



Test report No:
NIE: 59770REM.002A1

Test report

FCC Rules and Regulations CFR 47, Part 15, Subpart B
(10-1-19 Edition) & ICES-003 Issue 7 (October 2020)

(*) Identification of item tested	M2M/IoT Linux based open platform designed to gather, process and report data
(*) Trademark	OWASYS
(*) Model and /or type reference tested	owa450
Other identification of the product	FCC ID: SJE – OWA450 IC: 7830A-PLS62W Contains FCC ID: QIPPLS62-W Contains FCC ID: X02SPB209A HW version: R1A SW version: 1
(*) Features	LTE, WIFI, BLUETOOTH 4.2, 802.11@2.4, 802.11@5
Manufacturer	OWASYS ADVANCED WIRELESS DEVICES S.L. Parque tecnológico, 207B 48160 Derio, Vizcaya, SPAIN
Test method requested, standard	FCC Rules and Regulations CFR 47, Part 15, Subpart B (10-1-19 Edition) & ICES-003 Issue 7 (October 2020)
Summary	IN COMPLIANCE
Approved by (name / position & signature)	Rafael López EMC Consumer & RF Lab. Manager
Date of issue	2021-02-10
Report template No	FDT08_22 (*) "Data provided by the client"

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Competences and guarantees

DEKRA Testing and Certification is a testing laboratory accredited by the National Accreditation Body (ENAC - Entidad Nacional de Acreditación), to perform the tests indicated in the Certificate No. 51/LE 147.

In order to assure the traceability to other national and international laboratories, DEKRA Testing and Certification has a calibration and maintenance program for its measurement equipment.

DEKRA Testing and Certification 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 DEKRA Testing and Certification at the time of performance of the test.

DEKRA Testing and Certification 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.

The results presented in this Test Report apply only to the particular item under test established in this document.

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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 DEKRA Testing and Certification.
4. This test report cannot be used partially or in full for publicity and/or promotional purposes without previous written permission of DEKRA Testing and Certification and the Accreditation Bodies.

Uncertainty

Uncertainty (factor $k=2$) was calculated according to the DEKRA Testing and Certification internal document PODT000.

The total uncertainty of the measurement system for the measured conducted disturbance characteristics of EUT from 150kHz to 30 MHz is $I = \pm 3,9$ dB for quasi-peak measurements, $I = \pm 3,2$ dB for average measurements ($k = 2$)

The total uncertainty of the measurement system for the measured radio disturbance characteristics of EUT from 30 MHz to 1000 MHz is $I = \pm 4,9$ dB for quasi-peak measurements, $I = \pm 4,6$ dB for peak measurements ($k = 2$)

The total uncertainty of the measurement system for the measured radio disturbance characteristics of EUT from 1000 MHz to 12.75 GHz is $I = \pm 2,6$ dB for peaks and average measurements ($k = 2$)

Data provided by the client

The following data has been provided by the client:

1. Information relating to the description of the sample ("Identification of the item tested", "Trademark", "Model and/or type reference tested").
2. The device includes a Linux core with different communication interfaces, cellular communication with LTE capabilities, WIFI, BT, and GNSS.

DEKRA declines any responsibility with respect to the information provided by the client and that may affect the validity of results.

Usage of samples

Samples under test have been selected by: the client.

Sample **S/01** is composed of the following elements:

Control N°	Description	Model	Serial N°	Date of reception
59770B/005	Antenna	---	---	2019-11-25
59770B/006	Antenna	---	---	2019-11-25
59770B/007	Antenna	---	---	2019-11-25
59770B/008	M2M/IoT Linux based open platform designed to gather, process and report data.	owa450	A0A0VQ1	2019-11-25

Auxiliary elements used with sample S/01:

Control N°	Description	Model	Serial N°	Date of reception
59770B/003	Module	owa450	A1023J1	2019-11-25

Sample **S/02** is composed of the following elements:

