

FCC REPORT

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

Equipment Under Test (EUT)

Product Name: COMPREHENSIVE TPMS TOOL

Model No.: MaxiTPMS TS608, MaxiTPMS MX808TS

Trade Mark: AUTEL

FCC ID: WQ8MX808-TPMS

Applicable standards: FCC CFR Title 47 Part 15 Subpart C:2016

Date of sample receipt: January 04, 2017

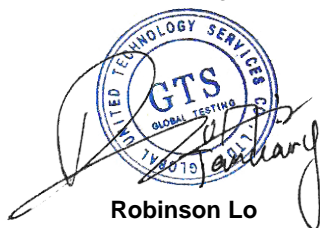
Date of Test: January 05-16, 2017

Date of report issued: January 17, 2017

Test Result : PASS *

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

Authorized Signature:



The image shows a handwritten signature in blue ink over a circular blue stamp. The stamp contains the text 'GTS', 'GLOBAL TESTING', and '2019'. The signature is written across the stamp.

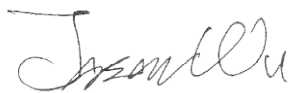
Robinson Lo
Laboratory Manager

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	January 17, 2017	Original

Prepared By:

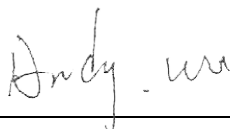


Date:

November 11, 2016

Project Engineer

Check By:



Date:

November 11, 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	$\pm 4.34\text{dB}$	(1)
Radiated Emission	30MHz ~ 1000MHz	$\pm 4.24\text{dB}$	(1)
Radiated Emission	1GHz ~ 26.5GHz	$\pm 4.68\text{dB}$	(1)
AC Power Line Conducted Emission	0.15MHz ~ 30MHz	$\pm 3.45\text{dB}$	(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:	COMPREHENSIVE TPMS TOOL
Model No.:	MaxiTPMS TS608, MaxiTPMS MX808TS
Test Model:	MaxiTPMS TS608
Remark:	<i>Remark: 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 (declare by Manufacturer)
Power supply:	Adapter: Model:GME10C-050200FUu Input: AC 100-240V, 50-60Hz, 0.28A Output: DC 5V, 2A DC 3.7V 3200mAh Lithium 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

5.2 Test mode

Transmitting mode	Keep the EUT in continuously transmitting.
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5.3 Description of Support Units

N/A

5.4 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.
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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

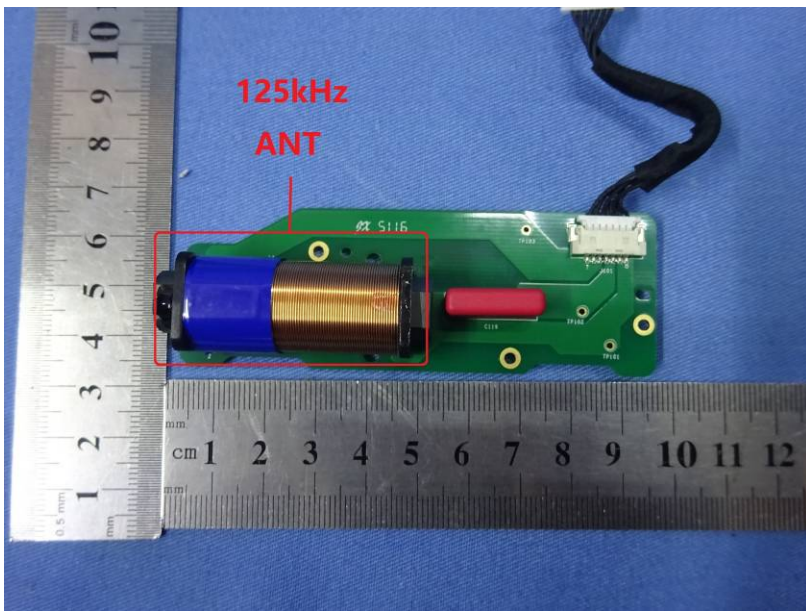
Radiated Emission:						
Item	Test Equipment	Manufacturer	Model No.	Inventory No.	Cal.Date (mm-dd-yy)	Cal.Due date (mm-dd-yy)
1	3m Semi- Anechoic Chamber	ZhongYu Electron	9.2(L)*6.2(W)* 6.4(H)	GTS250	July 03 2015	July 02 2020
2	Control Room	ZhongYu Electron	6.2(L)*2.5(W)* 2.4(H)	GTS251	N/A	N/A
3	Spectrum 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

