

**KES Co., Ltd.**

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Report No.:

KES-E2-19T0099

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EMC TEST REPORT

Test Report No. : KES-E2-19T0099
Date of Issue : Oct. 02, 2019
Product name : Digital Audio Player
Model/Type No. : PLENUE R2
Variant Mode : -
Applicant : COWON SYSTEMS. INC.
Applicant Address : 6th Fl, COWON TOWER, 689-3, Yeoksam-Dong,
Gangnam-Gu, Seoul
Manufacturer : COWON SYSTEMS. INC.
Manufacturer Address : 6th Fl, COWON TOWER, 689-3, Yeoksam-Dong,
Gangnam-Gu, Seoul
FCC ID : SXV-PLENUE-R2
Date of Receipt : Jul. 29, 2019
Test date : Sep. 11, 2019 ~ Sep. 14, 2019
Test Results : ☒ **In Compliance** ☐ **Not in Compliance**

Tested by

Dong Hyun, Won
EMC Test Engineer

Reviewed by

Dong-Hun, Jang
EMC Technical Manager

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REPORT REVISION HISTORY

Date	Test Report No.	Revision History
Oct. 02, 2019	KES-E2-19T0099	Issued

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1.0 General Product Description

Main Specifications of EUT are:

Item	spec
Operating Frequency	2.4 GHz (Bluetooth)
Power	DC 5 V (USB)
Size	(112 x 62 x 16) mm
Weight	414 g

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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.

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
Digital Audio Player	PLENUE R2	-	COWON SYSTEMS. INC.	EUT
Notebook	NT63025J	JK9091EF400432X	Samsung Electronics Co., Ltd.,	-
Notebook Adapter	A13-040N2A	CN60BA4400313ADON843K0200	Chicony Power Technology Co., Ltd.	-
Adapter	XM-QC3.0	-	SHENZHEN RUIYU TECHNOLOGY CO.,LTD	-
Bluetooth Speaker	HX-P430PK	-	-	-
Micro SD Card	-	-	Kingston	16 GB
Earphone 1	-	-	-	-
Earphone 2	-	-	-	-

1.5 Support Equipments

Description	Model Number	Serial Number	Manufacturer	Remarks
-	-	-	-	-



1.6 External I/O Cabling

■ Charge Mode

Start		END		Cable Spec.	
Description	I/O Port	Description	I/O Port	Length	Shield
Digital Audio Player (EUT)	USB C Type	Adapter	USB	1.2	U
	Micro SD Slot	Micro SD Card	Micro SD Slot	-	-

■ Data Mode

Start		END		Cable Spec.	
Description	I/O Port	Description	I/O Port	Length	Shield
Digital Audio Player (EUT)	USB C Type	Notebook	USB	1.2	U
	Micro SD SLOT	Micro SD Card	Micro SD SLOT	-	-

■ 3.5 mm Mode

Start		END		Cable Spec.	
Description	I/O Port	Description	I/O Port	Length	Shield
Digital Audio Player (EUT)	3.5 mm	Earphone 1	3.5 mm	1.2	U
	Micro SD Slot	Micro SD Card	Micro SD Slot	-	-

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■ 2.5 mm Mode

Start		END		Cable Spec.	
Description	I/O Port	Description	I/O Port	Length	Shield
Digital Audio Player (EUT)	2.5 mm	Earphone 2	2.5 mm	1.3	U
	Micro SD Slot	Micro SD Card	Micro SD Slot	-	-

■ Bluetooth Mode

Start		END		Cable Spec.	
Description	I/O Port	Description	I/O Port	Length	Shield
Digital Audio Player (EUT)	Wireless	Bluetooth Speaker	Wireless	-	-

1.7 EUT Charge Mode(s)

Test mode	operating
Charge	The EUT checked the charging status through the LED.
Data	The EUT checked the operation through program of the Noetbook.
3.5 mm	The EUT checked the operation through sound of the earphone1.
2.5 mm	The EUT checked the operation through sound of the earphone2.
Bluetooth	The EUT checked the operation through sound of the Bluetooth Speaker.

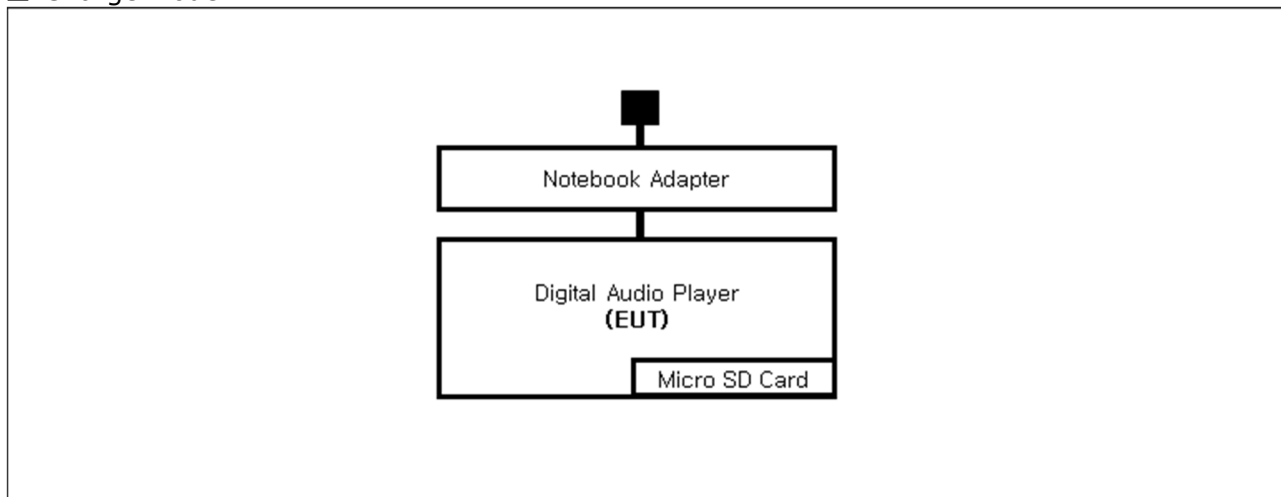
EUT Test operating S/W		
Name	Version	Manufacture Company
EMI Tool	-	-

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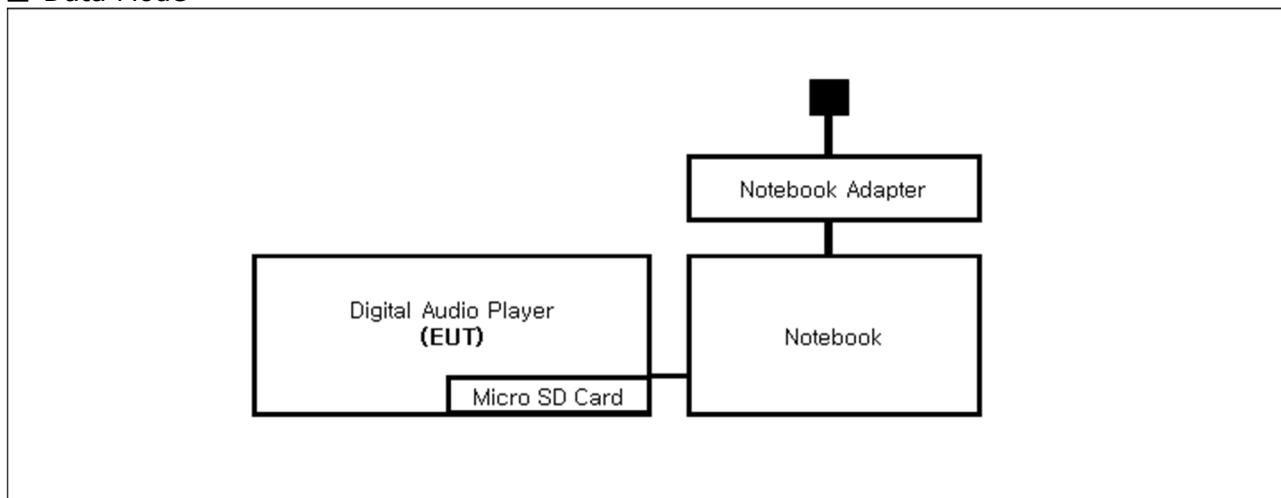
1.8 Configuration

