

FCC TEST REPORT

Under:

FCC Part 15 Subpart B, Class B

☒ JBP-Part 15 Class B Computing Device Peripheral

Prepared For:

YEALINK (XIAMEN) NETWORK TECHNOLOGY CO., LTD.

309, 3th Floor, No.16, Yun Ding North Road, Huli District, Xiamen City, Fujian, China

FCC ID: T2C-W60B
EUT: DECT IP Base Station
Model: W60B

August 21, 2018 Issue Date:
Extension Report Report Type:
 Test Engineer: Jacky Huang
 Review By: Apollo Liu / Manager

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1. General Information

1.1 Notes

The test results of this report relate exclusively to the test item specified in 1.5. The KMO Lab does not assume responsibility for any conclusions and generalizations drawn from the test results with regard to other specimens or samples of the type of the equipment represented by the test item. 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 KMO Lab.

1.2 Testing Laboratory

Test Firm Name:	Ke Mei Ou Lab Co., Ltd.
Test Firm Address:	2013-2016, 20th Floor, Business Center, Jiahui Xin Cheng, No 3027, Shen Nan Road, Fu Tian, Shen Zhen, Guang Dong, P. R. China
FCC Designation Number:	CN1532
Test Firm Registration Number:	344480
Internet:	www.kmolab.com
Email:	kmo@kmolab.com
ANSI-ASQ National Accreditation Board/ACLASS ISO/IEC 17025 Accredited Lab for telecommunication standards. The Registration Number is AT-1532. The testing quality system meets with ISO/IEC-17025 requirements, This approval results is accepted by MRA of ILAC.	

1.3 Details of Applicant

Name : YEALINK (XIAMEN) NETWORK TECHNOLOGY CO., LTD.
Address : 309, 3th Floor, No.16, Yun Ding North Road, Huli District, Xiamen City, Fujian, China

1.4 Application Details

Date of Receipt of Application : August 1, 2018
Date of Receipt of Test Item : August 1, 2018
Date of Test : August 1 ~ August 21, 2018

1.5 Test Item

Manufacturer : Same as applicant
Address : Same as applicant
Trade Name : YEALINK
Model No.(Base) : W60B
Model No.(Extension) : N/A
Description : DECT IP Base Station

Additional Information

Frequency : 1921.536~1928.448MHz
RF Power : FP- Ant0: 90.78mW, Ant1:98.86mW(Conducted Peak)
Number of Channels : 5
Type of Modulation : GFSK
Antenna : FP-Internal Ant0&Ant1 (-1.0dBi)

Specification of Accessory				
☑AC/DC Adapter #1(US)	Brand Name	Yealink	Model Name	YLPS050600C1-US
	Power Rating	I/P: AC 100-240V~50/60Hz, 0.2A; O/P:DC 5.0V /0.6A		
☑AC/DC Adapter #2(US)	Brand Name	Yealink	Model Name	OH-1006B0500600U-UL
	Power Rating	I/P: AC 100-240V~50/60Hz, 0.25A; O/P:DC 5.0V /0.6A		
☑AC/DC Adapter #3(US)	Brand Name	Yealink	Model Name	YLPS050600C-US
	Power Rating	I/P: AC 100-240V~50/60Hz, 0.2A; O/P:DC 5.0V /0.6A		
☑Power over Ethernet (PoE)	Power Rating	48VDC		

1.6 Test Standards

FCC Part 15, Class B

Note: All radiated measurements were made in all three orthogonal planes. The values reported are the maximum values.

2. Technical Test

2.1 Summary of Test Results

The EUT has been tested according to the following specifications:

FCC Rule	Test Type	Result	Notes
FCC Part 15, Paragraph 15.107	Conducted Test	PASS	Complies
FCC Part 15, Paragraph 15.109	Radiated Test	PASS	Complies

2.2 Measurement Uncertainty

Measurement	Frequency	Uncertainty
Conducted emissions	0.15MHz~30MHz	1.72
Radiated emissions	30MHz ~ 300MHz	3.88
Radiated emissions	300MHz ~1000MHz	3.86
Radiated emissions	>1000MHz	4.42

This uncertainty represents an expanded uncertainty expressed at approximately the 95% confidence level using a coverage factor of k=2.

3. EUT Modifications

No modification by test lab.

4. Conducted Power Line Test

4.1 Test Equipment

Please refer to Section 8 this report.

4.2 Test Procedure

Test Method	
☒	The EUT and simulators are connected to the main power through a line impedance stabilization network (L.I.S.N.). This provides a 50 ohm/50uH coupling impedance for the measuring equipment. The peripheral devices are also connected to the main power through a LISN that provides a 50ohm/50uH coupling impedance with 50ohm termination. Both sides of A.C. line are checked for maximum conducted interference. In order to find the maximum emission., the relative positions of equipment and all of the interface cables must be changed according to ANSI C63.17:2013 on conducted measurement. Conducted emissions were invested over the frequency range from 0.15MHz to 30MHz using a receiver bandwidth of 9kHz.

4.3 Test Setup

Test Setup

AC Line Conducted Emissions

Shielded Room

0.4m

PC+ ELIT

0.8m

LISN

Metal Ground



This test is applicable for radio equipment and/or ancillary equipment for fixed use powered by the AC mains. This test shall be performed on a representative configuration of the radio equipment, the associated ancillary equipment, or a representative configuration of the combination of radio and ancillary equipment. This test assesses the level of internally generated electrical noise present on the AC power input/output ports.

4. 4 Configuration of The EUT

The EUT was configured according to ANSI C63.4:2014. All interface ports were connected to the appropriate peripherals. All peripherals and cables are listed below.

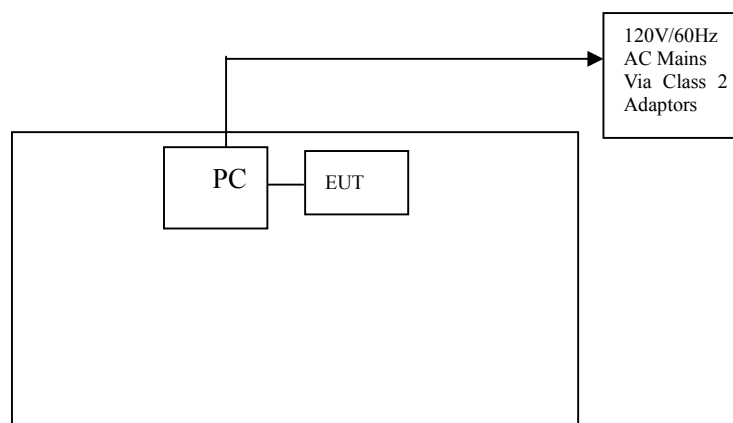
EUT Operation Test Setup	
Pre-Scan has been conducted to determine the worst-case mode from all possible combinations. Only the worst test mode data was reported.	
Pre-Scan Mode	
Test Mode	Operating Description
1	EUT power by AC/DC Adapter #1 (US)
2	EUT power by AC/DC Adapter #2 (US)
3	EUT power by AC/DC Adapter #3 (US)
4	PoE
AC Conducted Emissions → Final	
Test Mode	Operating Description
1	EUT power by AC/DC Adapter (US)
Radiated Emissions → Final	
Test Mode	Operating Description
1	EUT power by AC/DC Adapter (US)
Note: The test modes were carried out for all operation modes (include link and idle). The final test mode of the EUT was the worst test mode for Mode 1, and its test data was reported.	

Support Unit				
Device	Manufacturer	Model # Serial #	FCC ID	Cable
Notebook	LENOVO	20195	DoC	1.5m unshielded power cord

4.5 EUT Operating Condition

Operating condition is according to ANSI C63.4:2014.

- A. Setup the EUT and simulators as shown on follow.
- B. Enable RF signal and confirm EUT active.
- A. Modulate output capacity of EUT up to specification.



