TEST REPORT

For

Microcomputer Board

In conformity with

FCC CFR 47 Part15 Subpart C / RSS-247 Issue 2

Model (HVIN/PMN)	**: RTK5RX23W0C00000BJ**
FCC ID	**: 2AEMXRX23WTBQ56**
ISED ID	**: 20194-RX23WTBQ56**
Report No.	**: WE190516BB2-13**
Issue Date	**: November 28, 2019**

Prepared for

Renesas Electronics Corporation
3-2-24 Toyosu, Koto-ku, Tokyo 135-0061, Japan

Prepared by

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History

Report No.	Date	Revisions	Issued By
WE190516BB2-11	July 19, 2019	Initial Issue	K. Onishi
WE190516BB2-12	November 22, 2019	Correct FCC ID (Page. 1, 3) Correct test data (Page. 13, 17) Add other test data (Clause 2.6)	K.Onishi
WE190516BB2-13	November 28, 2019	Add extrapolation factor (Clause 2.6)	K. Onishi

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1 General information

1.1 Product description

Test item	: Microcomputer Board
Manufacturer	: meistier corporation
Address	: 2081-17 Tabaru, Mashiki-machi, Kamimashiki-gun, Kumamoto
Model (HVIN/PMN)	: RTK5RX23W0C00000BJ
FCC ID	: 2AEMXRX23WTBQ56
ISED ID	: 20194-RX23WTBQ56
Serial number	: WS027
Hardware version	: WS Ver.1
Software version	: WS Ver.1
Operating frequency	: 2402 - 2480 MHz
Modulation	: GFSK (Bluetooth Ver. 5.0 LE)
Antenna Gain	: +1.6 dBi (manufacturer declaration)
Receipt date of EUT	: June 14, 2019
Nominal power source voltages	: DC 5.0 V (USB)

1.2 Test(s) performed/ Summary of test result

Test specification(s)	: FCC CFR 47 Part 15 Subpart C (01 Oct. 2018) RSS-247 Issue 2, RSS-Gen Issue 5
Test method(s)	: ANSI C63.10: 2013
Test(s) started	: June 17, 2019
Test(s) completed	: July 10, 2019
Summary of test result	: *Complied*

Note: The above judgment is only based on the measurement data and it does not include the measurement uncertainty. Accordingly, the statement below is applied to the test result.
The EUT complies with the limit required in the standard in case that the margin is not less than the measurement uncertainty in the Laboratory.
Compliance of the EUT is more probable than non-compliance is case that the margin is less than the measurement uncertainty in the Laboratory.

Test engineer : K. Onishi
K. Onishi
Wireless testing laboratory

Reviewer : Y. Taki
Y. Taki
Manager, Wireless testing laboratory

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Member of the SGS Group (Société Générale de Surveillance)

1.3 Test facility

[Yokohama Laboratory]

Address: 472, Nippa-cho, Kohoku-ku, Yokohama, 223-0057, Japan
TEL: +81-45-534-0645
FAX: +81-45-592-7506

Accredited by National Voluntary Laboratory Accreditation Program (NVLAP) for the emission tests stated in the scope of the certificate under Certificate Number 200780-0

Registered by Innovation, Science and Economic Development Canada (ISED):
The registered CAB identifier is JP0009.

Registered by Voluntary Control Council for Interference by Information Technology Equipment (VCCI)
Each registered facility number is as follows;
Test site A-0045

[Kitayamata laboratory]

Address: 3-5-23, Kitayamata, Tsuzuki-ku, Yokohama, 224-0021, Japan
TEL: +81-45-550-3520
FAX: +81-45-592-7506

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Registered by Innovation, Science and Economic Development Canada (ISED):
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Test site A-0212

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TESTING
NVLAP LAB CODE 200780-0

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1.4 Measurement uncertainty

The treatment of uncertainty is based on the general matters on the definition of uncertainty in "Guide to the expression of uncertainty in measurement (GUM)" published by ISO. The Lab's uncertainty is determined by referring ETSI TR 100 028-1 V1.4.1 (2001-12).
The uncertainty of the measurement result in the level of confidence of approximately 95% (k=2) is as follows;

Conducted emission (150 kHz - 30 MHz):	± 3.3 dB
Radiated emission (9 kHz - 30 MHz):	± 5.0 dB
Radiated emission (30 MHz - 1000 MHz):	± 5.2 dB
Radiated emission (1 GHz - 6 GHz):	± 4.9 dB
Radiated emission (6 GHz - 18 GHz):	± 4.9 dB
Radiated emission (18 GHz - 26 GHz):	± 5.5 dB

1.5 Summary of test results

Requirement	Section in FCC	Section in RSS-247	Result	Section in this report
Occupied Bandwidth (99 %)	2.1049	6.7 (RSS-Gen)	Complied	2.1
6 dB Bandwidth	15.247 (a) (2)	5.2 (a)	Complied	2.2
Conducted Output Power	15.247 (b) (3)	5.4 (d)	Complied	2.3
Conducted Spurious Emission	15.247 (d)	5.5	Complied	2.4
Power Spectral Density	15.247 (e)	5.2 (b)	Complied	2.5
Transmitter Radiated Spurious Emissions	15.247(d), 15.205 (a)	8.9/8.10 (RSS-Gen)	Complied	2.6
AC power line conducted emissions	15.207	8.8 (RSS-Gen)	Complied	2.7
Radiated Emissions (Receiver)	-	7.3 (RSS-Gen)	Complied	2.8
AC power line conducted emissions (Receiver)	-	7.2 (RSS-Gen)	Complied	2.9

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1.6 Setup of equipment under test (EUT)

1.6.1 Test configuration of EUT

Equipment(s) under test

No.	Item	Model No.	Manufacture	Serial No.
A	Microcomputer Board	RTK5RX23W0C00000BJ	meistier	WS027
-	-	-	-	-

Support Equipment(s)

No.	Item	Model No.	Manufacture	Serial No.
B	PC	PC-VK17HBBCD	NEC	26012321A
C	AC adapter	ADP-65JH E	NEC	2208800DD

Connected cable(s)

No.	Item	From	To	Length [m]	Shield	Ferrite Core
1	USB cable	A	B	1.0	Yes	No
2	DC cable	B	C	1.8	No	Yes
3	AC cable	C	AC mains	1.8	No	Yes

1.6.2 Operating condition:

- Tx (2402MHz): The EUT is in normal transmission mode at 2402MHz (2Mbps, 1Mbps, 500kbps, 125kbps)
- Tx (2442MHz): The EUT is in normal transmission mode at 2442MHz (2Mbps, 1Mbps, 500kbps, 125kbps)
- Tx (2480MHz): The EUT is in normal transmission mode at 2480MHz (2Mbps, 1Mbps, 500kbps, 125kbps)
- Rx (2402MHz): The EUT is in normal transmission mode at 2402MHz
- Rx (2442MHz): The EUT is in normal transmission mode at 2442MHz
- Rx (2480MHz): The EUT is in normal transmission mode at 2480MHz

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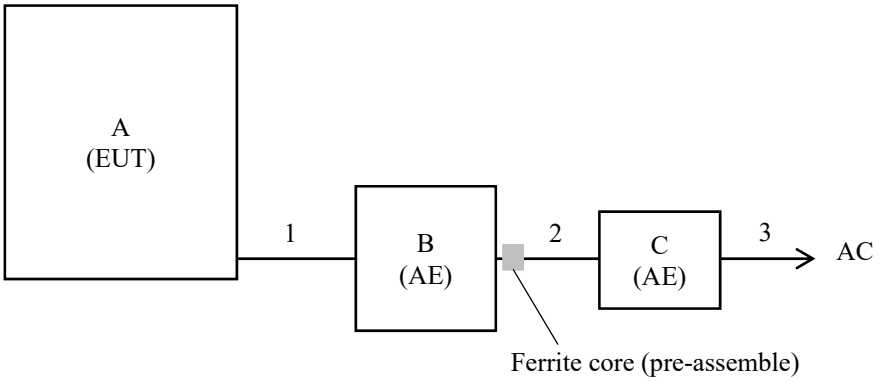
1.6.3 Setup diagram of tested system



1.7 Equipment modifications

No modifications have been made to the equipment in order to achieve compliance with the applicable standards described in clause 1.2.

1.8 Deviation from the standard

No deviations from the standards described in clause 1.2.

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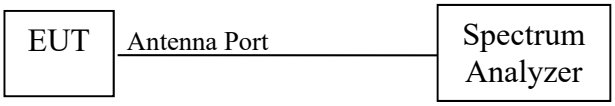
2 Test procedure and test data

2.1 Occupied Bandwidth (99%)

Test setup

Test setup is the following drawing. The antenna port of EUT was connected to the spectrum analyzer.



Test procedure

Spectrum analyzer is set as below according to ANSI C63.10 clause 6.9

- RBW: 1 to 5 % of OBW
- VBW > 3 x RBW
- Span: OBW x 1.5 to 5
- Trace: Max hold

Limitation

There are no limitations.
The measurement value is used for the emission designator.

Test equipment used (refer to List of utilized test equipment)

TR06	CL31	-	-	-	-

Test results

Transmission Frequency [MHz]	Occupied Bandwidth [MHz]	
	1Mbps	2Mbps
2402	1.038	2.049
2442	1.041	2.054
2480	1.043	2.057

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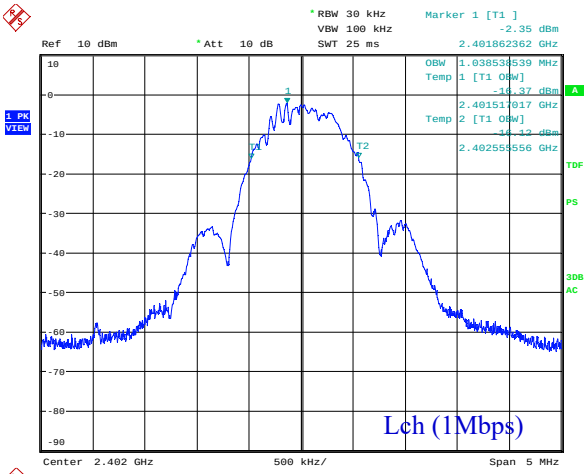

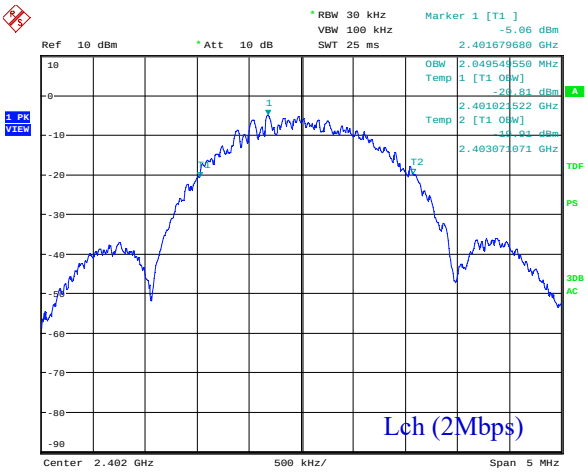

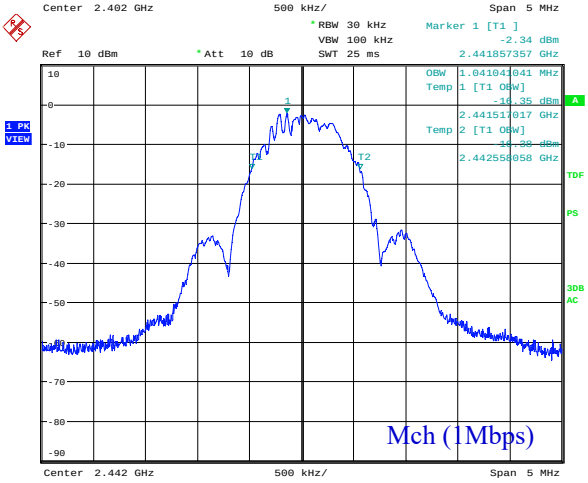

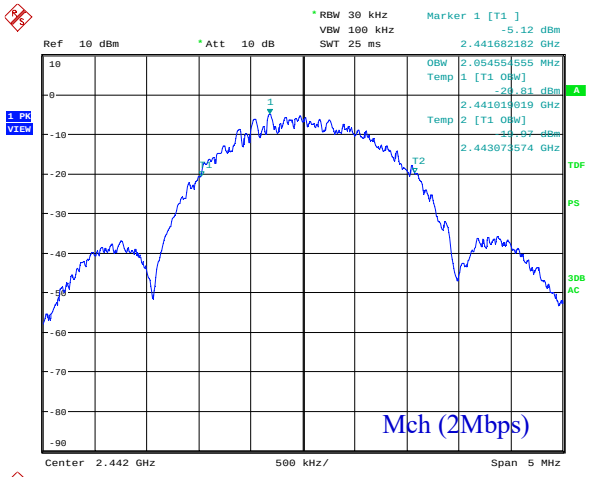

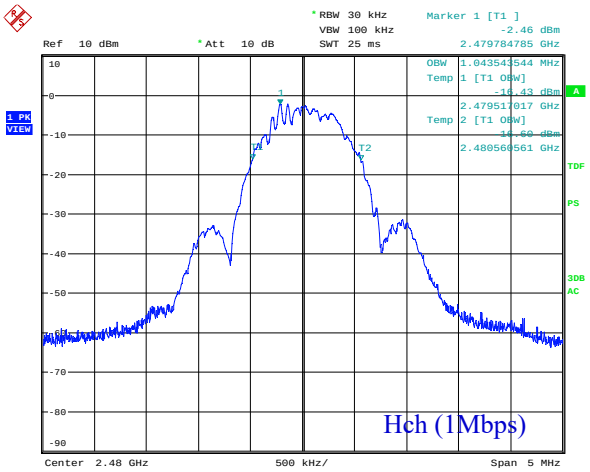

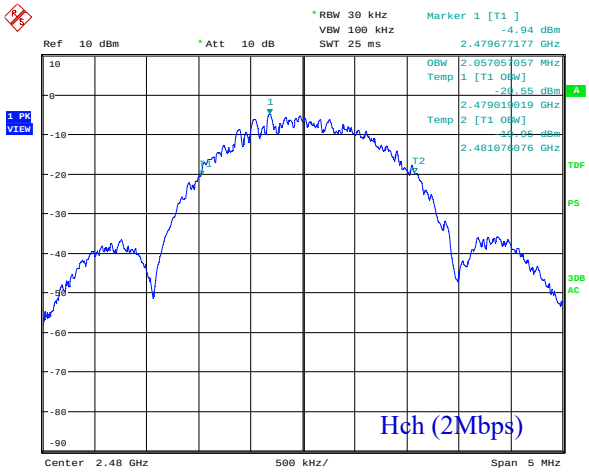

Tested Date:	June 26, 2019	Temperature:	19 degC
Humidity:	54 %	Atmos. Press:	1016 hPa

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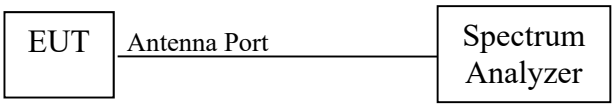
2.2 6dB Bandwidth

Test setup

Test setup is the following drawing. The antenna port of EUT was connected to the spectrum analyzer.



Test procedure

Spectrum analyzer is set as below according to ANSI C63.10 clause 11.8

- RBW: 100 kHz
- VBW: 300 kHz
- Detector: Peak
- Trace: Max hold

Applicable rule and limitation

15.247 (a) (2) / RSS-247 5.2 (a): Systems using digital modulation techniques may operate in the 902-928 MHz, 2400-2483.5 MHz, and 5725-5850 MHz bands. The minimum 6 dB bandwidth shall be at least 500 kHz.

Test equipment used (refer to List of utilized test equipment)

TR06	CL31	-	-	-	-

Test results - *Complied with requirement*

Test Data

Transmission Frequency [MHz]	6 dB Bandwidth [kHz]		Limit [kHz]
	1Mbps	2Mbps	
2402	730.7	1388.8	500
2442	723.2	1391.3	500
2480	733.2	1396.3	500

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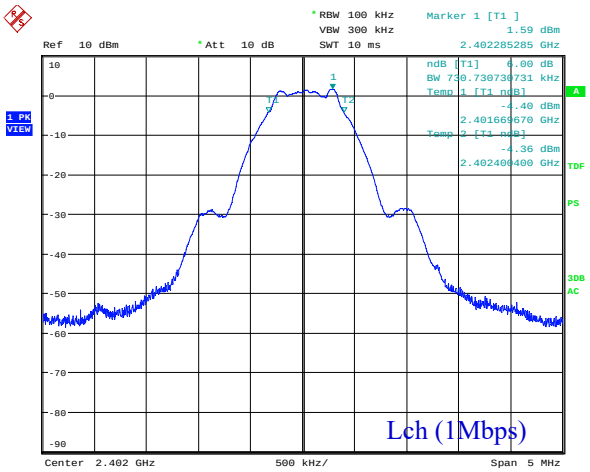

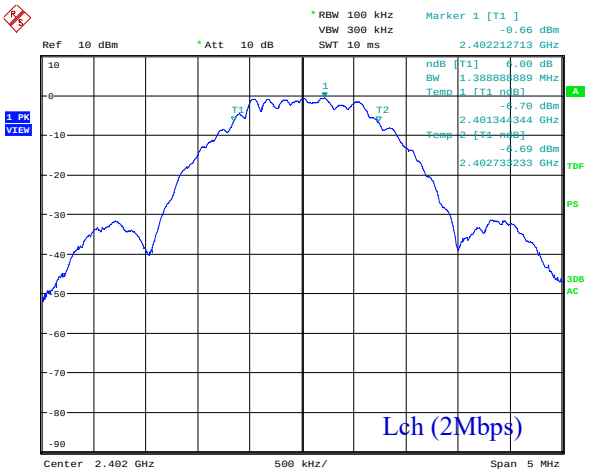

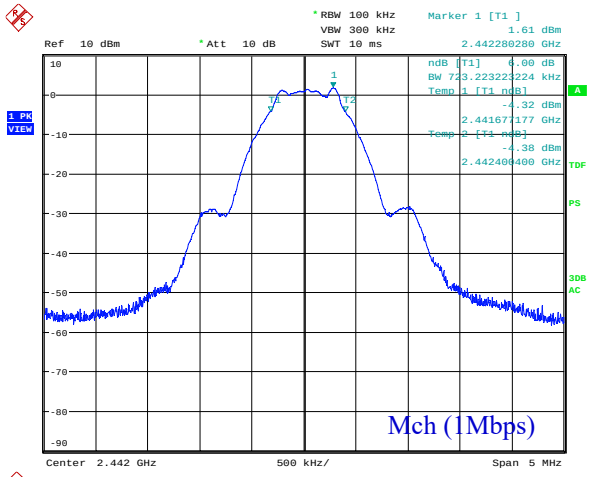

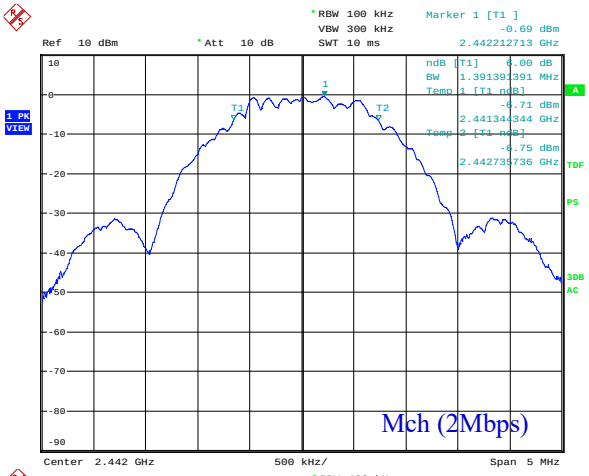

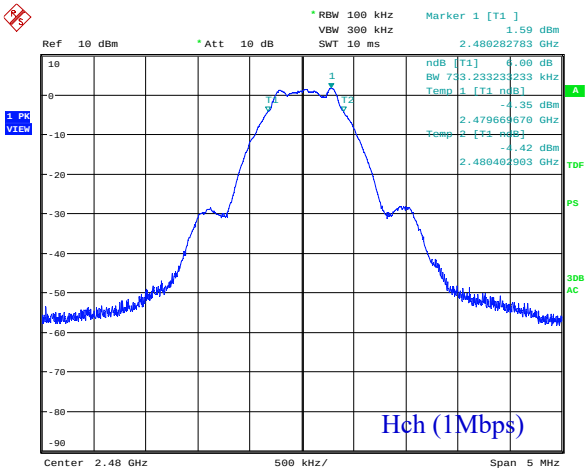

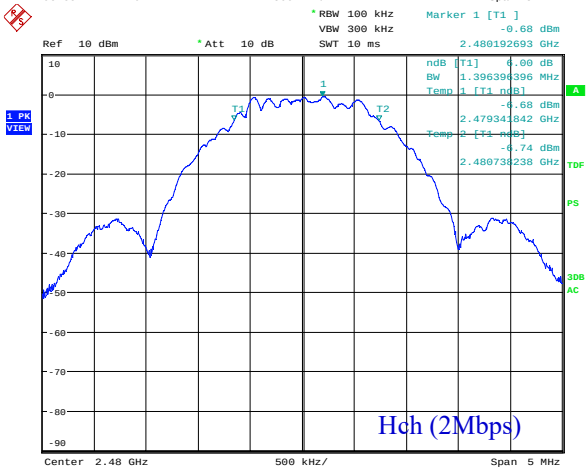

Tested Date:	June 26, 2019	Temperature:	19 degC
Humidity:	54 %	Atmos. Press:	1016 hPa

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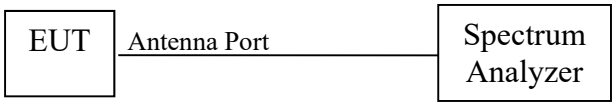
2.3 Peak Output Power

Test setup

Test setup is the following drawing. The antenna port of EUT was connected to the spectrum analyzer.



Test procedure

Spectrum analyzer is set as below according to ANSI C63.10 clause 11.9

- RBW > 6dB BW
- VBW > 3 x RBW
- Span > 3 x RBW
- Detector: Peak
- Trace: Max hold

Applicable rule and limitation

15.247(b) (3) / RSS-247 5.4 (d): For systems using digital modulation in the 902-928 MHz, 2400-2483.5MHz, and 5725-5850 MHz bands: 1 Watt (30 dBm).

Test equipment used (refer to List of utilized test equipment)

TR06	CL31	-	-	-	-

Test results - *Complied with requirement*

Test Data

Transmission Frequency [MHz]	Output Power [dBm]		Limit [dBm]
	1Mbps	2Mbps	
2402	2.45	2.53	30
2442	2.47	2.56	30
2480	2.54	2.60	30

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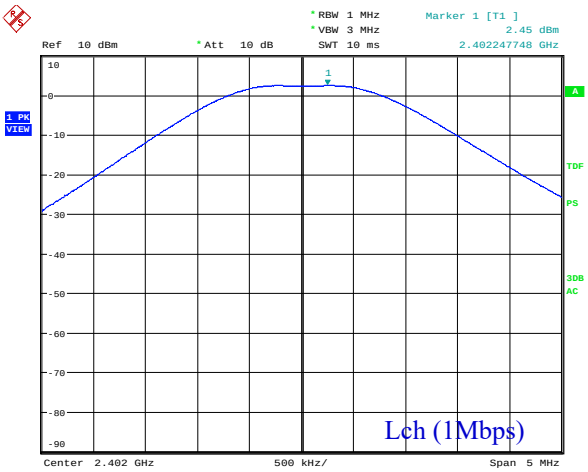

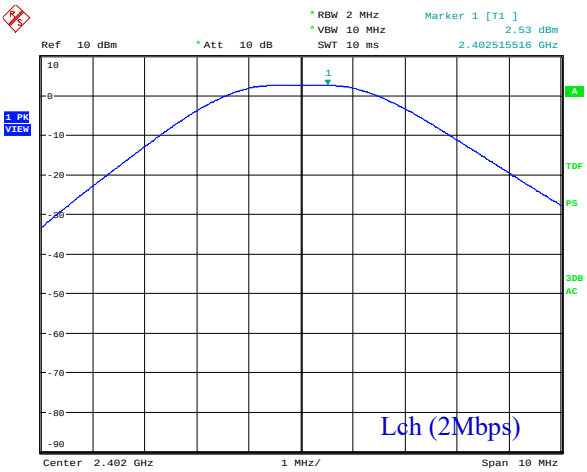

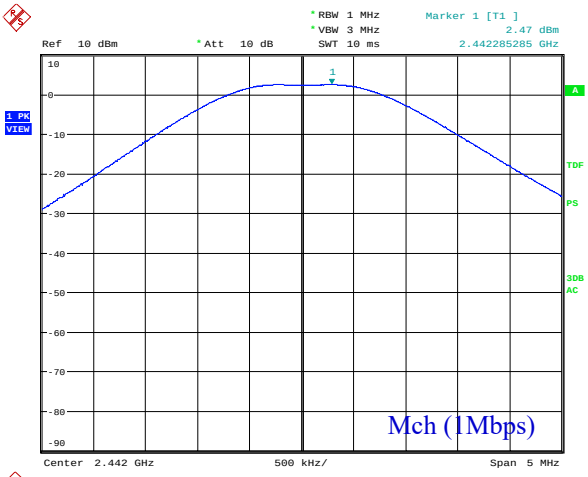

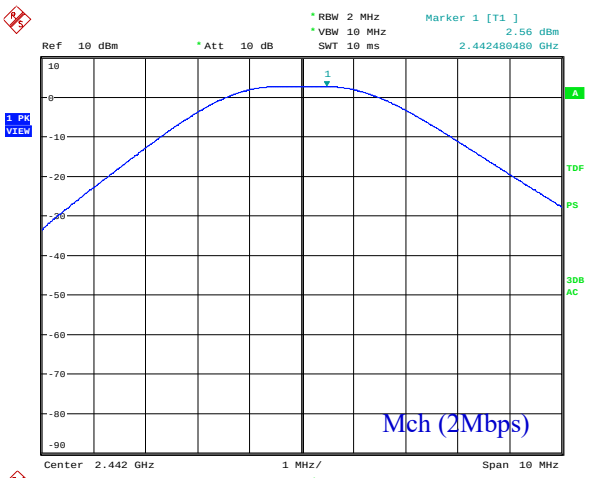

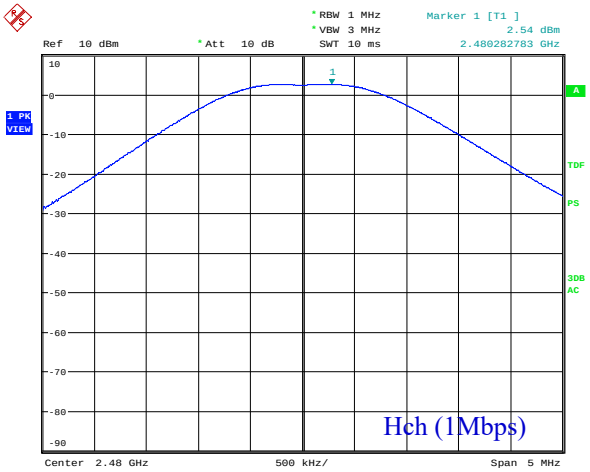

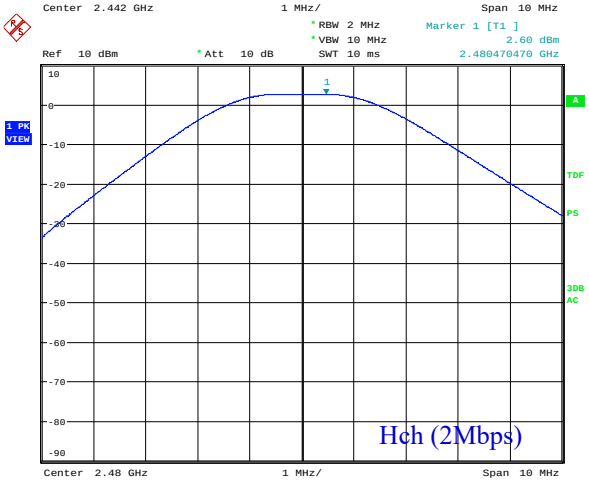

Tested Date:	June 26, 2019	Temperature:	19 degC
Humidity:	54 %	Atmos. Press:	1016 hPa

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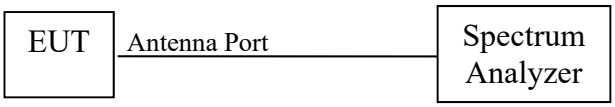
2.4 Conducted Spurious Emissions

Test setup

Test setup is the following drawing. The antenna port of EUT was connected to the spectrum analyzer.



Test procedure

Spectrum analyzer is set as below according to ANSI C63.10 clause 7.8.8

- RBW: 100 kHz
- VBW: 300 kHz
- Detector: Peak
- Trace: Max hold

Limitation

15.247(d) / RSS-247 5.5: In any 100 kHz bandwidth outside the frequency band in which the spread spectrum or digitally modulated intentional radiator is operating, the radio frequency power that is produced by the intentional radiator shall be at least 20 dB below that in the 100 kHz bandwidth within the band that contains the highest level of the desired power, based on either an RF conducted or a radiated measurement, provided the transmitter demonstrates compliance with the peak conducted power limits.

Test equipment used (refer to List of utilized test equipment)

TR06	CL31	-	-	-	-

Test results - *Complied with requirement*

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Test Data

Operating mode: Tx (2402MHz, 1Mbps)

Frequency [GHz]	Spurious level [dBm]	Carrier level [dBm]	Limit (-20dBc) [dBm]	Result
4.803	-52.83	1.75	-18.25	Pass
9.609	-36.85	1.75	-18.25	Pass
14.413	-39.99	1.75	-18.25	Pass
16.812	-47.35	1.75	-18.25	Pass

Operating mode: Tx (2442MHz, 1Mbps)

Frequency [GHz]	Spurious level [dBm]	Carrier level [dBm]	Limit (-20dBc) [dBm]	Result
4.883	-52.56	1.71	-18.29	Pass
9.769	-37.92	1.71	-18.29	Pass
14.650	-42.20	1.71	-18.29	Pass
17.092	-47.35	1.71	-18.29	Pass

Operating mode: Tx (2480MHz, 1Mbps)

Frequency [GHz]	Spurious level [dBm]	Carrier level [dBm]	Limit (-20dBc) [dBm]	Result
4.959	-48.92	1.74	-18.26	Pass
7.439	-55.25	1.74	-18.26	Pass
9.921	-38.64	1.74	-18.26	Pass
14.878	-41.56	1.74	-18.26	Pass
17.358	-45.57	1.74	-18.26	Pass

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Operating mode: Tx (2402MHz, 2Mbps)

Frequency [GHz]	Spurious level [dBm]	Carrier level [dBm]	Limit (-20dBc) [dBm]	Result
4.803	-53.84	-0.38	-20.38	Pass
9.606	**-37.61**	**-0.38**	**-20.38**	**Pass**
14.409	-42.24	-0.38	-20.38	Pass
16.810	-48.02	-0.38	-20.38	Pass

Operating mode: Tx (2442MHz, 2Mbps)

Frequency [GHz]	Spurious level [dBm]	Carrier level [dBm]	Limit (-20dBc) [dBm]	Result
4.885	-52.81	-0.63	-20.63	Pass
9.770	-40.26	-0.63	-20.63	Pass
14.649	-43.34	-0.63	-20.63	Pass
17.097	-49.05	-0.63	-20.63	Pass

Operating mode: Tx (2480MHz, 2Mbps)

Frequency [GHz]	Spurious level [dBm]	Carrier level [dBm]	Limit (-20dBc) [dBm]	Result
4.959	-50.16	-0.65	-20.65	Pass
9.918	-39.87	-0.65	-20.65	Pass
14.877	-43.92	-0.65	-20.65	Pass
17.356	-49.71	-0.65	-20.65	Pass

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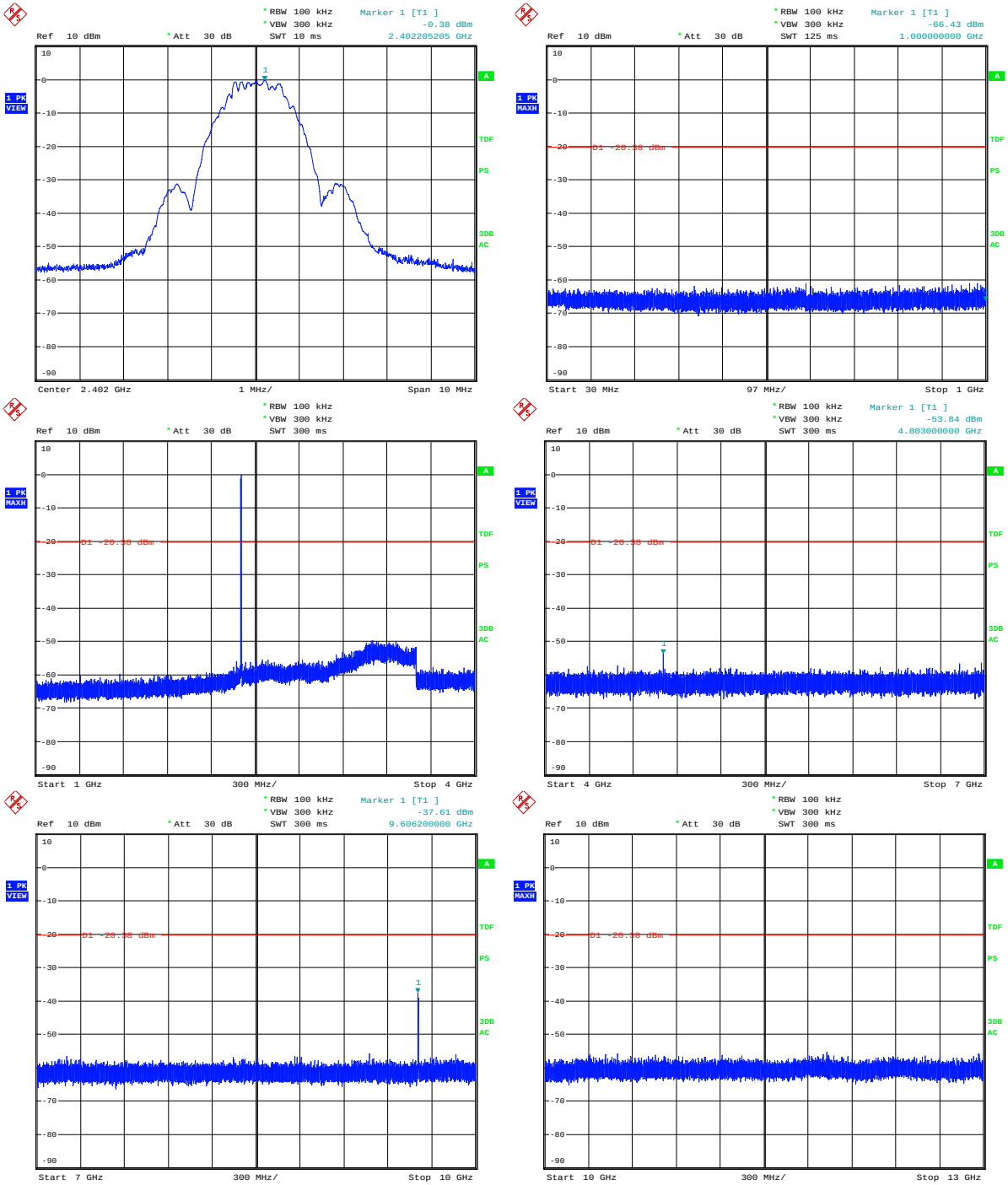
[Chart]

Tx (2402MHz, 2Mbps)



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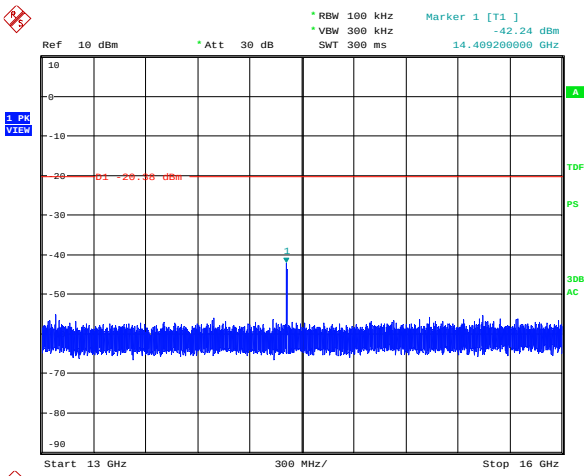

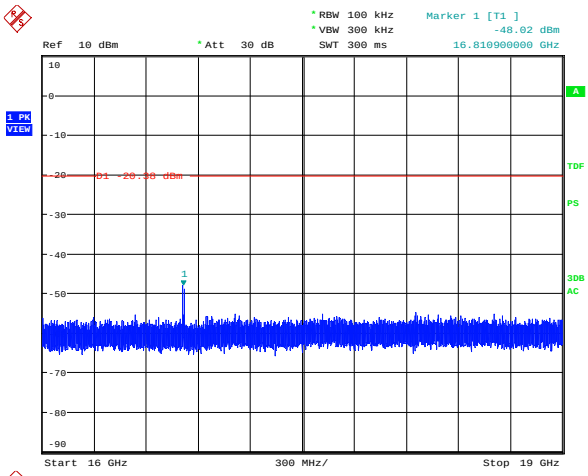

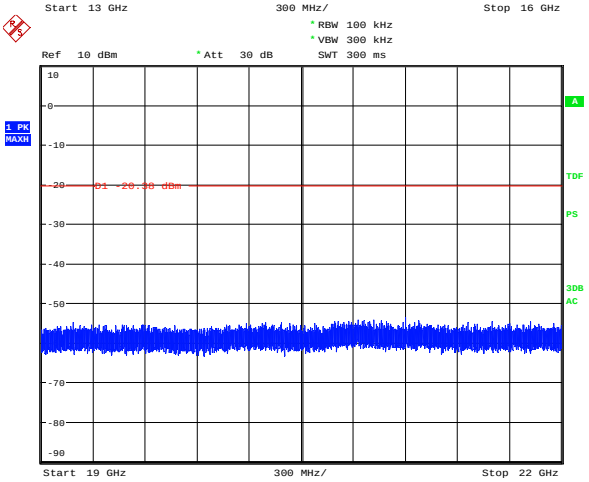

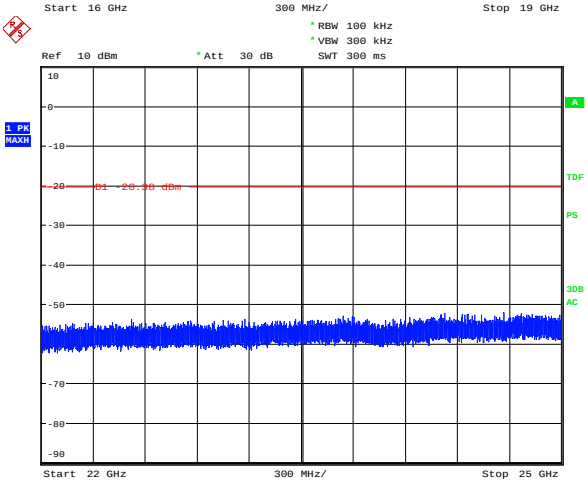

Tested Date:	June 26, 2019	Temperature:	19 degC
Humidity:	54 %	Atmos. Press:	1016 hPa

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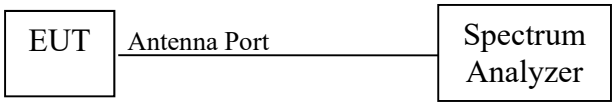
2.5 Power Spectral density

Test setup

Test setup is the following drawing. The antenna port of EUT was connected to the spectrum analyzer.



