TEST REPORT

Reference No.	:	WTX24X09218316W005
Manufacturer	:	Portable Multimedia Limited
Address	:	Unit 2, Caerphilly Business Park, Caerphilly, Mid Glamorgan CF83 3ED United Kingdom
Product Name	:	Dash Cam
Model No.	:	NBPICO2
Standards	:	**EN 55032:2015+A1:2020; EN 55035:2017+A11:2020** **ETSI EN 301 489-1 V2.2.3 (2019-11)** **ETSI EN 301 489-17 V3.2.4 (2020-09)** **ETSI EN 301 489-19 V2.2.1 (2022-09)**
Date of Receipt sample	:	2024-09-18
Date of Test	:	2024-09-18 to 2024-09-29
Date of Issue	:	2024-09-29
Test Report Form No.	:	WTX_ETSI EN 301 489_1_2019W
Test Result	:	**Pass**

Remarks:

The 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 auditor.

Prepared By:

Waltek Testing Group (Shenzhen) Co., Ltd.

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Tested by:

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Approved by:

Jason Su

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Version No.	Date of issue	Description
Rev.00	2024-09-29	Original
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1. GENERAL INFORMATION

1.1 Product Description for Equipment Under Test (EUT)

General Description of EUT	
Product Name:	Dash Cam
Trade Name:	Nextbase
Model No.:	NBPICO2
Adding Model(s):	NBPICO1, NBPIQO1, NBPIQO2, NBPICO1-32 NBPICO1-64, NBPICO1-128, NBPICO1-256, NBPICO1-PP, NBPICO1-CLC, NBPICO1-PIC, NBPICO1-QIC, NBPICO1-32PP, NBPICO1-64PP, NBPICO1-128PP, NBPICO1-256PP, NBPICO1-32PPQIC, NBPICO1-64PPQIC, NBPICO1-32PPPIC, NBPICO1-64PPPIC, NBPICO2-32, NBPICO2-64, NBPICO2-128, NBPICO2-256, NBPICO2-PP, NBPICO2-CLC, NBPICO2-PIC, NBPICO2-QIC, NBPICO2-32PP, NBPICO2-64PP, NBPICO2-128PP, NBPICO2-256PP, NBPICO2-32PPQIC, NBPICO2-64PPQIC, NBPICO2-32PPPIC, NBPICO2-64PPPIC
Rated Voltage:	Car charger power 5V 2.4A
Power adapter:	Input: 12-24Vdc Output: 5V 2.4A Max
Battery Capacity:	/
Software Version:	/
Hardware Version:	/
Note: The test data is gathered from a production sample provided by the manufacturer. The appearance of others models listed in the report is different from main-test model NBPICO2, but the circuit and the electronic construction do not change, declared by the manufacturer.	

Technical Characteristics of EUT	
Bluetooth	
Bluetooth Version:	Bluetooth V5.2
Frequency Range:	2402MHz-2480MHz
Max.RF Output Power:	9.92dBm (EIRP)
Type of Modulation:	GFSK, π/4 DQPSK, 8DPSK
Data Rate:	1Mbps, 2Mbps, 3Mbps
Quantity of Channels	79/40
Channel Separation:	1MHz/2MHz
Type of Antenna:	FPC Antenna
Antenna Gain:	3.27dBi
Wi-Fi (2.4GHz)	
Support Standards:	802.11b, 802.11g, 802.11n-HT20
Frequency Range:	2412-2472MHz for 802.11b/g/n(HT20)
Max.RF Output Power:	15.89dBm (EIRP)
Type of Modulation:	DBPSK,BPSK,DQPSK,QPSK,16QAM,64QAM
Quantity of Channels	13 for 802.11b/g/n(HT20)
Channel Separation:	5MHz
Type of Antenna:	FPC Antenna
Antenna Gain:	3.27dBi
GPS	
Frequency Range:	1575.42MHz
Note: The Antenna Gain is provided by the customer and can affect the validity of results.	

1.2 Test Standards

The tests were performed according to following standards:

EN 55032:2015+A1:2020: Electromagnetic compatibility of multimedia equipment - Emission requirements

EN 55035:2017+A11:2020: Electromagnetic compatibility of multimedia equipment - Immunity requirements.

ETSI EN 301 489-1 V2.2.3 (2019-11): Electromagnetic Compatibility (EMC) standard for radio equipment and services; Part 1: Common technical requirements; Harmonised Standard for Electromagnetic Compatibility

ETSI EN 301 489-17 V3.2.4 (2020-09): ElectroMagnetic Compatibility (EMC) standard for radio equipment and services;Part 17: Specific conditions for Broadband Data Transmission Systems; Harmonised Standard for ElectroMagnetic Compatibility.

ETSI EN 301 489-19 V2.2.1 (2022-09): ElectroMagnetic Compatibility (EMC) standard for radio equipment and services; Part 19: Specific conditions for Receive Only Mobile Earth Stations (ROMES) operating in the 1,5 GHz band providing data communications and GNSS receivers operating in the RNSS band providing positioning, navigation, and timing data; Harmonised Standard for ElectroMagnetic Compatibility

Maintenance of compliance is the responsibility of the manufacturer. Any modification of the product maybe which result in lowering the emission/immunity should be checked to ensure compliance has been maintained.

1.3 Test Methodology

All measurements contained in this report were conducted with the standard ETSI EN 301489-1, Electromagnetic compatibility and Radio spectrum Matters (ERM); Electromagnetic Compatibility (EMC) standard for radio equipment and services; Part 1: Common technical requirements.

1.4 Test Facility

Address of the test laboratory

Laboratory: Waltek Testing Group (Shenzhen) Co., Ltd.

Address: 1/F., Room 101, Building 1, Hongwei Industrial Park, Liuxian 2nd Road, Block 70 Bao'an District, Shenzhen, Guangdong, China

FCC – Registration No.: 125990

Waltek Testing Group (Shenzhen) Co., Ltd. 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 our files. The Designation Number is CN5010, and Test Firm Registration Number is 125990.

Industry Canada (IC) Registration No.: 11464A

The 3m Semi-anechoic chamber of Waltek Testing Group (Shenzhen) Co., Ltd. has been registered by Certification and Engineering Bureau of Industry Canada for radio equipment testing with Registration No.: 11464A.

1.5 EUT Setup and Operation Mode

The equipment under test (EUT) was configured to measure its highest possible emission/immunity level. The test modes were adapted according to the operation manual for use, more detailed description as follows:

Test Mode List		
Test Mode	Description	Remark
TM1	Normal working mode	DC 24V Connected and Connect Phone
TM2	WiFi	TR, CR, TT, CT for EMS testing
TM3	Bluetooth	TR, CR, TT, CT for EMS testing
TM4	GPS	TR, CR, TT, CT for EMS testing

EUT Cable List and Details			
Cable Description	Length (m)	Shielded/Unshielded	With / Without Ferrite
Type-C Cable	4.0	Unshielded	Without Ferrite

Auxiliary Cable List and Details			
Cable Description	Length (m)	Shielded/Unshielded	With / Without Ferrite
/	/	/	/

Auxiliary Equipment List and Details			
Description	Manufacturer	Model	Serial Number
iPhone	Apple	MGC33CH/A	/

1.6 Performance Criteria for EMS

➢ **EN 301 489-17, The performance criteria are:**

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

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

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

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

Table 1: Performance criteria

Criteria	During test	After test
A	Shall operate as intended. (see note 1). Shall be no loss of function. Shall be no unintentional transmissions.	Shall operate as intended. Shall be no degradation of performance (see note 3). Shall be no loss of function. Shall be no loss of stored data or user programmable
B	May show loss of function (one or more). May show degradation of performance (see note 2). Shall be no unintentional transmissions.	Functions shall be self-recoverable. Shall operate as intended after recovering. Shall be no degradation of performance (see note 3). Shall be no loss of stored data or user programmable functions.
C	May be loss of function (one or more).	Functions shall be recoverable by the operator. Shall operate as intended after recovering. Shall be no degradation of performance (see note 3).

NOTE 1: Operate as intended during the test allows a level of degradation not below a minimum performance level specified by the manufacturer for the use of the apparatus as intended. In some cases the specified minimum performance level may be replaced by a permissible degradation of performance. If the minimum performance level or the permissible performance degradation is not specified by the manufacturer then either of these may be derived from the product description and documentation (including leaflets and advertising) and what the user may reasonably expect from the apparatus if used as intended.

NOTE 2: Degradation of performance during the test is understood as a degradation to a level not below a minimum performance level specified by the manufacturer for the use of the apparatus as intended. In some cases the specified minimum performance level may be replaced by a permissible degradation of performance. If the minimum performance level or the permissible performance degradation is not specified by the manufacturer then either of these may be derived from the product description and documentation (including leaflets and advertising) and what the user may reasonably expect from the apparatus if used as intended.

NOTE 3: No degradation of performance after the test is understood as no degradation below a minimum performance level specified by the manufacturer for the use of the apparatus as intended. In some cases the specified minimum performance level may be replaced by a permissible degradation of performance. After the test no change of actual operating data or user retrievable data is allowed. If the minimum performance level or the permissible performance degradation is not specified by the manufacturer then either of these may be derived from the product description and documentation (including leaflets and advertising) and what the user may reasonably expect from the apparatus if used as intended.

➢ **EN 301 489-19, The performance criteria are:**

The present document, together with ETSI EN 301 489-1 [1], covers the assessment of Receive Only Mobile Earth Stations (ROMES) and GNSS receivers operating in the RNSS band (ROGNSS), as defined in annex B, and associated ancillary equipment in respect of Electro Magnetic Compatibility (EMC).

Technical specifications related to the antenna port and emissions from the enclosure port of ROMES are not included in the present document. Such technical specifications are found in the relevant product standards for the effective use of the radio spectrum.

The present document specifies the applicable test conditions, performance assessment and performance criteria for ROMES and associated ancillary equipment. ROMESs can have several configurations, including:

• vehicular equipment;
• portable equipment;
• fixed equipment;
• a number of modules including a display/control interface to the user.

The performance criteria used in the present document require that the satellite communications system of which the ROMES is a part provides reliable delivery of data or messages.

The environmental classification and the emission and immunity requirements used in the present document are as stated in ETSI EN 301 489-1 [1], except for any special conditions included in the present document.

