TEST REPORT

of

FCC Part 15 Subpart C

& CANADA RSS-210

☒ New Application; ☐ Class I PC; ☐ Class II PC

Product :	**CAC/PIV Flex Bay Module**
Brand:	**DELL**
Model:	**DPWC600**
Model Difference:	**N/A**
FCC ID:	**2AMA7DPWC600**
IC:	**22814-DPWC600**
FCC Rule Part:	**§15.225, Cat:DXX**
IC Rule Part:	**RSS 210 Issue 9: Aug. 2016, Annex B**
	RSS-Gen issue 4: 2014
Applicant:	**Hongfujin Precision Industry (Wuhan) Co., Ltd.**
Address:	**Foxconn Technological Park, 1#, 2nd Guang Gu Road, Donghu, New Technology Development District, Wuhan City, Hubei Province, China**

Test Performed by:

International Standards Laboratory
<Lung-Tan LAB>
*Site Registration No.
BSMI: SL2-IN-E-0013; MRA TW1036; TAF: 0997; IC: IC4067B-4;
*Address:
No. 120, Lane 180, Hsin Ho Rd., Lung-Tan Dist., Tao Yuan City 325, Taiwan
*Tel : 886-3-407-1718; Fax: 886-3-407-1738

Report No.: **ISL-17LR079FC**
Issue Date : **2017/05/31**

Test results given in this report apply only to the specific sample(s) tested and are traceable to national or international standard through calibration of the equipment and evaluating measurement uncertainty herein.

This report MUST not be used to claim product endorsement by TAF, NVLAP or any agency of the Government.

VERIFICATION OF COMPLIANCE

Applicant:	Hongfujin Precision Industry (Wuhan) Co., Ltd.
Product Description:	CAC/PIV Flex Bay Module
Brand Name:	DELL
Model No.:	DPWC600
Model Difference:	N/A
FCC ID:	2AMA7DPWC600
IC:	22814-DPWC600
Date of test:	2017/03/21 ~ 2017/05/30
Date of EUT Received:	2017/03/21

We hereby certify that:

All the tests in this report have been performed and recorded in accordance with the standards described above and performed by an independent electromagnetic compatibility consultant, International Standards Laboratory.

The test results contained in this report accurately represent the measurements of the characteristics and the energy generated by sample equipment under test at the time of the test. The sample equipment tested as described in this report is in compliance with the limits of above standards.

Test By:	Lake Cheng	***Date:***	2017/05/31
	Lake Cheng / Engineer		
Prepared By:	Eva Kao	***Date:***	2017/05/31
	Eva Kao / Technical Supervisor		
Approved By:	Vincent Su	***Date:***	2017/05/31
	Vincent Su / Technical Manager		

Version

Version No.	Date	Description
00	2017/05/31	Initial creation of document

Uncertainty of Measurement

Description Of Test	Uncertainty
Conducted Emission (AC power line)	2.586 dB
Field Strength of Spurious Radiation	<=30MHz: 2.96dB 30-1GHz: 4.22 dB 1-40 GHz: 4.08 dB
Conducted Power	2.412 GHz: 1.30 dB 5.805 GHz: 1.55 dB
Power Density	2.412 GHz:1.30 dB 5.805 GHz: 1.67 dB
Frequency	0.0032%
Time	0.01%
DC Voltage	1%

Table of Contents

1 GENERAL INFORMATION

1.1 Product Description

Product Name	CAC/PIV Flex Bay Module
Brand Name	DELL
Model Name	DPWC600
Model Difference	N/A
Card reader port	1 provide
Power Supply	5Vdc from host
Product SW version	ControlVault2_WINPE_0WDX0_4.5.21.0_A08
Product HW version	X01 A-can
Radio SW version	N/A
Radio HW version	X01 A-can

NFC:

Operating Frequency	13.56MHz
Transmit Power	45.71dBuV/m at 3 m
Number of Channels	1
Antenna Type	Fixed, Loop Antenna
Module Type	ASK

Remark: The above DUT's information was declared by manufacturer. Please refer to the specifications or user's manual for more detailed description.

1.2 Related Submittal(s) / Grant (s)

This submittal(s) (test report) is intended for FCC ID: **2AMA7DPWC600** filing to comply with Section 15.225 of the FCC Part 15, Subpart C Rules. and **IC: 22814-DPWC600** filing to comply with Industry Canada RSS-210 issue 9: 2016 Annex B

1.3 Test Methodology

Both conducted and radiated testing were performed according to the procedures in ANSI C63.10: 2013. and RSS-Gen: 2014. Radiated testing was performed at an antenna to EUT dis-tance 3 meters. Radiated testing was performed at an antenna to EUT distance 3 meters.

1.4 Test Facility

The measurement facilities used to collect the 3m Radiated Emission and AC power line conducted data are located on the address of **International Standards Laboratory** <Lung-Tan LAB> No. 120, Lane 180, Hsin Ho Rd., Lung-Tan Dist., Tao Yuan City 325, Taiwan which are constructed and calibrated to meet the FCC requirements in documents ANSI C63.10: 2013 FCC Registration Number is: TW1036, Canada Registration Number: 4067B-4.

1.5 Special Accessories

Not available for this EUT intended for grant.

1.6 Equipment Modifications

Not available for this EUT intended for grant.

