

FCC Radio Test Report

FCC ID: 2AEMC-BM1

Original Grant

Report No. : TB-FCC143356

Applicant : BIOMEDIS TECHNOLOGIES CO.,LIMITED

Equipment Under Test (EUT)

EUT Name : Device for generating modulated signals BIOMEDIS M

Model No. : BM1

Brand Name : N/A

Receipt Date : 2015-04-22

Test Date : 2015-05-04

Issue Date : 2015-05-05

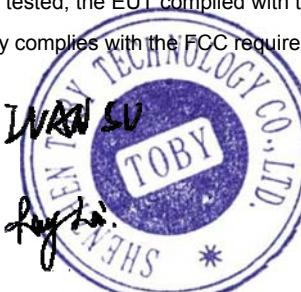
Standards : FCC Part 15, Subpart C: 2014

Test Method : ANSI C63.10: 2013

Conclusions : **PASS**

In the configuration tested, the EUT complied with the standards specified above,
The EUT technically complies with the FCC requirements

Test/Witness Engineer

: 

Approved& Authorized

: 

This report details the results of the testing carried out on one sample. The results contained in this test report do not relate to other samples of the same product. The manufacturer should ensure that all products in series production are in conformity with the product sample detailed in the report.

TB-RF-074-1.0

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1. General Information about EUT

1.1 Client Information

Applicant	:	BIOMEDIS TECHNOLOGIES CO.,LIMITED
Address	:	UNIT E223, 3/F WING TAT COMM BLDG 97 BONHAM STRAND EAST SHEUNG WAN HONG KONG
Manufacturer	:	BIOMEDIS TECHNOLOGIES CO.,LIMITED
Address	:	UNIT E223, 3/F WING TAT COMM BLDG 97 BONHAM STRAND EAST SHEUNG WAN HONG KONG

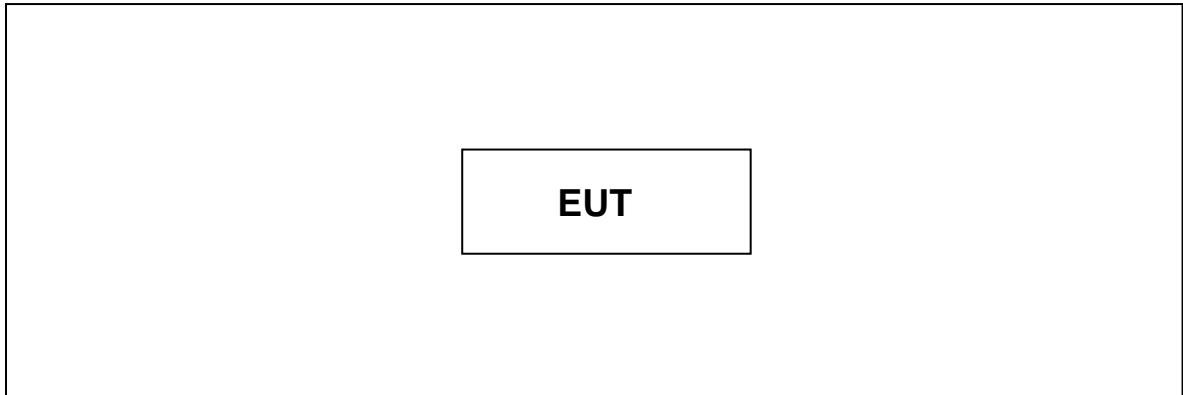
1.2 General Description of EUT (Equipment Under Test)

EUT Name	:	Device for generating modulated signals BIOMEDIS M	
Models No.	:	N/A	
Brand Name	:	BM1	
Model Difference	:	N/A	
Product Description	:	Operation Frequency:	24.00 MHz
		Out Power:	58.60 dBuV/m@3m
		Antenna Gain:	PCB Loop Antenna (0 dBi)
		Modulation Type:	AM
Power Supply	:	DC Voltage supplied from PC System by USB Cable. DC power by Li-ion battery	
Power Rating	:	USB DC 5V DC 3.7V by 300 mAh Li-ion Battery.	
Connecting I/O Port(S)	:	Please refer to the User's Manual	

Note:

- (1) For a more detailed features description, please refer to the manufacturer's specifications or the User's Manual.

1.3 Block Diagram Showing the Configuration of System Tested



1.4 Description of Support Units

The EUT has been tested as an independent unit.

1.5 Description of Test Mode

To investigate the maximum EMI emission characteristics generates from EUT, the test system was pre-scanning tested base on the consideration of following EUT operation mode or test configuration mode which possible have effect on EMI emission level. Each of these EUT operation mode(s) or test configuration mode(s) mentioned follow was evaluated respectively.

Test Items	Note
Radiated Emission	Continuously transmitting
Bandwidth	Continuously transmitting
Duty Cycle	Continuously transmitting

Note:

- (1) During the testing procedure, the continuously transmitting mode was programmed by the customer.
- (2) The EUT is considered a portable unit, and it was pre-tested on the positioned of each 3 axis: X axis, Y axis and Z axis. The worst case was found positioned on X-plane. There for only the test data of this X-plane were used for radiated emission measurement test.

1.6 Description of Test Software Setting

During testing channel& Power controlling software provided by the customer was used to

control the operating channel as well as the output power level. The RF output power selection is for the setting of RF output power expected by the customer and is going to be fixed on the firmware of the final end product power parameters of transmitting mode.

