FCC REPORT

Applicant:	SHENZHEN FCAR TECHNOLOGY CO.,LTD
Address of Applicant:	8th floor, Chuangyi Building, No. 3025 Nanhai Ave., Nanshan, Shenzhen, Guangdong, China
Manufacturer:	SHENZHEN FCAR TECHNOLOGY CO.,LTD
Address of Manufacturer:	8th floor, Chuangyi Building, No. 3025 Nanhai Ave., Nanshan, Shenzhen, Guangdong, China
Factory:	SHENZHEN FCAR TECHNOLOGY CO.,LTD
Address of Factory:	West 1F, Bldg. B, Hengchao Industrial Park, Tangtou North Ave., Bao'an, Shenzhen, China

Equipment Under Test (EUT)

Product Name:	TPMS Diagnostic Tool
Model No.:	FT-138
Trade Mark:	FCAR
FCC ID:	2AJDD-IDIAGT138
Applicable standards:	FCC CFR Title 47 Part 15 Subpart C:2016
Date of sample receipt:	April 27, 2017
Date of Test:	May 02-08, 2017
Date of report issued:	May 09, 2017
Test Result :	PASS *

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

Authorized Signature:

Robinson Lo
Laboratory Manager

This results shown in this test report refer only to the sample(s) tested, this test report cannot be reproduced, except in full, without prior written permission of the company. The report would be invalid without specific stamp of test institute and the signatures of compiler and approver.

2 Version

Version No.	Date	Description
00	*May 09, 2017*	*Original*

Prepared By:	Tiger. Chen	***Date:***	*May 09, 2017*
	Project Engineer		
Check By:	Andy. wu	***Date:***	*May 09, 2017*
	Reviewer		

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4 Test Summary

Test Item	Section in CFR 47	Result
Antenna requirement	15.203	Pass
AC Power Line Conducted Emission	15.207	Pass
Radiated Emission	15.209	Pass
20dB Bandwidth	15.205	Pass

Pass: The EUT complies with the essential requirements in the standard.

Remark: Test according to ANSI C63.10 2013 and ANSI C63.4: 2014

4.1 Measurement Uncertainty

Test Item	Frequency Range	Measurement Uncertainty	Notes
Radiated Emission	9kHz ~ 30MHz	± 4.34dB	(1)
Radiated Emission	30MHz ~ 1000MHz	± 4.24dB	(1)
Radiated Emission	1GHz ~ 26.5GHz	± 4.68dB	(1)
AC Power Line Conducted Emission	0.15MHz ~ 30MHz	± 3.45dB	(1)
Note (1): The measurement uncertainty is for coverage factor of k=2 and a level of confidence of 95%.			

5 General Information

5.1 General Description of EUT

Product Name:	TPMS Diagnostic Tool
Model No.:	FT-138
Operation Frequency:	125KHz
Modulation type:	ASK
Antenna Type:	Integral Antenna
Antenna gain:	0dBi (declare by Manufacturer)
Power supply:	Adapter: Model:GME12A-050200FXR Input: AC 100-240V, 50/60Hz, 0.4A Output: DC 5V, 2A or DC 3.7V 3500mAh Lithium Battery

Channel	Frequency
Test channel	125KHz

5.2 Test mode

Transmitting mode	Keep the EUT in continuously transmitting and charging mode

5.3 Description of Support Units

N/A

5.4 Test Facility

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

● **FCC —Registration No.: 600491**

Global United Technology 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 files. Registration 600491, June 22, 2016.

● **Industry Canada (IC) —Registration No.: 9079A-2**

The 3m Semi-anechoic chamber of Global United Technology Services Co., Ltd. has been registered by Certification and Engineering Bureau of Industry Canada for radio equipment testing with Registration No.: 9079A-2, August 15, 2016.

5.5 Test Location

All tests were performed at:
Global United Technology Services Co., Ltd. Address: No. 301-309, 3/F., Jinyuan Business Building, No.2, Laodong Industrial Zone, Xixiang Road, Baoan District, Shenzhen, Guangdong, China 518102 Tel: 0755-27798480 Fax: 0755-27798960

5.6 Other Information Requested by the Customer

None.

