



TEST REPORT

Reference No. : WTX24D03050003E
Applicant : Descartes Systems Group Inc.
Address : 105 Trafalgar Street, Floor 2, Nelson, Tasman 7011, New Zealand
Manufacturer : Descartes Systems Group Inc.
Address : 105 Trafalgar Street, Floor 2, Nelson, Tasman 7011, New Zealand
Product : Solar Reader
Model(s) : DSR002
Standards : VCCI-CISPR 32:2016
Date of Receipt sample ... : 2024-03-14
Date of Test : 2024-03-14 to 2024-03-25
Date of Issue : 2024-06-28
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 compiler and approver.

Prepared By:

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3 Revision History

Test Report No.	Date of Receipt Sample	Date of Test	Date of Issue	Purpose	Comment	Approved
WTX24D03050003E	2024-03-14	2024-03-14 to 2024-03-25	2024-06-28	Original	-	Valid

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4 General Information

4.1 Client Information

Factory name: Descartes Systems Group Inc.
 Factory address: 105 Trafalgar Street, Floor 2, Nelson, Tasman 7011, New Zealand

4.2 General Description of E.U.T.

Product: Solar Reader
 Model(s): DSR002

4.3 Details of E.U.T.

Power Supply: The EUT uses DC 5V 1A (AC adapter or USB)
 Battery rated capacity: 3400mAh
 Battery rated voltage: 3.7V*2
 Battery watt hour: 12.58Wh

Highest Internal Frequency: >500MHz, ≤1GHz

Classification of Equipment: Class B

4.4 Test Location

Laboratory: Waltek Testing Group Co., Ltd.
 Address: No. 77, Houjie Section, Guantai Road, Houjie Town, Dongguan City, Guangdong, China

4.5 Test Facility

The test facilities used to collect the test data in this report:

Test Item	Registration code	Uncertainty (Note 1)
<input checked="" type="checkbox"/> Conducted Emissions from the AC mains power ports	C-20130	±3.64dB
<input type="checkbox"/> Asymmetric Mode Conducted Emissions 150KHz to 30MHz	T-20131	±3.62dB
<input checked="" type="checkbox"/> Radiated Emissions, 30MHz to 1000MHz	R-20174	±5.24dB
<input checked="" type="checkbox"/> Radiated Emissions, Above 1GHz	G-20166	±5.03dB

Note 1: This uncertainty represents an expanded uncertainty expressed at approximately the 95% confidence level using a coverage factor of k=2.

4.6 Abnormalities from Standard Conditions

None

4.7 EUT Setup and Operation Mode

No	Title	Description
TM1	Charging mode	DC 5V
TM2	Working mode	By built-in battery

Pre-test in voltage input range & all operation modes, and find out the worst case for compliance test. And record it in the report.



5 Summary of Test Results

Item	Standard	Method	Requirement	Result
Conducted emissions from AC mains power ports (150kHz-30MHz)	VCCI-CISPR 32:2016	CISPR 16-2-1	Class B	Pass
Radiated emissions (30MHz-1GHz)	VCCI-CISPR 32:2016	CISPR 16-2-3	Class B	Pass
Radiated emissions (above 1GHz)	VCCI-CISPR 32:2016	CISPR 16-2-3	Class B	Pass

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6 Equipment Used during Test

6.1 Equipment List

Conducted emissions from AC mains power ports (150kHz-30MHz)					
Description	Manufacturer	Model	Serial No.	Cal. Date	Due. Date
Cable	Top	TYPE16(3.5M)	/	2023-07-27	2024-07-26
LISN	R&S	ENV216	100115	2023-07-27	2024-07-26
EMI Test Receiver	R&S	ESCI	100947	2023-07-27	2024-07-26
Test Software	Frad Technology	EZ-EMC(RA-03A1-1)	/	/	/

Radiated emissions (30MHz-1GHz)					
Description	Manufacturer	Model	Serial No.	Cal. Date	Due. Date
Coaxial Cable (below 1GHz)	Lair Microwave	LE400-NMNM-8M	#02	2024-01-16	2025-01-15
Broadband Preamplifier (9KHz-6GHz)	SCHWARZBECK	BBV9744	00140	2024-01-16	2025-01-15
Trilog Broadband Antenna	SCHWARZBECK	VULB9163	01376	2024-01-18	2025-01-17
Test Receiver (9KHz-7GHz)	R&S	ESR 7	102320	2024-01-16	2025-01-15
Test Software	Frad Technology	EZ-EMC(Ver.EMEC-3A1)	/	/	/

Radiated emissions (above 1GHz)					
Description	Manufacturer	Model	Serial No.	Cal. Date	Due. Date
Coaxial Cable (above 1GHz)	ZT26-NJ-NJ-8M/FA	1GHz-18GHz	NA	2023-04-24	2024-04-23
Broadband Preamplifier	COMPLIANCE DIRECTION	PAP-1G18	2004	2023-07-27	2024-07-26
Broad-band Horn Antenna	SCHWARZBECK	BBHA 9120 D	667	2024-01-23	2025-01-22
Spectrum Analyzer	R&S	FSP30	100091	2023-04-24	2024-04-23
Test Software	Frad Technology	EZ-EMC(RA-03A1-1)	/	/	/



6.2 Description of Support Units

Equipment	Manufacturer	Model No.	Series No.
Adapter	XIAOMI	MDY-09-EX	N/A

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7 Emission Test Results (EMI)

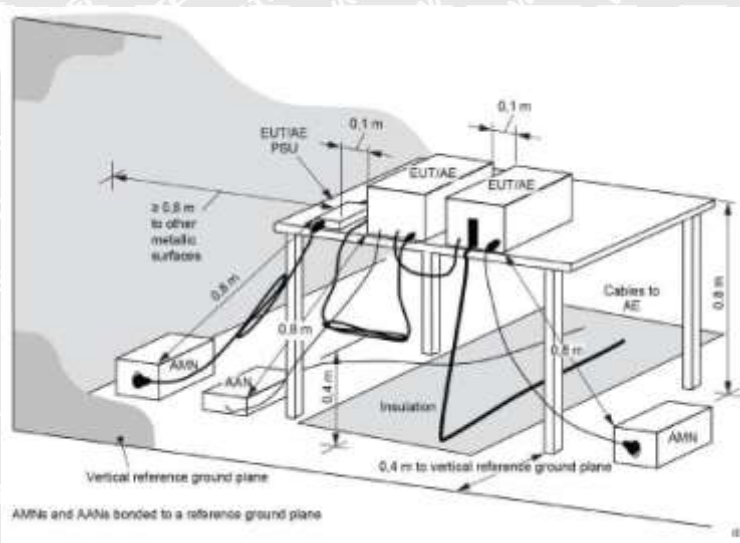
7.1 Conducted emissions from AC mains power ports (150kHz-30MHz)

