Report No.: GTS2023080072F02

TEST REPORT

Applicant:	Powerfleet Inc.
Address of Applicant:	123 Tice Boulevard,Suite 101,Woodcliff Lake, NJ 07677, United States
Manufacturer:	Powerfleet Inc.
Address of Manufacturer:	123 Tice Boulevard,Suite 101,Woodcliff Lake, NJ 07677, United States

Equipment Under Test (EUT)

Product Name:	MVAC 3.5
Model No.:	MVAC 3.5
FCC ID:	2AG69MVAC35
Applicable standards:	FCC CFR Title 47 Part 15 Subpart C Section 15.231
Date of sample receipt:	August 07, 2023
Date of Test:	August 07, 2023-November 09, 2023
Date of report issued:	November 10, 2023
Test Result :	PASS *

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

Authorized Signature:

Robinson Luo
Laboratory Manager

TESTING
NVLAP LAB CODE 600179-0

2 Version

Version No.	Date	Description
00	*November 10, 2023*	*Original*

Prepared By: ***Date:*** *November 10, 2023*

Project Engineer

Check By: ***Date:*** *November 10, 2023*

Reviewer

3 Contents

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4 Test Summary

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

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

N/A: Not applicable.

4.1 Measurement Uncertainty

Test Item	Frequency Range	Measurement Uncertainty	Notes
Radiated Emission	30MHz-200MHz	3.8039dB	(1)
Radiated Emission	200MHz-1GHz	3.9679dB	(1)
Radiated Emission	1GHz-18GHz	4.29dB	(1)
Radiated Emission	18GHz-40GHz	3.30dB	(1)
AC Power Line Conducted Emission	0.15MHz ~ 30MHz	3.44dB	(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:	MVAC 3.5
Model No.:	MVAC 3.5
S/N:	N/A
Test sample(s) ID:	GTS2023080072-1
Sample(s) Status	Engineer sample
Operation Frequency:	315MHz, 433.92MHz
Modulation type:	FSK, ASK
Antenna Type:	Integral Antenna
Antenna gain:	315MHz: -27.8dBi 433.92MHz: -2.67dBi
Power supply:	DC 9-16V

Remark:
1. Antenna gain information provided by the customer
2. The relevant information of the sample is provided by the entrusting company, and the laboratory is not responsible for its authenticity.

5.2 Test mode

Transmitting mode	Keep the EUT in transmitting mode.

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:

315MHz	Axis	X	Y	Z
	Field Strength(dBuV/m)	72.46	73.84	72.87
433MHz	Axis	X	Y	Z
	Field Strength(dBuV/m)	68.01	69.27	68.58

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)

5.3 Test Facility

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

● **FCC—Registration No.: 381383**

Designation Number: CN5029

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.

● **ISED—Registration No.: 9079A**

CAB identifier: CN0091

The 3m Semi-anechoic chamber of Global United Technology Services Co., Ltd. has been registered by Certification and Engineering Bureau of ISED for radio equipment testing

● **NVLAP (LAB CODE:600179-0)**

Global United Technology Services Co., Ltd., is accredited by the National Voluntary Laboratory Accreditation Program (NVLAP).

5.4 Test Location

All tests were performed at:

Global United Technology Services Co., Ltd.
No. 123- 128, Tower A, Jinyuan Business Building, No.2, Laodong Industrial Zone,
Xixiang Road, Baoan District, Shenzhen, Guangdong, China 518102
Tel: 0755-27798480
Fax: 0755-27798960

5.5 Description of Support Units

None.

5.6 Deviation from Standards

None.

5.7 Abnormalities from Standard Conditions

None.

5.8 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	June 23, 2021	June 22, 2024
2	Control Room	ZhongYu Electron	6.2(L)*2.5(W)* 2.4(H)	GTS251	N/A	N/A
3	EMI Test Receiver	Rohde & Schwarz	ESU26	GTS203	April 14, 2023	April 13, 2024
4	BiConiLog Antenna	SCHWARZBECK MESS-ELEKTRONIK	VULB9168	GTS640	March 19, 2023	March 18, 2025
5	Double -ridged waveguide horn	SCHWARZBECK MESS-ELEKTRONIK	BBHA 9120 D	GTS208	April 17, 2023	April 16, 2025
6	EMI Test Software	AUDIX	E3	N/A	N/A	N/A
7	Wideband Radio Communication Tester	Rohde & Schwarz	CMW500	GTS575	April 14, 2023	April 13, 2024
8	Loop Antenna	ZHINAN	ZN30900A	GTS534	Nov. 29, 2022	Nov. 28, 2023
9	Broadband Preamplifier	SCHWARZBECK	BBV9718	GTS535	April 14, 2023	April 13, 2024
10	Amplifier(1GHz-26.5GHz)	HP	8449B	GTS601	April 14, 2023	April 13, 2024
11	Horn Antenna (18-26.5GHz)	/	UG-598A/U	GTS664	Oct. 30, 2022	Oct. 29, 2023
12	Horn Antenna (26.5-40GHz)	A.H Systems	SAS-573	GTS665	Oct. 30, 2022	Oct. 29, 2023
13	FSV·Signal Analyzer (10Hz-40GHz)	Keysight	FSV-40-N	GTS666	March 13, 2023	March 12, 2024
14	Amplifier	/	LNA-1000-30S	GTS650	April 14, 2023	April 13, 2024
15	CDNE M2+M3-16A	HCT	30MHz-300MHz	GTS668	Dec. 20, 2022	Dec.19, 2023
16	Wideband Amplifier	/	WDA-01004000-15P35	GTS602	April 14, 2023	April 13, 2024
17	Thermo meter	JINCHUANG	GSP-8A	GTS643	April 19, 2023	April 18, 2024
18	RE cable 1	GTS	N/A	GTS675	July 31. 2023	July 30. 2024
19	RE cable 2	GTS	N/A	GTS676	July 31. 2023	July 30. 2024
20	RE cable 3	GTS	N/A	GTS677	July 31. 2023	July 30. 2024
21	RE cable 4	GTS	N/A	GTS678	July 31. 2023	July 30. 2024
22	RE cable 5	GTS	N/A	GTS679	July 31. 2023	July 30. 2024
23	RE cable 6	GTS	N/A	GTS680	July 31. 2023	July 30. 2024
24	RE cable 7	GTS	N/A	GTS681	July 31. 2023	July 30. 2024
25	RE cable 8	GTS	N/A	GTS682	July 31. 2023	July 30. 2024

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	July 12, 2022	July 11, 2027
2	EMI Test Receiver	R&S	ESCI 7	GTS552	April 14, 2023	April 13, 2024
3	LISN	ROHDE & SCHWARZ	ENV216	GTS226	April 14, 2023	April 13, 2024
4	Coaxial Cable	GTS	N/A	GTS227	N/A	N/A
5	EMI Test Software	AUDIX	E3	N/A	N/A	N/A
6	Thermo meter	JINCHUANG	GSP-8A	GTS639	April 18, 2023	April 17, 2024
7	Absorbing clamp	Elektronik-Feinmechanik	MDS21	GTS229	April 14, 2023	April 13, 2024
8	ISN	SCHWARZBECK	NTFM 8158	GTS565	April 14, 2023	April 13, 2024
9	High voltage probe	SCHWARZBECK	TK9420	GTS537	April 14, 2023	April 13, 2024
10	Antenna end assembly	Weinschel	1870A	GTS560	April 14, 2023	April 13, 2024

RF Conducted Test:						
Item	**Test Equipment**	**Manufacturer**	**Model No.**	**Serial No.**	**Cal.Date (mm-dd-yy)**	**Cal.Due date (mm-dd-yy)**
1	MXA Signal Analyzer	Agilent	N9020A	GTS566	April 14, 2023	April 13, 2024
2	EMI Test Receiver	R&S	ESCI 7	GTS552	April 14, 2023	April 13, 2024
3	PSA Series Spectrum Analyzer	Agilent	E4440A	GTS536	April 14, 2023	April 13, 2024
4	MXG vector Signal Generator	Agilent	N5182A	GTS567	April 14, 2023	April 13, 2024
5	ESG Analog Signal Generator	Agilent	E4428C	GTS568	April 14, 2023	April 13, 2024
6	USB RF Power Sensor	DARE	RPR3006W	GTS569	April 14, 2023	April 13, 2024
7	RF Switch Box	Shongyi	RFSW3003328	GTS571	April 14, 2023	April 13, 2024
8	Programmable Constant Temp & Humi Test Chamber	WEWON	WHTH-150L-40-880	GTS572	April 14, 2023	April 13, 2024
9	Thermo meter	JINCHUANG	GSP-8A	GTS641	April 19, 2023	April 18, 2024

