

FCC and Industry Canada Testing of the
Siemens AG
Access Point, Model: MSN65-W1-M12-E2
In accordance with FCC 47 CFR Part 15B and
ICES-003

Prepared for: Siemens AG
76181
Karlsruhe
Germany

FCC ID: LYHMSN65V1
IC: 267AA-MSN65V1



Product Service

Choose certainty.
Add value.

COMMERCIAL-IN-CONFIDENCE

Date: June 2017
Document Number: 75938097-04 | Issue: 01

RESPONSIBLE FOR	NAME	DATE	SIGNATURE
Project Management	Steven White	04 July 2017	
Authorised Signatory	Nic Forsyth	04 July 2017	

Signatures in this approval box have checked this document in line with the requirements of TÜV SÜD Product Service document control rules.

ENGINEERING STATEMENT

The measurements shown in this report were made in accordance with the procedures described on test pages. All reported testing was carried out on a sample equipment to demonstrate limited compliance with FCC 47 CFR Part 15B and ICES-003. The sample tested was found to comply with the requirements defined in the applied rules.

RESPONSIBLE FOR	NAME	DATE	SIGNATURE
Testing	Graeme Lawler	04 July 2017	

FCC Accreditation

90987 Octagon House, Fareham Test Laboratory

Industry Canada Accreditation

IC2932B-1 Octagon House, Fareham Test Laboratory

EXECUTIVE SUMMARY

A sample of this product was tested and found to be in compliance with FCC 47 CFR Part 15B: 2016 and ICES-003: 2016.



DISCLAIMER AND COPYRIGHT

This non-binding report has been prepared by TÜV SÜD Product Service with all reasonable skill and care. The document is confidential to the potential Client and TÜV SÜD Product Service. No part of this document may be reproduced without the prior written approval of TÜV SÜD Product Service. © 2017 TÜV SÜD Product Service.

ACCREDITATION

Our UKAS Accreditation does not cover opinions and interpretations and any expressed are outside the scope of our UKAS Accreditation. Results of tests not covered by our UKAS Accreditation Schedule are marked NUA (Not UKAS Accredited).

TÜV SÜD Product Service
is a trading name of TÜV SÜD Ltd
Registered in Scotland at East Kilbride,
Glasgow G75 0QF, United Kingdom
Registered number: SC215164

TÜV SÜD Ltd is a
TÜV SÜD Group Company

Phone: +44 (0) 1489 558100
Fax: +44 (0) 1489 558101
www.tuv-sud.co.uk

TÜV SÜD Product Service
Octagon House
Concorde Way
Fareham
Hampshire PO15 5RL
United Kingdom



Contents

1 Report Summary 2

1.1 Report Modification Record.....2

1.2 Introduction.....2

1.3 Brief Summary of Results 3

1.4 Application Form 4

1.5 Product Information 6

1.6 Deviations from the Standard.....6

1.7 EUT Modification Record 6

1.8 Test Location.....6

2 Test Details 7

2.1 Radiated Emissions.....7

3 Measurement Uncertainty 12

1 Report Summary

1.1 Report Modification Record

Alterations and additions to this report will be issued to the holders of each copy in the form of a complete document.

Issue	Description of Change	Date of Issue
1	First Issue	04 July 2017

Table 1

1.2 Introduction

Applicant	Siemens Karlsruhe
Manufacturer	Siemens AG
Model Number(s)	MSN65-W1-M12-E2
Serial Number(s)	Not Serialised (75938097-TSR0001)
Hardware Version(s)	1
Software Version(s)	6.1
Number of Samples Tested	1
Test Specification/Issue/Date	FCC 47 CFR Part 15B: 2016 ICES-003: 2016
Order Number	4500299377
Date	20-February-2017
Date of Receipt of EUT	23-February-2017
Start of Test	11-June-2017
Finish of Test	11-June-2017
Name of Engineer(s)	Graeme Lawler
Related Document(s)	ANSI C63.4 (2014)



Product Service

1.3 Brief Summary of Results

A brief summary of the tests carried out in accordance with FCC 47 CFR Part 15B and ICES-003 is shown below.

