

**KES Co., Ltd.**

3701, 40, Simin-daero 365beon-gil,
Dongan-gu, Anyang-si, Gyeonggi-do, 14057, Korea
Tel: +82-31-425-6200 / Fax: +82-31-424-0450
www.kes.co.kr

Report No.:

KES-E1-19T0708

Page (1) of (25)

EMC TEST REPORT

Test Report No. : KES-E1-19T0708
Date of Issue : Oct. 30, 2019
Product name : Wearable Translator
Model/Type No. : TalkBox
Variant Mode : -
Applicant : Soundbridge Co., Ltd.
Applicant Address : 4th Fl., Daegu Center for Creative Economy & Innovation, 51,
Hoam-ro, Buk-gu, Daegu, 41585, Korea
Manufacturer : Soundbridge Co., Ltd.
Manufacturer Address : 4th Fl., Daegu Center for Creative Economy & Innovation, 51,
Hoam-ro, Buk-gu, Daegu, 41585, Korea
FCC ID : 2AG88-TALKBOX
Date of Receipt : Sep. 04, 2019
Test date : Oct. 16, 2019 ~ Oct. 17, 2019
Test Results : ☒ **In Compliance** ☐ **Not in Compliance**

Tested by

Dae Hyun, Kim
EMC Test Engineer

Reviewed by

Dong-Hun, Jang
EMC 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

**KES Co., Ltd.**

3701, 40, Simin-daero 365beon-gil,
Dongan-gu, Anyang-si, Gyeonggi-do, 14057, Korea
Tel: +82-31-425-6200 / Fax: +82-31-424-0450
www.kes.co.kr

Report No.:

KES-E1-19T0708

Page (2) of (25)

REPORT REVISION HISTORY

Date	Test Report No.	Revision History
Oct. 30, 2019	KES-E1-19T0708	Issued

This report shall not be reproduced except in full, without the written approval of KES Co., Ltd. This document may be altered or revised by KES Co., Ltd. personnel only, and shall be noted in the revision section of the document. Any alteration of this document not carried out by KES Co., Ltd. will constitute fraud and shall nullify the document.

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



KES Co., Ltd.

3701, 40, Simin-daero 365beon-gil,
Dongan-gu, Anyang-si, Gyeonggi-do, 14057, Korea
Tel: +82-31-425-6200 / Fax: +82-31-424-0450
www.kes.co.kr

Report No.:
KES-E1-19T0708
Page (3) of (25)

TABLE OF CONTENTS

1.0	General Product Description.....	4
1.1	Test Voltage & Frequency	5
1.2	Variant Model Differences.....	5
1.3	Device Modifications	5
1.4	Equipment Under Test.....	5
1.5	Support Equipments	5
1.6	External I/O Cabling	6
1.7	EUT Charge Mode(s).....	6
1.8	Configuration.....	7
1.9	Remarks when standards applied	8
1.10	Calibration Details of Equipment Used for Measurement.....	8
1.11	Test Facility	8
1.12	Laboratory Accreditations and Listings	8
2.0	Test Regulations.....	9
2.1	Conducted Emissions at Mains Power Ports.....	11
2.2	Radiated Electric Field Emissions(Below 1 GHz)	12
2.3	Radiated Electric Field Emissions(Above 1 GHz)	13
APPENDIX A – TEST DATA.....		13
Conducted Emissions at Mains Power Ports.....		14
Radiated Electric Field Emissions(Below 1 GHz)		16
Radiated Electric Field Emissions(Above 1 GHz).....		18
APPENDIX B - Test Setup Photos and Configuration.....		21
Conducted Voltage Emissions		21
Radiated Electric Field Emissions(Below 1 GHz)		22
Radiated Electric Field Emissions(Above 1 GHz).....		24

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



KES Co., Ltd.

3701, 40, Simin-daero 365beon-gil,
Dongan-gu, Anyang-si, Gyeonggi-do, 14057, Korea
Tel: +82-31-425-6200 / Fax: +82-31-424-0450
www.kes.co.kr

Report No.:

KES-E1-19T0708

Page (4) of (25)

1.0 General Product Description

Main Specifications of EUT are:

Item	spec
Operating Frequency	Bluetooth
Power	DC 5 V (USB) DC 3.7 V (Battery)
Size	(80 x 30 x 15) mm

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



KES Co., Ltd.

3701, 40, Simin-daero 365beon-gil,
Dongan-gu, Anyang-si, Gyeonggi-do, 14057, Korea
Tel: +82-31-425-6200 / Fax: +82-31-424-0450
www.kes.co.kr

Report No.:

KES-E1-19T0708

Page (5) of (25)

1.1 Test Voltage & Frequency

Unless indicated otherwise on the individual data sheet or test results, the test voltage and frequency was as indicated below.

Voltage ☐ 230 Vac ☒ 120 Vac ☐ 12 Vdc ☒ DC 3.7 V (Battery)

Frequency ☐ 50 Hz ☒ 60 Hz ☐ Hz

1.2 Variant Model Differences

Not applicable

1.3 Device Modifications

Not applicable

1.4 Equipment Under Test

Description	Model Number	Serial Number	Manufacturer	Remarks
Wearable Translator	TalkBox	-	Soundbridge Co., Ltd.	EUT

1.5 Support Equipments

Description	Model Number	Serial Number	Manufacturer	Remarks
AC/DC Aadapter	MCS-04KD	-	Dongdo Electronics(Yantal) Co., Ltd	-
SmartPhone	A1429	-	Apple	-

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



1.6 External I/O Cabling

■ Charge Mode

Start		END		Cable Spec.	
Description	I/O Port	Description	I/O Port	Length	Shield
Wearable Translator (EUT)	Micro 5 Pin	SmartPhone	USB	0.8	U