6 Test Instruments list

Radiated Emission:						
Item	**Test Equipment**	**Manufacturer**	**Model No.**	**Inventory No.**	**Cal.Date (mm-dd-yy)**	**Cal.Due date (mm-dd-yy)**
1	3m Semi- Anechoic Chamber	ZhongYu Electron	9.2(L)*6.2(W)* 6.4(H)	GTS250	July 03 2015	July 02 2020
2	Control Room	ZhongYu Electron	6.2(L)*2.5(W)* 2.4(H)	GTS251	N/A	N/A
3	Spectrum Analyzer	Agilent	E4440A	GTS533	June 29 2016	June 28 2017
4	EMI Test Receiver	Rohde & Schwarz	ESU26	GTS203	June 29 2016	June 28 2017
5	Loop Antenna	Zhinan	ZN30900A	GTS534	June. 29 2016	June. 28 2017
6	BiConiLog Antenna	SCHWARZBECK MESS-ELEKTRONIK	VULB9163	GTS214	June 29 2016	June 28 2017
7	Double -ridged waveguide horn	SCHWARZBECK MESS-ELEKTRONIK	9120D-829	GTS208	June 29 2016	June 28 2017
8	Horn Antenna	ETS-LINDGREN	3160	GTS217	June 29 2016	June 28 2017
9	EMI Test Software	AUDIX	E3	N/A	N/A	N/A
10	Coaxial Cable	GTS	N/A	GTS213	June 29 2016	June 28 2017
11	Coaxial Cable	GTS	N/A	GTS211	June 29 2016	June 28 2017
12	Coaxial cable	GTS	N/A	GTS210	June 29 2016	June 28 2017
13	Coaxial Cable	GTS	N/A	GTS212	June 29 2016	June 28 2017
14	Amplifier(100kHz-3GHz)	HP	8347A	GTS204	June 29 2016	June 28 2017
15	Amplifier(2GHz-20GHz)	HP	8349B	GTS206	June 29 2016	June 28 2017
16	Amplifier (18-26GHz)	Rohde & Schwarz	AFS33-18002 650-30-8P-44	GTS218	June 29 2016	June 28 2017
17	Band filter	Amindeon	82346	GTS219	June 29 2016	June 28 2017
18	Power Meter	Anritsu	ML2495A	GTS540	June 29 2016	June 28 2017
19	Power Sensor	Anritsu	MA2411B	GTS541	June 29 2016	June 28 2017

Conducted Emission:						
Item	**Test Equipment**	**Manufacturer**	**Model No.**	**Inventory No.**	**Cal.Date (mm-dd-yy)**	**Cal.Due date (mm-dd-yy)**
1	Shielding Room	ZhongYu Electron	7.3(L)x3.1(W)x2.9(H)	GTS252	May.16 2014	May.15 2019
2	EMI Test Receiver	R&S	ESCI 7	GTS552	June. 29 2016	June. 28 2017
3	Coaxial Switch	ANRITSU CORP	MP59B	GTS225	June. 29 2016	June. 28 2017
4	Artificial Mains Network	SCHWARZBECK MESS	NSLK8127	GTS226	June. 29 2016	June. 28 2017
5	Coaxial Cable	GTS	N/A	GTS227	N/A	N/A
6	EMI Test Software	AUDIX	E3	N/A	N/A	N/A
7	Thermo meter	KTJ	TA328	GTS233	June. 29 2016	June. 28 2017

General used equipment:						
Item	**Test Equipment**	**Manufacturer**	**Model No.**	**Inventory No.**	**Cal.Date (mm-dd-yy)**	**Cal.Due date (mm-dd-yy)**
1	Barometer	ChangChun	DYM3	GTS257	June 29 2016	June 28 2017

7 Test results and Measurement Data

7.1 Antenna requirement:

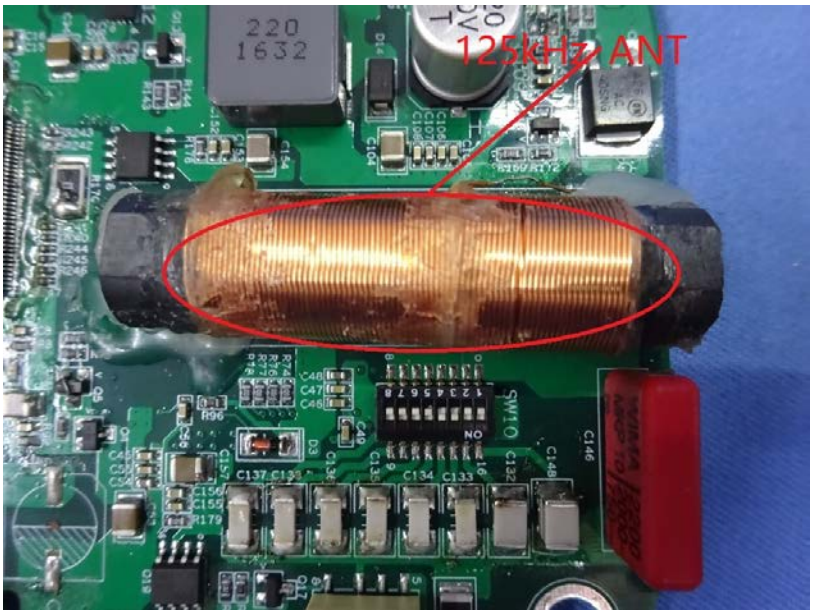
Standard requirement:	FCC Part15 C Section 15.203

15.203 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, 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.