Control N°	Description	Model	Serial N°	Date of reception
59770B/005	Antenna	---	---	2019-11-25
59770B/006	Antenna	---	---	2019-11-25
59770B/007	Antenna	---	---	2019-11-25
59770B/008	M2M/IoT Linux based open platform designed to gather, process and report data.	owa450	A0A0VQ1	2019-11-25

Auxiliary elements used with sample S/01:

Control N°	Description	Model	Serial N°	Date of reception
59770B/003	Module	owa450	A1023J1	2019-11-25
-	AC/DC adaptor (*)	6A-181WP12	---	-

*AC/DC property of Dekra TC

Test sample description

Ports..... :	Port name and description		Cable				
			Specified length [m]	Attached during test	Shielded		
	ETHERNET		>10	☒	☒		
	4*CAN		>30	☒	☐		
	2*RS485		>30	☒	☐		
	RS232		10	☒	☐		
	USB		10	☐	☐		
	IOS, CODEC		3	☒	☐		
Supplementary information to the ports..... :							
Rated power supply	Voltage and Frequency		Reference poles				
			L1	L2	L3	N	PE
	☐	AC:	☐	☐	☐	☐	☐
☒	DC: 24V (nominal), 9V (min), 48V (max)						
Rated Power	12W						
Clock frequencies	5GHz (WiFi)						
Other parameters..... :							
Software version	1.1.0						
Hardware version..... :	R2A						
Dimensions in cm (W x H x D)..... :	150x94x32mm						
Mounting position..... :	☐	Table top equipment					
	☐	Wall/Ceiling mounted equipment					
	☐	Floor standing equipment					
	☐	Hand-held equipment					
	☒	Other:					
Modules/parts	Module/parts of test item		Type		Manufacturer		
	GEMALTO PLS62-W		LTE MODULE		GEMALTO		
	H&D SPB209A WIFI/BT COMBO		WIFI/BT COMBO		H&D		
	UBLOX NEO-M8N		GNSS MODULE		UBLOX		
Accessories (not part of the test item)	Description		Type		Manufacturer		
	LTE ANTENNA ANT100_9100		ANTENNA		2J Antennae		
	GNSS ANTENNA ANT100_9101		ANTENNA		2J Antennae		
Documents as provided by the applicant..... :	Description		File name		Issue date		

Identification of the client

OWASYS ADVANCED WIRELESS DEVICES S.L.
Parque tecnológico, 207B
48160 Derio, Vizcaya, SPAIN

Testing period and place

Test Location	DEKRA Testing and Certification S.A.U.
Date (start)	2019-12-11
Date (finish)	2019-12-11

Document history

Report number	Date	Description
59770REM.002	2020-01-16	First release
59770REM.002A1	2021-02-10	First modification due to typos, missing information (conducted emission testing) and updated standard version. This modification test report cancels and replaces the test report 59770REM.002

Environmental conditions

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

Temperature	Min. = 15 °C Max. = 35 °C
Relative humidity	Min. = 30 % Max. = 75 %
Air pressure	Min. = 860 mbar Max. = 1060 mbar

In the semianechoic chamber, the following limits were not exceeded during the test.

Temperature	Min. = 15 °C Max. = 35 °C
Relative humidity	Min. = 30 % Max. = 75 %
Air pressure	Min. = 860 mbar Max. = 1060 mbar

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

Temperature	Min. = 15 °C Max. = 35 °C
Relative humidity	Min. = 30 % Max. = 60 %
Air pressure	Min. = 860 mbar Max. = 1060 mbar

Remarks and comments

The test have been performed by the technical personnel: Carlos Haro.

DEKRA declines any responsibility with respect to the information provided by the client and that may affect the validity of results.