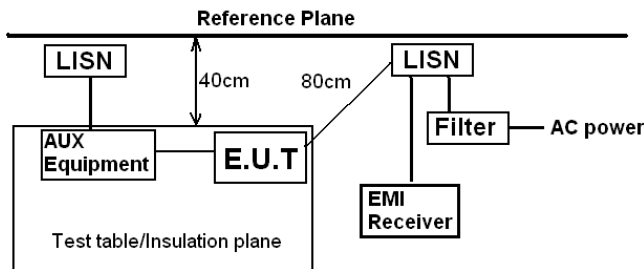
General used equipment:						
Item	Test Equipment	Manufacturer	Model No.	Inventory No.	Cal.Date (mm-dd-yy)	Cal.Due date (mm-dd-yy)
1	Barometer	ChangChun	DYM3	GTS257	June 29 2016	June 28 2017

7 Test results and Measurement Data

7.1 Antenna requirement:

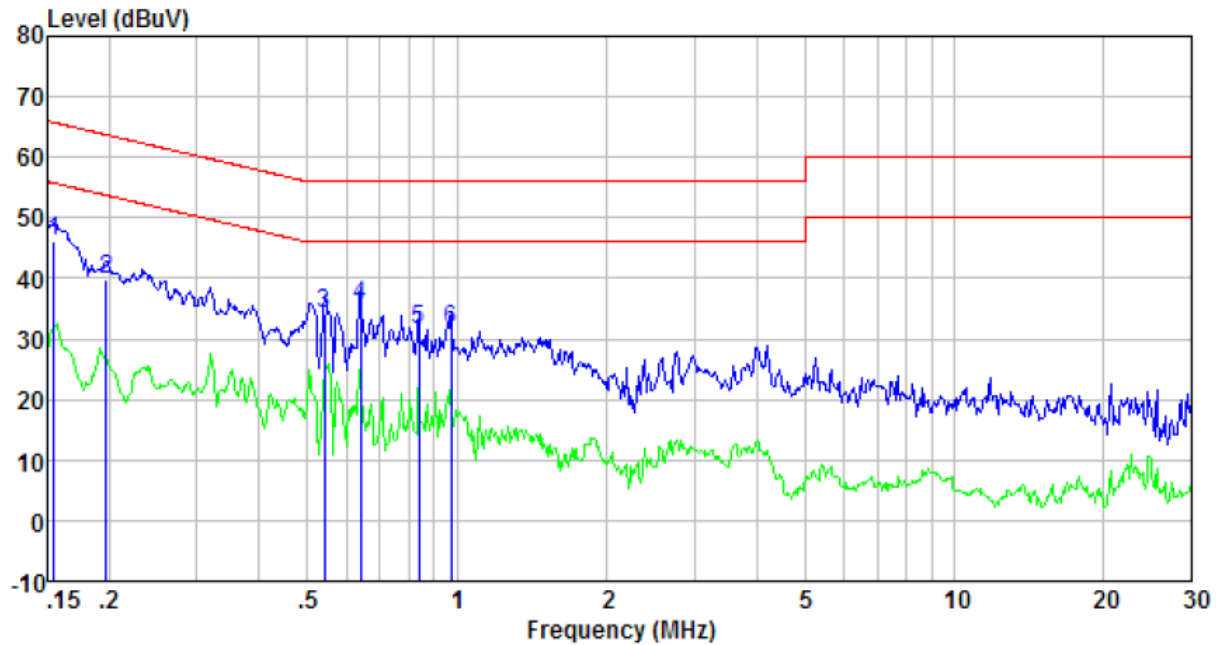
Standard requirement:	FCC Part15 C Section 15.203
15.203 requirement: An intentional radiator shall be designed to ensure that no antenna other than that furnished by the responsible party shall be used with the device. The use of a permanently attached antenna or of an antenna that uses a unique coupling 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: <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:	Frequency range (MHz)		Limit (dBuV)
			Quasi-peak
			Average
	0.15-0.5		66 to 56*
	0.5-5		56
	5-30		60
* Decreases with the logarithm of the frequency.			
Test setup:	<div><p>Reference Plane</p><p>Remark: E.U.T: Equipment Under Test LISN: Line Impedance Stabilization Network Test table height=0.8m</p></div>		
Test procedure:	<div><p>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.</p><p>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).</p><p>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.</p></div>		
Test Instruments:	Refer to section 6.0 for details		
Test mode:	Refer to section 5.3 for details		
Test results:	Pass		

