



Registration No. DAT-P-207/05

EMI -- TEST REPORT

- FCC Part 15B -

Test Report No. : T34492-00-04HS	22. October 2010
	Date of issue

Type / Model Name : MobilePanel277IWLAN V2 / 277FIWLAN V2

Product Description : Mobile Human Machine Interface

Applicant : Siemens AG, Industry Sector, IIA AS RD ST TT

Address : Werner-von-Siemens-Str. 50

92224 AMBERG, GERMANY

Manufacturer : Siemens AG, Industry Sector, IIA AS RD ST TT

Address : Werner-von-Siemens-Str. 50

92224 AMBERG, GERMANY

Licence holder : Siemens AG, Industry Sector, IIA AS RD ST TT

Address : Werner-von-Siemens-Str. 50

92224 AMBERG, GERMANY

Test Result according to the standards listed in clause 1 test standards:	POSITIVE
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DAT-P-207/05-00

The test report merely corresponds to the test sample. It is not permitted to copy extracts of these test results without the written permission of the test laboratory.

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1 TEST STANDARDS

The tests were performed according to following standards:

FCC Rules and Regulations Part 15 Subpart A - General (October, 2009)

Part 15, Subpart A, Section 15.31	Measurement standards
Part 15, Subpart A, Section 15.33	Frequency range of radiated measurements
Part 15, Subpart A, Section 15.35	Measurement detector functions and bandwidths

FCC Rules and Regulations Part 15 Subpart B - Unintentional Radiators (October, 2009)

Part 15, Subpart B, Section 15.107	AC Line conducted emissions <input type="checkbox"/> Class A device <input checked="" type="checkbox"/> Class B device
Part 15, Subpart B, Section 15.109	Radiated emissions, general requirements

ANSI C63.4: 2009	Methods of Measurement of Radio-Noise Emissions from Low-Voltage Electrical and Electronic Equipment in the Range of 9 kHz to 40 GHz.
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ANSI C95.1:1992	IEEE Standard for Safety Levels with respect to Human Exposure to Radio Frequency Electromagnetic Fields, 3 kHz to 300 GHz
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CISPR 16-4-2: 2003	Uncertainty in EMC measurement
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CISPR 22: 2005 EN 55022: 2006	Information technology equipment
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2 SUMMARY

GENERAL REMARKS:

For the test measurement digital device and data transmission via USB 1.1 to a PC the transmitter WLAN and ERM are manually disabled. The highest frequency on the digital device is not known so the EUT was scanned up to 12 GHz.

FINAL ASSESSMENT:

The equipment under test **fulfills** the EMI requirements cited in clause 1 test standards.

Date of receipt of test sample : acc. to storage records

Testing commenced on : 30 August 2010

Testing concluded on : 30 August 2010

Checked by:

Tested by:

Klaus Gegenfurtner
Dipl.-Ing.(FH)
Manager: Radio Group

Hermann Smetana
Dipl.-Ing.(FH)
Radio Expert

3 EQUIPMENT UNDER TEST

3.1 Photo documentation of the EUT – Detailed photos see attachment A

3.2 Power supply system utilised

Power supply voltage : 7.2 VDC, Li ion battery.
Power supply voltage (alternative) : Input: 110 - 230 VAC / 50-60 Hz / 1 ϕ Power supply, Output: +12 VDC

3.3 Short description of the equipment under test (EUT)

The MobilePanel277IWLAN V2 / 277FIWLAN V2 permits mobile remote operation at almost any location in the system. The HMI device communicates with the PLC via WLAN. The HMI device is equipped with a zone recognition function (ERM).

Number of tested samples: 1
Serial number: #12

EUT operation mode:

The equipment under test was operated during the measurement under the following conditions:

- USB data transmission

EUT configuration:

(The CDF filled by the applicant can be viewed at the test laboratory.)

