AZ/NZS Test Report

Report Reference No. ..... :	AAEMT/EMC/201119-01-04
Applicant's name.....:	Netradyne Inc.
Address..... :	9191 Towne Centre Drive, Suite 200, San Diego, CA 92122
Manufacture's Name ..... :	Netradyne Inc.
Address..... :	9191 Towne Centre Drive, Suite 200, San Diego, CA 92122
Test item description:	
Product name.....:	Driveri
Trademark .....:	Netradyne
Model and/or type reference .....:	D-210
Serial Model：……..:	D-210A, D-211
Standards .....:	AZ/NZS CISPR 32:2015+A1:2020, AZ/NZS CISPR 24:2013+A1:2017
Testing Laboratory information:	
Testing Laboratory Name .....:	AA Electro Magnetic Test Laboratory Private Limited
Address .....:	Plot No 174, Udyog Vihar - Phase 4, Sector 18, Gurgaon, Haryana, India

This device described above has been tested by AA Electro Magnetic Test Laboratory Private Limited, and the test results show that the equipment under test (EUT) is in compliance with the RCM requirements. And it is applicable only to the tested sample identified in the report.

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Testing .....:	
Date of receipt of test item .....:	Nov. 19, 2020
Date (s) of performance of tests .....:	Nov. 23, 2020 ~ Dec. 14,2020
Date of Issue.....:	Dec. 29,2020
Test Result.....:	**Pass**
Declaration of Conformity:	Declaration of conformity of the results is based as per the standard limits
Prepared By: (+ signature) Vaishali:	
Reviewed by (+ signature Dr R Lenin Raja (Authorized Representative) (/ lenin83/):	
Approved by:(+ signature) Bittu Kumar:	

1 Contents

2 Test Summary

Test	Test Requirement	Test Method	Limits	Criterion	Result
Conducted Emission 150kHz to 30MHz	AZ/NZS CISPR 32:2015+A1:2020	Clause 7 of CISPR 16-2-1	Refer to clause 6.1	Limits Class B	**PASS**
Radiated Emissions 30MHz to 6GHz	AZ/NZS CISPR 32:2015+A1:2020	Clause 7.3 of CISPR 16-2-3	Refer to clause 6.2	Limits Class B	**PASS**
Electrostatic Discharge Immunity	AZ/NZS CISPR 24:2013+A1:2017	AZ/NZS IEC 61000.4.2:2013	Air Discharge : ±8KV Contact Discharge : ±4KV	B	**PASS**
Radiated RF Electromagnetic Field Immunity	AZ/NZS CISPR 24:2013+A1:2017	AZ/NZS IEC 61000.4.3:2013	80MHz~6000MHz, 3V/m	A	**PASS**
Electrical Fast Transients/Burst Immunity	AZ/NZS CISPR 24:2013+A1:2017	AZ/NZS IEC 61000.4.4:2013	+/-0.5 kV on DC Line	B	**PASS**
Transients	ISO 7637-2:2011, ISO 16750-2:2010	AZ/NZS IEC 61000.4.4:2013	Refer to clause 7.4 of this report	B	**PASS**
Immunity to Conducted Disturbances Induced by RF Fields(Conducted Disturbance Immunity)	AZ/NZS CISPR 24:2013+A1:2017	IEC 61000-4-6:2014	3 Vrms	A	**PASS**
Pulse Frequency Magnetic Field Immunity	AZ/NZS CISPR 24:2013+A1:2017	AZ/NZS IEC 61000.4.8:2012	1A/m	A	PASS

N/A is an abbreviation for Not Applicable.

Note: *EUT is an automobile accessory; hence immunity to surges test is not applicable.

Model description: Driveri is an AI powered vision based IoT system, sold as an aftermarket product to fleets. The device is installed in trucks/cars behind the rear-view mirror, and the power is supplied from the car battery through a custom power cable.

When the vehicle is being driven, the road facing camera is enabled by default, records and generates real time safety alerts to assist the driver. The camera facing the driver / passenger's optional due to privacy requirements and enabled at customers' request. The recorded videos are processed (using our patented machine learning algorithms) on the device together with the other sensor data and can detect any events related to driving behavior and driver behavior. The device has 2 buttons on the bottom side of the device, when pressed creates alerts which are user generated. 2 LEDs on driver facing side indicate the current operational state of device & also indicate privacy setting (driver facing camera recording status).

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Performance criterion	During the test	After the test
A	During and after the test the EUT shall continue to operate as intended without operator intervention. No degradation of performance or loss of function is allowed below a minimum performance level specified by the manufacturer when the EUT is used as intended. 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 EUT if used as intended.	During and after the test the EUT shall continue to operate as intended without operator intervention. No degradation of performance or loss of function is allowed below a minimum performance level specified by the manufacturer when the EUT is used as intended. 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 EUT if used as intended.
B	During the test, degradation of performance is allowed. However, no change of operating state or stored data is allowed to persist after the test. If the minimum performance level (or the permissible performance loss) is not specified by the manufacturer, then either of these may be derived from the product description and documentation, and by what the user may reasonably expect from the EUT if used as intended.	After the test, the EUT shall continue to operate as intended without operator intervention. No degradation of performance or loss of function is allowed, after the application of the phenomena below a performance level specified by the manufacturer, when the EUT is used as intended. The performance level may be replaced by a permissible loss of performance.
C	During and after testing, a temporary loss of function is allowed, provided the function is self recoverable, or can be restored by the operation of the controls or cycling of the power to the EUT by the user in accordance with the manufacturer's instructions. Functions, and/or information stored in non-volatile memory, or protected by a battery backup, shall not be lost.	During and after testing, a temporary loss of function is allowed, provided the function is self recoverable, or can be restored by the operation of the controls or cycling of the power to the EUT by the user in accordance with the manufacturer's instructions. Functions, and/or information stored in non-volatile memory, or protected by a battery backup, shall not be lost.

Particular performance criteria

The particular performance criteria which are specified in the normative annexes take precedence over the corresponding parts of the general performance criteria.

Where particular performance criteria for specific functions are not given, then the general performance criteria shall apply.

Product documentation

The specification used by the manufacturer to define the performance criteria for the testing required by this standard shall be made available to the user upon request.

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2.1 Measurement Uncertainty

The report uncertainty of measurement **y** ± **U**, where expended uncertainty **U** is based on a standard uncertainty Multiplied by a coverage factor of **k=2**, providing a level of confidence of approximately 95%.

No.	Item	Frequency Range	U , Value
1	Power Line Conducted Emission	150KHz~30MHz	2.69 dB
2	Radiated Emission Test	30MHz~6GHz	3.08 dB

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3 Test Facility

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

ILAC / NABL Accreditation No.: TC-8597

Three 3m Semi-Anechoic Chamber, 1 full-Anechoic chamber and 2 Shielding Rooms of AA Electro Magnetic Test Laboratory Private Limited have been registered by National Accreditation Board for Testing and Calibration Laboratories (NABL).

ILAC –A2LA Accreditation No.: 5593.01

Three 3m Semi-Anechoic Chamber, 1 full-Anechoic chamber and 2 Shielding Rooms of AA Electro Magnetic Test Laboratory Private Limited have been registered American Association of Laboratory Accreditation (A2LA.)

FCC- Recognition No.: 137777

Three 3m Semi-Anechoic Chamber, 1 full-Anechoic chamber and 2 Shielding Rooms of AA Electro Magnetic Test Laboratory Private Limited have been registered by Federal Communications Commission (FCC).

ISED Recognition No.: 26046

Three 3m Semi-Anechoic Chamber, 1 full-Anechoic chamber and 2 Shielding Rooms of AA Electro Magnetic Test Laboratory Private Limited have been registered by Institute for Social and Economic Development.(ISED)

VCCI- Registration No: 4053

Three 3m Semi-Anechoic Chamber, 1 full-Anechoic chamber and 2 Shielding Rooms of AA Electro Magnetic Test Laboratory Private Limited have been registered by Voluntary Control Council for Interference.(VCCI)

TEC Designation No.: IND063

Three 3m Semi-Anechoic Chamber, 1 full-Anechoic chamber and 2 Shielding Rooms of AA Electro Magnetic Test Laboratory Private Limited have been registered by Telecommunication Engineering (TEC) Center.

BIS Recognition No: 816586

BIS recognized as per CRS scheme for IT electronics, LED control gears, Lamp, Inverter / UPS are recognized as per LRS 2020.