Testing verdicts

Not applicable :	N/A
Pass :	P
Fail :	F
Not measured :	N/M

List of equipment used during the test

Control Number	Description	Model	Manufacturer	Next Calibration
4567	ETHERNET TEMPERATURE AND HUMIDITY LOGGER	HWg-STE	HW GROUP	2020-04-03
4570	ETHERNET TEMPERATURE AND HUMIDITY LOGGER	HWg-STE	HW GROUP	2020-04-05
4578	HYBRID BILOG ANTENNA 30MHz-6GHz	3142E	ETS LINDGREN	2020-04-03
4612	HORN ANTENNA 1-18GHz	BBHA 9120 D	SCHWARZBECK MESS-ELEKTRONIK	2021-06-14
4716	SIGNAL AND SPECTRUM ANALYZER 2Hz-50GHz	FSW50	ROHDE AND SCHWARZ	2020-02-21
4825	SEMIANECHOIC ABSORBER LINED CHAMBER	FACT 3 200 STP	ETS LINDGREN	---
4826	SHIELDED ROOM	S101	ETS LINDGREN	---
4828	SHIELDED ROOM	S101	ETS LINDGREN	---
5705	PRE-AMPLIFIER G>40dB 1-18 GHz	BLMA 0118-1M	BONN ELEKTRONIK	2020-04-30
6120	PRE-AMPLIFIER G>38dB 30MHz-6GHz	BLNA 0360-01N	BONN ELEKTRONIK	Before the test
1650	THREE-PHASE ARTIFICIAL V-NETWORK 100A	NNLK8121	SCHWARZBECK	2021-09-24
5151	TRANSIENT LIMITER 10DB N CONNECTOR	VTSD 9561-F	SCHWARZBECK	2021-10-02

Summary

Emission Test		
Requirement – Test case	Verdict	Remark
Conducted disturbance voltage at mains terminals (150 KHz – 30 MHz)	P	-
Radiated electromagnetic disturbances (30 MHz to 12.75 GHz)	P	-
<u>Supplementary information and remarks:</u>		
N/A		

Appendix A: Test results

APPENDIX A CONTENT

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DESCRIPTION OF THE OPERATION MODES

The operation modes described in this paragraph constitute a functionality of the sample under test for itself. The operation modes used by the samples to which the present report refers, are shown in the following table:

OPERATION MODE	DESCRIPTION
OM#01	EUT ON. Bluetooth ON unpaired with auxiliary device. WiFi ON unconnected with auxiliary device. MS in IDLE mode. LTE Band 5. Power supply: 24Vdc.
OM#02	EUT ON. Bluetooth ON unpaired with auxiliary device. WiFi ON unconnected with auxiliary device. MS in IDLE mode. LTE Band 5. Power supply: 24Vdc (through an AC/DC adaptor powered by 115Vac).

RADIATED EMISSION. ELECTROMAGNETIC FIELD MEASURE

LIMITS:	Product standard:	FCC CFR 47, Part 15, Subpart B (10-1-19 Edition), Sec. 15.109 & ICES-003 Issue 7 (October 2020)
	Test standard:	FCC CFR 47, Part 15, Subpart B (10-1-19 Edition), Sec. 15.109 & ICES-003 Issue 7 (October 2020)

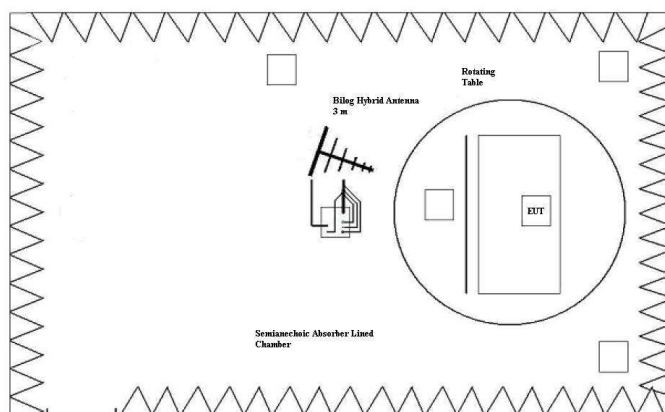
Limits of interference Class B

The applied limit for radiated emissions, 3 m distance, according with the requirements of FCC Rules and Regulations 47 CFR Part 15, Subpart B (10-1-19 Edition), Secs. 15.109 & ICES-003 Issue 7 (Updated 04-2020)