E.U.T Antenna:

The antenna is Integral Antenna, the best case gain of the antenna is 0dBi



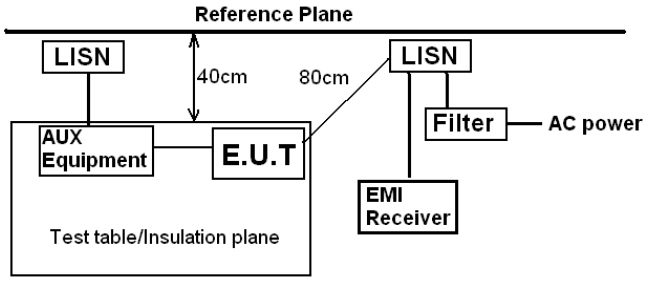
7.2 Conducted Emissions

Test Requirement:	FCC Part15 C Section 15.207
Test Method:	ANSI C63.10:2013
Test Frequency Range:	150KHz to 30MHz
Class / Severity:	Class B
Receiver setup:	RBW=9KHz, VBW=30KHz, Sweep time=auto
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 setup:



Remark:
E.U.T: Equipment Under Test
LISN: Line Impedence Stabilization Network
Test table height=0.8m

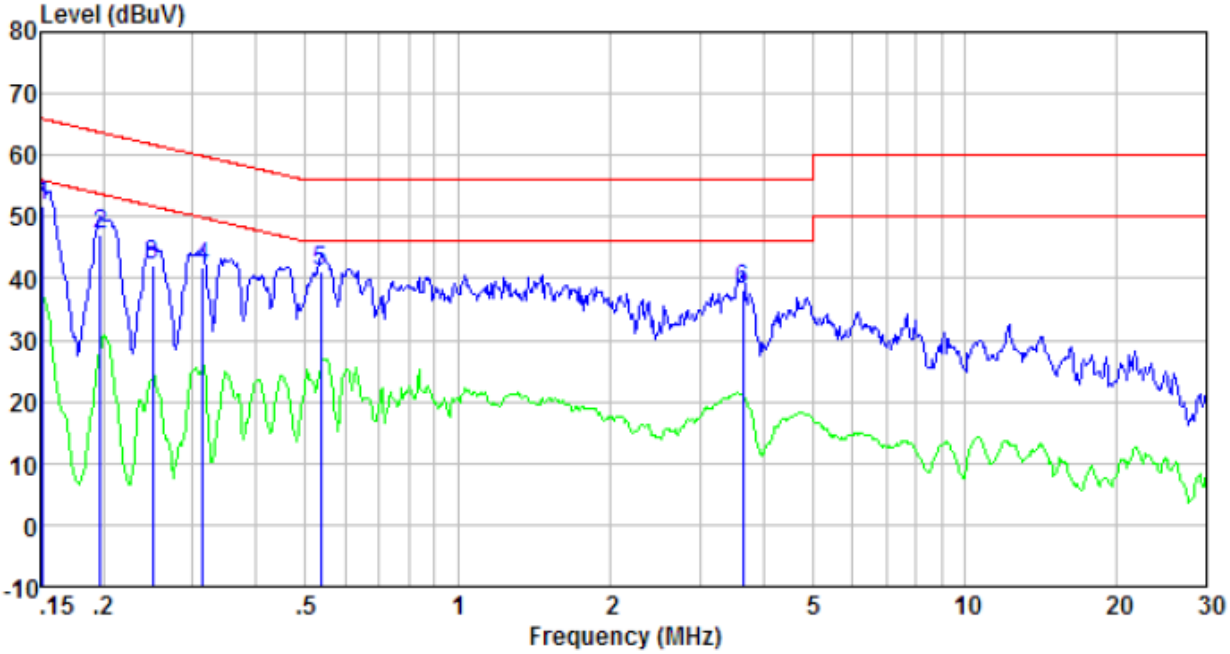
Test procedure:

1. The E.U.T and simulators are connected to the main power through a line impedance stabilization network (L.I.S.N.). This provides a 50ohm/50uH coupling impedance for the measuring equipment.
2. The peripheral devices are also connected to the main power through a LISN that provides a 50ohm/50uH coupling impedance with 50ohm termination. (Please refer to the block diagram of the test setup and photographs).
3. Both sides of A.C. line are checked for maximum conducted interference. In order to find the maximum emission, the relative positions of equipment and all of the interface cables must be changed according to ANSI C63.10:2013 on conducted measurement.

Test Instruments:	Refer to section 6.0 for details
Test mode:	Refer to section 5.2 for details
Test results:	Pass

