

**47 CFR PART 15 SUBPART C TEST REPORT**

**for**

**Frontpoint Hub**

**Model No.: FPHUB3.1**

**FCC ID: GX9FPHUB3-1**

**of**

**Applicant: CLIMAX TECHNOLOGY CO., LTD.**

**Address: No. 258, Sinhu 2nd Rd., Neihu District  
Taipei City 114 Taiwan (R.O.C.)**

**Tested and Prepared**

**by**

**Worldwide Testing Services (Taiwan) Co., Ltd.**

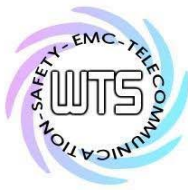
**FCC Registration No.: TW1477, TW1072**

**Industry Canada filed test laboratory Reg. No. 20037**



**Report No.: W6R22112-21431-C-9**

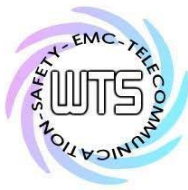
6F, NO. 58, LANE 188, RUEY-KUANG RD., NEIHU TAIPEI 114, TAIWAN, R.O.C.  
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Registration number: W6R22112-21431-C-9  
FCC ID: GX9FPHUB3-1

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**1 General Information**

**1.1 Notes**

The purpose of conformity testing is to increase the probability of adherence to the essential requirements or conformity specifications, as appropriate.

The complexity of the technical specifications, however, means that full and thorough testing is impractical for both technical and economic reasons.

Furthermore, there is no guarantee that a test sample which has passed all the relevant tests conforms to a specification.

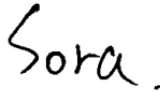
Neither is there any guarantee that such a test sample will interwork with other genuinely open systems. The existence of the tests nevertheless provides the confidence that the test sample possesses the qualities as maintained and that its performance generally conforms to representative cases of communications equipment.

The test results of this test report relate exclusively to the item tested as specified in 1.5.

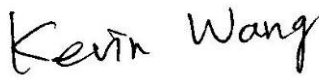
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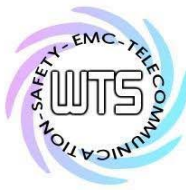
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**Tester:**

December 24, 2021	Sora Kuo	
_____	_____	_____
Date	WTS-Lab. Name	Signature

**Technical responsibility for area of testing:**

December 24, 2021	Kevin Wang	
_____	_____	_____
Date	WTS Name	Signature



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## **1.2 Testing laboratory**

### **1.2.1 Location**

OATS

No.5-1, Lishui, Shuang Sing Village,  
Wanli Dist., New Taipei City 207,  
Taiwan (R.O.C.)

3 meter semi-anechoic chamber

No.35, Aly. 21, Ln. 228, Ankang Rd., Neihu Dist., Taipei City 114, Taiwan (R.O.C.)

TEL:886-2-6613-0228

FAX:886-2-2791-5046

Company

Worldwide Testing Services(Taiwan) Co., Ltd.

6F, NO. 58, LANE 188, RUEY-KUANG RD.

NEIHU, TAIPEI 114, TAIWAN R.O.C.

Tel : 886-2-66068877

Fax : 886-2-66068879

### **1.2.2 Details of accreditation status**

Accredited testing laboratory

FCC filed test laboratory Reg. No. TW1477, TW1072

Industry Canada filed test laboratory Reg. No. 20037

### **Test location, where different from Worldwide Testing Services (Taiwan) Co., Ltd. :**

Name: ./.

Accredited number: ./.

Street: ./.

Town: ./.

Country: ./.

Telephone: ./.

Fax: ./.

## **1.3 Details of approval holder**

Name: CLIMAX TECHNOLOGY CO., LTD.

Street: No. 258, Sinhu 2nd Rd., Neihu District

City: Taipei City 114

Country: Taiwan (R.O.C.)

Telephone: +886-2-2794-0001

Fax: +886-2-2792-6618

## **1.4 Application details**

Date of receipt of test item(1st): May 29, 2018

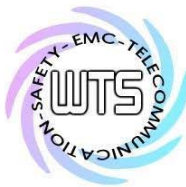
Date of test(1st): from May 29, 2018 to June 07, 2018

Date of receipt of test item(2nd): April 26, 2021

Date of test(2nd): from April 27, 2021 to May 05, 2021

Date of receipt of test item(3rd): December 07, 2021

Date of test(3rd): from December 08, 2021 to December 20, 2021



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## **1.5 General information of Test item**

Type of test item: Frontpoint Hub  
Model Number: FPHUB3.1  
Multi-listing model number: ./.  
Photos: see Annex

### **Technical data**

Frequency band: 902-928 MHz  
Operation Frequency: 908.41 MHz  
Operation modes: Half-duplex  
Modulation Type: GFSK  
Antenna type: PCB antenna  
Power supply: Adaptor (I/P: 100-240V~ 50/60Hz, 0.8A; O/P: 12V, 1.5A)  
Battery 7.2V, 2300mAh

### **Manufacturer: (if different from applicant)**

Name: ./.  
Street: ./.  
Town: ./.  
Country: ./.

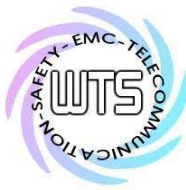
Additional information: ./.

## **1.6 Test standards**

Technical standard : 47 CFR PART 15 SUBPART C § 15.249 (2020-10)

### **Special statement**

1. This test report is based on the original test report no.: W6R22104-20827-C-9.
2. The relevant Circuitry, PCB Layout, Inner element, appearance and Function is exactly the same as the one in original test report. The differences are the model number, multi-listing model number, test item of conducted item has been retested and version of test standard. Therefore the other test result is also based on the original test report no. W6R22104-20827-C-9 without retesting.



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**2 Technical test**

**2.1 Summary of test results**

No deviations from the technical specification(s) were ascertained in the course of the tests performed.

**or**

The deviations as specified in 2.5 were ascertained in the course of the tests performed.

**2.2 Test environment**

Relative humidity content: 20 ... 75 %

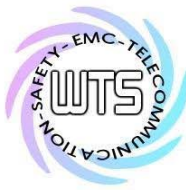
Air pressure: 86 ... 103 kPa

Details Power supply: Adaptor (I/P: 100-240V~ 50/60Hz, 0.8A; O/P: 12V, 1.5A)  
Battery 7.2V, 2300mAh

Extreme conditions parameters: Not required

Test item Name	Uncertainty
Estimation Result of Uncertainty of Conducted Emission (Power Line Conducted Emission)	Expanded Uncertainty : AMN : 1.05 dB Voltage probe : 1.05 dB
Estimation Result of Uncertainty of Radiated Emission(3M) (Peak Output Power (transmitter), Equivalent isotropic radiated power, RF Exposure Compliance Requirements, Out of Band Radiated Emissions, Spurious emission (tx), Radiated Emissions from Receiver Part)	Expanded Uncertainty : 0.009-30 MHz : 2.13 dB 30-1000 MHz : 3.53 dB 1-18 GHz : 4.19 dB 18-40 GHz : 4.09 dB
Estimation Result of Uncertainty of Band Edge Measurement (Radiated Emission on the band edge)	Expanded Uncertainty : 1.33 dBc
Estimation Result of Uncertainty of Bandwidth Measurement (Occupied Bandwidth)	Expanded Uncertainty : 0.41 kHz

The decision rule is: Measurement uncertainty is not included in the calculation of test results.



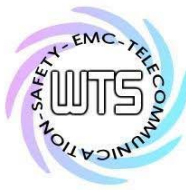
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## 2.3 Test Equipment List

No.	Test equipment	Type	Serial No.	Manufacturer	Cal. Date	Next Cal. Date
ETSTW-CE 001	EMI TEST RECEIVER	ESHS10	842121/013	R&S	2021/6/17	2022/6/16
ETSTW-CE 003	AC POWER SOURCE	APS-9102	D161137	GW	Function Test	
ETSTW-CE 004	ZWEILEITER-V-NETZNACHBILDUNG TWO-LINE V-NETWORK	ESH3-Z5	840731/011	R&S	2021/11/9	2022/11/8
ETSTW-CE 006	IMPULSBEGRENZER PULSE LIMITER	ESH3-Z2	100226	R&S	2021/9/22	2022/9/21
ETSTW-CE 008	HF-EICHLEITUNG RF STEP ATTENUATOR 139dB DPSP	334.6010.02	844581/024	R&S	Function Test	
ETSTW-CE 009	TEMP.&HUMIDITY CHAMBER	GTH-225-40-1P-U	MAA0305-009	GIANT FORCE	2021/7/29	2022/7/28
ETSTW-CE 016	TWO-LINE V-NETWORK	ENV216	100050	R&S	2021/11/8	2022/11/7
ETSTW-CE 028	MXE EMI Receiver	N9038A	MY53220110	Agilent	2021/7/28	2022/7/27
ETSTW-RE 003	EMI TEST RECEIVER	ESI 26	831438/001	R&S	2021/6/17	2022/6/16
ETSTW-RE 004	EMI TEST RECEIVER	ESI 40	832427/004	R&S	2021/9/28	2022/9/27
ETSTW-RE 012	TUNABLE BANDREJECT FILTER	D.C 0309	146	K&L	Function Test	
ETSTW-RE 013	TUNABLE BANDREJECT FILTER	D.C 0336	397	K&L	Function Test	
ETSTW-RE 018	MICROWAVE HORN ANTENNA	AT4560	27212	AR	2021/8/4	2022/8/3
ETSTW-RE 019	MICROWAVE HORN ANTENNA	22240-25	121074	FM	2021/5/31	2022/5/30
ETSTW-RE 027	Passive Loop Antenna	6512	00034563	ETS-Lindgren	2021/6/16	2022/6/15
ETSTW-RE 030	Double-Ridged Guide Horn Antenna	3117	00035224	ETS-Lindgren	2021/5/5	2022/5/4
ETSTW-RE 042	Biconical Antenna	HK116	100172	R&S	2021/3/18	2022/3/17
ETSTW-RE 043	Log-Periodic Dipole Antenna	HL223	100166	R&S	2021/5/21	2022/5/20
ETSTW-RE 044	Log-Periodic Antenna	HL050	100094	R&S	2021/7/14	2022/7/13
ETSTW-RE 045	ESA-E SERIES SPECTRUM ANALYZER	E4404B	MY45111242	Agilent	Pre-test Use	
ETSTW-RE 050	Attenuator 10dB	50HF-010-1	None	JFW	2021/2/19	2022/2/18
ETSTW-RE 051	Attenuator 6dB	50HF-006-1	None	JFW	2021/2/19	2022/2/18
ETSTW-RE 053	Attenuator 3dB	50HF-003-1	None	JFW	2021/2/19	2022/2/18
ETSTW-RE 055	SPECTRUM ANALYZER	FSU 26	200074	R&S	2021/3/16	2022/3/15
ETSTW-RE 060	Attenuator 30dB	5015-30	F651012z-01	ATM	2021/2/19	2022/2/18
ETSTW-RE 062	Amplifier Module	CHC 2	None	KMIC	2021/5/14	2022/5/13
ETSTW-RE 064	Bluetooth Test Set	MT8852B-042	6K00005709	Anritsu	Function Test	
ETSTW-RE 069	Double-Ridged Guide Horn Antenna	3117	00069377	ETS-Lindgren	Function Test	
ETSTW-RE 072	CELL SITE TEST SET	8921A	3339A00375	HP	2021/10/27	2022/10/26
ETSTW-RE 088	SOLID STATE AMPLIFIER	KMA180265A01	99057	KMIC	2021/9/17	2022/9/16
ETSTW-RE 091	Match Pad	MDCS1500	None	WOKEN	2021/5/27	2022/5/26
ETSTW-RE 099	DC Block	50DB-007-1	None	JFW	2021/2/19	2022/2/18