2 System Test Configuration

2.1 EUT Configuration

The EUT configuration for testing is installed on RF field strength measurement to meet the Commissions requirement and operating in a manner which intends to maximize its emission characteristics in a continuous normal application.

2.2 EUT Exercise

The EUT (Transmitter) was tested with a test program to fix the Tx frequency that was for the purpose of the measurements. For more information please see test data and APPENDIX 1 for set-up photographs.

2.3 Test Procedure

2.3.1 Conducted Emissions

The EUT is a placed on as turn table which is 0.8 m above ground plane. According to the requirements in Section 6 of C63.10: 2013.Conducted emissions from the EUT measured in the frequency range between 0.15 MHz and 30MHz using CISPR 16-1-1 Quasi-Peak and Average detector mode.

2.3.2 Radiated Emissions

The EUT is a placed on as turn table which is 0.8/1.5 m above ground plane. The turn table shall rotate 360 degrees to determine the position of maximum emission level. EUT is set 3m away from the receiving antenna which varied from 1m to 4m to find out the highest emission. And also, each emission was to be maximized by changing the polarization of receiving antenna both horizontal and vertical. In order to find out the max. emission, the relative positions of this hand-held transmitter (EUT) was rotated through three orthogonal axes and measurement procedures for electric field radiated emissions above 1 GHz the EUT measurement is to be made “while keeping the antenna in the ‘cone of radiation’ from that area and pointed at the area both in azimuth and elevation, with polarization oriented for maximum response.” Is still within the 3dB illumination BW of the measurement antenna. According to the requirements in Section 8 and 13 and Subclause 8.3.1.2 of ANSI C63.10: 2013.

2.4 Limitation

(1) Conducted Emission

According to §15.207 & RSS-Gen §8.8, frequency range within 150KHz to 30MHz shall not exceed the Limit table as below.

Frequency range MHz	Limits dB (uV)	
	Quasi-peak	Average
0.15 to 0.50	66 to 56	56 to 46
0.50 to 5	56	46
5 to 30	60	50
Note 1.The lower limit shall apply at the transition frequencies 2.The limit decreases linearly with the logarithm of the frequency in the range 0.15 MHz to 0.50 MHz.		

(2) Radiated Emission

1. The field strength of any emission within the band 13.553-13.567 MHz shall not exceed 15,848 microvolts/meter at 30 meters. (124dBuV/m at 3m)
2. Within the bands 13.410-13.553 MHz and 13.567-13.710 MHz, the field strength of any emissions shall not exceed 334 microvolts/meter at 30 meters. (90.47dBuV/m at 3m.)
3. Within the bands 13.110-13.410 MHz and 13.710-14.010 MHz the field strength of any emissions shall not exceed 106 microvolts/meter at 30 meters. (80.5dBuV/m at 3m.)
4. The field strength of any emissions appearing outside of the 13.110-14.010 MHz shall not exceed the general radiated emission limits in section 15.209 and RSS GEN(Intentional Radiators general limit).as below.

Frequency (MHz)	Field strength μV/m	Distance (m)	Field strength at 3m dBμV/m
1.705-30	30	30	69.54
30-88	100	3	40
88-216	150	3	43.5
216-960	200	3	46
Above 960	500	3	54

Remark:
1. Emission level in dBuV/m=20 log (uV/m)
2. Measurement was performed at an antenna to the closed point of EUT distance of meters.
3. Only spurious frequency is permitted to locate within the Restricted Bands specified in provision of ξ 15.205 and 8.10(RSS-GEN)
4. Emission spurious frequency which appearing within the Restricted Bands specified in provision of ξ15.205 and 8.10(RSS-GEN), then the general radiated emission limits in ξ 15.209 and 8.9(RSS-GEN) apply.

Limitation Calculation:

15,848 microvolts/meter at 30 meters =20log(15,848) dBuV/m at 30m = 84dBuV/m at 30m = 124dBuV/m at 3m

30m to 3m distance correction factor: 40log(30/3) = 40dB

(3) Frequency Tolerance

The frequency tolerance of the carrier signal shall be maintained within +/- 0.01% of the operating frequency over a temperature variation of -20 degrees to +50 degrees C at normal supply voltage, and for a variation in the primary supply voltage from 85% to 115% of the rated supply voltage at a temperature of 20 degrees C. For battery operated equipment, the equipment tests shall be performed using a new battery.

