

FCC PART SUBPART C TEST REPORT

for

IOT Gateway

Model No.: IOT-GW-02

FCC ID: 2AI42IOT-GW-02

of

Applicant: HARMAN CONNECTED SERVICES

**Address: Plot No.3 & 3A, EOIZ Industrial Area, Sy.No.85 and 86,
Sadaramangala Village, Krishnarajapuram Hobli,
Bangalore-560066, Karnataka, India**

Tested and Prepared

by

Worldwide Testing Services (Taiwan) Co., Ltd.

FCC Registration No.: 930600

Industry Canada filed test laboratory Reg. No. IC 5679A-1, IC 5107A-1

A2LA Accredited No.: 2732.01



Report No.: W6M21607-16005-C-1

6F, NO. 58, LANE 188, RUEY-KUANG RD., NEIHU TAIPEI 114, TAIWAN, R.O.C.
TEL: 886-2-66068877 FAX: 886-2-66068879 E-mail: wts@wts-lab.com

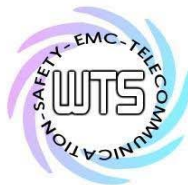
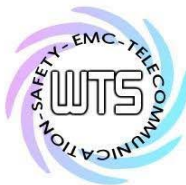


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Worldwide Testing Services(Taiwan) Co., Ltd.

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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.

The test report may only be reproduced or published in full.

Reproduction or publication of extracts from the report requires the prior written approval of the Worldwide Testing Services(Taiwan) Co., Ltd.

Tester:

July 28, 2016

Mark Cheng

Mark Cheng.

Date

WTS-Lab.

Name

Signature

Technical responsibility for area of testing:

July 28, 2016

Kevin Wang

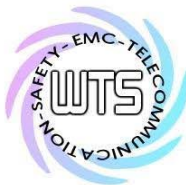
Kevin Wang

Date

WTS

Name

Signature



Worldwide Testing Services(Taiwan) Co., Ltd.

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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

A2LA accredited number: 2730.01

FCC filed test laboratory Reg. No. 930600

Industry Canada filed test laboratory Reg. No. IC 5679A-1, IC 5107A-1

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

Name: ./.

Accredited number: ./.

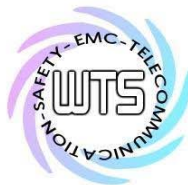
Street: ./.

Town: ./.

Country: ./.

Telephone: ./.

Fax: ./.



Worldwide Testing Services(Taiwan) Co., Ltd.

Registration number: W6M21607-16005-C-1

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1.3 Details of approval holder

Name: HARMAN CONNECTED SERVICES
Street: Plot No.3 & 3A, EOIZ Industrial Area, Sy.No.85 and 86,
Sadaramangala Village, Krishnarajapuram Hobli,
City: Bangalore-560066, Karnataka,
Country: India
Telephone: +91 (80) 3307 1000
Fax: +91 (80) 3307 2000

1.4 Application details

Date of receipt of test item: July 15, 2016
Date of test: From July 15, 2016 to July 28, 2016

1.5 General information of Test item

Type of test item: IOT Gateway
Model Number: IOT-GW-02
Multi-listing model number: ./.
Photos: see Annex

Technical data

Frequency band: 2.405 GHz
Operation Frequency: 2.405 GHz
Operation modes: Duplex
Modulation Type: OQPSK
Antenna type: Multilayer Chip Antenna
Power supply: 2.5 dBi

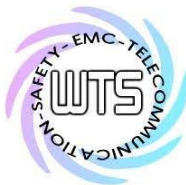
Manufacturer: (if different from applicant)

Name: VVDN Technologies Pvt. Ltd
Street: B-22, Infocity Sector-34,
Town: Gurgaon-122001, Haryana,
Country: India

Additional information: ./.

1.6 Test standards

Technical standard : FCC RULES PART 15 SUBPART C § 15.249 (2015-10)



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2 Technical test

2.1 Summary of test results

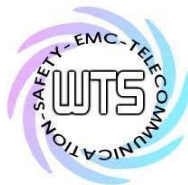
No deviations from the technical specification(s) were ascertained in the course of the tests performed. ☒

or

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

2.2 Test environment

Temperature:	23 °C
Relative humidity content:	20 ... 75 %
Air pressure:	86 ... 103 kPa
Details Power supply:	USB Adapter (I/P: 100-240VAC, 50/60Hz, 0.3A O/P: 5V, 2000mA) Optional Adapter (I/P: 100-240V ~ 50/60Hz, 0.2A O/P: 5V, 1A)
Extreme conditions parameters:	Not required



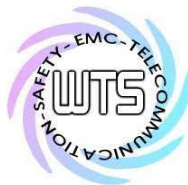
Worldwide Testing Services(Taiwan) Co., Ltd.

Registration number: W6M21607-16005-C-1

FCC ID: 2A142IOT-GW-02

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	2016/5/20	2017/5/19
ETSTW-CE 003	AC POWER SOURCE	APS-9102	D161137	GW	Function Test	
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	2016/7/12	2017/7/11
ETSTW-CE 016	TWO-LINE V-NETWORK	ENV216	100050	R&S	2015/9/7	2016/9/6
ETSTW-RE 003	EMI TEST RECEIVER	ESI 26	831438/001	R&S	2016/5/20	2017/5/19
ETSTW-RE 004	EMI TEST RECEIVER	ESI 40	832427/004	R&S	2016/5/25	2017/5/24
ETSTW-RE 005	EMI TEST RECEIVER	ESVS10	843207/020	R&S	2016/7/4	2017/7/3
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	2016/6/24	2017/6/23
ETSTW-RE 027	Passive Loop Antenna	6512	00034563	ETS-Lindgren	2016/6/29	2017/6/28
ETSTW-RE 030	Double-Ridged Guide Horn Antenna	3117	00035224	ETS-Lindgren	2016/3/23	2017/3/22
ETSTW-RE 042	Biconical Antenna	HK116	100172	R&S	2016/1/25	2017/1/24
ETSTW-RE 043	Log-Periodic Dipole Antenna	HL223	100166	R&S	2016/3/28	2017/3/27
ETSTW-RE 044	Log-Periodic Antenna	HL050	100094	R&S	2016/4/14	2017/4/13
ETSTW-RE 045	ESA-E SERIES SPECTRUM ANALYZER	E4404B	MY45111242	Agilent	Pre-test Use	
ETSTW-RE 050	Attenuator 10dB	50HF-010-1	None	JFW	2016/2/25	2017/2/24
ETSTW-RE 051	Attenuator 6dB	50HF-006-1	None	JFW	2016/2/25	2017/2/24
ETSTW-RE 053	Attenuator 3dB	50HF-003-1	None	JFW	2016/2/25	2017/2/24
ETSTW-RE 055	SPECTRUM ANALYZER	FSU 26	200074	R&S	2016/2/27	2017/2/26
ETSTW-RE 060	Attenuator 30dB	5015-30	F651012z-01	ATM	2016/2/25	2017/2/24
ETSTW-RE 062	Amplifier Module	CHC 2	None	KMIC	2016/4/13	2017/4/12
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	2015/9/6	2016/9/5
ETSTW-RE 088	SOLID STATE AMPLIFIER	KMA180265A01	99057	KMIC	2015/9/21	2016/9/20
ETSTW-RE 099	DC Block	50DB-007-1	None	JFW	2016/2/25	2017/2/24
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	2016/1/13	2017/1/12
ETSTW-RE 120	RF Player	MP9200	MP9210-111022	ADIVIC	Function test	
ETSTW-RE 122	SIGNAL GENERATOR	SMF100A	102149	R&S	2016/5/23	2017/5/22
ETSTW-RE 125	5GHz Notch filter	5NSL11-5200/E221.3-O/O	1	K&L Microwave	2015/8/11	2016/8/10
ETSTW-RE 126	5GHz Notch filter	5NSL11-5800/E221.3-O/O	1	K&L Microwave	2015/8/11	2016/8/10

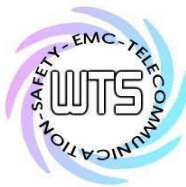


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ETSTW-RE 127	RF Switch Box	RFS-01	None	WTS	2016/2/25	2017/2/24
ETSTW-RE 128	5.3GHz Notch filter	N0153001	SN487233	Microwave Circuits	2015/8/11	2016/8/10
ETSTW-RE 129	5.5GHz Notch filter	N0555984	SN487234	Microwave Circuits	2015/8/11	2016/8/10
ETSTW-RE 130	Handheld RF Spectrum Analyzer	N9340A	CN0147000204	Agilent	Pre-test Use	
ETSTW-RE 142	Amplifier	8447D	2805A03378	Agilent	2016/4/13	2017/4/12
ETSTW-RE 143	Humidity Temperature Meter	TES-1260	110104623	TES	2015/9/9	2016/9/8
ETSTW-RE 147	Bi-log Hybrid Antenna	MCTD 2786B	BLB16M04005	ETC	2016/3/31	2017/3/30
ETSTW-EMI 011	USB Compact Modulator	SFC-U	101689	R&S	2016/5/4	2017/5/3
ETSTW-GSM 002	Universal Radio Communication Tester	CMU 200	109439	R&S	2016/3/4	2017/3/3
ETSTW-GSM 003	Radio Communication Analyzer	MT8820C	6201342073	Anritsu	2016/2/3	2017/2/2
ETSTW-GSM 019	Band Reject Filter	WRCTF824/849-822/851-40 /12+9SS	3	WI	2016/1/13	2017/1/12
ETSTW-GSM 020	Band Reject Filter	WRCD1747/1748-1743/1752-32/5SS	1	WI	2016/1/13	2017/1/12
ETSTW-GSM 021	Band Reject Filter	WRCD1879.5/1880.5-1875.5/1884.5-32/5SS	3	WI	2016/1/13	2017/1/12
ETSTW-GSM 022	Band Reject Filter	WRCT901.9/903.1-904.25-50/8SS	1	WI	2016/1/13	2017/1/12
ETSTW-GSM 023	Power Divider	4901.19.A	None	SUHNER	2015/9/16	2016/9/15
ETSTW-Cable 010	BNC Cable	5 M BNC Cable	None	JYE BAO CO.,LTD.	2015/9/11	2016/9/10
ETSTW-Cable 011	BNC Cable	BNC Cable 1	None	JYE BAO CO.,LTD.	Pre-test Use NCR	
ETSTW-Cable 012	N TYPE To SMA Cable	Cable 012	None	JYE BAO CO.,LTD.	2015/9/11	2016/9/10
ETSTW-Cable 016	BNC Cable	Switch Box	B Cable 1	Schwarz beck	2016/2/24	2017/2/23
ETSTW-Cable 017	BNC Cable	X Cable	B Cable 2	Schwarz beck	2016/2/24	2017/2/23
ETSTW-Cable 018	BNC Cable	Y Cable	B Cable 3	Schwarz beck	2016/2/24	2017/2/23
ETSTW-Cable 019	BNC Cable	Z Cable	B Cable 4	Schwarz beck	2016/2/24	2017/2/23
ETSTW-Cable 020	N TYPE Cable	OATS Cable 1	N30N30-L335-15M	JYE BAO CO.,LTD.	2016/4/22	2017/4/21
ETSTW-Cable 022	N TYPE Cable	5006	0002	JYE BAO CO.,LTD.	2016/4/7	2017/4/6
ETSTW-Cable 026	Microwave Cable	SUCOFLEX 104	279075	HUBER+SUHNER	2016/2/25	2017/2/24
ETSTW-Cable 027	Microwave Cable	SUCOFLEX 104	279083	HUBER+SUHNER	2016/5/13	2017/5/12
ETSTW-Cable 028	Microwave Cable	FA147A0015M2020	30064-2	UTIFLEX	2015/9/21	2016/9/20
ETSTW-Cable 029	Microwave Cable	FA147A0015M2020	30064-3	UTIFLEX	2015/9/21	2016/9/20
ETSTW-Cable 030	Microwave Cable	SUCOFLEX 104 (S_Cable 9)	279067	HUBER+SUHNER	2016/2/25	2017/2/24
ETSTW-Cable 031	Microwave Cable	SUCOFLEX 104 (S_Cable 10)	238092	HUBER+SUHNER	2016/4/13	2017/4/12
ETSTW-Cable 043	Microwave Cable	SUCOFLEX 104	317576	HUBER+SUHNER	2016/4/13	2017/4/12
ETSTW-Cable 048	Microwave Cable	SUCOFLEX 104	325518	HUBER+SUHNER	2016/4/13	2017/4/12
ETSTW-Cable 058	Microwave Cable	SUCOFLEX 104	none	HUBER+SUHNER	2016/4/7	2017/4/6
ETSTW-Cable 064	Microwave Cable	SUCOFLEX 104	MY28891	HUBER+SUHNER	2016/4/13	2017/4/12
WTSTW-SW 002	EMI TEST SOFTWARE	EZ EMC	None	Farad	Version ETS-03A1	



