



TEST REPORT N°: (5210)004-0127

TEST REPORT

To:	ADVANCED CONTROL TECHNOLOGIES, INC.	To:	-
Attn:	Kevin Shelow	Attn:	-
Address:	8076 Woodland Drive, Indianapolis, IN 46278	Address:	-
Fax:	--	Fax:	-
E-mail:	kshelow@act-solutions.com	E-mail:	-
Folder No.:	MEW-09NO169ATHS-B		
Factory name:	MEGA WORLD HOLDINGS LTD.		
Location:	Unit J, 13/F., World Tech Centre, 95 How Ming Street, Kwun Tong, Hong Kong		
Product:	RF Wall Mount 3-Way Switch Model No.: ZRW103W Additional Model: ZRW103A / ZRW103I / LSM20W / LSM20A / LSM20I		
		Sample No:	(5209) 323-0762
		Test date:	November 25, 2009
		Test Requested:	FCC Part 15 - 2008
		Test Method:	ANSI C63.4 - 2003
		FCC ID:	QIE0763-03

The results given in this report are related to the tested specimen of the described electrical apparatus.

CONCLUSION: The submitted sample was found to COMPLY with requirement of FCC Part 15 Subpart C.

Authorized Signature:

Reviewed by: Keith Yeung

Approved by: Steven Tsang

Date: January 7, 2010

Date: January 7, 2010

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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	24-AUG-2010
BILOG ANTENNA	SCHAFFNER	CBL6112D	25229	31-MAY-2010
OPEN AREA TEST SITE	BVCPS	N/A	N/A	03-JULY-2010
ANECHOIC CHAMBER	ALBATROSS	M-CDC	80374004499B	07-JULY-2010
HORN ANTENNA	SCHWARZBECK	BBHA9120D	9120D-692	21-JULY-2010
PREAMPLIFIER	SCHWARZBECK	BBV9718	9718-152	27-JULY-2010
COAXIAL CABLE	SUHNER	N/A	N/A	11-MAY-2010
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	26-SEP-2010
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

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TEST REPORT N°: (5210)004-0127

Equipment Under Test [EUT]

Description of Sample:

Model Name: RF Wall Mount 3-Way Switch

Model Number: ZRW103W / ZRW103I / ZRW103A / LSM-20W / LSM-20I / LSM-20A

ZRW103W, ZRW103I, ZRW103A, LSM-20W, LSM-20I, LSM-20A are using the same circuit, PCB layout and components, the differences are only on the label and user manual with different model number and colour of the outlook.

Rating: 120V a.c, 60Hz

Description of EUT Operation:

The Equipment Under Test (EUT) is an ADVANCED CONTROL TECHNOLOGIES, INC. of RF Wall Mount 3-Way Switch. The transceiver is 1 button on/off function and operating at 908.42MHz. The transmission occurs briefly in response to one of two events: 1) A manually issued command initiated by the User via a remote control, or 2) An automated command that is initiated when the internal time of day clock matches a previously User-programmed time. Modulation by IC, and type is FSK modulation.

The transmitter has different control:

1. On/Off button – on/off control

Antenna Requirement (Section 15.203)

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

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TEST REPORT N°: (5210)004-0127

Test Results

Emission

Conducted Emissions (150kHz to 30MHz)

Test Requirement: FCC Part 15 Section 15.207
Test Method: ANSI C63.4
Test Limits: Class B
Test Date(s): 2009-11-24
Temperature: 24.0 °C
Humidity: 49.0 %
Atmospheric Pressure: 101.5 kPa
Mode of Operation: Transmission mode (with load) & Receiver mode (with load)
Tested Voltage: 117V a.c., 60Hz

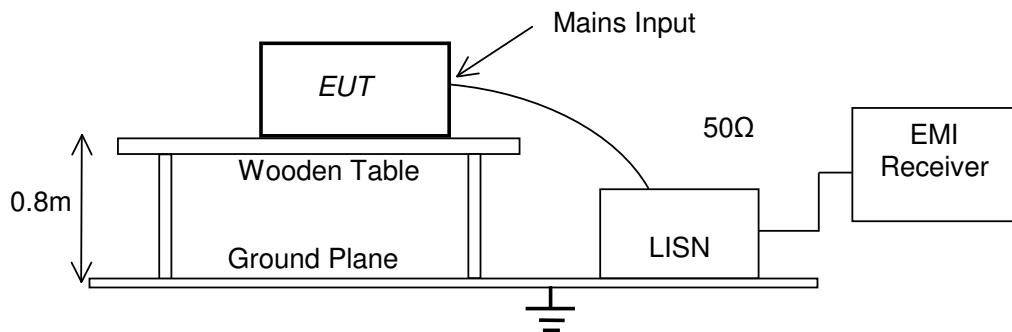
Test Procedure:

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.

