TEST REPORT

Application No.:	SHCR2311002374EV
Applicant:	CSE Energy&Technology Co.,Ltd
Address of Applicant:	Building S4, No.777, Sizhuan Road, Shanghai, China
Manufacturer:	CSE Energy&Technology Co.,Ltd
Address of Manufacturer:	Building S4, No.777, Sizhuan Road, Shanghai, China
Equipment Under Test (EUT):	
EUT Name:	AC charging pile of electric vehicle
Model No.:	CSE-BCG-AS32-K01-3-CE, CSE-BCG-AS32-K01-1-CE
Remark:	Please refer to section 2 of this report which indicates which model was actually tested and which were electrically identical.
Trade Mark:	CSE
Standard(s) :	EN 301 489-1 V2.2.3
	EN 301 489-3 V2.3.2
	EN 301 489-17 V3.2.4
	EN 301 489-52 V1.2.1
Date of Receipt:	2023-10-09
Date of Test:	2023-10-17 to 2023-10-24
Date of Issue:	2023-11-21
Test Result:	**Pass***

* In the configuration tested, the EUT complied with the standards specified above.

Revision Record			
Version	**Description**	**Date**	**Remark**
00	Co-license	2023-11-21	Base on SHCR231000209001

Authorized for issue by:				
Tested By		Bill Wu **Bill Wu/Project Engineer**		
Approved By		Parlam Zhan **Parlam Zhan / Reviewer**		

2 Test Summary

Emission Part				
Item	**Standard**	**Method**	**Requirement**	**Result**
Conducted Emissions at AC Mains Power Port (150kHz-30MHz)	EN 301 489-1 V2.2.3 EN 301 489-3 V2.3.2 EN 301 489-17 V3.2.4 EN 301 489-52 V1.2.1	EN 55032: 2015+A11:2020+A1:2020	Class B	Pass
Radiated Emissions (30MHz-1GHz)		EN 55032: 2015+A11:2020+A1:2020	Class B	Pass
Radiated Emissions (Above 1GHz)		EN 55032: 2015+A11:2020+A1:2020	Class B	Pass
Harmonic Current Emission		EN 61000-3-12:2011	Table 2	Pass
Voltage Fluctuations and Flicker		EN IEC 61000-3-11: 2019	Clause 5	Pass

Immunity Part				
Item	**Standard**	**Method**	**Requirement**	**Result**
Electrostatic Discharge	EN 301 489-1 V2.2.3 EN 301 489-3 V2.3.2 EN 301 489-17 V3.2.4 EN 301 489-52 V1.2.1	EN 61000-4-2:2009	4kV Contact Discharge 8kV Air Discharge	Pass
Radiated Immunity (80MHz-6GHz)		EN IEC 61000-4-3: 2020	3V/m, 80%, 1kHz Amp. Mod.	Pass
Electrical Fast Transients Burst at AC Mains Power Port		EN 61000-4-4:2012	1kV; 5/50ns Tr/Td; 5kHz Repetition Frequency	Pass
Surge at AC Mains Power Port		EN 61000-4-5:2014 +A1:2017	1.2/50μs Tr/Td; 1kV Line to Line	Pass
Conducted Immunity at AC Mains Power Port (150kHz-80MHz)		EN 61000-4-6:2014	3Vrms (emf),80%,1kHz Amp. Mod.	Pass
Voltage Dips and Interruptions		EN IEC 61000-4-11:2020	0 % UT for 0.5per;0 % UT for 1per;0 % UT for 250per;70 % UT for 25per;UT is Supply Voltage	Pass

Note1: There are series models mentioned in this report, and they are the similar in electrical and electronic characters. Only the model CSE-BCG-AS32-K01-3-CE was tested since their difference was the number of wireless modules varies.

Note2: This report was an additional report copied from the report SHCR231000209001, just changing the model name, company information and trade mark. Since the electrical circuit design, layout, components used and internal wiring for the model CSE-BCG-AS32-K01-3-CE in this report was exactly the same as the model CSG-BCG-AS32-K01-3-CE in the report SHCR231000209001.

3 Contents

4 General Information

4.1 Details of E.U.T.

Power supply:	AC 230V 50 32A
Test voltage:	AC 230V 50Hz

BLE

Operation Frequency:	2402MHz to 2480MHz
Modulation Type:	GFSK
Channel Spacing:	2MHz
Number of Channels:	40
Receiver Category:	2
Antenna Gain:	2 dBi (Provided by manufacturer)
Antenna Type:	PCB Antenna

2.4GHz WiFi

Operation Frequency:	802.11b/g/n(HT20): 2412MHz to 2472MHz
Modulation Type:	802.11b: DSSS (CCK, DQPSK, DBPSK), 802.11g/n: OFDM (64QAM, 16QAM, QPSK, BPSK)
Channel Spacing:	5MHz
Number of Channels:	802.11b/g/n(HT20): 13
Receiver Category:	1
Antenna Gain:	2 dBi (Provided by manufacturer)
Antenna Type:	PCB Antenna

NFC

Operation Frequency:	13.56MHz
Modulation Type:	ASK
Antenna Type:	Loop Antenna

GSM

Frequency Band:	Band	Tx (MHz)	Rx (MHz)
	E-GSM900	880-915	925-960
	DCS1800	1710-1785	1805-1880
Type of Modulation:	GMSK(GSM/GPRS/EGPRS), 8PSK (EGPRS)		
Sample Type:	Module equipment		
Antenna Type:	External Antenna		
Antenna Gain:	3dBi (Provided by manufacturer)		

LTE

Frequency Band:	LTE BAND	Duplex Mode	Uplink (MHz)	Downlink (MHz)	Supported Channel Bandwidth					
					1.4	3	5	10	15	20
	1	FDD	1920-1980	2110-2170	---	---	☒	☒	☒	☒
	3	FDD	1710-1785	1805-1880	☒	☒	☒	☒	☒	☒
	7	FDD	2500-2570	2620-2690	---	---	☒	☒	☒	☒
	8	FDD	880-915	925-960	☒	☒	☒	☒	---	---
	20	FDD	791-821	832-862	---	---	☒	☒	☒	☒
	28	FDD	703-748	758-803	---	☒	☒	☒	☒	☒
Type of Modulation:	UL: QPSK,16QAM DL: QPSK,16QAM,64QAM									
Sample Type:	Module equipment									
Antenna Type:	External Antenna									
Antenna Gain:	3dBi (Provided by manufacturer)									

4.2 Description of Support Units

Description	Manufacturer	Model No.	Serial No.
iPad	Apple	A1490	-
Resistance load	-	-	-
Router	NETGEAR	RAX50	-

4.3 Measurement Uncertainty & Decision Rule

Measurement Uncertainty:

No.	Item	Measurement Uncertainty (U_{Lab})	U_{CISPR}
1	Conducted Emission at mains port using AMN	3.4dB (9kHz to 150kHz)	3.8dB (9kHz to 150kHz)
		2.9dB (150kHz to 30MHz)	3.4dB (150kHz to 30MHz)
2	Conducted Emission at mains port using VP	2.2dB (9kHz to 30MHz)	2.9dB (9kHz to 30MHz)
3	Conducted Emission at telecommunication port using AAN	4.6dB (150kHz to 30MHz)	5.0dB (150kHz to 30MHz)
4	Radiated Power	3.4dB (30MHz to 300MHz)	4.5dB (30MHz to 300MHz)
5	Radiated emission	5.7dB (30MHz-1GHz)	6.3dB (30MHz-1GHz)
		4.8dB (1GHz-6GHz)	5.2dB (1GHz-6GHz)
		5.0dB (6GHz-18GHz)	5.5dB (6GHz-18GHz)
6	Radiated disturbance (disturbance current in a LLAS)	2.6dB (9kHz to 30MHz)	3.3dB (9kHz to 30MHz)

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

Decision Rule:

• CISPR 16-4-2 for emission measurements is as below described.

Pass means the test result passed the test standard requirement, please find the detailed decision rule in the report relative section.

U_{LAB} less than U_{CISPR}, therefore:

- compliance is deemed to occur if no measured disturbance level exceeds the disturbance limit;
- non-compliance is deemed to occur if any measured disturbance level exceeds the disturbance limit.

4.4 Test Location

All tests were performed at:
SGS-CSTC Standards Technical Services (Shanghai) Co., Ltd. E&E Lab
588 West Jindu Road, Xinqiao, Songjiang, 201612 Shanghai, China
Tel: +86 21 6191 5666 Fax: +86 21 6191 5678

No tests were sub-contracted.

Note:

1. SGS is not responsible for wrong test results due to incorrect information (e.g., max. internal working frequency, antenna gain, cable loss, etc) is provided by the applicant. (If applicable).
2. SGS is not responsible for the authenticity, integrity and the validity of the conclusion based on results of the data provided by applicant. (If applicable).
3. Sample source: sent by customer.

4.5 Test Facility

The test facility is recognized, certified, or accredited by the following organizations:

• A2LA (Certificate No. 6332.01)

SGS-CSTC Standards Technical Services (Shanghai) Co., Ltd. is accredited by the American Association for Laboratory Accreditation(A2LA).

• FCC (Designation Number: CN1301)

SGS-CSTC Standards Technical Services (Shanghai) Co., Ltd. has been recognized as an accredited testing laboratory.

• ISED (CAB Identifier: CN0020)

SGS-CSTC Standards Technical Services (Shanghai) Co., Ltd. EMC Laboratory has been recognized by Innovation, Science and Economic Development Canada (ISED) as an accredited testing laboratory.
Company Number: 8617A

• VCCI (Member No.: 3061)

The 3m Semi-anechoic chamber and Shielded Room of SGS-CSTC Standards Technical Services (Shanghai) Co., Ltd. has been registered in accordance with the Regulations for Voluntary Control Measures with Registration No.: R-13868, C-14336, T-12221, G-10830 respectively.

4.6 Deviation from Standards

None

4.7 Abnormalities from Standard Conditions

None

4.8 EMS Monitor

Visual: Working status of EUT.
Other: A support spectrum analyser and pick up antenna was used to monitor for any unintentional transmission from the EUT.

5 Equipment List

Conducted Emissions at AC Mains Power Port (150kHz-30MHz)					
Equipment	**Manufacturer**	**Model No.**	**Inventory No.**	**Cal Date**	**Cal Due Date**
EMI test receiver	Rohde & Schwarz	ESR7	SHEM162-1	2022/12/20	2023/12/19
Line impedance stabilization network	SCHWARZBECK	NSLK8127	SHEM061-1	2022/12/20	2023/12/19
Line impedance stabilization network	EMCO	3816_2	SHEM019-1	2022/12/20	2023/12/19
Pulse limiter	Rohde & Schwarz	ESH3-Z2	SHEM029-1	2022/12/20	2023/12/19
Shielding Room	ZHONGYU	8*4*3M	SHEM079-2	2020/12/20	2023/12/19
CE test Cable	/	/	SHEM172-1	2022/12/20	2023/12/19
Test Software	ESE	e3	Version: 6.111221a	N/A	N/A

Radiated Emissions (30MHz-1GHz)					
Equipment	**Manufacturer**	**Model No.**	**Inventory No.**	**Cal Date**	**Cal Due Date**
EMI test receiver	Rohde & Schwarz	ESU40	SHEM051-1	2022/12/20	2023/12/19
EMI test receiver	Rohde & Schwarz	ESR7	SHEM201-1	2023/8/01	2024/7/31
CONTROLLER	INNCO	CO2000	SHEM047-1	N/A	N/A
ANTENNA MAST	INNCO	MA400-EP	SHEM047-2	N/A	N/A
TURN DEVICE	INNCO	DE 3600-RH	SHEM047-3	N/A	N/A
Broadband UHF-VHF ANTENNA	SCHWARZBECK	VULB9168	SHEM048-1	2023/9/3	2025/9/2
Broadband UHF-VHF ANTENNA	SCHWARZBECK	VULB9168	SHEM202-1	2023/4/17	2025/4/16
Semi/Fully Anechoic	ST	11*6*6M	SHEM078-2	2023/5/6	2026/5/5
Pre-amplifier	HP	8447D	SHEM236-1	2022/12/22	2023/12/21
Pre-amplifier	HP	8447D	SHEM143-1	2022/12/20	2023/12/19
RE test Cable	/	/	SHEM217-2	2023/5/9	2024/5/8
Test Software	ESE	e3	Version: 6.191211	N/A	N/A
Semi/Fully Anechoic	TIANDE	9*6*6M	SHEM198-1	2021/05/27	2024/05/26

Radiated Emissions (Above 1GHz)					
Equipment	**Manufacturer**	**Model No.**	**Inventory No.**	**Cal Date**	**Cal Due Date**
EMI test receiver	Rohde & Schwarz	ESU40	SHEM051-1	2022/12/20	2023/12/19
EMI test receiver	Rohde & Schwarz	ESR7	SHEM201-1	2023/8/01	2024/7/31
CONTROLLER	INNCO	CO2000	SHEM047-1	N/A	N/A
ANTENNA MAST	INNCO	MA400-EP	SHEM047-2	N/A	N/A
TURN DEVICE	INNCO	DE 3600-RH	SHEM047-3	N/A	N/A
Horn Antenna (1-18GHz)	Schwarzbeck	BBHA9120D	SHEM050-1	2023/9/3	2025/9/2
Pre-amplifier (1-18GHz)	Schwarzbeck	SCU-F0118-G40-BZ4-CSS(F)	SHEM050-2	2022/12/20	2023/12/19
Horn Antenna (1-18GHz)	Schwarzbeck	HF906	SHEM009-1	2022/8/11	2024/8/10

Semi/Fully Anechoic	ST	11*6*6M	SHEM078-2	2023/5/6	2026/5/5
RE test Cable	/	/	SHEM217-2	2023/5/9	2024/5/8
Test Software	ESE	e3	Version: 6.191211	N/A	N/A
Semi/Fully Anechoic	TIANDE	9*6*6M	SHEM198-1	2021/05/27	2024/05/26

Voltage Fluctuations and Flicker					
Equipment	**Manufacturer**	**Model No.**	**Inventory No.**	**Cal Date**	**Cal Due Date**
Harmonic&Flicker analyzer	AMETEK	PACS-1	SHEM024-2	2023/8/01	2024/7/31
AC Power Source 5KVA	AMETEK	5001iX	SHEM025-2	2023/8/01	2024/7/31
Test Software	AMETEK	CTS4	Version: 4.24.0	N/A	N/A
Harmonic&Flicker analyzer	EM TEST	DPA500	SHEM024-1	2023/8/01	2024/7/31
AC Power Source 6KVA	EM TEST	ACS500	SHEM025-1	2023/8/01	2024/7/31
Test Software	EM TEST	DPA	Version: 5.4.8.0	N/A	N/A

