

FCC PART 15 SUBPART C TEST REPORT

for

Transmitter Microphone

Model No.: ACT-31H

FCC ID: M5X-ACT30NH

of

Applicant: MIPRO Electronics Co., Ltd.

Address: 814 Pei-kang Road Chia-yi 600 Taiwan, R.O.C

Tested and Prepared

by

Worldwide Testing Services (Taiwan) Co., Ltd.

FCC Registration No.: 930600

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

A2LA Accredited No.: 2732.01



Report No.: W6M21306-13283-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



Registration number: W6M21306-13283-C-1
FCC ID: M5X-ACT30NH

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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:

August 07, 2013

Rick Chen

Rick Chen

Date

WTS-Lab.

Name

Signature

Technical responsibility for area of testing:

August 07, 2013

Kevin Wang

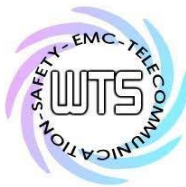
Kevin Wang

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

A2LA accredited number: 2730.01

FCC filed test laboratory Reg. No. 930600

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



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

Name: ./.

Accredited number: ./.

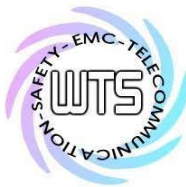
Street: ./.

Town: ./.

Country: ./.

Telephone: ./.

Fax: ./.



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1.3 Details of approval holder

Name: MIPRO Electronics Co., Ltd.
Street: 814 Pei-kang Road
Town: Chia-yi 600
Country: Taiwan, R.O.C
Telephone: +886-5-238-0809
Fax: +886-5-238-0803

1.4 Application details

Date of receipt of test item: June 14, 2013
Date of test: From June 17, 2013 to August 05, 2013

1.5 General information of Test item

Type of test item: Transmitter Microphone
Model Number: ACT-31H
Multi-listing model number: ACT-30NHr, ACT-50NH
Brand Name: MIPRO
Photos: see Annex

Technical data

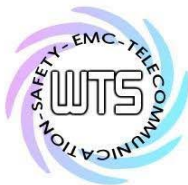
Frequency band: 902-928 MHz
Operation Frequency: 902-928 MHz
Frequency 1: 902.4 MHz
Frequency 2: 915 MHz
Frequency 3: 927.6 MHz
Operation modes: simplex
Modulation Type: FM
Antenna type: Build in Antenna
Power supply: Battery AA3 (1.5V*2)

Manufacturer: (if different from applicant)

Name: ./.
Street: ./.
Town: ./.
Country: ./.
Additional information: ./.

1.6 Test standards

Technical standard : FCC RULES PART 15 SUBPART C § 15.249 (2011-10)



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2 Technical test

2.1 Summary of test results

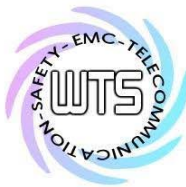
No deviations from the technical specification(s) were ascertained in the course of the tests performed.

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:	Battery AA3 (1.5V*2)
Extreme conditions parameters:	Not required



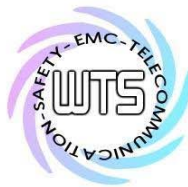
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2.3 Test Equipment List

No.	Test equipment	Type	Serial No.	Manufacturer	Cal. Date	Next Cal. Date
ETSTW-CE 001	EMI TEST RECEIVER	ESHS10	842121/013	R&S	2012/9/5	2013/9/4
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	2012/12/21	2013/12/20
ETSTW-CE 006	IMPULSBEGRENZER PULSE LIMITER	ESH3-Z2	100226	R&S	2013/3/4	2014/3/3
ETSTW-CE 007	SPECTRUM ANALYZER 5GHz	FSB	849670/001	R&S	Pre-test Use	
ETSTW-CE 008	HF-EICHLITUNG 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	2013/7/10	2014/7/9
ETSTW-RE 004	EMI TEST RECEIVER	ESI 40	832427/004	R&S	2012/9/5	2013/9/4
ETSTW-RE 005	EMI TEST RECEIVER	ESVS10	843207/020	R&S	2012/9/5	2013/9/4
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	2012/10/12	2013/10/11
ETSTW-RE 027	Passive Loop Antenna	6512	00034563	ETS-Lindgren	2013/7/3	2014/7/2
ETSTW-RE 030	Double-Ridged Guide Horn Antenna	3117	00035224	EMCO	2013/3/4	2014/3/3
ETSTW-RE 045	ESA-E SERIES SPECTRUM ANALYZER	E4404B	MY45111242	Agilent	Pre-test Use	
ETSTW-RE 049	TRILOG Super Broadband test Antenna	VULB 9160	9160-3185	Schwarzbeck	2013/3/21	2014/3/20
ETSTW-RE 050	Attenuator 10dB	50HF-010-1	None	JFW	2013/3/4	2014/3/3
ETSTW-RE 051	Attenuator 6dB	50HF-006-1	None	JFW	2013/3/4	2014/3/3
ETSTW-RE 053	Attenuator 3dB	50HF-003-1	None	JFW	2013/3/4	2014/3/3
ETSTW-RE 055	SPECTRUM ANALYZER	FSU 26	200074	R&S	2013/5/31	2014/5/30
ETSTW-RE 060	Attenuator 30dB	5015-30	F651012z-01	ATM	2013/3/4	2014/3/3
ETSTW-RE 062	Amplifier Module	CHC 2	None	KMIC	2012/11/28	2013/11/27
ETSTW-RE 064	Bluetooth Test Set	MT8852B-042	6K00005709	Anritsu	Function Test	
ETSTW-RE 069	Double-Ridged Guide Horn Antenna	3117	00069377	EMCO	Function Test	
ETSTW-RE 072	CELL SITE TEST SET	8921A	3339A00375	HP	2012/10/5	2013/10/4
ETSTW-RE 088	SOLID STATE AMPLIFIER	KMA180265A01	99057	KMIC	2012/10/12	2013/10/11
ETSTW-RE 099	DC Block	50DB-007-1	None	JFW	2013/3/4	2014/3/3
ETSTW-RE 106	Humidity Temperature Meter	TES-1366	091011113	TES	2012/12/4	2013/12/3
ETSTW-RE 111	TRILOG Super Broadband test Antenna	VULB 9160	9160-3309	Schwarz beck	2012/12/13	2013/12/12
ETSTW-RE 112	AC POWER SOURCE	TFC-1005	None	T-Power	Function test	
ETSTW-RE 115	2.4GHz Notch Filter	N0124411	473874	MICROWAVE CIRCUITS	2013/1/11	2014/1/10
ETSTW-RE 120	RF Player	MP9200	MP9210-111022	ADIVIC	Function test	



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ETSTW-RE 122	SIGNAL GENERATOR	SMF100A	102149	R&S	2013/6/28	2014/6/27
ETSTW-RE 125	5GHz Notch filter	5NSL11-5200/E221.3-O/O	1	K&L Microwave	2012/8/18	2013/8/17
ETSTW-RE 126	5GHz Notch filter	5NSL11-5800/E221.3-O/O	1	K&L Microwave	2012/8/18	2013/8/17
ETSTW-RE 127	RF Switch Box	RFS-01	None	WTS	2013/3/4	2014/3/3
ETSTW-GSM 002	Universal Radio Communication Tester	CMU 200	109439	R&S	2012/10/5	2013/10/4
ETSTW-GSM 019	Band Reject Filter	WRCTF824/849-822/851-40 /12+9SS	3	WI	2013/1/11	2014/1/10
ETSTW-GSM 020	Band Reject Filter	WRCD1747/1748-1743/1752-32/5SS	1	WI	2013/1/11	2014/1/10
ETSTW-GSM 021	Band Reject Filter	WRCD1879.5/1880.5-1875.5/1884.5-32/5SS	3	WI	2013/1/11	2014/1/10
ETSTW-GSM 022	Band Reject Filter	WRCT901.9/903.1-904.25-50/8SS	1	WI	2013/1/11	2014/1/10
ETSTW-GSM 023	Power Divider	4901.19.A	None	SUHNER	2012/9/18	2013/9/17
ETSTW-Cable 010	BNC Cable	5 M BNC Cable	None	JYE BAO CO.,LTD.	2013/3/4	2014/3/3
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.	2013/3/4	2014/3/3
ETSTW-Cable 016	BNC Cable	Switch Box	B Cable 1	Schwarz beck	2013/3/4	2014/3/3
ETSTW-Cable 017	BNC Cable	X Cable	B Cable 2	Schwarz beck	2013/3/4	2014/3/3
ETSTW-Cable 018	BNC Cable	Y Cable	B Cable 3	Schwarz beck	2013/3/4	2014/3/3
ETSTW-Cable 019	BNC Cable	Z Cable	B Cable 4	Schwarz beck	2013/3/4	2014/3/3
ETSTW-Cable 022	N TYPE Cable	5006	0002	JYE BAO CO.,LTD.	2013/3/26	2014/3/25
ETSTW-Cable 026	Microwave Cable	SUCOFLEX 104	279075	HUBER+SUHNER	2013/3/4	2014/3/3
ETSTW-Cable 027	Microwave Cable	SUCOFLEX 104	279083	HUBER+SUHNER	2013/3/4	2014/3/3
ETSTW-Cable 028	Microwave Cable	FA147A0015M2020	30064-2	UTIFLEX	2012/10/12	2013/10/11
ETSTW-Cable 029	Microwave Cable	FA147A0015M2020	30064-3	UTIFLEX	2012/10/12	2013/10/11
ETSTW-Cable 030	Microwave Cable	SUCOFLEX 104 (S_Cable 9)	279067	HUBER+SUHNER	2013/3/4	2014/3/3
ETSTW-Cable 031	Microwave Cable	SUCOFLEX 104 (S_Cable 10)	238092	HUBER+SUHNER	2012/11/28	2013/11/27
ETSTW-Cable 043	Microwave Cable	SUCOFLEX 104	317576	HUBER+SUHNER	2012/11/28	2013/11/27
ETSTW-Cable 047	Microwave Cable	SUCOFLEX 104	325518	HUBER+SUHNER	2012/11/28	2013/11/27
ETSTW-Cable 053	N TYPE To SMA Cable	RG142	None	JYE BAO CO.,LTD.	2013/3/26	2014/3/25
ETSTW-Cable 058	Microwave Cable	SUCOFLEX 104	none	HUBER+SUHNER	2013/6/20	2014/6/19
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 C63.4-2009 5.2 using a 50 μ H 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 C63.4-2009 6.4 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 μ 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 μ V + 10.36 dB + 6 dB = 36.36 dB μ V/m @3m

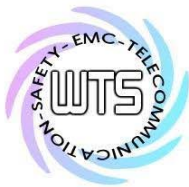
ANSI STANDARD C63.4-2009 6.3.1 MEASUREMENT PROCEDURES: The EUT was placed on a table 80 cm height and with dimensions of 1m by 1.5m (non metallic table). The EUT was placed in the centre of the table. The table used for radiated measurements is capable of continuous rotation. The spectrum was scanned 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 C63.4-2009 10.2.7: 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)	<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 type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

The following is intentionally left blank.



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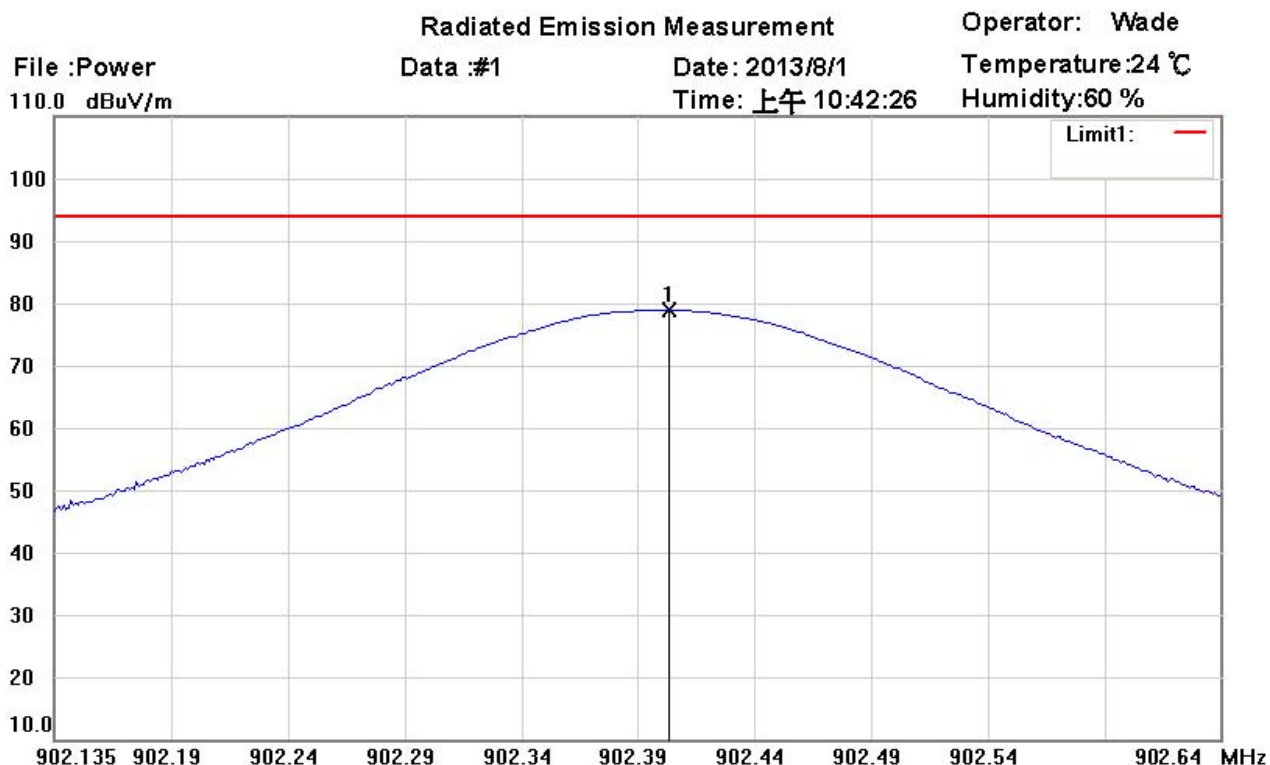
FCC ID: M5X-ACT30NH

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).



Site : Chamber

Condition : FCC 15.249 power(902-928)_QP

EUT : W6M21306-13283

M/N : ACT-31H

Test Mode : Power

Note :

Polarization: *Horizontal*

Power : 3VDC

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
*	902.3983	51.83	peak	27.05	78.88	94.00	100	32	-15.12	



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Radiated Emission Measurement

Operator: Wade

File :Power
 130.0 dBuV/m

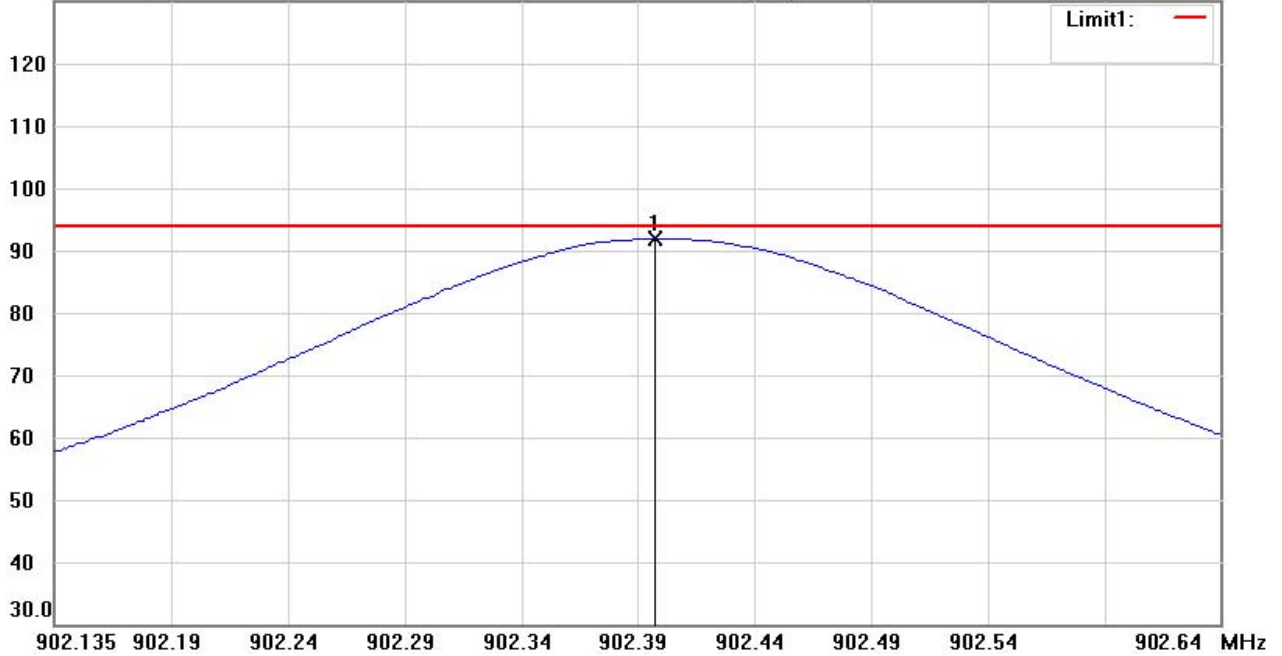
Data :#2

Date: 2013/8/1

Temperature:24 °C

Time: 上午 10:43:36

Humidity:60 %



Site : Chamber

Condition : FCC 15.249 power(902-928)_QP

Polarization: *Vertical*

EUT : W6M21306-13283

Power : 3VDC

M/N: ACT-31H

Distance: 3m

Test Mode : Power

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
*	902.3923	64.82	peak	27.05	91.87	94.00	100	226	-2.13	



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Radiated Emission Measurement

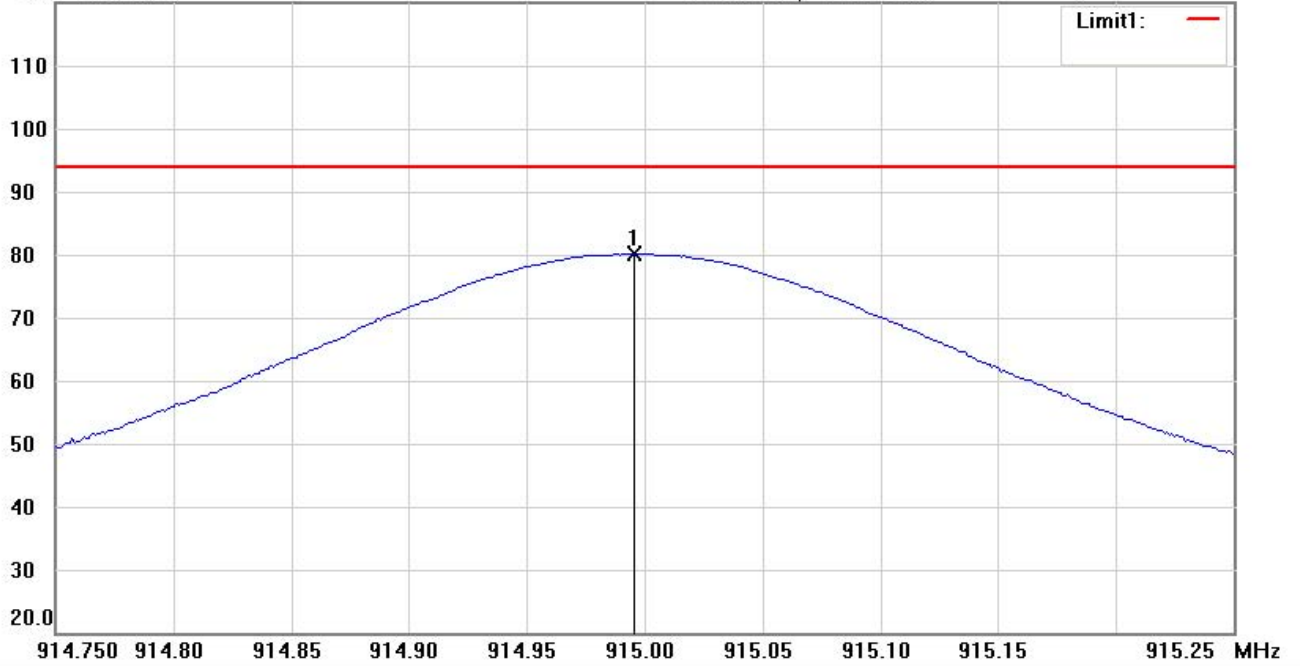
Operator: Wade

File :Power
 120.0 dBuV/m

Data :#1

Date: 2013/7/31
 Time: 上午 11:12:16

Temperature:24 °C
 Humidity:60 %



Site : Chamber

Condition : FCC 15.249 power(902-928)_QP

Polarization: *Horizontal*

EUT : W6M21306-13283

Power : 3VDC

M/N: ACT-31H

Distance: 3m

Test Mode : Power

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
*	914.9955	52.72	peak	27.34	80.06	94.00	100	221	-13.94	



