TCT 通测检测 TESTING CENTRE TECHNOLOGY

EMC TEST REPORT

Radio Frequency Devices - Unintentional Radiators

Test Report No. .....:	TCT231226E004	
Date of issue .....:	Feb. 02, 2024	
Testing laboratory.....:	SHENZHEN TONGCE TESTING LAB	
Testing location/ address.....:	2101 & 2201, Zhenchang Factory, Renshan Industrial Zone, Fuhai Subdistrict, Bao'an District, Shenzhen, Guangdong, 518103, People's Republic of China	
Applicant's name .....:	HELLA GmbH & Co. KGaA	
Address.....:	Rixbecker Straße 75, 59552 Lippstadt/Germany	
Manufacturer's name.....:	HELLA GmbH & Co. KGaA	
Address.....:	Rixbecker Straße 75, 59552 Lippstadt/Germany	
Factory's name.....:	HELLA GmbH & Co. KGaA	
Address.....:	Römerstraße 66 59075 Hamm Germany	
Standard(s) .....:	FCC 47 CFR Part 15 Subpart B	
Test item description .....:	Passive Entry-Passive Start Radio Identification Device	
Trade Mark.....:	HELLA	
Model/Type reference .....:	FS197R	
Rating(s) .....:	Battery: DC 3 V	
Date of receipt of test item.....:	Dec. 26, 2023	
Date (s) of performance of test:	Dec. 26, 2023 ~ Feb. 02, 2024	
Tested by (+signature).....:	Kyle ZHOU	Kyle Zhou
Check by (+signature) .....:	Howie LYU	Howie Lyu
Approved by (+signature) .....:	Tomsin	Tomsin

General disclaimer:

This report shall not be reproduced except in full, without the written approval of SHENZHEN TONGCE TESTING LAB This document may be altered or revised by SHENZHEN TONGCE TESTING LAB personnel only, and shall be noted in the revision section of the document. The test results in the report only apply to the tested sample.

Hotline: 400-6611-140 Tel: 86-755-27673339 Fax: 86-755-27673332 http://www.tct-lab.com

Table of Contents

Hotline: 400-6611-140 Tel: 86-755-27673339 Fax: 86-755-27673332 http://www.tct-lab.com

1. General Product Information

1.1. EUT description

Test item description ..... :	Passive Entry-Passive Start Radio Identification Device
Model/Type reference ..... :	FS197R
Rating(s) ..... :	Battery: DC 3 V
Highest internal frequency F_x..... :	☐ *Fx* ≤ 108 MHz ☐ 108 MHz < *Fx* ≤ 500 MHz ☐ 500 MHz < *Fx* ≤ 1 GHz ☒ *Fx* > 1 GHz
DC Line ..... :	☐Shielded ☐Unshielded, ☐Detachable ☐Un-detachable ☒No applicable ☐Length:

1.2. Model(s) list

None.

2. Test Information

2.1.EUT operation mode(s)

Mode #	Operating mode description	Test voltage
1	Normal Operation	DC 3 V

2.2.Special accessories and auxiliary equipment

Product Type	Manufacturer	Model No.	Serial No.
/	/	/	/

Auxiliary cable description

Port name	Specified length(m)	Shielded	Unshielded
/	/	/	/

2.3.Configuration of system under test

EUT

(EUT: Passive Entry-Passive Start Radio Identification Device)

2.4.General test conditions

Environmental reference conditions

The climatic conditions during the tests are within the limits specified by the manufacturer for the operation of the EUT and the test equipment.

The climatic conditions during the tests were within the following limits:

Temperature	Humidity	Atmospheric pressure
15 °C – 35 °C	30 % - 60 %	86 kPa – 106 kPa

If explicitly required in the basic standard or applied product standard the climatic values are recorded and documented separately in this test report.

Measurement uncertainties

Test Item	Uncertainty
Uncertainty for Disturbance voltage at the mains terminals	3.10 dB
Uncertainty for Radiated emission (30 MHz to 1 GHz)	4.56 dB
Uncertainty for Radiated emission (above 1 GHz)	4.22 dB
Uncertainty for Radiated emission (1 GHz to 18 GHz)	4.22dB
Uncertainty for Radiated emission (18 GHz to 40 GHz)	4.36dB

The overall measurement uncertainty of a measurement is defined as the range of which can be supposed that it contains the true value with a specified probability.