3.1 Deviation from standard

None

3.2 Abnormalities from standard conditions

None

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4 General Information

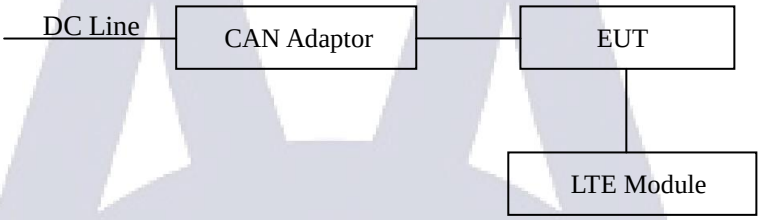
4.1 General Description of EUT

Manufacturer:	Netradyne Inc.
Manufacturer Address:	9191 Towne Centre Drive, Suite 200, San Diego, CA 92122
EUT Name:	Driveri
Model No:	D-210
Serial Model:	D-210A, D-211
Trademark:	Netradyne
H/W No.:	501-1-00908_B1
S/W No.:	2.4.9.rc.2
Power Supply Range:	Input : 12VDC, 3A
Battery:	N/A

4.2 EUT Test Mode

Mode 1	The EUT in full transmission mode

4.3 Description of Test setup

1. Block diagram of EUT configuration-EMI
Mode 1: 
2. Block diagram of EUT configuration-EMS
Same as EMI

4.4 Test Peripheral List

No.	Equipment	Manufacturer	EMC Compliance	Model No.	Serial No.	Power cord	signal cable
1	N/A	N/A	N/A	N/A	N/A	N/A	N/A

4.5 EUT Peripheral List

No.	Equipment	Manufacturer	FCC ID	Model No.	Serial No.	Power cord	signal cable
1	Driveri/DCM LTE Module	Netradyne Inc.	2AM8R-DCM-NA1-100	DriverI/DCM	N/A	N/A	N/A
2	CAN Adaptor Board	Netradyne Inc.	N/A	A1 version : D-210-AD1 A2 version : D-210-AD2 A3 version : D-210-AD3	N/A	N/A	N/A

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5 Equipments List for All Test Items

☒ Radiation Test Equipment						
No	Test Equipment	Manufacturer	Model No	Serial No	Cal. Date	Cal. Due Date
1	EMI TEST Receiver	Rohde and schwarz	ESIB26	838786/010	2020/01/28	2021/01/27
2	Loop antenna	DA ZE Beijing	ZN30900C	18052	2020/01/29	2021/01/28
3	Horn antenna	DA ZE Beijing	ZN30701	18012	2020/01/30	2021/01/29
4	Horn antenna	DA ZE Beijing	ZN30702	18006	2020/01/30	2021/01/29
5	Horn antenna	DA ZE Beijing	ZN30703	18005	2020/01/30	2021/01/29
6	Pre Amplifier	KELIANDA	LNA-0009295	-	2020/01/28	2021/01/27
7	Pre Amplifier	KELIANDA	CF-00218	-	2020/01/28	2021/01/27
8	Bi conical Antenna	DA ZE Beijing	ZN30505C	17038	2020/01/29	2021/01/30

☒ Conduction Test equipment						
No	Test Equipment	Manufacturer	Model No	Serial No	Cal. Date	Cal. Due Date
1	EMI-RECEIVER	Schwarzbeck	FCKL	1528194	2020/01/28	2021/01/27
2	Spectrum Analyzer	ADVANTEST	R3162	191200845	2020/01/28	2021/01/27
3	LISN	Kyoritsu	KNW-407	8-1789-5	2020/01/28	2021/01/27
4	Network – LISN	Schwarzbeck	NNBM8125	81251314	2020/01/28	2021/01/27
5	Network – LISN	Schwarzbeck	NNBM8125	81251315	2020/01/28	2021/01/27
6	ISN	Schwarzbeck	ISN T8 CAT5	CATS-8158#225	2020/01/28	2021/01/27
7	ISN	Schwarzbeck	ISN T8 CAT6	NTFM8158#184	2020/01/28	2021-01-27
8	ISN	Schwarzbeck	ISN T8 CAT3	CAT3-8158#120	2020/01/28	2021/01/27
9	PULSE LIMITER	Rohde and schwarz	ESH3-Z2	100681	2019/05/13	2021/05/12
10	50Ω Coaxial Switch	DAIWA	1565157	-	2019/05/13	2021/05/12

☒ ESD Test Equipment						
No	Test Equipment	Manufacturer	Model No	Serial No	Cal. Date	Cal. Due Date
1	ESD generator	Noiseken	ESS-100L	G266763	2020/01/29	2021/01/28
2	ESD gun	Noiseken	TC-815D	G266751	2020/01/29	2021/01/28

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☒ R/S Test Equipment						
No	Test Equipment	Manufacturer	Model No	Serial No	Cal. Date	Cal. Due Date
1	High-Speed Power meter	LumiLoop	LSPM 1.0	005	2020/01/29	2021/01/28
2	POWER AMPLIFIER	PRANA	MT200D	1902-2451	2020/01/28	2021/01/27
3	Dual Directional Coupler	Welartone	C3908	118239	2020/01/27	2021/01/26
4	POWER AMPLIFIER	PRANA	SX70/55D	1902-2465	2020/01/28	2021/01/27
5	Dual Directional Coupler	Welartone	C10117	118308	2020/01/28	2021/01/27
6	Electric Field Monitoring System	LumiLoop	LS Probe 1.2	133	2020/01/28	2021/01/27
7	Signal Generator	Rohde and schwarz	SMB100A	511991	2020/01/29	2021/01/28
8	Bi-log antenna	DA ZE Beijing	ZN30505E	18051	2020/01/30	2021/01/29
9	Hi-Power Horn antenna	DA ZE Beijing	ZN30700	18011	2020/01/30	2021/01/29

☒ EFT/B Test equipment						
No	Test Equipment	Manufacturer	Model No	Serial No	Cal. Date	Cal. Due Date
1	Compact Immunity simulator	3ctest	CCS 600	ES0801819	2020/01/28	2021/01/27
2	Capacitance coupling clamp	3ctest	CCC 100	CCC-18100179	2020/01/28	2021/01/27

☒ C/S Test Equipment						
No	Test Equipment	Manufacturer	Model No	Serial No	Cal. Date	Cal. Due Date
1	Conductivity sensitivity tester	DA ZE Beijing	ZN1186	18014	2020/01/28	2021/01/27
2	CDN-M2/M3	DA ZE Beijing	ZN3750CDN	15030	2019/06/04	2021/06/03
3	EM CLAMP	DA ZE Beijing	ZN23203	14011	2019/05/13	2021/05/12
4	Attenuator	DA ZE Beijing	E-002	-	2019/05/13	2021/05/12

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☒ Transient Test Equipment						
No	Test Equipment	Manufacturer	Model No	Serial No	Cal. Date	Cal. Due Date
1	Compact immunity simulator	3ctest	CCS 600	ES0801819	2020/01/28	2021/01/27
2	Capacitance coupling clamp	3ctest	CCC 100	CCC-18100179	2020/01/28	2021/01/27

☒ PFMF Test Equipment						
No	Test Equipment	Manufacturer	Model No	Serial No	Cal. Date	Cal. Due Date
1	Compact immunity simulator	3ctest	CCS 600	ES0801819	2020/01/28	2021/01/27
2	Power failure and power frequency magnetic field module	3ctest	VMT 2216SV	ES0471802	2020/01/28	2021/01/27
3	Magnetic field coil	3ctest	TCXS 111	ES0801819	2020/01/28	2021/01/27

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6 Emission Test Results

6.1 Mains Terminals Disturbance Voltage Measurement

Limits for mains Port :

Frequency (MHz)	☐ Class A (dBµV)		☒ Class B (dBµV)	
	Q.P. (Quasi-Peak)	A.V. (Average)	Q.P. (Quasi-Peak)	A.V. (Average)
0.15 ~ 0.50	79	66	66 to 56	56 to 46
0.50 ~ 5.0	73	60	56	46
5.0 ~ 30	73	60	60	50

Limits for Signal Port :

Frequency (MHz)	☐ Class A (dBµV)		☐ Class B (dBµV)	
	Q.P. (Quasi-Peak)	A.V. (Average)	Q.P (Quasi-Peak)	A.V. (Average)
0.15 ~ 0.50	97 to 87	84 to 74	84 to 74	74 to 64
0.50 ~ 30	87	74	74	64

Detector:	Peak for pre-scan (9kHz Resolution Bandwidth) Quasi-Peak & Average if maximized peak within 6dB of Average Limit

6.1.1 E.U.T. Operation

Temperature:	24.6°C	Humidity:	55% RH	Atmospheric Pressure:	98.5	Kpa
Test Mode:	Mode 1					

