SGS-CSTC Standards Technical Services Co., Ltd.

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

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FCC REPORT

Application No. :	SZEM1401000194RF
Applicant:	Zmodo Technology Shenzhen Corp. Ltd
Manufacturer:	Zmodo Technology Shenzhen Corp. Ltd
Factory:	Zmodo Technology Shenzhen Corp. Ltd
Product Name:	IPC
Model No.(EUT):	ZMD-ISV-BFS23NM
Add Model No.:	Zx-Ixxyy- x(1st x=h,p,s;2nd x=D,B,Z,X,O;3rd x=AtoZ,1st y=0,1,2,3,5,7; 2nd y=0 to 9 or A to Z;4th x=W,A,P,C,S,WC,PA,WC-T,WAC or null). ZMD-ISx-xxxyyxx(1st x=V,E,S;2nd x=B,D,Z,O;3rd x=A to Z; 4th x=S,M,L,H;1st y=0 to 9;2nd y=1 to 9;5th x=N,P,6th X=A,M).
Standards:	47 CFR Part 15B (2013)
Date of Receipt:	2014-01-17
Date of Test:	2014-03-26 to 2014-05-27
Date of Issue:	2014-06-05
Test Result:	**PASS ***

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

Authorized Signature:

Jack Zhang
EMC Laboratory Manager

The manufacturer should ensure that all products in series production are in conformity with the product sample detailed in this report.
If the product in this report is used in any configuration other than that detailed in the report, the manufacturer must ensure the new system complies with all relevant standards. Any mention of SGS International Electrical Approvals or testing done by SGS International Electrical Approvals in connection with, distribution or use of the product described in this report must be approved by SGS International Electrical Approvals in writing.
The report must not be used by the client to claim product certification, approval, or endorsement by NVLAP, NIST, or any agency of the federal government. All test results in this report can be traceable to National or International Standards.

2 Test Summary

Test Item	Test Requirement	Test method	Result
Radiated Emission	47 CFR Part 15B	ANSI C63.4 (2009)	PASS
Conducted Emission (150kHz to 30MHz)	47 CFR Part 15B	ANSI C63.4 (2009)	PASS

Remark:

Model No.: ZMD-ISV-BFS23NM, Zx-Ixxyy- x(1^{st}x=h,p,s;2^{nd}x=D,B,Z,X,O;3^{rd}x=AtoZ,1^{st}y=0,1,2,3,5, 7; 2^{nd}y=0 to 9 or A to Z;4^{th}x=W,A,P,C,S,WC,PA,WC-T,WAC or null).ZMD-ISx-xxxyyxx(1^{st}x=V,E,S; 2^{nd}x=B,D,Z,O;3^{rd}x=A to Z; 4^{th}x=S,M, L,H;1^{st}y=0 to 9;2^{nd}y=1 to 9;5^{th}x=N,P,6^{th}X=A,M).

Only the model ZMD-ISV-BFS23NM was tested, since the circuit design, PCB layout, electrical components used, internal wiring and functions were identical for the above models, with difference being the color of appearance and the size.

3 Contents

4 General Information

4.1 Client Information

Applicant:	Zmodo Technology Shenzhen Corp. Ltd
Address of Applicant:	17/F, Office Tower A, Financial Technology Building, 11 Keyuan Road, Nanshan District, Shenzhen, Guangdong, China
Manufacturer:	Zmodo Technology Shenzhen Corp. Ltd
Address of Manufacturer:	17/F, Office Tower A, Financial Technology Building, 11 Keyuan Road, Nanshan District, Shenzhen, Guangdong, China
Factory:	Zmodo Technology Shenzhen Corp. Ltd
Address of Factory:	17/F, Office Tower A, Financial Technology Building, 11 Keyuan Road, Nanshan District, Shenzhen, Guangdong, China

