

# RADIO PERFORMANCE TEST REPORT

**Test Report No.** : OT-232-RWD-032  
**Reception No.** : 2212004035  
**Applicant** : CHIPSEN. Co., Ltd  
**Address** : B1 C-17, 15, Gyeongin-ro 53-gil, Guro-gu, Seoul, Korea  
**Manufacturer** : CHIPSEN. Co., Ltd  
**Address** : B1 C-17, 15, Gyeongin-ro 53-gil, Guro-gu, Seoul, Korea  
**Type of Equipment** : Wireless Communication Module  
**FCC ID.** : 2APB6-BOT-TMA50  
**Model Name** : BoT-TMA50  
**Multiple Model Name** : BoT-TMA50D, BoT-TMA50DU, BoT-TMA50DS  
**Serial number** : N/A  
**Total page of Report** : 54 pages (including this page)  
**Date of Incoming** : February 07, 2023  
**Date of issue** : February 27, 2023

## SUMMARY

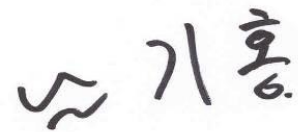
The equipment complies with the regulation; *FCC PART 15 SUBPART C Section 15.247*

This test report only contains the result of a single test of the sample supplied for the examination.

It is not a generally valid assessment of the features of the respective products of the mass-production.

**This report is not correlated with the "KS Q ISO/IEC 17025 and KOLAS accreditation" of Korean Laboratory Accreditation Scheme.**





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※ Please refer to the Annex section for All test plots

**Revision History**

Rev. No.	Issue Report No.	Issued Date	Revisions	Section Affected
0	OT-232-RWD-032	February 27, 2023	Initial Release	All

## 1. VERIFICATION OF COMPLIANCE

Applicant : CHIPSEN. Co., Ltd  
 Address : B1 C-17, 15, Gyeongin-ro 53-gil, Guro-gu, Seoul, Korea  
 Contact Person : Young Min Park / Senior Engineer  
 Telephone No. : +82-10-7144-0729  
 FCC ID : 2APB6-BOT-TMA50  
 Model Name : BoT-TMA50  
 Brand Name : N/A  
 Serial Number : N/A  
 Date : February 27, 2023

EQUIPMENT CLASS	DTS – DIGITAL TRNSMISSION SYSTEM
E.U.T. DESCRIPTION	Wireless Communication Module
THIS REPORT CONCERNS	Original Grant
MEASUREMENT PROCEDURES	ANSI C63.10: 2013
TYPE OF EQUIPMENT TESTED	Pre-Production
KIND OF EQUIPMENT AUTHORIZATION REQUESTED	Certification
EQUIPMENT WILL BE OPERATED UNDER FCC RULES PART(S)	FCC PART 15 SUBPART C Section 15.247 KDB 558074 D01 15.247 Meas Guidance v05r02
Modifications on the Equipment to Achieve Compliance	None
Final Test was Conducted On	3 m, Semi Anechoic Chamber

-. The above equipment was tested by ONETECH Corp. for compliance with the requirement set forth in the FCC Rules and Regulations. This said equipment in the configuration described in this report, shows the maximum emission levels emanating from equipment are within the compliance requirements.

## 2. TEST SUMMARY

### 2.1 Test items and results

SECTION	TEST ITEMS	RESULTS
15.247 (a) (2)	Minimum 6 dB Bandwidth	Met the Limit / PASS
15.247 (b) (3)	Maximum Peak Conducted Output Power	Met the Limit / PASS
15.247 (d)	100 kHz Bandwidth Outside the Frequency Band	Met the Limit / PASS
15.247 (d)	Radiated Emission which fall in the Restricted Band	Met the Limit / PASS
15.247 (e)	Peak Power Spectral Density	Met the Limit / PASS
15.209	Radiated Emission Limits	Met the Limit / PASS
15.207	Conducted Limits	Met the Limit / PASS
15.203	Antenna Requirement	Met requirement / PASS

### 2.2 Additions, deviations, exclusions from standards

No additions, deviations or exclusions have been made from standard.

### 2.3 Related Submittal(s) / Grant(s)

Original submittal only

### 2.4 Purpose of the test

To determine whether the equipment under test fulfills the requirements of the regulation stated in FCC PART 15 SUBPART C Section 15.247.

### 2.5 Test Methodology

Both conducted and radiated testing was performed according to the procedures in ANSI C63.10: 2013. Radiated testing was performed at a distance of 3 m from EUT to the antenna.

### 2.6 Test Facility

The Onetech Corp. has been designated to perform equipment testing in compliance with ISO/IEC 17025.

The Electromagnetic compatibility measurement facilities are located at 43-14, Jinsaegol-gil, Chowol-eup, Gwangju-si, Gyeonggi-do, 12735, Korea.

-. Site Filing:

VCCI (Voluntary Control Council for Interference) – Registration No. R-20122/ C-14617/ G-10666/ T-11842

ISED (Innovation, Science and Economic Development Canada) – Registration No. Site# 3736A-3

KOLAS (Korea Laboratory Accreditation Scheme) - Accreditation NO. KT085

FCC (Federal Communications Commission) - Accreditation No. KR0013

RRA (Radio Research Agency) – Designation No. KR0013

### 3. GENERAL INFORMATION

#### 3.1 Product Description

The CHIPSEN. Co., Ltd, Model BoT-TMA50 (referred to as the EUT in this report) is a Wireless Communication Module. The product specification described herein was obtained from product data sheet or user’s manual.

Device Type	Wireless Communication Module		
Temperature Range	-40 °C ~ +85 °C		
Operating Frequency	2 402 MHz ~ 2 480 MHz		
MAX. RF OUTPUT POWER	Bluetooth LE	1 Mbps	11.93 dBm
		2 Mbps	12.77 dBm
Number of Channel	Bluetooth LE	40 Channels	
Modulation Type	Bluetooth LE	GFSK	
Antenna Type	Chip Antenna		
Antenna Gain	3.50 dBi		
List of each Osc. or crystal Freq.(Freq. >= 1 MHz)	32 MHz		
Rated Supply Voltage	DC 3.3 V		

#### 3.2 Alternative type(s)/model(s); also covered by this test report.

-. The following lists consist of the added model and their differences.

Model Name	Differences	Tested
BoT-TMA50	Basic Model	<input checked="" type="checkbox"/>
BoT-TMA50D	This model is identical to the basic model except for added Pin Header board surrounding Module.	<input checked="" type="checkbox"/>
BoT-TMA50DU	This model is identical to the basic model except for mounted Pin Header board including U.FL connector and added PCB Antenna	<input checked="" type="checkbox"/>
BoT-TMA50DS	This model is identical to the basic model except for mounted Pin Header board including SMA connector and added Dipole Antennas	<input checked="" type="checkbox"/>

- Note: 1. For multiple models, Only radiated emission test has been performed.  
 2. The Applicant/manufacturer is responsible for the compliance of all variants.

### 4. EUT MODIFICATIONS

-. None



## 5. SYSTEM TEST CONFIGURATION

### 5.1 Justification

This device was configured for testing in a typical way as a normal customer is supposed to be used. During the test, the following components were installed inside of the EUT.

DEVICE TYPE	MANUFACTURER	MODEL/PART NUMBER	FCC ID
Module	CHIPSEN. Co., Ltd	BoT-TMA50	2ABP6-BOT-TMA50

### 5.2 Peripheral equipment

Defined as equipment needed for correct operation of the EUT, but not considered as tested:

Model	Manufacturer	Description	Connected to
BoT-TMA50	CHIPSEN. Co., Ltd	Wireless Communication Module (EUT)	-
Ideapad 320	LENOVO	Notebook PC	EUT

### 5.3 Mode of operation during the test

For the testing, software used to control the EUT for staying in continuous transmitting is programmed.

For final testing, the EUT was set at 2 402 MHz, 2 440 MHz, and 2 480 MHz to get a maximum emission levels from the EUT. The EUT was moved throughout the XY, XZ, and YZ planes and the worst case is “XY” axis, but the worst data was recorded in this report.

-. Frequency / Channel Operations

Channel	Frequency
0	2 402
19	2 440
39	2 480

- Duty Cycle

Mode	Tx On Time [ ms ]	Tx Off Time [ ms ]	Duty Cycle [ % ]	Correction Factor [ dB ]
Bluetooth LE 1 Mbps	2.140	0.360	85.60	0.68
Bluetooth LE 2 Mbps	1.083	0.794	57.70	2.39

Note – Duty Cycle :  $(Tx\ On\ Time / (Tx\ On\ Time + Tx\ Off\ Time)) * 100$

Correction Factor :  $10 * \log(1 / (Duty\ Cycle / 100))$

### 5.4 Configuration of Test System

**Line Conducted Test:** The EUT was tested in the Transmitting mode. All supporting equipment were connected to another LISN. Preliminary Power line Conducted Emission test was performed by using the procedure in ANSI C63.10: 2013 to determine the worse operating conditions.

**Radiated Emission Test:** Preliminary radiated emissions test were conducted using the procedure in ANSI C63.10: 2013 to determine the worse operating conditions. Final radiated emission tests were conducted at 3 meter Semi Anechoic Chamber.  
The turntable was rotated through 360 degrees and the EUT was tested by positioned three orthogonal planes to obtain the highest reading on the field strength meter. Once maximum reading was determined, the search antenna was raised and lowered in both vertical and horizontal polarization.

### 5.5 Antenna Requirement

For intentional device, according to section 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.

**Antenna Construction:**

The antenna of the EUT is a Chip Antenna on the main board in the EUT, so no consideration of replacement by the user.

## 6. PRELIMINARY TEST

### 6.1 AC Power line Conducted Emissions Tests

During Preliminary Test, the following operating mode was investigated.

Operation Mode	The Worse operating condition (Please check one only)
Transmitting Mode	X

### 6.2 General Radiated Emissions Tests

During Preliminary Test, the following operating mode was investigated.

Operation Mode	The Worse operating condition (Please check one only)
Transmitting Mode	X

## 7. MINIMUM 6 dB BANDWIDTH

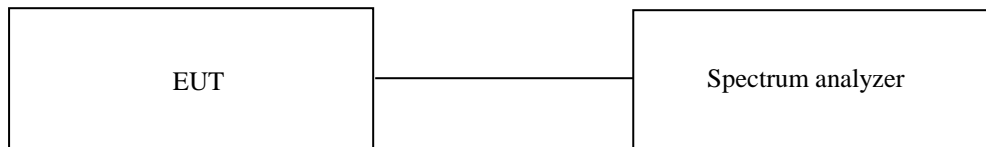
### 7.1 Operating environment

Temperature : 23 °C

Relative humidity : 46 % R.H.

### 7.2 Test set-up

The antenna output of the EUT was connected to the spectrum analyzer. The resolution bandwidth is set to 100 kHz, and peak detection was used. The 6 dB bandwidth is defined as the total spectrum over which the power is higher than the peak power minus 6 dB.



### 7.3 Test Date

February 07, 2023 ~ February 15, 2023

**7.4 Test data for 1 Mbps**

CHANNEL	FREQUENCY(MHz)	MEASURED VALUE (kHz)	LIMIT (kHz)	MARGIN (kHz)
Low	2 402.00	714.30	500.00	214.30
Middle	2 440.00	724.30	500.00	224.30
High	2 480.00	714.30	500.00	214.30

Remark. Margin = Measured Value - Limit

**7.5 Test data for 2 Mbps**

CHANNEL	FREQUENCY(MHz)	MEASURED VALUE (kHz)	LIMIT (kHz)	MARGIN (kHz)
Low	2 402.00	1 161.00	500.00	661.00
Middle	2 440.00	1 169.00	500.00	669.00
High	2 480.00	1 149.00	500.00	649.00

Remark. Margin = Measured Value - Limit

## 8. MAXIMUM CONDUCTED(AVERAGE) OUTPUT POWER

### 8.1 Operating environment

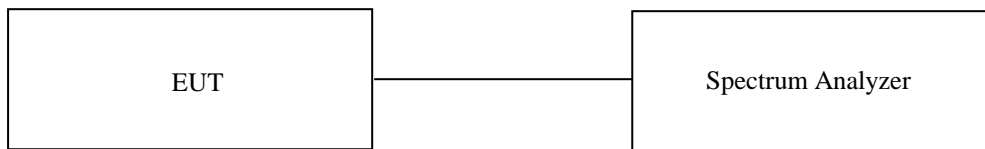
Temperature : 23 °C

Relative humidity : 46 % R.H.

### 8.2 Test set-up

The antenna output of the EUT was connected to the spectrum analyzer.

The resolution bandwidth is set to 1 MHz, the video bandwidth is set to 3 times the resolution bandwidth.



### 8.3 Test Date

February 07, 2023 ~ February 15, 2023

### 8.4 Test data for 1 Mbps

-. Test Result : Pass

CHANNEL	FREQUENCY (MHz)	MEASURED VALUE (dBm)	Duty Factor (dB)	RESULT (dBm)	LIMIT (dBm)	MARGIN (dB)
LOW	2 402.00	11.25	0.68	11.93	30.00	18.07
MIDDLE	2 440.00	11.19	0.68	11.87	30.00	18.13
HIGH	2 480.00	10.42	0.68	11.10	30.00	18.90

Remark. Margin = Limit – Result (=Measured Value + Duty Factor)

### 8.5 Test data for 2 Mbps

-. Test Result : Pass

CHANNEL	FREQUENCY (MHz)	MEASURED VALUE (dBm)	Duty Factor(dB)	RESULT (dBm)	LIMIT (dBm)	MARGIN (dB)
LOW	2 402.00	10.31	2.39	12.70	30.00	17.30
MIDDLE	2 440.00	10.38	2.39	12.77	30.00	17.23
HIGH	2 480.00	5.65	2.39	8.04	30.00	21.96

Remark. Margin = Limit – Result (=Measured Value + Duty Factor)

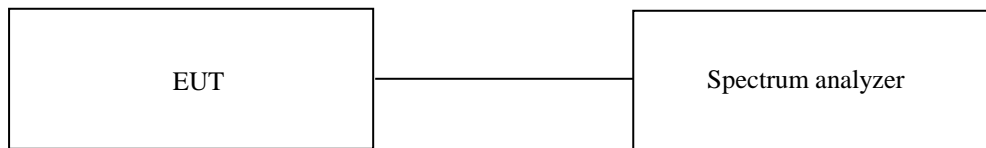
## 9. 100 kHz BANDWIDTH OUTSIDE THE FREQUENCY BAND

### 9.1 Operating environment

Temperature : 23 °C  
 Relative humidity : 46 % R.H.

### 9.2 Test set-up for conducted measurement

The antenna output of the EUT was connected to the spectrum analyzer. The resolution bandwidth is set to 100 kHz, the video bandwidth is set to 3 times the resolution bandwidth and peak detection was used.



### 9.3 Test set-up for radiated measurement

The radiated emissions measurements were performed on the 3 m semi anechoic chamber. The EUT was placed on turntable approximately 1.5 m above the ground plane.

