TEST REPORT

Report No.: SHATBL2305005W01

Applicant	:	Shanghai Qingjian Automotive Technology Co., LTD
Product Name	:	BCM
Brand Name	:	上汽集团 SAIC MOTOR
Model Name	:	11596455
FCC ID	:	2BAVO11596455
Test Standard	:	FCC CFR Title 47 Part 15 Subpart C
Date of Test	:	2023.05.20-2023.05.26

Report Prepared by : Chris Xu

(Chris Xu)

Report Approved by : Ghost Li.

(Ghost Li)

Authorized Signatory : Terry Yang

(Terry Yang)

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GENERAL DESCRIPTION

Applicant's Name..... : Shanghai Qingjian Automotive Technology Co., LTD

Address..... : Building 26, 1387 Zhangdong Road, Pudong New Area, Shanghai, China

Manufacture's Name..... : Shanghai Qingjian Automotive Technology Co., LTD

Address..... : Building 26, 1387 Zhangdong Road, Pudong New Area, Shanghai, China

Product Description

Product Name..... : BCM

Brand Name..... : 上汽集团 SAIC MOTOR

Model Name..... : 11596455

Series Model..... : N/A

Test Standards..... : FCC CFR Title 47 Part 15 Subpart C

Test Procedure..... : ANSI C63.10-2013

The device has been tested by ATBL, and the test results show that the equipment under test (EUT) is in compliance with the FCC CFR Title 47 Part 15 Subpart C requirements. And it is applicable only to the tested sample identified in the report.

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Date of receipt of test item..... : 2023.05.10

Date (s) of performance of tests..... : 2023.05.20-2023.05.26

Date of Issue..... : 2023.05.27

Test Result..... : **Pass**

TABLE OF CONTENTS

REVISION HISTORY 4
SUMMARY OF TEST RESULT 5
1. GENERAL DESCRIPTION 6
1.1. Applicant 6
1.2. Manufacturer 6
1.3. Factory 6
1.4. General Information of EUT 6
1.5. Modification of EUT 7
1.6. Laboratory Information 7
1.7. Applicable Standards 7
2. TEST CONFIGURATION OF EUT 8
2.1. Block Diagram of Test System 8
2.2. Operating Mode(s) 9
2.3. Description of Necessary Accessories And Support Units 10
2.4. Test Software and Power Level 11
2.5. EUT Operating Conditions 11
2.6. Equipment List 12
2.7. Measurement Uncertainty 13
3. TEST RESULT 14
3.1. AC Power Line Conducted Emission 14
3.1.1. Limit 14
3.1.2. Test Procedure 14
3.1.3. Test Setup 14
3.1.4. Test Data 14
3.2. Radiated Emissions 15
3.2.1. Limit 15
3.2.2. Test Procedure 16
3.2.3. Test Setup 16
3.2.4. Test Data 18
3.3. Emission bandwidth 22
3.3.1. Limit 22
3.3.2. Test Procedure 22
3.3.3. Test Setup 22
3.3.4. Test Data 22
3.4. Antenna Requirement 24
3.4.1. Standard Requirement 24
3.4.2. Eut Antenna 24
4. Test Setup Photographs 25

REVISION HISTORY

Rev.	Issue Date	Report NO.	Effect Page	Contents
00	2023.05.27	SHATBL2305005W01	ALL	Initial Issue

SUMMARY OF TEST RESULT

Report Section	Standard Section	Test Item	Judgment	Remark
3.1	FCC CFR Title 47 Part 15 Subpart C Section 15.207	Conducted Emission	N/A	N/A
3.2	FCC CFR Title 47 Part 15 Subpart C Section 15.209	Field Strength of Spurious	Pass	N/A
3.3	FCC CFR Title 47 Part 15 Subpart C Section 15.215(c)	Channel Bandwidth	Pass	N/A
3.4	FCC CFR Title 47 Part 15 Subpart C Section 15.203	Antenna Requirement	Pass	N/A

NOTE:

(1) 'N/A' denotes test is not applicable in this Test Report.

(2)All tests are according to ANSI C63.10-2013.

1. GENERAL DESCRIPTION

1.1. Applicant

Name : Shanghai Qingjian Automotive Technology Co., LTD

Address : Building 26, 1387 Zhangdong Road, Pudong New Area, Shanghai, China

1.2. Manufacturer

Name : Shanghai Qingjian Automotive Technology Co., LTD

Address : Building 26, 1387 Zhangdong Road, Pudong New Area, Shanghai, China

1.3. Factory

Name : Shangrao Qingjian Automotive Technology Co., LTD

Address : No. 125, Longmen Road, Shangrao Economic and Technological Development Zone, Jiangxi Province, China

1.4. General Information of EUT

General Information	
Equipment Name	BCM
Brand Name	上汽集团 SAIC MOTOR
Model Name	11596455
Series Model	N/A
Model Difference	N/A
Frequency Range:	TX 125KHz; RX: 433.92MHz, 433.369MHz;
Modulation Technique:	FSK
Antenna type:	external antenna 1.PEPS Antenna 2.Door handle Antenna 3.Antenna Connector supplier:Sumitomo
Adapter	N/A
Rated voltage	BCM Rated voltage: 13V DC, Min: 9V DC; Max:16V DC
Hardware version	BCM:V1.0
Software version	BCM:V1.0
Temperature Range:	BCM:-40~80 °C
Connecting I/O Port(s)	Refer to the remark below.

Remark:

The above information of EUT was declared by manufacturer. Please refer to the specifications or user's manual for more detailed description.

1.5. Modification of EUT

No modifications are made to the EUT during all test items.

1.6. Laboratory Information

Company Name	:	Shanghai ATBL Technology Co., Ltd.
Address	:	Building 8,No.160 Basheng Road, Waigaoqiao Free Trade Zone, Pudong New Area, Shanghai
Telephone	:	+86(0)21-51298625
A2LA Number	:	6184.01
CNAS Number	:	CNAS L14531

1.7. Applicable Standards

According to the specifications of the manufacturer, the EUT must comply with the requirements of the following standards:

FCC CFR Title 47 Part 15 Subpart C

Remark:

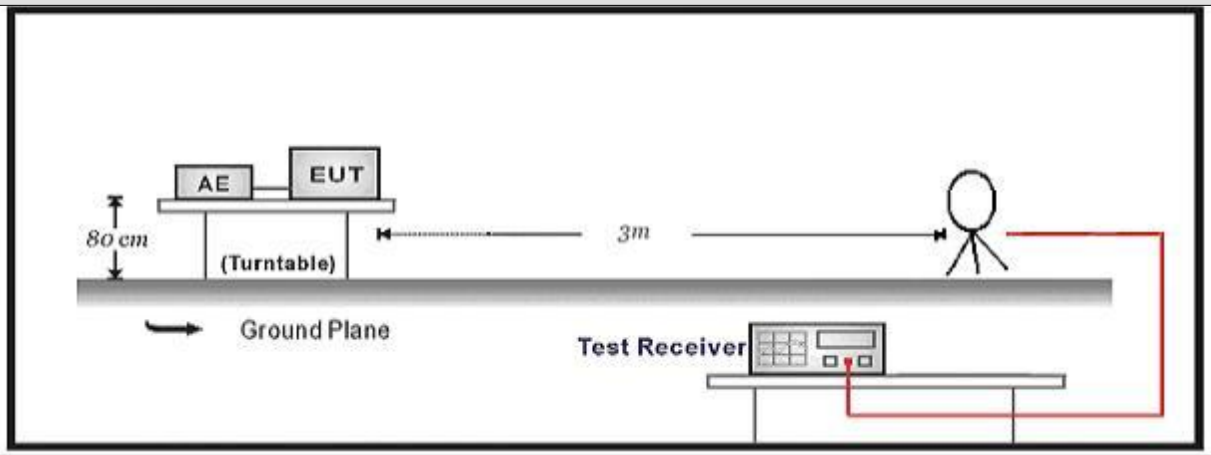
All test items were verified and recorded according to the standards and without any deviation during the test.

