EMC TEST REPORT

On Behalf of

SHENZHEN WALE GROUP CO., LTD

WiFi Temperature Humidity Sensor

Model No.: TH02

Prepared for	:	SHENZHEN WALE GROUP CO., LTD
Address	:	5/F, BLDG2, NO.5, TIANHUA ROAD, XINXIA AVENUE PINGHU, LONGGANG, SHENZHEN

Prepared By	:	Shenzhen Alpha Product Testing Co., Ltd.
Address	:	Building i, No.2, Lixin Road, Fuyong Street, Bao'an District, 518103, Shenzhen, Guangdong, China

Report Number	:	A2206159-C01-R04
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Date of Report	:	July 29, 2022
Version Number	:	V0

TABLE OF CONTENTS

Description Page

TEST REPORT DECLARATION

Applicant	:	SHENZHEN WALE GROUP CO., LTD
Address	:	5/F, BLDG2, NO.5, TIANHUA ROAD, XINXIA AVENUE PINGHU, LONGGANG, SHENZHEN
Manufacturer	:	SHENZHEN WALE GROUP CO., LTD
Address	:	5/F, BLDG2, NO.5, TIANHUA ROAD, XINXIA AVENUE PINGHU, LONGGANG, SHENZHEN
EUT Description	:	WiFi Temperature Humidity Sensor
		(A) Model No. : TH02
		(B) Trademark : N/A

Measurement Standard Used:

ETSI EN 301 489-1 V2.2.3:2019

ETSI EN 301 489-17 V3.2.4:2020

The device described above is tested by Shenzhen Alpha Product Testing Co., Ltd. to determine the maximum emission levels emanating from the device and the severe levels of the device can endure and its performance criterion. The test results are contained in this test report and Shenzhen Alpha Product Testing Co., Ltd. is assumed full responsibility for the accuracy and completeness of test. Also, this report shows that the EUT is technically compliant with the EN 301 489-1 and EN 301 489-17 requirements.

This report applies to above tested sample only. This report shall not be reproduced in parts without written approval of Shenzhen Alpha Product Testing Co., Ltd.

Tested by (name + signature).....…..: Yannis Wen
Project Engineer

Approved by (name + signature)…....: Jack Xu
Project Manager

Date of issue…… ……..: July 29, 2022

Revision History

Revision	Issue Date	Revisions	Revised By
V0	July 29, 2022	Initial released Issue	Yannis Wen

1. General Information

1.1. Description of Device (EUT)

EUT Name	:	WiFi Temperature Humidity Sensor
Trademark	:	N/A
Model No.	:	TH02
DIFF.	:	N/A
Power supply		DC 3V from battery
2.4G WIFI	:	
Operation frequency	:	2412MHz-2472MHz for IEEE 802.11 b, g. n/HT20
Channel No.	:	802.11b/802.11g /802.11n(HT20): 13CH
Modulation type	:	IEEE 802.11b: DSSS(CCK,DQPSK,DBPSK) IEEE 802.11g: OFDM(64QAM, 16QAM, QPSK, BPSK) IEEE 802.11n :OFDM(64QAM, 16QAM, QPSK, BPSK)
Antenna Type	:	Internal antenna, Maximum Gain is 1dBi
	:	
Software version	:	V1.0
Hardware version	:	94V-0
Intend use environment	:	Residential, commercial and light industrial environment

1.2. Accessories of Device (EUT)

Accessories1 : /
Manufacturer : /
Model : /
INPUT : /
OUTPUT : /

1.3. Ancillary Equipment Details

No.	Description	Manufacturer	Model	Serial Number	Certification or SDOC
1.	Notebook PC	Lenovo	ThinkPad E14	N/A	**SDOC**

1.4. Test Lab Information

Shenzhen Alpha Product Testing Co., Ltd
Building i, No.2, Lixin Road, Fuyong Street, Bao'an District, 518103,
Shenzhen, Guangdong, China

2. Summary of Measurement

2.1. Test Standard Description

ETSI EN 301 489-1 V2.2.3 ElectroMagnetic Compatibility (EMC) standard for radio equipment and services; Part 1: Common technical requirements; Harmonised Standard covering the essential requirements of article 3.1(b) of Directive 2014/53/EU and the essential requirements of article 6 of Directive 2014/30/EU

ETSI EN 301 489-17 V3.2.4 ElectroMagnetic Compatibility (EMC) standard for radio equipment and services; Part 17: Specific conditions for Broadband Data Transmission Systems; Harmonised Standard for ElectroMagnetic Compatibility.

2.2. Performance criteria description

According to EN 301 489 -17 standard, the general performance criteria as following:

The performance criteria are:

• performance criteria A for immunity tests with phenomena of a continuous nature;

• performance criteria B for immunity tests with phenomena of a transient nature;

• performance criteria C for immunity tests with power interruptions exceeding a certain time.

The equipment shall meet the minimum performance criteria as specified in the following clauses.

Performance criteria overview

Criteria	During test	After test (i.e. as a result of the application of the test)
A	Shall operate as intended. (See note). Shall be no loss of function. Shall be no unintentional transmissions.	Shall operate as intended. Shall be no degradation of performance. Shall be no loss of function. Shall be no loss of critical stored data.
B	May be loss of function.	Functions shall be self-recoverable. Shall operate as intended after recovering. Shall be no loss of critical stored data.
C	May be loss of function.	Functions shall be recoverable by the operator. Shall operate as intended after recovering. Shall be no loss of critical stored data.
NOTE: Operate as intended during the test allows a level of degradation in accordance with clause 6.2.2.		

Minimum performance level

For equipment that supports a PER or FER, the minimum performance level shall be a PER or FER less than or equal to 10 %.

For equipment that does not support a PER or a FER, the minimum performance level shall be no loss of the wireless transmission function needed for the intended use of the equipment.

Performance criteria for Continuous phenomena

The performance criteria A shall apply.

Where the EUT is a transmitter in standby mode, unintentional transmission shall not occur during the test.

Where the EUT is a transceiver in receive mode, unintentional transmission shall not occur during the test.

Performance criteria for Transient phenomena

The performance criteria B shall apply, except for voltage dips greater than or equal to 100 ms and voltage interruptions of 5 000 ms duration, for which performance criteria C shall apply.

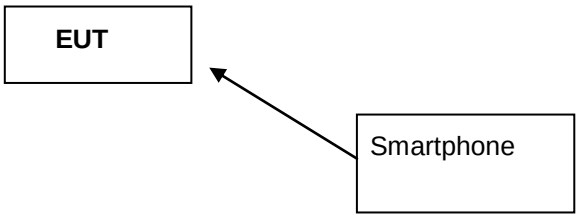
Where the EUT is a transmitter in standby mode, unintentional transmission shall not occur as a result of the application of the test.

Where the EUT is a transceiver in receive mode, unintentional transmission shall not occur as a result of the application
of the test.

2.3. Summary of test result

No.	Test Parameter	Application	Results
EMC emission			
1	Radiated emission	Enclosure of ancillary equipment	PASS
2	Conducted emission	DC power input/output port	N/A
3	Conducted emission	AC mains input/output port	N/A
4	Harmonic Current Emissions	AC mains input port	N/A
5	Voltage Fluctuation & Flicker	AC mains input port	N/A
6	Conducted emission	Telecommunication port	N/A
Immunity			
7	RF electromagnetic field	Enclosure	PASS
8	Electrostatic Discharge	Enclosure	PASS
9	Fast transients common mode	Signal, telecommunication and control ports, DC and AC power ports	N/A
10	RF Common mode	Signal, telecommunication and control ports, DC and AC power ports	N/A
11	Transients and Surges	DC power input ports for vehicular use	N/A
12	Voltage dips and interruptions	AC mains power input ports	N/A
13	Surges, line to line and line to ground	AC mains power input ports, wired network ports	N/A
Note: N/A means this test item is not applicable for this device. Cause EUT belongs to portable Equipment, so test items reference to ETSI EN 301 489-1 V2.2.3 Clause 7.1 and 7.2			

2.4. Block Diagram of Configuration for test



2.5. Test mode

Number	Test mode	Radiated emission	Conducted emission	Harmonic Current Emissions	Voltage Fluctuation & Flicker
Mode 1	2.4g wifi	※	/	/	/
	Note: 1: ※ is worst case mode. 2. EMS test items are required for all modes.				