Location: Shielding Room, No. 603, 6/F., Westin Centre, 26 Hung To Road, Kwun Tong, Kowloon, Hong Kong

Test Setup:



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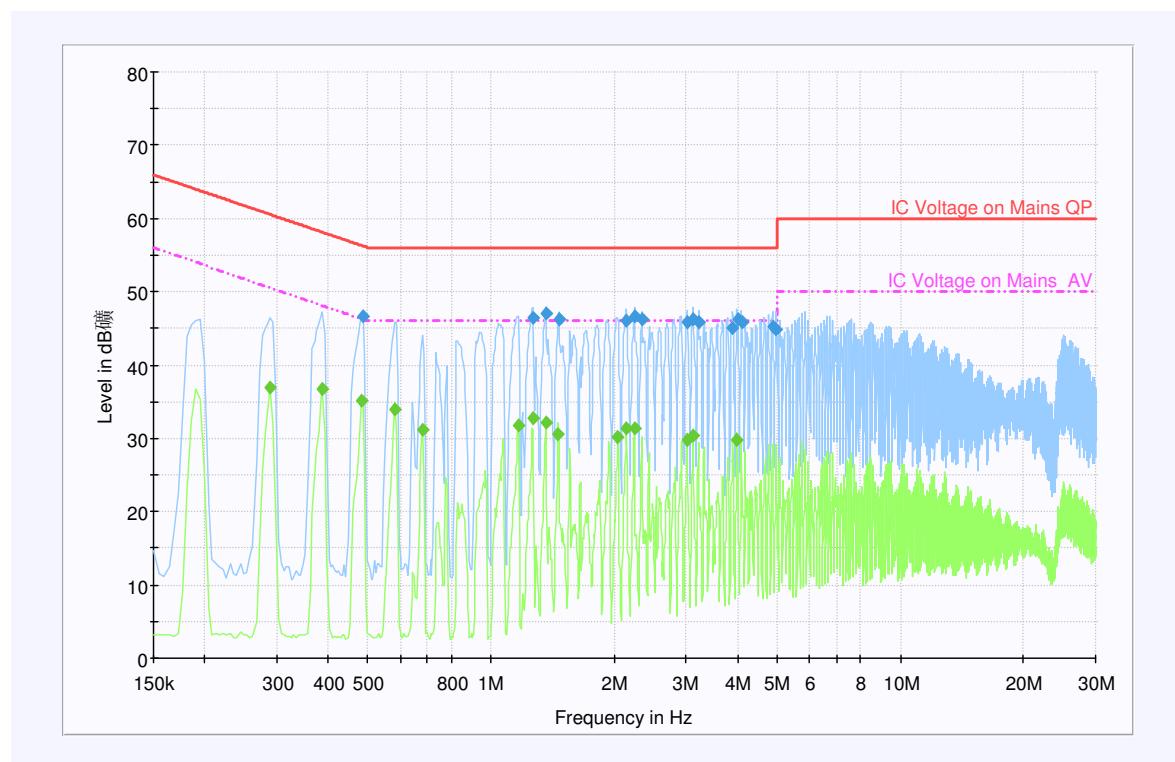
TEST REPORT N°: (5210)004-0127

Measurement Data: Live

Test Result of (Transmission mode, with load): 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.





TEST REPORT N°: (5210)004-0127

Results and limit lines for Conducted Emission:

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

Frequency (MHz)	QuasiPeak (dB μ V)	Bandwidth (kHz)	Line	Margin (dB)	Limit (dB μ V)
0.487500	46.7	9.000	L1	9.5	56.2
1.266000	46.5	9.000	L1	9.5	56.0
1.365000	47.0	9.000	L1	9.0	56.0
1.464000	46.3	9.000	L1	9.7	56.0
2.143500	46.1	9.000	L1	9.9	56.0
2.242500	46.7	9.000	L1	9.3	56.0
2.341500	46.3	9.000	L1	9.7	56.0
3.021000	45.8	9.000	L1	10.2	56.0
3.120000	46.3	9.000	L1	9.7	56.0
3.219000	45.9	9.000	L1	10.1	56.0
3.898500	45.1	9.000	L1	10.9	56.0
4.002000	46.2	9.000	L1	9.8	56.0
4.101000	45.9	9.000	L1	10.1	56.0
4.875000	45.2	9.000	L1	10.8	56.0
4.974000	44.9	9.000	L1	11.1	56.0

