

# TEST REPORT

## FCC Part 15C

**Equipment under test** Flex 10W Dual Wireless Charging Pad

**Model name** EA1202

**FCC ID** 2ACCCEA1202

**Applicant** KOMATECH Co.,Ltd.

**Manufacturer** KOMATECH Co.,Ltd.

**Date of test(s)** 2018.06.26 ~ 2018.07.02



**Date of issue** 2018.07.03

**Issued to**

**KOMATECH Co.,Ltd.**  
62-16 19<sup>th</sup> st, Gamjeong-ro,  
Gimpo-si, Gyeonggi-do, Korea  
Tel: +82-31-999-3940 / Fax: +82-31-997-7900

**Issued by**

**KES Co., Ltd.**  
3701, 40, Simin-daero 365beon-gil, Dongan-gu, Anyang-si,  
Gyeonggi-do, 14057, Korea  
473-21, Gayeo-ro, Yeoju-si, Gyeonggi-do, Korea  
Tel: +82-31-425-6200 / Fax: +82-31-424-0450

| Test and report completed by :  | Report approval by :   |
|---|--|
|  |  |
| Young-Jin Lee<br>Test engineer  | Hyeon-Su Jang<br>Technical manager   |

This report shall not be reproduced except in full, without the written approval of KES Co., Ltd.  
The results shown in this test report refer only to the sample(s) tested unless otherwise stated.  
The authenticity of the test report, contact shchoi@kes.co.kr



---

### Revision history

| Revision | Date of issue | Test report No. | Description |
|----------|---------------|-----------------|-------------|
| -        | 2018.07.03    | KES-RF-18T0074  | Initial     |

---

## TABLE OF CONTENTS

|   |  |    |
|---|--|----|
| 1.                                      | General information .....                | 4  |
| 1.1.                                    | EUT description .....                    | 4  |
| 1.2.                                    | Test configuration .....                 | 4  |
| 1.3.                                    | Test frequency .....                     | 4  |
| 1.4.                                    | Test mode .....                          | 4  |
| 1.5.                                    | Information about derivative model ..... | 5  |
| 1.6.                                    | Device modifications.....                | 5  |
| 1.7.                                    | Accessory information .....              | 5  |
| 1.8.                                    | Measurement Uncertainty .....            | 5  |
| 2.                                      | Summary of tests .....                   | 6  |
| 3.                                      | Test results .....                       | 7  |
| 3.1.                                    | Radiated spurious emission .....         | 7  |
| 3.2.                                    | 20dB Bandwidth.....                      | 15 |
| 3.3.                                    | AC conducted emissions .....             | 16 |
| Appendix A. Measurement equipment ..... |  | 18 |
| Appendix B. Test setup photo.....       |  | 19 |

## 1. General information

Applicant KOMATECH Co.,Ltd.  
Applicant address 62-16 19th st, Gamjeong-ro, Gimpo-si, Gyeonggi-do, Korea  
Test site KES Co., Ltd.  
Test site address 3701, 40, Simin-daero 365beon-gil, Dongan-gu, Anyang-si,  
Gyeonggi-do, 14057, Korea  
473-21, Gayeo-ro, Yeosu-si, Gyeonggi-do, Korea  
Test Facility FCC Accreditation Designation No.: KR0100, Registration No.: 444148  
FCC rule part(s): Part 15C  
FCC ID: 2ACCCEA1202  
Test device serial No. ☒ Production ☐ Pre-production ☐ Engineering

### 1.1. EUT description

Equipment under test Flex 10W Dual Wireless Charging Pad  
Frequency 0.110 MHz ~ 0.205 MHz  
Modulation type AM  
Model: EA1202  
Antenna specification Internal type(Coil antenna)  
Power source AC/DC Adapter (Output : DC 12V)

### 1.2. Test configuration

The **KOMATECH Co.,Ltd. Flex 10W Dual Wireless Charging Pad FCC ID: 2ACCCEA1202** was tested according to the specification of EUT, the EUT must comply with following standards and KDB documents.

FCC Part 15C  
ANSI C63.10-2013

### 1.3. Test frequency

|              |               | Frequency Range       |
|--------------|---------------|-----------------------|
| Power source | AC/DC Adapter | 0.110 MHz ~ 0.205 MHz |

### 1.4. Test mode

| Mode                                | Description                    |
|-------------------------------------|--------------------------------|
| Charging mode<br>With Client device | 100% full charging of Battery. |
|                                     | Less than 50% of Battery       |
|                                     | Less than 1% of Battery        |

### 1.5. Information about derivative model

N/A

### 1.6. Device modifications

N/A

### 1.7. Accessory information

| Equipment     | Manufacturer | Model       | Serial No. | Power source     |
|---------------|--------------|-------------|------------|------------------|
| AC/DC Adapter | Qualcomm     | RH-120200US | -          | Output : 12V, 2A |