2. TEST CONFIGURATION OF EUT

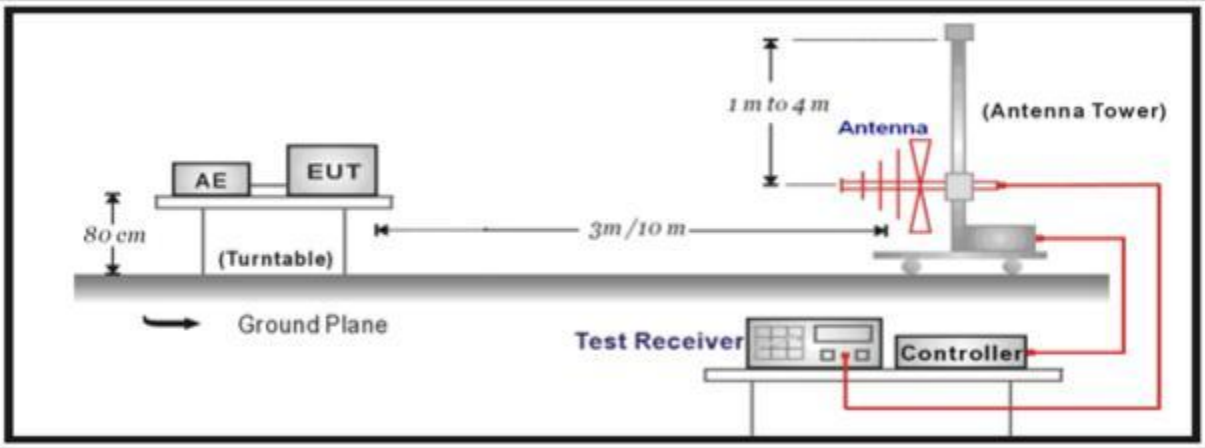
2.1. Block Diagram of Test System

Test setup Diagram- Radiated Emission

Below 30MHz Test Setup:



30MHz- 1GHz Test Setup:



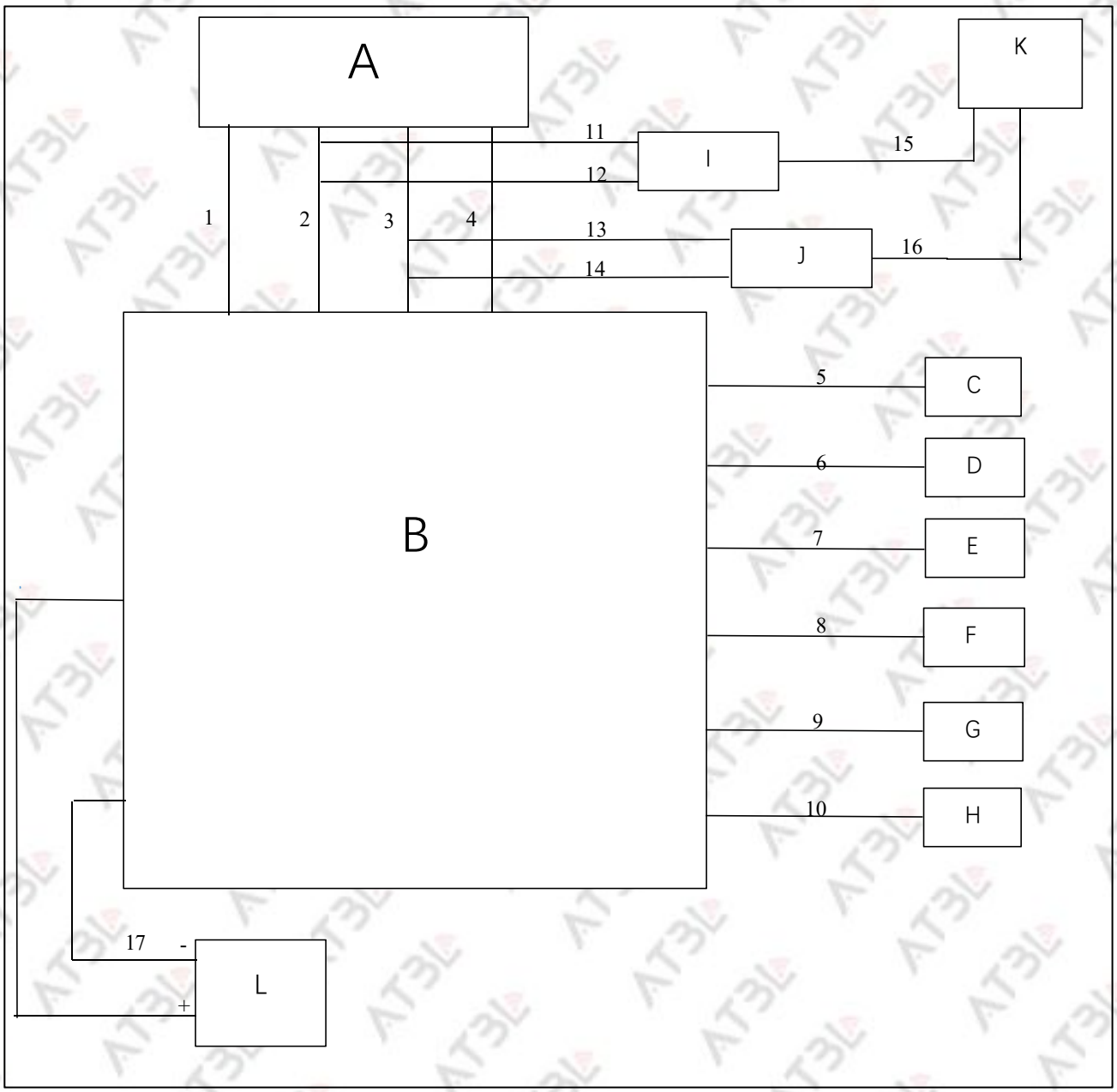
2.2. Operating Mode(s)

Test Item	Test setup and operating modes
Conducted Emission	N/A
Field Strength of Spurious	Mode 1: Transmit mode
Channel Bandwidth	Mode 1: Transmit mode

Remark: The EUT has been tested under normal operating condition. Control the EUT for staying in continuous transmitting for testing.

The field strength of spurious radiation emission was measured in the following position: The antennas of EUT stand-up position (Z axis), lie-down position (X, Y axis). The following data show only with the worst case setup.