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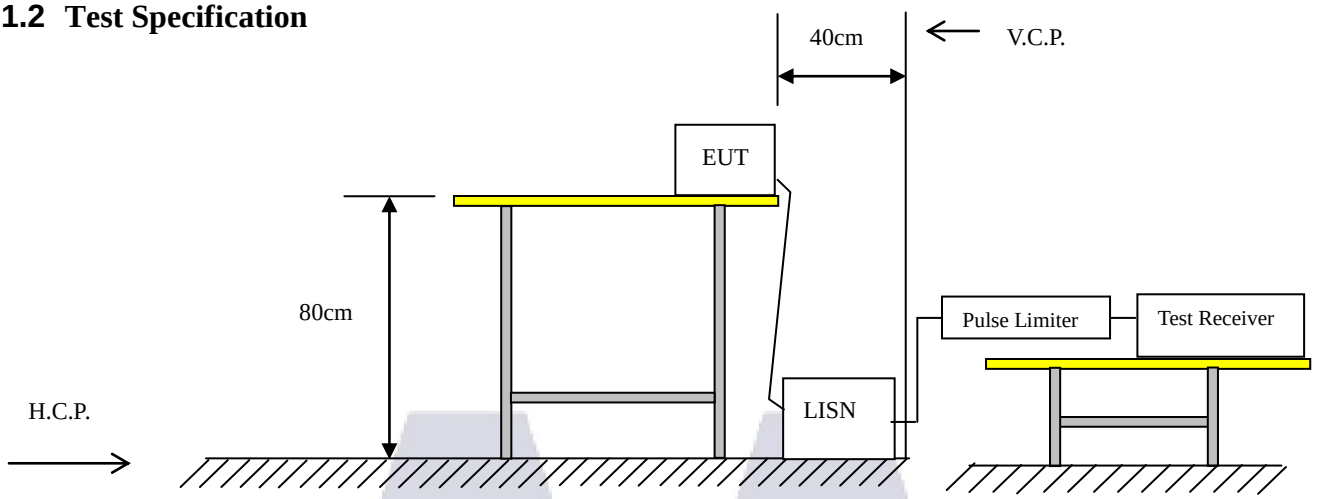
6.1.2 Test Specification



EUT was placed upon a wooden test table 0.8m above the horizontal metal reference plane and 0.4m from the vertical ground plane, and it was connected to an AMN. The closest distance between the boundary of the EUT and the surface of the AMN is 0.8m. All peripherals were connected to another AMN, and placed at a distance of 10cm from each other. A spectrum and receiver was connected to the RF output port of the AMN. Both average and quasi-peak value were detected.

6.1.3 Measurement Data

An initial pre-scan was performed on the live and neutral lines.

Quasi-peak or average measurements were performed at the frequency which maximum peak emissions were detected.

Please refer to the attached quasi-peak & average measurement data for reference.

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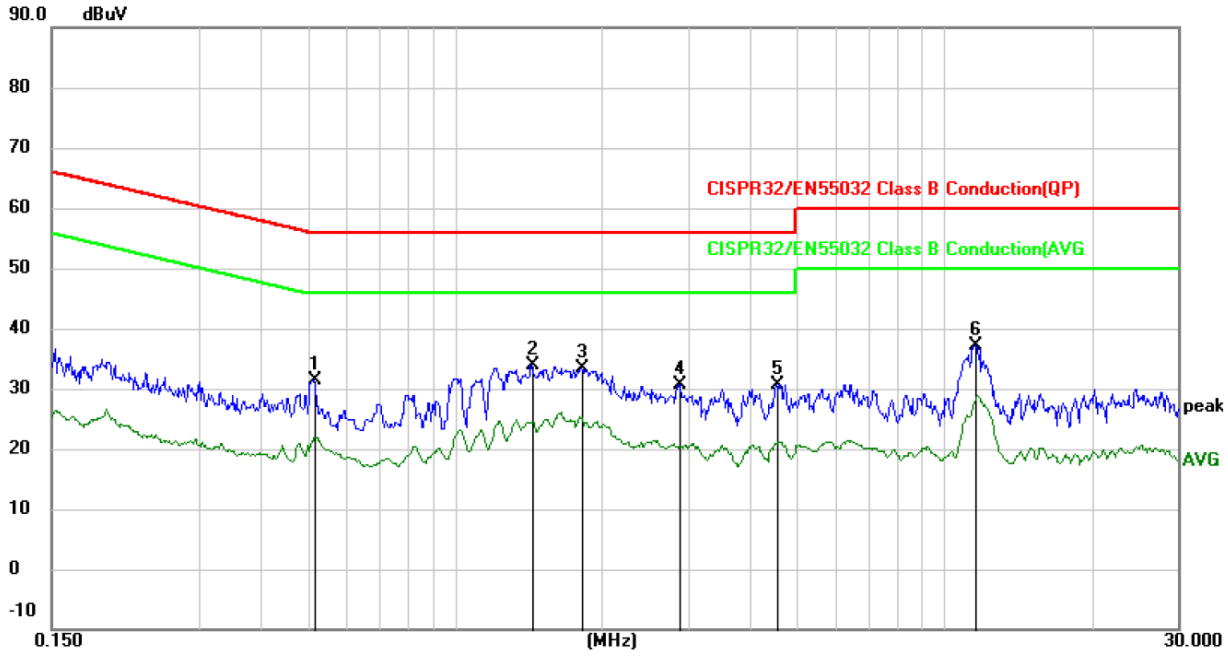
Mode:	Mode 1	Test Date :	Nov. 23, 2020
Test Voltage:	12VDC	Phase :	Line



Remark: Factor = LISN factor + Cable Loss + Pulse limiter factor.

No.	Mk.	Freq.	Reading Level	Correct Factor	Measure-ment	Limit	Over	
		MHz	dBuV	dB	dBuV	dBuV	dB	Detector
1		0.5180	15.23	16.12	31.35	56.00	-24.65	peak
2	*	1.4360	18.10	15.87	33.97	56.00	-22.03	peak
3		1.8140	17.43	15.83	33.26	56.00	-22.74	peak
4		2.8760	14.82	15.84	30.66	56.00	-25.34	peak
5		4.5275	14.68	15.89	30.57	56.00	-25.43	peak
6		11.5000	21.33	15.83	37.16	60.00	-22.84	peak

*Maximum Data

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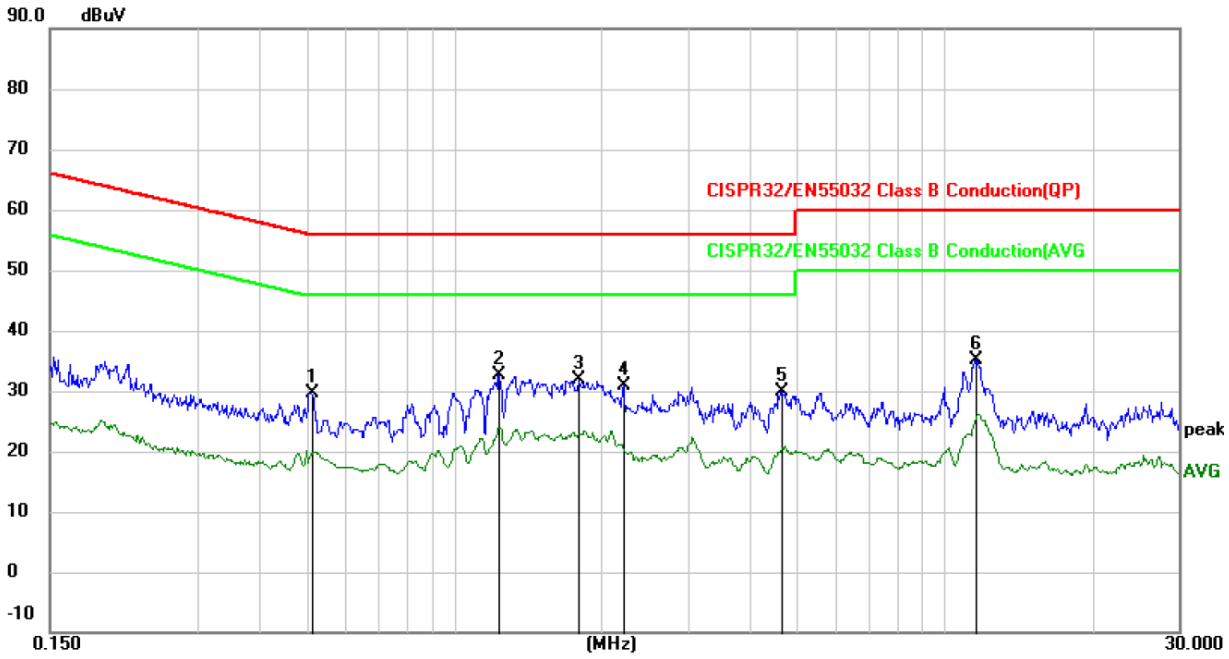
Mode:	Mode 1	Test Date :	Nov. 23, 2020
Test Voltage:	12VDC	Phase :	Neutral



Remark: Factor = LISN factor + Cable Loss + Pulse limiter factor.