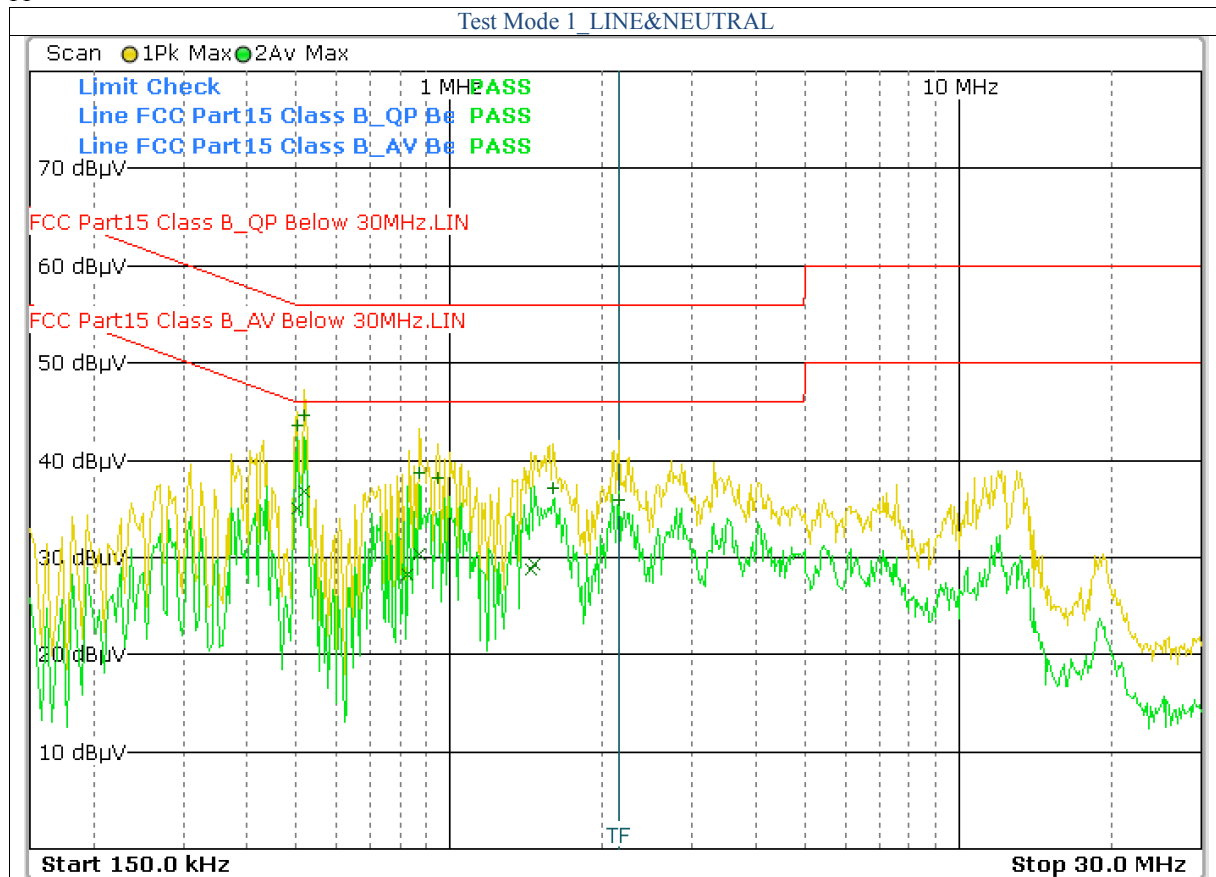
4.6 Conducted Power Line Emission Limits

Frequency Range (MHz)	Class A QP/AV (dBuV)	Class B QP/AV (dBuV)
0.15 – 0.5	79/66	66 –56/56 –46
0.5 – 5.0	73/60	56/46
5.0 – 30	73/60	60/50

Note: In the above table, the tighter limit applies at the band edges.

4.7 Conducted Power Line Test Result

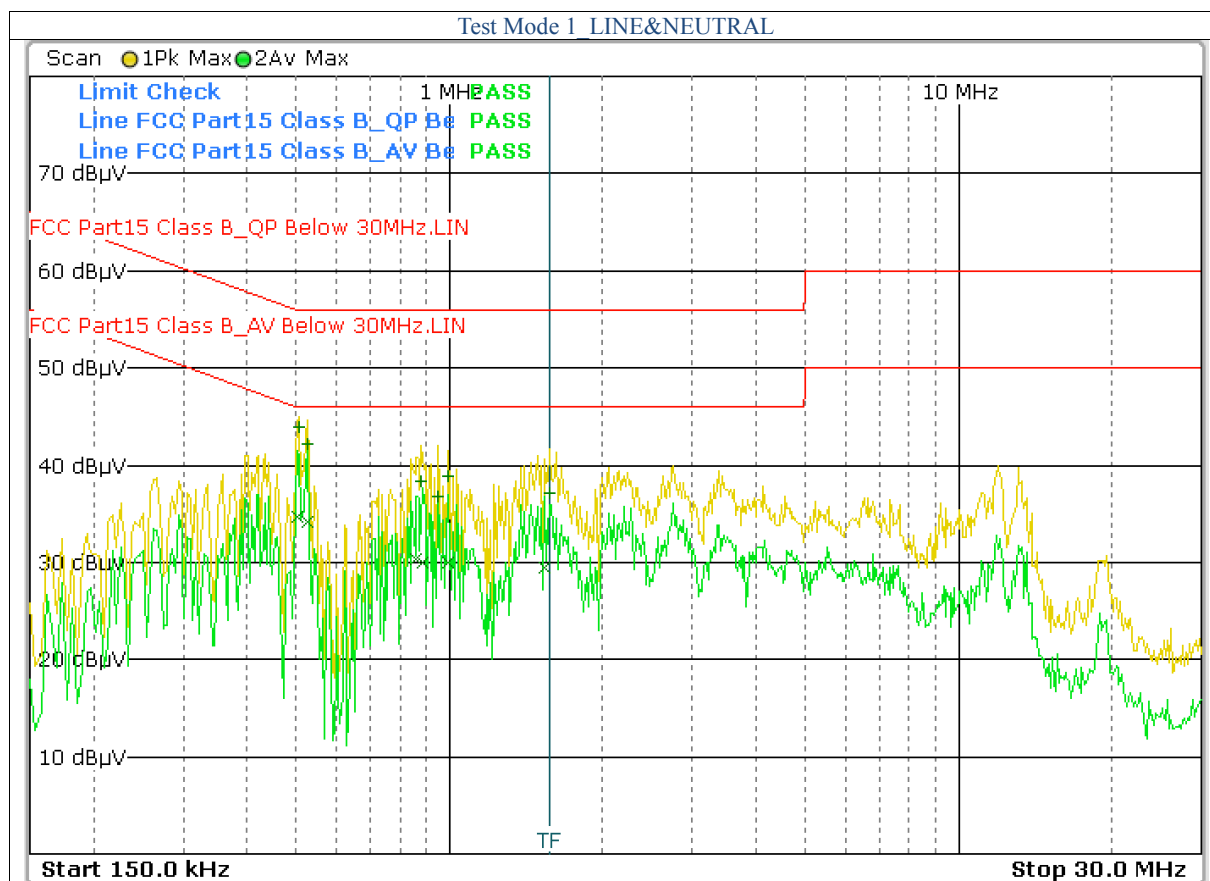
FP



FCC15										
Frequency (MHz)	Read Level (dBUV)		Factor (dB)	Emission (dBUV)		Line/Neutral	Limit (dBUV)		Margin(dBUV)	
	QP	AV		QP	AV		QP	AV	QP	AV
0.502	33.20	24.57	10.40	43.60	34.97	Line	56.00	46.00	-12.40	-11.03
0.518	34.20	26.30	10.40	44.60	36.70	Line	56.00	46.00	-11.40	-9.30
0.870	28.31	19.97	10.40	38.71	30.37	Line	56.00	46.00	-17.29	-15.63
0.950	27.76	16.47	10.40	38.16	26.87	Line	56.00	46.00	-17.84	-19.13
1.598	26.67	18.26	10.50	37.17	28.76	Line	56.00	46.00	-18.83	-17.24
2.150	25.43	18.76	10.50	35.93	29.26	Line	56.00	46.00	-20.07	-16.74
FCC15										

Note:

- 1.Uncertainty in conducted emission measured is ± 2 dB.
- 2.The emission levels of other frequencies were very low against the limit.
- 3.All Reading Levels are Quasi-Peak and Average value.
- 4.Emission = Meter Reading + Factor; Factor = Insertion Loss + Cable Loss.
- 5.Margin Value= Emission Level - Limit Value.



FCC15										
Frequency (MHz)	Read Level (dBuV)		Factor (dB)	Emission (dBuV)		Line/Neutral	Limit (dBuV)		Margin(dBuV)	
	QP	AV		QP	AV		QP	AV	QP	AV
0.506	33.52	24.29	10.40	43.92	34.69	Neutral	56.00	46.00	-12.08	-11.31
0.526	31.80	23.68	10.40	42.20	34.08	Neutral	56.00	46.00	-13.80	-11.92
0.862	27.98	19.89	10.40	38.38	30.29	Neutral	56.00	46.00	-17.62	-15.71
0.882	27.98	19.59	10.40	38.38	29.99	Neutral	56.00	46.00	-17.62	-16.01
0.994	28.52	19.63	10.40	38.92	30.03	Neutral	56.00	46.00	-17.08	-15.97
1.578	26.75	19.00	10.40	37.15	29.40	Neutral	56.00	46.00	-18.85	-16.60
FCC15										

Note:

- 1.Uncertainty in conducted emission measured is <+/- 2dB.
- 2.The emission levels of other frequencies were very low against the limit.
- 3.All Reading Levels are Quasi-Peak and Average value.
- 4.Emission = Meter Reading + Factor; Factor = Insertion Loss + Cable Loss.
- 5.Margin Value= Emission Level - Limit Value.

