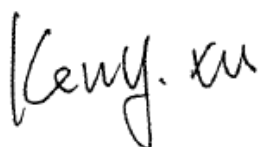


TEST REPORT

Application No.: SZEM1909018272CR
Applicant: Zhuhai Pantum Electronics Co., Ltd.
Address of Applicant: Area A, 3rd floor, Building No.1, No.3883, Zhuhai Avenue, Zhuhai, Guangdong, China
Manufacturer: Zhuhai Pantum Electronics Co., Ltd.
Address of Manufacturer: Area A, 3rd floor, Building No.1, No.3883, Zhuhai Avenue, Zhuhai, Guangdong, China
Factory: Zhuhai Pantum Electronics Co., Ltd.
Address of Factory: Area A, 3rd floor, Building No.1, No.3883, Zhuhai Avenue, Zhuhai, Guangdong, China
Equipment Under Test (EUT):
EUT Name: Monochrome Laser Printer
Model No.: P3010DW, P3012DW, P3015DW, P3016DW, P3017DW, P3018DW, P3300DW, P3302DW, P3305DW, P3306DW, P3307DW, P3308DW *
 * Please refer to section 2 of this report which indicates which model was actually tested and which were electrically identical.
Trade Mark: PANTUM
FCC ID: 2AEGOPANTUM-4
Standard(s) : 47 CFR Part 15, Subpart C 15.247
Date of Receipt: 2019-09-05
Date of Test: 2019-09-06 to 2019-09-09
Date of Issue: 2019-09-16

Test Result:	Pass*
---------------------	--------------

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

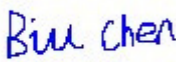



Keny Xu
 EMC Laboratory Manager



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Revision Record				
Version	Chapter	Date	Modifier	Remark
01		2019-09-16		Original

Authorized for issue by:			
			
		<hr/> Bill Chen /Project Engineer	
			
		<hr/> Eric Fu /Reviewer	



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2 Test Summary

Radio Spectrum Matter Part				
Item	Standard	Method	Requirement	Result
Conducted Emissions at AC Power Line (150kHz-30MHz)	47 CFR Part 15, Subpart C 15.247	ANSI C63.10 (2013) Section 6.2	47 CFR Part 15, Subpart C 15.207	Pass
Radiated Spurious Emissions	47 CFR Part 15, Subpart C 15.247	ANSI C63.10 (2013) Section 6.4,6.5,6.6	47 CFR Part 15, Subpart C 15.209 & 15.247(d)	Pass

Remark:

Model No.: P3010DW, P3012DW, P3015DW, P3016DW, P3017DW, P3018DW, P3300DW, P3302DW, P3305DW, P3306DW, P3307DW, P3308DW

Only the model P3300DW was tested, since the electrical circuit design, layout, components used, internal wiring and functions were identical for the above models, only the below are different.

Model	Speed	Color	Communication Interface
P3010DW, P3012DW, P3015DW, P3016DW, P3017DW, P3018DW	30ppm	Various	USB+WIFI+NET+NFC
P3300DW, P3302DW, P3305DW, P3306DW, P3307DW, P3308DW	33ppm		USB+WIFI+NET+NFC

This test report (Ref. No.: SZEM190901827201) is only valid with the original test report (Ref. No.: SZEM160800655501).

Compared with the original report, this report just changed the Electronic Components.

According to the declaration from the applicant, the items in this report and the models in original report were identical on RF module electrical circuit design, layout, components used and internal wiring, the new sample in this report has changed in following: Add a new power board; Data board to improve energy efficiency, fine-tuned the socket circuit on the board .

Considering to the difference, pre-scan were performed on the sample in this report to find the items which can be influential to the result in the original test report for fully retest.

Therefore in this report Conducted Emissions at AC Power Line (150kHz-30MHz) and Radiated Spurious Emissions from 30MHz to 1GHz were fully retested on model P3010DW and shown the data in this report, other tests data please refer to original report SZEM160800655501.