4.2 General Description of EUT

Product Name:	IPC	
Model No.:	ZMD-ISV-BFS23NM Zx-Ixxyy- x(1^{st}x=h,p,s;2^{nd}x=D,B,Z,X,O;3^{rd}x=AtoZ,1^{st}y=0,1,2,3,5,7; 2^{nd}y=0 to 9 or A to Z;4^{th}x=W,A,P,C,S,WC,PA,WC-T,WAC or null). ZMD-ISx-xxxyyxx(1^{st}x=V,E,S;2^{nd}x=B,D,Z,O;3^{rd}x=A to Z; 4^{th}x=S,M,L,H;1^{st}y=0 to 9;2^{nd}y=1 to 9;5^{th}x=N,P,6^{th}X=A,M).	
The Highest frequency：	440MHz	
Sample Type:	Fixed production	
Antenna Type:	Integral	
Power Supply:	AC adapter:	MODEL: GEO151UB-1215 INPUT: AC110-240V 50/60Hz 0.3A OUTPUT: DC 12V 1.5A
Test Voltage:	AC 120V 60Hz	
AC Cable:	140cm (Unshielded, One core)	

4.3 Test Environment and Mode

Operating Environment:	
Temperature:	22.0 °C
Humidity:	54 % RH
Atmospheric Pressure:	1010 mbar
Test mode:	
LAN mode:	Build the connection between EUT and Ethernet, keep EUT exchanging data via LAN port.

4.4 Description of Support Units

The EUT has been tested with associated equipment below

Description	Manufacturer	Model No.
PC	DELL	DCSM
LCD-displaying	DELL	SP2208WFPt
KEYBOARD	DELL	SK-8115
MOUSE	Lenovo	MO28UOL
PC	IBM	8172
LCD-displaying	Lenovo	L1711pC
KEYBOARD	IBM	SK-8115
MOUSE	Lenovo	MO28UOA
Printer	Canon	BJC-1000SP
Coded	HengTong ELECTRON	HT4000
Router	TP-link	TL-WR340G+

4.5 Test Location

All tests were performed at:

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

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.

4.6 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.

- **VCCI**

  The 3m Semi-anechoic chamber, Full-anechoic Chamber and Shielded Room (7.5m x 4.0m x 3.0m) of SGS-CSTC Standards Technical Services Co., Ltd. have been registered in accordance with the Regulations for Voluntary Control Measures with Registration No.: R-2197, G-416, T-1153 and C-2383 respectively.

- **FCC – Registration No.: 556682**

  SGS-CSTC Standards Technical Services Co., Ltd., Shenzhen EMC Laboratory has been registered and fully described in a report filed with the (FCC) Federal Communications Commission. The acceptance letter from the FCC is maintained in our files. Registration No.: 556682.

- **Industry Canada (IC)**

  Two 3m Semi-anechoic chambers of SGS-CSTC Standards Technical Services Co., Ltd. have been registered by Certification and Engineering Bureau of Industry Canada for radio equipment testing with Registration No.: 4620C-1 & 4620C-2.

4.7 Deviation from Standards

None.

4.8 Abnormalities from Standard Conditions

None.

4.9 Other Information Requested by the Customer

None.

4.10 Equipment List

RE in Chamber					
Item	**Test Equipment**	**Manufacturer**	**Model No.**	**Inventory No.**	**Cal.Due date (yyyy-mm-dd)**
1	3m Semi-Anechoic Chamber	ETS-LINDGREN	N/A	SEL0017	2015-06-10
2	EMI Test Receiver	Rohde & Schwarz	ESIB26	SEL0023	2015-05-16
3	EMI Test software	AUDIX	E3	SEL0050	N/A
4	Coaxial cable	SGS	N/A	SEL0027	2015-05-29
5	Coaxial cable	SGS	N/A	SEL0189	2015-05-29
6	Coaxial cable	SGS	N/A	SEL0121	2015-05-29
7	Coaxial cable	SGS	N/A	SEL0178	2015-05-29
8	BiConiLog Antenna (26-3000MHz)	ETS-LINDGREN	3142C	SEL0015	2014-10-24
9	Double-ridged horn (1-18GHz)	ETS-LINDGREN	3117	SEL0006	2014-10-24
10	Pre-amplifier (0.1-1300MHz)	Agilent Technologies	8447D	SEL0053	2015-05-16
11	Pre-Amplifier (0.1-26.5GHz)	Compliance Directions Systems Inc.	PAP-0126	SEL0168	2014-10-24
12	Barometer	ChangChun	DYM3	SEL0088	2015-05-16
13	DC Power Supply	Zhao Xin	RXN-305D	SEL0117	2014-10-24
14	Humidity/ Temperature Indicator	Shanhai Qixiang	ZJ1-2B	SEL0103	2014-10-24
15	Signal Generator	Rohde & Schwarz	SMY01	SEL0155	2014-10-24
16	Signal Generator (10M-27GHz)	Rohde & Schwarz	SMR27	SEL0067	2015-05-16
17	Loop Antenna	Beijing Daze	ZN30401	SEL0203	2015-06-04

