



EMC TEST REPORT

Test Report No. : KES-EM-21T0154
Date of Issue : Mar. 10, 2021
Product name : LOAA Analyzer
Model/Type No. : On-Point
Variant Model : -
Applicant : OPTOLANE Technologies, Inc.
Applicant Address : 6F, 20, Pangyoyeok-ro 241 beon-gil, Bundang-gu,
Seongnam-si, Gyeonggi-do, 13494, S.Korea
Manufacturer : OPTOLANE Technologies, Inc.
Manufacturer Address : 6F, 20, Pangyoyeok-ro 241 beon-gil, Bundang-gu,
Seongnam-si, Gyeonggi-do, 13494, S.Korea
Equipment authorization : **Supplier's Declaration of Conformity**
Date of Receipt : Feb. 03, 2021
Test date : Feb. 09, 2021 ~ Feb. 10, 2021
Test Results : ☒ **In Compliance** ☐ **Not in Compliance**

Tested by

Seong Min, Choi
EMC Test Engineer

Reviewed by

Dong-Hun, Jang
EMC Technical Manager

This test report is not related to KS Q ISO/IEC 17025 and KOLAS.

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REPORT REVISION HISTORY

Date	Test Report No.	Revision History
Mar. 10, 2021	KES-EM-21T0154	Issued

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1.0 General Product Description

Main Specifications of EUT are:

(Division)	(Specificity)
Sample	Nucleic acid sample extracted from blood, serum and plasma
Fluorescence acquisition	Single color optical module: 457 nm excitation, 461nm emission, sensor imaging
Operating specifications	• 15 °C ~ 30 °C at 20 to 80 % humidity (noncondensing) • 0 m ~ 2 000 m (0 ft ~ 6,562 ft.) • 0.763 bar (2 000 m) ~ 1.01 bar(sea level) • Indoor use only (IP20)
Storage conditions	• 2 °C ~ 50 °C at 20 to 80 % humidity (noncondensing)
Shipping conditions	• -10 °C ~ 50 °C at 10 to 85 % humidity (noncondensing) • 0 m ~ 10,600 m
Power requirements	• 100 – 240 VAC 50 ~ 60 Hz 1.3 A input, 24 VDC output, 3.75 A, 90 W
Dimensions and weight	• (176 x 250 x 214) mm (width x depth x height) • Total weight: About 4.4 kg – Analyzer: 3.4 kg (With adaptor: 4.1 kg) – Sample Loader POSTMAN: 0.25 kg
EMC requirements	LOAA® Analyzer PATIO system complies with the emission and immunity requirements of IEC 61326 (Class A).
CPU	Cortex-A53 Octa core 1.4 GHz or higher
Storage and Memory	• 2 GB DDR3 • 8 GB eMMC – Able to save 20,000 patient test results
Interface and peripherals	• One Ethernet network interface • 2 USB ports for storage (lower rear) • Wireless (Wi-Fi) antenna: 5 GHz / 2.4 GHz
Display	• Color touch screen • (68.04 x 120.96) mm • 1080 x 1920 resolution or similar one • driver IC, FPC, back light unit 5.46"
Operating system	Android 7.x (Nougat)



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 ☐ 24 Vac ☐ DC 3 V (Battery)

Frequency ☐ 50 Hz ☒ 60 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
LOAA Analyzer	On-Point	-	OPTOLANE Technologies, Inc.	EUT
AC / DC Adapter	GSM90A24	-	MEAN WELL ENTERPRISES CO.,LTD.	-

1.5 Support Equipments

Description	Model Number	Serial Number	Manufacturer	Remarks
Notebook	HSN-Q07C	5CD8367KND	HP	-
Notebook Adapter	HSTNN-CA40	WFTKU0ERLB4QCH	HP	-
USB Memory	-	-	SanDisk	4 GB
Keyboard	K120	820-007661	Logitech	-
Barcode sample	-	-	-	-