The following peripheral devices and interface cables were connected during the measurements:

- Power supply 100 -240 VAC, 50 – 60 Hz Model : Mean Well, GS60A12
- _____ Model : _____

4 TEST ENVIRONMENT

4.1 Address of the test laboratory

mikes-testingpartners gmbh
Ohmstrasse 2-4
94342 STRASSKIRCHEN
GERMANY

4.2 Environmental conditions

During the measurement the environmental conditions were within the listed ranges:

Temperature: 15-35 ° C

Humidity: 30-60 %

Atmospheric pressure: 86-106 kPa

4.3 Statement of the measurement uncertainty

The data and results referenced in this document are true and accurate. The reader may notice that tolerances within the calibration of the equipment and facilities may cause additional uncertainty. The measurement uncertainty is calculated for all measurements listed in this test report acc. to CISPR 16-4-2 „Uncertainties, statistics and limit modelling – Uncertainty in EMC measurement“ and documented in the mikes-testingpartners gmbh quality system acc. to DIN EN ISO/IEC 17025. For all measurements shown in this report, the measurement uncertainty of the test laboratory, mikes-testingpartners gmbh, is below the measurement uncertainty as defined by CISPR. Therefore, no special measures must be taken into consideration with regard to the limits according to CISPR. Furthermore, component diversity and modifications in production processes may result in additional deviation. If necessary, refer to the test lab for the actual measurement uncertainty for specific tests. The manufacturer has the sole responsibility of continued compliance of the EUT.

4.4 Measurement protocol for FCC

4.4.1 GENERAL INFORMATION

4.4.1.1 Test methodology

Conducted and radiated disturbance testing is performed according to the procedures set out by the International Special Committee on Radio Interference (CISPR) Publication 22, European Standard EN 55022 as shown under section 1 of this report.

4.4.1.2 Justification

The equipment under test (EUT) is configured in a typical user arrangement in accordance with the manufacturer's instructions. A cable is connected to each available port and either terminated with a peripheral using the appropriate impedance characteristic or left unterminated. Where appropriate, cables are manually manipulated with respect to each other thus obtaining maximum disturbances from the unit.

4.4.2 DETAILS OF TEST PROCEDURES

General Standard information

The test methods used comply with CISPR Publication 22, EN 55022 - "Information technology equipment - Radio disturbance characteristics - Limits and methods of measurement" and with ANSI C63.4 - "Methods of Measurement of Radio-Noise Emissions from Low-Voltage Electrical and Electronic Equipment in the Range of 9 kHz to 40 GHz". In compliance with 47 CFR Part 15 Subpart A, Section 15.38 testing for FCC compliance may be achieved by following the procedures set out in ANSI C63.4 and applying the CISPR 22 limits.

4.4.3 Conducted emission

Description of measurement

The final level, expressed in dB μ V, is arrived at by taking the reading directly from the EMI receiver. This level is compared directly to the FCC limit or to the CISPR limit.

To convert between dB μ V and μ V, the following conversions apply:

$$\begin{aligned} \text{dB}\mu\text{V} &= 20 \cdot \log(\mu\text{V}); \\ \mu\text{V} &= 10^{(\text{dB}\mu\text{V}/20)}; \end{aligned}$$

Conducted emissions on the 50 Hz and/or 60 Hz power interface of the EUT are measured in the frequency range of 150 kHz to 30 MHz. The measurements are performed using a receiver, which has CISPR characteristic bandwidth and quasi-peak detection and a Line Impedance Stabilization Network (LISN) with 50 Ω /50 μ H (CISPR 16) characteristics. Table top equipment is placed on a non-conducting table 80 centimetres above the floor and is positioned 40 centimetres from the vertical ground plane (wall) of the screen room. If the minimum limit margin of a peak mode measurement appears to be less than 20 dB, the emissions are remeasured using a tuned receiver with quasi-peak and average detection and recorded on the data sheets.

4.4.4 Radiated emission (electrical field 30 MHz - 1 GHz)

Description of measurement

Spurious emissions from the EUT are measured in the frequency range of 30 MHz to 1000 MHz using a tuned receiver and appropriate broadband linearly polarised antennas. Measurements between 30 MHz and 1000 MHz are made with 120 kHz/6 dB bandwidth and quasi-peak detection. Table top equipment is placed on a 1.0 X 1.5 m non-conducting table 80 centimetres above the ground plane. Floor standing equipment is placed directly on the turntable/ground plane. The setup of the equipment under test is established in accordance with ANSI C63.4. The interface cables that are closer than 40 centimetres to the ground plane are bundled in the center in a serpentine fashion so that they are at least 40 centimetres from the ground plane. Cables to simulators/testers (if used in this test) are routed through the center of the table and to a screened room located outside the test area. The antenna is positioned in horizontal polarisation and is repeated vertically. To locate maximum emissions from the test sample the antenna is varied in height from 1 to 4 metres and the EUT is rotated 360 degrees.