Test Requirement:	Class B		
Test Limit:	Frequency Range	Limit (Quasi-Peak)	Limit (Average)
	0.15MHz to 0.5MHz	66dB(μ V) to 56dB(μ V)	56dB(μ V) to 46dB(μ V)
	0.5MHz to 5MHz	56dB(μ V)	46dB(μ V)
	5MHz to 30MHz	60dB(μ V)	50dB(μ V)
Detector:	Peak for pre-scan (9kHz resolution bandwidth) 0.15M to 30MHz		
Test Method:	CISPR 16-2-1		
Procedure:	An initial pre-scan was performed with peak detector. Quasi-Peak or Average measurement were performed at the frequencies with maximized peak emission were detected. Remark: Level= Read Level+ Cable Loss+ LISN Factor		

7.1.1 E.U.T. Operation

Environmental Conditions					
Temperature:	26.7 °C	Humidity:	51.6 %	Atmospheric Pressure:	101.6 kPa
Test mode:	TM1				

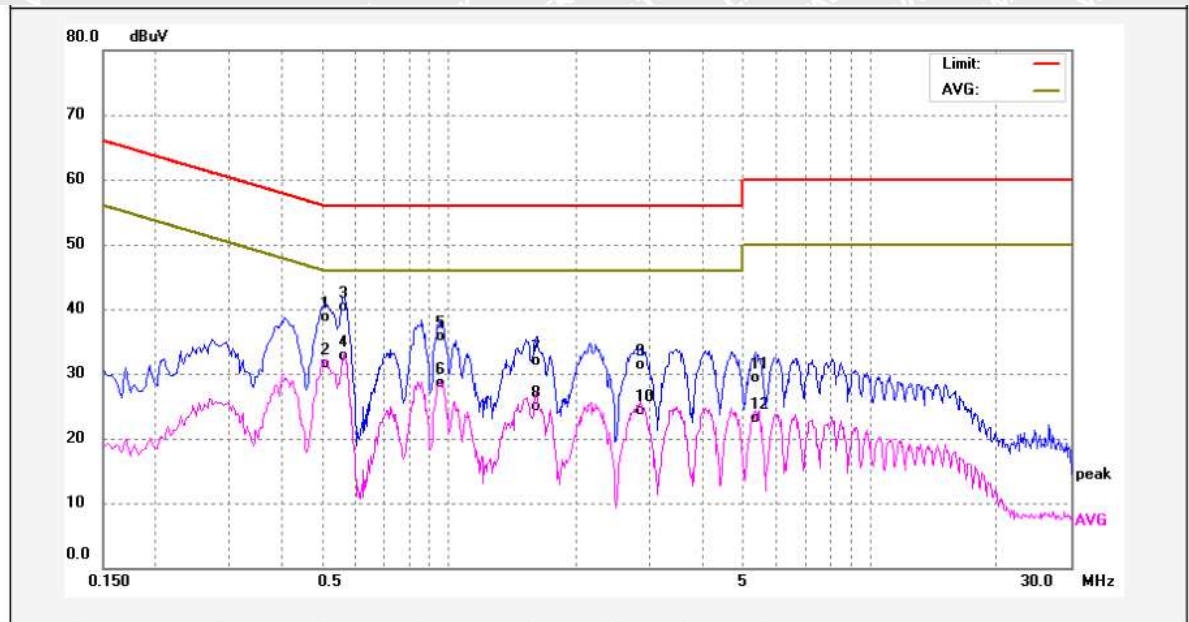
7.1.2 Basic Test Setup Block Diagram





7.1.3 Summary of Test Results

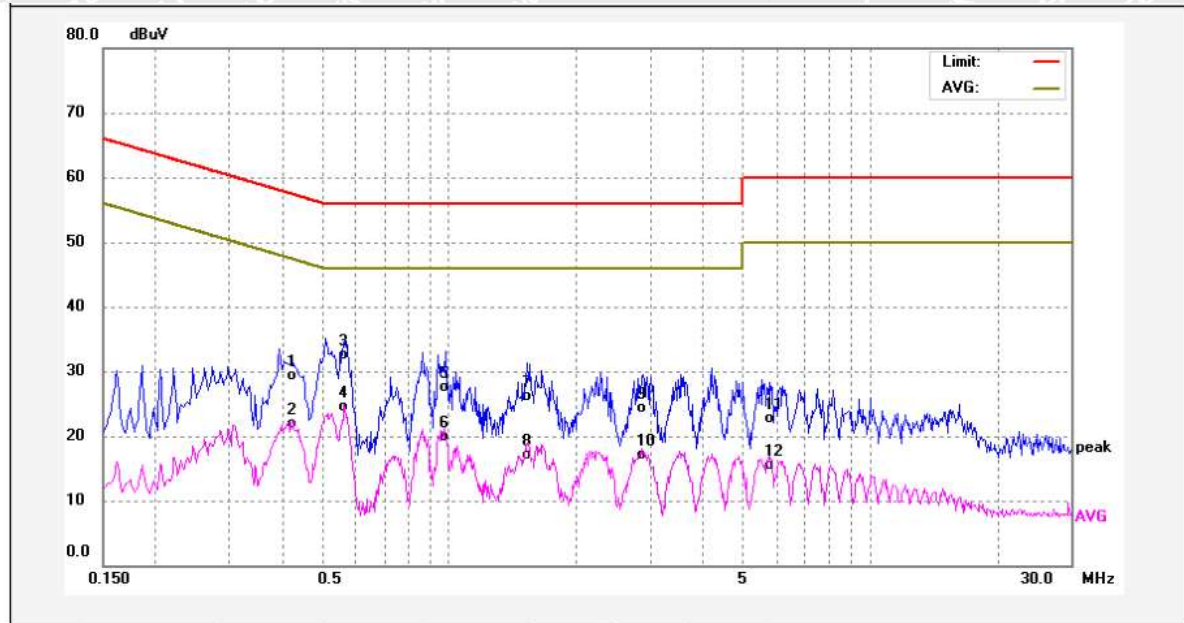
TM1 / Line: Line



No.	Freq. (MHz)	Reading (dBuV)	Factor (dB)	Result (dBuV)	Limit dBuV	Margin (dB)	Detector	Remark
1	0.5100	27.73	10.97	38.70	56.00	-17.30	QP	
2	0.5100	20.46	10.97	31.43	46.00	-14.57	AVG	
3	0.5660	29.26	10.97	40.23	56.00	-15.77	QP	
4	0.5660	21.81	10.97	32.78	46.00	-13.22	AVG	
5	0.9540	24.77	11.00	35.77	56.00	-20.23	QP	
6	0.9540	17.58	11.00	28.58	46.00	-17.42	AVG	
7	1.6019	20.97	11.02	31.99	56.00	-24.01	QP	
8	1.6019	13.96	11.02	24.98	46.00	-21.02	AVG	
9	2.8460	20.28	11.06	31.34	56.00	-24.66	QP	
10	2.8460	13.19	11.06	24.25	46.00	-21.75	AVG	
11	5.3540	18.10	11.16	29.26	60.00	-30.74	QP	