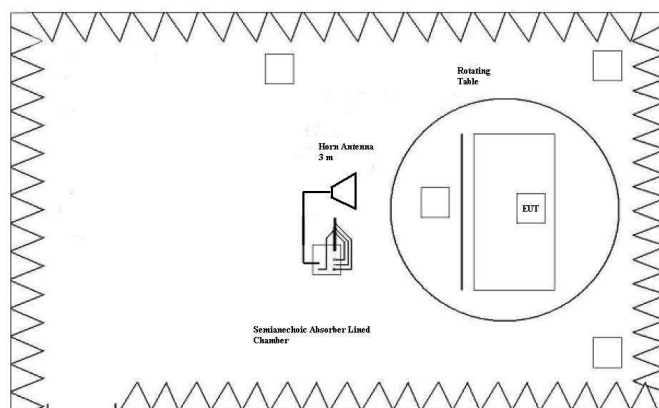
Frequency of emission (MHz)	Field strength limit (microvolt/meter) (QuasiPeak Detector)	ICES-003 Issue 7 Field strength (dBµV/m)
30-88	100	40
88-216	150	43.5
216-230	200	46
230-960	200	47
Above 960	500	54
*Above 1GHz, the limit is defined for an AVG detector.		

TESTED SAMPLE:	S/01
TESTED OPERATION MODES:	OM#01
TEST RESULTS:	CRmmnnRRPP: CR, Radiated Condition; mm: Sample number; nn: Operation mode; RR: Range; PP: Polarization.

CRmmnnRRPP	Description	Result
CR0101LR	Range: 30 MHz - 1000 MHz.	P
CR0101HR1_H	Range: 1 GHz – 12.75 GHz. Horizontal polarization.	P
CR0101HR1_V	Range: 1 GHz – 12.75 GHz. Vertical polarization.	P
CR0101	Range: $f > 12.75$ GHz. Test required only to the 5 th harmonics of the maximum internal work frequency in the EUT.	N/A



Setup for measurements < 1GHz.