The final level in dBµV/m is calculated by add the antenna correction factor and cable loss factor (dB) on the reading from the EMI receiver (dBµV). The FCC or CISPR limit is subtracted from this result in order to provide the delta to limit listed in the measurement protocol.

Example:

Frequency (MHz)	Reading level (dBµV)	+ Correction Factor (dB/m)	=	Level (dBµV/m)	- CISPR Limit (dBµV/m)	= Delta (dB)
719.0	75.0	+ 32.6	=	107.6	- 110.0	= -2.4

4.4.5 Radiated emission (electrical field 1 GHz - 40 GHz)

Description of measurement

Radiated emission from the EUT are measured in the frequency range 1 GHz up to the maximum frequency as specified in 47 CFR Part 15, Subpart A, Section 15.33, using a spectrum analyser and appropriate linearly polarized antennas. Table top equipment is placed on a 1.0 X 1.5 metre non-conducting table 80 centimetres above the ground plane. Floor standing equipment is placed directly on the turntable/ground plane. The setup of the equipment under test is following set out in ANSI C63.4. The interface cables that are closer than 40 centimetres to the ground plane are bundled in the center in a serpentine fashion so they are at least 40 centimetres from the ground plane. Cables to simulators/testers (if used in this test) are routed through the center of the table and to a screened room located outside the test area. Measurements are made in both the horizontal and vertical polarization planes in a fully anechoic room using a spectrum analyser set to max peak detector function and a resolution 1 MHz and video bandwidth 3 MHz for peak and 10 Hz for average measurement. The conditions determined as worst case will then be used for the final measurements. When the EUT is larger than the beam width of the measuring antenna it will be moved over the surface for the four sides of the equipment. Where appropriate, the test distance may be reduced in order to detect emission under better uncertainty and is calculated to the specified test distance.

4.5 Determination of worst case measurement conditions

Measurements have been made in all three orthogonal axes and the settings of the EUT were changed to locate at which position and at what setting of the EUT produce the maximum of the emissions. For the further measurement the EUT is set in X position with the following settings:

WLAN module disabled, ERM disabled, USB connected to a PC capturing data.

5 TEST CONDITIONS AND RESULTS

5.1 Conducted emissions

For test instruments and accessories used see section 6 Part A 4.

5.1.1 Description of the test location

Test location: Shielded Room S2

5.1.2 Photo documentation of the test set-up



5.1.3 Applicable standard

According to FCC Part 15, Section 15.107(a):

Except for Class A devices, for equipment that is designed to be connected to the public utility (AC) power line, the radio frequency voltage that is conducted back onto the AC power line on any frequency or frequencies within the band 150 kHz to 30 MHz shall not exceed the given limits.

5.1.4 Description of Measurement

The measurements are performed following the procedures set out in ANSI C63.4 described under item 4.4.3. If the minimum limit margin appears to be less than 20 dB with a peak mode measurement, the emissions are remeasured using a tuned receiver with quasi-peak and average detection and recorded on the data sheets.

5.1.5 Test result

Frequency range: 0.15 MHz - 30 MHz

Min. limit margin 10.0 dB at 26.0 MHz

Limit according to FCC Part 15, Section 15.107(a):

Frequency of Emission (MHz)	Conducted limit (dB μ V)	
	Quasi-peak	Average
0.15-0.5	66 to 56 *	56 to 46 *
0.5-5	56	46
5-30	60	50

* Decreases with the logarithm of the frequency

The requirements are **FULFILLED**.

