



# FCC REPORT

Report Reference No..... : **TRE1606009703** R/C.....: 69473

Applicant's name ..... : **Shenzhen Mindray BIO-Medical electronics Co.,LTD.**

Address.....: Mindray Building,Keji 12th Road South,High-tech Industrial Park,Nanshan,Shenzhen, China

Manufacturer.....: Shenzhen Mindray BIO-Medical electronics Co.,LTD.

Address.....: Mindray Building,Keji 12th Road South,High-tech Industrial Park,Nanshan,Shenzhen, China

Test item description ..... : **ECG Patch Charger (Professional)**

Trade Mark .....: Mindray

Model/Type reference.....: EPC002

List Model .....: -

Standard ..... : **47 CFR FCC Part 15 Subpart B - Unintentional Radiators**

Date of receipt of test sample.....: Sept 23, 2016

Date of testing.....: Sept 23, 2016- Sept 28,2016

Date of issue.....: Sept 28,2016

Result.....: **Pass**

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Jeff Sun

Approved by  
( position+printed name+signature)...: RF Manager Hans Hu

Hans Hu

Testing Laboratory Name ..... : **Shenzhen Huatongwei International Inspection Co., Ltd**

Address.....: 1/F, Bldg 3, Hongfa Hi-tech Industrial Park, Genyu Road, Tianliao, Gongming, Shenzhen, China

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## 1. Test standards and Report version

### 1.1. Test Standards

The tests were performed according to following standards:

[47 CFR FCC Part 15 Subpart B](#) - Unintentional Radiators

[ANSI C63.4: 2014](#) – American National Standard for Methods of Measurement of Radio-Noise Emissions from Low-Voltage Electrical and Electronic Equipment in the Range of 9 kHz to 40GHz

### 1.2. Report version

Version No.	Date of issue	Description
00	September 28, 2013	Original

## 2. Test Description

Test Item	Section in CFR 47	Result
Conducted Emissions	15.107(a)	Pass
Radiated Emission	15.109(a)	Pass

Note: The measurement uncertainty is not included in the test result.

### 3. Summary

#### 3.1. Client Information

Applicant:	Shenzhen Mindray BIO-Medical electronics Co.,LTD.
Address:	Mindray Building,Keji 12th Road South,High-tech Industrial Park,Nanshan,Shenzhen, China
Manufacturer:	Shenzhen Mindray BIO-Medical electronics Co.,LTD.
Address:	Mindray Building,Keji 12th Road South,High-tech Industrial Park,Nanshan,Shenzhen, China

#### 3.2. Product Description

Name of EUT	ECG Patch Charger (Professional)
Trade Mark:	Mindray
Model No.:	EPC002
List Model:	-
Power supply:	AC 120V/60Hz
Adapter information:	-
Hardware Version:	-
Software Version:	-
Wireless Charger	
Operation Frequency Range:	100kHz~205kHz

#### 3.3. EUT operation mode

The EUT has been tested under typical operating condition.

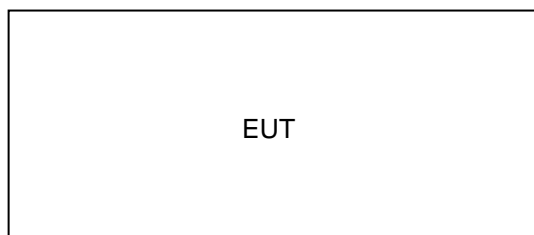
#### 3.4. EUT configuration

The following peripheral devices and interface cables were connected during the measurement:

- - supplied by the manufacturer
- - supplied by the lab

○	PowerCable	Length (m) :	/
		Shield :	/
		Detachable :	/
○	Multimeter	Manufacturer :	/
		Model No. :	/

#### 3.5. Configuration of Tested System



## **4. Test Environment**

### **4.1. Address of the test laboratory**

Laboratory: Shenzhen Huatongwei International Inspection Co., Ltd.