Configuration and peripherals



2.3. Description of Necessary Accessories And Support Units

Description of EUT and Support equipment

NO.	Item	Model number	Manufacturer	Remarks
A	BCM	11596455	Shanghai Qingjian Automotive Technology Co., LTD	EUT
B	Checker Box	N/A	N/A	N/A
C	Antenna	0300360000_001	Sumitomo	EUT
D	PEPS Antenna	0300220000_001	Sumitomo	EUT
E	PEPS Antenna	0300220000_001	Sumitomo	EUT
F	PEPS Antenna	0300220000_001	Sumitomo	EUT
G	Door handle Antenna	0300210000_001	Sumitomo	EUT
H	Door handle Antenna	0300210000_001	Sumitomo	EUT
I	CAN Box1	CANcaseXL	VECTOR	N/A
J	CAN Box2	VN1630	VECTOR	N/A
K	PC	ThinkBook 14s-IWL	Lenovo	N/A
L	Battery	80D26LX	Camel Group Co.,Ltd.	N/A
N/A	Software	Vector CANoe 12.0	VECTOR	N/A

List of cables used

No.	Name	Length (m)	Shield		Remarks
			Cable	Connector	
1	Cables	1.7	Unshielded	Unshielded	N/A
2	Cables	1.7	Unshielded	Unshielded	N/A
3	Cables	1.7	Unshielded	Unshielded	N/A
4	Cables	1.7	Unshielded	Unshielded	N/A
5	Antenna Cable	1.7	Unshielded	Unshielded	N/A
6	Antenna Cable	1.7	Unshielded	Unshielded	N/A
7	Antenna Cable	1.7	Unshielded	Unshielded	N/A
8	Antenna Cable	1.7	Unshielded	Unshielded	N/A
9	Antenna Cable	1.7	Unshielded	Unshielded	N/A
10	Antenna Cable	1.7	Unshielded	Unshielded	N/A
11	Signal Cable	0.5	Unshielded	Unshielded	N/A
12	Signal Cable	0.5	Unshielded	Unshielded	N/A
13	Signal Cable	0.5	Unshielded	Unshielded	N/A
14	Signal Cable	0.5	Unshielded	Unshielded	N/A
15	Signal Cable	1.0	Unshielded	Unshielded	N/A
16	Signal Cable	1.0	Unshielded	Unshielded	N/A
17	DC Cable	1.0	Unshielded	Unshielded	N/A

2.4. Test Software and Power Level

During the test, the channel and power control software provided by the customer is used to control the operation channel and output power level.

Test the software version: version 12.0.75-64 bit

2.5. EUT Operating Conditions

For radiated spurious emission and conducted test, the engineering test program was provided and make the EUT to continuous transmit/receive.

2.6. Equipment List

2.6.1. For Radiated Spurious Emission

Equipment Name	Manufacturer	Model	Serial No.	Equipment No.	Calibration Until
Signal analyzer	Agilent	N9020A	MY50200811	SHATBL-E017	2023.09.27
Amplifier	JPT	JPA0118-55-303A	1910001800055000	SHATBL-E006	2023.09.27
Amplifier	JPT	JPA-10M1G32	21010100035001	SHATBL-E005	2023.09.27
Antenna/Turn table Controller	Brilliant	N/A	N/A	SHATBL-E007	N/A
Loop Antenna	Daze	ZN30900C	20077	SHATBL-E042	2023.09.27
Bilog Antenna	SCHWARZBECK	VULB 9168	01174	SHATBL-E008	2023.09.27
Broad-band Horn Antenna	SCHWARZBECK	BBHA 9120D	02334	SHATBL-E009	2023.09.27
Horn Antenna	COM-POWER	AH-1840	10100008	SHATBL-E043	2023.09.27
Thermometer	DeLi	N/A	N/A	SHATBL-E015	2023.09.20
Test Software	FALA	EMC-RI	N/A	SHATBL-E046	N/A

2.6.2. For Conducted Test

Equipment Name	Manufacturer	Model	Serial No.	Equipment No.	Calibration Until
Power meter	Anritsu	ML2496A	1935001	SHATBL-W030	2023.09.27
Power sensor	Anritsu	MA2411B	1911006	SHATBL-W031	2023.09.27
Power sensor	DARE	RPR3006W	16I00054SN016	SHATBL-W008	2023.09.27
Power sensor	DARE	RPR3006W	RPR6W-2001005	SHATBL-W032	2023.09.27
Power sensor	Rediteq	RPR3006W	RPR6W-2201002	SHATBL-W033	2023.11.15
Power sensor	Rediteq	RPR3006W	RPR6W-2201003	SHATBL-W034	2023.11.15
Power sensor	Keysight	U2021XA	MY59120004	SHATBL-W035	2023.08.14
Adjustable Attenuator	Agilent	8494B	MY42144015	SHATBL-W009	2023.09.27
Adjustable Attenuator	Agilent	8496B	MY42143776	SHATBL-W010	2023.09.27
Environmental Test Chamber	KSON	THS-B6C-150	9159K	SHATBL-W019	2024.01.16
Signal analyzer	Keysight	N9020A	MY50510136	SHATBL-W003	2023.09.27
Vector signal generator	Keysight	N5182B	MY57300196	SHATBL-W005	2023.09.27
Vector signal generator	Agilent	N5182A	MY50143555	SHATBL-W037	2023.07.17
Analog signal generator	Keysight	N5173B	MY60403026	SHATBL-W038	2023.07.17
Wideband radio communication tester	R&S	CMW500	101331	SHATBL-W007	2023.09.27
Spectrum analyzer	R&S	FSV40-N	101761	SHATBL-W036	2023.08.23
Switch Box	N/A	RFSW3003328	RFSW201019	SHATBL-W029	N/A
Thermometer	DeLi	N/A	N/A	SHATBL-W012	2023.09.20
Test Software	FALA	LZ-RF	N/A	SHATBL-W020	N/A

2.7. Measurement Uncertainty

The reported uncertainty of measurement y±U, where expended uncertainty U is based on a standard uncertainty multiplied by a coverage factor of k=2, providing a level of confidence of approximately 95 %.

No.	Item	Uncertainty
1	RF output power, conducted	±0.958dB
2	Conducted spurious emissions	±2.988dB
3	All emissions, radiated 30MHz-1GHz	±2.50dB
4	All emissions, radiated 1GHz-18GHz	±3.51dB
5	Occupied bandwidth	±23.20Hz
6	Power spectral density	±0.886dB

3. TEST RESULT

3.1. AC Power Line Conducted Emission

3.1.1. Limit

Standard	FCC Part 15 Subpart E Paragraph 15.207	
Frequency range [MHz]	Limit: QP [dB(μV)1)]	Limit: AV [dB(μV) 1)]
0,15 - 0,50	66 - 56 2)	56 - 46 2)
0,50 - 5,0	56	46
5,0 - 30	60	50

1) At the transition frequency, the lower limit applies.

2) The limit decreases linearly with the logarithm of the frequency.

NOTE 1: The exclusion band for transmitters shall be considered for transmitters operating at frequencies below 30 MHz.

