CE EMC TEST REPORT

Equipment	:	Draadloze WiFi Versterker
Brand Name	:	kpn
Model Name	:	Draadloze WiFi Versterker
Applicant	:	Arcadyan Technology Corporation No.8, Sec.2, Guangfu Rd.,Hsinchu, 30071 Taiwan
Manufacturer	:	Arcadyan Technology Corporation No.8, Sec.2, Guangfu Rd.,Hsinchu, 30071 Taiwan
Standard	:	Draft EN 301 489-1 V2.2.0 (2017-03) Class B Draft EN 301 489-17 V3.2.0 (2017-03) EN 55032:2015/AC:2016 Class B EN 55024:2010/A1:2015 CISPR 32:2012 Class B CISPR 24:2010 AS/NZS CISPR 32:2015 Class B

The product was received on Sep. 06, 2016, and testing was started from Dec. 17, 2018 and completed on Dec. 27, 2018. We, SPORTON INTERNATIONAL INC. EMC & Wireless Communications Laboratory, would like to declare that the tested sample has been evaluated in accordance with the procedures given in above standards and shown compliance with the applicable technical standards.

The report must not be used by the client to claim product certification, approval, or endorsement by TAF or any agency of government.

The test results in this report apply exclusively to the tested model / sample. Without written approval of SPORTON INTERNATIONAL INC. EMC & Wireless Communications Laboratory, the test report shall not be reproduced except in full.

Approved by: Sin Chang

SPORTON INTERNATIONAL INC. EMC & Wireless Communications Laboratory
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History of this test report

Report No.	Version	Description	Issued Date
EH683123-03	01	Initial issue of report	Jan. 17, 2019

Summary of Test Result

Applicable Standard: Draft EN 301 489-1 V2.2.0 (2017-03), EN 55032:2015/AC:2016, CISPR 32:2012 and AS/NZS CISPR 32:2015					
Report Clause	**Ref Std. Clause (EN301 489-1)**	**Test Standard**	**Test Items**	**Result (PASS/FAIL)**	**Remarks**
4	8.3/8.4	EN 55032:2015, EN 55032:2015/AC:2016, CISPR 32:2012 and AS/NZS CISPR 32:2015	AC Power Port Conducted Emission	PASS	Under limit 13.74 dB at 13.56 MHz
4	8.7		Telecommunication Port Conducted Emission	PASS	Under limit 12.05 dB at 0.397 MHz
5	8.2		Radiated Emission below 1GHz	PASS	Under limit 3.93 dB at 215.27 MHz
5	8.2		Radiated Emission above 1GHz	PASS	Under limit 13.35 dB at 3000.00 MHz
6	8.5	EN 61000-3-2:2014	Harmonic Current Emission	N/A	Note 1
7	8.6	EN 61000-3-3:2013	Voltage Fluctuations and Flicker	PASS	-
Applicable Standard: Draft EN 301 489-1 V2.2.0 (2017-03)					
Report Clause	**Ref Std. Clause (EN301 489-1)**	**Test Standard**	**Test Items**	**Result (PASS/FAIL)**	**Remarks**
10	9.3	EN 61000-4-2:2009	ESD	PASS	-
11	9.2	EN 61000-4-3:2006/A1:2008/A2:2010	RS	PASS	-
12	9.4	EN 61000-4-4:2012	EFT	PASS	-
13	9.8	EN 61000-4-5:2014/A1:2017	Surges	PASS	-
14	9.5	EN 61000-4-6:2014/AC:2015	CS	PASS	-
16	9.7	EN 61000-4-11:2004/A1:2017	Voltage dips and Interruptions	PASS	-
Applicable Standard: EN 55024:2010/A1:2015 and CISPR 24:2010					
Report Clause	**Ref Std. Clause (EN55024)**	**Test Standard**	**Test Items**	**RESULT (PASS/FAIL)**	**Remarks**
10	4.2.1	IEC 61000-4-2:2008	ESD	PASS	-
11	4.2.3.2	IEC 61000-4-3:2006/A1:2007/A2:2010	RS	PASS	-
12	4.2.2	IEC 61000-4-4:2012	EFT	PASS	-
13	4.2.5	IEC 61000-4-5:2014/A1:2017	Surges	PASS	Note 2
14	4.2.3.3	IEC 61000-4-6:2013	CS	PASS	-
15	4.2.4	IEC 61000-4-8:2009	PFMF	PASS	-
16	4.2.6	IEC 61000-4-11:2004/A1:2017	Voltage dips and Interruptions	PASS	-

Note 1: The power consumption of EUT is lower than 75W, so the limit is not specified in EN 61000-3-2:2014. Note 2: According to EN 55024 Table 2 description, the surge test of telecommunication/signal cable will be performed only when it's directly connected to outdoor cables; thus, indoor telecommunication/signal port isn't necessary to perform surge test.

Declaration of Conformity:
The test results with all measurement uncertainty excluded are presented in accordance with the regulation limits or requirements declared by manufacturers.
Comments and Explanations:
None

Reviewed by: Sin Chang

Report Producer: Cindy Peng

1. General Description of Equipment under Test

Product Detail	
Equipment Name	Draadloze WiFi Versterker
Model Name	Draadloze WiFi Versterker
Brand Name	kpn
Power Supply	From power adapter

1.1. Feature of Equipment under Test

1. The EUT supports 2.4GHz / 5GHz wireless function.
2. Accessories:

Power	Brand	Model	Rating
Adapter	APD	WB-18R12FG	Input: 100-240Vac~, 50-60Hz, 0.6A Max. Output: 12Vdc, 1.5A

3. For a more detailed features description, please refer to the manufacturer's specifications or the User's Manual.

2. Test Configuration of Equipment under Test

2.1. Test Mode

The following table is a list of the test modes shown in this test report.

Conducted Emissions	
Test Mode	Description
1	Normal Link

Disturbances at Telecommunication Ports	
Test Mode	Description
1	Normal Link-Ethernet Port / 1Gbps

Radiated Emissions	
Test Mode	Description
1	Normal Link

Harmonic Current Emissions、Voltage Fluctuations and Flicker、ESD、RS、EFT、Surge、CS、PFMF、DIP	
Test Mode	Description
1	Normal Link

Note 1: The EUT can only be used at Y axis position

2.2. Description of Support Units

The EUT has been tested as an independent unit together with other necessary accessories or support units. The following support units or accessories were used to form a representative test configuration during the tests.

No.	Support Unit	Brand	Model	FCC ID
A	AP Router	ASUS	RP-N53	N/A
B	LAN NB	DELL	E6430	N/A
C	2.4G NB	DELL	E6430	N/A
D	5G NB	DELL	E6430	N/A

2.3. EUT Operation Condition

<EMI>

During the test, the remote notebook "ping.exe" under WIN7 to link with the EUT to maintain the connection by LAN and WLAN.

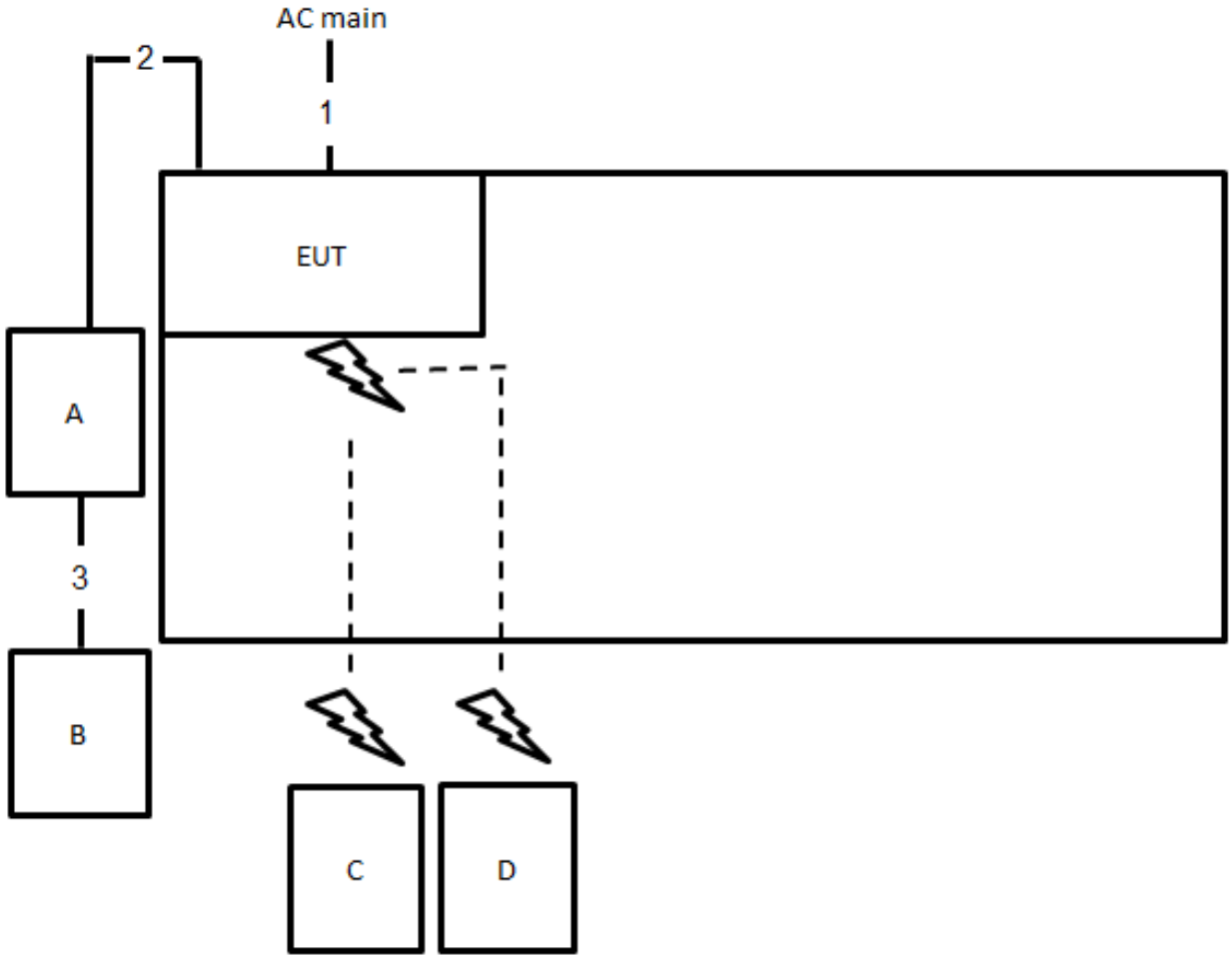
For Telecommunication Port Conducted Emission test: At the same time, the remote notebook executed “LAN TEST” to link with the EUT to traffic packet data generated software and keep maximum traffic load by LAN.

<EMS>

During the test, the remote notebook "ping.exe" under WIN7 to link with the EUT to maintain the connection by LAN and WLAN.

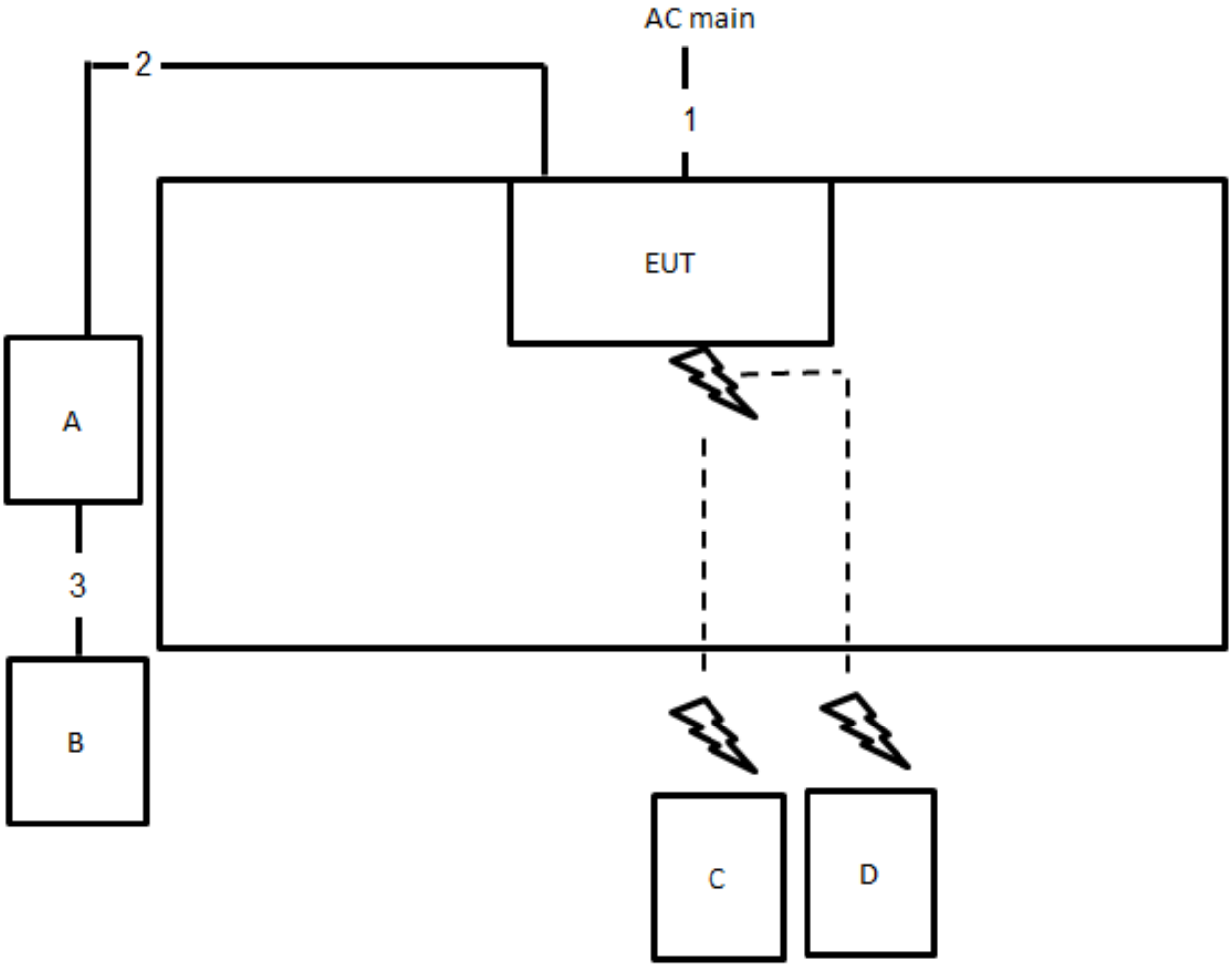
2.4. Connection Diagram of Test System

2.4.1. AC Power Line Conduction Emissions Test Configuration



Item	Connection	Shielded	Length
1	Power cable	No	1.5m
2	RJ-45 cable	No	3m
3	RJ-45 cable	No	1.5m

2.4.2. Radiation Emissions Test Configuration



Item	Connection	Shielded	Length
1	Power cable	No	1.5m
2	RJ-45 cable	No	10m
3	RJ-45 cable	No	1.5m

3. General Information of Test

3.1. Test Facility

EMI	
JHU BEI	ADD : No.8, Lane 724, Bo-ai St., Jhubei City, HsinChu County 302, Taiwan, R.O.C. TEL : 886-3-656-9065 FAX : 886-3-656-9085
EMS for RS test	
HWA YA	ADD : No. 52, Huaya 1st Rd., Guishan Dist., Taoyuan City, Taiwan (R.O.C.) TEL : 886-3-327-3456 FAX : 886-3-327-0973
EMS for other tests	
JHU BEI	ADD : No.8, Lane 724, Bo-ai St., Jhubei City, HsinChu County 302, Taiwan, R.O.C. TEL : 886-3-656-9065 FAX : 886-3-656-9085

3.2. Test Environment

Test Items	Test Site No.	Test Engineer	Test Environment			Test Date	Remark
			Temp (°C)	Humidity (%)	Pressure (kPa)		
AC Power Port Conducted Emission	CO02-CB	Tony Chang	23	56	-	Dec. 17, 2018	-
Telecommunication Port Conducted Emission	CO02-CB	Tony Chang	23	56	-	Dec. 17, 2018	-
Radiated Emission below 1GHz	10CH01-CB	GN Hou	23	67	-	Dec. 27, 2018	-
Radiated Emission above 1GHz	10CH01-CB	GN Hou	23	67	-	Dec. 27, 2018	-
Harmonic Current Emission	EX02-CB	Rick Yeh	23	50	-	Dec. 18, 2018	-
Voltage Fluctuations and Flicker	EX02-CB	Rick Yeh	23	50	-	Dec. 18, 2018	-
ESD	ES01-CB	Max Lin	24	52	101	Dec. 18, 2018	-
RS	RS06-HY	Max Lin	23	50	-	Dec. 17, 2018	-
EFT	EX02-CB	Rick Yeh	23	50	-	Dec. 18, 2018	-
Surges	EX02-CB	Max Lin	23	50	-	Dec. 18, 2018	-
CS	EX01-CB	Max Lin	26	55	-	Dec. 18, 2018	-
PFMF	EX02-CB	Max Lin	23	50	-	Dec. 17, 2018	-
Voltage dips and Interruptions	EX02-CB	Rick Yeh	23	50	-	Dec. 18, 2018	-

3.3. Test Voltage

Power Type	Test Voltage
AC Power Supply	230 V / 50 Hz

3.4. Frequency Range Investigated

EMI Test Items	Frequency Range
Conducted emission test	150 kHz to 30 MHz
Radiated emission test	30 MHz to 6,000 MHz
EMS Test Items	**Frequency Range**
Radio frequency electromagnetic field immunity test	80 MHz to 6,000 MHz
Conducted immunity test	150 kHz to 80 MHz

3.5. Test Distance

Test Items	Test Distance
Radiated emission test below 1 GHz (30 MHz to 1,000 MHz)	10 m
Radiated emission test above 1 GHz (1,000 MHz to 6,000 MHz)	3 m
Radio frequency electromagnetic field immunity test (80 MHz to 1,000 MHz)	3 m
Radio frequency electromagnetic field immunity test (1,000 MHz to 6,000 MHz)	3 m

4. Test of Conducted Emission

4.1. Limit

4.1.1. Limit for AC power ports：

Frequency (MHz)	QP Limit (dBuV)	AV Limit (dBuV)
0.15~0.5	66~56	56~46
0.5~5	56	46
5~30	60	50

4.1.2. Limit for Telecommunication ports：

Frequency (MHz)	Voltage Limit (dBuV)		Current Limit (dBuA)	
	QP	AV	QP	AV
0.15~0.5	84~74	74~64	40~30	30~20
0.5~30	74	64	30	20

4.2. Description of Major Test Instruments

Test Receiver	Setting
Start Frequency	0.15 MHz
Stop Frequency	30 MHz
IF Bandwidth	9 kHz

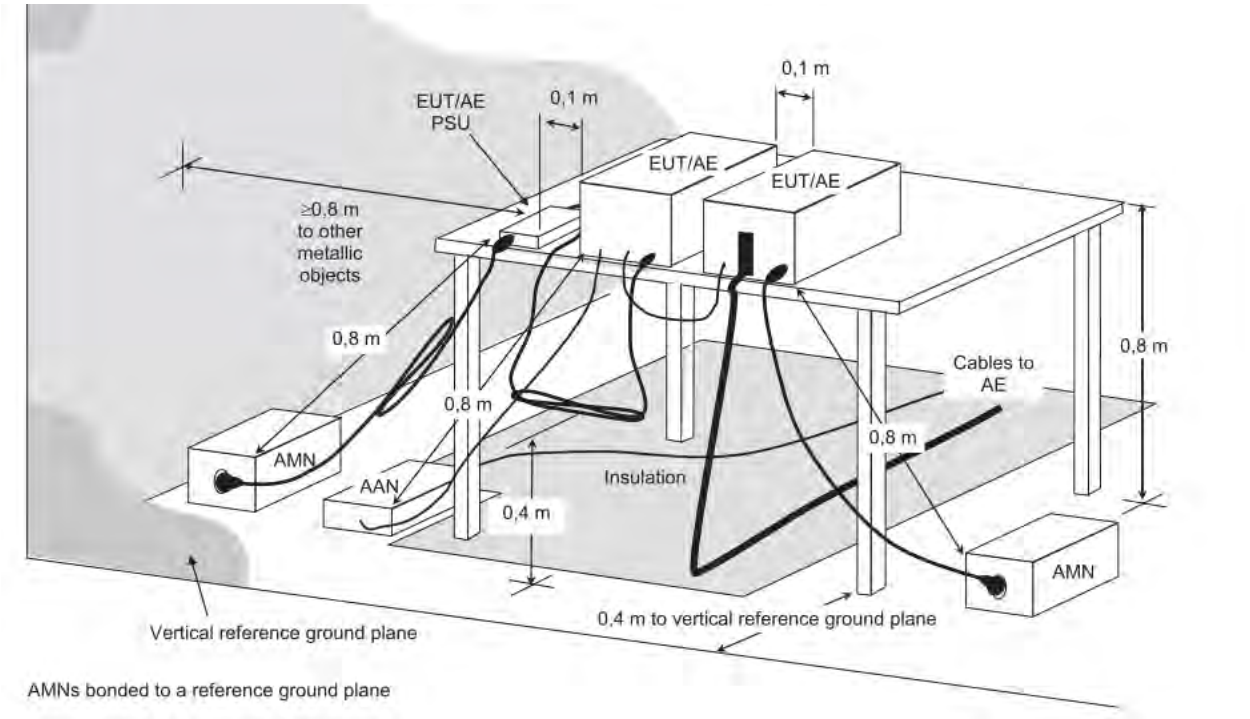
4.3. Test Procedures

a. The EUT was placed on a desk 0.8 meters height from the metal ground plane and 0.4 meter from the conducting wall of the shielding room and it was kept at least 0.8 meters from any other grounded conducting surface.
b. Connect EUT to the power mains through a line impedance stabilization network (LISN).
c. Connect Telecommunication port to ISN (Impedance Stabilization Network).
d. All the support units are connect to the other LISN.
e. The LISN provides 50 Ω coupling impedance for the measuring instrument.
f. The CISPR states that a 50 Ω, 50 uH LISN should be used.
g. Both sides of AC line were checked for maximum conducted interference.
h. The frequency range from 150 kHz to 30 MHz was searched.
i. Set the test-receiver system to Peak Detect Function and Specified Bandwidth with Maximum Hold Mode.

4.4. Measurement Results Calculation

The measured Level is calculated using:
For AC Power Port Conducted Emission
a. Corrected Reading (dBuV) = LISN Factor + Cable Loss + Read Level = Level
b. Margin = - Limit + (Read Level + LISN Factor + Cable Loss)
For Telecommunication Port Conducted Emission
a. Corrected Reading (dBuV) = LISN Factor + Cable Loss + Read Level = Level
b. Margin = - Limit + (Read Level + LISN Factor + Cable Loss)

4.5. Typical Test Setup Layout of Conducted Emission and disturbances at telecommunication ports



4.6. Test Result of AC Power Ports

Refer as Appendix A

4.7. Test Result of Telecommunication Ports

Refer as Appendix B

5. Test of Radiated Emission

5.1. Limit

Radiated Emission below 1 GHz test at 10 m:

Frequency (MHz)	QP (dBuV/m)
30~230	30
230~1,000	37

Radiated Emission above 1 GHz test at 3 m:

Frequency (MHz)	PK (dBuV/m)	AV (dBuV/m)
1,000~3,000	70	50
3,000~6,000	74	54

5.2. Description of Major Test Instruments

5.2.1. 30 MHz ~ 1,000 MHz

Amplifier	Setting
RF Gain	25 dB
Signal Input	9 kHz to 1.3 GHz

Spectrum Analyzer	Setting
Start Frequency	30 MHz
Stop Frequency	1000 MHz
Resolution Bandwidth	120 kHz
Signal Input	9 kHz to 30 GHz

Test Receiver	Setting
Start Frequency	30 MHz
Stop Frequency	1000 MHz
Resolution Bandwidth	120 kHz
Signal Input	9 kHz to 3 GHz

5.2.2. Above 1 GHz

Amplifier	Setting
RF Gain	35 dB
Signal Input	1 GHz to 26.5 GHz

Spectrum Analyzer	Setting
Start Frequency	1 GHz
Stop Frequency	6 GHz
Resolution Bandwidth	1 MHz
Signal Input	9 kHz to 30 GHz

5.3. Test Procedures

<Below 1 GHz>:

a. The EUT was placed on a rotatable table top 0.8 meter above ground.

b. The EUT was set 10 meters from the interference receiving antenna which was mounted on the top of a variable height antenna tower.

c. The table was rotated 360 degrees to determine the position of the highest radiation.

d. The antenna is a half wave dipole and its height is varied between one meter and four meters above ground to find the maximum value of the field strength both horizontal polarization and vertical polarization of the antenna are set to make the measurement.

e. For each suspected emission the EUT was arranged to its worst case and then tune the antenna tower (from 1 M to 4 M) and turn table (from 0 degree to 360 degrees) to find the maximum reading.

f. Set the test-receiver system to Peak Detect Function and specified bandwidth with Maximum Hold Mode.

g. If the emission level of the EUT in peak mode was 3 dB lower than the limit specified, then testing will be stopped and peak values of EUT will be reported, otherwise, the emissions which do not have 3 dB margin will be repeated one by one using the quasi-peak method and reported.

<Above 1 GHz>:

a. Same test set up as below 1 GHz radiated testing.

b. The EUT was set 3 meters from the interference-receiving antenna which was mounted on the top of a variable height antenna tower.

c. There should be absorber placed between the EUT and Antenna and its located size should let the test site meet CISPR16-1-4 requirement.

d. The table was rotated 360 degrees to determine the position of the highest radiation.

e. Set the test-receiver system to Peak Detect Function and specified bandwidth with Maximum Hold Mode.

f. Set the DRG Horn Antenna at 1M height, then run the turn table to get the maximum noise reading from Horizontal and Vertical polarity separately.

g. When EUT locating on the turn-table, and its height is over 172 cm (Antenna's 3dB beam width of 6 GHz is 27°), the DRG Horn Antenna must be raised up and descended down, then turning around the turn-table to get the maximum noise reading of the Horizontal and Vertical polarity separately. Note the maximum raise up height is same as the top of EUT.

h. If emission level of the EUT in peak mode was 20 dB lower than average limit (that means the emission level in peak mode also complies with the limit in average mode), then testing will be stopped and peak values of EUT will be reported, otherwise, the emissions will be measured in average mode again and reported.

