

# 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: Professional Scan Tool

Model No.: MaxiTPMS TS508, MaxiTPMS TS408

Trade Mark: AUTEL

**FCC ID:** WQ82016-TS408

**Applicable standards:** FCC CFR Title 47 Part 15 Subpart C Section 15.231:2015

**Date of sample receipt:** October 25, 2016

**Date of Test:** October 26-November 08, 2016

**Date of report issued:** November 11, 2016

**Test Result :** PASS \*

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

Authorized Signature:



\_\_\_\_\_  
**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	November 11, 2016	Original

Prepared By:

*Bill. Yuan*

Date:

November 11, 2016

Project Engineer

Check By:

*Andy. Wu*

Date:

November 11, 2016

Reviewer

## 3 Contents

	Page
1 COVER PAGE .....	1
2 VERSION .....	2
3 CONTENTS .....	3
4 TEST SUMMARY .....	4
4.1 MEASUREMENT UNCERTAINTY .....	4
5 GENERAL INFORMATION .....	5
5.1 CLIENT INFORMATION .....	5
5.2 GENERAL DESCRIPTION OF EUT .....	5
5.3 TEST MODE .....	6
5.4 TEST FACILITY .....	6
5.5 TEST LOCATION .....	6
5.6 OTHER INFORMATION REQUESTED BY THE CUSTOMER.....	6
6 TEST INSTRUMENTS LIST .....	7
7 TEST RESULTS AND MEASUREMENT DATA .....	8
7.1 ANTENNA REQUIREMENT .....	8
7.2 CONDUCTED EMISSIONS .....	9
7.3 RADIATED EMISSION METHOD.....	14
7.3.1 Field Strength of The Fundamental Signal.....	16
7.3.2 Spurious emissions .....	19
7.4 20dB OCCUPY BANDWIDTH .....	22
7.5 DWELL TIME .....	24
8 TEST SETUP PHOTO .....	28
9 EUT CONSTRUCTIONAL DETAILS.....	30

## 4 Test Summary

Test Item	Section in CFR 47	Result
Antenna requirement	15.203	Pass
Conduction Emission	15.207	Pass
Field strength of the fundamental signal	15.231(e)	Pass
Spurious emissions	15.231(e) & 15.209	Pass
20dB Bandwidth	15.231(c)	Pass
Dwell time	15.231(e)	Pass

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

### 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 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:	Professional Scan Tool
Model No.:	MaxiTPMS TS508, MaxiTPMS TS408
Test Model:	MaxiTPMS TS508
Remark:	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.
Operation Frequency:	433.94MHz, 315.0MHz
Modulation technology:	ASK
Antenna Type:	PCB Antenna
Antenna gain:	0dBi (declare by Manufacturer)
Power supply:	Adapter: Model:GME10C-050200FQU Input: AC 100-240V, 50/60Hz, 0.28A Output: DC 5V, 1A DC 3.7V 3200mAh Lithium Battery

## 5.3 Test mode

Transmitting mode	Keep the EUT in transmitting mode.
<i>Remark: During the test, the New Battery was used.</i>	

### Per-test mode.

We have verified the construction and function in typical operation, The EUT was placed on three different polar directions; i.e. X axis, Y axis, Z axis. which was shown in this test report and defined as follows:

433.94MHz	Axis	X	Y	Z
	Field Strength(dBuV/m)	75.31	76.10	75.95

315MHz	Axis	X	Y	Z
	Field Strength(dBuV/m)	73.35	73.98	73.59

### Final Test Mode:

According to ANSI C63.10 standards, the test results are both the “worst case” and “worst setup”:  
Y axis (see the test setup photo)

## 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.  
No. 301-309, 3/F., Jinyuan Business Building, No.2, Laodong Industrial Zone,  
Xixiang Road, Baoan District, Shenzhen, Guangdong, China  
Tel: 0755-27798480  
Fax: 0755-27798960

## 5.6 Other Information Requested by the Customer

None.

## 6 Test Instruments list

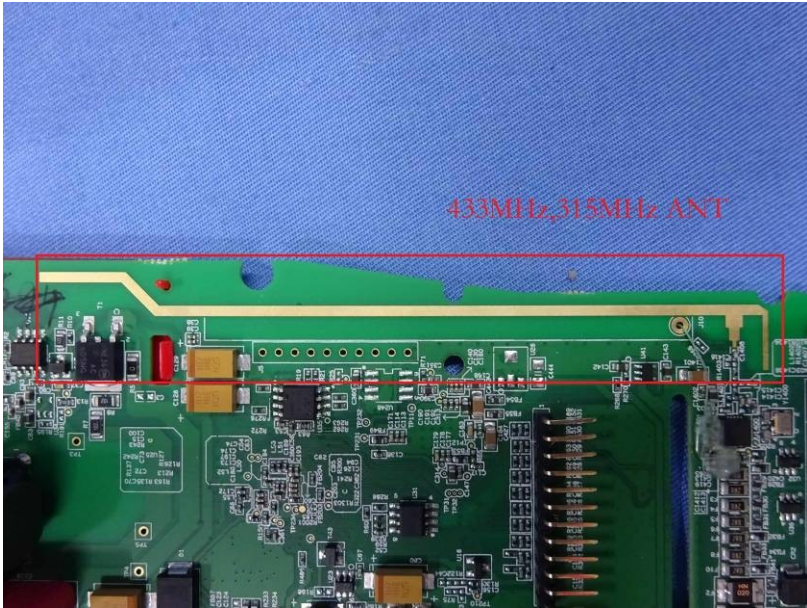
Radiated Emission:						
Item	Test Equipment	Manufacturer	Model No.	Inventory No.	Cal.Date (mm-dd-yy)	Cal.Due date (mm-dd-yy)
1	3m Semi- Anechoic Chamber	ZhongYu Electron	9.2(L)*6.2(W)* 6.4(H)	GTS250	July 03 2015	July 02 2020
2	Control Room	ZhongYu Electron	6.2(L)*2.5(W)* 2.4(H)	GTS251	N/A	N/A
3	Spectrum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

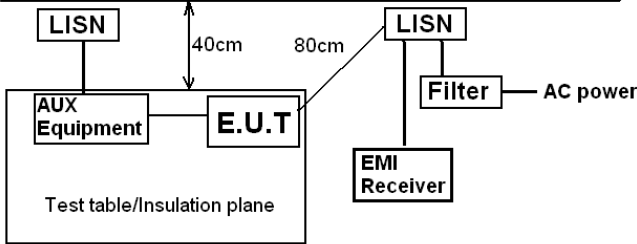
## 7 Test results and Measurement Data

### 7.1 Antenna requirement

<b>Standard requirement:</b>	FCC Part15 C Section 15.203
<b>15.203 requirement:</b> 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.	
<b>EUT Antenna:</b>	
The antenna is PCB antenna, the best case gain of the antenna is 0dBi 	



