

Recognized by the  
Federal Communications Commission  
**Anechoic chamber registration no.: 90462 (FCC)**  
**Anechoic chamber registration no.: 3463 (IC)**  
**TCB ID: DE 0001**



Accredited by the  
German Accreditation Council  
DAR-Registration Number  
TTI-P-G 081/94-D0



Independent ETSI  
compliance test house



## **Accredited Bluetooth™ Test Facility (BQTF)**

**Test report no.: 4-1235-01-05/04**  
**FCC Part 15.247 / CANADA RSS-210**  
FCC ID: OYMSL400I-37  
IC: 135M-SL400I37  
SL400i/37

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## ANNEX 1: TECHNICAL PRODUCT DESCRIPTION

## 1. Administrative data

### 1.1. Administrative data of the test facility

#### 1.1.1 Identification of the testing laboratory

|                                     |                                                                                                             |
|-------------------------------------|-------------------------------------------------------------------------------------------------------------|
| Company name:                       | Cetecom ICT Services GmbH                                                                                   |
| Address:                            | Untertürkheimerstr. 6-10<br>D-66117 Saarbruecken<br>Germany                                                 |
| Laboratory accreditation:           | DAR-Registration No. TTI-P-G166/98<br>Bluetooth Qualification Test Facility (BQTF)                          |
| Responsible for testing laboratory: | Ames Harro / Hausknecht Dirk<br>Phone: +49 681 598 0<br>Fax: +49 681 598 9075<br>email: info@ict.cetecom.de |



Responsible for testing laboratory  
(Ames Harro / Hausknecht Dirk)

#### 1.1.2 Organizational items

|                                                 |                              |
|-------------------------------------------------|------------------------------|
| Reference No.:                                  | 4-1235-01-05/04              |
| Order No.:                                      | NL11-4500228461              |
| Responsible for test report and project leader: | Ames Harro / Hausknecht Dirk |
| Receipt of EUT:                                 | 2004-02-11                   |
| Date(s) of test:                                | 2004-02-11 to 2004-02-13     |
| Date of report:                                 | 2004-02-18                   |
| Number of report pages:                         | 73                           |
| Number of diagram pages (annex):                |                              |
| Version of template: 1.1                        |                              |



Responsible for test report  
(Ames Harro / Hausknecht Dirk)

Note:

The test results of this test report relate exclusively to the item tested as specified in this report. The CETECOM ICT Services GmbH does not assume responsibility for any conclusions and generalizations drawn from the test results with regard to other specimens or samples of the type of the equipment represented by the test item.

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During the test no hardware and software changes are allowed to be performed at the EUT.

## 1.1.3 Applicant's details

|                   |                                                                                                       |
|-------------------|-------------------------------------------------------------------------------------------------------|
| Applicant's name: | Philips Consumer Electronics                                                                          |
| Address:          | Glaslaan 2, Building SBP 636<br>5600 JB Eindhoven<br>The Netherlands                                  |
| Contact person:   | Mr. Karel Rysman<br>Phone: +31-40-273-6589<br>Fax: +31-40-273-7256<br>email: karel.rysman@philips.com |

## 1.2 Administrative data of manufacturer / member

|                      |                                                               |
|----------------------|---------------------------------------------------------------|
| Manufacturer's name: | Philips Consumer Electronics<br>Audio Video Innovation Centre |
| Address:             | Gutheil-Schoder-Gasse 8<br>1102 Vienna<br>Austria             |

## 1.3 Description of the Equipment under test (EUT)

### 1.3.1 EUT: Type, S/N etc.

| Product name            | Product ID            | Description           | S/N<br>serial number                   | HW<br>hardware status              | SW<br>software status |
|-------------------------|-----------------------|-----------------------|----------------------------------------|------------------------------------|-----------------------|
| SL400i/37               |                       |                       |                                        |                                    |                       |
| Frequency Band<br>[MHz] | Type of<br>Modulation | Number of<br>channels | Antenna                                | Power Supply                       | Temperature Range     |
| ISM<br>2.412 - 2.462    | 22M0P7D<br>(OFDM)     | 11                    | Integrated<br>printed board<br>antenna | 110 V by internal<br>AC/DC adapter | 0°C - +40°C           |

### 1.3.2 If RF component testing only, description of additional used HW/SW

|   | Product name | Product ID | Description | S/N<br>serial number | HW<br>hardware status | SW<br>software<br>status |
|---|--------------|------------|-------------|----------------------|-----------------------|--------------------------|
| 1 |              |            |             |                      |                       |                          |
| 2 |              |            |             |                      |                       |                          |
| 3 |              |            |             |                      |                       |                          |
| 4 |              |            |             |                      |                       |                          |

### 1.3.3 Additional EUT information

It is not possible to change the data speed and modulation type from the test sample. That means only 802.11g (54 Mbit/s) mode was activated.

## 1.3.4 EUT operating modes

| EUT operating mode no.*) | Description of operating modes | Additional information                         |
|--------------------------|--------------------------------|------------------------------------------------|
| Op. 0                    | Normal mode                    | Normal temperature and power source conditions |
| Op. 1                    |                                | low temperature, low power source conditions   |
| Op. 3                    |                                | low temperature, high power source conditions  |
| Op. 4                    |                                | high temperature, low power source conditions  |
| Op. 5                    |                                | high temperature, high power source conditions |

\*) EUT operating mode no. is used to simplify the test report.

## 1.3.5 Extreme conditions testing values

| Description                    | Shortcut          | Unit   | Value   |
|--------------------------------|-------------------|--------|---------|
|                                |                   |        |         |
| Nominal Temperature / humidity | T <sub>nom</sub>  | °C / % | 22 / 42 |
| Low Temperature                | T <sub>low</sub>  | °C     | 0       |
| High Temperature               | T <sub>high</sub> | °C     | 40      |
|                                |                   |        |         |
| Nominal Power Source           | V <sub>nom</sub>  | V      | 110     |
| Low Power Source               | V <sub>low</sub>  | V      |         |
| High Power Source              | V <sub>high</sub> | V      |         |

Type of powersource: 110V AC

## 2 Teststandard & summary list of all performed test cases

| TC identifier | Description                          | verdict | date | Remark |
|---------------|--------------------------------------|---------|------|--------|
| RF-Testing    | FCC Part 15 §15.247 - CANADA RSS-210 |         |      |        |

| Test Specification Clause | Test Case                                    | Pass | Fail | Not applicable | Not performed |
|---------------------------|----------------------------------------------|------|------|----------------|---------------|
| None                      | Antenna Gain                                 | Yes  |      |                |               |
| §15.247 (d)               | Peak power spectral density                  | Yes  |      |                |               |
| §15.247(a2)               | Spectrum Bandwidth of a OFDM System / 6dB BW | Yes  |      |                |               |
| § 15.247 (b) (3)          | Maximum output power (conducted)             | Yes  |      |                |               |
| § 15.247 (b) (3)          | Max. peak output power (radiated)            | Yes  |      |                |               |
| §15.247 (c)               | Band-edge compliance of conducted emissions  | Yes  |      |                |               |
| §15.205                   | Band-edge compliance of radiated emissions   | Yes  |      |                |               |
| §15.247 (c)               | Spurious Emission - conducted (Transmitter)  | Yes  |      |                |               |
| § 15.209                  | Spurious Emission -radiated (Transmitter)    | Yes  |      |                |               |
| § 15.247 (c)              | Spurious Emissions-radiated (Receiver)       | Yes  |      |                |               |
| § 15.109                  | Spurious Emissions-radiated <30 MHz          | Yes  |      |                |               |
| § 15.107/207              | Conducted Emissions <30 MHz                  | Yes  |      |                |               |

## 3 RF measurement testing

### 3.1 Description of test set-up

#### 3.1.1 Radiated measurements

The radiated measurements are performed in vertical and horizontal plane in the frequency range from 9 kHz to 25 GHz in semi-anechoic chambers. The EUT is positioned on a non-conductive support with a height of 0.80 m above a conductive ground plane that covers the whole chamber. The receiving antennas conform with specifications ANSI C63.2-1987 clause 15 and ANSI C63.4-1992 clause 4.1.5. These antennas can be moved over the height range between 1.0 m and 4.0 m in order to search for maximum field strength emitted from EUT. The measurement distances between EUT and receiving antennas are indicated in the test setups for the various frequency ranges. For each measurement, the EUT is rotated in all three axes until the maximum field strength is received. The wanted and unwanted emissions are received by spectrum analysers where the detector modes and resolution bandwidths over various frequency ranges are set according to requirement ANSI C63.4-1992 clause 4.2.

Antennas conform with ANSI C63.2-1996 item 15.

150 kHz - 30 MHz: Quasi Peak measurement, 9kHz Bandwidth, passive loop antenna.

30 MHz - 200 MHz: Quasi Peak measurement, 120KHz Bandwidth, biconical antenna

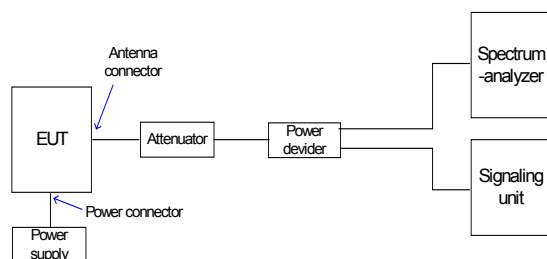
200MHz - 1GHz: Quasi Peak measurement, 120KHz Bandwidth, log periodic antenna

>1GHz: Average, RBW 1MHz, VBW 10 MHz, waveguide horn with lownoise preamp

The EUT is powered by a special shielded laptop to avoid spurs that do not come from the test object.

#### 3.1.2 Conducted measurements

The EUT's RF signal is coupled out by the antenna connector which is supplied by the manufacturer. The signal is connected to the spectrum analyzer. The specific losses for signal paths are first checked within a calibration. The measurement readings on the spectrum analyzer are corrected by the specific test set-up loss. The attenuator, power divider, signaling unit and the spectrum analyzer are impedance matched on 50 Ohm.



## 3.2 Referenced Documents

none

## 3.3 Additional comments

Hardware / software changes during testing

| Setup revision | Description of change | Change referenced to setup revision | Already perf. testcases influenced yes (reaped ) / no |
|----------------|-----------------------|-------------------------------------|-------------------------------------------------------|
| 1.0            | Start setup           | -                                   | -                                                     |
|                |                       |                                     |                                                       |
|                |                       |                                     |                                                       |
|                |                       |                                     |                                                       |
|                |                       |                                     |                                                       |
|                |                       |                                     |                                                       |
|                |                       |                                     |                                                       |
|                |                       |                                     |                                                       |
|                |                       |                                     |                                                       |
|                |                       |                                     |                                                       |
|                |                       |                                     |                                                       |

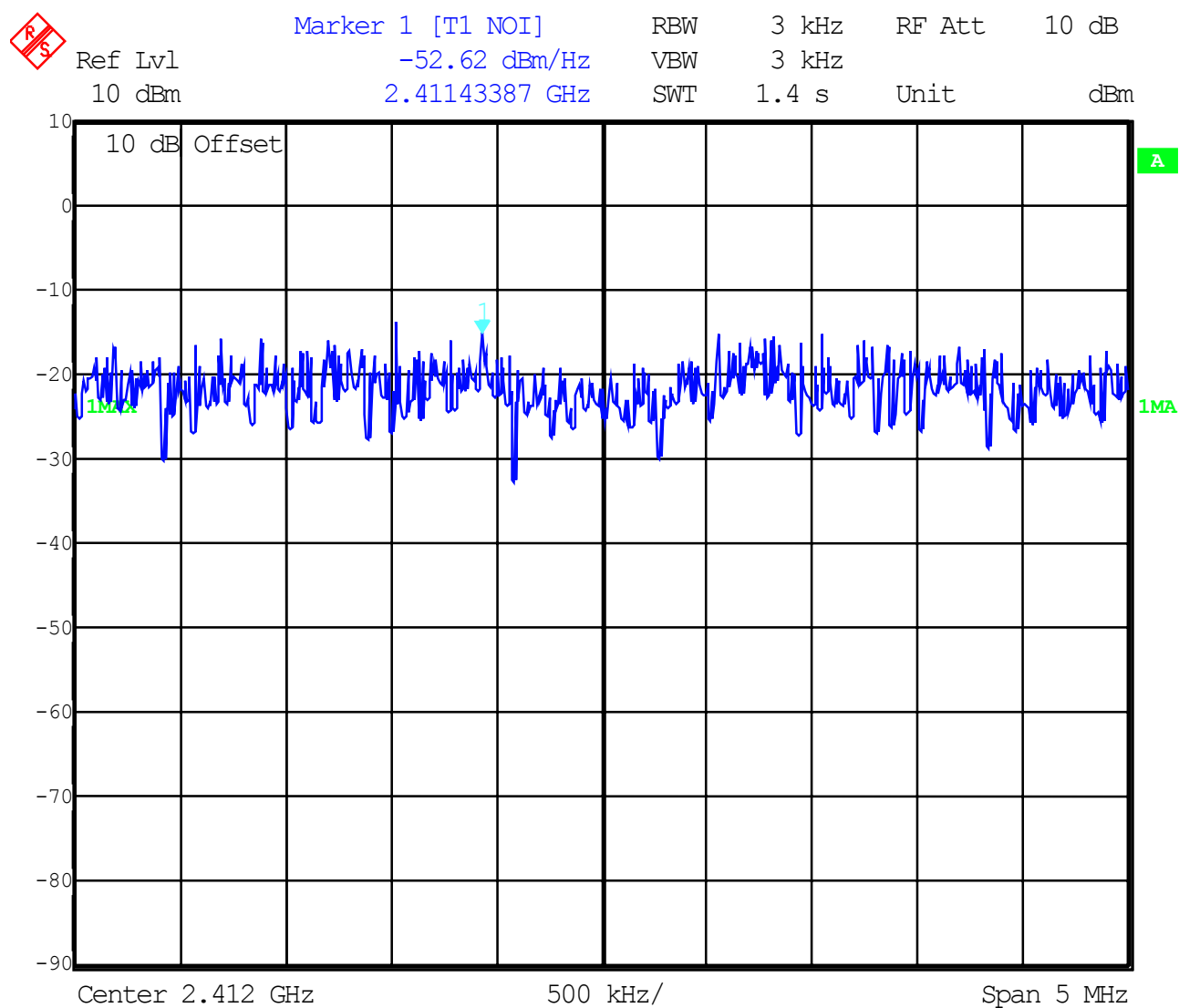
## 3.4 Antenna gain

The antenna gain of the complete system is calculated by the difference of conducted power of the module and the radiated power in EIRP.

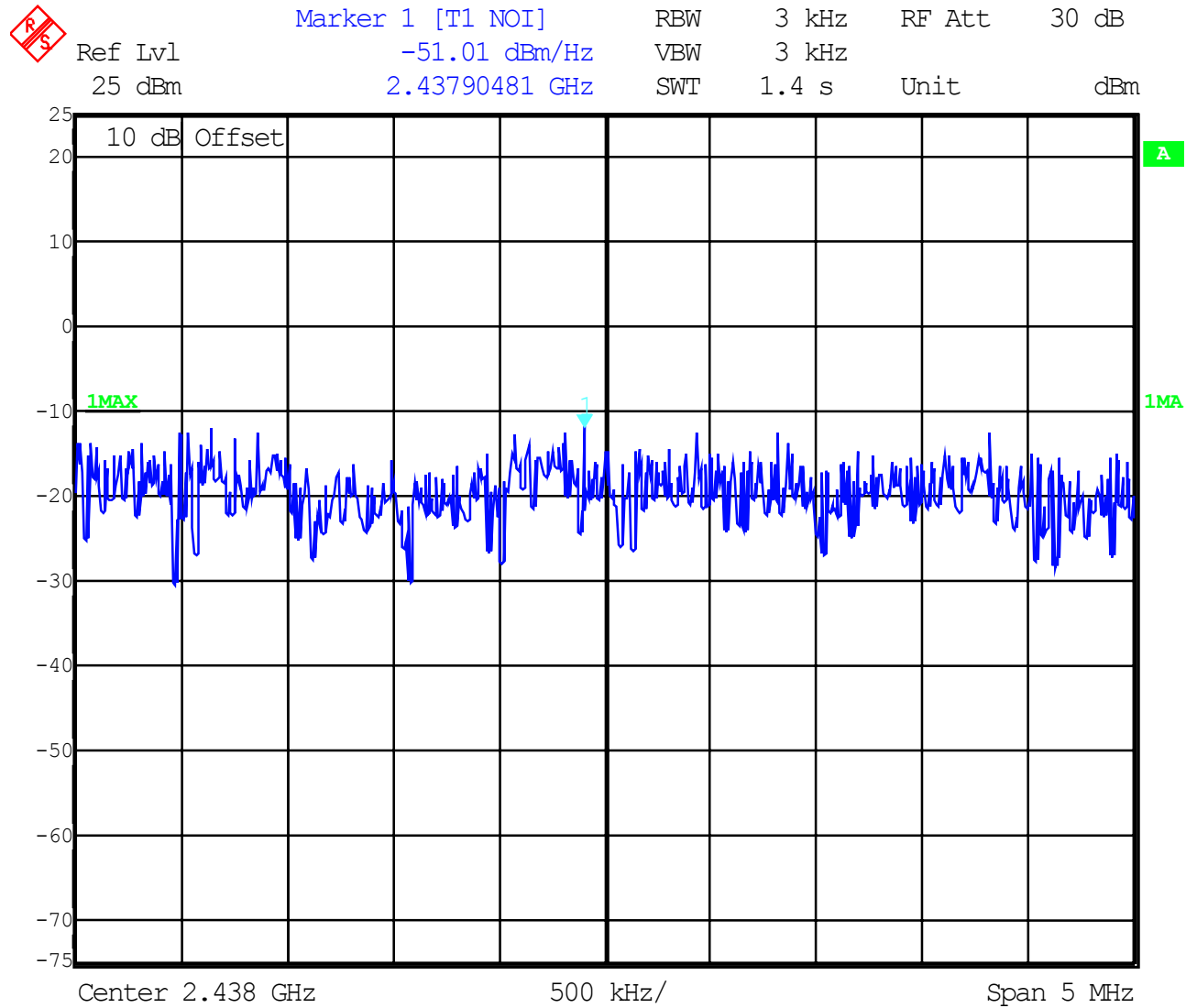
|                       | low channel | mid channel | high channel |
|-----------------------|-------------|-------------|--------------|
| Conducted power [dBm] | 21.10       | 22.91       | 22.30        |
| Radiated power [dBm]  | 12.87       | 16.05       | 17.11        |
| Gain [dBi]            | -8.23       | -6.86       | -5.19        |

## 3.5 Peak Power Spectral density (digitally modulated systems) §15.247(d)

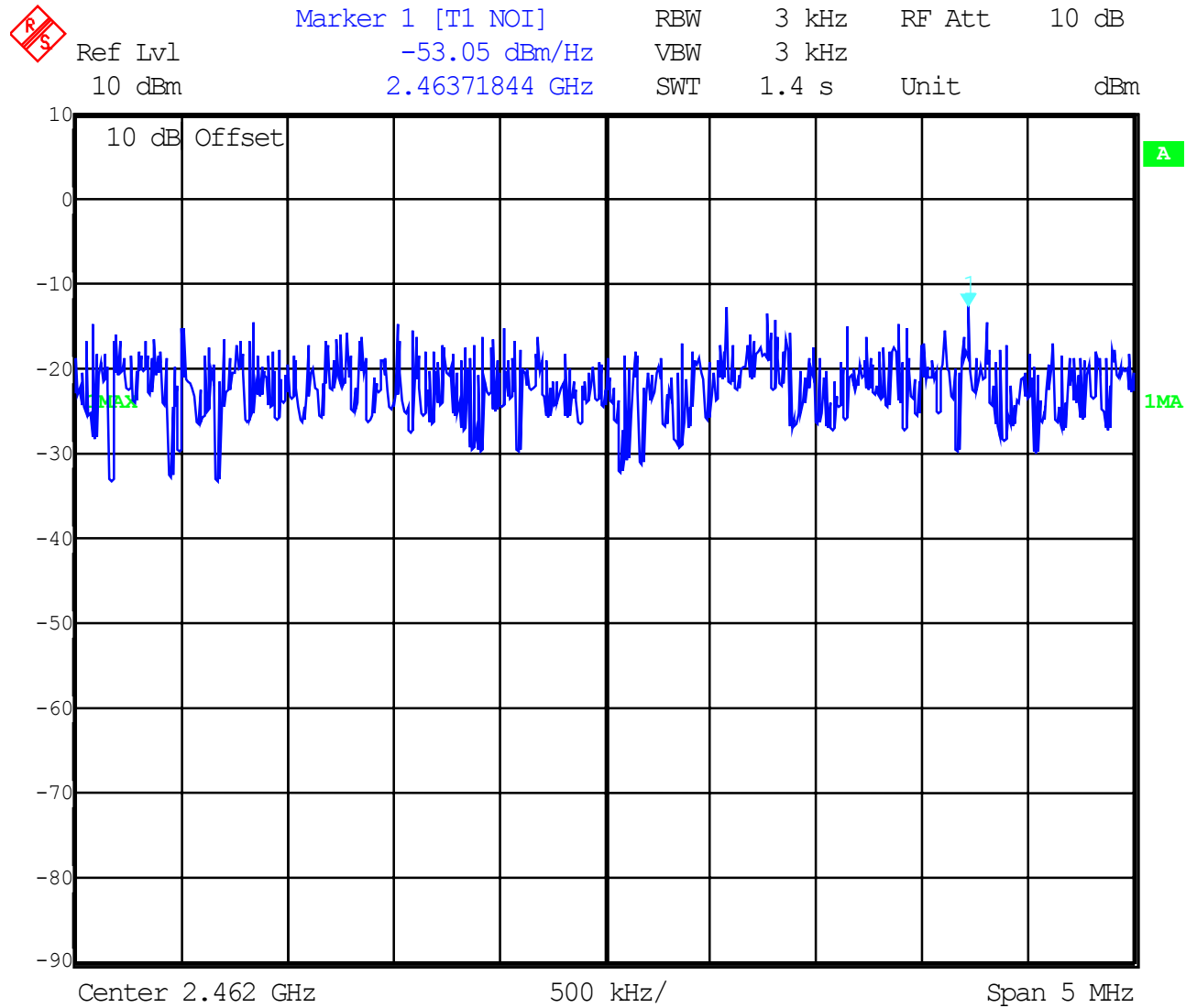
Plot 1: (result calculated by the Signal analyzer FSIQ 26 from Rohde & Schwarz)



