



ACCREDITED TESTING LABORATORY (NR. 312)

for Electromagnetic Compatibility

Notified body No. 0438 according to EMC-Directive and Radio Equipment Directive

FCC Recognition as accredited EMC Test Laboratory No: 835627

## TEST REPORT NR. EMV-E 114/19

**Subject:** Title 47 - Telecommunication  
Chapter I - FEDERAL COMMUNICATIONS COMMISSION  
Subchapter A - GENERAL  
Part 15 - RADIO FREQUENCY DEVICES  
October 1, 2018

The summary of the results can be found on page 2.

**Ordered by:** TTEch Computertechnik AG

**Address:** Schönbrunner Straße 7  
1040 Wien  
Austria

**On:** TTE Switch Lab Space  
FCC ID: 2ATXITTESWLSP-12735

This report contains the pages 1 to 24.

Authorized person:

Test performed by:

Dipl.-Ing. Dr.techn. Kurt Lamedschwandner, M.B.A.

Ing. Michael Szobel

Date: 2019-07-31  
Internal Order Number: EMC/E-2565

### Comments:

The testing result refers exclusively to the testing subject.

The production or transmission of extracts of the present report is subject to authorization by the testing laboratory.

Akkreditierung Austria is a full member of the International Laboratory Accreditation Cooperation ILAC and a signatory of the MRA for "Testing, Calibration and Inspection".

## 1. Summary of all measurements and tests

| Measurements according to FCC 47 CFR Part 15<br>Subpart B - Unintentional Radiators |                                       |                        |        |
|-------------------------------------------------------------------------------------|---------------------------------------|------------------------|--------|
| Chapter /<br>Norm. Reference                                                        | Term                                  | Details see<br>chapter | Result |
| §15.107<br>ANSI C63.4-2014                                                          | Conducted limits -<br>(AC power line) | 4.1                    | PASS   |
| §15.109<br>ANSI C63.4-2014                                                          | Radiated emission limits              | 4.2                    | PASS   |

**Table 1: Summary Emission measurements**

|             |                                                        |
|-------------|--------------------------------------------------------|
| PASS        | The DUT meets the requirements of the standard         |
| <b>FAIL</b> | The DUT does not meet the requirements of the standard |
| n.a.        | The Test is not applicable                             |
| n.p.        | The Test was not performed                             |

**Table 2: General definitions for the report**

All indications of Pass/Fail in this report are opinions expressed by Seibersdorf Laboratories based on interpretations and/or observations of test results.

## 2. Contents

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### 3. General information

#### 3.1 Device under test (DUT)

|                        |                             |
|------------------------|-----------------------------|
| DUT:                   | <b>TTE-Switch Lab Space</b> |
| FCC ID:                | 2ATXITTESWLSP-12735         |
| P. number:             | 12735                       |
| Serial number:         | 0001                        |
| MFR:                   | 5944N                       |
| Hardware revision:     | V02.00.00                   |
| Firmware End System:   | 0x80017253                  |
| Firmware Switch:       | 0x23790100                  |
| Year of manufacturing: | 21/2019                     |

|               |                                               |
|---------------|-----------------------------------------------|
| Manufacturer: | <b>TTTech Computertechnik AG</b>              |
| Address:      | Schönbrunner Straße 7<br>1040 Wien<br>Austria |

#### Description:

The TTE-Switch Lab Space is a high-performance deterministic Ethernet switch and provides 25 Ethernet ports in total:

- 6 double-speed 100/1000 Mbit/s ports
- 19 100 Mbit/s ports

One additional port is available for traffic monitoring. The TTE-Switch Lab Space has built-in mechanisms for traffic policing and fault isolation.

#### Virtual Links and Protocol Support:

The TTE-Switch Lab Space allows configuring up to 4096 virtual links (VL). Virtual links can be configured with 8 priorities and a bandwidth allocation gap (BAG) of 0.5 ms to 1600 ms. The network configuration is stored in the non-volatile memory of the switch (256 Mbit). It is optionally possible to configure IEEE 802.1Q VLANs. Profiled IP/UDP, redundancy management, and traffic shaping are implemented in hardware.

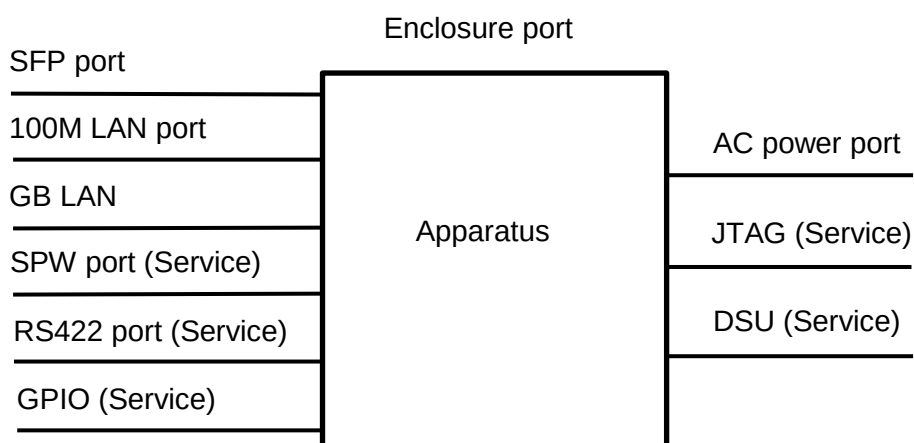
#### Data Loading and Diagnostics:

The TTE-Switch Lab Space features an integrated CPU for management. Switch management relies on SNMP. Data loading is possible through TFTP.

### 3.2 Test Configuration

The DUT was mounted by Mr. Sindrak, TTTech Computertechnik AG and Mr. Szobel, Seibersdorf Labor GmbH, in the Semi anechoic chamber (SAC3), the Test room 1 and the Test room 3 of the EMC-Test Laboratory Seibersdorf.