2.6. Test Conditions

Items	Required
Temperature range	21-25℃
Humidity range	30-60%
Pressure range	86-106kPa

2.7. Measurement Uncertainty (95% confidence levels, k=2)

Item	MU	Remark
Uncertainty for Conducted Emission Test	1.63dB	
Uncertainty for Radiation Emission test in 3m chamber (30MHz to 1GHz)	3.74 dB	Polarize: V
	3.76 dB	Polarize: H
Uncertainty for Radiation Emission test in 3m chamber (1GHz to 25GHz)	3.77 dB	Polarize: H
	3.80 dB	Polarize: V
Uncertainty for radio frequency	5.06×10^{-8}GHz	
Uncertainty for conducted RF Power	0.40dB	

2.8. Test Equipment

Equipment	Manufacturer	Model No.	Firmware version	Serial No.	Last Cal.	Cal. Due day
Test Receiver	ROHDE&SCHWARZ	ESCI	4.42 SP1	101165	2021.08.25	2022.08.24
Test Receiver	ROHDE&SCHWARZ	ESR	2.28 SP1	1316.3003K03-102082-Wa	2021.08.25	2022.08.24
Loop Antenna	SCHWARZBECK	FMZB 1519B	/	00128	2021.08.30	2023.08.29
Bilog Antenna	Schwarzbeck	VULB 9168	/	9168-627	2021.08.30	2023.08.29
Spectrum analyzer	SCHWARZBECK	FSV40-N	2.3	102137	2021.08.25	2022.08.24
Spectrum analyzer	SCHWARZBECK	FSU	4.71.SP5	200002	2021.08.25	2022.08.24
Amplifier	HP	HP8347A	/	2834A00455	2021.08.25	2022.08.24
Amplifier	Agilent	8449B	/	3008A02664	2021.08.25	2022.08.24
Horn Antenna	Schwarzbeck	BBHA 9120 D	/	2106	2021.08.30	2023.08.29
L.I.S.N.#1	Schwarzbeck	NSLK8126	/	8126-466	2021.08.25	2022.08.24
L.I.S.N.#2	ROHDE&SCHWARZ	ENV216	/	101043	2021.08.25	2022.08.24
Pulse Limiter	Schwarzbeck	9516F	/	9618	2021.08.25	2022.08.24
ESD Tester	HAEFELY	PESD1610	/	H310546	2021.08.25	2022.08.24
Fixed Coaxial Attenuator (6dB Attenuation)	CD	ATT-0675	/	120540086	2021.08.25	2022.08.24
Coupling-Decoupling Network (CDN)	CD	CDN M2/M3	/	2302	2021.08.25	2022.08.24
Electromagnetic Injection Clamp (EMC-Clamp)	CD	EM-Clamp	/	0513A031201	2021.08.25	2022.08.24
Multifunctional Compact Immunity Test system	3ctest	CCS 600	CCS V4.0.9	ES0801655	2021.08.27	2022.08.26
Main Interference Simulator	3ctest	VDG-1105G	/	EC0171002	2021.08.25	2022.08.24
Burst Tester	3ctest	EFT-4001G	/	EC0461015	2021.08.25	2022.08.24
Capacitive Coupling	3ctest	EFTC	/	EC0441049	2021.08.25	2022.08.24
Surge CDN	3ctest	SGN-5010G	/	EC5591004	2021.08.25	2022.08.24
Surge Generator	3ctest	SG-5006G	/	EC5581006	2021.08.25	2022.08.24
Conducted Immunity test System	SKET	CITS_150K230M	/	SK2019101001_CITS	2021.08.25	2022.08.24

Universal Radio Communication Tester	ROHDE&SCHWARZ	CMU200	V5.21	116785	2021.08.25	2022.08.24
Signal Generator	Agilent	N5182A	/	MY49060042	2021.08.25	2022.08.24
Vector Signal Generator	Agilent	E4438C	/	US44271917	2021.08.25	2022.08.24
Power meter	Agilent	E4419B	/	GB40202122	2021.08.25	2022.08.24
Power Sensor	Agilent	E9300A	/	MY41496628	2021.08.25	2022.08.24
RF power Amplifier	OPHIR	5225R	/	1045	2021.08.25	2022.08.24
RF power Amplifier	OPHIR	5273R	/	1018	2021.08.25	2022.08.24
Antenna	SCHWARZBECK	STLP9128E-special	/	STLP9128Es#139	N/A	N/A
Antenna	SCHWARZBECK	STLP9128E-special	/	STLP 9149 #456	N/A	N/A
CMW500	ROHDE&SCHWARZ	CMW500	V 3.7.22	1201.0002K50-117239-sM	2021.08.25	2022.08.24

Software Information			
Test Item	Software Name	Manufacturer	Version
RE	EZ-EMC	farad	Alpha-3A1
CE	EZ-EMC	farad	Alpha-3A1

3. Conducted emission

3.1. Limit for AC mains port

Frequency	Quasi-Peak Level dB (μV)	Average Level dB (μV)
150kHz ~ 500kHz	66 ~ 56*	56 ~ 46*
500kHz ~ 5MHz	56	46
5MHz ~ 30MHz	60	50

Notes: 1. * Decreasing linearly with logarithm of frequency.

2. The lower limit shall apply at the transition frequencies.

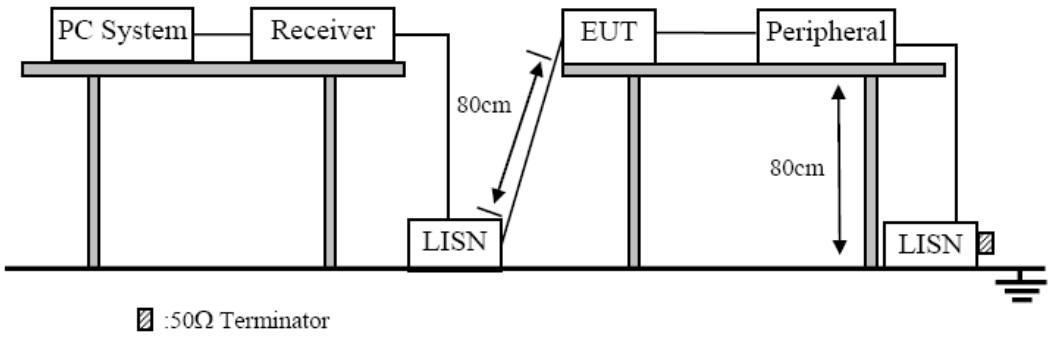
3.2. Test Procedure

The EUT was placed on a non-metallic table, 80cm above the ground plane. The EUT was power charged from notebook which powered from power mains through a line impedance stabilization network (L.I.S.N. 1#). This provided a 50-ohm coupling impedance for the EUT (Please refer to the block diagram of the test setup and photographs). The other peripheral devices power cord connected to the power mains through a line impedance stabilization network (L.I.S.N.3#). Both sides of power line were checked for maximum conducted interference. In order to find the maximum emission, the relative positions of equipments and all of the interface cables were changed according to the EN55032 regulations during conducted emission test.

The bandwidth of the test receiver (R&S Test Receiver ESCI) is set at 9kHz.

The frequency range from 150kHz to 30MHz is checked. The test result are reported on Section 3.6

3.3. Test Setup



3.4. Operation condition of EUT

1, Setup the EUT and the simulators as shown on Section 3.3

2, Turned on the power of all equipments.

3, EUT transmit though EUT and notebook.

3.5. Test Result

Not applicable for equipment operated with PC, battery, or DC Power Supply.

4. Radiated emission

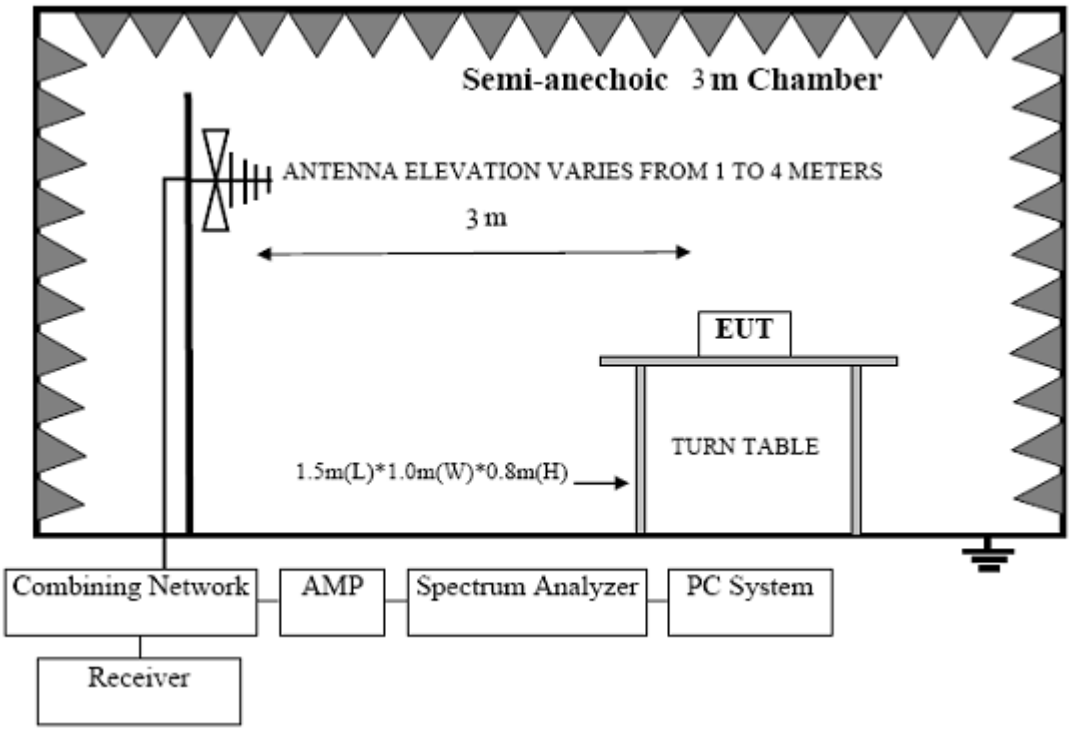
4.1. Limit

FREQUENCY (MHz)	DISTANCE (Meters)	FIELD STRENGTHS LIMITS (dBμV/m)
30 ~ 230	3	40
230 ~ 1000	3	47
1000-3000	3	Average limit:50 Peak limit:70
3000-6000	3	Average limit:54 Peak limit:74

