

10.6 Band edge

Test Method

1. The RF output of EUT was connected to the spectrum analyzer by RF cable. The path loss was compensated to the results for each measurement.
2. Set to the maximum power setting, the instrument center frequency is set to the nominal EUT channel center frequency enable the EUT transmit continuously.
3. Use the following spectrum analyzer settings:
Span = wide enough to capture the peak level of the in-band emission and all spurious
RBW = 100 kHz, VBW $\geq$ 3RBW, Sweep = auto, Detector function = peak, Trace = max hold
4. Allow the trace to stabilize, use the peak and delta measurement to record the result.
5. The level displayed must comply with the limit specified in this Section.
6. Repeat above procedures until all frequencies measured were complete and submit all the plots.

Limit:

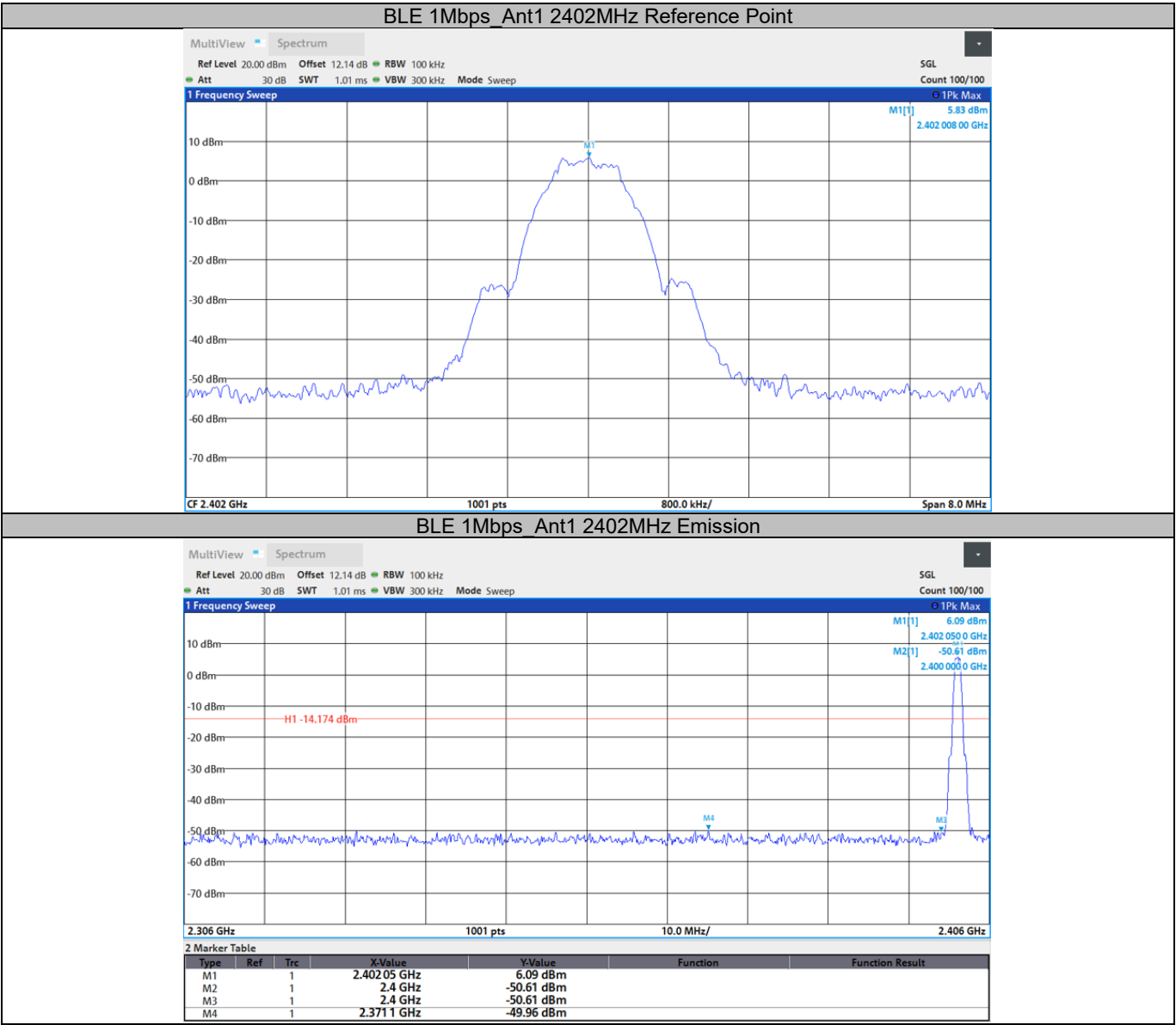
In any 100 kHz bandwidth outside the frequency band in which the spread spectrum or digitally modulated device is operating, the RF power that is produced shall be at least 20 dB below that in the 100 kHz bandwidth within the band that contains the highest level of the desired power, based on either an RF conducted or a radiated measurement, provided that the transmitter demonstrates compliance with the peak conducted power limits. If the transmitter complies with the conducted power limits based on the use of RMS averaging over a time interval, as permitted under § 15.247(b)(3), the attenuation required shall be 30 dB instead of 20 dB.

Frequency Range MHz	Limit (dBc)
30-25000	-20

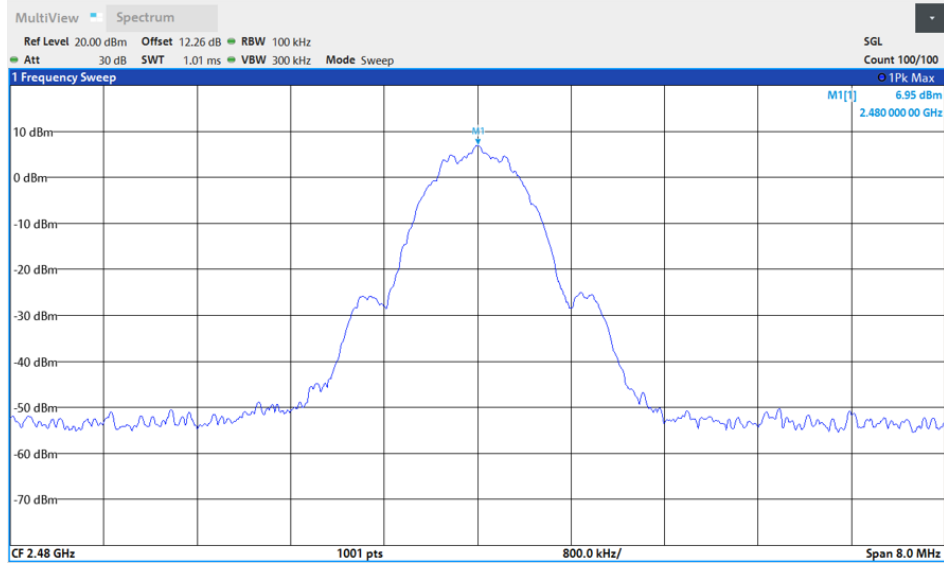


Test result

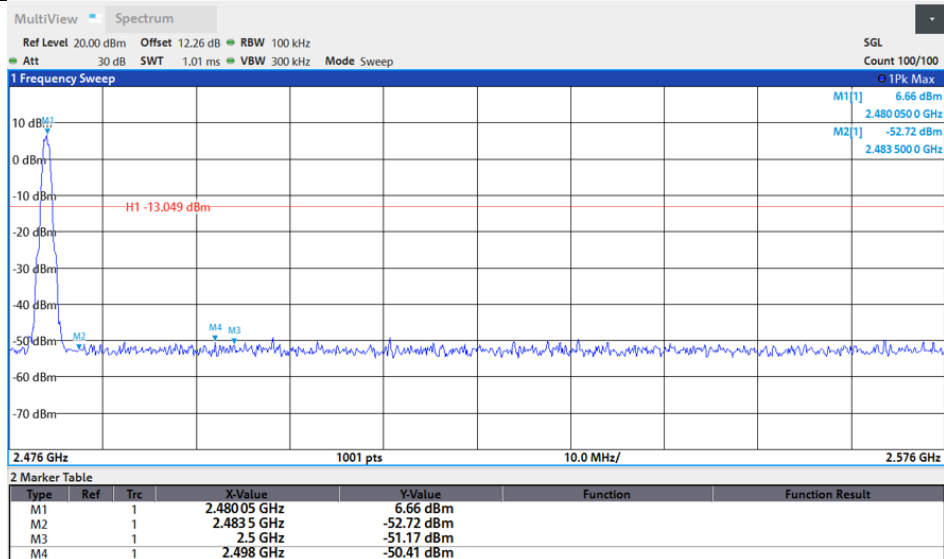
Test Mode	Channel (MHz)	Reference Level (dBm)	Result (dBm)	Limit (dBm)	Verdict
BLE_1Mbps	2402	5.83	-49.96	<=-14.17	PASS
	2480	6.95	-50.41	<=-13.05	PASS
BLE_2Mbps	2402	6.55	-32.45	<=-13.45	PASS
	2480	5.62	-50.07	<=-14.38	PASS



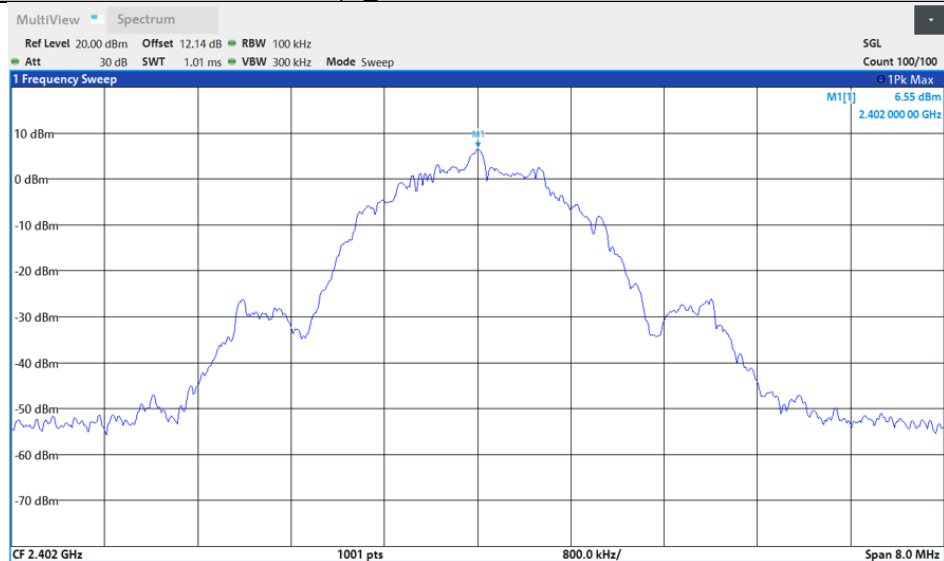
BLE 1Mbps_Ant1 2480MHz Reference Point

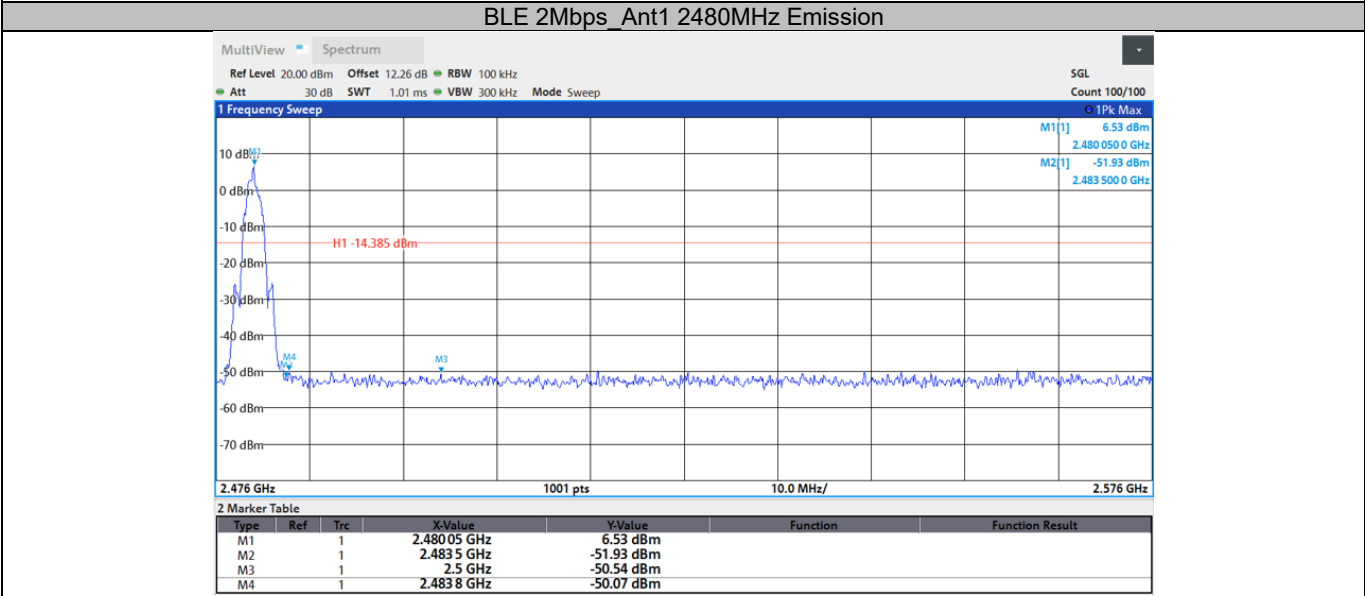
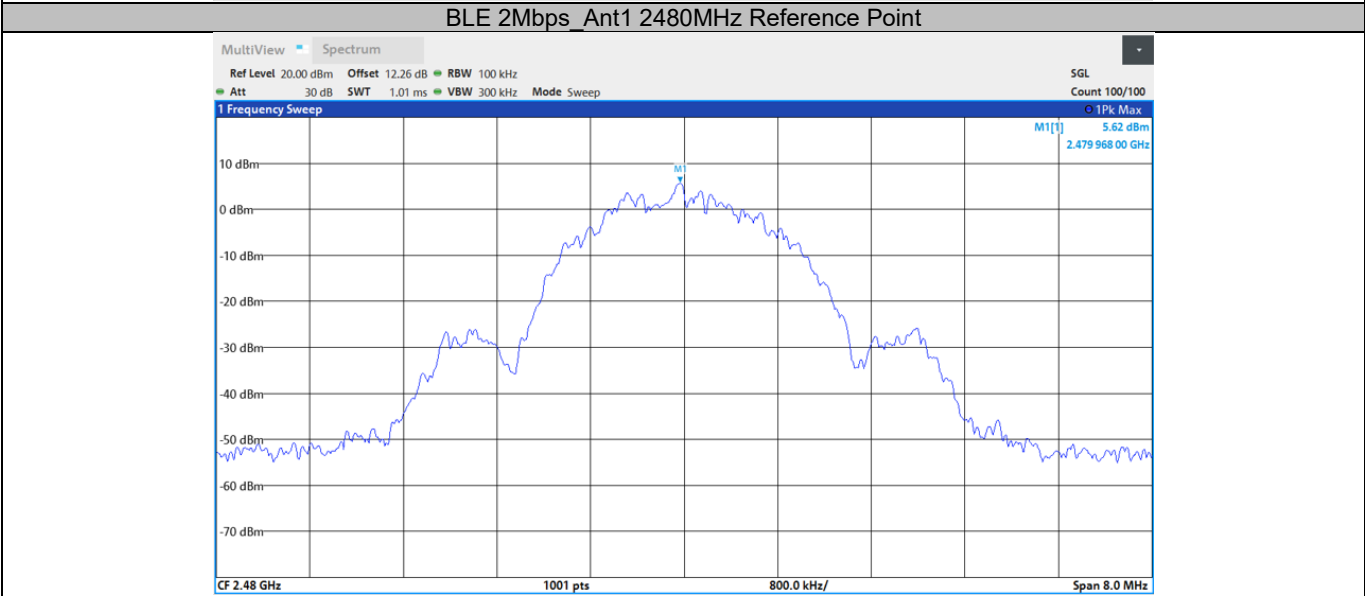
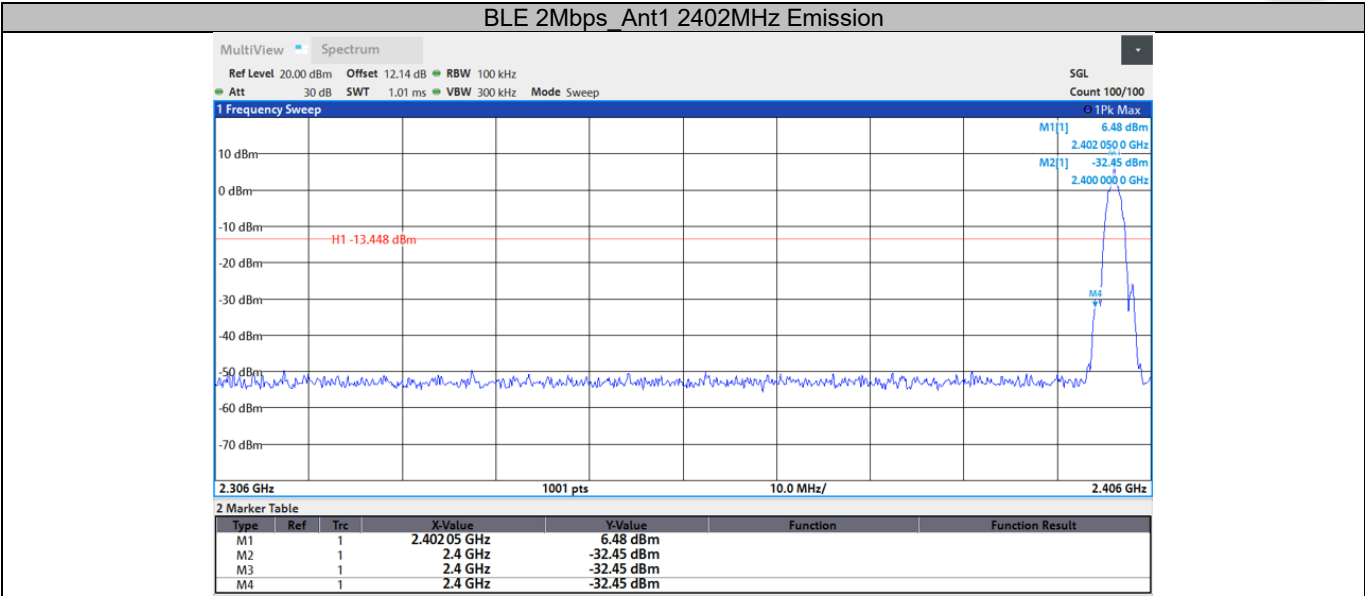


