



Ke Mei Ou Lab Corp.

2013-2016, 20th Floor, Business Center, JiahuiXin Cheng, No 3027,
Shen Nan Road, Fu Tian, Shen Zhen, Guang Dong, P. R. China
Tel: + 86 755 83642690 Fax: + 86 755 83297077
www.kmolab.com



FCC TEST REPORT

Under
FCC Part 15D for Isochronous UPCS Devices 1920–1930 MHz
 PUB_Part 15 Unlicensed PCS Base Station

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

October 18, 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 15D for Isochronous UPCS Devices

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 FCC Part15, Subpart D	Test Type	Result	Notes
15.107(a), 15.207(a)	Power Line Conducted Emission	PASS	Complies
15.319(g) 15.109(a), 15.209(a)	Spurious Emissions (Radiated)	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. Technical Characteristics Test

3.1 Conducted Emission Test

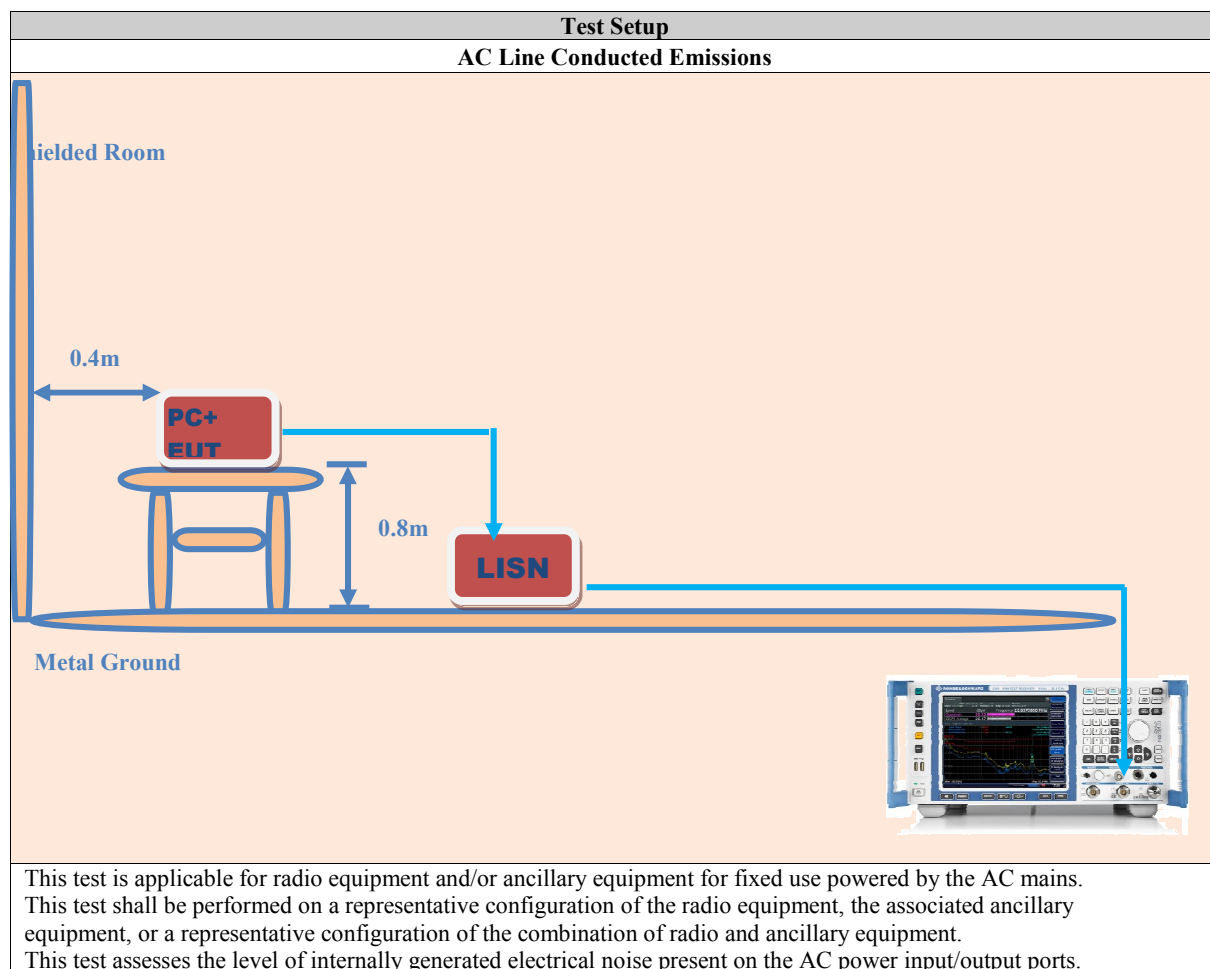
3.1.1 Test Equipment

Please refer to Section 6 this report.

3.1.2 Test Procedure

Test Method	
☒	<p>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.</p> <p>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 investigated over the frequency range from 0.15MHz to 30MHz using a receiver bandwidth of 9kHz.</p>

3.1.3 Test Setup



3.1.4 Configuration of the EUT

The EUT was configured according to ANSI C63.17:2013. All interface ports were connected to the appropriate peripherals. All peripherals and cables are listed below.

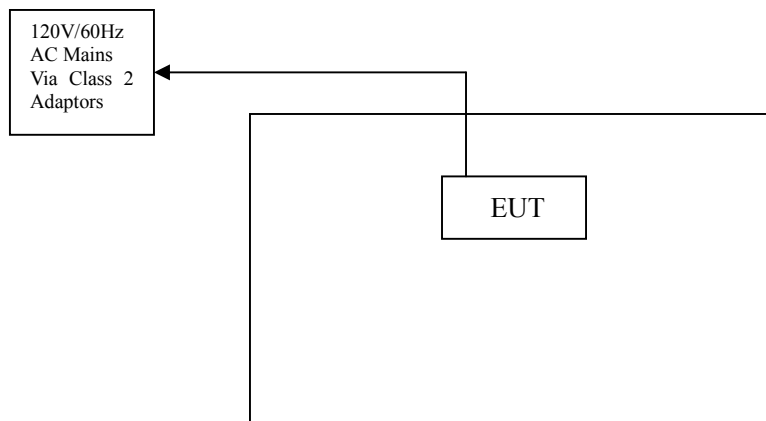
EUT Operation Test Setup	
Pre-Scan has been conducted to determine the worst-case mode from all possible combinations. Only the worst test mode data was reported.	
Pre-Scan Mode	
Test Mode	Operating Description
1	EUT power by AC/DC Adapter #1 (US)
2	EUT power by AC/DC Adapter #2 (US)
3	EUT power by AC/DC 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

3.1.5 EUT Operating Condition

Operating condition is according to ANSI C63.17:2013.

- 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.



3.1.6 Conducted Power Line Emission Limits

FCC Part 15.207(a)

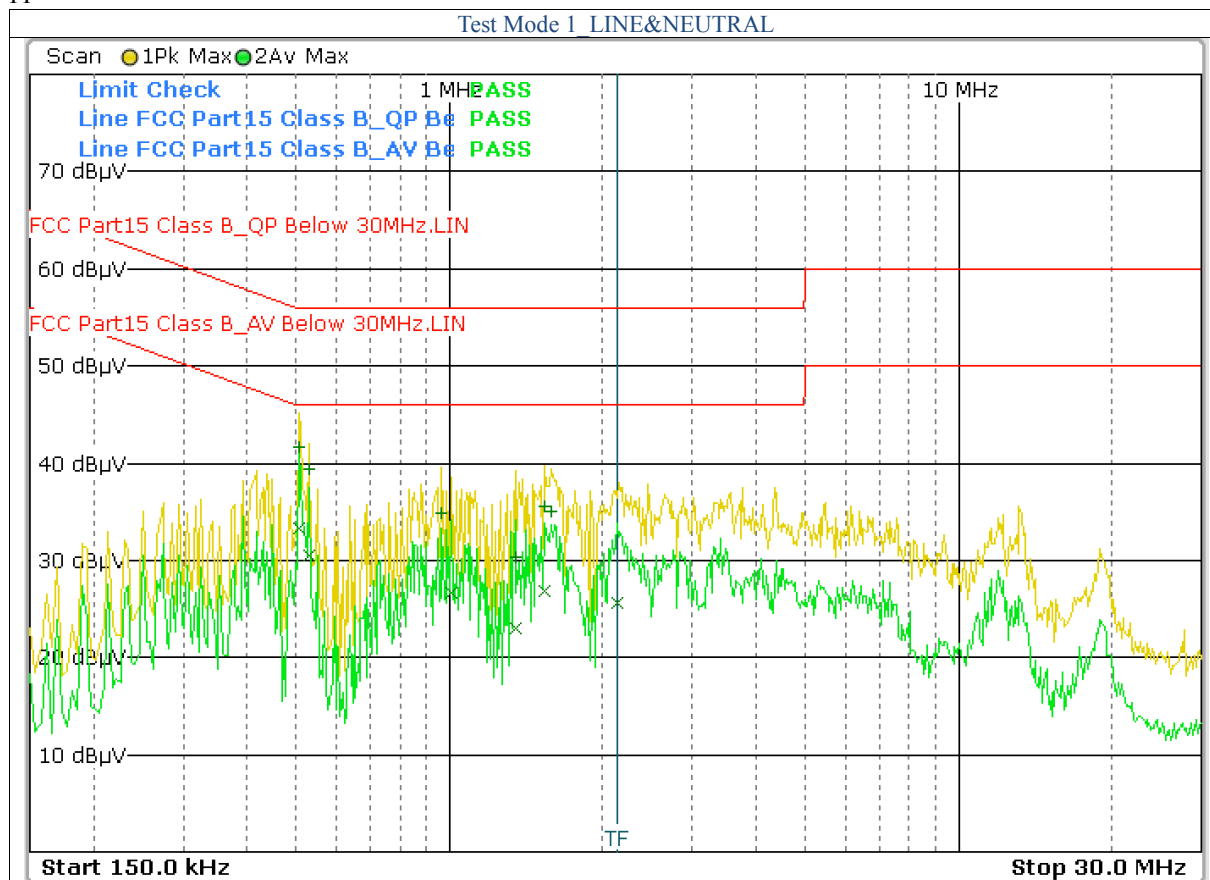
RSS-213 Clause 6.3, RSS-GEN Clause 8.8

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.