The frequency spectrum from 30 MHz to 26.5 GHz was scanned and maximum emission levels at each frequency recorded. The system was rotated 360°, and the antenna was varied in the height between 1.0 m and 4.0 m in order to determine the maximum emission levels. This procedure was performed for horizontal and vertical polarization of the receiving antenna.

### 9.4 Test Date

February 07, 2023 ~ February 15, 2023



**9.5 Test data for Basic model (Model name: BoT-TMA50)**

**9.5.1 Test data for 1 Mbps**

**9.5.1.1 Test data for conducted emission**

※ Please refer to the Appendix section for test plots

**9.5.1.2 Test data for radiated emission**

**9.5.1.2.1 Radiated Emission which fall in the Restricted Band**

- Resolution bandwidth : 1 MHz and Peak Detector for Peak Mode  
1 MHz and RMS Detector for Average Mode
- Video bandwidth : 3 MHz for Peak and Average Mode
- Measurement distance : 3 m
- Duty Cycle : 85.60 %
- Result : PASSED

Frequency (MHz)	Reading (dBμV)	Detector Mode	Ant. Pol. (H/V)	Ant. Factor (dB/m)	Cable Loss (dB)	AMP Gain (dB)	ATT (dB)	Duty Factor (dB)	Total (dBμV/m)	Limits (dBμV/m)	Margin (dB)
<b>Test Data for Low Channel</b>											
2 370.430	57.47	Peak	H	27.42	6.92	44.95	5.84	-	52.70	74.00	21.30
2 369.970	50.94	Average	H	27.42	6.92	44.95	5.84	0.68	46.85	54.00	7.15
2 370.060	55.56	Peak	V	27.42	6.92	44.95	5.84	-	50.79	74.00	23.21
2 370.060	49.17	Average	V	27.42	6.92	44.95	5.84	0.68	45.08	54.00	8.92
<b>Test Data for High Channel</b>											
2 483.750	58.65	Peak	H	27.57	7.09	44.91	5.84	-	54.24	74.00	19.76
2 483.810	44.14	Average	H	27.56	7.09	44.91	5.84	0.68	40.40	54.00	13.60
2 483.530	57.83	Peak	V	27.57	7.09	44.91	5.84	-	53.42	74.00	20.58
2 483.570	43.27	Average	V	27.57	7.09	44.91	5.84	0.68	39.54	54.00	14.46

Remark: “H”: Horizontal, “V”: Vertical

$$\text{Margin (dB)} = \text{Limits (dB}\mu\text{V/m)} - \text{Total Level (dB}\mu\text{V/m)}$$

$$\text{Total Level} = \text{Reading} + \text{Antenna Factor} + \text{Cable Loss} + \text{ATT} + \text{Duty Factor} - \text{AMP Gain}$$

### 9.5.1.2.2 Spurious & Harmonic Radiated Emission

- Resolution bandwidth : 1 MHz for Peak and Average Mode for the emissions fall in restricted band,  
1 MHz for Peak Mode for the emissions outside restricted band
- Video bandwidth : 3 MHz for Peak and Average Mode
- Frequency range : 1 GHz ~ 26.5 GHz
- Measurement distance : 3 m
- Duty Cycle : 85.60 %
- Result : PASSED

Frequency (MHz)	Reading (dBμV)	Detector Mode	Ant. Pol. (H/V)	Ant. Factor (dB/m)	Cable Loss (dB)	AMP Gain (dB)	Duty Factor (dB)	Total (dBμV/m)	Limits (dBμV/m)	Margin (dB)
<b>Test Data for Low Channel</b>										
7 205.340	49.43	Peak	H	36.22	12.45	44.42	-	53.68	74.00	20.32
7 205.470	38.58	Average	H	36.22	12.45	44.42	0.68	43.51	54.00	10.49
7 206.730	52.58	Peak	V	36.23	12.45	44.42	-	56.84	74.00	17.16
7 205.290	44.05	Average	V	36.22	12.45	44.42	0.68	48.98	54.00	5.02
<b>Test Data for Middle Channel</b>										
7 319.040	50.15	Peak	H	36.44	13.33	44.49	-	55.43	74.00	18.57
7 320.490	38.23	Average	H	36.44	13.33	44.49	0.68	44.19	54.00	9.81
7 319.460	51.99	Peak	V	36.44	13.33	44.49	-	57.27	74.00	16.73
7 320.580	42.58	Average	V	36.44	13.33	44.49	0.68	48.54	54.00	5.46
<b>Test Data for High Channel</b>										
7 439.380	49.70	Peak	H	36.58	13.33	44.56	-	55.05	74.00	18.95
7 440.570	38.63	Average	H	36.58	13.33	44.56	0.68	44.66	54.00	9.34
7 440.890	52.50	Peak	V	36.58	13.33	44.56	-	57.85	74.00	16.15
7 439.430	43.38	Average	V	36.58	13.33	44.56	0.68	49.41	54.00	4.59

Remark: "H": Horizontal, "V": Vertical

$$\text{Margin (dB)} = \text{Limits (dB}\mu\text{V/m)} - \text{Total Level (dB}\mu\text{V/m)}$$

$$\text{Total Level} = \text{Reading} + \text{Antenna Factor} + \text{Cable Loss} + \text{Duty Factor} - \text{AMP Gain}$$

**9.5.2 Test data for 2 Mbps**

**9.5.2.1 Test data for conducted emission**

※ Please refer to the Appendix section for test plots

**9.5.2.2 Test data for radiated emission**

**9.5.2.2.1 Radiated Emission which fall in the Restricted Band**

- Resolution bandwidth : 1 MHz and Peak Detector for Peak Mode  
1 MHz and RMS Detector for Average Mode
- Video bandwidth : 3 MHz for Peak and Average Mode
- Measurement distance : 3 m
- Duty Cycle : 57.70 %
- Result : PASSED

Frequency (MHz)	Reading (dBμV)	Detector Mode	Ant. Pol. (H/V)	Ant. Factor (dB/m)	Cable Loss (dB)	AMP Gain (dB)	ATT (dB)	Duty Factor (dB)	Total (dBμV/m)	Limits (dBμV/m)	Margin (dB)
<b>Test Data for Low Channel</b>											
2 370.610	57.16	Peak	H	27.42	6.92	44.95	5.84	-	52.39	74.00	21.61
2 370.150	49.76	Average	H	27.42	6.92	44.95	5.84	2.39	47.38	54.00	6.62
2 370.430	55.88	Peak	V	27.42	6.92	44.95	5.84	-	51.11	74.00	22.89
2 370.060	48.22	Average	V	27.42	6.92	44.95	5.84	2.39	45.84	54.00	8.16
<b>Test Data for High Channel</b>											
2 483.530	55.05	Peak	H	27.57	6.94	44.91	9.95	-	54.60	74.00	19.40
2 483.510	43.10	Average	H	27.57	6.94	44.91	9.95	2.39	45.04	54.00	8.96
2 486.460	53.39	Peak	V	27.55	6.94	44.91	9.95	-	52.92	74.00	21.08
2 483.510	42.31	Average	V	27.57	6.94	44.91	9.95	2.39	44.25	54.00	9.75

Remark: “H”: Horizontal, “V”: Vertical

$$\text{Margin (dB)} = \text{Limits (dB}\mu\text{V/m)} - \text{Total Level (dB}\mu\text{V/m)}$$

$$\text{Total Level} = \text{Reading} + \text{Antenna Factor} + \text{Cable Loss} + \text{ATT} + \text{Duty Factor} - \text{AMP Gain}$$

### 9.5.2.2.2 Spurious & Harmonic Radiated Emission

- Resolution bandwidth : 1 MHz for Peak and Average Mode for the emissions fall in restricted band,  
1 MHz for Peak Mode for the emissions outside restricted band
- Video bandwidth : 3 MHz for Peak and Average Mode
- Frequency range : 1 GHz ~ 26.5 GHz
- Measurement distance : 3 m
- Duty Cycle : 57.70 %
- Result : PASSED

Frequency (MHz)	Reading (dBμV)	Detector Mode	Ant. Pol. (H/V)	Ant. Factor (dB/m)	Cable Loss (dB)	AMP Gain (dB)	Duty Factor (dB)	Total (dBμV/m)	Limits (dBμV/m)	Margin (dB)
<b>Test Data for Low Channel</b>										
7 207.490	49.24	Peak	H	36.23	12.45	44.42	-	53.50	74.00	20.50
7 207.270	37.88	Average	H	36.23	12.45	44.42	2.39	44.53	54.00	9.47
7 207.510	52.53	Peak	V	36.23	12.45	44.42	-	56.79	74.00	17.21
7 204.710	42.46	Average	V	36.22	12.45	44.42	2.39	49.10	54.00	4.90
<b>Test Data for Middle Channel</b>										
7 318.580	50.41	Peak	H	36.44	13.33	44.49	-	55.69	74.00	18.31
7 318.740	38.79	Average	H	36.44	13.33	44.49	2.39	46.46	54.00	7.54
7 319.360	51.52	Peak	V	36.44	13.33	44.49	-	56.80	74.00	17.20
7 321.370	40.79	Average	V	36.44	13.33	44.49	2.39	48.46	54.00	5.54
<b>Test Data for High Channel</b>										
7 438.550	48.64	Peak	H	36.58	15.05	44.56	-	55.71	74.00	18.29
7 440.770	36.21	Average	H	36.58	15.05	44.56	2.39	45.67	54.00	8.33
7 441.580	50.21	Peak	V	36.58	15.05	44.56	-	57.28	74.00	16.72
7 438.940	38.56	Average	V	36.58	15.05	44.56	2.39	48.02	54.00	5.98

Remark: "H": Horizontal, "V": Vertical

$$\text{Margin (dB)} = \text{Limits (dB}\mu\text{V/m)} - \text{Total Level (dB}\mu\text{V/m)}$$

$$\text{Total Level} = \text{Reading} + \text{Antenna Factor} + \text{Cable Loss} + \text{Duty Factor} - \text{AMP Gain}$$

**9.6 Test data for Multiple model (Model name: BoT-TMA50D)**

**9.6.1 Test data for 1 Mbps**

**9.6.1.1 Test data for radiated emission**

**9.6.1.1.1 Radiated Emission which fall in the Restricted Band**

- Resolution bandwidth : 1 MHz and Peak Detector for Peak Mode  
1 MHz and RMS Detector for Average Mode
- Video bandwidth : 3 MHz for Peak and Average Mode
- Measurement distance : 3 m
- Duty Cycle : 85.60 %
- Result : PASSED

Frequency (MHz)	Reading (dBμV)	Detector Mode	Ant. Pol. (H/V)	Ant. Factor (dB/m)	Cable Loss (dB)	AMP Gain (dB)	ATT (dB)	Duty Factor (dB)	Total (dBμV/m)	Limits (dBμV/m)	Margin (dB)
<b>Test Data for Low Channel</b>											
2 357.290	53.36	Peak	H	27.34	6.66	44.96	5.73	-	48.13	74.00	25.87
2 370.150	43.64	Average	H	27.42	6.77	44.95	5.73	0.68	39.29	54.00	14.71
2 369.690	53.07	Peak	V	27.42	6.77	44.95	5.73	-	48.04	74.00	25.96
2 370.150	45.50	Average	V	27.42	6.77	44.95	5.73	0.68	41.15	54.00	12.85
<b>Test Data for High Channel</b>											
2 483.690	61.61	Peak	H	27.57	6.94	44.91	5.73	-	56.94	74.00	17.06
2 483.530	43.04	Average	H	27.57	6.94	44.91	5.73	0.68	39.05	54.00	14.95
2 483.510	58.00	Peak	V	27.57	6.94	44.91	5.73	-	53.33	74.00	20.67
2 484.670	41.26	Average	V	27.56	6.94	44.91	5.73	0.68	37.26	54.00	16.74

Remark: "H": Horizontal, "V": Vertical

$$\text{Margin (dB)} = \text{Limits (dB}\mu\text{V/m)} - \text{Total Level (dB}\mu\text{V/m)}$$

$$\text{Total Level} = \text{Reading} + \text{Antenna Factor} + \text{Cable Loss} + \text{ATT} + \text{Duty Factor} - \text{AMP Gain}$$

### 9.6.1.1.2 Spurious & Harmonic Radiated Emission

- Resolution bandwidth : 1 MHz for Peak and Average Mode for the emissions fall in restricted band,  
1 MHz for Peak Mode for the emissions outside restricted band
- Video bandwidth : 3 MHz for Peak and Average Mode
- Frequency range : 1 GHz ~ 26.5 GHz
- Measurement distance : 3 m
- Duty Cycle : 85.60 %
- Result : PASSED

Frequency (MHz)	Reading (dBμV)	Detector Mode	Ant. Pol. (H/V)	Ant. Factor (dB/m)	Cable Loss (dB)	AMP Gain (dB)	Duty Factor (dB)	Total (dBμV/m)	Limits (dBμV/m)	Margin (dB)
<b>Test Data for Low Channel</b>										
7 205.790	49.22	Peak	H	36.22	14.22	44.42	-	55.24	74.00	18.76
7 205.480	37.47	Average	H	36.22	14.22	44.42	0.68	44.17	54.00	9.83
7 205.290	52.28	Peak	V	36.22	14.22	44.42	-	58.30	74.00	15.70
7 206.670	43.01	Average	V	36.23	14.22	44.42	0.68	49.72	54.00	4.28
<b>Test Data for Middle Channel</b>										
7 315.440	49.41	Peak	H	36.43	14.12	44.49	-	55.47	74.00	18.53
7 316.200	36.85	Average	H	36.43	14.12	44.49	0.68	43.59	54.00	10.41
7 321.050	52.71	Peak	V	36.44	14.12	44.49	-	58.78	74.00	15.22
7 319.330	43.23	Average	V	36.44	14.12	44.49	0.68	49.98	54.00	4.02
<b>Test Data for High Channel</b>										
7 443.010	49.18	Peak	H	36.59	15.05	44.57	-	56.25	74.00	17.75
7 439.860	37.20	Average	H	36.58	15.05	44.56	0.68	44.95	54.00	9.05
7 439.100	52.23	Peak	V	36.58	15.05	44.56	-	59.30	74.00	14.70
7 439.490	43.37	Average	V	36.58	15.05	44.56	0.68	51.12	54.00	2.88

Remark: "H": Horizontal, "V": Vertical

$$\text{Margin (dB)} = \text{Limits (dB}\mu\text{V/m)} - \text{Total Level (dB}\mu\text{V/m)}$$

$$\text{Total Level} = \text{Reading} + \text{Antenna Factor} + \text{Cable Loss} + \text{Duty Factor} - \text{AMP Gain}$$

**9.6.2 Test data for 2 Mbps**

**9.6.2.1 Test data for radiated emission**

**9.6.2.1.1 Radiated Emission which fall in the Restricted Band**

- Resolution bandwidth : 1 MHz and Peak Detector for Peak Mode  
1 MHz and RMS Detector for Average Mode
- Video bandwidth : 3 MHz for Peak and Average Mode
- Measurement distance : 3 m
- Duty Cycle : 57.70 %
- Result : PASSED