1.6 External I / O Cabling

Start		END		Cable Spec.	
Description	I / O Port	Description	I / O Port	Length	Shield
LOAA Analyzer (EUT)	RJ-45	Notebook	RJ-45	3.0	U
	USB	USB Memory	USB	-	-
	USB	Keyboard	Line-Out (USB)	1.2	U
	Barcode reader	Barcode sample	SLOT	-	-

* Unshielded = U, Shielded = S

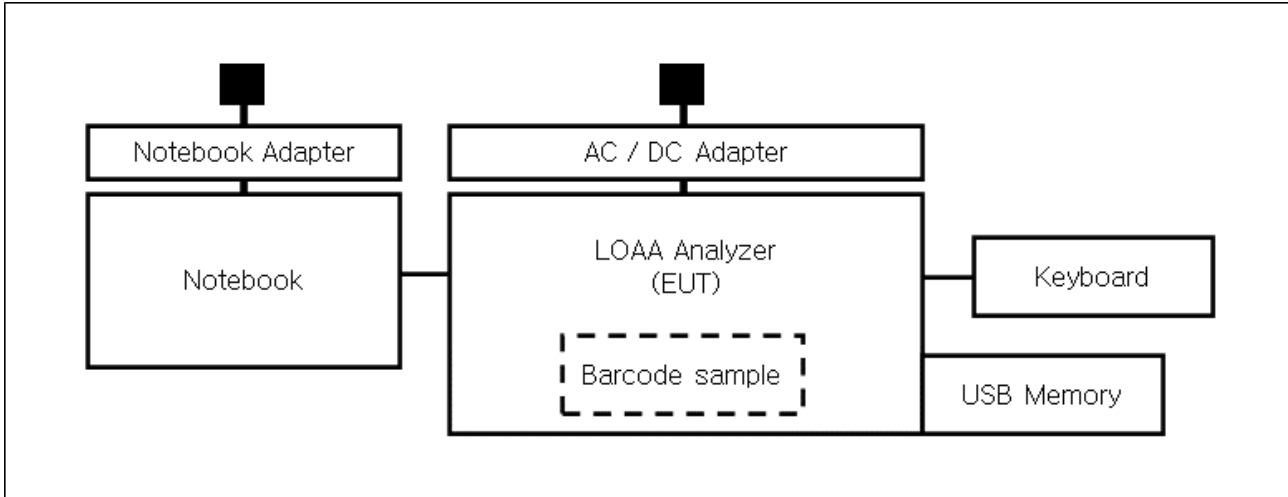
1.7 EUT Operating Mode(s)

Test mode	operating
Operating	Using EUT's LOAA program, the barcode samples were recognized and normal operation was confirmed.

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

1.8 Configuration

■ AC Main
 □ DC Main



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-Anechoic 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-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, 10 m Open Area and Conducted test site to perform FCC Part 15/18 measurements.	 KR0100
Canada	ISED	3 m & 10 m Semi-Anechoic Chamber and Conducted test site	 23298-1
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	TÜ V SÜ D	EMI (3 m & 10 m Semi-Anechoic Chamber , 10 m Open Area and conducted test site) EMS (ESD, RS, EFT/Burst, Surge, CS, Magnetic, Dips and interruptions)	 CARAT 001633 0004



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-CISPR 32:2016 | ☐ Class A | ☐ Class B |
| ☐ AS/NZS CISPR32:2015 | ☐ 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

Feb. 09, 2021

Test Location

Electro wave Shieldroom #6

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	01, 15, 2022
☒	LISN	ENV216	R & S	101787	12, 29, 2021
☐	LISN	ESH2-Z5	R & S	100450	12, 29, 2021
☒	PULSE LIMITER	ESH3-Z2	R & S	101915	12, 29, 2021

Test Conditions

Temperature: (22,6 ± 0,1) °C
Relative Humidity: (46,8 ± 0,1)% 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

Remarks

See Appendix A for test data.