2.5 Configuration of Tested System

Fig. 1 Configuration of Tested System

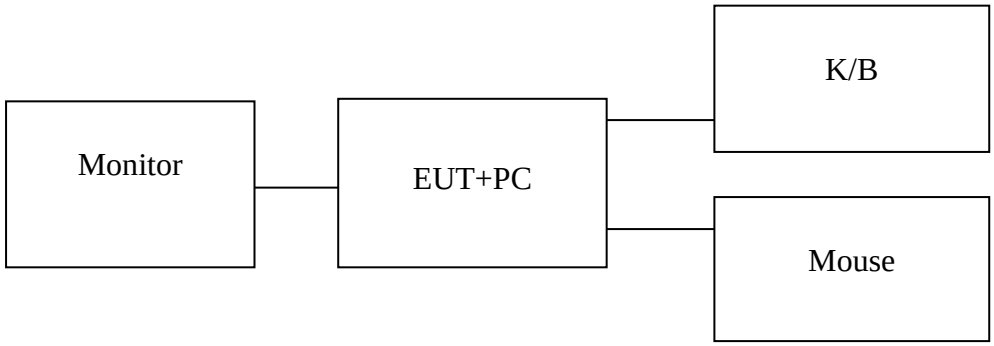


Table 2-1 Equipment Used in Tested System

Item	Equipment	Mfr/Brand	Model/ Type No.	Series No.	Data Cable	Power Cord
1	PC	Dell	Matira7	NA	Non-shielded	Non-shielded
2	Monitor	Dell	U2415B	NA	Shielded	Non-shielded
3	K/B	Dell	KB212-B	NA	Shielded	Shielded
4	Mouse	Dell	M-U0026	NA	Shielded	Shielded

3 Summary of Test Results

FCC and IC Rules	Description Of Test	Result
§15.207 and RSS-GEN 8.8	Conducted Emission	Compliant
§15.225 (a)-(d) and RSS210 B.6(a)-(d)	Radiated Emission	Compliant
§15.225 (e) and RSS210 B.6	Frequency Stability	Compliant
RSS-GEN 8.1	99% Band Width	Compliant

4 Description of test modes

The EUT was installed inside a PC what placed vertically on the table and the EUT stay in continuous transmitting mode.

5 Conducted Emissions Test

5.1 Measurement Procedure:

1. The EUT was placed on a table which is 0.8m above ground plane.
2. Maximum procedure was performed on the six highest emissions to ensure EUT compliance.
3. Repeat above procedures until all frequency measured were complete.

5.2 Test SET-UP (Block Diagram of Configuration)

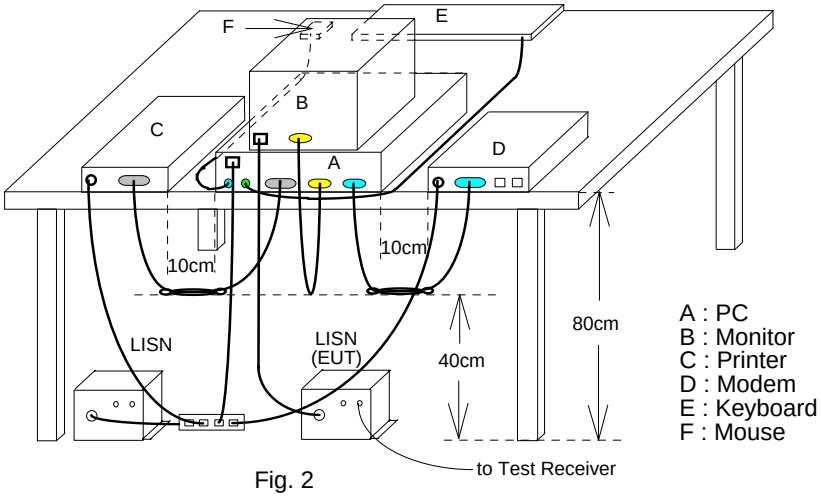


Fig. 2

5.3 Measurement Equipment Used:

Conducted Emission Test Site					
EQUIPMENT TYPE	**MFR**	**MODEL NUMBER**	**SERIAL NUMBER**	**LAST CAL.**	**CAL DUE.**
Conduction 04-3 Cable	WOKEN	CFD 300-NL	Conduction 04 -3	09/12/2016	09/11/2017
EMI Receiver 17	Rohde & Schwarz	ESCI 7	100887	10/24/2016	10/23/2017
LISN 18	ROHDE & SCHWARZ	ENV216	101424	02/05/2017	02/04/2018
LISN 19	ROHDE & SCHWARZ	ENV216	101425	03/07/2017	03/06/2018
Test Software	Farad	EZEMC Ver:ISL-03A2	N/A	N/A	N/A

5.4 Measurement Result:

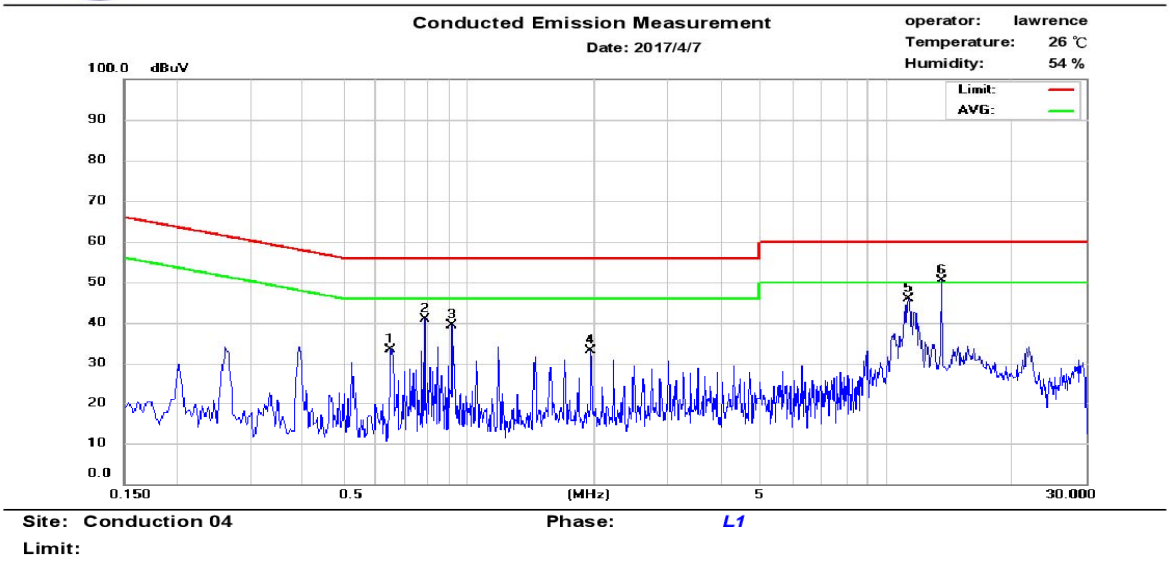
The initial step in collecting conducted data is a spectrum analyzer peak scan of the measurement range. Significant peaks are then marked as shown on the following data page, and these signals are then quasi-peaked.

