



TEST REPORT N°: (5209)152-0764

## TEST REPORT

To:	<b>ADVANCED CONTROL TECHNOLOGIES, INC.</b>		
Attn:	Kevin Shelow		
Address:	8076 Woodland Drive, Indianapolis IN 46278		
Fax:	--		
E-mail:	kshelow@act-solutions.com		
Folder No.	MEW-09JU003LTHS-B		
Factory name:	<b>ADVANCED CONTROL TECHNOLOGIES, INC.</b>		
Location:	8076 Woodland Drive, Indianapolis IN 46278		
Product:	<b>RF LIGHT MODULES</b> <b>MODEL: ZDP100/RP200</b>		
<b>(Please see Exhibit: External Photo)</b>		Sample No:	HK090526/017
		Test date:	June 15, 2009 To July 2, 2009
		Test Requested:	FCC Part 15 - 2008
		Test Method:	ANSI C63.4 - 2003
		FCC ID:	QIE0778-0X
		<b>The results given in this report are related to the tested specimen of the described electrical apparatus.</b>	
<b>CONCLUSION: The submitted sample was found to COMPLY with requirement of FCC Part 15 Subpart C.</b>			
Authorized Signature:			
		for	
Reviewed by: Eric Wong	Approved by: Steven Tsang		
Date: July 3, 2009	Date: July 3, 2009		

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### Location of the test site

Radiated and Conducted emissions measurements are investigated and taken pursuant to the procedures of ANSI C63.4 – 2003. An Open Area Test Site and Full Anechoic Chamber (FCC Listed Site, Registration No. 642151) are set up for investigation and located at :

**BUREAU VERITAS HONG KONG LIMITED, EMC CENTRE**  
No. 2106-2107, 21/F., Westin Centre,  
26 Hung To Road,  
Kwun Tong, Kowloon,  
Hong Kong

### List of measuring equipment

#### Radiated Emission

EQUIPMENT	MANUFACTURER	MODEL NO.	SERIAL NO.	CALIBRATION DUE
EMI TEST RECEIVER	R&S	ESCI	100379	18-AUG-2009
HF LOOP ANTENNA	SCHAFFNER	HLA 6120	21728	14-NOV-2009
BILOG ANTENNA	SCHAFFNER	CBL6112D	25229	01-JUNE-2010
OPEN AREA TEST SITE	BVCPS	N/A	N/A	05-JULY-2010
ANECHOIC CHAMBER	ALBATROSS	M-CDC	80374004499B	09-JULY-2010
HORN ANTENNA	SCHWARZBECK	BBHA9120D	9120D-692	29-JULY-2009
PREAMPLIFIER	SCHWARZBECK	BBV9718	9718-152	22-JULY-2009
COAXIAL CABLE	SUHNER	N/A	N/A	23-JULY-2009
SPECTRUM ANALYZER	ADVANTEST	R3127	111000909	02-DEC-2009

#### Conducted Emission

EQUIPMENT	MANUFACTURER	MODEL NO.	SERIAL NO.	CALIBRATION DUE
EMI TEST RECEIVER	R&S	ESCS30	830986/030	18-SEP-2009
LISN	R&S	ENV216	100024	25-MAR-2010

#### Remarks:-

N/A : Not Applicable or Not Available

The measurement instrumentation uncertainty would be taking into consideration on each of the test result



## TEST REPORT N°: (5209)152-0764

### Equipment Under Test [EUT]

#### Description of Sample:

Model Name: RF LIGHT MODULES

Model Number: ZDP100 / RP200 (ZDP100 & RP200 are using the same circuit, PCB layout and components, the differences are only on the label and user manual.)

Rating: 120V a.c. 60Hz

#### Description of EUT Operation:

The Equipment Under Test (EUT) is a **ADVANCED CONTROL TECHNOLOGIES, INC.** of RF LIGHT MODULES. The transceiver is a 1 button for dimmer function and operating at 908MHz. Modulation by IC, and type is pulse modulation.