No.	Mk.	Freq.	Reading Level	Correct Factor	Measure-ment	Limit	Over	
		MHz	dBuV	dB	dBuV	dBuV	dB	Detector
1		0.5135	14.28	15.41	29.69	56.00	-26.31	peak
2	*	1.2335	17.10	15.41	32.51	56.00	-23.49	peak
3		1.7915	16.40	15.41	31.81	56.00	-24.19	peak
4		2.2145	15.35	15.41	30.76	56.00	-25.24	peak
5		4.6490	14.45	15.41	29.86	56.00	-26.14	peak
6		11.5750	19.77	15.32	35.09	60.00	-24.91	peak

*Maximum Data

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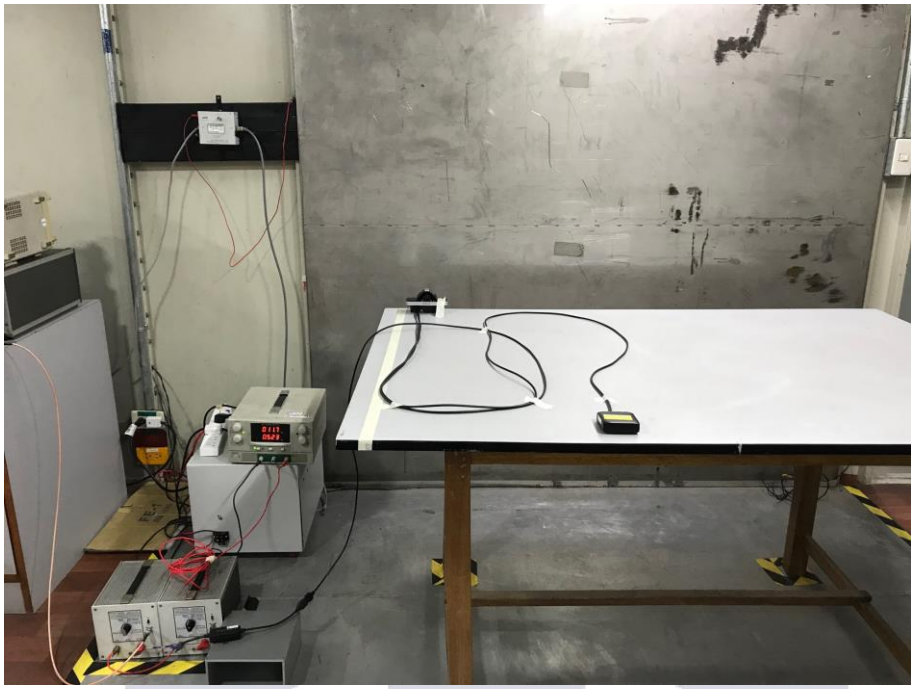
6.1.4 Test Setup photograph



6.2 Radiated Emission Measurement

Limits of Radiated Emission Measurement (Below 1GHz)

Frequency (MHz)	☐ Class A (3m)	☒ Class B (3m)
	Quasi-Peak dB(μ /m)	Quasi-Peak dB(μV/m)
30 ~ 230	50.0	40.0
230 ~ 1000	57.0	47.0

Limits of Radiated Emission Measurement (Above 1GHz)

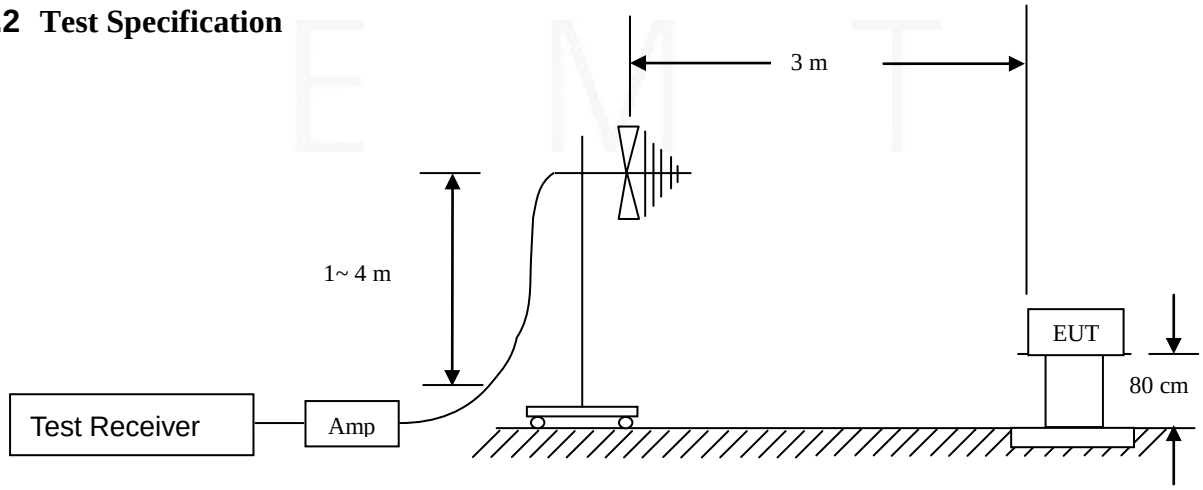
Frequency (MHz)	☐ Class A (3m)		☒ Class B (3m)	
	Peak dB(μV/m)	Average dB(μV/m)	Peak dB(μV/m)	Average dB(μV/m)
1000~3000	76	56	70	50
3000~6000	80	60	74	54

Detector:	Peak for pre-scan (120kHz resolution bandwidth) Quasi-Peak if maximum peak within 6dB of limit

6.2.1 E.U.T. Operation

Temperature:	23.8°C	Humidity:	55% RH	Atmospheric Pressure:	97.8	Kpa
Test Mode:	Mode 1					

6.2.2 Test Specification



EUT was placed upon a polyester fiber top test table which was placed on the turn table 0.8m above the horizontal metal ground plane, and operating in the mode as mentioned above. A receiving antenna was placed 3m away from the EUT. During testing, turn around the turn table and move the antenna from 1m to 4m to find the maximum field-strength reading. All peripherals were placed at a distance of 10cm between each other. Both horizontal and vertical antenna polarities were tested.

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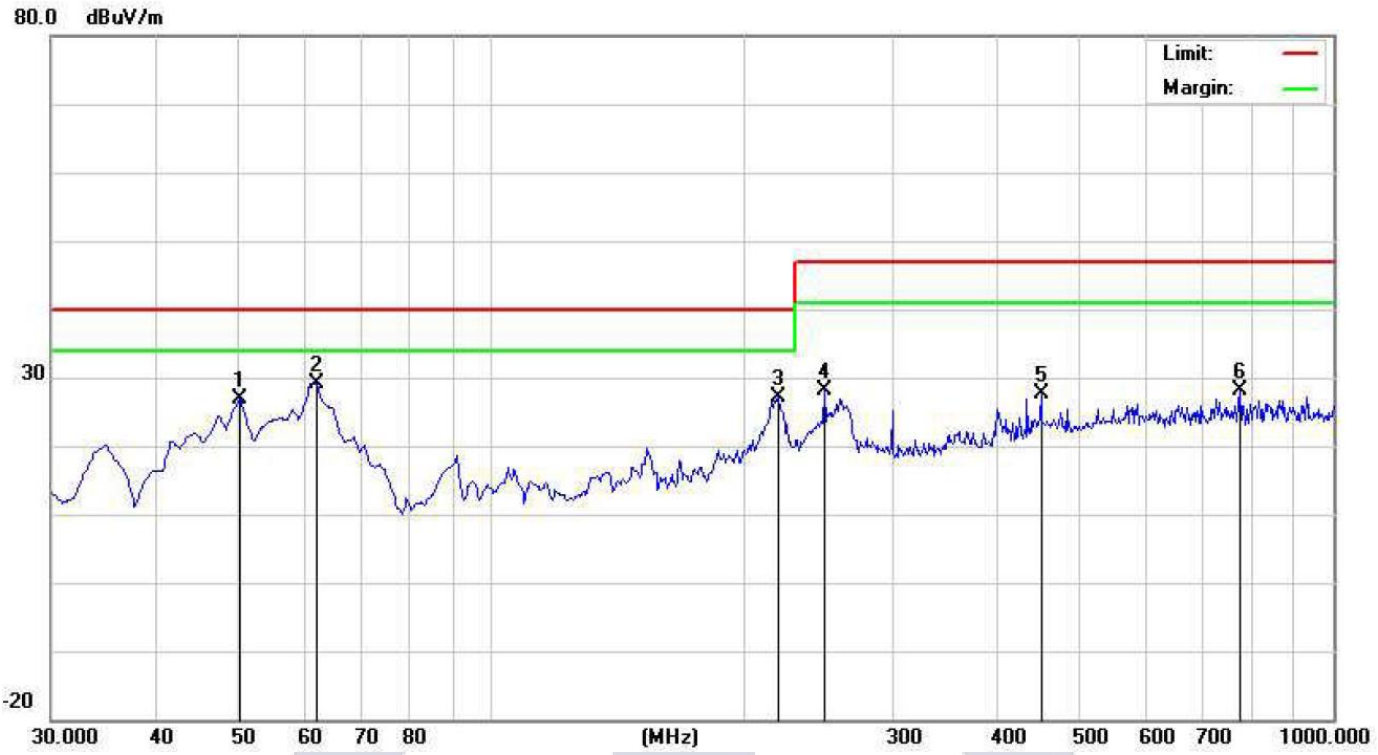
6.2.3 Measurement Data

An initial pre-scan was performed in the 3m chamber using the spectrum analyzers in peak detection mode. The EUT was measured by Biolog antenna with 2 orthogonal polarities and peak emissions from the EUT were detected within 6dB of the class B limit line.

