APPLICATION CERTIFICATION FCC Part 15C
On Behalf of
LEEDARSON LIGHTING CO., LTD.

Multi-Protocol Gateway

Model No.: 6AA-GW-ZB-H0

FCC ID: 2AB2Q6AAGWZBH0

Prepared for	:	LEEDARSON LIGHTING CO., LTD.
Address	:	Xingda Road, Xingtai Industrial Zone, Changtai County, Zhangzhou, Fujian, China.
Prepared by	:	Shenzhen Accurate Technology Co., Ltd.
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Report No.	:	ATE20181350
Date of Test	:	June 05, 2018-June 14, 2018
Date of Report	:	June 23, 2018

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Description Page

Test Report Certification

Applicant	:	LEEDARSON LIGHTING CO., LTD.
Address	:	Xingda Road, Xingtai Industrial Zone, Changtai County, Zhangzhou, Fujian, China
Manufacturer	:	LEEDARSON LIGHTING CO., LTD.
Address	:	Xingda Road, Xingtai Industrial Zone, Changtai County, Zhangzhou, Fujian, China
Product	:	Multi-Protocol Gateway
Model No.	:	6AA-GW-ZB-H0
Trade name	:	n.a

Measurement Procedure Used:

FCC Rules and Regulations Part 15 Subpart C Section 15.247
ANSI C63.10: 2013

The EUT was tested according to DTS test procedure of Apr 05, 2017 KDB558074 D01 DTS Meas Guidance v04 for compliance to FCC 47CFR 15.247 requirements

The device described above is tested by SHENZHEN ACCURATE TECHNOLOGY CO., LTD to determine the maximum emission levels emanating from the device. The maximum emission levels are compared to the FCC Part 15 Subpart C Section 15.247 limits. The measurement results are contained in this test report and SHENZHEN ACCURATE TECHNOLOGY CO., LTD is assumed full responsibility for the accuracy and completeness of these measurements. Also, this report shows that the Equipment Under Test (EUT) is to be technically compliant with the FCC requirements.
This report applies to above tested sample only. This report shall not be reproduced in part without written approval of SHENZHEN ACCURATE TECHNOLOGY CO., LTD.

Date of Test : June 05, 2018-June 14, 2018
Date of Report: June 23, 2018

Prepared by : (Tim Zhang, Engineer)

Approved & Authorized Signer : (Sean Liu, Manager)

1. GENERAL INFORMATION

1.1.Description of Device (EUT)

EUT	:	Multi-Protocol Gateway
Model Number	:	6AA-GW-ZB-H0
Frequency Range	:	2405-2480MHz
Number of Channels	:	16
Antenna Gain	:	1dBi
Type of Antenna	:	PCB Antenna
Power Supply	:	DC 5V(Powered by Adapter)
Adapter information	:	Model: DSA-6PFG-05 FUS 050100 Input: AC100-240V 50/60Hz 0.2A Output: 5V⎓1A
Channel Spacing	:	5MHz
Modulation Type	:	O-QPSK
Applicant	:	LEEDARSON LIGHTING CO., LTD.
Address	:	Xingda Road, Xingtai Industrial Zone, Changtai County, Zhangzhou, Fujian, China.
Manufacturer	:	LEEDARSON LIGHTING CO., LTD.
Address	:	Xingda Road, Xingtai Industrial Zone, Changtai County, Zhangzhou, Fujian, China.
Date of sample received	:	June 05, 2018
Date of Test	:	June 05, 2018-June 14, 2018

1.2.Carrier Frequency of Channels

Channel	Freq.(MHz)	Channel	Freq.(MHz)
11	2405	19	2445
12	2410	20	2450
13	2415	21	2455
14	2420	22	2460
15	2425	23	2465
16	2430	24	2470
17	2435	25	2475
18	2440	26	2480

1.3.Accessory and Auxiliary Equipment

Notebook PC	Manufacturer: LENOVO M/N: ThinkPad X240 S/N: N/A
Zigbee Lamp	Manufacturer: LEEDARSON M/N: 7ZB-A806ST-Q1Z S/N: N/A
Wireless Router	Manufacturer: MERCURY M/N: MW323R S/N: N/A

1.4.Description of Test Facility

EMC Lab	:	Recognition of accreditation by Federal Communications Commission (FCC) The Designation Number is CN1189 The Registration Number is 708358 Listed by Innovation, Science and Economic Development Canada (ISEDC) The Registration Number is 5077A-2 Accredited by China National Accreditation Service for Conformity Assessment (CNAS) The Registration Number is CNAS L3193 Accredited by American Association for Laboratory Accreditation (A2LA) The Certificate Number is 4297.01
Name of Firm	:	Shenzhen Accurate Technology Co., Ltd
Site Location	:	1/F., Building A, Changyuan New Material Port, Science & Industry Park, Nanshan District, Shenzhen, Guangdong, P.R. China.

1.5.Measurement Uncertainty

Conducted Emission Expanded Uncertainty	=	2.23dB, k=2
Radiated emission expanded uncertainty (9kHz-30MHz)	=	3.08dB, k=2
Radiated emission expanded uncertainty (30MHz-1000MHz)	=	4.42dB, k=2
Radiated emission expanded uncertainty (Above 1GHz)	=	4.06dB, k=2

2. MEASURING DEVICE AND TEST EQUIPMENT

Table 1: List of Test and Measurement Equipment

Kind of equipment	Manufacturer	Type	S/N	Calibrated dates	Calibrated until
EMI Test Receiver	Rohde&Schwarz	ESCS30	100307	Jan. 06, 2018	1 Year
EMI Test Receiver	Rohde&Schwarz	ESPI3	101526/003	Jan. 06, 2018	1 Year
Spectrum Analyzer	Rohde&Schwarz	FSV-40	101495	Jan. 06, 2018	1 Year
Spectrum Analyzer	Agilent	E7405A	MY45115511	Jan. 06, 2018	1 Year
Pre-Amplifier	Rohde&Schwarz	CBLU1183540-01	3791	Jan. 06, 2018	1 Year
Loop Antenna	Schwarzbeck	FMZB1516	1516131	Jan. 06, 2018	1 Year
Bilog Antenna	Schwarzbeck	VULB9163	9163-323	Jan. 06, 2018	1 Year
Horn Antenna	Schwarzbeck	BBHA9120D	9120D-655	Jan. 06, 2018	1 Year
Horn Antenna	Schwarzbeck	BBHA9170	9170-359	Jan. 06, 2018	1 Year
Open Switch and Control Unit	Rohde&Schwarz	OSP120 + OSP-B157	101244 + 100866	Jan. 06, 2018	1 Year
LISN	Rohde&Schwarz	ESH3-Z5	100305	Jan. 06, 2018	1 Year
LISN	Schwarzbeck	NSLK8126	8126431	Jan. 06, 2018	1 Year
Highpass Filter	Wainwright Instruments	WHKX3.6/18G-10SS	N/A	Jan. 06, 2018	1 Year
Band Reject Filter	Wainwright Instruments	WRCG2400/2485-2375/2510-60/11SS	N/A	Jan. 06, 2018	1 Year

3. OPERATION OF EUT DURING TESTING

3.1.Operating Mode

The mode is used: **Transmitting mode**
Low Channel: 2405MHz
Middle Channel: 2445MHz
High Channel: 2480MHz

3.2.Configuration and peripherals

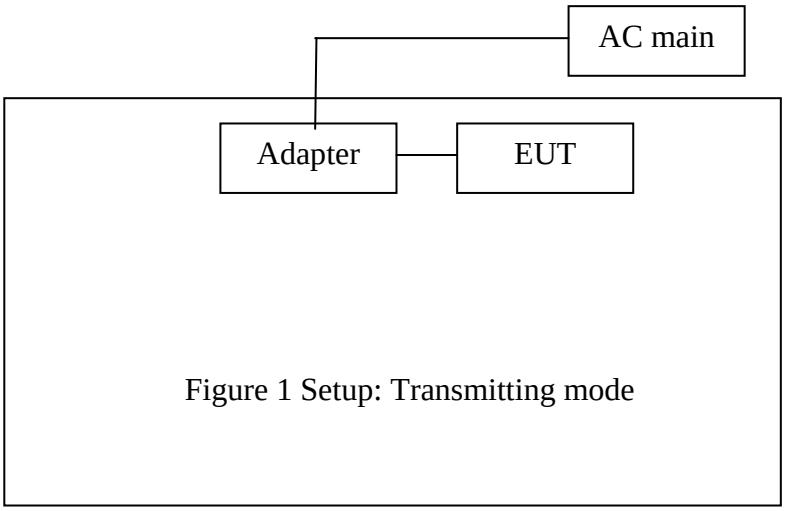


Figure 1 Setup: Transmitting mode

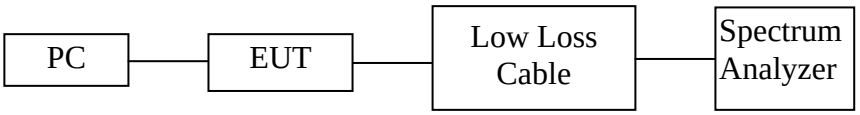
4. TEST PROCEDURES AND RESULTS

FCC Rules	Description of Test	Result
Section 15.207	Power Line Conducted Emission	Compliant
Section 15.247(a)(2)	6dB Bandwidth Test	Compliant
Section 15.247(d)	Conducted Spurious Emission Test	Compliant
KDB558074 D01 DTS Meas Guidance v04	OBW	Compliant
Section 15.247(e)	Power Spectral Density Test	Compliant
Section 15.247(b)(3)	Maximum Peak Output Power Test	Compliant
Section 15.247(d)	Band Edge Compliance Test	Compliant
Section 15.247(d) Section 15.209	Radiated Spurious Emission Test	Compliant
Section 15.203	Antenna Requirement	Compliant

Note: There are two kinds of shells (round and square shell) and two PCB board (one with the power key and the another is removed) for the product, and this does not affect testing, so we choose the round shell with power key as representative model to test .

5. 6DB BANDWIDTH MEASUREMENT

5.1.Block Diagram of Test Setup



5.2.The Requirement For Section 15.247(a)(2)

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

5.3.EUT Configuration on Measurement

The equipment are installed on the emission measurement to meet the commission requirements and operating regulations in a manner which tends to maximize its emission characteristics in normal application.

5.4.Operating Condition of EUT

5.4.1.Setup the EUT and simulator as shown as Section 5.1.

5.4.2.Turn on the power of all equipment.

5.4.3.Let the EUT work in TX modes and measure it. The transmit frequency is 2405-2480MHz. We select 2405MHz, 2445MHz and 2480MHz TX frequency to transmit.

5.5.Test Procedure

1. Set resolution bandwidth (RBW) = 100 kHz.
2. Set the video bandwidth (VBW) ≥ 3 x RBW.
3. Detector = Peak.
4. Trace mode = max hold.
5. Sweep = auto couple.
6. Allow the trace to stabilize.
7. Measure the maximum width of the emission that is constrained by the frequencies associated with the two outermost amplitude points (upper and lower) that are attenuated by 6 dB relative to the maximum level measured in the fundamental emission.

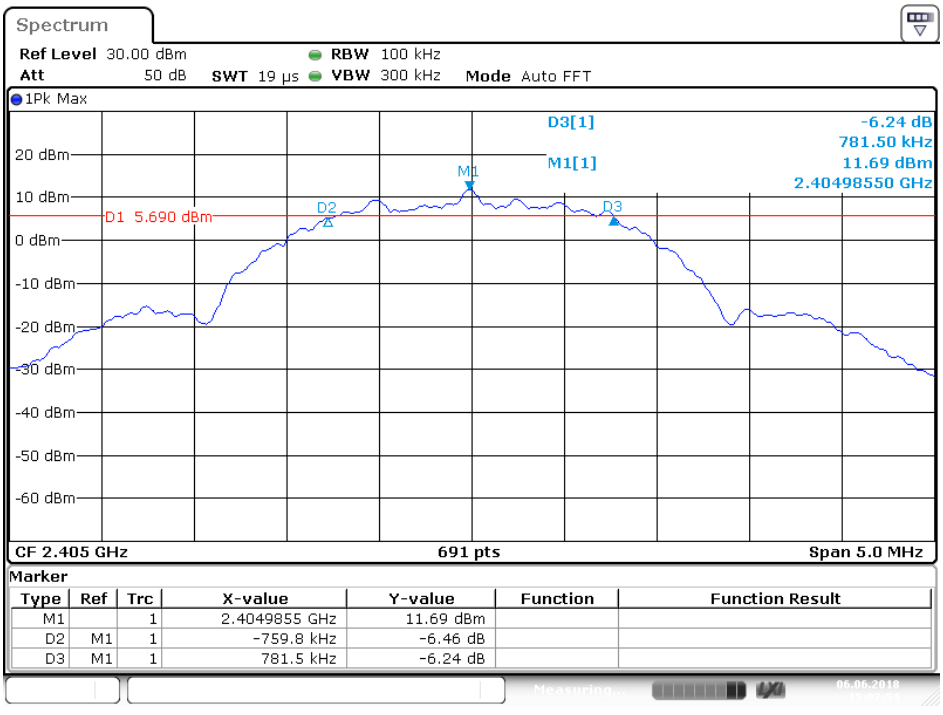
5.6.Test Result

Channel	Frequency (MHz)	6dB Bandwidth (MHz)	Limit (MHz)
Low	2405	1.5413	> 0.5MHz
Middle	2445	1.5557	> 0.5MHz
High	2480	1.5413	> 0.5MHz

The spectrum analyzer plots are attached as below.

6dB Bandwidth

Low Channel 2405MHz



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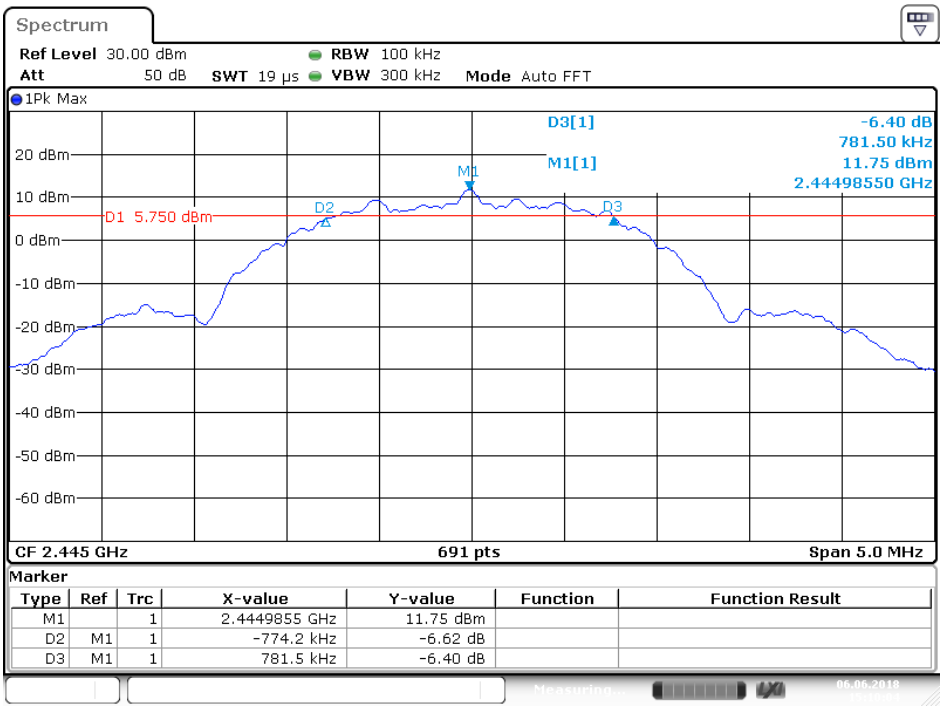
Middle Channel 2445MHz



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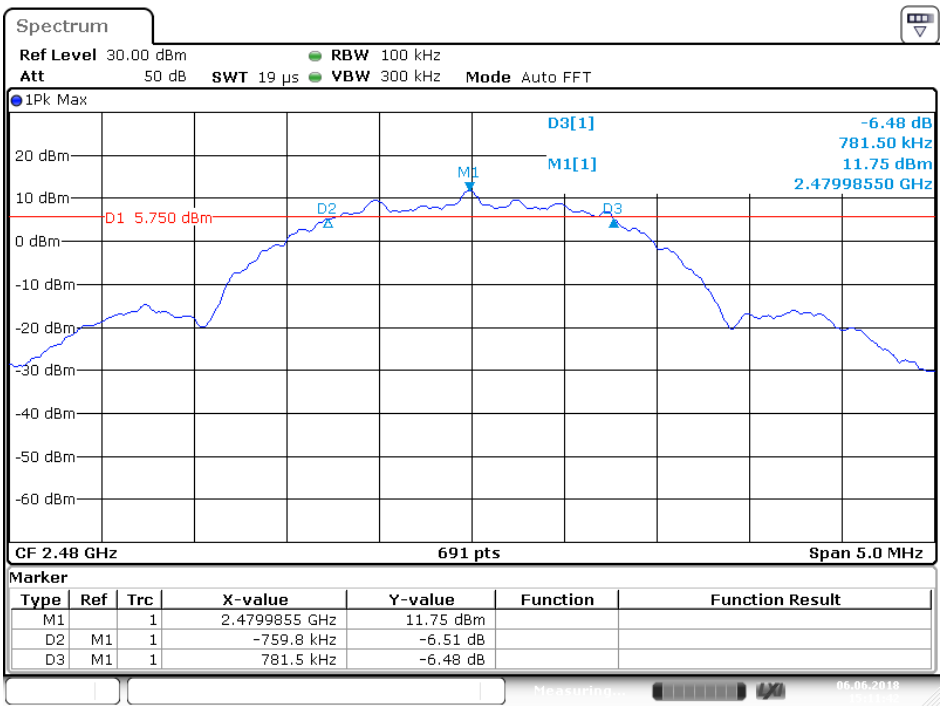
High Channel 2480MHz



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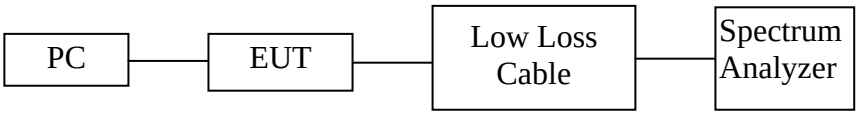
6. MAXIMUM CONDUCTED PEAK OUTPUT POWER

6.1.Block Diagram of Test Setup



6.2.The Requirement For Section 15.247(b)(3)

Section 15.247(b)(3): For systems using digital modulation in the 902-928MHz, 2400-2483.5MHz, and 5725-5850MHz bands: 1 Watt.

6.3.EUT Configuration on Measurement

The equipment is installed on the emission Measurement to meet the commission requirements and operating regulations in a manner which tends to maximize its emission characteristics in normal application.

6.4.Operating Condition of EUT

6.4.1.Setup the EUT and simulator as shown as Section 6.1.

6.4.2.Turn on the power of all equipment.

6.4.3.Let the EUT work in TX modes then measure it. The transmit frequency is 2405-2480MHz. We select 2405MHz, 2445MHz and 2480MHz TX frequency to transmit.

6.5.Test Procedure

6.5.1.The EUT was tested according to DTS test procedure of Apr 05, 2017 KDB5580 74 D01 DTS Meas Guidance v04 for compliance to FCC 47CFR 15.247 requirements.

6.5.2.The transmitter output was connected to the spectrum analyzer through a low loss cable.

6.5.3.Set RBW ≥ DTS bandwidth.

6.5.4.Set VBW ≥3 x RBW, VBW=10MHz.

6.5.5.Set span ≥3 x RBW, Span=10MHz.

6.5.6.Detector = peak.

6.5.7.Sweep time =auto couple.

6.5.8.Trace mode = max hold.

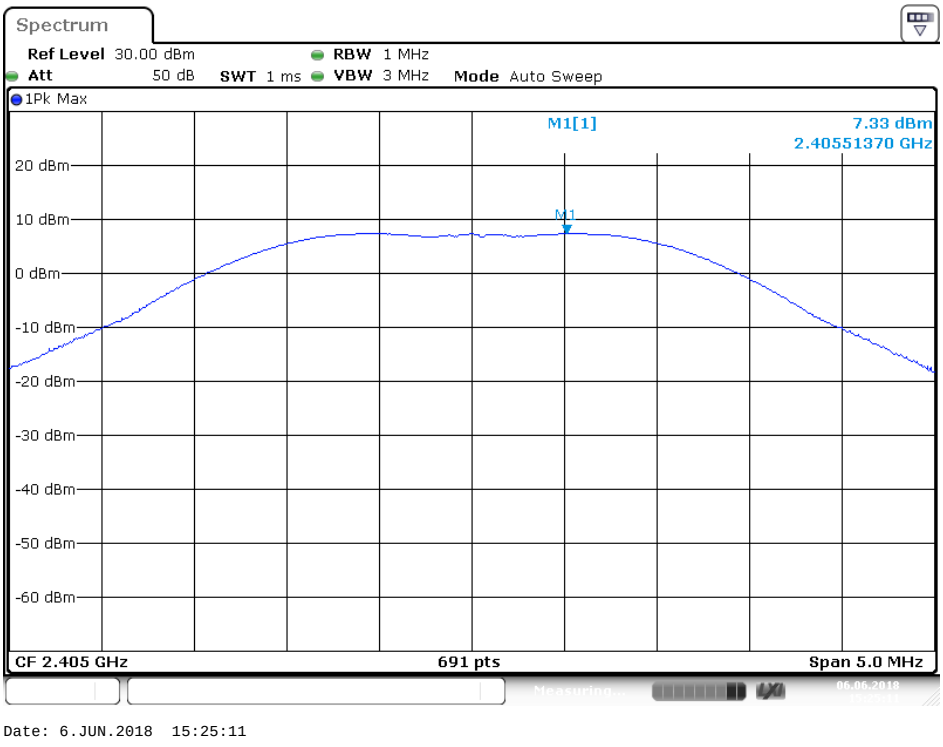
6.5.9.Allow trace to fully stability, Use peak marker function to determine the peak amplitude level.

6.6.Test Result

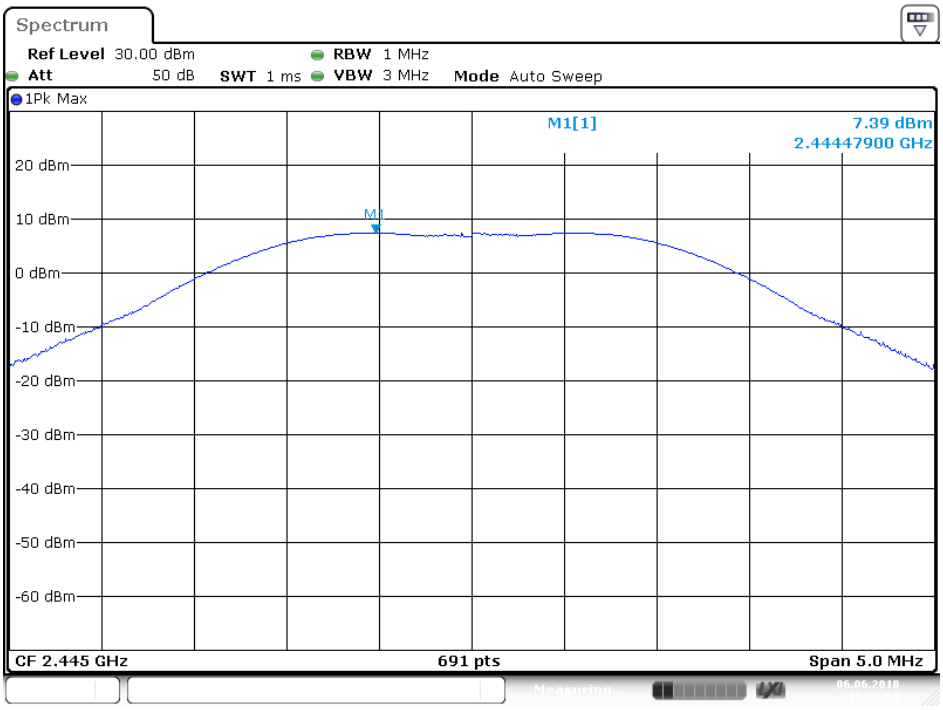
Channel	Frequency (MHz)	Peak Power Output (dBm)	Peak Power Limit (dBm)	Pass / Fail
Low	2405	7.33	30	PASS
Middle	2445	7.39	30	PASS
High	2480	7.40	30	PASS

The spectrum analyzer plots are attached as below.

