

TEST REPORT

Applicant: Xiamen Topstar Co., Ltd.

Address of Applicant: No.696 Meixi Road, Tongan District Xiamen City, Fujian Province, P.R.China

Manufacturer: Xiamen Topstar Co., Ltd.

Address of Manufacturer: No.696 Meixi Road, Tongan District Xiamen City, Fujian Province, P.R.China

Factory: Xiamen Topstar Lighting Co., Ltd

Address of Factory: 676 Meixi Avenue, Tong'an District, Xiamen, China

Equipment Under Test (EUT)

Product Name: Electric Vehicle supply equipment

Model No.: See Section 5.1

FCC ID: 2A9FM-TSEA240VT

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

Date of sample receipt: April 15, 2024

Date of Test: April 15, 2024-May 10, 2024

Date of report issued: May 10, 2024

Test Result : PASS *

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

Authorized Signature:

A red circular stamp with a star in the center. The text around the star reads "Global United Technology Services Co., Ltd." and "检验检测专用章" (Inspection and Testing Special Seal). Below the star, it says "Inspection/Testing Services".

Robinson Luo

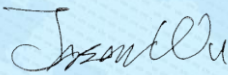
Laboratory Manager

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

2 Version

Version No.	Date	Description
00	May 10, 2024	Original

Prepared By:



Date:

May 10, 2024

Project Engineer

Check By:



Reviewer

Date:

May 10, 2024

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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.

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:	Electric Vehicle supply equipment
Model No.:	TSEA240V/80AUS-ZRGECP-C, TSEA240V/80AUS-ZRGCP-C, TSEA240V/48AUS-ZRGECP-C, TSEA240V/48AUS-ZRGCP-C, TSEA240V/40AUS-ZRGECP-C, TSEA240V/40AUS-ZRGCP-C, TSEA240V/32AUS-ZRGECP-C, TSEA240V/32AUS-ZRGCP-C TSEA240V/80AUS-ZRECP-H, TSEA240V/80AUS-ZREC-H TSEA240V/48AUS-ZRECP-H, TSEA240V/48AUS-ZREC-H TSEA240V/40AUS-ZRECP-H, TSEA240V/40AUS-ZREC-H TSEA240V/32AUS-ZRECP-H, TSEA240V/32AUS-ZREC-H
Test Model No:	TSEA240V/80AUS-ZRGECP-C
Remark: The EUT is Electric Vehicle AC Charger with RF ID and PLC Function, it supports WIFI, Bluetooth and LTE function, the wireless module FCC ID is XMR202008EC25AFXD and 2AC7Z-ESP32WROOM32U.the wireless module IC is 10224A-022EC25AFXD and 21098-ESPWROOM32U used in those models except for output current. Home Edition model: TSEA240V/80AUS-ZRECP-H:208-240VAC, 60Hz, 80A TSEA240V/48AUS-ZRECP-H:208-240VAC, 60Hz, 48A TSEA240V/40AUS-ZRECP-H:208-240VAC, 60Hz, 40A TSEA240V/32AUS-ZRECP-H:208-240VAC, 60Hz, 32A with WIFI, BLE, RF ID, 433MHz and PLC; TSEA240V/80AUS-ZREC-H:208-240VAC, 60Hz, 80A TSEA240V/48AUS-ZREC-H:208-240VAC, 60Hz, 48A TSEA240V/40AUS-ZREC-H:208-240VAC, 60Hz, 40A TSEA240V/32AUS-ZREC-H:208-240VAC, 60Hz, 32A with WIFI, BLE, 433MHz and RF ID; Business Edition model: TSEA240V/80AUS-ZRGECP-C:208-240VAC, 60Hz, 80A TSEA240V/48AUS-ZRGECP-C:208-240VAC, 60Hz, 48A TSEA240V/40AUS-ZRGECP-C:208-240VAC, 60Hz, 40A TSEA240V/32AUS-ZRGECP-C:208-240VAC, 60Hz, 32A with WIFI, BLE, RF ID, PLC, 433MHz and 4G; TSEA240V/80AUS-ZRGEC-C:208-240VAC, 60Hz, 80A TSEA240V/48AUS-ZRGEC-C:208-240VAC, 60Hz, 48A TSEA240V/40AUS-ZRGEC-C:208-240VAC, 60Hz, 40A TSEA240V/32AUS-ZRGEC-C:208-240VAC, 60Hz, 32A with WIFI, BLE, RF ID , 433MHz and 4G; Because the 80A and other current models use different relays Both NEMA plug (for 40A Max models) and hardwired (for all models) are optional for the input installation. So choose TSEA240V/80AUS-ZRGECP-C to test as representative	
S/N:	N/A
Test sample(s) ID:	GTSL2024010284-1
Sample(s) Status	Engineer sample
Operation Frequency:	433.92MHz
Modulation type:	ASK
Antenna Type:	Integral Antenna
Antenna gain:	2dBi
Power supply:	AC 208-240V, 60Hz

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.
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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:

433.40MHz	Axis	X	Y	Z
	Field Strength(dBuV/m)	72.95	74.37	73.08

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 13, 2024	April 12, 2025
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. 13, 2023	Nov.12, 2024
9	Broadband Preamplifier	SCHWARZBECK	BBV9718	GTS535	April 13, 2024	April 12, 2025
10	Amplifier(1GHz-26.5GHz)	HP	8449B	GTS601	April 13, 2024	April 12, 2025
11	Horn Antenna (18-26.5GHz)	/	UG-598A/U	GTS664	Oct. 29, 2023	Oct. 28, 2024
12	Horn Antenna (26.5-40GHz)	A.H Systems	SAS-573	GTS665	Oct. 29, 2023	Oct. 28, 2024
13	FSV·Signal Analyzer (10Hz-40GHz)	Keysight	FSV-40-N	GTS666	March 12, 2024	March 11, 2025
14	Amplifier	/	LNA-1000-30S	GTS650	April 13, 2024	April 12, 2025
15	CDNE M2+M3-16A	HCT	30MHz-300MHz	GTS692	Nov. 08, 2023	Nov.07, 2024
16	Wideband Amplifier	/	WDA-01004000-15P35	GTS602	April 13, 2024	April 12, 2025
17	Thermo meter	JINCHUANG	GSP-8A	GTS643	April 18, 2024	April 17, 2025
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

