

EMC TEST REPORT

Applicant: Quanzhou SKYDROID Technology Co., Ltd.

Address of Applicant: 2nd Floor, Building A, Yucheng Base, Fengze District, Quanzhou City, Fujian Province, China

Manufacturer: Quanzhou SKYDROID Technology Co., Ltd.

Address of Manufacturer: 2nd Floor, Building A, Yucheng Base, Fengze District, Quanzhou City, Fujian Province, China

Factory: Quanzhou SKYDROID Technology Co., Ltd.

Address of Factory: 2nd Floor, Building A, Yucheng Base, Fengze District, Quanzhou City, Fujian Province, China

Equipment Under Test (EUT)

Product Name: Remote control

Model No.: G20, G20Pro, G20/G20Pro, GR01

Trade Mark: SKYDROID

Applicable standards: ETSI EN 301 489-1 V2.2.3 (2019-11)
ETSI EN 301 489-3 V2.3.2 (2023-01)
ETSI EN 301 489-17 V3.3.1 (2024-09)
EN 55032:2015+A11:2020
EN 55035:2017+A11:2020
EN IEC 61000-3-2:2019+A2:2024
EN 61000-3-3:2013+A2:2021

Date of sample receipt: 01/21/2025

Date of Test: 01/21/2025~03/04/2025

Date of report issue: 03/04/2025

Test Result : PASS *

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

The CE mark as shown below can be used, under the responsibility of the manufacturer, after completion of an EC Declaration of Conformity and compliance with all relevant EC Directives. The protection requirements with respect to electromagnetic compatibility contained in Directive 2014/53/EU are considered.



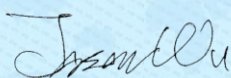
Robinson Luo
Laboratory Manager

This results shown in this test report refer only to the sample(s) tested, this test report cannot be reproduced, except in full, without prior written permission of the company. The report would be invalid without specific stamp of test institute and the signatures of compiler and approver

2 Version

Version No.	Date	Description
00	03/04/2025	Original

Prepared By:



Date:

03/04/2025

Project Engineer

Check By:


Reviewer

Date:

03/04/2025

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4 Test Summary

No	Test Standard	Test specifications	Result
EN301 489-1/-3/-17, EN 55032 Emission			
1	EN55032	Radiated emission below 1GHz	Pass
2	EN55032	Radiated emission above 1GHz	Pass
3	EN55032	Conducted emission at DC power input/output port	N.A
4	EN55032	Conducted emission at AC mains input/output port	Pass
5	EN55032	Conducted emission at telecommunication port	N.A
6	EN61000-3-2	Harmonic current emissions at AC mains input port	N.A.2
7	EN61000-3-3	Voltage fluctuations and flicker at AC mains input port	Pass
EN301 489-1/-3/-17, EN 55035 Immunity			
8	EN61000-4-2	Electrostatic discharge	Pass
9	EN61000-4-3	RF electromagnetic field	Pass
10	EN61000-4-4	Fast transients common mode	Pass
11	EN61000-4-5	Surges, line to line and line to ground	Pass
12	EN61000-4-6	RF common mode 0.15 MHz to 80 MHz	Pass
13	EN61000-4-11	Voltage dips and interruptions	Pass

Remark:

1. N.A. means the abbreviation for Not Applicable.
2. There is no need for Harmonics test to be performed on this product (rated power is less than 75W) in accordance with EN IEC 61000-3-2:2019.

5 General Information

5.1 General Description of EUT

Product Name:	Remote control
Model No.:	G20, G20Pro, G20/G20Pro, GR01
Test Model No:	G20
Remark: all the models are electrical identical including the same software parameter and hardware design, Only the model name is different	
Operation Frequency:	Bluetooth/ BLE: 2402MHz ~ 2480MHz 2.4G WiFi: 2412MHz~2472MHz(802.11b/g/n20/n40), 5.8G WiFi: 5745MHz ~ 5825MHz 2.4G SRD: 2411~2466MHz 5.8G SRD: 5750~5820MHz
Modulation technology:	BT: GFSK), $\pi/4$ -DQPSK, 8DPSK 2.4G WiFi: 802.11b(DSSS), 802.11g/n (OFDM) 5.8G WiFi: 802.11a/n/ac (OFDM) 2.4G/5.8G SRD: OFDM
Antenna Type:	BT/WIFI: PIFA Antenna 2.4/5.8G SRD: External Antenna
Power Supply:	AC Adapter(100~240VAC)

Note:

1. Antenna gain information provided by the customer.
2. The relevant information of the sample is provided by the entrusting company, and the laboratory is not responsible for its authenticity.

5.2 Operating Modes

Operating mode	Detail description
Bluetooth mode	Keep the EUT in communications with Bluetooth function.
Wi-Fi mode	Keep the EUT in play internet information by Wi-Fi network.
2.4G SRD mode	Keep the EUT in 2.4G SRD connection mode.
5.8G SRD mode	Keep the EUT in 5.8G SRD connection mode.

5.3 Description of Support Units

Manufacturer	Description	Model	Serial Number
Lenovo	Display	LS2013	/
Lenovo	Notebook	X240	

5.4 Test Facility

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

• **FCC—Registration No.: 381383**

Designation Number: CN5029

Global United Technology Services Co., Ltd., Shenzhen EMC Laboratory has been registered and fully described in a report filed with the (FCC) Federal Communications Commission. The acceptance letter from the FCC is maintained in files.

• **ISED —Registration No.: 9079A**

CAB identifier: CN0091

The 3m Semi-anechoic chamber of Global United Technology Services Co., Ltd. has been registered by Certification and Engineering Bureau of ISED for radio equipment testing

• **NVLAP (LAB CODE:600179-0)**

Global United Technology Services Co., Ltd., is accredited by the National Voluntary Laboratory Accreditation Program (NVLAP).

5.5 Test Location

RI test was performed at:

SGS-CSTC Standards Technical Services Co., Ltd., Shenzhen Branch,
No. 1 Workshop, M-10, Middle Section, Science & Technology Park, Shenzhen, Guangdong, China.
518057.

All other tests were performed at:

Global United Technology Services Co., Ltd.
Address: No. 123-128, Tower A, Jinyuan Business Building, No.2, Laodong Industrial Zone, Xixiang Road, Baoan District, Shenzhen, Guangdong, China 518102
Tel: 0755-27798480
Fax: 0755-27798960

5.6 Deviation from Standards

None.

5.7 Abnormalities from Standard Conditions

None.

5.8 Other Information Requested by the Customer

None.

5.9 Monitoring of EUT for All Immunity Test

Visual:	Monitored the light and work status of the EUT
Audio:	None.

