J55001, J55011, J55013, J55014-1, J55015, J55022, J55032, CISPRJ 32
JIS C 1806-1 (Particular requirement JIS C 1806-2 series)
JIS C 61326-1 (Particular requirement EN 61326-2 series)
JIS T 0601-1-2(Particular requirement JIS T 06012 series)

Immunity test
Nippon Kaiji Kyokai Technical rule of Materials and Equipment for Marine Use: Article 7 Chapter 1
AS/NZS CISPR 14.2, AS/NZS CISPR 20, AS/NZS CISPR 24, AS/NZS 61000.6.1, AS/NZS 61000.6.2

CISPR 14-2, CISPR 20, CISPR 24, CISPR 35

EN 50121-3-2, EN 50121-4, EN 50130-4, EN 55103-2, EN 55014-2, EN 55020, EN 55024, EN 55035

EN 60945, EN 61000-6-1, EN 61000-6-2
EN 61000-4-2, EN 61000-4-3, EN 61000-4-4, EN 61000-4-5, EN 61000-4-6, EN 61000-4-8
EN 61000-4-9, EN 61000-4-11, EN 61000-4-12, EN 61000-4-13, EN 61000-4-16, EN 61000-4-18
EN 61000-4-29, EN61000-4-34, EN 61000-4-39(test frequency is 380MHz and above)
EN 61000-6-7, EN 61326-3-1, EN 61326-3-2
EN 61547, EN 61800-3, EN 61851-21-1, EN 61851-21-2
EN 60601-1-2(Particular requirement EN 60601-2 series)
EN 61326-1(Particular requirement EN 61326-2 series), EN 61326-2-6

IACS E10
IEC 60601-1-2(Particular requirement IEC 60601-2 series)
IEC 60945, IEC 61000-4-2, IEC 61000-4-3, IEC 61000-4-4, IEC 61000-4-5, IEC 61000-4-6
IEC 61000-4-8, IEC 61000-4-9, IEC 61000-4-11, IEC 61000-4-12, IEC 61000-4-13, IEC 61000-4-16
IEC 61000-4-18, IEC 61000-4-29, IEC 61000-4-34
EN 61000-4-39(test frequency is 380MHz and above)

IEC 61000-6-1, IEC 61000-6-2, IEC 61000-6-7
IEC 61326-1(Particular requirement IEC 61326-2 series)
IEC 61326-2-6, IEC 61326-3-1, IEC 61326-3-2, IEC 61547, IEC 61851-21-1, IEC 61851-21-2
IEC 61800-3, IEC 62040-2, IEC 62236-3-2, IEC 62236-4, IEC 62236-5

JIS C 1806-1(Particular requirement JIS C 1806-2 series), JIS C 4411-2
JIS C 61000-4-2, JIS C 61000-4-3, JIS C 61000-4-4, JIS C 61000-4-5, JIS C 61000-4-6
JIS C 61000-4-8, JIS C 61000-4-11, JIS C 61000-6-1, JIS C 61000-6-2
JIS C 61326-1(Particular requirement JIS C 61326-2 series)
JIS T 0601-1-2(Particular requirement JIS T 0601-2 series)

GOST CISPR 24

Harmonic Test in Public Low Voltage Systems
AS/NZS 61000.3.2, AS/NZS 61000.3.3, AS/NZS 61000.3.11, AS/NZS 61000.3.12
AS/NZS 61000.6.3, AS/NZS 61000.6.4

IEC 60601-1-2(Particular requirement IEC 60601-2 series)
IEC 61000-3-2, IEC 61000-3-3, IEC 61000-3-11, IEC 61000-3-12, IEC 61000-6-3, IEC 61000-6-4
IEC 61326-1(Particular requirement IEC 61326-2 series)

EN 60601-1-2(Particular requirement EN 60601-2 series)
EN 61000-3-2, EN 61000-3-3, EN 61000-3-11, EN 61000-3-12, EN 61000-6-3, EN 61000-6-4
EN 61326-1(Particular requirement EN 61326-2 series)

JIS C 1806-1(Particular requirement JIS C 1806-2 series), JIS C 61000-3-2
JIS T 0601-1-2(Particular requirement JIS T 0601-2 series)

Telecommunication characteristic test 1
IC RSS-Gen, IC RSS-210, IC RSS-247

EN 300 328, EN 300 330, EN 300 440(up to 40 GHz)
EN 301 489-1, EN 301 489-3, EN 301 489-17, EN 301 489-19, EN 301 893
EN 303 413

ANSI C63.10-2013(up to 40 GHz)
FCC KDB Publication 905462 D02 U-NII DFS Compliance Procedures New Rules v02 (April 8, 2016)
(up to 40 GHz)

Voluntary EMC Laboratory Accreditation Center Inc.

Shinji Mine
Director: Shinji Mine

Ikoma 2nd Test Site

Certificate of Accreditation

VLAC has accredited

KEC Electronic Industry Development Center
Testing Division Keihanna Test Center
Testing Division Ikoma 1st Test Site
Testing Division Ikoma 2nd Test Site

3-2-2, Hikari-dai, Seika-cho, Soraku-gun, Kyoto 619-0237 JAPAN

for technical competence in the field of

EMC Testing and

Telecommunication equipment performance testing 1

For the type of tests and test standards to which this accreditation applies, please refer to the laboratory's Scope of Accreditation.

This laboratory is accredited in accordance with the recognized International Standard ISO/IEC 17025:2017 "*General Requirements for the Competence of Testing and Calibration Laboratories*".

This accreditation demonstrates technical competence for a defined scope and the operation of a laboratory quality management system. (*refer to joint ISO-ILAC-IAF Communiqué dated 8 January 2009*).

Accreditation Number: VLAC-005

Date of accreditation: December 1, 2000

Date of renewal: August 23, 2019

Date of expiration: July 22, 2021

Voluntary EMC Laboratory Accreditation Center Inc.

Shinji Mine
Director: Shinji Mine

Scope of Accreditation

(Measurement Method)

Accreditation Number : VLAC-005-3

Expiration Date : July 22, 2021

〔Name of Laboratory〕
KEC Electronic Industry Development Center

〔Test site name〕
Testing Division Ikoma 2nd Test Site

〔Test site Address〕
10630 Takayama-cho Ikoma City Nara 630-0101 JAPAN

〔Measurement Method 〕
Emission test
Radiated disturbance : Enclosure Port
Disturbance electric field test
[Test Condition] On the reference ground plane, Measurement distance : 3m
Measurement Frequency Range : 30 MHz – 1 GHz
[Test Condition] Quasi Free Space: Measurement Frequency Range : 1 GHz – 18 GHz
Disturbance magnetic field strength measurement
[Test Condition] Loop Antenna
Conducted disturbance measurement : AC mains port
Disturbance voltage measurement
[Test Condition] AMN, High impedance probe
Conductive interference measurement : Telecommunication port
Disturbance voltage measurement
[Test Condition] AMN, AAN, Capacitive voltage probe
Disturbance current measurement
[Test Condition] Current probe
Conductive interference measurement : DC power line port
Disturbance voltage measurement
[Test Condition] AMN, High impedance probe
Antenna port, RF modulator output port, Tuner port
Disturbance voltage measurement
[Test Condition] AMN, High impedance probe
Disturbance current measurement
[Test Condition] Current probe
Wanted signal and disturbance voltage test at the RF output
[Test Condition] Selective voltmeter
Local oscillator power at the input terminal of the outdoor unit

Telecommunication equipment performance 1
Intentional Radiators (FCC Part 15 Subpart C)
U-NII without DFS International Radiators (FCC Part 15 Subpart E)
U-NII with DFS International Radiators (FCC Part 15 Subpart E)
Based on European standards
Based on Canadian standards

Voluntary EMC Laboratory Accreditation Center Inc.

Director: Shinji Mine

Scope of Accreditation

(Test standards)

Accreditation Number :VLAC-005-3
Expiration Date : July 22, 2021

〔Name of Laboratory〕
KEC Electronic Industry Development Center
〔Test site name〕
Testing Division Ikoma 2nd Test Site
〔Test site Address〕
10630 Takayama-cho Ikoma City Nara 630-0101 JAPAN

〔Test standards〕
Emission test
Technical requirements under the Electrical Appliances and Materials safety Act appendix 10 Chapter 2/3/4/5 *
Enforcement rule of Radio Law : Article 46.7
Nippon Kaiji Kyokai Technical rule of Materials and Equipment for Marine Use: Article 7 Chapter 1
VCCI Technical Requirements : V-3 / VCCI-CISPR 32

AS/NZS CISPR11, AS/NZS CISPR13 *, AS/NZS CISPR14-1 *, AS/NZS CISPR15 *
AS/NZS CISPR22, AS/NZS CISPR32, AS/NZS 61000.6.3, AS/NZS 61000.6.4

CISPR 11, CISPR 13 *, CISPR 14-1 *, CISPR 15 *, CISPR 22, CISPR 32
CISPR 16-1-2, CISPR 16-1-4, CISPR 16-2-1, CISPR 16-2-3

EN 12015
EN 50121-3-2, EN 50121-4, EN 50121-5, EN 55011, EN 55013 *, EN 55014-1 *, EN 55015 *
EN 55022, EN 55032, EN 55103-1
EN 61000-6-3, EN 61000-6-4, EN 61800-3
EN 60601-1-2(Particular requirement EN 60601-2 series), EN 60945
EN 61326-1(Particular requirement EN 61326-2 series), EN 61326-2-1, EN 61326-2-2, EN 61326-2-6
EN 61851-21-1, EN 61851-21-2, EN 62040-2

FCC 47CFR Part15 Subpart B : ANSI C63.4 -2014(up to 40 GHz)
FCC 47CFR Part15 Subpart B : FCC MP-2
FCC 47CFR Part18 : FCC MP-5(up to 40 GHz)

GOST 30805.22

IACS E10
ICES-001, ICES-003, ICES-005
IEC 60945, IEC 61000-6-3, IEC 61000-6-4, IEC 61800-3

* : Except for Disturbance electric power measurement

IEC 60601-1-2(Particular requirements IEC 60601-2series)
IEC 61326-1(Particular requirements IEC 61326-2series)
IEC 61326-2-1, IEC 61326-2-2, IEC 61326-2-6, IEC 61851-21-1, IEC 61851-21-2, IEC 62040-2
IEC 62236-3-2, IEC 62236-4, IEC 62236-5

J55001, J55011, J55013 *, J55014-1 *, J55015 *, J55022, J55032, CISPRJ 32
JIS C 1806-1 (Particular requirement JIS C 1806-2 series)
JIS C 61326-1 (Particular requirement EN 61326-2 series)
JIS T 0601-1-2(Particular requirement JIS T 06012 series)

* : Except for Disturbance electric power measurement

Telecommunication characteristic test 1
IC RSS-Gen, IC RSS-210, IC RSS-247

EN 300 328, EN 300 330, EN 300 440(up to 40 GHz)
EN 301 489-1, EN 301 489-3, EN 301 489-17, EN 301 489-19, EN 301 893
EN 303 413

ANSI C63.10-2013(up to 40 GHz)
FCC KDB Publication 905462 D02 U-NII DFS Compliance Procedures New Rules v02 (April 8, 2016) (up to 40 GHz)

Voluntary EMC Laboratory Accreditation Center Inc.

Director: Shinji Mine

[Note]
The following standards have a limited scope of accreditation.

EN55103-1	: Not include the “Magnetic immunity test”.
EN/ETSI 300 440-1/2	: Transmitter operating frequency below 5GHz.
BETS-7	: The test items for the standard TV are accredited.

2.2. Test Facility

All tests described in this report were performed by:

Name : KEC Electronic Industry Development Center Testing Division

Keihanna Test Center

Address : 3-2-2, Hikari-dai, Seika-cho, Soraku-gun, Kyoto 619-0237 Japan

Anechoic Chamber	: ☐No.7	☐No.8	☐No.9	☐No.10	■No.11	☐No.12
	☐No.13	■No.14				
Shielded Room	: ☐No.7	☐No.8	■No.9	☐No.10		

Ikoma 1st Test Site

Address : 12128 Takayama-cho, Ikoma-city, Nara 630-0101 Japan

Anechoic Chamber	: ☐No.1	☐No.2	☐No.6
Shielded Room	: ☐No.1		
Harmonic Current Meas. Room	: ☐		

Ikoma 2nd Test Site

Address : 10630 Takayama-cho, Ikoma-city, Nara 630-0101 Japan

Anechoic Chamber : ☐No.3

2.3. Measurement Uncertainty

The result of a measurement is only an approximation or estimate of the value of a specific quantity.
And thus the measurand is complete only when a statement of uncertainty is given.
KEC quotes Measurement Uncertainty (U) as follows.

Conducted Disturbance at Mains Port using AMN	Frequency Range 9kHz-30MHz	+/- 3.2 dB
	Frequency Range 150kHz-30MHz	+/- 2.5 dB
Conducted Disturbance at DC Power Port using the PV-AN Frequency Range150kHz-30MHz		
	Common Mode Disturbance	+/- 4.5 dB
	Differential Mode Disturbance	+/- 4.5 dB
Conducted Disturbance at Mains Port using Voltage Probe		+/- 1.2 dB
Conducted Disturbance at Telecommunication Ports using AAN	LCL 55 dB	+/- 2.4 dB
	LCL 65 dB	+/- 2.4 dB
	LCL 75 dB	+/- 3.0 dB
	Shield type	+/- 2.4 dB
Conducted Disturbance at Telecommunication Ports using Current Probe Method		+/- 1.2 dB
Conducted Disturbance at Telecommunication Ports using 150Ω Load Method		+/- 2.4 dB
Conducted Disturbance at Telecommunication Ports using Capacitive Voltage Probe Method		+/- 2.8 dB
Conducted Disturbance at Telecommunication Ports None Invasive Method		+/- 3.0 dB
Conducted Difference Voltage Emission	below 1GHz	+/- 0.5 dB
	above 1GHz	+/- 1.0 dB
Disturbance Power (30MHz -300MHz)		+/- 3.7 dB
Radiated Magnetic Disturbance Frequency Range from9kHz up to 30MHz using the 60cmLoop Antenna Method Distance:3.0m		
	1st Chamber (all axis)	+/- 3.5 dB
	10th Chamber (all axis)	+/- 3.4 dB
Radiated Magnetic Disturbance Frequency Range from9kHz up to 30MHz using the LLAS	X axis	+/- 2.0 dB
	Y axis	+/- 2.0 dB
	Z axis	+/- 2.2 dB
Radiated Electric Disturbance Range from30MHz up to 200MHz 3mMethod using the Biconical Antenna	1st Chamber	+/- 2.8 dB (H) +/- 3.1 dB (V)
	10th Chamber	+/- 2.2 dB (H) +/- 3.1 dB (V)
	11th Chamber	+/- 3.0 dB (H) +/- 3.3 dB (V)
	14th Chamber	+/- 2.9 dB (H) +/- 3.4 dB (V)
Radiated Electric Disturbance Range from200MHz up to 1GHz 3mMethod using the LPDA	1st Chamber	+/- 3.1 dB (H) +/- 4.7 dB (V)
	10th Chamber	+/- 2.8 dB (H) +/- 4.5 dB (V)
	11th Chamber	+/- 3.1 dB (H) +/- 4.8 dB (V)
	14th Chamber	+/- 3.1 dB (H) +/- 4.7 dB (V)
Radiated Electric Disturbance Range from30MHz up to 200MHz 10mMethod using the Biconical Antenna	1st Chamber	+/- 3.9 dB (H) +/- 3.7 dB (V)
	10th Chamber	+/- 3.1 dB (H) +/- 3.1 dB (V)
Radiated Electric Disturbance Range from200MHz up to 1GHz 10mMethod using the LPDA	1st Chamber	+/- 3.3 dB (H) +/- 3.3 dB (V)
	10th Chamber	+/- 3.4 dB (H) +/- 3.4 dB (V)
Radiated Electric Disturbance Range from156MHz up to 165MHz 3mMethod using the Biconical Antenna (For IEC 60945)		+/- 2.2 dB (H) +/- 2.7 dB (V)
Radiated Electric Disturbance Range from1GHz up to 6GHz (FSOATS) using the Horn Antenna	1st Chamber	+/- 3.7 dB (H) +/- 3.8 dB (V)
	10th Chamber	+/- 3.9 dB (H) +/- 3.8 dB (V)
	11th Chamber	+/- 3.9 dB (H) +/- 4.0 dB (V)
	14th Chamber	+/- 3.8 dB (H) +/- 4.0 dB (V)
Radiated Electric Disturbance Range from6GHz up to 18GHz (FSOATS) using the Horn Antenna	1st Chamber	+/- 5.0 dB (H) +/- 5.0 dB (V)
	10th Chamber	+/- 5.2 dB (H) +/- 5.2 dB (V)
	11th Chamber	+/- 5.1 dB (H) +/- 5.3 dB (V)
	14th Chamber	+/- 5.2 dB (H) +/- 5.1 dB (V)
Radiated Electric Disturbance Range from18GHz up to 40GHz (FAR) using the Horn Antenna		+/- 5.9 dB
Harmonics Currents Emissions	Less than 16A	+/- 2.4 %
	Over 16A	+/- 1.2 %
Voltage Change, Voltage Fluctuations and Flicker	<16A	+/- 2.4 %
	>16A	+/- 2.4 %