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 13, 2024	April 12, 2025
2	EMI Test Receiver	R&S	ESCI 7	GTS552	April 13, 2024	April 12, 2025
3	PSA Series Spectrum Analyzer	Agilent	E4440A	GTS536	April 13, 2024	April 12, 2025
4	MXG vector Signal Generator	Agilent	N5182A	GTS567	April 13, 2024	April 12, 2025
5	ESG Analog Signal Generator	Agilent	E4428C	GTS568	April 13, 2024	April 12, 2025
6	USB RF Power Sensor	DARE	RPR3006W	GTS569	April 13, 2024	April 12, 2025
7	RF Switch Box	Shongyi	RFSW3003328	GTS571	April 13, 2024	April 12, 2025
8	Programmable Constant Temp & Humi Test Chamber	WEWON	WHTH-150L-40-880	GTS572	April 13, 2024	April 12, 2025
9	Thermo meter	JINCHUANG	GSP-8A	GTS641	April 18, 2024	April 17, 2025

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 13, 2024	April 12, 2025
3	LISN	ROHDE & SCHWARZ	ENV216	GTS226	April 13, 2024	April 12, 2025
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	GTS642	April 18, 2024	April 17, 2025
7	Absorbing clamp	Elektronik-Feinmechanik	MDS21	GTS229	April 13, 2024	April 12, 2025
8	ISN	SCHWARZBECK	NTFM 8158	GTS565	April 13, 2024	April 12, 2025
9	High voltage probe	SCHWARZBECK	TK9420	GTS537	April 13, 2024	April 12, 2025
10	Antenna end assembly	Weinschel	1870A	GTS560	April 13, 2024	April 12, 2025
11	LISN	SCHWARZBECK	NSLK 8127	GTS711	April 13, 2024	April 12, 2025

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 18, 2024	April 17, 2025

7 Test results and Measurement Data

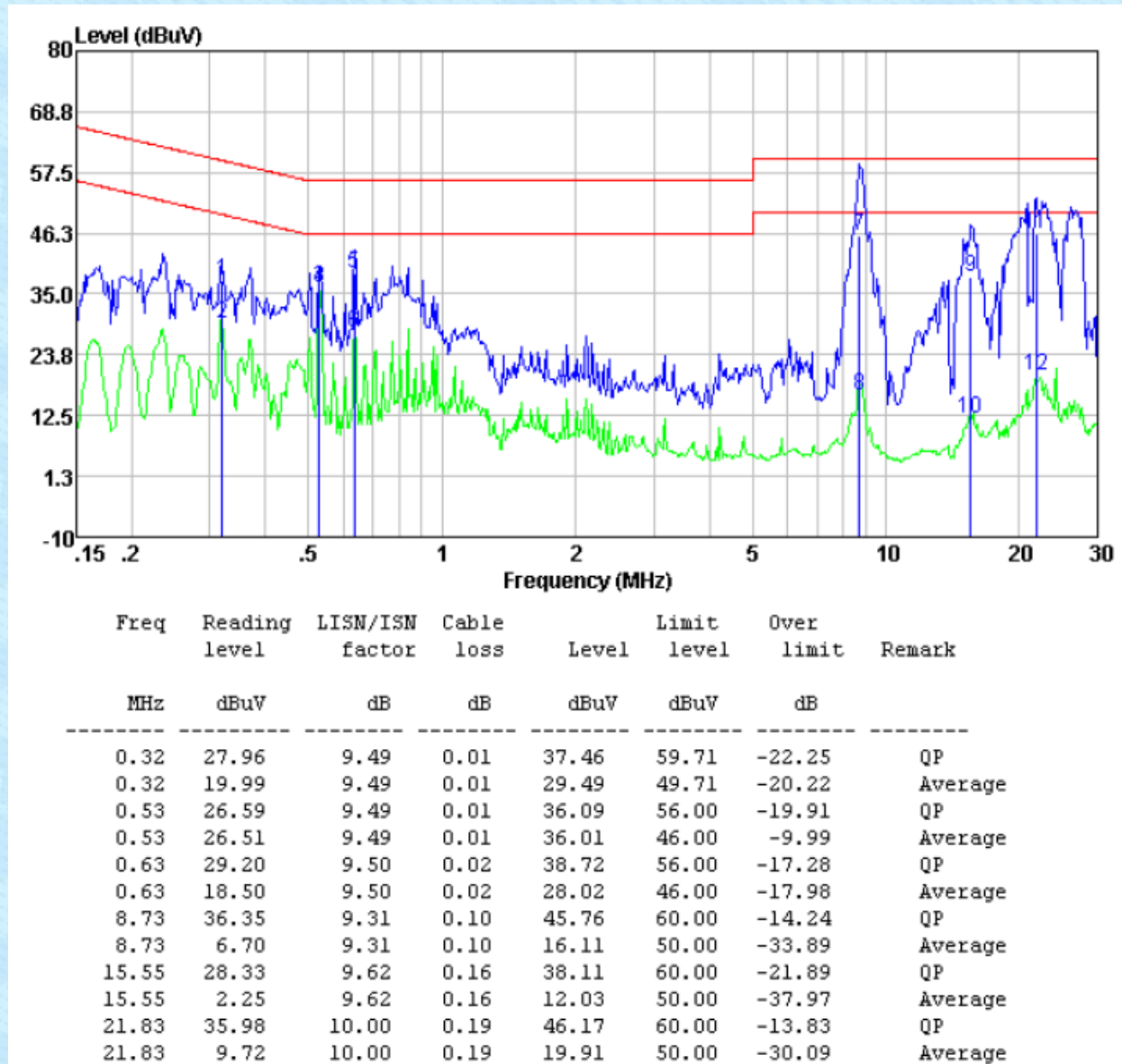
7.1 Antenna requirement

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.	