Harmonic Current Emission					
Equipment	**Manufacturer**	**Model No.**	**Inventory No.**	**Cal Date**	**Cal Due Date**
Harmonic&Flicker analyzer	AMETEK	PACS-1	SHEM024-2	2023/8/01	2024/7/31
AC Power Source 5KVA	AMETEK	5001iX	SHEM025-2	2023/8/01	2024/7/31
Test Software	AMETEK	CTS4	Version: 4.24.0	N/A	N/A
Harmonic&Flicker analyzer	EM TEST	DPA500	SHEM024-1	2023/8/01	2024/7/31
AC Power Source 6KVA	EM TEST	ACS500	SHEM025-1	2023/8/01	2024/7/31
Test Software	EM TEST	DPA	Version: 5.4.8.0	N/A	N/A

Electrostatic Discharge					
Equipment	**Manufacturer**	**Model No.**	**Inventory No.**	**Cal Date**	**Cal Due Date**
Electrostatic Discharge Simulator	TESEQ	NSG 437	SHEM041-2	2023/8/01	2024/7/31
Electrostatic Discharge Simulator	3CTEST	EDS20H	SHEM199-1	2022/12/20	2023/12/19

Radiated Immunity (80MHz-6GHz)					
Equipment	**Manufacturer**	**Model No.**	**Inventory No.**	**Cal Date**	**Cal Due Date**
Signal generator	Rohde & Schwarz	SMB100A	SHEM194-1	2022/12/20	2023/12/19
Power Meter	Rohde & Schwarz	NRP	SHEM057-1	2023/8/01	2024/7/31
Power meter sensor	Rohde & Schwarz	NRP-Z91	SHEM057-3	2023/8/01	2024/7/31
Antenna	SCHWARZBECK	STLP9128D	SHEM130-1	N/A	N/A
Antenna	SCHWARZBECK	STLP9149	SHEM131-1	N/A	N/A
Amplifier	MILMEGA	AS0840-55-55	SHEM133-1	2022/12/20	2023/12/19
Amplifier	MILMEGA	80RF1000-250	SHEM132-1	2022/12/20	2023/12/19
Amplifier	Rohde & Schwarz	BBA150-E60	SHEM171-1	2022/12/20	2023/12/19
Power meter sensor	Rohde & Schwarz	NRP-Z22	SHEM136-1	2023/8/01	2024/7/31

ElectroMagnetic Field Probe	ETS-Lindgren	HI-6105	SHEM134-1	2023/8/24	2024/8/23
Semi/Fully Anechoic	ST	11*6*6M	SHEM078-2	2023/5/6	2026/5/5
Test Software	Rohde & Schwarz	EMC32	Version: 10.20.01	N/A	N/A

Electrical Fast Transients Burst at AC Mains Power Port

Equipment	Manufacturer	Model No.	Inventory No.	Cal Date	Cal Due Date
Immunity Test System	EMC PARTNER	TRA3000 F-S-D-V	SHEM163-1	2022/12/20	2023/12/19
Test Software	EMC-PARTNER	GENECS	Version: 3.29	N/A	N/A
Immunity Test System	TESEQ	NSG 3060	SHEM224-1	2023/8/01	2024/7/31
Coupling / Decoupling Network (CDN)	TESEQ	CDN 3061	SHEM224-3	2023/8/01	2024/7/31
EFT & Surge Generator	PRIMA	PRM61045TB	SHEM200-1	2023/9/28	2024/9/27
CDN for EFT & Surge	PRIMA	PRM-CDN	SHEM200-2	2023/9/28	2024/9/27

Surge at AC Mains Power Port

Equipment	Manufacturer	Model No.	Inventory No.	Cal Date	Cal Due Date
Immunity Test System	EMC PARTNER	TRA3000 F-S-D-V	SHEM163-1	2022/12/20	2023/12/19
Test Software	EMC-PARTNER	GENECS	Version: 3.29	N/A	N/A
Immunity Test System	TESEQ	NSG 3060	SHEM224-1	2023/8/01	2024/7/31
Coupling / Decoupling Network (CDN)	TESEQ	CDN 3061	SHEM224-3	2023/8/01	2024/7/31
EFT & Surge Generator	PRIMA	PRM61045TB	SHEM200-1	2023/9/28	2024/9/27
CDN for EFT & Surge	PRIMA	PRM-CDN	SHEM200-2	2023/9/28	2024/9/27
CDN for unsymmetrical interconnection lines (1.2/50us)	SCHAFFNER	CDN 117	SHEM224-5	2023/8/01	2024/7/31
CDN for symmetric datalines & Resistor network (Surge 1.2/50 or 10/700 us)	SCHAFFNER	CDN 118 & INA172	SHEM224-6 & SHEM224-7	2023/8/01	2024/7/31

Conducted Immunity at AC Mains Power Port (150kHz-80MHz)

Equipment	Manufacturer	Model No.	Inventory No.	Cal Date	Cal Due Date
Signal generator	Rohde & Schwarz	SMB100A	SHEM194-1	2022/12/20	2023/12/19
Power Amplifier	HAEFFLY	PAMP250	SHEM023-1	2022/12/20	2023/12/19
6dB Attenuator	HUAXIANG	DTS50-6dB-1G-A	SHEM123-2	2022/12/20	2023/12/19
Coupling clamp	LUTHI	EM 101	SHEM027-1	2023/06/05	2024/06/04
Power Meter	Rohde & Schwarz	NRP	SHEM057-1	2023/8/01	2024/7/31
Power meter sensor	Rohde & Schwarz	NRP-Z91	SHEM057-3	2023/8/01	2024/7/31
Coupling and Decoupling Network (CDN)	LUTHI	L-801 M1	SHEM023-5	2022/12/20	2023/12/19
Coupling and Decoupling Network	LUTHI	L-801 M2/M3	SHEM023-6	2022/12/20	2023/12/19

(CDN)					
Shielding Room	ZHONGYU	5*3*3M	SHEM079-6	2022/12/20	2025/12/19
Coupling and Decoupling Network	Teseq	CDN M016	SHEM168-1	2023/8/01	2024/7/31
RF Generator	SCHAFFNER	NSG 2070	SHEM221-1	2022/8/02	2024/8/01
Test Software	Rohde & Schwarz	EMC32	Version: 10.20.01	N/A	N/A

Voltage Dips and Interruptions					
Equipment	**Manufacturer**	**Model No.**	**Inventory No.**	**Cal Date**	**Cal Due Date**
Immunity Test System	EMC PARTNER	TRA3000 F-S-D-V	SHEM163-1	2022/12/20	2023/12/19
Test Software	EMC-PARTNER	GENECS	Version: 3.29	N/A	N/A
Immunity Test System	TESEQ	NSG 3060	SHEM224-1	2023/8/01	2024/7/31
Coupling / Decoupling Network (CDN)	TESEQ	CDN 3061	SHEM224-3	2023/8/01	2024/7/31
Manual step transformer	TESEQ	INA 6501	SHEM224-4	2023/8/01	2024/7/31

General used equipment					
Equipment	**Manufacturer**	**Model No.**	**Inventory No.**	**Cal Date**	**Cal Due Date**
Digital pressure meter	YONGZHI	DYM3-01	SHEM082-1	2021-01-22	2024-01-21
Temperature&humidity recorder	ShangHai weather meter work	ZJ 1-2B	SHEM042-9~10	2022-12-31	2023-12-30
Temperature&humidity recorder	ShangHai weather meter work	ZJ 1-2B	SHEM042-5	2023-07-23	2024-07-22
Digital Temperature& humidity recorder	Jianda Renke	RS-WS-N01-6J	SHEM247-1~8	2023-01-13	2024-01-12
Digital Multimeter	FLUKE	17B+	SHEM271-1	2023-07-19	2024-07-18
Autoformer regulator	Guangzhou bao de	TDGC2-5KVA	SHEM150-1	N/A	N/A
Multi-purpose tong tester	FLUKE	317	SHEM001-2	2022-11-14	2023-11-13

6 Emission Test Results

6.1 Conducted Emissions at AC Mains Power Port (150kHz-30MHz)

Test Requirement: EN 301 489-1 V2.2.3
EN 301 489-3 V2.3.2
EN 301 489-17 V3.2.4
EN 301 489-52 V1.2.1

Test Method: EN 55032: 2015+A11:2020+A1:2020

Limit:

Frequency of emission(MHz)	Conducted limit(dBμV)	
	Quasi-peak	Average
0.15-0.5	66 to 56*	56 to 46*
0.5-5	56	46
5-30	60	50
*Decreases with the logarithm of the frequency.		
Detector: Peak for pre-scan (9kHz resolution bandwidth) 0.15M to 30MHz		

6.1.1 E.U.T. Operation

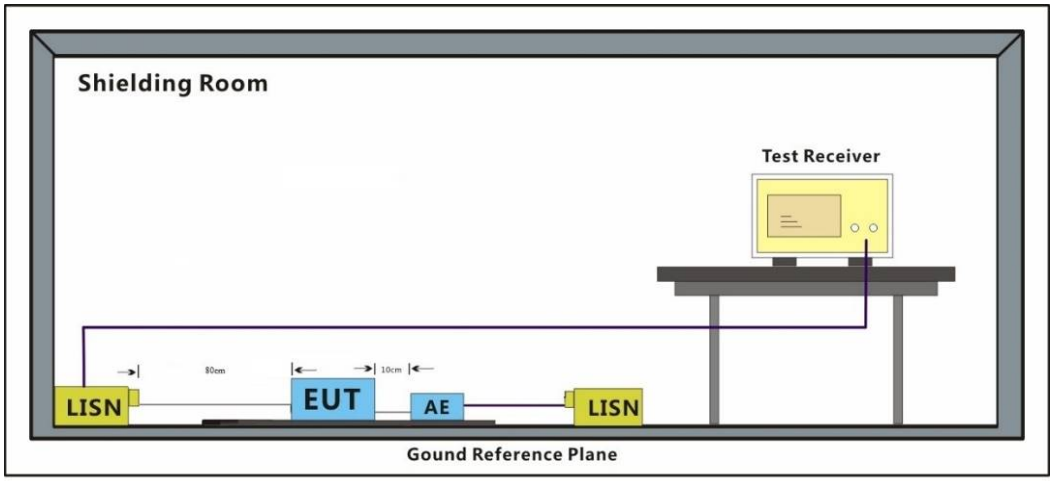
Operating Environment:

Temperature: 22 °C Humidity: 50 % RH Atmospheric Pressure: 1010 mbar

6.1.2 Test Mode Description

Pre-scan / Final test	Mode Code	Description
Final test	00	WiFi mode_Establish the communication between EUT and Ipad mini via wifi function, and use the "APP" in Ipad mini to control EUT working continuously.
Final test	01	Data Communication Mode:The EUT is connected with CMW500 (wireless communication tester). The Absolute Radio Frequency Channel Number is allocated to the middle channel during the test for all working frequency bands. The EUT is commanded to operate at maximum transmitting power. A data communication link has been established.

6.1.3 Test Setup Diagram



6.1.4 Measurement Procedure and Data

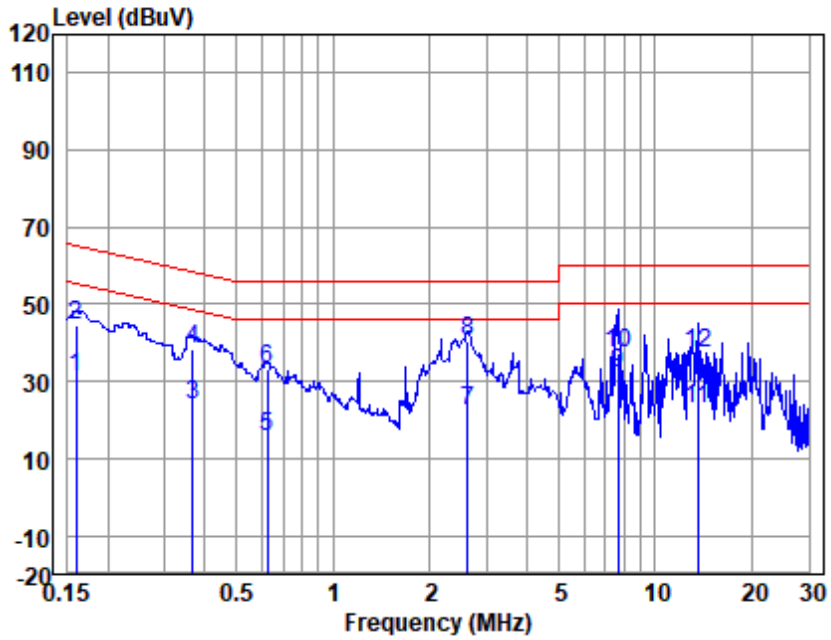
Frequency range: 150kHz-30MHz

An initial pre-scan was performed with peak detector.Quasi-Peak or Average measurement were performed at the frequencies with maximized peak emission were detected.

The red line show in graphic is the limit in standard used in this section.