Frequency (MHz)	Reading (dBμV)	Detector Mode	Ant. Pol. (H/V)	Ant. Factor (dB/m)	Cable Loss (dB)	AMP Gain (dB)	ATT (dB)	Duty Factor (dB)	Total (dBμV/m)	Limits (dBμV/m)	Margin (dB)
<b>Test Data for Low Channel</b>											
2 370.250	54.76	Peak	H	27.42	6.77	44.95	5.73	-	49.73	74.00	24.27
2 369.880	47.16	Average	H	27.42	6.77	44.95	5.73	2.39	44.52	54.00	9.48
2 337.800	52.82	Peak	V	27.47	6.72	44.96	5.73	-	47.78	74.00	26.22
2 370.340	42.40	Average	V	27.42	6.77	44.95	5.73	2.39	39.76	54.00	14.24
<b>Test Data for High Channel</b>											
2 483.510	54.87	Peak	H	27.57	6.94	44.91	9.95	-	54.42	74.00	19.58
2 483.550	42.99	Average	H	27.57	6.94	44.91	9.95	2.39	44.93	54.00	9.07
2 483.630	54.49	Peak	V	27.57	6.94	44.91	9.95	-	54.04	74.00	19.96
2 483.590	42.10	Average	V	27.57	6.94	44.91	9.95	2.39	44.04	54.00	9.96

Remark: "H": Horizontal, "V": Vertical

$$\text{Margin (dB)} = \text{Limits (dB}\mu\text{V/m)} - \text{Total Level (dB}\mu\text{V/m)}$$

$$\text{Total Level} = \text{Reading} + \text{Antenna Factor} + \text{Cable Loss} + \text{ATT} + \text{Duty Factor} - \text{AMP Gain}$$

**9.6.2.1.2 Spurious & Harmonic Radiated Emission**

- Resolution bandwidth : 1 MHz for Peak and Average Mode for the emissions fall in restricted band,  
1 MHz for Peak Mode for the emissions outside restricted band
- Video bandwidth : 3 MHz for Peak and Average Mode
- Frequency range : 1 GHz ~ 26.5 GHz
- Measurement distance : 3 m
- Duty Cycle : 57.70 %
- Result : PASSED

Frequency (MHz)	Reading (dBμV)	Detector Mode	Ant. Pol. (H/V)	Ant. Factor (dB/m)	Cable Loss (dB)	AMP Gain (dB)	Duty Factor (dB)	Total (dBμV/m)	Limits (dBμV/m)	Margin (dB)
<b>Test Data for Low Channel</b>										
7 213.410	48.44	Peak	H	36.25	14.22	44.43	-	54.48	74.00	19.52
7 205.200	35.67	Average	H	36.22	14.22	44.42	2.39	44.08	54.00	9.92
7 204.620	51.93	Peak	V	36.22	14.22	44.42	-	57.95	74.00	16.05
7 204.860	42.00	Average	V	36.22	14.22	44.42	2.39	50.41	54.00	3.59
<b>Test Data for Middle Channel</b>										
7 316.140	49.17	Peak	H	36.43	14.12	44.49	-	55.23	74.00	18.77
7 319.200	36.23	Average	H	36.44	14.12	44.49	2.39	44.69	54.00	9.31
7 321.460	52.51	Peak	V	36.44	14.12	44.49	-	58.58	74.00	15.42
7 318.820	41.57	Average	V	36.44	14.12	44.49	2.39	50.03	54.00	3.97
<b>Test Data for High Channel</b>										
7 437.450	48.48	Peak	H	36.57	15.05	44.56	-	55.54	74.00	18.46
7 444.570	36.26	Average	H	36.59	15.05	44.57	2.39	45.72	54.00	8.28
7 438.560	50.13	Peak	V	36.58	15.05	44.56	-	57.20	74.00	16.80
7 438.940	38.87	Average	V	36.58	15.05	44.56	2.39	48.33	54.00	5.67

Remark: “H”: Horizontal, “V”: Vertical

$$\text{Margin (dB)} = \text{Limits (dB}\mu\text{V/m)} - \text{Total Level (dB}\mu\text{V/m)}$$

$$\text{Total Level} = \text{Reading} + \text{Antenna Factor} + \text{Cable Loss} + \text{Duty Factor} - \text{AMP Gain}$$



**9.7 Test data for Multiple model (Model name: BoT-TMA50DU)**

**9.7.1 Test data for 1 Mbps**

**9.7.1.1 Test data for radiated emission**

**9.7.1.1.1 Radiated Emission which fall in the Restricted Band**

- Resolution bandwidth : 1 MHz and Peak Detector for Peak Mode  
1 MHz and RMS Detector for Average Mode
- Video bandwidth : 3 MHz for Peak and Average Mode
- Measurement distance : 3 m
- Duty Cycle : 85.60 %
- Result : PASSED

Frequency (MHz)	Reading (dBμV)	Detector Mode	Ant. Pol. (H/V)	Ant. Factor (dB/m)	Cable Loss (dB)	AMP Gain (dB)	ATT (dB)	Duty Factor (dB)	Total (dBμV/m)	Limits (dBμV/m)	Margin (dB)
<b>Test Data for Low Channel</b>											
2 332.930	53.55	Peak	H	27.54	6.59	44.97	5.73	-	48.44	74.00	25.56
2 369.880	45.12	Average	H	27.42	6.77	44.95	5.73	0.68	40.77	54.00	13.23
2 370.430	54.98	Peak	V	27.42	6.77	44.95	5.73	-	49.95	74.00	24.05
2 370.060	47.80	Average	V	27.42	6.77	44.95	5.73	0.68	43.45	54.00	10.55
<b>Test Data for High Channel</b>											
2 483.530	58.89	Peak	H	27.57	6.94	44.91	5.73	-	54.22	74.00	19.78
2 483.850	41.46	Average	H	27.56	6.94	44.91	5.73	0.68	37.46	54.00	16.54
2 483.530	65.44	Peak	V	27.57	6.94	44.91	5.73	-	60.77	74.00	13.23
2 483.970	44.60	Average	V	27.56	6.94	44.91	5.73	0.68	40.60	54.00	13.40

Remark: "H": Horizontal, "V": Vertical

$$\text{Margin (dB)} = \text{Limits (dB}\mu\text{V/m)} - \text{Total Level (dB}\mu\text{V/m)}$$

$$\text{Total Level} = \text{Reading} + \text{Antenna Factor} + \text{Cable Loss} + \text{ATT} + \text{Duty Factor} - \text{AMP Gain}$$

### 9.7.1.1.2 Spurious & Harmonic Radiated Emission

- Resolution bandwidth : 1 MHz for Peak and Average Mode for the emissions fall in restricted band,  
1 MHz for Peak Mode for the emissions outside restricted band
- Video bandwidth : 3 MHz for Peak and Average Mode
- Frequency range : 1 GHz ~ 26.5 GHz
- Measurement distance : 3 m
- Duty Cycle : 85.60 %
- Result : PASSED

Frequency (MHz)	Reading (dBμV)	Detector Mode	Ant. Pol. (H/V)	Ant. Factor (dB/m)	Cable Loss (dB)	AMP Gain (dB)	Duty Factor (dB)	Total (dBμV/m)	Limits (dBμV/m)	Margin (dB)
<b>Test Data for Low Channel</b>										
7 206.200	48.99	Peak	H	36.22	14.22	44.42	-	55.01	74.00	18.99
7 210.370	36.99	Average	H	36.24	14.22	44.43	0.68	43.70	54.00	10.30
7 206.890	50.72	Peak	V	36.23	14.22	44.42	-	56.75	74.00	17.25
7 205.490	40.64	Average	V	36.22	14.22	44.42	0.68	47.34	54.00	6.66
<b>Test Data for Middle Channel</b>										
7 322.240	49.50	Peak	H	36.44	14.12	44.49	-	55.57	74.00	18.43
7 320.400	37.35	Average	H	36.44	14.12	44.49	0.68	44.10	54.00	9.90
7 320.670	52.02	Peak	V	36.44	14.12	44.49	-	58.09	74.00	15.91
7 320.740	41.99	Average	V	36.44	14.12	44.49	0.68	48.74	54.00	5.26
<b>Test Data for High Channel</b>										
7 436.290	49.54	Peak	H	36.57	15.05	44.56	-	56.60	74.00	17.40
7 435.010	36.87	Average	H	36.57	15.05	44.56	0.68	44.61	54.00	9.39
7 440.670	50.55	Peak	V	36.58	15.05	44.56	-	57.62	74.00	16.38
7 439.500	40.22	Average	V	36.58	15.05	44.56	0.68	47.97	54.00	6.03

Remark: "H": Horizontal, "V": Vertical

$$\text{Margin (dB)} = \text{Limits (dB}\mu\text{V/m)} - \text{Total Level (dB}\mu\text{V/m)}$$

$$\text{Total Level} = \text{Reading} + \text{Antenna Factor} + \text{Cable Loss} + \text{Duty Factor} - \text{AMP Gain}$$

**9.7.2 Test data for 2 Mbps**

**9.7.2.1 Test data for radiated emission**

**9.7.2.1.1 Radiated Emission which fall in the Restricted Band**

- Resolution bandwidth : 1 MHz and Peak Detector for Peak Mode  
1 MHz and RMS Detector for Average Mode
- Video bandwidth : 3 MHz for Peak and Average Mode
- Measurement distance : 3 m
- Duty Cycle : 57.70 %
- Result : PASSED

Frequency (MHz)	Reading (dBμV)	Detector Mode	Ant. Pol. (H/V)	Ant. Factor (dB/m)	Cable Loss (dB)	AMP Gain (dB)	ATT (dB)	Duty Factor (dB)	Total (dBμV/m)	Limits (dBμV/m)	Margin (dB)
<b>Test Data for Low Channel</b>											
2 369.970	52.39	Peak	H	27.42	6.77	44.95	5.73	-	47.36	74.00	26.64
2 369.970	41.20	Average	H	27.42	6.77	44.95	5.73	2.39	38.56	54.00	15.44
2 369.970	54.29	Peak	V	27.42	6.77	44.95	5.73	-	49.26	74.00	24.74
2 369.880	45.89	Average	V	27.42	6.77	44.95	5.73	2.39	43.25	54.00	10.75
<b>Test Data for High Channel</b>											
2 492.580	53.29	Peak	H	27.53	6.97	44.90	9.95	-	52.84	74.00	21.16
2 496.990	41.62	Average	H	27.51	6.91	44.90	9.95	2.39	43.48	54.00	10.52
2 483.630	55.95	Peak	V	27.57	6.94	44.91	9.95	-	55.50	74.00	18.50
2 483.790	42.00	Average	V	27.56	6.94	44.91	9.95	2.39	43.93	54.00	10.07

Remark: "H": Horizontal, "V": Vertical

$$\text{Margin (dB)} = \text{Limits (dB}\mu\text{V/m)} - \text{Total Level (dB}\mu\text{V/m)}$$

$$\text{Total Level} = \text{Reading} + \text{Antenna Factor} + \text{Cable Loss} + \text{ATT} + \text{Duty Factor} - \text{AMP Gain}$$

**9.7.2.1.2 Spurious & Harmonic Radiated Emission**

- Resolution bandwidth : 1 MHz for Peak and Average Mode for the emissions fall in restricted band,  
1 MHz for Peak Mode for the emissions outside restricted band
- Video bandwidth : 3 MHz for Peak and Average Mode
- Frequency range : 1 GHz ~ 26.5 GHz
- Measurement distance : 3 m
- Duty Cycle : 57.70 %
- Result : PASSED

Frequency (MHz)	Reading (dBμV)	Detector Mode	Ant. Pol. (H/V)	Ant. Factor (dB/m)	Cable Loss (dB)	AMP Gain (dB)	Duty Factor (dB)	Total (dBμV/m)	Limits (dBμV/m)	Margin (dB)
<b>Test Data for Low Channel</b>										
7 206.630	48.18	Peak	H	36.23	14.22	44.42	-	54.21	74.00	19.79
7 209.230	35.93	Average	H	36.24	14.22	44.43	2.39	44.35	54.00	9.65
7 204.570	49.95	Peak	V	36.22	14.22	44.42	-	55.97	74.00	18.03
7 207.350	38.49	Average	V	36.23	14.22	44.42	2.39	46.91	54.00	7.09
<b>Test Data for Middle Channel</b>										
7 320.010	48.77	Peak	H	36.44	14.12	44.49	-	54.84	74.00	19.16
7 318.910	36.87	Average	H	36.44	14.12	44.49	2.39	45.33	54.00	8.67
7 321.360	51.74	Peak	V	36.44	14.12	44.49	-	57.81	74.00	16.19
7 318.790	40.42	Average	V	36.44	14.12	44.49	2.39	48.88	54.00	5.12
<b>Test Data for High Channel</b>										
7 440.530	48.87	Peak	H	36.58	15.05	44.56	-	55.94	74.00	18.06
7 443.410	36.42	Average	H	36.59	15.05	44.57	2.39	45.88	54.00	8.12
7 436.030	48.47	Peak	V	36.57	15.05	44.56	-	55.53	74.00	18.47
7 441.510	36.35	Average	V	36.58	15.05	44.56	2.39	45.81	54.00	8.19

Remark: "H": Horizontal, "V": Vertical

$$\text{Margin (dB)} = \text{Limits (dB}\mu\text{V/m)} - \text{Total Level (dB}\mu\text{V/m)}$$

$$\text{Total Level} = \text{Reading} + \text{Antenna Factor} + \text{Cable Loss} + \text{Duty Factor} - \text{AMP Gain}$$

**9.8 Test data for Multiple model (Model name: BoT-TMA50DS)**

**9.8.1 Test data for 1 Mbps**

**9.8.1.1 Test data for radiated emission**

**9.8.1.1.1 Radiated Emission which fall in the Restricted Band**

- Resolution bandwidth : 1 MHz and Peak Detector for Peak Mode  
1 MHz and RMS Detector for Average Mode
- Video bandwidth : 3 MHz for Peak and Average Mode
- Measurement distance : 3 m
- Duty Cycle : 85.60 %
- Result : PASSED

Frequency (MHz)	Reading (dBμV)	Detector Mode	Ant. Pol. (H/V)	Ant. Factor (dB/m)	Cable Loss (dB)	AMP Gain (dB)	ATT (dB)	Duty Factor (dB)	Total (dBμV/m)	Limits (dBμV/m)	Margin (dB)
<b>Test Data for Low Channel</b>											
2 370.060	57.10	Peak	H	27.42	6.77	44.95	9.95	-	56.29	74.00	17.71
2 370.060	51.84	Average	H	27.42	6.77	44.95	9.95	0.68	51.71	54.00	2.29
2 370.060	54.85	Peak	V	27.42	6.77	44.95	9.95	-	54.04	74.00	19.96
2 370.060	47.81	Average	V	27.42	6.77	44.95	9.95	0.68	47.68	54.00	6.32
<b>Test Data for High Channel</b>											
2 483.650	67.44	Peak	H	27.57	6.94	44.91	9.95	-	66.99	74.00	7.01
2 483.690	48.49	Average	H	27.57	6.94	44.91	9.95	0.68	48.72	54.00	5.28
2 483.510	65.51	Peak	V	27.57	6.94	44.91	9.95	-	65.06	74.00	8.94
2 483.810	45.68	Average	V	27.56	6.94	44.91	9.95	0.68	45.90	54.00	8.10