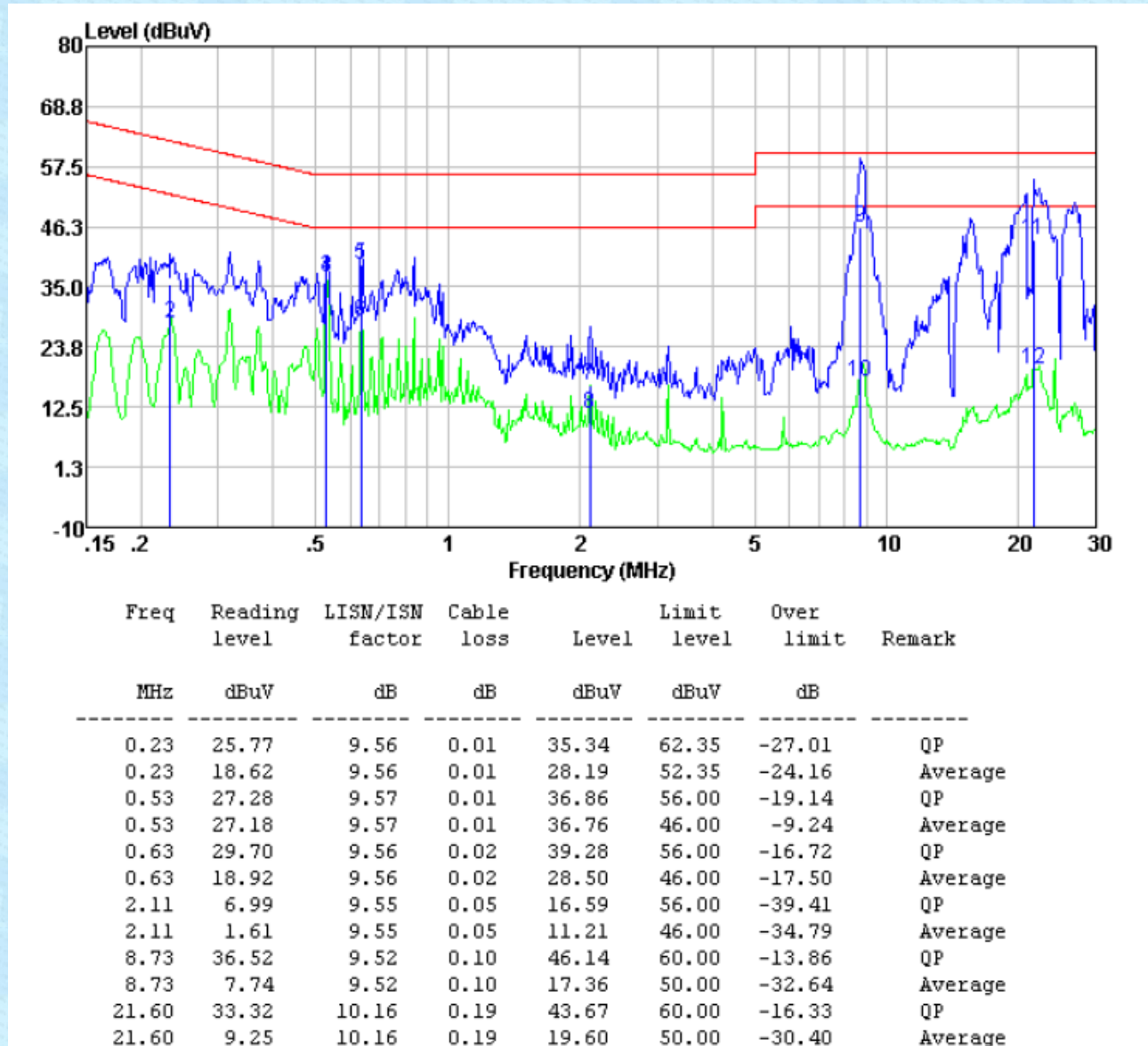
Test Requirement:	FCC Part15 C Section 15.207																			
Test Method:	ANSI C63.10:2013																			
Test Frequency Range:	150KHz to 30MHz																			
Receiver setup:	RBW=9KHz, VBW=30KHz, Sweep time=auto																			
Limit:	<table border="1"> <thead> <tr> <th rowspan="2">Frequency 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> * Decreases with the logarithm of the frequency.						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:	Reference Plane 40cm LISN AUX Equipment E.U.T 80cm 40cm LISN Filter AC power EMI Receiver Test table/Insulation plane Remark E.U.T: Equipment Under Test LISN: Line Impedance Stabilization Network Test table height=0.8m																			
Test procedure:	1. The E.U.T and simulators are connected to the main power through a line impedance stabilization network (L.I.S.N.). This provides a 50ohm/50uH coupling impedance for the measuring equipment. 2. The peripheral devices are also connected to the main power through a LISN that provides a 50ohm/50uH coupling impedance with 50ohm termination. (Please refer to the block diagram of the test setup and photographs). 3. Both sides of A.C. line are checked for maximum conducted interference. In order to find the maximum emission, the relative positions of equipment and all of the interface cables must be changed according to ANSI C63.10:2013 on conducted measurement.																			
Test Instruments:	Refer to section 6.0 for details																			
Test mode:	Refer to section 5.2 for details																			
Test environment:	Temp.:	25 °C	Humid.:	52%	Press.:	1012mbar														
Test voltage:	AC 240V, 60Hz																			
Test results:	Pass																			

Measurement data:

Line:



Neutral:

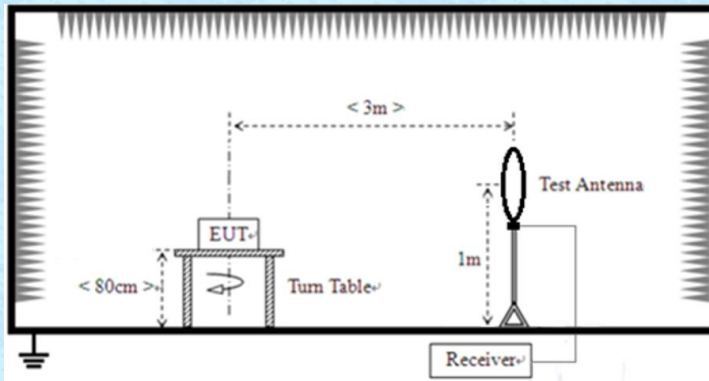


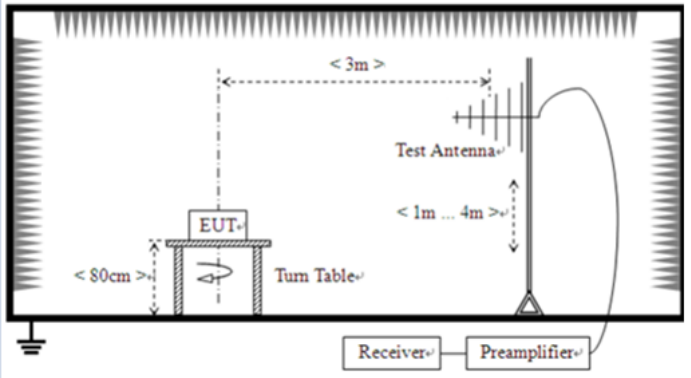
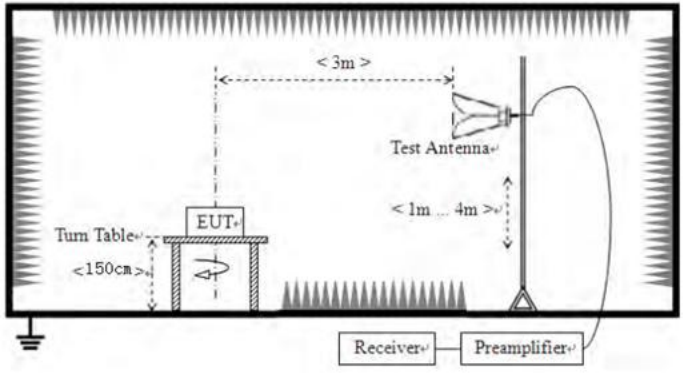
Notes:

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.

Final Level = Receiver Read level + LISN Factor + Cable Loss

7.3 Radiated Emission Method

Test Requirement:	FCC Part15 C Section 15.209				
Test Method:	ANSI C63.10:2013				
Test Frequency Range:	9kHz to 6000MHz				
Test site:	Measurement Distance: 3m				
Receiver setup:	Frequency	Detector	RBW	VBW	Value
	9KHz-150KHz	Quasi-peak	200Hz	600Hz	Quasi-peak
	150KHz-30MHz	Quasi-peak	9KHz	30KHz	Quasi-peak
	30MHz-1GHz	Quasi-peak	120KHz	300KHz	Quasi-peak
	Above 1GHz	Peak	1MHz	3MHz	Peak
		Peak	1MHz	10Hz	Average
Limit: (Field strength of the fundamental signal)	Frequency	Limit (dBuV/m @3m)		Remark	
	433.92MHz	72.87		Average Value	
		92.87		Peak Value	
Limit: (Spurious Emissions)	Frequency	Limit (uV/m)	Value	Measurement Distance	
	0.009MHz-0.490MHz	2400/F(KHz)	QP	300m	
	0.490MHz-1.705MHz	24000/F(KHz)	QP	30m	
	1.705MHz-30MHz	30	QP	30m	
	30MHz-88MHz	100	QP	3m	
	88MHz-216MHz	150	QP		
	216MHz-960MHz	200	QP		
	960MHz-1GHz	500	QP		
	Above 1GHz	500	Average		
		5000	Peak		
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 30MHz				
					
Below 1GHz					

	 Above 1GHz 
Test Procedure:	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.
Test Instruments:	Refer to section 6.0 for details
Test mode:	Refer to section 5.2 for details
Test environment:	Temp.: 25 °C Humid.: 50% Press.: 1 010mbar
Test voltage:	AC 240V
Test results:	Pass

Measurement data:

7.3.1 Field Strength of The Fundamental Signal

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
433.40	87.18	16.38	3.01	32.20	74.37	92.85	28.37	Horizontal
433.40	81.91	16.38	3.01	32.20	69.10	92.85	23.10	Vertical

Average value:

Frequency (MHz)	Peak Value (dBuV/m)	Duty cycle factor	Average value (dBuV/m)	Limit Line (dBuV/m)	Over Limit (dB)	Polarization
433.40	74.37	-8.48	65.89	72.85	-6.96	Horizontal
433.40	69.1	-8.48	60.62	72.85	-12.23	Vertical

Remark:

1. *Final Level = Receiver Read level + Antenna Factor + Cable Loss – Preamplifier Factor*
2. *Duty cycle factor = 20 log(Duty cycle)*
Duty cycle = on time / 100 milliseconds or period, whichever is less
3. *Average value = Peak value + Duty cycle factor*