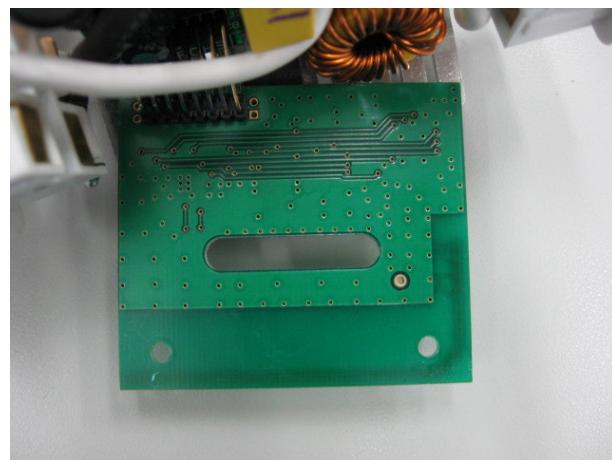
The dimmer circuit itself is not generating radio frequency energy for its dimming function and not use IC regulate.

All the orthogonal planes (x, Y & Z plane) are pre-scanned to determine the worst-case of test setup - X plane is the worst-case and all the tests in this report are carried with this setup.

Model ZDP100 is chosen for testing.

#### Antenna Requirement (Section 15.203)

The EUT is use of a permanently antenna. It is a PCB antenna. The antenna is not replaceable or user serviceable. The requirement of S15.203 are met. There are no deviations or exceptions to the specifications.





## TEST REPORT N°: (5209)152-0764

### Radiated Emissions (Fundamental)

Test Requirement: FCC Part 15 Section 15.249

Test Method: ANSI C63.4

Test Date(s): 2009-06-15 to 2009-06-27

Mode of Operation: Transmission continuously with test mode

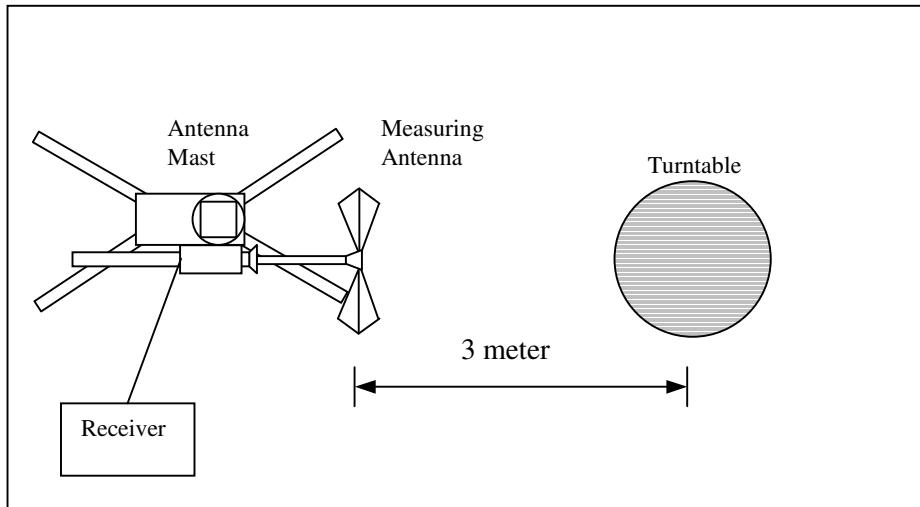
### Test Procedure:

Radiated emissions measurements are investigated and taken pursuant to the procedures of ANSI C63.4 – 2003.

The equipment under test (EUT) was placed on a non-conductive turntable with dimensions of 1.5m x 1m and 0.8m high above the ground. 3m from the EUT, a broadband antenna mounting on the mast received the signal strength. During the test, each emission was maximized by: having the EUT continuously working, investigated all operating modes, rotated about all 3 axis (X, Y & Z) and considered typical configuration to obtain worst position, manipulating interconnecting cables. For battery operated equipment, the equipment tests shall be perform using new battery. The turntable was rotated to maximize the emission level. The antenna was then moving along the mast from 1m up to 4m until no more higher value was found. Both horizontal and vertical polarization of the antenna were placed and investigated.

For below 30MHz, a loop antenna with its vertical plane is place 3m from the EUT and rotated about its vertical axis for maximum response at each azimuth about the EUT. And the centre of the loop shall be 1m above the ground.