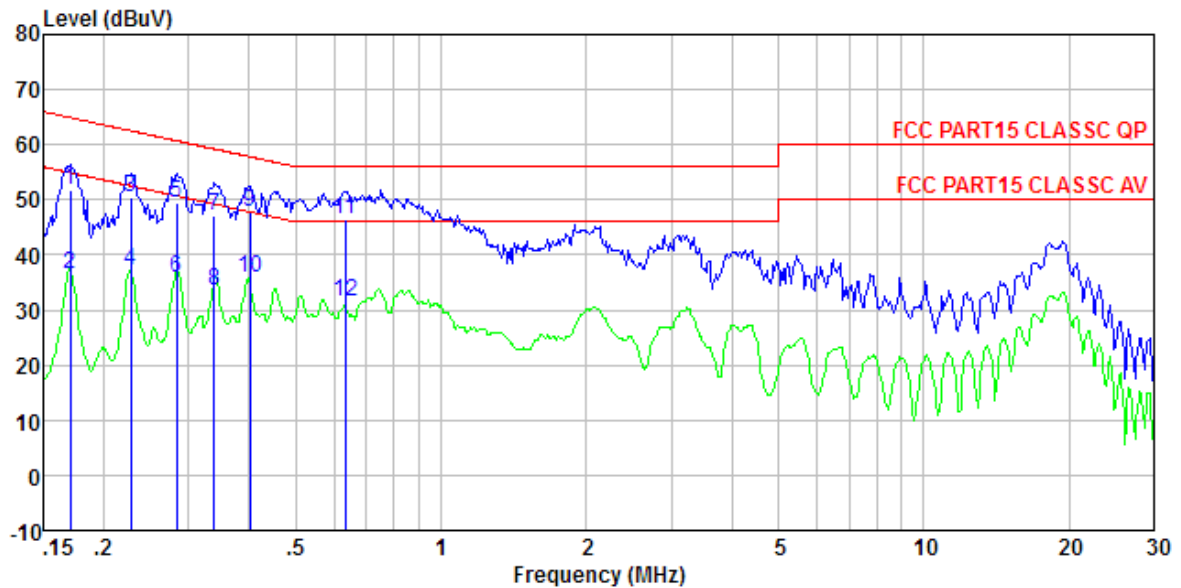
## 7.2 Conducted Emissions

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:	<table><tr><th rowspan="2">Frequency range (MHz)</th><th colspan="2">Limit (dBuV)</th></tr><tr><th>Quasi-peak</th><th>Average</th></tr><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></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:	<div><p style="text-align: center;"><b>Reference Plane</b></p><p style="text-align: center;">Test table/Insulation plane</p><p><i>Remark</i> E.U.T: Equipment Under Test LISN: Line Impedance Stabilization Network Test table height=0.8m</p></div>																
Test procedure:	<div><div>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.</div><div>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).</div><div>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.</div></div>																
Test Instruments:	Refer to section 6.0 for details																
Test mode:	Refer to section 5.3 for details																
Test results:	Pass																

### Measurement data:

433.94MHz

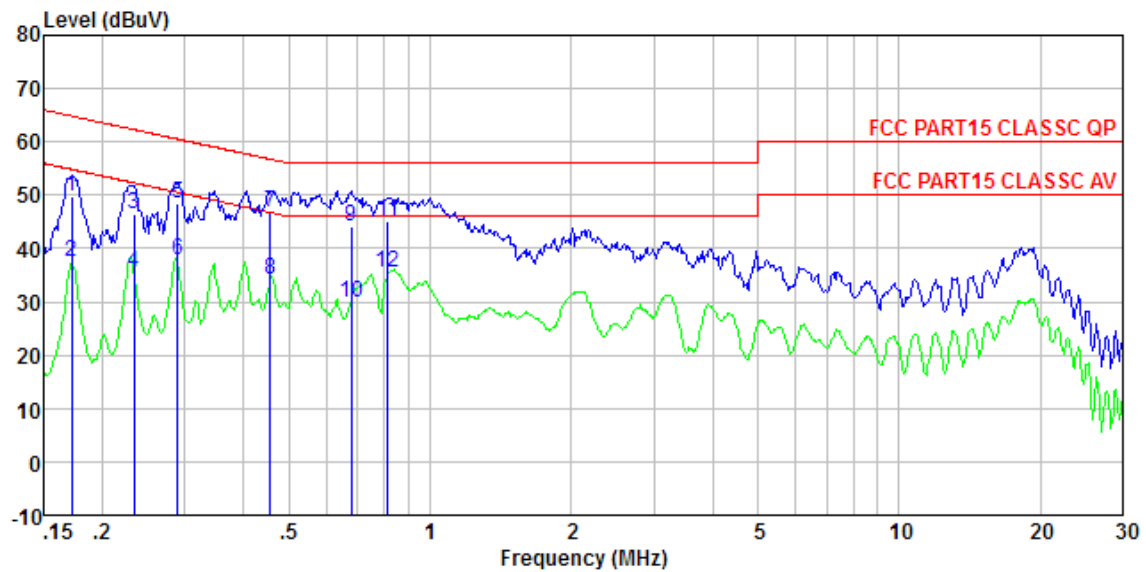
Line:



Site : Shielded room  
 Condition : FCC PART15 CLASSC QP LISN-2016 LINE  
 Job No. : 0080  
 Test mode : transmitting mode  
 Test Engineer: Boy  
 Remark : 433MHz

	Freq	Read Level	LISN Factor	Cable Loss	Level	Limit Line	Over Limit	Remark
	MHz	dBuV	dB	dB	dBuV	dBuV	dB	
1	0.170	51.24	0.42	0.12	51.78	64.94	-13.16	QP
2	0.170	35.90	0.42	0.12	36.44	54.94	-18.50	Average
3	0.228	50.04	0.43	0.12	50.59	62.52	-11.93	QP
4	0.228	36.69	0.43	0.12	37.24	52.52	-15.28	Average
5	0.283	49.03	0.44	0.10	49.57	60.72	-11.15	QP
6	0.283	35.34	0.44	0.10	35.88	50.72	-14.84	Average
7	0.339	46.70	0.43	0.10	47.23	59.22	-11.99	QP
8	0.339	33.11	0.43	0.10	33.64	49.22	-15.58	Average
9	0.402	47.38	0.42	0.11	47.91	57.81	-9.90	QP
10	0.402	35.35	0.42	0.11	35.88	47.81	-11.93	Average
11	0.634	46.12	0.30	0.13	46.55	56.00	-9.45	QP
12	0.634	31.14	0.30	0.13	31.57	46.00	-14.43	Average

## Neutral:

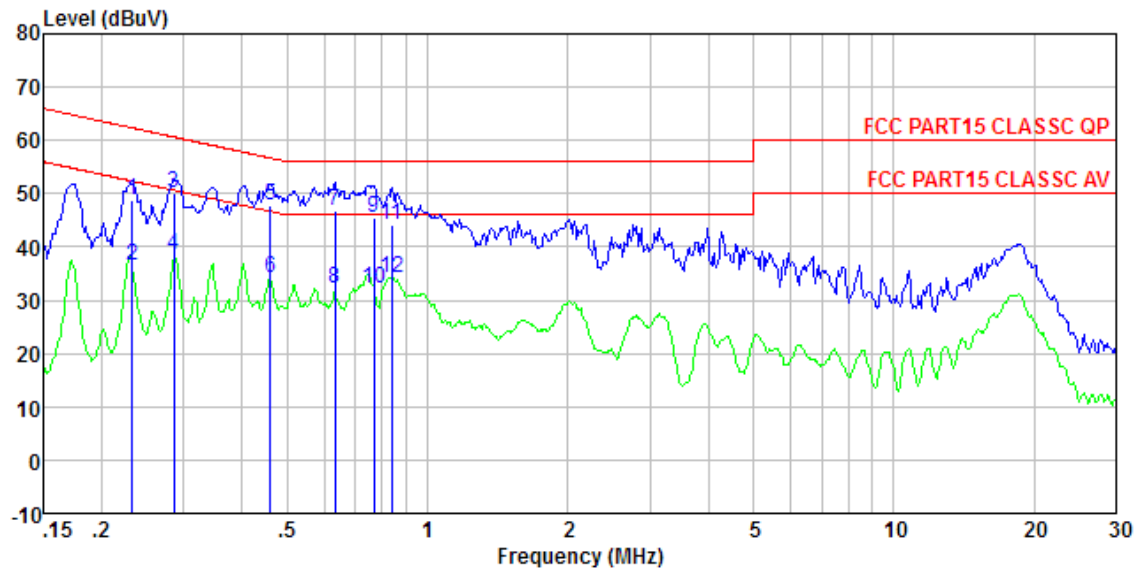


Site : Shielded room  
 Condition : FCC PART15 CLASSC QP LISN-2016 NEUTRAL  
 Job No. : 0080  
 Test mode : transmitting mode  
 Test Engineer: Boy  
 Remark : 433MHz