### 1.8. Measurement Uncertainty

| Test Item   |              | Uncertainty |
|---|--------------|-------------|
| Uncertainty for Conduction emission test  |              | 2.62 dB     |
| Uncertainty for Radiation emission test<br>(include Fundamental emission)   | 9kHz - 30MHz | 4.54 dB     |
|   | 30MHz - 1GHz | 4.36 dB     |
|   | Above 1GHz   | 5.00 dB     |
| Note. This uncertainty represents an expanded uncertainty expressed at approximately the 95% confidence level using a coverage factor of k=2. |              |             |

### 1.9. Software and Firmware description

The software and firmware installed in the EUT is LU5000\_KOMA\_1COIL\_Ver3.0



## 2. Summary of tests

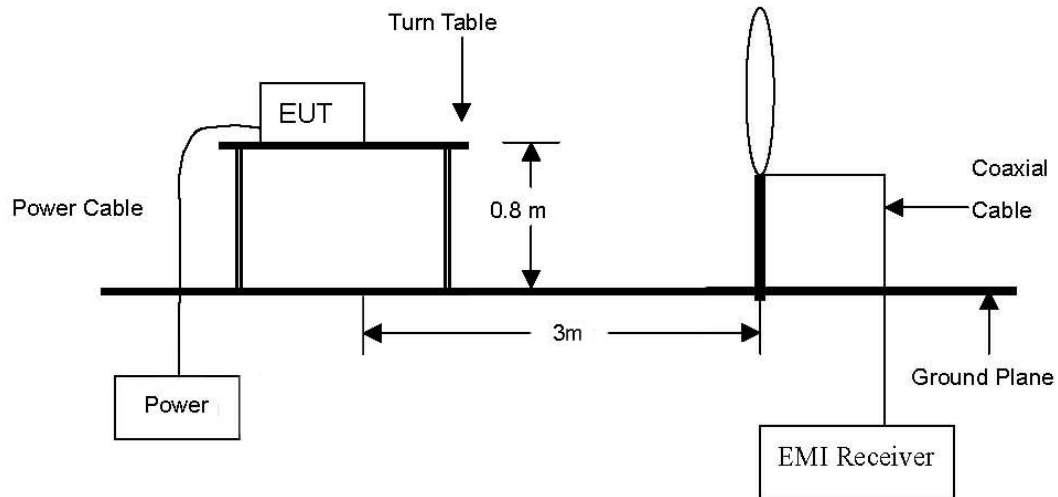
| FCC Part Sections | Parameter                  | Test results |
|-------------------|----------------------------|--------------|
| 15.209            | Radiated spurious emission | Pass         |
| -                 | 99% occupied bandwidth     | Pass         |
| 15.207            | AC conducted emissions     | Pass         |

### 3. Test results

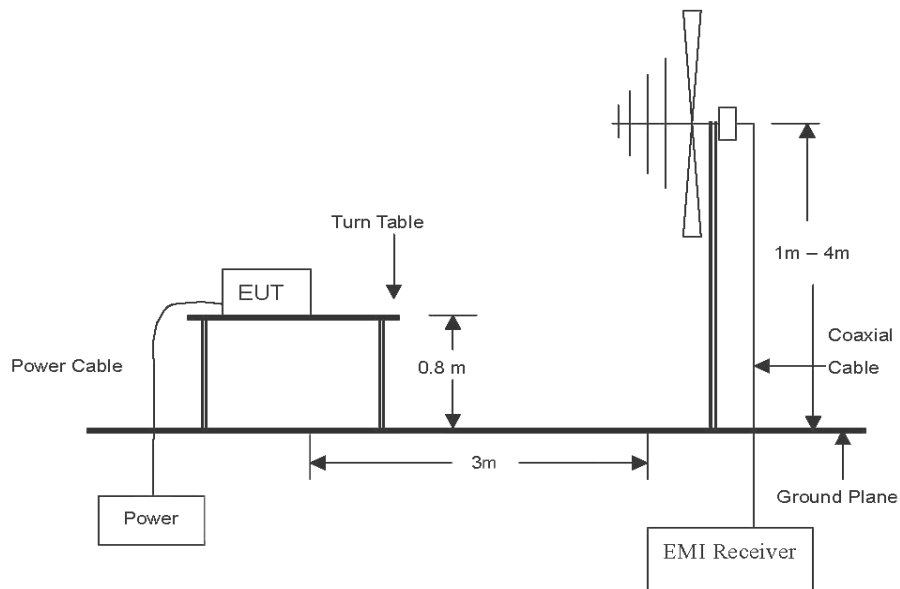
#### 3.1. Radiated spurious emission

##### Test setup

The diagram below shows the test setup that is utilized to make the measurements for emission from 9 kHz to 30 MHz Emissions.



The diagram below shows the test setup that is utilized to make the measurements for emission from 30 MHz to 1 GHz emissions.



This report shall not be reproduced except in full, without the written approval of KES Co., Ltd.

The results shown in this test report refer only to the sample(s) tested unless otherwise stated.