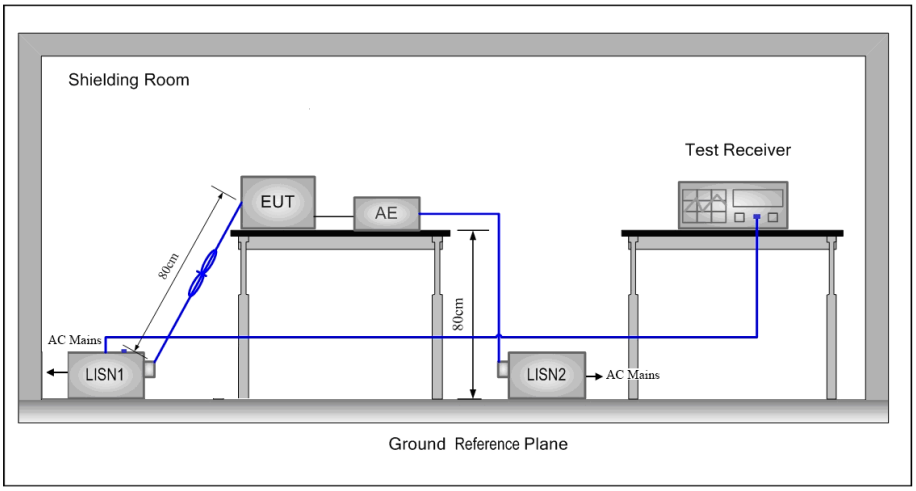
Conducted Emission					
Item	**Test Equipment**	**Manufacturer**	**Model No.**	**Inventory No.**	**Cal.Due date (yyyy-mm-dd)**
1	Shielding Room	ZhongYu Electron	GB-88	SEL0042	2015-06-10
2	LISN	Rohde & Schwarz	ENV216	SEL0152	2014-10-24
3	LISN	ETS-LINDGREN	3816/2	SEL0021	2015-05-16
4	8 Line ISN	Fischer Custom Communications Inc.	FCC-TLISN-T8-02	SEL0162	2014-11-10
5	4 Line ISN	Fischer Custom Communications Inc.	FCC-TLISN-T4-02	SEL0163	2014-11-10
6	2 Line ISN	Fischer Custom Communications Inc.	FCC-TLISN-T2-02	SEL0164	2014-11-10
7	EMI Test Receiver	Rohde & Schwarz	ESCI	SEL0022	2015-05-16
8	Coaxial Cable	SGS	N/A	SEL0025	2015-05-29
9	DC Power Supply	Zhao Xin	RXN-305D	SEL0117	2014-10-24
10	Humidity/ Temperature Indicator	Shanhai Qixiang	ZJ1-2B	SEL0103	2014-10-24
11	Barometer	Chang Chun	DYM3	SEL0088	2015-05-16

Note: The calibration interval is one year, all the instruments are valid.

5 Test results and Measurement Data

5.1 Conducted Emissions

Test Requirement:	47 CFR Part 15B
Test Method:	ANSI C63.4: 2009
Test frequency range:	150kHz to 30MHz
Limit:	Frequency range (MHz) / Limit (dBuV): 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.
Test Procedure:	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 50Ω/50μH + 5Ω 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 C63.4: 2009 on conducted measurement.