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Radiated Emission Measurement

Operator: Wade

File :Power
 130.0 dBuV/m

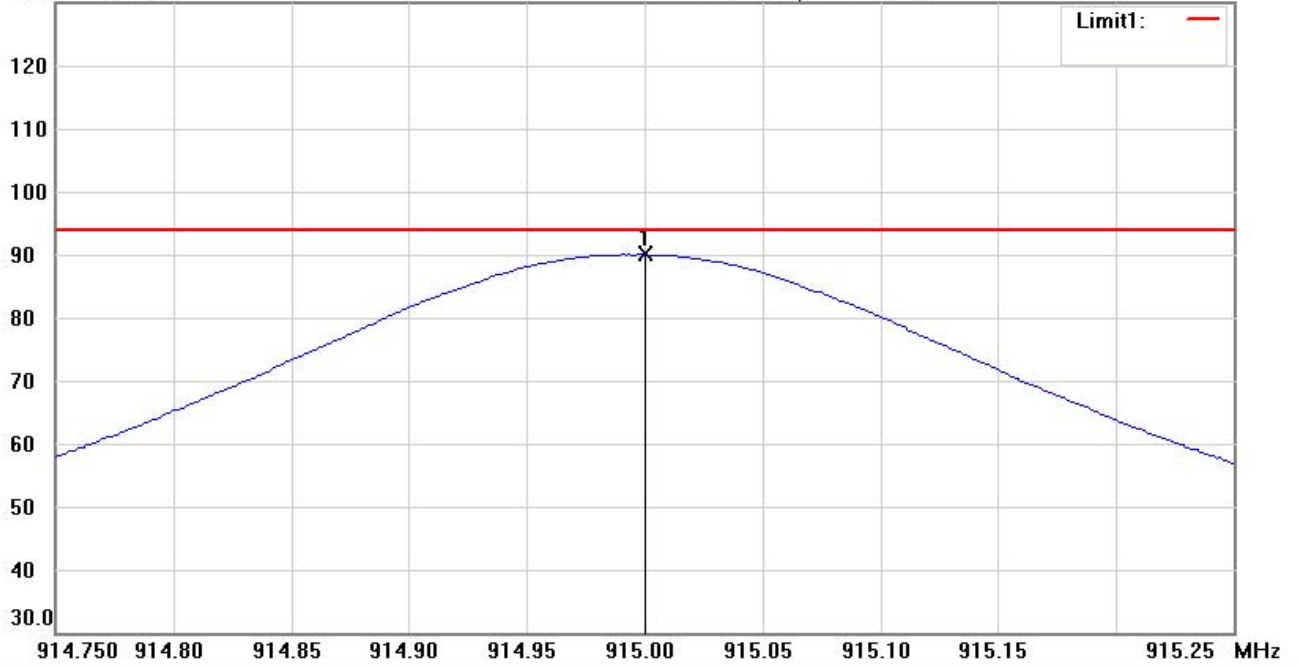
Data :#2

Date: 2013/7/31

Temperature:24 °C

Time: 上午 11:13:35

Humidity:60 %



Site : Chamber

Condition : FCC 15.249 power(902-928)_QP

Polarization: *Vertical*

EUT : W6M21306-13283

Power : 3VDC

M/N: ACT-31H

Distance: 3m

Test Mode : Power

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
*	915.0005	62.67	peak	27.34	90.01	94.00	100	54	-3.99	



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 FCC ID: M5X-ACT30NH

Radiated Emission Measurement

Operator: Wade

File :Power
 120.0 dBuV/m

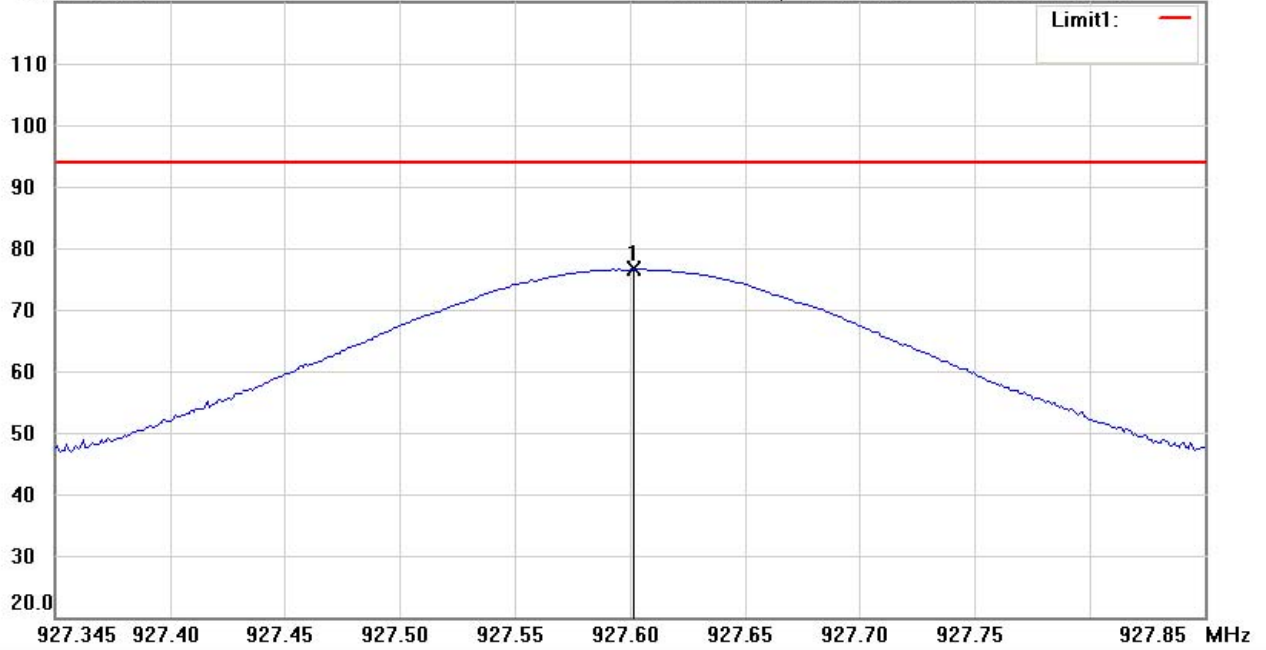
Data :#1

Date: 2013/7/31

Temperature:24 °C

Time: 上午 11:32:06

Humidity:60 %



Site : Chamber

Condition : FCC 15.249 power(902-928)_QP

Polarization: *Horizontal*

EUT : W6M21306-13283

Power : 3VDC

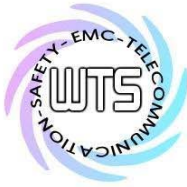
M/N: ACT-31H

Distance: 3m

Test Mode : Power

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
*	927.5957	48.93	peak	27.63	76.56	94.00	100	302	-17.44	



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Radiated Emission Measurement

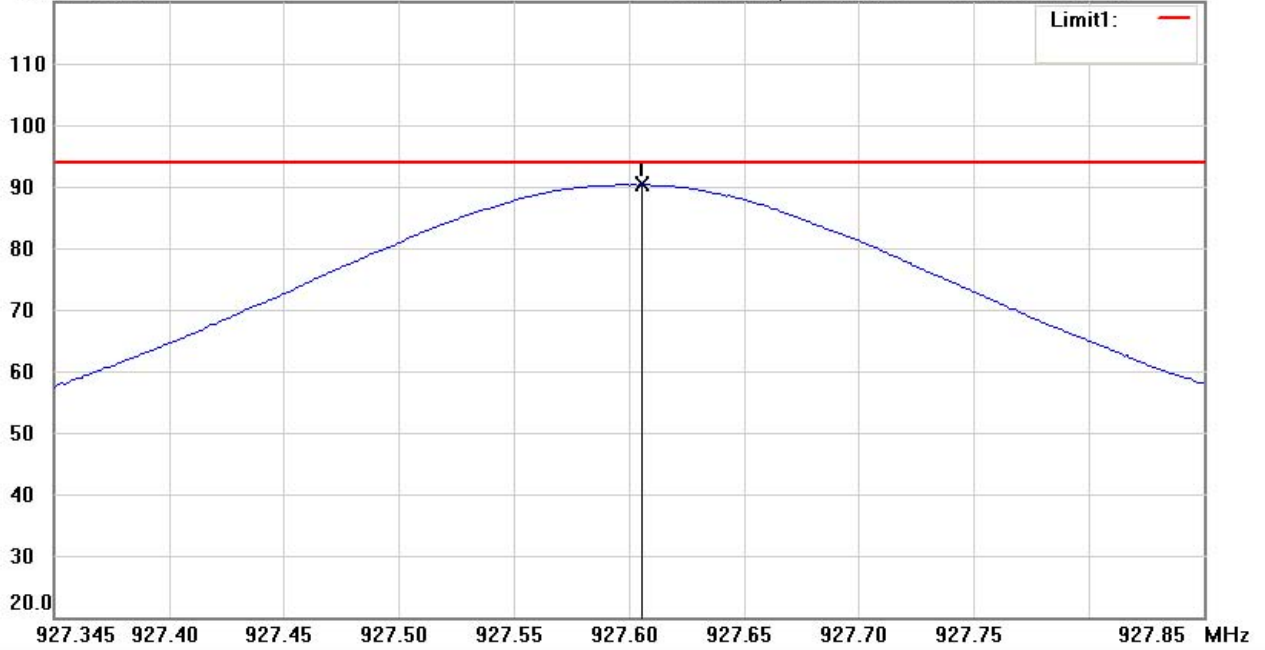
Operator: Wade

File :Power
120.0 dBuV/m

Data :#2

Date: 2013/7/31
Time: 上午 11:33:01

Temperature:24 °C
Humidity:60 %



Site : Chamber

Condition : FCC 15.249 power(902-928)_QP

Polarization: *Vertical*

EUT : W6M21306-13283

Power : 3VDC

M/N: ACT-31H

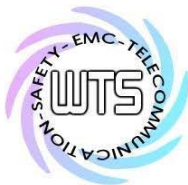
Distance: 3m

Test Mode : Power

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
*	927.5997	62.63	peak	27.63	90.26	94.00	100	214	-3.74	

Test equipment used: ETSTW-RE 003, ETSTW-RE 004, ETSTW-RE 030, ETSTW-RE 044



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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 dBμV/m + 20 dB= 74dBμV/m

Or

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

Test equipment used: ETSTW-RE 003, ETSTW-RE 004, ETSTW-RE 111, ETSTW-RE 030, ETSTW-RE 044



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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

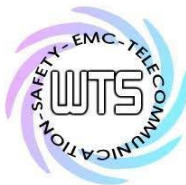
Model: ACT-31H Date: 2013/7/31
 Mode: 902.4MHz Temperature: 24 °C Engineer: Wade
 Polarization: Horizontal Humidity: 60 %

Frequency (MHz)	Reading (dBuV)	Detector	Factor (dB)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Table Degree (Deg.)	Ant. High (cm)
39.7194	5.20	peak	14.02	19.22	40.00	-20.78	220	100
148.5772	3.77	peak	15.26	19.03	43.50	-24.47	35	100

Frequency (MHz)	Reading (dBuV)		Factor (dB) Corr.	Result @3m (dBuV/m)		Limit @3m (dBuV/m)		Margin (dB)	Table Degree (Deg.)	Ant. High (cm)
	Peak	Ave.		Peak	Ave.	Peak	Ave.			
1804.8000	43.28	---	-6.04	37.24	---	74.00	54.00	-36.76	58	100
2707.2000	43.40	---	-3.08	40.32	---	74.00	54.00	-33.68	122	100
3609.6000	41.36	---	-1.51	39.85	---	74.00	54.00	-34.15	207	100
4512.0000	41.49	---	0.19	41.68	---	74.00	54.00	-32.32	175	100

Polarization: Vertical

Frequency (MHz)	Reading (dBuV)	Detector	Factor (dB)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Table Degree (Deg.)	Ant. High (cm)
39.7194	5.77	peak	14.02	19.79	40.00	-20.21	260	100
162.1844	4.40	peak	15.17	19.57	43.50	-23.93	70	100



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Frequency (MHz)	Reading (dBuV)		Factor (dB) Corr.	Result @3m (dBuV/m)		Limit @3m (dBuV/m)		Margin (dB)	Table Degree (Deg.)	Ant. High (cm)
	Peak	Ave.		Peak	Ave.	Peak	Ave.			
1804.8000	43.06	---	-6.04	37.02	---	74.00	54.00	-36.98	122	100
2707.2000	42.48	---	-3.08	39.40	---	74.00	54.00	-34.60	45	100
3609.6000	41.30	---	-1.51	39.79	---	74.00	54.00	-34.21	302	100
4512.0000	42.00	---	0.19	42.19	---	74.00	54.00	-31.81	173	100

Mode: 915MHz

Polarization: Horizontal

Frequency (MHz)	Reading (dBuV)	Detector	Factor (dB)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Table Degree (Deg.)	Ant. High (cm)
39.7194	5.71	peak	14.02	19.73	40.00	-20.27	255	100
156.3526	4.91	peak	15.27	20.18	43.50	-23.32	60	100

Frequency (MHz)	Reading (dBuV)		Factor (dB) Corr.	Result @3m (dBuV/m)		Limit @3m (dBuV/m)		Margin (dB)	Table Degree (Deg.)	Ant. High (cm)
	Peak	Ave.		Peak	Ave.	Peak	Ave.			
1830.0000	44.43	---	-5.77	38.66	---	74.00	54.00	-35.34	14	100
2745.0000	42.26	---	-3.08	39.18	---	74.00	54.00	-34.82	204	100
3660.0000	40.90	---	-1.38	39.52	---	74.00	54.00	-34.48	354	100
4575.0000	42.16	---	0.11	42.27	---	74.00	54.00	-31.73	25	100

Polarization: Vertical

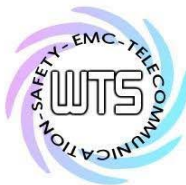
Frequency (MHz)	Reading (dBuV)	Detector	Factor (dB)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Table Degree (Deg.)	Ant. High (cm)
39.7194	5.92	peak	14.02	19.94	40.00	-20.06	135	100
136.9138	4.68	peak	14.81	19.49	43.50	-24.01	310	100

Frequency (MHz)	Reading (dBuV)		Factor (dB) Corr.	Result @3m (dBuV/m)		Limit @3m (dBuV/m)		Margin (dB)	Table Degree (Deg.)	Ant. High (cm)
	Peak	Ave.		Peak	Ave.	Peak	Ave.			
1830.0000	44.44	---	-5.77	38.67	---	74.00	54.00	-35.33	204	100
2745.0000	42.14	---	-3.08	39.06	---	74.00	54.00	-34.94	122	100
3660.0000	40.87	---	-1.38	39.49	---	74.00	54.00	-34.51	304	100
4575.0000	42.66	---	0.11	42.77	---	74.00	54.00	-31.23	75	100

Mode: 927.6MHz

Polarization: Horizontal

Frequency (MHz)	Reading (dBuV)	Detector	Factor (dB)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Table Degree (Deg.)	Ant. High (cm)
35.8316	5.65	peak	13.60	19.25	40.00	-20.75	235	100
152.4650	4.17	peak	15.28	19.45	43.50	-24.05	40	100



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Frequency (MHz)	Reading (dBuV)		Factor (dB) Corr.	Result @3m (dBuV/m)		Limit @3m (dBuV/m)		Margin (dB)	Table Degree (Deg.)	Ant. High (cm)
	Peak	Ave.		Peak	Ave.	Peak	Ave.			
1855.2000	43.65	---	-5.51	38.14	---	74.00	54.00	-35.86	75	100
2782.8000	42.61	---	-3.07	39.54	---	74.00	54.00	-34.46	127	100
3710.4000	41.59	---	-1.27	40.32	---	74.00	54.00	-33.68	306	100
4638.0000	41.92	---	0.14	42.06	---	74.00	54.00	-31.94	35	100

Polarization: Vertical

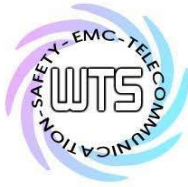
Frequency (MHz)	Reading (dBuV)	Detector	Factor (dB)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Table Degree (Deg.)	Ant. High (cm)
39.7194	5.87	peak	14.02	19.89	40.00	-20.11	185	100
148.5772	4.09	peak	15.26	19.35	43.50	-24.15	340	100

Frequency (MHz)	Reading (dBuV)		Factor (dB) Corr.	Result @3m (dBuV/m)		Limit @3m (dBuV/m)		Margin (dB)	Table Degree (Deg.)	Ant. High (cm)
	Peak	Ave.		Peak	Ave.	Peak	Ave.			
1855.2000	48.60	---	-5.51	43.09	---	74.00	54.00	-30.91	55	100
2782.8000	42.46	---	-3.07	39.39	---	74.00	54.00	-34.61	345	100
3710.4000	42.11	---	-1.27	40.84	---	74.00	54.00	-33.16	127	100
4638.0000	42.00	---	0.14	42.14	---	74.00	54.00	-31.86	50	100

- 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 = ± 3.72 dB, 1-18 GHz = ± 5.33 dB, 18-40 GHz = ± 3.43 dB ; Reported uncertainties represent expanded uncertainties expressed at approximately the 95% confidence level using a coverage factor of k = 2.**
 - 6. See attached diagrams in appendix.**

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

Test equipment used: ETSTW-RE 003, ETSTW-RE 004, ETSTW-RE 111, ETSTW-RE 030,
ETSTW-RE 044, ETSTW-RE 088, ETSTW-RE 018



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FCC ID: M5X-ACT30NH

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:

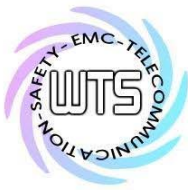
Frequency of Emission (MHz)	Field Strength (microvolts/meter)	Field Strength (dBmicrovolts/meter)
30 – 88	100	40.0
88 – 216	150	43.5
216 – 960	200	46.0
Above 960	500	54.0

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 = ± 3.72 dB, 1-18 GHz = ±5.33 dB, 18-40 GHz= ±3.43 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 003, ETSTW-RE 004, ETSTW-RE 111, ETSTW-RE 030,
ETSTW-RE 044

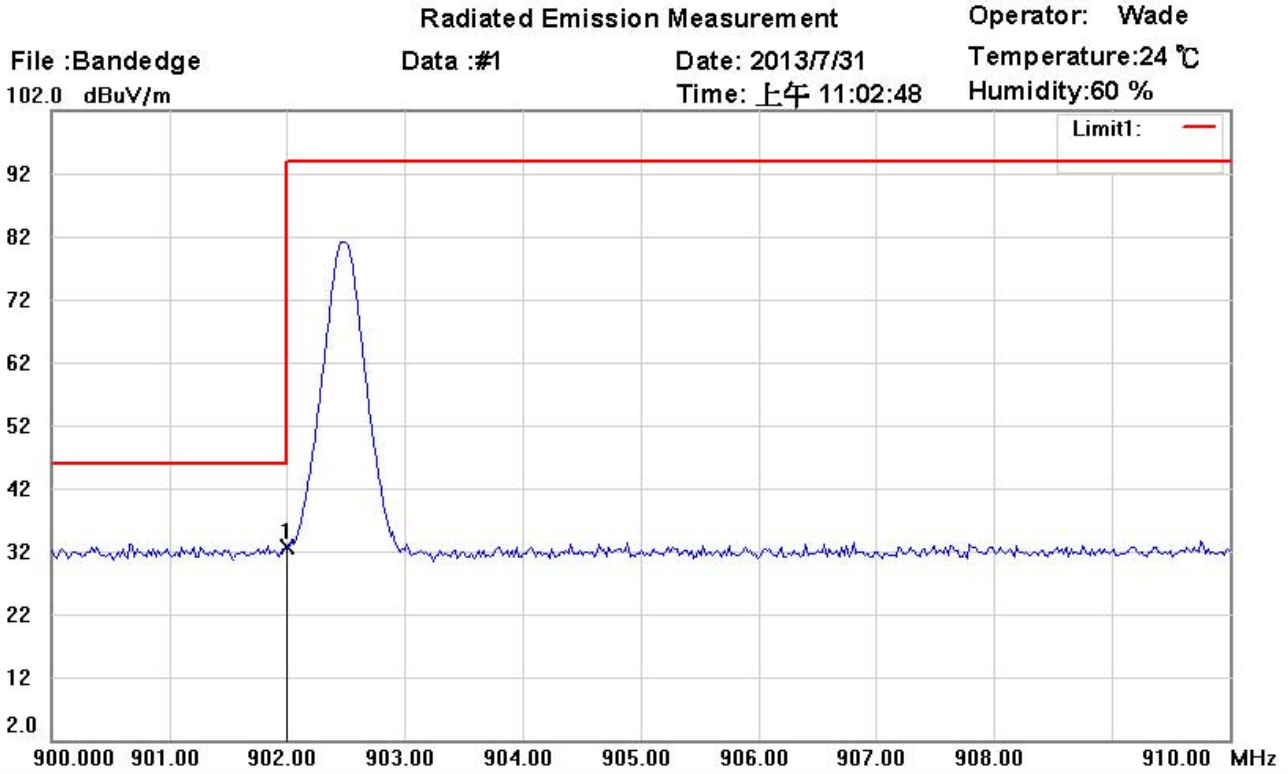
Explanation: This test is not required.



