

**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
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Report No.:
KES-EM-23T0851
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EMC TEST REPORT

Test Report No. : KES-EM-23T0851
Date of Issue : Sep. 22, 2023
Product name : Hand grip strength dynamometer
Model/Type No. : IB-HGSm
Variant Model : IB-HGS
Applicant : InBody Co., Ltd.
Applicant Address : InBody Bldg., 625, Eonju-ro, Gangnam-gu, Seoul 06106 KOREA
Manufacturer : InBody Co., Ltd.
Manufacturer Address : InBody Bldg., 625, Eonju-ro, Gangnam-gu, Seoul 06106 KOREA
FCC ID : F6OIBHGSM
Date of Receipt : Jul. 27, 2023
Test date : Aug. 01, 2023
Test Results : **In Compliance** **Not in Compliance**

Tested by

Dae Hyun, Kim
EMC Test Engineer

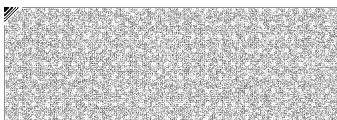
Reviewed by

Dong Il, Lee
EMC Technical Manager

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KES-QP16-F01(00-23-01-01)

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REPORT REVISION HISTORY

Date	Test Report No.	Revision History
Sep. 22, 2023	KES-EM-23T0851	Issued

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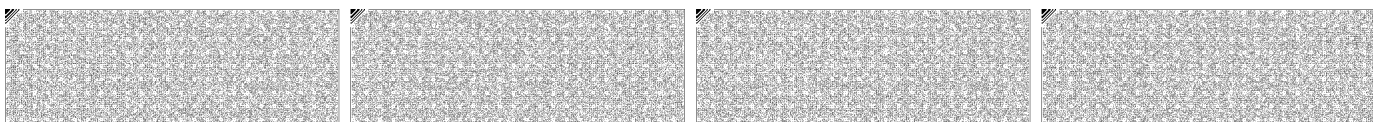
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1.0 General Product Description

Main Specifications of EUT are:

Division	Characteristic
Frequency	Bluetooth
Power	DC 3 V (AA Battery x 2 EA)
Components	EUT x 1 EA

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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.

Battery (AA Battery x 2 EA)

1.2 Variant Model Differences

products for marketing

1.3 Device Modifications

Not applicable

1.4 Equipment Under Test

Description	Model Number	Serial Number	Manufacturer	Remarks
Hand grip strength dynamometer	IB-HGSm	-	InBody Co., Ltd.	EUT

1.5 Support Equipments

Description	Model Number	Serial Number	Manufacturer	Remarks
SmartPhone	SM-G955N	-	Samsung Electronics Co., Ltd.	-

1.6 External I/O Cabling

Start		END		Cable Spec.	
Description	I/O Port	Description	I/O Port	Length	Shield
Hand grip strength dynamometer (EUT)	Wireless	SmartPhone	Wireless	-	-

* Unshielded = U, Shielded = S

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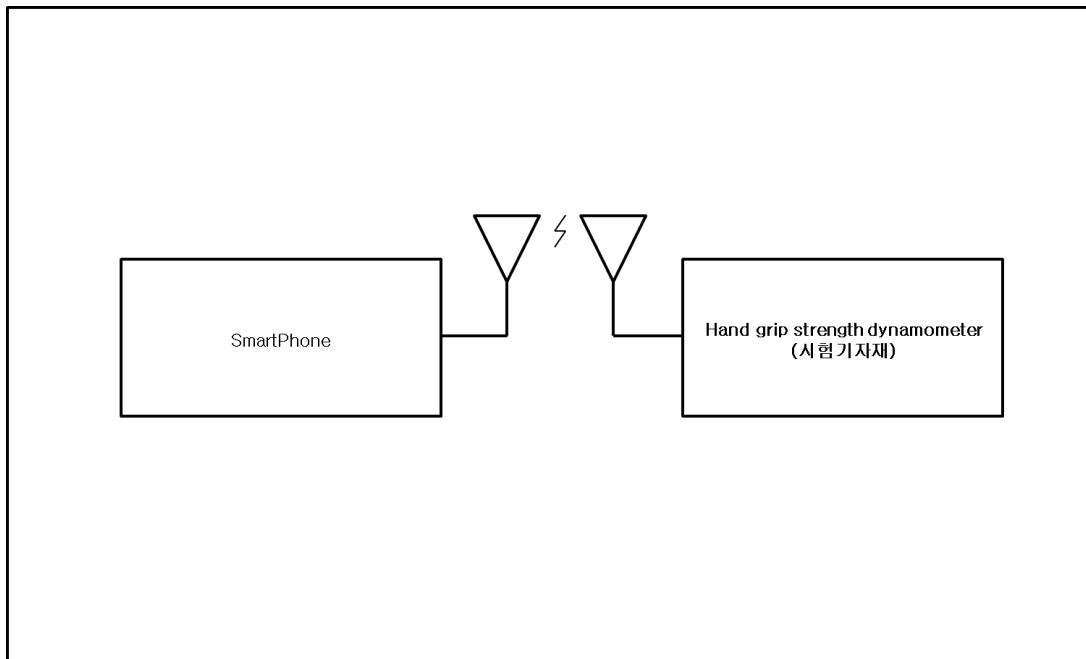
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1.7 EUT Operating Mode(s)

