

RADIO PERFORMANCE TEST REPORT

Test Report No. : OT-248-RWD-015
Reception No. : 2407002381
Applicant : CHIPSEN. Co., Ltd
Address : B1 C-17, 15, Gyeongin-ro 53-gil, Guro-gu, Seoul, South Korea
Manufacturer : CHIPSEN. Co., Ltd
Address : B1 C-17, 15, Gyeongin-ro 53-gil, Guro-gu, Seoul, South Korea
Type of Equipment : Wireless Communication Module
FCC ID. : 2APB6-BOT-NLE523
Model Name : BoT-nLE523
Multiple Model Name : BoT-nLE523D, BoT-nLE523DU
Serial number : N/A
Total page of Report : 52 pages (including this page)
Date of Incoming : June 27, 2024
Date of issue : August 21, 2024

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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CONTENTS

	Page
1. VERIFICATION OF COMPLIANCE	6
2. TEST SUMMARY	7
2.1 TEST ITEMS AND RESULTS	7
2.2 ADDITIONS, DEVIATIONS, EXCLUSIONS FROM STANDARDS	7
2.3 RELATED SUBMITTAL(S) / GRANT(S)	7
2.4 PURPOSE OF THE TEST	7
2.5 TEST METHODOLOGY	7
2.6 TEST FACILITY	7
3. GENERAL INFORMATION	8
3.1 PRODUCT DESCRIPTION	8
3.2 ALTERNATIVE TYPE(S)/MODEL(S); ALSO COVERED BY THIS TEST REPORT	8
4. EUT MODIFICATIONS	8
5. SYSTEM TEST CONFIGURATION	9
5.1 JUSTIFICATION	9
5.2 PERIPHERAL EQUIPMENT	9
5.3 MODE OF OPERATION DURING THE TEST	9
5.4 CONFIGURATION OF TEST SYSTEM	10
5.5 ANTENNA REQUIREMENT	10
6. MEASUREMENT UNCERTAINTY	10
7. PRELIMINARY TEST	11
7.1 AC POWER LINE CONDUCTED EMISSIONS TESTS	11
7.2 GENERAL RADIATED EMISSIONS TESTS	11
8. MINIMUM 6 dB BANDWIDTH	12
8.1 OPERATING ENVIRONMENT	12
8.2 TEST SET-UP	12
8.3 TEST DATE	12
8.4 TEST DATA FOR 1 MBPS	12
8.5 TEST DATA FOR 2 MBPS	12
9. MAXIMUM CONDUCTED (PEAK) OUTPUT POWER	13
9.1 OPERATING ENVIRONMENT	13
9.2 TEST SET-UP	13
9.3 TEST DATE	13

9.4 TEST DATA FOR 1 MBPS	13
9.5 TEST DATA FOR 2 MBPS	13
10. 100 kHz BANDWIDTH OUTSIDE THE FREQUENCY BAND	14
10.1 OPERATING ENVIRONMENT	14
10.2 TEST SET-UP FOR CONDUCTED MEASUREMENT	14
10.3 TEST SET-UP FOR RADIATED MEASUREMENT.....	14
10.4 TEST DATE	14
10.5 TEST DATA FOR CONDUCTED EMISSION	14
10.6 TEST DATA FOR RADIATED EMISSION(MODEL NAME: BoT-nLE523).....	15
10.6.1 Radiated Emission which fall in the Restricted Band.....	15
10.6.2 Spurious & Harmonic Radiated Emission.....	17
10.7 TEST DATA FOR RADIATED EMISSION(MODEL NAME: BoT-nLE523D)	21
10.7.1 Radiated Emission which fall in the Restricted Band.....	21
10.7.2 Spurious & Harmonic Radiated Emission.....	23
10.8 TEST DATA FOR RADIATED EMISSION(MODEL NAME: BoT-nLE523DU(PCB ANTENNA)).....	27
10.8.1 Radiated Emission which fall in the Restricted Band.....	27
10.8.2 Spurious & Harmonic Radiated Emission.....	29
10.9 TEST DATA FOR RADIATED EMISSION(MODEL NAME: BoT-nLE523DU(DIPOLE ANTENNA)).....	33
10.9.1 Radiated Emission which fall in the Restricted Band.....	33
10.9.2 Spurious & Harmonic Radiated Emission.....	35
11. PEAK POWER SPECTRAL DENSITY	39
11.1 OPERATING ENVIRONMENT	39
11.2 TEST SET-UP	39
11.3 TEST DATE	39
11.4 TEST DATA FOR 1 MBPS	39
11.5 TEST DATA FOR 2 MBPS	39
12. RADIATED EMISSION TEST	40
12.1 OPERATING ENVIRONMENT	40
12.2 TEST SET-UP	40
12.3 TEST DATE	40
12.4 TEST DATA FOR BASIC MODEL (MODEL NAME: BoT-nLE523).....	41
12.4.1 Test data for 30 MHz ~ 1 000 MHz.....	41
12.4.2 Test data for Below 30 MHz	42
12.4.3 Test data for above 1 GHz	42
12.5 TEST DATA FOR MULTIPLE MODEL (MODEL NAME: BoT-nLE523D)	43
12.5.1 Test data for 30 MHz ~ 1 000 MHz.....	43

12.5.2 Test data for Below 30 MHz	44
12.5.3 Test data for above 1 GHz	44
12.6 TEST DATA FOR MULTIPLE MODEL (MODEL NAME: BoT-nLE523DU(PCB ANTENNA)).....	45
12.6.1 Test data for 30 MHz ~ 1 000 MHz.....	45
12.6.2 Test data for Below 30 MHz	46
12.6.3 Test data for above 1 GHz	46
12.7 TEST DATA FOR MULTIPLE MODEL (MODEL NAME: BoT-nLE523DU(DIPOLE ANTENNA)).....	47
12.7.1 Test data for 30 MHz ~ 1 000 MHz.....	47
12.7.2 Test data for Below 30 MHz	48
12.7.3 Test data for above 1 GHz	48
13. CONDUCTED EMISSION TEST.....	49
13.1 OPERATING ENVIRONMENT	49
13.2 TEST SET-UP	49
13.3 TEST DATE	49
13.4 TEST DATA.....	50
14. LIST OF TEST EQUIPMENT	52

※ Please refer to the Annex section for All test plots

Revision History

Rev. No.	Issue Report No.	Issued Date	Revisions	Section Affected
0	OT-248-RWD-015	August 21, 2024	Initial Release	All

1. VERIFICATION OF COMPLIANCE

Applicant : CHIPSEN. Co., Ltd
Address : B1 C-17, 15, Gyeongin-ro 53-gil, Guro-gu, Seoul, South Korea
Contact Person : Young Min Park / Senior Engineer
Telephone No. : +82-70-8708-5990
FCC ID : 2APB6-BOT-NLE523
Model Name : BoT-nLE523
Brand Name : -
Serial Number : N/A
Date : August 21, 2024

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-nLE523 (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	5.73 dBm
		2 Mbps	5.70 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)	24 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-nLE523	Basic Model	☒
BoT-nLE523D	This model is identical to the basic model except for added Pin Header board surrounding Module.	☒
BoT-nLE523DU	This model is identical to the basic model except for mounted Pin Header board including U.FL connector and added 1 PCB Antenna, 2 Dipole Antennas	☒

Note: 1. For multiple models, Only radiated emission test has been performed.