All measurements and tests were performed at rated power. The power supply voltage of the DUT was 230 VAC / 50 Hz.



| Type            | Name            | Cable type             |
|-----------------|-----------------|------------------------|
| AC power port   | 230 VAC         | Unshielded             |
| Ethernet port   | SFP             | LAN Cat 6a SSTP        |
| Ethernet port   | 100M LAN        | LAN Cat 6a SSTP        |
| Ethernet port   | GB LAN          | LAN Cat 6a SSTP        |
| SPW port        | SPW (Service)   | Shielded               |
| RS422 port      | RS422 (Service) | Shielded               |
| JTAG 10pin port | JTAG (Service)  | Unshielded or shielded |
| USB port (rear) | DSU (Service)   | Shielded               |
| GPIO port       | GPIO (Service)  | Unshielded or shielded |

**Table 3: Cable configuration**

### 3.3 Standards / Documents

- [1] **Code of Federal Regulations**  
Title 47 - Telecommunication  
Chapter I - FEDERAL COMMUNICATIONS COMMISSION  
Subchapter A - GENERAL  
Part 15 - RADIO FREQUENCY DEVICES  
October 1, 2017
- [2] **ANSI C63.4-2014**  
American National Standard for Methods of Measurement of Radio-Noise Emissions  
from Low-Voltage Electrical and Electronic Equipment in the Range of  
9 kHz to 40 GHz
- [3] **CISPR 16-1-1:2010-11**  
Specification for Radio Disturbance and Immunity Measuring Apparatus and  
Methods -  
Part 1-1: Radio Disturbance and Immunity Measuring Apparatus -  
Measuring Apparatus, Ed. 3.1
- [4] **CISPR 16-1-2:2006-08**  
Specification for Radio Disturbance and Immunity Measuring Apparatus and  
Methods -  
Part 1-2: Radio Disturbance and Immunity Measuring Apparatus - Ancillary  
equipment -  
Conducted disturbances, Ed. 1.2
- [5] **CISPR 16-1-4:2010-04**  
Specification for Radio Disturbance and Immunity Measuring Apparatus and  
Methods -  
Part 1-4: Radio Disturbance and Immunity Measuring Apparatus - Ancillary  
equipment -  
Radiated disturbances, Ed. 3
- [6] **CISPR 16-2-1:2008 + A1:2010 + A2:2013**  
Specification for radio disturbance and immunity measuring apparatus and methods  
Part 2-1: Methods of measurement of disturbances and immunity -  
Conducted disturbance measurements
- [7] **CISPR 16-2-3:2010 + A1:2010 + A2:2014**  
Specification for radio disturbance and immunity measuring apparatus and methods  
Part 2-3: Methods of measurement of disturbances and immunity -  
Radiated disturbance measurements

### 3.4 Date and location of the measurements and tests

|              |                                                                                                   |
|--------------|---------------------------------------------------------------------------------------------------|
| Date:        | 11 June 2019                                                                                      |
| Location:    | Semi anechoic chamber (SAC3)<br>Test room 1<br>EMC-Test Laboratory<br>2444 Seibersdorf<br>Austria |
| Temperature: | 21°C – 25°C                                                                                       |
| Humidity:    | 35% - 50 % rel.                                                                                   |

#### 4. Measurements and tests – parameters and results

All indications of Pass/Fail in this report are opinions expressed by Seibersdorf Laboratories based on interpretations and/or observations of test results.

## 4.1 Measurement of the conducted emissions

### 4.1.1 Equipment

| ID-No. | Identification                                                          | Type             | SNo           | Calibration Date | Calibration Interval | Manufacturer       |
|--------|-------------------------------------------------------------------------|------------------|---------------|------------------|----------------------|--------------------|
| E0127  | Measurement receiver incl. Options                                      | ESIB26           | 100136        | 20 Nov. 2018     | 2 years              | Rohde & Schwarz    |
| E0500  | V-LISN                                                                  | ESH3-Z5          | 861189/0007   | 25 Aug. 2017     | 2 years              | Rohde & Schwarz    |
| E0915  | EMC Measurement Software EMC32                                          | V 10.40.10       | 100280/101333 | ---              | ---                  | Rohde & Schwarz    |
| E1143  | Thermo-Hygrometer Test Room 1                                           | 608-H2           | 34803740      | 29 Jul. 2016     | 3 years              | testo              |
| LE0116 | Semi Anechoic Chamber with Control Room, Test room 1 and Amplifier Room | SAC3+CR, TR1, AR | P28090        | 26 Jan. 2018     | 5 years              | Albatross Projects |

**Table 4: Equipment**

### 4.1.2 Procedure and setup

The measurement was done inside the Test room 1 of the EMC-Test Laboratory Seibersdorf. Measurement procedure and setup were according to ANSI C63.4.

|                                   |                |
|-----------------------------------|----------------|
| Frequency range                   | 0.15 to 30 MHz |
| Bandwidth                         | 9 kHz          |
| Stepsize                          | 4 kHz          |
| Detector pre- / final-measurement | PK / QP, AV    |
| LISN used for AC supply lines     | V-LISN         |

**Table 5: Parameters**

|                       |                              |
|-----------------------|------------------------------|
| Frequency range (MHz) | Measurement uncertainty (dB) |
| 0.15 to 30            | +3.01 / -3.01                |

**Table 6: Extended measurement uncertainty for V-LISN**

### 4.1.3 Results

| Measurement at | Frequency range [MHz] | Data see chapter 5.2        | Result |
|----------------|-----------------------|-----------------------------|--------|
| L              | 0.15 – 30             | Chart 1, Table 12, Table 13 | PASS   |
| N              |                       | Chart 2, Table 14, Table 15 | PASS   |

**Table 7: Results FCC**

## 4.2 Radiated emissions measurement

### 4.2.1 Equipment

| ID-No. | Identification                                                          | Type             | SNo           | Calibration Date | Calibration Interval | Manufacturer       |
|--------|-------------------------------------------------------------------------|------------------|---------------|------------------|----------------------|--------------------|
| E0127  | Measurement receiver incl. Options                                      | ESIB26           | 100136        | 20 Nov. 2018     | 2 years              | Rohde & Schwarz    |
| E0915  | EMC Measurement Software EMC32                                          | V 10.40.10       | 100280/101333 | ---              | ---                  | Rohde & Schwarz    |
| E1143  | Thermo-Hygrometer Test Room 1                                           | 608-H2           | 34803740      | 29 Jul. 2016     | 3 years              | testo              |
| E1677  | Antenna (BiLog)                                                         | CBL6143A         | 32401         | 29 May 2018      | 2 years              | Teseq              |
| LE0116 | Semi Anechoic Chamber with Control Room, Test room 1 and Amplifier Room | SAC3+CR, TR1, AR | P28090        | 26 Jan. 2018     | 5 years              | Albatross Projects |

**Table 8: Equipment**

### 4.2.2 Procedure and setup

The measurement was done inside the Semi anechoic chamber (SAC3) of the EMC-Test Laboratory Seibersdorf.