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4 General Information

4.1 Details of E.U.T.

Power supply:	AC 120V 60Hz
Test voltage:	120V
Cable:	AC Cable:180cm shield USB Cable:145cm shield
Operation Frequency:	IEEE 802.11b/g/n(HT20): 2412MHz to 2462MHz
Channel Numbers:	IEEE 802.11b/g, IEEE 802.11n HT20: 11 Channels
Channel Separation:	5MHz
Type of Modulation:	IEEE for 802.11b: DSSS(CCK,DQPSK,DBPSK) IEEE for 802.11g: OFDM(64QAM, 16QAM, QPSK, BPSK) IEEE for 802.11n(T20) : OFDM (64QAM, 16QAM, QPSK,BPSK)
Sample Type:	Fixed product
Antenna Type :	Integral
Antenna Gain:	2dBi

Operation Frequency each of channel(802.11b/g/n HT20)							
Channel	Frequency	Channel	Frequency	Channel	Frequency	Channel	Frequency
1	2412MHz	4	2427MHz	7	2442MHz	10	2457MHz
2	2417MHz	5	2432MHz	8	2447MHz	11	2462MHz
3	2422MHz	6	2437MHz	9	2452MHz		

Note:

In section 15.31(m), regards to the operating frequency range over 10 MHz, the Lowest frequency, the middle frequency, and the highest frequency of channel were selected to perform the test, and the selected channel see below:

For 802.11b/g/n (HT20):

Channel	Frequency
The Lowest channel	2412MHz
The Middle channel	2437MHz
The Highest channel	2462MHz



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4.2 Description of Support Units

The EUT has been tested as an independent unit.

4.3 Measurement Uncertainty

No.	Item	Measurement Uncertainty
1	Conducted Spurious emissions	± 0.75dB
2	Radiated Spurious emission test	± 4.5dB (Below 1GHz)
		± 4.8dB (Above 1GHz)
3	Temperature test	± 1 °C
4	Humidity test	± 3%
5	Supply voltages	± 1.5%
6	Time	± 3%



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4.4 Test Location

All tests were performed at:

SGS-CSTC Standards Technical Services Co., Ltd., Shenzhen Branch

No. 1 Workshop, M-10, Middle Section, Science & Technology Park, Shenzhen, Guangdong, China. 518057.

Tel: +86 755 2601 2053 Fax: +86 755 2671 0594

No tests were sub-contracted.

4.5 Test Facility

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

• **CNAS (No. CNAS L2929)**

CNAS has accredited SGS-CSTC Standards Technical Services Co., Ltd. Shenzhen Branch EMC Lab to ISO/IEC 17025:2005 General Requirements for the Competence of Testing and Calibration Laboratories (CNAS-CL01 Accreditation Criteria for the Competence of Testing and Calibration Laboratories) for the competence in the field of testing.

• **A2LA (Certificate No. 3816.01)**

SGS-CSTC Standards Technical Services Co., Ltd., Shenzhen EMC Laboratory is accredited by the American Association for Laboratory Accreditation(A2LA). Certificate No. 3816.01.

• **VCCI**

The 3m Fully-anechoic chamber for above 1GHz, 10m Semi-anechoic chamber for below 1GHz, Shielded Room for Mains Port Conducted Interference Measurement and Telecommunication Port Conducted Interference Measurement of SGS-CSTC Standards Technical Services Co., Ltd. have been registered in accordance with the Regulations for Voluntary Control Measures with Registration No.: G-20026, R-14188, C-12383 and T-11153 respectively.

• **FCC –Designation Number: CN1178**

SGS-CSTC Standards Technical Services Co., Ltd., Shenzhen EMC Laboratory has been recognized as an accredited testing laboratory.

Designation Number: CN1178. Test Firm Registration Number: 406779.

• **Innovation, Science and Economic Development Canada**

SGS-CSTC Standards Technical Services Co., Ltd., Shenzhen EMC Laboratory has been recognized by ISED as an accredited testing laboratory.

CAB identifier: CN0006.

IC#: 4620C.