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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 dBμV) 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 dBμV + 10.36 dB + 6 dB = 36.36 dBμV/m @3m

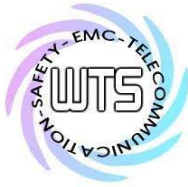
ANSI STANDARD C63.10-2013 6.2.2 MEASUREMENT PROCEDURES: The EUT was placed on a table 80 cm height and with dimensions of 1m by 1.5m (non metallic table). The EUT was placed in the centre of the table. The table used for radiated measurements is capable of continuous rotation. The spectrum was scanned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

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

Measurements were made by Worldwide Testing Services(Taiwan) Co., Ltd. at the registered open field test site located at No.5-1, Lishui, Shuang Sing Village, Wanli Dist., New Taipei City 207, Taiwan (R.O.C.). The Registration Number: 930600.

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.

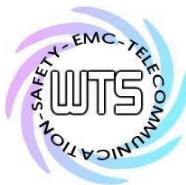


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3 Test results (enclosure)

Test case	Para. Number	Required	Test passed	Test failed
Peak Output Power	15.249 (a)	☒	☒	☐
Spurious Emissions radiated – Transmitter operating	15.249 (e)	☒	☒	☐
Spurious Emissions conducted – Transmitter operating	15.249 (e)	☐	☐	☐
Radiated Emission from Digital Part	15.109	☐	☐	☐
Out of Band Spurious Emission, Band edge-Transmitter operating	15.249 (e)	☒	☒	☐
Power Line Conducted Emission	15.207	☒	☒	☐

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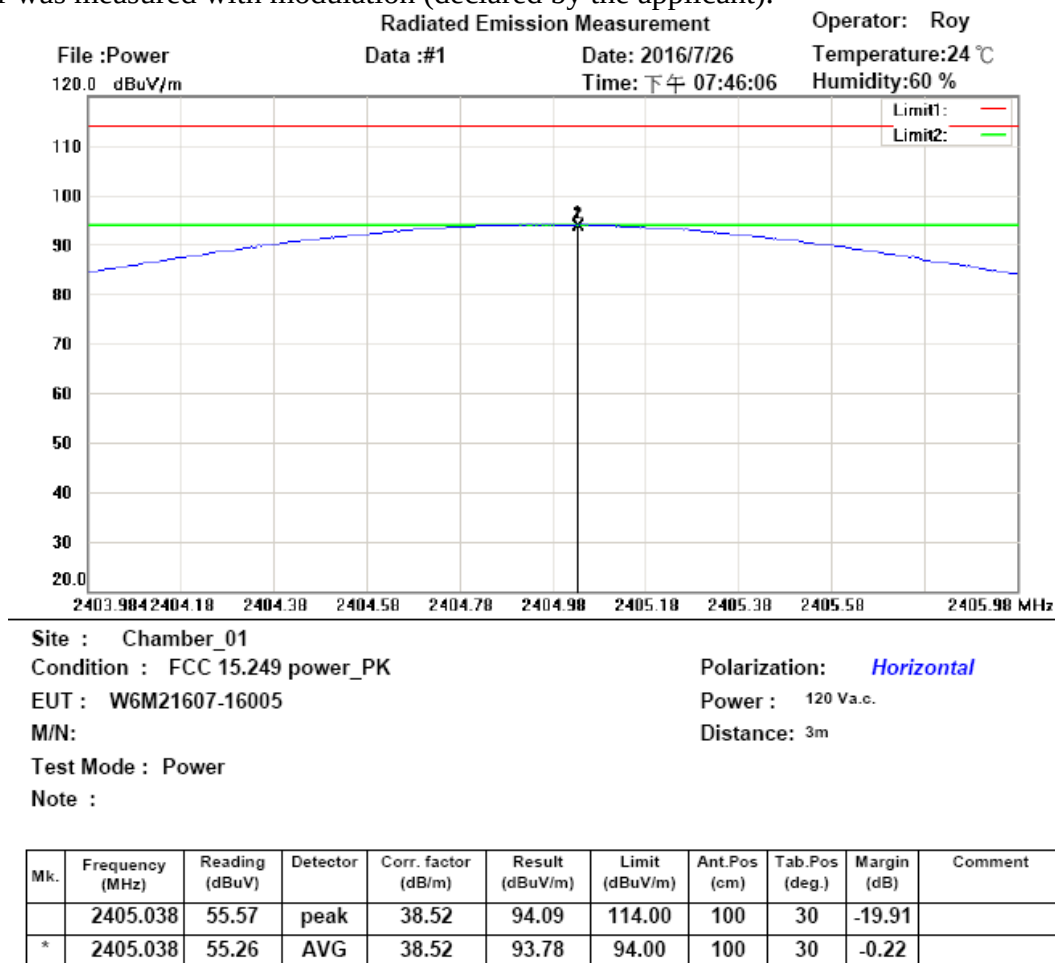
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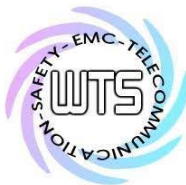
3.1 Peak Output Power (transmitter)

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).

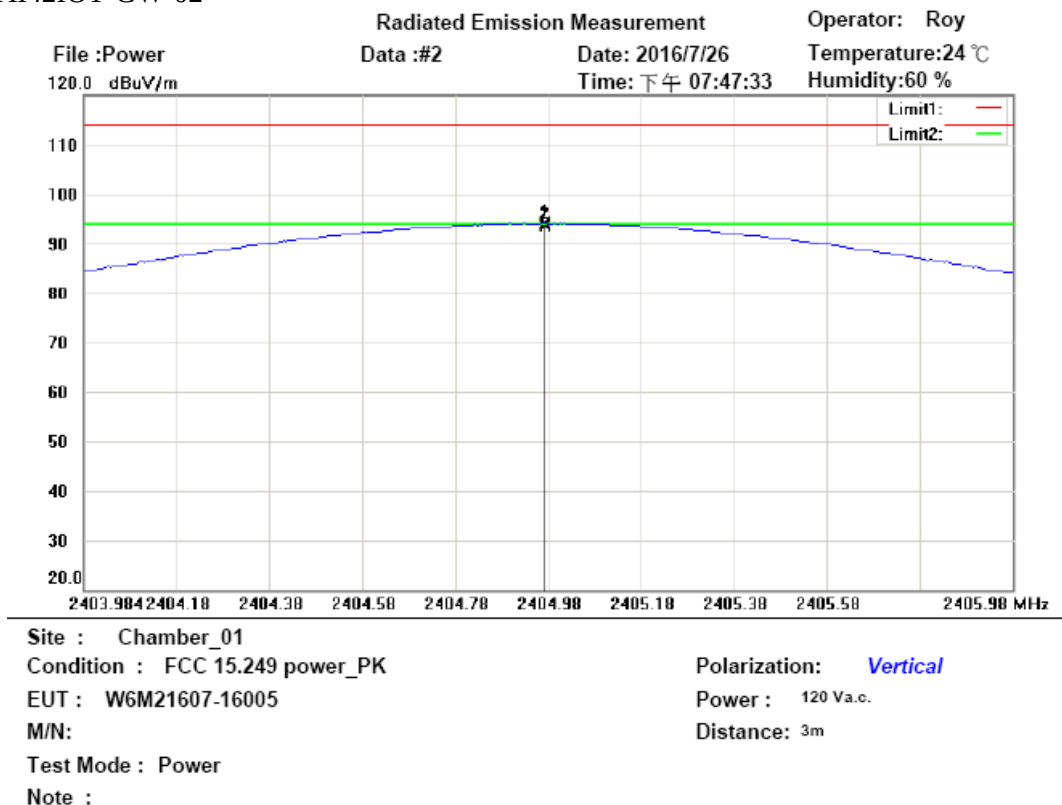




Worldwide Testing Services(Taiwan) Co., Ltd.

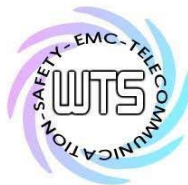
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Mk.	Frequency (MHz)	Reading (dBuV)	Detector	Corr. factor (dB/m)	Result (dBuV/m)	Limit (dBuV/m)	Ant.Pos (cm)	Tab.Pos (deg.)	Margin (dB)	Comment
	2404.978	55.61	peak	38.52	94.13	114.00	100	165	-19.87	
*	2404.978	55.23	AVG	38.52	93.75	94.00	100	165	-0.25	

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



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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.

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).

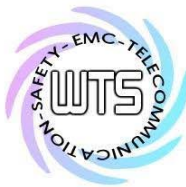
Limit + 20 dB 54.0 dB μ V/m + 20 dB= 74dB μ V/m

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.



Worldwide Testing Services(Taiwan) Co., Ltd.

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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.