Section	Specification Clause		Test Description	Result	Comments/Base Standard
	Part 15B	ICES-003			
Configuration: Idle Mode					
2.1	15.109	6.2	Radiated Emissions	Pass	ANSI C63.4

Table 2



1.4 Application Form

EQUIPMENT DESCRIPTION	
Model Name/Number	MSN65-W1-M12-E2
Part Number	
Hardware Version	1
Software Version	6.1
FCC ID (if applicable)	LYHMSN65V1
Industry Canada ID (if applicable)	267AA-MSN65V1
Technical Description (Please provide a brief description of the intended use of the equipment)	802.11 a/b/g/n Wi-Fi Access Point. EUT can be operated in either Master or Client mode depending on firmware configuration. EUT supports 20 MHz and 40 MHz bandwidths and 2x2 MIMO data rates (MCS0-7 and MCS 8-15).

INTENTIONAL RADIATORS									
Technology	Frequency Band (MHz)	Conducted Declared Output Power (dBm)	Antenna Gain (dBi)	Supported Bandwidth (s) (MHz)	Modulation Scheme(s)	ITU Emission Designator	Test Channels (MHz)		
							Bottom	Middle	Top
802.11a	5	20	6	20	OFDM		5180	5500	5825
802.11b/g	2.4	20	0	20	CCK/DSS S/OFDM		2412	2437	2462
802.11n	2.4	20	0	20/40	OFDM		2412	2437	2462
802.11n	5	20	6	20/40	OFDM		5180	5500	5825

UN-INTENTIONAL RADIATOR	
Highest frequency generated or used in the device or on which the device operates or tunes	5835 MHz

Power Source			
AC	Single Phase	Three Phase	Nominal Voltage
External DC	Nominal Voltage		Maximum Current
	24		250mA@24V, 350mA@16.8V
Battery	Nominal Voltage		Battery Operating End Point Voltage
Can EUT transmit whilst being charged?			Yes ☐ No ☐

EXTREME CONDITIONS			
Maximum temperature	75	°C	Minimum temperature -30 °C



Ancillaries
Please list all ancillaries which will be used with the device.

ANTENNA CHARACTERISTICS			
☒	Antenna connector	State impedance	50 Ohm
☐	Temporary antenna connector	State impedance	Ohm
☐	Integral antenna	Type	
☒	External antenna	Type	Please see attached Antenna List

I hereby declare that the information supplied is correct and complete.

Name: Malgorzata Janson

Position held: Project Manager Date: 29.05.2017

1.5 Product Information

1.5.1 Technical Description

802.11 a/b/g/n Wi-Fi Access Point. EUT can be operated in either Master or Client mode depending on firmware configuration. EUT supports 20 MHz and 40 MHz bandwidths and 2x2 MIMO data rates (MCS0-7 and MCS 8-15).

1.6 Deviations from the Standard

No deviations from the applicable test standard were made during testing.

1.7 EUT Modification Record

The table below details modifications made to the EUT during the test programme. The modifications incorporated during each test are recorded on the appropriate test pages.

Modification State	Description of Modification still fitted to EUT	Modification Fitted By	Date Modification Fitted
Serial Number: Not Stated			
0	As supplied by the customer	Not Applicable	Not Applicable

Table 3

1.8 Test Location

TÜV SÜD Product Service conducted the following tests at our Fareham Test Laboratory.

Test Name	Name of Engineer(s)	Accreditation
Configuration: Idle Mode		
Radiated Emissions	Graeme Lawler	UKAS

Table 4

Office Address:

Octagon House
Concorde Way
Segensworth North
Fareham
Hampshire
PO15 5RL
United Kingdom

2 Test Details

2.1 Radiated Emissions

2.1.1 Specification Reference

FCC 47 CFR Part 15B, Clause 15.109
ICES-003, Clause 6.2

2.1.2 Equipment Under Test and Modification State

MSN65-W1-M12-E2, S/N: Not Serialised (75938097-TSR0001) - Modification State 0

2.1.3 Date of Test

11-June-2017

2.1.4 Test Method

The test was performed in accordance with ANSI C63.4, clause 8.