Plot 2: (result calculated by the Signal analyzer FSIQ 26 from Rohde & Schwarz)



Plot 3: (result calculated by the Signal analyzer FSIQ 26 from Rohde & Schwarz)



Results:      Plot 1: Power density : -52.62 dBm/Hz = -17.82 dBm / 3 KHz  
                 Plot 2: Power density : -51.01 dBm/Hz = -16.21 dBm / 3 KHz  
                 Plot 3: Power density : -53.05 dBm/Hz = -18.25 dBm / 3 KHz

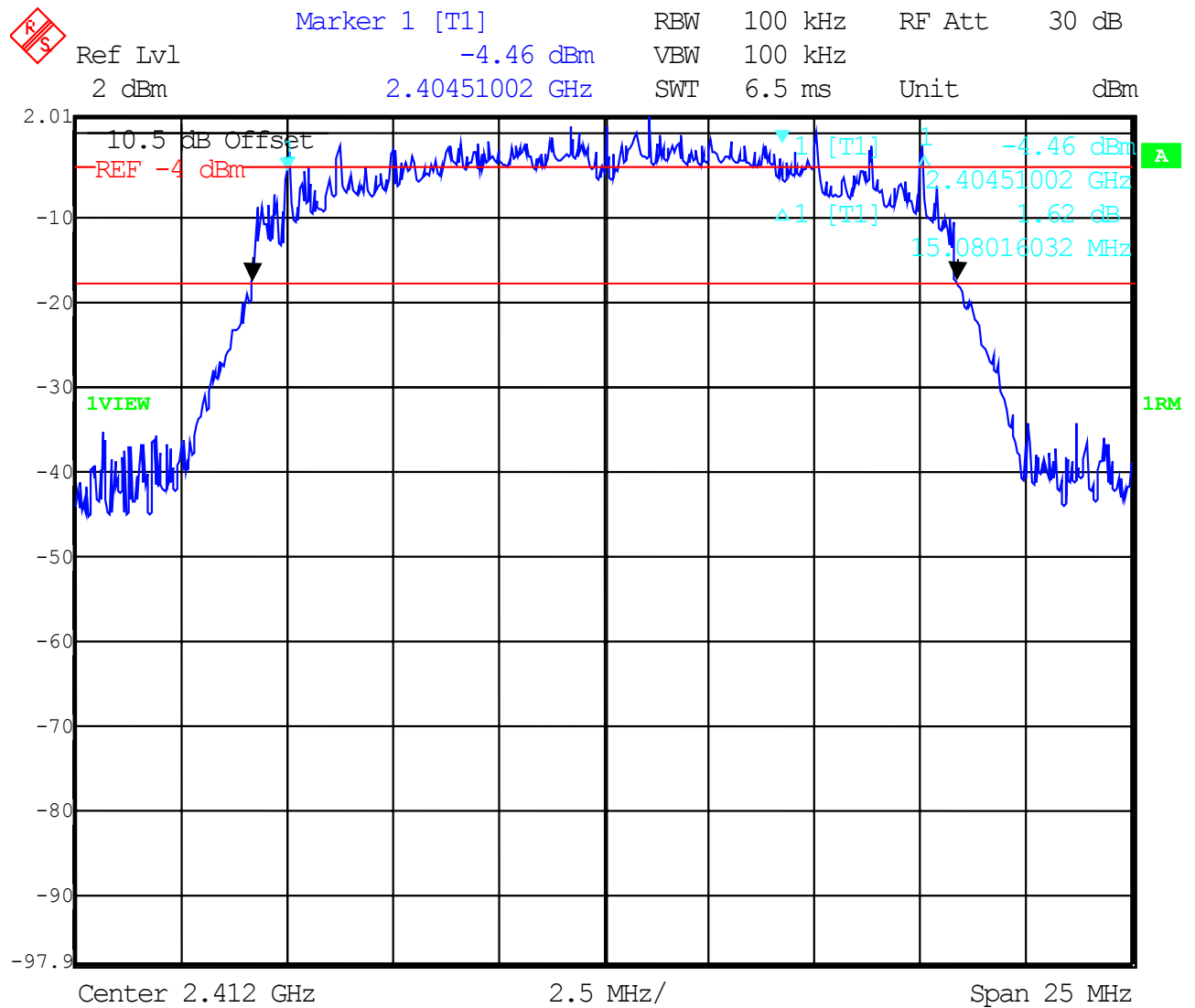
Correction factor from dBm/Hz to dBm/3KHz is +34,8 dB

Limits :

|                                   |                                                                                                                                                                                                                               |
|-----------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Under normal test conditions only | For digitally modulated systems, the peak power spectral density conducted from the intentional radiator to the antenna shall not be greater than 8 dBm in any 3 KHz band during any time interval of continuous transmission |
|-----------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|

## 3.6 Spectrum Bandwidth of a OFDM System / 6 dB/20 dB Bandwith §15.247(a2)

Plot 1 :



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Plot 2:



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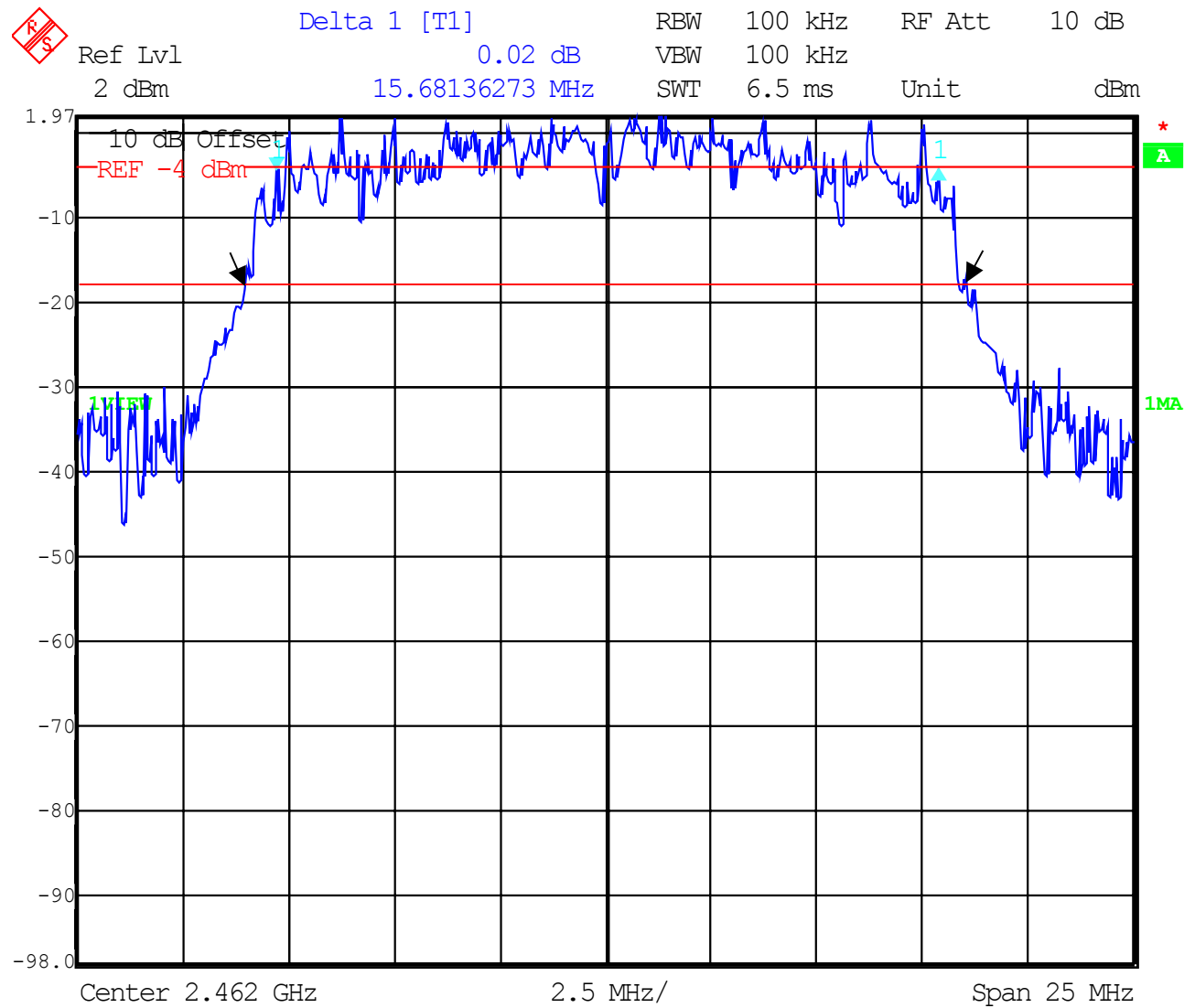


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Plot 3:



## Results:

| Test conditions         |                  | 6 dB BANDWIDTH [MHz] |        |        |
|-------------------------|------------------|----------------------|--------|--------|
| Frequency [MHz]         |                  | 2412                 | 2437   | 2462   |
| T <sub>nom</sub>        | V <sub>nom</sub> | 15.080               | 15.130 | 15.681 |
| Measurement uncertainty |                  | ±1kHz                |        |        |

| Test conditions         |                  | 20 dB BANDWIDTH [MHz] |        |        |
|-------------------------|------------------|-----------------------|--------|--------|
| Frequency [MHz]         |                  | 2412                  | 2437   | 2462   |
| T <sub>nom</sub>        | V <sub>nom</sub> | 17.220                | 17.243 | 17.334 |
| Measurement uncertainty |                  | ±1kHz                 |        |        |

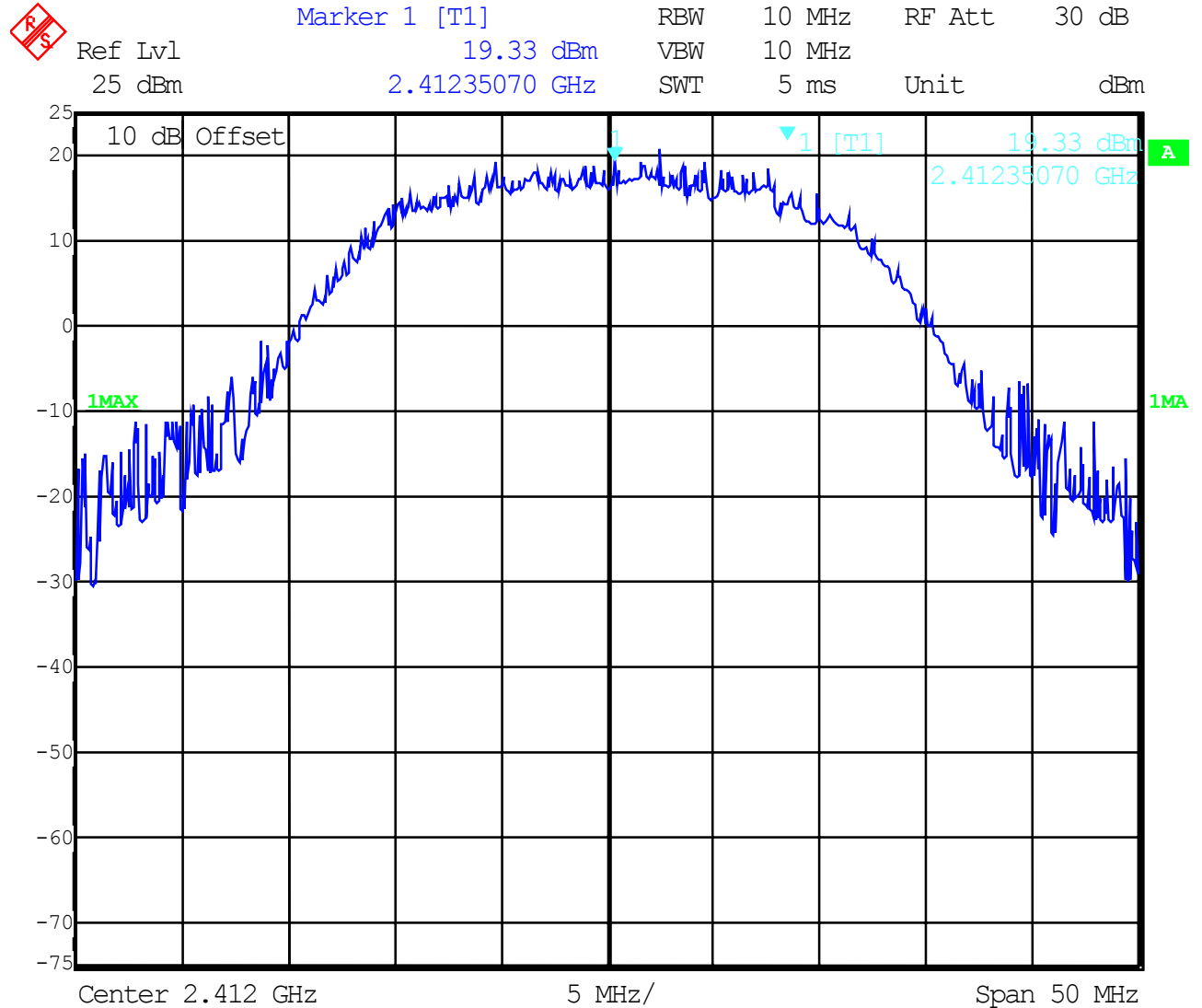
RBW: 100 kHz / VBW 100 kHz

## Limits :

|                                   |           |
|-----------------------------------|-----------|
| Under normal test conditions only | > 500 KHz |
|-----------------------------------|-----------|

## 3.7 Maximum output power (conducted) §15.247 (b) (1)

Plot 1:



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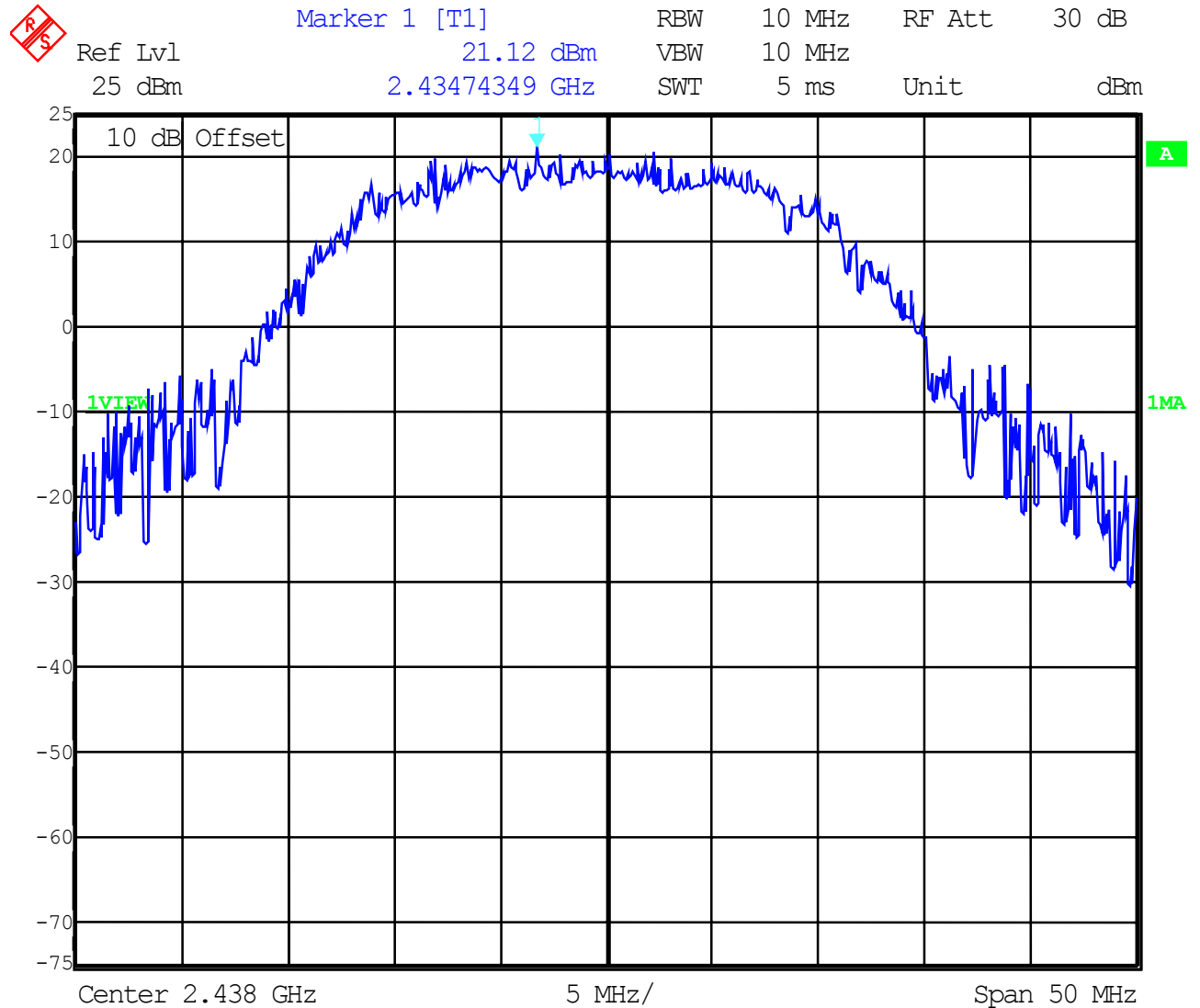


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Plot 2:



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Plot 3:



Marker 1 [T1]

RBW 10 MHz RF Att 30 dB

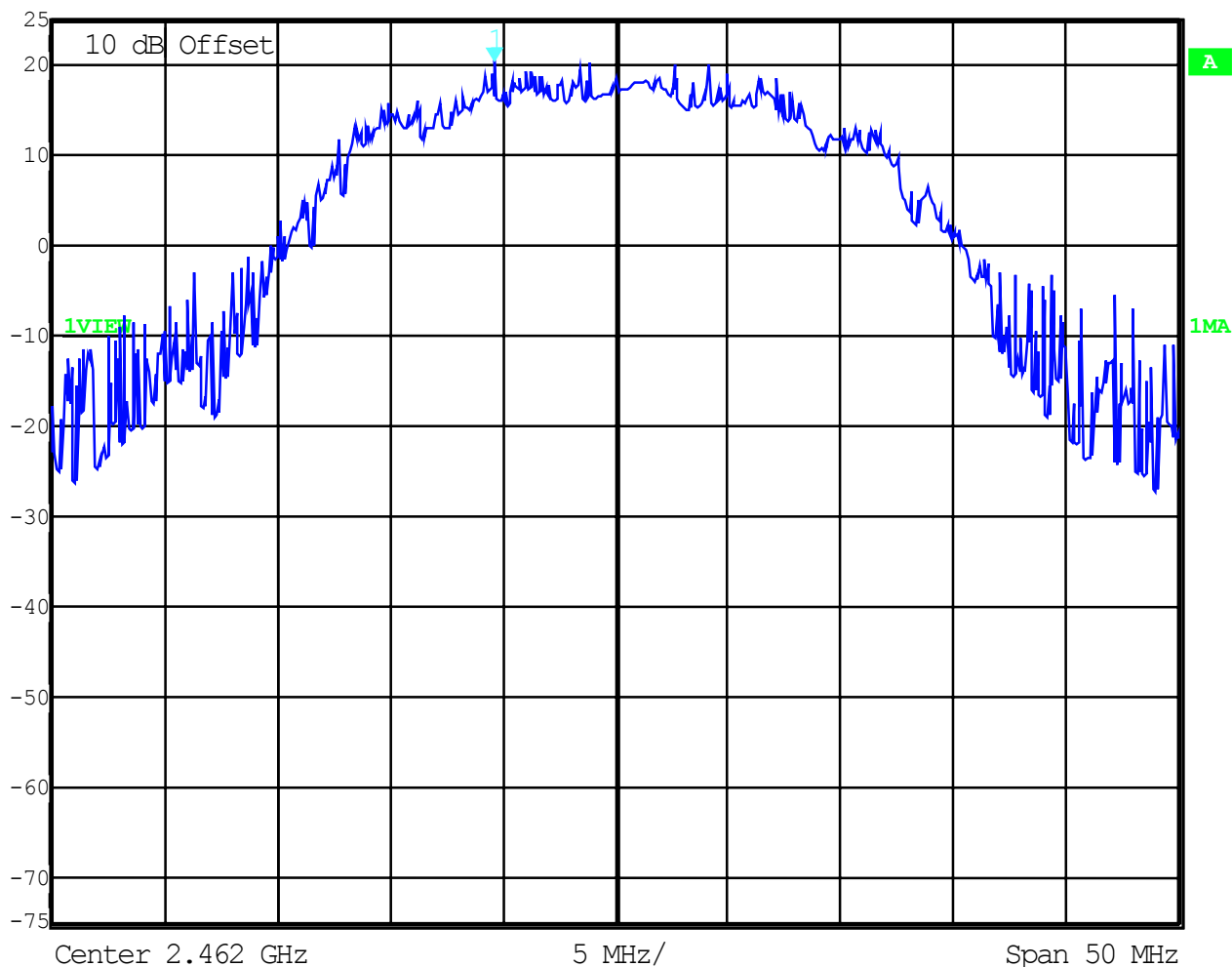
Ref Lvl 20.35 dBm

VBW 10 MHz

25 dBm 2.45663928 GHz

SWT 5 ms

Unit dBm



## Results:

| Test conditions            |                  | Max. peak output power [dBm] |               |               |               |
|----------------------------|------------------|------------------------------|---------------|---------------|---------------|
| Frequency [MHz]            |                  | 2412                         |               | 2437          | 2462          |
| T <sub>nom</sub>           | V <sub>nom</sub> | PK                           | 19.33         | 21.12         | 20.35         |
|                            |                  | PK<br>corrected              | 1.77<br>21.10 | 1.79<br>22.91 | 1.95<br>22.30 |
| De facto EIRP (Peak) [dBm] |                  | 12.87                        |               | 16.05         | 17.11         |
| Antenna gain: [dBi]        |                  | -8.23                        |               | -6.86         | -5.19         |
| Measurement uncertainty    |                  | ±3dB                         |               |               |               |

RBW / VBW : 10 MHz

## Remark:

The correction factor is calculated by  $10 \times \log (\text{measured BW} / \text{used BW})$  [dB]

## Limits:

|                                                                        |                        |
|------------------------------------------------------------------------|------------------------|
| Under normal test conditions only, for frequency range 2400-2483.5 MHz | Max. 1.0 Watt / 30 dBm |
|------------------------------------------------------------------------|------------------------|

## MPE calculation

These equations are generally accurate in the far field of an antenna but will over predict power density in the near field, where they could be used for making a “worst case” prediction.

$$S = PG/4\pi R^2$$

where S = power density ( in appropriate units, e.g. mW/cm<sup>2</sup>)

P = power input to the antenna (in appropriate units e.g. mW)

G = power gain of the antenna in the direction of interest relative to the isotropic radiator

R = distance to the center of radiation of the antenna (appropriate units e.g. cm)

Or

$$S = EIRP/4\pi R^2$$

where EIRP = equivalent isotropically radiated power

### Calculation:

(Calculated for max. EIRP)

EIRP: +17.11 dBm (51.40 mW)

calculated at distance of 20 cm:

$$\text{power density} = 51.40/4\pi 20^2 = 1.023 * 10^{-2} \text{ mW/ cm}^2$$

Limit:

1mW/ cm<sup>2</sup> is the reference level for general public exposure according to the OET Bulletin 65,  
Edition 97-01 Table 1.