6 Equipment Used during Test

Radiated Emission:						
Item	Test Equipment	Manufacturer	Model No.	Inventory No.	Cal.Date (mm-dd-yy)	Cal.Due date (mm-dd-yy)
1	3m Semi- Anechoic Chamber	ZhongYu Electron	9.2(L)*6.2(W)* 6.4(H)	GTS250	Jun. 22, 2024	Jun. 21, 2027
2	Control Room	ZhongYu Electron	6.2(L)*2.5(W)* 2.4(H)	GTS251	N/A	N/A
3	EMI Test Receiver	Rohde & Schwarz	ESU26	GTS203	Apr. 11, 2024	Apr. 10, 2025
4	BiConiLog Antenna	SCHWARZBECK MESS-ELEKTRONIK	VULB9168	GTS640	Mar. 19, 2023	Mar. 18, 2025
5	Double -ridged waveguide horn	SCHWARZBECK MESS-ELEKTRONIK	BBHA 9120 D	GTS208	Apr. 17, 2023	Apr. 16, 2025
6	Wideband Radio Communication Tester	Rohde & Schwarz	CMW500	GTS575	Apr. 11, 2024	Apr. 10, 2025
7	Loop Antenna	ZHINAN	ZN30900A	GTS534	Nov.12, 2024	Nov.11, 2025
8	Broadband Preamplifier	SCHWARZBECK	BBV9718	GTS535	Apr. 11, 2024	Apr. 10, 2025
9	Amplifier(1GHz-26.5GHz)	HP	8449B	GTS601	Apr. 11, 2024	Apr. 10, 2025
10	Horn Antenna (15GH-40GHz)	SCHWARZBECK	01296	GTS691	Mar. 07, 2024	Mar. 06, 2025
11	FSV-Signal Analyzer (10Hz-40GHz)	Keysight	FSV-40-N	GTS666	Mar. 12, 2024	Mar. 11, 2025
12	Amplifier	/	LNA-1000-30S	GTS650	Apr. 11, 2024	Apr. 10, 2025
13	CDNE M2+M3-16A	HCT	30MHz-300MHz	GTS692	Nov. 07, 2024	Nov. 06, 2025
14	Wideband Amplifier	/	WDA-01004000-15P35	GTS602	Apr. 11, 2024	Apr. 10, 2025
15	Thermo meter	JINCHUANG	GSP-8A	GTS643	Apr. 18, 2024	Apr. 17, 2025
16	RE cable 1	GTS	N/A	GTS675	Jul. 02, 2024	Jul. 01, 2025
17	RE cable 2	GTS	N/A	GTS676	Jul. 02, 2024	Jul. 01, 2025
18	RE cable 3	GTS	N/A	GTS677	Jul. 02, 2024	Jul. 01, 2025
19	RE cable 4	GTS	N/A	GTS678	Jul. 02, 2024	Jul. 01, 2025
20	RE cable 5	GTS	N/A	GTS679	Jul. 02, 2024	Jul. 01, 2025
21	RE cable 6	GTS	N/A	GTS680	Jul. 02, 2024	Jul. 01, 2025
22	RE cable 7	GTS	N/A	GTS681	Jul. 05, 2024	Jul. 04, 2025
23	RE cable 8	GTS	N/A	GTS682	Jul. 05, 2024	Jul. 04, 2025
24	EMI Test Software	AUDIX	E3-6.100614a	GTS725	N/A	N/A

Conducted Emission						
Item	Test Equipment	Manufacturer	Model No.	Inventory No.	Cal.Date (mm-dd-yy)	Cal.Due date (mm-dd-yy)
1	Shielding Room	ZhongYu Electron	7.3(L)x3.1(W)x2.9(H)	GTS252	July 12, 2022	July 11, 2027
2	EMI Test Receiver	R&S	ESCI 7	GTS552	April 11, 2024	April 10, 2025
3	LISN	ROHDE & SCHWARZ	ENV216	GTS226	April 11, 2024	April 10, 2025
4	Coaxial Cable	GTS	N/A	GTS227	N/A	N/A
5	EMI Test Software	AUDIX	E3	N/A	N/A	N/A
6	Thermo meter	JINCHUANG	GSP-8A	GTS642	April 18, 2024	April 17, 2025
7	Absorbing clamp	Elektronik-Feinmechanik	MDS21	GTS229	April 11, 2024	April 10, 2025
8	ISN	SCHWARZBECK	NTFM 8158	GTS565	April 11, 2024	April 10, 2025
9	High voltage probe	SCHWARZBECK	TK9420	GTS537	April 11, 2024	April 10, 2025
10	Antenna end assembly	Weinschel	1870A	GTS560	April 11, 2024	April 10, 2025

ESD						
Item	Test Equipment	Manufacturer	Model No.	Inventory No.	Cal.Date (mm-dd-yy)	Cal.Due date (mm-dd-yy)
1	ESD Simulator	LINCEL	ESD-203B	GTS645	April 16, 2024	April 15, 2025
2	Thermo meter	KTJ	TA328	GTS243	April 17, 2024	April 16, 2025

Conducted Immunity						
Item	Test Equipment	Manufacturer	Model No.	Inventory No.	Cal.Date (mm-dd-yy)	Cal.Due date (mm-dd-yy)
1	Signal Generator	ROHDE & SCHWARZ	SMB 100A	GTS553	April 11, 2024	April 10, 2025
2	CDN	LionCEL	CDN-M3-16	GTS554	April 11, 2024	April 10, 2025
3	CDN	CYBERTEK	EM 5070	GTS559	April 11, 2024	April 10, 2025
4	Power amplifier	rflight	NTWPA-00010475	GTS555	April 11, 2024	April 10, 2025
5	ATT	SUNWAVE	SJ-50-06DB	GTS556	April 11, 2024	April 10, 2025
6	Clamp	SCHAFFNER	KEMZ 801	GTS558	April 11, 2024	April 10, 2025
7	Thermo meter	JINCHUANG	GSP-8A	GTS642	April 18, 2024	April 17, 2025

Harmonic/ Flicker						
Item	Test Equipment	Manufacturer	Model No.	Inventory No.	Cal.Date (mm-dd-yy)	Cal.Due date (mm-dd-yy)
1	Power Analyzer H/F	EMTEST	LFZ-1-16	GTS646	April 11, 2024	April 10, 2025
2	AC POWER SUPPLY	EMTEST	ACS500	GTS236	April 11, 2024	April 10, 2025
3	Thermo meter	JINCHUANG	GSP-8A	GTS639	April 17, 2024	April 16, 2025

EFT, Surge, Voltage dips and Interruption						
Item	Test Equipment	Manufacturer	Model No.	Inventory No.	Cal.Date (mm-dd-yy)	Cal.Due date (mm-dd-yy)
1	EMTEST system	EMTEST	UCS500N	GTS239	April 11, 2024	April 10, 2025
2	Clamp	EMTEST	HFK	GTS557	April 11, 2024	April 10, 2025
3	Thermo meter	JINCHUANG	GSP-8A	GTS639	April 17, 2024	April 16, 2025