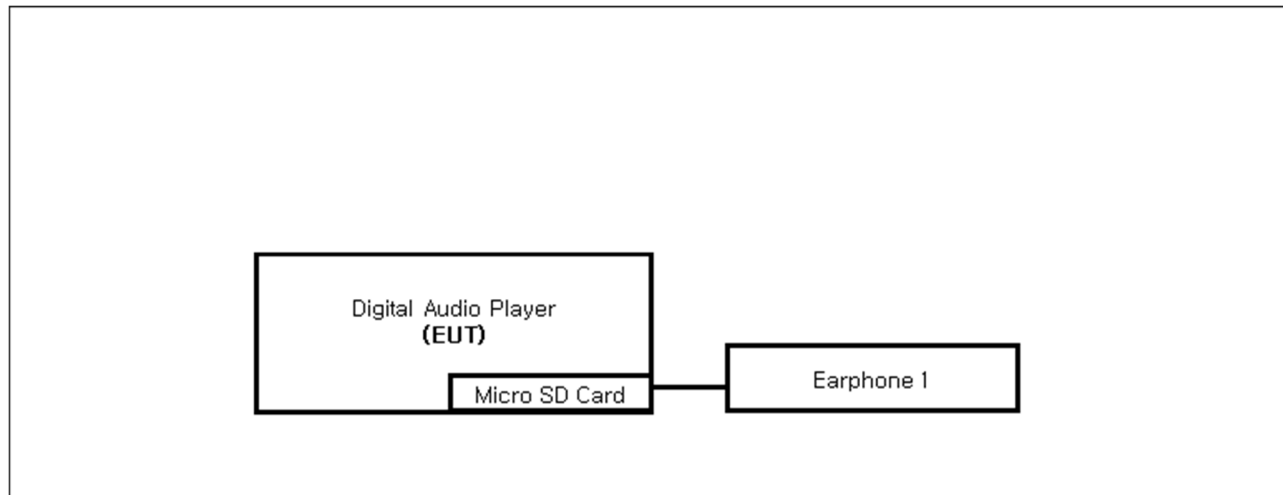
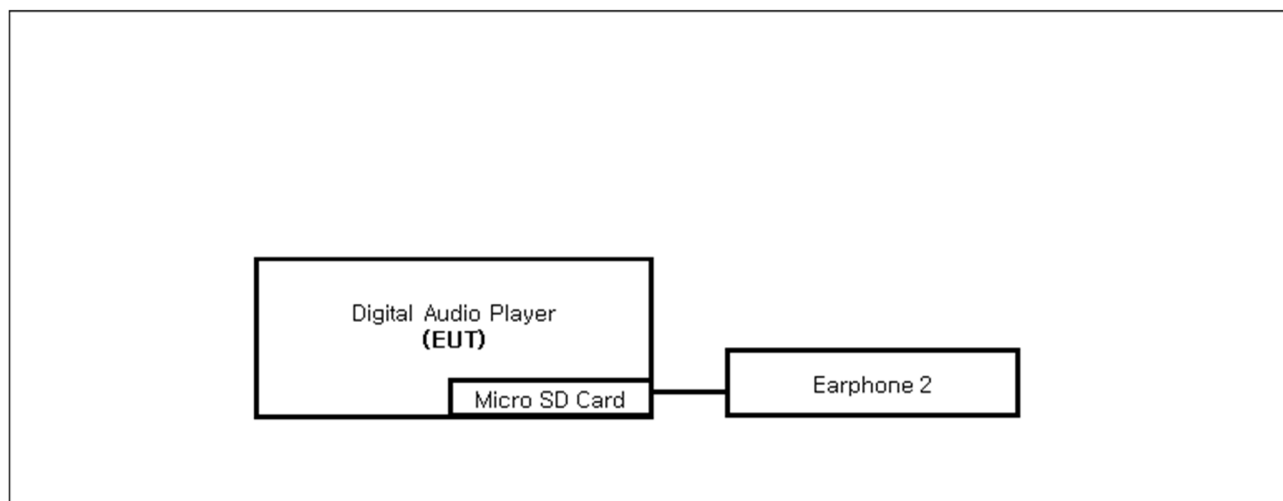
■ AC Main
 □ DC Main

■ Charge Mode

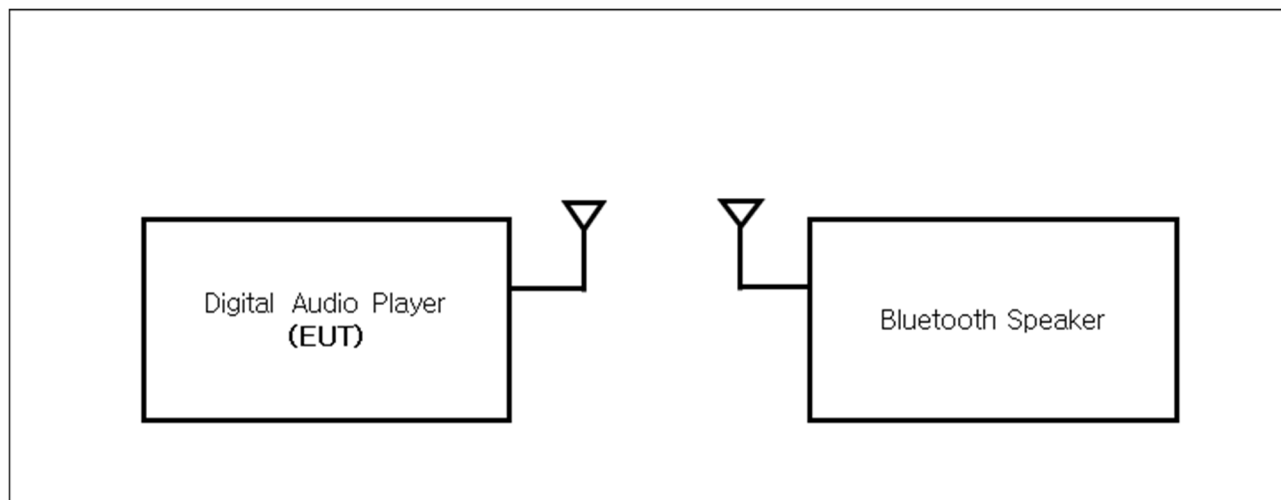


■ Data Mode



■ 3.5 mm Mode**■ 2.5 mm Mode**

■ Bluetooth 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



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☐ **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

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2.1 Conducted Emissions at Mains Power Ports

Test Date

Sep. 11, 2019

Test Location

Electro wave Shieldroom #3

Test Equipment

Used	Description	Model Number	Manufacturer	Serial Number	Cal. Due
☒	EMI Test S/W	EMC32	R & S	9.12.00	-
☒	EMI TEST RECEIVER	ESR3	R & S	101783	04, 22, 2020
☒	LISN	ENV216	R & S	101786	01, 25, 2020

Test Conditions

Temperature: 24.5 °C
Relative Humidity: 57.1 % 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

RemarksSee Appendix A for test data.