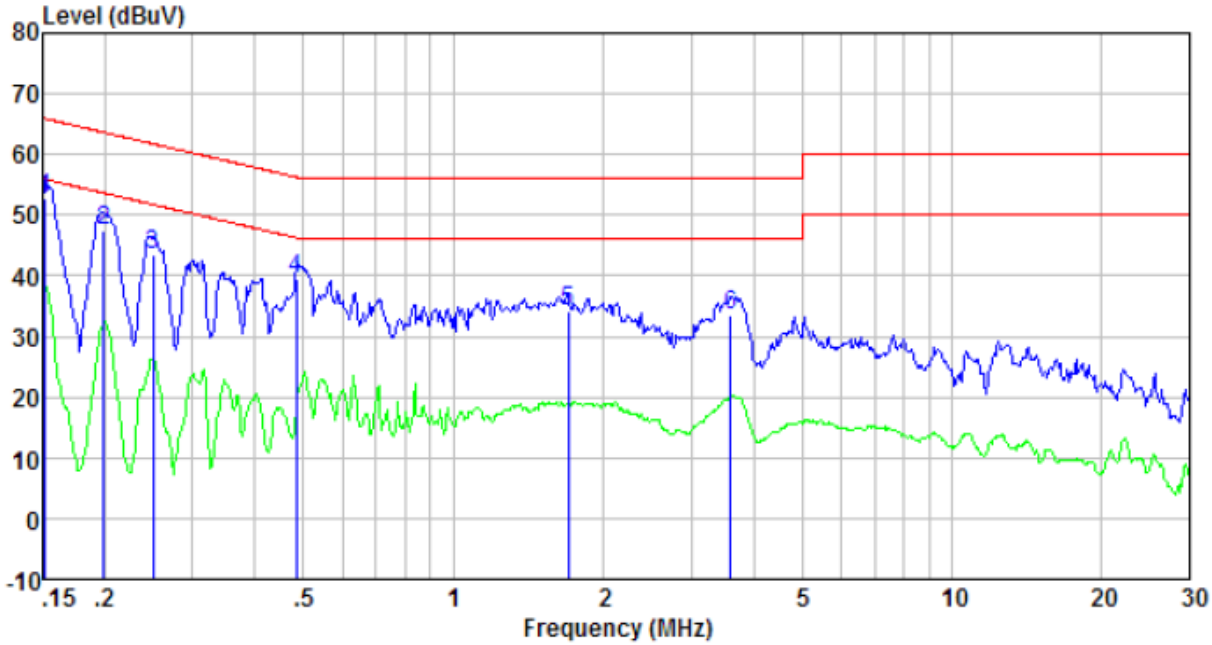
Measurement data

Line:



Freq MHz	Reading level dBuV	lISN/ISN factor dB	Cable loss dB	level dBuV	Limit level dBuV	Over limit dB	Remark
0.152	51.26	0.42	0.12	51.80	65.91	-14.11	QP
0.197	46.41	0.43	0.13	46.97	63.76	-16.79	QP
0.249	41.48	0.44	0.11	42.03	61.78	-19.75	QP
0.313	41.12	0.44	0.10	41.66	59.88	-18.22	QP
0.535	40.52	0.35	0.11	40.98	56.00	-15.02	QP
3.642	37.80	0.21	0.15	38.16	56.00	-17.84	QP

Neutral:



Freq MHz	Reading level dBuV	lISN/ISN factor dB	Cable loss dB	level dBuV	Limit level dBuV	Over limit dB	Remark
0.152	52.15	0.41	0.12	52.68	65.91	-13.23	QP
0.199	46.77	0.41	0.13	47.31	63.67	-16.36	QP
0.249	42.91	0.42	0.11	43.44	61.78	-18.34	QP
0.484	39.10	0.36	0.11	39.57	56.27	-16.70	QP
1.698	33.83	0.20	0.14	34.17	56.00	-21.83	QP
3.603	33.21	0.21	0.15	33.57	56.00	-22.43	QP

Notes:

1. An initial pre-scan was performed on the line and neutral lines with peak detector.
2. Quasi-Peak and Average measurement were performed at the frequencies with maximized peak emission.
3. Final Level =Receiver Read level + LISN Factor + Cable Loss
4. *If the average limit is met when using a quasi-peak detector receiver, the EUT shall be deemed to meet both limits and measurement with the average detector receiver is unnecessary.*

7.3 Radiated Emission Method

Test Requirement:	FCC Part15 C Section 15.209
Test Method:	ANSI C63.4:2014
Test Frequency Range:	9kHz to 1GHz
Test site:	Measurement Distance: 3m
Receiver setup:	

Frequency	Detector	RBW	VBW	Remark
9kHz - 30MHz	Quasi-peak	10kHz	30kHz	Quasi-peak Value
30MHz-1GHz	Quasi-peak	120kHz	300kHz	Quasi-peak Value

Remark: For the frequency bands 9-90 kHz, 110-490 kHz and above 1000 MHz. Radiated emission test in these three bands are based on measurements employing an average detector.

Limit:
(Spurious Emissions)

Limits for frequency below 30MHz

Frequency	Limit (uV/m)	Measurement Distance(m)	Remark
0.009-0.490	2400/F(kHz)	300	Quasi-peak Value
0.490-1.705	24000/F(kHz)	30	Quasi-peak Value
1.705-30	30	30	Quasi-peak Value

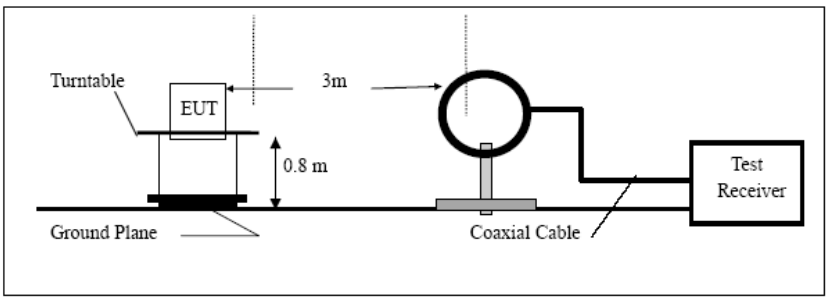
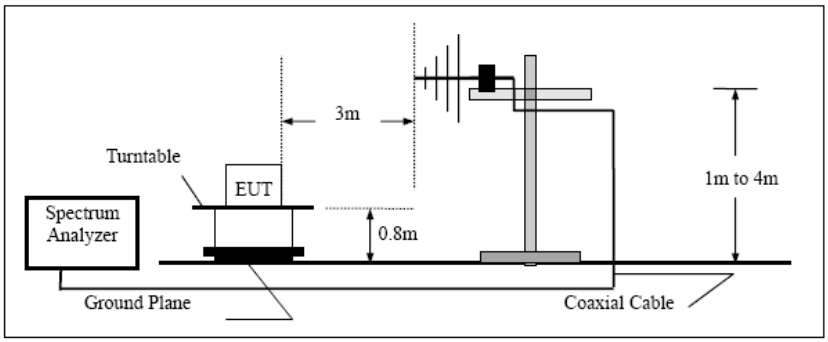
Limits for frequency Above 30MHz