Remark: "H": Horizontal, "V": Vertical

$$\text{Margin (dB)} = \text{Limits (dB}\mu\text{V/m)} - \text{Total Level (dB}\mu\text{V/m)}$$

$$\text{Total Level} = \text{Reading} + \text{Antenna Factor} + \text{Cable Loss} + \text{ATT} + \text{Duty Factor} - \text{AMP Gain}$$

### 9.8.1.1.2 Spurious & Harmonic Radiated Emission

- Resolution bandwidth : 1 MHz for Peak and Average Mode for the emissions fall in restricted band,  
1 MHz for Peak Mode for the emissions outside restricted band
- Video bandwidth : 3 MHz for Peak and Average Mode
- Frequency range : 1 GHz ~ 26.5 GHz
- Measurement distance : 3 m
- Duty Cycle : 85.60 %
- Result : PASSED

Frequency (MHz)	Reading (dBμV)	Detector Mode	Ant. Pol. (H/V)	Ant. Factor (dB/m)	Cable Loss (dB)	AMP Gain (dB)	Duty Factor (dB)	Total (dBμV/m)	Limits (dBμV/m)	Margin (dB)
<b>Test Data for Low Channel</b>										
7 205.010	48.85	Peak	H	36.22	14.22	44.42	-	54.87	74.00	19.13
7 206.550	36.87	Average	H	36.23	14.22	44.42	0.68	43.58	54.00	10.42
7 205.370	52.94	Peak	V	36.22	14.22	44.42	-	58.96	74.00	15.04
7 206.550	45.11	Average	V	36.23	14.22	44.42	0.68	51.82	54.00	2.18
<b>Test Data for Middle Channel</b>										
7 320.370	49.29	Peak	H	36.44	14.12	44.49	-	55.36	74.00	18.64
7 321.050	36.91	Average	H	36.44	14.12	44.49	0.68	43.66	54.00	10.34
7 320.710	50.63	Peak	V	36.44	14.12	44.49	-	56.70	74.00	17.30
7 319.610	39.53	Average	V	36.44	14.12	44.49	0.68	46.28	54.00	7.72
<b>Test Data for High Channel</b>										
7 437.280	48.82	Peak	H	36.57	15.05	44.56	-	55.88	74.00	18.12
7 440.230	36.66	Average	H	36.58	15.05	44.56	0.68	44.41	54.00	9.59
7 440.070	51.98	Peak	V	36.58	15.05	44.56	-	59.05	74.00	14.95
7 440.720	42.50	Average	V	36.58	15.05	44.56	0.68	50.25	54.00	3.75

Remark: "H": Horizontal, "V": Vertical

$$\text{Margin (dB)} = \text{Limits (dB}\mu\text{V/m)} - \text{Total Level (dB}\mu\text{V/m)}$$

$$\text{Total Level} = \text{Reading} + \text{Antenna Factor} + \text{Cable Loss} + \text{Duty Factor} - \text{AMP Gain}$$

**9.8.2 Test data for 2 Mbps**

**9.8.2.1 Test data for radiated emission**

**9.8.2.1.1 Radiated Emission which fall in the Restricted Band**

- Resolution bandwidth : 1 MHz and Peak Detector for Peak Mode  
1 MHz and RMS Detector for Average Mode
- Video bandwidth : 3 MHz for Peak and Average Mode
- Measurement distance : 3 m
- Duty Cycle : 57.70 %
- Result : PASSED

Frequency (MHz)	Reading (dBμV)	Detector Mode	Ant. Pol. (H/V)	Ant. Factor (dB/m)	Cable Loss (dB)	AMP Gain (dB)	ATT (dB)	Duty Factor (dB)	Total (dBμV/m)	Limits (dBμV/m)	Margin (dB)
<b>Test Data for Low Channel</b>											
2 369.420	56.99	Peak	H	27.42	6.77	44.95	9.95	-	56.18	74.00	17.82
2 369.880	49.72	Average	H	27.42	6.77	44.95	9.95	2.39	51.30	54.00	2.70
2 370.150	55.58	Peak	V	27.42	6.77	44.95	9.95	-	54.77	74.00	19.23
2 370.150	46.69	Average	V	27.42	6.77	44.95	9.95	2.39	48.27	54.00	5.73
<b>Test Data for High Channel</b>											
2 483.590	64.59	Peak	H	27.57	6.94	44.91	9.95	-	64.14	74.00	9.86
2 483.510	49.17	Average	H	27.57	6.94	44.91	9.95	2.39	51.11	54.00	2.89
2 483.590	59.74	Peak	V	27.57	6.94	44.91	9.95	-	59.29	74.00	14.71
2 483.530	45.39	Average	V	27.57	6.94	44.91	9.95	2.39	47.33	54.00	6.67

Remark: "H": Horizontal, "V": Vertical

$$\text{Margin (dB)} = \text{Limits (dB}\mu\text{V/m)} - \text{Total Level (dB}\mu\text{V/m)}$$

$$\text{Total Level} = \text{Reading} + \text{Antenna Factor} + \text{Cable Loss} + \text{ATT} + \text{Duty Factor} - \text{AMP Gain}$$

**9.8.2.1.2 Spurious & Harmonic Radiated Emission**

- Resolution bandwidth : 1 MHz for Peak and Average Mode for the emissions fall in restricted band,  
1 MHz for Peak Mode for the emissions outside restricted band
- Video bandwidth : 3 MHz for Peak and Average Mode
- Frequency range : 1 GHz ~ 26.5 GHz
- Measurement distance : 3 m
- Duty Cycle : 57.70 %
- Result : PASSED

Frequency (MHz)	Reading (dBµV)	Detector Mode	Ant. Pol. (H/V)	Ant. Factor (dB/m)	Cable Loss (dB)	AMP Gain (dB)	Duty Factor (dB)	Total (dBµV/m)	Limits (dBµV/m)	Margin (dB)
<b>Test Data for Low Channel</b>										
7 208.070	49.08	Peak	H	36.23	14.22	44.42	-	55.11	74.00	18.89
7 207.480	36.28	Average	H	36.23	14.22	44.42	2.39	44.70	54.00	9.30
7 207.280	53.79	Peak	V	36.23	14.22	44.42	-	59.82	74.00	14.18
7 207.270	42.44	Average	V	36.23	14.22	44.42	2.39	50.86	54.00	3.14
<b>Test Data for Middle Channel</b>										
7 319.430	49.27	Peak	H	36.44	14.12	44.49	-	55.34	74.00	18.66
7 319.190	36.91	Average	H	36.44	14.12	44.49	2.39	45.37	54.00	8.63
7 318.620	50.89	Peak	V	36.44	14.12	44.49	-	56.96	74.00	17.04
7 318.700	39.66	Average	V	36.44	14.12	44.49	2.39	48.12	54.00	5.88
<b>Test Data for High Channel</b>										
7 440.900	49.81	Peak	H	36.58	15.05	44.56	-	56.88	74.00	17.12
7 441.230	36.96	Average	H	36.58	15.05	44.56	2.39	46.42	54.00	7.58
7 436.970	49.51	Peak	V	36.57	15.05	44.56	-	56.57	74.00	17.43
7 440.940	36.92	Average	V	36.58	15.05	44.56	2.39	46.38	54.00	7.62

Remark: "H": Horizontal, "V": Vertical

$$\text{Margin (dB)} = \text{Limits (dBµV/m)} - \text{Total Level (dBµV/m)}$$

$$\text{Total Level} = \text{Reading} + \text{Antenna Factor} + \text{Cable Loss} + \text{Duty Factor} - \text{AMP Gain}$$



## 10. POWER SPECTRAL DENSITY

### 10.1 Operating environment

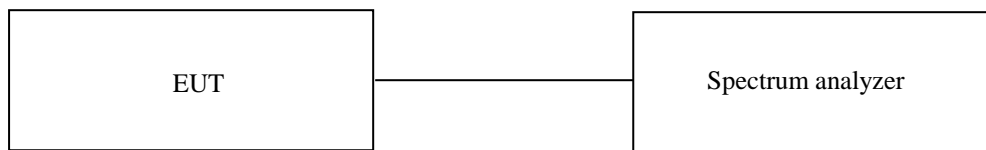
Temperature : 23 °C

Relative humidity : 46 % R.H.

### 10.2 Test set-up

The antenna output of the EUT was connected to the spectrum analyzer.

The resolution bandwidth is set to  $3 \text{ kHz} \leq \text{RBW} \leq 100 \text{ kHz}$ , the video bandwidth is set to 3 times the resolution bandwidth.



### 10.3 Test Date

February 07, 2023 ~ February 15, 2023

**10.4 Test data for 1 Mbps**

-. Test Result : Pass

-. Operating Condition : Continuous transmitting mode

CHANNEL	FREQUENCY (MHz)	MEASURED VALUE (dBm)	Duty Factor (dB)	RESULT (dBm)	LIMIT (dBm)	MARGIN (dB)
Low	2 402.00	-7.99	0.68	-7.31	8.00	15.31
Middle	2 440.00	-7.56	0.68	-6.88	8.00	14.88
High	2 480.00	-9.00	0.68	-8.32	8.00	16.32

Remark. Margin = Limit – Result (=Measured Value + Duty Factor)

**10.5 Test data for 2 Mbps**

-. Test Result : Pass

-. Operating Condition : Continuous transmitting mode

CHANNEL	FREQUENCY (MHz)	MEASURED VALUE (dBm)	Duty Factor (dB)	RESULT (dBm)	LIMIT (dBm)	MARGIN (dB)
Low	2 402.00	-12.64	2.39	-10.25	8.00	18.25
Middle	2 440.00	-12.96	2.39	-10.57	8.00	18.57
High	2 480.00	-17.71	2.39	-15.32	8.00	23.32

Remark. Margin = Limit – Result (=Measured Value + Duty Factor)

# 11. RADIATED EMISSION TEST

## 11.1 Operating environment

Temperature : 23 °C  
 Relative humidity : 46 % R.H.

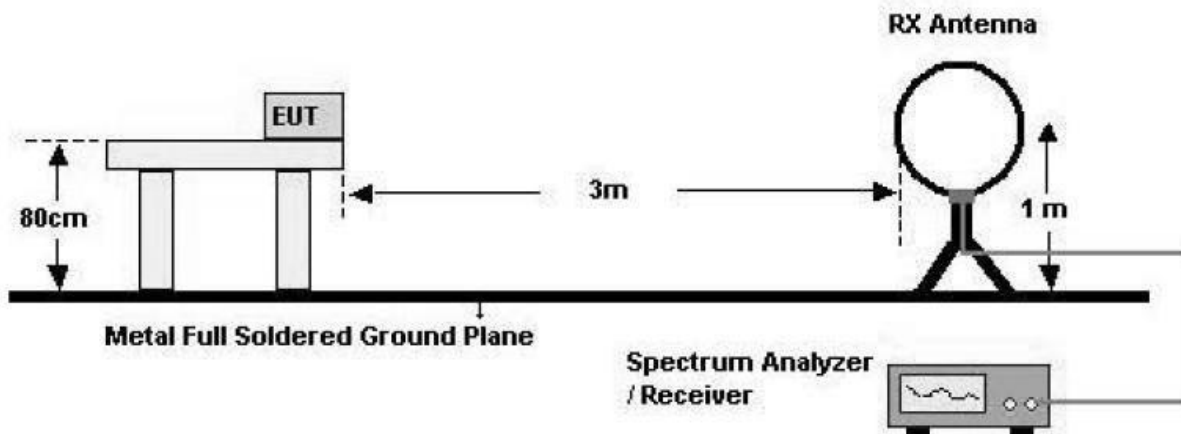
## 11.2 Test set-up

The radiated emissions measurements were on the 3 m semi anechoic chamber. The EUT and other support equipment were placed on a non-conductive turntable above the ground plane. The interconnecting cables from outside test site were inserted into ferrite clamps at the point where the cables reach the turntable.

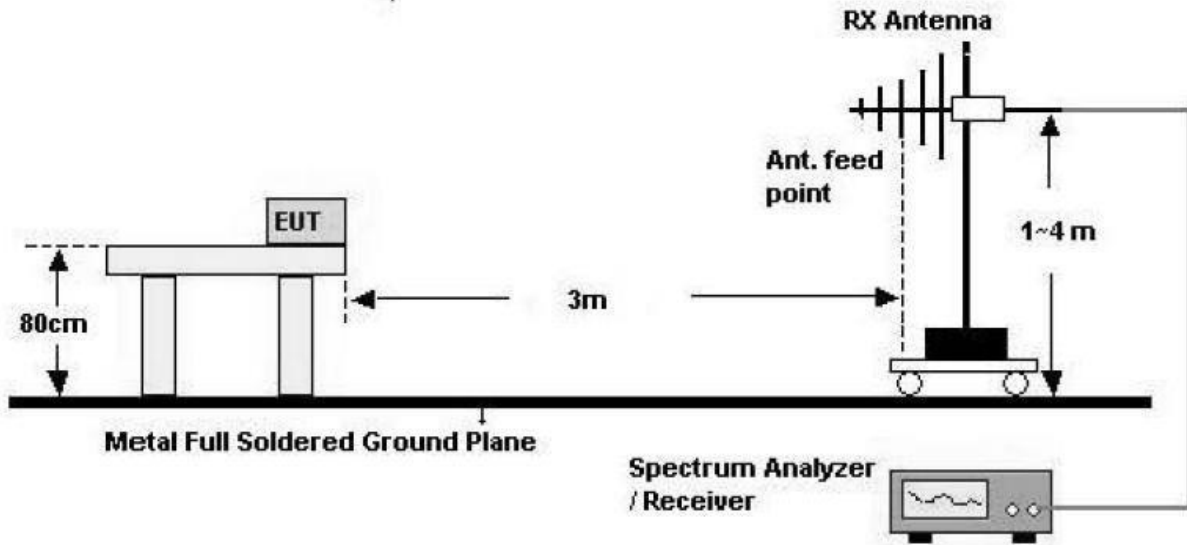
The frequency spectrum from 30 MHz to 26.5 GHz was scanned and emission levels maximized at each frequency recorded. The system was rotated 360°, and the antenna was varied in height between 1.0 m and 4.0 m in order to determine the maximum emission levels. This procedure was performed for both horizontal and vertical polarization of the receiving antenna.