	Freq	Read Level	LISN Factor	Cable Loss	Level	Limit Line	Over Limit	Remark
	MHz	dBuV	dB	dB	dBuV	dBuV	dB	
1	0.172	49.32	0.41	0.12	49.85	64.86	-15.01	QP
2	0.172	36.82	0.41	0.12	37.35	54.86	-17.51	Average
3	0.234	46.06	0.42	0.12	46.60	62.30	-15.70	QP
4	0.234	35.07	0.42	0.12	35.61	52.30	-16.69	Average
5	0.289	47.83	0.42	0.10	48.35	60.54	-12.19	QP
6	0.289	37.46	0.42	0.10	37.98	50.54	-12.56	Average
7	0.456	46.41	0.37	0.11	46.89	56.76	-9.87	QP
8	0.456	33.55	0.37	0.11	34.03	46.76	-12.73	Average
9	0.679	43.74	0.25	0.13	44.12	56.00	-11.88	QP
10	0.679	29.41	0.25	0.13	29.79	46.00	-16.21	Average
11	0.813	44.69	0.23	0.13	45.05	56.00	-10.95	QP
12	0.813	35.06	0.23	0.13	35.42	46.00	-10.58	Average

## 315MHz

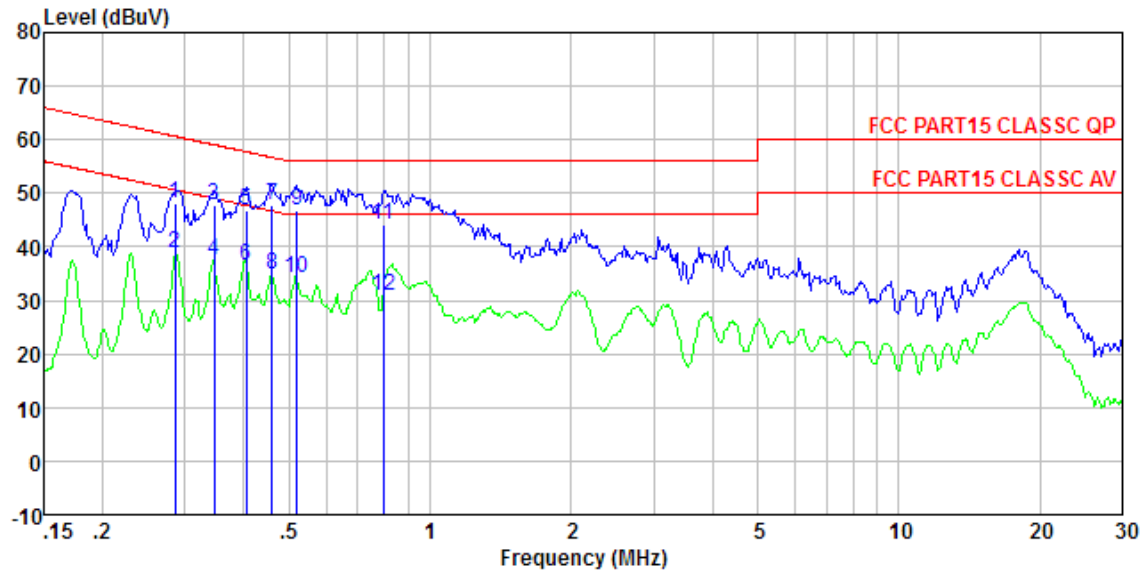
Line:



Site : Shielded room  
 Condition : FCC PART15 CLASSC QP LISN-2016 LINE  
 Job No. : 0080  
 Test mode : transmitting mode  
 Test Engineer: Boy  
 Remark : 315MHz

	Read	LISN	Cable		Limit	Over	
Freq	Level	Factor	Loss	Level	Line	Limit	Remark
MHz	dBuV	dB	dB	dBuV	dBuV	dB	
1	0.233	48.34	0.43	0.12	48.89	62.35	-13.46 QP
2	0.233	35.85	0.43	0.12	36.40	52.35	-15.95 Average
3	0.286	49.69	0.44	0.10	50.23	60.63	-10.40 QP
4	0.286	37.86	0.44	0.10	38.40	50.63	-12.23 Average
5	0.461	47.37	0.40	0.11	47.88	56.67	-8.79 QP
6	0.461	33.70	0.40	0.11	34.21	46.67	-12.46 Average
7	0.634	46.38	0.30	0.13	46.81	56.00	-9.19 QP
8	0.634	31.60	0.30	0.13	32.03	46.00	-13.97 Average
9	0.767	45.20	0.27	0.13	45.60	56.00	-10.40 QP
10	0.767	31.83	0.27	0.13	32.23	46.00	-13.77 Average
11	0.839	43.75	0.26	0.13	44.14	56.00	-11.86 QP
12	0.839	33.66	0.26	0.13	34.05	46.00	-11.95 Average

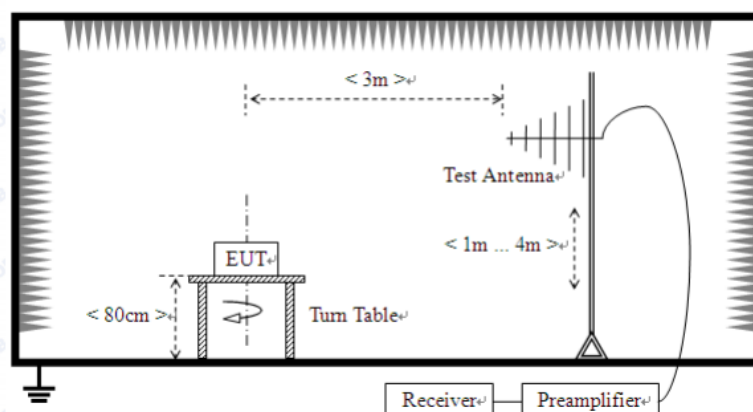
## Neutral:

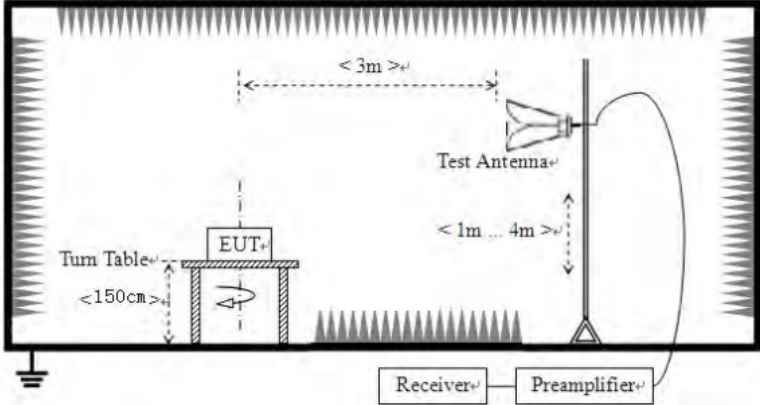


Site : Shielded room  
 Condition : FCC PART15 CLASSC QP LISN-2016 NEUTRAL  
 Job No. : 0080  
 Test mode : transmitting mode  
 Test Engineer: Boy  
 Remark : 315MHz