Measurement procedure and setup were according to the standard ANSI C63.4.

|                                   |                |
|-----------------------------------|----------------|
| Frequency range                   | 30 to 1000 MHz |
| Bandwidth                         | 120 kHz        |
| Step size                         | 40 kHz         |
| Detector pre- / final-measurement | PK / QP        |
| Measurement distance              | 3 m            |
| Orientations                      | 0° - 360°      |
| Height scan                       | 1 m – 4 m      |

**Table 9: Parameters**

|                       |                              |
|-----------------------|------------------------------|
| Frequency range (MHz) | Measurement uncertainty (dB) |
| 30 – 200              | +4.03 / -4.03                |
| 200 – 1000            | +3.31 / -3.35                |

**Table 10: Extended measurement uncertainty**

### 4.2.3 Results

| Orientation (°) | Polarization | Frequency range (MHz) | Data see chapter 5.2        | Result |
|-----------------|--------------|-----------------------|-----------------------------|--------|
| 0 - 360         | Horizontal   | 30 - 1000             | Chart 3, Table 16, Table 17 | PASS   |
| 0 - 360         | Vertical     | 30 - 1000             | Chart 4, Table 18           | PASS   |

**Table 11: Results FCC**

## 5. Annex

### 5.1 Photos of the DUT and the configuration

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Photo 1: DUT

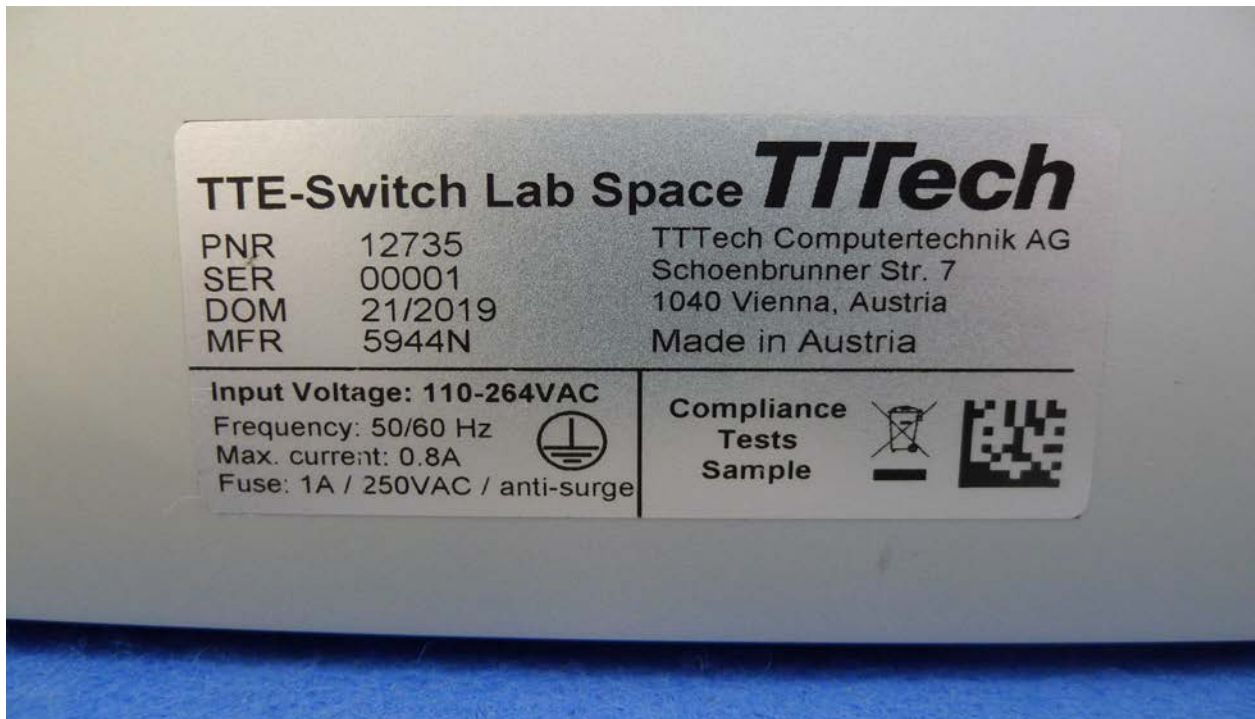
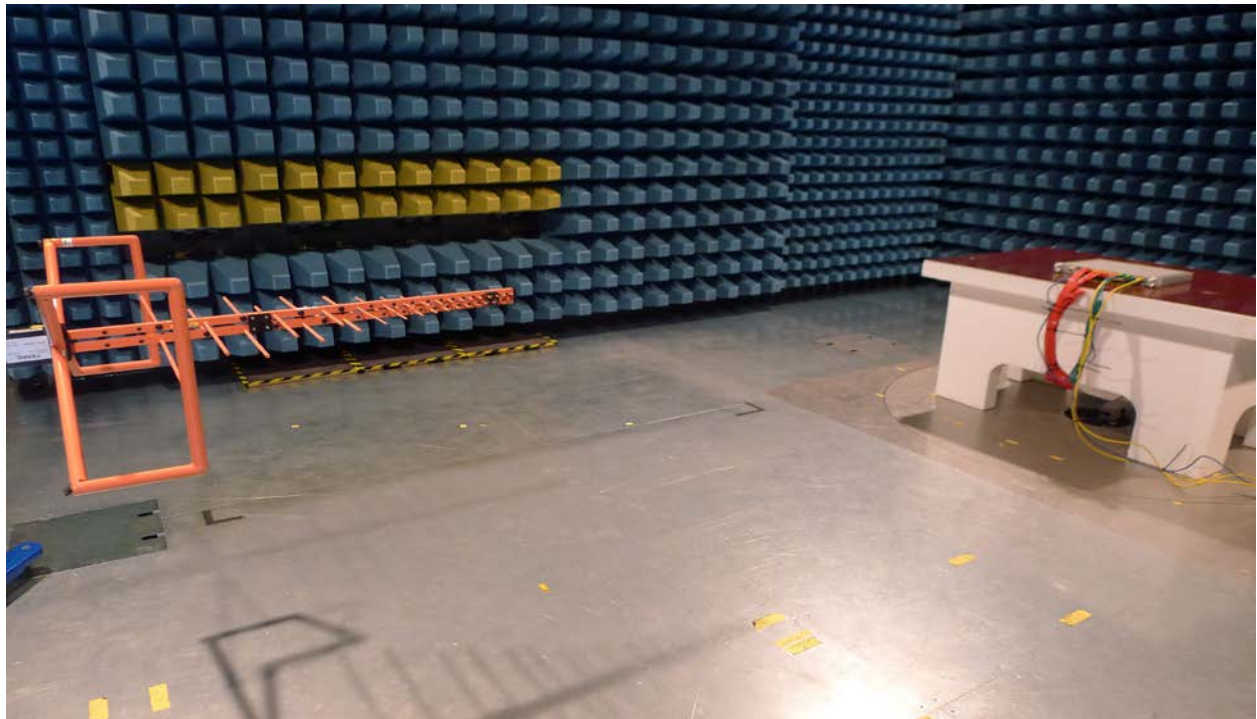