### Test Setup: Open Area Test Site



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### Limits for Field Strength of Fundamental Emissions [FCC 47CFR 15.249]:

Frequency Range of Fundamental [MHz]	Field Strength of Fundamental Emission (Quasi-Peak) [mV/m]	Field Strength of Harmonics Emission (Average) [μV/m]
902-928	50 (94 dBμV/m)	500 (54 dBμV/m)

### Measurement Data

**Test Result of (Transmission continuously with test mode): PASS**

#### Detection mode: Quasi-Peak

Frequency (MHz)	Polarity (H/V) and degree	EUT Orientation	Antenna Factor and Cable Loss (dB/m)	Field Strength at 3m (dBμV/m)	Limit at 3m (dBμV/m)	Margin (dB)
908.38	V	Front side	24.9	88.7	94.0	-5.3

Note: EUT Orientation is shown as Set up photo.

Field Strength includes Antenna Factor and Cable Loss.

Receiver setting: RBW = 120KHz  
VBW = 120KHz



## TEST REPORT N°: (5209)152-0764

### Radiated Emissions (Spurious Emission)

Test Requirement: FCC Part 15 Section 15.249

Test Method: ANSI C63.4

Test Date(s): 2009-06-15 to 2009-06-27

Mode of Operation: Transmission continuously with test mode

### Measurement Data

**Test Result of (Transmission mode): PASS**

**Detection mode: Peak**

Frequency (MHz)	Polarity (H/V)	Antenna Factor and Cable Loss (dB/m)	Field Strength at 3m (dB $\mu$ V/m)	Limit at 3m (dB $\mu$ V/m)	Margin (dB)
1816.76	H	29.1	38.4	54.0	-15.6
2725.14	V	33.1	41.4	54.0	-12.6
3633.52	H	34.9	41.8	54.0	-12.2
4541.90	V	37.4	42.0	54.0	-12.0
5450.28	V	39.3	43.1	54.0	-10.9
6358.66	V	41.8	45.9	54.0	-8.1
7267.04	H	45.4	51.4	54.0	-2.6
8175.42	H	46.5	52.6	54.0	-1.4
9083.80	H	47.5	52.3	54.0	-1.7

Note: Field Strength includes Antenna Factor and Cable Loss.

Receiver setting: RBW = 1MHz  
VBW = 1MHz



## TEST REPORT N°: (5209)152-0764

### Radiated Emissions (30MHz – 1GHz)

Test Requirement: FCC Part 15 Section 15.209

Test Method: ANSI C63.4

Test Date(s): 2009-06-15 to 2009-06-27

Mode of Operation: Transmission

#### Limits for Radiated Emissions [FCC 47 CFR 15.209]:

Frequency Range [MHz]	Quasi-Peak Limits [ $\mu$ V/m]
1.705-30	300
30-88	100
88-216	150
216-960	200
Above 960	500

### Measurement Data

Test Result of (Transmission mode): PASS

#### Detection mode: Quasi-Peak

Frequency (MHz)	Polarity (H/V)	Antenna Factor and Cable Loss (dB/m)	Field Strength at 3m (dB $\mu$ V/m)	Limit at 3m (dB $\mu$ V/m)	Margin (dB)
36.20	H	12.1	29.5	40.0	-10.5
272.24	H	14.6	21.7	43.5	-21.8
326.36	H	15.9	23.5	43.5	-20.0
367.36	H	17.0	24.7	43.5	-18.8
426.16	V	18.5	26.1	43.5	-17.4

Note: Field Strength includes Antenna Factor and Cable Loss.

Receiver setting: RBW = 120KHz  
VBW = 120KHz



## TEST REPORT N°: (5209)152-0764

### Radiated Emissions (30MHz – 5GHz)

Test Requirement: FCC Part 15 Section 15.109

Test Method: ANSI C63.4

Test Date(s): 2009-06-15 to 2009-06-27

Mode of Operation: Receiver mode

#### Limits for Radiated Emissions [FCC 47 CFR 15.109]:

Frequency Range [MHz]	Quasi-Peak Limits [ $\mu$ V/m]
30-88	100
88-216	150
216-960	200
Above 960	500

### Test Result of (Receiver mode): PASS

#### Detection mode: Quasi-Peak

Frequency (MHz)	Polarity (H/V)	Antenna Factor and Cable Loss (dB/m)	Field Strength at 3m (dB $\mu$ V/m)	Limit at 3m (dB $\mu$ V/m)	Margin (dB)
38.72	H	11.3	25.3	40.0	-14.7
45.08	H	10.8	22.4	40.0	-17.6
264.60	H	14.2	21.2	46.0	-24.8
333.52	H	16.1	22.9	46.0	-23.1
390.40	H	17.9	24.6	46.0	-21.4
908.56	H	24.9	32.1	46.0	-13.9



