



TEST REPORT



Report No. : KES-EM242575

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KES Co., Ltd.

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1. Client

Applicant : LEETEK LIFE CO.,LTD

Applicant Address : 2F, 47, Ojeong-ro, Bucheon-si, Gyeonggi-do, Republic of Korea

2. Sample Description

Product name : Fall prevention sensor

Model/Type No. : LFW2939-01

Variant Model : LF-2T

Manufacturer : LEETEK LIFE CO.,LTD

Manufacturer Address : 2F, 47, Ojeong-ro, Bucheon-si, Gyeonggi-do, Republic of Korea

3. FCC ID : 2BDLQ-LFW2939-01

4. Date of Receipt : Aug. 26, 2024

5. Test date : Sep. 03, 2024 ~ Sep. 04, 2024

6. Date of Issue : Sep. 24, 2024

7. Test Results : In Compliance

Tested by

김동인
[김동인]2024/09/24

Reviewed by

장동훈
[장동훈]2024/09/24

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

KES Co., Ltd.

The authenticity of this test report can be found on the verification page of our website (www.kes.co.kr).

**REPORT REVISION HISTORY**

Date	Test Report No.	Revision History
Sep. 24, 2024	KES-EM242575	Issued

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1.0 General Product Description

Main Specifications of EUT are:

Model Name	FCC : Fall prevention sensor
Model code	LFW2939-01
Manufacture	LEETEK LIFE CO.,LTD
certification	KC, FCC
Frequency range	KC : 922.1 ~ 923.3MHz FCC : 902.2 ~ 927.5MHz
Channel Spacing	200KHz
Occupied Bandwidth	125 KHz
Frequency stability	+/- 5 ppm
Spurious Rejection	-40dBm below
Modulation Scheme	LORA
RF data rate	5Kbps
TX POWER	10mW below (+10dBm)
Operating temperature	-10 ~ +50 (℃)
Dimension	W(65) X D(38) X H(35) (Excluding Cables)
Total Weight	50g(depending on cable)
Charger	USB 5V/0.31A
Full Charge time	3 hour
Power consumption	0.185mW (3.7V/0.05mA)
Operation time	12 month
Battery	lithium polymer, 3.7V, 650mAh
ANTENNA	Internal PCB pattern antenna
Product Color	Black
Case Material	ABS



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.

☒ AC 120 V, 60 Hz(DC Adapter Input Power)

1.2 Variant Model Differences

Added Derived model of difference in simple model name.
Basic model and electrical circuitry, structure and performance are the same.

1.3 Device Modifications

Not applicable

1.4 Equipment Under Test

Description	Model Number	Serial Number	Manufacturer	Remarks
Fall prevention sensor	LFW2939-01	-	LEETEK LIFE CO.,LTD	EUT

1.5 Support Equipments

Description	Model Number	Serial Number	Manufacturer	Remarks
DC Adapter	GA-0501000V	-	Huizhou Guoatong Technology Co.,Ltd.	-
Fall Alarm Bell	LFW2938-01	-	LEETEK LIFE CO.,LTD	-
Fall Alarm Bell Adapter	RS-AB1000-K	-	Dongguan Jinhua Sheng Power Technology Co.,Ltd	-
Conductive tape	-	-	-	-



1.6 External I/O Cabling

■ #1

Start		END		Cable Spec.	
Description	I/O Port	Description	I/O Port	Length	Shield
Fall prevention sensor (EUT)	Mini B Type USB	DC Adapter	A Type USB	1.2	U

* Unshielded = U, Shielded = S

■ #2

Start		END		Cable Spec.	
Description	I/O Port	Description	I/O Port	Length	Shield
Fall prevention sensor (EUT)	Wireless	Fall Alarm Bell	Wireless	-	-
	1 Pin	Conductive tape	1 Pin	0.4	U
Fall Alarm Bell	DC Jack	Fall Alarm Bell Adapter	DC Jack	0.8	U