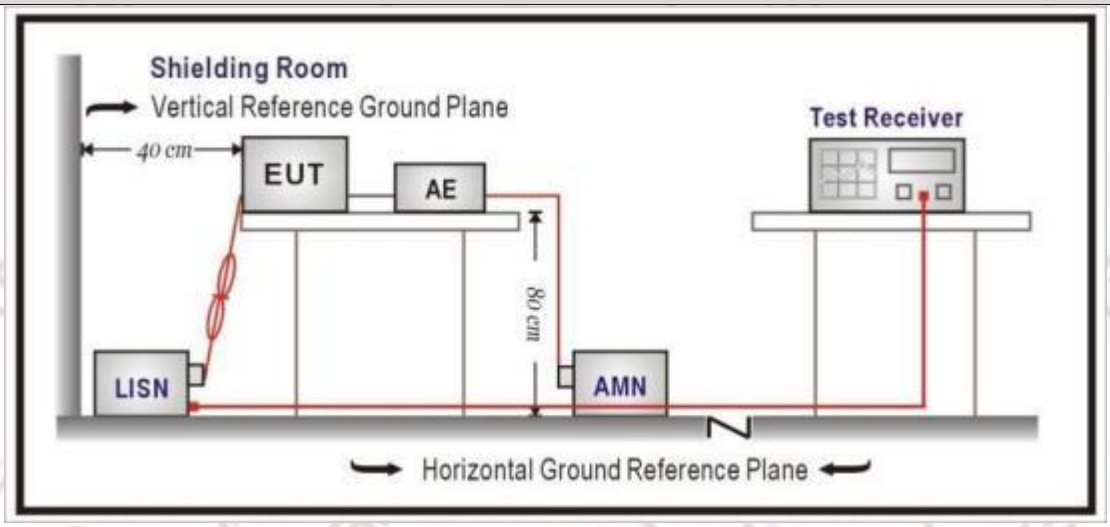
NOTE 2: Where the AC output port is directly connected (or via a circuit breaker) to the AC power input port of the EUT the AC power output port need not to be tested.

3.1.2. Test Procedure

References Rule	Chapter	Item
ANSI C63.10-2013	6.2	Standard test method for ac power-line conducted emissions from unlicensed wireless devices

3.1.3. Test Setup

Test Setup



3.1.4. Test Data

N/A: The test is not applicable since the EUT is not the device that is designed to be connected to the public utility (AC) power line.

3.2. Radiated Emissions

3.2.1. Limit

Standard	FCC Part 15 Subpart C Paragraph 15. 209		
Restricted Band Emissions Limit			
Frequency (MHz)	Field strength (μV/m)	Field strength (dBμV/m)	Measurement distance (m)
0.009 - 0.49	2400/F(kHz)	48.5 – 13.8	300(Note 1)
0.49 - 1.705	24000/F(kHz)	33.8 - 23	30(Note 1)
1.705 - 30	30	29.5	30(Note 1)
30 - 88	100	40	3(Note 2)
88 - 216	150	43.5	3(Note 2)
216 - 960	200	46	3(Note 2)
Above 960	500	54	3(Note 2)

Note 1: At frequencies below 30 MHz, measurements may be performed at a distance closer than that specified in the regulations; however, an attempt should be made to avoid making measurements in the near field. Pending the development of an appropriate measurement procedure for measurements performed below 30 MHz, when performing measurements at a closer distance than specified, the results shall be extrapolated to the specified distance by either making measurements at a minimum of two distances on at least one radial to determine the proper extrapolation factor or by using the square of an inverse linear distance extrapolation factor (40dB/decade).

Note 2: At frequencies at or above 30 MHz, measurements may be performed at a distance other than what is specified provided: measurements are not made in the near field except where it can be shown that near field measurements are appropriate due to the characteristics of the device; and it can be demonstrated that the signal levels needed to be measured at the distance employed can be detected by the measurement equipment. Measurements shall not be performed at a distance greater than 30 meters unless it can be further demonstrated that measurements at a distance of 30 meters or less are impractical. When performing measurements at a distance other than that specified, the results shall be extrapolated to the specified distance using an extrapolation factor of 20 dB/decade (inverse linear-distance for field strength measurements; inverse-linear-distance-squared for power density measurements).

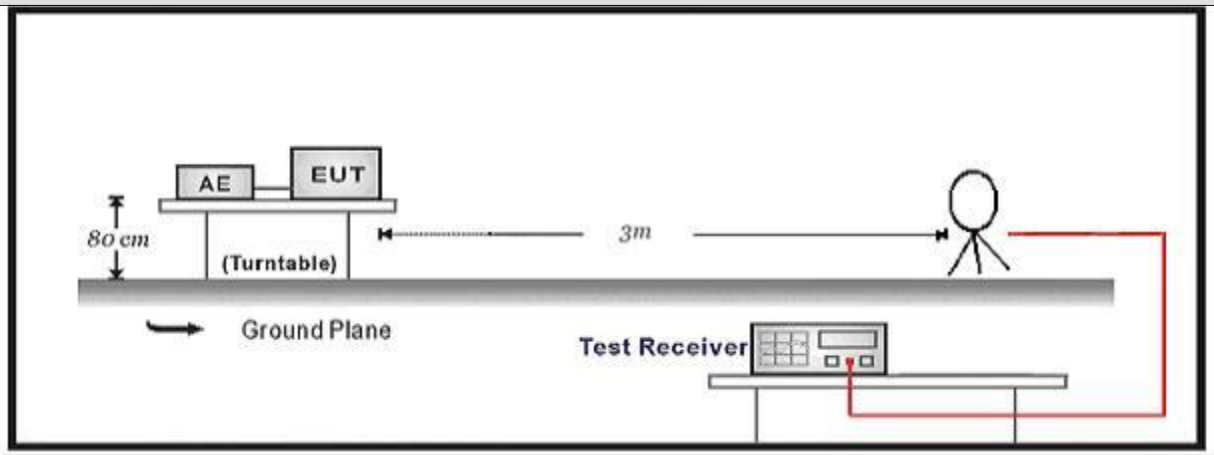
Note 3:The emission limits shown in the above table are based on measurements employing a CISPR quasi-peak detector except for the frequency bands 9-90 kHz, 110-490 kHz and above 1000 MHz. Radiated emission limits in these three bands are based on measurements employing an average detector.

3.2.2. Test Procedure

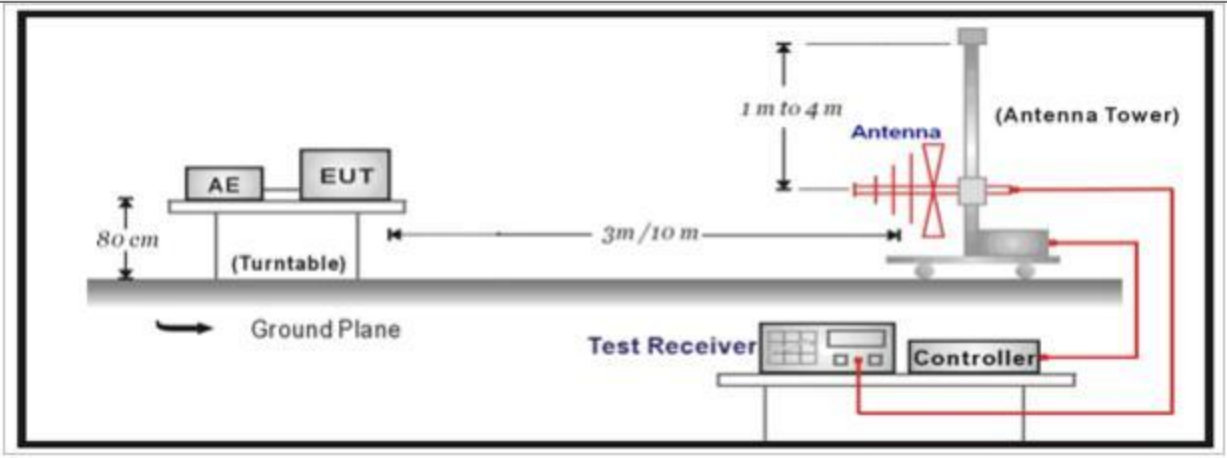
References Rule	Chapter	Description
ANSI C63.10	6.4	Radiated emissions from unlicensed wireless devices below 30 MHz
ANSI C63.10	6.5	Radiated emissions from unlicensed wireless devices in the frequency range of 30 MHz to 1000 MHz
ANSI C63.10	6.6	Radiated emissions from unlicensed wireless devices above 1 GHz