Expiration Date : 2021/9/30

Frequency Range Measurement (Frequency Band Measurement)		+/- 4.6 %
Time Base Measurement (Hopping Dwell Time)		+/- 2.4 %
Carrier Frequency Measurement (Frequency Measurement)	EN300 328, EN300 440, EN301 893, FCC Part2, FCC Part15C	+/- 1.8×10-7
	EN300 330	+/- 1.8×10-7
Power Density Measurement (Spectrum Analyzer Method)		+/- 1.2 dB
RF Output Power (e.i.r.p) Measurement (Power Meter Method)	All Other Radio Devices Excluding the Wi-Fi Device	+/- 0.7 dB
	Only 2.4GHz/5GHz Radio Device (EN300 328, EN301 893)	+/- 0.9 dB
Conducted Spurious Measurement	9kHz–26.5GHz	+/- 0.9 dB
	26.5GHz–40GHz	+/- 1.1 dB
Effective Radiated Power Measurement	30–200MHz	+/- 3.7 dB
	200–1000MHz	+/- 2.4 dB
	1–12.75GHz	+/- 2.7 dB
	12.75–18.0GHz	+/- 3.2 dB
	18.0–40.0GHz	+/- 4.0 dB
Temperature Control on Thermostatic Chamber Test		+/- 1.2 °C

Expiration Date : 2021/9/30

The above values are calculated as Expanded Uncertainty (k=2 [Approximately 95%]).

[Note]
If the measured result is below the specification limit and a margin is less than the above measurement uncertainty, it is impossible to determine compliance at a level of confidence of approximately 95%. However, the measured result indicates high probability that the tested device complies with the specification limit.

2.4. Certification of the Conformance

The conformity at each test are determined under the following conditions. All conformity criteria are declared by the applicant.

Emission Measurement
■Less than standard Limits
☐Less than Limits directed by the applicant
☐Applicant Margin for limits (Spurious Emission (_____dB))
☐Include the MIU calculated by KEC

3. GENERAL INFORMATION

3.1. Product Description

(1) Radio Specifications

(a) Bluetooth

Type of Radio	Bluetooth Ver 5.0
Frequency of Operation	2402MHz – 2480MHz
Output Power	BLE : +4dBm
Antenna Gain	+0.9dBi
Antenna Type	Microstrip antenna
Antenna Impedance	50ohm
Modulation / Spreading	-
Type of Modulation	BLE : GFSK
Nominal Bandwidth	BLE : 2MHz
The number of Hopping Frequencies	BLE : 37
The minimum number of Hopping Frequencies	-

(2) Antenna Type

■Integral Antenna (undetachable)
☐Dedicated Antenna (equipment with antenna connector)

(3) Supply Voltage and Operating Temperature

(1) Supply Voltage

☐AC mains	State AC voltage	: Minimum: _____V	Normal: _____V	Maximum: _____V
■DC State1-1	DC voltage	: Minimum: _____V	Normal: 5.0V	Maximum: _____V (from AC Adapter)
■DC State1-2	DC voltage	: Minimum: 4.5 V	Normal: 5.0V	Maximum: 10V
■DC State2	DC voltage	: Minimum: 2.7 V	Normal: 3.0V	Maximum: 3.3V

In case of DC, indicate the type of power source
☐Internal Power Supply
■External Power Supply or AC/DC adapter
☐Battery ☐Nickel Cadmium
☐Alkaline
☐Nickel-Metal Hydride
☐Lithium-Ion
☐Lead acid(Vehicle regulated)
☐Other (_____)

(2) Operating Temperature: -20 deg C to +50 deg C

(4) Maximum Oscillators Frequency

Name	Frequency
Clock Generator for Wireless module	2480MHz

(5) Software Version

Software	Version
BLE_TEST_tool	v1.0

(6) Firmware Version

Firmware Version
DTM_WHERE_v1

(7) Interface and Provide Terminal

Terminal	Primary Use / Remarks
UART	Module control
I2C	
SPI	

(8) Rated Power Supply

Rated Power	Test Voltage
DC 3.0V or 5.0V AC100-240V50/60Hz(AC Adapter)	DC 3.0V or 5.0V AC120V60Hz(AC Adapter)

[Note]
Test Voltage and Frequency
■Selected by the applicant.
□Selected by test result.
□in accordance with the standard.

(9) Power Setting

Mode	Power Setting
BLE	Phigh : +4dBm, Plow : -40dBm

[Attention]
All above information in this chapter was declared by the applicant.

4. TESTED SYSTEM

4.1. Reference Rule and Specification

(1) Reference Rule and Regulation	: FCC Rule Part 15 Subpart C, Section 15.247 Operation within the bands 902-928MHz, 2400-2483.5MHz, 5725-5850MHz ■Section 15.205 ■Section 15.207 ■Section 15.209 ☐Section 15.247 (a)(1) ■Section 15.247 (a)(2) ☐Section 15.247 (b)(1) ■Section 15.247 (b)(3) ■Section 15.247 (d) ■Section 15.247 (e)
(2) Test Procedure	: ANSI C63.10-2013 KDB Publication No.558074 D01 DTS Meas Guidance v05r02

4.2. Date of Test

Receipt of Test Sample : 26 November 2020
Condition of Test Sample : ■Damage is not found on the set.
☐Damage is found on the set. (Details are described in this report)

Test Completed on : 10 December 2020
Condition of Test Sample : ■Damage is not found on the set.
☐Damage is found on the set. (Details are described in this report)

4.3. Test Mode

Tested Item	Operation Mode	Test Frequency
AC Power Line Conducted Emission	BT LE 1Mbps, 2Mbps	2402MHz / 2440MHz / 2480MHz
6dB Bandwidth		
Peak Conducted Output Power		
Power Spectral Density		
Spurious Emission/Restricted Band Edges (Radiated/Conducted)(*1)		

[Note]
(1) The test program was prepared by the applicant.
(2) Output power of Bluetooth in Peak Conducted Output Power was performed at +4dBm/-40dBm. The other tests were performed at +4dBm.
(3) Spurious Emissions and Restricted Band Edges were checked in three orthogonal axes.
(4) AC Power Line Conducted Emission was performed at the worst conditions at DC 3V, DC 5V and AC 120V 60Hz(AC Adapter). The other tests were performed at AC 120V 60Hz.
(5) Spurious Emission measurement of 30MHz to 1000MHz was performed at the worst conditions.
(*1) Above 30MHz: Radiated measurement, Below 30MHz: Conducted measurement

4.4. Deviation of Standard and Disclaimer

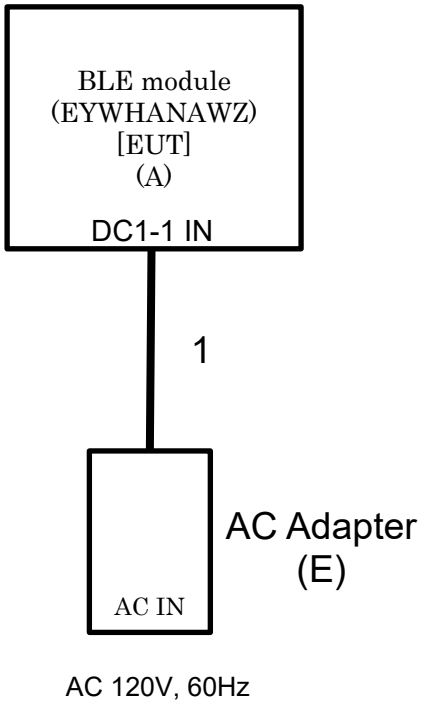
■without deviation, ☐with deviation (details are found inside of this report)

4.5. Procedure of Application

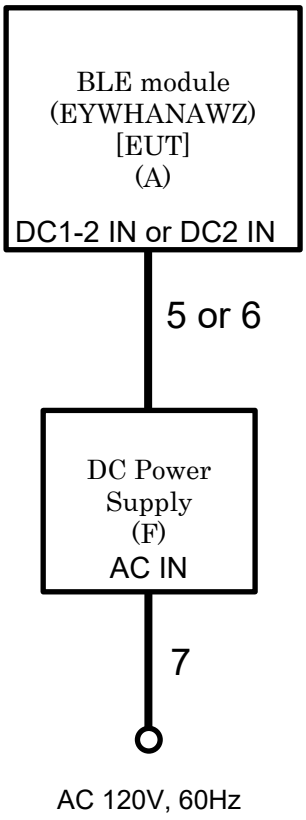
■Original Equipment, ☐Modification (Original test report No. _____)

4.6. Block Diagram of Test System

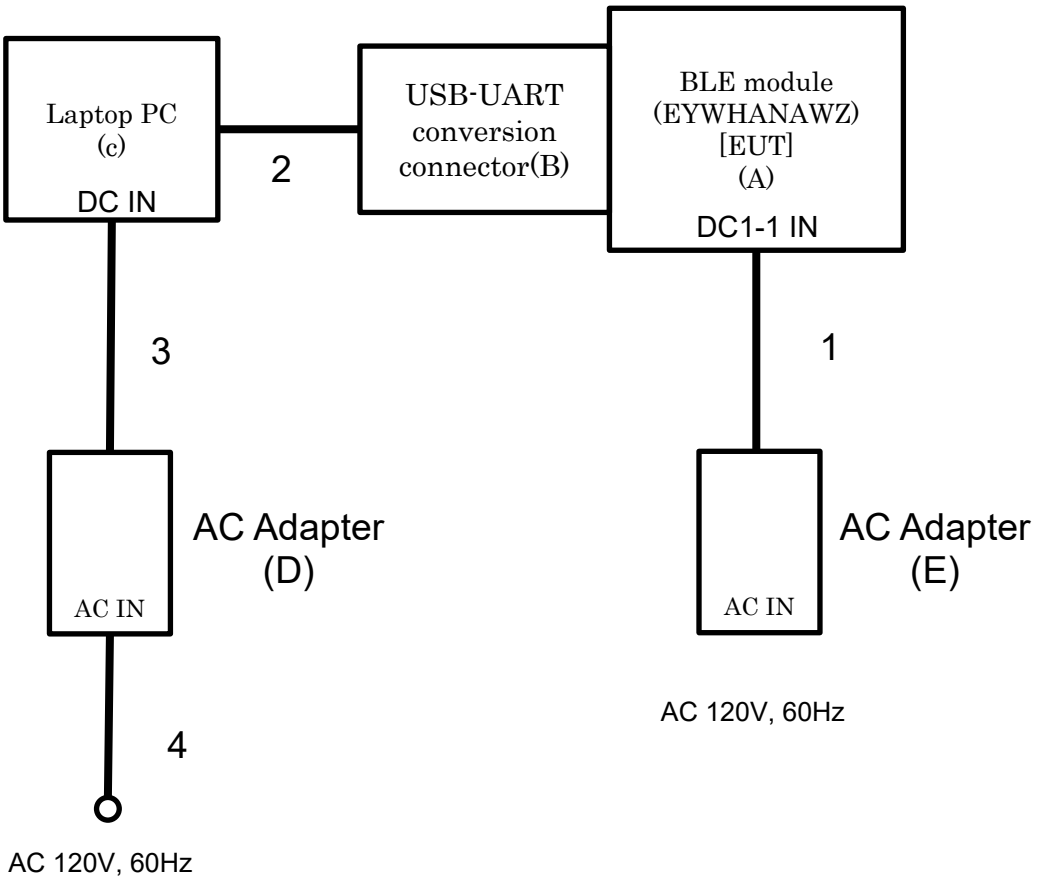
1, AC Power Line Conducted emission test (DC State 1-1) and Spurious emission test



2, AC Power Line Conducted emission test (DC State 1-2 and 2)



3, Other RF tests



4.7. List of Test System

No.	Device Name	Model No.	Serial No.	Trade Name	Device Classification / Remarks
A	BLE module	EYWHANAWZ	C1	WHERE	EUT Conducted test
			R1	WHERE	EUT Radiated test
B	USB-UART conversion connector	-	-	-	AE2
C	Laptop PC	PR734MEF137JD71	6F074032H	TOSHIBA	AE2
D	AC adapter	PA3917U-1ACA	T0215160003044A	TOSHIBA	AE2
E	AC adapter	MU015A050150	-	WHERE	AE1
F	DC Power Supply	7326	-	KIKUSUI	AE1

4.8. List of Cables

No.	Cable Name	Shielded (Y/N)	Length (m)	Cable Specification	Remarks
1	DC Power Cord	N	1.8	Option cable of EUT Undetachable cable	
2	USB Cable	Y	1.7	None specified	
3	DC Power Cord	N	1.7	Undetachable cable	
4	AC Power Cord	N	0.8	None specified	2wire
5	DC Power Cord	N	0.8	None specified	Input CN331
6	DC Power Cord	N	0.7	None specified	Input CN301
7	AC Power Cord	N	1.1	Undetachable cable	2wire

[Attention]
The all information from 4.6 to 4.8 in use the EMC test were submitted by the applicant.

5. AC POWER LINE CONDUCTED EMISSION MEASUREMENT

5.1. Test Procedure

(1) The EUT is placed in accordance with ANSI C63.10.
(2) The EUT is activated as to simulate a worst data rate.
(3) Connect the EUT's AC power cord to one Line Impedance Stabilization Network (LISN).
(4) Any other power cord of other equipment is connected to a LISN different from the LISN used for the EUT.
(5) Connect the spectrum analyzer (*1) to the measuring port of the LISN for the EUT, using a calibrated coaxial cable.
(6) To find out the maximum emission of the configuration of the EUT System, the operation mode and the position of the cables are changed, then preliminary conducted measurement are performed.
(7) The spectrums are scanned from 150kHz to 30MHz and collect the six highest emissions minimum on the spectrum analyzer relative to the limits in the whole range.
(8) The test receiver (*2) is connected to the LISN for the EUT, and the six highest emissions minimum recorded above are measured.

