

MPE TEST REPORT

of

FCC CFR 47 part 1, 1.1307(b), 1.1310

FCC ID : Q48-AUHS-3190-AM

Equipment Under Test : UWB Wireless USB dongle

Model Name : AUHS-3190-AM

Applicant : ABCO

Manufacturer : ABCO

Date of Test(s) : 2013.12.24 ~ 2013.12.26

Date of Issue : 2013.12.26

In the configuration tested, the EUT complied with the standards specified above.

Tested By:



Date:

2013.12.26

Hyunchae You

Approved By:



Date:

2013.12.26

Feel Jeong

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SGS Korea Co., Ltd. (Gunpo Laboratory) 18-34, Sanbon-dong, Gunpo-si, Gyeonggi-do, Korea, 435-040 www.ee.sgs.com/korea

RTT5041-20(2013.07.27) (1)

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A4(210mm x 297mm)

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1. General Information

1.1. Testing Laboratory

SGS Korea Co., Ltd. (Gunpo Laboratory)

- Wireless Div. 3FL, 18-34, Sanbon-dong, Gunpo-si, Gyeonggi-do, Korea 435-040 (Lab)
- 400-2, Gomae-dong, Giheung-gu, Yongin-si, Gyeonggi-do, Korea, 446-901 (Chamber)

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Telephone : +82 31 428 5700

FAX : +82 31 427 2371

1.2. Details of Applicant

Applicant : ABCO
Address : 31, Dunchon-daero 388 Beon-gil, Jungwon-gu, Seongnam-si Gyeonggi-do, Korea
Contact Person : Hyun Soo, Kim
Phone No. : +82-31-730-5188

1.3. Description of EUT

Kind of Product	UWB Wireless USB dongle
Model Name	AUHS-3190-AM
Serial Number	N/A
Power Supply	DC 5 V
Frequency Range	3 168 MHz ~ 4 752 MHz
Modulation Technique	MB-OFDM
Number of Channels	3 Sub-band (please refer to the section 1.10)
Antenna Type	Internal type (Chip Antenna)

1.4. Test report revision

Revision	Report number	Description
0	F690501/RF-RTL007251	Initial

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2. RF Exposure Evaluation

2.1. Environmental evaluation and exposure limit according to FCC CFR 47 part 1, 1.1307(b), 1.1310

According to FCC 1.1310 : The criteria listed in the following table shall be used to evaluate the environment impact of human exposure to radio frequency (RF) radiation as specified in §1.1307(b)

LIMITS FOR MAXIMUM PERMISSIBLE EXPOSURE (MPE)

Frequency Range (MHz)	Electric Field Strength(V/m)	Magnetic Field Strength (A/m)	Power Density (mW/cm ²)	Average Time
(A) Limits for Occupational /Control Exposures				
300 – 1 500	--	--	F/300	6
1 500 – 100 000	--	--	5	6
(B) Limits for General Population/Uncontrol Exposures				
300 – 1 500	--	--	F/1500	6
<u>1 500 – 100 000</u>	--	--	<u>1</u>	<u>30</u>

2.1.1. Friis transmission formula: $P_d = (P_{out} \cdot G) / (4 \cdot \pi \cdot R^2) = (EIRP) / (4 \cdot \pi \cdot R^2)$

Where P_d = power density in mW/cm^2

P_{out} = output power to antenna in mW

G = gain of antenna in linear scale

$\pi = 3.1416$

R = distance between observation point and center of the radiator in cm

P_d the limit of MPE, 1 mW/cm^2 . If we know the maximum gain of the antenna and the total power input to the antenna, through the calculation, we will know the distance where the MPE limit is reached.

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2.1.2. Field Strength Calculations

The field strength is calculated by taking the received spectrum analyzer (or receiver) signal and adjusting it by the system parameters. These system parameters are the antenna factor (AF); any cable, coupler, filter or switching losses (CL); and the preamplifier gain (PG). The basic formula is displayed below.

$$E (\text{dB } \mu\text{V/m}) = SA (\text{dB } \mu\text{V}) + AF (\text{dB/m}) + CL (\text{dB}) - PG (\text{dB})$$

Where:

E is the electric field represented in dB μ V/m

SA is the spectrum analyser (or receiver) reading in dB μ V

AF is the receive antenna's factor in dB/m

CL is the cable, etc. system losses in dB

PG is the external pre-amplifier gain in dB

2.1.3. EIRP Calculations

As defined in FCC 47 CFR Part 15, Subpart F (15.503 k), EIRP is the equivalent isotropic radiated power, i.e. the product of the power supplied to the antenna and the antenna gain in a given direction relative to an isotropic antenna. The EIRP, in terms of dBm, can be converted to field strength, in dB μ V/m at 3 meters, by adding 95.2 dB. Conversely, the field strength in dB μ V/m at 3 meters can be converted to the EIRP in dB m by subtracting 95.2 dB. As used in Subpart F, EIRP refers to the highest signal strength measured in any direction and at any frequency from the UWB device, as tested in accordance with the procedures specified in 15.31(a) and 15.523 of FCC 47 CFR.

Now to convert to an EIRP reading at 3 meters use $EIRP (\text{dBm}) = E (\text{dB } \mu\text{V/m}) - 95.2 (\text{dB}) - 9.54 (\text{distance compensation})$

$$EIRP (\text{dB m}) = 86.45 (\text{dB } \mu\text{V/m}) - 95.2 (\text{dB}) - 9.54 = -18.29 \text{ dB m}$$

2.1.4. Test Result of RF Exposure Evaluation

Test Item : RF Exposure Evaluation Data

Test Mode : Normal Operation

2.1.5. RF Exposure Evaluation Data

From the measurement data we can see that the peak detected EIRP at 3 meters distance and 10 MHz RBW yields a result of -18.29 dB m. Translated to 20 cm this would yield a result of 5.23 dB m. Correlating this to a worst-case scenario with a 50 MHz RBW would yield 19.21 dB m EIRP. 19.21 dB m is equal to 83.37 mW EIRP. Plugging this into the above equation yields:

$$S = (EIRP) / (4 * \pi * R^2) = 83.37 / 4 * \pi * 20^2 = 0.0166 \text{ mW/cm}^2$$

Based on these worse case calculations the device is well below the maximum permissible exposure limit of 1 mW/cm² by a large margin.

Note. RBW was compensated according to Rec.ITU-R SM.1754

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