Remark: Measured Level= Read Level+ Cable Loss+ LISN Factor

Test Mode: 00; Line: Live line

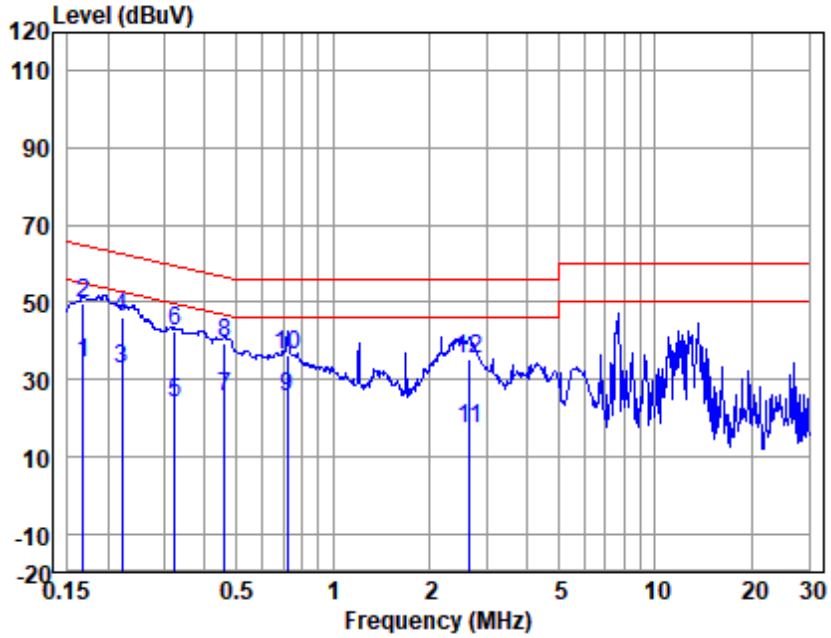


LISN : LINE
EUT/Project No : 02090EV
Test Mode : 00

	Freq (MHz)	Read level (dBuV)	LISN Factor (dB)	Cable Loss (dB)	Emission Level (dBuV)	Limit (dBuV)	Over Limit (dB)	Remark
1	0.16	20.69	0.40	9.87	30.96	55.52	-24.56	Average
2	0.16	34.17	0.40	9.87	44.44	65.52	-21.08	QP
3	0.37	13.77	0.27	9.87	23.91	48.56	-24.65	Average
4	0.37	28.27	0.27	9.87	38.41	58.56	-20.15	QP
5	0.63	5.45	0.20	9.86	15.51	46.00	-30.49	Average
6	0.63	23.06	0.20	9.86	33.12	56.00	-22.88	QP
7	2.62	12.49	0.23	9.87	22.59	46.00	-23.41	Average
8	2.62	30.13	0.23	9.87	40.23	56.00	-15.77	QP
9	7.65	21.68	0.40	9.98	32.06	50.00	-17.94	Average
10	7.65	26.80	0.40	9.98	37.18	60.00	-22.82	QP
11	13.55	12.57	0.47	10.02	23.06	50.00	-26.94	Average
12	13.55	27.10	0.47	10.02	37.59	60.00	-22.41	QP

Notes: Emission Level = Read Level +LISN Factor + Cable loss

Test Mode: 00; Line: Neutral Line

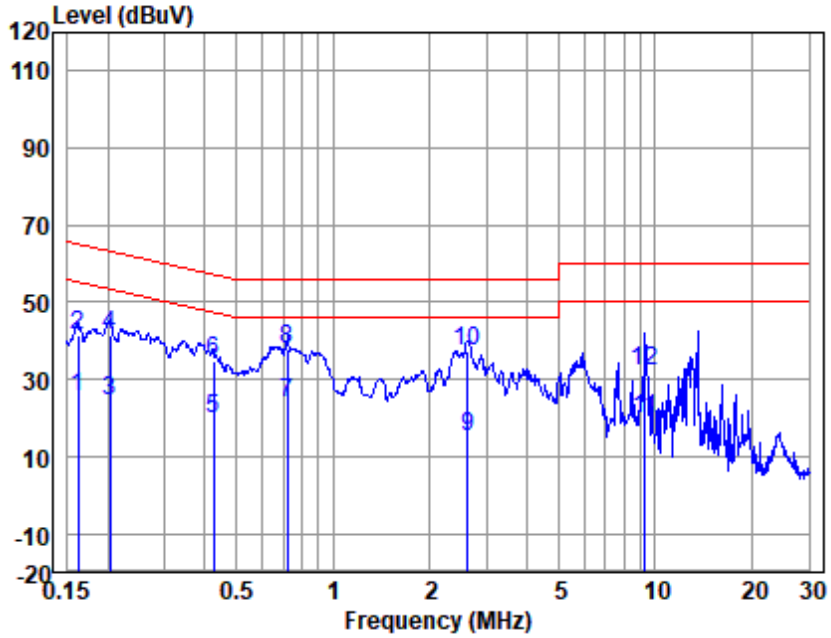


LISN : NEUTRAL
EUT/Project No : 02090EV
Test Mode : 00

	Freq	Read level	LISN Factor	Cable Loss	Emission Level	Limit	Over Limit	Remark
	(MHz)	(dBuV)	(dB)	(dB)	(dBuV)	(dBuV)	(dB)	
1	0.17	24.29	0.32	9.87	34.48	55.08	-20.60	Average
2	0.17	39.54	0.32	9.87	49.73	65.08	-15.35	QP
3	0.22	22.34	0.30	9.87	32.51	52.74	-20.23	Average
4	0.22	35.74	0.30	9.87	45.91	62.74	-16.83	QP
5	0.32	13.84	0.30	9.87	24.01	49.66	-25.65	Average
6	0.32	32.27	0.30	9.87	42.44	59.66	-17.22	QP
7	0.46	15.38	0.30	9.86	25.54	46.67	-21.13	Average
8	0.46	29.39	0.30	9.86	39.55	56.67	-17.12	QP
9	0.72	15.32	0.30	9.86	25.48	46.00	-20.52	Average
10	0.72	26.22	0.30	9.86	36.38	56.00	-19.62	QP
11	2.65	6.78	0.36	9.87	17.01	46.00	-28.99	Average
12	2.65	25.25	0.36	9.87	35.48	56.00	-20.52	QP

Notes: Emission Level = Read Level +LISN Factor + Cable loss

Test Mode: 01; Line: Live line

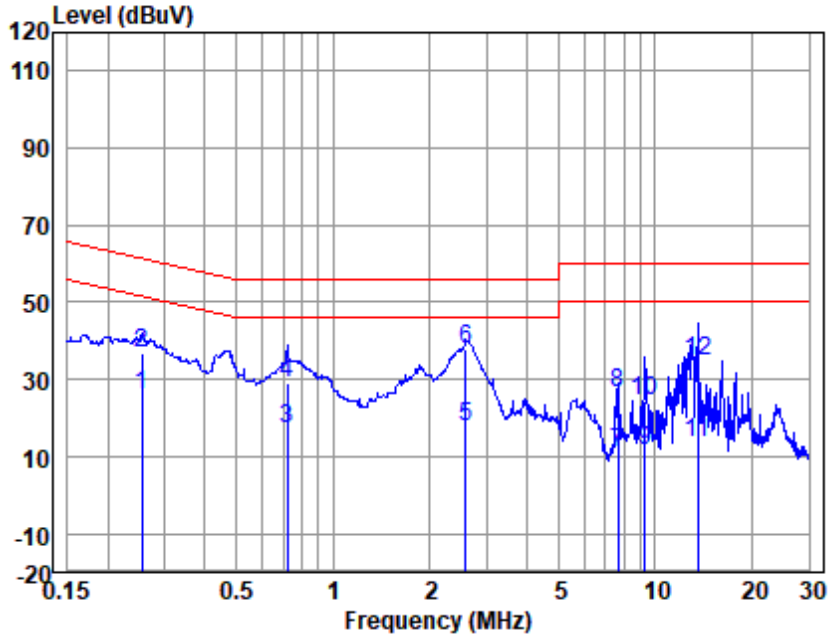


LISN : LINE
EUT/Project No : 02090EV
Test Mode : 01

	Freq (MHz)	Read level (dBuV)	LISN Factor (dB)	Cable Loss (dB)	Emission Level (dBuV)	Limit (dBuV)	Over Limit (dB)	Remark
1	0.16	15.29	0.40	9.87	25.56	55.38	-29.82	Average
2	0.16	31.01	0.40	9.87	41.28	65.38	-24.10	QP
3	0.20	13.97	0.40	9.87	24.24	53.49	-29.25	Average
4	0.20	31.24	0.40	9.87	41.51	63.49	-21.98	QP
5	0.43	9.69	0.23	9.87	19.79	47.33	-27.54	Average
6	0.43	24.48	0.23	9.87	34.58	57.33	-22.75	QP
7	0.72	14.02	0.20	9.86	24.08	46.00	-21.92	Average
8	0.72	27.92	0.20	9.86	37.98	56.00	-18.02	QP
9	2.61	5.19	0.23	9.87	15.29	46.00	-30.71	Average
10	2.61	27.34	0.23	9.87	37.44	56.00	-18.56	QP
11	9.30	9.26	0.40	9.98	19.64	50.00	-30.36	Average
12	9.30	21.98	0.40	9.98	32.36	60.00	-27.64	QP

Notes: Emission Level = Read Level +LISN Factor + Cable loss

Test Mode: 01; Line: Neutral Line



LISN : NEUTRAL
EUT/Project No : 02090EV
Test Mode : 01

	Freq (MHz)	Read level (dBuV)	LISN Factor (dB)	Cable Loss (dB)	Emission Level (dBuV)	Limit (dBuV)	Over Limit (dB)	Remark
1	0.25	15.66	0.30	9.87	25.83	51.60	-25.77	Average
2	0.25	26.42	0.30	9.87	36.59	61.60	-25.01	QP
3	0.72	7.18	0.30	9.86	17.34	46.00	-28.66	Average
4	0.72	18.99	0.30	9.86	29.15	56.00	-26.85	QP
5	2.58	7.59	0.36	9.87	17.82	46.00	-28.18	Average
6	2.58	27.76	0.36	9.87	37.99	56.00	-18.01	QP
7	7.65	0.81	0.37	9.98	11.16	50.00	-38.84	Average
8	7.65	15.92	0.37	9.98	26.27	60.00	-33.73	QP
9	9.30	1.10	0.54	9.98	11.62	50.00	-38.38	Average
10	9.30	14.08	0.54	9.98	24.60	60.00	-35.40	QP
11	13.55	3.08	0.45	10.02	13.55	50.00	-36.45	Average
12	13.55	24.09	0.45	10.02	34.56	60.00	-25.44	QP

Notes: Emission Level = Read Level +LISN Factor + Cable loss

6.2 Radiated Emissions (30MHz-1GHz)

Test Requirement: EN 301 489-1 V2.2.3
EN 301 489-3 V2.3.2
EN 301 489-17 V3.2.4
EN 301 489-52 V1.2.1

Test Method: EN 55032: 2015+A11:2020+A1:2020

Limit:

Test Distance:	3m
30MHz-230MHz	40 dB(μV/m) quasi-peak
230MHz-1GHz	47 dB(μV/m) quasi-peak
Detector:	Peak for pre-scan (120kHz resolution bandwidth) 30M to 1000MHz

Test Distance:	10m
30MHz-230MHz	30 dB(μV/m) quasi-peak
230MHz-1GHz	37 dB(μV/m) quasi-peak
Detector:	Peak for pre-scan (120kHz resolution bandwidth) 30M to 1000MHz

6.2.1 E.U.T. Operation

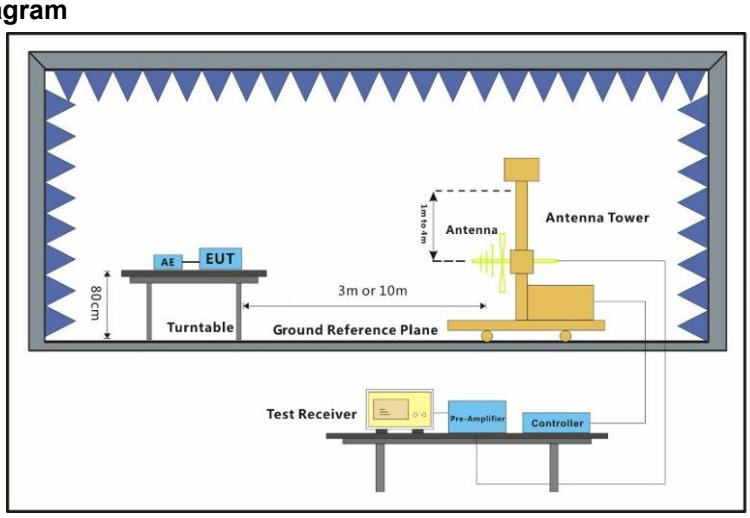
Operating Environment:

Temperature: 22 °C Humidity: 50 % RH Atmospheric Pressure: 1010 mbar

6.2.2 Test Mode Description

Pre-scan / Final test	Mode Code	Description
Final test	00	WiFi mode_Establish the communication between EUT and Ipad mini via wifi function, and use the "APP" in Ipad mini to control EUT working continuously.
Final test	01	Data Communication Mode:The EUT is connected with CMW500 (wireless communication tester). The Absolute Radio Frequency Channel Number is allocated to the middle channel during the test for all working frequency bands. The EUT is commanded to operate at maximum transmitting power. A data communication link has been established.

6.2.3 Test Setup Diagram



6.2.4 Measurement Procedure and Data

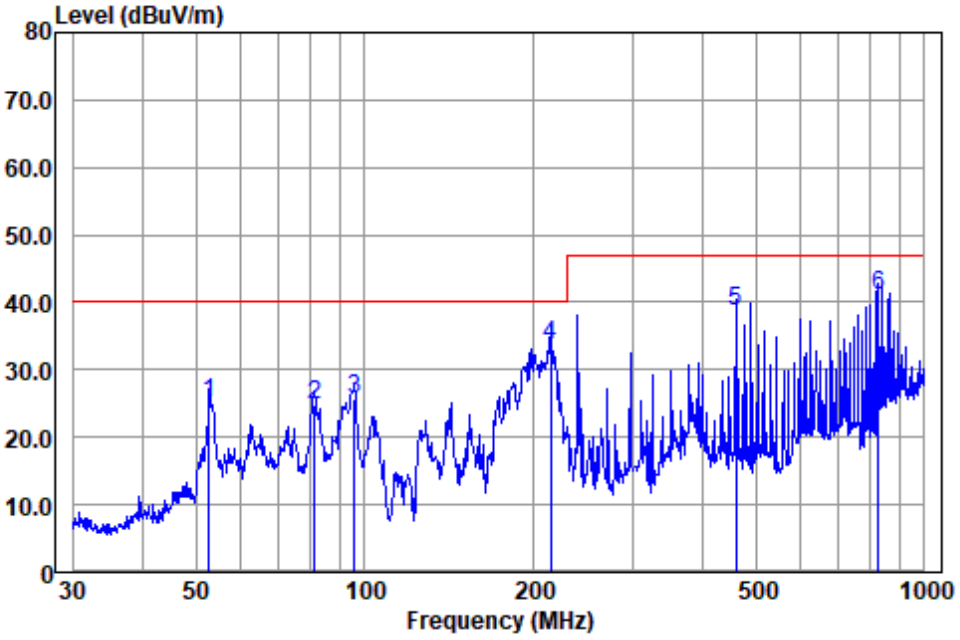
Frequency range: 30MHz-1GHz

An initial pre-scan was performed in the chamber using the spectrum analyser in peak detection mode. Quasi-peak measurements were conducted based on the peak sweep graph. The EUT was measured by BiConiLog antenna with 2 orthogonal polarities.