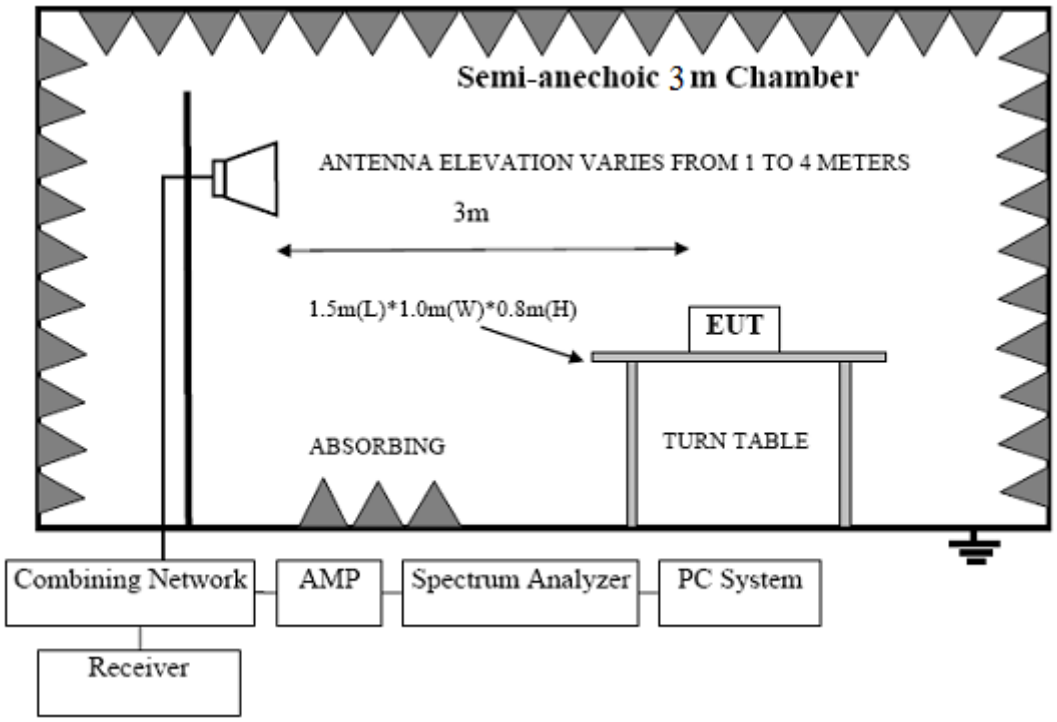
Note: The lower limit shall apply at the transition frequencies.

4.2. Test setup

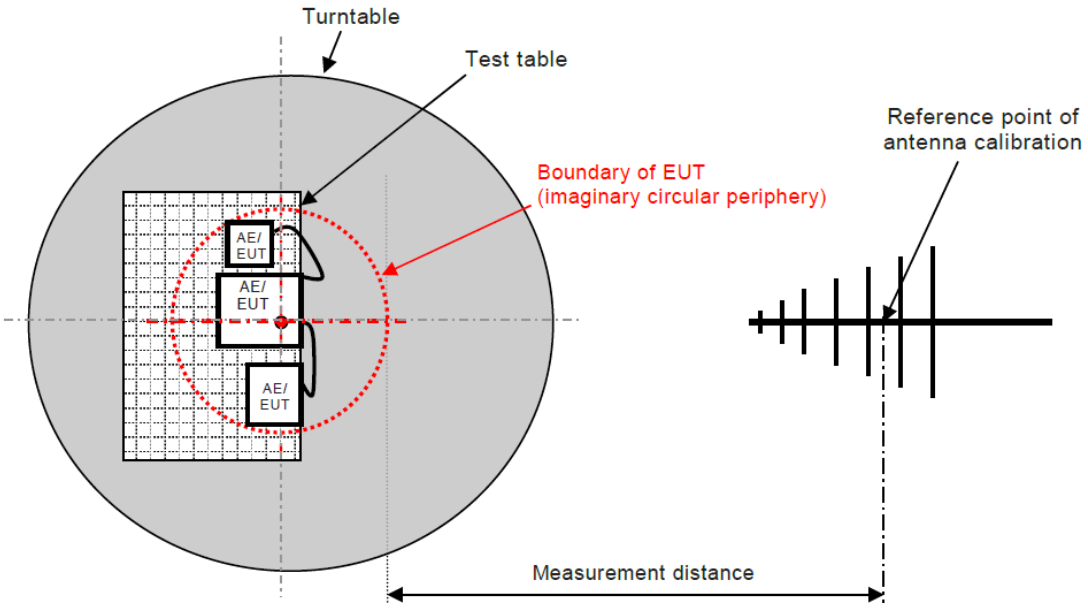
Semi Anechoic Chamber (3m) Test Setup Diagram for Below 1GHz



Semi Anechoic Chamber (3m) Test Setup Diagram for Above 1GHz



For 3m distance description:



4.3. Test Procedure

The EUT was placed on a non-metallic table, 80cm above the ground plane inside a semi-anechoic chamber. An antenna was located 10m from the EUT for below 1GHz test and 3m for above 1GHz test on an adjustable mast. A pre-scan was first performed in order to find prominent radiated emissions. For final emissions measurements at each frequency of interest, the EUT were rotated and the antenna height was varied between 1m and 4m in order to maximize the emission. Measurements in both horizontal and vertical polarities were made and the data was recorded. In order to find the maximum emission, the relative positions of equipments and all of the interface cables were changed according to EN 55032 Class B on Radiated Disturbance test.

The bandwidth setting on the test receiver (R&S TEST RECEIVER ESR) is 120 kHz for below 1GHz test. For emission above 1GHz, The Spectrum's RWB is set 1MHz and VBW 1MHz to measure Peak Level.

4.4. Operation condition of EUT

1, Setup the EUT and the simulators as shown on Section 4.2

2, Turned on the power of all equipments.

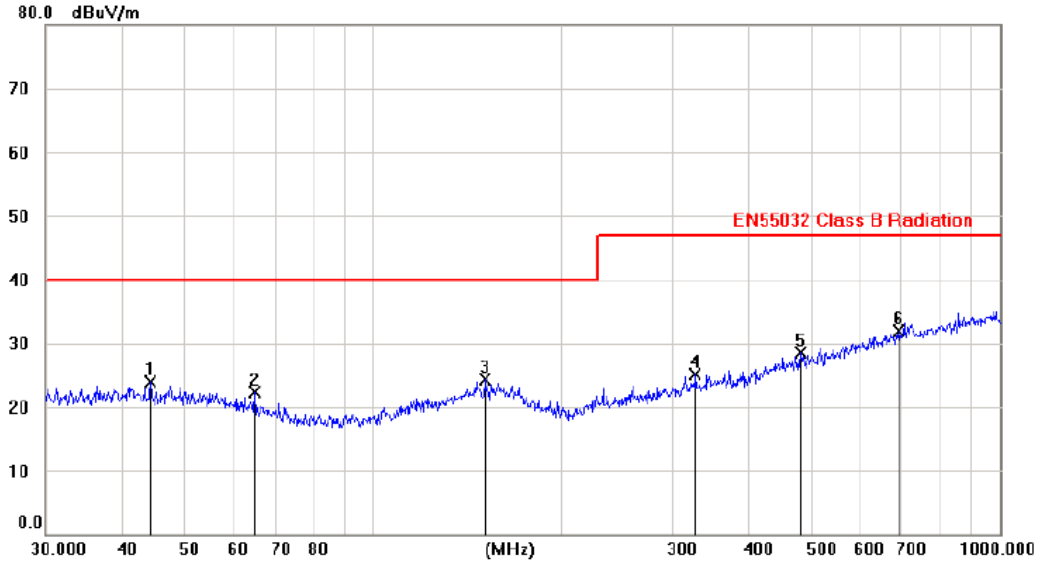
3, EUT transmit though EUT and notebook.