Frequency (MHz)	Average (dB μ V)	Bandwidth (kHz)	Line	Margin (dB)	Limit (dB μ V)
0.289500	37.0	9.000	L1	13.5	50.5
0.388500	36.7	9.000	L1	11.4	48.1
0.483000	35.1	9.000	L1	11.2	46.3
0.582000	34.0	9.000	L1	12.0	46.0
0.681000	31.1	9.000	L1	14.9	46.0
1.167000	31.7	9.000	L1	14.3	46.0
1.266000	32.8	9.000	L1	13.2	46.0
1.365000	32.2	9.000	L1	13.8	46.0
1.459500	30.7	9.000	L1	15.3	46.0
2.044500	30.2	9.000	L1	15.8	46.0
2.143500	31.4	9.000	L1	14.6	46.0
2.242500	31.4	9.000	L1	14.6	46.0
3.021000	29.7	9.000	L1	16.3	46.0
3.120000	30.4	9.000	L1	15.6	46.0
3.997500	29.7	9.000	L1	16.3	46.0

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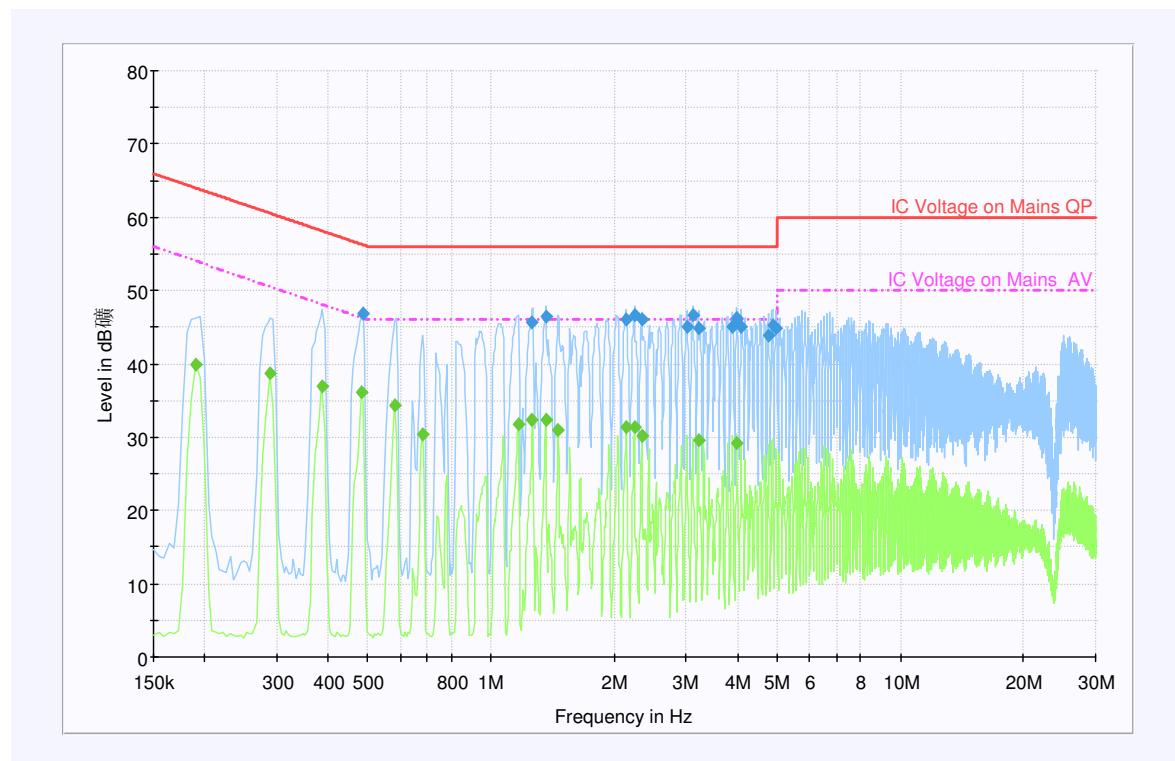
TEST REPORT N°: (5210)004-0127

Measurement Data: Neutral

Test Result of (Transmission mode, with load): 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.