	Freq	Read Level	LISN Factor	Cable Loss	Level	Limit Line	Over Limit	Remark
	MHz	dBuV	dB	dB	dBuV	dBuV	dB	
1	0.286	47.59	0.42	0.10	48.11	60.63	-12.52	QP
2	0.286	38.26	0.42	0.10	38.78	50.63	-11.85	Average
3	0.346	47.15	0.41	0.10	47.66	59.05	-11.39	QP
4	0.346	37.06	0.41	0.10	37.57	49.05	-11.48	Average
5	0.406	46.21	0.39	0.11	46.71	57.73	-11.02	QP
6	0.406	36.00	0.39	0.11	36.50	47.73	-11.23	Average
7	0.461	47.17	0.37	0.11	47.65	56.67	-9.02	QP
8	0.461	34.48	0.37	0.11	34.96	46.67	-11.71	Average
9	0.521	46.42	0.34	0.11	46.87	56.00	-9.13	QP
10	0.521	33.68	0.34	0.11	34.13	46.00	-11.87	Average
11	0.796	43.78	0.23	0.13	44.14	56.00	-11.86	QP
12	0.796	30.40	0.23	0.13	30.76	46.00	-15.24	Average

## 7.3 Radiated Emission Method

Test Requirement:	FCC Part15 C Section 15.209				
Test Method:	ANSI C63.10:2013				
Test Frequency Range:	30MHz to 5000MHz				
Test site:	Measurement Distance: 3m				
Receiver setup:	Frequency	Detector	RBW	VBW	Remark
	30MHz-1GHz	Quasi-peak	120KHz	300KHz	Quasi-peak Value
	Above 1GHz	Peak	1MHz	3MHz	Peak Value
Limit: (Field strength of the fundamental signal)	Frequency	Limit (dBuV/m @3m)		Remark	
	433.94MHz	72.87		Average Value	
		92.87		Peak Value	
	315MHz	67.66		Average Value	
		87.66		Peak Value	
Limit: (Spurious Emissions)	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	
Or The maximum permitted unwanted emission level is 20 dB below the maximum permitted fundamental level whichever limit permits a higher field strength.					
Test setup:	Below 1GHz				
					
	Above 1GHz				

	
<p>Test Procedure:</p>	<ol style="list-style-type: none"> <li>1. During the test, the New Battery was used.</li> <li>2. The EUT was placed on the top of a rotating table (0.8 meters for below 1GHz and 1.5 meters for above 1GHz) above the ground at a 3 meter camber. The table was rotated 360 degrees to determine the position of the highest radiation.</li> <li>3. The EUT was set 3 meters away from the interference-receiving antenna, which was mounted on the top of a variable-height antenna tower.</li> <li>4. 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.</li> <li>5. 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.</li> <li>6. The test-receiver system was set to Peak Detect Function and Specified Bandwidth with Maximum Hold Mode.</li> <li>7. 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.</li> </ol>
<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:

## 7.3.1 Field Strength of The Fundamental Signal

**433.94MHz:**
**Peak value:**

Frequency (MHz)	Read Level (dBuV)	Antenna Factor (dB/m)	Cable Loss (dB)	Preamp Factor (dB)	Level (dBuV/m)	Limit Line (dBuV/m)	Over Limit (dB)	polarization
433.94	84.98	17.53	3.02	29.43	76.10	92.87	-16.77	Horizontal
433.94	83.63	17.53	3.02	29.43	74.75	92.87	-18.12	Vertical

**Average value:**

Frequency (MHz)	Peak Value (dBuV/m)	Duty cycle factor	Average value (dBuV/m)	Limit Line (dBuV/m)	Polarization	
433.94	76.10	-20.3	55.8	72.87	Horizontal	
433.94	74.75	-20.3	54.45	72.87	Vertical	

**315MHz:**
**Peak value:**

Frequency (MHz)	Read Level (dBuV)	Antenna Factor (dB/m)	Cable Loss (dB)	Preamp Factor (dB)	Level (dBuV/m)	Limit Line (dBuV/m)	Over Limit (dB)	polarization
315.00	86.17	15.28	2.44	29.29	73.98	87.66	-13.68	Horizontal
315.00	80.24	15.28	2.44	29.91	68.05	87.66	-19.61	Vertical

**Average value:**

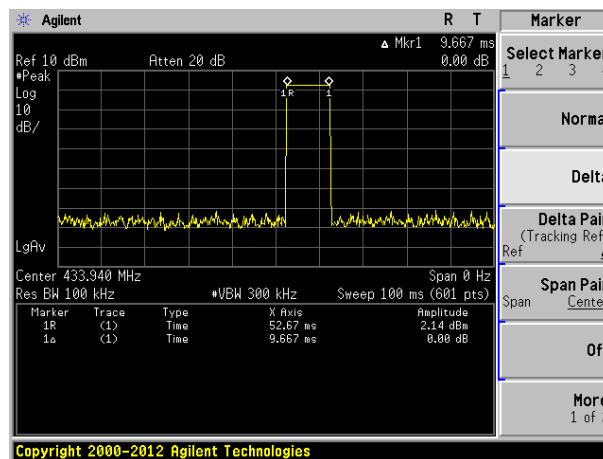
Frequency (MHz)	Peak Value (dBuV/m)	Duty cycle factor	Average value (dBuV/m)	Limit Line (dBuV/m)	Polarization	
315.00	73.98	-20	53.98	67.66	Horizontal	
315.00	68.05	-20	48.05	67.66	Vertical	



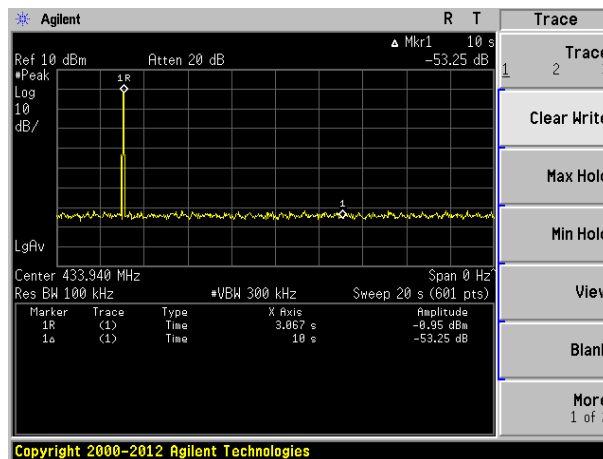
## 433.94MHz:

Average value:	
Calculate Formula:	Average value=Peak value + Duty Cycle Factor
	Duty cycle factor=20 log(Duty cycle)
	Duty cycle=on time/100 milliseconds or period, whichever is less
Test data:	T on time =9.667(ms)
	T period >10 (s)
	Duty cycle=0.097
	duty cycle factor=-20.3

Test plot as follows:  
Ton time:



T period:

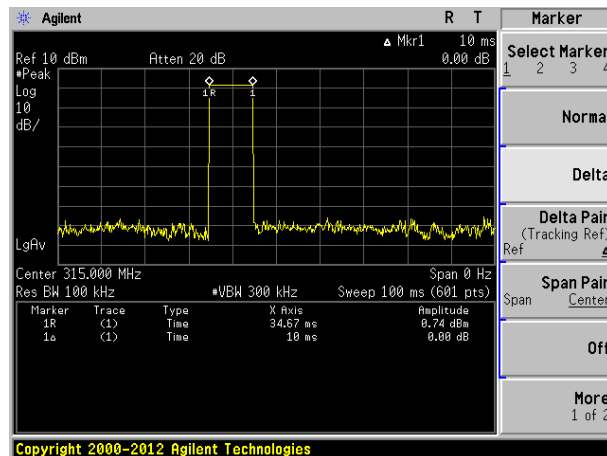


315MHz:

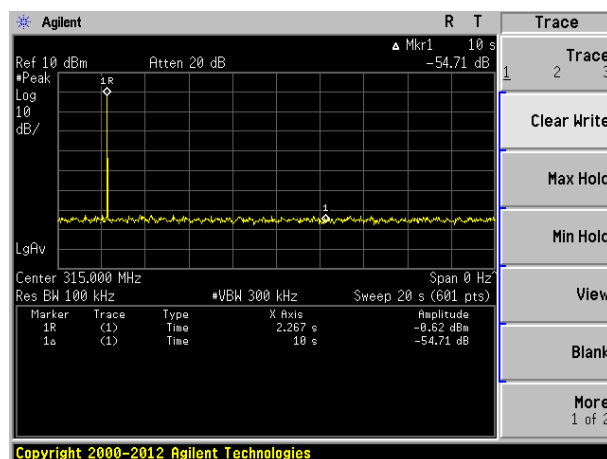
Average value:	
Calculate Formula:	Average value=Peak value + Duty Cycle Factor
	Duty cycle factor=20 log(Duty cycle)
	Duty cycle=on time/100 milliseconds or period, whichever is less
Test data:	T on time =10(ms)
	T period >10 (s)
	Duty cycle=0.1
	duty cycle factor=-20

Test plot as follows:

Ton time:



T period:



## 7.3.2 Spurious emissions

Quasi-peak Value

433.94MHz:

Quasi-peak Value Frequency (MHz)	Read Level (dBuV)	Antenna Factor (dB/m)	Cable Loss (dB)	Preamplifier Factor (dB)	Level (dBuV/m)	Limit Line (dBuV/m)	Over Limit (dB)	Polarization
38.35	45.08	15.15	0.64	30.05	30.82	40.00	-9.18	Vertical
51.12	41.66	15.20	0.78	29.99	27.65	40.00	-12.35	Vertical
86.81	33.53	12.89	1.08	29.76	17.74	40.00	-22.26	Vertical
119.86	39.70	12.48	1.36	29.57	23.97	43.50	-19.53	Vertical
149.49	42.58	10.26	1.56	29.41	24.99	43.50	-18.51	Vertical
239.99	40.40	14.09	2.07	29.56	27.00	46.00	-19.00	Vertical
36.51	34.30	14.73	0.62	30.06	19.59	40.00	-20.41	Horizontal
66.03	38.42	12.30	0.91	29.88	21.75	40.00	-18.25	Horizontal
119.86	43.04	12.48	1.36	29.57	27.31	43.50	-16.19	Horizontal
148.96	48.25	10.26	1.56	29.41	30.66	43.50	-12.84	Horizontal
275.16	49.20	14.55	2.25	29.83	36.17	46.00	-9.83	Horizontal
345.60	45.73	16.20	2.60	29.75	34.78	46.00	-11.22	Horizontal

315MHz:

Quasi-peak Value Frequency (MHz)	Read Level (dBuV)	Antenna Factor (dB/m)	Cable Loss (dB)	Preamplifier Factor (dB)	Level (dBuV/m)	Limit Line (dBuV/m)	Over Limit (dB)	Polarization
36.51	43.67	14.73	0.62	30.06	28.96	40.00	-11.04	Vertical
44.59	37.77	15.55	0.72	30.02	24.02	40.00	-15.98	Vertical
70.83	32.69	10.52	0.95	29.85	14.31	40.00	-25.69	Vertical
84.11	36.88	12.02	1.06	29.78	20.18	40.00	-19.82	Vertical
119.86	39.84	12.48	1.36	29.57	24.11	43.50	-19.39	Vertical
150.54	40.20	10.29	1.57	29.41	22.65	43.50	-20.85	Vertical
36.64	33.90	14.73	0.63	30.06	19.20	40.00	-20.80	Horizontal
79.24	33.48	10.43	1.02	29.80	15.13	40.00	-24.87	Horizontal
119.86	50.14	12.48	1.36	29.57	34.41	43.50	-9.09	Horizontal
126.77	42.77	11.41	1.41	29.53	26.06	43.50	-17.44	Horizontal
148.96	47.92	10.26	1.56	29.41	30.33	43.50	-13.17	Horizontal
239.99	41.56	14.09	2.07	29.56	28.16	46.00	-17.84	Horizontal

## Harmonic emissions

Peak value: (433.94MHz)

Frequency (MHz)	Read Level (dBuV)	Antenna Factor (dB/m)	Cable Loss (dB)	Preamplifier Factor (dB)	Level (dBuV/m)	Limit Line (dBuV/m)	Over Limit (dB)	Polarization
867.88	44.63	22.78	4.74	29.13	43.02	72.87	-29.85	Vertical
1301.82	39.13	25.63	4.54	33.27	36.03	74.00	-37.97	Vertical
1735.76	39.55	25.05	4.82	34.00	35.42	74.00	-38.58	Vertical
2169.70	38.43	27.74	5.15	34.27	37.05	74.00	-36.95	Vertical
2603.64	37.57	27.82	5.58	33.78	37.19	74.00	-36.81	Vertical
3037.58	36.58	28.56	6.00	33.28	37.86	74.00	-36.14	Vertical
3471.52	35.01	28.87	6.89	32.79	37.98	74.00	-36.02	Vertical
3905.46	32.70	29.52	7.69	32.29	37.62	74.00	-36.38	Vertical
4339.40	33.15	30.88	8.19	31.86	40.36	74.00	-33.64	Vertical
867.88	44.41	22.78	4.74	29.13	42.80	72.87	-30.07	Horizontal
1301.82	38.72	25.63	4.54	33.27	35.62	74.00	-38.38	Horizontal
1735.76	39.47	25.05	4.82	34.00	35.34	74.00	-38.66	Horizontal
2169.70	37.99	27.74	5.15	34.27	36.61	74.00	-37.39	Horizontal
2603.64	37.32	27.82	5.58	33.78	36.94	74.00	-37.06	Horizontal
3037.58	35.34	28.56	6.00	33.28	36.62	74.00	-37.38	Horizontal
3471.52	36.01	28.87	6.89	32.79	38.98	74.00	-35.02	Horizontal
3905.46	33.56	29.52	7.69	32.29	38.48	74.00	-35.52	Horizontal
4339.40	33.57	30.88	8.19	31.86	40.78	74.00	-33.22	Horizontal