■ Operating Mode

Start		END		Cable Spec.	
Description	I/O Port	Description	I/O Port	Length	Shield
Wearable Translator (EUT)	Micro 5 Pin	SmartPhone	USB	0.8	U

1.7 EUT Charge Mode(s)

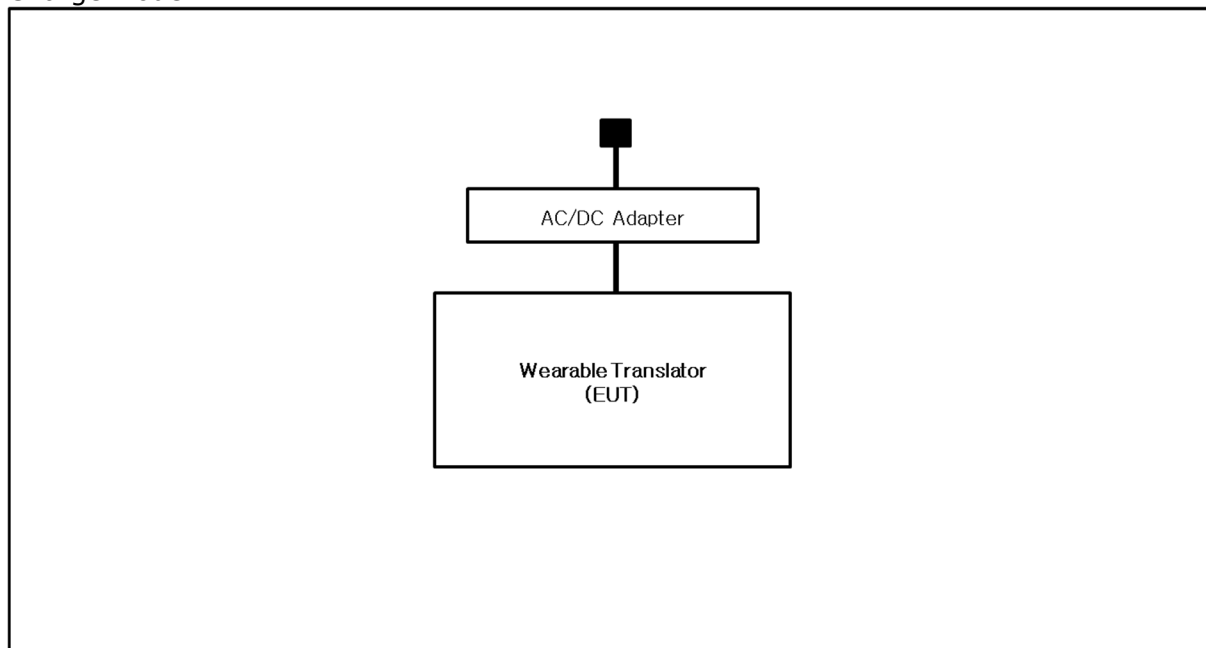
Test mode	operating
Charge	Confirmed the charge of EUT through LED of the EUT
Operating	EUT and SmartPhone to Bluetooth pairing. Normal operation was confirmed by playing 1 kHz Tone built in SmartPhone

EUT Test operating S/W		
Name	Version	Manufacture Company
-	-	-

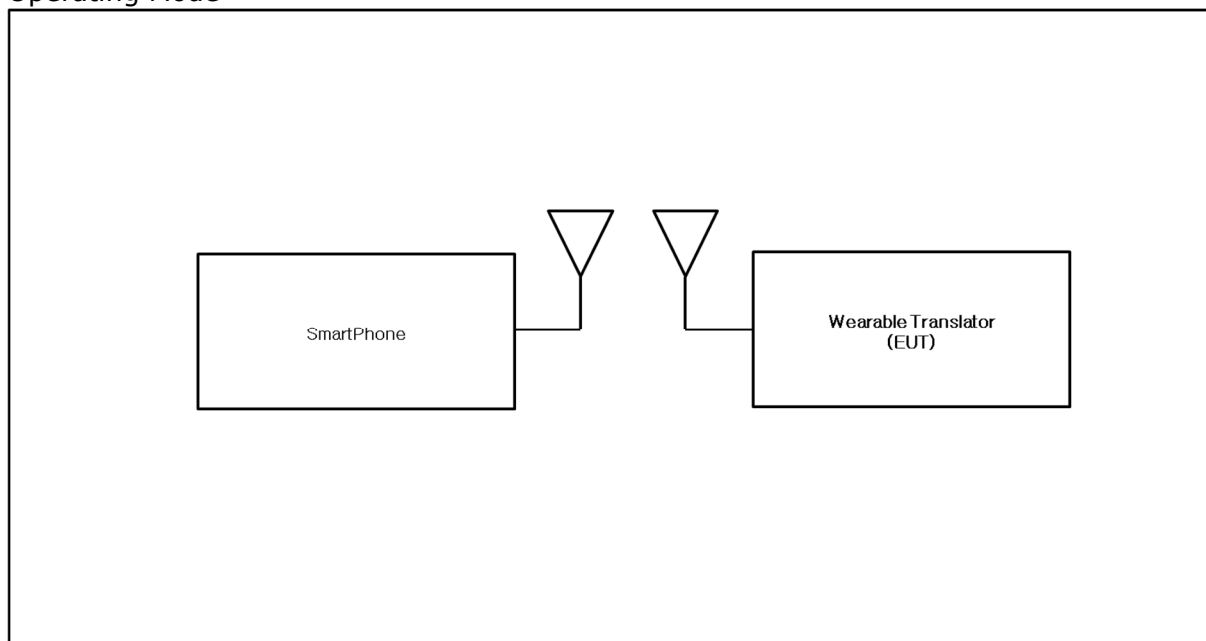
1.8 Configuration

■ AC Main
 □ DC Main

■ Charge Mode



■ Operating Mode



1.9 Remarks when standards applied

N/A







1.10 Calibration Details of Equipment Used for Measurement

Test equipment and test accessories are calibrated on regular basis. The maximum time between calibrations is one year or what is recommended by the manufacturer, whichever is less.