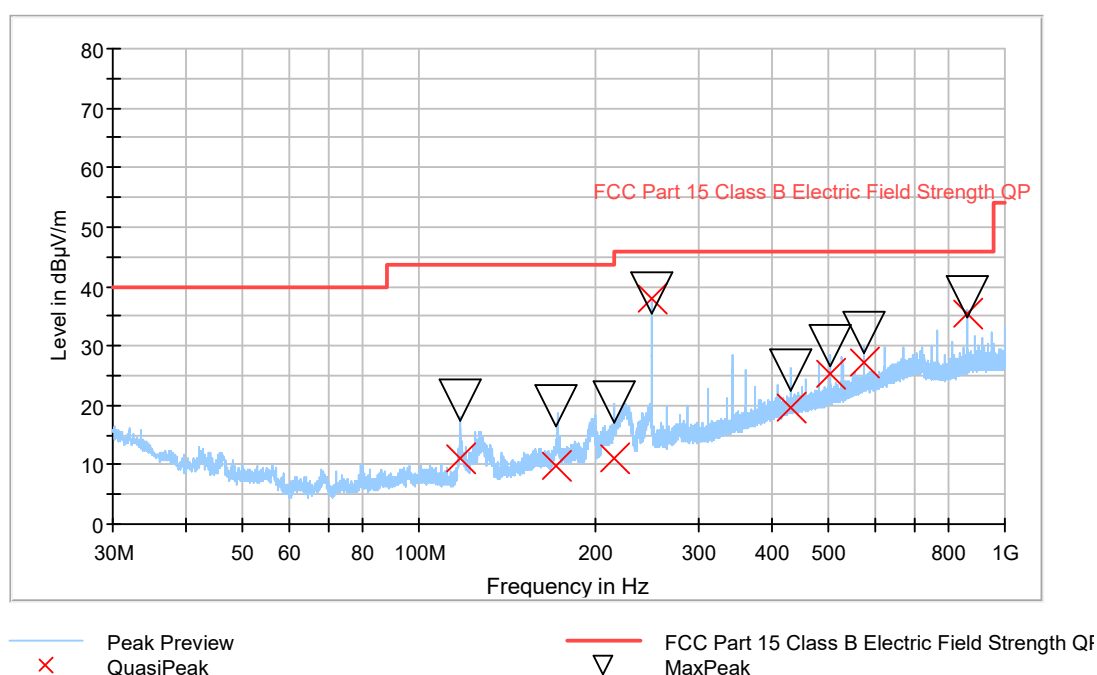


Setup for measurements > 1GHz.

Radiated Emission. CR0101LR

Project: 59770REM.002
Company: OWASYS ADVANCED WIRELESS DEVICES S.L.
Sample: S/01
Operation mode: OM#01
Description: EUT ON. Bluetooth ON unpaired with auxiliary device. WiFi ON unconnected with auxiliary device. MS in IDLE mode. LTE Band 5. Power supply: 24Vdc.

FCC Part 15 Class B



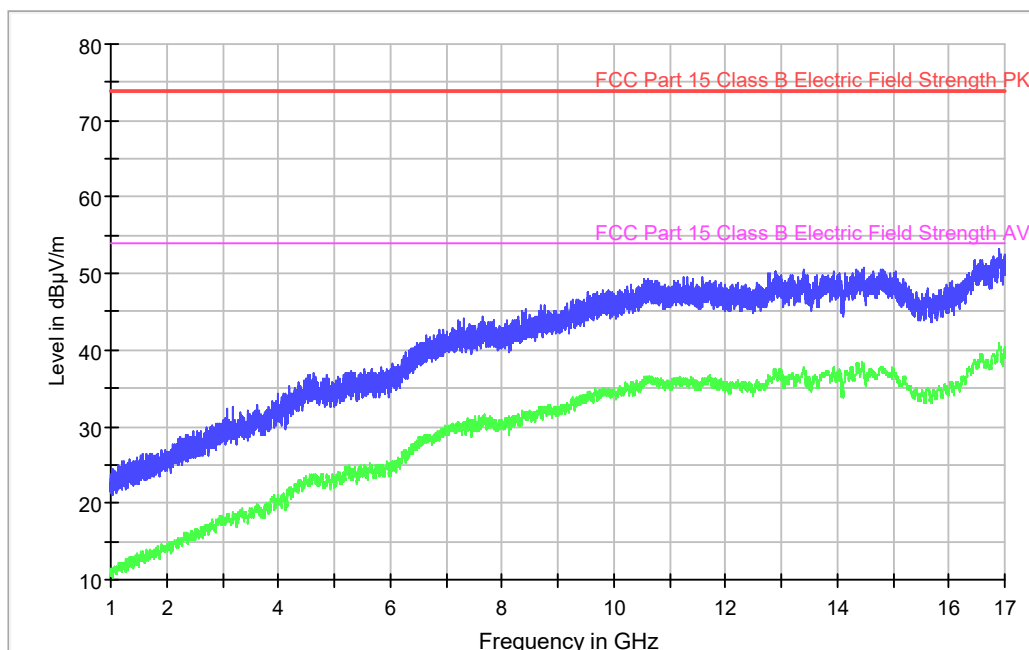
Maximizations

Frequency (MHz)	QuasiPeak (dBµV/m)	MaxPeak (dBµV/m)	Limit (dBµV/m)	Margin (dB)	Height (cm)	Pol	Azimuth (deg)
117.576000	11.15	21.01	43.52	32.37	255.0	H	32.0
171.634000	9.71	20.00	43.52	33.81	226.0	H	4.0
216.025000	11.19	20.65	46.00	34.81	154.0	H	94.0
249.996000	38.00	38.91	46.00	8.00	198.0	V	66.0
432.033000	19.51	25.95	46.00	26.49	311.0	V	242.0
504.037000	25.32	30.02	46.00	20.68	199.0	V	87.0
576.037000	27.14	32.15	46.00	18.86	153.0	H	350.0
864.042000	35.30	38.37	46.00	10.70	160.0	V	129.0