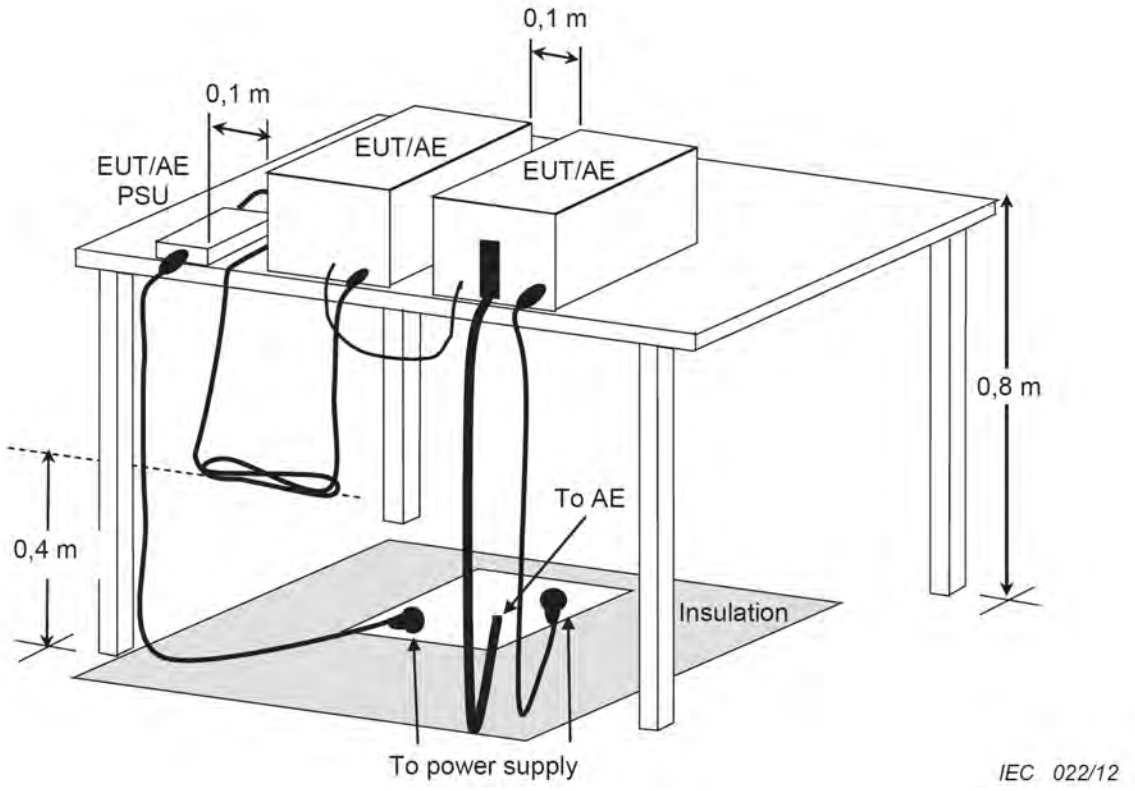
5.4. Measurement Results Calculation

The measured Level is calculated using:

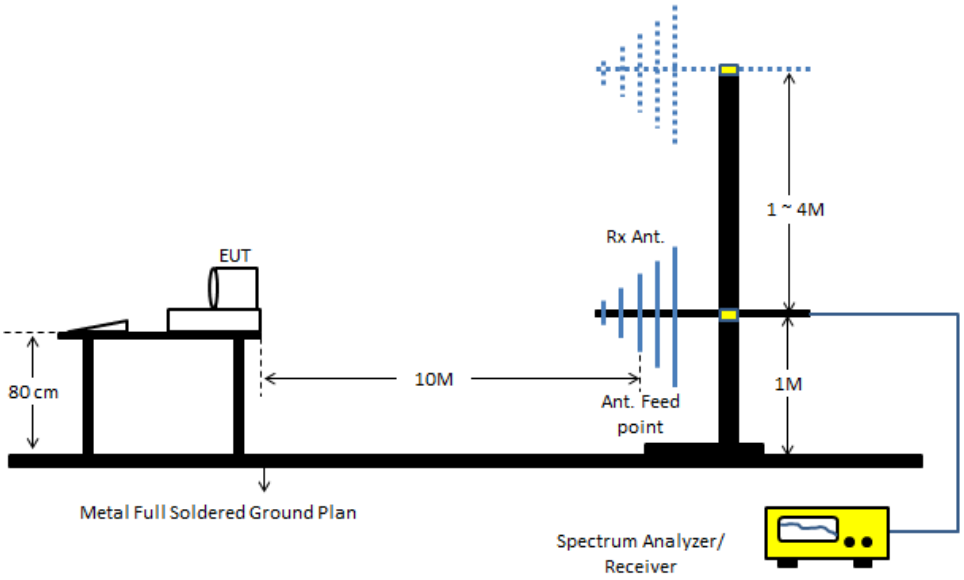
a. Corrected Reading: Antenna Factor + Cable Loss + Read Level - Preamp Factor = Level

b. Margin = - Limit + (Read Level + Antenna Factor + Cable Loss - Preamp Factor)

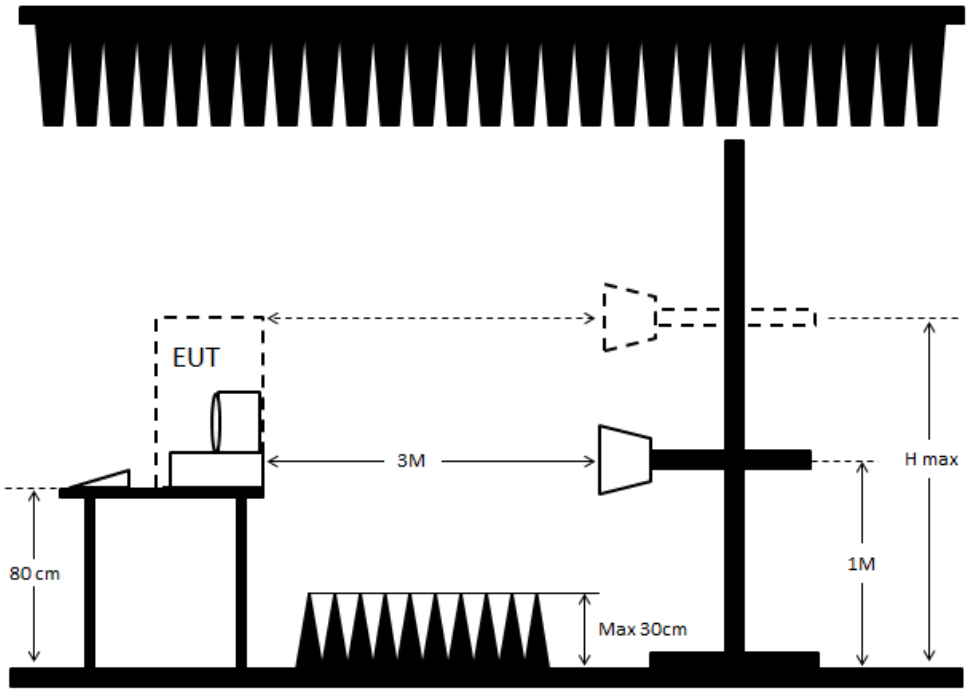
5.5. Typical Test Setup Layout of Radiated Emission



<Below 1 GHz>:



<Above 1 GHz>:



Remark : When EUT height is over 172cm , H max = Top of EUT

5.6. Test Result of Radiated Emission below 1 GHz

Refer as Appendix C

5.7. Test Result of Radiated Emission above 1 GHz

Refer as Appendix C

6. Harmonics Test

6.1. Standard

- EN 61000-3-2:2014

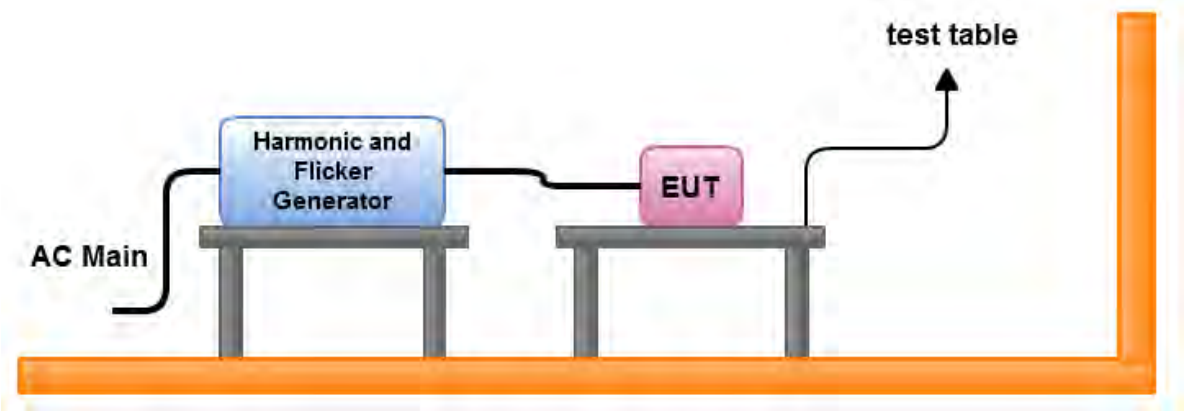
6.2. Test Procedure

The measured values of the harmonics components of the input current, including line current and neutral current, shall be compared with the limits given in Clause 7 of EN 61000-3-2.

6.3. Test Equipment Settings

Line Voltage	230 V
Line Frequency	50 Hz
Device Class	A

6.4. Test Setup



6.5. Test Result of Current Harmonics Test

Refer as Appendix D

7. Voltage Fluctuations and Flicker Test

7.1. Standard

- EN 61000-3-3:2013

7.2. Test Procedure

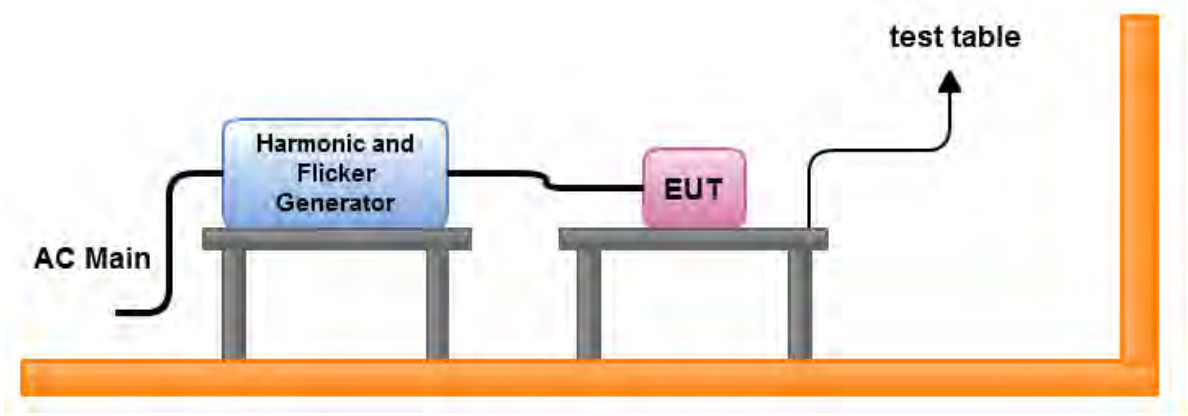
The equipment shall be tested under the conditions of **Clause 5.**

The total impedance of the test circuit, excluding the appliance under test, but including the internal impedance of the supply source, shall be equal to the reference impedance. The stability and tolerance of the reference impedance shall be adequate to ensure that the overall accuracy of ±8% is achieved during the whole assessment procedure.

7.3. Test Equipment Settings

Line Voltage	230 V
Line Frequency	50 Hz

7.4. Test Setup



7.5. Test Result of Voltage Fluctuation and Flicker Test

Refer as Appendix E

8. General Performance Criteria Description of Immunity Test

For EN 301 489-1

CT / CR (Criterion A)	**Performance criteria for continuous phenomena applied to transmitters and receivers** During and after the test, the apparatus shall continue to operate as intended. No degradation of performance or loss of function is allowed below a permissible performance level specified by the manufacturer when the apparatus is used as intended. In some cases this permissible performance level may be replaced by a permissible loss of performance. During the test the EUT shall not unintentionally transmit or change its actual operating state and stored data.
TT / TR (Criterion B)	**Performance criteria for transient phenomena applied to transmitters and receivers** After the test, the apparatus shall continue to operate as intended. No degradation of performance or loss of function is allowed below a permissible performance level specified by the manufacturer, when the apparatus is used as intended. In some cases this permissible performance level may be replaced by a permissible loss of performance.
TT / TR (Criterion C)	**Only for voltage interruption** **Performance criteria for transient phenomena applied to transmitters and receivers** In the case where the equipment is powered solely from the AC mains supply (without the use of a parallel battery back-up) volatile user data may have been lost and if applicable the communication link need not to be maintained and lost functions should be recoverable by user or operator.

For EN 55024

According to Clause 7.1 of EN 55024 standard, the following describes the general performance criteria.

Criterion A (Note 1)	During and after the test the EUT shall continue to operate as intended without operator intervention. No degradation of performance or loss of function is allowed below a minimum performance level specified by the manufacturer when the EUT is used as intended.
Criterion B (Note 2)	During the test, degradation of performance is allowed. However, no change of operating state or stored data is allowed to persist after the test. After the test, the equipment shall continue to operate as intended without operator intervention. For xDSL Terminal equipment: During the test shall not cause the system to lose the established connection or retrain. At the cessation of the test, the system shall operate in the condition established prior to the application of the test without user intervention.
Criterion C	Loss of function is allowed, provided the function is self-recoverable, or can be restored by the operation of the controls by the user in accordance with the manufacturer's instructions. Functions, and/or information stored in non-volatile memory, or protected by a battery backup, shall not be lost.

Note 1：No degradation of performance or loss of function is allowed below a performance level specified by the manufacturer when the equipment is used as intended. The performance level may be replaced by a permissible loss of performance. If the minimum performance level or the permissible performance loss is not specified by the manufacturer, then either of these may be derived from the product description and documentation, and by what the user may reasonably expect from the equipment if used as intended.

Note 2：After the application of the phenomenon below a performance level specified by the manufacturer, when the equipment is used as intended. The performance level may be replaced by a permissible loss of performance. During the test, degradation of performance is allowed. However, no change of operating state if stored data is allowed to persist after the test. If the minimum performance level (or the permissible performance loss) is not specified by the manufacturer, then either of these may be derived from the product description and documentation, and by what the user may reasonably expect from the equipment if used as intended.

9. EUT Performance Criteria

Applicable Standard: Draft EN 301 489-1 V2.2.0 (2017-03)	
Test Type	**Pass Criterion**
Electrostatic discharge immunity test ± 2, 4 kV Contact Discharge ± 2, 4, 8 kV Air Discharge Standard Criterion B	A
Radiated immunity test Frequency Range：80 MHz to 6,000 MHz Electromagnetic field：3 V/m (unmodulated, r.m.s) Amplitude modulated：80 % AM (1 kHz) Standard Criterion A	A
Electrical fast transient / burst immunity test AC ports 5/50 ns, ± 1 kV, 5 kHz I/O ports 5/50 ns, ± 0.5 kV, 5 kHz Standard Criterion B	A
Surge immunity test AC ports (1.2/50 us)： line to line：± 0.5, 1 kV Telecommunication/Signal ports： indoor (1.2/50 us)：± 0.5 kV Standard Criterion B	A
Conducted immunity test Frequency Range：150 kHz to 80 MHz Electromagnetic field：3 V (unmodulated, r.m.s) Amplitude modulated：80 % AM (1 kHz) Standard Criterion A	A
Voltage dips, short interruptions and voltage variations immunity tests 1. Dip 0% residual 10 ms (0.5 cycles) – Standard Criterion B	A
2. Dip 0% residual 20 ms (1.0 cycles) – Standard Criterion B	A
3. Dip 70% residual 500 ms (25 cycles) – Standard Criterion B	A
4. Interruption 0% residual 5000 ms (250 cycles) – Standard Criterion C	B

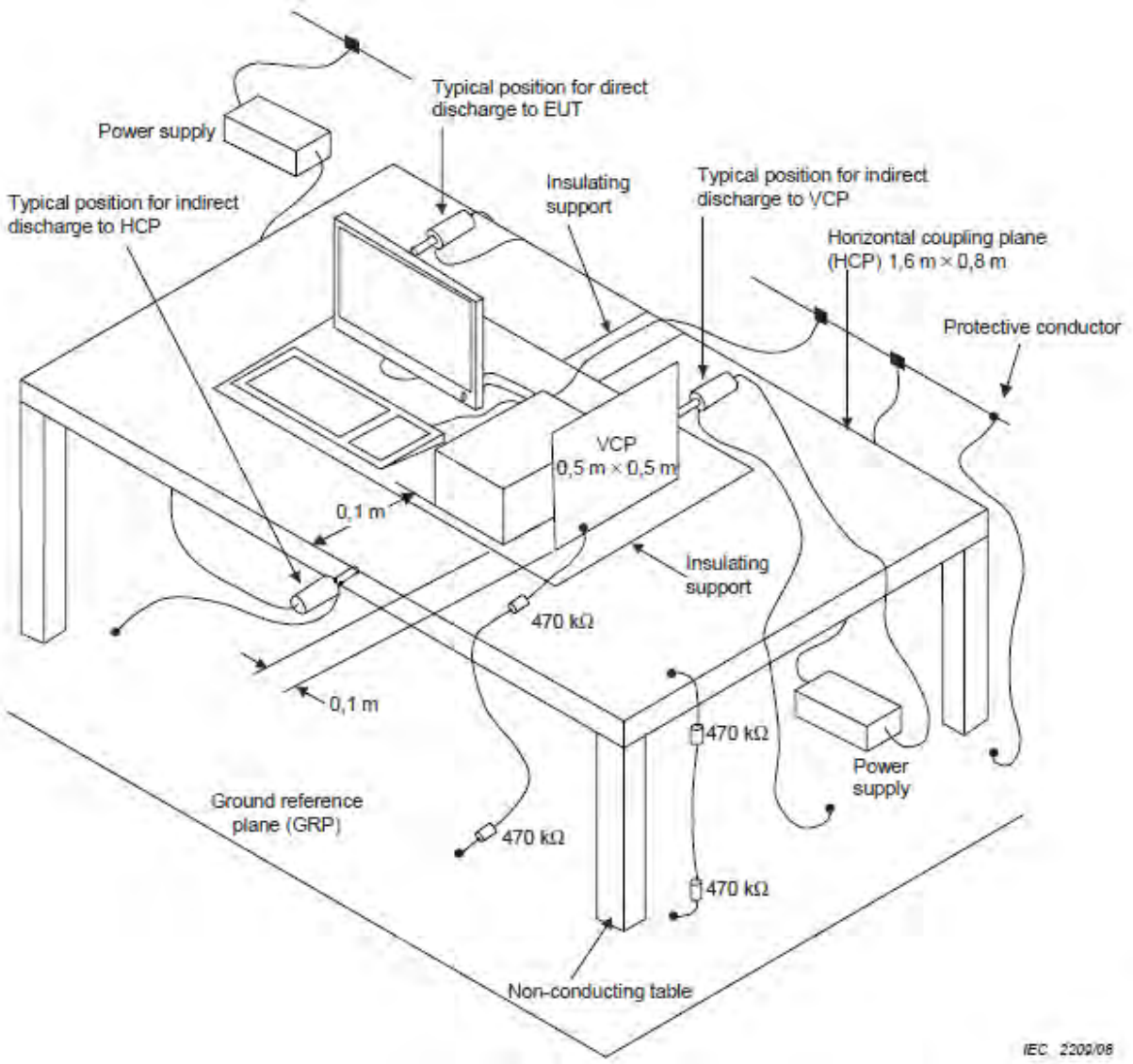
Applicable Standard: EN 55024:2010/A1:2015 and CISPR 24:2010	
Test Type	**Pass Criterion**
Electrostatic discharge immunity test ± 2, 4 kV Contact Discharge ± 2, 4, 8 kV Air Discharge Standard Criterion B	A
Radiated immunity test Frequency Range：80 MHz to 1,000 MHz Amplitude modulated：80 % AM (1 kHz) Electromagnetic field：3 V/m (unmodulated, r.m.s) Standard Criterion A	A
Electrical fast transient / burst immunity test AC ports 5/50 ns, ± 1 kV, 5 kHz I/O ports 5/50 ns, ± 0.5 kV, 5 kHz Standard Criterion B	A
Surge immunity test AC ports (1.2/50 us)： line to line：± 0.5, 1 kV Standard Criterion B	A
Conducted immunity test Frequency Range：150 kHz to 80 MHz Amplitude modulated：80 % AM (1 kHz) Electromagnetic field：3 V (unmodulated, r.m.s) Standard Criterion A	A
Power frequency magnetic field immunity test 1 A/m, 50 Hz Standard Criterion A	A
Voltage dips, short interruptions and voltage variations immunity tests 1. >95% reduction 10 ms (0.5 cycles) – Standard Criterion B	A
2. 30% reduction 500 ms (25 cycles) – Standard Criterion C	A
3. Interruption >95% reduction 5,000 ms (250 cycles) – Standard Criterion C	B

10. Electrostatic Discharge Immunity Test (ESD)

10.1. Test Specification

Reference Standard	EN 61000-4-2 / IEC 61000-4-2	
Discharge Impedance	330 ohm / 150 pF	
Contact Discharge	± 2, 4 kV	
Air Discharge	± 2, 4, 8 kV	
Rise Time	0.8 ns +/-25 %	
Current at 30 ns	+/- 30 %	
Current at 60 ns	+/- 30 %	
Polarity	Positive / Negative	
Number of Discharge	For EN 301 489-1	Air Discharge 20 times at each test point
		Contact Discharge 20 times at each test point
	For EN 55024/CISPR 24	Air Discharge 20 times at each test point
		Contact Discharge 50 times at each test point
Single Discharge Mode	1 discharge per 1s	

10.2. Test Setup



The test setup consists of the test generator, EUT and auxiliary instrumentation necessary to perform DIRECT and INDIRECT application of discharges to the EUT as applicable, in the follow manner:

a. CONTACT DISCHARGE to the conductive surfaces and to coupling plane;

b. AIR DISCHARGE at insulating surfaces.

The preferred test method is that of type tests performed in laboratories and the only accepted method of demonstrating conformance with this standard. The EUT was arranged as closely as possible to arrangement in final installed conditions.

10.3. Test Setup for Tests Performed in Laboratory

A ground reference plane was provided on the floor of the test site. It was a metallic sheet (copper or aluminum) of 0.25 mm, minimum thickness; other metallic may be used but they shall have at least 0.65 mm thickness. In the SPORTON EMC LAB., we provided 1 mm thickness aluminum ground reference plane or 1 mm thickness stainless steel ground reference plane. The minimum size of the ground reference plane is 1 m x 1 m, the exact size depending on the dimensions of the EUT. It was connected to the protective grounding system.

The EUT was arranged and connected according to its functional requirements. A distance of 1m minimum was provided between the EUT and the wall of the lab. and any other metallic structure. In cases where this length exceeds the length necessary to apply the discharges to the selected points, the excess length shall, where possible, be placed non-inductively off the ground reference plane and shall not come closer than 0.2m to other conductive parts in the test setup.

Where the EUT is installed on a metal table, the table was connected to the reference plane via a cable with a 470k ohm resister located at each end, to prevent a build-up of charge. The test setup was consist a wooden table, 0.8m high, standing on the ground reference plane. A HCP, 1.6 m x 0.8 m, was placed on the table. The EUT and cables was isolated from the HCP by an insulating support 0.5 mm thick. The VCP size, 0.5 m x 0.5 m.

10.4. ESD Test Procedure

a. In the case of air discharge testing the climatic conditions shall be within the following ranges:
   - ambient temperature: 15°C to 35°C;
   - relative humidity : 30% to 60%;
   - atmospheric pressure : 86 kPa (860 mbar) to 106 kPa (1060 mbar).

b. Test programs and software shall be chosen so as to exercise all normal modes of operation of the EUT.

   The use of special exercising software is encouraged, but permitted only where it can be shown that the EUT is being comprehensively exercised.

c. The test voltage shall be increased from the minimum to the selected test severity level, in order to determine any threshold of failure. The final severity level should not exceed the product specification value in order to avoid damage to the equipment.

d. For the time interval between successive single discharges an initial value of one second is recommended. Longer intervals may be necessary to determine whether a system failure has occurred.

e. In the case of contact discharges, the tip of the discharge electrode shall touch the EUT before the discharge switch is operated.

f. In the case of painted surface covering a conducting substrate, the following procedure shall be adopted:
   - If the coating is not declared to be an insulating coating by the equipment manufacturer, then the pointed tip of the generator shall penetrate the coating so as to make contact with the conducting substrate.
   - Coating declared as insulating by the manufacturer shall only be submitted to the air discharge.
   - The contact discharge test shall not be applied to such surfaces.

g. In the case of air discharges, the round discharge tip of the discharge electrode shall be approached as fast as possible (without causing mechanical damage) to touch the EUT . After each discharge, the ESD generator (discharge electrode) shall be removed from the EUT. The generator is then retriggered for a new single discharge. This procedure shall be repeated until the discharges are completed. In the case of an air discharge test, the discharge switch, which is used for contact discharge, shall be closed.

10.5. Test Result

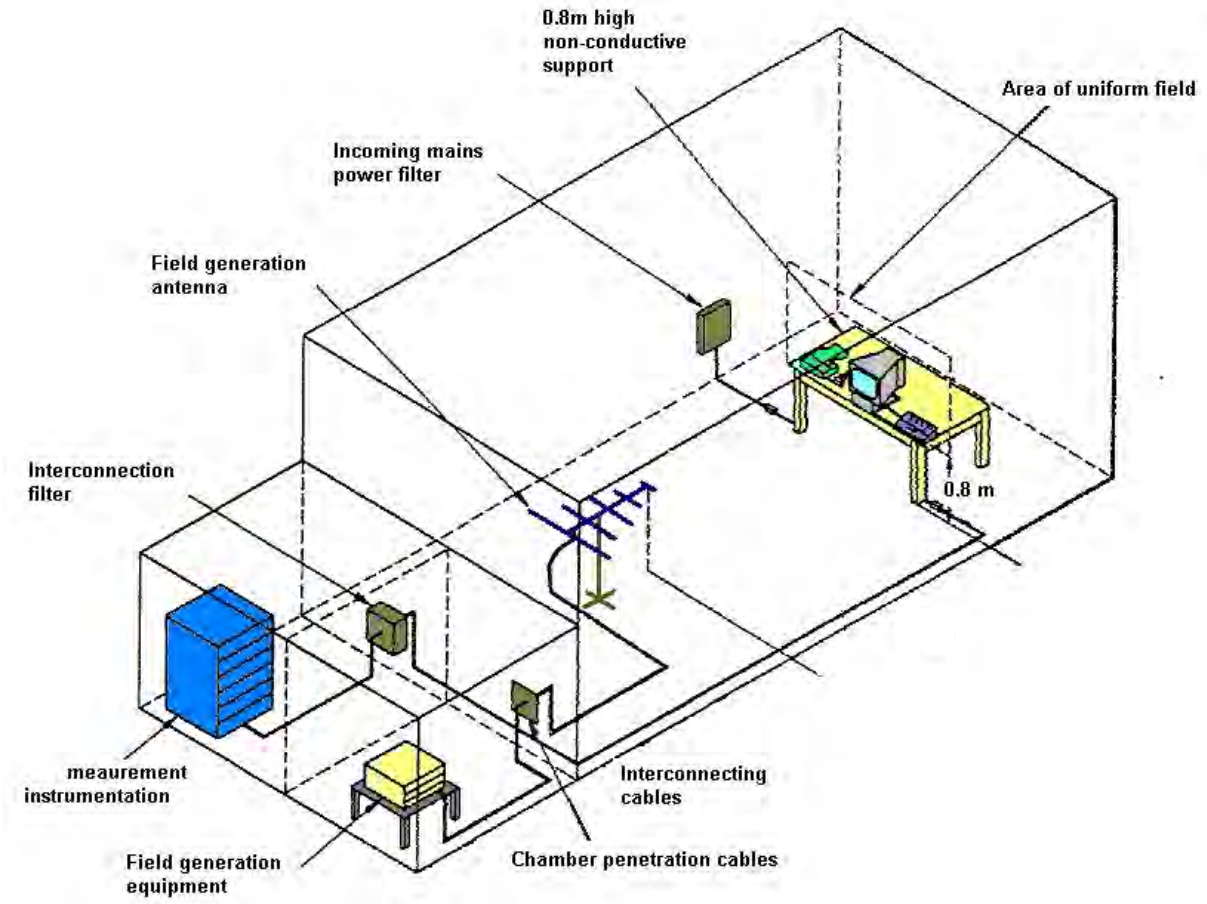
Refer as Appendix F

11. Radio Frequency Electromagnetic Field Immunity Test (RS)

11.1. Test Specification

Reference Standard	EN 61000-4-3 / IEC 61000-4-3
Frequency Range	For EN 301 489-1: 80 MHz to 6,000 MHz
	For EN 55024: 80 MHz to 1,000 MHz
Field Strength	3 V/m (un-modulated, r.m.s) 80% AM (1 kHz)
Frequency Step	1 %
Dwell Time	2.9 sec
Antenna Polarity	Vertical / Horizontal

11.2. Test Setup



The procedure defined in this part requires the generation of electromagnetic fields within which the test sample is placed and its operation observed. To generate fields that are useful for simulation of actual (field) conditions may require significant antenna drive power and the resultant high field strength levels.

11.3. Test Procedure

a. The equipment to be tested is placed in the center of the enclosure on a wooden table. The equipment is then connected to power and signal leads according to pertinent installation instructions.

b. The bilog antenna which is enabling the complete frequency range of 80 MHz - 1,000 MHz / 1,000 MHz - 6,000 MHz is placed 3m away from the equipment. The required field strength is determined by placing the field strength meter(s) on top of or directly alongside the equipment under test and monitoring the field strength meter via a remote field strength indicator outside the enclosure while adjusting the continuous-wave to the applicable antennae.

c. The test is normally performed with the generating antenna facing each of four sides of the EUT. The polarization of the field generated by the broadband (bilog) antenna necessitates testing each position twice, once with the antenna positioned vertically and again with the antenna positioned horizontally.

d. At each of the above conditions, the frequency range is swept 80 MHz - 6,000 MHz, pausing to adjust the R.F. signal level or to switch oscillators and antenna. The rate of sweep is in the order of $1.5*10^{-3}$ decades/s. The sensitive frequencies or frequencies of dominant interest may be discretely analyzed.

e. If need to use the exclusion band, for different equipment should be referenced as below:

The exclusion band for 2.4 GHz equipment was from 2280 MHz to 2603.5 MHz.

The exclusion band for 5 GHz equipment was from 4880 MHz to 5995 MHz.

The exclusion band for 5.8 GHz equipment was from 5455 MHz to 6000 MHz.