Photo 2: DUT label



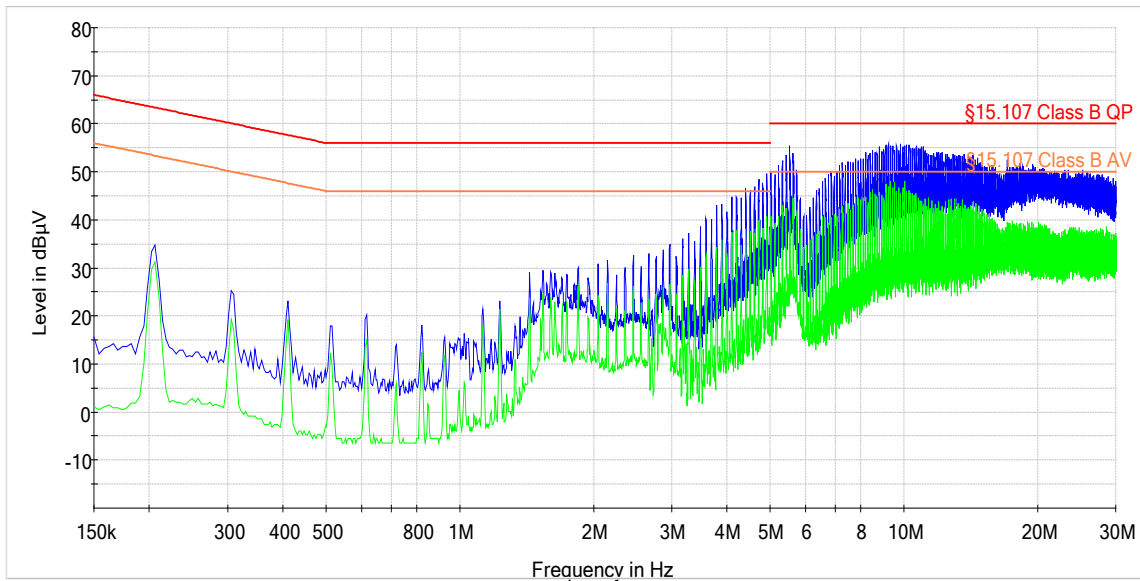
**Photo 3: Setup in the Semi anechoic chamber (SAC3)  
radiated emissions measurement (30 MHz – 1000 MHz)**



**Photo 4: Setup in the Test room 1  
Conducted emissions measurement at AC power lines (150 kHz – 30 MHz)**

## 5.2 Charts

|                                                              |    |
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— PK+ MAXH  
— §15.107 Class B QP  
— §15.107 Class B AV  
— AVG MAXH

E-2565 TTTech 11.06.2019 MS  
TTE Switch Lab Space  
Normalbetrieb, 20% Bandbreite auf alle Ethernet-Ports  
29 L

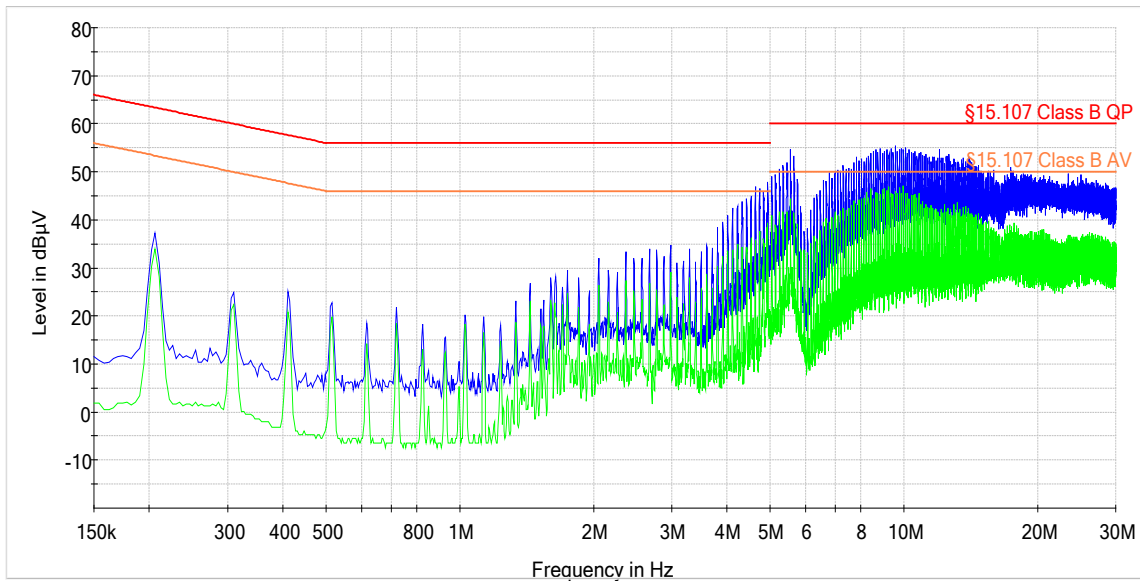
Chart 1: Conducted emissions, 0.15 - 30 MHz, L

