AT4 wireless, S.A.
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Registro Mercantil de Málaga,Tomo 1169,
Libro 82, Folio 133, Hoja MA3729

ENAC ENSAYOS Nº 51/LE203

TEST REPORT

REFERENCE STANDARD:

FCC Rules and Regulations 47 CFR Chapter I Part 15 Subpart B (10-01-10 Edition)

FCC Rules and Regulations 47 CFR Chapter I Part 15 Subpart B:

Radio frequency devices Subpart B. Unintentional radiators

NIE ..... :	38685REM.001
Approved by (name / position & signature) ..... :	Rafael López EMC Lab Manager
Elaboration date ..... :	2013-07-16

Rafael López Martín
Firmado digitalmente por Rafael López Martín
Fecha: 2013.07.17 14:20:07 +02'00'

Identification of item tested ..... :	VWAND
Trademark ..... :	Sistelnetworks
Model and/or type reference ..... :	SVW-10-1021W vWand White/Aluminum
Other identification of the product ..... :	S/N : VWBBB000393. HW Version: R1RD2 SW Version: --- FCC ID: 2AAHG1
Features ..... :	NFC peer-to peer, read/write and card emulation modes.Up to 75.000 NFC read/write actions with a battery charge. Bluetooth 2.1 connectivity with the tablet or smarthphone. Low energy consumption and long battery duration. Charging through micro-USB connector. Can be charged with virtually any micro-USB mobile charger. Power on and charging indicator LEDS.
Description ..... :	The vWand is an innovative NFC-Bluetooth Gateway designed to add NFC to smarthphones and tablets in a natural way. With the form factor of a marker, it features a soft rubber nib to interact with the touchscreen, and enables a variety of NFC applications.

Applicant ..... :	SISTELNETWORKS, S.L.
Address ..... :	Ronda Narciso Monturiol, 6. Dpcho. 109B. C.P. : 46980. Paterna. Valencia. Spain.
CIF/NIF/Passport ..... :	B98327489
Contact person ..... :	Jorge Marcos
Telephone / Fax ..... :	(+34) 961366533 / (+34) 961318383
e-mail ..... :	Jorge.marcos@sistelnetworks.com

Test samples supplier ..... :	SISTELNETWORKS, S.L.
Address ..... :	Ronda Narciso Monturiol, 6. Dpcho. 109B. C.P. : 46980. Paterna. Valencia. Spain.
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Manufacturer ..... :	SISTELNETWORKS, S.L.
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e-mail..... :	Jorge.marcos@sistelnetworks.com
Test method requested ..... :	
Standard..... :	FCC Rules and Regulations 47 CFR Chapter I Part 15 Subpart B (10-01-10 Edition).
Test procedure.....:	PEEM103
Report template No..... :	FDT08_14

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Competences and guarantees

This certificate of conformity was issued in accordance with the decision Nº 3/2000 of the Joint Committee established under the Agreement on Mutual Recognition between the European Community and the United States of America. By this decision, AT4 wireless can act as Conformity Assessment Body (CAB) on Electromagnetic Compatibility. This Certificate applies to the samples listed at technical reports.

This laboratory is designed by the Federal Communications Commission (ES0004)

AT4 wireless is a testing laboratory competent to carry out the tests described in this report.

In order to assure the traceability to other national and international laboratories, AT4 wireless has a calibration and maintenance programme for its measurement equipment.

AT4 wireless guarantees the reliability of the data presented in this report, which is the result of the measurements and the tests performed to the item under test on the date and under the conditions stated on the report and, it is based on the knowledge and technical facilities available at AT4 wireless at the time of performance of the test.

AT4 wireless is liable to the client for the maintenance of the confidentiality of all information related to the item under test and the results of the test.

General conditions

1. This report is only referred to the item that has undergone the test.
2. This report does not constitute or imply on its own an approval of the product by the Certification Bodies or competent Authorities.
3. This document is only valid if complete; no partial reproduction can be made without previous written permission of AT4 wireless.
4. This test report cannot be used partially or in full for publicity and/or promotional purposes without previous written permission of AT4 wireless and the Accreditation Bodies.

Uncertainty

Uncertainty (factor k=2) was calculated according to the following AT4 wireless's internal documents:

1. PODT000: Procedure for the measure uncertainty calculation.

Usage of samples

Samples under test have been selected by: The client.

Sample S/01 is composed of the following elements:

Control Nº	Description	Model	Serial Nº	Date of reception
38685D/01	VWAND NFC-Bluetooth Gateway	SVW-10-1021W vWand White/Aluminum	VWBBB000393	2013-04-24
38685D/06	USB cable	---	---	2013-04-24

Testing period

The performed test started on 2013-04-26 and finished on the 2013-05-03.