The authenticity of the test report, contact shchoi@kes.co.kr

## Test procedure

[9 kHz to 30 MHz]

The EUT was placed on the top of a rotating table 0.8 meter above the ground at a 3 meter anechoic chamber test site. The table was rotated 360 degrees to determine the position of the highest radiation. Then antenna is a loop antenna is fixed at one meter above the ground to determine the maximum value of the field strength. Both parallel and perpendicular of the antenna are set to make the measurement. For each suspected emission, the EUT was arranged to its worst case and then the table was turned from 0 degrees to 360 degrees to find the maximum reading. The test-receiver system was set to Quasi-peak function and specified bandwidth with maximum hold mode.

The spectrum analyzer is set to:

1. The resolution bandwidth and video bandwidth of test receiver/spectrum analyzer 200 Hz / 300 Hz for peak detection (PK) at frequency below 9 kHz~ 150 kHz.
2. The resolution bandwidth and video bandwidth of test receiver/spectrum analyzer 9 kHz / 10 kHz for peak detection (PK) at frequency below 150 kHz~ 30 MHz.
3. For the frequency bands 9~ 90 kHz, 110~490 kHz the radiated emission limits are based on measurements employing an average detector.

[30 MHz to 1 GHz]

The height of the measuring antenna was varied between 1 to 4 m and the table was rotated a full revolution in order to obtain maximum values of the electric field intensity.

The measurement was made in both the vertical and horizontal polarization, and the maximum value is presented in the report.

The spectrum analyzer is set to:

1. The resolution bandwidth and video bandwidth of test receiver/spectrum analyzer 120 kHz for Peak detection (PK) or Quasi-peak detection (QP) at frequency below 1 GHz.



**Note:**

1. According to exploratory test no any obvious emission were detected from 9 kHz to 30 MHz. Although these tests were performed other than open area test site, adequate comparison measurements were confirmed against 30 m open are test site. Therefore sufficient tests were made to demonstrate that the alternative site produces results that correlate with the ones of tests made in an open field based on KDB 414788.
2. Measurement distance : 3 m.
3. Field strength = Level + Correction factor +  $F_d$
4.  $F_d = 40\log(D_m / D_s)$

Where:

$F_d$  = Distance factor in dB

$D_m$  = Measurement distance in meters

$D_s$  = Specification distance in meters

For 300m:  $40\log(300/3) = 80$  dB for frequency band 0.009 MHz to 0.490 MHz

For 30m:  $40\log(30/3) = 40$  dB for frequency band 0.490 MHz to 30 MHz

5. No significant emissions were found in the 90 - 110kHz restricted band.

### Limit

According to 15.209(a), for an intentional radiator devices, the general required of field strength of radiated emissions from unintentional radiators at a distance of 3 meters shall not exceed the following values :

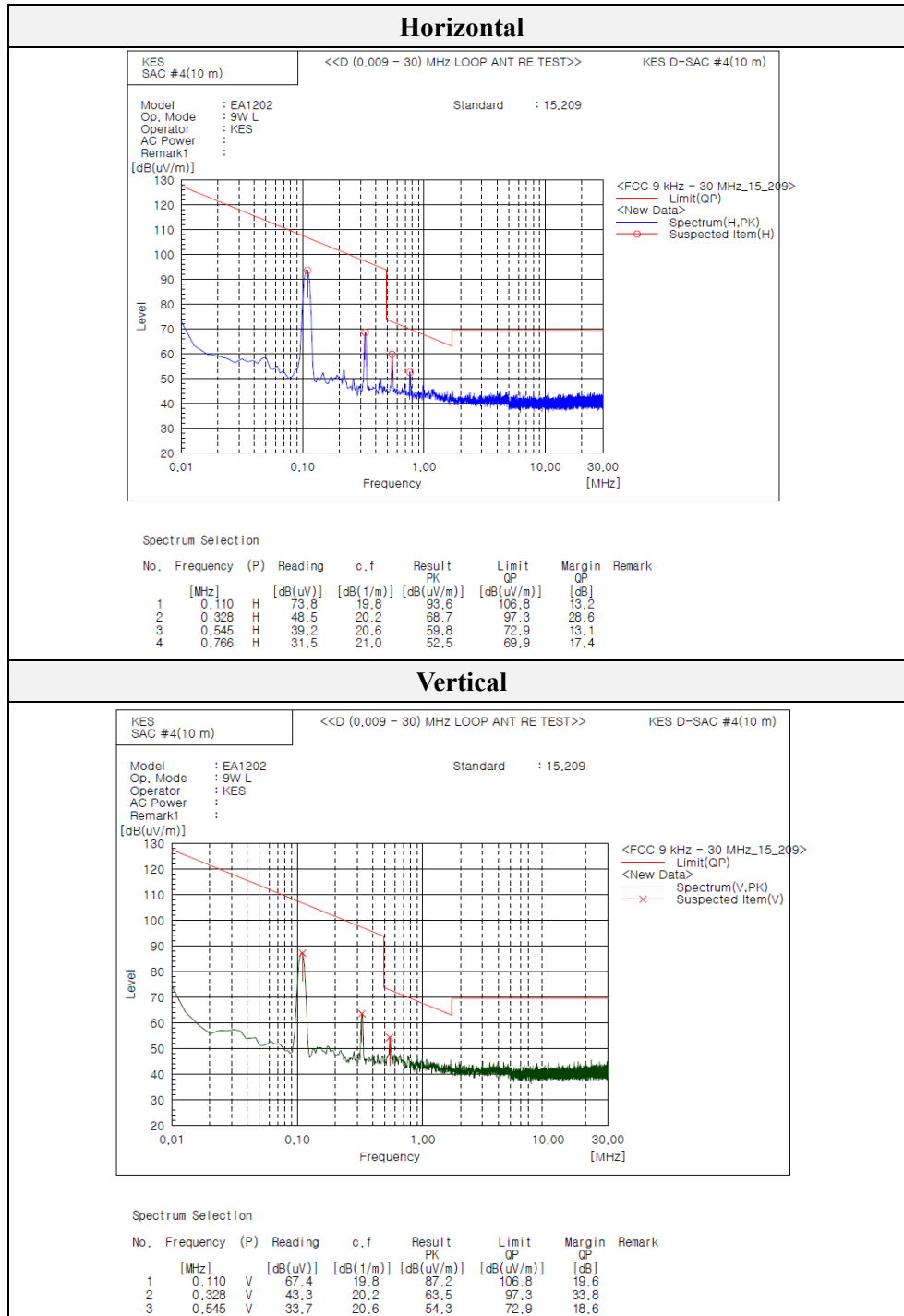
| Frequency (MHz) | Distance (Meters) | Radiated ( $\mu\text{V/m}$ ) |
|-----------------|-------------------|------------------------------|
| 0.009 ~ 0.490   | 300               | 2400 / F(kHz)                |
| 0.490 ~ 1.705   | 30                | 24000 / F(kHz)               |
| 1.705 ~ 30.0    | 30                | 30                           |
| 30 ~ 88         | 3                 | 100**                        |
| 88 ~ 216        | 3                 | 150**                        |
| 216 ~ 960       | 3                 | 200**                        |
| Above 960       | 3                 | 500                          |