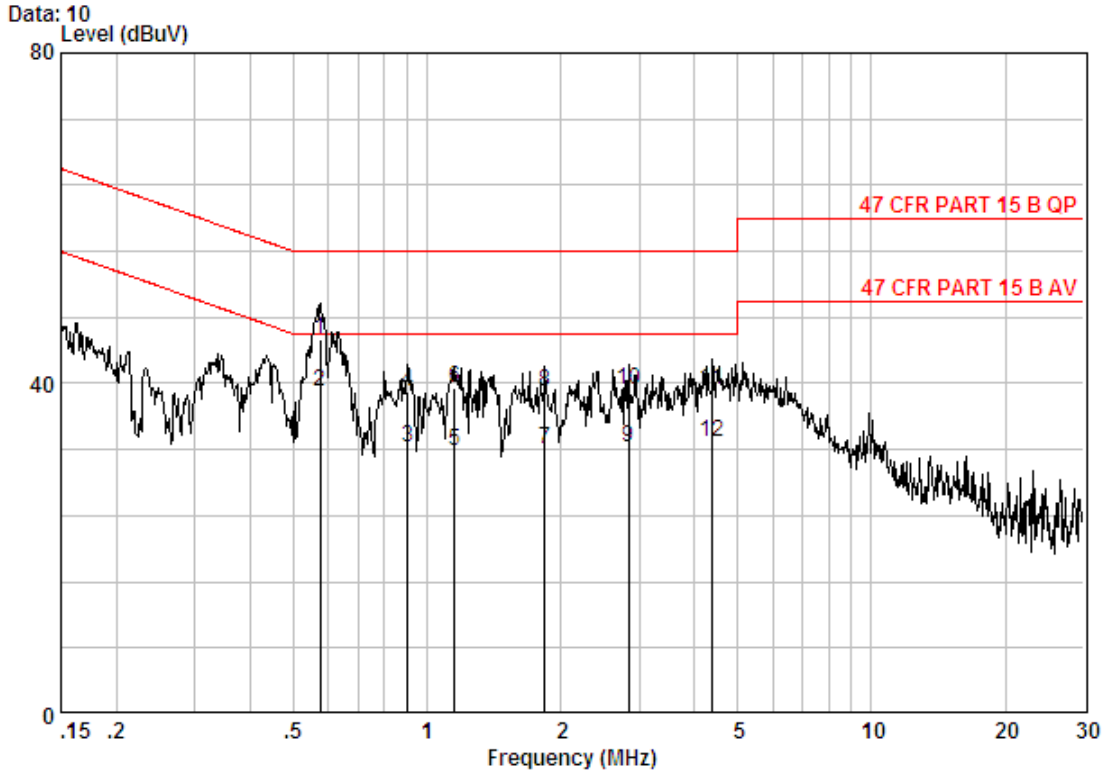
Test Setup:	
Instruments Used:	Refer to section 4.10 for details
Test Mode:	LAN mode
Test Results:	Pass

Measurement Data

An initial pre-scan was performed on the live and neutral lines with peak detector.

Quasi-Peak and Average measurement were performed at the frequencies with maximized peak emission were detected.

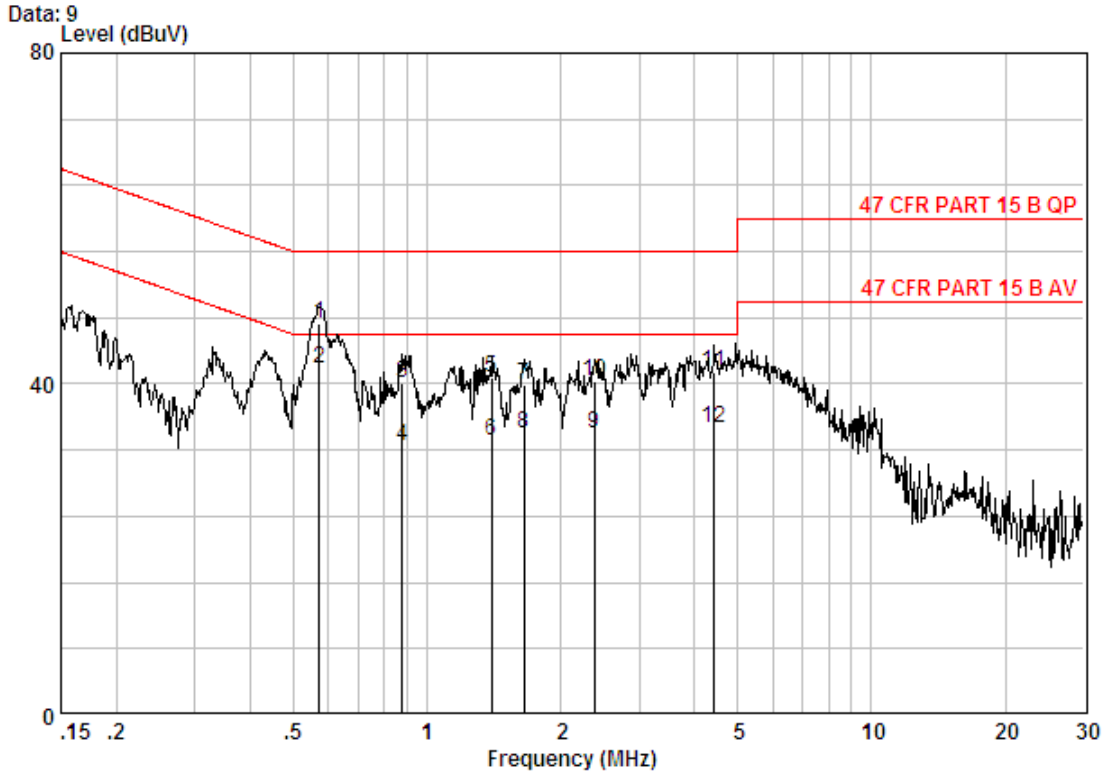
Live Line:



Site : Shielding Room
Condition : 47 CFR PART 15 B QP CE LINE
Job No. : 0194RF
Test mode : LAN

	Freq	Cable Loss	LISN Factor	Read Level	Level	Limit Line	Over Limit	Remark
	MHz	dB	dB	dBuV	dBuV	dBuV	dB	
1	0.57600	0.01	9.80	35.50	45.31	56.00	-10.69	QP
2 @	0.57600	0.01	9.80	29.30	39.11	46.00	-6.89	Average
3	0.90394	0.02	9.80	22.51	32.33	46.00	-13.67	Average
4	0.90394	0.02	9.80	29.26	39.08	56.00	-16.92	QP
5	1.153	0.02	9.80	22.09	31.91	46.00	-14.09	Average
6	1.153	0.02	9.80	29.56	39.38	56.00	-16.62	QP
7	1.839	0.02	9.80	22.28	32.10	46.00	-13.90	Average
8	1.839	0.02	9.80	29.29	39.11	56.00	-16.89	QP
9	2.839	0.02	9.84	22.37	32.23	46.00	-13.77	Average
10	2.839	0.02	9.84	29.47	39.33	56.00	-16.67	QP
11	4.384	0.01	9.89	29.35	39.25	56.00	-16.75	QP
12	4.384	0.01	9.89	22.97	32.87	46.00	-13.13	Average

Neutral Line:



Site : Shielding Room
Condition : 47 CFR PART 15 B QP CE NEUTRAL
Job No. : 0194RF
Test mode : LAN

	Freq	Cable Loss	LISN Factor	Read Level	Level	Limit Line	Over Limit	Remark
	MHz	dB	dB	dBuV	dBuV	dBuV	dB	
1	0.57300	0.01	9.80	37.40	47.21	56.00	-8.79	QP
2 @	0.57300	0.01	9.80	32.10	41.91	46.00	-4.09	Average
3	0.88031	0.02	9.80	30.27	40.09	56.00	-15.91	QP
4	0.88031	0.02	9.80	22.73	32.55	46.00	-13.45	Average
5	1.396	0.02	9.80	30.94	40.76	56.00	-15.24	QP
6	1.396	0.02	9.80	23.24	33.06	46.00	-12.94	Average
7	1.654	0.02	9.80	30.02	39.84	56.00	-16.16	QP
8	1.654	0.02	9.80	24.18	34.00	46.00	-12.00	Average
9	2.384	0.02	9.82	24.15	33.99	46.00	-12.01	Average
10	2.384	0.02	9.82	30.49	40.33	56.00	-15.67	QP
11	4.430	0.01	9.89	31.48	41.38	56.00	-14.62	QP
12	4.430	0.01	9.89	24.82	34.72	46.00	-11.28	Average

Notes:

1. The following Quasi-Peak and Average measurements were performed on the EUT:

2. Final Test Level =Receiver Reading + LISN Factor + Cable Loss.

5.2 Radiated Emission

<table>
<tr><td>Test Requirement:</td><td>47 CFR Part 15B</td></tr>
<tr><td>Test Method:</td><td>ANSI C63.4: 2009</td></tr>
<tr><td>Test site:</td><td>Measurement Distance: 3m (Semi-Anechoic Chamber)</td></tr>
<tr><td>Receiver setup:</td><td>
<table>
<tr><td>Frequency</td><td>Detector</td><td>RBW</td><td>VBW</td><td>Remark</td></tr>
<tr><td>30MHz-1GHz</td><td>Quasi-peak</td><td>100kHz</td><td>300kHz</td><td>Quasi-peak Value</td></tr>
<tr><td>Above 1GHz</td><td>Peak</td><td>1MHz</td><td>3MHz</td><td>Peak Value</td></tr>
</table>
</td></tr>
<tr><td>Limit:</td><td>
<table>
<tr><td>Frequency</td><td>Limit (dBuV/m @3m)</td><td>Remark</td></tr>
<tr><td>30MHz-88MHz</td><td>40.0</td><td>Quasi-peak Value</td></tr>
<tr><td>88MHz-216MHz</td><td>43.5</td><td>Quasi-peak Value</td></tr>
<tr><td>216MHz-960MHz</td><td>46.0</td><td>Quasi-peak Value</td></tr>
<tr><td>960MHz-1GHz</td><td>54.0</td><td>Quasi-peak Value</td></tr>
<tr><td rowspan="2">Above 1GHz</td><td>54.0</td><td>Average Value</td></tr>
<tr><td>74.0</td><td>Peak Value</td></tr>
</table>
</td></tr>
<tr><td>Test Procedure:</td><td>
a. The EUT was placed on the top of a rotating table 0.8 meters above the ground at a 3 meter semi-anechoic camber. The table was rotated 360 degrees to determine the position of the highest radiation.
b. The EUT was set 3 meters away from the interference-receiving antenna, which was mounted on the top of a variable-height antenna tower.
c. 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.
d. 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 and the rotatable table was turned from 0 degrees to 360 degrees to find the maximum reading.
e. The test-receiver system was set to Peak Detect Function and Specified Bandwidth with Maximum Hold Mode.
f. 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.
</td></tr>
</table>

Test Setup:	