| Frequency [MHz] | Peak [dBμV] | Meas. Time [ms] | Bandwidth [kHz] | Line [°] | Margin – PK [dB] | Limit – QPK [dBμV] |
|-----------------|-------------|-----------------|-----------------|----------|------------------|--------------------|
| 5,5320          | 55,5        | 50,0            | 9,000           | L        | 4,5              | 60,0               |
| 8,8120          | 55,3        | 50,0            | 9,000           | L        | 4,7              | 60,0               |
| 8,8160          | 54,5        | 50,0            | 9,000           | L        | 5,5              | 60,0               |
| 9,0160          | 54,4        | 50,0            | 9,000           | L        | 5,6              | 60,0               |
| 9,0200          | 54,6        | 50,0            | 9,000           | L        | 5,4              | 60,0               |
| 9,1160          | 55,6        | 50,0            | 9,000           | L        | 4,4              | 60,0               |
| 9,1240          | 55,2        | 50,0            | 9,000           | L        | 4,8              | 60,0               |
| 9,2200          | 55,1        | 50,0            | 9,000           | L        | 4,9              | 60,0               |
| 9,2240          | 55,9        | 50,0            | 9,000           | L        | 4,1              | 60,0               |
| 9,3280          | 55,5        | 50,0            | 9,000           | L        | 4,5              | 60,0               |
| 9,4240          | 54,8        | 50,0            | 9,000           | L        | 5,2              | 60,0               |
| 9,4320          | 55,5        | 50,0            | 9,000           | L        | 4,5              | 60,0               |
| 9,6360          | 55,5        | 50,0            | 9,000           | L        | 4,5              | 60,0               |
| 9,6400          | 54,7        | 50,0            | 9,000           | L        | 5,3              | 60,0               |
| 9,8360          | 55,0        | 50,0            | 9,000           | L        | 5,0              | 60,0               |
| 9,8400          | 55,4        | 50,0            | 9,000           | L        | 4,6              | 60,0               |
| 9,8440          | 55,8        | 50,0            | 9,000           | L        | 4,2              | 60,0               |
| 9,9400          | 55,3        | 50,0            | 9,000           | L        | 4,7              | 60,0               |
| 10,0440         | 55,4        | 50,0            | 9,000           | L        | 4,6              | 60,0               |
| 10,1480         | 55,6        | 50,0            | 9,000           | L        | 4,4              | 60,0               |
| 10,2520         | 55,6        | 50,0            | 9,000           | L        | 4,4              | 60,0               |
| 10,6640         | 55,3        | 50,0            | 9,000           | L        | 4,7              | 60,0               |
| 10,9680         | 55,1        | 50,0            | 9,000           | L        | 4,9              | 60,0               |
| 10,9720         | 55,3        | 50,0            | 9,000           | L        | 4,7              | 60,0               |
| 11,0680         | 55,2        | 50,0            | 9,000           | L        | 4,8              | 60,0               |

**Table 12: Final result, 0.15-30 MHz, L, Peak**

| Frequency [MHz] | Average [dBμV] | Meas. Time [ms] | Bandwidth [kHz] | Line [°] | Margin – AVG [dB] | Limit – AVG [dBμV] |
|-----------------|----------------|-----------------|-----------------|----------|-------------------|--------------------|
| 5,5320          | 46,2           | 50,0            | 9,000           | L        | 3,8               | 50,0               |
| 8,4040          | 45,8           | 50,0            | 9,000           | L        | 4,2               | 50,0               |
| 8,5040          | 46,3           | 50,0            | 9,000           | L        | 3,7               | 50,0               |
| 8,6080          | 45,4           | 50,0            | 9,000           | L        | 4,6               | 50,0               |
| 8,8120          | 45,7           | 50,0            | 9,000           | L        | 4,3               | 50,0               |
| 8,9200          | 45,1           | 50,0            | 9,000           | L        | 4,9               | 50,0               |
| 9,1240          | 47,4           | 50,0            | 9,000           | L        | 2,6               | 50,0               |
| 9,2240          | 47,0           | 50,0            | 9,000           | L        | 3,0               | 50,0               |
| 9,3280          | 48,2           | 50,0            | 9,000           | L        | 1,8               | 50,0               |
| 9,4280          | 46,7           | 50,0            | 9,000           | L        | 3,3               | 50,0               |
| 9,4320          | 45,4           | 50,0            | 9,000           | L        | 4,6               | 50,0               |
| 9,5320          | 47,9           | 50,0            | 9,000           | L        | 2,1               | 50,0               |
| 9,6320          | 46,0           | 50,0            | 9,000           | L        | 4,0               | 50,0               |
| 9,6360          | 45,8           | 50,0            | 9,000           | L        | 4,2               | 50,0               |
| 9,7360          | 46,8           | 50,0            | 9,000           | L        | 3,2               | 50,0               |
| 9,8360          | 45,6           | 50,0            | 9,000           | L        | 4,4               | 50,0               |
| 9,8400          | 45,4           | 50,0            | 9,000           | L        | 4,6               | 50,0               |
| 9,9400          | 46,7           | 50,0            | 9,000           | L        | 3,3               | 50,0               |
| 10,0440         | 48,0           | 50,0            | 9,000           | L        | 2,0               | 50,0               |
| 10,1480         | 46,0           | 50,0            | 9,000           | L        | 4,0               | 50,0               |
| 10,2520         | 46,1           | 50,0            | 9,000           | L        | 3,9               | 50,0               |
| 10,3520         | 45,6           | 50,0            | 9,000           | L        | 4,4               | 50,0               |
| 10,4560         | 45,6           | 50,0            | 9,000           | L        | 4,4               | 50,0               |
| 10,5560         | 45,2           | 50,0            | 9,000           | L        | 4,8               | 50,0               |
| 10,6600         | 45,6           | 50,0            | 9,000           | L        | 4,4               | 50,0               |

**Table 13: Final result, 0.15-30 MHz, L, Average**



— PK+\_MAXH  
— §15.107 Class B QP  
— §15.107 Class B AV  
— AVG\_MAXH

E-2565 TTTech 11.06.2019 MS  
TTE Switch Lab Space  
Normalbetrieb, 20% Bandbreite auf alle Ethernet-Ports  
30 N