This probability is 95 % for the generally specified measurement uncertainty (so-called expanded measurement uncertainty).

The limits for emission measurements and the Test levels for immunity tests in the applied standards were defined taking into consideration the accuracy limits for measurement and testing equipment required by the Basic standards.

All measurement and test results of the EMC laboratory of SHENZHEN TONGCE TESTING LAB fulfil the requirements for measurement uncertainties according to the standards applied.

Decision rule for statement(s) of conformity is based on simple acceptance specified in Clause 4.3.3 in IEC Guide 115:2023.

3. Test Result Summary

FCC 47 CFR Part 15 Subpart B	
Requirement – Test case	**Verdict**
Classification Class (☐A ☒B)	—
Disturbance voltage at the mains terminals	N/A
Radiated emission	Pass
Remark:---	

Test case verdicts	
- Test case does not apply to the test object ..... :	N/A
- Test object does meet the requirement ..... :	P (Pass)
- Test object does not meet the requirement ..... :	F (Fail)

4. List of Test Equipment

Equipment	Manufacturer	Model No.	Serial No.	Cal. Due
Disturbance voltage at mains terminals				
EMI Test Receiver	R&S	ESCI3	100898	2024/06/29
Line Impedance Stabilisation Newtork(LISN)	Schwarzbeck	NSLK 8126	8126453	2024/02/20
Attenuator	N/A	10dB	164080	2024/06/29
844 Shielded room	SKET	8m*4m*4m	CR4	2024/03/02
Test software	EZ_EMC	EMEC-3A1	/	/
Radiated emission (30 MHz to 1 GHz)				
Broadband Antenna	Schwarzbeck	VULB 9168	01197	2024/02/24
EMI Test Receiver	R&S	ESCI7	100529	2024/02/20
Test software	EZ_EMC	FA-03A2 RE+	/	/
3m Anechoic Chamber	SKET	9m*6m*6m	SA01	2025/01/25
Radiated emission (above 1 GHz)				
Horn Antenna	Schwarzbeck	BBHA 9120 D	02372	2024/02/24
Horn Antenna	Schwarzbeck	BBHA 9170	00956	2024/02/24
Signal Analyzer	R&S	FSQ40	200061	2024/06/29
Pre-amplifier	SKET	LNPA_0118G-45	SK2021012102	2024/02/20
Pre-amplifier	SKET	LNPA_1840G-50	SK202109203500	2024/02/20
3m Anechoic Chamber	SKET	9m*6m*6m	SA03	2025/01/25
Test software	EZ_EMC	FA-03A2 RE+	/	/