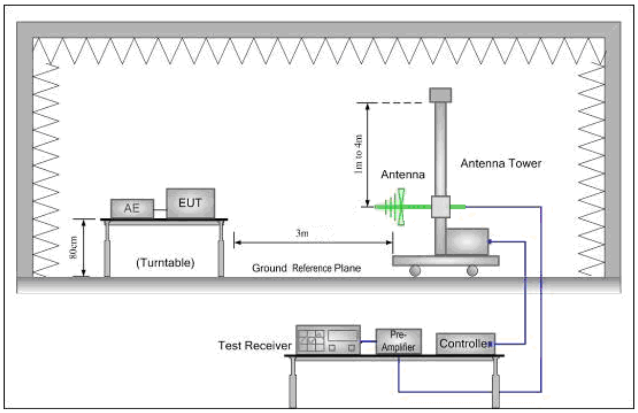


Figure 1. 30MHz to 1GHz

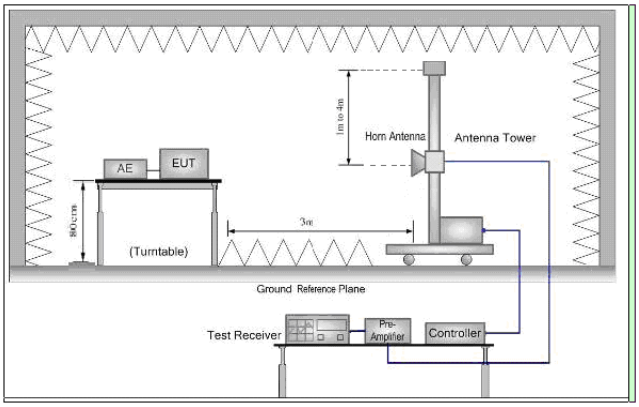
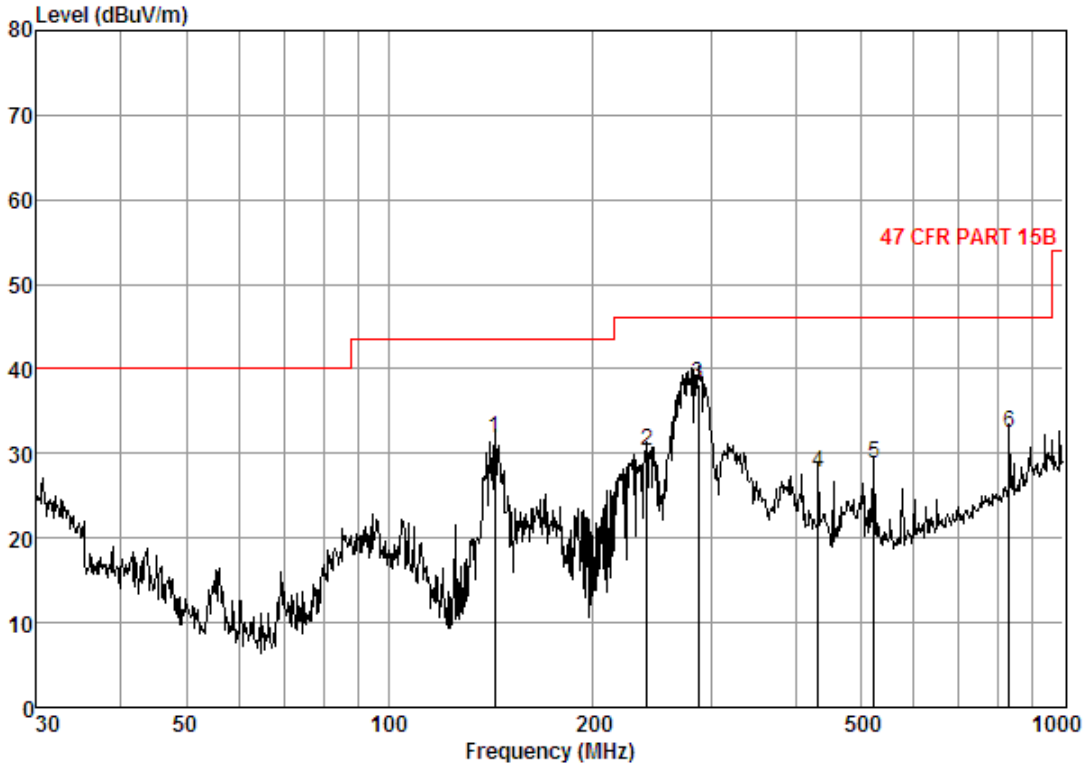


Figure 2. Above 1 GHz

Instruments Used:	Refer to section 4.10 for details
Test Mode:	LAN mode
Test Results:	Pass