4.5. Test result

See below original test data.

For 30MHz-1000MHz :

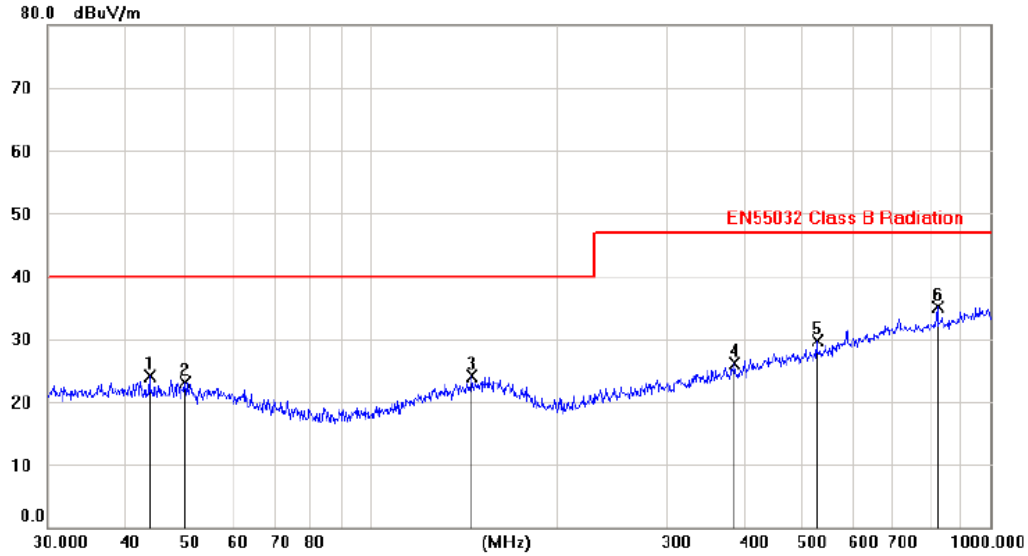
Horizontal :



No.	Mk.	Freq.	Reading Level	Correct Factor	Measure-ment	Limit	Margin		Antenna Height	Table Degree	
		MHz	dBuV	dB	dBuV/m	dBuV/m	dB	Detector	cm	degree	Comment
1		44.2080	9.79	14.20	23.99	40.00	-16.01	peak			
2		64.7956	10.16	12.22	22.38	40.00	-17.62	peak			
3		151.0666	9.23	15.06	24.29	40.00	-15.71	peak			
4		327.3894	10.41	14.77	25.18	47.00	-21.82	peak			
5		480.9209	10.46	17.96	28.42	47.00	-18.58	peak			
6	*	691.1783	10.27	21.56	31.83	47.00	-15.17	peak			

Note:1. *:Maximum data; x:Over limit; !:over margin.
2.Measurement=Reading Level+Correct Factor; Correct Factor=Antenna Factor+Cable Loss.

Vertical:



No.	Mk.	Freq.	Reading Level	Correct Factor	Measure-ment	Limit	Margin		Antenna Height	Table Degree	
		MHz	dBuV	dB	dBuV/m	dBuV/m	dB	Detector	cm	degree	Comment
1		43.8734	9.78	14.23	24.01	40.00	-15.99	peak			
2		50.1210	9.05	14.02	23.07	40.00	-16.93	peak			
3		145.7928	9.41	14.75	24.16	40.00	-15.84	peak			
4		386.8146	9.99	16.03	26.02	47.00	-20.98	peak			
5		525.6589	10.88	18.75	29.63	47.00	-17.37	peak			
6	*	823.8261	11.87	23.16	35.03	47.00	-11.97	peak			

Note:1. *:Maximum data; x:Over limit; !:over margin.
2.Measurement=Reading Level+Correct Factor; Correct Factor=Antenna Factor+Cable Loss.

Note: 1. The test voltage is DC 3V from battery, All modes have been tested, and only worst data was listed in this report.(2.4g wifi)

2. For 1-6GHz results are 20dB lower against the limit, so they are not shown in this report.

5. Harmonic current emissions

5.1. Test Procedure

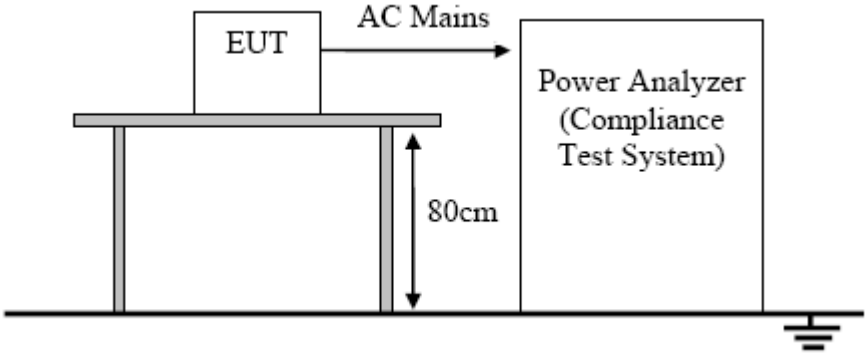
The EUT was placed on a non-metallic table, 80cm above the ground plane. The EUT was powered from notebook which's power was connected to the power mains through a power Analyzer, let EUT worked in test mode then measure Harmonic current emissions by power analyzer and recorded data.

5.2. Limit

Limits for Class A equipment	
Harmonic order **n**	**Maximum permissible Harmonic current** **A**
Odd harmonics	
3 5 7 9 11 13 15≤n≤39	2,30 1,14 0,77 0,40 0,33 0,21 $0{,}15\ \frac{15}{n}$
Even harmonics	
2 4 6 8≤n≤40	1,08 0,43 0,30 $0{,}23\ \frac{8}{n}$

Remark: if the EUT Power level is below 75 Watts and therefore has no defined limits.

5.3. Test setup



5.4. Operation condition of EUT

1, Setup the EUT and the simulators as shown on Section 5.3

2, Turned on the power of all equipments.

3, EUT transmit data with notebook

5.5. Test Result

Not applicable for equipment operated with PC, battery, or DC Power Supply.

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6. Voltage fluctuations and flicker

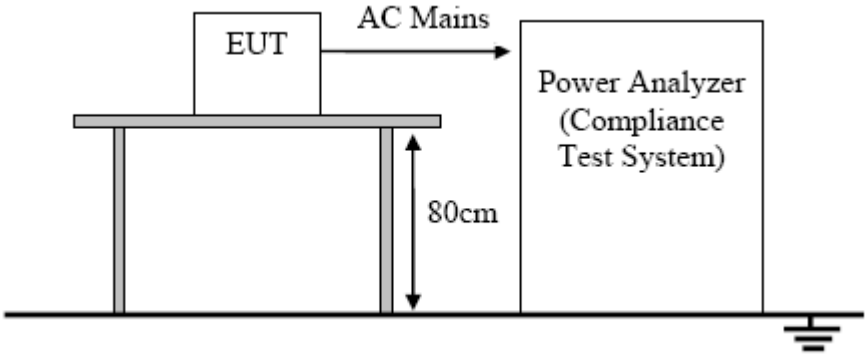
6.1. Test Procedure

The EUT was placed on a non-metallic table, 80cm above the ground plane. The EUT was powered from notebook which's power through a power Analyzer, let EUT worked in test mode then measure voltage fluctuations and flicker by power analyzer and recorded data.

6.2. Limit

Test Item	Limit	Note
P_{st}	1.0	P_{st} means Short-term flicker indicator
P_{lt}	0.65	P_{lt} means long-term flicker indicator
T_{dt}	0.2	T_{dt} means maximum time that dt exceeds 3%
d_{max}(%)	4%	d_{max} means maximum relative voltage change.
d_c(%)	3%	d_c means relative steady-state voltage change.

6.3. Test setup



6.4. Operation condition of EUT

1, Setup the EUT and the simulators as shown on Section 6.3

2, Turned on the power of all equipments.

3, EUT transmit data with notebook

6.5. Test Result

Not applicable for equipment operated with PC, battery, or DC Power Supply.

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7. RF electromagnetic field

7.1. Lest levels and Performance Criteria

Test Level		Performance Criteria
Frequency	80MHz-6000MHz	**A**
Field Strength	3V/m measured unmodulated	
Modulation	AM modulated to a depth of 80% by a sinusoidal audio signal of 1KHz(Note)	
Step Size	1% increments	
Dwell time	1 Sec.	