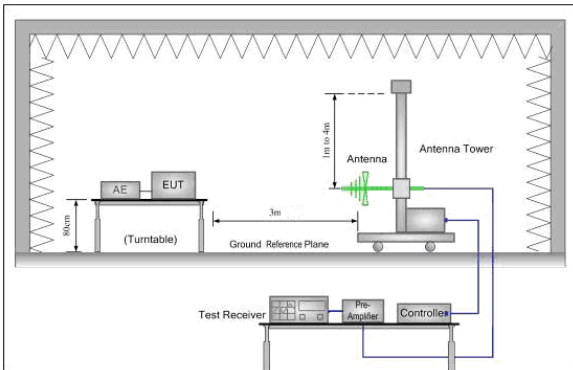
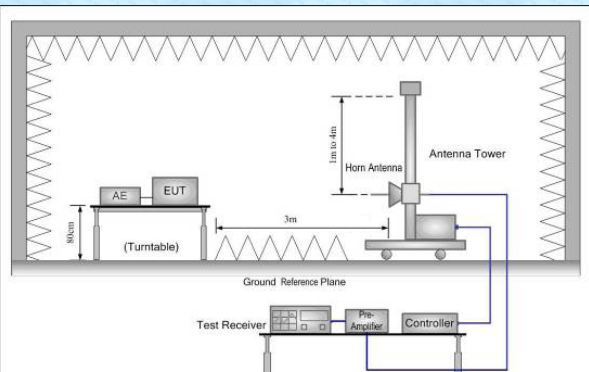
Radiated Immunity						
Item	Test Equipment	Manufacturer	Model No.	Inventory No.	Cal.Date (mm-dd-yy)	Cal.Due date (mm-dd-yy)
1	Fully-Anechoic Chamber 2	Chang Zhou Zhong Shuo	854	SEM001-05	May 09, 2020	May 08, 2025
2	Power Sensor	Rohde & Schwarz	NRP-Z91	SEM009-09	March 28, 2024	March 27, 2025
3	Stacked Log.-Per.-Broadband Antenna (70MHz-10GHz)	Schwarzbeck	STLP 9129	SEM003-25	N/A	N/A
4	Signal Generator (9kHz-6GHz)	Rohde & Schwarz	SMB100A	SEM006-11	March 28, 2024	March 27, 2025
5	Broadband Amplifier (80MHz-1GHz)	Rohde & Schwarz	BBA150-BC250	SEM005-12	Sep. 20, 2024	Sep. 19, 2025
6	Broadband Amplifier(800MHz-3GHz)	Rohde & Schwarz	BBA150-D110	SEM005-13	March 28, 2024	March 27, 2025
7	Broadband Amplifier(2.5GHz-6GHz)	Rohde & Schwarz	BBA150-E60	SEM005-16	April 07, 2024	April 06, 2025
8	Measurement Software	Rohde & Schwarz	EMC32 V9.25.00	N/A	N/A	N/A

General used equipment:						
Item	Test Equipment	Manufacturer	Model No.	Inventory No.	Cal.Date (mm-dd-yy)	Cal.Due date (mm-dd-yy)
1	Barometer	KUMAO	SF132	GTS647	April 18, 2024	April 17, 2025

7 EMC Requirements Specification in

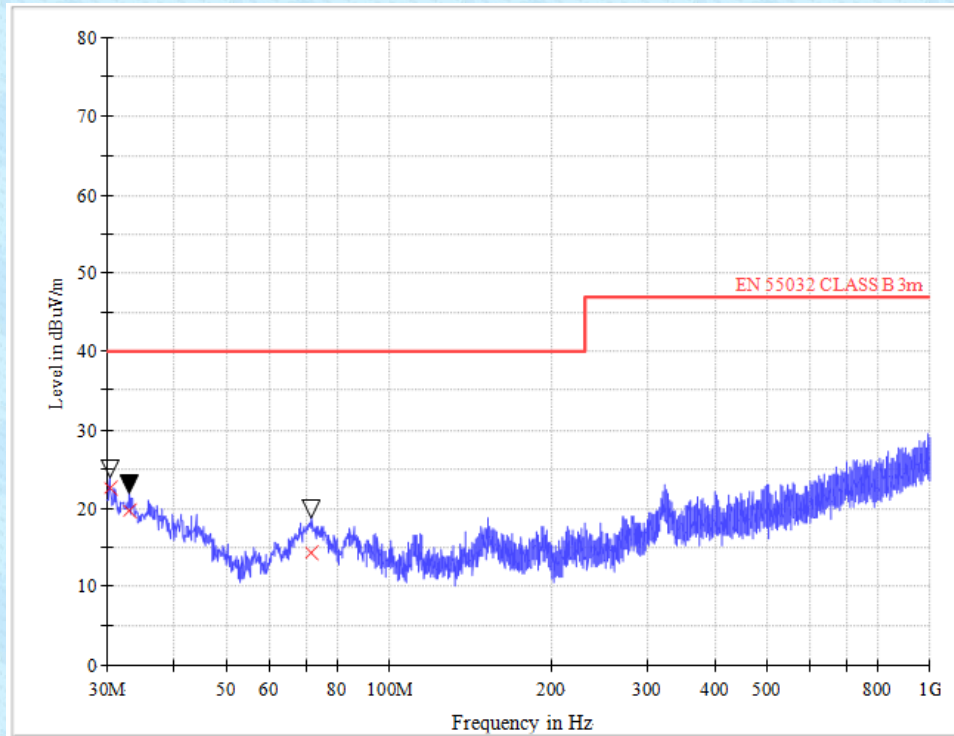
7.1 EMI (Emission)

7.1.1 Radiated Emission

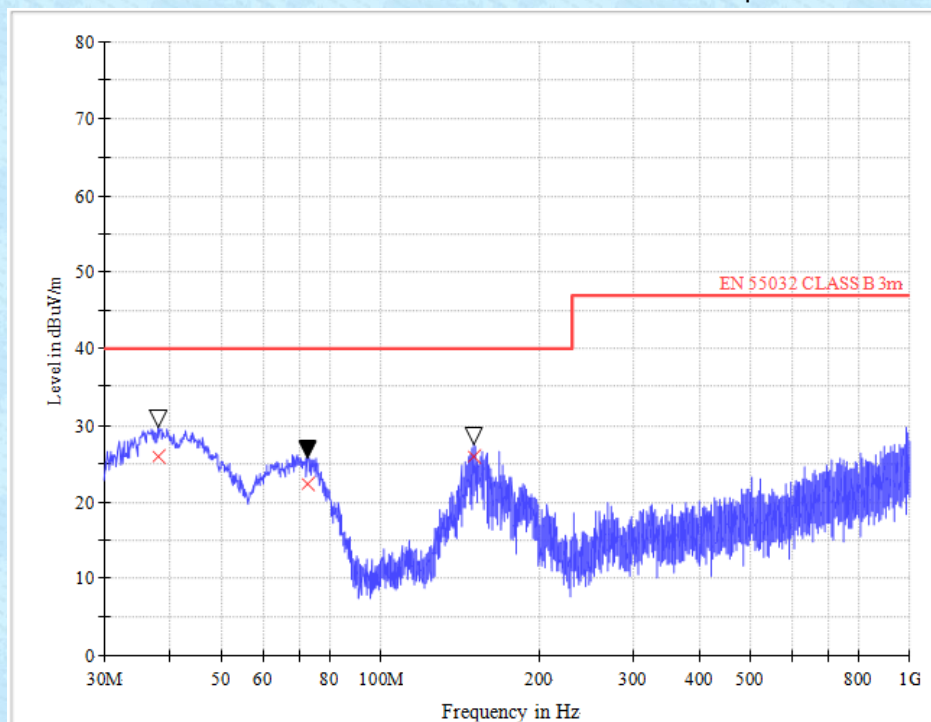
Test Requirement:	ETSI EN 301 489-1/-3/-17				
Test Method:	EN 55032				
Test Frequency Range:	30MHz to 6GHz				
Test site:	Measurement Distance: 3m				
Receiver setup:	Frequency	Detector	RBW	VBW	Remark
	30MHz-1GHz	Quasi-peak	120kHz	300kHz	Quasi-peak Value
	Above 1GHz	Peak	1MHz	3MHz	Peak Value
		AV	1MHz	3MHz	Average Value
Limit:	Frequency		Limit (dBuV/m @3m)		Remark
	30MHz-230MHz		40.00		Quasi-peak Value
	230MHz-1GHz		47.00		Quasi-peak Value
	1GHz-3GHz		50.00		Average Value
			70.00		Peak Value
	3GHz-6GHz		54.00		Average Value
			74.00		Peak Value
Test setup:	Below 1GHz				
					