11.4. Test Result

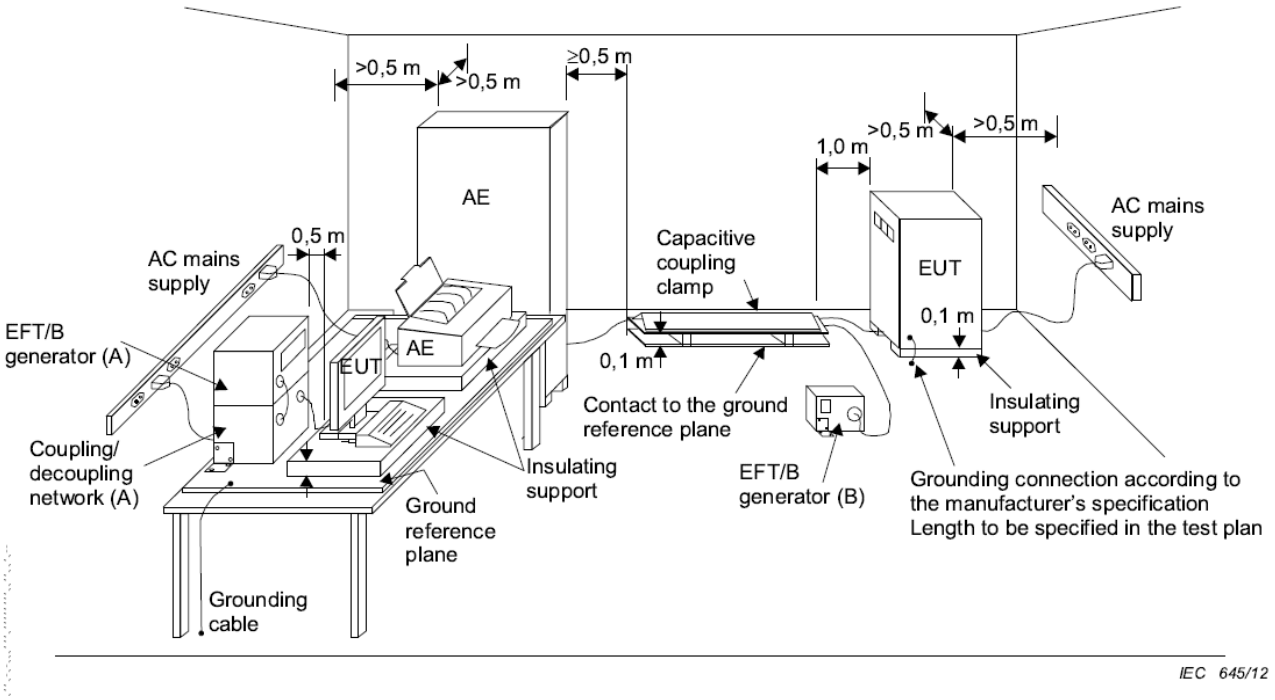
Refer as Appendix F

12. Electrical Fast Transient/Burst Immunity Test (EFT/BURST)

12.1. Test Specification

Reference Standard	EN 61000-4-4 / IEC 61000-4-4
Test Voltage	AC Power Line: ± 1 kV
	Telecommunication/Signal Line: ± 0.5 kV
Polarity	Positive / Negative
Rise time of the pulses	5 ns
Impulse duration	50 ns
Burst duration	15 ms for 5 kHz
Burst period	300 ms
Impulse Frequency	5 kHz
Duration	1 min

12.2. Test Setup



The EUT was placed on a ground reference plane and was insulated from it by an insulating support about 0.1m thick. If the EUT is table-top equipment, it was located approximately 0.8 m above the GRP.. The GRP. Was a metallic sheet (copper or aluminum) of 0.25 mm ,minimum thickness; other metallic may be used but they shall have at least 0.65 mm thickness. It shall project beyond the EUT by at least 0.1 m on all sides and connected to the protective earth. In the SPORTON EMC LAB. We provided 1 mm thickness aluminum ground reference plane or 1 mm thickness stainless steel ground reference plane. The minimum size of the ground reference plane is 1 m x 1 m, the exact size depending on the dimensions of the EUT. It was connected to the protective grounding system. The EUT was arranged and connected according to its functional requirements. The minimum distance between the EUT and other conductive structures, except the GRP. Beneath the EUT, was more than 0.5 m. Using the coupling clamp, the minimum distance between the coupling plates and all other conductive structures, except the GRP. Beneath the EUT, was more than 0.5 m. The length of the signal and power lines between the coupling device and the EUT was 0.5m or less.

12.3. Test Procedure

a. In order to minimize the effect of environmental parameters on test results, the climatic conditions when test is carrying out shall comply with the following requirements:
   - ambient temperature: 15°C to 35°C;
   - relative humidity : 45% to 75%;
   - atmospheric pressure : 86 kPa (860 mbar) to 106 kPa (1060 mbar).

b. In order to minimize the effect of environmental parameters on test results, the electromagnetic environment of the laboratory shall not influence the test results.

c. The variety and diversity of equipment and systems to be tested make it difficult to establish general criteria for the evaluation of the effects of fast transients/bursts on equipment and systems.

d. The test results may be classified on the basic of the operating conditions and the functional specification of the equipment under test, according to the following performance criteria :
   - Normal performance within the specification limits.
   - Temporary degradation or loss of function or performance which is self-recoverable.
   - Temporary degradation or loss of function or performance which requires operator intervention or system reset.
   - Degradation or loss of function which is not recoverable due to damage of equipment (components).

12.4. Test Result

Refer as Appendix F

13. Surge Immunity Test

13.1. Test Specification

Reference Standard	EN 61000-4-5 / IEC 61000-4-5	
Test Voltage	For EN 301 489-1	AC Power Port: line to line：± 0.5, 1 kV Indoor Telecommunication/Signal Port: ± 0.5 kV
	For EN 55024	AC Power Port: line to line：± 0.5, 1 kV
Polarity	Positive / Negative	
Wave Shape	For EN 301 489-1	Power Port: 1.2/50 us Open-circuit voltage 8/20 us Short-circuit current Telecommunication/Signal port: Indoor 1.2/50 us Open-circuit voltage 8/20 us Short-circuit current
	For EN 55024	Power Port: 1.2/50 us Open-circuit voltage 8/20 us Short-circuit current
Phase Angle	0°, 90°, 180°, 270°	
Time between successive pulses	60 sec.	
Number of test	5 positive and 5 negative	

13.2. Test Setup

13.3. Test Procedure

a. Climatic conditions
The climatic conditions shall comply with the following requirements :
-- ambient temperature : 15 ˚C to 35 ˚C
-- relative humidity : 10 % to 75 %
-- atmospheric pressure : 86 kPa to 106 kPa (860 mbar to 1060 mbar)

b. Electromagnetic conditions
The electromagnetic environment of the laboratory shall not influence the test results.

c. The test shall be performed according the test plan that shall specify the test set-up with
-- generator and other equipment utilized;
-- test level (voltage/current);
-- generator source impedance;
-- internal or external generator trigger;
-- number of tests: at least five positive and five negative at the selected points;
-- repetition rate: maximum 1/min.
-- inputs and outputs to be tested;
-- representative operating conditions of the EUT;
-- sequence of application of the surge to the circuit;
-- phase angle in the case of a.c. power supply;
-- actual installation conditions, for example :
AC : neutral earthed,
DC : (+) or (-) earthed to simulated the actual earthing conditions.

d. If not otherwise specified the surges have to be applied synchronized to the voltage phase at the zero-crossing and the peak value of the a.c. voltage wave (positive and negative).

e. The surges have to be applied line to line and line(s) and earth. When testing line to earth, the test voltage has to be applied successively between each of the lines and earth, if there is no other specification.

f. The test procedure shall also consider the non-linear current-voltage characteristics of the equipment under test. Therefore the test voltage has to be increased by steps up to the test level specified in the product standard or test plan.

g. If the actual operating signal sources are not available, the may be simulated. Under no circumstances may the test level exceed the product specification. The test shall be carried out according the a test plan.

h. To find all critical points of the duty cycle of the equipment, a sufficient number of positive and negative test pulses shall be applied. For acceptance test a previously unstressed equipment shall be used to the protection devices shall be replaced.

13.4. Test Result

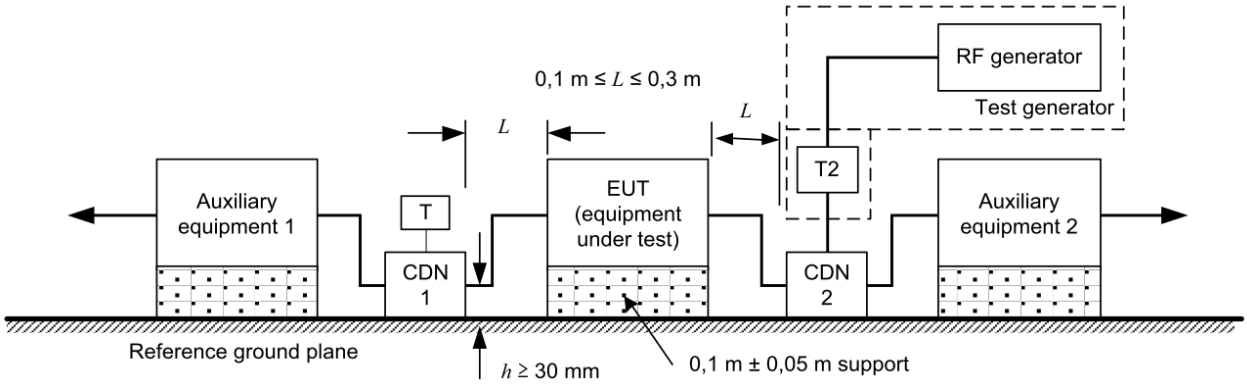
Refer as Appendix F

14. Conducted Disturbances Induced by Radio-Frequency Field Immunity Test (CS)

14.1. Test Specification

Reference Standard	EN 61000-4-6 / IEC 61000-4-6
Frequency Range	150 kHz~80 MHz
Field Strength	3 Vr.m.s (un-modulated, r.m.s) 80% AM (1 kHz)
Frequency Step	1 %
Dwell Time	2.9 sec
Coupling mode	CDN M016 (M2), CDN T8-10

14.2. Test Setup



14.3. Test Procedure

a. The EUT shall be operated within its intended climatic conditions. The temperature and relative humidity should be recorded.

b. This test method test can be performed without using a self-shielded enclosure. This is because the disturbance levels applied and the geometry of the setups are not likely to radiated a high amount of energy, especially at the lower frequencies. If under certain circumstances the radiated energy is too high, a shielded enclosure has to be used.

c. The test shall be performed with the test generator connected to each of the coupling and decoupling devices in turn while the other non-excited RF-input ports of the coupling devices are terminated by a 50 ohm load resistor.

d. The frequency range is swept from 150 kHz to 80 MHz, using the signal levels established during the setting process, and with the disturbance signal 80% amplitude modulated with a 1kHz sinewave, pausing to adjust the RF-signal level or to switch coupling devices as necessary. The rate of sweep shall no exceed 1.5×10^{-3} decades/s. Where the frequency is swept incrementally, the step size shall no exceed 1% of the start and thereafter 1% of the preceding frequency value.

e. The dwell time at each frequency shall not be less than the time necessary for the EUT to be exercised, and able to respond. Sensitive frequencies e.g. clock frequency(ies) and harmonics or frequencies of dominant interest shall be analyzed separately.

f. In cases of dispute, the test procedure using a step size not exceeding 1% of the start and thereafter 1% of preceding frequency value shall take precedence.

g. Attempts should be made to fully exercise the EUT during testing, and to fully interrogate all exercise modes selected for susceptibility.

h. The use of special exercising programs is recommended.

i. Testing shall be performed according to a Test Plan, which shall be included in the test report.

j. It may be necessary to carry out some investigatory testing in order to establish some aspects of the test plan.

14.4. Test Result

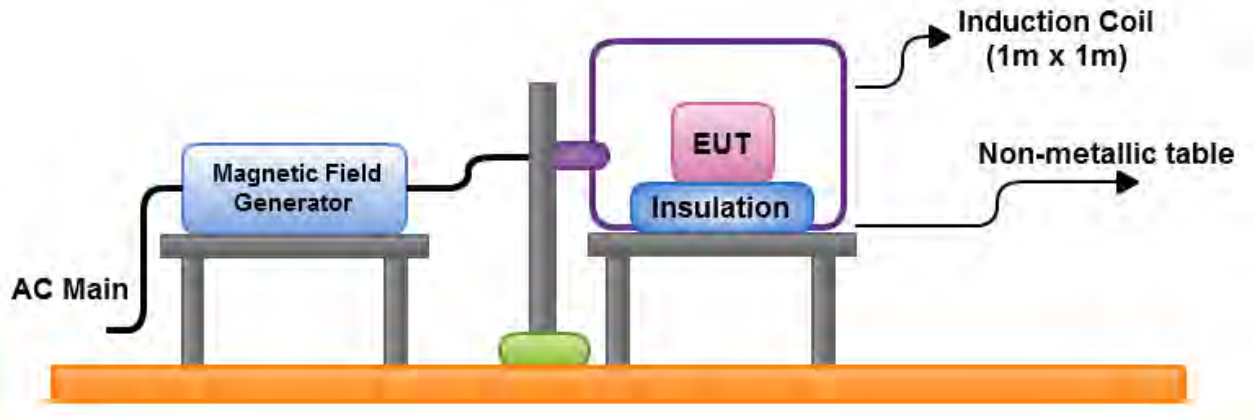
Refer as Appendix F

15. Power Frequency Magnetic Field Immunity Tests

15.1. Test Specification

Reference Standard	IEC 61000-4-8
Power Frequency	50 Hz
Field Strength	1 A/m
Observation type	1 min
Inductance Coil	1 m x 1 m

15.2. Test Setup



15.3. Test Procedure

a. The equipment is configured and connected to satisfy its functional requirements.

b. The power supply, input and output circuits shall be connected to the sources of power supply, control and signal.

c. The cables supplied or recommended by the equipment manufacturer shall be used. 1 meter of all cables used shall be exposed to the magnetic field.

15.4. Test Result

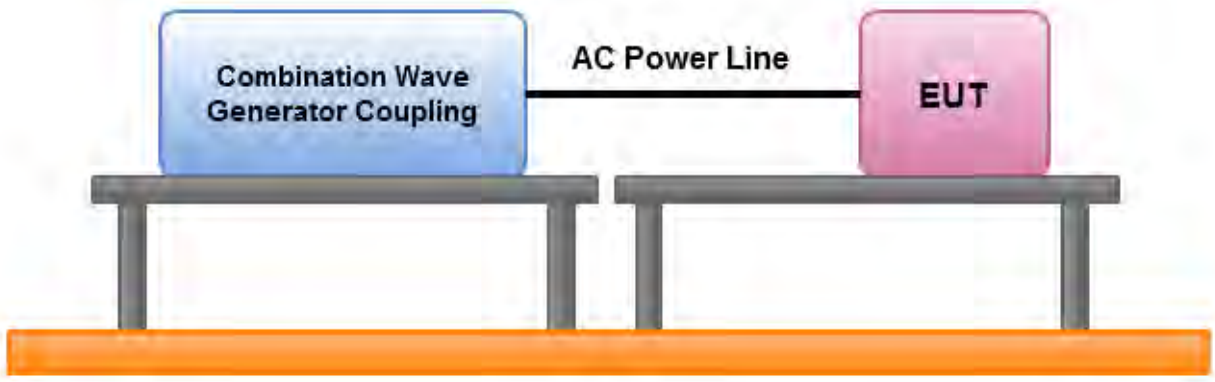
Refer as Appendix F

16. Voltage Dips and Voltage Interruptions Immunity Tests

16.1. Test Specification

Reference Standard	EN 61000-4-11 / IEC 61000-4-11	
Test Voltage	For EN 301 489-1	Voltage Dip：
		1. 0% residual, 0.5 period
		2. 0% residual, 1.0 period
		3. 70% residual, 25 period
		Voltage interruptions
		4. 0% residual, 250 period
	For EN 55024	Voltage Dip：
		1. >95%, Reduction, 0.5 period
		2. 30%, Reduction, 25 period
		Voltage interruptions
		3. >95%, Reduction, 250 period
Test Duration Time	3 times	
Intervals between event	10 sec.	
Test Angle	0, 180°	

16.2. Test Setup



16.3. Test Conditions

1. Source voltage and frequency: 100/230/240V / 50Hz, Single phase.
2. Test of interval: 10 sec.
3. Level and duration: Sequency of 3 dips/interrupts.
4. Voltage rise (and fall) time: 1 ~ 5 μs.

16.4. Test Result

Refer as Appendix F

17. List of Measuring Equipment Used

<EMI>

Instrument	Manufacturer	Model No.	Serial No.	Characteristics	Calibration Date	Calibration Due Date	Remark
LISN	Schwarzbeck	NSLK 8127	8127650	9kHz ~ 30MHz	Nov. 21, 2018	Nov. 20, 2019	Conduction (CO02-CB)
LISN	Schwarzbeck	NSLK 8127	8127478	9kHz ~ 30MHz	Nov. 05, 2018	Nov. 04, 2019	Conduction (CO02-CB)
EMI Receiver	Agilent	N9038A	MY52260140	9kHz ~ 8.4GHz	Jan. 17, 2018	Jan. 16, 2019	Conduction (CO02-CB)
Impedance Stabilization Network	Teseq GmbH	ISN T800	34403	150kHz ~ 30MHz	May 22, 2018	May 21, 2019	Conduction (CO02-CB)
COND Cable	Woken	Cable	2	0.15MHz ~ 30MHz	Nov. 06, 2018	Nov. 05, 2019	Conduction (CO02-CB)
Software	Audix	E3	6.120210n	-	N.C.R.	N.C.R.	Conduction (CO02-CB)
10m Semi Anechoic Chamber	TDK	NSA	10CH01-CB	30MHz~1GHz 10m,3m	Mar. 16, 2018	Mar. 15, 2019	Radiation (10CH01-CB)
10m Semi Anechoic Chamber	TDK	VSWR	10CH01-CB	1GHz ~18GHz 3m	Mar. 17, 2018	Mar. 16, 2019	Radiation (10CH01-CB)
Pre-Amplifier	Agilent	8447D	2944A10783	9kHz ~ 1.3GHz	Mar. 26, 2018	Mar. 25, 2019	Radiation (10CH01-CB)
Pre-Amplifier	Agilent	8447D	2944A10784	9kHz ~ 1.3GHz	Mar. 13, 2018	Mar. 12, 2019	Radiation (10CH01-CB)
Low Cable	Woken	SUCOFLEX 104	low cable-01	25MHz ~ 1GHz	Nov. 06, 2018	Nov. 05, 2019	Radiation (10CH01-CB)
High Cable	Woken	SUCOFLEX 104	low cable-02	25MHz ~ 1GHz	Nov. 06, 2018	Nov. 05, 2019	Radiation (10CH01-CB)
Biconical Antenna	Schwarzbeck	VHBB 9124	324	30MHz ~ 200MHz	Apr. 24, 2018	Apr. 23, 2019	Radiation (10CH01-CB)
Log Antenna	Schwarzbeck	VUSLP 9111	247	200MHz ~ 1GHz	May 22, 2018	May 21, 2019	Radiation (10CH01-CB)
EMI Test Receiver	Rohde&Schwarz	ESCI	100186	9kHz ~ 3GHz	Jul. 10, 2018	Jul. 09, 2019	Radiation (10CH01-CB)
Spectrum Analyzer	Rohde&Schwarz	FSV30	101026	9kHz ~ 30GHz	Jan. 10, 2018	Jan. 09, 2019	Radiation (10CH01-CB)
Horn Antenna	ESCO	3117	00081283	1GHz ~ 18GHz	Dec. 11, 2018	Dec. 10, 2019	Radiation (10CH01-CB)
Amplifier	Agilent	8449B	3008A02660	1GHz ~ 26.5GHz	May 23, 2018	May 22, 2019	Radiation (10CH01-CB)
CABLE(1~40G)	Woken	SUCOFLEX 104	high cable-01	1GHz ~ 40GHz	Nov. 06, 2018	Nov. 05, 2019	Radiation (10CH01-CB)
Software	Audix	E3	6.120210m	-	N.C.R.	N.C.R.	Radiation (10CH01-CB)

※ Calibration Interval of instruments listed above is one year.

※ N.C.R. means Non-Calibration required.

<EMS>

Instrument	Manufacturer	Model No.	Serial No.	Characteristics	Calibration Date	Calibration Due Date	Remark
Harmonic/Flicker	Teseq	CCN 1000-1	1306A00130	N/A	Mar. 06, 2018	Mar. 05, 2019	Harmonic/ Flicker
Software	Teseq	WIN2100V3	-	-	N.C.R.	N.C.R.	Harmonic/ Flicker
ESD Simulator	Teseq QG	NSG 437	1053	Air: 0 kV ~ 30 kV, Contact: 0 kV ~ 30kV	Nov. 12, 2018	Nov. 11, 2019	ESD
Signal Generator	ROHDE& SCHWARZ	SMB100A	108589	9kHz ~ 6GHz	May 17, 2018	May 16, 2019	RS06-HY
Amplifier	MILMEGA	80RF1000-300	1079234	80MHz ~ 1GHz, 300W	N.C.R.	N.C.R.	RS06-HY
Amplifier	MILMEGA	AS0860B-50/50	1079525	0.8 ~ 6GHz ,50W(0.8GHz~2GHz and 1.8GHz~6.0GHz)	N.C.R.	N.C.R.	RS06-HY
AMPLIFIER CONTROLLER	MILMEGA	AC-001	N/A	N/A	N.C.R.	N.C.R.	RS06-HY
Antenna	AR	ATL80M1G	0348541	80MHz ~ 1GHz	N.C.R.	N.C.R.	RS06-HY
Antenna	SCHWARZBECK	STLP 9149	STLP9149 #490	700MHz ~ 10.5GHz	N.C.R.	N.C.R.	RS06-HY
Power Meter	Keysight	N1914A	MY57070002	9 kHz to 110 GHz	Apr. 18, 2018	Apr. 17, 2019	RS06-HY
Power Sensor	KEYSIGHT	E9304A	MY57020004	9K-6G	Apr. 18, 2018	Apr. 17, 2019	RS06-HY
Power Sensor	KEYSIGHT	E9304A	MY57030009	9K-6G	Apr. 18, 2018	Apr. 17, 2019	RS06-HY
RF-SWITCH NETWORK	TESEQ	RFB 2000	45818	N/A	N.C.R.	N.C.R.	RS06-HY
Surge/EFT/Dip Generator	Teseq AG	NSG 3060	1534	Surge 0 ~ 6kV EFT 0 kV ~ 4.4 kV Dip 100~240V/ 50Hz /60Hz	Apr. 17, 2018	Apr. 16, 2019	Surge/ EFT/Dip
Burst/EFT Dataline Coupling Clamp	Teseq AG	CDN 3425	1776	0.25kV~4kV	Feb. 07, 2018	Feb. 06, 2019	EFT
Surge Coupling Decoupling Network	Teseq GebH	CDN HSS-2	34283	0.25kV~4kV	Jun. 13, 2018	Jun. 12, 2019	Surge
Software	Teseq AG	NSG3000	-	-	N.C.R.	N.C.R.	Surge/ EFT/Dip
RF-Generator	Teseq GmbH	NSG 4070B-30	035084	150kHz~230MHz	Apr. 27, 2018	Apr. 26, 2019	CS
Coupling decoupling network	Teseq GmbH	CDN M016	34634	150kHz~80MHz	Apr. 25, 2018	Apr. 24, 2019	CS
Coupling decoupling network	Teseq GmbH	CDN T8-10	46729	150kHz~230MHz	Jul. 24, 2018	Jul. 23, 2019	CS

Software	Tesq	NSG4070	030593.V1.28	-	N.C.R.	N.C.R.	CS
Magnetic field Immunity Loop	FCC	F-1000-4-8/9 /10-L-1AM	04014,04017	30A//CONTINUOUS, 100A/2Hrs, 230A/30SEC	Jul. 31, 2018	Jul. 30, 2019	Magnetic

※ Calibration Interval of instruments listed above is one year.

※ N.C.R. means Non-Calibration required.

18. Uncertainty of Test Site

Test Items	Uncertainty	Remark
Conducted Emissions	2.0 dB	Confidence levels of 95%
Radiated Emissions below 1GHz	4.6 dB	Confidence levels of 95%
Radiated Emissions above 1GHz	5.4 dB	Confidence levels of 95%

Immunity Test Measurement Uncertainty

Electrostatic Discharge Immunity (ESD)

Negative Discharge Current

From Standard					From calibration certificate					
2kV	First Peak Current	Current at 30ns	Current at 60ns		Measured First Peak Current	1st Peak Worst case **+5%**	Measured Current at 30ns	30ns Worst case **+5%**	Measured Current at 60ns	60ns Worst case **+5%**
Nominal	7.5	4.0	2.0	Positive	7.5	7.9	4.1	4.3	2.2	2.3
Min.	6.4	2.8	1.4	Negative	7.5	7.9	4.0	4.2	2.0	2.1
Max.	8.6	5.2	2.6	Min.		6.4		2.8		1.4
Tolerance in %	0.2	0.3	0.3	Max.		8.6		5.2		2.6

4kV	First Peak Current	Current at 30ns	Current at 60ns		Measured First Peak Current	1st Peak Worst case **+5%**	Measured Current at 30ns	30ns Worst case **+5%**	Measured Current at 60ns	60ns Worst case **+5%**
Nominal	15.0	8.0	4.0	Positive	13.5	14.1	7.9	8.3	4.0	4.2
Min.	12.8	5.6	2.8	Negative	13.9	14.6	7.9	8.3	4.0	4.2
Max.	17.3	10.4	5.2	Min.		12.8		5.6		2.8
Tolerance in %	0.2	0.3	0.3	Max.		17.3		10.4		5.2

6kV	First Peak Current	Current at 30ns	Current at 60ns		Measured First Peak Current	1st Peak Worst case **-5%**	Measured Current at 30ns	30ns Worst case **+5%**	Measured Current at 60ns	60ns Worst case **+5%**
Nominal	22.5	12.0	6.0	Positive	21.2	22.2	12.2	12.9	6.3	6.7
Min.	19.1	8.4	4.2	Negative	21.3	22.3	12.3	12.9	6.2	6.6
Max.	25.9	15.6	7.8	Min.		19.1		8.4		4.2
Tolerance in %	0.2	0.3	0.3	Max.		25.9		15.6		7.8

8kV	First Peak Current	Current at 30ns	Current at 60ns		Measured First Peak Current	1st Peak Worst case **-5%**	Measured Current at 30ns	30ns Worst case **+5%**	Measured Current at 60ns	60ns Worst case **+5%**
Nominal	30.0	16.0	8.0	Positive	29.5	31.0	17.1	18.0	8.8	9.3
Min.	25.5	11.2	5.6	Negative	29.3	30.8	16.9	17.7	8.2	8.6
Max.	34.5	20.8	10.4	Min.		25.5		11.2		5.6
Tolerance in %	0.2	0.3	0.3	Max.		34.5		20.8		10.4

Negative Discharge Voltage

Standard Parameters					Calculated Range		
Indicated Voltage (kV)	Polarity	Tolerance (%)	Max. (kV)	Min. (kV)	Calibration (kV)	Max. (kV)	Min. (kV)
2	Positive	15.0	2.3	1.7	2.0	2.0	2.0
	Negative	15.0	2.3	1.7	-2.1	-2.1	-2.1
4	Positive	15.0	4.6	3.4	4.1	4.1	4.1
	Negative	15.0	4.6	3.4	-4.1	-4.1	-4.1
6	Positive	15.0	6.9	5.1	6.1	6.1	6.1
	Negative	15.0	6.9	5.1	-6.1	-6.1	-6.1
8	Positive	15.0	9.2	6.8	8.1	8.1	8.1
	Negative	15.0	9.2	6.8	-8.2	-8.2	-8.2
15	Positive	15.0	17.3	12.8	15.3	15.3	15.3
	Negative	15.0	17.3	12.8	-15.0	-15.0	-15.0

It has been demonstrated that the ESD generator meets the specified requirements in the standard with at least a 95% confidence.

Radio Frequency Electromagnetic Field Immunity (RS)

Calibration process	1.3 dB
Level setting	1.7 dB

It has been demonstrated that the RS generator meets the specified requirements in the standard with at least a 95% confidence.

Electrical Fast Transient/Burst Immunity (EFT/BURST)
Voltage

Impedance	Voltage Setting(V)	Expected (V)	Actual (V)	Uncertainty (%)	T1	Uncertainty (%)	T2	Uncertainty (%)
50Ω	250	125	126	6.1	3.71	5.1	50.86	5.1
50Ω	500	250	253	6.2	4.37	5.1	47.98	5.1
50Ω	1000	500	516	6.0	4.3	5.1	45.6	5.1
50Ω	2000	1000	1035	6.0	4.35	5.1	44.99	5.1
50Ω	4000	2000	2042	5.9	5.13	5.1	45.49	5.1
50Ω	-500	-250	-248	6.0	4.02	5.1	49.51	5.1
50Ω	-1000	-500	-516	6.0	4.48	5.1	48.03	5.1
50Ω	-2000	-1000	-1020	6.0	4.5	5.1	44.32	5.1
50Ω	-4000	-2000	-2032	6.0	4.52	5.1	43.39	5.1
1kΩ	500	500	470	6.0	4.34	5.1	93.68	5.1
1kΩ	1000	1000	964	6.3	4.36	5.1	72.77	5.1
1kΩ	2000	2000	1929	6.0	4.38	5.1	72.19	5.1
1kΩ	4000	4000	3776	6.0	4.9	5.1	81.94	5.1
1kΩ	-500	-500	-447	6.2	4.39	5.1	83.53	5.1
1kΩ	-1000	-1000	-946	6.0	4.38	5.1	76.24	5.1
1kΩ	-2000	-2000	-1876	6.0	4.52	5.1	73.84	5.1
1kΩ	-4000	-4000	-3740	6.0	5.18	5.1	79.76	5.1

EFT Repetition Frequency (Voltage @ 1 kV)

Setting (kHz)	Actual (kHz)	Uncertainty (%)	Tolerance (%)
2.5	2.5	5.1	20%
5	5.01	5.1	20%
100	99.96	5.1	20%

Burst Duration (Voltage @ 1 kV)

Setting (ms)	Repetition Freq. (kHz)	Actual (ms)	Uncertainty (%)	Tolerance (%)
15	5	14.81	5.1	20%
0.75	100	0.74	5.1	20%

Burst Period (Voltage @ 1 kV)

Setting (ms)	Repetition Freq. (kHz)	Actual (ms)	Uncertainty (%)	Tolerance (%)
300	5	300.6	5.1	20%
300	100	299.8	5.1	20%

It has been demonstrated that the EFT/BURST generator meets the specified requirements in the standard with at least a 95% confidence.