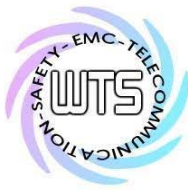


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Registration number: W6R22112-21431-C-9  
 FCC ID: GX9FPHUB3-1

ETSTW-RE 112	AC POWER SOURCE	TFC-1005	T-0A023536	T-Power	Function test	
ETSTW-RE 115	2.4GHz Notch Filter	N0124411	473874	MICROWAVE CIRCUITS	2021/1/6	2022/1/5
ETSTW-RE 120	RF Player	MP9200	MP9210-111022	ADIVIC	2021/10/29	2022/10/28
ETSTW-RE 122	SIGNAL GENERATOR	SMF100A	102149	R&S	2021/6/8	2022/6/7
ETSTW-RE 125	5GHz Notch filter	5NSL11-5200/E221.3-O/O	1	K&L Microwave	2021/8/6	2022/8/5
ETSTW-RE 126	5GHz Notch filter	5NSL12-5800/E221.3-O/O	1	K&L Microwave	2021/8/6	2022/8/5
ETSTW-RE 127	RF Switch Box	RFS-01	None	WTS	2021/2/19	2022/2/18
ETSTW-RE 128	5.3GHz Notch filter	N0153001	SN487233	Microwave Circuits	2021/8/6	2022/8/5
ETSTW-RE 129	5.5GHz Notch filter	N0555984	SN487234	Microwave Circuits	2021/8/6	2022/8/5
ETSTW-RE 130	Handheld RF Spectrum Analyzer	N9340A	CN0147000204	Agilent	Pre-test Use	
ETSTW-RE 142	Amplifier	8447D	2805A03378	Agilent	2021/5/14	2022/5/13
ETSTW-RE 146	Preamplifier	JPA-10MIG	15090004	JPT	2021/6/4	2022/6/3
ETSTW-RE 152	Bi-log Hybrid Antenna	MCTD 2786B	BLB20J04029	ETC	2021/10/5	2022/10/4
ETSTW-RE 153	Signal Analyzer	FSV40	101929	R&S	2021/10/6	2022/10/5
ETSTW-RE 159	Bi-log Hybrid Antenna (30M~1000 MHz)	MCTD 2786B	BLB21N04035	ETC	2021/12/06	2022/12/05
ETSTW-RF 002	Electromagnetic field probe	LF-30	K-0007	STT	2021/7/19	2022/7/18
ETSTW-EMI 011	USB Compact Modulator	SFC-U	101689	R&S	2021/6/2	2022/6/1
ETSTW-GSM 002	Universal Radio Communication Tester	CMU 200	109439	R&S	2021/3/16	2022/3/15
ETSTW-GSM 003	Radio Communication Analyzer	MT8820C	6201342073	Anritsu	2021/4/27	2022/4/26
ETSTW-GSM 004	Wideband Radio Communication Tester	CMW500	128092	R&S	2021/10/29	2022/10/28
ETSTW-GSM 019	Band Reject Filter	WRCTF824/849-822/851-40 /12+9SS	3	WI	2021/1/6	2022/1/5
ETSTW-GSM 020	Band Reject Filter	WRCD1747/1748-1743/1752-32/5SS	1	WI	2021/1/6	2022/1/5
ETSTW-GSM 021	Band Reject Filter	WRCD1879.5/1880.5-1875.5/1884.5-32/5SS	3	WI	2021/1/6	2022/1/5
ETSTW-GSM 022	Band Reject Filter	WRCT901.9/903.1-904.25-50/8SS	1	WI	2021/1/6	2022/1/5
ETSTW-GSM 023	Power Divider	4901.19.A	None	SUHNER	2021/9/7	2022/9/6
ETSTW-GSM 024	Radio Communication Analyzer	MT8821C	None	Anritsu	2021/4/1	2022/3/31
ETSTW-GSM 025	Band Reject Filter	BRM19835	001	Micro-Tronics	2021/8/6	2022/8/5
ETSTW-Cable 011	SMA to N type Cable	RGU-400	None	THERMAX	Pre-test Use NCR	
ETSTW-Cable 016	BNC Cable	Switch Box	B Cable 1	Schwarz beck	2021/2/19	2022/2/18
ETSTW-Cable 017	BNC Cable	X Cable	B Cable 2	Schwarz beck	2021/2/19	2022/2/18
ETSTW-Cable 018	BNC Cable	Y Cable	B Cable 3	Schwarz beck	2021/2/19	2022/2/18
ETSTW-Cable 019	BNC Cable	Z Cable	B Cable 4	Schwarz beck	2021/2/19	2022/2/18
ETSTW-Cable 020	N TYPE Cable	OATS Cable 1	N30N30-L335-15M	JYE BAO CO.,LTD.	2021/7/1	2022/6/30
ETSTW-Cable 027	Microwave Cable	SUCOFLEX 104	279083	HUBER+SUHNER	2021/5/7	2022/5/6
ETSTW-Cable 028	Microwave Cable	FA147A0015M2020	30064-2	UTIFLEX	2021/9/17	2022/9/16
ETSTW-Cable 029	Microwave Cable	FA147A0015M2020	30064-3	UTIFLEX	2021/9/17	2022/9/16

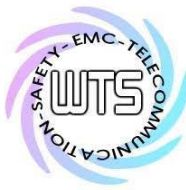




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ETSTW-Cable 030	Microwave Cable	SUCOFLEX 104 (S Cable 9)	279067	HUBER+SUHNER	2021/2/19	2022/2/18
ETSTW-Cable 043	Microwave Cable	SUCOFLEX 104	317576	HUBER+SUHNER	2021/5/14	2022/5/13
ETSTW-Cable 047	Microwave Cable	SUCOFLEX 104	325518	HUBER+SUHNER	2021/7/2	2022/7/1
ETSTW-Cable 058	Microwave Cable	SUCOFLEX 104	none	HUBER+SUHNER	2021/6/4	2022/6/3
ETSTW-Cable 064	Microwave Cable	SUCOFLEX 104	MY28891	HUBER+SUHNER	2021/5/14	2022/5/13
ETSTW-Cable 071	N TYPE CABLE	EMCCFD400-NM- NM-25000	170239	EMCI	2021/6/4	2022/6/3
ETSTW-Cable 072	SMA type cable (8m)	SUCOFLEX 104	805800/4	HUBER+SUHNER	2021/5/14	2022/5/13
ETSTW-Cable 074	SMA type cable (2m)	SUCOFLEX 104	802563/4	HUBER+SUHNER	2021/5/14	2022/5/13
WTSTW-SW 002	EMI TEST SOFTWARE	EZ EMC	None	Farad	Version ETS-03A1 Version EMEC-3A1+	
WTSTW-SW 006	EMI TEST SOFTWARE	e3	None	AUDIX	Version 9.161014	
WTSTW-SW 008	Signal studio	Agilent	None	AUDIX	Version 2.0.0.1	
ETSTW-TH 002	Thermohygrometer	608-H1	45204317	Testo	2021/10/18	2022/10/17
ETSTW-TH 003	Wireless weather station	GAIA	N/A	TFA	2021/10/18	2022/10/17



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## **2.4 General Test Procedure**

**POWER LINE CONDUCTED INTERFERENCE:** The procedure used was ANSI STANDARD C63.10-2013 6.2 using a LISN (if necessary). Both lines were observed. The bandwidth of the spectrum analyzer was 10 kHz with an appropriate sweep speed.

**RADIATION INTERFERENCE:** The test procedure used was according to ANSI STANDARD C63.10-2013 6.3 employing a spectrum analyzer. For investigated frequency is equal to or below 1GHz, the RBW and VBW of the spectrum analyzer was 100 kHz and 100kHz respectively with an appropriate sweep speed. For investigated frequency is above 1GHz, both of RBW and VBW of the spectrum analyzer were 1 MHz with an appropriate sweep speed. The analyzer was calibrated in dB above a microvolt at the output of the antenna.

**FORMULA OF CONVERSION FACTORS:** The Field Strength at 3m was established by adding the meter reading of the spectrum analyzer (which is set to read in units of dB $\mu$ V) to the antenna correction factor supplied by the antenna manufacturer. The antenna correction factors are stated in terms of dB.