1	Product SW/HW Version :	N/A
2	Radio SW/HW Version:	N/A
3	Test SW Version:	N/A
4	RF Power Setting in Test SW:	DEF

1.7 Measurement Uncertainty

The reported uncertainty of measurement $y \pm U$, where expended uncertainty U is based on a standard uncertainty multiplied by a coverage factor of $k=2$, providing a level of confidence of approximately 95 %.

Test Item	Parameters	Expanded Uncertainty (U_{Lab})
Conducted Emission	Level Accuracy: 9kHz~150kHz 150kHz to 30MHz	± 3.42 dB ± 3.42 dB
Radiated Emission	Level Accuracy: 9kHz to 30 MHz	± 4.60 dB
Radiated Emission	Level Accuracy: 30MHz to 1000 MHz	± 4.40 dB
Radiated Emission	Level Accuracy: Above 1000MHz	± 4.20 dB

1.8 Test Facility

The testing was performed by the Shenzhen Toby Technology Co., Ltd., in their facilities located at:

1A/F., Bldg.6, Yusheng Industrial Zone, The National Road No.107 Xixiang Section 467, Xixiang, Bao'an, Shenzhen, Guangdong, China.

At the time of testing, the following bodies accredited the Laboratory:

CNAS (L5813)

The Laboratory has been accredited by CNAS to ISO/IEC 17025: 2005 General Requirements for the Competence of Testing and Calibration Laboratories for the competence in the field of testing. And the Registration No.: CNAS L5813.

FCC List No.: (811562)

The Laboratory is listed in the United States of American Federal Communications Commission (FCC), and the registration number is 811562.

IC Registration No.: (11950A-1)

The Laboratory has been registered by Certification and Engineering Bureau of Industry Canada for radio equipment testing. The site registration: Site# 11950A-1.

2. Test Summary

FCC Part 15 Subpart C			
Standard Section	Test Item	Judgment	Remark
15.203	Antenna Requirement	PASS	
15.207	Conducted Emission	PASS	
15.209	Radiation Emission	PASS	

Note: N/A is an abbreviation for Not Applicable.

3. Conducted Emission Test

3.1 Test Standard and Limit

3.1.1 Test Standard
FCC Part 15.207

3.1.2 Test Limit

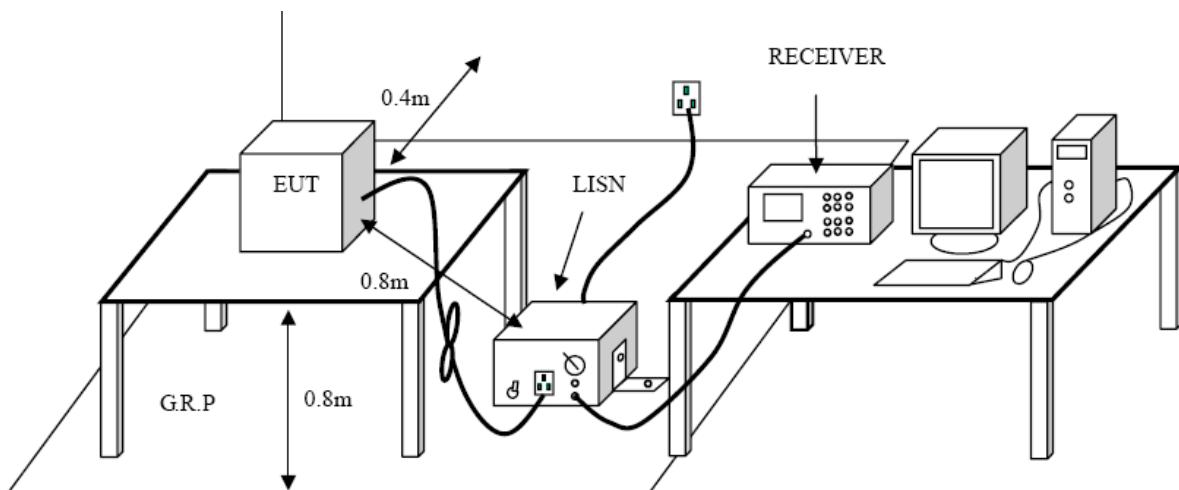
Conducted Emission Test Limit

Frequency	Maximum RF Line Voltage (dB μ V)	
	Quasi-peak Level	Average Level
150kHz~500kHz	66 ~ 56 *	56 ~ 46 *
500kHz~5MHz	56	46
5MHz~30MHz	60	50

Notes:

- (1) *Decreasing linearly with logarithm of the frequency.
- (2) The lower limit shall apply at the transition frequencies.
- (3) The limit decrease in line with the logarithm of the frequency in the range of 0.15 to 0.50MHz.

3.2 Test Setup



3.3 Test Procedure

The EUT was placed 0.8 meters from the horizontal ground plane with EUT being connected to the power mains through a line impedance stabilization network (LISN). All other support equipments powered from additional LISN(s). The LISN provide 50 Ohm/ 50uH of coupling impedance for the measuring instrument.

Interconnecting cables that hang closer than 40 cm to the ground plane shall be folded back and forth in the center forming a bundle 30 to 40 cm long.