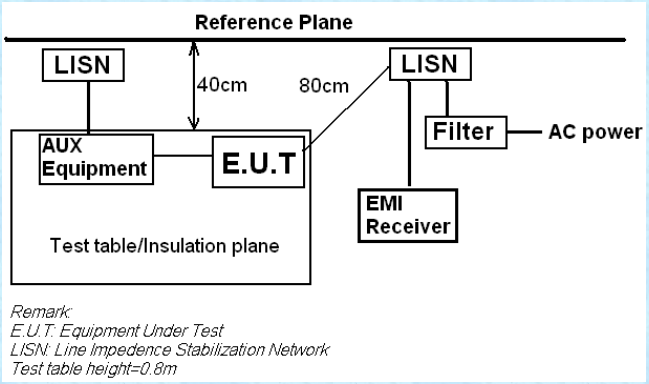
General used equipment:						
Item	**Test Equipment**	**Manufacturer**	**Model No.**	**Inventory No.**	**Cal.Date (mm-dd-yy)**	**Cal.Due date (mm-dd-yy)**
1	Barometer	KUMAO	SF132	GTS647	April 19, 2023	April 18, 2024

7 Test results and Measurement Data

7.1 Antenna requirement

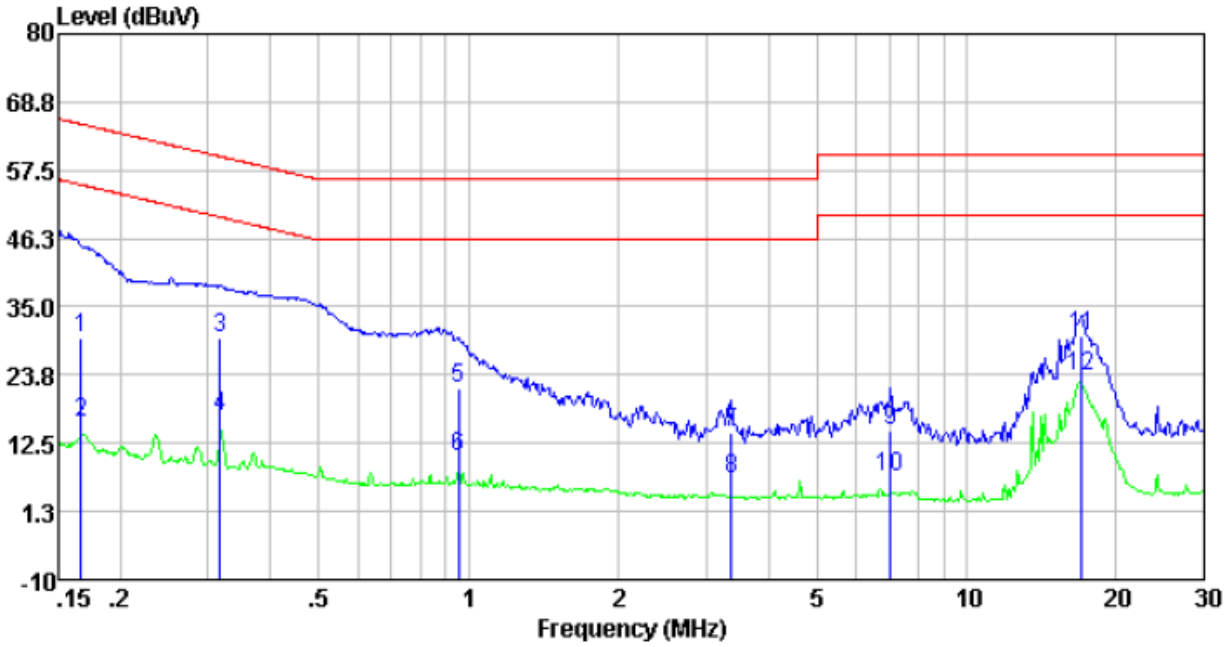
Standard requirement:	FCC Part15 C Section 15.203
15.203 requirement: An intentional radiator shall be designed to ensure that no antenna other than that furnished by the responsible party shall be used with the device. The use of a permanently attached antenna or of an antenna that uses a unique coupling 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.	
EUT Antenna:	
The antenna is integral antenna, reference to the appendix II for details.	

7.2 Conducted Emissions

<table>
<tr><td>Test Requirement:</td><td colspan="5">FCC Part15 C Section 15.207</td></tr>
<tr><td>Test Method:</td><td colspan="5">ANSI C63.10:2013</td></tr>
<tr><td>Test Frequency Range:</td><td colspan="5">150KHz to 30MHz</td></tr>
<tr><td>Class / Severity:</td><td colspan="5">Class B</td></tr>
<tr><td>Receiver setup:</td><td colspan="5">RBW=9KHz, VBW=30KHz, Sweep time=auto</td></tr>
<tr><td>Limit:</td><td colspan="5">
<table>
<tr><td rowspan="2">Frequency range (MHz)</td><td colspan="2">Limit (dBuV)</td></tr>
<tr><td>Quasi-peak</td><td>Average</td></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>
* Decreases with the logarithm of the frequency.
</td></tr>
<tr><td>Test setup:</td><td colspan="5"> 
</td></tr>
<tr><td>Test procedure:</td><td colspan="5">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 C63.10:2009 on conducted measurement.</td></tr>
<tr><td>Test Instruments:</td><td colspan="5">Refer to section 6.0 for details</td></tr>
<tr><td>Test mode:</td><td colspan="5">Refer to section 5.2 for details</td></tr>
<tr><td>Test environment:</td><td>Temp.:</td><td>25 °C</td><td>Humid.:</td><td>52%</td><td>Press.:</td><td>1012mbar</td></tr>
<tr><td>Test voltage:</td><td colspan="5">AC 120V, 60Hz</td></tr>
<tr><td>Test results:</td><td colspan="5">Pass</td></tr>
</table>