Example:

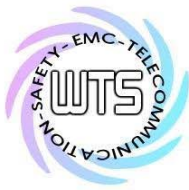
Freq (MHz)      METER READING + ACF + CABLE LOSS (to the receiver) = FS  
33                      20 dB $\mu$ V + 10.36 dB + 6 dB = 36.36 dB $\mu$ V/m @3m

**ANSI STANDARD C63.10-2013 6.2.2 MEASUREMENT PROCEDURES:** The EUT was placed on a table 80 cm height and with dimensions of 1m by 1.5m (non metallic table). The EUT was placed in the centre of the table. The table used for radiated measurements is capable of continuous rotation. The spectrum was scanned from 30 MHz to 10<sup>th</sup> harmonic of the fundamental.

Peak readings were taken in three (3) orthogonal planes and the highest readings.

When an emission was found, the table was rotated to produce the maximum signal strength. At this point, the antenna was raised and lowered from 1m to 4m. The antenna was placed in both the horizontal and vertical planes.

**ANSI STANDARD C63.10-2013 B.2.7:** Any measurements that utilize special test software shall be indicated and referenced in the test report. During testing, test software 'EZ EMC' was used for setting up different operation modes.

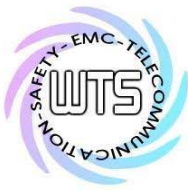


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**3 Test results (enclosure)**

Test case	Para. Number	Required	Test passed	Test failed
Out Power (Field Strength)	15.249 (a)	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>
Spurious Emissions radiated – Transmitter operating	15.249 (e)	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>
Spurious Emissions conducted – Transmitter operating	15.249 (e)	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Radiated Emission from Digital Part	15.109	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Out of Band Spurious Emission, Band edge-Transmitter operating	15.249 (e)	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>
Power Line Conducted Emission	15.207	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>

The following is intentionally left blank.



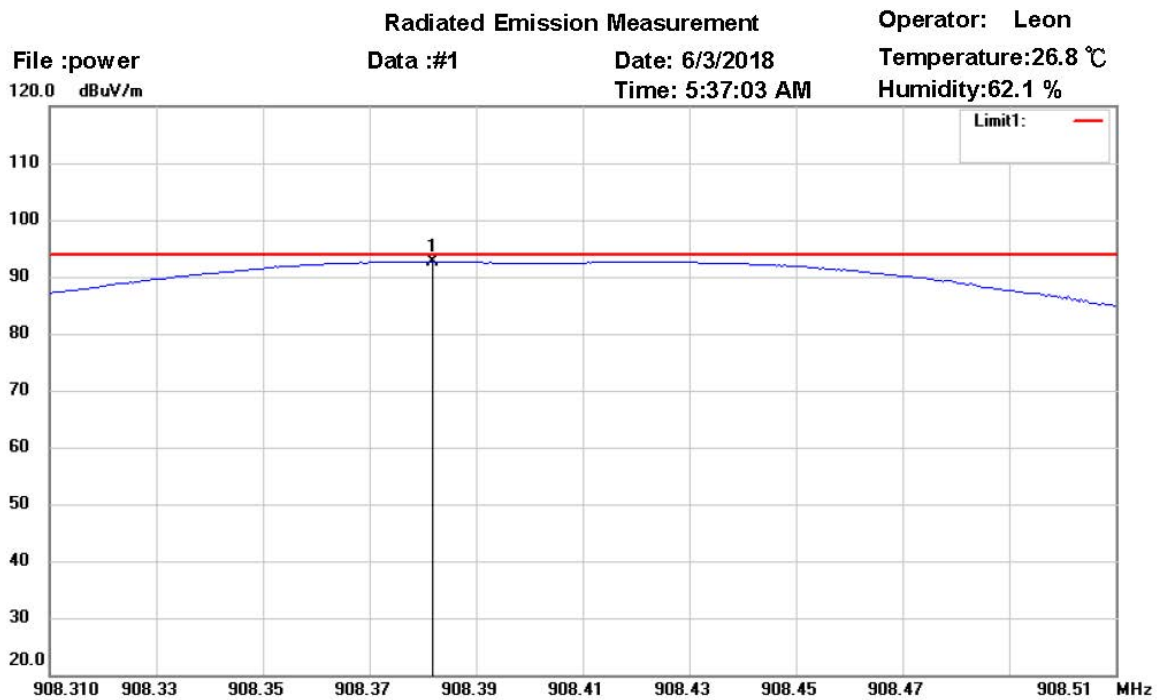
Registration number: W6R22112-21431-C-9  
 FCC ID: GX9FPHUB3-1

### 3.1 Out Power (Field Strength)

FCC Rule: 15.249 (b)

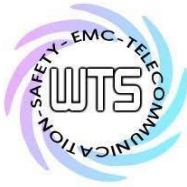
This measurement applies to equipment with an integral antenna and to equipment with an antenna connector and equipped with an antenna as declared by the applicant.

The power was measured with modulation (declared by the applicant).

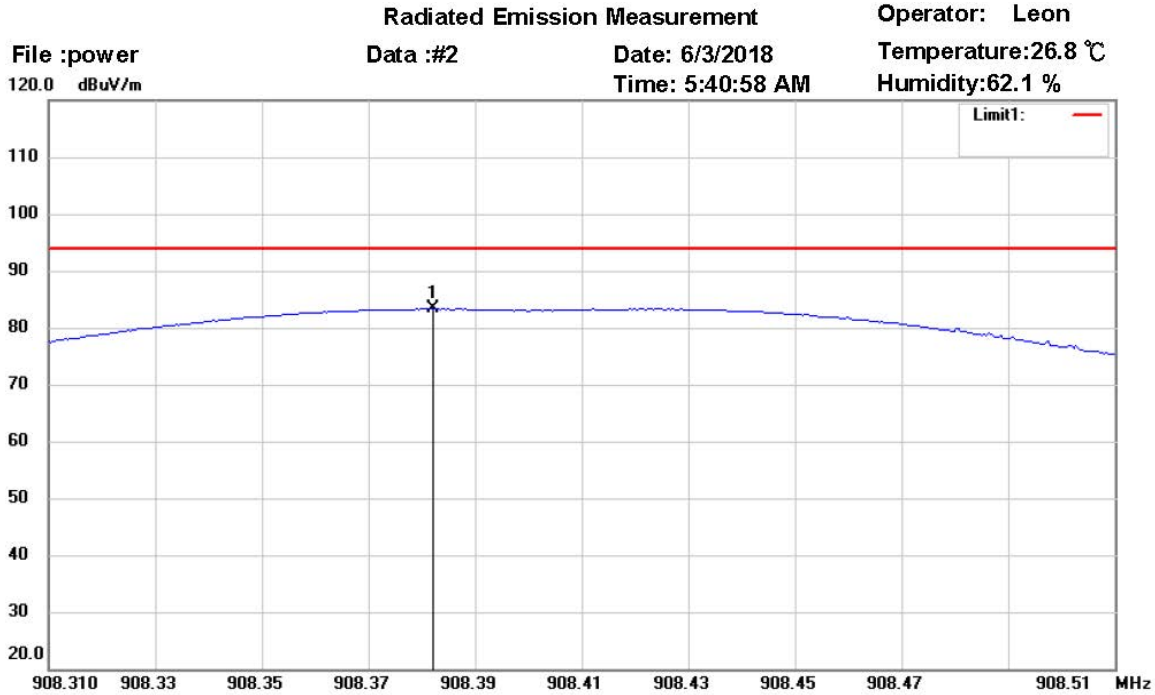


Site : Chamber  
 Condition : FCC 15.249 power(902-928)\_QP      Polarization: *Horizontal*  
 EUT : W6R21805-18133      Power : 120 Va.c.  
 M/N:      Distance: 3m  
 Test Mode : TX 908.41MHz  
 Note :

Mk.	Frequency (MHz)	Reading (dBuV)	Detector	Corr. factor (dB/m)	Result (dBuV/m)	Limit (dBuV/m)	Ant.Pos (cm)	Tab.Pos (deg.)	Margin (dB)	Comment
*	908.3817	59.75	QP	32.98	92.73	94.00	100	200	-1.27	



Registration number: W6R22112-21431-C-9  
 FCC ID: GX9FPHUB3-1



Site : Chamber

Condition : FCC 15.249 power(902-928)\_QP

EUT : W6R21805-18133

M/N:

Test Mode : TX 908.41MHz

Note :

Polarization: *Vertical*

Power : 120 Va.c.

Distance: 3m

Mk.	Frequency (MHz)	Reading (dBuV)	Detector	Corr. factor (dB/m)	Result (dBuV/m)	Limit (dBuV/m)	Ant.Pos (cm)	Tab.Pos (deg.)	Margin (dB)	Comment
*	908.3821	50.37	QP	32.98	83.35	94.00	100	30	-10.65	

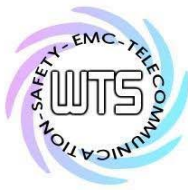
Test equipment used: ETSTW-RE 004, ETSTW-RE 030, ETSTW-RE 062, ETSTW-RE 142, ETSTW-RE 147

### 3.2 Equivalent isotropic radiated power

Because using an permanent antenna there are no deviations from the radiated test results according 3.1.

### 3.3 RF Exposure Compliance Requirements

Not applicable for this EUT for the low power level.



Registration number: W6R22112-21431-C-9  
FCC ID: GX9FPHUB3-1

**3.4 Out of Band Radiated Emissions**

FCC Rule: 15.249 (d)(e), 15.35(b)

Emissions radiated outside of the specified frequency bands, except for harmonics, shall be attenuated by at least 50 dB below the level of the fundamental or to the general radiated emission limits in Section 15.209, whichever is the lesser attenuation.

For frequency above 1000 MHz, the field strength limits are based on average limits. However, the peak field strength of any emission shall not exceed the maximum permitted average limits specified above by more than 20 dB under any condition of modulation. For point-to-point operation, the peak field strength shall not exceed 2500 millivolts/meter at 3 meters along the antenna azimuth.

Limits:

Frequency of Emission (MHz)	Field strength (microvolts/meter)	Field Strength (dB microvolts/meter)
30 - 88	100	40.0
88 – 216	150	43.5
216 – 960	200	46.5
Above 960	500	54.0

For frequencies above 1 GHz (Peak measurements).