* Unshielded = U, Shielded = S

1.7 EUT Operating Mode(s)

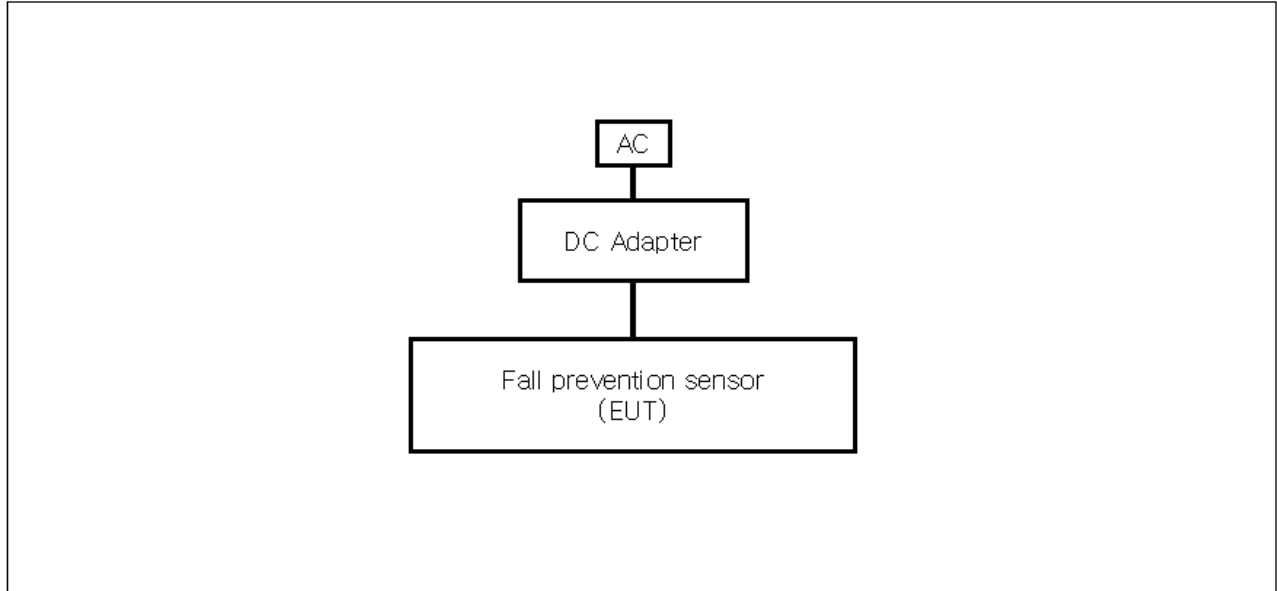
Test No.	Test mode	Operating	Test Voltages
#1	CHARGE	- Connect the EUT and DC Adapter and check the charge status with the charge LED	AC 120 V, 60 Hz
#2	OPERATE	- By connecting the EUT and the conductive tape, the EUT is operated to transmit radio signals. - The EUT's LED and Fall Alarm Bell were tested while confirming that they operated by receiving the signal.	-

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

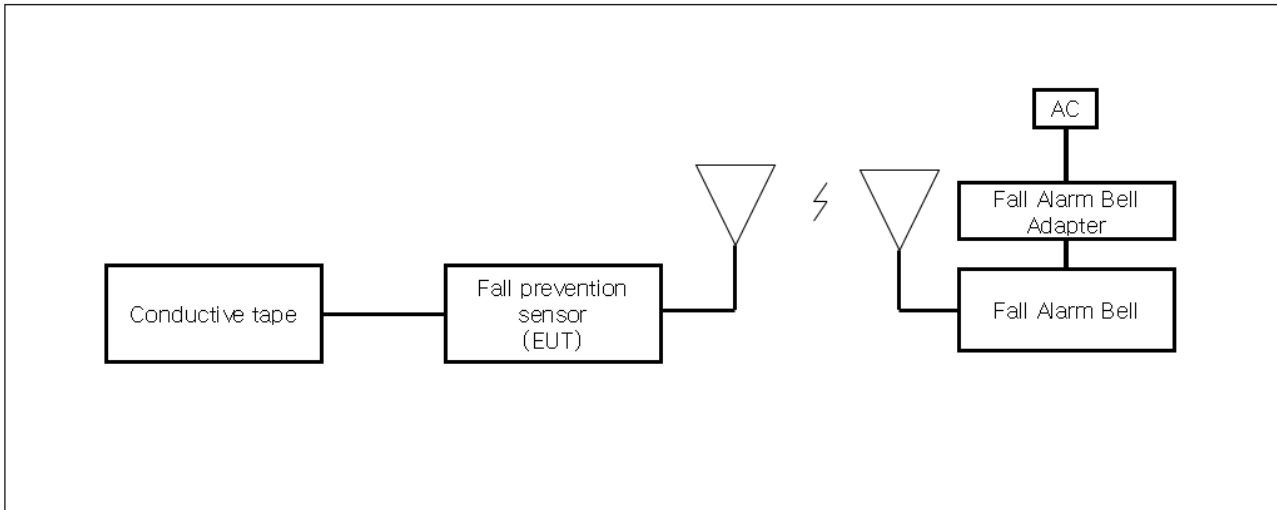


1.8 Configuration

■ #1



■ #2



EUT – Fall prevention sensor : LoRa



1.9 Remarks when standards applied

The USB port is an internal battery charging port and has no communication capabilities.