5. Test Conditions and Results

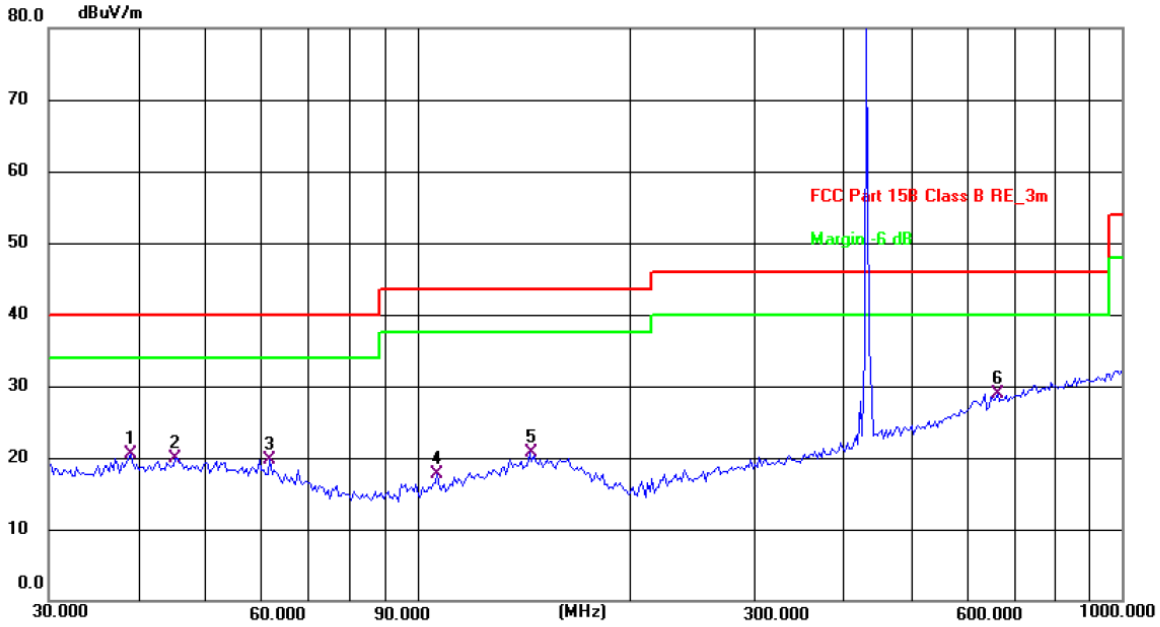
5.1. Disturbance voltage at mains terminals

Test requirement.....:	FCC 47 CFR Part 15 Subpart B		
Basic standard .....:	ANSI C63.4: 2014+A1:2017		
Test frequency range.:	150 kHz to 30 MHz		
Limits.....:	**Limits for Class A**		
	Frequency (MHz)	**dBµV Quasi-peak**	**dBµV Average**
	0.15 to 0.5	79	66
	0.5 to 30	73	60
	Limits for Class B		
	Frequency (MHz)	**dBµV Quasi-peak**	**dBµV Average**
	0.15 to 0.5	66 to 56	56 to 46
	0.5 to 5	56	46
	5 to 30	60	50
Test method.....:	The AMN placed 0.8 m from the boundary of the unit under test and bonded to a ground reference plane. This distance was between the closest points of the AMN and the EUT. All other units of the EUT and associated equipment were at least 0.8 m from the AMN. All power was connected to the system through Artificial Mains Network (AMN).		
Ambient temperature.:	/		
Relative humidity.....:	/		
Test location .....:	/		
Test model(s) .....:	/		
EUT operation mode..:	/		
Test results .....:	N/A		
Remark.....:	According to the electrical construction of the EUT, there is no AC terminal incorporated. Therefore this test is not applicable for this EUT.		

5.2. Radiated emission

Test requirement.....:	FCC 47 CFR Part 15 Subpart B				
Basic standard .....:	ANSI C63.4: 2014+A1:2017				
Test frequency range..:	30 MHz to 40 GHz				
Limits.....:	**Frequency (MHz)**	**3 m measurement distance**			
		Quasi-peak (dBµV/m)			
		Class A		**Class B**	
	30 to 88	49		40	
	88 to 216	53.5		43.5	
	216 to 960	56.4		46	
	960 to 1000	59.5		54	
	Frequency (MHz)	**3 m measurement distance**			
		Class A		**Class B**	
		Peak (dBµV/m)	**Average (dBµV/m)**	**Peak (dBµV/m)**	**Average (dBµV/m)**
	Above 1000	79.5	59.5	74	54
Test method.....:	Measurements were made in a 3-meter semi-anechoic chamber that complies to CISPR 16. Preliminary (peak) measurements were performed at an antenna to EUT separation distance of 3 meters with the receive antenna located at 1 to 4-meter height in both horizontal and vertical polarities. Final measurements (quasi-peak) were then performed by rotating the EUT 360° and adjusting the receive antenna height from 1 to 4-meters. All frequencies were investigated in both horizontal and vertical antenna polarity, where applicable.				
Ambient temperature..:	24.2 °C (30 MHz to 1 GHz) 25.3 °C (Above 1 GHz)				
Relative humidity.....:	51 % (30 MHz to 1 GHz) 50 % (Above 1 GHz)				
Test location.....:	2101 & 2201, Zhenchang Factory, Renshan Industrial Zone, Fuhai Subdistrict, Bao'an District, Shenzhen, Guangdong, 518103, People's Republic of China				
Test model(s) .....:	FS197R				
EUT operation mode..:	Mode 1				
Test results.....:	Pass				
Remark.....:	/				