BLE 1Mbps_Ant1 2480MHz Emission



BLE 2Mbps_Ant1 2402MHz Reference Point





10.7 Spurious radiated emissions for transmitter

Test Method

1. The EUT was placed on a turn table which is 1.5m above ground plane for above 1GHz and 0.8m above ground for below 1GHz at 3 meter chamber room for test. The table was rotated 360 degrees to determine the position of the highest radiation.
2. The EUT was set 3 meters away from the interference – receiving antenna, which was mounted on the top of a variable – height antenna tower.
3. The height of antenna is varied from one meter to four meters above the ground to determine the maximum value of the field strength. Both horizontal and vertical polarizations of the antenna are set to make the measurement.
4. For each suspected emission, the EUT was arranged to its worst case and then the antenna was tuned to heights from 1 meter to 4 meters and the rotatable table was turned from 0 degrees to 360 degrees to find the maximum reading.
5. Use the following spectrum analyzer settings According to C63.10
 - 1) Procedure for Unwanted Emissions Measurements Below 1000 MHz
Span = wide enough to capture the peak level of the in-band emission and all spurious
RBW = 100 kHz to 120kHz, VBW ≥ RBW for peak measurement, Sweep = auto, Detector function = peak, Trace = max hold.
 - 2) For Peak unwanted emissions Above 1GHz:
Span = wide enough to capture the peak level of the in-band emission and all spurious
RBW = 1MHz, VBW ≥ RBW for peak measurement, Sweep = auto, Detector function = peak, Trace = max hold.
Procedures for average unwanted emissions measurements above 1GHz
 - a) RBW = 1MHz.
 - b) VBW \ [3 × RBW].
 - c) Detector = RMS (power averaging), if [span / (# of points in sweep)] \ RBW / 2.
Satisfying this condition can require increasing the number of points in the sweep or reducing the span. If the condition is not satisfied, then the detector mode shall be set to peak.
 - d) Averaging type = power (i.e., rms) (As an alternative, the detector and averaging type may be set for linear voltage averaging. Some instruments require linear display mode to use linear voltage averaging. Log or dB averaging shall not be used.)
 - e) Sweep time = auto.
 - f) Perform a trace average of at least 100 traces if the transmission is continuous. If the transmission is not continuous, then the number of traces shall be increased by a factor of 1 / D, where D is the duty cycle. For example, with 50% duty cycle, at least 200 traces shall be averaged. (If a specific emission is demonstrated to be continuous—i.e., 100% duty cycle—then rather than turning ON and OFF with the transmit cycle, at least 100 traces shall be averaged.)
 - g) If tests are performed with the EUT transmitting at a duty cycle less than 98%, then a correction factor shall be added to the measurement results prior to comparing with the emission limit, to compute the emission level that would have been measured had the test been performed at 100% duty cycle. The correction factor is computed as follows:
 - 1) If power averaging (rms) mode was used in the preceding step e), then the correction factor is [10 log (1 / D)], where D is the duty cycle. For example, if the transmit duty cycle was 50%, then 3 dB shall be added to the measured emission levels.
 - 2) If linear voltage averaging mode was used in the preceding step e), then the correction factor is [20 log (1 / D)], where D is the duty cycle. For example, if the transmit duty

cycle was 50%, then 6 dB shall be added to the measured emission levels.

3) If a specific emission is demonstrated to be continuous (100% duty cycle) rather than turning ON and OFF with the transmit cycle, then no duty cycle correction is required for that emission (AV) at frequency above 1GHz.

Limit

In any 100 kHz bandwidth outside the frequency band in which the spread spectrum or digitally modulated device is operating, the RF power that is produced 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 that the transmitter demonstrates compliance with the peak conducted power limits. If the transmitter complies with the conducted power limits based on the use of RMS averaging over a time interval, as permitted under § 15.247(b)(3), the attenuation required shall be 30 dB instead of 20 dB. Attenuation below the general field strength limits specified in § 15.209(a) is not required. In addition, radiated emissions which fall in the restricted bands, as defined in § 15.205(a), must also comply with the radiated emission limits specified in § 15.209(a).

Frequency MHz	Field Strength μV/m	Field Strength dBμV/m	Detector	Measurement distance meters
0.009-0.490	2400/F(kHz)	48.5-13.8	AV	300
0.490-1.705	24000/F(kHz)	33.8-23.0	QP	30
1.705-30	30	29.5	QP	30
30-88	100	40	QP	3
88-216	150	43.5	QP	3
216-960	200	46	QP	3
960-1000	500	54	QP	3
Above 1000	500	54	AV	3
Above 1000	5000	74	PK	3

Note 1: Limit 3m(dBμV/m)=Limit 300m(dBμV/m)+40Log(300m/3m) (Below 30MHz)

Note 2: Limit 3m(dBμV/m)=Limit 30m(dBμV/m)+40Log(30m/3m) (Below 30MHz)

Spurious radiated emissions for transmitter

According to C63.10, if the peak (or quasi-peak) measured value complies with the average limit, it is unnecessary to perform an average measurement, so AV emission value did not show in below table if the peak value complies with average limit.

Test result

The worst case of Radiated Emission below 1GHz:

0.009-30MHz Radiated Emission

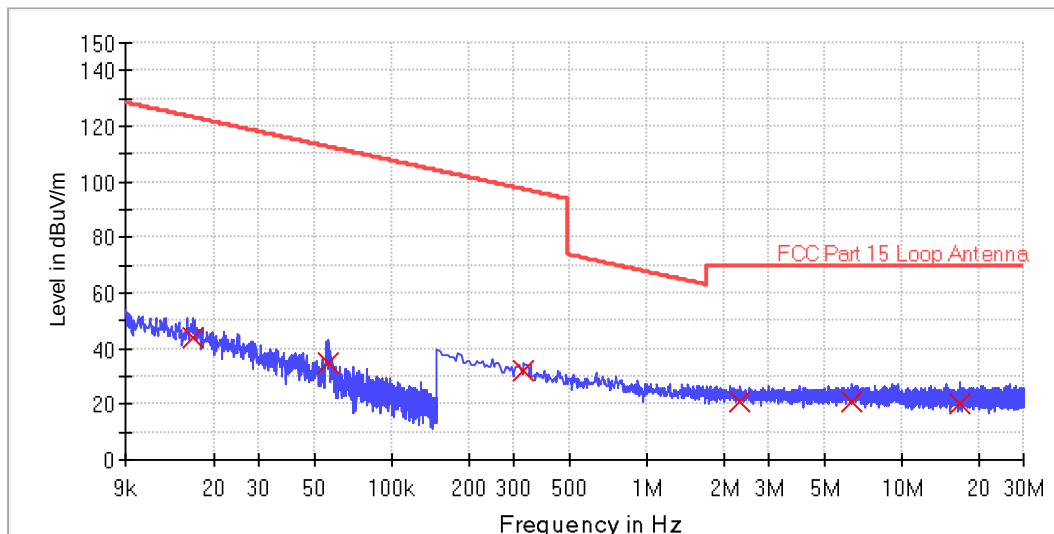
Common Information

EUT:	Dual Band Wireless Multi-mode Gateway
Model:	THP01-ZB-V5
Client:	Zhejiang Lingzhu Technology Co., Ltd
Operating conditions:	Power on, BLE transmitting, Data rate: 2Mbps, 2480MHz
Operator name:	Zhihua Xia
Input:	AC 120V 60Hz
Sample No:	WUX 0896895-002
Test standard:	FCC Part 15.209(a)
Comment:	X-axis orientation

Scan Setup: FCC_RE_9K-30M_Max_3m [EMI radiated]

Hardware Setup:	Radiated E Field 9K-30MHz_3m
Receiver:	[ESR 3]
Level Unit:	dBuV/m

Subrange	Step Size	Detectors	IF BW	Meas. Time	Preamp
9 kHz - 150 kHz	80 Hz	PK+	200 Hz	0.01 s	20 dB
150 kHz - 30 MHz	4 kHz	PK+	9 kHz	0.01 s	20 dB



Limit and Margin

Frequency (MHz)	QuasiPeak (dBuV/m)	Meas. Time (ms)	Bandwidth (kHz)	Height (cm)	Azimuth (deg)	Corr. (dB/m)	Margin - QPK (dB)	Limit - QPK (dBuV/m)
0.016520	44.2	1000.0	0.200	100.0	308.7	19.8	79.0	123.2
0.055720	35.2	1000.0	0.200	100.0	203.7	19.5	77.5	112.7
0.330000	32.1	1000.0	9.000	100.0	161.0	19.3	65.1	97.2
2.326000	21.1	1000.0	9.000	100.0	124.6	19.3	48.4	69.5
6.370000	20.9	1000.0	9.000	100.0	245.6	19.1	48.6	69.5
16.838000	20.4	1000.0	9.000	100.0	61.5	18.7	49.1	69.5

0.009-30MHz Radiated Emission

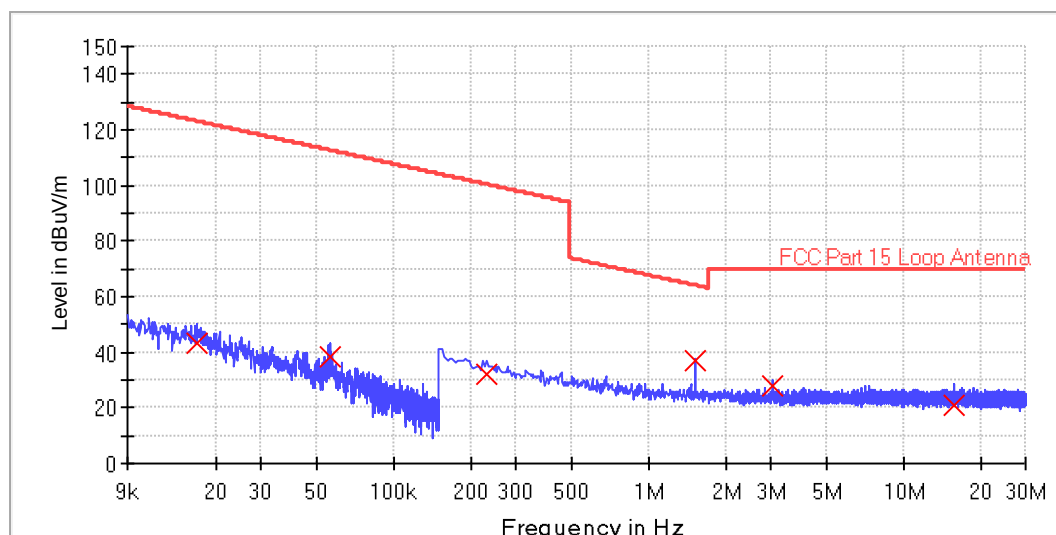
Common Information

EUT: Dual Band Wireless Multi-mode Gateway
Model: THP01-ZB-V5
Client: Zhejiang Lingzhu Technology Co., Ltd
Operating conditions: Power on, BLE transmitting, Data rate: 2Mbps, 2480MHz
Operator name: Zhihua Xia
Input: AC 120V 60Hz
Sample No: WUX 0896895-002
Test standard: FCC Part 15.209(a)
Comment: Y-axis orientation

Scan Setup: FCC_RE_9K-30M_Max_3m [EMI radiated]

Hardware Setup: Radiated E Field 9K-30MHz_3m
Receiver: [ESR 3]
Level Unit: dBuV/m

Subrange	Step Size	Detectors	IF BW	Meas. Time	Preamp
9 kHz - 150 kHz	80 Hz	PK+	200 Hz	0.01 s	20 dB
150 kHz - 30 MHz	4 kHz	PK+	9 kHz	0.01 s	20 dB



Limit and Margin

Frequency (MHz)	QuasiPeak (dBuV/m)	Meas. Time (ms)	Bandwidth (kHz)	Height (cm)	Azimuth (deg)	Corr. (dB/m)	Margin - QPK (dB)	Limit - QPK (dBuV/m)
0.016920	43.6	1000.0	0.200	100.0	354.2	19.8	79.5	123.0
0.056280	38.7	1000.0	0.200	100.0	8.5	19.5	73.9	112.6
0.230000	32.3	1000.0	9.000	100.0	284.1	19.3	68.0	100.4
1.518000	36.7	1000.0	9.000	100.0	33.6	19.3	27.3	64.0
3.034000	28.0	1000.0	9.000	100.0	232.2	19.2	41.5	69.5
15.646000	20.6	1000.0	9.000	100.0	6.7	18.7	48.9	69.5