- **EN 301 489-52, The performance criteria are:**

According to the section 6.1 and 6.2 EN301489-52, the test data has been collected, reduced, and analyzed within this report in accordance with Immunity requires the following as specific performance criteria:

The equipment shall meet the performance criteria specified in this clause and clauses 6.1.1 to 6.1.4, as appropriate.
Portable equipment intended for use whilst powered by the main battery of a vehicle shall additionally fulfil the applicable requirements set out in ETSI EN 301 489-1 [1], clauses 7.1 and 7.2 for mobile equipment.
Portable or mobile equipment powered by the AC mains shall additionally fulfil the applicable requirements of ETSI EN 301 489-1 [1], clauses 7.1 and 7.2 for radio and ancillary equipment for fixed use.
The establishment and maintenance of a communications link, the assessment of RXQUAL, and the assessment of the audio breakthrough by monitoring the speech output signal level, are used as performance criteria to ensure that all primary functions of the transmitter and receiver are evaluated during the immunity tests. In addition, the test shall also be performed in idle mode to ensure the transmitter does not unintentionally operate.
The maintenance of a communications link shall be assessed using an indicator which may be part of the test system or the EUT.
If an equipment is of a specialized nature, such that the performance criteria described in the following clauses are not appropriate, then the manufacturer shall declare, for inclusion in the test report, his own specification for an acceptable level of performance or degradation of performance during and/or after the immunity tests. The performance specification shall be included in the product description and documentation.
The performance criteria specified by the manufacturer shall give the same degree of immunity protection as called for in the following clauses.

The equipment shall meet the performance criteria specified in this clause and clauses 6.2.2 and 6.2.3 as appropriate.
The maintenance of a communications link shall be assessed by using an indicator, which may be part of the test system or the equipment under test.
If an equipment is of a specialized nature, that the performance criteria described in the following clauses are not appropriate, then the manufacturer shall declare, for inclusion in the test report, his own specification for an acceptable level of performance or degradation of performance during and/or after testing, as required by the present document.
The performance criteria specified by the manufacturer shall give the same degree of immunity protection as called for in the following clauses.
In addition, the test shall also be performed in idle mode to ensure the transmitter does not unintentionally operate.
The requirements apply to all types of UTRA and E-UTRA (FDD or TDD) for the UE.

➢ **EN 55035, The performance criteria are:**

A. The apparatus shall continue to operate as intended during and after the test. The manufacturer specifies some minimum performance level. The performance level may be specified by the manufacturer as a permissible loss of performance.

B. The apparatus shall continue to operate as intended after the test. This indicates that the EUT does not need to function at normal performance levels during the test, but must recover. Again some minimal performance is defined by the manufacture. No change in operating state or loss or data is permitted.

C. Temporary loss of function is allowed. Operation of the EUT may stop as long as it is either automatically reset or can be manually restored by operation of the controls.

➢ **Monitoring EUT in Immunity Test:**

Monitoring for Continuous Phenomena Applied to EUT

GSM
At the start of the test, a communication link shall be established.
During the test, the operator shall observe whether the communication link is maintained and set the EUT volume to provide center audio level.
For GSM voice service, use an audio analyzer to measure uplink and downlink speech output levels to see whether audio breakthroughs are at least 35 dB less than reference measurement values of audio calibration.
For GSM voice service, RXQUAL is measured by SS. It should be not more than 3.
At the conclusion of the test, the operator shall directly check whether the EUT operate as intended with no loss of user control functions or stored data.
In addition to confirming the above performance during traffic mode, the test is also been performed in idle mode, with an interference receiver to monitor whether the transmitter unintentionally operates.

WCDMA
At the start of the test, a communication link shall be established.
During the test, the operator shall observe whether the communication link is maintained and set the EUT volume to provide center audio level.
For WCDMA voice service, use an audio analyzer to measure uplink and downlink speech output levels to see whether audio breakthroughs are at least 35 dB less than reference measurement values of audio calibration.
For WCDMA voice service, RXQUAL is measured by SS. It should be not more than 3.
For WCDMA data service, the BLER shall not exceed 0,01 during the test sequence.
At the conclusion of the test, the operator shall directly check whether the EUT operate as intended with no loss of user control functions or stored data.
In addition to confirming the above performance during traffic mode, the test is also been performed in idle

mode, with an interference receiver to monitor whether the transmitter unintentionally operates.

LTE

At the start of the test, a communication link shall be established.

During the test, the operator shall observe whether the communication link is maintained and set the EUT volume to provide center audio level.

For LTE data service, the throughput shall be ≥ 95 % of the maximum through put.

At the conclusion of the test, the operator shall directly check whether the EUT operate as intended with no loss of user control functions or stored data.

In addition to confirming the above performance during traffic mode, the test is also been performed in idle mode, with an interference receiver to monitor whether the transmitter unintentionally operates.

5G NR

At the start of the test, a communication link shall be established.

During the test, the operator shall observe whether the communication link is maintained and set the EUT volume to provide center audio level.

For 5G NR data service, the data throughput of the EUT shall not fall below 95% of the maximum data throughput.

At the conclusion of the test, the operator shall directly check whether the EUT operate as intended with no loss of user control functions or stored data.

In addition to confirming the above performance during traffic mode, the test is also been performed in idle mode, with an interference receiver to monitor whether the transmitter unintentionally operates.

Wi-Fi

The communication link should be maintained and there should be no loss of data packets during the test.

In addition to confirming the above performance during a communication, the test is also been performed in idle mode, with an interference receiver to monitor if the transmitter unintentionally operates.

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.

1.7 Measurement Uncertainty

Measurement uncertainty	
Parameter	**Uncertainty**
Uncertainty for Radiated Emission in 3m chamber	@30-200MHz ±4.52dB @0.2-1GHz ±5.56dB @1-6GHz ±3.84dB @6-18GHz ±3.92dB
Uncertainty for Conducted Emission	@9-150kHz ±3.74dB @0.15-30MHz ±3.34dB
Uncertainty for Harmonic test	3.26%
Uncertainty for Flicker test	4.76%
Uncertainty for RS test	21%, k=2
Uncertainty for CS test	29%, k=2
Uncertainty for ESD test	The immunity measurement system uncertainty is within standard requirement and is based on a standard uncertainty multiplied by a coverage factor k=2, providing a level of confidence of approximately 95%.
Uncertainty for EFT test	
Uncertainty for Surges test	
Uncertainty for Voltage Dips, Voltage Variations and Short Interruptions Test	
Uncertainty for PFMF test	

1.8 Test Equipment List and Details

Description	Manufacturer	Model	Serial Number	Cal Date	Due Date
☐Chamber A: Below 1GHz					
Spectrum Analyzer	Rohde & Schwarz	FSP30	836079/035	2024-02-24	2025-02-23
EMI Test Receiver	Rohde & Schwarz	ESPI	101611	2024-03-19	2025-03-18
Amplifier	HP	8447F	2805A03475	2024-02-24	2025-02-23
Loop Antenna	Schwarz beck	FMZB 1516	9773	2024-02-26	2025-02-25
Trilog Broadband Antenna	Schwarz beck	VULB9163	9163-333	2024-02-24	2025-02-23
☐Chamber A: Above 1GHz					
Spectrum Analyzer	Rohde & Schwarz	FSP30	836079/035	2024-02-24	2025-02-23
Spectrum Analyzer	Rohde & Schwarz	FSP40	100612	2024-02-24	2025-02-23
EMI Test Receiver	Rohde & Schwarz	ESPI	101611	2024-03-19	2025-03-18
Amplifier	C&D	PAP-1G18	2002	2024-02-27	2025-02-26
Horn Antenna	ETS	3117	00086197	2024-02-26	2025-02-25
DRG Horn Antenna	A.H. SYSTEMS	SAS-574	571	2024-03-17	2025-03-16
Pre-amplifier	Schwarzbeck	BBV 9721	9721-031	2024-02-29	2025-02-28
☐Chamber B:Below 1GHz					
Trilog Broadband Antenna	Schwarz beck	VULB9163(B)	9163-635	2024-03-17	2027-03-16
Amplifier	Agilent	8447D	2944A10457	2024-02-24	2025-02-23
EMI Test Receiver	Rohde & Schwarz	ESPI	101391	2024-02-24	2025-02-23
☒Chamber C:Below 1GHz					
EMI Test Receiver	Rohde & Schwarz	ESIB 26	100401	2024-02-27	2025-02-26
Trilog Broadband Antenna	Schwarz beck	VULB 9168	1194	2024-04-18	2027-04-17
Loop Antenna	Schwarz beck	FMZB 1516	9773	2024-02-26	2025-02-25
Amplifier	HP	8447F	2944A03869	2024-02-24	2025-02-23
☒Chamber C: Above 1GHz					
EMI Test Receiver	Rohde & Schwarz	ESIB 26	100401	2024-02-27	2025-02-26
Horn Antenna	POAM	RTF-118A	1820	2023-03-10	2026-03-09
Amplifier	Tonscend	TAP01018050	AP22E806235	2024-02-27	2025-02-26
DRG Horn Antenna	A.H. SYSTEMS	SAS-574	571	2024-03-17	2025-03-16
Pre-amplifier	Schwarzbeck	BBV 9721	9721-031	2024-02-29	2025-02-28
☐Conducted Room 1#					
EMI Test Receiver	Rohde & Schwarz	ESCI	100525	2023-12-12	2024-12-11
Pulse Limiter	Rohde & Schwarz	ESH3-Z2	100911	2024-02-24	2025-02-23
AC LISN	Schwarz beck	NSLK8126	8126-279	2024-02-24	2025-02-23
8-WIRE ISN CAT5	Schwarz beck	8158	CAT5-8158-0117	2024-02-24	2025-02-23
☒Conducted Room 2#					