The following quasi-peak measurements were performed on the EUT.

Between 30 MHz – 1000 MHz

Test Mode:	Mode 1	Test Date :	Nov. 23, 2020
Test Voltage :	12VDC	Polarization :	Vertical



Remark: Factor = Antenna Factor + Cable Loss – Pre-amplifier.

No.	Mk.	Freq.	Reading Level	Correct Factor	Measure-ment	Limit	Over	
		MHz	dBuV	dB	dBuV/m	dB/m	dB	Detector
1		50.3700	24.42	2.49	26.91	40.00	-13.09	peak
2	*	62.0100	26.59	2.62	29.21	40.00	-10.79	peak
3		219.1500	16.47	10.65	27.12	40.00	-12.88	peak
4		249.2200	15.15	12.91	28.06	47.00	-18.94	peak
5		450.0100	10.22	17.32	27.54	47.00	-19.46	peak
6		775.9300	6.36	21.80	28.16	47.00	-18.84	peak

*Maximum Data

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Test Mode:	Mode 1	Test Date :	Nov. 23, 2020
Test Voltage:	12VDC	Polarization :	Horizontal

Remark: Factor = Antenna Factor + Cable Loss – Pre-amplifier.

No.	Mk.	Freq.	Reading Level	Correct Factor	Measure-ment	Limit	Over	
		MHz	dBuV	dB	dBuV/m	dB/m	dB	Detector
1		137.6700	19.20	6.56	25.76	40.00	-14.24	peak
2		185.2000	16.20	8.59	24.79	40.00	-15.21	peak
3	*	216.2400	17.89	10.45	28.34	40.00	-11.66	peak
4		228.8500	15.07	11.77	26.84	40.00	-13.16	peak
5		249.2200	21.95	12.91	34.86	47.00	-12.14	peak
6		392.7800	19.65	15.45	35.10	47.00	-11.90	peak

*Maximum Data

!Above Margin

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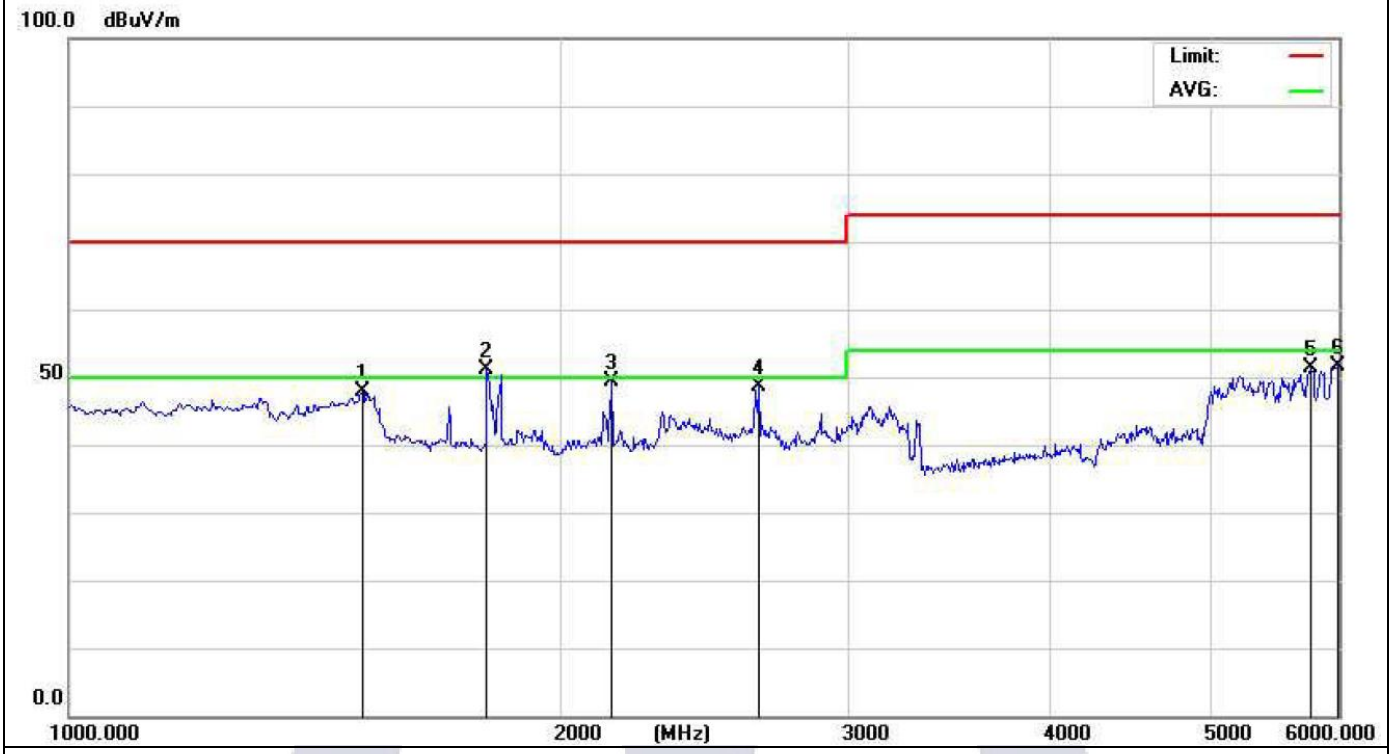
Between 1000 MHz – 6000 MHz

Test Mode:	Mode 1	Test Date :	Nov. 23, 2020
Test Voltage :	12VDC	Polarization :	Vertical



Remark: Factor = Antenna Factor + Cable Loss – Pre-amplifier.

No.	Mk.	Freq.	Reading Level	Correct Factor	Measure-ment	Limit	Over	
		MHz	dBuV	dB	dBuV/m	dB/m	dB	Detector
1		1515.000	16.71	31.13	47.84	70.00	-22.16	peak
2	*	1805.000	17.37	33.71	51.08	70.00	-18.92	peak
3		2150.000	13.74	35.60	49.34	70.00	-20.66	peak
4		2650.000	12.11	36.49	48.60	70.00	-21.40	peak
5		5775.000	6.06	45.23	51.29	74.00	-22.71	peak
6		5995.000	5.74	45.81	51.55	74.00	-22.45	peak

*Maximum Data

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Test Mode:	Mode 1	Test Date :	Nov. 23, 2020
Test Voltage:	12VDC	Polarization :	Horizontal

Remark: Factor = Antenna Factor + Cable Loss – Pre-amplifier.

No.	Mk.	Freq.	Reading Level	Correct Factor	Measure-ment	Limit	Over	
		MHz	dBuV	dB	dBuV/m	dB/m	dB	Detector
1	*	1710.000	15.66	32.86	48.52	70.00	-21.48	peak
2		5215.000	7.46	43.81	51.27	74.00	-22.73	peak
3		5280.000	7.39	43.96	51.35	74.00	-22.65	peak
4		5415.000	7.17	44.28	51.45	74.00	-22.55	peak
5		5470.000	7.57	44.42	51.99	74.00	-22.01	peak
6		5575.000	6.63	44.69	51.32	74.00	-22.68	peak

*Maximum Data

!Above Margin

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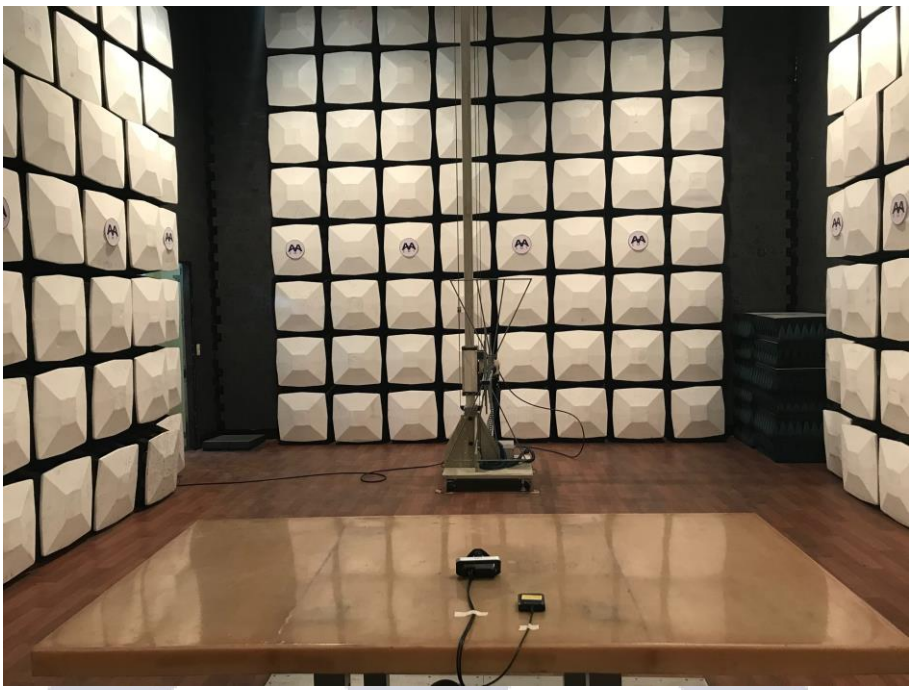
6.2.4 Test Setup photograph