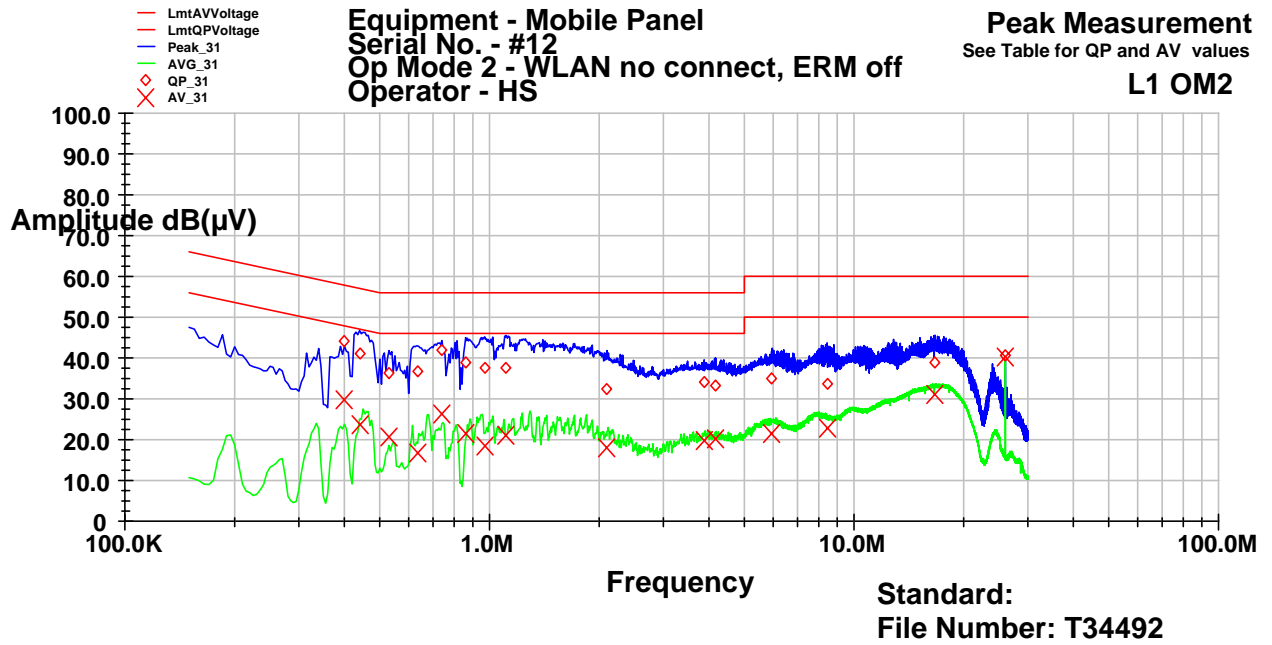
Remarks: For detailed test result please see the following test protocols.

mikes

5.1.6 Test protocol

Test point: L1
 Operation mode: USB data transmission
 Remarks:

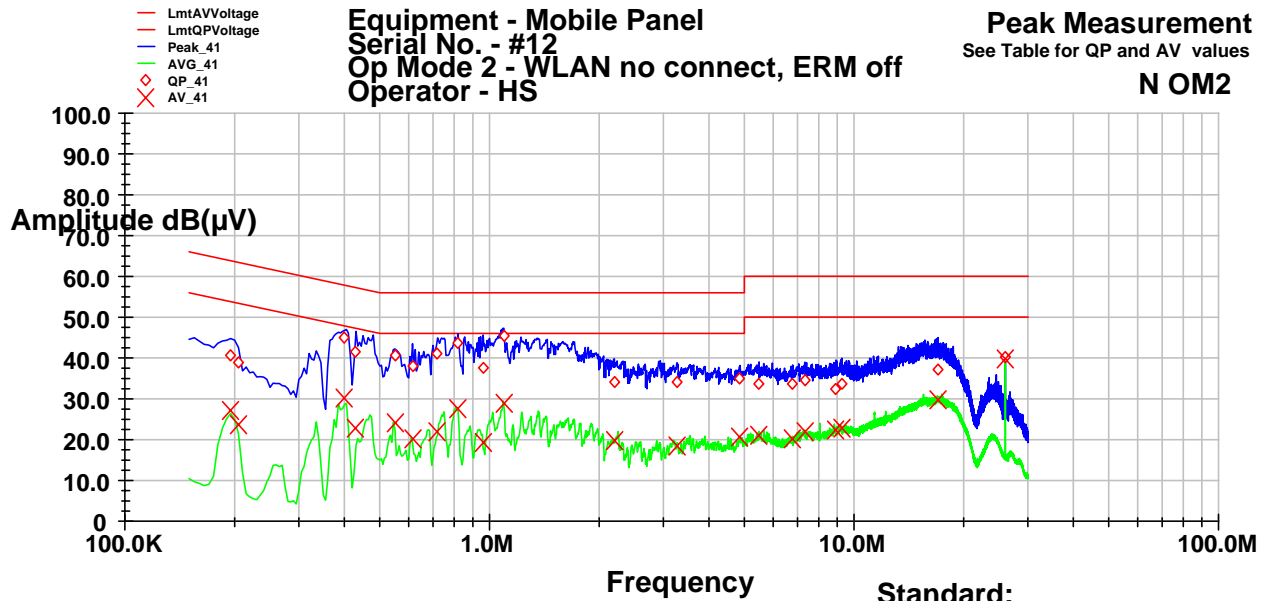
Result: passed



Frequency MHz	QP Level dB(µV)	QP Delta dB	QP Limit dB	AV Level dB(µV)	AV Delta dB	AV Limit dB
0.4	44.3	-13.6	57.9	29.8	-18.1	47.9
0.44	41.1	-16.0	57.1	23.6	-23.5	47.1
0.53	36.2	-19.8	56.0	20.4	-25.6	46.0
0.635	36.8	-19.2	56.0	16.6	-29.4	46.0
0.74	41.9	-14.1	56.0	26.3	-19.7	46.0
0.86	38.8	-17.3	56.0	21.6	-24.4	46.0
0.97	37.8	-18.2	56.0	18.3	-27.7	46.0
1.11	37.7	-18.3	56.0	21.1	-24.9	46.0
2.1	32.5	-23.5	56.0	17.9	-28.1	46.0
3.88	33.9	-22.1	56.0	19.8	-26.2	46.0
4.16	33.3	-22.7	56.0	20.1	-25.9	46.0
5.96	35.0	-25.0	60.0	21.3	-28.7	50.0
8.43	33.5	-26.5	60.0	22.8	-27.2	50.0
16.665	39.0	-21.0	60.0	31.2	-18.8	50.0
26	40.7	-19.3	60.0	40.0	-10.0	50.0

Test point: N
 Operation mode: USB data transmission
 Remarks:

Result: passed



Standard:
File Number: T34492

Frequency MHz	QP Level dB(µV)	QP Delta dB	QP Limit dB	AV Level dB(µV)	AV Delta dB	AV Limit dB
0.195	40.7	-23.1	63.8	27.3	-26.5	53.8
0.205	38.9	-24.5	63.4	23.5	-29.9	53.4
0.4	45.1	-12.7	57.9	30.2	-17.7	47.9
0.43	41.5	-15.8	57.3	22.6	-24.6	47.3
0.55	40.4	-15.6	56.0	24.0	-22.0	46.0
0.615	38.0	-18.0	56.0	20.2	-25.8	46.0
0.72	41.0	-15.0	56.0	22.0	-24.0	46.0
0.82	43.7	-12.3	56.0	27.6	-18.4	46.0
0.96	37.4	-18.6	56.0	19.3	-26.8	46.0
1.095	45.2	-10.8	56.0	28.7	-17.3	46.0
2.2	34.2	-21.8	56.0	19.5	-26.5	46.0
3.265	34.1	-21.9	56.0	18.7	-27.3	46.0
4.865	35.0	-21.0	56.0	20.5	-25.5	46.0
5.485	33.8	-26.2	60.0	21.2	-28.8	50.0
6.785	33.5	-26.5	60.0	20.2	-29.8	50.0
7.33	34.6	-25.4	60.0	21.8	-28.2	50.0
8.915	32.5	-27.5	60.0	22.2	-27.8	50.0
9.255	33.5	-26.5	60.0	22.8	-27.2	50.0
17.005	36.9	-23.1	60.0	29.9	-20.1	50.0
26	40.2	-19.8	60.0	39.5	-10.5	50.0

5.2 Radiated emissions

For test instruments and accessories used see section 6 Part **SER 2**, **SER 3**.