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Results and limit lines for Conducted Emission:

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

Frequency (MHz)	QuasiPeak (dB μ V)	Bandwidth (kHz)	Line	Margin (dB)	Limit (dB μ V)
0.487500	46.9	9.000	N	9.3	56.2
1.261500	45.7	9.000	N	10.3	56.0
1.360500	46.5	9.000	N	9.5	56.0
2.139000	46.1	9.000	N	9.9	56.0
2.238000	46.7	9.000	N	9.3	56.0
2.337000	46.1	9.000	N	9.9	56.0
3.012000	45.0	9.000	N	11.0	56.0
3.115500	46.6	9.000	N	9.4	56.0
3.210000	44.9	9.000	N	11.1	56.0
3.889500	45.0	9.000	N	11.0	56.0
3.993000	46.3	9.000	N	9.7	56.0
4.087500	45.1	9.000	N	10.9	56.0
4.762500	43.9	9.000	N	12.1	56.0
4.866000	45.2	9.000	N	10.8	56.0
4.965000	44.8	9.000	N	11.2	56.0

Frequency (MHz)	Average (dB μ V)	Bandwidth (kHz)	Line	Margin (dB)	Limit (dB μ V)
0.190500	39.9	9.000	N	14.1	54.0
0.289500	38.7	9.000	N	11.8	50.5
0.388500	37.0	9.000	N	11.1	48.1
0.483000	36.2	9.000	N	10.1	46.3
0.582000	34.3	9.000	N	11.8	46.0
0.681000	30.4	9.000	N	15.6	46.0
1.167000	31.7	9.000	N	14.3	46.0
1.261500	32.3	9.000	N	13.7	46.0
1.360500	32.4	9.000	N	13.6	46.0
1.459500	30.9	9.000	N	15.1	46.0
2.139000	31.4	9.000	N	14.6	46.0
2.238000	31.4	9.000	N	14.6	46.0
2.337000	30.2	9.000	N	15.8	46.0
3.210000	29.6	9.000	N	16.4	46.0
3.988500	29.3	9.000	N	16.7	46.0



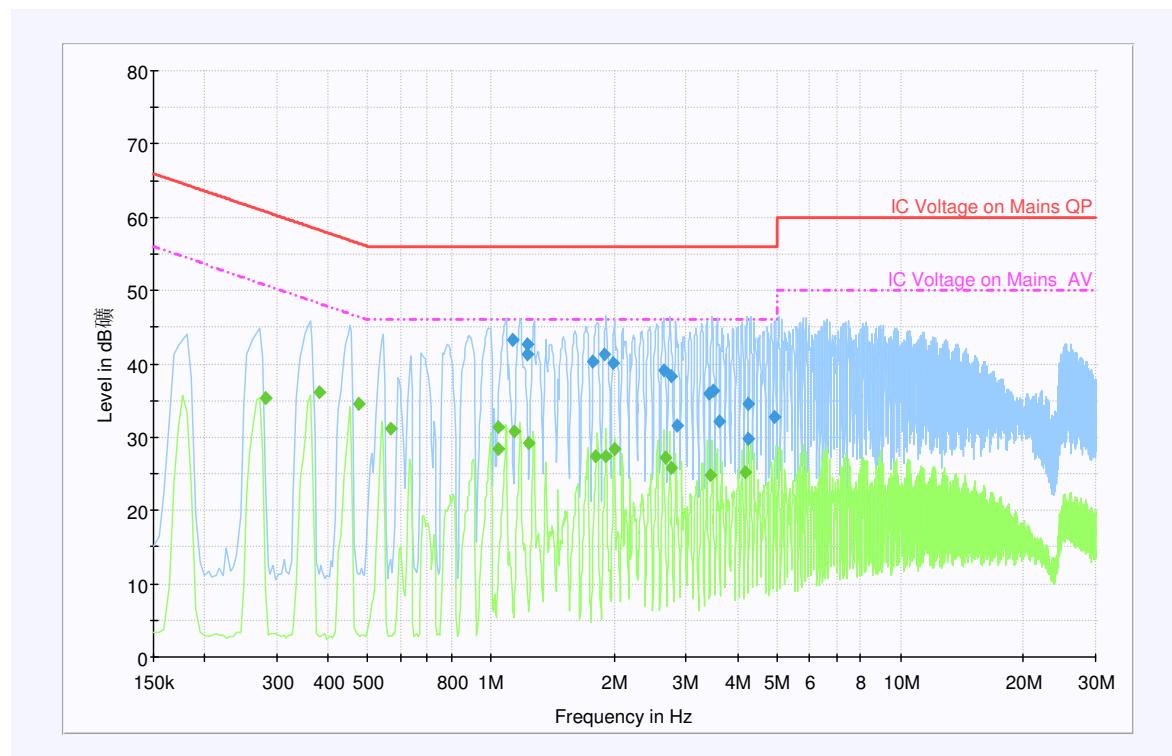
TEST REPORT N°: (5210)004-0127

Measurement Data: Live

Test Result of (Receiver mode, with load): 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.