4.6 Deviation from Standards

None

4.7 Abnormalities from Standard Conditions

None



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5 Equipment List

Conducted Emissions at AC Power Line (150kHz-30MHz)					
Equipment	Manufacturer	Model No	Inventory No	Cal Date	Cal Due Date
Shielding Room	ZhongYu Electron	GB-88	SEM001-06	2019-06-13	2022-06-12
Measurement Software	AUDIX	e3 V8.2014-6-27	N/A	N/A	N/A
Coaxial Cable	SGS	N/A	SEM024-01	2019-07-11	2020-07-10
LISN	Rohde & Schwarz	ENV216	SEM007-01	2018-09-25	2019-09-24
LISN	ETS-LINDGREN	3816/2	SEM007-02	2019-04-01	2020-03-31
EMI Test Receiver	Rohde & Schwarz	ESCI	SEM004-02	2019-04-01	2020-03-31

Radiated Emissions					
Test Equipment	Manufacturer	Model No.	Inventory No.	Cal. Date	Cal. Due date
3m Semi-Anechoic Chamber	ETS-LINDGREN	N/A	SEM001-01	2017-08-05	2020-08-04
MXE EMI Receiver (20Hz-8.4GHz)	Agilent Technologies	N9038A	SEM004-05	2018-09-25	2019-09-24
BiConiLog Antenna (26-3000MHz)	ETS-LINDGREN	3142C	SEM003-01	2017-06-27	2020-06-26
Pre-amplifier (0.1-1300MHz)	Agilent Technologies	8447D	SEM005-01	2019-04-01	2020-03-31
Measurement Software	AUDIX	e3 V8.2014-6-27	N/A	N/A	N/A
Coaxial Cable	SGS	N/A	SEM025-01	2019-07-10	2020-07-09

General used equipment					
Equipment	Manufacturer	Model No	Inventory No	Cal Date	Cal Due Date
Humidity/ Temperature Indicator	Shanghai Meteorological Industry Factory	ZJ1-2B	SEM002-03	2018-09-27	2019-09-26
Humidity/ Temperature Indicator	Shanghai Meteorological Industry Factory	ZJ1-2B	SEM002-04	2018-09-27	2019-09-26
Humidity/ Temperature Indicator	Mingle	N/A	SEM002-08	2018-09-27	2019-09-26
Barometer	Changchun Meteorological Industry Factory	DYM3	SEM002-01	2019-04-04	2020-04-03



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6 Radio Spectrum Matter Test Results

6.1 Conducted Emissions at AC Power Line (150kHz-30MHz)

Test Requirement 47 CFR Part 15, Subpart C 15.207

Test Method: ANSI C63.10 (2013) Section 6.2

Limit:

Frequency of emission(MHz)	Conducted limit(dBμV)	
	Quasi-peak	Average
0.15-0.5	66 to 56*	56 to 46*
0.5-5	56	46
5-30	60	50

*Decreases with the logarithm of the frequency.

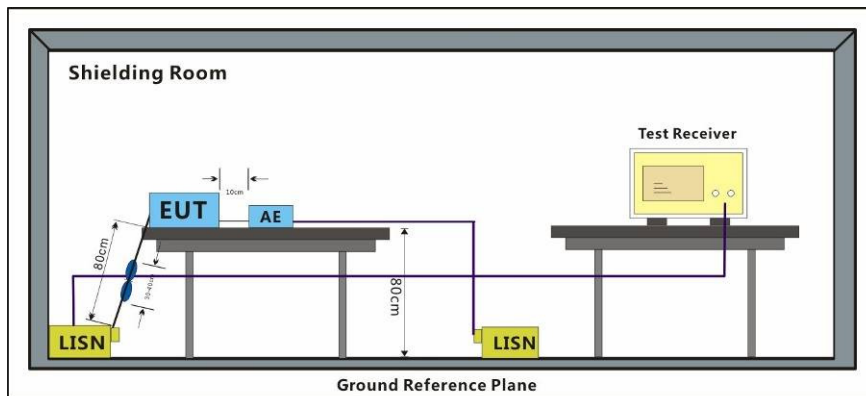
6.1.1 E.U.T. Operation

Operating Environment:

Temperature: 19.4 °C Humidity: 53 % RH Atmospheric Pressure: 1005 mbar

Test mode a:Charge + TX mode_Keep the EUT in charging and continuously transmitting mode with all modulation types. All data rates for each modulation type have been tested and found the data rate @ 1Mbps is the worst case of IEEE 802.11b; data rate @ 6Mbps is the worst case of IEEE 802.11g; data rate @ 6.5Mbps is the worst case of IEEE 802.11n(HT20). Only the data of worst case is recorded in the report.