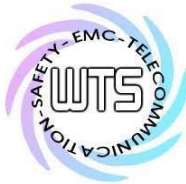
Summary table with radiated data of the test plots

Model:	IOT-GW-02	Date:	--					
Mode:	--	Temperature:	--	°C	Engineer:	--		
Polarization:	--	Humidity:	--	%				
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. **Measurement uncertainty for 3m measurement: 30-1000 MHz = ± 4.69 dB, 1-18 GHz = ± 4.78 dB, 18-40 GHz = ± 2.44 dB ; Reported uncertainties represent expanded uncertainties expressed at approximately the 95% confidence level using a coverage factor of k = 2.**
 6. **Up Line: PK Limit Line, Down Line: Ave Limit Line.**
 7. **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 147, ETSTW-RE 030, ETSTW-RE 088, ETSTW-RE 018



Registration number: W6M21607-16005-C-1
FCC ID: 2AI42IOT-GW-02

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:

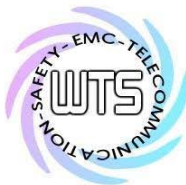
Frequency of Emission (MHz)	Field Strength (microvolts/meter)	Field Strength (dBmicrovolts/meter)
30 – 88	100	40.0
88 – 216	150	43.5
216 – 960	200	46.0
Above 960	500	54.0

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.**
- 5. Measurement uncertainty for 3m measurement : 30-1000 MHz = ± 4.69 dB, 1-18 GHz = ± 4.78 dB, 18-40 GHz = ± 2.44 dB ; Reported uncertainties represent expanded uncertainties expressed at approximately the 95% confidence level using a coverage factor of $k = 2$.**

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

Explanation: The test results are listed in the separated test report no.: W6M21607-16005-P-15B.

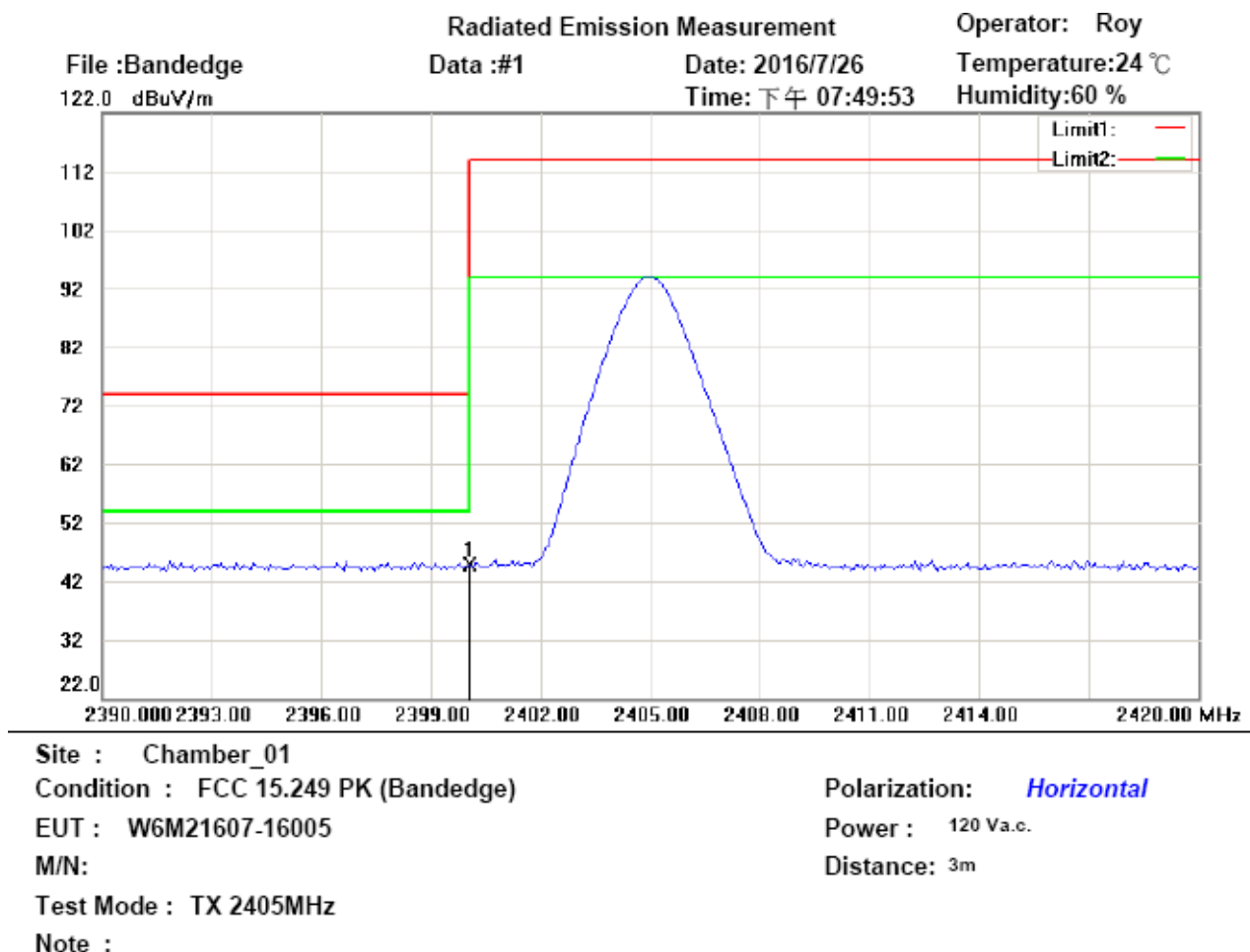


Registration number: W6M21607-16005-C-1

FCC ID: 2AI42IOT-GW-02

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 they are 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).



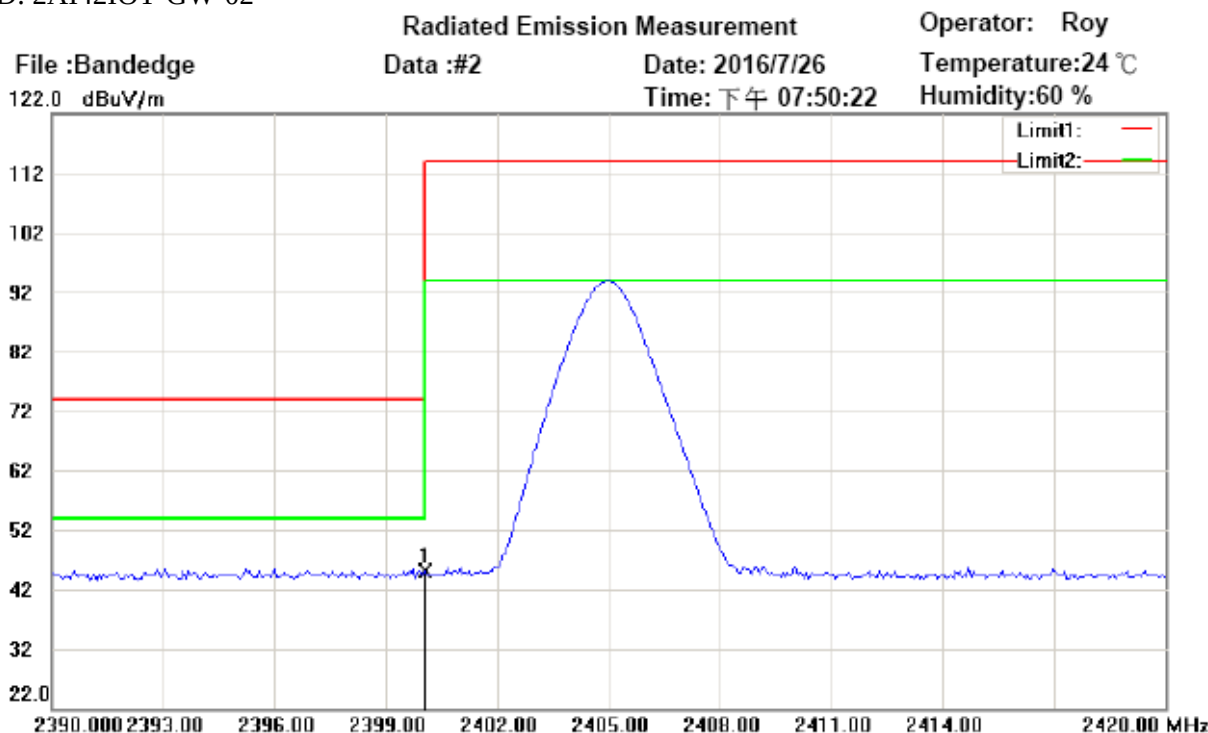
Mk.	Frequency (MHz)	Reading (dBuV)	Detector	Corr. factor (dB/m)	Result (dBuV/m)	Limit (dBuV/m)	Ant.Pos (cm)	Tab.Pos (deg.)	Margin (dB)	Comment
*	2400.000	6.30	peak	38.50	44.80	74.00	100	30	-29.20	



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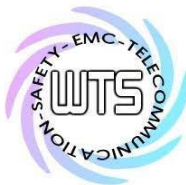


Mk.	Frequency (MHz)	Reading (dBuV)	Detector	Corr. factor (dB/m)	Result (dBuV/m)	Limit (dBuV/m)	Ant.Pos (cm)	Tab.Pos (deg.)	Margin (dB)	Comment
*	2400.000	6.74	peak	38.50	45.24	74.00	100	165	-28.76	

Limit:

Frequency Range (MHz)	Limit (dBμV/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: W6M21607-16005-C-1