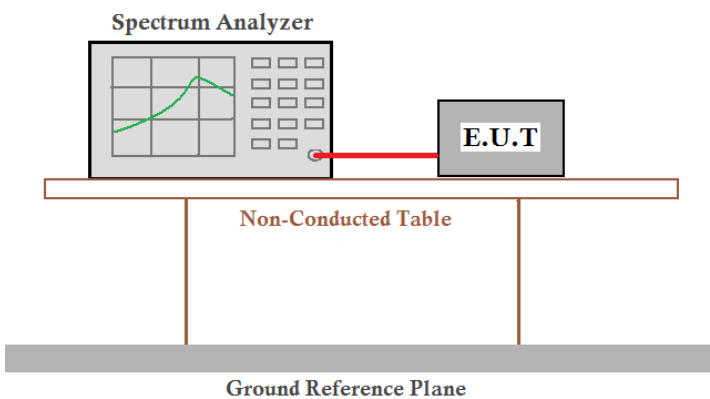
**Peak value: (315MHz)**

Frequency (MHz)	Read Level (dBuV)	Antenna Factor (dB/m)	Cable Loss (dB)	Preamplifier Factor (dB)	Level (dBuV/m)	Limit Line (dBuV/m)	Over Limit (dB)	Polarization
630.00	46.21	20.57	3.84	29.27	41.35	67.66	-26.31	Vertical
945.00	42.10	23.40	5.03	29.10	41.43	67.66	-26.23	Vertical
1260.00	35.67	25.55	4.51	33.18	32.55	74.00	-41.45	Vertical
1575.00	35.09	25.02	4.73	33.74	31.10	74.00	-42.90	Vertical
1890.00	35.53	25.70	4.90	34.26	31.87	74.00	-42.13	Vertical
2205.00	35.66	27.96	5.19	34.23	34.58	74.00	-39.42	Vertical
2520.00	34.32	27.58	5.51	33.88	33.53	74.00	-40.47	Vertical
2835.00	33.36	28.39	5.79	33.51	34.03	74.00	-39.97	Vertical
3150.00	34.62	28.87	6.25	33.16	36.58	74.00	-37.42	Vertical
630.00	46.71	20.57	3.84	29.27	41.85	67.66	-25.81	Horizontal
945.00	38.87	23.40	5.03	29.10	38.20	67.66	-29.46	Horizontal
1260.00	39.20	25.55	4.51	33.18	36.08	74.00	-37.92	Horizontal
1575.00	39.58	25.02	4.73	33.74	35.59	74.00	-38.41	Horizontal
1890.00	38.95	25.70	4.90	34.26	35.29	74.00	-38.71	Horizontal
2205.00	37.37	27.96	5.19	34.23	36.29	74.00	-37.71	Horizontal
2520.00	37.33	27.58	5.51	33.88	36.54	74.00	-37.46	Horizontal
2835.00	35.79	28.39	5.79	33.51	36.46	74.00	-37.54	Horizontal
3150.00	35.36	28.87	6.25	33.16	37.32	74.00	-36.68	Horizontal

**Remark:**

1. *Final Level = Receiver Read level + Antenna Factor + Cable Loss – Preamplifier Factor*
2. *Average value = Peak value + Duty cycle factor*

## 7.4 20dB Occupy Bandwidth

Test Requirement:	FCC Part15 C Section 15.231 (c)
Test Method:	ANSI C63.10:2013
Limit:	The bandwidth of the emission shall be no wider than 0.25% of the center frequency for devices operating above 70 MHz and below 900MHz. For devices operating above 900 MHz, the emission shall be no wider than 0.5% of the center frequency. Bandwidth is determined at the points 20 dB down from the modulated carrier.
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

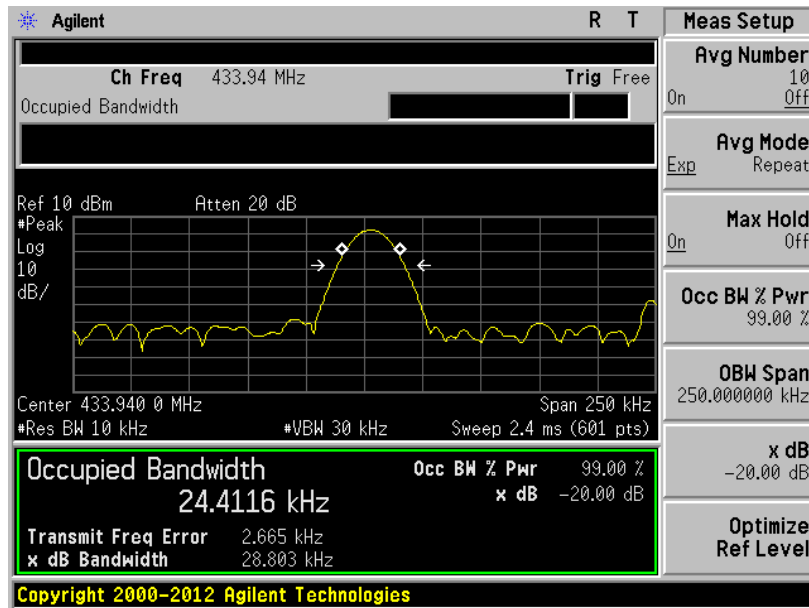
Test Frequency (MHz)	20dB bandwidth (MHz)	Limit (MHz)	Result
433.94	0.0280	1.0849	Pass
315	0.0287	0.7875	Pass

Note: Limit(433.94MHz)= Fundamental frequency×0.25%=433.94×0.25%=1.0849MHz

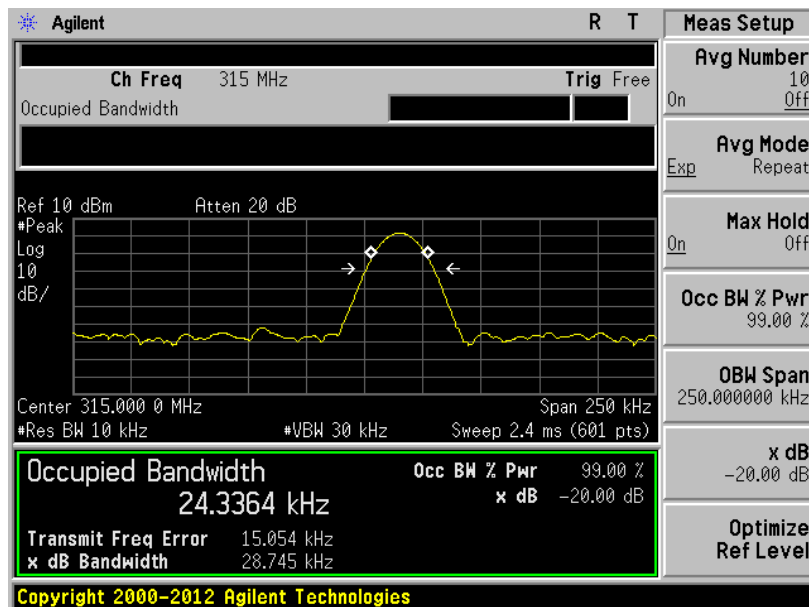
Limit(315MHz)= Fundamental frequency×0.25%=315×0.25%=0.7875MHz

Test plot as follows:

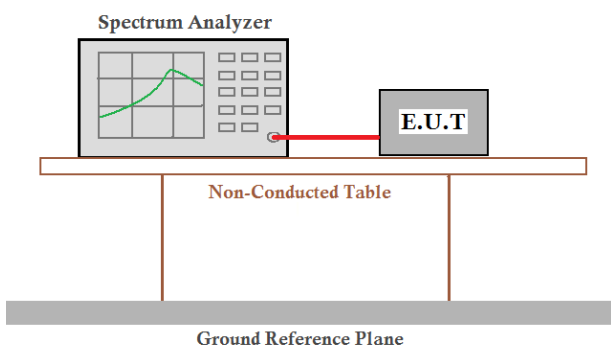
433.94MHz



315MHz:



## 7.5 Dwell time

Test Requirement:	FCC Part15 C Section 15.231 (e)
Test Method:	ANSI C63.10:2013
Receiver setup:	RBW=100KHz, VBW=300KHz, span=0Hz, detector: Peak
Limit:	Not more than 1 seconds
Test setup:	 <p>The diagram illustrates the test setup. A Spectrum Analyzer is connected to an E.U.T. (Equipment Under Test) via a red cable. Both are placed on a Non-Conducted Table, which is supported by 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