Low Channel 2405MHz



Channel Middle 2445MHz



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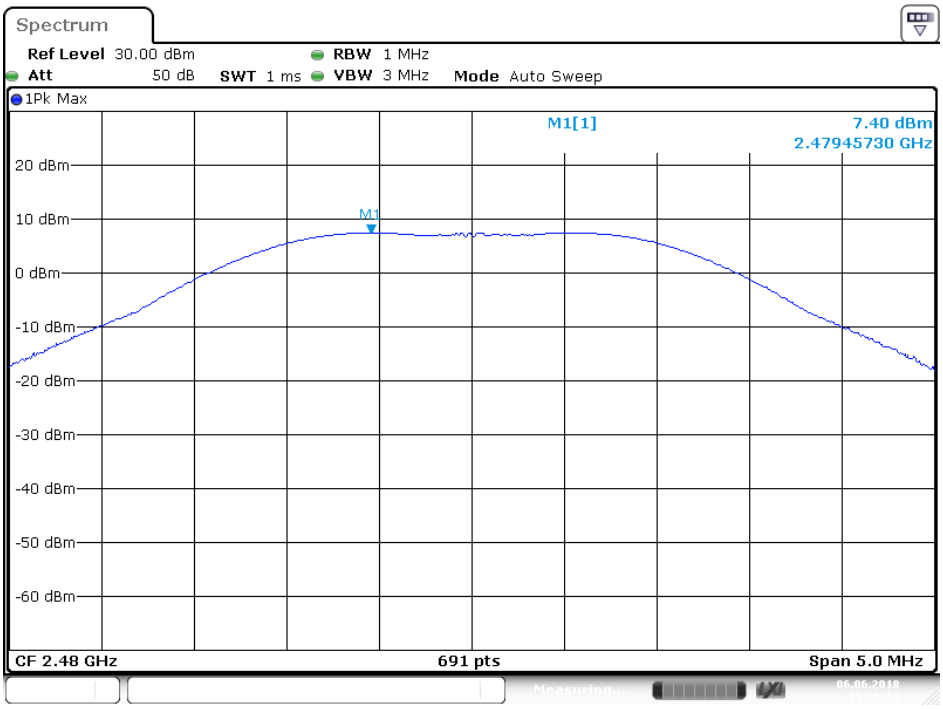
Channel High 2480MHz



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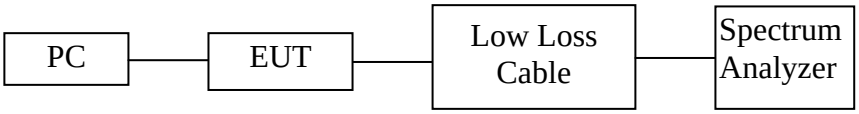
7. POWER SPECTRAL DENSITY MEASUREMENT

7.1.Block Diagram of Test Setup



7.2.The Requirement For Section 15.247(e)

Section 15.247(e): 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.

7.3.EUT Configuration on Measurement

The equipment are installed on the emission Measurement to meet the commission requirements and operating regulations in a manner which tends to maximize its emission characteristics in normal application.

7.4.Operating Condition of EUT

7.4.1.Setup the EUT and simulator as shown as Section 7.1.

7.4.2.Turn on the power of all equipment.

7.4.3.Let the EUT work in TX modes then measure it. The transmit frequency is 2405-2480MHz. We select 2405MHz, 2445MHz and 2480MHz TX frequency to transmit.

7.5.Test Procedure

7.5.1.The transmitter output was connected to the spectrum analyzer through a low loss cable.

7.5.2.Measurement Procedure PKPSD:

7.5.3.This procedure must be used if maximum peak conducted output power was used to demonstrate compliance to the fundamental output power limit, and is optional if the maximum (average) conducted output power was used to demonstrate compliance.

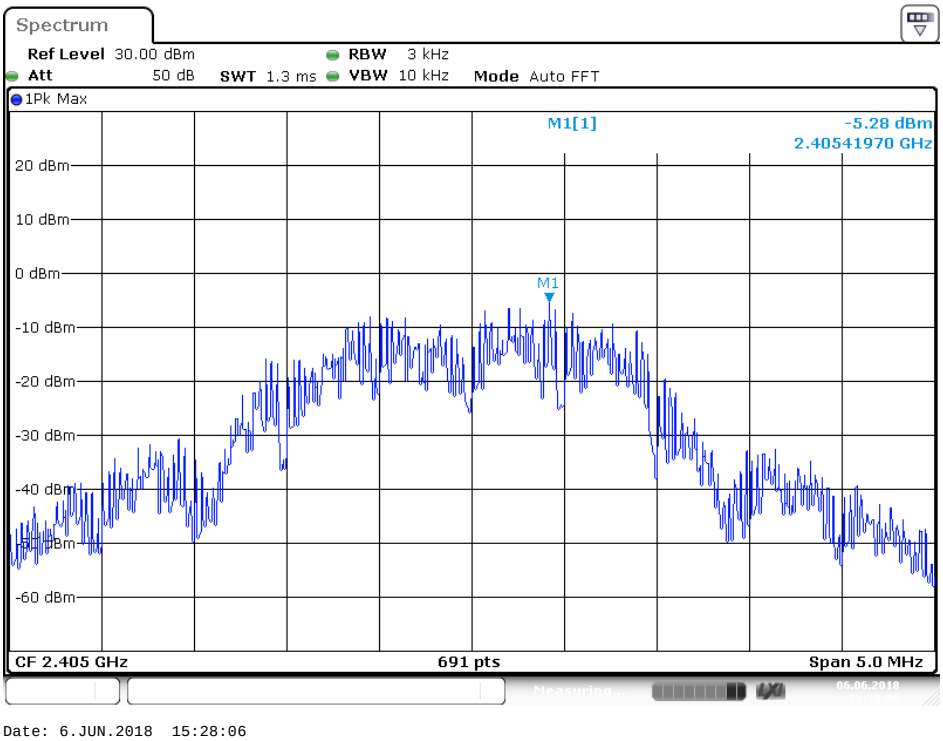
1. Set analyzer center frequency to DTS channel center frequency.
2. Set the span to 1.5 times the DTS channel bandwidth.
3. Set the RBW to: 3 kHz ≤ RBW ≤ 100 kHz.
4. Set the VBW ≥ 3 x RBW.
5. Detector = peak.
6. Sweep time = auto couple.
7. Trace mode = max hold.
8. Allow trace to fully stabilize.
9. Use the peak marker function to determine the maximum amplitude level.
10. If measured value exceeds limit, reduce RBW (no less than 3kHz) and repeat.

7.6.Test Result

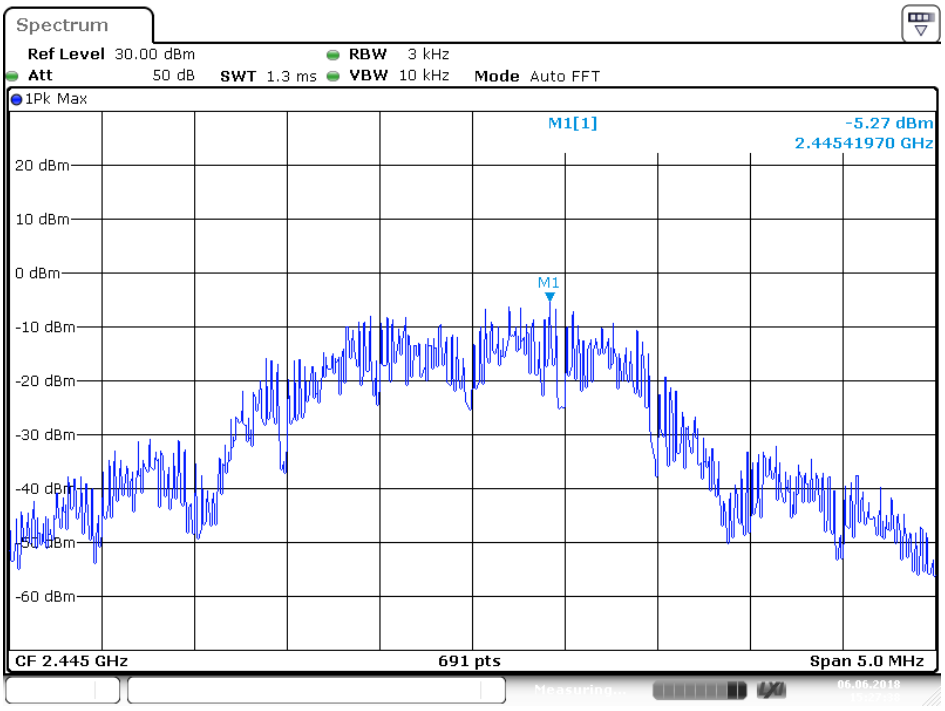
CHANNEL NUMBER	FREQUENCY (MHz)	PSD (dBm/3kHz)	LIMIT (dBm/3kHz)	PASS/FAIL
Low	2405	-5.28	8	PASS
Middle	2445	-5.27	8	PASS
High	2480	-5.34	8	PASS

The spectrum analyzer plots are attached as below.

Low channel



Middle channel



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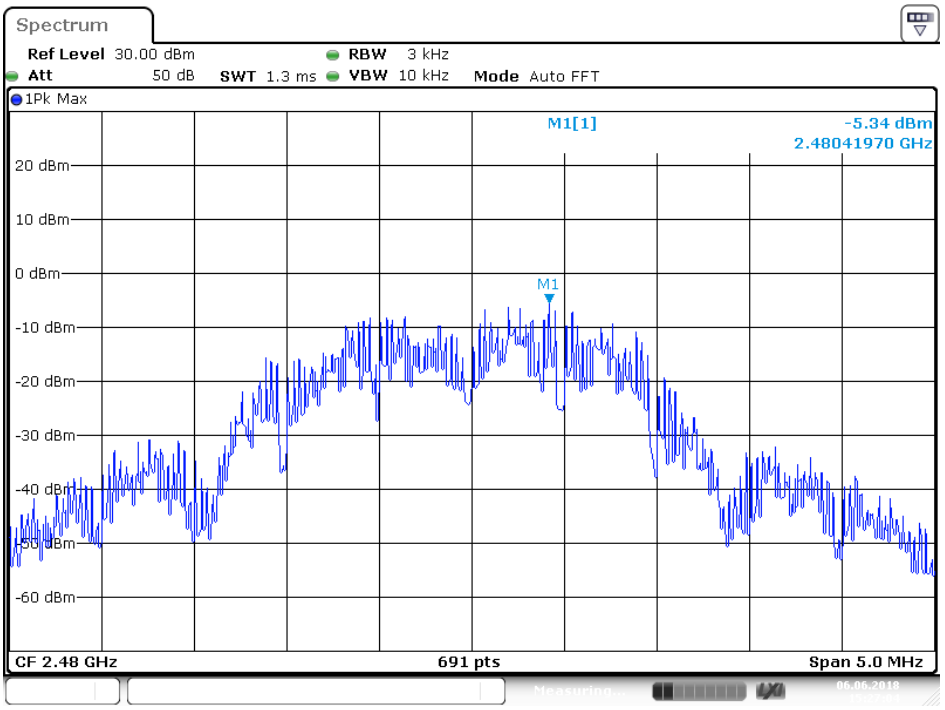
High channel



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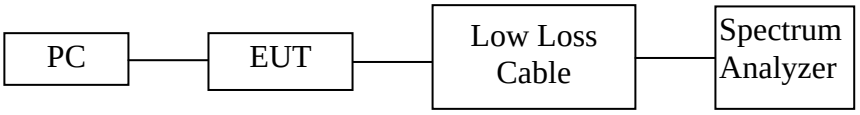
8. BAND EDGE COMPLIANCE TEST

8.1.Block Diagram of Test Setup



8.2.The Requirement For Section 15.247(d)

Section 15.247(d): 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. If the transmitter complies with the conducted power limits based on the use of RMS averaging over a time interval, as permitted under paragraph (b)(3) of this section, the attenuation required under this paragraph shall be 30 dB instead of 20 dB. Attenuation below the general limits specified in Section 15.209(a) is not required. In addition, radiated emissions which fall in the restricted bands, as defined in Section 15.205(a), must also comply with the radiated emission limits specified in Section 15.209(a).

8.3.EUT Configuration on Measurement

The equipment are installed on the emission Measurement to meet the commission requirements and operating regulations in a manner which tends to maximize its emission characteristics in normal application.

8.4.Operating Condition of EUT

8.4.1.Setup the EUT and simulator as shown as Section 8.1.

8.4.2.Turn on the power of all equipment.

8.4.3.Let the EUT work in TX modes then measure it. The transmit frequency is 2405-2480MHz. We select 2405MHz, 2445MHz and 2480MHz TX frequency to transmit.

8.5.Test Procedure

Conducted Band Edge:

8.5.1.The transmitter output was connected to the spectrum analyzer via a low loss cable.

8.5.2.Set RBW of spectrum analyzer to 100kHz and VBW to 300kHz.

Radiate Band Edge:

8.5.3.The EUT is placed on a turntable, which is 1.5m above the ground plane and worked at highest radiated power.

8.5.4.The turntable was rotated for 360 degrees to determine the position of maximum emission level.

8.5.5.EUT is set 3m away from the receiving antenna, which is varied from 1m to 4m to find out the highest emission.

8.5.6.Set the spectrum analyzer in the following setting in order to capture the lower and upper band-edges of the emission:

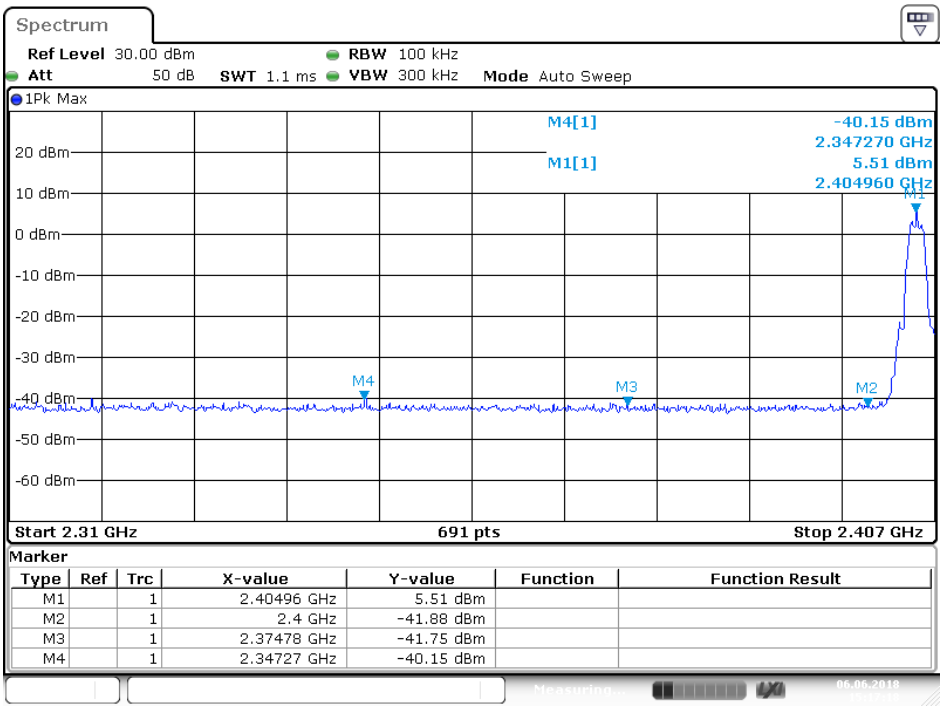
8.5.7.RBW=1MHz, VBW=1MHz

8.5.8.The band edges was measured and recorded.

8.6.Test Result

Frequency (MHz)	Result of Band Edge (dBc)	Limit of Band Edge (dBc)
2347.27	45.66	> 20dBc
2483.5	47.74	> 20dBc

Low Channel 2405MHz



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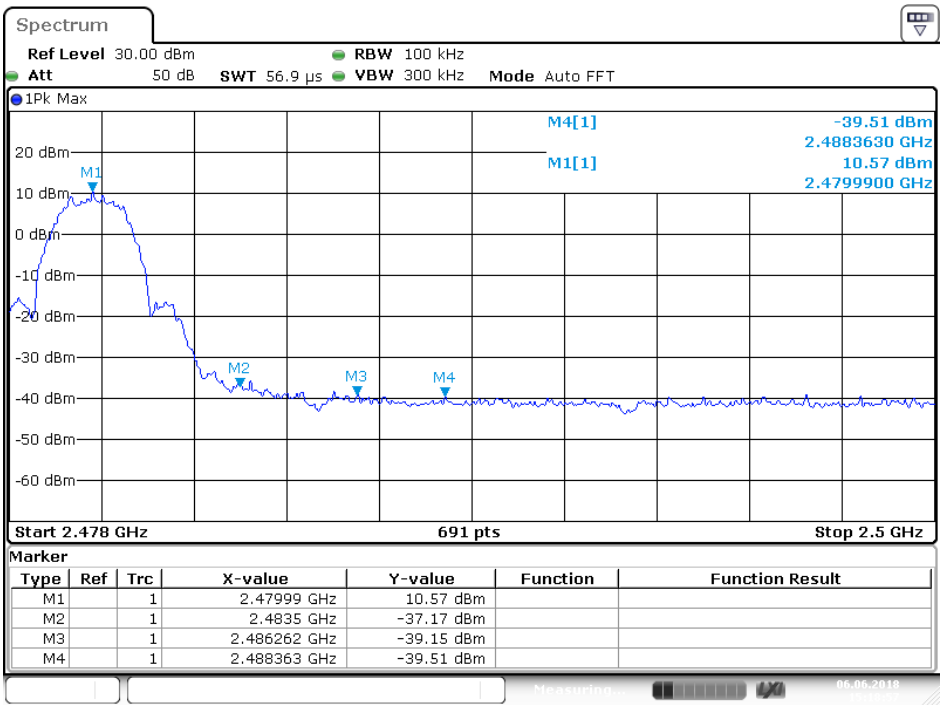
High Channel 2480MHz



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Radiated Band Edge Result

Note:

1. Emissions attenuated more than 20 dB below the permissible value are not reported.
2. The field strength is calculated by adding the antenna factor, high pass filter loss(if used) and cable loss, and subtracting the amplifier gain(if any)from the measured reading. The basic equation calculation is as follows:

   Result = Reading + Corrected Factor
3. Display the measurement of peak values.

Test Procedure:

The EUT and its simulators are placed on a turntable, which is 1.5 meter high above ground(Above 1GHz). The turntable can rotate 360 degrees to determine the position of the maximum emission level. EUT is set 3.0 meters away from the receiving antenna, which is mounted on an antenna tower. The antenna can be moved up and down between 1.0 meter and 4 meters to find out the maximum emission level. Broadband antenna (calibrated bi-log antenna) is used as receiving antenna. Both horizontal and vertical polarizations of the antenna are set on measurement. In order to find the maximum emission levels, all of the EUT location must be manipulated according to ANSI C63.10:2013 on radiated emission measurement. The EUT was tested in 3 orthogonal planes.

Let the EUT work in TX modes then measure it.
We select 2405MHz, 2480MHz TX frequency to transmit.

During the radiated emission test, the spectrum analyzer was set with the following configurations:
1.The resolution bandwidth of test receiver/spectrum analyzer is 1MHz and video bandwidth is 3MHz for peak measurement with peak detector at frequency above 1GHz.
2.The resolution bandwidth of test receiver/spectrum analyzer is 1MHz and video bandwidth is 10Hz for Average measurement with peak detection at frequency above 1GHz.
3.All modes of operation were investigated and the worst-case emissions are reported.

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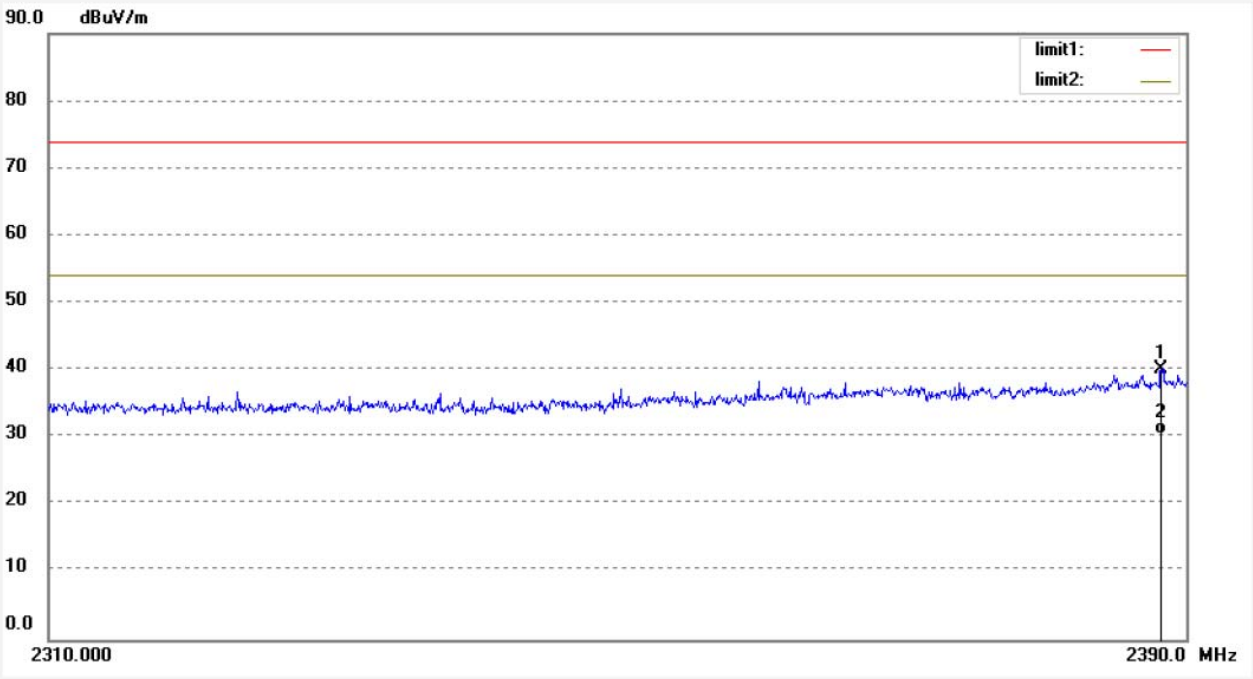
Job No.: LGW2018 #1351	Polarization: Horizontal
Standard: FCC (Band Edge)	Power Source: AC 120V/60Hz
Test item: Radiation Test	Date: 18/06/06/
Temp.(C)/Hum.(%) 23 C / 48 %	Time:
EUT: Multi-Protocol Gateway	Engineer Signature: WADE
Mode: TX 2405MHz	Distance: 3m
Model: 6AA-GW-ZB-H0	
Manufacturer: Leedarson	

Note:



No.	Freq. (MHz)	Reading (dBuV/m)	Factor (dB)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Detector	Height (cm)	Degree (deg.)	Remark
1	2388.240	39.43	0.78	40.21	74.00	-33.79	peak			
2	2388.240	29.73	0.78	30.51	54.00	-23.49	AVG			