I/O cables that are not connected to a peripheral shall be bundled in the center. The end of the cable may be terminated, if required, using the correct terminating impedance. The overall length shall not exceed 1 m.

LISN at least 80 cm from nearest part of EUT chassis.

The bandwidth of EMI test receiver is set at 9kHz, and the test frequency band is from 0.15MHz to 30MHz.

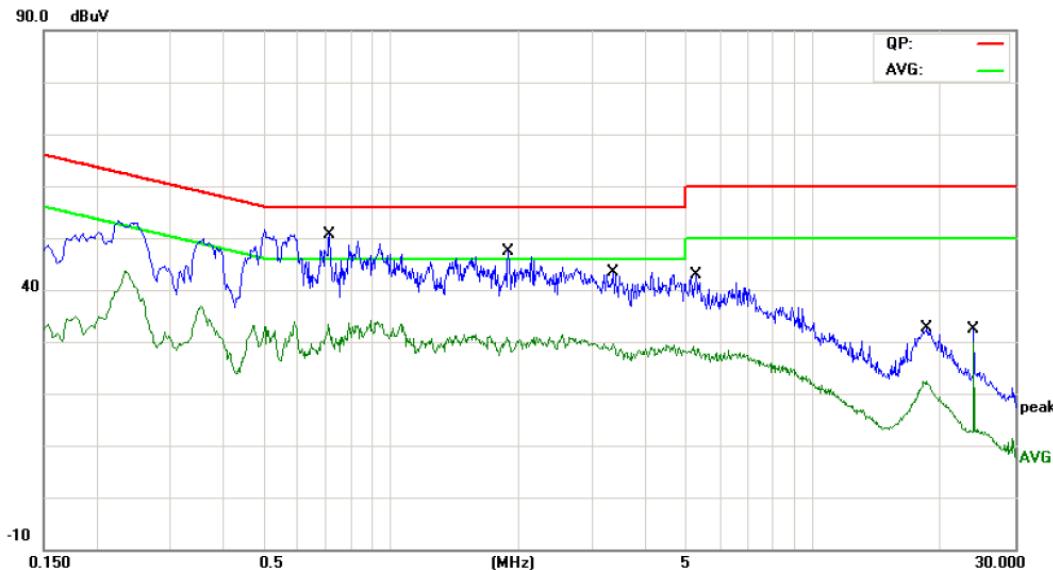
3.4 Test Equipment Used

Description	Manufacturer	Model No.	Serial No.	Cal. Date	Cal. Due Date
EMI Test Receiver	ROHDE& SCHWARZ	ESCI	100321	Aug. 08, 2014	Aug.07, 2015
50ΩCoaxial Switch	Anritsu	MP59B	X10321	Aug. 08, 2014	Aug.07, 2015
L.I.S.N	Rohde & Schwarz	ENV216	101131	Aug. 08, 2014	Aug.07, 2015
L.I.S.N	SCHWARZBECK	NNBL 8226-2	8226-2/164	Aug. 08, 2014	Aug.07, 2015

3.5 Test Data

The test is not applicable.

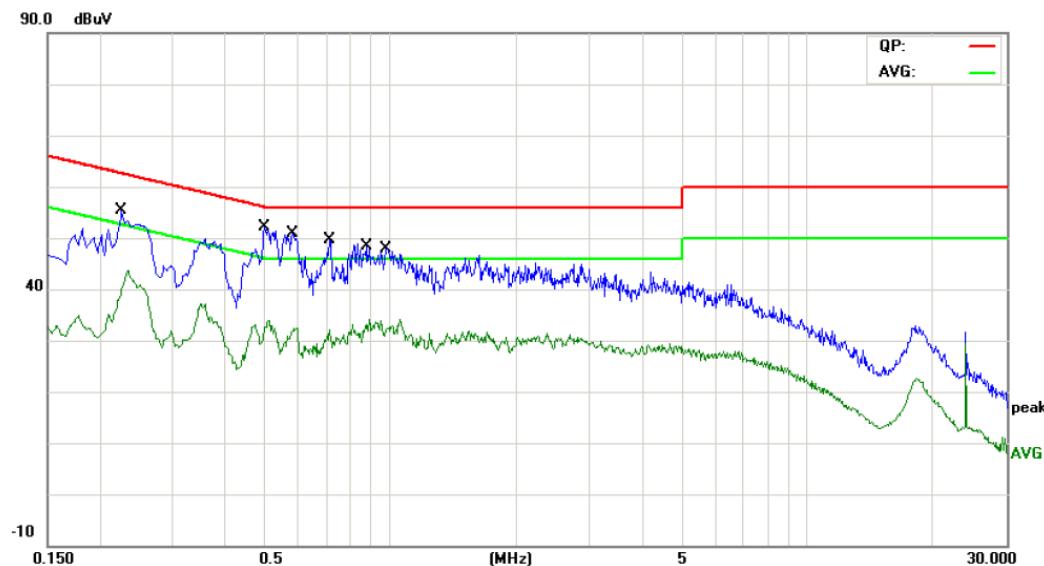
EUT:	Device for generating modulated signals BIOMEDIS M	Model Name :	BM1
Temperature:	25 °C	Relative Humidity:	55%
Test Voltage:	AC 120V/60Hz		
Terminal:	Line		
Test Mode:	TX 24.00MHz		
Remark:	Only worse case is reported		