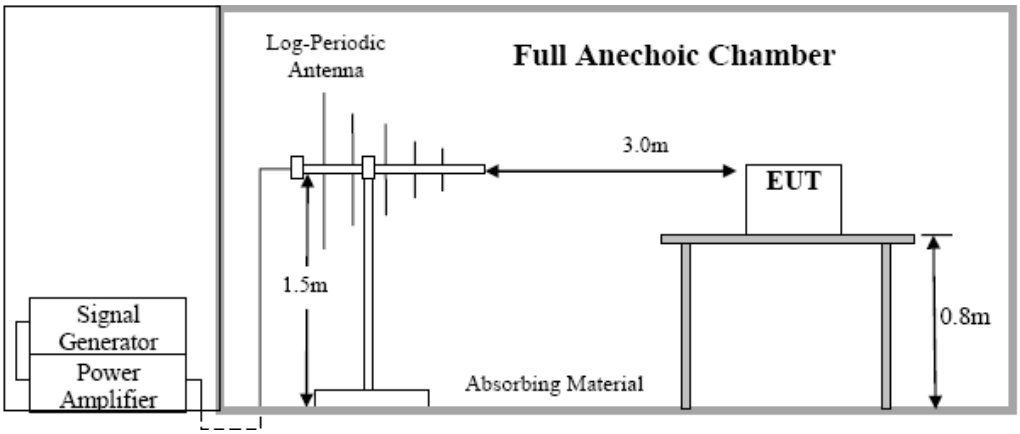
7.2. Test Procedure

The field sensor is placed on the EUT table (0.8 meter above the ground) which is 3 meters away from the transmitting antenna. Through the signal generator, power amplifier and transmitting antenna to produce a uniformity field strength (3V/m measured by field sensor) around the EUT table from frequency range specified and records the signal generator‘s output level at the same time for whole measured frequency range. Then, put EUT and its simulators on the EUT turn table and keep them 3 meters away from the transmitting antenna which is mounted on an antenna tower and fixes at 1 meter height above the ground. Using the recorded signal generator’s output level to measure the EUT from frequency range specified and both horizontal & vertical polarization of antenna must be set and measured. Each of the four sides of EUT must be faced this transmitting antenna and measures individually.

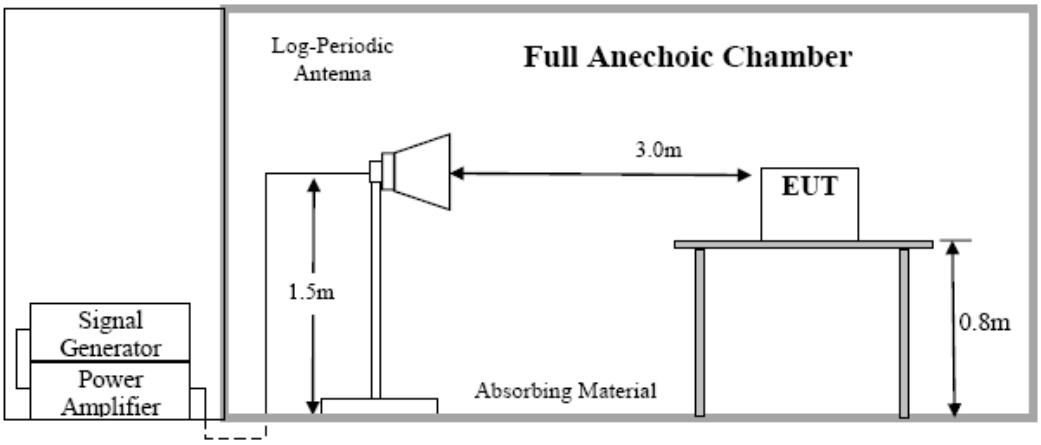
Set EUT in idle mode and repeated test with a receive antenna connected to a spectrum analyzer to see if there was unintentional transmissions happened.

7.3. Test setup

For frequency from 80MHz to 1GHz



Frequency For 1-6GHz



7.4. Operation condition of EUT

1, Setup the EUT and the simulators as shown on Section 7.3

2, Turned on the power of all equipments.

3, EUT transmit data with notebook

7.5. Test Result

EUT Position	Antenna	R.F. Field Strength	Test frequency	Observation	Perform. Criteria	Conclusion
Front	H/V	3 V/m (rms) AM Modulated 1000Hz, 80%	80-1000MHz/ 1000-6000MHz	A	A	PASS
Right	H/V				A	PASS
Rear	H/V				A	PASS
Left	H/V				A	PASS
Note: The minimum performance level per is less than 10%.						

8. Electrostatic discharge

8.1. Test level and Performance Criteria

Test Level		Performance Criteria
Air Discharge	±2kV, ±4kV and ±8kV	B
Contact Discharge	±2kV and ±4kV	

8.2. Test Procedure

Air discharge:

The test was applied on non-conductive surfaces of EUT. The round discharge tip of the discharge electrode was approached as fast as possible to touch the EUT. After each discharge, the discharge electrode was removed from the EUT. The generator was re-triggered for a new single discharge and repeated 20 times for each pre-selected test point. This procedure was repeated until all the air discharge completed

Contact Discharge:

All the procedure was same as air discharge. except that the generator was re-triggered for a new single discharge and repeated 50 times for each pre-selected test point. The tip of the discharge electrode was touching the EUT before the discharge switch was operated.

Indirect discharge for horizontal coupling plane

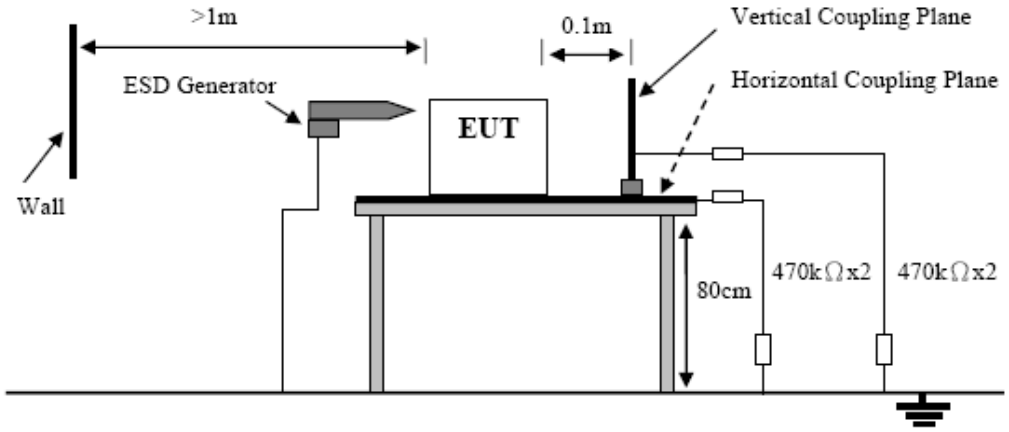
At least 20 single discharges were applied to the horizontal coupling plane, at points on each side of the EUT. The discharge electrode positions vertically at a distance of 0.1m from the EUT and with the discharge electrode touching the coupling plane.

Indirect discharge for vertical coupling plane

At least 20 single discharges were applied to the center of one vertical edge of the coupling plane. The coupling plane, of dimensions 0.5m X 0.5m, was placed parallel to, and positioned at a distance of 0.1m from the EUT. Discharges were applied to the coupling plane, with this plane in sufficient different positions that the four faces of the EUT are completely illuminated.

Set EUT in idle mode and repeated test with a receive antenna connected to a spectrum analyzer to see if there was unintentional transmissions happened.

8.3. Test setup



8.4. Test Result

Discharge Voltage (kV)	Type of discharge	Dischargeable Points	Observation	Perform. Criteria	Conclusion
±2	Contact	/	/	B	/
±4	Contact	/	/	B	/
±2	Air	1,2,3	A	B	PASS
±4	Air	1,2	A	B	PASS
±8	Air	1,2	A	B	PASS
±2	HCP-Bottom	Edge of the HCP	A	B	PASS
±2	VCP-Front	Center of the VCP	A	B	PASS
±2	VCP-Left	Center of the VCP	A	B	PASS
±2	VCP-Back	Center of the VCP	A	B	PASS
±2	VCP-Right	Center of the VCP	A	B	PASS
±4	HCP-Bottom	Edge of the HCP	A	B	PASS
±4	VCP-Front	Center of the VCP	A	B	PASS
±4	VCP-Left	Center of the VCP	A	B	PASS
±4	VCP-Back	Center of the VCP	A	B	PASS
±4	VCP-Right	Center of the VCP	A	B	PASS
Operation as intend, no loss of function during test and after test.					
Note: The minimum performance level per is less than 10%.					
Discharge Points Description					
1	Gap		2	LED Light	

9. Fast transients test

9.1. Lest levels and Performance Criteria

Test Level		Performance Criteria
Test voltage	1KV For AC mains Port	B
	0.5KV for wired network ports	
Repetition Frequency	5KHz	
Burst Duration	15ms	
Burst Period	300ms	
Inject Time(s)	120s	
Inject Method	Direct For AC mains port	
	Couple for wired network ports	
Inject Line	AC Mains of adapter and wired network ports	