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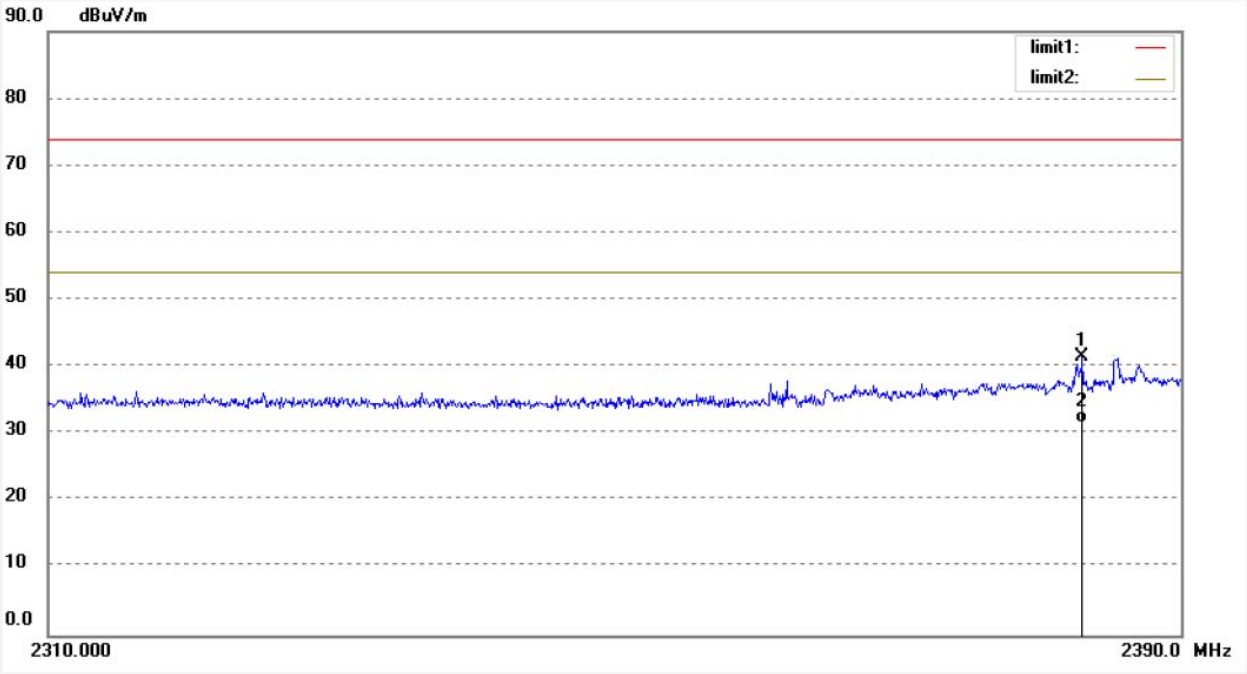
Site: 2# Chamber
Tel:+86-0755-26503290
Fax:+86-0755-26503396

Job No.: LGW2018 #1350	Polarization: Vertical
Standard: FCC (Band Edge)	Power Source: AC 120V/60Hz
Test item: Radiation Test	Date: 18/06/06/
Temp.(C)/Hum.(%) 23 C / 48 %	Time:
EUT: Multi-Protocol Gateway	Engineer Signature: WADE
Mode: TX 2405MHz	Distance: 3m
Model: 6AA-GW-ZB-H0	
Manufacturer: Leedarson	

Note:



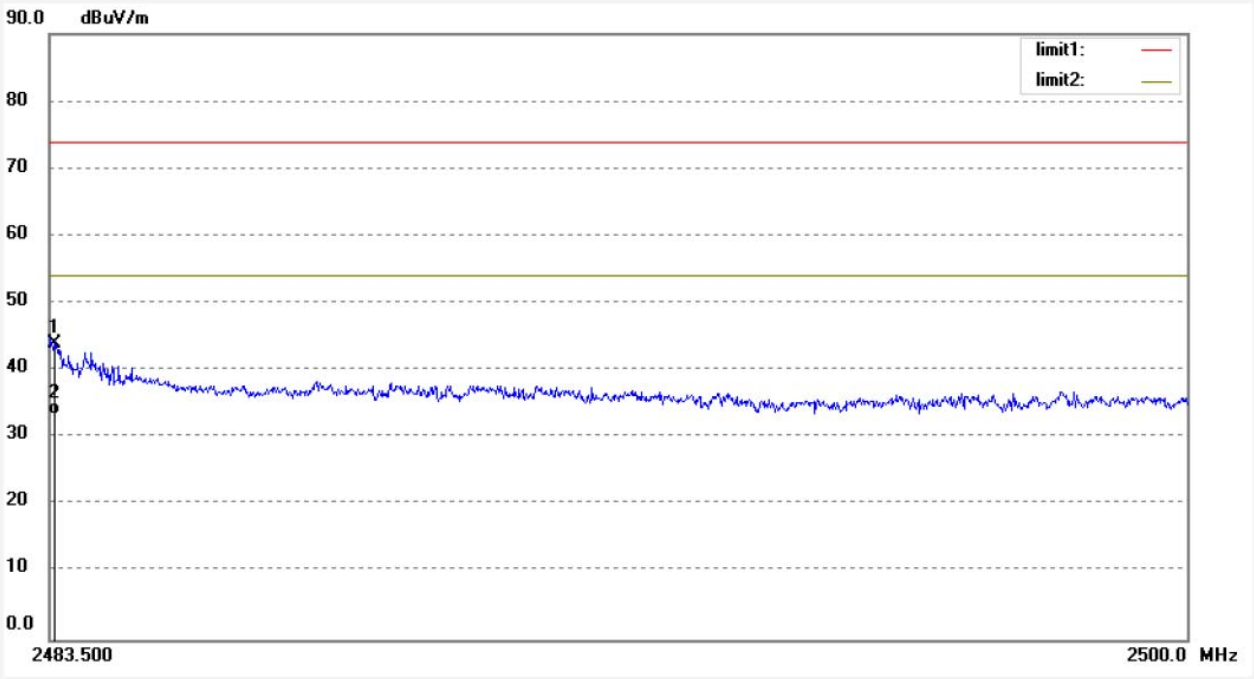
No.	Freq. (MHz)	Reading (dBuV/m)	Factor (dB)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Detector	Height (cm)	Degree (deg.)	Remark
1	2382.960	40.87	0.74	41.61	74.00	-32.39	peak			
2	2382.960	30.78	0.74	31.52	54.00	-22.48	AVG			

ACCURATE TECHNOLOGY CO., LTD.
F1,Bldg,A,Changyuan New Material Port Keyuan Rd,
Science & Industry Park,Nanshan Shenzhen,P.R.China

Site: 2# Chamber
Tel:+86-0755-26503290
Fax:+86-0755-26503396

Job No.: LGW2018 #1356	Polarization: Horizontal
Standard: FCC (Band Edge)	Power Source: AC 120V/60Hz
Test item: Radiation Test	Date: 18/06/06/
Temp.(C)/Hum.(%) 23 C / 48 %	Time:
EUT: Multi-Protocol Gateway	Engineer Signature: WADE
Mode: TX 2480MHz	Distance: 3m
Model: 6AA-GW-ZB-H0	
Manufacturer: Leedarson	

Note:

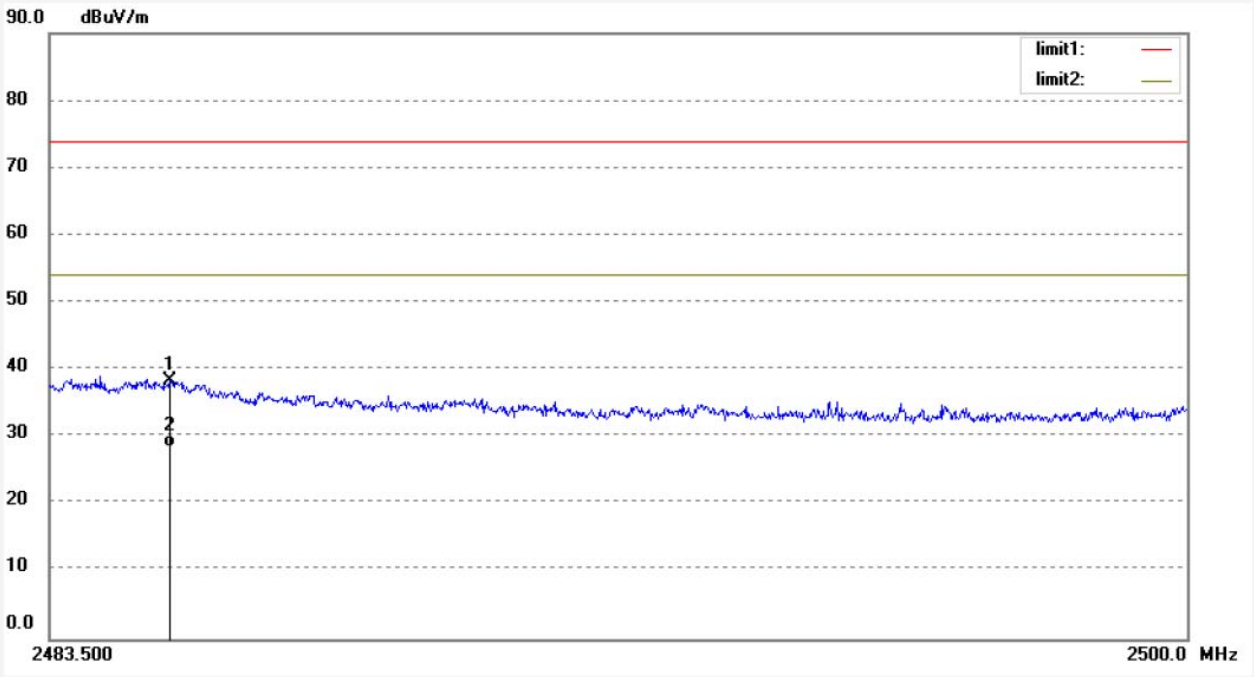


No.	Freq. (MHz)	Reading (dBuV/m)	Factor (dB)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Detector	Height (cm)	Degree (deg.)	Remark
1	2483.582	42.85	1.10	43.95	74.00	-30.05	peak			
2	2483.582	32.37	1.10	33.47	54.00	-20.53	AVG			

ACCURATE TECHNOLOGY CO., LTD.
F1,Bldg,A,Changyuan New Material Port Keyuan Rd,
Science & Industry Park,Nanshan Shenzhen,P.R.China
Site: 2# Chamber
Tel:+86-0755-26503290
Fax:+86-0755-26503396

Job No.: LGW2018 #1357	Polarization: Vertical
Standard: FCC (Band Edge)	Power Source: AC 120V/60Hz
Test item: Radiation Test	Date: 18/06/06/
Temp.(C)/Hum.(%) 23 C / 48 %	Time:
EUT: Multi-Protocol Gateway	Engineer Signature: WADE
Mode: TX 2480MHz	Distance: 3m
Model: 6AA-GW-ZB-H0	
Manufacturer: Leedarson	

Note:



No.	Freq. (MHz)	Reading (dBuV/m)	Factor (dB)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Detector	Height (cm)	Degree (deg.)	Remark
1	2485.249	37.28	1.10	38.38	74.00	-35.62	peak			
2	2485.249	27.25	1.10	28.35	54.00	-25.65	AVG			

9. RADIATED SPURIOUS EMISSION TEST

9.1.Block Diagram of Test Setup

9.1.1.Block diagram of connection between the EUT and peripherals

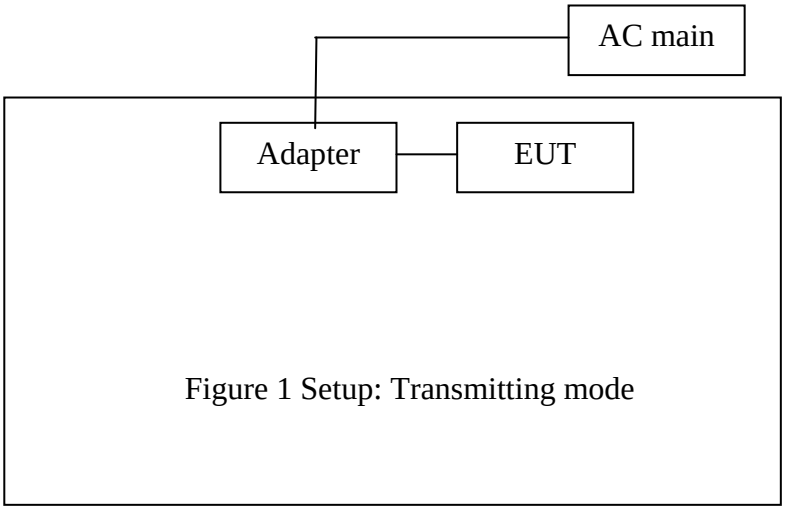
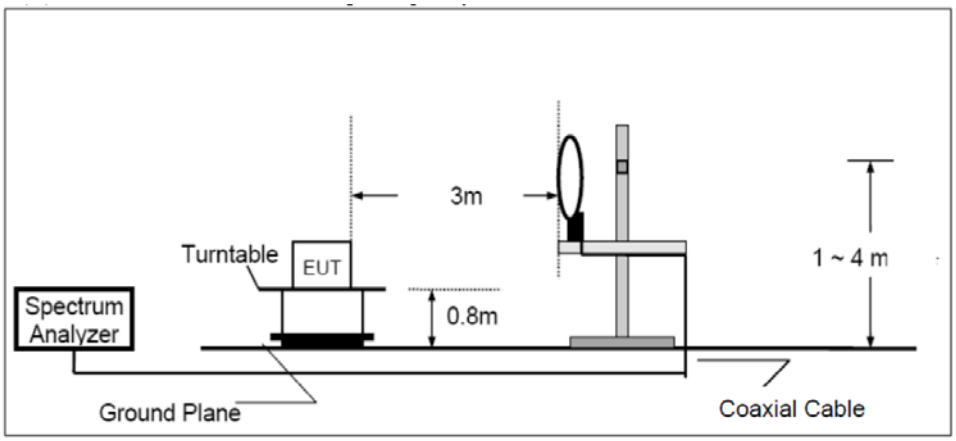


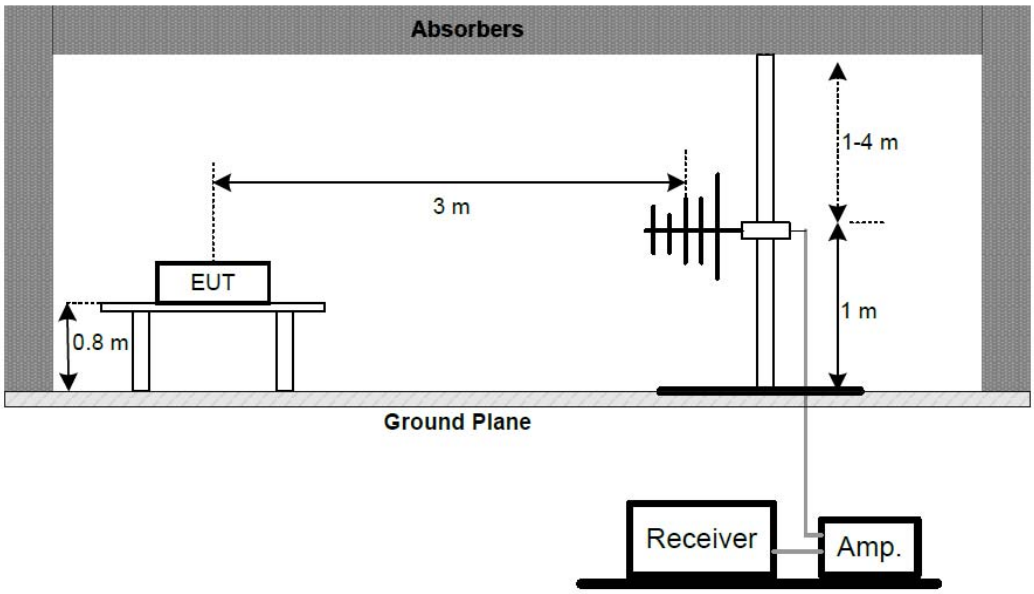
Figure 1 Setup: Transmitting mode

9.1.2.Semi-Anechoic Chamber Test Setup Diagram

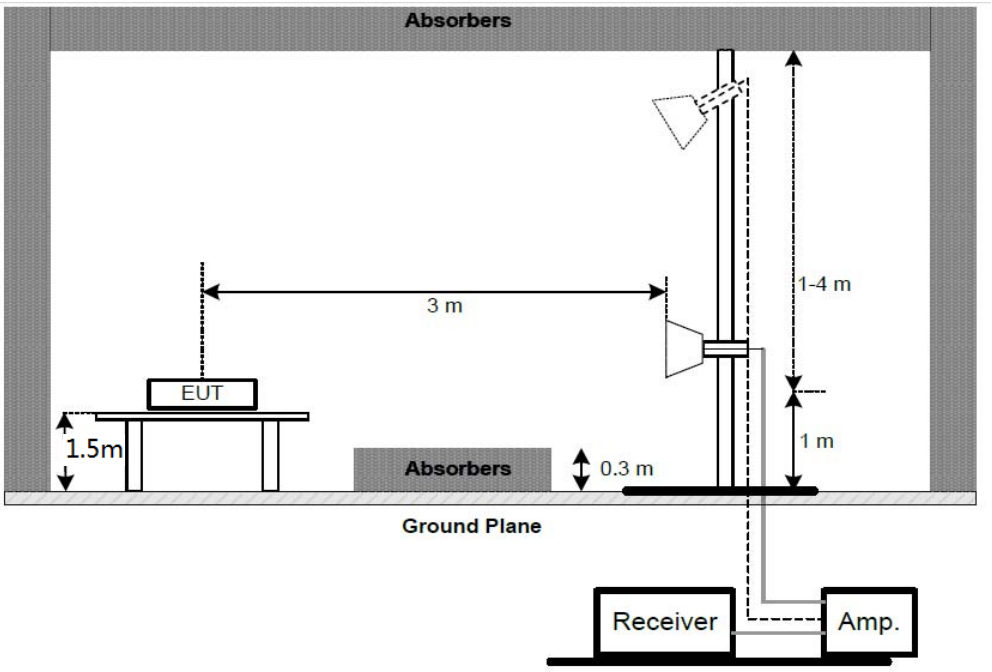
(A) Radiated Emission Test Set-Up, Frequency below 30MHz



(B) Radiated Emission Test Set-Up, Frequency below 1GHz



(C) Radiated Emission Test Set-Up, Frequency above 1GHz



9.2.The Limit For Section 15.247(d)

Section 15.247(d): 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. If the transmitter complies with the conducted power limits based on the use of RMS averaging over a time interval, as permitted under paragraph (b)(3) of this section, the attenuation required under this paragraph shall be 30 dB instead of 20 dB. Attenuation below the general limits specified in Section 15.209(a) is not required. In addition, radiated emissions which fall in the restricted bands, as defined in Section 15.205(a), must also comply with the radiated emission limits specified in Section 15.209(a).

9.3.Restricted bands of operation

9.3.1.FCC Part 15.205 Restricted bands of operation

(a) Except as shown in paragraph (d) of this section, Only spurious emissions are permitted in any of the frequency bands listed below:

MHz	MHz	MHz	GHz
0.090-0.110	16.42-16.423	399.9-410	4.5-5.15
[1]0.495-0.505	16.69475-16.69525	608-614	5.35-5.46
2.1735-2.1905	16.80425-16.80475	960-1240	7.25-7.75
4.125-4.128	25.5-25.67	1300-1427	8.025-8.5
4.17725-4.17775	37.5-38.25	1435-1626.5	9.0-9.2
4.20725-4.20775	73-74.6	1645.5-1646.5	9.3-9.5
6.215-6.218	74.8-75.2	1660-1710	10.6-12.7
6.26775-6.26825	108-121.94	1718.8-1722.2	13.25-13.4
6.31175-6.31225	123-138	2200-2300	14.47-14.5
8.291-8.294	149.9-150.05	2310-2390	15.35-16.2
8.362-8.366	156.52475-156.52525	2483.5-2500	17.7-21.4
8.37625-8.38675	156.7-156.9	2690-2900	22.01-23.12
8.41425-8.41475	162.0125-167.17	3260-3267	23.6-24.0
12.29-12.293	167.72-173.2	3332-3339	31.2-31.8
12.51975-12.52025	240-285	3345.8-3358	36.43-36.5
12.57675-12.57725	322-335.4	3600-4400	([2])
13.36-13.41			

[1]Until February 1, 1999, this restricted band shall be 0.490-0.510
[2]Above 38.6

(b) Except as provided in paragraphs (d) and (e), the field strength of emission appearing within these frequency bands shall not exceed the limits shown in Section 15.209. At frequencies equal to or less than 1000MHz, Compliance with the limits in Section 15.209 shall be demonstrated using measurement instrumentation employing a CISPR quasi-peak detector. Above 1000MHz, compliance with the emission limits in Section15.209 shall be demonstrated based on the average value of the measured emissions. The provisions in Section

15.35 apply to these measurements.

9.4. Configuration of EUT on Measurement

The equipment are installed on Radiated Emission Measurement to meet the commission requirements and operating regulations in a manner which tends to maximize its emission characteristics in normal application.

9.5. Operating Condition of EUT

9.5.1. Setup the EUT and simulator as shown as Section 9.1.

9.5.2. Turn on the power of all equipment.

9.5.3. Let the EUT work in TX modes measure it. The transmit frequency is 2405-2480MHz. We select 2405MHz, 2445MHz and 2480MHz TX frequency to transmit.

9.6. Test Procedure

The EUT and its simulators are placed on a turntable, which is 0.8 meter high above ground(Below 1GHz). The EUT and its simulators are placed on a turntable, which is 1.5 meter high above ground(Above 1GHz). The turntable can rotate 360 degrees to determine the position of the maximum emission level. EUT is set 3.0 meters away from the receiving antenna, which is mounted on an antenna tower. The antenna can be moved up and down between 1.0 meter and 4 meters to find out the maximum emission level. Broadband antenna (calibrated bi-log antenna) is used as receiving antenna. Both horizontal and vertical polarizations of the antenna are set on measurement. In order to find the maximum emission levels, all of the EUT location must be manipulated according to ANSI C63.10:2013 on radiated emission measurement. The EUT was tested in 3 orthogonal planes.

The frequency range from 30MHz to 25000MHz is checked.
Result = Reading + Corrected Factor
Where Corrected Factor = Antenna Factor + Cable Loss – Amplifier Gain
During the radiated emission test, the spectrum analyzer was set with the following configurations:

1. The resolution bandwidth and video bandwidth of test receiver/spectrum analyzer is 120kHz for Quasi-peak at frequency below 1GHz.
2. The resolution bandwidth of test receiver/spectrum analyzer is 1MHz and video bandwidth is 3MHz for peak measurement with peak detector at frequency above 1GHz.
3. The resolution bandwidth of test receiver/spectrum analyzer is 1MHz and video bandwidth is 10Hz for Average measurement with peak detection at frequency above 1GHz.
4. All modes of operation were investigated and the worst-case emissions are reported.

9.7.The Field Strength of Radiation Emission Measurement Results

Note: 1. Emissions attenuated more than 20 dB below the permissible value are not reported.

2. *: Denotes restricted band of operation.

3. The EUT is tested radiation emission at each test mode in three axes. The worst emissions are reported in all test mode.

4. The ZigBee, Z-Wave and wifi can transmitting simultaneously and we tested simultaneously mode only the worse case were recorded.