The tests have been performed at AT4 wireless.

Environmental conditions

In the control chamber, the following limits were not exceeded during the test:

Temperature	Min. = 15 ºC Max. = 35 ºC
Relative humidity	Min. = 20 % Max. = 80 %
Shielding effectiveness	> 100 dB
Electric insulation	> 10 kΩ
Reference resistance to earth	< 0,5 Ω

In the semianechoic chamber (21 meters x 11 meters x 8 meters), the following limits were not exceeded during the test.

Temperature	Min. = 15 ºC Max. = 30 ºC
Relative humidity	Min. = 45 % Max. = 60 %
Air pressure	Min. = 860 mbar Max. = 1060 mbar
Shielding effectiveness	> 100 dB
Electric insulation	> 10 kΩ
Reference resistance to earth	< 0,5 Ω
Normal site attenuation (NSA)	< ±4 dB at 10 m distance between item under test and receiver antenna, (30 MHz to 1000 MHz)
Field homogeneity	More than 75% of illuminated surface is between 0 and 6 dB (26 MHz to 1000 MHz).

In the chamber for conducted measurements, the following limits were not exceeded during the test:

Temperature	Min. = 15 ºC Max. = 30 ºC
Relative humidity	Min. = 45 % Max. = 60 %
Air pressure	Min. = 860 mbar Max. = 1060 mbar
Shielding effectiveness	> 100 dB
Electric insulation	> 10 kΩ
Reference resistance to earth	< 0,5 Ω

Summary

Considering the results of the performed test according to standard **FCC Rules and Regulations 47 CFR Chapter I Part 15 Subpart B (10-01-10 Edition),** the items under test are **IN COMPLIANCE** with the requested specifications specified in the standard.

NOTE: The results presented in this Test Report apply only to the particular item under test established in page 1 of this document, as presented for test on the date(s) shown in section, "USAGE OF SAMPLES, TESTING PERIOD AND ENVIRONMENTAL CONDITIONS".

Remarks and comments

The tests have been realized by the technical personnel: Antonio Jurado; Pedro Manuel Valenzuela & Margarita Haro.

The total uncertainty of the measurement system for the measured radio disturbance characteristics of EUT from 150 kHz to 30 MHz is I = ± 3,60 dB for quasi-peak measurements, I = ± 3,48 dB for peak measurements (k = 2).

The total uncertainty of the measurement system for the measured radio disturbance characteristics of EUT from 30 MHz to 1 GHz is I = ± 4,57 dB for quasi-peak measurements, I = ± 4,48 dB for peak measurements (k = 2) and from 1 to 12,75 GHz is I = ± 3,43 dB for average and peak measurements.

Testing veredicts

Not applicable ..... : NA

Pass..... : P

Fail ..... : F

Not measured..... : NM

List of equipment used during the test

CONTROL NUMBER	DESCRIPTION	MANUFACTURER	MODEL	LAST CALIBRATION	NEXT CALIBRATION
1935	EMI Receptor	ROHDE & SCHWARZ	ESPI	2011-10-19	2013-10-19
2942	EMI Receptor	ROHDE & SCHWARZ	ESU 40	2012-03-05	2014-03-05
245	Horn Antenna	HEWLETT PACKARD	11966E	2011-03-18	2014-03-18
1658	RF Amplifier	SCHAFFNER	CPA9231A	2013-06-17	2015-06-17
2932	Bilog Hybrid antenna	SUNOL SCIENCES CORPORATION	JB6	2011-05-11	2014-03-11
3556	Thermohygrograph	T&D	TR-72W	2012-11-30	2013-11-30
2933	RF Amplifier	A.H. SYSTEMS	PAM-0207	2013-05-10	2014-05-10

APPENDIX A

Test Result

APPENDIX A CONTENT:

DESCRIPTION OF THE OPERATION MODES

The operation modes described in this paragraph constitute a functionality of the sample under test for itself. Every operation mode takes a failure criteria for the immunity test that they were applying to it and a monitoring to guarantee performance of the same ones.

In the following table appears the operation modes used by the samples tested to that it refers the present test report.

OPERATION MODE	DESCRIPTION
OM#01	EUT ON. Equipment in Stand-By mode and charging batteries by USB cable.
OM#02	EUT ON. Equipment in transmission mode and charging batteries by USB cable.

RADIATED EMISSION. ELECTROMAGNETIC FIELD MEASURE.