No.	Mk.	Freq.	Reading	Correct	Measure-	Limit	Over	Detector
			Level	Factor	ment			
		MHz	dBuV	dB	dBuV	dBuV	dB	
1	*	0.7140	35.30	10.12	45.42	56.00	-10.58	QP
2		0.7140	21.61	10.12	31.73	46.00	-14.27	AVG
3		1.8900	28.49	10.06	38.55	56.00	-17.45	QP
4		1.8900	19.59	10.06	29.65	46.00	-16.35	AVG
5		3.3500	25.95	10.02	35.97	56.00	-20.03	QP
6		3.3500	19.02	10.02	29.04	46.00	-16.96	AVG
7		5.2500	23.87	9.97	33.84	60.00	-26.16	QP
8		5.2500	17.08	9.97	27.05	50.00	-22.95	AVG
9		18.5419	16.49	10.19	26.68	60.00	-33.32	QP
10		18.5419	11.27	10.19	21.46	50.00	-28.54	AVG
11		24.0020	20.53	10.16	30.69	60.00	-29.31	QP
12		24.0020	19.70	10.16	29.86	50.00	-20.14	AVG

Emission Level= Read Level+ Correct Factor

EUT:	Device for generating modulated signals BIOMEDIS M	Model Name :	BM1
Temperature:	25 °C	Relative Humidity:	55%
Test Voltage:	AC 120V/60Hz		
Terminal:	Neutral		
Test Mode:	TX 24.00MHz		
Remark:	Only worse case is reported		



No.	Mk.	Freq. MHz	Reading Level dBuV	Correct Factor dB	Measure- ment dBuV	Limit dBuV	Over dB	Over Detector
1		0.2260	38.98	10.11	49.09	62.59	-13.50	QP
2		0.2260	29.79	10.11	39.90	52.59	-12.69	AVG
3	*	0.4980	37.73	10.02	47.75	56.03	-8.28	QP
4		0.4980	21.50	10.02	31.52	46.03	-14.51	AVG
5		0.5860	37.37	10.02	47.39	56.00	-8.61	QP
6		0.5860	22.41	10.02	32.43	46.00	-13.57	AVG
7		0.7140	34.85	10.03	44.88	56.00	-11.12	QP
8		0.7140	21.27	10.03	31.30	46.00	-14.70	AVG
9		0.8740	33.88	10.10	43.98	56.00	-12.02	QP
10		0.8740	22.62	10.10	32.72	46.00	-13.28	AVG
11		0.9700	30.65	10.15	40.80	56.00	-15.20	QP
12		0.9700	20.83	10.15	30.98	46.00	-15.02	AVG

Emission Level= Read Level+ Correct Factor

4. Radiated Emission Test

4.1 Test Standard and Limit

4.1.1 Test Standard

FCC Part 15.209

4.1.2 Test Limit

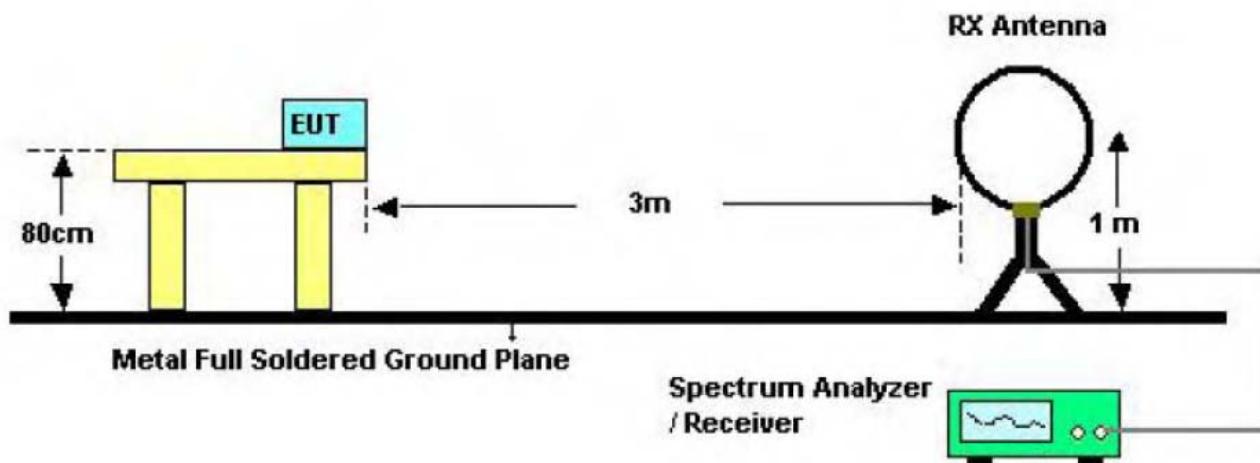
(1) The maximum permitted unwanted emissions level is 20 dB below the maximum permitted fundamental level. In addition field strength of any emissions which appear inside of the restriction band shall not exceed the general radiated emissions limits in Section 15.209(a).