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

Remark: The emission limits shown in the above table are based on measurements employing a CISPR quasi-peak detector except for the frequency bands 9-90 kHz, 110-490 kHz and above 1000 MHz. Radiated emission limits in these three bands are based on measurements employing an average detector.

Test Procedure:

1. The EUT was placed on the top of a rotating table 0.8 meters above the ground at a 3 meter camber. The table was rotated 360 degrees to determine the position of the highest radiation.
2. The EUT was set 3 meters away from the interference-receiving antenna, which was mounted on the top of a variable-height antenna tower.
3. 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.
4. 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 rota table was turned from 0 degrees to 360 degrees to find the maximum reading.
5. The test-receiver system was set to Peak Detect Function and Specified Bandwidth with Maximum Hold Mode.
6. 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. 7. The radiation measurements are performed in X, Y, Z axis positioning. And found the Y axis positioning which it is worse case, only the test worst case mode is recorded in the report.
Test setup:	Below 30MHz  30MHz ~ 1000MHz 
Test Instruments:	Refer to section 6.0 for details
Test mode:	Refer to section 5.2 for details
Test results:	Pass

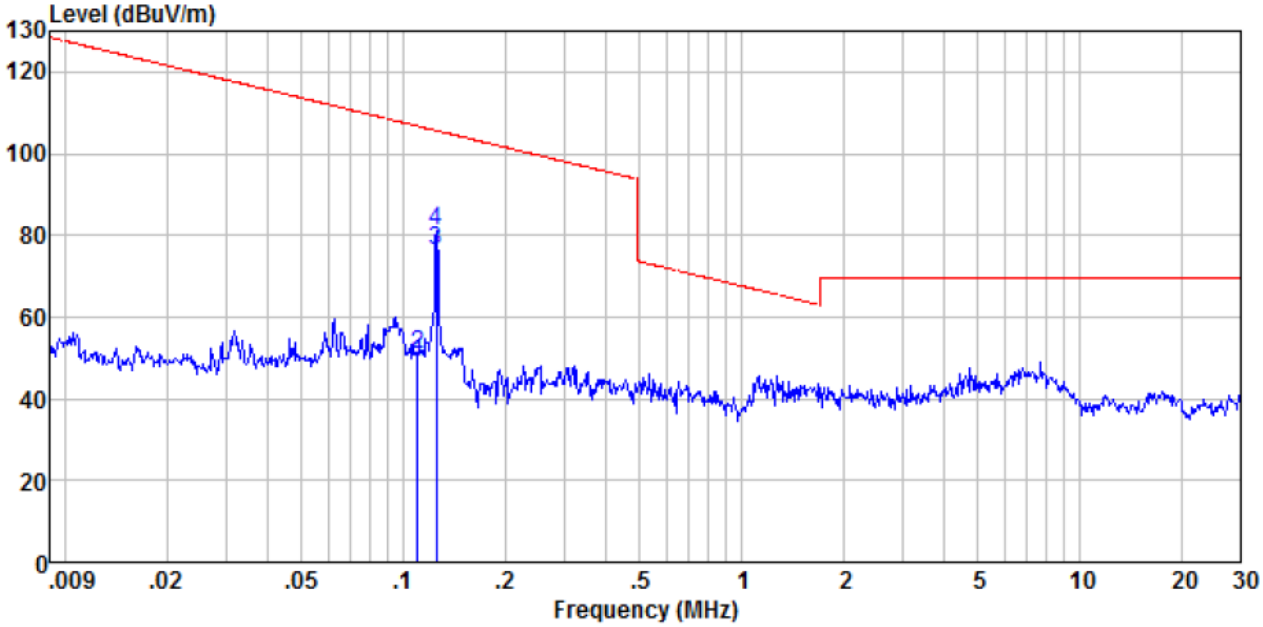
Measurement data:

Measurement data:

Note: Limit dBuV/m @3m = Limit dBuV/m @300m+ 80

Limit dBuV/m @3m = Limit dBuV/m @30m + 40

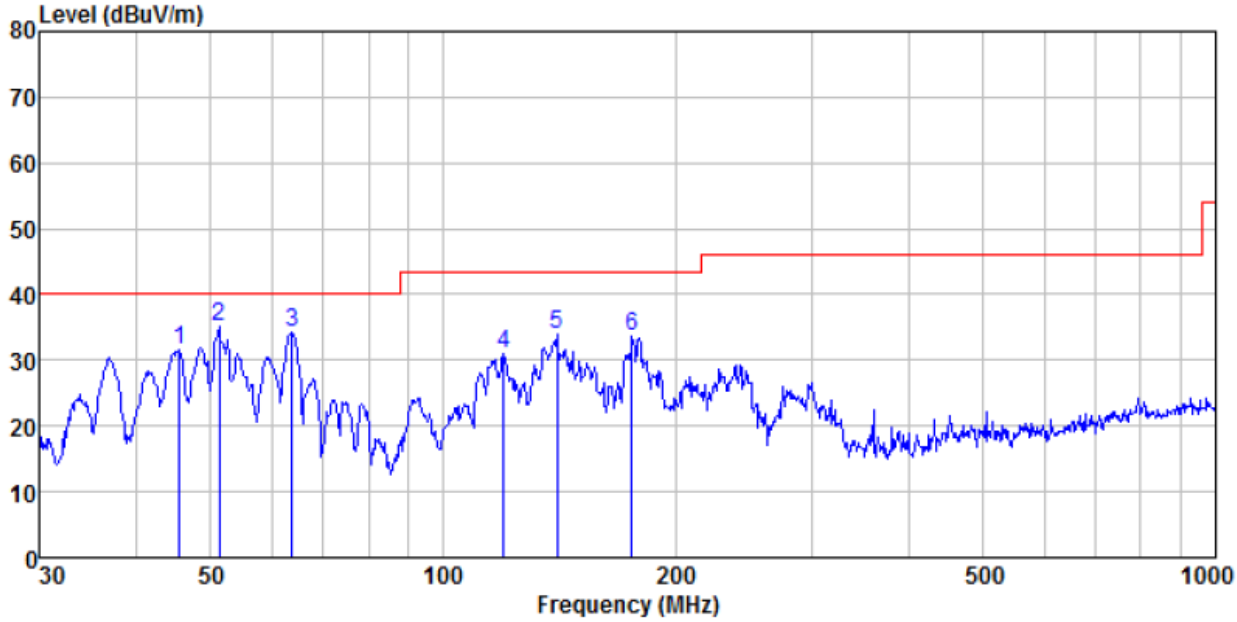
9kHz ~ 30MHz



Freq MHz	Reading level dBuV	Antenna factor dB/m	Cable loss dB	Preamp factor dB	level dBuV/m	Limit level dBuV/m	Over limit dB	Remark
0.110	26.03	22.86	0.17	0.00	49.06	106.78	-57.72	Average
0.110	28.01	22.86	0.17	0.00	51.04	106.78	-55.74	Peak
0.125	53.20	22.75	0.18	0.00	76.13	105.66	-29.53	Average
0.125	58.27	22.75	0.18	0.00	81.20	105.66	-24.46	Peak

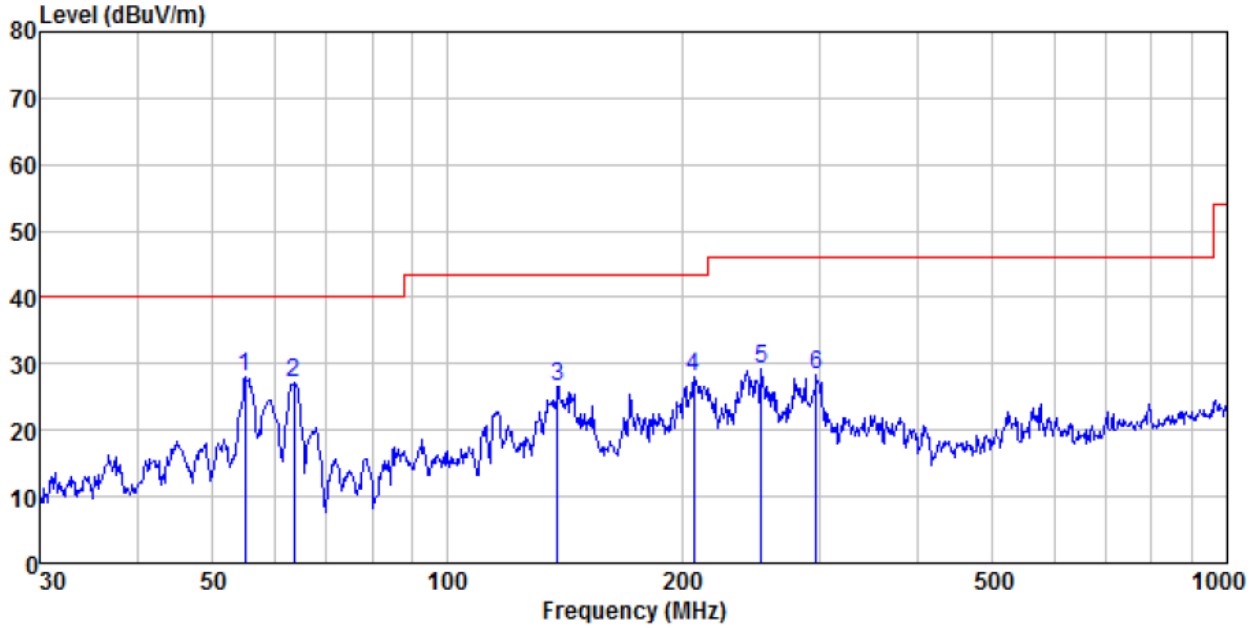
30MHz~1GHz

Vertical:



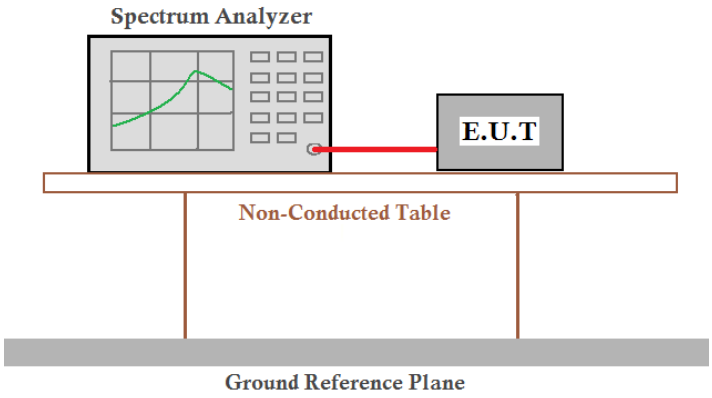
Freq MHz	Reading level dBuV	Antenna factor dB/m	Cable loss dB	Preamp factor dB	level dBuV/m	Limit level dBuV/m	Over limit dB	Remark
45.535	48.60	12.25	0.72	30.02	31.55	40.00	-8.45	QP
51.301	52.01	12.20	0.78	29.99	35.00	40.00	-5.00	QP
63.759	53.28	10.07	0.89	29.89	34.35	40.00	-5.65	QP
119.856	49.83	9.40	1.36	29.57	31.02	43.50	-12.48	QP
140.342	54.62	7.30	1.51	29.46	33.97	43.50	-9.53	QP
175.652	52.65	8.60	1.72	29.30	33.67	43.50	-9.83	QP

Horizontal:



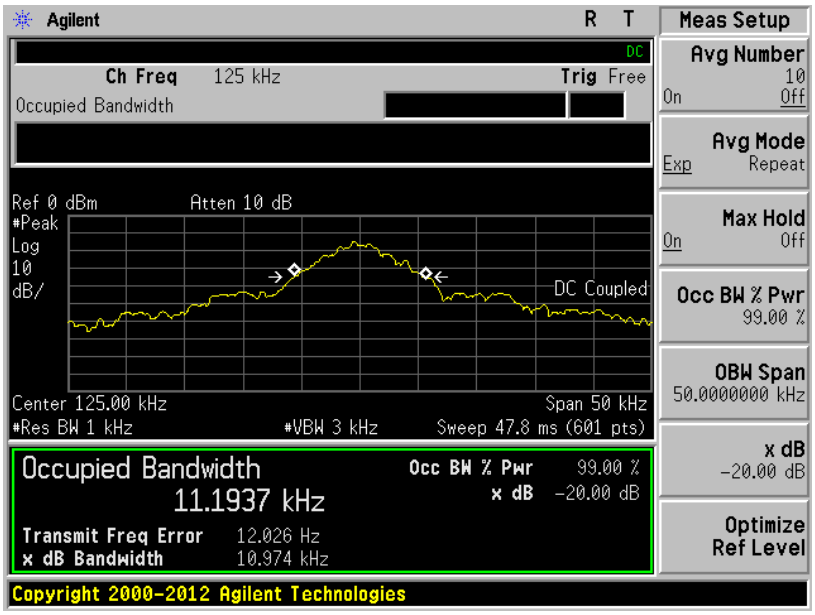
Freq MHz	Reading level dBuV	Antenna factor dB/m	Cable loss dB	Preamp factor dB	level dBuV/m	Limit level dBuV/m	Over limit dB	Remark
55.027	45.24	11.93	0.82	29.96	28.03	40.00	-11.97	QP
63.536	46.18	10.07	0.89	29.90	27.24	40.00	-12.76	QP
138.387	46.87	7.57	1.50	29.46	26.48	43.50	-17.02	QP
207.123	44.91	10.49	1.88	29.27	28.01	43.50	-15.49	QP
252.948	44.73	11.95	2.14	29.66	29.16	46.00	-16.84	QP
297.224	42.57	13.40	2.35	29.99	28.33	46.00	-17.67	QP

7.4 20dB Occupy Bandwidth

Test Requirement:	FCC Part15 C Section 15.215
Test Method:	ANSI C63.10: 2013
Test setup:	
Test Instruments:	Refer to section 6.0 for details
Test mode:	Refer to section 5.2 for details
Test results:	Pass