## 3.8 Max. peak output power (radiated) §15.247 (b) (1)

Results:

| Test conditions         |                  | Max. peak output power EIRP [dBm] |       |       |
|-------------------------|------------------|-----------------------------------|-------|-------|
| Frequency [MHz]         |                  | 2412                              | 2437  | 2462  |
| T <sub>nom</sub>        | V <sub>nom</sub> | 12.87                             | 16.05 | 17.11 |
| Measurement uncertainty |                  | ±3dB                              |       |       |

RBW / VBW : 10 MHz

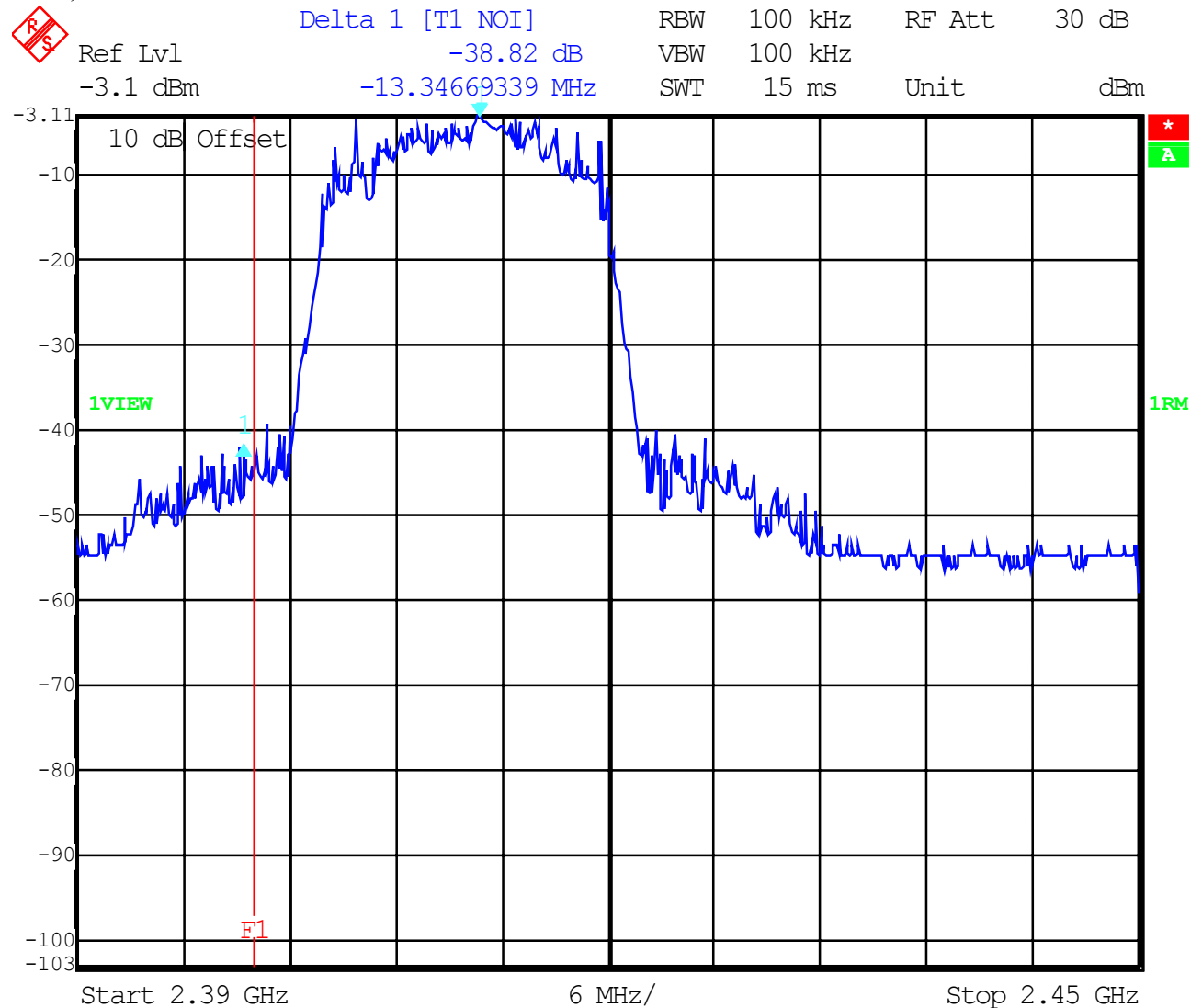
Measured at a distance of 3m

Limits:

|                                                                        |               |
|------------------------------------------------------------------------|---------------|
| Under normal test conditions only, for frequency range 2400-2483.5 MHz | Max. 1.0 Watt |
|------------------------------------------------------------------------|---------------|

## 3.9 Band-edge compliance of conducted emissions §15.247 (c)

Plot 1, lowest channel



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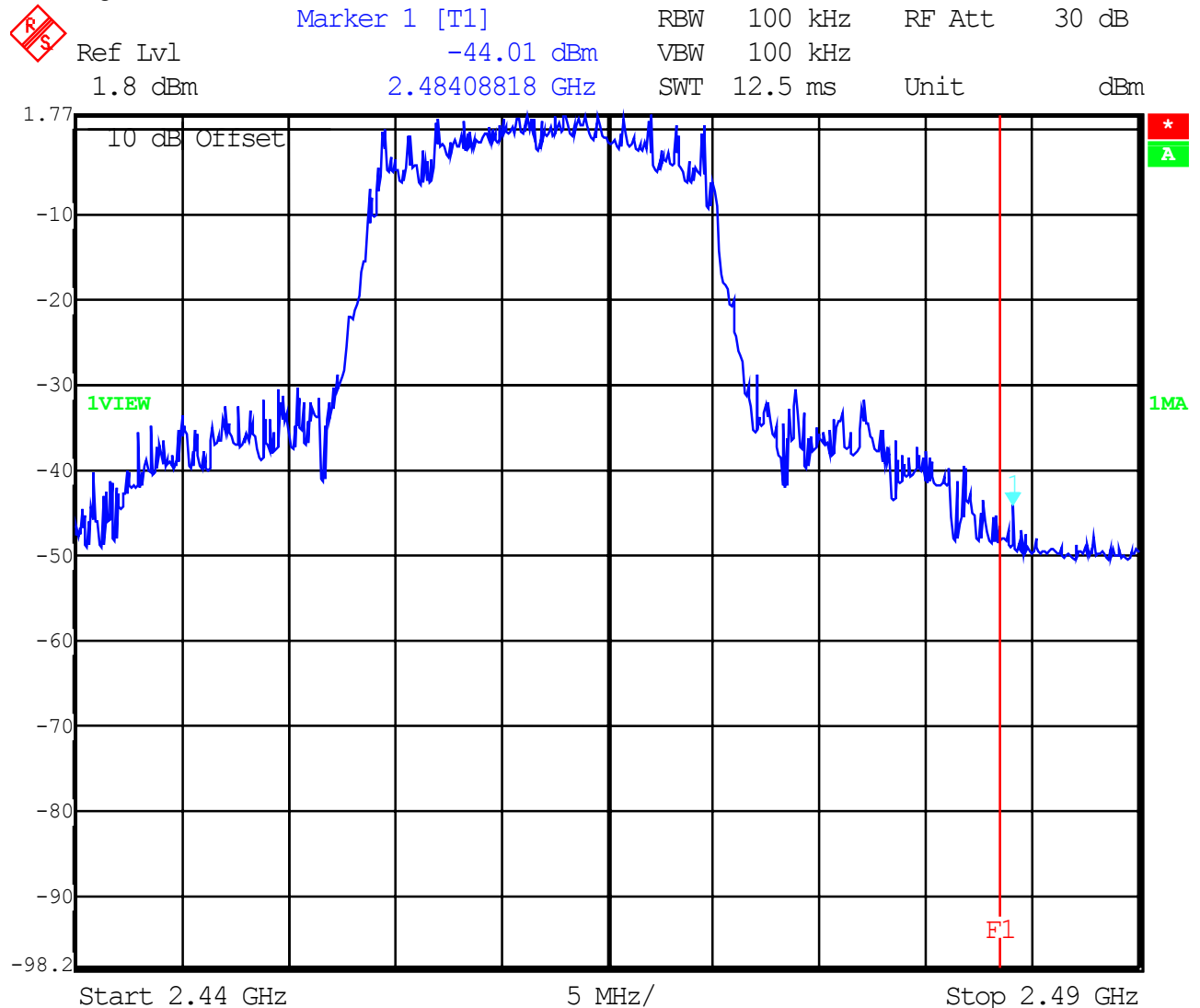


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Plot 2, highest channel

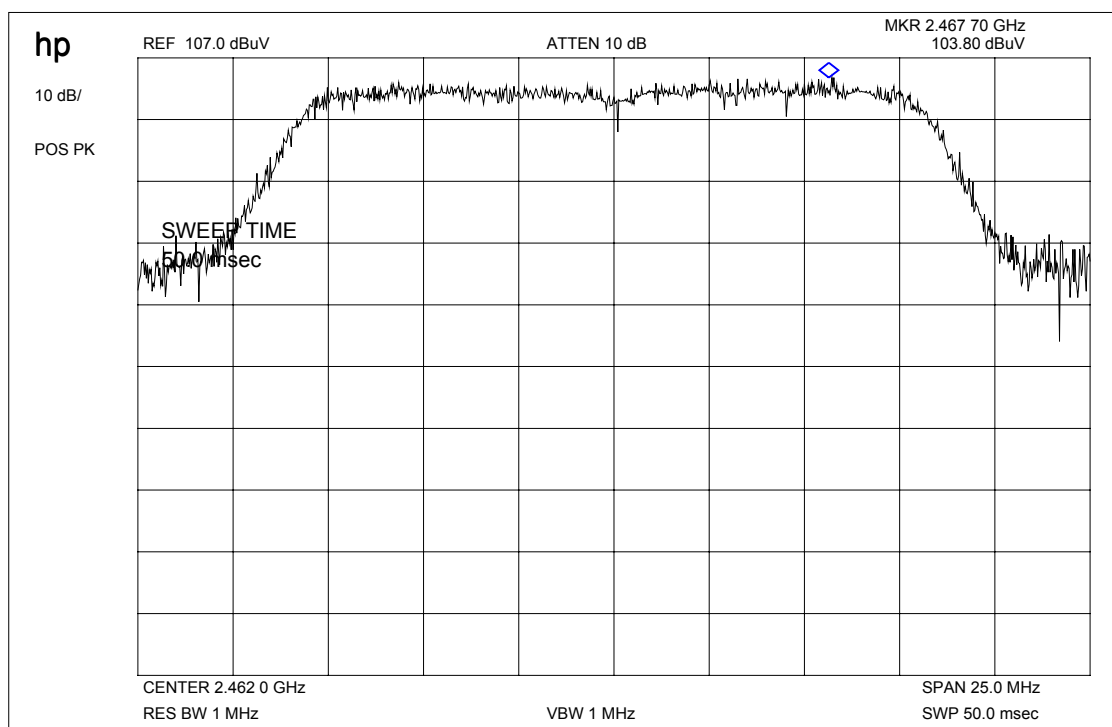


Limits:

|                                   |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    |
|-----------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Under normal test conditions only | In any 100 kHz bandwidth outside the frequency band in which the spread spectrum or digitally modulated intentional radiator is operating, the radio frequency power that is produced by the intentional radiator shall be at least 20 dB below that in the 100 kHz bandwidth within the band that contains the highest level of the desired power, based on either an RF conducted or a radiated measurement. Attenuation below the general limits specified in Section 15.209(a) is not required. In addition, radiated emissions which fall in the restricted bands, as defined in Section 15.205(a), must also comply with the radiated emission limits specified in Section 15.209(a) (see Section 5.205(c)). |
|-----------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|

## 3.10 Band-edge compliance of radiated emissions §15.205

Plot 1 : Max field strength in 3m distance (single frequency) peak



Plot including correction factor

Result:

| Frequency | Meter reading | Cable loss | Antenna factor | Results |
|-----------|---------------|------------|----------------|---------|
| 2462 MHz  |               | 22.8 dB    | -7.2           |         |
|           |               |            |                |         |

# SRD-Testreport

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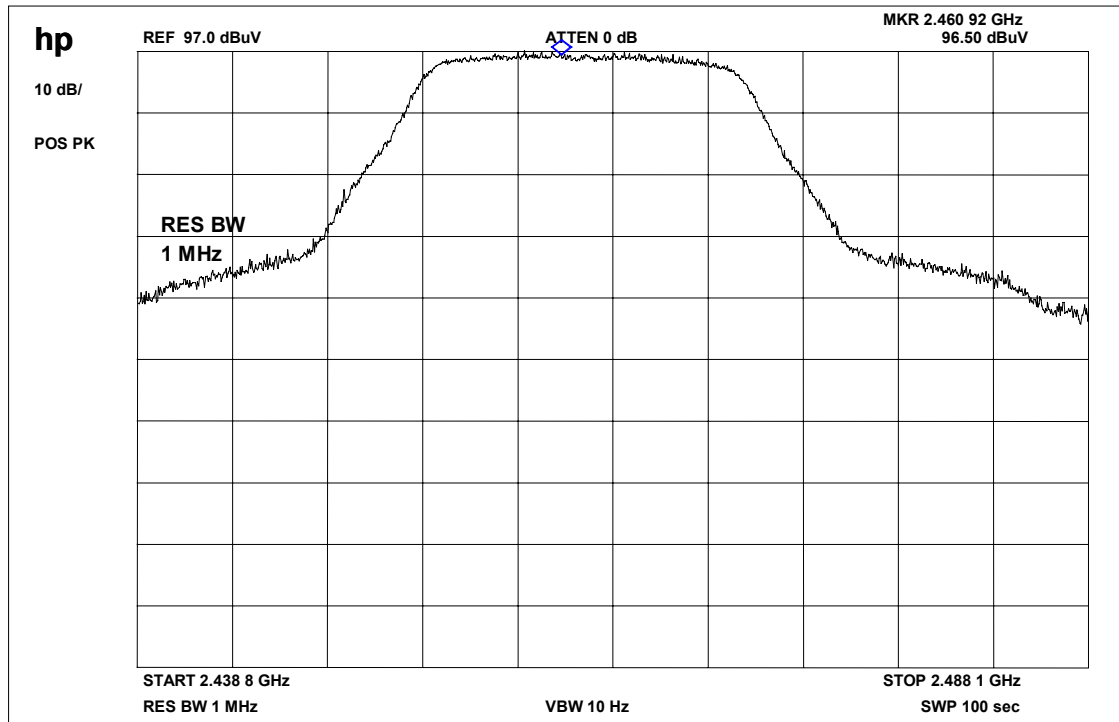


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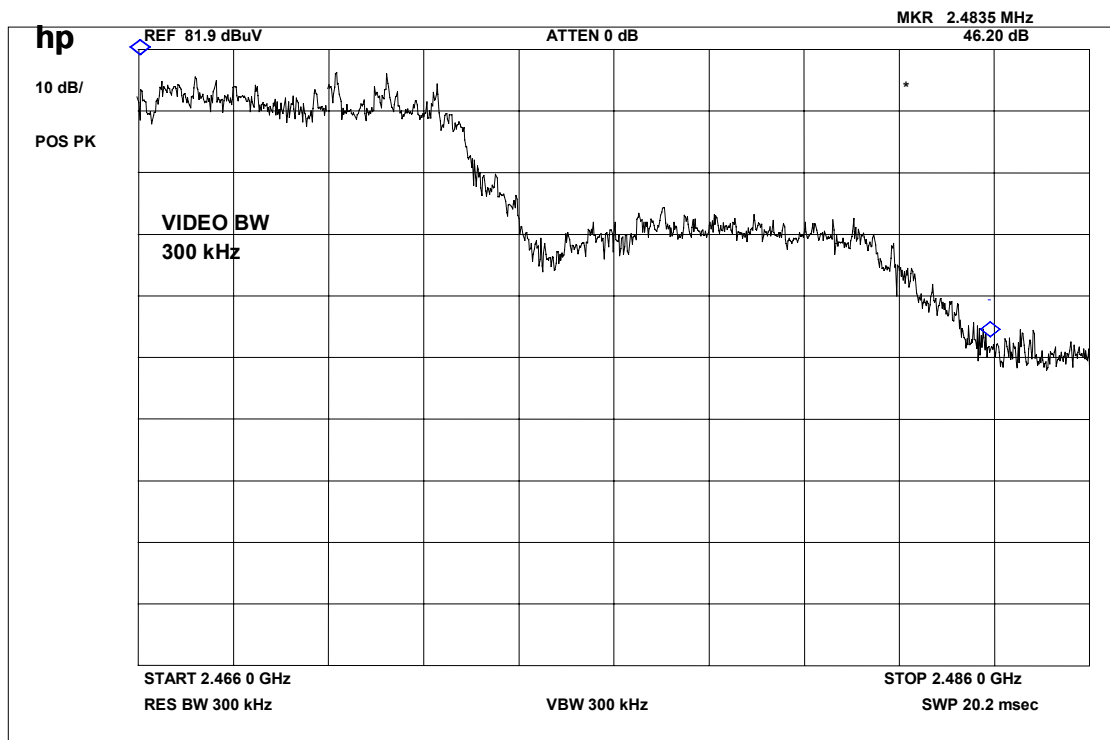
Plot 2 : Max field strength in 3m distance (single frequency) average



Result:

| Frequency | Meter reading | Cable loss | Antenna factor | Results |
|-----------|---------------|------------|----------------|---------|
| 2462 MHz  |               | 22.8 dB    | -7.2           |         |
|           |               |            |                |         |

Plot 3: Marker-Delta Method RBW/VBW = 1% of span



Result:

Marker-Delta-Value : 46.20dB

This measurement was made to show that the behavior of the system is conform to FCC 15.205 (restricted bands)

## Results & Limits:

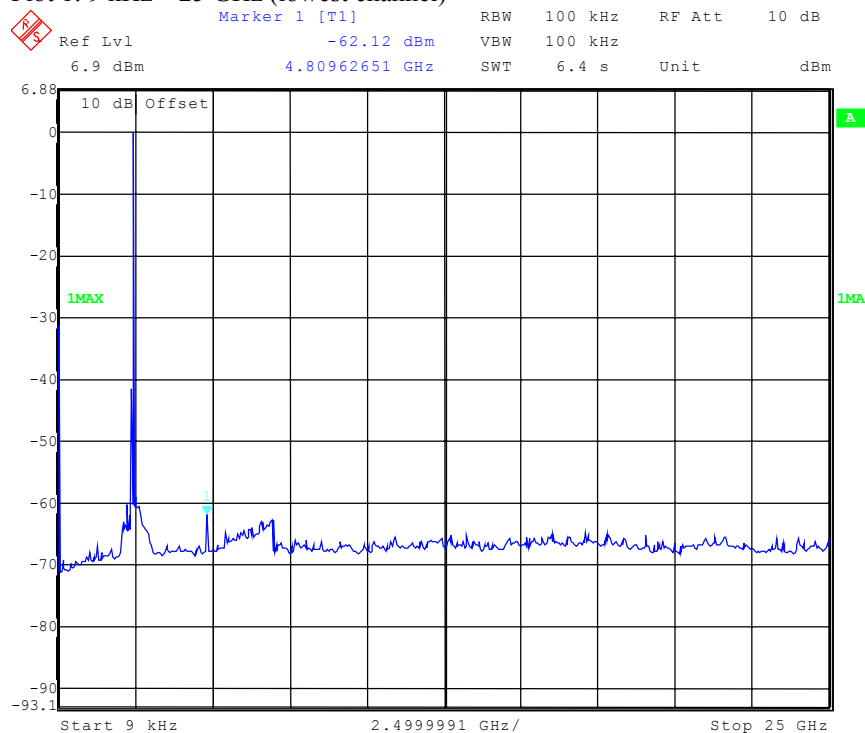
### Radiated field strength

The field strength was measured with an EMI measuring receiver and 1 MHz RBW / VBW for peak and with 1MHz RBW / 10Hz VBW for average at a distance of 3m.