Frequency (MHz)	Field Strength (microvolt/meter)	Measurement Distance (meters)
0.009~0.490	2400/F(KHz)	300
0.490~1.705	2400/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

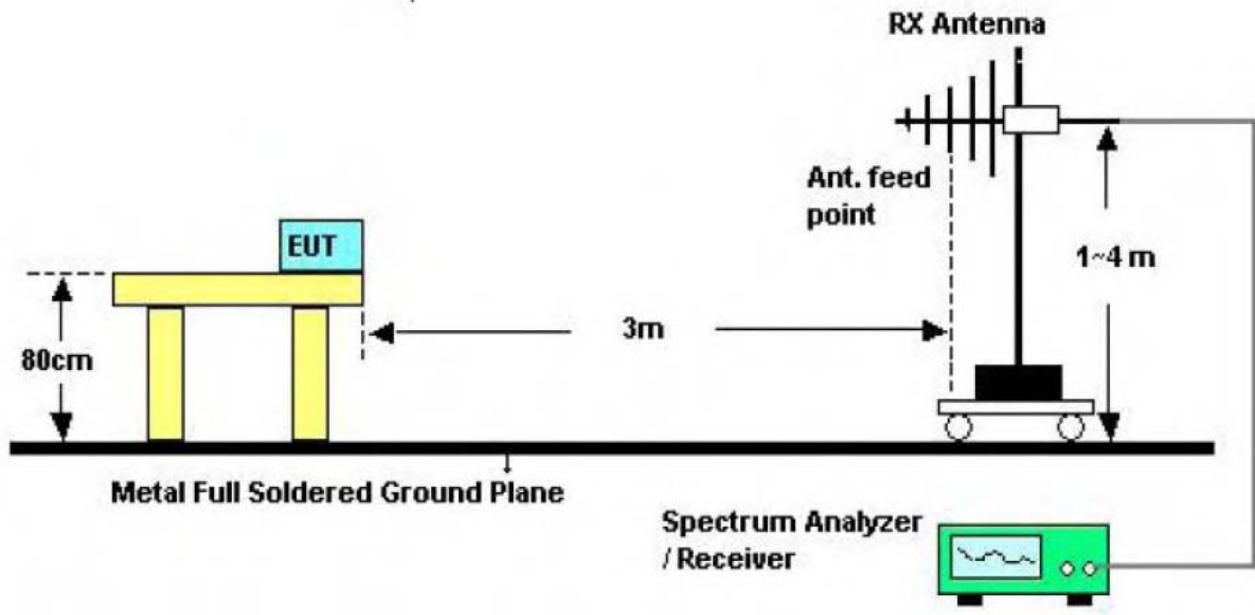
Note:

(1) The tighter limit applies at the band edges.
 (2) Emission Level(dBuV/m)=20log Emission Level(uV/m)

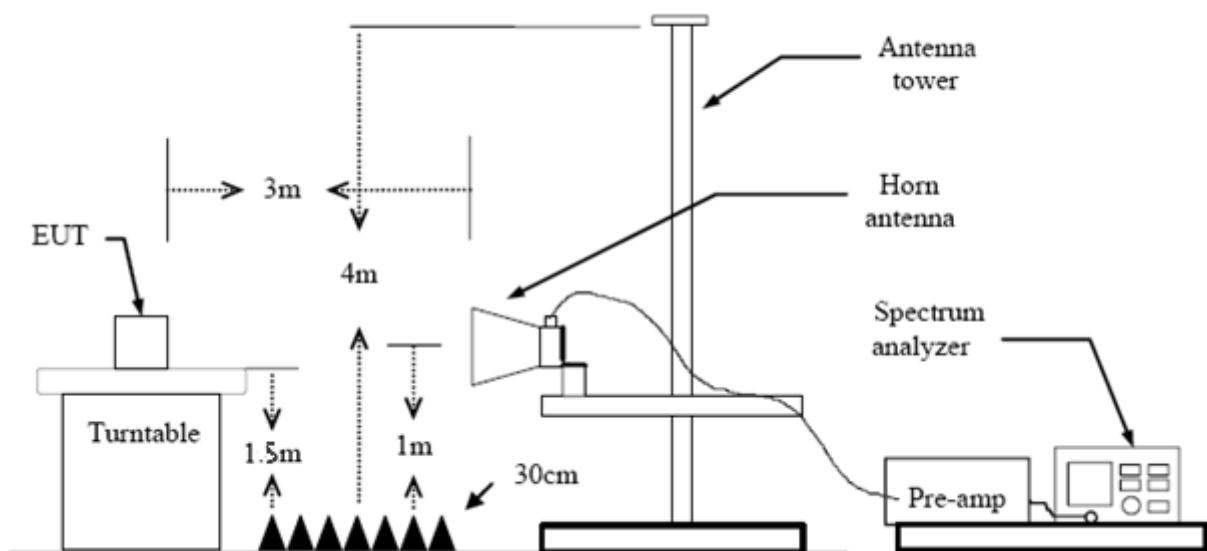
4.2 Test Setup



Bellow 30MHz Test Setup



Bellow 1000MHz Test Setup



Above 1GHz Test Setup

4.3 Test Procedure

- (1) The measuring distance of 3m shall be used for measurements at frequency up to 1GHz. The EUT was placed on a rotating 0.8m high above the ground, the table was rotated 360 degrees to determine the position of the highest radiation.
- (2) Measurements at frequency above 1GHz. The EUT was placed on a rotating 1.5m high above the ground. RF absorbers covered the ground plane with a minimum area of 3.0m by

3.0m between the EUT and measurement receiver antenna. The RF absorber shall not exceed 30cm in high above the conducting floor. The table was rotated 360 degrees to determine the position of the highest radiation.