[Note]
(*1) Spectrum Analyzer Set Up Conditions
Frequency range : 150kHz – 30MHz
Resolution bandwidth : 10kHz (6dB Bandwidth)
Video bandwidth : 1MHz
Detector : Peak
(*2) Test Receiver Set Up Conditions
Detector function : Quasi – Peak / Average (if necessary)
IF bandwidth : 10kHz (6dB Bandwidth)

5.2. Test Software List

KEC No.	Software Name	Version	Manufacture
TF-088	TEPTO Conducted emission automatic measurement	2.6.0164	TSJ
TF-110	Junction sheet	1.6k	KEC

5.3. Test Results

BT LE 2402MHz 1Mbps

AC 120V 60Hz

Measured Frequency	Correction Factor	Meter Reading				Maximum RF Voltage		Limit		Margin for Limit	
		Q-Peak		Average							
		Va	Vb	Va	Vb	Q-Peak	Average	Q-Peak	Average	Q-Peak	Average
(MHz)	(dB)	(dBµV)	(dBµV)	(dBµV)	(dBµV)	(dBµV)	(dBµV)	(dBµV)	(dBµV)	(dB)	(dB)
0.150	10.4	26.0	25.6	18.3	18.1	36.4	28.7	66.0	56.0	29.6	27.3
0.300	10.3	20.7	24.3	3.6	10.9	34.6	21.2	60.2	50.2	25.6	29.0
0.336	**10.3**	**21.2**	**26.5**	**5.2**	**13.7**	**36.8**	**24.0**	**59.3**	**49.3**	**22.5**	**25.3**
0.500	10.3	14.3	18.3	0.7	5.5	28.6	15.8	56.0	46.0	27.4	30.2
0.900	10.3	12.1	16.6	<0.0	4.0	26.9	14.3	56.0	46.0	29.1	31.7
1.000	10.4	9.3	14.0	4.0	5.9	24.4	16.3	56.0	46.0	31.6	29.7

DC5V

Measured Frequency	Correction Factor	Meter Reading				Maximum RF Voltage		Limit		Margin for Limit	
		Q-Peak		Average							
		Va	Vb	Va	Vb	Q-Peak	Average	Q-Peak	Average	Q-Peak	Average
(MHz)	(dB)	(dBµV)	(dBµV)	(dBµV)	(dBµV)	(dBµV)	(dBµV)	(dBµV)	(dBµV)	(dB)	(dB)
0.150	10.4	24.2	24.0	16.4	16.2	34.6	26.8	66.0	56.0	31.4	29.2
0.400	10.3	13.7	4.6	10.2	<0.0	24.0	20.5	57.9	47.9	33.9	27.4
0.495	**10.3**	**19.2**	**9.5**	**16.3**	**6.6**	**29.5**	**26.6**	**56.1**	**46.1**	**26.6**	**19.5**
1.000	10.4	8.0	0.6	3.8	<0.0	18.4	14.2	56.0	46.0	37.6	31.8
2.000	10.4	8.7	4.0	4.4	1.7	19.1	14.8	56.0	46.0	36.9	31.2
24.030	10.8	13.8	19.5	8.2	13.1	30.3	23.9	60.0	50.0	29.7	26.1

DC3V

Measured Frequency	Correction Factor	Meter Reading				Maximum RF Voltage		Limit		Margin for Limit	
		Q-Peak		Average							
		Va	Vb	Va	Vb	Q-Peak	Average	Q-Peak	Average	Q-Peak	Average
(MHz)	(dB)	(dBµV)	(dBµV)	(dBµV)	(dBµV)	(dBµV)	(dBµV)	(dBµV)	(dBµV)	(dB)	(dB)
0.150	10.4	24.4	24.1	16.4	16.1	34.8	26.8	66.0	56.0	31.2	29.2
0.400	10.3	14.5	7.8	11.4	1.7	24.8	21.7	57.9	47.9	33.1	26.2
0.495	**10.3**	**19.1**	**9.5**	**15.9**	**6.5**	**29.4**	**26.2**	**56.1**	**46.1**	**26.7**	**19.9**
1.000	10.4	6.4	1.2	1.7	<0.0	16.8	12.1	56.0	46.0	39.2	33.9
2.000	10.4	8.4	4.1	4.5	2.4	18.8	14.9	56.0	46.0	37.2	31.1
24.000	10.8	11.2	17.5	6.7	11.4	28.3	22.2	60.0	50.0	31.7	27.8

[Note]
Correction Factor includes the LISN Factor, cable loss and attenuator loss.

[Calculation method]
Maximum RF Voltage (dBµV)
= Meter Reading (at maximum level of Va or Vb) (dBµV) + Correction Factor (dB)

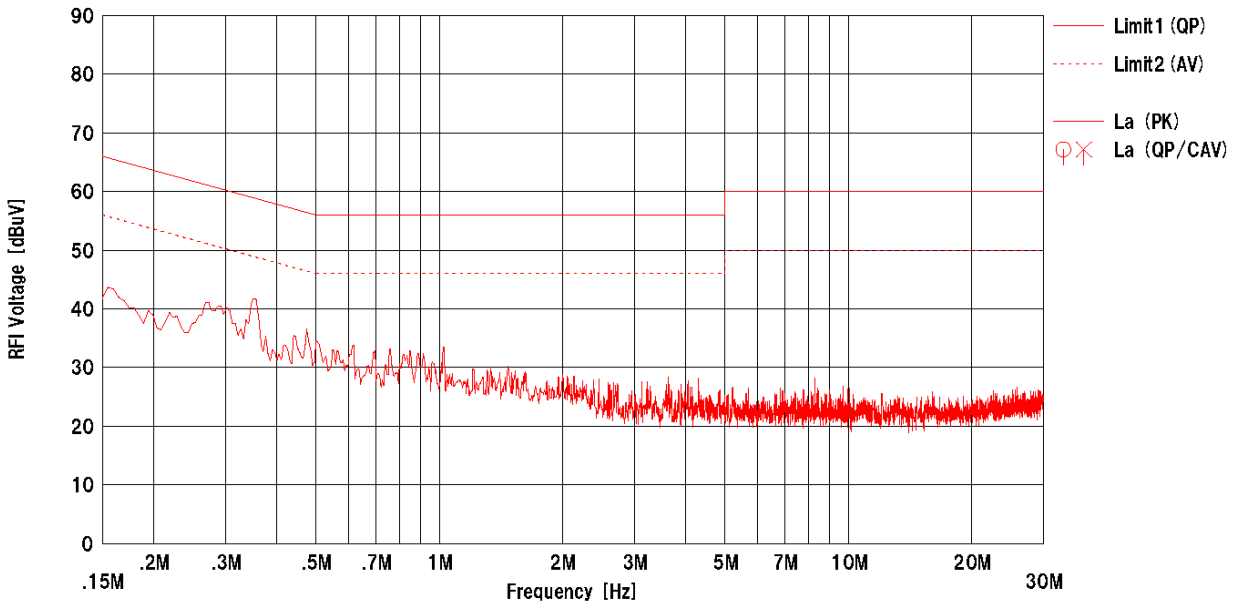
At the next page, the result of exploratory conducted emission measurement by using the spectrum analyzer is shown by the spectrum chart.

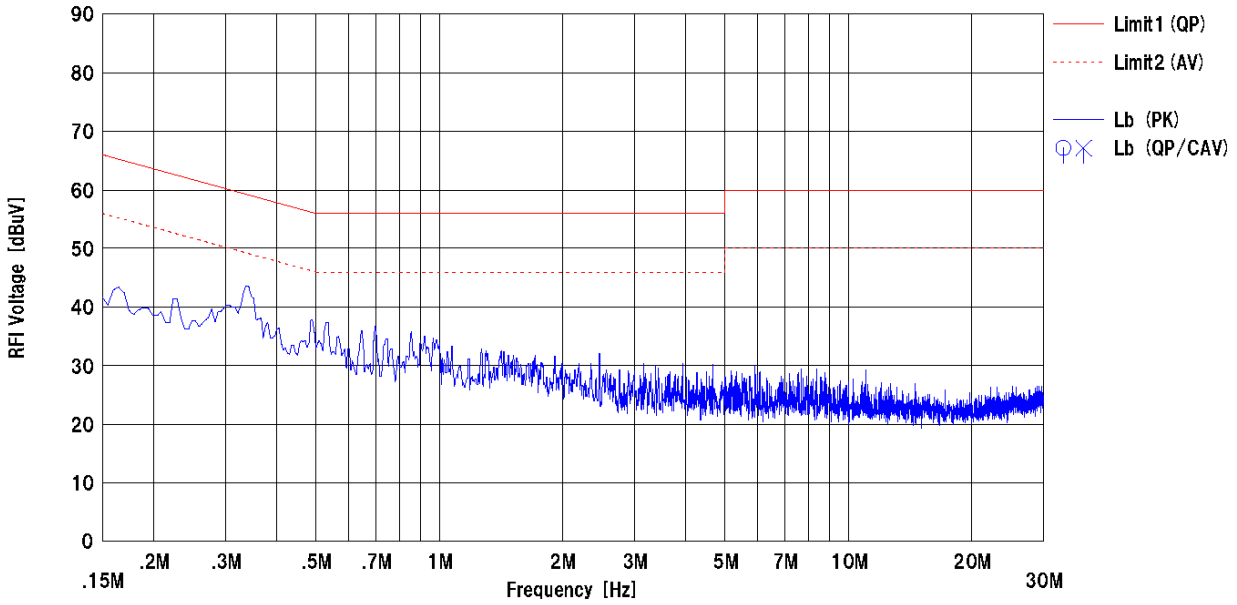
Tested Date	Environment (before the test / after the test)			Power Supply Voltage (before the test / after the test)
	Temperature	Humidity	Atmospheric Pressure	
9 December 2020	24 °C / 24 °C	31 % / 31 %	1011 hPa	■DC 3V / 3V
				■DC 5V / 5V
				■AC 120V / 120V Freq. 60Hz / 60Hz