1.11 Test Facility

The measurement facility is located at 473-21 Gayeo-ro, Yeosu-si, Gyeonggi-do, 12658, Korea. The sites are constructed in conformance with the requirements of ANSI C63.4:2014 and CISPR 16-1-4:2012

1.12 Laboratory Accreditations and Listings

Country	Agency	Scope of Accreditation	Logo
KOREA	RRA	EMI (3 m & 10 m Semi-Aechoic Chamber, 10 m Open Area and conducted test site) EMS (ESD, RS, EFT/Burst, Surge, CS, Magnetic, Dips and interruptions)	 KR0100
International	KOLAS	EMI (3 m & 10 m Semi-Aechoic Chamber, and conducted test site) EMS (ESD, RS, EFT/Burst, Surge, CS, Magnetic, Dips and interruptions)	 KT489
USA	FCC	3 m & 10 m Semi-Aechoic Chamber, 10 m Open Area and Conducted test site to perform FCC Part 15/18 measurements.	 KR0100
Canada	ISED	3 m & 10 m Semi-Aechoic Chamber and Conducted test site	 23298-1
JAPAN	VCCI	Mains Ports Conducted Interference Measurement, Telecommunication Ports Conducted Disturbance Measurement and Radiation 10 meter site, Facility for measuring radiated disturbance above 1 GHz	 R-20056, C-20036 T-20040, G-20057
Europe	TÜV SÜD	EMI (3 m & 10 m Semi-Aechoic Chamber, 10 m Open Area and conducted test site) EMS (ESD, RS, EFT/Burst, Surge, CS, Magnetic, Dips and interruptions)	 CARAT 001633 0003



2.0 Test Regulations

The emissions tests were performed according to following regulations:

☐ **EMC – Directive 2014/30/EU**

☐ EN 61000-6-3:2011

☐ EN 61000-6-1:2007

☐ EN 61000-6-4:2007 +A1:2011

☐ EN 61000-6-2:2005

☐ EN 55011:2007 +A1:2010

☐ Group 1
☐ Class A

☐ Group 2
☐ Class B

☐ EN 55014-1:2006 +A2:2011

☐ EN 55014-2:1997 +A2:2008

☐ EN 55015:2013

☐ EN 55032:2015

☐ Class A

☐ Class B

☐ EN 55024:2010

☐ EN 50130-4:2011 +A1:2014

☐ EN 61000-3-2:2014

☐ EN 61000-3-3:2013

☐ EN 61326-1:2013



KES Co., Ltd.

3701, 40, Simin-daero 365beon-gil,
Dongan-gu, Anyang-si, Gyeonggi-do, 14057, Korea
Tel: +82-31-425-6200 / Fax: +82-31-424-0450
www.kes.co.kr

Report No.:

KES-E1-19T0708

Page (10) of (25)

☐ **VCCI V-3 / 2015.04**

☐ Class A

☐ Class B

☐ **AS/NZS:2013**

☐ Class A

☐ Class B

☒ **47 CFR Part 15, Subpart B**

☐ CISPR 22:2009 +A1:2010

☐ Class A

☐ Class B

☒ ANSI C63.4-2014

☐ Class A

☒ Class B

☐ **IC Regulation ICES-003 : 2016**

☐ CAN/CSA CISPR 22-10

☐ Class A

☐ Class B

☐ ANSI C63.4-2014

☐ Class A

☐ Class B

☐ **RE- Directive 2014/53/EU**

☐ EN 301 489-1 V1.9.2

☐ Equipment for fixed use

☐ Equipment for vehicular use

☐ Equipment for portable use

☐ EN 301 489-3 V1.6.1

☐ EN 301 489-17 V2.2.1

☐ EN 60945:2002

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



KES Co., Ltd.

3701, 40, Simin-daero 365beon-gil,
Dongan-gu, Anyang-si, Gyeonggi-do, 14057, Korea
Tel: +82-31-425-6200 / Fax: +82-31-424-0450
www.kes.co.kr

Report No.:

KES-E1-19T0708

Page (11) of (25)

2.1 Conducted Emissions at Mains Power Ports

Test Date

Oct. 17, 2019

Test Location

Electro wave Shieldroom #6

Test Equipment

Used	Description	Model Number	Manufacturer	Serial Number	Cal. Due	calibration interval
<input checked="" type="checkbox"/>	EMI Test S/W	EMC32	R & S	9.12.00	-	-
<input checked="" type="checkbox"/>	EMI TEST RECEIVER	ESR3	R & S	101781	04, 22, 2020	1 Year
<input checked="" type="checkbox"/>	LISN	ENV216	R & S	101787	01, 04, 2020	1 Year
<input type="checkbox"/>	LISN	ESH2-Z5	R & S	100450	04, 22, 2020	1 Year
<input checked="" type="checkbox"/>	PULSE LIMITER	ESH3-Z2	R & S	101915	11, 26, 2019	1 Year

Test Conditions

Temperature: 24.0 °C
Relative Humidity: 52.9 % R.H.

Frequency Range of Measurement

150 kHz to 30 MHz

Instrument Settings

IF Band Width: 9 kHz

Test Results

The requirements are:

- ☒ PASS
☐ NOT PASS
☐ NOT APPLICABLE

Remarks

See Appendix A for test data.