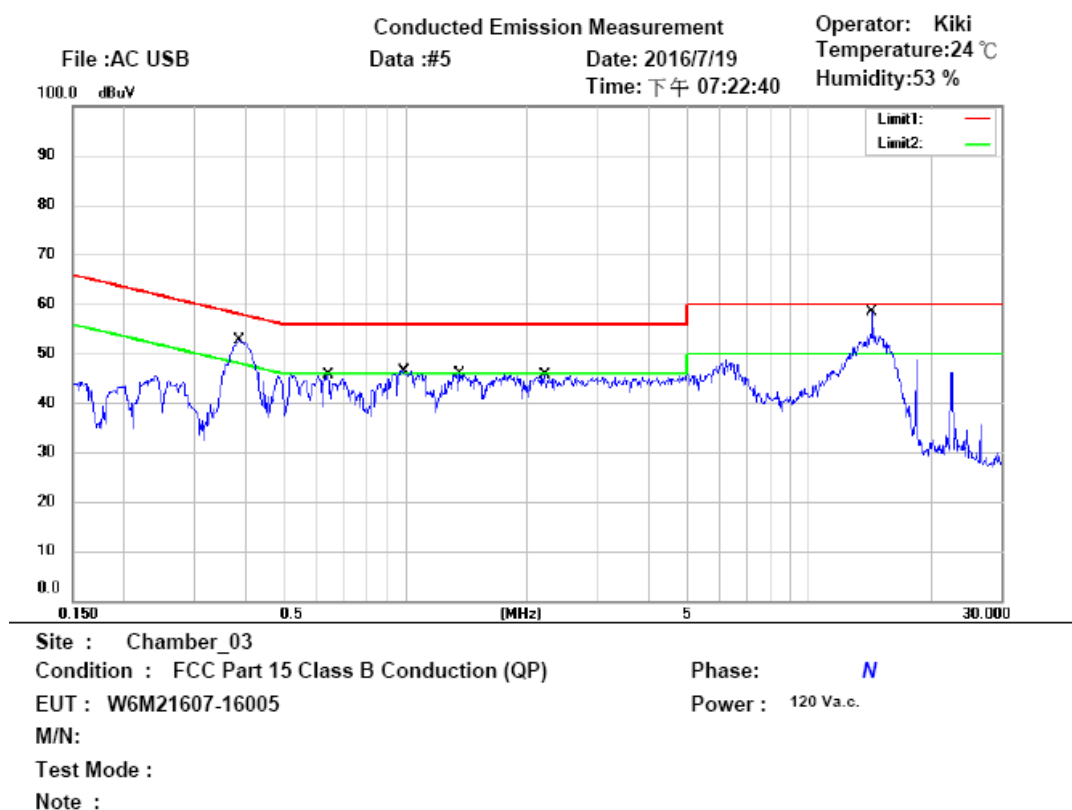
FCC ID: 2A142IOT-GW-02

3.8 Power Line Conducted Emission

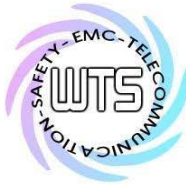
For an intentional radiator which is designed to be connected to the public utility (AC) power line, the radio frequency voltage that is conducted back onto the AC line on any frequency or frequencies within the band 150 kHz to 30 MHz shall not exceed the limits in the table bellows with this provision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

USB



Mk.	Frequency (MHz)	Reading (dBuV)	Detector	Corrected factor(dB)	Result (dBuV)	Limit (dBuV)	Margin (dB)	Comment
	0.3865	39.94	QP	9.73	49.67	58.14	-8.47	
	0.3865	16.37	AVG	9.73	26.10	48.14	-22.04	
	0.6417	33.07	QP	9.74	42.81	56.00	-13.19	
	0.6417	12.27	AVG	9.74	22.01	46.00	-23.99	
	0.9882	32.73	QP	9.75	42.48	56.00	-13.52	
	0.9882	8.57	AVG	9.75	18.32	46.00	-27.68	
	1.3640	32.27	QP	9.76	42.03	56.00	-13.97	
	1.3640	10.60	AVG	9.76	20.36	46.00	-25.64	
	2.2033	30.70	QP	9.80	40.50	56.00	-15.50	
	2.2033	9.47	AVG	9.80	19.27	46.00	-26.73	
*	14.3361	45.41	QP	10.17	55.58	60.00	-4.42	
	14.3361	30.12	AVG	10.17	40.29	50.00	-9.71	



Worldwide Testing Services(Taiwan) Co., Ltd.

Registration number: W6M21607-16005-C-1

FCC ID: 2A142IOT-GW-02

Conducted Emission Measurement

Operator: Kiki

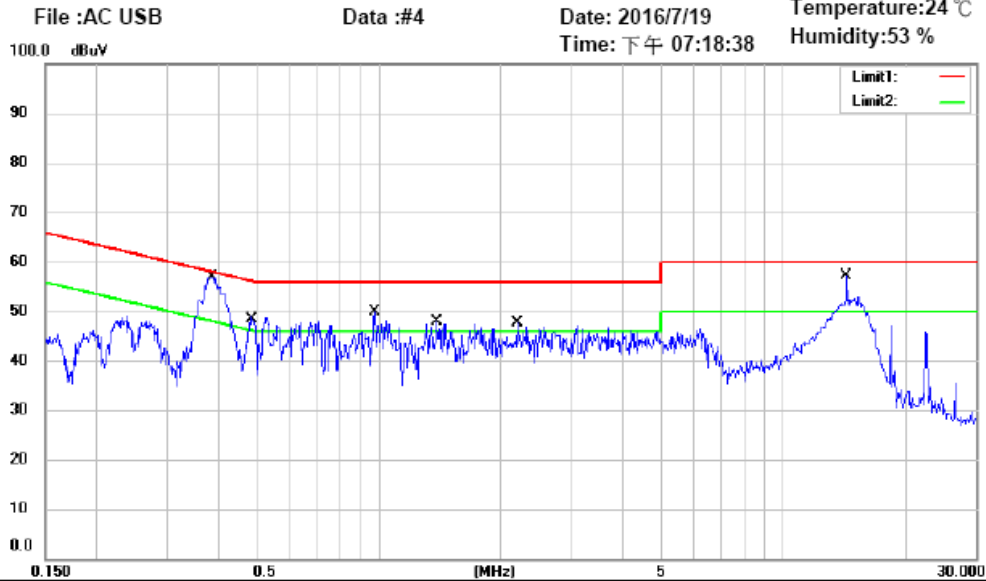
Data :#4

Date: 2016/7/19

Temperature:24 °C

Time: 下午 07:18:38

Humidity:53 %



Site : Chamber_03

Condition : FCC Part 15 Class B Conduction (QP)

Phase: L1

EUT : W6M21607-16005

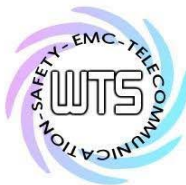
Power : 120 Va.c.

M/N:

Test Mode :

Note :

Mk.	Frequency (MHz)	Reading (dBuV)	Detector	Corrected factor(dB)	Result (dBuV)	Limit (dBuV)	Margin (dB)	Comment
	0.3851	40.44	QP	9.73	50.17	58.17	-8.00	
	0.3851	20.64	AVG	9.73	30.37	48.17	-17.80	
	0.4870	32.71	QP	9.73	42.44	56.22	-13.78	
	0.4870	15.16	AVG	9.73	24.89	46.22	-21.33	
	0.9770	32.39	QP	9.75	42.14	56.00	-13.86	
	0.9770	14.12	AVG	9.75	23.87	46.00	-22.13	
	1.3888	30.97	QP	9.77	40.74	56.00	-15.26	
	1.3888	13.21	AVG	9.77	22.98	46.00	-23.02	
	2.1988	29.23	QP	9.80	39.03	56.00	-16.97	
	2.1988	12.36	AVG	9.80	22.16	46.00	-23.84	
*	14.3343	42.79	QP	10.08	52.87	60.00	-7.13	
	14.3343	27.98	AVG	10.08	38.06	50.00	-11.94	

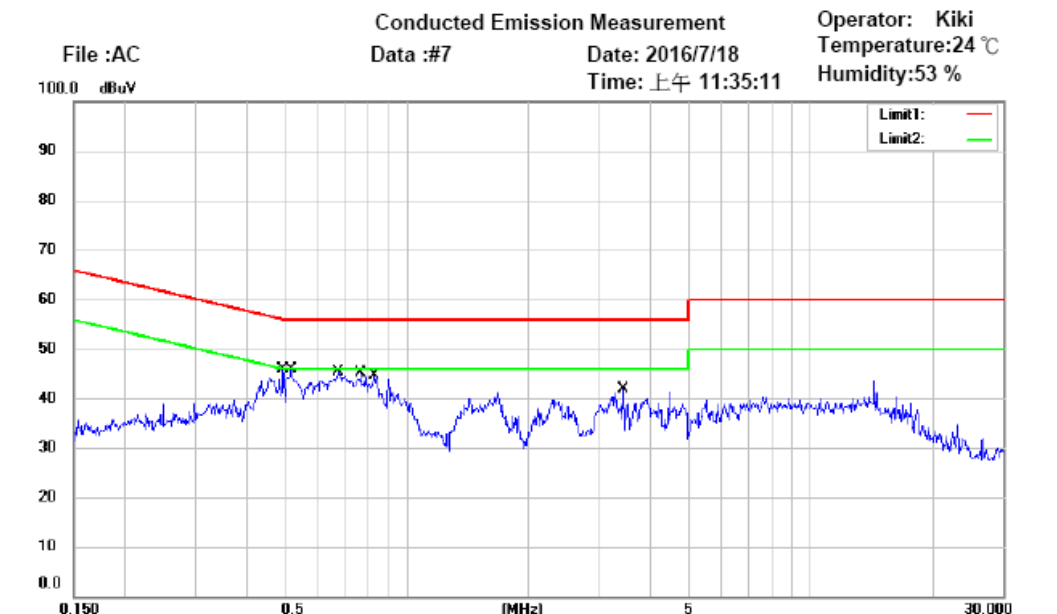


Worldwide Testing Services(Taiwan) Co., Ltd.

Registration number: W6M21607-16005-C-1

FCC ID: 2A142IOT-GW-02

Optional



Site : Chamber_03

Condition : FCC Part 15 Class B Conduction (QP)

EUT : W6M21607-16005

M/N:

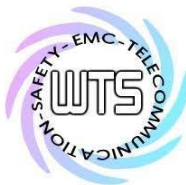
Test Mode :

Note :

Phase: N

Power : 120 V.a.c.

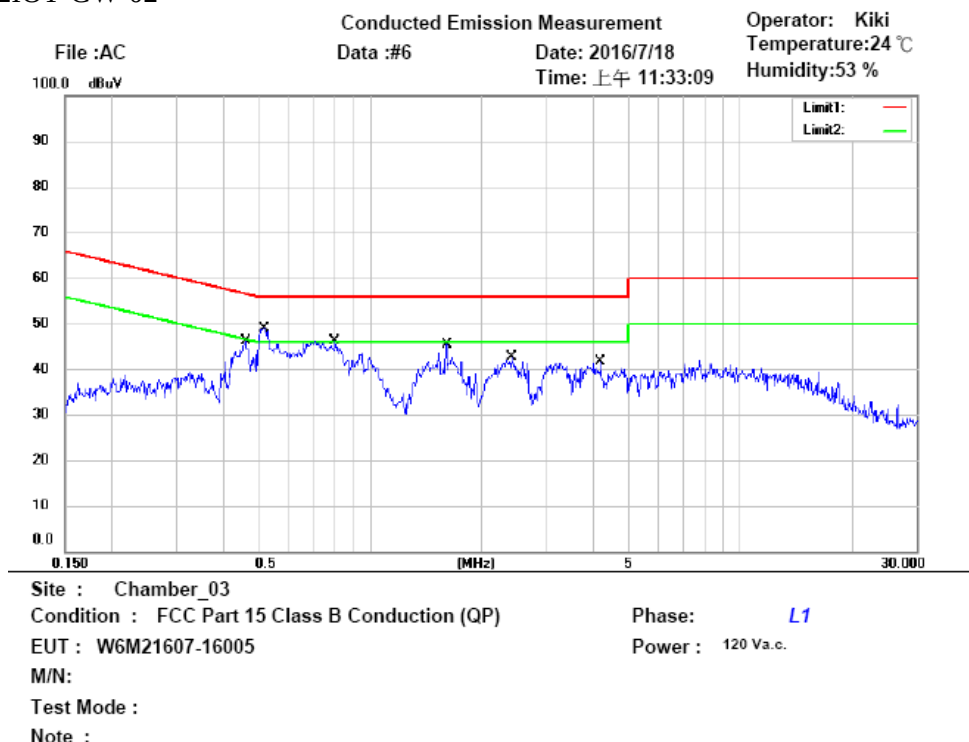
Mk.	Frequency (MHz)	Reading (dBuV)	Detector	Corrected factor(dB)	Result (dBuV)	Limit (dBuV)	Margin (dB)	Comment
	0.4923	28.30	QP	9.73	38.03	56.13	-18.10	
	0.4923	17.50	AVG	9.73	27.23	46.13	-18.90	
	0.5157	32.38	QP	9.73	42.11	56.00	-13.89	
*	0.5157	24.06	AVG	9.73	33.79	46.00	-12.21	
	0.6755	25.44	QP	9.74	35.18	56.00	-20.82	
	0.6755	18.43	AVG	9.74	28.17	46.00	-17.83	
	0.7700	28.92	QP	9.74	38.66	56.00	-17.34	
	0.7700	14.52	AVG	9.74	24.26	46.00	-21.74	
	0.8285	22.02	QP	9.74	31.76	56.00	-24.24	
	0.8285	16.43	AVG	9.74	26.17	46.00	-19.83	
	3.4272	20.41	QP	9.86	30.27	56.00	-25.73	
	3.4272	12.07	AVG	9.86	21.93	46.00	-24.07	



