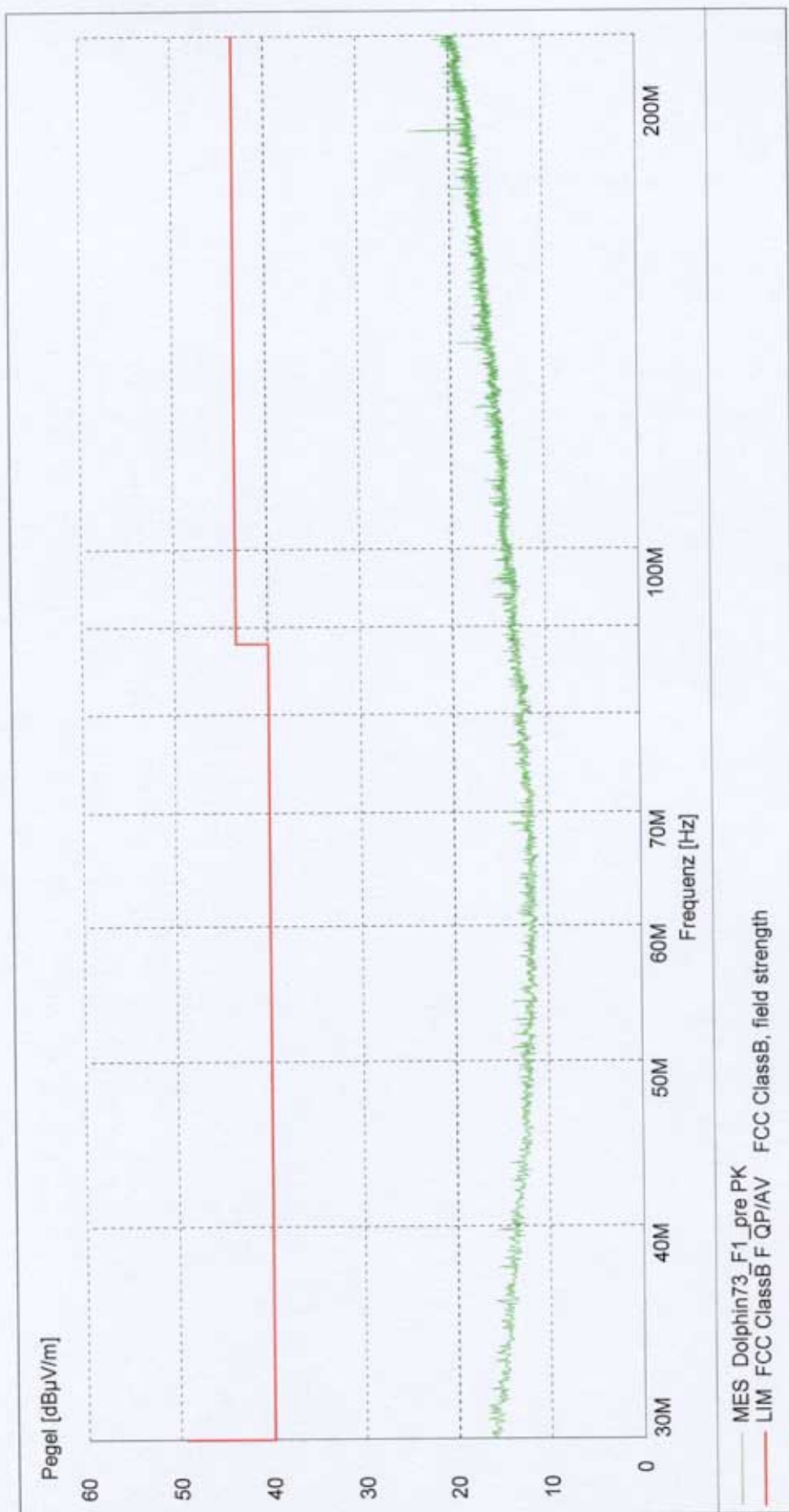
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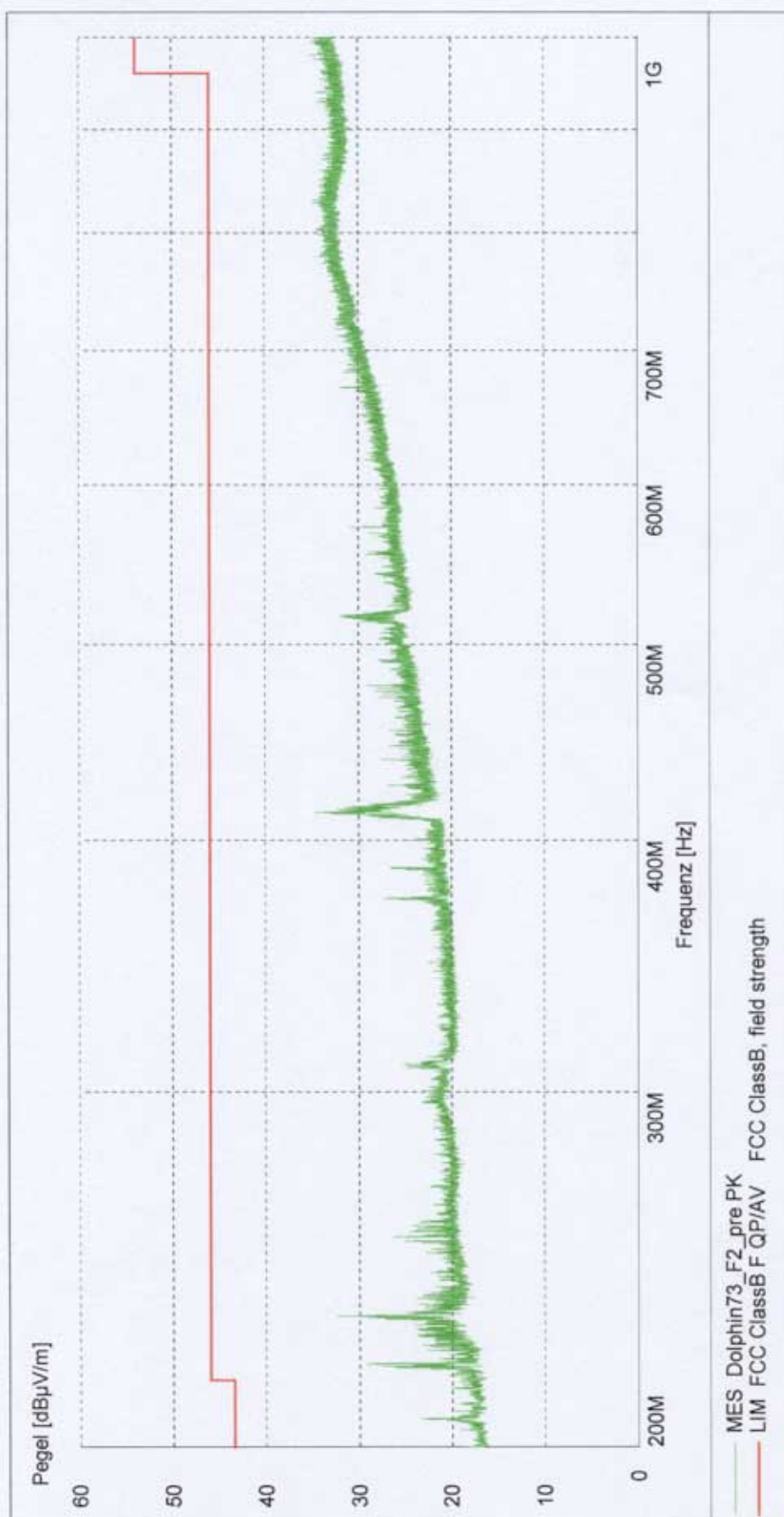