- (3) The Test antenna shall vary between 1m and 4m, Both Horizontal and Vertical antenna are set to make measurement.
- (4) The initial step in collecting conducted emission data is a spectrum analyzer peak detector mode pre-scanning the measurement frequency range. Significant peaks are then marked and then Quasi Peak detector mode re-measured.
- (5) If the Peak Mode measured value compliance with and lower than Quasi Peak Mode Limit Below 1 GHz, the EUT shall be deemed to meet QP Limits and then no additional QP Mode measurement performed. But the Peak Value and average value both need to comply with applicable limit above 1 GHz.
- (6) Testing frequency range below 1GHz the measuring instrument use VBW=120 kHz with Quasi-peak detection.
- (7) Testing frequency range above 1GHz the measuring instrument use RBW=1 MHz and VBW=3 MHz with Peak Detector for Peak Values, and use RBW=1 MHz and VBW=10 Hz with Peak Detector for Average Values.
- (8) For the actual test configuration, please see the test setup photo.

4.4 EUT Operating Condition

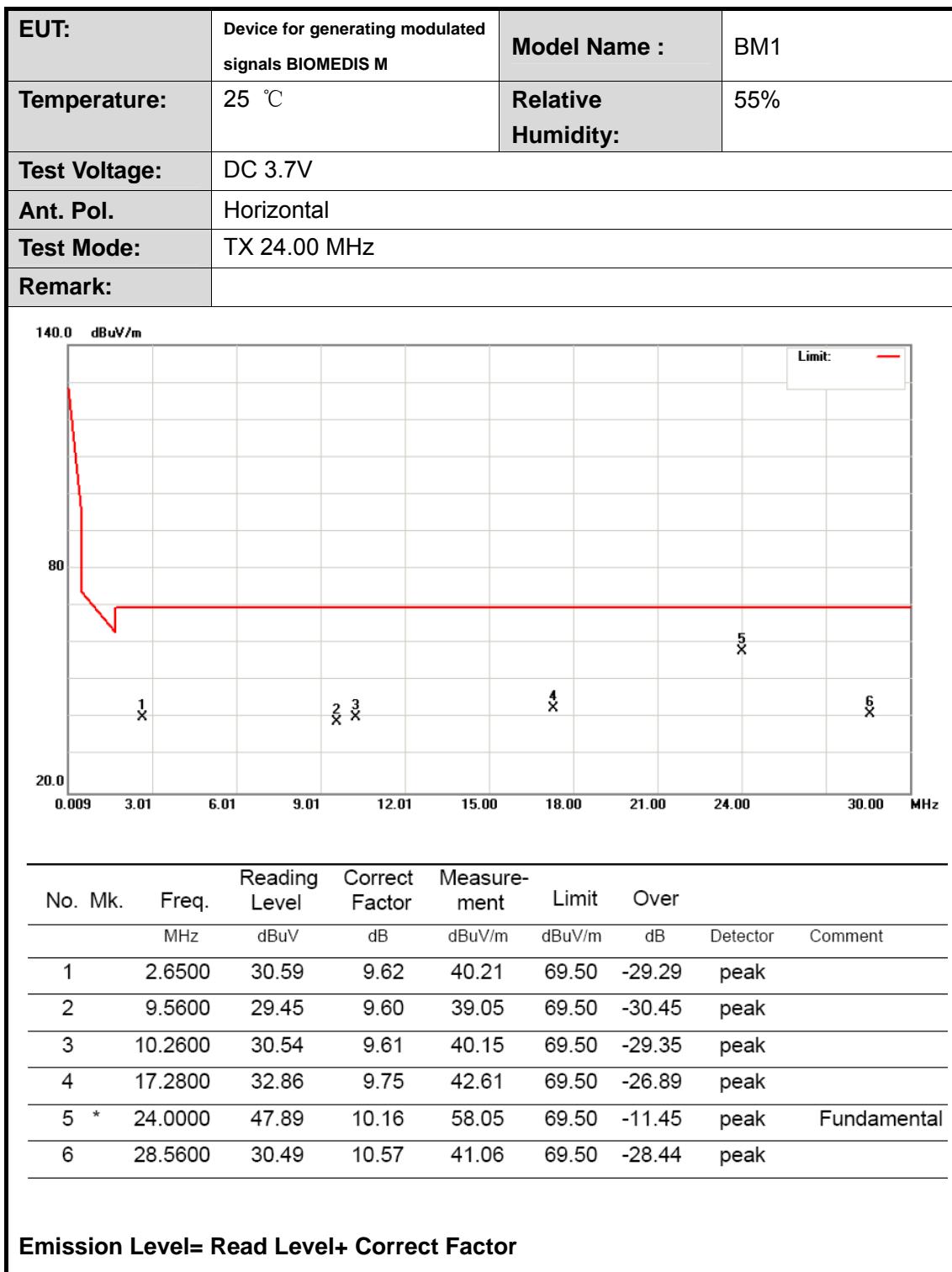
The Equipment Under Test was set to Continual Transmitting in maximum power.