Test procedure

Spectrum analyzer is set as below according to ANSI C63.10 clause 11.10

- RBW: 3 kHz
- VBW: 10 kHz
- Span > 1.5 x 6dB BW
- Detector: Peak
- Trace: Max hold

Limitation

15.247(e) / RSS-247 5.2 (b): For digitally modulated systems, the power spectral density conducted from the intentional radiator to the antenna shall not be greater than 8 dBm in any 3 kHz band during any time interval of continuous transmission.

Test equipment used (refer to List of utilized test equipment)

TR06	CL31	-	-	-	-

Test results - *Complied with requirement*

Test Data

Transmission Frequency [MHz]	Spectral Density [dBm]		Limit [dBm]
	1Mbps	2Mbps	
2402	-14.39	-19.44	8
2442	-14.53	-19.59	8
2480	-14.59	-19.45	8

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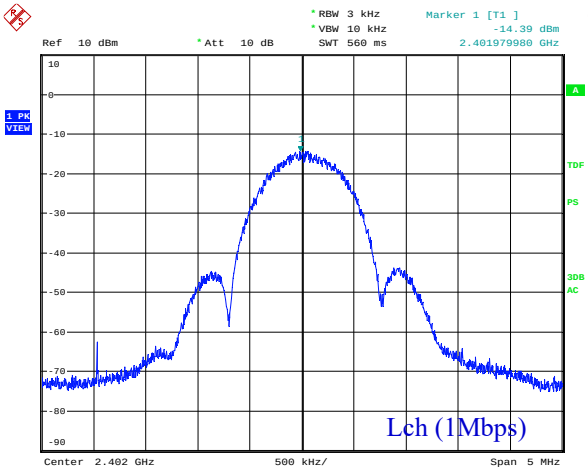

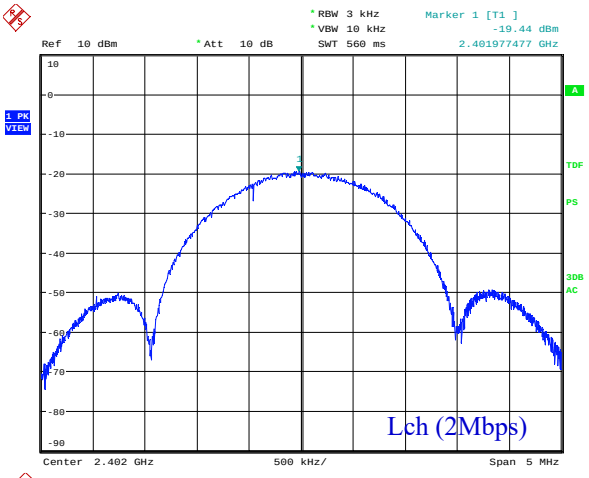

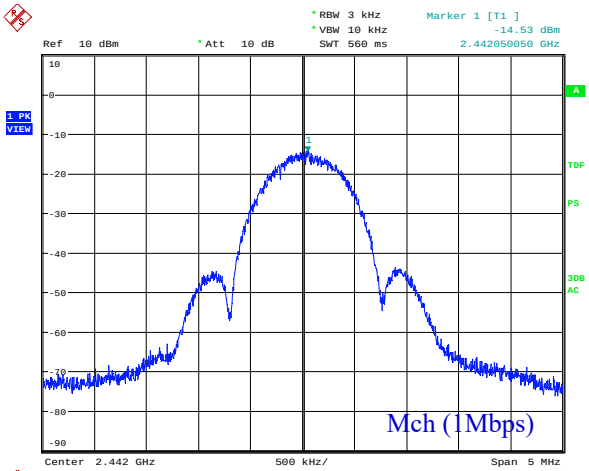

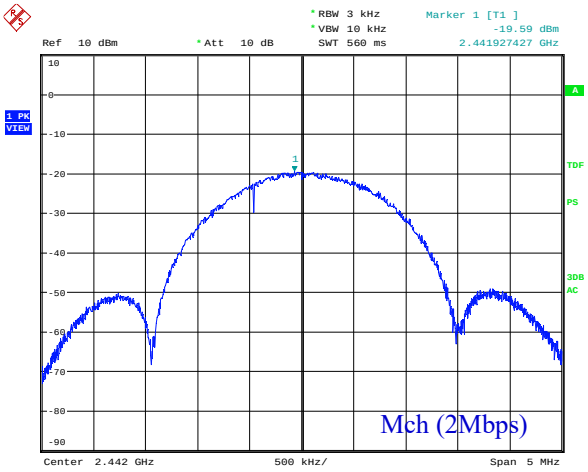

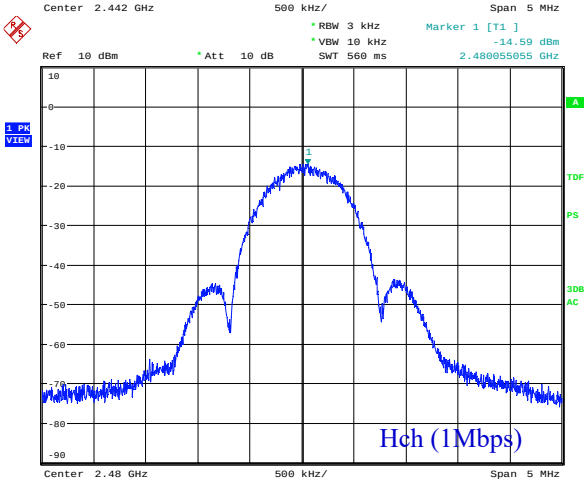

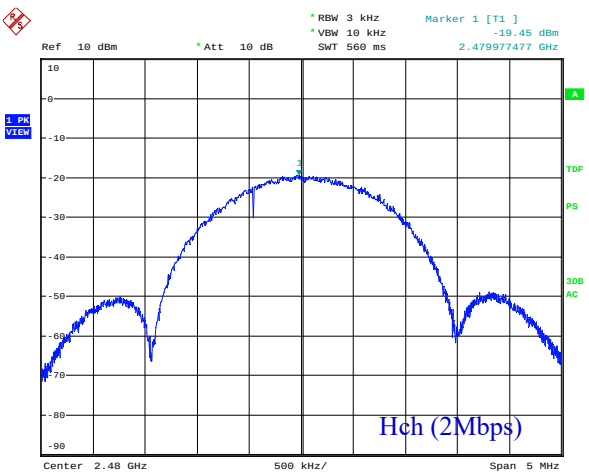

Tested Date:	June 26, 2019	Temperature:	19 degC
Humidity:	54 %	Atmos. Press:	1016 hPa

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2.6 Transmitter Radiated Spurious Emissions

Test setup

Test setup was implemented according to the method of ANSI C63.10 clause 6.

Test procedure

Measurement procedures were implemented according to the method of ANSI C63.10 clauses 6.
The test receiver is set as below

[9 - 150 kHz]
RBW: 200 Hz, Detector: QP

[150 kHz - 30 MHz]
RBW: 9 kHz, Detector: QP

[30 - 1000 MHz]
RBW: 120 kHz, Detector: QP

[above 1000 MHz]
RBW: 1 MHz, Detector: Ave/PK

Applicable rule and limitation

Except as shown in paragraph 15.205 (d) of this section, only spurious emissions are permitted in any of the frequency bands listed (FCC 15.205 / RSS-Gen 8.10)

The field strength of emissions appearing within these frequency bands shall not exceed the limits shown in FCC 15.209 / RSS-Gen 8.9. At frequencies equal to or less than 1000 MHz, compliance with the limits in FCC 15.209 / RSS-Gen 8.9 shall be demonstrated using measurement instrumentation employing a CISPR quasi-peak detector. Above 1000 MHz, compliance with the emission limits in Section 15.209 shall be demonstrated based on the average value of the measured emissions.

FCC 15.209: Field strength limits below 30 MHz

Frequency [MHz]	Field Strength [µV/m]	Measurement Distance [m]
0.009 – 0.490	2400/F(kHz)	300
0.490 – 1.705	24000/F(kHz)	30
1.705 – 30.0	30	30

RSS-Gen 8.9: Field strength limits below 30 MHz

Frequency	Field Strength [µA/m]	Measurement Distance [m]
9 – 490 kHz	6.37/F(kHz)	300
490 – 1705 kHz	63.7/F(kHz)	30
1.705 – 30.0 MHz	0.08	30

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Extrapolation factor of 3m test distance (ANSI C63.10-2013 6.4.4)

Frequency [MHz]	D (λ/2π) [m]	D (Limit) [m]	Extrapolation Factor
0.009	5305.16	300	80.00
0.159	300.29	300	80.00
0.160	298.42	300	79.95
0.490	97.44	300	70.23
0.490	97.44	30	40.00
1.591	30.01	30	40.00
1.592	29.99	30	40.00
10.000	4.77	30	24.04
13.560	3.52	30	21.39
15.910	3.00	30	20.00
30.000	1.59	30	20.00

FCC 15.209 / RSS-Gen 8.9: Field strength limits above 30 MHz

Frequency [MHz]	Field Strength [μV/m]	Measurement Distance [m]	Field Strength [dBμV/m]
30 – 88	100	3	40.0
88 –216	150	3	43.5
216 – 960	200	3	46.0
Above 960	500	3	53.9

In the emission table above, the tighter limit applies at the band edges.
The emission limits shown in the above table are based on measurements employing a quasi-peak detector.

Test results - *Complied with requirement*

Test equipment used (refer to List of utilized test equipment)

AC01	BA07	BRF12	CL11	CL30	CL31	CL38	DH06
HPF4	LP06	PR12	PR21	SH01	TR06	-	-

Test software used

EMI1 Ver. 5.9

Calculation method

The Correction Factor and Result are calculated as followings.

Correction Factor [dB/m] = Ant. Factor [dB/m] + Loss [dB] – Gain [dB]
Result [dBμV/m] = Reading [dBμV] + Correction Factor [dB/m]

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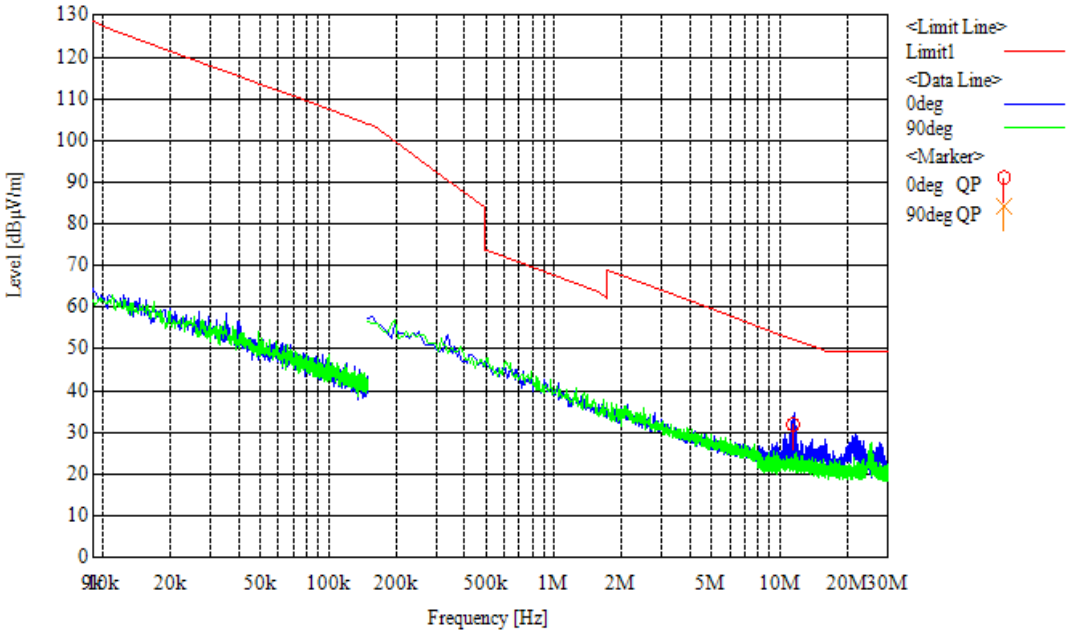
Test Data (9 kHz - 30MHz)

Operating frequency: 2402MHz
Worst configuration: 2Mbps, X-plane
Test site: Yokohama Laboratory
Measurement distance: 3 m

[Emission level]

No.	Frequency [MHz]	Reading [dBμV]	Factor [dB/m]	Loss [dB]	Gain [dB]	Result [dBμV/m]	Limit [dBμV/m]	Margin [dB]	Ant.
1	**11.43916**	**21.2**	**10.2**	**0.6**	**0.0**	**32.0**	**52.4**	**20.4**	**0deg**

[Chart]



Tested Date: June 26, 2019 Temperature: 19 degC
Humidity: 54 % Atmos. Press: 1016 hPa

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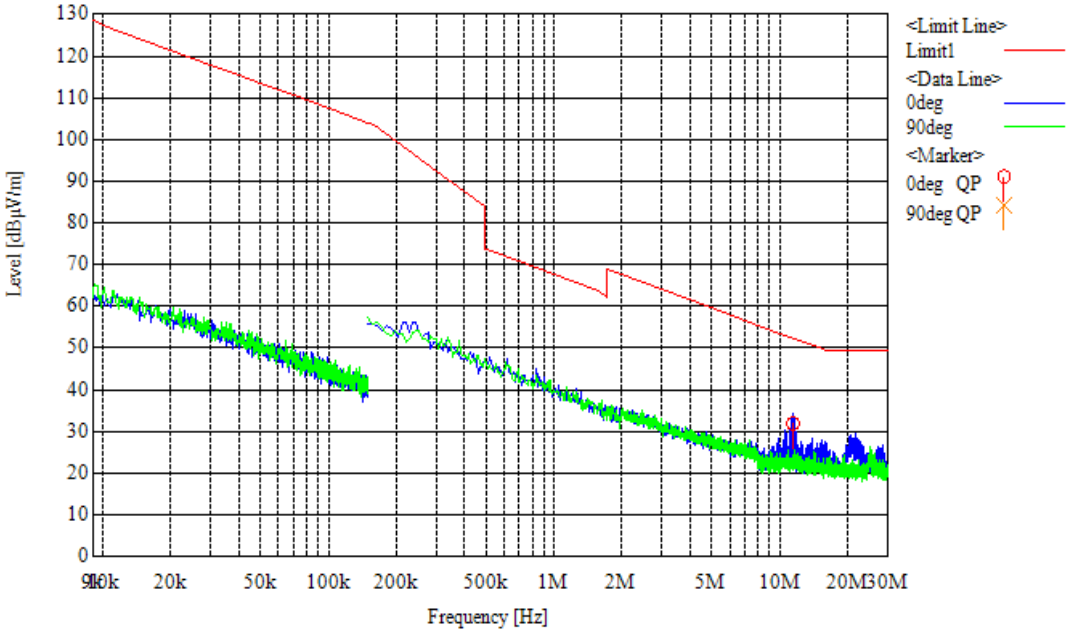
Operating frequency: 2442MHz
Worst configuration: 2Mbps, X-plane
Test site: Yokohama Laboratory
Measurement distance: 3 m

[Emission level]

No.	Frequency [MHz]	Reading [dBμV]	Factor [dB/m]	Loss [dB]	Gain [dB]	Result [dBμV/m]	Limit [dBμV/m]	Margin [dB]	Ant.
1	**11.43972**	**20.9**	**10.2**	**0.6**	**0.0**	**31.7**	**52.4**	**20.7**	**0deg**

[Chart]



Tested Date: June 26, 2019 Temperature: 19 degC
Humidity: 54 % Atmos. Press: 1016 hPa

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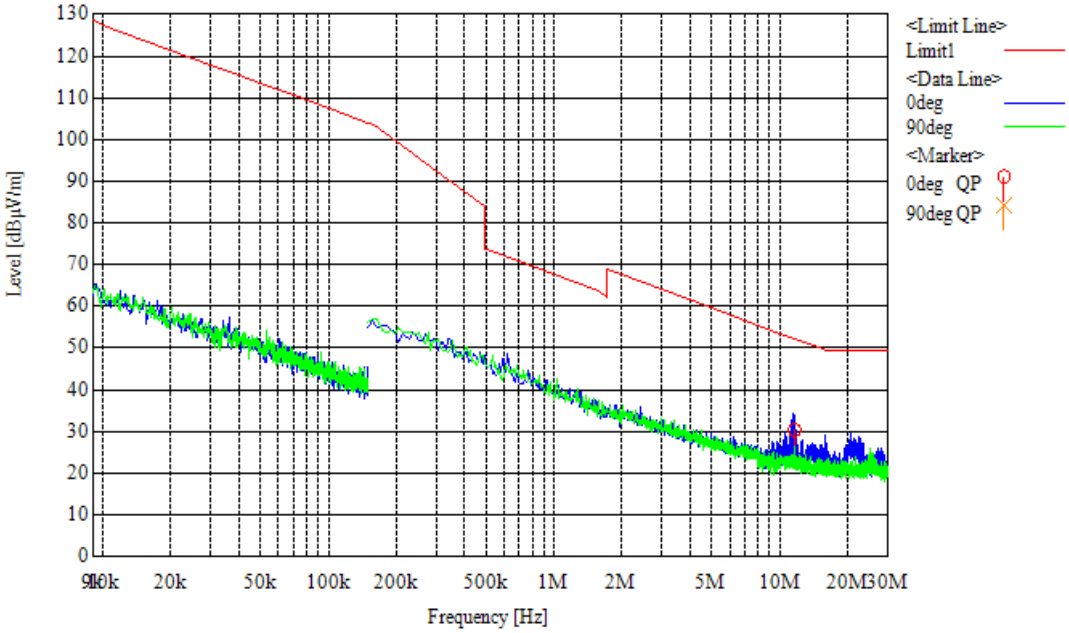
Operating frequency: 2480MHz
Worst configuration: 2Mbps, X-plane
Test site: Yokohama Laboratory
Measurement distance: 3 m

[Emission level]

No.	Frequency [MHz]	Reading [dBμV]	Factor [dB/m]	Loss [dB]	Gain [dB]	Result [dBμV/m]	Limit [dBμV/m]	Margin [dB]	Ant.
1	**11.55829**	**19.3**	**10.2**	**0.6**	**0.0**	**30.1**	**52.3**	**22.2**	**0deg**

[Chart]



Tested Date: June 26, 2019 Temperature: 19 degC
Humidity: 54 % Atmos. Press: 1016 hPa

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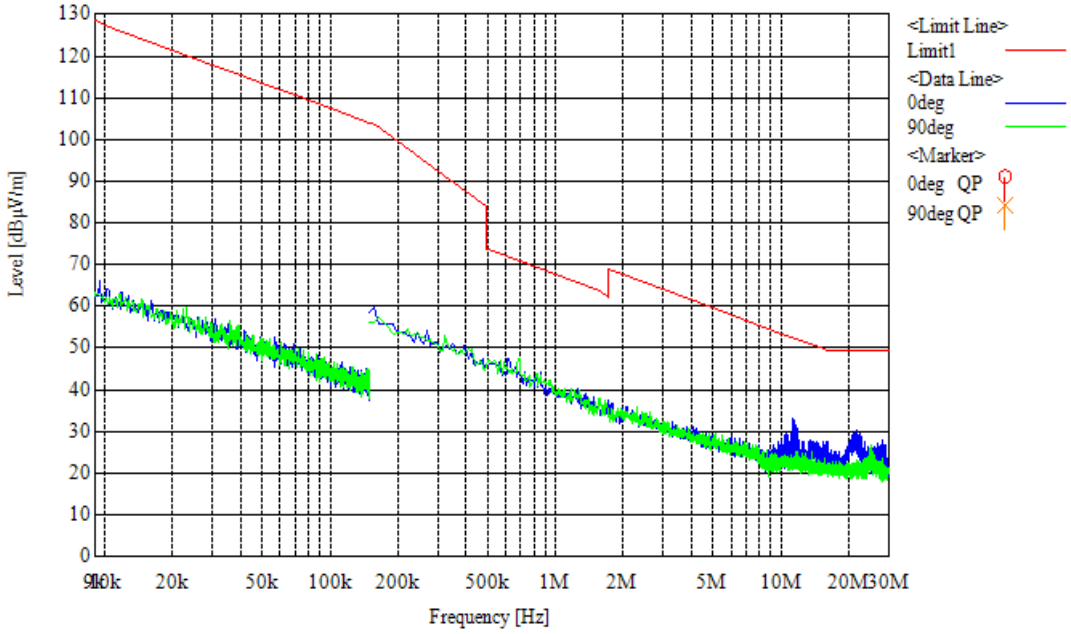
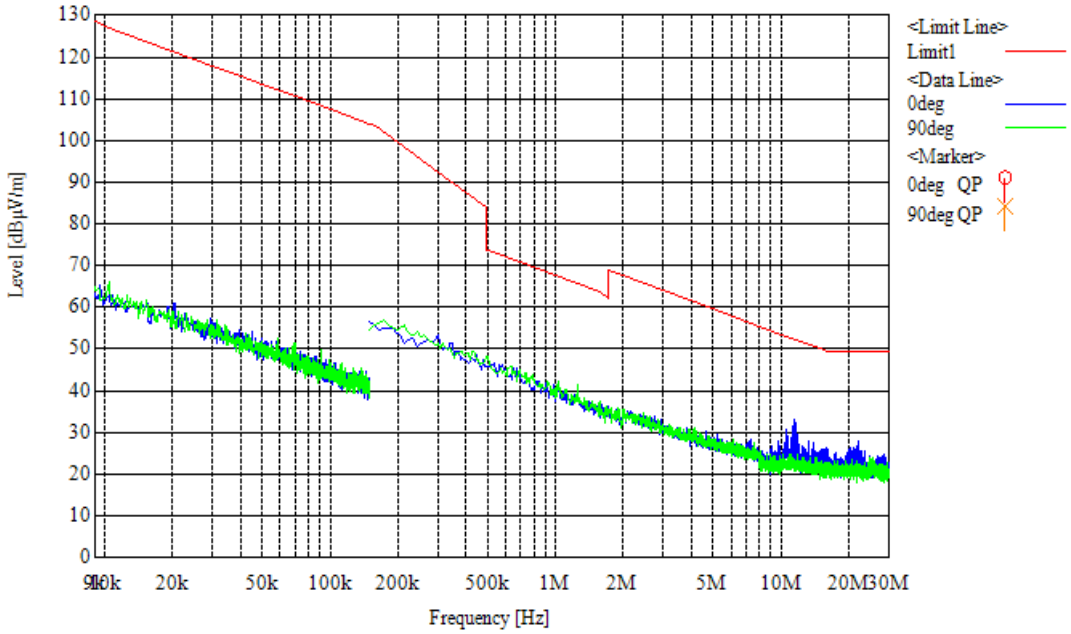
Other test Data (9 kHz - 30MHz)

Operating mode: 2402MHz, 1Mbps, X-plane



Operating mode: 2402MHz, 1Mbps, Y-plane



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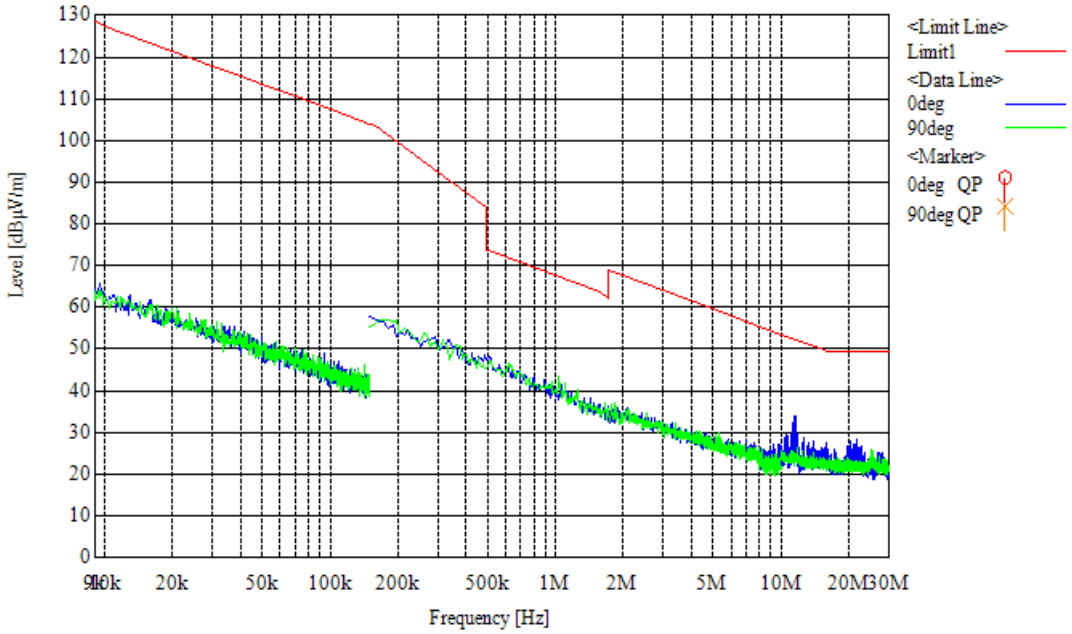
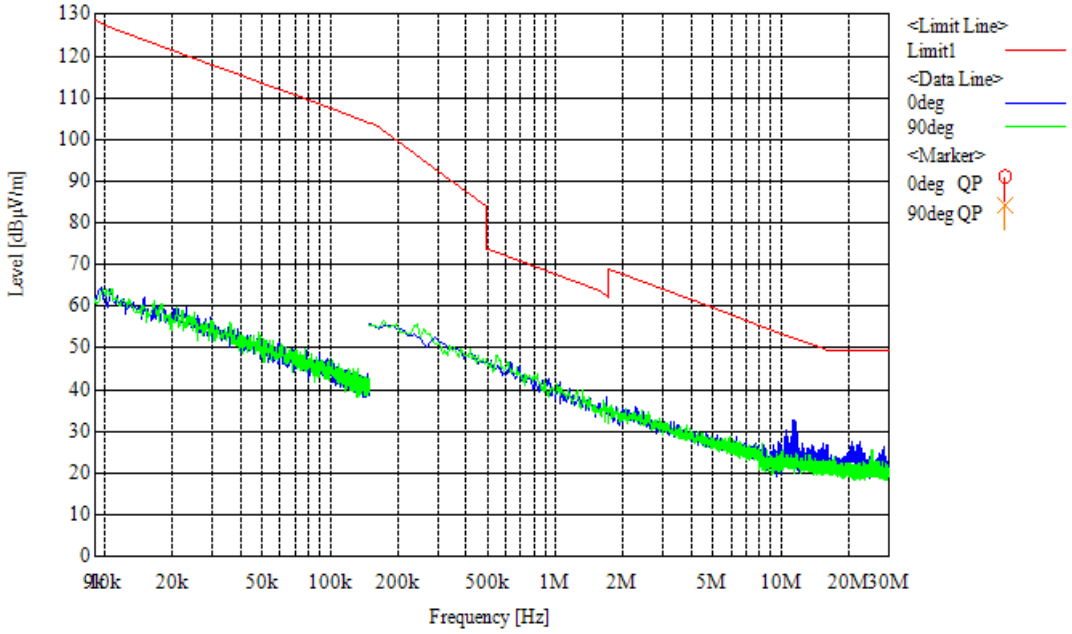
Operating mode: 2402MHz, 1Mbps, Z-plane



Operating mode: 2402MHz, 2Mbps, Y-plane



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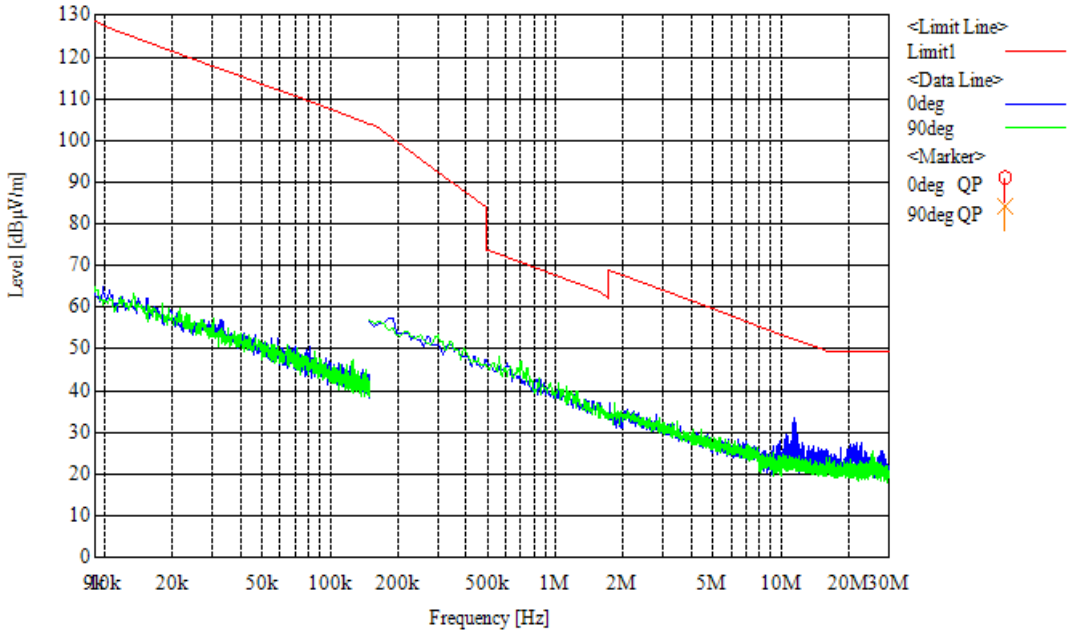
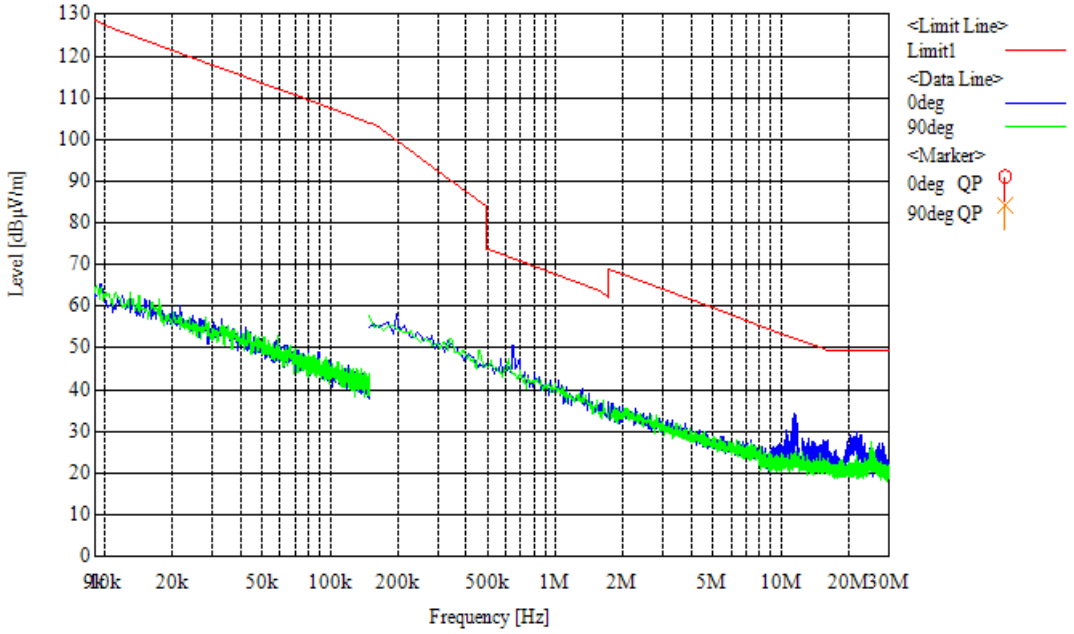
Operating mode: 2402MHz, 2Mbps, Z-plane