LIMITS:	Product standard:	FCC RULES AND REGULATIONS 47 CFR PART 15, SUBPART B (10-01-10 ED.)
	Test standard:	FCC RULES AND REGULATIONS 47 CFR PART 15, SUBPART B (10-01-10 ED.)

LIMITS OF INTERFERENCE CLASS B

The applied limit for radiated emissions, 3 m distance, according with the requirements of FCC Rules and Regulations 47 CFR Part 15.109, Subpart B & IC RSS-Gen Issue 2, June 2007 in the frequency range 30 MHz to 25 GHz, for Class B equipment, which is a transmitter in a band over 500 MHz, was:

Frequency range (MHz)	**Limit for 3 m (µV/m)**	**Limit for 3 m (dBµV/m)**
30 to 88	100	40
88 to 216	150	43,52
216 to 960	200	46,02
Above 960	500	53,98

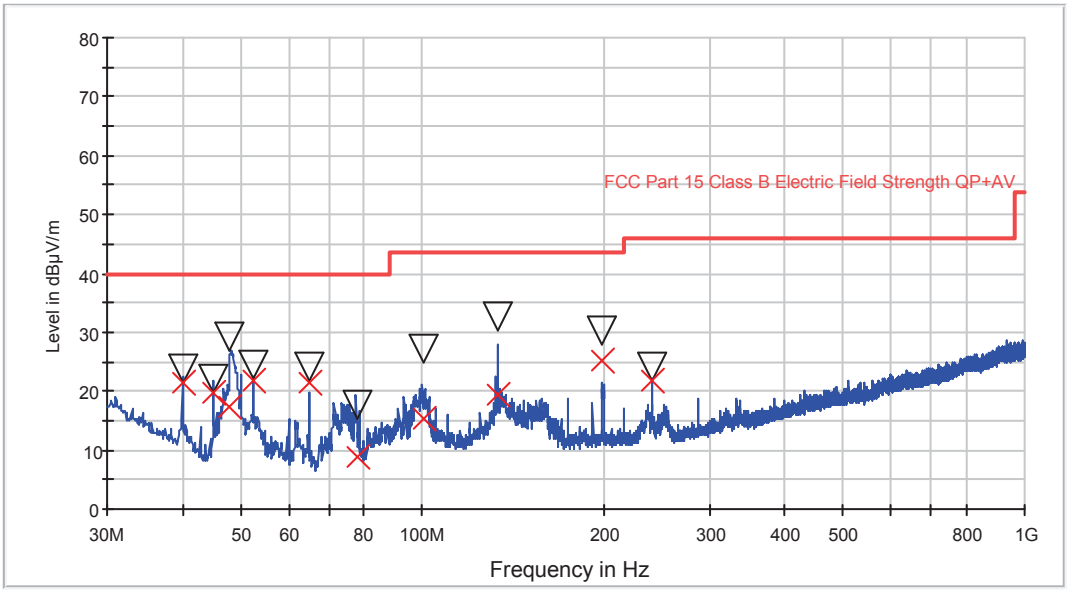
TESTED SAMPLES:	S/01
TESTED OPERATION MODES:	OM#01
TEST RESULTS :	**CR**mmnn: CR, Radiation Condition; mm: Sample number; nn: Operation mode, xx: Polarisation.

CRmmnn	**Description**	**Result**
CR0101	EUT ON. Idle Bluetooth. Range 30MHz-1 GHz.	P
CR0101_RA_PH	EUT ON. Idle Bluetooth. Range 1-12.5 GHz. Horizontal Pol.	P
CR0101_RA_PV	EUT ON. Idle Bluetooth. Range 1-12.5 GHz. Vertical Pol.	P

Radiated Emission: CR0101 (30MHz to 1GHz)

Project:	38685REM.001
Company:	SISTELNETWORKS, S.L.
Sample:	S/01
Operation mode:	OM#01
Description:	EUT ON. Stand-By mode. Charging batteries.

FCC class B ESPI Bilog Hybrid



FCC Part 15 Class B Electric Field Strength QP+AV
MaxPeak
Preview Result
QuasiPeak