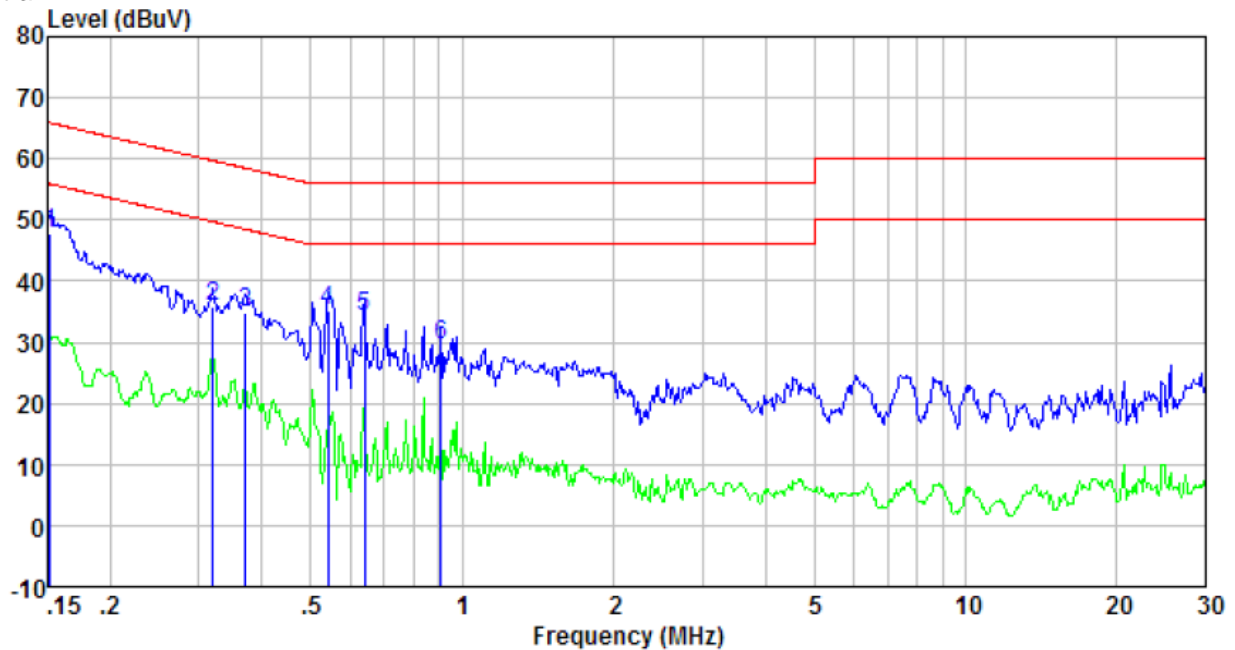
Measurement data

Line:



Freq MHz	Reading level dBuV	1ISN/ISN factor dB	Cable loss dB	level dBuV	Limit level dBuV	Over limit dB	Remark
0.155	45.42	0.42	0.12	45.96	65.74	-19.78	QP
0.197	39.36	0.43	0.13	39.92	63.76	-23.84	QP
0.541	33.72	0.35	0.11	34.18	56.00	-21.82	QP
0.641	35.15	0.30	0.13	35.58	56.00	-20.42	QP
0.839	31.19	0.26	0.13	31.58	56.00	-24.42	QP
0.974	31.17	0.25	0.13	31.55	56.00	-24.45	QP

Neutral:



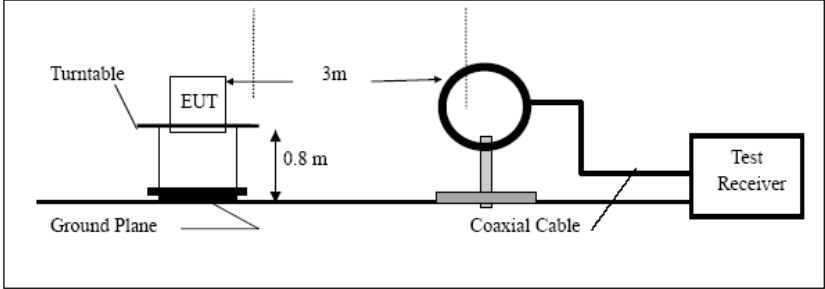
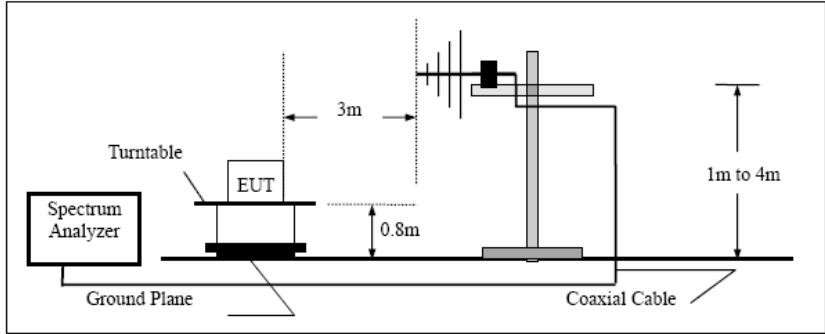
Freq MHz	Reading level dBuV	LISN/ISN factor dB	Cable loss dB	level dBuV	Limit level dBuV	Over limit dB	Remark
0.152	47.36	0.41	0.12	47.89	65.91	-18.02	QP
0.320	35.28	0.42	0.10	35.80	59.71	-23.91	QP
0.371	34.47	0.40	0.10	34.97	58.47	-23.50	QP
0.541	34.84	0.32	0.11	35.27	56.00	-20.73	QP
0.641	33.72	0.26	0.13	34.11	56.00	-21.89	QP
0.909	29.25	0.22	0.13	29.60	56.00	-26.40	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:	<table><tr><td>Frequency</td><td>Detector</td><td>RBW</td><td>VBW</td><td>Remark</td></tr><tr><td>9kHz - 30MHz</td><td>Quasi-peak</td><td>10kHz</td><td>30kHz</td><td>Quasi-peak Value</td></tr><tr><td>30MHz-1GHz</td><td>Quasi-peak</td><td>120kHz</td><td>300kHz</td><td>Quasi-peak Value</td></tr></table> <p>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.</p>					Frequency	Detector	RBW	VBW	Remark	9kHz - 30MHz	Quasi-peak	10kHz	30kHz	Quasi-peak Value	30MHz-1GHz	Quasi-peak	120kHz	300kHz	Quasi-peak Value																					
Frequency	Detector	RBW	VBW	Remark																																					
9kHz - 30MHz	Quasi-peak	10kHz	30kHz	Quasi-peak Value																																					
30MHz-1GHz	Quasi-peak	120kHz	300kHz	Quasi-peak Value																																					
Limit: (Spurious Emissions)	<p>Limits for frequency below 30MHz</p> <table><tr><td>Frequency</td><td>Limit (uV/m)</td><td>Measurement Distance(m)</td><td>Remark</td></tr><tr><td>0.009-0.490</td><td>2400/F(kHz)</td><td>300</td><td>Quasi-peak Value</td></tr><tr><td>0.490-1.705</td><td>24000/F(kHz)</td><td>30</td><td>Quasi-peak Value</td></tr><tr><td>1.705-30</td><td>30</td><td>30</td><td>Quasi-peak Value</td></tr></table> <p>Limits for frequency Above 30MHz</p> <table><tr><td>Frequency</td><td>Limit (dBuV/m @3m)</td><td>Remark</td></tr><tr><td>30MHz-88MHz</td><td>40.00</td><td>Quasi-peak Value</td></tr><tr><td>88MHz-216MHz</td><td>43.50</td><td>Quasi-peak Value</td></tr><tr><td>216MHz-960MHz</td><td>46.00</td><td>Quasi-peak Value</td></tr><tr><td>960MHz-1GHz</td><td>54.00</td><td>Quasi-peak Value</td></tr><tr><td rowspan="2">Above 1GHz</td><td>54.00</td><td>Average Value</td></tr><tr><td>74.00</td><td>Peak Value</td></tr></table> <p>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.</p>					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	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
Frequency	Limit (uV/m)	Measurement Distance(m)	Remark																																						
0.009-0.490	2400/F(kHz)	300	Quasi-peak Value																																						
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1.705-30	30	30	Quasi-peak Value																																						
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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																																							
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>
Test setup:	<p>Below 30MHz</p>  <p>30MHz ~ 1000MHz</p> 
Test Instruments:	Refer to section 6.0 for details
Test mode:	Refer to section 5.3 for details
Test results:	Pass