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2.2 Radiated Electric Field Emissions(Below 1 GHz)

Test Date

Sep. 12, 2019

Test Location☐ OPEN AREA TEST SITE #2☒ SEMI ANECHOIC CHAMBER #4(10 m)**Test Equipment**

Used	Description	Model Number	Manufacturer	Serial Number	Cal. Due
☒	EMI Test S/W	EP5/RE	TOYO Corporation	6.0.0	-
☒	EMI TEST RECEIVER	ESU26	R & S	100551	04, 09, 2020
☒	AMPLIFIER	SCU 01	R & S	100603	11, 26, 2019
☒	TRILOG-BROADBAND ANTENNA	VULB9163	Schwarzbeck	715	11, 29, 2020
☒	ATTENUATOR	8491A	HP	32173	03, 11, 2020

Test Conditions

Temperature: 21.8 °C

Relative Humidity: 54.6 % 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.

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2.3 Radiated Electric Field Emissions(Above 1 GHz)

Test Date

■ Charge, Data, Bluetooth Mode
Sep. 13, 2019

■ 3.5 mm, 2.5 mm Mode
Sep. 14, 2019

Test Location

SEMI ANECHOIC CHAMBER #4(10 m)

Test Equipment

Used	Description	Model Number	Manufacturer	Serial Number	Cal. Due
☒	EMI Test S/W	EP5/RE	TOYO Corporation	6.0.0	-
☒	EMI TEST RECEIVER	ESU26	R & S	100551	04, 09, 2020
☒	PREAMPLIFIER	8449B	AGILENT	3008A01742	01, 08, 2020
☒	ATTENUATOR	8491A	HP	35496	03, 11, 2020
☒	DOUBLE RIDGED HORN ANTENNA	SAS-571	A.H.SYSTEM,INC	781	03, 12, 2021

Test Conditions

■ Charge, Data, Bluetooth Mode

Temperature: 23.2 °C
Relative Humidity: 52.9 % R.H.

■ 3.5 mm, 2.5 mm Mode

Temperature: 22.1 °C
Relative Humidity: 54.3 % R.H.



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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.

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APPENDIX A – TEST DATA

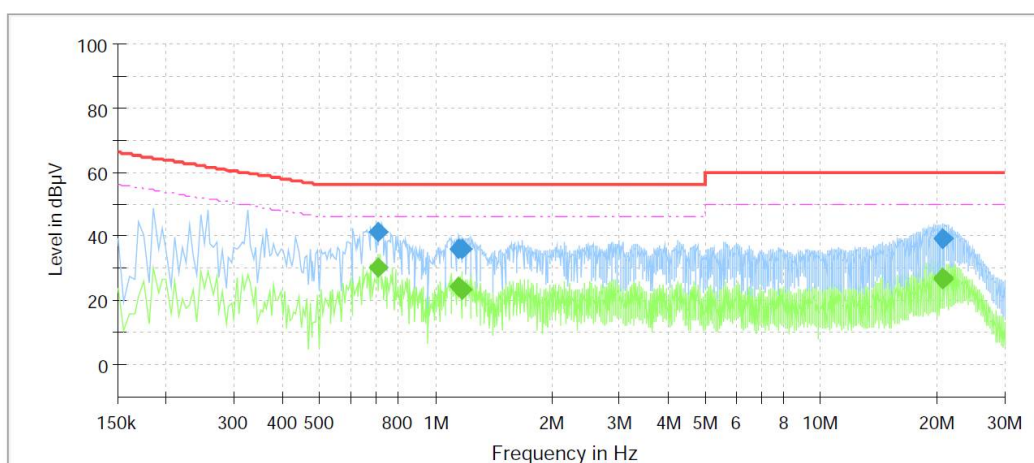
Conducted Emissions at Mains Power Ports

■ Charge Mode

HOT LINE

Common Information

Test Description:	Conducted Emission
Model No.:	PLENUE R2
Mode	Charger_L1
Operator Name:	KES



Final Result

Frequency (MHz)	QuasiPeak (dBμV)	CAverage (dBμV)	Limit (dBμV)	Margin (dB)	Meas. Time (ms)	Bandwidth (kHz)	Line	Corr. (dB)
0.705000	---	30.16	46.00	15.84	1000.0	9.000	L1	11.4
0.705000	41.46	---	56.00	14.54	1000.0	9.000	L1	11.4
1.150000	---	24.27	46.00	21.73	1000.0	9.000	L1	11.1
1.150000	36.25	---	56.00	19.75	1000.0	9.000	L1	11.1
1.170000	---	23.53	46.00	22.47	1000.0	9.000	L1	11.0
1.170000	36.08	---	56.00	19.92	1000.0	9.000	L1	11.0
20.665000	---	26.77	50.00	23.23	1000.0	9.000	L1	11.3
20.665000	39.39	---	60.00	20.61	1000.0	9.000	L1	11.3
20.735000	---	26.66	50.00	23.34	1000.0	9.000	L1	11.3
20.735000	39.37	---	60.00	20.63	1000.0	9.000	L1	11.3



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NEUTRAL LINE

Common Information

Test Description:

Model No.:

Mode

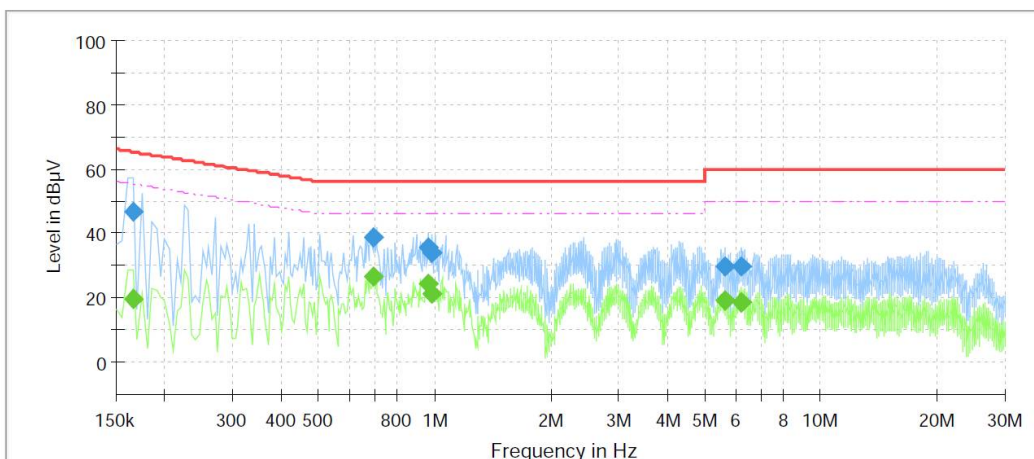
Operator Name:

Conducted Emission

PLENUE R2

Charger_N

KES



Final Result

Frequency (MHz)	QuasiPeak (dBμV)	CAverage (dBμV)	Limit (dBμV)	Margin (dB)	Meas. Time (ms)	Bandwidth (kHz)	Line	Corr. (dB)
0.165000	---	19.59	55.21	35.62	1000.0	9.000	N	10.0
0.165000	46.48	---	65.21	18.73	1000.0	9.000	N	10.0
0.695000	---	26.46	46.00	19.54	1000.0	9.000	N	11.4
0.695000	38.90	---	56.00	17.10	1000.0	9.000	N	11.4
0.965000	---	24.31	46.00	21.69	1000.0	9.000	N	11.4
0.965000	35.36	---	56.00	20.64	1000.0	9.000	N	11.4
0.985000	---	21.42	46.00	24.58	1000.0	9.000	N	11.4
0.985000	33.65	---	56.00	22.35	1000.0	9.000	N	11.4
5.650000	---	19.04	50.00	30.96	1000.0	9.000	N	10.4
5.650000	29.44	---	60.00	30.56	1000.0	9.000	N	10.4
6.220000	---	18.74	50.00	31.26	1000.0	9.000	N	10.5
6.220000	29.53	---	60.00	30.47	1000.0	9.000	N	10.5

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■ Data Mode

HOT LINE

Common Information

Test Description:

Model No.:

Mode

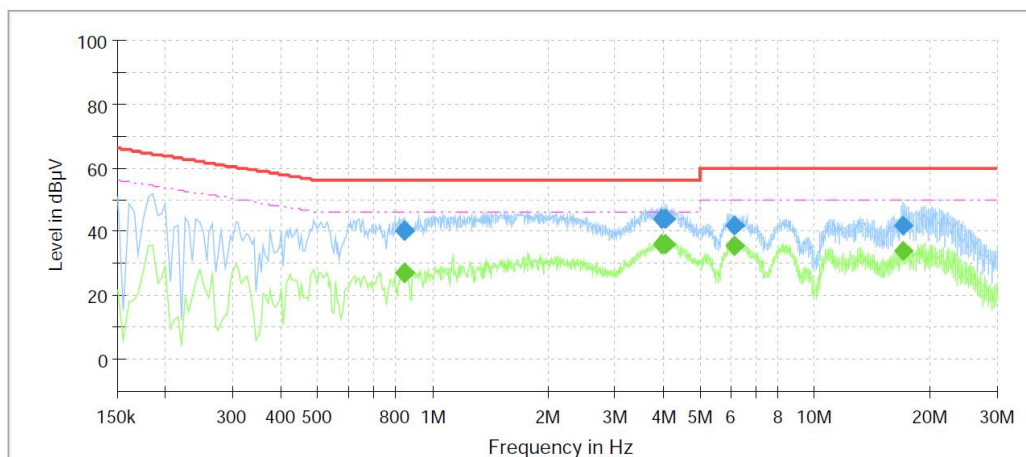
Operator Name:

Conducted Emission

PLENUE R2

Data_L1

KES



Final Result

Frequency (MHz)	QuasiPeak (dBμV)	CAverage (dBμV)	Limit (dBμV)	Margin (dB)	Meas. Time (ms)	Bandwidth (kHz)	Line	Corr. (dB)
0.840000	---	26.91	46.00	19.09	1000.0	9.000	L1	11.4
0.840000	40.22	---	56.00	15.78	1000.0	9.000	L1	11.4
0.845000	---	26.77	46.00	19.23	1000.0	9.000	L1	11.4
0.845000	40.12	---	56.00	15.88	1000.0	9.000	L1	11.4
3.970000	---	35.75	46.00	10.25	1000.0	9.000	L1	10.1
3.970000	43.86	---	56.00	12.14	1000.0	9.000	L1	10.1
4.050000	---	35.76	46.00	10.24	1000.0	9.000	L1	10.1
4.050000	43.87	---	56.00	12.13	1000.0	9.000	L1	10.1
6.125000	---	35.73	50.00	14.27	1000.0	9.000	L1	10.3
6.125000	41.94	---	60.00	18.06	1000.0	9.000	L1	10.3
17.080000	---	33.85	50.00	16.15	1000.0	9.000	L1	10.6
17.080000	41.76	---	60.00	18.24	1000.0	9.000	L1	10.6

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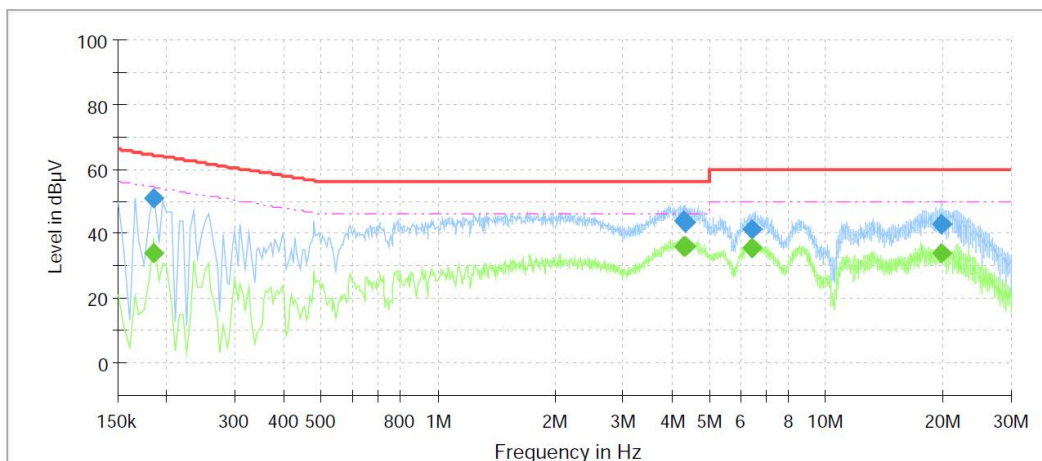
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NEUTRAL LINE

Common Information

Test Description:	Conducted Emission
Model No.:	PLENUE R2
Mode	Data_N
Operator Name:	KES



Final Result

Frequency (MHz)	QuasiPeak (dBμV)	CAverage (dBμV)	Limit (dBμV)	Margin (dB)	Meas. Time (ms)	Bandwidth (kHz)	Line	Corr. (dB)
0.185000	---	33.80	54.26	20.46	1000.0	9.000	N	10.0
0.185000	50.76	---	64.26	13.50	1000.0	9.000	N	10.0
4.300000	---	36.15	46.00	9.85	1000.0	9.000	N	10.1
4.300000	43.75	---	56.00	12.25	1000.0	9.000	N	10.1
4.345000	---	36.04	46.00	9.96	1000.0	9.000	N	10.0
4.345000	43.65	---	56.00	12.35	1000.0	9.000	N	10.0
6.425000	---	35.52	50.00	14.48	1000.0	9.000	N	10.2
6.425000	41.56	---	60.00	18.44	1000.0	9.000	N	10.2
19.775000	---	33.83	50.00	16.17	1000.0	9.000	N	10.7
19.775000	42.76	---	60.00	17.24	1000.0	9.000	N	10.7

◆ Calculation

QuasiPeak [dBμV] / CAverage [dBμV] = Reading Value [dBμV] + 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 %, $k=2$)

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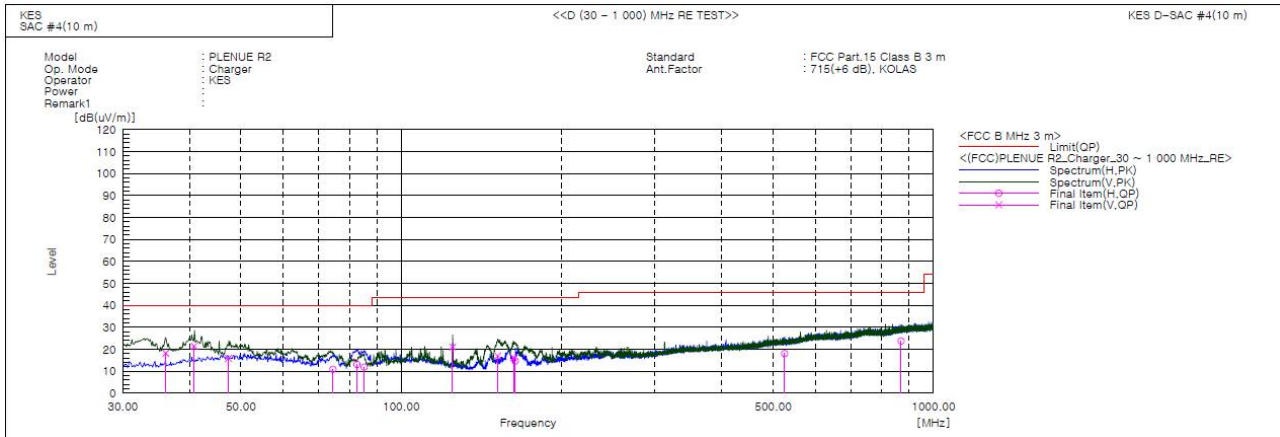
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Radiated Electric Field Emissions(Below 1 GHz)