Surge Immunity

Open Circuit Output Voltage Waveform check:

Impedance	Voltage Setting(V)	Actual (V)	Uncertainty (%)	T3	Uncertainty (%)	T4	Uncertainty (%)
L-N 2Ω	500	476	5.6	1.29	4.6	54.23	4.6
L-N 2Ω	4000	3831	5.6	1.16	4.6	52.31	4.6
L-N 2Ω	-500	-479	5.6	1.3	4.6	54.13	4.6
L-N 2Ω	-4000	-3885	5.6	1.16	4.6	52.07	4.6
L-G 12Ω	500	452	5.6	1.33	4.6	30.31	4.6
L-G 12Ω	6000	5640	5.6	0.97	4.6	29	4.6
L-G 12Ω	-500	-466	5.6	1.31	4.6	30.22	4.6
L-G 12Ω	-6000	-6038	5.6	1.21	4.6	28.53	4.6
N-G 12Ω	500	461	5.6	1.32	4.6	30.41	4.6
N-G 12Ω	6000	5609	5.6	0.86	4.6	29.6	4.6
N-G 12Ω	-500	-460	5.6	1.33	4.6	30.25	4.6
N-G 12Ω	-6000	-5694	5.6	1.09	4.6	28.72	4.6
Impulse	500	473	5.6	1.45	4.6	56.27	4.6
Impulse	6000	5778	5.6	1.19	4.6	54.83	4.6
Impulse	-500	-472	5.6	1.43	4.6	58.54	4.6
Impulse	-6000	-5860	5.6	1.21	4.7	54.49	4.6

Short Circuit Output Voltage Waveform check:

Impedance	Voltage Setting(V)	Actual (V)	Uncertainty (%)	T5	Uncertainty (%)	T6	Uncertainty (%)
L-N 2Ω	500	225	4.8	7.2	3.4	19.15	3.4
L-N 2Ω	4000	1884	4.8	7.1	3.4	19.63	3.4
L-N 2Ω	-500	-225	4.8	7.06	3.4	19.45	3.4
L-N 2Ω	-4000	-1867	4.8	7.16	3.4	19.71	3.4
L-G 12Ω	500	42	4.8	1.98	3.4	25.35	3.4
L-G 12Ω	6000	502	4.8	2.28	3.4	24.62	3.4
L-G 12Ω	-500	-39	4.8	2.01	3.4	24.87	3.4
L-G 12Ω	-6000	-504	4.8	2.32	3.4	24.74	3.4
N-G 12Ω	500	39	4.8	2.67	3.4	25.28	3.4
N-G 12Ω	6000	495	4.8	2.79	3.4	25.37	3.4
N-G 12Ω	-500	-39	4.8	2.62	3.4	25.45	3.4
N-G 12Ω	-6000	-493	4.8	2.8	3.4	25.4	3.4
Impulse	500	225	4.8	7.43	3.4	19.52	3.4
Impulse	6000	2946	4.8	7.32	3.4	19.27	3.4
Impulse	-500	-226	4.8	7.39	3.4	19.52	3.4
Impulse	-6000	-2948	4.8	7.29	3.4	19.31	3.4

It has been demonstrated that the Surge generator meets the specified requirements in the standard with at least a 95% confidence.

Conducted Disturbances Induced by Radio-Frequency Field Immunity (CS)

RF Frequency Measurement Check		RF Generator Second Harmonic Check
Reading	Standard	Harmonic (dBc)
9.000 kHz	8.999960682 kHz	-48.6
50.000 kHz	49.99978775 kHz	-44.6
100.000 kHz	99.99957519 kHz	-45.6
1.000000 MHz	0.99999716 MHz	-44.3
5.000000 MHz	4.99997873 MHz	-45.6
10.000000 MHz	9.99995741 MHz	-47.5
50.000000 MHz	49.9997877 MHz	-48.3
100.000000 MHz	99.9995757 MHz	-46.2
500.000000 MHz	499.997880 MHz	-47.1
1000.000000 MHz	999.995761 MHz	-48.5

RF Generator AM Modulation Measurement Check (1 kHz ; 80 %)			
Frequency	Mod. Freq.	Reading	Standard
100.000 kHz	1 kHz	80.00%	79.90%
1.000000 MHz	1 kHz	80.00%	80.90%
5.000000 MHz	1 kHz	80.00%	81.00%
10.000000 MHz	1 kHz	80.00%	80.70%
50.000000 MHz	1 kHz	80.00%	80.90%
100.000000 MHz	1 kHz	80.00%	80.80%
500.000000 MHz	1 kHz	80.00%	81.50%
1000.000000 MHz	1 kHz	80.00%	80.90%

RF Generator Response and Accuracy Measurement Check		
Frequency	Reading (dBm)	Standard (dBm)
9.000 kHz	0	0.17
50.000 kHz	0	0.19
100.000 kHz	0	0.22
1.000000 MHz	0	0.25
5.000000 MHz	0	0.23
10.000000 MHz	0	0.19
50.000000 MHz	0	-0.14
50.000000 MHz	-10	-10.28
50.000000 MHz	-20	-20.29
50.000000 MHz	-30	-30.28
50.000000 MHz	-40	-40.36
50.000000 MHz	-50	-50.42
100.000000 MHz	0	0.16
500.000000 MHz	0	0.16
1000.000000 MHz	0	0.01

RF Power Meter Measurement Check			
Frequency (MHz)		Standard (dBm)	Reading (dBm)
CH 1	50	10	9.96
CH 1	50	0	-0.03
CH 1	50	-10	-10.05
CH 1	50	-15	-15.04
CH 2	50	10	9.92
CH 2	50	0	-0.08
CH 2	50	-10	-10.05
CH 2	50	-15	-15.09

Power Amplifier Gain Flatness Measurement		Power Amplifier Standard Measurement (Input: 10 dBm)		Power Amplifier Second Harmonic Measurement Check
Frequency	Reading (dB)	Result (dBm)	Spec. (dBm)	Reading (dBc)
150.000 kHz	48.9	46.7	> 44.77	-47.5
1.000000 MHz	49.3	46.9	> 44.77	-47.2
5.000000 MHz	49.4	47.1	> 44.77	-49.5
10.000000 MHz	49.4	47.1	> 44.77	-48.7
50.000000 MHz	49	47.1	> 44.77	-49.2
100.000000 MHz	48.4	46.9	> 44.77	-48
200.000000 MHz	48	45.8	> 44.77	-53.5
2300.000000 MHz	48.4	45.3	> 44.77	-55.7

Uncertainty: Frequency: 1.9×10^{-9}
Linear: 0.9 dB
RF Power Level: 1.2 dB
Harmonic: 2.0 dB

It has been demonstrated that the CS generator meets the specified requirements in the standard with at least a 95% confidence.

Power Frequency Magnetic Field Immunity
AC Current Accuracy Check

Freq.(Hz)	Range (A)	Standard (A)	Reading (A)	Uncertainty (%)
50	0~10	1.062	1.02	0.3
50	0~10	3.143	3.03	0.3
50	0~10	5.177	5.03	0.3
50	0~10	10.406	10.15	0.3
50	10~125	10.65	10	0.3
50	10~125	31.11	30.2	0.3
50	10~125	51.36	50.1	0.3
50	10~125	101.8	100	0.3
60	0~10	1.08	1	0.3
60	0~10	3.081	3.02	0.3
60	0~10	5.093	5.03	0.3
60	0~10	10.275	10.18	0.3
60	10~125	10.54	9.9	0.3
60	10~125	30.81	30.02	0.3
60	10~125	51.05	50.3	0.3
60	10~125	101.04	100.2	0.3

Magnetic Measurement Check：(@50Hz)

Range (A)	Standard (A/m)	Reading (A)	Uncertainty (%)
0~10	1	1.04	1.0
0~10	3	3.22	1.0
0~10	10	10.89	1.0
10~125	10	11.3	1.0
10~125	30	33.6	1.0
10~125	100	104.8	1.0

It has been demonstrated that the PFMF the specified requirements in the standard with at least a 95% confidence.

Voltage Dips and Voltage Interruptions Immunity

PQF Measurement: (Input Voltage: 230V/50Hz)

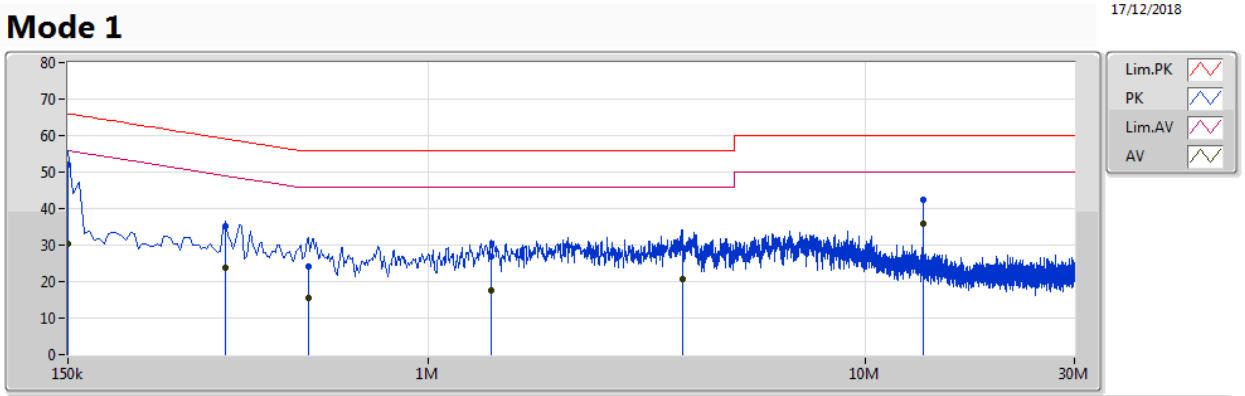
Level	Load	Actual (V)	Uncertainty (mV/V)	Tolerance (%)
80%	100Ω	180.7	17	184 +/- 5%
70%	100Ω	158.3	17	161 +/- 5%
40%	100Ω	89.3	17	92 +/- 5%
0%	100Ω	6.8	17	-

VAR Check: (Input Voltage: 230V/50Hz)

Level	Load	Actual (V)	Uncertainty (mV/V)	Tolerance (%)
80%	100Ω	181.3	17	184 +/- 5%
70%	100Ω	159.2	17	161 +/- 5%
40%	100Ω	90.7	17	92 +/- 5%
0%	100Ω	6.7	17	-

It has been demonstrated that the Dip generator meets the specified requirements in the standard with at least a 95% confidence.

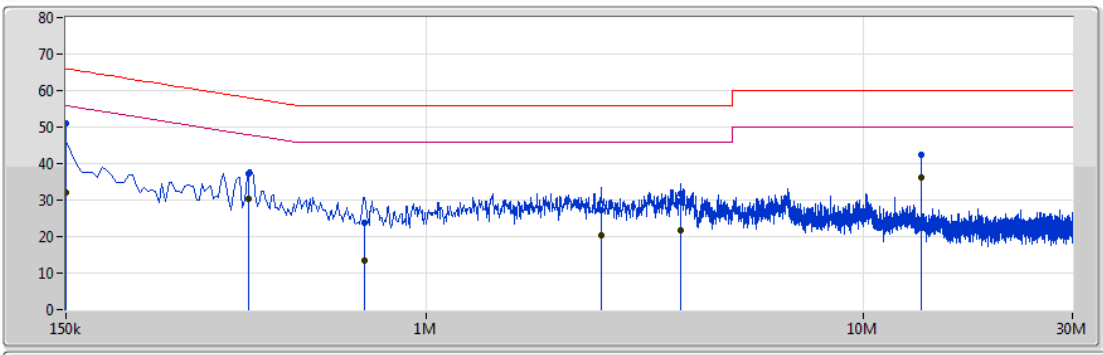
Test Mode	Mode 1	Frequency Range	0.15 MHz to 30 MHz



Type	Freq	Level	Limit	Margin	Factor	Condition	Comment	Raw	AF	CL	AT
	(Hz)	(dBuV)	(dBuV)	(dB)	(dB)			(dBuV)	(dB)	(dB)	(dB)
QP	150k	52.15	66.00	-13.85	10.17	Line	"Worst"	41.98	0.05	0.02	10.10
AV	150k	30.35	56.00	-25.65	10.17	Line	-	20.18	0.05	0.02	10.10
QP	343.5k	35.31	59.12	-23.81	10.18	Line	-	25.13	0.06	0.02	10.10
AV	343.5k	23.72	49.12	-25.40	10.18	Line	-	13.54	0.06	0.02	10.10
QP	532.5k	24.21	56.00	-31.79	10.18	Line	-	14.03	0.06	0.02	10.10
AV	532.5k	15.53	46.00	-30.47	10.18	Line	-	5.35	0.06	0.02	10.10
QP	1.392M	26.98	56.00	-29.02	10.21	Line	-	16.77	0.08	0.03	10.10
AV	1.392M	17.62	46.00	-28.38	10.21	Line	-	7.41	0.08	0.03	10.10
QP	3.822M	29.20	56.00	-26.80	10.29	Line	-	18.91	0.12	0.07	10.10
AV	3.822M	20.78	46.00	-25.22	10.29	Line	-	10.49	0.12	0.07	10.10
QP	13.56M	42.47	60.00	-17.53	10.44	Line	-	32.03	0.23	0.10	10.11
AV	13.56M	35.98	50.00	-14.02	10.44	Line	-	25.54	0.23	0.10	10.11

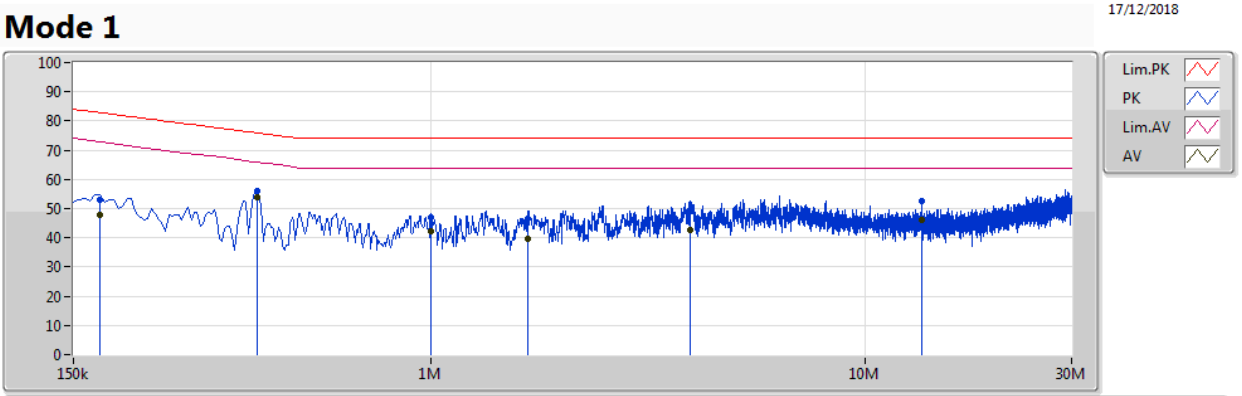
Mode 1

17/12/2018



Type	Freq	Level	Limit	Margin	Factor	Condition	Comment	Raw	AF	CL	AT
	(Hz)	(dBuV)	(dBuV)	(dB)	(dB)			(dBuV)	(dB)	(dB)	(dB)
QP	150k	51.17	66.00	-14.83	10.15	Neutral	-	41.02	0.03	0.02	10.10
AV	150k	32.02	56.00	-23.98	10.15	Neutral	-	21.87	0.03	0.02	10.10
QP	393k	37.12	58.01	-20.89	10.16	Neutral	-	26.96	0.04	0.02	10.10
AV	393k	30.44	48.01	-17.57	10.16	Neutral	-	20.28	0.04	0.02	10.10
QP	721.5k	23.65	56.00	-32.35	10.16	Neutral	-	13.49	0.04	0.02	10.10
AV	721.5k	13.35	46.00	-32.65	10.16	Neutral	-	3.19	0.04	0.02	10.10
QP	2.513M	27.33	56.00	-28.67	10.23	Neutral	-	17.10	0.07	0.06	10.10
AV	2.513M	20.51	46.00	-25.49	10.23	Neutral	-	10.28	0.07	0.06	10.10
QP	3.818M	31.57	56.00	-24.43	10.25	Neutral	-	21.32	0.08	0.07	10.10
AV	3.818M	21.66	46.00	-24.34	10.25	Neutral	-	11.41	0.08	0.07	10.10
QP	13.56M	42.52	60.00	-17.48	10.40	Neutral	-	32.12	0.19	0.10	10.11
AV	13.56M	36.26	50.00	-13.74	10.40	Neutral	"Worst"	25.86	0.19	0.10	10.11

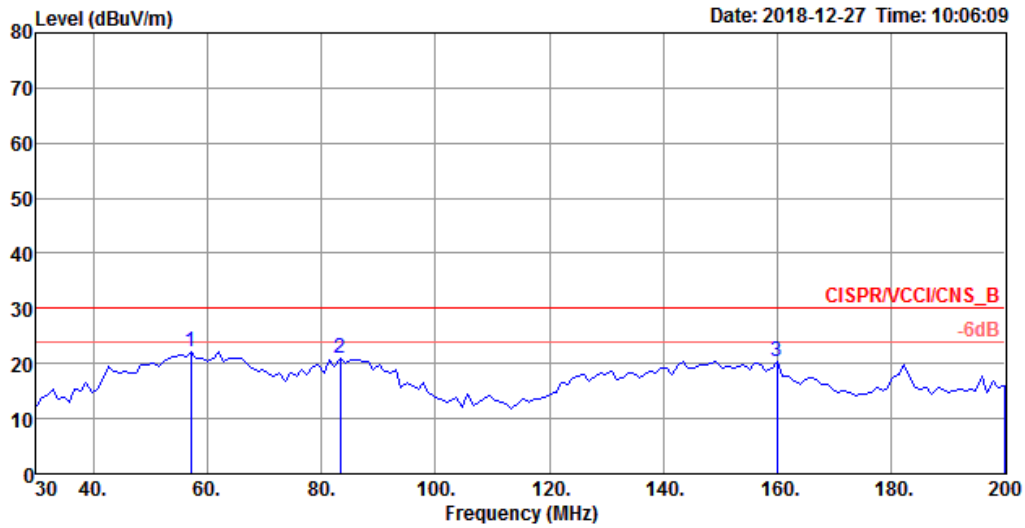
Test Mode	Mode 1	Frequency Range	0.15 MHz to 30 MHz



Type	Freq	Level	Limit	Margin	Factor	Condition	Comment	Raw	AF	CL	AT
	(Hz)	(dBuV)	(dBuV)	(dB)	(dB)			(dBuV)	(dB)	(dB)	(dB)
QP	172.5k	53.01	82.83	-29.82	20.12	ISN	-	32.89	10.00	0.02	10.10
AV	172.5k	47.89	72.83	-24.94	20.12	ISN	-	27.77	10.00	0.02	10.10
QP	397.5k	56.14	75.91	-19.77	20.08	ISN	-	36.06	9.96	0.02	10.10
AV	397.5k	53.86	65.91	-12.05	20.08	ISN	"Worst"	33.78	9.96	0.02	10.10
QP	1.001M	47.18	74.00	-26.82	19.68	ISN	-	27.50	9.56	0.02	10.10
AV	1.001M	42.27	64.00	-21.73	19.68	ISN	-	22.59	9.56	0.02	10.10
QP	1.676M	46.71	74.00	-27.29	19.65	ISN	-	27.06	9.51	0.04	10.10
AV	1.676M	39.66	64.00	-24.34	19.65	ISN	-	20.01	9.51	0.04	10.10
QP	3.966M	49.67	74.00	-24.33	19.63	ISN	-	30.04	9.46	0.07	10.10
AV	3.966M	42.54	64.00	-21.46	19.63	ISN	-	22.91	9.46	0.07	10.10
QP	13.56M	52.78	74.00	-21.22	19.70	ISN	-	33.08	9.49	0.10	10.11
AV	13.56M	46.21	64.00	-17.79	19.70	ISN	-	26.51	9.49	0.10	10.11

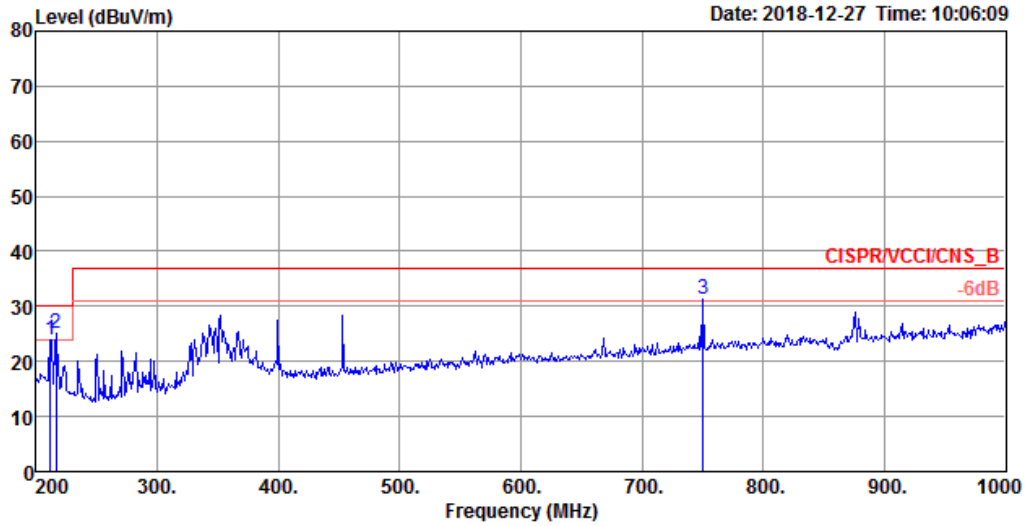
Test Mode	Mode 1	Frequency Range	30 MHz to 1,000 MHz

Vertical 30 MHz to 200 MHz



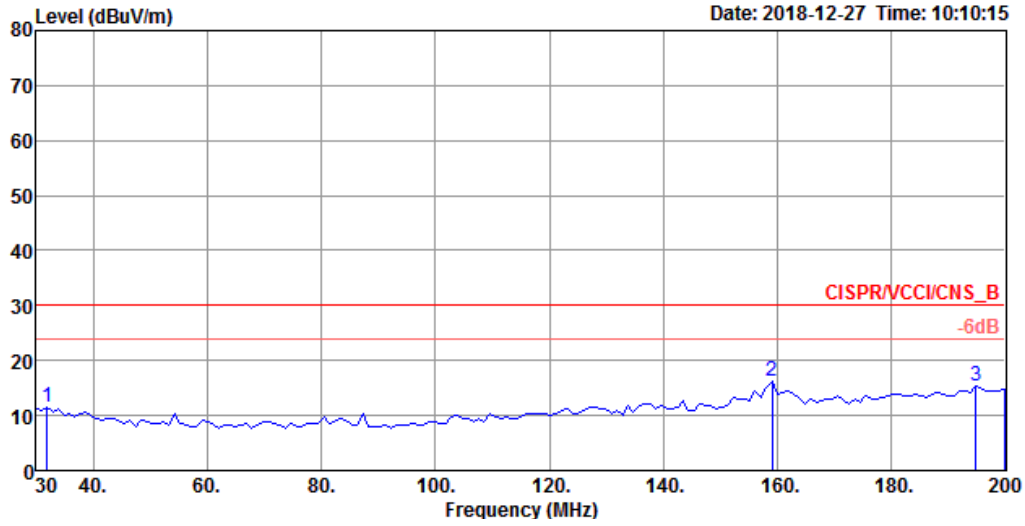
	Freq	Level	Limit Line	Over Limit	Read Level	Preamp Factor	Antenna Factor	Cable Loss	Remark	A/Pos	T/Pos	Pol/Phase
	MHz	dBuV/m	dBuV/m	dB	dBuV	dB	dB/m	dB		cm	deg	
1	57.16	22.25	30.00	-7.75	39.97	28.57	9.64	1.21	Peak	200	9	VERTICAL
2	83.35	20.85	30.00	-9.15	38.53	28.49	9.03	1.78	Peak	100	358	VERTICAL
3	159.98	20.31	30.00	-9.69	33.61	28.15	12.10	2.75	Peak	100	112	VERTICAL

Vertical 200 MHz to 1,000 MHz



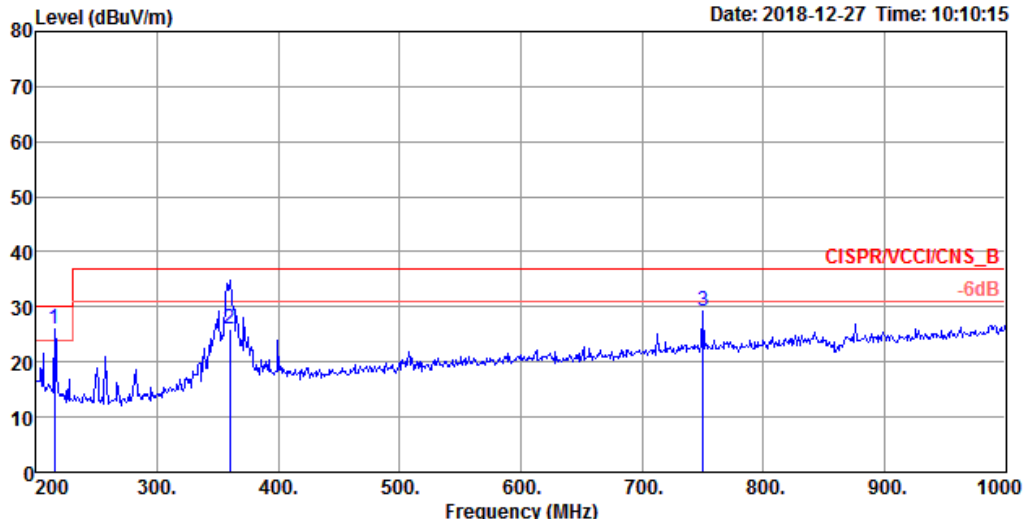
	Freq	Level	Limit Line	Over Limit	Read Level	Preamp Factor	Antenna Factor	Cable Loss	Remark	A/Pos	T/Pos	Pol/Phase
	MHz	dBuV/m	dBuV/m	dB	dBuV	dB	dB/m	dB		cm	deg	
1	211.39	24.02	30.00	-5.98	33.02	27.29	15.29	3.00	Peak	400	310	VERTICAL
2	216.24	25.19	30.00	-4.81	34.87	27.28	14.57	3.03	Peak	300	108	VERTICAL
3	750.71	31.18	37.00	-5.82	32.79	28.02	20.70	5.71	Peak	200	11	VERTICAL

Horizontal 30 MHz to 200 MHz



	Freq	Level	Limit Line	Over Limit	Read Level	Preamp Factor	Antenna Factor	Cable Loss	Remark	A/Pos	T/Pos	Pol/Phase
	MHz	dBuV/m	dBuV/m	dB	dBuV	dB	dB/m	dB		cm	deg	
1	31.94	11.57	30.00	-18.43	26.48	28.63	12.94	0.78	Peak	200	177	HORIZONTAL
2	159.01	16.10	30.00	-13.90	29.43	28.15	12.08	2.74	Peak	400	319	HORIZONTAL
3	194.90	15.24	30.00	-14.76	25.92	27.98	14.15	3.15	Peak	400	356	HORIZONTAL

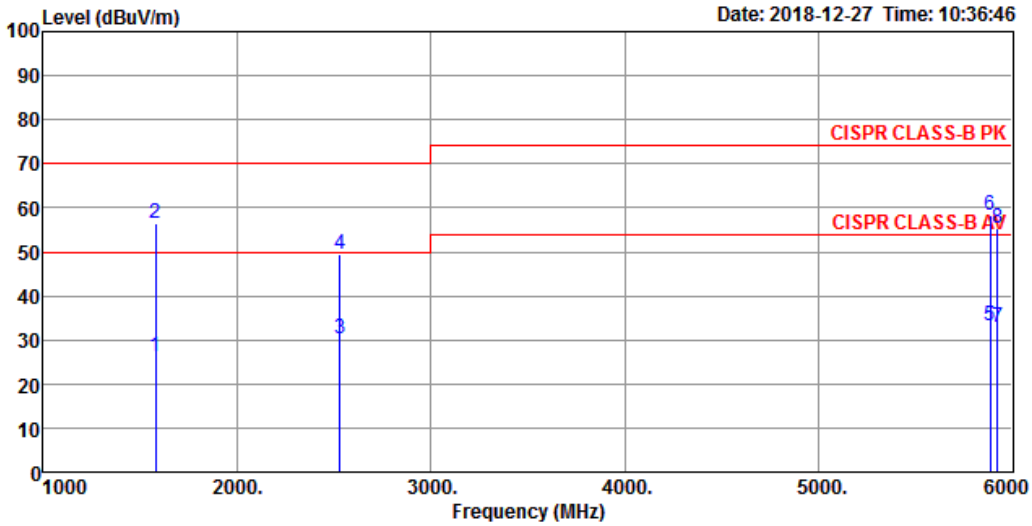
Horizontal 200 MHz to 1,000 MHz



	Freq	Level	Limit Line	Over Limit	Read Level	Preamp Factor	Antenna Factor	Cable Loss	Remark	A/Pos	T/Pos	Pol/Phase
	MHz	dBuV/m	dBuV/m	dB	dBuV	dB	dB/m	dB		cm	deg	
1	215.27	26.07	30.00	-3.93	35.61	27.28	14.72	3.02	Peak	400	180	HORIZONTAL
2	359.80	25.94	37.00	-11.06	33.90	27.62	15.72	3.94	QP	200	4	HORIZONTAL
3	750.71	29.31	37.00	-7.69	30.92	28.02	20.70	5.71	Peak	100	14	HORIZONTAL