0.009-30MHz Radiated Emission

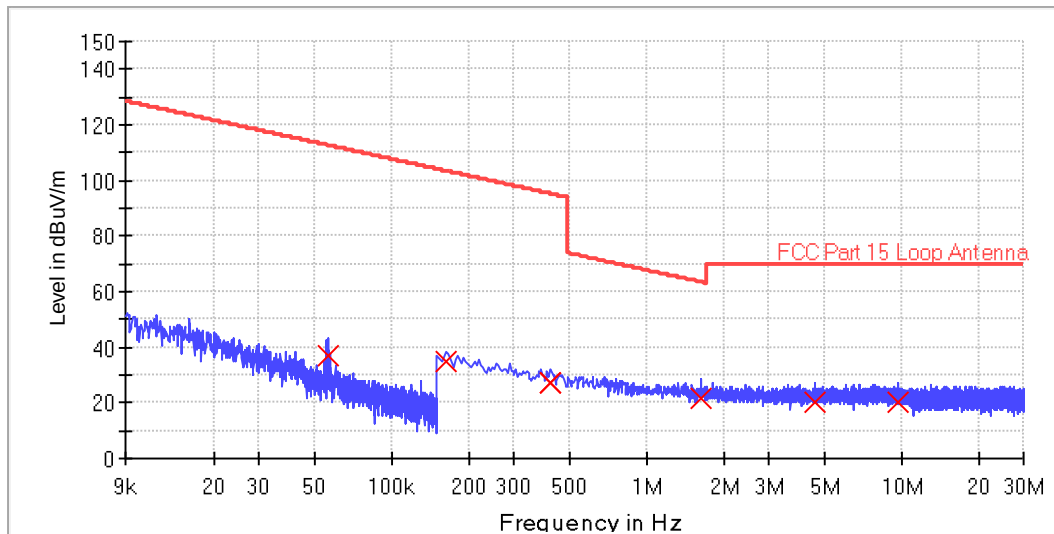
Common Information

EUT: Dual Band Wireless Multi-mode Gateway
Model: THP01-ZB-V5
Client: Zhejiang Lingzhu Technology Co., Ltd
Operating conditions: Power on, BLE transmitting, Data rate: 2Mbps, 2480MHz
Operator name: Zhihua Xia
Input: AC 120V 60Hz
Sample No: WUX 0896895-002
Test standard: FCC Part 15.209(a)
Comment: Z-axis orientation

Scan Setup: FCC_RE_9K-30M_Max_3m [EMI radiated]

Hardware Setup: Radiated E Field 9K-30MHz_3m
Receiver: [ESR 3]
Level Unit: dBuV/m

Subrange	Step Size	Detectors	IF BW	Meas. Time	Preamp
9 kHz - 150 kHz	80 Hz	PK+	200 Hz	0.01 s	20 dB
150 kHz - 30 MHz	4 kHz	PK+	9 kHz	0.01 s	20 dB



Limit and Margin

Frequency (MHz)	QuasiPeak (dBuV/m)	Meas. Time (ms)	Bandwidth (kHz)	Height (cm)	Azimuth (deg)	Corr. (dB/m)	Margin - QPK (dB)	Limit - QPK (dBuV/m)
0.056040	36.9	1000.0	0.200	100.0	7.5	19.5	75.7	112.6
0.162000	34.6	1000.0	9.000	100.0	104.1	19.3	68.8	103.4
0.418000	27.2	1000.0	9.000	100.0	29.0	19.3	68.0	95.2
0.418000	27.2	1000.0	9.000	100.0	80.7	19.3	68.0	95.2
1.626000	21.7	1000.0	9.000	100.0	63.2	19.3	41.7	63.4
4.590000	20.5	1000.0	9.000	100.0	90.3	19.2	49.0	69.5
9.618000	20.5	1000.0	9.000	100.0	72.6	18.8	49.0	69.5

Note: Measure Level (dBuV/m) = Reading Level (dBuV) + Factor (dB)

Factor (dB) = Cable Loss (dB) + Antenna Factor (dB/m)



30-1000MHz Radiated Emission

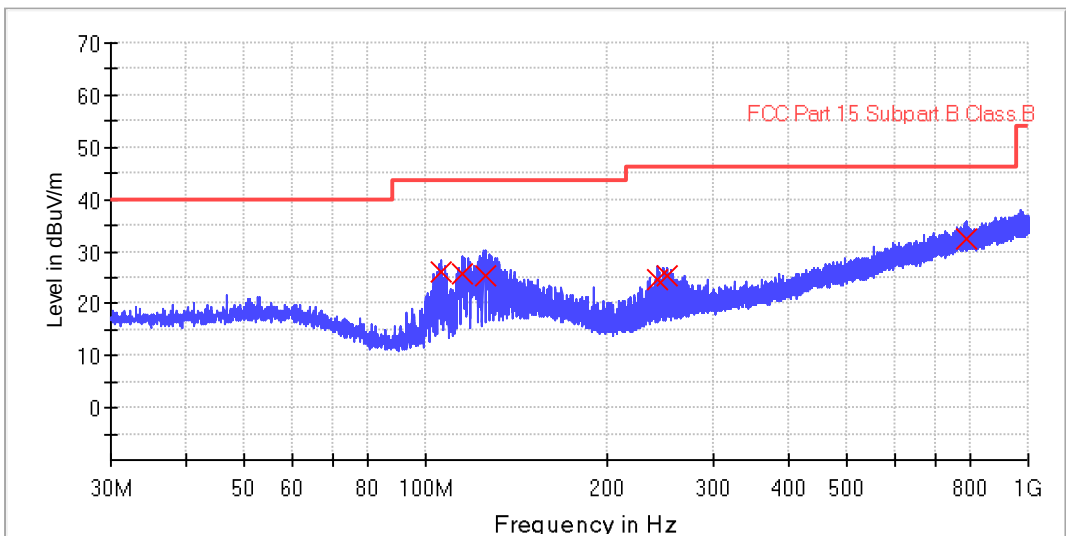
Common Information

EUT:	Dual Band Wireless Multi-mode Gateway
Model:	THP01-ZB-V5
Client:	Zhejiang Lingzhu Technology Co., Ltd
Operating conditions:	Power on, BLE transmitting, Data rate: 2Mbps, 2480MHz
Operator name:	Zhihua Xia
Input:	AC 120V 60Hz
Sample No:	WUX 0896895-002
Test standard:	FCC Part 15.209(a)
Comment:	Horizontal

Sweep Setup: RE_30M-1G_Sweep_3m [EMI radiated]

Hardware Setup:	Radiated E Field 30MHz-1GHz_3m
Receiver:	[ESR 3]
Level Unit:	dBuV/m

Subrange	Step Size	Detectors	Bandwidth	Sweep Time	Preamp
30 MHz - 1 GHz	40.417 kHz	PK+	120 kHz	1.5 s	20 dB



Limit and Margin

Frequency (MHz)	QuasiPeak (dBuV/m)	Meas. Time (ms)	Bandwidth (kHz)	Height (cm)	Pol	Azimuth (deg)	Corr. (dB/m)	Margin - QPK (dB)	Limit - QPK (dBuV/m)
105.960000	26.2	1000.0	120.000	200.0	H	199.3	17.4	17.3	43.5
115.000000	25.7	1000.0	120.000	200.0	H	358.5	18.4	17.8	43.5
125.600000	25.5	1000.0	120.000	200.0	H	336.8	19.6	18.1	43.5
242.720000	24.5	1000.0	120.000	200.0	H	154.6	20.3	21.5	46.0
250.640000	25.5	1000.0	120.000	200.0	H	45.4	20.6	20.6	46.0
786.720000	32.4	1000.0	120.000	200.0	H	151.2	33.4	13.6	46.0

30-1000MHz Radiated Emission

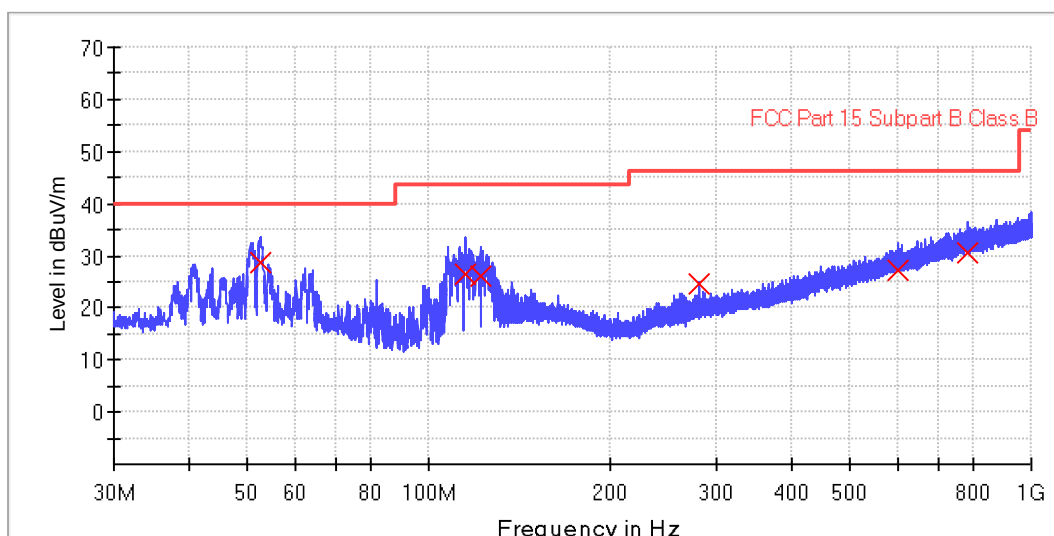
Common Information

EUT: Dual Band Wireless Multi-mode Gateway
Model: THP01-ZB-V5
Client: Zhejiang Lingzhu Technology Co., Ltd
Operating conditions: Power on, BLE transmitting, Data rate: 2Mbps, 2480MHz
Operator name: Zhihua Xia
Input: AC 120V 60Hz
Sample No: WUX 0896895-002
Test standard: FCC Part 15.209(a)
Comment: Vertical

Sweep Setup: RE_30M-1G_Sweep_3m [EMI radiated]

Hardware Setup: Radiated E Field 30MHz-1GHz_3m
Receiver: [ESR 3]
Level Unit: dBuV/m

Subrange	Step Size	Detectors	Bandwidth	Sweep Time	Preamp
30 MHz - 1 GHz	40.417 kHz	PK+	120 kHz	1.5 s	20 dB



Limit and Margin

Frequency (MHz)	QuasiPeak (dBuV/m)	Meas. Time (ms)	Bandwidth (kHz)	Height (cm)	Pol	Azimuth (deg)	Corr. (dB/m)	Margin - QPK (dB)	Limit - QPK (dBuV/m)
52.560000	28.7	1000.0	120.000	100.0	V	258.2	20.9	11.3	40.0
115.040000	26.6	1000.0	120.000	100.0	V	176.9	18.4	16.9	43.5
122.360000	26.2	1000.0	120.000	100.0	V	110.0	19.3	17.3	43.5
281.360000	24.5	1000.0	120.000	100.0	V	310.2	21.9	21.6	46.0
599.440000	27.4	1000.0	120.000	100.0	V	6.2	30.4	18.6	46.0
784.080000	30.7	1000.0	120.000	100.0	V	35.4	33.5	15.3	46.0

Note: Measure Level (dBuV/m) = Reading Level (dBuV) + Factor (dB)

Factor (dB) = Cable Loss (dB) + Antenna Factor (dB/m)

Radiated Emission 1GHz-18GHz:

1-18G Radiated Emission Test

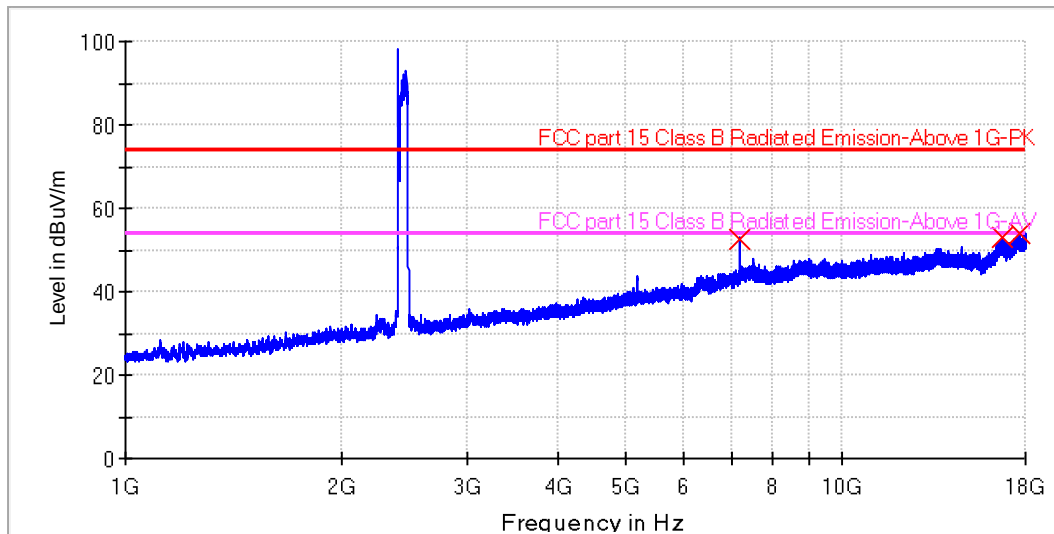
Common Information

EUT:	Dual Band Wireless Multi-mode Gateway
Model:	THP01-ZB-V5
Client:	Zhejiang Lingzhu Technology Co., Ltd
Operating conditions:	Power on, BLE transmitting, Data rate: 1Mbps, 2402M
Operator name:	Zhihua Xia
Input:	AC 120V 60Hz
Sample No:	WUX 0896895-002
Test standard:	FCC Part 15.209(a)
Comment:	Horizontal

Sweep Setup: FCC_RE_1-18G Sweep 3m_bonn [EMI radiated]

Hardware Setup:	FCC part15C Radiated E Field 1GHz-18GHz_3m_BONN
Receiver:	[FSV 40]
Level Unit:	dBuV/m

Subrange	Step Size	Detectors	Bandwidth	Sweep Time	Preamp
1 GHz - 6.3 GHz	441.667 kHz	PK+	1 MHz	1 s	0 dB
6.3 GHz - 18 GHz	487.5 kHz	PK+	1 MHz	1 s	0 dB