5. Radiated Emission Test

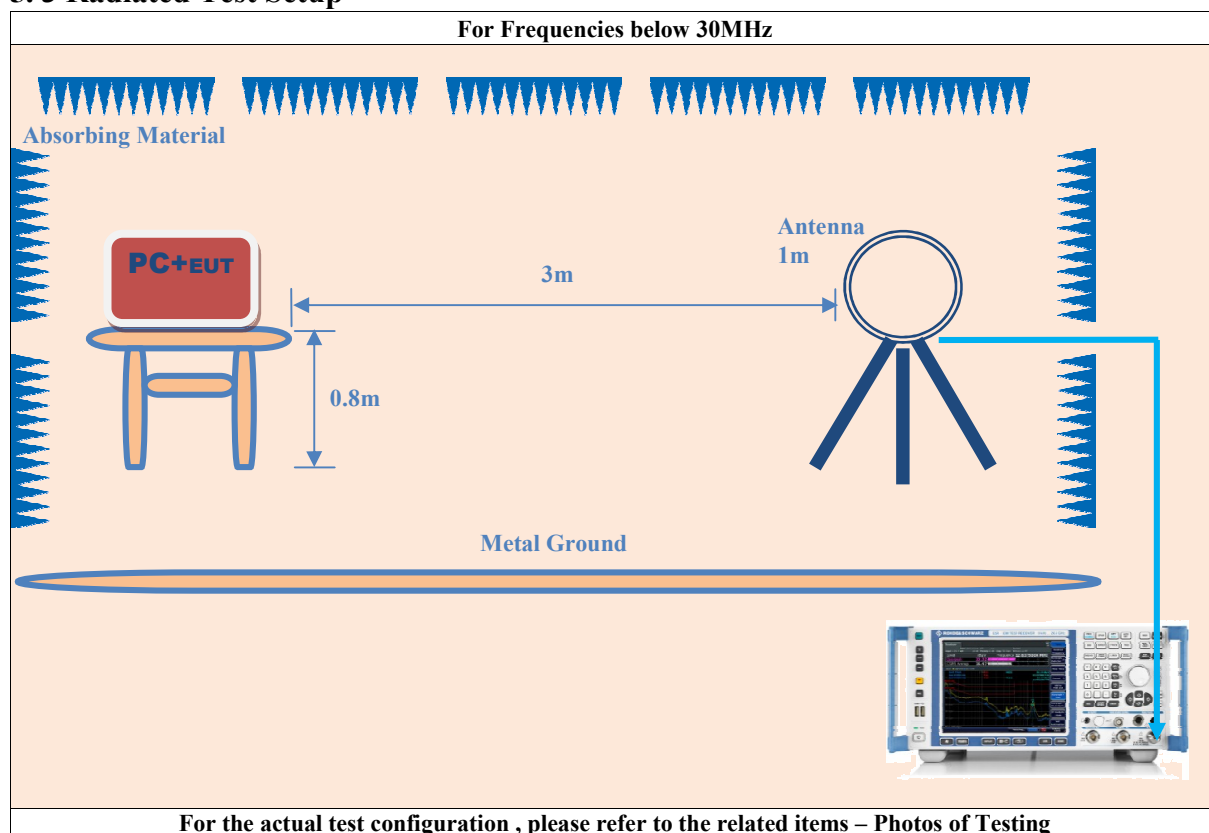
5.1 Test Equipment

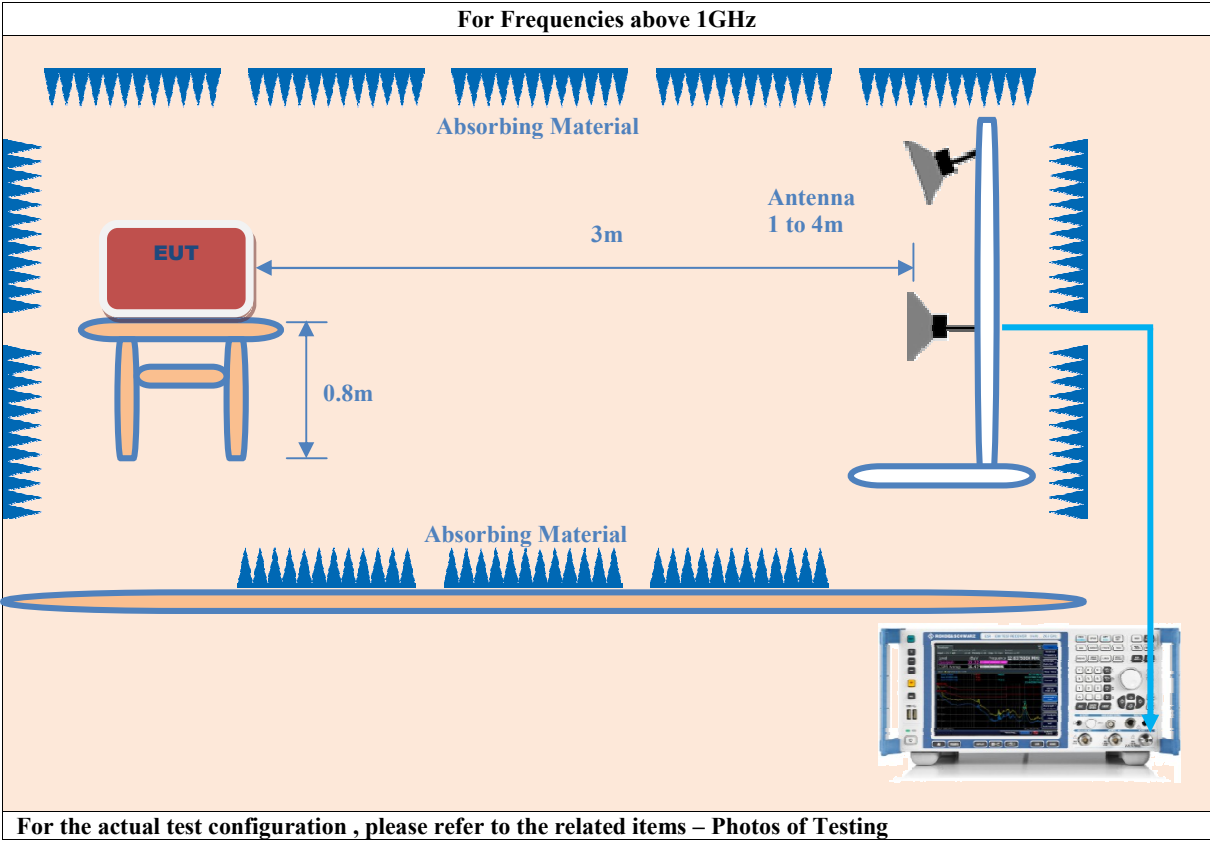
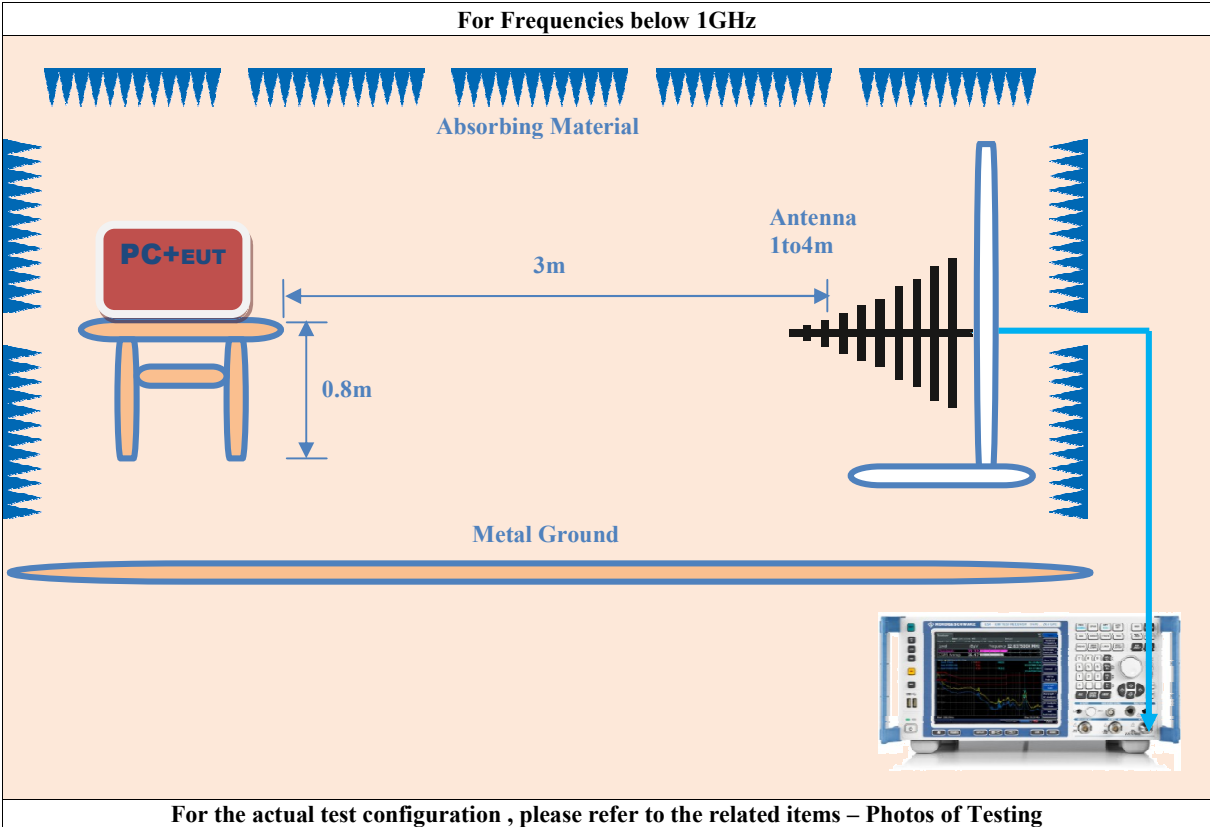
Please refer to Section 8 this report.