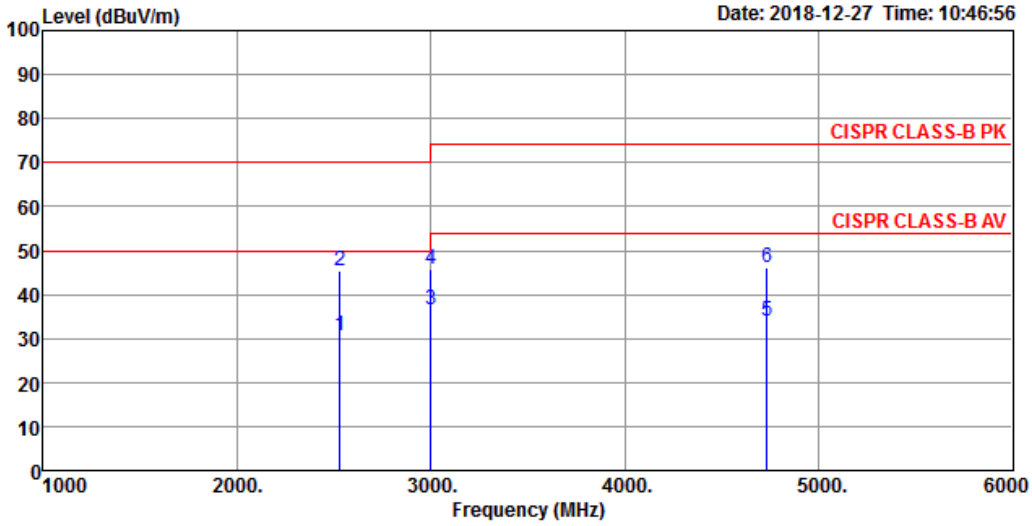
Test Mode	Mode 1	Frequency Range	1,000 MHz to 6,000 MHz

Vertical 1,000 MHz to 6,000 MHz



	Freq	Level	Limit Line	Over Limit	Read Level	Preamp Factor	Antenna Factor	Cable Loss	Remark	A/Pos	T/Pos	Pol/Phase
	MHz	dBuV/m	dBuV/m	dB	dBuV	dB	dB/m	dB		cm	deg	
1	1580.00	26.06	50.00	-23.94	30.17	36.08	28.50	3.47	Average	100	108	VERTICAL
2	1580.00	56.56	70.00	-13.44	60.67	36.08	28.50	3.47	Peak	100	108	VERTICAL
3	2530.00	30.37	50.00	-19.63	29.56	36.19	32.50	4.50	Average	100	94	VERTICAL
4	2530.00	49.61	70.00	-20.39	48.80	36.19	32.50	4.50	Peak	100	94	VERTICAL
5	5885.00	33.04	54.00	-20.96	26.47	36.32	35.53	7.36	Average	100	160	VERTICAL
6	5885.00	58.27	74.00	-15.73	51.70	36.32	35.53	7.36	Peak	100	160	VERTICAL
7	5925.00	32.95	54.00	-21.05	26.39	36.31	35.53	7.34	Average	100	85	VERTICAL
8	5925.00	55.37	74.00	-18.63	48.81	36.31	35.53	7.34	Peak	100	85	VERTICAL

Horizontal 1,000 MHz to 6,000 MHz



	Freq	Level	Limit Line	Over Limit	Read Level	Preamp Factor	Antenna Factor	Cable Loss	Remark	A/Pos	T/Pos	Pol/Phase
	MHz	dBuV/m	dBuV/m	dB	dBuV	dB	dB/m	dB		cm	deg	
1	2530.00	30.64	50.00	-19.36	29.83	36.19	32.50	4.50	Average	100	3	HORIZONTAL
2	2530.00	45.48	70.00	-24.52	44.67	36.19	32.50	4.50	Peak	100	3	HORIZONTAL
3	3000.00	36.65	50.00	-13.35	35.44	36.48	32.70	4.99	Average	100	131	HORIZONTAL
4	3000.00	45.66	70.00	-24.34	44.45	36.48	32.70	4.99	Peak	100	131	HORIZONTAL
5	4735.00	33.89	54.00	-20.11	28.49	36.46	34.07	7.79	Average	100	136	HORIZONTAL
6	4735.00	46.01	74.00	-27.99	40.61	36.46	34.07	7.79	Peak	100	136	HORIZONTAL

Test Mode	Mode 1

Highest parameter values during test:

V_RMS (Volts):	230.38	Frequency(Hz):	50.00
I_Peak (Amps):	0.513	I_RMS (Amps):	0.082
I_Fund (Amps):	0.028	Crest Factor:	7.379
Power (Watts):	6.0	Power Factor:	0.367

Note: The power consumption of EUT is lower than 75W, so the limit is not specified in EN 61000-3-2.

Test Mode	Mode 1	**Final Test Result**	Pass

Vrms at the end of test (Volt):	**230.31**			
T-max (mS):	**0**	**Test limit (mS):**	**500.0**	**Pass**
Highest dc (%):	**0.00**	**Test limit (%):**	**3.30**	**Pass**
Highest dmax (%):	**0.00**	**Test limit (%):**	**4.00**	**Pass**
Highest Pst (10 min. period):	**0.064**	**Test limit:**	**1.000**	**Pass**

1 Test Result of ESD Immunity

Test Mode	Mode 1
Standard	Required Criteria B
Test Standard	EN 301 489-1 EN 301 489-17 EN 55024 CISPR 24
Test Recorded	There was no abnormal situation during the test compared with initial operation.

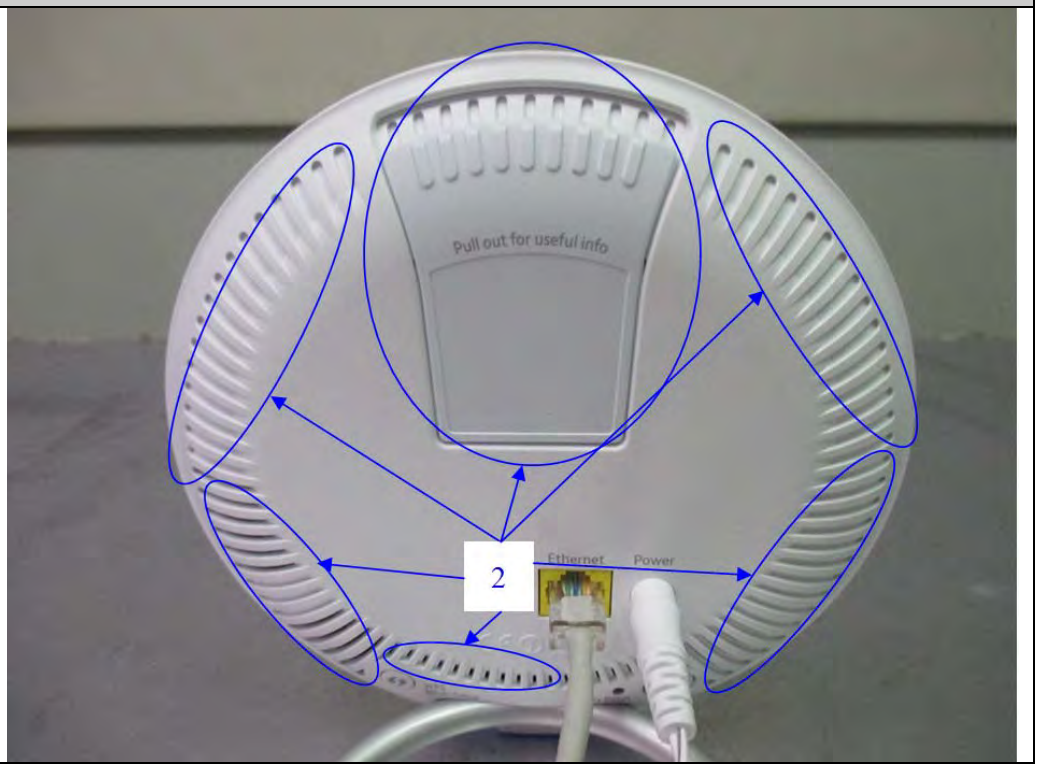
Direct Application：

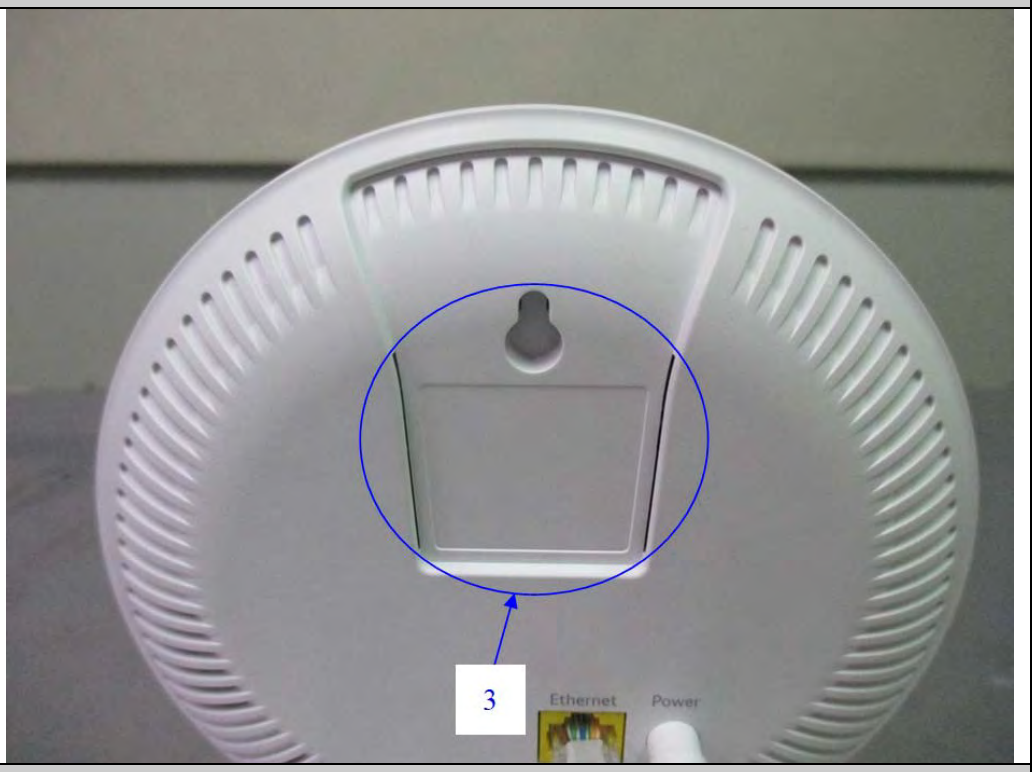
Test Point	Tested Voltage (kV)	Contact Discharge (Performance Criteria)	Air Discharge (Performance Criteria)
1~8	± 2, 4, 8	-	A
9	± 2, 4	A	-
10	± 2, 4, 8	-	A

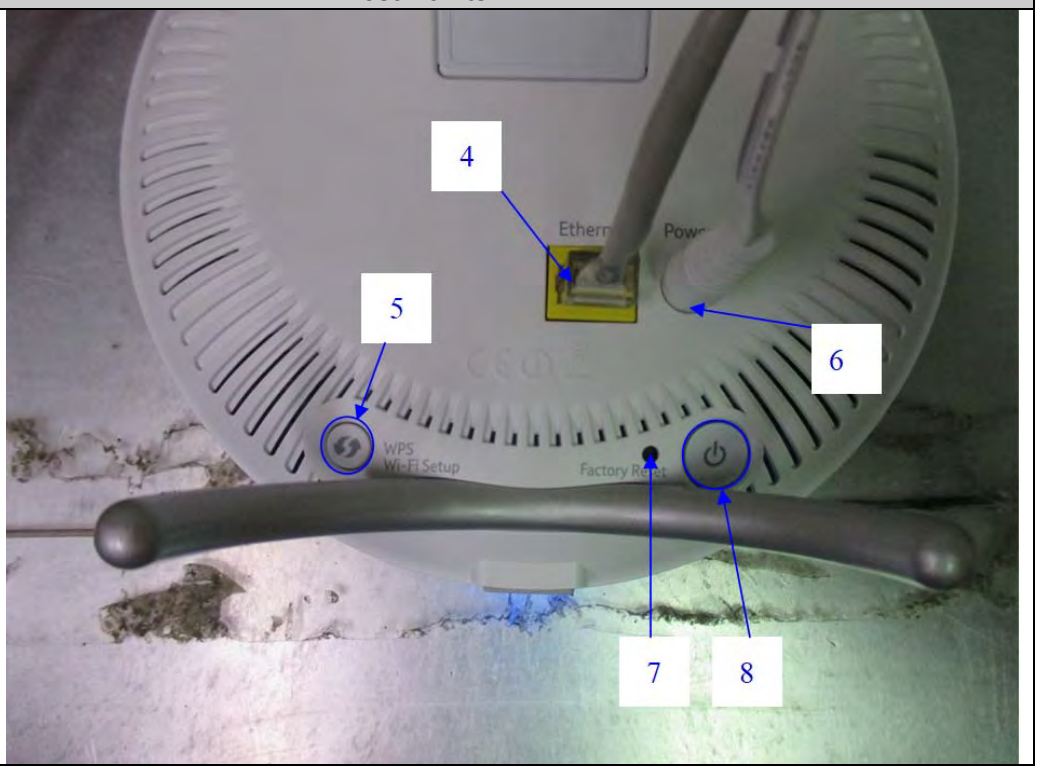
Indirect Application：

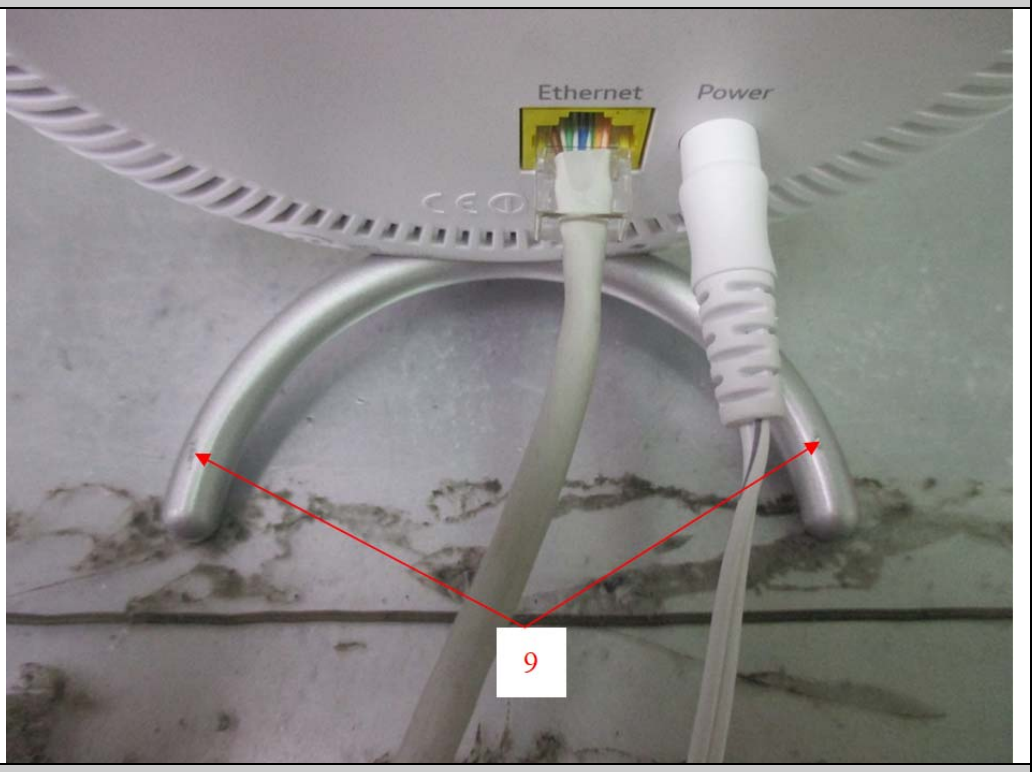
Coupling Plan	Coupling Side	Test Voltage (kV)	Performance Criteria
HCP	Front / Rear / Right / Left	± 2, 4	A
VCP	Front / Rear / Right / Left	± 2, 4	A

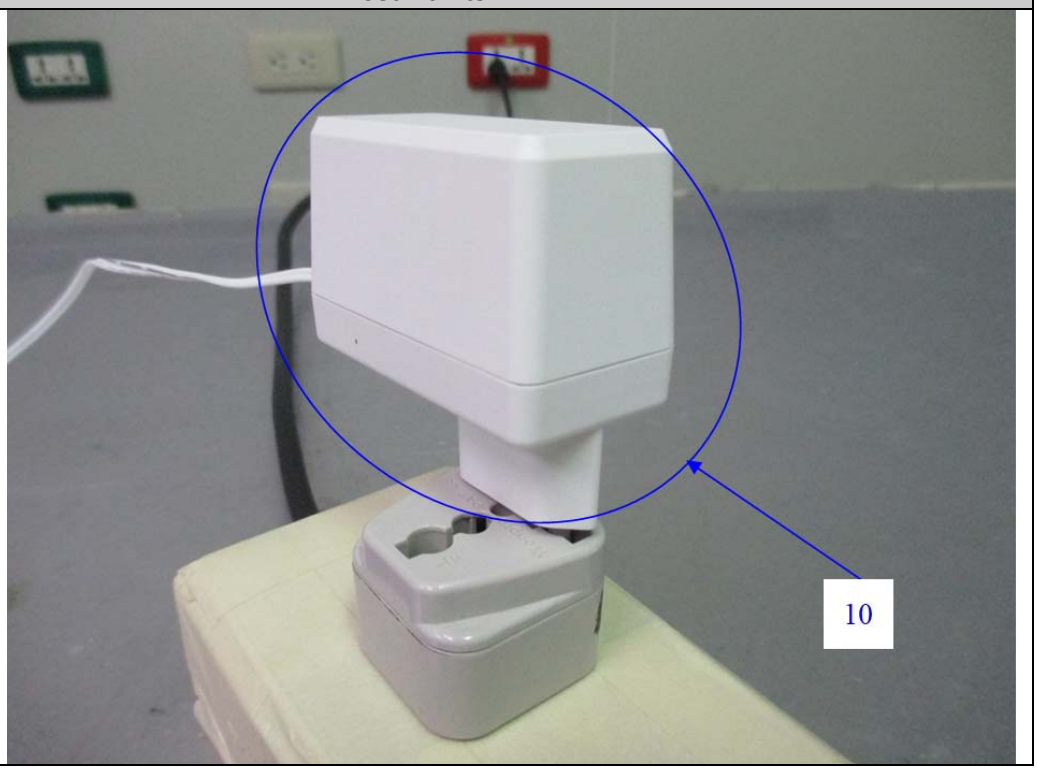
Test Points	
Air Discharge (BLUE color) Contact Discharge (RED color)	

Test Points	
Air Discharge (BLUE color) Contact Discharge (RED color)	

Test Points	
Air Discharge (BLUE color) Contact Discharge (RED color)	

Test Points	
Air Discharge (BLUE color) Contact Discharge (RED color)	

Test Points	
Air Discharge (BLUE color) Contact Discharge (RED color)	

Test Points	
Air Discharge (BLUE color) Contact Discharge (RED color)	

2 Test Result of RS Immunity

Test Mode	Mode 1
Standard	Required Criteria A
Test Standard	EN 301 489-1 EN 301 489-17
Test Recorded	There was no abnormal situation during the test compared with initial operation.

Frequency Range MHz	Field V/m	Antenna Polarization	EUT Face Exposed	Performance Criteria
80~6,000	3	Vertical	Front/Back/Right/Left	A
80~6,000	3	Horizontal	Front/Back/Right/Left	A

Test Mode	Mode 1
Standard	Required Criteria A
Test Standard	EN 55024 CISPR 24
Test Recorded	There was no abnormal situation during the test compared with initial operation.

Frequency Range MHz	Field V/m	Antenna Polarization	EUT Face Exposed	Performance Criteria
80~1,000	3	Vertical	Front/Back/Right/Left	A
80~1,000	3	Horizontal	Front/Back/Right/Left	A

3 Test Result of EFT

Test Mode	Mode 1
Standard	Required Criteria B
Test Standard	EN 301 489-1 EN 301 489-17 EN 55024 CISPR 24
Test Recorded	There was no abnormal situation during the test compared with initial operation.

AC Power Port：

AC Phase	Test Voltage (kV)
	±1 kV
L	A
N	A
L-N	A

Telecommunication Port：

Telecommunication Port	Test Voltage (kV)
	±0.5 kV
Ethernet	A

4 Test Result of Surge

Test Mode	Mode 1
Standard	Required Criteria B
Test Standard	EN 301 489-1 EN 301 489-17
Test Recorded	There was no abnormal situation during the test compared with initial operation.

AC Power Port:

Voltage (kV)	Test Location	Polarity	Phase Angle			
			0°	90°	180°	270°
0.5, 1	L - N	+	A	A	A	A
		−	A	A	A	A

Telecommunication Port:

Voltage (kV)	Test Location	Polarity	Performance Criteria
0.5	Ethernet (Indoor)	+	A
		−	A

Test Mode	Mode 1
Standard	Required Criteria B
Test Standard	EN 55024 CISPR 24
Test Recorded	There was no abnormal situation during the test compared with initial operation.

AC Power Port:

Voltage (kV)	Test Location	Polarity	Phase Angle			
			0°	90°	180°	270°
0.5, 1	L - N	+	A	A	A	A
		−	A	A	A	A

5 Test Result of CS Immunity

Test Mode	Mode 1
Standard	Required Criteria A
Test Standard	EN 301 489-1 EN 301 489-17 EN 55024 CISPR 24
Test Recorded	There was no abnormal situation during the test compared with initial operation.

Frequency Range MHz	V (r.m.s)	CDN	Coupling port	Performance Criteria
0.15 ~ 80	3	M016 (M2)	AC	A
0.15 ~ 80	3	T8-10	Ethernet (1Gbps)	A

6 Test Result of MF Immunity

Test Mode	Mode 1
Standard	Required Criteria A
Test Standard	EN 55024 CISPR 24
Test Recorded	There was no abnormal situation during the test compared with initial operation.

Power Frequency Magnetic Field	Testing duration	Coil Orientation	Performance Criteria
50 Hz, 1 A/m	1.0 Min	X-axis	A
50 Hz, 1 A/m	1.0 Min	Y-axis	A
50 Hz, 1 A/m	1.0 Min	Z-axis	A

7 Test Result of DIP

Test Mode	Mode 1
Standard	Required Criteria B/B/B/C
Test Standard	EN 301 489-1 EN 301 489-17
Test Recorded	The EUT had "reboot" situation happened during the test, but it will automatically return to normal conditions after the test.

Voltage Dip & Interruption :

Voltage (V)	Frequency (Hz)	% Residual	Periods	ms	Performance Criteria
100	50	0%	0.5	10	A
		0%	1.0	20	A
		70%	25	500	A
		Interruption 0%	250	5000	B

Voltage (V)	Frequency (Hz)	% Residual	Periods	ms	Performance Criteria
230	50	0%	0.5	10	A
		0%	1.0	20	A
		70%	25	500	A
		Interruption 0%	250	5000	B

Voltage (V)	Frequency (Hz)	% Residual	Periods	ms	Performance Criteria
240	50	0%	0.5	10	A
		0%	1.0	20	A
		70%	25	500	A
		Interruption 0%	250	5000	B

Test Mode	Mode 1
Standard	Required Criteria B/C/C
Test Standard	EN 55024 CISPR 24
Test Recorded	The EUT had "reboot" situation happened during the test, but it will automatically return to normal conditions after the test.

Voltage Dip & Interruption :

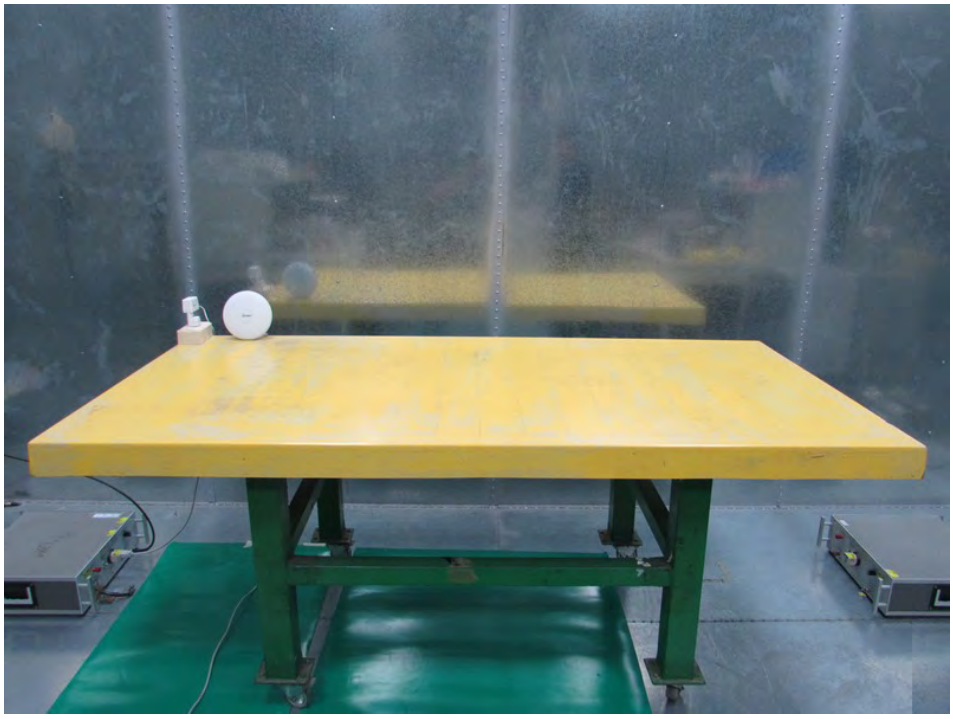
Voltage (V)	Frequency (Hz)	% Reduction	Periods	ms	Performance Criteria
100	50	>95 %	0.5	10	A
		30 %	25	500	A
		>95%	250	5,000	B

Voltage (V)	Frequency (Hz)	% Reduction	Periods	ms	Performance Criteria
230	50	>95 %	0.5	10	A
		30 %	25	500	A
		>95%	250	5,000	B

Voltage (V)	Frequency (Hz)	% Reduction	Periods	ms	Performance Criteria
240	50	>95 %	0.5	10	A
		30 %	25	500	A
		>95%	250	5,000	B