Test Results in Graph

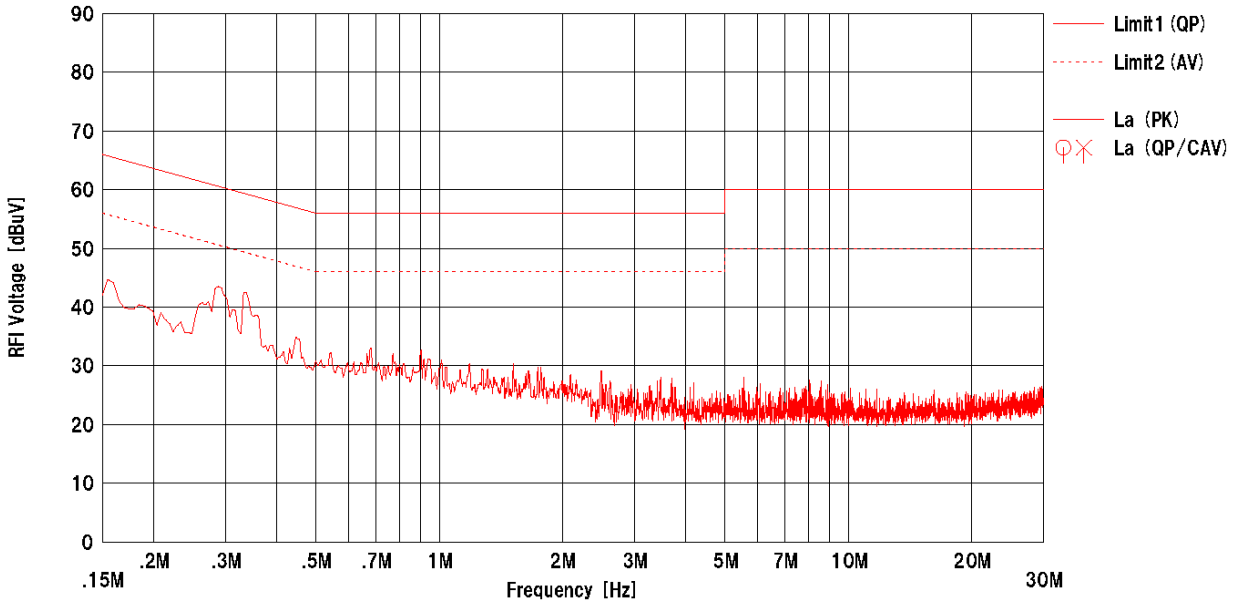
BT LE

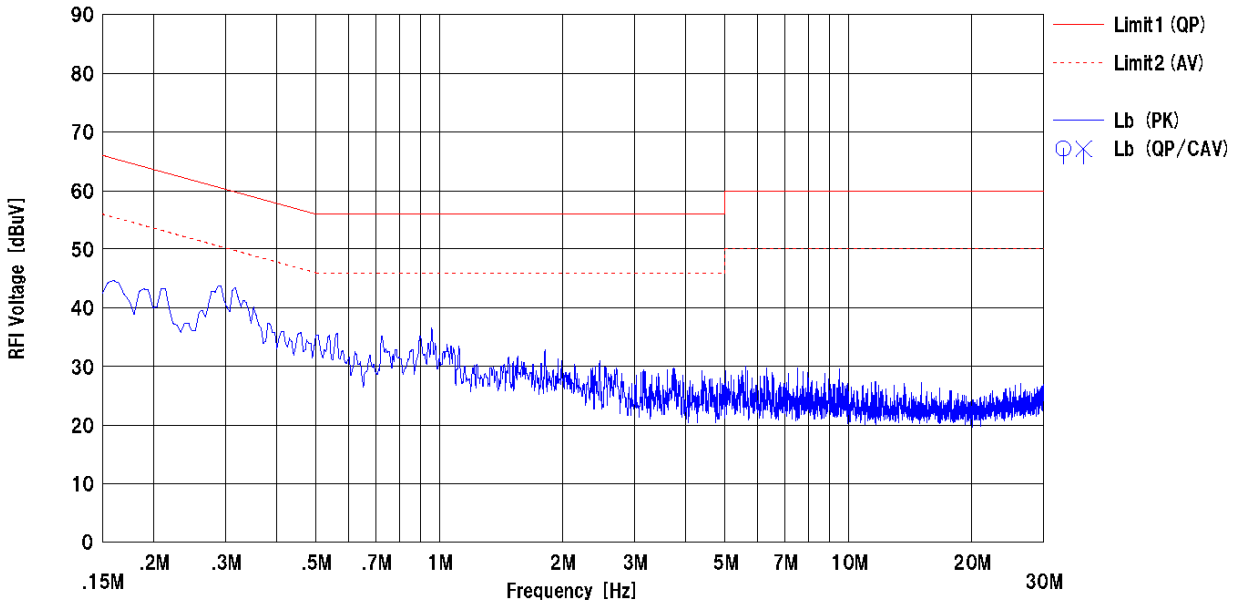
AC 120V 60Hz_2402MHz_1Mbps



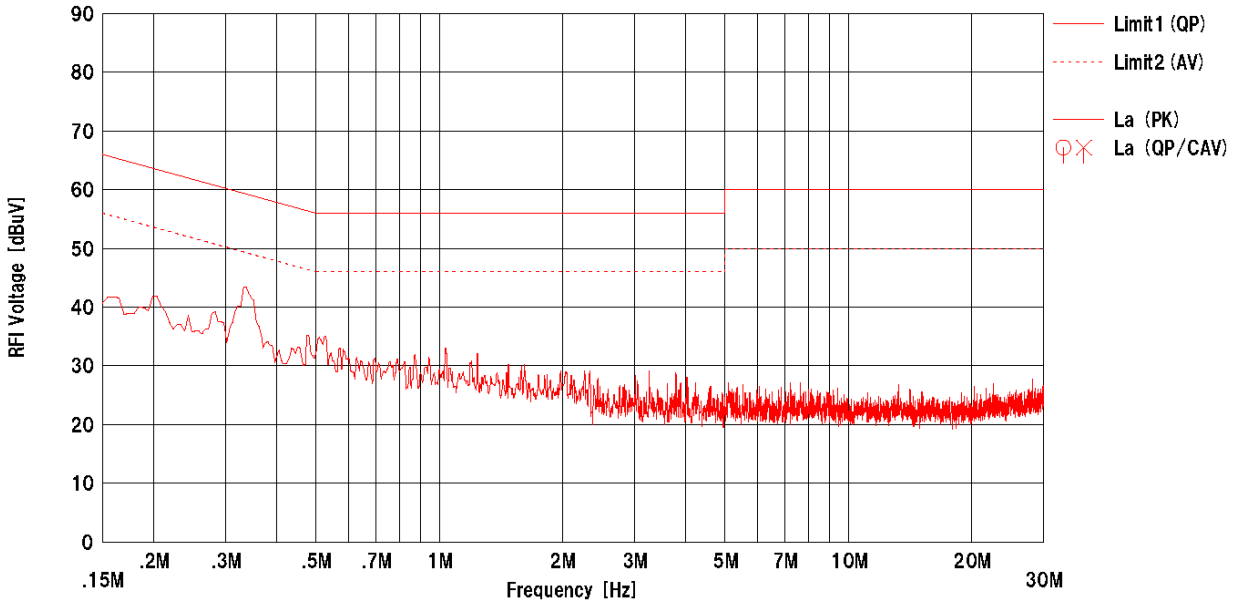


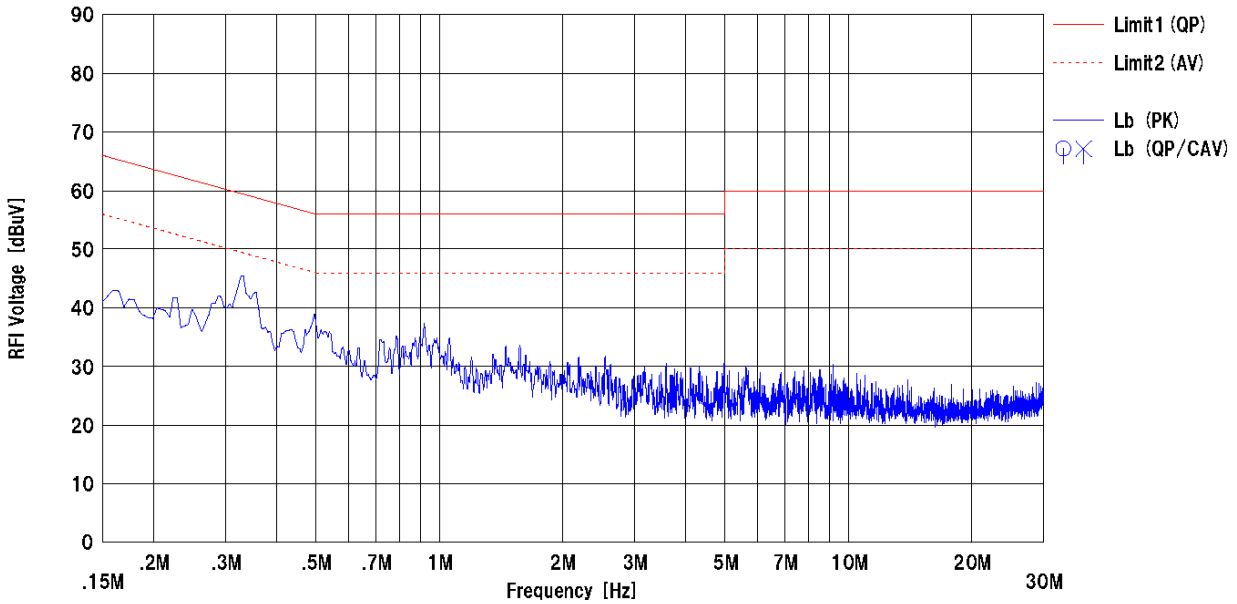
AC 120V 60Hz_2402MHz_2Mbps



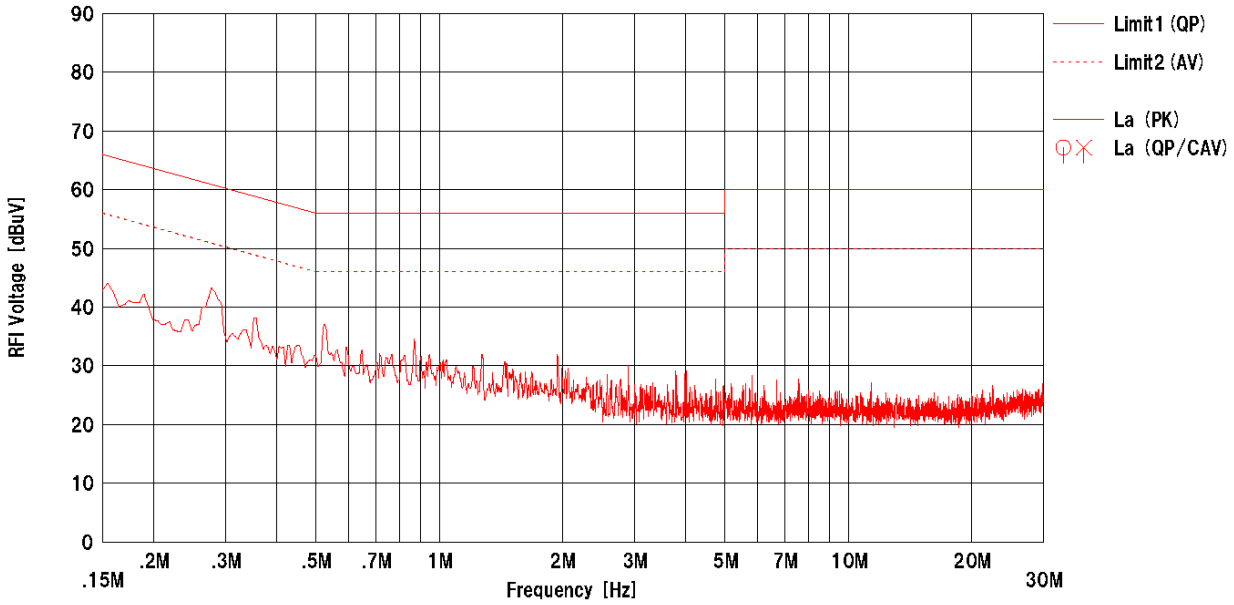


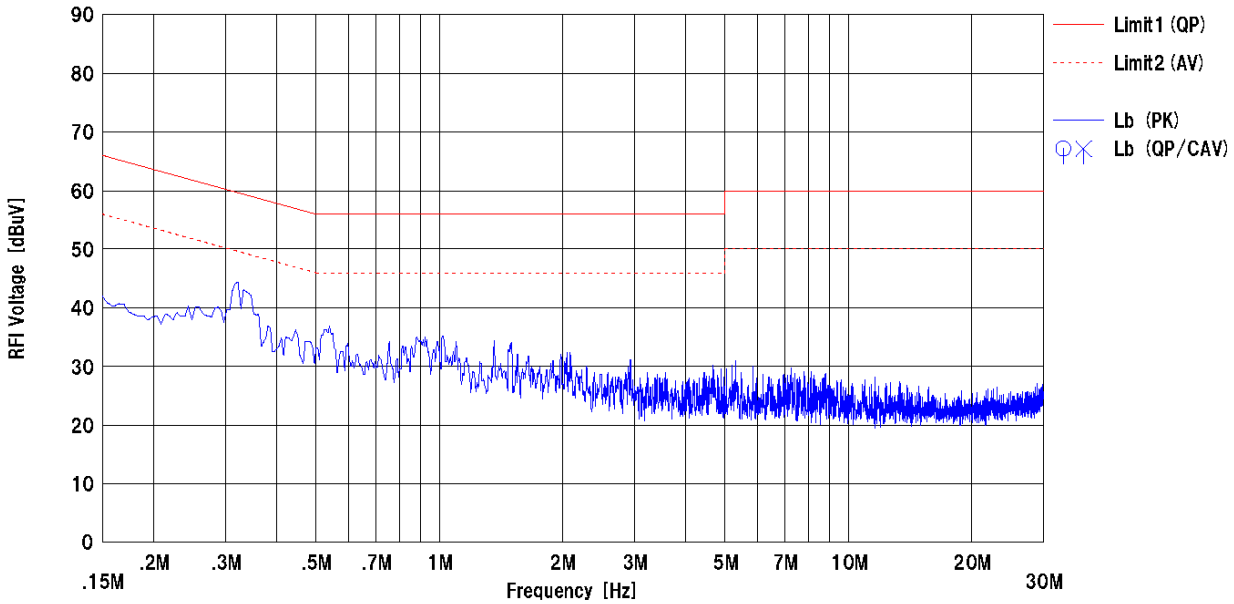
AC 120V 60Hz_2440MHz_1Mbps



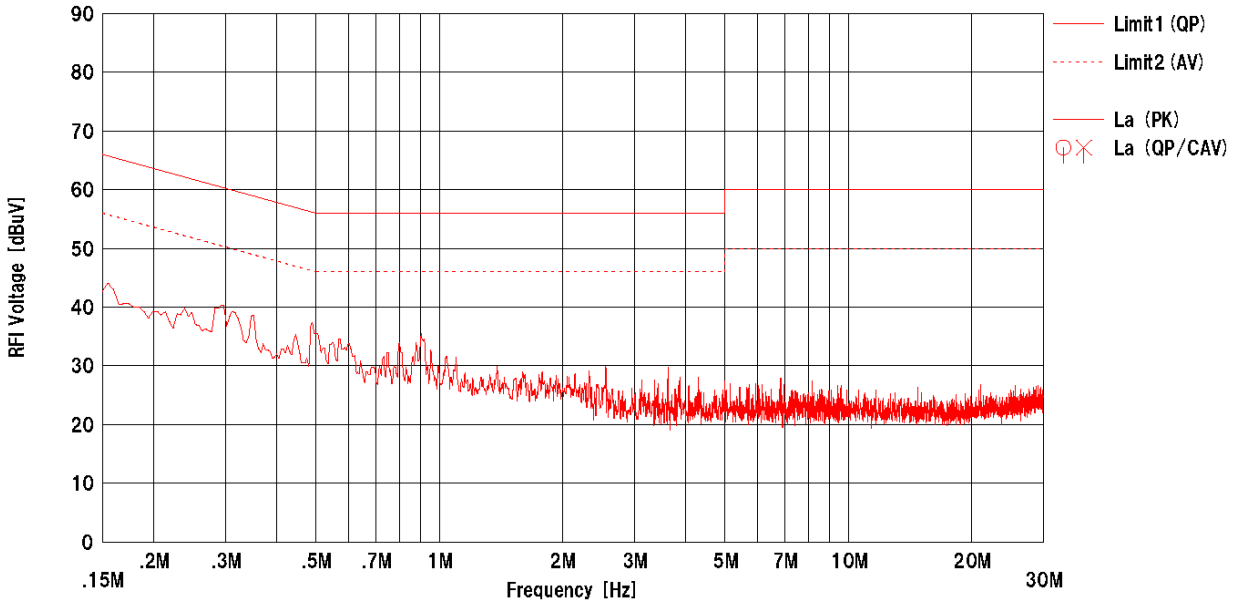


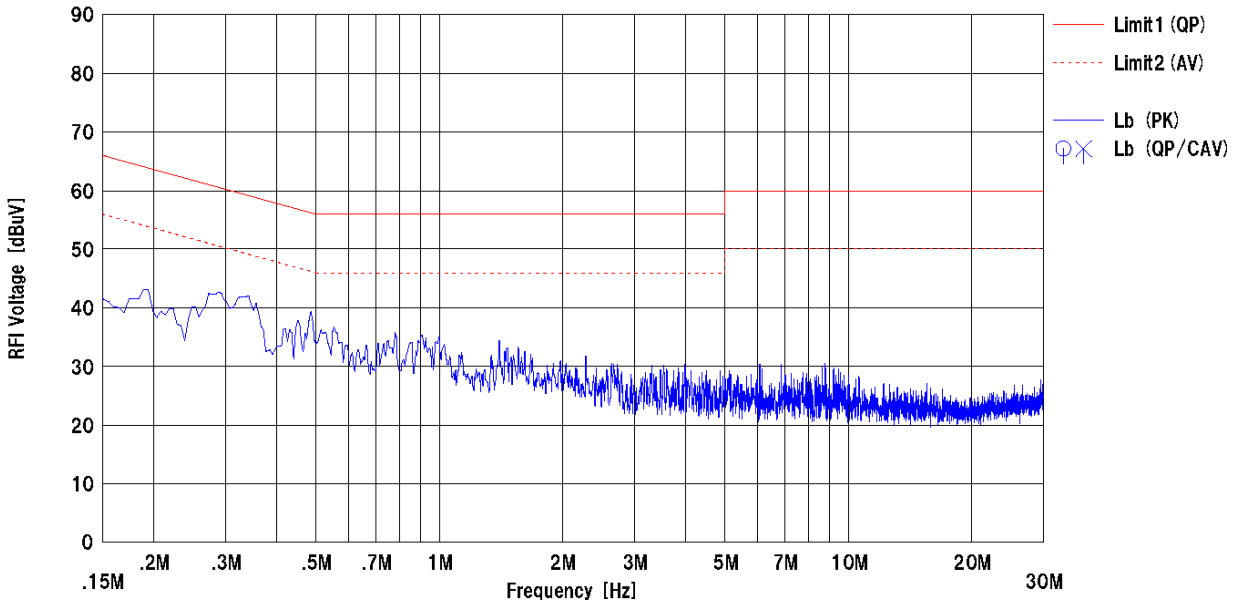
AC 120V 60Hz_2440MHz_2Mbps



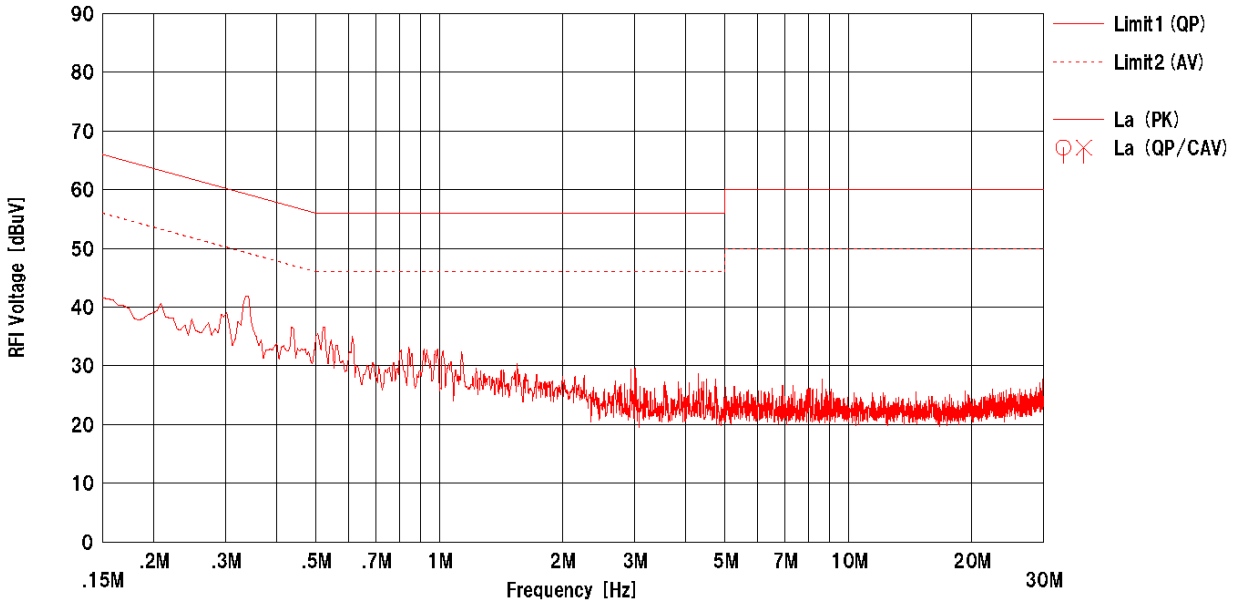


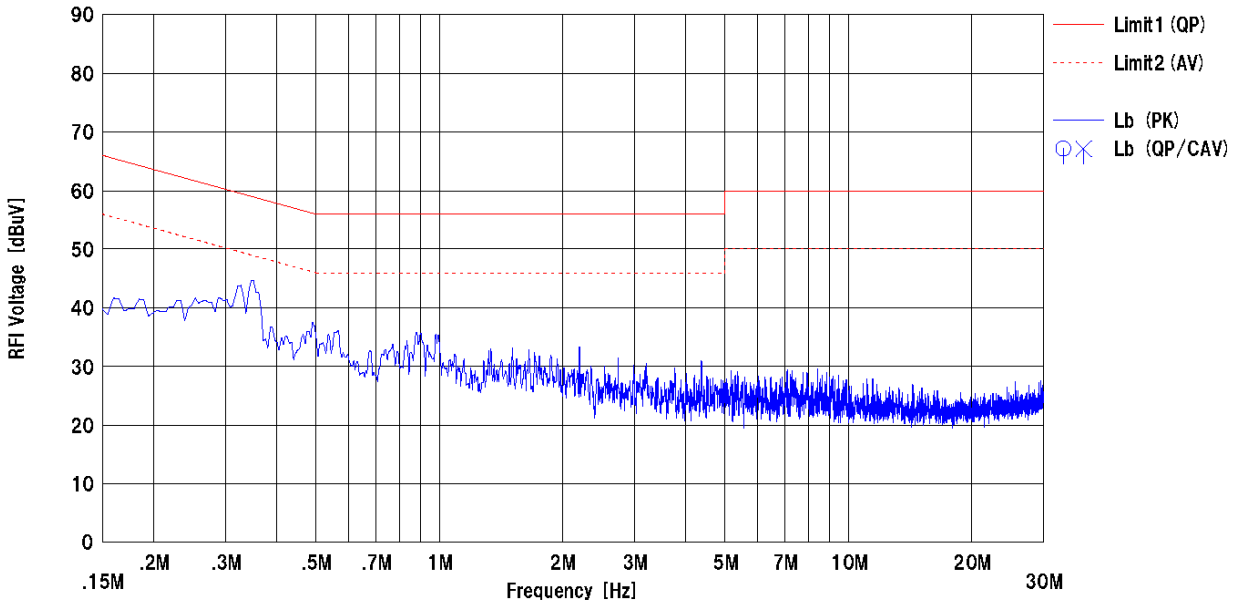
AC 120V 60Hz_2480MHz_1Mbps