12	5.3540	11.98	11.16	23.14	50.00	-26.86	AVG	



TM1 / Line: Neutral



No.	Freq. (MHz)	Reading (dBuV)	Factor (dB)	Result (dBuV)	Limit dBuV	Margin (dB)	Detector	Remark
1	0.4220	18.33	11.03	29.36	57.41	-28.05	QP	
2	0.4220	10.78	11.03	21.81	47.41	-25.60	AVG	
3	0.5620	21.46	11.08	32.54	56.00	-23.46	QP	
4	0.5620	13.34	11.08	24.42	46.00	-21.58	AVG	
5	0.9700	16.36	11.21	27.57	56.00	-28.43	QP	
6	0.9700	8.68	11.21	19.89	46.00	-26.11	AVG	
7	1.5300	14.88	11.26	26.14	56.00	-29.86	QP	
8	1.5300	5.85	11.26	17.11	46.00	-28.89	AVG	
9	2.8620	13.11	11.26	24.37	56.00	-31.63	QP	
10	2.8620	5.86	11.26	17.12	46.00	-28.88	AVG	
11	5.7660	11.36	11.25	22.61	60.00	-37.39	QP	
12	5.7660	4.32	11.25	15.57	50.00	-34.43	AVG	



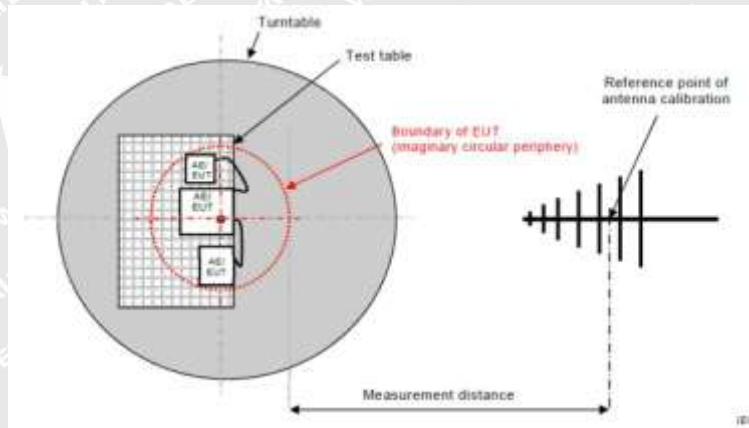
7.2 Radiated emissions (30MHz-1GHz)

Test Requirement:	Class B		
Test Limit:	Frequency (MHz)	Limit [dB(uV/m) at 10m]	Limit [dB(uV/m) at 3m]
	30 to 230	30	40
	230 to 1000	37	47
	Detector: Peak for pre-scan (120kHz resolution bandwidth) 30M to 1000MHz		
Test Method:	CISPR 16-2-3		
Procedure:	An initial pre-scan was performed in the chamber using the spectrum analyser in peak detection mode. Quasi-peak measurements were conducted based on the peak sweep graph. The EUT was measured by BiConiLog antenna with 2 orthogonal polarities. Remark: Level= Read Level+ Cable Loss+ Antenna Factor- Preamp Factor		

7.2.1 E.U.T. Operation

Environmental Conditions			
Temperature:	23.8 °C	Humidity:	65.2 %
		Atmospheric Pressure:	101.6 kPa
Test mode:	TM1, TM2		

