

FCC REPORT

Applicant: Autel Intelligent Tech. Corp., Ltd.

Address of Applicant: 6th - 10th Floor, Bldg. B1, Zhiyuan, Xueyuan Rd., Xili, Nanshan, Shenzhen, China

Equipment Under Test (EUT)

Product Name: TPMS diagnostic and service tool

Model No.: MaxiTPMS TS601, MaxiTPMS TS501

Trade Mark: AUTEL

FCC ID: WQ82016501601

Applicable standards: FCC CFR Title 47 Part 15 Subpart C:2015

Date of sample receipt: September 09, 2016

Date of Test: September 10-14, 2016

Date of report issued: September 18, 2016

Test Result : PASS *

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

Authorized Signature:

A circular logo for GTS (Global United Technology Services Co., Ltd.) is overlaid with a handwritten signature in black ink. The signature appears to read 'Robinson Lo' and is dated 'September 18, 2016'. The logo contains the text 'GTS', 'GLOBAL UNITED TECHNOLOGY SERVICES CO., LTD.', and 'LABORATORY TESTING'.

Robinson Lo

Laboratory Manager

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 and does not permit the use of the GTS product certification mark. The manufacturer should ensure that all products in series production are in conformity with the product sample detailed in this report.

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2 Version

Version No.	Date	Description
00	September 18, 2016	Original

Prepared By: Tiger Chen **Date:** September 18, 2016
Project Engineer

Check By: Andy Wu **Date:** September 18, 2016
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 Client Information

Applicant:	Autel Intelligent Tech. Corp., Ltd.
Address of Applicant:	6th - 10th Floor, Bldg. B1, Zhiyuan, Xueyuan Rd., Xili, Nanshan, Shenzhen, China
Manufacturer/ Factory:	Autel Intelligent Tech. Corp., Ltd.
Address of Manufacturer/ Factory:	6th - 10th Floor, Bldg. B1, Zhiyuan, Xueyuan Rd., Xili, Nanshan, Shenzhen, China

5.2 General Description of EUT

Product Name:	TPMS diagnostic and service tool
Model No.:	MaxiTPMS TS601, MaxiTPMS TS501
Test model	MaxiTPMS TS601
Remark:	<i>All above models are identical in the same PCB layout, interior structure and electrical circuits. The only difference is the model name for commercial purpose.</i>
Operation Frequency:	125KHz
Modulation type:	ASK
Antenna Type:	Integral antenna
Antenna gain:	0dBi (declared by manufacturer)
Power supply:	Adapter: Model: HK-AR-050A200-US Input: 100-240V, 50/60Hz, 0.35A Output: 5V, 2.0A or DC 3.7V Li-ion Battery

Note:

In section 15.31(m), regards to the operating frequency range less than 1 MHz, only the middle frequency of channel was selected to perform the test, and the selected channel see below:

Channel	Frequency
Test channel	125KHz

5.3 Test mode

Transmitting mode	Keep the EUT in continuously transmitting and charging mode
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5.4 Description of Support Units

Manufacturer	Description	Model	Serial Number	FCC Approval
GS	Lead-Acid battery	S5D26R-MFZ	9442804454	N/A

5.5 Test Facility

<p>The test facility is recognized, certified, or accredited by the following organizations:</p> <ul style="list-style-type: none"> ● 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.

5.6 Test Location

All tests were performed at:
<p>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</p>

5.7 Other Information Requested by the Customer

None.