Max PK

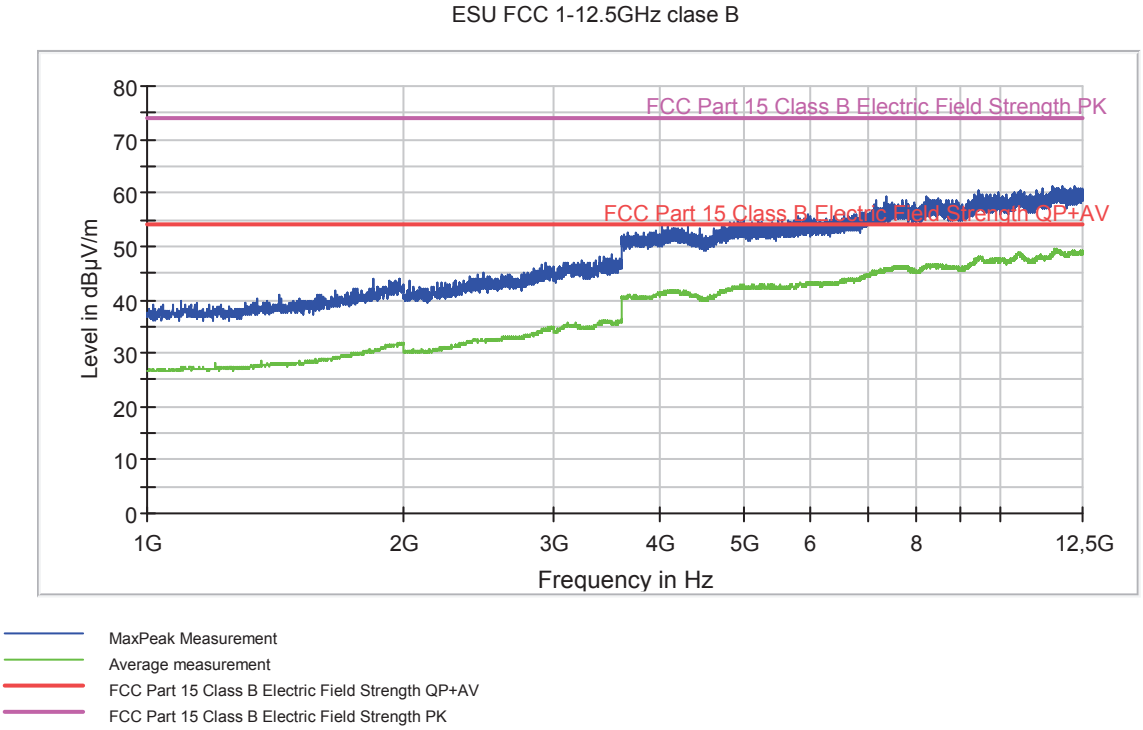
Frequency (MHz)	MaxPeak (dBµV/m)	Height (cm)	Polarization	Azimuth (deg)
40.000000	23.8	116.0	V	219.0
44.903226	22.2	107.0	V	328.0
47.948387	29.4	107.0	V	82.0
52.475806	24.5	120.0	V	334.0
65.024194	24.0	107.0	V	233.0
77.969355	17.7	146.0	V	0.0
100.253226	27.1	123.0	V	80.0
133.766129	32.8	107.0	V	355.0
199.140323	30.3	272.0	V	211.0
239.991935	24.2	107.0	V	50.0

Max QP

Frequency (MHz)	QuasiPeak (dBµV/m)	Height (cm)	Polarization	Azimuth (deg)
40.000000	21.4	116.0	V	219.0
44.903226	19.8	107.0	V	328.0
47.948387	17.2	107.0	V	82.0
52.475806	21.8	120.0	V	334.0
65.024194	21.4	107.0	V	233.0
77.969355	8.9	146.0	V	0.0
100.253226	15.4	123.0	V	80.0
133.766129	19.6	107.0	V	355.0
199.140323	25.2	272.0	V	211.0
239.991935	21.8	107.0	V	50.0

Radiated Emission: CR0101_RA_PH (1 – 12.5 GHz)