\*\*Except as provided in paragraph (g), fundamental emissions from intentional radiators operating under this Section shall not be located in the frequency bands 54 ~ 72 MHz, 76 ~ 88 MHz, 174 ~ 216 MHz or 470 ~ 806 MHz. However, operation within these frequency bands is permitted under other sections of this Part, e.g., Sections 15.231 and 15.241.

## Test results (Below 30 MHz)

Mode: 10W // 1 % charger

Distance of measurement: 3 meter



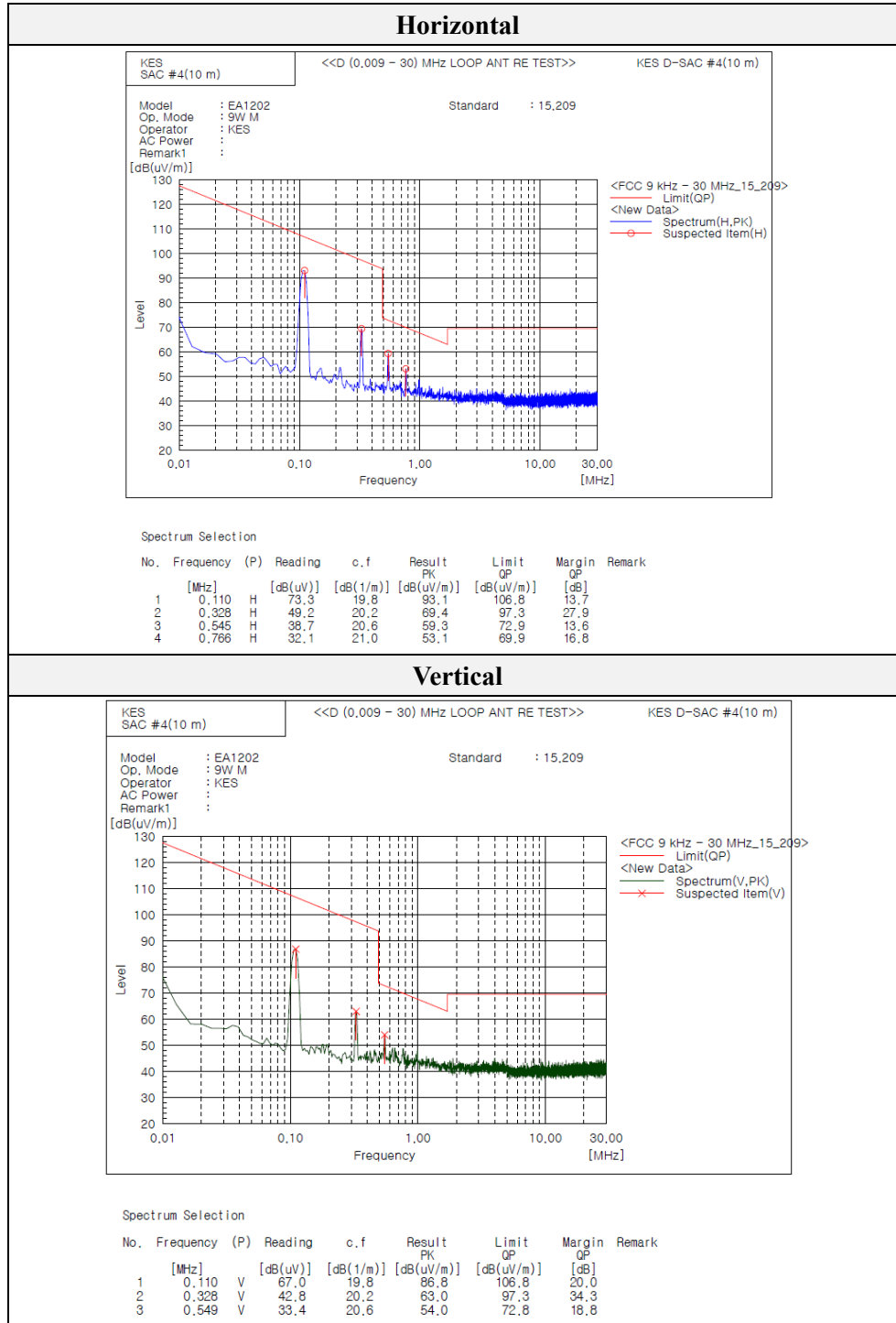
This report shall not be reproduced except in full, without the written approval of KES Co., Ltd.