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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).



Site : Chamber
 Condition : FCC 15.249 Bandedge(902-928)_QP Polarization: *Horizontal*
 EUT : W6M21306-13283 Power : 3VDC
 M/N: ACT-31H Distance: 3m
 Test Mode : 902.4MHz
 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	5.52	peak	27.05	32.57	46.00	100	42	-13.43	



Worldwide Testing Services(Taiwan) Co., Ltd.

Registration number: W6M21306-13283-C-1
 FCC ID: M5X-ACT30NH

Radiated Emission Measurement

Operator: Wade

File :Bandedge
 112.0 dBuV/m

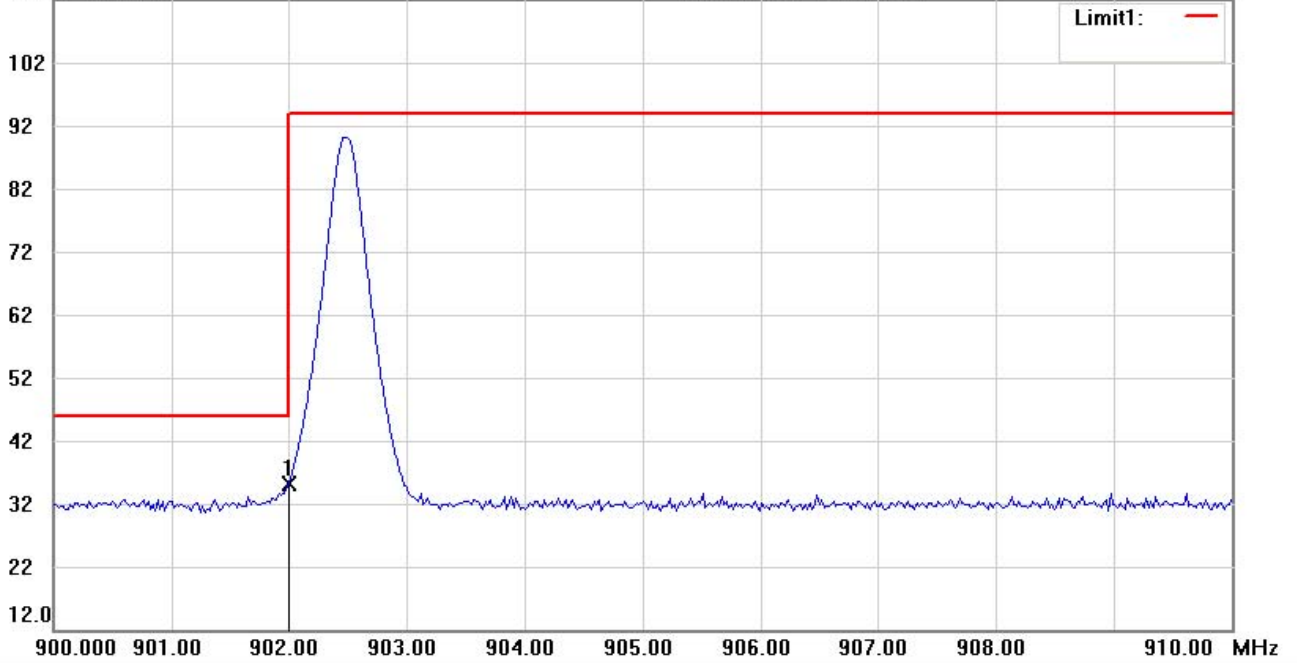
Data :#2

Date: 2013/7/31

Temperature:24 °C

Time: 上午 11:03:59

Humidity:60 %



Site : Chamber

Condition : FCC 15.249 Bandedge(902-928)_QP

Polarization: *Vertical*

EUT : W6M21306-13283

Power : 3VDC

M/N: ACT-31H

Distance: 3m

Test Mode : 902.4MHz

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	8.16	peak	27.05	35.21	46.00	100	123	-10.79	



Worldwide Testing Services(Taiwan) Co., Ltd.

Registration number: W6M21306-13283-C-1
 FCC ID: M5X-ACT30NH

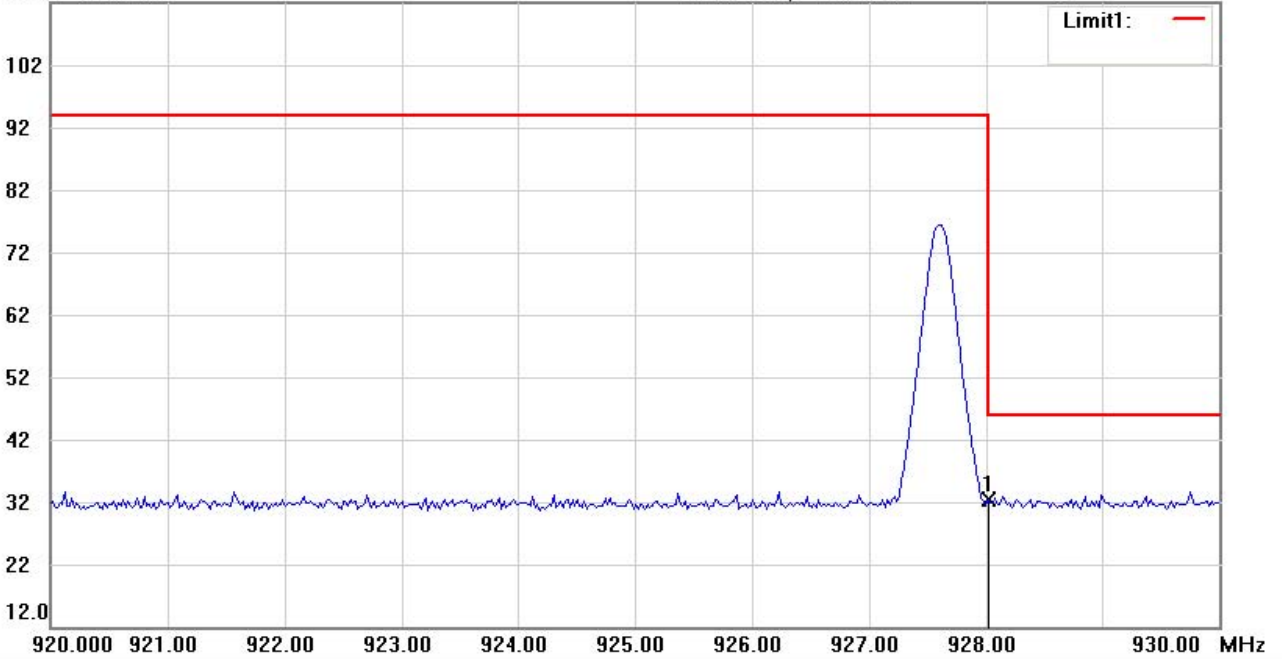
Radiated Emission Measurement

Operator: Wade
 Temperature: 24 °C
 Humidity: 60 %

File : Bandedge
 112.0 dBuV/m

Data : #1

Date: 2013/7/31
 Time: 上午 11:27:01



Site : Chamber

Condition : FCC 15.249 Bandedge(902-928)_QP

EUT : W6M21306-13283

M/N: ACT-31H

Test Mode : 927.6MHz

Note :

Polarization: *Horizontal*

Power : 3VDC

Distance: 3m

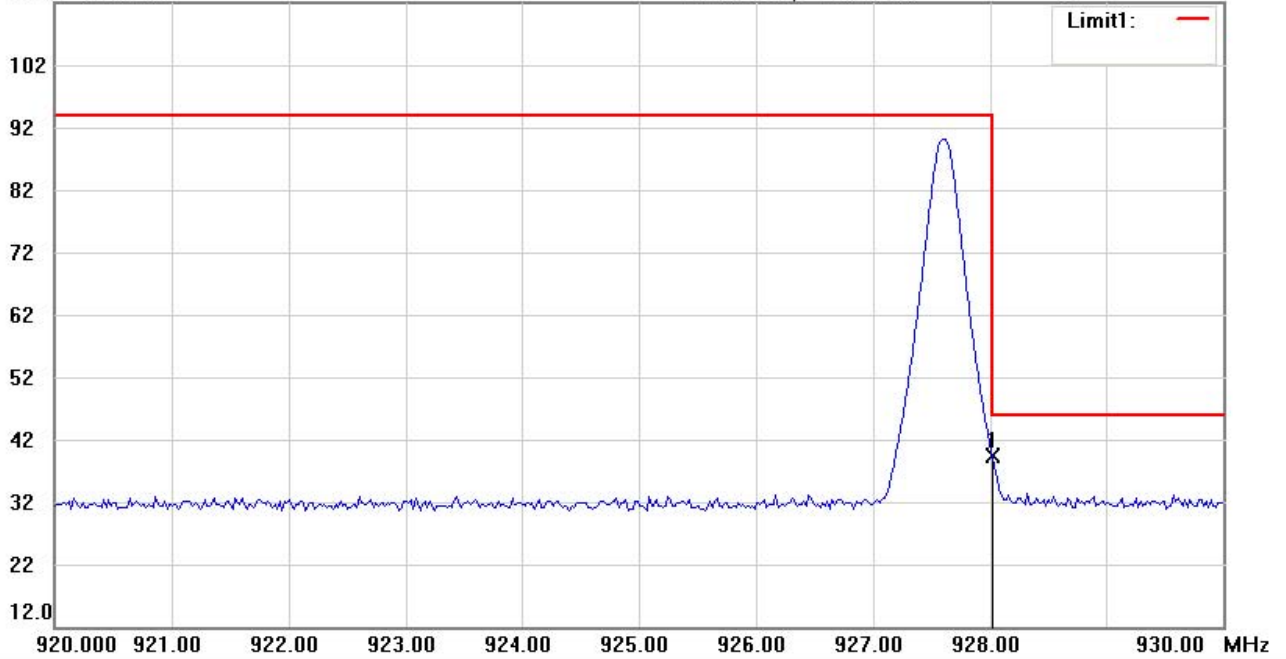
Mk.	Frequency (MHz)	Reading (dBuV)	Detector	Corr. factor (dB/m)	Result (dBuV/m)	Limit (dBuV/m)	Ant.Pos (cm)	Tab.Pos (deg.)	Margin (dB)	Comment
*	928.0000	4.73	peak	27.64	32.37	46.00	100	42	-13.63	



Worldwide Testing Services(Taiwan) Co., Ltd.

Registration number: W6M21306-13283-C-1
 FCC ID: M5X-ACT30NH

Radiated Emission Measurement
 File :Bandedge Data :#2 Date :2013/7/31 Operator: Wade
 112.0 dBuV/m Time: 上午 11:27:59 Temperature:24 °C
 Humidity:60 %



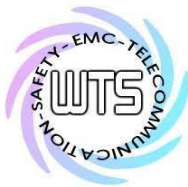
Site : Chamber
 Condition : FCC 15.249 Bandedge(902-928)_QP Polarization: Vertical
 EUT : W6M21306-13283 Power : 3VDC
 M/N : ACT-31H Distance: 3m
 Test Mode : 927.6MHz
 Note :

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
*	928.0000	11.78	peak	27.64	39.42	46.00	100	301	-6.58	

Limit:

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

Test equipment used: ETSTW-RE 003, ETSTW-RE 004, ETSTW-RE 030, ETSTW-RE 044



Registration number: W6M21306-13283-C-1

FCC ID: M5X-ACT30NH

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.

Frequency	Level (dB μ V)	
	quasi-peak	average
150 kHz	lower limit line	Lower 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 001, ETSTW-CE 004, ETSTW-CE 006, ETSTW-RE045

Explanation: This test is not required because the EUT is battery-used.



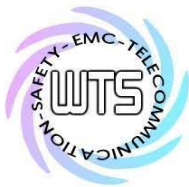
Appendix

A Measurement diagrams

Spurious Emissions radiated

B Photos

1. External Photos
2. Internal Photos
3. Set Up Photo of Radiated Emission



Registration number: W6M21306-13283-C-1

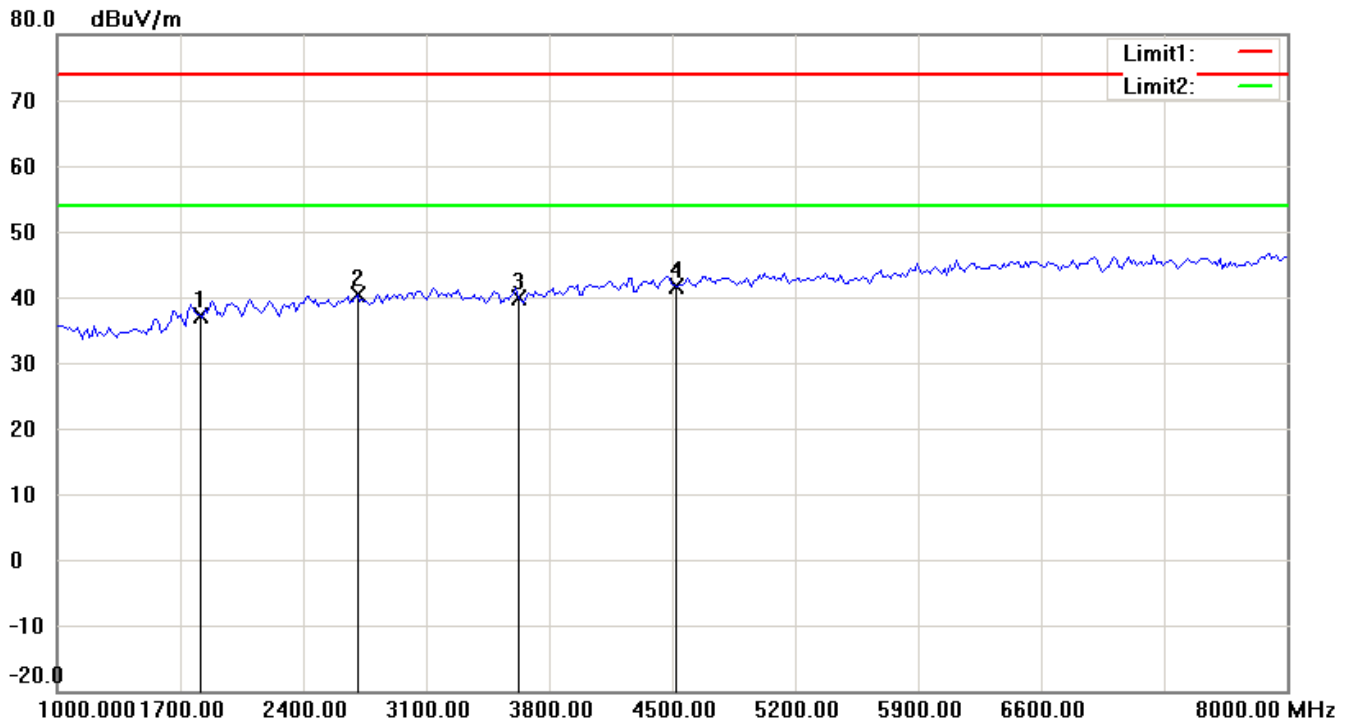
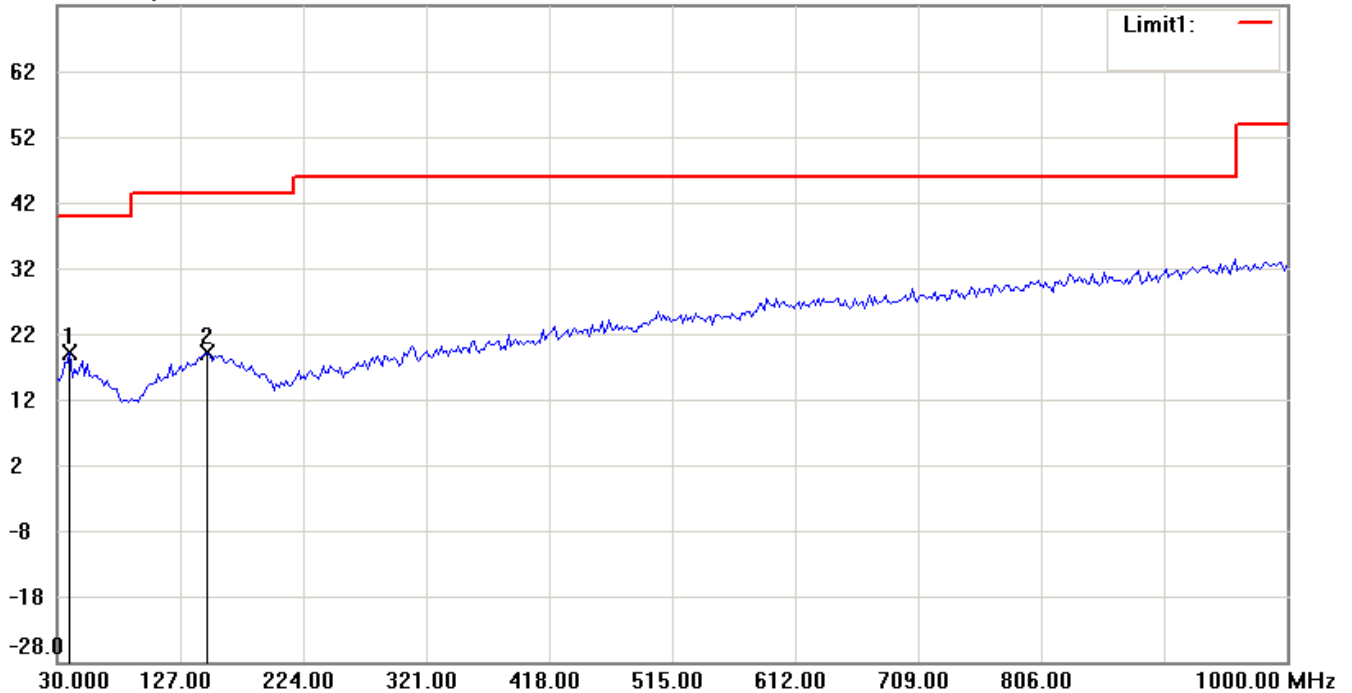
FCC ID: M5X-ACT30NH

Spurious Emissions radiated

902.4MHz

Antenna Polarization H

72.0 dBuV/m



Up Line: Peak Limit Line Down Line: Ave Limit Line

Note:

1. The attached measurement plots are preliminarily pre-scanned with peak detector for determining the final checking frequencies and are for reference only.
2. The some frequencies may exceed the limit line without the specified detectors, but that cannot present the results are failed to the specification of test standard.
3. For corrected test results are listed in the relevant table of radiated test data of this test report.