2.1.5 Environmental Conditions

Ambient Temperature 21.3 °C
Relative Humidity 51.0 %

2.1.6 Test Results

Idle Mode

Highest frequency generated or used within the EUT: 5825 MHz.
Upper frequency test limit: 30 GHz

Frequency (MHz)	QP Level (dBuV/m)	QP Limit (dBuV/m)	QP Margin (dBuV/m)	Angle(Deg)	Height(m)	Polarity
30.770	29.8	40.0	-10.2	198	1.00	Vertical
574.974	38.6	46.0	-7.4	144	1.00	Vertical
584.984	39.6	46.0	-6.4	165	1.00	Vertical
589.989	41.6	46.0	-4.4	153	1.00	Vertical
625.016	35.6	46.0	-10.4	150	1.00	Vertical
764.957	34.4	46.0	-11.6	8	1.16	Vertical
923.351	37.7	46.0	-8.3	360	1.00	Vertical

Table 5 - 30 MHz to 1 GHz

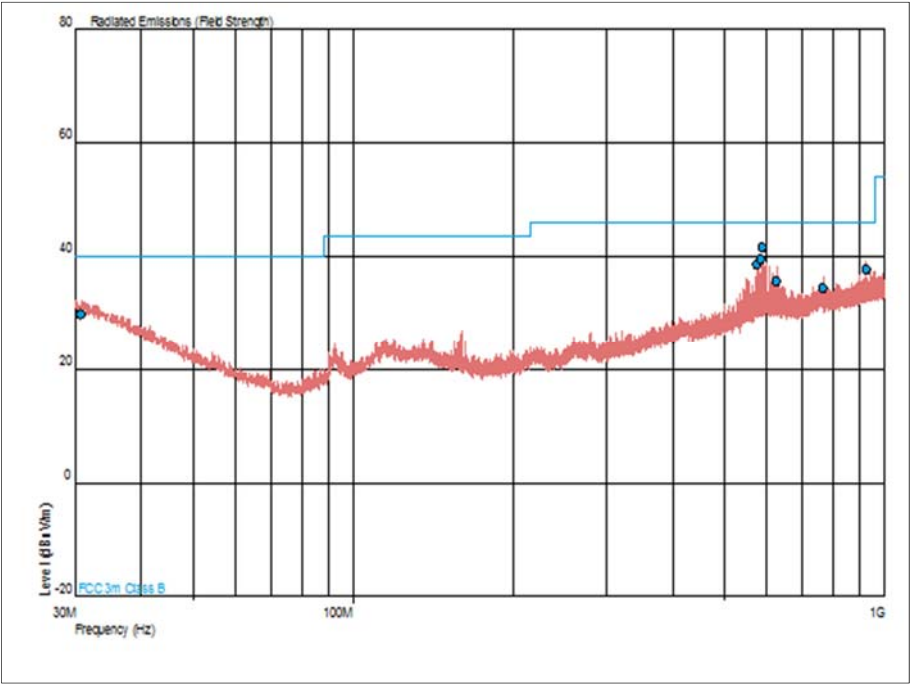


Figure 1 - 30 MHz to 1 GHz - Horizontal and Vertical

Frequency (GHz)	Result (µV/m)		Limit (µV/m)		Margin (µV/m)		Angle (°)	Height (m)	Polarisation
	Peak	Average	Peak	Average	Peak	Average			
*									

Table 6 - 1 GHz to 30 GHz

*No emissions were detected within 10 dB of the limit.

Frequency (GHz)	Result (dBµV/m)		Limit (dBµV/m)		Margin (dBµV/m)		Angle (°)	Height (m)	Polarisation
	Peak	Average	Peak	Average	Peak	Average			
*									

Table 7 - 1 GHz to 30 GHz

*No emissions were detected within 10 dB of the limit.