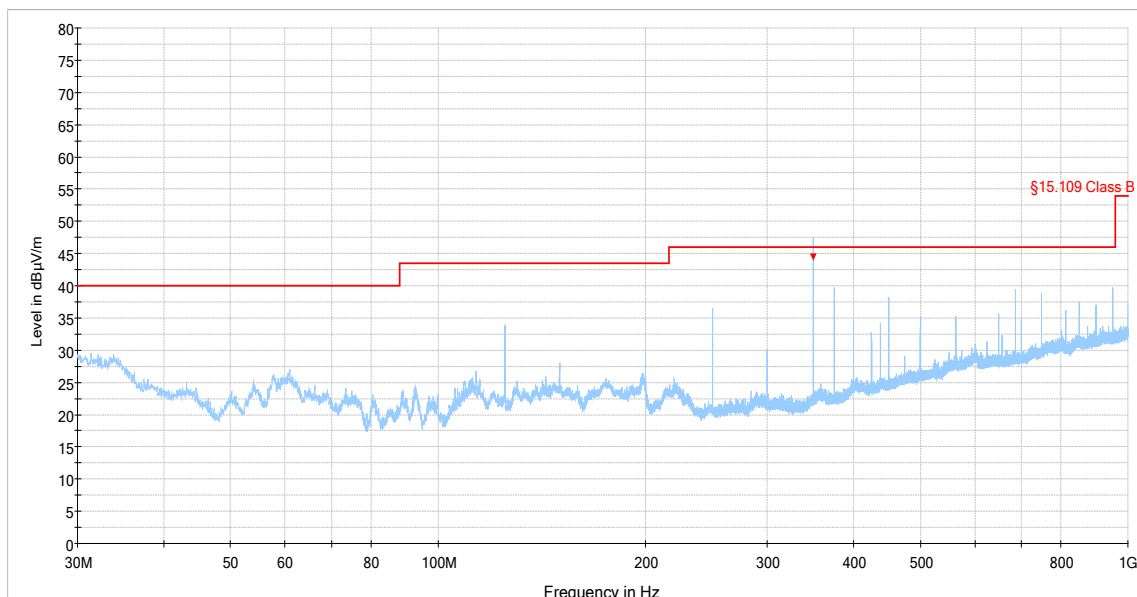
**Chart 2: Conducted emissions, 0.15 - 30 MHz, N**

| Frequency<br>[MHz] | Peak<br>[dBμV] | Meas. Time<br>[ms] | Bandwidth<br>[kHz] | Line<br>[°] | Margin – PK<br>[dB] | Limit – QPK<br>[dBμV] |
|--------------------|----------------|--------------------|--------------------|-------------|---------------------|-----------------------|
| 5,5560             | 54,7           | 50,0               | 9,000              | N           | 5,3                 | 60,0                  |
| 8,5360             | 54,2           | 50,0               | 9,000              | N           | 5,8                 | 60,0                  |
| 8,6400             | 54,6           | 50,0               | 9,000              | N           | 5,4                 | 60,0                  |
| 8,8480             | 54,8           | 50,0               | 9,000              | N           | 5,2                 | 60,0                  |
| 9,0520             | 54,3           | 50,0               | 9,000              | N           | 5,7                 | 60,0                  |
| 9,1560             | 54,7           | 50,0               | 9,000              | N           | 5,3                 | 60,0                  |
| 9,1600             | 54,3           | 50,0               | 9,000              | N           | 5,7                 | 60,0                  |
| 9,3600             | 54,8           | 50,0               | 9,000              | N           | 5,2                 | 60,0                  |
| 9,3640             | 54,4           | 50,0               | 9,000              | N           | 5,6                 | 60,0                  |
| 9,5640             | 55,5           | 50,0               | 9,000              | N           | 4,5                 | 60,0                  |
| 9,5720             | 55,1           | 50,0               | 9,000              | N           | 4,9                 | 60,0                  |
| 9,6720             | 54,3           | 50,0               | 9,000              | N           | 5,7                 | 60,0                  |
| 9,7720             | 54,4           | 50,0               | 9,000              | N           | 5,6                 | 60,0                  |
| 9,7760             | 54,7           | 50,0               | 9,000              | N           | 5,3                 | 60,0                  |
| 9,8720             | 54,3           | 50,0               | 9,000              | N           | 5,7                 | 60,0                  |
| 9,8760             | 54,8           | 50,0               | 9,000              | N           | 5,2                 | 60,0                  |
| 9,8800             | 54,5           | 50,0               | 9,000              | N           | 5,5                 | 60,0                  |
| 9,9800             | 54,7           | 50,0               | 9,000              | N           | 5,3                 | 60,0                  |
| 10,0880            | 55,0           | 50,0               | 9,000              | N           | 5,0                 | 60,0                  |
| 10,2880            | 54,6           | 50,0               | 9,000              | N           | 5,4                 | 60,0                  |
| 10,2920            | 54,5           | 50,0               | 9,000              | N           | 5,5                 | 60,0                  |
| 10,3960            | 54,1           | 50,0               | 9,000              | N           | 5,9                 | 60,0                  |
| 10,6000            | 54,3           | 50,0               | 9,000              | N           | 5,8                 | 60,0                  |
| 12,0360            | 54,6           | 50,0               | 9,000              | N           | 5,4                 | 60,0                  |
| 12,6520            | 53,8           | 50,0               | 9,000              | N           | 6,2                 | 60,0                  |