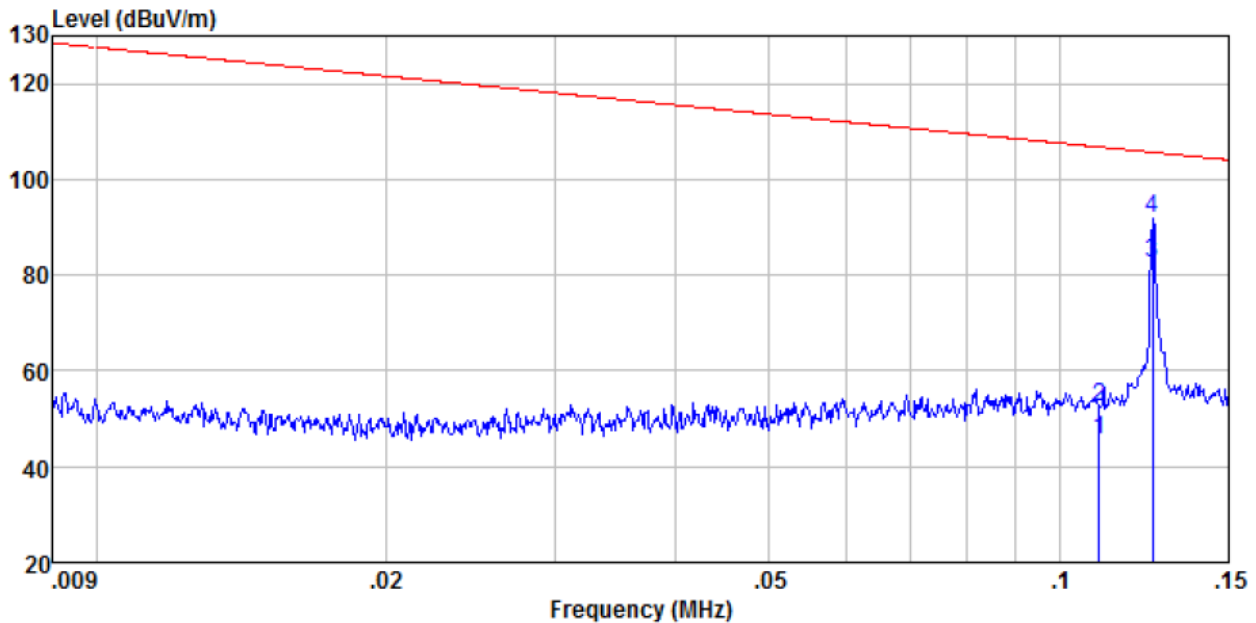
Measurement data:

Measurement data:

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

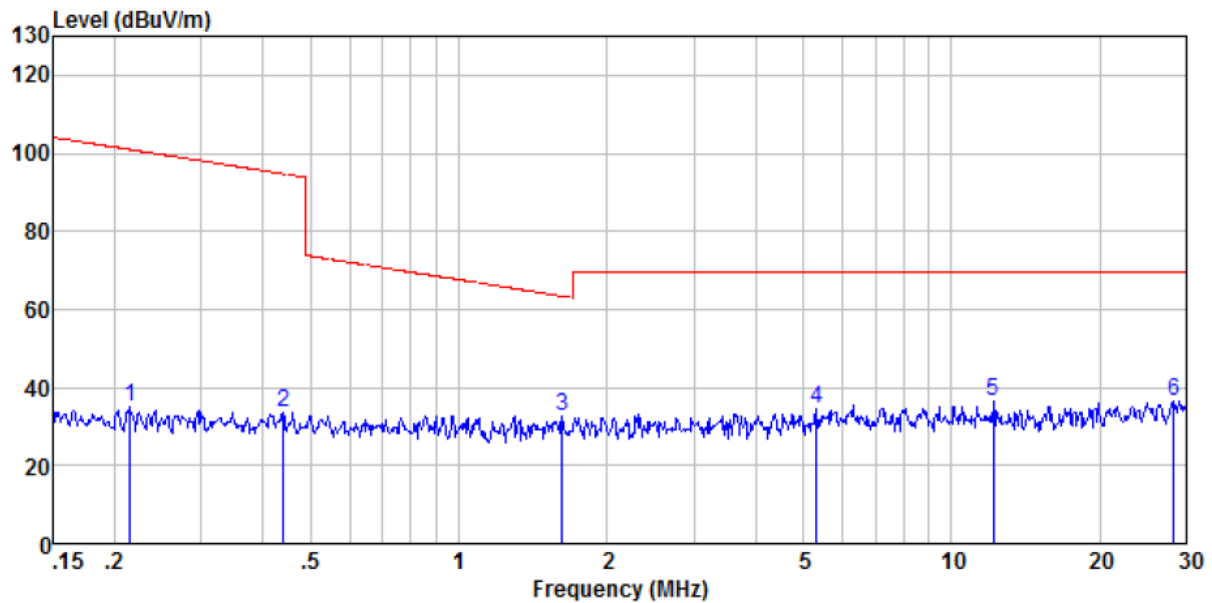
Limit dBuV/m @3m = Limit dBuV/m @30m + 40

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	21.38	24.12	0.17	0.00	45.67	106.78	-61.11	Average
0.110	28.33	24.12	0.17	0.00	52.62	106.78	-54.16	Peak
0.125	58.57	23.64	0.18	0.00	82.39	105.66	-23.27	Average
0.125	68.21	23.64	0.18	0.00	92.03	105.66	-13.63	Peak