Operating mode: 2442MHz, 1Mbps, X-plane



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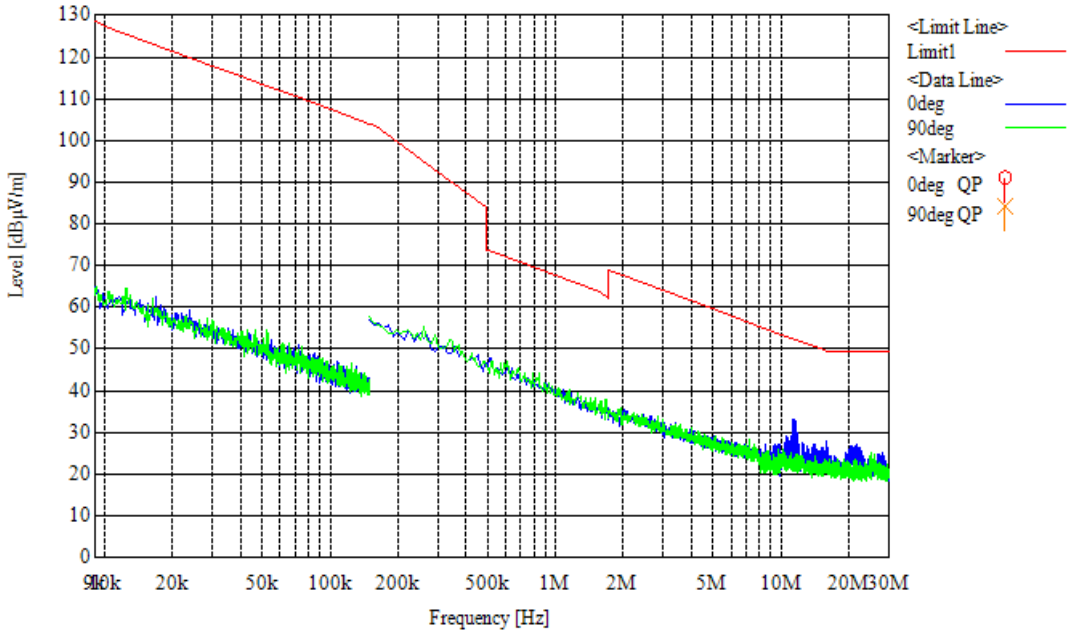
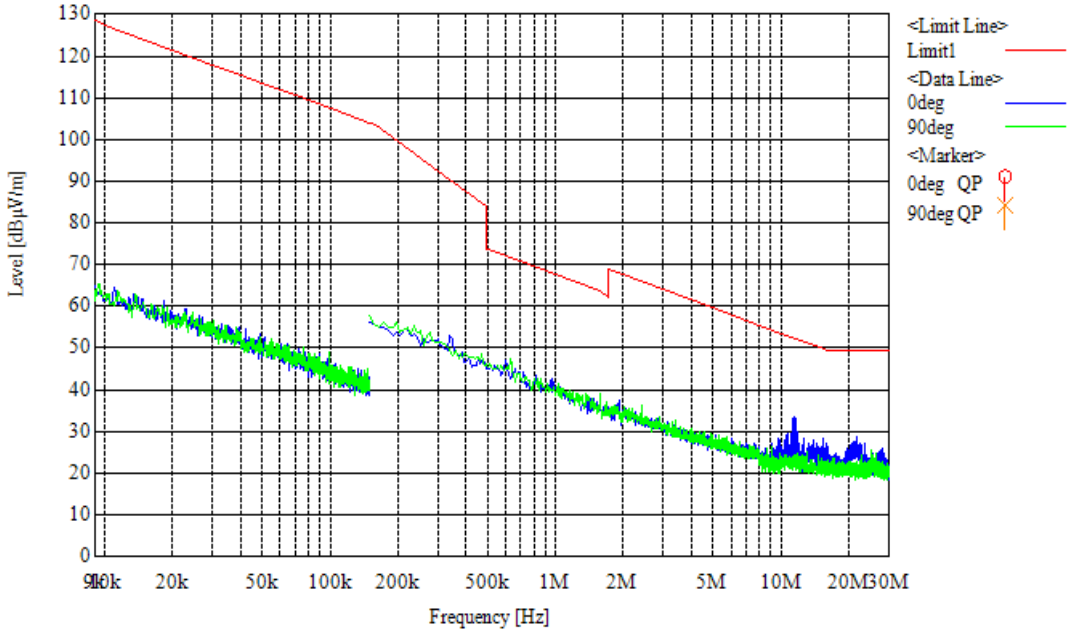
Operating mode: 2442MHz, 1Mbps, Y-plane



Operating mode: 2442MHz, 1Mbps, Z-plane



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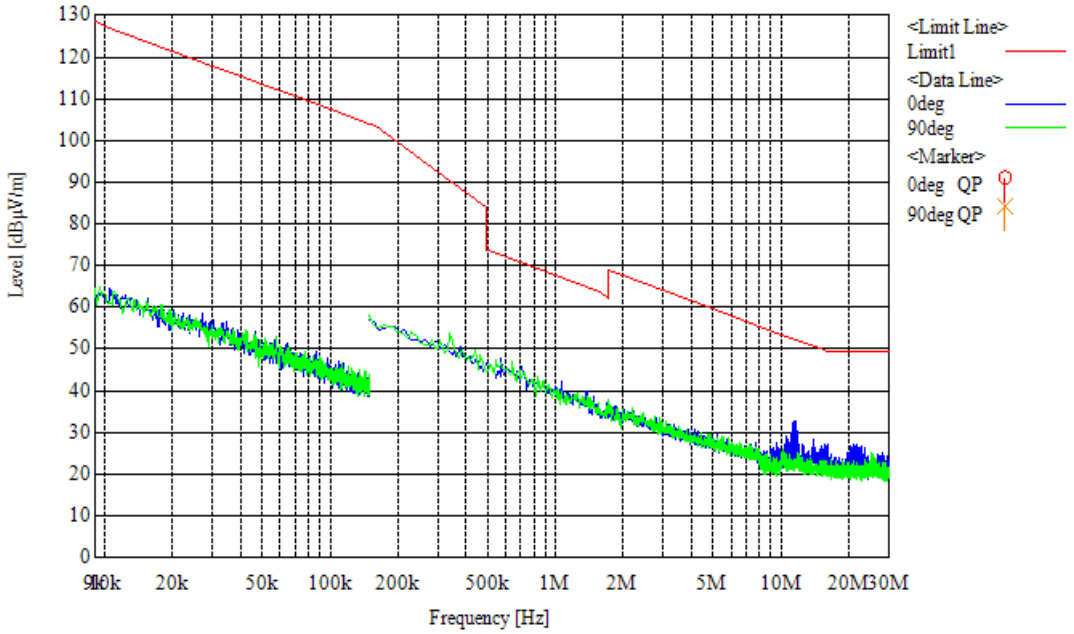
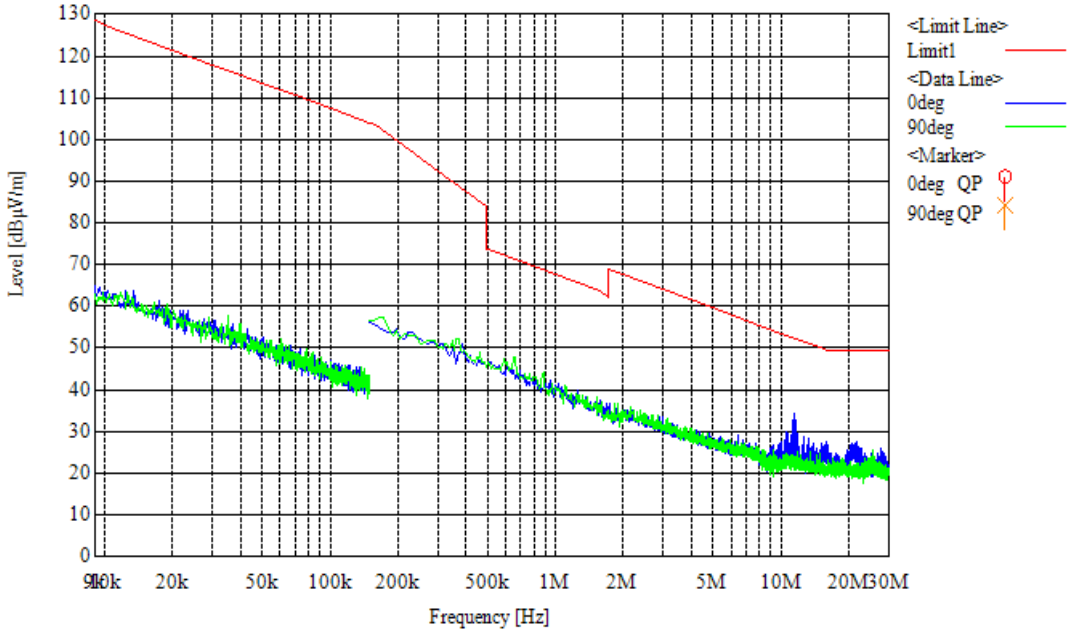
Operating mode: 2442MHz, 2Mbps, Y-plane



Operating mode: 2442MHz, 2Mbps, Z-plane



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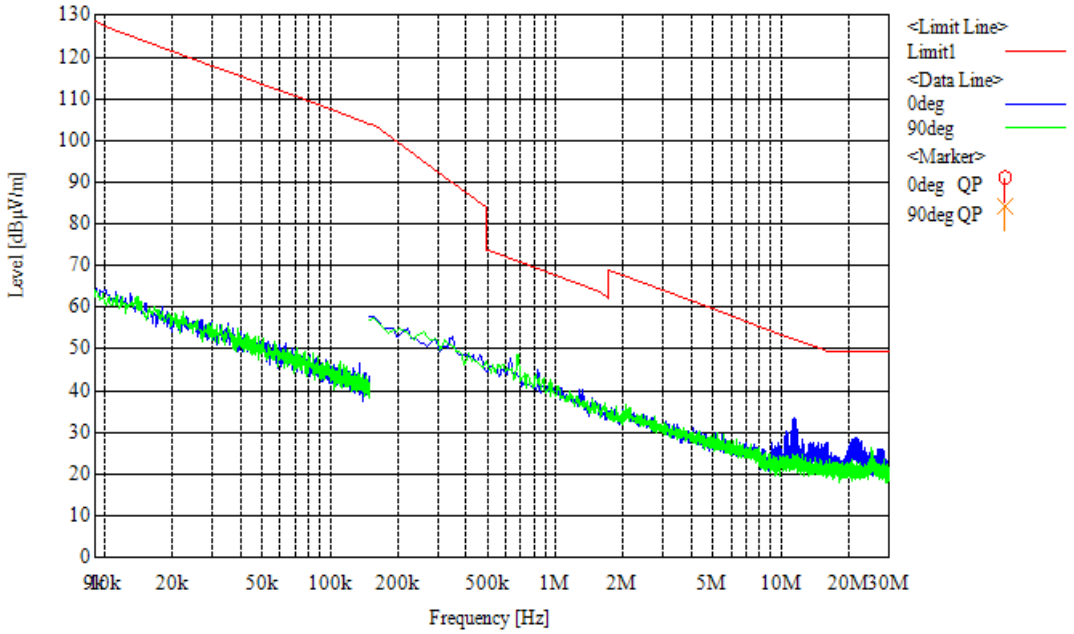
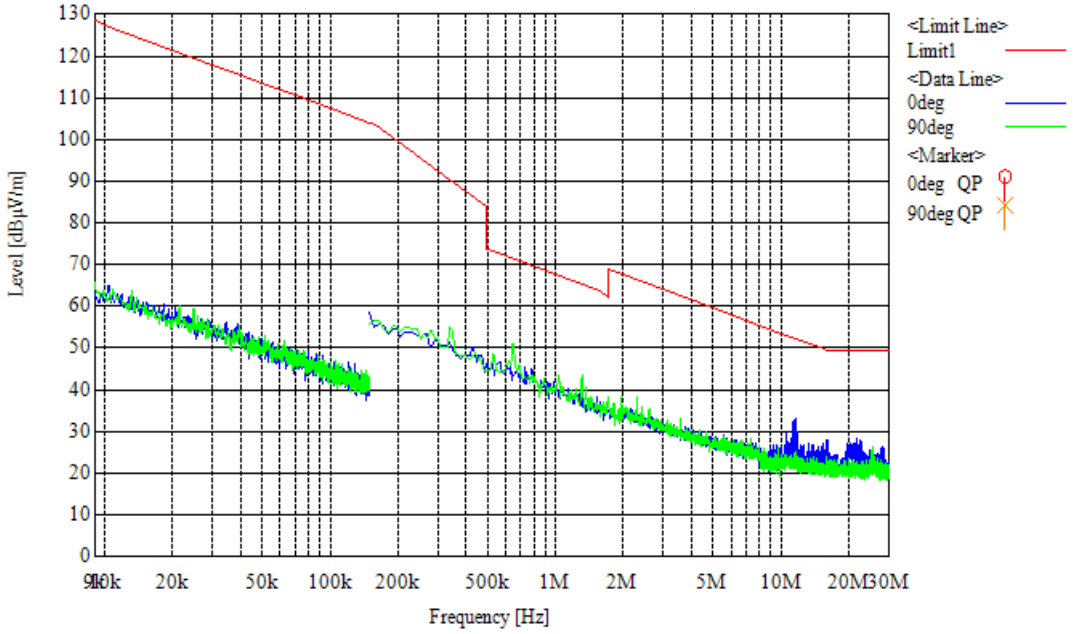
Operating mode: 2480MHz, 1Mbps, X-plane



Operating mode: 2480MHz, 1Mbps, Y-plane



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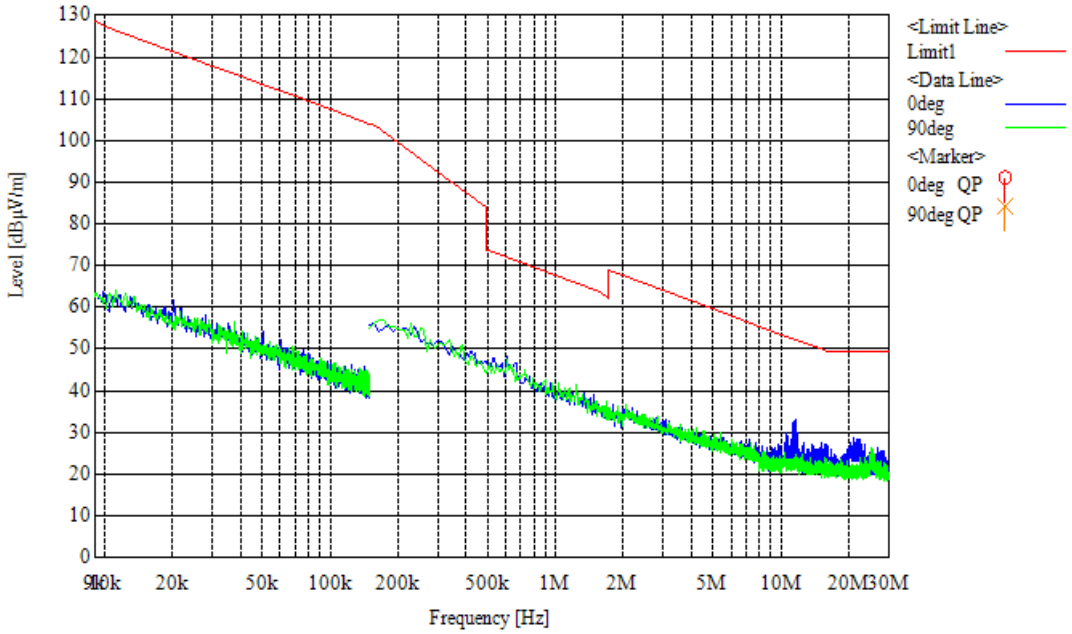
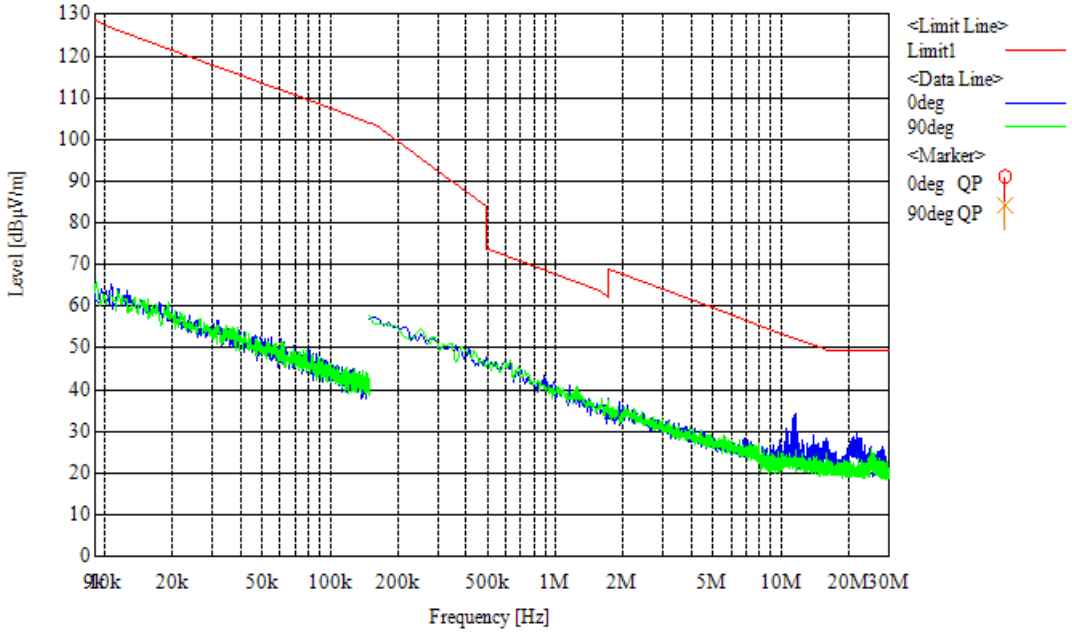
Operating mode: 2480MHz, 1Mbps, Z-plane



Operating mode: 2480MHz, 2Mbps, Y-plane



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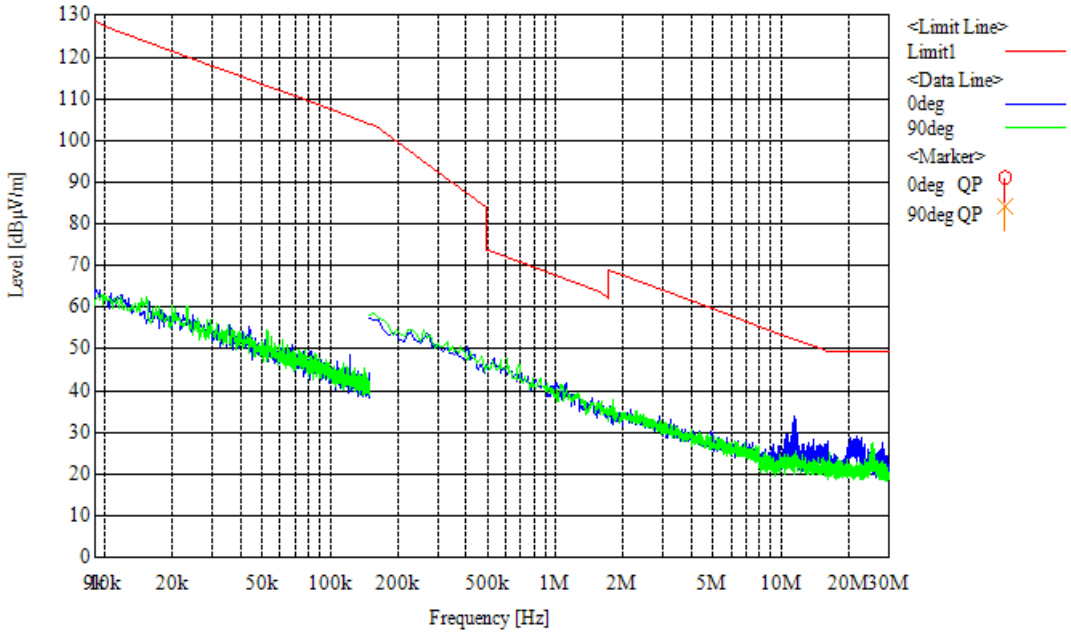
Operating mode: 2480MHz, 2Mbps, Z-plane



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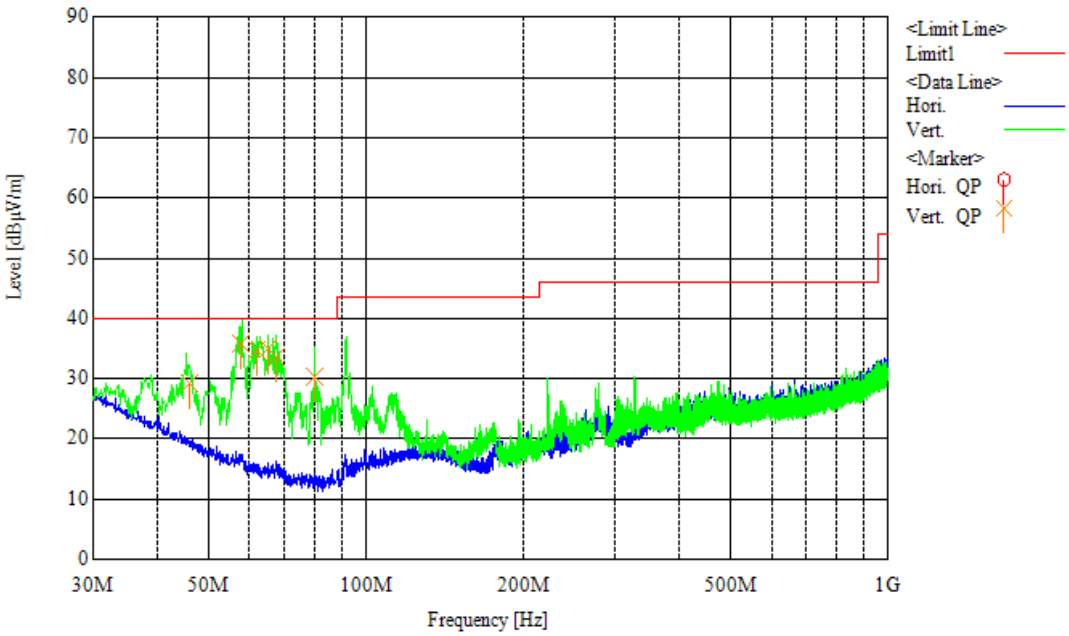
Test Data (30 - 1000MHz)

Operating frequency: 2402MHz
Worst configuration: 2Mbps, X-plane
Test site: Yokohama Laboratory
Measurement distance: 3 m

[Emission level]

No.	Frequency [MHz]	Reading [dBμV]	Factor [dB/m]	Loss [dB]	Gain [dB]	Result [dBμV/m]	Limit [dBμV/m]	Margin [dB]	Ant.
1	45.968	37.7	14.8	7.1	30.3	29.3	40.0	10.7	Vert.
2	**57.566**	**47.8**	**11.0**	**7.2**	**30.3**	**35.7**	**40.0**	**4.3**	**Vert.**
3	62.110	47.7	10.0	7.3	30.3	34.7	40.0	5.3	Vert.
4	65.260	48.3	9.5	7.4	30.3	34.9	40.0	5.1	Vert.
5	67.578	47.3	9.1	7.4	30.3	33.5	40.0	6.5	Vert.
6	80.095	45.6	7.3	7.6	30.3	30.2	40.0	9.8	Vert.

[Chart]



Tested Date: June 20, 2019 Temperature: 19 degC
Humidity: 56 % Atmos. Press: 1006 hPa

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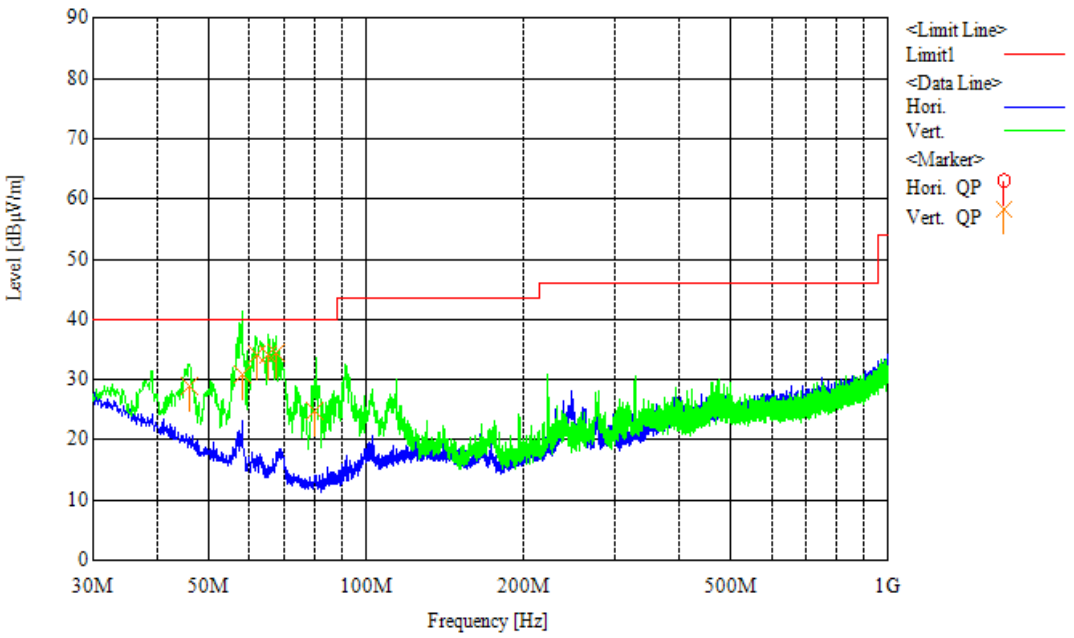
Operating frequency: 2442MHz
Worst configuration: 2Mbps, X-plane
Test site: Yokohama Laboratory
Measurement distance: 3 m

[Emission level]

No.	Frequency [MHz]	Reading [dBμV]	Factor [dB/m]	Loss [dB]	Gain [dB]	Result [dBμV/m]	Limit [dBμV/m]	Margin [dB]	Ant.
1	46.081	37.4	14.8	7.1	30.3	29.0	40.0	11.0	Vert.
2	57.957	43.1	10.9	7.3	30.3	31.0	40.0	9.0	Vert.
3	62.132	47.2	10.0	7.3	30.3	34.2	40.0	5.8	Vert.
4	65.217	47.6	9.5	7.4	30.3	34.2	40.0	5.8	Vert.
5	**67.516**	**48.2**	**9.1**	**7.4**	**30.3**	**34.4**	**40.0**	**5.6**	**Vert.**
6	80.166	40.2	7.3	7.6	30.3	24.8	40.0	15.2	Vert.

[Chart]



Tested Date: June 20, 2019 Temperature: 19 degC
Humidity: 56 % Atmos. Press: 1006 hPa

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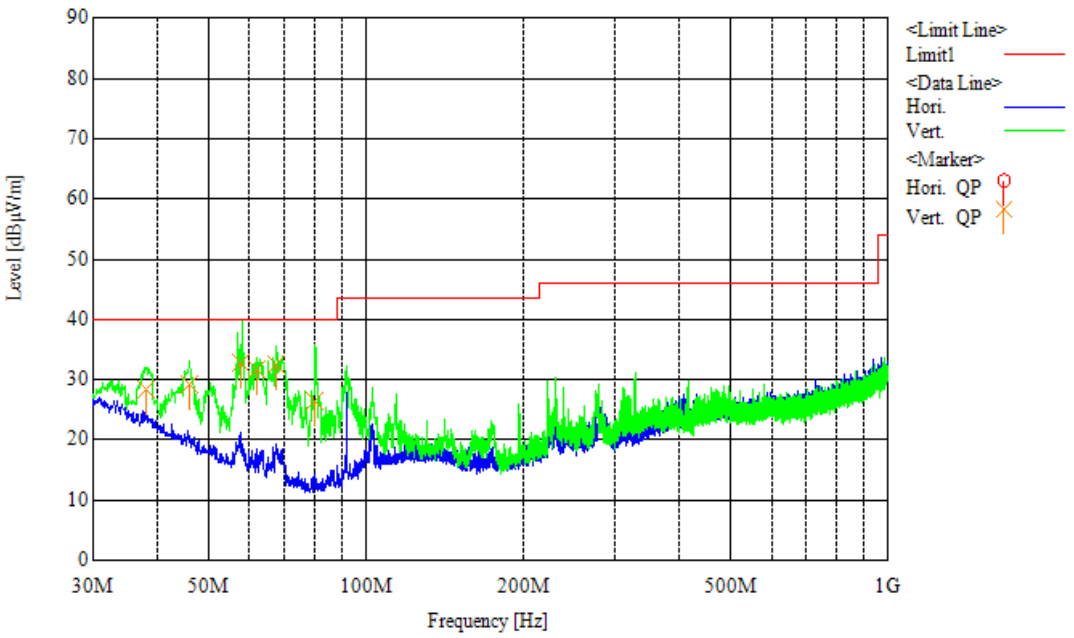
Operating frequency: 2480MHz
Worst configuration: 1Mbps, Z-plane
Test site: Yokohama Laboratory
Measurement distance: 3 m

[Emission level]

No.	Frequency [MHz]	Reading [dBμV]	Factor [dB/m]	Loss [dB]	Gain [dB]	Result [dBμV/m]	Limit [dBμV/m]	Margin [dB]	Ant.
1	38.070	33.5	18.5	6.9	30.4	28.5	40.0	11.5	Vert.
2	46.075	37.6	14.8	7.1	30.3	29.2	40.0	10.8	Vert.
3	**57.541**	**44.9**	**11.0**	**7.2**	**30.3**	**32.8**	**40.0**	**7.2**	**Vert.**
4	62.140	44.6	10.0	7.3	30.3	31.6	40.0	8.4	Vert.
5	67.505	46.4	9.1	7.4	30.3	32.6	40.0	7.4	Vert.
6	80.092	41.9	7.3	7.6	30.3	26.5	40.0	13.5	Vert.

[Chart]



Tested Date: June 20, 2019 Temperature: 19 degC
Humidity: 56 % Atmos. Press: 1006 hPa

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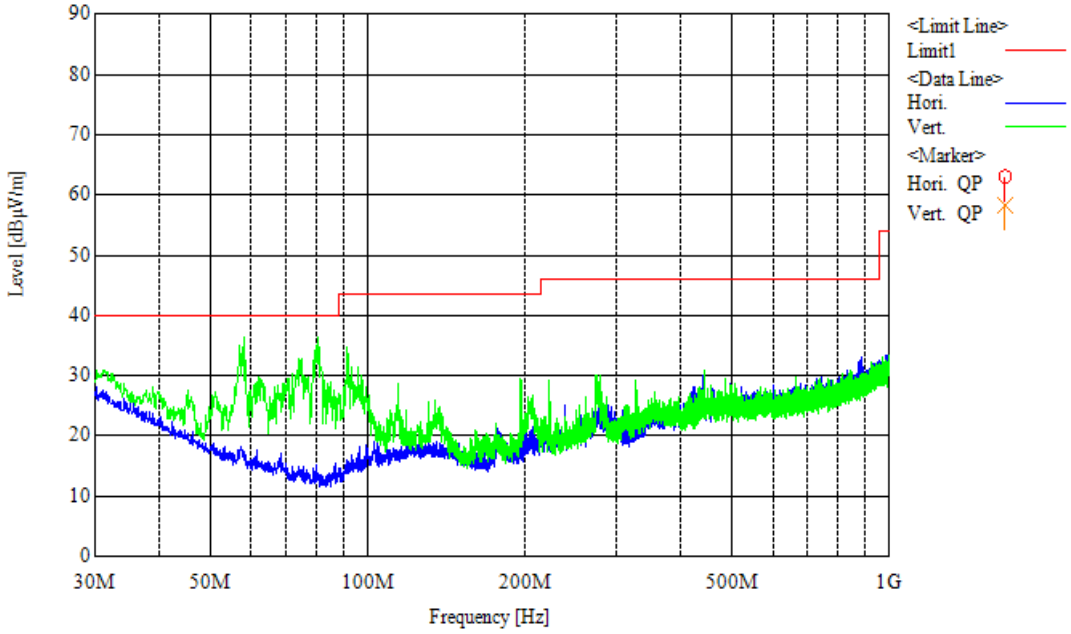
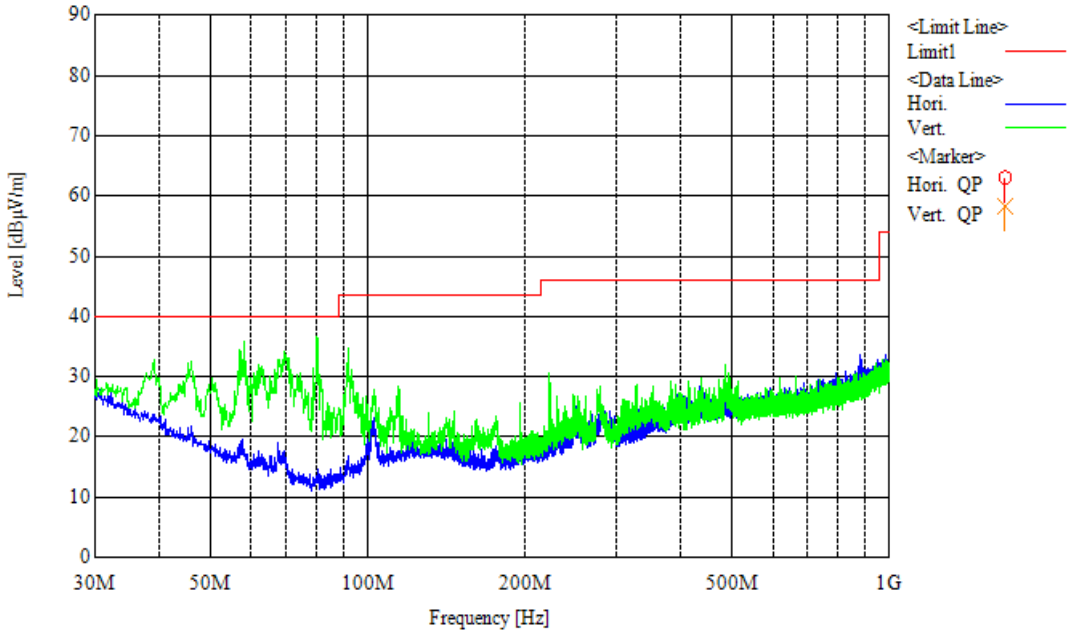
Other test Data (30MHz - 1000MHz)