■ 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	36.121	V	43.5	-25.3	18.2	40.0	21.8	100.0	102.0	
2	40.858	V	44.6	-23.2	21.4	40.0	18.6	100.0	206.0	
3	47.358	V	38.1	-22.2	15.9	40.0	24.1	100.0	130.0	
4	74.458	H	38.2	-27.3	10.9	40.0	29.1	366.0	24.0	
5	82.585	H	41.0	-27.9	13.1	40.0	26.9	397.0	30.0	
6	85.214	H	38.9	-27.0	11.9	40.0	28.1	399.0	30.0	
7	124.912	V	46.6	-25.6	21.0	43.5	22.5	128.0	64.0	
8	151.814	V	43.8	-26.8	17.0	43.5	26.5	110.0	239.0	
9	162.558	V	42.1	-25.8	16.3	43.5	27.2	100.0	70.0	
10	163.892	H	40.4	-25.7	14.7	43.5	28.8	374.0	274.0	
11	525.331	H	32.0	-13.9	18.1	46.0	27.9	371.0	139.0	
12	869.583	H	32.0	-8.2	23.8	46.0	22.2	370.0	85.0	

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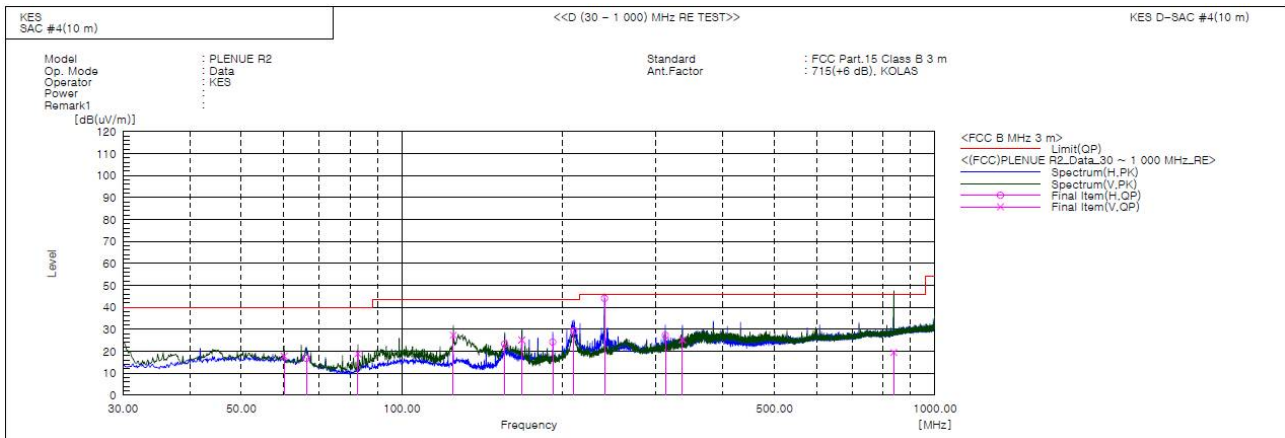


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Data Mode



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	60.151	V	40.9	-23.1	17.8	40.0	22.2	134.0	252.0	
2	66.214	H	41.4	-24.6	16.8	40.0	23.2	371.0	204.0	
3	82.714	V	46.7	-27.8	18.9	40.0	21.1	128.0	118.0	
4	124.912	V	53.0	-25.6	27.4	43.5	16.1	100.0	218.0	
5	155.927	H	49.7	-26.4	23.3	43.5	20.2	362.0	159.0	
6	167.924	V	50.7	-25.5	25.2	43.5	18.3	100.0	210.0	
7	191.951	H	47.9	-23.7	24.2	43.5	19.3	392.0	139.0	
8	210.258	H	51.5	-22.2	29.3	43.5	14.2	361.0	131.0	
9	240.005	H	65.4	-21.3	44.1	46.0	1.9	100.0	108.0	
10	312.091	H	46.5	-19.2	27.3	46.0	18.7	392.0	36.0	
11	336.081	V	43.3	-18.0	25.3	46.0	20.7	136.0	161.0	
12	837.156	V	28.5	-9.0	19.5	46.0	26.5	100.0	115.0	

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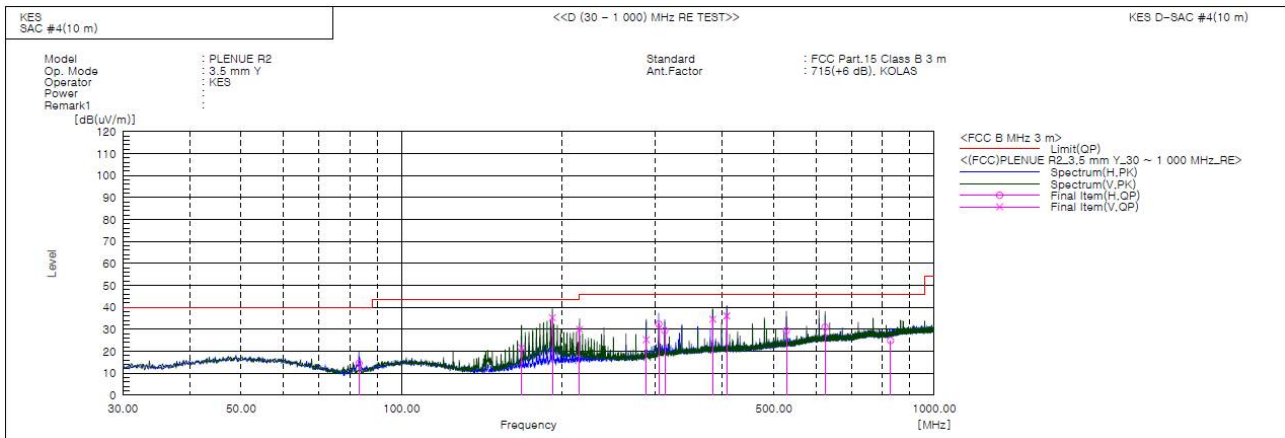


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3.5 mm Mode



Final Result

No.	Frequency	(P)	Reading	c.f	Result	Limit	Margin	Height	Angle	Remark
	[MHz]		QP		QP	QP	QP			
			[dB(uV)]	[dB(1/m)]	[dB(uV/m)]	[dB(uV/m)]	[dB]	[cm]	[deg]	
1	83.251	H	42.2	-27.7	14.5	40.0	25.5	372.0	15.0	
2	167.914	V	47.2	-25.5	21.7	43.5	21.8	100.0	6.0	
3	191.945	V	59.0	-23.7	35.3	43.5	8.2	100.0	154.0	
4	215.945	V	51.9	-21.9	30.0	43.5	13.5	100.0	20.0	
5	288.151	V	45.7	-20.4	25.3	46.0	20.7	100.0	59.0	
6	304.081	H	52.1	-19.7	32.4	46.0	13.6	394.0	2.0	
7	312.088	H	48.6	-19.2	29.4	46.0	16.6	366.0	95.0	
8	384.104	V	51.6	-17.0	34.6	46.0	11.4	135.0	206.0	
9	408.077	V	52.7	-16.6	36.1	46.0	9.9	135.0	167.0	
10	527.891	H	43.3	-13.9	29.4	46.0	16.6	368.0	115.0	
11	624.077	H	42.5	-11.4	31.1	46.0	14.9	377.0	223.0	
12	827.911	H	34.1	-9.2	24.9	46.0	21.1	366.0	86.0	

it was determined that Y orientation was worst-case orientation; therefore, al final radiated testing was performed with the EUT in Y orientation.