3.1.7 Conducted Power Line Test Result

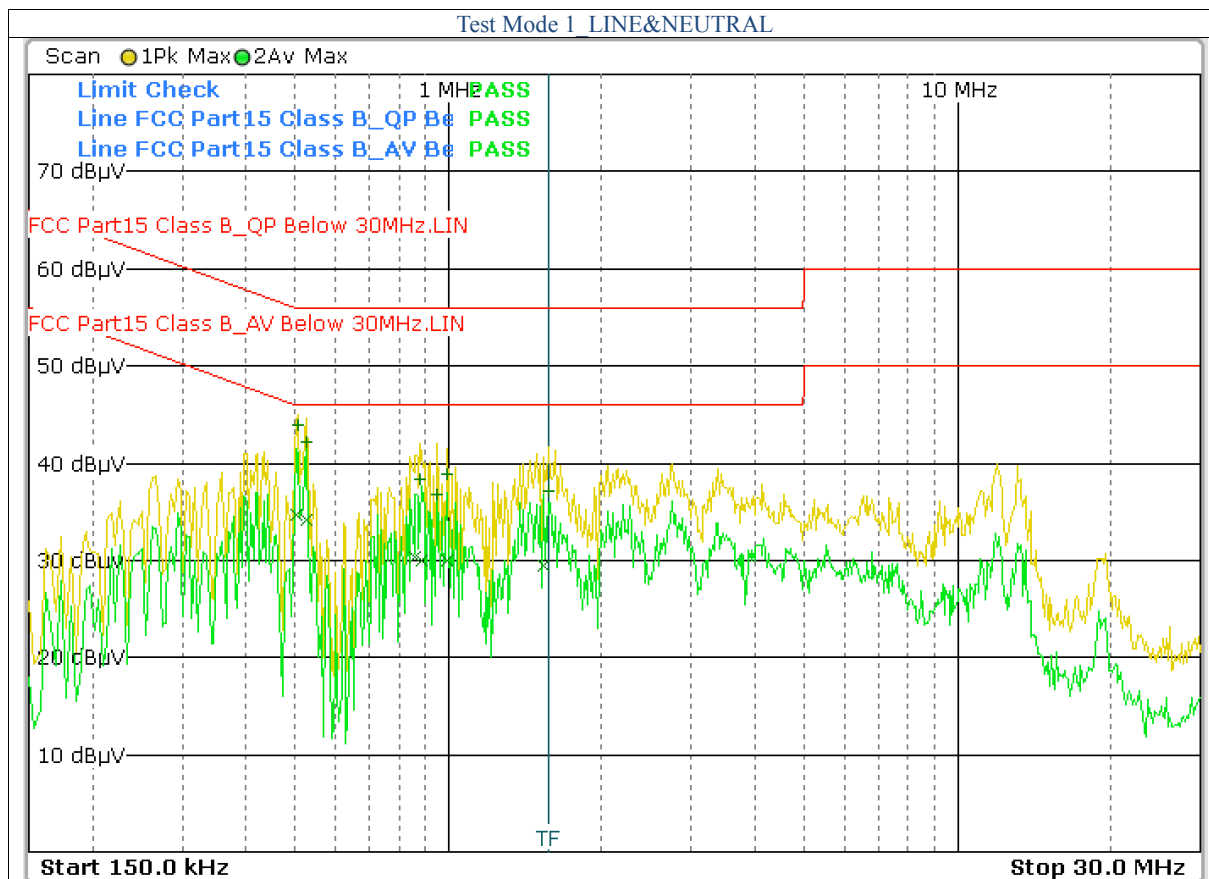
FP



FCC15										
Frequency (MHz)	Read Level (dBuV)		Factor (dB)	Emission (dBuV)		Line/Neutral	Limit (dBuV)		Margin(dBuV)	
	QP	AV		QP	AV		QP	AV	QP	AV
0.506	31.31	22.88	10.40	41.71	33.28	Line	56.00	46.00	-14.29	-12.72
0.530	28.94	20.17	10.40	39.34	30.57	Line	56.00	46.00	-16.66	-15.43
0.996	24.38	16.26	10.40	34.78	26.66	Line	56.00	46.00	-21.22	-19.34
1.346	19.98	12.53	10.40	30.38	22.93	Line	56.00	46.00	-25.62	-23.07
1.542	25.07	16.35	10.50	35.57	26.85	Line	56.00	46.00	-20.43	-19.15
1.586	24.62	15.16	10.40	35.02	25.56	Line	56.00	46.00	-20.98	-20.44

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.



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.

3. 6 Radiated Spurious Emission

3.6.1 Test Equipment

Please refer to section 6 this report.

3.6.2 Test Procedure

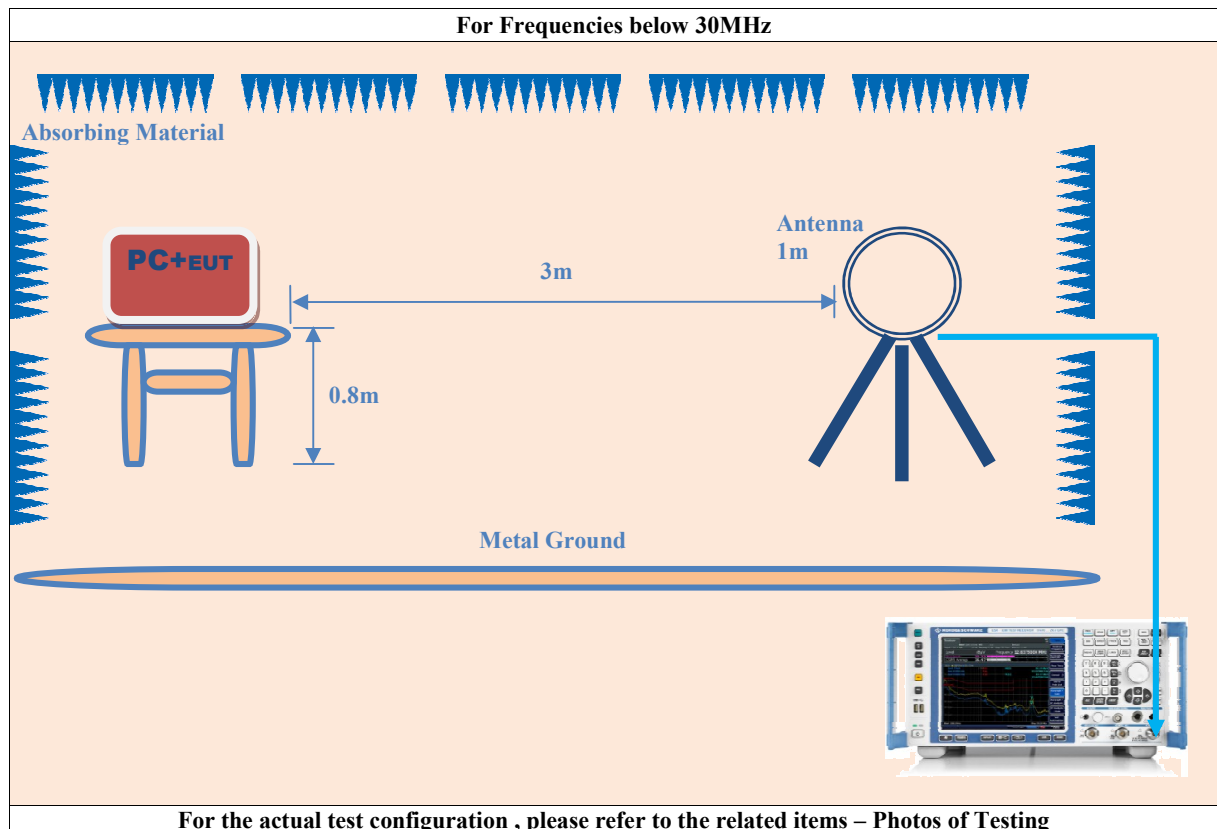
The transmitter was placed on a wooden turntable and was transmitting in a non radiating dummy load which was directly connected to the antenna connector. The battery was replaced by monitored voltage source. The measurement antenna was placed at a distance of 3 meters from the EUT. During the tests, the antenna was height and polarization as well as the EUT azimuth where varied in orders to identify the maximum level of emission from the EUT. The test was performed by placing the EUT on 3 orthogonal axis. The frequency range up to tenth harmonic of the fundamental frequency was investigated. Remove the EUT and replace it with substitution antenna. A signal generator was connected to the substitution antenna by a non-radiating cable. The absolute levels of the spurious emissions were measured by the substitution. All tests was performed for the lower, the middle and the highest frequency.