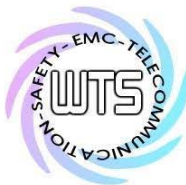
Limit + 20 dB     $54.0 \text{ dB}\mu\text{V/m} + 20 \text{ dB} = 74 \text{ dB}\mu\text{V/m}$

Or

Must be attenuated at least 50dB below the level of fundament

Test equipment used: ETSTW-RE 004, ETSTW-RE 062, ETSTW-RE 142, ETSTW-RE 147, ETSTW-RE 030

Explanation: Please see attached diagram as appendix.



Registration number: W6R22112-21431-C-9

FCC ID: GX9FPHUB3-1

### 3.5 Spurious emission (tx)

Spurious emission was measured with modulation (declared by manufacturer).

Emissions radiated outside of the specified frequency bands, except for harmonics, shall be attenuated by at least 50 dB below the level of the fundamental or to the general radiated emission limits in Section 15.209, whichever is the lesser attenuation.

For frequencies above 1000 MHz, the field strength limits are based on average limits. However, the peak field strength of any emission shall not exceed the maximum permitted average limits specified above by more than 20 dB under any condition of modulation. For point-to-point operation, the peak field strength shall not exceed 2500 millivolts/meter at 3 meters along the antenna azimuth.

SAMPLE CALCULATION OF LIMIT. ALL results will be updated by an automatic measuring system in accordance with point 2.3.

The peak and average spurious emission plots was measured with the average limits.  
The critical peak value listed in the table agree with the above calculated limits.

#### Summary table with radiated data of the test plots

Model:	FPHUB3.1	Date:	--	Engineer:	--
Mode:	--	Temperature:	-- °C		
Polarization:	Horizontal	Humidity:	-- %		

Frequency (MHz)	Reading (dBuV)	Detector	Factor (dB)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Table Degree (Deg.)	Ant. High (cm)
--	--	--	--	--	--	--	--	--
--	--	--	--	--	--	--	--	--

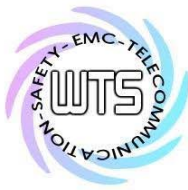
Polarization: Vertical

Frequency (MHz)	Reading (dBuV)	Detector	Factor (dB)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Table Degree (Deg.)	Ant. High (cm)
--	--	--	--	--	--	--	--	--
--	--	--	--	--	--	--	--	--

- Note**
1. Correction Factor = Antenna factor + Cable loss - Preamplifier
  2. The formula of measured value as: Test Result = Reading + Correction Factor
  3. Detector function in the form : PK = Peak, QP = Quasi Peak, AV = Average
  4. All not in the table noted test results are more than 20 dB below the relevant limits.
  5. Up Line: PK Limit Line, Down Line: Ave Limit Line.
  6. See attached diagrams in appendix.

**TEST RESULT (Transmitter):** The unit DOES meet the FCC requirements.

Test equipment used: ETSTW-RE 004, ETSTW-RE 062, ETSTW-RE 142, ETSTW-RE 152, ETSTW-RE 030, ETSTW-RE 088, ETSTW-RE 018



Registration number: W6R22112-21431-C-9  
FCC ID: GX9FPHUB3-1

### **3.6 Radiated Emissions from Digital Part**

#### **Summary table with radiated data of the test plots**

Except for Class A digital devices, the field strength of radiated emissions from unintentional radiators at a distance of 3 meters shall not exceed the following values:

Frequency of Emission (MHz)	Field Strength (microvolts/meter)	Field Strength (dBmicrovolts/meter)
30 – 88	100	40.0
88 – 216	150	43.5
216 – 960	200	46.0
Above 960	500	54.0

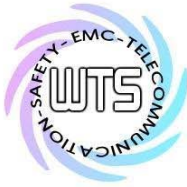
#### **Note**

- 1. Correction Factor = Antenna factor + Cable loss - Preamplifier**
- 2. The formula of measured value as: Test Result = Reading + Correction Factor**
- 3. Detector function in the form : PK = Peak, QP = Quasi Peak, AV = Average**
- 4. All not in the table noted test results are more than 20 dB below the relevant limits.**

Test equipment used: ETSTW-RE 004, ETSTW-RE 062, ETSTW-RE 142, ETSTW-RE 152, ETSTW-RE 030

Explanation: The test results are listed in the separated test report no.: W6R22112-21431-P-15B.

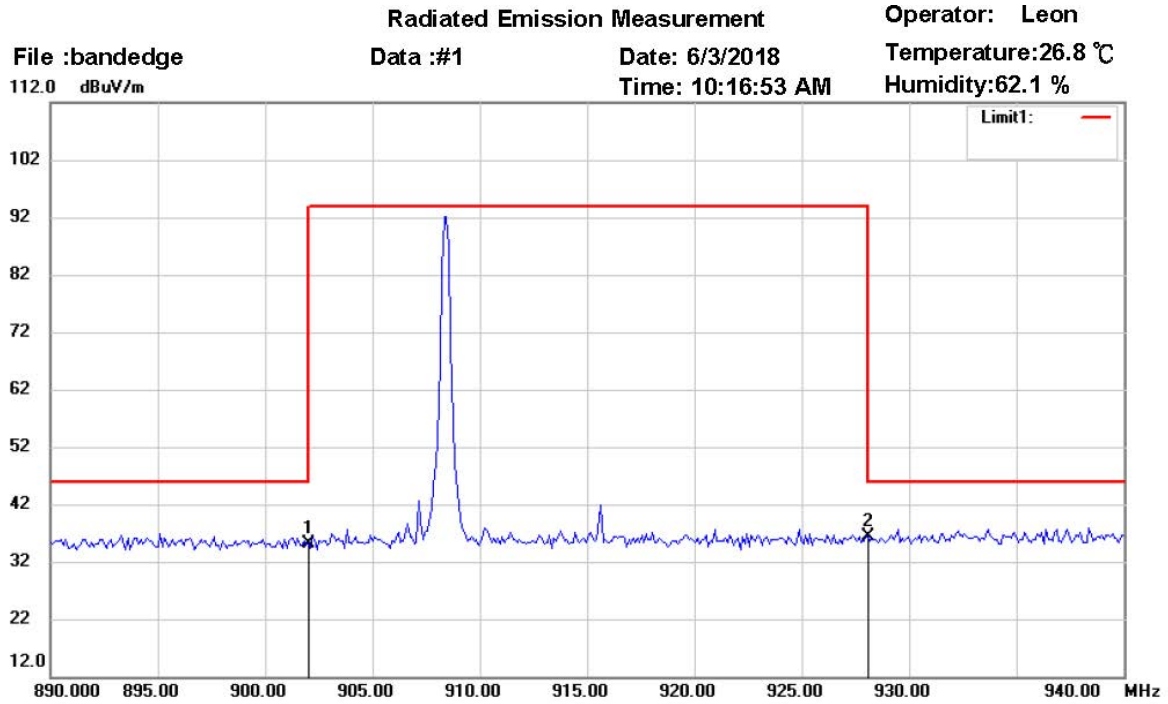




Registration number: W6R22112-21431-C-9  
 FCC ID: GX9FPHUB3-1

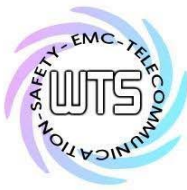
### 3.7 Radiated Emission on the band edge

From the following plots, they show that the fundamental emissions are confined in the specified band and hey at least 50 dB below the carrier level at band edge (2400 and 2483.5 MHz). It meets the requirement of section 15.249(d).



Site : Chamber  
 Condition : FCC 15.249 Bandedge(902-928)\_QP      Polarization: *Horizontal*  
 EUT : W6R21805-18133      Power : 120 Va.c.  
 M/N:      Distance: 3m  
 Test Mode : TX 908.41MHz  
 Note :

Mk.	Frequency (MHz)	Reading (dBuV)	Detector	Corr. factor (dB/m)	Result (dBuV/m)	Limit (dBuV/m)	Ant.Pos (cm)	Tab.Pos (deg.)	Margin (dB)	Comment
	902.0000	2.30	peak	32.88	35.18	46.00	100	200	-10.82	
*	928.0000	3.15	peak	33.30	36.45	46.00	100	200	-9.55	

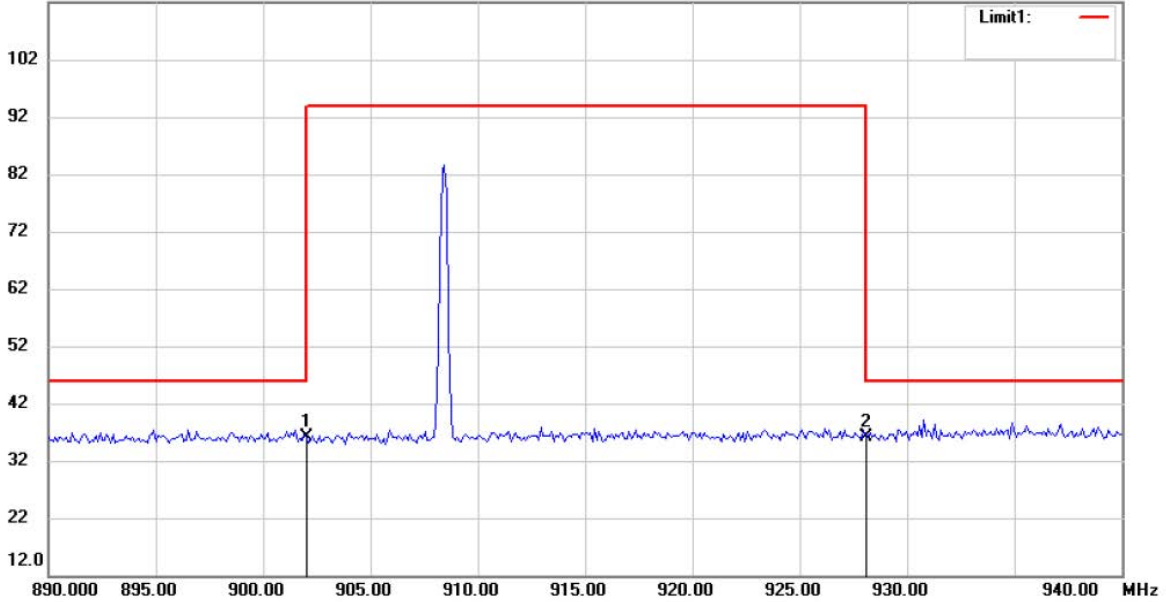


# Worldwide Testing Services(Taiwan) Co., Ltd.

Registration number: W6R22112-21431-C-9  
 FCC ID: GX9FPHUB3-1

**Radiated Emission Measurement**

File : bandedge      Data : #2      Date : 6/3/2018      Operator: Leon  
 112.0 dBuV/m      Time: 10:17:54 AM      Temperature: 26.8 °C  
 Humidity: 62.1 %