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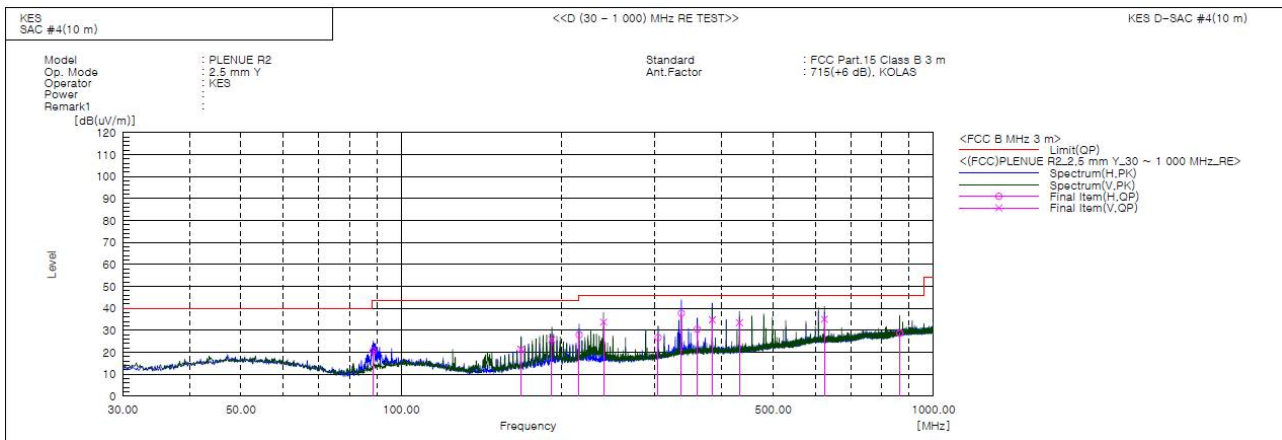


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■ 2.5 mm Mode



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	88.574	H	46.7	-26.0	20.7	43.5	22.8	364.0	199.0	
2	167.914	V	46.9	-25.5	21.4	43.5	22.1	100.0	6.0	
3	191.858	V	49.5	-23.7	25.8	43.5	17.7	100.0	1.0	
4	215.947	H	49.9	-21.9	28.0	43.5	15.5	366.0	32.0	
5	240.044	V	55.1	-21.3	33.8	46.0	12.2	100.0	4.0	
6	303.858	H	46.4	-19.7	26.7	46.0	19.3	369.0	238.0	
7	336.078	H	55.8	-18.0	37.8	46.0	8.2	355.0	91.0	
8	360.014	H	48.0	-17.5	30.5	46.0	15.5	375.0	278.0	
9	384.114	V	51.8	-17.0	34.8	46.0	11.2	133.0	202.0	
10	432.102	V	49.9	-16.4	33.5	46.0	12.5	100.0	135.0	
11	624.058	V	46.5	-11.4	35.1	46.0	10.9	100.0	127.0	
12	864.107	H	37.0	-8.3	28.7	46.0	17.3	366.0	115.0	

it was determined that Y orientation was worst-case orientation; therefore, al final radiated testing was performed with the EUT in Y orientation.

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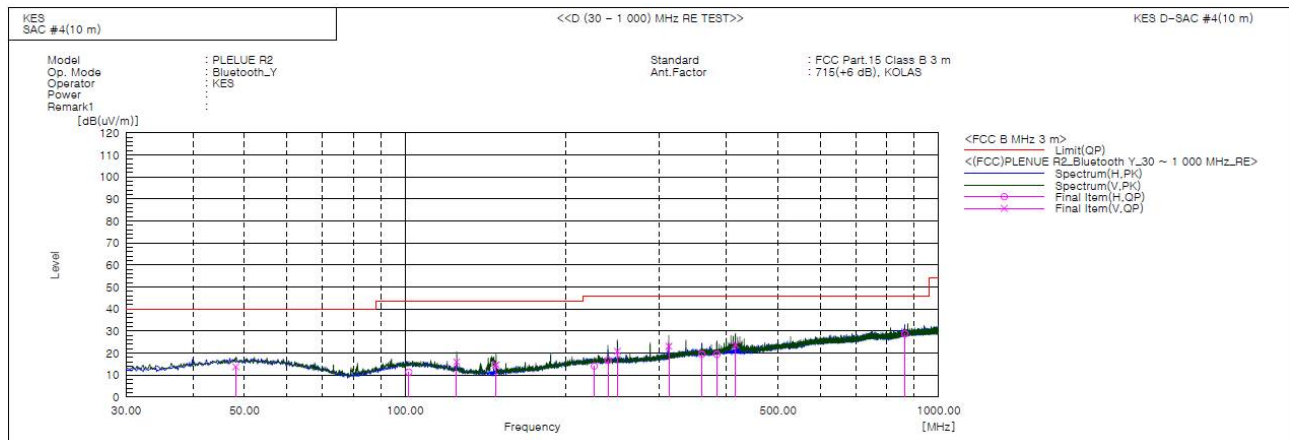


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Bluetooth Mode



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	48.158	V	35.9	-22.1	13.8	40.0	26.2	141.0	218.0	
2	101.628	H	34.7	-23.3	11.4	43.5	32.1	362.0	123.0	
3	124.911	V	41.6	-25.6	16.0	43.5	27.5	100.0	223.0	
4	148.124	V	41.6	-26.9	14.7	43.5	28.8	100.0	290.0	
5	226.352	H	35.6	-21.5	14.1	46.0	31.9	366.0	43.0	
6	240.087	H	38.1	-21.3	16.8	46.0	29.2	397.0	138.0	
7	249.911	V	42.1	-21.2	20.9	46.0	25.1	100.0	32.0	
8	312.055	V	42.3	-19.2	23.1	46.0	22.9	142.0	143.0	
9	359.895	H	36.9	-17.5	19.4	46.0	26.6	365.0	159.0	
10	384.014	H	36.4	-17.0	19.4	46.0	26.6	366.0	186.0	
11	416.107	V	40.4	-16.6	23.8	46.0	22.2	100.0	334.0	
12	864.054	H	37.1	-8.3	28.8	46.0	17.2	370.0	226.0	

it was determined that Y orientation was worst-case orientation; therefore, al final radiated testing was performed with the EUT in Y orientation.

♦ Calculation – SAC #4(10 m)

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

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

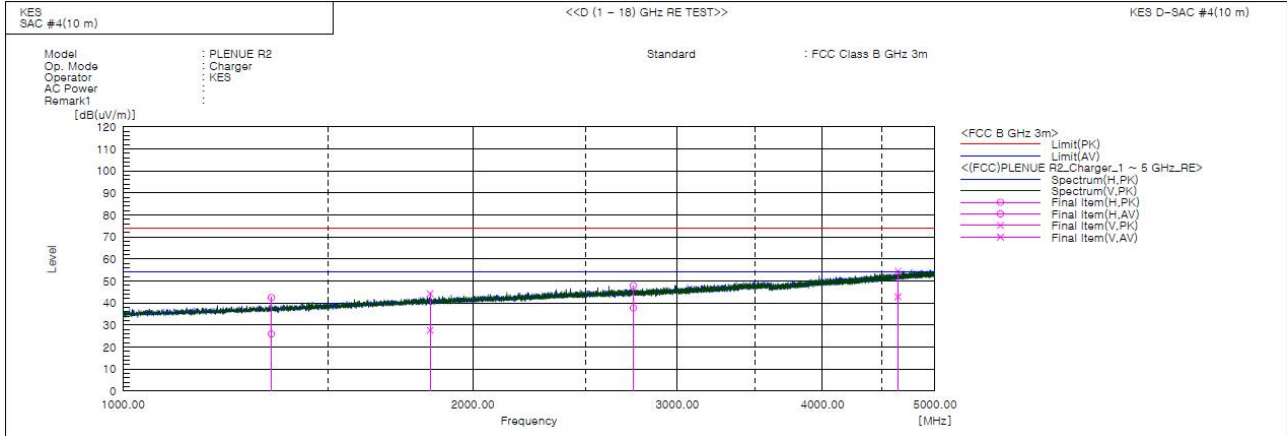
(Confidence level: Approx. 95 %, k=2)