The red line show in graphic is the limit in standard used in this section.

Remark: Level= Read Level+ Cable Loss+ Antenna Factor- Preamp Factor

Test Mode: 00; Polarity: Horizontal

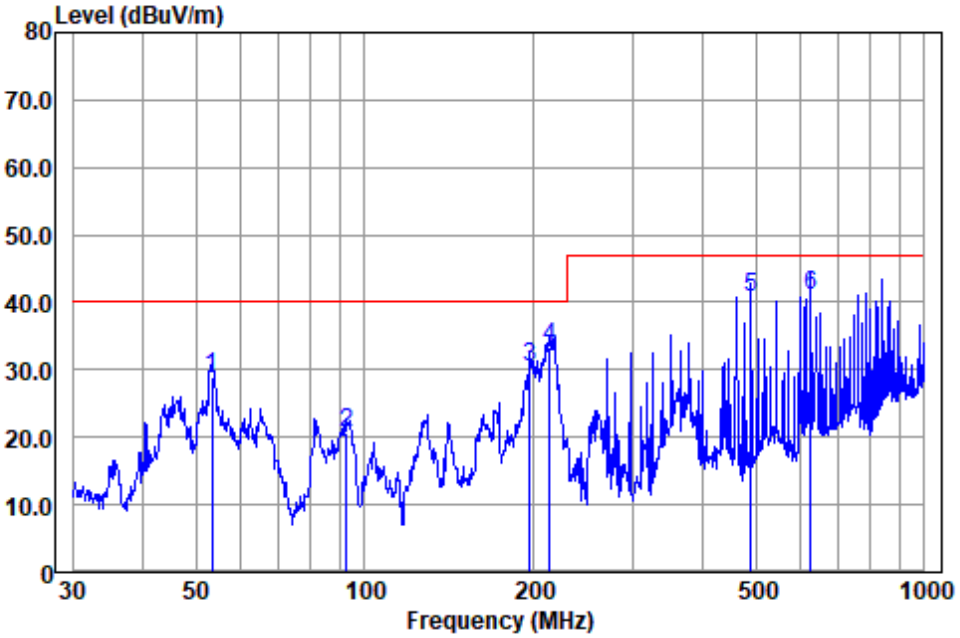


Antenna Polarity :HORIZONTAL
EUT/Project :2090EV
Test mode :00

	Freq	Read Level	Antenna Factor	Cable Loss	Preamp Factor	Emission Level	Limit Line	Over Limit	Remark
	MHz	dBuV	dB/m	dB	dB	dBuV/m	dBuV/m	dB	
1	52.760	43.82	13.90	1.08	33.67	25.13	40.00	-14.87	QP
2	81.212	47.90	8.75	1.78	33.51	24.92	40.00	-15.08	QP
3	95.762	49.11	8.33	1.85	33.60	25.69	40.00	-14.31	QP
4	214.514	53.95	9.85	3.22	33.23	33.79	40.00	-6.21	QP
5	460.727	49.95	17.40	4.22	33.00	38.57	47.00	-8.43	QP
6	827.493	43.95	22.88	6.56	32.45	40.94	47.00	-6.06	QP

Note:Emission Level=Read Level+Antenna Factor+Cable loss-Preamp Factor

Test Mode: 00; Polarity: Vertical

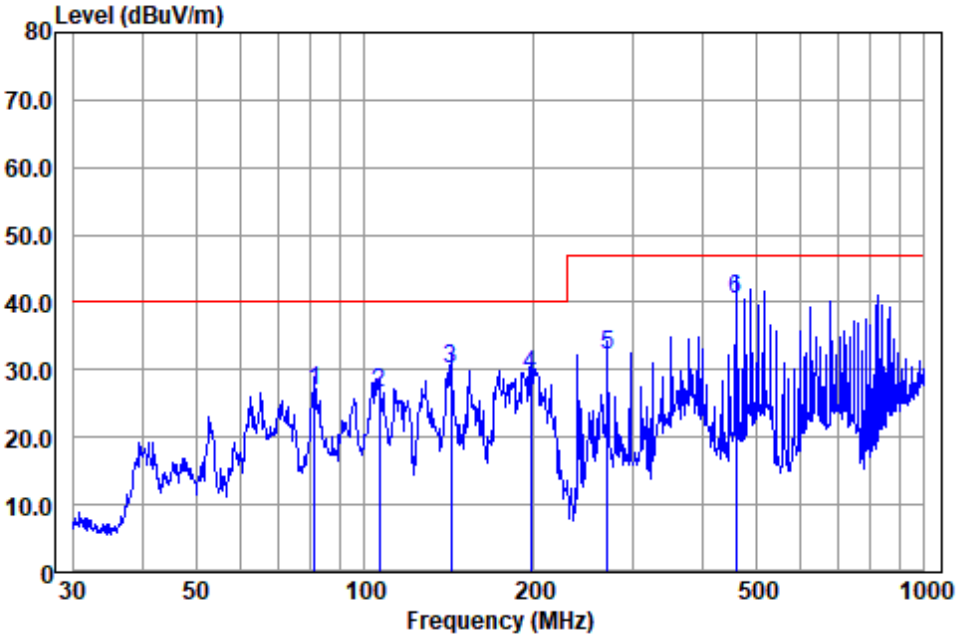


Antenna Polarity :VERTICAL
EUT/Project :2090EV
Test mode :00

	Freq	Read Level	Antenna Factor	Cable Loss	Preamp Factor	Emission Level	Limit Line	Over Limit	Remark
	MHz	dBuV	dB/m	dB	dB	dBuV/m	dBuV/m	dB	
1	53.318	47.54	13.90	1.08	33.66	28.86	40.00	-11.14	QP
2	92.787	44.35	8.03	1.86	33.60	20.64	40.00	-19.36	QP
3	197.200	50.76	10.16	2.90	33.31	30.51	40.00	-9.49	QP
4	213.763	53.41	9.84	3.22	33.24	33.23	40.00	-6.77	QP
5	489.027	51.65	17.75	4.37	33.00	40.77	47.00	-6.23	QP
6	625.078	47.95	20.40	5.74	32.94	41.15	47.00	-5.85	QP

Note:Emission Level=Read Level+Antenna Factor+Cable loss-Preamp Factor

Test Mode: 01; Polarity: Horizontal

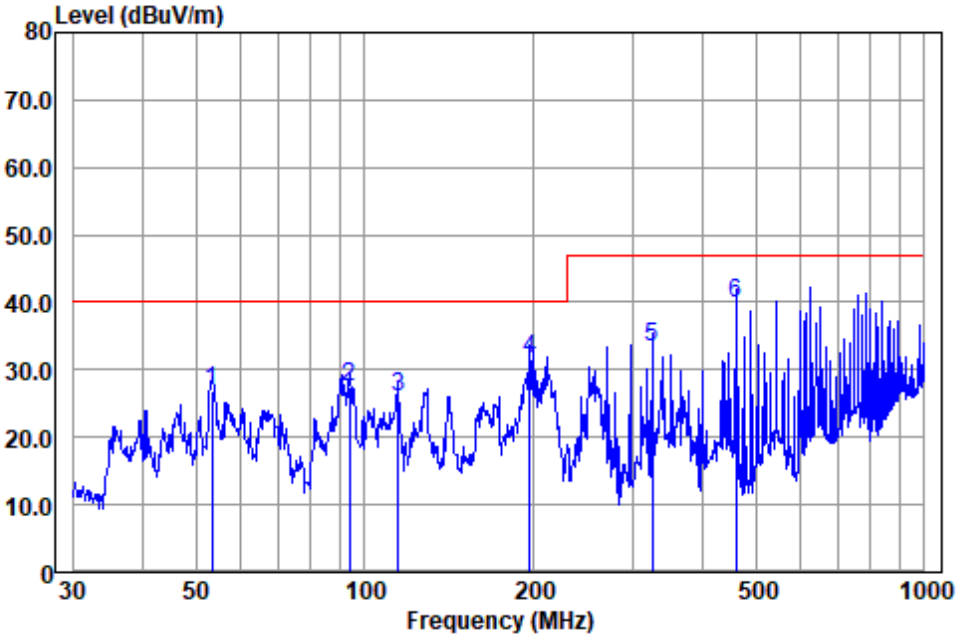


Antenna Polarity :HORIZONTAL
EUT/Project :2090EV
Test mode :01

	Freq	Read Level	Antenna Factor	Cable Loss	Preamp Factor	Emission Level	Limit Line	Over Limit	Remark
	MHz	dBuV	dB/m	dB	dB	dBuV/m	dBuV/m	dB	
1	81.212	49.90	8.75	1.78	33.51	26.92	40.00	-13.08	QP
2	106.013	48.27	10.00	1.95	33.59	26.63	40.00	-13.37	QP
3	142.324	47.84	13.25	2.47	33.51	30.05	40.00	-9.95	QP
4	197.893	49.38	10.12	2.93	33.31	29.12	40.00	-10.88	QP
5	271.325	49.53	12.35	3.45	33.05	32.28	47.00	-14.72	QP
6	460.727	51.95	17.40	4.22	33.00	40.57	47.00	-6.43	QP

Note:Emission Level=Read Level+Antenna Factor+Cable loss-Preamp Factor

Test Mode: 01; Polarity: Vertical



Antenna Polarity :VERTICAL
EUT/Project :2090EV
Test mode :01

	Freq	Read Level	Antenna Factor	Cable Loss	Preamp Factor	Emission Level	Limit Line	Over Limit	Remark
	MHz	dBuV	dB/m	dB	dB	dBuV/m	dBuV/m	dB	
1	53.318	45.54	13.90	1.08	33.66	26.86	40.00	-13.14	QP
2	93.768	51.23	8.10	1.85	33.60	27.58	40.00	-12.42	QP
3	114.515	46.76	10.70	2.03	33.57	25.92	40.00	-14.08	QP
4	197.200	51.76	10.16	2.90	33.31	31.51	40.00	-8.49	QP
5	325.596	48.15	14.21	3.98	33.00	33.34	47.00	-13.66	QP
6	460.727	51.18	17.40	4.22	33.00	39.80	47.00	-7.20	QP

Note:Emission Level=Read Level+Antenna Factor+Cable loss-Preamp Factor

6.3 Radiated Emissions (Above 1GHz)

Test Requirement: EN 301 489-1 V2.2.3
EN 301 489-3 V2.3.2
EN 301 489-17 V3.2.4
EN 301 489-52 V1.2.1

Test Method: EN 55032: 2015+A11:2020+A1:2020

Limit:

Frequency range(GHz)	Radiated emissions limit(dBμV/m)	
	Peak	Average
1GHz-3GHz	70	50
3GHz-6GHz	74	54
Detector: Peak for pre-scan (1000kHz resolution bandwidth) 1000M to 6000MHz		

6.3.1 E.U.T. Operation

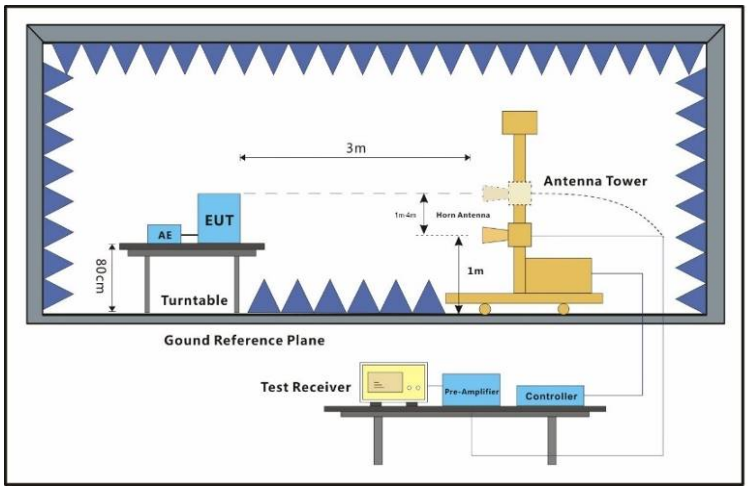
Operating Environment:

Temperature: 22 °C Humidity: 50 % RH Atmospheric Pressure: 1010 mbar

6.3.2 Test Mode Description

Pre-scan / Final test	Mode Code	Description
Final test	00	WiFi mode_Establish the communication between EUT and Ipad mini via wifi function, and use the "APP" in Ipad mini to control EUT working continuously.
Final test	01	Data Communication Mode:The EUT is connected with CMW500 (wireless communication tester). The Absolute Radio Frequency Channel Number is allocated to the middle channel during the test for all working frequency bands. The EUT is commanded to operate at maximum transmitting power. A data communication link has been established.

6.3.3 Test Setup Diagram



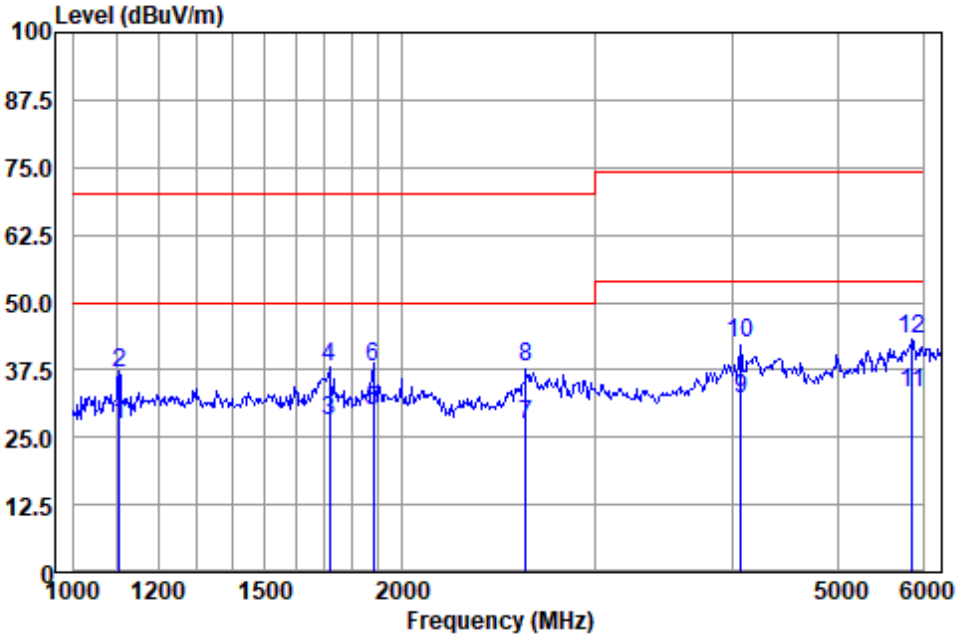
6.3.4 Measurement Procedure and Data

Frequency range: Above 1GHz

An initial pre-scan was performed in the chamber using the spectrum analyser in peak detection mode. Average measurements were conducted based on the peak sweep graph. The EUT was measured by Horn antenna with 2 orthogonal polarities.