5.2 Test Procedure

1. The EUT was tested according to ANSI C63.4:2014.
2. The EUT, peripherals were put on the turntable which table size is 1m x 1.5 m, table high 0.8 m, and which is 1.5 m high for above 1 GHz. All set up is according to ANSI C63.4:2014 .
3. The frequency spectrum from 9 kHz to 25 GHz was investigated. All readings from 9 kHz to 150 kHz are quasi-peak values with a resolution bandwidth of 200 Hz. All readings from 150 kHz to 30 MHz are quasi-peak values with a resolution bandwidth of 9 KHz. All readings from 30 MHz to 1 GHz are quasi-peak values with a resolution bandwidth of 120 KHz. All readings are above 1 GHz , peak values with a resolution bandwidth of 1 MHz . Measurements were made at 3 meters.
4. The emissions from the EUT were measured continuously at every azimuth by rotating the turntable. The Receiving antenna high is varied from 1 m to 4 m high to find the maximum emission for each frequency. Emissions below 30MHz were measured with a loop antenna while emission above 30MHz were measured using a broadband E-field antenna.
5. Maximizing procedure was performed on the six (6) highest emissions to ensure EUT compliance is with all installation combinations. All data was recorded in the peak detection mode. Quasi-peak readings was performed only when an emission was found to be marginal (within -4 dB of specification limit), and are distinguished with a "QP" in the data table.
6. Each emission was to be maximized by changing the polarization of receiving antenna both horizontal and vertical. In order to find out the max. emission, the relative positions of this transmitter(EUT) was rotated through three orthogonal axes according to the requirements in Section 8 and 13 of ANSI C63.4:2014

5.3 Radiated Test Setup





5. 4 Configuration of The EUT

Same as section 4.4 of this report

5. 5 EUT Operating Condition

Same as section 4.5 of this report

5. 6 Radiated Emission Limit

All emission from a digital device, including any network of conductors and apparatus connected thereto, shall not exceed the level of field strength specified below:

Frequencies in restricted band are complied to limit on Paragraph 15.109.

Frequency (MHz)	Distance (m)	Field Strength (dBuV/m)
30 - 88	3	40.0
88 - 216	3	43.5
216 - 960	3	46.0
Above 960	3	54.0

Note:

1. In the emission tables above, the tighter limit applies at the band edges.
2. Distance refers to the distance between measuring instrument, antenna, and the closest point of any part of the device or system.
3. The lower limit shall apply at the transition frequencies.

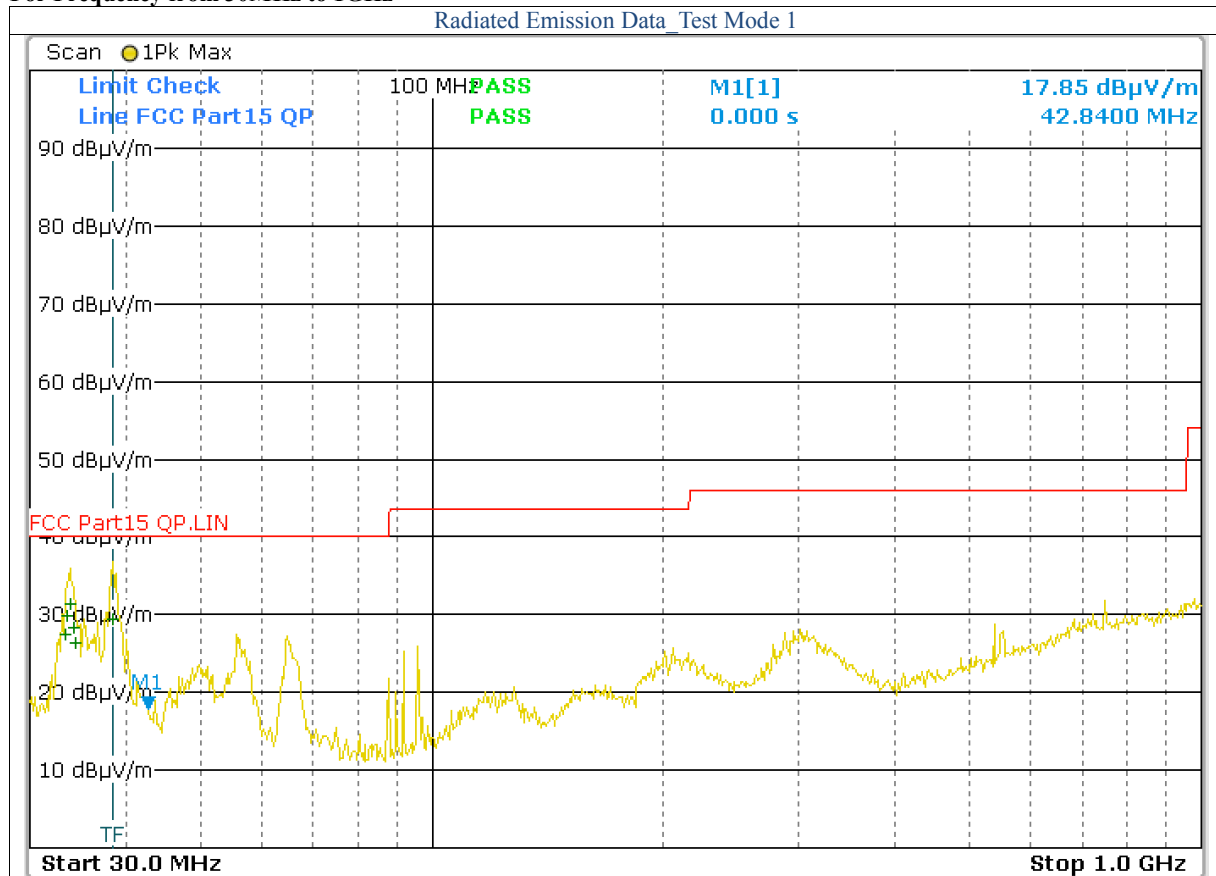
5.7 Radiated Emission Test Result

For Frequency below 30MHz

Frequency (MHz)	Read Level (dBuV)	Factor (dB)	Emission (dBuV/m)	Horiz./ Vert.	Limit (dBuV/m)	Margin (dB)
N/A						
N/A						
N/A						
N/A						
N/A						
N/A						

- Note:**
- (1) All Readings below 1GHz are Quasi-Peak, above are performed with peak and/or average measurements as necessary.
 - (2) "N/A" remark, if no specific emissions from the EUT are recorded (ie: margin>20dB from the applicable limit) and considered that's already beyond the background noise floor.
 - (3) Emission Level = Reading Level + Probe Factor + Cable Loss.

For Frequency from 30MHz to 1GHz



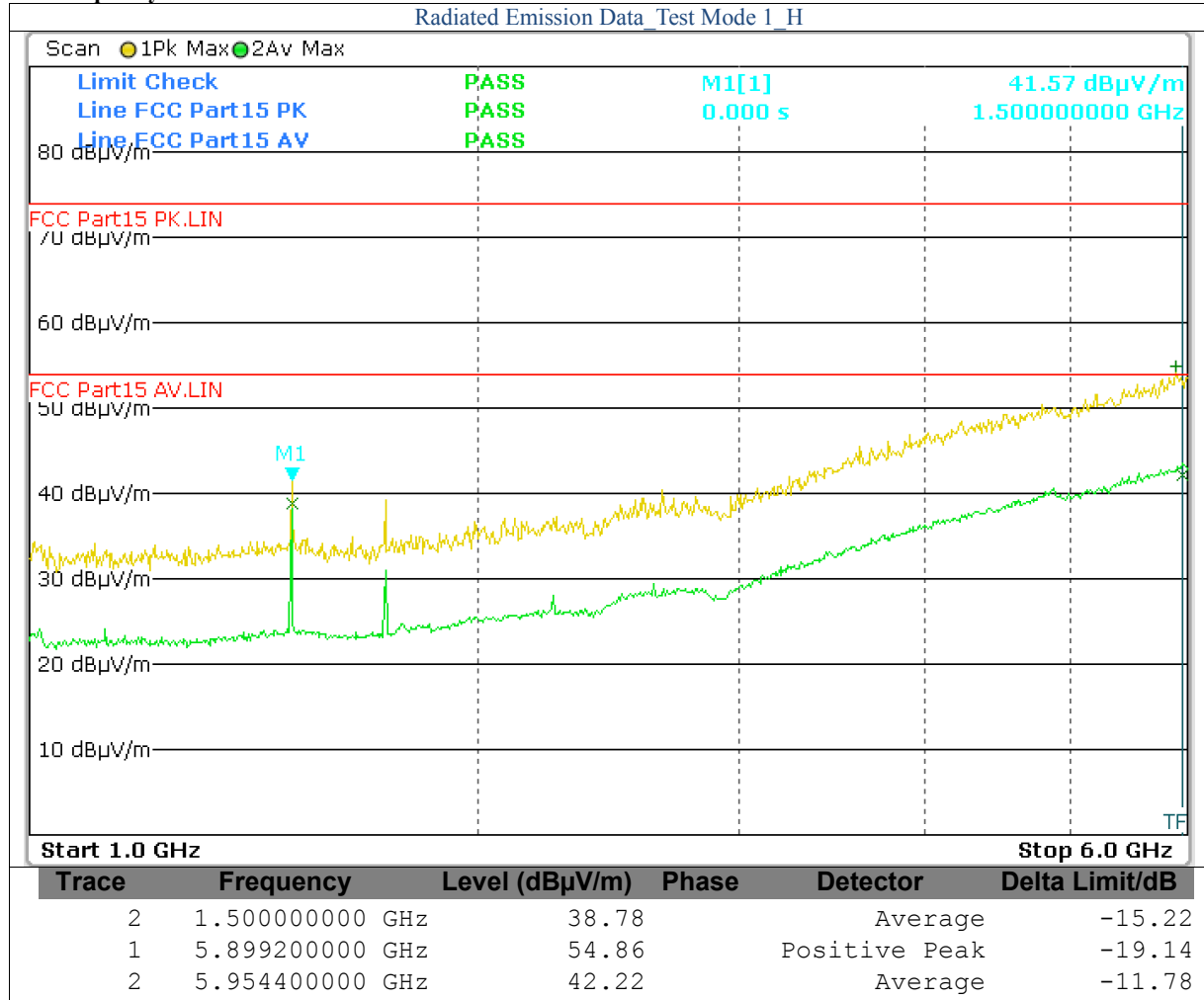
Frequency (MHz)	Read Level (dBuV)	Factor (dB)	Emission (dBuV/m)	Horiz./ Vert.	Limit (dBuV/m)	Margin (dB)
33.360	15.41	12.06	27.47	Horiz./	40.0	-12.53
33.560	17.73	12.06	29.79	Horiz./	40.0	-10.21
33.800	19.22	12.06	31.28	Horiz./	40.0	-8.72
34.200	16.36	12.06	28.42	Horiz./	40.0	-11.58
34.400	14.32	12.06	26.38	Horiz./	40.0	-13.62
38.520	17.64	11.78	29.42	Horiz./	40.0	-10.58