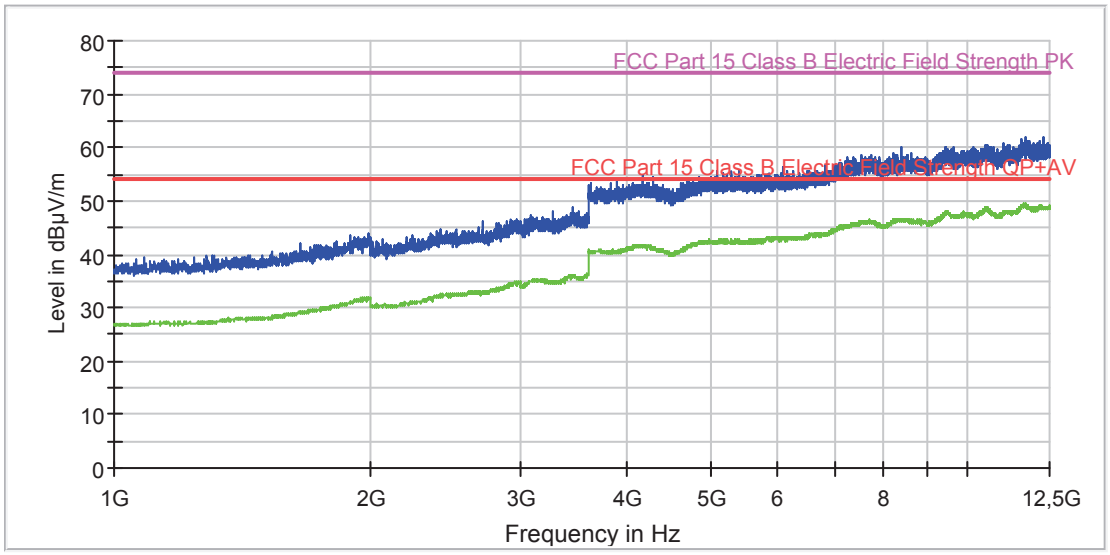
Project:	38685REM.001
Company:	SISTELNETWORKS, S.L.
Sample:	S/01
Operation mode:	OM#01
Description:	EUT ON. Stand-By mode. Charging batteries. Horizontal polarization.



Radiated Emission: CR0101_RA_PV (1 – 12.5 GHz)

Project:	38685REM.001
Company:	SISTELNETWORKS, S.L.
Sample:	S/01
Operation mode:	OM#01
Description:	EUT ON. Stand-By mode. Charging batteries. Vertical polarization

ESU FCC 1-12.5GHz clase B



MaxPeak Measurement
Average Measurement
FCC Part 15 Class B Electric Field Strength QP+AV
FCC Part 15 Class B Electric Field Strength PK

CONTINUOUS CONDUCTED EMISSION ON POWER LEADS

LIMITS:	Product standard :	FCC RULES AND REGULATIONS 47 CFR PART 15, SUBPART B (10-01-10 ED.)
	Test standard :	FCC RULES AND REGULATIONS 47 CFR PART 15, SUBPART B (10-01-10 ED.)

CLASS B

The applied limit for continuous conducted emissions in power leads, according with the requirements of FCC RULES AND REGULATIONS 47 CFR PART 15, SUBPART B (10-01-10 Ed.) & IC RSS-Gen Issue 2, June 2007 in the frequency range 0,15 to 30 MHz, for Class B equipment was:

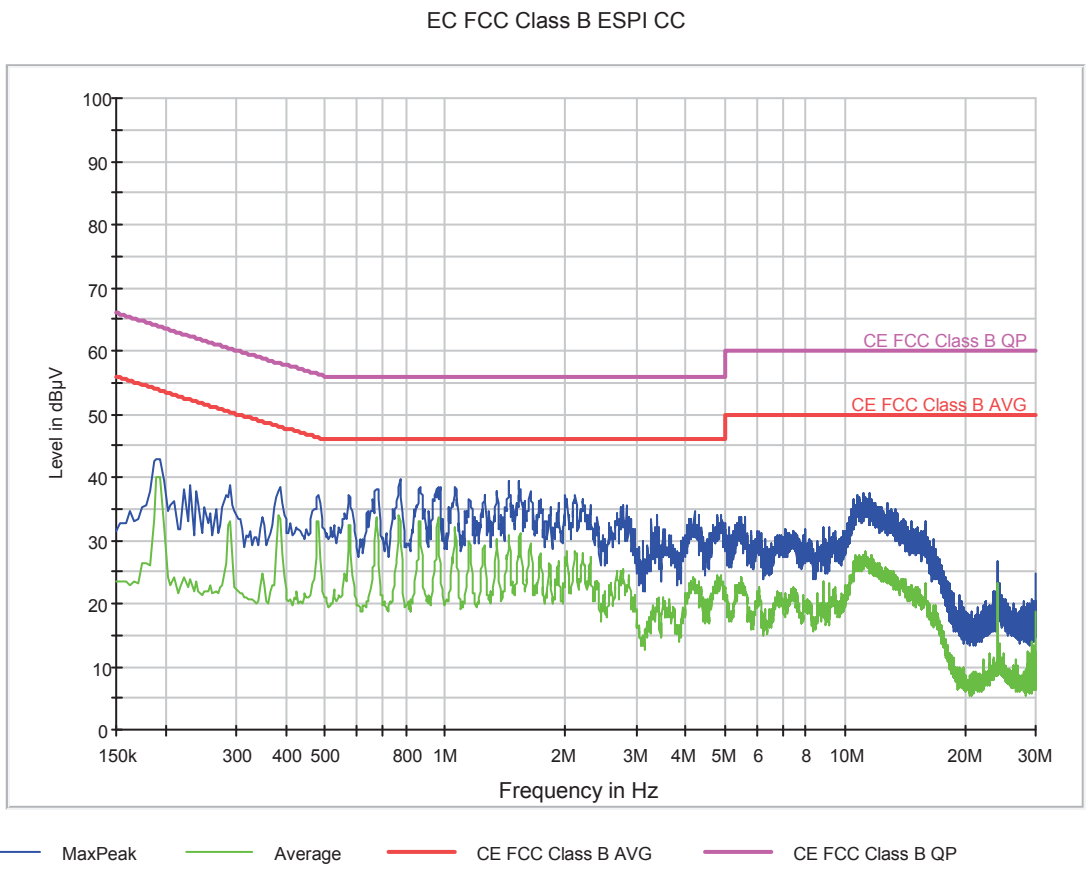
Frequency range (MHz)	**Limit (dBµV)**	
	Quasi-peak	**Average**
0,15 to 0,5	66-56	56-46
0,5 to 5	56	46
5 to 30	60	50