EMI Test Receiver	Rohde & Schwarz	ESPI	101259	2024-02-24	2025-02-23
LISN	Rohde & Schwarz	ENV 216	100097	2024-02-24	2025-02-23
PFMF					
PMF Generator	LIONCEL	PMF-801C-C	0171101	2024-02-24	2025-02-23
PMF Antenna	LIONCEL	PMF-801C-A	0180302	2024-02-24	2025-02-23
Instantaneous PMF Generator Module	LIONCEL	PMF-801C-T	0171001	2024-02-24	2025-02-23
H/F					
Digital Power Analyzer	California Instrument	CTS	72831	2024-02-24	2025-02-23
Power Source	California Instrument	5001IX-CTS-400	60077	2024-02-24	2025-02-23
ESD					
ESD Generator	LIONCEL	ESD-203B	0170901	2024-02-26	2025-02-25
EFT/SURGE/DIPS					
Transient 2000	EMC PARTNER	TRA2000	836	2024-03-19	2025-03-18
Couple Clamp	EMC PARTNER	CN-EFT1000	513	2024-03-19	2025-03-18
CS					
CONDUCTED IMMUNITY TEST SYSTEM	FRANKONIA	CIT-10/75	126B1247/2013	2024-02-27	2025-02-26
Attenuator	EMTEST	MA-5100/6BF2	1009	2024-02-27	2025-02-26
CDN	Luthi	L-801M2/M3	2665	2024-02-27	2025-02-26
CDN	LIONCEL	CDN-T8	0210401	2024-02-24	2025-02-23
EM Clamp	TESEQ	KEMZ801A	45028	2024-02-26	2025-02-25
RS					
Signal Generator	HP	8665B	3438A00604	2024-02-27	2025-02-26
Power Sensor	Agilent	E9301A	MY52450001	2024-02-27	2025-02-26
Power Sensor	Agilent	E9304A	MY55081055	2024-02-27	2025-02-26
RF Power Amplifier	MicoTop	MPA-80-1000-250	MPA1906239	2024-02-27	2025-02-26
RF Power Amplifier	MicoTop	MPA-80-6000-100	MPA1906238	2024-02-27	2025-02-26
Antenna	SCHWARZBECK	STLP 9129	9129 114	N/A	N/A
Power Meter	Agilent	E4419B	GB42420578	2024-02-27	2025-02-26
Communication Tester					
Universal Radio Communication Tester	Rohde & Schwarz	CMW500	148650	2024-02-24	2025-02-23
Transients and Surges in the Vehicle Environment					
DC source	PRIMA	33V/25A	/	2024-06-15	2025-06-14

Pulse Generator	PRIMA	PRM-16750G	PR16107683	2024-06-15	2025-06-14
Pulse Generator	PRIMA	SO7637-Tp1,2a	PR15087721	2024-01-17	2025-01-16
Pulse Generator	PRIMA	ISO7637-Tp3a/ 3b	PR16087862	2024-06-15	2025-06-14
Pulse Generator	PRIMA	ISO7637-Tp5a	PR16101004	2024-06-15	2025-06-14

Software List			
Description	Manufacturer	Model	Version
EMI Test Software (Radiated Emission A)*	Farad	EZ-EMC	RA-03A1 (1.1.4.2)
EMI Test Software (Radiated Emission B)*	Farad	EZ-EMC	RA-03A1 (1.1.4.2)
EMI Test Software (Radiated Emission C)*	Farad	EZ-EMC	RA-03A1-2 (1.1.4.2)
EMI Test Software (Conducted Emission Room 1#)*	Farad	EZ-EMC	3A1*CE-RE 1.1.4.3
EMI Test Software (Conducted Emission Room 2#)*	Farad	EZ-EMC	3A1*CE-RE 1.1.4.3

*Remark: indicates software version used in the compliance certification testing.

2. SUMMARY OF TEST RESULTS

Standards	Reference	Description of Test Item	Result
ETSI EN 301 489-1	8.2	Radiated Emissions	Pass
	8.3	Conducted Emissions for DC Power Port	Pass
	8.4	Conducted Emissions for AC Power Port	N/A
	8.5	Harmonic Current Emissions	N/A
	8.6	Voltage Fluctuations and Flicker	N/A
	8.7	Telecommunication Ports	N/A
	9.2	Radio Frequency Electromagnetic Field	Pass
	9.3	Electrostatic Discharge	Pass
	9.4	Fast Transients, Common Mode	N/A
	9.5	Radio Frequency, Common Mode	Pass
	9.6	Transient and Surges in the Vehicular Environment	Pass
	9.7	Voltage Dips and Interruptions	N/A
	9.8	Surges	N/A

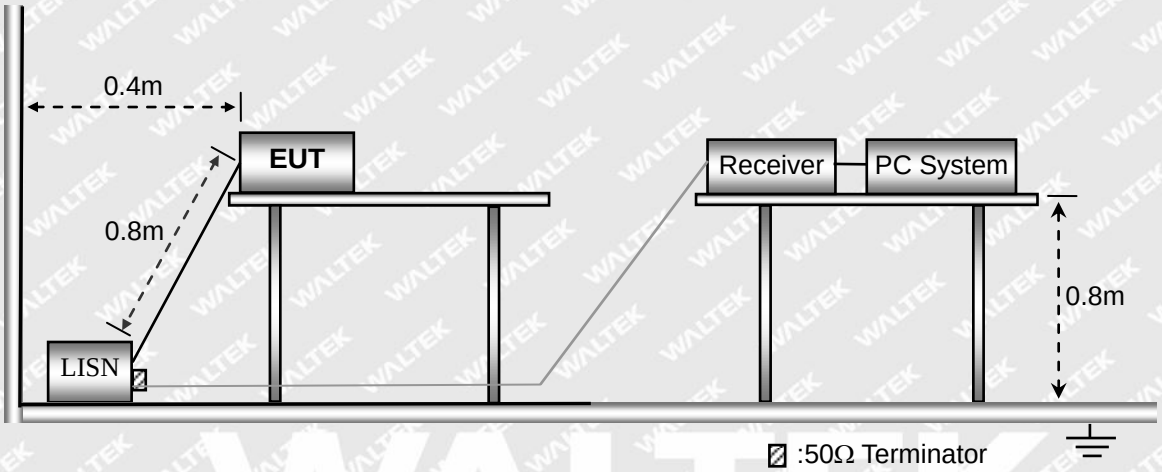
Pass: The EUT complies with the essential requirements in the standard.
Fail: The EUT does not comply with the essential requirements in the standard.
N/A: Not applicable.

3. Conducted Emissions

3.1 Test Procedure

Test is conducting under the description of EN55032 Information technology equipment - Radio disturbance characteristics - Limits and methods of measurement.