The results shown in this test report refer only to the sample(s) tested unless otherwise stated.

The authenticity of the test report, contact shchoi@kes.co.kr

Mode: 10W // 50 % charge

Distance of measurement: 3 meter



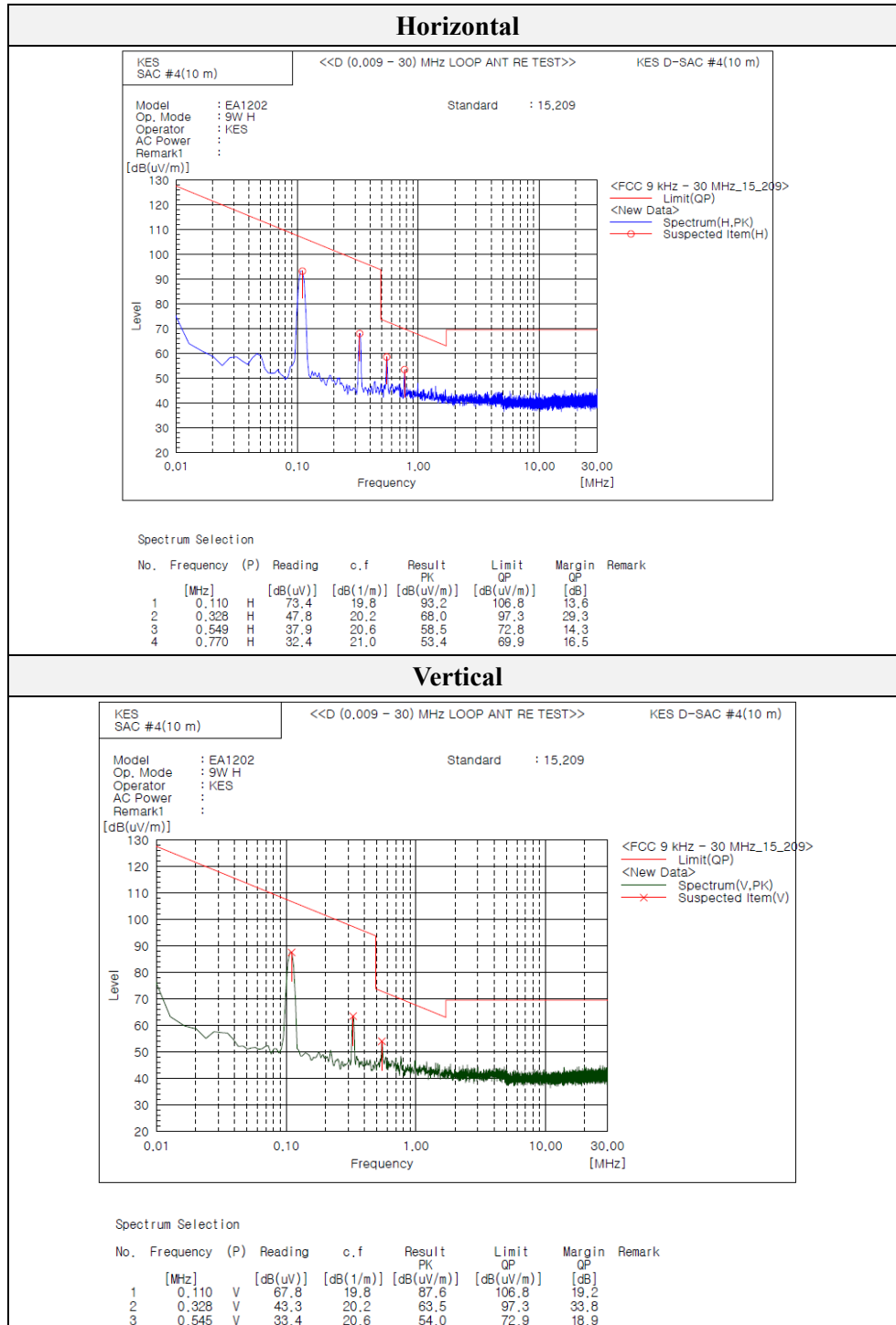
This report shall not be reproduced except in full, without the written approval of KES Co., Ltd.