5.2.1 Description of the test location

Test location: OATS1
Test location: Anechoic Chamber A2

Test distance: 3 metres

5.2.2 Photo documentation of the test setup

30 MHz – 1 GHz



1 GHz – 12 GHz



5.2.3 Applicable standard

According to FCC Part 15B, Section 15.109 (a):

Except for Class A digital devices, the field strength of radiated emissions from unintentional radiators at a distance of 3 m shall not exceed the given limit.

5.2.4 Description of Measurement

The radiated power of the spurious emission from the EUT is measured in a test setup following the procedures set out in ANSI C63.4. If the emission level of the EUT in peak mode complies with the average/quasipeak limit is 20 dB lower, then testing will be stopped and peak values of the EUT will be reported, otherwise the emission will be measured in average/quasipeak mode again and reported.

Instrument settings:

30 MHz – 1000 MHz: RBW: 120 kHz

1000 MHz – 12000 MHz RBW: 1 MHz

5.2.5 Test result

f < 1 GHz

Frequency (MHz)	L: QP (dB μ V)	Bandwidth (kHz)	Correct. (dB)	L: QP (dB μ V/m)	Limit (dB μ V/m)	Delta (dB)
143	20.4	120	15.4	35.8	43.5	-7.7
156	22.4	120	15.8	38.2	43.5	-5.3
169	18.5	120	15.4	33.9	43.5	-9.6
182	21.3	120	14.5	35.8	43.5	-7.7
208	22.1	120	13.2	35.3	43.5	-8.2
260	20.8	120	15.3	36.1	46.0	-9.9

f > 1 GHz

Frequency (MHz)	L: PK (dB μ V)	L: AV (dB μ V)	Bandwidth (kHz)	Correct. (dB)	L: PK (dB μ V/m)	L: AV (dB μ V/m)	Limit AV (dB μ V/m)	Delta (dB)
-								

Limit according to FCC Part 15B, Section 15.109(a):

Frequency of emission (MHz)	Limit (μ V/m)	Limit (dB μ V/m)
30 - 88	100	40
88 - 216	150	43.5
216 - 960	200	46
Above 960	500	54

The requirements are **FULFILLED**.

Remarks: The measurement was performed according to FCC Part 15A, Section 15.33(b), 30 MHz up to 12 GHz. In the range > 1 GHz all emissions are at least 20 dB below the limit

6 USED TEST EQUIPMENT AND ACCESSORIES

All test instruments used are calibrated and verified regularly. The calibration history is available on request.

Test ID	Model Type	Equipment No.	Next Calib.	Last Calib.	Next Verif.	Last Verif.
A 4	ESHS 30	02-02/03-05-002	18/06/2011	18/06/2010		
	ESH 2 - Z 5	02-02/20-05-004	13/03/2011	13/03/2008	11/12/2010	11/06/2010
	N-4000-BNC	02-02/50-05-138				
	N-1500-N	02-02/50-05-140				
	ESH 3 - Z 2	02-02/50-05-155			07/10/2010	07/04/2010
SER 2	ESVS 30	02-02/03-05-006	11/06/2011	11/06/2010		
	VULB 9168	02-02/24-05-005	06/05/2011	06/05/2008	01/10/2010	01/04/2010
	S10162-B	02-02/50-05-031				
	KK-EF393-21N-16	02-02/50-05-033				
	NW-2000-NB	02-02/50-05-113				
SER 3	FSP 30	02-02/11-05-001	04/05/2011	04/05/2010		
	AFS4-01000400-10-10P-4	02-02/17-05-003				
	AMF-4F-04001200-15-10P	02-02/17-05-004				
	AFS5-12001800-18-10P-6	02-02/17-06-002				
	3117	02-02/24-05-009	10/02/2011	10/02/2010		
	Sucoflex N-1600-SMA	02-02/50-05-073				
	Sucoflex N-2000-SMA	02-02/50-05-075				