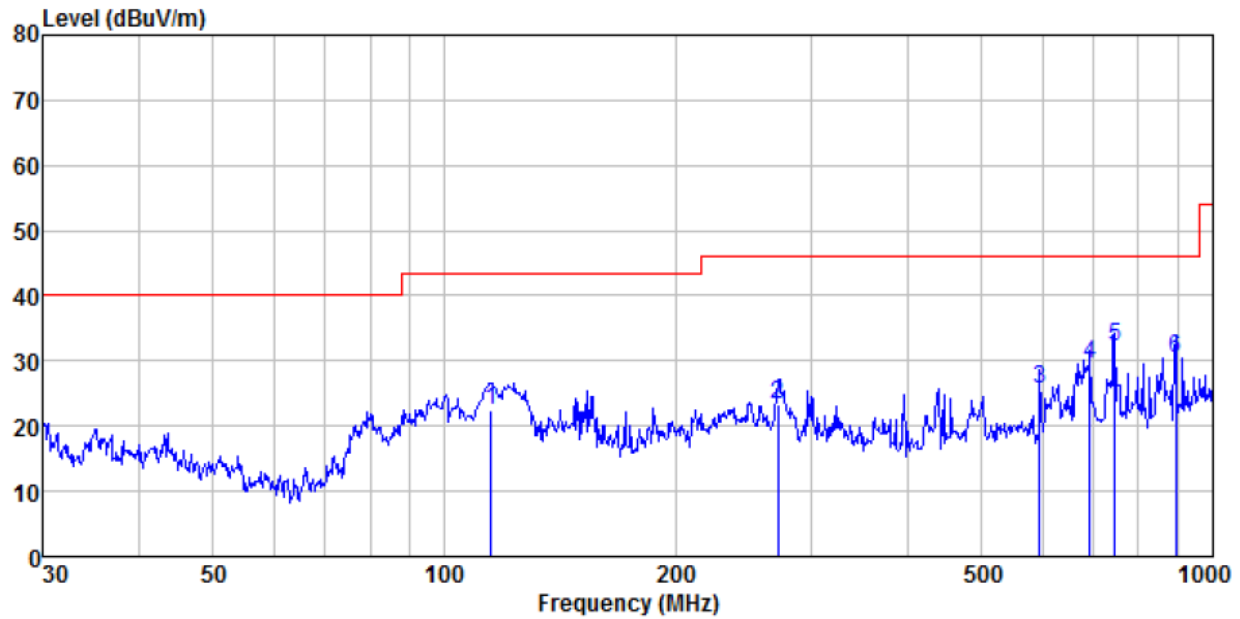
150kHz~30MHz



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
0.215	12.86	22.06	0.22	0.00	35.14	100.96	-65.82	Peak
0.440	12.59	20.89	0.27	0.00	33.75	94.74	-60.99	Peak
1.619	11.63	20.79	0.36	0.00	32.78	63.42	-30.64	Peak
5.333	11.34	22.57	0.44	0.00	34.35	69.54	-35.19	Peak
12.188	13.06	23.01	0.50	0.00	36.57	69.54	-32.97	Peak
28.302	7.94	27.80	0.56	0.00	36.30	69.54	-33.24	Peak