3.2 Basic Test Setup Block Diagram



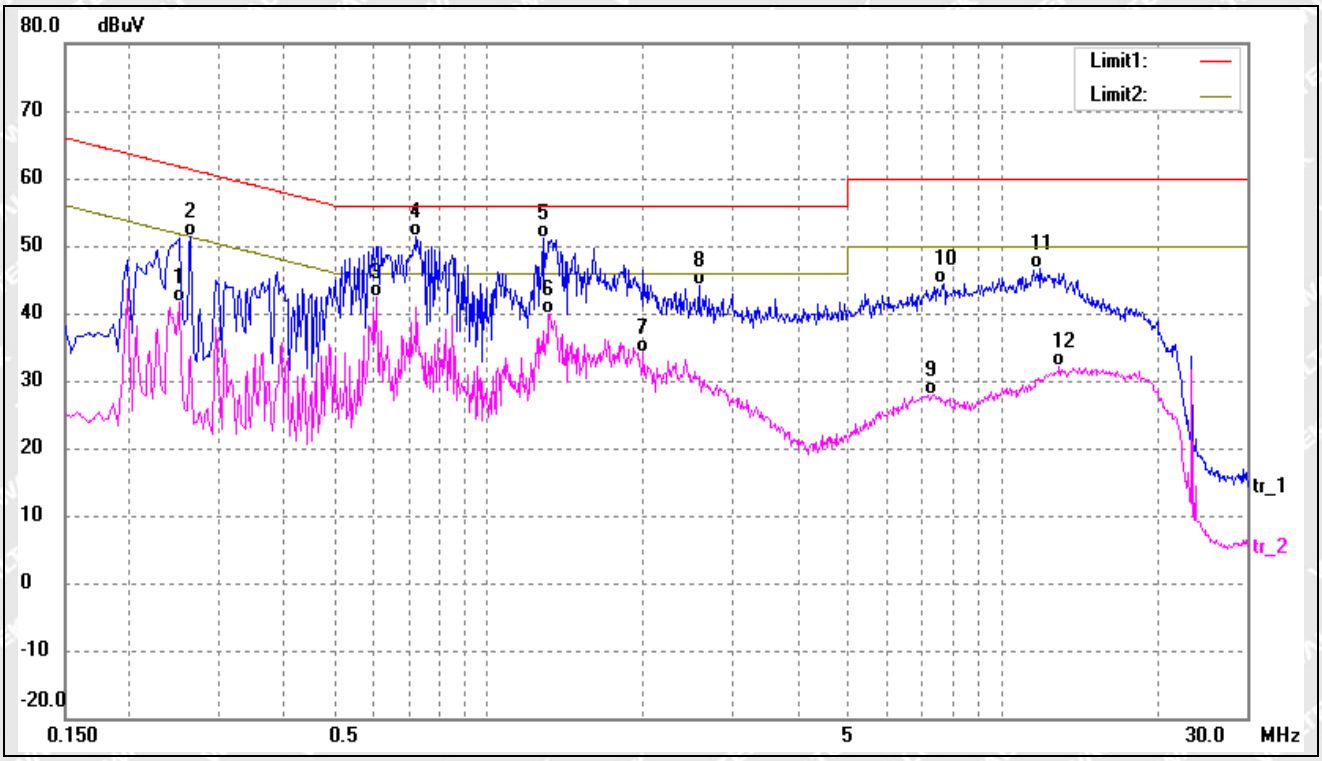
3.3 Environmental Conditions

Temperature:	22 ° C
Relative Humidity:	55 %
ATM Pressure:	1015 mbar

3.4 Conducted Emissions Test Data

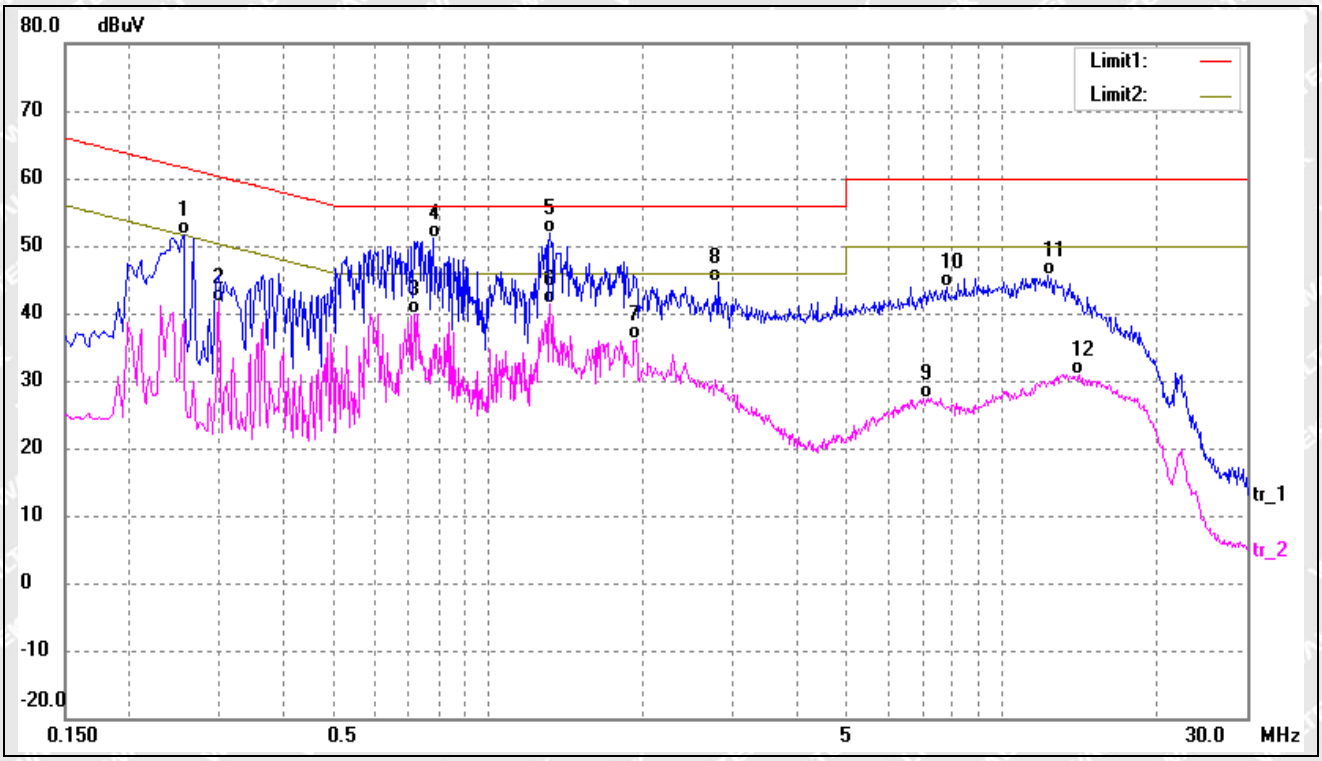
Note: Only show the worst case in the test report

Test mode:	TM1	Polarity:	Neutral



No.	Frequency	Reading	Correct	Result	Limit	Margin	Detector
	(MHz)	(dBuV)	(dB)	(dBuV)	(dBuV)	(dB)	
1	0.2500	32.06	9.60	41.66	51.75	-10.09	AVG
2	0.2620	41.67	9.61	51.28	61.36	-10.08	QP
3*	0.6060	32.60	9.71	42.31	46.00	-3.69	AVG
4	0.7260	41.61	9.69	51.30	56.00	-4.70	QP
5	1.2820	41.43	9.66	51.09	56.00	-4.91	QP
6	1.3099	30.24	9.65	39.89	46.00	-6.11	AVG
7	2.0100	24.41	9.62	34.03	46.00	-11.97	AVG
8	2.5740	34.43	9.62	44.05	56.00	-11.95	QP
9	7.3580	18.08	9.80	27.88	50.00	-22.12	AVG
10	7.7060	34.65	9.80	44.45	60.00	-15.55	QP
11	11.8139	36.74	9.90	46.64	60.00	-13.36	QP
12	12.9540	22.26	9.92	32.18	50.00	-17.82	AVG

Test mode:	TM1	Polarity:	Line

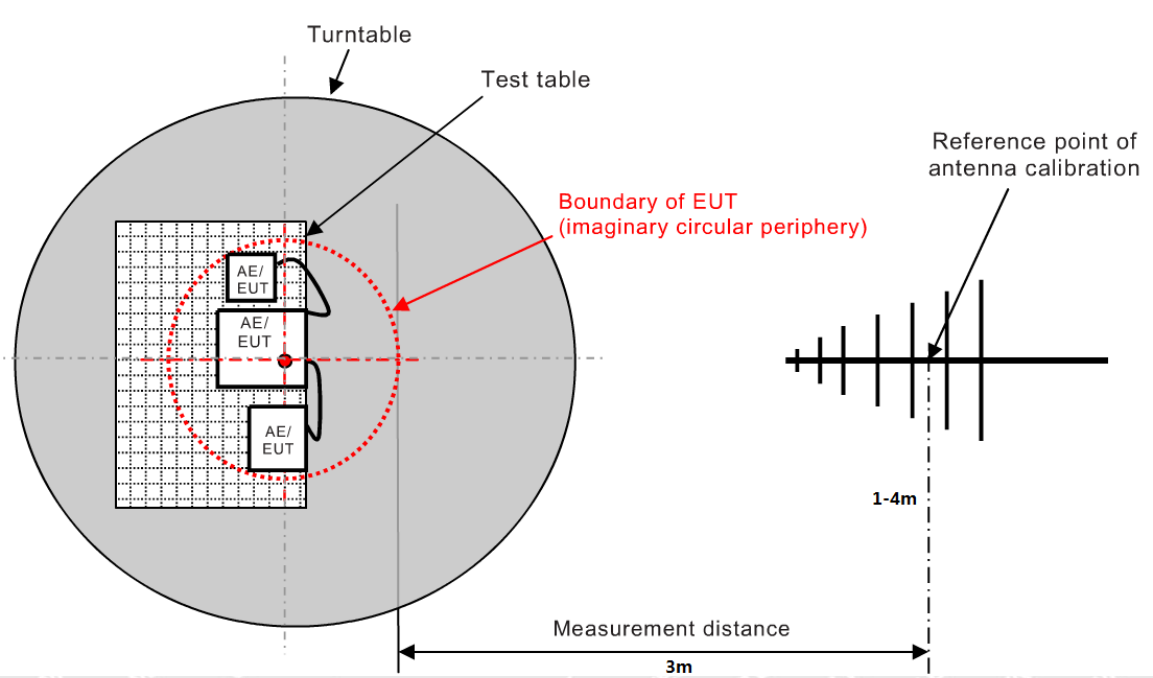


No.	Frequency (MHz)	Reading (dBuV)	Correct (dB)	Result (dBuV)	Limit (dBuV)	Margin (dB)	Detector
1	0.2540	42.04	9.61	51.65	61.62	-9.97	QP
2	0.2980	32.05	9.64	41.69	50.30	-8.61	AVG
3	0.7180	30.28	9.69	39.97	46.00	-6.03	AVG
4	0.7820	41.40	9.69	51.09	56.00	-4.91	QP
5*	1.3220	42.19	9.65	51.84	56.00	-4.16	QP
6	1.3220	31.78	9.65	41.43	46.00	-4.57	AVG
7	1.9460	26.46	9.62	36.08	46.00	-9.92	AVG
8	2.8060	35.04	9.62	44.66	56.00	-11.34	QP
9	7.2060	17.68	9.79	27.47	50.00	-22.53	AVG
10	7.8380	34.02	9.82	43.84	60.00	-16.16	QP
11	12.3180	35.66	9.91	45.57	60.00	-14.43	QP
12	14.1860	21.01	9.94	30.95	50.00	-19.05	AVG

4. Radiated Emissions

4.1 Test Procedure

Test is conducting under the description of EN55032 Information technology equipment - Radio disturbance characteristics - Limits and methods of measurement.



4.2 Corrected Amplitude & Margin Calculation

The Corrected Amplitude is calculated by adding the Antenna Factor and the Cable Factor, and subtracting the Amplifier Gain from the Amplitude reading. The basic equation is as follows:

Corr. Ampl. = Indicated Reading + Antenna Factor + Cable Factor - Amplifier Gain

The "**Margin**" column of the following data tables indicates the degree of compliance with the applicable limit. For example, a margin of -6dBμV means the emission is 6dBμV below the maximum limit for Class B device. The equation for margin calculation is as follows:

Margin = Corr. Ampl. – EN 301489 Class B Limit

4.3 Environmental Conditions

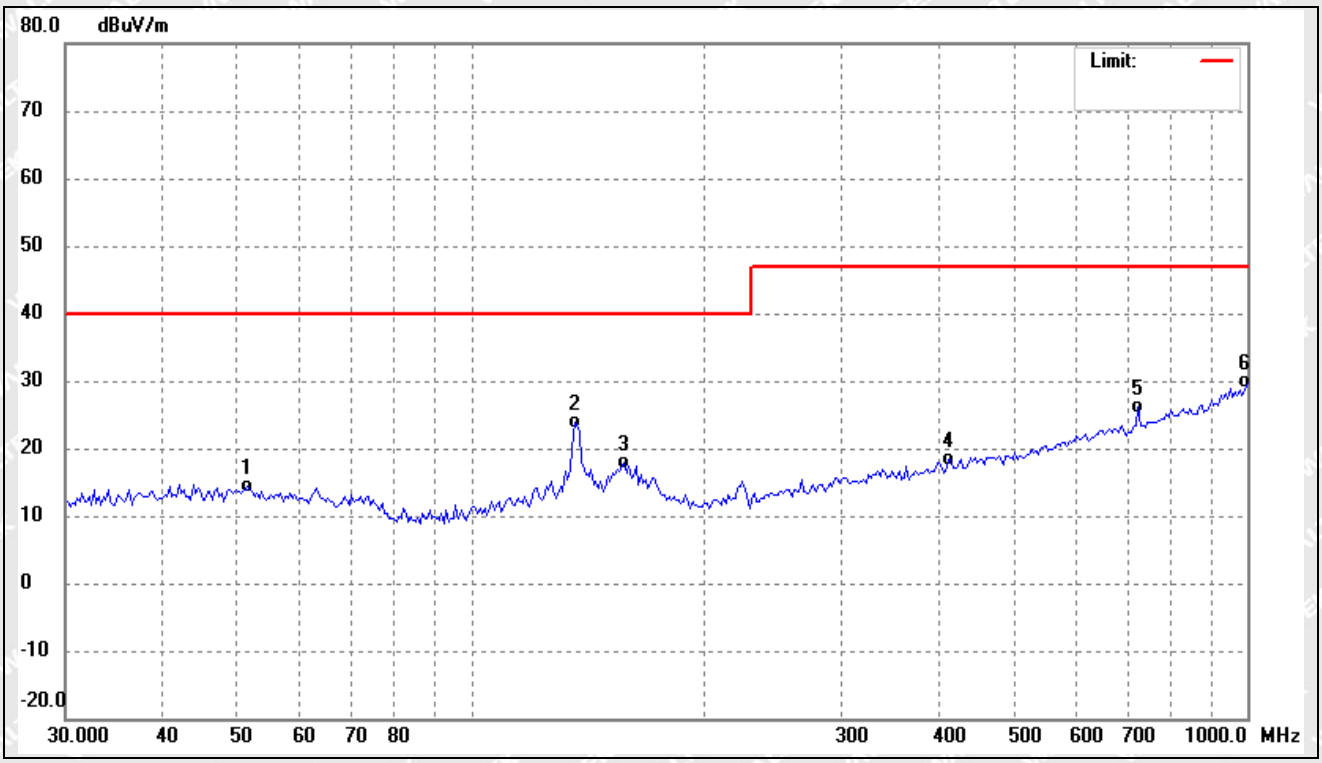
Temperature:	26.4° C
Relative Humidity:	52%
ATM Pressure:	1011 mbar