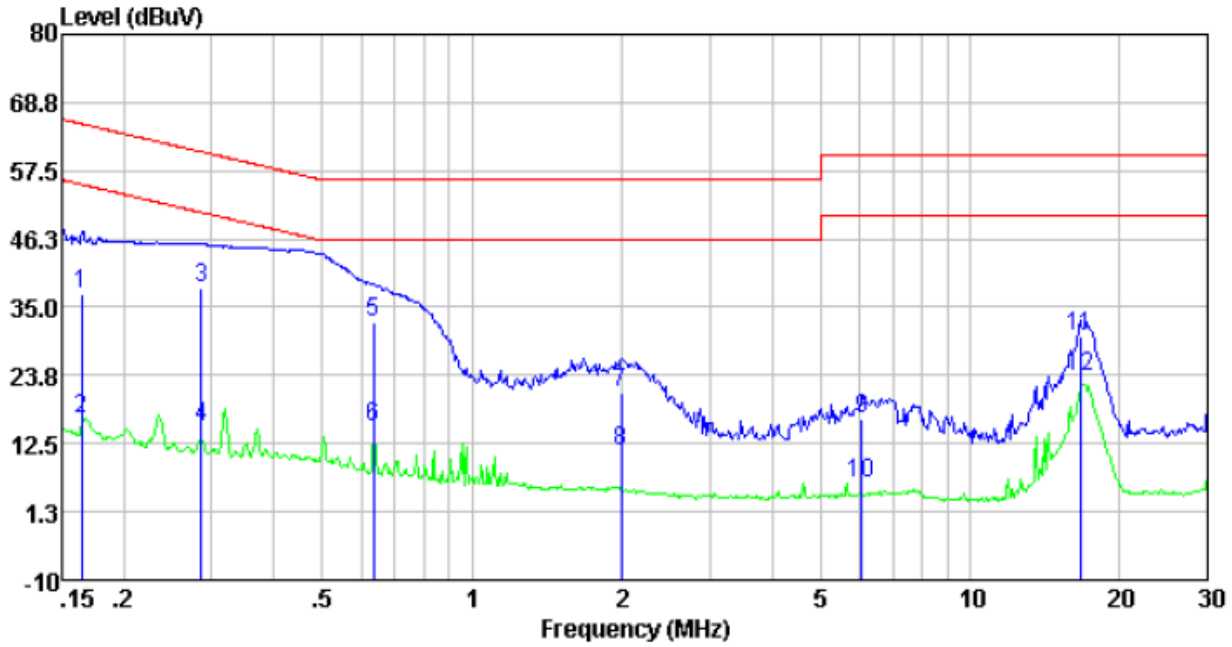
Measurement data

Test channel:	315MHz	Phase Polarity:	Line



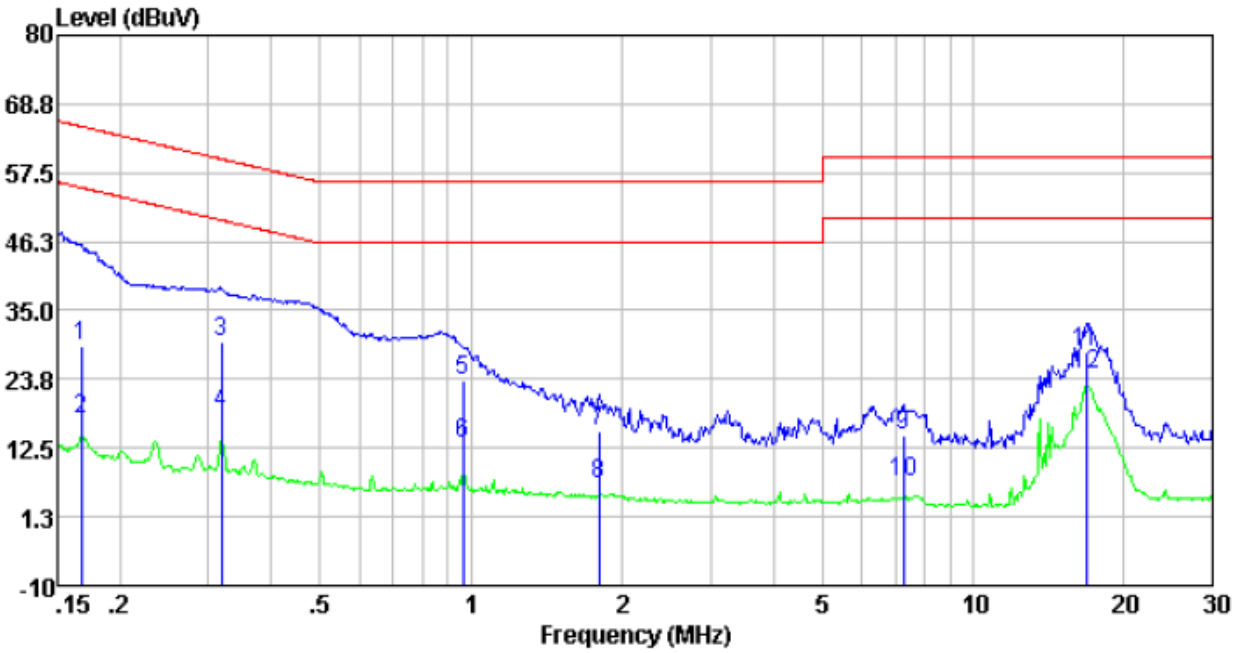
Freq	Reading level	LISN/ISN factor	Cable loss	Level	Limit level	Over limit	Remark
MHz	dBuV	dB	dB	dBuV	dBuV	dB	
0.17	20.29	9.55	0.01	29.85	65.12	-35.27	QP
0.17	6.47	9.55	0.01	16.03	55.12	-39.09	Average
0.32	20.46	9.49	0.01	29.96	59.80	-29.84	QP
0.32	7.41	9.49	0.01	16.91	49.80	-32.89	Average
0.95	12.02	9.49	0.03	21.54	56.00	-34.46	QP
0.95	0.81	9.49	0.03	10.33	46.00	-35.67	Average
3.36	4.55	9.52	0.05	14.12	56.00	-41.88	QP
3.36	-2.89	9.52	0.05	6.68	46.00	-39.32	Average
7.02	5.15	9.31	0.09	14.55	60.00	-45.45	QP
7.02	-2.53	9.31	0.09	6.87	50.00	-43.13	Average
17.02	20.09	9.76	0.17	30.02	60.00	-29.98	QP
17.02	13.60	9.76	0.17	23.53	50.00	-26.47	Average

Test channel:	315MHz	Phase Polarity:	Neutral



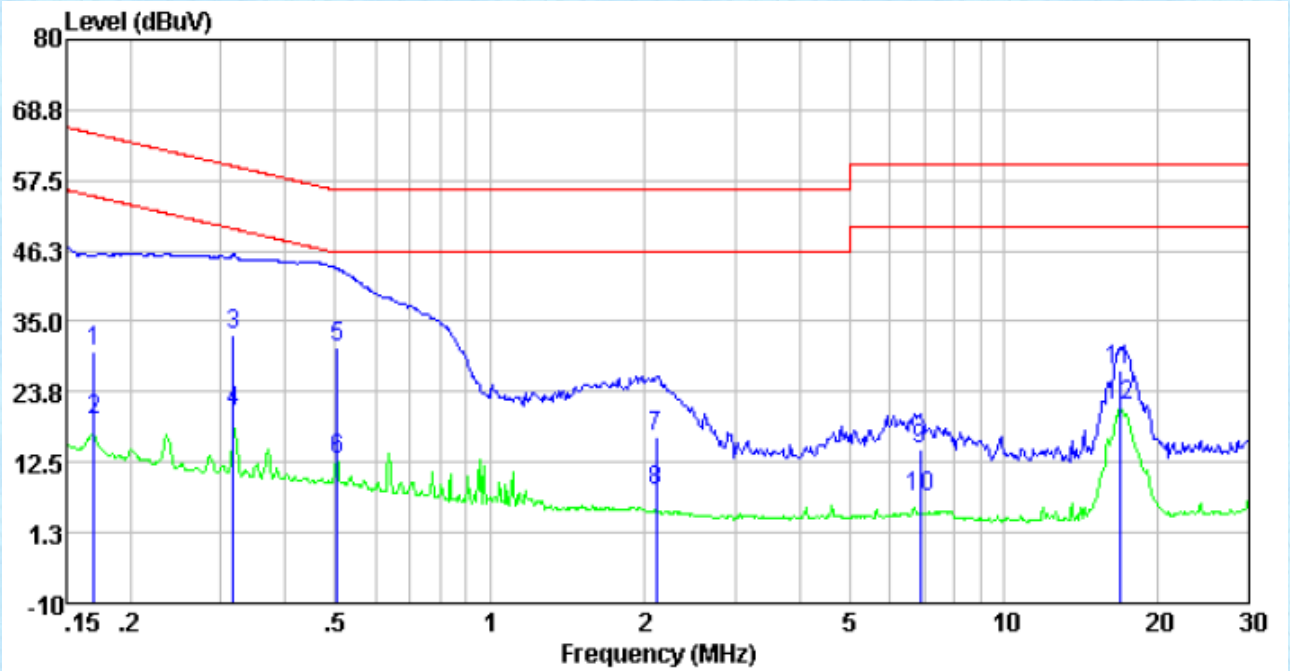
Freq	Reading level	LISN/ISN factor	Cable loss	Level	Limit level	Over limit	Remark
MHz	dBuV	dB	dB	dBuV	dBuV	dB	
0.16	27.63	9.55	0.01	37.19	65.25	-28.06	QP
0.16	7.14	9.55	0.01	16.70	55.25	-38.55	Average
0.29	28.70	9.56	0.01	38.27	60.63	-22.36	QP
0.29	5.55	9.56	0.01	15.12	50.63	-35.51	Average
0.63	23.04	9.56	0.02	32.62	56.00	-23.38	QP
0.63	5.53	9.56	0.02	15.11	46.00	-30.89	Average
1.99	11.37	9.55	0.04	20.96	56.00	-35.04	QP
1.99	1.82	9.55	0.04	11.41	46.00	-34.59	Average
6.06	6.87	9.54	0.08	16.49	60.00	-43.51	QP
6.06	-3.80	9.54	0.08	5.82	50.00	-44.18	Average
16.66	20.15	9.82	0.17	30.14	60.00	-29.86	QP
16.66	13.57	9.82	0.17	23.56	50.00	-26.44	Average

Test channel:	433MHz	Phase Polarity:	Line



Freq	Reading level	LISN/ISN factor	Cable loss	Level	Limit level	Over limit	Remark
MHz	dBuV	dB	dB	dBuV	dBuV	dB	
0.17	19.61	9.54	0.01	29.16	65.08	-35.92	QP
0.17	7.73	9.54	0.01	17.28	55.08	-37.80	Average
0.32	20.42	9.49	0.01	29.92	59.75	-29.83	QP
0.32	8.85	9.49	0.01	18.35	49.75	-31.40	Average
0.96	14.01	9.49	0.03	23.53	56.00	-32.47	QP
0.96	3.87	9.49	0.03	13.39	46.00	-32.61	Average
1.80	5.57	9.59	0.04	15.20	56.00	-40.80	QP
1.80	-3.02	9.59	0.04	6.61	46.00	-39.39	Average
7.25	5.28	9.31	0.09	14.68	60.00	-45.32	QP
7.25	-2.42	9.31	0.09	6.98	50.00	-43.02	Average
16.84	18.12	9.74	0.17	28.03	60.00	-31.97	QP
16.84	14.47	9.74	0.17	24.38	50.00	-25.62	Average