## TEST REPORT N°: (5209)152-0764

### Detection mode: Peak

Frequency (MHz)	Polarity (H/V)	Antenna Factor and Cable Loss (dB/m)	Field Strength at 3m (dB $\mu$ V/m)	Limit at 3m (dB $\mu$ V/m)	Margin (dB)
1817.12	H	29.1	36.6	54.0	-17.4
2725.68	V	33.0	39.3	54.0	-14.7
3634.24	V	34.9	40.3	54.0	-13.7
4542.80	V	37.4	43.2	54.0	-10.8
4715.22	H	38.0	42.2	54.0	-11.8
4923.86	H	38.4	42.7	54.0	-11.3

Note: Field Strength includes Antenna Factor and Cable Loss.

During the test shall be used to radiate an unmodulated CW signal to a superregenerative receiver at its operating frequency in order to "cohere" or to resolve the individual components of the characteristic broadband emissions from such a receiver. The level of the signal may need to be increased for this to occur.

(30-1000MHz)

Receiver setting: RBW = 120KHz  
VBW = 120KHz

(above 1GHz)

Receiver setting: RBW = 1MHz  
VBW = 1MHz



## TEST REPORT N°: (5209)152-0764

### Conducted Emissions (150kHz to 30MHz)

Test Requirement: FCC Part 15 Section 15.107 / 15.207

Test Method: ANSI C63.4

Test Limits: Class B

Test Date(s): 2009-06-26

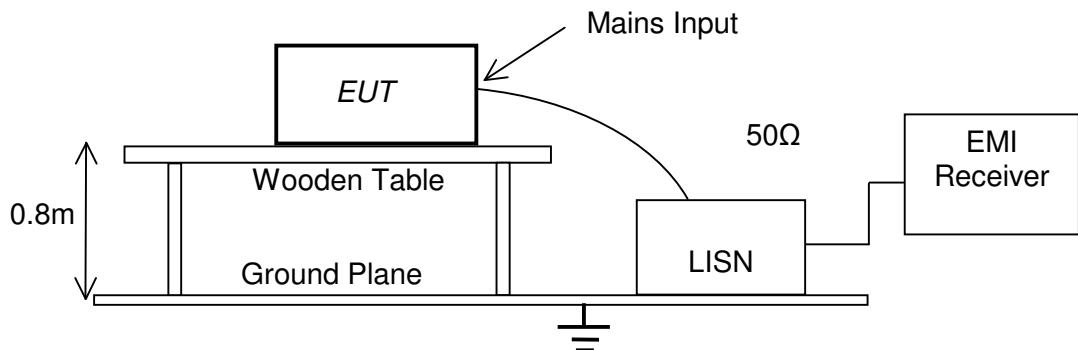
Mode of Operation: Transmission and Receiver mode  
The dimmer function of the EUT was not active during testing

### Test Procedure:

Conducted emissions measurements are investigated and also taken pursuant to the procedures of ANSI C63.4 – 2003. The EUT was setup as described in the procedures, and both lines were measured.

Initial measurements were performed in peak and average detection modes on the Live and Neutral line, any emissions recorded within 30dB of the relevant limit lines were re-measured using quasi-peak and average detection on the live and neutral lines with the worst case recorded in the table of results.