### - Test Configuration

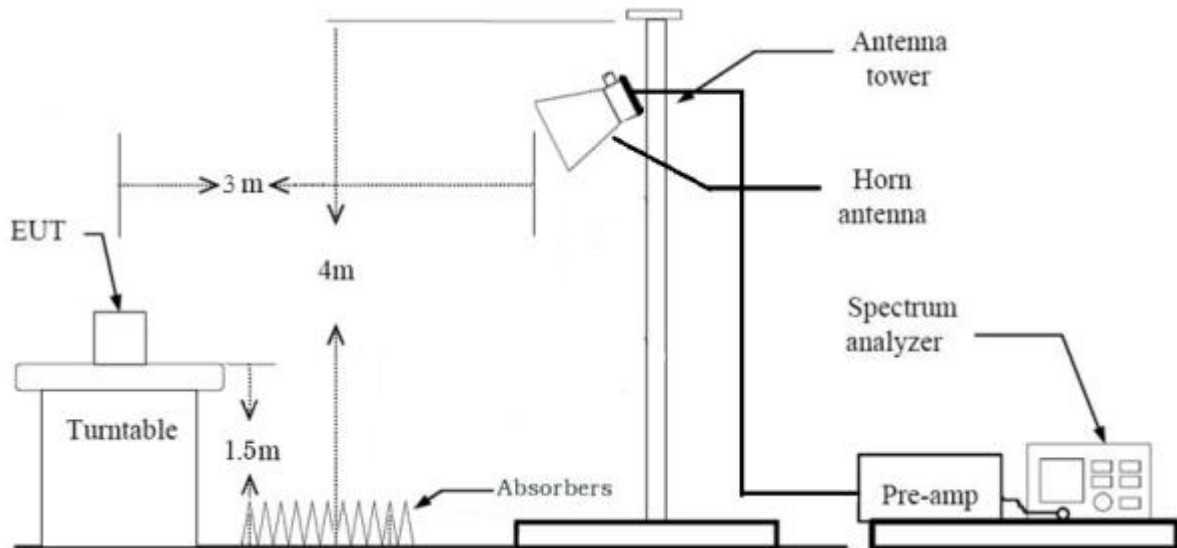
1. Below 30 MHz



2. 30 MHz - 1 GHz



3. Above 1 GHz



**11.3 Test Date**

February 07, 2023 ~ February 15, 2023

**11.4 Test data for Basic model (Model name: BoT-TMA50)**

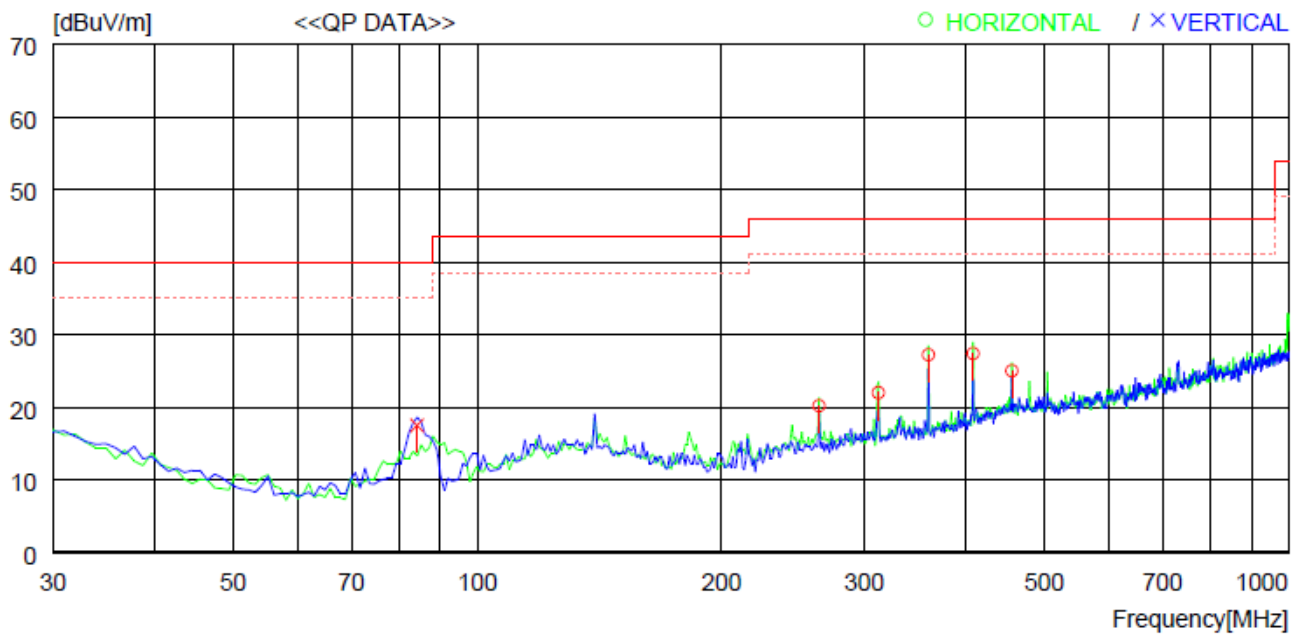
**11.4.1 Test data for 30 MHz ~ 1 GHz**

Limits apply to : FCC CFR 47, PART 15, SUBPART C, SECTION 15.247

Result : PASSED

EUT : Wireless Communication Module

Detector : CISPR Quasi-Peak (6 dB Bandwidth: 120 kHz)



No.	FREQ [MHz]	READING QP [dBuV]	ANT FACTOR [dB]	LOSS [dB]	GAIN [dB]	RESULT [dBuV/m]	LIMIT [dBuV/m]	MARGIN [dB]	ANTENNA [cm]	TABLE [DEG]
---- Horizontal ----										
1	263.770	31.9	18.5	2.7	32.9	20.2	46.0	25.8	100	299
2	312.270	32.3	19.6	3.0	32.9	22.0	46.0	24.0	300	161
3	359.800	36.7	20.3	3.2	33.0	27.2	46.0	18.8	300	359
4	408.300	35.2	21.6	3.5	32.9	27.4	46.0	18.6	100	30
5	455.831	31.2	23.4	3.5	33.1	25.0	46.0	21.0	100	59
---- Vertical ----										
6	84.320	35.6	13.5	1.5	33.1	17.5	40.0	22.5	200	59

※ Only the worst case (Bluetooth LE 2 Mbps) of data is stated.

**11.4.2 Test data for Below 30 MHz**

- . Resolution bandwidth : 200 Hz (from 9 kHz to 0.15 MHz), 9 kHz (from 0.15 MHz to 30 MHz)
- . Frequency range : 9 kHz ~ 30 MHz
- . Measurement distance : 3 m
- . Operating mode : Transmitting mode

Frequency (MHz)	Reading (dBμV)	Ant. Pol. (H/V)	Ant. Height (m)	Angle (°)	Ant. Factor (dB/m)	Cable Loss	Emission Level(dBμV/m)	Limits (dBμV/m)	Margin (dB)
Emission from the EUT more than 20 dB below the limit in each frequency range.									

**11.4.3 Test data for above 1 GHz**

- . Resolution bandwidth : 1 MHz for Peak and Average Mode for the emissions fall in restricted band,  
1 MHz for Peak Mode for the emissions outside restricted band
- . Video bandwidth : 3 MHz for Peak and Average Mode
- . Frequency range : 1 GHz ~ 26.5 GHz
- . Measurement distance : 3 m
- . Operating mode : Transmitting mode

Frequency (MHz)	Reading (dBμV)	Ant. Pol. (H/V)	Ant. Height (m)	Angle (°)	Ant. Factor (dB/m)	Cable Loss	Emission Level(dBμV/m)	Limits (dBμV/m)	Margin (dB)
Emission from the EUT more than 20 dB below the limit in each frequency range.									

**11.5 Test data for Multiple model (Model name: BoT-TMA50D)**

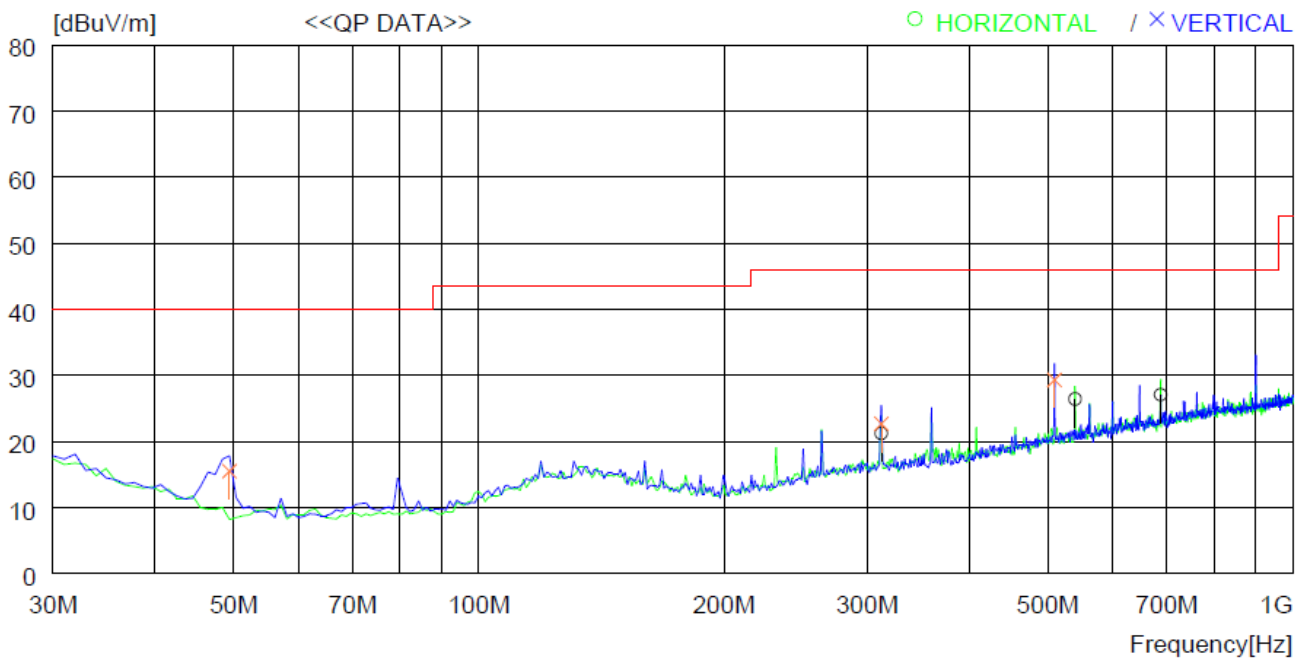
**11.5.1 Test data for 30 MHz ~ 1 GHz**

Limits apply to : FCC CFR 47, PART 15, SUBPART C, SECTION 15.247

Result : PASSED

EUT : Wireless Communication Module

Detector : CISPR Quasi-Peak (6 dB Bandwidth: 120 kHz)



No.	FREQ [MHz]	READING QP [dBuV]	ANT FACTOR [dB]	LOSS [dB]	GAIN [dB]	RESULT [dBuV/m]	LIMIT [dBuV/m]	MARGIN [dB]	ANTENNA [cm]	TABLE [DEG]
----- Horizontal -----										
1	312.270	31.5	19.4	2.3	32.0	21.2	46.0	24.8	300	353
2	540.220	32.0	23.5	3.0	32.1	26.4	46.0	19.6	100	295
3	687.655	30.8	25.2	3.4	32.3	27.1	46.0	18.9	300	42
----- Vertical -----										
4	49.400	33.5	13.1	0.9	32.0	15.5	40.0	24.5	100	0
5	312.270	33.0	19.4	2.3	32.0	22.7	46.0	23.3	200	208
6	509.181	35.3	23.2	2.9	32.1	29.3	46.0	16.7	200	359

※ Only the worst case (Bluetooth LE 2 Mbps) of data is stated.

**11.5.2 Test data for Below 30 MHz**

- Resolution bandwidth : 200 Hz (from 9 kHz to 0.15 MHz), 9 kHz (from 0.15 MHz to 30 MHz)
- Frequency range : 9 kHz ~ 30 MHz
- Measurement distance : 3 m
- Operating mode : Transmitting mode

Frequency (MHz)	Reading (dBμV)	Ant. Pol. (H/V)	Ant. Height (m)	Angle (°)	Ant. Factor (dB/m)	Cable Loss	Emission Level(dBμV/m)	Limits (dBμV/m)	Margin (dB)
Emission from the EUT more than 20 dB below the limit in each frequency range.									

**11.5.3 Test data for above 1 GHz**

- Resolution bandwidth : 1 MHz for Peak and Average Mode for the emissions fall in restricted band,  
1 MHz for Peak Mode for the emissions outside restricted band
- Video bandwidth : 3 MHz for Peak and Average Mode
- Frequency range : 1 GHz ~ 26.5 GHz
- Measurement distance : 3 m
- Operating mode : Transmitting mode

Frequency (MHz)	Reading (dBμV)	Ant. Pol. (H/V)	Ant. Height (m)	Angle (°)	Ant. Factor (dB/m)	Cable Loss	Emission Level(dBμV/m)	Limits (dBμV/m)	Margin (dB)
Emission from the EUT more than 20 dB below the limit in each frequency range.									