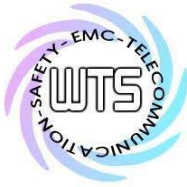
Site : Chamber  
 Condition : FCC 15.249 Bandedge(902-928)\_QP      Polarization: *Vertical*  
 EUT : W6R21805-18133      Power : 120 Va.c.  
 M/N:  
 Test Mode : TX 908.41MHz      Distance: 3m  
 Note :

Mk.	Frequency (MHz)	Reading (dBuV)	Detector	Corr. factor (dB/m)	Result (dBuV/m)	Limit (dBuV/m)	Ant.Pos (cm)	Tab.Pos (deg.)	Margin (dB)	Comment
*	902.0000	3.35	QP	32.88	36.23	46.00	100	30	-9.77	
	928.0000	2.91	QP	33.30	36.21	46.00	100	30	-9.79	

Limit:

Frequency Range (MHz)	Limit (dB $\mu$ V/m)	
	Peak	Average
902 – 928	114	94
2400 – 2483.5	74	54
5725 – 5875	74	54

Test equipment used: ETSTW-RE 004, ETSTW-RE 030, ETSTW-RE 062, ETSTW-RE 142, ETSTW-RE 147

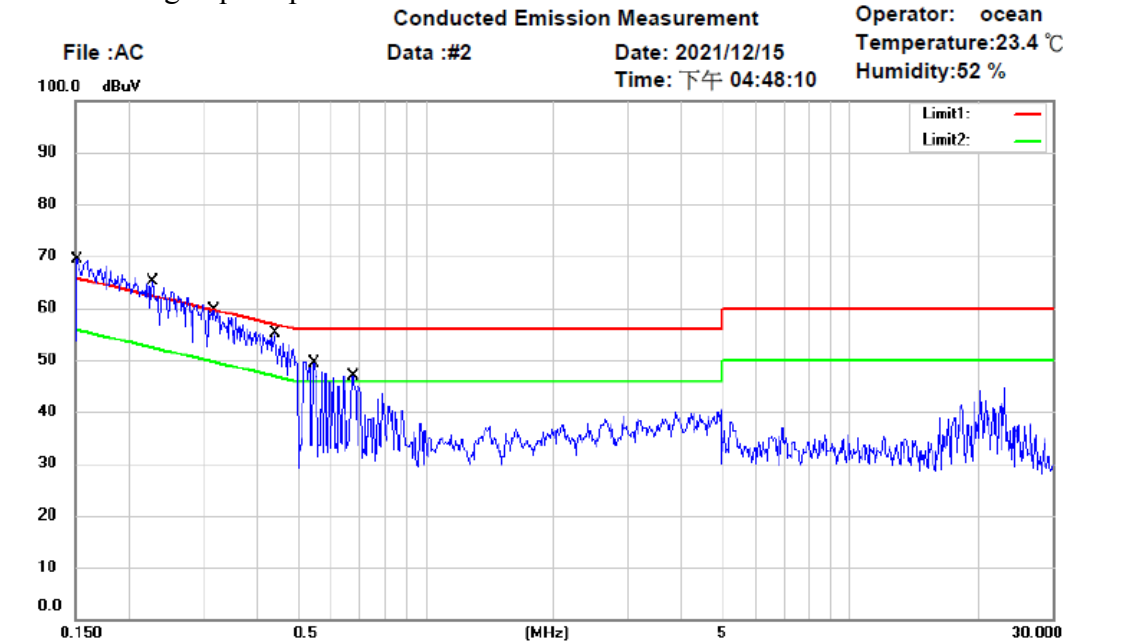


Registration number: W6R22112-21431-C-9  
 FCC ID: GX9FPHUB3-1

## 3.8 Power Line Conducted Emission

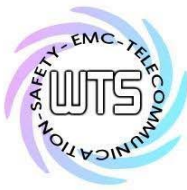
For an intentional radiator which is designed to be connected to the public utility (AC) power line, the radio frequency voltage that is conducted back onto the AC line on any frequency or frequencies within the band 150 kHz to 30 MHz shall not exceed the limits in the table bellows with this provision shall be based on the measurement of the radio frequency voltage between each power line and ground at the power terminals.

This measurement was transact first with instrumentation using an average and peak detector and a 10 kHz bandwidth. If the peak detector achieves a calculated level, the measurement is repeated by an instrumentation using a quasi-peak detector.



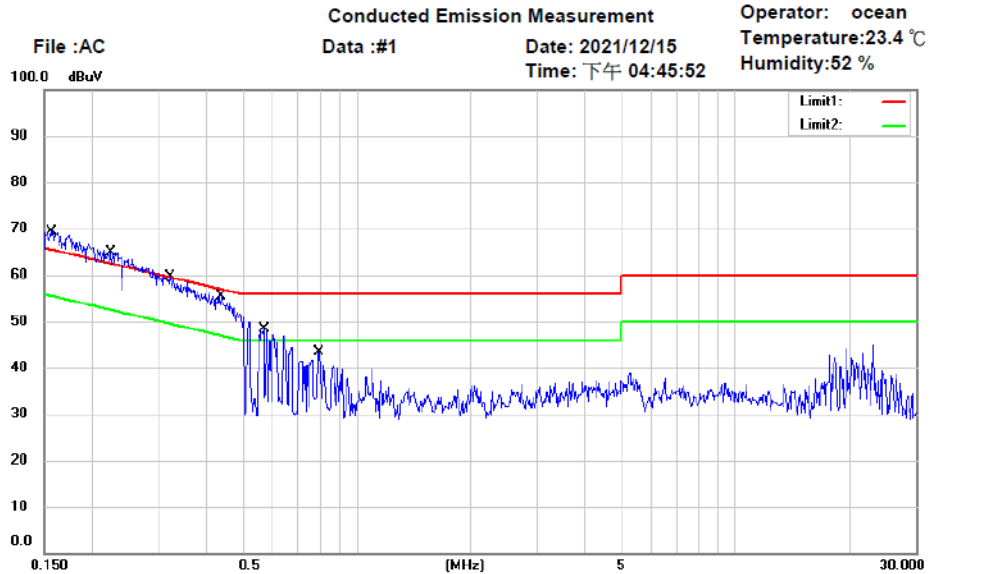
Site : Chamber\_03  
 Condition : FCC Part 15 Class B Conduction (QP)      Phase: N  
 EUT : W6R22112-21431      Power : 120 Va.c.  
 M/N:  
 Test Mode :  
 Note :

Mk.	Frequency (MHz)	Reading (dBuV)	Detector	Corrected factor(dB)	Result (dBuV)	Limit (dBuV)	Margin (dB)	Comment
	0.1508	46.49	QP	9.61	56.10	65.96	-9.86	
	0.1508	25.36	AVG	9.61	34.97	55.96	-20.99	
	0.2277	40.27	QP	9.59	49.86	62.53	-12.67	
	0.2277	18.62	AVG	9.59	28.21	52.53	-24.32	
	0.3168	36.51	QP	9.51	46.02	59.79	-13.77	
	0.3168	17.10	AVG	9.51	26.61	49.79	-23.18	
	0.4435	34.17	QP	9.46	43.63	57.00	-13.37	
*	0.4435	28.47	AVG	9.46	37.93	47.00	-9.07	
	0.5450	26.85	QP	9.50	36.35	56.00	-19.65	
	0.5450	6.98	AVG	9.50	16.48	46.00	-29.52	
	0.6732	22.00	QP	9.55	31.55	56.00	-24.45	
	0.6732	9.38	AVG	9.55	18.93	46.00	-27.07	



# Worldwide Testing Services(Taiwan) Co., Ltd.

Registration number: W6R22112-21431-C-9  
 FCC ID: GX9FPHUB3-1



Site : Chamber\_03  
 Condition : FCC Part 15 Class B Conduction (QP)      Phase: L1  
 EUT : W6R22112-21431      Power : 120 Va.c.  
 M/N:  
 Test Mode :  
 Note :

Mk.	Frequency (MHz)	Reading (dBuV)	Detector	Corrected factor(dB)	Result (dBuV)	Limit (dBuV)	Margin (dB)	Comment
	0.1573	47.05	QP	9.62	56.67	65.61	-8.94	
	0.1573	25.98	AVG	9.62	35.60	55.61	-20.01	
	0.2251	42.31	QP	9.60	51.91	62.63	-10.72	
	0.2251	18.71	AVG	9.60	28.31	52.63	-24.32	
	0.3224	36.51	QP	9.52	46.03	59.64	-13.61	
	0.3224	17.66	AVG	9.52	27.18	49.64	-22.46	
	0.4390	37.23	QP	9.47	46.70	57.08	-10.38	
*	0.4390	33.24	AVG	9.47	42.71	47.08	-4.37	
	0.5697	26.47	QP	9.52	35.99	56.00	-20.01	
	0.5697	11.98	AVG	9.52	21.50	46.00	-24.50	
	0.7925	19.66	QP	9.61	29.27	56.00	-26.73	
	0.7925	12.68	AVG	9.61	22.29	46.00	-23.71	

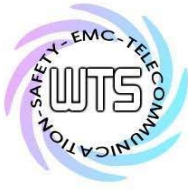
**Note:**

1. The formula of measured value as: Test Result = Reading + Correction Factor
2. The Correction Factor = Cable Loss + LISN Insertion Loss
3. Detector function in the form : PK = Peak, QP = Quasi Peak, AV = Average
4. All not in the table noted test results are more than 20 dB below the relevant limits.
5. Up Line: QP Limit Line, Down Line: Ave Limit Line.