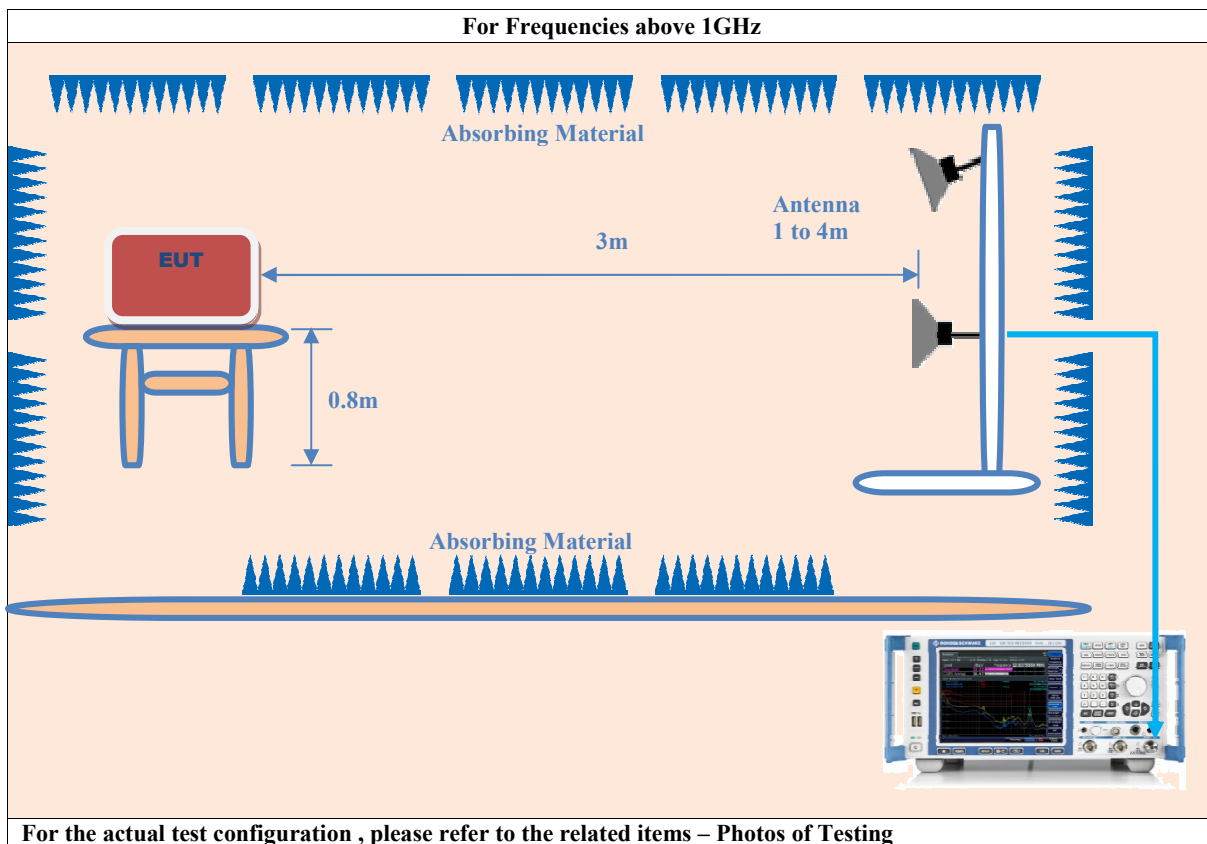
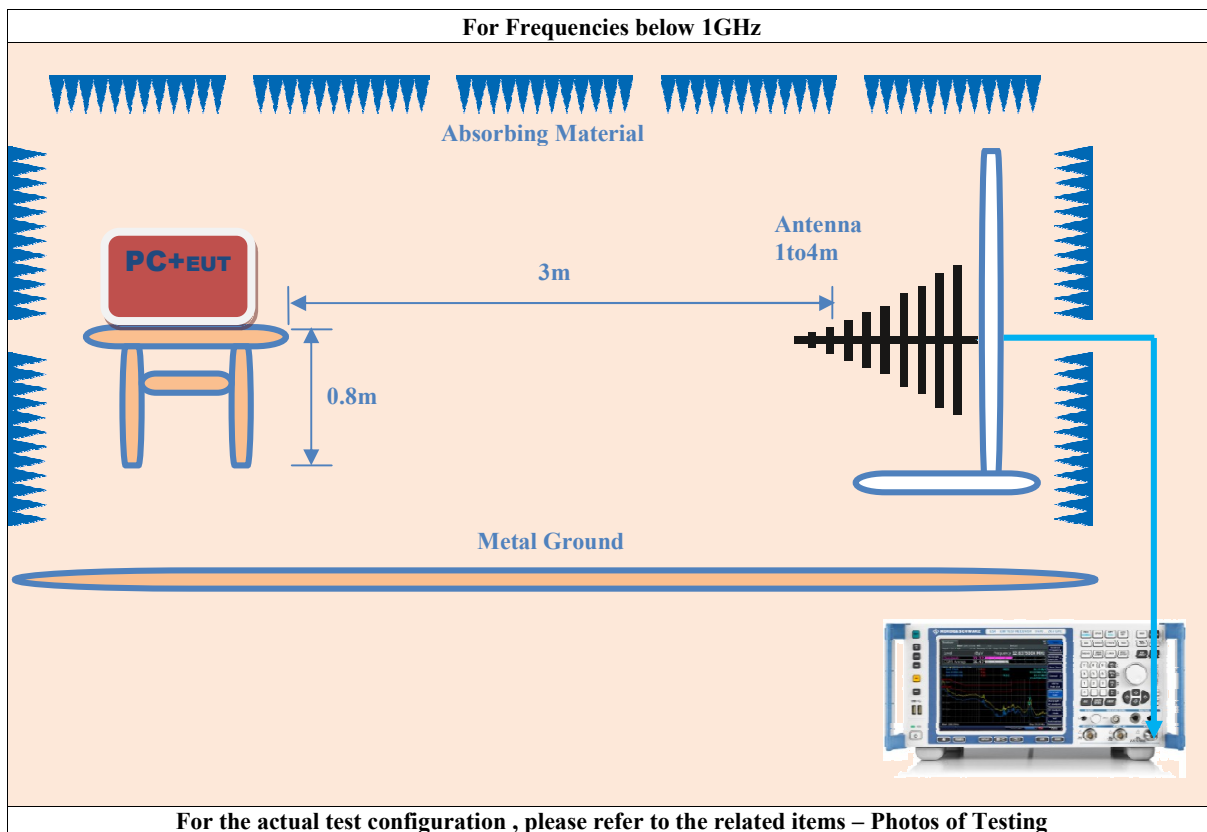
The radiated emission tests were performed in the 3 meters test site, using the setup accordance with the ANSI C63.17. The specification used was the FCC 15§ 15.319(g).

The external I/O cables were draped along the test table and formed a bundle 30 to 40 cm long in the middle. During the radiated emission test, the EMI test receiver & Spectrum Analyzer Setup were set with the following configurations:

Frequency Range	RWB	Video B/W	IF B/W	Detector
30~1000MHz	100kHz	300kHz	120kHz	QP
Above 1GHz	1MHz	1MHz	/	PK
	1MHz	30Hz	/	AV

3.6.3 Test Setup





3.6.4 Configuration of The EUT

Same as section 3.1.4 of this report

3.6.5 EUT Operating Condition

Same as section 3.1.5 of this report

3.6.6 Limit

According to FCC§15.319(g), notwithstanding other technical requirements specified in this subpart, attenuation of emissions below the general emission limits in §15.209 is not required.