Test channel:	433MHz	Phase Polarity:	Neutral

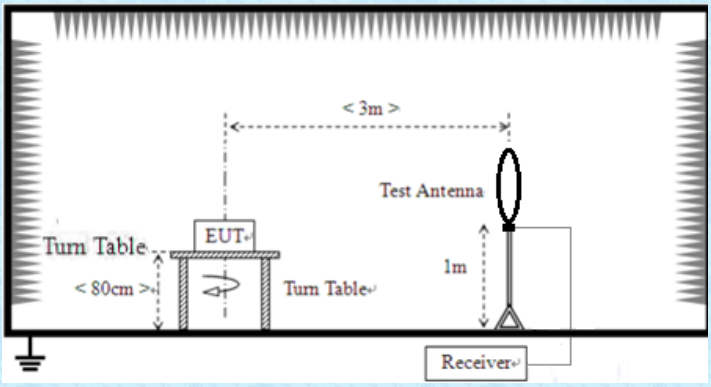


Freq	Reading level	LISN/ISN factor	Cable loss	Level	Limit level	Over limit	Remark
MHz	dBuV	dB	dB	dBuV	dBuV	dB	
0.17	20.74	9.55	0.01	30.30	64.99	-34.69	QP
0.17	9.68	9.55	0.01	19.24	54.99	-35.75	Average
0.32	23.26	9.56	0.01	32.83	59.80	-26.97	QP
0.32	10.96	9.56	0.01	20.53	49.80	-29.27	Average
0.50	21.40	9.57	0.01	30.98	56.00	-25.02	QP
0.50	3.24	9.57	0.01	12.82	46.00	-33.18	Average
2.11	7.05	9.55	0.05	16.65	56.00	-39.35	QP
2.11	-1.63	9.55	0.05	7.97	46.00	-38.03	Average
6.88	5.11	9.53	0.08	14.72	60.00	-45.28	QP
6.88	-2.55	9.53	0.08	7.06	50.00	-42.94	Average
16.84	17.06	9.84	0.17	27.07	60.00	-32.93	QP
16.84	11.59	9.84	0.17	21.60	50.00	-28.40	Average

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

<table>
<tr><td>Test Requirement:</td><td>FCC Part15 C Section 15.209</td></tr>
<tr><td>Test Method:</td><td>ANSI C63.10:2013</td></tr>
<tr><td>Test Frequency Range:</td><td>9kHz to 6000MHz</td></tr>
<tr><td>Test site:</td><td>Measurement Distance: 3m</td></tr>
<tr><td>Receiver setup:</td><td>
<table>
<tr><th>Frequency</th><th>Detector</th><th>RBW</th><th>VBW</th><th>Value</th></tr>
<tr><td>9KHz-150KHz</td><td>Quasi-peak</td><td>200Hz</td><td>600Hz</td><td>Quasi-peak</td></tr>
<tr><td>150KHz-30MHz</td><td>Quasi-peak</td><td>9KHz</td><td>30KHz</td><td>Quasi-peak</td></tr>
<tr><td>30MHz-1GHz</td><td>Quasi-peak</td><td>120KHz</td><td>300KHz</td><td>Quasi-peak</td></tr>
<tr><td rowspan="2">Above 1GHz</td><td>Peak</td><td>1MHz</td><td>3MHz</td><td>Peak</td></tr>
<tr><td>Peak</td><td>1MHz</td><td>10Hz</td><td>Average</td></tr>
</table>
</td></tr>
<tr><td>Limit:
(Field strength of the fundamental signal)</td><td>
<table>
<tr><th>Frequency</th><th>Limit (dBuV/m @3m)</th><th>Remark</th></tr>
<tr><td rowspan="2">315MHz</td><td>67.66</td><td>Average Value</td></tr>
<tr><td>87.66</td><td>Peak Value</td></tr>
</table>
</td></tr>
<tr><td>Limit:
(Spurious Emissions)</td><td>
<table>
<tr><th>Frequency</th><th>Limit (uV/m)</th><th>Value</th><th>Measurement Distance</th></tr>
<tr><td>0.009MHz-0.490MHz</td><td>2400/F(KHz)</td><td>QP</td><td>300m</td></tr>
<tr><td>0.490MHz-1.705MHz</td><td>24000/F(KHz)</td><td>QP</td><td>30m</td></tr>
<tr><td>1.705MHz-30MHz</td><td>30</td><td>QP</td><td>30m</td></tr>
<tr><td>30MHz-88MHz</td><td>100</td><td>QP</td><td rowspan="6">3m</td></tr>
<tr><td>88MHz-216MHz</td><td>150</td><td>QP</td></tr>
<tr><td>216MHz-960MHz</td><td>200</td><td>QP</td></tr>
<tr><td>960MHz-1GHz</td><td>500</td><td>QP</td></tr>
<tr><td rowspan="2">Above 1GHz</td><td>500</td><td>Average</td></tr>
<tr><td>5000</td><td>Peak</td></tr>
</table>
Or The maximum permitted unwanted emission level is 20 dB below the maximum permitted fundamental level whichever limit permits a higher field strength.
</td></tr>
<tr><td>Test setup:</td><td>Below 30MHz
 

Below 1GHz</td></tr>
</table>

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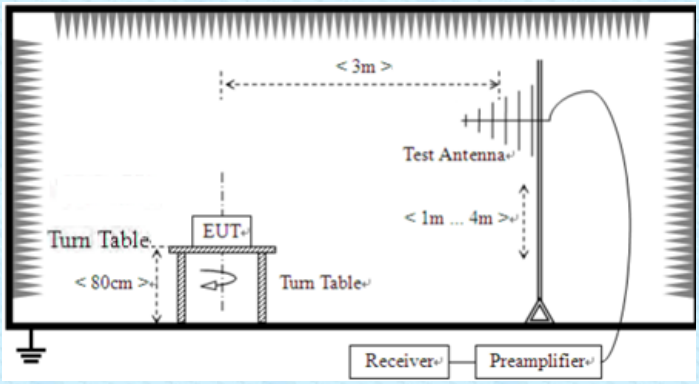
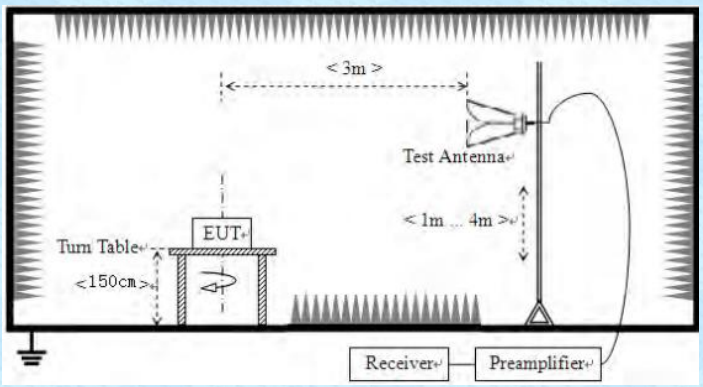


Above 1GHz


</td></tr>
<tr><td>Test Procedure:</td><td>1. 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.
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.</td></tr>
<tr><td>Test Instruments:</td><td colspan="5">Refer to section 6.0 for details</td></tr>
<tr><td>Test mode:</td><td colspan="5">Refer to section 5.2 for details</td></tr>
<tr><td>Test environment:</td><td>Temp.:</td><td>25 °C</td><td>Humid.:</td><td>50%</td><td>Press.:</td><td>1 010mbar</td></tr>
<tr><td>Test results:</td><td colspan="5">Pass</td></tr>
</table>

Measurement data:

7.3.1 Field Strength of The Fundamental Signal

315MHz:

Peak value:

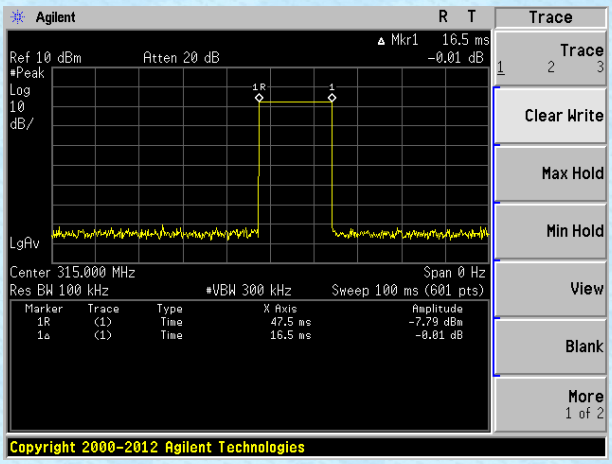
Frequency (MHz)	Read Level (dBuV)	Antenna Factor (dB/m)	Cable Loss (dB)	Preamp Factor (dB)	Level (dBuV/m)	Limit Line (dBuV/m)	Over Limit (dB)	polarization
315	83.99	12.96	2.44	30	69.39	87.66	-18.27	Horizontal
315	88.44	12.96	2.44	30	73.84	87.66	-13.82	Vertical