Radiated Emission. CR0101HR1_HP

Project: 59770REM.002
Company: OWASYS ADVANCED WIRELESS DEVICES S.L.
Sample: S/01
Operation mode: OM#01
Description: EUT ON. Bluetooth ON unpaired with auxiliary device. WiFi ON unconnected with auxiliary device. MS in IDLE mode. LTE Band 5. Power supply: 24Vdc. Horizontal polarization.

FCC 15 Class B (1-12.75GHz)



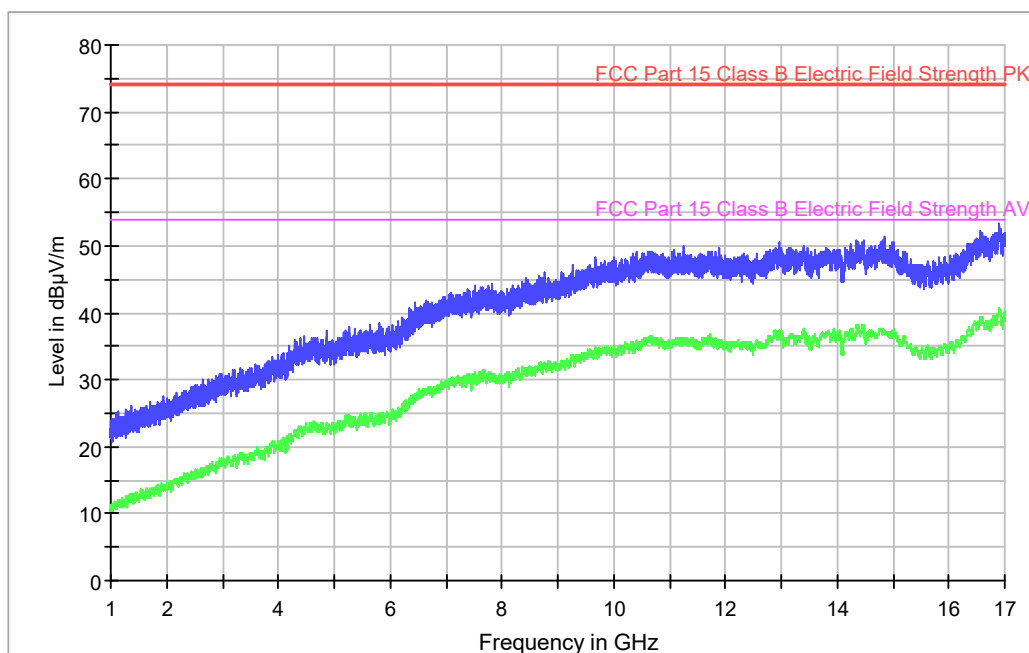
Subrange Maxima

Frequency (MHz)	PK+ CLRWR (dBµV/m)	AVG CLRWR (dBµV/m)
2558.000000	29.4	16.6
4188.800000	35.3	21.8
5664.400000	37.6	24.8
7315.200000	44.1	29.6
8763.600000	46.0	32.5
10557.600000	49.3	36.4
11318.000000	49.6	36.0
13416.400000	50.6	37.3
14479.200000	50.7	37.6
16903.200000	53.3	40.7

Radiated Emission. CR0101HR1_VP

Project: 59770REM.002
Company: OWASYS ADVANCED WIRELESS DEVICES S.L.
Sample: S/01
Operation mode: OM#01
Description: EUT ON. Bluetooth ON unpaired with auxiliary device. WiFi ON unconnected with auxiliary device. MS in IDLE mode. LTE Band 5. Power supply: 24Vdc. Vertical polarization.