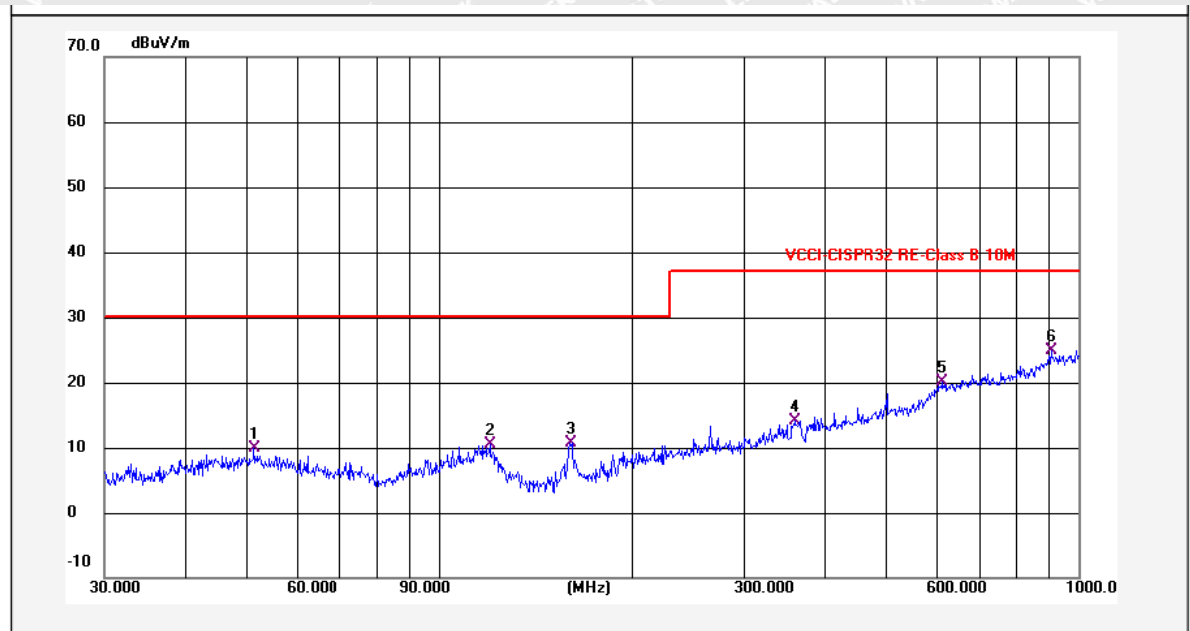
7.2.2 Basic Test Setup Block Diagram





7.2.3 Summary of Test Results

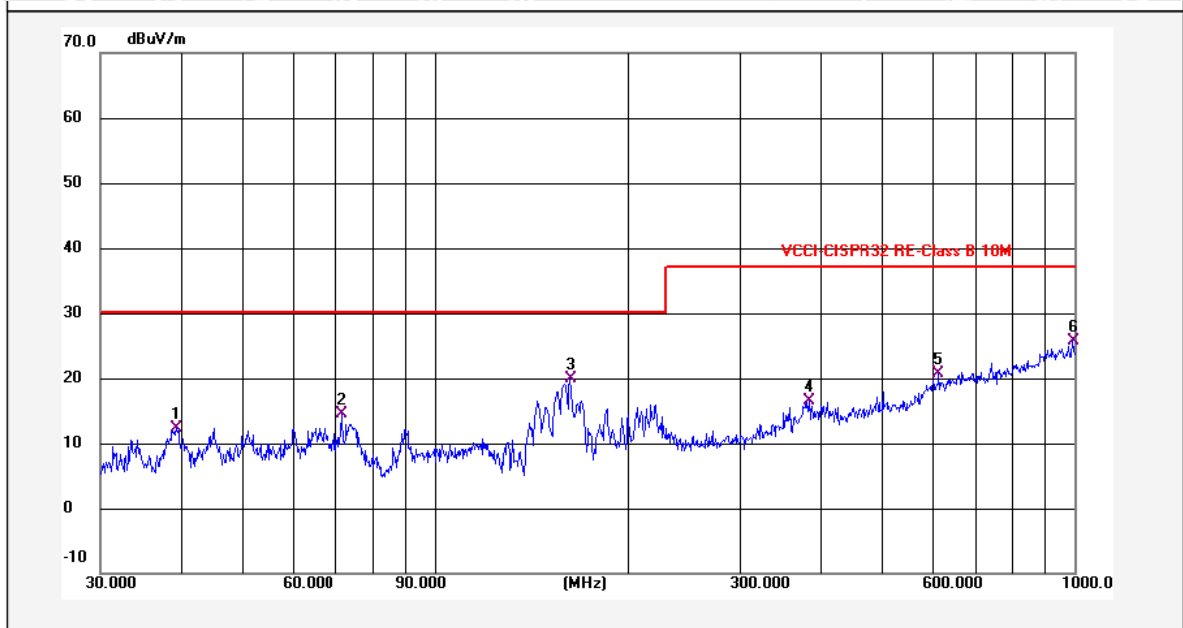
TM1 / Polarization: Horizontal



No.	Freq. (MHz)	Reading (dBuV/m)	Factor (dB)	Result (dBuV/m)	Limit (dBuV/)	Margin (dB)	Detector	Remark
1	51.3005	24.43	-14.44	9.99	30.00	-20.01	QP	
2	120.2766	23.90	-13.46	10.44	30.00	-19.56	QP	
3	160.3456	29.06	-18.29	10.77	30.00	-19.23	QP	
4	359.1860	24.67	-10.63	14.04	37.00	-22.96	QP	
5	614.2142	24.27	-4.11	20.16	37.00	-16.84	QP	
6	906.4824	24.19	0.72	24.91	37.00	-12.09	QP	