Limit and Margin

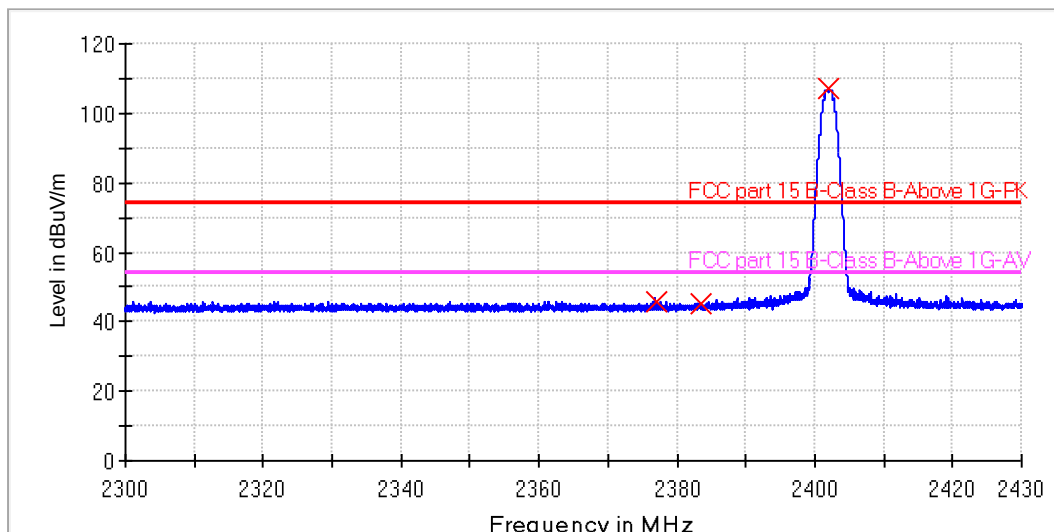
Frequency (MHz)	MaxPeak (dBuV/m)	Meas. Time (ms)	Height (cm)	Pol	Azimuth (deg)	Corr. (dB/m)	Margin - PK+ (dB)	Limit - PK+ (dBuV/m)
7206.000000	52.5	1000.0	150.0	H	316.0	8.5	21.6	74.0
16676.500000	53.0	1000.0	150.0	H	0.0	19.2	21.0	74.0
17622.500000	54.0	1000.0	150.0	H	242.0	22.0	20.0	74.0

Note: Emission level= Original Receiver Reading + Correct Factor
Correct Factor = Antenna Factor + Cable Loss -Amplifier gain

Sweep Setup: FCC_Band edge-2300-2430 Sweep 3m_without PA [EMI radiated]

Hardware Setup: 1-18G_3m_without PA
Receiver: [FSV 40]
Level Unit: dBuV/m

Subrange	Step Size	Detectors	Bandwidth	Sweep Time	Preamp
2.3 GHz - 2.43 GHz	26 kHz	PK+	1 MHz	1 s	20 dB



Limit and Margin

Frequency (MHz)	MaxPeak (dBuV/m)	Average (dBuV/m)	Meas. Time (ms)	Height (cm)	Pol	Azimuth (deg)	Corr. (dB/m)	Margin - PK+ (dB)	Limit - PK+ (dBuV/m)
2377.000000	45.7	---	1000.0	150.0	H	120.0	34.3	28.3	74.0
2383.500000	45.5	---	1000.0	150.0	H	30.0	34.3	28.5	74.0
2402.000000	107.3	---	1000.0	150.0	H	68.0	34.5	---	---

Note: Measure Level = Reading Level + Correct Factor
Correct Factor = Cable Loss + Antenna Factor



1-18G Radiated Emission Test

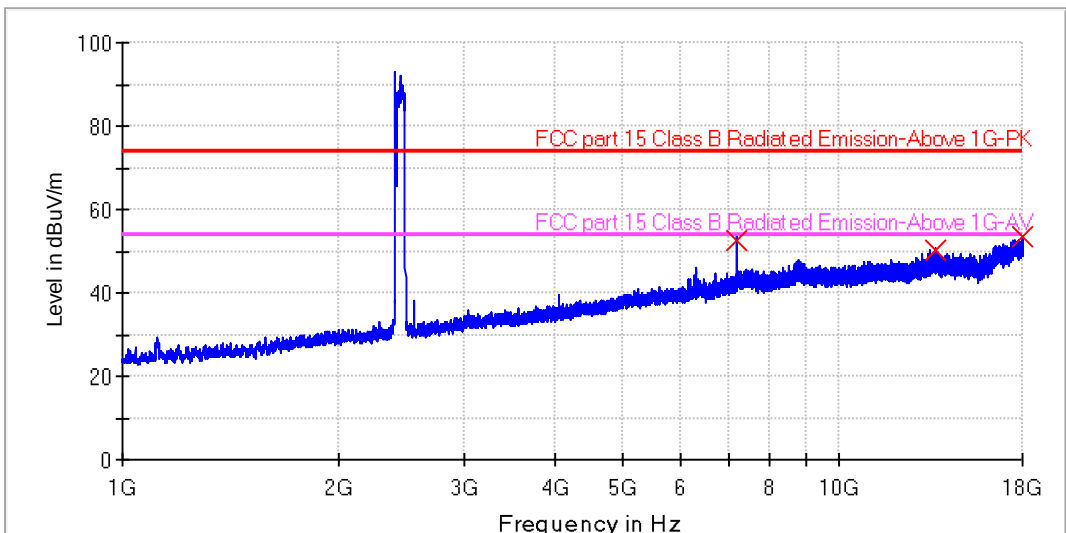
Common Information

EUT: Dual Band Wireless Multi-mode Gateway
 Model: THP01-ZB-V5
 Client: Zhejiang Lingzhu Technology Co., Ltd
 Operating conditions: Power on, BLE transmitting, Data rate: 1Mbps, 2402M
 Operator name: Zhihua Xia
 Input: AC 120V 60Hz
 Sample No: WUX 0896895-002
 Test standard: FCC Part 15.209(a)
 Comment: Vertical

Sweep Setup: FCC_RE_1-18G Sweep 3m_bonn [EMI radiated]

Hardware Setup: FCC part15C Radiated E Field 1GHz-18GHz_3m_BONN
 Receiver: [FSV 40]
 Level Unit: dBuV/m

Subrange	Step Size	Detectors	Bandwidth	Sweep Time	Preamp
1 GHz - 6.3 GHz	441.667 kHz	PK+	1 MHz	1 s	0 dB
6.3 GHz - 18 GHz	487.5 kHz	PK+	1 MHz	1 s	0 dB



Limit and Margin

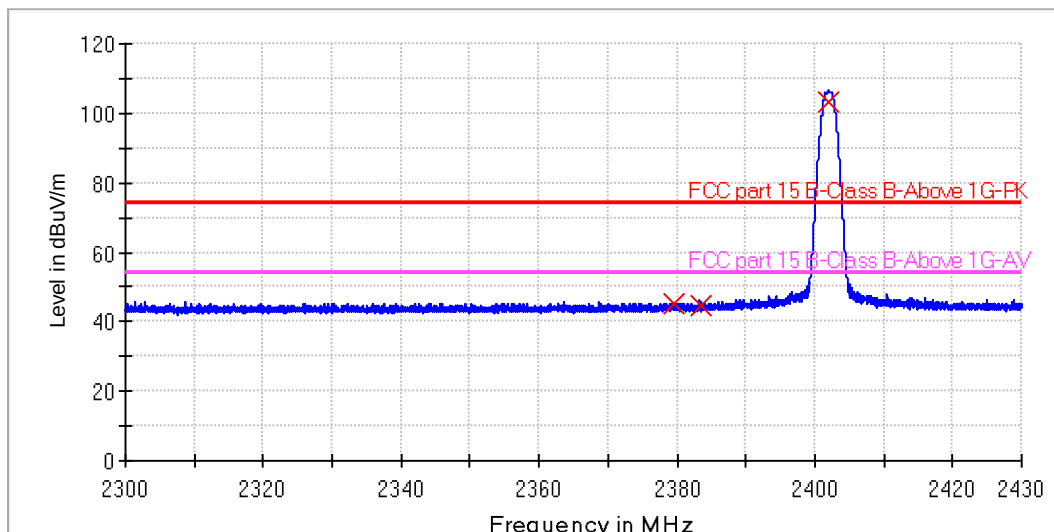
Frequency (MHz)	MaxPeak (dBuV/m)	Meas. Time (ms)	Height (cm)	Pol	Azimuth (deg)	Corr. (dB/m)	Margin - PK+ (dB)	Limit - PK+ (dBuV/m)
7204.500000	52.4	1000.0	150.0	V	100.3	8.5	21.6	74.0
13589.000000	50.3	1000.0	150.0	V	21.9	17.1	23.7	74.0
17955.000000	53.6	1000.0	150.0	V	234.7	22.1	20.4	74.0

Note: Emission level= Original Receiver Reading + Correct Factor
 Correct Factor = Antenna Factor + Cable Loss -Amplifier gain

Sweep Setup: FCC_Band edge-2300-2430 Sweep 3m_without PA [EMI radiated]

Hardware Setup: 1-18G_3m_without PA
Receiver: [FSV 40]
Level Unit: dBuV/m

Subrange	Step Size	Detectors	Bandwidth	Sweep Time	Preamplifier
2.3 GHz - 2.43 GHz	26 kHz	PK+	1 MHz	1 s	20 dB



Limit and Margin

Frequency (MHz)	MaxPeak (dBuV/m)	Average (dBm)	Meas. Time (ms)	Height (cm)	Pol	Azimuth (deg)	Corr. (dB/m)	Margin - PK+ (dB)	Limit - PK+ (dBuV/m)
2379.500000	45.3	---	1000.0	150.0	H	140.9	34.3	28.7	74.0
2383.500000	44.9	---	1000.0	150.0	H	245.8	34.3	29.1	74.0
2402.000000	103.0	---	1000.0	150.0	H	328.1	34.5	---	---

Note: Measure Level = Reading Level + Correct Factor

Correct Factor = Cable Loss + Antenna Factor



1-18G Radiated Emission Test

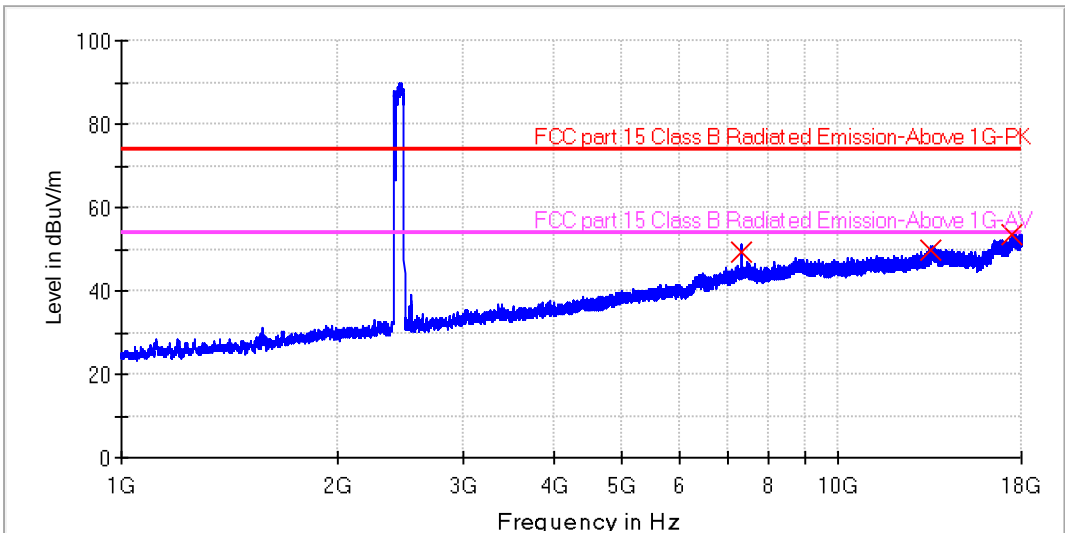
Common Information

EUT:	Dual Band Wireless Multi-mode Gateway
Model:	THP01-ZB-V5
Client:	Zhejiang Lingzhu Technology Co., Ltd
Operating conditions:	Power on, BLE transmitting, Data rate: 1Mbps, 2440M
Operator name:	Zhihua Xia
Input:	AC 120V 60Hz
Sample No:	WUX 0896895-002
Test standard:	FCC Part 15.209(a)
Comment:	Horizontal

Sweep Setup: FCC_RE_1-18G Sweep 3m_bonn [EMI radiated]

Hardware Setup:	FCC part15C Radiated E Field 1GHz-18GHz_3m_BONN
Receiver:	[FSV 40]
Level Unit:	dBuV/m

Subrange	Step Size	Detectors	Bandwidth	Sweep Time	Preamp
1 GHz - 6.3 GHz	441.667 kHz	PK+	1 MHz	1 s	0 dB
6.3 GHz - 18 GHz	487.5 kHz	PK+	1 MHz	1 s	0 dB



Limit and Margin

Frequency (MHz)	MaxPeak (dBuV/m)	Meas. Time (ms)	Height (cm)	Pol	Azimuth (deg)	Corr. (dB/m)	Margin - PK+ (dB)	Limit - PK+ (dBuV/m)
7319.500000	49.3	1000.0	150.0	H	233.7	8.7	24.7	74.0
13459.500000	49.9	1000.0	150.0	H	323.6	17.2	24.1	74.0
17435.000000	53.5	1000.0	150.0	H	84.5	21.5	20.5	74.0

Note: Emission level= Original Receiver Reading + Correct Factor
Correct Factor = Antenna Factor + Cable Loss -Amplifier gain

1-18G Radiated Emission Test

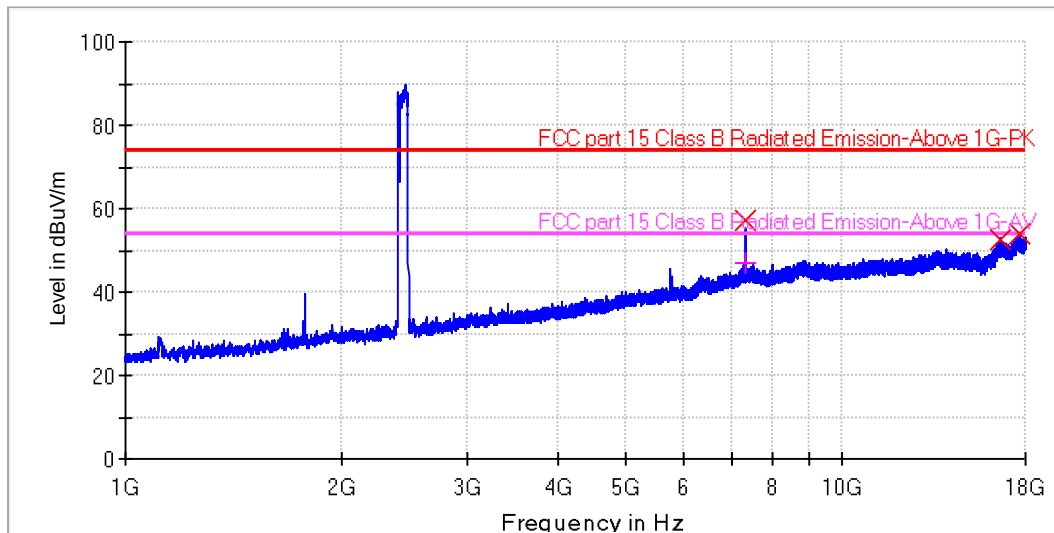
Common Information

EUT: Dual Band Wireless Multi-mode Gateway
Model: THP01-ZB-V5
Client: Zhejiang Lingzhu Technology Co., Ltd
Operating conditions: Power on, BLE transmitting, Data rate: 1Mbps, 2440M
Operator name: Zhihua Xia
Input: AC 120V 60Hz
Sample No: WUX 0896895-002
Test standard: FCC Part 15.209(a)
Comment: Vertical