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



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 0008



2.0 Test Regulations

The emissions tests were performed according to following regulations:

☒ **47 CFR Part 15, Subpart B**

☒ ANSI C63.4a-2017

☐ Class A

☒ Class B





2.1 Conducted Emissions at Mains Power Ports

Test Date

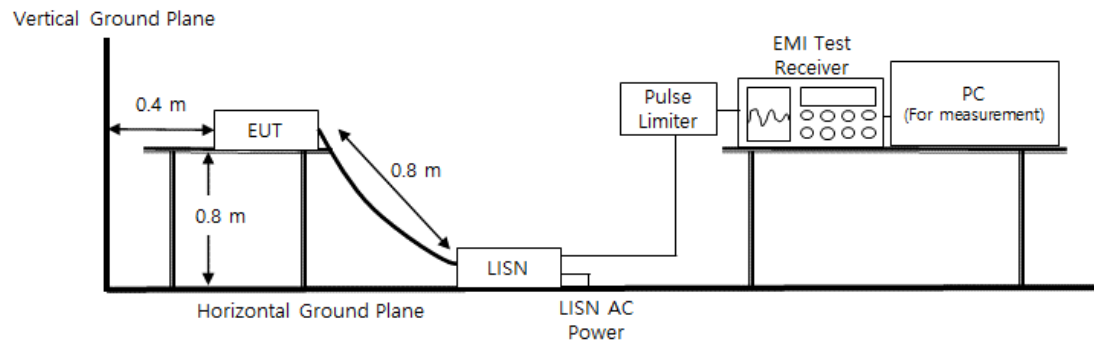
Sep. 03, 2024

Test Location

SHIELD ROOM #6

Test Equipment

Used	Description	Model Number	Manufacturer	Serial Number	Cal. Due	calibration interval
☒	EMI Test S/W	EMC32	R & S	9.12.00	-	-
☒	EMI TEST RECEIVER	ESR3	R & S	101783	11, 08, 2024	1 Year
☒	LISN	ENV216	R & S	101787	11, 08, 2024	1 Year
☐	LISN	ESH2-Z5	R & S	100450	11, 08, 2024	1 Year
☒	PULSE LIMITER	ESH3-Z2	R & S	101915	11, 08, 2024	1 Year

Diagram of test setup

**Test Conditions**

Temperature: (24,8 ± 0,0) °C
Relative Humidity: (47,9 ± 0,0) % 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.



2.2 Radiated Electric Field Emissions(Below 1 GHz)

Test Date

Sep. 04, 2024

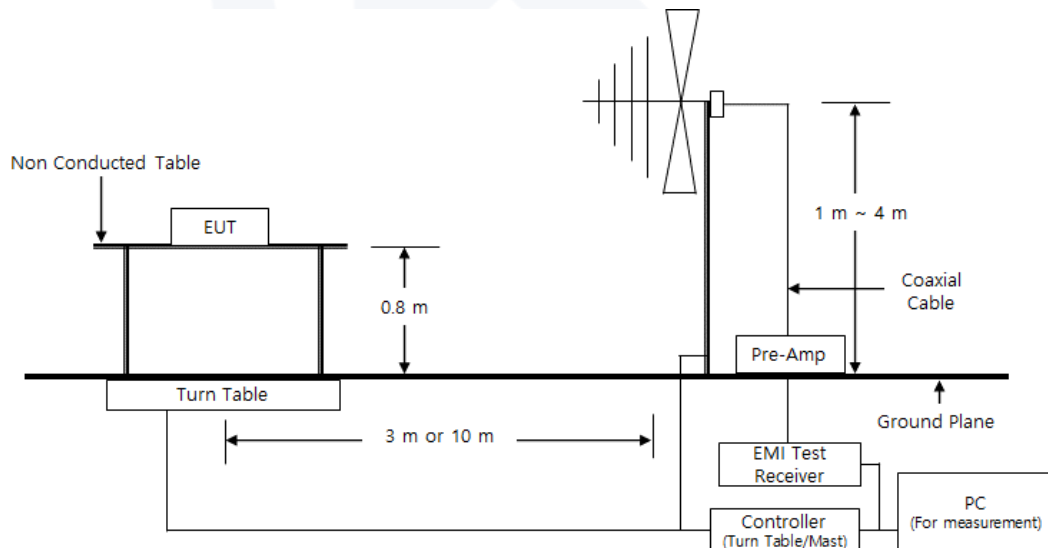
Test Location

SEMI ANECHOIC CHAMBER #4(10 m)

Test Equipment

Used	Description	Model Number	Manufacturer	Serial Number	Cal. Due	calibration interval
☒	EMI Test S/W	EP5/RE	TOYO Corporation	6.0.0	-	-
☒	EMI TEST RECEIVER	ESU26	R & S	100551	02, 13, 2025	1 Year
☒	AMPLIFIER	SCU 01	R & S	100603	11, 08, 2024	1 Year
☒	TRILOG-BROADBAND ANTENNA	VULB9163	Schwarzbeck	715	11, 17, 2024	2 Year
☒	ATTENUATOR	8491A	HP	32173	02, 13, 2025	1 Year

Diagram of test setup



**Test Conditions**

Temperature: (23,8 ± 0,0) °C
Relative Humidity: (47,3 ± 0,1) % 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.