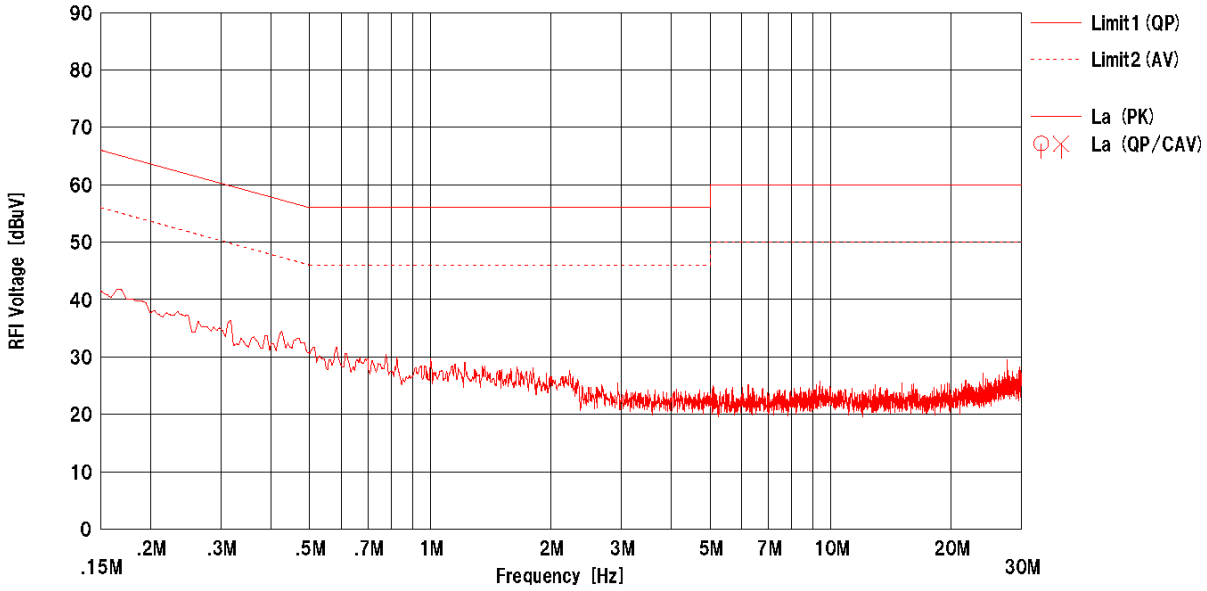


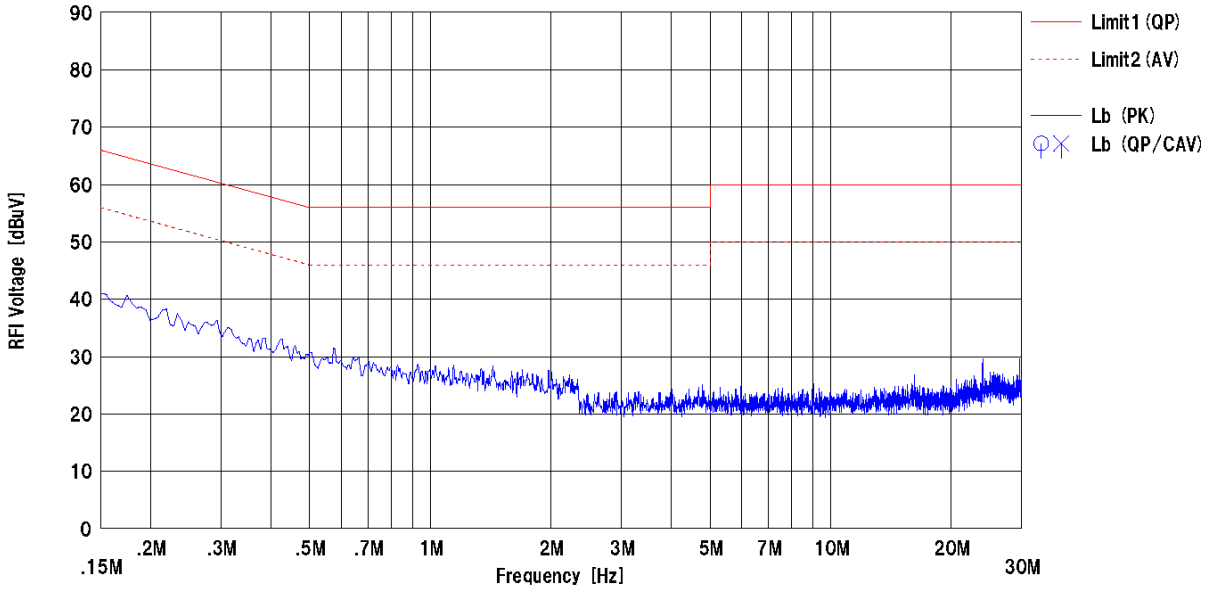
AC 120V 60Hz_2480MHz_2Mbps



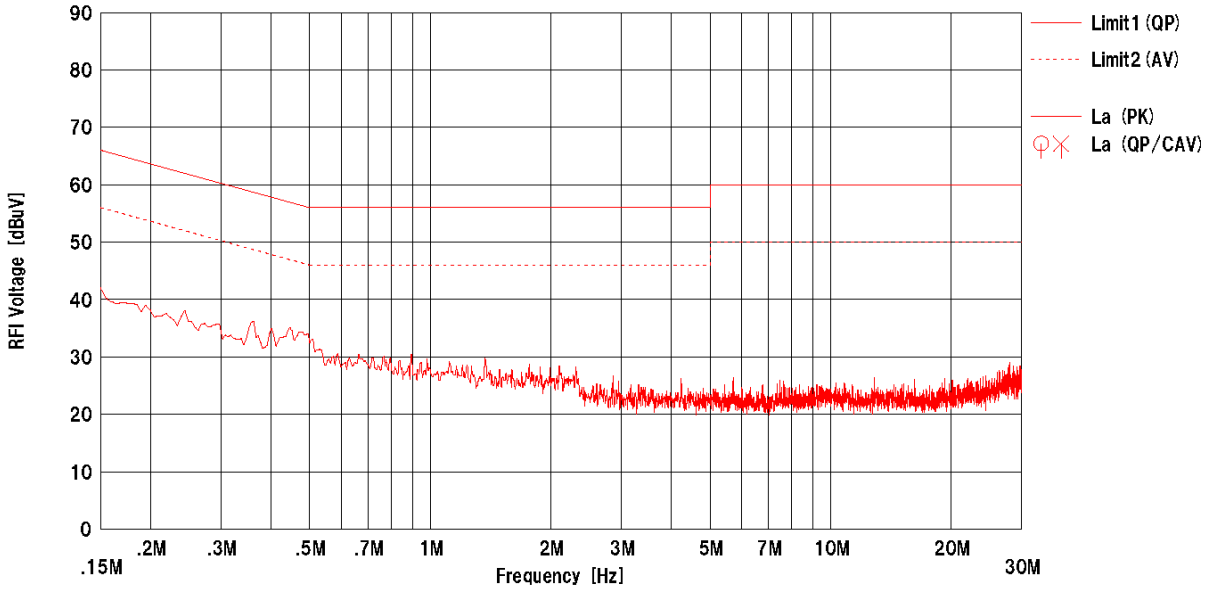


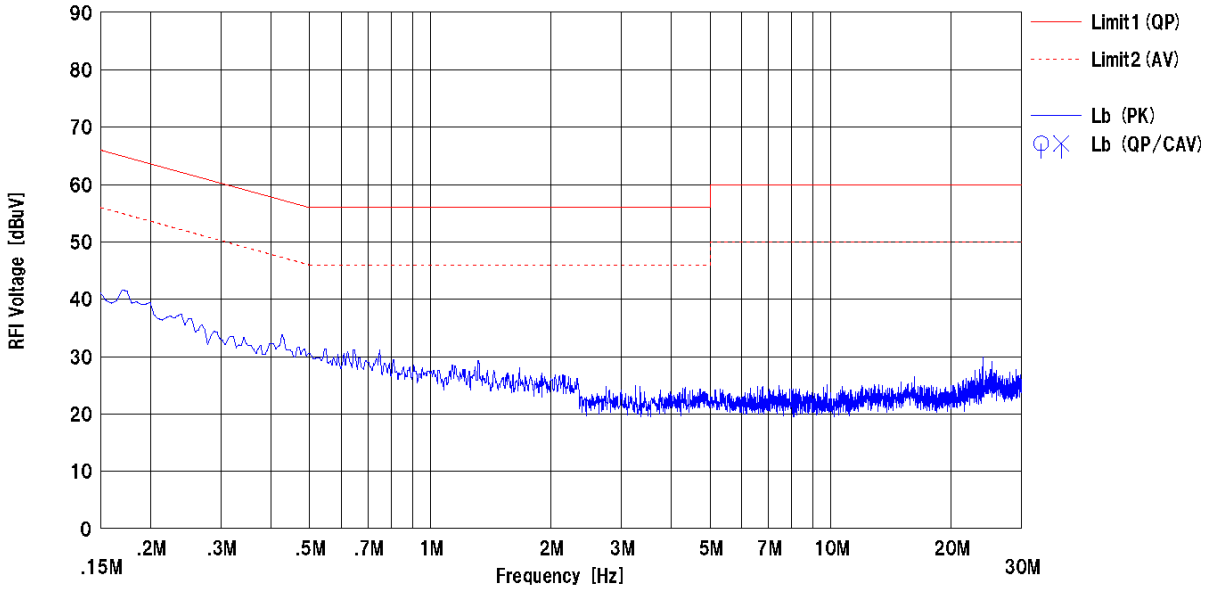
DC5V _2402MHz_1Mbps



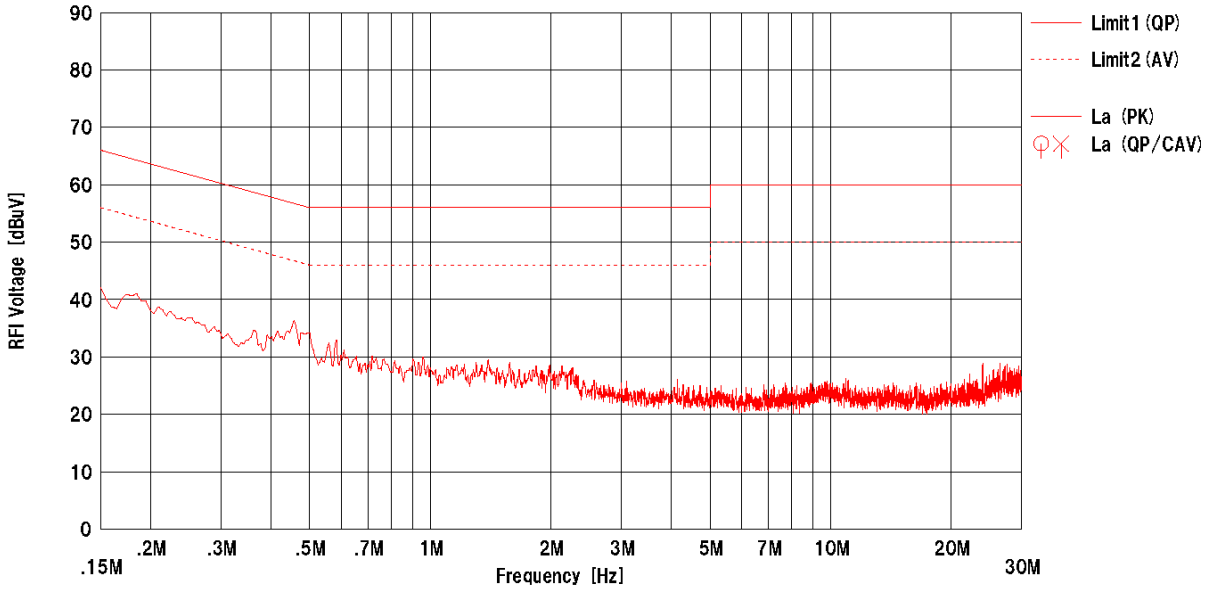


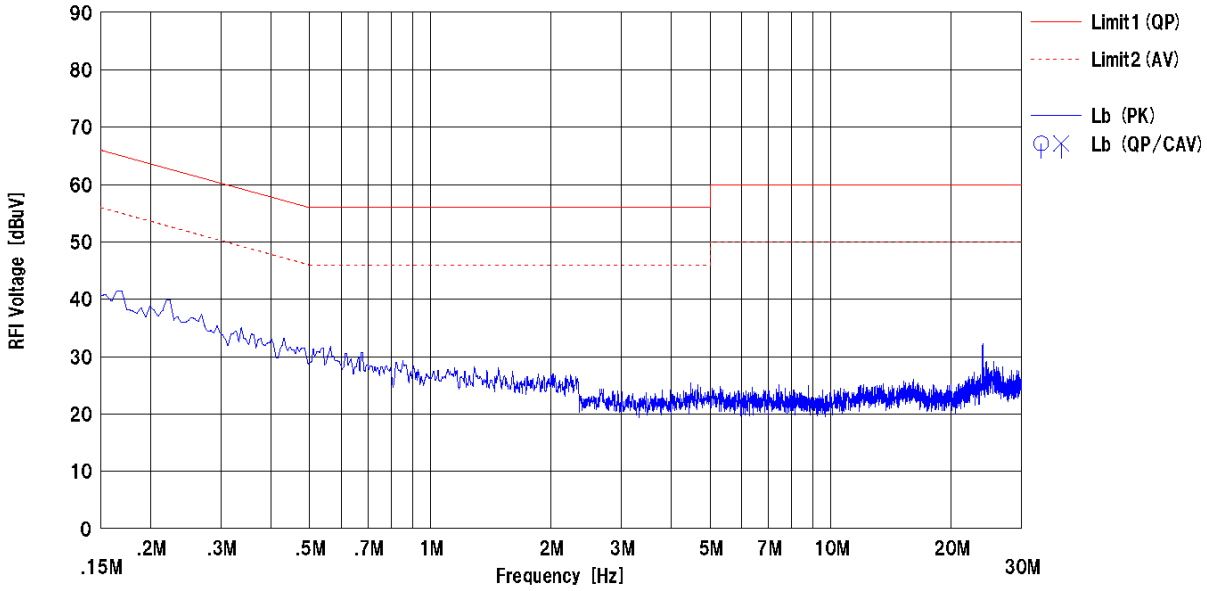
DC5V _2402MHz_2Mbps



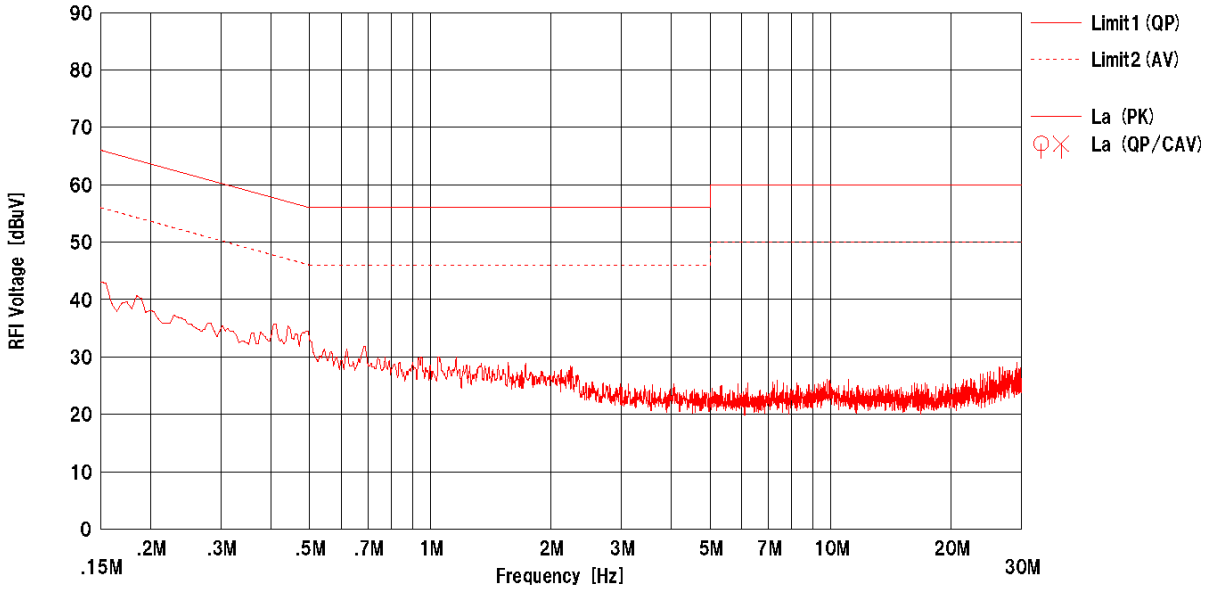


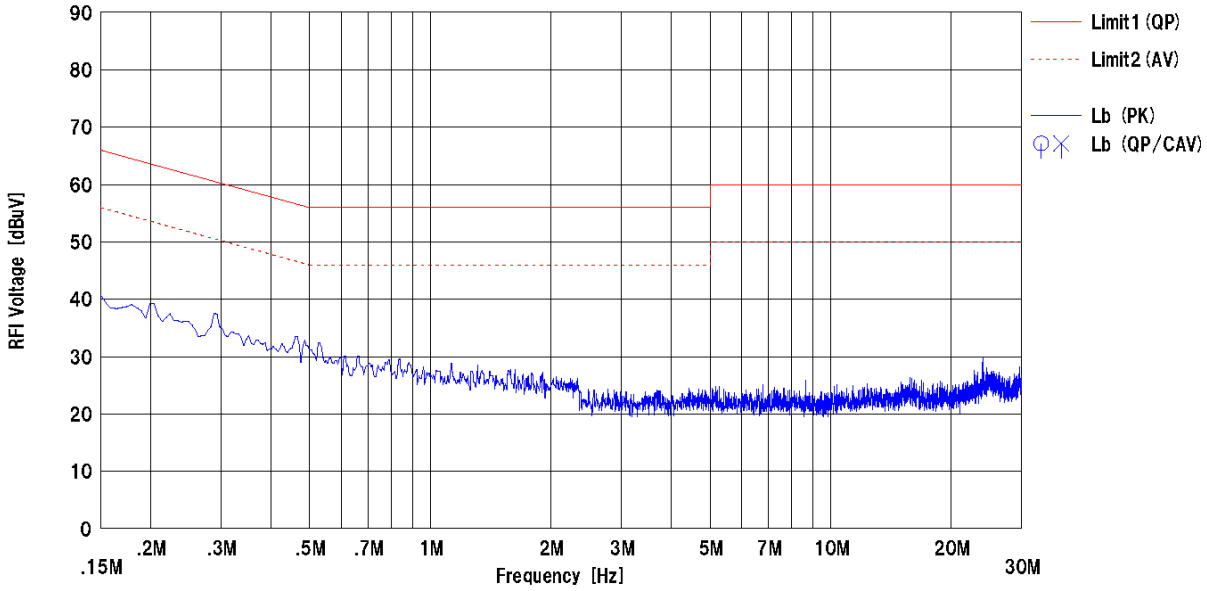
DC5V _2440MHz_1Mbps



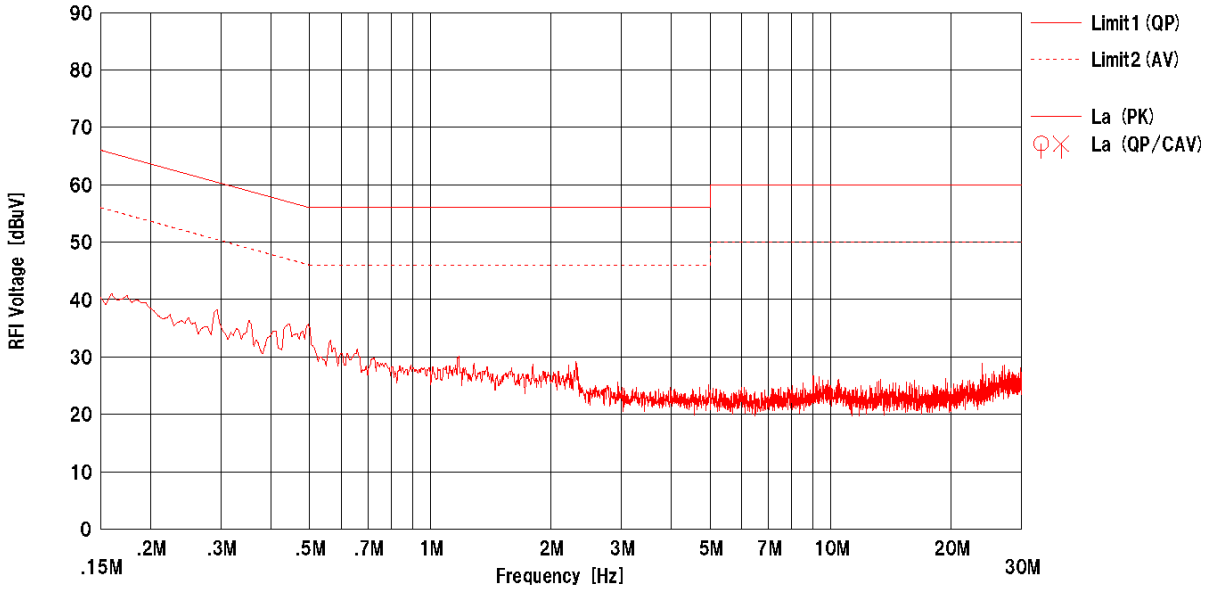


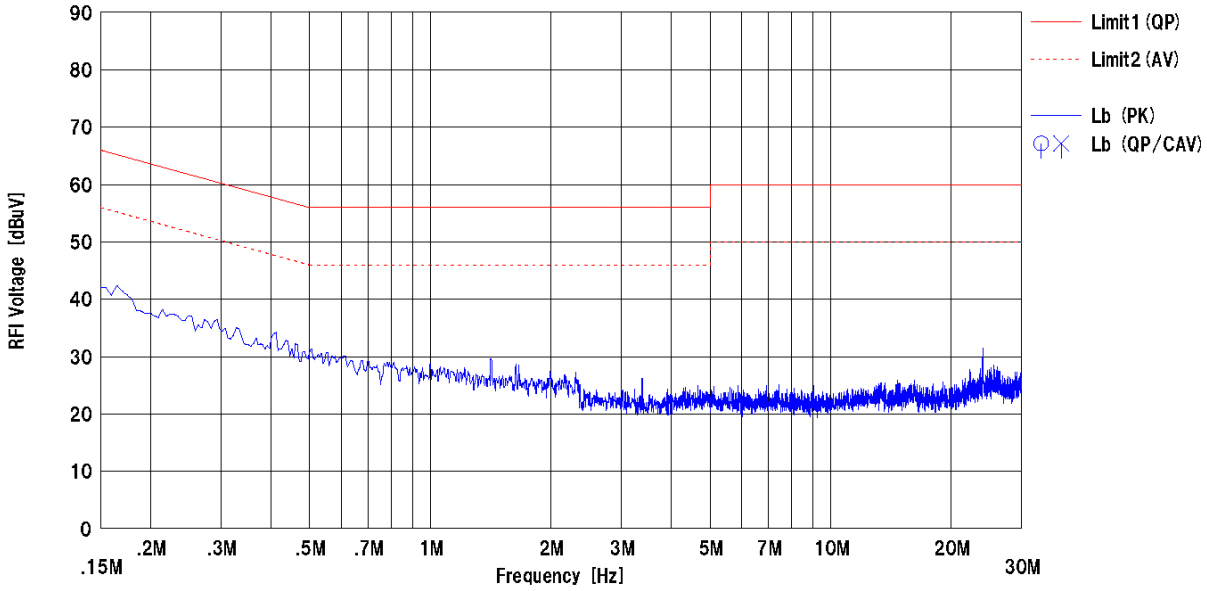
DC5V _2440MHz_2Mbps



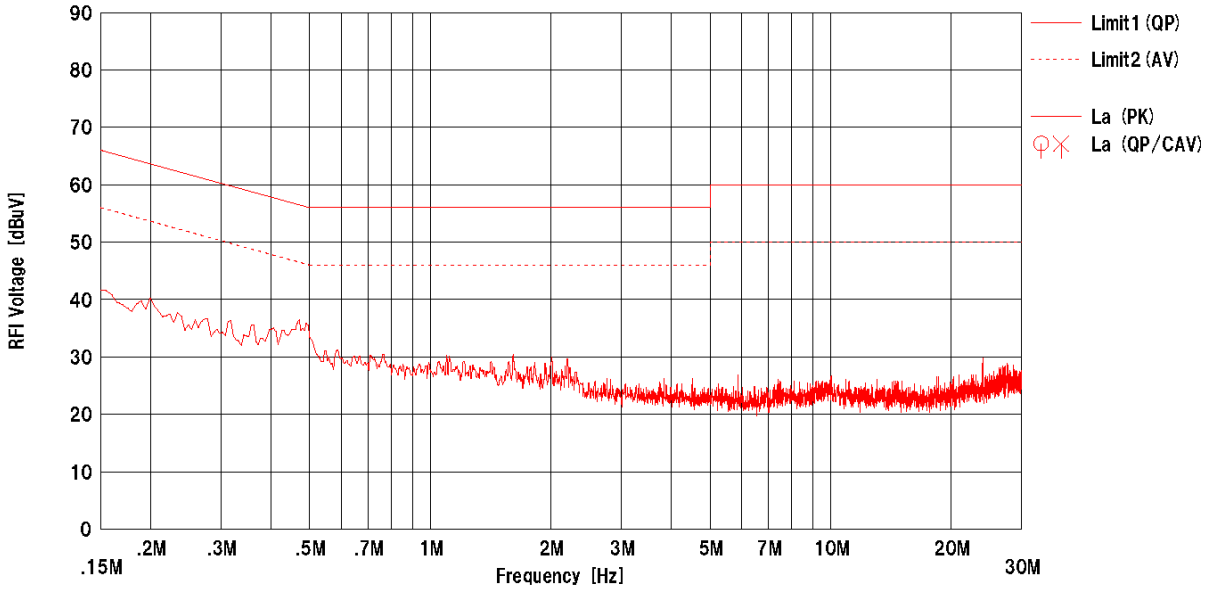


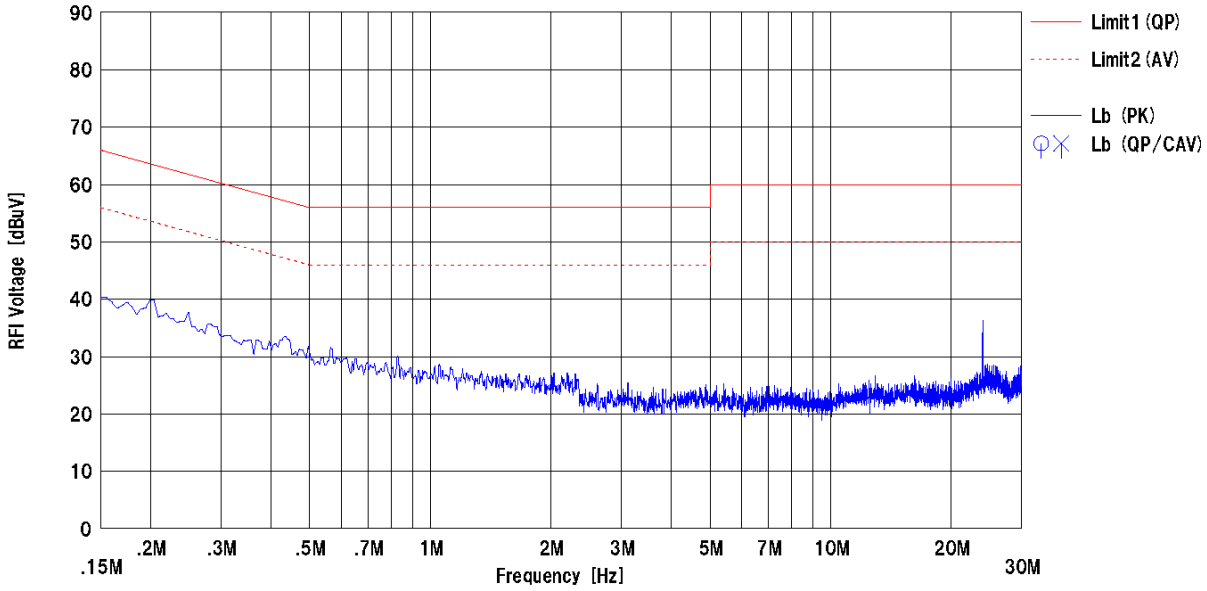