**Limits:**

Frequency of Emission (MHz)	Conducted Limit (dBuV)	
	Quasi Peak	Average
0.15-0.5	66 to 56	56 to 46
0.5-5	56	46
5-30	60	50

Test equipment used: ETSTW-CE 016, ETSTW-CE 028, ETSTW-RE-045



Registration number: W6R22112-21431-C-9  
FCC ID: GX9FPHUB3-1

## **Appendix**

Spurious Emissions radiated \_TX\_Z-Wave



Radiated Emission Measurement

Operator: Leon

File :1

Data :#1

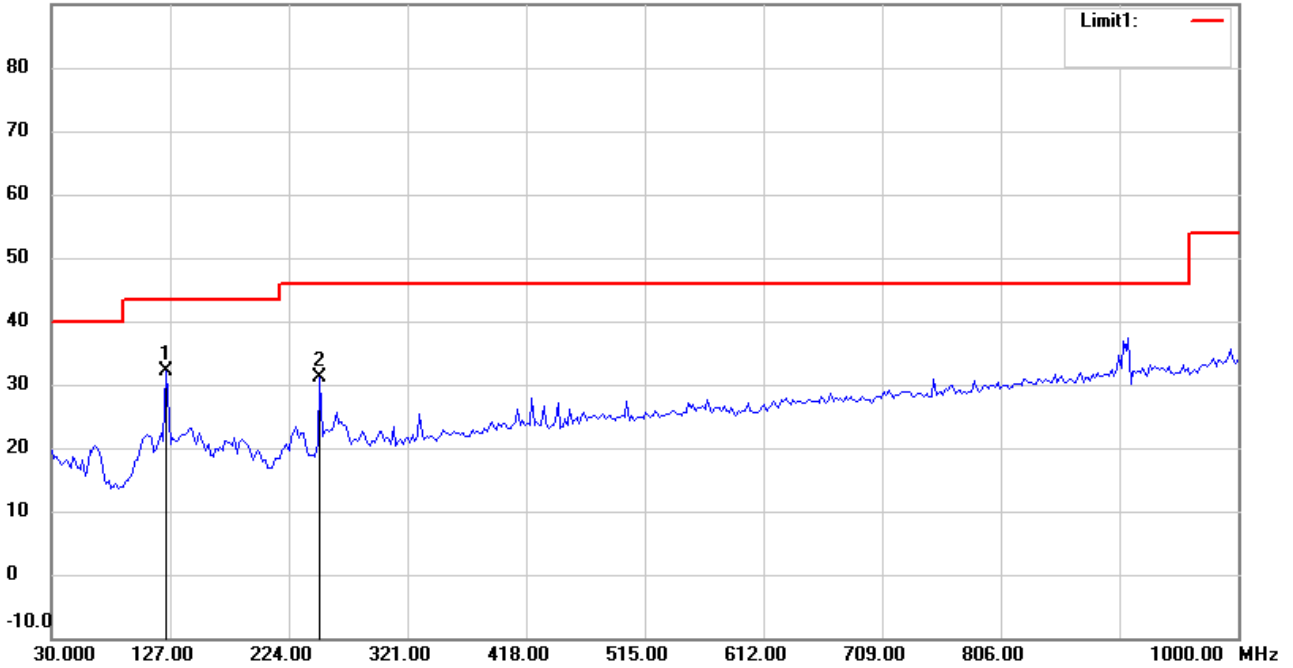
Date: 6/3/2018

Temperature:26.8 °C

90.0 dBuV/m

Time: 10:23:54 AM

Humidity:62.1 %



Site : Chamber

Condition : FCC\_part 15 RE-Class C\_30-1000MHz

Polarization: *Horizontal*

EUT : W6R21805-18133

Power : 120 Va.c.

M/N:

Distance: 3m

Test Mode : TX 908.41MHz

Note :

Mk.	Frequency (MHz)	Reading (dBuV)	Detector	Corr. factor (dB/m)	Result (dBuV/m)	Limit (dBuV/m)	Ant.Pos (cm)	Tab.Pos (deg.)	Margin (dB)	Comment
*	123.3066	38.68	peak	-6.50	32.18	43.50	100	245	-11.32	
	249.6593	38.61	peak	-7.39	31.22	46.00	100	190	-14.78	



Radiated Emission Measurement

Operator: Leon

File :1

Data :#2

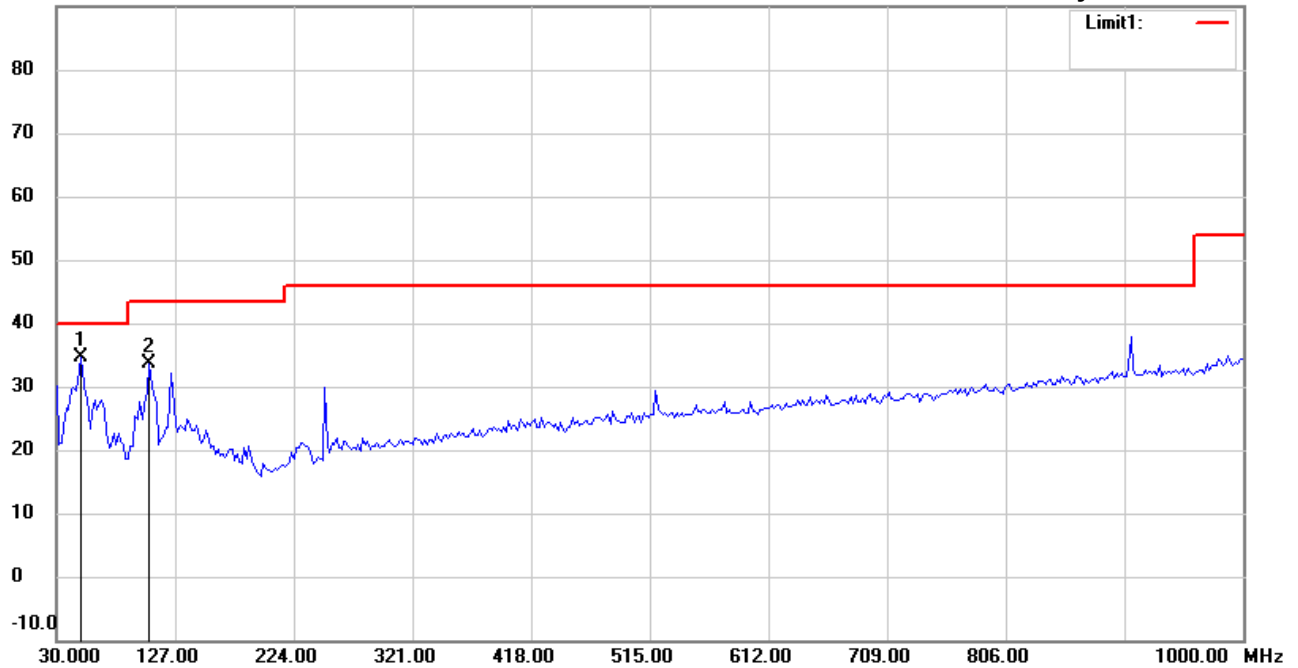
Date: 6/3/2018

Temperature:26.8 °C

90.0 dBuV/m

Time: 10:27:33 AM

Humidity:62.1 %



Site : Chamber

Condition : FCC\_part 15 RE-Class C\_30-1000MHz

Polarization: *Vertical*

EUT : W6R21805-18133

Power : 120 Va.c.

M/N:

Distance: 3m

Test Mode : TX 908.41MHz

Note :

Mk.	Frequency (MHz)	Reading (dBuV)	Detector	Corr. factor (dB/m)	Result (dBuV/m)	Limit (dBuV/m)	Ant.Pos (cm)	Tab.Pos (deg.)	Margin (dB)	Comment
*	49.4388	44.77	peak	-10.03	34.74	40.00	100	215	-5.26	
	105.8116	42.13	peak	-8.44	33.69	43.50	100	110	-9.81	



Radiated Emission Measurement

Operator: Leon

File :3

Data :#1

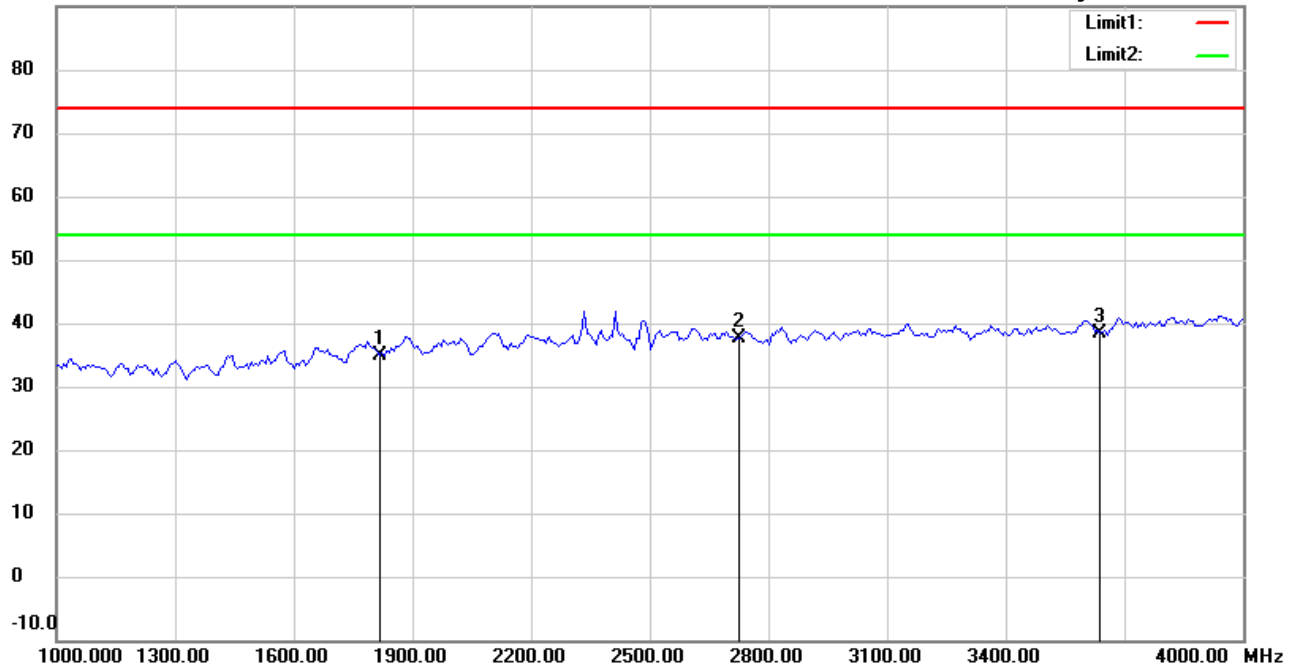
Date: 6/3/2018

Temperature:26.8 °C

90.0 dBuV/m

Time: 6:32:42 AM

Humidity:62.1 %



Site : Chamber

Condition : FCC\_part 15 RE-Class C\_Above 1GHz\_PK

EUT : W6R21805-18133

M/N:

Test Mode : TX 908.41MHz

Note :

Polarization: *Horizontal*

Power : 120 Va.c.