Test mode	operating
Operating	Tested while checking the normal operation status on the application (BLE Scanner) of the SmartPhone.

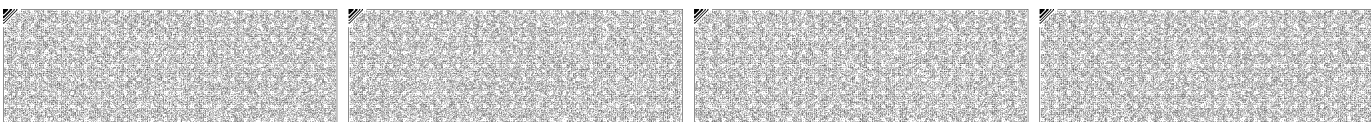
EUT Test operating S/W		
Name	Version	Manufacture Company
-	-	-

1.8 Configuration



EUT – Smartphone : Bluetooth

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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, Republic of. The sites are constructed in conformance with the requirements of ANSI C63.4a-2017 and CISPR 16-1-4:2019

1.12 Measurement Procedure

- Conducted Emissions

The conducted emission levels were measured on each current-carrying line with the spectrum analyzer operating in the CISPR quasi-peak mode (or peak mode if applicable). The initial step in collecting conducted data is a spectrum analyzer peak scan of the measurement range. If the conducted emission exceed the average limit with the instrument set to the quasi-peak mode, the measurements are made in the average mode. The emission spectrum was scanned from 150 kHz to 30 MHz. The highest emission amplitudes relative to the appropriate limits were measured and have been recorded. Quasi-peak readings are distinguished with a "QP".

- Radiated Electric Field Emissions

The test was done at a SEMI ANECHOIC CHAMBER with quasi-peak detector. The final test data was measured using a Quasi-Peak detector below 1 GHz at 10 m or 3 m distance and a Peak and Average detector above 1 GHz at 3 m distance. Test was proceeded worst case test mode and cable configuration.

Measurements were made with the antenna positioned in both the horizontal and vertical planes of polarization. The antenna height was varied from 1 m to 4 m and the EUT was rotated 360° to find the maximum emitting point for each frequency.

Measurement procedures was In accordance with ANSI C63.4-2014 7.3.3, 7.3.4, 8.3.1.1, 8.3.1.2, 8.3.2.1, 8.3.2.2

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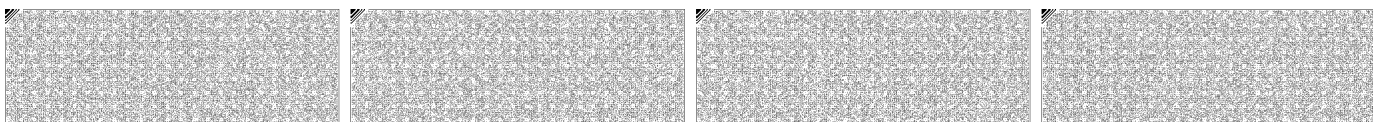
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1.13 Laboratory Accreditations and Listings