4.4 Summary of Test Results/Plots

Note: Only show the worst case in the test report

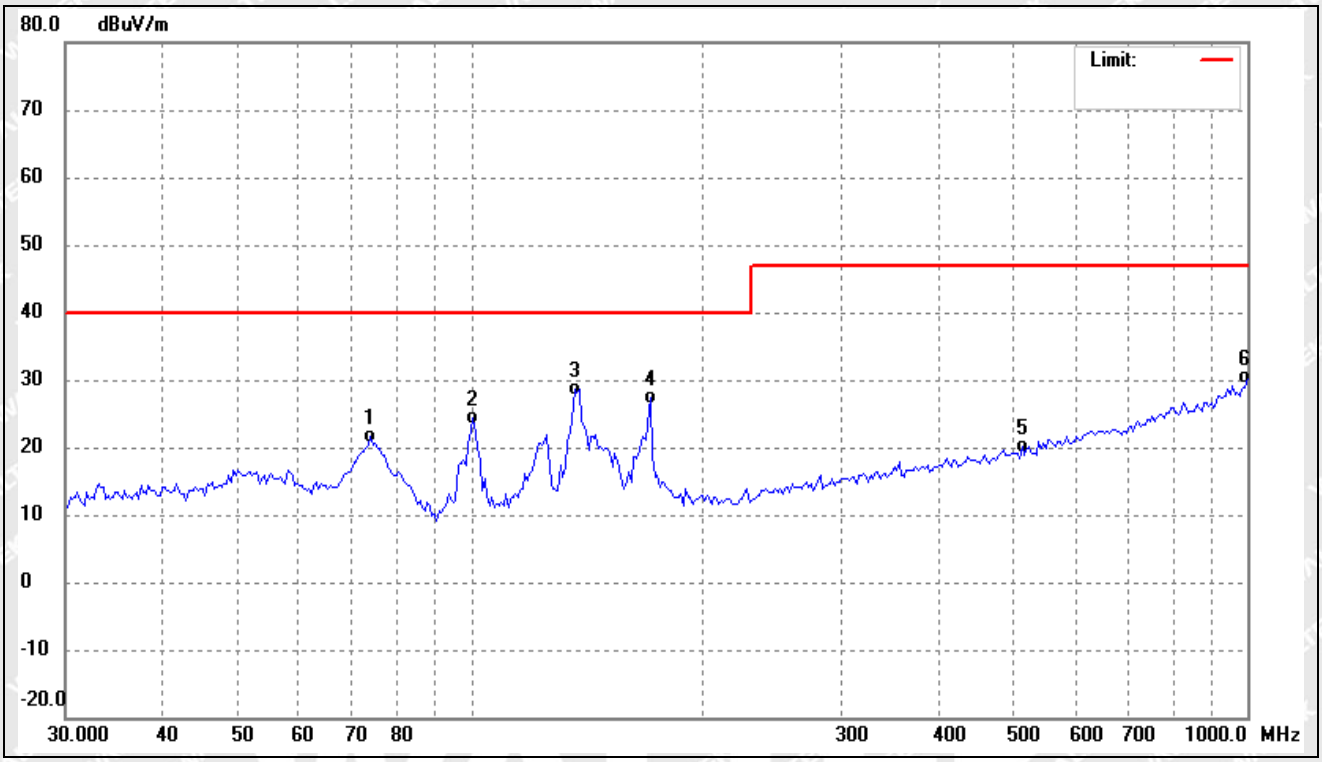
➢ 30MHz to 1GHz

Test mode:	TM1	Polarity:	Horizontal



No.	Frequency	Reading	Correct	Result	Limit	Margin	Degree	Height	Remark
	(MHz)	(dBuV/m)	dB/m	(dBuV/m)	(dBuV/m)	(dB)	( )	(cm)	
1	51.5365	27.88	-13.40	14.48	40.00	-25.52	-	-	QP
2	135.9163	37.84	-14.07	23.77	40.00	-16.23	-	-	QP
3	157.5290	31.02	-13.04	17.98	40.00	-22.02	-	-	QP
4	412.5395	29.57	-11.27	18.30	47.00	-28.70	-	-	QP
5	723.7930	32.43	-6.24	26.19	47.00	-20.81	-	-	QP
6	1000.0000	31.35	-1.54	29.81	47.00	-17.19	-	-	QP

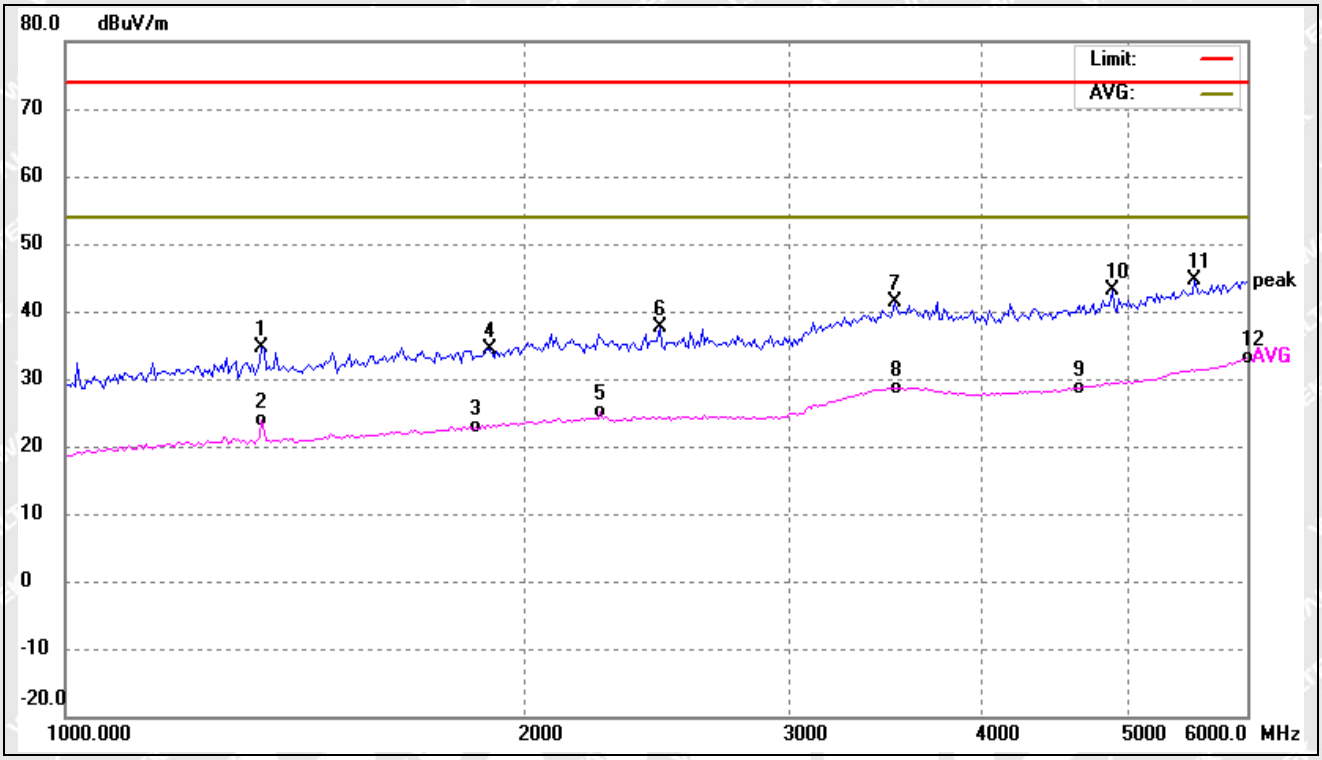
Test mode:	TM1	Polarity:	Vertical



No.	Frequency	Reading	Correct	Result	Limit	Margin	Degree	Height	Remark
	(MHz)	(dBuV/m)	dB/m	(dBuV/m)	(dBuV/m)	(dB)	( )	(cm)	
1	74.2696	38.11	-16.48	21.63	40.00	-18.37	-	-	QP
2	100.4712	41.23	-16.95	24.28	40.00	-15.72	-	-	QP
3	135.9163	42.79	-14.07	28.72	40.00	-11.28	-	-	QP
4	170.1888	40.75	-13.33	27.42	40.00	-12.58	-	-	QP
5	512.9477	30.16	-10.05	20.11	47.00	-26.89	-	-	QP
6	1000.0000	31.85	-1.54	30.31	47.00	-16.69	-	-	QP