Distance: 3m

Mk.	Frequency (MHz)	Reading (dBuV)	Detector	Corr. factor (dB/m)	Result (dBuV/m)	Limit (dBuV/m)	Ant.Pos (cm)	Tab.Pos (deg.)	Margin (dB)	Comment
	1816.820	41.29	peak	-6.44	34.85	74.00	150	175	-39.15	
	2725.230	41.59	peak	-3.84	37.75	74.00	150	95	-36.25	
*	3633.640	39.68	peak	-1.19	38.49	74.00	150	20	-35.51	





Radiated Emission Measurement

Operator: Leon

File :3

Data :#4

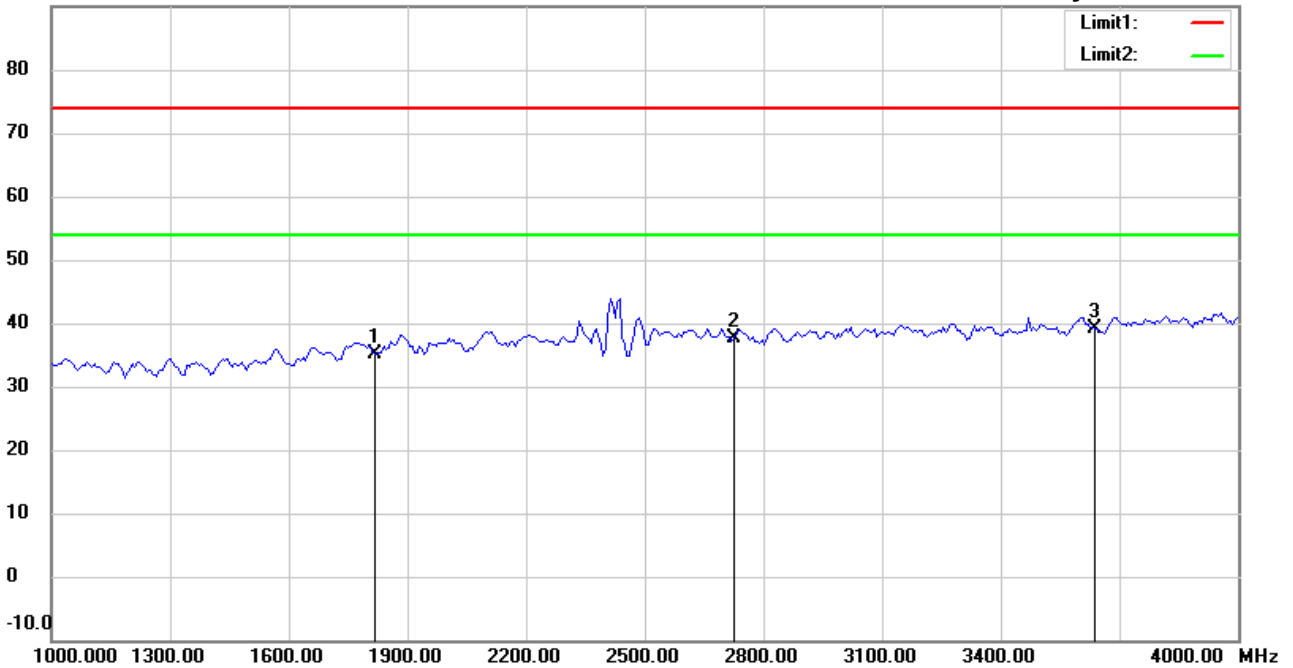
Date: 6/3/2018

Temperature:26.8 °C

90.0 dBuV/m

Time: 6:35:05 AM

Humidity:62.1 %



Site : Chamber

Condition : FCC\_part 15 RE-Class C\_Above 1GHz\_PK

Polarization: **Vertical**

EUT : W6R21805-18133

Power : 120 Va.c.

M/N:

Distance: 3m

Test Mode : TX 908.41MHz

Note :

Mk.	Frequency (MHz)	Reading (dBuV)	Detector	Corr. factor (dB/m)	Result (dBuV/m)	Limit (dBuV/m)	Ant.Pos (cm)	Tab.Pos (deg.)	Margin (dB)	Comment
	1816.820	41.67	peak	-6.44	35.23	74.00	150	40	-38.77	
	2725.230	41.36	peak	-3.84	37.52	74.00	150	110	-36.48	
*	3633.640	40.22	peak	-1.19	39.03	74.00	150	75	-34.97	



Address:6F.,No.58,Ln 188,Ruey Kuang Rd,Neihu,Taipei  
 Tel:+886-2-6606-8877  
 Fax:+886-2-6606-8879

Radiated Emission Measurement

Operator: Leon

File :3

Data :#2

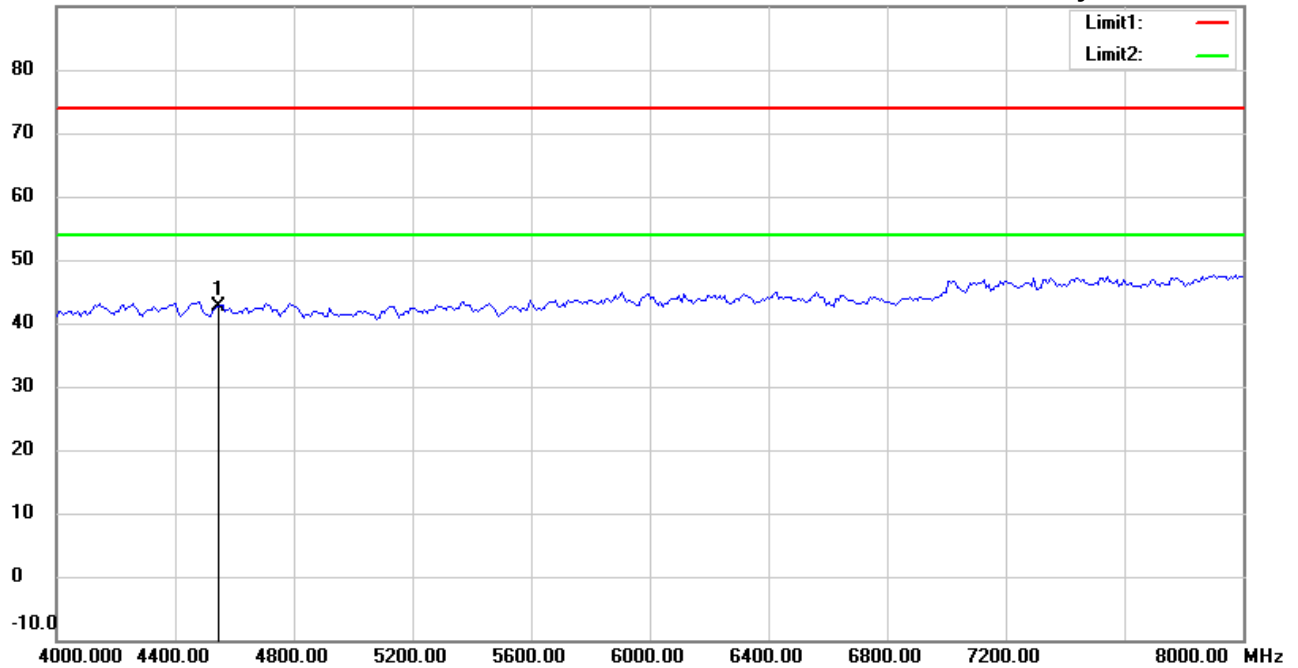
Date: 6/3/2018

Temperature:26.8 °C

90.0 dBuV/m

Time: 6:37:29 AM

Humidity:62.1 %



Site : Chamber

Condition : FCC\_part 15 RE-Class C\_Above 1GHz\_PK

Polarization: *Horizontal*

EUT : W6R21805-18133

Power : 120 Va.c.

M/N:

Distance: 3m

Test Mode : TX 908.41MHz

Note :

Mk.	Frequency (MHz)	Reading (dBuV)	Detector	Corr. factor (dB/m)	Result (dBuV/m)	Limit (dBuV/m)	Ant.Pos (cm)	Tab.Pos (deg.)	Margin (dB)	Comment
*	4542.050	41.91	peak	0.77	42.68	74.00	150	76	-31.32	

\*:Maximum data x:Over limit !:over margin



Address:6F.,No.58,Ln 188,Ruey Kuang Rd,Neihu,Taipei  
 Tel:+886-2-6606-8877  
 Fax:+886-2-6606-8879