Operating mode: 2402MHz, 1Mbps, X-plane



Operating mode: 2402MHz, 1Mbps, Y-plane



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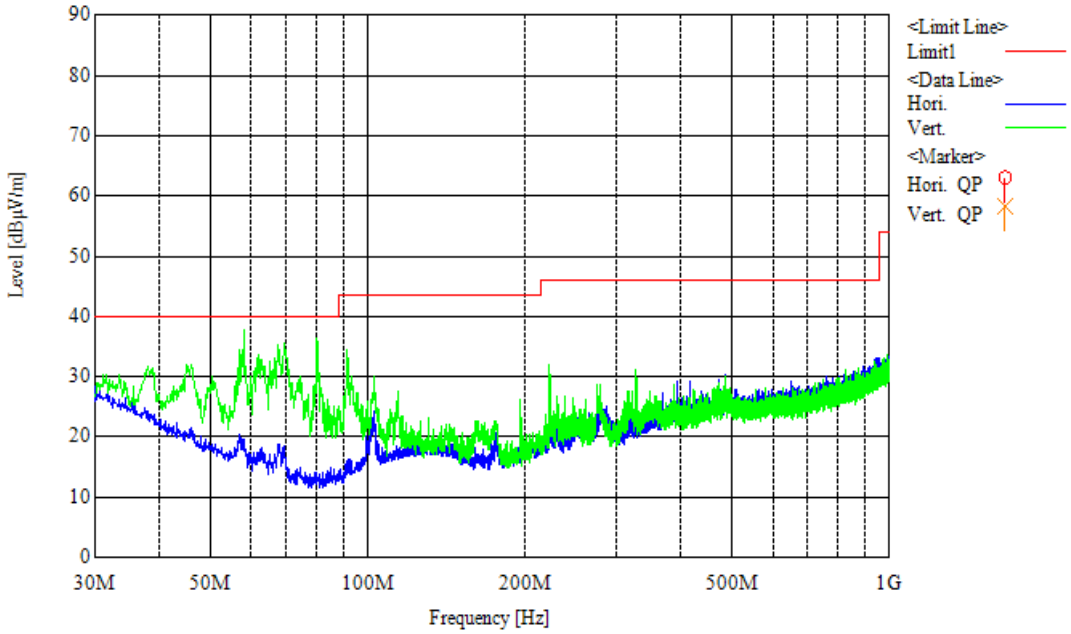
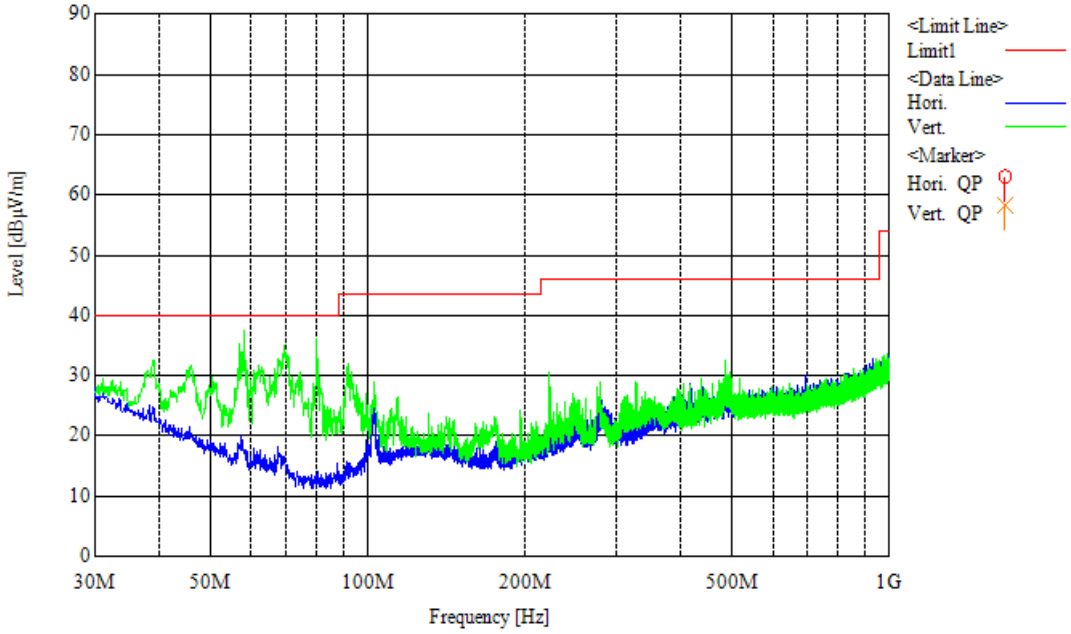
Operating mode: 2402MHz, 1Mbps, Z-plane



Operating mode: 2402MHz, 2Mbps, Y-plane



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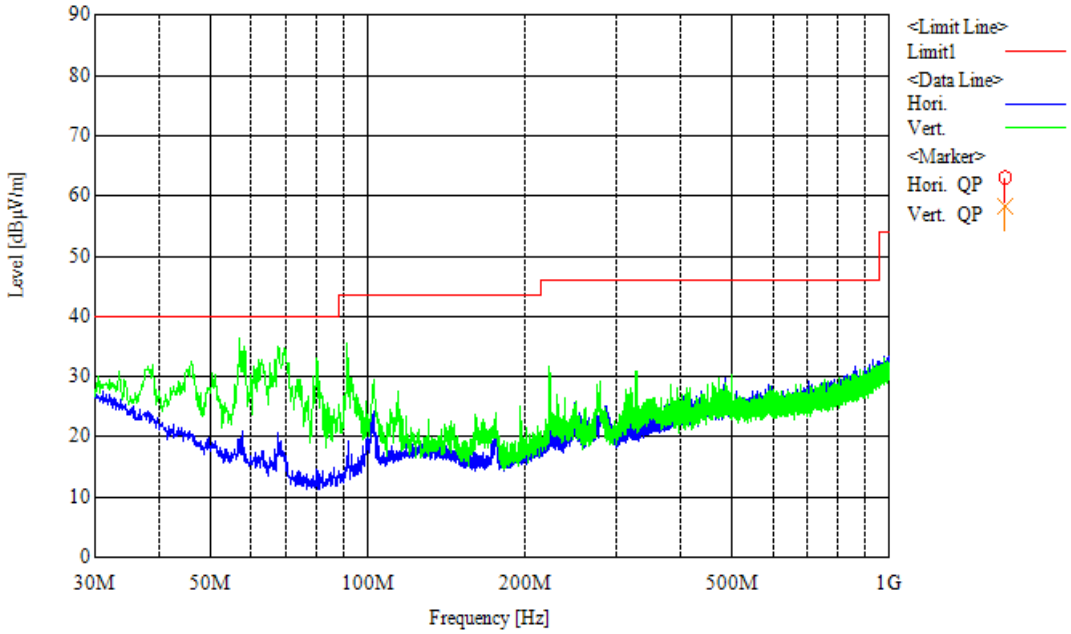
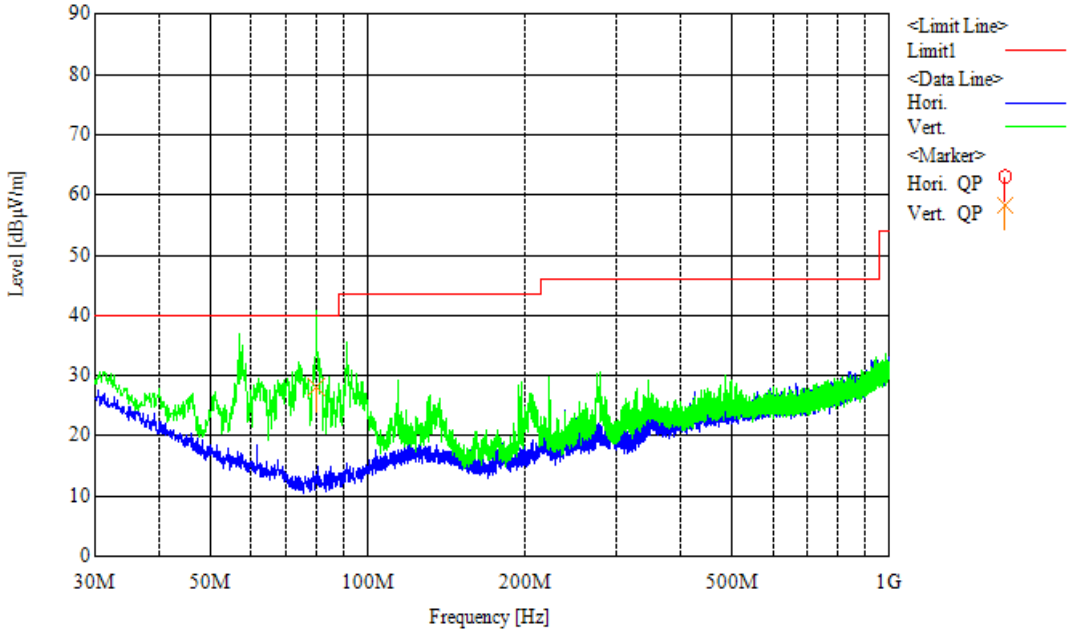
Operating mode: 2402MHz, 2Mbps, Z-plane



Operating mode: 2442MHz, 1Mbps, X-plane



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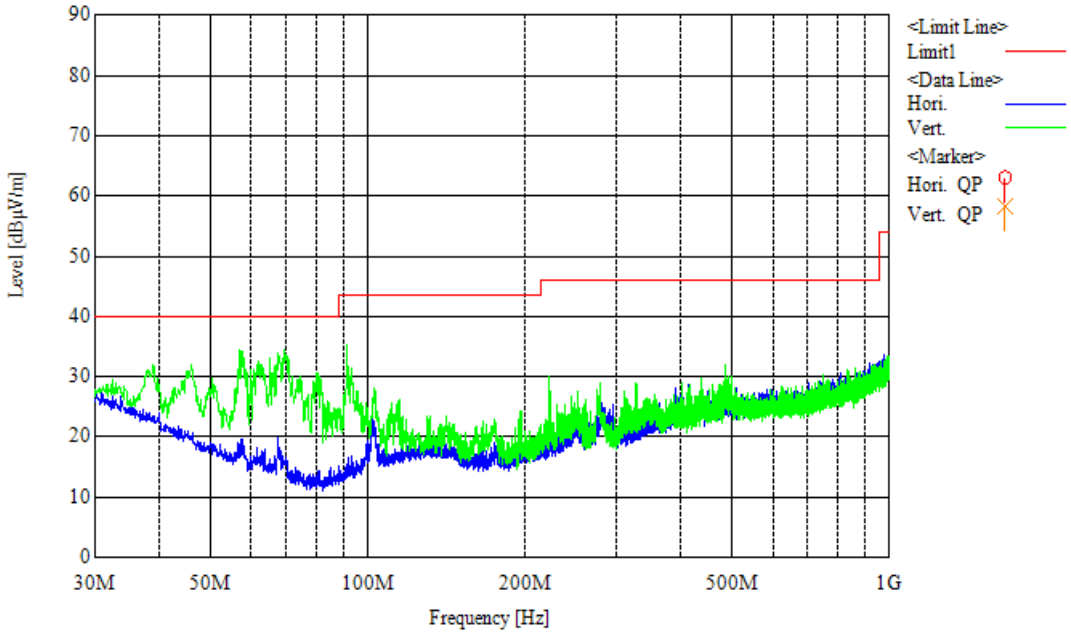
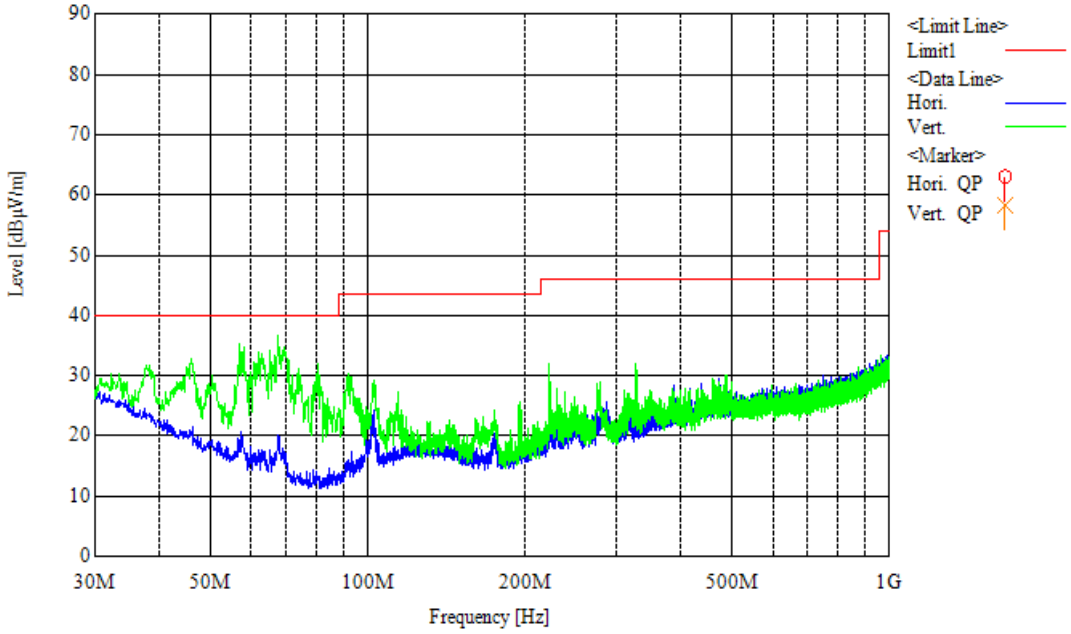
Operating mode: 2442MHz, 1Mbps, Y-plane



Operating mode: 2442MHz, 1Mbps, Z-plane



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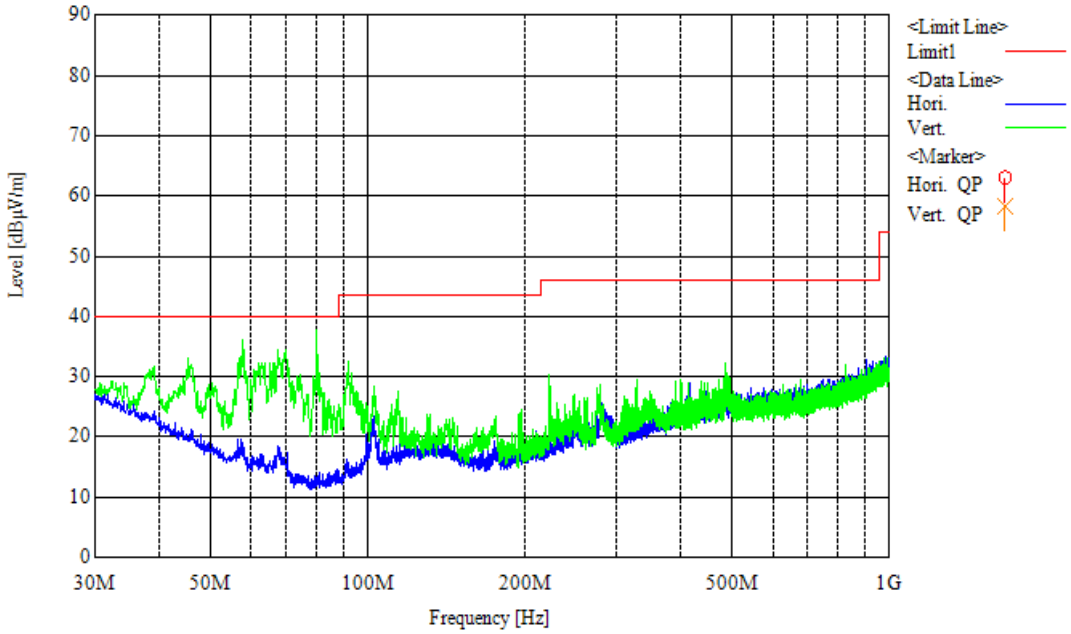
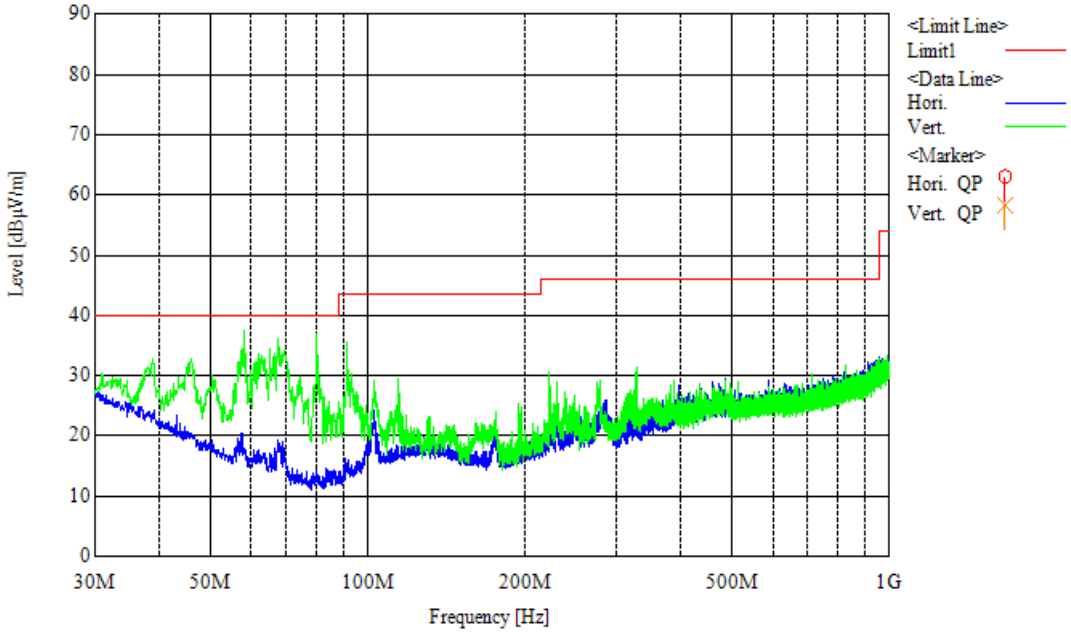
Operating mode: 2442MHz, 2Mbps, Y-plane



Operating mode: 2442MHz, 2Mbps, Z-plane



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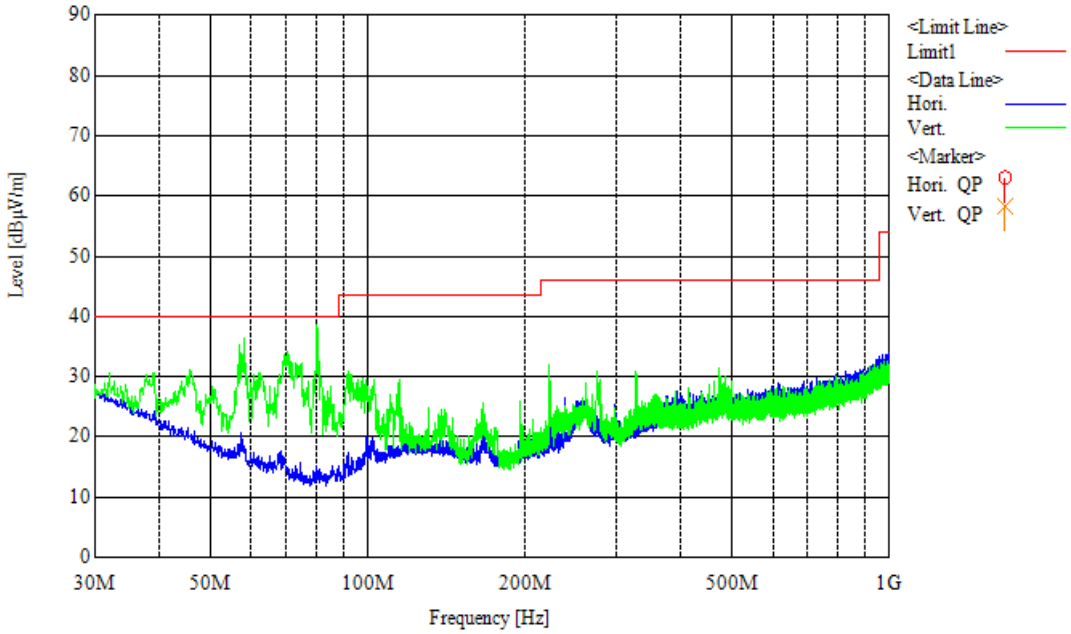
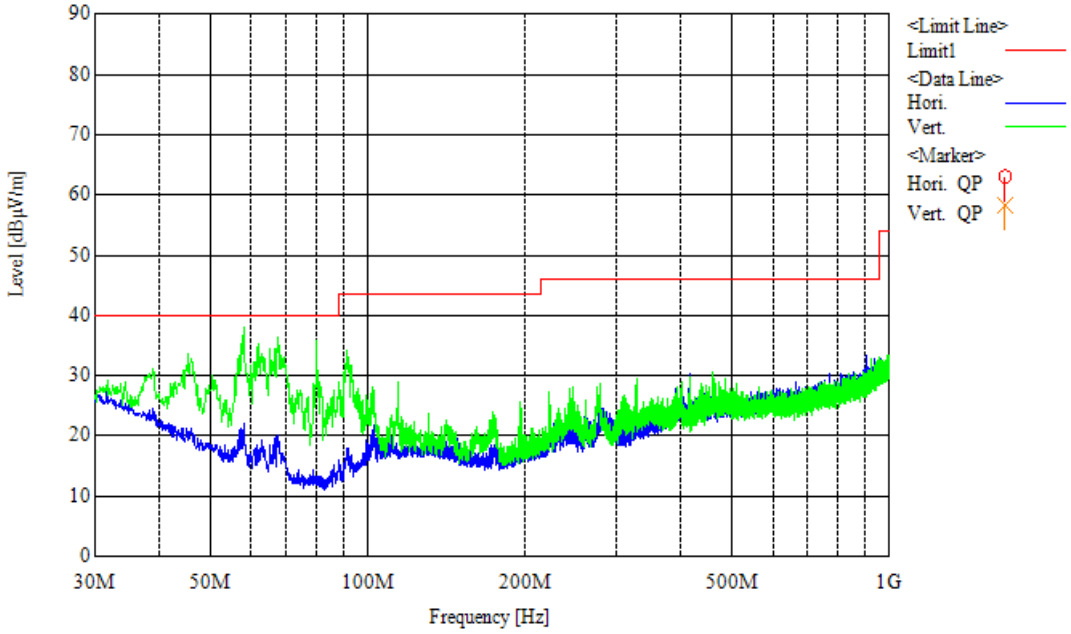
Operating mode: 2480MHz, 1Mbps, X-plane



Operating mode: 2480MHz, 1Mbps, Y-plane



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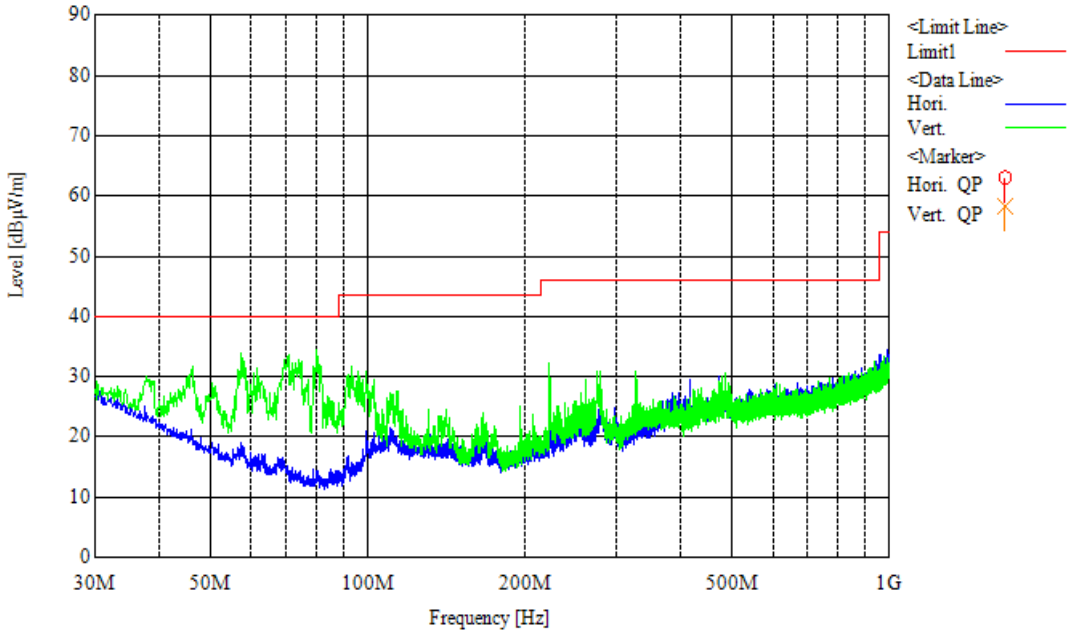
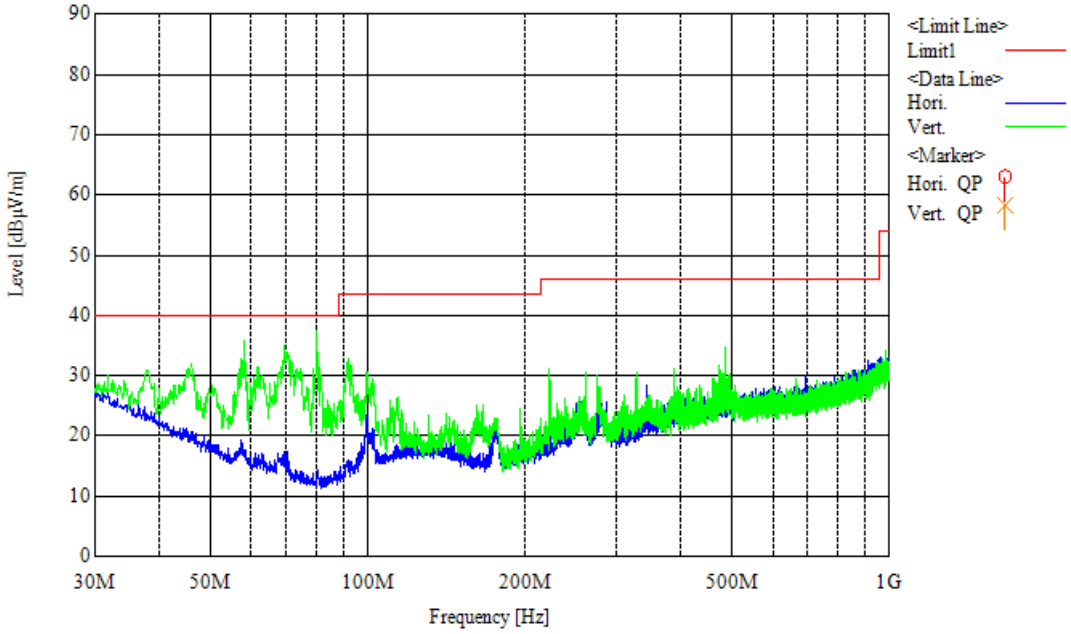
Operating mode: 2480MHz, 2Mbps, X-plane



Operating mode: 2480MHz, 2Mbps, Y-plane



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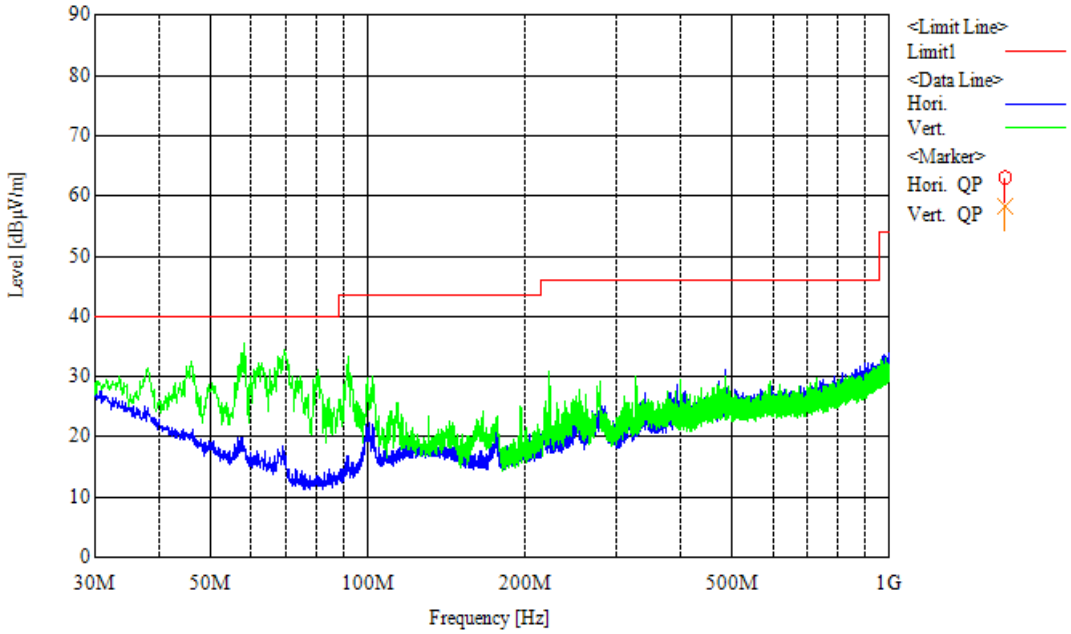
Operating mode: 2480MHz, 2Mbps, Z-plane



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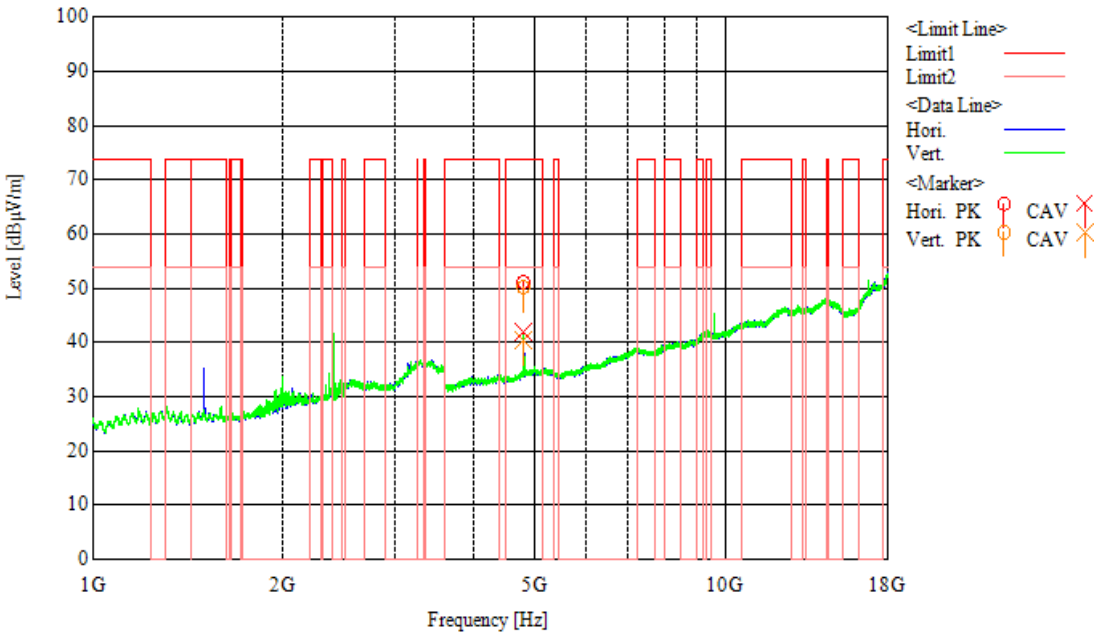
Test Data (1-18GHz)

Operating frequency: 2402MHz
Worst configuration: 1Mbps, Y-plane
Test site: Yokohama Laboratory
Measurement distance: 3 m

[Emission level]

No.	Frequency [MHz]	Reading PK [dBμV]	Reading Ave [dBμV]	C.Factor [dB]	Result PK [dBμV/m]	Result Ave [dBμV/m]	Limit PK [dBμV/m]	Limit Ave [dBμV/m]	Margin PK [dB]	Margin Ave [dB]	Ant.
1	**4803.944**	47.9	**38.7**	**3.2**	51.1	**41.9**	73.9	**53.9**	22.8	**12.0**	**Hori.**
2	4803.976	46.9	37.1	3.2	50.1	40.3	73.9	53.9	23.8	13.6	Vert.