Country	Agency	Scope of Accreditation	Logo
KOREA	RRA	EMI (3 m & 10 m Semi-Anechoic Chamber and conducted test site) EMS (ESD, RS, EFT/Burst, Surge, CS, Magnetic, Dips and interruptions)	 KR0100
International	KOLAS	EMI (3 m & 10 m Semi-Anechoic Chamber and conducted test site) EMS (ESD, RS, EFT/Burst, Surge, CS, Magnetic, Dips and interruptions)	 KT489
USA	FCC	3 m & 10 m Semi-Anechoic Chamber Conducted test site to perform FCC Part 15/18 measurements.	 KR0100
Canada	ISED	3 m & 10 m Semi-Anechoic Chamber and Conducted test site	 23298
JAPAN	VCCI	EMI (3 m & 10 m Semi-Anechoic Chamber and conducted test site)	 C-20136, T-20137, R-20181, G-20176
Europe	TÜV SÜD	EMI (3 m & 10 m Semi-Anechoic Chamber and conducted test site) EMS (ESD, RS, EFT/Burst, Surge, CS, Magnetic, Dips and interruptions)	 CARAT 001633 0004

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2.0 Test Regulations

The emissions tests were performed according to following regulations:

47 CFR Part 15, Subpart B

CISPR 22:2009 +A1:2010

Class A

Class B

ANSI C63.4a-2017

Class A

Class B

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2.1 Conducted Emissions at Mains Power Ports

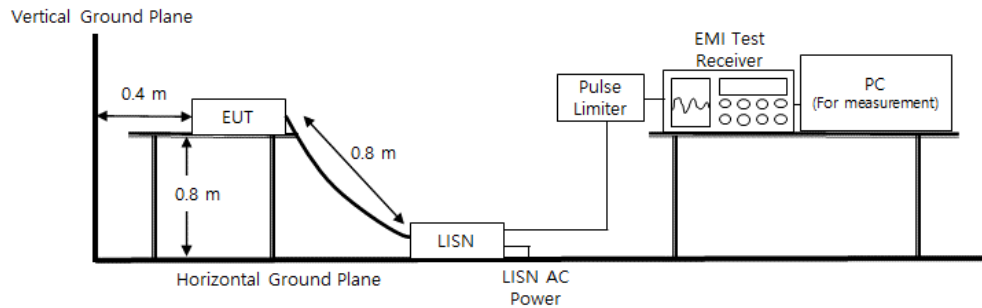
Test Date
N/A

Test Location
Electro wave Shieldroom #6

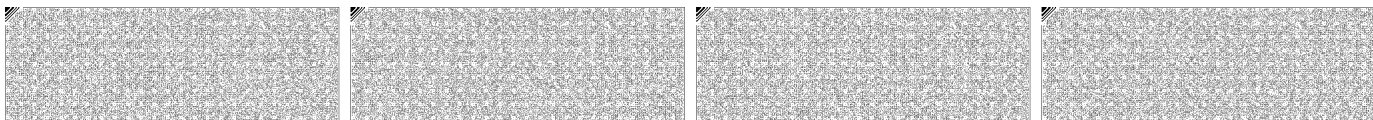
Test Equipment

Used	Description	Model Number	Manufacturer	Serial Number	Cal. Due	calibration interval
<input type="checkbox"/>	EMI Test S/W	EMC32	R & S	9.12.00	-	-
<input type="checkbox"/>	EMI TEST RECEIVER	ESR3	R & S	101783	11, 11, 2023	1 Year
<input type="checkbox"/>	LISN	ENV216	R & S	101787	11, 10, 2023	1 Year
<input type="checkbox"/>	LISN	ESH2-Z5	R & S	100450	11, 10, 2023	1 Year
<input type="checkbox"/>	PULSE LIMITER	ESH3-Z2	R & S	101915	11, 10, 2023	1 Year

Diagram of test setup



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Test Conditions

Temperature: °C
Relative Humidity: % 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

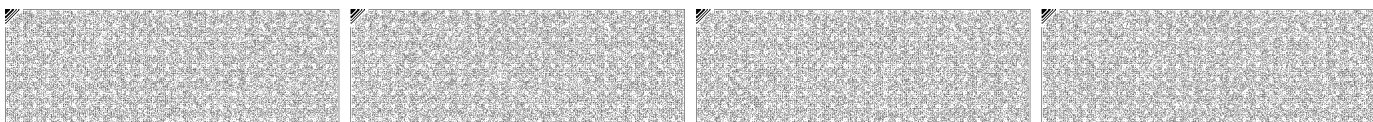
Remarks

The EUT applied portable Use equipment.