3.2.3. Test Setup

Below 30MHz Test Setup:



30MHz- 1GHz Test Setup:



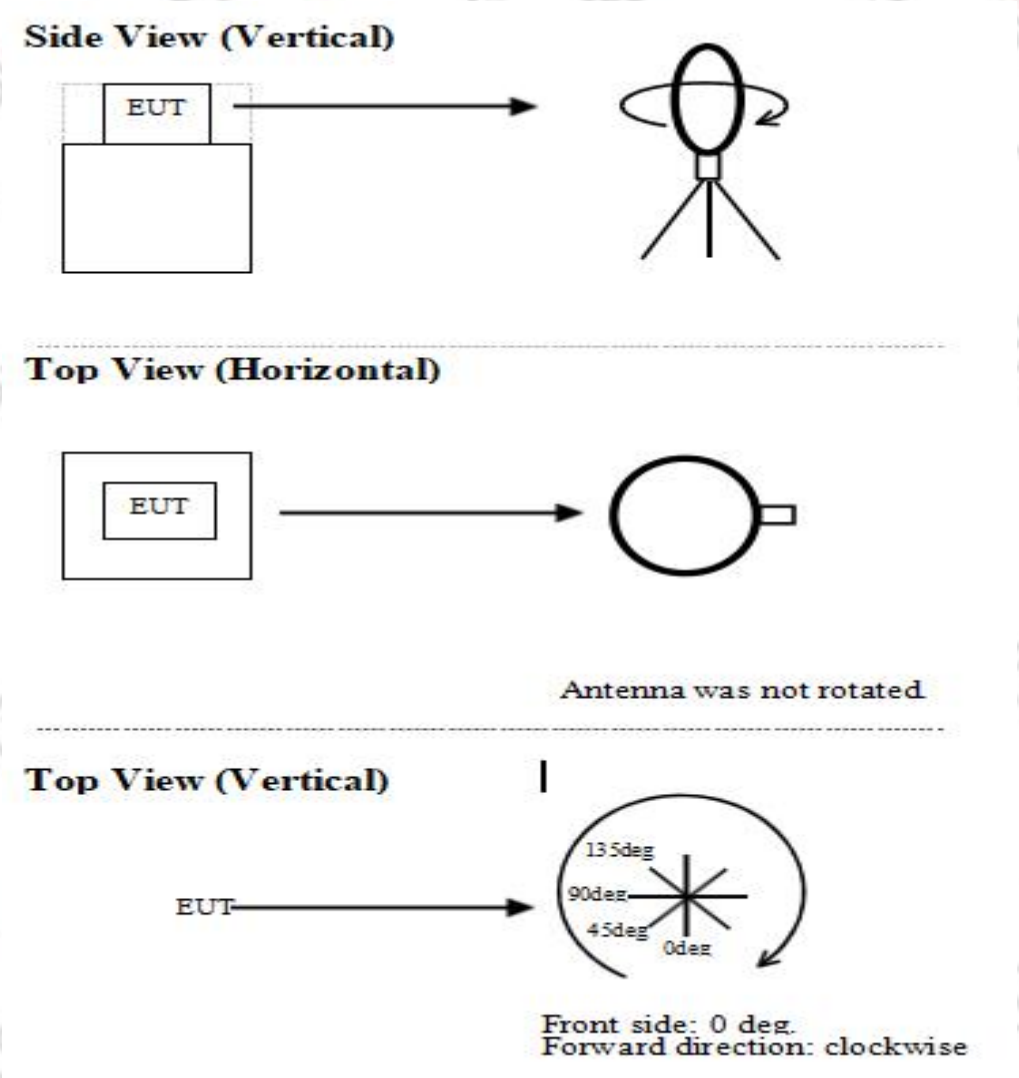
NOTE:

1.The carrier level and noise levels were confirmed at each position of X, Y and Z axes of EUT to see the position of maximum noise, and the test was made at the position that has the maximum noise.

2.The test results and limit are rounded off to one decimal place, so some differences might be observed.The direction of the ring antenna is shown in Figure 1.The worst case emissions were reported.

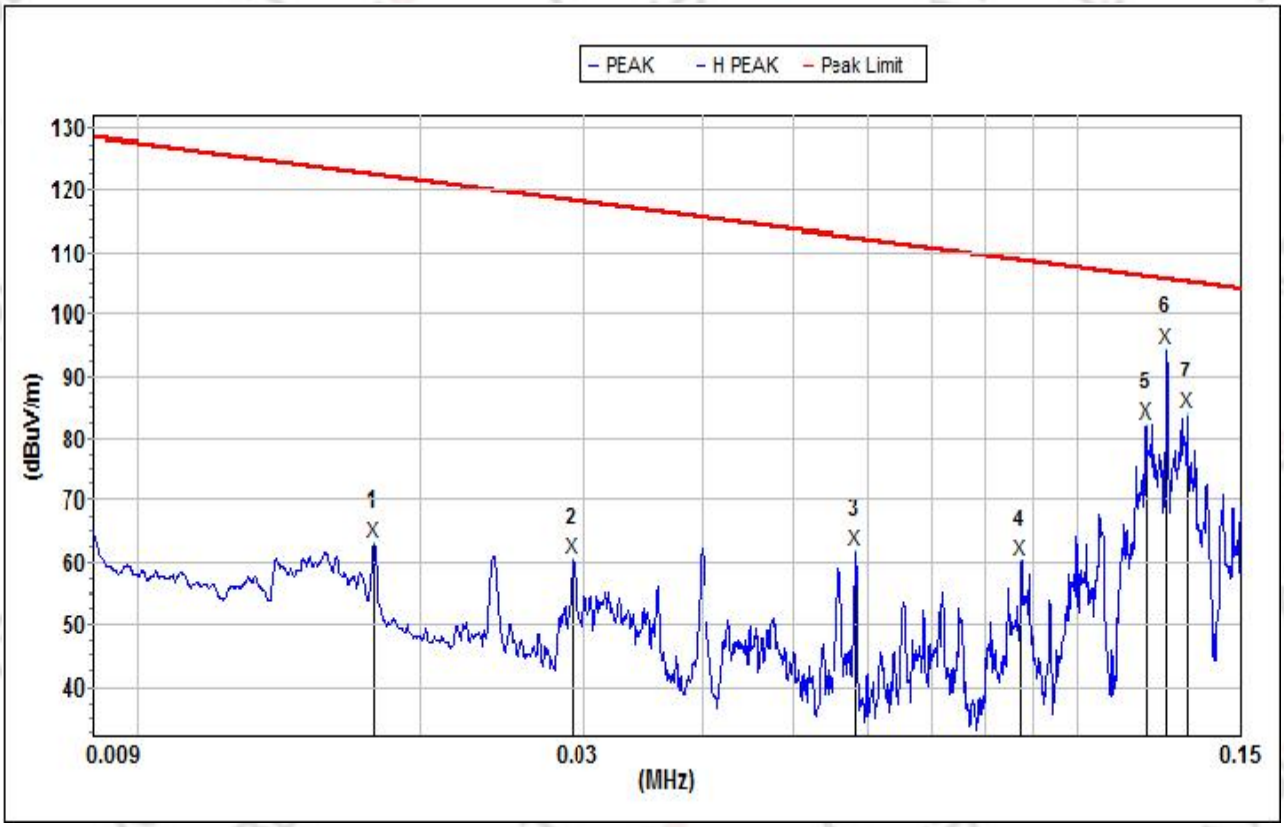
3.If the Peak value below the AV/QP Limit, the AV /QP test doesn't perform for this submission.