6 Test Instruments list

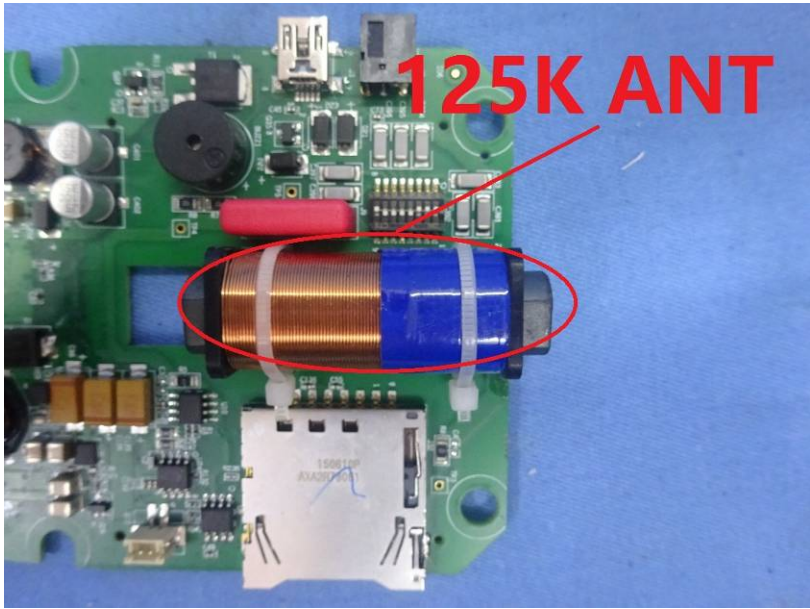
Radiated Emission:						
Item	Test Equipment	Manufacturer	Model No.	Inventory No.	Cal.Date (mm-dd-yy)	Cal.Due date (mm-dd-yy)
1	3m Semi- Anechoic Chamber	ZhongYu Electron	9.0(L)*6.0(W)* 6.0(H)	GTS250	July. 03 2015	July. 02 2020
2	Control Room	ZhongYu Electron	6.2(L)*2.5(W)* 2.4(H)	GTS251	N/A	N/A
3	Spectrum Analyzer	Agilent	E4440A	GTS533	Jun. 29 2016	Jun. 28 2017
4	EMI Test Receiver	Rohde & Schwarz	ESU26	GTS203	Jun. 29 2016	Jun. 28 2017
5	BiConiLog Antenna	SCHWARZBECK MESS-ELEKTRONIK	VULB9163	GTS214	Jun. 29 2016	Jun. 28 2017
6	Double -ridged waveguide horn	SCHWARZBECK MESS-ELEKTRONIK	9120D-829	GTS208	Jun. 25 2016	Jun. 24 2017
7	Horn Antenna	ETS-LINDGREN	3160	GTS217	Mar. 26 2016	Mar. 25 2017
8	EMI Test Software	AUDIX	E3	N/A	N/A	N/A
9	Coaxial Cable	GTS	N/A	GTS213	Mar. 26 2016	Mar. 25 2017
10	Coaxial Cable	GTS	N/A	GTS211	Mar. 26 2016	Mar. 25 2017
11	Coaxial cable	GTS	N/A	GTS210	Mar. 26 2016	Mar. 25 2017
12	Coaxial Cable	GTS	N/A	GTS212	Mar. 26 2016	Mar. 25 2017
13	Amplifier(100kHz-3GHz)	HP	8347A	GTS204	Jun. 29 2016	Jun. 28 2017
14	Amplifier(2GHz-20GHz)	HP	8349B	GTS206	Jun. 29 2016	Jun. 28 2017
15	Amplifier (18-26GHz)	Rohde & Schwarz	AFS33-18002 650-30-8P-44	GTS218	Jun. 25 2016	Jun. 24 2017
16	Band filter	Amindeon	82346	GTS219	Mar. 26 2016	Mar. 25 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	July 06 2016	July 05 2017

7 Test results and Measurement Data

7.1 Antenna requirement:

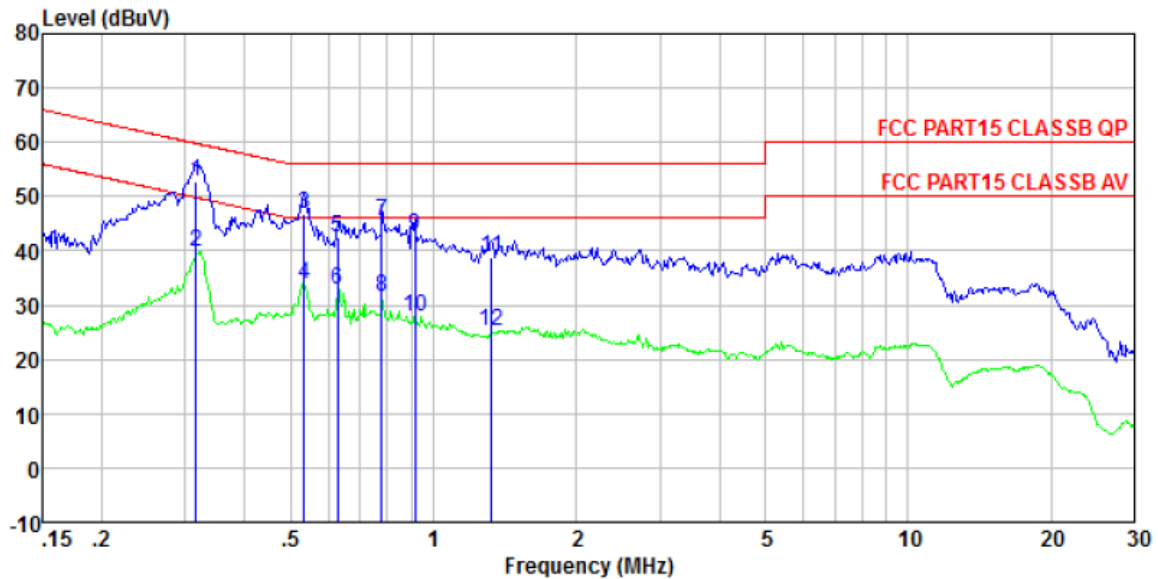
Standard requirement:	FCC Part15 C Section 15.203
<p>15.203 requirement:</p> <p>An intentional radiator shall be designed to ensure that no antenna other than that furnished by the responsible party shall be used with the device. The use of a permanently attached antenna or of an antenna that uses a 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.</p>	
<p>E.U.T Antenna:</p>	
<p><i>The antenna is Integral Antenna, the best case gain of the antenna is 0dBi</i></p> 	