6.1.2 Test Setup Diagram



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6.1.3 Measurement Procedure and Data

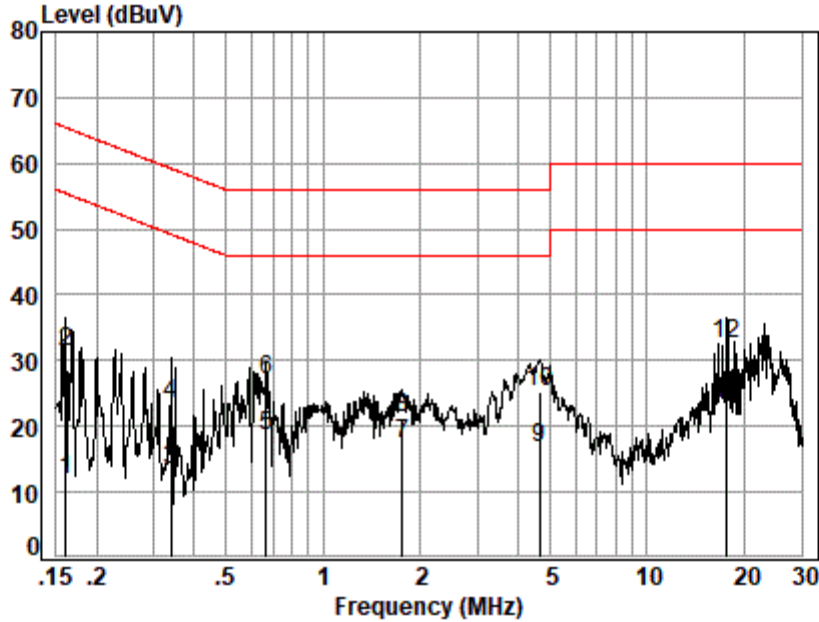
- 1) The mains terminal disturbance voltage test was conducted in a shielded room.
- 2) The EUT was connected to AC power source through a LISN 1 (Line Impedance Stabilization Network) which provides a 50ohm/50μH + 5ohm linear impedance. The power cables of all other units of the EUT were connected to a second LISN 2, which was bonded to the ground reference plane in the same way as the LISN 1 for the unit being measured. A multiple socket outlet strip was used to connect multiple power cables to a single LISN provided the rating of the LISN was not exceeded.
- 3) The tabletop EUT was placed upon a non-metallic table 0.8m above the ground reference plane. And for floor-standing arrangement, the EUT was placed on the horizontal ground reference plane,
- 4) The test was performed with a vertical ground reference plane. The rear of the EUT shall be 0.4 m from the vertical ground reference plane. The vertical ground reference plane was bonded to the horizontal ground reference plane. The LISN 1 was placed 0.8 m from the boundary of the unit under test and bonded to a ground reference plane for LISNs mounted on top of the ground reference plane. This distance was between the closest points of the LISN 1 and the EUT. All other units of the EUT and associated equipment was at least 0.8 m from the LISN 2.
- 5) In order to find the maximum emission, the relative positions of equipment and all of the interface cables must be changed according to ANSI C63.10 on conducted measurement.