Address: 1/F, Bldg 3, Hongfa Hi-tech Industrial Park, Genyu Road, Tianliao, Gongming, Shenzhen, China

Phone: 86-755-26748019 Fax: 86-755-26748089

### **4.2. Test Facility**

The test facility is recognized, certified, or accredited by the following organizations:

#### **CNAS-Lab Code: L1225**

Shenzhen Huatongwei International Inspection Co., Ltd. has been assessed and proved to be in compliance with CNAS-CL01 Accreditation Criteria for Testing and Calibration Laboratories

(identical to ISO/IEC17025: 2005 General Requirements) for the Competence of Testing and Calibration Laboratories, Date of Registration: February 28, 2015. Valid time is until February 27, 2018.

#### **A2LA-Lab Cert. No. 3902.01**

Shenzhen Huatongwei International Inspection Co., Ltd. EMC Laboratory has been accredited by A2LA for technical competence in the field of electrical testing, and proved to be in compliance with

ISO/IEC 17025: 2005 General Requirements for the Competence of Testing and Calibration Laboratories and any additional program requirements in the identified field of testing. Valid time is until December 31, 2016.

#### **FCC-Registration No.: 317478**

Shenzhen Huatongwei International Inspection Co., Ltd. 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 317478, Renewal date Jul. 18, 2014, valid time is until Jul. 18, 2017.

#### **IC-Registration No.: 5377A&5377B**

The 3m Alternate Test Site of Shenzhen Huatongwei International Inspection Co., Ltd. has been registered by Certification and Engineering Bureau of Industry Canada for the performance of radiated measurements with Registration No. 5377A on Dec. 31, 2013, valid time is until Dec. 31, 2016.

Two 3m Alternate Test Site of Shenzhen Huatongwei International Inspection Co., Ltd. has been registered by Certification and Engineering Bureau of Industry Canada for the performance of radiated measurements with Registration No. 5377B on Dec.03, 2014, valid time is until Dec.03, 2017.

#### **ACA**

Shenzhen Huatongwei International Inspection Co., Ltd. EMC Laboratory can also perform testing for the Australian C-Tick mark as a result of our A2LA accreditation.

### 4.3. Equipments Used during the Test

Conducted Emission					
Item	Test Equipment	Manufacturer	Model No.	Serial No.	Last Cal
1	EMI Test Receiver	Rohde & Schwarz	ESCI	101247	2015/11/03
2	Artificial Mains	Rohde & Schwarz	NNLK 8121	573	2015/11/03
3	Pulse Limiter	Rohde & Schwarz	ESH3-Z2	101488	2015/11/03
4	Test Software	Rohde & Schwarz	ES-K1	N/A	N/A

Radiated Emission					
Item	Test Equipment	Manufacturer	Model No.	Serial No.	Cal.Due
1	Ultra-Broadband Antenna	ShwarzBeck	VULB9163	538	2015/11/08
2	EMI Test Receiver	Rohde & Schwarz	ESCI	101247	2015/11/03
3	EMI Test Software	Audix	E3	N/A	N/A
4	Turntable	MATURO	TT2.0	----	N/A
5	Antenna Mast	MATURO	TAM-4.0-P-12	----	N/A
6	EMI Test Software	Rohde & Schwarz	ESK1	N/A	N/A
7	Ultra-Broadband Antenna	Rohde&Schwarz	HL562	100015	2015/11/08
8	Amplifer	ShwarzBeck	BBV 9743	9743-0022	2015/11/03
9	TURNTABLE	ETS	2088	2149	N/A
10	HORN ANTENNA	Rohde&Schwarz	HF906	100039	2015/11/08

The calibration interval was one year.

### 4.4. Environmental conditions

During the measurement the environmental conditions were within the listed ranges:

Temperature:	15~35°C
Relative Humidity:	30~60 %
Air Pressure:	950~1050mba

#### 4.5. Statement of the measurement uncertainty

The data and results referenced in this document are true and accurate. The reader is cautioned that there may be errors within the calibration limits of the equipment and facilities. The measurement uncertainty was calculated for all measurements listed in this test report acc. to CISPR 16 - 4 „Specification for radio disturbance and immunity measuring apparatus and methods – Part 4: Uncertainty in EMC Measurements“ and is documented in the Shenzhen Huatongwei International Inspection Co., Ltd quality system acc. to DIN EN ISO/IEC 17025. Furthermore, component and process variability of devices similar to that tested may result in additional deviation. The manufacturer has the sole responsibility of continued compliance of the device.