2.3 Radiated Electric Field Emissions(Above 1 GHz)

Test Date

Sep. 03, 2024

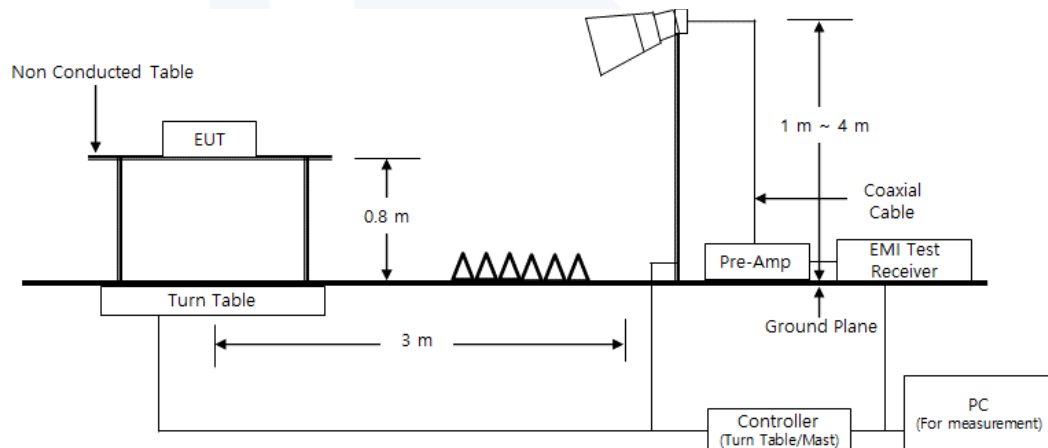
Test Location

SEMI ANECHOIC CHAMBER #5

Test Equipment

Used	Description	Model Number	Manufacturer	Serial Number	Cal. Due	calibration interval
☒	EMI Test S/W	ES10/RE	TOYO Corporation	2022.01.000	-	-
☒	EMI TEST RECEIVER	ESU26	Rohde & Schwarz	100552	02, 13, 2025	1 Year
☒	HORN ANTENNA	BBHA 9120D	SCHWARZBECK	9120D-1802	11, 03, 2024	1 Year
☒	PREAMPLIFIER	8449B	HP	3008A00538	04, 30, 2025	1 Year
☒	ATTENUATOR	8491B	HP	23094	02, 13, 2025	1 Year

Diagram of test setup





Test Conditions

Temperature: (24,1 ± 0,0) °C
Relative Humidity: (48,4 ± 0,1) % R.H.

Frequency Range of Measurement

1 GHz to 12,5 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.

The Average of the test data is the cispr average result.



APPENDIX A – TEST DATA

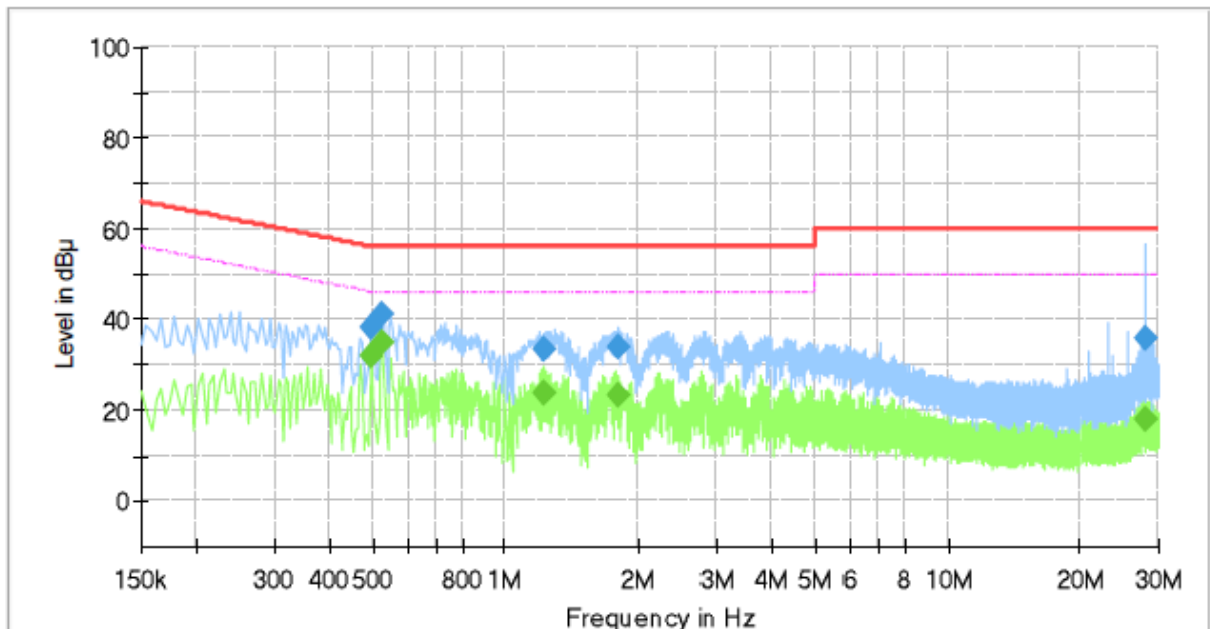
Conducted Emissions at Mains Power Ports