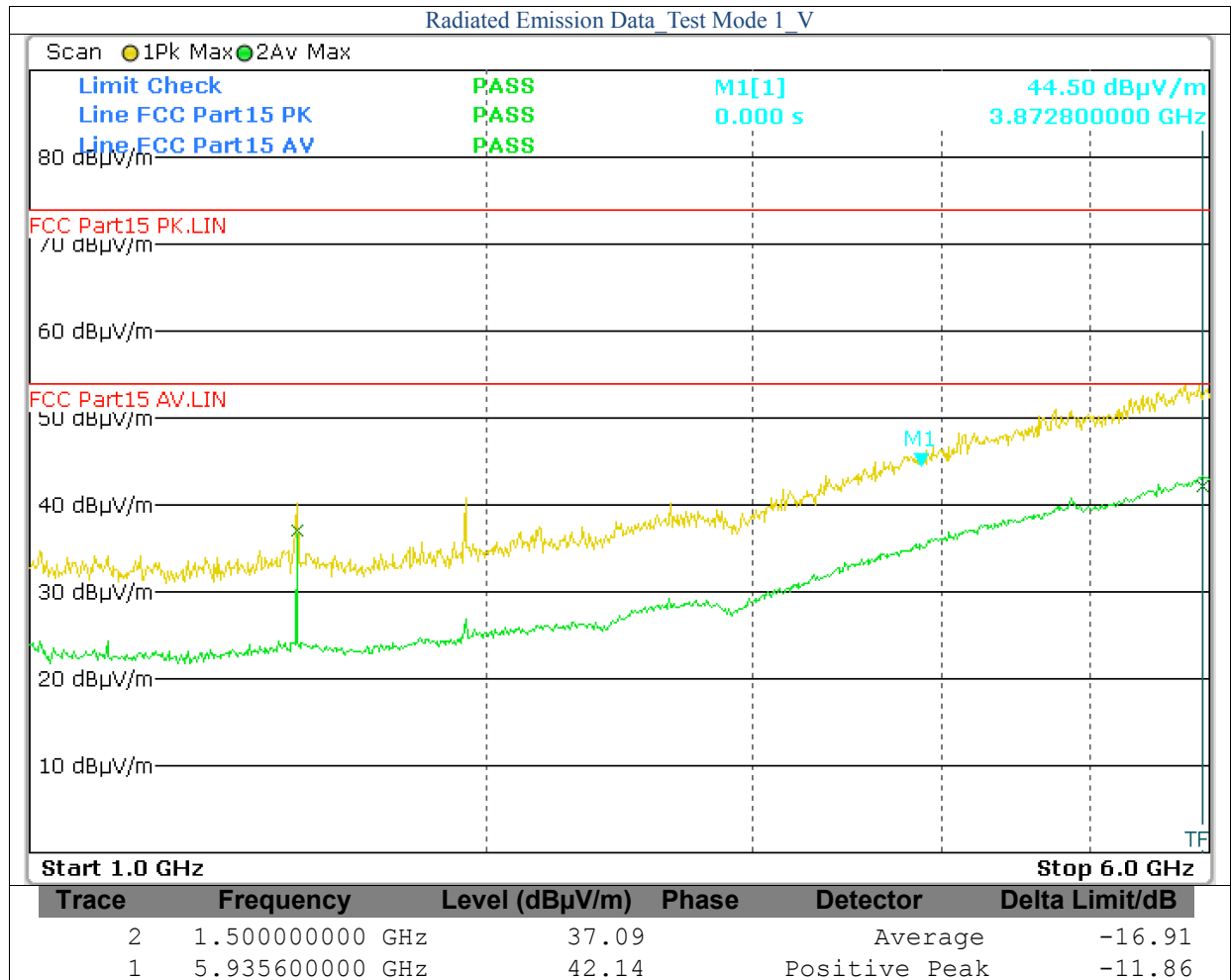


Frequency (MHz)	Read Level (dBuV)	Factor (dB)	Emission (dBuV/m)	Horiz./ Vert.	Limit (dBuV/m)	Margin (dB)
33.760	21.66	12.06	33.72	Vert.	40.0	-6.28
34.080	19.95	12.06	32.01	Vert.	40.0	-7.99
37.640	21.13	11.78	32.91	Vert.	40.0	-7.09
37.940	21.66	11.78	33.44	Vert.	40.0	-6.56
38.640	22.57	11.78	34.35	Vert.	40.0	-5.65
39.680	16.99	11.78	28.77	Vert.	40.0	-11.23

- Note:**
- (1) All Readings below 1GHz are Quasi-Peak, above are performed with peak and/or average measurements as necessary.
 - (2) "N/A" remark, if no specific emissions from the EUT are recorded (ie: margin>20dB from the applicable limit) and considered that's already beyond the background noise floor.
 - (3) Emission Level = Reading Level + Probe Factor + Cable Loss.

For Frequency above 1GHz





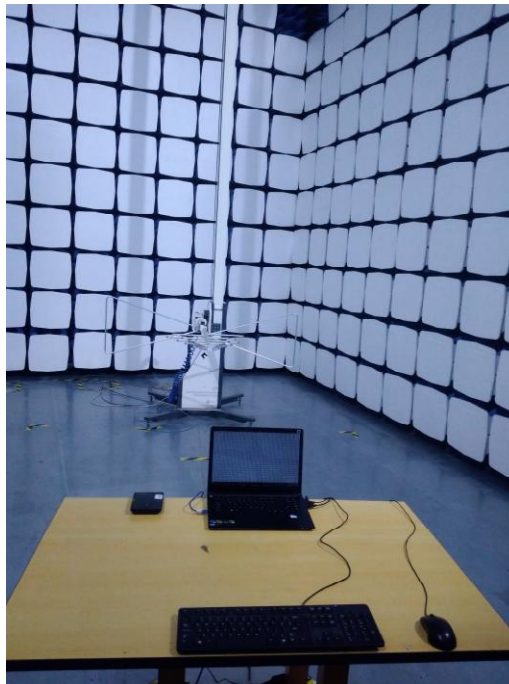
6. Photo of Testing

6.1 Emission test view

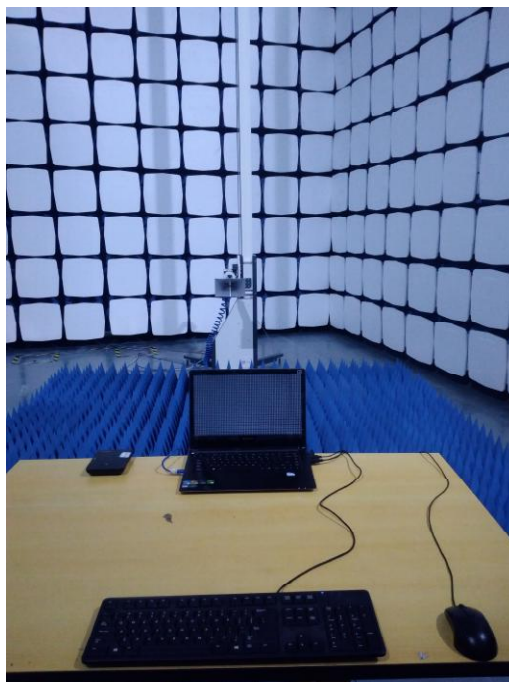
FP Conducted Emission test view



FP - Radiated Emission test view (Frequency from 30MHz to 1GHz)