Note: Refer to next page for measurement data and plots.

AC POWER LINE CONDUCTED EMISSION TEST DATA

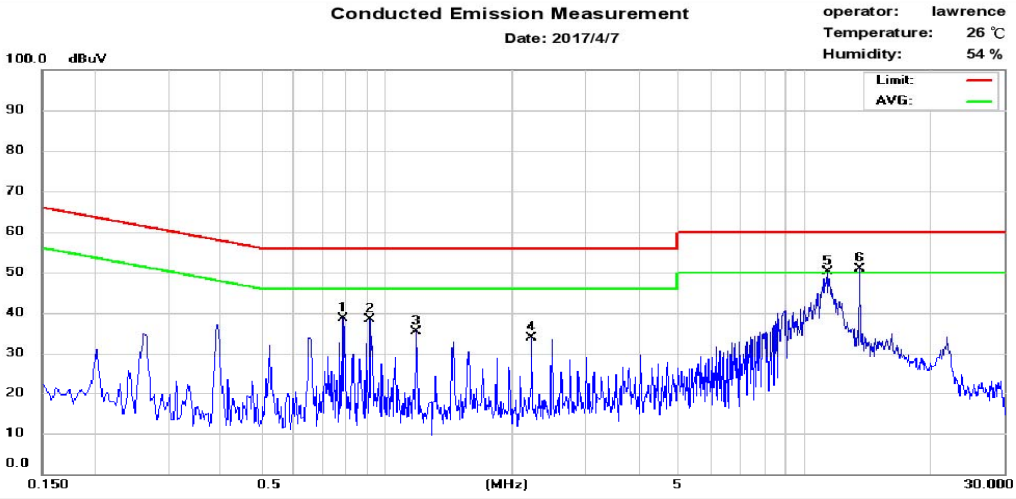
Operation Mode:	Operation Mode	Test Date:	2017/04/07
Test By:	Lake		

Address:No. 120, Lane 180, Hsin Ho Rd., Lung-Tan Dist.,
Tao Yuan City 325, Taiwan.
Tel:03-4071718



No.	Frequency (MHz)	QP_R (dBuV)	AVG_R (dBuV)	Correct Factor (dB)	QP Emission (dBuV)	QP Limit (dBuV)	QP Margin (dB)	AVG Emission (dBuV)	AVG Limit (dBuV)	AVG Margin (dB)
1	0.654	21.57	20.94	9.70	31.27	56.00	-24.73	30.64	46.00	-15.36
2	0.786	27.89	13.18	9.72	37.61	56.00	-18.39	22.90	46.00	-23.10
3	0.914	27.34	20.51	9.72	37.06	56.00	-18.94	30.23	46.00	-15.77
4	1.966	23.07	19.75	9.75	32.82	56.00	-23.18	29.50	46.00	-16.50
5	11.266	33.43	22.28	9.95	43.38	60.00	-16.62	32.23	50.00	-17.77
6	13.558	40.30	38.26	9.99	50.29	60.00	-9.71	48.25	50.00	-1.75

Address:No. 120, Lane 180, Hsin Ho Rd., Lung-Tan Dist.,
Tao Yuan City 325, Taiwan.
Tel:03-4071718



Site: Conduction 04 Phase: N

Limit:

No.	Frequency (MHz)	QP_R (dBuV)	AVG_R (dBuV)	Correct Factor (dB)	QP Emission (dBuV)	QP Limit (dBuV)	QP Margin (dB)	AVG Emission (dBuV)	AVG Limit (dBuV)	AVG Margin (dB)
1	0.786	26.36	11.59	9.70	36.06	56.00	-19.94	21.29	46.00	-24.71
2	0.914	25.52	21.02	9.70	35.22	56.00	-20.78	30.72	46.00	-15.28
3	1.182	24.37	24.16	9.71	34.08	56.00	-21.92	33.87	46.00	-12.13
4	2.230	21.39	17.38	9.74	31.13	56.00	-24.87	27.12	46.00	-18.88
5	11.330	36.80	27.82	9.98	46.78	60.00	-13.22	37.80	50.00	-12.20
6	13.558	40.24	38.34	10.04	50.28	60.00	-9.72	48.38	50.00	-1.62