Sweep Setup: FCC_RE_1-18G Sweep 3m_bonn [EMI radiated]

Hardware Setup: FCC part15C Radiated E Field 1GHz-18GHz_3m_BONN
Receiver: [FSV 40]
Level Unit: dBuV/m

Subrange	Step Size	Detectors	Bandwidth	Sweep Time	Preamp
1 GHz - 6.3 GHz	441.667 kHz	PK+	1 MHz	1 s	0 dB
6.3 GHz - 18 GHz	487.5 kHz	PK+	1 MHz	1 s	0 dB



Limit and Margin

Frequency (MHz)	MaxPeak (dBuV/m)	Average (dBuV/m)	Meas. Time (ms)	Height (cm)	Pol	Azimuth (deg)	Corr. (dB/m)	Margin - PK+ (dB)	Limit - PK+ (dBuV/m)
7319.500000	57.0	47.2	1000.0	150.0	V	286.0	8.7	17.0	74.0
16650.000000	52.6	---	1000.0	150.0	V	310.0	19.1	21.4	74.0
17629.000000	53.7	---	1000.0	150.0	V	320.0	22.0	20.3	74.0

Frequency (MHz)	Margin - Average (dB)	Limit - Average (dBuV/m)
7319.500000	6.9	54.0
16650.000000	---	---
17629.000000	---	---

Note: Emission level= Original Receiver Reading + Correct Factor
Correct Factor = Antenna Factor + Cable Loss - Amplifier gain



1-18G Radiated Emission Test

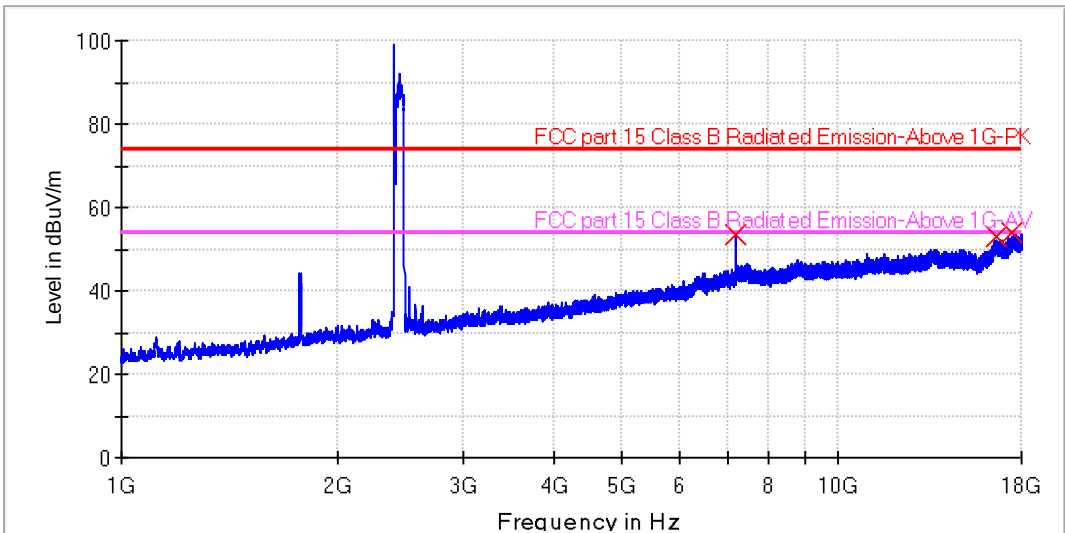
Common Information

EUT:	Dual Band Wireless Multi-mode Gateway
Model:	THP01-ZB-V5
Client:	Zhejiang Lingzhu Technology Co., Ltd
Operating conditions:	Power on, BLE transmitting, Data rate: 1Mbps, 2480M
Operator name:	Zhihua Xia
Input:	AC 120V 60Hz
Sample No:	WUX 0896895-002
Test standard:	FCC Part 15.209(a)
Comment:	Horizontal

Sweep Setup: FCC_RE_1-18G Sweep 3m_bonn [EMI radiated]

Hardware Setup:	FCC part15C Radiated E Field 1GHz-18GHz_3m_BONN
Receiver:	[FSV 40]
Level Unit:	dBuV/m

Subrange	Step Size	Detectors	Bandwidth	Sweep Time	Preamp
1 GHz - 6.3 GHz	441.667 kHz	PK+	1 MHz	1 s	0 dB
6.3 GHz - 18 GHz	487.5 kHz	PK+	1 MHz	1 s	0 dB



Limit and Margin

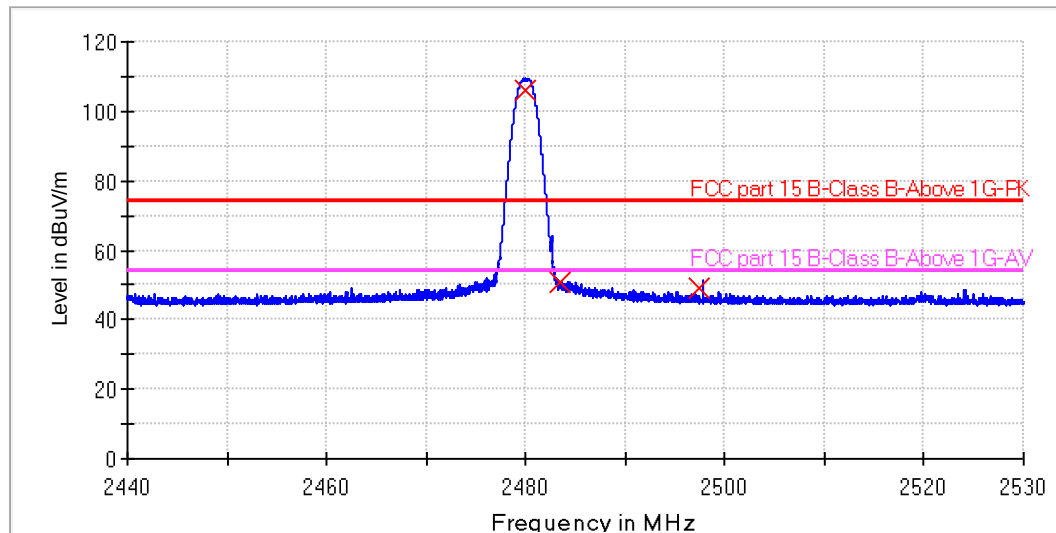
Frequency (MHz)	MaxPeak (dBuV/m)	Meas. Time (ms)	Height (cm)	Pol	Azimuth (deg)	Corr. (dB/m)	Margin - PK+ (dB)	Limit - PK+ (dBuV/m)
7205.500000	53.5	1000.0	150.0	H	44.0	8.5	20.5	74.0
16605.000000	52.8	1000.0	150.0	H	172.0	18.9	21.2	74.0
17464.000000	53.8	1000.0	150.0	H	104.0	21.7	20.2	74.0

Note: Emission level= Original Receiver Reading + Correct Factor
Correct Factor = Antenna Factor + Cable Loss -Amplifier gain

Sweep Setup: FCC_Band edge-2440-2530 Sweep 3m_without PA [EMI radiated]

Hardware Setup: 1-18G_3m_without PA
Receiver: [FSV 40]
Level Unit: dBuV/m

Subrange	Step Size	Detectors	Bandwidth	Sweep Time	Preamp
2.44 GHz - 2.53 GHz	18 kHz	PK+	1 MHz	1 s	20 dB



Limit and Margin

Frequency (MHz)	MaxPeak (dBuV/m)	Average (dBm)	Meas. Time (ms)	Height (cm)	Pol	Azimuth (deg)	Corr. (dB/m)	Margin - PK+ (dB)	Limit - PK+ (dBuV/m)
2480.000000	106.3	---	1000.0	150.0	H	211.6	34.8	---	---
2483.500000	50.9	---	1000.0	150.0	H	12.7	34.8	23.1	74.0
2497.500000	49.2	---	1000.0	150.0	H	76.2	34.8	24.8	74.0

Note: Measure Level = Reading Level + Correct Factor
Correct Factor = Cable Loss + Antenna Factor

1-18G Radiated Emission Test

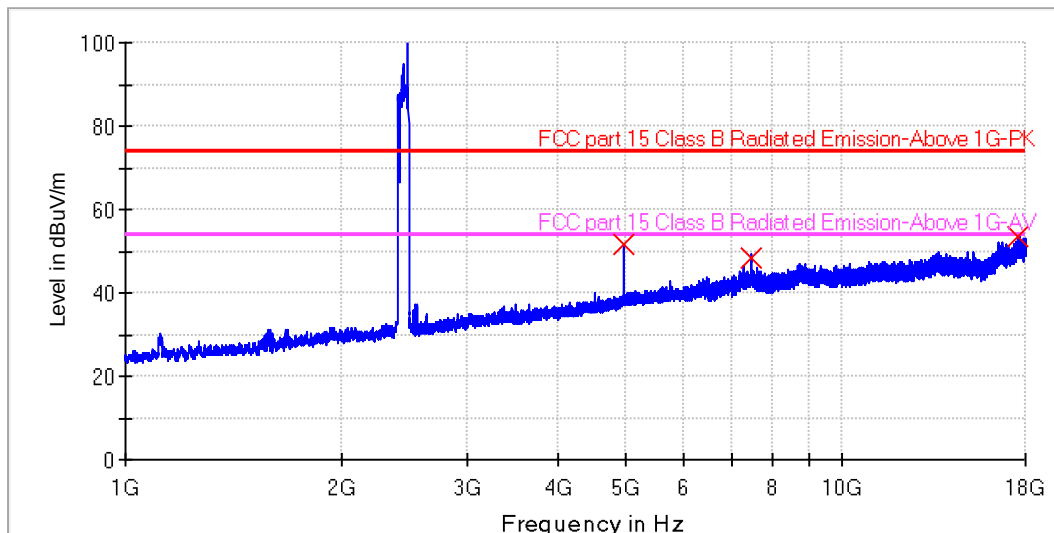
Common Information

EUT: Dual Band Wireless Multi-mode Gateway
Model: THP01-ZB-V5
Client: Zhejiang Lingzhu Technology Co., Ltd
Operating conditions: Power on, BLE transmitting, Data rate: 1Mbps, 2480M
Operator name: Zhihua Xia
Input: AC 120V 60Hz
Sample No: WUX 0896895-002
Test standard: FCC Part 15.209(a)
Comment: Vertical

Sweep Setup: FCC_RE_1-18G Sweep 3m_bonn [EMI radiated]

Hardware Setup: FCC part15C Radiated E Field 1GHz-18GHz_3m_BONN
Receiver: [FSV 40]
Level Unit: dBuV/m

Subrange	Step Size	Detectors	Bandwidth	Sweep Time	Preamp
1 GHz - 6.3 GHz	441.667 kHz	PK+	1 MHz	1 s	0 dB
6.3 GHz - 18 GHz	487.5 kHz	PK+	1 MHz	1 s	0 dB



Limit and Margin

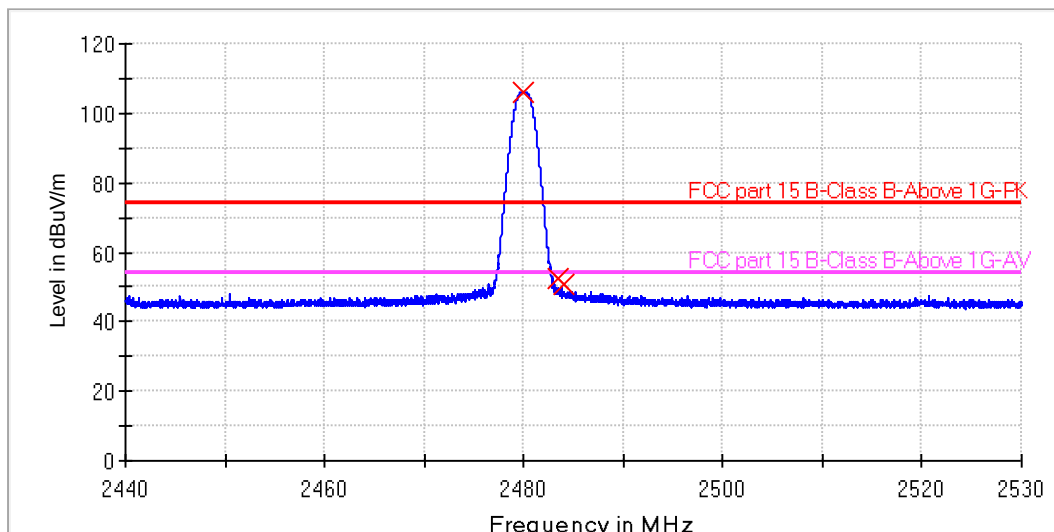
Frequency (MHz)	MaxPeak (dBuV/m)	Meas. Time (ms)	Height (cm)	Pol	Azimuth (deg)	Corr. (dB/m)	Margin - PK+ (dB)	Limit - PK+ (dBuV/m)
4961.000000	51.6	1000.0	150.0	V	144.5	0.0	22.4	74.0
7441.000000	48.2	1000.0	150.0	V	28.5	8.9	25.8	74.0
17574.500000	53.3	1000.0	150.0	V	204.2	21.9	20.7	74.0

Note: Emission level= Original Receiver Reading + Correct Factor
Correct Factor = Antenna Factor + Cable Loss -Amplifier gain

Sweep Setup: FCC_Band edge-2440-2530 Sweep 3m_without PA [EMI radiated]

Hardware Setup: 1-18G_3m_without PA
Receiver: [FSV 40]
Level Unit: dBuV/m

Subrange	Step Size	Detectors	Bandwidth	Sweep Time	Preamp
2.44 GHz - 2.53 GHz	18 kHz	PK+	1 MHz	1 s	20 dB



Limit and Margin

Frequency (MHz)	MaxPeak (dBuV/m)	Average (dBm)	Meas. Time (ms)	Height (cm)	Pol	Azimuth (deg)	Corr. (dB/m)	Margin - PK+ (dB)	Limit - PK+ (dBuV/m)
2480.000000	106.2	---	1000.0	150.0	V	193.1	34.8	---	---
2483.500000	52.5	---	1000.0	150.0	V	167.4	34.8	21.5	74.0
2484.000000	50.9	---	1000.0	150.0	V	196.2	34.8	23.1	74.0