■ #1

HOT LINE

Common Information

Test Description:	Conducted Emission
Job No.:	KES-EM242575
Phase:	L
Mode:	#1
Operator Name:	KES



Final Result

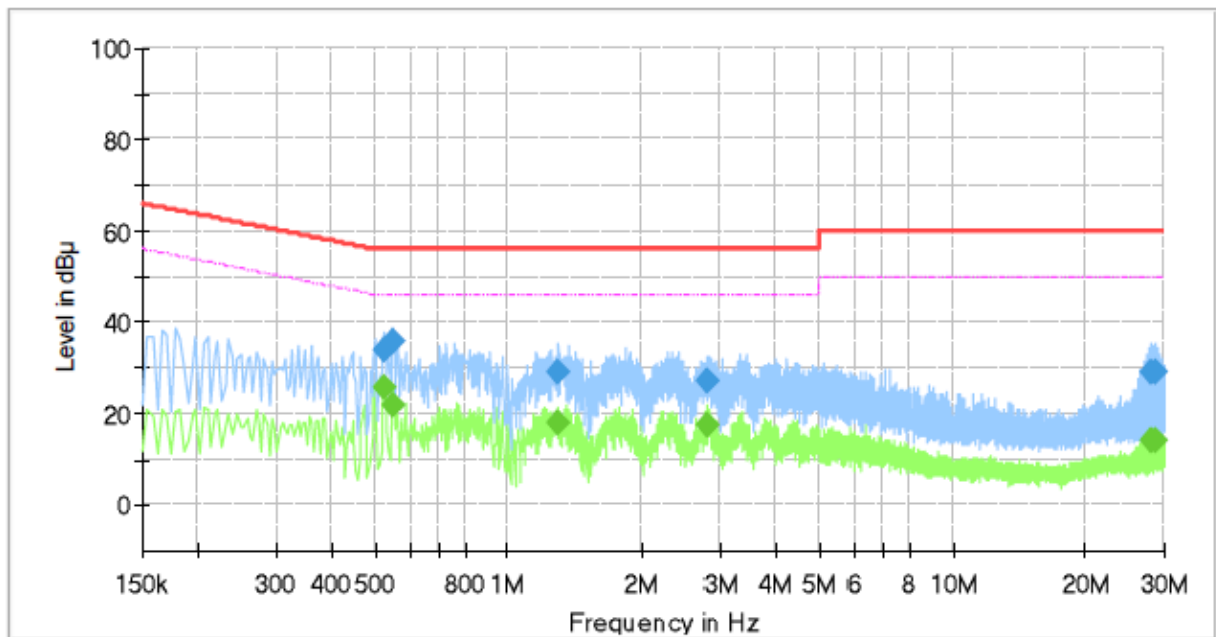
Frequency (MHz)	QuasiPeak (dBμV)	CAverage (dBμV)	Limit (dBμV)	Margin (dB)	Meas. Time (ms)	Bandwidth (kHz)	Line	Corr. (dB)
0.498000	---	31.83	46.03	14.20	1000.0	9.000	L1	19.7
0.498000	38.19	---	56.03	17.84	1000.0	9.000	L1	19.7
0.526000	---	34.67	46.00	11.33	1000.0	9.000	L1	19.7
0.526000	41.19	---	56.00	14.81	1000.0	9.000	L1	19.7
1.222000	---	23.76	46.00	22.24	1000.0	9.000	L1	19.8
1.222000	33.45	---	56.00	22.55	1000.0	9.000	L1	19.8
1.806000	---	23.06	46.00	22.94	1000.0	9.000	L1	19.8
1.806000	34.01	---	56.00	21.99	1000.0	9.000	L1	19.8
27.882000	---	17.97	50.00	32.03	1000.0	9.000	L1	21.4
27.882000	35.95	---	60.00	24.05	1000.0	9.000	L1	21.4



NEUTRAL LINE

Common Information

Test Description: Conducted Emission
Job No.: KES-EM242575
Phase: N
Mode: #1
Operator Name: KES

**Final Result**

Frequency (MHz)	QuasiPeak (dBμV)	CAverage (dBμV)	Limit (dBμV)	Margin (dB)	Meas. Time (ms)	Bandwidth (kHz)	Line	Corr. (dB)
0.526000	---	25.71	46.00	20.29	1000.0	9.000	N	19.8
0.526000	33.69	---	56.00	22.31	1000.0	9.000	N	19.8
0.550000	---	21.81	46.00	24.19	1000.0	9.000	N	19.8
0.550000	35.90	---	56.00	20.10	1000.0	9.000	N	19.8
1.298000	---	17.94	46.00	28.06	1000.0	9.000	N	19.8
1.298000	29.26	---	56.00	26.74	1000.0	9.000	N	19.8
2.810000	---	17.26	46.00	28.74	1000.0	9.000	N	20.0
2.810000	27.20	---	56.00	28.80	1000.0	9.000	N	20.0
28.106000	---	14.03	50.00	35.97	1000.0	9.000	N	21.5
28.106000	29.05	---	60.00	30.95	1000.0	9.000	N	21.5
28.698000	---	14.25	50.00	35.75	1000.0	9.000	N	21.5
28.698000	29.10	---	60.00	30.90	1000.0	9.000	N	21.5