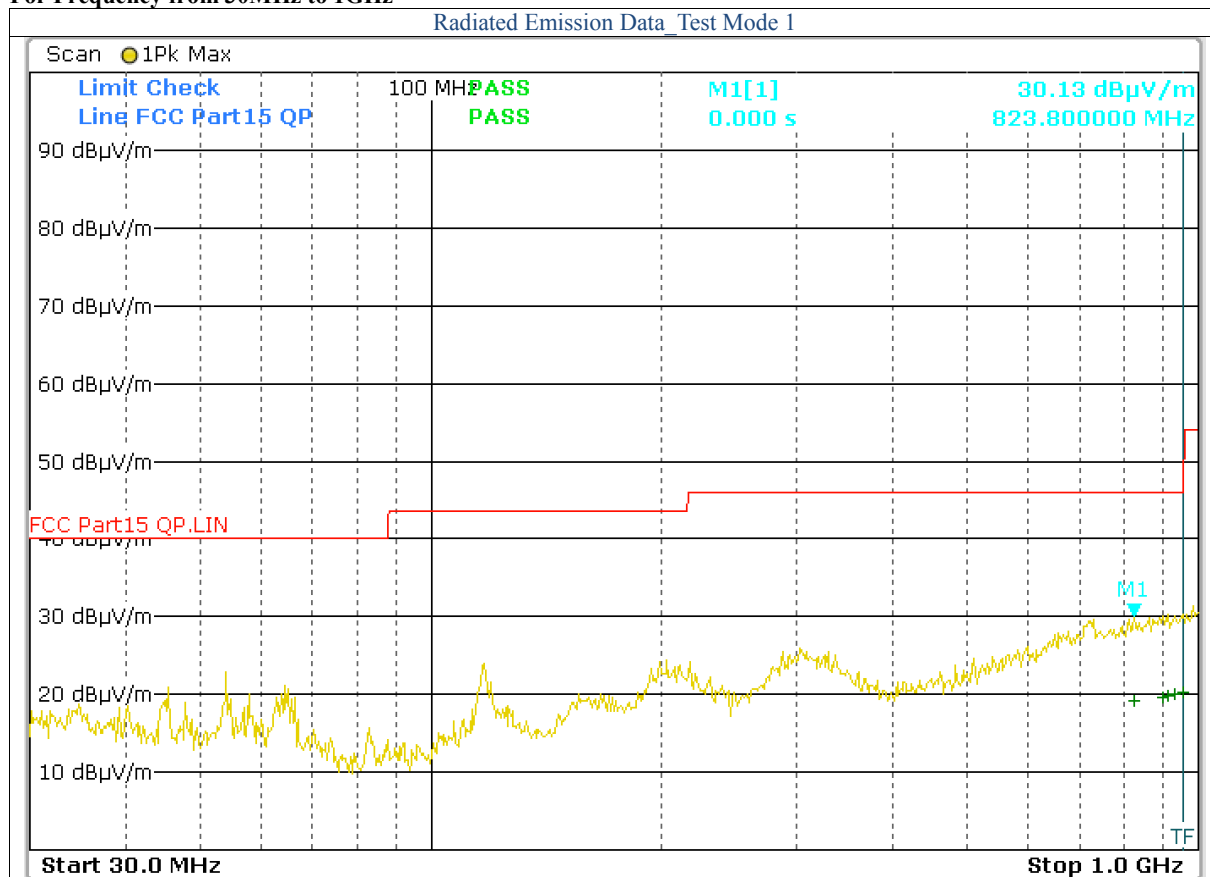
3.6.7 Radiated Spurious Emission Test Result

For Frequency below 30MHz

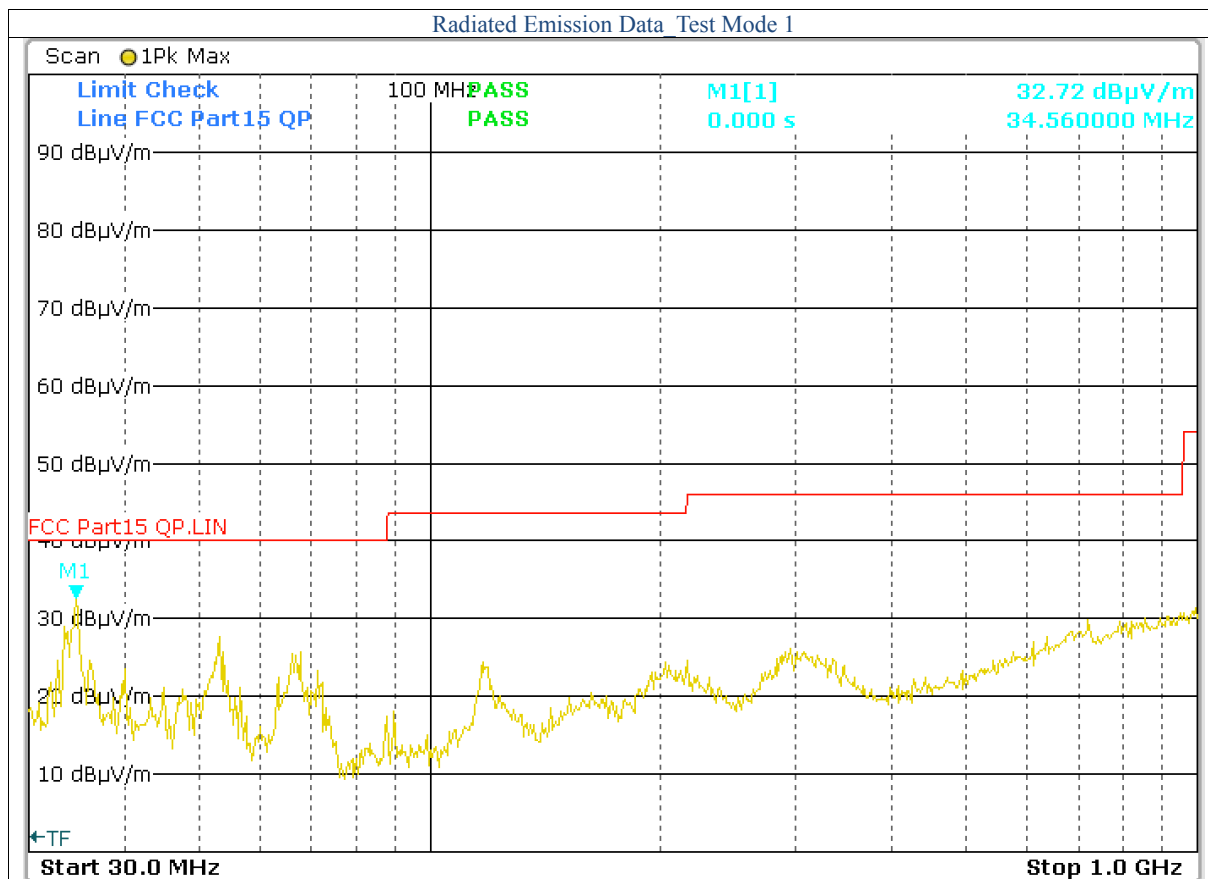
Frequency (MHz)	Read Level (dBuV)	Factor (dB)	Emission (dBuV/m)	Horiz./Vert.	Limit (dBuV/m)	Margin (dB)
N/A						
N/A						
N/A						
N/A						
N/A						
N/A						

- 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



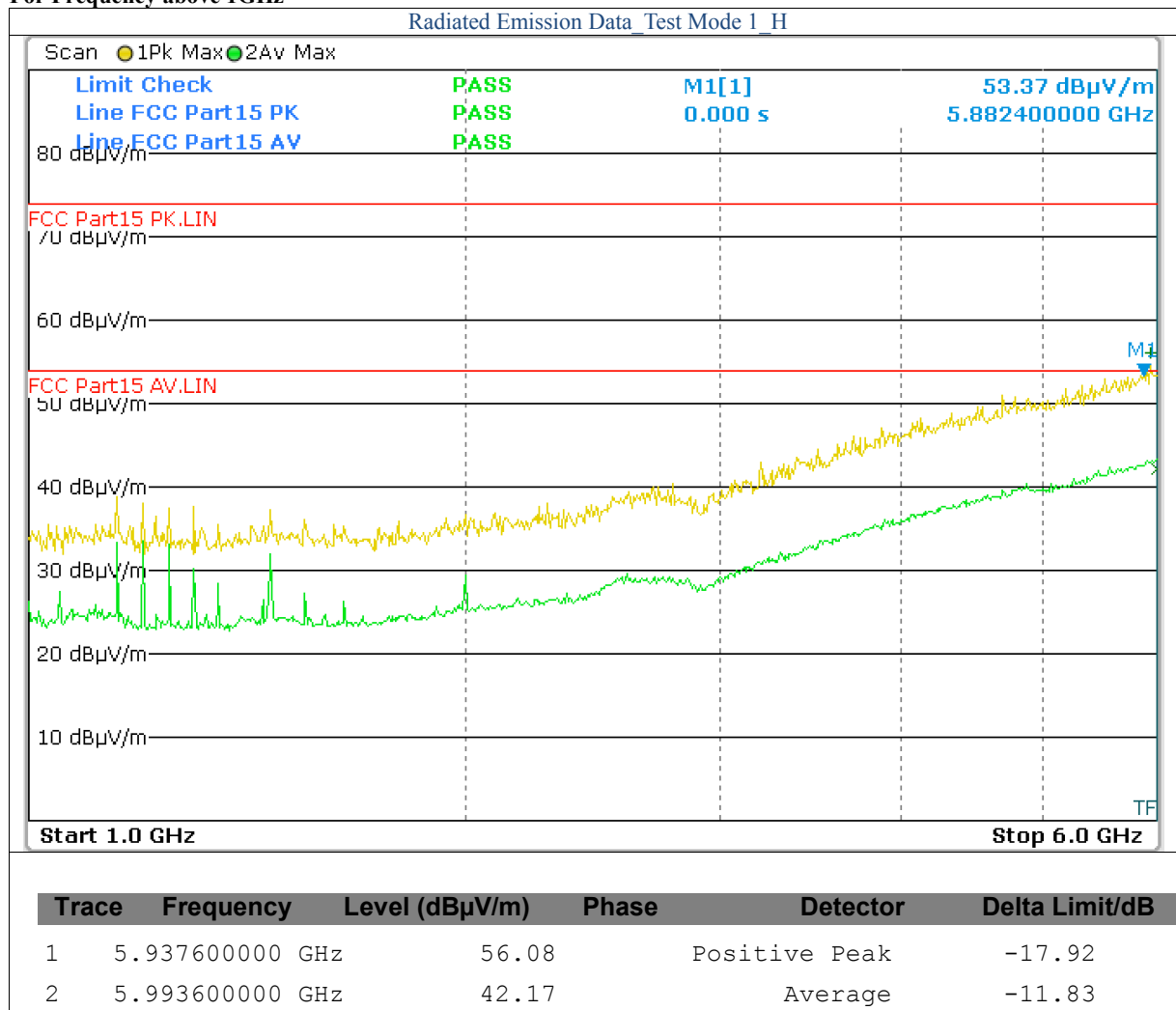
Frequency (MHz)	Read Level (dBuV)	Factor (dB)	Emission (dBuV/m)	Horiz./Vert.	Limit (dBuV/m)	Margin (dB)
823.800	0.52	22.68	23.20	Horiz./	46.0	-22.80
899.800	0.98	22.68	23.66	Horiz./	46.0	-22.34
915.080	0.90	22.99	23.89	Horiz./	46.0	-22.11
930.400	0.09	22.99	23.08	Horiz./	46.0	-22.92
953.760	0.37	22.99	23.36	Horiz./	46.0	-22.64
957.240	0.31	22.99	23.30	Horiz./	46.0	-22.70