2. The Applicant/manufacture 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-nLE523	N/A

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-nLE523	CHIPSEN. Co., Ltd	Wireless Communication Module (EUT)	-
IdeaPad L340	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	1.080	0.800	57.45	2.41

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

Correction Factor : $10 * \text{Log}(1 / (\text{Duty Cycle} / 100))$

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. MEASUREMENT UNCERTAINTY

The measurement uncertainties shown below were calculated in accordance with the requirements of ANSI C63.10-2013. All measurement uncertainty values are shown with a coverage factor of $k = 2$ to indicate a 95 % level of confidence. The measurement data shown herein meets or exceeds the U_{CISPR} measurement uncertainty values specified in CISPR 16-4-2 and, thus, can be compared directly to specified limits to determine compliance.

Parameter	Expanded Uncertainty (dB)
Conducted Output Power	0.90
Conducted Spurious Emission < 26.5 GHz	1.26
Power Spectral Density	1.20
Line Conducted Disturbance (150 kHz ~ 30 MHz)	2.00
Radiated Disturbance (9 kHz ~ 30 MHz)	3.30
Radiated Disturbance (30 MHz ~ 1 GHz)	4.42
Radiated Disturbance (1 GHz ~ 18 GHz)	5.10
Radiated Disturbance (18 GHz ~ 40 GHz)	5.65

7. PRELIMINARY TEST

7.1 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

7.2 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

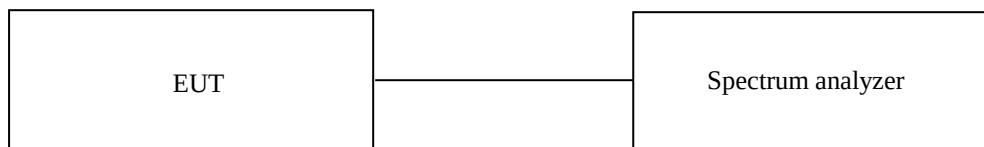
8. MINIMUM 6 dB BANDWIDTH

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 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.



8.3 Test Date

June 27, 2024 ~ August 02, 2024

8.4 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	714.30	500.00	214.30
High	2 480.00	719.30	500.00	219.30

Remark. Margin = Measured Value - Limit

8.5 Test data for 2 Mbps

CHANNEL	FREQUENCY(MHz)	MEASURED VALUE (kHz)	LIMIT (kHz)	MARGIN (kHz)
Low	2 402.00	1 159.00	500.00	659.00
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

9. MAXIMUM CONDUCTED (PEAK) OUTPUT POWER

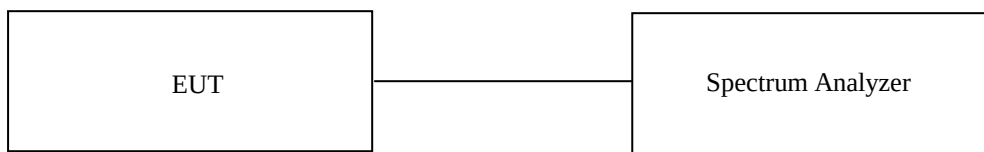
9.1 Operating environment

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

9.2 Test set-up

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

The resolution bandwidth is set to $\geq$ DTS Bandwidth, the video bandwidth is set to 3 times the resolution bandwidth.



9.3 Test Date

June 27, 2024 ~ August 02, 2024

9.4 Test data for 1 Mbps

-. Test Result : Pass

CHANNEL	FREQUENCY (MHz)	MEASURED VALUE (dBm)	LIMIT (dBm)	MARGIN (dB)
LOW	2 402.00	5.73	30.00	24.27
MIDDLE	2 440.00	5.57	30.00	24.43
HIGH	2 480.00	5.41	30.00	24.59

Remark. Margin = Limit – Measured Value

9.5 Test data for 2 Mbps

-. Test Result : Pass

CHANNEL	FREQUENCY (MHz)	MEASURED VALUE (dBm)	LIMIT (dBm)	MARGIN (dB)
LOW	2 402.00	5.70	30.00	24.30
MIDDLE	2 440.00	5.62	30.00	24.38
HIGH	2 480.00	5.52	30.00	24.48

Remark. Margin = Limit – Measured Value

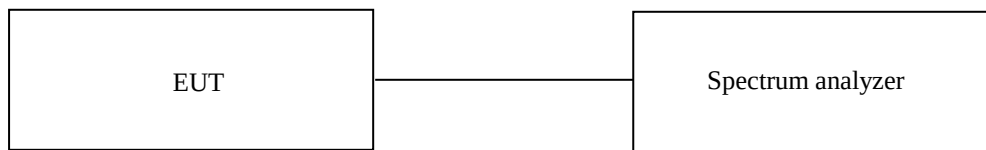
10. 100 kHz BANDWIDTH OUTSIDE THE FREQUENCY BAND

10.1 Operating environment

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

10.2 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.



10.3 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.

10.4 Test Date

June 27, 2024 ~ August 02, 2024

10.5 Test data for conducted emission

For Test data for conducted emission, please refer to the Annex.

10.6 Test data for radiated emission(Model name: BoT-nLE523)

10.6.1 Radiated Emission which fall in the Restricted Band

10.6.1.1 Test data for 1 Mbps

- 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	Cable Loss	AMP Gain	ATT (dB)	Duty Factor (dB)	Total (dBμV/m)	Limits (dBμV/m)	Margin (dB)
Test Data for Low Channel											
2 325.12	57.41	Peak	H	27.80	4.67	41.74	6.11	-	54.25	74.00	19.75
2 370.15	47.12	Average	H	27.62	4.63	41.74	6.11	0.68	44.42	54.00	9.58
2 333.11	57.04	Peak	V	27.77	4.67	41.74	6.11	-	53.85	74.00	20.15
2 369.60	45.44	Average	V	27.62	4.63	41.74	6.11	0.68	42.74	54.00	11.26
Test Data for High Channel											
2 483.87	57.72	Peak	H	27.40	4.83	41.73	6.13	-	54.35	74.00	19.65
2 483.61	47.70	Average	H	27.40	4.83	41.73	6.13	0.68	45.01	54.00	8.99
2 489.20	57.49	Peak	V	27.40	4.88	41.73	6.11	-	54.15	74.00	19.85
2 483.79	46.03	Average	V	27.40	4.83	41.73	6.13	0.68	43.34	54.00	10.66