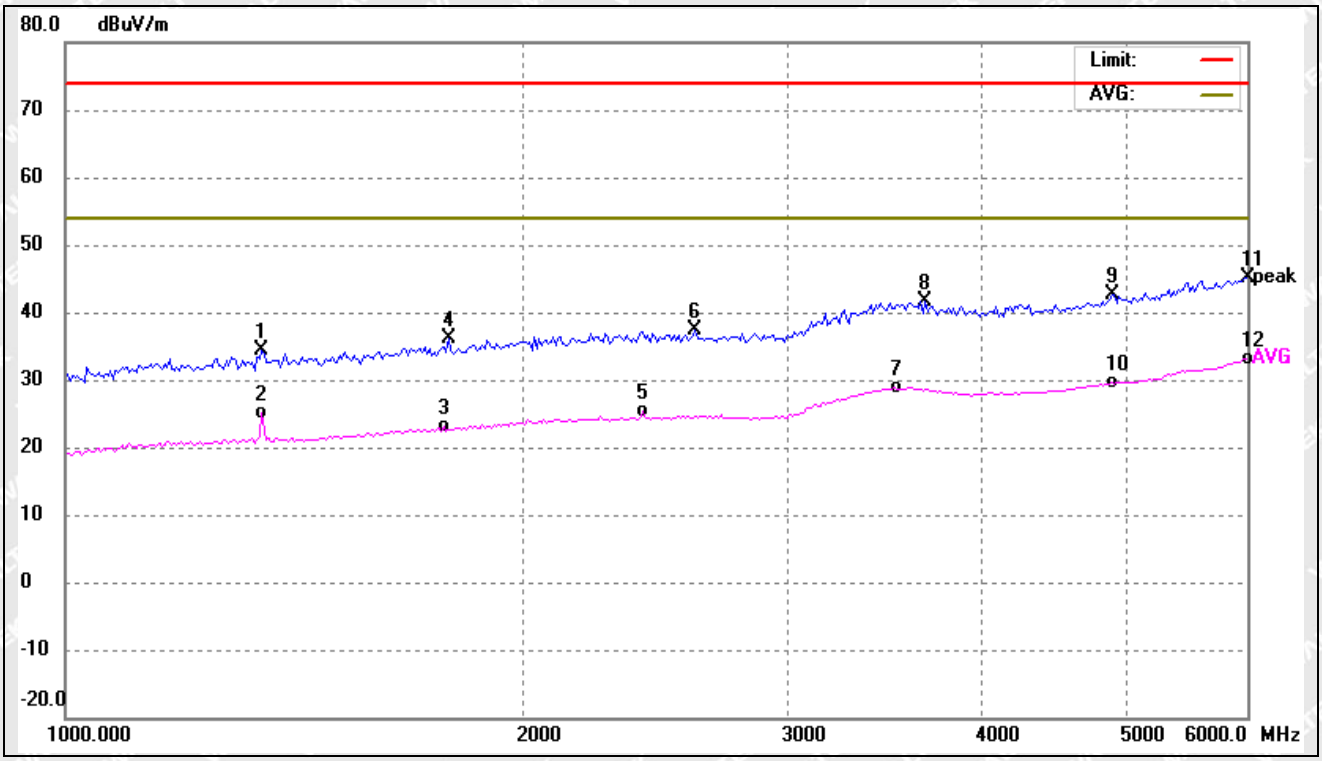
➢ Above 1GHz

Test mode:	TM1	Polarity:	Horizontal



No.	Frequency	Reading	Correct	Result	Limit	Margin	Degree	Height	Remark
	(MHz)	(dBuV/m)	dB/m	(dBuV/m)	(dBuV/m)	(dB)	( )	(cm)	
1	1347.200	57.94	-23.26	34.68	74.00	-39.32	-	-	peak
2	1347.200	47.17	-23.26	23.91	54.00	-30.09	-	-	AVG
3	1861.144	43.95	-21.04	22.91	54.00	-31.09	-	-	AVG
4	1901.676	55.26	-20.85	34.41	74.00	-39.59	-	-	peak
5	2251.278	44.99	-19.81	25.18	54.00	-28.82	-	-	AVG
6	2462.718	57.00	-19.33	37.67	74.00	-36.33	-	-	peak
7	3513.965	56.13	-14.76	41.37	74.00	-32.63	-	-	peak
8	3526.606	43.49	-14.78	28.71	54.00	-25.29	-	-	AVG
9	4583.473	42.30	-13.77	28.53	54.00	-25.47	-	-	AVG
10	4889.498	56.42	-13.41	43.01	74.00	-30.99	-	-	peak
11	5544.265	55.26	-10.68	44.58	74.00	-29.42	-	-	peak
12	6000.000	42.59	-9.57	33.02	54.00	-20.98	-	-	AVG

Test mode:	TM1	Polarity:	Vertical



No.	Frequency	Reading	Correct	Result	Limit	Margin	Degree	Height	Remark
	(MHz)	(dBuV/m)	dB/m	(dBuV/m)	(dBuV/m)	(dB)	( )	(cm)	
1	1347.200	57.72	-23.26	34.46	74.00	-39.54	-	-	peak
2	1347.200	48.42	-23.26	25.16	54.00	-28.84	-	-	AVG
3	1776.264	44.50	-21.47	23.03	54.00	-30.97	-	-	AVG
4	1789.066	57.56	-21.41	36.15	74.00	-37.85	-	-	peak
5	2401.590	44.84	-19.48	25.36	54.00	-28.64	-	-	AVG
6	2598.999	56.51	-19.02	37.49	74.00	-36.51	-	-	peak
7	3513.965	43.57	-14.76	28.81	54.00	-25.19	-	-	AVG
8	3681.883	56.62	-14.99	41.63	74.00	-32.37	-	-	peak
9	4889.498	56.03	-13.41	42.62	74.00	-31.38	-	-	peak
10	4889.498	42.94	-13.41	29.53	54.00	-24.47	-	-	AVG
11	6000.000	54.76	-9.57	45.19	74.00	-28.81	-	-	peak
12	6000.000	42.69	-9.57	33.12	54.00	-20.88	-	-	AVG

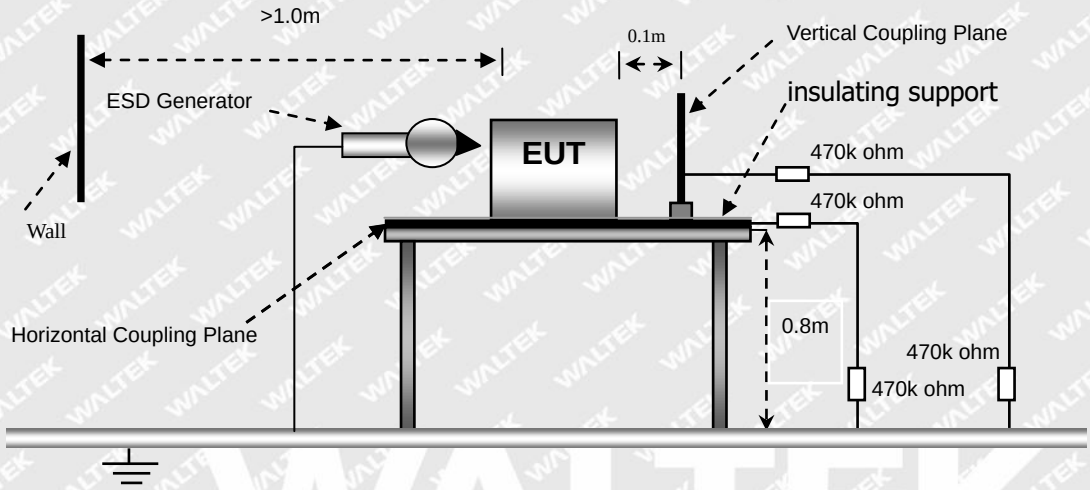
Remark:'-'Means' the test Degree and Height are not recorded by the test software and only show the worst case in the test report.

5. Electrostatic Discharge (ESD)

5.1 Test Procedure

Test is conducting under the description of EN 61000-4-2.

5.2 Test Setup Block Diagram



5.3 Test Performance

Required Performance Criterion:	B
Mode:	TM1-TM4
Note:TM2-TM4 for TT,TR	

5.4 Environmental Conditions

Temperature:	26 °C
Relative Humidity:	55%
ATM Pressure:	1011 mbar

5.5 Electrostatic Discharge Immunity Test Data

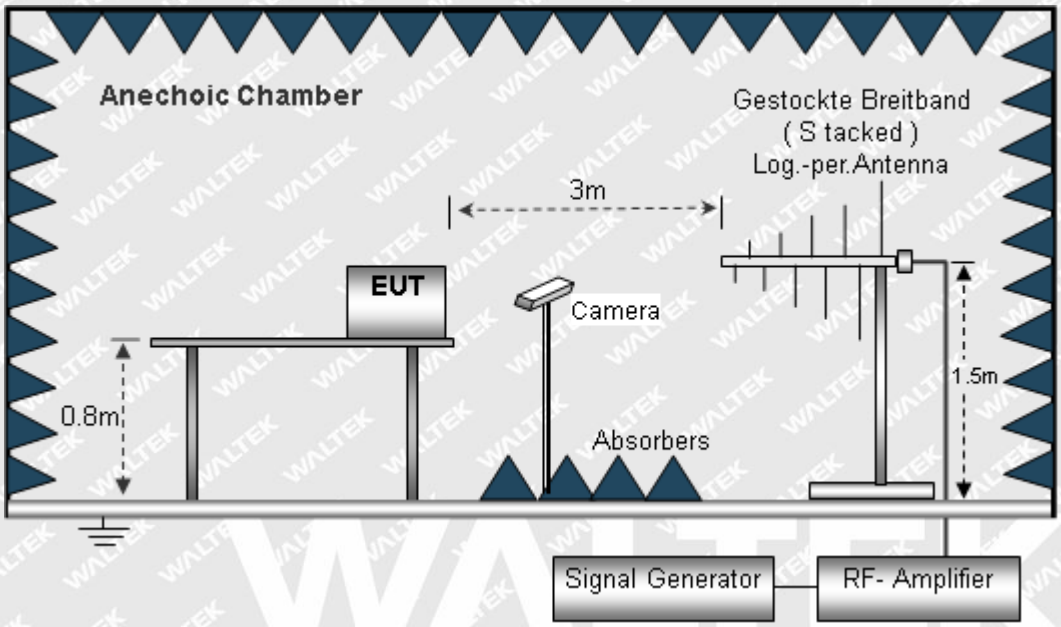
Test mode	TM1-TM4							
EN 61000-4-2	Test Levels (kV)							
Test Points	-2	+2	-4	+4	-6	+6	-8	+8
Air Discharge								
USB Port	A	A	A	A	A	A	A	A
Gap	A	A	A	A	A	A	A	A
screen	A	A	A	A	A	A	A	A
Enclosure	A	A	A	A	A	A	A	A
Direct Contact Discharge								
/	/	/	/	/	/	/	/	/
Indirect Contact Discharge								
HCP (6 Sides)	A	A	A	A	/	/	/	/
VCP (4 Sides)	A	A	A	A	/	/	/	/

6. Radio Frequency Electromagnetic Field (R/S)

6.1 Test Procedure

Test is conducting under the description of EN 61000-4-3.