1. Photographs of Conducted Emissions Test Configuration

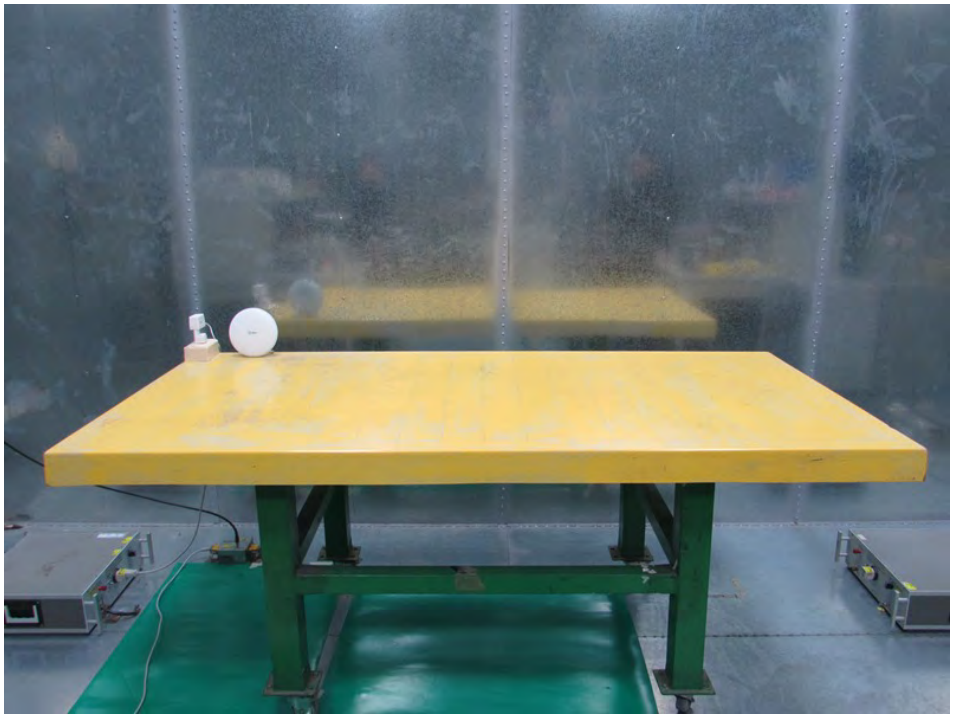
FRONT VIEW



REAR VIEW

2. Photographs of Telecommunication Line Conducted Emissions Test Configuration

FRONT VIEW

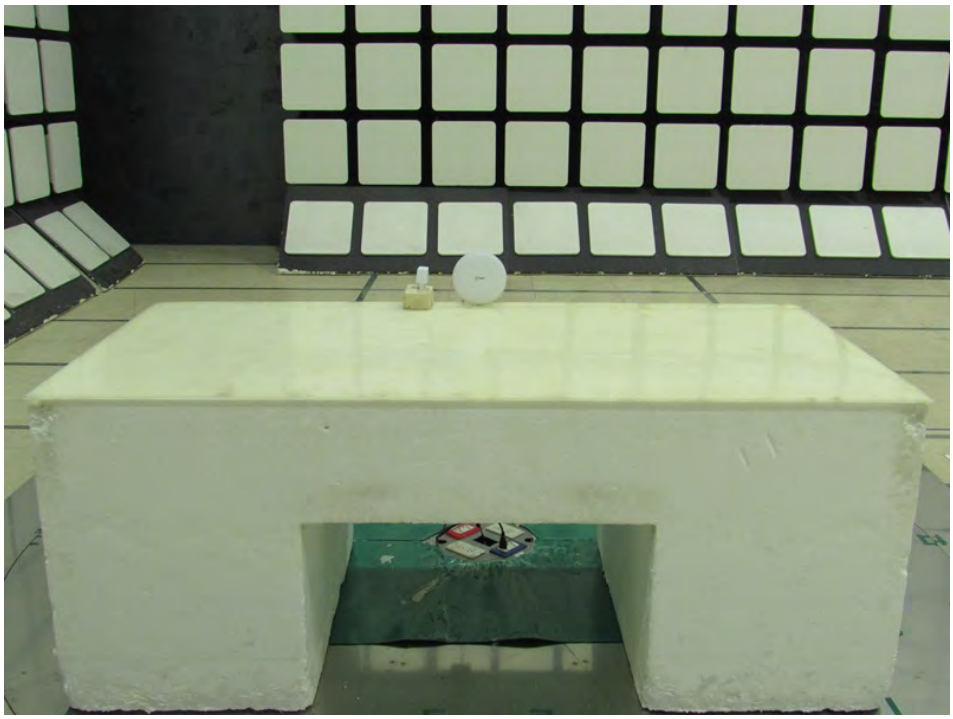


REAR VIEW

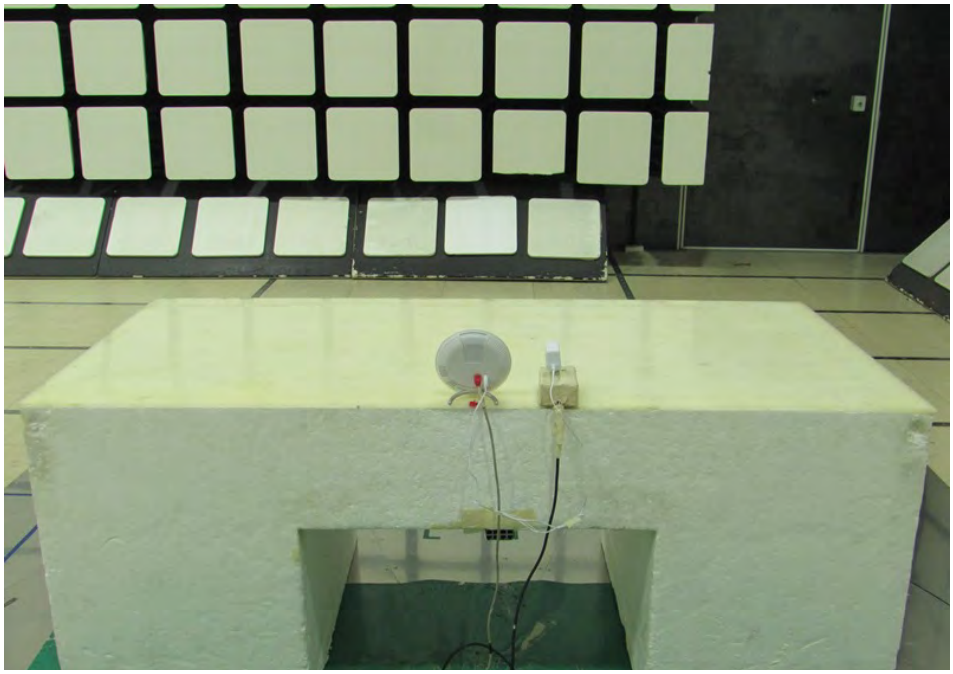
3. Photographs of Radiated Emissions Test Configuration

Test Configuration: 30MHz~1GHz

FRONT VIEW



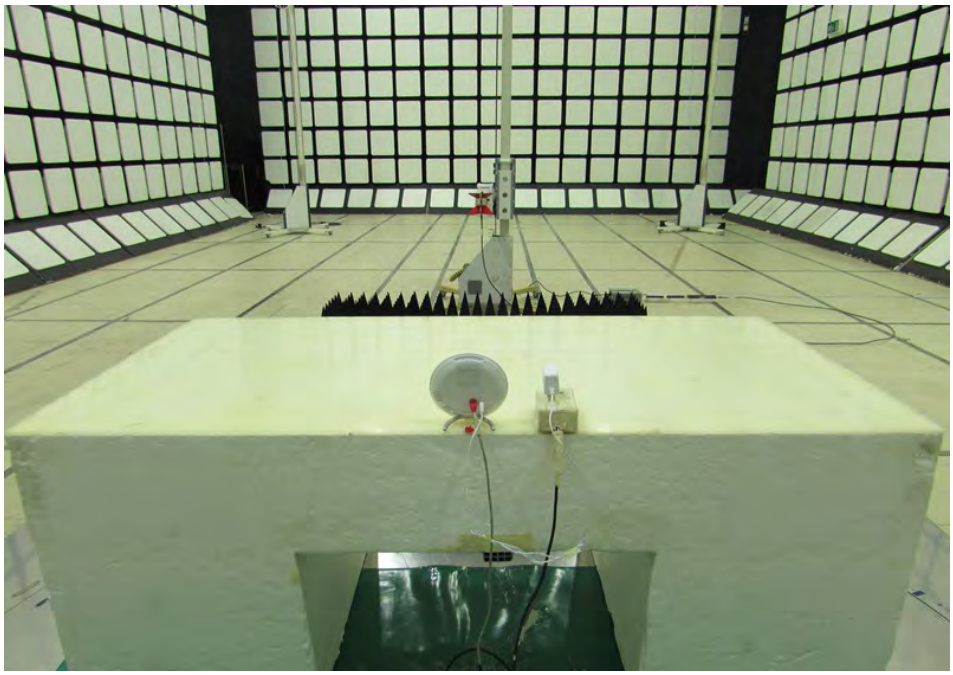
REAR VIEW



Test Configuration: Above 1GHz

FRONT VIEW

REAR VIEW



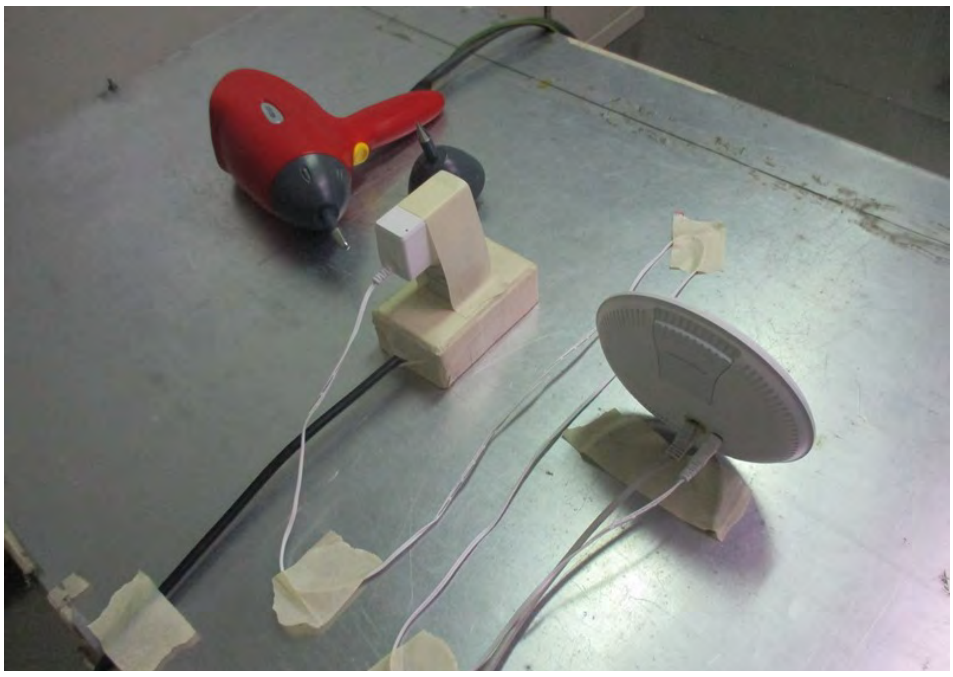
4. Photographs of Harmonic, Flicker Test Configuration

FRONT VIEW

5. Photographs of ESD Immunity Test Configuration

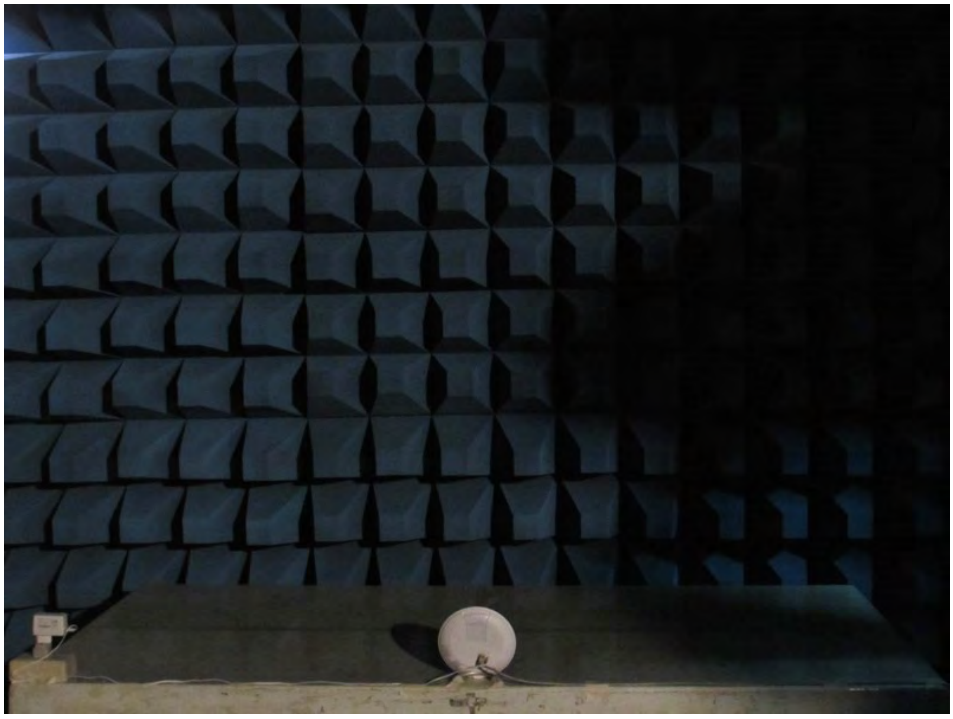
FRONT VIEW

REAR VIEW

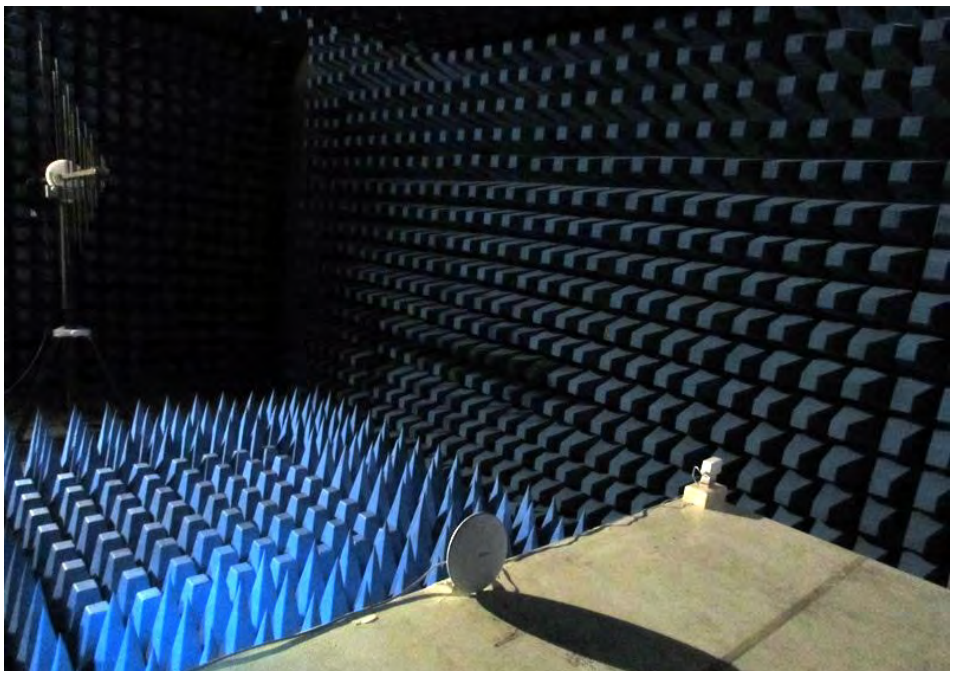


6. Photographs of RS Immunity Test Configuration

FRONT VIEW

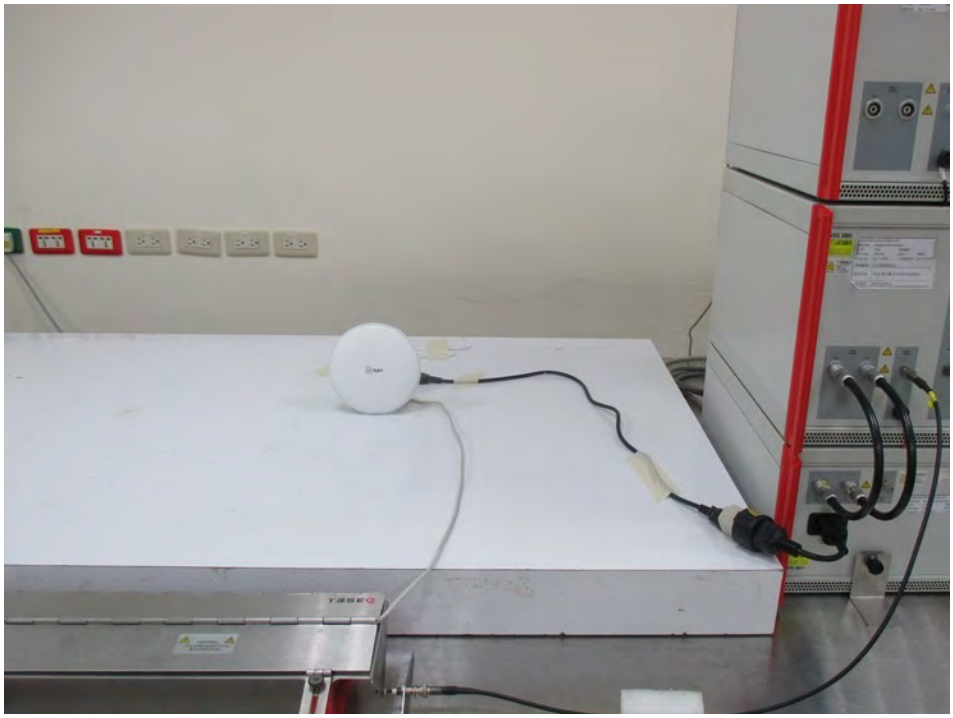


REAR VIEW



7. Photographs of EFT Test Configuration

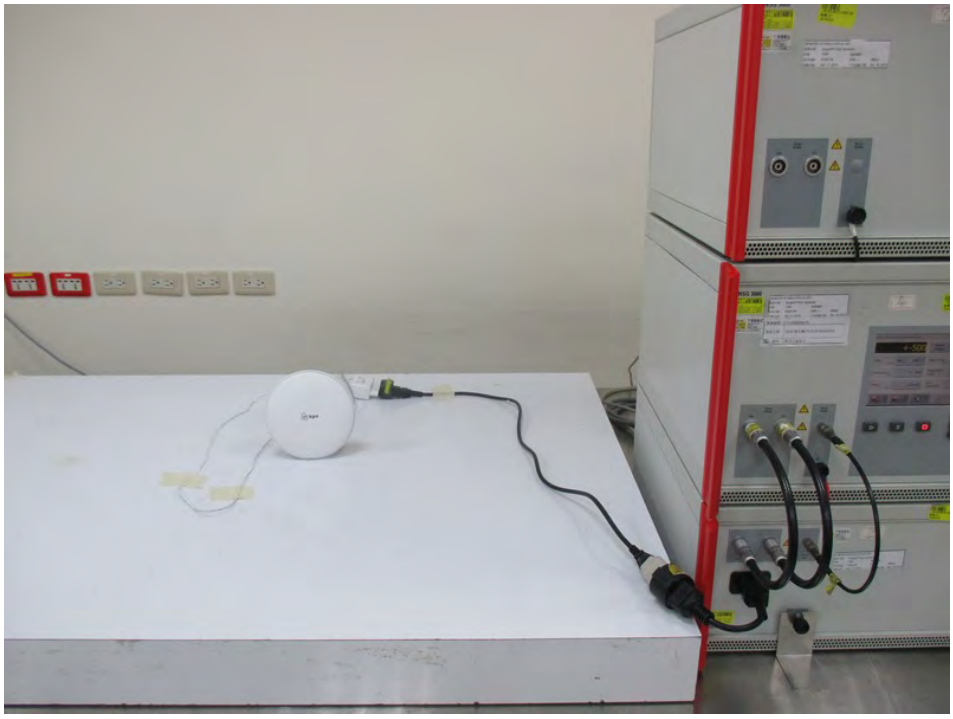
FRONT VIEW



REAR VIEW

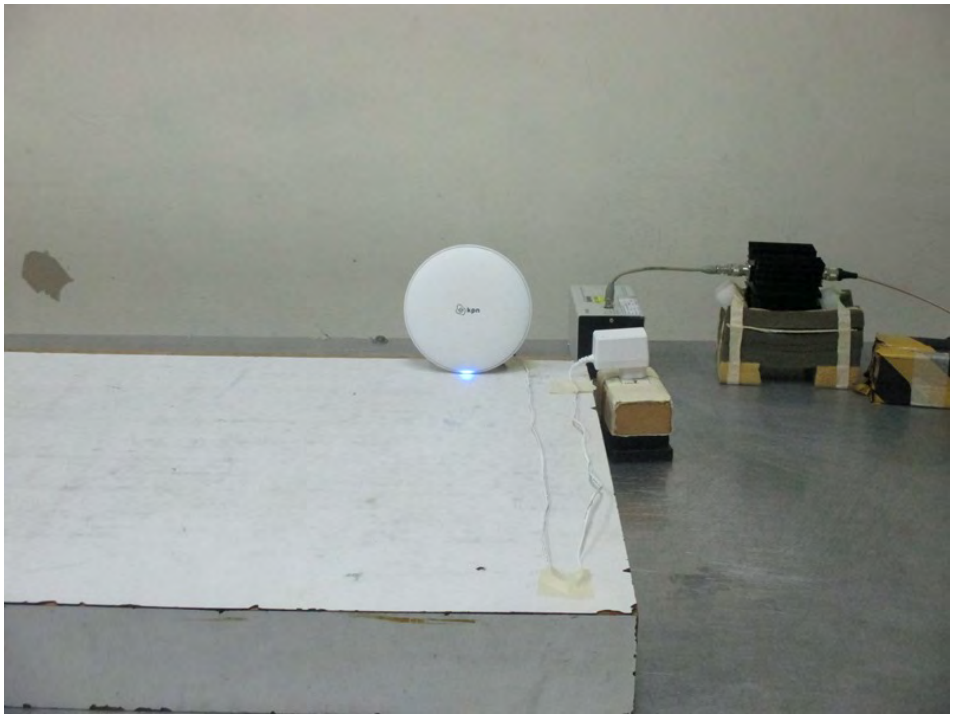
8. Photographs of Surge Test Configuration

FRONT VIEW

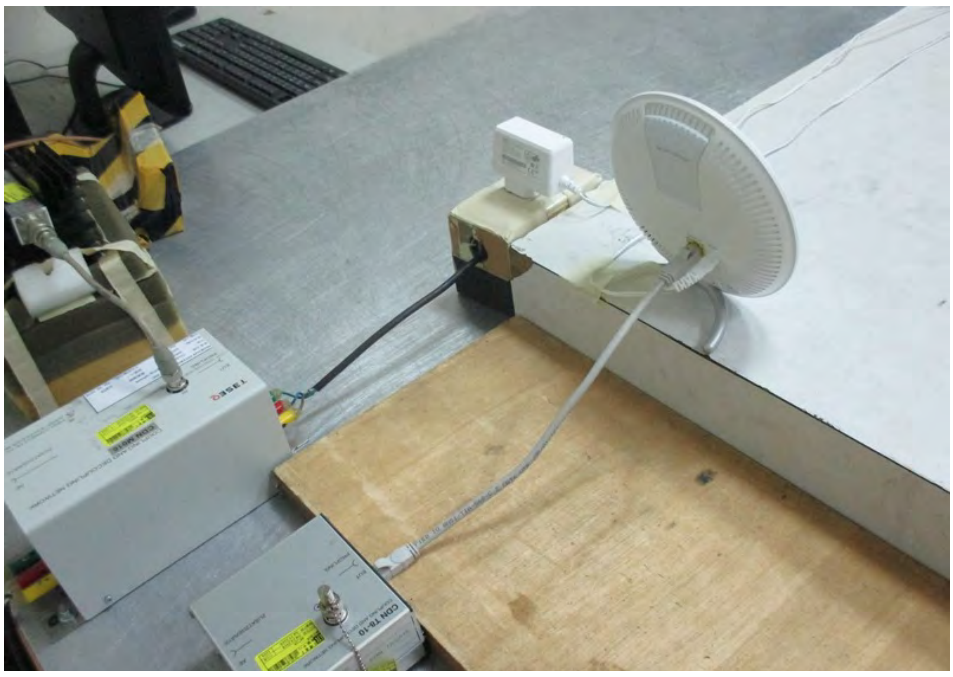


9. Photographs of CS Immunity Test Configuration

FRONT VIEW

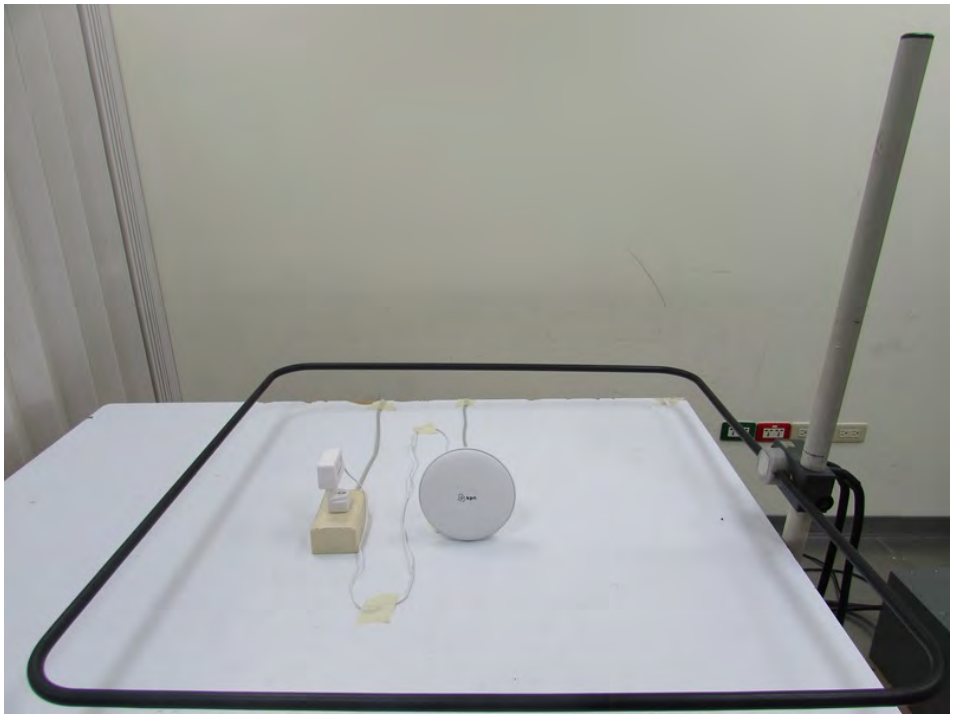


REAR VIEW



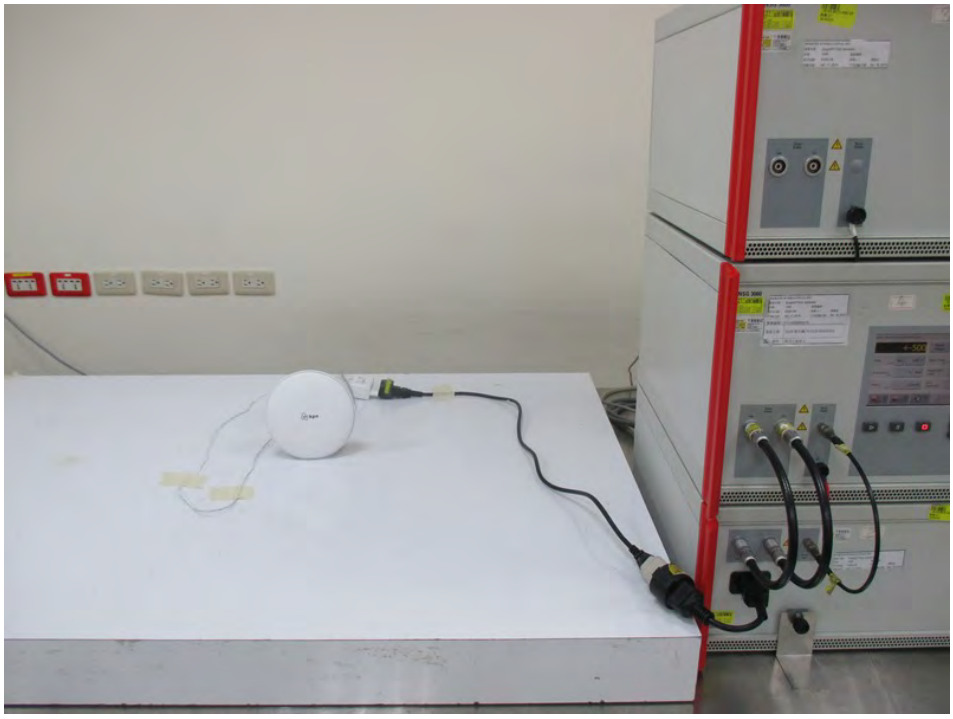
10. Photographs of MF Immunity Test Configuration