7 Immunity Test Results

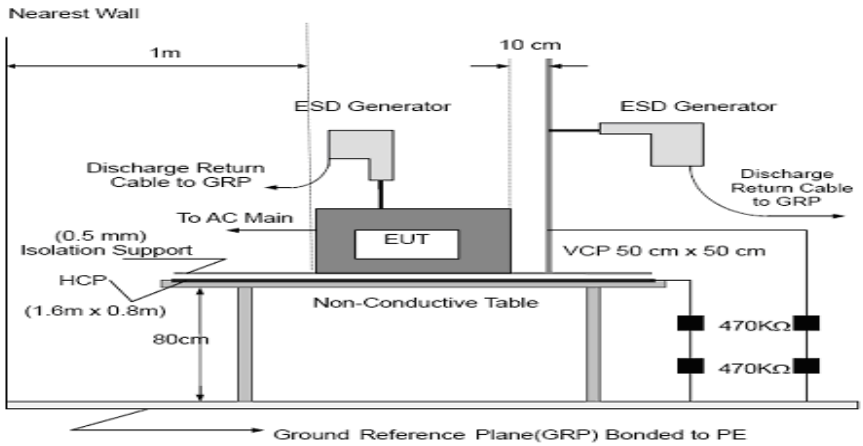
7.1 Electrostatic discharge immunity test

Acceptable Performance Criterion:	B	
Discharge Impedance:	330 Ω / 150 pF	
Discharge Voltage:	Air Discharge:	±8 kV
	Contact Discharge:	±4 kV
	VCP, HCP:	±4 kV
Polarity:	Positive & Negative	
Minimum discharge Interval:	1 second	

7.1.1 E.U.T. Operation

Temperature:	25.3°C	Humidity:	54% RH	Atmospheric Pressure:	96.52	Kpa
Test Mode:	Mode 1					

7.1.2 Test specification



EUT was operated in the mode as mentioned above. Both contact and air discharge was executed. Contact discharge to the conductive surfaces and to coupling planes; air discharge at insulating surfaces. Each test point shall be subjected to 25 discharges at least (For each voltage and polarity).

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7.1.3 Measurement Data

Test Record

Electrostatic Discharge Test Results																		
M/N:	D-210								Test Result: ☒ Pass ☐ Fail									
Test Voltage:	12VDC								Test date: Dec. 11, 2020									
Discharge times	Contact discharge: minimum 25 times (+/-respectively) at each point, Air discharge: minimum 25 times (+/- respectively) at each point.																	
Discharge Mode	Air Discharge								Contact Discharge								Performance Criterion	Result
Test level (kV)	4		8		10		15		2		4		6		8			
Test Location	+	-	+	-	+	-	+	-	+	-	+	-	+	-	+	-		
HCP									A	A	A	A					B	Pass
VCP									A	A	A	A						Pass
Metal Screws									A	A	A	A						Pass
Plastic Enclosure	A	A	A	A														Pass
Button	A	A	A	A														Pass
Air gaps	A	A	A	A														Pass
LED	A	A	A	A														Pass
Note： Horizontal Coupling Plane (**HCP**) and Vertical Coupling plane (**VCP**). "**Cx**" means Contact Point ,x=1～N,"**Ax**" means Air Point, x=1～N.																		

7.1.4 Test Setup Photograph

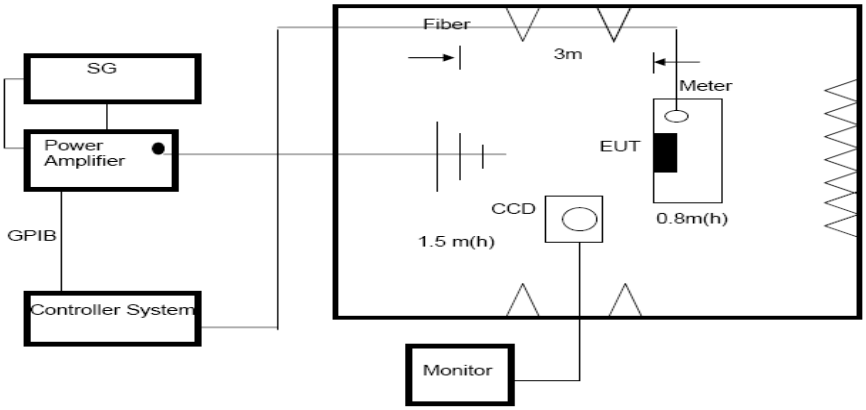
7.2 RF field strength immunity test

Acceptable Performance Criterion:	A
Frequency Range & Test Level	80MHz~6000MHz, 3V/m
Test Distance	3 m
Polarity:	Horizontal & Vertical

7.2.1 E.U.T. Operation

Temperature:	24°C	Humidity:	55% RH	Atmospheric Pressure:	97.4	Kpa
Test Mode:	Mode 1					

7.2.2 Test specification



Test was executed in a fully Anechoic chamber. An antenna was used to transmit interference signal. EUT was placed upon a wooden table above the reference ground 0.8m, and was positioned so that the four sides of the EUT shall be exposed to the electromagnetic field in a sequence. In each position the performance of the EUT was investigated. A camera was used to monitor the loss of function or degradation of performance of the EUT.

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7.2.3 Measurement Data

Test Record

Radiated Frequency Field Strength Susceptibility Results				
M/N:	D-210	Test Result: ☒ Pass ☐ Fail		
Test Voltage:	12VDC	Test date: Nov. 23, 2020		
Test Port	Enclosure			
Operating Mode	Mode 1			
Test Level	3 V/m(r.m.s) (unmodulated)		Criterion	A
Frequency Range(MH_Z)	Antenna polarity	Modulation	EUT position	Result
80~1000 1000~6000	Horizontal	1KHz, 80% AM	Front	Pass
			Rear	Pass
			Left	Pass
			Right	Pass
			Top	Pass
			Bottom	Pass
80~1000 1000~6000	Vertical	1KHz， 80% AM	Front	Pass
			Rear	Pass
			Left	Pass
			Right	Pass
			Top	Pass
			Bottom	Pass
Note: During the test no deviation was detected to the selected operation mode(s).				