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2.2 Radiated Electric Field Emissions(Below 1 GHz)

Test Date

Aug. 01, 2023

Test Location

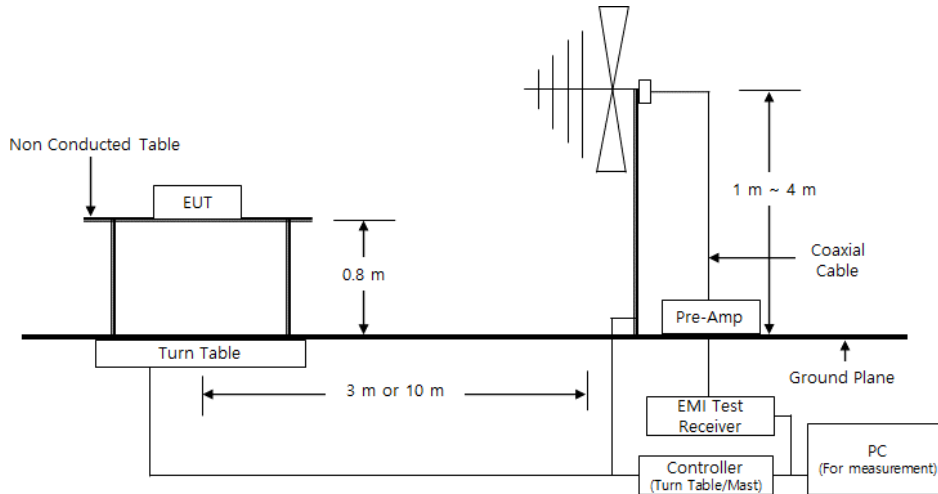
OPEN AREA TEST SITE #2

SEMI ANECHOIC CHAMBER #4(10m)

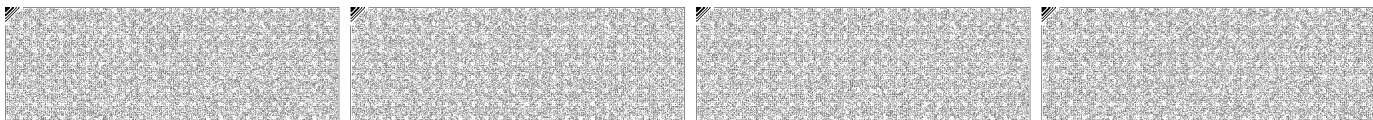
Test Equipment

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	03, 31, 2023	1 Year
<input checked="" type="checkbox"/>	AMPLIFIER	SCU 01	R & S	100603	11, 10, 2023	1 Year
<input checked="" type="checkbox"/>	TRILOG-BROADBAND ANTENNA	VULB9163	Schwarzbeck	715	11, 17, 2024	2 Year
<input checked="" type="checkbox"/>	ATTENUATOR	8491A	HP	32173	03, 03, 2024	1 Year

Diagram of test setup



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Test Conditions

Temperature: (24,9 ± 0,1) °C
Relative Humidity: (47,1 ± 0,0) % R.H.

Frequency Range of Measurement

30 MHz to 1 GHz

Instrument Settings

IF Band Width: 120 kHz

Test Results

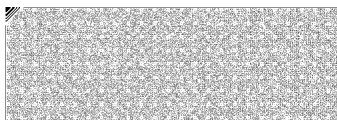
The requirements are:

- PASS
- NOT PASS
- NOT APPLICABLE

Remarks

See Appendix A for test data.