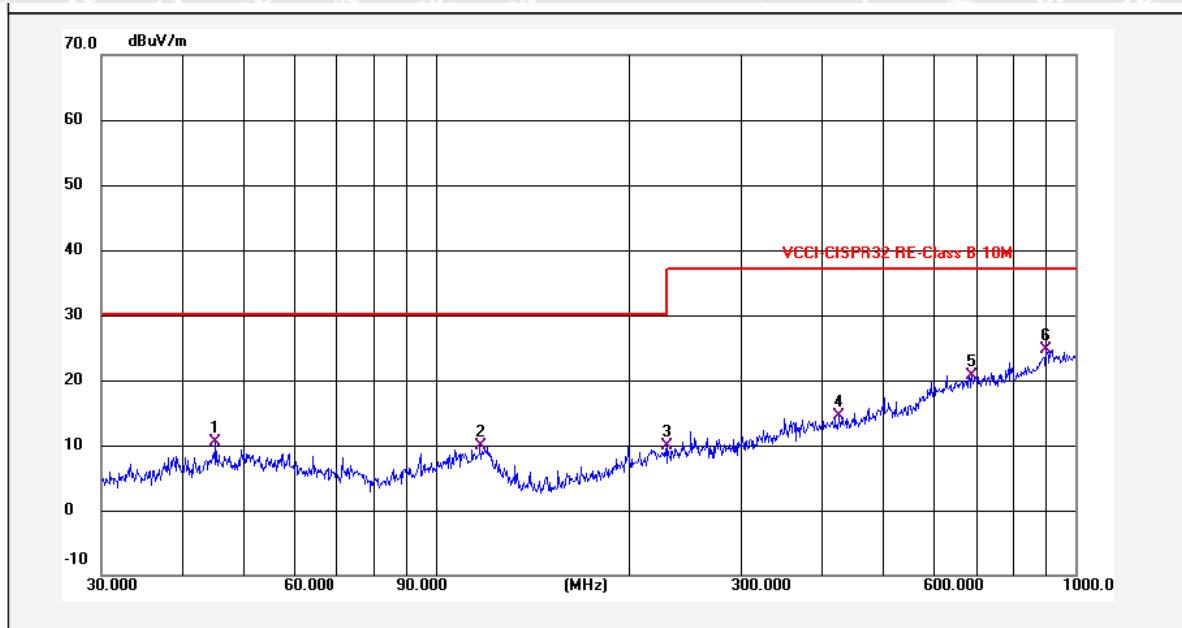
TM1 / Polarization: Vertical



No.	Freq. (MHz)	Reading (dBuV/m)	Factor (dB)	Result (dBuV/m)	Limit (dBuV/)	Margin (dB)	Detector	Remark
1	39.4371	27.87	-15.55	12.32	30.00	-17.68	QP	
2	71.5806	31.44	-16.87	14.57	30.00	-15.43	QP	
3	162.6106	38.08	-18.19	19.89	30.00	-10.11	QP	
4	383.9318	26.81	-10.37	16.44	37.00	-20.56	QP	
5	614.2142	24.77	-4.11	20.66	37.00	-16.34	QP	
6	993.0114	24.30	1.46	25.76	37.00	-11.24	QP	



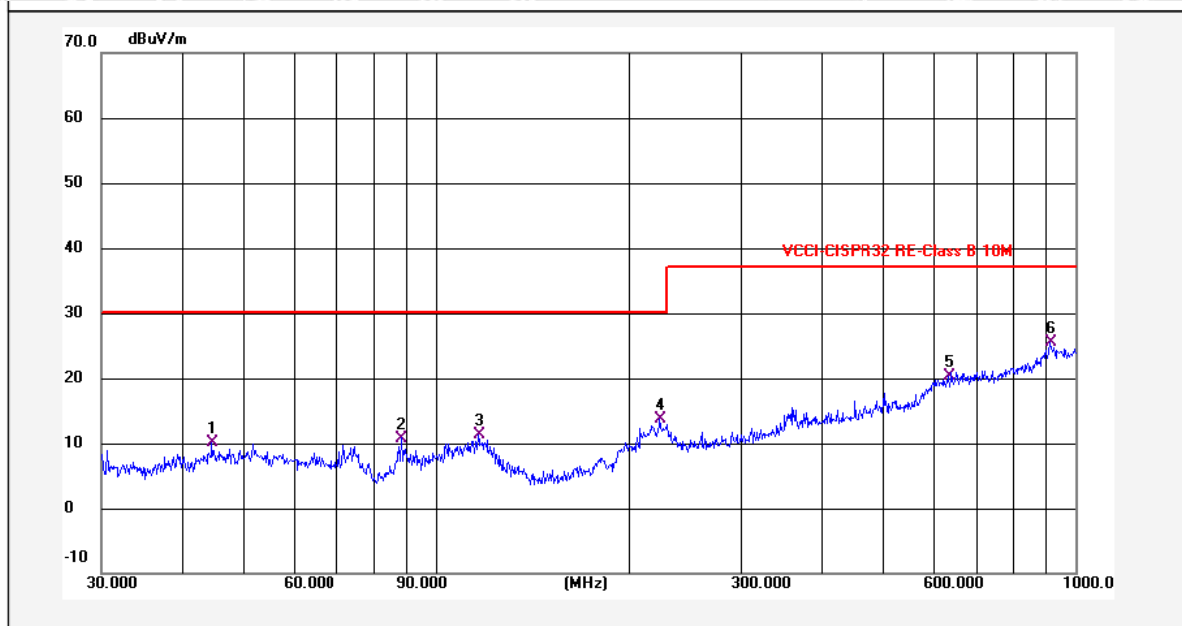
TM2 / Polarization: Horizontal



No.	Freq. (MHz)	Reading (dBuV/m)	Factor (dB)	Result (dBuV/m)	Limit (dBuV/)	Margin (dB)	Detector	Remark
1	45.2166	25.07	-14.49	10.58	30.00	-19.42	QP	
2	117.3603	23.39	-13.50	9.89	30.00	-20.11	QP	
3	230.0985	24.84	-14.95	9.89	37.00	-27.11	QP	
4	426.5210	23.92	-9.51	14.41	37.00	-22.59	QP	
5	689.5644	22.90	-2.14	20.76	37.00	-16.24	QP	
6	900.1474	23.81	0.91	24.72	37.00	-12.28	QP	



TM2 / Polarization: Vertical



No.	Freq. (MHz)	Reading (dBuV/m)	Factor (dB)	Result (dBuV/m)	Limit (dBuV/)	Margin (dB)	Detector	Remark
1	44.5868	24.57	-14.56	10.01	30.00	-19.99	QP	
2	88.6524	27.92	-17.12	10.80	30.00	-19.20	QP	
3	116.5401	24.85	-13.56	11.29	30.00	-18.71	QP	
4	223.7334	28.75	-15.12	13.63	30.00	-16.37	QP	
5	633.9073	24.28	-4.06	20.22	37.00	-16.78	QP	
6	912.8620	25.02	0.52	25.54	37.00	-11.46	QP	



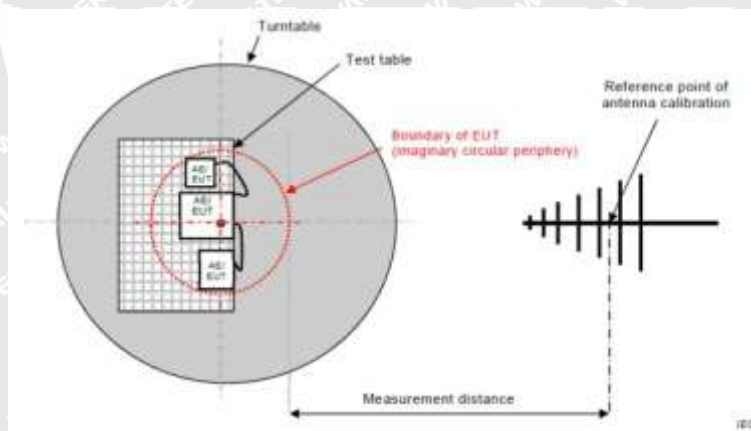
7.3 Radiated emissions (above 1GHz)