6.2 Test Setup Block Diagram



6.3 Test Performance

Required Performance Criterion:	A
Mode:	TM1-TM4
Note: TM2-TM4 for CT,CR	

6.4 Environmental Conditions

Temperature:	25 °C
Relative Humidity:	52%
ATM Pressure:	1010 mbar

6.5 Continuous Radiated Disturbances Test Data

Frequency step: 1% of fundamental

Dwell time: 1 second

Modulation: AM by 1kHz sine wave with 80% modulation depth

Test mode		TM1-TM3							
Frequency Range(MHz)	Field (V/m)	Front		Rear		Left Side		Right Side	
		VERT	HORI	VERT	HORI	VERT	HORI	VERT	HORI
80-1000	3	A	A	A	A	A	A	A	A
1000-3000	3	A	A	A	A	A	A	A	A
3000-6000	3	A	A	A	A	A	A	A	A

Test mode		GPS							
Frequency Range(MHz)	Field (V/m)	Front		Rear		Left Side		Right Side	
		VERT	HORI	VERT	HORI	VERT	HORI	VERT	HORI
80-1000	3	A	A	A	A	A	A	A	A
1000-3000	3	A	A	A	A	A	A	A	A
3000-6000	3	A	A	A	A	A	A	A	A

Test Result: Pass

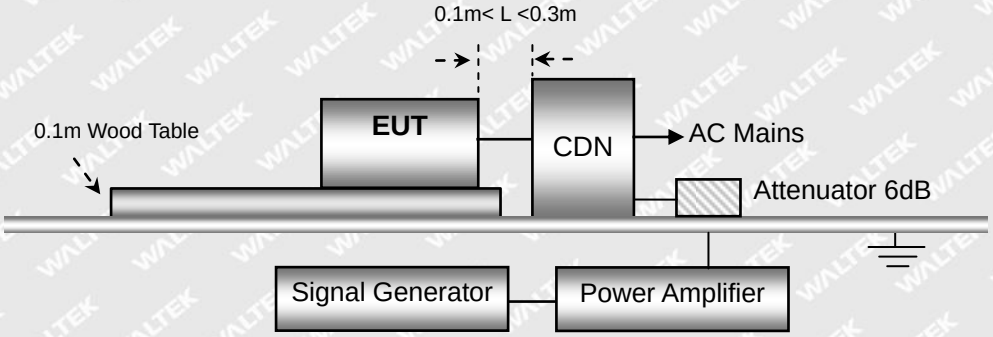
7. Radio Frequency, Common Mode (C/S)

7.1 Test Procedure

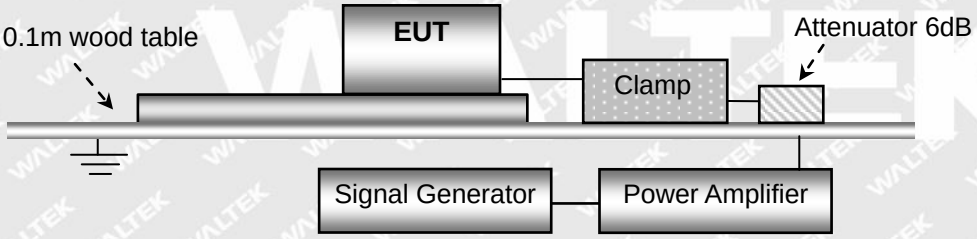
Test is conducting under the description of EN 61000-4-6.

7.2 Test Setup Block Diagram

For AC Mains or DC Input:



For Signal or Telecommunication Ports:



7.3 Test Performance

Required Performance Criterion:	A
Mode:	TM1-TM4
Note: TM2-TM4 for CT,CR	

7.4 Environmental Conditions

Temperature:	25 °C
Relative Humidity:	53%
ATM Pressure:	1011 mbar

7.5 Continuous Conducted Disturbances Test Data

Sweep frequency range: 150kHz~80MHz

Frequency step: 1% of fundamental

Dwell time: 1 second

Test Mode		TM1-TM4		
Level	**Voltage (V) (rms, unmodulated)**	**Modulation:**	**Pass**	**Fail**
1	1	AM 80%, 1kHz sinewave	/	/
2	3	AM 80%, 1kHz sinewave	A	/
3	10	AM 80%, 1kHz sinewave	/	/
X	Special	/	/	/

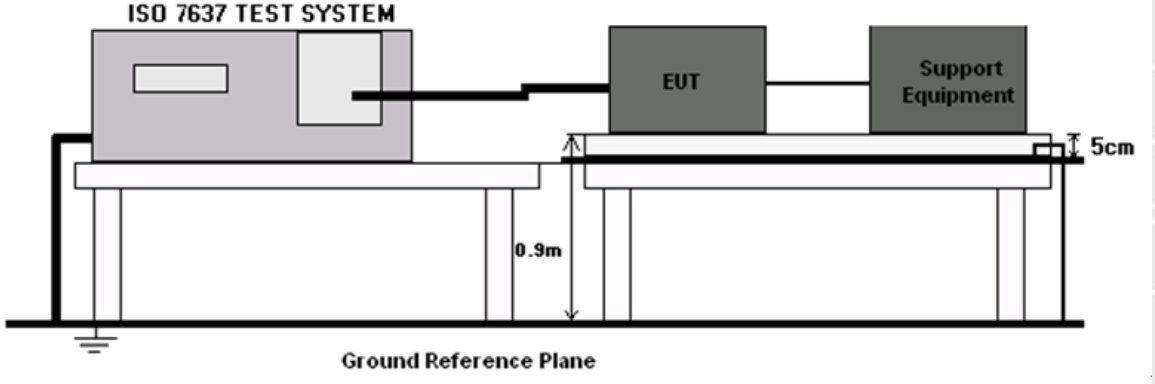
Test Result: Pass

8. Transients and Surges in the Vehicle Environment

8.1 Test Procedure

The EUT was configured as described in section 5 for this test. The set-up and test methods were according to ISO 7637-2.

8.2 Test Setup



8.3 Test Results

Input: DC 12V

Test pulse	Test Specification	Number of pulse / test time	Required minimum functional status	Status of function true value
1	-75V	10 pulses	Transient Phenomena	Pass
2a	+37V	10 pulses	Transient Phenomena	Pass
2b	+10V	10 pulses	Transient Phenomena	Pass
3a	-112V	20min	Continuous Phenomena	Pass
3b	+75V	20min	Continuous Phenomena	Pass
4	-6V	10 pulse	Transient Phenomena	Pass

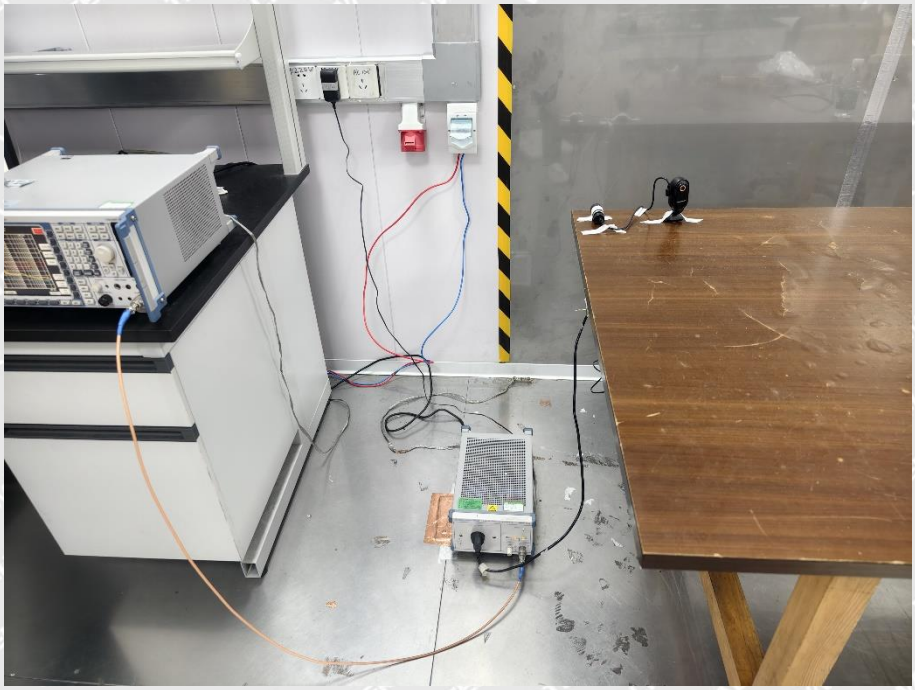
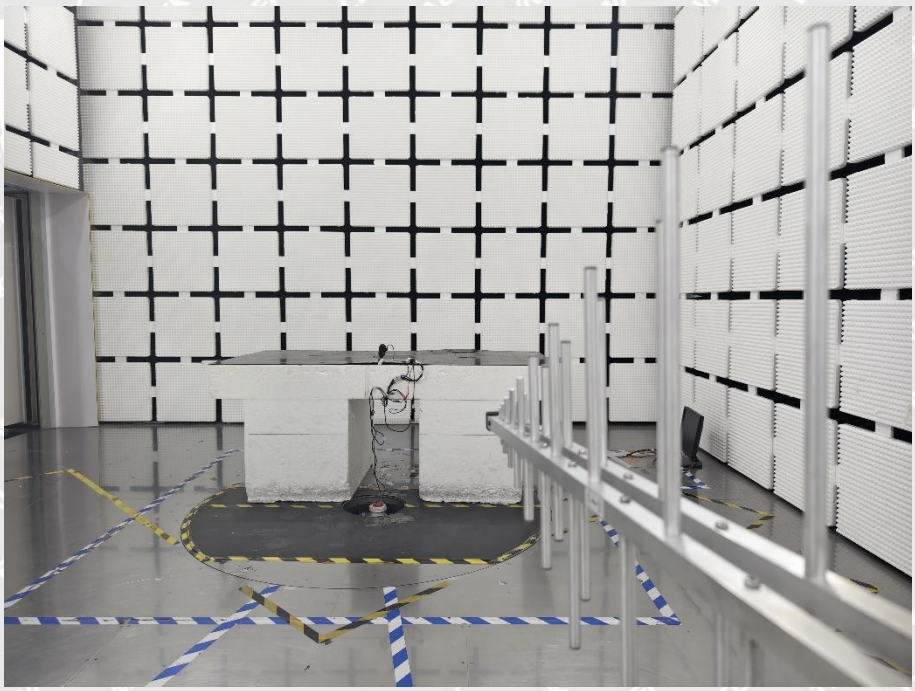
Input: DC 24V