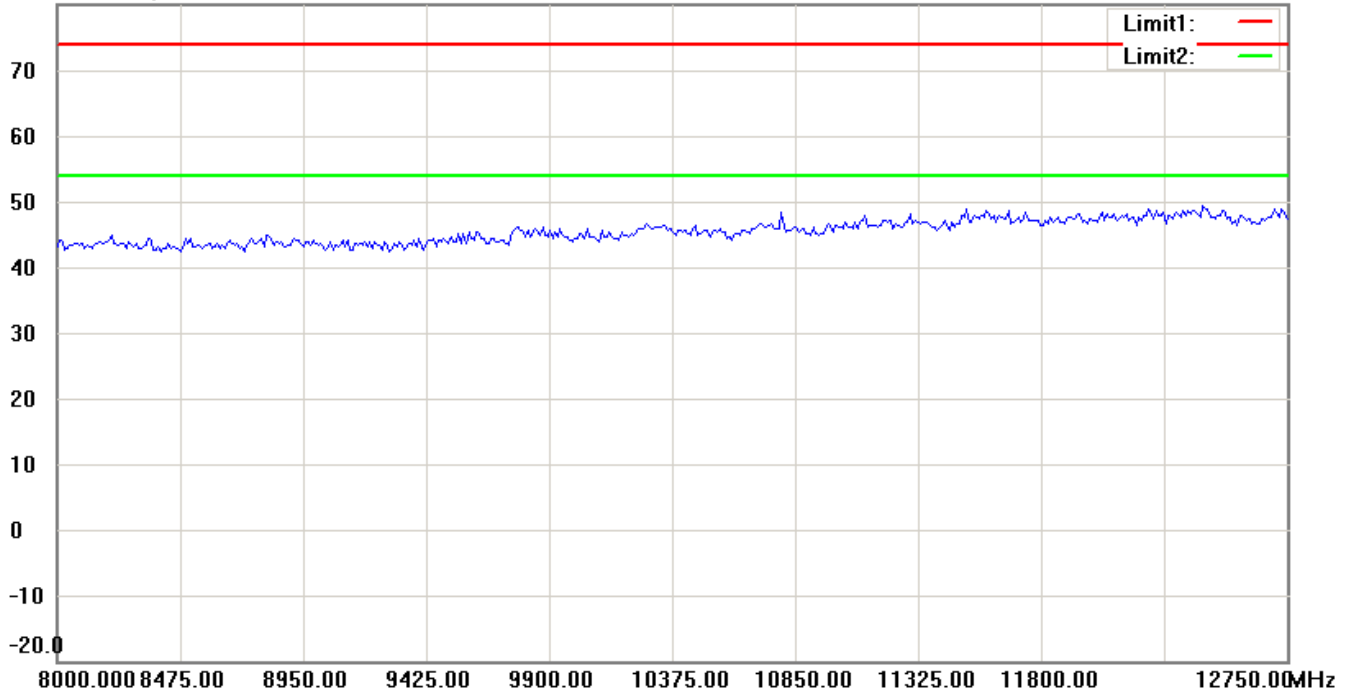


Worldwide Testing Services(Taiwan) Co., Ltd.

Registration number: W6M21306-13283-C-1

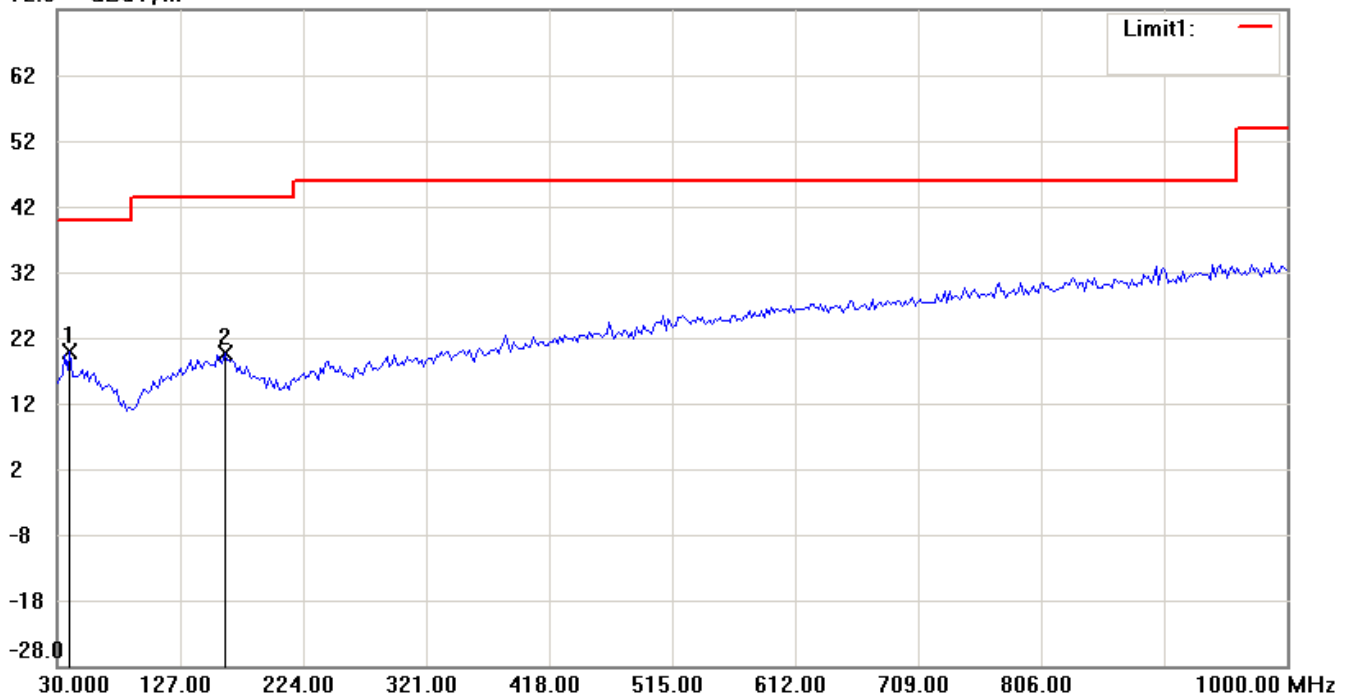
FCC ID: M5X-ACT30NH

80.0 dBuV/m



Antenna Polarization V

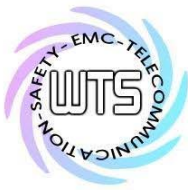
72.0 dBuV/m



Up Line: Peak Limit Line Down Line: Ave Limit Line

Note:

1. The attached measurement plots are preliminarily pre-scanned with peak detector for determining the final checking frequencies and are for reference only.
2. The some frequencies may exceed the limit line without the specified detectors, but that cannot present the results are failed to the specification of test standard.
3. For corrected test results are listed in the relevant table of radiated test data of this test report.

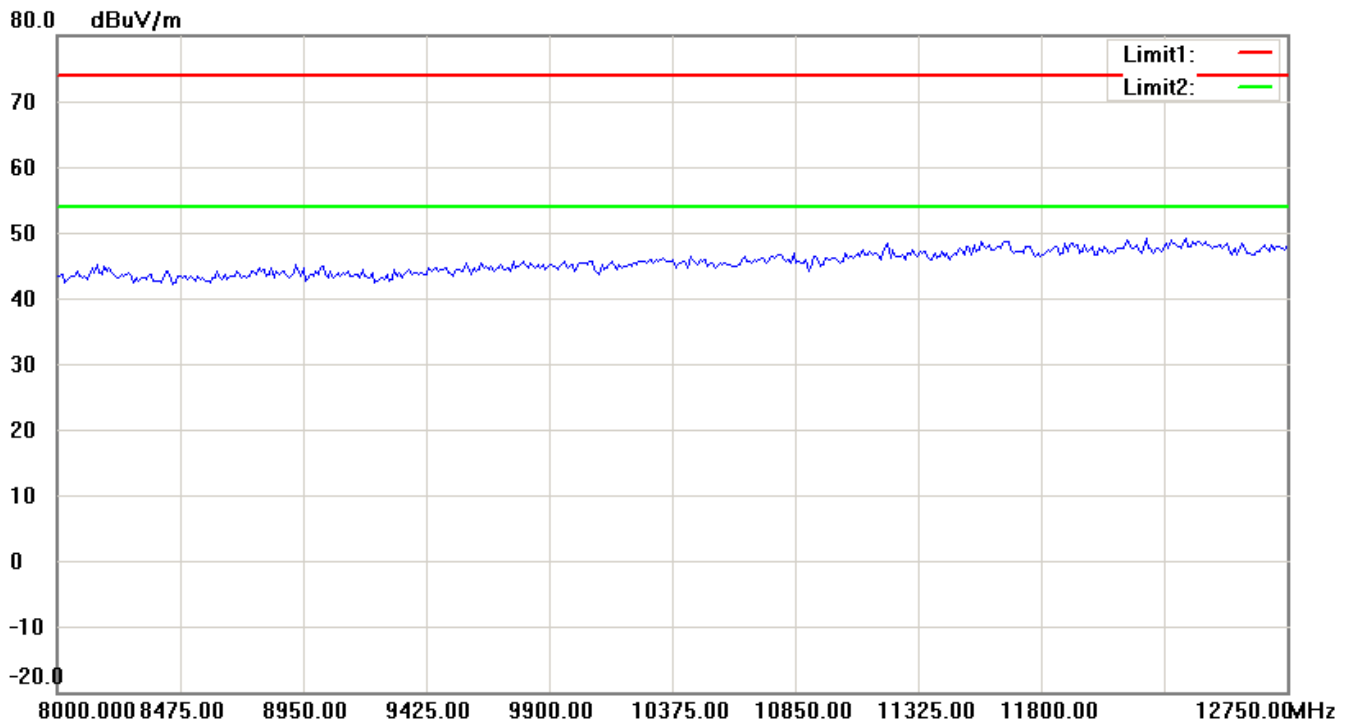
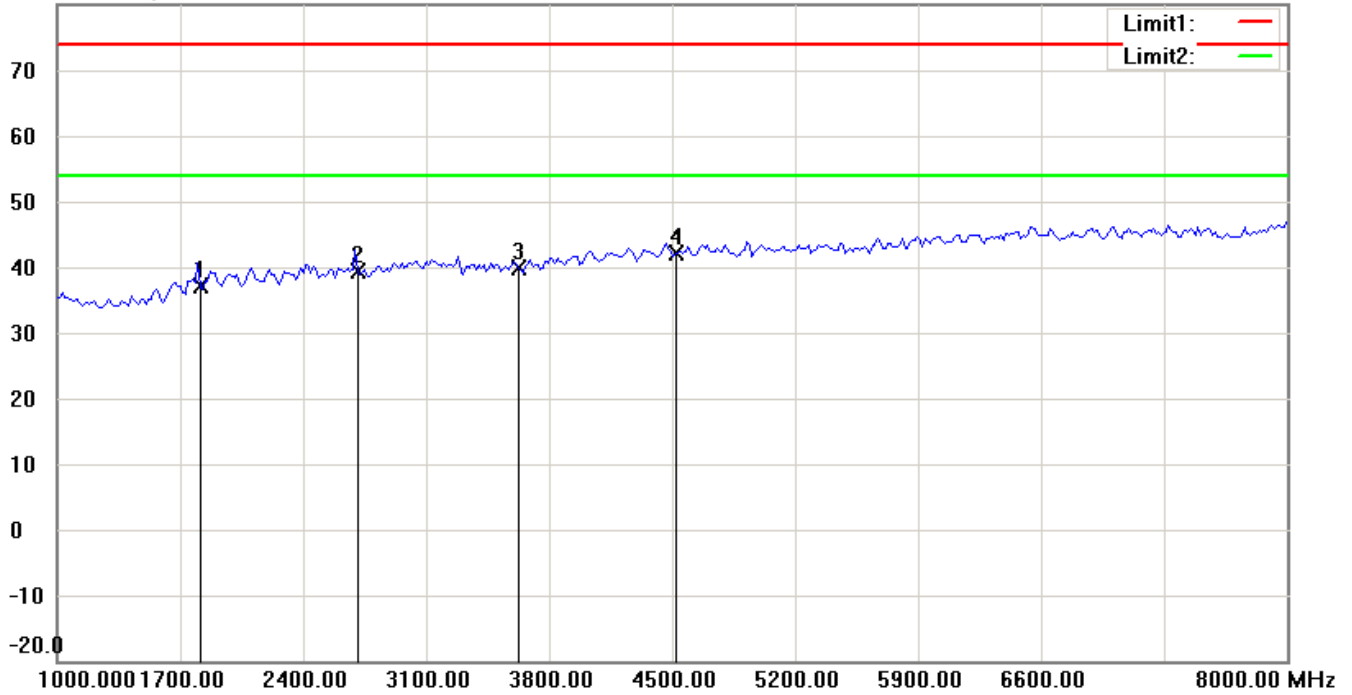


Worldwide Testing Services(Taiwan) Co., Ltd.

Registration number: W6M21306-13283-C-1

FCC ID: M5X-ACT30NH

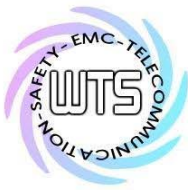
80.0 dBuV/m



Up Line: Peak Limit Line Down Line: Ave Limit Line

Note:

1. The attached measurement plots are preliminarily pre-scanned with peak detector for determining the final checking frequencies and are for reference only.
2. The some frequencies may exceed the limit line without the specified detectors, but that cannot present the results are failed to the specification of test standard.
3. For corrected test results are listed in the relevant table of radiated test data of this test report.



Worldwide Testing Services(Taiwan) Co., Ltd.

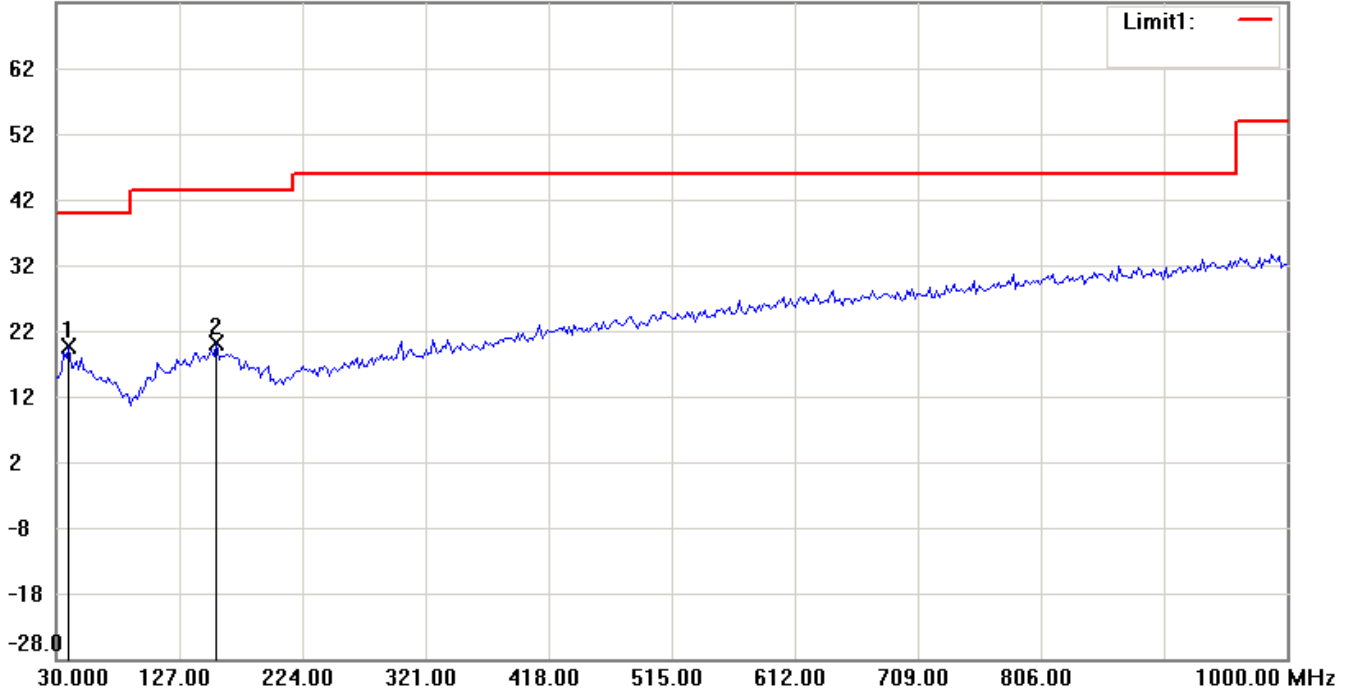
Registration number: W6M21306-13283-C-1

FCC ID: M5X-ACT30NH

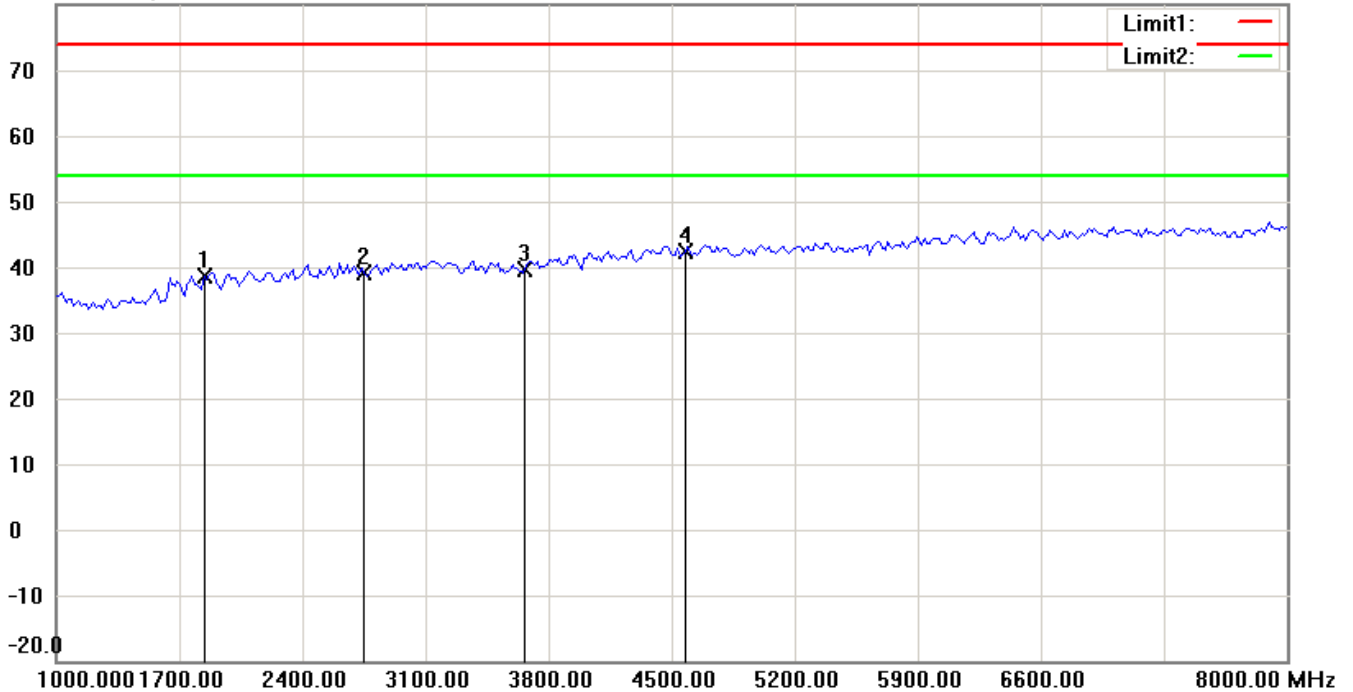
915MHz

Antenna Polarization H

72.0 dBuV/m



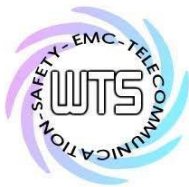
80.0 dBuV/m



Up Line: Peak Limit Line Down Line: Ave Limit Line

Note:

1. The attached measurement plots are preliminarily pre-scanned with peak detector for determining the final checking frequencies and are for reference only.
2. The some frequencies may exceed the limit line without the specified detectors, but that cannot present the results are failed to the specification of test standard.
3. For corrected test results are listed in the relevant table of radiated test data of this test report.