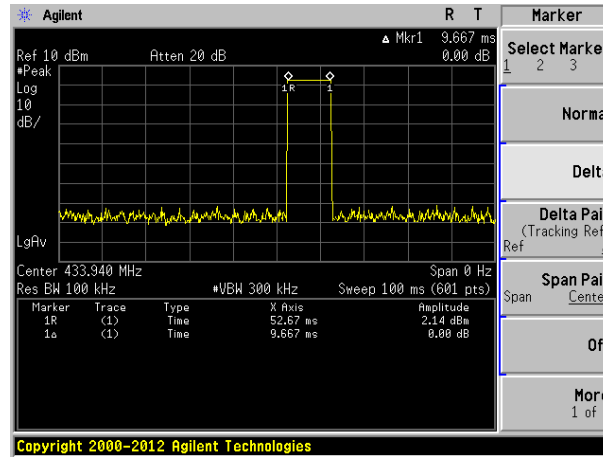


**Measurement data:**

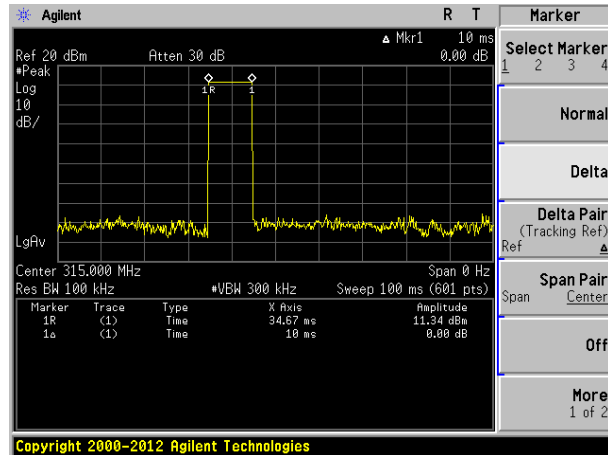
Test Frequency (MHz)	Duration of each TX (second)	Limit (second)	Result
433.94	0.0097	<1.0	Pass
315	0.0100	<1.0	Pass

Test plot as follows:

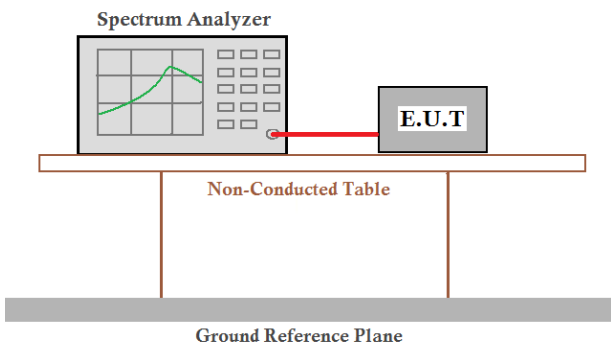
433.94MHz:



315MHz:



## 7.6 Silent period

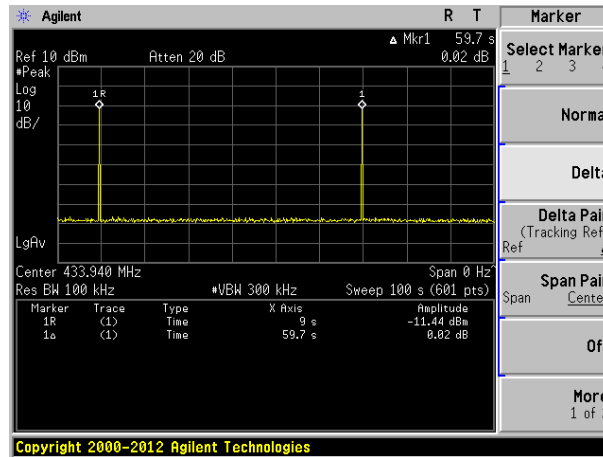
Test Requirement:	FCC Part15 C Section 15.231 (e)
Test Method:	ANSI C63.10:2013
Receiver setup:	RBW=100KHz, VBW=300KHz, span=0Hz, detector: Peak
Limit:	at least 30 times the duration of the transmission or more than 10 seconds
Test Procedure:	<ol style="list-style-type: none"> <li>1. According to the follow Test-setup, keep the relative position between the artificial antenna and the EUT.</li> <li>2. Set the EUT to proper test channel.</li> <li>3. Single scan the transmit, and read the transmission time.</li> </ol>
Test setup:	 <p>The diagram illustrates the test setup. A Spectrum Analyzer is connected to an E.U.T. (Equipment Under Test) via a red cable. Both the Spectrum Analyzer and the E.U.T. are placed on a Non-Conducted Table. The table is supported by 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:**

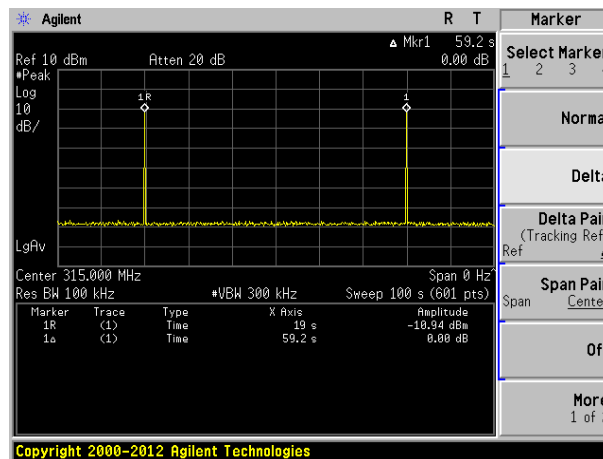
Test Frequency (MHz)	Silent period (second)	Limit (second)	Result
433.94	59.7	>10	Pass
315	59.2	>10	Pass
Remark	The manufacturer declared that the silent time is 1 minutes in normal working condition.		

Test plot as follows:

433.94MHz:

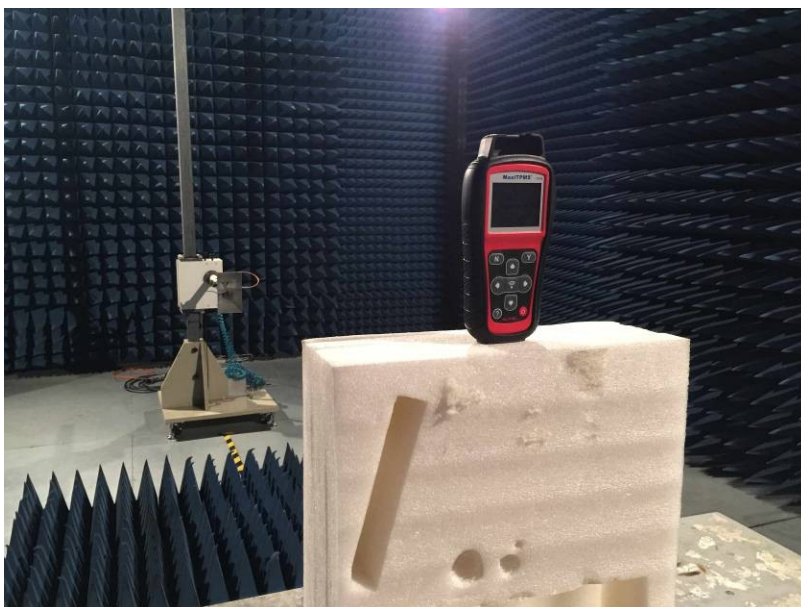
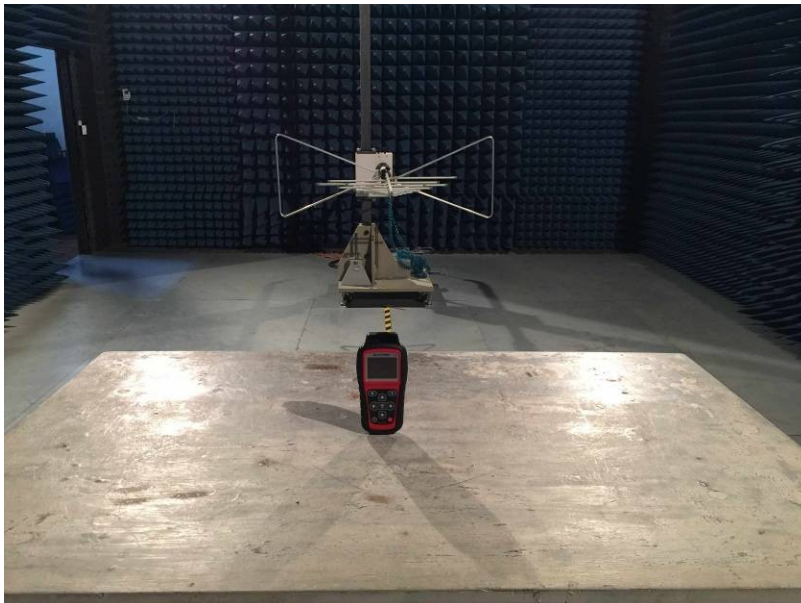