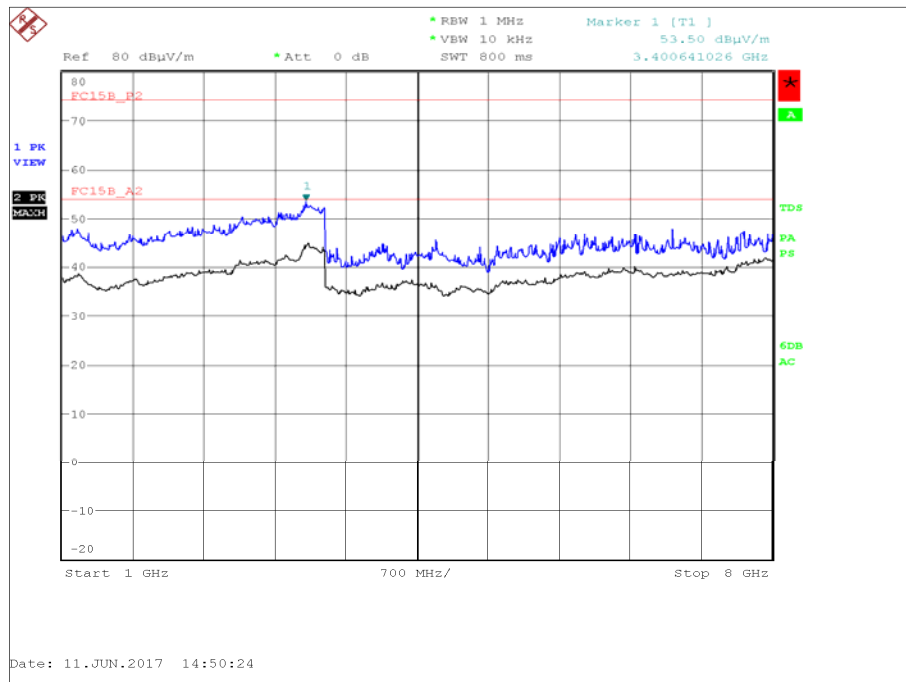


Figure 2 - 1 GHz to 8 GHz - Horizontal and Vertical

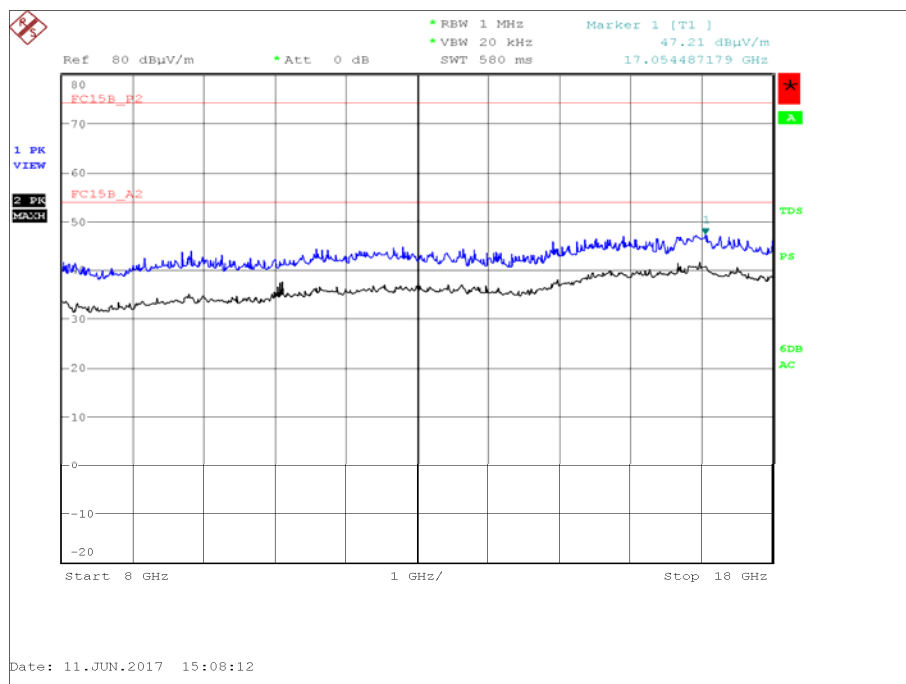


Figure 3 - 8 GHz to 18 GHz - Horizontal and Vertical



Product Service

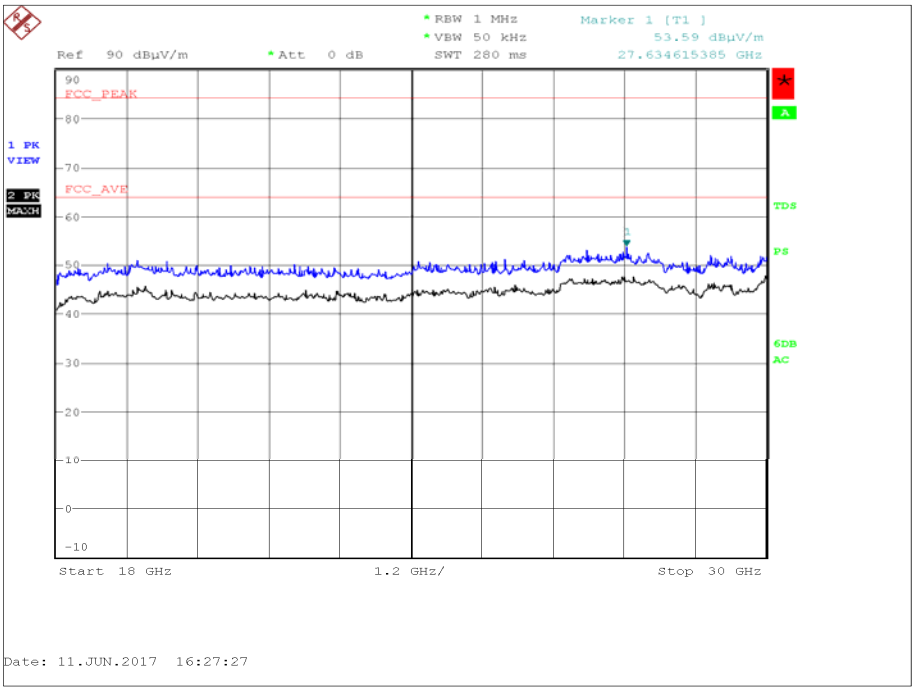


Figure 4 - 18 GHz to 30 GHz - Horizontal and Vertical

FCC 47 CFR Part 15B, Limit Clause 15.109

Frequency of Emission (MHz)	Field Strength (μV/m)
30 to 88	100.0
88 to 216	150.0
216 to 960	200.0
Above 960	500.0

ICES-003, Limit Clause 6.2

Frequency of Emission (MHz)	Quasi-Peak (dBμV/m)
30 to 88	40.0
88 to 216	43.5
216 to 960	46.0
960 to 1000	54.0

Frequency of Emission (MHz)	Field Strength (dBμV/m)	
	Linear Average Detector	Peak Detector
Above 1000	54.0	74.0

2.1.7 Test Location and Test Equipment Used

This test was carried out in EMC Chamber 5.

Instrument	Manufacturer	Type No	TE No	Calibration Period (months)	Calibration Due
Antenna 18-40GHz (Double Ridge Guide)	Link Microtek Ltd	AM180HA-K-TU2	230	24	12-Feb-2018
Signal Generator (10MHz to 40GHz)	Rohde & Schwarz	SMR40	1002	12	14-Oct-2017
Antenna 18-40GHz (Double Ridge Guide)	Q-Par Angus Ltd	QSH 180K	1511	24	07-Dec-2018
Pre-Amplifier	Phase One	PS04-0086	1533	12	29-Jul-2017