Tabulated test data for Restricted Band

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

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

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

10.6.1.2 Test data for 2 Mbps

- 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 : 57.45 %
- Result : PASSED

Frequency (MHz)	Reading (dBμV)	Detector Mode	Ant. Pol. (H/V)	Ant. Factor	Cable Loss	AMP Gain	ATT (dB)	Duty Factor (dB)	Total (dBμV/m)	Limits (dBμV/m)	Margin (dB)
Test Data for Low Channel											
2 388.17	56.86	Peak	H	27.55	4.65	41.74	6.11	-	53.43	74.00	20.57
2 370.15	46.45	Average	H	27.62	4.63	41.74	6.11	2.41	45.48	54.00	8.52
2 344.14	57.14	Peak	V	27.72	4.63	41.74	6.09	-	53.84	74.00	20.16
2 378.61	45.43	Average	V	27.59	4.65	41.74	6.12	2.41	44.46	54.00	9.54
Test Data for High Channel											
2 483.53	60.32	Peak	H	27.40	4.83	41.73	6.13	-	56.95	74.00	17.05
2 483.53	49.94	Average	H	27.40	4.83	41.73	6.13	2.41	48.98	54.00	5.02
2 498.57	57.94	Peak	V	27.40	4.93	41.73	6.11	-	54.65	74.00	19.35
2 483.55	46.59	Average	V	27.40	4.83	41.73	6.13	2.41	45.63	54.00	8.37

Tabulated test data for Restricted Band

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

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

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

10.6.2 Spurious & Harmonic Radiated Emission

10.6.2.1 Test data for 1 Mbps

- . 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	Cable Loss	AMP Gain	Duty Factor (dB)	Total (dBμV/m)	Limits (dBμV/m)	Margin (dB)
Test Data for Low Channel										
4 806.16	50.10	Peak	H	31.20	6.60	41.29	-	46.61	74.00	27.39
4 804.82	38.46	Average	H	31.20	6.60	41.29	0.68	35.65	54.00	18.35
7 208.86	50.88	Peak	H	36.12	8.06	41.38	-	53.68	74.00	20.32
7 197.09	38.85	Average	H	36.09	8.06	41.38	0.68	42.30	54.00	11.70
4 804.76	51.72	Peak	V	31.20	6.60	41.29	-	48.23	74.00	25.77
4 803.82	42.80	Average	V	31.20	6.60	41.29	0.68	39.99	54.00	14.01
7 205.22	54.64	Peak	V	36.11	8.06	41.38	-	57.43	74.00	16.57
7 205.44	46.02	Average	V	36.11	8.06	41.38	0.68	49.49	54.00	4.51
Test Data for Middle Channel										
4 882.46	51.12	Peak	H	31.26	6.70	41.27	-	47.81	74.00	26.19
4 885.40	38.17	Average	H	31.27	6.70	41.27	0.68	35.55	54.00	18.45
7 322.02	51.19	Peak	H	36.30	8.62	41.36	-	54.75	74.00	19.25
7 320.88	38.86	Average	H	36.30	8.62	41.37	0.68	43.09	54.00	10.91
4 880.60	50.60	Peak	V	31.26	6.70	41.27	-	47.29	74.00	26.71
4 880.18	40.88	Average	V	31.26	6.70	41.27	0.68	38.25	54.00	15.75
7 319.20	51.80	Peak	V	36.30	8.62	41.37	-	55.35	74.00	18.65
7 320.70	40.10	Average	V	36.30	8.62	41.37	0.68	44.33	54.00	9.67

Test Data for High Channel										
4 961.14	49.75	Peak	H	31.54	6.71	41.25	-	46.75	74.00	27.25
4 969.23	38.03	Average	H	31.58	6.71	41.25	0.68	35.75	54.00	18.25
7 449.19	50.67	Peak	H	36.40	8.22	41.35	-	53.94	74.00	20.06
7 431.07	38.72	Average	H	36.40	8.22	41.35	0.68	42.67	54.00	11.33
4 960.32	51.41	Peak	V	31.54	6.71	41.25	-	48.41	74.00	25.59
4 960.06	41.58	Average	V	31.54	6.71	41.25	0.68	39.26	54.00	14.74
7 440.58	55.08	Peak	V	36.40	8.22	41.35	-	58.35	74.00	15.65
7 439.64	46.39	Average	V	36.40	8.22	41.35	0.68	50.34	54.00	3.66

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

Margin (dB) = Limits (dBμV/m) - Total Level (dBμV/m)

Total Level = Reading + Antenna Factor + Cable Loss – AMP Gain + Duty Factor

10.6.2.2 Test data for 2 Mbps

- 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 : 57.45 %
- Result : PASSED

Frequency (MHz)	Reading (dBμV)	Detector Mode	Ant. Pol. (H/V)	Ant. Factor	Cable Loss	AMP Gain	Duty Factor (dB)	Total (dBμV/m)	Limits (dBμV/m)	Margin (dB)
Test Data for Low Channel										
4 812.61	50.19	Peak	H	31.20	6.60	41.29	-	46.70	74.00	27.30
4 804.36	38.38	Average	H	31.20	6.60	41.29	2.41	37.30	54.00	16.70
7 199.13	50.87	Peak	H	36.10	8.06	41.38	-	53.65	74.00	20.35
7 198.17	38.82	Average	H	36.10	8.06	41.38	2.41	44.01	54.00	9.99
4 803.02	51.96	Peak	V	31.20	6.60	41.29	-	48.47	74.00	25.53
4 803.20	39.19	Average	V	31.20	6.60	41.29	2.41	38.11	54.00	15.89
7 207.64	54.22	Peak	V	36.12	8.06	41.38	-	57.02	74.00	16.98
7 204.96	42.97	Average	V	36.11	8.06	41.38	2.41	48.17	54.00	5.83
Test Data for Middle Channel										
4 886.03	49.85	Peak	H	31.27	6.70	41.27	-	46.55	74.00	27.45
4 874.25	38.23	Average	H	31.25	6.69	41.27	2.41	37.31	54.00	16.69
7 319.58	50.96	Peak	H	36.30	8.62	41.37	-	54.51	74.00	19.49
7 314.09	38.73	Average	H	36.30	8.62	41.37	2.41	44.69	54.00	9.31
4 880.18	51.04	Peak	V	31.26	6.70	41.27	-	47.73	74.00	26.27
4 879.98	39.86	Average	V	31.26	6.70	41.27	2.41	38.96	54.00	15.04
7 318.14	52.70	Peak	V	36.30	8.62	41.37	-	56.25	74.00	17.75
7 321.30	41.98	Average	V	36.30	8.62	41.37	2.41	47.94	54.00	6.06