315MHz:



## 8 Test Setup Photo

Radiated Emission



## Conduction Emission



## 9 EUT Constructional Details

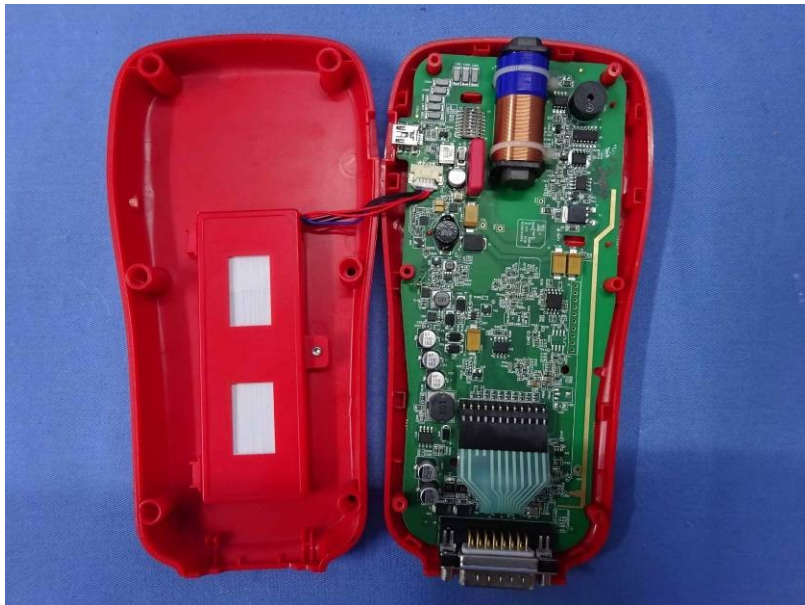


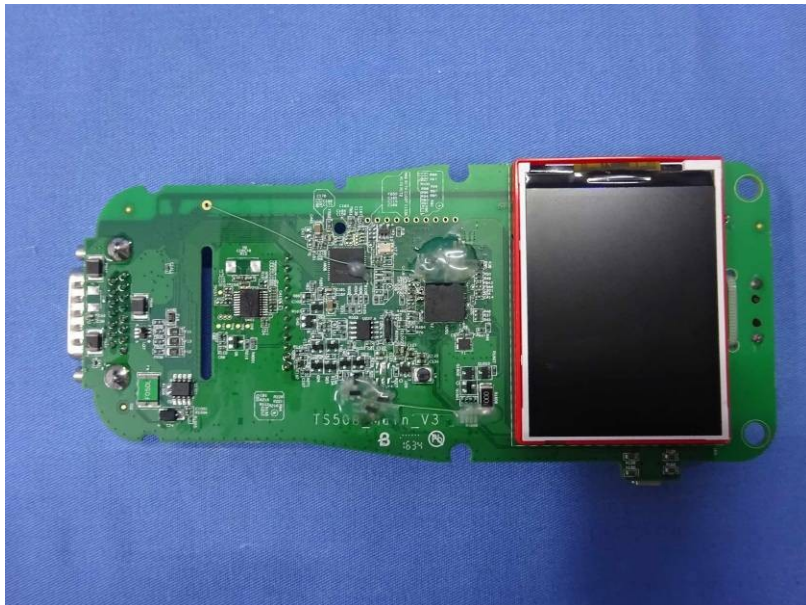
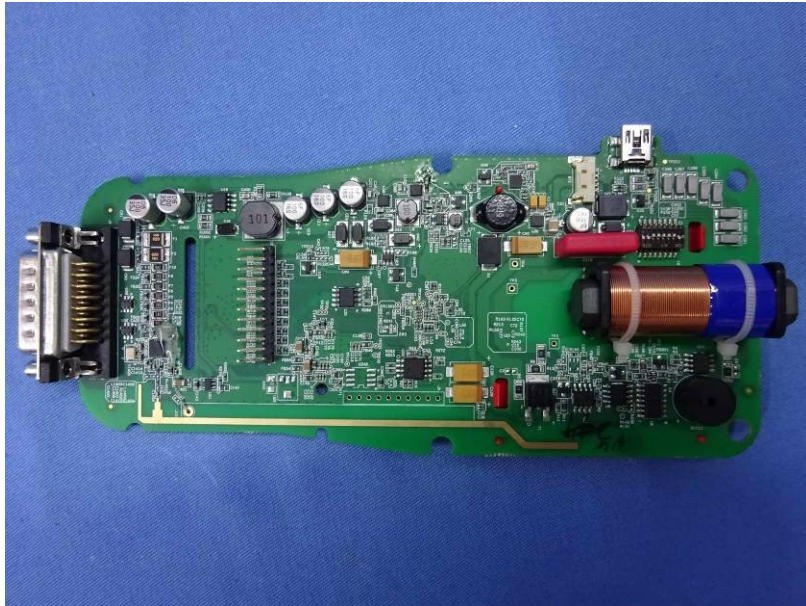




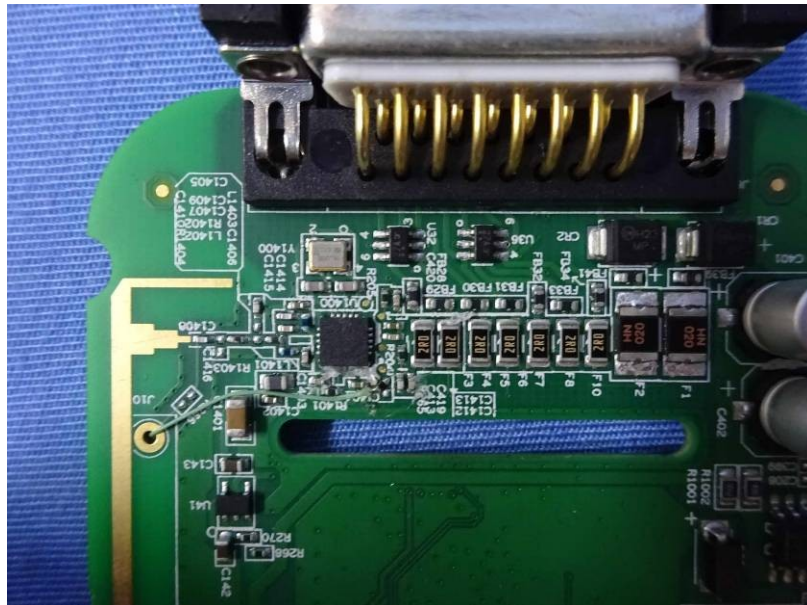












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