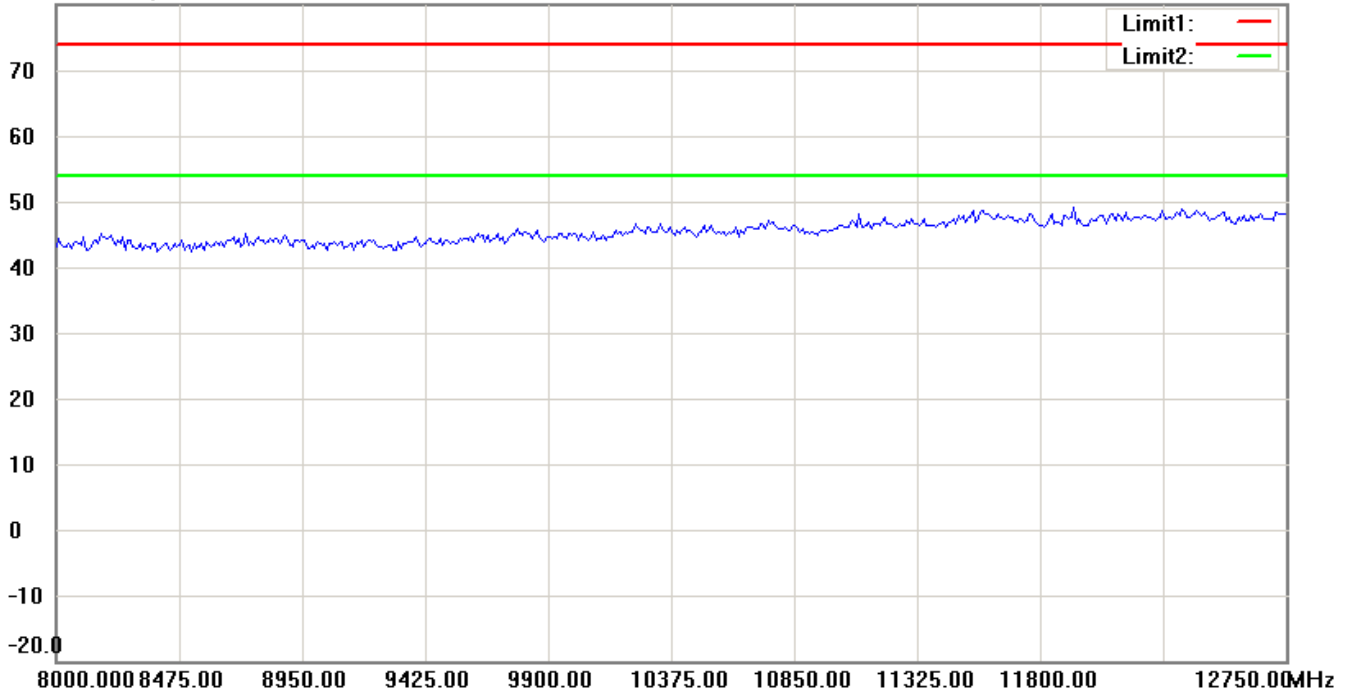


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Registration number: W6M21306-13283-C-1

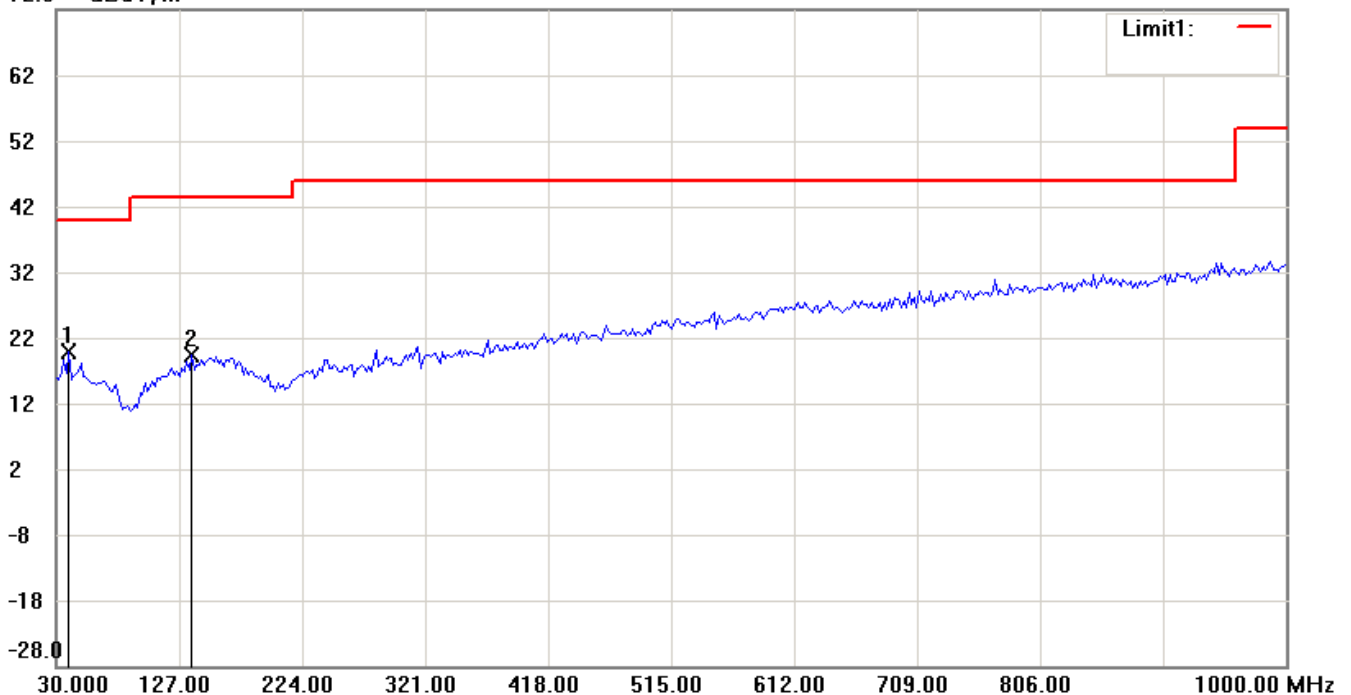
FCC ID: M5X-ACT30NH

80.0 dBuV/m



Antenna Polarization V

72.0 dBuV/m



Up Line: Peak Limit Line Down Line: Ave Limit Line

Note:

1. The attached measurement plots are preliminarily pre-scanned with peak detector for determining the final checking frequencies and are for reference only.
2. The some frequencies may exceed the limit line without the specified detectors, but that cannot present the results are failed to the specification of test standard.
3. For corrected test results are listed in the relevant table of radiated test data of this test report.

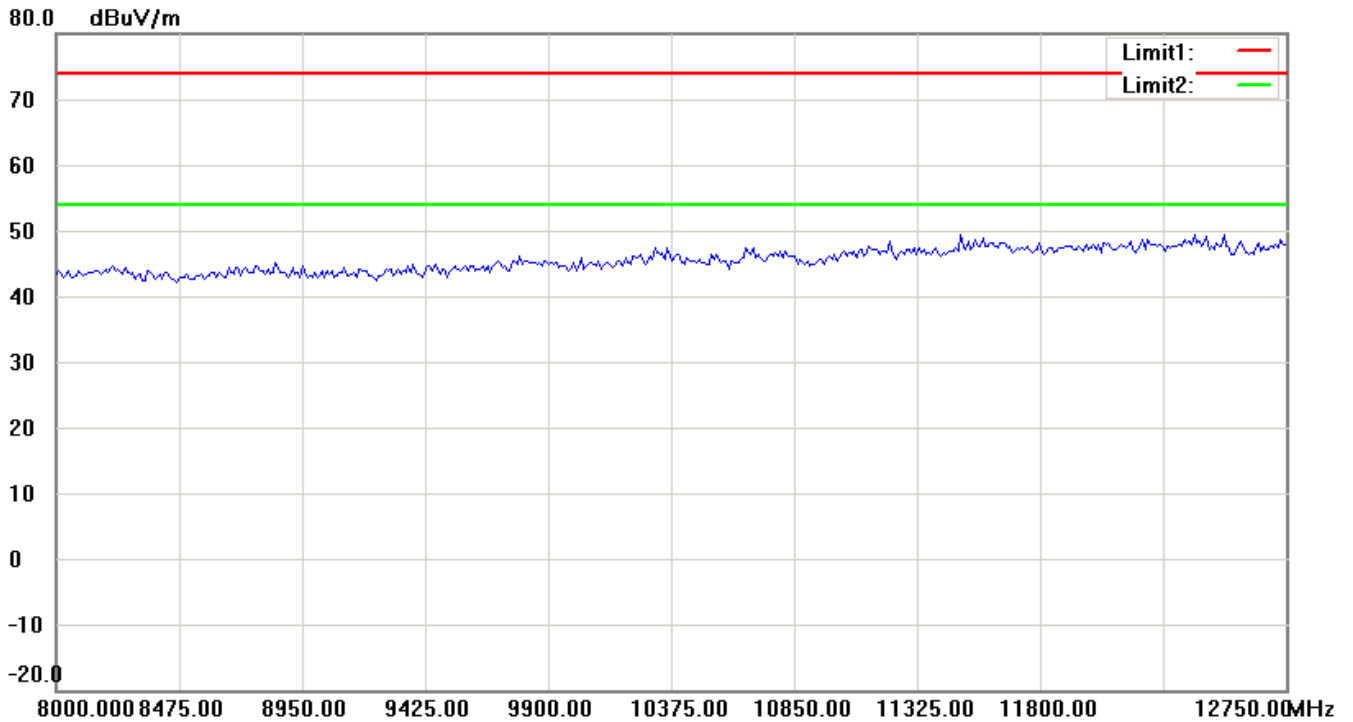
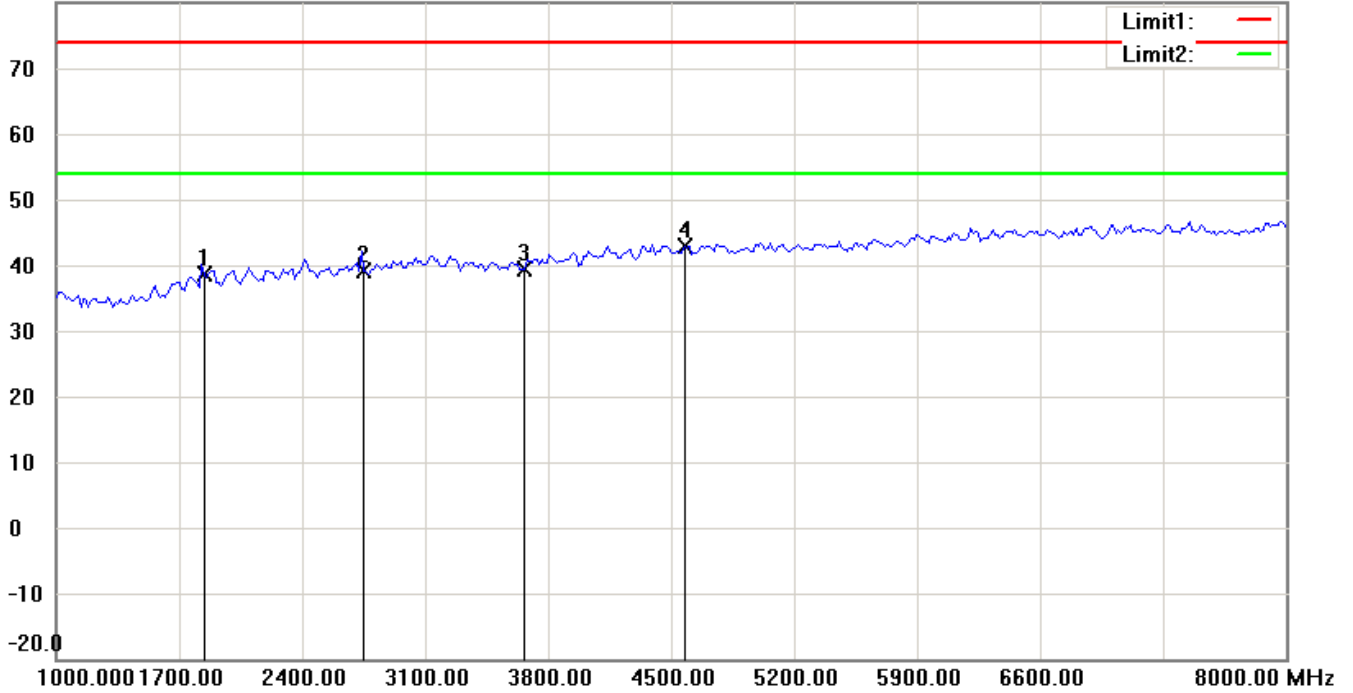


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Registration number: W6M21306-13283-C-1

FCC ID: M5X-ACT30NH

80.0 dBuV/m



Up Line: Peak Limit Line Down Line: Ave Limit Line

Note:

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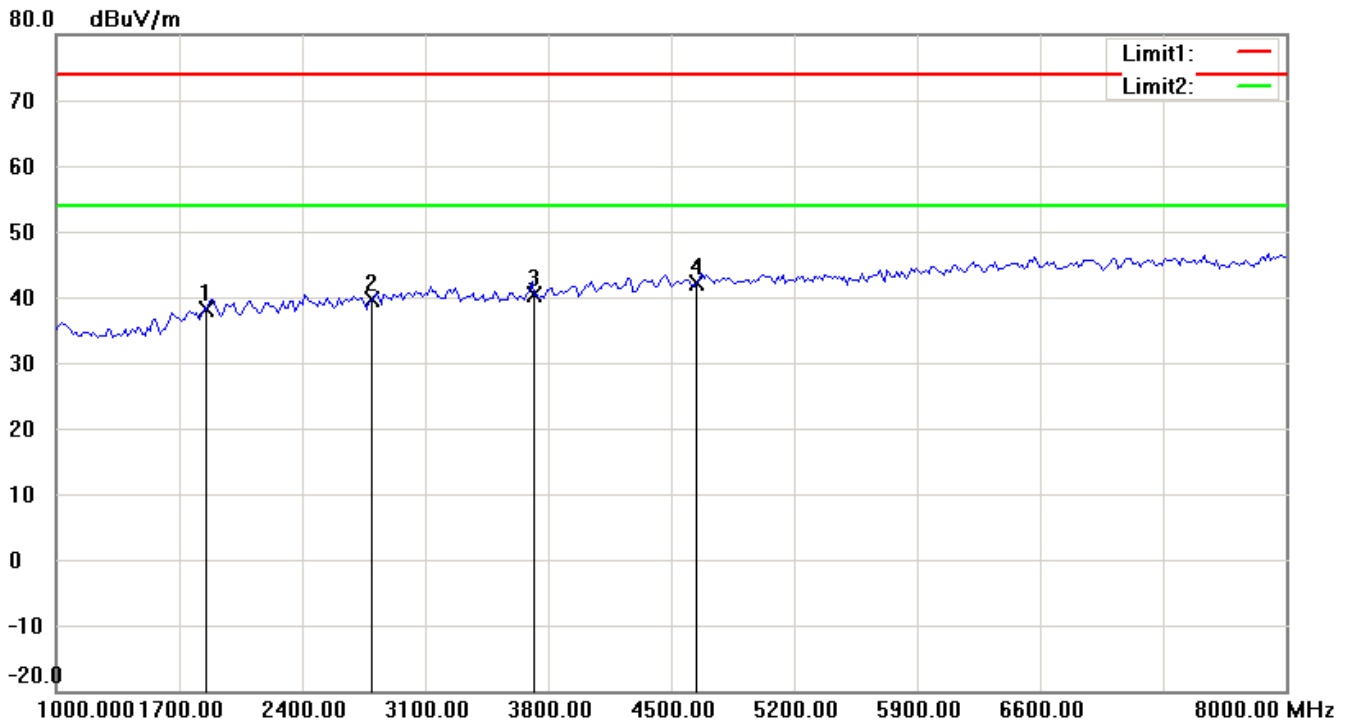
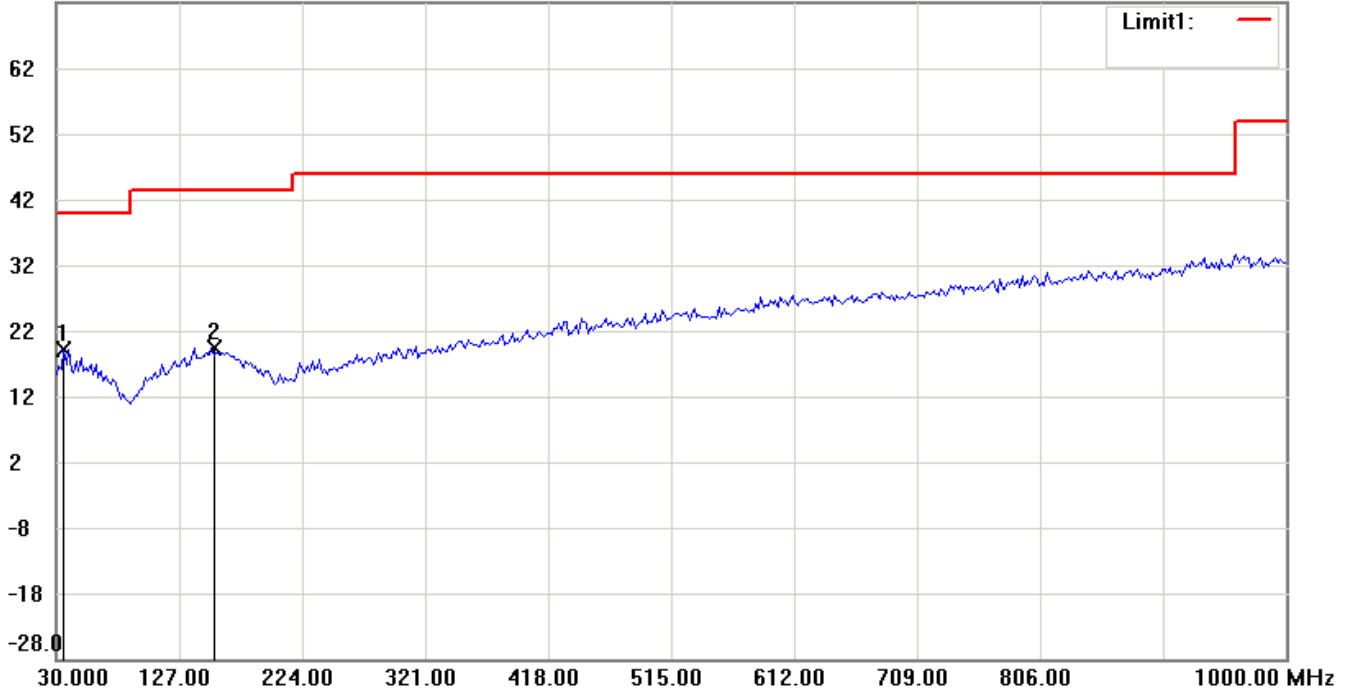
Registration number: W6M21306-13283-C-1

FCC ID: M5X-ACT30NH

927.6MHz

Antenna Polarization H

72.0 dBuV/m



Up Line: Peak Limit Line Down Line: Ave Limit Line

Note:

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2. The some frequencies may exceed the limit line without the specified detectors, but that cannot present the results are failed to the specification of test standard.
3. For corrected test results are listed in the relevant table of radiated test data of this test report.