DC5V _2480MHz_1Mbps



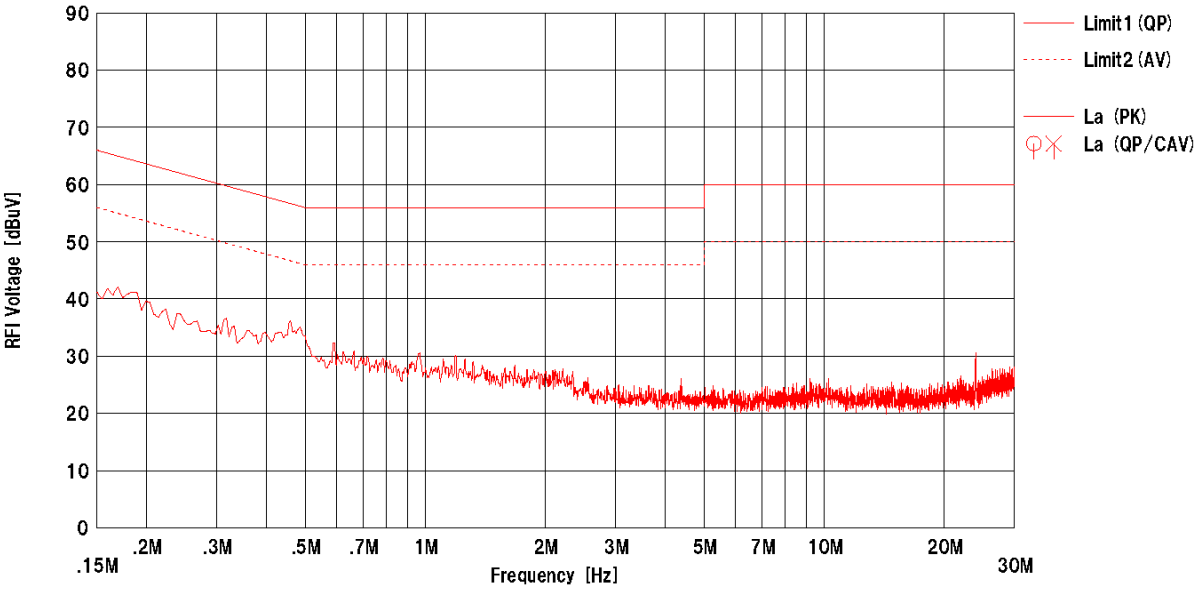


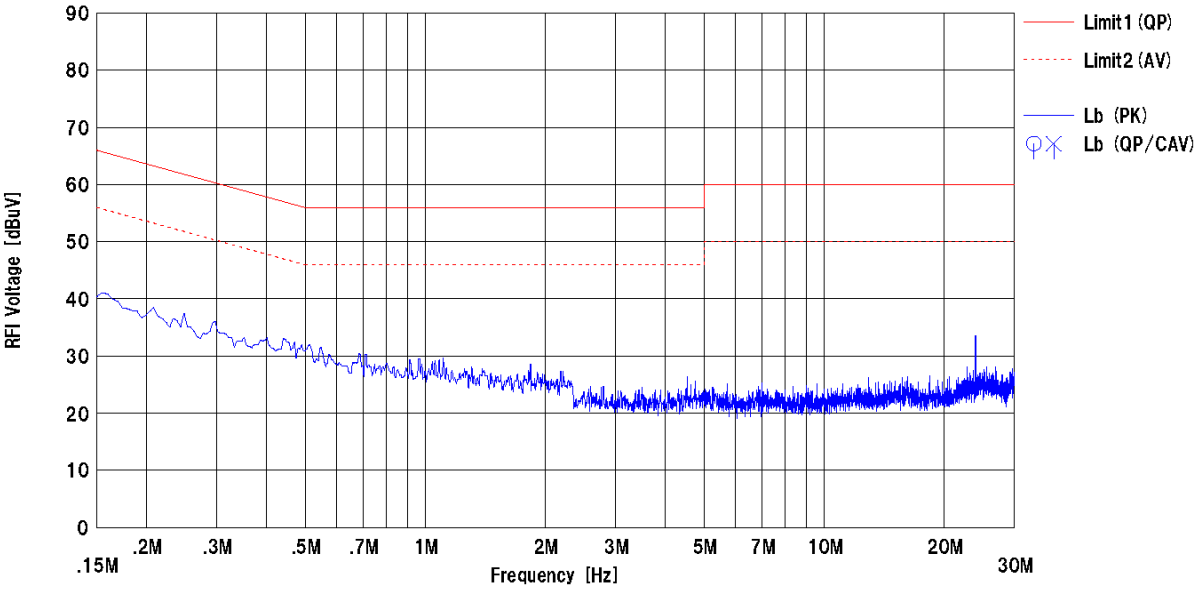
DC5V_2480MHz_2Mbps



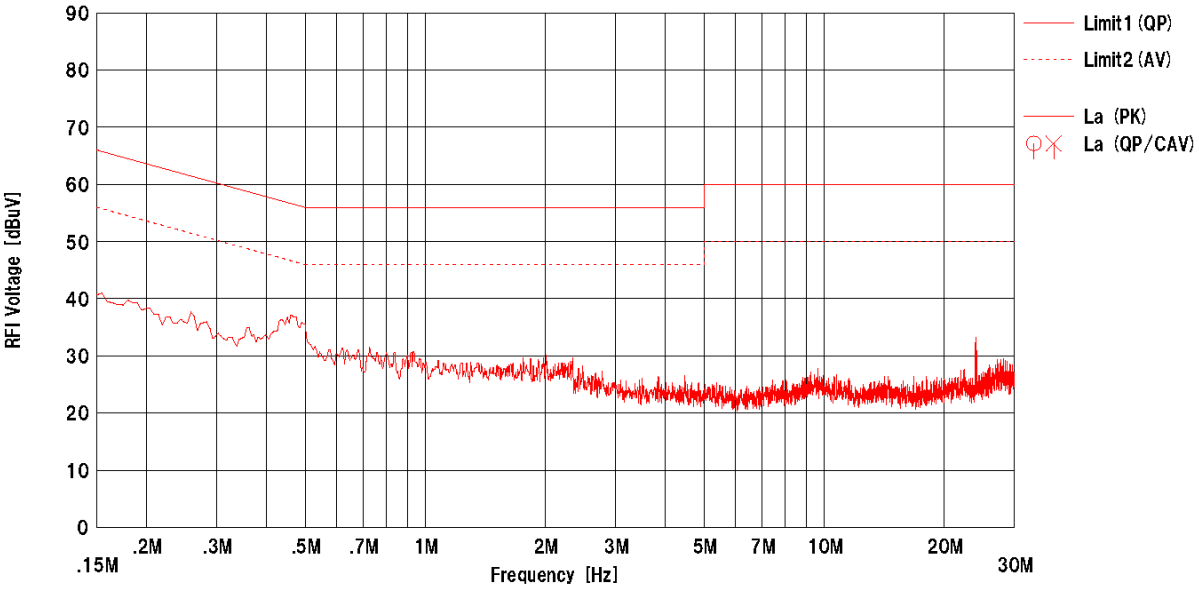


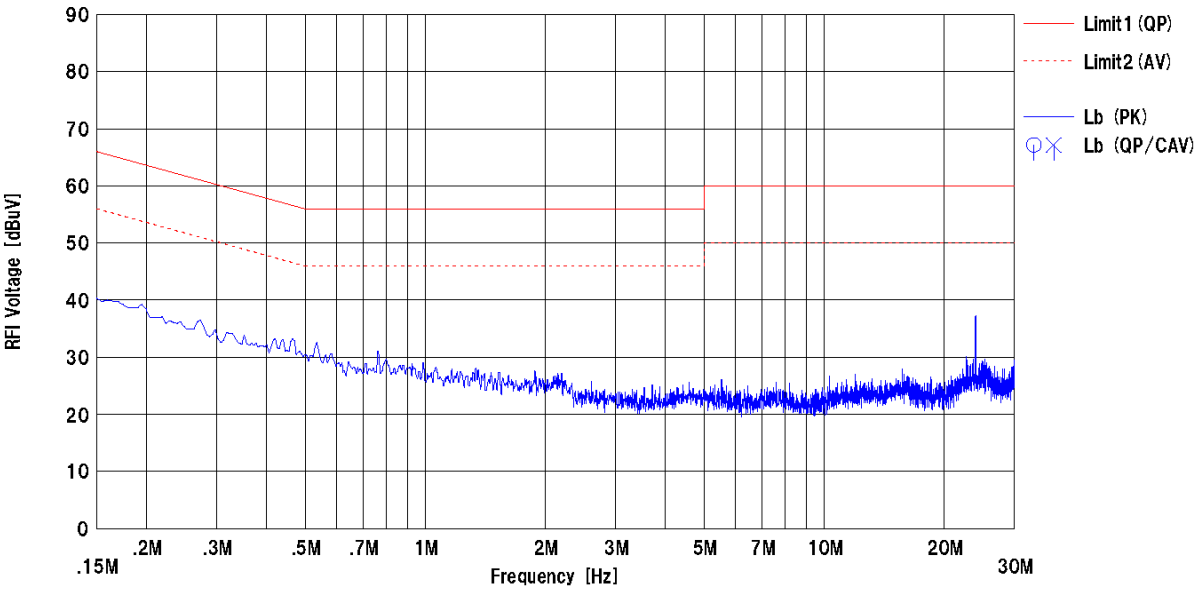
DC3V _2402MHz_1Mbps



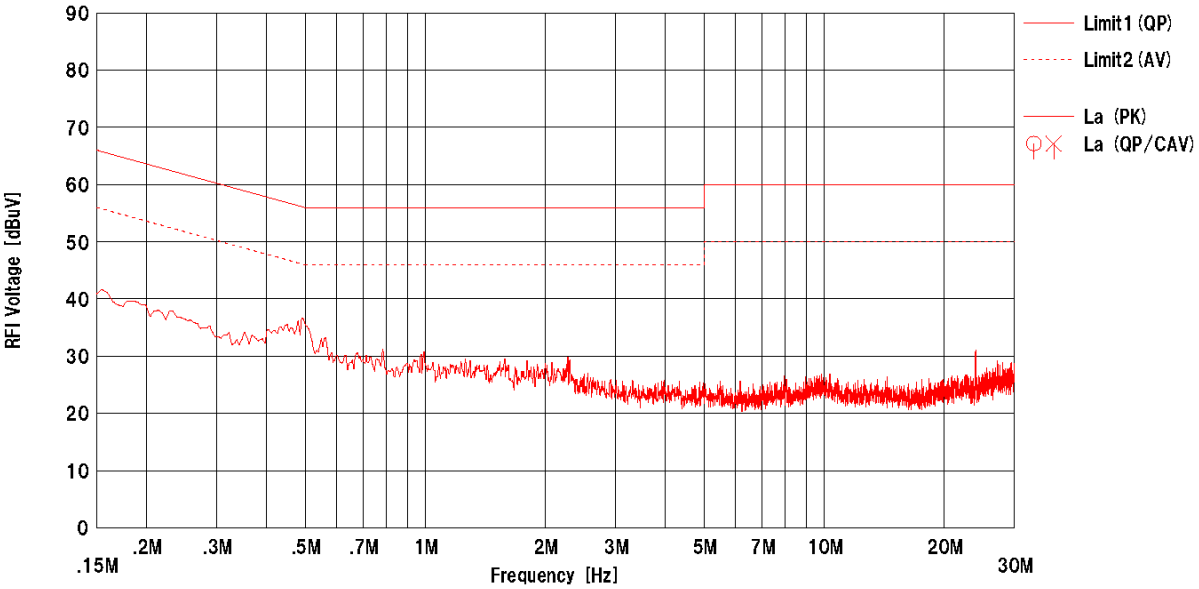


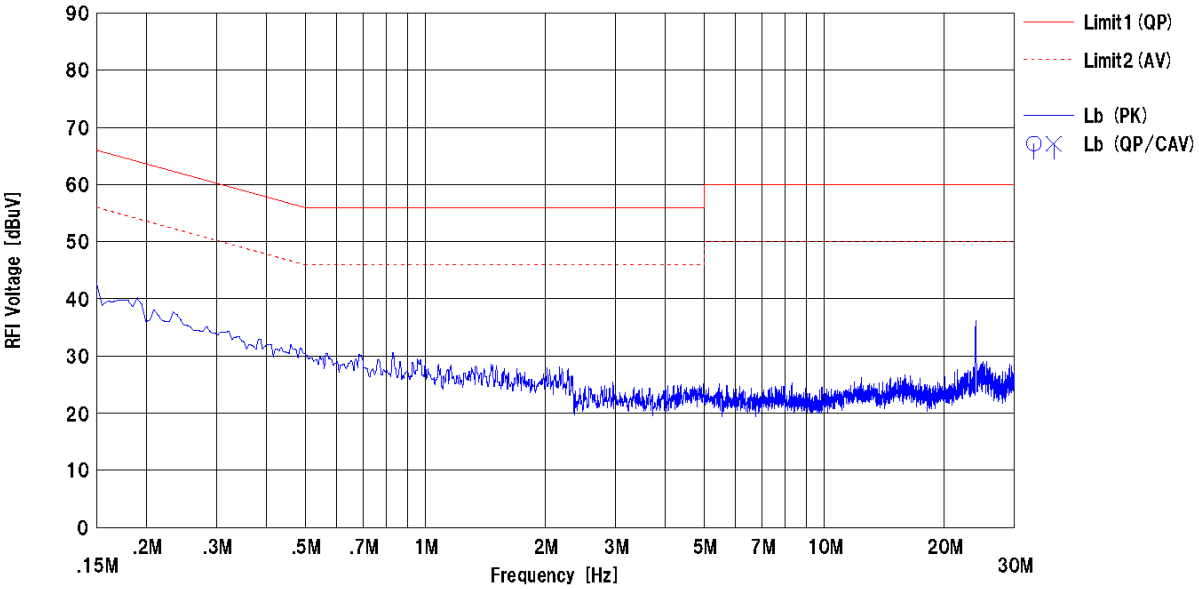
DC3V _2402MHz_2Mbps



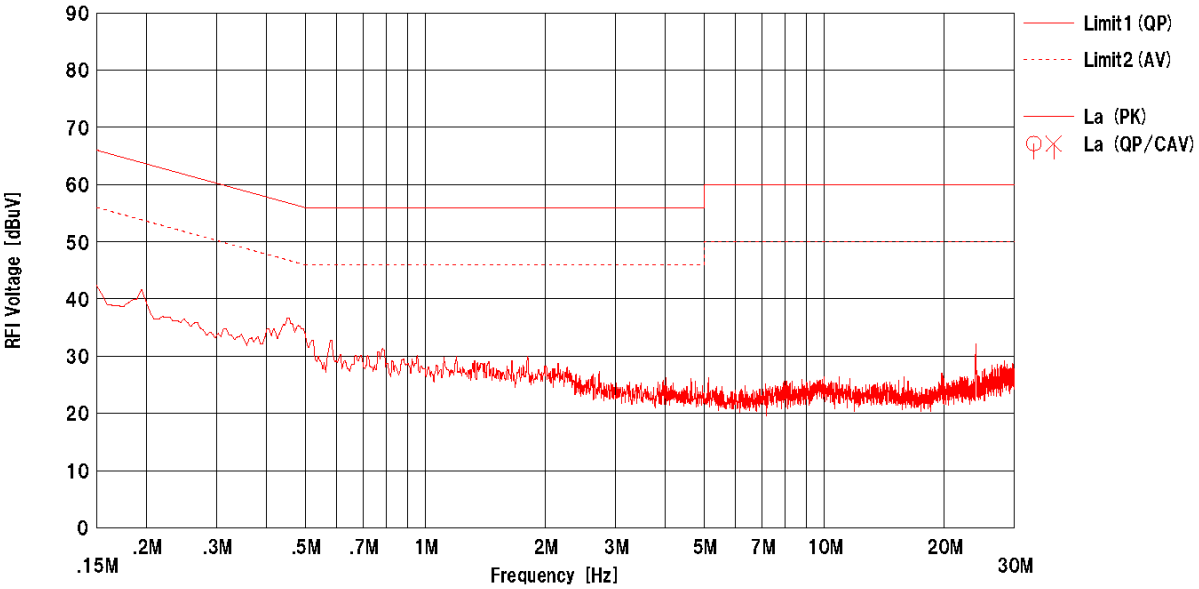


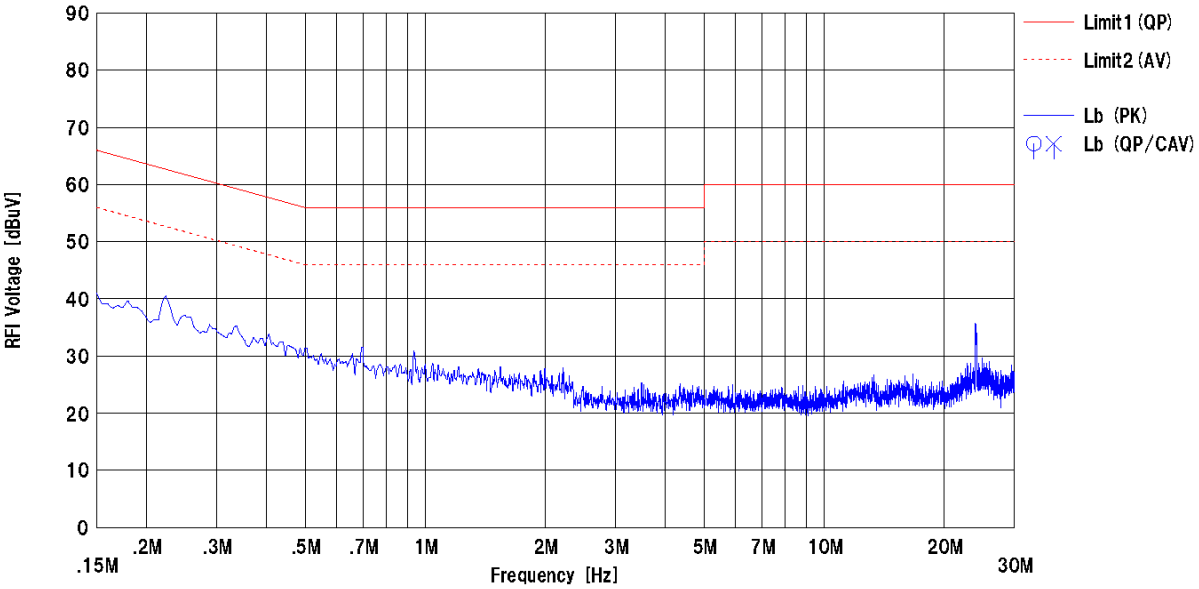
DC3V _2440MHz_1Mbps



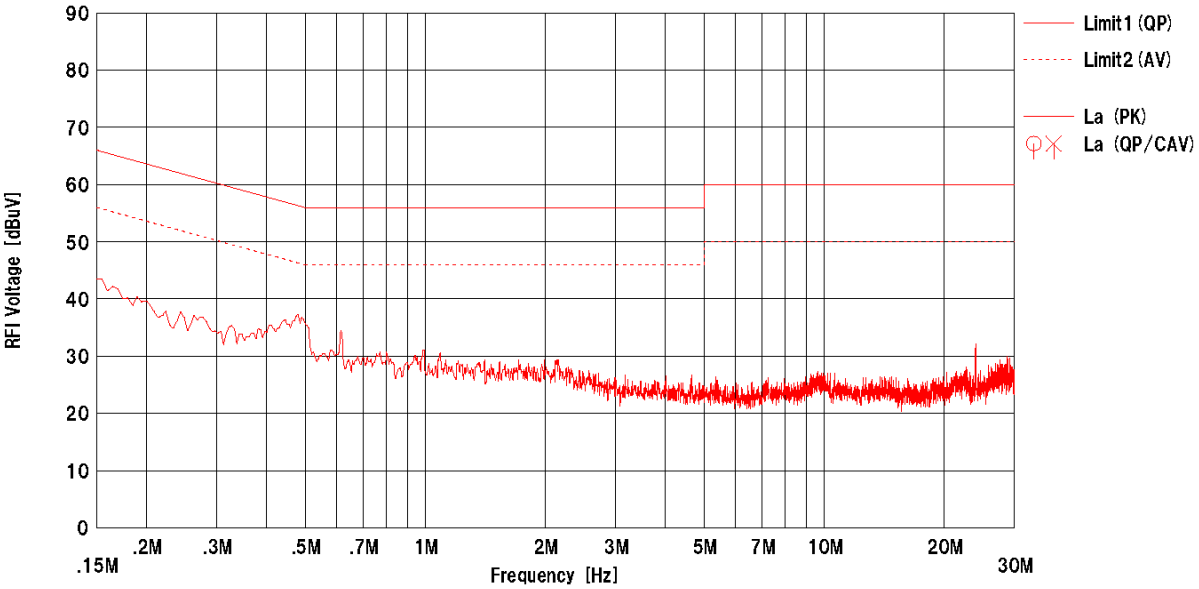


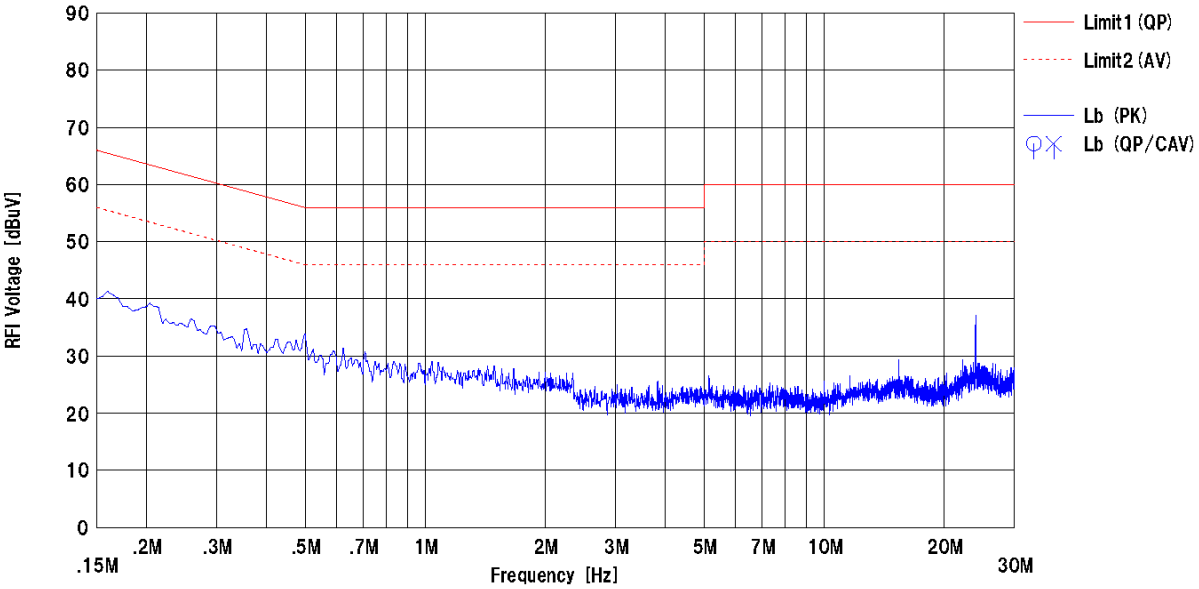
DC3V _2440MHz_2Mbps



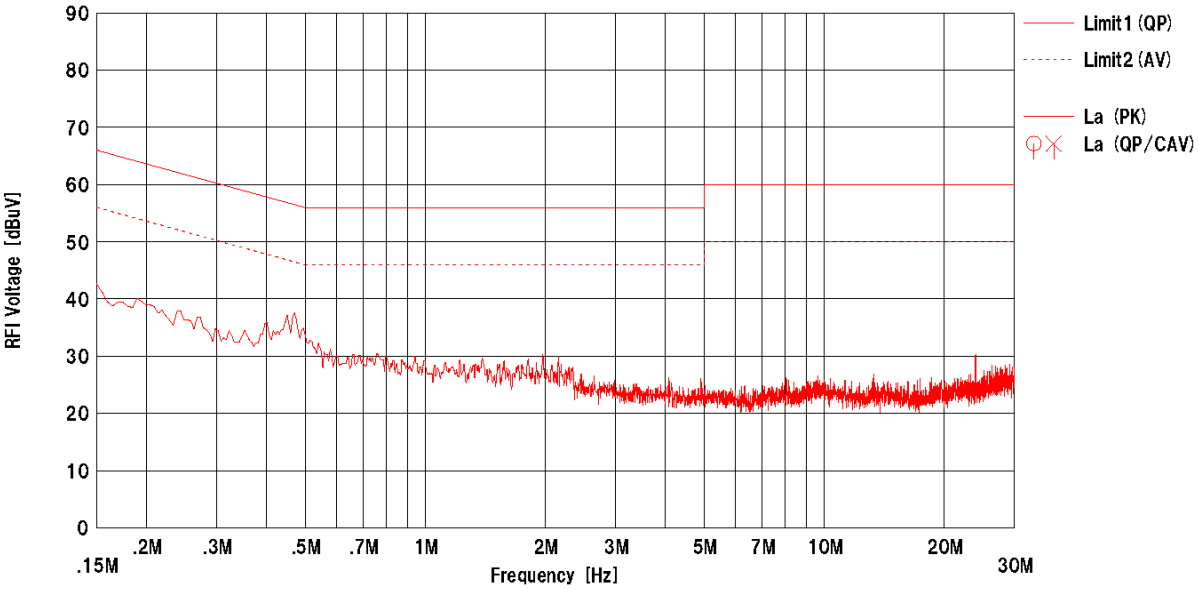