Test Data for High Channel										
4 965.53	50.92	Peak	H	31.56	6.71	41.25	-	47.94	74.00	26.06
4 958.84	38.31	Average	H	31.54	6.71	41.25	2.41	37.72	54.00	16.28
7 436.24	50.97	Peak	H	36.40	8.22	41.35	-	54.24	74.00	19.76
7 430.67	38.79	Average	H	36.40	8.22	41.35	2.41	44.47	54.00	9.53
4 961.08	51.28	Peak	V	31.54	6.71	41.25	-	48.28	74.00	25.72
4 960.66	40.01	Average	V	31.54	6.71	41.25	2.41	39.42	54.00	14.58
7 441.62	55.02	Peak	V	36.40	8.22	41.35	-	58.29	74.00	15.71
7 441.42	44.40	Average	V	36.40	8.22	41.35	2.41	50.08	54.00	3.92

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

Margin (dB) = Limits (dBμV/m) - Total Level (dBμV/m)

Total Level = Reading + Antenna Factor + Cable Loss – AMP Gain + Duty Factor

10.7 Test data for radiated emission(Model name: BoT-nLE523D)

10.7.1 Radiated Emission which fall in the Restricted Band

10.7.1.1 Test data for 1 Mbps

- 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	Cable Loss	AMP Gain	ATT (dB)	Duty Factor (dB)	Total (dBμV/m)	Limits (dBμV/m)	Margin (dB)
Test Data for Low Channel											
2 337.71	54.31	Peak	H	27.75	4.63	41.74	6.09	-	51.04	74.00	22.96
2 369.97	45.84	Average	H	27.62	4.63	41.74	6.11	0.68	43.14	54.00	10.86
2 375.76	53.53	Peak	V	27.60	4.65	41.74	6.12	-	50.16	74.00	23.84
2 369.69	42.54	Average	V	27.62	4.63	41.74	6.11	0.68	39.84	54.00	14.16
Test Data for High Channel											
2 493.90	54.22	Peak	H	27.40	4.88	41.73	6.11	-	50.88	74.00	23.12
2 483.57	43.23	Average	H	27.40	4.83	41.73	6.13	0.68	40.54	54.00	13.46
2 496.39	53.65	Peak	V	27.40	4.93	41.73	6.11	-	50.36	74.00	23.64
2 483.91	42.21	Average	V	27.40	4.83	41.73	6.13	0.68	39.52	54.00	14.48

Tabulated test data for Restricted Band

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

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

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

10.7.1.2 Test data for 2 Mbps

- 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 : 57.45 %
- Result : PASSED

Frequency (MHz)	Reading (dBμV)	Detector Mode	Ant. Pol. (H/V)	Ant. Factor	Cable Loss	AMP Gain	ATT (dB)	Duty Factor (dB)	Total (dBμV/m)	Limits (dBμV/m)	Margin (dB)
Test Data for Low Channel											
2 354.71	53.41	Peak	H	27.68	4.62	41.74	6.09	-	50.06	74.00	23.94
2 370.06	43.97	Average	H	27.62	4.63	41.74	6.11	2.41	43.00	54.00	11.00
2 384.95	53.14	Peak	V	27.56	4.65	41.74	6.12	-	49.73	74.00	24.27
2 315.93	41.82	Average	V	27.84	4.62	41.74	6.12	2.41	41.07	54.00	12.93
Test Data for High Channel											
2 484.77	56.41	Peak	H	27.40	4.83	41.73	6.13	-	53.04	74.00	20.96
2 483.51	45.44	Average	H	27.40	4.83	41.73	6.13	2.41	44.48	54.00	9.52
2 485.27	54.13	Peak	V	27.40	4.83	41.73	6.11	-	50.74	74.00	23.26
2 483.51	43.35	Average	V	27.40	4.83	41.73	6.13	2.41	42.39	54.00	11.61

Tabulated test data for Restricted Band

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

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

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

10.7.2 Spurious & Harmonic Radiated Emission

10.7.2.1 Test data for 1 Mbps

- . 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	Cable Loss	AMP Gain	Duty Factor (dB)	Total (dBμV/m)	Limits (dBμV/m)	Margin (dB)
Test Data for Low Channel										
4 803.42	50.33	Peak	H	31.20	6.60	41.29	-	46.84	74.00	27.16
4 803.84	39.98	Average	H	31.20	6.60	41.29	0.68	37.17	54.00	16.83
7 207.13	49.89	Peak	H	36.11	8.06	41.38	-	52.68	74.00	21.32
7 205.18	37.54	Average	H	36.11	8.06	41.38	0.68	41.01	54.00	12.99
4 803.37	52.16	Peak	V	31.20	6.60	41.29	-	48.67	74.00	25.33
4 803.97	42.96	Average	V	31.20	6.60	41.29	0.68	40.15	54.00	13.85
7 205.37	53.02	Peak	V	36.11	8.06	41.38	-	55.81	74.00	18.19
7 206.70	43.02	Average	V	36.11	8.06	41.38	0.68	46.49	54.00	7.51
Test Data for Middle Channel										
4 880.53	50.59	Peak	H	31.26	6.70	41.27	-	47.28	74.00	26.72
4 880.22	40.42	Average	H	31.26	6.70	41.27	0.68	37.79	54.00	16.21
7 322.24	49.46	Peak	H	36.30	8.62	41.36	-	53.02	74.00	20.98
7 322.20	37.31	Average	H	36.30	8.62	41.36	0.68	41.55	54.00	12.45
4 880.45	51.43	Peak	V	31.26	6.70	41.27	-	48.12	74.00	25.88
4 879.62	41.91	Average	V	31.26	6.70	41.27	0.68	39.28	54.00	14.72
7 319.43	53.30	Peak	V	36.30	8.62	41.37	-	56.85	74.00	17.15
7 319.32	44.23	Average	V	36.30	8.62	41.37	0.68	48.46	54.00	5.54

Test Data for High Channel										
4 959.39	49.38	Peak	H	31.54	6.71	41.25	-	46.38	74.00	27.62
4 957.79	37.53	Average	H	31.53	6.71	41.25	0.68	35.20	54.00	18.80
7 440.60	50.93	Peak	H	36.40	8.22	41.35	-	54.20	74.00	19.80
7 440.62	39.03	Average	H	36.40	8.22	41.35	0.68	42.98	54.00	11.02
4 960.84	49.80	Peak	V	31.54	6.71	41.25	-	46.80	74.00	27.20
4 959.58	37.70	Average	V	31.54	6.71	41.25	0.68	35.38	54.00	18.62
7 440.91	54.56	Peak	V	36.40	8.22	41.35	-	57.83	74.00	16.17
7 440.53	45.81	Average	V	36.40	8.22	41.35	0.68	49.76	54.00	4.24