◆ Calculation

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

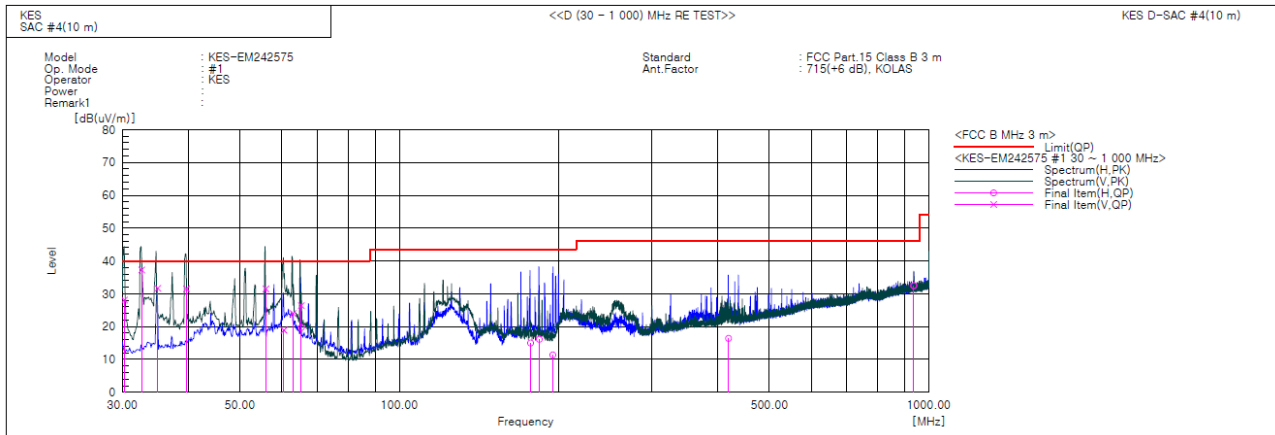
QuasiPeak / CAverage : The Final Value

Reading Value : Not shown in the table.