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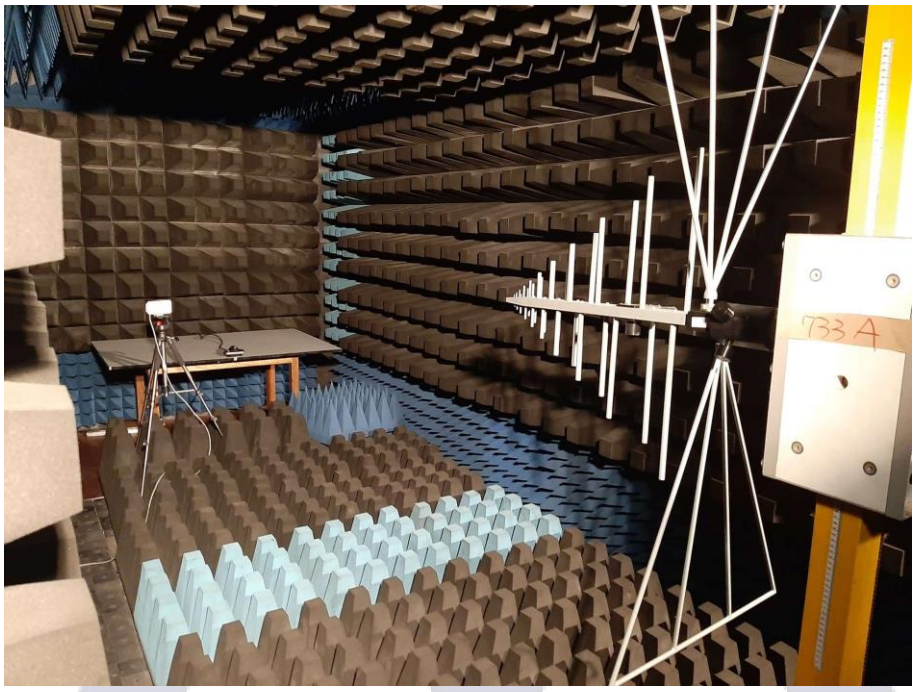
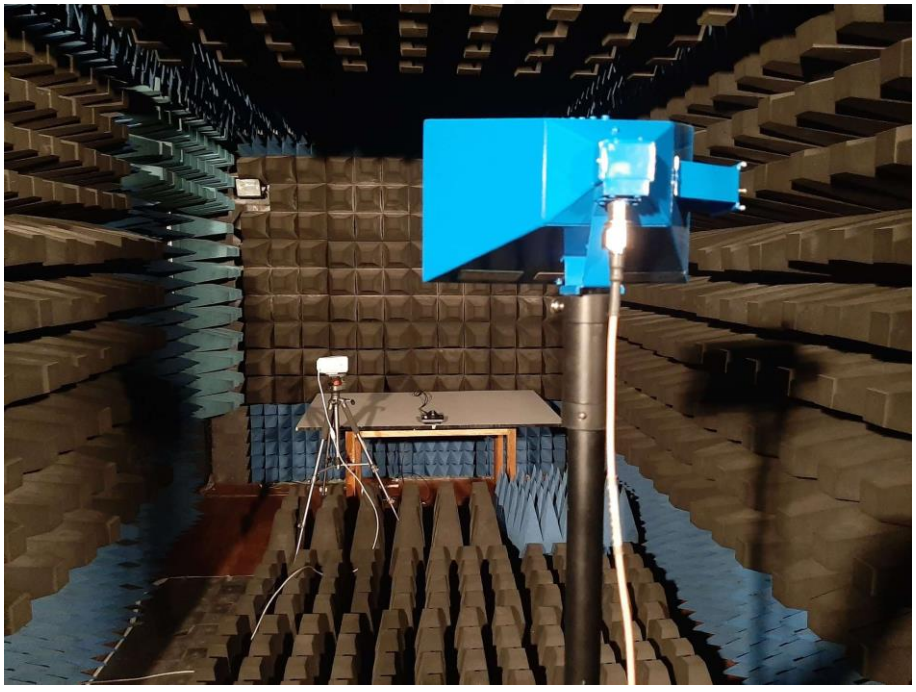
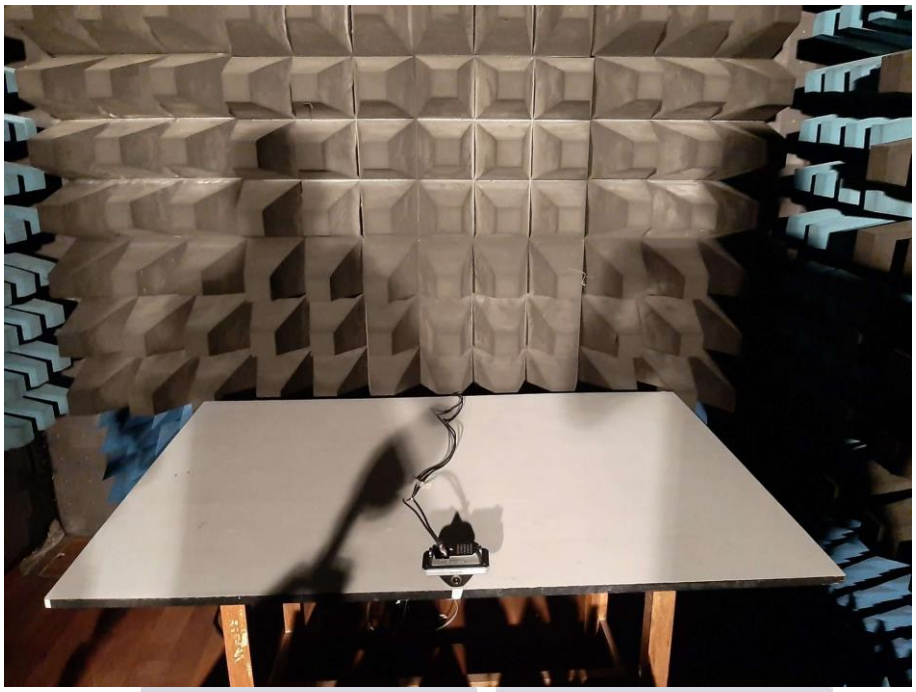
7.2.4 Test Setup Photograph







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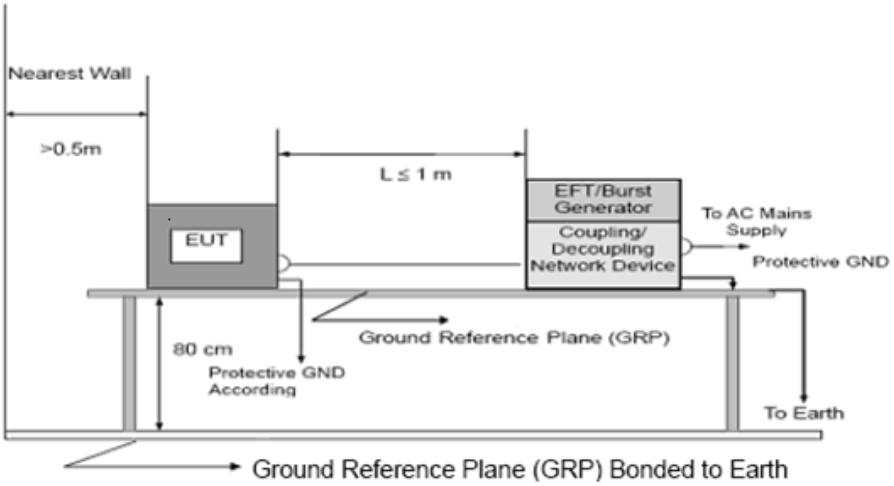
7.3 Electrical fast transient/burst immunity test

Acceptable Performance Criterion:	B
Test Level:	+/-0.5 kV on DC Line
Repetition Frequency:	5 kHz
Burst Duration:	300 ms
Test Duration:	1 minutes for each level & polarity

7.3.1 E.U.T. Operation

Temperature:	25.1°C	Humidity:	56% RH	Atmospheric Pressure:	96.8	Kpa
Test Mode:	Mode 1					

7.3.2 Test specification



EUT was placed on a metal ground reference plane and was insulated from it by a wooden support which is 0.1m thick. The ground reference plane is connected to the protective earth. The test generator and the coupling/decoupling network were placed directly on, and bonded to the ground reference plane.

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7.3.3 Measurement Data

Test Record

Electrical Fast Transient/Burst Result												
M/N:		D-210				Test Result: ☒ Pass ☐ Fail						
Test Voltage:		12VDC				Test date: Nov. 24, 2020						
Test Signal		Rise time: 5ns, Duration: 50ns, repetition rate : ☒5KHz ☐100KHz										
Coupling Line		Test level (kV)								Performance Criterion	Result	
		0.5		1		2		4				
		+	-	+	-	+	-	+	-			
DC line	P	A	A							B	Pass	
	N	A	A								Pass	
	P+N	A	A								Pass	
Note：During the test no deviation was detected to the selected operation mode(s).												

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7.3.4 Test Setup Photograph

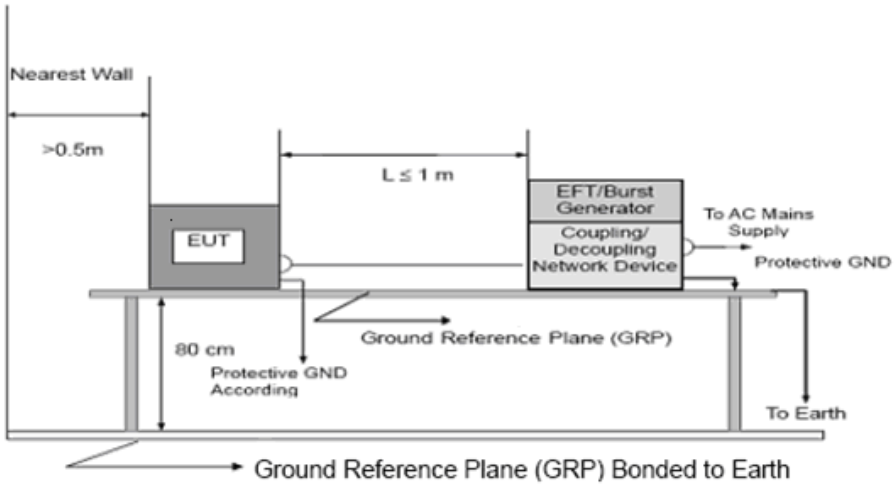
7.4 Transient test

Acceptable Performance Criterion:	B (Auto-restart)
Test Level:	Test pulses 1, 2a, 2b, 3a, 3b, 4, 5a & 5b as per ISO 7637-2:2011, ISO 16750-2:2010

7.4.1 E.U.T. Operation

Temperature:	25.1°C	Humidity:	56% RH	Atmospheric Pressure:	96.8	Kpa
Test Mode:	Mode 1					

7.4.2 Test specification



EUT was placed on a metal ground reference plane and was insulated from it by a wooden support which is 0.1m thick. The ground reference plane is connected to the protective earth. The test generator and the coupling/decoupling network were placed directly on, and bonded to the ground reference plane.