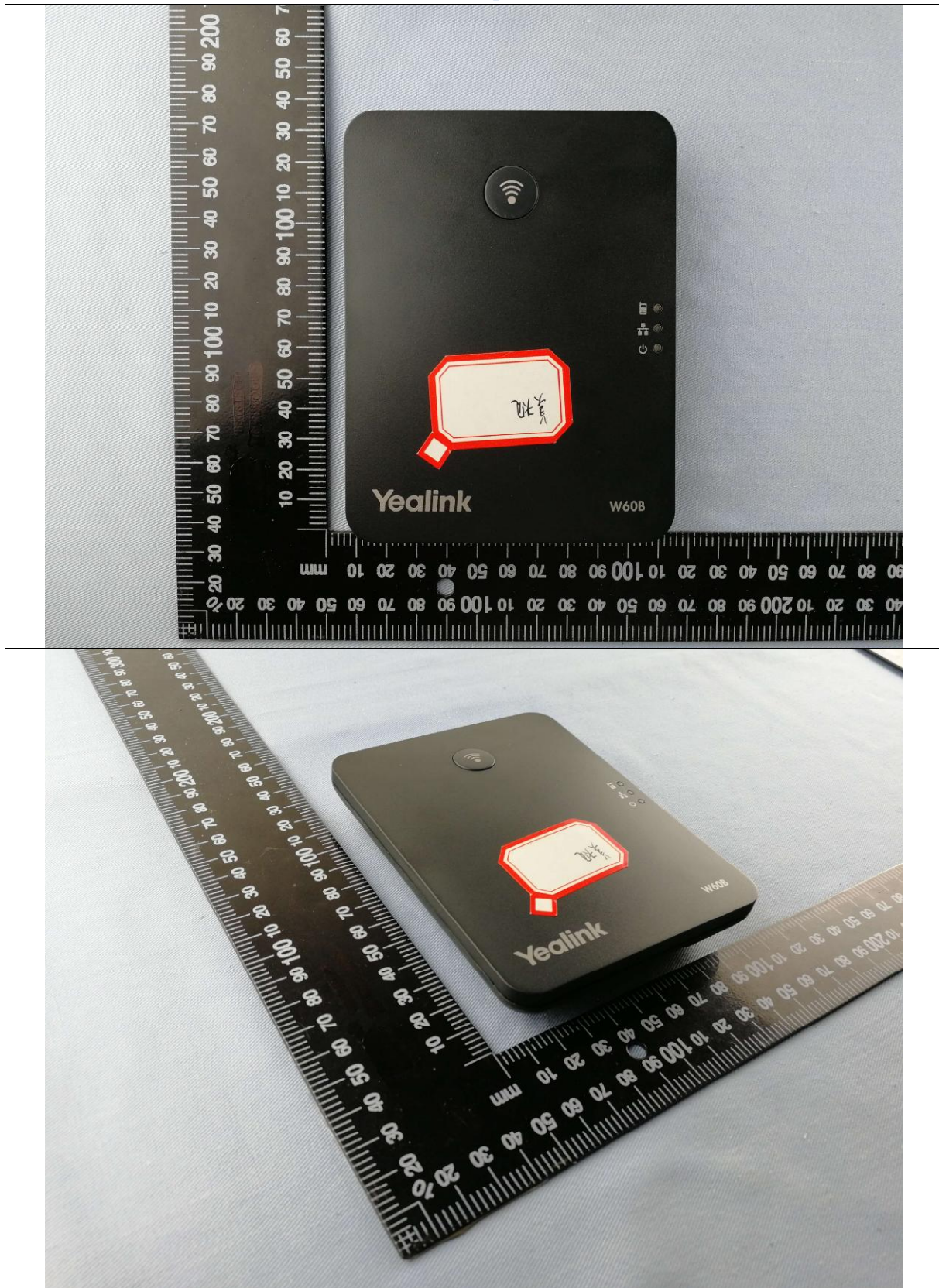


FP - Radiated Emission test view (Frequency above 1GHz)