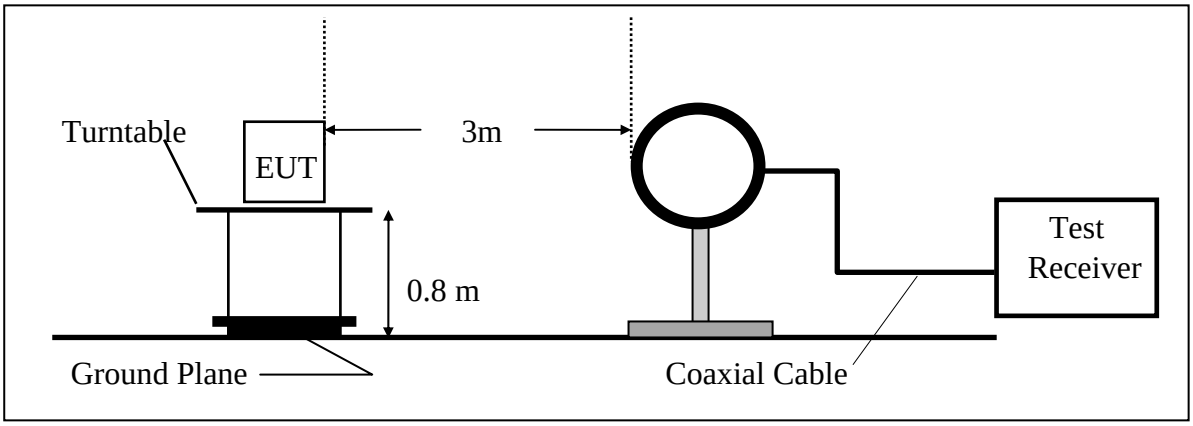
6 Radiated Emission Test

6.1 Measurement Procedure

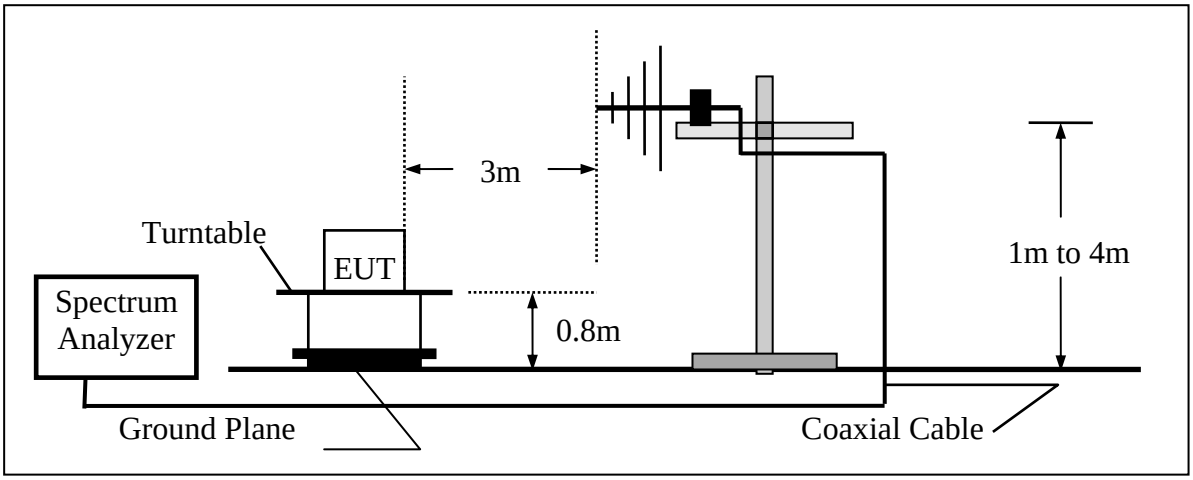
1. The EUT was placed on a turn table which is 0.8m above ground plane.
2. Maximum procedure was performed on the six highest emissions to ensure EUT compliance.
3. And also, each emission was to be maximized by changing the polarization of receiving antenna both horizontal and vertical.
4. Repeat above procedures until all frequency measured were complete.

6.2 Test SET-UP (Block Diagram of Configuration)

(A) Radiated Emission Test Set-Up, Frequency Below 30MHz



(B) Radiated Emission Test Set-Up, Frequency Below 1000MHz



6.3 Measurement Equipment Used:

Chamber 19(966)					
EQUIPMENT TYPE	**MFR**	**MODEL NUMBER**	**SERIAL NUMBER**	**LAST CAL.**	**CAL DUE.**
Spectrum Analyzer 21(3Hz-44GHz)	Agilent	N9030A	MY51360021	11/14/2016	11/13/2017
Loop Antenna(9K-30M)	EM	EM-6879	271	11/01/2016	10/31/2018
Loop Antenna (9K-30M)	A.H.SYSTEM	SAS-564	294	06/17/2015	06/16/2017
Bilog Antenna (30M-1G)	SCHWARZBECK	VULB9168 w 5dB Att	736	07/22/2016	07/21/2017
Horn antenna (1G-18G)	SCHWARZBECK	9120D	9120D-1627	07/22/2016	07/21/2017
Preamplifier (9k-1000M)	HP	8447F	3113A06362	11/13/2016	11/12/2017
Preamplifier(1G-26G)	Agilent	8449B	3008A02471	08/25/2016	08/24/2017
RF Cable (9k-18G)	HUBER SUHNER	SUCOFLEX 104A	MY1397/4A	08/25/2016	08/24/2017
RF cable (18G~40G)	HUBER SUHNER	Sucoflex 102	27963/2&37421/2	11/03/2015	11/02/2017
Test Software	Audix	E3 Ver:6.12023	N/A	N/A	N/A