	Above 1GHz				
					

Test Procedure:	■ From 30MHz to 1GHz: 1. The radiated emissions test was conducted in a semi-anechoic chamber. 2. The tabletop EUT was placed upon a non-metallic table 0.1m above the ground reference plane. And for floor-standing arrangement, the EUT was placed on the horizontal ground reference plane, but separated from metallic contact with the ground reference plane by 0.1m of insulation. 3. Before final measurements of radiated emissions, a pre-scan was performed in the spectrum mode with the peak detector to find out the maximum emissions spectrum plots of the EUT. 4. The frequencies of maximum emission were determined in the final radiated emissions measurement. At each frequency, the EUT was rotated 360°, and the antenna was raised and lowered from 1 to 4 meters in order to determine the maximum disturbance. Measurements were performed for both horizontal and vertical antenna polarization. ■ Above 1GHz: 1. The radiated emissions test was conducted in a fully-anechoic chamber. 2. The tabletop EUT was placed upon a non-metallic table 0.8m above the ground reference plane. And for floor-standing arrangement, the EUT was placed on the horizontal ground reference plane, but separated from metallic contact with the ground reference plane by 0.1m of insulation. 3. Before final measurements of radiated emissions, a pre-scan was performed in the spectrum mode with the peak detector to find out the maximum emission spectrum plots of the EUT. 4. The frequencies of maximum emission were determined in the final radiated emissions measurement. At each frequency, the EUT was rotated 360°, and the antenna was raised and lowered from 1 to 4 meters in order to determine the maximum disturbance. Measurements were performed for both horizontal and vertical antenna polarization.					
Test environment:	Temp.:	25 °C	Humid.:	50%	Press.:	1 010mbar
Measurement Record:	Uncertainty: 3.8039dB (30MHz-200MHz) 3.9679dB (200MHz-1GHz) 4.29dB (1GHz-18GHz)					
Test Instruments:	Refer to section 6.0 for details					
Test mode:	Refer to section 5.2 for details, only show the worst case.					
Test results:	Pass					

Measurement Data Below 1GHz

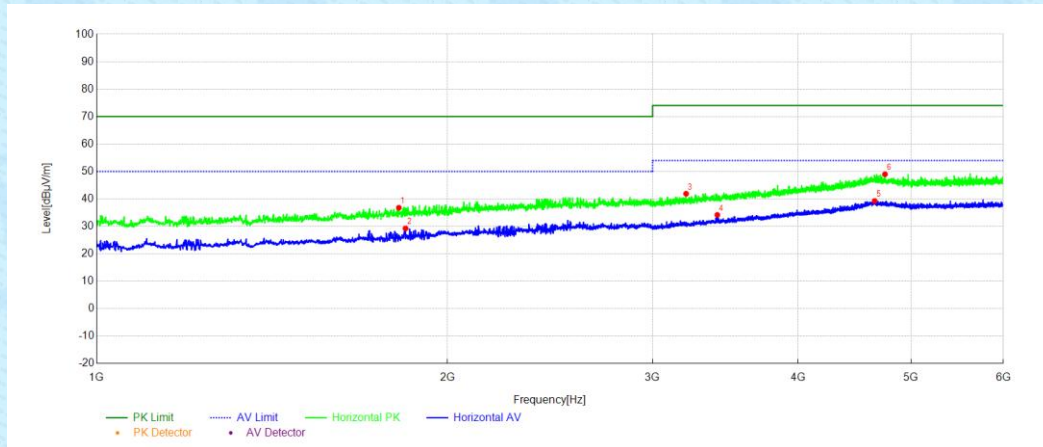


No.	Frequency (MHz)	Antenna Polarization	Antenna Height (cm)	Table Angle (Degree)	QP Limits (dBμV/m)	Emission Level QP (dBμV/m)
1	30.36	H	105	158	40	22.63
2	33.04	H	103	7	40	19.72
3	71.84	H	106	22	40	14.27

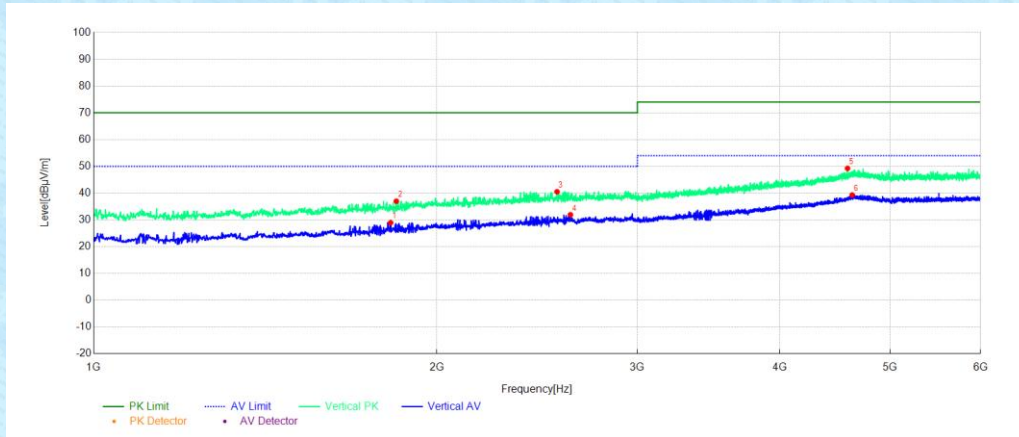


No.	Frequency (MHz)	Antenna Polarization	Antenna Height (cm)	Table Angle (Degree)	QP Limits (dBμV/m)	Emission Level QP (dBμV/m)
1	37.88	V	101	97	40	25.91
2	72.92	V	109	48	40	22.43
3	150.40	V	104	66	40	25.99

Above 1GHz



Antenna Polarization	Antenna Height (cm)	Table Angle (Degree)	Average			Peak		
			Freq. (MHz)	Limits (dB $\square$ V/m)	Level (dB $\square$ V/m)	Freq. (MHz)	Limits (dB $\square$ V/m)	Level (dB $\square$ V/m)
Horizontal	100~400	0~360	1000~3000	50	<40	1000~3000	70	<50
Horizontal	100~400	0~360	3000~6000	54	<48	3000~6000	74	<60

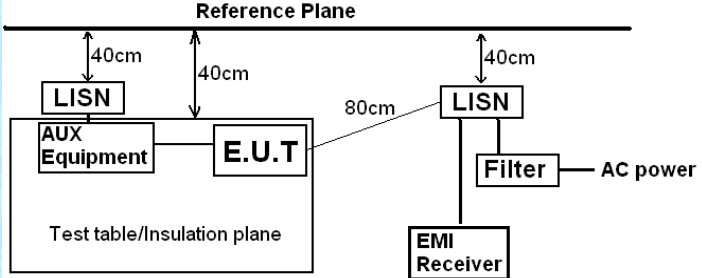


Antenna Polarization	Antenna Height (cm)	Table Angle (Degree)	Average			Peak		
			Freq. (MHz)	Limits (dBμV/m)	Level (dBμV/m)	Freq. (MHz)	Limits (dBμV/m)	Level (dBμV/m)
Vertical	100~400	0~360	1000~3000	50	<40	1000~3000	70	<50
Vertical	100~400	0~360	3000~6000	54	<48	3000~6000	74	<60

Notes:

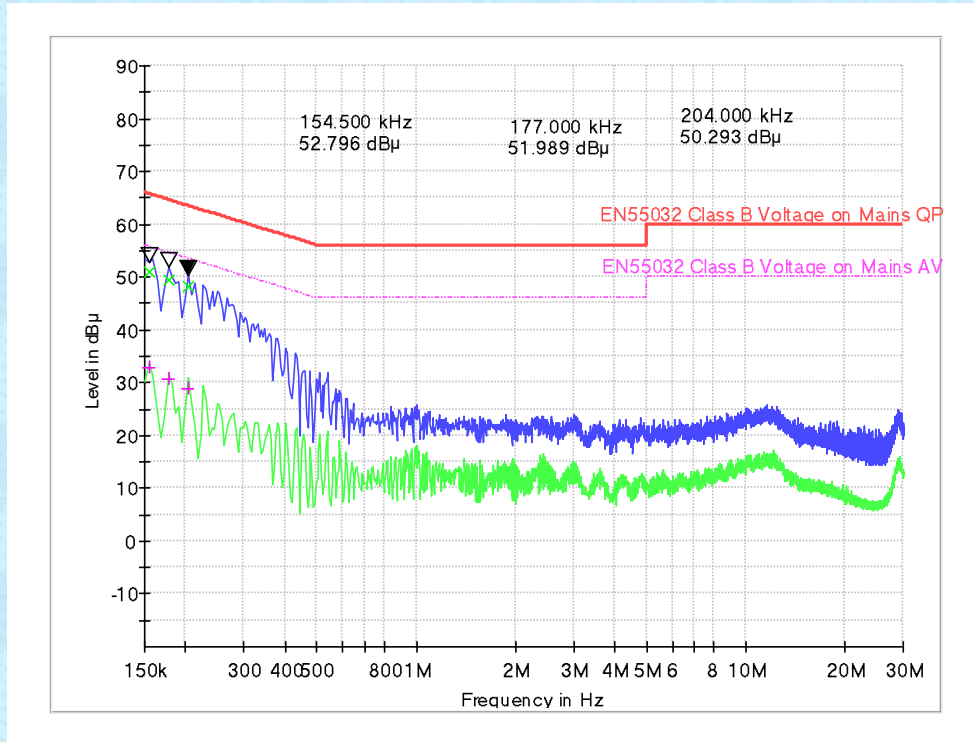
1. The EUT was test at 3m in field chamber.
2. Final Level =Receiver Read level + Antenna Factor + Cable Loss – Preamplifier Factor
3. The emission levels of other frequencies are very lower than the limit and not show in test report.
4. If the average limit is met when using a Peak detector, the EUT shall be deemed to meet both peak and average limits. And measurement with the average detector is unnecessary.

7.1.2 Conducted Emissions

Test Requirement:	ETSI EN 301 489-1/-3/-17					
Test Method:	EN 55032					
Test Frequency Range:	150kHz to 30MHz					
Class / Severity:	Class B					
Receiver setup:	RBW=9kHz, VBW=30kHz					
Limit:	Frequency range (MHz)		Limit (dBuV)			
			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.						
Test setup:	Reference Plane  <i>Remark</i> E.U.T: Equipment Under Test LISN: Line Impedance Stabilization Network Test table height=0.8m					
Test procedure	1. The E.U.T and simulators are connected to the main power through a line impedance stabilization network(L.I.S.N.). The provide a 50ohm/50uH coupling impedance for the measuring equipment. 2. The peripheral devices are also connected to the main power through a LISN that provides a 50ohm/50uH coupling impedance with 50ohm termination. (Please refers to the block diagram of the test setup and photographs). 3. Both sides of A.C. line are checked for maximum conducted interference. In order to find the maximum emission, the relative positions of equipment and all of the interface cables must be changed according to EN55032 Class B on conducted measurement.					
Test Instruments:	Temp.:	24 °C	Humid.:	51%	Press.:	1 010mbar
Measurement Record:	Uncertainty: 3.44dB					
Test Instruments:	Refer to section 6.0 for details					
Test mode:	Refer to section 5.2 for details, only show the worst case.					
Test results:	Pass					

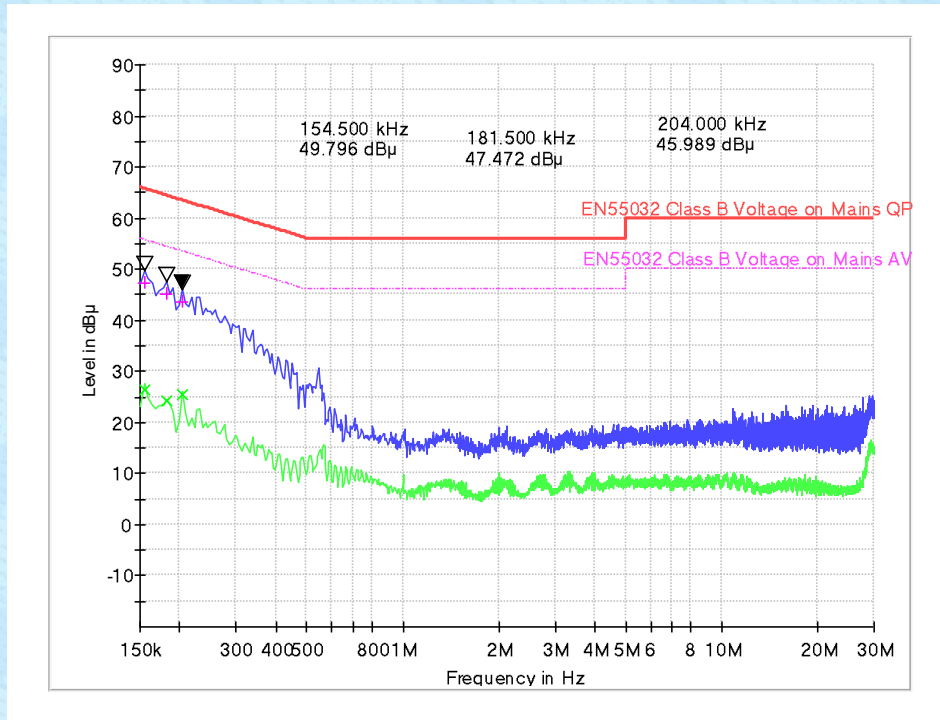
Measurement Data

Line:



No.	Freq. (MHz)	Limit Value (dBμV)		Emission Level (dBμV)		Phase
		QP	AV	QP	AV	
1	0.154500	65.75	55.75	50.97	32.70	L
2	0.177000	64.63	54.63	49.38	30.76	L
3	0.204000	63.45	53.45	48.09	28.79	L

Neutral:



No.	Freq. (MHz)	Limit Value (dBμV)		Emission Level (dBμV)		Phase
		QP	AV	QP	AV	
1	0.154500	65.75	55.75	47.39	26.48	N
2	0.181500	64.42	54.42	45.02	24.19	N
3	0.204000	63.45	53.45	43.69	25.52	N

Notes:

1. An initial pre-scan was performed on the live and neutral lines with peak detector.
2. Quasi-Peak and Average measurement were performed at the frequencies with maximized peak emission.
3. Final Level = Receiver Read level + LISN Factor + Cable Loss

7.1.3 Harmonics Test Results

Test Requirement:	ETSI EN 301 489-1, EN IEC 61000-3-2
Test Method:	N/A: See Remark Below
Remark:	There is no need for Harmonics test to be performed on this product (rated power of 75 W or less) in accordance with EN IEC 61000-3-2. For further details, please refer to Clause 7, Note 1 of EN IEC 61000-3-2 Which states: “For the following categories of equipment limits are not specified in this edition of the standard. Note 1: Equipment with a rated power of 75W or less, other than lighting equipment.”