Remark: Level= Read Level+ Cable Loss+ Antenna Factor- Preamp Factor

Test Mode: 00; Polarity: Horizontal

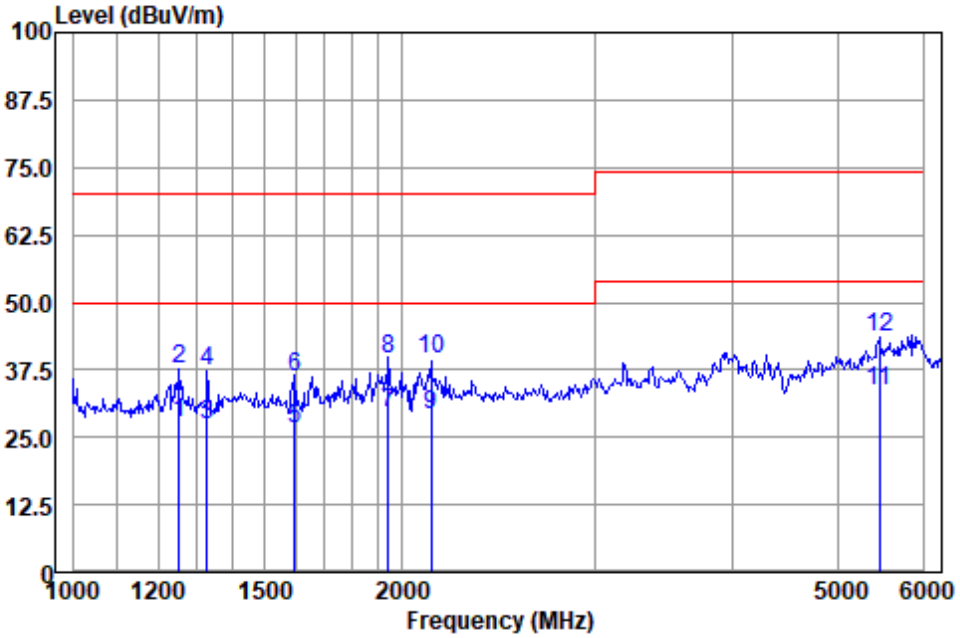


Antenna Polarity :HORIZONTAL
EUT/Project :02090EV
Test mode :00

	Freq	Read Level	Antenna Factor	Cable Loss	Preamp Factor	Emission Level	Limit Line	Over Limit	Remark
	MHz	dBuV	dB/m	dB	dB	dBuV/m	dBuV/m	dB	
1	1103.264	41.76	23.00	3.64	41.20	27.20	50.00	-22.80	Average
2	1103.264	51.56	23.00	3.64	41.20	37.00	70.00	-33.00	Peak
3	1716.864	41.03	23.40	4.68	41.20	27.91	50.00	-22.09	Average
4	1716.864	51.15	23.40	4.68	41.20	38.03	70.00	-31.97	Peak
5	1883.236	41.96	24.03	4.94	41.16	29.77	50.00	-20.23	Average
6	1883.236	50.33	24.03	4.94	41.16	38.14	70.00	-31.86	Peak
7	2595.613	37.27	26.70	5.73	42.30	27.40	50.00	-22.60	Average
8	2595.613	47.78	26.70	5.73	42.30	37.91	70.00	-32.09	Peak
9	4074.388	38.16	29.23	7.21	42.39	32.21	54.00	-21.79	Average
10	4074.388	48.34	29.23	7.21	42.39	42.39	74.00	-31.61	Peak
11	5847.517	34.58	32.50	8.63	42.35	33.36	54.00	-20.64	Average
12	5847.517	44.47	32.50	8.63	42.35	43.25	74.00	-30.75	Peak

Note:Emission Level=Read Level+Antenna Factor+Cable loss-Preamp Factor

Test Mode: 00; Polarity: Vertical

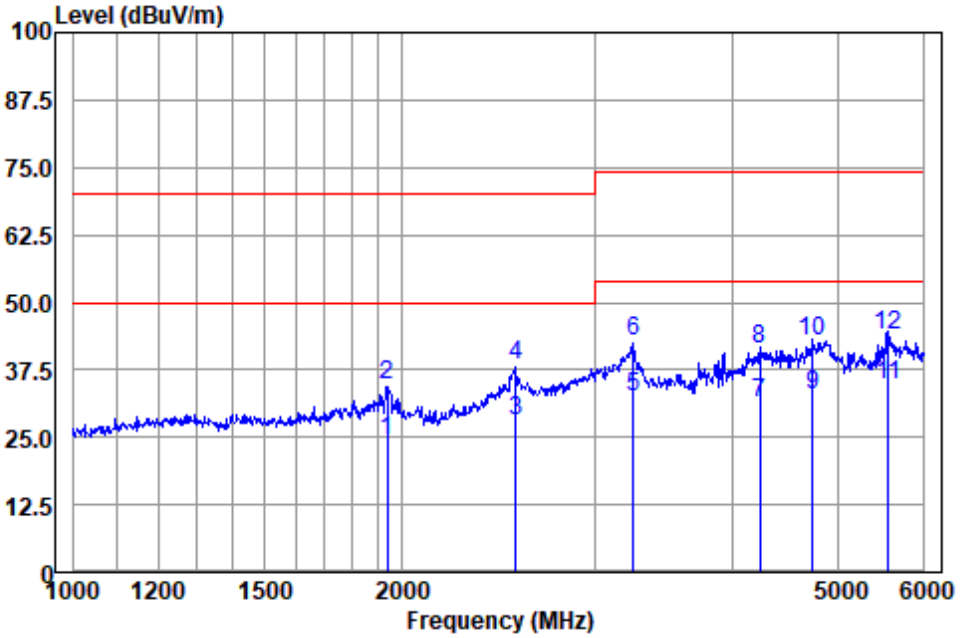


Antenna Polarity :VERTICAL
EUT/Project :02090EV
Test mode :00

	Freq	Read Level	Antenna Factor	Cable Loss	Preamp Factor	Emission Level	Limit Line	Over Limit	Remark
	MHz	dBuV	dB/m	dB	dB	dBuV/m	dBuV/m	dB	
1	1252.885	41.68	23.40	3.92	41.20	27.80	50.00	-22.20	Average
2	1252.885	51.55	23.40	3.92	41.20	37.67	70.00	-32.33	Peak
3	1327.446	40.92	23.60	4.02	41.20	27.34	50.00	-22.66	Average
4	1327.446	50.89	23.60	4.02	41.20	37.31	70.00	-32.69	Peak
5	1597.181	39.64	23.60	4.46	41.20	26.50	50.00	-23.50	Average
6	1597.181	49.35	23.60	4.46	41.20	36.21	70.00	-33.79	Peak
7	1944.073	41.71	24.10	4.98	41.12	29.67	50.00	-20.33	Average
8	1944.073	51.35	24.10	4.98	41.12	39.31	70.00	-30.69	Peak
9	2126.308	41.03	24.40	5.15	41.39	29.19	50.00	-20.81	Average
10	2126.308	51.46	24.40	5.15	41.39	39.62	70.00	-30.38	Peak
11	5455.631	35.68	31.60	8.43	42.21	33.50	54.00	-20.50	Average
12	5455.631	45.66	31.60	8.43	42.21	43.48	74.00	-30.52	Peak

Note:Emission Level=Read Level+Antenna Factor+Cable loss-Preamp Factor

Test Mode: 01; Polarity: Horizontal

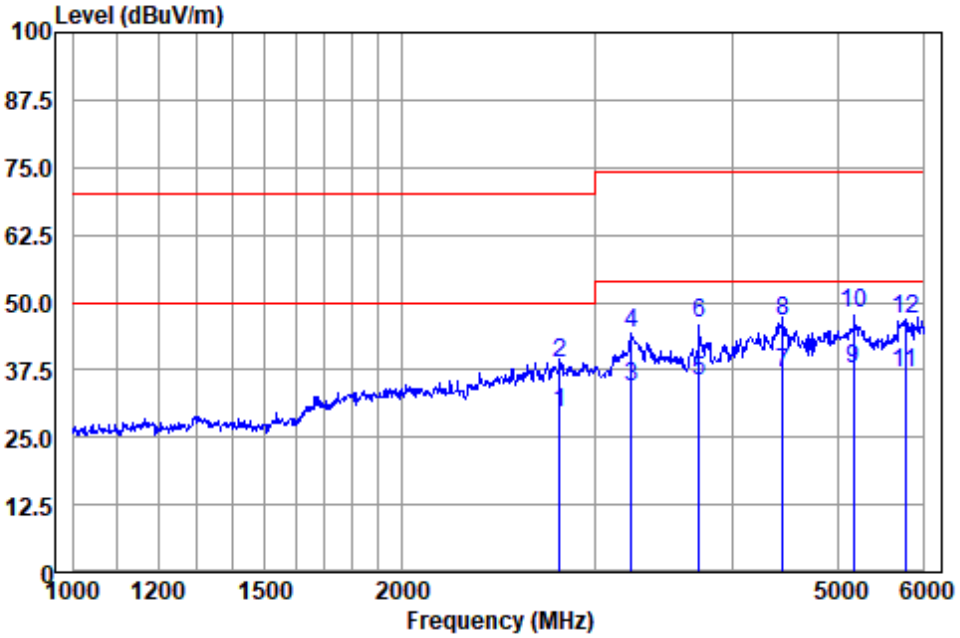


Antenna Polarity :HORIZONTAL
EUT/Project :02090EV
Test mode :01

	Freq	Read Level	Antenna Factor	Cable Loss	Preamp Factor	Emission Level	Limit Line	Over Limit	Remark
	MHz	dBuV	dB/m	dB	dB	dBuV/m	dBuV/m	dB	
1	1940.510	36.45	24.10	4.98	41.12	24.41	50.00	-25.59	Average
2	1940.510	46.65	24.10	4.98	41.12	34.61	70.00	-35.39	Peak
3	2543.413	38.25	26.40	5.67	42.30	28.02	50.00	-21.98	Average
4	2543.413	48.45	26.40	5.67	42.30	38.22	70.00	-31.78	Peak
5	3251.049	40.42	27.70	6.53	42.30	32.35	54.00	-21.65	Average
6	3251.049	50.99	27.70	6.53	42.30	42.92	74.00	-31.08	Peak
7	4245.883	36.69	29.80	7.38	42.35	31.52	54.00	-22.48	Average
8	4245.883	46.64	29.80	7.38	42.35	41.47	74.00	-32.53	Peak
9	4744.751	36.52	30.80	7.97	42.30	32.99	54.00	-21.01	Average
10	4744.751	46.32	30.80	7.97	42.30	42.79	74.00	-31.21	Peak
11	5565.048	36.57	31.67	8.53	42.22	34.55	54.00	-19.45	Average
12	5565.048	46.12	31.67	8.53	42.22	44.10	74.00	-29.90	Peak

Note:Emission Level=Read Level+Antenna Factor+Cable loss-Preamp Factor

Test Mode: 01; Polarity: Vertical



Antenna Polarity :VERTICAL
EUT/Project :02090EV
Test mode :01

	Freq	Read Level	Antenna Factor	Cable Loss	Preamp Factor	Emission Level	Limit Line	Over Limit	Remark
	MHz	dBuV	dB/m	dB	dB	dBuV/m	dBuV/m	dB	
1	2786.779	38.82	26.90	5.94	42.30	29.36	50.00	-20.64	Average
2	2786.779	48.24	26.90	5.94	42.30	38.78	70.00	-31.22	Peak
3	3239.420	42.46	27.70	6.51	42.30	34.37	54.00	-19.63	Average
4	3239.420	52.45	27.70	6.51	42.30	44.36	74.00	-29.64	Peak
5	3738.689	42.20	28.63	6.97	42.35	35.45	54.00	-18.55	Average
6	3738.689	53.00	28.63	6.97	42.35	46.25	74.00	-27.75	Peak
7	4456.338	41.80	29.90	7.67	42.30	37.07	54.00	-16.93	Average
8	4456.338	51.12	29.90	7.67	42.30	46.39	74.00	-27.61	Peak
9	5170.883	40.13	31.50	8.24	42.27	37.60	54.00	-16.40	Average
10	5170.883	50.33	31.50	8.24	42.27	47.80	74.00	-26.20	Peak
11	5757.763	38.32	32.27	8.61	42.31	36.89	54.00	-17.11	Average
12	5757.763	48.13	32.27	8.61	42.31	46.70	74.00	-27.30	Peak

Note:Emission Level=Read Level+Antenna Factor+Cable loss-Preamp Factor

6.4 Harmonic Current Emission

Test Requirement: EN 301 489-1 V2.2.3
EN 301 489-3 V2.3.2
EN 301 489-17 V3.2.4
EN 301 489-52 V1.2.1

Test Method: EN 61000-3-12:2011

6.4.1 E.U.T. Operation

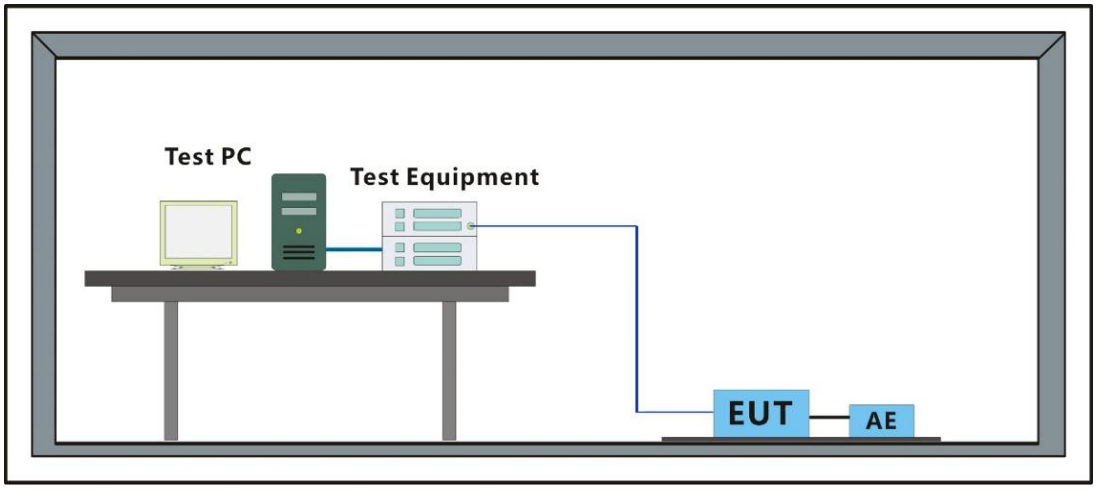
Operating Environment:

Temperature: 22 °C Humidity: 50 % RH Atmospheric Pressure: 1010 mbar

6.4.2 Test Mode Description

Pre-scan / Final test	Mode Code	Description
Final test	00	WiFi mode_Establish the communication between EUT and Ipad mini via wifi function, and use the "APP" in Ipad mini to control EUT working continuously.
Pre-scan	01	Data Communication Mode:The EUT is connected with CMW500 (wireless communication tester). The Absolute Radio Frequency Channel Number is allocated to the middle channel during the test for all working frequency bands. The EUT is commanded to operate at maximum transmitting power. A data communication link has been established.