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2.3 Radiated Electric Field Emissions(Above 1 GHz)

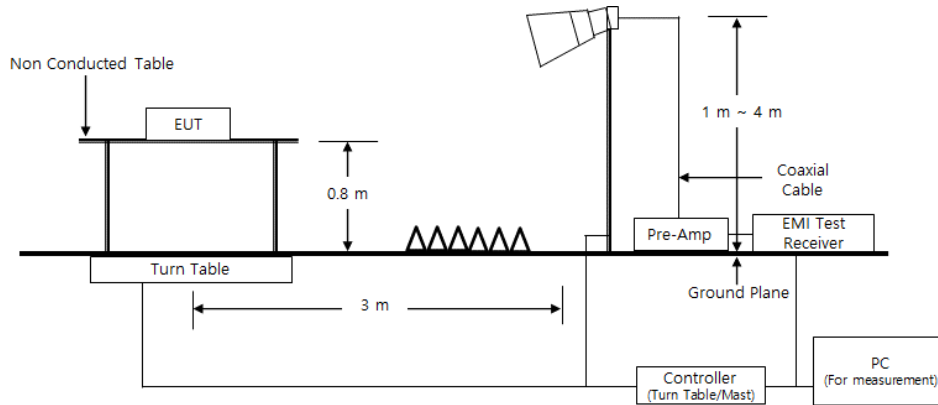
Test Date
 Aug. 01, 2023

Test Location
 SEMI ANECHOIC CHAMBER #5

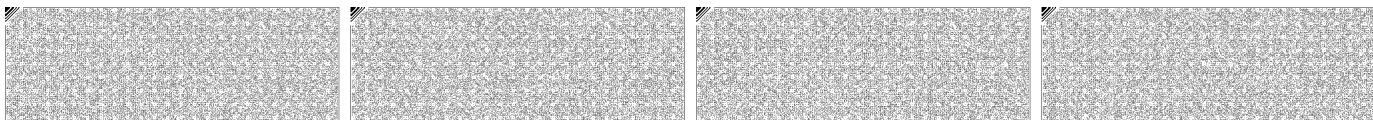
Test Equipment

Used	Description	Model Number	Manufacturer	Serial Number	Cal. Due	calibration interval
<input checked="" type="checkbox"/>	EMI Test SW	ES10/RE	TOYO Corporation	2022.01.000	-	-
<input checked="" type="checkbox"/>	EMI TEST RECEIVER	ESU26	Rohde & Schwarz	100552	03, 21, 2024	1 Year
<input checked="" type="checkbox"/>	HORN ANTENNA	BBHA 9120D	SCHWARZBECK	9120D-1802	11, 08, 2023	1 Year
<input checked="" type="checkbox"/>	PREAMPLIFIER	8449B	HP	3008A00538	05, 31, 2024	1 Year
<input checked="" type="checkbox"/>	ATTENUATOR	8491B	HP	23094	03, 21, 2024	1 Year

Diagram of test setup



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Test Conditions

Temperature: (24,9 ± 0,1) °C
Relative Humidity: (45,9 ± 0,1) % R.H.

Frequency Range of Measurement

1 GHz to 5 GHz

Instrument Settings

IF Band Width: 1 MHz

Test Results

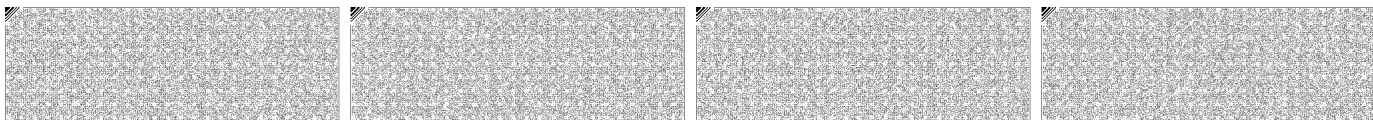
The requirements are:

- PASS
- NOT PASS
- NOT APPLICABLE

Remarks

See Appendix A for test data.