6.4 Field Strength Calculation

The field strength is calculated by adding the Antenna Factor and Cable Factor and subtracting the Amplifier Gain and Duty Cycle Correction Factor (if any) from the measured reading. The basic equation with a sample calculation is as follows:

FS = RA + AF + CL - AG

Where	FS = Field Strength	CL = Cable Attenuation Factor (Cable Loss)
	RA = Reading Amplitude	AG = Amplifier Gain
	AF = Antenna Factor	

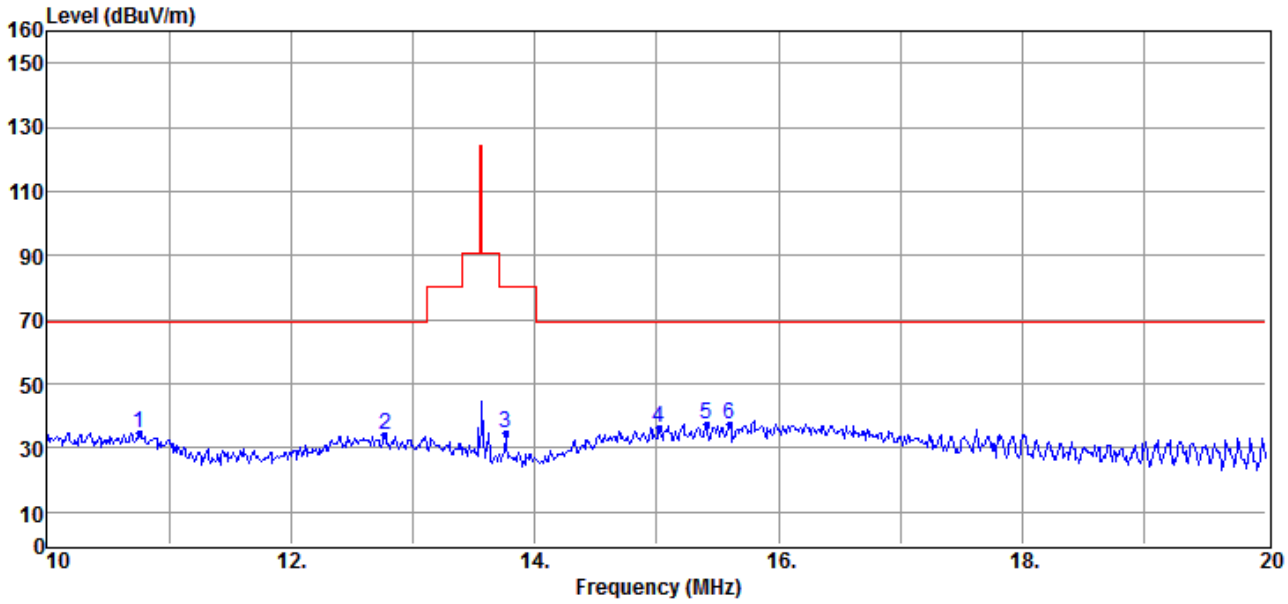
6.5 Measurement Result

6.5.1 Fundamental Measurement Result

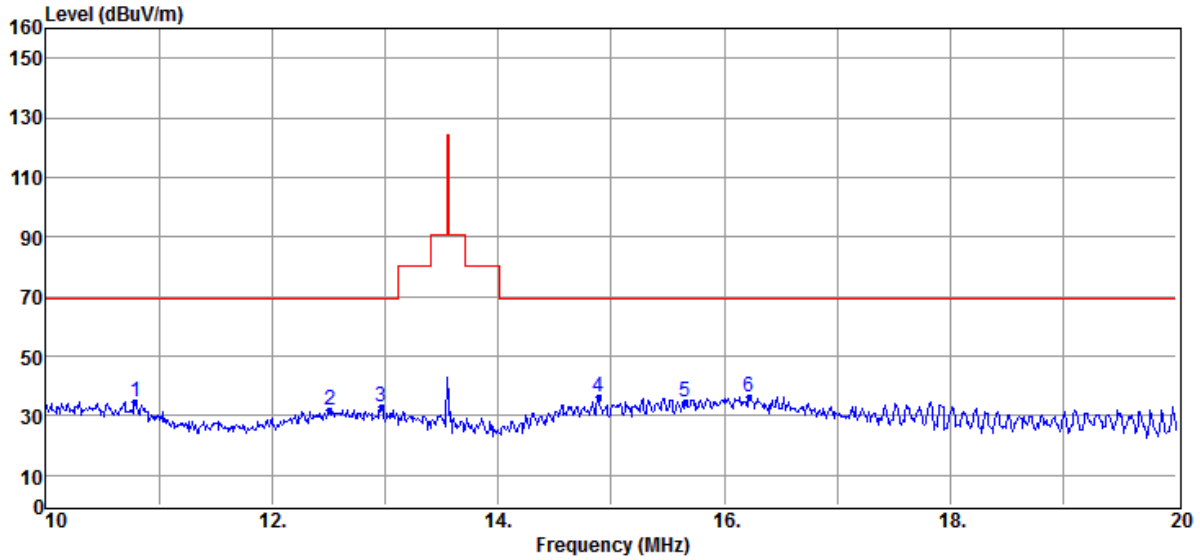
Operation Mode	: Transmitting Mode	Test Date	: 2017/04/07
Fundamental Frequency	: 13.56 MHz	Test By	: Lake
Temp	: 25 ℃	Hum.	: 60%