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:	<table border="1"> <thead> <tr> <th rowspan="2">Frequency range (MHz)</th> <th colspan="2">Limit (dBuV)</th> </tr> <tr> <th>Quasi-peak</th> <th>Average</th> </tr> </thead> <tbody> <tr> <td>0.15-0.5</td> <td>66 to 56*</td> <td>56 to 46*</td> </tr> <tr> <td>0.5-5</td> <td>56</td> <td>46</td> </tr> <tr> <td>5-30</td> <td>60</td> <td>50</td> </tr> </tbody> </table> <p>* Decreases with the logarithm of the frequency.</p>	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
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													
Test setup:	<p><i>Remark</i> E.U.T: Equipment Under Test LISN: Line Impedance Stabilization Network Test table height=0.8m</p>														
Test procedure:	<ol style="list-style-type: none"> 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 5.3 for details														
Test results:	Pass														

Measurement data:

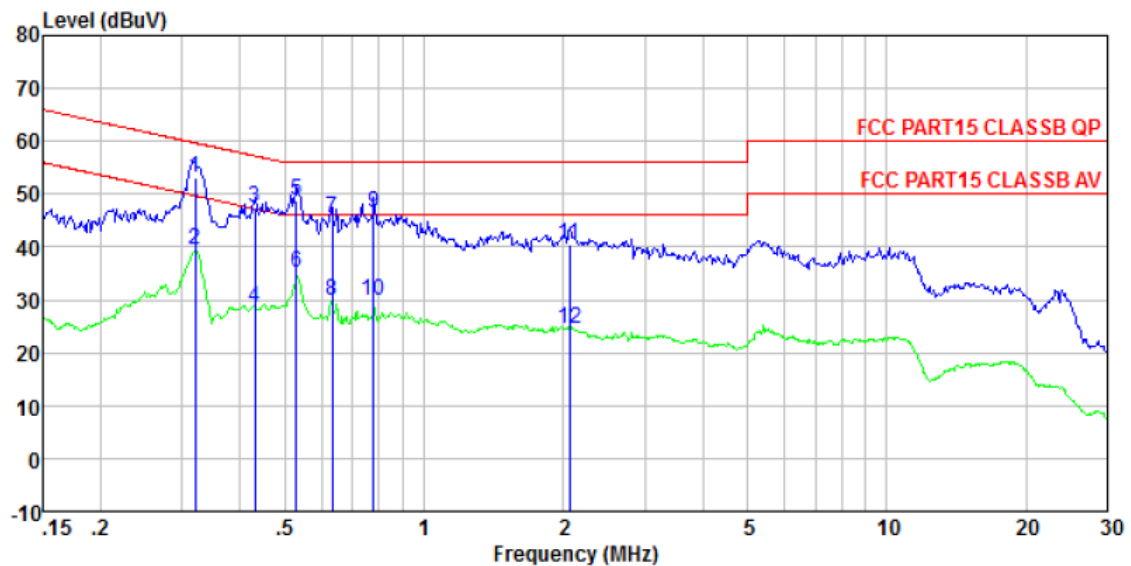
Line:



Site : Shielded room
 Condition : FCC PART15 CLASSB QP LISN-2013 LINE
 Job No. : 0217
 Test mode : Transmitting mode
 Test Engineer: Boy

	Freq	Read Level	LISN Factor	Cable Loss	Level	Limit Line	Over Limit	Remark
	MHz	dBuV	dB	dB	dBuV	dBuV	dB	
1	0.317	52.53	0.11	0.10	52.74	59.80	-7.06	QP
2	0.317	39.74	0.11	0.10	39.95	49.80	-9.85	Average
3	0.535	46.44	0.13	0.11	46.68	56.00	-9.32	QP
4	0.535	33.68	0.13	0.11	33.92	46.00	-12.08	Average
5	0.627	42.34	0.13	0.12	42.59	56.00	-13.41	QP
6	0.627	32.60	0.13	0.12	32.85	46.00	-13.15	Average
7	0.779	45.11	0.14	0.13	45.38	56.00	-10.62	QP
8	0.779	31.38	0.14	0.13	31.65	46.00	-14.35	Average
9	0.914	42.39	0.14	0.13	42.66	56.00	-13.34	QP
10	0.914	27.66	0.14	0.13	27.93	46.00	-18.07	Average
11	1.324	38.72	0.12	0.13	38.97	56.00	-17.03	QP
12	1.324	24.98	0.12	0.13	25.23	46.00	-20.77	Average

Neutral:

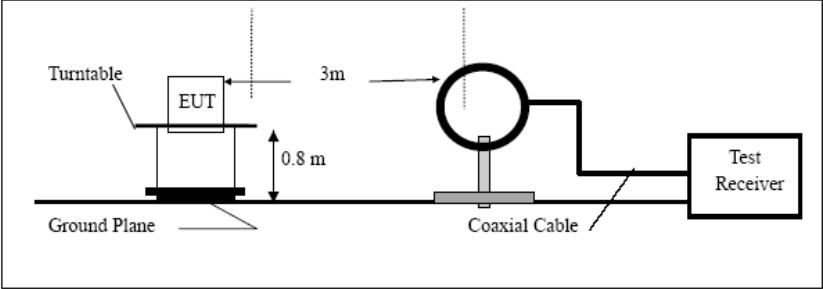
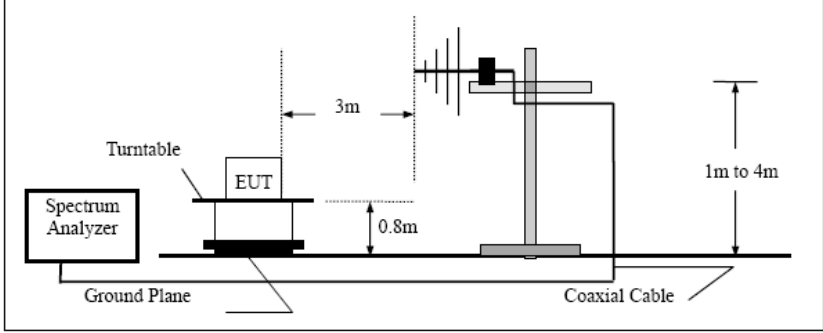