Test Requirement:	Class B		
Test Limit:	Frequency range(MHz)	Radiated emissions limit(dBμV/m)	
		Peak	Average
	1000-3000	70	50
	3000-5000	74	54
	Detector: Peak for pre-scan (1000kHz resolution bandwidth) 1000M to 5000MHz		
Test Method:	CISPR 16-2-3		
Procedure:	An initial pre-scan was performed in the chamber using the spectrum analyser in peak detection mode. Average measurements were conducted based on the peak sweep graph. The EUT was measured by Horn antenna with 2 orthogonal polarities. Remark: Level= Read Level+ Cable Loss+ Antenna Factor- Preamp Factor		

7.3.1 E.U.T. Operation

Environmental Conditions					
Temperature:	25.6 °C	Humidity:	57.7 %	Atmospheric Pressure:	101.6 kPa
Test mode:	TM1, TM2				

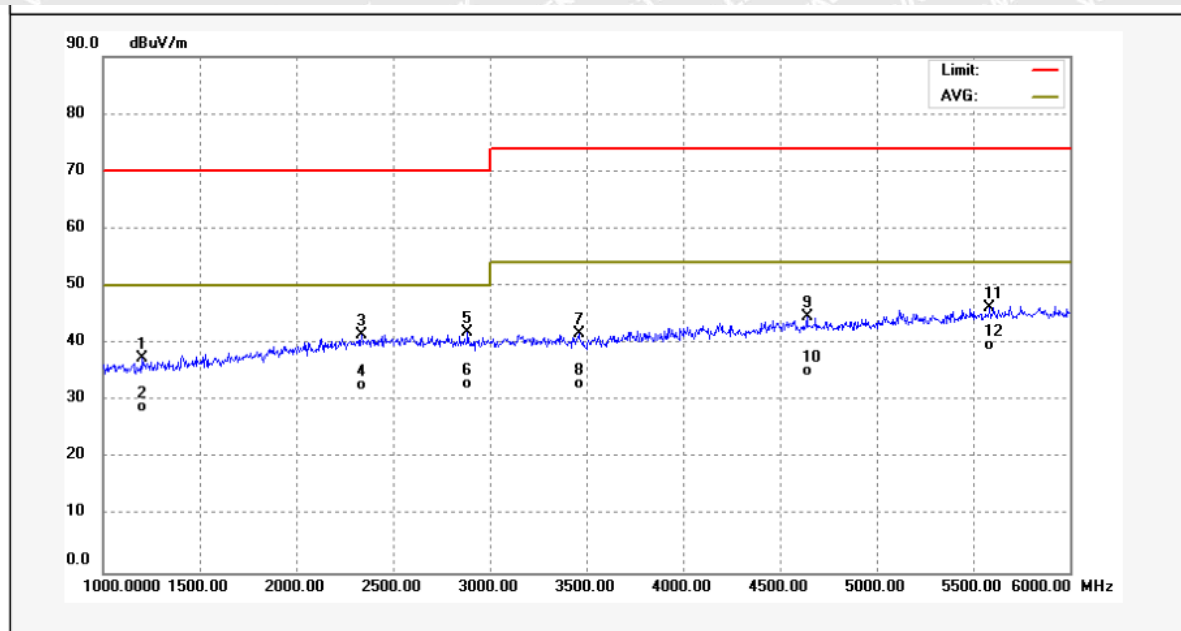
7.3.2 Basic Test Setup Block Diagram





7.3.3 Summary of Test Results

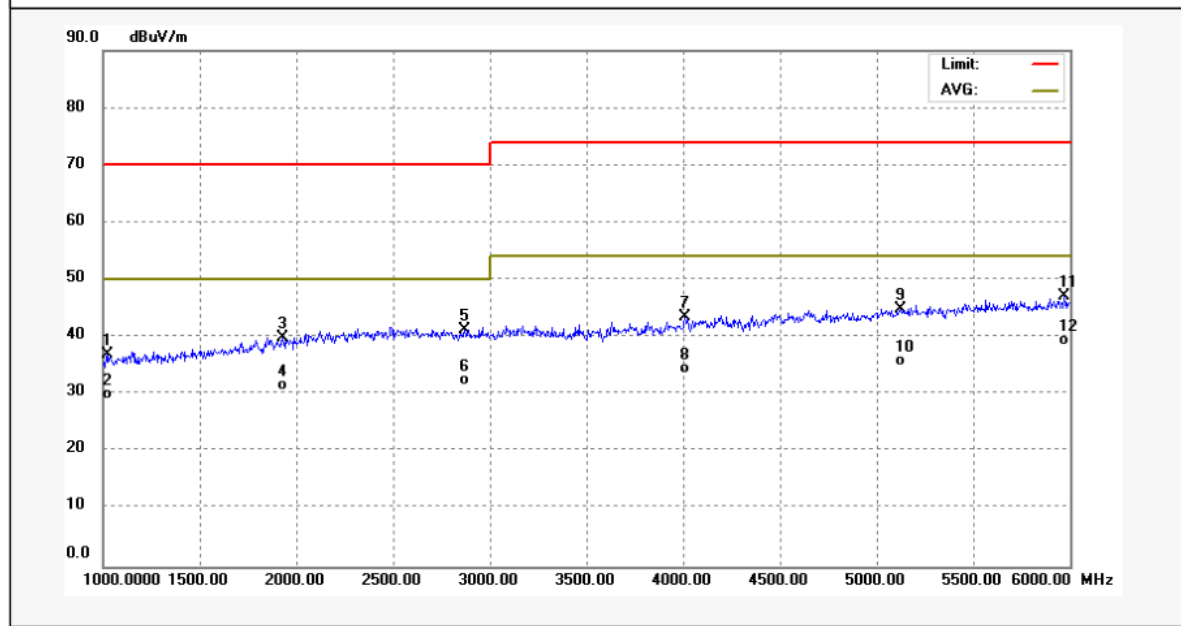
TM1 / Polarization: Horizontal



No.	Freq. (MHz)	Reading (dBuV/m)	Factor (dB)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Detector	Remark
1	1200.000	50.54	-13.10	37.44	70.00	-32.56	peak	
2	1200.000	42.06	-13.10	28.96	50.00	-21.04	AVG	
3	2335.000	50.18	-8.67	41.51	70.00	-28.49	peak	
4	2335.000	41.52	-8.67	32.85	50.00	-17.15	AVG	
5	2885.000	50.19	-8.33	41.86	70.00	-28.14	peak	
6	2885.000	41.24	-8.33	32.91	50.00	-17.09	AVG	
7	3460.000	49.97	-8.31	41.66	74.00	-32.34	peak	
8	3460.000	41.37	-8.31	33.06	54.00	-20.94	AVG	
9	4640.000	50.35	-5.77	44.58	74.00	-29.42	peak	
10	4640.000	41.05	-5.77	35.28	54.00	-18.72	AVG	
11	5585.000	50.32	-3.99	46.33	74.00	-27.67	peak	
12	5585.000	43.68	-3.99	39.69	54.00	-14.31	AVG	