7.1.4 Flicker Test Results

Test Requirement:	ETSI EN 301 489-1, EN 61000-3-3
Test Method:	EN 61000-3-3
Class/Severity:	Clause 5 of EN 61000-3-3
Measurement Time:	10 min
Detector:	As per EN 61000-3-3
Test Instruments:	Temp.: 24 °C Humid.: 51% Press.: 1 010mbar
Test Instruments:	Refer to section 6.0 for details
Test mode:	Refer to section 5.2 for details.
Test results:	Pass

Measurement Data

N/A

7.2 Immunity

Performance Criteria of ETSI EN 301 489-1, clause 6	
6.0 Introduction	The performance criteria are used to take a decision on whether a radio equipment passes or fails immunity tests. For the purpose of the present document two categories of performance criteria apply: •Performance criteria for continuous phenomena. •Performance criteria for transient phenomena. NOTE: Normally, the performance criteria depends upon the type of radio equipment and/or its intended application. Thus, the present document only contains general performance criteria commonly used for the assessment of radio equipment.
6.1 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.
6.2 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.

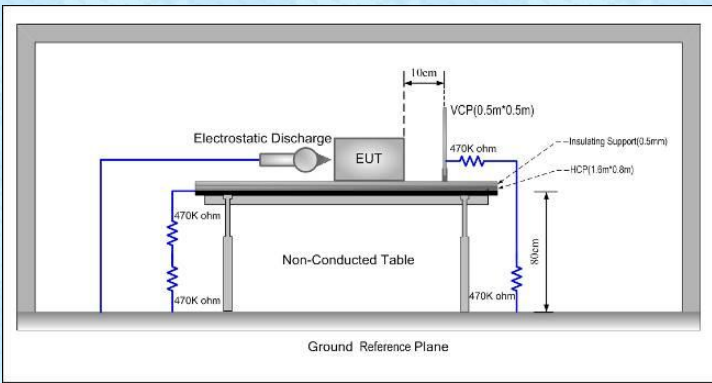
Performance Criteria of ETSI EN 301 489-3 clause 6	
6.1	Introduction The performance criteria are used to make an assessment whether a radio equipment passes or fails immunity tests. Only the performance criteria specified in the present document or in ETSI EN 301 489-1 [1] where referenced shall apply. The provisions of ETSI EN 301 489-1 [1] clause 6 shall apply, together with clauses 6.2 and 6.3 of the present document.
6.2	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.
6.3	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.

Performance Criteria of ETSI EN 301 489-17, clause 6		
Criteria	During Test	After Test
A	Shall operate as intended. (see note). Shall be no loss of function. Shall be no unintentional transmissions.	Shall operate as intended. Shall be no degradation of performance. Shall be no loss of function. Shall be no loss of critical stored data.
B	May be loss of function .	Functions shall be self-recoverable. Shall operate as intended after recovering. Shall be no loss of critical stored data.
C	May be loss of function .	Functions shall be recoverable by the operator. Shall operate as intended after recovering. Shall be no loss of critical stored data.
Note:	Operate as intended during the test allows a level of degradation in accordance with clause 6.2.2.	
6.2.2	Minimum performance level For equipment that supports a PER or FER, the minimum performance level shall be a PER or FER less than or equal to 10 %. For equipment that does not support a PER or a FER, the minimum performance level shall be no loss of the wireless transmission function needed for the intended use of the equipment.	
6.3	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.	
6.4	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 Clause 8 of EN 55035

Criterion A:	The equipment shall continue to operate as intended without operator intervention. No degradation of performance, loss of function or change of operating state 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.
Criterion B:	During the application of the disturbance, degradation of performance is allowed. However, no unintended change of actual 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; 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), or recovery time, 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.
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. A reboot or re-start operation is allowed. Information stored in non-volatile memory, or protected by a battery backup, shall not be lost.

7.2.1 Electrostatic Discharge

Test Requirement:	ETSI EN 301489-1/-3/-17, EN55035
Test Method:	EN 61000-4-2
Discharge Voltage:	Contact Discharge: $\pm 4\text{kV}$ Air Discharge: $\pm 2\text{kV}$, $\pm 4\text{kV}$, $\pm 8\text{kV}$ HCP/VCP: $\pm 4\text{kV}$
Polarity:	Positive & Negative
Number of Discharge:	Contact Discharge: Minimum 10 times at each test point, Air Discharge: Minimum 10 times at each test point.
Discharge Mode:	Single Discharge
Discharge Period:	1 second minimum
Limit:	Criteria B
Test setup:	
Test Procedure:	Air discharge: 1. The test was applied on non-conductive surfaces of EUT. 2. The round discharge tip of the discharge electrode was approached as fast as possible to touch the EUT. 3. After each discharge, the discharge electrode was removed from the EUT. 4. The generator was re-triggered for a new single discharge and repeated 10 times for each pre-selected test point. 5. This procedure was repeated until all the air discharge completed Contact Discharge: 1. The test was applied on conductive surfaces of EUT. 2. the generator was re-triggered for a new single discharge and repeated 10 times for each pre-selected test point. 3. the tip of the discharge electrode was touch the EUT before the discharge switch was operated. Indirect discharge for horizontal coupling plane 1. At least 10 single discharges shall be applied at the front edge of each HCP opposite the centre point of each unit of the EUT and 0.1m from the front of the EUT. 2. The long axis of the discharge electrode shall be in the plane of the HCP and perpendicular to its front edge during the discharge. 3. Consideration should be given to exposing all sides of the EUT. Indirect discharge for vertical coupling plane 1. At least 10 single discharges were applied to the center of one vertical edge of the coupling plane.

	2. The coupling plane, of dimensions 0.5m X 0.5m, was placed parallel to, and positioned at a distance of 0.1m from the EUT. 3. Discharges were applied to the coupling plane, with this plane in sufficient different positions that the four faces of the EUT are completely illuminated.
Test environment:	Temp.: 24 °C Humid.: 51% Press.: 1 010mbar
Test Instruments:	Refer to section 6.0 for details
Test mode:	Refer to section 5.2 for details
Test results:	Pass

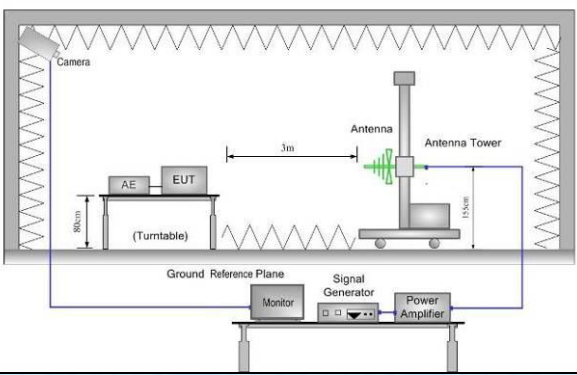
Measurement Record:

Test points:	I: N/A			
	II: All plastic seams			
Direct discharge				
Discharge Voltage (KV)	Type of discharge	Test points	Observations Performance	Result
± 4	Contact	I	N/A	N/A
± 2, ± 4, ± 8	Air	II	A	Pass
Indirect discharge				
Discharge Voltage (KV)	Type of discharge	Test points	Observation Performance	Result
± 4	HCP-Bottom/Top/ Front/Back/Left/Right	Edge of the HCP	A	Pass
± 4	VCP-Front/Back /Left/Right	Center of the VCP	A	Pass
± 2, ± 4,	Contact	Display	A	Pass
± 2, ± 4,	Contact	Bottom	A	Pass
± 2, ± 4, ± 8	Air	HCP	A	Pass
± 2, ± 4, ± 8	Air	VCP	A	Pass

Remark:

A: Normal performance within the specification limits.