4.5 Test Equipment

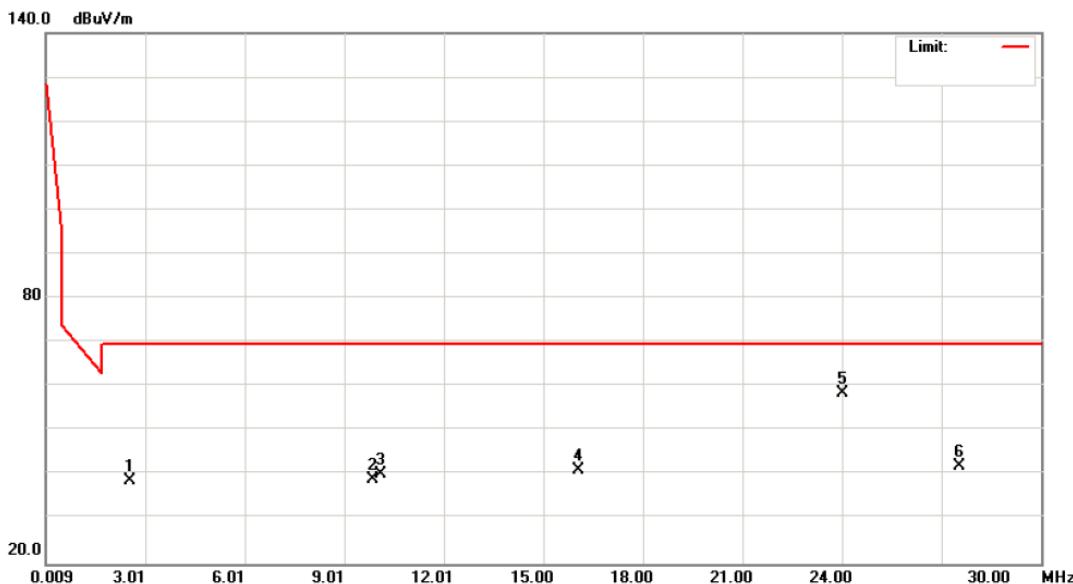
Equipment	Manufacturer	Model No.	Serial No.	Last Cal.	Cal. Due Date
Spectrum Analyzer	Agilent	E4407B	MY45106456	Aug. 08, 2014	Aug.07, 2015
Spectrum Analyzer	Rohde & Schwarz	FSP30	DE25181	Aug. 08, 2014	Aug.07, 2015
EMI Test Receiver	Rohde & Schwarz	ESCI	101165	Aug. 08, 2014	Aug.07, 2015
Bilog Antenna	ETS-LINDGREN	3142E	00117537	Mar. 06, 2015	Mar.05, 2016
Horn Antenna	ETS-LINDGREN	3117	00143207	Mar. 06, 2015	Mar.05, 2016
Pre-amplifier	HP	11909A	185903	Mar. 06, 2015	Mar.05, 2016
Pre-amplifier	HP	8447B	3008A00849	Mar. 06, 2015	Mar.05, 2016
Cable	HUBER+SUHNER	100	SUCOFLEX	Mar. 06, 2015	Mar.05, 2016
Signal Generator	Rohde & Schwarz	SML03	IKW682-054	Feb. 10, 2015	Feb.09, 2016
Positioning Controller	ETS-LINDGREN	2090	N/A	N/A	N/A
Loop Antenna	Laplace Instrument	RF300	EMC0701	Aug. 12, 2014	Aug. 11, 2015

4.7 Test Data

Radiated Emissions (9kHz~30MHz)



EUT:	Device for generating modulated signals BIOMEDIS M	Model Name :	BM1
Temperature:	25 °C	Relative Humidity:	55%
Test Voltage:	DC 3.7V		
Ant. Pol.	Vertical		
Test Mode:	TX 24.00 MHz		
Remark:			



No.	Mk.	Freq.	Reading	Correct	Measure-	Limit	Over	Detector	Comment
			Level	Factor	ment				
		MHz	dBuV	dB	dBuV/m	dBuV/m	dB		
1		2.5500	28.99	9.62	38.61	69.50	-30.89	peak	
2		9.8500	29.45	9.60	39.05	69.50	-30.45	peak	
3		10.0600	30.51	9.60	40.11	69.50	-29.39	peak	
4		16.0500	31.34	9.72	41.06	69.50	-28.44	peak	
5	*	24.0000	48.44	10.16	58.60	69.50	-10.90	peak	Fundamental
6		27.5400	31.53	10.48	42.01	69.50	-27.49	peak	

Emission Level= Read Level+ Correct Factor

Radiated Emission 30MHz~1 GHz

EUT:	Device for generating modulated signals BIOMEDIS M	Model Name :	BM1
Temperature:	25 °C	Relative Humidity:	55%
Test Voltage:	DC 3.7V		
Ant. Pol.	Horizontal		
Test Mode:	TX 24.00 MHz		
Remark:			