### Test Setup:





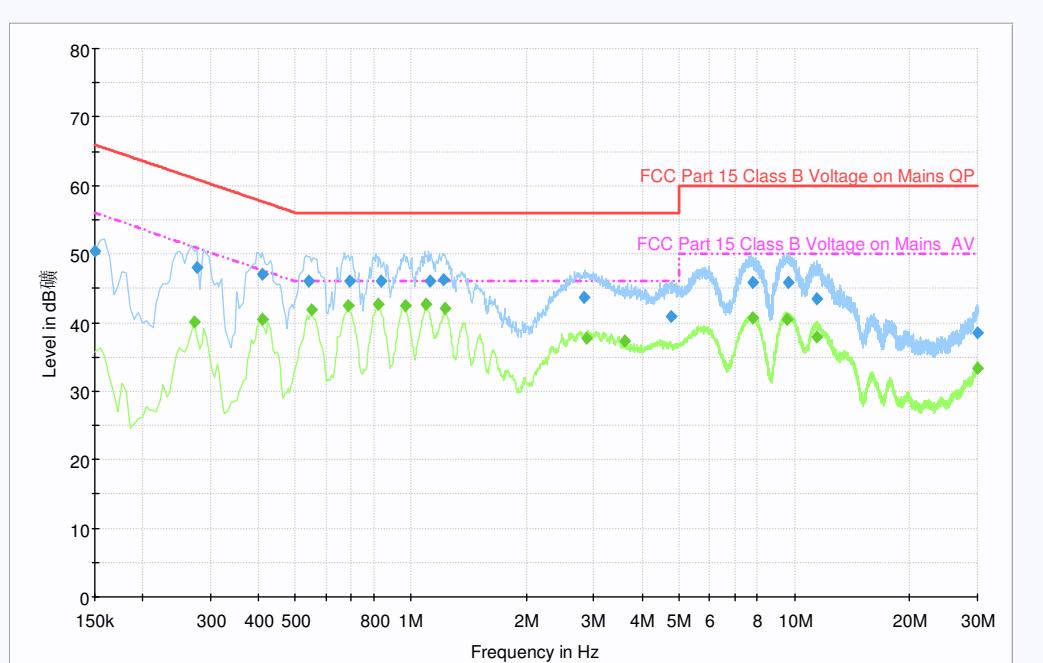
## TEST REPORT N°: (5209)152-0764

### Measurement Data : Live

#### Test Result of (Transmission mode): PASS

#### Results and limit lines for Conducted Emission:

Limits for Conducted Emission Test, please refer to limit lines (Quasi-Peak and Average) in the following diagram.



Frequency (MHz)	QuasiPeak (dB $\mu$ V)	Bandwidth (kHz)	Corr. (dB)	Margin (dB)	Limit (dB $\mu$ V)
0.150000	50.5	9.000	9.6	15.5	66.0
0.276000	48.0	9.000	9.6	12.9	60.9
0.411000	47.1	9.000	9.6	10.5	57.6
0.541500	46.0	9.000	9.6	10.0	56.0
0.694500	46.0	9.000	9.7	10.0	56.0
0.838500	46.1	9.000	9.7	9.9	56.0
1.117500	46.1	9.000	9.6	9.9	56.0
Frequency (MHz)	Average (dB $\mu$ V)	Bandwidth (kHz)	Corr. (dB)	Margin (dB)	Limit (dB $\mu$ V)
0.271500	40.2	9.000	9.6	10.9	51.1
0.411000	40.5	9.000	9.6	7.1	47.6
0.550500	41.9	9.000	9.6	4.1	46.0
0.685500	42.5	9.000	9.6	3.6	46.0
0.825000	42.8	9.000	9.6	3.2	46.0
0.964500	42.6	9.000	9.7	3.4	46.0
1.095000	42.6	9.000	9.6	3.4	46.0