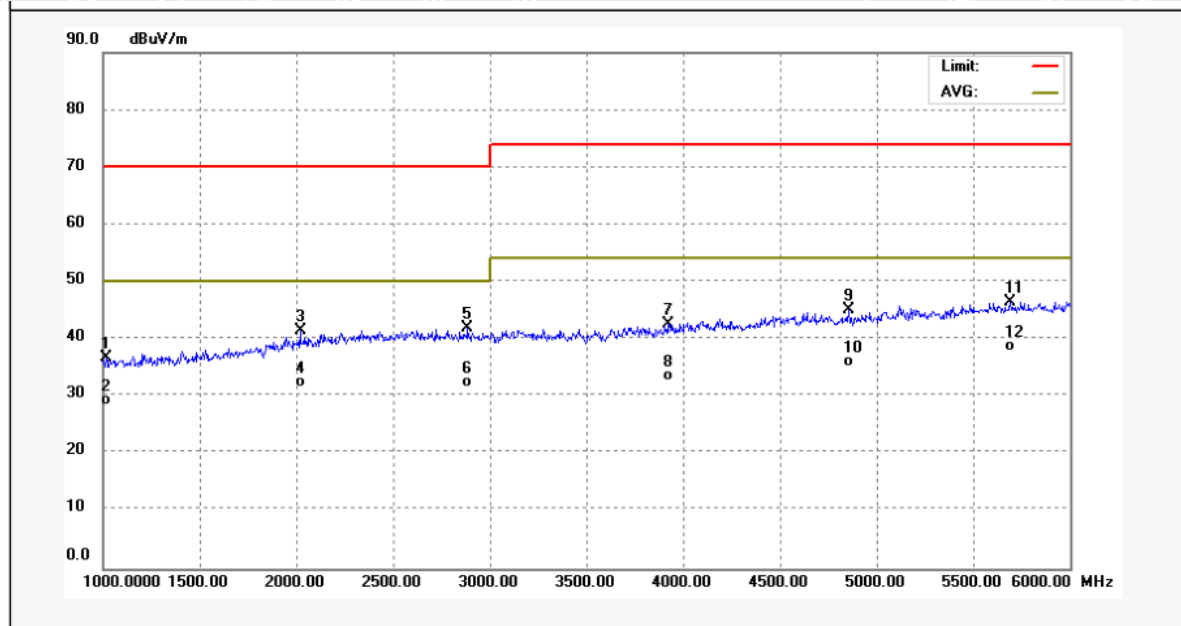
TM1 / Polarization: Vertical



No.	Freq. (MHz)	Reading (dBuV/m)	Factor (dB)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Detector	Remark
1	1025.000	50.64	-13.58	37.06	70.00	-32.94	peak	
2	1025.000	43.64	-13.58	30.06	50.00	-19.94	AVG	
3	1930.000	50.09	-10.08	40.01	70.00	-29.99	peak	
4	1930.000	41.78	-10.08	31.70	50.00	-18.30	AVG	
5	2870.000	49.61	-8.32	41.29	70.00	-28.71	peak	
6	2870.000	40.91	-8.32	32.59	50.00	-17.41	AVG	
7	4010.000	50.63	-7.11	43.52	74.00	-30.48	peak	
8	4010.000	41.75	-7.11	34.64	54.00	-19.36	AVG	
9	5125.000	49.84	-4.92	44.92	74.00	-29.08	peak	
10	5125.000	40.73	-4.92	35.81	54.00	-18.19	AVG	
11	5970.000	50.52	-3.33	47.19	74.00	-26.81	peak	
12	5970.000	42.72	-3.33	39.39	54.00	-14.61	AVG	