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



2.2 Radiated Electric Field Emissions(Below 1 GHz)

Test Date

Oct. 17, 2019

Test Location

SEMI ANECHOIC CHAMBER #4(10 m)

Test Equipment

Used	Description	Model Number	Manufacturer	Serial Number	Cal. Due	calibration interval
<input checked="" type="checkbox"/>	EMI Test S/W	EP5/RE	TOYO Corporation	6.0.0	-	-
<input checked="" type="checkbox"/>	EMI TEST RECEIVER	ESU26	R & S	100551	04, 09, 2020	1 Year
<input checked="" type="checkbox"/>	AMPLIFIER	SCU 01	R & S	100603	11, 26, 2019	1 Year
<input checked="" type="checkbox"/>	TRILOG-BROADBAND ANTENNA	VULB9163	Schwarzbeck	715	11, 29, 2020	2 Year
<input checked="" type="checkbox"/>	ATTENUATOR	8491A	HP	32173	03, 11, 2020	1 Year

Test Conditions

Temperature: 24.9 °C
Relative Humidity: 53.8 % R.H.

Frequency Range of Measurement

30 MHz to 1 GHz

Instrument Settings

IF Band Width: 120 kHz

Test Results

The requirements are:

- ☒ PASS
☐ NOT PASS
☐ NOT APPLICABLE

Remarks

- See Appendix A for test data.
- The fundamental of the EUT was investigated in three orthogonal orientations X, Y and Z, it was determined that X orientation was worst-case orientation; therefore, all final radiated testing was performed with the EUT in X orientation.

**KES Co., Ltd.**

3701, 40, Simin-daero 365beon-gil,
Dongan-gu, Anyang-si, Gyeonggi-do, 14057, Korea
Tel: +82-31-425-6200 / Fax: +82-31-424-0450
www.kes.co.kr

Report No.:

KES-E1-19T0708

Page (13) of (25)

2.3 Radiated Electric Field Emissions(Above 1 GHz)

Test Date

Oct. 16, 2019

Test Location

SEMI ANECHOIC CHAMBER #4(10 m)

Test Equipment

Used	Description	Model Number	Manufacturer	Serial Number	Cal. Due	calibration interval
<input checked="" type="checkbox"/>	EMI Test S/W	EP5/RE	TOYO Corporation	6.0.0	-	-
<input checked="" type="checkbox"/>	EMI TEST RECEIVER	ESU26	R & S	100551	04, 09, 2020	1 Year
<input checked="" type="checkbox"/>	PREAMPLIFIER	8449B	AGILENT	3008A01742	01, 08, 2020	1 Year
<input checked="" type="checkbox"/>	ATTENUATOR	8491A	HP	35496	03, 11, 2020	1 Year
<input checked="" type="checkbox"/>	HORN ANTENNA	BBHA 9120D	SCHWARZBECK	9120D-1802	03, 12, 2020	2 Year

Test Conditions

Temperature: 25.2 °C
Relative Humidity: 53.7 % R.H.

Frequency Range of Measurement

1 GHz to 12.4 GHz

Instrument Settings

IF Band Width: 1 MHz

Test Results

The requirements are:

- ☒ PASS
☐ NOT PASS
☐ NOT APPLICABLE

Remarks

- See Appendix A for test data.
- The fundamental of the EUT was investigated in three orthogonal orientations X, Y and Z, it was determined that X orientation was worst-case orientation; therefore, all final radiated testing was performed with the EUT in X orientation.

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 – TEST DATA

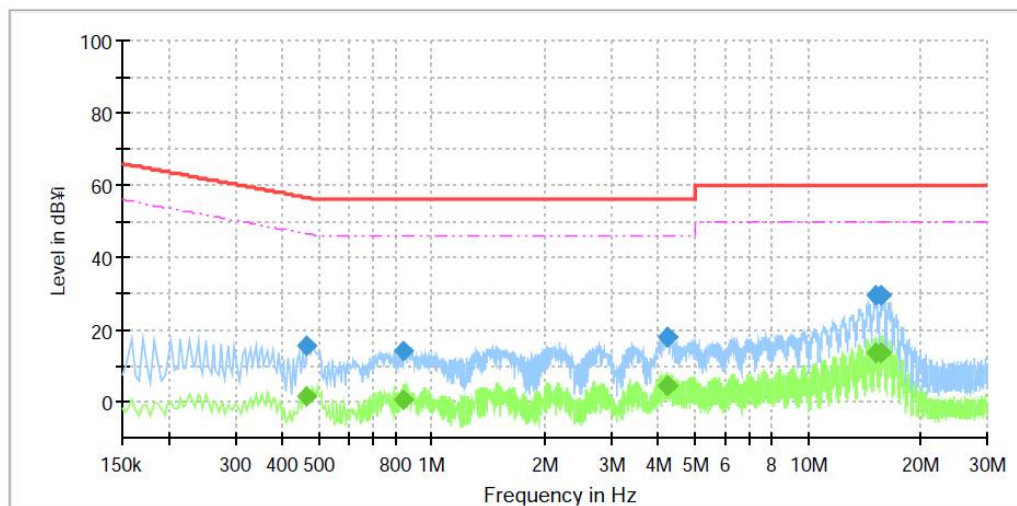
Conducted Emissions at Mains Power Ports

■ Operating Mode

HOT LINE

Common Information

Test Description: Conducted Emission
 Model No.: TalkBox
 Phase:
 Mode: Charge
 Operator Name: KES