[Chart]



Tested Date: June 17, 2019 Temperature: 18 degC
Humidity: 53 % Atmos. Press: 1009 hPa

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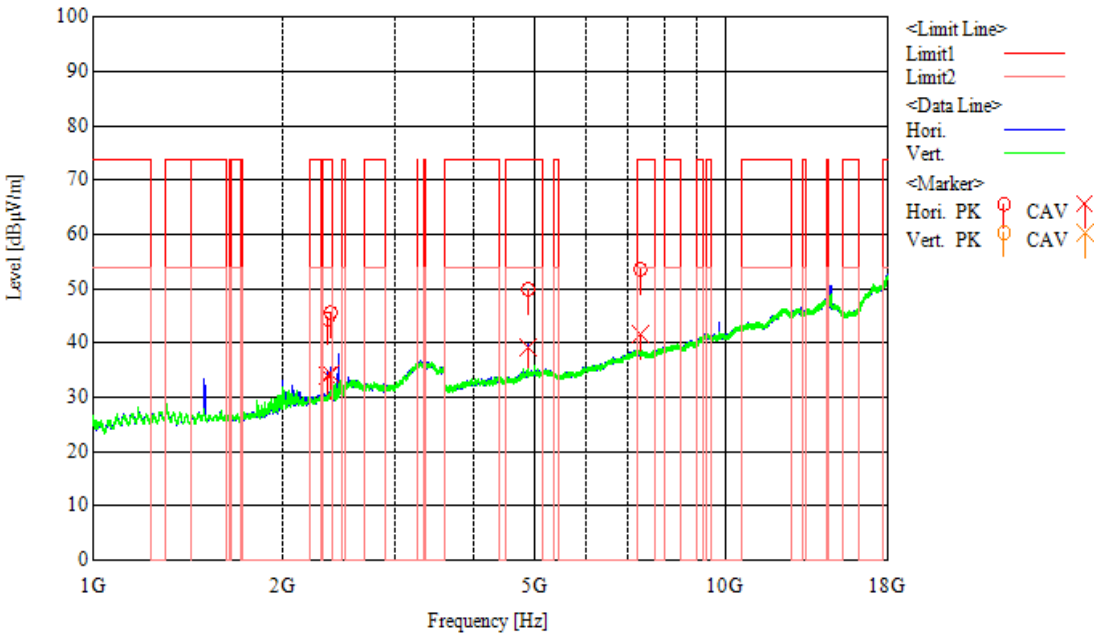
Operating frequency: 2442MHz
Worst configuration: 1Mbps, X-plane
Test site: Yokohama Laboratory
Measurement distance: 3 m

[Emission level]

No.	Frequency [MHz]	Reading PK [dBμV]	Reading Ave [dBμV]	C.Factor [dB]	Result PK [dBμV/m]	Result Ave [dBμV/m]	Limit PK [dBμV/m]	Limit Ave [dBμV/m]	Margin PK [dB]	Margin Ave [dB]	Ant.
1	2346.067	47.8	37.3	-3.4	44.4	33.9	73.9	53.9	29.5	20.0	Hori.
2	2378.100	48.6	37.4	-3.0	45.6	34.4	73.9	53.9	28.3	19.5	Hori.
3	4884.232	46.2	35.7	3.6	49.8	39.3	73.9	53.9	24.1	14.6	Hori.
4	**7325.507**	45.6	**33.6**	**7.9**	53.5	**41.5**	73.9	**53.9**	20.4	**12.4**	**Hori.**

[Chart]



Tested Date: June 17, 2019 Temperature: 18 degC
Humidity: 53 % Atmos. Press: 1009 hPa

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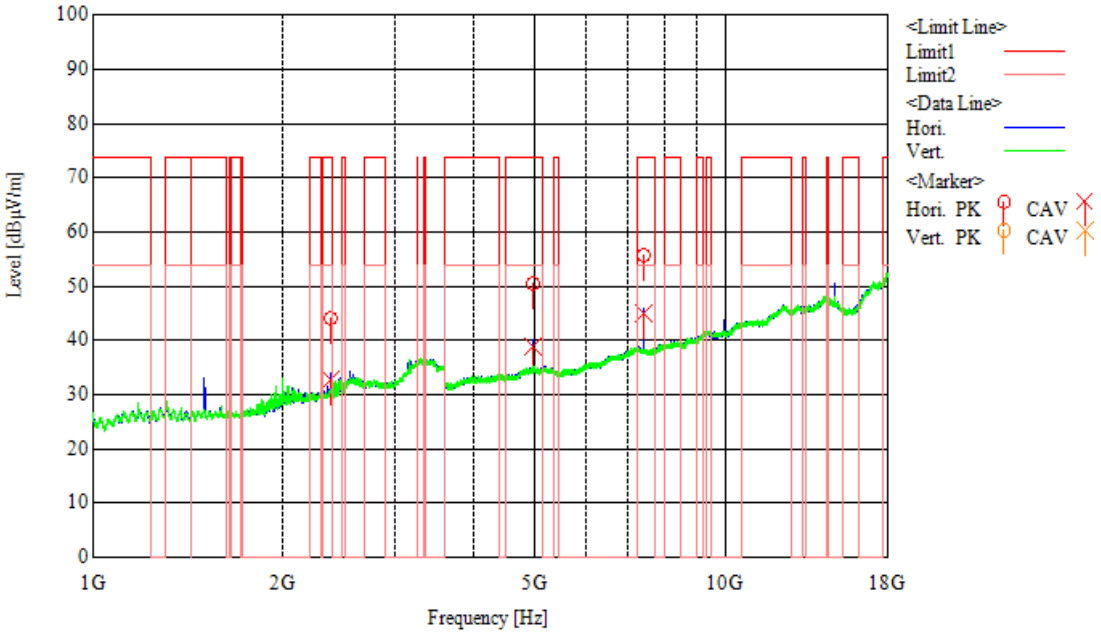
Operating frequency: 2480MHz
Worst configuration: 1Mbps, X-plane
Test site: Yokohama Laboratory
Measurement distance: 3 m

[Emission level]

No.	Frequency [MHz]	Reading PK [dBμV]	Reading Ave [dBμV]	C.Factor [dB]	Result PK [dBμV/m]	Result Ave [dBμV/m]	Limit PK [dBμV/m]	Limit Ave [dBμV/m]	Margin PK [dB]	Margin Ave [dB]	Ant.
1	2383.979	47.0	35.8	-2.9	44.1	32.9	73.9	53.9	29.8	21.0	Hori.
2	4959.964	46.6	35.2	3.8	50.4	39.0	73.9	53.9	23.5	14.9	Hori.
3	**7439.296**	47.7	**37.0**	**8.0**	55.7	**45.0**	73.9	**53.9**	18.2	**8.9**	**Hori.**

[Chart]



Tested Date: June 17, 2019 Temperature: 18 degC
Humidity: 53 % Atmos. Press: 1009 hPa

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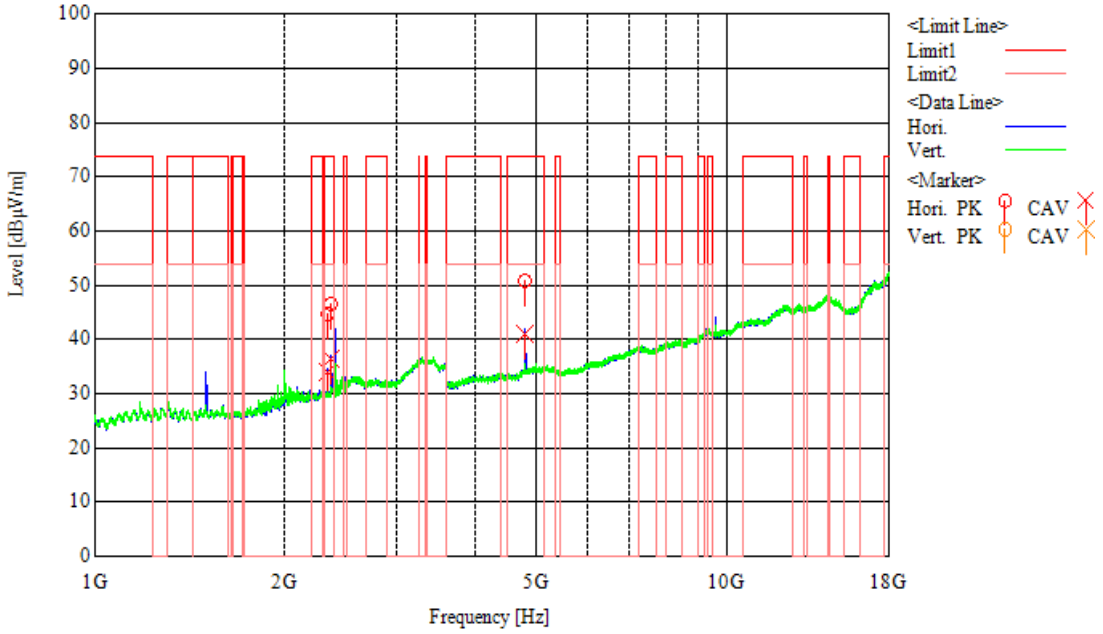
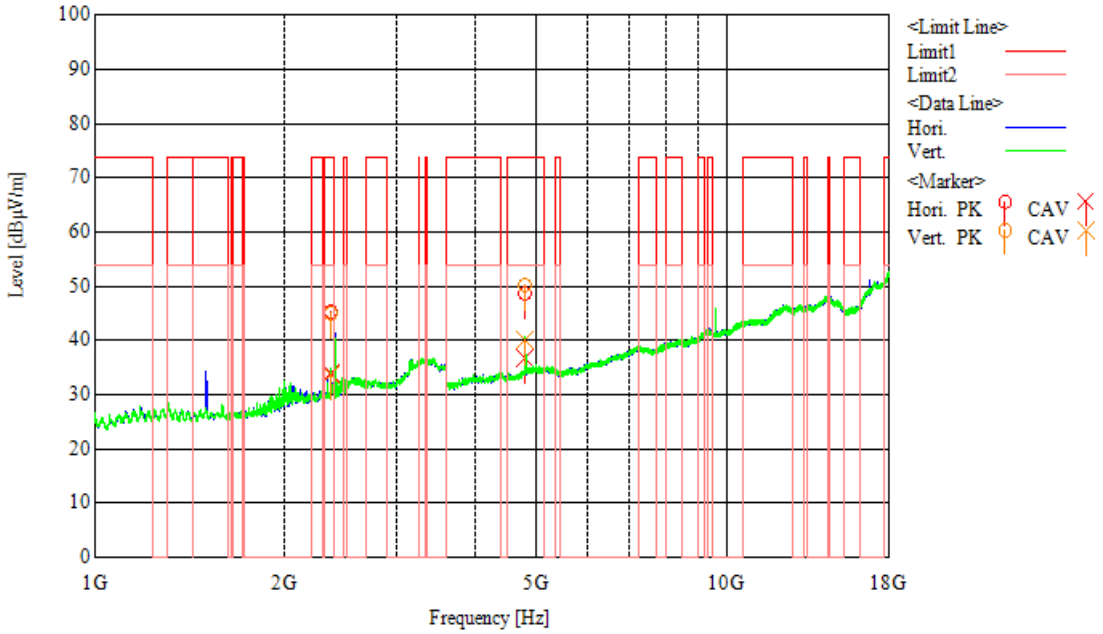
Other test Data (1-18GHz)

Operating mode: 2402MHz, 1Mbps, X-plane



Operating mode: 2402MHz, 1Mbps, Z-plane



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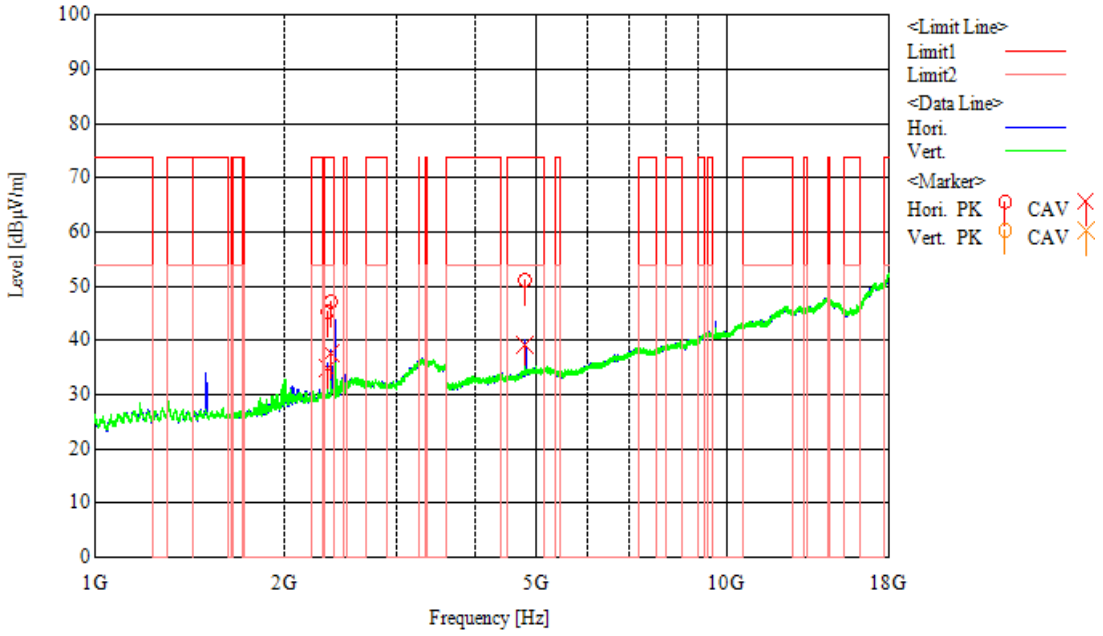
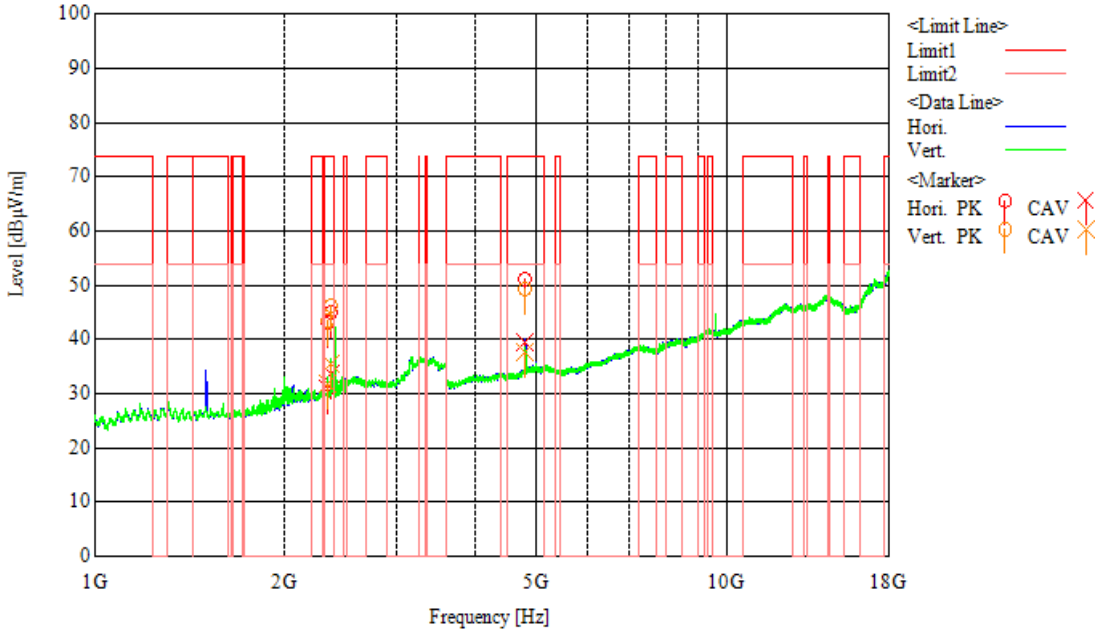
Operating mode: 2402MHz, 2Mbps, X-plane



Operating mode: 2402MHz, 2Mbps, Y-plane



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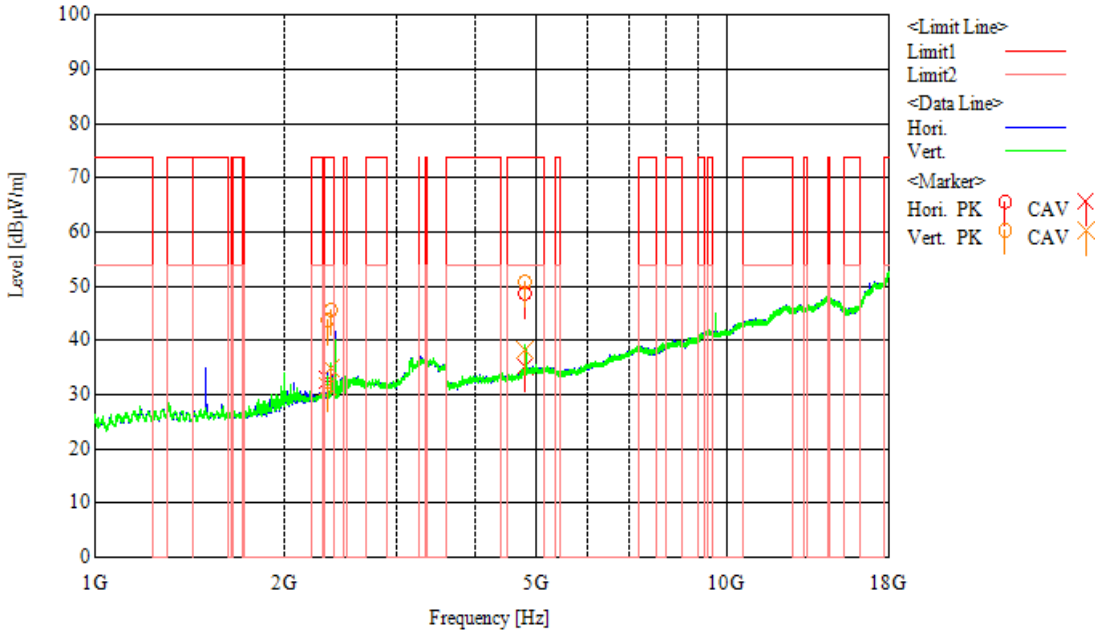
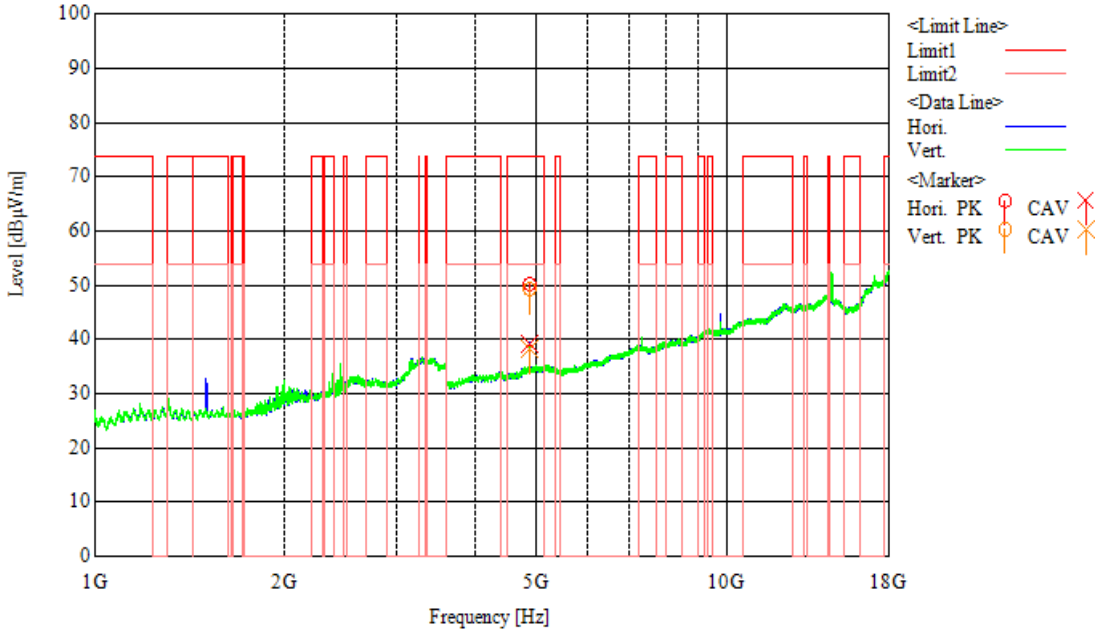
Operating mode: 2402MHz, 2Mbps, Z-plane



Operating mode: 2442MHz, 1Mbps, Y-plane



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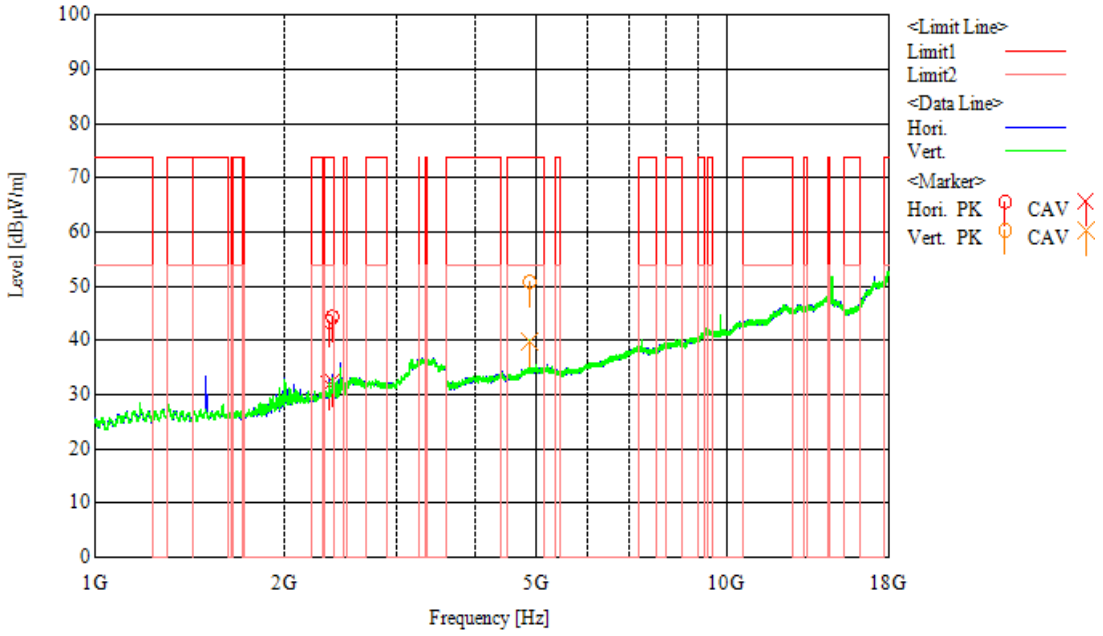
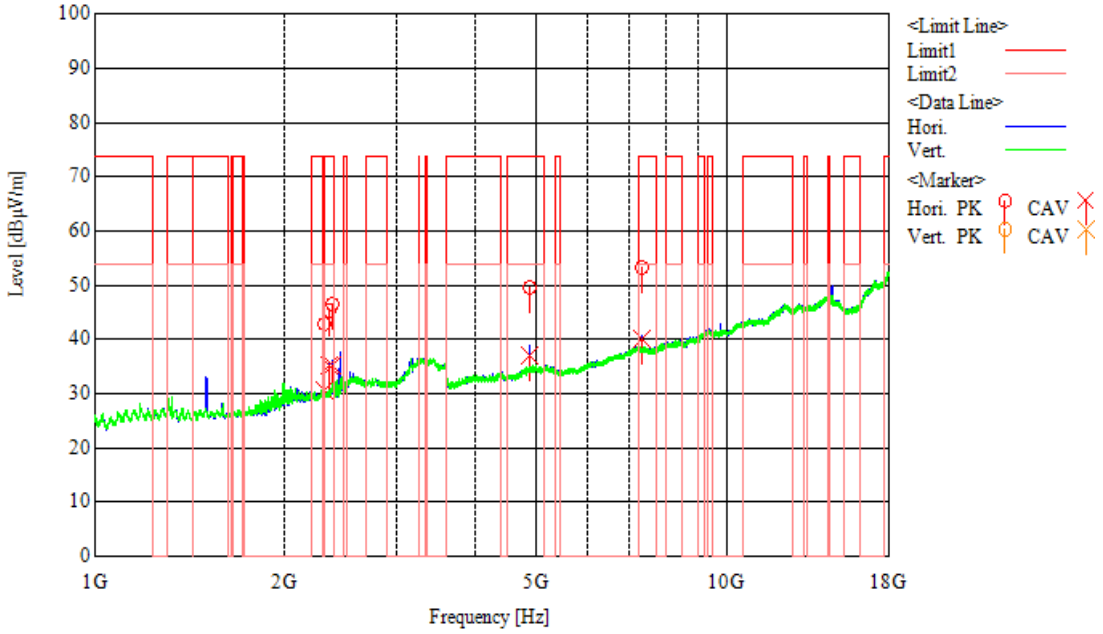
Operating mode: 2442MHz, 1Mbps, Z-plane



Operating mode: 2442MHz, 2Mbps, X-plane



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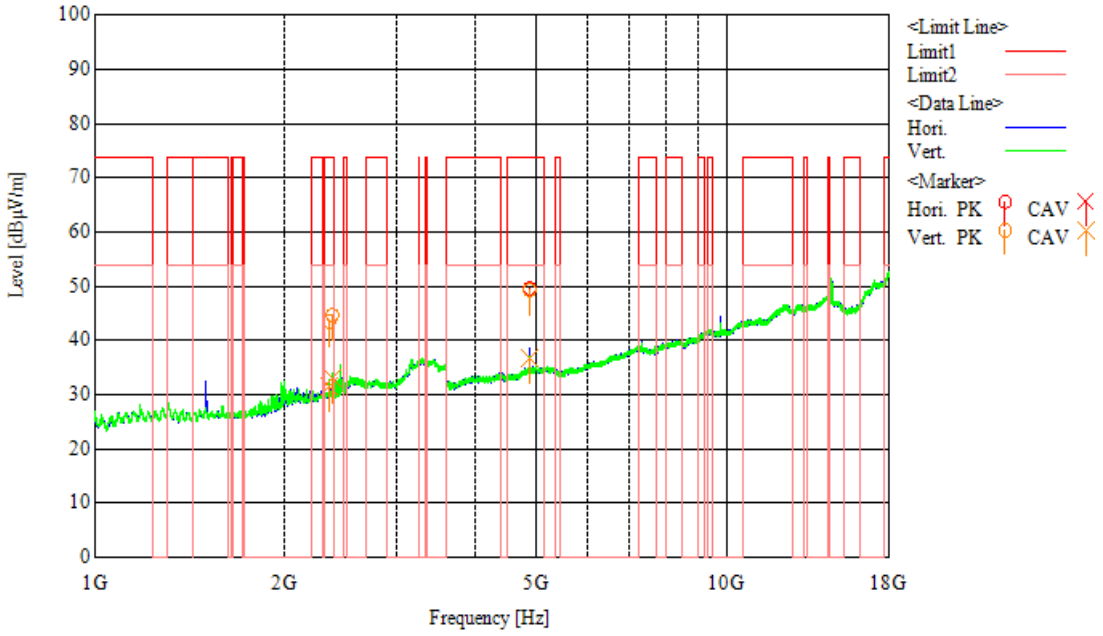
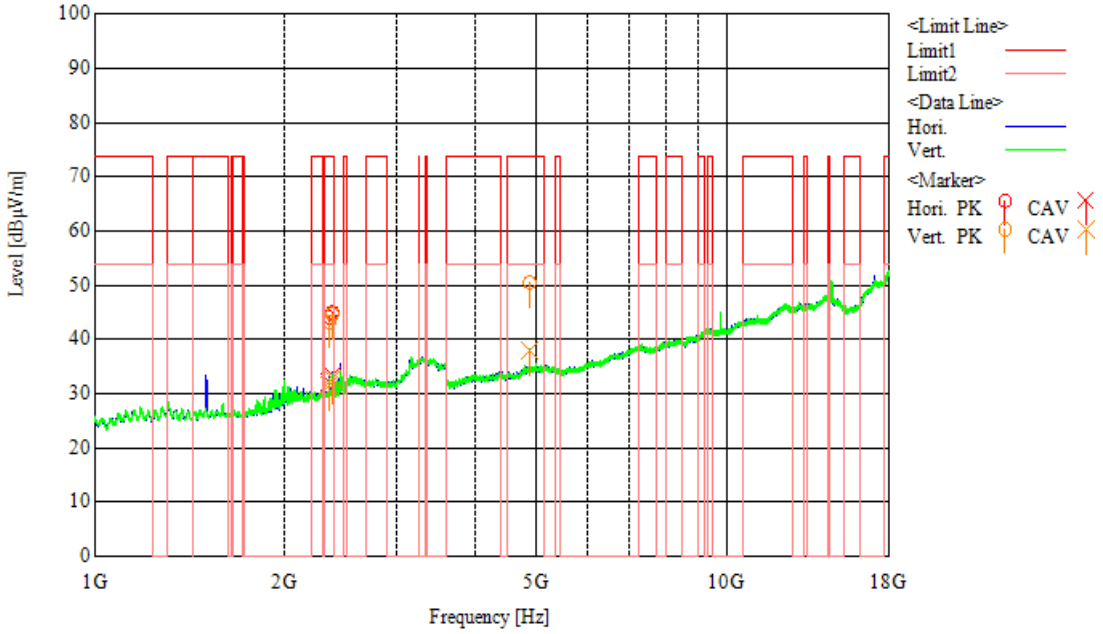
Operating mode: 2442MHz, 2Mbps, Y-plane



Operating mode: 2442MHz, 2Mbps, Z-plane



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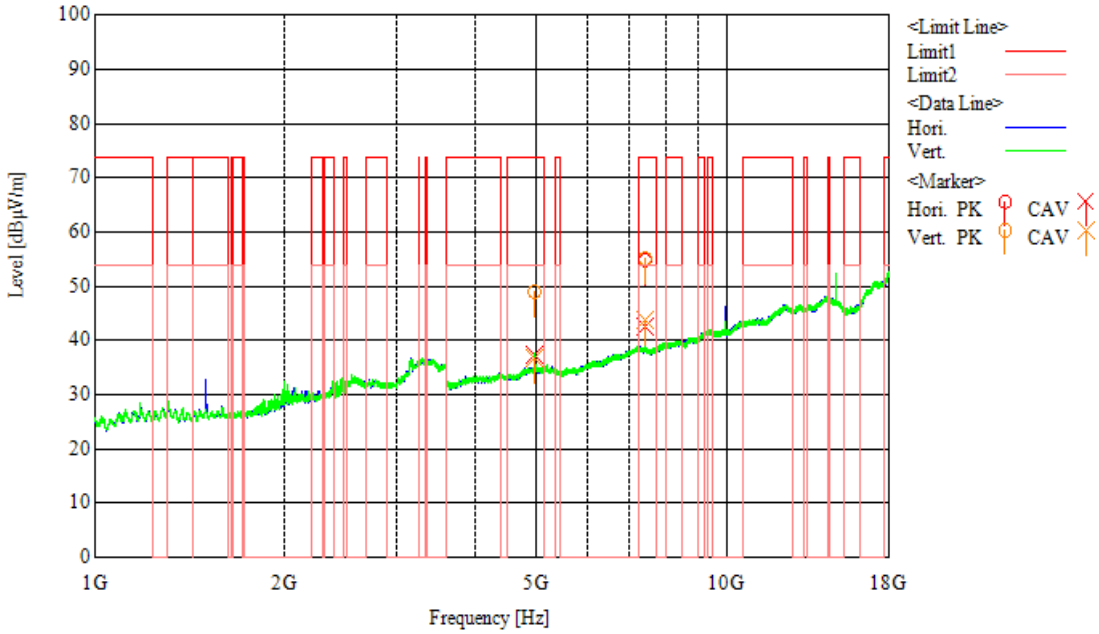
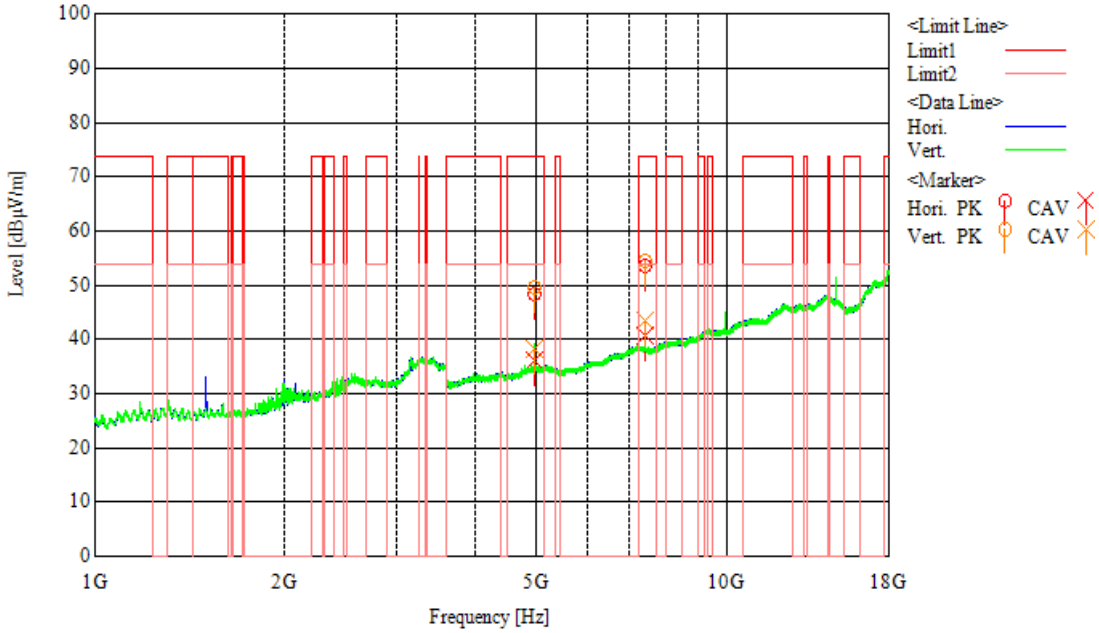
Operating mode: 2480MHz, 1Mbps, Y-plane



Operating mode: 2480MHz, 1Mbps, Z-plane



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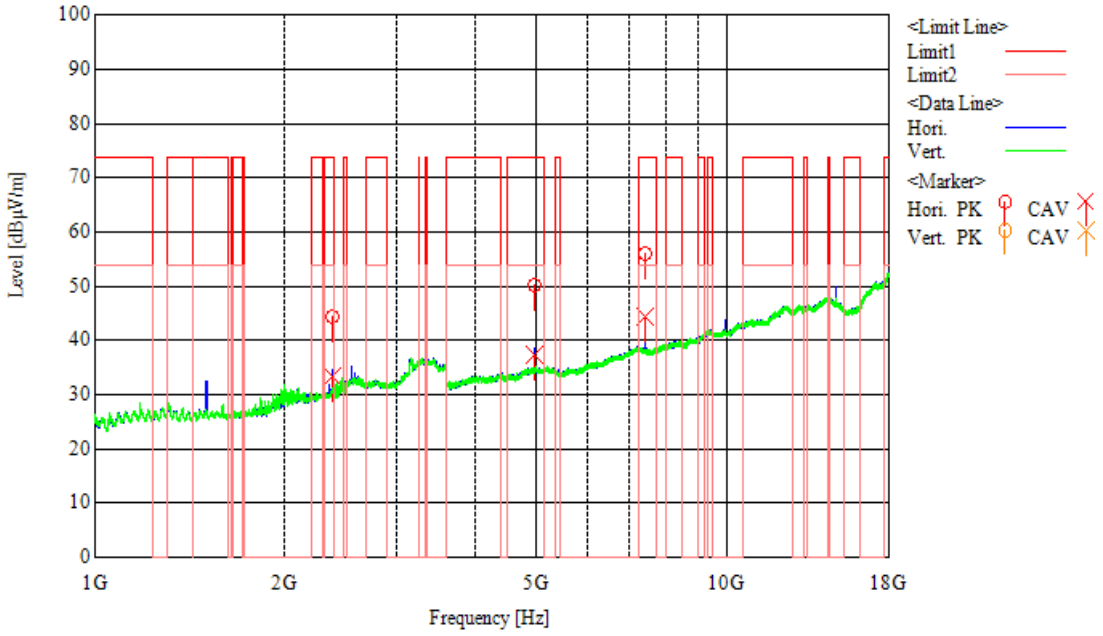
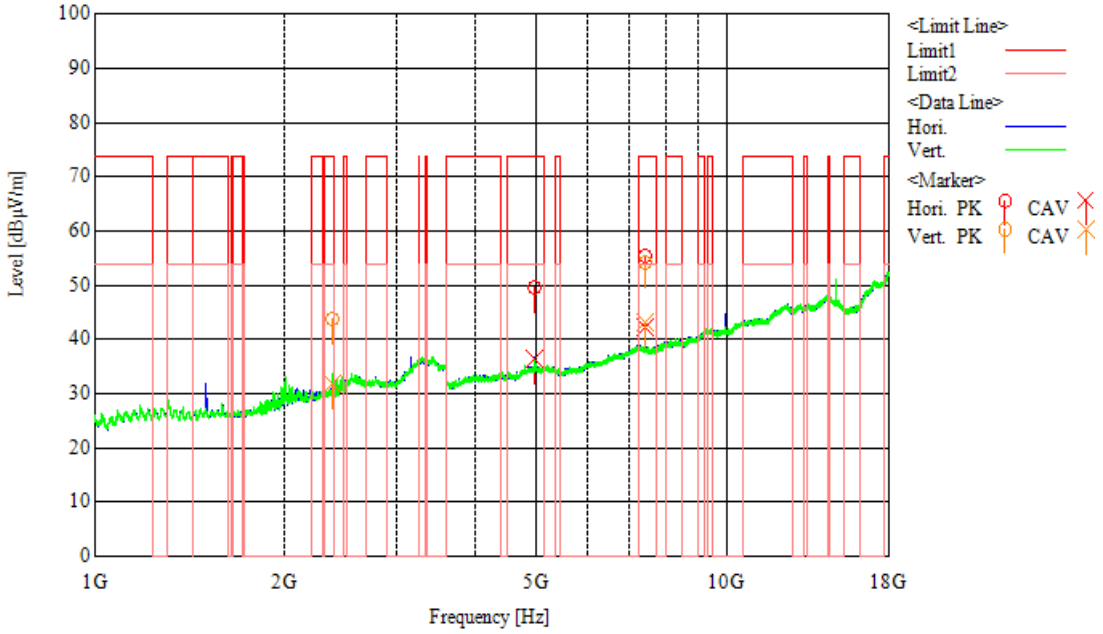
Operating mode: 2480MHz, 2Mbps, X-plane