The results shown in this test report refer only to the sample(s) tested unless otherwise stated.

The authenticity of the test report, contact shchoi@kes.co.kr

Mode: 10W // 100 % charge

Distance of measurement: 3 meter



This report shall not be reproduced except in full, without the written approval of KES Co., Ltd.

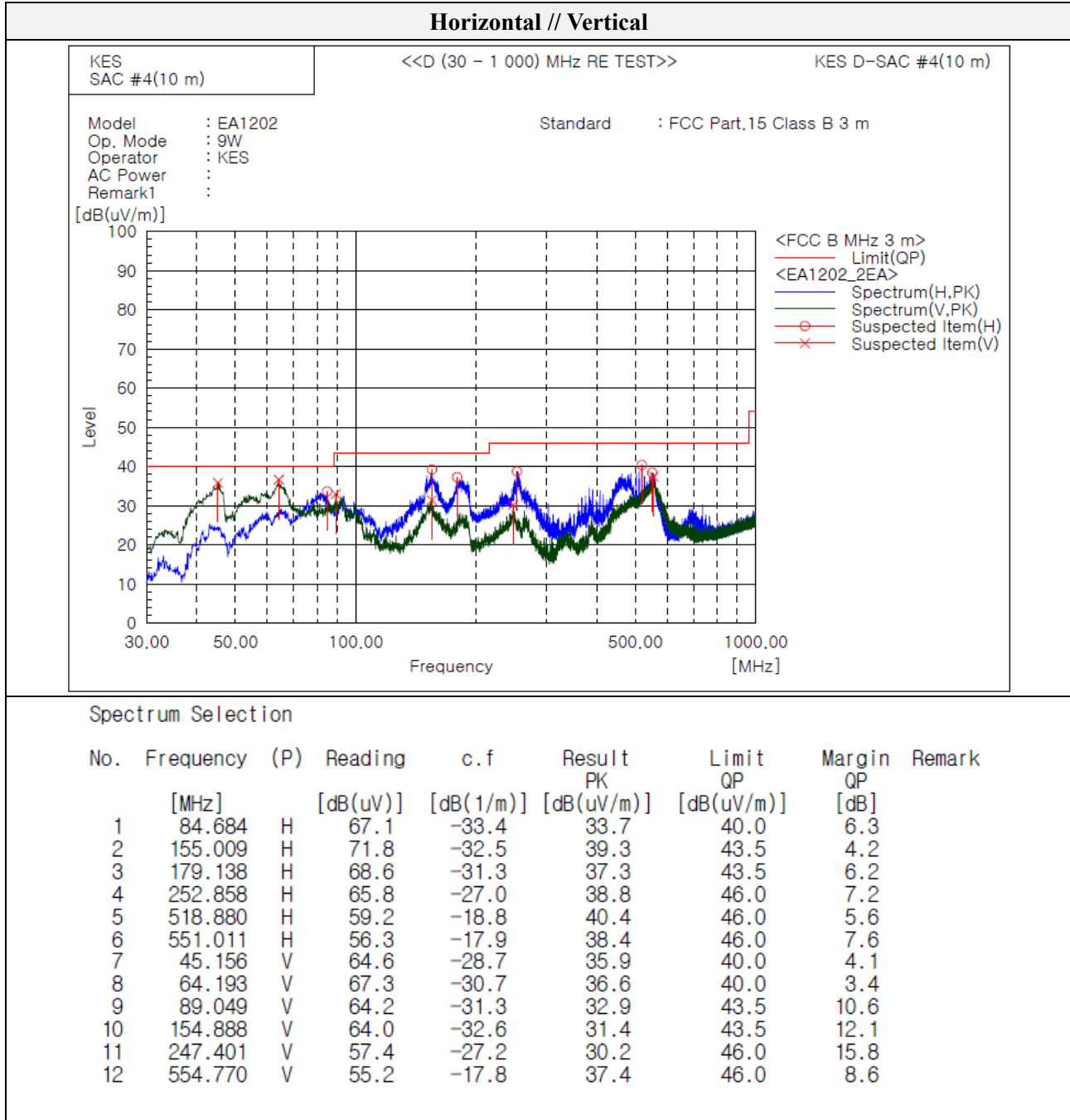
The results shown in this test report refer only to the sample(s) tested unless otherwise stated.