Hereafter the best measurement capability for Shenzhen Huatongwei laboratory is reported:

Test	Range	Measurement Uncertainty	Notes
Radiated Emission	30~1000MHz	4.24 dB	(1)
Radiated Emission	1~18GHz	5.16 dB	(1)
Radiated Emission	18-40GHz	5.54 dB	(1)
Conducted Disturbance	0.15~30MHz	3.39 dB	(1)

(1) This uncertainty represents an expanded uncertainty expressed at approximately the 95% confidence level using a coverage factor of  $k=2$ .



## 5. Test Conditions and Results

### 5.1. Conducted Emissions Test

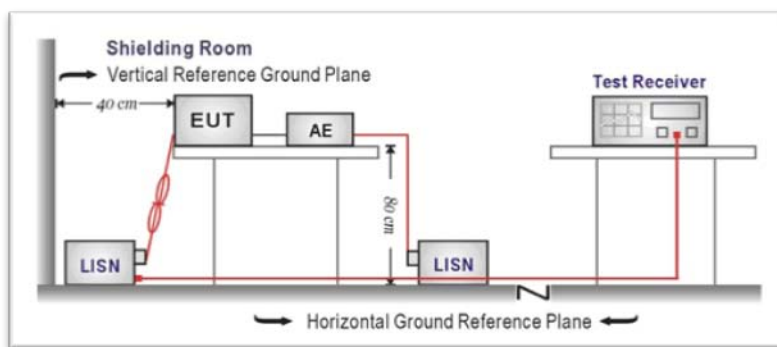
#### LIMIT

FCC CFR Title 47 Part 15 Subpart B Section 15.107:

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 CONFIGURATION



#### TEST PROCEDURE

1. The EUT was setup according to ANSI C63.4-2014.
2. The EUT was placed on a platform of nominal size, 1 m by 1.5 m, raised 80 cm above the conducting ground plane. The vertical conducting plane was located 40 cm to the rear of the EUT. All other surfaces of EUT were at least 80 cm from any other grounded conducting surface.
3. The EUT and simulators are connected to the main power through a line impedance stabilization network (LISN). The LISN provides a 50 ohm /50uH coupling impedance for the measuring equipment.
4. The peripheral devices are also connected to the main power through a LISN. (Please refer to the block diagram of the test setup and photographs)
5. Each current-carrying conductor of the EUT power cord, except the ground (safety) conductor, was individually connected through a LISN to the input power source.
6. The excess length of the power cord between the EUT and the LISN receptacle were folded back and forth at the center of the lead to form a bundle not exceeding 40 cm in length.
7. Conducted emissions were investigated over the frequency range from 0.15MHz to 30MHz using a receiver bandwidth of 9 kHz.
8. During the above scans, the emissions were maximized by cable manipulation.