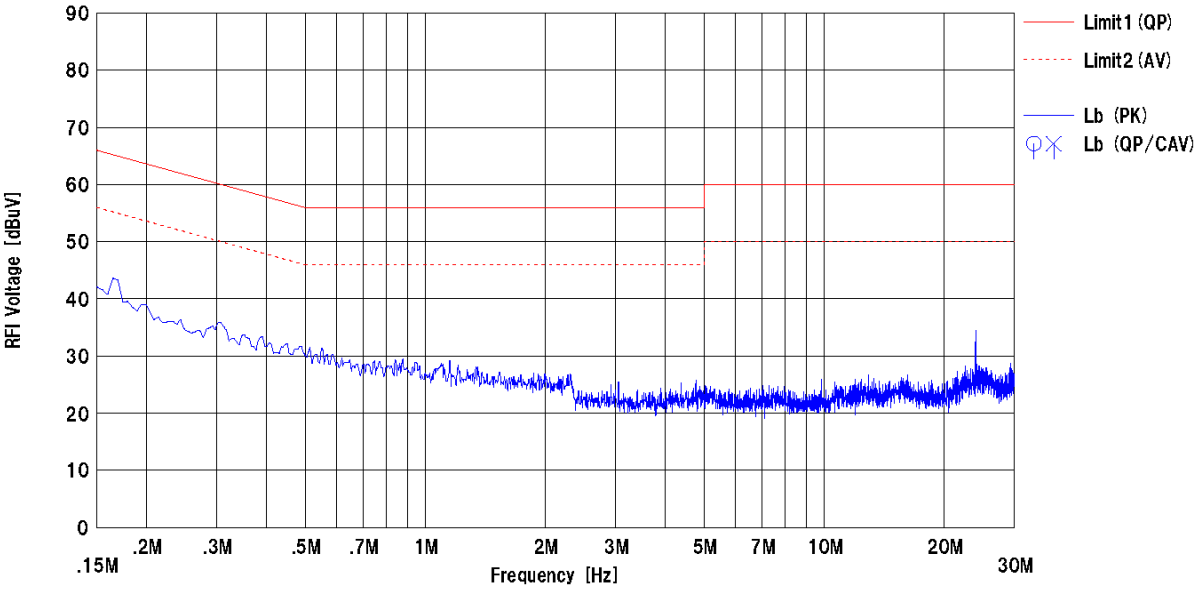
DC3V _2480MHz_1Mbps





DC3V_2480MHz_2Mbps





6. 6dB BANDWIDTH MEASUREMENT (DTS only)

6.1. Test Procedure

(1) Connect the EUT RF output port to spectrum analyzer (*1) via calibrated coaxial cable and suitable attenuator (if necessary).
(2) Activates the EUT System and execute the software prepared for test, if necessary.
(3) To find out the worst condition, the transmitting data rate of EUT is changed.
(4) 6dB Bandwidth is measured using the function of spectrum analyzer.

[Note]
(*1) Spectrum Analyzer Set Up Conditions

Resolution bandwidth	: 100kHz
Video bandwidth	:≧3×RBW
Detector function	: Peak
x dB	: -6dB

6.2. Test Results

BT LE 1Mbps

Measured Frequency (MHz)	6dB Bandwidth (MHz)	Limit (MHz)
2402	0.71	≥0.50
2400	0.72	≥0.50
2480	0.72	≥0.50

BT LE 2Mbps

Measured Frequency (MHz)	6dB Bandwidth (MHz)	Limit (MHz)
2402	1.15	≥0.50
2400	1.15	≥0.50
2480	1.16	≥0.50

[Note]
See next page figure.

Tested Date	Environment (before the test / after the test)			Power Supply Voltage (before the test / after the test)
	Temperature	Humidity	Atmospheric Pressure	
10 December 2020	24 °C / 24 °C	31 % / 31 %	1003 hPa	☐DC V / V ■AC 120V / 120V Freq. 60Hz / 60Hz