TESTED SAMPLES:	S/01
TESTED OPERATION MODES:	OM#01 & 02
TEST RESULTS :	CCmmnnhh: CC, Conducted Condition; mm: Sample number; nn: Operation mode; hh: wire

CCmmnnhh	**Description**	**Result**
CC01010N	Neutral wire noise	P
CC0101L1	Phase wire noise	P
CC01020N	Neutral wire noise	P
CC0102L1	Phase wire noise	P

Continuous Conducted emission : CC01010N	Detector : Peak / Average / Cuasi-peak

Project: 38685REM.001
Company: SISTELNETWORKS, S.L.
Sample: S/01
Operation mode: OM#01
Mode: EUT ON. Stand-By mode. Charging batteries. Neutral wire noise.

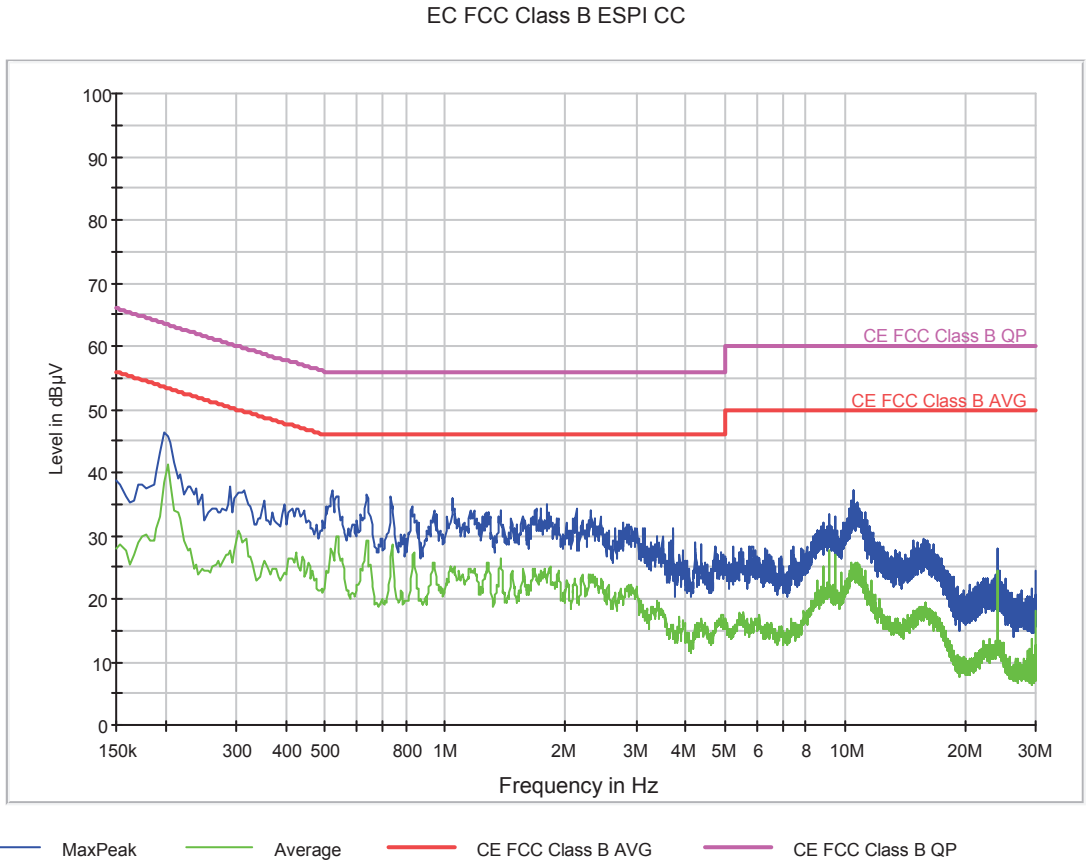


Max PK AVG

Frequency (MHz)	MaxPeak-ClearWrite (dBµV)	Average-ClearWrite (dBµV)
0.190000	42.9	40.1
0.290000	38.8	33.1
0.670000	38.1	33.6
0.770000	39.7	32.9
1.530000	39.4	30.0
2.214000	36.7	27.5
4.194000	34.5	23.8
10.394000	33.9	24.3