Site : Shielded room
 Condition : FCC PART15 CLASSB QP LISN-2013 NEUTRAL
 Job No. : 0217
 Test mode : Transmitting mode
 Test Engineer: Boy

	Read Freq	LISN Level	LISN Factor	Cable Loss	Level	Limit Line	Over Limit	Remark
	MHz	dBuV	dB	dB	dBuV	dBuV	dB	
1	0.320	53.02	0.06	0.10	53.18	59.71	-6.53	QP
2	0.320	39.18	0.06	0.10	39.34	49.71	-10.37	Average
3	0.431	47.17	0.06	0.11	47.34	57.24	-9.90	QP
4	0.431	28.34	0.06	0.11	28.51	47.24	-18.73	Average
5	0.529	48.71	0.07	0.11	48.89	56.00	-7.11	QP
6	0.529	34.88	0.07	0.11	35.06	46.00	-10.94	Average
7	0.634	45.36	0.07	0.13	45.56	56.00	-10.44	QP
8	0.634	29.55	0.07	0.13	29.75	46.00	-16.25	Average
9	0.779	46.31	0.07	0.13	46.51	56.00	-9.49	QP
10	0.779	29.51	0.07	0.13	29.71	46.00	-16.29	Average
11	2.066	40.16	0.09	0.15	40.40	56.00	-15.60	QP
12	2.066	24.39	0.09	0.15	24.63	46.00	-21.37	Average

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:	<ol style="list-style-type: none"> 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 				

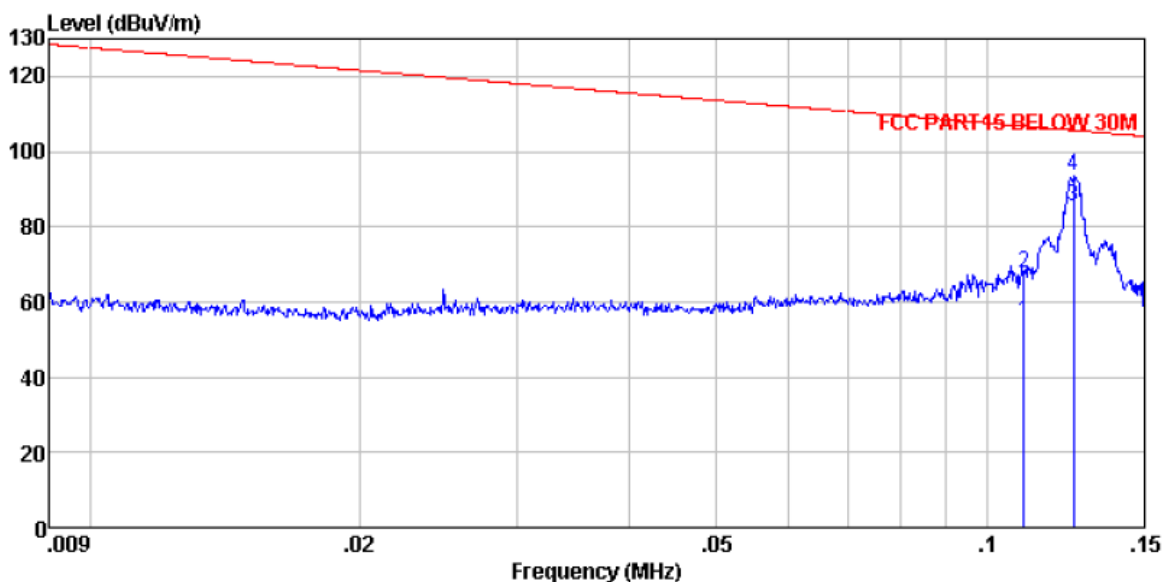
	<p>10dB margin would be re-tested one by one using peak, quasi-peak or average method as specified and then reported in a data sheet.</p> <p>7. The radiation measurements are performed in X, Y, Z axis positioning. And found the Y axis positioning which it is worse case, only the test worst case mode is recorded in the report.</p>
<p>Test setup:</p>	<p>Below 30MHz</p>  <p>30MHz ~ 1000MHz</p> 
<p>Test Instruments:</p>	<p>Refer to section 6.0 for details</p>
<p>Test mode:</p>	<p>Refer to section 5.3 for details</p>
<p>Test results:</p>	<p>Pass</p>

Measurement data:

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

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

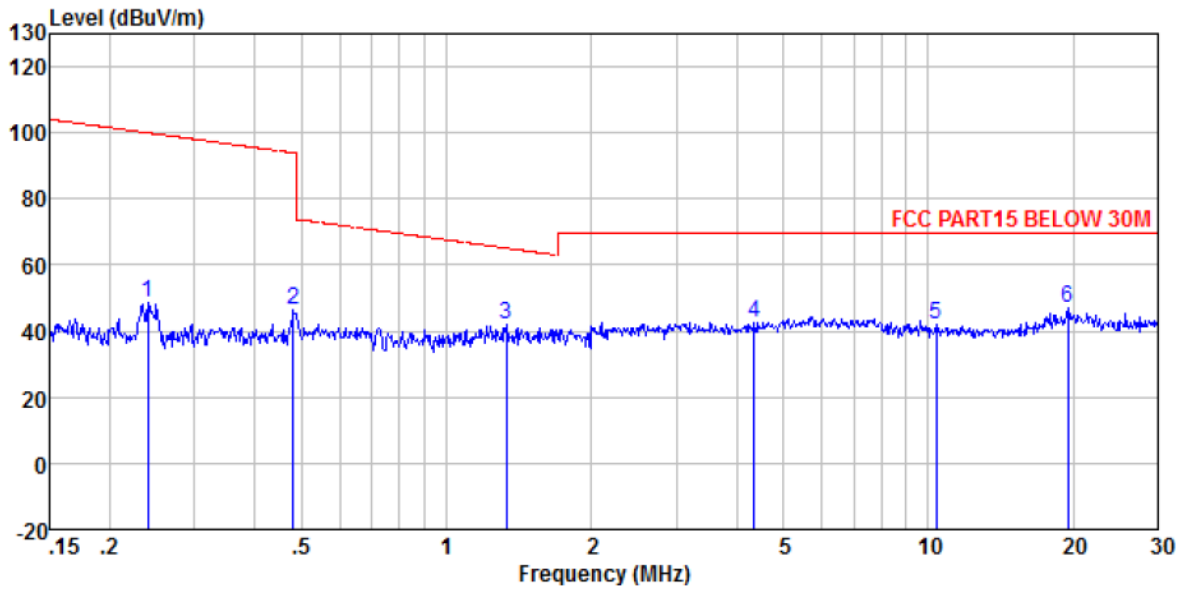
9kHz ~ 30MHz



Site : 3m chamber
 Condition : FCC PART15 BELOW 30M 3m
 No job : 0217
 Test Mode : Transmitting mode
 Test Engineer: Sky

	Freq	Read Level	Antenna Factor	Preamp Factor	Cable Loss	Level	Limit Line	Over Limit	Remark
	MHz	dBuV	dB/m	dB	dB	dBuV/m	dBuV/m	dB	
1	0.110	30.26	24.12	0.00	0.17	54.55	106.78	-52.23	Average
2	0.110	43.47	24.12	0.00	0.17	67.76	106.78	-39.02	Peak
3	0.125	61.34	23.64	0.00	0.18	85.16	105.66	-20.50	Average
4	0.125	69.53	23.64	0.00	0.18	93.35	105.66	-12.31	Peak

150kHz~30MHz

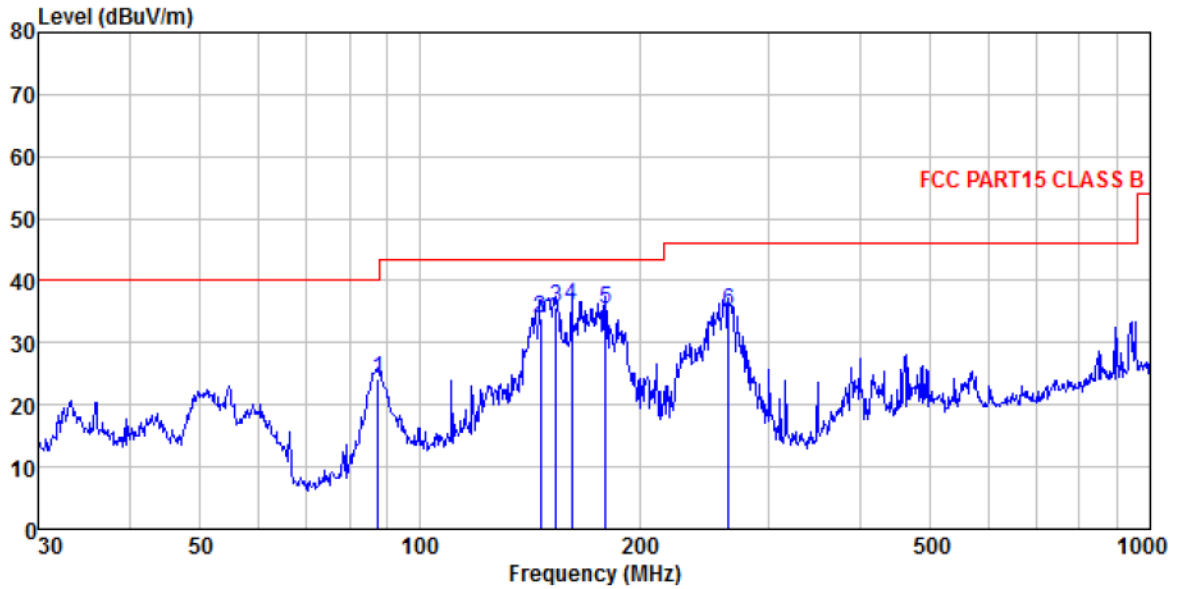


Site : 3m chamber
 Condition : FCC PART15 BELOW 30M 3m
 No job : 0217
 Test Mode : Transmitting mode
 Test Engineer: Sky