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

**Radiated Electric Field Emissions(Below 1 GHz)**

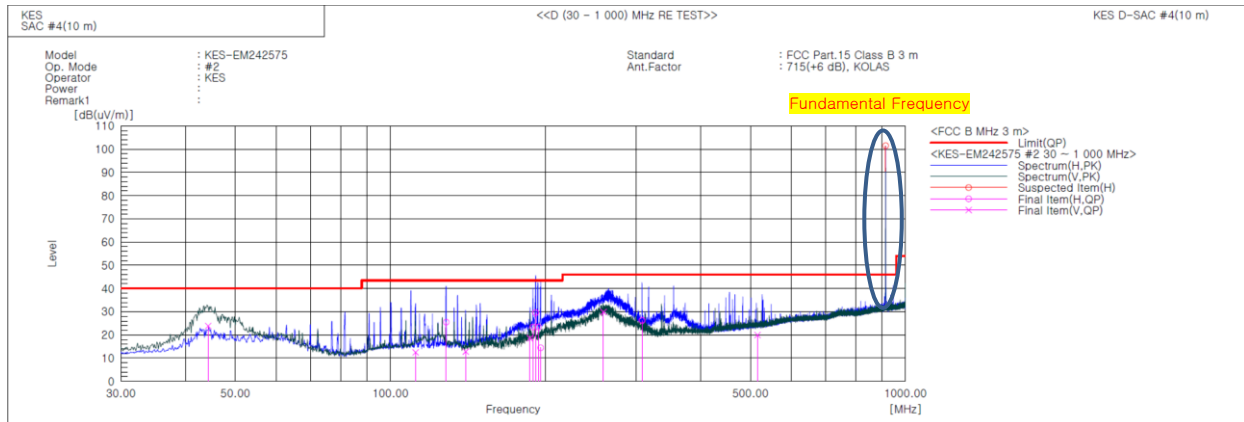
■ #1

**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	30.258	V	53.6	-25.5	28.1	40.0	11.9	100.0	248.0	
2	32.618	V	62.5	-25.2	37.3	40.0	2.7	100.0	315.0	
3	35.002	V	56.5	-24.8	31.7	40.0	8.3	100.0	236.0	
4	39.639	V	54.5	-23.0	31.5	40.0	8.5	100.0	210.0	
5	55.996	V	52.9	-21.4	31.5	40.0	8.5	107.0	127.0	
6	60.535	V	41.1	-22.2	18.9	40.0	21.1	105.0	267.0	
7	62.975	V	46.8	-22.8	24.0	40.0	16.0	108.0	241.0	
8	65.287	V	49.8	-23.4	26.4	40.0	13.6	103.0	8.0	
9	65.287	H	43.1	-23.4	19.7	40.0	20.3	396.0	32.0	
10	176.991	H	38.5	-23.5	15.0	43.5	28.5	385.0	347.0	
11	183.852	H	38.8	-22.7	16.1	43.5	27.4	391.0	110.0	
12	194.919	H	32.8	-21.4	11.4	43.5	32.1	384.0	201.0	
13	418.657	H	30.0	-13.6	16.4	46.0	29.6	374.0	77.0	
14	936.766	H	35.2	-2.7	32.5	46.0	13.5	355.0	89.0	



#2



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	44.283	V	45.6	-21.7	23.9	40.0	16.1	105.0	29.0	
2	111.906	V	35.5	-23.0	12.5	43.5	31.0	118.0	150.0	
3	128.360	H	50.4	-24.9	25.5	43.5	18.0	390.0	233.0	
4	139.958	V	38.1	-25.3	12.8	43.5	30.7	143.0	161.0	
5	186.570	V	41.0	-22.4	18.6	43.5	24.9	119.0	191.0	
6	189.088	H	45.4	-22.1	23.3	43.5	20.2	385.0	1.0	
7	191.376	H	51.4	-21.8	29.6	43.5	13.9	388.0	124.0	
8	193.808	H	44.8	-21.5	23.3	43.5	20.2	368.0	188.0	
9	195.831	H	35.8	-21.3	14.5	43.5	29.0	388.0	158.0	
10	259.246	V	48.5	-18.6	29.9	46.0	16.1	123.0	135.0	
11	307.954	H	43.4	-17.1	26.3	46.0	19.7	371.0	244.0	
12	515.907	V	30.7	-10.7	20.0	46.0	26.0	156.0	157.0	
13	915.125	H	-----	-2.9	-----	46.0	-----	100.0	263.0	

* Exclusion bands

- Fundamental Frequency: 915 MHz

◆ Calculation

$$\text{Result(QP)} [\text{dB}(\mu\text{V/m})] = (\text{Reading(QP)} [\text{dB}(\mu\text{V})] + \text{c.f} [\text{dB}(1/\text{m})])$$
$$\text{Margin(QP)} [\text{dB}] = \text{Limit} [\text{dB}(\mu\text{V/m})] - \text{Result(QP)} [\text{dB}(\mu\text{V/m})]$$

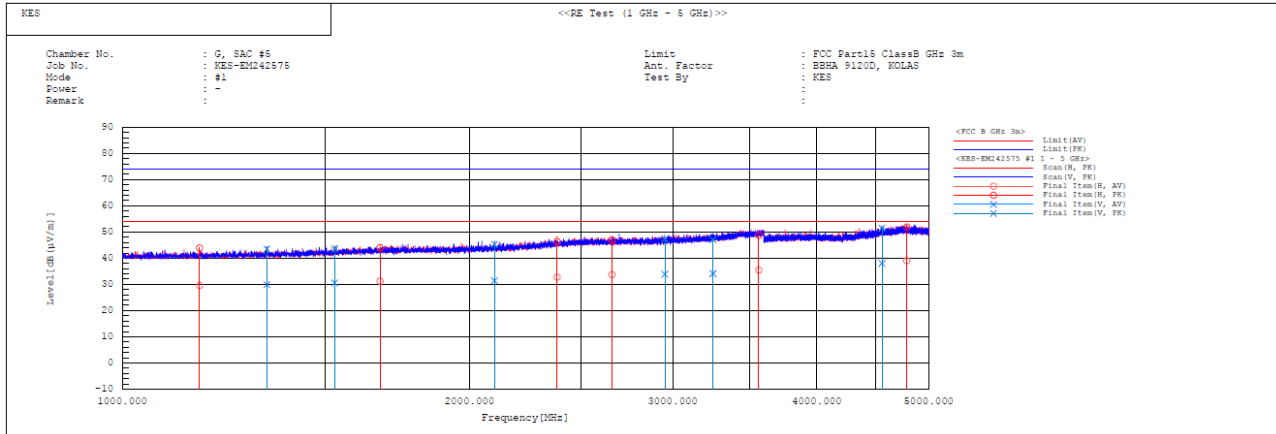
Reading(QP) : Reading value, Result(QP) : Reading value + Factor value