Operating mode: 2480MHz, 2Mbps, Y-plane



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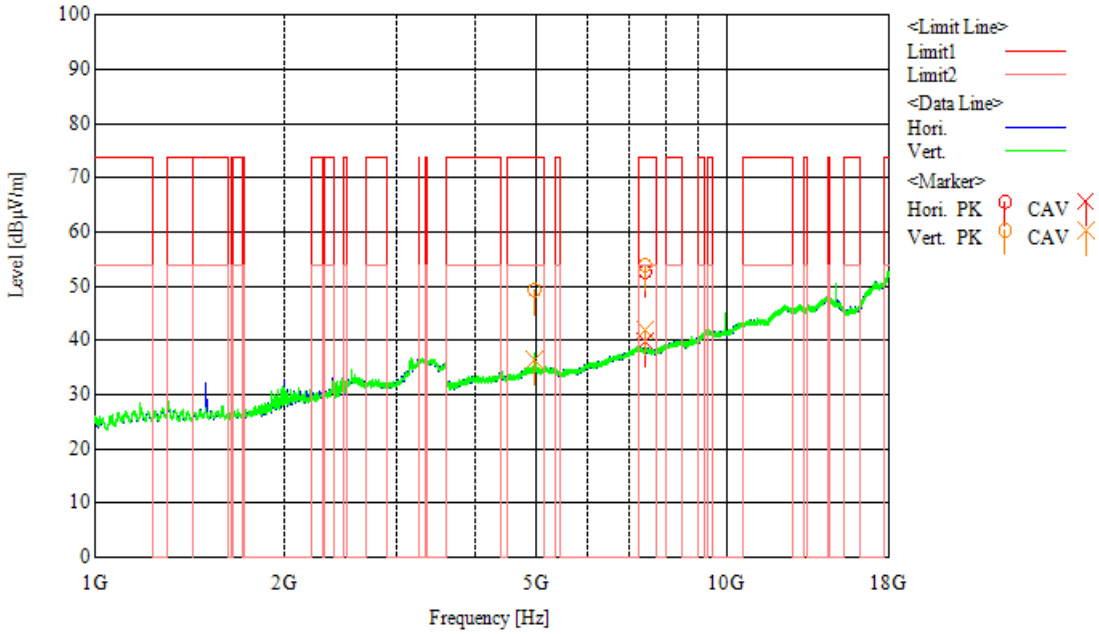
Operating mode: 2480MHz, 2Mbps, Z-plane



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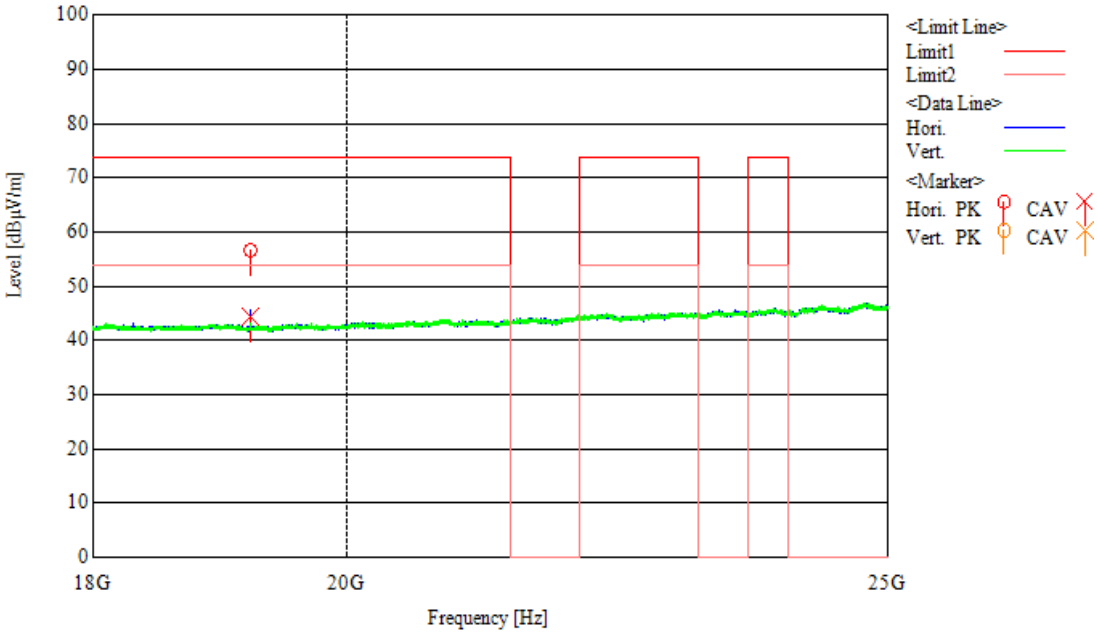
Test Data (18-25GHz)

Operating frequency: 2402MHz
Worst configuration: 1Mbps, Z-plane
Test site: Yokohama Laboratory
Measurement distance: 3 m

[Emission level]

No.	Frequency [MHz]	Reading PK [dBμV]	Reading Ave [dBμV]	C.Factor [dB]	Result PK [dBμV/m]	Result Ave [dBμV/m]	Limit PK [dBμV/m]	Limit Ave [dBμV/m]	Margin PK [dB]	Margin Ave [dB]	Ant.
1	**19214.439**	42.4	**30.2**	**14.2**	56.6	**44.4**	73.9	**53.9**	17.3	**9.5**	**Hori.**

[Chart]



Tested Date: June 19, 2019 Temperature: 20 degC
Humidity: 52 % Atmos. Press: 1010 hPa

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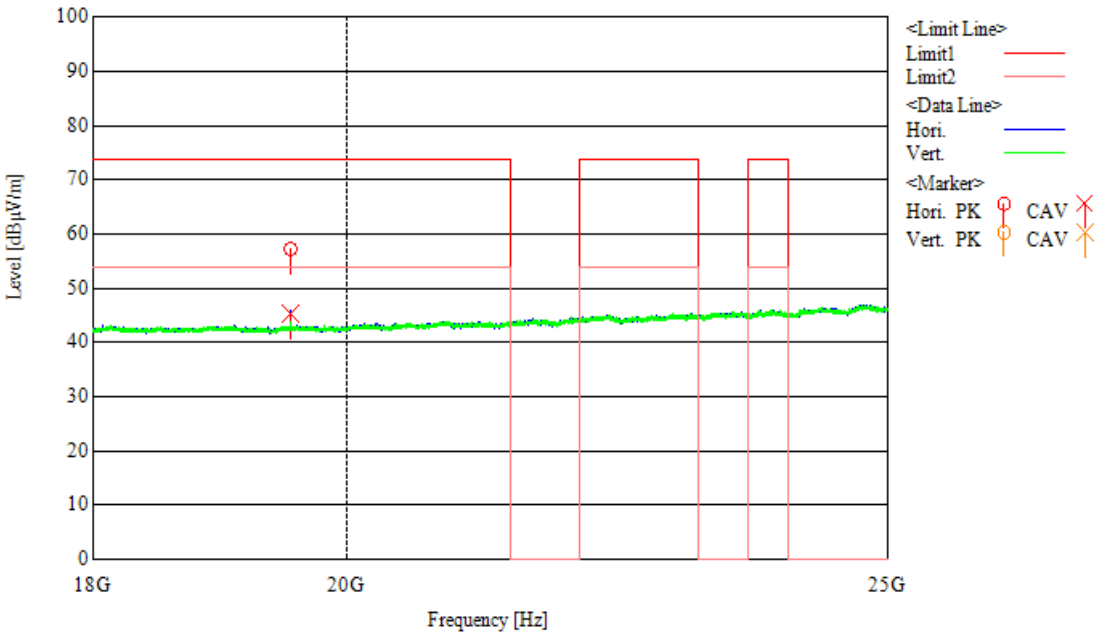
Operating frequency: 2442MHz
Worst configuration: 1Mbps, Z-plane
Test site: Yokohama Laboratory
Measurement distance: 3 m

[Emission level]

No.	Frequency [MHz]	Reading PK [dBμV]	Reading Ave [dBμV]	C.Factor [dB]	Result PK [dBμV/m]	Result Ave [dBμV/m]	Limit PK [dBμV/m]	Limit Ave [dBμV/m]	Margin PK [dB]	Margin Ave [dB]	Ant.
1	**19534.330**	43.5	**31.6**	**13.8**	57.3	**45.4**	73.9	**53.9**	16.6	**8.5**	**Hori.**

[Chart]



Tested Date: June 19, 2019 Temperature: 20 degC
Humidity: 52 % Atmos. Press: 1010 hPa

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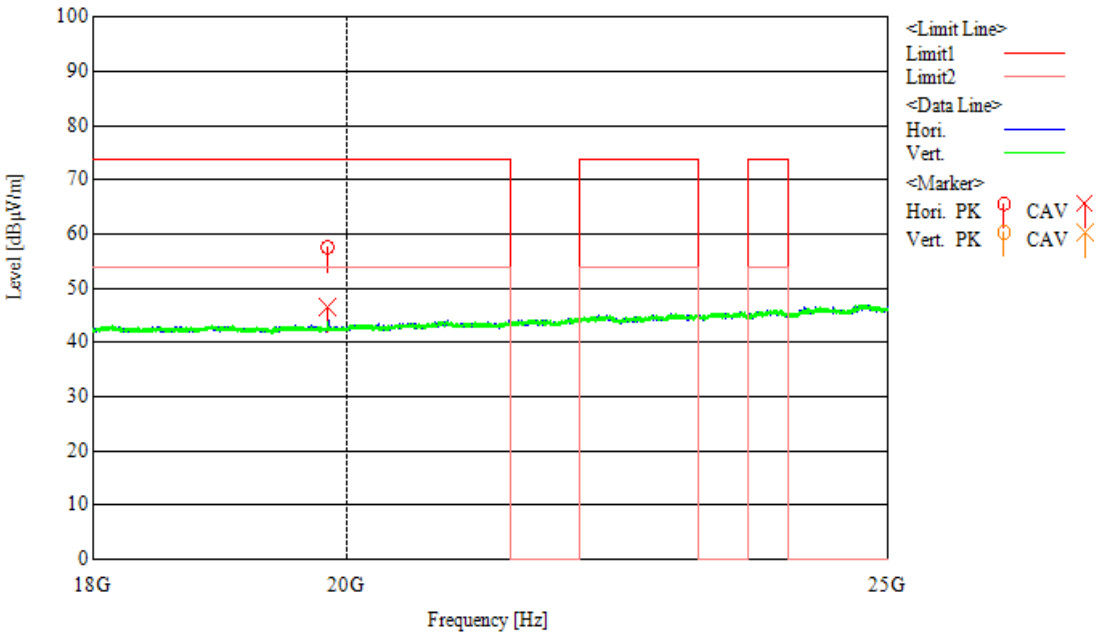
Operating frequency: 2480MHz
Worst configuration: 1Mbps, Z-plane
Test site: Yokohama Laboratory
Measurement distance: 3 m

[Emission level]

No.	Frequency [MHz]	Reading PK [dBμV]	Reading Ave [dBμV]	C.Factor [dB]	Result PK [dBμV/m]	Result Ave [dBμV/m]	Limit PK [dBμV/m]	Limit Ave [dBμV/m]	Margin PK [dB]	Margin Ave [dB]	Ant.
1	**19838.340**	44.1	**32.8**	**13.6**	57.7	**46.4**	73.9	**53.9**	16.2	**7.5**	**Hori.**

[Chart]



Tested Date: June 19, 2019 Temperature: 20 degC
Humidity: 52 % Atmos. Press: 1010 hPa

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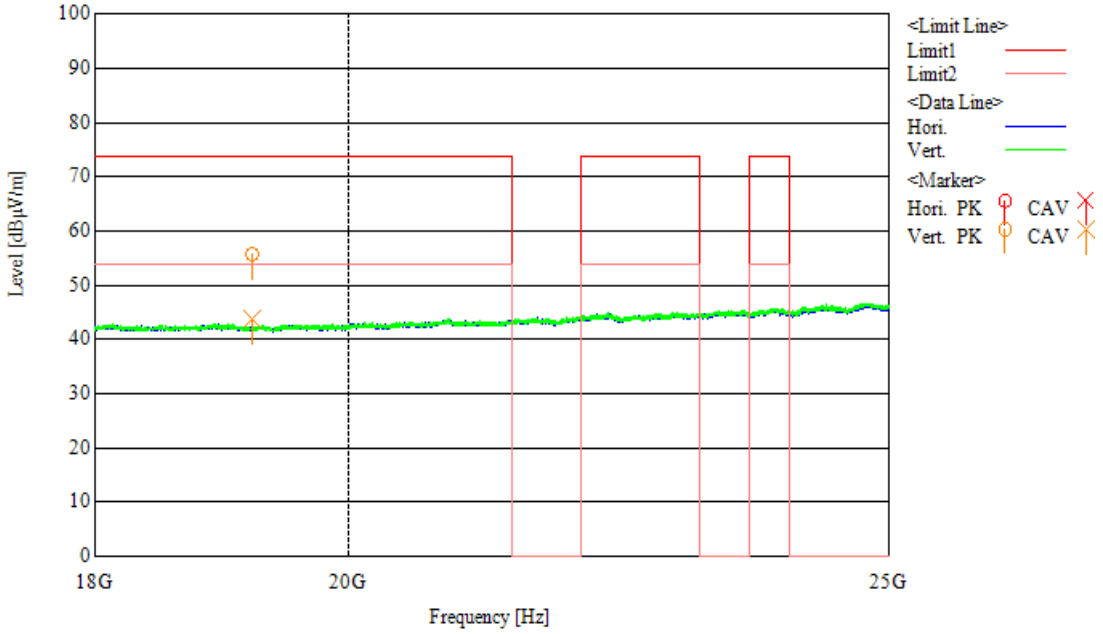
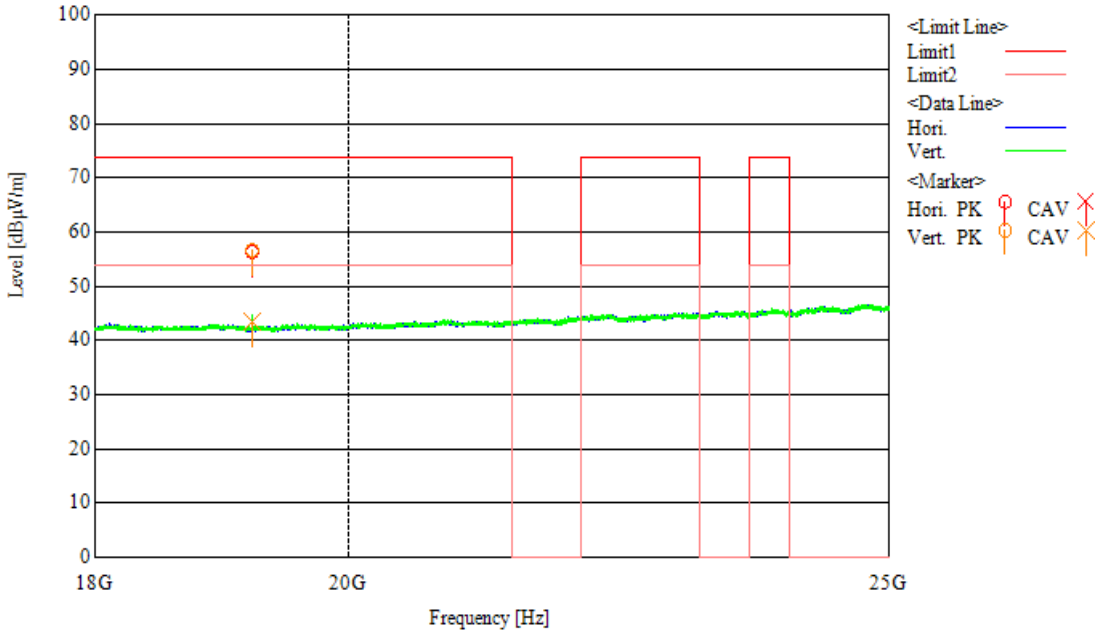
Other test Data (18-25GHz)

Operating mode: 2402MHz, 1Mbps, X-plane



Operating mode: 2402MHz, 1Mbps, Y-plane



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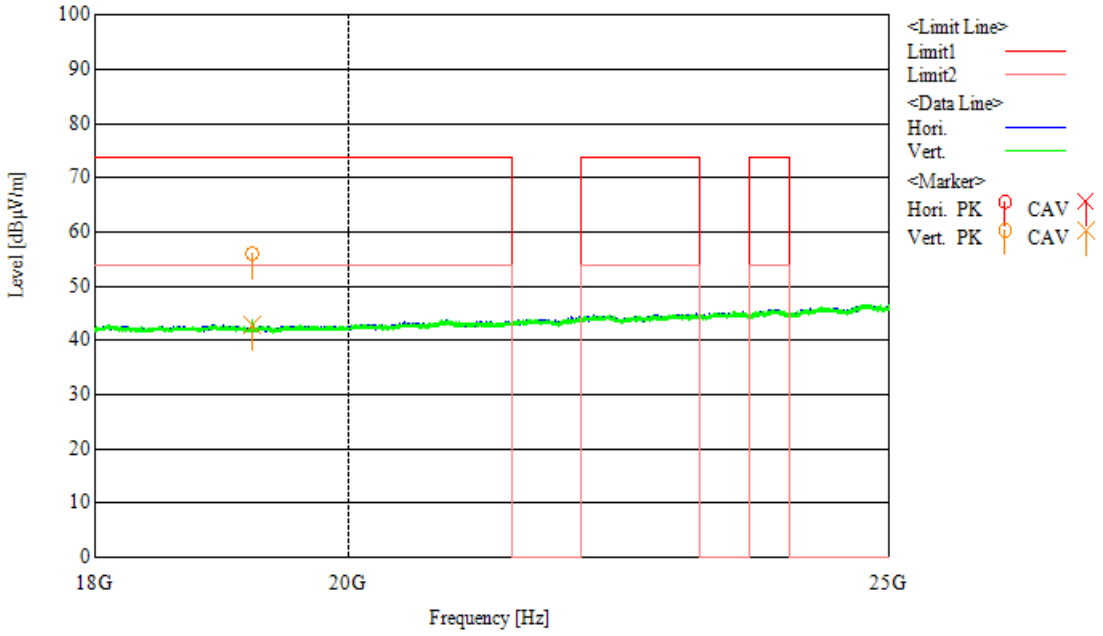
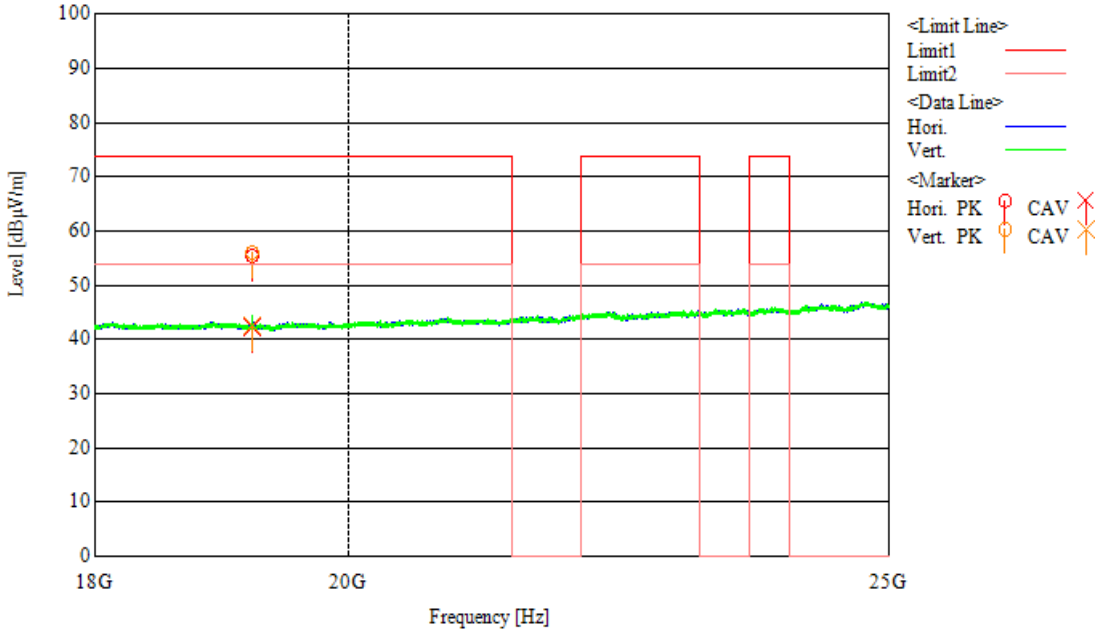
Operating mode: 2402MHz, 2Mbps, X-plane



Operating mode: 2402MHz, 2Mbps, Y-plane



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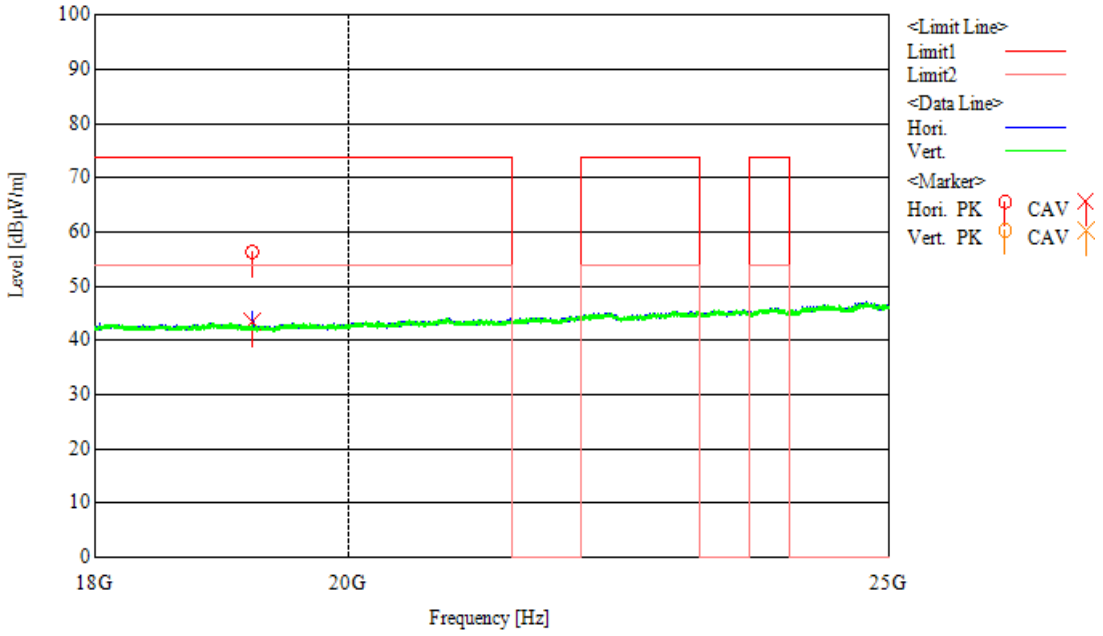
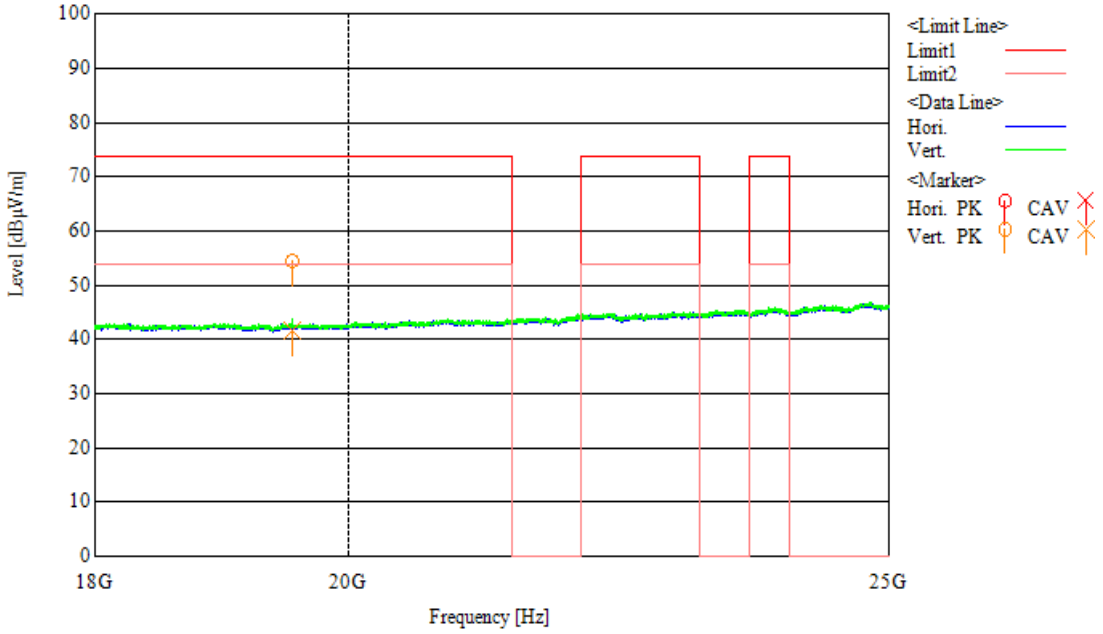
Operating mode: 2402MHz, 2Mbps, Z-plane



Operating mode: 2442MHz, 1Mbps, X-plane



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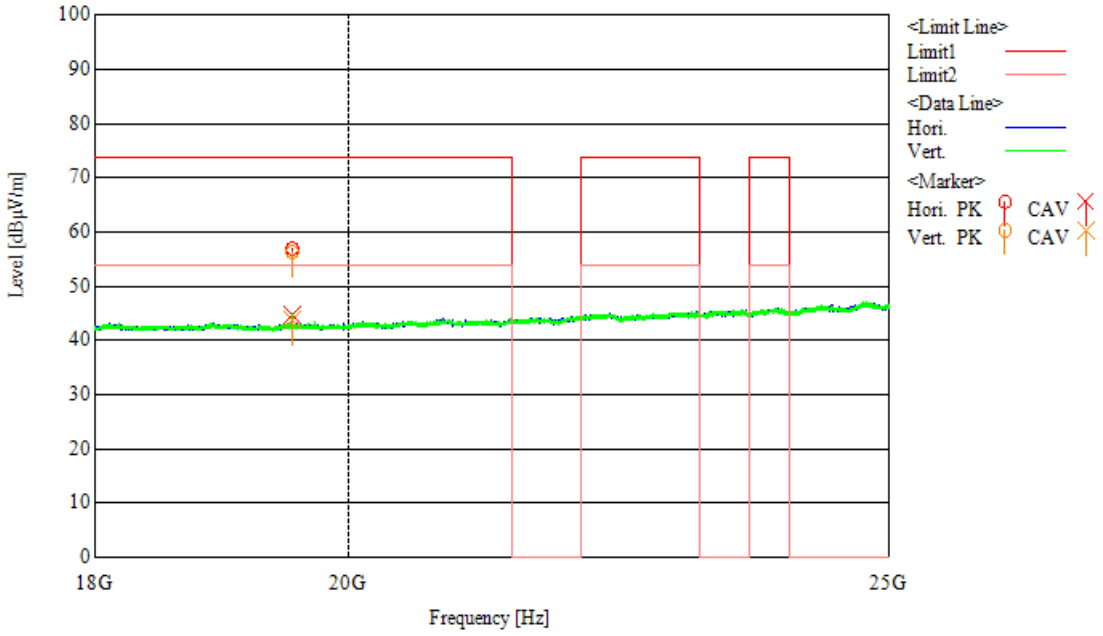
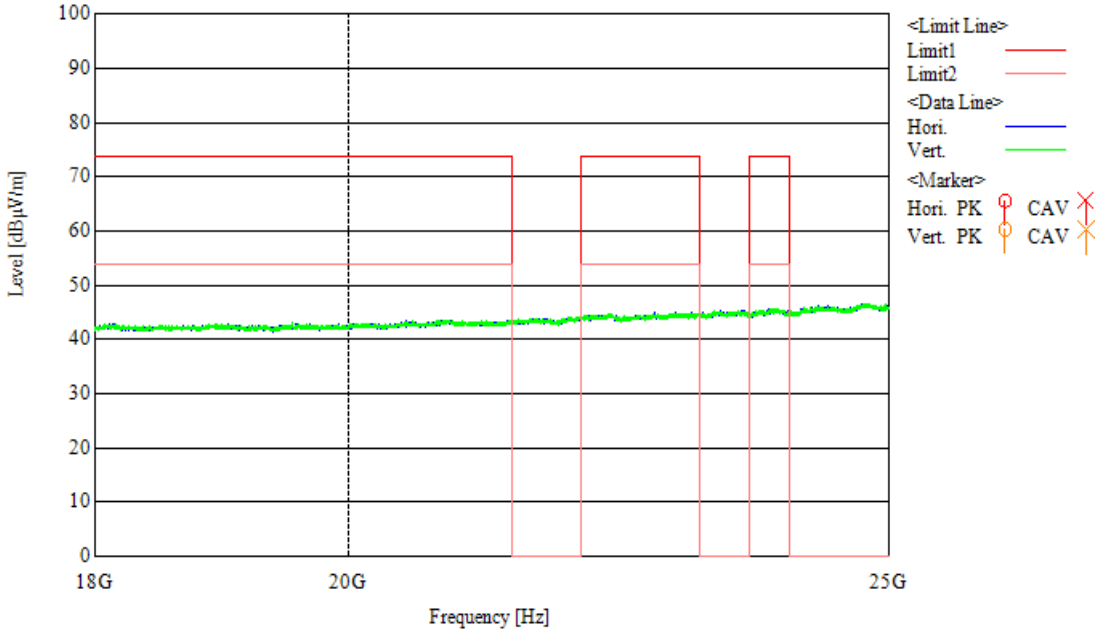
Operating mode: 2442MHz, 1Mbps, Y-plane



Operating mode: 2442MHz, 2Mbps, X-plane



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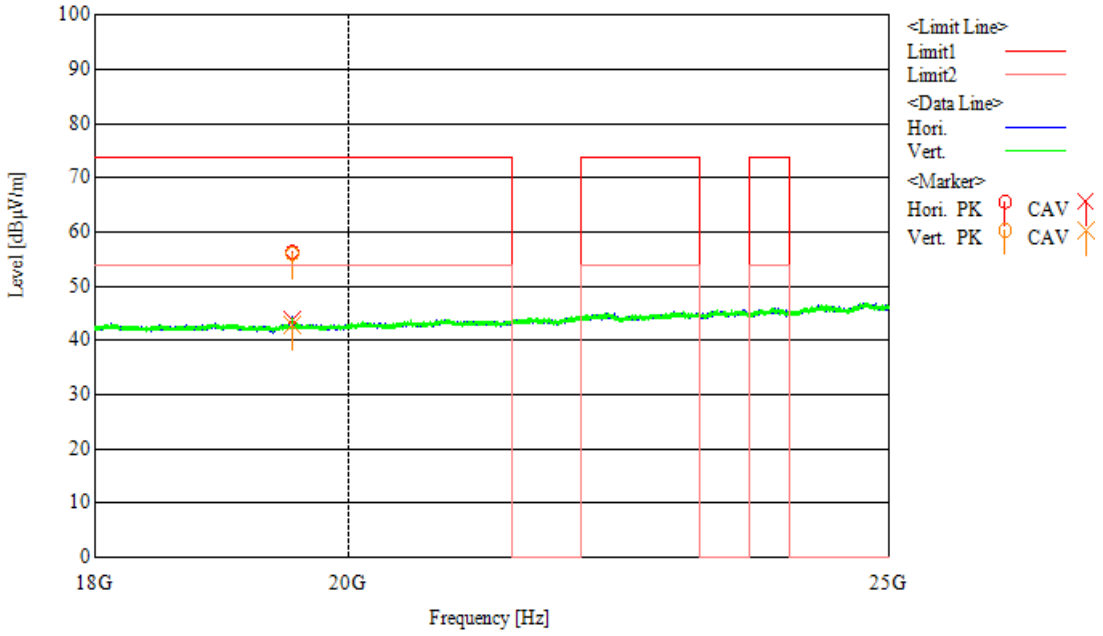
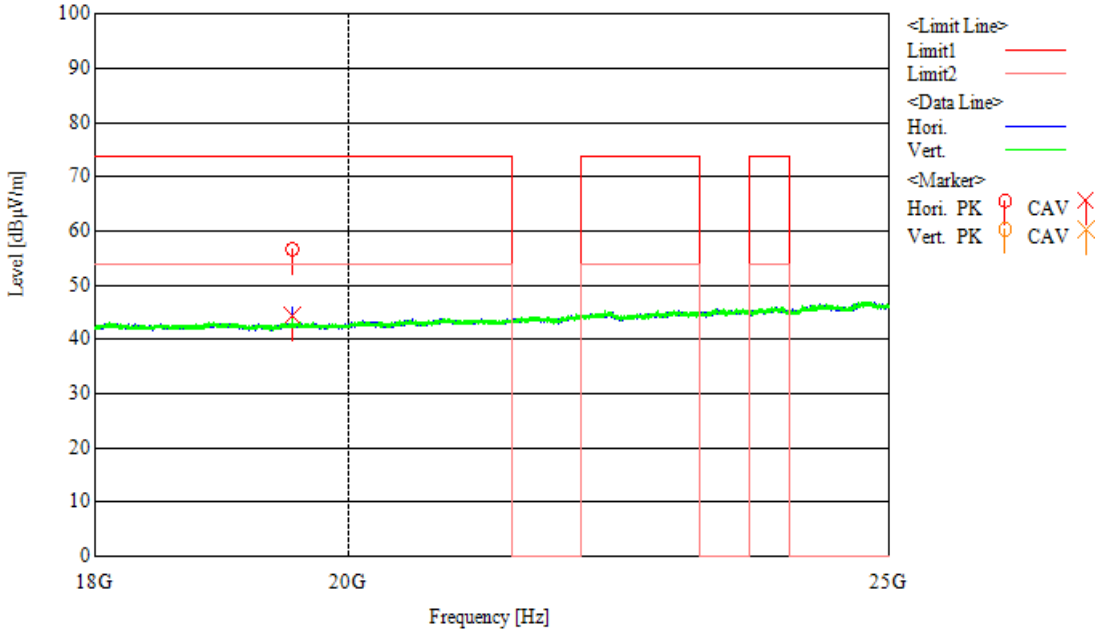
Operating mode: 2442MHz, 2Mbps, Y-plane



Operating mode: 2442MHz, 2Mbps, Z-plane



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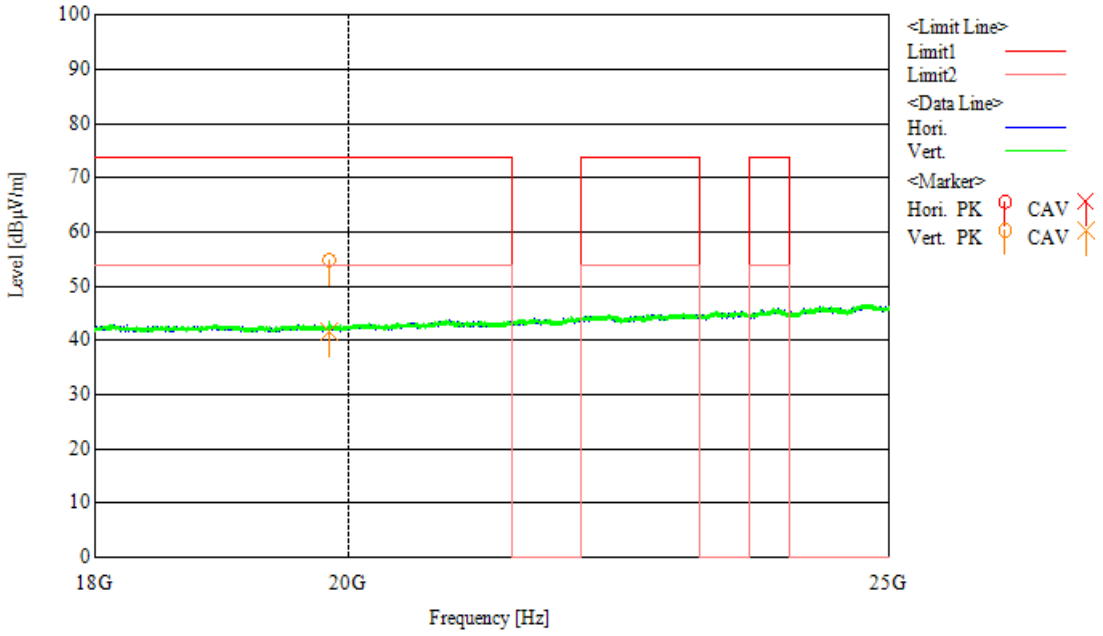
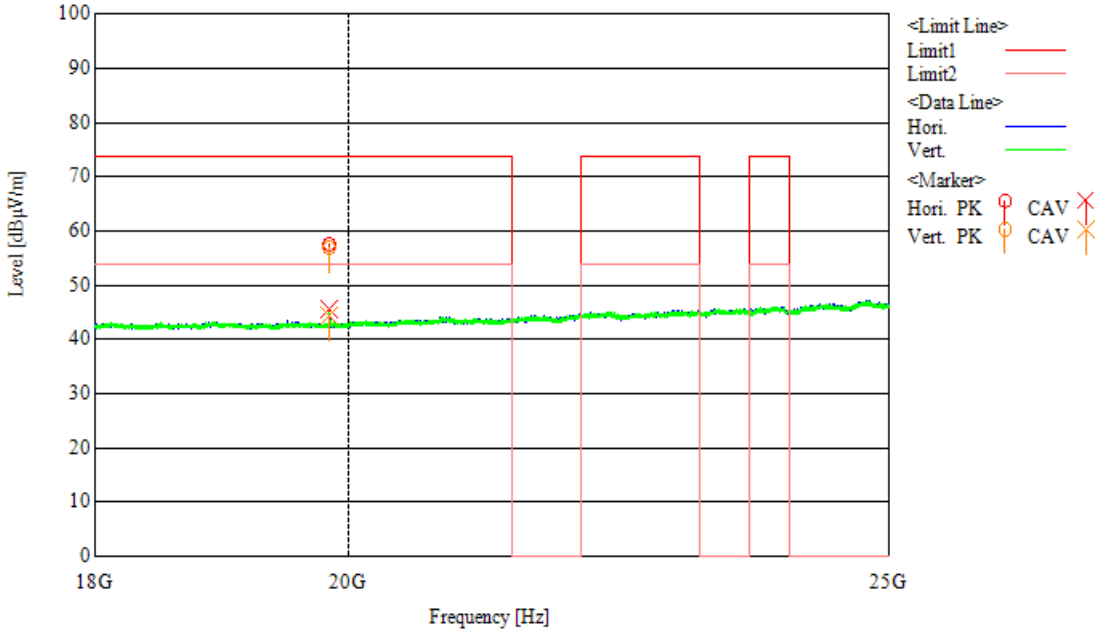
Operating mode: 2480MHz, 1Mbps, X-plane