FRONT VIEW



11. Photographs of DIP Test Configuration

FRONT VIEW



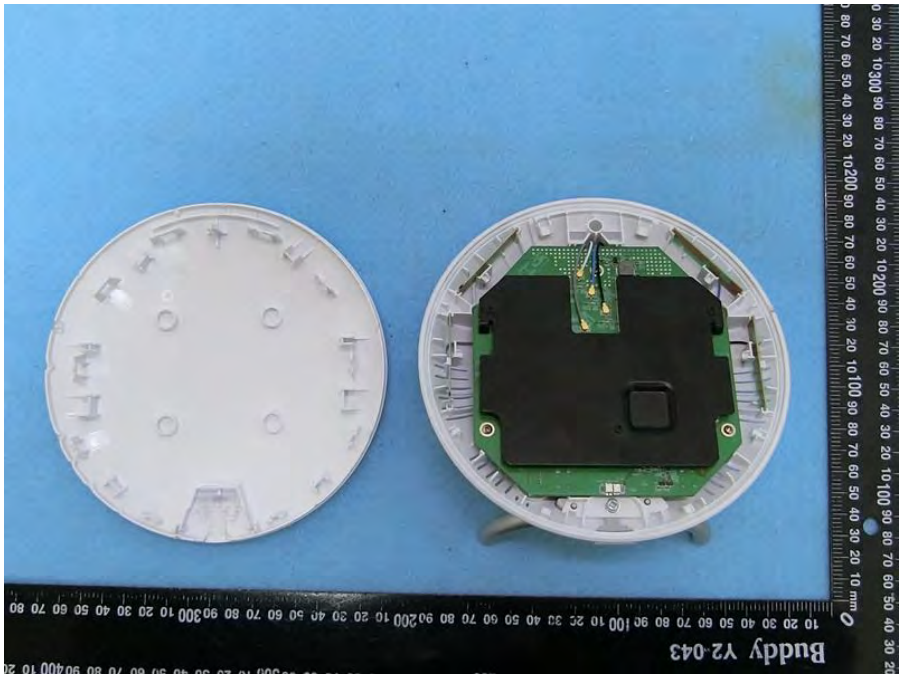

kpn
Buddy V2-043

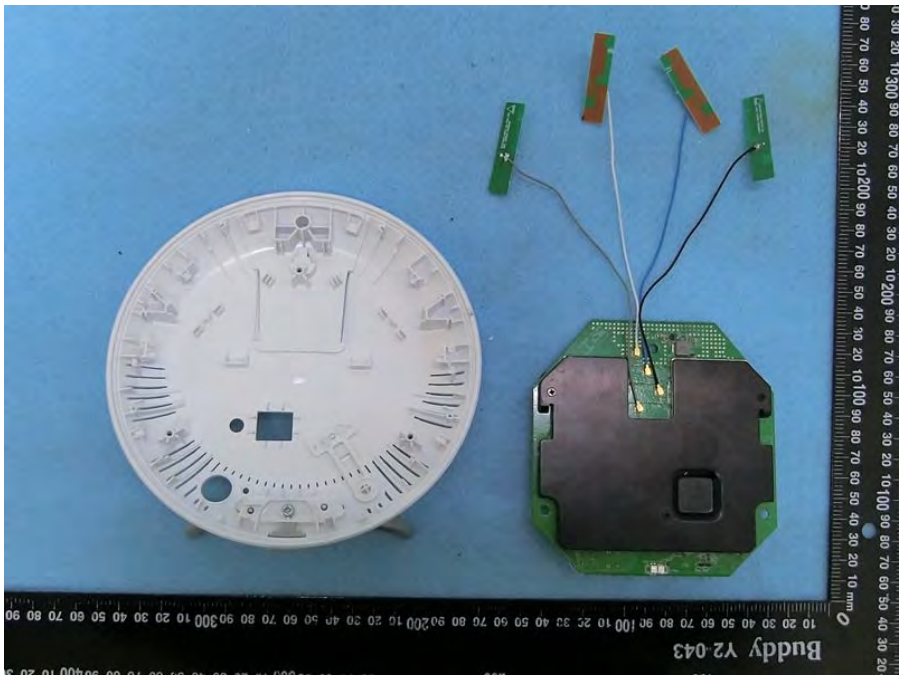

kpn


Pull out for useful info
Ethernet
Power
WPS
Wi-Fi Setup
Factory Reset

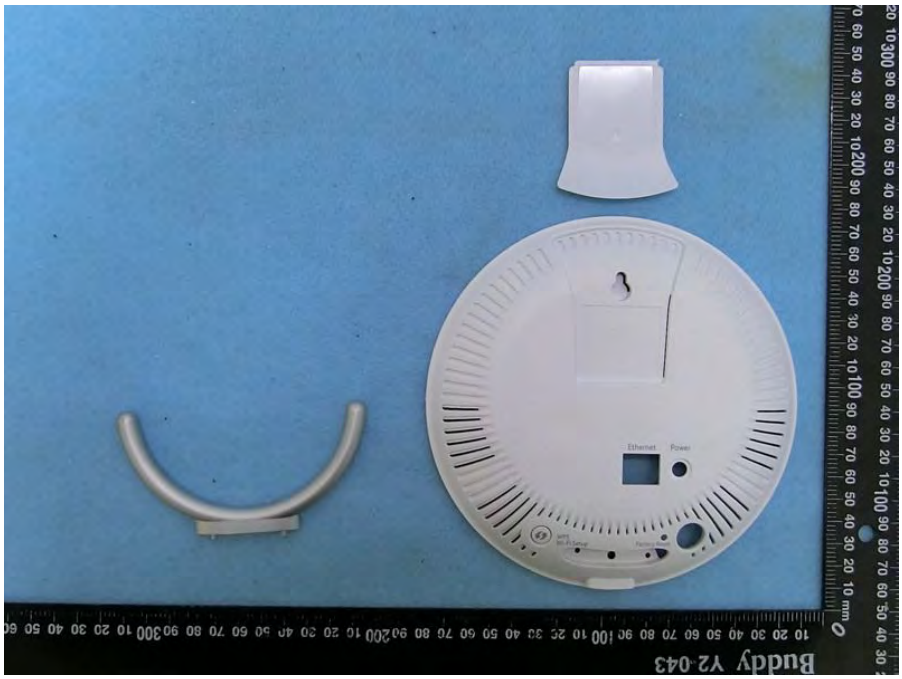

Ethernet
Power
WPS
Wi-Fi Setup
Factory Reset


Pull out for useful info
Ethernet
Power
WPS
Wi-Fi Setup
Factory Reset


Buddy Y2-043


Buddy V2-043


Pull out for useful info
Ethernet
Power
WPS
Wi-Fi Setup
Factory Reset
Buddy V2-043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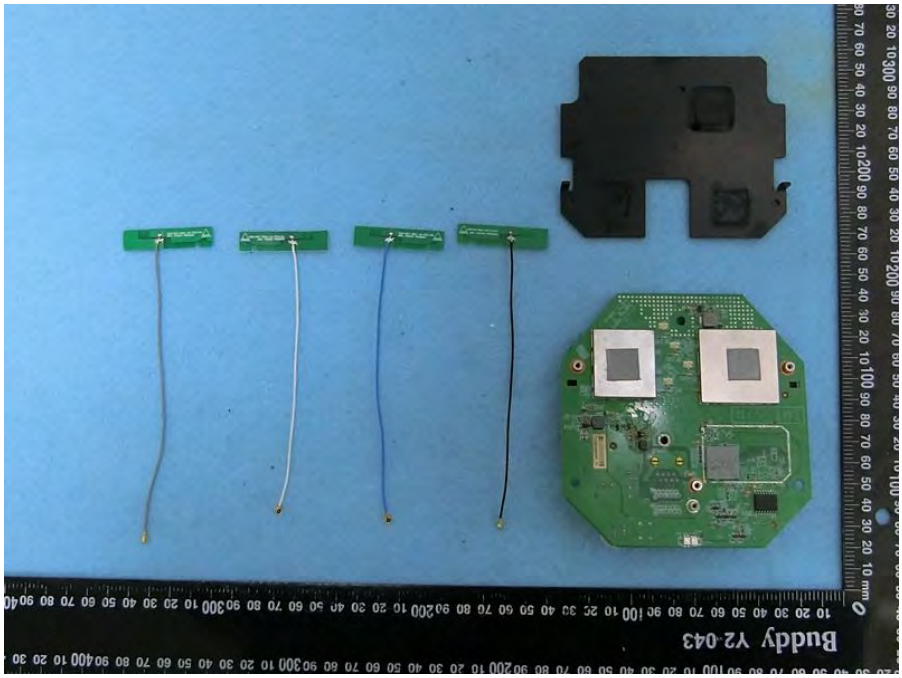
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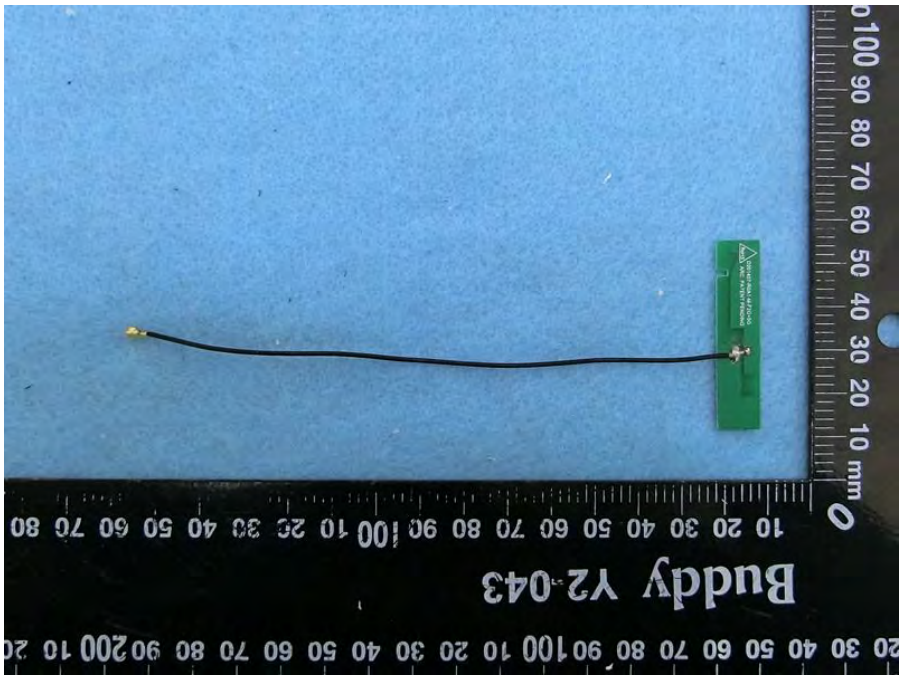
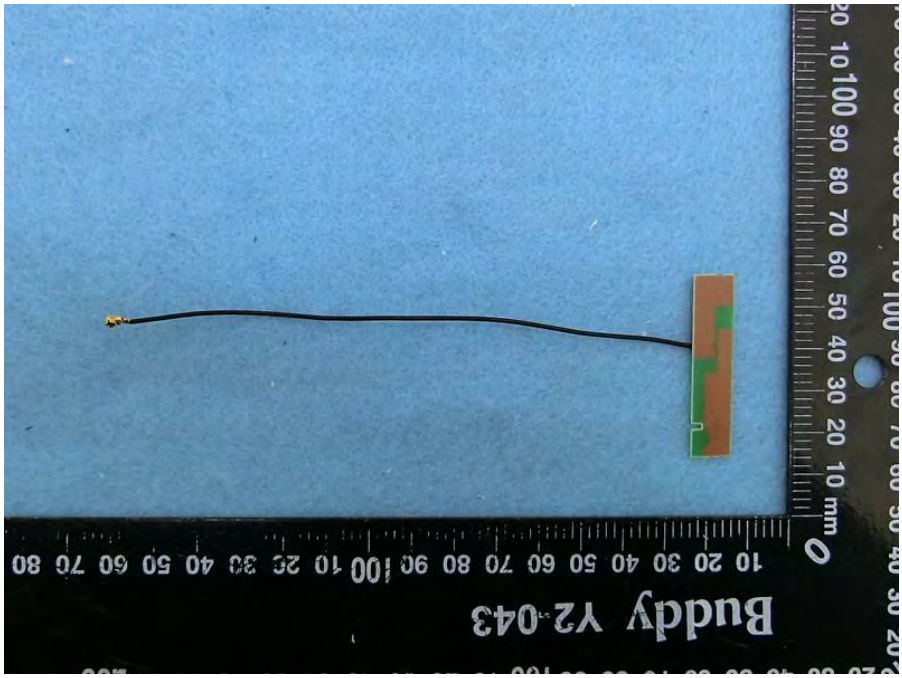

Buddy V2.043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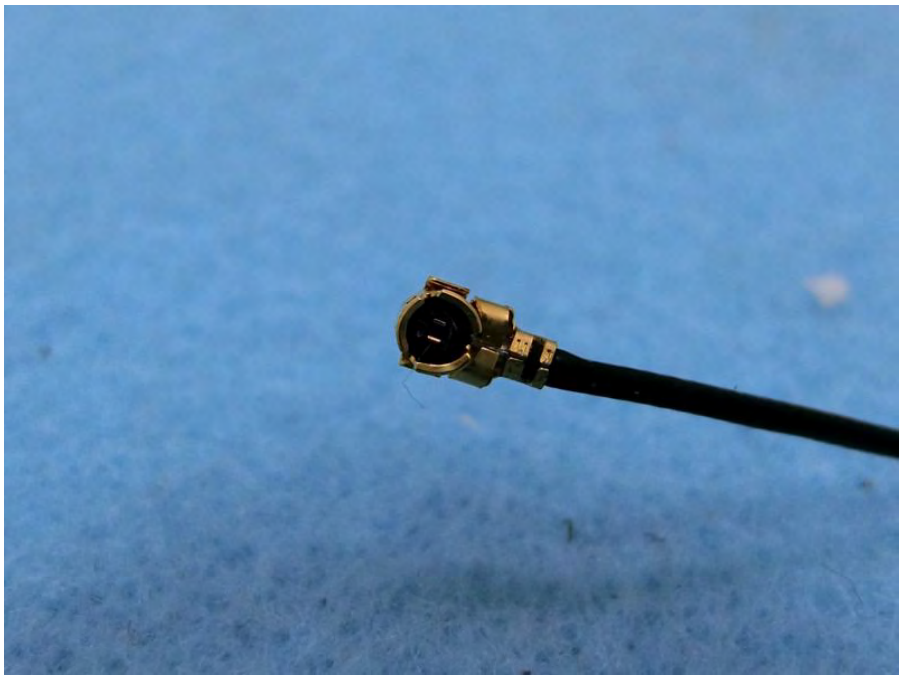
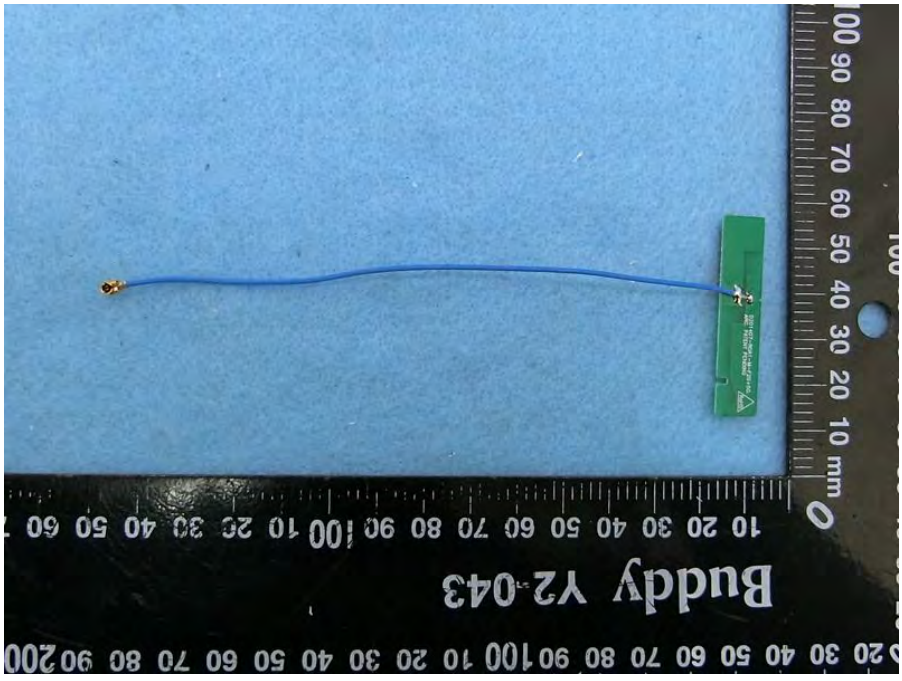
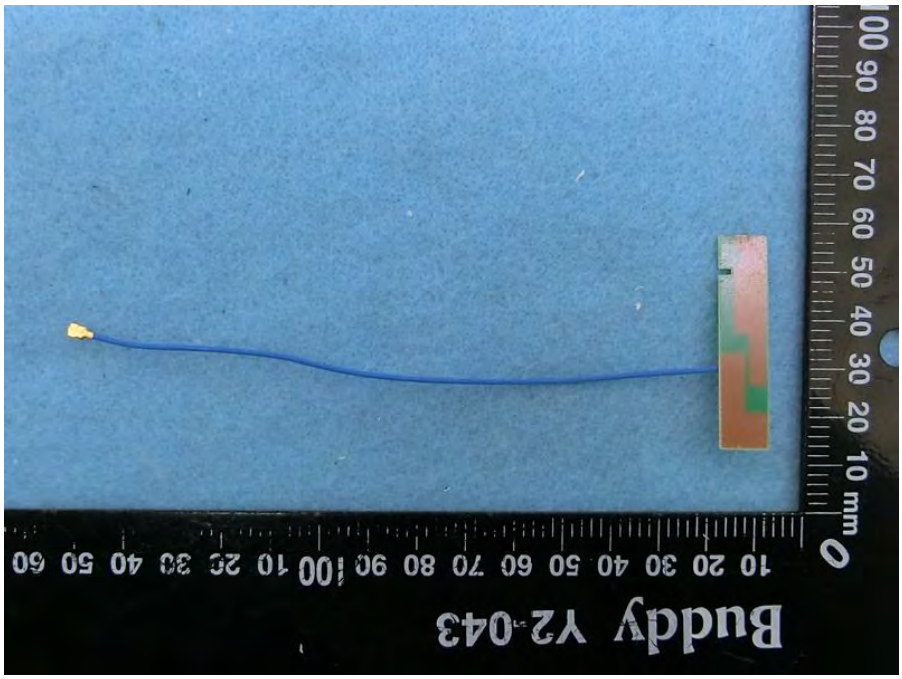



Buddy V2.043
mm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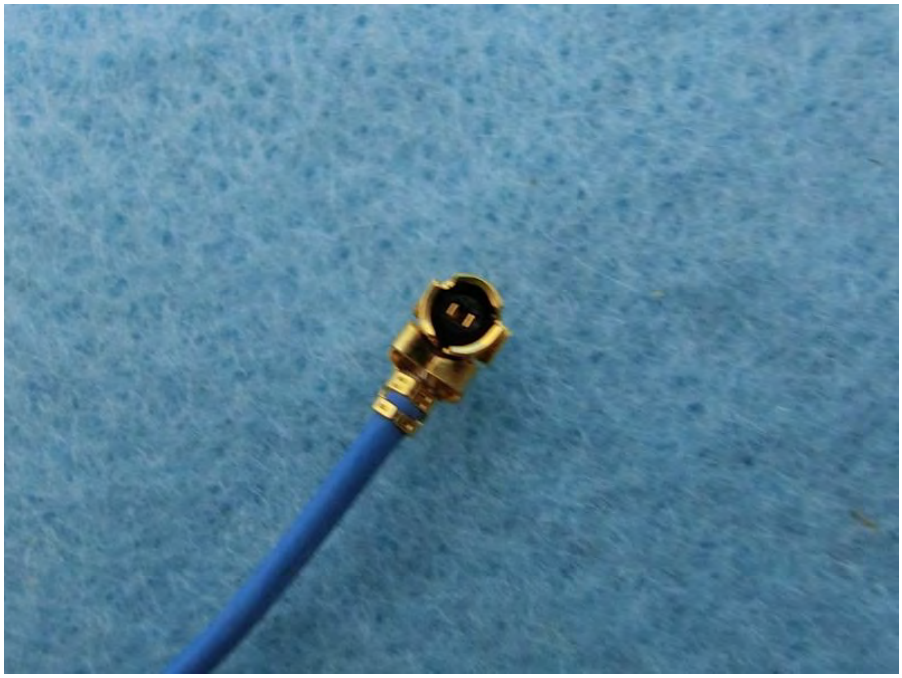

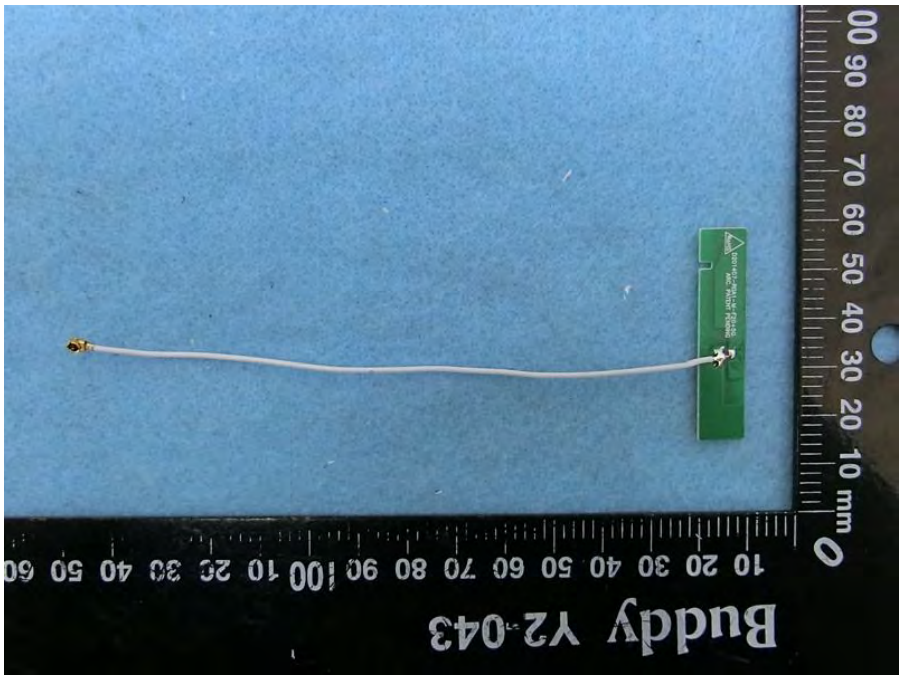
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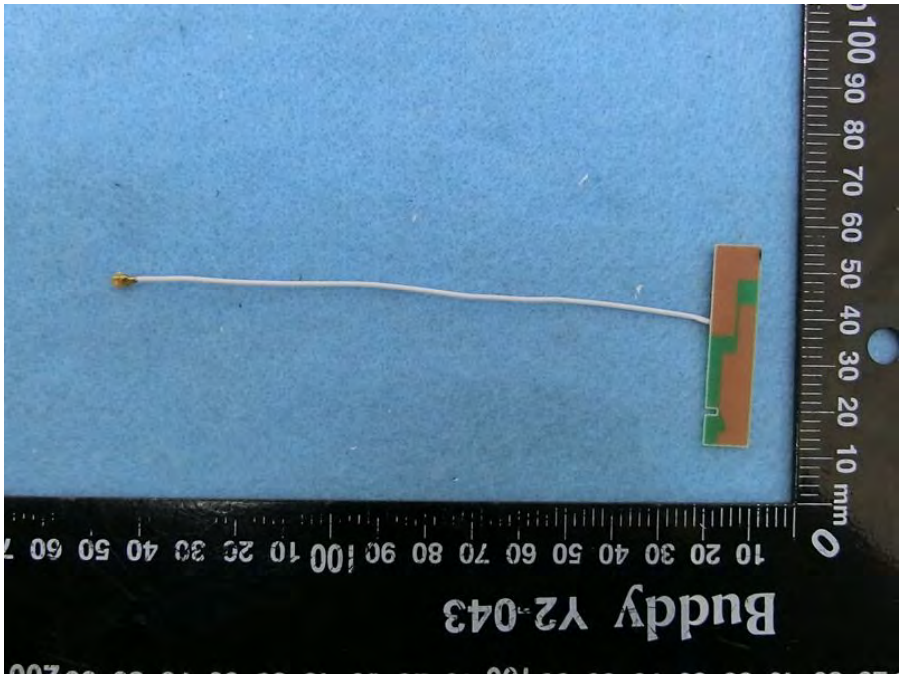
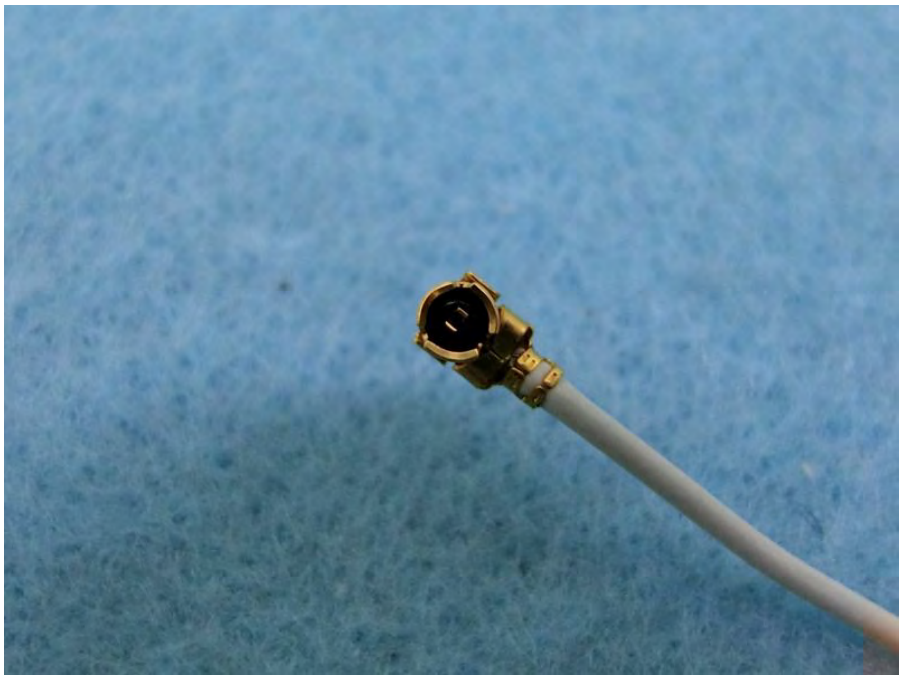
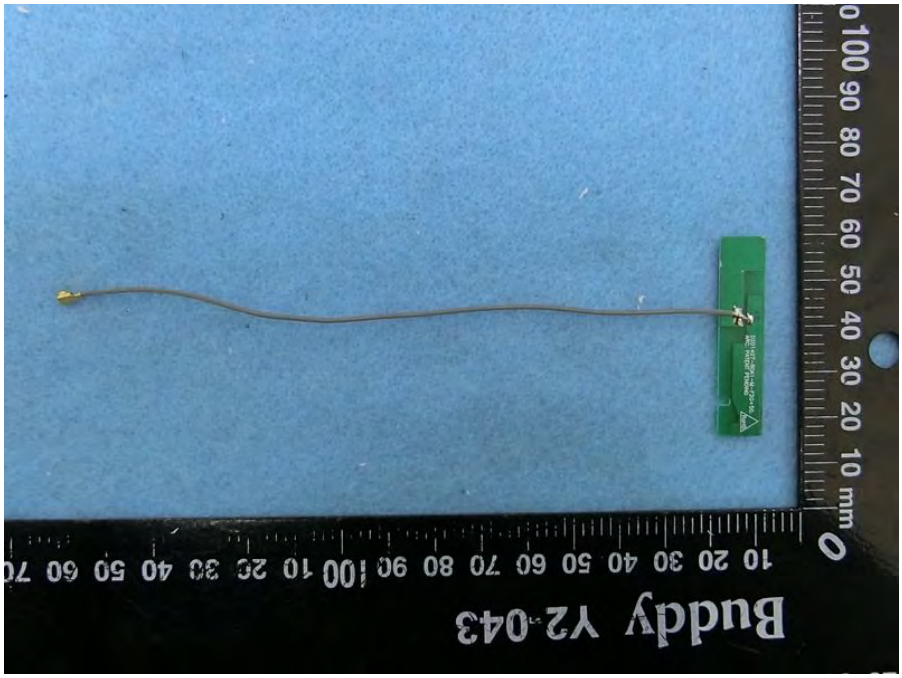

Buddy Y2-043
mm

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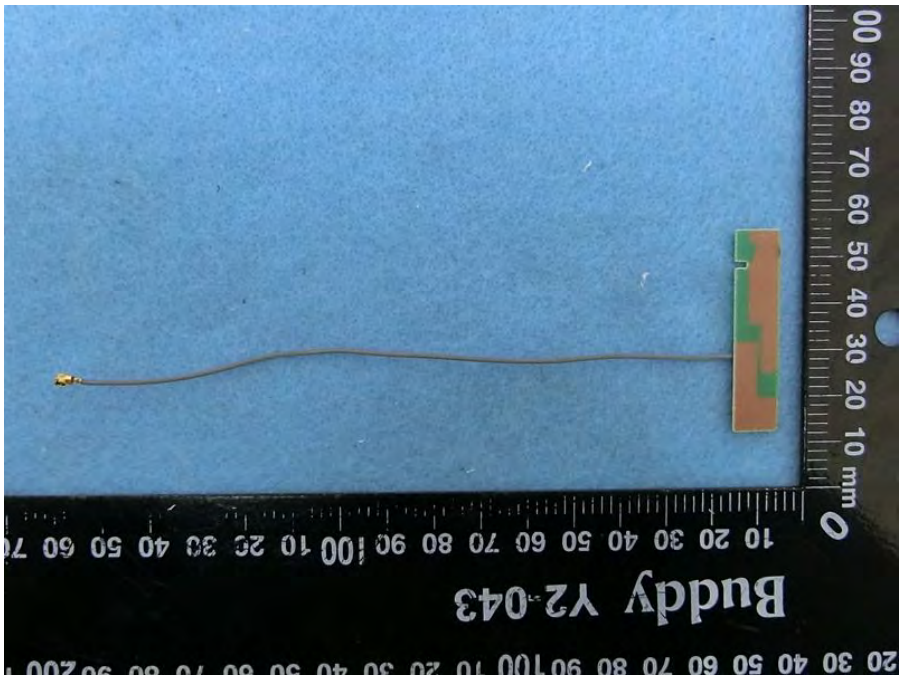
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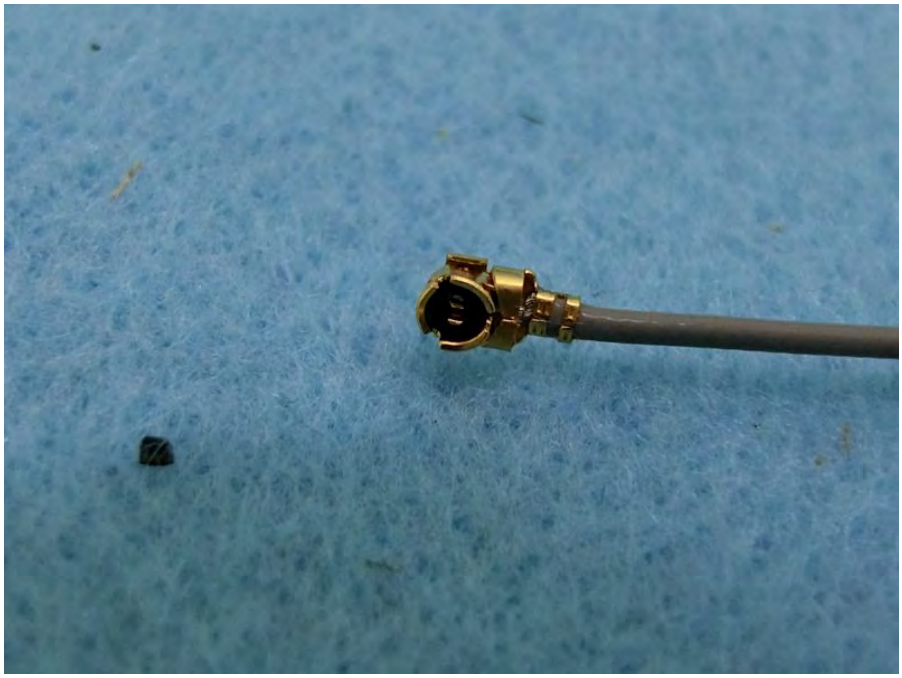