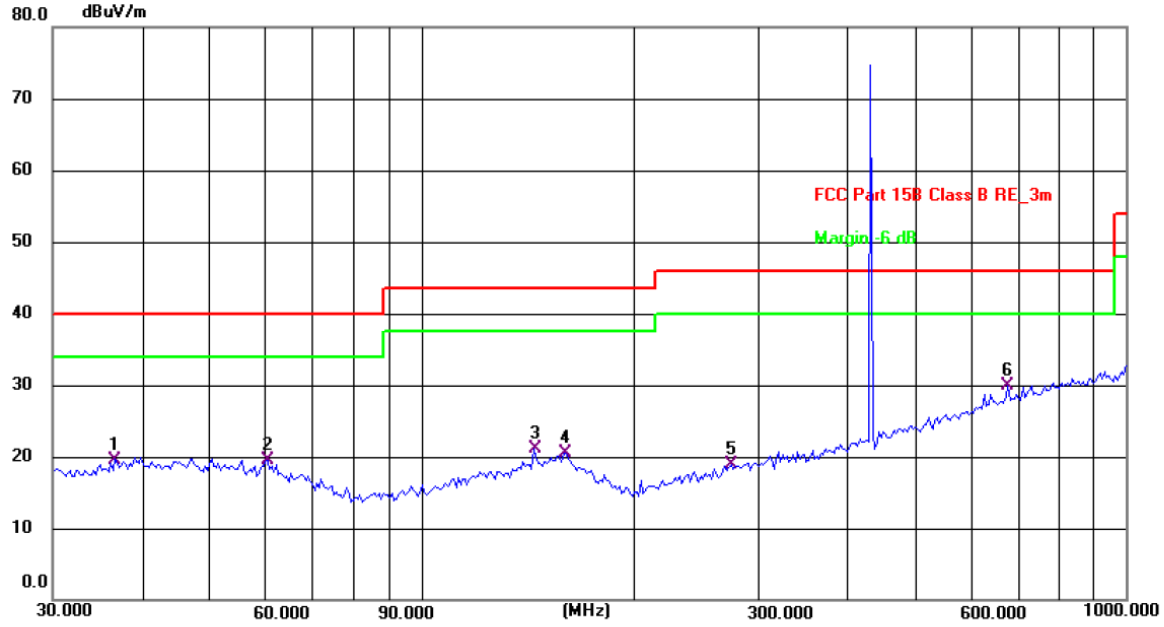
Measurement data and Graphical presentation of the result



Site: #1 3m Anechoic Chamber Polarization: ***Horizontal*** Temperature: 24.2(C) Humidity: 51 %