6.4.3 Test Setup Diagram



6.4.4 Measurement Procedure and Data

Frequency range: 100Hz-2KHz

Average harmonic current results

Hn	Ieff [A]	% of Limit	Limit [A]	Result
1	2.315			
2	13.612E-3			PASS
3	347.356E-3	15.102	2.30	PASS
4	12.645E-3			PASS
5	315.225E-3	27.651	1.14	PASS
6	10.393E-3			PASS
7	271.351E-3	35.240	770.00E-3	PASS
8	9.046E-3			PASS
9	221.154E-3	55.288	400.00E-3	PASS
10	7.663E-3			PASS
11	166.005E-3	50.305	330.00E-3	PASS
12	6.416E-3			PASS
13	116.345E-3	55.403	210.00E-3	PASS
14	5.421E-3			PASS
15	72.018E-3	48.012	150.00E-3	PASS
16	4.762E-3			PASS
17	40.205E-3	30.377	132.35E-3	PASS
18	4.556E-3			PASS
19	27.868E-3	23.533	118.42E-3	PASS
20	4.111E-3			PASS
21	30.171E-3	18.774	160.71E-3	PASS
22	4.141E-3			PASS
23	31.893E-3	21.734	146.74E-3	PASS
24	3.589E-3			PASS
25	30.795E-3	22.811	135.00E-3	PASS
26	3.557E-3			PASS
27	24.483E-3	19.587	124.99E-3	PASS
28	3.006E-3			PASS
29	17.143E-3	14.729	116.39E-3	PASS
30	2.807E-3			PASS
31	12.105E-3			PASS
32	2.620E-3			PASS
33	10.327E-3			PASS
34	2.578E-3			PASS
35	12.254E-3			PASS
36	2.473E-3			PASS
37	12.394E-3			PASS
38	2.405E-3			PASS
39	11.477E-3			PASS
40	2.317E-3			PASS

Harmonic currents less than 0.6% of the input current measured under the test conditions, or less than 5 mA, whichever is greater, are disregarded.

Maximum harmonic current results

Hn	Ieff [A]	% of Limit	Limit [A]	Result
1	8.929			
2	145.527E-3	8.983	1.62	PASS
3	460.887E-3	13.359	3.45	PASS
4	54.825E-3	8.500	645.00E-3	PASS
5	410.515E-3	24.007	1.71	PASS
6	49.522E-3			PASS
7	342.325E-3	29.639	1.15	PASS
8	43.069E-3			PASS
9	265.873E-3	44.312	600.00E-3	PASS
10	36.151E-3			PASS
11	188.742E-3	38.130	495.00E-3	PASS
12	29.609E-3			PASS
13	125.655E-3	39.890	315.00E-3	PASS
14	24.243E-3			PASS
15	77.960E-3	34.649	225.00E-3	PASS
16	20.829E-3			PASS
17	46.523E-3			PASS
18	18.720E-3			PASS
19	42.762E-3			PASS
20	17.376E-3			PASS
21	46.576E-3			PASS
22	15.975E-3			PASS
23	42.629E-3			PASS
24	14.367E-3			PASS
25	38.110E-3			PASS
26	12.604E-3			PASS
27	29.875E-3			PASS
28	10.841E-3			PASS
29	20.968E-3			PASS
30	9.548E-3			PASS
31	16.066E-3			PASS
32	8.693E-3			PASS
33	19.356E-3			PASS
34	8.304E-3			PASS
35	18.233E-3			PASS
36	7.934E-3			PASS
37	18.263E-3			PASS
38	7.377E-3			PASS
39	16.867E-3			PASS
40	6.632E-3			PASS

Harmonic currents less than 0.6% of the input current measured under the test conditions, or less than 5 mA, whichever is greater, are disregarded.

Maximum harmonic voltage results

Hn	Ueff [V]	Ueff [%]	Limit [%]	Result
1	231.29	100.561		
2	86.91E-3	0.038	0.2	PASS
3	194.85E-3	0.085	0.9	PASS
4	18.02E-3	0.008	0.2	PASS
5	140.97E-3	0.061	0.4	PASS
6	15.43E-3	0.007	0.2	PASS
7	97.80E-3	0.043	0.3	PASS
8	15.24E-3	0.007	0.2	PASS
9	105.11E-3	0.046	0.2	PASS
10	13.50E-3	0.006	0.2	PASS
11	131.19E-3	0.057	0.1	PASS
12	14.31E-3	0.006	0.1	PASS
13	72.55E-3	0.032	0.1	PASS
14	15.05E-3	0.007	0.1	PASS
15	104.34E-3	0.045	0.1	PASS
16	14.66E-3	0.006	0.1	PASS
17	42.20E-3	0.018	0.1	PASS
18	17.20E-3	0.007	0.1	PASS
19	90.16E-3	0.039	0.1	PASS
20	15.35E-3	0.007	0.1	PASS
21	105.39E-3	0.046	0.1	PASS
22	18.82E-3	0.008	0.1	PASS
23	81.49E-3	0.035	0.1	PASS
24	17.95E-3	0.008	0.1	PASS
25	72.69E-3	0.032	0.1	PASS
26	14.10E-3	0.006	0.1	PASS
27	42.00E-3	0.018	0.1	PASS
28	16.46E-3	0.007	0.1	PASS
29	70.81E-3	0.031	0.1	PASS
30	12.57E-3	0.005	0.1	PASS
31	72.52E-3	0.032	0.1	PASS
32	14.31E-3	0.006	0.1	PASS
33	83.65E-3	0.036	0.1	PASS
34	16.90E-3	0.007	0.1	PASS
35	67.87E-3	0.030	0.1	PASS
36	15.66E-3	0.007	0.1	PASS
37	54.29E-3	0.024	0.1	PASS
38	18.16E-3	0.008	0.1	PASS
39	36.00E-3	0.016	0.1	PASS
40	17.38E-3	0.008	0.1	PASS

Power and THD results - DS: 41

True power P:	2.06kW	Apparent power S:	2.065kVA
Reactiv power Q:	152var	Power factor:	0.997
THD (U):	0.001	THD (I):	0.072
Crest Factor (U):	1.414	Crest Factor (I):	1.634

6.5 Voltage Fluctuations and Flicker

Test Requirement: EN 301 489-1 V2.2.3
EN 301 489-3 V2.3.2
EN 301 489-17 V3.2.4
EN 301 489-52 V1.2.1

Test Method: EN IEC 61000-3-11: 2019

6.5.1 E.U.T. Operation

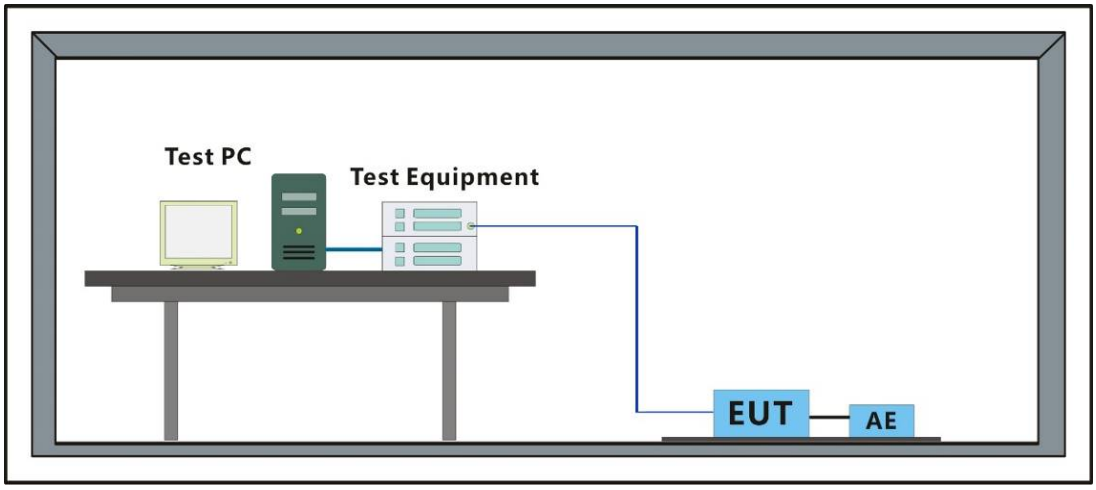
Operating Environment:

Temperature: 22 °C Humidity: 50 % RH Atmospheric Pressure: 1010 mbar

6.5.2 Test Mode Description

Pre-scan / Final test	Mode Code	Description
Final test	00	WiFi mode_Establish the communication between EUT and Ipad mini via wifi function, and use the "APP" in Ipad mini to control EUT working continuously.
Pre-scan	01	Data Communication Mode:The EUT is connected with CMW500 (wireless communication tester). The Absolute Radio Frequency Channel Number is allocated to the middle channel during the test for all working frequency bands. The EUT is commanded to operate at maximum transmitting power. A data communication link has been established.

6.5.3 Test Setup Diagram



6.5.4 Measurement Procedure and Data

Maximum Flicker results

	EUT values	Limit
dc [%]	1.510	3.30
dmax [%]	1.653	6.00
dt [s]	0.000	0.50
Pst	0.447	1.00
Plt	0.419	0.65

Maximum permissible system impedance

(According to EN IEC 61000-3-11:2019 clause 6.3.2)

	Impedance [Ohm]
Zsys1 (dmax)	1.713
Zsys2 (dc)	1.032
Zsys3 (Pst)	1.579
Zsys4 (Plt)	0.912
Zmax (smallest value Zsys1~4)	0.912

Determine the maximum permissible sys impedance Zmax (0.912Ω) at the interface point of user's supply, if necessary that the equipment is connected only to a supply of that impedance or less.

7 Immunity Test Results

Performance Criteria Description in EN 301 489-1

Performance criteria for continuous phenomena	During the test, the equipment shall: • continue to operate as intended; • not unintentionally transmit; • not unintentionally change its operating state; • not unintentionally change critical stored data.
Performance criteria for transient phenomena	For all ports and transient phenomena with the exception described below, the following applies: • The application of the transient phenomena shall not result in a change of the mode of operation (e.g. unintended transmission) or the loss of critical stored data. • After application of the transient phenomena, the equipment shall operate as intended. For surges applied to symmetrically operated wired network ports intended to be connected directly to outdoor lines the following criteria applies: • For products with only one symmetrical port intended for connection to outdoor lines, loss of function is allowed, provided the function is self-recoverable, or can be otherwise restored. Information stored in non-volatile memory, or protected by a battery backup, shall not be lost. • For products with more than one symmetrical port intended for connection to outdoor lines, loss of function on the port under test is allowed, provided the function is self-recoverable. Information stored in non-volatile memory, or protected by a battery backup, shall not be lost.

Performance Criteria Description in EN 301 489-17

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 Minimum performance level.		
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.

Performance Criteria Description in EN 301 489-3 V2.3.2

Performance Criteria	
Introduction	The performance criteria are used to make an assessment whether a radio equipment passes or fails immunity tests. Only the performance criteria specified in the present document or in ETSI EN 301 489-1 [1] where referenced shall apply. The provisions of ETSI EN 301 489-1 [1], clause 6, shall apply together with the following.
Continuous and non-continuous operation	Latency is the time delay between the initiation and the completion of operation of the EUT. Correct functioning requires completing the relevant operation within the maximum latency time. Where the maximum latency is specified in the applicable harmonised radio standard (in the wanted performance criterion, or an acknowledge requirement), that value shall be used. Where this is not the case, then the maximum latency is that required by the intended use of the EUT.
Operating modes	Where the EUT has more than one mode of operation (see clause 4.4.1), an unplanned transition from one mode to another is considered as an unintentional response. The EUT shall be tested in all modes to confirm there are no such unintentional responses.

Special conditions for EMC immunity tests

Reference to clauses in ETSI EN 301 489-1	Special product-related conditions, additional to or modifying the test conditions in ETSI EN 301 489-1, clause 9
Test method; Radio frequency electromagnetic field	Where the EUT is subject to EMC Immunity testing under a Harmonised Standard of a Directive other than the Directive 2014/53/EU [i.2] then the modulating signal frequency specified in that Harmonised Standard may be used. If this alternative modulating frequency is used, then the applicable Directive, Harmonised Standard & modulating frequency shall be noted in the test report.
Fast transients common mode	The requirements of ETSI EN 301 489-1 [1], clauses 9.4.1 and 9.4.2 shall be applied with the exception of clause 7.4 of EN 61000-4-4 [4].
Test method; Radio frequency, common mode	Where the EUT is subject to EMC Immunity testing under a Harmonised Standard of a Directive other than the Directive 2014/53/EU [i.2] then the modulating signal frequency specified in that Harmonised Standard may be used. If this alternative modulating frequency is used, then the applicable Directive, Harmonised Standard & modulating frequency shall be noted in the test report.