Average value:

Frequency (MHz)	Peak Value (dBuV/m)	Duty cycle factor	Average value (dBuV/m)	Limit Line (dBuV/m)	Over Limit (dB)	Polarization
315	69.39	-15.65	53.74	67.66	-13.92	Horizontal
315	73.84	-15.65	58.19	67.66	-9.47	Vertical

Average value:	
Calculate Formula:	Average value=Peak value + Duty Cycle Factor
	Duty cycle factor=20 log(0.165)
	Duty cycle=on time/100 milliseconds or period, whichever is less
Test data:	T on time =16.5 (ms)
	T period =100(ms)
	Duty cycle=0.165
	duty cycle factor=-15.65

Test plot as follows:



433.92MHz:

Peak value:

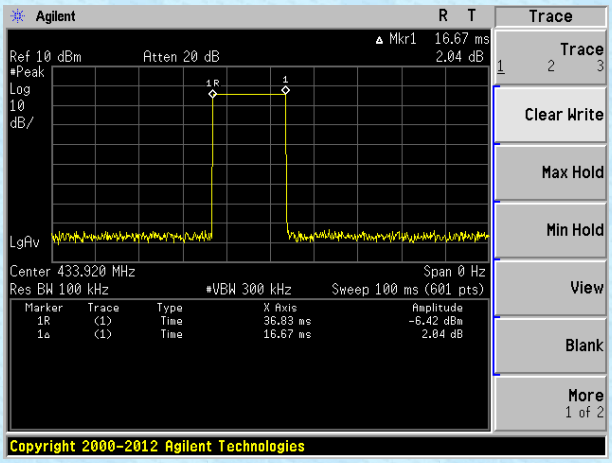
Frequency (MHz)	Read Level (dBuV)	Antenna Factor (dB/m)	Cable Loss (dB)	Preamp Factor (dB)	Level (dBuV/m)	Limit Line (dBuV/m)	Over Limit (dB)	polarization
433.92	79.47	16.37	3.01	30	68.85	92.87	-24.02	Horizontal
433.92	79.37	16.37	3.01	30	69.27	92.87	-23.60	Vertical

Average value:

Frequency (MHz)	Peak Value (dBuV/m)	Duty cycle factor	Average value (dBuV/m)	Limit Line (dBuV/m)	Over Limit (dB)	Polarization
433.92	68.85	-15.56	53.29	72.87	-19.58	Horizontal
433.92	69.27	-15.56	53.71	72.87	-19.16	Vertical

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 =16.67 (ms)
	T period =100(ms)
	Duty cycle=0.1667
	duty cycle factor=-15.56

Test plot as follows:



7.3.2 Spurious emissions

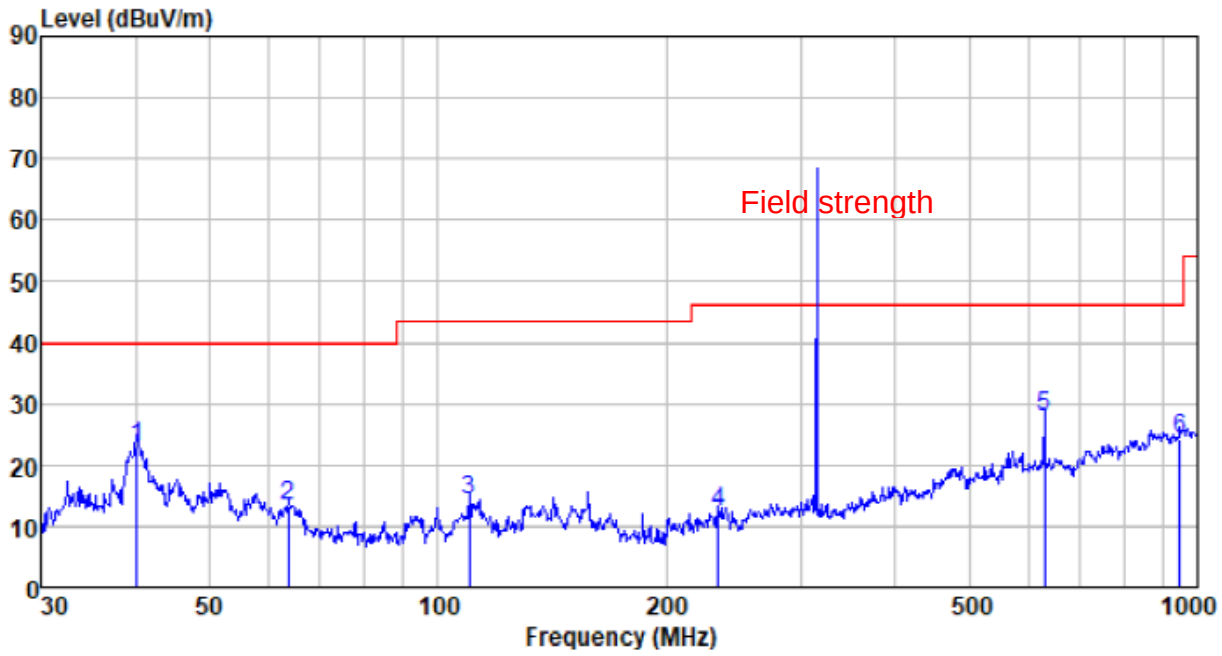
Measurement data:

9 kHz ~ 30 MHz

The low frequency, which started from 9 kHz to 30 MHz, was pre-scanned and the result which was 20 dB lower than the limit line per 15.31(o) was not reported.

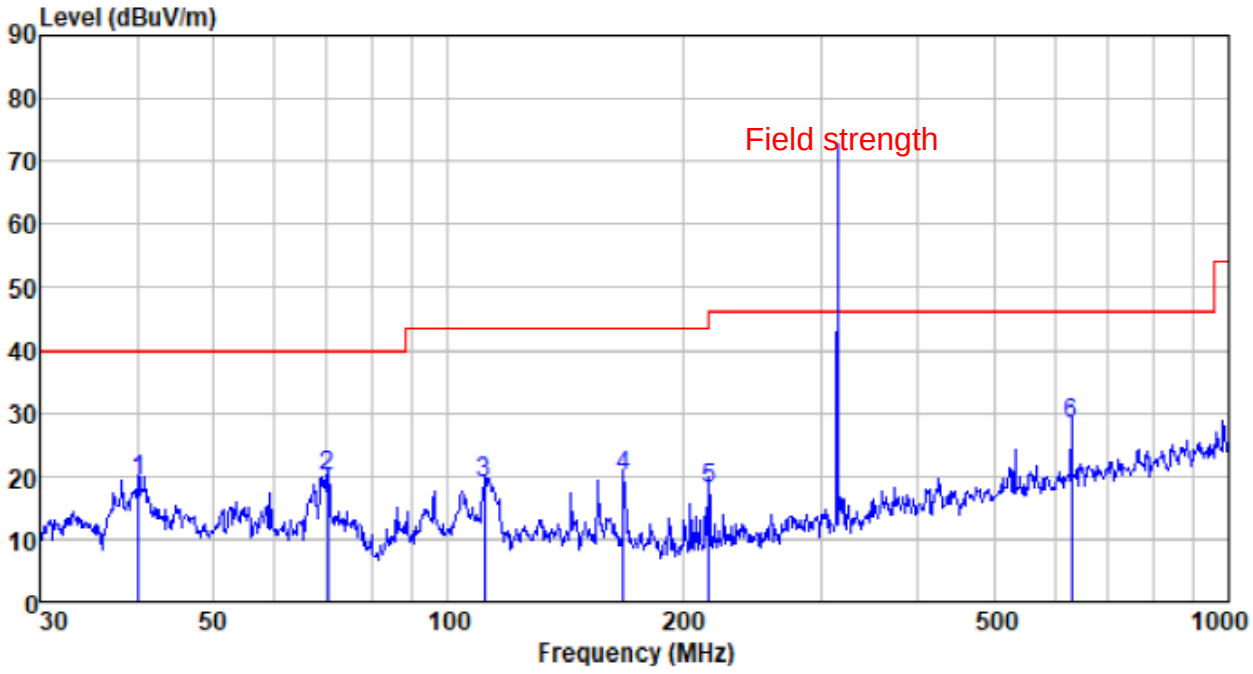
Below 1GHz:

Test channel:	**315MHz**	**Polarization:**	**Horizontal**



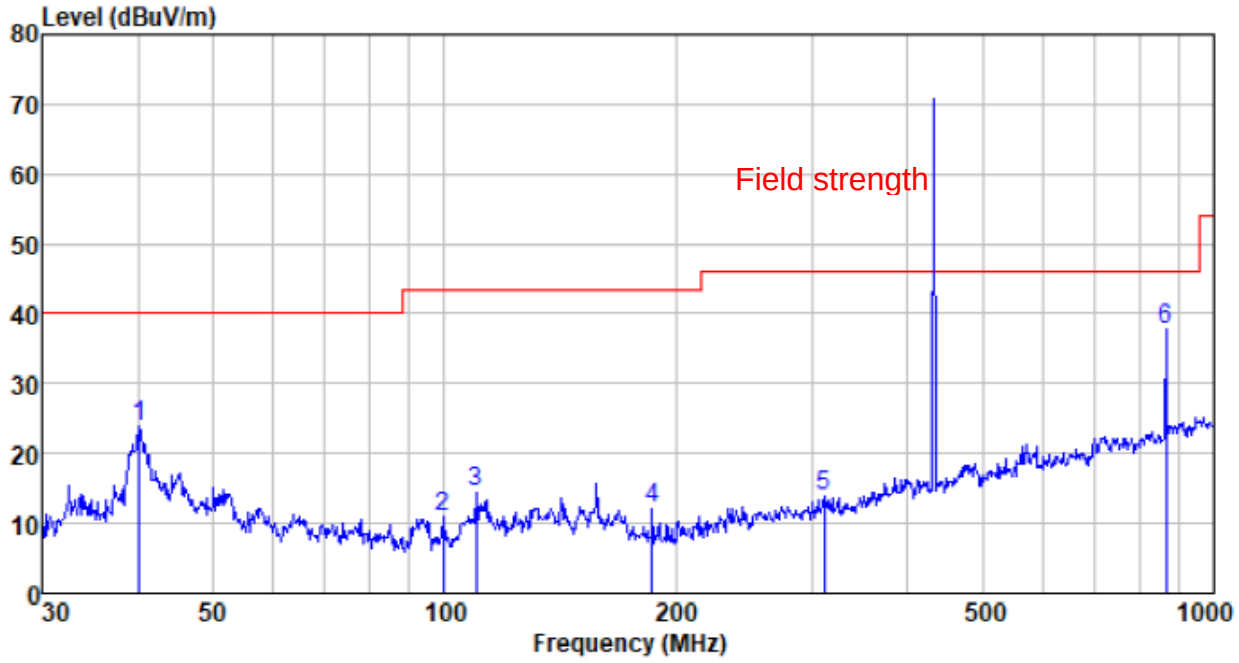
Freq MHz	Reading level dBuV	Antenna factor dB/m	Cable loss dB	Preamp factor dB	level dBuV/m	Limit level dBuV/m	Over limit dB	Remark
40.135	38.71	13.50	0.66	30.00	22.87	40.00	-17.13	QP
63.536	30.60	11.82	0.89	30.00	13.31	40.00	-26.69	QP
109.796	32.65	10.47	1.28	30.00	14.40	43.50	-29.10	QP
234.168	28.98	11.23	2.04	30.00	12.25	46.00	-33.75	QP
629.477	34.21	19.77	3.83	30.00	27.81	46.00	-18.19	QP
948.761	24.79	24.30	5.04	30.00	24.13	46.00	-21.87	QP

Test channel:	315MHz	Polarization:	Vertical



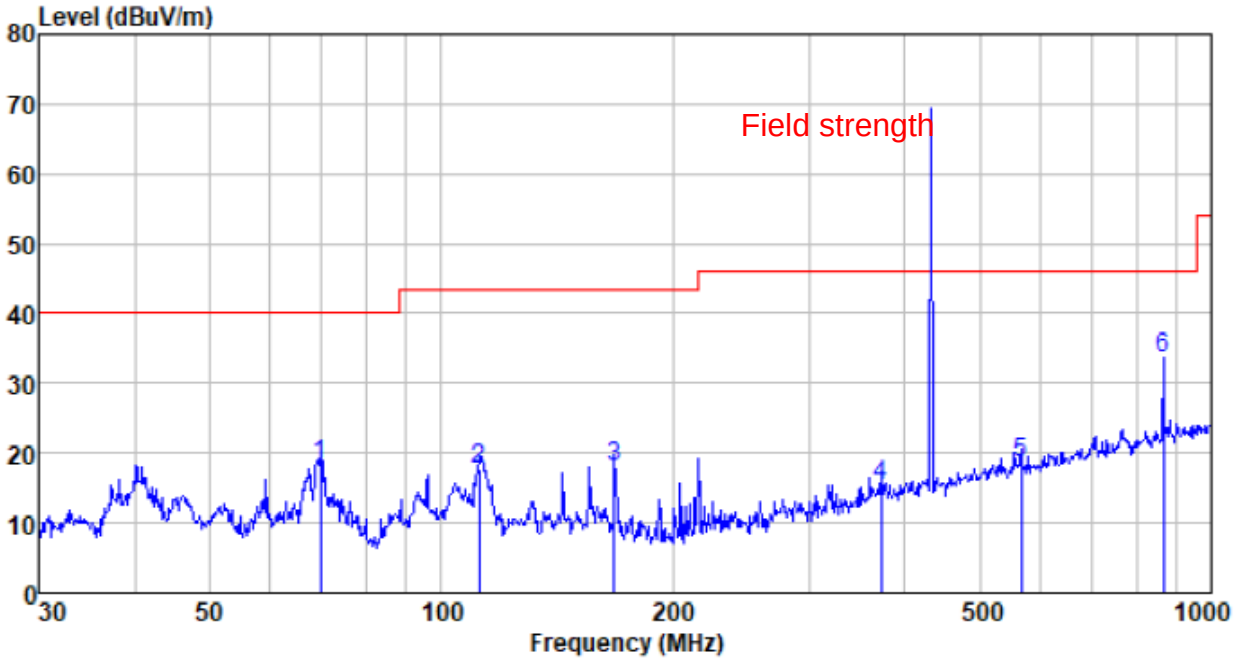
Freq	Reading level	Antenna factor	Cable loss	Preamp factor	level	Limit level	Over limit	Remark
MHz	dBuV	dB/m	dB	dB	dBuV/m	dBuV/m	dB	
40.135	35.22	13.50	0.66	30.00	19.38	40.00	-20.62	QP
70.090	38.36	10.48	0.94	30.00	19.78	40.00	-20.22	QP
111.347	37.00	10.58	1.29	30.00	18.87	43.50	-24.63	QP
167.824	36.54	11.67	1.67	30.00	19.88	43.50	-23.62	QP
216.024	36.05	10.09	1.93	30.00	18.07	46.00	-27.93	QP
629.477	34.77	19.77	3.83	30.00	28.37	46.00	-17.63	QP

Test channel:	433MHz	Polarization:	Horizontal



Freq	Reading level	Antenna factor	Cable loss	Preamp factor	level	Limit level	Over limit	Remark
MHz	dBuV	dB/m	dB	dB	dBuV/m	dBuV/m	dB	
40.135	39.71	13.50	0.66	30.00	23.87	40.00	-16.13	QP
99.528	29.96	9.65	1.19	30.00	10.80	43.50	-32.70	QP
109.796	32.65	10.47	1.28	30.00	14.40	43.50	-29.10	QP
186.441	30.36	9.93	1.77	30.00	12.06	43.50	-31.44	QP
311.087	28.61	12.82	2.42	30.00	13.85	46.00	-32.15	QP
866.088	39.66	23.51	4.73	30.00	37.90	46.00	-8.10	QP

Test channel:	433MHz	Polarization:	Vertical



Freq	Reading level	Antenna factor	Cable loss	Preamp factor	level	Limit level	Over limit	Remark
MHz	dBuV	dB/m	dB	dB	dBuV/m	dBuV/m	dB	
69.600	36.81	10.58	0.94	30.00	18.33	40.00	-21.67	QP
112.131	35.63	10.64	1.30	30.00	17.57	43.50	-25.93	QP
167.824	34.54	11.67	1.67	30.00	17.88	43.50	-25.62	QP
372.005	27.76	14.87	2.72	30.00	15.35	46.00	-30.65	QP
566.622	26.28	18.77	3.59	30.00	18.64	46.00	-27.36	QP
866.088	35.29	23.51	4.73	30.00	33.53	46.00	-12.47	QP

Above 1G:

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
1260.00	46.91	24.33	2.17	39.33	34.08	70.00	-35.92	Vertical
1890.00	45.96	26.25	2.51	38.49	36.23	70.00	-33.77	Vertical
2520.00	45.59	27.45	3.03	38.60	37.47	70.00	-32.53	Vertical
1260.00	46.49	24.33	2.17	39.33	33.66	70.00	-36.34	Horizontal
1890.00	46.95	26.25	2.51	38.49	37.22	70.00	-32.78	Horizontal
2520.00	45.34	27.45	3.03	38.60	37.22	70.00	-32.78	Horizontal

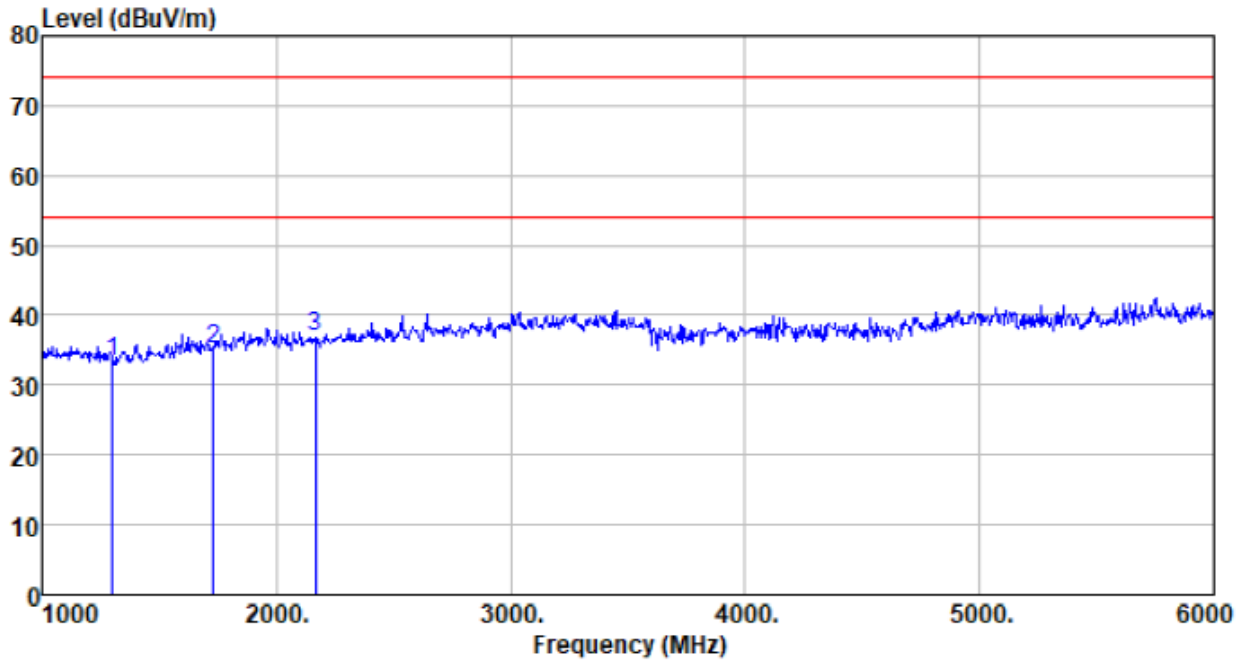
Average value:

Frequency (MHz)	Level (dBuV/m)	Duty cylcle factor	Average Level (dBuV/m)	Limit Line (dBuV/m)	Over Limit (dB)	Polarization
1260.00	34.08	-15.65	18.43	50.00	-31.57	Vertical
1890.00	36.23	-15.65	20.58	50.00	-29.42	Vertical
2520.00	37.47	-15.65	21.82	50.00	-28.18	Vertical
1260.00	33.66	-15.65	18.01	50.00	-31.99	Horizontal
1890.00	37.22	-15.65	21.57	50.00	-28.43	Horizontal
2520.00	37.22	-15.65	21.57	50.00	-28.43	Horizontal

Remarks:

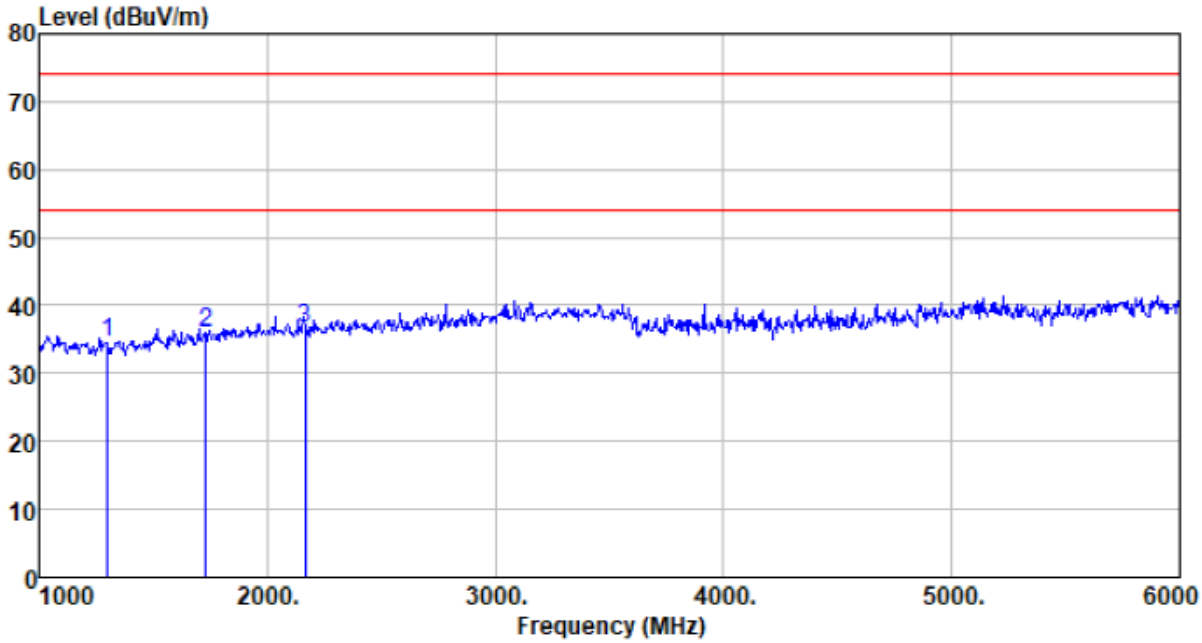
Final Level =Receiver Read level + Antenna Factor + Cable Loss – Preamplifier Factor

Test channel:	433MHz	Polarization:	Horizontal



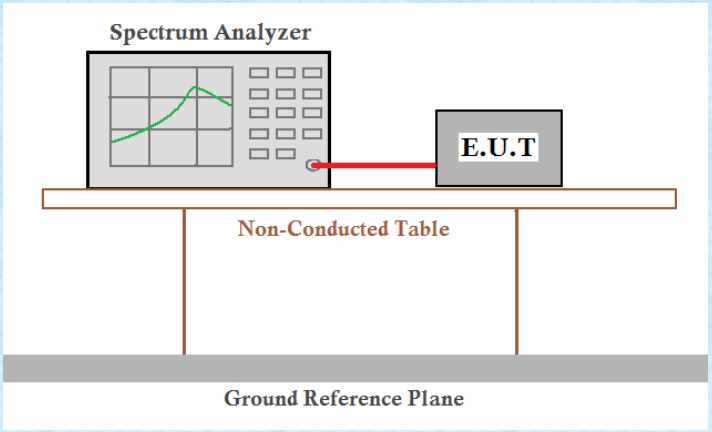
Freq	Reading level	Antenna factor	Cable loss	Preamp factor	level	Limit level	Over limit	Remark
MHz	dBuV	dB/m	dB	dB	dBuV/m	dBuV/m	dB	
1299.000	45.93	24.35	2.20	39.24	33.24	74.00	-40.76	Peak
1732.000	45.68	25.60	2.43	38.61	35.10	74.00	-38.90	Peak
2165.000	45.73	27.00	2.66	38.47	36.92	74.00	-37.08	Peak

Test channel:	433MHz	Polarization:	Vertical



Freq	Reading level	Antenna factor	Cable loss	Preamp factor	level	Limit level	Over limit	Remark
MHz	dBuV	dB/m	dB	dB	dBuV/m	dBuV/m	dB	
1299.000	47.19	24.35	2.20	39.24	34.50	74.00	-39.50	Peak
1732.000	46.74	25.60	2.43	38.61	36.16	74.00	-37.84	Peak
2165.000	45.49	27.00	2.66	38.47	36.68	74.00	-37.32	Peak