#### TEST MODE:

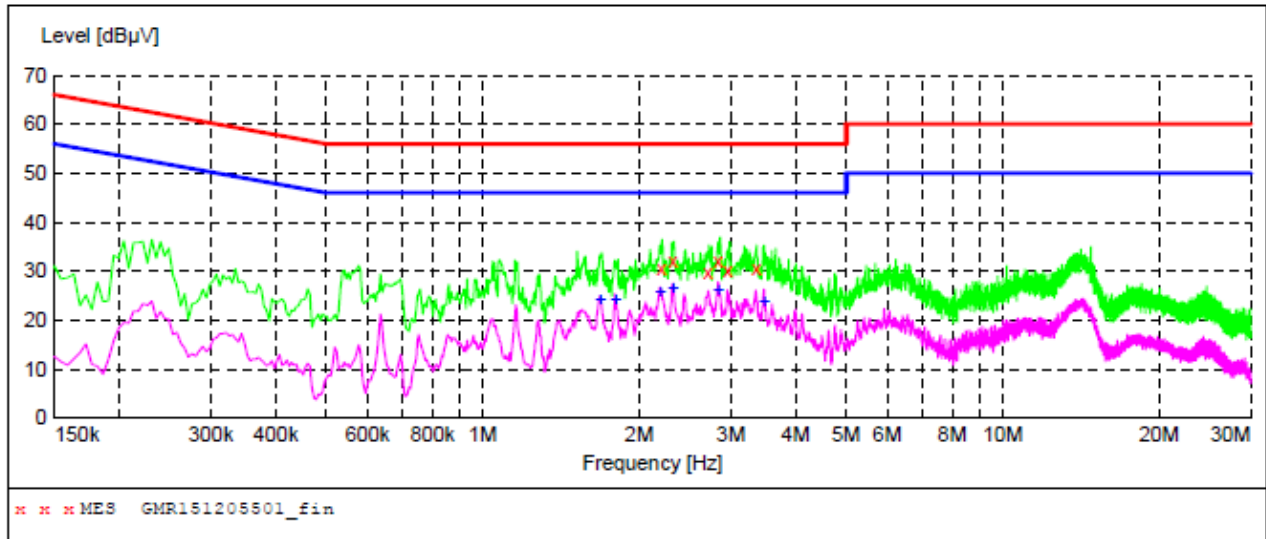
Please refer to the clause 3.3

#### TEST RESULTS

☒ Passed      ☐ Not Applicable

Test Line:

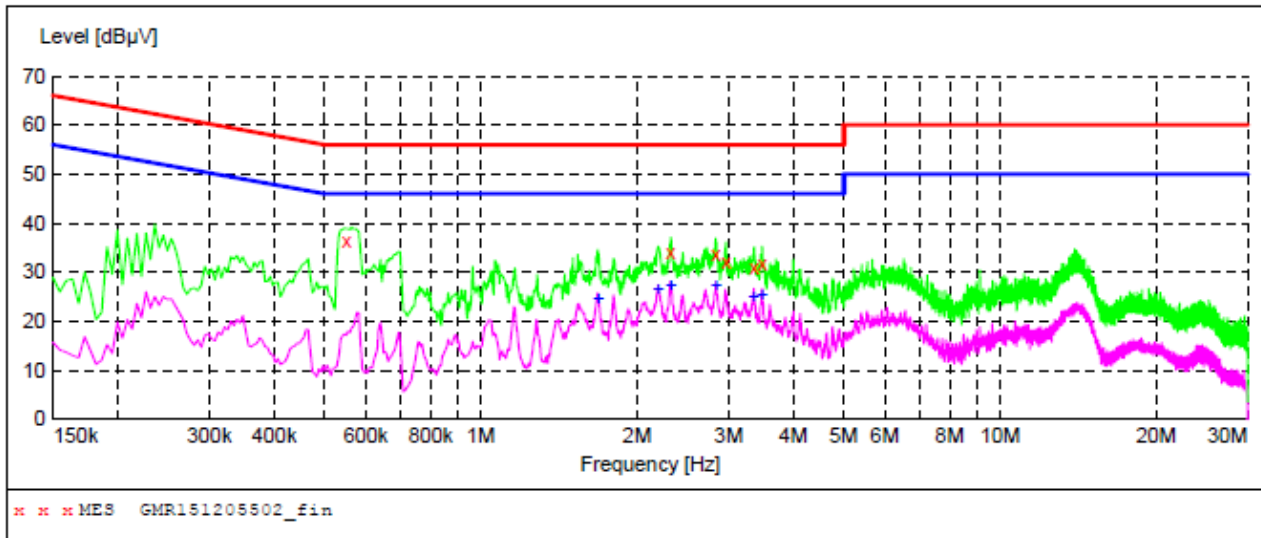
N



Frequency MHz	Level dBμV	Transd dB	Limit dBμV	Margin dB	Detector	Line	PE
2.206500	30.40	10.2	56	25.6	QP	N	GND
2.319000	32.30	10.3	56	23.7	QP	N	GND
2.706000	29.80	10.3	56	26.2	QP	N	GND
2.836500	32.20	10.3	56	23.8	QP	N	GND
2.958000	30.20	10.3	56	25.8	QP	N	GND
3.358500	30.40	10.3	56	25.6	QP	N	GND
Frequency MHz	Level dBμV	Transd dB	Limit dBμV	Margin dB	Detector	Line	PE
1.684500	24.20	10.2	46	21.8	AV	N	GND
1.801500	24.30	10.2	46	21.7	AV	N	GND
2.197500	25.80	10.2	46	20.2	AV	N	GND
2.323500	26.60	10.3	46	19.4	AV	N	GND
2.836500	26.30	10.3	46	19.7	AV	N	GND
3.480000	24.10	10.3	46	21.9	AV	N	GND

Test Line:

L



Frequency MHz	Level dBμV	Transd dB	Limit dBμV	Margin dB	Detector	Line	PE
0.550500	36.40	10.2	56	19.6	QP	L1	GND
2.319000	33.90	10.3	56	22.1	QP	L1	GND
2.836500	33.50	10.3	56	22.5	QP	L1	GND
2.962500	32.00	10.3	56	24.0	QP	L1	GND
3.358500	31.00	10.3	56	25.0	QP	L1	GND
3.480000	31.70	10.3	56	24.3	QP	L1	GND
Frequency MHz	Level dBμV	Transd dB	Limit dBμV	Margin dB	Detector	Line	PE
1.684500	24.80	10.2	46	21.2	AV	L1	GND
2.193000	26.60	10.2	46	19.4	AV	L1	GND
2.323500	27.50	10.3	46	18.5	AV	L1	GND
2.836500	27.50	10.3	46	18.5	AV	L1	GND
3.349500	25.10	10.3	46	20.9	AV	L1	GND
3.480000	25.50	10.3	46	20.5	AV	L1	GND

## 5.2. Radiated Emission Test

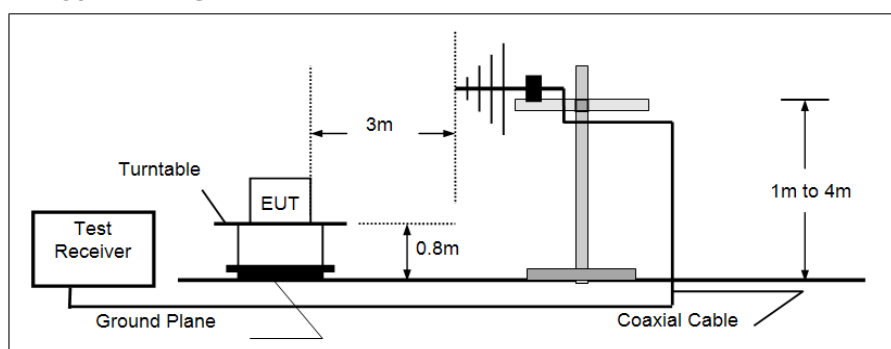
### LIMIT

#### FCC CFR Title 47 Part 15 Subpart C Section 15.209

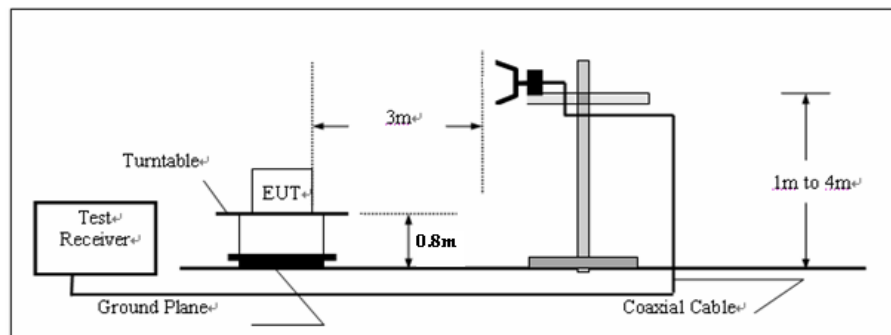
Frequency	Limit (dBuV/m @3m)	Value
30MHz-88MHz	40.00	Quasi-peak
88MHz-216MHz	43.50	Quasi-peak
216MHz-960MHz	46.00	Quasi-peak
960MHz-1GHz	54.00	Quasi-peak
Above 1GHz	54.00	Average
	74.00	Peak