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Registration number: W6M21607-16005-C-1

FCC ID: 2A142IOT-GW-02

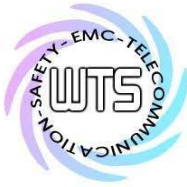


Mk.	Frequency (MHz)	Reading (dBuV)	Detector	Corrected factor(dB)	Result (dBuV)	Limit (dBuV)	Margin (dB)	Comment
	0.4600	33.89	QP	9.73	43.62	56.69	-13.07	
	0.4600	20.65	AVG	9.73	30.38	46.69	-16.31	
*	0.5157	35.45	QP	9.73	45.18	56.00	-10.82	
	0.5157	20.25	AVG	9.73	29.98	46.00	-16.02	
	0.8037	30.07	QP	9.74	39.81	56.00	-16.19	
	0.8037	15.22	AVG	9.74	24.96	46.00	-21.04	
	1.6025	18.96	QP	9.77	28.73	56.00	-27.27	
	1.6025	13.93	AVG	9.77	23.70	46.00	-22.30	
	2.4080	26.09	QP	9.81	35.90	56.00	-20.10	
	2.4080	10.77	AVG	9.81	20.58	46.00	-25.42	
	4.1923	18.72	QP	9.89	28.61	56.00	-27.39	
	4.1923	4.37	AVG	9.89	14.26	46.00	-31.74	

- 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. Measurement uncertainty = ± 1.14 dB; Reported uncertainties represent expanded uncertainties expressed at approximately the 95% confidence level using a coverage factor of $k = 2$.
 6. Up Line: QP Limit Line, Down Line: Ave Limit Line.

Limits:

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



Registration number: W6M21607-16005-C-1
FCC ID: 2AI42IOT-GW-02

Appendix

Measurement diagrams

Spurious Emissions radiated

Radiated Emission Measurement

Operator: Roy

File :1

Data :#1

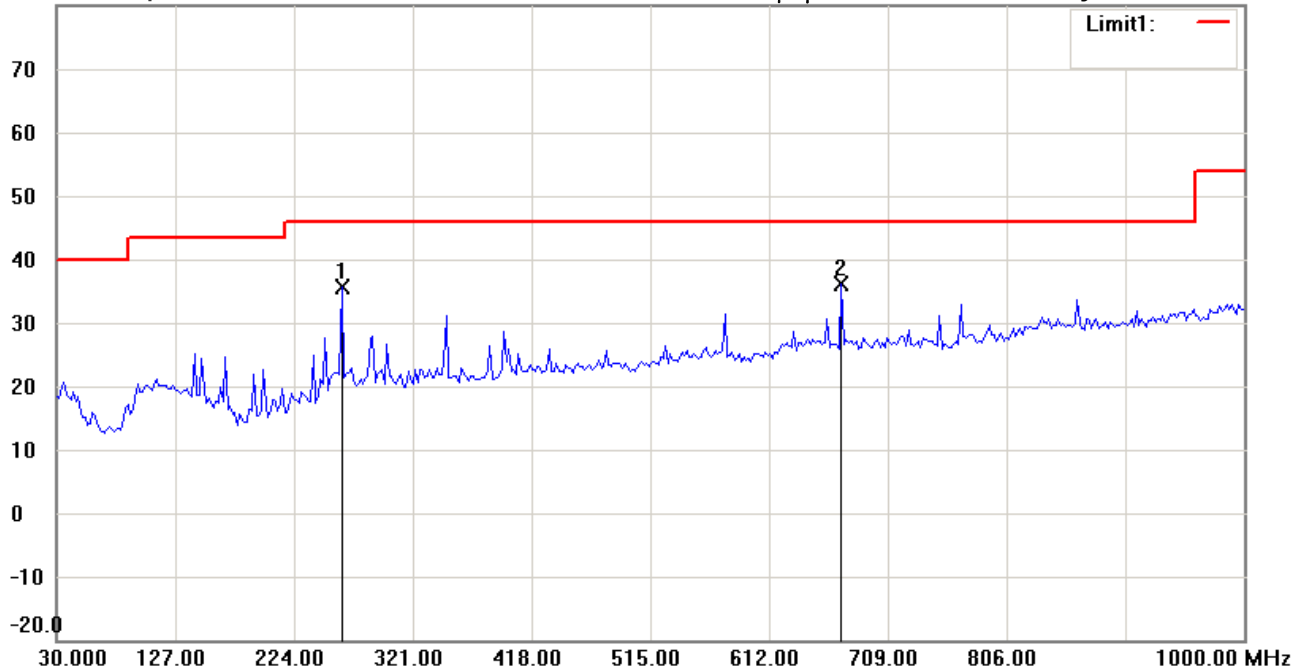
Date: 2016/7/22

Temperature:24 °C

80.0 dBuV/m

Time: 下午 09:47:50

Humidity:60 %



Site : Chamber_01

Condition : FCC_part 15 RE-Class C_30-1000MHz

EUT : W6M21607-16005

M/N:

Test Mode : TX 2405MHz

Note :

Polarization: *Horizontal*

Power : 120 V.a.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
	263.2664	42.33	peak	-6.67	35.66	46.00	100	25	-10.34	
*	671.4830	35.27	peak	0.85	36.12	46.00	100	110	-9.88	

Radiated Emission Measurement

Operator: Roy

File :1

Data :#2

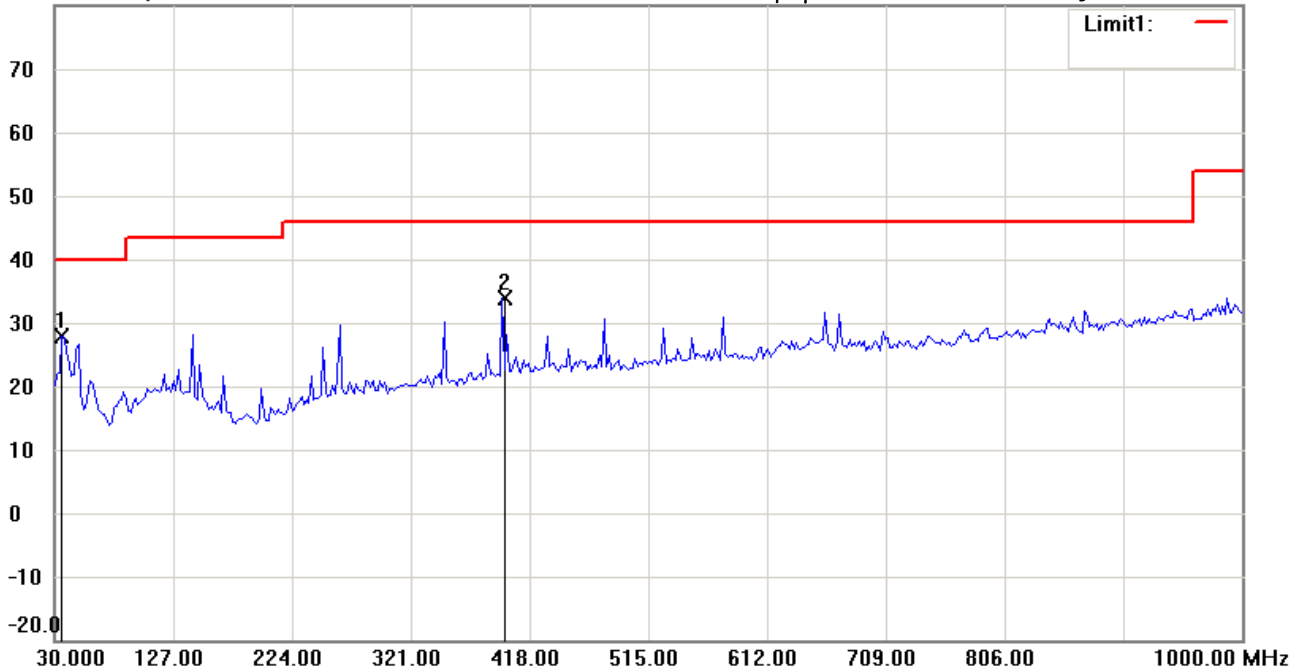
Date: 2016/7/22

Temperature:24 °C

80.0 dBuV/m

Time: 下午 09:48:35

Humidity:60 %



Site : Chamber_01

Condition : FCC_part 15 RE-Class C_30-1000MHz

Polarization: **Vertical**

EUT : W6M21607-16005

Power : 120 V.a.c.