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

Margin (dB) = Limits (dBμV/m) - Total Level (dBμV/m)

Total Level = Reading + Antenna Factor + Cable Loss – AMP Gain + Duty Factor

10.7.2.2 Test data for 2 Mbps

- 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 : 57.45 %
- Result : PASSED

Frequency (MHz)	Reading (dBμV)	Detector Mode	Ant. Pol. (H/V)	Ant. Factor	Cable Loss	AMP Gain	Duty Factor (dB)	Total (dBμV/m)	Limits (dBμV/m)	Margin (dB)
Test Data for Low Channel										
4 805.02	49.50	Peak	H	31.20	6.60	41.29	-	46.01	74.00	27.99
4 804.01	37.48	Average	H	31.20	6.60	41.29	2.41	36.40	54.00	17.60
7 208.16	49.72	Peak	H	36.12	8.06	41.38	-	52.52	74.00	21.48
7 205.00	37.42	Average	H	36.11	8.06	41.38	2.41	42.62	54.00	11.38
4 802.96	51.43	Peak	V	31.20	6.60	41.29	-	47.94	74.00	26.06
4 804.77	40.43	Average	V	31.20	6.60	41.29	2.41	39.35	54.00	14.65
7 207.33	52.82	Peak	V	36.11	8.06	41.38	-	55.61	74.00	18.39
7 204.85	41.72	Average	V	36.11	8.06	41.38	2.41	46.92	54.00	7.08
Test Data for Middle Channel										
4 880.11	50.63	Peak	H	31.26	6.70	41.27	-	47.32	74.00	26.68
4 880.85	38.70	Average	H	31.26	6.70	41.27	2.41	37.80	54.00	16.20
7 322.10	49.92	Peak	H	36.30	8.62	41.36	-	53.48	74.00	20.52
7 322.37	37.34	Average	H	36.30	8.62	41.36	2.41	43.31	54.00	10.69
4 880.84	51.21	Peak	V	31.26	6.70	41.27	-	47.90	74.00	26.10
4 880.80	39.99	Average	V	31.26	6.70	41.27	2.41	39.09	54.00	14.91
7 321.52	52.73	Peak	V	36.30	8.62	41.36	-	56.29	74.00	17.71
7 321.35	42.31	Average	V	36.30	8.62	41.37	2.41	48.27	54.00	5.73

Test Data for High Channel										
4 959.86	49.66	Peak	H	31.54	6.71	41.25	-	46.66	74.00	27.34
4 958.80	37.73	Average	H	31.54	6.71	41.25	2.41	37.14	54.00	16.86
7 440.64	51.09	Peak	H	36.40	8.22	41.35	-	54.36	74.00	19.64
7 441.14	38.83	Average	H	36.40	8.22	41.35	2.41	44.51	54.00	9.49
4 959.36	50.19	Peak	V	31.54	6.71	41.25	-	47.19	74.00	26.81
4 960.80	37.95	Average	V	31.54	6.71	41.25	2.41	37.36	54.00	16.64
7 438.54	54.47	Peak	V	36.40	8.22	41.35	-	57.74	74.00	16.26
7 441.32	41.69	Average	V	36.40	8.22	41.35	2.41	47.37	54.00	6.63

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

Margin (dB) = Limits (dBμV/m) - Total Level (dBμV/m)

Total Level = Reading + Antenna Factor + Cable Loss – AMP Gain + Duty Factor

10.8 Test data for radiated emission(Model name: BoT-nLE523DU(PCB Antenna))

10.8.1 Radiated Emission which fall in the Restricted Band

10.8.1.1 Test data for 1 Mbps

- . 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	Cable Loss	AMP Gain	ATT (dB)	Duty Factor (dB)	Total (dBμV/m)	Limits (dBμV/m)	Margin (dB)
Test Data for Low Channel											
2 360.32	53.64	Peak	H	27.66	4.63	41.74	6.11	-	50.30	74.00	23.70
2 353.98	42.22	Average	H	27.68	4.62	41.74	6.09	0.68	39.55	54.00	14.45
2 369.97	54.03	Peak	V	27.62	4.63	41.74	6.11	-	50.65	74.00	23.35
2 370.25	45.28	Average	V	27.62	4.63	41.74	6.11	0.68	42.58	54.00	11.42
Test Data for High Channel											
2 483.75	56.50	Peak	H	27.40	4.83	41.73	6.13	-	53.13	74.00	20.87
2 483.55	42.43	Average	H	27.40	4.83	41.73	6.13	0.68	39.74	54.00	14.26
2 483.67	58.63	Peak	V	27.40	4.83	41.73	6.13	-	55.26	74.00	18.74
2 483.73	44.07	Average	V	27.40	4.83	41.73	6.13	0.68	41.38	54.00	12.62

Tabulated test data for Restricted Band

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

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

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

10.8.1.2 Test data for 2 Mbps

- 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 : 57.45 %
- Result : PASSED

Frequency (MHz)	Reading (dBμV)	Detector Mode	Ant. Pol. (H/V)	Ant. Factor	Cable Loss	AMP Gain	ATT (dB)	Duty Factor (dB)	Total (dBμV/m)	Limits (dBμV/m)	Margin (dB)
Test Data for Low Channel											
2 370.61	53.91	Peak	H	27.62	4.63	41.74	6.11	-	50.53	74.00	23.47
2 370.06	41.95	Average	H	27.62	4.63	41.74	6.11	2.41	40.98	54.00	13.02
2 370.25	53.62	Peak	V	27.62	4.63	41.74	6.11	-	50.24	74.00	23.76
2 370.06	43.49	Average	V	27.62	4.63	41.74	6.11	2.41	42.52	54.00	11.48
Test Data for High Channel											
2 483.59	55.30	Peak	H	27.40	4.83	41.73	6.13	-	51.93	74.00	22.07
2 483.61	42.62	Average	H	27.40	4.83	41.73	6.13	2.41	41.66	54.00	12.34
2 483.61	58.67	Peak	V	27.40	4.83	41.73	6.13	-	55.30	74.00	18.70
2 483.51	44.67	Average	V	27.40	4.83	41.73	6.13	2.41	43.71	54.00	10.29