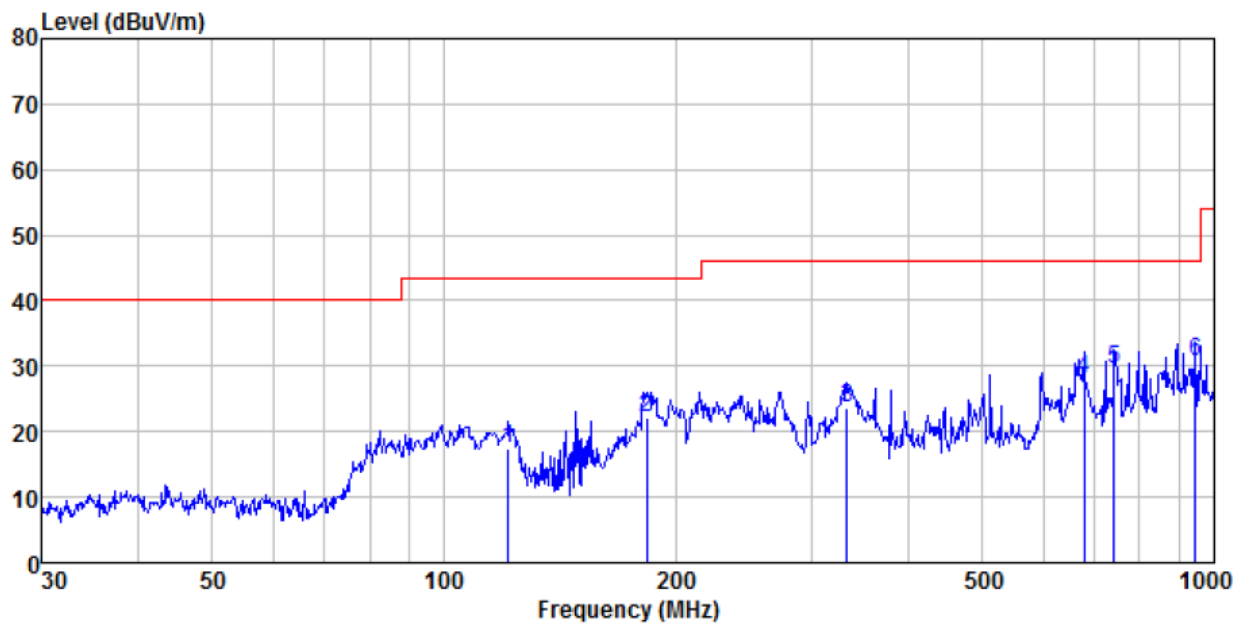
30MHz~1GHz

Vertical:



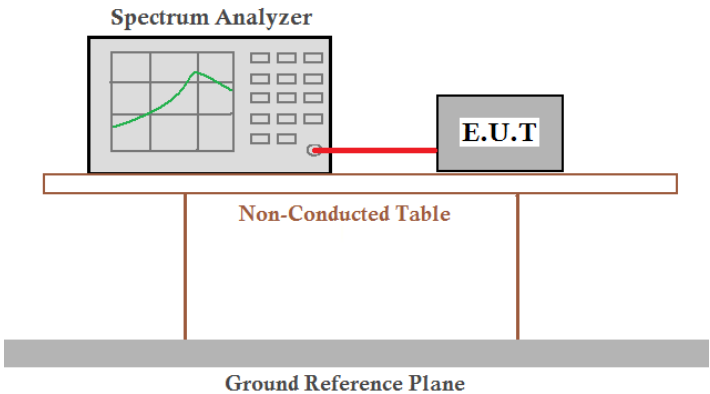
Freq MHz	Reading level dBuV	Antenna factor dB/m	Cable loss dB	Preamp factor dB	level dBuV/m	Limit level dBuV/m	Over limit dB	Remark
114.917	40.83	10.00	1.32	29.60	22.55	43.50	-20.95	QP
271.325	38.24	12.53	2.23	29.81	23.19	46.00	-22.81	QP
595.133	32.08	19.19	3.70	29.30	25.67	46.00	-20.33	QP
691.987	35.00	19.76	4.06	29.21	29.61	46.00	-16.39	QP
744.866	36.74	20.48	4.26	29.20	32.28	46.00	-13.72	QP
893.857	32.63	22.15	4.83	29.10	30.51	46.00	-15.49	QP

Horizontal:



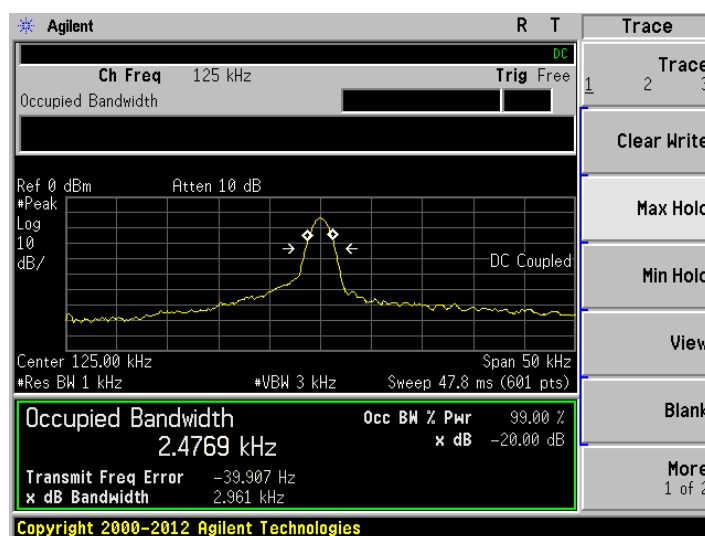
Freq MHz	Reading level dBuV	Antenna factor dB/m	Cable loss dB	Preamp factor dB	level dBuV/m	Limit level dBuV/m	Over limit dB	Remark
121.123	36.61	9.07	1.37	29.56	17.49	43.50	-26.01	QP
183.201	40.44	9.10	1.75	29.26	22.03	43.50	-21.47	QP
333.687	36.63	14.15	2.54	29.81	23.51	46.00	-22.49	QP
677.580	33.62	19.68	4.00	29.22	28.08	46.00	-17.92	QP
742.259	34.02	20.44	4.24	29.20	29.50	46.00	-16.50	QP
945.440	32.23	22.46	5.03	29.10	30.62	46.00	-15.38	QP