M/N:

Distance: 3m

Test Mode : TX 2405MHz

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
*	35.8316	35.59	peak	-7.59	28.00	40.00	100	50	-12.00	
	395.4510	37.56	peak	-3.76	33.80	46.00	100	305	-12.20	

Radiated Emission Measurement

Operator: Roy

File :3

Data :#1

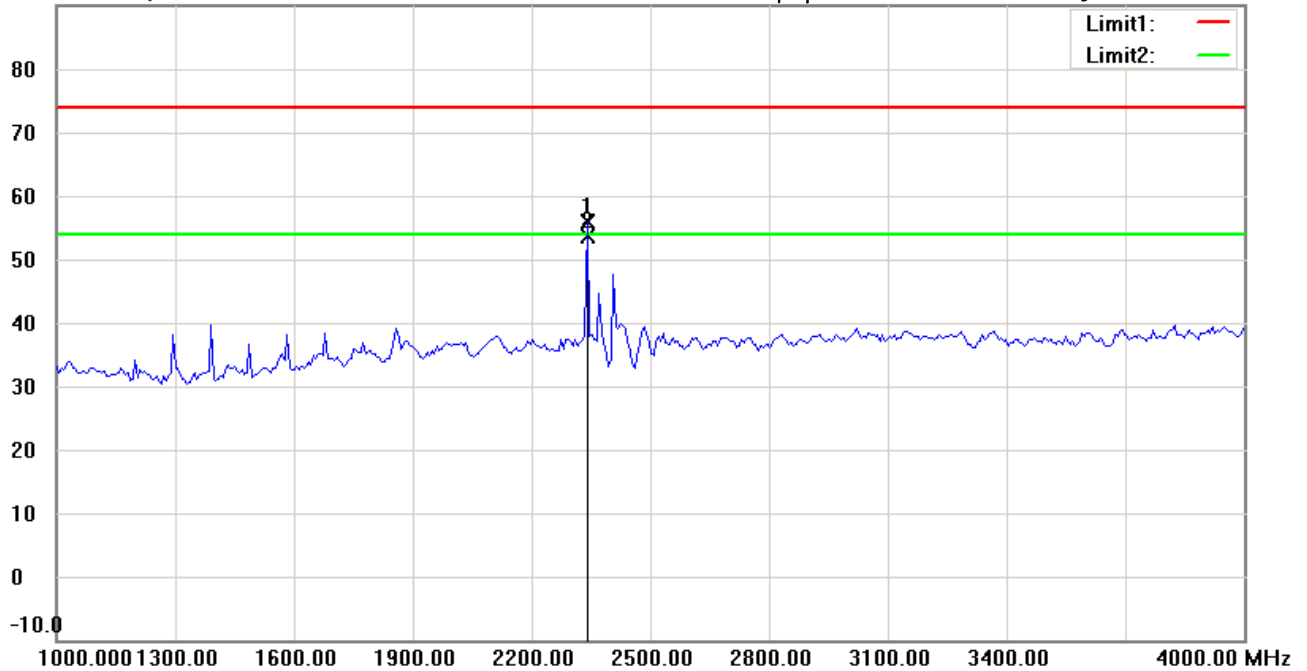
Date: 2016/7/21

Temperature:24 °C

90.0 dBuV/m

Time: 下午 10:09:18

Humidity:60 %



Site : Chamber_01

Condition : FCC_part 15 RE-Class C_Above 1GHz_PK

EUT : W6M21607-16005

M/N:

Test Mode : TX 2405MHz

Note :

Polarization: *Horizontal*

Power : 120 V.a.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
	2340.681	60.67	peak	-4.89	55.78	74.00	100	170	-18.22	
*	2340.681	58.63	AVG	-4.89	53.74	54.00	100	170	-0.26	

Radiated Emission Measurement

Operator: Roy

File :3

Data :#6

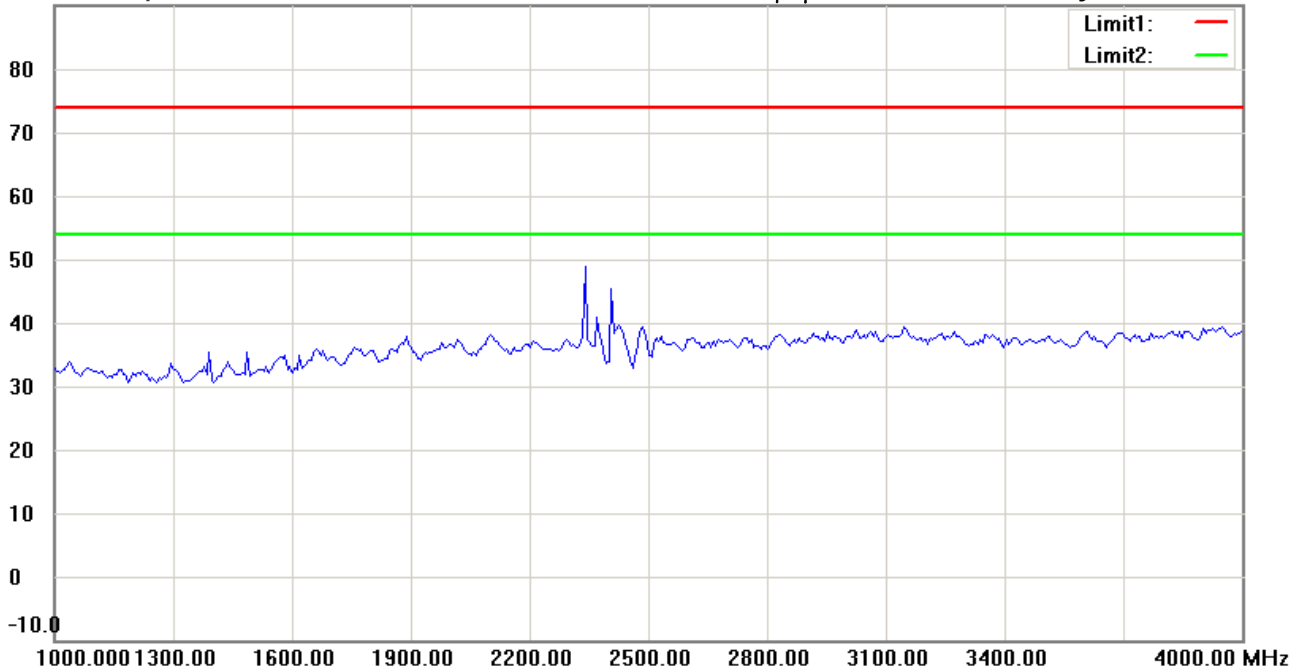
Date: 2016/7/21

Temperature:24 °C

90.0 dBuV/m

Time: 下午 10:12:09

Humidity:60 %



Site : Chamber_01

Condition : FCC_part 15 RE-Class C_Above 1GHz_PK

Polarization: **Vertical**

EUT : W6M21607-16005

Power : 120 V.a.c.

M/N:

Distance: 3m

Test Mode : TX 2405MHz

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
-----	-----------------	----------------	----------	---------------------	-----------------	----------------	--------------	----------------	-------------	---------

Radiated Emission Measurement

Operator: Roy

File :3

Data :#2

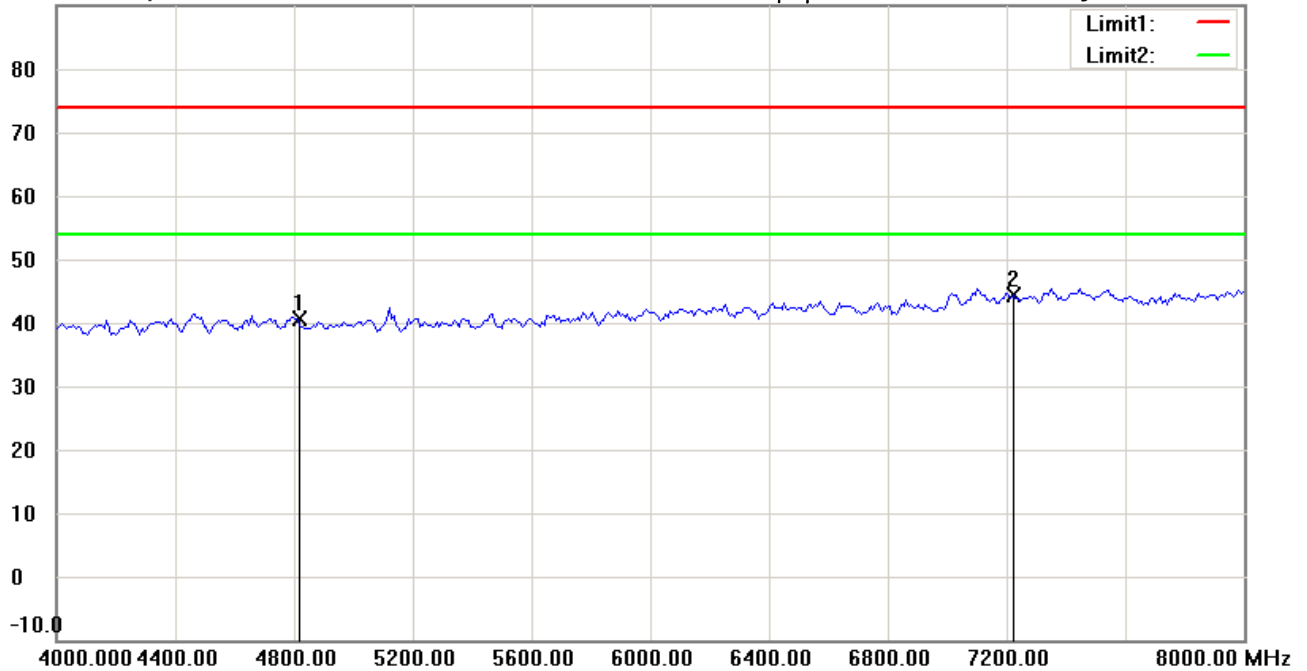
Date: 2016/7/21

Temperature:24 °C

90.0 dBuV/m

Time: 下午 10:10:03

Humidity:60 %



Site : Chamber_01

Condition : FCC_part 15 RE-Class C_Above 1GHz_PK

EUT : W6M21607-16005

M/N:

Test Mode : TX 2405MHz

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
	4810.000	41.26	peak	-0.59	40.67	74.00	100	300	-33.33	
*	7215.000	40.02	peak	4.27	44.29	74.00	100	165	-29.71	