### TEST CONFIGURATION

#### ➤ 30MHz ~ 1GHz



#### ➤ Above 1GHz



### TEST PROCEDURE

1. The EUT was tested according to ANSI C63.4:2014.
2. The EUT is placed on a turn table which is 0.8 meter above ground. The turn table is rotated 360 degrees to determine the position of the maximum emission level.
3. The EUT was positioned such that the distance from antenna to the EUT was 3 meters.
4. The antenna is scanned from 1 meter to 4 meters to find out the maximum emission level. This is repeated for both horizontal and vertical polarization of the antenna.
5. Use the following spectrum analyzer settings
  - (1) Span shall wide enough to fully capture the emission being measured;
  - (2) Below 1GHz, RBW=120KHz, VBW=300KHz, Sweep=auto, Detector function=peak, Trace=max hold;  
*If the emission level of the EUT measured by the peak detector is 3 dB lower than the applicable limit, the peak emission level will be reported. Otherwise, the emission measurement will be repeated using the quasi-peak detector and reported.*
  - (3) Above 1GHz, RBW=1MHz, VBW=3MHz

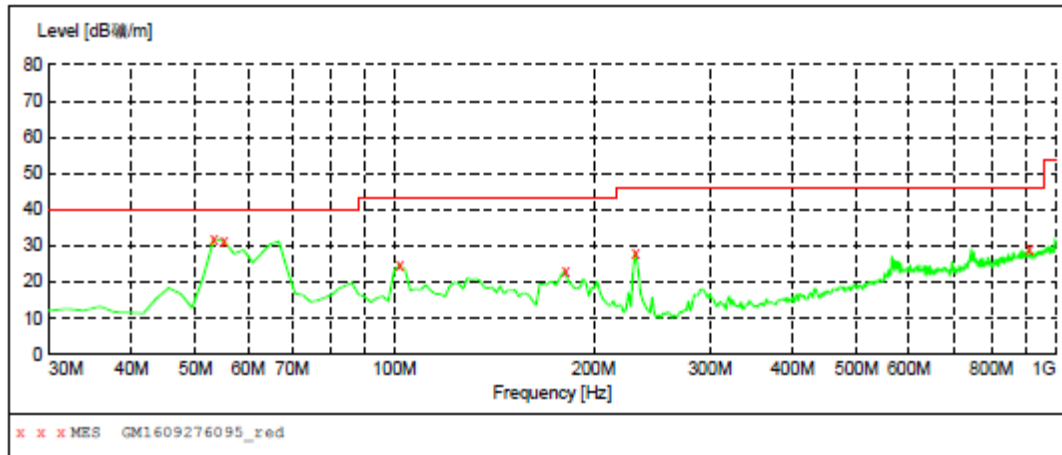
**TEST MODE:**

Please refer to the clause 3.3

**TEST RESULTS**

☒ **Passed**      ☐ **Not Applicable**

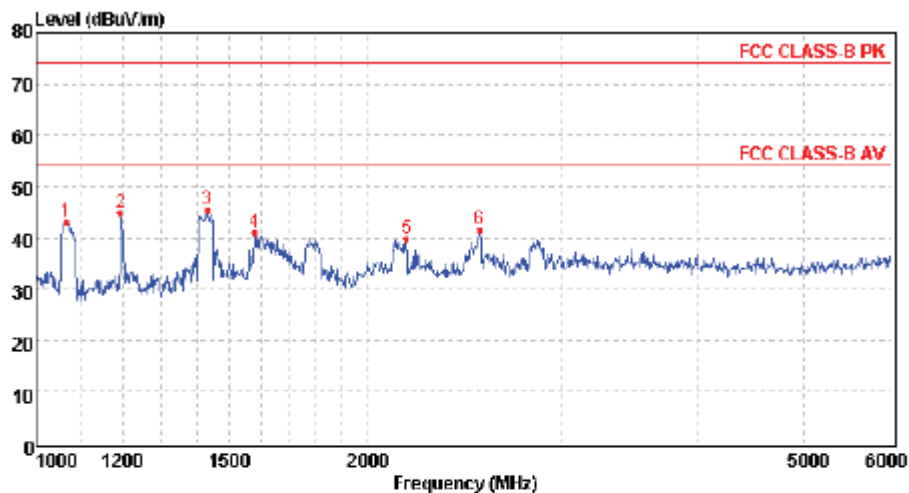
Note: *Final Level = Receiver Read level + Antenna Factor + Cable Loss – Preamplifier Factor*



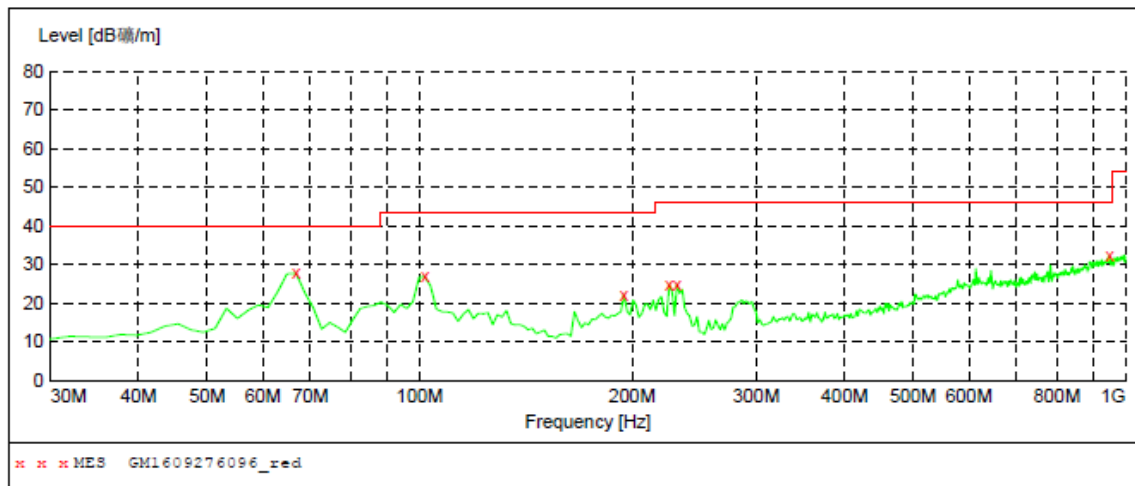
### MEASUREMENT RESULT: "GM1609276095\_red"

9/27/2016 8:32PM

Frequency MHz	Level dBμV/m	Transd dB	Limit dBμV/m	Margin dB	Det.	Height cm	Azimuth deg	Polarization
53.280000	31.80	-14.5	40.0	8.2	QP	100.0	359.00	VERTICAL
55.220000	31.40	-14.6	40.0	8.6	QP	100.0	359.00	VERTICAL
101.780000	24.60	-14.4	43.5	18.9	QP	100.0	320.00	VERTICAL
181.320000	22.90	-15.7	43.5	20.6	QP	100.0	346.00	VERTICAL
231.760000	28.20	-14.9	46.0	17.8	QP	100.0	54.00	VERTICAL
912.700000	29.20	2.9	46.0	16.8	QP	100.0	54.00	VERTICAL