**Table 14: Final result, 0.15-30 MHz, N, Peak**

| Frequency [MHz] | Average [dBμV] | Meas. Time [ms] | Bandwidth [kHz] | Line [°] | Margin – AVG [dB] | Limit – AVG [dBμV] |
|-----------------|----------------|-----------------|-----------------|----------|-------------------|--------------------|
| 8,2320          | 45,7           | 50,0            | 9,000           | N        | 4,3               | 50,0               |
| 8,4360          | 46,6           | 50,0            | 9,000           | N        | 3,4               | 50,0               |
| 8,6400          | 45,8           | 50,0            | 9,000           | N        | 4,2               | 50,0               |
| 8,7480          | 45,6           | 50,0            | 9,000           | N        | 4,4               | 50,0               |
| 8,8520          | 45,3           | 50,0            | 9,000           | N        | 4,7               | 50,0               |
| 8,9520          | 46,3           | 50,0            | 9,000           | N        | 3,7               | 50,0               |
| 9,0520          | 45,5           | 50,0            | 9,000           | N        | 4,5               | 50,0               |
| 9,0560          | 46,5           | 50,0            | 9,000           | N        | 3,5               | 50,0               |
| 9,1560          | 46,1           | 50,0            | 9,000           | N        | 3,9               | 50,0               |
| 9,2560          | 45,6           | 50,0            | 9,000           | N        | 4,4               | 50,0               |
| 9,2600          | 46,8           | 50,0            | 9,000           | N        | 3,2               | 50,0               |
| 9,3600          | 45,5           | 50,0            | 9,000           | N        | 4,5               | 50,0               |
| 9,4640          | 45,4           | 50,0            | 9,000           | N        | 4,6               | 50,0               |
| 9,5720          | 45,9           | 50,0            | 9,000           | N        | 4,1               | 50,0               |
| 9,6720          | 45,5           | 50,0            | 9,000           | N        | 4,5               | 50,0               |
| 9,7760          | 46,7           | 50,0            | 9,000           | N        | 3,3               | 50,0               |
| 9,8760          | 45,5           | 50,0            | 9,000           | N        | 4,5               | 50,0               |
| 9,9760          | 44,2           | 50,0            | 9,000           | N        | 5,8               | 50,0               |
| 9,9800          | 47,0           | 50,0            | 9,000           | N        | 3,0               | 50,0               |
| 10,0840         | 45,6           | 50,0            | 9,000           | N        | 4,4               | 50,0               |
| 10,1840         | 45,5           | 50,0            | 9,000           | N        | 4,5               | 50,0               |
| 10,3960         | 45,3           | 50,0            | 9,000           | N        | 4,7               | 50,0               |
| 10,4960         | 45,1           | 50,0            | 9,000           | N        | 4,9               | 50,0               |
| 10,6000         | 45,4           | 50,0            | 9,000           | N        | 4,6               | 50,0               |
| 10,8040         | 45,5           | 50,0            | 9,000           | N        | 4,5               | 50,0               |

**Table 15: Final result, 0.15-30 MHz, N, Average**



— Preview Result 1H-PK+  
— §15.109 Class B  
▼ Final\_Result QPK

E-2565 TTTech 11.06.2019 MS  
TTE Switch Lab Space  
Normalbetrieb, 20% Bandbreite auf alle Ethernet-Ports  
02 0°-360° 1m-4m H

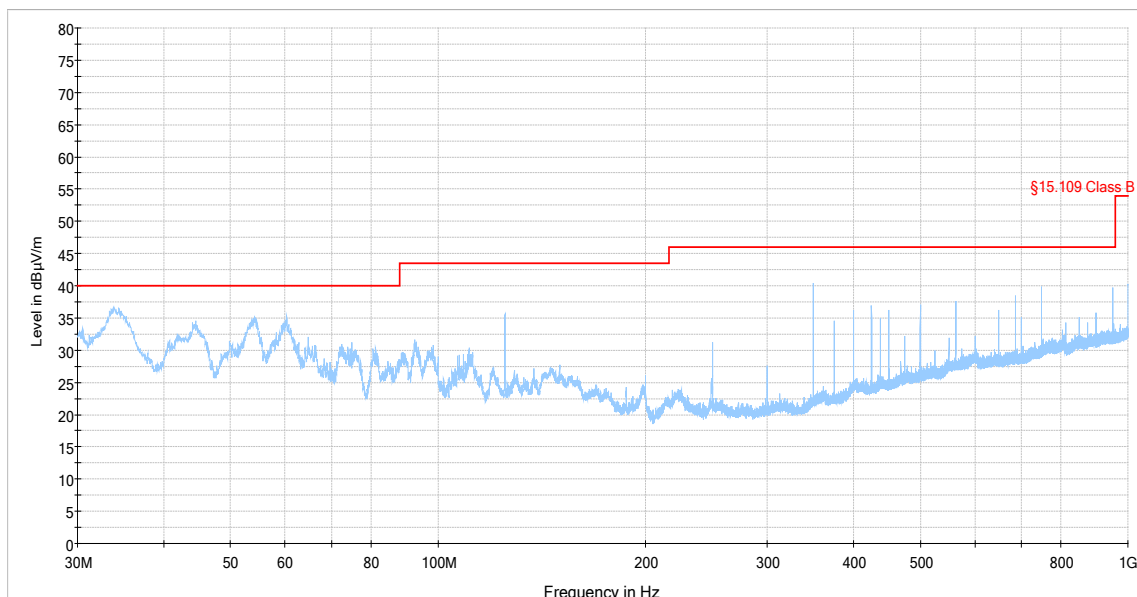
**Chart 3: Radiated emissions, 30 - 1000 MHz, horizontal**

| Frequency [MHz] | Peak [dB $\mu$ V/m] | Meas. Time [ms] | Bandwidth [kHz] | Azimuth [deg] | Height [cm] | Pol [°] | Margin – PK [dB] | Limit – QPK [dB $\mu$ V/m] |
|-----------------|---------------------|-----------------|-----------------|---------------|-------------|---------|------------------|----------------------------|
| 349,9200        | 37,3                | 50,0            | 120,000         | 90,0          | 100,0       | H       | 8,7              | 46,0                       |
| 349,9500        | 43,3                | 50,0            | 120,000         | 90,0          | 100,0       | H       | 2,7              | 46,0                       |
| 350,0100        | 47,3                | 50,0            | 120,000         | 90,0          | 100,0       | H       | -1,3             | 46,0                       |
| 350,0400        | 45,1                | 50,0            | 120,000         | 90,0          | 100,0       | H       | 0,9              | 46,0                       |
| 350,0700        | 40,2                | 50,0            | 120,000         | 90,0          | 100,0       | H       | 5,8              | 46,0                       |
| 374,9700        | 37,9                | 50,0            | 120,000         | 90,0          | 100,0       | H       | 8,1              | 46,0                       |
| 375,0000        | 39,7                | 50,0            | 120,000         | 90,0          | 100,0       | H       | 6,3              | 46,0                       |
| 375,0300        | 38,6                | 50,0            | 120,000         | 90,0          | 100,0       | H       | 7,4              | 46,0                       |
| 450,0000        | 38,2                | 50,0            | 120,000         | 0,0           | 250,0       | H       | 7,8              | 46,0                       |
| 687,4800        | 38,4                | 50,0            | 120,000         | 90,0          | 100,0       | H       | 7,6              | 46,0                       |
| 687,5100        | 39,4                | 50,0            | 120,000         | 90,0          | 100,0       | H       | 6,6              | 46,0                       |
| 687,5400        | 37,9                | 50,0            | 120,000         | 90,0          | 100,0       | H       | 8,1              | 46,0                       |
| 749,9700        | 37,7                | 50,0            | 120,000         | 270,0         | 150,0       | H       | 8,3              | 46,0                       |
| 750,0000        | 38,9                | 50,0            | 120,000         | 270,0         | 150,0       | H       | 7,1              | 46,0                       |
| 750,0300        | 37,8                | 50,0            | 120,000         | 270,0         | 150,0       | H       | 8,2              | 46,0                       |
| 850,0200        | 37,4                | 50,0            | 120,000         | 90,0          | 100,0       | H       | 8,6              | 46,0                       |
| 949,9500        | 37,4                | 50,0            | 120,000         | 180,0         | 150,0       | H       | 8,6              | 46,0                       |
| 949,9800        | 39,7                | 50,0            | 120,000         | 180,0         | 150,0       | H       | 6,3              | 46,0                       |
| 950,0100        | 39,8                | 50,0            | 120,000         | 180,0         | 150,0       | H       | 6,2              | 46,0                       |
| 950,0400        | 38,0                | 50,0            | 120,000         | 90,0          | 100,0       | H       | 8,0              | 46,0                       |