Radiated Emission Measurement

Operator: Roy

File :3

Data :#7

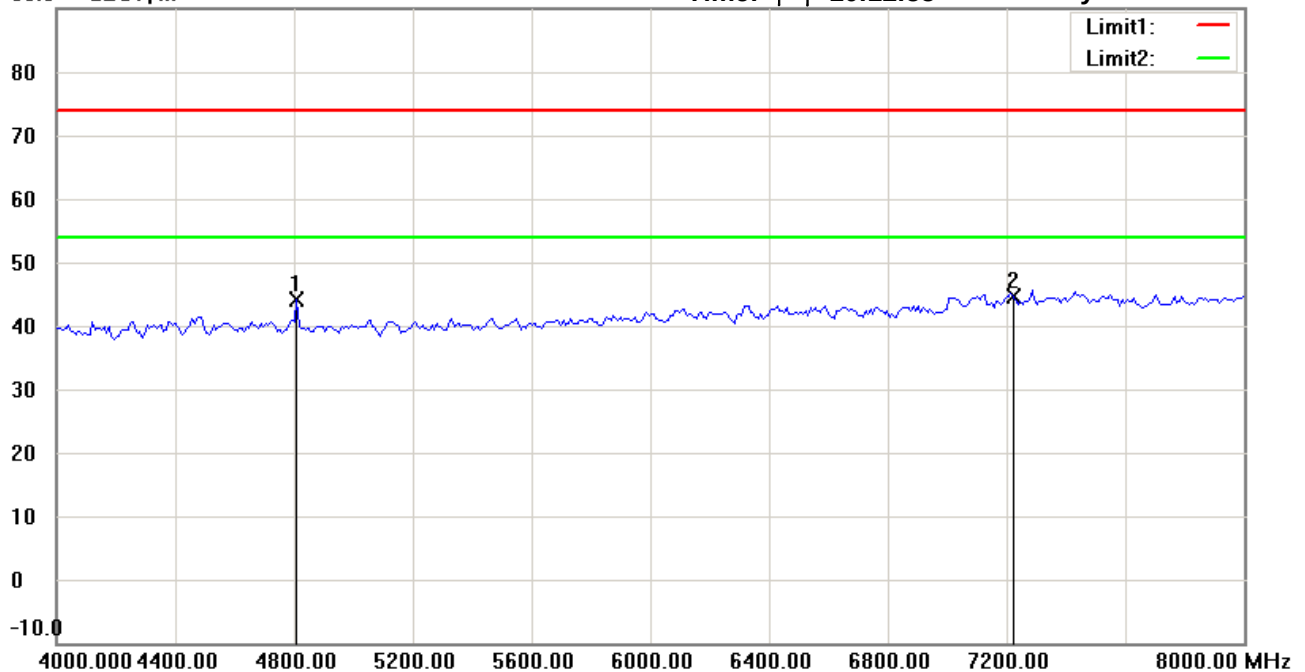
Date: 2016/7/21

Temperature:24 °C

90.0 dBuV/m

Time: 下午 10:12:55

Humidity:60 %



Site : Chamber_01

Condition : FCC_part 15 RE-Class C_Above 1GHz_PK

EUT : W6M21607-16005

M/N:

Test Mode : TX 2405MHz

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
	4809.619	44.81	peak	-0.59	44.22	74.00	100	190	-29.78	
*	7215.000	40.37	peak	4.27	44.64	74.00	100	305	-29.36	

Radiated Emission Measurement

Operator: Roy

File :3

Data :#3

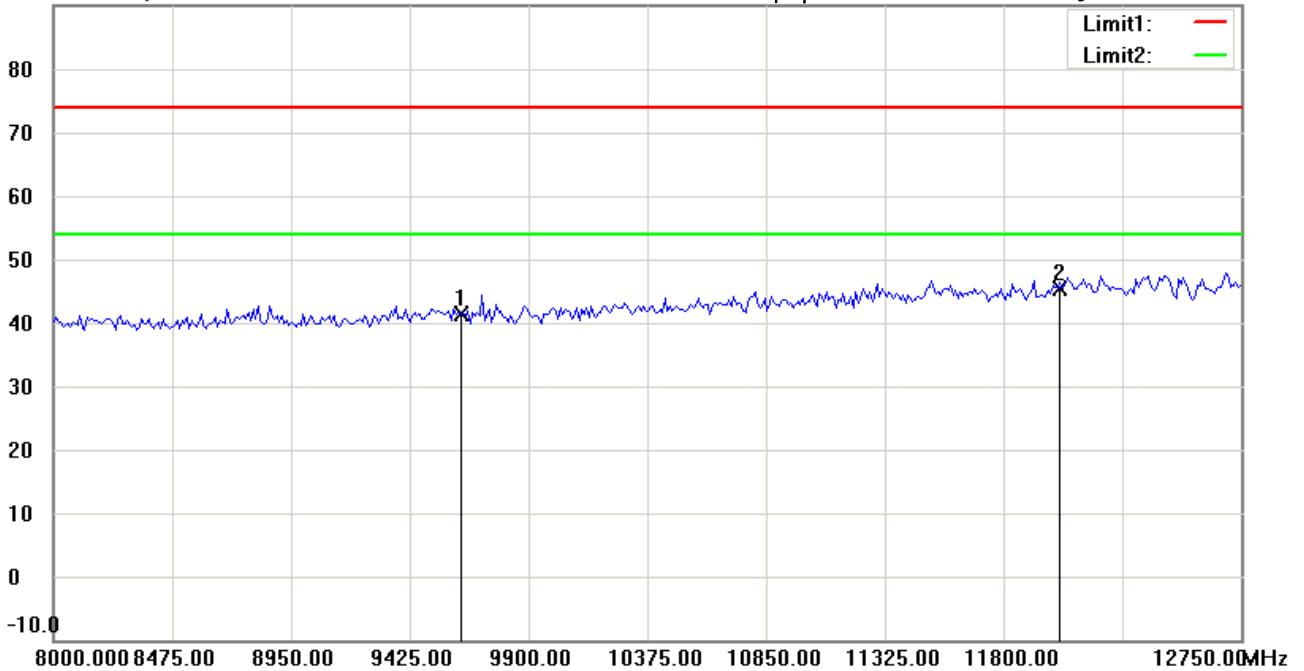
Date: 2016/7/21

Temperature:24 °C

90.0 dBuV/m

Time: 下午 10:10:16

Humidity:60 %



Site : Chamber_01

Condition : FCC_part 15 RE-Class C_Above 1GHz_PK

EUT : W6M21607-16005

M/N:

Test Mode : TX 2405MHz

Note :

Polarization: **Horizontal**

Power : 120 V.a.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
	9620.000	33.82	peak	7.56	41.38	74.00	100	125	-32.62	
*	12025.000	32.62	peak	12.69	45.31	74.00	100	70	-28.69	

Radiated Emission Measurement

Operator: Roy

File :3

Data :#8

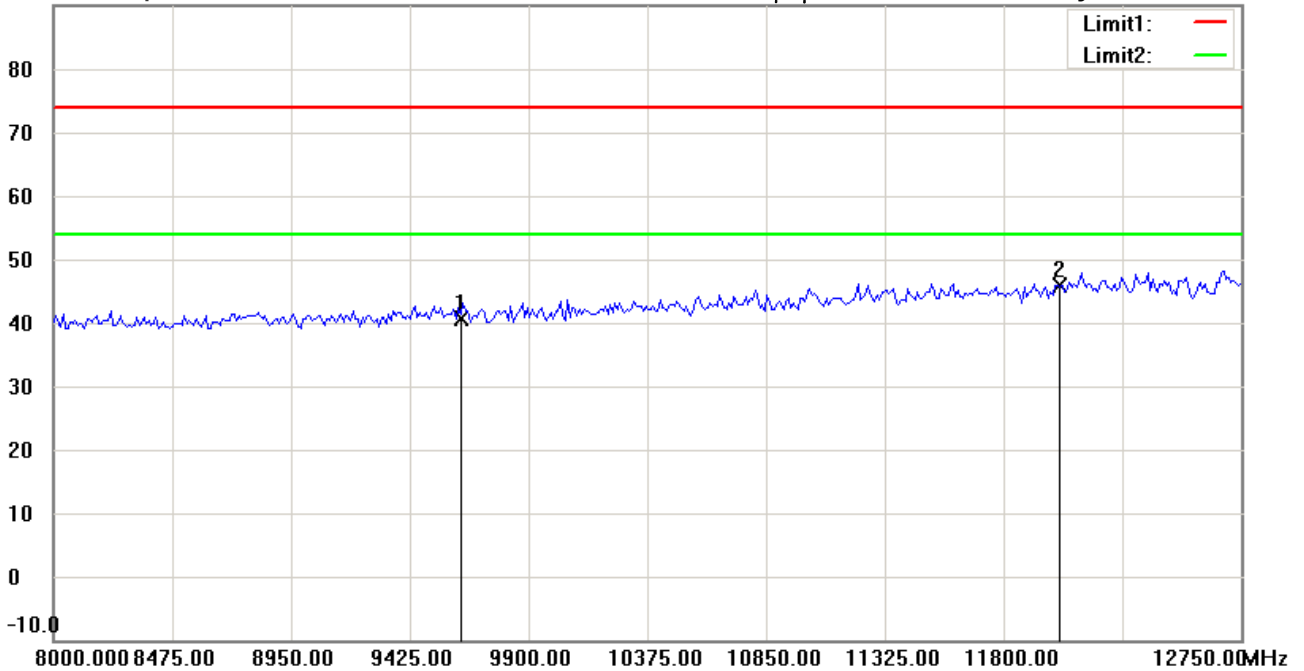
Date: 2016/7/21

Temperature:24 °C

90.0 dBuV/m

Time: 下午 10:13:08

Humidity:60 %



Site : Chamber_01

Condition : FCC_part 15 RE-Class C_Above 1GHz_PK

EUT : W6M21607-16005

M/N:

Test Mode : TX 2405MHz

Note :

Polarization: Vertical

Power : 120 V.a.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
	9620.000	33.13	peak	7.56	40.69	74.00	100	110	-33.31	
*	12025.000	33.26	peak	12.69	45.95	74.00	100	170	-28.05	

Radiated Emission Measurement

Operator: Roy

File :3

Data :#4

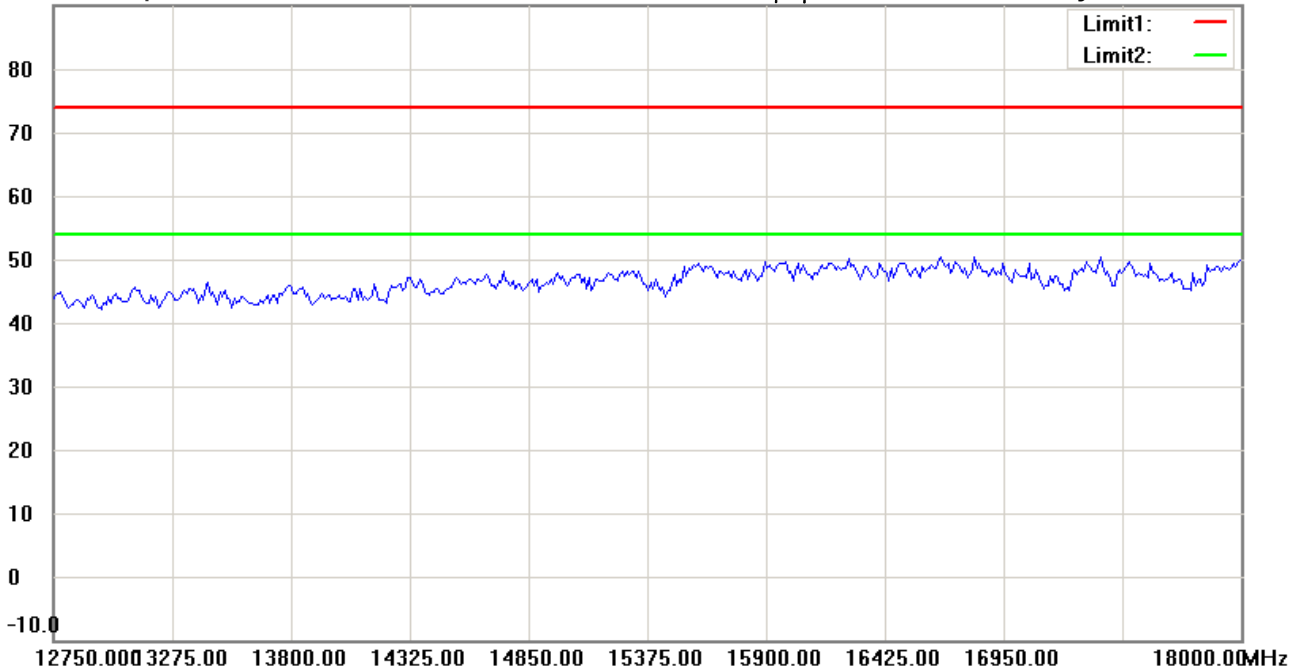
Date: 2016/7/21

Temperature:24 °C

90.0 dBuV/m

Time: 下午 10:11:14

Humidity:60 %



Site : Chamber_01

Condition : FCC_part 15 RE-Class C_Above 1GHz_PK

EUT : W6M21607-16005

M/N:

Test Mode : TX 2405MHz

Note :

Polarization: *Horizontal*

Power : 120 V.a.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
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Radiated Emission Measurement

Operator: Roy

File :3

Data :#9

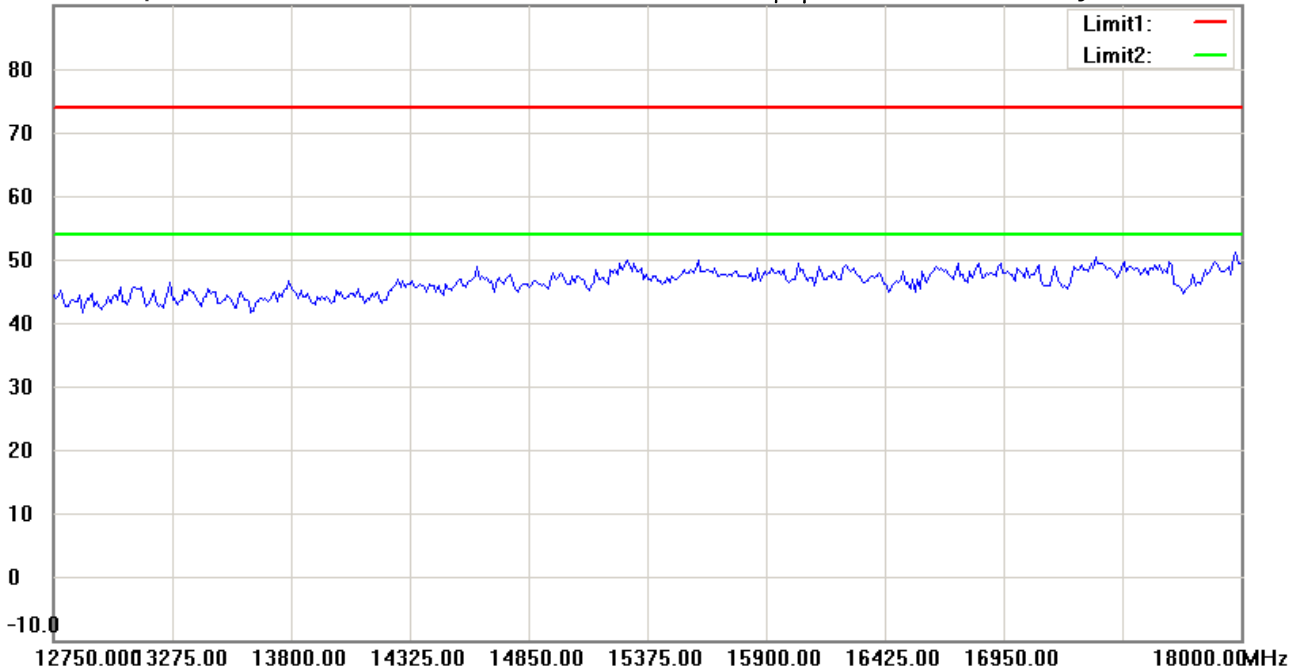
Date: 2016/7/21

Temperature:24 °C

90.0 dBuV/m

Time: 下午 10:14:10

Humidity:60 %



Site : Chamber_01

Condition : FCC_part 15 RE-Class C_Above 1GHz_PK

Polarization: **Vertical**

EUT : W6M21607-16005

Power : 120 V.a.c.

M/N:

Distance: 3m

Test Mode : TX 2405MHz

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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Radiated Emission Measurement

Operator: Roy

File :3

Data :#5

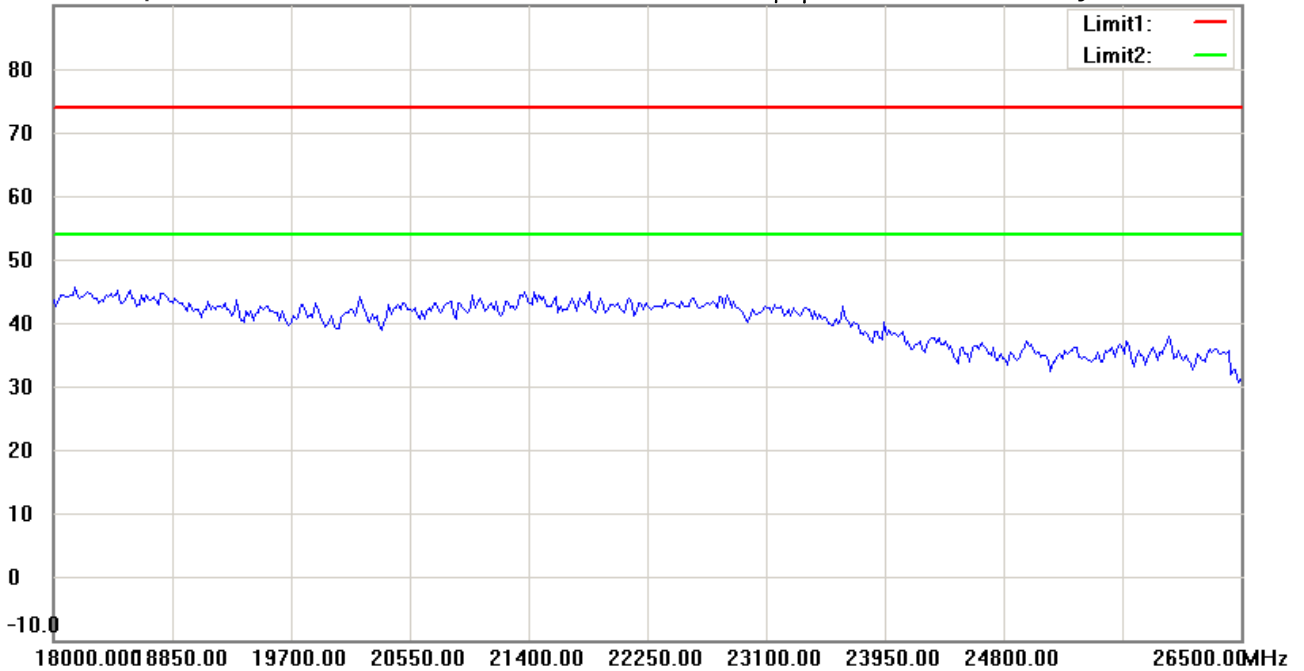
Date: 2016/7/21

Temperature:24 °C

90.0 dBuV/m

Time: 下午 10:11:24

Humidity:60 %



Site : Chamber_01

Condition : FCC_part 15 RE-Class C_Above 1GHz_PK

EUT : W6M21607-16005

M/N:

Test Mode : TX 2405MHz

Note :

Polarization: *Horizontal*

Power : 120 V.a.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
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Radiated Emission Measurement

Operator: Roy

File :3

Data :#10

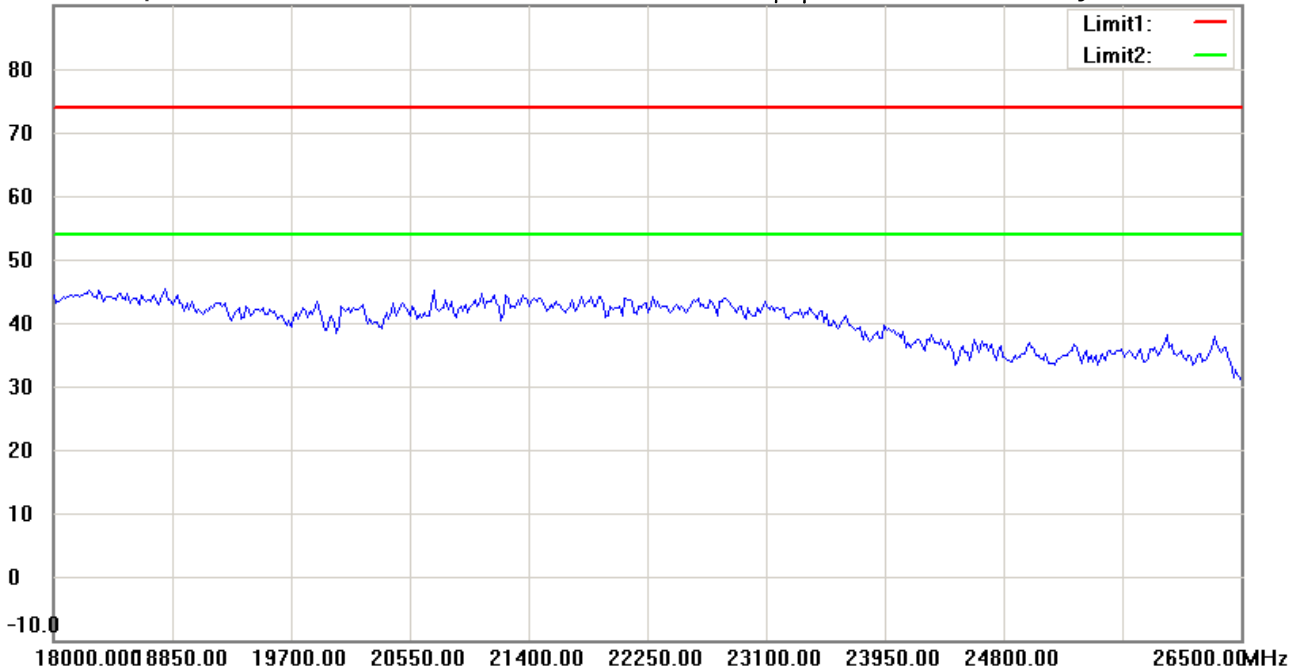
Date: 2016/7/21

Temperature:24 °C

90.0 dBuV/m

Time: 下午 10:14:20

Humidity:60 %



Site : Chamber_01

Condition : FCC_part 15 RE-Class C_Above 1GHz_PK

Polarization: Vertical

EUT : W6M21607-16005

Power : 120 V.a.c.

M/N:

Distance: 3m

Test Mode : TX 2405MHz

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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