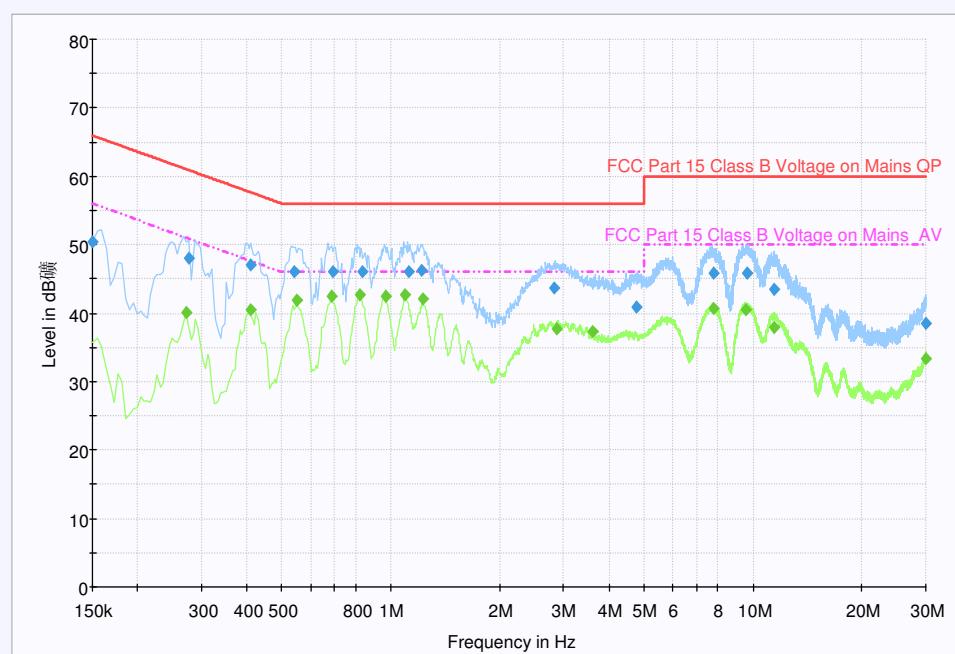
## TEST REPORT N°: (5209)152-0764

### Measurement Data : Neutral

#### Test Result of (Transmission mode): PASS

#### Results and limit lines for Conducted Emission:

Limits for Conducted Emission Test, please refer to limit lines (Quasi-Peak and Average) in the following diagram.



Frequency (MHz)	QuasiPeak (dB $\mu$ V)	Bandwidth (kHz)	Corr. (dB)	Margin (dB)	Limit (dB $\mu$ V)
1.216500	46.2	9.000	9.6	9.8	56.0
2.832000	43.7	9.000	9.6	12.3	56.0
4.776000	40.8	9.000	9.7	15.2	56.0
7.773000	45.9	9.000	9.7	14.1	60.0
9.649500	45.8	9.000	9.8	14.2	60.0
11.422500	43.5	9.000	9.7	16.5	60.0
29.917500	38.5	9.000	10.0	21.5	60.0
Frequency (MHz)	Average (dB $\mu$ V)	Bandwidth (kHz)	Corr. (dB)	Margin (dB)	Limit (dB $\mu$ V)
1.230000	42.1	9.000	9.6	3.9	46.0
2.877000	37.8	9.000	9.6	8.2	46.0
3.601500	37.4	9.000	9.7	8.6	46.0
7.755000	40.7	9.000	9.7	9.3	50.0
9.559500	40.6	9.000	9.8	9.4	50.0
11.436000	37.9	9.000	9.7	12.1	50.0
29.976000	33.4	9.000	10.1	16.6	50.0

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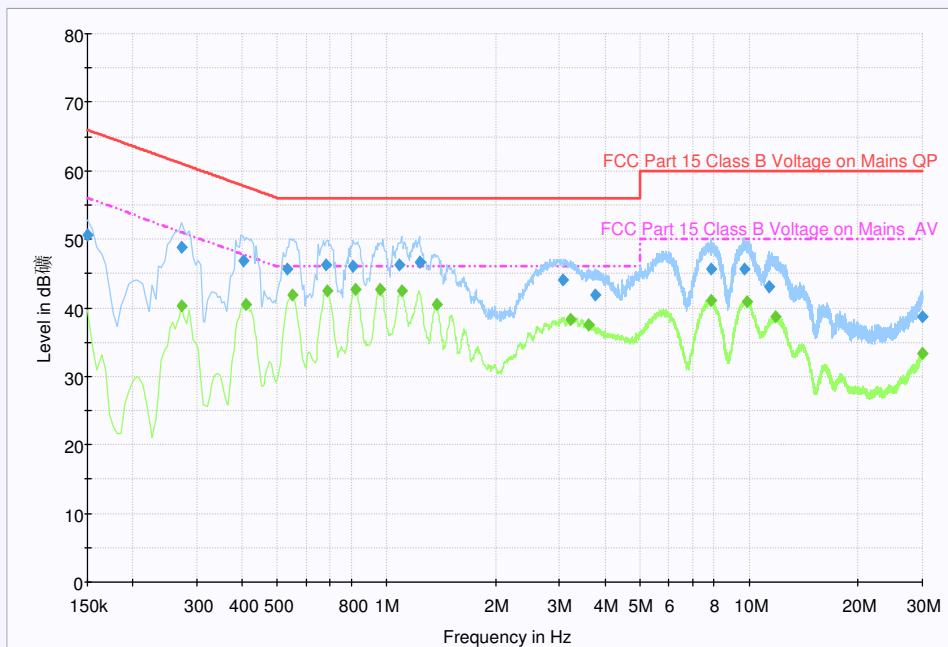
## TEST REPORT N°: (5209)152-0764

### Measurement Data : Live

#### Test Result of (Receiver mode): PASS

#### Results and limit lines for Conducted Emission:

Limits for Conducted Emission Test, please refer to limit lines (Quasi-Peak and Average) in the following diagram.