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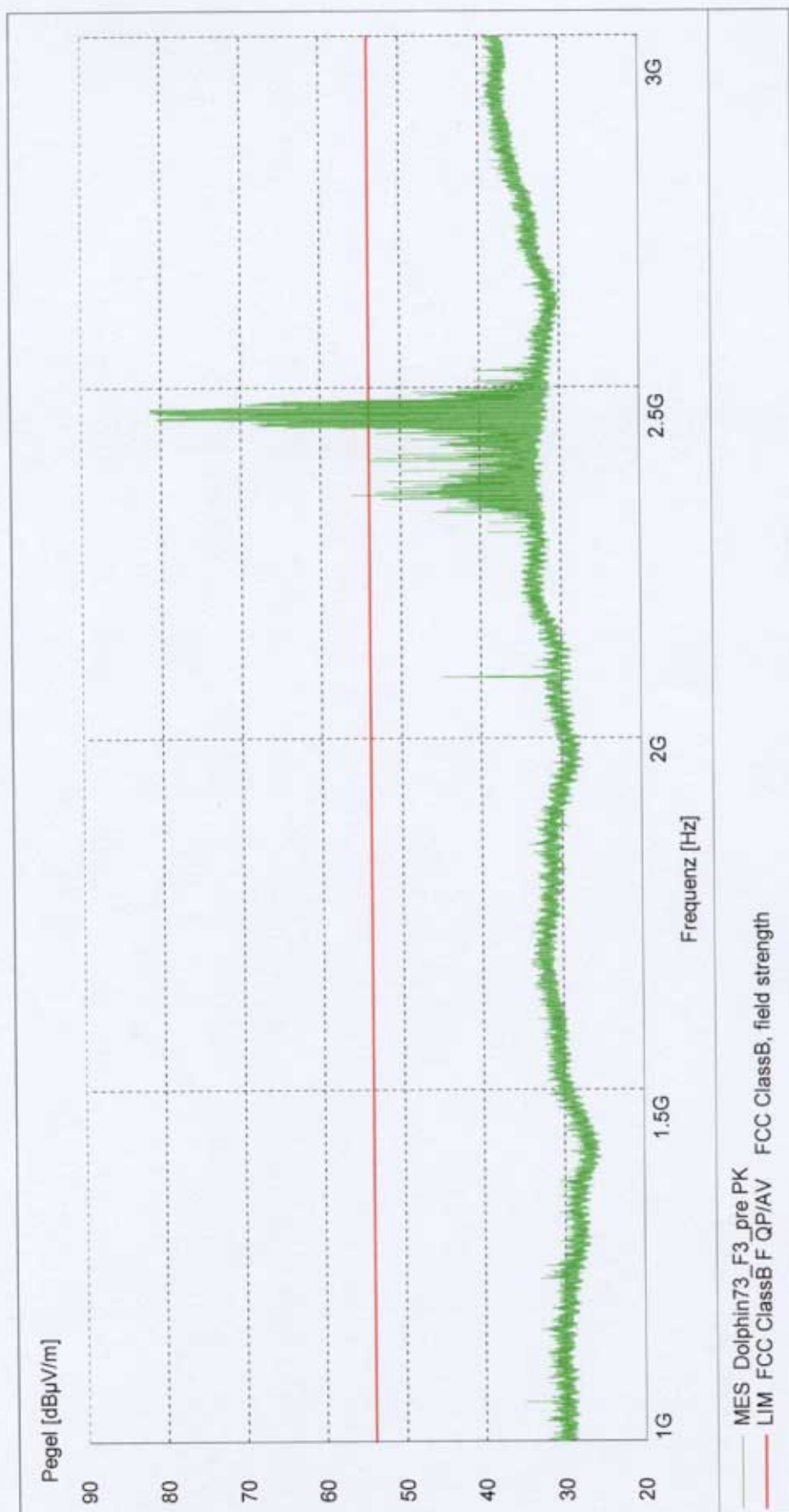