9kHz-30MHz

ACCURATE TECHNOLOGY CO.,LTD

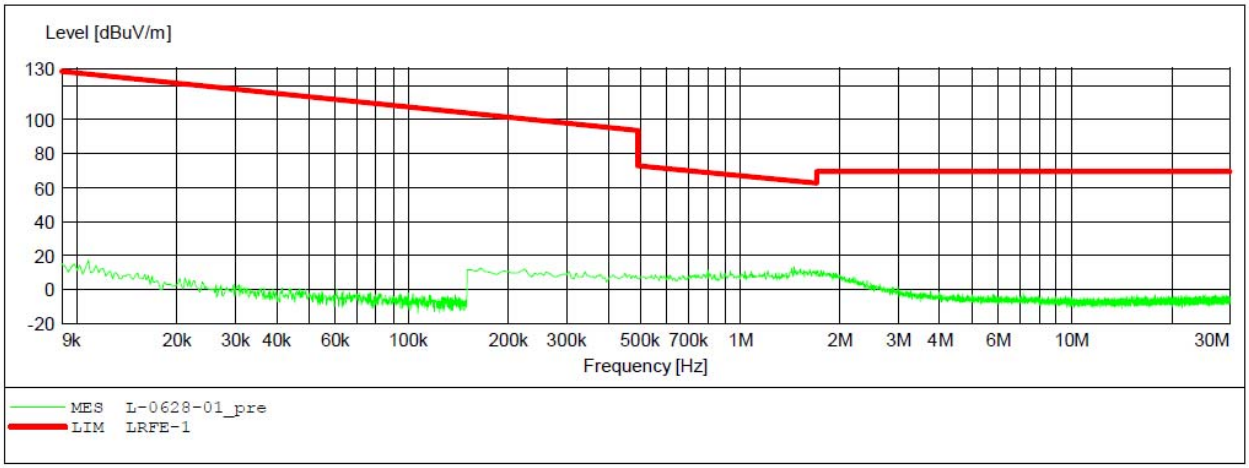
FCC Class B 3m Radiated

EUT: Multi-Protocol Gateway M/N:6AA-GW-ZB-H0
Manufacturer:
Operating Condition: TX 2405MHz
Test Site: 2# Chamber
Operator: WADE
Test Specification: AC 120V/60Hz
Comment: X

SCAN TABLE: "LFRE Fin"

Short Description: SUB STD VTERM2 1.70

Start Frequency	Stop Frequency	Step Width	Detector	Meas. Time	IF Bandw.	Transducer
9.0 kHz	150.0 kHz	100.0 Hz	QuasiPeak	1.0 s	200 Hz	1516M
150.0 kHz	30.0 MHz	5.0 kHz	QuasiPeak	1.0 s	9 kHz	1516M



ACCURATE TECHNOLOGY CO.,LTD

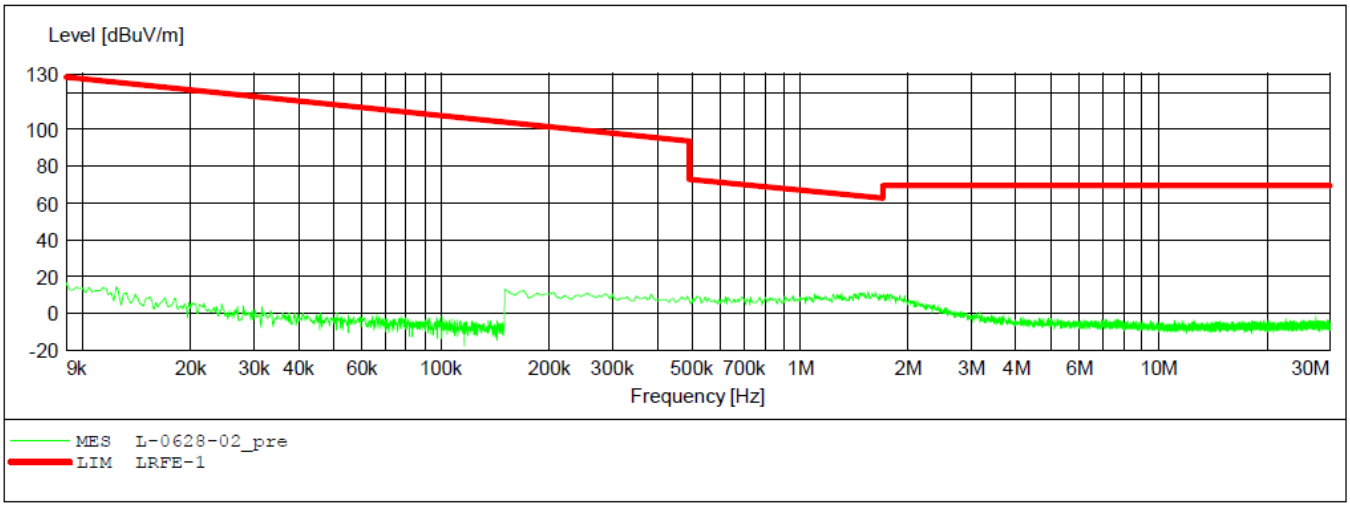
FCC Class B 3m Radiated

EUT: Multi-Protocol Gateway M/N:6AA-GW-ZB-H0
Manufacturer:
Operating Condition: TX 2405MHz
Test Site: 2# Chamber
Operator: WADE
Test Specification: AC 120V/60Hz
Comment: Y

SCAN TABLE: "LFRE Fin"

Short Description: SUB STD VTERM2 1.70

Start Frequency	Stop Frequency	Step Width	Detector	Meas. Time	IF Bandw.	Transducer
9.0 kHz	150.0 kHz	100.0 Hz	QuasiPeak	1.0 s	200 Hz	1516M
150.0 kHz	30.0 MHz	5.0 kHz	QuasiPeak	1.0 s	9 kHz	1516M



ACCURATE TECHNOLOGY CO.,LTD

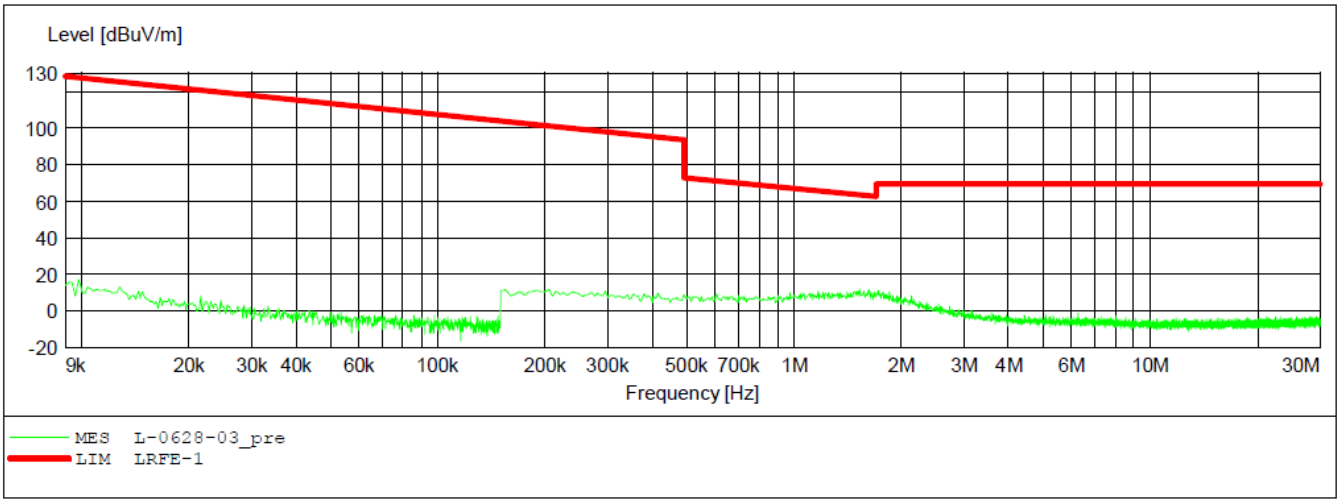
FCC Class B 3m Radiated

EUT: Multi-Protocol Gateway M/N:6AA-GW-ZB-H0
Manufacturer:
Operating Condition: TX 2405MHz
Test Site: 2# Chamber
Operator: WADE
Test Specification: AC 120V/60Hz
Comment: Z

SCAN TABLE: "LFRE Fin"

Short Description: SUB STD VTERM2 1.70

Start Frequency	Stop Frequency	Step Width	Detector	Meas. Time	IF Bandw.	Transducer
9.0 kHz	150.0 kHz	100.0 Hz	QuasiPeak	1.0 s	200 Hz	1516M
150.0 kHz	30.0 MHz	5.0 kHz	QuasiPeak	1.0 s	9 kHz	1516M



ACCURATE TECHNOLOGY CO.,LTD

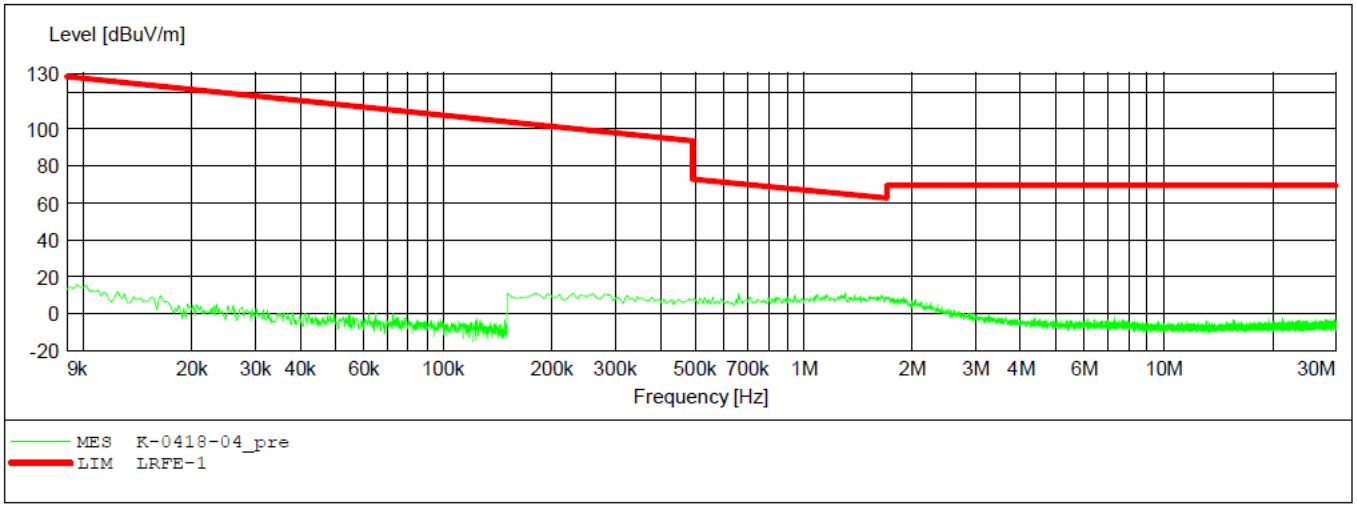
FCC Class B 3m Radiated

EUT: Multi-Protocol Gateway M/N:6AA-GW-ZB-H0
Manufacturer:
Operating Condition: TX 2445MHz
Test Site: 2# Chamber
Operator: WADE
Test Specification: AC 120V/60Hz
Comment: X

SCAN TABLE: "LFRE Fin"

Short Description: SUB STD VTERM2 1.70

Start Frequency	Stop Frequency	Step Width	Detector	Meas. Time	IF Bandw.	Transducer
9.0 kHz	150.0 kHz	100.0 Hz	QuasiPeak	1.0 s	200 Hz	1516M
150.0 kHz	30.0 MHz	5.0 kHz	QuasiPeak	1.0 s	9 kHz	1516M



ACCURATE TECHNOLOGY CO.,LTD

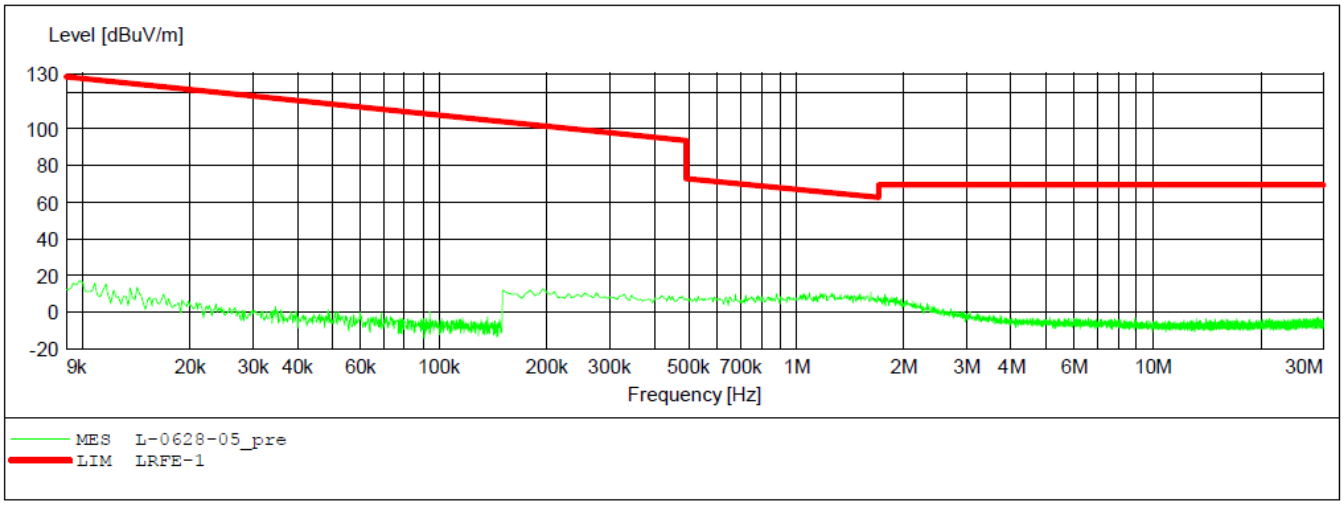
FCC Class B 3m Radiated

EUT: Multi-Protocol Gateway M/N:6AA-GW-ZB-H0
Manufacturer:
Operating Condition: TX 2445MHz
Test Site: 2# Chamber
Operator: WADE
Test Specification: AC 120V/60Hz
Comment: Y

SCAN TABLE: "LFRE Fin"

Short Description: SUB STD VTERM2 1.70

Start Frequency	Stop Frequency	Step Width	Detector	Meas. Time	IF Bandw.	Transducer
9.0 kHz	150.0 kHz	100.0 Hz	QuasiPeak	1.0 s	200 Hz	1516M
150.0 kHz	30.0 MHz	5.0 kHz	QuasiPeak	1.0 s	9 kHz	1516M



ACCURATE TECHNOLOGY CO.,LTD

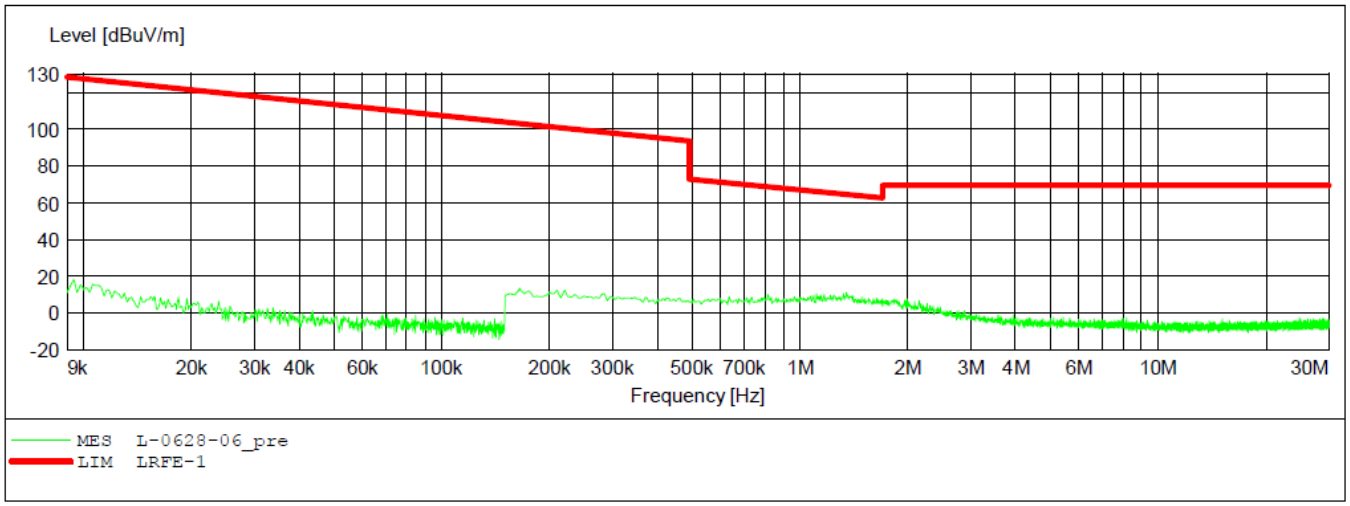
FCC Class B 3m Radiated

EUT: Multi-Protocol Gateway M/N:6AA-GW-ZB-H0
Manufacturer:
Operating Condition: TX 2445MHz
Test Site: 2# Chamber
Operator: WADE
Test Specification: AC 120V/60Hz
Comment: Z

SCAN TABLE: "LFRE Fin"

Short Description: SUB STD VTERM2 1.70

Start Frequency	Stop Frequency	Step Width	Detector	Meas. Time	IF Bandw.	Transducer
9.0 kHz	150.0 kHz	100.0 Hz	QuasiPeak	1.0 s	200 Hz	1516M
150.0 kHz	30.0 MHz	5.0 kHz	QuasiPeak	1.0 s	9 kHz	1516M



ACCURATE TECHNOLOGY CO.,LTD

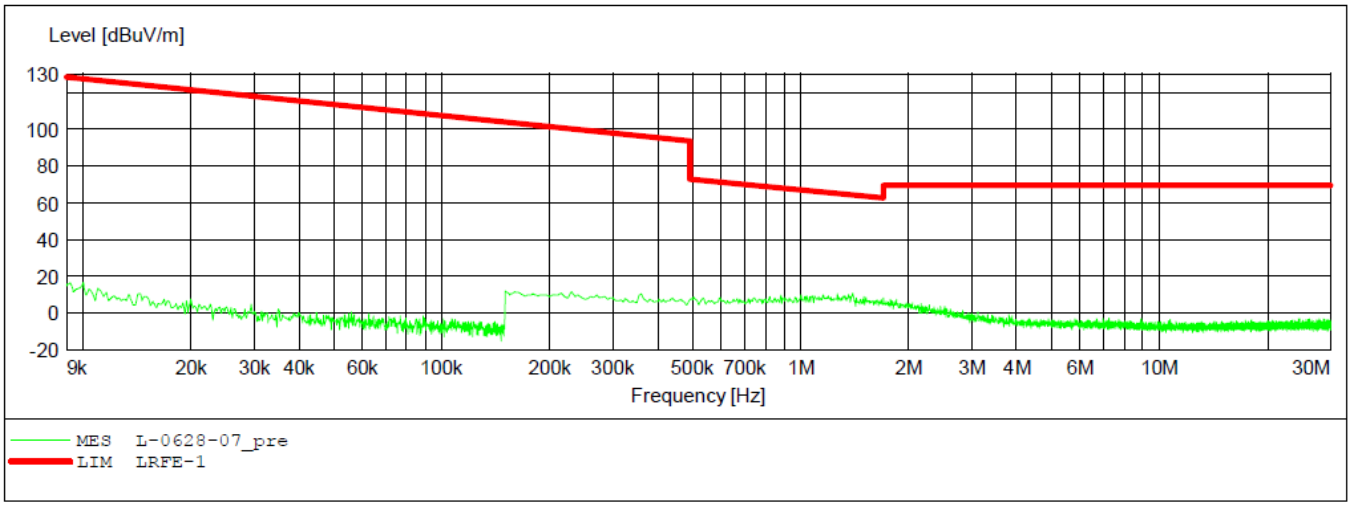
FCC Class B 3m Radiated

EUT: Multi-Protocol Gateway M/N:6AA-GW-ZB-H0
Manufacturer:
Operating Condition: TX 2480MHz
Test Site: 2# Chamber
Operator: WADE
Test Specification: AC 120V/60Hz
Comment: X

SCAN TABLE: "LFRE Fin"

Short Description: SUB STD VTERM2 1.70

Start Frequency	Stop Frequency	Step Width	Detector	Meas. Time	IF Bandw.	Transducer
9.0 kHz	150.0 kHz	100.0 Hz	QuasiPeak	1.0 s	200 Hz	1516M
150.0 kHz	30.0 MHz	5.0 kHz	QuasiPeak	1.0 s	9 kHz	1516M



ACCURATE TECHNOLOGY CO.,LTD

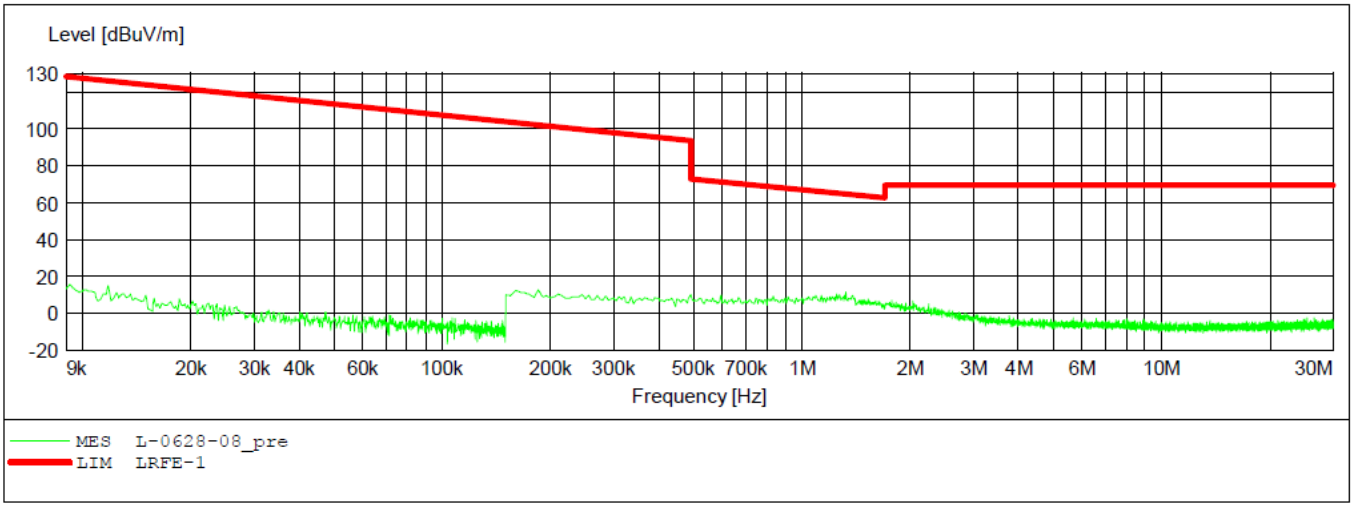
FCC Class B 3m Radiated

EUT: Multi-Protocol Gateway M/N:6AA-GW-ZB-H0
Manufacturer:
Operating Condition: TX 2480MHz
Test Site: 2# Chamber
Operator: WADE
Test Specification: AC 120V/60Hz
Comment: Y

SCAN TABLE: "LFRE Fin"

Short Description: SUB STD VTERM2 1.70

Start Frequency	Stop Frequency	Step Width	Detector	Meas. Time	IF Bandw.	Transducer
9.0 kHz	150.0 kHz	100.0 Hz	QuasiPeak	1.0 s	200 Hz	1516M
150.0 kHz	30.0 MHz	5.0 kHz	QuasiPeak	1.0 s	9 kHz	1516M



ACCURATE TECHNOLOGY CO.,LTD

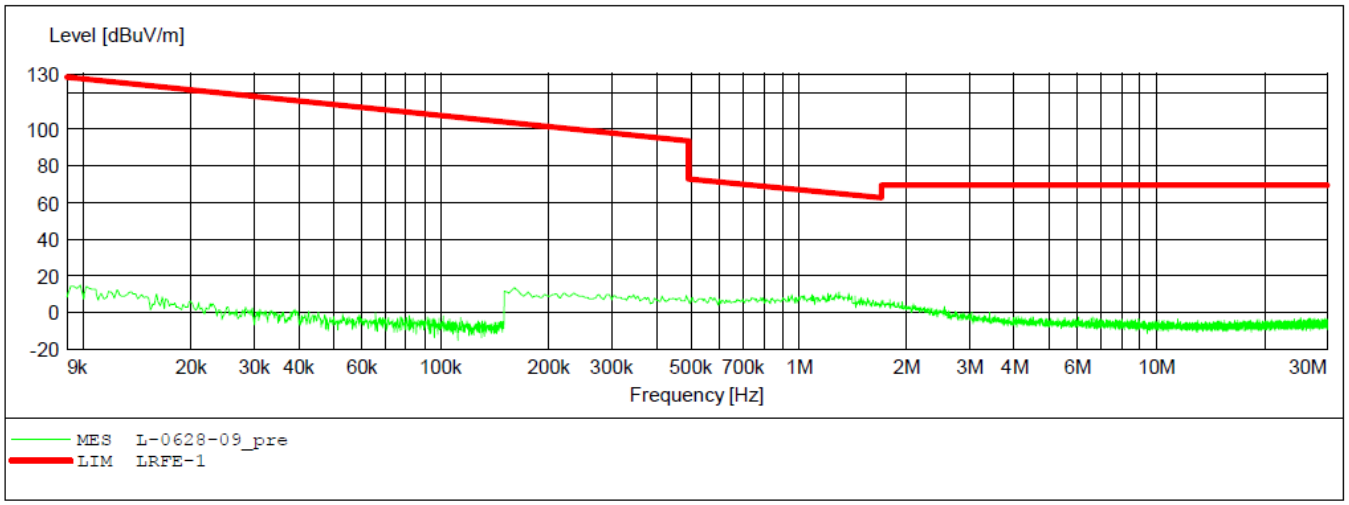
FCC Class B 3m Radiated

EUT: Multi-Protocol Gateway M/N:6AA-GW-ZB-H0
Manufacturer:
Operating Condition: TX 2480MHz
Test Site: 2# Chamber
Operator: WADE
Test Specification: AC 120V/60Hz
Comment: Z