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7.4.3 Measurement Data

Test Record

Electrical Fast Transient/Burst Result		
M/N:	D-210	Test Result: ☒ Pass ☐ Fail
Test Voltage:	12VDC	Test date: Nov. 24, 2020

12V System	
Test Pulse	**Result**
1	No Reset
2a	No Reset
2b	No Reset
3a	No Reset
3b	Reset & Auto restart
4	No Reset
5a	Reset & Auto restart
5b	Reset & Auto restart

Note: After completion of test unit was in proper working condition

7.4.4 Test Setup Photograph

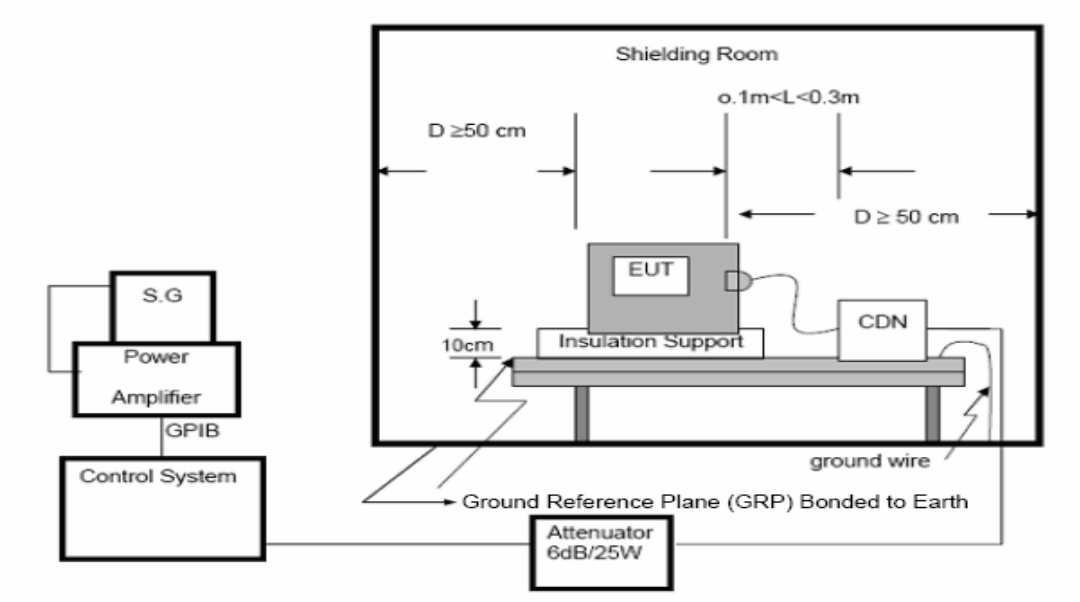
7.5 Conducted disturbance immunity Test

Acceptable Performance Criterion:	A
Test Level	3 Vrms
Frequency Range	0.150MHz~80MHz

7.5.1 E.U.T. Operation

Temperature:	24.5°C	Humidity:	55% RH	Atmospheric Pressure:	95.6	Kpa
Test Mode:	Mode 1					

7.5.2 Test specification



The equipment to be tested was placed on an insulating support of 0,1m height above a ground reference Plane. The minimum distance between the EUT and all other conductive structures, except the ground reference plane is more than 0.5m. All relevant cables were provided with the appropriate coupling and decoupling devices at a distance between 0.1m and 0.3m from the projected geometry of the EUT.

7.5.3 Measurement Data

Test Record

Injected Currents Susceptibility Measurement Result					
M/N:	D-210			Test Result: ☒ Pass ☐ Fail	
Test Voltage:	12VDC			Test date: Nov. 23, 2020	
Test Port	DC Mains Line				
Test Level (V)	3 V(r.m.s) (unmodulated)			Criterion	A
Step Size	1 %	Dwell Time（S）	3		
Frequency Range（MHz）		Modulation		Result	
0.15~80		1 KHz, 80 % AM		Pass	
Note：None					

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7.5.4 Test Setup Photograph

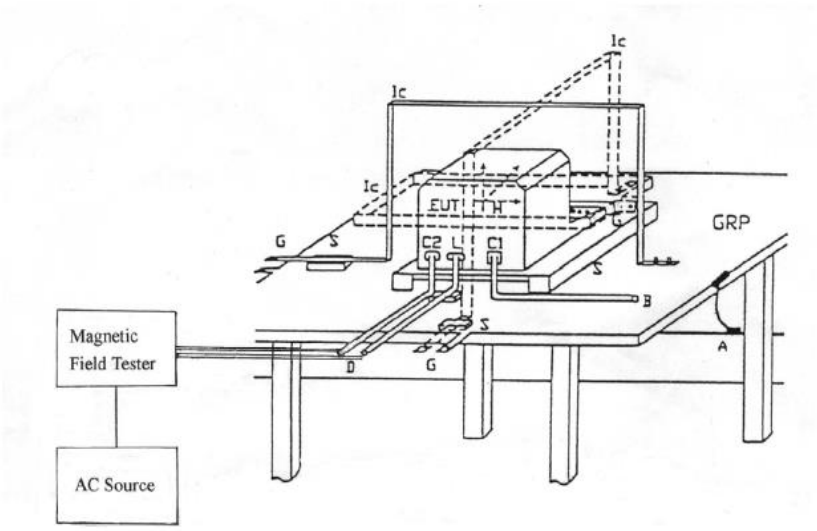
7.6 Power frequency magnetic field immunity test

Acceptable Performance Criterion:	A
Test Level:	1 A/m
Coil Orientation:	X,Y & Z
Test Duration:	5 Minutes for each orientation

7.6.1 E.U.T. Operation

Temperature:	26°C	Humidity:	60% RH	Atmospheric Pressure:	101	Kpa
Test Mode:	Mode 1					

7.6.2 Test specification



The equipment is configured and connected to satisfy its functional requirements. It was placed on the ground reference plane with the interposition of a 0.1 m thickness wooden support and was placed in the center of the induction coil. All cables (include power cord and signal line) were exposed to the magnetic field for at least 1m of their length.

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7.6.3 Measurement Data

Test Record

Power Frequency Magnetic Field Immunity Test Results

M/N: D-210

Test Voltage: 12VDC

Test Date: Nov. 24,2020

☐ IEC61000-4-8
☒ EN61000-4-8
☐ other:

Test Result: ☒ Pass ☐ Fail

Temp: 26 °C Humi: 60 %

Atmospheric Pressure: 97.3 Kpa

Operating Mode	Mode 1			
Test Level	Test Duration	Coil Orientation	Criterion	Result
1 A/m	5 minutes	X	A	Pass
1 A/m	5 minutes	Y	A	Pass
1 A/m	5 minutes	Z	A	Pass

Note: None

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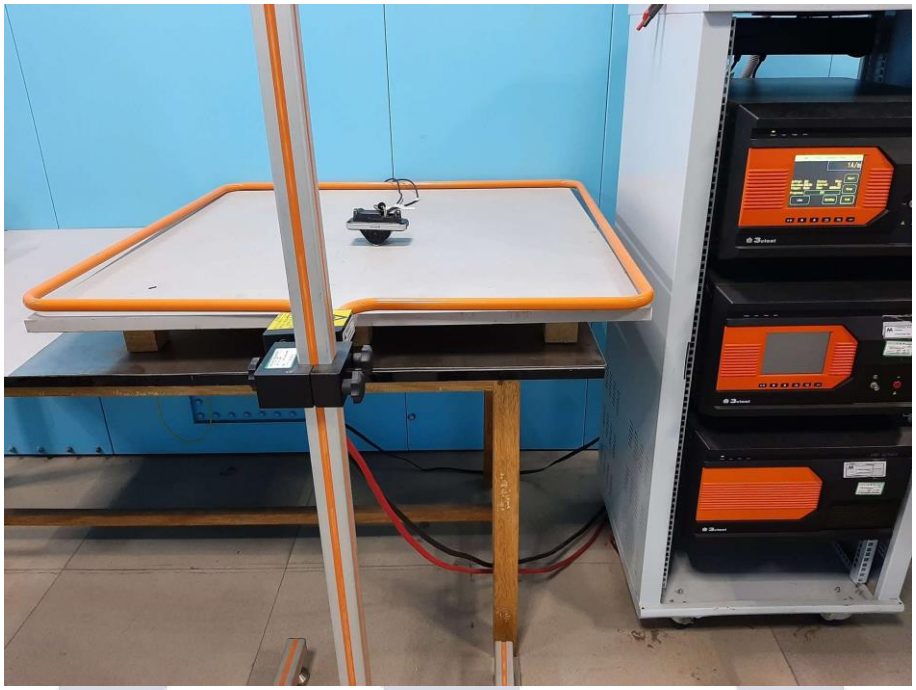
7.6.4 Test Setup Photograph



****END OF REPORT****

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