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Radiated Electric Field Emissions(Above 1 GHz)

■ Charge Mode - (1 ~ 5) GHz



Final Result

No.	Frequency [MHz]	(P)	Reading PK [dB(uV)]	Reading AV [dB(uV)]	c.f [dB(1/m)]	Result PK [dB(uV/m)]	Result AV [dB(uV/m)]	Limit PK [dB(uV/m)]	Limit AV [dB(uV/m)]	Margin PK [dB]	Margin AV [dB]	Height [cm]	Angle [deg]	Remark
1	1342.132	H	46.2	29.7	-3.7	42.5	26.0	74.0	54.0	31.5	28.0	371.0	345.0	
2	1838.134	V	44.1	27.5	0.2	44.3	27.7	74.0	54.0	29.7	26.3	100.0	71.0	
3	2750.214	H	43.2	33.1	4.7	47.9	37.8	74.0	54.0	26.1	16.2	362.0	174.0	
4	4646.412	V	41.3	29.7	13.2	54.5	42.9	74.0	54.0	19.5	11.1	100.0	148.0	

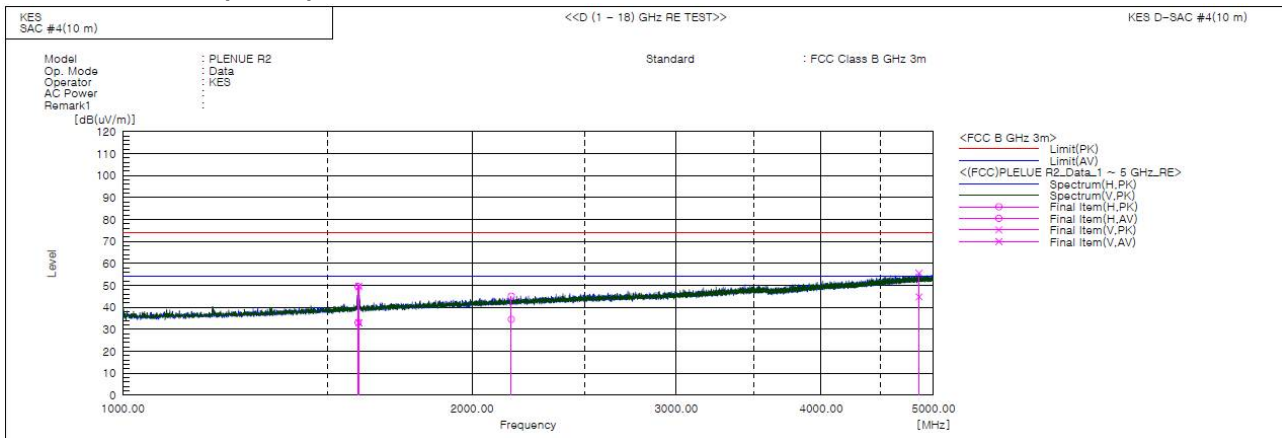


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■ Data Mode - (1 ~ 5) GHz



Final Result

No.	Frequency [MHz]	(P)	Reading PK [dB(uV)]	Reading AV [dB(uV)]	c.f [dB(1/m)]	Result PK [dB(uV/m)]	Result AV [dB(uV/m)]	Limit PK [dB(uV/m)]	Limit AV [dB(uV/m)]	Margin PK [dB]	Margin AV [dB]	Height [cm]	Angle [deg]	Remark
1	1595.530	H	51.1	34.7	-1.6	49.5	33.1	74.0	54.0	24.5	20.9	100.0	284.0	
2	1598.090	V	51.3	34.6	-1.6	49.7	33.0	74.0	54.0	24.3	21.0	100.0	29.0	
3	2162.565	H	42.9	32.3	2.2	45.1	34.5	74.0	54.0	28.9	19.5	100.0	48.0	
4	4858.635	V	41.4	30.7	14.1	55.5	44.8	74.0	54.0	18.5	9.2	100.0	326.0	

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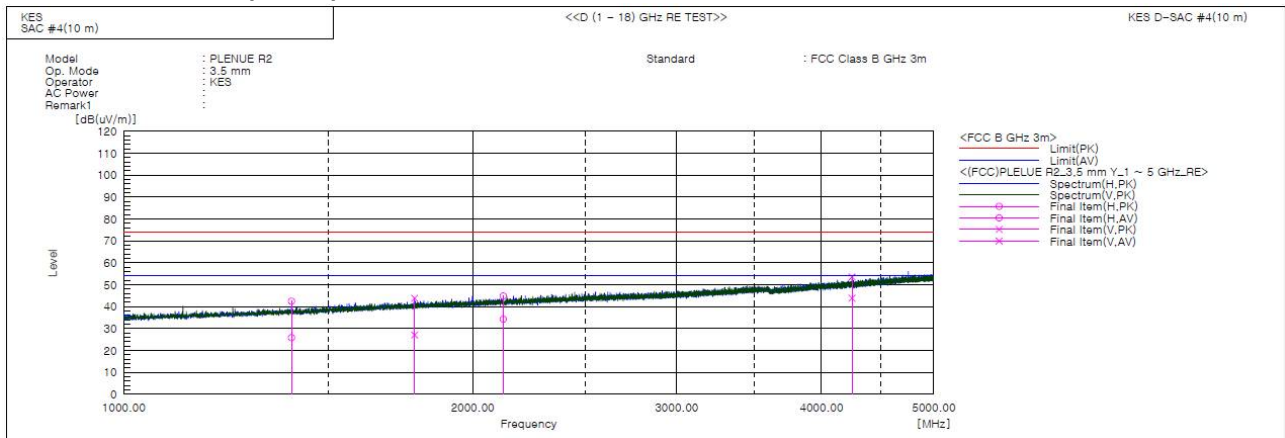


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■ 3.5 mm Mode - (1 ~ 5) GHz



Final Result

No.	Frequency [MHz]	(P)	Reading PK [dB(uV)]	Reading AV [dB(uV)]	c.f [dB(1/m)]	Result PK [dB(uV/m)]	Result AV [dB(uV/m)]	Limit PK [dB(uV/m)]	Limit AV [dB(uV/m)]	Margin PK [dB]	Margin AV [dB]	Height [cm]	Angle [deg]	Remark
1	1395.700	H	45.8	29.2	-3.3	42.5	25.9	74.0	54.0	31.5	28.1	372.0	104.0	
2	1782.200	V	44.1	27.3	-0.2	43.9	27.1	74.0	54.0	30.1	26.9	100.0	22.0	
3	2125.581	H	42.9	32.3	2.0	44.9	34.3	74.0	54.0	29.1	19.7	381.0	188.0	
4	4250.577	V	42.4	32.7	11.2	53.6	43.9	74.0	54.0	20.4	10.1	100.0	3.0	

it was determined that Y orientation was worst-case orientation; therefore, al final radiated testing was performed with the EUT in Y orientation.