11.074000	37.6	27.1
23.994000	26.5	23.1

Continuous Conducted emission : CC0101L1	Detector : Peak / Average / Cuasi-peak

Project: 38685REM.001
Company: SISTELNETWORKS, S.L.
Sample: S/01
Operation mode: OM#01
Mode: EUT ON. Stand-By mode. Charging batteries. Phase wire noise.

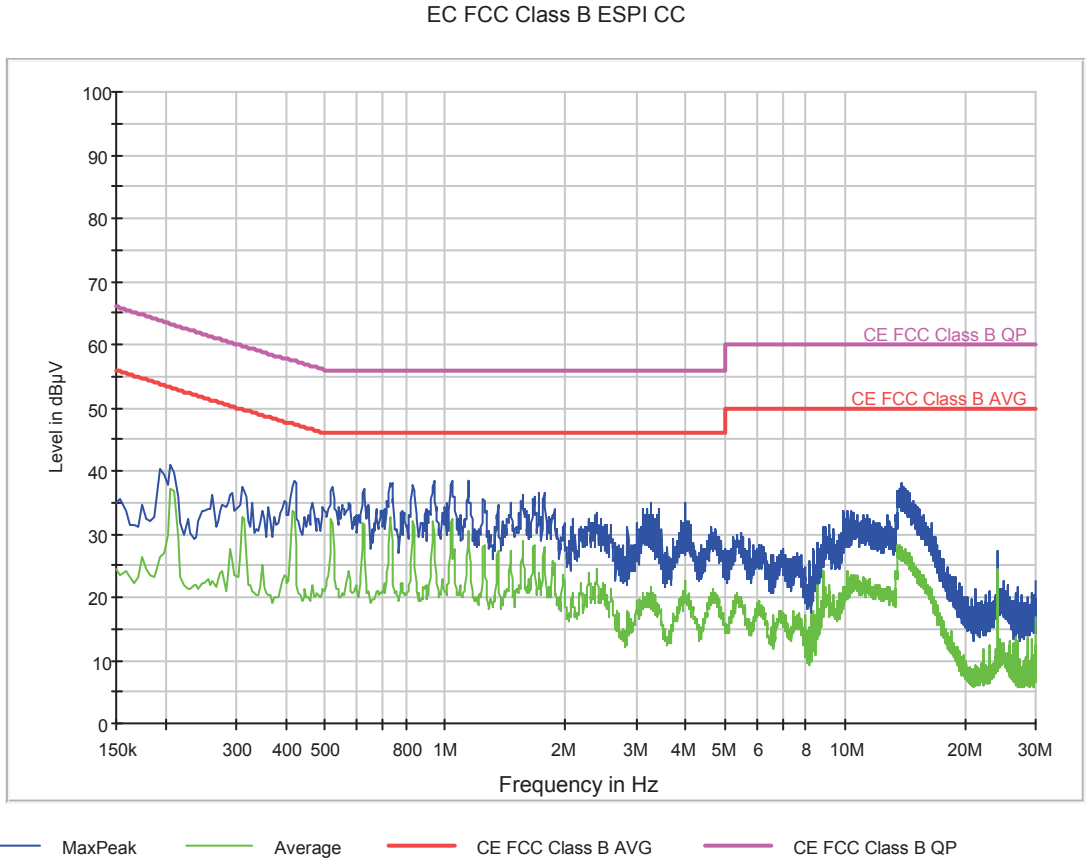


Max PK AVG

Frequency (MHz)	MaxPeak-ClearWrite (dBµV)	Average-ClearWrite (dBµV)
0.198000	46.3	38.3
0.290000	37.9	27.5
0.522000	37.1	27.2
1.042000	35.8	24.7
1.798000	35.0	22.6
2.122000	34.2	21.8
3.714000	31.0	15.8
10.366000	35.6	24.0
10.510000	37.3	25.5
23.994000	27.9	24.5

Continuous Conducted emission : CC01020N	Detector : Peak / Average / Cuasi-peak

Project: 38685REM.001
Company: SISTELNETWORKS, S.L.
Sample: S/01
Operation mode: OM#02
Mode: EUT ON. Transmission mode. Charging batteries. Neutral wire noise.