Limit: FCC Part 15B Class B RE_3m Power: DC 3 V

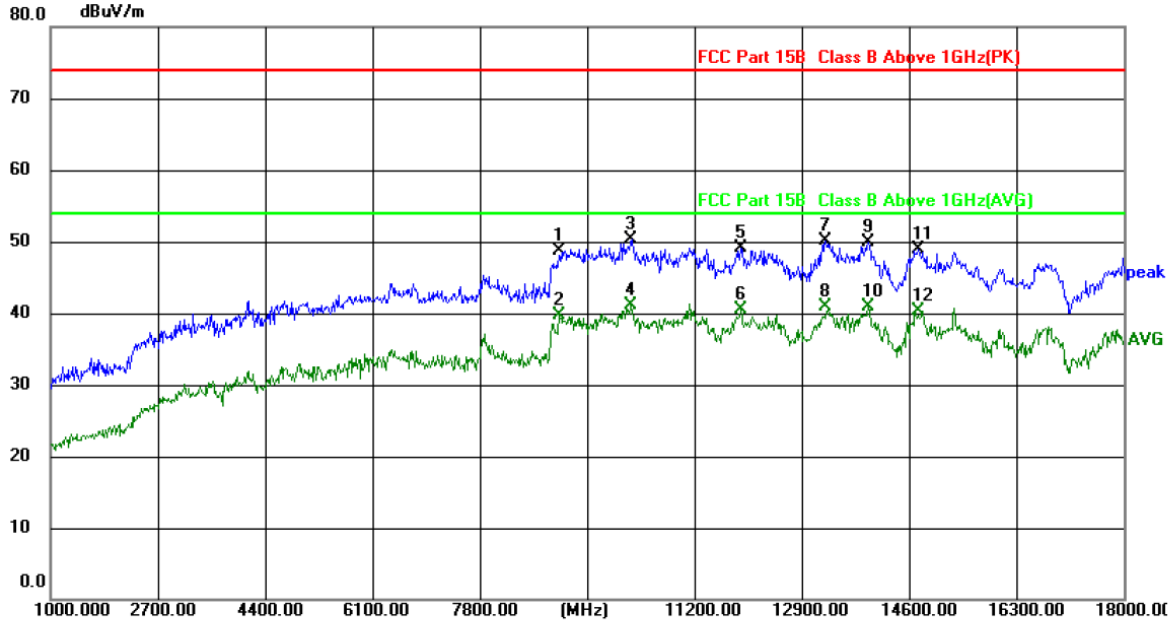
No.	Frequency (MHz)	Reading (dBuV)	Factor (dB/m)	Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Detector	P/F	Remark
1	39.1613	6.27	14.15	20.42	40.00	-19.58	QP	P	
2	45.3753	6.08	13.79	19.87	40.00	-20.13	QP	P	
3	61.7779	7.14	12.61	19.75	40.00	-20.25	QP	P	
4	106.7587	6.46	11.18	17.64	43.50	-25.86	QP	P	
5	144.3346	6.72	14.08	20.80	43.50	-22.70	QP	P	
6 *	665.8034	7.15	21.80	28.95	46.00	-17.05	QP	P	



Site: #1 3m Anechoic Chamber Polarization: ***Vertical*** Temperature: 24.2(C) Humidity: 51 %

Limit: FCC Part 15B Class B RE_3m Power: DC 3 V

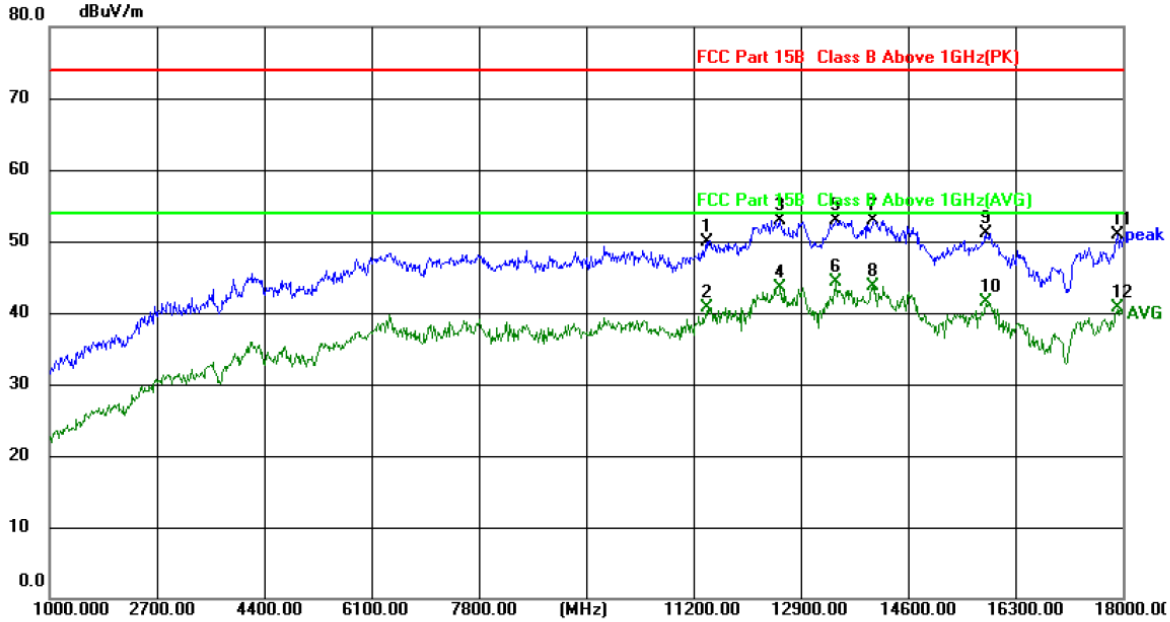
No.	Frequency (MHz)	Reading (dBuV)	Factor (dB/m)	Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Detector	P/F	Remark
1	36.7661	5.83	13.77	19.60	40.00	-20.40	QP	P	
2	60.4917	6.68	12.83	19.51	40.00	-20.49	QP	P	
3	144.3346	6.98	14.08	21.06	43.50	-22.44	QP	P	
4	159.2250	6.03	14.50	20.53	43.50	-22.97	QP	P	
5	275.1569	5.65	13.27	18.92	46.00	-27.08	QP	P	
6 *	679.9600	8.08	21.90	29.98	46.00	-16.02	QP	P	