The authenticity of the test report, contact shchoi@kes.co.kr

### Test results (Below 1 000 MHz)

Mode: 10W // 1 % charge (Worst Case)

Distance of measurement: 3 meter



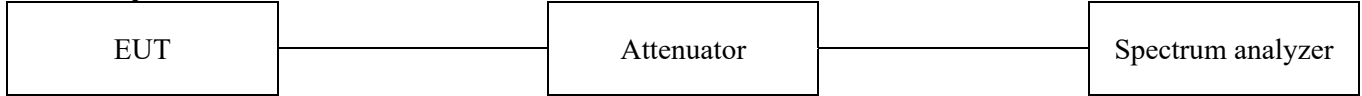
This report shall not be reproduced except in full, without the written approval of KES Co., Ltd.

The results shown in this test report refer only to the sample(s) tested unless otherwise stated.

The authenticity of the test report, contact shchoi@kes.co.kr

### 3.2. 20dB Bandwidth

#### Test setup



#### Test procedures

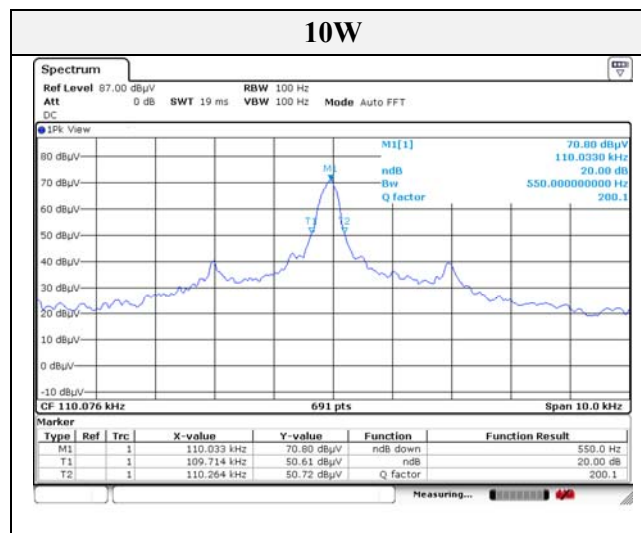
The transmitter output is connected to a spectrum analyzer. The RBW is set to  $\geq 1\%$  of the emission bandwidth. The VBW is set to  $\geq$ RBW. The sweep time is coupled.

#### Limit

None; for reporting purposes only.

#### Test results

| Power source(W) | Frequency(MHz) | Measured bandwidth(kHz) |
|-----------------|----------------|-------------------------|
| 10              | 0.110          | 0.550                   |



#### Note.

Because the measured signal is CW/CW-like, adjusting the RBW per C63.10 would not be practical since measured bandwidth will always follow the RBW and the result will be approximately twice the RBW.

### 3.3. AC conducted emissions

#### Limit

According to 15.207(a), for an intentional radiator 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 limits in the following table, as measured using a 50uH/50 ohm line impedance stabilization network (LISN). Compliance with the provision of this paragraph shall on the measurement of the radio frequency voltage between each power line and ground at the power terminal. The lower applies at the boundary between the frequencies ranges.

| Frequency of Emission (MHz) | Conducted limit (dBμV/m) |          |
|-----------------------------|--------------------------|----------|
|                             | Quasi-peak               | Average  |
| 0.15 – 0.50                 | 66 - 56*                 | 56 - 46* |
| 0.50 – 5.00                 | 56                       | 46       |
| 5.00 – 30.0                 | 60                       | 50       |

This report shall not be reproduced except in full, without the written approval of KES Co., Ltd.

The results shown in this test report refer only to the sample(s) tested unless otherwise stated.

The authenticity of the test report, contact shchoi@kes.co.kr



## Test results

Mode: 10W // 1 % charge (Worst case)

## Hot Line

EMI test result graph for Hot Line. The Y-axis represents Level in dBμV (0 to 100), and the X-axis represents Frequency in Hz (150k to 30M). The graph shows two traces: a blue trace for FCC Part 15 Class B Voltage on Mains GP and a green trace for FCC Part 15 Class B Voltage on Mains AV. Both traces are below the limit lines, indicating compliance.

## Final Result

| Frequency (MHz) | QuasiPeak (dBμV) | CAverage (dBμV) | Limit (dBμV) | Margin (dB) | Meas. Time (ms) | Bandwidth (kHz) | Line | Corr. (dB) |
|-----------------|------------------|-----------------|--------------|-------------|-----------------|-----------------|------|------------|
| 0.170000        | ---              | 33.34           | 54.96        | 21.62       | 1000.0          | 9.000           | L1   | 19.3       |
| 0.170000        | 60.54            | ---             | 64.96        | 4.42        | 1000.0          | 9.000           | L1   | 19.3       |
| 0.285000        | ---              | 34.66           | 51.27        | 16.61       | 1000.0          | 9.000           | L1   | 19.4       |
| 0.285000        | 55.57            | ---             | 61.27        | 5.70        | 1000.0          | 9.000           | L1   | 19.4       |
| 0.885000        | ---              | 22.57           | 46.00        | 23.43       | 1000.0          | 9.000           | L1   | 19.9       |
| 0.885000        | 35.90            | ---             | 56.00        | 20.10       | 1000.0          | 9.000           | L1   | 19.9       |
| 2.620000        | ---              | 21.97           | 46.00        | 24.03       | 1000.0          | 9.000           | L1   | 20.1       |
| 2.620000        | 33.55            | ---             | 56.00        | 22.45       | 1000.0          | 9.000           | L1   | 20.1       |
| 25.060000       | ---              | 30.40           | 50.00        | 19.60       | 1000.0          | 9.000           | L1   | 20.4       |
| 25.060000       | 38.09            | ---             | 60.00        | 21.91       | 1000.0          | 9.000           | L1   | 20.4       |
| 25.070000       | ---              | 30.34           | 50.00        | 19.66       | 1000.0          | 9.000           | L1   | 20.4       |
| 25.070000       | 37.79            | ---             | 60.00        | 22.21       | 1000.0          | 9.000           | L1   | 20.4       |