Note: Measure Level = Reading Level + Correct Factor

Correct Factor = Cable Loss + Antenna Factor

1-18G Radiated Emission Test

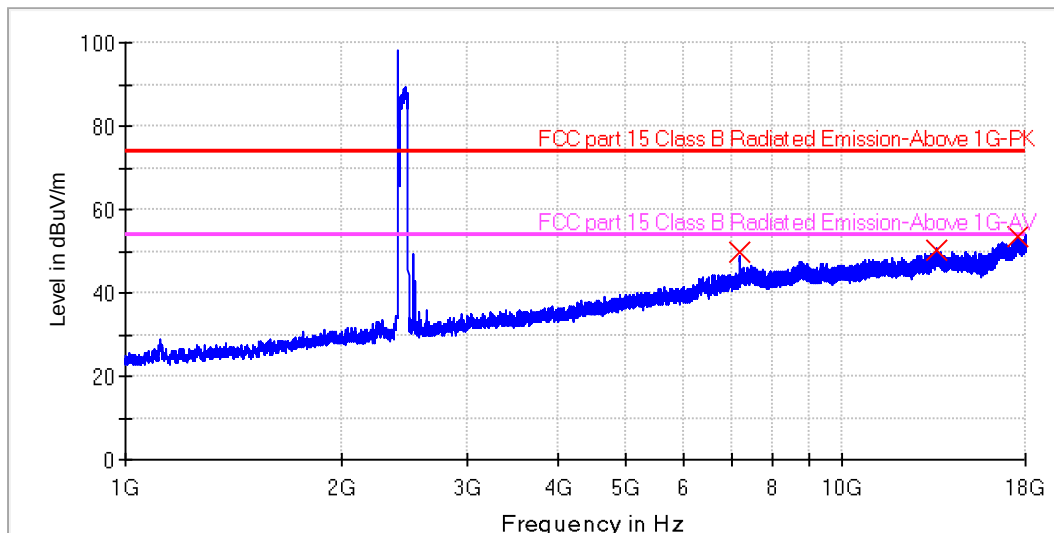
Common Information

EUT: Dual Band Wireless Multi-mode Gateway
Model: THP01-ZB-V5
Client: Zhejiang Lingzhu Technology Co., Ltd
Operating conditions: Power on, BLE transmitting, Data rate: 2Mbps, 2402M
Operator name: Zhihua Xia
Input: AC 120V 60Hz
Sample No: WUX 0896895-002
Test standard: FCC Part 15.209(a)
Comment: Horizontal

Sweep Setup: FCC_RE_1-18G Sweep 3m_bonn [EMI radiated]

Hardware Setup: FCC part15C Radiated E Field 1GHz-18GHz_3m_BONN
Receiver: [FSV 40]
Level Unit: dBuV/m

Subrange	Step Size	Detectors	Bandwidth	Sweep Time	Preamp
1 GHz - 6.3 GHz	441.667 kHz	PK+	1 MHz	1 s	0 dB
6.3 GHz - 18 GHz	487.5 kHz	PK+	1 MHz	1 s	0 dB



Limit and Margin

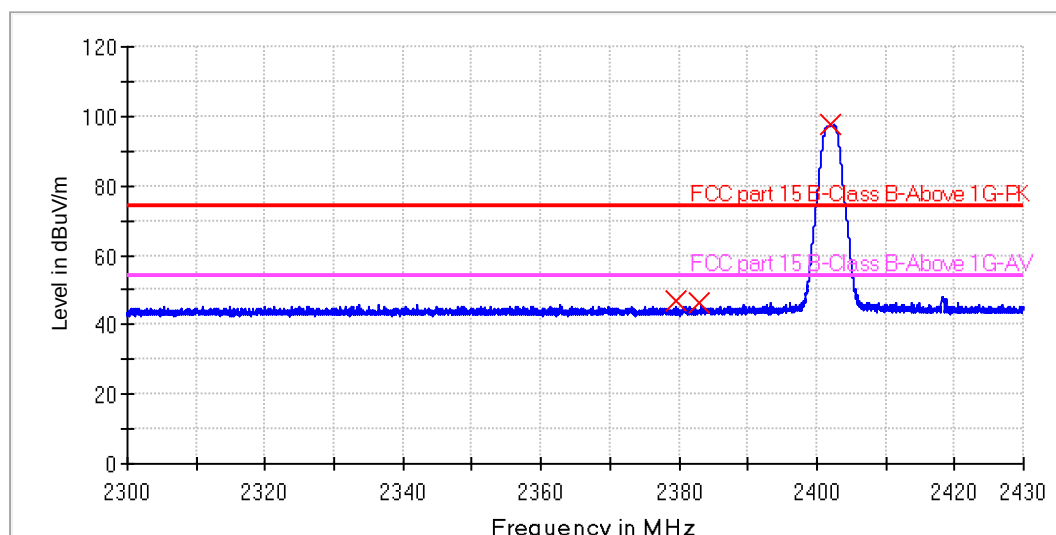
Frequency (MHz)	MaxPeak (dBuV/m)	Meas. Time (ms)	Height (cm)	Pol	Azimuth (deg)	Corr. (dB/m)	Margin - PK+ (dB)	Limit - PK+ (dBuV/m)
7205.000000	49.8	1000.0	150.0	H	127.4	8.5	24.2	74.0
13527.500000	50.2	1000.0	150.0	H	19.2	17.2	23.8	74.0
17524.000000	53.5	1000.0	150.0	H	19.0	21.8	20.5	74.0

Note: Emission level= Original Receiver Reading + Correct Factor
Correct Factor = Antenna Factor + Cable Loss -Amplifier gain

Sweep Setup: FCC_Band edge-2300-2430 Sweep 3m_without PA [EMI radiated]

Hardware Setup: 1-18G_3m_without PA
 Receiver: [FSV 40]
 Level Unit: dBuV/m

Subrange	Step Size	Detectors	Bandwidth	Sweep Time	Preamp
2.3 GHz - 2.43 GHz	26 kHz	PK+	1 MHz	1 s	20 dB



Limit and Margin

Frequency (MHz)	MaxPeak (dBuV/m)	Average (dBuV/m)	Meas. Time (ms)	Height (cm)	Pol	Azimuth (deg)	Corr. (dB/m)	Margin - PK+ (dB)	Limit - PK+ (dBuV/m)
2379.500000	46.7	---	1000.0	150.0	H	354.6	34.3	27.3	74.0
2383.000000	46.5	---	1000.0	150.0	H	186.0	34.3	27.5	74.0
2402.000000	97.5	---	1000.0	150.0	H	69.1	34.5	-23.5	74.0

Note: Measure Level = Reading Level + Correct Factor

Correct Factor = Cable Loss + Antenna Factor

1-18G Radiated Emission Test

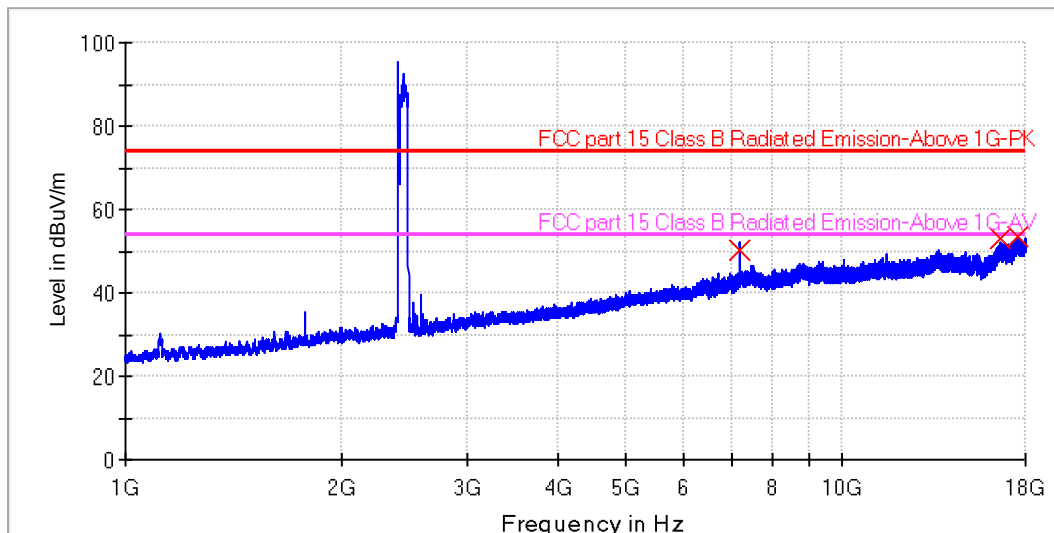
Common Information

EUT: Dual Band Wireless Multi-mode Gateway
Model: THP01-ZB-V5
Client: Zhejiang Lingzhu Technology Co., Ltd
Operating conditions: Power on, BLE transmitting, Data rate: 2Mbps, 2402M
Operator name: Zhihua Xia
Input: AC 120V 60Hz
Sample No: WUX 0896895-002
Test standard: FCC Part 15.209(a)
Comment: Vertical

Sweep Setup: FCC_RE_1-18G Sweep 3m_bonn [EMI radiated]

Hardware Setup: FCC part15C Radiated E Field 1GHz-18GHz_3m_BONN
Receiver: [FSV 40]
Level Unit: dBuV/m

Subrange	Step Size	Detectors	Bandwidth	Sweep Time	Preamp
1 GHz - 6.3 GHz	441.667 kHz	PK+	1 MHz	1 s	0 dB
6.3 GHz - 18 GHz	487.5 kHz	PK+	1 MHz	1 s	0 dB



Limit and Margin

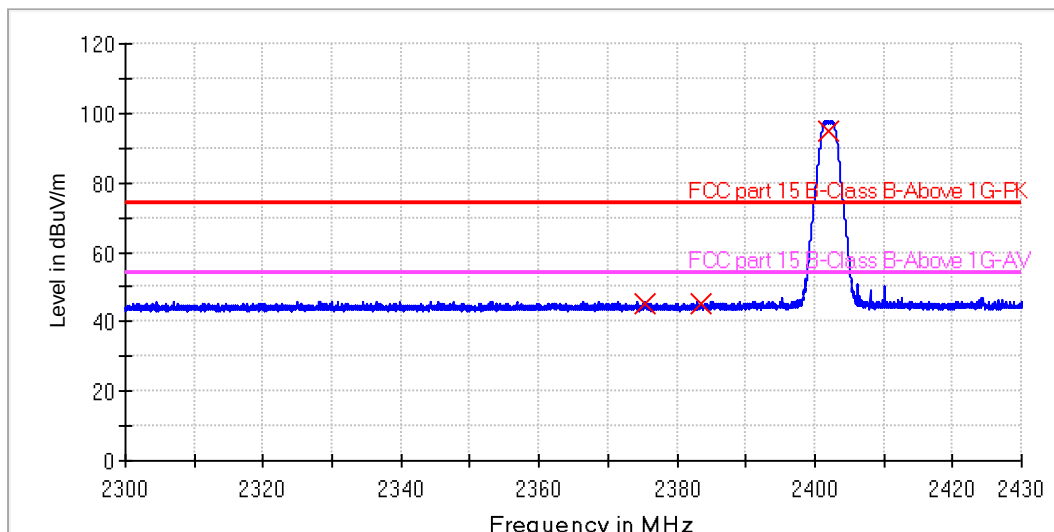
Frequency (MHz)	MaxPeak (dBuV/m)	Meas. Time (ms)	Height (cm)	Pol	Azimuth (deg)	Corr. (dB/m)	Margin - PK+ (dB)	Limit - PK+ (dBuV/m)
7205.500000	50.1	1000.0	150.0	V	72.6	8.5	23.9	74.0
16633.500000	53.1	1000.0	150.0	V	201.9	19.0	20.9	74.0
17591.000000	53.6	1000.0	150.0	V	85.9	21.9	20.4	74.0

Note: Emission level= Original Receiver Reading + Correct Factor
Correct Factor = Antenna Factor + Cable Loss -Amplifier gain

Sweep Setup: FCC_Band edge-2300-2430 Sweep 3m_without PA [EMI radiated]

Hardware Setup: 1-18G_3m_without PA
Receiver: [FSV 40]
Level Unit: dBuV/m

Subrange	Step Size	Detectors	Bandwidth	Sweep Time	Preamp
2.3 GHz - 2.43 GHz	26 kHz	PK+	1 MHz	1 s	20 dB



Limit and Margin

Frequency (MHz)	MaxPeak (dBuV/m)	Average (dBuV/m)	Meas. Time (ms)	Height (cm)	Pol	Azimuth (deg)	Corr. (dB/m)	Margin - PK+ (dB)	Limit - PK+ (dBuV/m)
2375.500000	45.1	---	1000.0	150.0	V	196.2	34.3	28.9	74.0
2383.500000	45.4	---	1000.0	150.0	V	130.2	34.3	28.6	74.0
2402.000000	94.8	---	1000.0	150.0	V	58.4	34.5	---	---

Note: Measure Level = Reading Level + Correct Factor

Correct Factor = Cable Loss + Antenna Factor

1-18G Radiated Emission Test

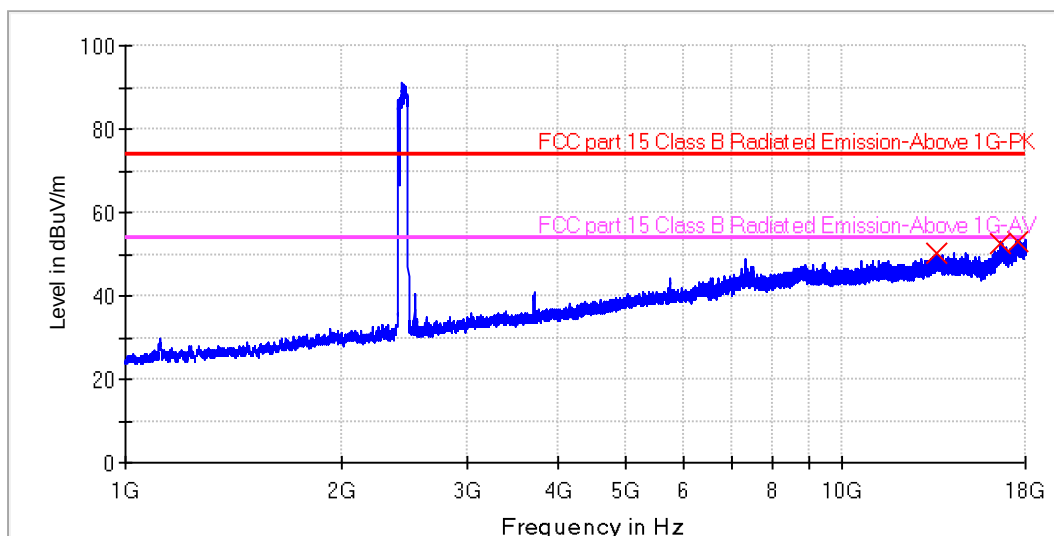
Common Information

EUT: Dual Band Wireless Multi-mode Gateway
Model: THP01-ZB-V5
Client: Zhejiang Lingzhu Technology Co., Ltd
Operating conditions: Power on, BLE transmitting, Data rate: 2Mbps, 2440M
Operator name: Zhihua Xia
Input: AC 120V 60Hz
Sample No: WUX 0896895-002
Test standard: FCC Part 15.209(a)
Comment: Horizontal

Sweep Setup: FCC_RE_1-18G Sweep 3m_bonn [EMI radiated]

Hardware Setup: FCC part15C Radiated E Field 1GHz-18GHz_3m_BONN
Receiver: [FSV 40]
Level Unit: dBuV/m

Subrange	Step Size	Detectors	Bandwidth	Sweep Time	Preamp
1 GHz - 6.3 GHz	441.667 kHz	PK+	1 MHz	1 s	0 dB
6.3 GHz - 18 GHz	487.5 kHz	PK+	1 MHz	1 s	0 dB



Limit and Margin

Frequency (MHz)	MaxPeak (dBuV/m)	Meas. Time (ms)	Height (cm)	Pol	Azimuth (deg)	Corr. (dB/m)	Margin - PK+ (dB)	Limit - PK+ (dBuV/m)
13558.000000	50.5	1000.0	150.0	H	233.6	17.1	23.6	74.0
16628.500000	52.7	1000.0	150.0	H	289.1	19.0	21.3	74.0
17560.500000	53.2	1000.0	150.0	H	226.0	21.9	20.8	74.0