7.3.2 Spurious emissions

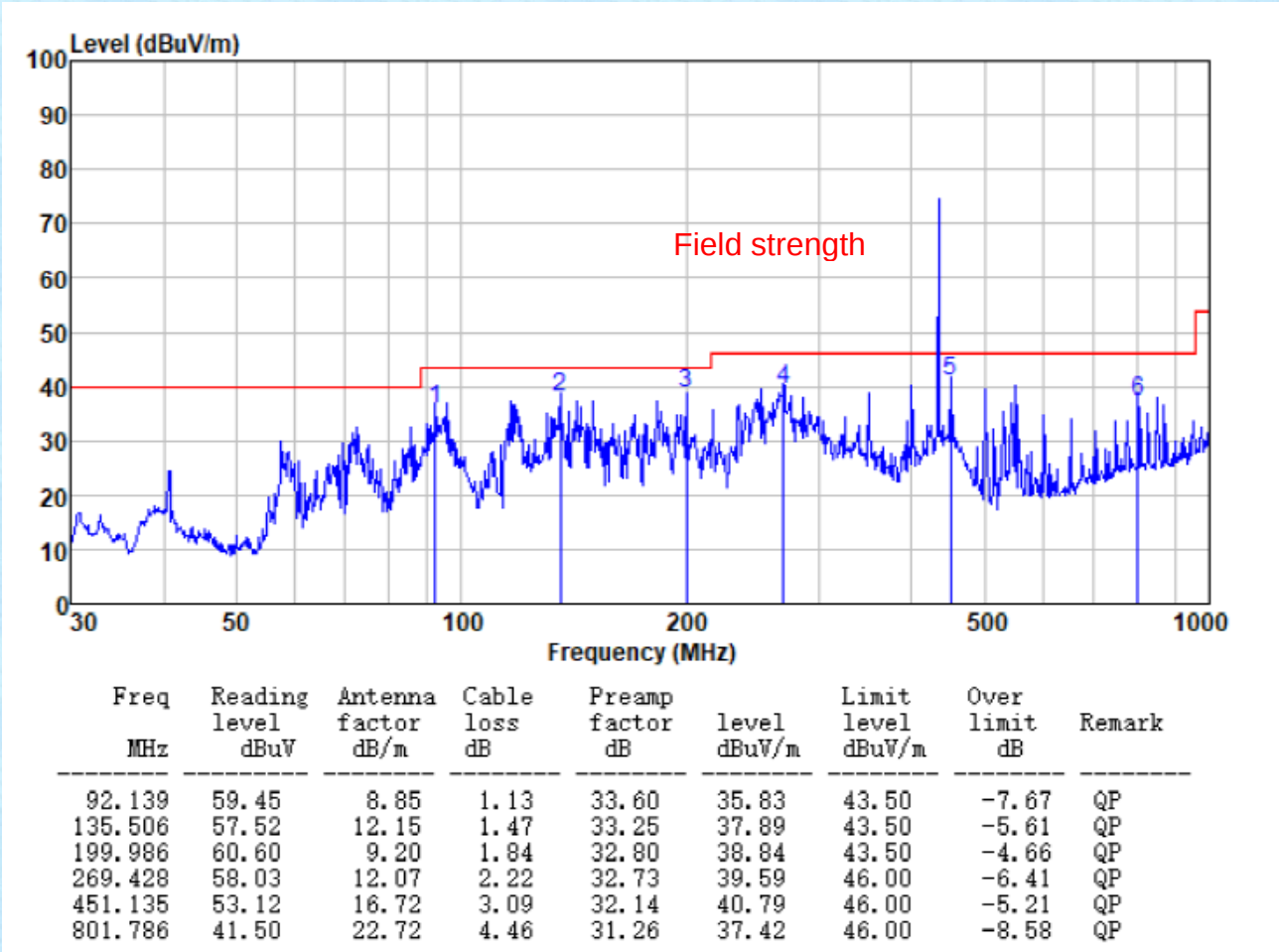
Measurement data:

9 kHz ~ 30 MHz

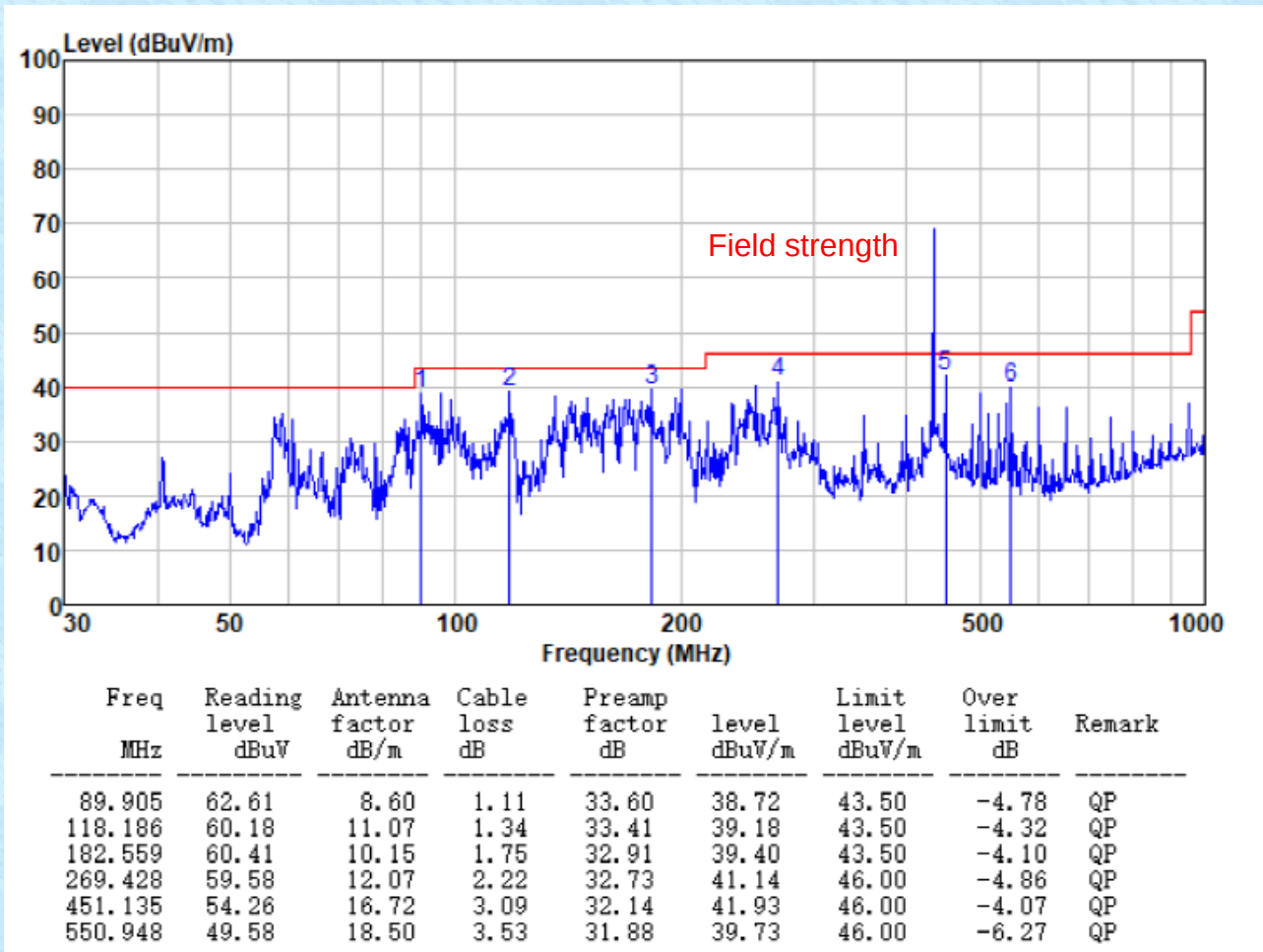
The low frequency, which started from 9 kHz to 30 MHz, was pre-scanned and the result which was 20 dB lower than the limit line per 15.31(o) was not reported.