Frequency (MHz)	QuasiPeak (dB $\mu$ V)	Bandwidth (kHz)	Corr. (dB)	Margin (dB)	Limit (dB $\mu$ V)
0.150000	50.7	9.000	9.6	15.3	66.0
0.271500	48.9	9.000	9.6	12.2	61.1
0.402000	46.9	9.000	9.6	10.9	57.8
0.532500	45.7	9.000	9.6	10.3	56.0
0.681000	46.2	9.000	9.7	9.8	56.0
0.811500	46.0	9.000	9.7	10.0	56.0
1.081500	46.3	9.000	9.7	9.7	56.0
Frequency (MHz)	Average (dB $\mu$ V)	Bandwidth (kHz)	Corr. (dB)	Margin (dB)	Limit (dB $\mu$ V)
0.271500	40.3	9.000	9.6	10.8	51.1
0.411000	40.4	9.000	9.6	7.2	47.6
0.550500	41.9	9.000	9.6	4.1	46.0
0.685500	42.5	9.000	9.6	3.5	46.0
0.825000	42.7	9.000	9.6	3.3	46.0
0.960000	42.7	9.000	9.7	3.3	46.0
1.099500	42.5	9.000	9.6	3.5	46.0



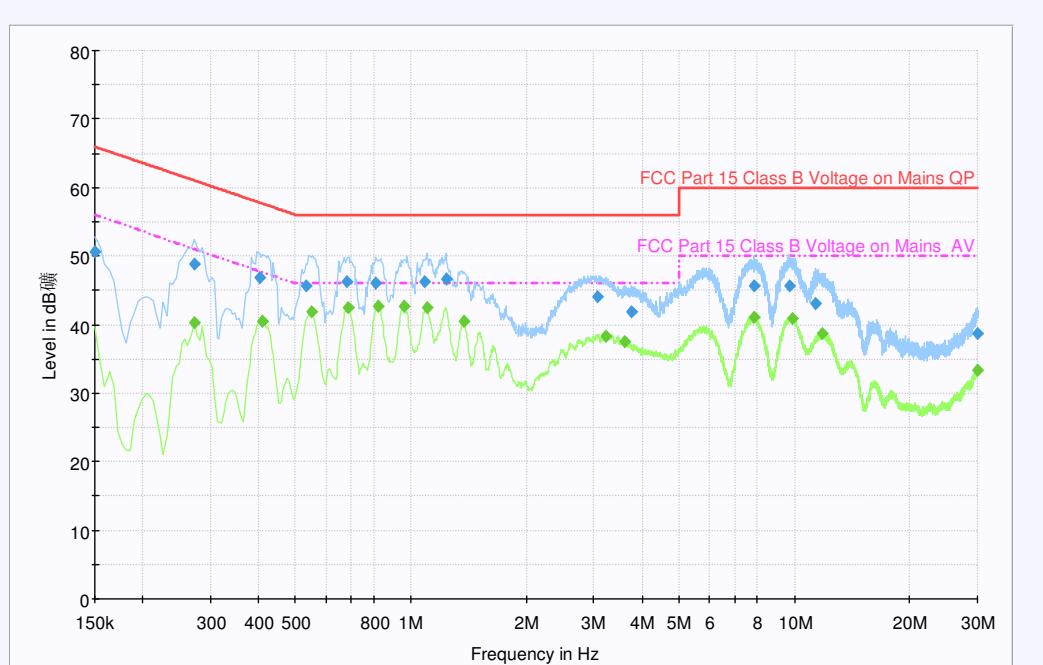
## TEST REPORT N°: (5209)152-0764

### Measurement Data : Neutral

Test Result of (Receiver mode): PASS

### Results and limit lines for Conducted Emission:

Limits for Conducted Emission Test, please refer to limit lines (Quasi-Peak and Average) in the following diagram.