Remark: LISN=Read Level+ Cable Loss+ LISN Factor



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Mode:a; Line:Live Line



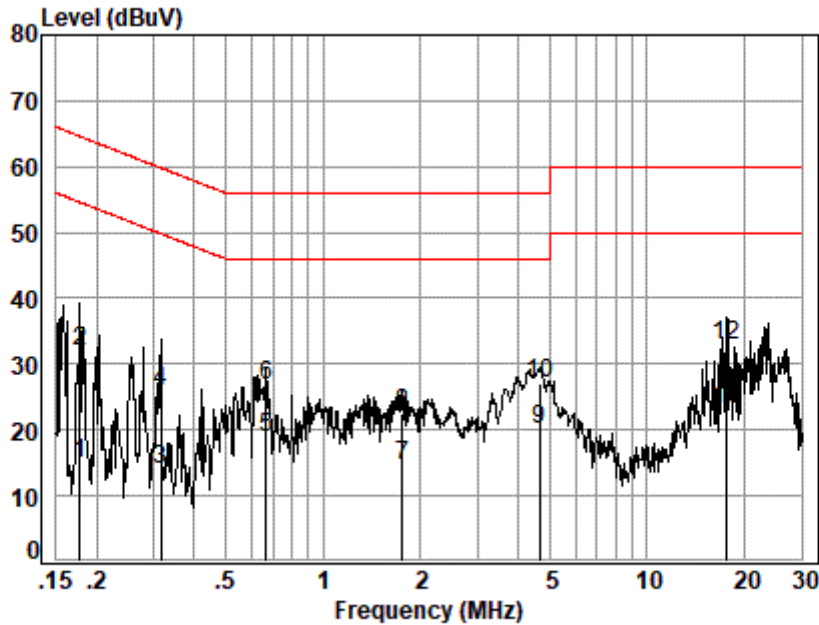
Site : Shielding Room
Condition: Line
Job No. : 18272CR
Test mode: a

	Freq	Cable Loss	LISN Factor	Read Level	Limit Level	Limit Line	Over Limit	Remark
	MHz	dB	dB	dBuV	dBuV	dBuV	dB	
1	0.16	0.01	9.66	2.33	12.00	55.43	-43.43	Average
2	0.16	0.01	9.66	21.52	31.19	65.43	-34.24	QP
3	0.34	0.04	9.67	3.75	13.46	49.22	-35.76	Average
4	0.34	0.04	9.67	13.66	23.37	59.22	-35.85	QP
5	0.67	0.07	9.68	8.73	18.48	46.00	-27.52	Average
6	0.67	0.07	9.68	17.35	27.10	56.00	-28.90	QP
7	1.75	0.15	9.72	7.54	17.41	46.00	-28.59	Average
8	1.75	0.15	9.72	11.57	21.44	56.00	-34.56	QP
9	4.67	0.17	9.73	6.83	16.73	46.00	-29.27	Average
10	4.67	0.17	9.73	15.35	25.25	56.00	-30.75	QP
11	17.57	0.23	10.19	13.01	23.43	50.00	-26.57	Average
12	17.57	0.23	10.19	21.98	32.40	60.00	-27.60	QP



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Mode:a; Line:Neutral Line



Site : Shielding Room
 Condition: Neutral
 Job No. : 18272CR
 Test mode: a

	Freq	Cable Loss	LISN Factor	Read Level	Limit Level	Limit Line	Over Limit	Remark
	MHz	dB	dB	dBuV	dBuV	dBuV	dB	
1	0.18	0.02	9.64	5.37	15.03	54.59	-39.56	Average
2	0.18	0.02	9.64	22.27	31.93	64.59	-32.66	QP
3	0.31	0.04	9.64	4.31	13.99	49.84	-35.85	Average
4	0.31	0.04	9.64	16.23	25.91	59.84	-33.93	QP
5	0.66	0.07	9.65	9.05	18.77	46.00	-27.23	Average
6	0.66	0.07	9.65	17.01	26.73	56.00	-29.27	QP
7	1.76	0.15	9.69	4.65	14.49	46.00	-31.51	Average
8	1.76	0.15	9.69	12.78	22.62	56.00	-33.38	QP
9	4.67	0.17	9.70	10.15	20.02	46.00	-25.98	Average
10	4.67	0.17	9.70	17.16	27.03	56.00	-28.97	QP
11	17.57	0.23	10.23	12.61	23.07	50.00	-26.93	Average
12	17.57	0.23	10.23	22.52	32.98	60.00	-27.02	QP