2.2 Radiated Electric Field Emissions(Below 1 GHz)

Test Date

Feb. 09, 2021

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, 01, 2021
☒	AMPLIFIER	SCU 01	R & S	100603	11, 25, 2021
☒	TRILOG-BROADBAND ANTENNA	VULB9163	Schwarzbeck	715	12, 08, 2022
☒	ATTENUATOR	8491A	HP	32173	03, 10, 2022

Test Conditions

Temperature: (22,9 ± 0,2) °C
Relative Humidity: (44,5 ± 0,3)% 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

Feb. 10, 2021

Test Location

SEMI ANECHOIC CHAMBER #45

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, 01, 2021
☒	PREAMPLIFIER	8449B	AGILENT	3008A01742	12, 29, 2021
☐	ATTENUATOR	8491A	HP	35496	03, 10, 2022
☒	HORN ANTENNA	BBHA 9120D	SCHWARZBECK	9120D-1802	12, 14, 2021

Test Conditions

Temperature: (22,4 ± 0,2) °C
Relative Humidity: (44,6 ± 0,5)% 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.



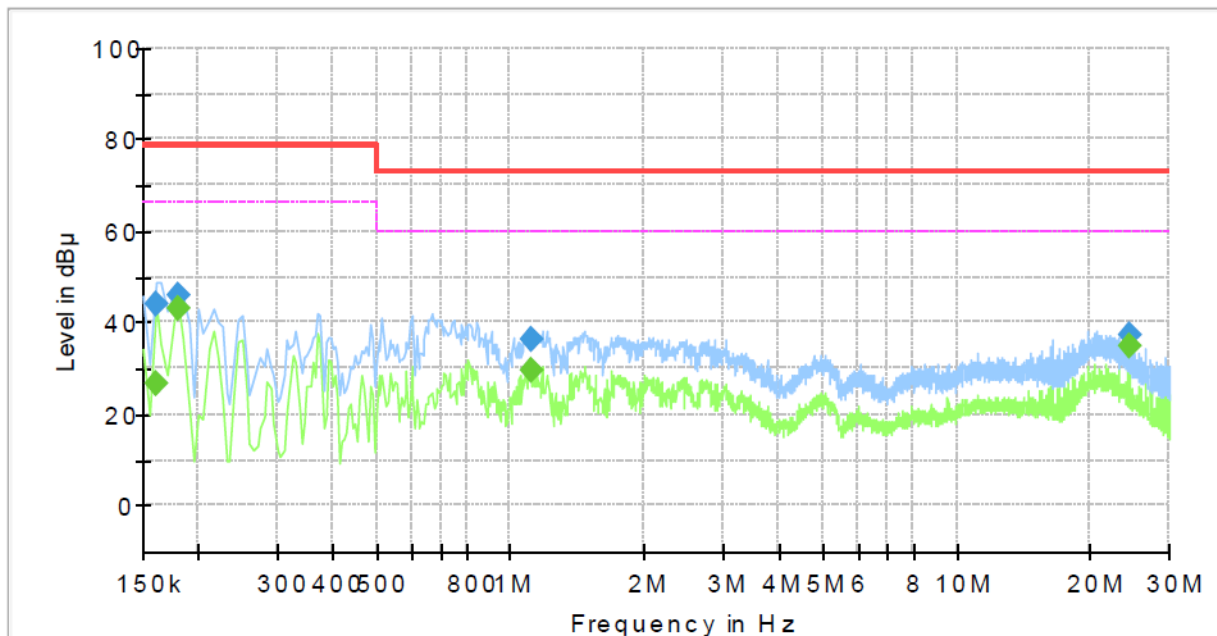
APPENDIX A – TEST DATA

Conducted Emissions at Mains Power Ports

HOT LINE

Common Information

Test Description:	Conducted Emission
Model No.:	On-Point
Phase:	H
Mode:	-
Operator Name:	KES