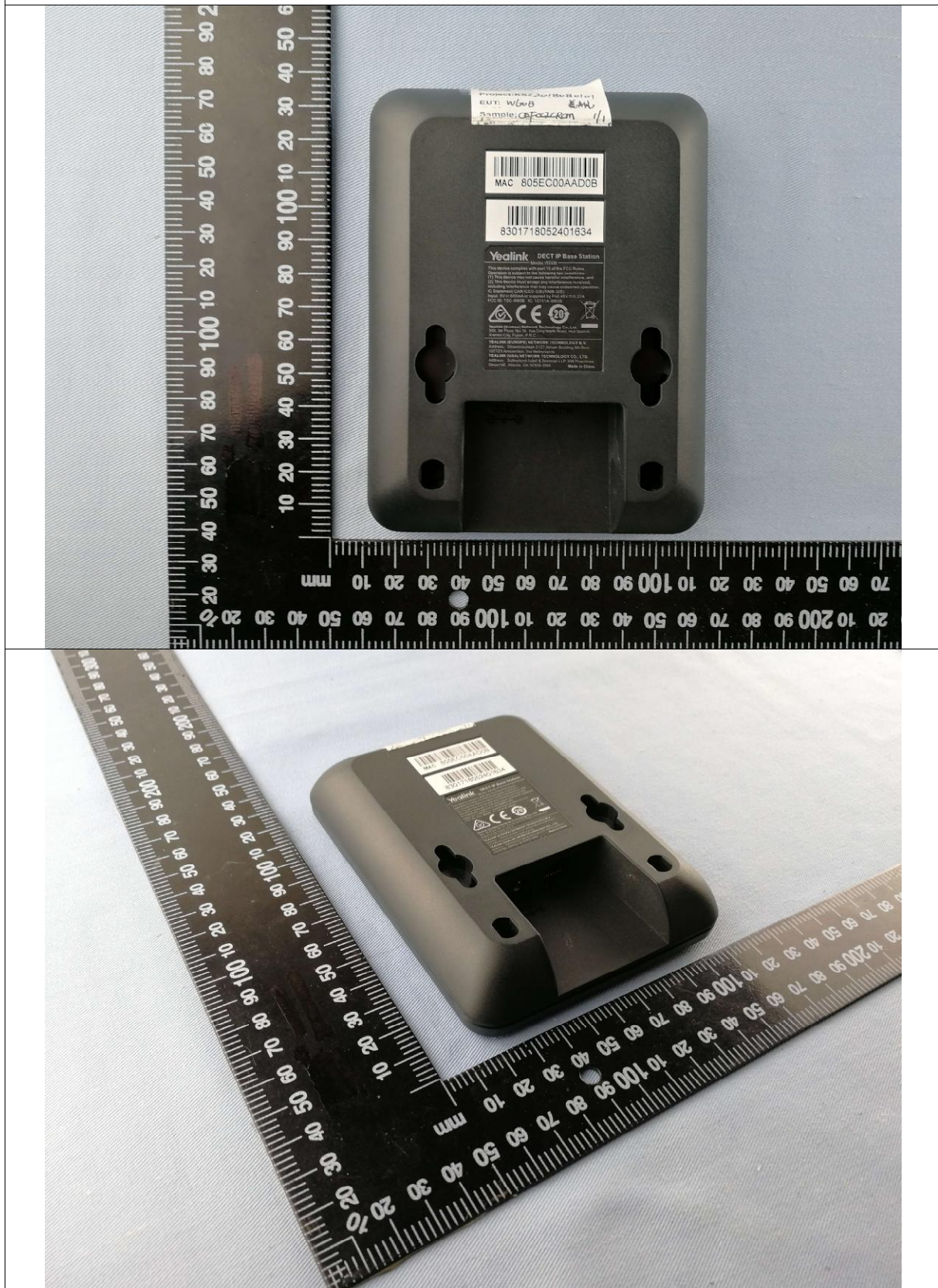


6.2 Photograph - EUT

FP EUT top view

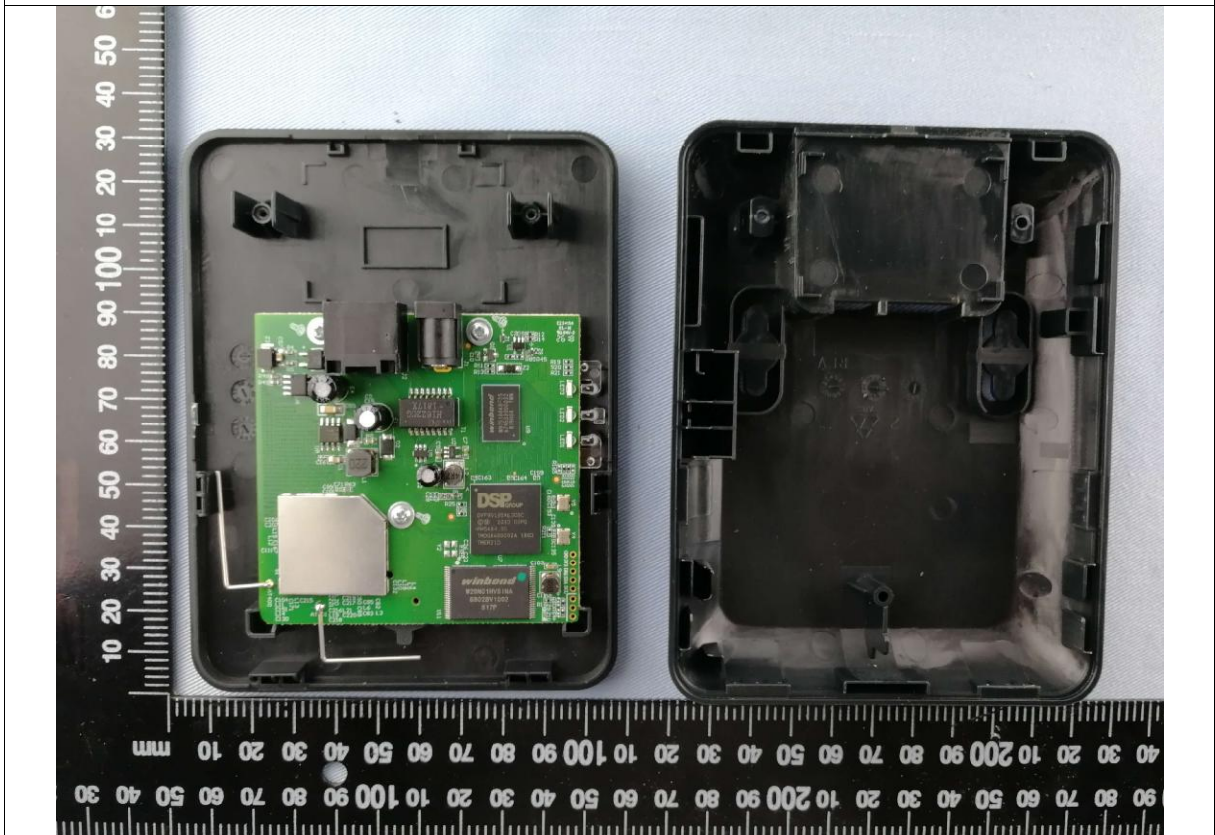


EUT bottom view

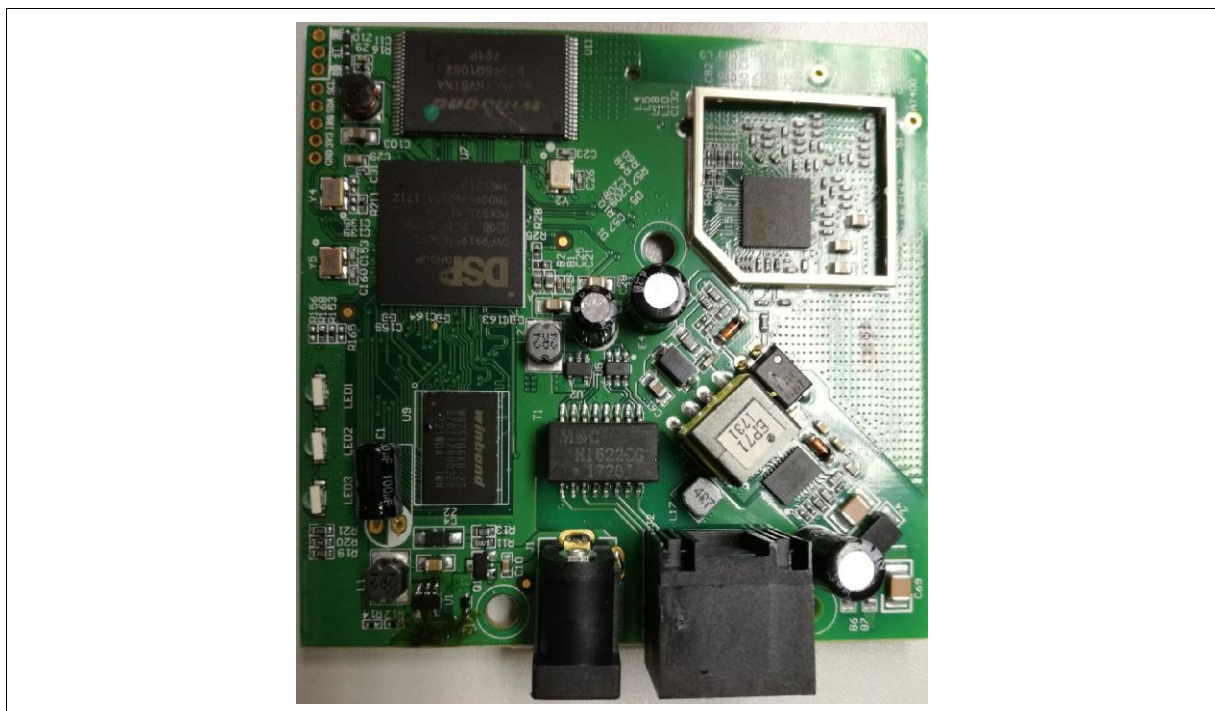
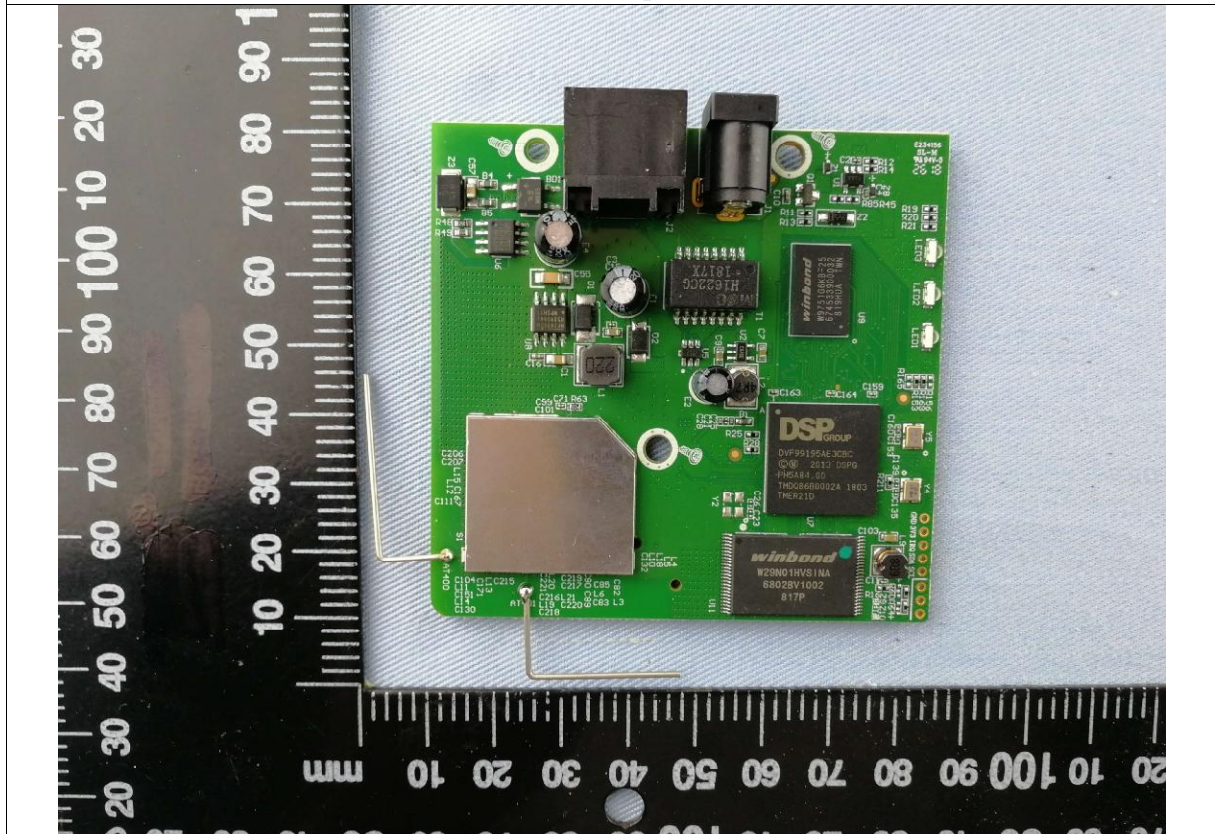