	Read	Antenna	Cable	Preamp	Limit	Over	
Freq	Level	Factor	Loss	Factor	Line	Limit	Remark
-----	-----	-----	-----	-----	-----	-----	-----
MHz	dBuV	dB/m	dB	dB	dBuV/m	dBuV/m	dB
1	0.240	26.38	21.80	0.23	0.00	48.41	99.99 -51.58 Peak
2	0.481	25.61	20.75	0.27	0.00	46.63	93.96 -47.33 Peak
3	1.331	20.55	20.88	0.34	0.00	41.77	65.13 -23.36 Peak
4	4.361	20.43	21.87	0.43	0.00	42.73	69.54 -26.81 Peak
5	10.397	18.06	23.25	0.49	0.00	41.80	69.54 -27.74 Peak
6	19.532	18.75	27.64	0.53	0.00	46.92	69.54 -22.62 Peak

30MHz~1GHz

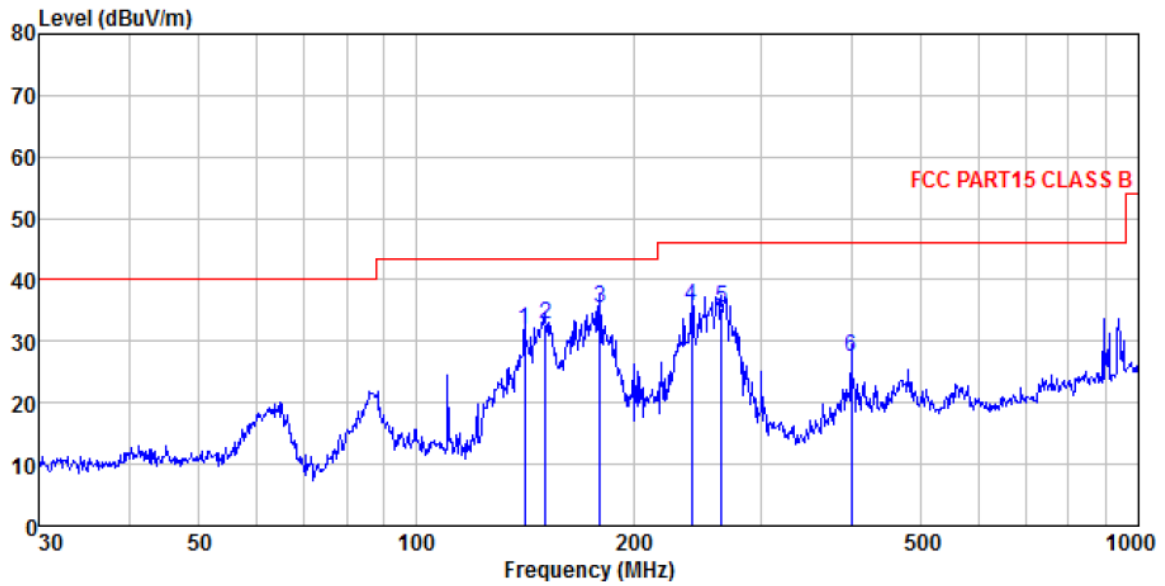
Vertical:



Site : 3m chamber
 Condition : FCC PART15 CLASS B 3m VERTICAL
 Job No. : 0217
 Test Mode : Transmitting mode
 Test Engineer: Sky

	ReadAntenna	Cable	Preamp	Limit	Over				
Freq	Level	Factor	Loss	Line	Limit	Remark			
MHz	dBuV	dB/m	dB	dB	dBuV/m	dBuV/m			
1	87.725	39.60	13.18	1.09	29.76	24.11	40.00	-15.89	QP
2	146.374	51.62	10.23	1.55	29.43	33.97	43.50	-9.53	QP
3	153.739	52.97	10.42	1.59	29.39	35.59	43.50	-7.91	QP
4	161.474	53.13	10.72	1.64	29.35	36.14	43.50	-7.36	QP
5	179.386	51.48	11.62	1.74	29.28	35.56	43.50	-7.94	QP
6	264.746	48.42	14.22	2.19	29.75	35.08	46.00	-10.92	QP

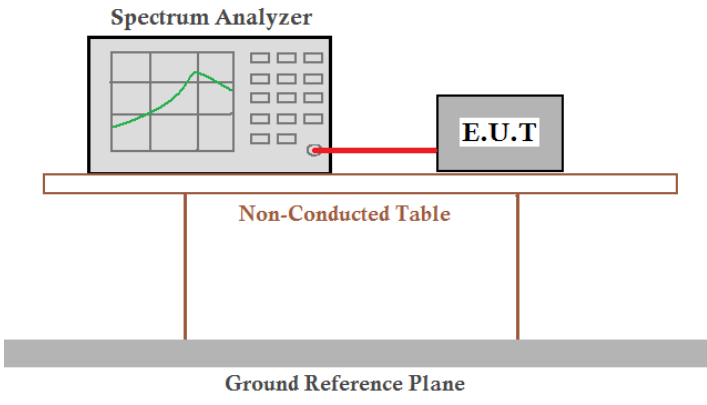
Horizontal:



Site : 3m chamber
 Condition : FCC PART15 CLASS B 3m HORIZONTAL
 Job No. : 0217
 Test Mode : Transmitting mode
 Test Engineer: Sky

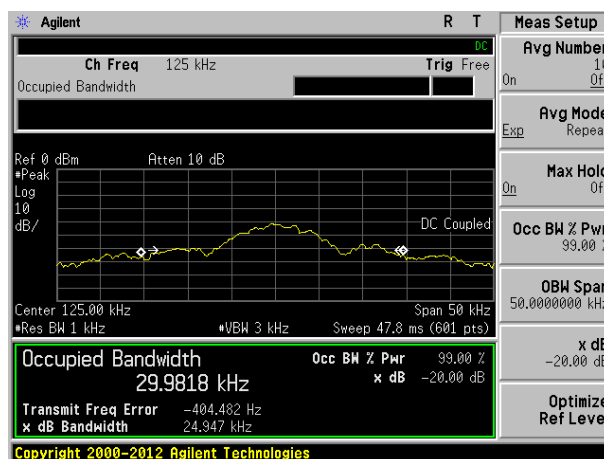
	ReadAntenna	Cable	Preamp	Limit	Over				
Freq	Level	Factor	Loss	Factor	Level	Line	Limit		
-----	-----	-----	-----	-----	-----	-----	-----		
MHz	dBuV	dB/m	dB	dB	dBuV/m	dBuV/m	dB		
1	141.330	49.52	10.20	1.51	29.45	31.78	43.50	-11.72	QP
2	151.067	50.21	10.29	1.58	29.40	32.68	43.50	-10.82	QP
3	179.386	51.42	11.62	1.74	29.28	35.50	43.50	-8.00	QP
4	240.830	49.24	14.09	2.08	29.57	35.84	46.00	-10.16	QP
5	264.746	48.80	14.22	2.19	29.75	35.46	46.00	-10.54	QP
6	400.432	36.96	17.10	2.85	29.50	27.41	46.00	-18.59	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 5.3 for details
Test results:	Pass

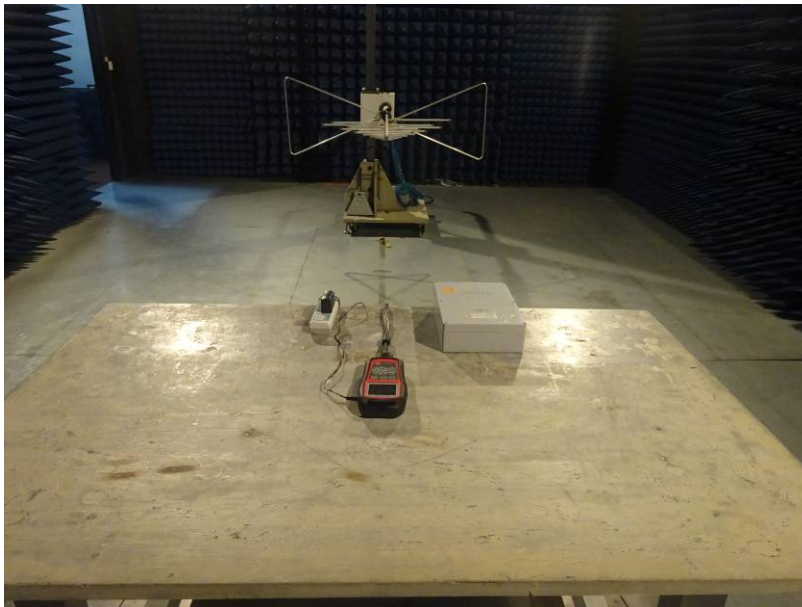
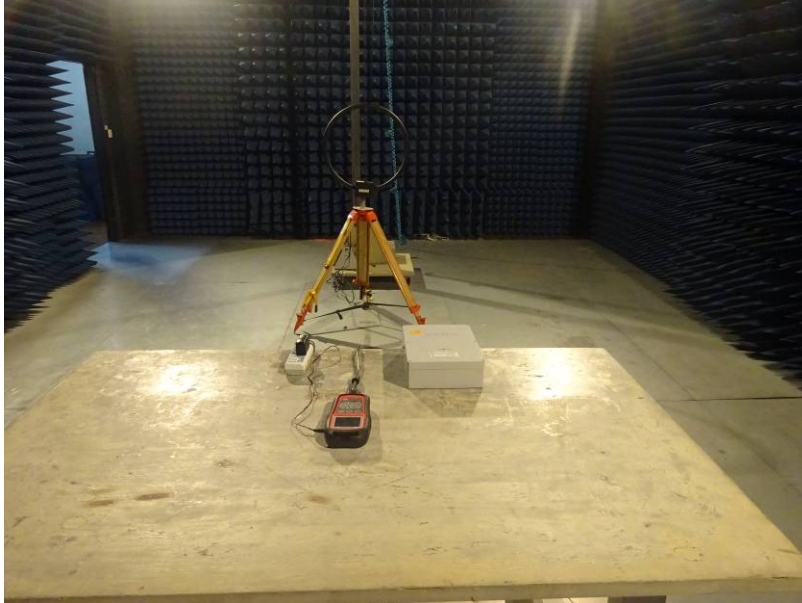
Measurement Data