7.2.2 Radiated Immunity

Test Requirement:	ETSI EN 301489-1/-3/-17, EN55035
Test Method:	EN 61000-4-3
Frequency range:	80MHz to 6GHz
Test Level:	3V/m
Modulation:	80%, 1kHz Amplitude Modulation
Performance Criterion:	Criteria A
Test setup:	
Test Procedure:	1. For table-top equipment, the EUT was placed in the chamber on a non-conductive table 0.8m high. For arrangement of floor-standing equipment, the EUT was mounted on a non-conductive support 0.1m above the supporting plane. For human body-mounted equipment, the EUT may be tested in the same manner as table top items. 2. If possible, a minimum of 1 m of cable is exposed to the electromagnetic field. Excess length of cables interconnecting units of the EUT shall be bundled low-inductively in the approximate center of the cable to form a bundle 30 cm to 40 cm in length. 3. The EUT was initially placed with one face coincident with the calibration plane. The EUT face being illuminated was contained within the UFA (Uniform Field Area). 4. The frequency ranges to be considered were swept with the signal modulated and pausing to adjust the RF signal level or to switch oscillators and antennas as necessary. Where the frequency range was swept incrementally, the step size was not exceed 1 % of the preceding frequency value. 5. The dwell time of the amplitude modulated carrier at each frequency was not be less than the time necessary for the EUT to be exercised and to respond, and was not less than 0,5 s. 6. The test normally was performed with the generating antenna facing each side of the EUT. 7. The polarization of the field generated by each antenna necessitates testing each selected side twice, once with the antenna positioned vertically and again with the antenna positioned horizontally. 8. The EUT was performed in a configuration to actual installation conditions, a video camera and/or a audio monitor were used to monitor the performance of the EUT.
Test monitor:	Traffic mode: 1. The test system shall simulate a Base Station (BS) with Broadcast Control Channel/Common Control Channel (BCCH/CCCH) on one carrier. 2. The EUT shall be synchronized to the BCCH, listening to the CCCH

	and able to respond to paging messages.					
	Idle mode: 1. The test system shall simulate a Base Station (BS) with Broadcast Control Channel/Common Control Channel (BCCH/CCCH) on one carrier. 2. The EUT shall be synchronized to the BCCH, listening to the CCCH and able to respond to paging messages.					
Test environment:	Temp.:	25 °C	Humid.:	52%	Press.:	1 010mbar
Test Instruments:	Refer to section 6.0 for details					
Test results:	Pass					

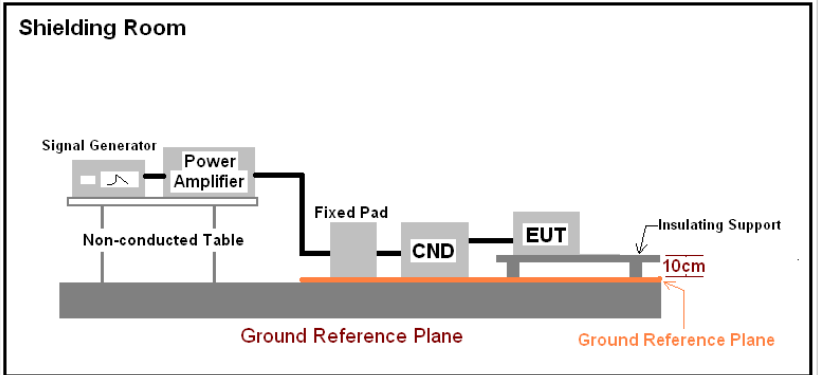
Measurement Record: WIFI/Bluetooth Mode

Frequency	Level	Modulation	Operating Mode	Antenna Polarization	EUT Face	Observations (Performance Criterion)
80 MHz-6 GHz	3 V/m	1kHz, 80 % Amp. Mod, 1 % increment	All modes	V	Front	A
				H		A
				V	Rear	A
				H		A
				V	Left	A
				H		A
				V	Right	A
				H		A
				V	Top	A
				H		A
				V	Bottom	A
				H		A

Remarks:

A: normal performance within the specification limits

7.2.3 Radio frequency common mode

Test Requirement:	ETSI EN 301489-1/-3/-17, EN55035					
Test Method:	EN 61000-4-6					
Frequency range:	0.15MHz to 80MHz					
Test Level:	3V rms on AC Ports (unmodulated emf into 150 Ω)					
Modulation:	80%, 1kHz Amplitude Modulation					
Performance Criterion:	Criteria A					
Test setup:						
Test Procedure:	1. Let the EUT work in test mode and test it. 2. The EUT are placed on an insulating support 0.1m high above a ground reference plane. CDN (coupling and decoupling device) is placed on the ground plane about 0.3m from EUT. Cables between CDN and EUT are as short as possible, and their height above the ground reference plane shall be between 30 and 50 mm (where possible). 3. The disturbance signal described below is injected to EUT through CDN. 4. The EUT operates within its operational mode(s) under intended climatic conditions after power on. 5. The frequency range is swept from 0.150MHz to 80MHz using 3V signal level, and with the disturbance signal 80% amplitude modulated with a 1kHz sine wave. The rate of sweep shall not exceed 1.5×10^{-3} decades/s. Where the frequency is swept incrementally; the step size shall not exceed 1% of the start and thereafter 1% of the preceding frequency value. 6. Recording the EUT operating situation during compliance testing and decide the EUT immunity criterion.					
Test environment:	Temp.:	24 °C	Humid.:	51%	Press.:	1 010mbar
Test Instruments:	Refer to section 6.0 for details					
Test results:	Pass					

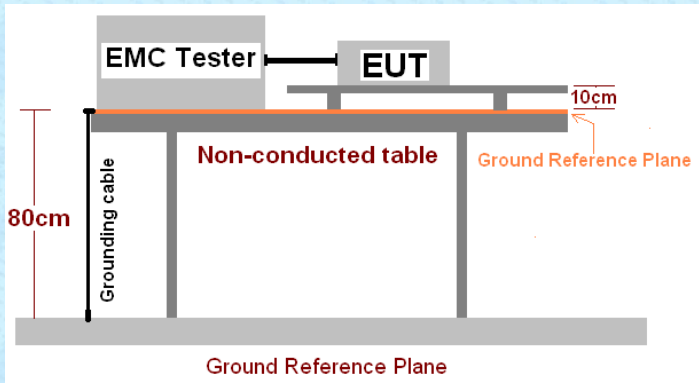
Measurement Record:

Frequency	Injected Position	Test Level	Modulation	Step Size	Dwell Time	Observations (Performance Criterion)
150kHz to 80MHz	AC Main	3Vrms	80%, 1kHz Amp. Mod.	1%	2s	A

Remark:

A: Normal performance within the specification limits.