Tabulated test data for Restricted Band

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

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

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

10.8.2 Spurious & Harmonic Radiated Emission

10.8.2.1 Test data for 1 Mbps

- . 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	Cable Loss	AMP Gain	Duty Factor (dB)	Total (dBμV/m)	Limits (dBμV/m)	Margin (dB)
Test Data for Low Channel										
4 803.69	49.80	Peak	H	31.20	6.60	41.29	-	46.31	74.00	27.69
4 803.75	37.96	Average	H	31.20	6.60	41.29	0.68	35.15	54.00	18.85
7 205.37	49.92	Peak	H	36.11	8.06	41.38	-	52.71	74.00	21.29
7 206.95	37.68	Average	H	36.11	8.06	41.38	0.68	41.15	54.00	12.85
4 804.46	52.66	Peak	V	31.20	6.60	41.29	-	49.17	74.00	24.83
4 803.75	44.00	Average	V	31.20	6.60	41.29	0.68	41.19	54.00	12.81
7 207.07	50.98	Peak	V	36.11	8.06	41.38	-	53.77	74.00	20.23
7 206.62	38.18	Average	V	36.11	8.06	41.38	0.68	41.65	54.00	12.35
Test Data for Middle Channel										
4 880.21	49.23	Peak	H	31.26	6.70	41.27	-	45.92	74.00	28.08
4 877.64	37.67	Average	H	31.26	6.70	41.27	0.68	35.04	54.00	18.96
7 319.91	49.61	Peak	H	36.30	8.62	41.37	-	53.16	74.00	20.84
7 322.46	37.54	Average	H	36.30	8.62	41.36	0.68	41.78	54.00	12.22
4 879.63	51.80	Peak	V	31.26	6.70	41.27	-	48.49	74.00	25.51
4 879.77	40.13	Average	V	31.26	6.70	41.27	0.68	37.50	54.00	16.50
7 322.16	49.96	Peak	V	36.30	8.62	41.36	-	53.52	74.00	20.48
7 319.55	37.79	Average	V	36.30	8.62	41.37	0.68	42.02	54.00	11.98

Test Data for High Channel										
4 961.29	50.05	Peak	H	31.55	6.71	41.25	-	47.06	74.00	26.94
4 960.41	38.40	Average	H	31.54	6.71	41.25	0.68	36.08	54.00	17.92
7 442.29	51.45	Peak	H	36.40	8.22	41.35	-	54.72	74.00	19.28
7 441.08	38.64	Average	H	36.40	8.22	41.35	0.68	42.59	54.00	11.41
4 958.85	51.43	Peak	V	31.54	6.71	41.25	-	48.43	74.00	25.57
4 959.76	40.37	Average	V	31.54	6.71	41.25	0.68	38.05	54.00	15.95
7 440.60	53.49	Peak	V	36.40	8.22	41.35	-	56.76	74.00	17.24
7 440.61	43.23	Average	V	36.40	8.22	41.35	0.68	47.18	54.00	6.82

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

Margin (dB) = Limits (dBμV/m) - Total Level (dBμV/m)

Total Level = Reading + Antenna Factor + Cable Loss – AMP Gain + Duty Factor

10.8.2.2 Test data for 2 Mbps

- . 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 : 57.45 %
- . Result : PASSED

Frequency (MHz)	Reading (dBμV)	Detector Mode	Ant. Pol. (H/V)	Ant. Factor	Cable Loss	AMP Gain	Duty Factor (dB)	Total (dBμV/m)	Limits (dBμV/m)	Margin (dB)
Test Data for Low Channel										
4 805.32	49.83	Peak	H	31.20	6.60	41.29	-	46.34	74.00	27.66
4 803.72	37.49	Average	H	31.20	6.60	41.29	2.41	36.41	54.00	17.59
7 206.90	49.72	Peak	H	36.11	8.06	41.38	-	52.51	74.00	21.49
7 208.25	37.54	Average	H	36.12	8.06	41.38	2.41	42.75	54.00	11.25
4 804.73	52.89	Peak	V	31.20	6.60	41.29	-	49.40	74.00	24.60
4 803.27	41.30	Average	V	31.20	6.60	41.29	2.41	40.22	54.00	13.78
7 204.35	51.85	Peak	V	36.11	8.06	41.38	-	54.64	74.00	19.36
7 204.95	38.30	Average	V	36.11	8.06	41.38	2.41	43.50	54.00	10.50
Test Data for Middle Channel										
4 881.02	49.74	Peak	H	31.26	6.70	41.27	-	46.43	74.00	27.57
4 879.04	37.63	Average	H	31.26	6.70	41.27	2.41	36.73	54.00	17.27
7 320.53	49.77	Peak	H	36.30	8.62	41.37	-	53.32	74.00	20.68
7 322.43	37.48	Average	H	36.30	8.62	41.36	2.41	43.45	54.00	10.55
4 879.03	52.19	Peak	V	31.26	6.70	41.27	-	48.88	74.00	25.12
4 879.50	39.38	Average	V	31.26	6.70	41.27	2.41	38.48	54.00	15.52
7 318.41	51.05	Peak	V	36.30	8.62	41.37	-	54.60	74.00	19.40
7 321.34	38.62	Average	V	36.30	8.62	41.37	2.41	44.58	54.00	9.42

Test Data for High Channel										
4 961.03	49.48	Peak	H	31.54	6.71	41.25	-	46.48	74.00	27.52
4 959.59	37.80	Average	H	31.54	6.71	41.25	2.41	37.21	54.00	16.79
7 439.63	51.08	Peak	H	36.40	8.22	41.35	-	54.35	74.00	19.65
7 440.88	38.59	Average	H	36.40	8.22	41.35	2.41	44.27	54.00	9.73
4 959.28	50.52	Peak	V	31.54	6.71	41.25	-	47.52	74.00	26.48
4 960.20	38.17	Average	V	31.54	6.71	41.25	2.41	37.58	54.00	16.42
7 441.99	53.08	Peak	V	36.40	8.22	41.35	-	56.35	74.00	17.65
7 441.26	40.16	Average	V	36.40	8.22	41.35	2.41	45.84	54.00	8.16

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

Margin (dB) = Limits (dBμV/m) - Total Level (dBμV/m)

Total Level = Reading + Antenna Factor + Cable Loss – AMP Gain + Duty Factor

10.9 Test data for radiated emission(Model name: BoT-nLE523DU(Dipole Antenna))

10.9.1 Radiated Emission which fall in the Restricted Band

10.9.1.1 Test data for 1 Mbps

- . 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	Cable Loss	AMP Gain	ATT (dB)	Duty Factor (dB)	Total (dBμV/m)	Limits (dBμV/m)	Margin (dB)
Test Data for Low Channel											
2 369.69	55.48	Peak	H	27.62	4.63	41.74	6.11	-	52.10	74.00	21.90
2 370.06	46.74	Average	H	27.62	4.63	41.74	6.11	0.68	44.04	54.00	9.96
2 370.25	55.41	Peak	V	27.62	4.63	41.74	6.11	-	52.03	74.00	21.97
2 354.16	47.40	Average	V	27.68	4.62	41.74	6.09	0.68	44.73	54.00	9.27
Test Data for High Channel											
2 483.51	62.94	Peak	H	27.40	4.83	41.73	6.13	-	59.57	74.00	14.43
2 483.79	46.02	Average	H	27.40	4.83	41.73	6.13	0.68	43.33	54.00	10.67
2 483.63	63.85	Peak	V	27.40	4.83	41.73	6.13	-	60.48	74.00	13.52
2 483.51	46.09	Average	V	27.40	4.83	41.73	6.13	0.68	43.40	54.00	10.60