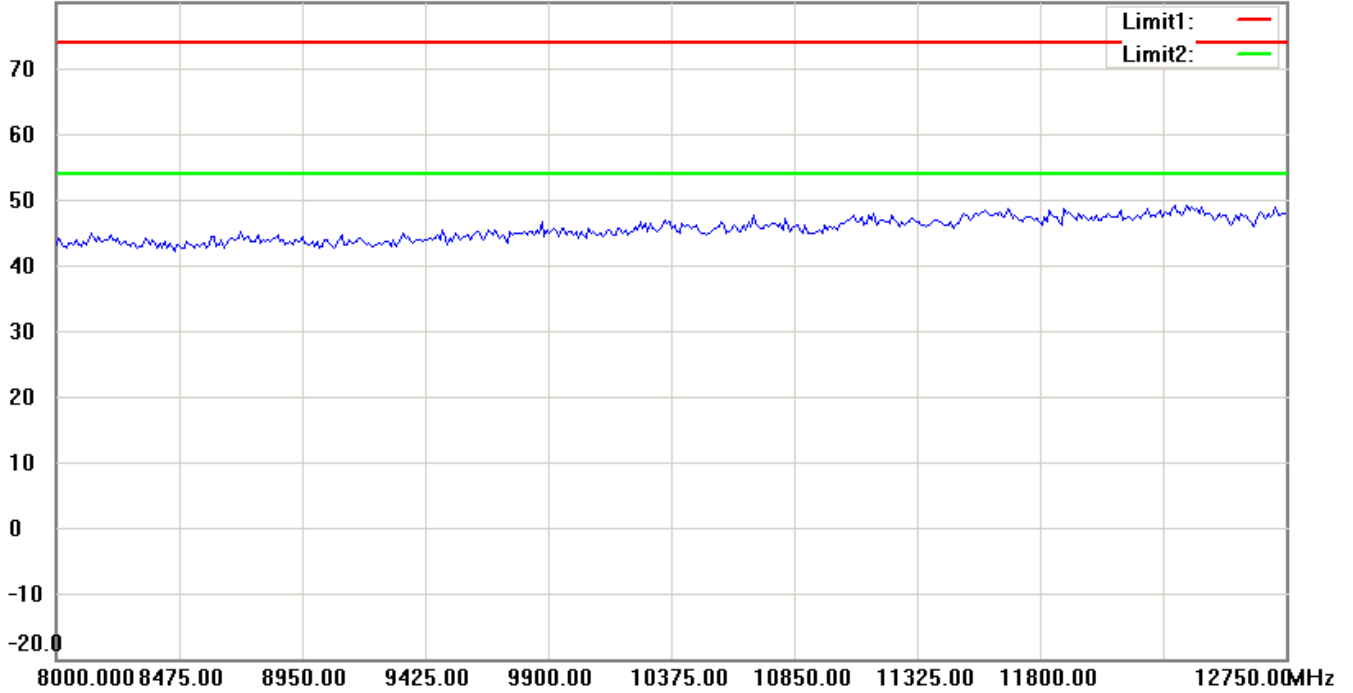


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Registration number: W6M21306-13283-C-1

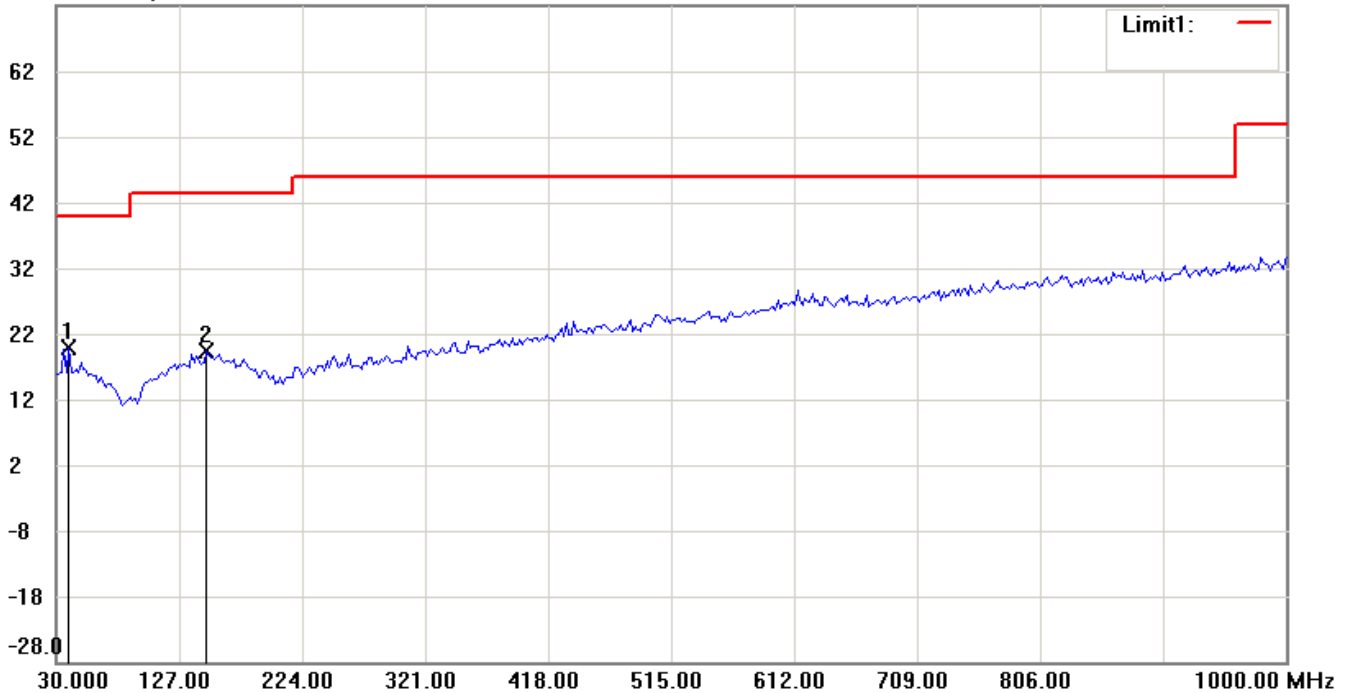
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80.0 dBuV/m



Antenna Polarization V

72.0 dBuV/m



Up Line: Peak Limit Line Down Line: Ave Limit Line

Note:

1. The attached measurement plots are preliminarily pre-scanned with peak detector for determining the final checking frequencies and are for reference only.
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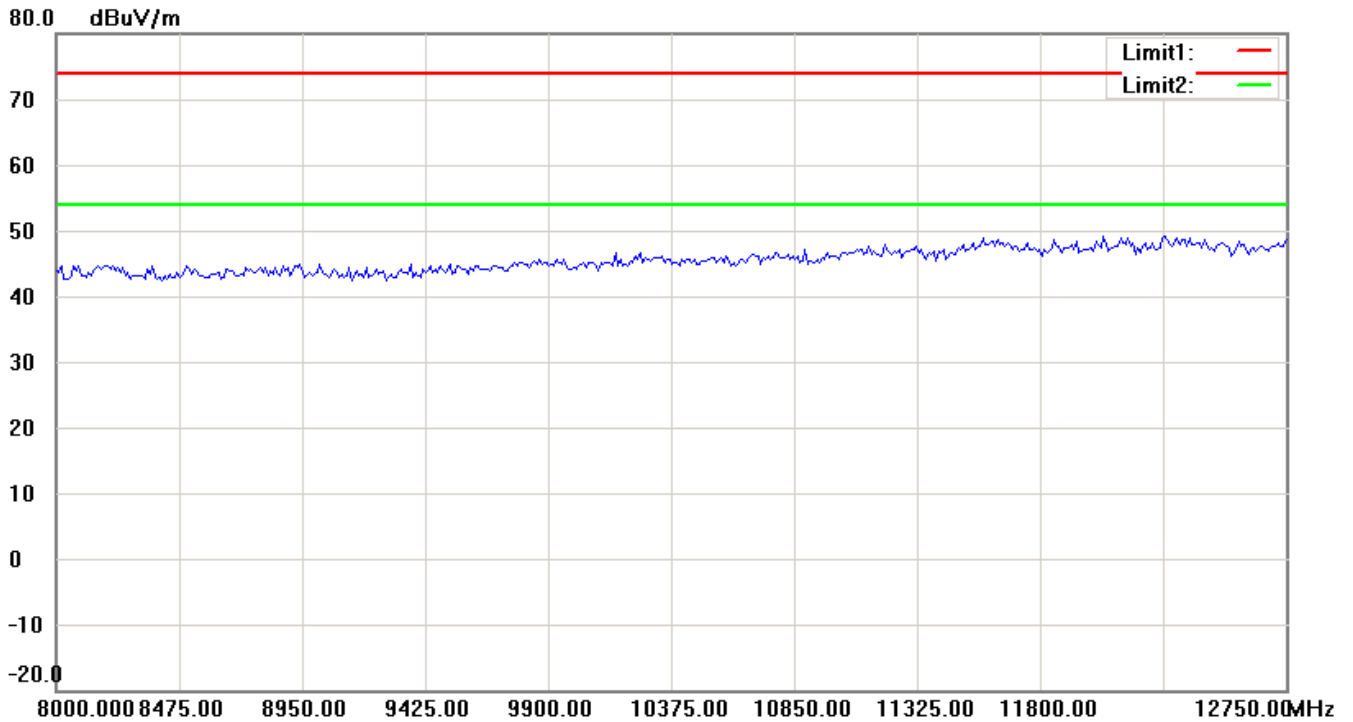
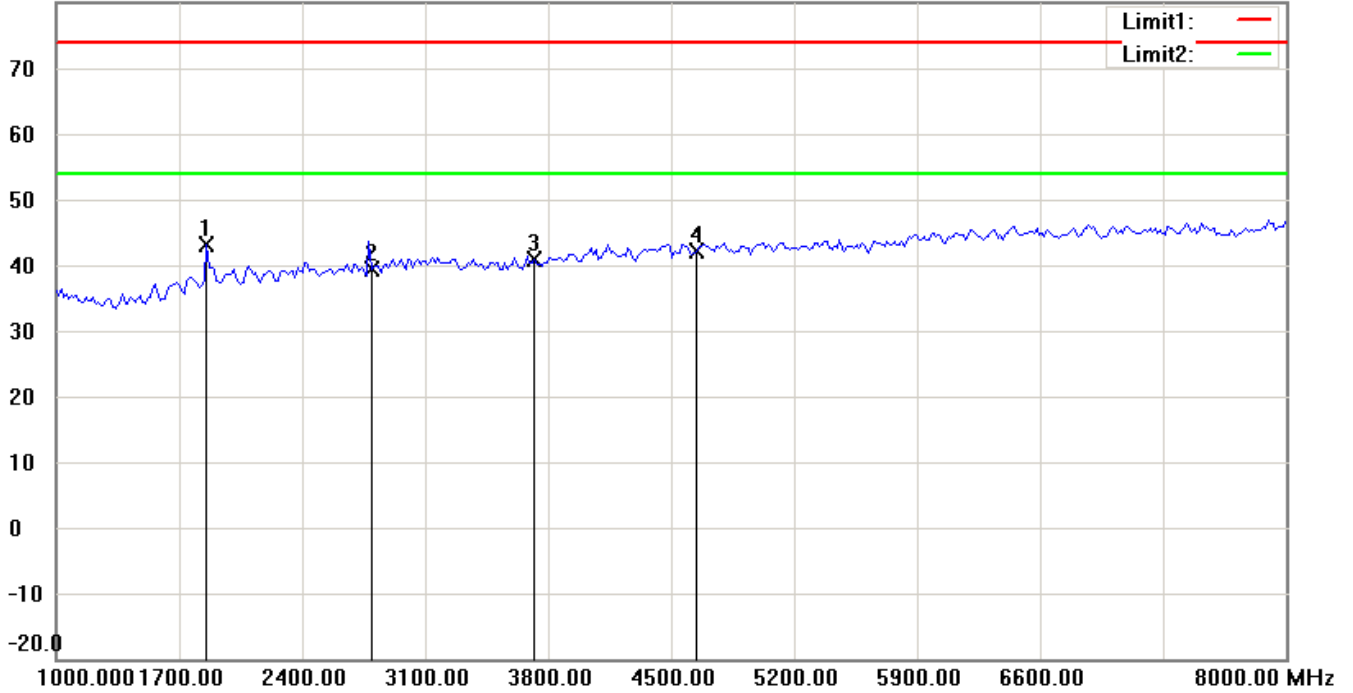


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Registration number: W6M21306-13283-C-1

FCC ID: M5X-ACT30NH

80.0 dBuV/m



Up Line: Peak Limit Line Down Line: Ave Limit Line

Note:

1. The attached measurement plots are preliminarily pre-scanned with peak detector for determining the final checking frequencies and are for reference only.
2. The some frequencies may exceed the limit line without the specified detectors, but that cannot present the results are failed to the specification of test standard.
3. For corrected test results are listed in the relevant table of radiated test data of this test report.

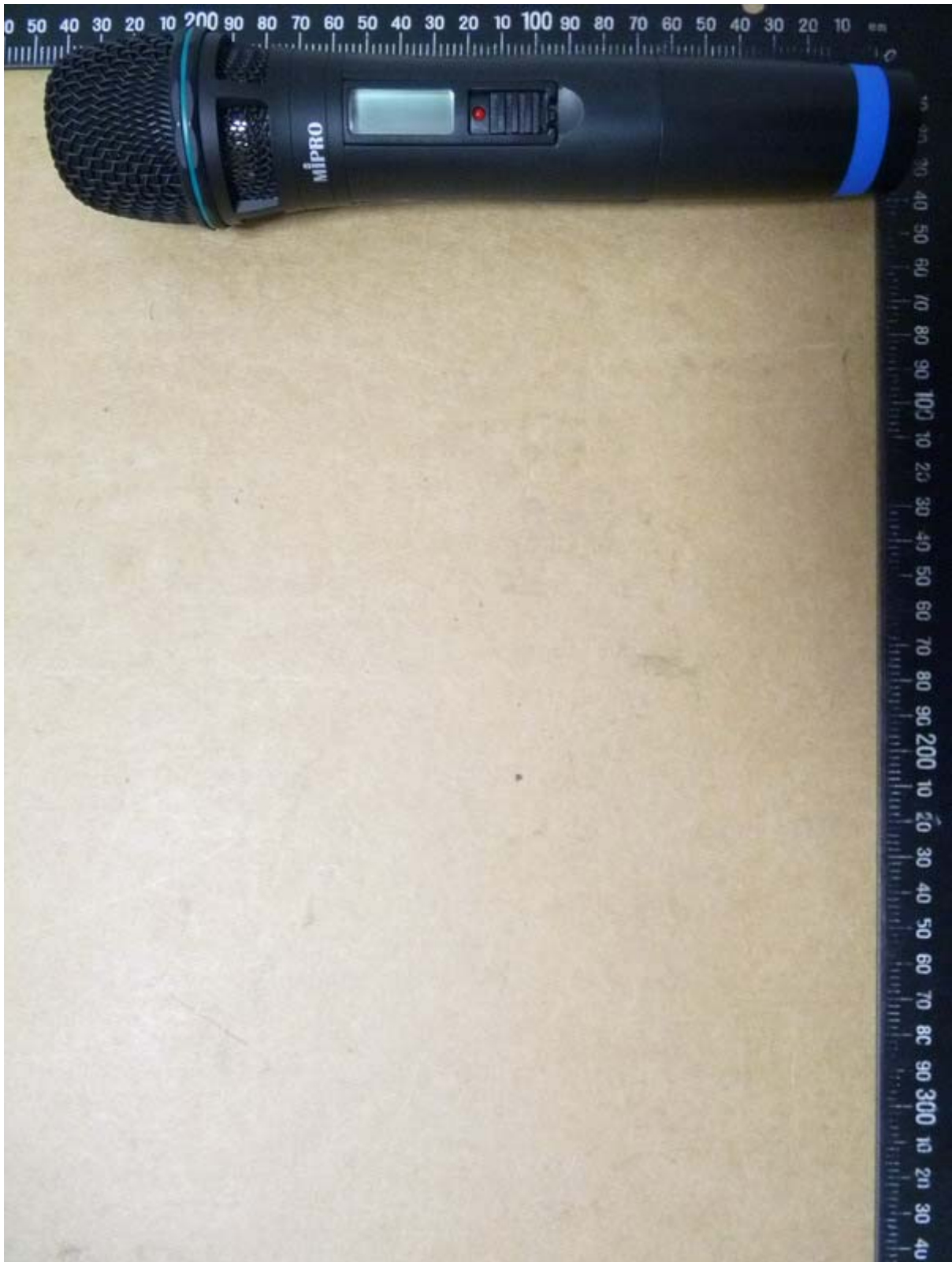


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External Photos





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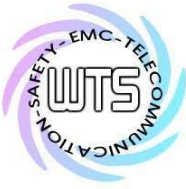
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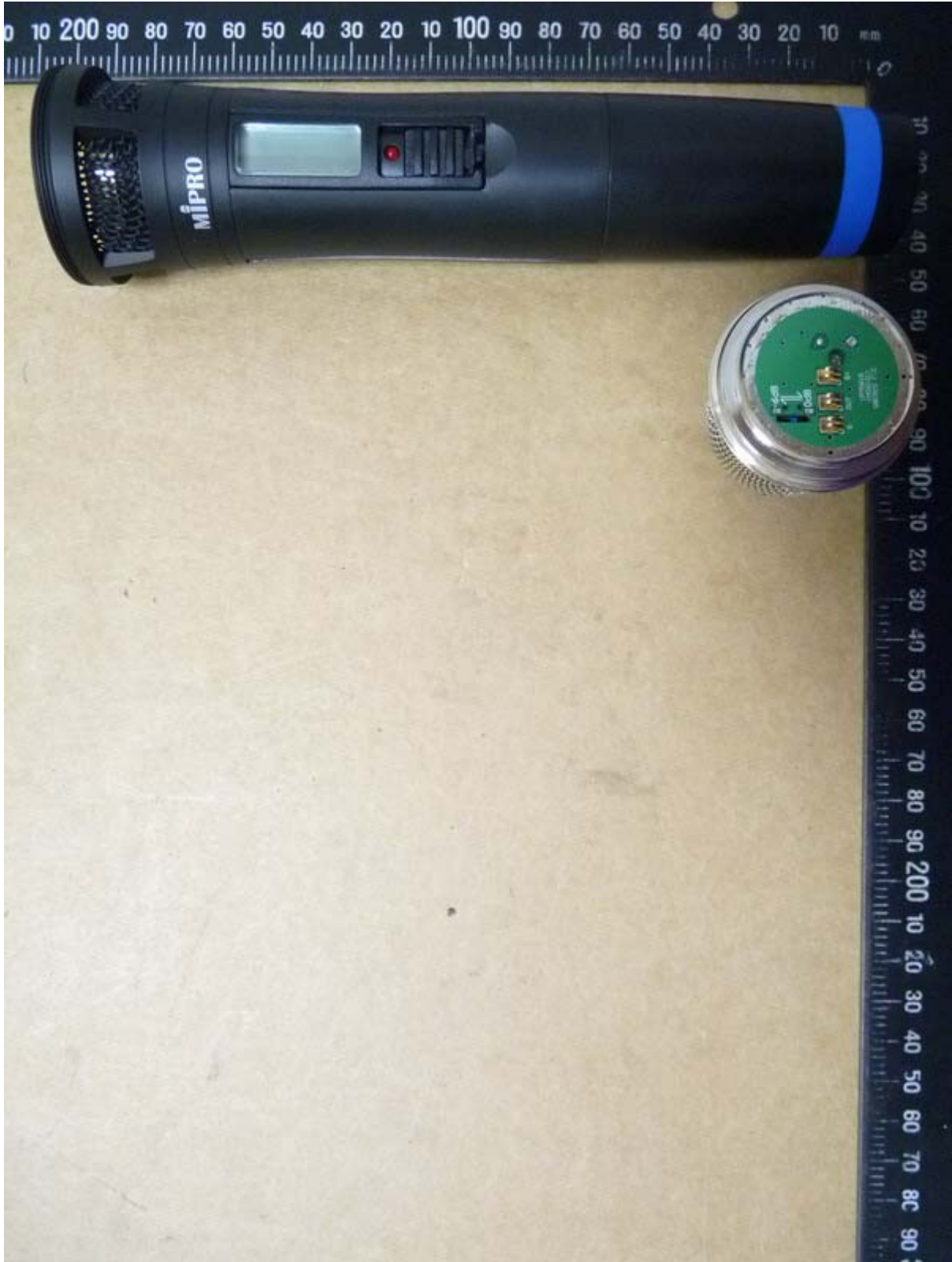
Internal Photos