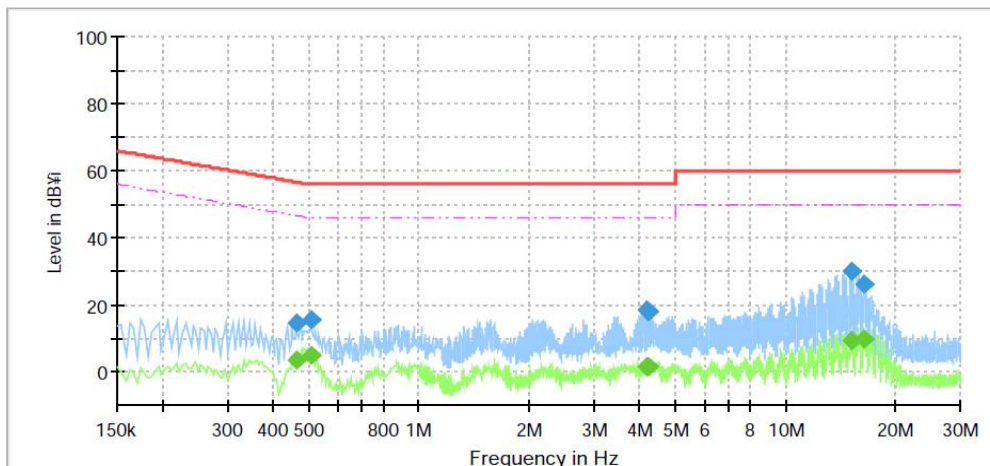
Final Result

Frequency (MHz)	MaxPeak (dBμV)	Average (dBμV)	Limit (dBμV)	Margin (dB)	Meas. Time (ms)	Bandwidth (kHz)	Line	Corr. (dB)
0.466000	---	1.39	46.58	45.19	1000.0	9.000	L1	9.7
0.466000	15.33	---	56.58	41.25	1000.0	9.000	L1	9.7
0.838000	---	0.78	46.00	45.22	1000.0	9.000	L1	9.7
0.838000	14.36	---	56.00	41.64	1000.0	9.000	L1	9.7
4.210000	---	4.55	46.00	41.45	1000.0	9.000	L1	9.8
4.210000	18.10	---	56.00	37.90	1000.0	9.000	L1	9.8
4.234000	---	4.51	46.00	41.49	1000.0	9.000	L1	9.8
4.234000	18.13	---	56.00	37.87	1000.0	9.000	L1	9.8
15.114000	---	13.83	50.00	36.17	1000.0	9.000	L1	10.1
15.114000	29.47	---	60.00	30.53	1000.0	9.000	L1	10.1
15.750000	---	13.73	50.00	36.27	1000.0	9.000	L1	10.2
15.750000	29.35	---	60.00	30.65	1000.0	9.000	L1	10.2

NEUTRAL LINE

Common Information

Test Description:	Conducted Emission
Model No.:	TalkBox
Phase:	
Mode:	Charge
Operator Name:	KES



Final Result

Frequency (MHz)	MaxPeak (dBμV)	Average (dBμV)	Limit (dBμV)	Margin (dB)	Meas. Time (ms)	Bandwidth (kHz)	Line	Corr. (dB)
0.462000	---	3.65	46.66	43.01	1000.0	9.000	N	9.6
0.462000	14.61	---	56.66	42.05	1000.0	9.000	N	9.6
0.510000	---	4.83	46.00	41.17	1000.0	9.000	N	9.6
0.510000	15.59	---	56.00	40.41	1000.0	9.000	N	9.6
4.202000	---	1.52	46.00	44.48	1000.0	9.000	N	9.8
4.202000	18.45	---	56.00	37.55	1000.0	9.000	N	9.8
4.222000	---	1.50	46.00	44.50	1000.0	9.000	N	9.8
4.222000	18.11	---	56.00	37.89	1000.0	9.000	N	9.8
15.134000	---	9.10	50.00	40.90	1000.0	9.000	N	10.2
15.134000	30.23	---	60.00	29.77	1000.0	9.000	N	10.2
16.482000	---	9.81	50.00	40.19	1000.0	9.000	N	10.3
16.482000	26.28	---	60.00	33.72	1000.0	9.000	N	10.3

◆ Calculation

QuasiPeak[dBuV] / CAverage [dBuV] = Reading Value[dBuV] + Corr. [dB]

QuasiPeak / CAverage : The Final Value

Reading Value : Not shown in the table.

Corr. : Correction values (LISN FACTOR + (Cable Loss + Pulse Limiter FACTOR))

Uncertainty of measurement

HOT Line : Uncertainty of measurement 2.38 dB

(Confidence level: Approx. 95 %, k=2)

Neutral Line : Uncertainty of measurement 2.38 dB

(Confidence level: Approx. 95 %, k=2)