TEST REPORT N°: (5210)004-0127

Results and limit lines for Conducted Emission:

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

Frequency (MHz)	QuasiPeak (dB μ V)	Bandwidth (kHz)	Line	Margin (dB)	Limit (dB μ V)
1.131000	43.3	9.000	L1	12.7	56.0
1.225500	41.3	9.000	L1	14.7	56.0
1.230000	42.7	9.000	L1	13.3	56.0
1.779000	40.3	9.000	L1	15.7	56.0
1.887000	41.4	9.000	L1	14.6	56.0
1.986000	40.1	9.000	L1	15.9	56.0
2.643000	39.2	9.000	L1	16.8	56.0
2.746500	38.3	9.000	L1	17.7	56.0
2.841000	31.5	9.000	L1	24.5	56.0
3.399000	35.9	9.000	L1	20.1	56.0
3.507000	36.4	9.000	L1	19.6	56.0
3.606000	32.2	9.000	L1	23.8	56.0
4.258500	29.7	9.000	L1	26.3	56.0
4.267500	34.5	9.000	L1	21.5	56.0
4.920000	32.7	9.000	L1	23.3	56.0

Frequency (MHz)	Average (dB μ V)	Bandwidth (kHz)	Line	Margin (dB)	Limit (dB μ V)
0.280500	35.3	9.000	L1	15.5	50.8
0.379500	36.1	9.000	L1	12.2	48.3
0.474000	34.5	9.000	L1	11.9	46.4
0.568500	31.2	9.000	L1	14.8	46.0
1.041000	28.5	9.000	L1	17.5	46.0
1.045500	31.5	9.000	L1	14.5	46.0
1.140000	30.9	9.000	L1	15.2	46.0
1.234500	29.2	9.000	L1	16.8	46.0
1.806000	27.5	9.000	L1	18.5	46.0
1.900500	27.3	9.000	L1	18.7	46.0
1.999500	28.4	9.000	L1	17.6	46.0
2.665500	27.1	9.000	L1	18.9	46.0
2.760000	25.9	9.000	L1	20.1	46.0
3.426000	24.8	9.000	L1	21.2	46.0
4.191000	25.3	9.000	L1	20.7	46.0