Tabulated test data for Restricted Band

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

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

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

10.9.1.2 Test data for 2 Mbps

- 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 : 57.45 %
- Result : PASSED

Frequency (MHz)	Reading (dBμV)	Detector Mode	Ant. Pol. (H/V)	Ant. Factor	Cable Loss	AMP Gain	ATT (dB)	Duty Factor (dB)	Total (dBμV/m)	Limits (dBμV/m)	Margin (dB)
Test Data for Low Channel											
2 369.42	55.55	Peak	H	27.62	4.63	41.74	6.11	-	52.17	74.00	21.83
2 370.06	46.31	Average	H	27.62	4.63	41.74	6.11	2.41	45.34	54.00	8.66
2 370.43	55.37	Peak	V	27.62	4.63	41.74	6.11	-	51.99	74.00	22.01
2 354.16	46.52	Average	V	27.68	4.62	41.74	6.09	2.41	45.58	54.00	8.42
Test Data for High Channel											
2 483.65	63.33	Peak	H	27.40	4.83	41.73	6.13	-	59.96	74.00	14.04
2 483.51	49.87	Average	H	27.40	4.83	41.73	6.13	2.41	48.91	54.00	5.09
2 483.55	63.67	Peak	V	27.40	4.83	41.73	6.13	-	60.30	74.00	13.70
2 483.59	49.51	Average	V	27.40	4.83	41.73	6.13	2.41	48.55	54.00	5.45

Tabulated test data for Restricted Band

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

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

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

10.9.2 Spurious & Harmonic Radiated Emission

10.9.2.1 Test data for 1 Mbps

- 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	Cable Loss	AMP Gain	Duty Factor (dB)	Total (dBμV/m)	Limits (dBμV/m)	Margin (dB)
Test Data for Low Channel										
4 803.61	50.73	Peak	H	31.20	6.60	41.29	-	47.24	74.00	26.76
4 803.89	39.23	Average	H	31.20	6.60	41.29	0.68	36.42	54.00	17.58
7 204.52	50.03	Peak	H	36.11	8.06	41.38	-	52.82	74.00	21.18
7 205.26	37.58	Average	H	36.11	8.06	41.38	0.68	41.05	54.00	12.95
4 803.41	53.24	Peak	V	31.20	6.60	41.29	-	49.75	74.00	24.25
4 803.75	44.02	Average	V	31.20	6.60	41.29	0.68	41.21	54.00	12.79
7 206.65	50.73	Peak	V	36.11	8.06	41.38	-	53.52	74.00	20.48
7 205.42	39.72	Average	V	36.11	8.06	41.38	0.68	43.19	54.00	10.81
Test Data for Middle Channel										
4 877.86	49.55	Peak	H	31.26	6.70	41.27	-	46.24	74.00	27.76
4 880.28	37.93	Average	H	31.26	6.70	41.27	0.68	35.30	54.00	18.70
7 319.25	49.70	Peak	H	36.30	8.62	41.37	-	53.25	74.00	20.75
7 322.31	37.52	Average	H	36.30	8.62	41.36	0.68	41.76	54.00	12.24
4 880.62	51.42	Peak	V	31.26	6.70	41.27	-	48.11	74.00	25.89
4 880.04	41.54	Average	V	31.26	6.70	41.27	0.68	38.91	54.00	15.09
7 319.59	50.01	Peak	V	36.30	8.62	41.37	-	53.56	74.00	20.44
7 319.40	38.26	Average	V	36.30	8.62	41.37	0.68	42.49	54.00	11.51

Test Data for High Channel										
4 957.95	49.87	Peak	H	31.53	6.71	41.25	-	46.86	74.00	27.14
4 959.80	37.93	Average	H	31.54	6.71	41.25	0.68	35.61	54.00	18.39
7 440.59	50.83	Peak	H	36.40	8.22	41.35	-	54.10	74.00	19.90
7 440.56	38.74	Average	H	36.40	8.22	41.35	0.68	42.69	54.00	11.31
4 959.57	51.69	Peak	V	31.54	6.71	41.25	-	48.69	74.00	25.31
4 959.70	40.72	Average	V	31.54	6.71	41.25	0.68	38.40	54.00	15.60
7 440.59	54.03	Peak	V	36.40	8.22	41.35	-	57.30	74.00	16.70
7 440.73	44.28	Average	V	36.40	8.22	41.35	0.68	48.23	54.00	5.77

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

Margin (dB) = Limits (dBμV/m) - Total Level (dBμV/m)

Total Level = Reading + Antenna Factor + Cable Loss – AMP Gain + Duty Factor

10.9.2.2 Test data for 2 Mbps

- 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 : 57.45 %
- Result : PASSED

Frequency (MHz)	Reading (dBμV)	Detector Mode	Ant. Pol. (H/V)	Ant. Factor	Cable Loss	AMP Gain	Duty Factor (dB)	Total (dBμV/m)	Limits (dBμV/m)	Margin (dB)
Test Data for Low Channel										
4 803.10	50.16	Peak	H	31.20	6.60	41.29	-	46.67	74.00	27.33
4 803.31	38.53	Average	H	31.20	6.60	41.29	2.41	37.45	54.00	16.55
7 208.15	49.76	Peak	H	36.12	8.06	41.38	-	52.56	74.00	21.44
7 206.42	37.60	Average	H	36.11	8.06	41.38	2.41	42.80	54.00	11.20
4 803.10	53.73	Peak	V	31.20	6.60	41.29	-	50.24	74.00	23.76
4 803.21	42.93	Average	V	31.20	6.60	41.29	2.41	41.85	54.00	12.15
7 206.96	50.63	Peak	V	36.11	8.06	41.38	-	53.42	74.00	20.58
7 204.86	38.61	Average	V	36.11	8.06	41.38	2.41	43.81	54.00	10.19
Test Data for Middle Channel										
4 880.67	49.72	Peak	H	31.26	6.70	41.27	-	46.41	74.00	27.59
4 882.46	37.54	Average	H	31.26	6.70	41.27	2.41	36.64	54.00	17.36
7 322.08	49.23	Peak	H	36.30	8.62	41.36	-	52.79	74.00	21.21
7 322.33	37.47	Average	H	36.30	8.62	41.36	2.41	43.44	54.00	10.56
4 880.02	51.41	Peak	V	31.26	6.70	41.27	-	48.10	74.00	25.90
4 880.78	39.79	Average	V	31.26	6.70	41.27	2.41	38.89	54.00	15.11
7 317.88	49.77	Peak	V	36.30	8.62	41.37	-	53.32	74.00	20.68
7 322.34	37.49	Average	V	36.30	8.62	41.36	2.41	43.46	54.00	10.54