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



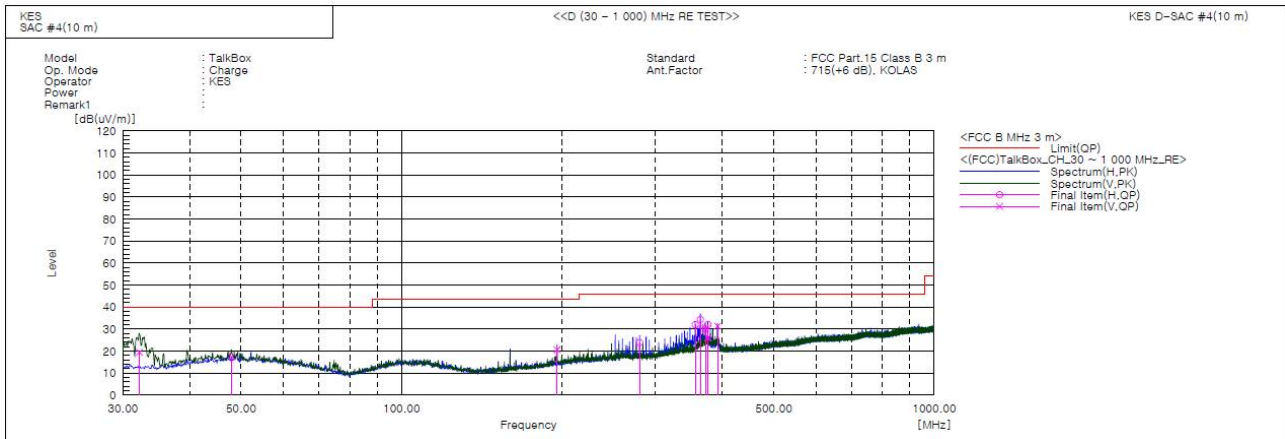
KES Co., Ltd.

3701, 40, Simin-daero 365beon-gil,
Dongan-gu, Anyang-si, Gyeonggi-do, 14057, Korea
Tel: +82-31-425-6200 / Fax: +82-31-424-0450
www.kes.co.kr

Report No.:
KES-E1-19T0708
Page (16) of (25)

Radiated Electric Field Emissions(Below 1 GHz)

■ Charge Mode



Final Result

No.	Frequency [MHz]	(P)	Reading QP [dB(uV)]	c.f [dB(1/m)]	Result QP [dB(uV/m)]	Limit QP [dB(uV/m)]	Margin QP [dB]	Height [cm]	Angle [deg]	Remark
1	32.222	V	45.1	-25.6	19.5	40.0	20.5	133.0	124.0	
2	47.975	V	39.5	-22.1	17.4	40.0	22.6	100.0	338.0	
3	195.991	V	44.0	-23.3	20.7	43.5	22.8	106.0	266.0	
4	280.042	H	44.6	-20.7	23.9	46.0	22.1	227.0	90.0	
5	356.004	H	49.5	-17.5	32.0	46.0	14.0	314.0	265.0	
6	363.942	H	51.8	-17.4	34.4	46.0	11.6	322.0	257.0	
7	367.942	H	14.2	-17.3	-3.1	46.0	49.1	351.0	261.0	
8	371.939	H	47.3	-17.2	30.1	46.0	15.9	299.0	265.0	
9	372.046	V	47.3	-17.2	30.1	46.0	15.9	135.0	108.0	
10	376.048	H	49.3	-17.2	32.1	46.0	13.9	319.0	261.0	
11	376.050	V	43.3	-17.2	26.1	46.0	19.9	154.0	87.0	
12	392.053	V	48.2	-16.8	31.4	46.0	14.6	184.0	100.0	

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

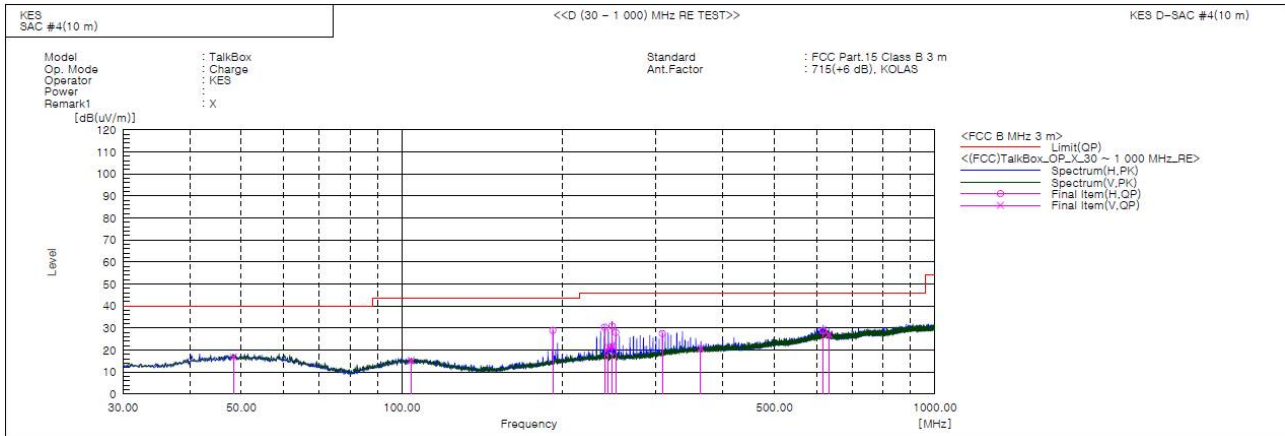


KES Co., Ltd.

3701, 40, Simin-daero 365beon-gil,
Dongan-gu, Anyang-si, Gyeonggi-do, 14057, Korea
Tel: +82-31-425-6200 / Fax: +82-31-424-0450
www.kes.co.kr

Report No.:
KES-E1-19T0708
Page (17) of (25)

Operating Mode



Final Result

No.	Frequency [MHz]	(P)	Reading QP [dB(uV)]	c.f [dB(1/m)]	Result QP [dB(uV/m)]	Limit QP [dB(uV/m)]	Margin QP [dB]	Height [cm]	Angle [deg]	Remark
1	48.309	V	38.9	-22.1	16.8	40.0	23.2	100.0	294.0	
2	104.070	V	38.6	-23.3	15.3	43.5	28.2	105.0	111.0	
3	191.984	H	52.7	-23.7	29.0	43.5	14.5	136.0	271.0	
4	239.999	H	51.7	-21.3	30.4	46.0	15.6	251.0	191.0	
5	244.009	V	42.7	-21.3	21.4	46.0	24.6	135.0	139.0	
6	248.010	H	52.1	-21.2	30.9	46.0	15.1	322.0	179.0	
7	248.020	V	43.0	-21.2	21.8	46.0	24.2	106.0	115.0	
8	252.009	H	49.2	-21.2	28.0	46.0	18.0	133.0	242.0	
9	308.026	H	47.0	-19.5	27.5	46.0	18.5	249.0	115.0	
10	363.679	V	38.2	-17.4	20.8	46.0	25.2	110.0	278.0	
11	617.093	H	40.2	-11.4	28.8	46.0	17.2	305.0	147.0	
12	632.011	V	38.4	-11.3	27.1	46.0	18.9	354.0	210.0	