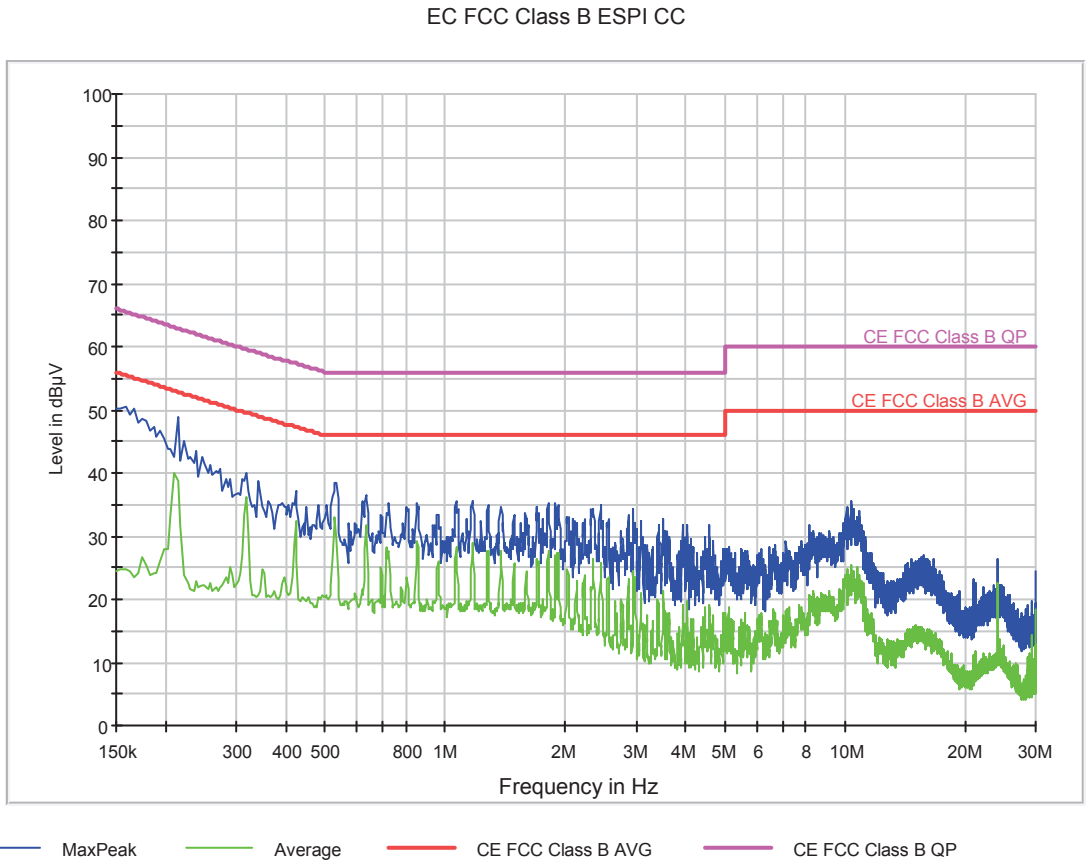


Max PK AVG

Frequency (MHz)	MaxPeak-ClearWrite (dBµV)	Average-ClearWrite (dBµV)
0.206000	41.0	37.1
0.418000	38.5	33.4
0.734000	38.2	28.8
1.038000	38.5	32.5
1.770000	36.5	26.9
3.274000	34.8	21.5
3.994000	34.8	22.5
9.930000	33.6	20.5
13.910000	37.9	26.5
23.994000	27.3	24.2

Continuous Conducted emission : CC0102L1	Detector : Peak / Average / Cuasi-peak

Project: 38685REM.001
Company: SISTELNETWORKS, S.L.
Sample: S/01
Operation mode: OM#02
Mode: EUT ON. Transmission mode. Charging batteries. Phase wire noise.



Max PK AVG

Frequency (MHz)	MaxPeak-ClearWrite (dBµV)	Average-ClearWrite (dBµV)
0.158000	50.6	24.6
0.258000	41.2	22.5
0.530000	38.5	32.9
1.062000	35.6	28.0
1.810000	35.3	27.5
2.446000	34.8	25.8
4.030000	31.8	17.1
10.370000	35.4	24.8
10.510000	34.3	24.3
23.994000	26.4	22.6