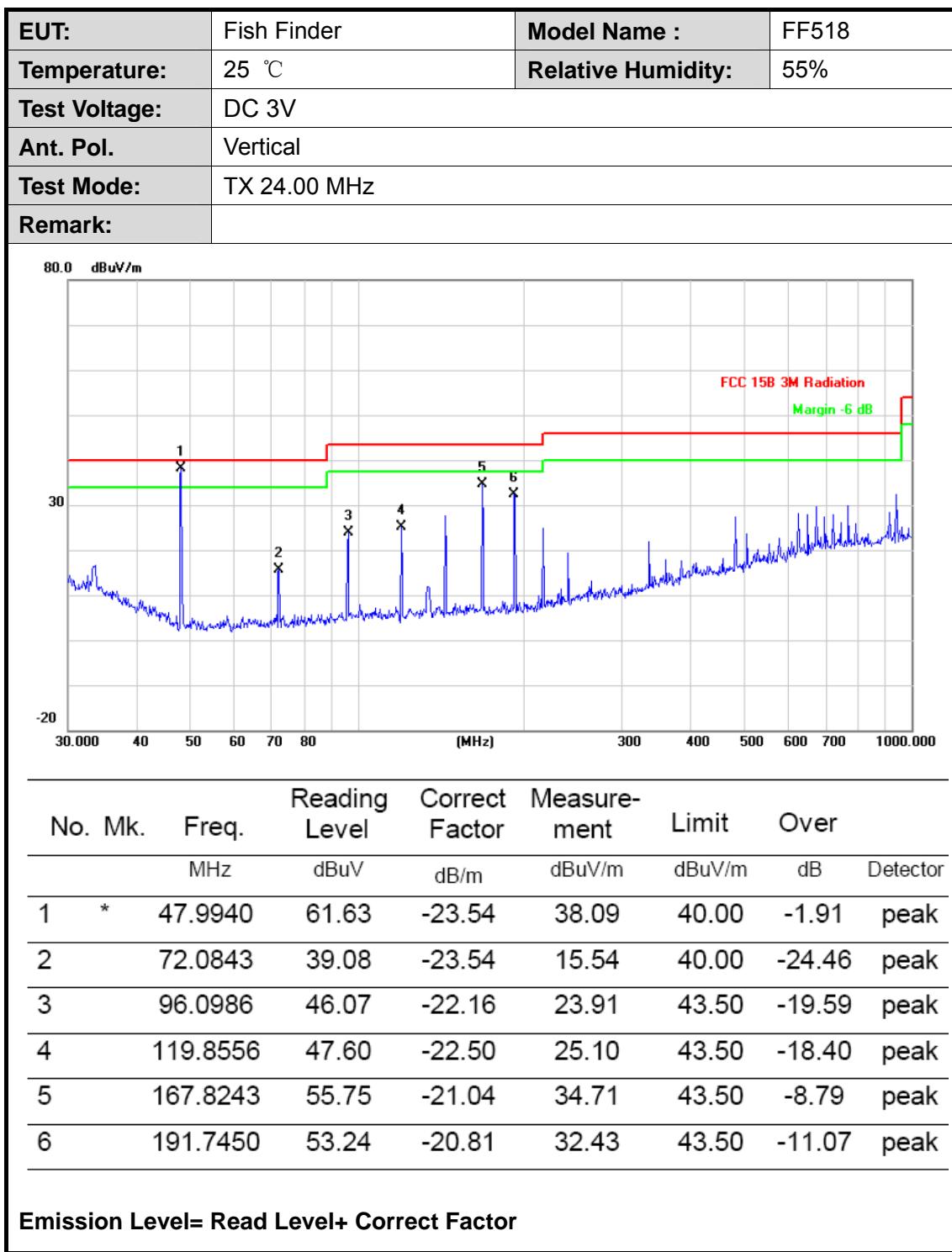
80.0 dBuV/m

30.000 40 50 60 70 80 240 300 400 500 600 700 1000.000

30.000 40 50 60 70 80 240 300 400 500 600 700 1000.000

No.	Mk.	Freq.	Reading Level	Correct Factor	Measure-ment	Limit	Over
		MHz	dBuV	dB/m	dBuV/m	dB	Detector
1		47.9940	54.14	-23.54	30.60	40.00	-9.40 peak
2		96.0986	46.48	-22.16	24.32	43.50	-19.18 peak
3		119.8556	48.23	-22.50	25.73	43.50	-17.77 peak
4		143.8295	50.15	-21.67	28.48	43.50	-15.02 peak
5	*	167.8243	60.89	-21.04	39.85	43.50	-3.65 peak
6	!	191.7450	60.02	-20.81	39.21	43.50	-4.29 peak

Emission Level= Read Level+ Correct Factor



Note:

- (1) All Readings are Peak Value.
- (2) Emission Level= Reading Level+ Probe Factor +Cable Loss
- (3) The QP measurement was not performed when the peak measured data under the limit of QP detection.

5. Antenna Requirement

5.1 Standard Requirement

5.1.1 Standard

FCC Part 15.203

5.1.2 Requirement

An intentional radiator shall be designed to ensure that no antenna other than that furnished by the responsible party shall be used with the device. The use of a permanently attached antenna or of an antenna that uses a unique coupling to the intentional radiator shall be considered sufficient to comply with the provisions of this Section. The manufacturer may design the unit so that a broken antenna can be replaced by the user, but the use of a standard antenna jack or electrical connector is prohibited.

5.2 Antenna Connected Construction

The directional gains of the antenna used for transmitting is 0 dBi, and the antenna connector is designed with permanent attachment and no consideration of replacement. Please see the EUT photo for details.

5.3 Result

The EUT antenna is a Integral Antenna. It complies with the standard requirement.

Antenna Type
<input checked="" type="checkbox"/> Permanent attached antenna
<input type="checkbox"/> Unique connector antenna
<input type="checkbox"/> Professional installation antenna