Note: Emission level= Original Receiver Reading + Correct Factor
Correct Factor = Antenna Factor + Cable Loss -Amplifier gain

1-18G Radiated Emission Test

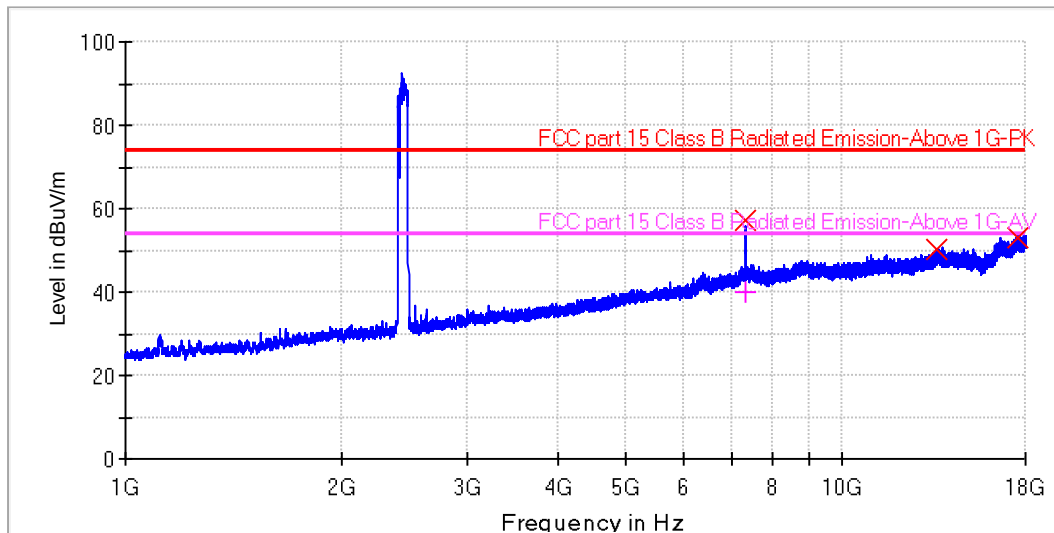
Common Information

EUT: Dual Band Wireless Multi-mode Gateway
Model: THP01-ZB-V5
Client: Zhejiang Lingzhu Technology Co., Ltd
Operating conditions: Power on, BLE transmitting, Data rate: 2Mbps, 2440M
Operator name: Zhihua Xia
Input: AC 120V 60Hz
Sample No: WUX 0896895-002
Test standard: FCC Part 15.209(a)
Comment: Vertical

Sweep Setup: FCC_RE_1-18G Sweep 3m_bonn [EMI radiated]

Hardware Setup: FCC part15C Radiated E Field 1GHz-18GHz_3m_BONN
Receiver: [FSV 40]
Level Unit: dBuV/m

Subrange	Step Size	Detectors	Bandwidth	Sweep Time	Preamp
1 GHz - 6.3 GHz	441.667 kHz	PK+	1 MHz	1 s	0 dB
6.3 GHz - 18 GHz	487.5 kHz	PK+	1 MHz	1 s	0 dB



Limit and Margin

Frequency (MHz)	MaxPeak (dBuV/m)	Average (dBuV/m)	Meas. Time (ms)	Height (cm)	Pol	Azimuth (deg)	Corr. (dB/m)	Margin - PK+ (dB)	Limit - PK+ (dBuV/m)
7320.000000	57.3	40.2	1000.0	150.0	V	109.0	8.7	16.7	74.0
13574.000000	50.4	---	1000.0	150.0	V	157.0	17.1	23.6	74.0
17564.500000	53.3	---	1000.0	150.0	V	151.0	21.9	20.8	74.0

Frequency (MHz)	Margin - Average (dB)	Limit - Average (dBuV/m)
7320.000000	13.8	54.0
13574.000000	---	---
17564.500000	---	---

Note: Emission level= Original Receiver Reading + Correct Factor
Correct Factor = Antenna Factor + Cable Loss - Amplifier gain

1-18G Radiated Emission Test

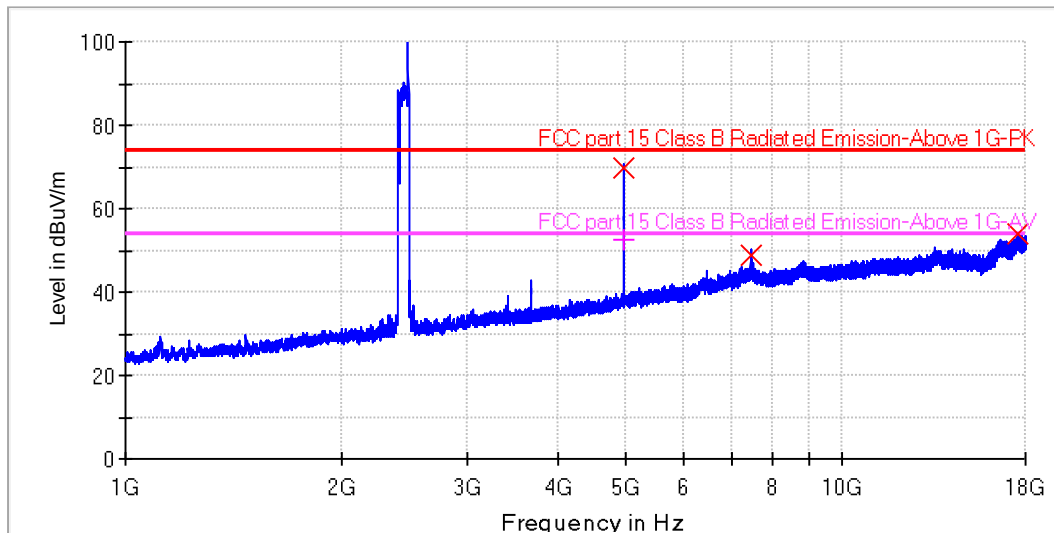
Common Information

EUT: Dual Band Wireless Multi-mode Gateway
Model: THP01-ZB-V5
Client: Zhejiang Lingzhu Technology Co., Ltd
Operating conditions: Power on, BLE transmitting, Data rate: 2Mbps, 2480M
Operator name: Zhihua Xia
Input: AC 120V 60Hz
Sample No: WUX 0896895-002
Test standard: FCC Part 15.209(a)
Comment: Horizontal

Sweep Setup: FCC_RE_1-18G Sweep 3m_bonn [EMI radiated]

Hardware Setup: FCC part15C Radiated E Field 1GHz-18GHz_3m_BONN
Receiver: [FSV 40]
Level Unit: dBuV/m

Subrange	Step Size	Detectors	Bandwidth	Sweep Time	Preamp
1 GHz - 6.3 GHz	441.667 kHz	PK+	1 MHz	1 s	0 dB
6.3 GHz - 18 GHz	487.5 kHz	PK+	1 MHz	1 s	0 dB



Limit and Margin

Frequency (MHz)	MaxPeak (dBuV/m)	Average (dBuV/m)	Meas. Time (ms)	Height (cm)	Pol	Azimuth (deg)	Corr. (dB/m)	Margin - PK+ (dB)	Limit - PK+ (dBuV/m)
4961.500000	70.0	52.4	1000.0	150.0	H	71.3	0.0	4.1	74.0
7440.000000	49.1	---	1000.0	150.0	H	329.6	8.9	24.9	74.0
17586.500000	54.1	---	1000.0	150.0	H	4.9	21.9	19.9	74.0

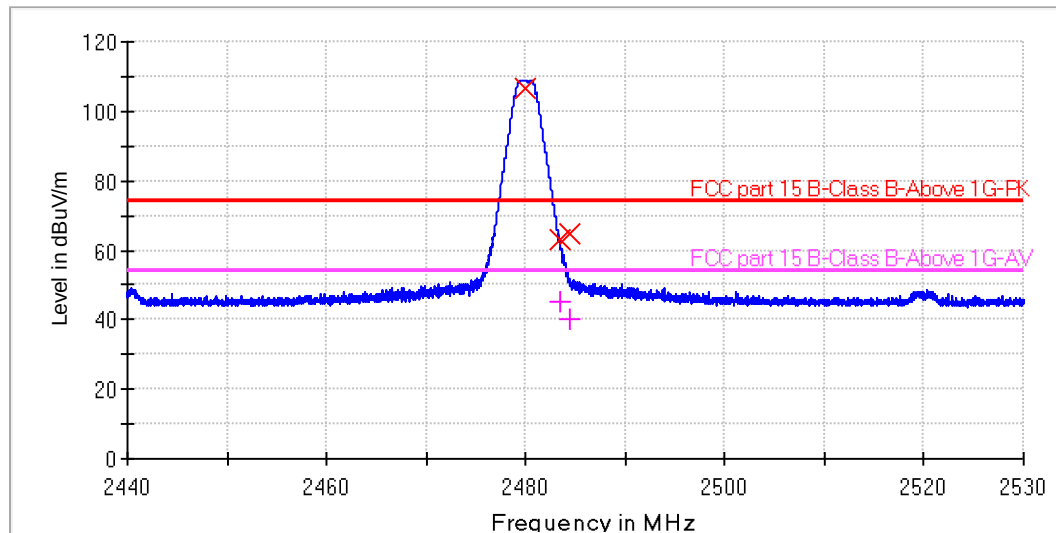
Frequency (MHz)	Margin - Average (dB)	Limit - Average (dBuV/m)
4961.500000	1.6	54.0
7440.000000	---	---
17586.500000	---	---

Note: Emission level= Original Receiver Reading + Correct Factor
Correct Factor = Antenna Factor + Cable Loss - Amplifier gain

Sweep Setup: FCC_Band edge-2440-2530 Sweep 3m_without PA [EMI radiated]

Hardware Setup: 1-18G_3m_without PA
 Receiver: [FSV 40]
 Level Unit: dBuV/m

Subrange	Step Size	Detectors	Bandwidth	Sweep Time	Preamp
2.44 GHz - 2.53 GHz	18 kHz	PK+	1 MHz	1 s	20 dB



Limit and Margin

Frequency (MHz)	MaxPeak (dBuV/m)	Average (dBuV/m)	Meas. Time (ms)	Height (cm)	Pol	Azimuth (deg)	Corr. (dB/m)	Margin - PK+ (dB)	Limit - PK+ (dBuV/m)	Margin - Average (dB)
2480.000000	106.4	---	1000.0	150.0	H	114.0	34.8	---	---	---
2483.500000	63.2	45.3	1000.0	150.0	H	79.0	34.8	10.8	74.0	8.7
2484.500000	64.8	40.1	1000.0	150.0	H	0.0	34.8	9.2	74.0	13.9

(continuation of the "Limit and Margin" table from column 18 ...)

Frequency (MHz)	Limit - Average (dBuV/m)
2480.000000	---
2483.500000	54.0
2484.500000	54.0

Note: Measure Level = Reading Level + Correct Factor
 Correct Factor = Cable Loss + Antenna Factor

1-18G Radiated Emission Test

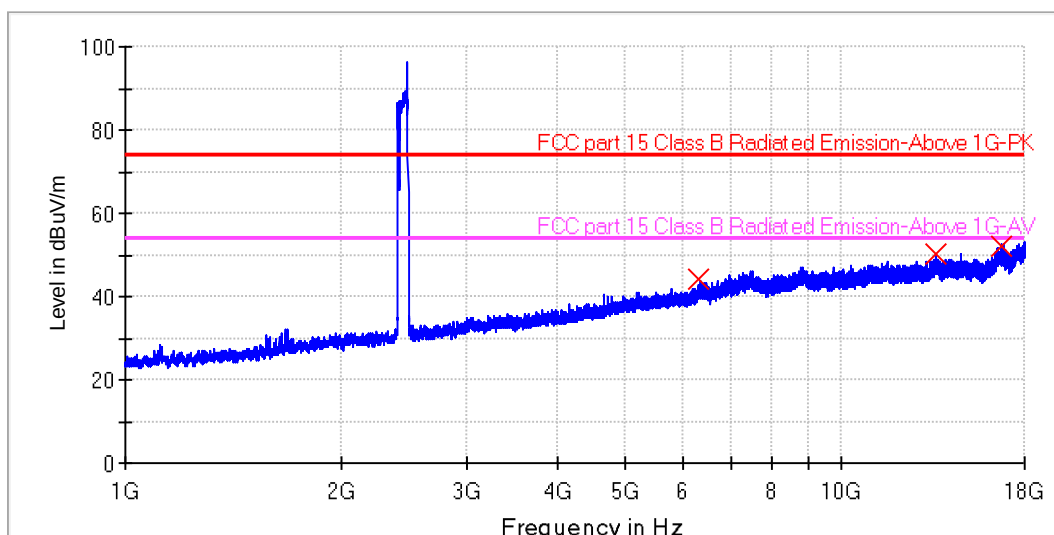
Common Information

EUT: Dual Band Wireless Multi-mode Gateway
Model: THP01-ZB-V5
Client: Zhejiang Lingzhu Technology Co., Ltd
Operating conditions: Power on, BLE transmitting, Data rate: 2Mbps, 2480M
Operator name: Zhihua Xia
Input: AC 120V 60Hz
Sample No: WUX 0896895-002
Test standard: FCC Part 15.209(a)
Comment: Vertical

Sweep Setup: FCC_RE_1-18G Sweep 3m_bonn [EMI radiated]

Hardware Setup: FCC part15C Radiated E Field 1GHz-18GHz_3m_BONN
Receiver: [FSV 40]
Level Unit: dBuV/m

Subrange	Step Size	Detectors	Bandwidth	Sweep Time	Preamp
1 GHz - 6.3 GHz	441.667 kHz	PK+	1 MHz	1 s	0 dB
6.3 GHz - 18 GHz	487.5 kHz	PK+	1 MHz	1 s	0 dB



Limit and Margin

Frequency (MHz)	MaxPeak (dBuV/m)	Average (dBuV/m)	Meas. Time (ms)	Height (cm)	Pol	Azimuth (deg)	Corr. (dB/m)	Margin - PK+ (dB)	Limit - PK+ (dBuV/m)
4961.500000	56.3	40.0	1000.0	150.0	V	90.3	0.0	17.7	74.0
16714.500000	53.2	---	1000.0	150.0	V	72.6	19.2	20.8	74.0
17646.500000	53.7	---	1000.0	150.0	V	201.9	22.0	20.3	74.0

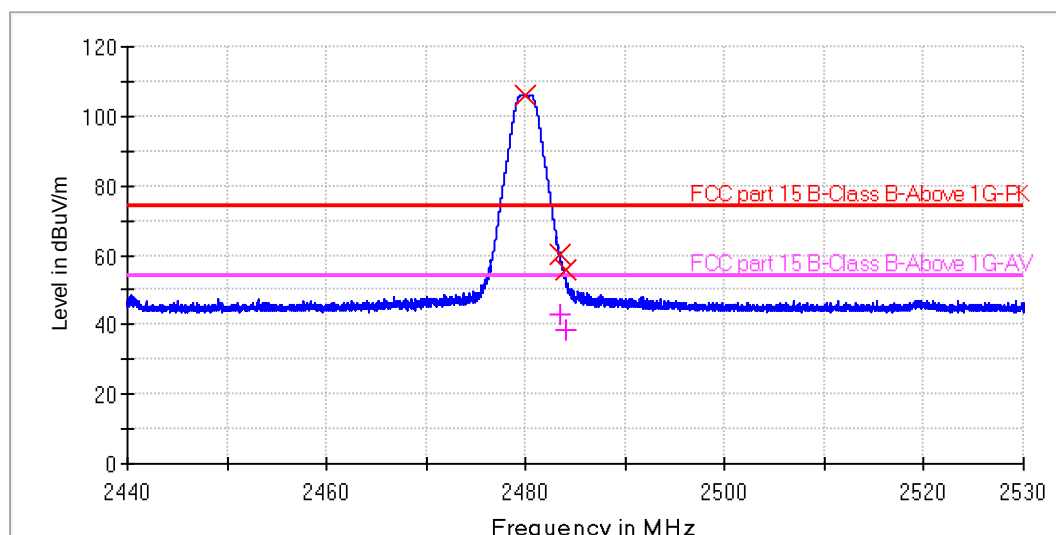
Frequency (MHz)	Margin - Average (dB)	Limit - Average (dBuV/m)
4961.500000	14.1	54.0
16714.500000	---	---
17646.500000	---	---

Note: Emission level= Original Receiver Reading + Correct Factor
Correct Factor = Antenna Factor + Cable Loss - Amplifier gain

Sweep Setup: FCC_Band edge-2440-2530 Sweep 3m_without PA [EMI radiated]

Hardware Setup: 1-18G_3m_without PA
 Receiver: [FSV 40]
 Level Unit: dBuV/m

Subrange	Step Size	Detectors	Bandwidth	Sweep Time	Preamp
2.44 GHz - 2.53 GHz	18 kHz	PK+	1 MHz	1 s	20 dB



Limit and Margin

Frequency (MHz)	MaxPeak (dBuV/m)	Average (dBuV/m)	Meas. Time (ms)	Height (cm)	Pol	Azimuth (deg)	Corr. (dB/m)	Margin - PK+ (dB)	Limit - PK+ (dBuV/m)	Margin - Average (dB)
2480.000000	106.1	---	1000.0	150.0	V	343.1	34.8	---	---	---
2483.500000	60.1	42.8	1000.0	150.0	V	222.4	34.8	13.9	74.0	11.2
2484.000000	55.7	38.6	1000.0	150.0	V	152.1	34.8	18.3	74.0	15.4

(continuation of the "Limit and Margin" table from column 18 ...)