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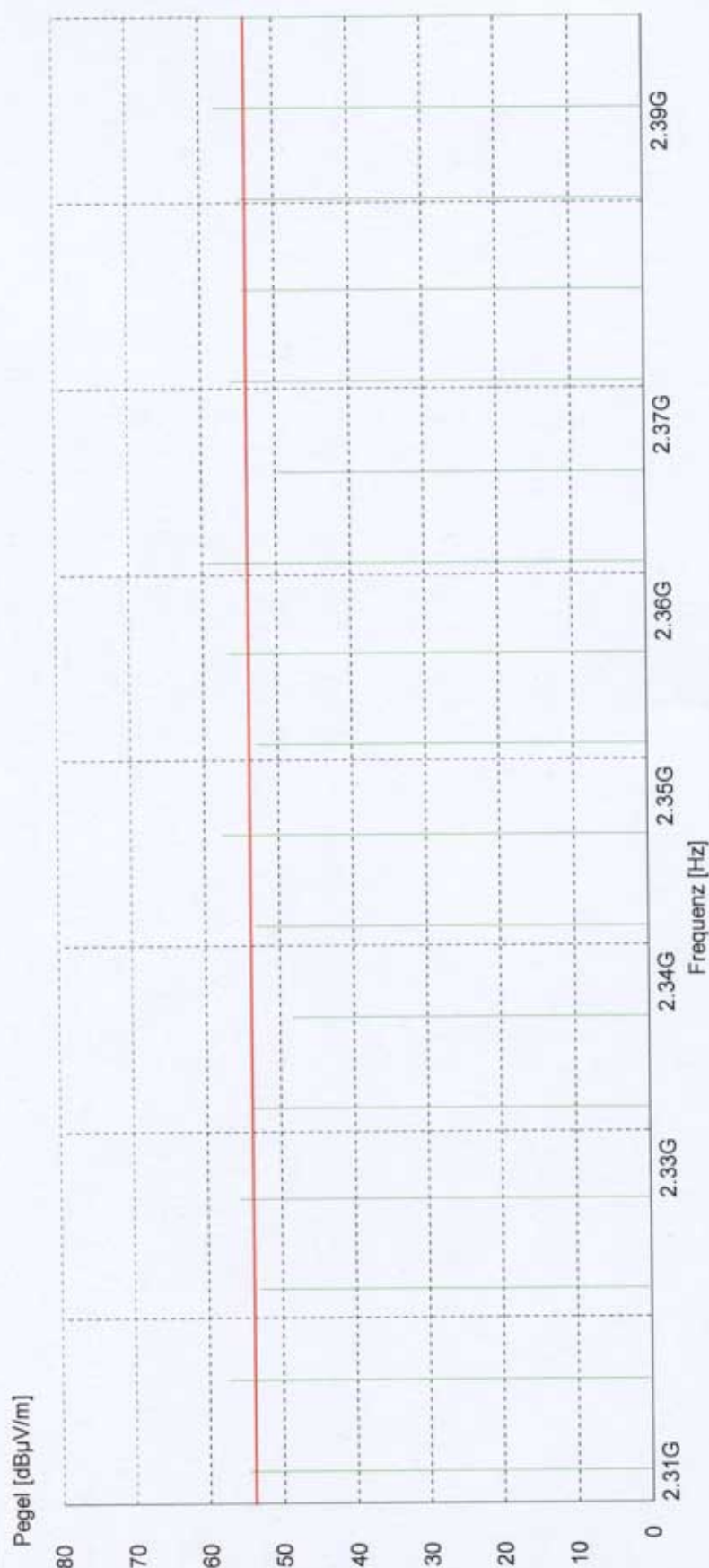
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MES Dolphn73\_F3b\_pre PK  
LIM FCC ClassB F QP/AV FCC ClassB, field strength

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