7.4 20dB Occupy Bandwidth

Test Requirement:	FCC Part15 C Section 15.215
Test Method:	ANSI C63.10: 2013
Test setup:	 <p>The diagram illustrates the test setup. A Spectrum Analyzer is connected via a red cable to an E.U.T. (Equipment Under Test). Both are placed on a Non-Conducted Table. Below the table is a Ground Reference Plane.</p>
Test Instruments:	Refer to section 6.0 for details
Test mode:	Refer to section 5.3 for details
Test results:	Pass

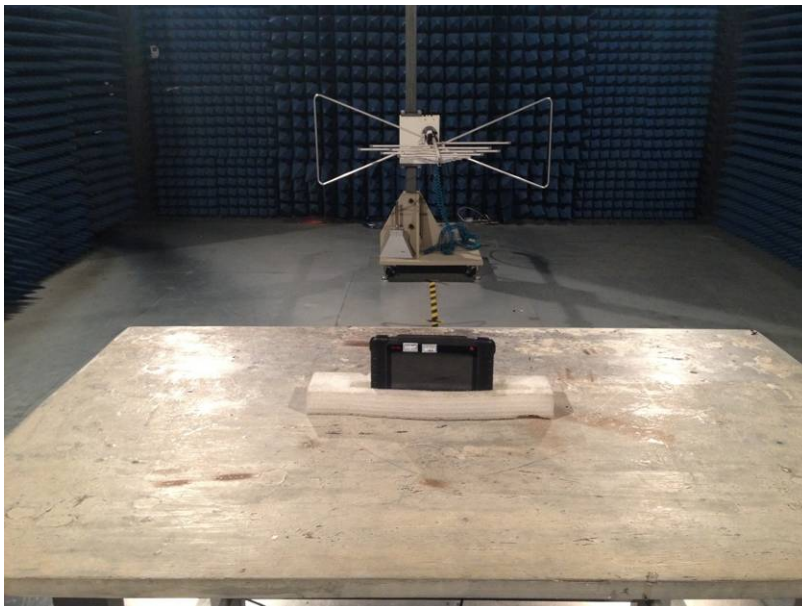
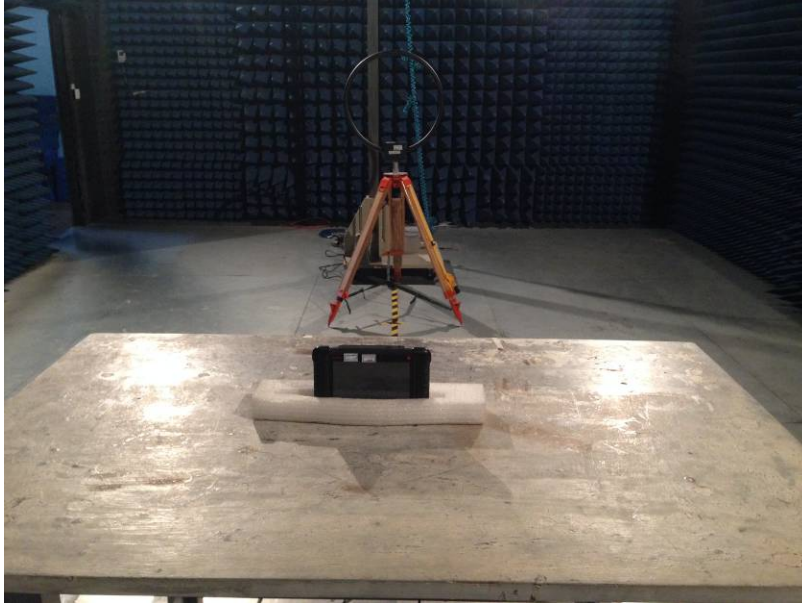
Measurement Data

Test frequency	20dB bandwidth(KHz)	Result
125KHz	2.961	Pass



8 Test Setup Photo

Radiated Emission



Conducted Emission



9 EUT Constructional Details

Reference to the test report No. GTS201701000007F01

-----End-----