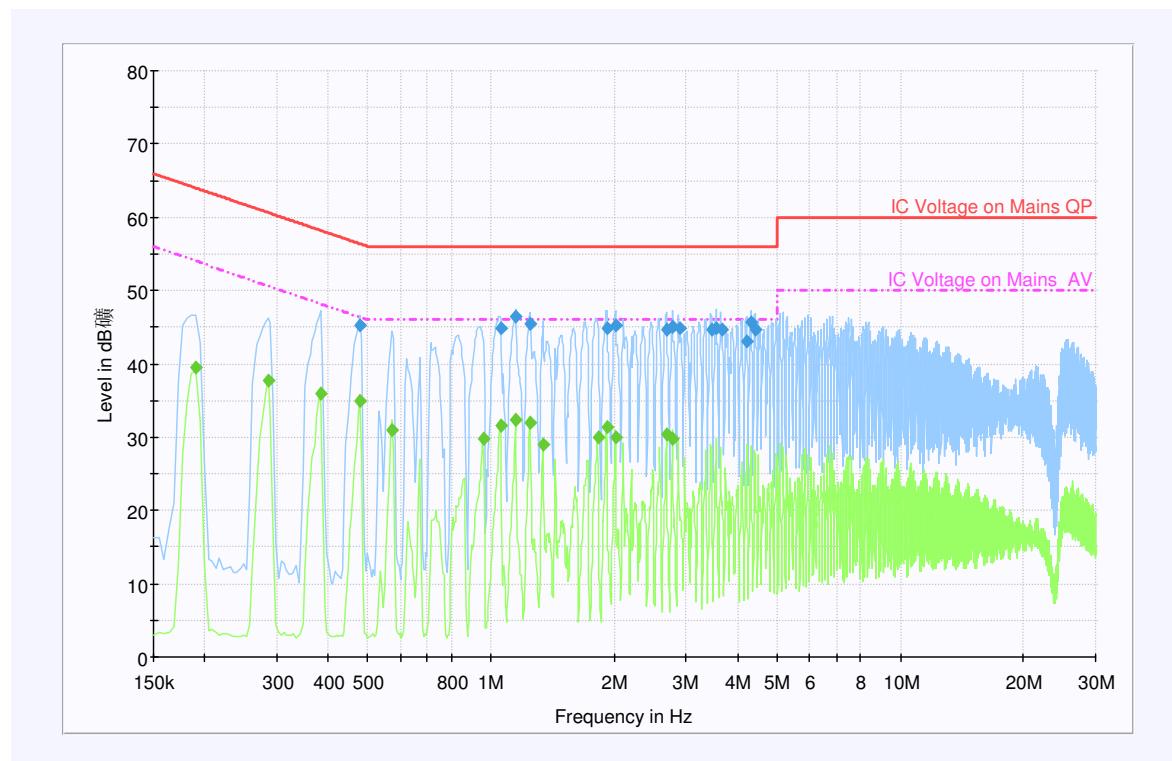
TEST REPORT N°: (5210)004-0127

Measurement Data: Neutral

Test Result of (Receiver mode, with load): 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.



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Results and limit lines for Conducted Emission:

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

Frequency (MHz)	QuasiPeak (dB μ V)	Bandwidth (kHz)	Line	Margin (dB)	Limit (dB μ V)
0.478500	45.2	9.000	N	11.2	56.4
1.054500	44.9	9.000	N	11.1	56.0
1.153500	46.5	9.000	N	9.5	56.0
1.248000	45.5	9.000	N	10.5	56.0
1.918500	44.8	9.000	N	11.2	56.0
2.017500	45.2	9.000	N	10.8	56.0
2.688000	44.7	9.000	N	11.3	56.0
2.787000	45.1	9.000	N	10.9	56.0
2.886000	44.8	9.000	N	11.2	56.0
3.457500	44.6	9.000	N	11.4	56.0
3.556500	44.9	9.000	N	11.1	56.0
3.655500	44.6	9.000	N	11.4	56.0
4.222500	43.1	9.000	N	12.9	56.0
4.330500	45.6	9.000	N	10.4	56.0
4.425000	44.7	9.000	N	11.3	56.0

Frequency (MHz)	Average (dB μ V)	Bandwidth (kHz)	Line	Margin (dB)	Limit (dB μ V)
0.190500	39.4	9.000	N	14.6	54.0
0.285000	37.8	9.000	N	12.9	50.7
0.384000	36.0	9.000	N	12.2	48.2
0.478500	34.9	9.000	N	11.5	46.4
0.573000	31.0	9.000	N	15.0	46.0
0.960000	29.9	9.000	N	16.1	46.0
1.054500	31.5	9.000	N	14.5	46.0
1.153500	32.4	9.000	N	13.6	46.0
1.248000	32.0	9.000	N	14.0	46.0
1.342500	29.0	9.000	N	17.0	46.0
1.824000	29.9	9.000	N	16.1	46.0
1.923000	31.3	9.000	N	14.7	46.0
2.017500	30.1	9.000	N	15.9	46.0
2.692500	30.4	9.000	N	15.6	46.0
2.787000	29.7	9.000	N	16.3	46.0



TEST REPORT N°: (5210)004-0127

Radiated Emissions (Fundamental)

Test Requirement: FCC Part 15 Section 15.249
Test Method: ANSI C63.4
Test Date(s): 2009-11-25
Temperature: 27.0 °C
Humidity: 56.0 %
Atmospheric Pressure: 102.1 kPa
Mode of Operation: Transmission mode (with load)
Tested Voltage: 117V a.c., 60Hz

Test Procedure:

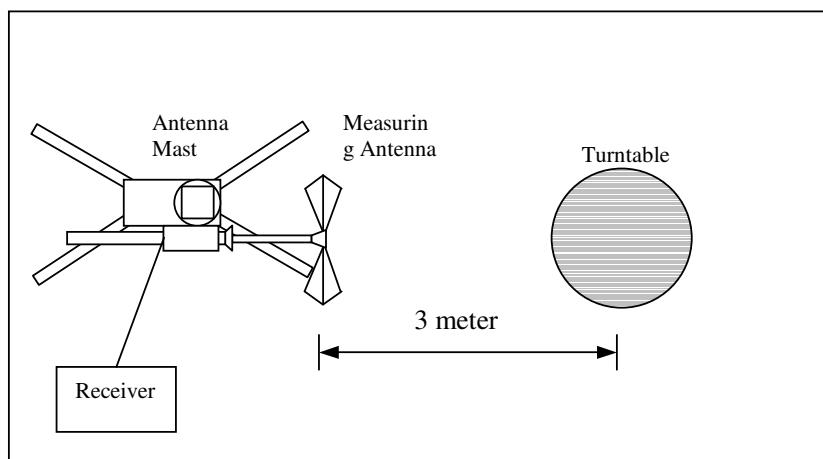
Radiated emissions measurements are investigated and taken pursuant to the procedures of ANSI C63.4 – 2003.