Figure 1: Direction of the Loop Antenna



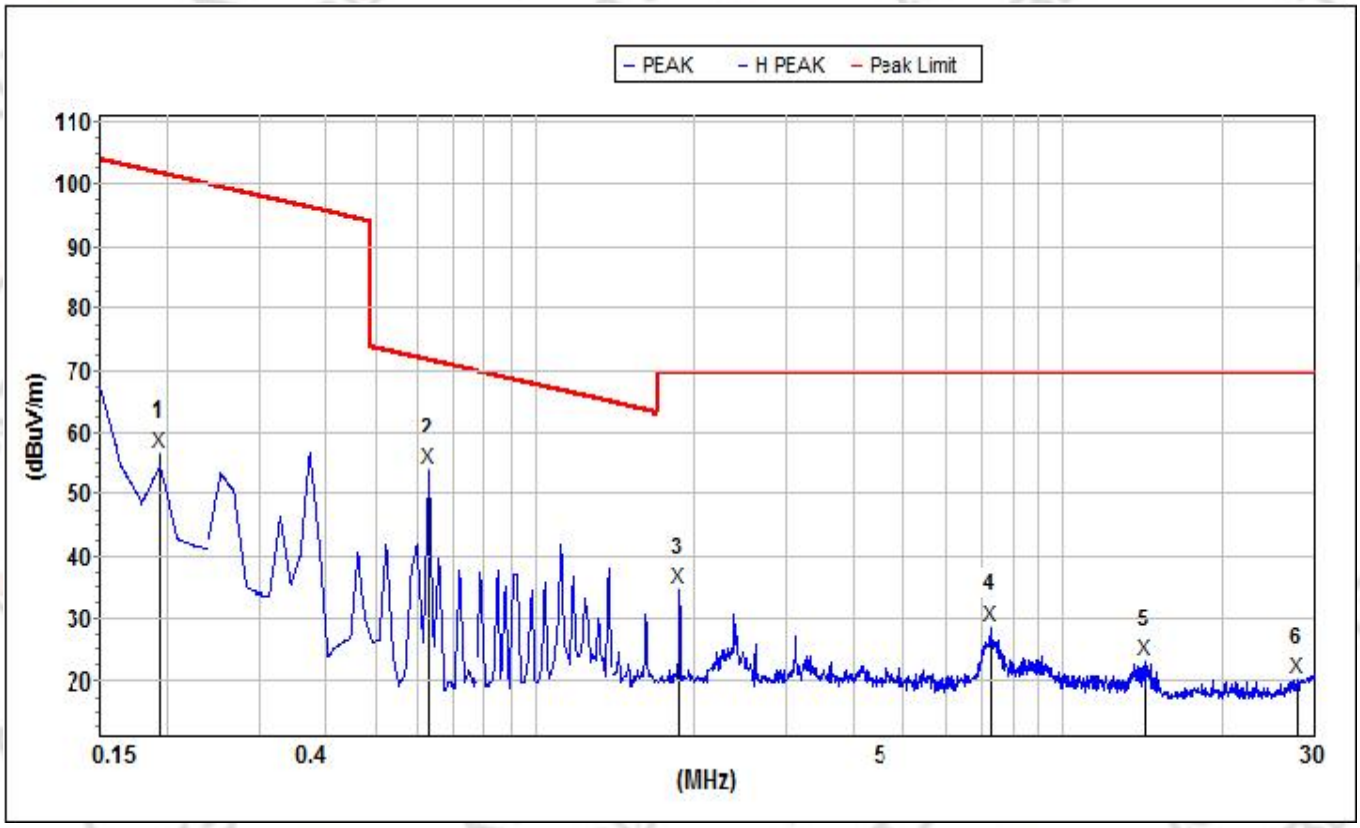
3.2.4. Test Data

9kHz-150kHz Operating mode



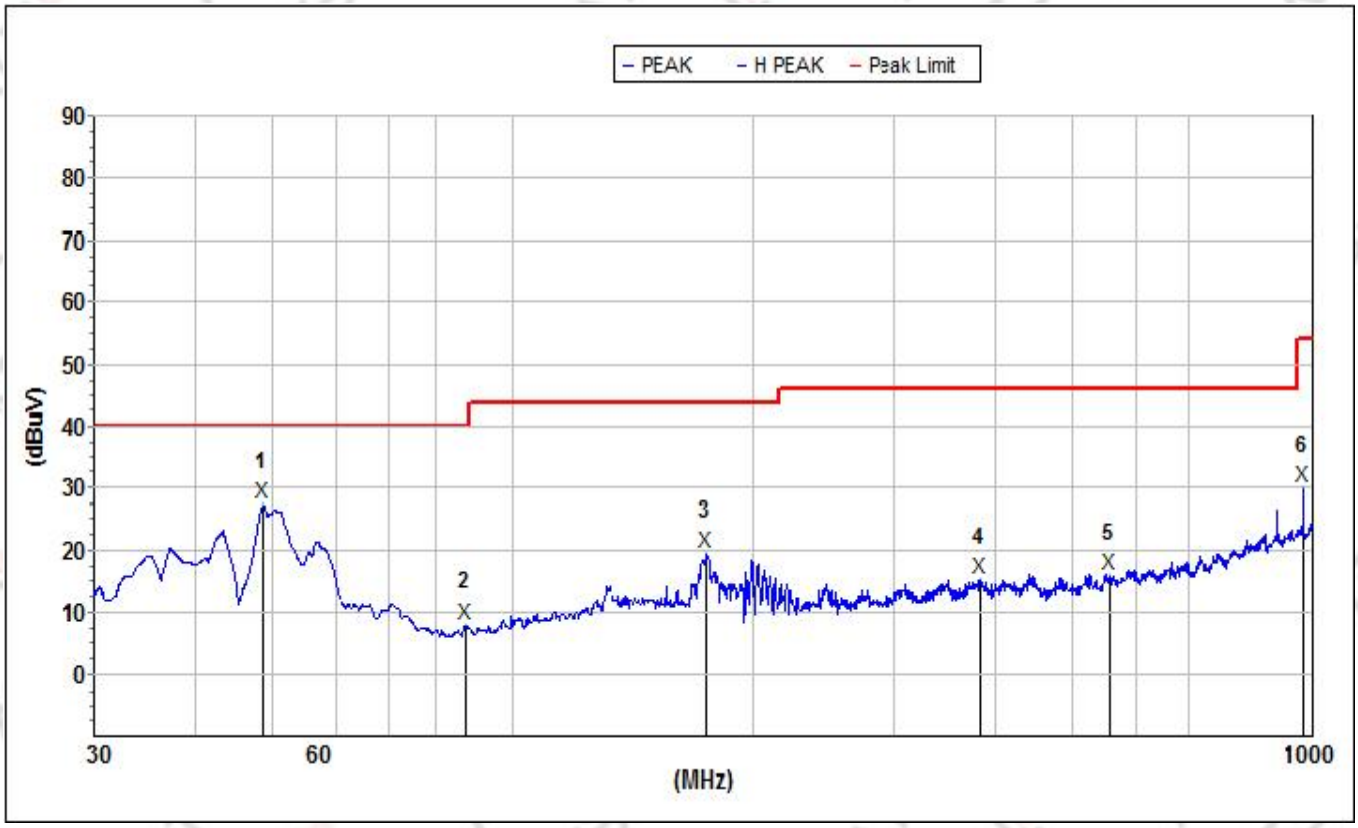
Mk.	Freq.	Level	Limit	Margin	Ant.F/G.	Cbl.L.	Remark
	(MHz)	(dBuV/m)	(dBuV/m)	(dB)	(dB/m)	(dB)	
1	0.017880	63.3	122.5	59.2	33.5	0.0	Peak
2	0.029132	60.6	118.3	57.7	28.8	0.0	Peak
3	0.058284	61.8	112.3	50.5	24.3	0.1	Peak
4	0.087397	60.3	108.8	48.5	22.9	0.1	Peak
5	0.118762	82.4	106.1	23.7	22.6	0.1	Peak
6	0.124931	94.5	105.7	11.2	22.6	0.1	Peak
7	0.131236	84.1	105.2	21.1	22.5	0.1	Peak