SCAN TABLE: "LFRE Fin"

Short Description: SUB STD VTERM2 1.70

Start Frequency	Stop Frequency	Step Width	Detector	Meas. Time	IF Bandw.	Transducer
9.0 kHz	150.0 kHz	100.0 Hz	QuasiPeak	1.0 s	200 Hz	1516M
150.0 kHz	30.0 MHz	5.0 kHz	QuasiPeak	1.0 s	9 kHz	1516M

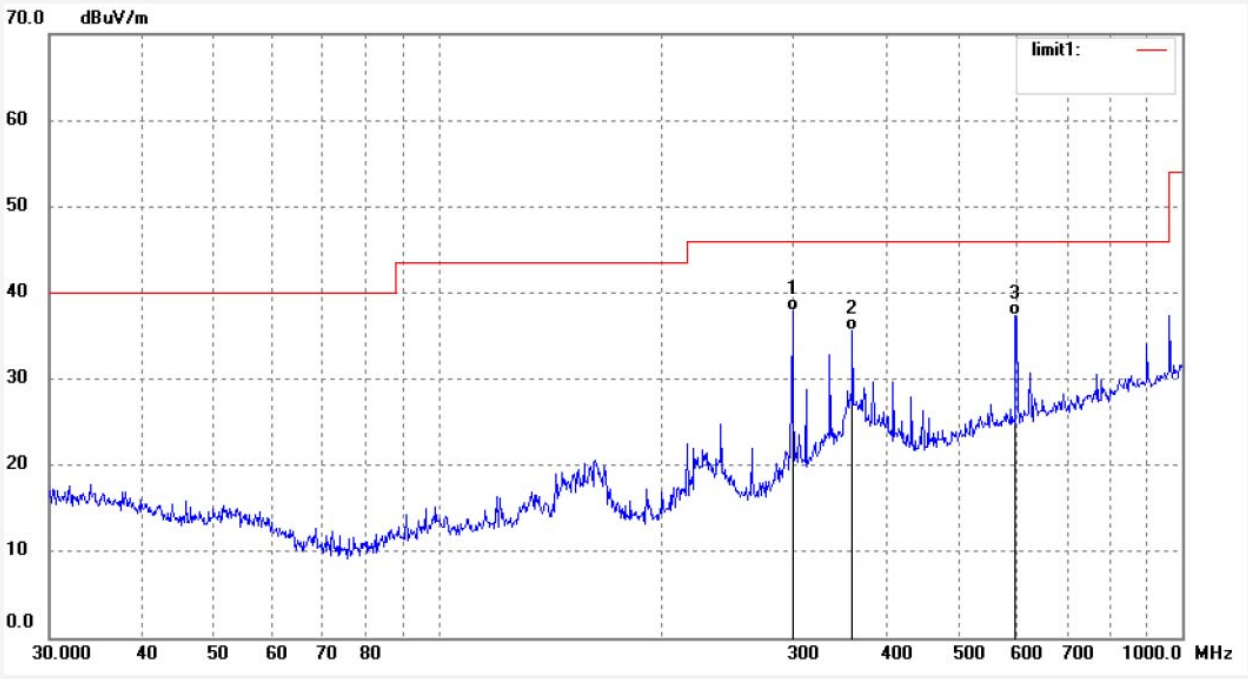


30MHz-1000MHz

ACCURATE TECHNOLOGY CO., LTD.
F1,Bldg,A,Changyuan New Material Port Keyuan Rd,
Science & Industry Park,Nanshan Shenzhen,P.R.China
Site: 2# Chamber
Tel:+86-0755-26503290
Fax:+86-0755-26503396

Job No.: LGW2018 #1364	Polarization: Horizontal
Standard: FCC Class B 3M Radiated	Power Source: AC 120V/60Hz
Test item: Radiation Test	Date: 18/06/06/
Temp.(C)/Hum.(%) 23 C / 48 %	Time:
EUT: Multi-Protocol Gateway	Engineer Signature: WADE
Mode: TX 2405MHz	Distance: 3m
Model: 6AA-GW-ZB-H0	
Manufacturer: LEEDARSON LIGHTING CO., LTD.	

Note:

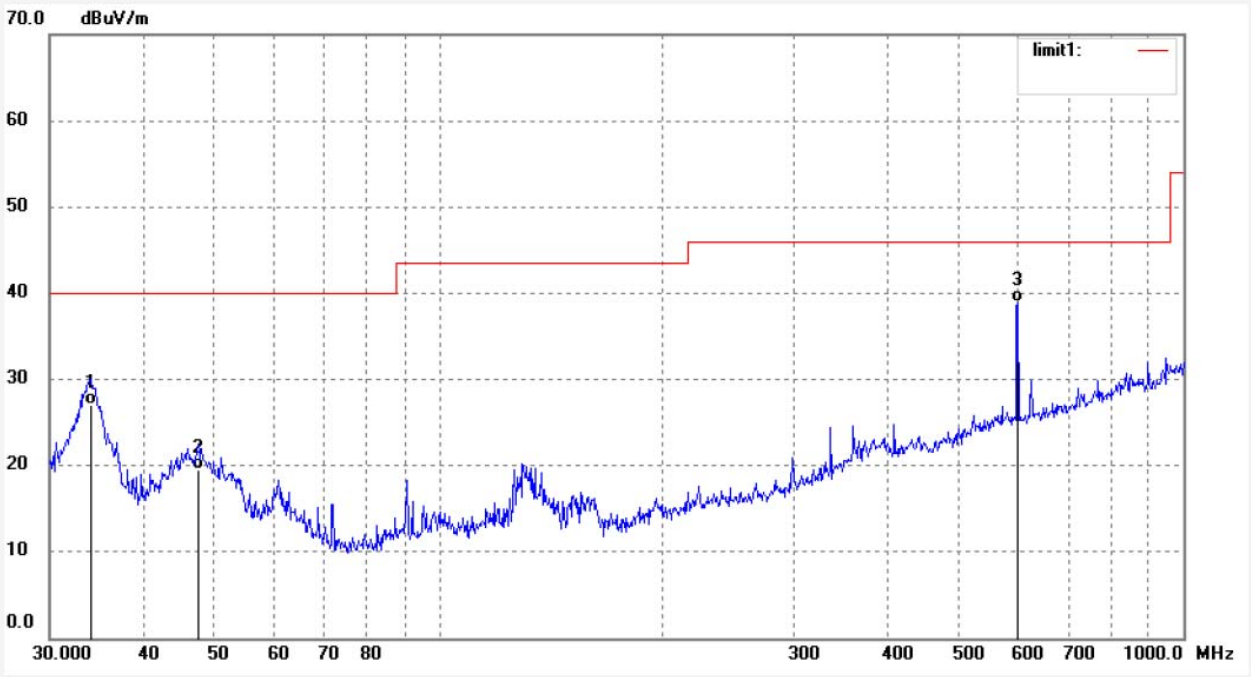


No.	Freq. (MHz)	Reading (dBuV/m)	Factor (dB)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Detector	Height (cm)	Degree (deg.)	Remark
1	299.3158	46.95	-9.01	37.94	46.00	-8.06	QP			
2	360.4476	42.91	-7.26	35.65	46.00	-10.35	QP			
3	597.2233	39.72	-2.43	37.29	46.00	-8.71	QP			

ACCURATE TECHNOLOGY CO., LTD.
F1,Bldg,A,Changyuan New Material Port Keyuan Rd,
Science & Industry Park,Nanshan Shenzhen,P.R.China
Site: 2# Chamber
Tel:+86-0755-26503290
Fax:+86-0755-26503396

Job No.: LGW2018 #1365	Polarization: Vertical
Standard: FCC Class B 3M Radiated	Power Source: AC 120V/60Hz
Test item: Radiation Test	Date: 18/06/06/
Temp.(C)/Hum.(%) 23 C / 48 %	Time:
EUT: Multi-Protocol Gateway	Engineer Signature: WADE
Mode: TX 2405MHz	Distance: 3m
Model: 6AA-GW-ZB-H0	
Manufacturer: LEEDARSON LIGHTING CO., LTD.	

Note:

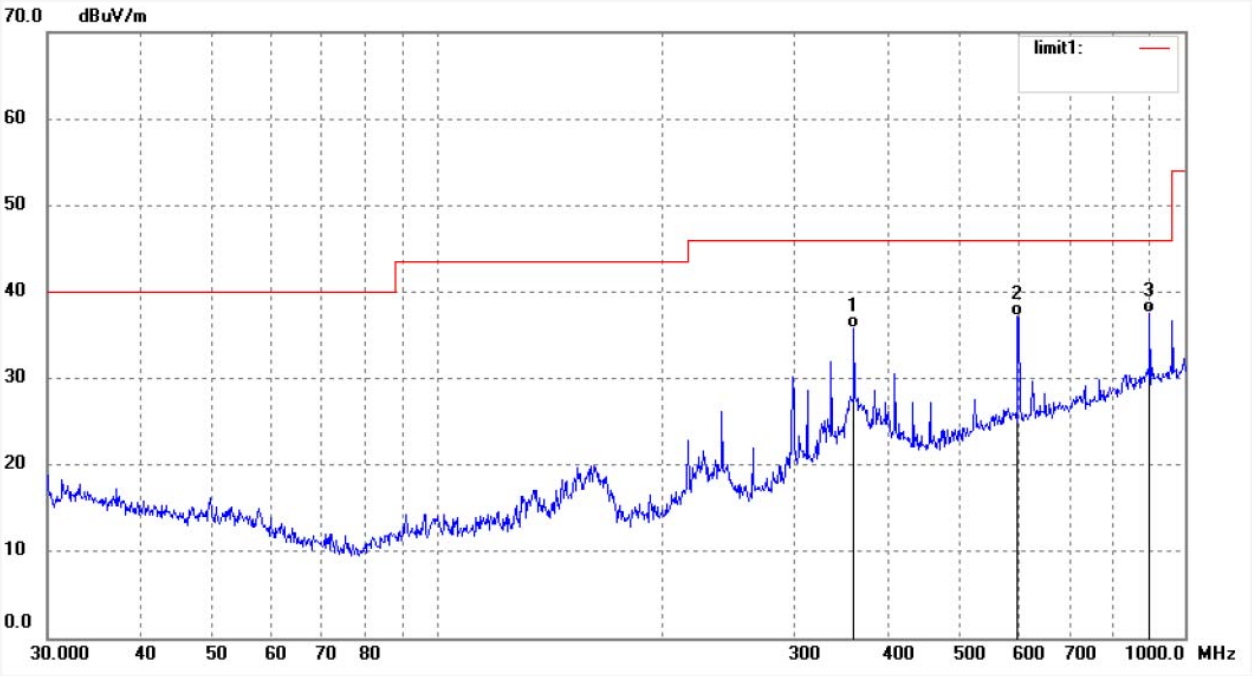


No.	Freq. (MHz)	Reading (dBuV/m)	Factor (dB)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Detector	Height (cm)	Degree (deg.)	Remark
1	34.1561	37.26	-10.16	27.10	40.00	-12.90	QP			
2	47.4917	32.04	-12.61	19.43	40.00	-20.57	QP			
3	599.3212	41.39	-2.38	39.01	46.00	-6.99	QP			

ACCURATE TECHNOLOGY CO., LTD.
F1,Bldg,A,Changyuan New Material Port Keyuan Rd,
Science & Industry Park,Nanshan Shenzhen,P.R.China
Site: 2# Chamber
Tel:+86-0755-26503290
Fax:+86-0755-26503396

Job No.: LGW2018 #1367	Polarization: Horizontal
Standard: FCC Class B 3M Radiated	Power Source: AC 120V/60Hz
Test item: Radiation Test	Date: 18/06/06/
Temp.(C)/Hum.(%) 23 C / 48 %	Time:
EUT: Multi-Protocol Gateway	Engineer Signature: WADE
Mode: TX 2445MHz	Distance: 3m
Model: 6AA-GW-ZB-H0	
Manufacturer: LEEDARSON LIGHTING CO., LTD.	

Note:



No.	Freq. (MHz)	Reading (dBuV/m)	Factor (dB)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Detector	Height (cm)	Degree (deg.)	Remark
1	360.4476	42.97	-7.26	35.71	46.00	-10.29	QP			
2	597.2233	39.65	-2.43	37.22	46.00	-8.78	QP			
3	896.9964	35.32	2.16	37.48	46.00	-8.52	QP			

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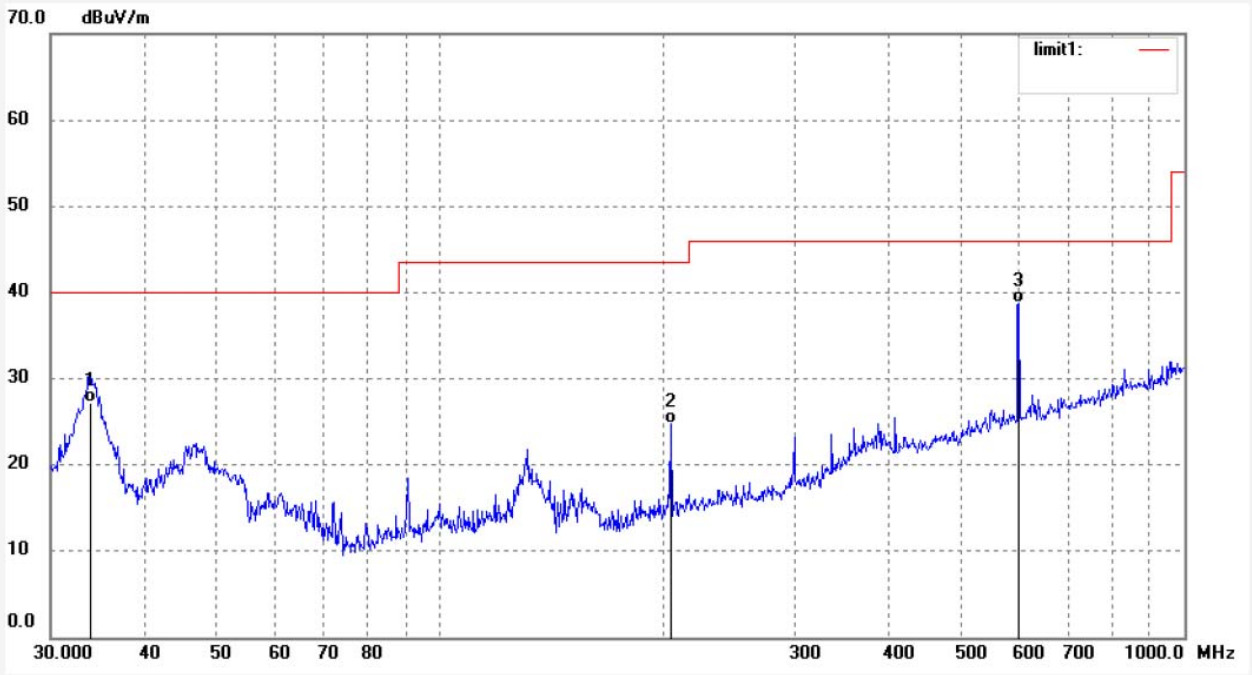
Fax:+86-0755-26503396

Job No.: LGW2018 #1366	Polarization: Vertical
Standard: FCC Class B 3M Radiated	Power Source: AC 120V/60Hz
Test item: Radiation Test	Date: 18/06/06/
Temp.(C)/Hum.(%) 23 C / 48 %	Time:
EUT: Multi-Protocol Gateway	Engineer Signature: WADE
Mode: TX 2445MHz	Distance: 3m
Model: 6AA-GW-ZB-H0	
Manufacturer: LEEDARSON LIGHTING CO., LTD.	

Note:



No.	Freq. (MHz)	Reading (dBuV/m)	Factor (dB)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Detector	Height (cm)	Degree (deg.)	Remark
1	33.9174	37.33	-10.10	27.23	40.00	-12.77	QP			
2	204.2376	36.87	-12.14	24.73	43.50	-18.77	QP			
3	599.3212	41.10	-2.38	38.72	46.00	-7.28	QP			

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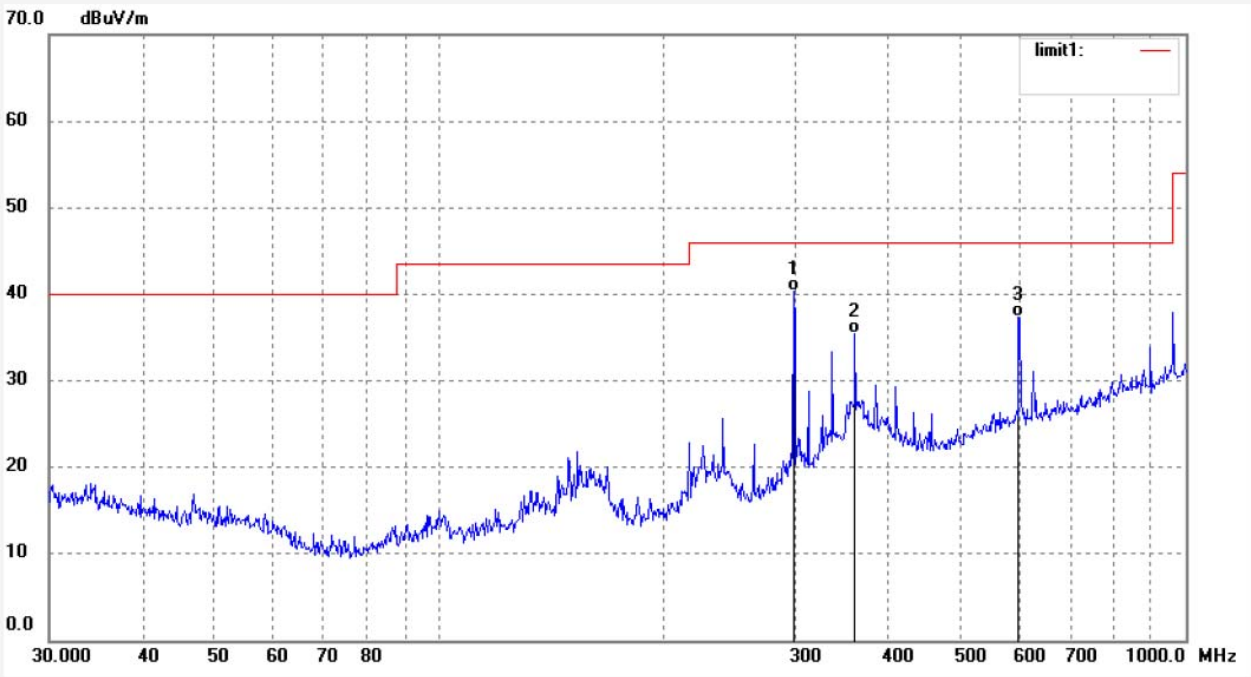
Job No.: LGW2018 #1368	Polarization: Horizontal
Standard: FCC Class B 3M Radiated	Power Source: AC 120V/60Hz
Test item: Radiation Test	Date: 18/06/06/
Temp.(C)/Hum.(%) 23 C / 48 %	Time:
EUT: Multi-Protocol Gateway	Engineer Signature: WADE
Mode: TX 2480MHz	Distance: 3m
Model: 6AA-GW-ZB-H0	
Manufacturer: LEEDARSON LIGHTING CO., LTD.	

Note:



No.	Freq. (MHz)	Reading (dBuV/m)	Factor (dB)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Detector	Height (cm)	Degree (deg.)	Remark
1	298.2681	49.41	-9.04	40.37	46.00	-5.63	QP			
2	360.4476	42.68	-7.26	35.42	46.00	-10.58	QP			
3	597.2233	39.83	-2.43	37.40	46.00	-8.60	QP			

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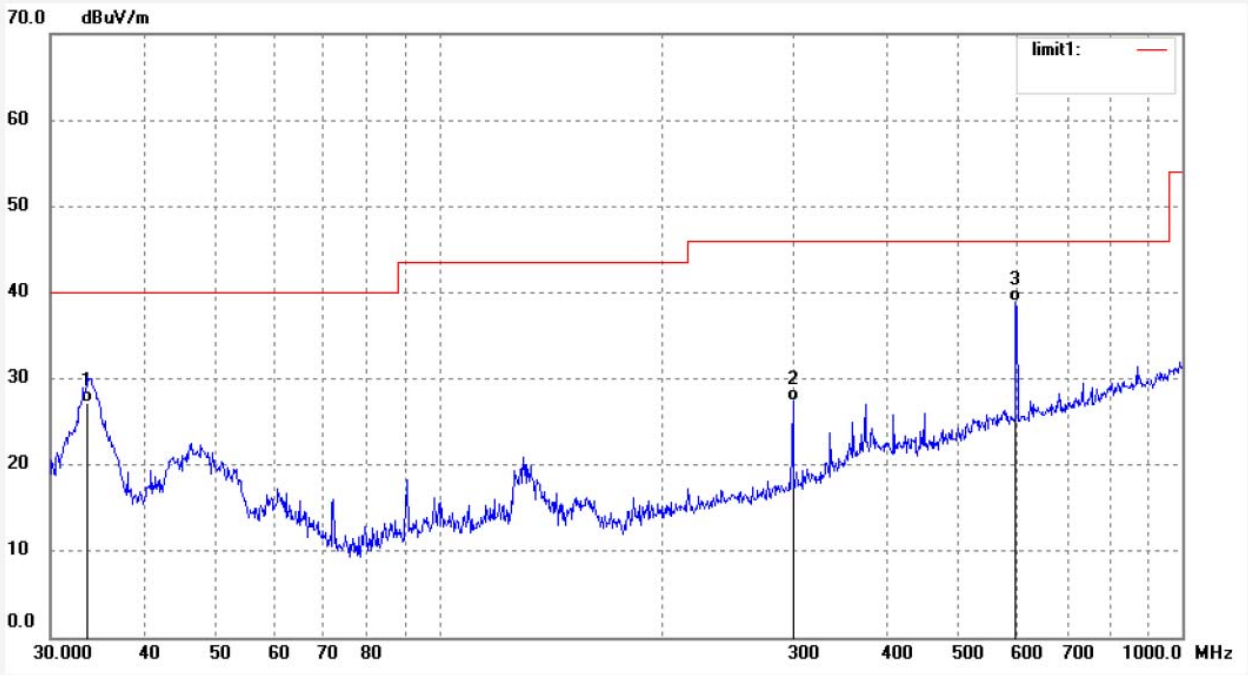
Job No.: LGW2018 #1369
Standard: FCC Class B 3M Radiated
Test item: Radiation Test
Temp.(C)/Hum.(%) 23 C / 48 %
EUT: Multi-Protocol Gateway
Mode: TX 2480MHz
Model: 6AA-GW-ZB-H0
Manufacturer: LEEDARSON LIGHTING CO., LTD.