**11.6 Test data for Multiple model (Model name: BoT-TMA50DU)**

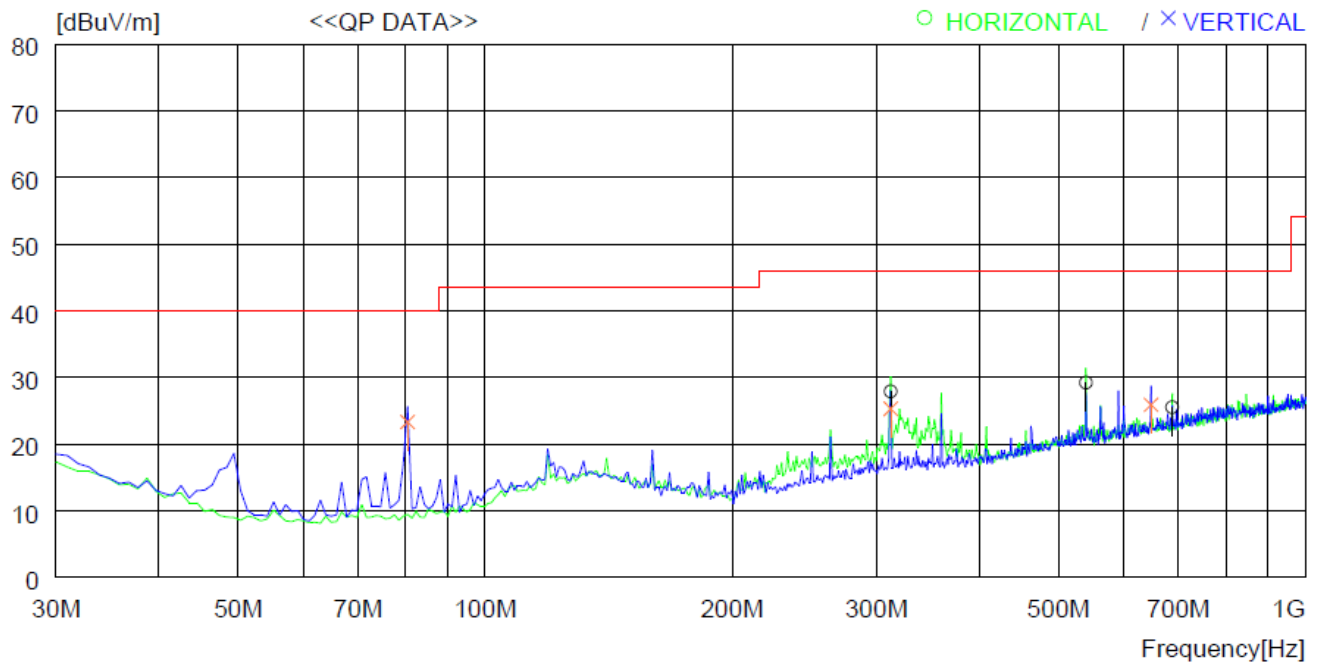
**11.6.1 Test data for 30 MHz ~ 1 GHz**

Limits apply to : FCC CFR 47, PART 15, SUBPART C, SECTION 15.247

Result : PASSED

EUT : Wireless Communication Module

Detector : CISPR Quasi-Peak (6 dB Bandwidth: 120 kHz)



No.	FREQ [MHz]	READING QP [dBuV]	ANT FACTOR [dB]	LOSS [dB]	GAIN [dB]	RESULT [dBuV/m]	LIMIT [dBuV/m]	MARGIN [dB]	ANTENNA [cm]	TABLE [DEG]
----- Horizontal -----										
1	312.270	38.2	19.4	2.3	32.0	27.9	46.0	18.1	100	359
2	540.220	34.8	23.5	3.0	32.1	29.2	46.0	16.8	400	101
3	687.655	29.2	25.2	3.4	32.3	25.5	46.0	20.5	300	359
----- Vertical -----										
4	80.440	41.0	13.2	1.1	32.0	23.3	40.0	16.7	400	211
5	312.270	35.6	19.4	2.3	32.0	25.3	46.0	20.7	200	232
6	647.887	30.1	24.7	3.3	32.2	25.9	46.0	20.1	100	0

※ Only the worst case (Bluetooth LE 2 Mbps) of data is stated.

**11.6.2 Test data for Below 30 MHz**

- Resolution bandwidth : 200 Hz (from 9 kHz to 0.15 MHz), 9 kHz (from 0.15 MHz to 30 MHz)
- Frequency range : 9 kHz ~ 30 MHz
- Measurement distance : 3 m
- Operating mode : Transmitting mode

Frequency (MHz)	Reading (dBµV)	Ant. Pol. (H/V)	Ant. Height (m)	Angle (°)	Ant. Factor (dB/m)	Cable Loss	Emission Level(dBµV/m)	Limits (dBµV/m)	Margin (dB)
Emission from the EUT more than 20 dB below the limit in each frequency range.									

**11.6.3 Test data for above 1 GHz**

- Resolution bandwidth : 1 MHz for Peak and Average Mode for the emissions fall in restricted band,  
1 MHz for Peak Mode for the emissions outside restricted band
- Video bandwidth : 3 MHz for Peak and Average Mode
- Frequency range : 1 GHz ~ 26.5 GHz
- Measurement distance : 3 m
- Operating mode : Transmitting mode

Frequency (MHz)	Reading (dBµV)	Ant. Pol. (H/V)	Ant. Height (m)	Angle (°)	Ant. Factor (dB/m)	Cable Loss	Emission Level(dBµV/m)	Limits (dBµV/m)	Margin (dB)
Emission from the EUT more than 20 dB below the limit in each frequency range.									

**11.7 Test data for Multiple model (Model name: BoT-TMA50DS)**

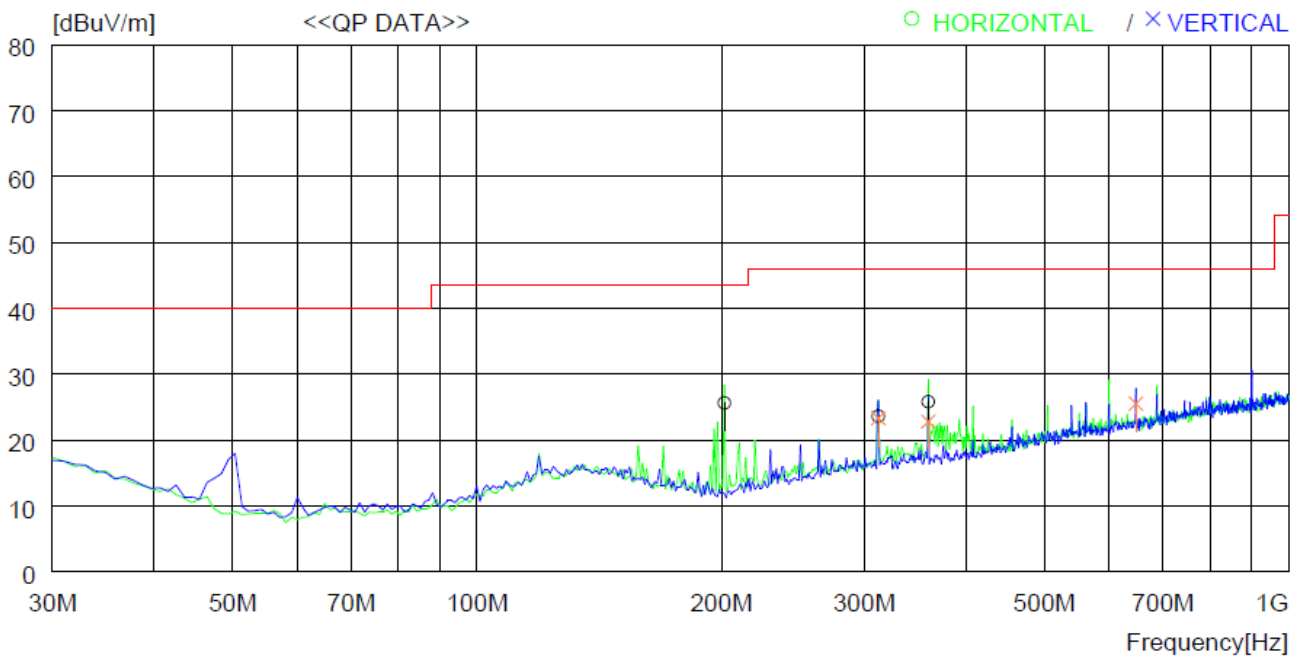
**11.7.1 Test data for 30 MHz ~ 1 GHz**

Limits apply to : FCC CFR 47, PART 15, SUBPART C, SECTION 15.247

Result : PASSED

EUT : Wireless Communication Module

Detector : CISPR Quasi-Peak (6 dB Bandwidth: 120 kHz)



No.	FREQ [MHz]	READING QP [dBuV]	ANT FACTOR [dB]	LOSS [dB]	GAIN [dB]	RESULT [dBuV/m]	LIMIT [dBuV/m]	MARGIN [dB]	ANTENNA [cm]	TABLE [DEG]
----- Horizontal -----										
1	201.690	40.3	15.5	1.8	32.0	25.6	43.5	17.9	300	359
2	312.270	33.9	19.4	2.3	32.0	23.6	46.0	22.4	100	359
3	359.800	35.4	20.0	2.4	32.0	25.8	46.0	20.2	100	359
----- Vertical -----										
4	312.270	33.6	19.4	2.3	32.0	23.3	46.0	22.7	200	359
5	359.800	32.4	20.0	2.4	32.0	22.8	46.0	23.2	200	359
6	647.887	29.7	24.7	3.3	32.2	25.5	46.0	20.5	100	304

※ Only the worst case (Bluetooth LE 2 Mbps) of data is stated.

**11.7.2 Test data for Below 30 MHz**

- Resolution bandwidth : 200 Hz (from 9 kHz to 0.15 MHz), 9 kHz (from 0.15 MHz to 30 MHz)
- Frequency range : 9 kHz ~ 30 MHz
- Measurement distance : 3 m
- Operating mode : Transmitting mode

Frequency (MHz)	Reading (dBμV)	Ant. Pol. (H/V)	Ant. Height (m)	Angle (°)	Ant. Factor (dB/m)	Cable Loss	Emission Level(dBμV/m)	Limits (dBμV/m)	Margin (dB)
Emission from the EUT more than 20 dB below the limit in each frequency range.									

**11.7.3 Test data for above 1 GHz**

- Resolution bandwidth : 1 MHz for Peak and Average Mode for the emissions fall in restricted band,  
1 MHz for Peak Mode for the emissions outside restricted band
- Video bandwidth : 3 MHz for Peak and Average Mode
- Frequency range : 1 GHz ~ 26.5 GHz
- Measurement distance : 3 m
- Operating mode : Transmitting mode

Frequency (MHz)	Reading (dBμV)	Ant. Pol. (H/V)	Ant. Height (m)	Angle (°)	Ant. Factor (dB/m)	Cable Loss	Emission Level(dBμV/m)	Limits (dBμV/m)	Margin (dB)
Emission from the EUT more than 20 dB below the limit in each frequency range.									

## 12. CONDUCTED EMISSION TEST

### 12.1 Operating environment

Temperature : 23 °C

Relative humidity : 46 % R.H.

### 12.2 Test set-up

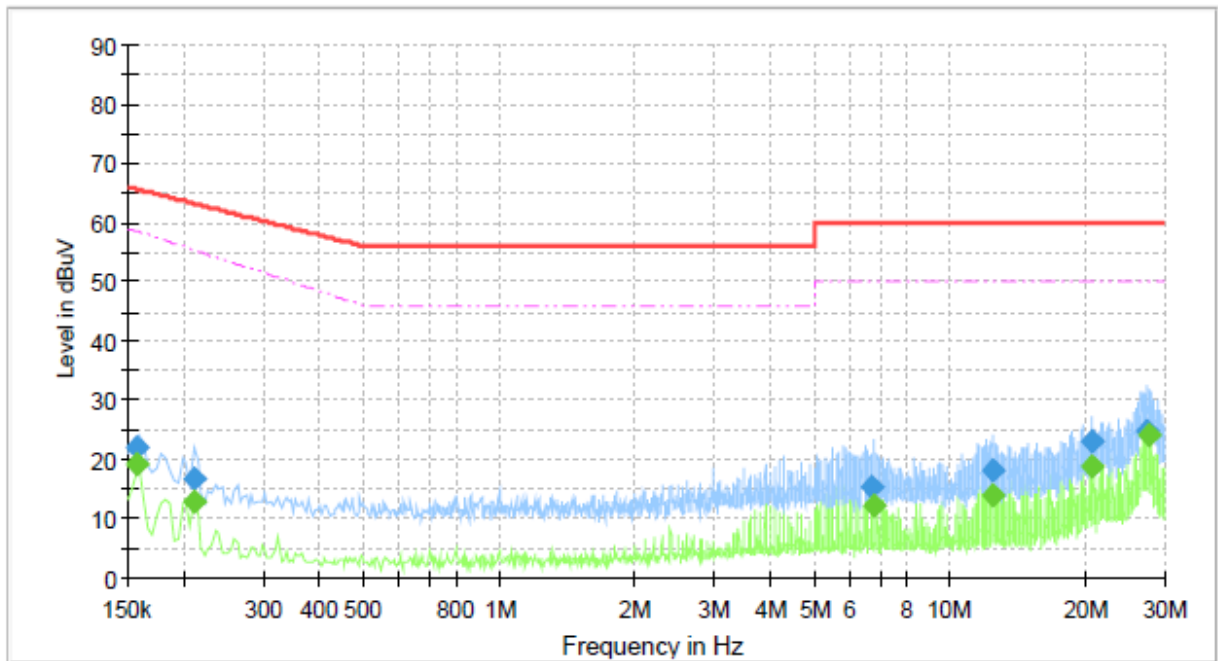
The EUT was placed on a wooden table, 0.8 m height above the floor. Power was fed to the EUT through a 50  $\Omega$  / 50  $\mu$ H + 5  $\Omega$  Artificial Mains Network (AMN). The ground plane was electrically bonded to the reference ground system and all power lines were filtered from ambient.

### 12.3 Test Date

February 07, 2023 ~ February 15, 2023

### 12.4 Test data for Basic model (Model name: BoT-TMA50)

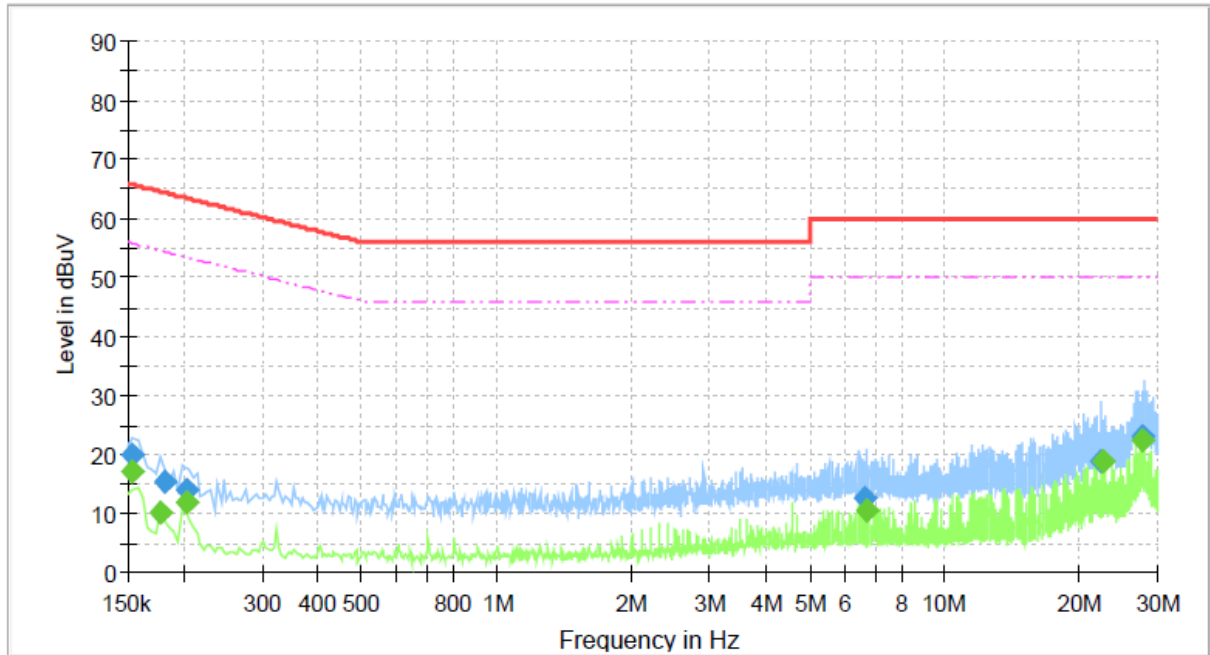
- Resolution bandwidth : 9 kHz
- Frequency range : 0.15 MHz ~ 30 MHz
- Tested Line : HOT LINE