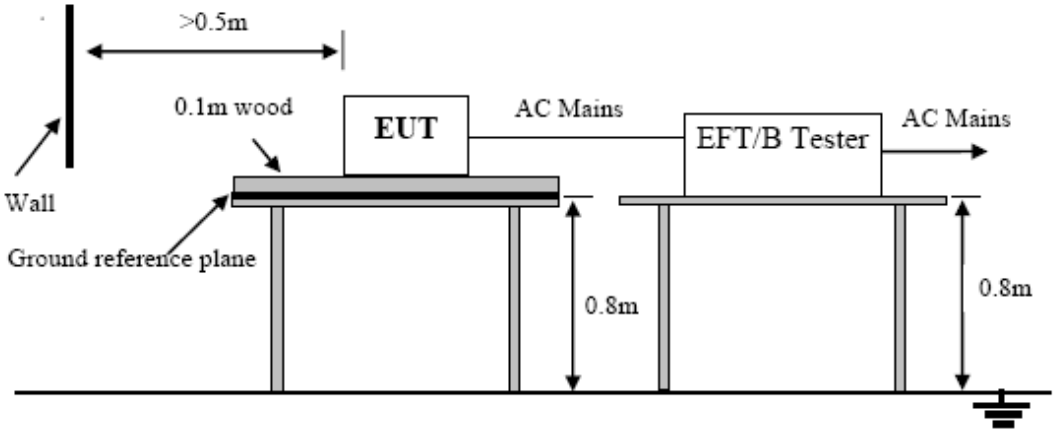
9.2. Test Procedure

The EUT and its simulators were placed on the ground reference plane and were insulated from it by a wood support 0.1m $\pm$ 0.01m thick. The ground reference plane was 1m*1m metallic sheet with 0.65mm minimum thickness. This reference ground plane was project beyond the EUT by at least 0.1m on all sides and the minimum distance between EUT and all other conductive structure, except the ground plane was more than 0.5m. All cables to the EUT was placed on the wood support, cables not subject to EFT/B was routed as far as possible from the cable under test to minimize the coupling between the cables.

The EUT was powered from notebook which powered from power mains by using a coupling device that couples the EFT interference signal to AC power lines. Both positive transients and negative transients of test voltage were applied during compliance test and the duration of the test can't less than 1min.

Set EUT in idle mode and repeated test with a receive antenna connected to a spectrum analyzer to see if there was unintentional transmissions happened.

9.3. Test setup



9.4. Test Result

Not applicable for equipment operated with PC, battery, or DC Power Supply.

10. Injection current test

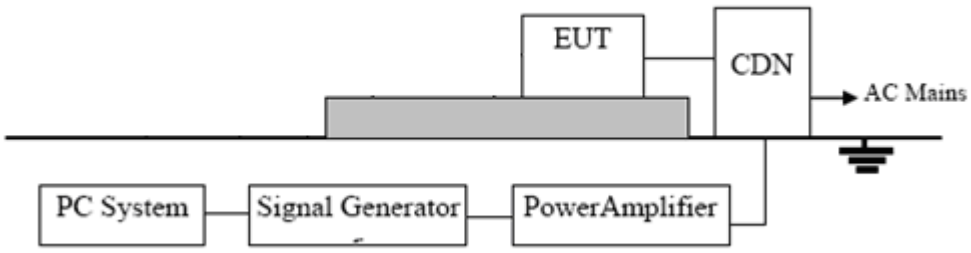
10.1. Test level and Performance Criteria

Test Level				Performance Criteria
Frequency	0.15-10.00MHz	10.00-30.00MHz	30.00-80.00MHz	**A**
Field Strength	3V	3-1V	1V	
Modulation	AM modulated to a depth of 80% by a sinusoidal audio signal of 1KHz(Note)			
Step Size	1% increments			
Dwell time	1 Sec.			

10.2. Test Procedure

The EUT are placed on an insulating support 0.1m high above a ground reference plane.
CDN (coupling and decoupling device) is placed on the ground plane about 0.3m from EUT.
Cables between CDN and EUT are as short as possible, and their height above the ground reference plane shall be between 30 and 50 mm (where possible).
The disturbance signal described below is injected to EUT through CDN.
The EUT operates within its operational mode(s) under intended climatic conditions after power on.
The frequency range is swept from 0.150MHz to 80MHz using 3V signal level, and with the disturbance signal 80% amplitude modulated with a 400Hz sine wave.
The rate of sweep shall not exceed $1.5*10^{-3}$decades/s. Where the frequency is swept incrementally; the step size shall not exceed 1% of the start and thereafter 1% of the preceding frequency value.
Recording the EUT operating situation during compliance testing and decide the EUT immunity criterion.
Set EUT in idle mode and repeated test with a receive antenna connected to a spectrum analyzer to see if there was unintentional transmissions happened.

10.3. Test setup



10.4. Test result

Not applicable for equipment operated with PC, battery, or DC Power Supply.

11. Voltage dips and interruptions

11.1. Test level and Performance Criteria

Test Level %UT	Duration (in period)	Performance Criterion
0	0.5P	B
0	1P	B
70	25P	B
0	250P	C

11.2. Test Procedure

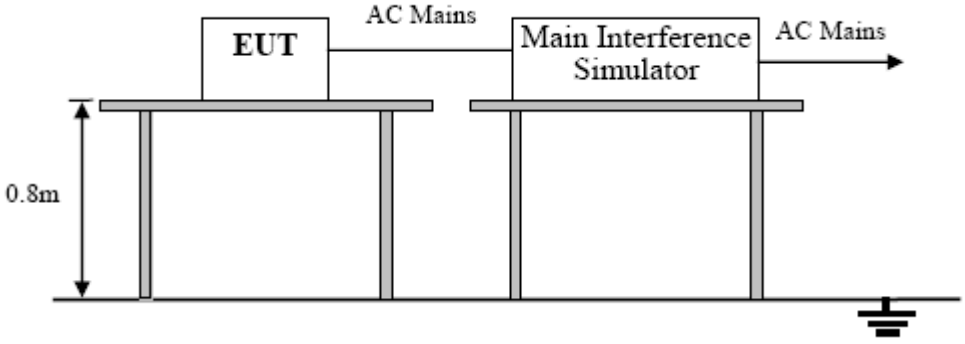
The EUT and test generator were setup as shown on Section 10.3

The interruptions are introduced at selected phase angles with specified duration.

Record any degradation of performance.

Set EUT in idle mode and repeated test with a receive antenna connected to a spectrum analyzer to see if there was unintentional transmissions happened.

11.3. Test setup



11.4. Test Result

Not applicable for equipment operated with PC, battery, or DC Power Supply.

12. Surge Test

12.1. Test level and Performance Criteria

Test level for AC mains ports		Performance Criterion
Line to Line	1KV	B
Line to ground	2KV	B
Test level for wired network ports		Performance Criterion
Line to ground	0.5KV	B

12.2. Test Procedure

Set up the EUT and test generator as shown on Section 11.2.2.
For line-to-line coupling mode, provide a 1kV 1.2/50us voltage surge (at pen-circuit condition) and 8/20us current surge to EUT selected points, and for active line / neutral lines to ground are same except test level is 2kV.

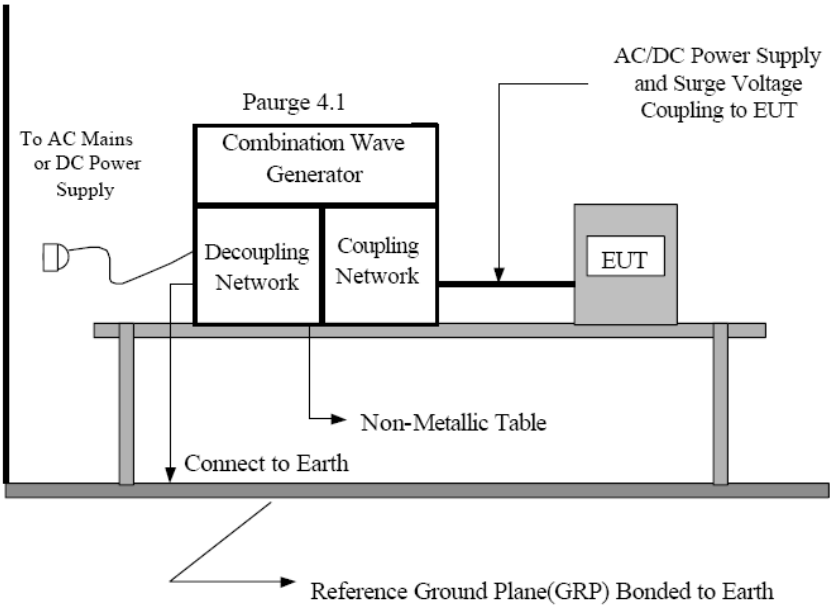
At least 5 positive and 5 negative (polarity) tests with a maximum 1/min repetition rate are applied during test.