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6.2 Radiated Spurious Emissions

Test Requirement 47 CFR Part 15, Subpart C 15.209 & 15.247(d)

Test Method: ANSI C63.10 (2013) Section 6.4,6.5,6.6

Measurement Distance: 3m

Limit:

Frequency(MHz)	Field strength(microvolts/meter)	Measurement distance(meters)
0.009-0.490	2400/F(kHz)	300
0.490-1.705	24000/F(kHz)	30
1.705-30.0	30	30
30-88	100	3
88-216	150	3
216-960	200	3
Above 960	500	3

Remark: The emission limits shown in the above table are based on measurements employing a CISPR quasi-peak detector except for the frequency bands 9-90kHz, 110-490kHz and above 1000 MHz. Radiated emission limits in these three bands are based on measurements employing an average detector, the peak field strength of any emission shall not exceed the maximum permitted average limits specified above by more than 20 dB under any condition of modulation.



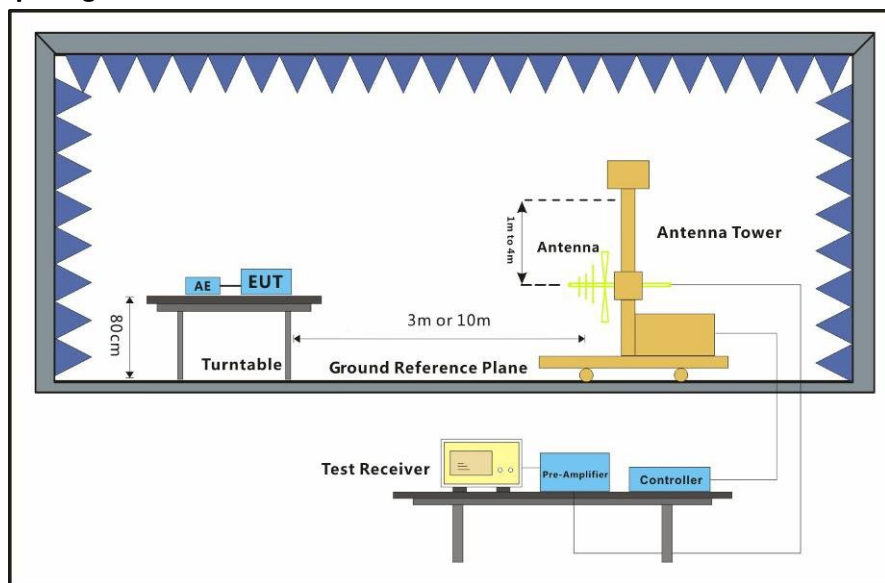
6.2.1 E.U.T. Operation

Operating Environment:

Temperature: 25 °C Humidity: 51 % RH Atmospheric Pressure: 1005 mbar

Test mode a: Charge + TX mode_Keep the EUT in charging and continuously transmitting mode with all modulation types. All data rates for each modulation type have been tested and found the data rate @ 1Mbps is the worst case of IEEE 802.11b; data rate @ 6Mbps is the worst case of IEEE 802.11g; data rate @ 6.5Mbps is the worst case of IEEE 802.11n(HT20). Only the data of worst case is recorded in the report.