7.4 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

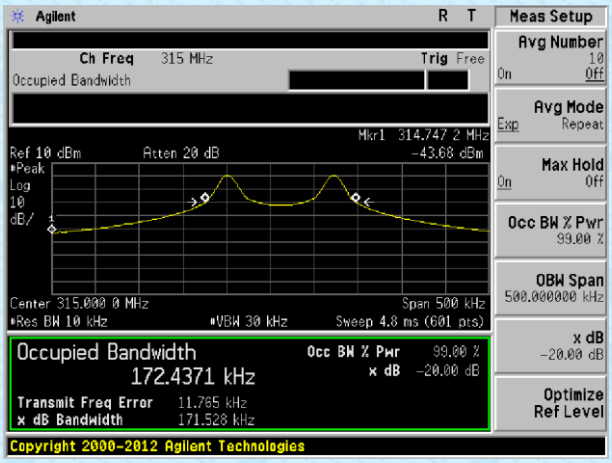
Measurement Data

Test Frequency (MHz)	20dB bandwidth (kHz)	99% bandwidth(kHz)	Limit (MHz)	Result
315	171.528	172.4371	0.7875	Pass
433	172.088	137.7514	1.08	Pass

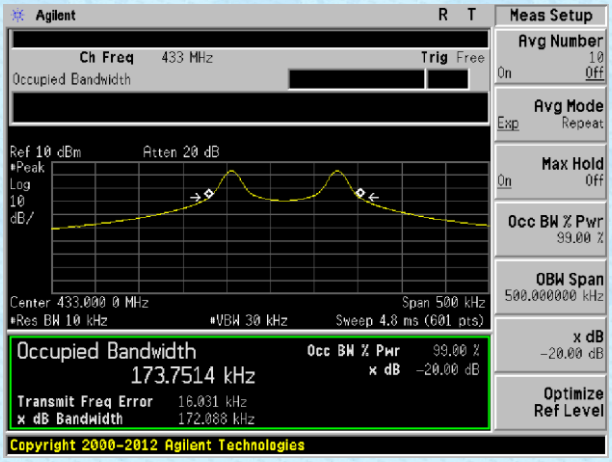
Note: Limit= Fundamental frequency×0.25%

Test plot as follows:

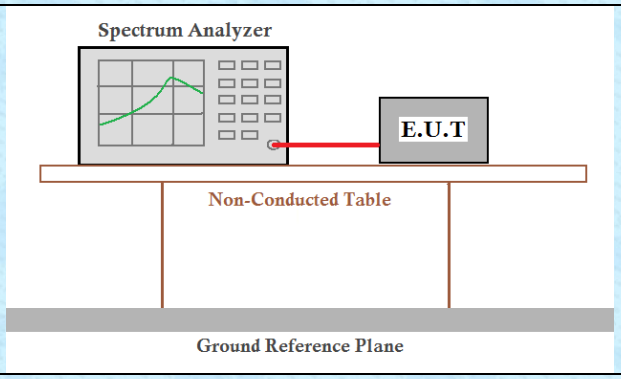
315MHz



433MHz



7.5 Dwell time

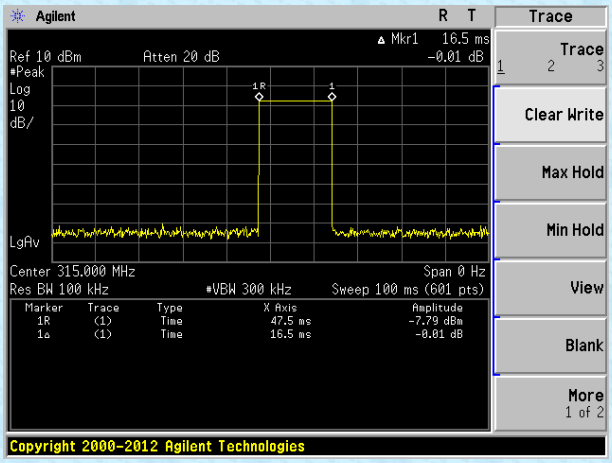
Test Requirement:	FCC Part15 C Section 15.231 (e)
Test Method:	ANSI C63.10:2013
Receiver setup:	RBW=100KHz, VBW=100KHz, span=0Hz, detector: Peak
Limit:	Not more than 1 seconds
Test setup:	
Test Instruments:	Refer to section 6.0 for details
Test mode:	Refer to section 5.2 for details
Test results:	Pass

Measurement data:

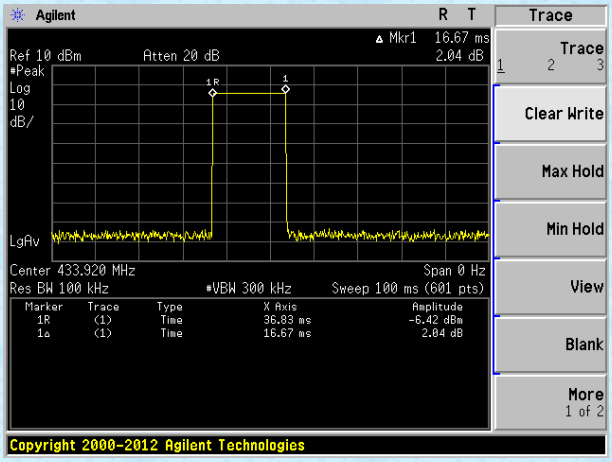
Test Frequency (MHz)	Duration of each TX (second)	Limit (second)	Result
315	0.0165	<1.0	Pass
433.92	0.01667	<1.0	Pass

Test plot as follows:

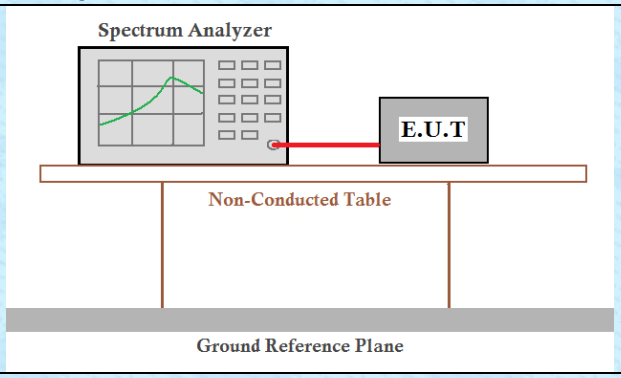
315MHz



433MHz



7.6 Silent period

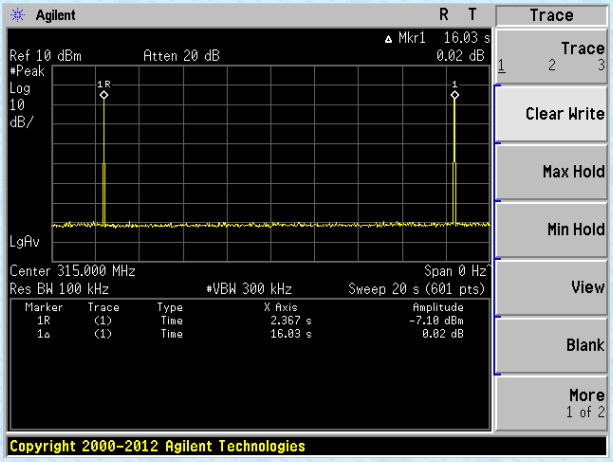
Test Requirement:	FCC Part15 C Section 15.231 (e)
Test Method:	ANSI C63.10:2013
Receiver setup:	RBW=100KHz, VBW=100KHz, span=0Hz, detector: Peak
Limit:	at least 30 times the duration of the transmission or more than 10 seconds
Test Procedure:	1. According to the follow Test-setup, keep the relative position between the artificial antenna and the EUT. 2. Set the EUT to proper test channel. 3. Single scan the transmit, and read the transmission time.
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:

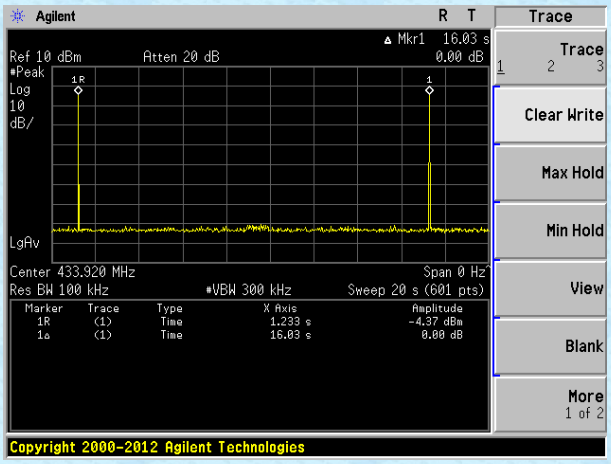
Test Frequency (MHz)	Silent period (second)	Limit (second)	Result
315	16.03	>10	Pass
433.92	16.03	>10	Pass

Test plot as follows:

315MHz



433MHz



8 Test Setup Photo

Reference to the **appendix I f**or details.

9 EUT Constructional Details

Reference to the **appendix II** for details.

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