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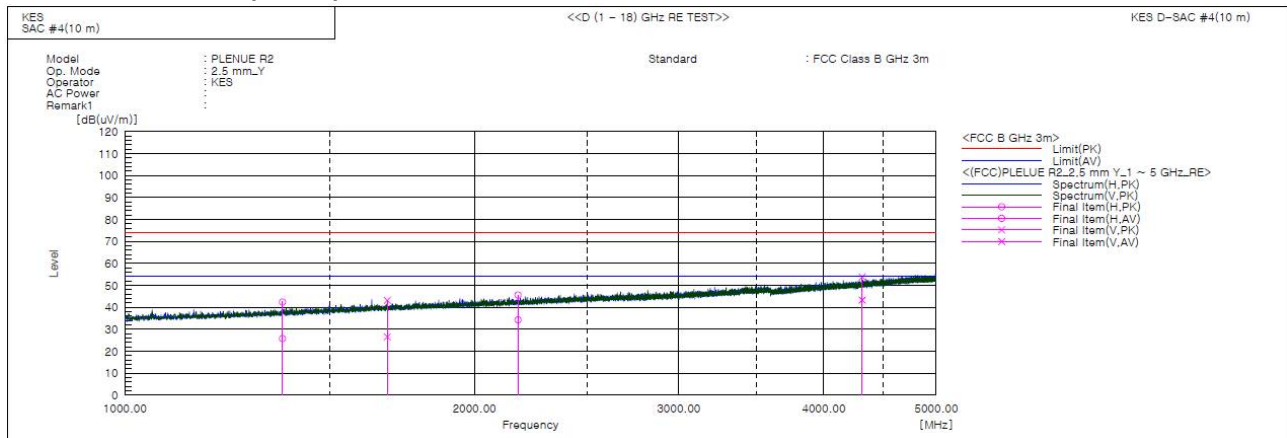


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■ 2.5 mm Mode – (1 ~ 5) GHz



Final Result

No.	Frequency [MHz]	(P)	Reading PK [dB(uV)]	Reading AV [dB(uV)]	c.f [dB(1/m)]	Result PK [dB(uV/m)]	Result AV [dB(uV/m)]	Limit PK [dB(uV/m)]	Limit AV [dB(uV/m)]	Margin PK [dB]	Margin AV [dB]	Height [cm]	Angle [deg]	Remark
1	1367.200	H	45.9	29.3	-3.5	42.4	25.8	74.0	54.0	31.6	28.2	365.0	27.0	
2	1682.800	V	44.1	27.5	-0.9	43.2	26.6	74.0	54.0	30.8	27.4	100.0	81.0	
3	2181.066	H	43.3	32.0	2.3	45.6	34.3	74.0	54.0	28.4	19.7	391.0	147.0	
4	4316.581	V	42.3	31.7	11.6	53.9	43.3	74.0	54.0	20.1	10.7	100.0	85.0	

it was determined that Y orientation was worst-case orientation; therefore, al final radiated testing was performed with the EUT in Y orientation.

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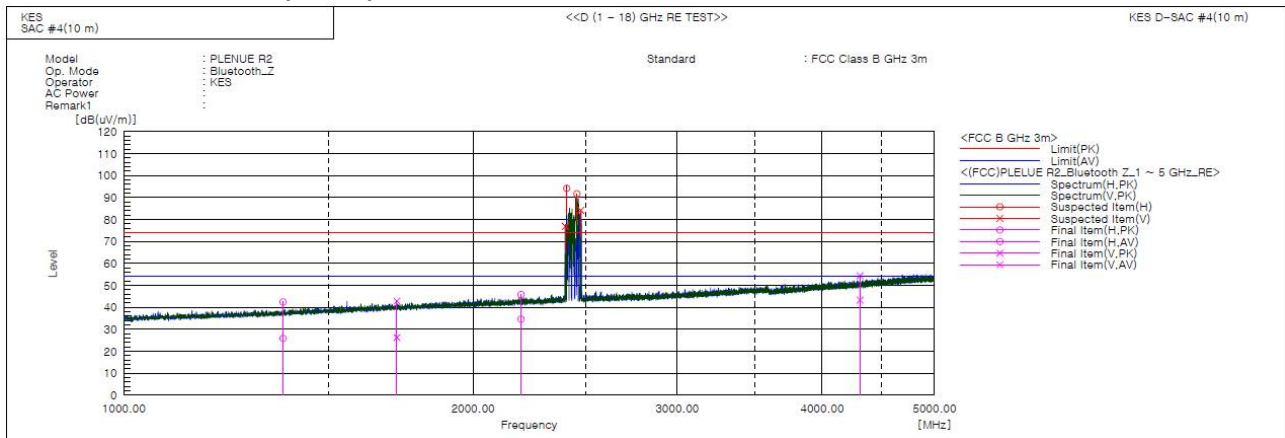


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Bluetooth Mode - (1 ~ 5) GHz



Final Result

No.	Frequency [MHz]	(P)	Reading PK [dB(uV)]	Reading AV [dB(uV)]	c.f [dB(1/m)]	Result PK [dB(uV/m)]	Result AV [dB(uV/m)]	Limit PK [dB(uV/m)]	Limit AV [dB(uV/m)]	Margin PK [dB]	Margin AV [dB]	Height [cm]	Angle [deg]	Remark
1	1372.010	H	46.0	29.4	-3.5	42.5	25.9	74.0	54.0	31.5	28.1	377.0	147.0	
2	1719.540	V	43.5	26.9	-0.6	42.9	26.3	74.0	54.0	31.1	27.7	100.0	213.0	
3	2200.481	H	43.4	32.3	2.4	45.8	34.7	74.0	54.0	28.2	19.3	362.0	356.0	
4	4313.018	V	42.8	31.7	11.6	54.4	43.3	74.0	54.0	19.6	10.7	100.0	333.0	
5	2402.500	V			3.4			74.0	54.0			100.0	266.0	
6	2409.500	H			3.4			74.0	54.0			100.0	24.0	
7	2458.500	H			3.6			74.0	54.0			100.0	87.0	
8	2477.000	V			3.7			74.0	54.0			100.0	102.0	

it was determined that Z orientation was worst-case orientation; therefore, a final radiated testing was performed with the EUT in Z orientation.

- * Bluetooth Mode Exclusion Band
- Fundamental Frequency: 2.4 GHz

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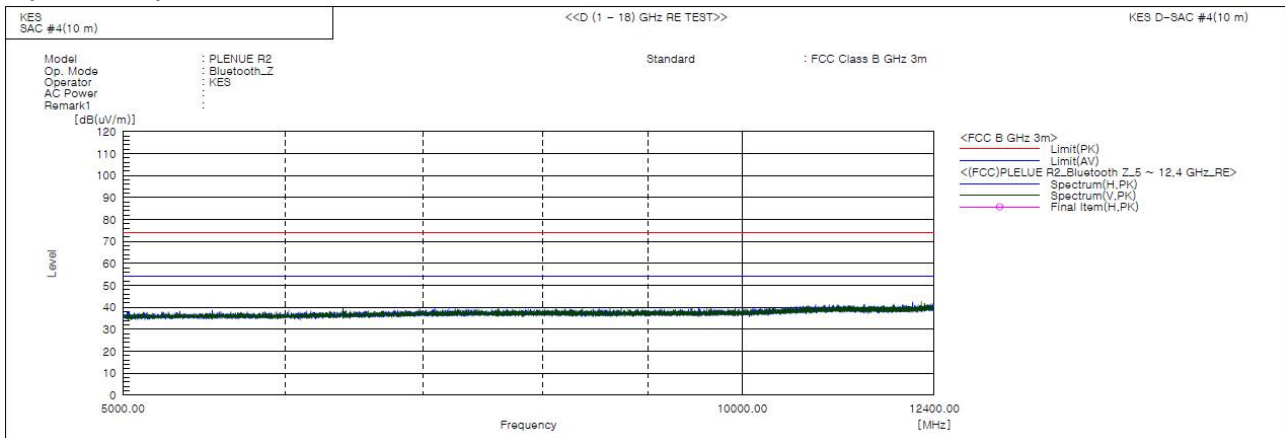


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- (5 ~ 12.4) GHz



◆ 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

* No spurious emission were detected above 5 GHz.

Uncertainty of measurement

Uncertainty of measurement 5.76 dB

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

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