## Neutral Line

EMI test result graph for Neutral Line. The Y-axis represents Level in dBμV (0 to 100), and the X-axis represents Frequency in Hz (150k to 30M). The graph shows two traces: a blue trace for FCC Part 15 Class B Voltage on Mains GP and a green trace for FCC Part 15 Class B Voltage on Mains AV. Both traces are below the limit lines, indicating compliance.

## Final Result

| Frequency (MHz) | QuasiPeak (dBμV) | CAverage (dBμV) | Limit (dBμV) | Margin (dB) | Meas. Time (ms) | Bandwidth (kHz) | Line | Corr. (dB) |
|-----------------|------------------|-----------------|--------------|-------------|-----------------|-----------------|------|------------|
| 0.170000        | ---              | 32.67           | 54.96        | 22.29       | 1000.0          | 9.000           | N    | 19.3       |
| 0.170000        | 60.74            | ---             | 64.96        | 4.22        | 1000.0          | 9.000           | N    | 19.3       |
| 0.285000        | ---              | 30.53           | 50.67        | 20.14       | 1000.0          | 9.000           | N    | 19.4       |
| 0.285000        | 53.77            | ---             | 60.67        | 6.90        | 1000.0          | 9.000           | N    | 19.4       |
| 0.950000        | ---              | 20.04           | 46.00        | 25.96       | 1000.0          | 9.000           | N    | 19.9       |
| 0.950000        | 32.70            | ---             | 56.00        | 23.30       | 1000.0          | 9.000           | N    | 19.9       |
| 3.320000        | ---              | 19.46           | 46.00        | 26.54       | 1000.0          | 9.000           | N    | 20.0       |
| 3.320000        | 27.26            | ---             | 56.00        | 28.74       | 1000.0          | 9.000           | N    | 20.0       |
| 24.395000       | ---              | 33.76           | 50.00        | 16.24       | 1000.0          | 9.000           | N    | 20.4       |
| 24.395000       | 39.05            | ---             | 60.00        | 20.95       | 1000.0          | 9.000           | N    | 20.4       |
| 24.510000       | ---              | 33.79           | 50.00        | 16.21       | 1000.0          | 9.000           | N    | 20.4       |
| 24.510000       | 39.12            | ---             | 60.00        | 20.88       | 1000.0          | 9.000           | N    | 20.4       |

This report shall not be reproduced except in full, without the written approval of KES Co., Ltd.

The results shown in this test report refer only to the sample(s) tested unless otherwise stated.

The authenticity of the test report, contact shchoi@kes.co.kr

### Appendix A. Measurement equipment

| Equipment                | Manufacturer | Model     | Serial No. | Calibration interval | Calibration due. |
|--------------------------|--------------|-----------|------------|----------------------|------------------|
| Spectrum Analyzer        | R&S          | FSV40     | 101002     | 1 year               | 2019.06.29       |
| Loop Antenna             | Schwarzbeck  | FMZB1513  | 225        | 2 years              | 2019.05.10       |
| Trilog-broadband antenna | SCHWARZBECK  | VULB 9163 | 9168-714   | 2 years              | 2018.11.28       |
| Preamplifier             | R&S          | SCU01     | 100603     | 1 year               | 2018.11.27       |
| Preamplifier             | AGILENT      | 8449B     | 3008A01742 | 1 year               | 2019.01.11       |
| EMI Test Receiver        | R&S          | ESU26     | 100551     | 1 year               | 2019.04.11       |
| Pulse Limiter            | R&S          | ESH3-Z2   | 101915     | 1 year               | 2018.11.27       |
| LISN                     | R&S          | ENV216    | 101787     | 1 year               | 2019.01.31       |

### Peripheral device

| Device        | Manufacturer | Model No.   | S/N         | Note             |
|---------------|--------------|-------------|-------------|------------------|
| AC/DC Adapter | Qualcomm     | RH-120200US | -           | Output : 12V, 2A |
| Client device | Samsung      | SM-N920S    | R39GB08DEBL | Mobile Phone     |
| Client device | Samsung      | SM-N920K    | R39G905K3MW | Mobile Phone     |