Site: #3 3m Anechoic Chamber Polarization: ***Horizontal*** Temperature: 25.3(℃) Humidity: 50 %

Limit: FCC Part 15B Class B Above 1GHz(PK) Power:DC 3 V

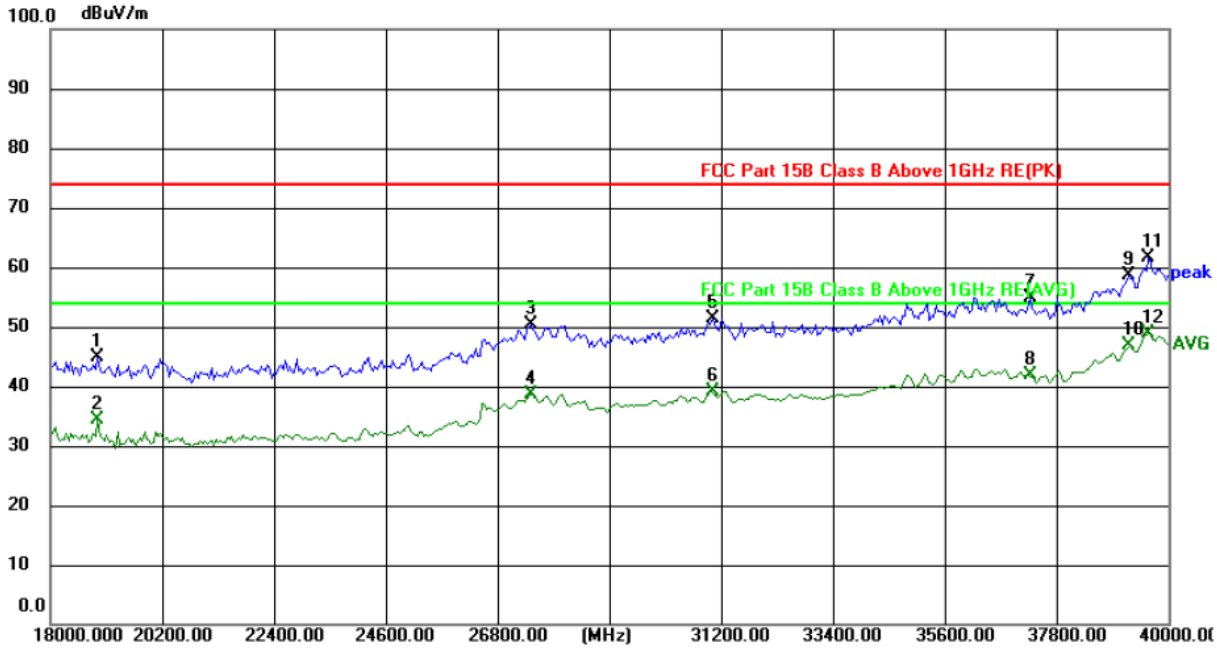
No.	Frequency (MHz)	Reading (dBuV)	Factor (dB/m)	Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Detector	P/F	Remark
1	9066.500	51.63	-2.95	48.68	74.00	-25.32	peak	P	
2	9066.500	42.64	-2.95	39.69	54.00	-14.31	AVG	P	
3	10219.100	51.63	-1.27	50.36	74.00	-23.64	peak	P	
4 *	10219.100	42.30	-1.27	41.03	54.00	-12.97	AVG	P	
5	11951.400	49.46	-0.28	49.18	74.00	-24.82	peak	P	
6	11951.400	40.75	-0.28	40.47	54.00	-13.53	AVG	P	
7	13292.700	48.64	1.51	50.15	74.00	-23.85	peak	P	
8	13292.700	39.31	1.51	40.82	54.00	-13.18	AVG	P	
9	13969.300	45.77	4.22	49.99	74.00	-24.01	peak	P	
10	13969.300	36.65	4.22	40.87	54.00	-13.13	AVG	P	
11	14751.300	44.46	4.37	48.83	74.00	-25.17	peak	P	
12	14751.300	35.98	4.37	40.35	54.00	-13.65	AVG	P	