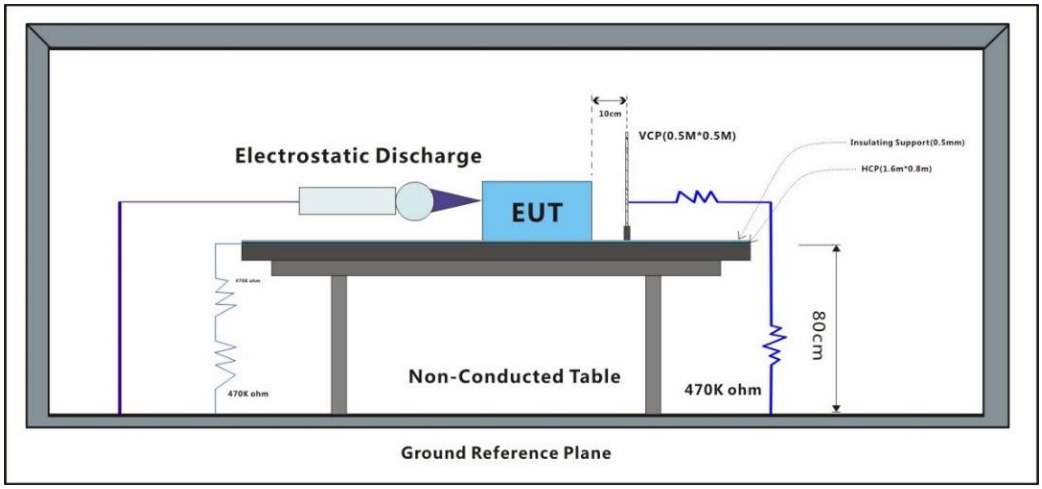
Performance Criteria Description in EN 301 489-52 V1.2.0
Performance criteria for Continuous phenomena
GSM and voice call Performance criteria for Continuous phenomena applied to Transmitters (CT) With a link established, during the test, the uplink speech output level shall be at least 35 dB less than the previously recorded reference levels, when measured through an audio band pass filter of width 200 Hz, centred on 1 kHz (audio breakthrough check). NOTE: When there is a high-level background noise present, the filter bandwidth may be reduced down to a minimum of 40 Hz. In idle mode, the transmitter shall not operate unintentionally. At the conclusion of the test, the EUT shall operate as intended with no loss of user control functions or critical stored data, and the communication link shall have been maintained. Performance criteria for Continuous phenomena applied to Receivers (CR) During the test, the RXQUAL of the downlink shall not exceed the value of three, measured during each individual exposure in the test sequence. In the case of narrow band responses, the procedure in clause 4.4.1 shall be followed. During the test, the downlink speech output level shall be at least 35 dB less than the previously recorded reference levels, when measured through an audio band pass filter of width 200 Hz, centred on 1 kHz (audio breakthrough check). NOTE: When there is a high-level background noise present, the filter bandwidth may be reduced down to a minimum of 40 Hz. At the conclusion of the test, the EUT shall operate as intended with no loss of user control functions or critical stored data, and the communication link shall have been maintained. **UTRA** In the data transfer mode, the performance criteria can be one of the following: • if the BER is used, it shall not exceed 0,001 during the test sequence; • if the BLER is used, it shall not exceed 0,01 during the test sequence. The BLER calculation shall be based on evaluating the CRC on each transport block. In the case of narrow band responses, the procedure in clause 4.4.2.1 shall be followed. When testing a voice call, the performance criteria in clause 6.1.1 shall apply. **E-UTRA, E-UTRA with LAA, inband or guard band NB-IoT, Standalone NB-IoT** In data transfer mode, the data throughput of the EUT shall not fall below 95 % of the maximum data throughput. In the case of narrow band responses, the procedure in clause 4.4.2.2 shall be followed. When testing a voice call, the performance criteria in clause 6.1.1 shall apply. **NR** In data transfer mode, the data throughput of the EUT shall not fall below 95 % of the maximum data throughput. In the case of narrow band responses, the procedure in clause 4.4.3 shall be followed. When testing a voice call, the performance criteria in clause 6.1.1 shall apply. Performance criteria for Transient phenomena At the conclusion of each exposure of the transient phenomena, the EUT shall operate without loss of the communication link. At the conclusion of the total test comprising the series of individual exposures, the EUT shall operate as intended without loss of user control functions or critical stored data. In addition, where the EUT supports idle mode it should be verified that the transmitter shall not unintentionally operate when transient phenomena are applied.

7.1 Electrostatic Discharge

Test Requirement: EN 301 489-1 V2.2.3
EN 301 489-3 V2.3.2
EN 301 489-17 V3.2.4
EN 301 489-52 V1.2.1

Test Method: EN 61000-4-2:2009

7.1.1 Test Setup Diagram



7.1.2 E.U.T. Operation

Operating Environment:

Temperature: 22 °C Humidity: 50 % RH Atmospheric Pressure: 1020 mbar

7.1.3 Test Mode Description

Pre-scan / Final test	Mode Code	Description
Final test	00	WiFi mode_Establish the communication between EUT and Ipad mini via wifi function, and use the "APP" in Ipad mini to control EUT working continuously.
Final test	01	Data Communication Mode:The EUT is connected with CMW500 (wireless communication tester). The Absolute Radio Frequency Channel Number is allocated to the middle channel during the test for all working frequency bands. The EUT is commanded to operate at maximum transmitting power. A data communication link has been established.

7.1.4 Test Condition and Results:

Performance Criterion: B

Discharge Impedance: 330Ω/150pF

Number of Discharge: Minimum 10 times at each test point

Discharge Mode: Single Discharge

Discharge Period: 1 second minimum

Test Point: 1. All insulated enclosure and seams.

2. All accessible metal parts of the enclosure.

3. All side

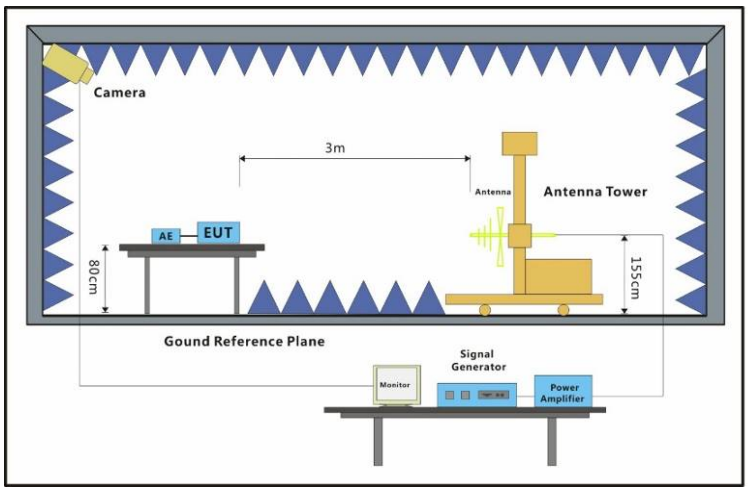
Discharge type	Level (kV)	Polarity	Test Point	EUT Performance	Criterion	Result
Air Discharge	2,4,8	+	1	CT/CR	A	Pass
Air Discharge	2,4,8	-	1	CT/CR	A	Pass
Contact Discharge	4	+	2	CT/CR	A	Pass
Contact Discharge	4	-	2	CT/CR	A	Pass
Horizontal Coupling	4	+	3	CT/CR	A	Pass
Horizontal Coupling	4	-	3	CT/CR	A	Pass
Vertical Coupling	4	+	3	CT/CR	A	Pass
Vertical Coupling	4	-	3	CT/CR	A	Pass
A: No degradation in the performance of the EUT was observed						

7.2 Radiated Immunity (80MHz-6GHz)

Test Requirement: EN 301 489-1 V2.2.3
EN 301 489-3 V2.3.2
EN 301 489-17 V3.2.4
EN 301 489-52 V1.2.1

Test Method: EN IEC 61000-4-3: 2020

7.2.1 Test Setup Diagram



7.2.2 E.U.T. Operation

Operating Environment:

Temperature: 22 °C Humidity: 50 % RH Atmospheric Pressure: 1010 mbar

7.2.3 Test Mode Description

Pre-scan / Final test	Mode Code	Description
Final test	00	WiFi mode_Establish the communication between EUT and Ipad mini via wifi function, and use the "APP" in Ipad mini to control EUT working continuously.
Final test	01	Data Communication Mode:The EUT is connected with CMW500 (wireless communication tester). The Absolute Radio Frequency Channel Number is allocated to the middle channel during the test for all working frequency bands. The EUT is commanded to operate at maximum transmitting power. A data communication link has been established.

7.2.4 Test Condition and Results:

Performance Criterion: A

Frequency Range: 80MHz to 6GHz

Antenna Polarisation: Vertical and Horizontal

Modulation: 1kHz,80% Amp. Mod,1% increment

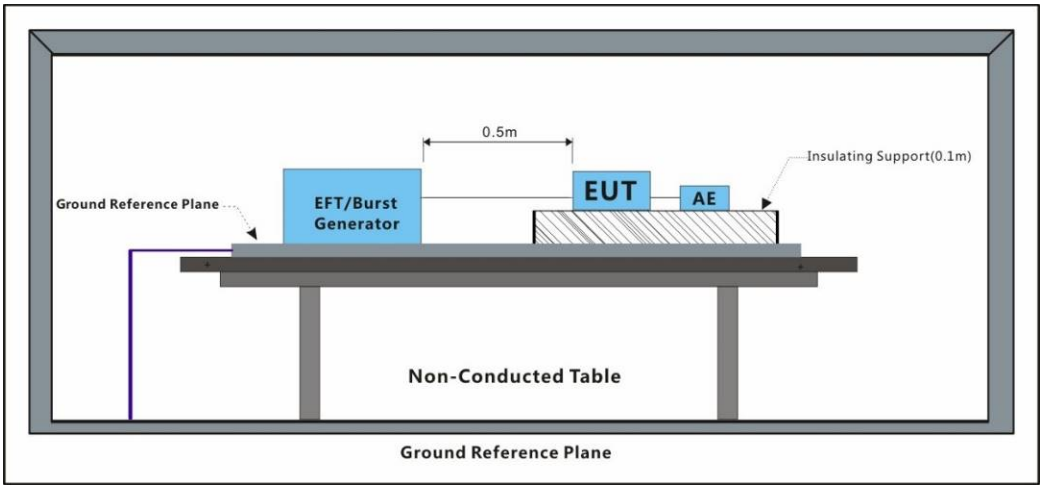
Frequency	Level (V/m)	EUT Face	Dwell time	EUT Performance	Criterion	Result
80MHz-6GHz	3	Front	2s	CT/CR	A	Pass
80MHz-6GHz	3	Back	2s	CT/CR	A	Pass
80MHz-6GHz	3	Left	2s	CT/CR	A	Pass
80MHz-6GHz	3	Right	2s	CT/CR	A	Pass
80MHz-6GHz	3	Top	2s	CT/CR	A	Pass
80MHz-6GHz	3	Underside	2s	CT/CR	A	Pass
A: No degradation in the performance of the EUT was observed						

7.3 Electrical Fast Transients Burst at AC Mains Power Port

Test Requirement: EN 301 489-1 V2.2.3
EN 301 489-3 V2.3.2
EN 301 489-17 V3.2.4
EN 301 489-52 V1.2.1

Test Method: EN 61000-4-4:2012

7.3.1 Test Setup Diagram



7.3.2 E.U.T. Operation

Operating Environment:

Temperature: 22 °C Humidity: 50 % RH Atmospheric Pressure: 1020 mbar

7.3.3 Test Mode Description

Pre-scan / Final test	Mode Code	Description
Final test	00	WiFi mode_Establish the communication between EUT and Ipad mini via wifi function, and use the "APP" in Ipad mini to control EUT working continuously.
Final test	01	Data Communication Mode:The EUT is connected with CMW500 (wireless communication tester). The Absolute Radio Frequency Channel Number is allocated to the middle channel during the test for all working frequency bands. The EUT is commanded to operate at maximum transmitting power. A data communication link has been established.

7.3.4 Test Condition and Results:

Performance Criterion: B

Repetition Frequency: 5kHz

Burst Period: 300ms

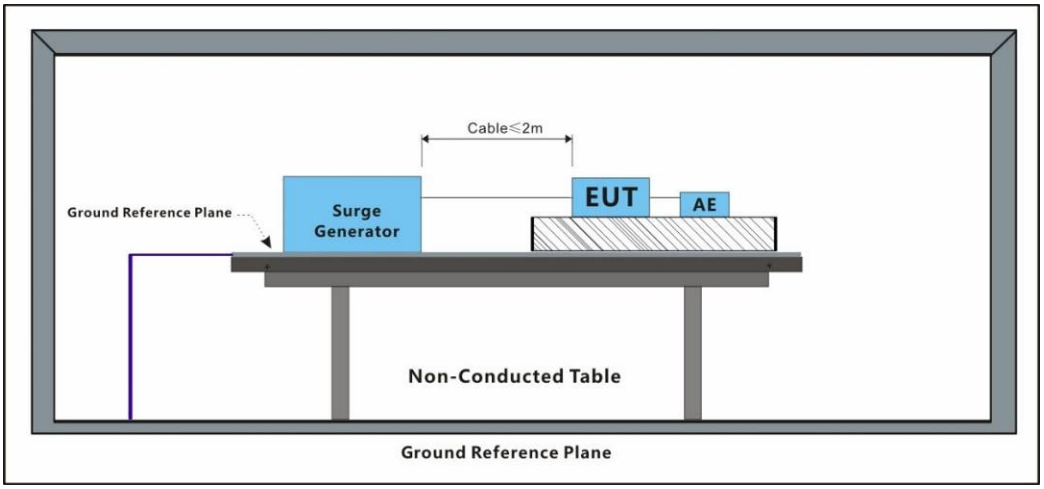
Test Line	Level (kV)	Polarity	CDN/Clamp	EUT Performance	Criterion	Result
AC mains power port	1	+	CDN	CT/CR	A	Pass
AC mains power port	1	-	CDN	CT/CR	A	Pass
A: No degradation in the performance of the EUT was observed						

7.4 Surge at AC Mains Power Port

Test Requirement: EN 301 489-1 V2.2.3
EN 301 489-3 V2.3.2
EN 301 489-17 V3.2.4
EN 301 489-52 V1.2.1

Test Method: EN 61000-4-5:2014 +A1:2017

7.4.1 Test Setup Diagram



7.4.2 E.U.T. Operation

Operating Environment:

Temperature: 22 °C Humidity: 50 % RH Atmospheric Pressure: 1020 mbar

7.4.3 Test Mode Description

Pre-scan / Final test	Mode Code	Description
Final test	00	WiFi mode_Establish the communication between EUT and Ipad mini via wifi function, and use the "APP" in Ipad mini to control EUT working continuously.
Final test	01	Data Communication Mode:The EUT is connected with CMW500 (wireless communication tester). The Absolute Radio Frequency Channel Number is allocated to the middle channel during the test for all working frequency bands. The EUT is commanded to operate at maximum transmitting power. A data communication link has been established.