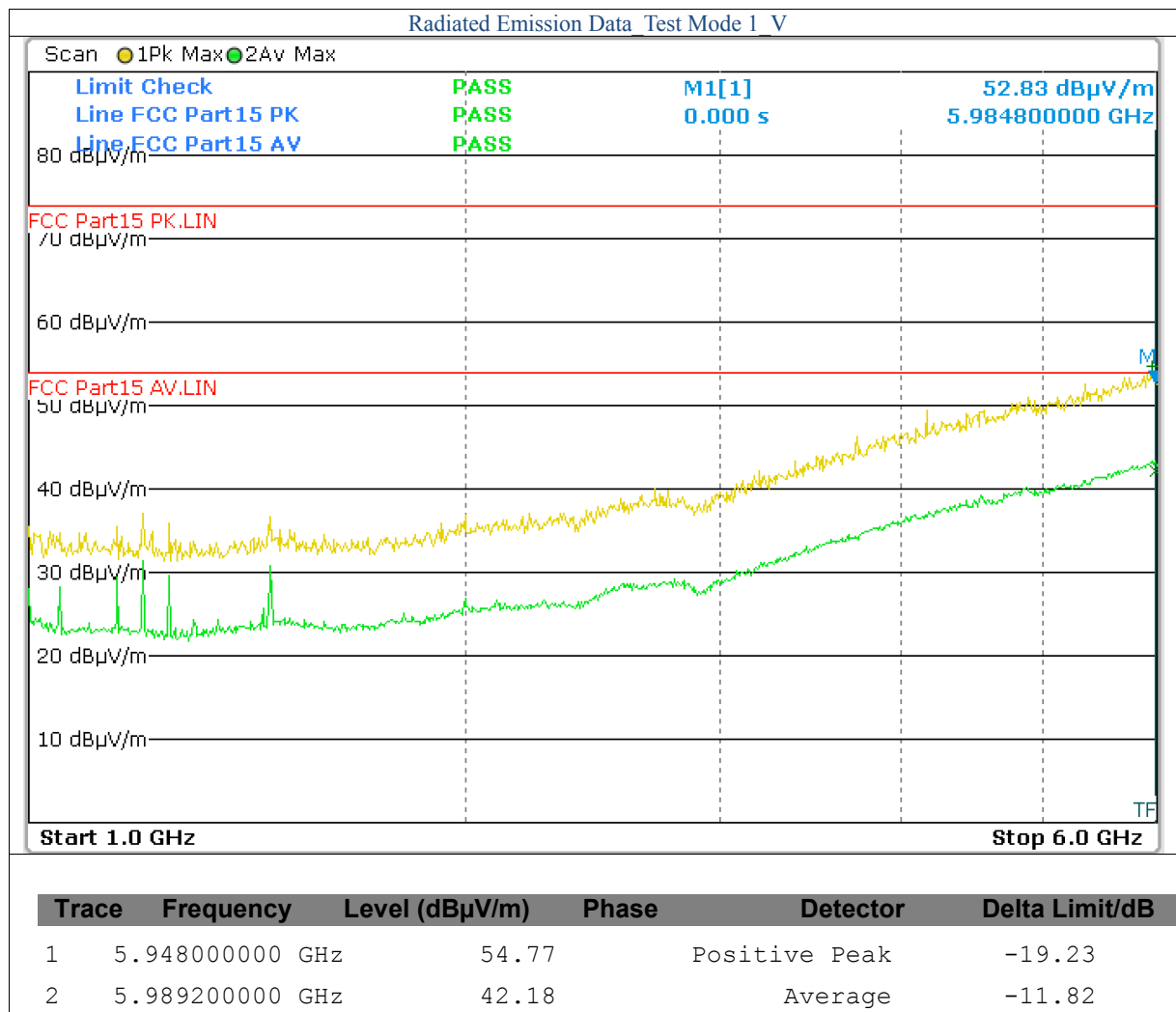


Frequency (MHz)	Read Level (dBuV)	Factor (dB)	Emission (dBuV/m)	Horiz./Vert.	Limit (dBuV/m)	Margin (dB)
34.560	11.62	12.06	23.68	Vert.	40.0	-16.32
53.620	11.39	10.66	22.05	Vert.	40.0	-17.95
72.350	13.12	7.24	20.36	Vert.	40.0	-19.64
120.360	5.75	13.83	19.58	Vert.	43.5	-23.92
203.240	1.83	18.19	20.02	Vert.	43.5	-23.48
298.630	5.24	14.94	20.18	Vert.	46.0	-25.82