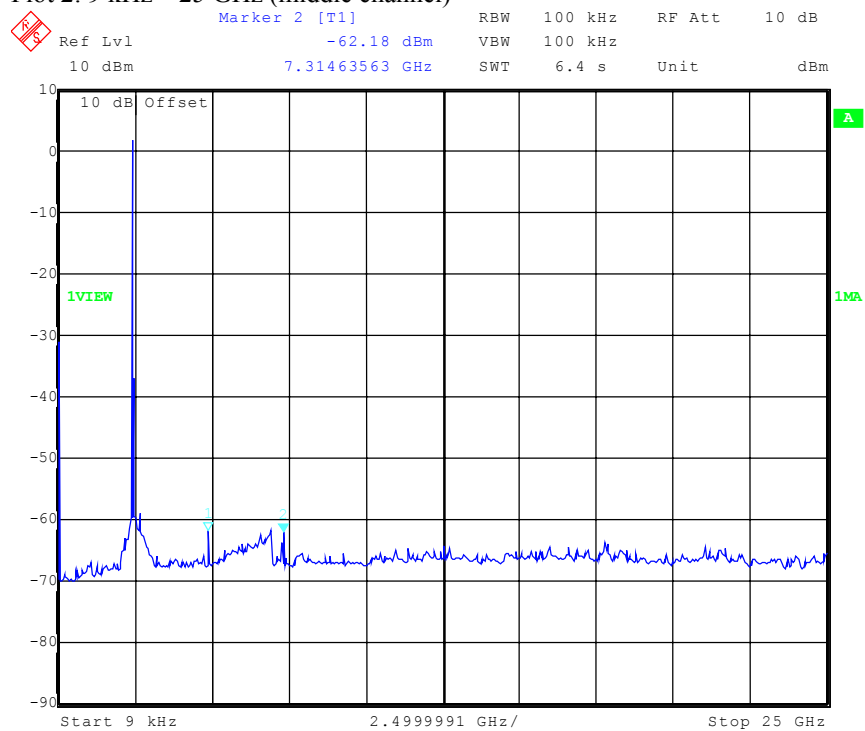
| high channel       | setup                      | measured value (3m) | correction factor (3m) | calculated value (3m) |
|--------------------|----------------------------|---------------------|------------------------|-----------------------|
| Max. peak value    | 1 MHz RBW<br>1 MHz VBW     | 103.8 dB $\mu$ V/m  | +0.6 dB                | 104.4 dB $\mu$ V/m    |
| Max. average value | 1 MHz RBW<br>10 Hz VBW     | 96.5 dB $\mu$ V/m   | +0.6 dB                | 97.1 dB $\mu$ V/m     |
| Delta value        | Peak<br>300 kHz<br>RBW/VBW | 46.2 dB             |                        |                       |
| Value at band edge | limit 54 dB $\mu$ V/m      |                     |                        | 50.9 dB $\mu$ V/m     |
| Statement:         |                            |                     |                        | Complies              |

## Spurious Emissions - conducted (Transmitter) §15.247 (c)

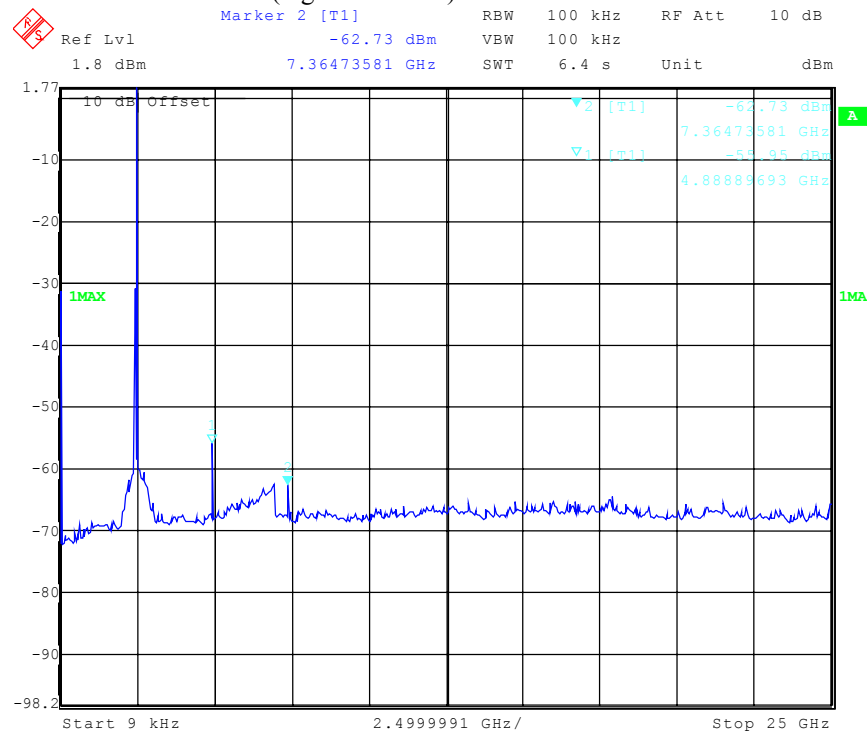
Plot 1: 9 kHz – 25 GHz (lowest channel)



Plot 2: 9 kHz – 25 GHz (middle channel)



Plot 3: 9 kHz – 25 GHz (highest channel)



## Result & Limits:

| Emission Limitations conducted |  |                             |                                   |                                                      |                     |
|--------------------------------|--|-----------------------------|-----------------------------------|------------------------------------------------------|---------------------|
| f [MHz]                        |  | amplitude of emission [dBm] | limit max. allowed emmision power | actual attenuation below frequency of operation [dB] | results             |
| 2412                           |  | 21.10                       | 30 dBm                            | -                                                    | Operating frequency |
| 4859.7                         |  | -62.10                      | -20 dBc (+1.1 dBm)                | 83.20                                                | Complies            |
|                                |  |                             |                                   |                                                      |                     |
|                                |  |                             |                                   |                                                      |                     |
| 2437                           |  | 22.91                       | 30 dBm                            | -                                                    | Operating frequency |
| 4859                           |  | -61.8                       | -20 dBc (+2.91 dBm)               | 84.71                                                | Complies            |
| 7311                           |  | -62.2                       |                                   | 85.11                                                | Complies            |
|                                |  |                             |                                   |                                                      |                     |
|                                |  |                             |                                   |                                                      |                     |
| 2462                           |  | 22.30                       | 30 dBm                            | -                                                    | Operating frequency |
| 4924                           |  | -55.95                      | -20 dBc (+2.30 dBm)               | 78.25                                                | Complies            |
| 7386                           |  | -62.73                      |                                   | 85.03                                                | Complies            |
|                                |  |                             |                                   |                                                      |                     |
| Measurement uncertainty        |  |                             | ± 3dB                             |                                                      |                     |

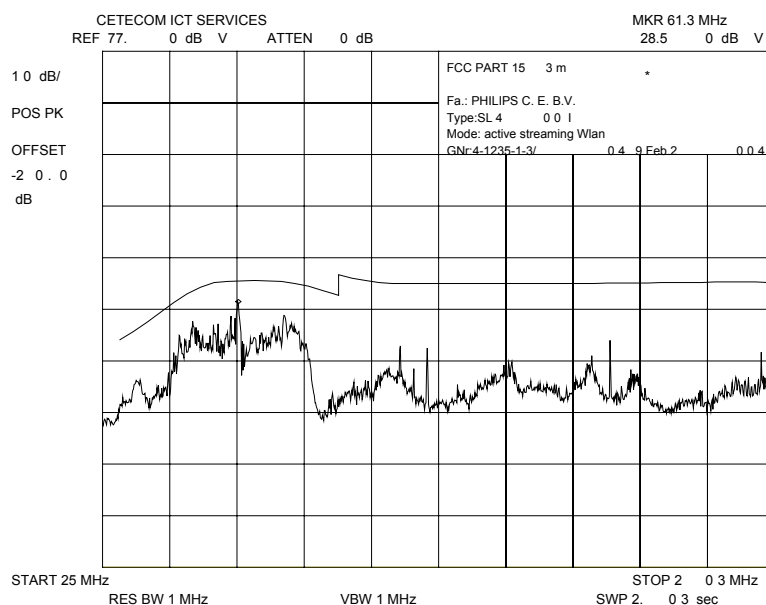
RBW : 100 kHz VBW: 100 kHz

|                                   |                                                                                                                                                                                                                                                                                                            |
|-----------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Under normal test conditions only | In any 100 kHz bandwidth outside the frequency band at least 20dB below the highest level of the desired power. In addition, radiated emissions which fall in the restricted bands, as defined in §15.205(a), must also comply with the radiated emission limits specified in §15.209(a) (see §15.205(c)). |
|-----------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|

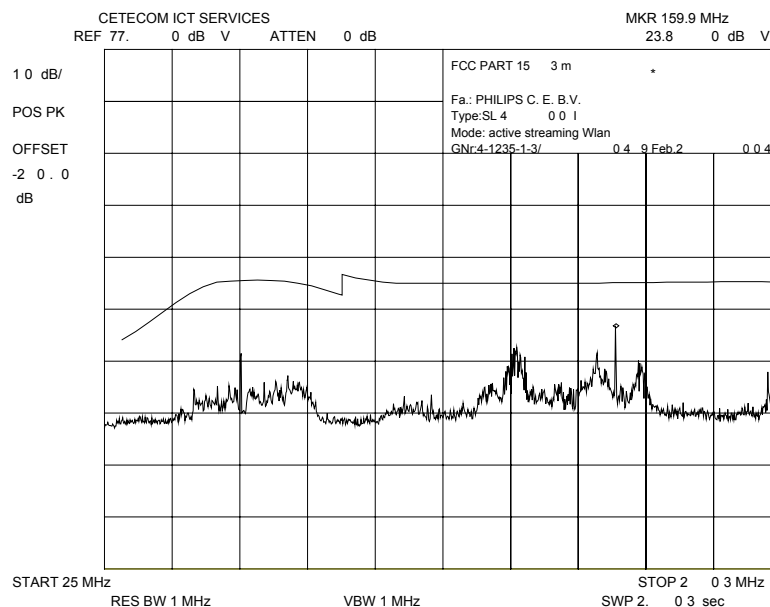
Note: For emissions that fall into restricted bands you find the radiated emissions later in the report.

## 3.11 Spurious Emissions - radiated (Transmitter) §15.209

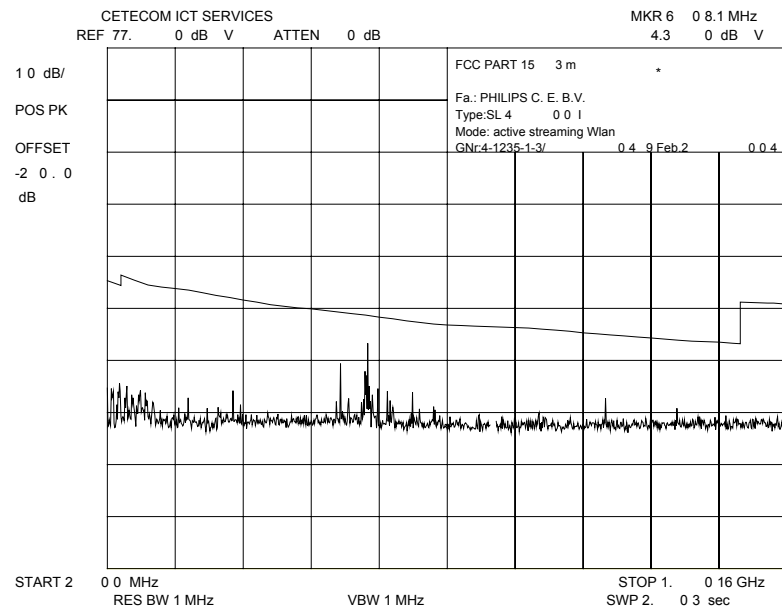
Plot 1: 0.03 – 0.2 GHz vertical (lowest channel)



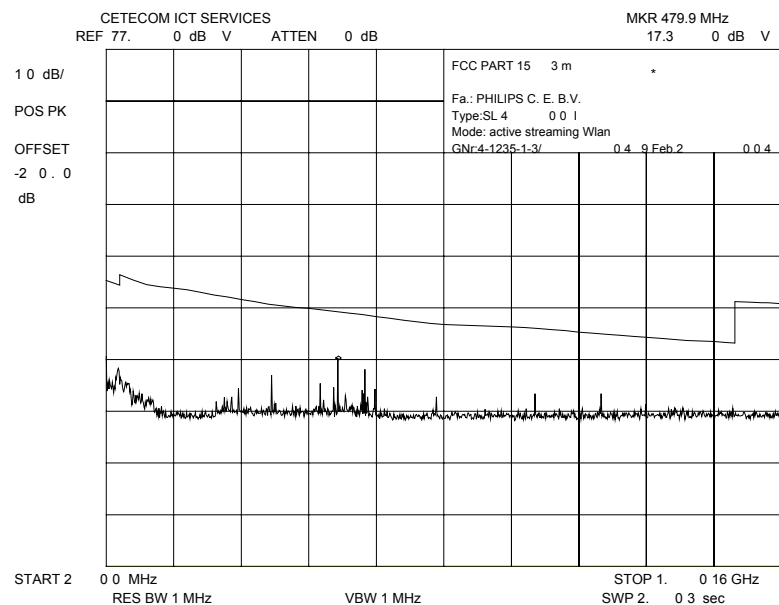
Plot 2: 0.03 – 0.2 GHz horizontal (lowest channel)



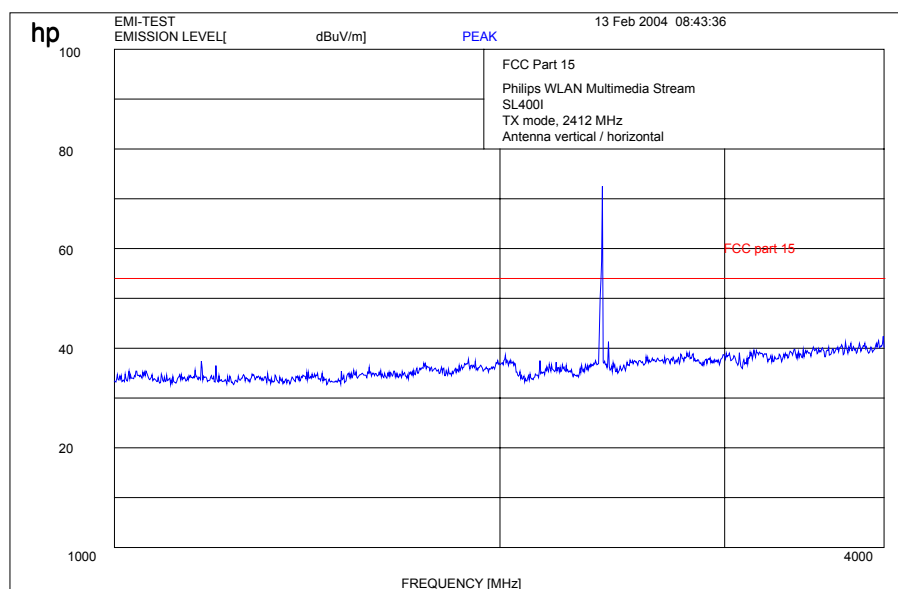
Plot 3: 0.2 – 1 GHz vertical (lowest channel)



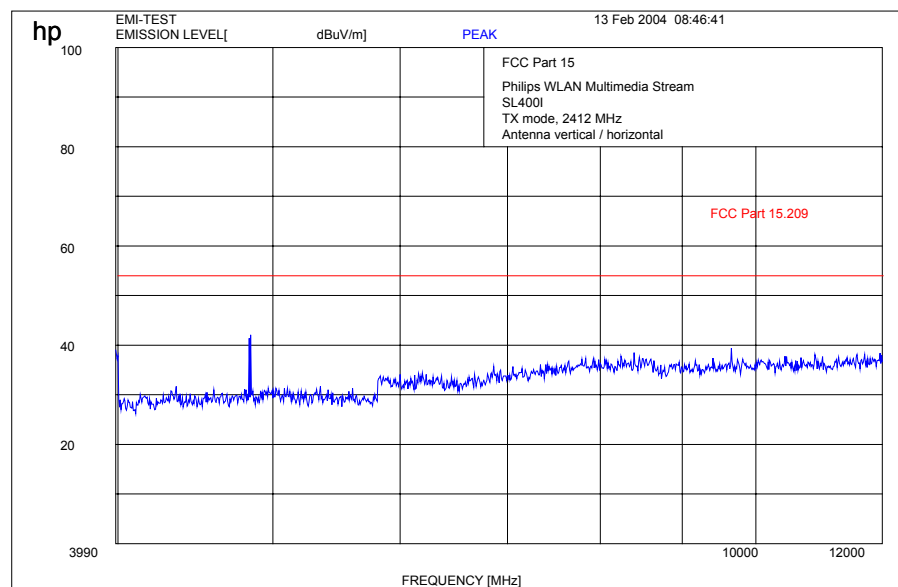
Plot 4: 0.2 – 1 GHz horizontal (lowest channel)



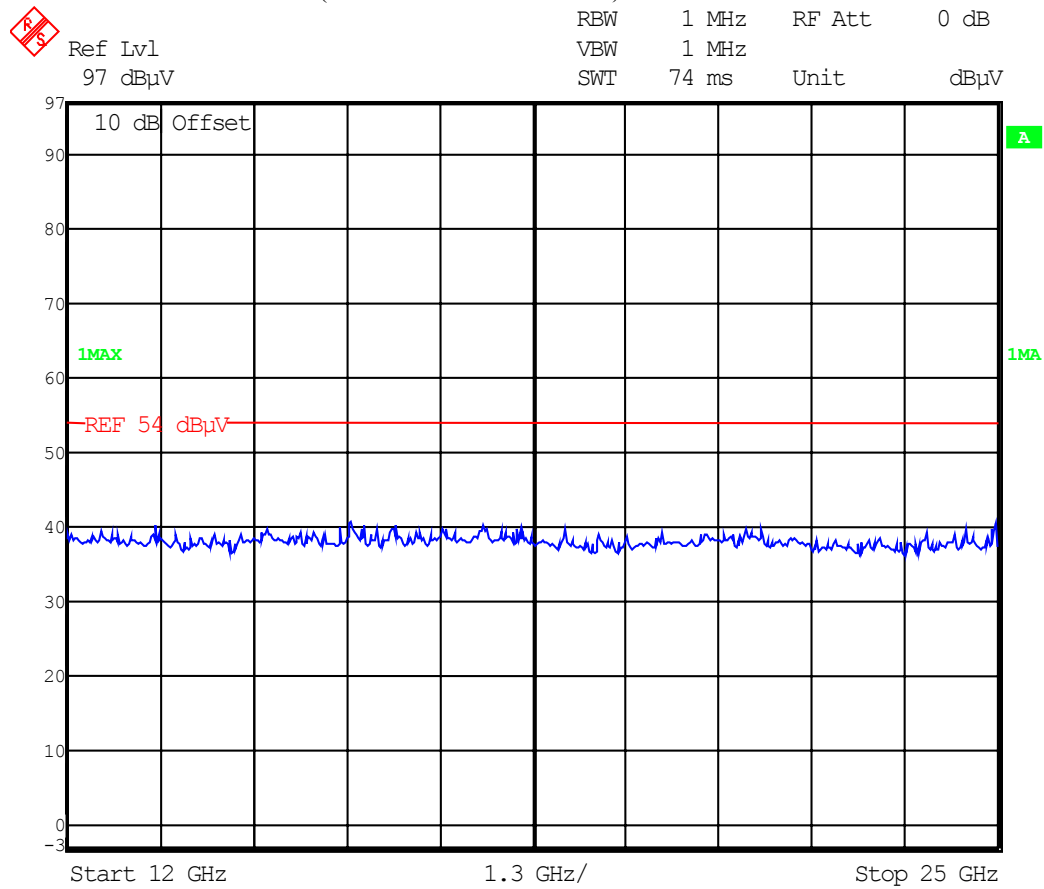
Plot 5: 1 - 4 GHz vertical / horizontal (lowest channel)



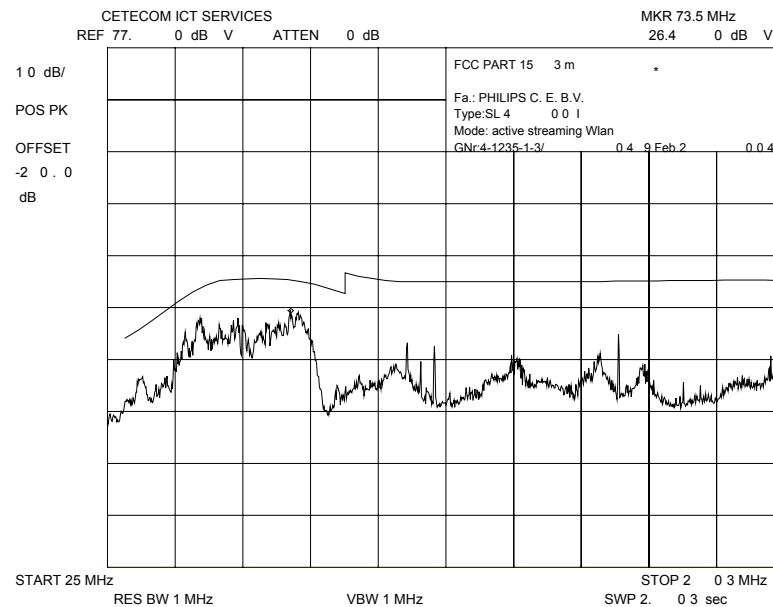
Plot 6: 4- 12 GHz vertical / horizontal (lowest channel)



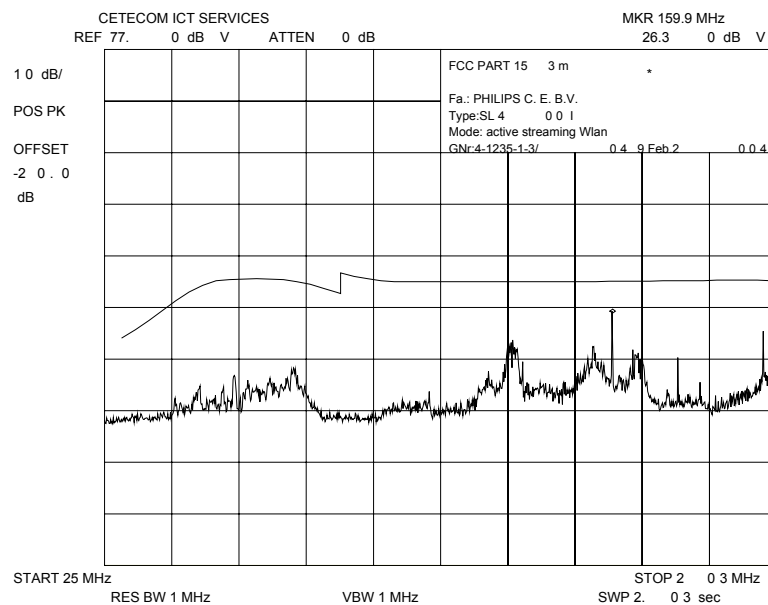
Plot 7: 12 – 25 GHz horizontal / vertical (valid for all three channels)



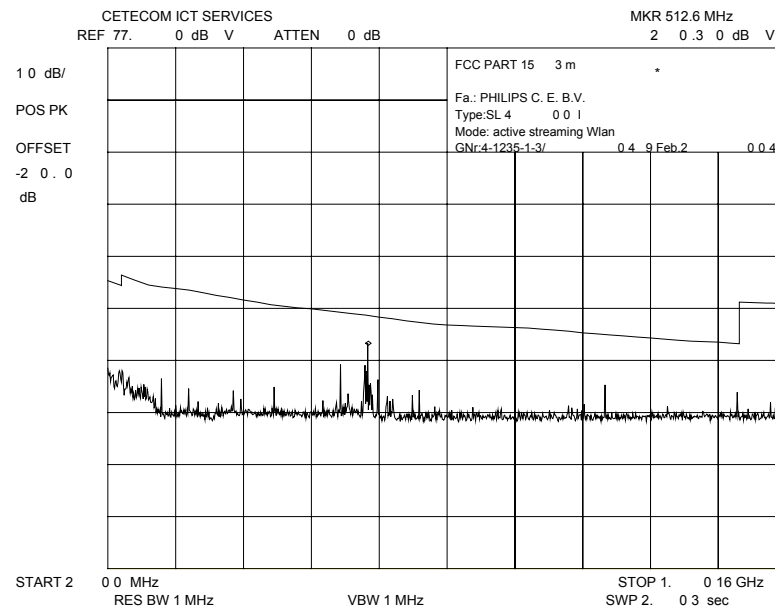
Plot 8: 0.03 – 0.2 GHz vertical (middle channel)