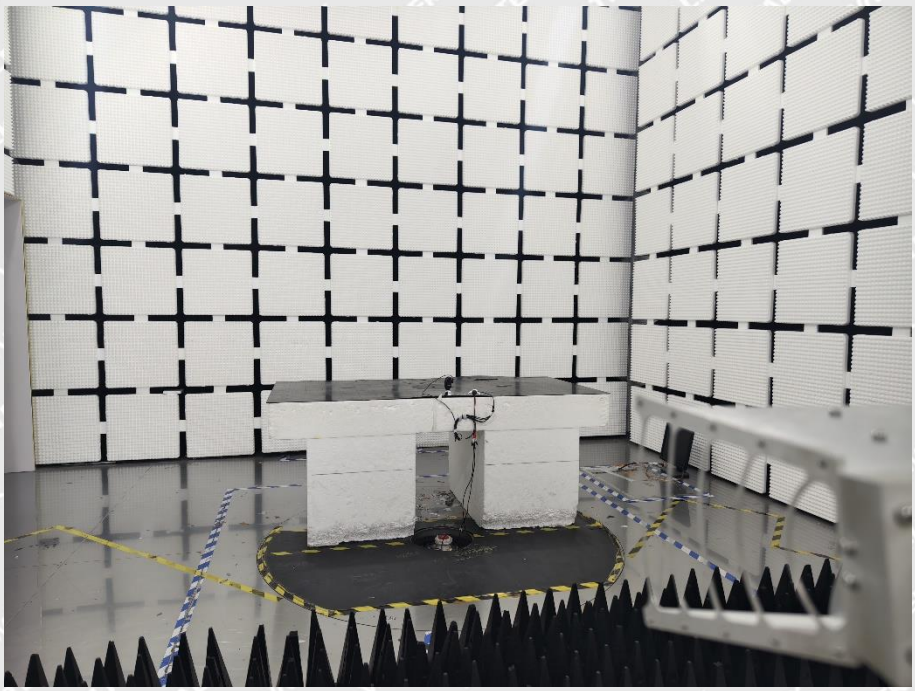
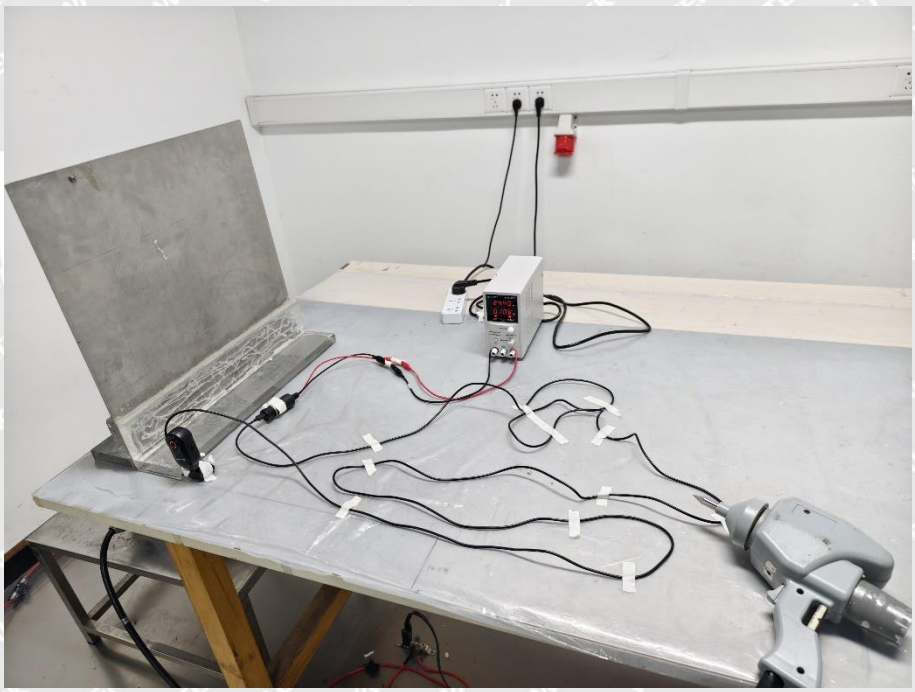
Test pulse	Test Specification	Number of pulse / test time	Required minimum functional status	Status of function true value
1	-450V	10 pulses	Transient Phenomena	Pass
2a	+37V	10 pulses	Transient Phenomena	Pass
2b	+20V	10 pulses	Transient Phenomena	Pass
3a	-150V	20min	Continuous Phenomena	Pass
3b	+150V	20min	Continuous Phenomena	Pass
4	-12V	10 pulse	Transient Phenomena	Pass

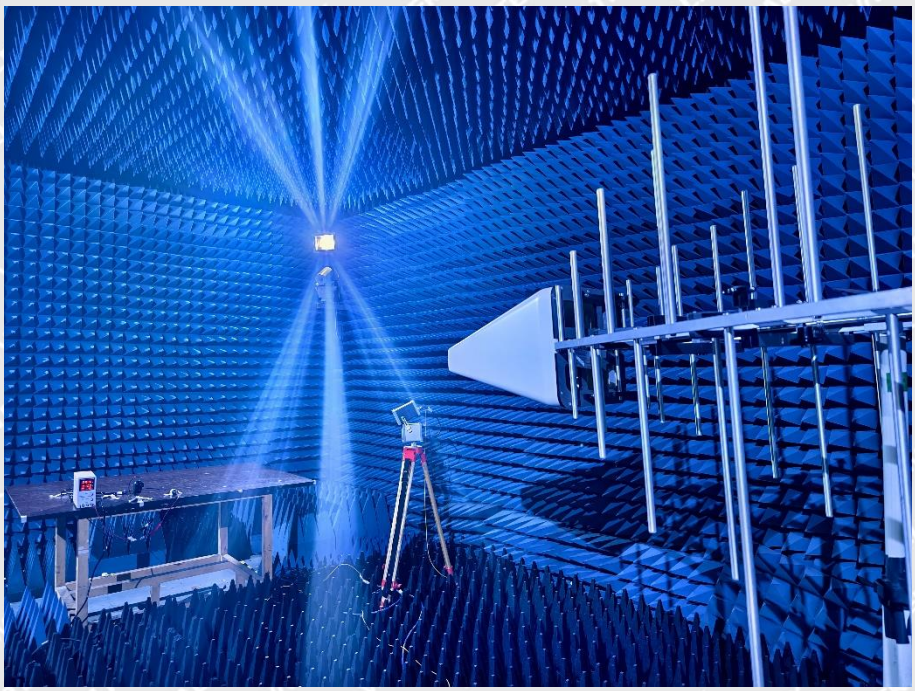
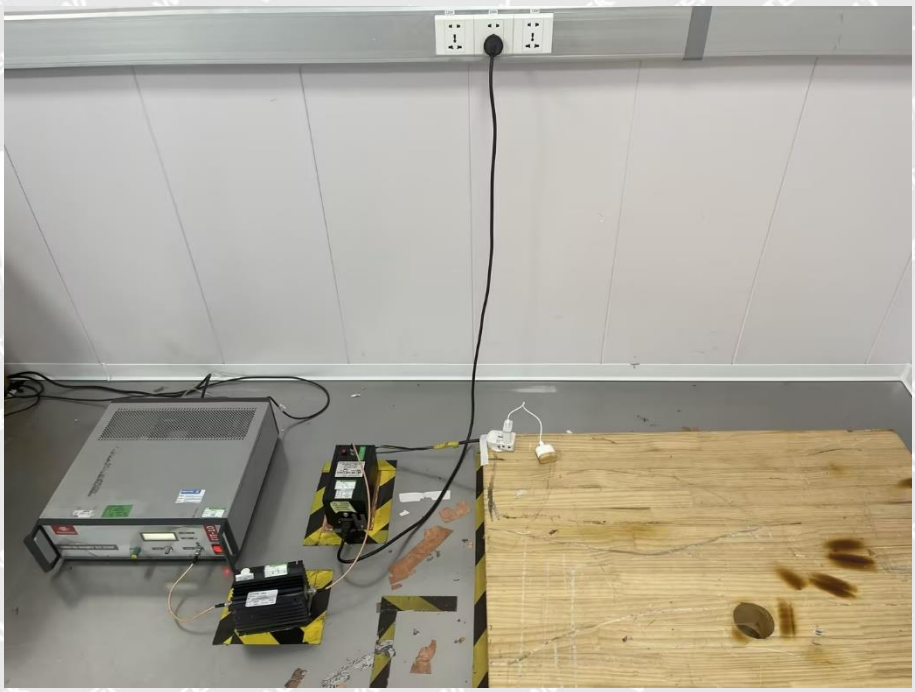
EXHIBIT 1 - EUT PHOTOGRAPHS

Please refer to “ANNEX”.

EXHIBIT 2 - TEST SETUP PHOTOGRAPHS

Conducted Emission Test Setup	
Radiation Emission Test View(30MHz to 1GHz)	

Radiation Emission Test Setup ((Above 1GHz)	
EN 61000-4-2 Test View	

EN 61000-4-3 Test View	
EN 61000-4-6 Test View	

******* END OF REPORT *******