6.2.2 Test Setup Diagram



6.2.3 Measurement Procedure and Data

- a. For below 1GHz, the EUT was placed on the top of a rotating table 0.8 meters above the ground at a 3 or 10 meter semi-anechoic chamber. The table was rotated 360 degrees to determine the position of the highest radiation.
- b. For above 1GHz, the EUT was placed on the top of a rotating table 1.5 meters above the ground at a 3 meter fully-anechoic chamber. The table was rotated 360 degrees to determine the position of the highest radiation.
- c. The EUT was set 3 or 10 meters away from the interference-receiving antenna, which was mounted on the top of a variable-height antenna tower.
- d. The antenna height is varied from one meter to four meters above the ground to determine the maximum value of the field strength. Both horizontal and vertical polarizations of the antenna are set to make the measurement.
- e. For each suspected emission, the EUT was arranged to its worst case and then the antenna was tuned to heights from 1 meter to 4 meters (for the test frequency of below 30MHz, the antenna was tuned to heights 1 meter) and the rotatable table was turned from 0 degrees to 360 degrees to find the maximum reading.
- f. The test-receiver system was set to Peak Detect Function and Specified Bandwidth with Maximum Hold Mode.
- g. If the emission level of the EUT in peak mode was 10dB lower than the limit specified, then testing could be stopped and the peak values of the EUT would be reported. Otherwise the emissions that did not have 10dB margin would be re-tested one by one using peak, quasi-peak or average method as specified and then reported in a data sheet.
- h. Test the EUT in the lowest channel, the middle channel, the Highest channel.
- i. The radiation measurements are performed in X, Y, Z axis positioning for Transmitting mode, and found the X axis positioning which it is the worst case.
- j. Repeat above procedures until all frequencies measured was complete.

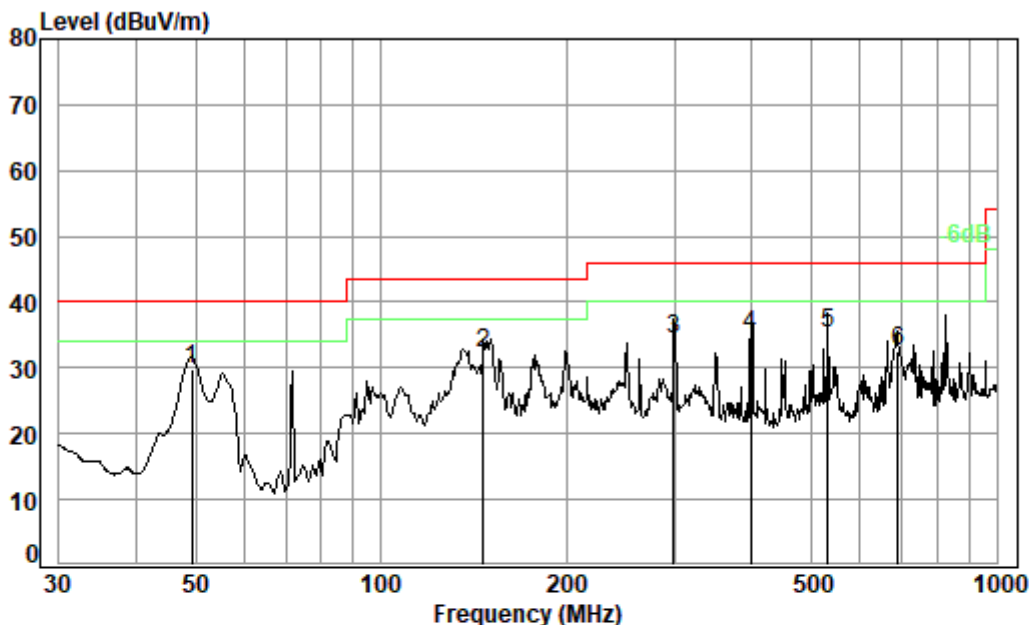
Remark:

- 1) For emission below 1GHz, through pre-scan found the worst case is the lowest channel. Only the worst case is recorded in the report.
- 2) The field strength is calculated by adding the Antenna Factor, Cable Factor & Preamplifier. The basic equation with a sample calculation is as follows:
 Final Test Level = Receiver Reading + Antenna Factor + Cable Factor – Preamplifier Factor
- 3) Scan from 9kHz to 25GHz, the disturbance above 18GHz and below 30MHz was very low. The points marked on above plots are the highest emissions could be found when testing, so only above points had been displayed. The amplitude of spurious emissions from the radiator which are attenuated more than 20dB below the limit need not be reported.
- 4) For frequencies above 1GHz, the field strength limits are based on average limits. However, the peak field strength of any emission shall not exceed the maximum permitted average limits specified above by more than 20 dB under any condition of modulation. For the emissions whose peak level is lower than the average limit, only the peak measurement is shown in the report.