Operating mode: 2480MHz, 1Mbps, Y-plane



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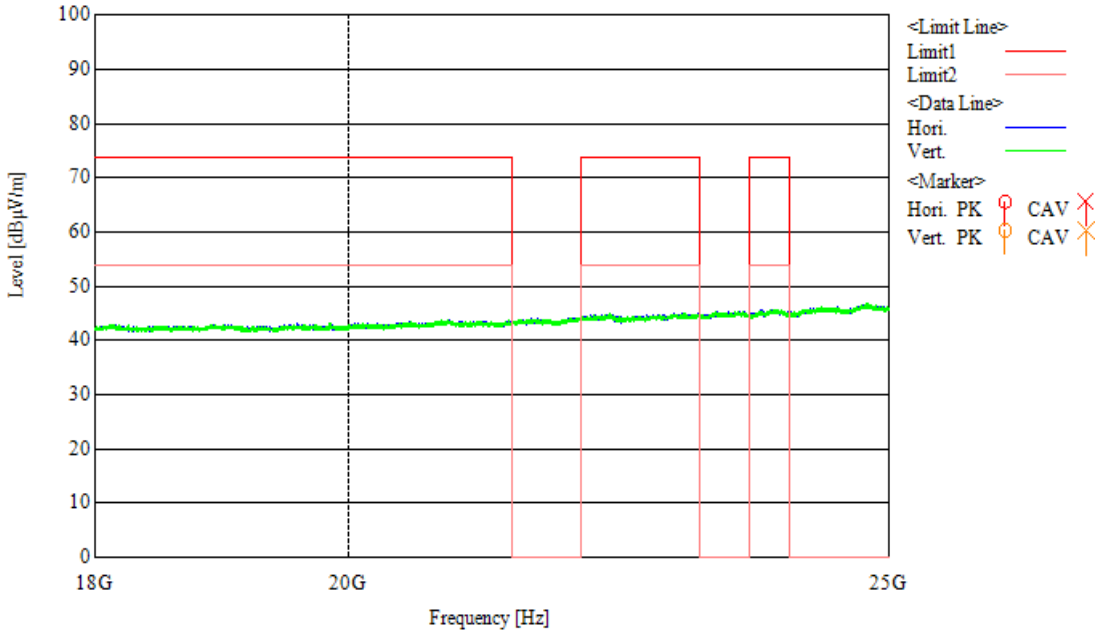
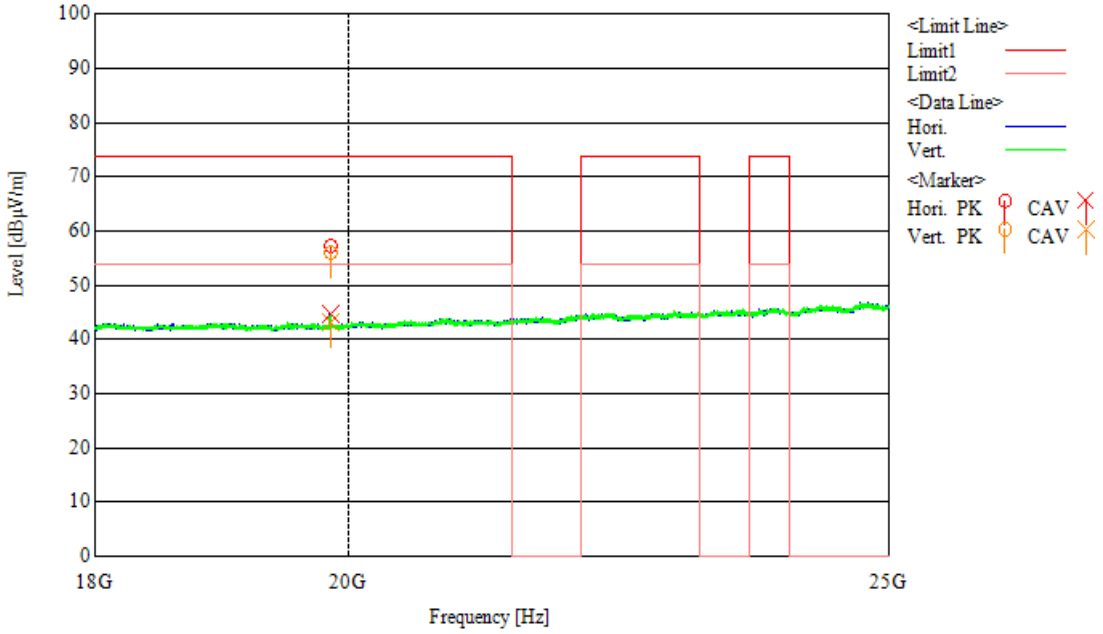
Operating mode: 2480MHz, 2Mbps, X-plane



Operating mode: 2480MHz, 2Mbps, Y-plane



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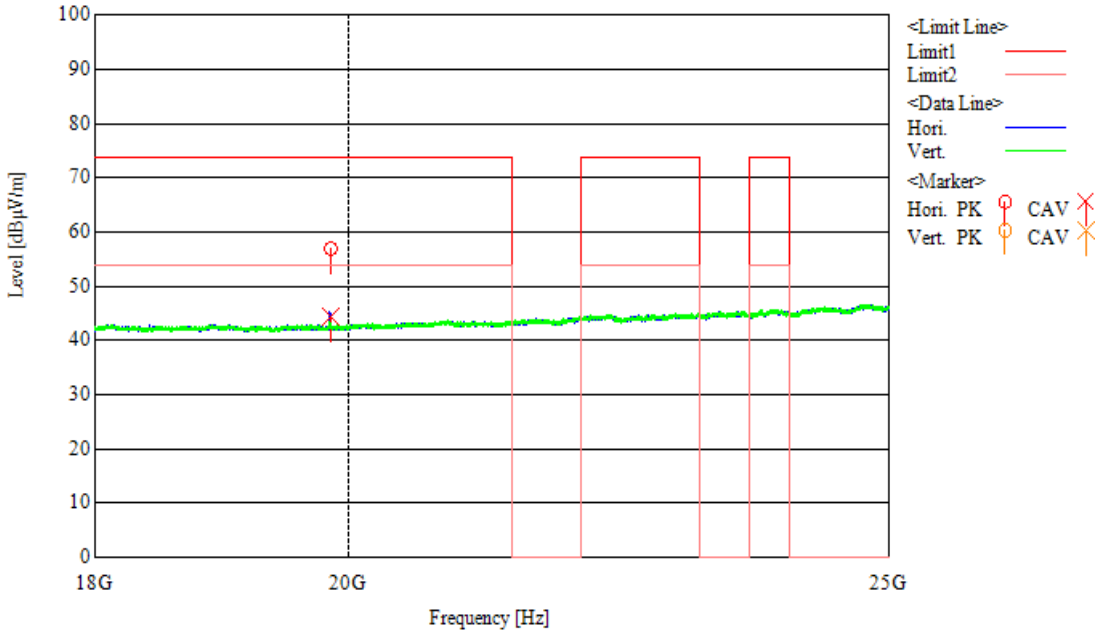
Operating mode: 2480MHz, 2Mbps, Z-plane



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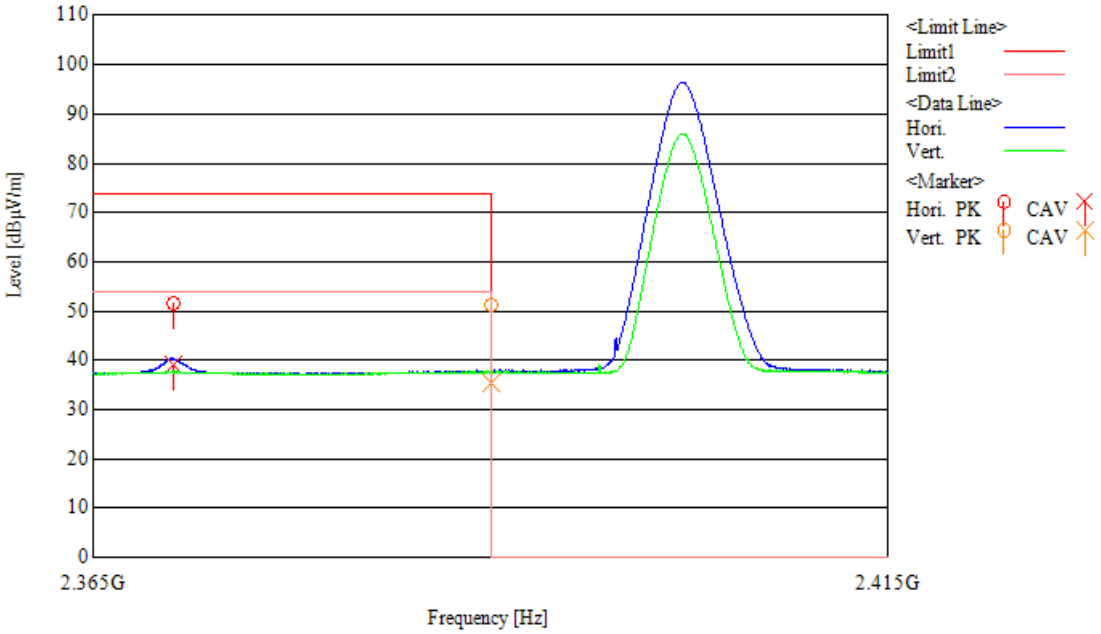
Restricted bandedge measurement

Operating frequency: 2402MHz
Worst configuration: 2Mbps, X-plane
Test site: Yokohama Laboratory
Measurement distance: 3 m

[Emission level]

No.	Frequency [MHz]	Reading PK [dBμV]	Reading Ave [dBμV]	C.Factor [dB]	Result PK [dBμV/m]	Result Ave [dBμV/m]	Limit PK [dBμV/m]	Limit Ave [dBμV/m]	Margin PK [dB]	Margin Ave [dB]	Ant.
1	**2369.996**	46.3	**34.0**	**5.1**	51.4	**39.1**	73.9	**53.9**	22.5	**14.8**	**Hori.**
2	2390.000	45.8	30.1	5.3	51.1	35.4	73.9	53.9	22.8	18.5	Vert.

[Chart]



Tested Date: June 17, 2019 Temperature: 18 degC
Humidity: 53 % Atmos. Press: 1009 hPa

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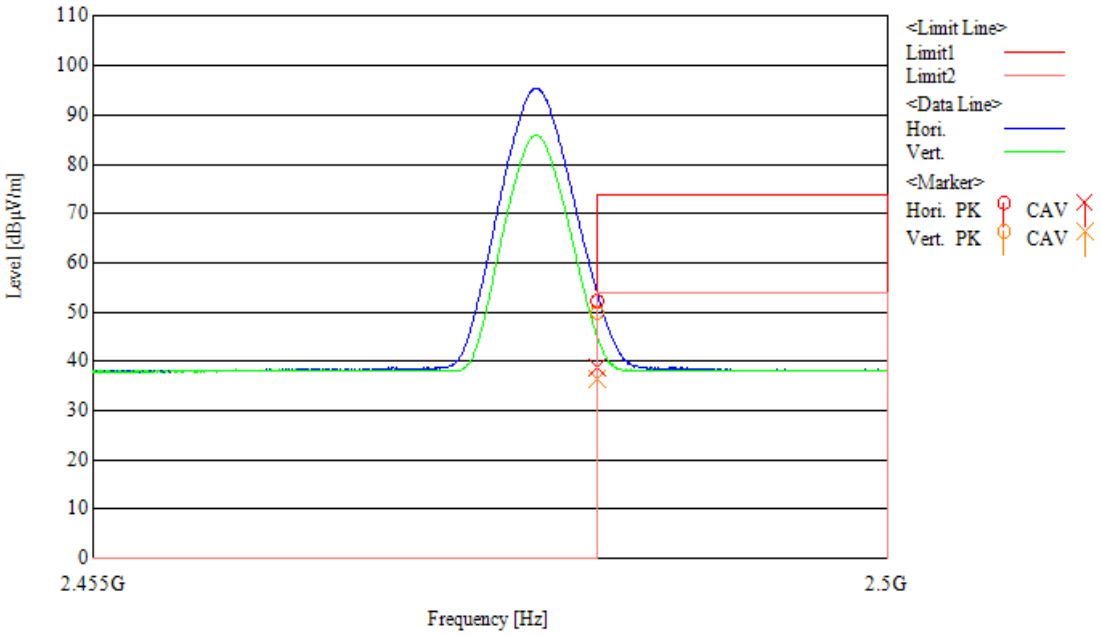
Operating frequency: 2480MHz
Worst configuration: 2Mbps, X-plane
Test site: Yokohama Laboratory
Measurement distance: 3 m

[Emission level]

No.	Frequency [MHz]	Reading PK [dBμV]	Reading Ave [dBμV]	C.Factor [dB]	Result PK [dBμV/m]	Result Ave [dBμV/m]	Limit PK [dBμV/m]	Limit Ave [dBμV/m]	Margin PK [dB]	Margin Ave [dB]	Ant.
1	**2483.500**	46.3	**32.9**	**6.0**	52.3	**38.9**	73.9	**53.9**	21.6	**15.0**	**Hori.**
2	2483.500	44.0	30.4	6.0	50.0	36.4	73.9	53.9	23.9	17.5	Vert.

[Chart]



Tested Date: June 17, 2019 Temperature: 18 degC
Humidity: 53 % Atmos. Press: 1009 hPa

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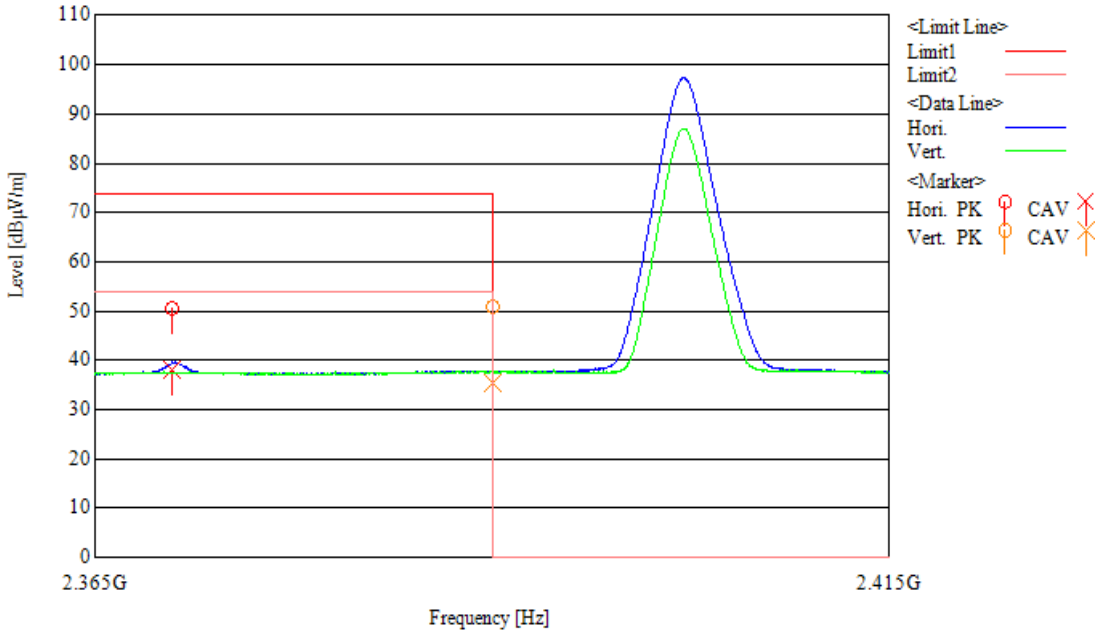
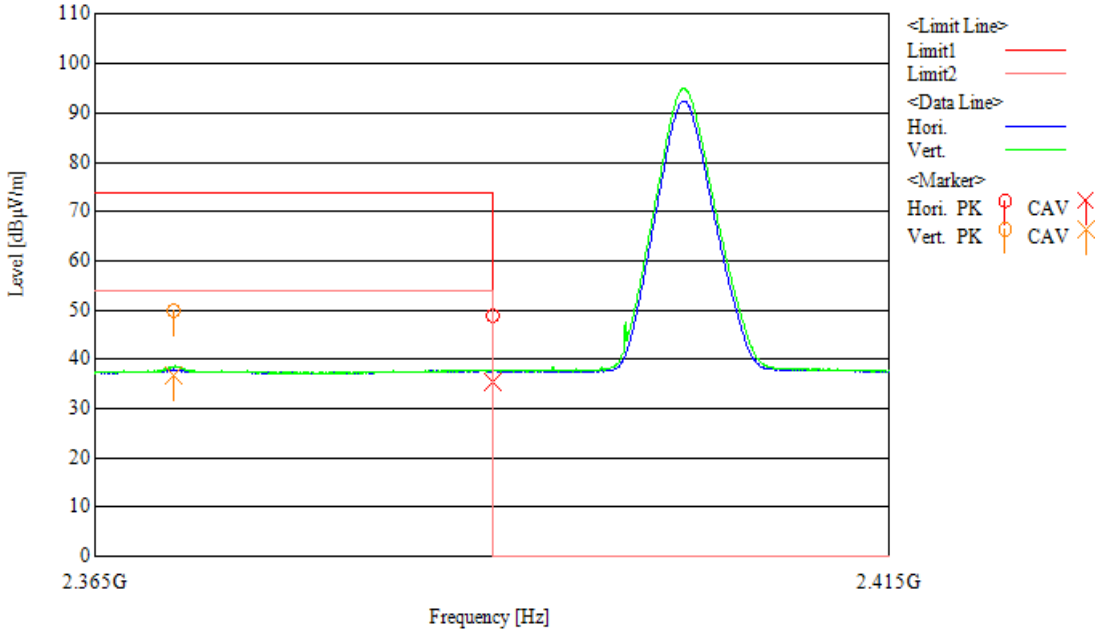
Restricted bandedge measurement (other test data)

Operating mode: 2402MHz, 1Mbps, X-plane



Operating mode: 2402MHz, 1Mbps, Y-plane



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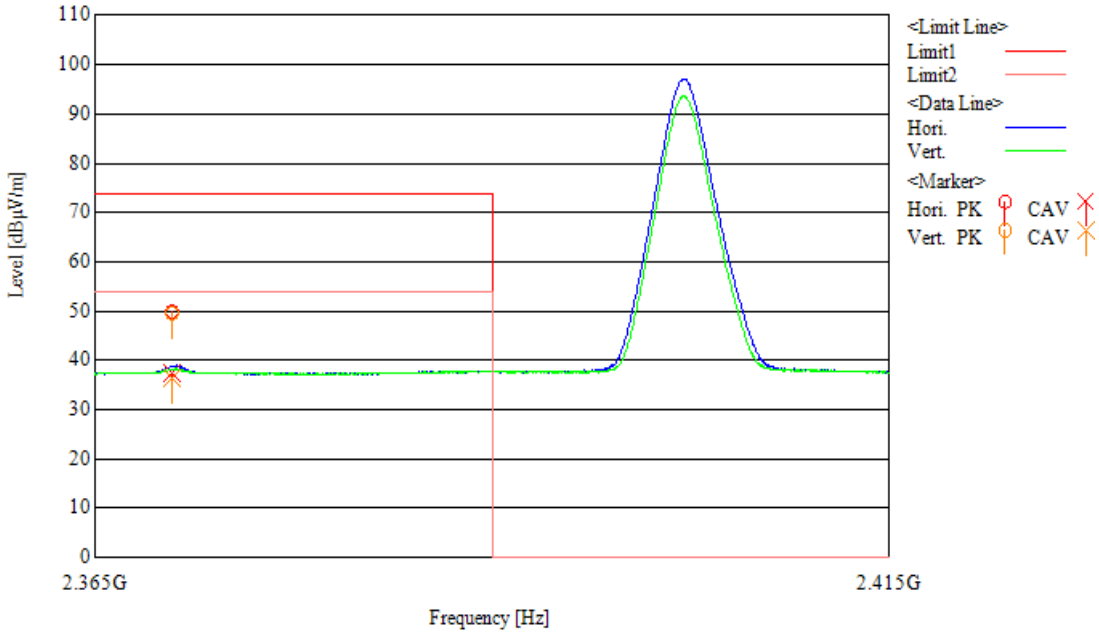
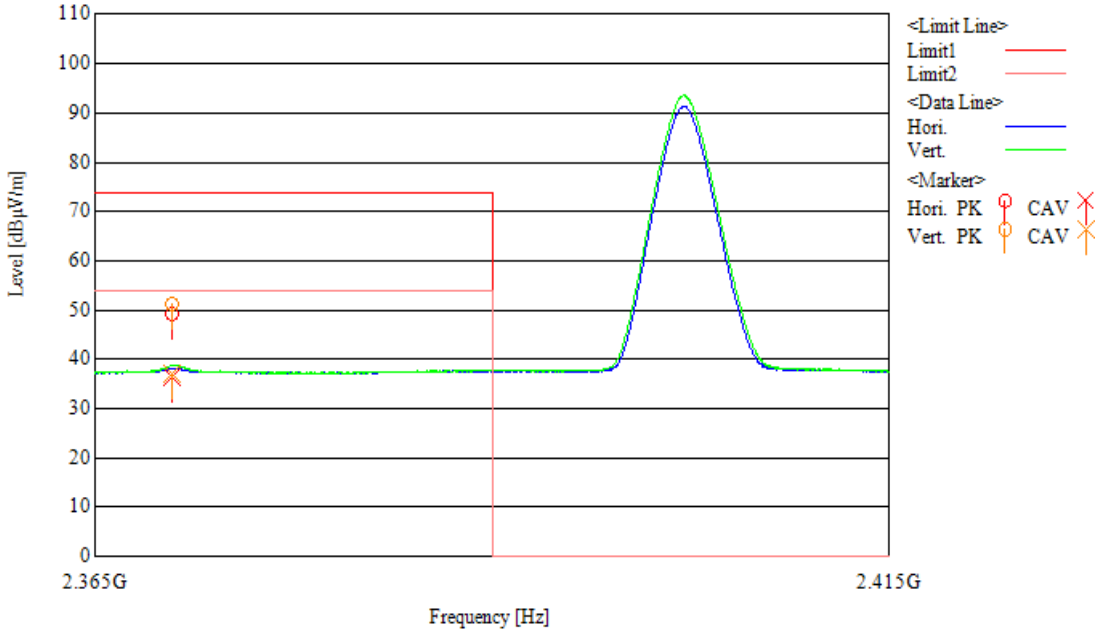
Operating mode: 2402MHz, 1Mbps, Z-plane



Operating mode: 2402MHz, 2Mbps, Y-plane



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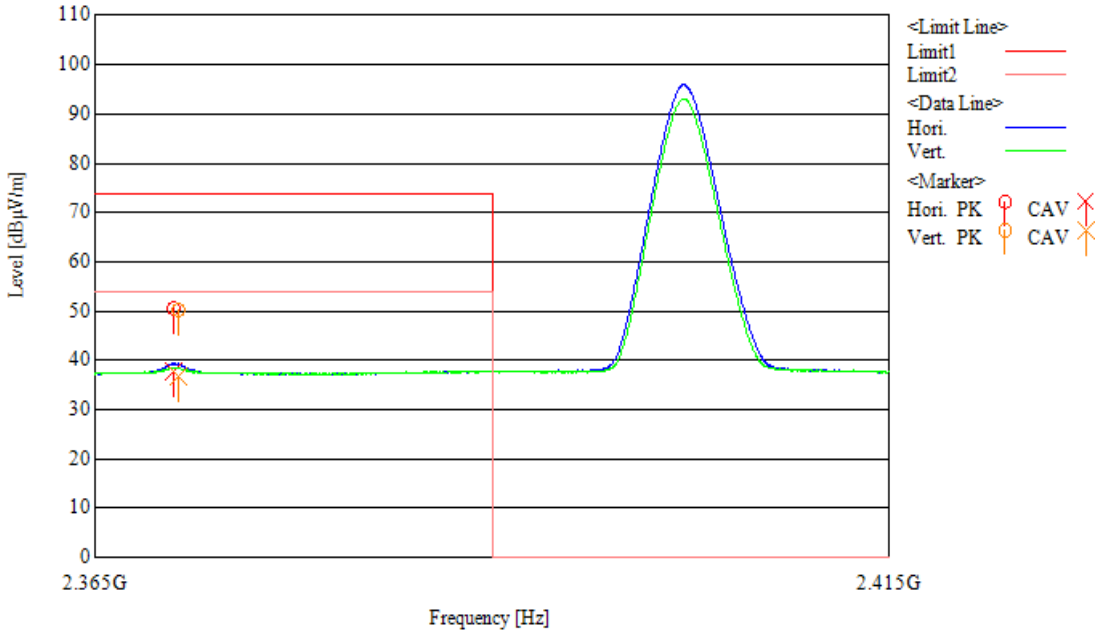
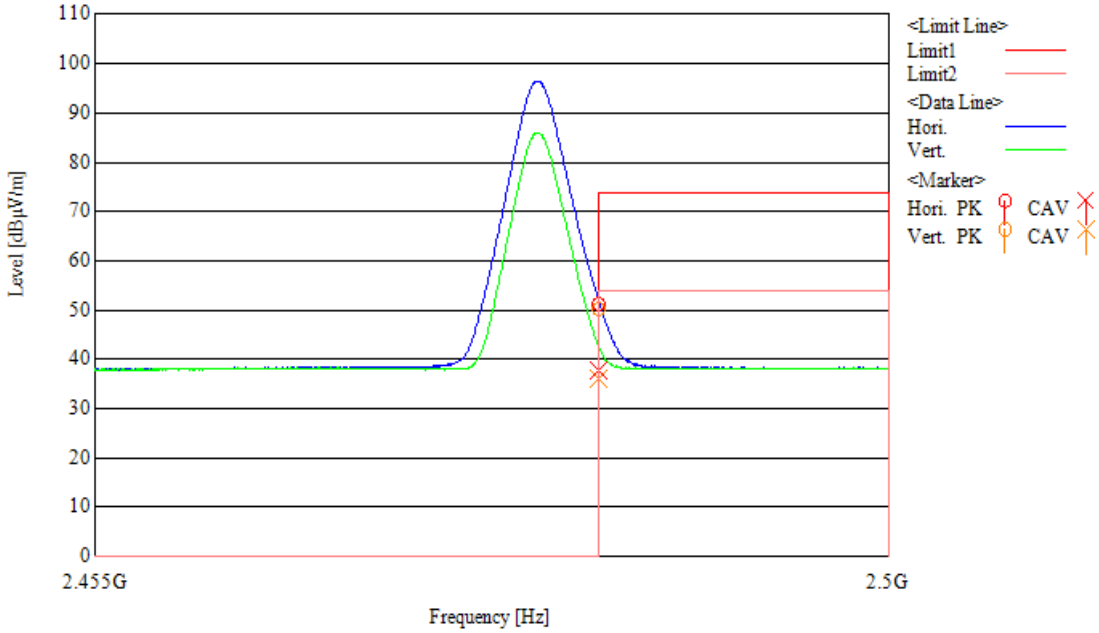
Operating mode: 2402MHz, 2Mbps, Z-plane



Operating mode: 2480MHz, 1Mbps, X-plane



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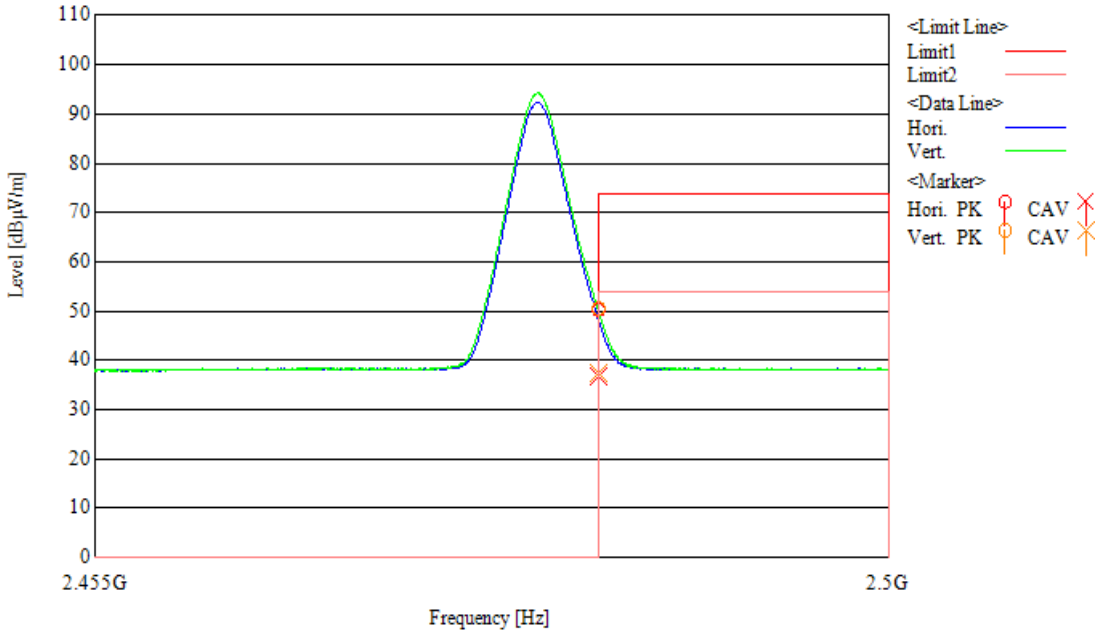
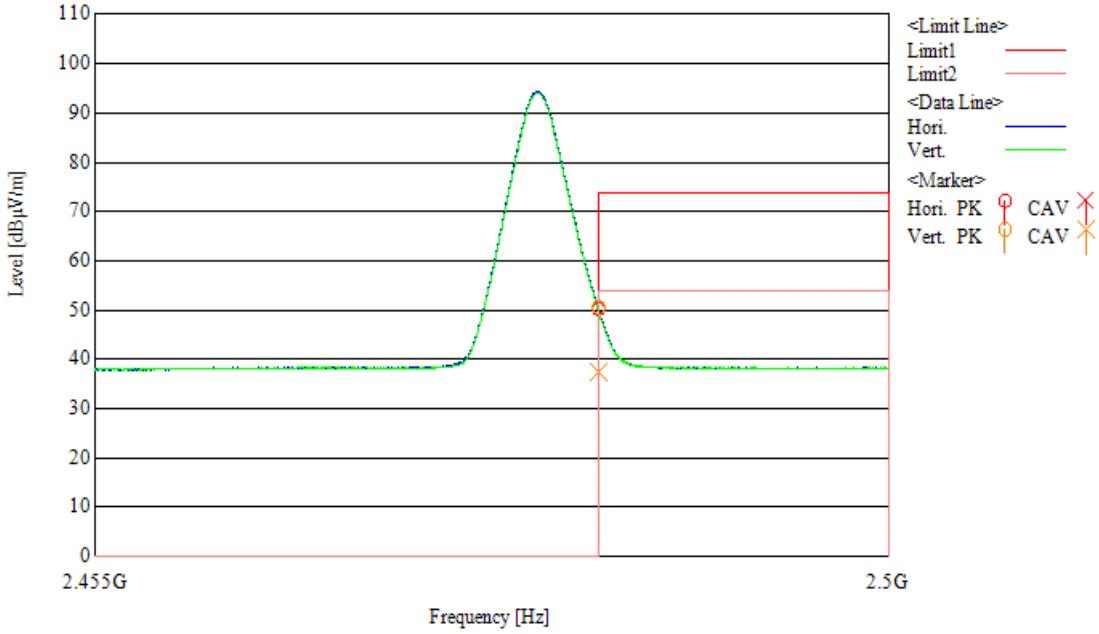
Operating mode: 2480MHz, 1Mbps, Y-plane



Operating mode: 2480MHz, 1Mbps, Z-plane



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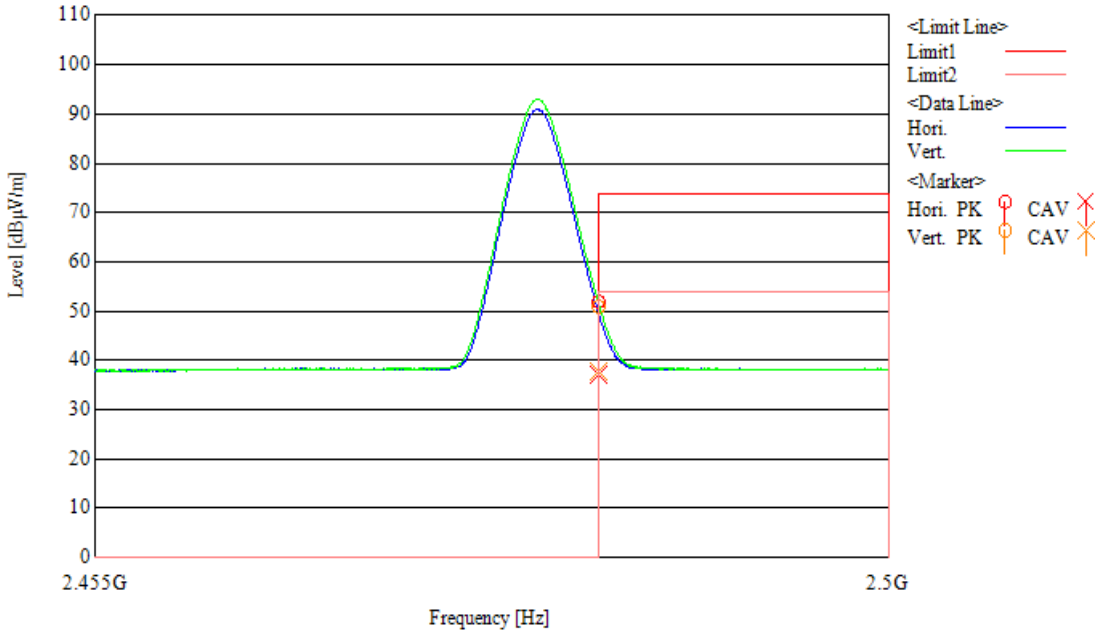
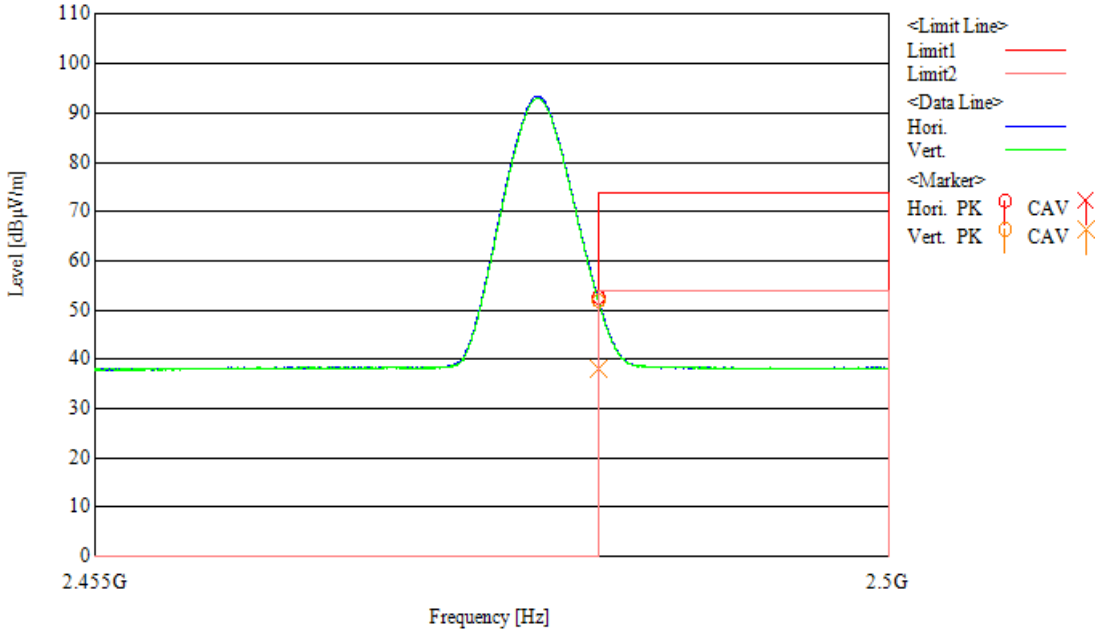
Operating mode: 2480MHz, 2Mbps, Y-plane



Operating mode: 2442MHz, 2Mbps, Z-plane



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2.7 AC power line conducted emissions

Test setup

Test setup was implemented according to the method of ANSI C63.10 clause 6.2.