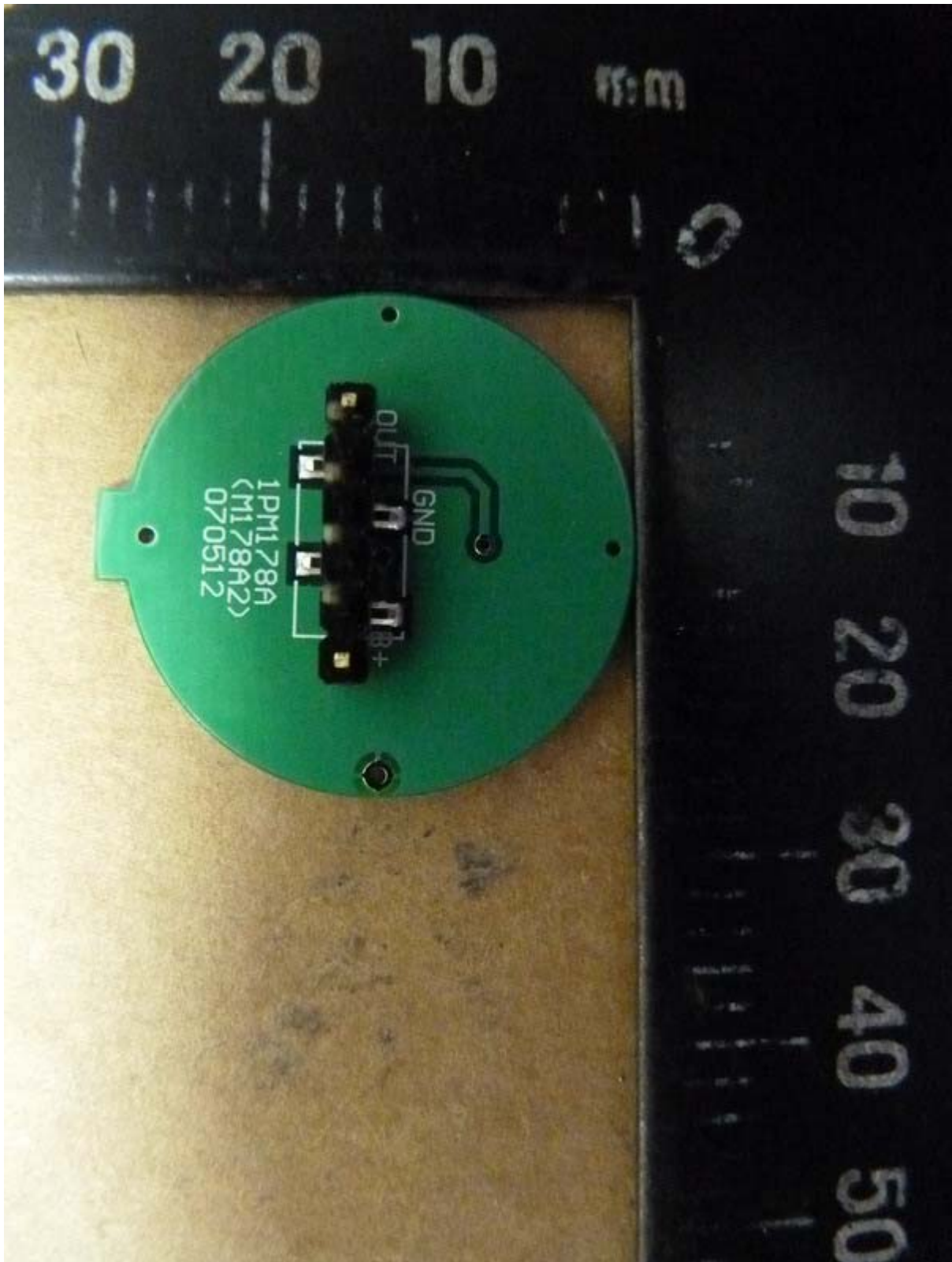
Worldwide Testing Services(Taiwan) Co., Ltd.

Registration number: W6M21306-13283-C-1
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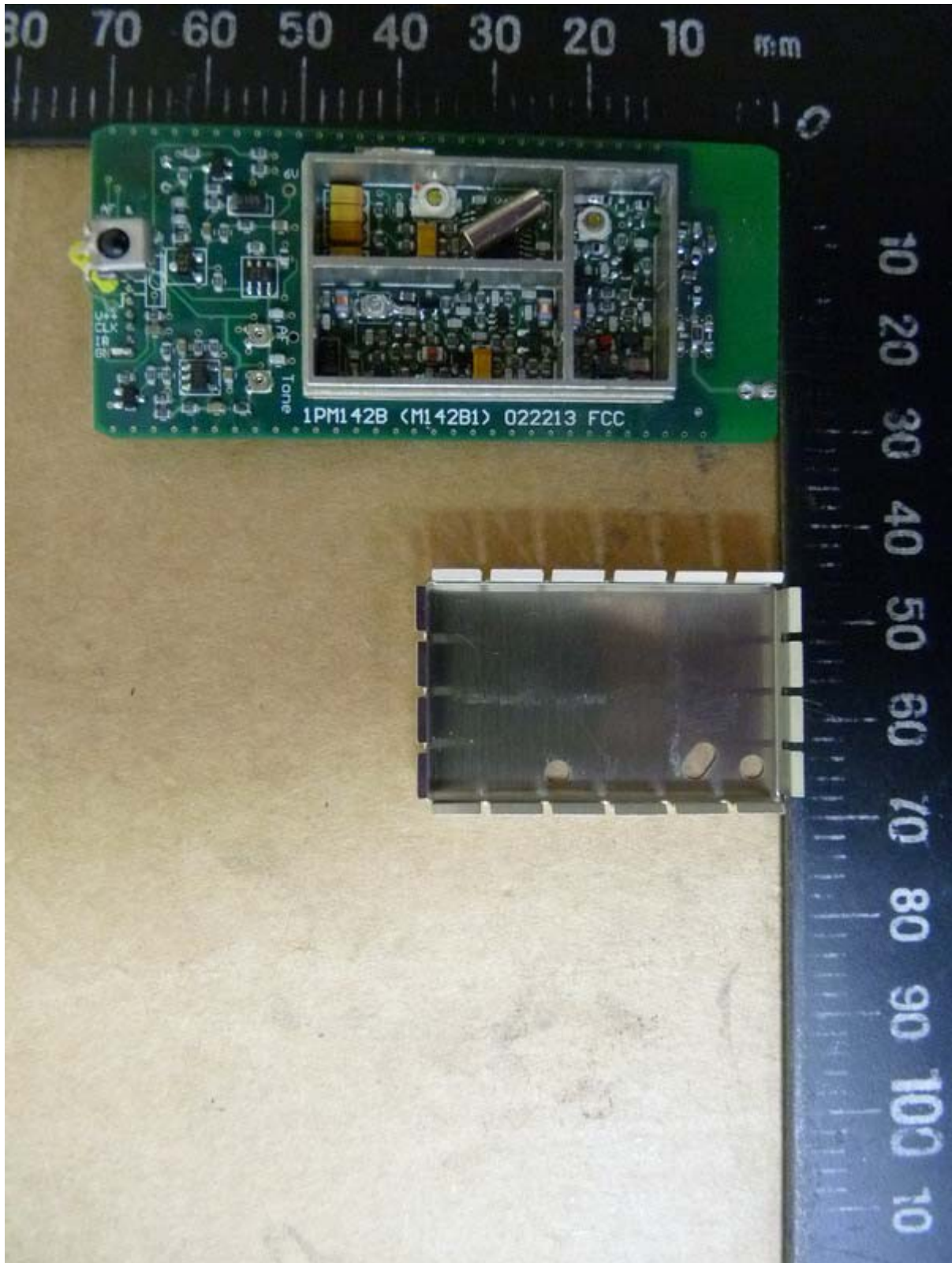


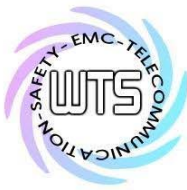
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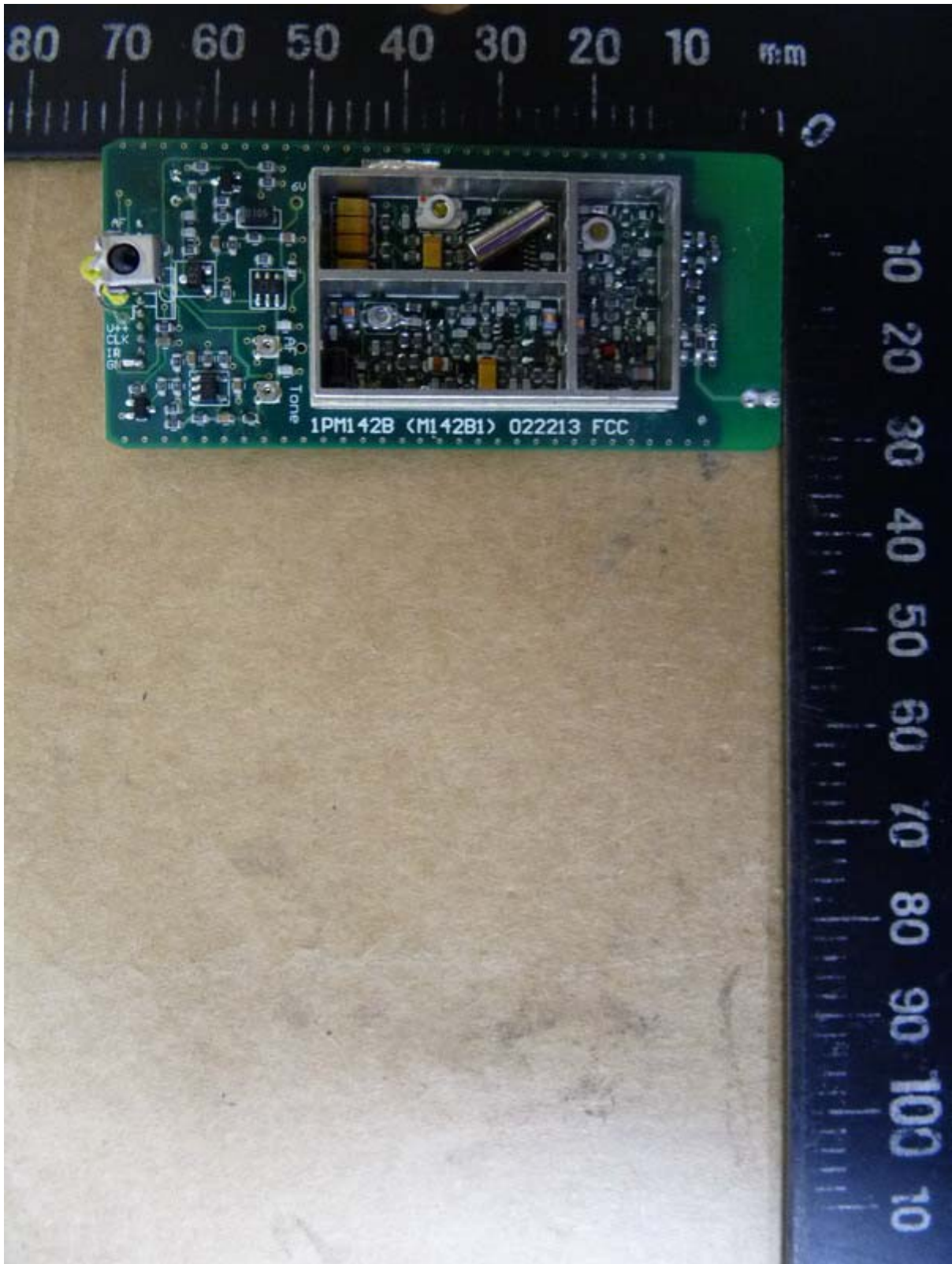


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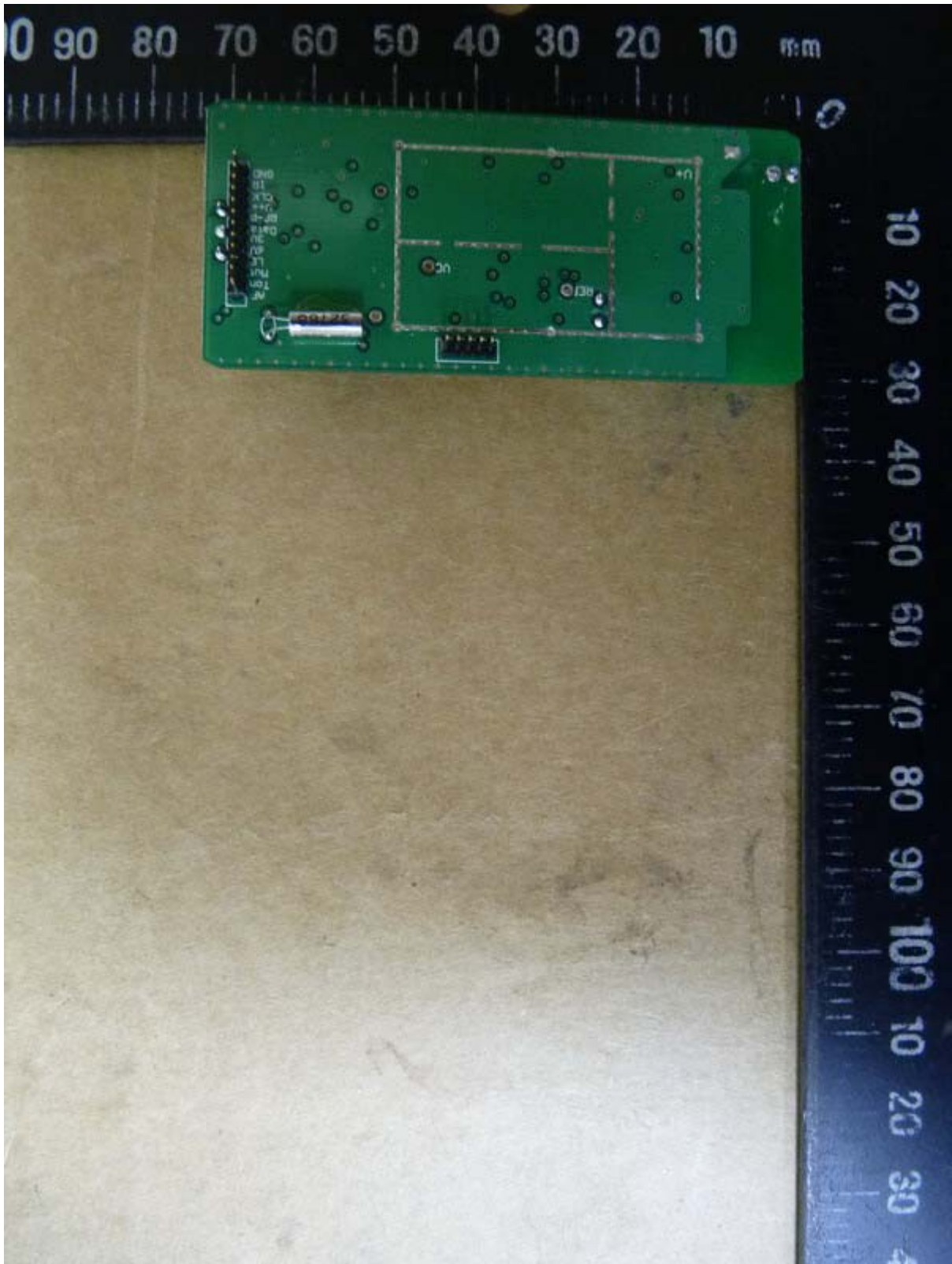