Site: #3 3m Anechoic Chamber Polarization: *Vertical* Temperature: 25.3(℃) Humidity: 50 %

Limit: FCC Part 15B Class B Above 1GHz(PK) Power:DC 3 V

No.	Frequency (MHz)	Reading (dBuV)	Factor (dB/m)	Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Detector	P/F	Remark
1	11429.500	49.82	0.03	49.85	74.00	-24.15	peak	P	
2	11429.500	40.71	0.03	40.74	54.00	-13.26	AVG	P	
3	12571.900	53.28	-0.40	52.88	74.00	-21.12	peak	P	
4	12571.900	43.89	-0.40	43.49	54.00	-10.51	AVG	P	
5	13481.400	50.85	2.10	52.95	74.00	-21.05	peak	P	
6 *	13481.400	42.27	2.10	44.37	54.00	-9.63	AVG	P	
7	14052.600	48.62	4.33	52.95	74.00	-21.05	peak	P	
8	14052.600	39.45	4.33	43.78	54.00	-10.22	AVG	P	
9	15830.800	50.39	0.75	51.14	74.00	-22.86	peak	P	
10	15830.800	40.80	0.75	41.55	54.00	-12.45	AVG	P	
11	17928.600	41.45	9.43	50.88	74.00	-23.12	peak	P	
12	17928.600	31.36	9.43	40.79	54.00	-13.21	AVG	P	