Polarization: Vertical
Power Source: AC 120V/60Hz
Date: 18/06/06/
Time:
Engineer Signature: WADE
Distance: 3m

Note:



No.	Freq. (MHz)	Reading (dBuV/m)	Factor (dB)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Detector	Height (cm)	Degree (deg.)	Remark
1	33.6802	37.30	-10.02	27.28	40.00	-12.72	QP			
2	299.3158	36.42	-9.01	27.41	46.00	-18.59	QP			
3	597.2233	41.36	-2.43	38.93	46.00	-7.07	QP			

1GHz-18GHz

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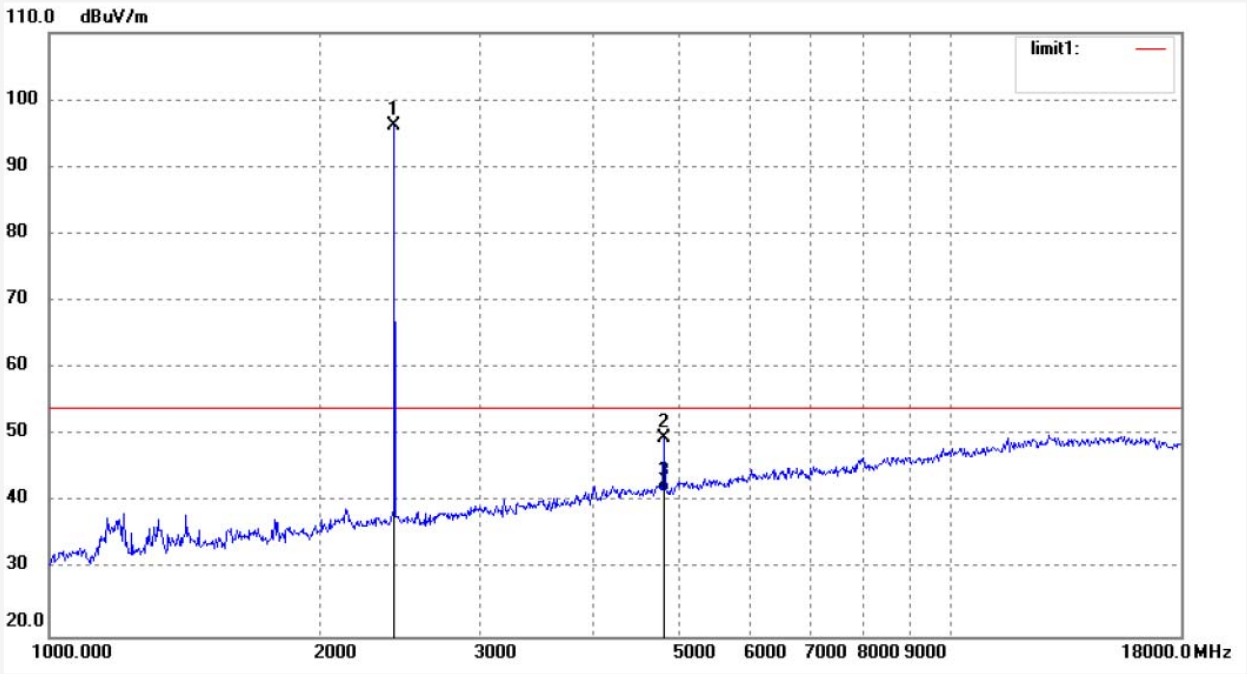
Job No.: LGW2018 #1348	Polarization: Horizontal
Standard: FCC Class B 3M Radiated	Power Source: AC 120V/60Hz
Test item: Radiation Test	Date: 18/06/06/
Temp.(C)/Hum.(%) 23 C / 48 %	Time:
EUT: Multi-Protocol Gateway	Engineer Signature: WADE
Mode: TX 2405MHz	Distance: 3m
Model: 6AA-GW-ZB-H0	
Manufacturer: LEEDARSON LIGHTING CO., LTD.	

Note:



No.	Freq. (MHz)	Reading (dBuV/m)	Factor (dB)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Detector	Height (cm)	Degree (deg.)	Remark
1	2405.000	95.26	0.90	96.16	/	/	peak			
2	4810.026	42.06	7.46	49.52	74.00	-24.48	peak			
3	4810.026	34.11	7.46	41.57	54.00	-12.43	AVG			

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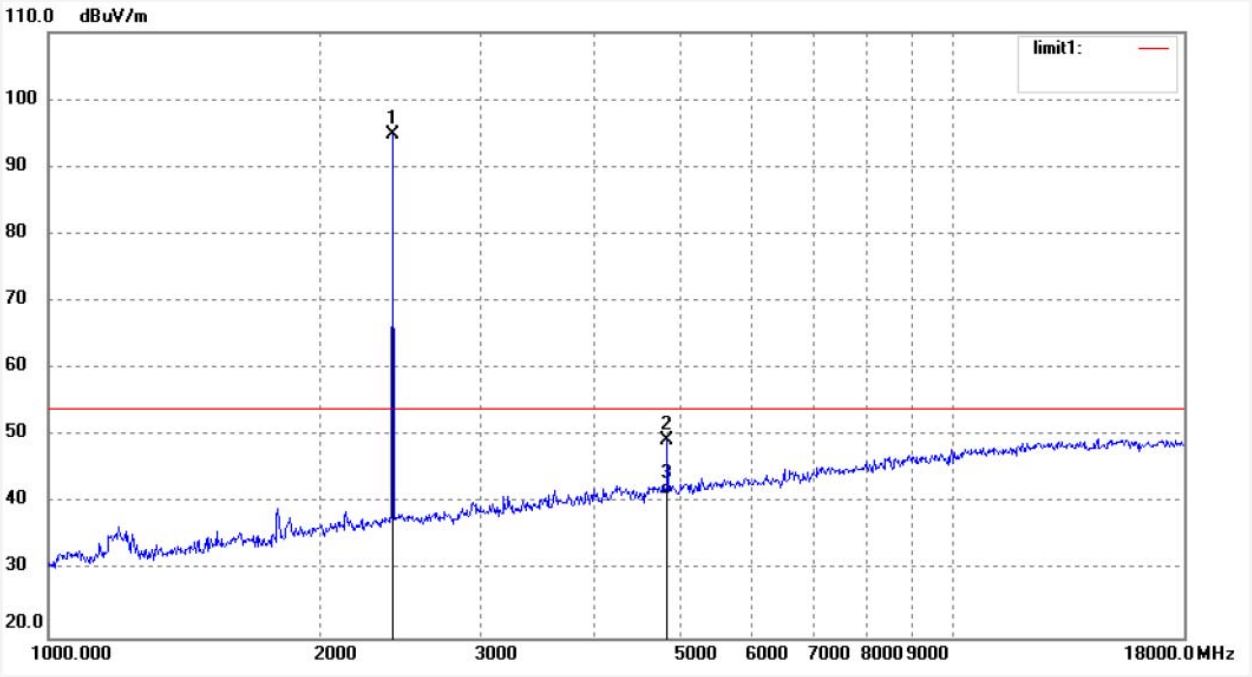
Job No.: LGW2018 #1349	Polarization: Vertical
Standard: FCC Class B 3M Radiated	Power Source: AC 120V/60Hz
Test item: Radiation Test	Date: 18/06/06/
Temp.(C)/Hum.(%) 23 C / 48 %	Time:
EUT: Multi-Protocol Gateway	Engineer Signature: WADE
Mode: TX 2405MHz	Distance: 3m
Model: 6AA-GW-ZB-H0	
Manufacturer: LEEDARSON LIGHTING CO., LTD.	

Note:



No.	Freq. (MHz)	Reading (dBuV/m)	Factor (dB)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Detector	Height (cm)	Degree (deg.)	Remark
1	2405.000	93.84	0.90	94.74	/	/	peak			
2	4810.025	41.96	7.46	49.42	74.00	-24.58	peak			
3	4810.025	33.86	7.46	41.32	54.00	-12.68	AVG			

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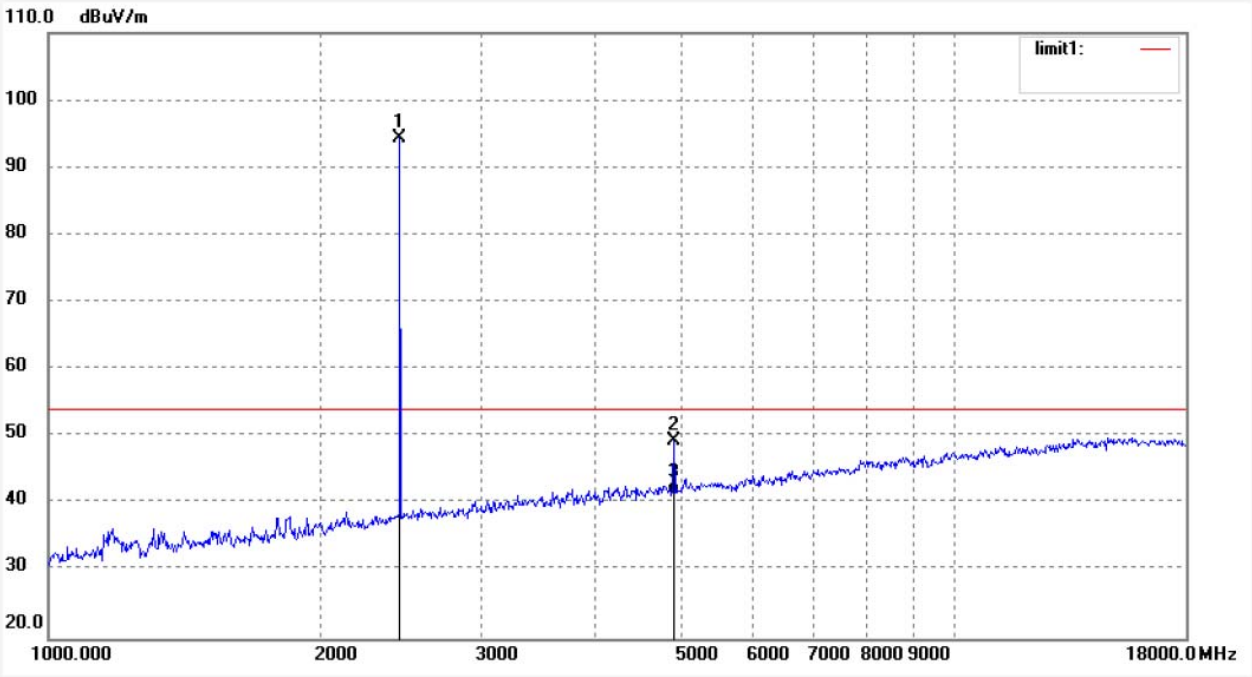
Job No.: LGW2018 #1352	Polarization: Horizontal
Standard: FCC Class B 3M Radiated	Power Source: AC 120V/60Hz
Test item: Radiation Test	Date: 18/06/06/
Temp.(C)/Hum.(%) 23 C / 48 %	Time:
EUT: Multi-Protocol Gateway	Engineer Signature: WADE
Mode: TX 2445MHz	Distance: 3m
Model: 6AA-GW-ZB-H0	
Manufacturer: LEEDARSON LIGHTING CO., LTD.	

Note:



No.	Freq. (MHz)	Reading (dBuV/m)	Factor (dB)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Detector	Height (cm)	Degree (deg.)	Remark
1	2445.000	93.19	1.07	94.26	/	/	peak			
2	4890.027	41.17	8.18	49.35	74.00	-24.65	peak			
3	4890.027	33.39	8.18	41.57	54.00	-12.43	AVG			

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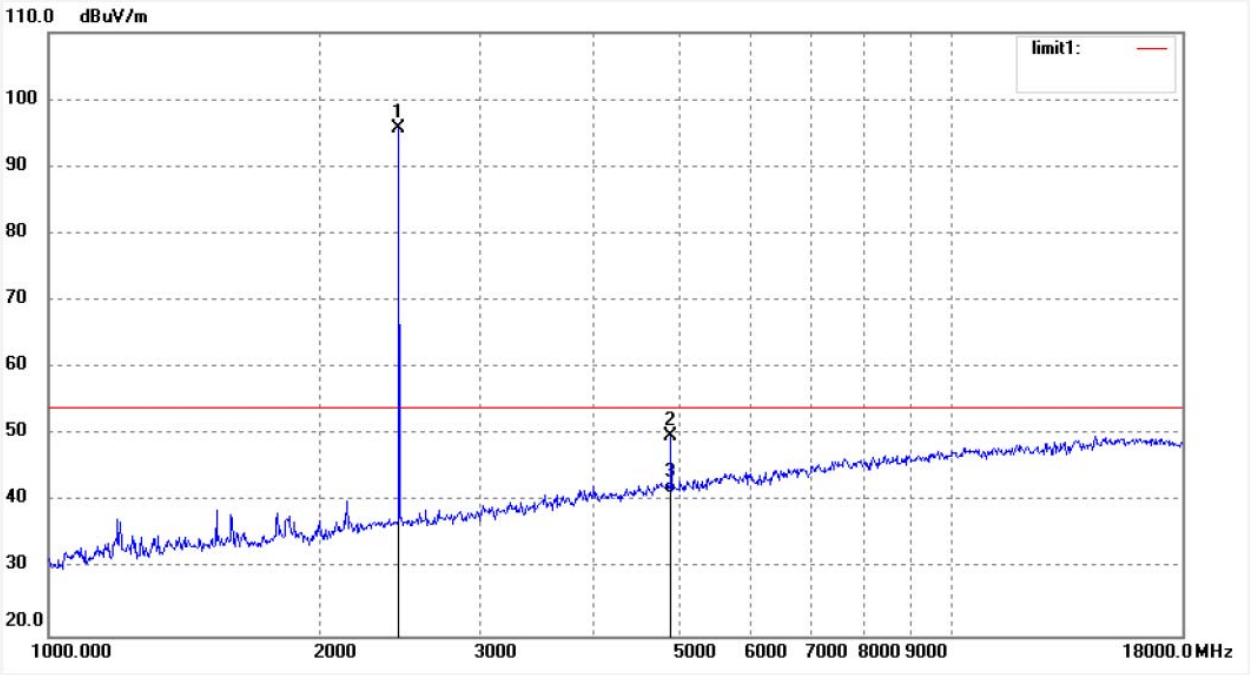
Job No.: LGW2018 #1353
Standard: FCC Class B 3M Radiated
Test item: Radiation Test
Temp.(C)/Hum.(%) 23 C / 48 %
EUT: Multi-Protocol Gateway
Mode: TX 2445MHz
Model: 6AA-GW-ZB-H0
Manufacturer: LEEDARSON LIGHTING CO., LTD.

Polarization: Vertical
Power Source: AC 120V/60Hz
Date: 18/06/06/
Time:
Engineer Signature: WADE
Distance: 3m

Note:



No.	Freq. (MHz)	Reading (dBuV/m)	Factor (dB)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Detector	Height (cm)	Degree (deg.)	Remark
1	2445.000	94.54	1.07	95.61	/	/	peak			
2	4890.027	41.65	8.18	49.83	74.00	-24.17	peak			
3	4890.027	33.06	8.18	41.24	54.00	-12.76	AVG			

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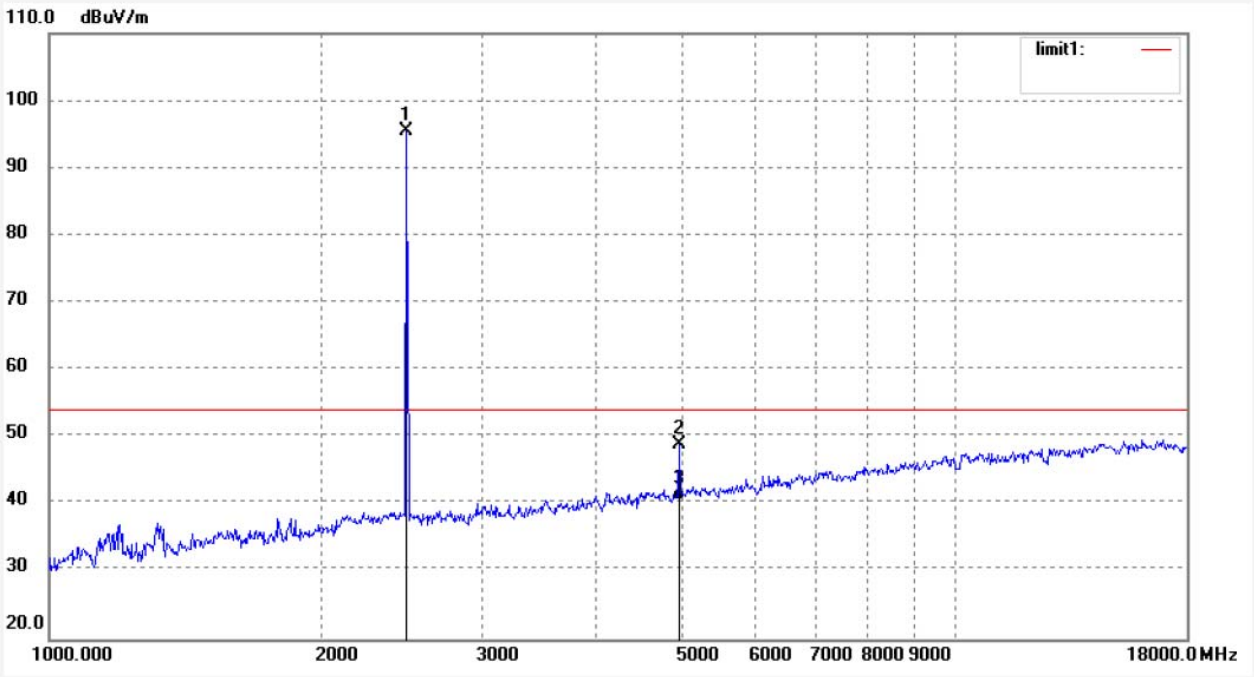
Job No.: LGW2018 #1355	Polarization: Horizontal
Standard: FCC Class B 3M Radiated	Power Source: AC 120V/60Hz
Test item: Radiation Test	Date: 18/06/06/
Temp.(C)/Hum.(%) 23 C / 48 %	Time:
EUT: Multi-Protocol Gateway	Engineer Signature: WADE
Mode: TX 2480MHz	Distance: 3m
Model: 6AA-GW-ZB-H0	
Manufacturer: LEEDARSON LIGHTING CO., LTD.	

Note:



No.	Freq. (MHz)	Reading (dBuV/m)	Factor (dB)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Detector	Height (cm)	Degree (deg.)	Remark
1	2480.000	94.41	1.10	95.51	/	/	peak			
2	4960.029	40.28	8.60	48.88	74.00	-25.12	peak			
3	4960.029	31.97	8.60	40.57	54.00	-13.43	AVG			

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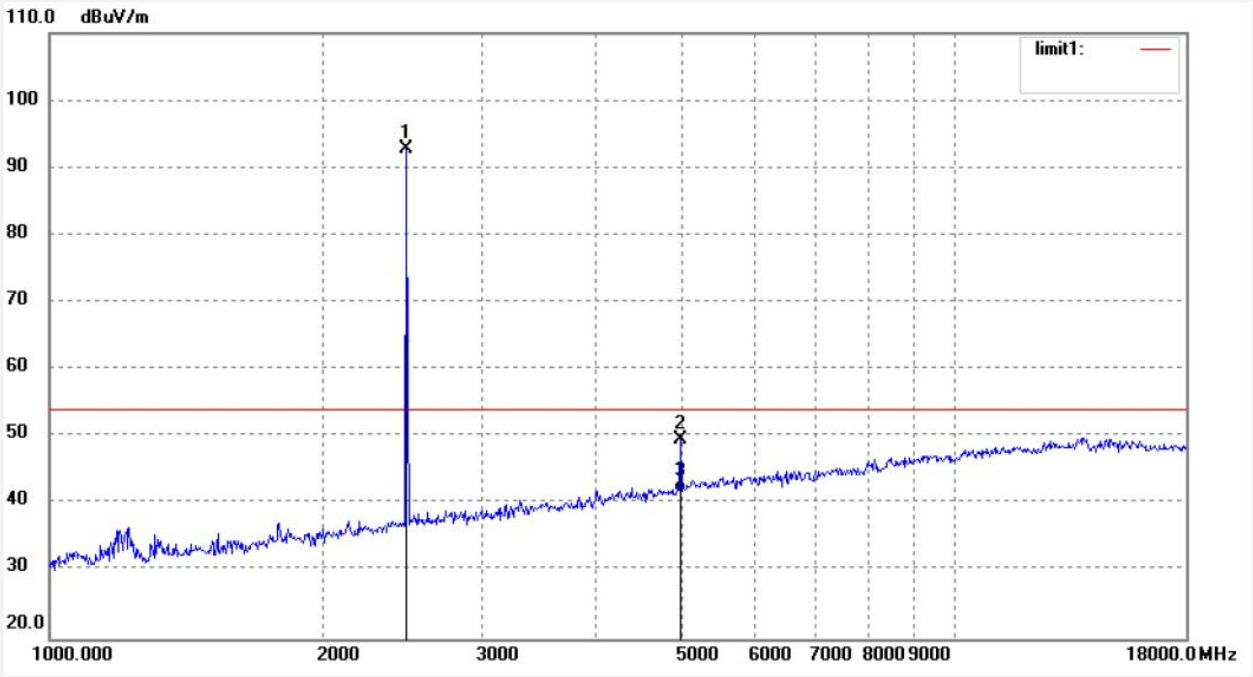
Job No.: LGW2018 #1354	Polarization: Vertical
Standard: FCC Class B 3M Radiated	Power Source: AC 120V/60Hz
Test item: Radiation Test	Date: 18/06/06/
Temp.(C)/Hum.(%) 23 C / 48 %	Time:
EUT: Multi-Protocol Gateway	Engineer Signature: WADE
Mode: TX 2480MHz	Distance: 3m
Model: 6AA-GW-ZB-H0	
Manufacturer: LEEDARSON LIGHTING CO., LTD.	

Note:



No.	Freq. (MHz)	Reading (dBuV/m)	Factor (dB)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Detector	Height (cm)	Degree (deg.)	Remark
1	2480.000	91.72	1.10	92.82	/	/	peak			
2	4960.028	41.01	8.60	49.61	74.00	-24.39	peak			
3	4960.028	33.05	8.60	41.65	54.00	-12.35	AVG			

18GHz-26.5GHz

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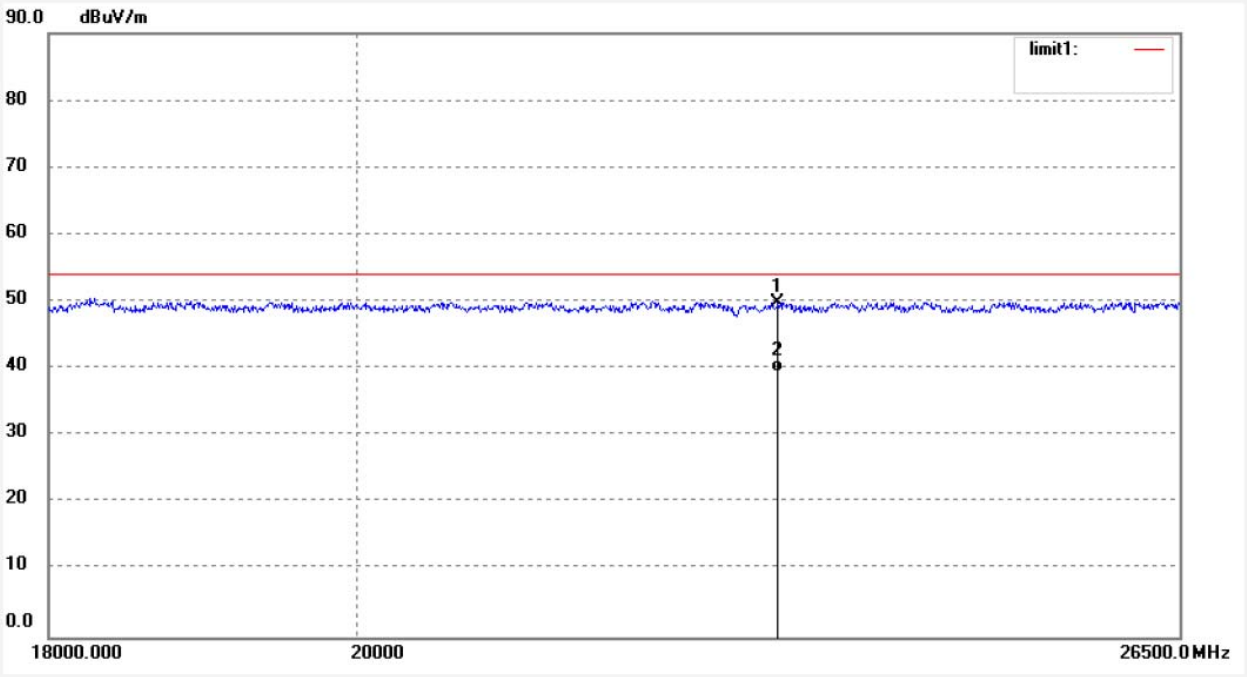
Fax:+86-0755-26503396

Job No.: LGW2018 #1359	Polarization: Horizontal
Standard: FCC Class B 3M Radiated	Power Source: AC 120V/60Hz
Test item: Radiation Test	Date: 18/06/06/
Temp.(C)/Hum.(%) 23 C / 48 %	Time:
EUT: Multi-Protocol Gateway	Engineer Signature: WADE
Mode: TX 2405MHz	Distance: 3m
Model: 6AA-GW-ZB-H0	
Manufacturer: LEEDARSON LIGHTING CO., LTD.	