Below 1GHz:

Test channel:	433.4MHz	Polarization:	Horizontal
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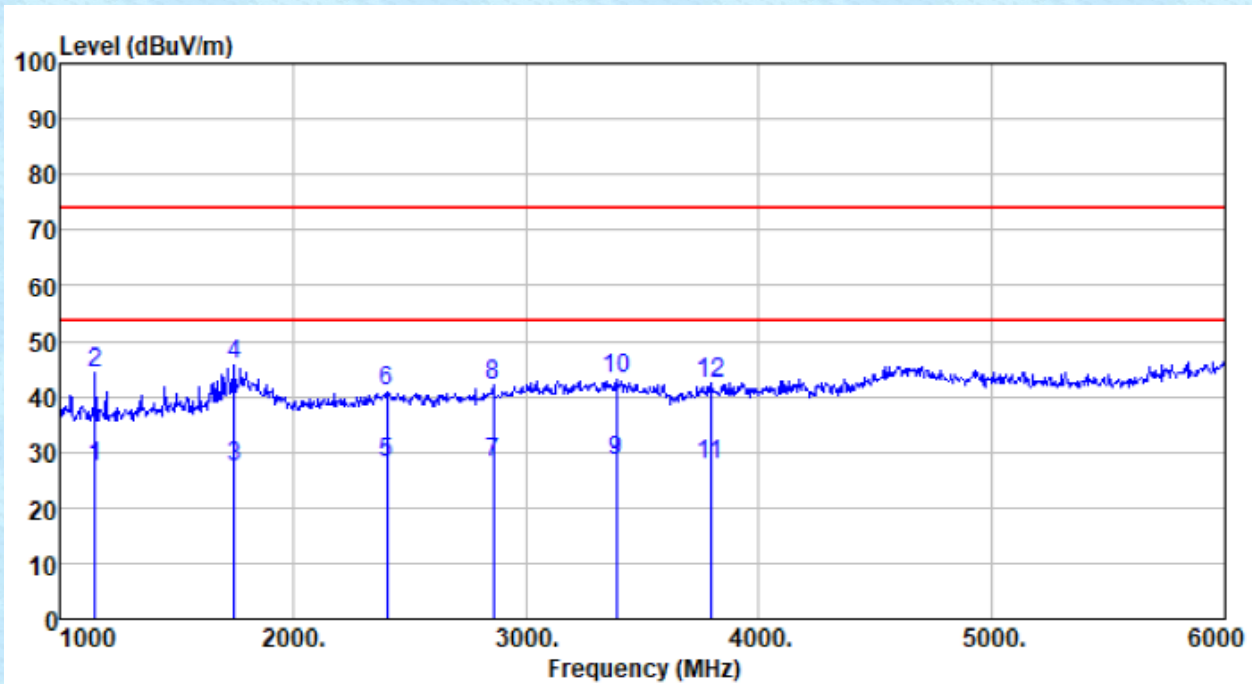


Test channel:	433.4MHz	Polarization:	Vertical
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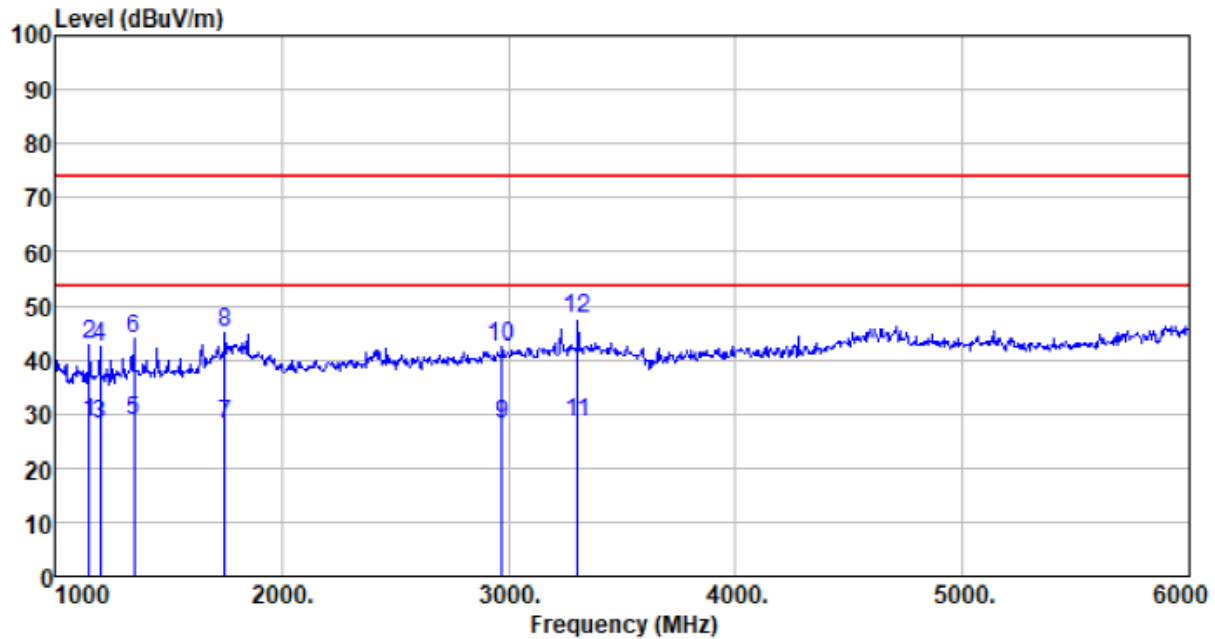
Above 1G:

Test channel:	433.4MHz	Polarization:	Horizontal
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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
1150.000	39.37	24.60	2.91	39.57	27.31	54.00	-26.69	Average
1150.000	56.21	24.60	2.91	39.57	44.15	74.00	-29.85	Peak
1750.000	33.20	25.65	7.10	38.60	27.35	54.00	-26.65	Average
1750.000	51.52	25.65	7.10	38.60	45.67	74.00	-28.33	Peak
2405.000	34.83	27.05	4.65	38.56	27.97	54.00	-26.03	Average
2405.000	47.79	27.05	4.65	38.56	40.93	74.00	-33.07	Peak
2860.000	33.74	28.24	4.79	38.60	28.17	54.00	-25.83	Average
2860.000	47.47	28.24	4.79	38.60	41.90	74.00	-32.10	Peak
3390.000	32.64	28.91	5.34	38.52	28.37	54.00	-25.63	Average
3390.000	47.56	28.91	5.34	38.52	43.29	74.00	-30.71	Peak
3790.000	30.41	29.52	6.24	38.33	27.84	54.00	-26.16	Average
3790.000	45.05	29.52	6.24	38.33	42.48	74.00	-31.52	Peak

Test channel:	433.4MHz	Polarization:	Vertical
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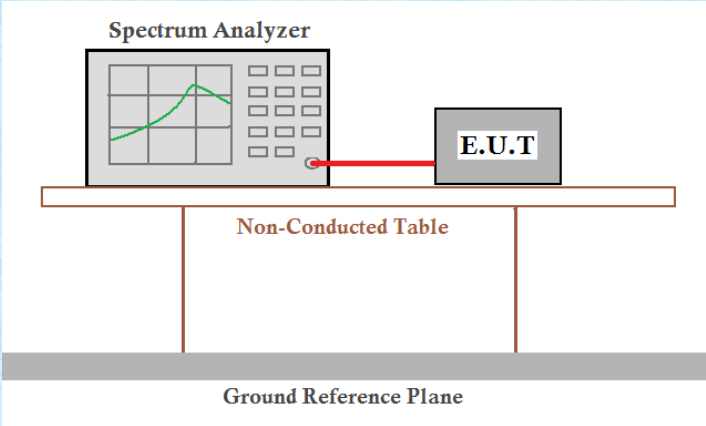


Freq MHz	Reading level dBuV	Antenna factor dB/m	Cable loss dB	Preamp factor dB	level dBuV/m	Limit level dBuV/m	Over limit dB	Remark
1150.000	40.30	24.60	2.91	39.57	28.24	54.00	-25.76	Average
1150.000	54.83	24.60	2.91	39.57	42.77	74.00	-31.23	Peak
1200.000	39.88	24.70	3.02	39.46	28.14	54.00	-25.86	Average
1200.000	54.19	24.70	3.02	39.46	42.45	74.00	-31.55	Peak
1350.000	38.99	25.00	3.75	39.13	28.61	54.00	-25.39	Average
1350.000	54.30	25.00	3.75	39.13	43.92	74.00	-30.08	Peak
1750.000	34.04	25.65	7.10	38.60	28.19	54.00	-25.81	Average
1750.000	50.80	25.65	7.10	38.60	44.95	74.00	-29.05	Peak
2970.000	33.01	28.52	5.22	38.60	28.15	54.00	-25.85	Average
2970.000	47.16	28.52	5.22	38.60	42.30	74.00	-31.70	Peak
3305.000	32.71	28.84	5.34	38.54	28.35	54.00	-25.65	Average
3305.000	51.88	28.84	5.34	38.54	47.52	74.00	-26.48	Peak

Remarks:

1. Final Level =Receiver Read level + Antenna Factor + Cable Loss – Preamplifier Factor
2. If the average limit is met when using a Peak detector, the EUT shall be deemed to meet both peak and average limits. And measurement with the average detector is unnecessary.

7.4 Occupy Bandwidth

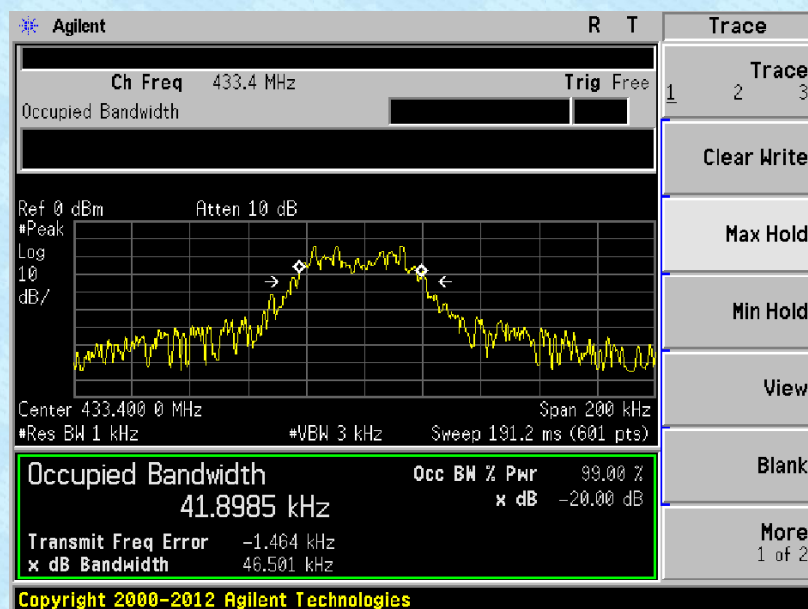
Test Requirement:	FCC Part15 C Section 15.231 (c)
Test Method:	ANSI C63.10:2013
Limit:	The bandwidth of the emission shall be no wider than 0.25% of the center frequency for devices operating above 70 MHz and below 900MHz. For devices operating above 900 MHz, the emission shall be no wider than 0.5% of the center frequency. Bandwidth is determined at the points 20 dB down from the modulated carrier.
Test setup:	 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.
Test Instruments:	Refer to section 6.0 for details
Test mode:	Refer to section 5.3 for details
Test results:	Pass