Frequency (MHz)	Limit - Average (dBuV/m)
2480.000000	---
2483.500000	54.0
2484.000000	54.0

Note: Measure Level = Reading Level + Correct Factor
 Correct Factor = Cable Loss + Antenna Factor

The worst case of Radiated Emission 18GHz-25GHz:

18-25G Radiated Emission

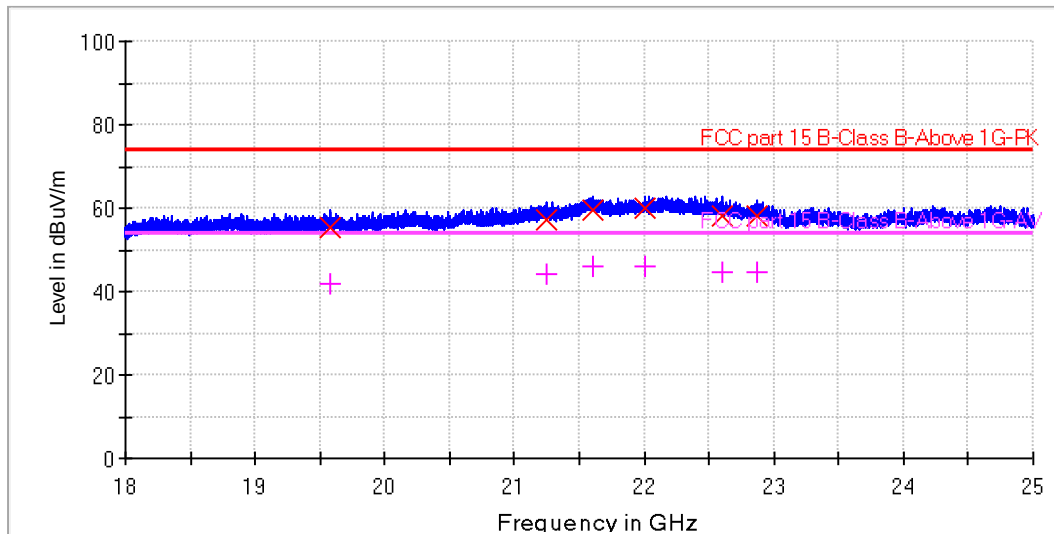
Common Information

EUT: Dual Band Wireless Multi-mode Gateway
Model: THP01-ZB-V5
Client: Zhejiang Lingzhu Technology Co., Ltd
Operating conditions: Power on, BLE transmitting, Data rate: 2Mbps, 2480MHz
Operator name: Zhihua Xia
Input: AC 120V 60Hz
Sample No: WUX 0896895-002
Test standard: FCC Part 15.209(a)
Comment: Horizontal

Sweep Setup: FCC_RE_18-25G_Sweep_3m [EMI radiated]

Hardware Setup: 18-40GHz_3m
Receiver: [FSV 40]
Level Unit: dBuV/m

Subrange	Step Size	Detectors	Bandwidth	Sweep Time	Preamp
18 GHz - 25 GHz	500 kHz	PK+	1 MHz	1 s	0 dB



Limit and Margin

Frequency (MHz)	MaxPeak (dBuV/m)	Average (dBuV/m)	Meas. Time (ms)	Height (cm)	Pol	Azimuth (deg)	Corr. (dB/m)	Margin - PK+ (dB)	Limit - PK+ (dBuV/m)	Margin - Average (dB)
19578.000000	55.3	41.9	1000.0	150.0	H	105.9	9.9	18.7	74.0	12.2
21248.000000	57.3	44.2	1000.0	150.0	H	114.1	12.0	16.8	74.0	9.8
21602.500000	59.7	46.1	1000.0	150.0	H	144.5	13.0	14.4	74.0	7.9
22013.000000	59.9	46.0	1000.0	150.0	H	28.5	13.6	14.1	74.0	8.0
22596.500000	58.1	44.8	1000.0	150.0	H	204.2	12.8	15.9	74.0	9.2
22873.000000	58.1	44.5	1000.0	150.0	H	122.5	12.0	15.9	74.0	9.5

(continuation of the "Limit and Margin" table from column 18 ...)

Title: DTS Test Report
Revision: 02
Effective date: 2024-08-01

ID-Number: EMC_WUX_F_25.34E
Author: Ming GU

Phone: +86 510 8820 3737
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TUV SUD Certification and Testing (China) Co., Ltd.
Floor 1-4, Building B, No.37, Tuanjie Road(Middle), Xishan Economic and Technological Development Zone, Wuxi, Jiangsu, China



Frequency (MHz)	Limit - Average (dBuV/m)
19578.000000	54.0
21248.000000	54.0
21602.500000	54.0
22013.000000	54.0
22596.500000	54.0
22873.000000	54.0

Note: Emission level= Original Receiver Reading + Correct Factor
Correct Factor = Antenna Factor + Cable Loss -Amplifier gain



18-25G Radiated Emission

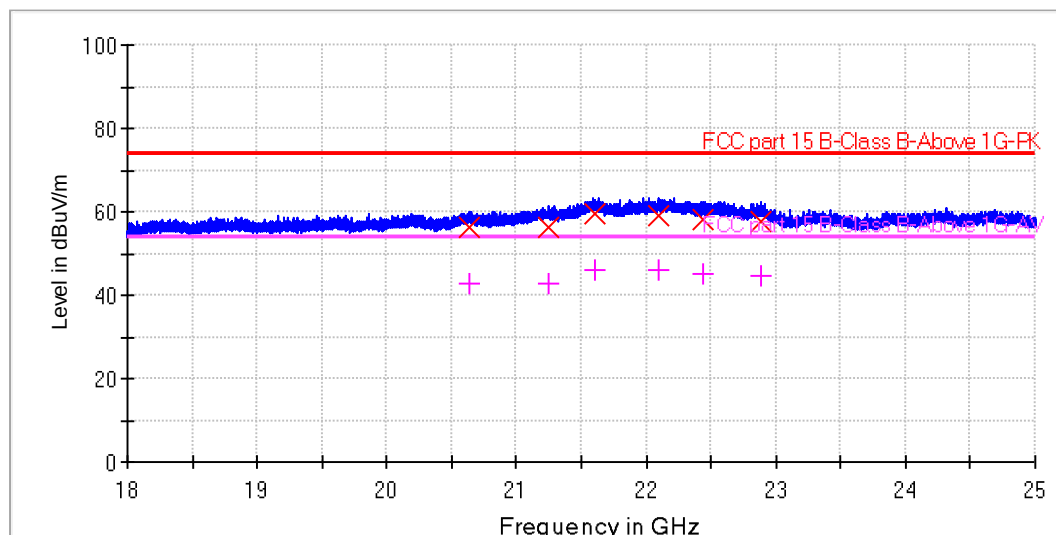
Common Information

EUT: Dual Band Wireless Multi-mode Gateway
 Model: THP01-ZB-V5
 Client: Zhejiang Lingzhu Technology Co., Ltd
 Operating conditions: Power on, BLE transmitting, Data rate: 2Mbps, 2480MHz
 Operator name: Zhihua Xia
 Input: AC 120V 60Hz
 Sample No: WUX 0896895-002
 Test standard: FCC Part 15.209(a)
 Comment: Vertical

Sweep Setup: FCC_RE_18-25G_Sweep_3m [EMI radiated]

Hardware Setup: 18-40GHz_3m
 Receiver: [FSV 40]
 Level Unit: dBuV/m

Subrange	Step Size	Detectors	Bandwidth	Sweep Time	Preamp
18 GHz - 25 GHz	500 kHz	PK+	1 MHz	1 s	0 dB



Limit and Margin

Frequency (MHz)	MaxPeak (dBuV/m)	Average (dBuV/m)	Meas. Time (ms)	Height (cm)	Pol	Azimuth (deg)	Corr. (dB/m)	Margin - PK+ (dB)	Limit - PK+ (dBuV/m)	Margin - Average (dB)
20638.000000	56.5	43.0	1000.0	150.0	V	102.9	10.6	17.5	74.0	11.0
21247.000000	56.4	42.6	1000.0	150.0	V	21.2	12.0	17.6	74.0	11.4
21604.500000	59.7	46.2	1000.0	150.0	V	322.3	13.0	14.3	74.0	7.9
22089.500000	59.2	45.9	1000.0	150.0	V	304.6	13.5	14.8	74.0	8.1
22441.000000	58.1	45.1	1000.0	150.0	V	337.2	13.1	15.9	74.0	9.0
22891.500000	57.8	44.5	1000.0	150.0	V	58.6	12.0	16.2	74.0	9.5

(continuation of the "Limit and Margin" table from column 18 ...)

Frequency (MHz)	Limit - Average (dBuV/m)
-----------------	--------------------------

Title: DTS Test Report
 Revision: 02
 Effective date: 2024-08-01

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 Author: Ming GU

Phone: +86 510 8820 3737
 Fax: +86 510 8820 3636

TUV SUD Certification and Testing (China) Co., Ltd.
 Floor 1-4, Building B, No.37, Tuanjie Road(Middle), Xishan Economic and Technological Development Zone, Wuxi, Jiangsu, China



20638.000000	54.0
21247.000000	54.0
21604.500000	54.0
22089.500000	54.0
22441.000000	54.0
22891.500000	54.0

Note: Emission level= Original Receiver Reading + Correct Factor
Correct Factor = Antenna Factor + Cable Loss -Amplifier gain

11 Test Equipment List

List of Test Instruments
Test Site1

	DESCRIPTION	MANUFACTURER	MODEL NO.	SERIAL NO.	CAL. DATE	CAL. DUE DATE
C	Spectrum analyzer	Rohde & Schwarz	FSV3044	487/642307	2025-3-13	2026-3-12
	RF Test System	Rohde & Schwarz	TS8997	487/391835	2024-11-23	2025-11-22
	Coaxial Cable	Rohde & Schwarz	RF03	/	2024-7-27	2025-7-26
RE	EMI Test Receiver	Rohde & Schwarz	ESR3	487/632314	2025-3-13	2026-3-12
	Signal Analyzer	Rohde & Schwarz	FSV40	487/641405	2024-4-8 2025-3-31	2025-4-7 2026-3-30
	Broadband Test Antenna	Schwarzbeck	VULB 9168	487/622345	2025-3-14	2026-3-13
	Horn Antenna	Rohde & Schwarz	3115PB	487/622346	2025-1-8	2026-1-7
	Pre-amplifier	Rohde & Schwarz	SCU-18F	487/402318	2025-3-13	2026-3-12
	Pre-amplifier	BONN	BLMA0118-1M	487/401411	2025-3-13	2026-3-12
	Loop antenna	Rohde & Schwarz	HFH2-Z2	487/621128	2024-11-23	2025-11-22
	DOUBLE-RIDGED WAVEGUIDE HORN WITH PRE-AMPLIFIER (18 GHZ - 40 GHZ)	ETS-Lindgren	3116C-PA	487/622347	2024-8-19	2025-8-18
	3m Semi anechoic chamber	TDK	9.2m×6.2m×6.2m	487/772307	2023-2-24	2026-2-23
	3m Fully anechoic chamber	TDK	9.2m×6.2m×6.2m	487/772304	2023-3-30	2026-3-29
	Coaxial Cable	Rohde & Schwarz	RF02	/	2024-7-27	2025-7-26
CE	EMI Test Receiver	Rohde & Schwarz	ESW8	487/631911	2025-3-13	2026-3-12
	LISN	Rohde & Schwarz	NSLK8127	487/601428	2024-9-2	2025-9-1

Measurement Software Information			
Test Item	Software	Manufacturer	Version
C	MTS 8310	MAXWELL	2.0.0.0
RE	EMC 32	Rohde & Schwarz	V10.60.20
CE	EMC 32	Rohde & Schwarz	V10.60.20

C - Conducted RF tests

- Conducted peak output power
- 6dB bandwidth and 99% Occupied Bandwidth
- Power spectral density*
- Spurious RF conducted emissions
- Band edge

12 System Measurement Uncertainty

For a 95% confidence level, the measurement expanded uncertainties for defined systems, in accordance with the recommendations of ISO 17025 were:

System Measurement Uncertainty	
Test Items	Extended Uncertainty
Conducted Disturbance at Mains Terminals	150kHz to 30MHz, LISN, 3.07dB
Uncertainty for Radiated Emission in 3m Semi anechoic chamber 9kHz-30MHz	4.38dB
Uncertainty for Radiated Emission in 3m Semi anechoic chamber 30MHz-1000MHz	Horizontal: 4.12dB Vertical: 4.30dB
Uncertainty for Radiated Emission in 3m Fully anechoic chamber 1000MHz-18000MHz	5.04dB
Uncertainty for Radiated Emission 18000MHz-40000MHz	5.42dB
Uncertainty for Conducted RF test	RF Power Conducted: 1.32dB Frequency test involved:1%

Measurement Uncertainty Decision Rule:

Determination of conformity with the specification limits is based on the decision rule according to IEC Guide 115: 2023, clause 4.3.3.



13 Photographs of Test Set-ups

Refer to the < Test Setup photos >.



14 Photographs of EUT

Refer to the < External Photos > & < Internal Photos >.

-----End of Test Report-----