Freq MHz	Reading dBuV	Factor dB/m	Level dBuV/m	Limit dBuV/m	Over Limit dB	Remark	Pol V/H
13.56	34.64	11.07	45.71	124.00	-78.29	Peak	VERTICAL
13.56	33.25	11.07	44.32	124.00	-79.68	Peak	HORIZONTAL

6.5.2 Radiated Mask



No	Freq MHz	Reading dBuV	Factor dB/m	Level dBuV/m	Limit dBuV/m	Over Limit dB	Remark	Pol V/H
1	10.76	19.74	14.67	34.41	69.54	-35.13	Peak	VERTICAL
2	12.77	19.65	14.63	34.28	69.54	-35.26	Peak	VERTICAL
3	13.76	19.99	14.62	34.61	80.50	-45.89	Peak	VERTICAL
4	15.02	21.91	14.60	36.51	69.54	-33.03	Peak	VERTICAL
5	15.41	22.90	14.56	37.46	69.54	-32.08	Peak	VERTICAL
6	15.60	23.02	14.56	37.58	69.54	-31.96	Peak	VERTICAL



No	Freq MHz	Reading dBuV	Factor dB/m	Level dBuV/m	Limit dBuV/m	Over Limit dB	Remark	Pol V/H
1	10.79	19.79	14.67	34.46	69.54	-35.08	Peak	HORIZONTAL
2	12.51	17.42	14.64	32.06	69.54	-37.48	Peak	HORIZONTAL
3	12.97	18.09	14.63	32.72	69.54	-36.82	Peak	HORIZONTAL
4	14.89	21.84	14.60	36.44	69.54	-33.10	Peak	HORIZONTAL
5	15.66	20.00	14.56	34.56	69.54	-34.98	Peak	HORIZONTAL
6	16.22	21.62	14.52	36.14	69.54	-33.40	Peak	HORIZONTAL

6.5.3 Radiated Spurious Emission Measurement Result (below 1GHz)

Operation Mode: Transmitting Mode
Fundamental Frequency: 13.56MHz
Temperature : 25 ℃
Test Date: 2017/04/07
Test By: Lake
Humidity : 65 %

No	Freq MHz	Reading dBuV	Factor dB/m	Level dBuV/m	Limit dBuV/m	Over Limit dB	Remark	Pol V/H
1	12.50	16.02	11.04	27.06	69.54	-42.48	Peak	VERTICAL
2	15.16	16.55	11.05	27.60	69.54	-41.94	Peak	VERTICAL
3	18.60	17.21	9.94	27.15	69.54	-42.39	Peak	VERTICAL
4	20.22	18.21	9.91	28.12	69.54	-41.42	Peak	VERTICAL
5	22.02	17.77	9.81	27.58	69.54	-41.96	Peak	VERTICAL
6	27.20	18.39	7.01	25.40	69.54	-44.14	Peak	VERTICAL
7	41.64	39.77	-5.52	34.25	40.00	-5.75	Peak	VERTICAL
8	125.06	36.69	-6.66	30.03	43.50	-13.47	Peak	VERTICAL
9	204.60	37.59	-7.70	29.89	43.50	-13.61	Peak	VERTICAL
10	353.01	33.07	-3.16	29.91	46.00	-16.09	Peak	VERTICAL
11	493.66	32.43	-0.95	31.48	46.00	-14.52	Peak	VERTICAL
12	933.07	32.95	6.69	39.64	46.00	-6.36	Peak	VERTICAL
1	17.22	18.18	10.27	28.45	69.54	-41.09	Peak	HORIZONTAL
2	20.22	25.04	9.91	34.95	69.54	-34.59	Peak	HORIZONTAL
3	20.50	25.81	9.95	35.76	69.54	-33.78	Peak	HORIZONTAL
4	21.76	21.04	9.86	30.90	69.54	-38.64	Peak	HORIZONTAL
5	23.72	19.86	8.87	28.73	69.54	-40.81	Peak	HORIZONTAL
6	27.36	24.23	7.11	31.34	69.54	-38.20	Peak	HORIZONTAL
7	41.64	32.42	-5.52	26.90	40.00	-13.10	Peak	HORIZONTAL
8	145.43	36.79	-5.33	31.46	43.50	-12.04	Peak	HORIZONTAL
9	175.50	39.03	-6.00	33.03	43.50	-10.47	Peak	HORIZONTAL
10	262.80	36.97	-5.20	31.77	46.00	-14.23	Peak	HORIZONTAL
11	489.78	33.34	-1.03	32.31	46.00	-13.69	Peak	HORIZONTAL
12	823.46	35.29	4.73	40.02	46.00	-5.98	Peak	HORIZONTAL

Remark:

1 Measuring frequencies from the lowest internal frequency to the 1GHz.

2 Radiated emissions measured in frequency range from 30 MHz to 1000MHz were made with an instrument using Peak / QP detector mode.