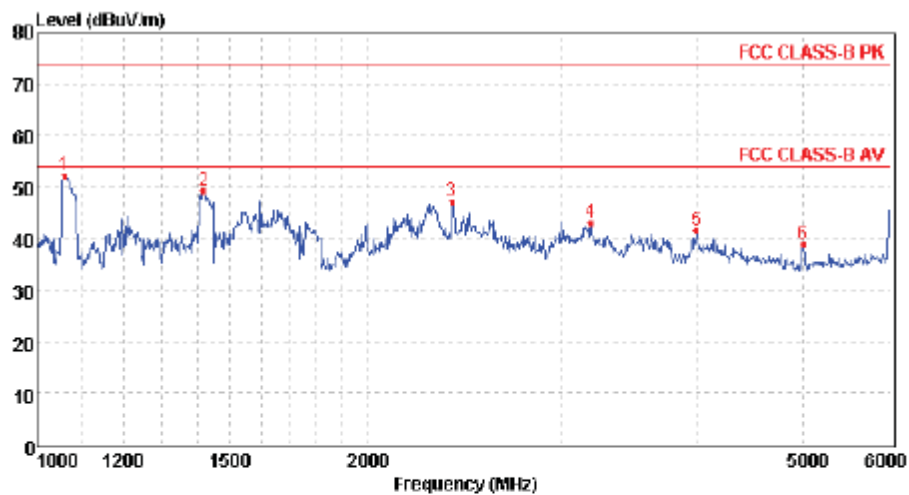
Mark	Freq MHz	Reading dBuV/m	Antenna dB	Cable dB	Preamp dB	level dBuV/m	Limit dBuV/m	Over limit	Remark
1	1064.72	51.86	24.28	4.18	36.34	43.18	74.00	-30.82	Peak
2	1194.09	52.43	24.42	4.52	36.50	44.87	74.00	-29.13	Peak
3	1430.97	52.71	24.64	5.04	36.77	45.62	74.00	-28.38	Peak
4	1579.17	47.55	24.95	5.35	36.91	40.94	74.00	-33.06	Peak
5	2172.40	43.98	26.75	6.46	37.40	39.79	74.00	-34.21	Peak
6	2529.78	44.27	27.94	7.04	37.68	41.57	74.00	-32.43	Peak



### MEASUREMENT RESULT: "GM1609276096\_red"

9/27/2016 8:35PM

Frequency MHz	Level dBμV/m	Transd dB	Limit dBμV/m	Margin dB	Det.	Height cm	Azimuth deg	Polarization
66.860000	27.70	-16.3	40.0	12.3	QP	300.0	245.00	HORIZONTAL
101.780000	26.90	-14.4	43.5	16.6	QP	300.0	255.00	HORIZONTAL
194.900000	22.30	-14.1	43.5	21.2	QP	100.0	270.00	HORIZONTAL
225.940000	25.00	-14.6	46.0	21.0	QP	100.0	306.00	HORIZONTAL
231.760000	24.90	-14.9	46.0	21.1	QP	100.0	316.00	HORIZONTAL
949.560000	32.20	3.7	46.0	13.8	QP	100.0	27.00	HORIZONTAL



Mark	Freq MHz	Reading dBuV/m	Antenna dB	Cable dB	Preamp dB	level dBuV/m	Limit dBuV/m	Over limit	Remark
1	1059.01	60.26	24.27	4.17	36.33	52.37	74.00	-21.63	Peak
2	1418.21	56.35	24.63	5.02	36.75	49.25	74.00	-24.75	Peak
3	2388.81	50.48	27.53	6.81	37.57	47.25	74.00	-26.75	Peak
4	3199.04	44.13	28.58	8.43	37.99	43.15	74.00	-30.85	Peak
5	3994.95	41.63	29.48	8.61	37.99	41.73	74.00	-32.27	Peak
6	4997.81	36.93	31.20	9.34	38.65	38.82	74.00	-35.18	Peak



## 6. Test Setup Photos of the EUT

AC Conducted Emission



Radiated Emission (30MHz-1GHz)



Radiated Emission (1GHz-6GHz)





## **7. External and Internal Photos of the EUT**

Reference to the test report No. TRE1606009701

.....End of Report.....