150kHz-30MHz Operating mode



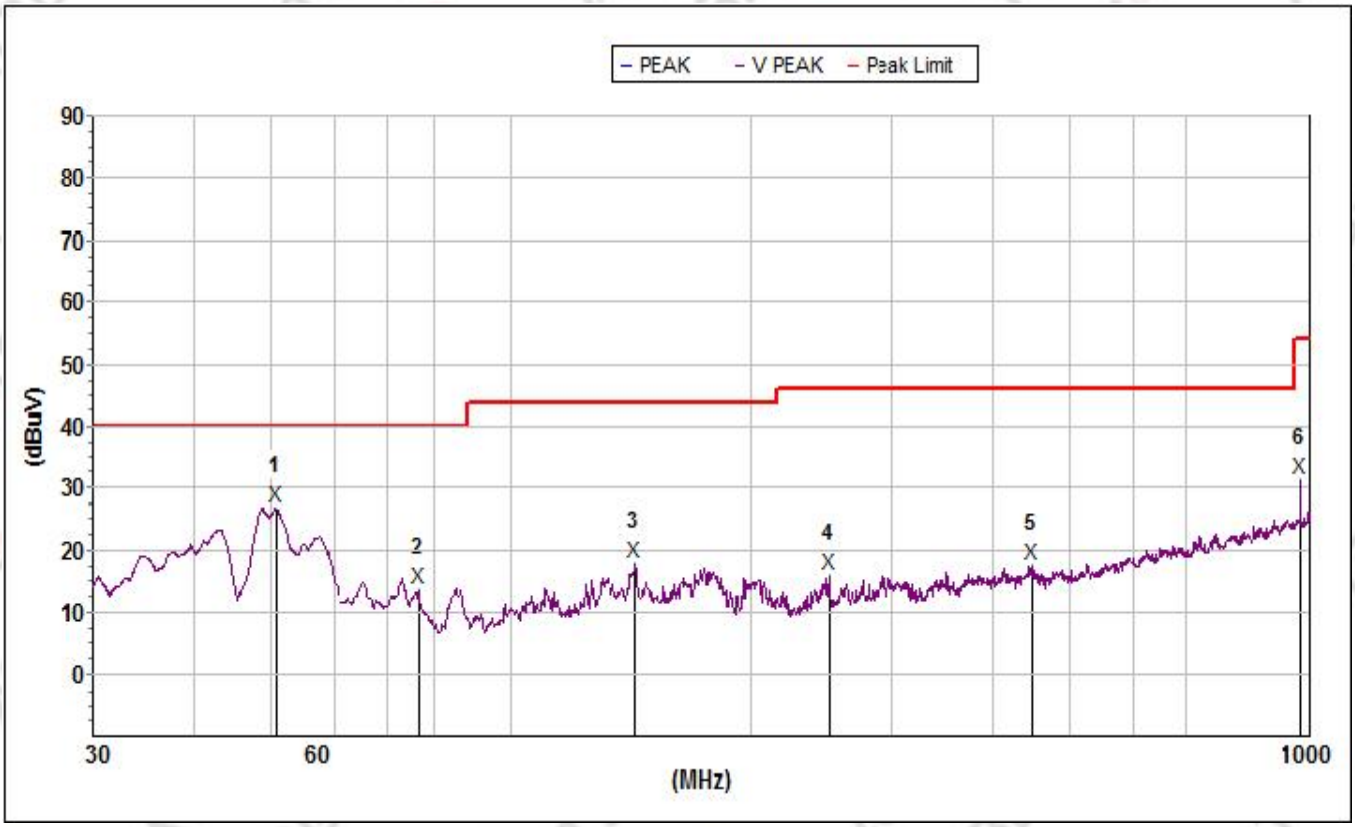
Mk.	Freq.	Level	Limit	Margin	Ant.F/G.	Cbl.L.	Remark
	(MHz)	(dBuV/m)	(dBuV/m)	(dB)	(dB/m)	(dB)	
1	0.194465	56.7	101.8	45.1	22.4	0.1	Peak
2	0.627147	54.1	71.7	17.6	21.5	0.1	Peak
3	1.877944	34.7	69.5	34.8	21.6	0.1	Peak
4	7.290314	28.7	69.5	40.8	20.0	0.2	Peak
5	14.250383	23.1	69.5	46.4	19.5	0.2	Peak
6	28.003213	20.1	69.5	49.4	19.4	0.3	Peak

30MHz-1GHz Operating mode
Horizontal



Mk.	Freq.(MHz)	Level(dBuV/m)	Limit(dBuV/m)	Margin(dB)	Ant.F/G.(dB/m)	Amp.G.(dB)	Cbl.L.(dB)	Pol.
Peak:								
1	48.842895	27.6	40.0	12.4	13.6	32.6	0.8	H
2	87.111681	8.0	40.0	32.0	9.4	32.9	1.1	H
3	174.424057	19.5	43.5	24.0	12.5	32.8	1.8	H
4	382.587894	15.2	46.0	30.8	13.7	32.4	2.7	H
5	557.751425	16.1	46.0	29.9	15.5	32.4	3.1	H
6	974.043628	30.0	54.0	24.0	20.5	31.1	3.8	H

Vertical



Mk.	Freq.(MHz)	Level(dBuV/m)	Limit(dBuV/m)	Margin(dB)	Ant.F/G.(dB/m)	Amp.G.(dB)	Cbl.L.(dB)	Pol.
Peak:								
1	50.852757	27.0	40.0	13.0	13.5	32.6	0.8	V
2	76.512057	13.8	40.0	26.2	9.8	32.9	0.9	V
3	143.326064	18.1	43.5	25.4	13.7	32.9	1.3	V
4	249.862716	16.0	46.0	30.0	11.6	32.8	2.6	V
5	449.555842	17.7	46.0	28.3	16.0	32.4	2.7	V
6	974.043628	31.6	54.0	22.4	22.2	31.1	3.8	V