Final Result

Frequency (MHz)	QuasiPeak (dBμV)	CAverage (dBμV)	Limit (dBμV)	Margin (dB)	Meas. Time (ms)	Bandwidth (kHz)	Line	Corr. (dB)
0.160000	---	26.89	66.00	39.11	1000.0	9.000	L1	19.4
0.160000	43.84	---	79.00	35.16	1000.0	9.000	L1	19.4
0.180000	---	42.91	66.00	23.09	1000.0	9.000	L1	19.4
0.180000	45.95	---	79.00	33.05	1000.0	9.000	L1	19.4
1.110000	---	29.78	60.00	30.22	1000.0	9.000	L1	20.0
1.110000	36.30	---	73.00	36.70	1000.0	9.000	L1	20.0
24.300000	---	35.08	60.00	24.92	1000.0	9.000	L1	20.1
24.300000	37.04	---	73.00	35.96	1000.0	9.000	L1	20.1



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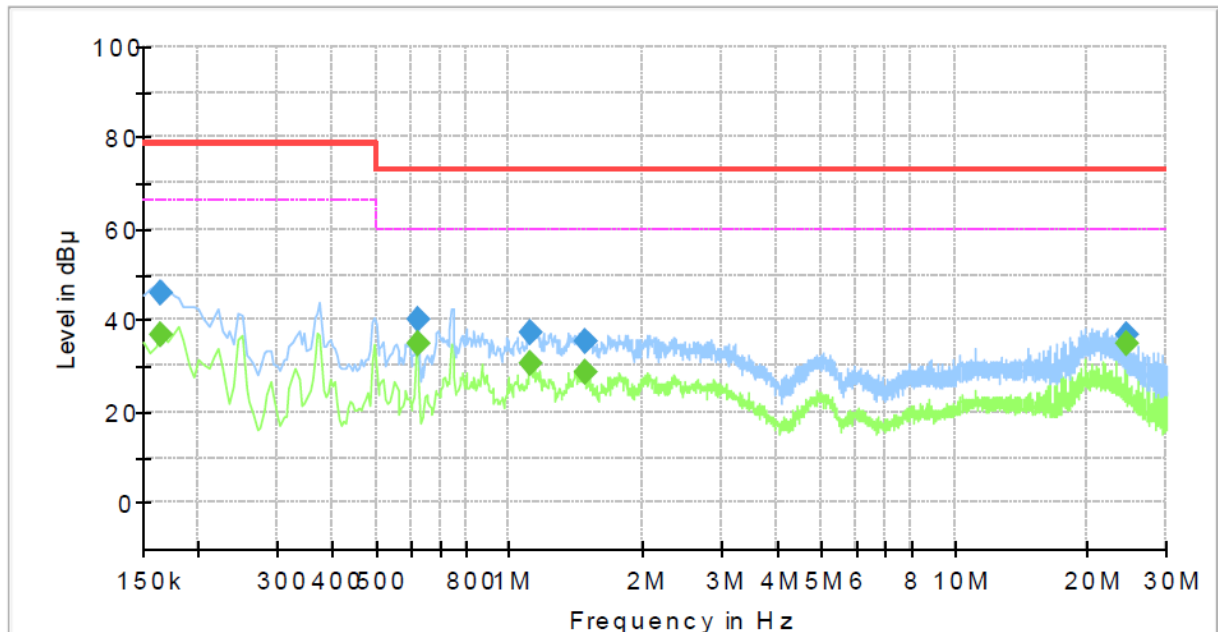
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NEUTRAL LINE

Common Information

Test Description: Conducted Emission
Model No.: On-Point
Phase: N
Mode: -
Operator Name: KES