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APPENDIX A – TEST DATA

Conducted Emissions at Mains Power Ports
HOT LINE

N/A

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NEUTRAL LINE

N/A

◆ 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))

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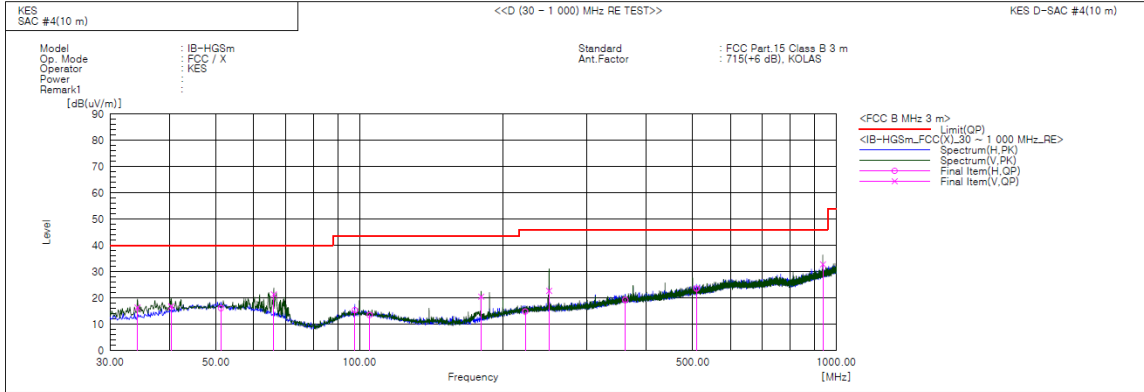




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Radiated Electric Field Emissions(Below 1 GHz)



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	34.244	V	41.1	-24.7	16.4	40.0	23.6	100.0	349.0	
2	40.306	V	39.3	-22.5	16.8	40.0	23.2	135.0	23.0	
3	51.219	H	37.0	-20.9	16.1	40.0	23.9	260.0	290.0	
4	66.133	V	45.0	-23.6	21.4	40.0	18.6	100.0	211.0	
5	97.779	H	38.2	-22.8	15.4	43.5	28.1	380.0	18.0	
6	105.054	H	36.3	-22.8	13.5	43.5	30.0	200.0	343.0	
7	179.986	V	44.5	-24.0	20.5	43.5	23.0	112.0	144.0	
8	222.666	H	35.2	-20.4	14.8	46.0	31.2	255.0	230.0	
9	249.948	V	42.5	-19.8	22.7	46.0	23.3	105.0	166.0	
10	361.013	H	34.9	-15.6	19.3	46.0	26.7	290.0	324.0	
11	509.180	H	35.4	-11.8	23.6	46.0	22.4	365.0	225.0	
12	937.556	V	37.9	-5.1	32.8	46.0	13.2	268.0	237.0	

* The Fundamental of the EUT was investigated in three orthogonal orientations X, Y, Z
 It was determined that X orientation was worst-case orientation; therefore, al tinal radiated testing was performed with the EUT in X orientation.

◆ Calculation – SAC #4(10 m)

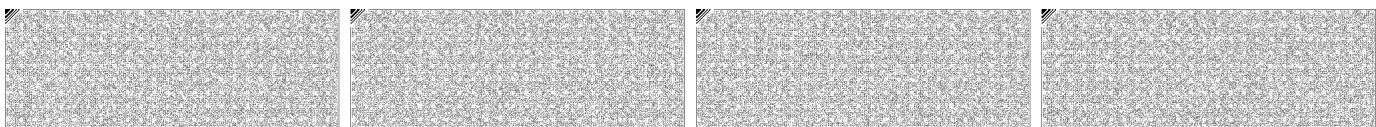
Result(QP) [dB(μV/m)] = (Reading(QP)[dB(μV)] + c.f[dB(1/m)])