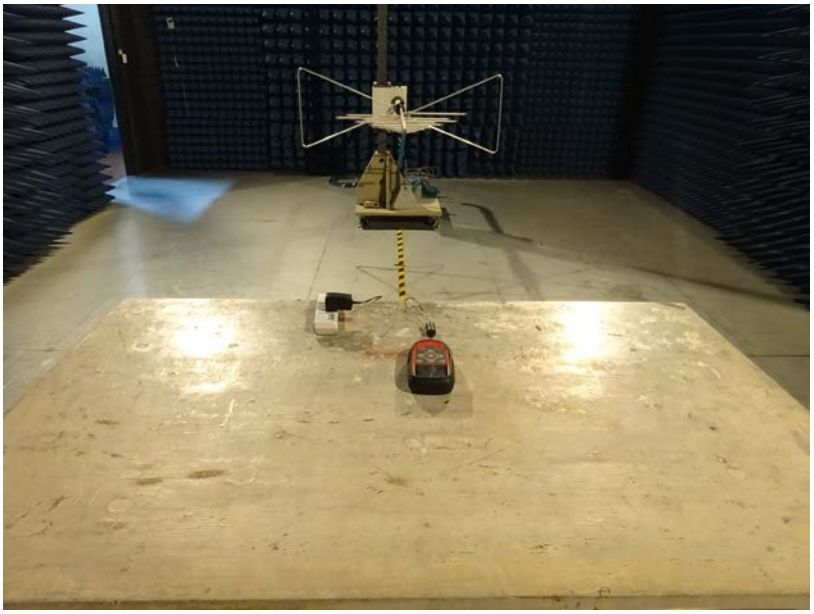
Measurement Data

Test frequency	20dB bandwidth(KHz)	Result
125KHz	10.974	Pass



8 Test Setup Photo

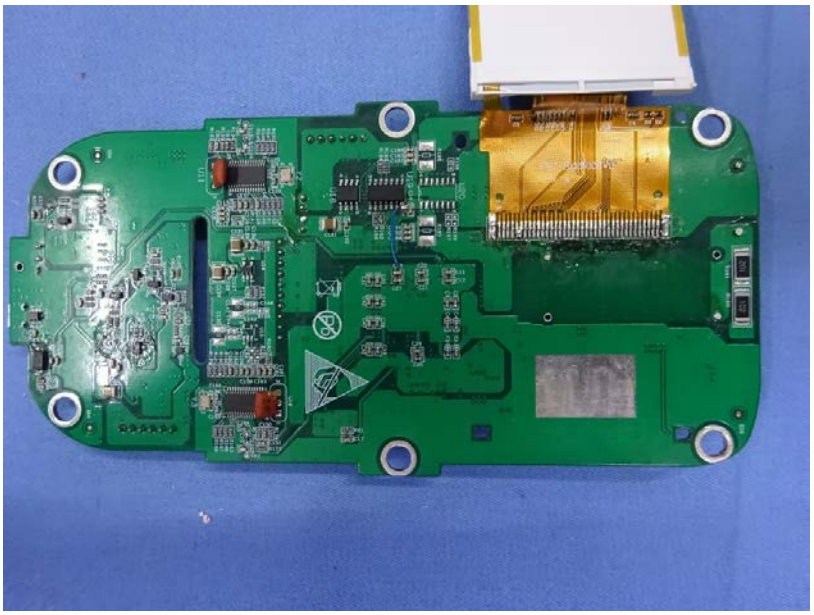
Radiated Emission

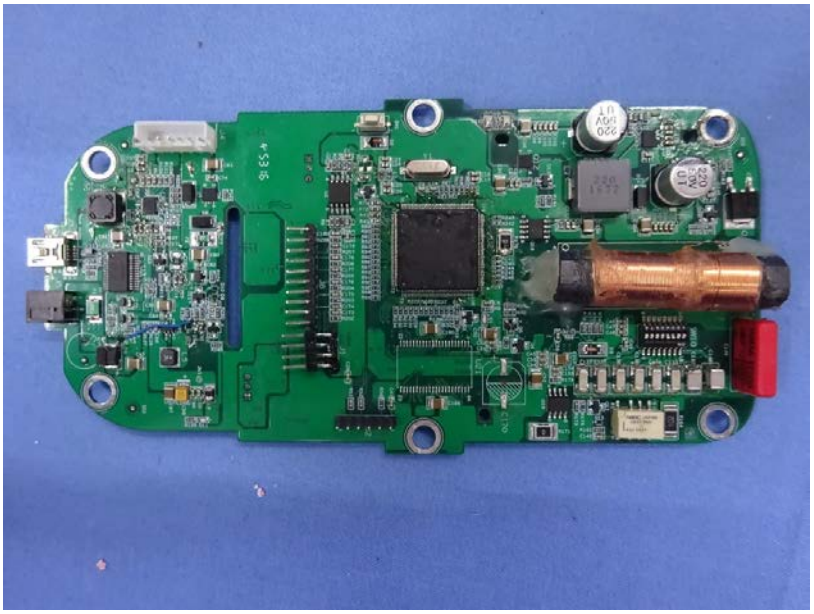


Conducted Emission

9 EUT Constructional Details

MODEL: Q01





GME SWITCHING POWER ADAPTER
MODEL:GME12A-050200FXR
INPUT: 100-240V ~ 50-60Hz 0.4A
OUTPUT: 5V⎓ 2A
I.T.E. POWER SUPPLY
LISTED
E241618
L.P.S
MADE IN CHINA XXXXX-XXXXXXX

------End------