Final Result

Frequency (MHz)	QuasiPeak (dBμV)	CAverage (dBμV)	Limit (dBμV)	Margin (dB)	Meas. Time (ms)	Bandwidth (kHz)	Line	Corr. (dB)
0.165000	---	36.65	66.00	29.35	1000.0	9.000	N	19.4
0.165000	45.89	---	79.00	33.11	1000.0	9.000	N	19.4
0.620000	---	35.02	60.00	24.98	1000.0	9.000	N	19.8
0.620000	40.22	---	73.00	32.78	1000.0	9.000	N	19.8
1.115000	---	30.51	60.00	29.49	1000.0	9.000	N	20.0
1.115000	37.36	---	73.00	35.64	1000.0	9.000	N	20.0
1.475000	---	28.60	60.00	31.40	1000.0	9.000	N	20.1
1.475000	35.31	---	73.00	37.69	1000.0	9.000	N	20.1
24.300000	---	35.08	60.00	24.92	1000.0	9.000	N	20.1
24.300000	37.02	---	73.00	35.98	1000.0	9.000	N	20.1

◆ Calculation

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

QuasiPeak / Caverage : The Final Value

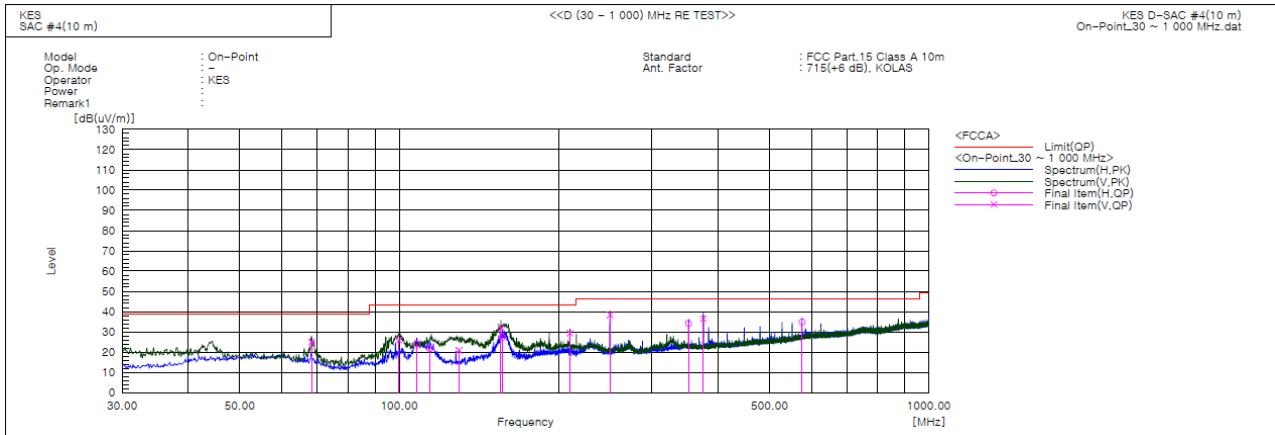
Reading Value : Not shown in the table.

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

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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	68.315	V	49.3	-24.3	25.0	39.0	14.0	100.0	298.0	
2	99.961	V	48.4	-22.5	25.9	43.5	17.6	123.0	148.0	
3	107.964	H	46.4	-22.4	24.0	43.5	19.5	400.0	199.0	
4	114.390	H	44.5	-22.8	21.7	43.5	21.8	344.0	222.0	
5	129.668	V	46.0	-25.1	20.9	43.5	22.6	128.0	67.0	
6	155.615	V	56.5	-24.8	31.7	43.5	11.8	100.0	180.0	
7	156.585	H	52.0	-24.7	27.3	43.5	16.2	328.0	117.0	
8	209.935	V	49.9	-20.5	29.4	43.5	14.1	105.0	71.0	
9	249.948	V	57.4	-19.1	38.3	46.5	8.2	100.0	215.0	
10	351.919	H	49.5	-15.3	34.2	46.5	12.3	310.0	12.0	
11	374.956	V	51.3	-14.8	36.5	46.5	10.0	117.0	245.0	
12	575.989	H	44.0	-9.2	34.8	46.5	11.7	297.0	24.0	