18GHz - 40GHz Pre-Amplifier	Phase One	PSO4-0087	1534	12	23-Jan-2018
Screened Room (5)	Rainford	Rainford	1545	36	20-Dec-2017
Turntable Controller	Inn-Co GmbH	CO 1000	1606	-	TU
Hygrometer	Rotronic	A1	2138	12	02-Feb-2018
Antenna (Bilog)	Chase	CBL6143	2904	24	11-Jun-2017
Cable (N-N, 8m)	Rhophase	NPS-2302-8000-NPS	3248	12	02-May-2018
EMI Test Receiver	Rohde & Schwarz	ESU40	3506	12	12-Nov-2017
Tilt Antenna Mast	maturo GmbH	TAM 4.0-P	3916	-	TU
Mast Controller	maturo GmbH	NCD	3917	-	TU
Cable 1503 2M 2.92(P)m 2.92(P)m	Rhophase	KPS-1503A-2000-KPS	4293	12	23-Jan-2018
Cable (Rx, Km-Km 2m)	Scott Cables	KPS-1501-2000-KPS	4526	6	23-Jul-2017
Cable (Yellow, Rx, Km-Km 2m)	Scott Cables	KPS-1501-2000-KPS	4527	6	04-Nov-2017
Cable (Rx, SMAM-SMAM 0.5m)	Scott Cables	SLSLL18-SMSM-00.50M	4528	6	03-Feb-2017
Double Ridged Waveguide Horn Antenna	ETS-Lindgren	3117	4722	12	17-Feb-2018
Double Ridge Broadband Horn Antenna	Schwarzbeck	BBHA 9120 B	4848	12	17-Feb-2018

Table 8

TU - Traceability Unscheduled



3 Measurement Uncertainty

For a 95% confidence level, the measurement uncertainties for defined systems are:

Test Name	Measurement Uncertainty
Radiated Emissions	30 MHz to 1 GHz: ± 5.2 dB 1 GHz to 40 GHz: ± 6.3 dB

Table 9