Note:



No.	Freq. (MHz)	Reading (dBuV/m)	Factor (dB)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Detector	Height (cm)	Degree (deg.)	Remark
1	23100.178	10.17	39.67	49.84	74.00	-24.16	peak			
2	23100.178	-0.26	39.67	39.41	54.00	-14.59	AVG			

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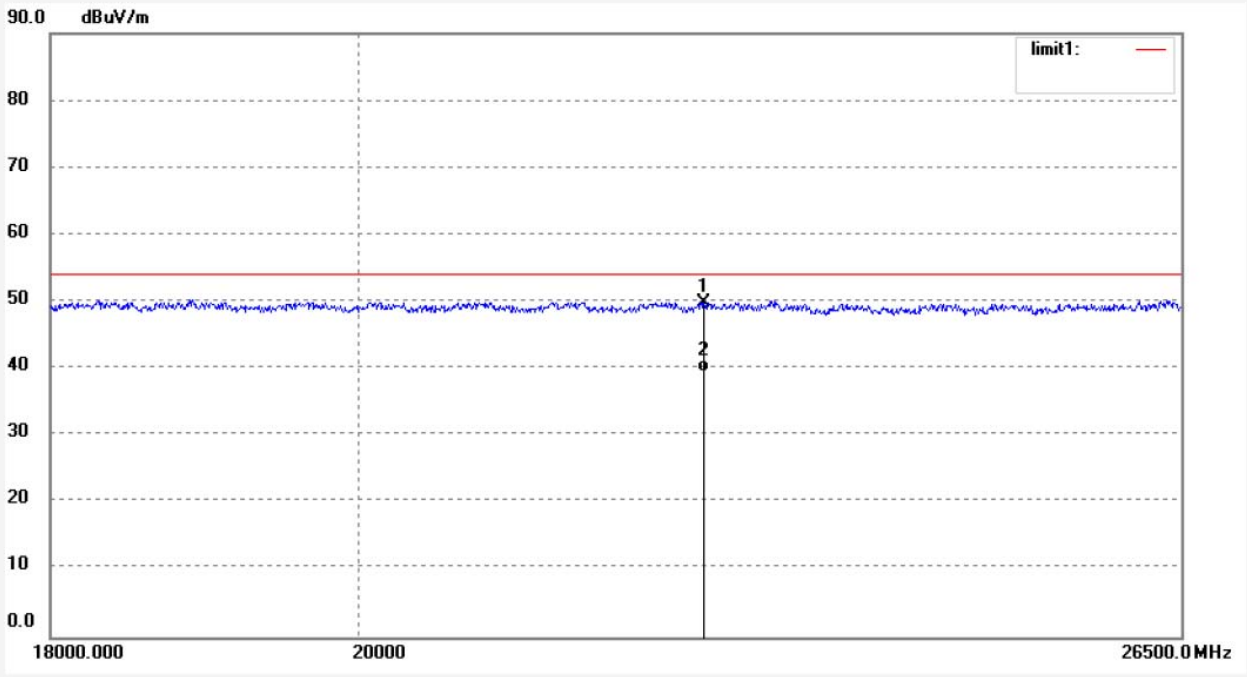
Job No.: LGW2018 #1358	Polarization: Vertical
Standard: FCC Class B 3M Radiated	Power Source: AC 120V/60Hz
Test item: Radiation Test	Date: 18/06/06/
Temp.(C)/Hum.(%) 23 C / 48 %	Time:
EUT: Multi-Protocol Gateway	Engineer Signature: WADE
Mode: TX 2405MHz	Distance: 3m
Model: 6AA-GW-ZB-H0	
Manufacturer: LEEDARSON LIGHTING CO., LTD.	

Note:



No.	Freq. (MHz)	Reading (dBuV/m)	Factor (dB)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Detector	Height (cm)	Degree (deg.)	Remark
1	22509.254	10.54	39.38	49.92	74.00	-24.08	peak			
2	22509.254	0.16	39.38	39.54	54.00	-14.46	AVG			

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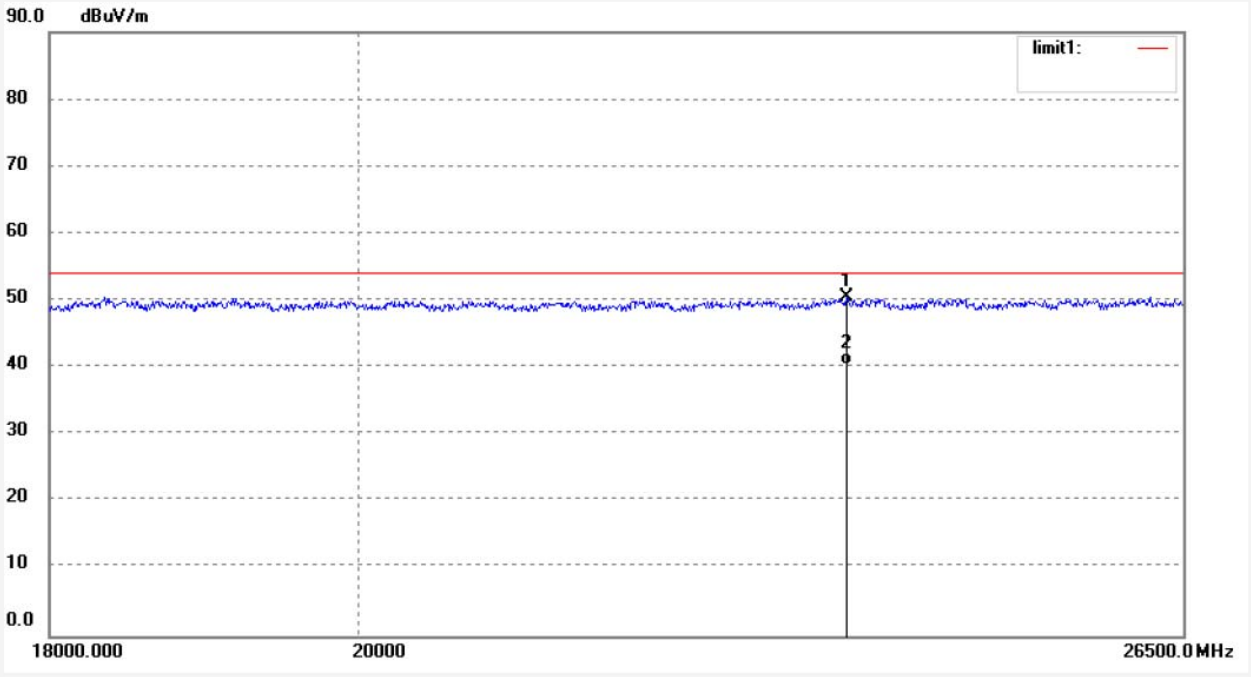
Job No.: LGW2018 #1360	Polarization: Horizontal
Standard: FCC Class B 3M Radiated	Power Source: AC 120V/60Hz
Test item: Radiation Test	Date: 18/06/06/
Temp.(C)/Hum.(%) 23 C / 48 %	Time:
EUT: Multi-Protocol Gateway	Engineer Signature: WADE
Mode: TX 2445MHz	Distance: 3m
Model: 6AA-GW-ZB-H0	
Manufacturer: LEEDARSON LIGHTING CO., LTD.	

Note:



No.	Freq. (MHz)	Reading (dBuV/m)	Factor (dB)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Detector	Height (cm)	Degree (deg.)	Remark
1	23624.237	10.36	40.13	50.49	74.00	-23.51	peak			
2	23624.237	0.21	40.13	40.34	54.00	-13.66	AVG			

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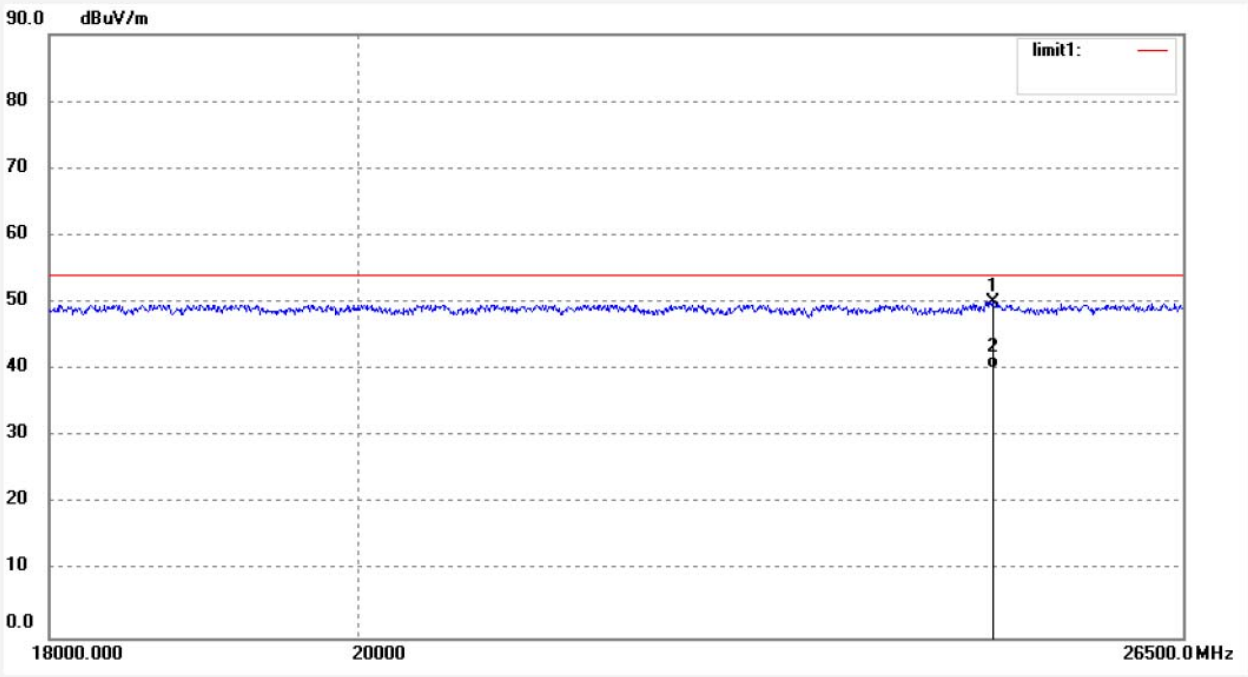
Job No.: LGW2018 #1361	Polarization: Vertical
Standard: FCC Class B 3M Radiated	Power Source: AC 120V/60Hz
Test item: Radiation Test	Date: 18/06/06/
Temp.(C)/Hum.(%) 23 C / 48 %	Time:
EUT: Multi-Protocol Gateway	Engineer Signature: WADE
Mode: TX 2445MHz	Distance: 3m
Model: 6AA-GW-ZB-H0	
Manufacturer: LEEDARSON LIGHTING CO., LTD.	

Note:



No.	Freq. (MHz)	Reading (dBuV/m)	Factor (dB)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Detector	Height (cm)	Degree (deg.)	Remark
1	24832.838	9.33	40.83	50.16	74.00	-23.84	peak			
2	24832.838	-0.62	40.83	40.21	54.00	-13.79	AVG			

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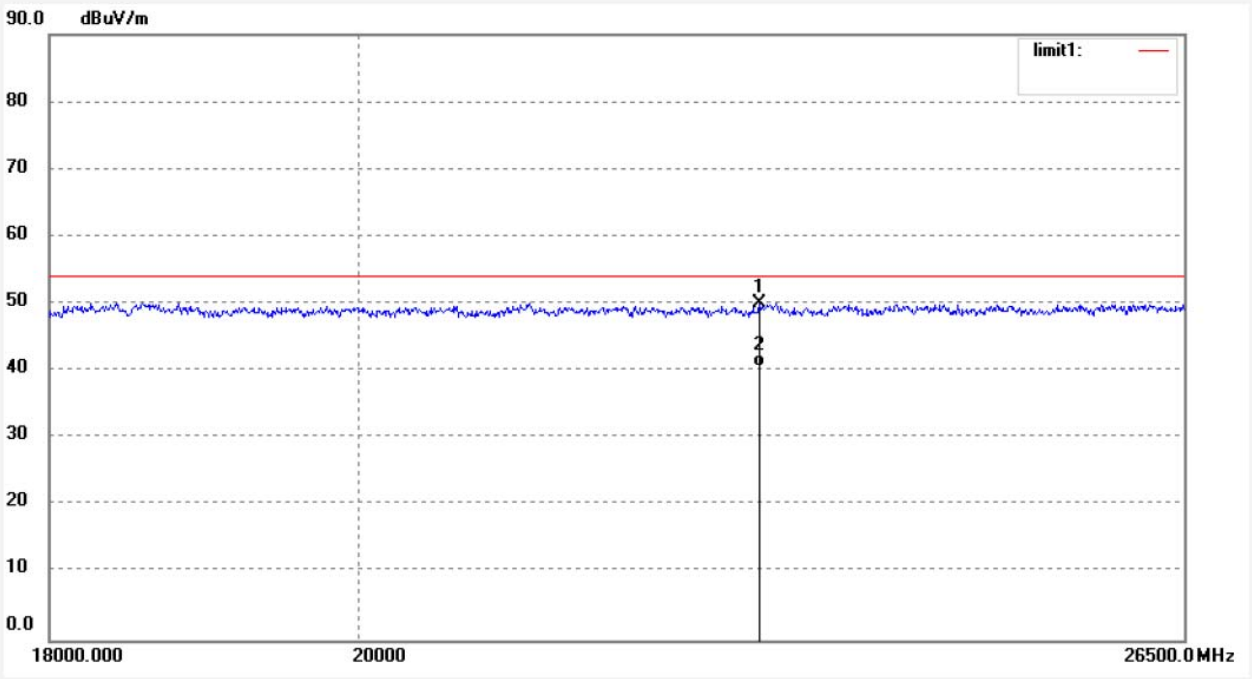
Job No.: LGW2018 #1363	Polarization: Horizontal
Standard: FCC Class B 3M Radiated	Power Source: AC 120V/60Hz
Test item: Radiation Test	Date: 18/06/06/
Temp.(C)/Hum.(%) 23 C / 48 %	Time:
EUT: Multi-Protocol Gateway	Engineer Signature: WADE
Mode: TX 2480MHz	Distance: 3m
Model: 6AA-GW-ZB-H0	
Manufacturer: LEEDARSON LIGHTING CO., LTD.	

Note:



No.	Freq. (MHz)	Reading (dBuV/m)	Factor (dB)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Detector	Height (cm)	Degree (deg.)	Remark
1	22931.044	10.43	39.61	50.04	74.00	-23.96	peak			
2	22931.044	0.96	39.61	40.57	54.00	-13.43	AVG			

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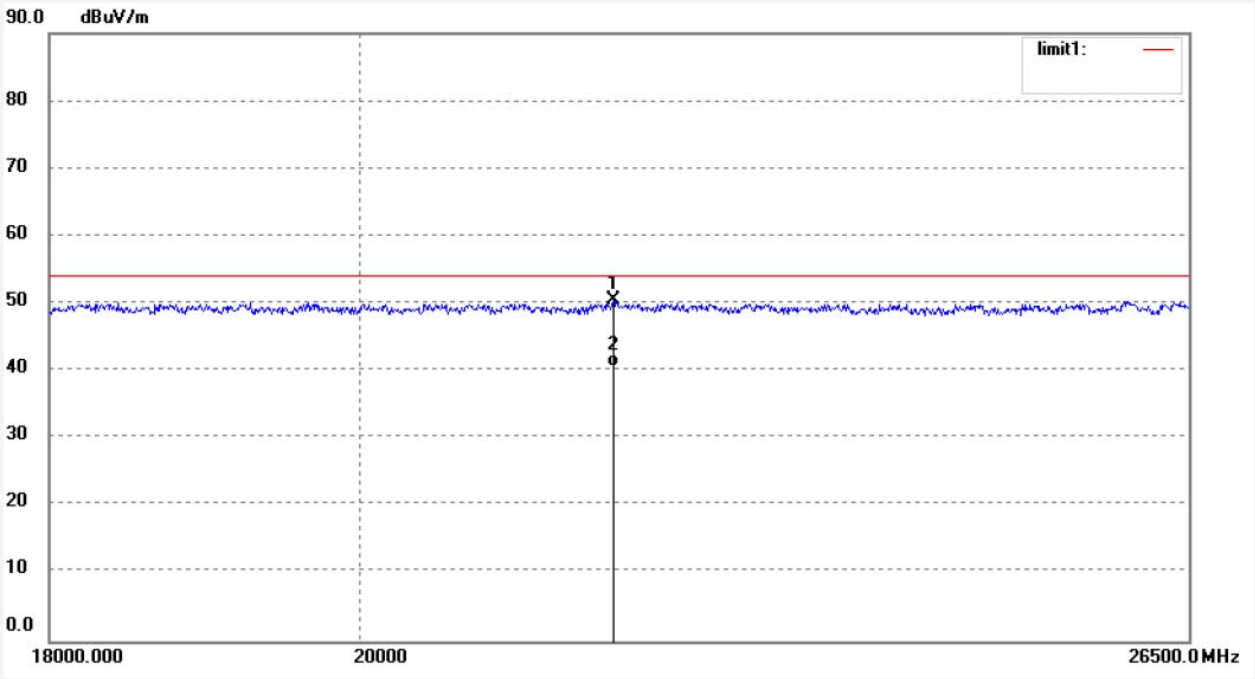
Job No.: LGW2018 #1362	Polarization: Vertical
Standard: FCC Class B 3M Radiated	Power Source: AC 120V/60Hz
Test item: Radiation Test	Date: 18/06/06/
Temp.(C)/Hum.(%) 23 C / 48 %	Time:
EUT: Multi-Protocol Gateway	Engineer Signature: WADE
Mode: TX 2480MHz	Distance: 3m
Model: 6AA-GW-ZB-H0	
Manufacturer: LEEDARSON LIGHTING CO., LTD.	

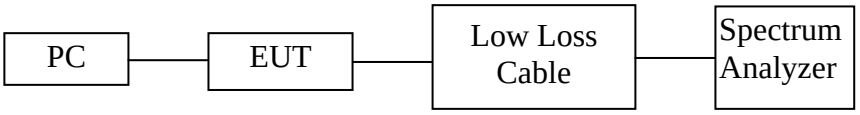
Note:



No.	Freq. (MHz)	Reading (dBuV/m)	Factor (dB)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Detector	Height (cm)	Degree (deg.)	Remark
1	21798.134	11.22	39.24	50.46	74.00	-23.54	peak			
2	21798.134	1.32	39.24	40.56	54.00	-13.44	AVG			

10.99% OCCUPIED BANDWIDTH

10.1.Block Diagram of Test Setup



10.2.EUT Configuration on Measurement

The following equipment is installed on the emission measurement to meet the commission requirements and operating regulations in a manner which tends to maximize its emission characteristics in normal application.

10.3.Operating Condition of EUT

10.3.1.Setup the EUT and simulator as shown as Section 10.1.

10.3.2.Turn on the power of all equipment.

10.3.3.Let the EUT work in TX mode then measure it. We select 2405MHz, 2445MHz, 2480MHz TX frequency to transmit.

10.4.Test Procedure

10.4.1.The transmitter output was connected to the spectrum analyzer through a low loss cable. The transmitter shall be operated at its maximum carrier power measured under normal test conditions. The span of the analyzer shall be set to capture all products of the modulation process, including the emission skirts.

10.4.2.The resolution bandwidth (RBW) shall be in the range of 1% to 5% of the occupied bandwidth (OBW) and video bandwidth (VBW) shall be approximately 3x RBW.

10.4.3.A peak, or peak hold, may be used in place of the sampling detector as this may produce a wider bandwidth than the actual bandwidth (worst-case measurement). Use of a peak hold may be necessary to determine the occupied bandwidth if the device is not transmitting continuously.

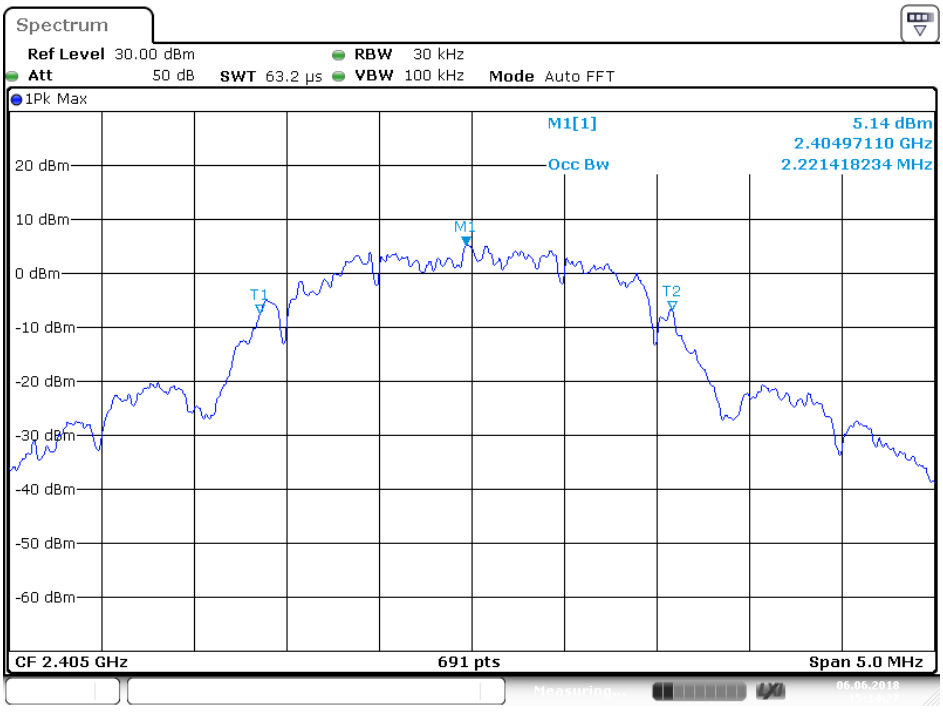
10.4.4.Set SPA “Meas” function, Select “Occupied Bandwidth” function, Select “99% Power Bandwidth”. The frequency of the upper and lower markers indicating the edges of the transmitters “99% Power” emission bandwidth shall be recorded to automate by SPA.

10.5.Measurement Result

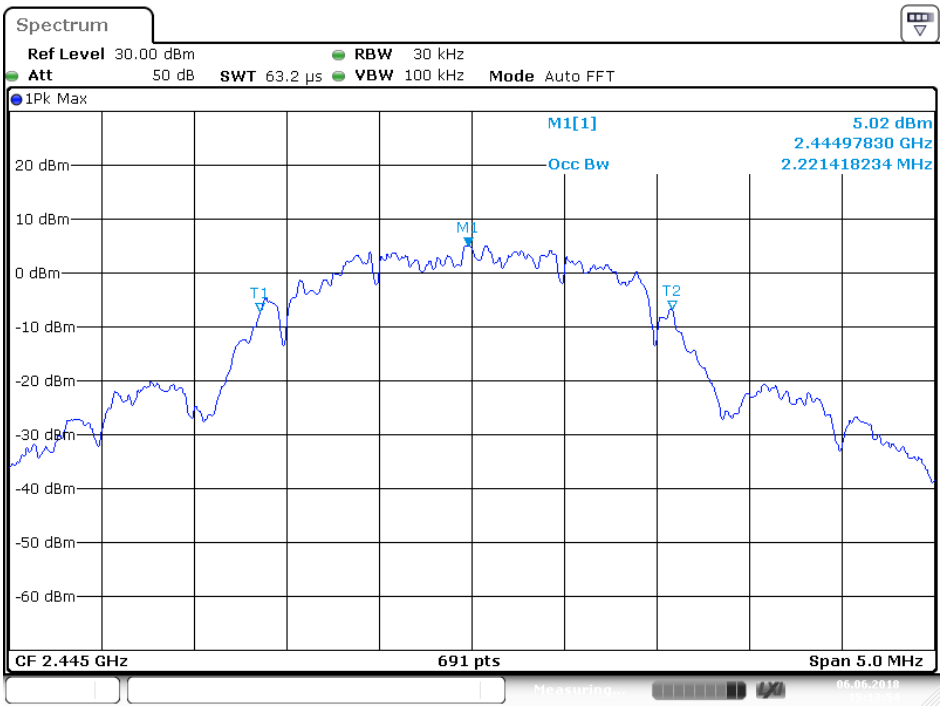
Channel	Frequency (MHz)	99% Occupied Bandwidth (MHz)
Low	2405	2.221
Middle	2445	2.221
High	2480	2.229

The spectrum analyzer plots are attached as below.