FCC 15 Class B (1-12.75GHz)



Subrange Maxima

Frequency (MHz)	PK+ CLRWR (dBµV/m)	AVG CLRWR (dBµV/m)
2550.800000	29.2	16.4
4178.000000	35.0	21.2
5791.600000	38.4	24.8
7364.400000	43.1	30.1
8764.800000	46.0	32.6
10404.000000	49.2	35.7
11248.400000	50.0	36.1
12955.600000	50.4	36.8
14840.800000	51.3	37.2
16895.200000	53.4	40.5

CONTINUOUS CONDUCTED EMISSION

LIMITS:	Product standard :	FCC CFR 47, Part 15, Subpart B (10-1-19 Edition), Sec. 15.107 & ICES-003 Issue 7 (October 2020)
	Test standard :	FCC CFR 47, Part 15, Subpart B (10-1-19 Edition), Sec. 15.107 & ICES-003 Issue 7 (October 2020)

CLASS B

The applied limit for continuous conducted emissions in power leads, according with the requirements of FCC Rules and Regulations FCC CFR 47, Part 15, Subpart B (10-1-19 Edition), Sec. 15.107 & ICES-003 Issue 7 (October 2020) in the frequency range 0,15 to 30 MHz, for Class B equipment was:

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

*Decreases with the logarithm of the frequency.

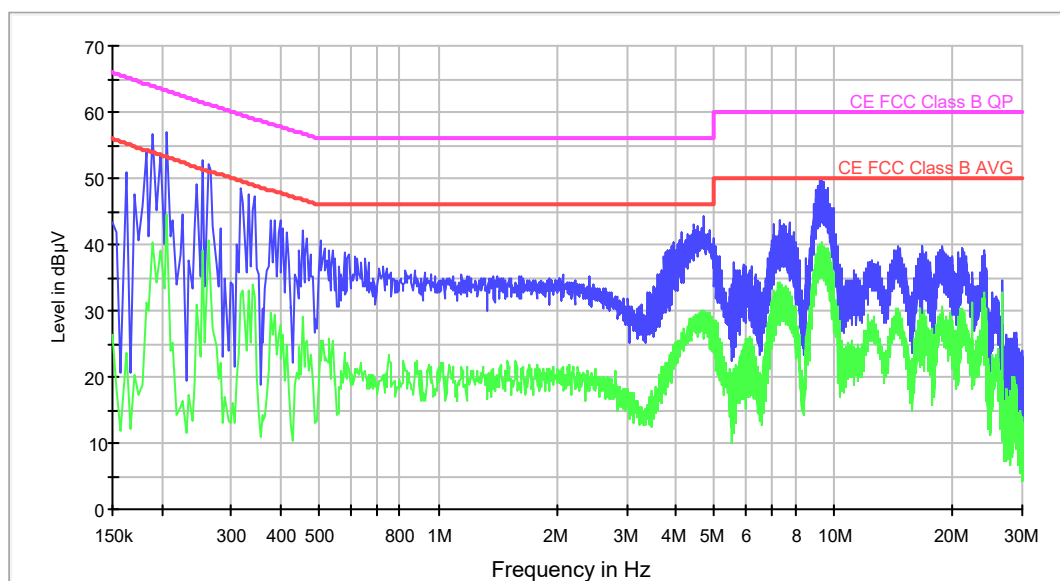
TESTED SAMPLES:	S/02
TESTED OPERATION MODES:	OM#02
TEST RESULTS:	CCmmnnhh: CC, Conducted Condition; mm: Sample number; nn: Operation mode; hh: wire

CCmmnnhh	DESCRIPTION	RESULT
CC02020N	Range: 150kHz – 30MHz. Neutral wire noise.	P
CC0202L1	Range: 150kHz – 30MHz. Phase wire noise.	P