7.4.4 Test Condition and Results:

Performance Criterion: B

Interval: 60s between each surge

No. of surges: 5 positive, 5 negative at 0°, 90°, 180°, 270°

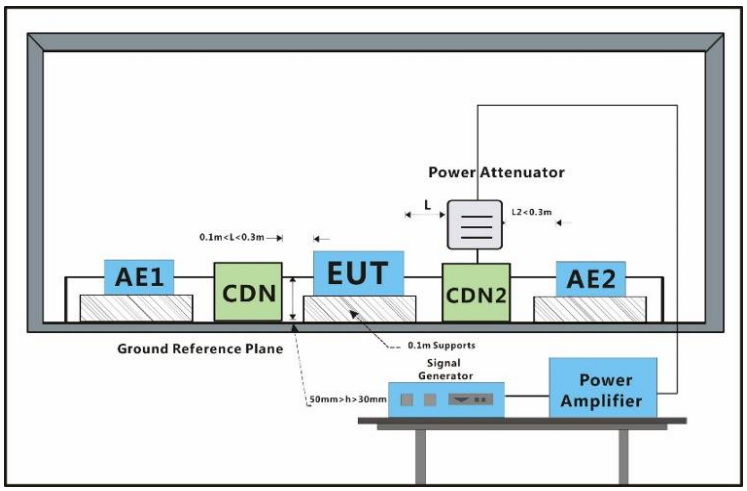
Test Line	Level (kV)	Polarity	Phase (deg)	EUT Performance	Criterion	Result
L-N	1	+	0°	CT/CR	A	Pass
L-N	1	-	0°	CT/CR	A	Pass
L-N	1	+	90°	CT/CR	A	Pass
L-N	1	-	90°	CT/CR	A	Pass
L-N	1	+	180°	CT/CR	A	Pass
L-N	1	-	180°	CT/CR	A	Pass
L-N	1	+	270°	CT/CR	A	Pass
L-N	1	-	270°	CT/CR	A	Pass
A: No degradation in the performance of the EUT was observed						

7.5 Conducted Immunity at AC Mains Power Port (150kHz-80MHz)

Test Requirement: EN 301 489-1 V2.2.3
EN 301 489-3 V2.3.2
EN 301 489-17 V3.2.4
EN 301 489-52 V1.2.1

Test Method: EN 61000-4-6:2014

7.5.1 Test Setup Diagram



7.5.2 E.U.T. Operation

Operating Environment:

Temperature: 22 °C Humidity: 50 % RH Atmospheric Pressure: 1020 mbar

7.5.3 Test Mode Description

Pre-scan / Final test	Mode Code	Description
Final test	00	WiFi mode_Establish the communication between EUT and Ipad mini via wifi function, and use the "APP" in Ipad mini to control EUT working continuously.
Final test	01	Data Communication Mode:The EUT is connected with CMW500 (wireless communication tester). The Absolute Radio Frequency Channel Number is allocated to the middle channel during the test for all working frequency bands. The EUT is commanded to operate at maximum transmitting power. A data communication link has been established.

7.5.4 Test Condition and Results:

Performance Criterion: A

Frequency Range: 0.15MHz to 80MHz

Modulation: 80%, 1kHz Amplitude Modulation

Step Size: 1%

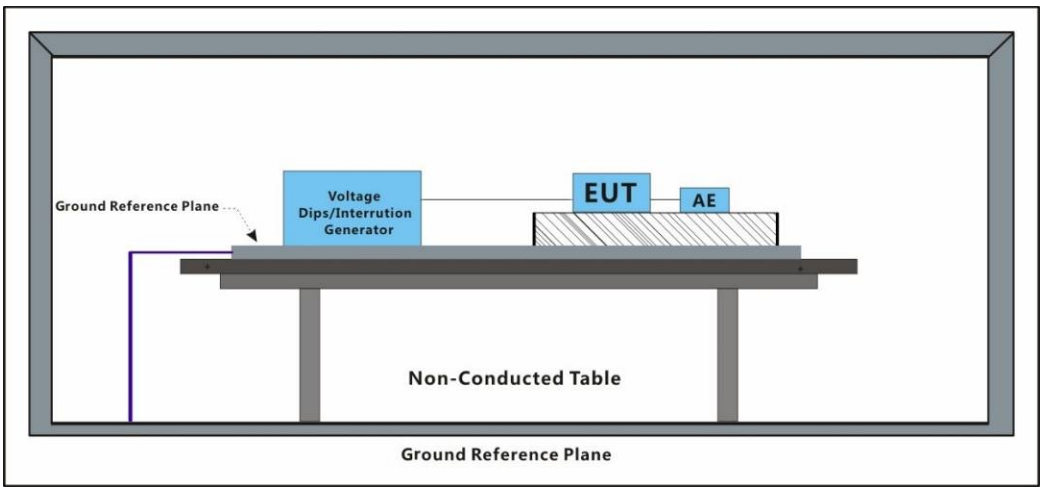
Cable port	Level (Vrms)	CDN/Clamp	Dwell time	EUT Performance	Criterion	Result
AC power port	3	CDN	2s	CT/CR	A	Pass
A: No degradation in the performance of the EUT was observed						

7.6 Voltage Dips and Interruptions

Test Requirement: EN 301 489-1 V2.2.3
EN 301 489-3 V2.3.2
EN 301 489-17 V3.2.4
EN 301 489-52 V1.2.1

Test Method: EN IEC 61000-4-11:2020

7.6.1 Test Setup Diagram



7.6.2 E.U.T. Operation

Operating Environment:

Temperature: 22 °C Humidity: 50 % RH Atmospheric Pressure: 1020 mbar

7.6.3 Test Mode Description

Pre-scan / Final test	Mode Code	Description
Final test	00	WiFi mode_Establish the communication between EUT and Ipad mini via wifi function, and use the "APP" in Ipad mini to control EUT working continuously.
Final test	01	Data Communication Mode:The EUT is connected with CMW500 (wireless communication tester). The Absolute Radio Frequency Channel Number is allocated to the middle channel during the test for all working frequency bands. The EUT is commanded to operate at maximum transmitting power. A data communication link has been established.

7.6.4 Test Condition and Results:

Performance Criterion: 0% of UT (Supply Voltage) for 0.5 Cycle:B;
0% of UT for 1 Cycle:B;
0% of UT for 250 Cycles:C;
70 % of UT for 25 Cycles:C
No. of Dips / Interruptions: 3 per Level
Time between dropout: 10s

Level % UT	Phase (deg)	Duration	No. of Dips / Interruptions	EUT Performance	Criterion	Result
0	0°	0.5 Cycle	3	CT/CR	A	Pass
0	180°	0.5 Cycle	3	CT/CR	A	Pass
0	0°	1 Cycle	3	CT/CR	A	Pass
0	180°	1 Cycle	3	CT/CR	A	Pass
0	0°	250 Cycles	3	CT/CR	C	Pass
0	180°	250 Cycles	3	CT/CR	C	Pass
70	0°	25 Cycles	3	CT/CR	A	Pass
70	180°	25 Cycles	3	CT/CR	A	Pass
A: No degradation in the performance of the EUT was observed C: During test,EUT stop work.After test,EUT restart by operator.						

8 Test Setup Photo

Radiated Emissions (30MHz-1GHz)

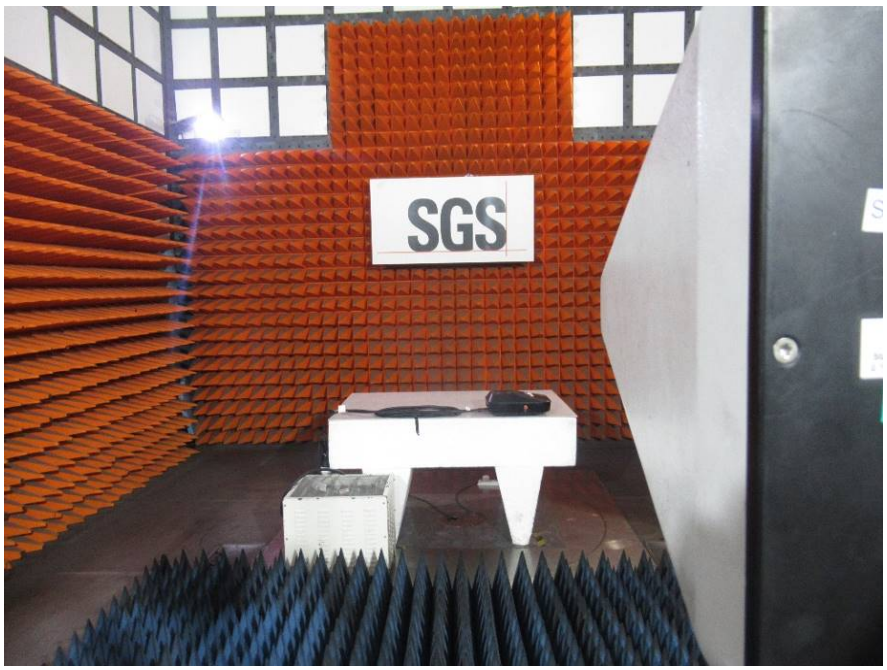
Radiated Emissions (Above 1GHz)

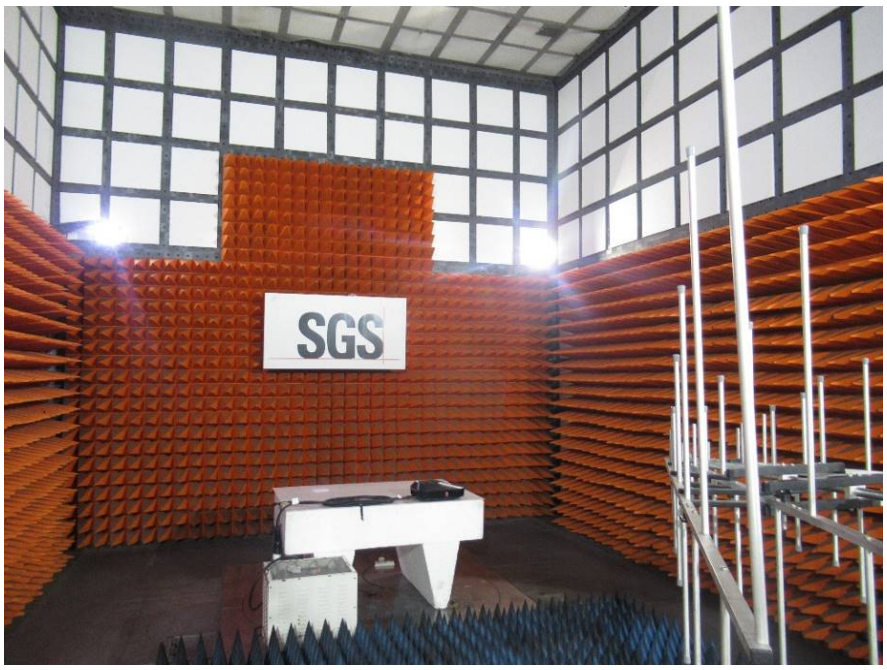
Harmonic Current Emission

Voltage Fluctuations and Flicker

Electrostatic Discharge

Radiated Immunity (80MHz-6GHz)

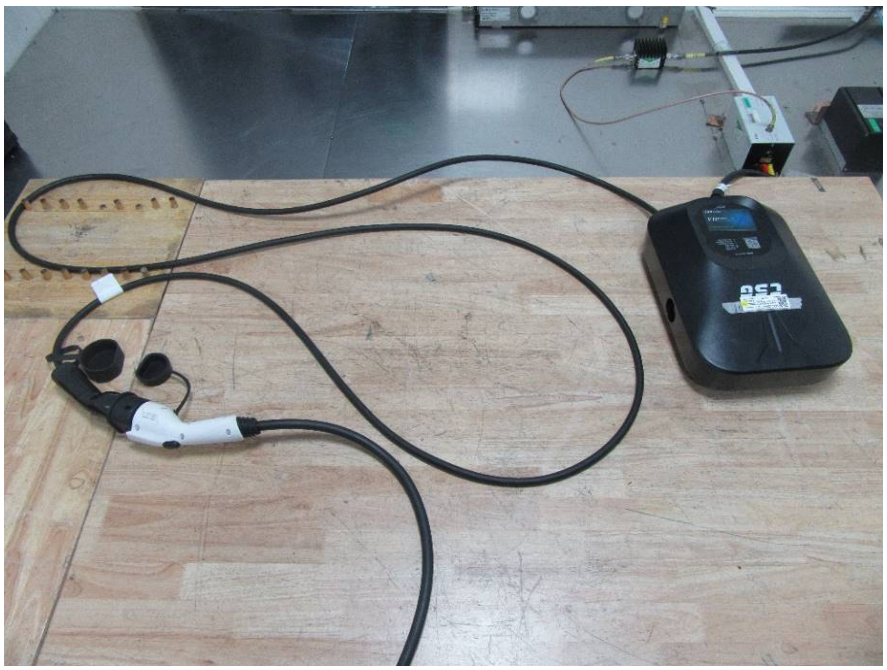




Electrical Fast Transients Burst at AC Mains Power Port

Surge at AC Mains Power Port

Conducted Immunity at AC Mains Power Port (150kHz-80MHz)



Voltage Dips and Interruptions

Conducted Emissions at Mains Terminals (150kHz-30MHz)

9 EUT Constructional Details (EUT Photos)

Refer to Appendix - Photographs of EUT Constructional Details for SHCR2311002374EV

- End of the Report -