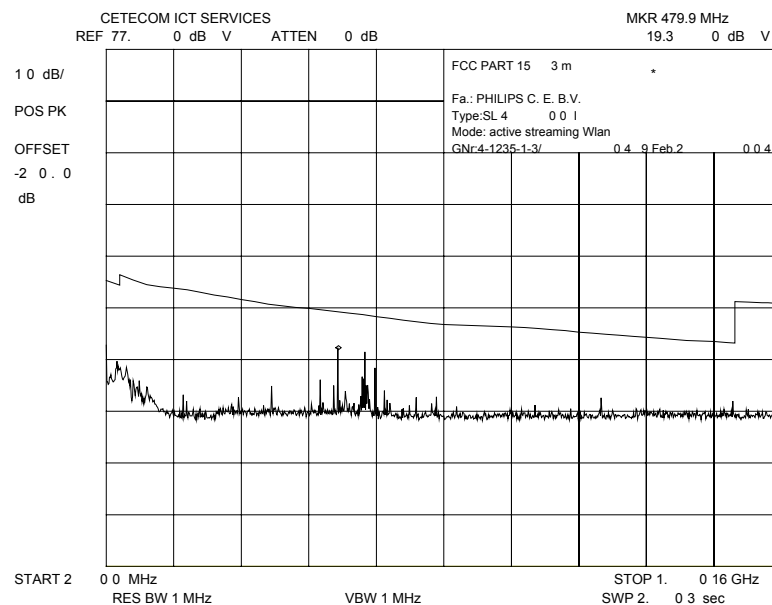
Plot 9: 0.03 – 0.2 GHz horizontal (middle channel)



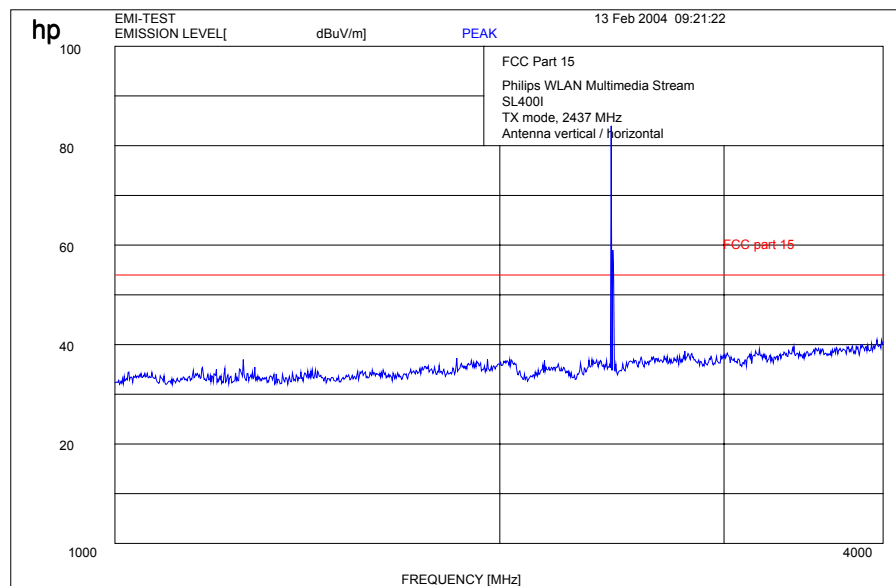
Plot 10: 0.2 – 1 GHz vertical (middle channel)



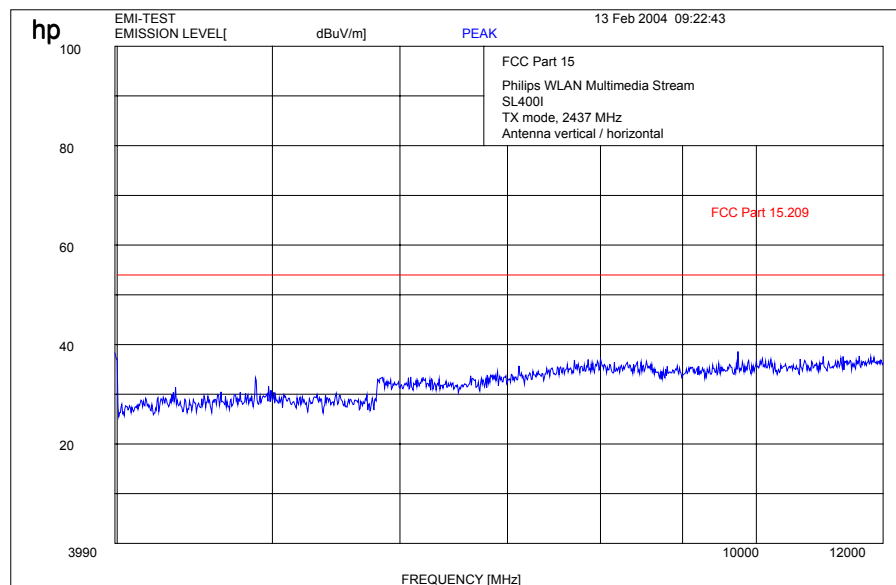
Plot 11: 0.2 – 1 GHz horizontal (middle channel)



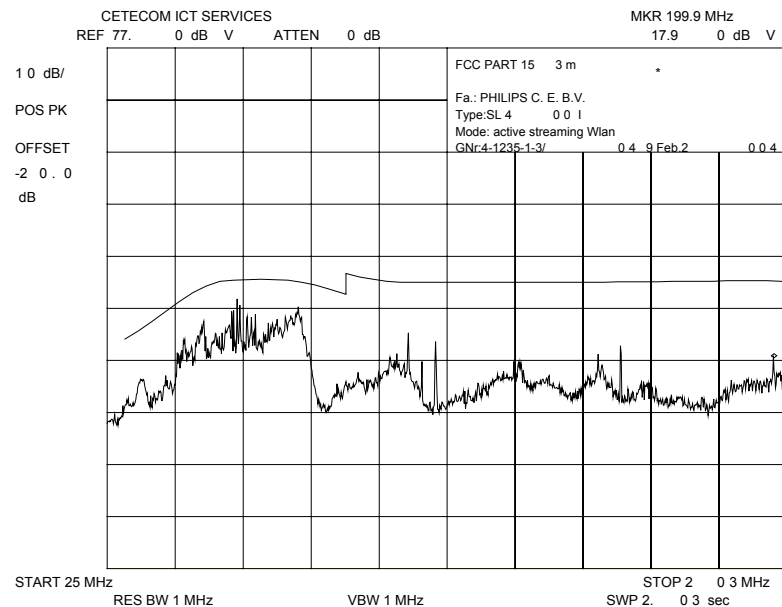
Plot 12: 1 - 4 GHz vertical / horizontal (middle channel)



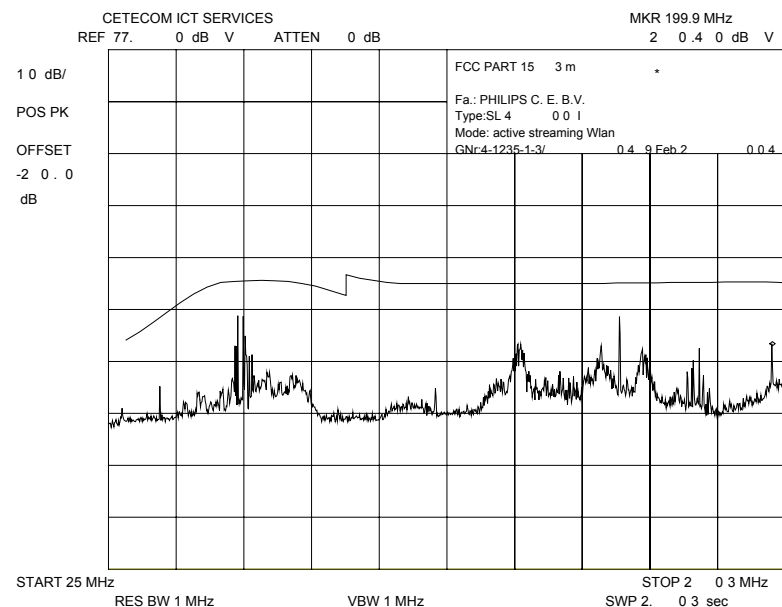
Plot 13: 4- 12 GHz vertical / horizontal (middle channel)



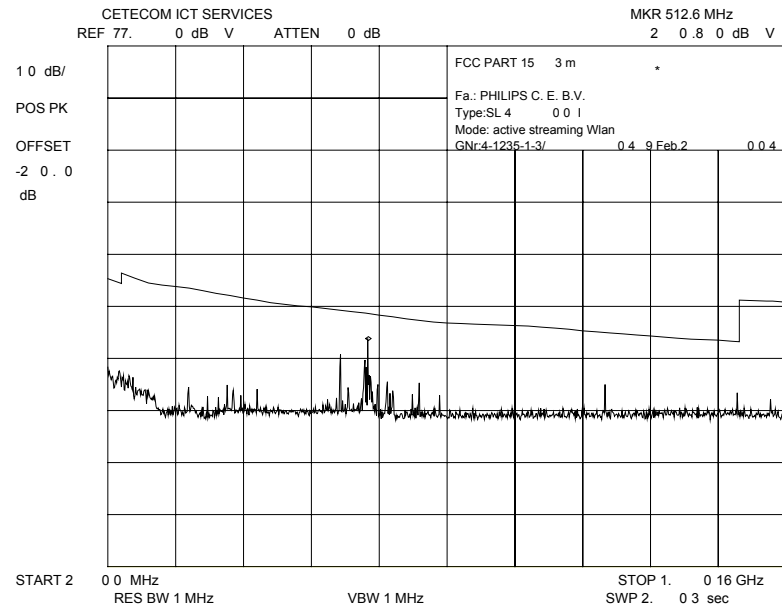
Plot 14: 0.03 – 0.2 GHz vertical (highest channel)



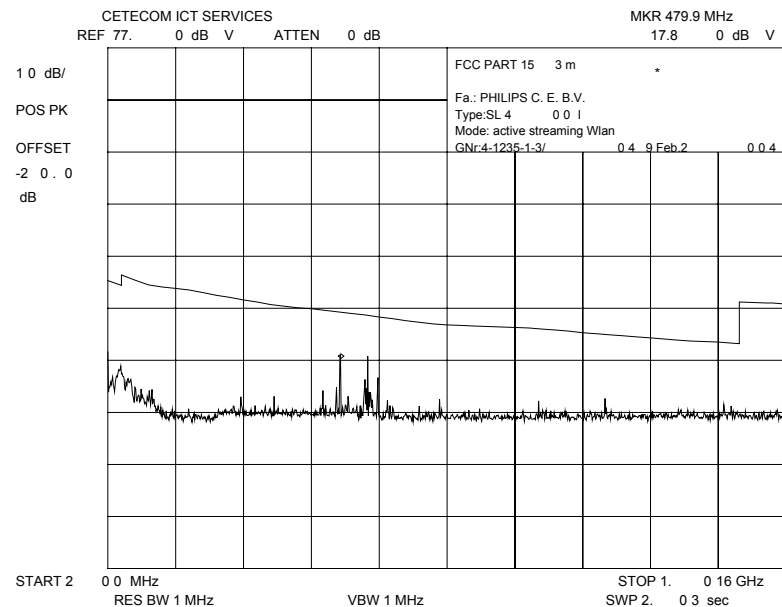
Plot 15: 0.03 – 0.2 GHz horizontal (highest channel)



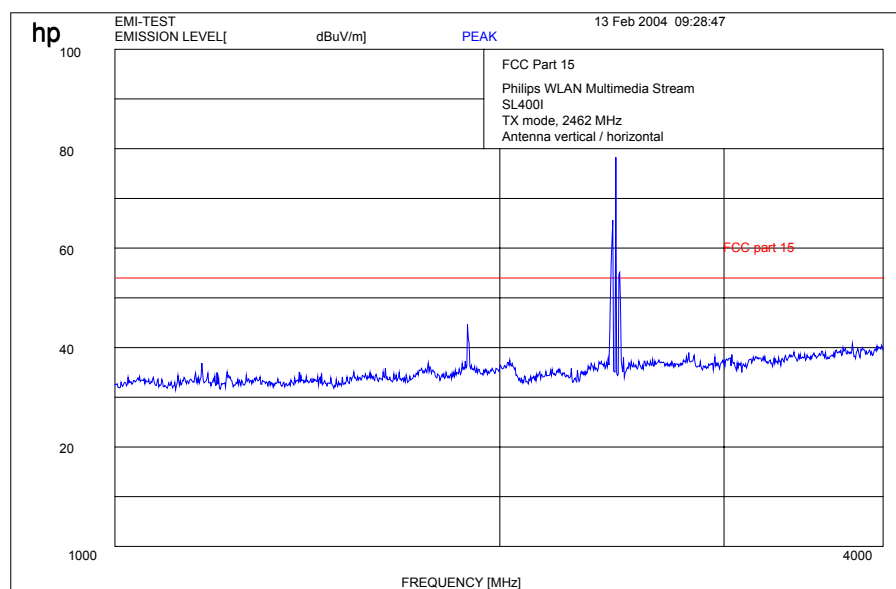
Plot 16: 0.2 – 1 GHz vertical (highest channel)



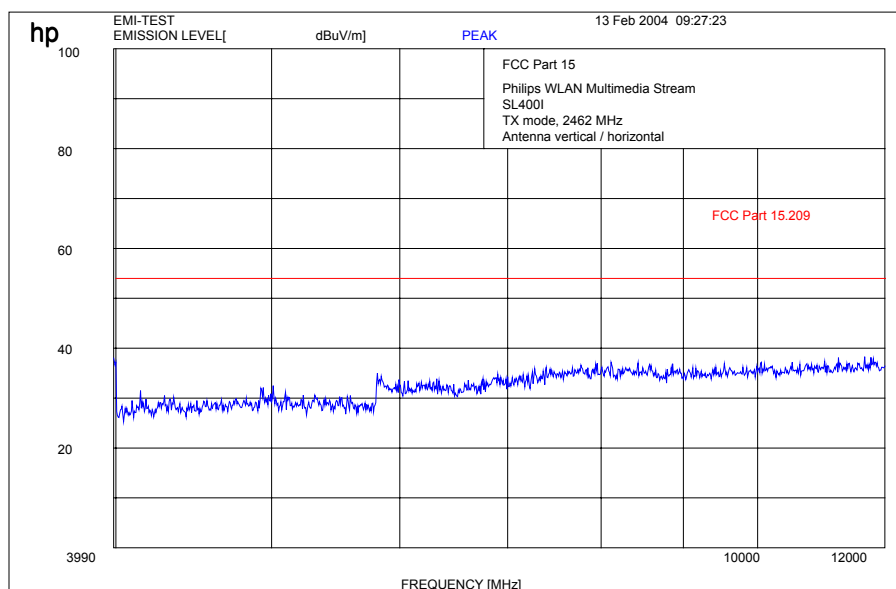
Plot 17: 0.2 – 1 GHz horizontal (highest channel)



Plot 18: 1 - 4 GHz vertical / horizontal (highest channel)



Plot 19: 4- 12 GHz vertical / horizontal (highest channel)



Results:

## 0.03 – 1 GHz vertical and horizontal (lowest channel)

| No | EMISSION         | SPEC            | MEASUREMENTS |       |      |     | SITE      |            | CORR         | COMMENTS |
|----|------------------|-----------------|--------------|-------|------|-----|-----------|------------|--------------|----------|
|    | FREQUENCY<br>MHz |                 | ABS          | dLIM  | MODE | POL | HGT<br>cm | AZM<br>deg |              |          |
|    |                  | LIMIT<br>dBuV/m |              | dB    |      |     |           |            | FACTOR<br>dB |          |
| 1  | 34.4             | 40.0            | 30.1         | -9.9  | PK   | H   | 100       | 360        | N/T          |          |
| 2  | 45.6             | 40.0            | 30.2         | -9.8  | PK   | H   | 100       | 360        | N/T          |          |
| 3  | 49.3             | 40.0            | 34.1         | -5.9  | PK   | H   | 100       | 360        | N/T          |          |
| 4  | 61.102           | 40.0            | 36.2         | -3.8  | QP   | V   | 96        | 59         | N/T          |          |
| 5  | 73.5             | 40.0            | 33.5         | -6.5  | PK   | V   | 100       | 360        | N/T          |          |
| 6  | 104.2            | 44.0            | 31.2         | -12.8 | PK   | V   | 100       | 360        | N/T          |          |
| 7  | 111.5            | 44.0            | 31.5         | -12.5 | PK   | V   | 100       | 360        | N/T          |          |
| 8  | 133.9            | 44.0            | 31.7         | -12.3 | PK   | H   | 302       | 360        | N/T          |          |
| 9  | 155.1            | 44.0            | 30.0         | -14.0 | PK   | V   | 100       | 360        | N/T          |          |
| 10 | 159.975          | 44.0            | 38.5         | -5.5  | QP   | H   | 165       | 65         | 11.9         |          |
| 11 | 199.9            | 44.0            | 30.4         | -13.6 | PK   | V   | 100       | 360        | N/T          |          |
| 12 | 266.9            | 46.0            | 26.7         | -19.3 | PK   | V   | 99        | 0          | N/T          |          |
| 13 | 297.1            | 46.0            | 26.4         | -19.6 | PK   | V   | 99        | 0          | N/T          |          |
| 14 | 351.0            | 46.0            | 28.2         | -17.8 | PK   | V   | 99        | 0          | N/T          |          |
| 15 | 399.1            | 46.0            | 25.4         | -20.6 | PK   | V   | 99        | 0          | N/T          |          |
| 16 | 399.9            | 46.0            | 32.5         | -13.6 | PK   | H   | 302       | 194        | N/T          |          |
| 17 | 479.9            | 46.0            | 37.1         | -8.9  | PK   | H   | 302       | 114        | N/T          |          |
| 18 | 512.974          | 46.0            | 40.8         | -5.2  | QP   | V   | 106       | 5          | 20.4         |          |
| 19 | 574.6            | 46.0            | 33.1         | -12.9 | PK   | V   | 99        | 0          | N/T          |          |
| 20 | 599.1            | 46.0            | 32.0         | -14.1 | PK   | H   | 302       | 269        | N/T          |          |
| 21 | 718.2            | 46.0            | 33.3         | -12.7 | PK   | H   | 302       | 348        | N/T          |          |
| 22 | 772.9            | 46.0            | 32.8         | -13.2 | PK   | V   | 99        | 0          | N/T          |          |
| 23 | 798.2            | 46.0            | 36.5         | -9.5  | PK   | V   | 99        | 0          | N/T          |          |
| 24 | 957.3            | 46.0            | 37.4         | -8.6  | PK   | V   | 99        | 0          | N/T          |          |
| 25 | 997.3            | 54.0            | 35.0         | -19.0 | PK   | V   | 99        | 0          | N/T          |          |

## 0.03 – 1 GHz vertical and horizontal (middle channel)

| No | EMISSION         | SPEC<br>LIMIT | MEASUREMENTS |       |      | POL | SITE |     | CORR<br>FACTOR | COMMENTS |
|----|------------------|---------------|--------------|-------|------|-----|------|-----|----------------|----------|
|    | FREQUENCY<br>MHz |               | ABS          | dLIM  | MODE |     | HGT  | AZM |                |          |
|    |                  |               | dBuV/m       | dB    |      |     | cm   | deg | dB             |          |
| 1  | 34.6             | 40.0          | 30.3         | -9.8  | PK   | V   | 99   | 360 | N/T            |          |
| 2  | 45.9             | 40.0          | 33.2         | -6.8  | PK   | V   | 99   | 360 | N/T            |          |
| 3  | 49.299           | 40.0          | 32.8         | -7.3  | QP   | V   | 102  | 61  | N/T            |          |
| 4  | 59.8             | 40.0          | 32.5         | -7.5  | PK   | V   | 99   | 360 | N/T            |          |
| 5  | 73.5             | 40.0          | 34.1         | -5.9  | PK   | V   | 99   | 360 | N/T            |          |
| 6  | 104.3            | 44.0          | 32.2         | -11.8 | PK   | V   | 99   | 360 | N/T            |          |
| 7  | 111.5            | 44.0          | 31.6         | -12.4 | PK   | V   | 99   | 360 | N/T            |          |
| 8  | 131.7            | 44.0          | 29.8         | -14.2 | PK   | V   | 99   | 360 | N/T            |          |
| 9  | 155.1            | 44.0          | 30.2         | -13.8 | PK   | V   | 99   | 360 | N/T            |          |
| 10 | 160.029          | 44.0          | 37.6         | -6.4  | QP   | H   | 169  | 65  | 11.9           |          |
| 11 | 177.3            | 44.0          | 29.1         | -14.9 | PK   | V   | 165  | 0   | N/T            |          |
| 12 | 199.9            | 44.0          | 34.1         | -9.9  | PK   | V   | 165  | 0   | N/T            |          |
| 13 | 214.7            | 44.0          | 27.2         | -16.8 | PK   | V   | 100  | 360 | N/T            |          |
| 14 | 264.5            | 46.0          | 28.4         | -17.6 | PK   | V   | 100  | 360 | N/T            |          |
| 15 | 297.1            | 46.0          | 27.1         | -18.9 | PK   | V   | 100  | 360 | N/T            |          |
| 16 | 351.0            | 46.0          | 28.2         | -17.8 | PK   | V   | 100  | 360 | N/T            |          |
| 17 | 399.9            | 46.0          | 30.4         | -15.7 | PK   | V   | 100  | 360 | N/T            |          |
| 18 | 479.9            | 46.0          | 39.1         | -6.9  | PK   | H   | 180  | 0   | N/T            |          |
| 19 | 512.978          | 46.0          | 41.4         | -4.6  | QP   | V   | 105  | 358 | 20.4           |          |
| 20 | 574.6            | 46.0          | 33.0         | -13.0 | PK   | V   | 100  | 360 | N/T            |          |
| 21 | 798.2            | 46.0          | 36.3         | -9.7  | PK   | V   | 100  | 360 | N/T            |          |
| 22 | 957.3            | 46.0          | 36.6         | -9.4  | PK   | V   | 100  | 360 | N/T            |          |
| 23 | 997.3            | 54.0          | 35.0         | -19.0 | PK   | V   | 100  | 360 | N/T            |          |