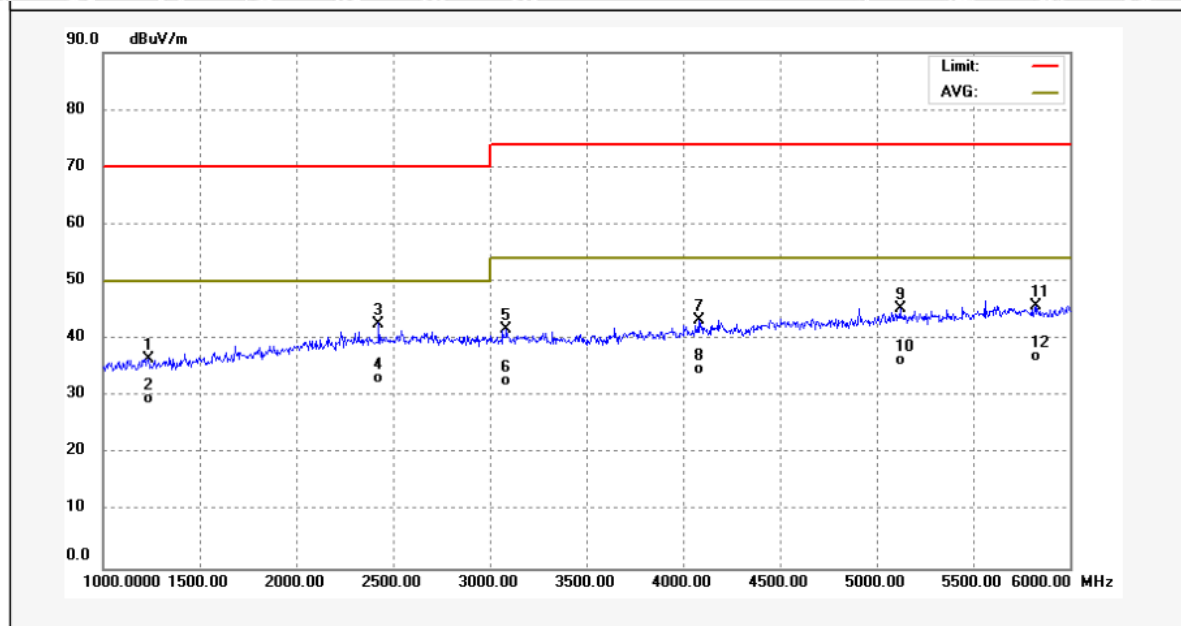
TM2 / Polarization: Horizontal



No.	Freq. (MHz)	Reading (dBuV/m)	Factor (dB)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Detector	Remark
1	1015.000	50.29	-13.60	36.69	70.00	-33.31	peak	
2	1015.000	42.99	-13.60	29.39	50.00	-20.61	AVG	
3	2020.000	51.09	-9.66	41.43	70.00	-28.57	peak	
4	2020.000	42.13	-9.66	32.47	50.00	-17.53	AVG	
5	2885.000	50.19	-8.33	41.86	70.00	-28.14	peak	
6	2885.000	40.81	-8.33	32.48	50.00	-17.52	AVG	
7	3920.000	49.96	-7.32	42.64	74.00	-31.36	peak	
8	3920.000	40.91	-7.32	33.59	54.00	-20.41	AVG	
9	4855.000	50.59	-5.42	45.17	74.00	-28.83	peak	
10	4855.000	41.51	-5.42	36.09	54.00	-17.91	AVG	
11	5690.000	50.32	-3.81	46.51	74.00	-27.49	peak	
12	5690.000	42.73	-3.81	38.92	54.00	-15.08	AVG	



TM2 / Polarization: Vertical



No.	Freq. (MHz)	Reading (dBuV/m)	Factor (dB)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Detector	Remark
1	1235.000	49.64	-13.00	36.64	70.00	-33.36	peak	
2	1235.000	42.62	-13.00	29.62	50.00	-20.38	AVG	
3	2425.000	51.14	-8.39	42.75	70.00	-27.25	peak	
4	2425.000	41.60	-8.39	33.21	50.00	-16.79	AVG	
5	3085.000	50.09	-8.36	41.73	74.00	-32.27	peak	
6	3085.000	41.20	-8.36	32.84	54.00	-21.16	AVG	
7	4080.000	50.24	-6.96	43.28	74.00	-30.72	peak	
8	4080.000	41.68	-6.96	34.72	54.00	-19.28	AVG	
9	5120.000	50.30	-4.92	45.38	74.00	-28.62	peak	
10	5120.000	41.20	-4.92	36.28	54.00	-17.72	AVG	
11	5825.000	49.44	-3.59	45.85	74.00	-28.15	peak	
12	5825.000	40.68	-3.59	37.09	54.00	-16.91	AVG	



8 Photographs – Test Setup

8.1 Conducted emissions from AC mains power ports (150kHz-30MHz)

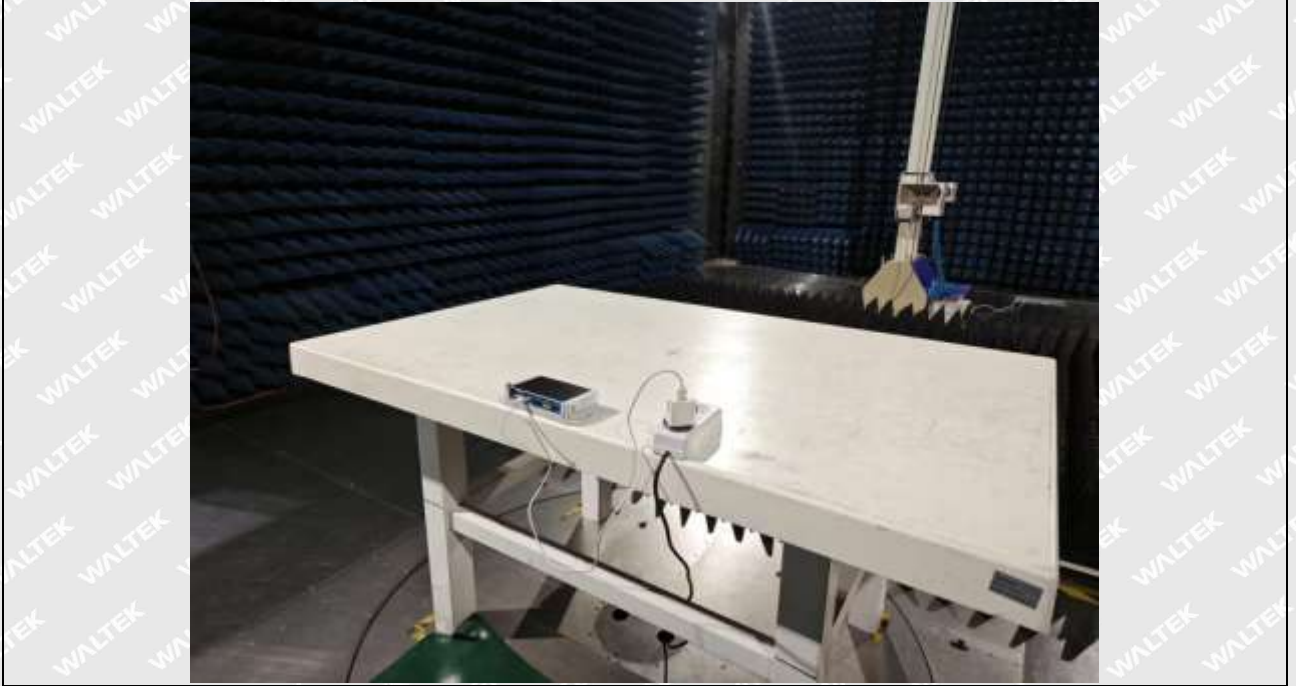


8.2 Radiated emissions (30MHz-1GHz)





8.3 Radiated emissions (above 1GHz)



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9 Photographs – Constructional Details





===== End of Report =====