3.3. Emission bandwidth

3.3.1. Limit

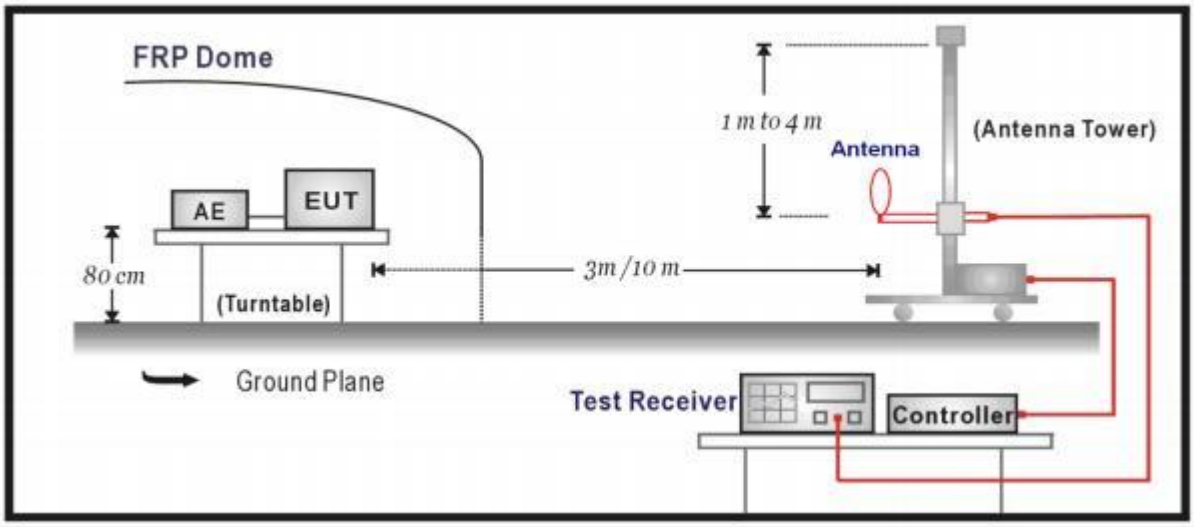
Standard	FCC Part 15 Subpart C Paragraph 15.215
Within the band.	

3.3.2. Test Procedure

Reference Rule	Chapter	Description
ANSI C63.10	6.9.2	Occupied bandwidth— relative measurement procedure

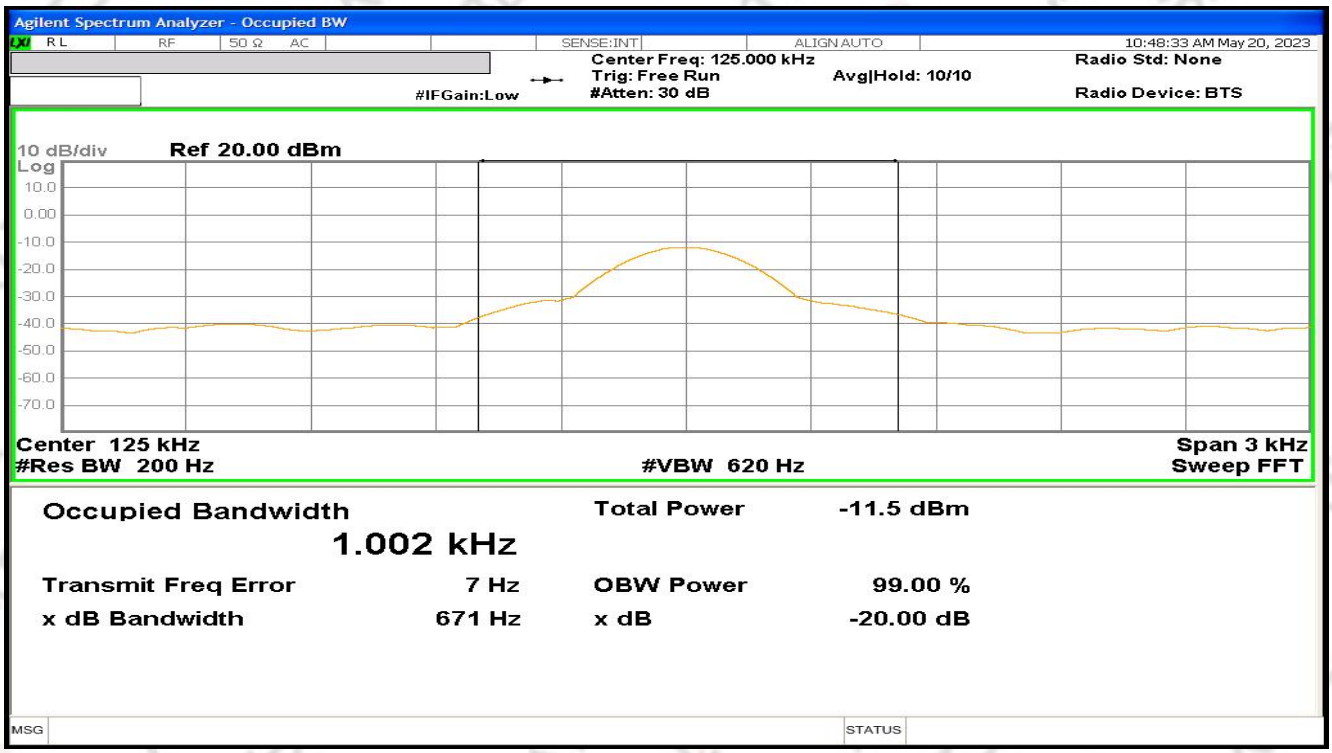
3.3.3. Test Setup

Test Setup



3.3.4. Test Data

Frequency (kHz)	20dB bandwidth (Hz)	99% bandwidth (Hz)	Result
125	671	1002	Pass



3.4. Antenna Requirement

3.4.1. Standard Requirement

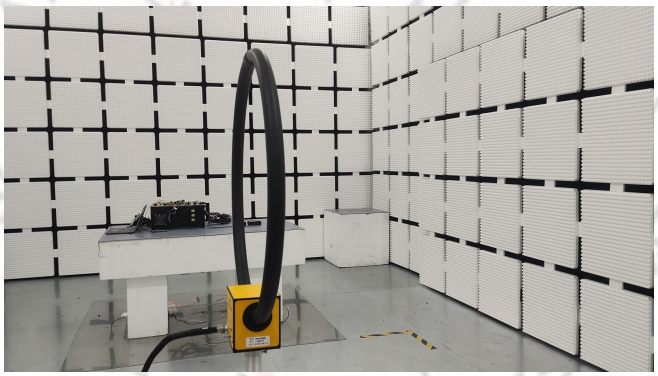
FCC Part 15 Paragraph 15.203, an intentional radiator shall be designed to ensure that no antenna other than that furnished by the responsible party shall be used with the device. The useof a permanently attached antenna to the intentional radiator shall be considered sufficient to comply with the provisions of this section.

3.4.2. Eut Antenna

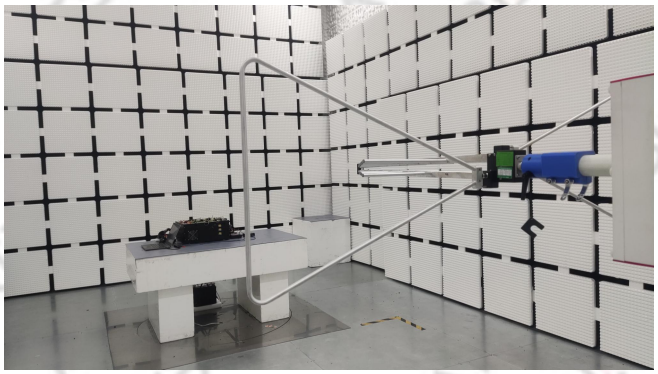
The EUT antenna used unique antenna jack. lt conforms to the standard requirements.

4. Test Setup Photographs

Radiated Emissions for 9kHz-30MHz



Radiated Emissions for 30MHz-1GHz



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