## 0.03 – 1 GHz vertical and horizontal (highest channel)

| No | EMISSION         | SPEC<br>LIMIT | MEASUREMENTS |       |      |     | SITE      |            | CORR<br>FACTOR | COMMENTS |
|----|------------------|---------------|--------------|-------|------|-----|-----------|------------|----------------|----------|
|    | FREQUENCY<br>MHz |               | ABS          | dLIM  | MODE | POL | HGT<br>cm | AZM<br>deg |                |          |
|    |                  |               | dBuV/m       | dB    |      |     |           |            | dB             |          |
| 1  | 34.4             | 40.0          | 30.1         | -9.9  | PK   | V   | 99        | 360        | N/T            |          |
| 2  | 39.0             | 40.0          | 26.7         | -13.3 | PK   | H   | 199       | 0          | N/T            |          |
| 3  | 49.2             | 40.0          | 20.4         | -19.6 | PK   | H   | 199       | 0          | N/T            |          |
| 4  | 50.8             | 40.0          | 33.4         | -6.7  | PK   | V   | 99        | 360        | N/T            |          |
| 5  | 60.428           | 40.0          | 21.6         | -18.4 | QP   | V   | 106       | 107        | 7.5            |          |
| 6  | 64.3             | 40.0          | 33.3         | -6.7  | PK   | V   | 99        | 360        | N/T            |          |
| 7  | 75.575           | 40.0          | 31.4         | -8.6  | QP   | V   | 135       | 83         | 7.9            |          |
| 8  | 104.3            | 44.0          | 34.3         | -9.7  | PK   | V   | 99        | 360        | N/T            |          |
| 9  | 111.5            | 44.0          | 32.6         | -11.4 | PK   | V   | 99        | 360        | N/T            |          |
| 10 | 133.0            | 44.0          | 32.0         | -12.0 | PK   | H   | 199       | 0          | N/T            |          |
| 11 | 154.0            | 44.0          | 30.2         | -13.8 | PK   | V   | 99        | 360        | N/T            |          |
| 12 | 159.985          | 44.0          | 38.1         | -5.9  | QP   | H   | 168       | 59         | 11.9           |          |
| 13 | 180.9            | 44.0          | 31.3         | -12.7 | PK   | H   | 199       | 0          | N/T            |          |
| 14 | 199.9            | 44.0          | 32.1         | -11.9 | PK   | H   | 199       | 0          | N/T            |          |
| 15 | 200.0            | 44.0          | 30.3         | -13.7 | PK   | H   | 201       | 0          | N/T            |          |
| 16 | 479.9            | 46.0          | 37.6         | -8.4  | PK   | V   | 100       | 360        | N/T            |          |
| 17 | 512.974          | 46.0          | 41.1         | -4.9  | QP   | V   | 100       | 4          | 20.4           |          |
| 18 | 574.6            | 46.0          | 34.0         | -12.0 | PK   | V   | 100       | 360        | N/T            |          |
| 19 | 798.2            | 46.0          | 36.0         | -10.0 | PK   | V   | 100       | 360        | N/T            |          |
| 20 | 957.3            | 46.0          | 36.1         | -9.9  | PK   | V   | 100       | 360        | N/T            |          |
| 21 | 997.3            | 54.0          | 35.2         | -18.8 | PK   | V   | 100       | 360        | N/T            |          |

| SPURIOUS EMISSIONS LEVEL §15.209 |          |                |          |          |                |          |          |                |
|----------------------------------|----------|----------------|----------|----------|----------------|----------|----------|----------------|
| 2412 MHz                         |          |                | 2437 MHz |          |                | 2462 MHz |          |                |
| F [MHz]                          | Detector | Level [dBµV/m] | F [MHz]  | Detector | Level [dBµV/m] | F [MHz]  | Detector | Level [dBµV/m] |
|                                  |          |                |          |          |                | 1881     | Peak     | 45.9           |
|                                  |          |                |          |          |                |          |          |                |
|                                  |          |                |          |          |                |          |          |                |
|                                  |          |                |          |          |                |          |          |                |
|                                  |          |                |          |          |                |          |          |                |
|                                  |          |                |          |          |                |          |          |                |
|                                  |          |                |          |          |                |          |          |                |
|                                  |          |                |          |          |                |          |          |                |
|                                  |          |                |          |          |                |          |          |                |
|                                  |          |                |          |          |                |          |          |                |
|                                  |          |                |          |          |                |          |          |                |
|                                  |          |                |          |          |                |          |          |                |
|                                  |          |                |          |          |                |          |          |                |
|                                  |          |                |          |          |                |          |          |                |
| Measurement uncertainty          |          |                | ±3 dB    |          |                |          |          |                |

f < 1 GHz : RBW/VBW: 100 kHz

f ≥ 1GHz : RBW/VBW: 1 MHz

Limits: § 15.247 (c)

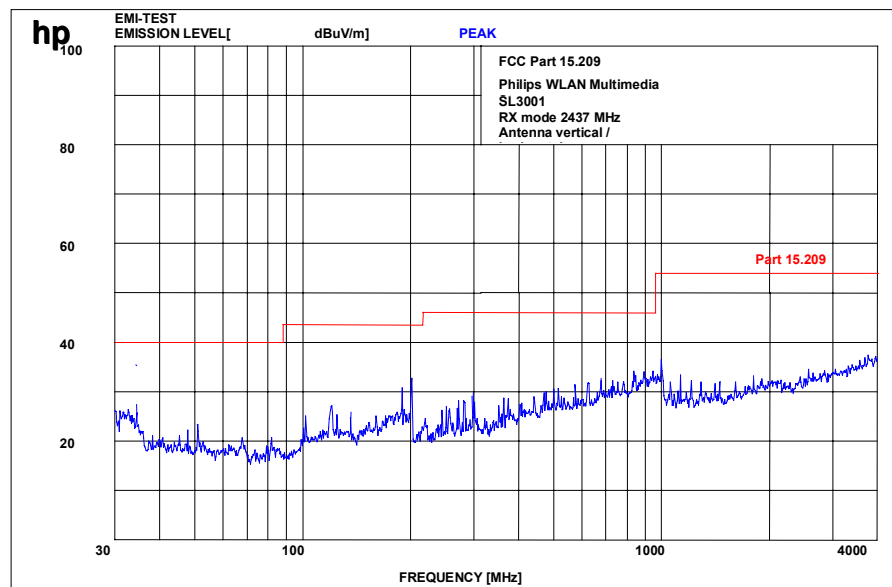
In any 100 kHz bandwidth outside the frequency band at least 20dB below the highest level of the desired power. In addition, radiated emissions which fall in the restricted bands, as defined in §15.205(a), must also comply with the radiated emission limits specified in §15.209(a) (see §15.205(c)).

Limits: § 15.209

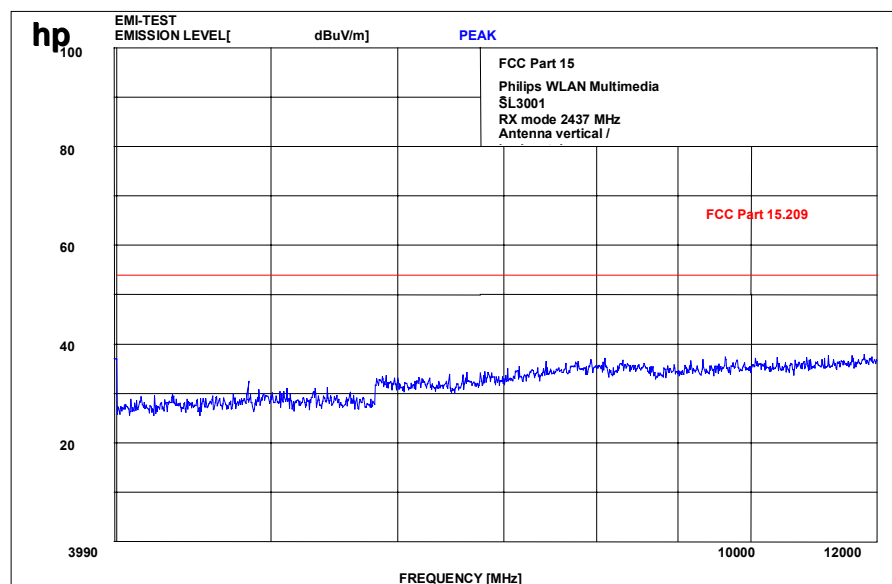
| Frequency [MHz] | Field strength [µV/m] | Measurement distance (m) |
|-----------------|-----------------------|--------------------------|
| 30 - 88         | 100 (40 dBµV/m)       | 3                        |
| 88 - 216        | 150 (43.5 dBµV/m)     | 3                        |
| 216 - 960       | 200 (46 dBµV/m)       | 3                        |
| above 960       | 500 (54 dBµV/m)       | 3                        |

## 3.12 Spurious Emissions - radiated (Receiver) §15.109 / 209

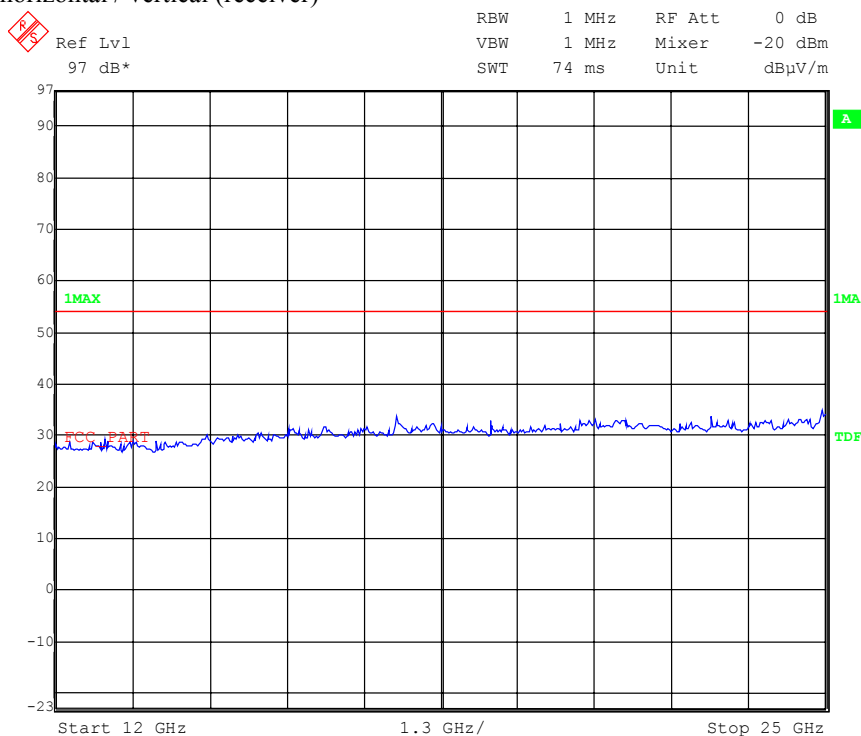
Plot 1: 0.03 – 4 GHz vertical (receiver)



Plot 2: 4- 12 GHz horizontal / vertical (receiver)



Plot 3: 12- 25 GHz horizontal / vertical (receiver)



Results:

| Spurious Emissions level [μV/m] |          |              |        |          |              |        |          |              |
|---------------------------------|----------|--------------|--------|----------|--------------|--------|----------|--------------|
| CH 1 / 2 / 3                    |          |              |        |          |              |        |          |              |
| f[MHz]                          | Detector | Level [μV/m] | f[MHz] | Detector | Level [μV/m] | f[MHz] | Detector | Level [μV/m] |
| All peaks << limit              |          |              |        |          |              |        |          |              |
|                                 |          |              |        |          |              |        |          |              |
|                                 |          |              |        |          |              |        |          |              |
|                                 |          |              |        |          |              |        |          |              |
|                                 |          |              |        |          |              |        |          |              |
|                                 |          |              |        |          |              |        |          |              |
|                                 |          |              |        |          |              |        |          |              |
|                                 |          |              |        |          |              |        |          |              |
|                                 |          |              |        |          |              |        |          |              |
|                                 |          |              |        |          |              |        |          |              |
|                                 |          |              |        |          |              |        |          |              |
| Measurement uncertainty         |          |              | ±3 dB  |          |              |        |          |              |

f < 1 GHz : RBW/VBW: 100 kHz

f ≥ 1GHz : RBW/VBW: 1 MHz

see above plots

Measurement distance see table

Limits : § 15.109 / 209

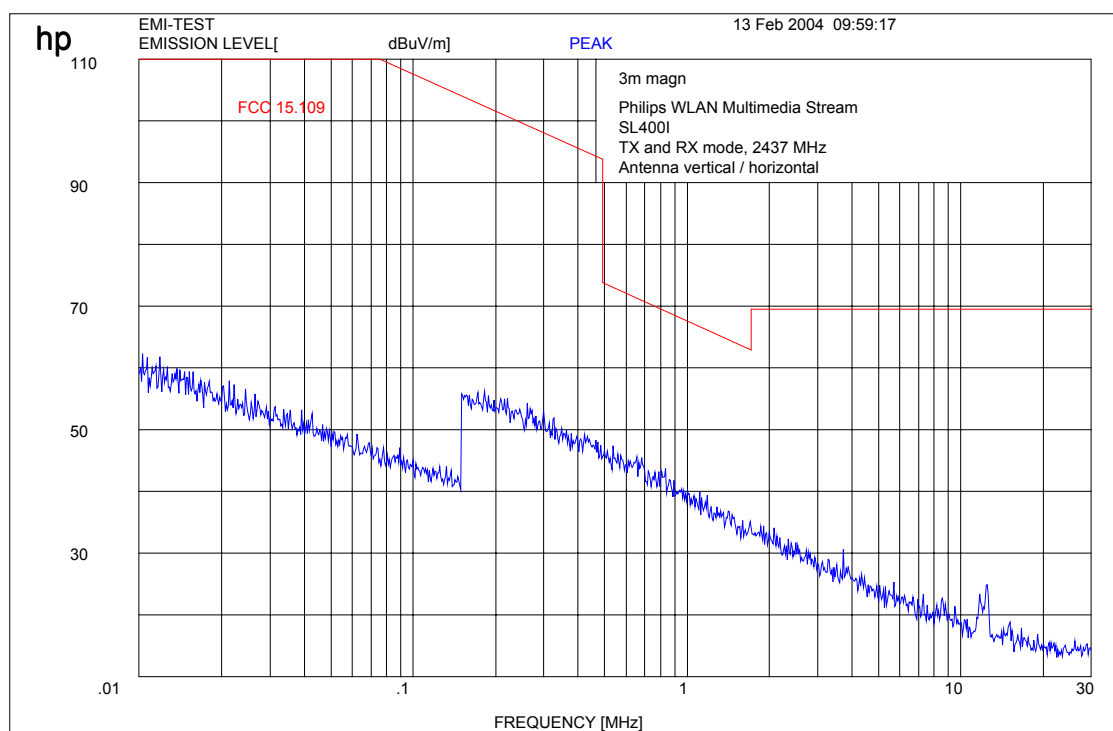
| Frequency (MHz) | Field strength (μV/m) | Measurement distance (m) |
|-----------------|-----------------------|--------------------------|
| 30 - 88         | 100 (40 dBμV/m)       | 3                        |
| 88 - 216        | 150 (43.5 dBμV/m)     | 3                        |
| 216 - 960       | 200 (46 dBμV/m)       | 3                        |
| above 960       | 500 (54 dBμV/m)       | 3                        |

## 3.13 Spurious Emissions - radiated <30 MHz §15.109

Measured at 10 m distance.

Values recalculated with 40 dB/decade according to FCC rules.

Plot 1:



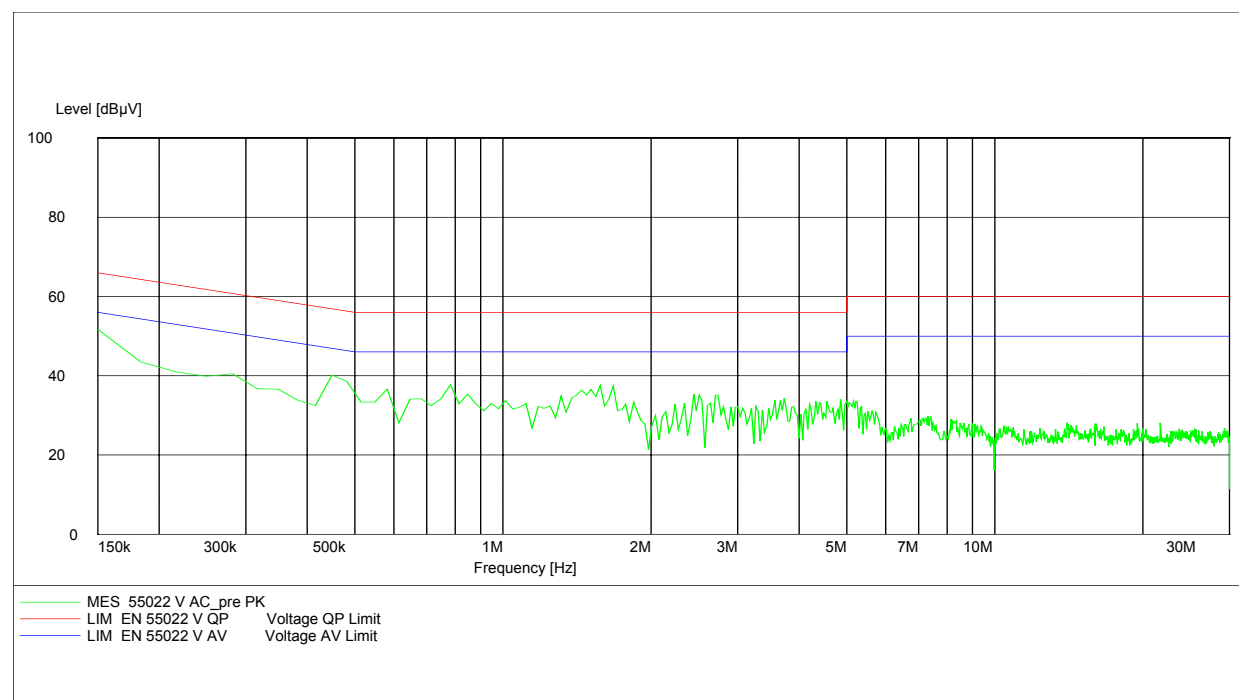
Limits:

| Frequency (MHz) | Field strength ( $\mu\text{V/m}$ ) | Measurement distance (m) |
|-----------------|------------------------------------|--------------------------|
| 0.009 – 0.490   | 2400/F(kHz)                        | 300                      |
| 0.490 – 1.705   | 24000/F(kHz)                       | 30                       |
| 1.705 – 30.0    | 30 / 29.5 dB $\mu\text{V/m}$       | 30                       |
| 30 - 88         | 100 / 40 dB $\mu\text{V/m}$        | 3                        |
| 88 - 216        | 150 / 43.5 dB $\mu\text{V/m}$      | 3                        |
| 216 - 960       | 200 / 46 dB $\mu\text{V/m}$        | 3                        |
| above 960       | 54 dB $\mu\text{V/m}$              | 3                        |

## 3.15 Conducted Emissions <30 MHz §15.107/207

Plot 1: CISPR 22

EUT: SL400I  
Manufacturer: Philips Consumer Electronics  
Operating Condition: TX and RX mode, max hold  
Test Site: Room 006  
Operator: Ames  
Test Specification: CISPR22  
Comment: pass



We measured in TX and RX mode, L1 and N floating and grounded, max value was hold.