7.2.4 Electrical Fast Transients

Test Requirement:	ETSI EN 301489-1/-3/-17, EN55035
Test Method:	EN 61000-4-4
Test Level:	1.0kV on AC port
Polarity:	Positive & Negative
Repetition Frequency:	5kHz
Burst Duration:	15ms
Burst Period:	300ms
Test Duration:	2 minute per level & polarity
Performance Criterion:	B
Test setup:	
Test Procedure:	1. The EUT and its simulators were placed on the ground reference plane and were insulated from it by a wood support 0.1m + 0.01m thick. The ground reference plane was 1m*1m metallic sheet with 0.65mm minimum thickness. 2. This reference ground plane was project beyond the EUT by at least 0.1m on all sides and the minimum distance between EUT and all other conductive structure, except the ground plane was more than 0.5m. 3. All cables to the EUT was placed on the wood support, cables not subject to EFT/B was routed as far as possible from the cable under test to minimize the coupling between the cables. 4. The length of the signal and power lines between the coupling device and the EUT is 0.5m Test on Signal Ports, Telecommunication Ports and Control Ports: The EFT interference signal is through a coupling clamp device couples to the signal and control lines of the EUT with burst noise for 2 minutes. Test on power supply ports: 1. The EUT is connected to the power mains through a coupling device that directly couples the EFT/B interference signal. 2. Each of the Line and Neutral conductors is impressed with burst noise for 2 minutes.
Test environment:	Temp.: 26 °C Humid.: 54% Press.: 1 010mbar
Test Instruments:	Refer to section 6.0 for details
Test mode:	Refer to section 5.2 for details
Test results:	Pass

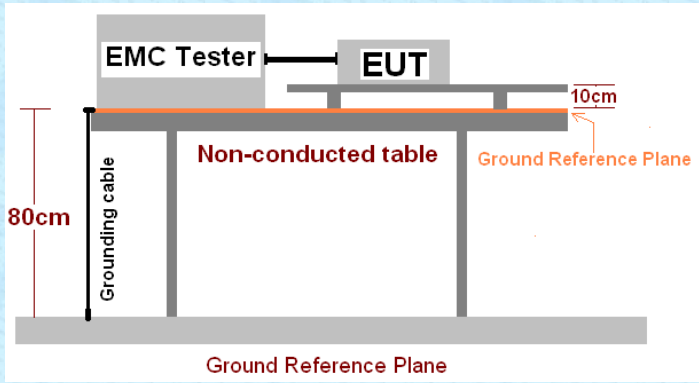
Measurement Record:

Lead under Test	Level ($\pm$ kV)	Coupling Direct/Clamp	Observations (Performance Criterion)	Result
L	± 1.0	Direct	A	Pass
N	± 1.0	Direct	A	Pass
L-N	± 1.0	Direct	A	Pass

Remark:

A: Normal performance within the specification limits

7.2.5 Surge

Test Requirement:	ETSI EN 301489-1/-3/-17, EN55035
Test Method:	ETSI EN 61000-4-5
Test Level:	$\pm 0.5, \pm 1\text{kV}$ line to line $\pm 0.51\text{kV}$ signal port
Polarity:	Positive & Negative
Test Interval:	60s between each surge
No. of surges:	5 positive, 5 negative at $0^\circ, 90^\circ, 180^\circ, 270^\circ$.
Performance Criterion:	B
Test setup:	 The diagram illustrates the test setup. An EMC Tester is connected to an EUT (Equipment Under Test) via a cable. Both are placed on a Non-conducted table. The table is grounded to a Ground Reference Plane. A vertical dimension of 80cm is shown from the Ground Reference Plane to the top of the table. A horizontal dimension of 10cm is shown from the EUT to the edge of the table.
Test Procedure:	1. For line-to-line coupling mode, provide a 1kV 1.2/50us voltage surge (at open-circuit condition) and 8/20us current surge to EUT selected points, and for active line / neutral lines to ground are same except test level is 2kV. 2. At least 5 positive and 5 negative (polarity) tests with a maximum 1/min repetition rate are applied during test. 3. Different phase angles are done individually. 4. Record the EUT operating situation during compliance test and decide the EUT immunity criterion for above each test.
Test environment:	Temp.: 26 °C Humid.: 53% Press.: 1 010mbar
Test Instruments:	Refer to section 6.0 for details
Test mode:	Refer to section 5.2 for details
Test results:	Pass

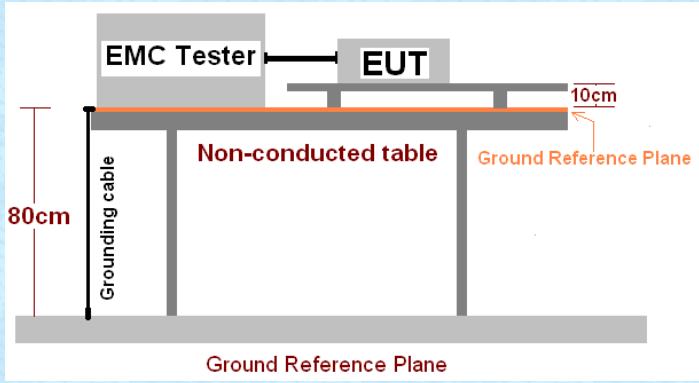
Measurement Record:

Test Point	Polarity	Test Level (kV)	Observation	Conformance
a.c. power port, L-N	+/-	1	Note (1)	Pass
a.c. power port, L	+/-	2	Note (1)	Pass
a.c. power port, N	+/-	2	Note (1)	Pass

Remark:

A. The EUT continued to operate as intended. No degradation of performance was observed.

7.2.6 Voltage Dip and Voltage Interruptions

Test Requirement:	ETSI EN 301489-1/-3/-17
Test Method:	EN 61000-4-11
Test Level:	0% of VT(Supply Voltage) for 0.5 period 0% of VT(Supply Voltage) for 1.0 period 70% of VT(Supply Voltage) for 25 period 0% of VT(Supply Voltage) for 250 period
No. of Dips / Interruptions:	3 per Level
Performance Criterion:	0% VD, 0.5 period----Performance criterion: B 0% VD, 1 period----Performance criterion: B 70% VD, 25 period----Performance criterion: C 0% VI, 250 period----Performance criterion: C
Test setup:	 The diagram illustrates the test setup. An EMC Tester and an EUT (Equipment Under Test) are positioned on a non-conducted table. The table is 80cm high. A grounding cable is connected to the table. The EUT is 10cm above the table surface. A Ground Reference Plane is indicated at the base of the table.
Test Procedure:	1>.The EUT and test generator were setup as shown on above setup photo. 2>.The interruptions are introduced at selected phase angles with specified duration. 3>.Record any degradation of performance.
Test environment:	Temp.: 26 °C Humid.: 53% Press.: 1 010mbar
Test Instruments:	Refer to section 6.0 for details
Test mode:	Refer to section 5.2 for details
Test results:	Pass

Measurement Record:

Test Level U_T	Duration (Periods)	Phase angle	No of dropout	Time between dropout	Observations (Performance Criterion)
0%	0.5	0°, 90°, 180°, 270°	3	10s	A
0%	1.0	0°, 90°, 180°, 270°	3	10s	A
70%	25	0°, 90°, 180°, 270°	3	10s	A
0%	250	0°, 90°, 180°, 270°	3	10s	B

Remark:

A: No loss of function was observed.

B: During the test, the EUT stops work, but after the test, it can recover automatically.

8 Test Setup Photo

Reference to the **appendix I** for details.

9 EUT Constructional Details

Reference to the **appendix II** for details.

-----End-----