Radiated Emission Measurement

Operator: Leon

File :3

Data :#5

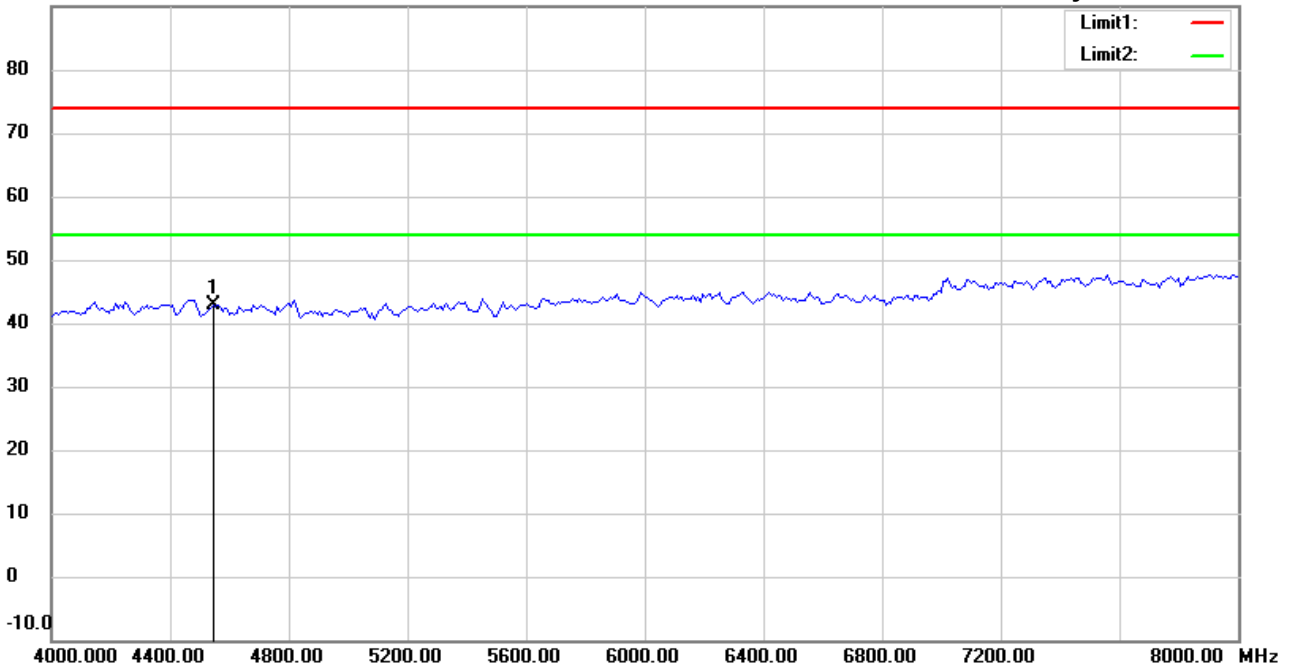
Date: 6/3/2018

Temperature:26.8 °C

90.0 dBuV/m

Time: 6:41:34 AM

Humidity:62.1 %



Site : Chamber

Condition : FCC\_part 15 RE-Class C\_Above 1GHz\_PK

Polarization: *Vertical*

EUT : W6R21805-18133

Power : 120 Va.c.

M/N:

Distance: 3m

Test Mode : TX 908.41MHz

Note :

Mk.	Frequency (MHz)	Reading (dBuV)	Detector	Corr. factor (dB/m)	Result (dBuV/m)	Limit (dBuV/m)	Ant.Pos (cm)	Tab.Pos (deg.)	Margin (dB)	Comment
*	4542.050	42.05	peak	0.77	42.82	74.00	150	211	-31.18	

\*:Maximum data    x:Over limit    !:over margin



Address:6F.,No.58,Ln 188,Ruey Kuang Rd,Neihu,Taipei  
 Tel:+886-2-6606-8877  
 Fax:+886-2-6606-8879

Radiated Emission Measurement

Operator: Leon

File :3

Data :#3

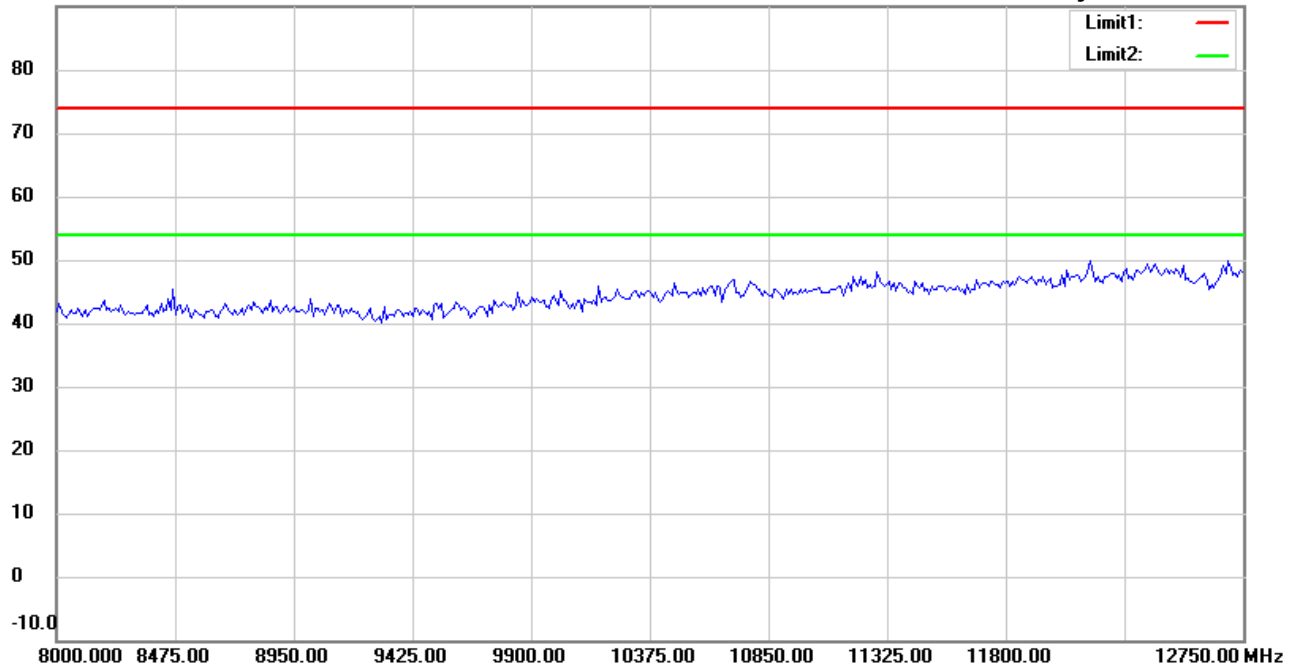
Date: 6/3/2018

Temperature:26.8 °C

90.0 dBuV/m

Time: 6:42:12 AM

Humidity:62.1 %



Site : Chamber

Condition : FCC\_part 15 RE-Class C\_Above 1GHz\_PK

Polarization: *Horizontal*

EUT : W6R21805-18133

Power : 120 Va.c.

M/N:

Distance: 3m

Test Mode : TX 908.41MHz

Note :

Mk.	Frequency (MHz)	Reading (dBuV)	Detector	Corr. factor (dB/m)	Result (dBuV/m)	Limit (dBuV/m)	Ant.Pos (cm)	Tab.Pos (deg.)	Margin (dB)	Comment
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\*:Maximum data    x:Over limit    !:over margin



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 Tel:+886-2-6606-8877  
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Radiated Emission Measurement

Operator: Leon

File :3

Data :#6

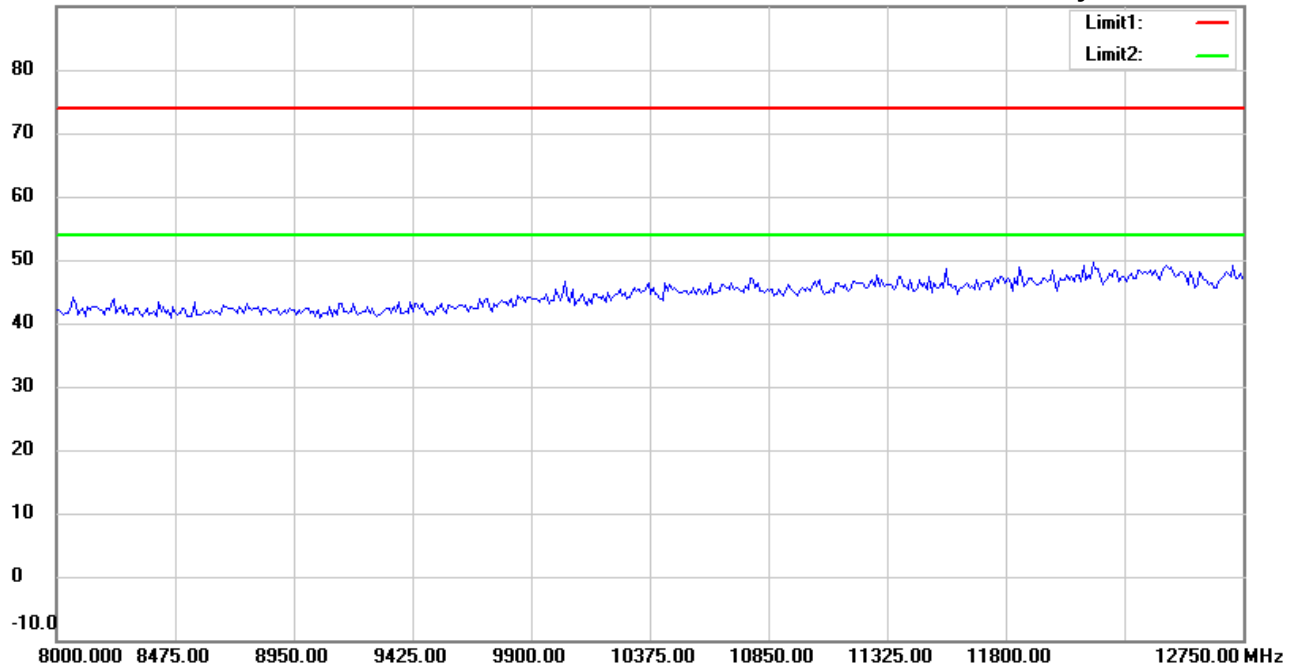
Date: 6/3/2018

Temperature:26.8 °C

90.0 dBuV/m

Time: 6:42:28 AM

Humidity:62.1 %



Site : Chamber

Condition : FCC\_part 15 RE-Class C\_Above 1GHz\_PK

Polarization: *Vertical*

EUT : W6R21805-18133

Power : 120 Va.c.

M/N:

Distance: 3m

Test Mode : TX 908.41MHz

Note :

Mk.	Frequency (MHz)	Reading (dBuV)	Detector	Corr. factor (dB/m)	Result (dBuV/m)	Limit (dBuV/m)	Ant.Pos (cm)	Tab.Pos (deg.)	Margin (dB)	Comment
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\*:Maximum data    x:Over limit    !:over margin