Test procedure

Measurement procedures were implemented according to the method of ANSI C63.10 clause 6.2.

Applicable rule and limitation

FCC 15.207 / RSS-Gen 8.8: AC power line conducted emissions limits

Frequency of Emission [MHz]	Conducted emissions Limit [dBμV]	
	Quasi-peak	Average
0.15 - 0.5	66 to 56 *	56 to 46 *
0.5 - 5	56	46
5 - 30	60	50

* Decreases with the logarithm of the frequency. The lower limit applies at the band edges.

Test equipment used (refer to List of utilized test equipment)

TR06	CL18	LN05

Test software used

EMI1 Ver. 5.9

Calculation method

The Correction Factor and Result are calculated as followings.

Correction Factor [dB] = ISN Factor [dB] + Loss [dB]
Result [dBμV] = Reading [dBμV] + Correction Factor [dB]

Test results - *Complied with requirement*

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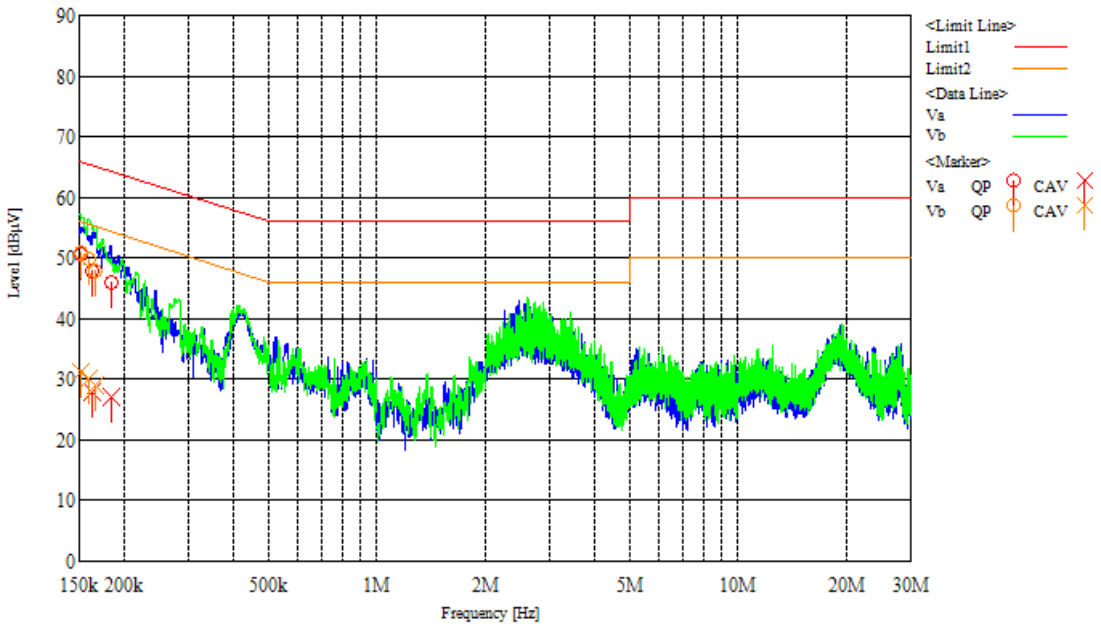
Test Data

Operating mode: 2402MHz, 1Mbps (worst)
Test site: Yokohama Laboratory

No.	Frequency [MHz]	Reading		C.F. [dB]	Result		Limit		Margin		PHASE
		QP [dBuV]	AV [dBuV]		QP [dBuV]	AV [dBuV]	QP [dBuV]	AV [dBuV]	QP [dB]	AV [dB]	
1	0.15119	40.3	21.0	10.3	50.6	31.3	65.9	55.9	15.3	24.6	Va
2	0.16292	37.5	17.5	10.3	47.8	27.8	65.3	55.3	17.5	27.5	Va
3	0.18331	35.8	16.9	10.2	46.0	27.1	64.3	54.3	18.3	27.2	Va
4	**0.15085**	**40.6**	21.0	**10.3**	**50.9**	31.3	**66.0**	56.0	**15.1**	24.7	**Vb**
5	0.15884	39.5	19.7	10.3	49.8	30.0	65.5	55.5	15.7	25.5	Vb
6	0.16632	37.6	18.7	10.3	47.9	29.0	65.1	55.1	17.2	26.1	Vb

[Chart]



Tested Date: July 10, 2019 Temperature: 24 degC
Humidity: 52 % Atmos. Press: 1013 hPa

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2.8 Radiated emissions (Receiver)

Test setup

Test setup was implemented according to the method of ANSI C63.4 clause 6 "General requirements for EUT equipment arrangements and operation", clause 8.2 and Annex H.3 "Radiated emission measurements setup".

Test procedure

Measurement procedures were implemented according to the method of ANSI C63.4 clauses 8.2.
The EUT is place on a non-conducted table which is 0.8 m height from a ground plane and the measurement antenna to EUT distance is 3 meters. The turn table is rotated for 360 degrees to determine the maximum emission level.
The antenna height scanned between 1 m and 4 m, and the antenna rotated to repeat the measurements for both the horizontal and vertical antenna polarizations.
The spectrum analyzer and receiver are set to the followings;

RBW=100 kHz (up to 1000 MHz) or 1 MHz (above 1000 MHz)
VBW= 300 kHz (up to 1000 MHz) or 3 MHz (above 1000 MHz)
Final measurement is carried out with a receiver RBW of 120 kHz (up to 1000 MHz), or 1 MHz (above 1000 MHz).

Applicable rule and limitation

RSS-Gen 7.3: Radiated emissions limits

Frequency [MHz]	Field Strength [μV/m]	Measurement Distance [m]	Field Strength [dBμV/m]
30 – 88	100	3	40.0
88 –216	150	3	43.5
216 – 960	200	3	46.0
Above 960	500	3	53.9

In the emission table above, the tighter limit applies at the band edges.
The emission limits shown in the above table are based on measurements employing a QP detector (up to 1000 MHz) or AVE/PEAK detector (above 1000 MHz).

Test results - *Complied with requirement*

Test equipment used (refer to List of utilized test equipment)

AC01	BA07	CL11	CL30	CL38	DH06	PR12	PR21
TR06	-	-	-	-	-	-	-

Test software used

EMI1 Ver. 5.9

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Calculation method

The Correction Factor and Result are calculated as followings.

Correction Factor [dB/m] = Ant. Factor [dB/m] + Loss [dB] – Gain [dB]
Result [dBμV/m] = Reading [dBμV] + Correction Factor [dB/m]

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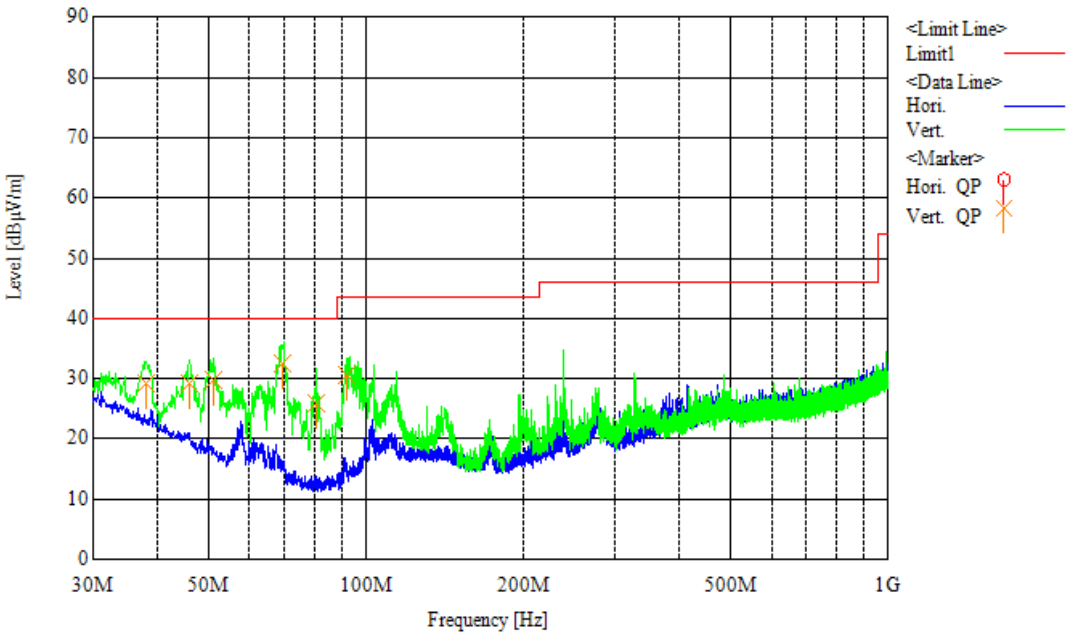
Test Data (below 1GHz)

Operating frequency: 2402MHz
Worst configuration: X-plane
Test site: Yokohama Laboratory
Measurement distance: 3 m

[Emission level]

No.	Frequency [MHz]	Reading [dBμV]	Factor [dB/m]	Loss [dB]	Gain [dB]	Result [dBμV/m]	Limit [dBμV/m]	Margin [dB]	Ant.
1	37.938	34.1	18.6	6.9	30.4	29.2	40.0	10.8	Vert.
2	46.114	37.7	14.8	7.1	30.3	29.3	40.0	10.7	Vert.
3	51.083	40.0	12.9	7.1	30.3	29.7	40.0	10.3	Vert.
4	**69.261**	**46.5**	**8.8**	**7.4**	**30.3**	**32.4**	**40.0**	**7.6**	**Vert.**
5	80.685	41.4	7.4	7.5	30.3	26.0	40.0	14.0	Vert.
6	92.354	44.5	8.8	7.6	30.3	30.6	43.5	12.9	Vert.

[Chart]



Tested Date: June 20, 2019 Temperature: 19 degC
Humidity: 56 % Atmos. Press: 1006 hPa

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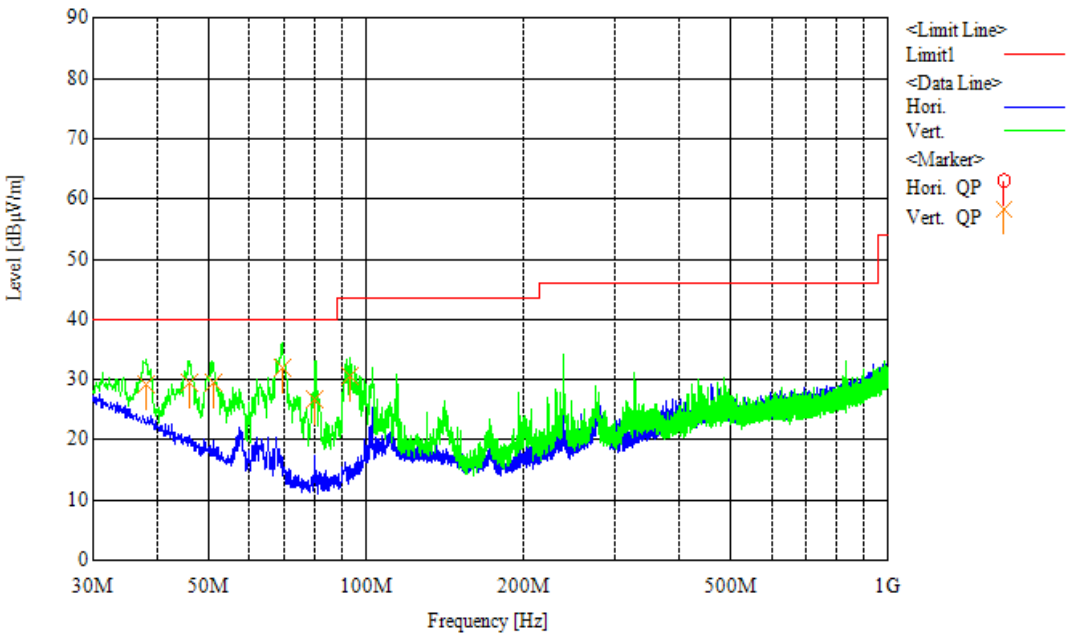
Operating frequency: 2442MHz
Worst configuration: X-plane
Test site: Yokohama Laboratory
Measurement distance: 3 m

[Emission level]

No.	Frequency [MHz]	Reading [dBμV]	Factor [dB/m]	Loss [dB]	Gain [dB]	Result [dBμV/m]	Limit [dBμV/m]	Margin [dB]	Ant.
1	38.058	34.1	18.6	6.9	30.4	29.2	40.0	10.8	Vert.
2	46.150	37.9	14.8	7.1	30.3	29.5	40.0	10.5	Vert.
3	51.066	39.9	12.9	7.1	30.3	29.6	40.0	10.4	Vert.
4	**69.493**	**46.1**	**8.8**	**7.4**	**30.3**	**32.0**	**40.0**	**8.0**	**Vert.**
5	79.863	42.1	7.3	7.5	30.3	26.6	40.0	13.4	Vert.
6	93.533	44.3	9.0	7.6	30.3	30.6	43.5	12.9	Vert.

[Chart]



Tested Date: June 20, 2019 Temperature: 19 degC
Humidity: 56 % Atmos. Press: 1006 hPa

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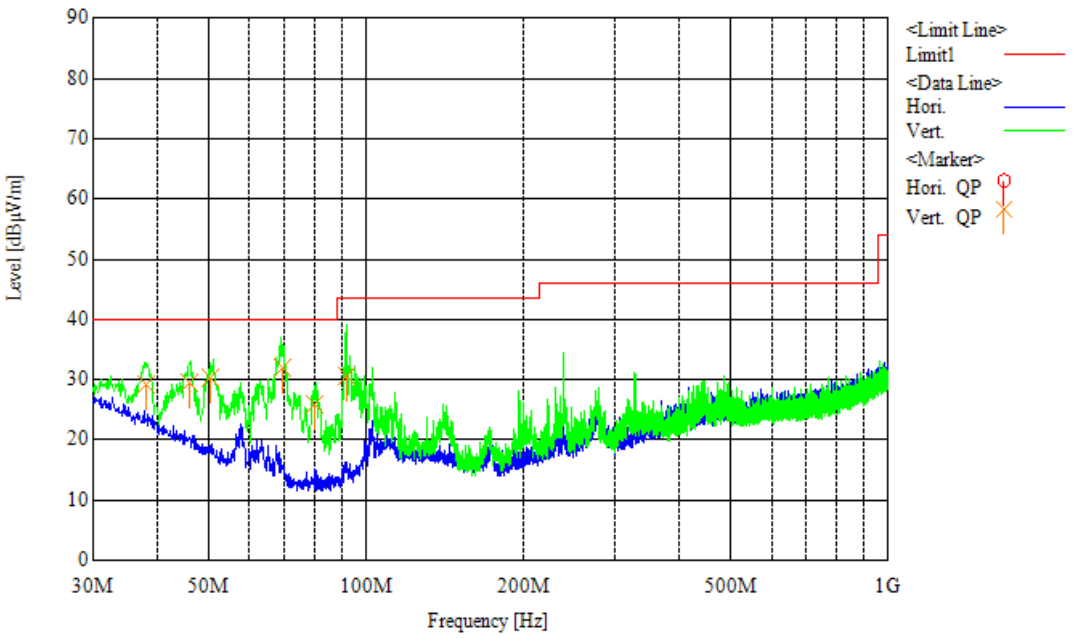
Operating frequency: 2480MHz
Worst configuration: X-plane
Test site: Yokohama Laboratory
Measurement distance: 3 m

[Emission level]

No.	Frequency [MHz]	Reading [dBμV]	Factor [dB/m]	Loss [dB]	Gain [dB]	Result [dBμV/m]	Limit [dBμV/m]	Margin [dB]	Ant.
1	38.040	34.1	18.6	6.9	30.4	29.2	40.0	10.8	Vert.
2	46.005	38.0	14.8	7.1	30.3	29.6	40.0	10.4	Vert.
3	50.606	40.6	13.0	7.1	30.3	30.4	40.0	9.6	Vert.
4	**69.181**	**46.0**	**8.9**	**7.4**	**30.3**	**32.0**	**40.0**	**8.0**	**Vert.**
5	79.811	41.5	7.3	7.5	30.3	26.0	40.0	14.0	Vert.
6	92.276	44.6	8.7	7.6	30.3	30.6	43.5	12.9	Vert.

[Chart]



Tested Date: June 20, 2019 Temperature: 19 degC
Humidity: 56 % Atmos. Press: 1006 hPa

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Test Data (Above 1000MHz)

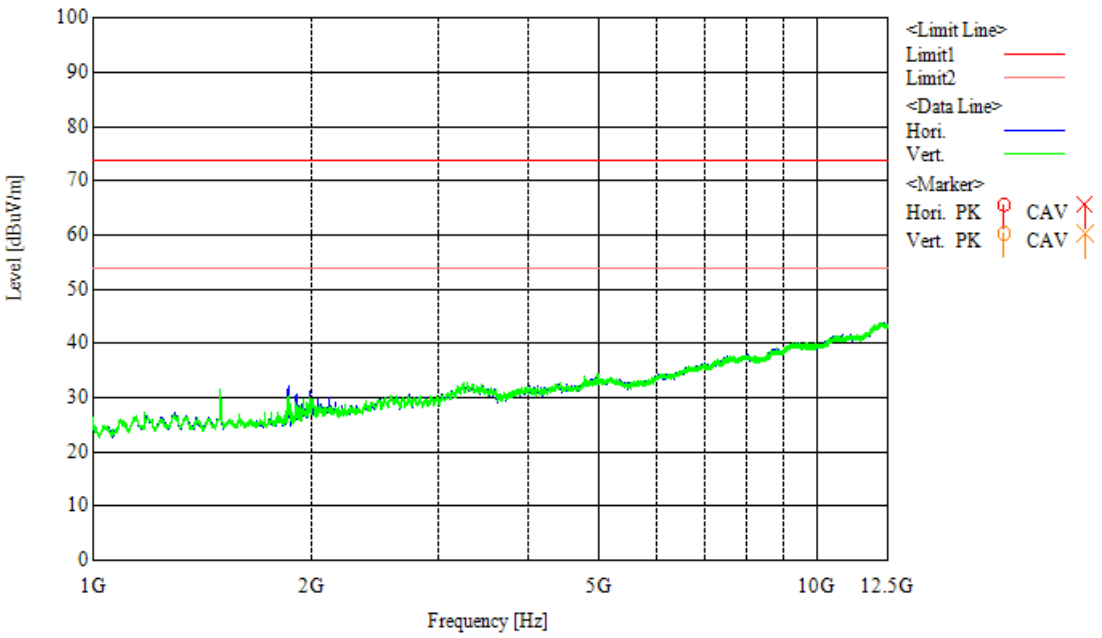
Operating frequency: 2402MHz
Worst configuration: X-plane
Test site: Yokohama Laboratory
Measurement distance: 3 m

There is no spurious emission greater than noise floor or 20dB below the limit.

[Emission level]

No.	Frequency [MHz]	Reading PK [dBμV]	Reading Ave [dBμV]	C.Factor [dB]	Result PK [dBμV/m]	Result Ave [dBμV/m]	Limit PK [dBμV/m]	Limit Ave [dBμV/m]	Margin PK [dB]	Margin Ave [dB]	Ant.
-	-	-	-	-	-	-	-	-	-	-	-
-	-	-	-	-	-	-	-	-	-	-	-

[Chart]



Tested Date: June 18, 2019 Temperature: 20 degC
Humidity: 48 % Atmos. Press: 1013 hPa

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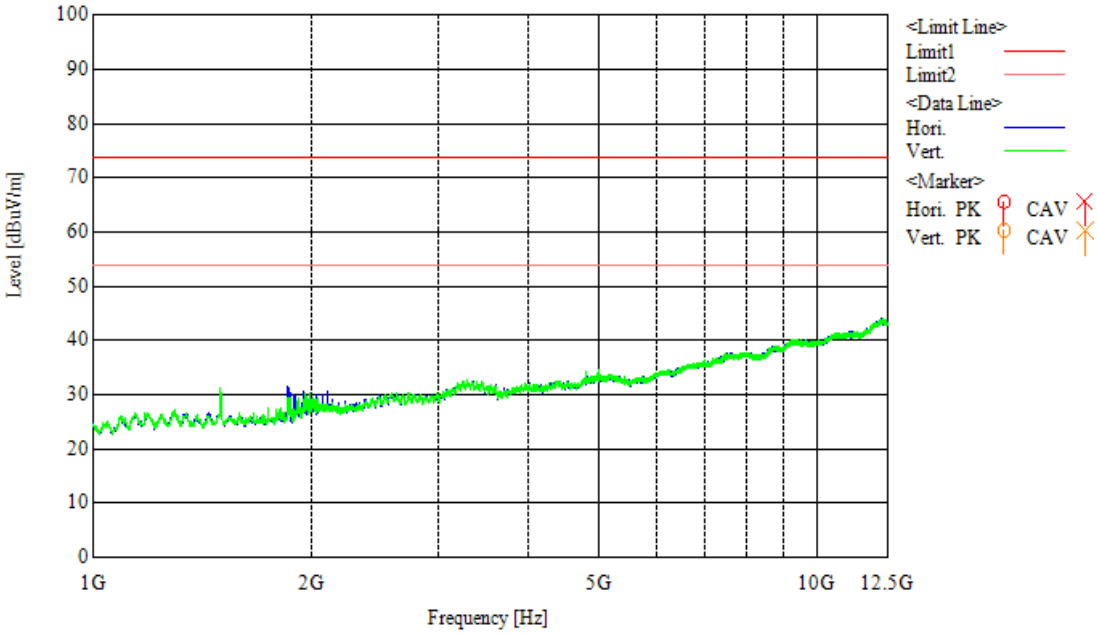
Operating frequency: 2442MHz
Worst configuration: X-plane
Test site: Yokohama Laboratory
Measurement distance: 3 m

There is no spurious emission greater than noise floor or 20dB below the limit.

[Emission level]

No.	Frequency [MHz]	Reading PK [dBμV]	Reading Ave [dBμV]	C.Factor [dB]	Result PK [dBμV/m]	Result Ave [dBμV/m]	Limit PK [dBμV/m]	Limit Ave [dBμV/m]	Margin PK [dB]	Margin Ave [dB]	Ant.
-	-	-	-	-	-	-	-	-	-	-	-
-	-	-	-	-	-	-	-	-	-	-	-

[Chart]



Tested Date: June 18, 2019 Temperature: 20 degC
Humidity: 48 % Atmos. Press: 1013 hPa

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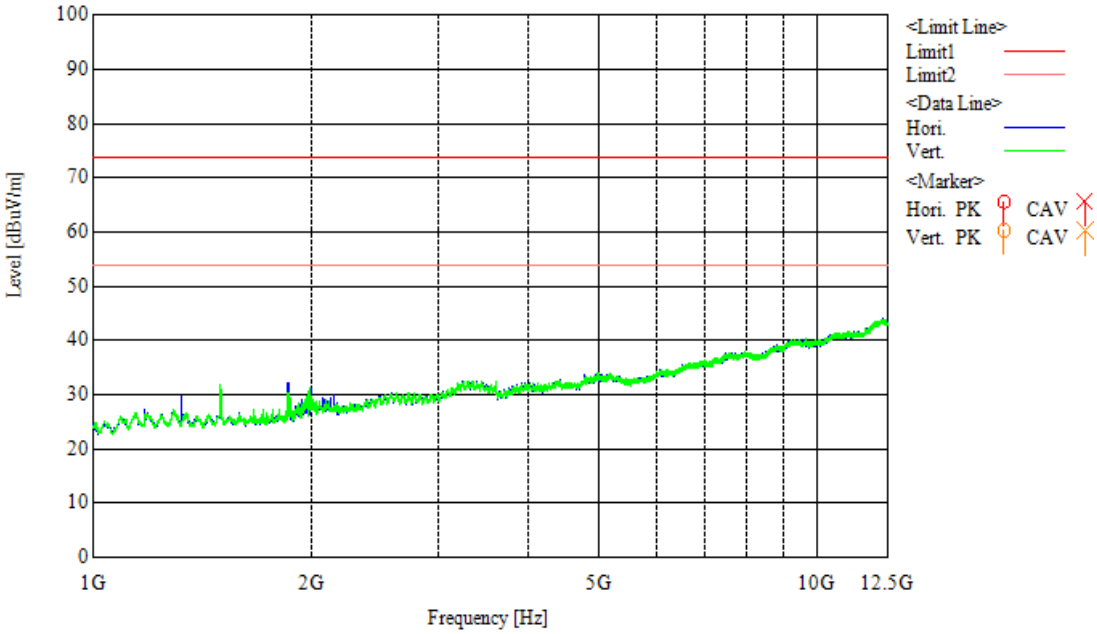
Operating frequency: 2480MHz
Worst configuration: X-plane
Test site: Yokohama Laboratory
Measurement distance: 3 m

There is no spurious emission greater than noise floor or 20dB below the limit.

[Emission level]

No.	Frequency [MHz]	Reading PK [dBμV]	Reading Ave [dBμV]	C.Factor [dB]	Result PK [dBμV/m]	Result Ave [dBμV/m]	Limit PK [dBμV/m]	Limit Ave [dBμV/m]	Margin PK [dB]	Margin Ave [dB]	Ant.
-	-	-	-	-	-	-	-	-	-	-	-
-	-	-	-	-	-	-	-	-	-	-	-

[Chart]



Tested Date: June 18, 2019 Temperature: 20 degC
Humidity: 48 % Atmos. Press: 1013 hPa

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2.9 AC power line conducted emissions (Receiver)

Test setup

Test setup was implemented according to the method of ANSI C63.4 clause 6 "General requirements for EUT equipment arrangements and operation" and Annex H.1 "AC power line conducted emission measurements setup".

Test procedure

Measurement procedures were implemented according to the method of ANSI C63.4 clauses 7, clause 13.1.3 and Annex H.2 "AC power line conducted emission measurements".
Exploratory measurements were used the spectrum analyzer to identify the frequency of the emission that has the highest amplitude relative to the limit by operating the EUT in a range of typical modes of operation, cable positions, and with a typical system equipment configuration and arrangement.
Final ac power line conducted emission measurements were performed based on the exploratory tests.
The EUT cable configuration and arrangement and mode of operation that produced the emission with the highest amplitude relative to the limit are selected for the final measurement.
When the measurement value is greater than average limitation the average detection measurements were performed.

Applicable rule and limitation

RSS-Gen 7.2: AC power line conducted emissions limits

Frequency of Emission [MHz]	Conducted emissions Limit [dBµV]	
	Quasi-peak	Average
0.15 - 0.5	66 to 56 *	56 to 46 *
0.5 - 5	56	46
5 - 30	60	50

* Decreases with the logarithm of the frequency. The lower limit applies at the band edges.

Test equipment used (refer to List of utilized test equipment)

TR06	CL18	LN05

Test software used

EMI1 Ver. 5.9

Calculation method

The Correction Factor and Result are calculated as followings.

Correction Factor [dB] = ISN Factor [dB] + Loss [dB]
Result [dBµV] = Reading [dBµV] + Correction Factor [dB]

Test results - *Complied with requirement*

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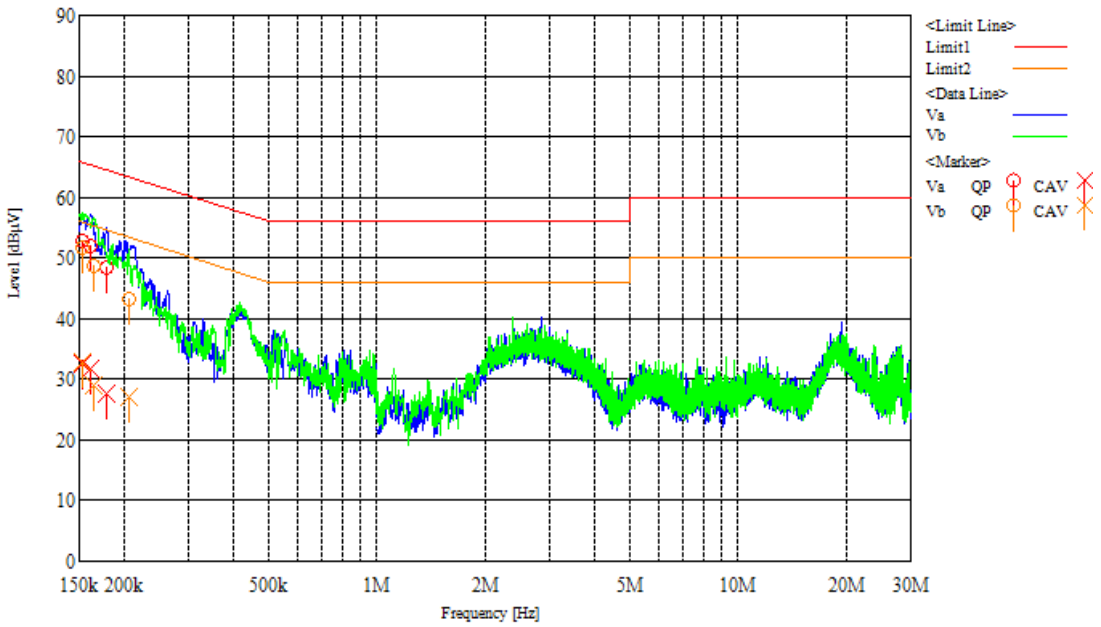
Test Data

Operating mode: 2402MHz, 1Mbps (worst)
Test site: Yokohama Laboratory

No.	Frequency [MHz]	Reading		C.F. [dB]	Result		Limit		Margin		PHASE
		QP [dBuV]	AV [dBuV]		QP [dBuV]	AV [dBuV]	QP [dBuV]	AV [dBuV]	QP [dB]	AV [dB]	
1	**0.15323**	**42.5**	22.3	**10.3**	**52.8**	32.6	**65.8**	55.8	**13.0**	23.2	**Va**
2	0.16088	41.7	21.4	10.3	52.0	31.7	65.4	55.4	13.4	23.7	Va
3	0.17855	38.4	17.5	10.2	48.6	27.7	64.6	54.6	16.0	26.9	Va
4	0.15323	41.5	22.6	10.3	51.8	32.9	65.8	55.8	14.0	22.9	Vb
5	0.16513	38.5	18.8	10.3	48.8	29.1	65.2	55.2	16.4	26.1	Vb
6	0.20541	33.0	17.0	10.2	43.2	27.2	63.4	53.4	20.2	26.2	Vb

[Chart]



Tested Date: July 10, 2019 Temperature: 24 degC
Humidity: 52 % Atmos. Press: 1013 hPa

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4 List of utilized test equipment / calibration

RFT ID No.	Kind of Equipment and Precision	Manufacturer	Model No.	Serial Number	Calibration Date	Calibrated until
AC01(EM)	Anechoic Chamber (1st test room)	JSE	203397C	-	2019/04/20	2020/04/30
AC01(EG)	Anechoic Chamber (1st test room)	JSE	203397C	-	2019/03/30	2020/03/31
BA07	Bilogical Antenna	TESEQ	CBL6143A	26670	2018/12/07	2019/12/31
BRF12	Band Reject Filter (2400MHz)	M-City	BRF2440-01	RF0012-02	2019/03/20	2020/03/31
CL11	RF Cable for RE	RFT	-	-	2019/03/19	2020/03/31
CL18	RF Cable for CE	RFT	-	-	2019/03/20	2020/03/31
CL30	RF Cable 5 m	SUHNER	SUCOFLEX104PE	MY3599	2019/01/23	2020/01/31
CL31	RF Cable 1 m	Junkosha	MWX221	1303S118	2019/01/23	2020/01/31
CL38	RF Cable 2 m	Junkosha	MWX221	1603S626	2019/01/23	2020/01/31
DH06	DRG Horn Antenna	A.H. Systems	SAS-571	1339	2018/06/19	2020/06/30
HPF4	High Pass Filter (3000MHz)	Tokyo KEIKI	TF23LCCZGA	9001	2018/12/04	2019/12/31
LN05	LISN	Kyoritsu	KNW-407F	8-1773-2	2019/05/13	2020/05/31
LP06	Loop Antenna	ETS-Lindgren	6502	00164299	2019/04/13	2020/04/30
PR12	Pre. Amplifier (1-26G)	Agilent Technologies	8449B	3008A02513	2019/01/23	2020/01/31
PR21	Pre. Amplifier	Anritsu	MH648A	6200467119	2018/12/04	2019/12/31
SH01	Standard Horn Antenna (18-26G)	A.H. Systems	SAS-572	208	2018/07/12	2020/07/31
TR06	Test Receiver (F/W : 4.73 SP4)	Rohde & Schwarz	ESU26	100002	2018/10/11	2019/10/31

The measuring equipment, which was utilized in performing the tests documented herein, has been calibrated in accordance with the manufacturer's recommendations for utilizing calibration equipment, which is traceable to recognized national standards.

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