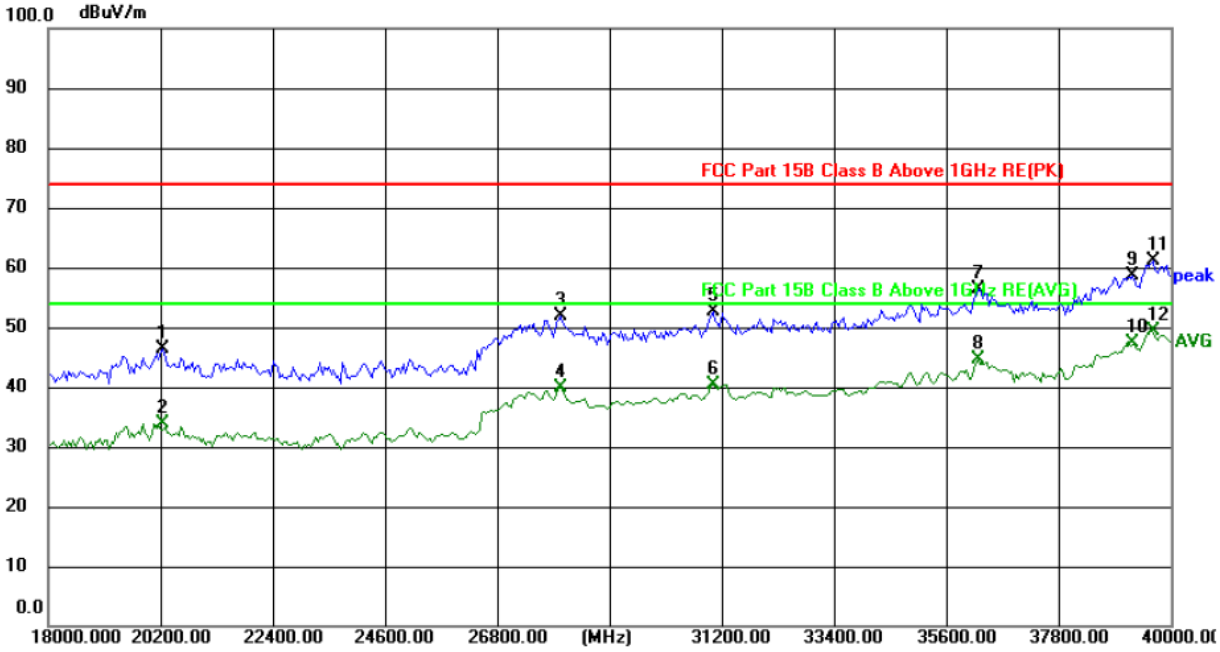


Site: #3 3m Anechoic Chamber Polarization: *Horizontal* Temperature: 25.3(℃) Humidity: 50 %

Limit: FCC Part 15B Class B Above 1GHz RE(PK) Power:DC 3 V

No.	Frequency (MHz)	Reading (dBuV)	Factor (dB/m)	Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Detector	P/F	Remark
1	18924.000	28.44	16.55	44.99	74.00	-29.01	peak	P	
2	18924.000	17.79	16.55	34.34	54.00	-19.66	AVG	P	
3	27460.000	30.00	20.32	50.32	74.00	-23.68	peak	P	
4	27460.000	18.35	20.32	38.67	54.00	-15.33	AVG	P	
5	31024.000	29.31	22.01	51.32	74.00	-22.68	peak	P	
6	31024.000	17.09	22.01	39.10	54.00	-14.90	AVG	P	
7	37272.000	30.36	24.53	54.89	74.00	-19.11	peak	P	
8	37272.000	17.45	24.53	41.98	54.00	-12.02	AVG	P	
9	39208.000	33.26	25.46	58.72	74.00	-15.28	peak	P	
10	39208.000	21.31	25.46	46.77	54.00	-7.23	AVG	P	
11	39604.000	36.07	25.58	61.65	74.00	-12.35	peak	P	
12 *	39604.000	23.40	25.58	48.98	54.00	-5.02	AVG	P	

Hotline: 400-6611-140 Tel: 86-755-27673339 Fax: 86-755-27673332 http://www.tct-lab.com



Site: #3 3m Anechoic Chamber Polarization: *Vertical* Temperature: 25.3(℃) Humidity: 50 %

Limit: FCC Part 15B Class B Above 1GHz RE(PK) Power:DC 3 V

No.	Frequency (MHz)	Reading (dBuV)	Factor (dB/m)	Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Detector	P/F	Remark
1	20244.000	29.09	17.22	46.31	74.00	-27.69	peak	P	
2	20244.000	16.75	17.22	33.97	54.00	-20.03	AVG	P	
3	28032.000	31.04	20.73	51.77	74.00	-22.23	peak	P	
4	28032.000	19.21	20.73	39.94	54.00	-14.06	AVG	P	
5	31024.000	30.53	22.01	52.54	74.00	-21.46	peak	P	
6	31024.000	18.44	22.01	40.45	54.00	-13.55	AVG	P	
7	36216.000	32.23	24.11	56.34	74.00	-17.66	peak	P	
8	36216.000	20.47	24.11	44.58	54.00	-9.42	AVG	P	
9	39252.000	33.07	25.48	58.55	74.00	-15.45	peak	P	
10	39252.000	22.00	25.48	47.48	54.00	-6.52	AVG	P	
11	39648.000	35.46	25.59	61.05	74.00	-12.95	peak	P	
12 *	39648.000	23.79	25.59	49.38	54.00	-4.62	AVG	P	

6. Test set-up photo

Refer to the Appendix A

7. Photo of the EUT

Refer to the Appendix B

********End of report********