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Mode:a; Polarization:Horizontal



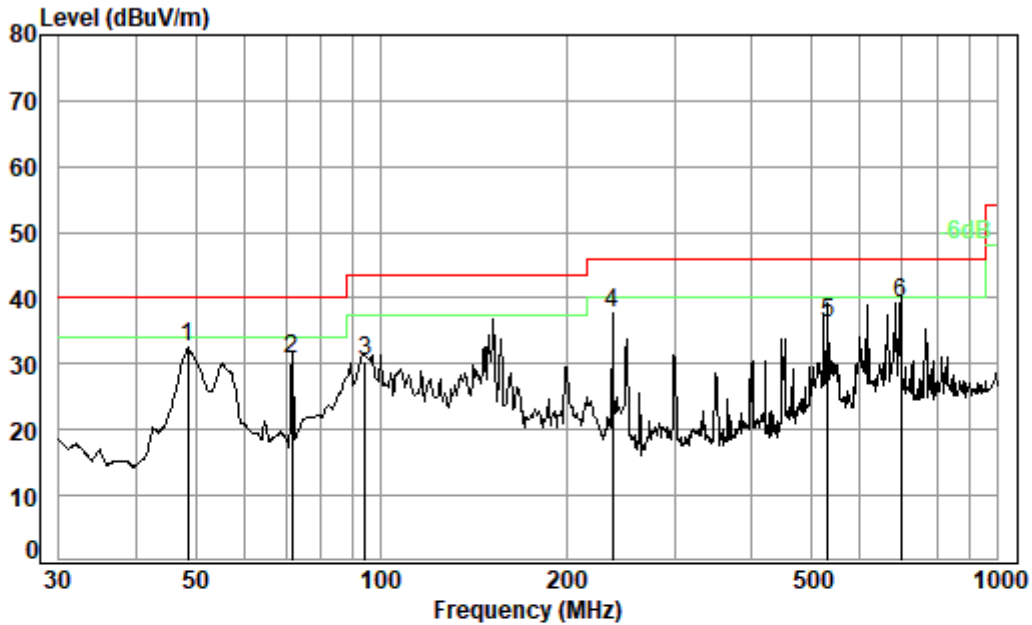
Condition: 3m Horizontal
 Job No. : 18272CR
 Test Mode: a

	Cable	Ant	Preamp	Read	Limit	Over	
Freq	Loss	Factor	Factor	Level	Level	Line	Limit
MHz	dB	dB/m	dB	dBuV	dBuV/m	dBuV/m	dB
1 pp	0.79	8.98	27.36	47.51	29.92	40.00	-10.08
2	1.31	8.67	27.06	49.33	32.25	43.50	-11.25
3	1.89	13.82	26.60	45.30	34.41	46.00	-11.59
4	2.20	16.29	27.09	43.61	35.01	46.00	-10.99
5	2.63	18.61	27.59	41.67	35.32	46.00	-10.68
6	2.89	21.54	27.60	35.63	32.46	46.00	-13.54



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Mode:a; Polarization:Vertical



Condition: 3m Vertical

Job No. : 18272CR

Teat Mode: a

	Cable	Ant	Preamp	Read	Limit	Over	
Freq	Loss	Factor	Factor	Level	Level	Line	Limit
MHz	dB	dB/m	dB	dBuV	dBuV/m	dBuV/m	dB
1	0.77	9.36	27.36	49.72	32.49	40.00	-7.51
2	0.86	7.05	27.33	50.05	30.63	40.00	-9.37
3	1.14	8.86	27.31	47.70	30.39	43.50	-13.11
4	1.61	11.90	26.75	50.93	37.69	46.00	-8.31
5	2.63	18.61	27.59	42.57	36.22	46.00	-9.78
6 pp	2.90	21.59	27.59	42.32	39.22	46.00	-6.78



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7 Photographs

7.1 Test Setup

Please refer to setup photos.

7.2 EUT Constructional Details (EUT Photos)

Please Refer to external and internal photos for details.

- End of the Report -