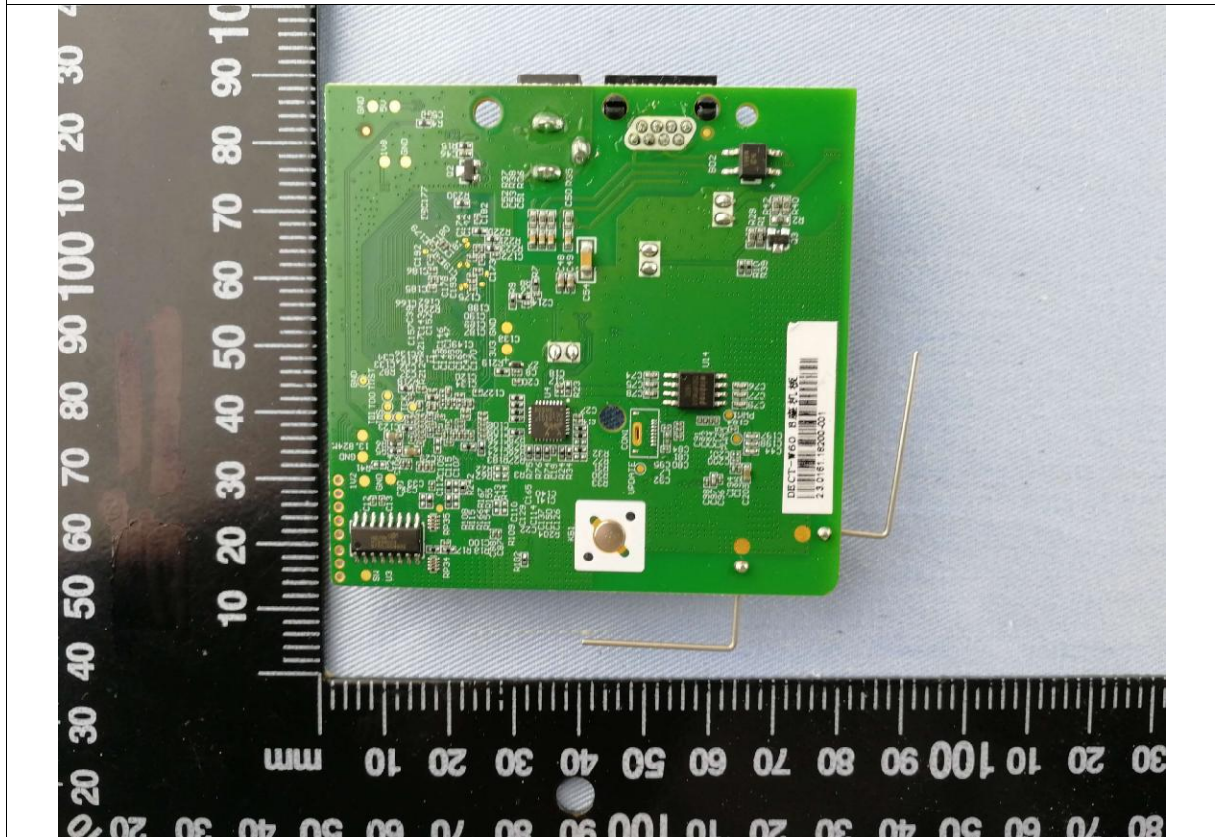
EUT inside whole view



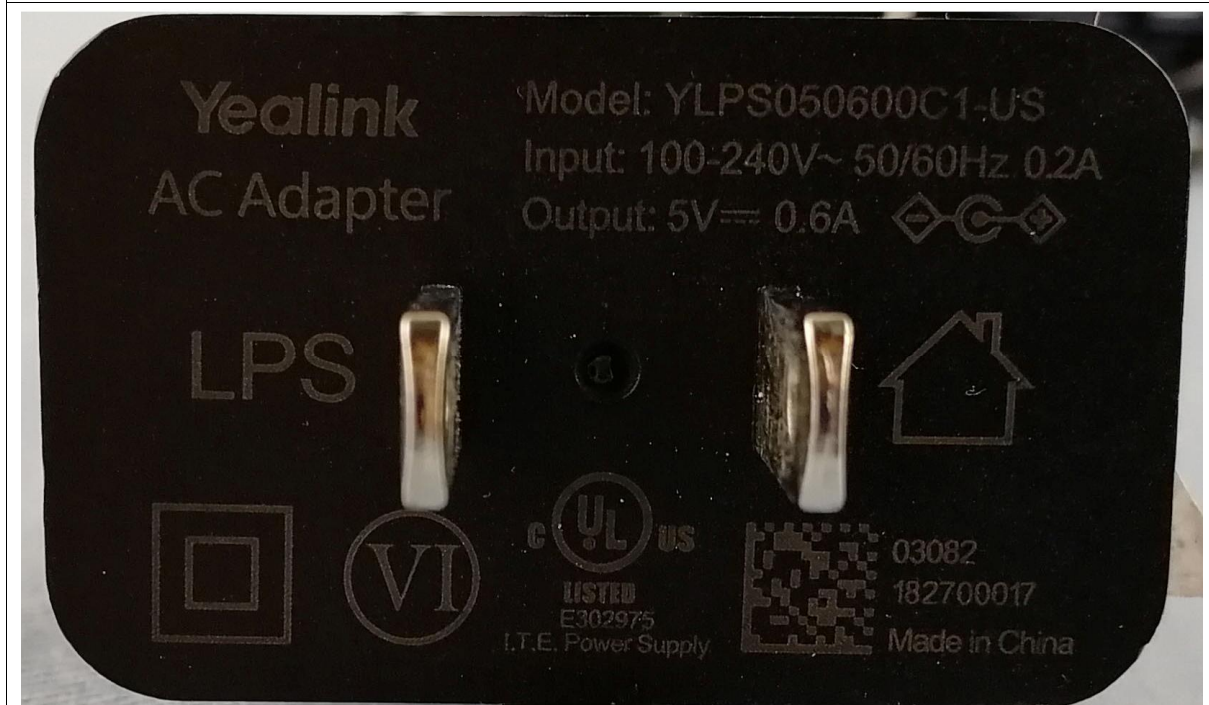
Main board component side



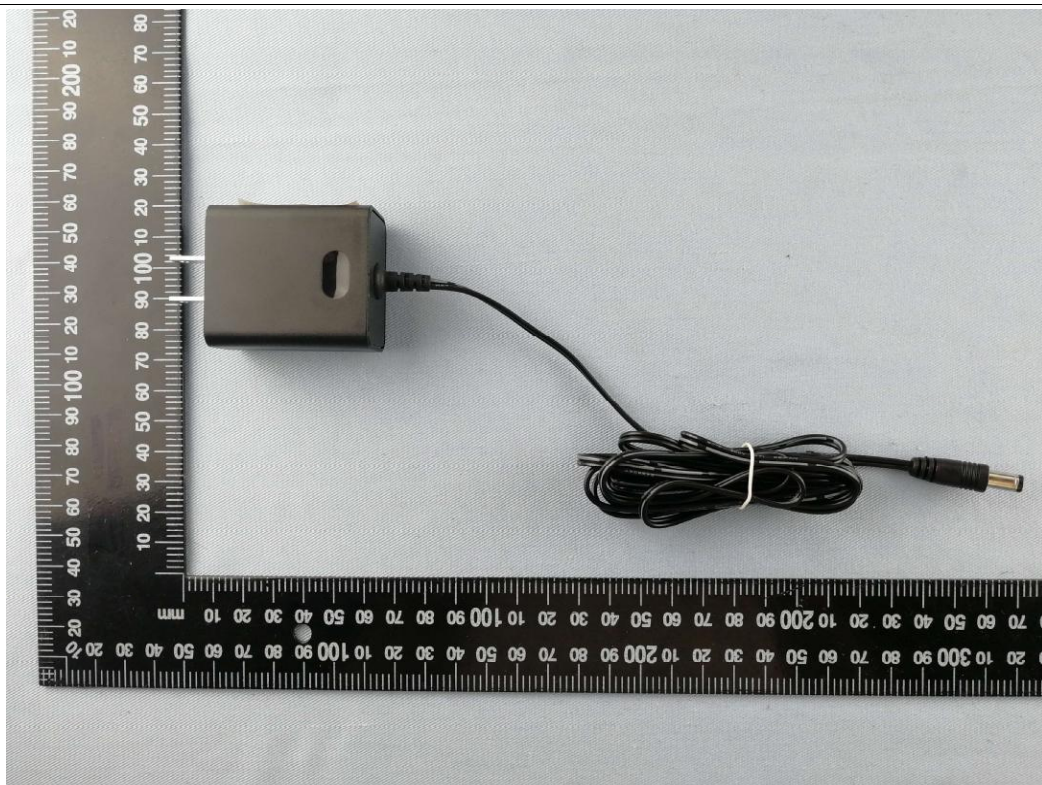
Main board solder side



FCC Adapter top view



Adapter side view



FCC Adapter top view



Adapter side view



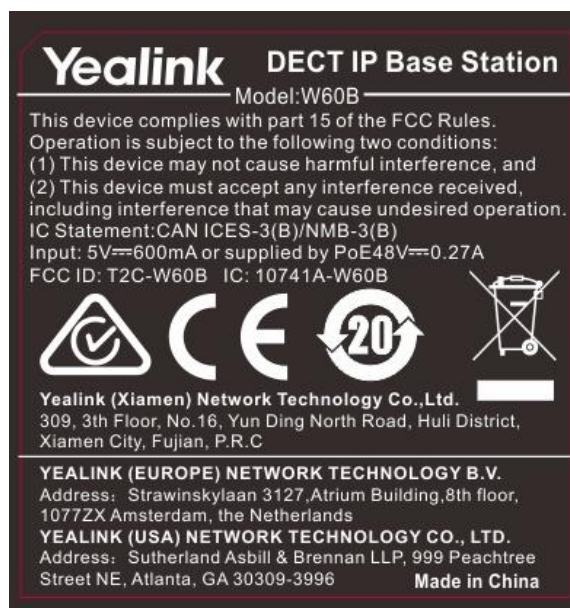
FCC Adapter top view



Adapter side view



7. FCC ID Label



The following note shall be conspicuously placed in the users manual: “Operation is subject to the following two conditions: (1) this device may not cause interference, and (2) this device must accept any interference, including interference that may cause undesired operation of this device.”

The Label must not be a stick-on paper label. The Label on these products must be permanently affixed to the product and readily visible at the time of purchase and must last the expected lifetime of the equipment not be readily detachable.

Proposed Label Location on EUT



8. Test Equipment

The following test equipments were used during the radiated & conducted emission test:

Equipment/ Facilities	Manufacturer	Model #	Serial No.	Cal/Char Date	Due Date
Turntable	Innco systems GmbH	CT-0801	N/A	NCR	NCR
Antenna Tower	Innco systems GmbH	MA-4640-XP-ET	N/A	NCR	NCR
Controller	Innco systems GmbH	CO3000	955/38850716L	NCR	NCR
Pre-Amplifier	Agilent	87405C	MY47010722	Dec.6, 2017	Dec.6, 2019
Horn Antenna	SCHWARZBECK	BBHA 9170	N/A	Dec.6, 2017	Dec.6, 2019
EMI Test Receiver	Rohde & Schwarz	ESR7	101091	Dec.6, 2016	Dec.6, 2018
Spectrum Analyzer	Rohde & Schwarz	FSP40	100273	Dec.14, 2017	Dec.14, 2019
Loop Antenna	Rohde & Schwarz	HFH2-Z2	100022	Feb.21, 2018	Feb.21, 2020
Trilog-Super Broadband Antenna	SCHWARZBECK	VULB9161	9161-4079	August 27, 2016	August 27, 2018
Broad-Band Horn Antenna	SCHWARZBECK	BBHA 9120D	9120D-565	August 19, 2018	August 19, 2020
AMN	Rohde & Schwarz	ESH3-Z5	100197	Dec.25, 2017	Dec.25, 2019
AMN	CYBERTEK	EM5040A	E115040054	Sep.6, 2016	Sep.6, 2018
Pulse Limiter	SCHWARZBECK	VTSD 9561-F	9604	Dec.25, 2017	Dec.25, 2019
KMO Shielded Room	KMO	KMO-001	N/A	NCR	NCR
Digital Radio Communication Tester	Rohde & Schwarz	CMD60	1050.9008.60	Dec.14, 2017	Dec.14, 2019
3m Anechoic Chamber	KMO	KMO-3AC	N/A	Dec.23, 2017	Dec.23, 2019