Measurement Data

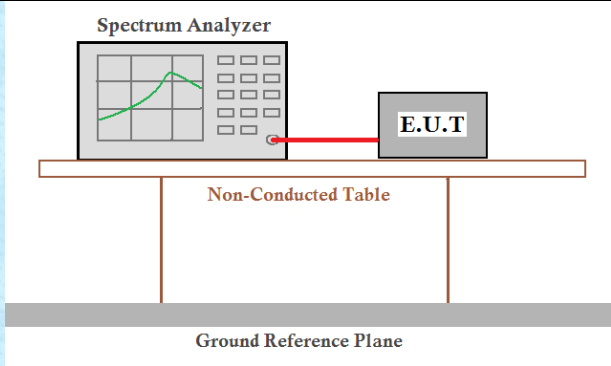
Test Frequency (MHz)	20dB bandwidth (kHz)	99% bandwidth(kHz)	Limit (MHz)	Result
433.4	46.501	41.8985	1.0835	Pass

Note: Limit= Fundamental frequency $\times$ 0.25%

Test plot as follows:



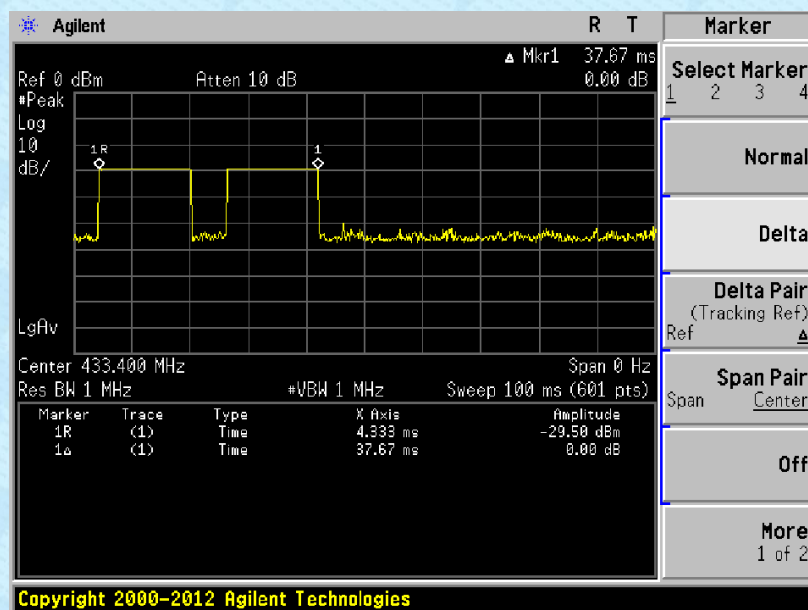
7.5 Dwell time

Test Requirement:	FCC Part15 C Section 15.231 (e)
Test Method:	ANSI C63.10:2013
Receiver setup:	RBW=1MHz, VBW=1MHz, 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

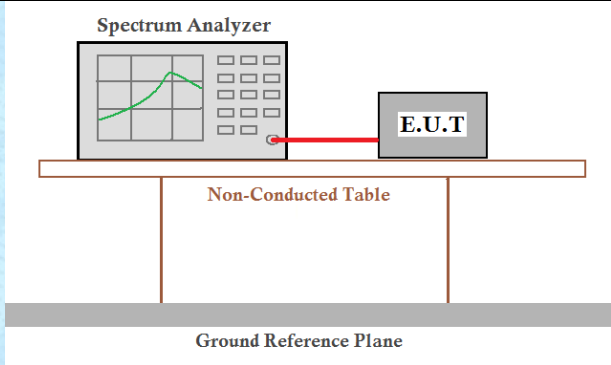
Measurement data:

Test Frequency (MHz)	Duration of each TX (second)	Limit (second)	Result
433.4	0.03767	<1.0	Pass

Test plot as follows:



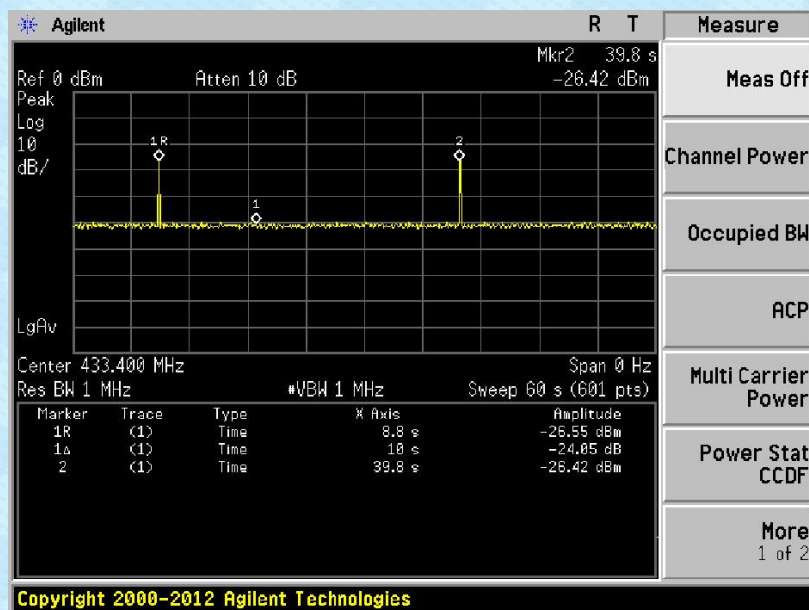
7.6 Silent period

Test Requirement:	FCC Part15 C Section 15.231 (e)
Test Method:	ANSI C63.10:2013
Receiver setup:	RBW=1MHz, VBW=1MHz, 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:	 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.
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)	Limit (second)	Result
433.92	>10	Pass

Test plot as follows:



8 Test Setup Photo

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

9 EUT Constructional Details

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

-----End-----