Different phase angles are done individually.

Record the EUT operating situation during compliance test and decide the EUT immunity criterion for above each test.

Set EUT in idle mode and repeated test with a receive antenna connected to a spectrum analyzer to see if there was unintentional transmissions happened.

12.3. Test setup

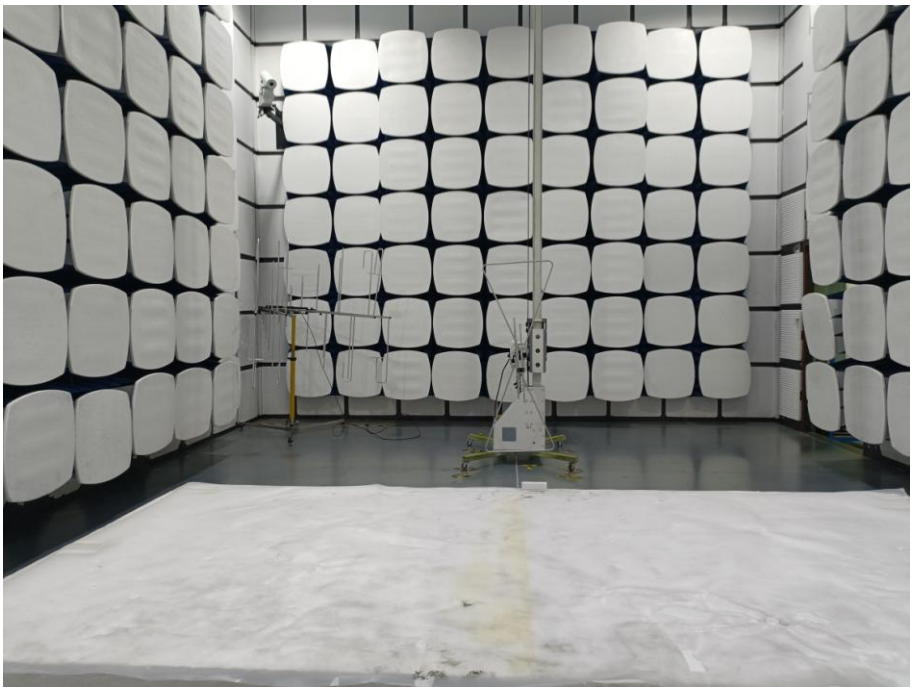


12.4. Test Result

Not applicable for equipment operated with PC, battery, or DC Power Supply.

13. Photos of test setup

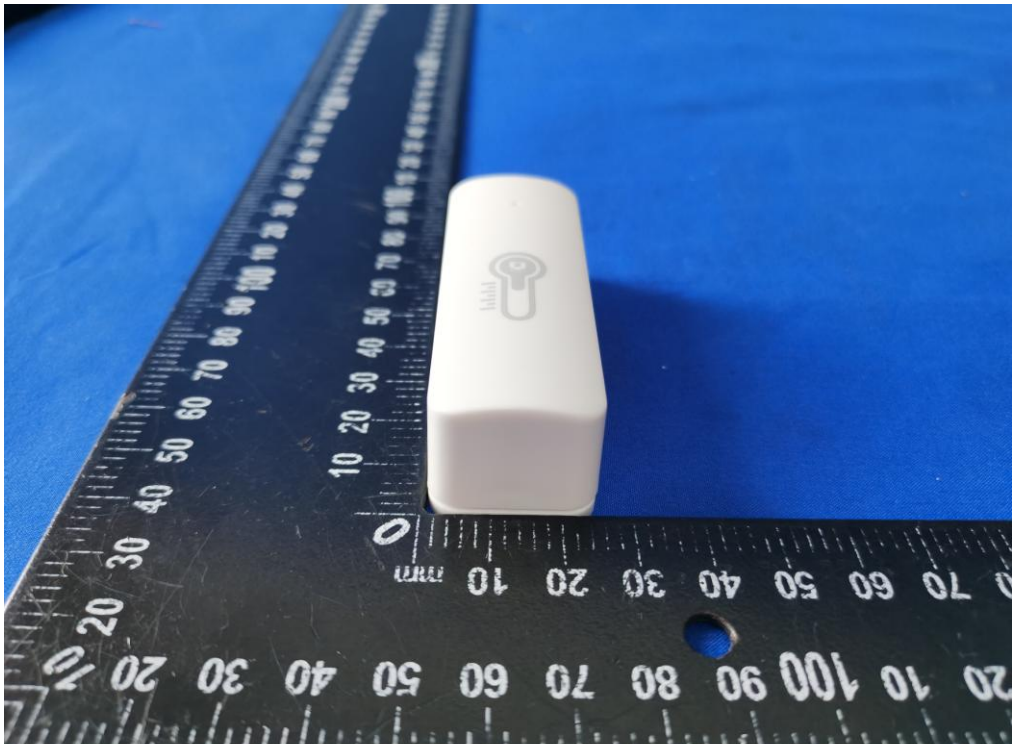
13.1. Photos of Radiated emission

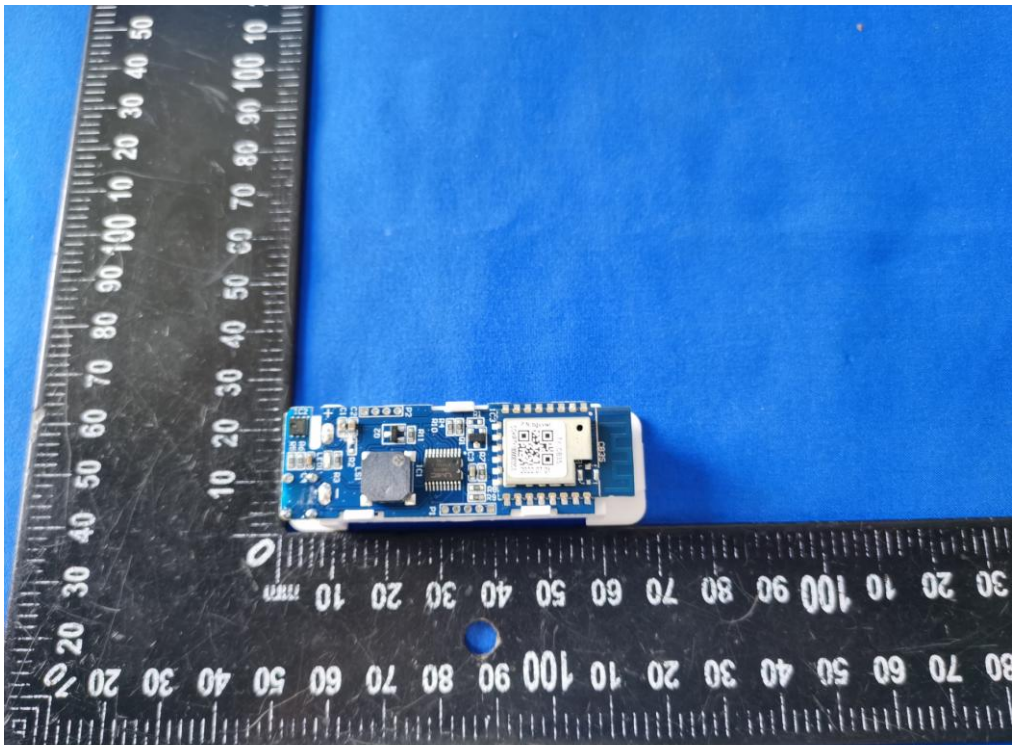


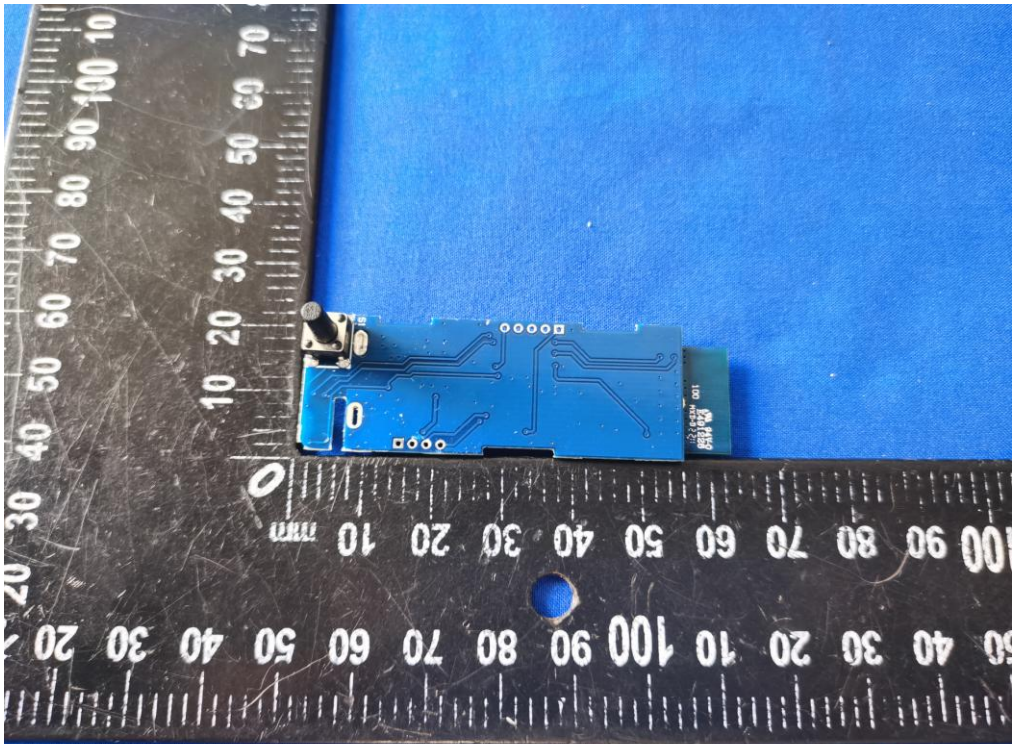
13.2. Photos of Electrostatic Discharge Immunity Test