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

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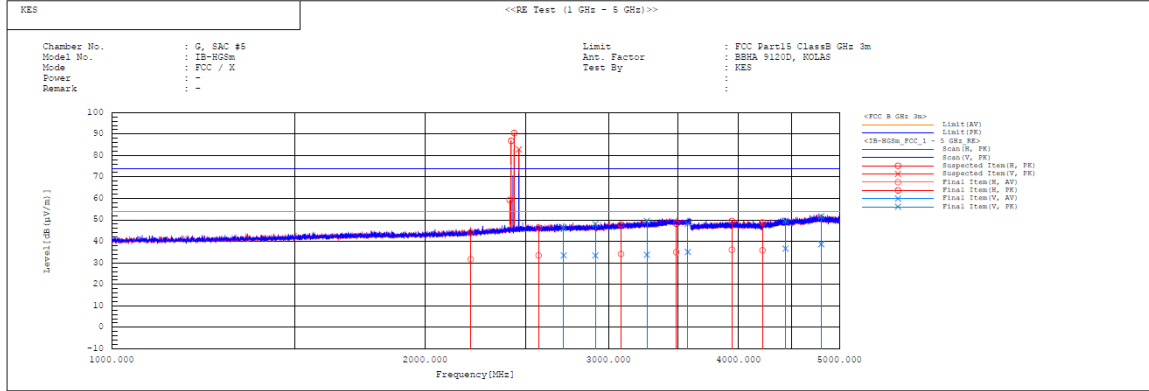


KES Co., Ltd.
 3701, 40, Simin-daero 365beon-gil,
 Dongan-gu, Anyang-si, Gyeonggi-do, 14057, Korea
 Tel: +82-31-425-6200 / Fax: +82-31-424-0450
 www.kes.co.kr

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Radiated Electric Field Emissions(Above 1 GHz)

- (1 ~ 5) GHz



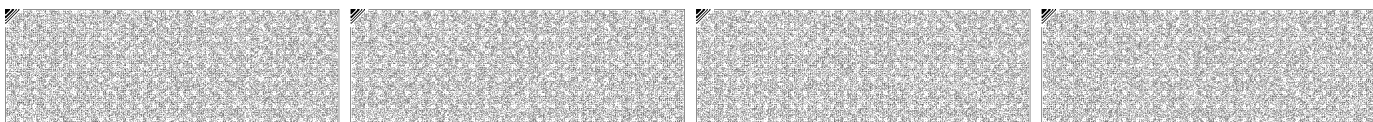
Final Result

No.	Frequency [MHz]	Pol	Reading AV [dB(μV)]	Reading PK [dB(μV)]	c.f [dB(1/m)]	Result AV [dB(μV/m)]	Result PK [dB(μV/m)]	Limit AV [dB(μV/m)]	Limit PK [dB(μV/m)]	Margin AV [dB]	Margin PK [dB]	Height [cm]	Angle [deg]	Remark
1	2212.555	H	28.2	40.8	3.5	31.7	44.3	54.0	74.0	22.3	29.7	290.0	74.4	
2	2571.489	H	28.6	41.5	4.9	33.5	46.4	54.0	74.0	20.5	27.6	220.0	171.6	
3	2717.789	V	28.1	41.0	5.4	33.5	46.4	54.0	74.0	20.5	27.6	110.0	134.0	
4	2914.356	V	27.5	42.0	6.0	33.5	48.0	54.0	74.0	20.5	26.0	115.0	124.7	
5	3084.696	H	27.8	41.5	6.4	34.2	47.9	54.0	74.0	19.8	26.1	400.0	222.2	
6	3266.089	V	27.2	43.0	6.6	33.8	49.6	54.0	74.0	20.2	24.4	100.0	8.7	
7	3486.735	H	28.2	41.5	6.8	35.0	48.3	54.0	74.0	19.0	25.7	400.0	260.4	
8	3576.378	V	28.1	41.2	7.0	35.1	48.2	54.0	74.0	18.9	25.8	100.0	357.7	
9	3942.202	H	28.1	41.5	8.0	36.1	49.5	54.0	74.0	17.9	24.5	229.0	83.0	
10	4218.800	H	26.9	39.8	9.0	35.9	48.8	54.0	74.0	18.1	25.2	350.0	102.5	
11	4439.817	V	26.5	39.4	10.2	36.7	49.6	54.0	74.0	17.3	24.4	100.0	359.7	
12	4803.770	V	27.2	40.2	11.5	38.7	51.7	54.0	74.0	15.3	22.3	135.0	99.4	
13	2412.000	H	-----	-----	4.3	-----	-----	-----	-----	-----	-----	100.0	355.6	
14	2419.600	H	-----	-----	4.4	-----	-----	-----	-----	-----	-----	400.0	214.9	
15	2435.600	H	-----	-----	4.4	-----	-----	-----	-----	-----	-----	400.0	359.8	
16	2461.600	V	-----	-----	4.5	-----	-----	-----	-----	-----	-----	100.0	73.1	