- 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





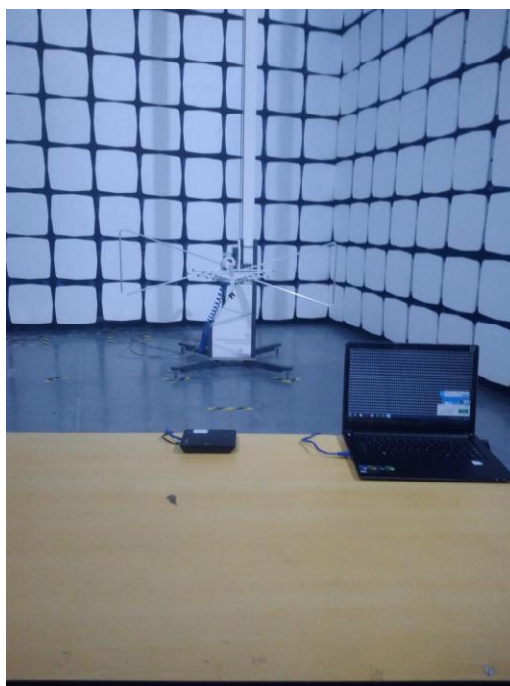
4. Photos of Testing

4.1 Emission Test View

FP Conducted Emission test view



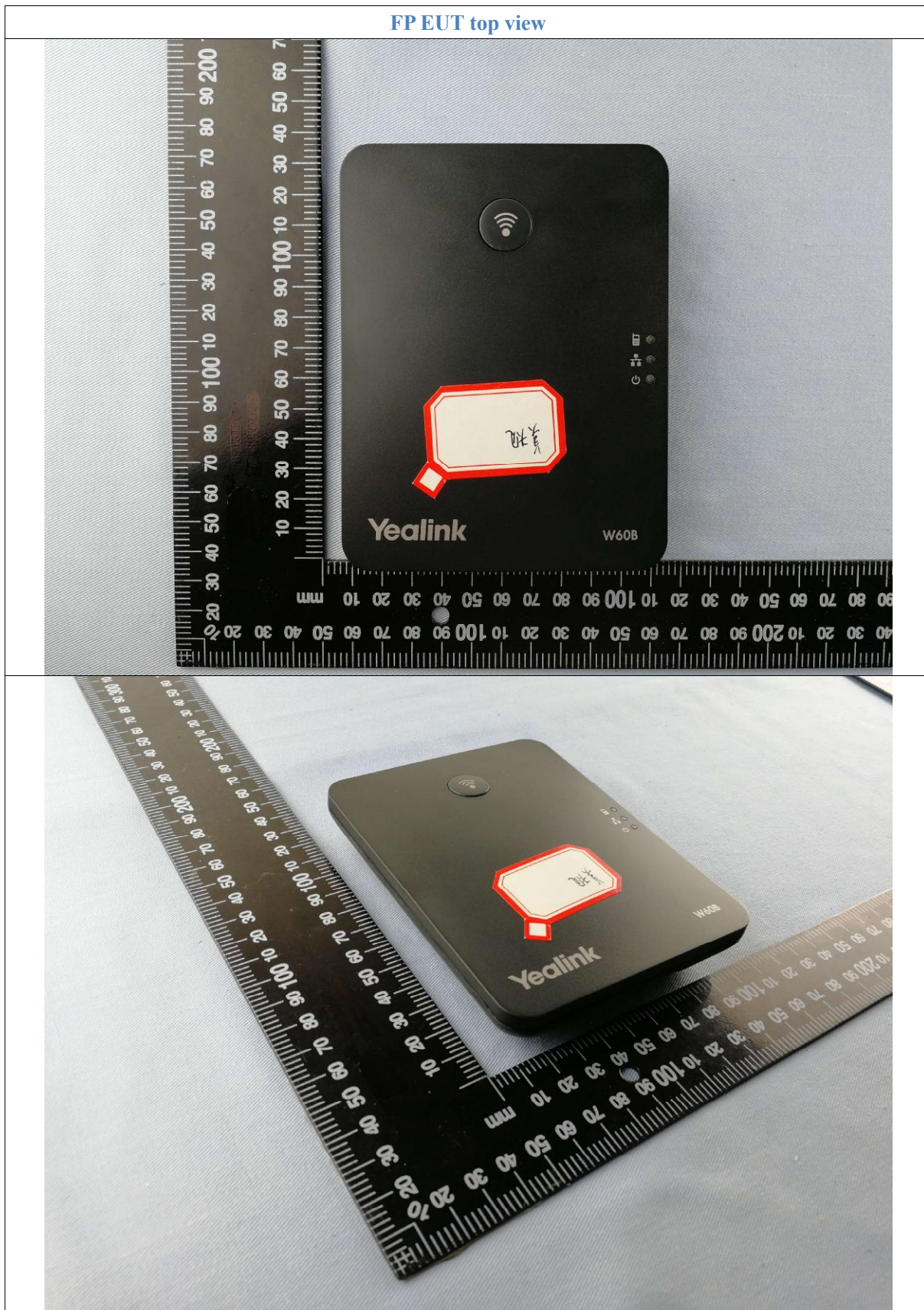
FP - Radiated Emission test view (Frequency from 30MHz to 1GHz)



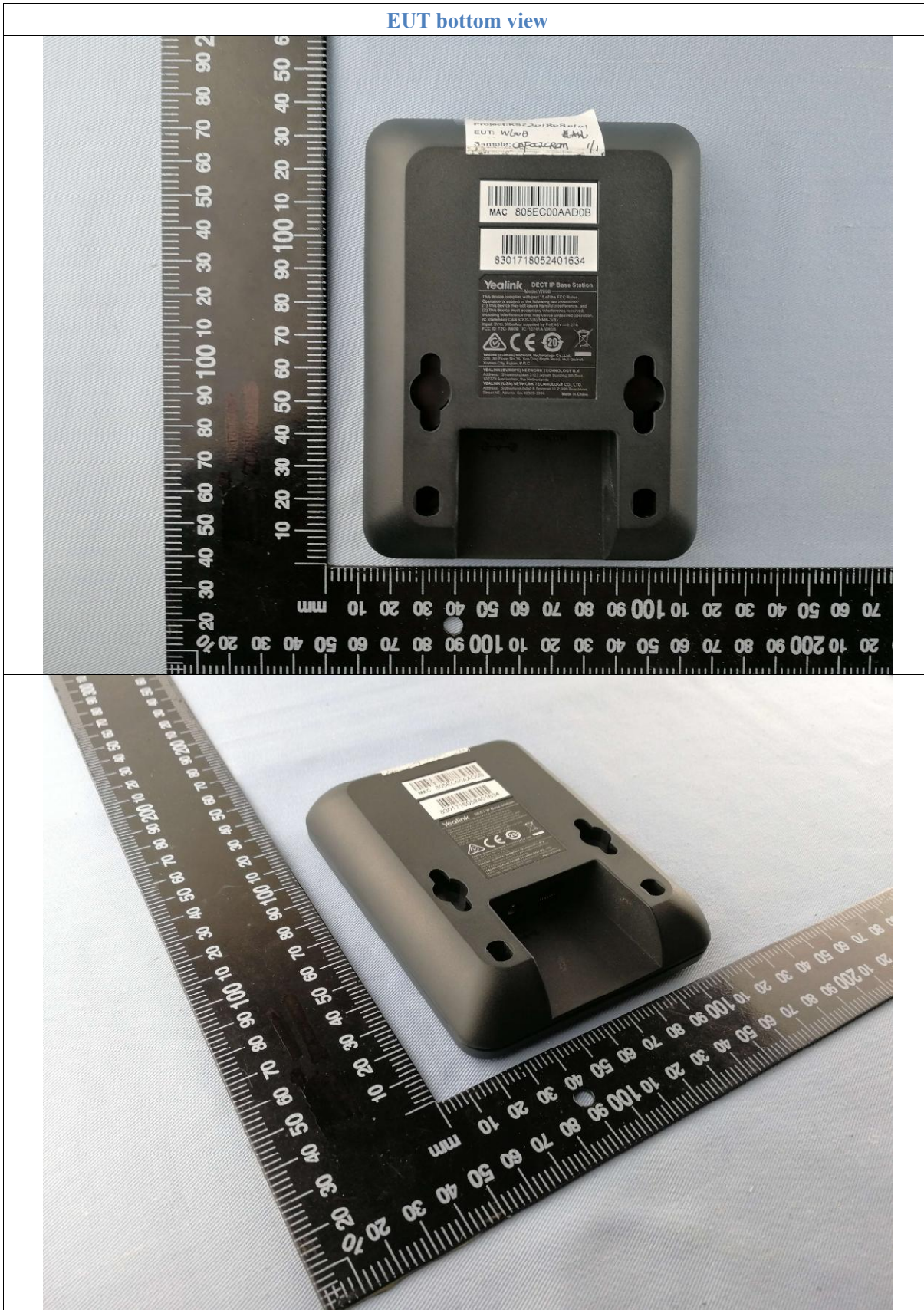
FP - Radiated Emission test view (Frequency above 1GHz)