3 Measurement result within this frequency range shown " - " in the table above means the reading of emissions are attenuated more than 20dB below the permissible limits or the field strength is too small to be measured.

4 The IF bandwidth of SPA between 30MHz to 1GHz was 100KHz, VBW=300KHz.

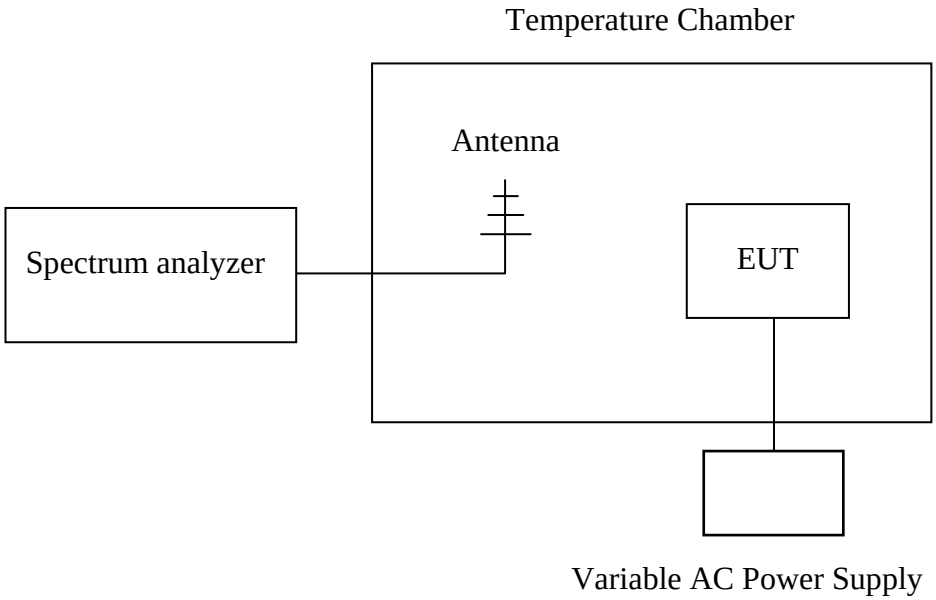
5 Peak is below the average limit, so that the average result is not measured

7 Frequency Tolerance

7.1 Measurement Procedure

1. The EUT was placed on a turn table which is 0.8m above ground plane.
2. Set EUT as normal operation
3. Set SPA Center Frequency = fundamental frequency, RBW, VBW= 10kHz, Span =100kHz.
4. Set SPA Max hold. Mark peak.

7.2 Test SET-UP (Block Diagram of Configuration)



7.3 Measurement Equipment Used:

Conducted Emission Test Site					
EQUIPMENT TYPE	**MFR**	**MODEL NUMBER**	**SERIAL NUMBER**	**LAST CAL.**	**CAL DUE.**
Spectrum analyzer	keysight	N9010A	MY56070257	05/31/2016	05/30/2017
Spectrum analyzer	R&S	FSP40	100143	08/07/2016	08/06/2017
Temperature Chamber	KSON	THS-B4H100	2287	06/28/2016	06/27/2017
DC Power supply	ABM	8185D	N/A	09/05/2016	09/04/2017

7.4 Measurement Results

Refer to attached data chart.

A. Temperature Variation

Limit: +/- 0.01%					
Power Supply	Environment	Frequency	Delta (KHz)	Limit (KHz)	**Result**
Vac	Temperature (℃)	(MHz)			
120V	-20	13.56024	0.810	1.356	**Pass**
	-10	13.56018	0.750		**Pass**
	0	13.56006	0.630		**Pass**
	10	13.55974	0.310		**Pass**
	20	13.55943	0.000		**Pass**
	30	13.56021	0.780		**Pass**
	40	13.56019	0.760		**Pass**
	50	13.56024	0.810		**Pass**

B. Supply Voltage Variation

Limit: +/- 0.01%					
Power Supply	Environment	Frequency	Delta (KHz)	Limit (KHz)	Result
Vac	Temperature (℃)	(MHz)			
120	20	13.55943	0.000	1.356	**Pass**
138	20	13.55928	-0.150		**Pass**
102	20	13.56014	0.710		**Pass**

8 99% Band Width Measurement

8.1 Measurement Procedure

1 Place the EUT on the table and set it in transmitting mode.

2 Remove the antenna from the EUT and then connect a low loss RF cable from the antenna port to the spectrum analyzer.

3 Set the spectrum analyzer as RBW=1% of the approximate emission bandwidth, VBW = 3 times RBW, Span= approximately 20dB below the peak level. Sweep=auto

4 Turn on the 99% bandwidth function, max reading.

5 Repeat above procedures until all frequency measured were complete.

8.2 Test SET-UP (Block Diagram of Configuration)

Same as 5.2 Radiated Emission Measurement.

8.3 Measurement Equipment Used:

Same as 5.3 Radiated Emission Measurement.

8.4 Measurement Results:

22.838KHz, Refer to attached data chart.

99% Band Width test Plot