### Final Result

Frequency (MHz)	QuasiPeak (dBuV)	CAverage (dBuV)	Limit (dBuV)	Margin (dB)	Meas. Time (ms)	Bandwidth (kHz)	Line	Corr. (dB)
0.158	---	19.30	58.47	39.17	3000.0	9.0	L1	9.97
0.158	22.16	---	65.60	43.44	3000.0	9.0	L1	9.97
0.209	---	12.91	55.39	42.49	3000.0	9.0	L1	10.01
0.209	16.94	---	63.23	46.29	3000.0	9.0	L1	10.01
6.738	15.46	---	60.00	44.54	3000.0	9.0	L1	10.31
6.818	---	12.31	50.00	37.69	3000.0	9.0	L1	10.32
12.421	18.23	---	60.00	41.77	3000.0	9.0	L1	10.51
12.437	---	13.93	50.00	36.07	3000.0	9.0	L1	10.51
20.748	23.03	---	60.00	36.97	3000.0	9.0	L1	10.69
20.748	---	18.76	50.00	31.24	3000.0	9.0	L1	10.69
27.519	24.80	---	60.00	35.20	3000.0	9.0	L1	10.73
27.663	---	24.07	50.00	25.93	3000.0	9.0	L1	10.73

-. Tested Line : NEUTRAL LINE



### Final Result

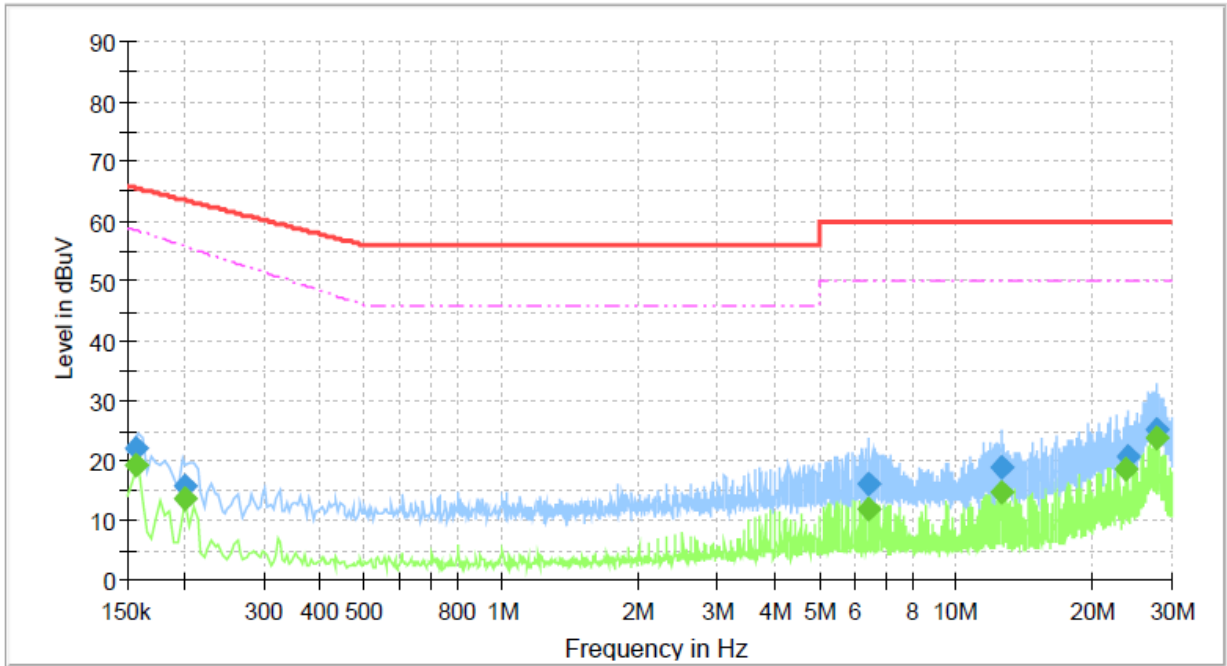
Frequency (MHz)	QuasiPeak (dBuV)	CAverage (dBuV)	Limit (dBuV)	Margin (dB)	Meas. Time (ms)	Bandwidth (kHz)	Line	Corr. (dB)
0.154	---	17.07	55.81	38.74	3000.0	9.0	N	9.95
0.154	19.91	---	65.81	45.90	3000.0	9.0	N	9.95
0.178	---	10.21	54.60	44.39	3000.0	9.0	N	9.95
0.182	15.44	---	64.42	48.97	3000.0	9.0	N	9.95
0.203	---	11.88	53.51	41.62	3000.0	9.0	N	9.95
0.203	13.94	---	63.51	49.57	3000.0	9.0	N	9.95
6.647	12.71	---	60.00	47.29	3000.0	9.0	N	10.19
6.735	---	10.37	50.00	39.63	3000.0	9.0	N	10.19
22.359	18.89	---	60.00	41.11	3000.0	9.0	N	10.72
22.629	---	18.80	50.00	31.20	3000.0	9.0	N	10.72
27.663	---	22.34	50.00	27.66	3000.0	9.0	N	10.72
27.734	22.99	---	60.00	37.01	3000.0	9.0	N	10.72

Remark: Margin (dB) = Limit – Level (Result)

The emission level in above table is included the transducer factor that means insertion loss (LISN), cable loss and attenuator.

**12.5 Test data for Multiple model (Model name: BoT-TMA50D)**

- Resolution bandwidth : 9 kHz
- Frequency range : 0.15 MHz ~ 30 MHz
- Tested Line : HOT LINE

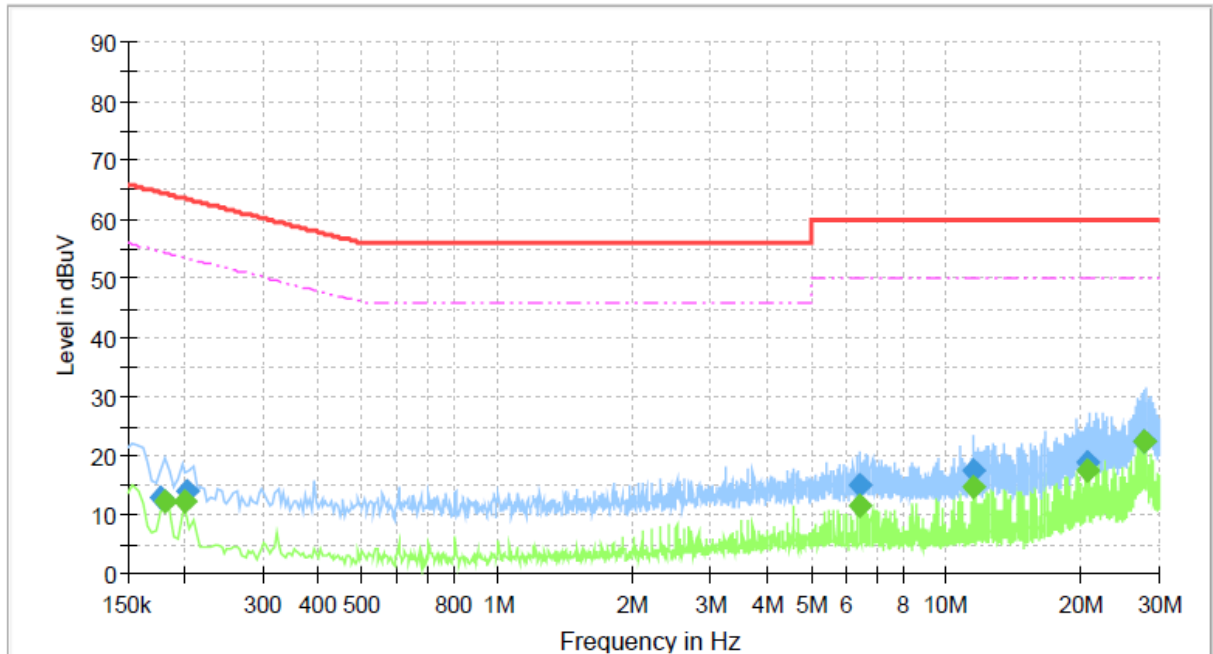


**Final Result**

Frequency (MHz)	QuasiPeak (dBuV)	CAverage (dBuV)	Limit (dBuV)	Margin (dB)	Meas. Time (ms)	Bandwidth (kHz)	Line	Corr. (dB)
0.158	---	19.30	58.47	39.18	3000.0	9.0	L1	9.97
0.158	22.11	---	65.60	43.48	3000.0	9.0	L1	9.97
0.202	---	13.56	55.81	42.26	3000.0	9.0	L1	10.01
0.202	15.88	---	63.55	47.67	3000.0	9.0	L1	10.01
6.442	16.11	---	60.00	43.89	3000.0	9.0	L1	10.30
6.446	---	12.05	50.00	37.95	3000.0	9.0	L1	10.30
12.620	18.80	---	60.00	41.20	3000.0	9.0	L1	10.52
12.624	---	14.72	50.00	35.28	3000.0	9.0	L1	10.52
23.700	---	18.60	50.00	31.40	3000.0	9.0	L1	10.70
23.972	20.61	---	60.00	39.39	3000.0	9.0	L1	10.71
27.664	---	23.91	50.00	26.09	3000.0	9.0	L1	10.73
27.856	25.22	---	60.00	34.78	3000.0	9.0	L1	10.73



-. Tested Line : NEUTRAL LINE



### Final Result

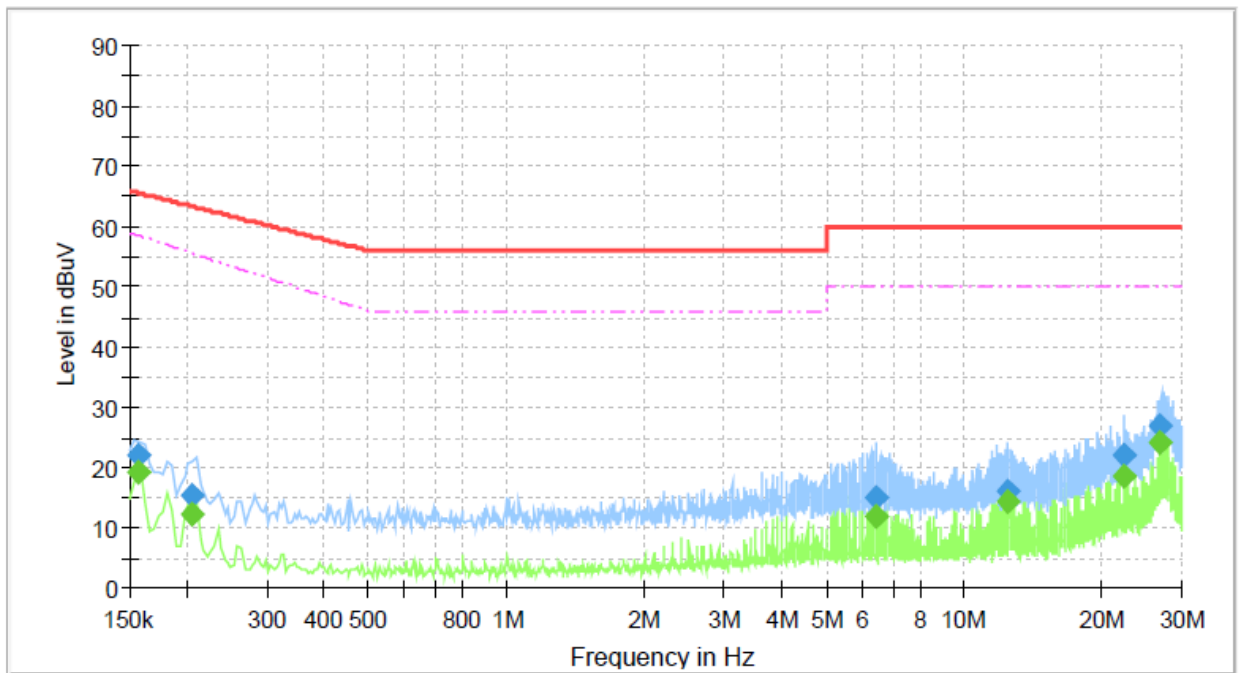
Frequency (MHz)	QuasiPeak (dBuV)	CAverage (dBuV)	Limit (dBuV)	Margin (dB)	Meas. Time (ms)	Bandwidth (kHz)	Line	Corr. (dB)
0.178	13.01	---	64.60	51.59	3000.0	9.0	N	9.95
0.182	---	12.37	54.42	42.05	3000.0	9.0	N	9.95
0.202	---	12.24	53.55	41.31	3000.0	9.0	N	9.95
0.203	13.92	---	63.51	49.59	3000.0	9.0	N	9.95
6.446	---	11.53	50.00	38.47	3000.0	9.0	N	10.18
6.446	15.19	---	60.00	44.81	3000.0	9.0	N	10.18
11.547	17.53	---	60.00	42.47	3000.0	9.0	N	10.44
11.551	---	14.61	50.00	35.39	3000.0	9.0	N	10.44
20.745	---	17.48	50.00	32.52	3000.0	9.0	N	10.72
20.813	19.04	---	60.00	40.96	3000.0	9.0	N	10.72
27.606	22.55	---	60.00	37.45	3000.0	9.0	N	10.72
27.797	---	22.27	50.00	27.73	3000.0	9.0	N	10.72

Remark: Margin (dB) = Limit – Level (Result)

The emission level in above table is included the transducer factor that means insertion loss (LISN), cable loss and attenuator.