◆ Calculation – SAC #4(10 m)

Result(QP) [dB(μV/m)] = (Reading(QP)[dB(μV)] + c.f[dB(1/m)])

Margin(QP)[dB] = Limit[dB(μV/m)] - Result(QP) [dB(μV/m)]

Reading(QP) : Reading value, Result(QP) : Reading value + Factor value

Limit(QP) : Limit value, c.f : (ANT Factor + Cable Loss - Preamp Factor), Margin: Margin value

Uncertainty of measurement

Horizontal : Uncertainty of measurement 4.16 dB
(Confidence level: Approx. 95 %, k=2)

Vertical : Uncertainty of measurement 4.24 dB
(Confidence level: Approx. 95 %, k=2)

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



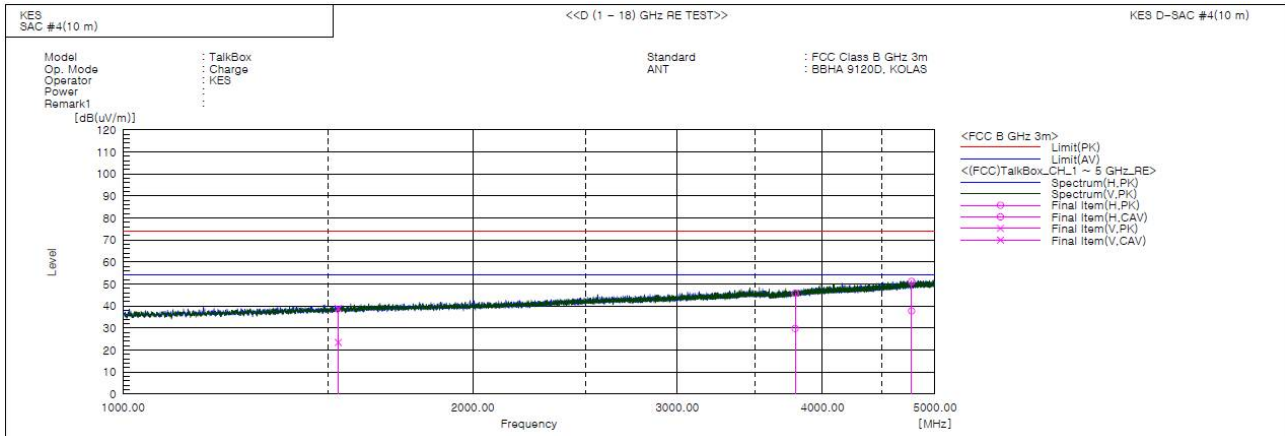
KES Co., Ltd.

3701, 40, Simin-daero 365beon-gil,
Dongan-gu, Anyang-si, Gyeonggi-do, 14057, Korea
Tel: +82-31-425-6200 / Fax: +82-31-424-0450
www.kes.co.kr

Report No.:
KES-E1-19T0708
Page (18) of (25)

Radiated Electric Field Emissions(Above 1 GHz)

■ Charge Mode



Final Result

No.	Frequency [MHz]	(P)	Reading PK [dB(uV)]	Reading CAV [dB(uV)]	c.f [dB(1/m)]	Result PK [dB(uV/m)]	Result CAV [dB(uV/m)]	Limit PK [dB(uV/m)]	Limit AV [dB(uV/m)]	Margin PK [dB]	Margin CAV [dB]	Height [cm]	Angle [deg]	Remark
1	1532.231	V	41.6	26.2	-2.7	38.9	23.5	74.0	54.0	35.1	30.5	155.0	207.0	
2	3789.541	H	39.2	23.2	6.6	45.8	29.8	74.0	54.0	28.2	24.2	319.0	47.0	
3	4774.046	H	40.6	27.2	10.6	51.2	37.8	74.0	54.0	22.8	16.2	224.0	275.0	

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

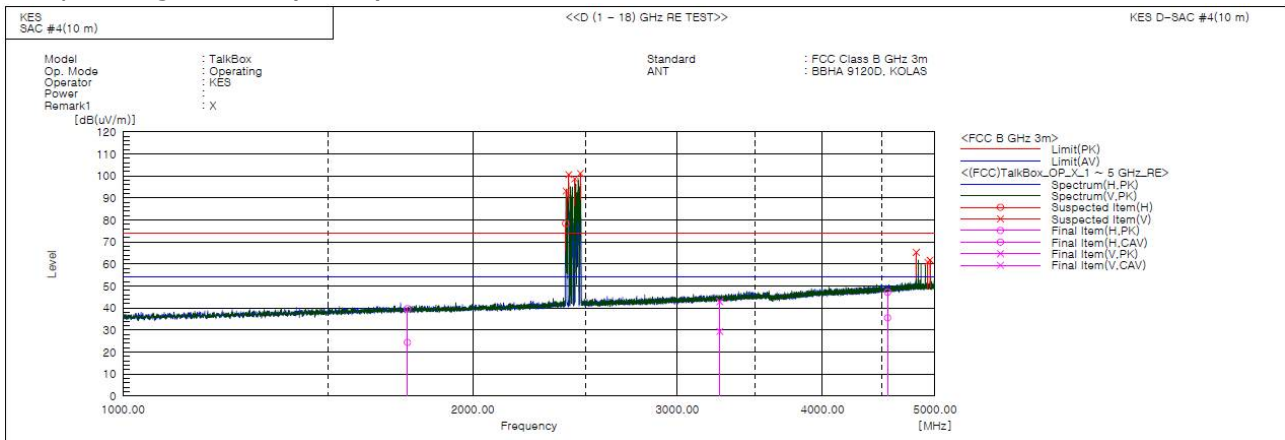


KES Co., Ltd.