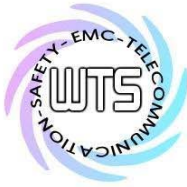
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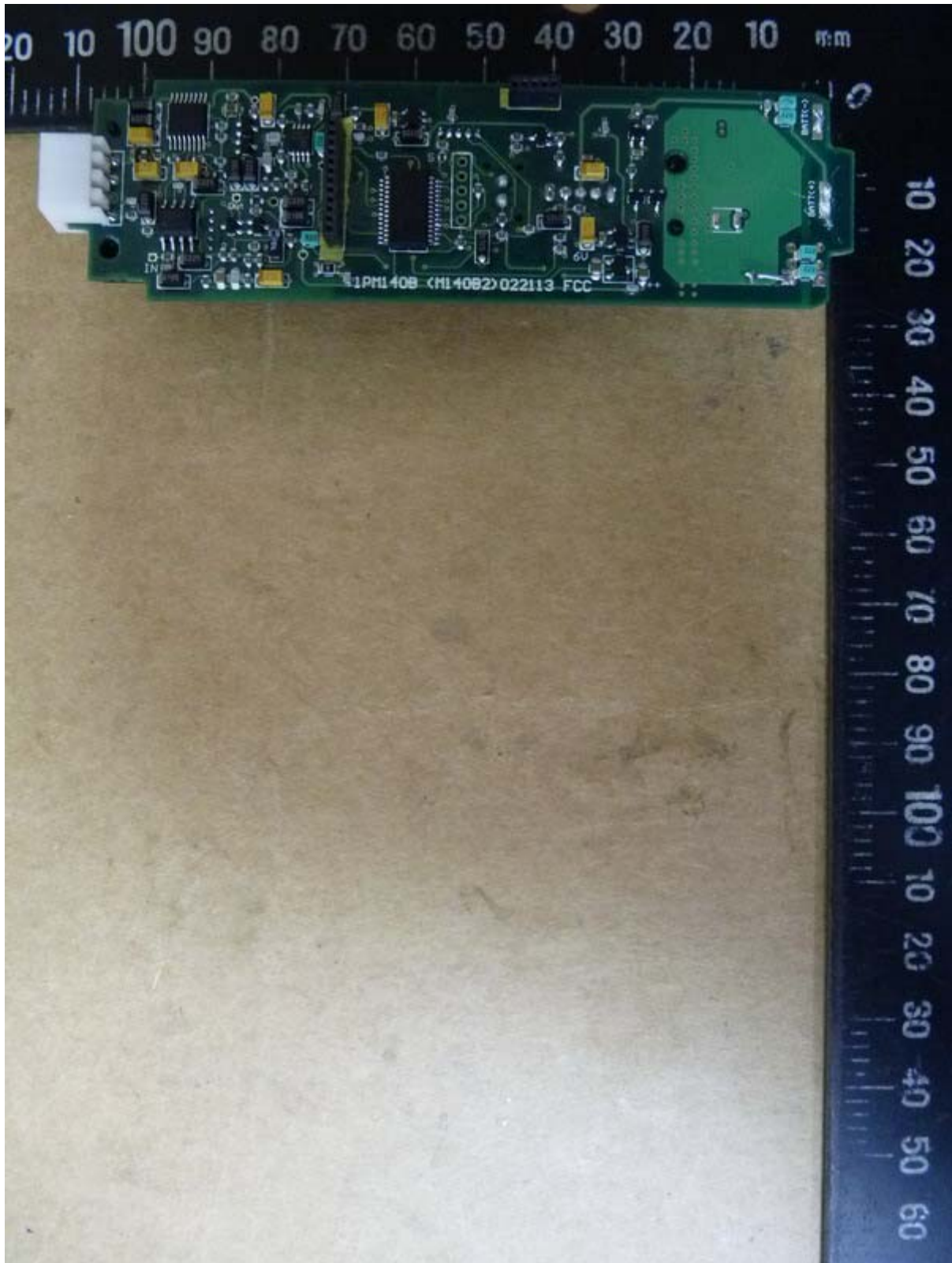
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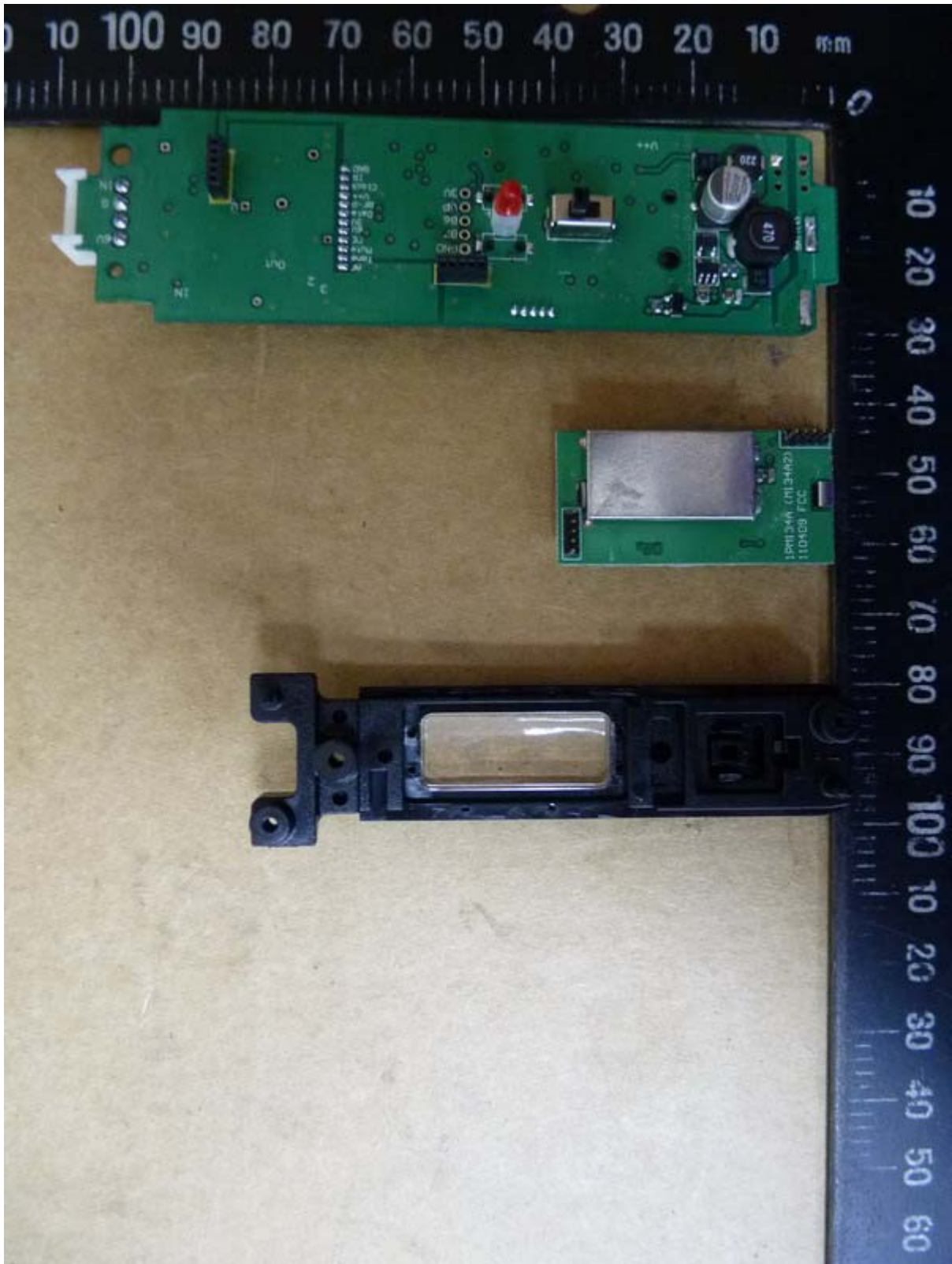
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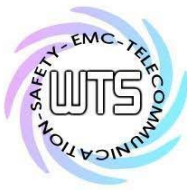




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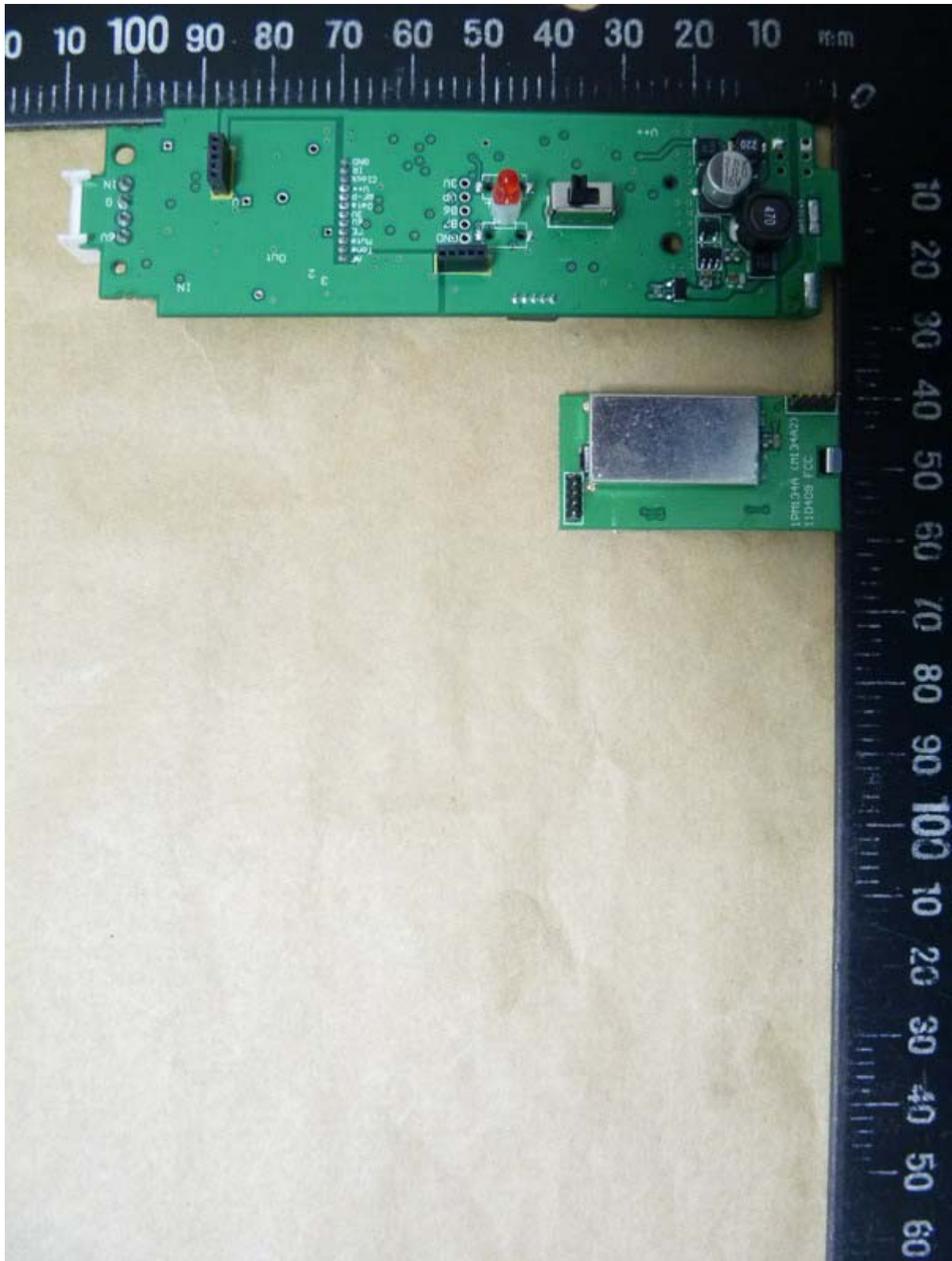
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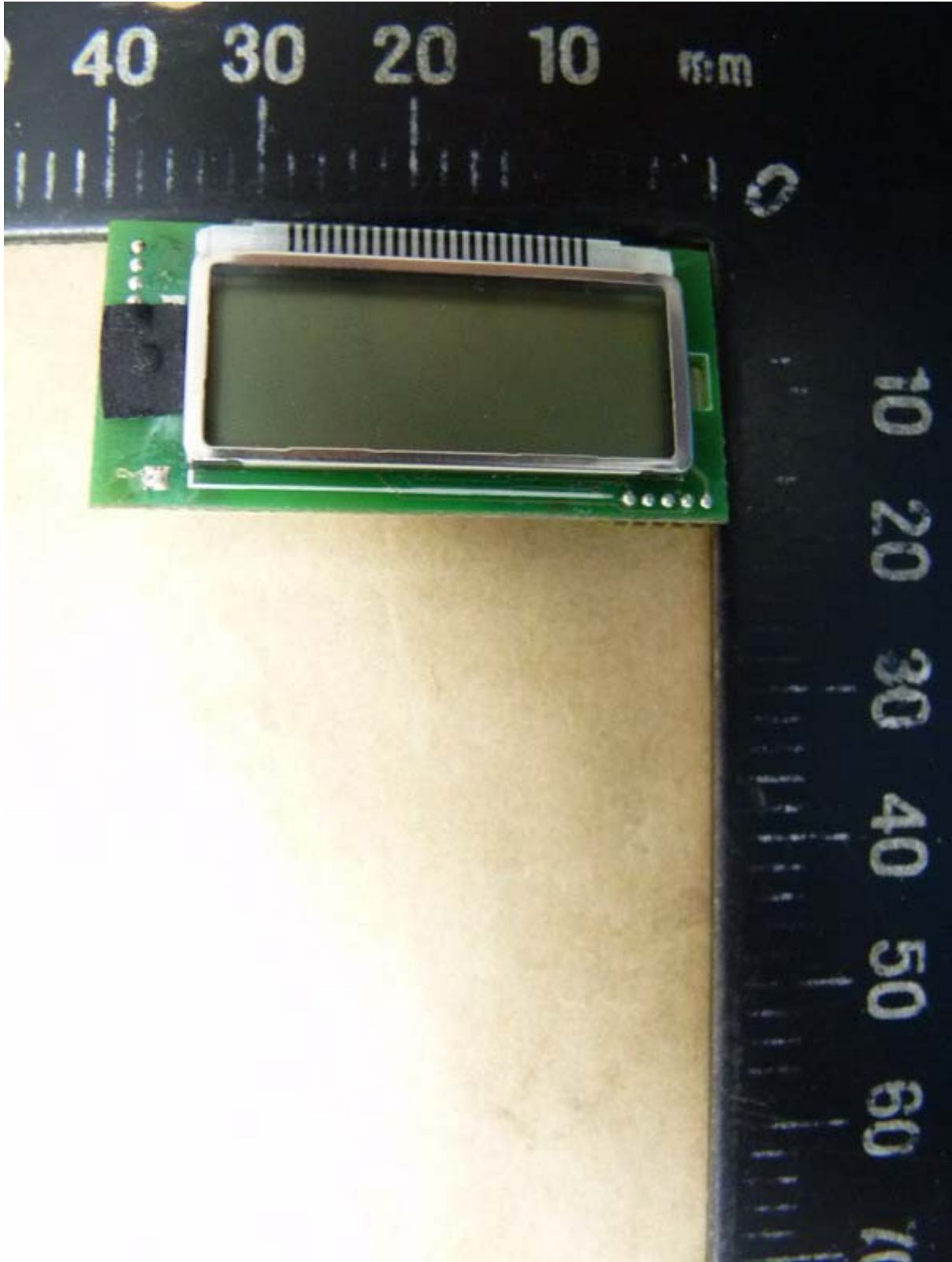


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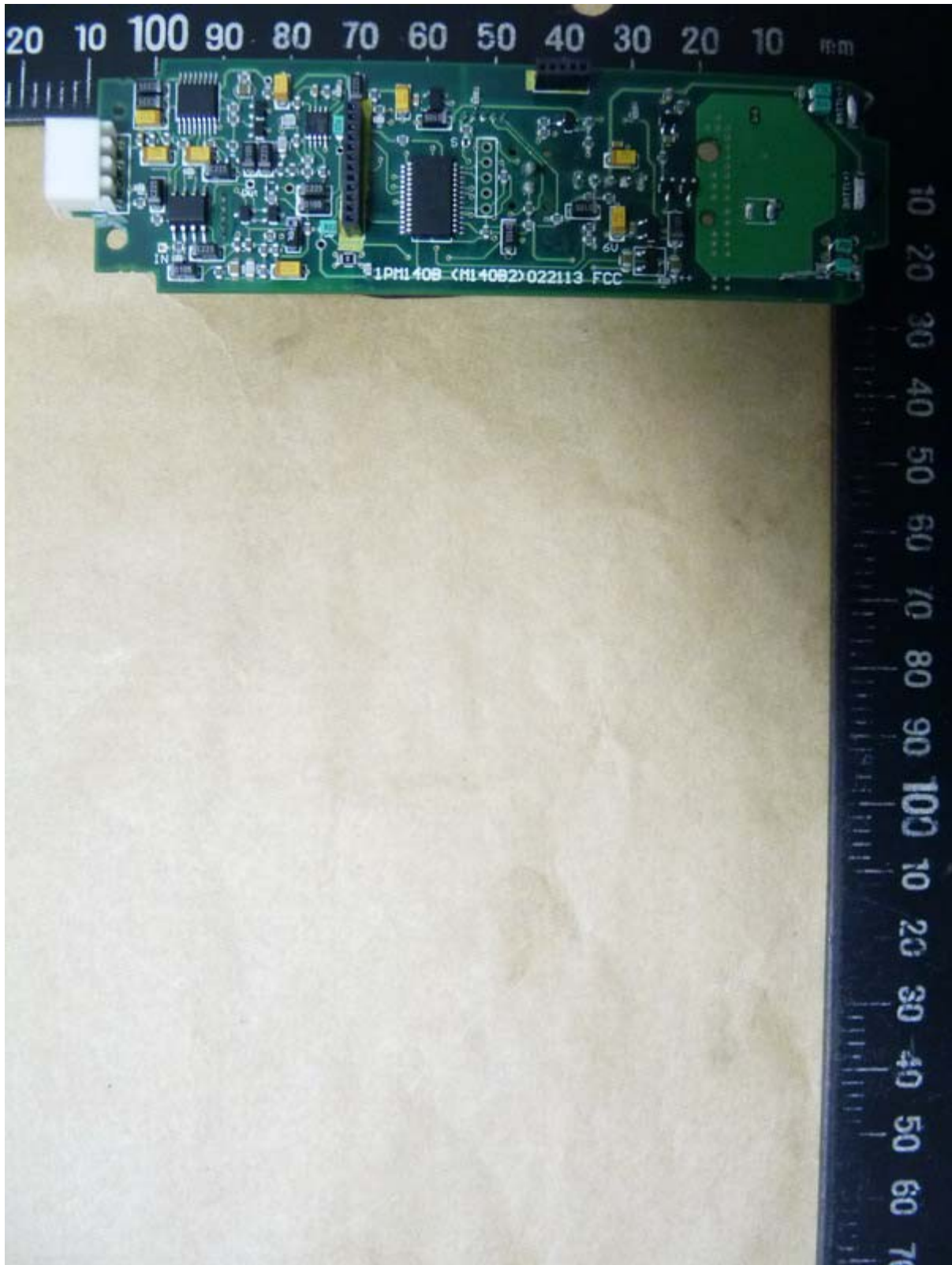
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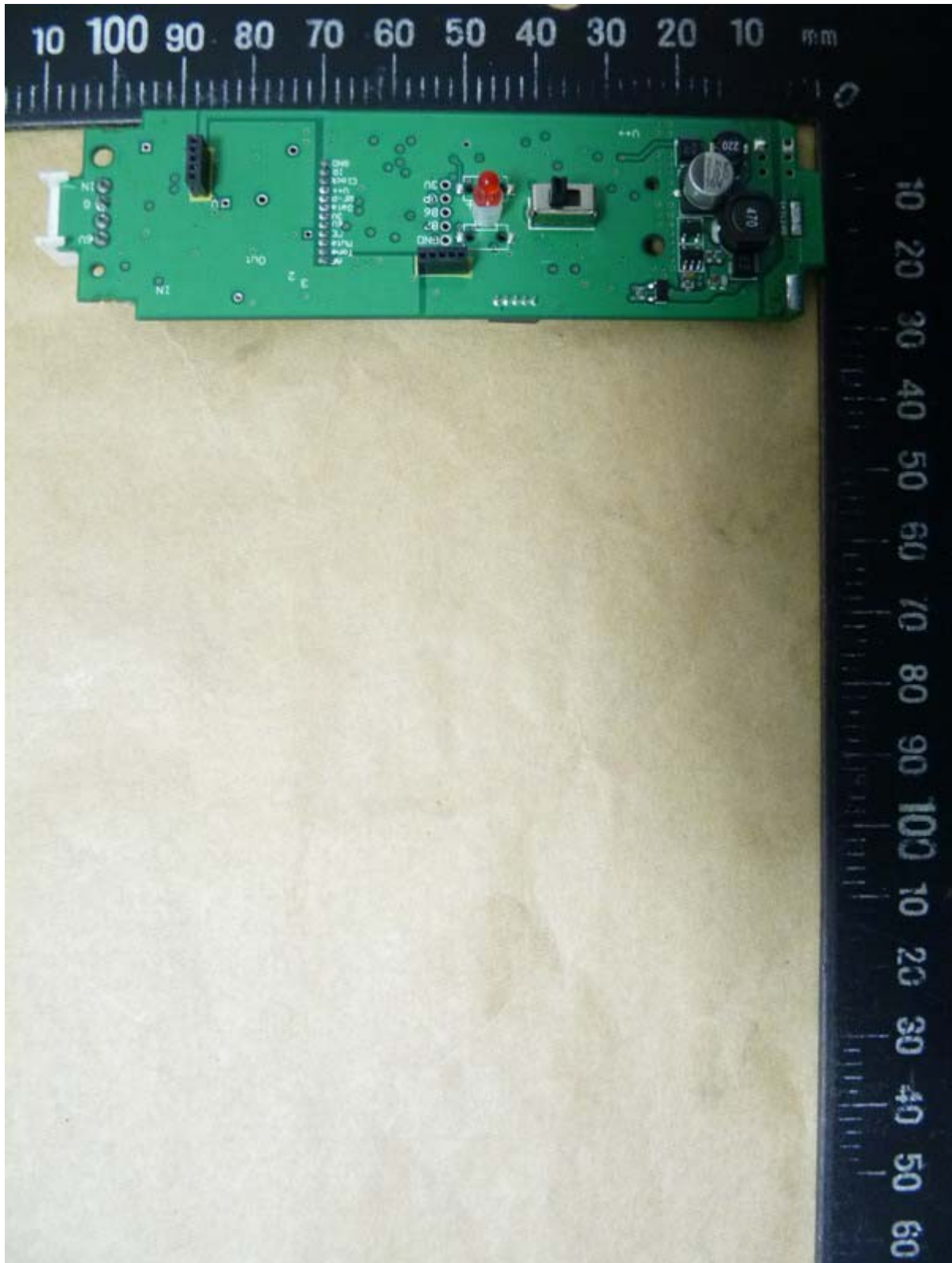
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Registration number: W6M21306-13283-C-1

FCC ID: M5X-ACT30NH

Multi-listing model no.: ACT-30NHr

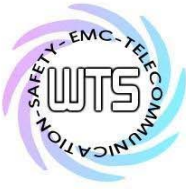




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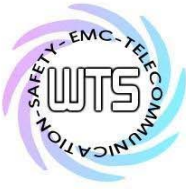
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FCC ID: M5X-ACT30NH

Set Up Photo of Radiated Emission