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

**Radiated Electric Field Emissions(Above 1 GHz)**

■ #1

- (1 ~ 5) GHz

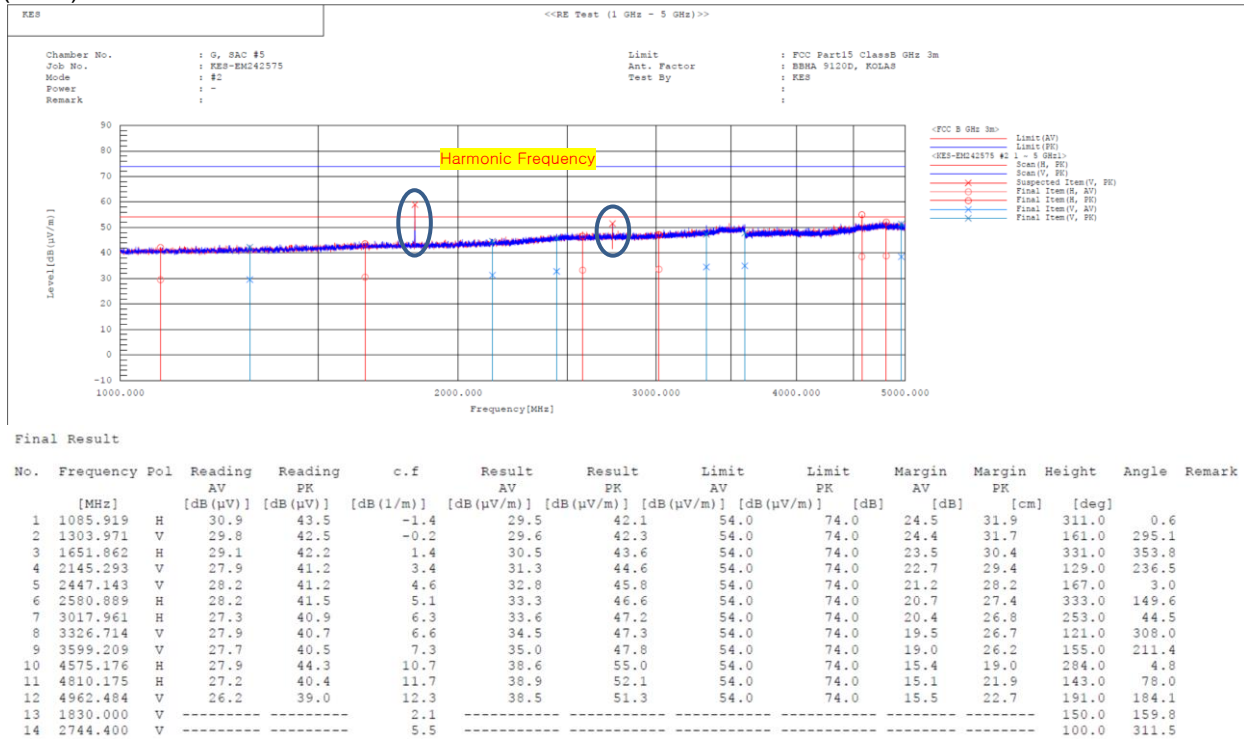
**Final Result**

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	1167.001	H	30.5	44.8	-0.9	29.6	43.9	54.0	74.0	24.4	30.1	318.0	322.5	
2	1334.849	V	30.0	43.6	-0.1	29.9	43.5	54.0	74.0	24.1	30.5	138.0	200.4	
3	1528.510	V	29.8	42.8	0.8	30.6	43.6	54.0	74.0	23.4	30.4	163.0	124.8	
4	1673.286	H	29.7	42.5	1.5	31.2	44.0	54.0	74.0	22.8	30.0	319.0	78.0	
5	2102.147	V	28.2	42.1	3.2	31.4	45.3	54.0	74.0	22.6	28.7	149.0	5.5	
6	2382.405	H	28.5	42.1	4.3	32.8	46.4	54.0	74.0	21.2	27.6	284.0	58.9	
7	2658.710	H	28.4	41.7	5.3	33.7	47.0	54.0	74.0	20.3	27.0	192.0	348.4	
8	2953.599	V	27.8	41.2	6.1	33.9	47.3	54.0	74.0	20.1	26.7	170.0	252.9	
9	3251.928	V	27.6	40.5	6.5	34.1	47.0	54.0	74.0	19.9	27.0	211.0	84.6	
10	3563.993	H	28.3	41.5	7.2	35.5	48.7	54.0	74.0	18.5	25.3	206.0	166.5	
11	4555.103	V	27.4	40.9	10.6	38.0	51.5	54.0	74.0	16.0	22.5	183.0	111.4	
12	4786.975	H	27.5	40.3	11.6	39.1	51.9	54.0	74.0	14.9	22.1	335.0	188.6	



■ #2

- (1 ~ 5) GHz



* Exclusion bands

- Harmonic Frequency : 1 830, 2 744 MHz

◆ Calculation

$$\text{Result(PK/CAV)} [\text{dB}(\mu\text{V/m})] = (\text{Reading(PK/CAV)} [\text{dB}(\mu\text{V})] + \text{c.f} [\text{dB}(1/\text{m})])$$
$$\text{Margin(PK/CAV)} [\text{dB}] = \text{Limit} [\text{dB}(\mu\text{V/m})] - \text{Result(PK/CAV)} [\text{dB}(\mu\text{V/m})]$$

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