Conducted Emission. CC02020N

Project: 59770REM.002
Company: OWASYS ADVANCED WIRELESS DEVICES S.L.
Sample: S/02
Operation mode: OM#02
Description: EUT ON. Bluetooth ON unpaired with auxiliary device. WiFi ON unconnected with auxiliary device. MS in IDLE mode. LTE Band 5. Power supply: 24Vdc (through an AC/DC adaptor powered by 115Vac). Neutral wire noise

EC FCC Class B ESPI CC



— Peak Scan — Average Scan — CE FCC Class B AVG — CE FCC Class B QP

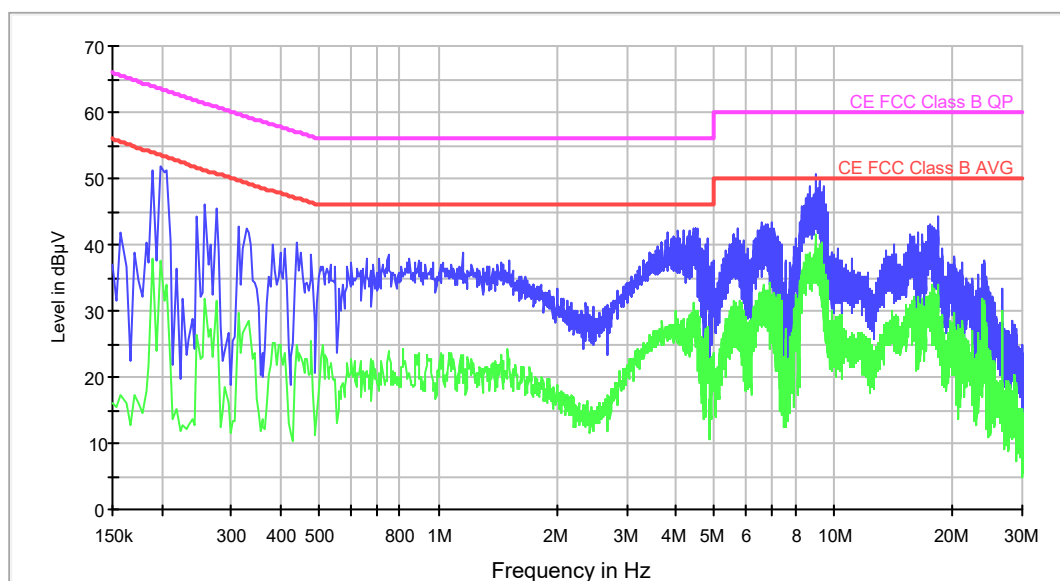
Subrange Maxima

Frequency (MHz)	MaxPeak-ClearWrite (dBµV)	Average-ClearWrite (dBµV)
0.206000	56.8	44.7
0.262000	52.0	40.5
0.454000	42.1	29.0
0.738000	36.5	20.5
2.062000	35.4	21.6
3.602000	35.4	17.8
4.674000	44.2	30.0
9.226000	50.0	40.1
14.594000	39.7	28.8
18.746000	39.8	29.8

Conducted Emission. CC0202L1

Project: 59770REM.002
Company: OWASYS ADVANCED WIRELESS DEVICES S.L.
Sample: S/02
Operation mode: OM#02
Description: EUT ON. Bluetooth ON unpaired with auxiliary device. WiFi ON unconnected with auxiliary device. MS in IDLE mode. LTE Band 5. Power supply: 24Vdc (through an AC/DC adaptor powered by 115Vac). Phase wire noise.

EC FCC Class B ESPI CC



Peak Scan Average Scan CE FCC Class B AVG CE FCC Class B QP

Subrange Maxima

Frequency (MHz)	MaxPeak-ClearWrite (dBµV)	Average-ClearWrite (dBµV)
0.198000	51.8	37.6
0.258000	46.0	31.8
0.438000	40.3	24.9
1.150000	38.7	23.4
1.514000	37.6	22.6
3.586000	39.7	25.7
4.458000	42.5	29.8
9.026000	50.5	41.6
17.606000	43.0	30.7
18.290000	44.1	33.9