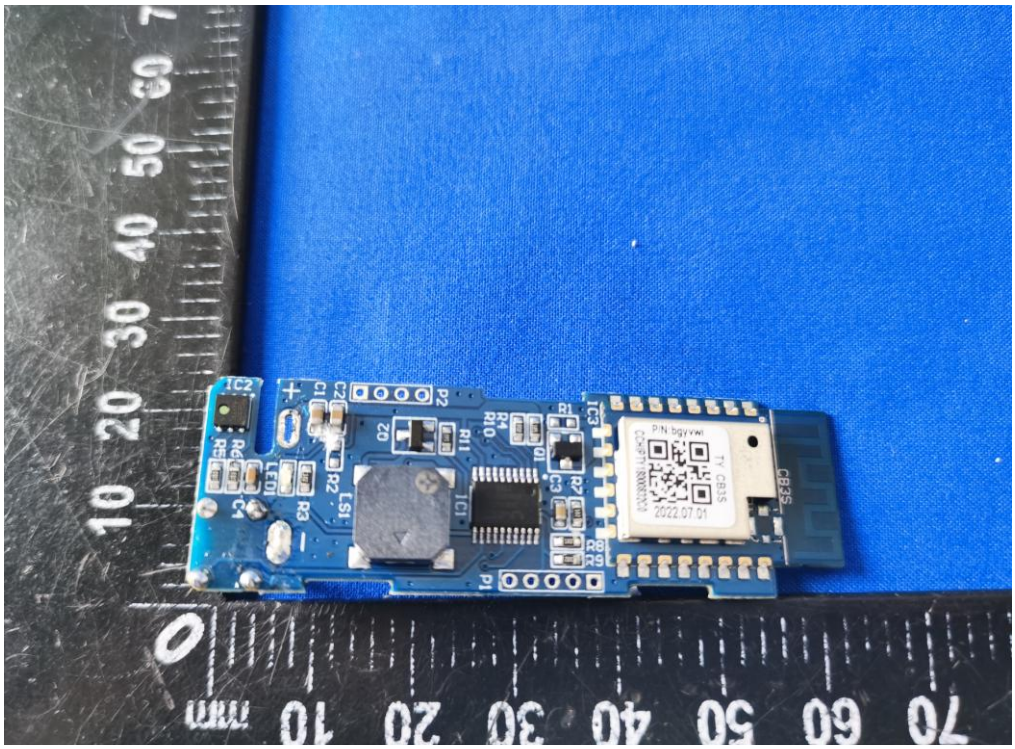
13.3. Photos of RF test

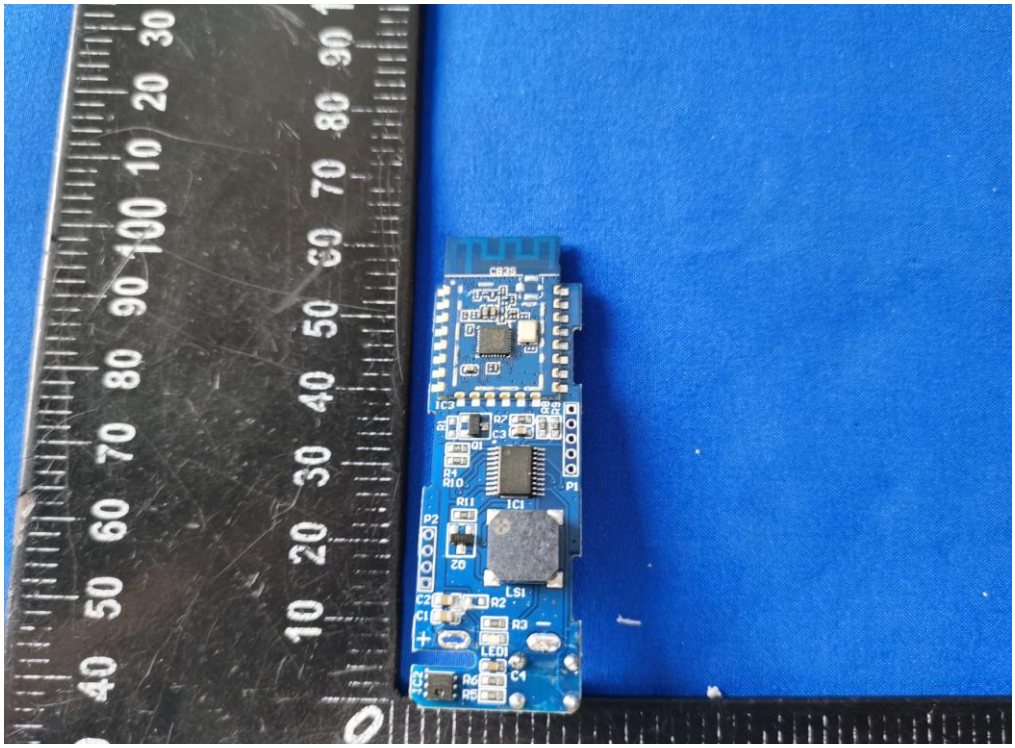
14. Photos of EUT

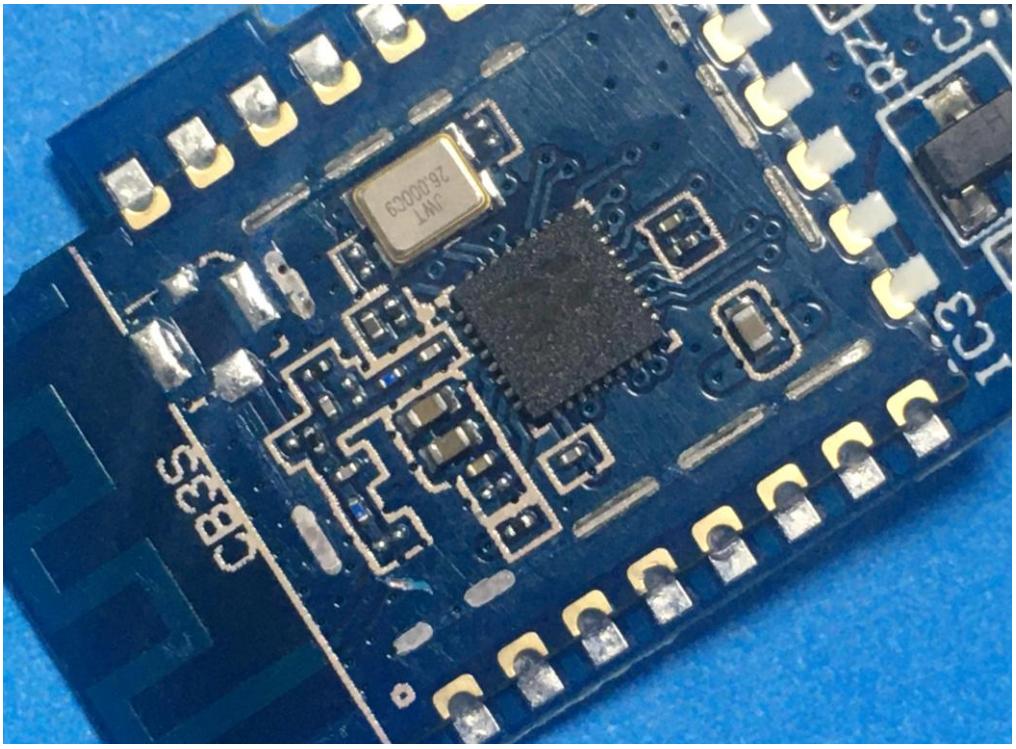












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