Frequency (MHz)	QuasiPeak (dB $\mu$ V)	Bandwidth (kHz)	Corr. (dB)	Margin (dB)	Limit (dB $\mu$ V)
1.234500	46.6	9.000	9.6	9.4	56.0
3.066000	44.0	9.000	9.6	12.0	56.0
3.754500	41.8	9.000	9.7	14.2	56.0
7.827000	45.6	9.000	9.8	14.4	60.0
9.708000	45.7	9.000	9.8	14.3	60.0
11.346000	43.0	9.000	9.8	17.0	60.0
29.989500	38.6	9.000	10.1	21.4	60.0
Frequency (MHz)	Average (dB $\mu$ V)	Bandwidth (kHz)	Corr. (dB)	Margin (dB)	Limit (dB $\mu$ V)
1.374000	40.4	9.000	9.6	5.6	46.0
3.214500	38.4	9.000	9.6	7.6	46.0
3.606000	37.5	9.000	9.7	8.5	46.0
7.840500	41.0	9.000	9.8	9.0	50.0
9.892500	40.9	9.000	9.8	9.1	50.0
11.773500	38.7	9.000	9.7	11.3	50.0
29.994000	33.3	9.000	10.1	16.7	50.0

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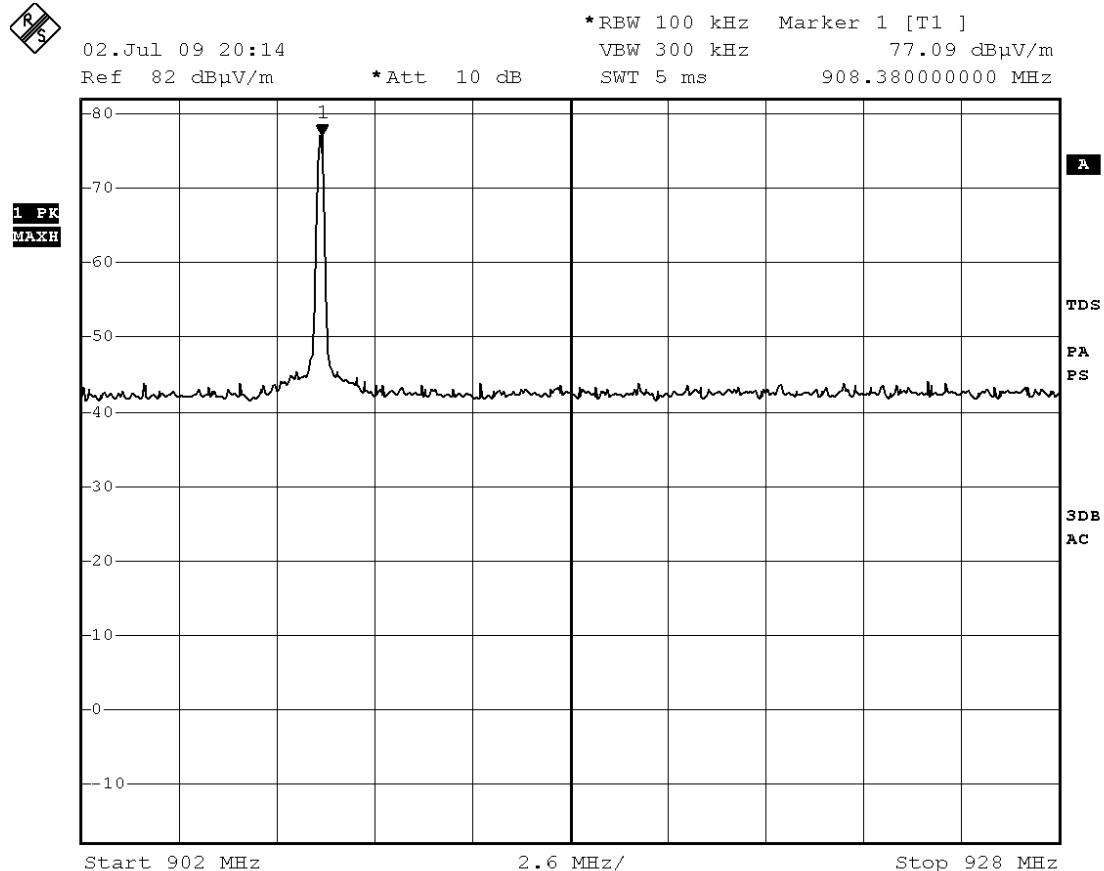
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## TEST REPORT N°: (5209)152-0764

### Measurement Data :

#### Test Result of Frequency Range of Fundamental Emission:



Date: 2.JUL.2009 20:14:37

\*\*\*\*\* End of Report \*\*\*\*\*