Below 1GHz

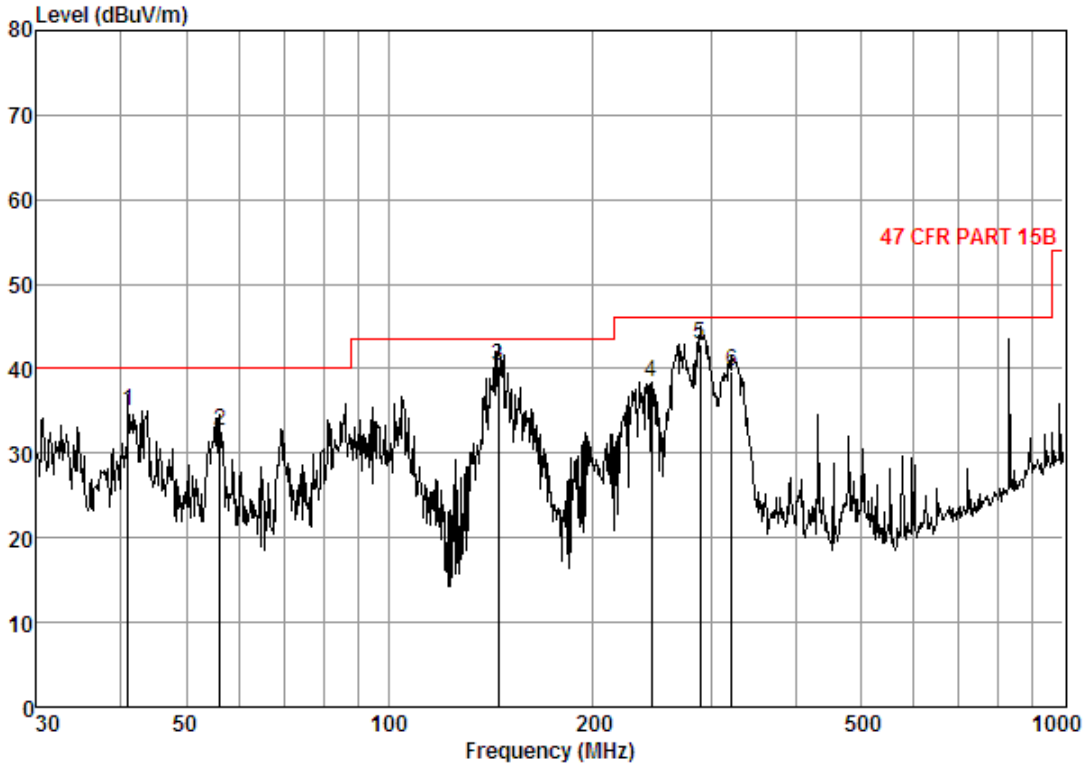
Horizontal



Condition: 47 CFR PART 15B 3m 3142C HORIZONTAL
Job No. : 0194RF
Mode : LAN mode

	Freq	Cable Loss	Antenna Factor	Preamp Factor	Read Level	Level	Limit Line	Over Limit
	MHz	dB	dB/m	dB	dBuV	dBuV/m	dBuV/m	dB
1	143.33	1.80	8.84	25.71	46.83	31.76	43.50	-11.74
2	240.83	2.44	8.00	24.76	44.65	30.33	46.00	-15.67
3	286.98	2.69	9.25	24.75	51.08	38.27	46.00	-7.73
4	432.55	3.39	11.97	25.88	38.35	27.83	46.00	-18.17
5	522.72	3.82	14.12	26.56	37.34	28.72	46.00	-17.28
6	830.40	5.20	19.08	26.24	34.40	32.44	46.00	-13.56

Vertical



Condition: 47 CFR PART 15B 3m 3142C VERTICAL
Job No. : 0194RF
Mode : LAN mode

	Freq	Cable Loss	Antenna Factor	Preamp Factor	Read Level	Level	Limit Line	Over Limit
	MHz	dB	dB/m	dB	dBuV	dBuV/m	dBuV/m	dB
1	40.99	0.84	10.95	25.83	48.96	34.92	40.00	-5.08
2	56.00	0.99	6.50	25.81	50.93	32.61	40.00	-7.39
3	145.25	1.80	9.00	24.97	54.50	40.33	43.50	-3.17
4	245.09	2.43	8.00	25.30	53.32	38.45	46.00	-7.55
5	289.00	2.67	9.27	24.74	55.71	42.91	46.00	-3.09
6	322.19	2.92	9.93	25.13	51.96	39.68	46.00	-6.32

Above 1GHz

Peak value:

Frequency (MHz)	Cable Loss (dB)	Antenna Factor (dB/m)	Preamp Factor (dB)	Read Level (dBuV)	Level (dBuV/m)	Limit Line (dBuV/m)	Over Limit (dB)	Polarization
1038.921	4.29	24.49	45.19	54.57	38.16	74	-35.84	Vertical
1201.149	4.74	25.02	45.16	53.01	37.61	74	-36.39	Vertical
1360.714	5.13	25.45	45.10	53.57	39.05	74	-34.95	Vertical
1521.981	5.46	25.15	44.98	54.16	39.79	74	-34.21	Vertical
1809.605	6.02	25.32	44.92	56.27	42.69	74	-31.31	Vertical
1948.245	6.26	25.94	44.90	55.69	42.99	74	-31.01	Vertical
1036.280	4.29	24.49	45.19	53.65	37.24	74	-36.76	Horizontal
1225.860	4.80	25.15	45.15	52.76	37.56	74	-36.44	Horizontal
1420.890	5.26	25.35	45.04	52.61	38.18	74	-35.82	Horizontal
1565.200	5.55	25.06	44.96	53.59	39.24	74	-34.76	Horizontal
1732.967	5.88	25.07	44.93	54.30	40.32	74	-33.68	Horizontal
1938.352	6.25	25.90	44.91	55.33	42.57	74	-31.43	Horizontal

Remark:

1) 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
2) As shown in this section, 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. So, only the peak measurements were shown in the report.

6 Photographs - EUT Test Setup

Test model No.: ZMD-ISV-BFS23NM

6.1 Conducted Emission Test Setup

6.2 Radiated Emission Test Setup

7 Photographs - EUT Constructional Details

Test model No.: ZMD-ISV-BFS23NM