Limits :

|                                   |           |
|-----------------------------------|-----------|
| Under normal test conditions only | See plots |
|-----------------------------------|-----------|

## 3.16 Used Testequipment

### *Anachoic chamber C:*

| Device                    | Manufacturer | Type      | S/N Number | Inv. No. Cetecom |
|---------------------------|--------------|-----------|------------|------------------|
| Spektrum Analyser         | HP           | 8566B     | 2747A05306 | 300001000        |
| Spektrum Analyser Display | HP           | 85662A    | 2816A16541 | 300002297        |
| Quasi-Peak-Adapter        | HP           | 85650A    | 2811A01131 | 300000999        |
| Power Dupply              | HP           | 6032A     | 2818A03450 | 300001040        |
| Power Attenuator          | Byrd         | 8325      | 1530       | 300001595        |
| Bikonical Antenna         | EMCO         | 3104      | 3758       | 300001602        |
| Log. Period. Antenna      | EMCO         | 3146      | 2130       | 300001603        |
| Double Ridged Antenna     | EMCO         | HP 3115P  | 3088       | 300001032        |
| Active Loop Antenna       | EMCO         | 6502      | 2210       | 300001015        |
| Antenna VDE/FCC           |              | HP11965B  |            | 300002298        |
| SRM-Drive                 | HP           | 9144A     | 2823e46556 | 300001044        |
| Software                  | HP           | EMI       |            | 300000983        |
| Busisolator               | Kontron      |           |            | 300001056        |
| Absorberhalle             | MWB          |           | 87400/02   | 300000996        |
| Salzsäule                 | Kontron      |           |            | 300001055        |
| Antenna                   | R&S          | HMO20     | 832211/003 | 300002243        |
| Indukt. Tast Antenna      | R&S          | HFH 2 Z4  | 881468/026 | 300001464        |
| System-Rack               | HP I.V.      | 85900     | *          | 300000222        |
| Spectrum Analyzer         | HP           | 8566B     | 2747A05275 | 300000219        |
| Quasi-Peak-Adapter        | HP           | 85650A    | 2811A01135 | 300000216        |
| RF-Preselector            | HP           | 85685A    | 2837A00779 | 300000218        |
| Rahmen Antenne            | R&S          | HFH2-Z2   | 891847-35  | 300001169        |
| Leitungsteiler            | HP           | 11850C    |            | 300000997        |
| Breitband-Hornantenne EMI | HP           | 35155P    |            | 300002300        |
| PC                        | HP           | Vectra VL |            | 300001688        |
| VHF Meßantenne            | Schwarzbeck  | VHA 9103  |            | 300001778        |
| Spectrum Analyzer Display | HP           | 85662A    | 2816A16497 | 300001690        |
| VHF Meßantenna            | Schwarzbeck  | VHA 9103  |            | 300001780        |
| Biconical Antenna         | EMCO         | 3104 C    | 9909-4868  | 300002590        |

### *SRD Laboratory:*

| Device                          | 300001207 | Type           | S/N Number | Inv. No. Cetecom |
|---------------------------------|-----------|----------------|------------|------------------|
| Spectrum Analyzer               | 300001208 | 494AP          | B010241    | 300000863        |
| Spectrum Analyzer               | HP        | 71210A (70000) | 2731A02347 | 300000321        |
| Spectrum Analyzer Display       | HP        | 70206A         | 2840A01553 | 300002017        |
| Reference Frequency             | HP        | 70310A         | 2736A00707 | 300002018        |
| Local Oscillator                | HP        | 70900A         | 2842A02221 | 300002019        |
| ZF-Modul 10Hz-300 kHz           | HP        | 70902A         | 2840A02145 | 300002020        |
| ZF-Modul 100 kHz-3 MHz          | HP        | 70903A         | 2835A01069 | 300002021        |
| HF-Teil für 71210A 100Hz- 22GHz | HP        | 70908A         |            | 300002022        |
| Spectrum Analyzer 2             | HP        | 85660B         | 3138A07614 |                  |
| Spectrum Analyzer Display 2     | HP        | 85662A         | 3144A20627 |                  |

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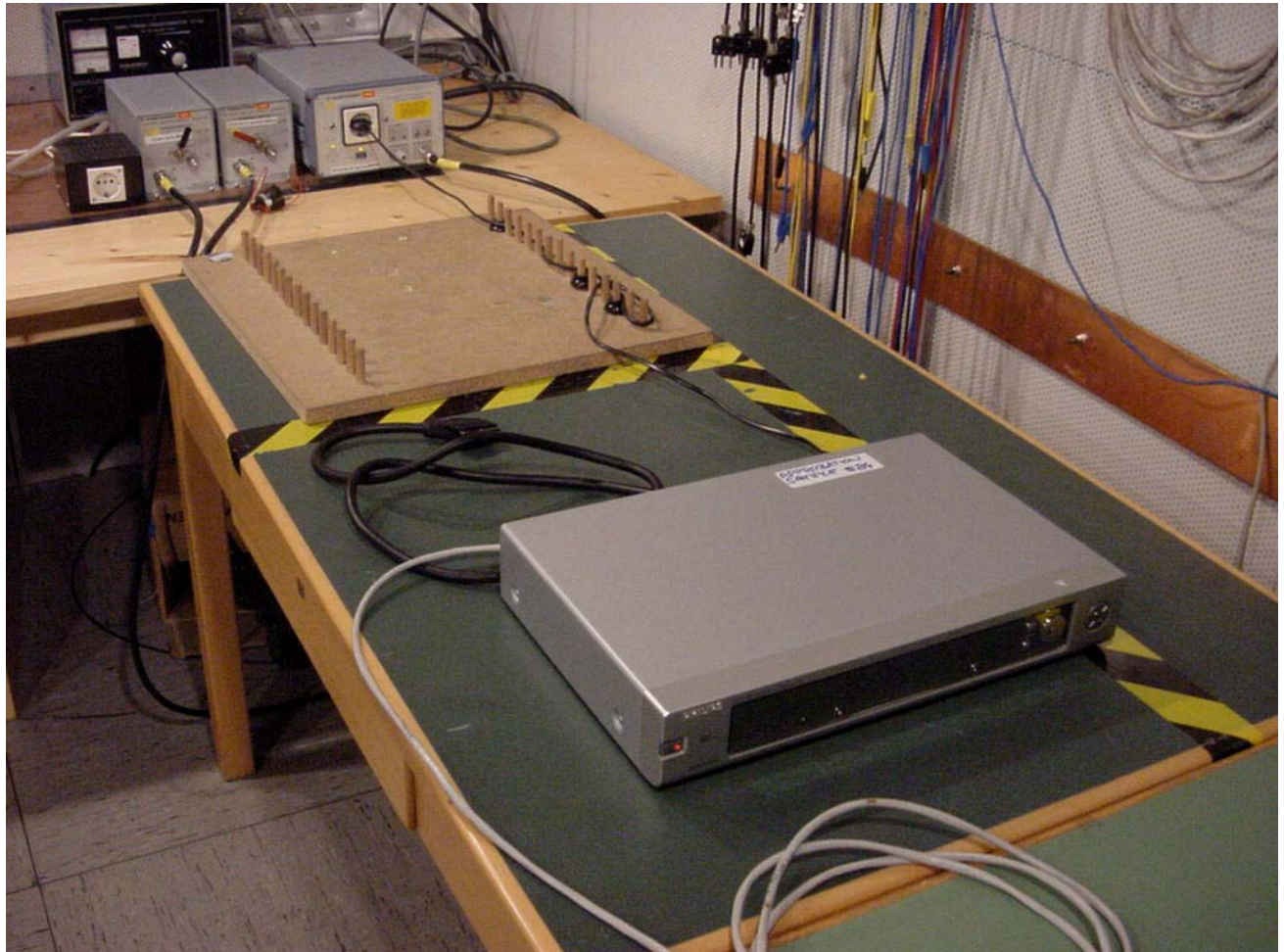
|                                |                 |           |            |           |
|--------------------------------|-----------------|-----------|------------|-----------|
| Signal Generator DC-600 KHz    | HP              | 8904A     | 2822A01213 | 300001157 |
| Signal Generator DC-600 KHz    | HP              | 8904A     | 2822A01214 | 300001158 |
| Powersupply                    | HP              | 6038A     | 3122A11097 | 300001204 |
| Netznachbildung                | R&S             | ESH3-Z5   | 828576/020 | 300001210 |
| Amplituden Controller          | R&S             | SMDU-Z2   | 871829/051 | 300002309 |
| Trenntrafo                     | Erfi            | 913501    |            | 300001205 |
| Trenntrafo                     | Grundig         | RT5A      | 9242       | 300001627 |
| Relais Matrix                  | HP              | 3488A     | 2719A15013 | 300001156 |
| Multimeter                     | Siemens         | Multizet  |            | 300001102 |
| Peak Power Calibrator          | HP              | 8900B     |            | 300001084 |
| Schallgeber                    | Schomandl       | SG 1      | 10159      | 300001209 |
| Schallgeber                    | Schomandl       | SG 2      | 10176      | 300002473 |
| Filter                         | FSY Microwave   |           |            | 300001206 |
| Attenuatorer                   | Pro Nova        |           |            | 300002476 |
| Klimaschrank                   | Heraeus Voetsch | VUK04/500 |            | 300001012 |
| Spectrum Analyzer 3            | HP              | 8566A     | 1925A00257 | 300001098 |
| Spectrum Analyzer Display 3    | HP              | 85662     | 1925A00860 | 300002306 |
| Oszilloscope                   | Tektronix       | 2432      | 110261     | 300001165 |
| Radiocom. Analyzer             | R&S             | CMTA 54   | 894043/010 | 300001175 |
| Powersupply                    | HP              | 6038A     | 2848A07027 | 300001174 |
| Signal Generator 0.01-1280 MHz | HP              | 8662A     | 2224A01012 | 300001110 |
| Signal Generator (Funktionen)  | R&S             | AFGU      | 862490/032 | 300001201 |
| Trenntrafo                     | Erfi            | MPL       | 91350      | 300001155 |
| Relais Matrix                  | R&S             | PSU       | 893285/020 | 300001173 |
| Power Meter                    | HP              | 436A      | 2101A12378 | 300001136 |
| Powersensor                    | HP              | 8484A     | 2237A10156 | 300001140 |
| Powersensor                    | HP              | 8482A     | 2237A06016 | 300001139 |
| Relais Matrix                  | R&S             | PSU       | 282628/004 | 300001214 |
| Powersupply                    | Zentro          |           | 2007       | 300001109 |
| Oszilloscope                   | Tektronix       | 7633      |            | 300001111 |
| Klimaschrank                   | Heraeus Voetsch | VUK04/500 | 32926      | 300001500 |
| Quasi-Peak Adapter             | HP              | 85650A    | 2811A01204 | 300002308 |
| Radiocom. Analyzer             | R&S             | CMTA 84   | 894199/012 | 300001176 |
| Oszilloscope                   | HP              | 54510A    | 3022A02062 | 300001202 |
| Funkmeßplatz                   | Schomandl       | FD1000    | 34982      | 300001115 |
| Signal Generator               | R&S             | SMPC      | 882416/019 | 300001162 |
| Frequency counter              | HP              | 5340A     | 2116A08138 | 300001104 |
| Power Meter                    | HP              | 436A      | 2031U01461 | 300001105 |
| Powersensor                    | HP              | 8482A     |            | 300001106 |
| Powersensor                    | HP              | 8484A     |            | 300001107 |
| Powersensor                    | HP              | 8485A     |            | 300001108 |
| Powersupply                    | HP              | 6038A     | 2752A04866 | 300001161 |
| Reflectionsmeter               | R&S             | NAP       | 879191     | 300001132 |
| Signal Generator NF            | R&S             | SPN       | 880139/068 | 300001142 |
| Trenntrafo                     | Erfi            | MPL       | 91350      | 300001151 |
| Attenuator                     | JFW             | 30 db     | 1350h/104  | 300001703 |
| Attenuator                     | JFW             | 10 db     | 1350h/103  | 300001704 |
| Attenuator                     | JFW             | 20 db     | 1350h/106  | 300001705 |
| Attenuator                     | JFW             | 20 db     | 1350h/105  | 300001766 |
| Filter                         | Spinner         | 153755    |            | 300001791 |

|                                |                 |           |            |           |
|--------------------------------|-----------------|-----------|------------|-----------|
| Powersensor                    | HP              | 8484A     | 2237A10494 | 300001666 |
| Powersupply                    | HP              | 6038A     | 3122A11097 | 300001204 |
| Netznachbildung                | R&S             | ESH3-Z5   | 828576/020 | 300001210 |
| Amplituden Controller          | R&S             | SMDU-Z2   | 871829/051 | 300002309 |
| Trenntrafo                     | Erfi            | 913501    |            | 300001205 |
| Trenntrafo                     | Grundig         | RT5A      | 9242       | 300001627 |
| Relais Matrix                  | HP              | 3488A     | 2719A15013 | 300001156 |
| Multimeter                     | Siemens         | Multizet  |            | 300001102 |
| Peak Power Calibrator          | HP              | 8900B     |            | 300001084 |
| Schallgeber                    | Schomandl       | SG 1      | 10159      | 300001209 |
| Schallgeber                    | Schomandl       | SG 2      | 10176      | 300002473 |
| Filter                         | FSY Microwave   |           |            | 300001206 |
| Attenuatorer                   | Pro Nova        |           |            | 300002476 |
| Klimaschrank                   | Heraeus Voetsch | VUK04/500 |            | 300001012 |
| Spectrum Analyzer 3            | HP              | 8566A     | 1925A00257 | 300001098 |
| Spectrum Analyzer Display 3    | HP              | 85662     | 1925A00860 | 300002306 |
| Oszilloscope                   | Tektronix       | 2432      | 110261     | 300001165 |
| Radiocom. Analyzer             | R&S             | CMTA 54   | 894043/010 | 300001175 |
| Powersupply                    | HP              | 6038A     | 2848A07027 | 300001174 |
| Signal Generator 0.01-1280 MHz | HP              | 8662A     | 2224A01012 | 300001110 |
| Signal Generator (Funktionen)  | R&S             | AFGU      | 862490/032 | 300001201 |
| Trenntrafo                     | Erfi            | MPL       | 91350      | 300001155 |
| Relais Matrix                  | R&S             | PSU       | 893285/020 | 300001173 |
| Power Meter                    | HP              | 436A      | 2101A12378 | 300001136 |
| Powersensor                    | HP              | 8484A     | 2237A10156 | 300001140 |
| Powersensor                    | HP              | 8482A     | 2237A06016 | 300001139 |
| Relais Matrix                  | R&S             | PSU       | 282628/004 | 300001214 |
| Powersupply                    | Zentro          |           | 2007       | 300001109 |
| Oszilloscope                   | Tektronix       | 7633      |            | 300001111 |
| Klimaschrank                   | Heraeus Voetsch | VUK04/500 | 32926      | 300001500 |
| Quasi-Peak Adapter             | HP              | 85650A    | 2811A01204 | 300002308 |
| Radiocom. Analyzer             | R&S             | CMTA 84   | 894199/012 | 300001176 |
| Oszilloscope                   | HP              | 54510A    | 3022A02062 | 300001202 |
| Funkmeßplatz                   | Schomandl       | FD1000    | 34982      | 300001115 |
| Signal Generator               | R&S             | SMPC      | 882416/019 | 300001162 |
| Frequency counter              | HP              | 5340A     | 2116A08138 | 300001104 |
| Power Meter                    | HP              | 436A      | 2031U01461 | 300001105 |
| Powersensor                    | HP              | 8482A     |            | 300001106 |
| Powersensor                    | HP              | 8484A     |            | 300001107 |
| Powersensor                    | HP              | 8485A     |            | 300001108 |
| Powersupply                    | HP              | 6038A     | 2752A04866 | 300001161 |
| Reflectionsmeter               | R&S             | NAP       | 879191     | 300001132 |
| Signal Generator NF            | R&S             | SPN       | 880139/068 | 300001142 |
| Trenntrafo                     | Erfi            | MPL       | 91350      | 300001151 |
| Attenuator                     | JFW             | 30 db     | 1350h/104  | 300001703 |
| Attenuator                     | JFW             | 10 db     | 1350h/103  | 300001704 |
| Attenuator                     | JFW             | 20 db     | 1350h/106  | 300001705 |
| Attenuator                     | JFW             | 20 db     | 1350h/105  | 300001766 |
| Filter                         | Spinner         | 153755    |            | 300001791 |
| Powersensor                    | HP              | 8484A     | 2237A10494 | 300001666 |

|                               |                    |                          |            |           |
|-------------------------------|--------------------|--------------------------|------------|-----------|
| Powersensor                   | HP                 | 8485A                    | 2238A00849 | 300001668 |
| Bandfilter                    | Telonic            | TTF7255EE                | 20293-11   | 300001300 |
| Bandfilter                    | Telonic            | TTF12555EE               | 20292-6    | 300001302 |
| Bandfilter                    | Telonic            | TTF25055EE               | 20291-8    | 300001304 |
| Bandfilter                    | Telonic            | TTF50055EE               | 20290-7    | 300001305 |
| Bandfilter                    | Telonic            | TTF100055EE              | 20289-7    | 300001307 |
| Bandfilter                    | Telonic            | TTA300055EESN            | 20370-2    | 300001312 |
| Bandstop                      | Telonic            | TTR3753EE1               | 30013-1    | 300001314 |
| Bandstop                      | Telonic            | TTR723EE                 | 20417-2    | 300001316 |
| Bandstop                      | Telonic            | TTR95-3EE                | 20372-4    | 300001318 |
| Bandstop                      | Telonic            | TTR1903EE                | 30036-4    | 300001320 |
| Bandstop                      | Telonic            | TTR3753EE                | 20369-5    | 300001321 |
| Bandstop                      | Telonic            | TTR750-3EE1              | 90177-1    | 300002387 |
| Highpass                      | Pro Nova           | HDP120-6GG               | ohne       | 300001348 |
| Highpass                      | Pro Nova           | HMC500-6AA               | HJ67-01?   | 300001350 |
| Highpass                      | Narda              | NHP 9000                 | 0004       | 300001362 |
| Highpass                      | Narda              | HDP16-6GH                | JV70-01    | 300001364 |
| Highpass                      | RSD                | HDP50-6GH,<br>HDP200-6GG |            | 300001371 |
| Highpass                      | RSD                | 2099-02-01               |            | 300000370 |
| Signal Generator 0.1-2060 MHz | HP                 | 8657A                    | 2838U00736 | 300001009 |
| Radio Code Analyzer           | Schlumberger       | SL4922                   |            | 300001038 |
| Signal Analyzer               | B&K                | 2033                     |            | 300001047 |
| Frequency counter             | HP                 | 5386A                    | 2704A01243 | 300000998 |
| Laufzeitelement               | WR-Elektronik      |                          |            | 300001036 |
| Powersupply Stromversorgung   | Syston             | M5P 40/15A               | 828233     | 300001291 |
| Powersupply                   | Heiden             | 1108-32                  | 1701       | 300001392 |
| Powersupply                   | Heiden             | 1108-32                  | 1802       | 300001383 |
| Powersupply                   | Heiden             | 1108-32                  | 003202     | 300001187 |
| Powersupply                   | Zentro             | LA 2x30/5GB1             | 2011       | 300001276 |
| Powersupply                   | Zentro             | LA 2x30/5GB2             | 2012       | 300001275 |
| Powersupply                   | Zentro             | LA 30/5GA                | 2041,2042  | 300001287 |
| Trenntrafo                    | Grundig            | RT5A                     | 8781       | 300001277 |
| Trenntrafo                    | Grundig            | RT5A                     | 9242       | 300001263 |
| Multimeter                    | Goerz Elektro      | Unigor 6e P              | 911 355    | 300001625 |
| Multimeter                    | Goerz Elektro      | Unigor 6e P              | 911 391    | 300001281 |
| Climatic Box                  | Heraeus Voetsch    | VUK04/500                | 32679      | 300000299 |
| Powersensor + Att.            | HP                 | 8482B                    | 2703A02586 | 300001492 |
| Attenuator 30 dB              | HP                 | 8498A                    | 1801A02445 | 300001475 |
| Signal Generator NF           | HP                 |                          | 2822A01203 | 300001004 |
| Attenuator                    | Spinner            | BN 534171 D              | 51881      | 300001516 |
| Attenuator coaxial            | Bird               | 8325                     | 2429       | 300001513 |
| Impulsbegrenzer               | R&S                | ESH 3 Z2                 |            | 300001460 |
| 4Port Box                     | R&S                | 4Port Box                | 860457/005 | 300001472 |
| Signal Generator 0.1-4200 MHz | HP                 | 8665A                    | 2833A0011  | 300002299 |
| NF-Spektrumanalyzer           | B&K                | 2033A                    |            | 300002301 |
| Swissphone Freifeld-Messbox   | Swissphone Schweiz |                          |            | 300002302 |
| Trenntrafo regelbar           | Grundig            | RT5H                     | 9242       | 300001628 |
| Signal Generator              | HP                 | 8111A                    | 2215G00867 | 300001117 |

## 4 Photographs

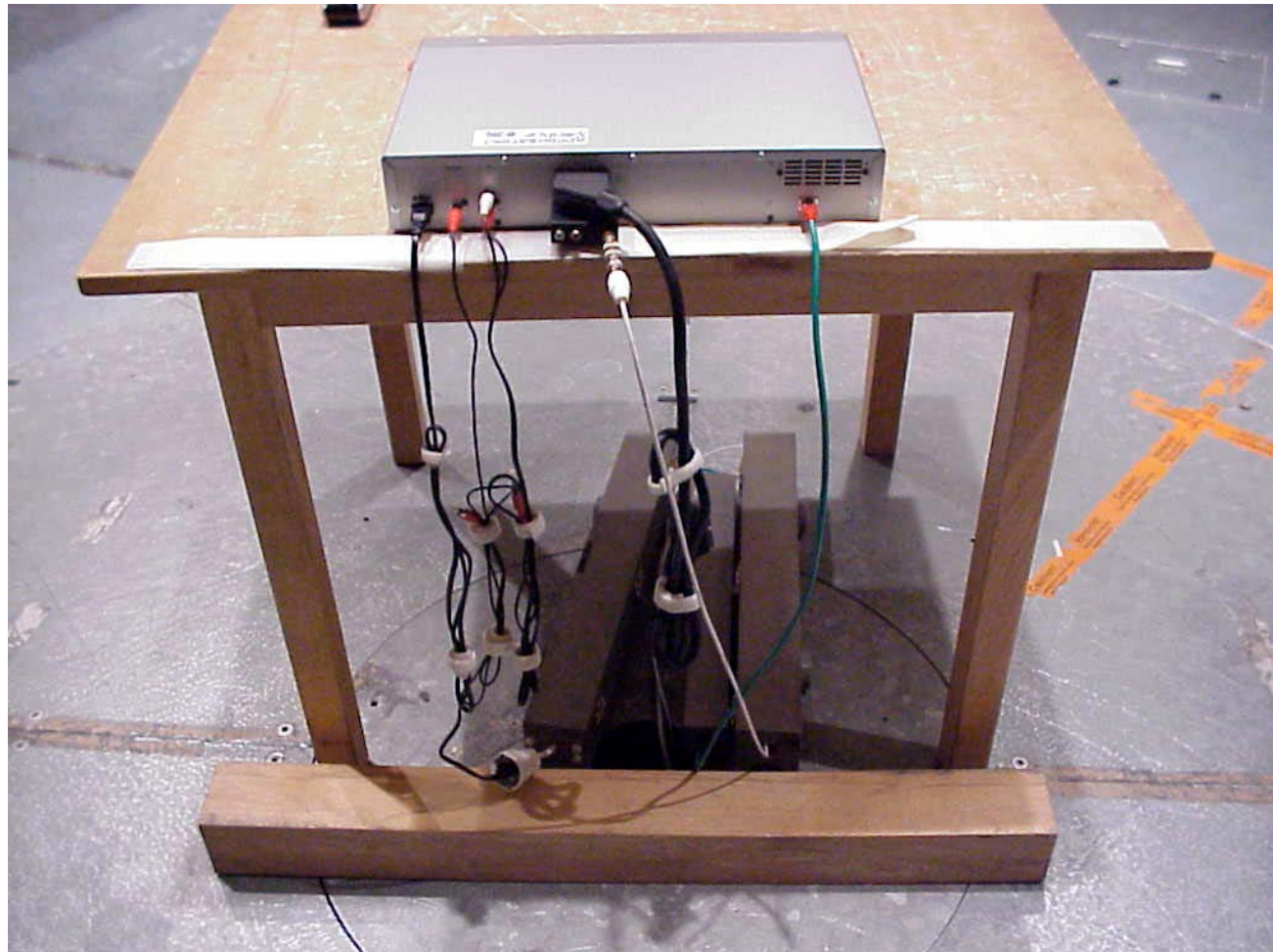
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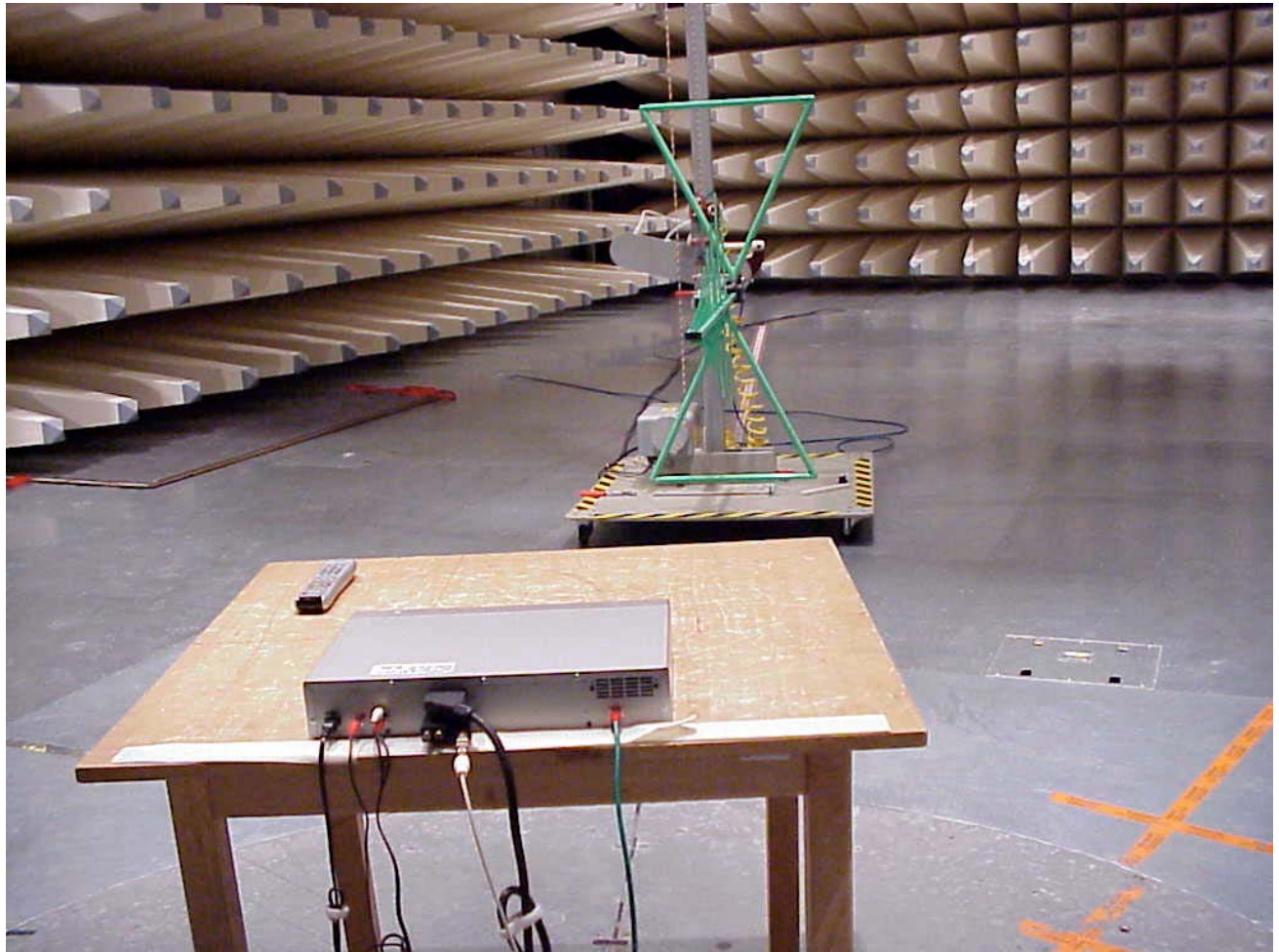
Test site:



Test site:



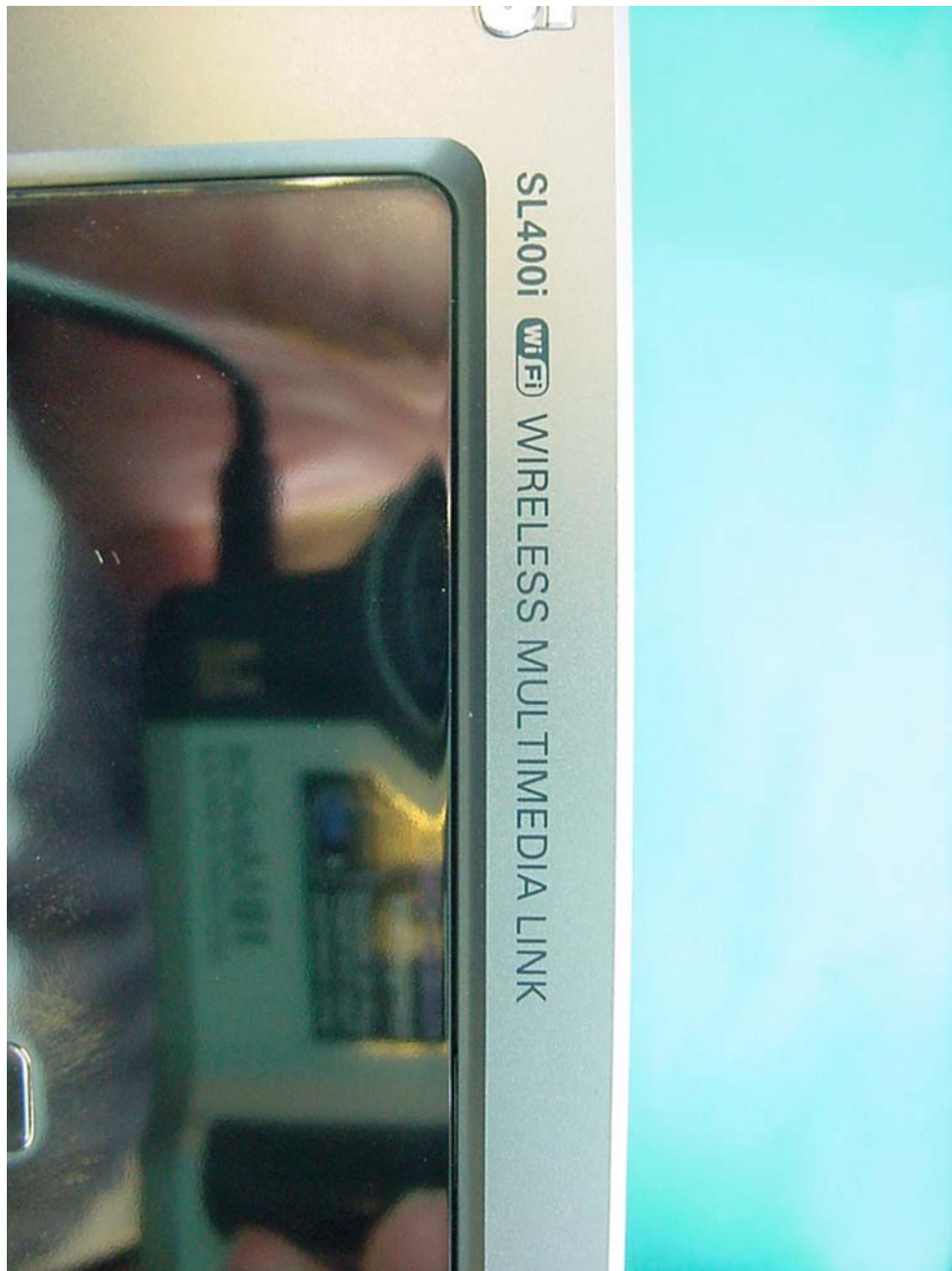
Test site:



Test sample:







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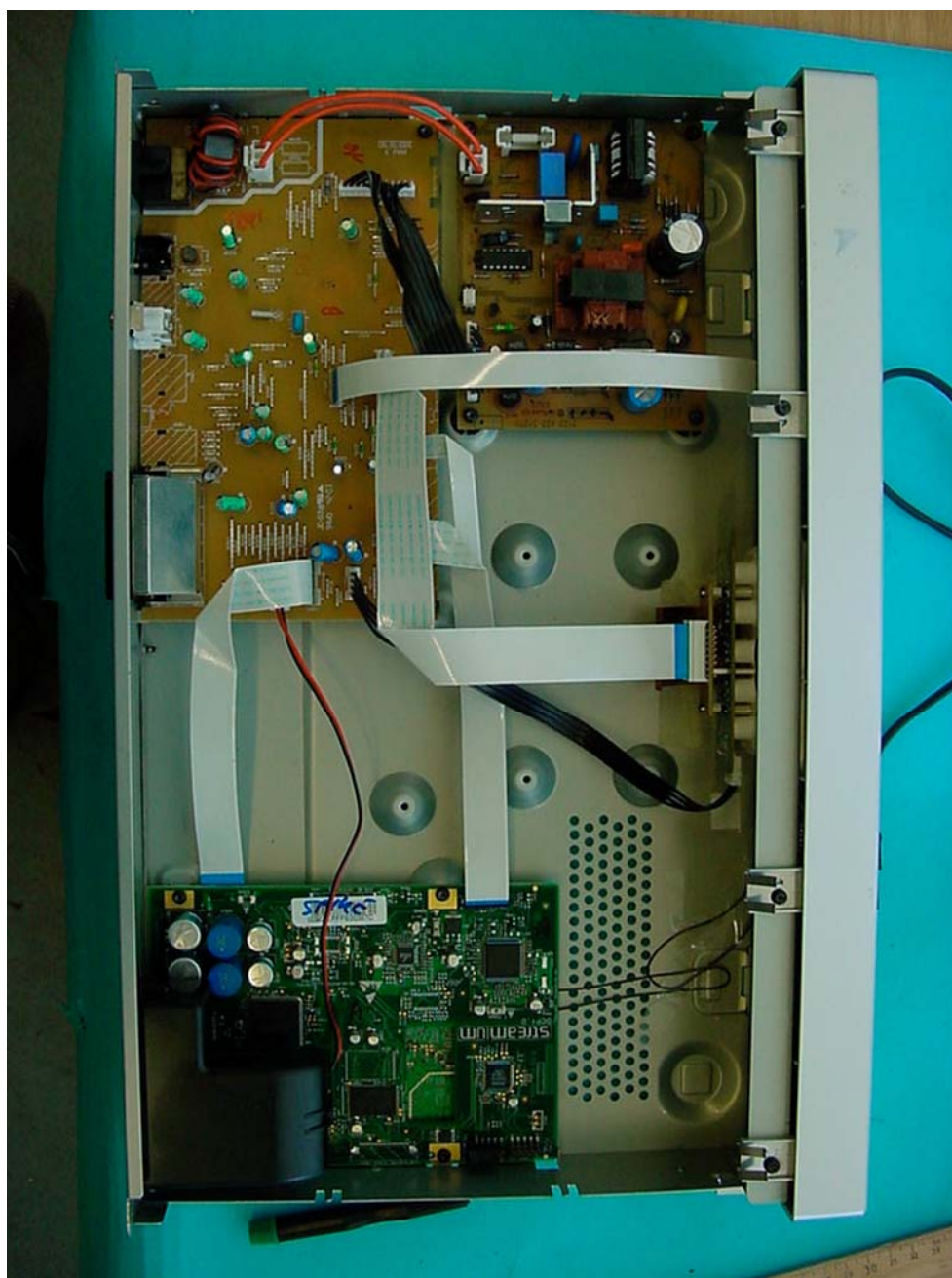
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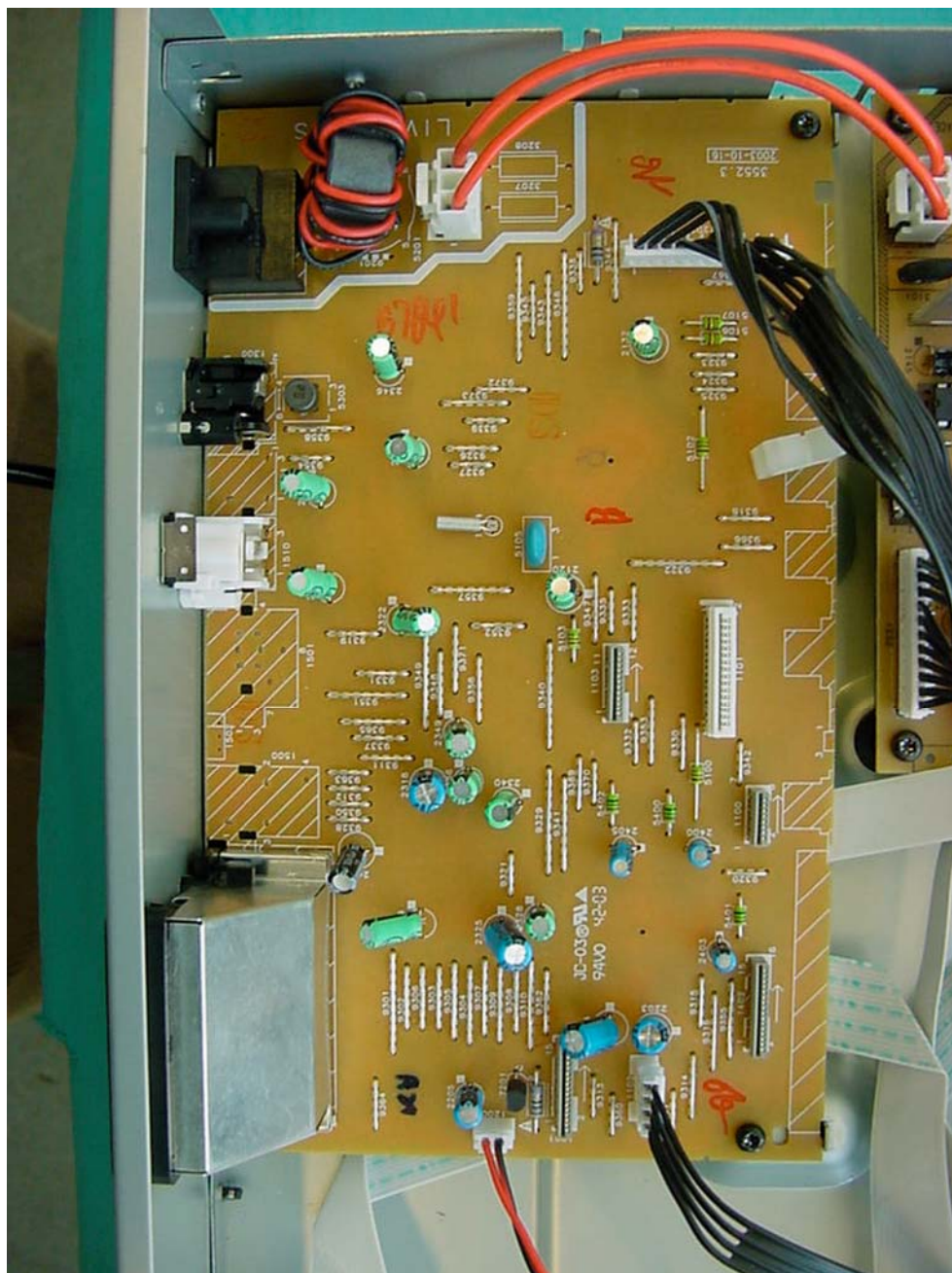
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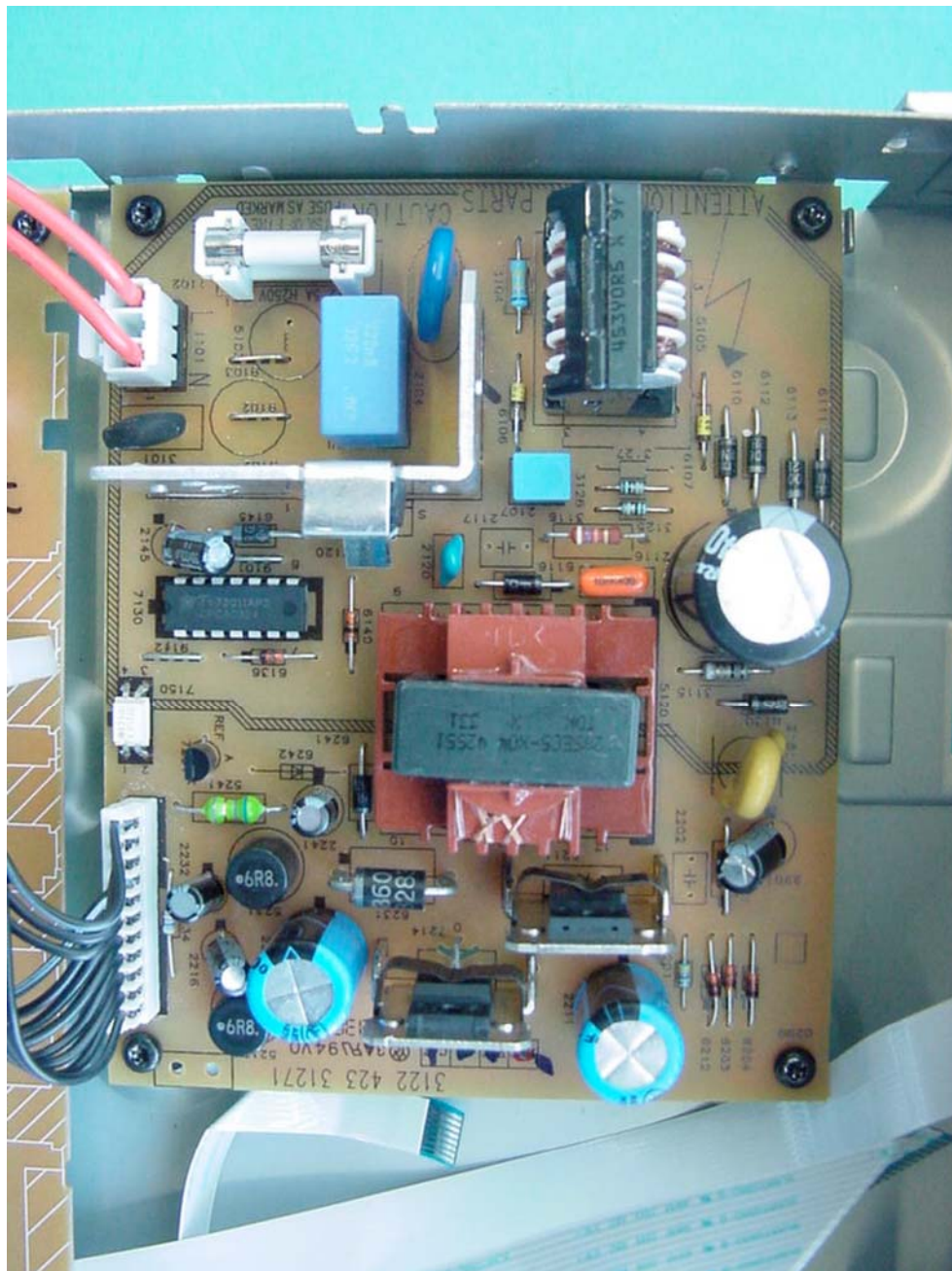
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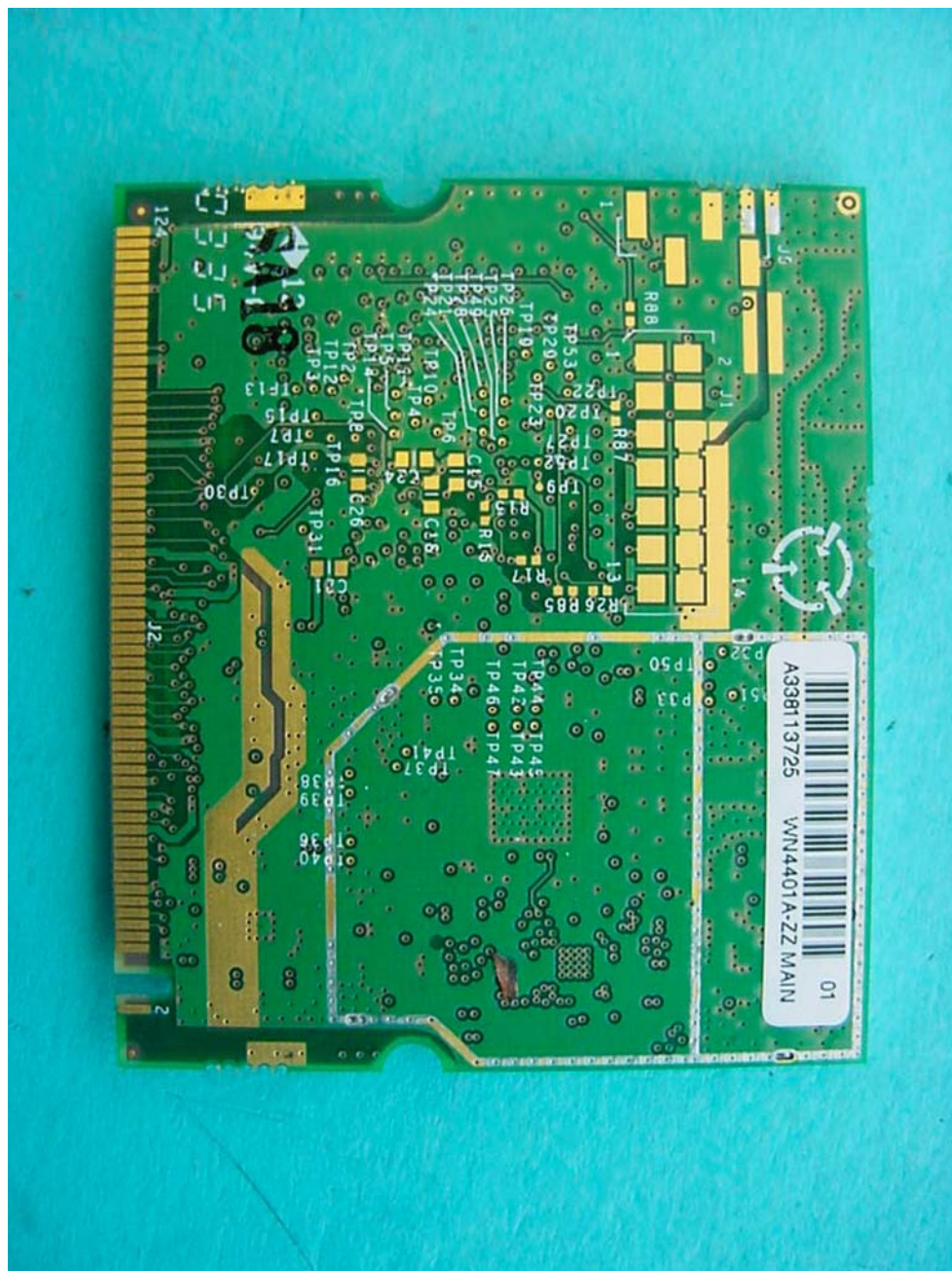


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