### 12.6 Test data for Multiple model (Model name: BoT-TMA50DU)

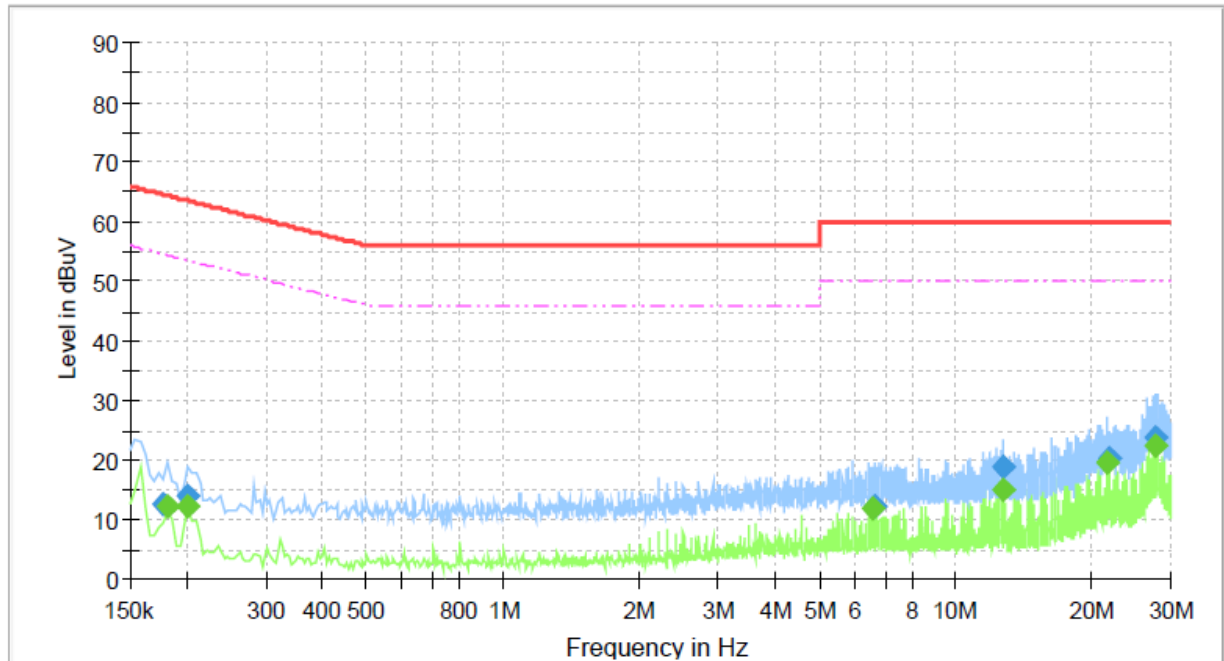
- Resolution bandwidth : 9 kHz
- Frequency range : 0.15 MHz ~ 30 MHz
- Tested Line : HOT LINE



### Final Result

Frequency (MHz)	QuasiPeak (dBuV)	CAverage (dBuV)	Limit (dBuV)	Margin (dB)	Meas. Time (ms)	Bandwidth (kHz)	Line	Corr. (dB)
0.158	---	19.24	58.47	39.24	3000.0	9.0	L1	9.97
0.158	22.07	---	65.60	43.53	3000.0	9.0	L1	9.97
0.205	---	12.14	55.60	43.46	3000.0	9.0	L1	10.01
0.205	15.27	---	63.39	48.11	3000.0	9.0	L1	10.01
6.430	---	11.81	50.00	38.19	3000.0	9.0	L1	10.30
6.454	14.96	---	60.00	45.04	3000.0	9.0	L1	10.30
12.489	---	14.29	50.00	35.71	3000.0	9.0	L1	10.52
12.533	16.05	---	60.00	43.95	3000.0	9.0	L1	10.52
22.494	---	18.52	50.00	31.48	3000.0	9.0	L1	10.70
22.495	22.22	---	60.00	37.78	3000.0	9.0	L1	10.70
26.856	---	24.25	50.00	25.75	3000.0	9.0	L1	10.72
26.860	26.95	---	60.00	33.05	3000.0	9.0	L1	10.72

-. Tested Line : NEUTRAL LINE



### Final Result

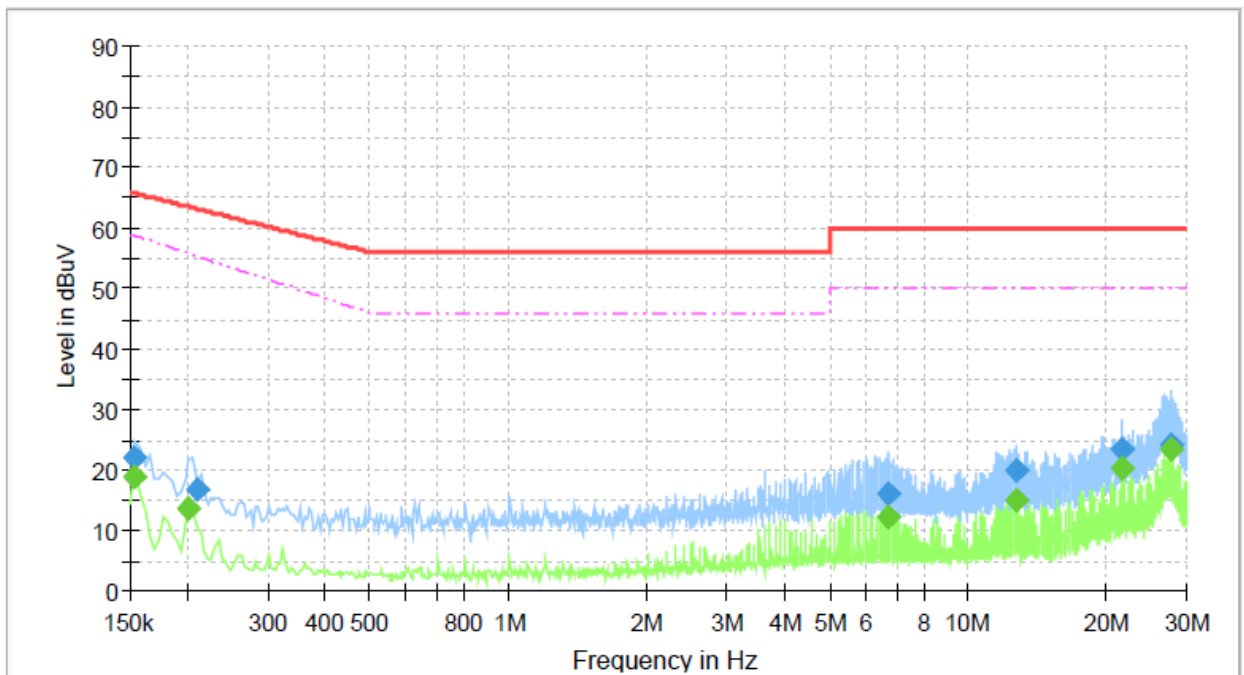
Frequency (MHz)	QuasiPeak (dBuV)	CAverage (dBuV)	Limit (dBuV)	Margin (dB)	Meas. Time (ms)	Bandwidth (kHz)	Line	Corr. (dB)
0.178	12.75	---	64.60	51.85	3000.0	9.0	N	9.95
0.182	---	12.40	54.42	42.01	3000.0	9.0	N	9.95
0.202	---	12.23	53.55	41.32	3000.0	9.0	N	9.95
0.202	14.16	---	63.55	49.39	3000.0	9.0	N	9.95
6.580	---	11.89	50.00	38.11	3000.0	9.0	N	10.18
6.644	12.29	---	60.00	47.71	3000.0	9.0	N	10.19
12.758	19.05	---	60.00	40.95	3000.0	9.0	N	10.48
12.758	---	15.10	50.00	34.90	3000.0	9.0	N	10.48
21.689	---	19.55	50.00	30.45	3000.0	9.0	N	10.72
21.797	20.45	---	60.00	39.55	3000.0	9.0	N	10.72
27.664	---	22.31	50.00	27.69	3000.0	9.0	N	10.72
27.704	23.88	---	60.00	36.12	3000.0	9.0	N	10.72

Remark: Margin (dB) = Limit – Level (Result)

The emission level in above table is included the transducer factor that means insertion loss (LISN), cable loss and attenuator.

**12.7 Test data for Multiple model (Model name: BoT-TMA50DS)**

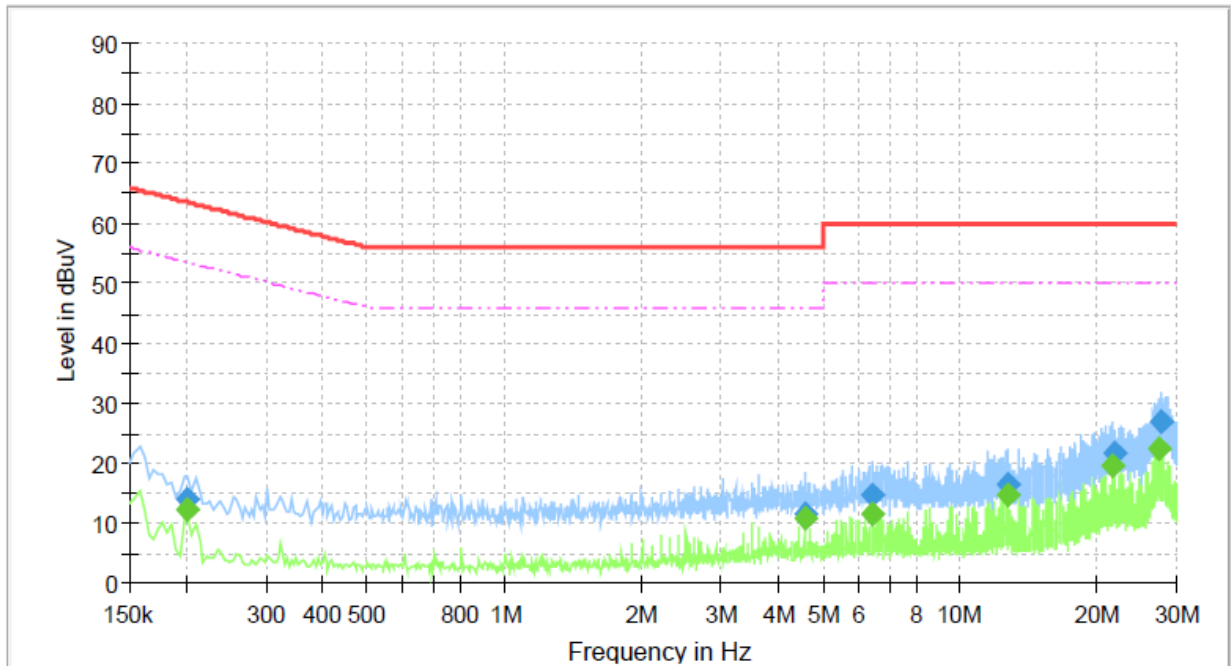
- Resolution bandwidth : 9 kHz
- Frequency range : 0.15 MHz ~ 30 MHz
- Tested Line : HOT LINE



**Final Result**

Frequency (MHz)	QuasiPeak (dBuV)	CAverage (dBuV)	Limit (dBuV)	Margin (dB)	Meas. Time (ms)	Bandwidth (kHz)	Line	Corr. (dB)
0.154	---	19.04	58.72	39.68	3000.0	9.0	L1	9.97
0.154	21.99	---	65.78	43.80	3000.0	9.0	L1	9.97
0.202	---	13.60	55.81	42.21	3000.0	9.0	L1	10.01
0.210	16.71	---	63.23	46.52	3000.0	9.0	L1	10.01
6.731	---	12.27	50.00	37.73	3000.0	9.0	L1	10.31
6.734	16.25	---	60.00	43.75	3000.0	9.0	L1	10.31
12.754	---	15.18	50.00	34.82	3000.0	9.0	L1	10.52
12.758	19.97	---	60.00	40.03	3000.0	9.0	L1	10.52
21.686	23.35	---	60.00	36.65	3000.0	9.0	L1	10.70
21.686	---	20.39	50.00	29.61	3000.0	9.0	L1	10.70
27.614	24.02	---	60.00	35.98	3000.0	9.0	L1	10.73
27.663	---	23.59	50.00	26.41	3000.0	9.0	L1	10.73

-. Tested Line : NEUTRAL LINE



### Final Result

Frequency (MHz)	QuasiPeak (dBuV)	CAverage (dBuV)	Limit (dBuV)	Margin (dB)	Meas. Time (ms)	Bandwidth (kHz)	Line	Corr. (dB)
0.202	---	12.27	53.55	41.28	3000.0	9.0	N	9.95
0.202	14.18	---	63.55	49.37	3000.0	9.0	N	9.95
4.564	---	10.83	46.00	35.17	3000.0	9.0	N	10.10
4.568	11.47	---	56.00	44.53	3000.0	9.0	N	10.10
6.446	---	11.42	50.00	38.58	3000.0	9.0	N	10.18
6.446	14.72	---	60.00	45.28	3000.0	9.0	N	10.18
12.754	16.40	---	60.00	43.60	3000.0	9.0	N	10.48
12.758	---	14.82	50.00	35.18	3000.0	9.0	N	10.48
21.688	---	19.70	50.00	30.30	3000.0	9.0	N	10.72
21.821	21.83	---	60.00	38.17	3000.0	9.0	N	10.72
27.529	---	22.32	50.00	27.68	3000.0	9.0	N	10.72
27.661	26.90	---	60.00	33.10	3000.0	9.0	N	10.72

Remark: Margin (dB) = Limit – Level (Result)

The emission level in above table is included the transducer factor that means insertion loss (LISN), cable loss and attenuator.

### 13. LIST OF TEST EQUIPMENT

Model Number	Manufacturer	Description	Serial Number	Last Cal.(Interval)
FSV40-N	Rohde & Schwarz	Signal Analyzer	102177	Apr. 03, 2023 (1Y)
FSV40-N	Rohde & Schwarz	Signal Analyzer	102165	Apr. 03, 2023 (1Y)
FSVA40	Rohde & Schwarz	Signal Analyzer	101586	Apr. 03, 2023 (1Y)
ZUP36-6	NEMIC-LAMBDA	DC Power Supply	YJV-535Z14-0018	Apr. 04, 2023 (1Y)
ESR	Rohde & Schwarz	EMI Test Receiver	101470	Oct. 18, 2022 (1Y)
310N	Sonoma Instrument	Pre-Amplifier	392756	Oct. 13, 2022 (1Y)
SCU18	Rohde & Schwarz	Signal Conditioning unit	102266	Jul. 12, 2022 (1Y)
SCU40A	Rohde & Schwarz	Signal Conditioning unit	100436	Jan. 18, 2023 (1Y)
HPF 3GHz	Rohde & Schwarz	High Pass Filter	N/A	Jan. 16, 2023 (1Y)
FMZB 1513	Schwarzbeck	Loop Antenna	1513-235	Mar. 24, 2022 (2Y)
HLP-2008	TDK	Hybrid Antenna	131316	Mar. 07, 2022 (2Y)
BBHA9120D	Schwarzbeck	Horn Antenna	9120D-1349	Jul. 08, 2022 (1Y)
BBHA9170	Schwarzbeck	Horn Antenna	BBHA9170179	Jan. 25, 2023 (1Y)
DT3000	Innco System	Turn Table	DT3000/093	N/A
MA4000-EP	Innco System	Antenna Master	MA4000/332/27030611/L	N/A
CO3000	Innco System	Controller	CO3000/904/37211215/L	N/A
DT2000-2t	Innco System	Turn Table	N/A	N/A
MA-4640-XPET	Innco System	Antenna Master	MA4640/652/43100318/P	N/A
CO3000	Innco System	Controller	1026/40960617/P	N/A
ESR	Rohde & Schwarz	EMI Test Receiver	102602	Mar. 14, 2023 (1Y)
ESH3Z2	Rohde & Schwarz	PULSE LIMITER	357.8810.52	Mar. 14, 2023 (1Y)
NSLK8126	Schwarzbeck	LISN	8126404	Aug. 09, 2022 (1Y)
3825/2	EMCO	AMN	9109-1869	Mar. 15, 2023 (1Y)