Low Channel 2405MHz

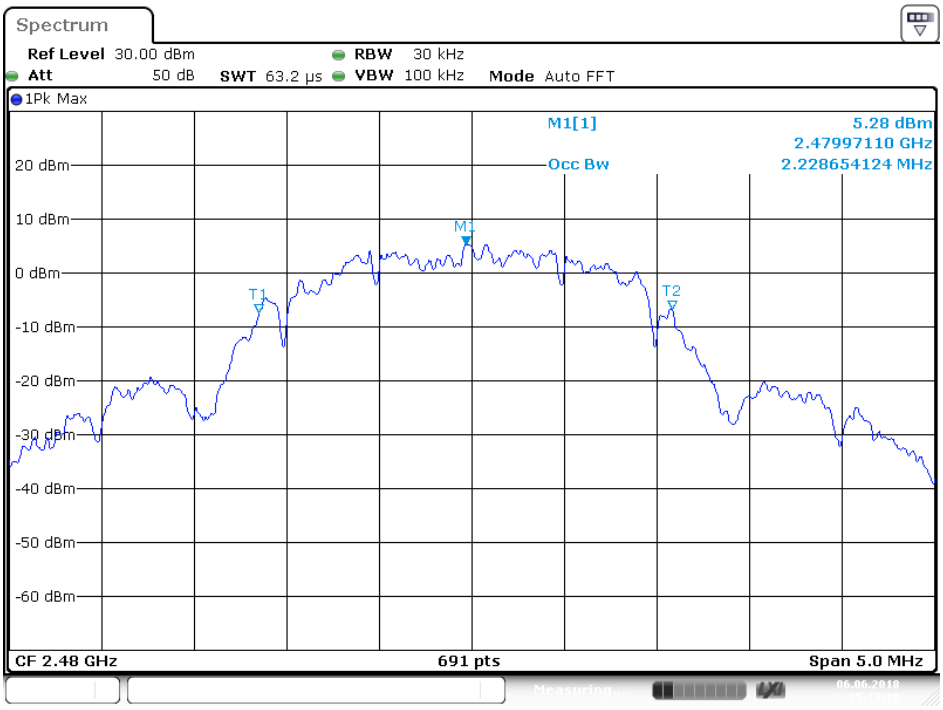


Middle Channel 2445MHz



Date: 6.JUN.2018 15:13:54

High Channel 2480MHz



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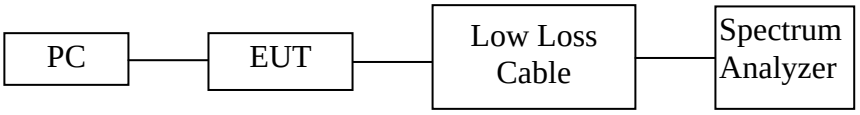
11.CONDUCTED SPURIOUS EMISSION COMPLIANCE TEST

11.1.Block Diagram of Test Setup



11.2.The Requirement For Section 15.247(d)

Section 15.247(d): 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. If the transmitter complies with the conducted power limits based on the use of RMS averaging over a time interval, as permitted under paragraph (b)(3) of this section, the attenuation required under this paragraph shall be 30 dB instead of 20 dB. Attenuation below the general limits specified in Section 15.209(a) is not required. In addition, radiated emissions which fall in the restricted bands, as defined in Section 15.205(a), must also comply with the radiated emission limits specified in Section 15.209(a).

11.3.EUT Configuration on Measurement

The equipment is installed on the emission measurement to meet the commission requirements and operating regulations in a manner which tends to maximize its emission characteristics in normal application.

11.4.Operating Condition of EUT

11.4.1.Setup the EUT and simulator as shown as Section 11.1.

11.4.2.Turn on the power of all equipment.

11.4.3.Let the EUT work in TX mode then measure it. We select 2405MHz, 2445MHz, 2480MHz TX frequency to transmit.

11.5.Test Procedure

11.5.1.The transmitter output was connected to the spectrum analyzer via a low loss cable.

11.5.2.Set RBW of spectrum analyzer to 100kHz and VBW to 300kHz

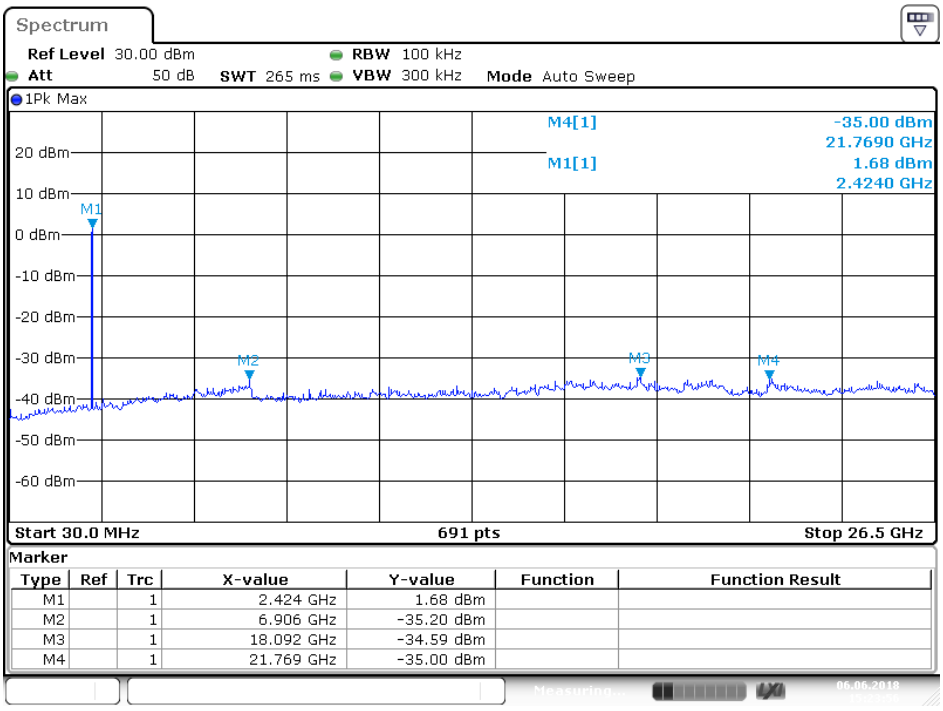
11.5.3.The Conducted Spurious Emission was measured and recorded.

11.6.Test Result

Pass.

The spectrum analyzer plots are attached as below.

Low Channel



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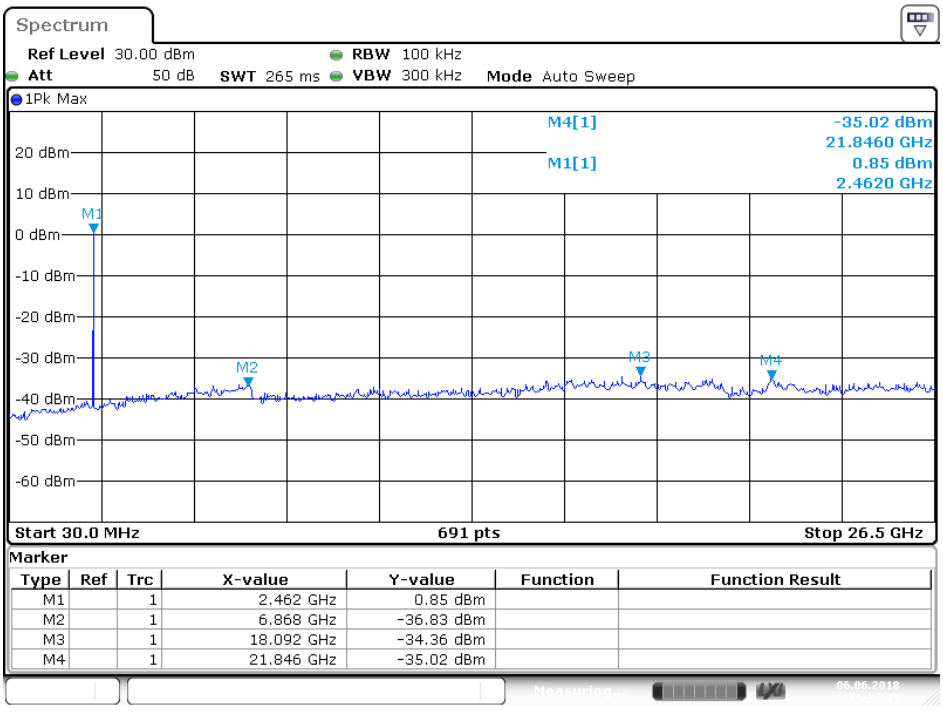
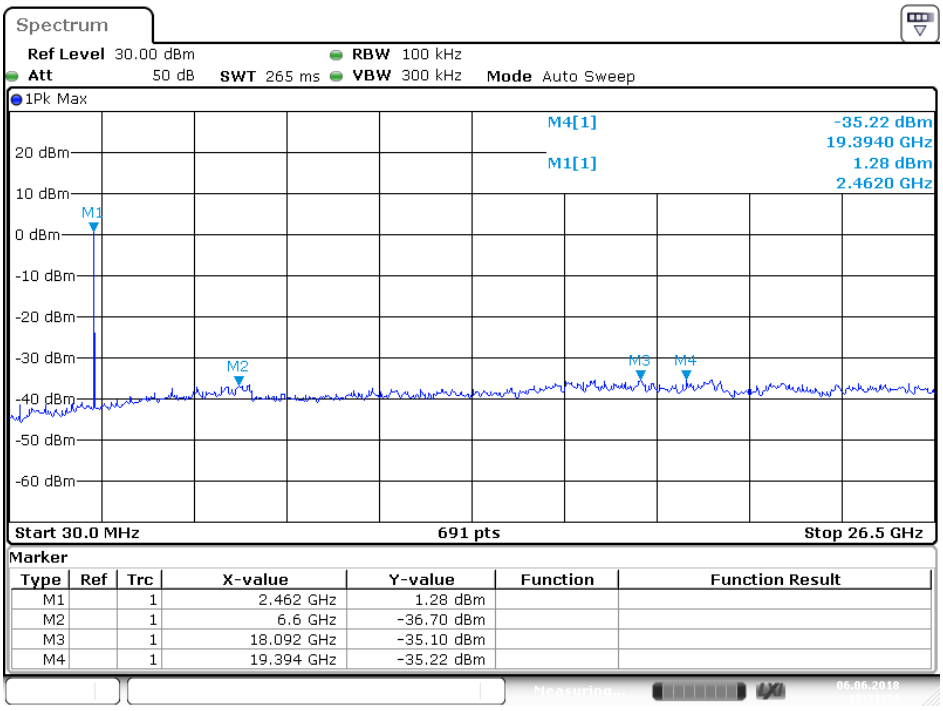
Middle Channel



Date: 6.JUN.2018 15:22:44

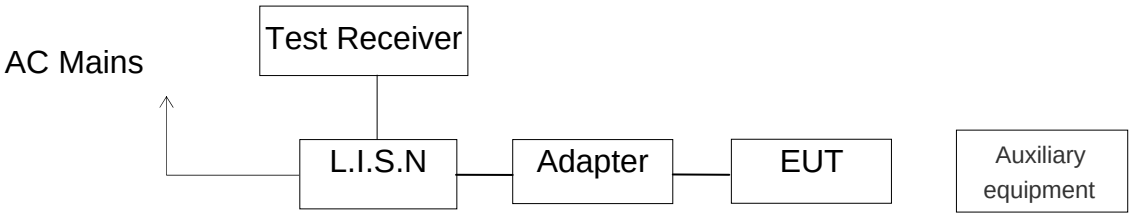
High Channel



Date: 6.JUN.2018 15:21:24

12. AC POWER LINE CONDUCTED EMISSION FOR FCC PART 15 SECTION 15.207(A)

12.1. Block Diagram of Test Setup



(EUT: Multi-Protocol Gateway)

12.2. Power Line Conducted Emission Measurement Limits

Frequency (MHz)	Limit dB(μV)	
	Quasi-peak Level	Average Level
0.15 - 0.50	66.0 – 56.0 *	56.0 – 46.0 *
0.50 - 5.00	56.0	46.0
5.00 - 30.00	60.0	50.0
NOTE1: The lower limit shall apply at the transition frequencies. NOTE2: The limit decreases linearly with the logarithm of the frequency in the range 0.15MHz to 0.50MHz.		

12.3. Configuration of EUT on Measurement

The following equipments are installed on Power Line Conducted Emission Measurement to meet the commission requirement and operating regulations in a manner, which tends to maximize its emission characteristics in a normal application.

12.4.Operating Condition of EUT

12.4.1.Setup the EUT and simulator as shown as Section 12.1.

12.4.2.Turn on the power of all equipment.

12.4.3.Let the EUT work in test mode and measure it.

12.5.Test Procedure

The EUT is put on the plane 0.8m high above the ground by insulating support and is connected to the power mains through a line impedance stabilization network (L.I.S.N.). This provides a 50ohm coupling impedance for the EUT system. Please refer the block diagram of the test setup and photographs. Both sides of AC lines are checked to find out the maximum conducted emission. In order to find the maximum emission levels, the relative positions of equipment and all of the interface cables shall be changed according to ANSI C63.4: 2014 on Conducted Emission Measurement.
The bandwidth of test receiver (R & S ESCS30) is set at 9kHz.

The frequency range from 150kHz to 30MHz is checked.

12.6.Power Line Conducted Emission Measurement Results

PASS.

The frequency range from 150kHz to 30MHz is checked.

Test mode : Zigbee OPERATION(AC 120V/60Hz)

MEASUREMENT RESULT: "TUV-0614-4_fin"

6/14/2018

Frequency MHz	Level dBµV	Transd dB	Limit dBµV	Margin dB	Detector	Line	PE
0.305000	38.00	10.6	60	22.1	QP	L1	GND
0.465000	37.80	10.7	57	18.8	QP	L1	GND
1.865000	36.00	11.0	56	20.0	QP	L1	GND
9.740000	39.00	11.3	60	21.0	QP	L1	GND

MEASUREMENT RESULT: "TUV-0614-4_fin2"

6/14/2018

Frequency MHz	Level dBµV	Transd dB	Limit dBµV	Margin dB	Detector	Line	PE
0.290000	30.10	10.6	51	20.4	AV	L1	GND
0.410000	33.60	10.7	48	14.0	AV	L1	GND
2.690000	27.50	11.0	46	18.5	AV	L1	GND
16.165000	34.60	11.4	50	15.4	AV	L1	GND

MEASUREMENT RESULT: "TUV-0614-3_fin"

6/14/2018

Frequency MHz	Level dBµV	Transd dB	Limit dBµV	Margin dB	Detector	Line	PE
0.410000	38.60	10.7	58	19.0	QP	N	GND
2.160000	32.70	11.0	56	23.3	QP	N	GND
4.990000	34.80	11.2	56	21.2	QP	N	GND
5.920000	39.30	11.2	60	20.7	QP	N	GND

MEASUREMENT RESULT: "TUV-0614-3_fin2"

6/14/2018

Frequency MHz	Level dBµV	Transd dB	Limit dBµV	Margin dB	Detector	Line	PE
0.410000	28.60	10.7	48	19.0	AV	N	GND
2.050000	22.70	11.0	46	23.3	AV	N	GND
2.930000	21.60	11.1	46	24.4	AV	N	GND
23.125000	32.00	11.4	50	18.0	AV	N	GND

Emissions attenuated more than 20 dB below the permissible value are not reported.

The spectral diagrams are attached as below.

ACCURATE TECHNOLOGY CO.,LTD

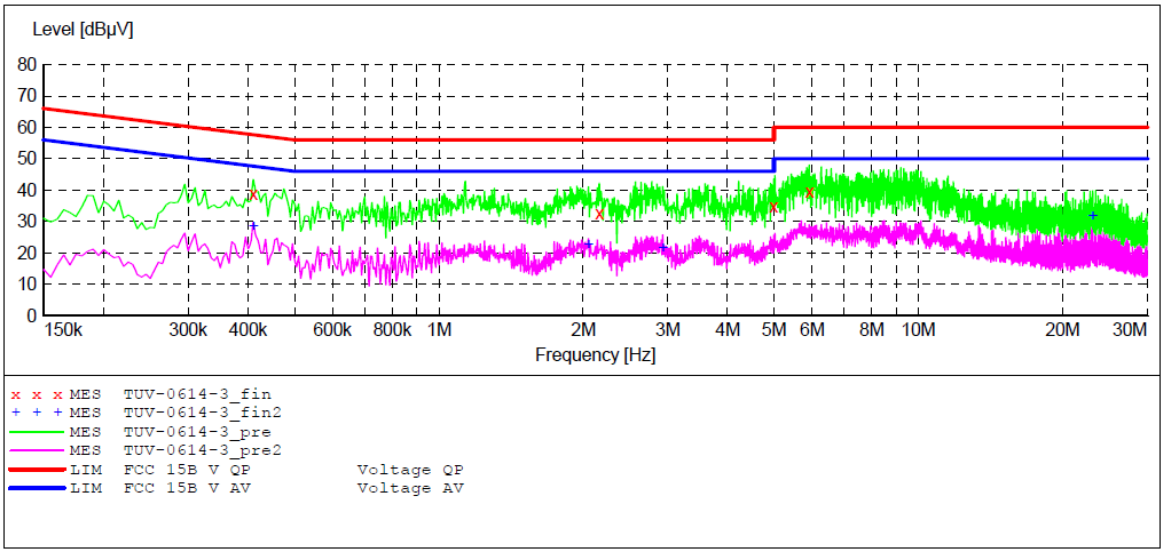
CONDUCTED EMISSION STANDARD FCC PART 15

EUT: Multi-Protocol Gateway M/N:6AA-GW-ZB-H0
Manufacturer: Leedarson
Operating Condition: Zigbee Operation
Test Site: 1#Shielding Room
Operator: WADE
Test Specification: N 120V/60Hz
Comment: Mains port
Start of Test: 6/14/2018 /

SCAN TABLE: "V 9K-30MHz fin"

Short Description: SUB STD VTERM2 1.70

Start Frequency	Stop Frequency	Step Width	Detector	Meas. Time	IF Bandw.	Transducer
9.0 kHz	150.0 kHz	100.0 Hz	QuasiPeak Average	1.0 s	200 Hz	NSLK8126 2008
150.0 kHz	30.0 MHz	5.0 kHz	QuasiPeak Average	1.0 s	9 kHz	NSLK8126 2008



MEASUREMENT RESULT: "TUV-0614-3_fin"

6/14/2018

Frequency MHz	Level dBµV	Transd dB	Limit dBµV	Margin dB	Detector	Line	PE
0.410000	38.60	10.7	58	19.0	QP	N	GND
2.160000	32.70	11.0	56	23.3	QP	N	GND
4.990000	34.80	11.2	56	21.2	QP	N	GND
5.920000	39.30	11.2	60	20.7	QP	N	GND

MEASUREMENT RESULT: "TUV-0614-3_fin2"

6/14/2018

Frequency MHz	Level dBµV	Transd dB	Limit dBµV	Margin dB	Detector	Line	PE
0.410000	28.60	10.7	48	19.0	AV	N	GND
2.050000	22.70	11.0	46	23.3	AV	N	GND
2.930000	21.60	11.1	46	24.4	AV	N	GND
23.125000	32.00	11.4	50	18.0	AV	N	GND

ACCURATE TECHNOLOGY CO.,LTD

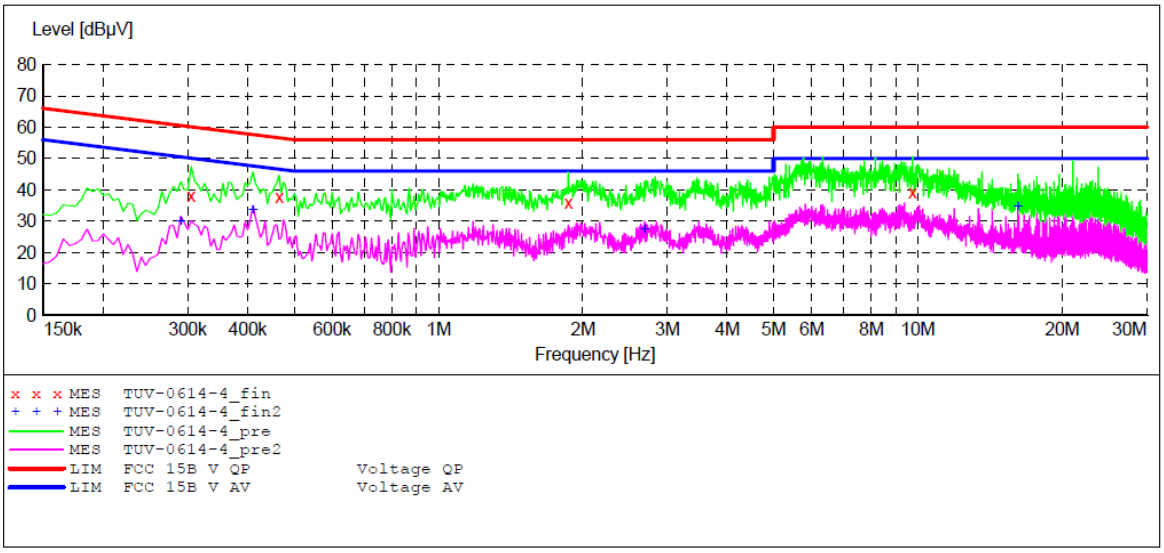
CONDUCTED EMISSION STANDARD FCC PART 15

EUT: Multi-Protocol Gateway M/N:6AA-GW-ZB-H0
Manufacturer: Leedarson
Operating Condition: Zigbee Operation
Test Site: 1#Shielding Room
Operator: WADE
Test Specification: L 120V/60Hz
Comment: Mains port
Start of Test: 6/14/2018 /

SCAN TABLE: "V 9K-30MHz fin"

Short Description: SUB STD VTERM2 1.70

Start Frequency	Stop Frequency	Step Width	Detector	Meas. Time	IF Bandw.	Transducer
9.0 kHz	150.0 kHz	100.0 Hz	QuasiPeak Average	1.0 s	200 Hz	NSLK8126 2008
150.0 kHz	30.0 MHz	5.0 kHz	QuasiPeak Average	1.0 s	9 kHz	NSLK8126 2008



MEASUREMENT RESULT: "TUV-0614-4_fin"

6/14/2018

Frequency MHz	Level dBµV	Transd dB	Limit dBµV	Margin dB	Detector	Line	PE
0.305000	38.00	10.6	60	22.1	QP	L1	GND
0.465000	37.80	10.7	57	18.8	QP	L1	GND
1.865000	36.00	11.0	56	20.0	QP	L1	GND
9.740000	39.00	11.3	60	21.0	QP	L1	GND

MEASUREMENT RESULT: "TUV-0614-4_fin2"

6/14/2018

Frequency MHz	Level dBµV	Transd dB	Limit dBµV	Margin dB	Detector	Line	PE
0.290000	30.10	10.6	51	20.4	AV	L1	GND
0.410000	33.60	10.7	48	14.0	AV	L1	GND
2.690000	27.50	11.0	46	18.5	AV	L1	GND
16.165000	34.60	11.4	50	15.4	AV	L1	GND

13. ANTENNA REQUIREMENT

13.1. The Requirement

According to Section 15.203, an intentional radiator shall be designed to ensure that no antenna other than that furnished by the responsible party shall be used with the device.

13.2. Antenna Construction

Device is equipped with permanent attached antenna, which isn't displaced by other antenna. The Antenna gain of EUT is 1dBi. Therefore, the equipment complies with the antenna requirement of Section 15.203.