**Table 16: Pre measurement Peak result, 30-1000 MHz, horizontal**

| Frequency [MHz] | QuasiPeak [dB $\mu$ V/m] | Meas. Time [ms] | Bandwidth [kHz] | Azimuth [deg] | Height [cm] | Pol [°] | Margin – QPK [dB] | Limit – QPK [dB $\mu$ V/m] |
|-----------------|--------------------------|-----------------|-----------------|---------------|-------------|---------|-------------------|----------------------------|
| 350,0100        | 44,46                    | 1000,0          | 120,000         | 90,0          | 100,0       | H       | 3,54              | 46,0                       |

**Table 17: Final QuasiPeak result, 30-1000 MHz, horizontal**



— Preview Result 1V-PK+  
— §15.109 Class B

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TTE Switch Lab Space  
Normalbetrieb, 20% Bandbreite auf alle Ethernet-Ports  
01 0°-360° 1m-4m V

**Chart 4: Radiated emissions, 30 - 1000 MHz, vertical**

| Frequency<br>[MHz] | Peak<br>[dB $\mu$ V/m] | Meas.<br>Time<br>[ms] | Bandwidth<br>[kHz] | Azimuth<br>[deg] | Height<br>[cm] | Pol<br>[°] | Margin –<br>PK<br>[dB] | Limit –<br>QPK<br>[dB $\mu$ V/m] |
|--------------------|------------------------|-----------------------|--------------------|------------------|----------------|------------|------------------------|----------------------------------|
| 33,6000            | 36,3                   | 50,0                  | 120,000            | 0,0              | 100,0          | V          | 3,7                    | 40,0                             |
| 33,6300            | 36,2                   | 50,0                  | 120,000            | 0,0              | 100,0          | V          | 3,8                    | 40,0                             |
| 33,7800            | 36,3                   | 50,0                  | 120,000            | 0,0              | 100,0          | V          | 3,7                    | 40,0                             |
| 33,8100            | 36,6                   | 50,0                  | 120,000            | 0,0              | 100,0          | V          | 3,4                    | 40,0                             |
| 33,8400            | 36,5                   | 50,0                  | 120,000            | 0,0              | 100,0          | V          | 3,5                    | 40,0                             |
| 33,9000            | 36,4                   | 50,0                  | 120,000            | 180,0            | 100,0          | V          | 3,6                    | 40,0                             |
| 33,9300            | 36,5                   | 50,0                  | 120,000            | 180,0            | 100,0          | V          | 3,5                    | 40,0                             |
| 33,9600            | 36,5                   | 50,0                  | 120,000            | 180,0            | 100,0          | V          | 3,5                    | 40,0                             |
| 33,9900            | 36,2                   | 50,0                  | 120,000            | 180,0            | 100,0          | V          | 3,8                    | 40,0                             |
| 34,0200            | 36,1                   | 50,0                  | 120,000            | 0,0              | 100,0          | V          | 3,9                    | 40,0                             |
| 34,0500            | 36,1                   | 50,0                  | 120,000            | 180,0            | 100,0          | V          | 3,9                    | 40,0                             |
| 34,0800            | 36,2                   | 50,0                  | 120,000            | 180,0            | 100,0          | V          | 3,8                    | 40,0                             |
| 34,4100            | 36,4                   | 50,0                  | 120,000            | 180,0            | 100,0          | V          | 3,6                    | 40,0                             |
| 34,4400            | 36,5                   | 50,0                  | 120,000            | 180,0            | 100,0          | V          | 3,5                    | 40,0                             |
| 34,4700            | 36,4                   | 50,0                  | 120,000            | 180,0            | 100,0          | V          | 3,6                    | 40,0                             |
| 34,5000            | 36,2                   | 50,0                  | 120,000            | 180,0            | 100,0          | V          | 3,8                    | 40,0                             |
| 44,5200            | 34,5                   | 50,0                  | 120,000            | 270,0            | 100,0          | V          | 5,5                    | 40,0                             |
| 54,2100            | 35,1                   | 50,0                  | 120,000            | 270,0            | 100,0          | V          | 4,9                    | 40,0                             |
| 54,2400            | 35,2                   | 50,0                  | 120,000            | 270,0            | 100,0          | V          | 4,8                    | 40,0                             |
| 54,3600            | 35,0                   | 50,0                  | 120,000            | 270,0            | 100,0          | V          | 5,0                    | 40,0                             |
| 54,3900            | 35,0                   | 50,0                  | 120,000            | 270,0            | 200,0          | V          | 5,0                    | 40,0                             |
| 60,3000            | 35,2                   | 50,0                  | 120,000            | 270,0            | 100,0          | V          | 4,8                    | 40,0                             |
| 60,3300            | 35,3                   | 50,0                  | 120,000            | 270,0            | 100,0          | V          | 4,7                    | 40,0                             |
| 60,3600            | 34,8                   | 50,0                  | 120,000            | 270,0            | 100,0          | V          | 5,2                    | 40,0                             |
| 350,0100           | 40,5                   | 50,0                  | 120,000            | 90,0             | 100,0          | V          | 5,5                    | 46,0                             |

**Table 18: Final Peak result, 30-1000 MHz, vertical**