◆ 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)]

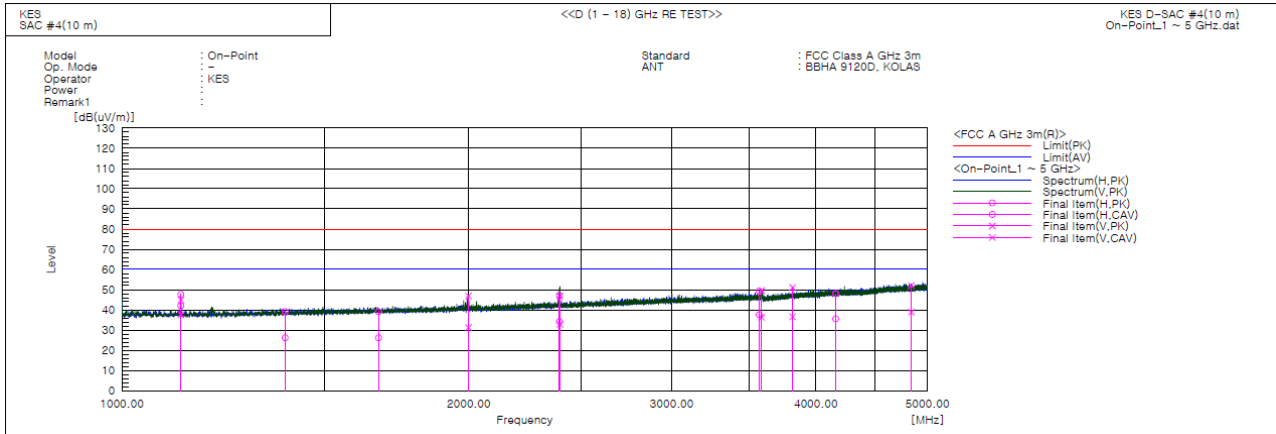
Reading(QP) : Reading value, Result(QP) : Reading value + Factor value

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



Radiated Electric Field Emissions(Above 1 GHz)

(1 ~ 5 GHz)



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	1124.880	H	52.3	46.7	-4.7	47.6	42.0	80.0	60.0	32.4	18.0	288.0	34.0	
2	1124.895	V	49.7	42.4	-4.7	45.0	37.7	80.0	60.0	35.0	22.3	166.0	227.0	
3	1385.325	H	42.3	29.3	-3.1	39.2	26.2	80.0	60.0	40.8	33.8	400.0	92.0	
4	1670.120	H	40.9	27.9	-1.7	39.2	26.2	80.0	60.0	40.8	33.8	377.0	18.0	
5	1998.047	V	47.2	31.5	-0.2	47.0	31.3	80.0	60.0	33.0	28.7	100.0	283.0	
6	2398.173	H	45.3	32.4	1.8	47.1	34.2	80.0	60.0	32.9	25.8	289.0	46.0	
7	2398.514	V	45.1	31.1	1.8	46.9	32.9	80.0	60.0	33.1	27.1	113.0	236.0	
8	3572.481	H	43.2	31.5	6.1	49.3	37.6	80.0	60.0	30.7	22.4	347.0	328.0	
9	3589.068	V	43.5	30.2	6.1	49.6	36.3	80.0	60.0	30.4	23.7	117.0	264.0	
10	3817.617	V	43.5	29.0	7.6	51.1	36.6	80.0	60.0	28.9	23.4	136.0	225.0	
11	4161.542	H	38.8	26.4	9.2	48.0	35.6	80.0	60.0	32.0	24.4	375.0	89.0	
12	4839.567	V	40.3	27.2	11.7	52.0	38.9	80.0	60.0	28.0	21.1	168.0	65.0	

◆ Calculation

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

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