3701, 40, Simin-daero 365beon-gil,
Dongan-gu, Anyang-si, Gyeonggi-do, 14057, Korea
Tel: +82-31-425-6200 / Fax: +82-31-424-0450
www.kes.co.kr

Report No.:
KES-E1-19T0708
Page (19) of (25)

Operating Mode – (1 ~ 5) GHz



Final Result

No.	Frequency	(P)	Reading	Reading	c.f	Result	Result	Limit	Limit	Margin	Margin	Height	Angle	Remark
	[MHz]		PK	CAV		PK	CAV	PK	AV	PK	CAV	[cm]	[deg]	
			[dB(uV)]	[dB(uV)]	[dB(1/m)]	[dB(uV/m)]	[dB(uV/m)]	[dB(uV/m)]	[dB(uV/m)]	[dB]	[dB]			
1	1757.337	H	41.3	26.0	-1.6	39.7	24.4	74.0	54.0	34.3	29.6	270.0	331.0	
2	3264.133	V	38.3	24.8	4.6	42.9	29.4	74.0	54.0	31.1	24.6	109.0	237.0	
3	4552.429	H	37.4	25.8	9.8	47.2	35.6	74.0	54.0	26.8	18.4	229.0	158.0	
4	2404.500	H			1.4			74.0	54.0			100.0	243.0	
5	2406.500	V			1.4			74.0	54.0			100.0	185.0	
6	2419.000	V			1.5			74.0	54.0			100.0	345.0	
7	2448.500	V			1.6			74.0	54.0			100.0	273.0	
8	2476.500	V			1.7			74.0	54.0			100.0	321.0	
9	4818.000	V			10.8			74.0	54.0			100.0	325.0	
10	4928.000	V			11.1			74.0	54.0			100.0	345.0	
11	4951.500	V			11.2			74.0	54.0			100.0	337.0	

* Operating Mode Exclusion Bands

- Fundamental Frequency: 2.4 GHz
- Harmonics Frequency: 4.8 GHz, 4.9 GHz

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

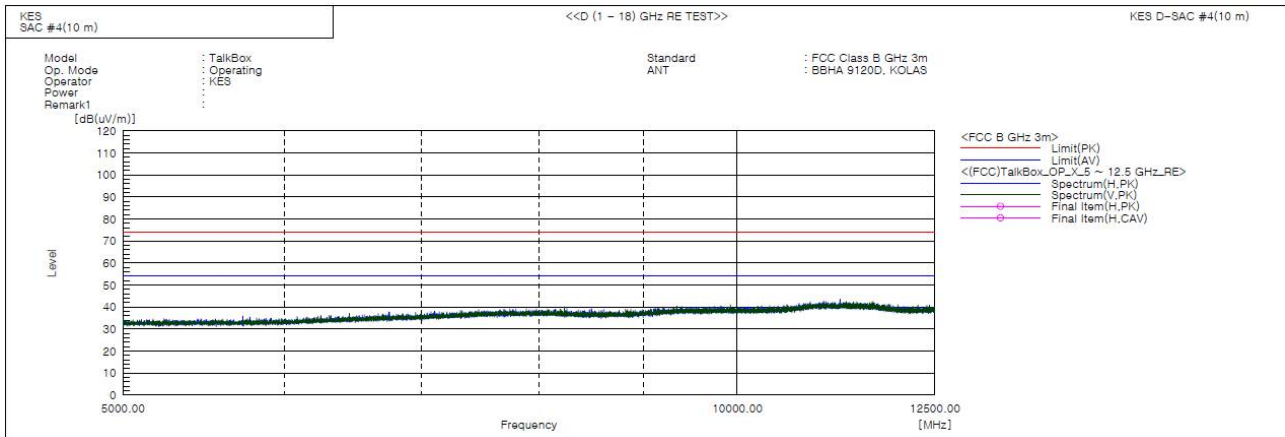


KES Co., Ltd.

3701, 40, Simin-daero 365beon-gil,
Dongan-gu, Anyang-si, Gyeonggi-do, 14057, Korea
Tel: +82-31-425-6200 / Fax: +82-31-424-0450
www.kes.co.kr

Report No.:
KES-E1-19T0708
Page (20) of (25)

– (5 ~ 12.5) GHz



* No spurious emission were detected above 5 GHz.

◆ Calculation

Result(PK/CAV) [dB(μV/m)] = (Reading(PK/CAV)[dB(μV)] + c.f[dB(1/m)])

Margin(PK/CAV)[dB] = Limit[dB(μV/m)] - Result(PK/CAV) [dB(μV/m)]

Reading(PK/CAV) : Reading value, Result(PK/CAV) : Reading value + Factor value

Limit(QP) : Limit value, c.f : (ANT Factor + Cable Loss + ATT Factor - Preamp Factor), Margin: Margin value

Uncertainty of measurement

Uncertainty of measurement 5.76 dB

(Confidence level: Approx. 95 %, k=2)

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