Test frequency	20dB bandwidth(KHz)	Result
125KHz	24.947	Pass



8 Test Setup Photo

Radiated Emission



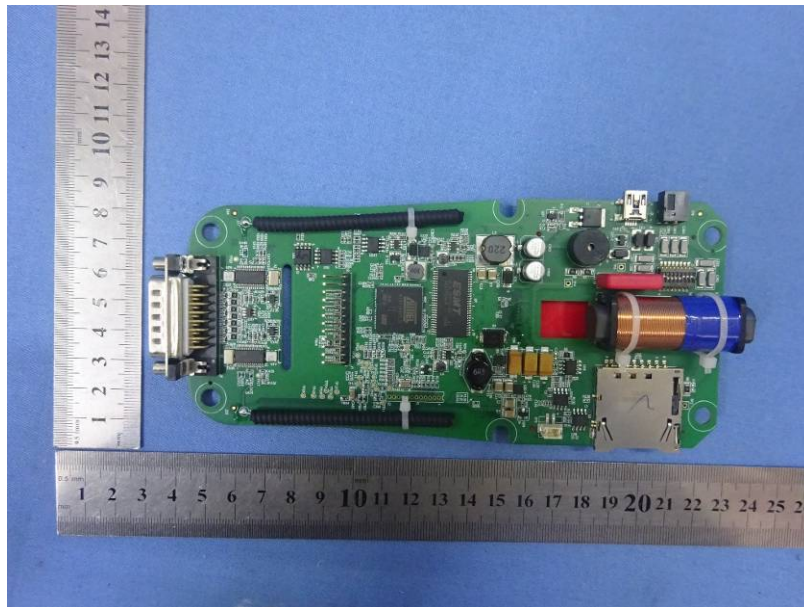
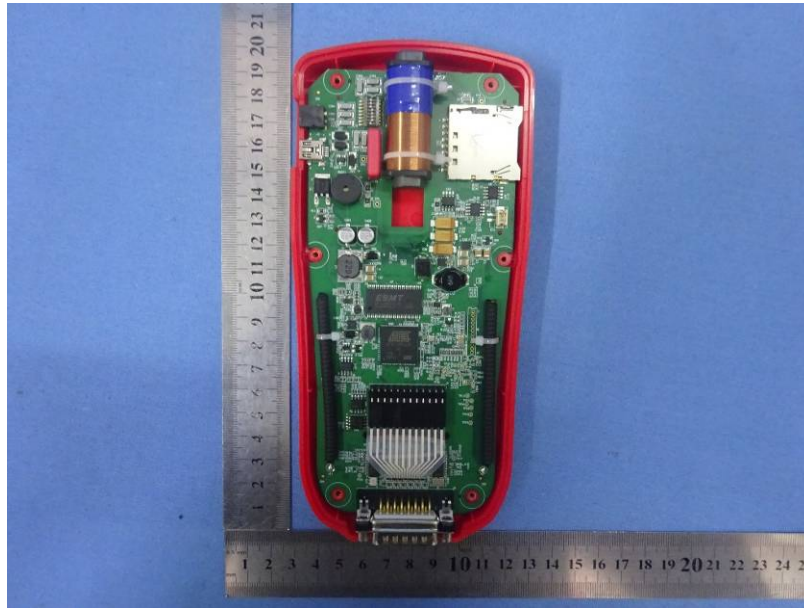
9 EUT Constructional Details

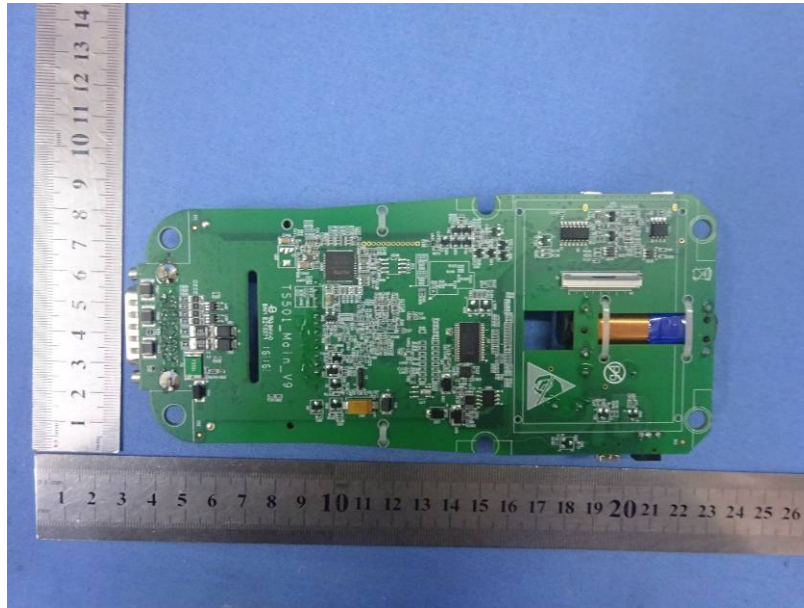














-----End-----