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.

Location: The Roof, Westin Centre, 26 Hung To Road, Kwun Tong, Kowloon, Hong Kong

Test Setup: Open Area Test Site



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TEST REPORT N°: (5210)004-0127

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	500

Measurement Data

Test Result of (Transmission mode, with load): 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)
908.396	V	Front side	25.1	86.6	94.0	-7.4

Note: EUT Orientation is shown as Set up photo.

Field Strength includes Antenna Factor and Cable Loss.

Receiver setting: RBW = 100KHz

VBW = 300KHz

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TEST REPORT N°: (5210)004-0127

Radiated Emissions (Spurious Emission)

Test Requirement: FCC Part 15 Section 15.249
Test Method: ANSI C63.4
Test Date(s): 2009-11-25
Temperature: 27.0 °C
Humidity: 56.0 %
Atmospheric Pressure: 102.1 kPa
Mode of Operation: Transmission mode (with load)
Tested Voltage: 117V a.c., 60Hz

Measurement Data

Test Result of (Transmission mode, with load): PASS

Detection mode: Peak

Frequency (MHz)	Polarity (H/V)	Antenna Factor and Cable Loss (dB/m)	Field Strength at 3m (dB μ V/m)	Limit at 3m (dB μ V/m)	Margin (dB)
1816.792	V	-5.7	45.3	74.0	-28.7
2725.188	V	-3.1	39.5	74.0	-34.5
3633.584	H	-0.9	41.2	74.0	-32.8
4541.980	H	1.7	42.0	74.0	-32.0
5450.376	H	4.1	44.0	74.0	-30.0
6358.772	V	6.8	45.7	74.0	-28.3
7267.168	H	10.0	50.8	74.0	-23.2
8175.564	H	11.2	52.7	74.0	-21.3
9083.960	H	12.4	53.8	74.0	-20.2

Note: Field Strength includes Antenna Factor and Cable Loss.

Receiver setting: RBW = 1MHz
VBW = 1MHz

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TEST REPORT N°: (5210)004-0127

Measurement Data

Test Result of (Transmission mode, with load): PASS

Detection mode: Average

Frequency (MHz)	Polarity (H/V)	Antenna Factor and Cable Loss (dB/m)	Field Strength at 3m (dB μ V/m)	Limit at 3m (dB μ V/m)	Margin (dB)
1816.792	V	-5.7	43.0	54.0	-11.0
2725.188	V	-3.1	29.2	54.0	-24.8
3633.584	H	-0.9	31.9	54.0	-22.1
4541.980	H	1.7	32.0	54.0	-22.0
5450.376	H	4.1	33.8	54.0	-20.2
6358.772	V	6.8	36.9	54.0	-17.1
7267.168	V	10.0	41.6	54.0	-12.4
8175.564	H	11.2	43.1	54.0	-10.9
9083.960	H	12.4	43.8	54.0	-10.2

Note: Field Strength includes Antenna Factor and Cable Loss.

Receiver setting: RBW = 1MHz
VBW = 10Hz

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TEST REPORT N°: (5210)004-0127

Radiated Emissions (30MHz – 1GHz)

Test Requirement: FCC Part 15 Section 15.209
Test Method: ANSI C63.4
Test Date(s): 2009-11-25
Temperature: 27.0 °C
Humidity: 56.0 %
Atmospheric Pressure: 102.1 kPa
Mode of Operation: Transmission mode (with load), Receiver mode (with load) and Standby mode
Tested Voltage: 117V a.c., 60Hz

Limits for Radiated Emissions [FCC 47 CFR 15.209]:

Frequency Range [MHz]	Quasi-Peak Limits [μ 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, with load and Standby mode): PASS

Detection mode: Quasi-Peak

Frequency (MHz)	Polarity (H/V)	Field Strength at 3m ($\text{dB}\mu\text{V}/\text{m}$)	Limit at 3m ($\text{dB}\mu\text{V}/\text{m}$)	Margin (dB)
Emissions detected are more than 20dB below the limit line(s).				

Note: Field Strength includes Antenna Factor and Cable Loss.