4. 2 EUT Detailed Photographs

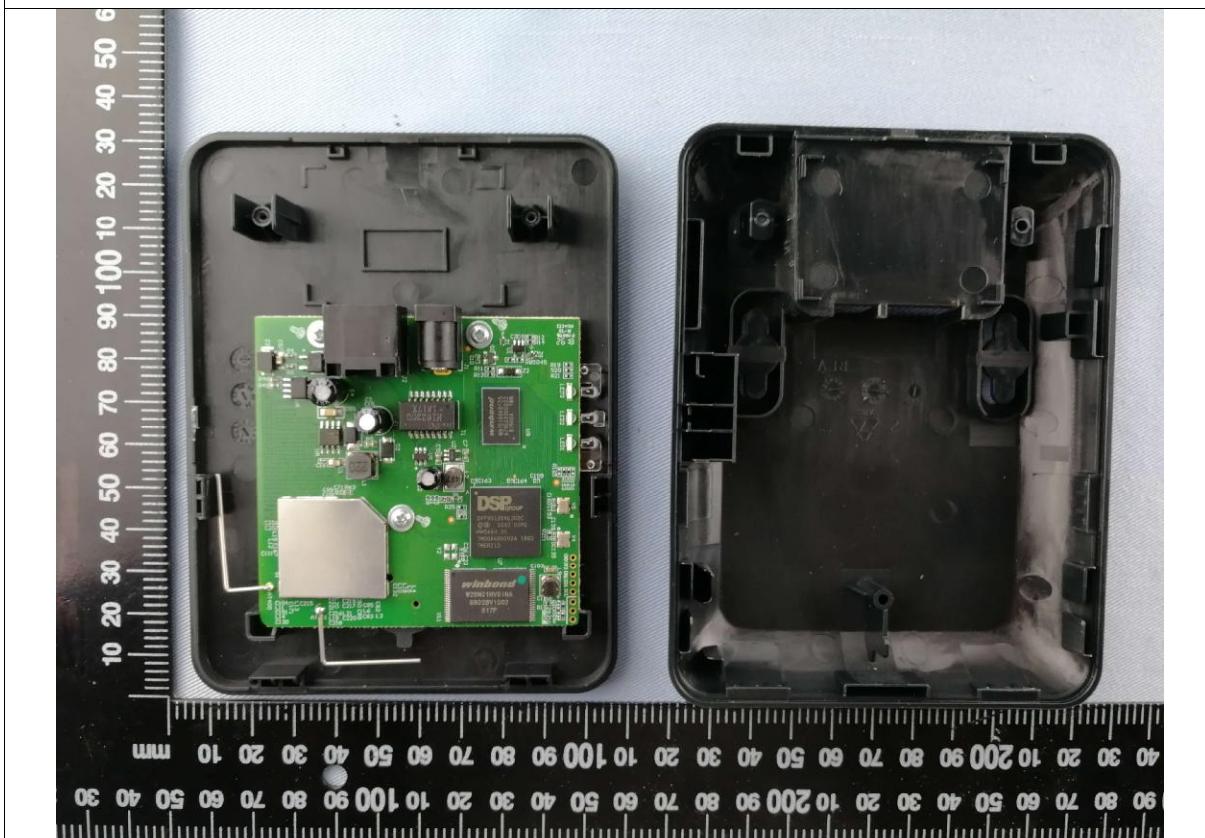


EUT bottom view

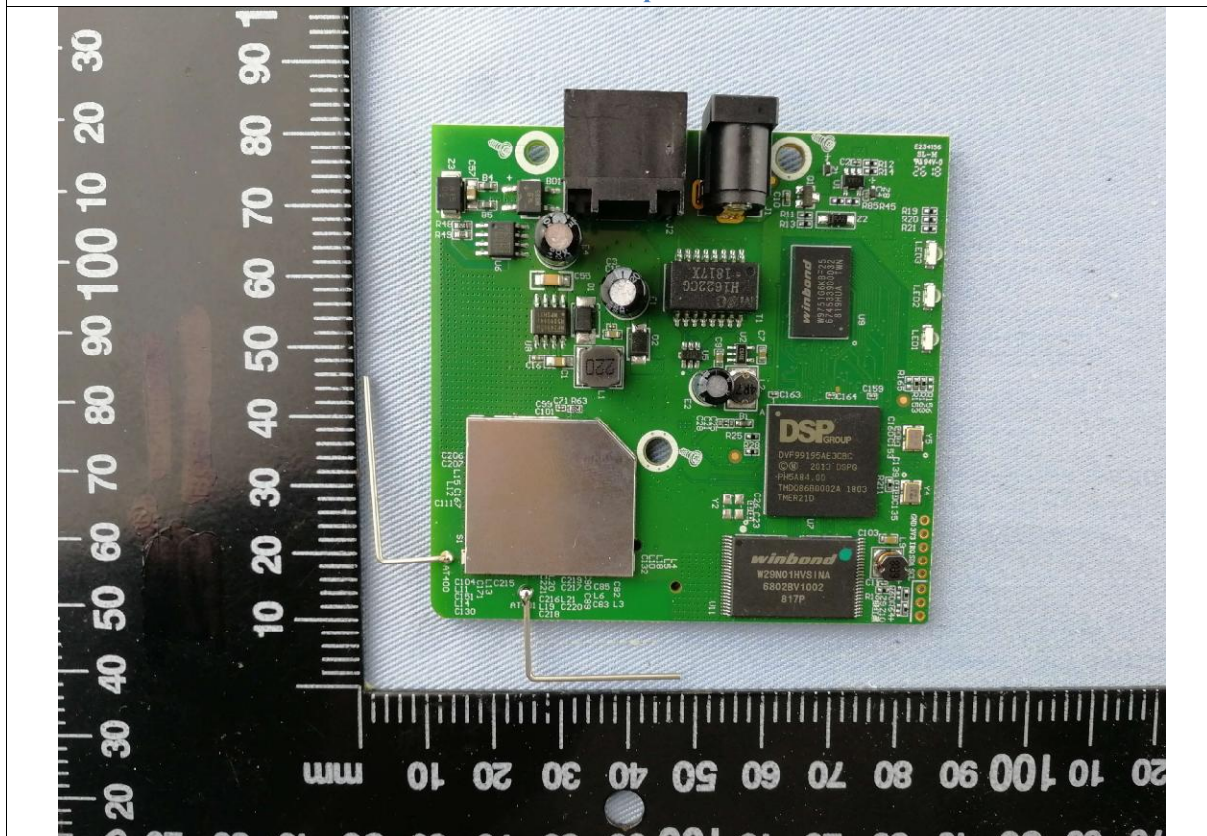




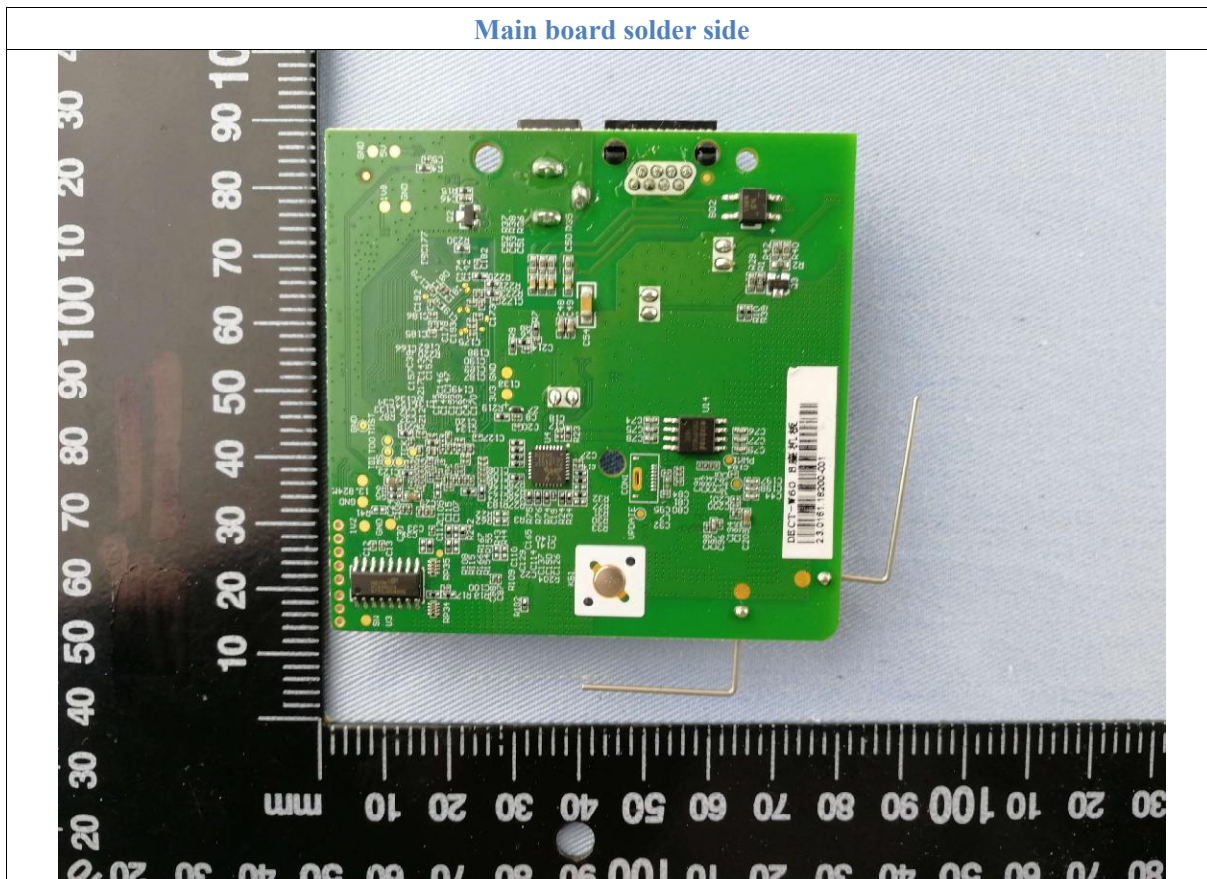
EUT inside whole view



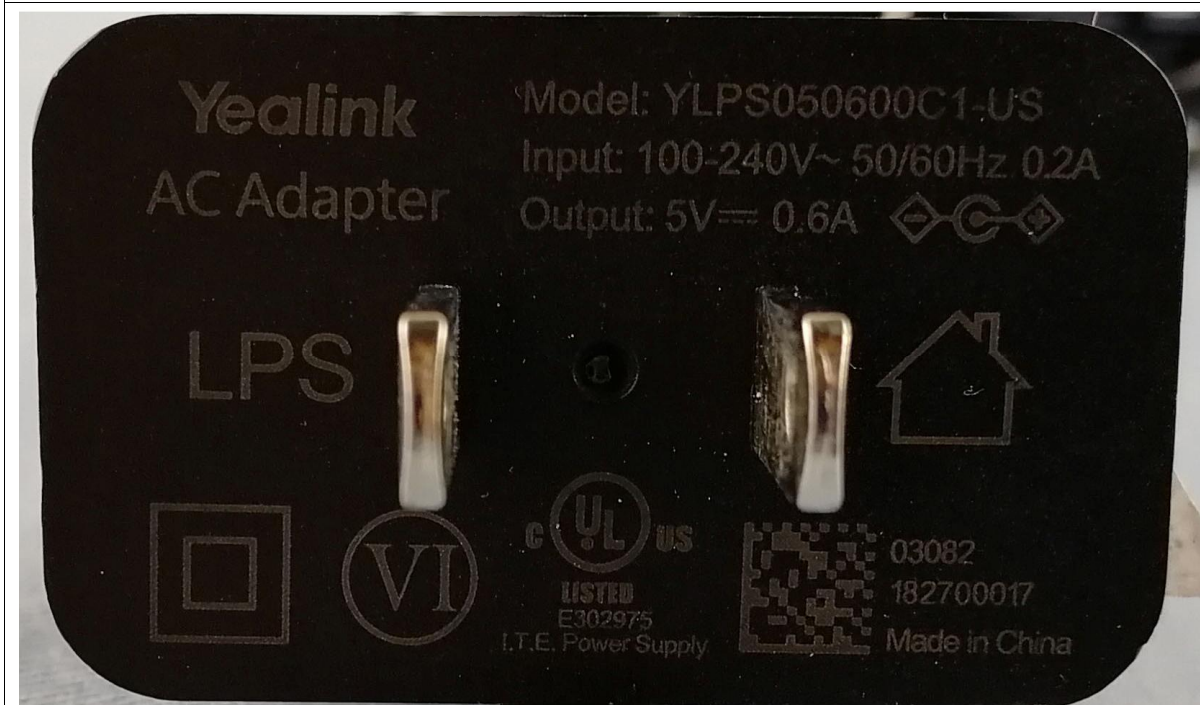
Main board component side



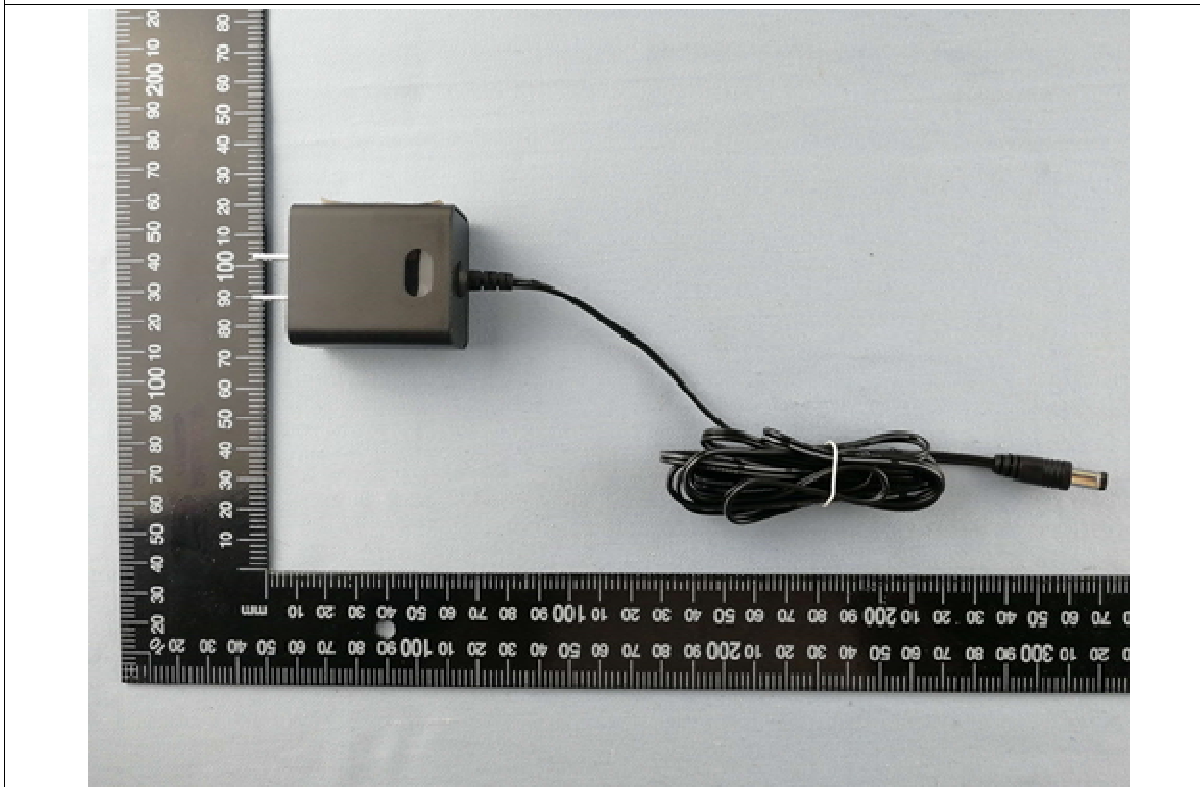
Main board solder side



FCC Adapter top view



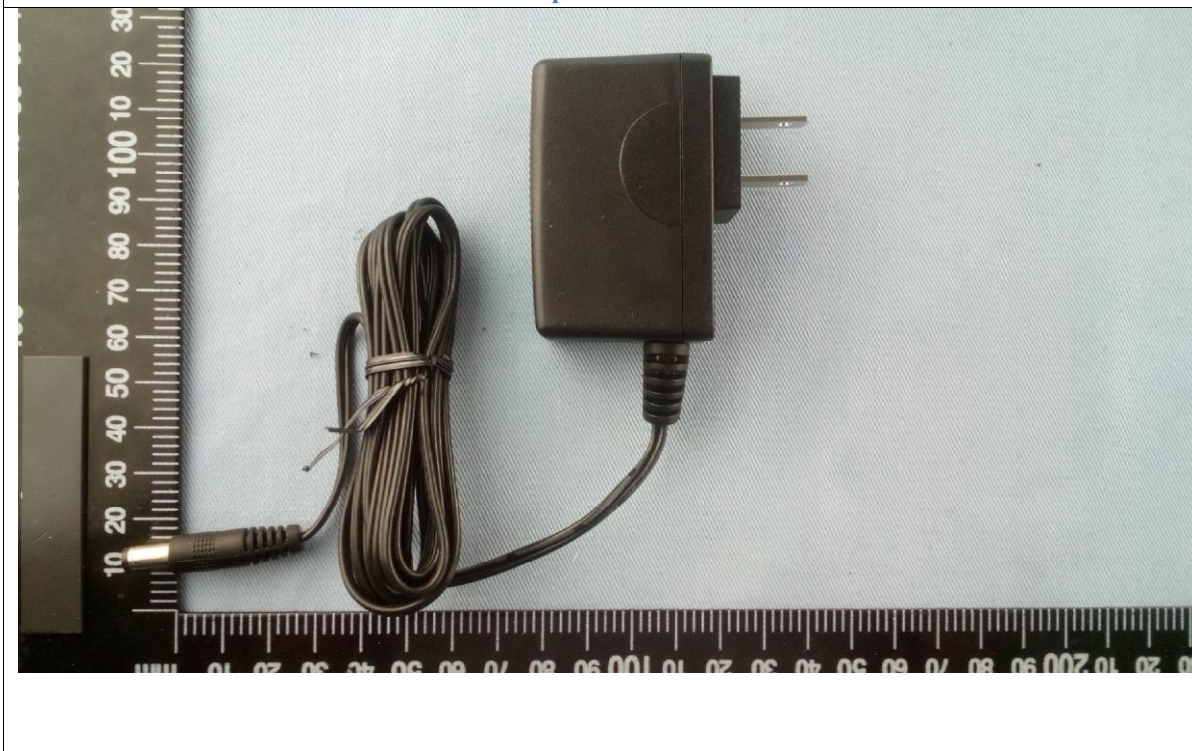
Adapter side view



FCC Adapter top view



Adapter side view



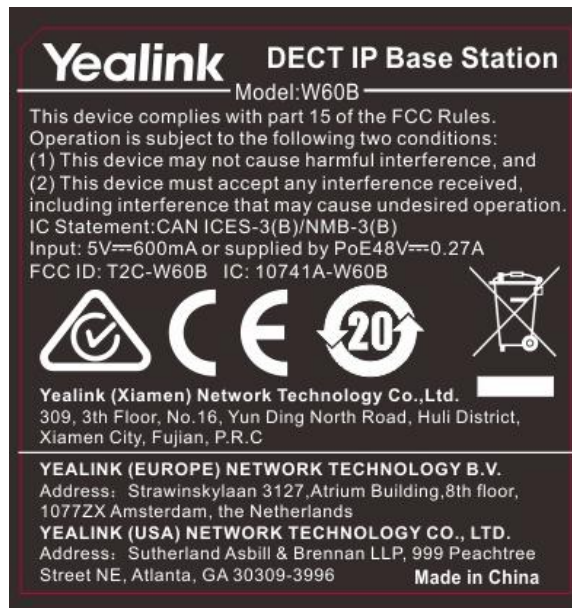
FCC Adapter top view



Adapter side view



5. 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.



6. 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
Pre-Amplifier	Com-Power	PAM-840	N/A	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
ISN	SCHWARZBECK	NTFM 8158 CAT3	CAT3-8158-001 0	Dec.25, 2017	Dec.25, 2019
ISN	SCHWARZBECK	NTFM 8158 CAT5	CAT5-8158-000 9	Dec.25, 2017	Dec.25, 2019
ISN	SCHWARZBECK	NTFM 8158 CAT6	CAT6-8158-001 2	Dec.25, 2017	Dec.25, 2019
KMO Shielded Room	KMO	KMO-001	N/A	NCR	NCR
Coaxial Cable with N-Connectors	SCHWARZBECK	AK9515H	95549	Sep.18, 2017	Sep.18, 2019
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
Temperature Chamber	TABAI	PSL-4GTW	N/A	Feb.10, 2017	Feb.10, 2019