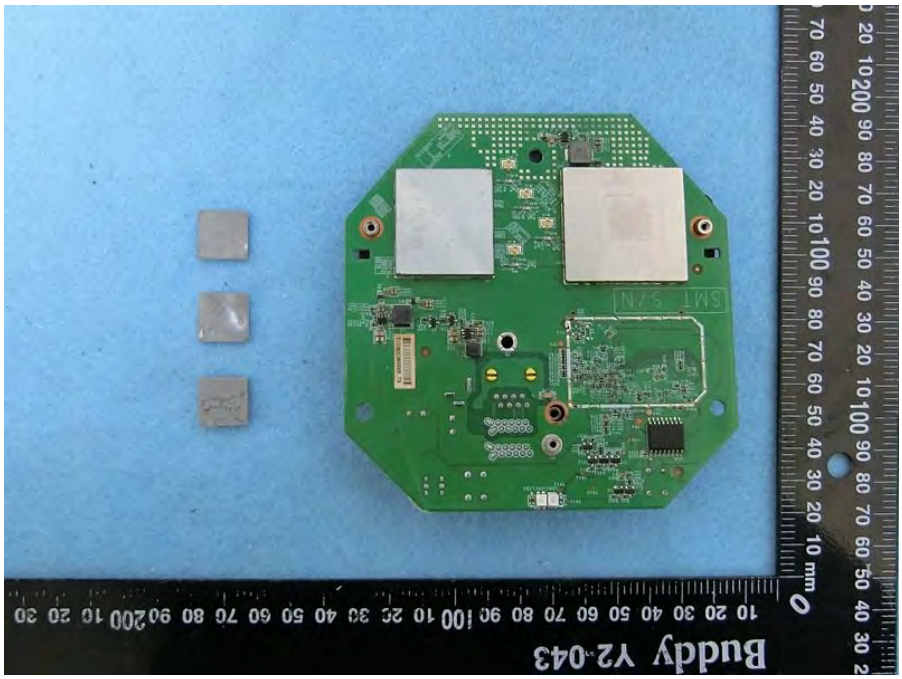
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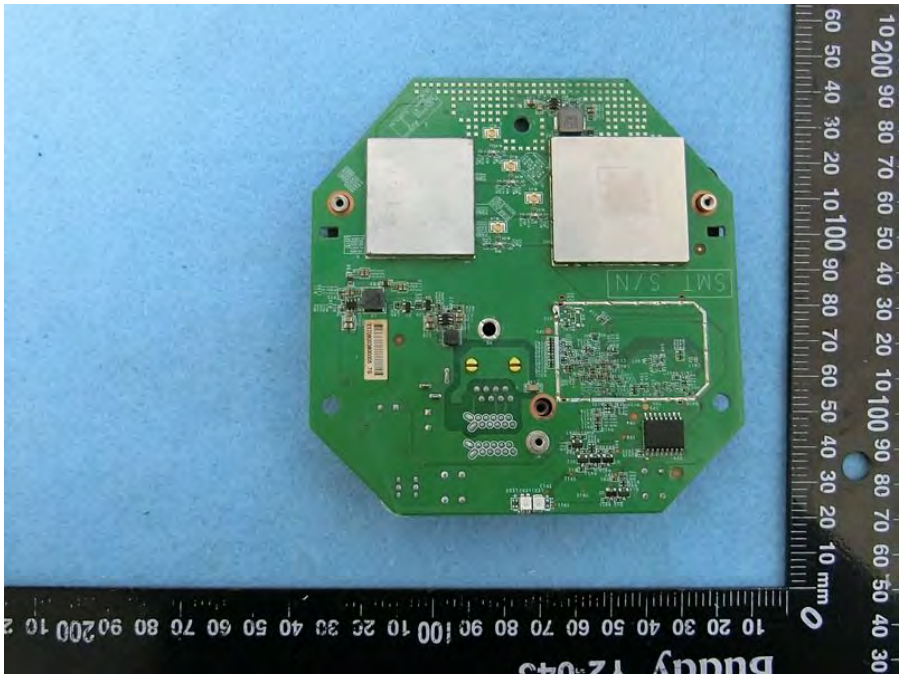
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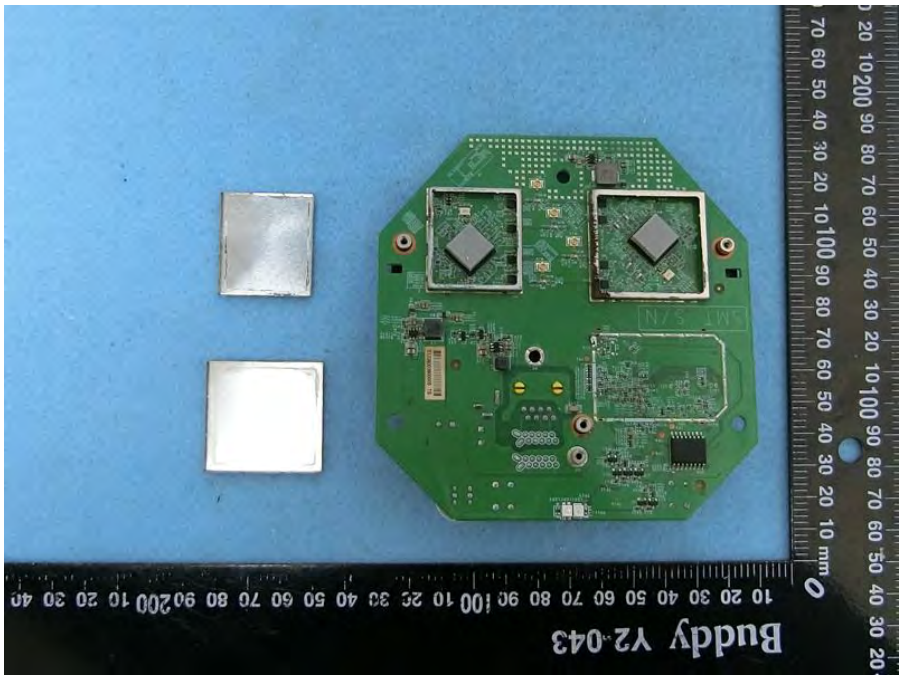
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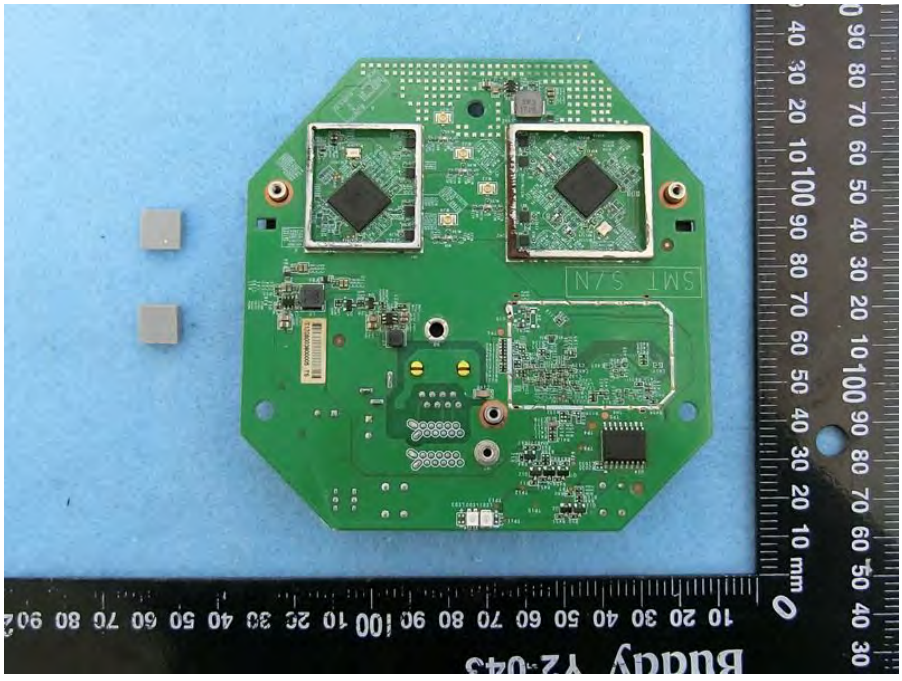

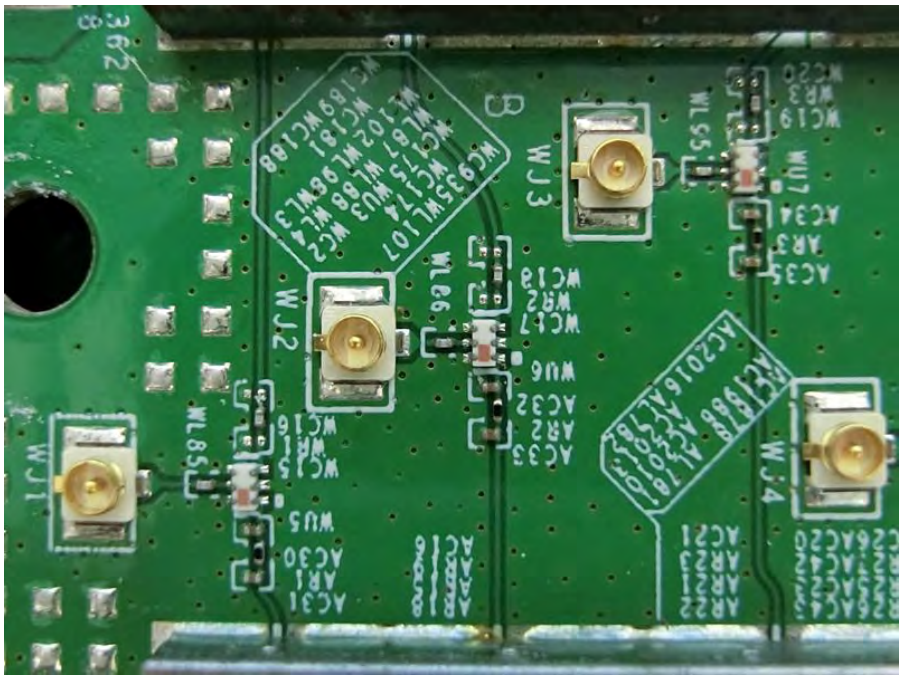

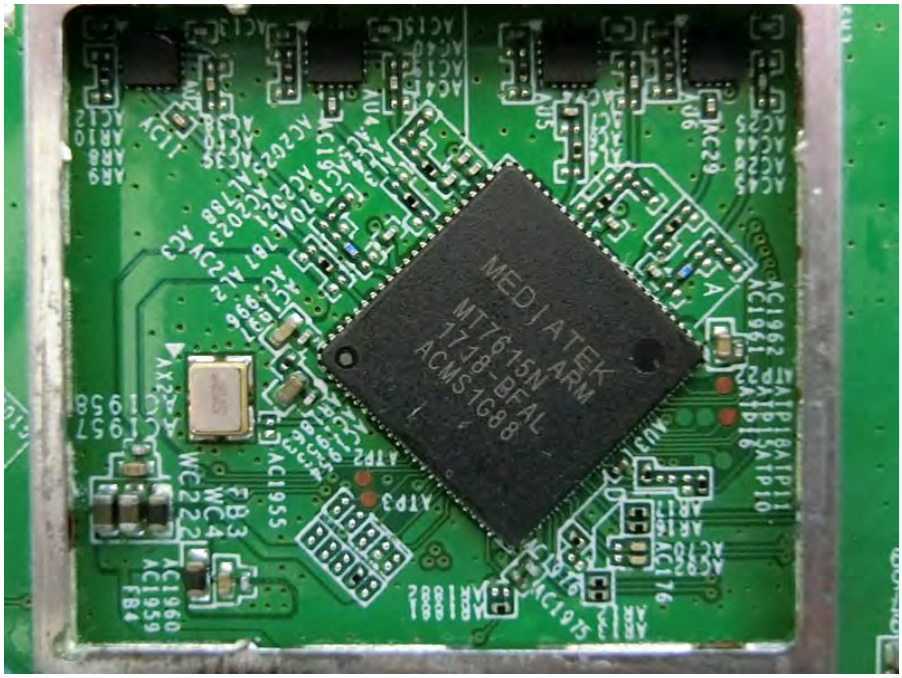
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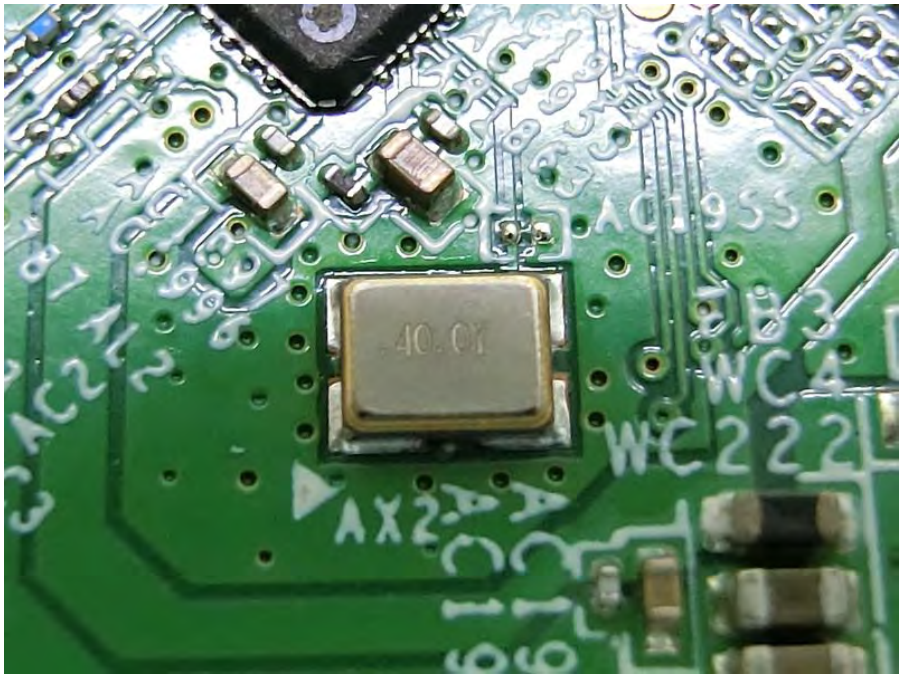
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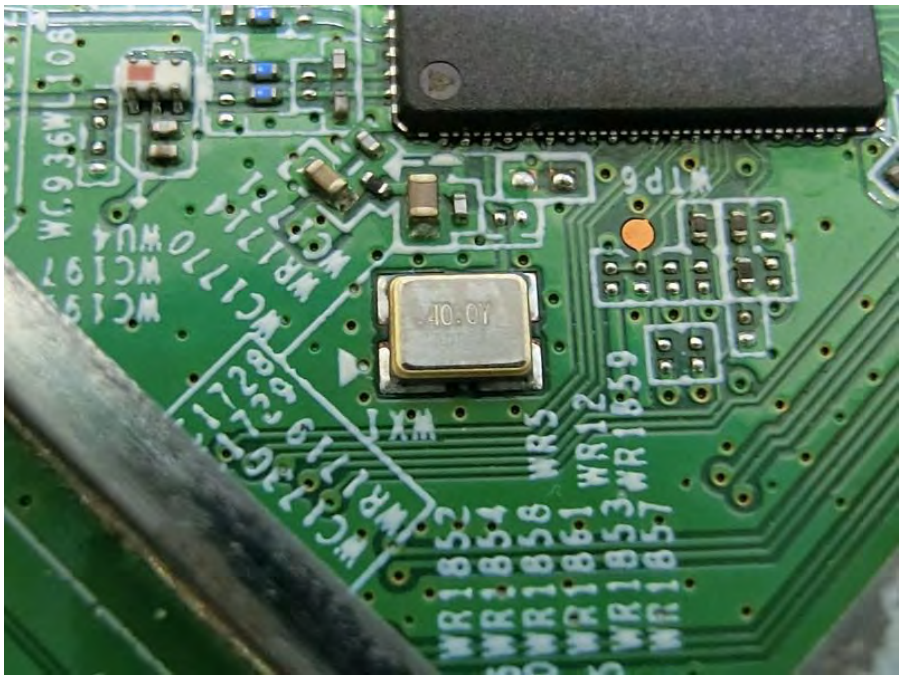

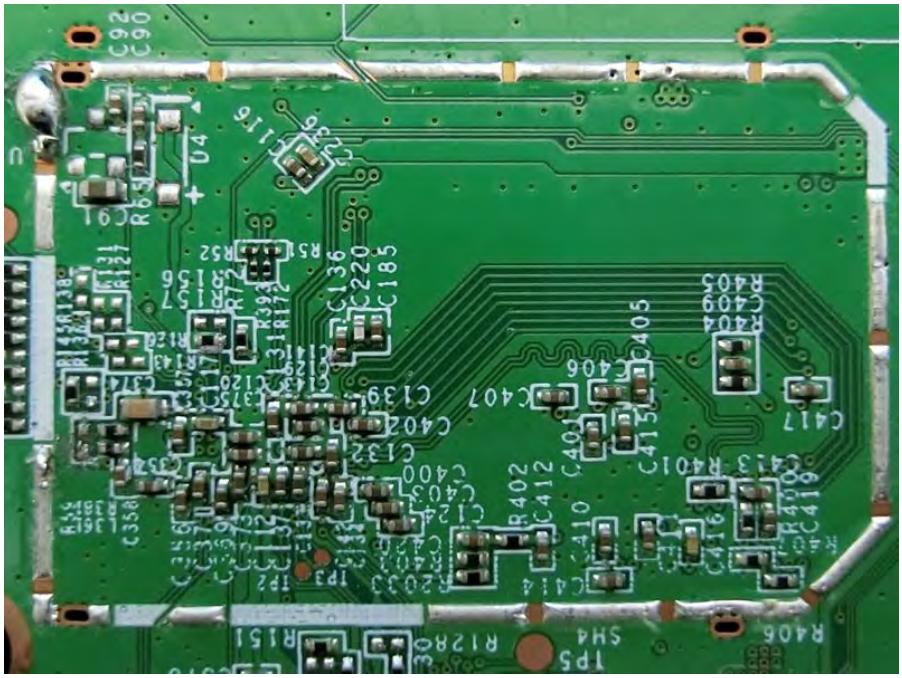


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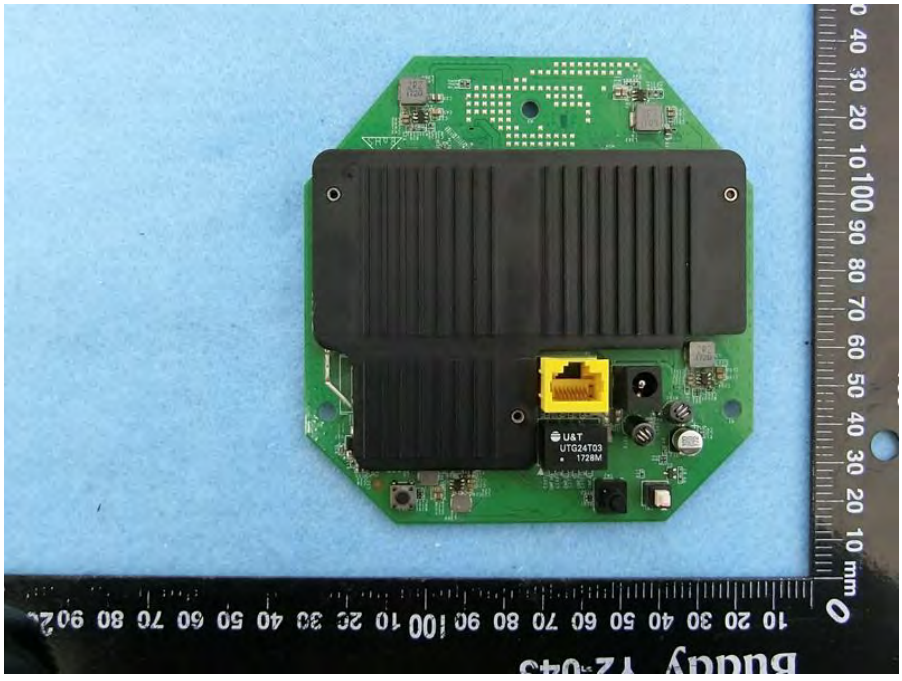
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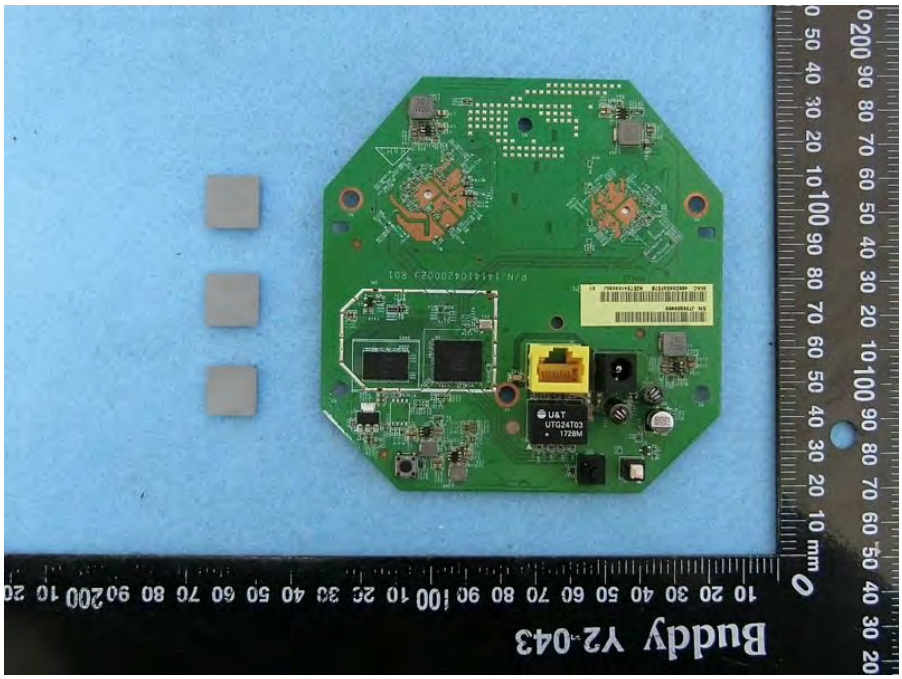
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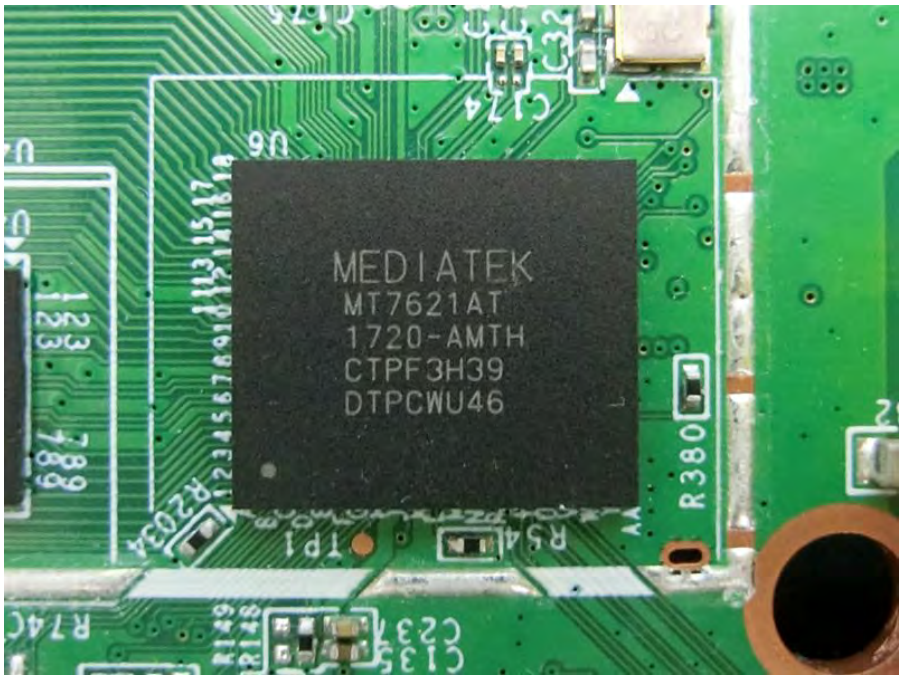
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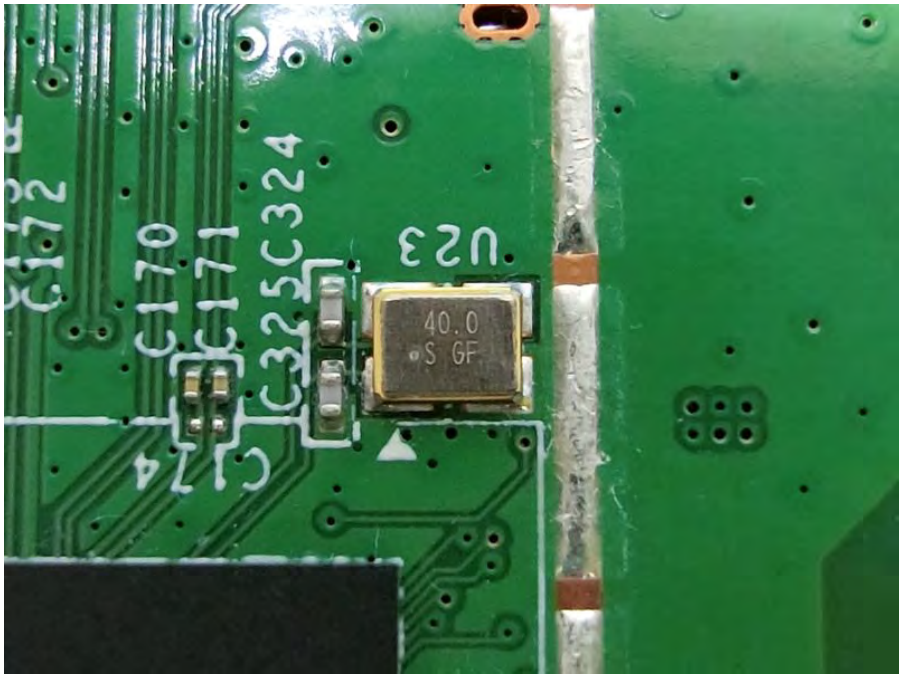
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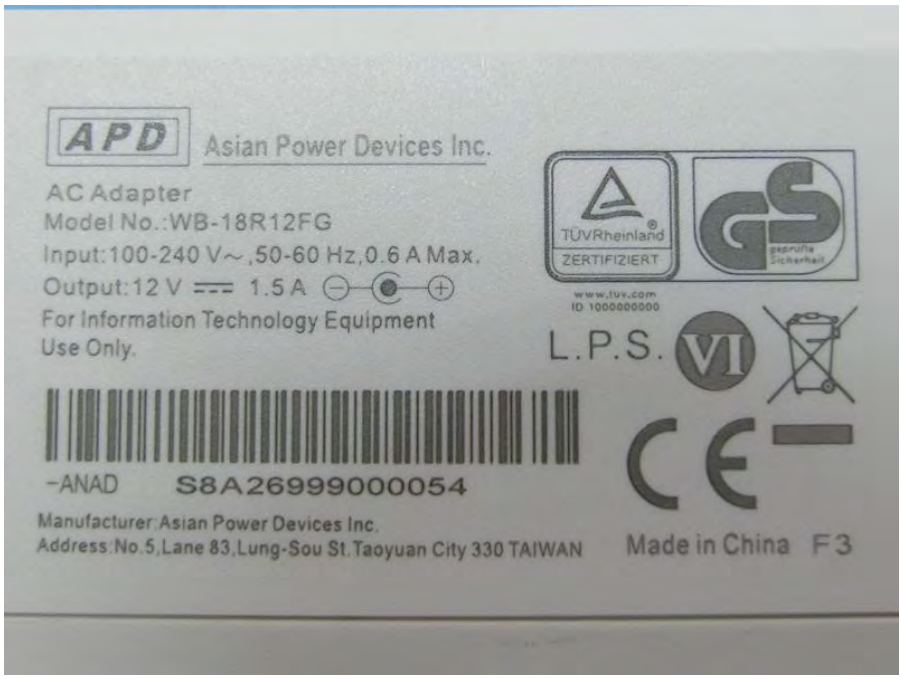
Adapter


APD
Asian Power Devices Inc.
AC Adapter
Model No.:WB-18R12FG
Input:100-240 V~,50-60 Hz,0.6 A Max.
Output:12 V ⎓ 1.5 A
For Information Technology Equipment
Use Only.
TÜVRheinland
ZERTIFIZIERT
L.P.S.
VI
-ANAD S8A26999000054
Manufacturer:Asian Power Devices Inc.
Address:No.5,Lane 83,Lung-Sou St.Taoyuan City 330 TAIWAN
Made in China F3

———THE END———