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TEST REPORT N°: (5210)004-0127

Measurement Data

Test Result of (Receiver mode, with load): PASS

Detection mode: Quasi-Peak

Frequency (MHz)	Polarity (H/V)	Field Strength at 3m (dB μ V/m)	Limit at 3m (dB μ V/m)	Margin (dB)
189.64	V	23.7	43.5	-19.8
218.32	V	25.8	46.0	-20.2
316.72	V	29.0	46.0	-17.0
388.84	V	29.7	46.0	-16.3
626.92	V	35.1	46.0	-10.9
906.20	H	37.1	46.0	-8.9

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.

Receiver setting (30-1000MHz) :RBW = 100KHz
:VBW = 300KHz

Receiver setting (1-18GHz) :RBW = 1MHz
:VBW = 1MHz

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TEST REPORT N°: (5210)004-0127

Frequency range of Fundamental Emission

Test Requirement: FCC 47 CFR 15.249
Test Method: ANSI C63.4:2003 (Section 13.1.7)
Test Date(s): 2009-11-25
Temperature: 27.0 °C
Humidity: 56.0 %
Atmospheric Pressure: 102.1 kPa
Mode of Operation: Transmission mode (with load)
Tested Voltage: 117V a.c., 60Hz

Test Method:

The bandwidth is measured at an amplitude level reduced from the reference level by a specified ratio. The reference level is the level of the highest amplitude signal observed from the transmitter at the fundamental frequency. Once the reference level is established, the equipment is conditioned with typical modulating signal to produce the worst-case (i.e. the widest) bandwidth.

Limits for Frequency range of Fundamental Emission:

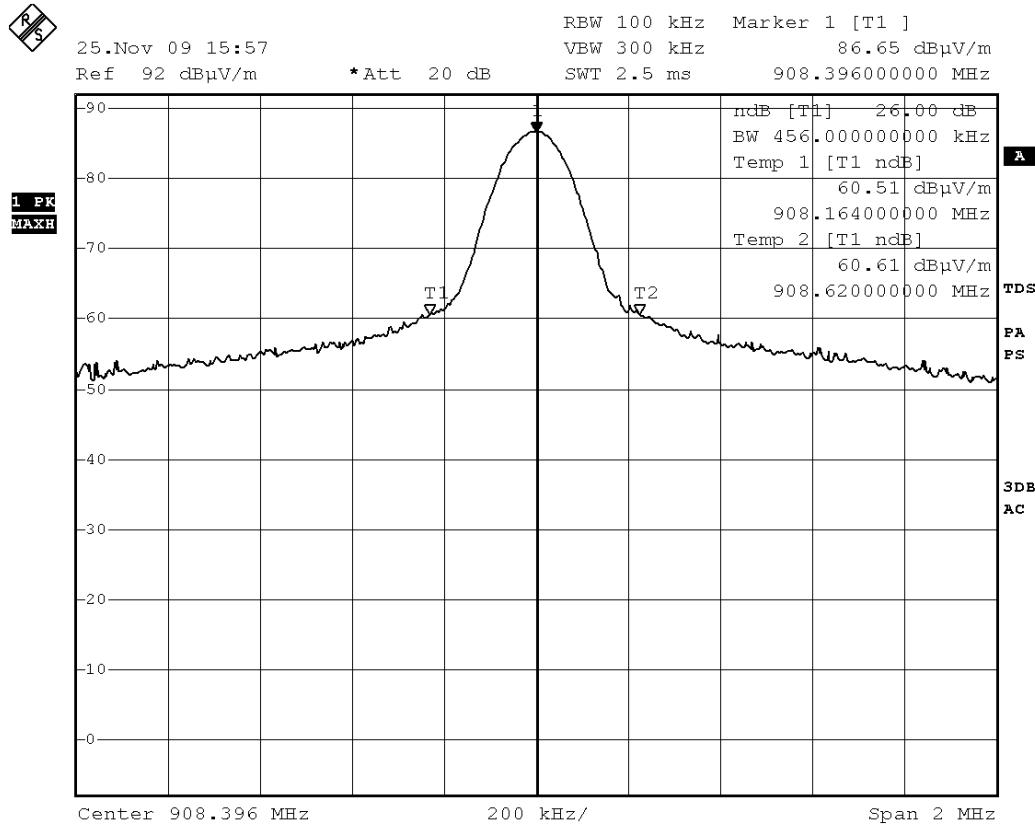
Frequency [MHz]	FCC Limits [MHz]
908.396	902-928



TEST REPORT N°: (5210)004-0127

Measurement Data :

Test Result of Frequency Range of Fundamental Emission: PASS



Date: 25.NOV.2009 15:57:02

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

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