*** Exclusion bands**

- Fundamental Frequency: (2 402 ~ 2 480) GHz

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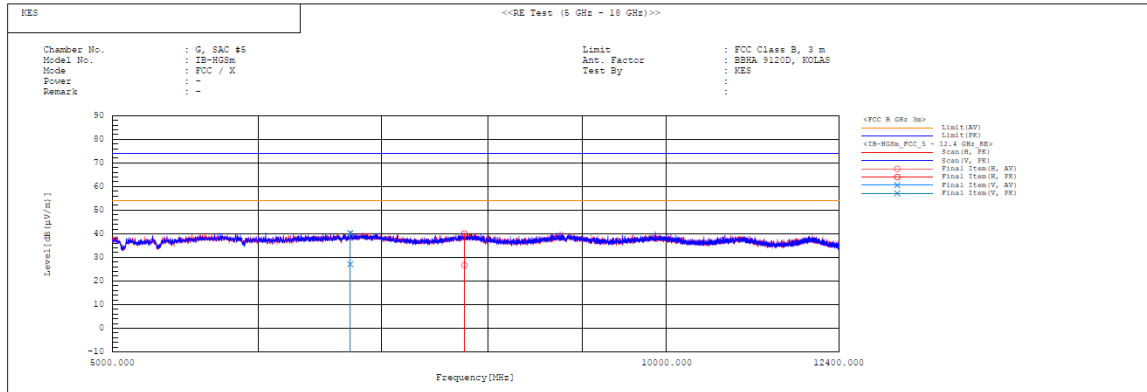




KES Co., Ltd.
 3701, 40, Simin-daero 365beon-gil,
 Dongan-gu, Anyang-si, Gyeonggi-do, 14057, Korea
 Tel: +82-31-425-6200 / Fax: +82-31-424-0450
 www.kes.co.kr

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- (5 ~ 12.4) GHz



- PK

Frequency (MHz)	Reading PK (dBuV)	Polarization	Height (m)	ANT Factor (dB)	Cable Loss (dB)	Preamp Factor (dB)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)
6 734.201	40.300	H	1.000	34.920	7.560	34.800	47.980	74.000	26.020
7 767.525	40.100	V	1.000	36.460	8.480	33.720	51.320	74.000	22.680

- CISPR AV

Frequency (MHz)	Reading CISPR AV (dBuV)	Polarization	Height (m)	ANT Factor (dB)	Cable Loss (dB)	Preamp Factor (dB)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)
6 734.200	27.100	H	1.000	34.920	7.560	34.800	34.780	54.000	19.220
7 767.525	26.700	V	1.000	36.460	8.480	33.720	37.920	54.000	16.080

* No Spurious emission were detected above 5 GHz.

◆ Calculation

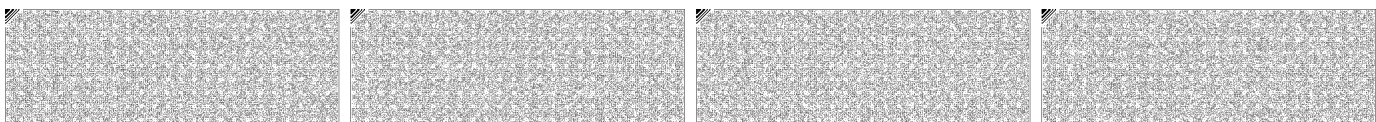
Result(PK/CAV) [dB(μV/m)] = (Reading(PK/CAV)[dB(μV)] + c.f[dB(1/m)])

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 - Preamp Factor), Margin: Margin value

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Dongan-gu, Anyang-si, Gyeonggi-do, 14057, Korea
Tel: +82-31-425-6200 / Fax: +82-31-424-0450
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APPENDIX B - Test Setup Photos and Configuration

Conducted Emissions at Mains Power Ports

N/A

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KES-QP16-F01(00-23-01-01)

주식회사 케이이에스 (KES Co.,Ltd)