Test Data for High Channel										
4 960.21	49.55	Peak	H	31.54	6.71	41.25	-	46.55	74.00	27.45
4 961.05	37.71	Average	H	31.54	6.71	41.25	2.41	37.12	54.00	16.88
7 439.06	51.27	Peak	H	36.40	8.22	41.35	-	54.54	74.00	19.46
7 440.71	38.68	Average	H	36.40	8.22	41.35	2.41	44.36	54.00	9.64
4 960.46	51.32	Peak	V	31.54	6.71	41.25	-	48.32	74.00	25.68
4 959.18	39.22	Average	V	31.54	6.71	41.25	2.41	38.63	54.00	15.37
7 441.72	53.42	Peak	V	36.40	8.22	41.35	-	56.69	74.00	17.31
7 441.36	42.51	Average	V	36.40	8.22	41.35	2.41	48.19	54.00	5.81

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

Margin (dB) = Limits (dBμV/m) - Total Level (dBμV/m)

Total Level = Reading + Antenna Factor + Cable Loss – AMP Gain + Duty Factor

11. PEAK POWER SPECTRAL DENSITY

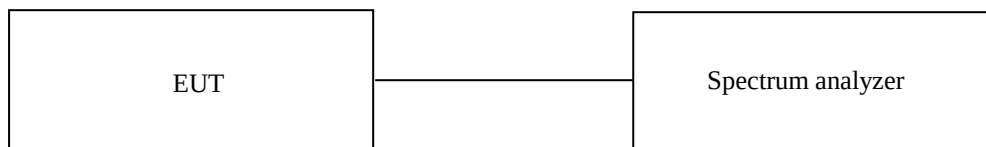
11.1 Operating environment

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

11.2 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.



11.3 Test Date

June 27, 2024 ~ August 02, 2024

11.4 Test data for 1 Mbps

-. Test Result : Pass

CHANNEL	FREQUENCY(MHz)	MEASURED VALUE (dBm)	LIMIT (dBm)	MARGIN (dB)
Low	2 402.00	-11.05	8.00	19.05
Middle	2 440.00	-11.24	8.00	19.24
High	2 480.00	-11.43	8.00	19.43

Remark. Margin = Limit – Measured Value

11.5 Test data for 2 Mbps

-. Test Result : Pass

CHANNEL	FREQUENCY(MHz)	MEASURED VALUE (dBm)	LIMIT (dBm)	MARGIN (dB)
Low	2 402.00	-11.94	8.00	19.94
Middle	2 440.00	-12.04	8.00	20.04
High	2 480.00	-12.21	8.00	20.21

Remark. Margin = Limit – Measured Value

12. RADIATED EMISSION TEST

12.1 Operating environment

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

12.2 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.

12.3 Test Date

June 27, 2024 ~ August 02, 2024

12.4 Test data for Basic model (Model name: BoT-nLE523)

12.4.1 Test data for 30 MHz ~ 1 000 MHz

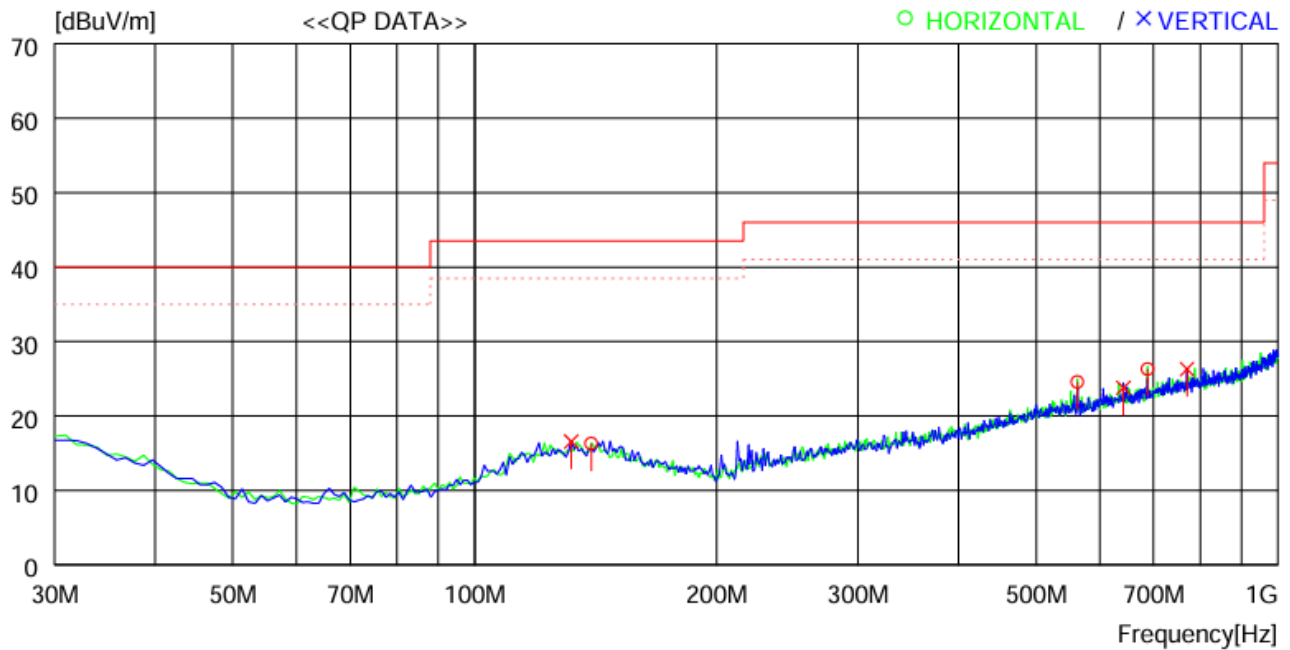
Limits apply to : FCC CFR 47, PART 15, SUBPART C, SECTION 15.247

Result : PASSED

EUT : Wireless Communication Module

Test mode : Worst case (Middle CH)

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



No.	FREQ	READING	ANT	LOSS	GAIN	RESULT	LIMIT	MARGIN	ANTENNA	TABLE
		QP	FACTOR							
	[MHz]	[dBuV]	[dB]	[dB]	[dB]	[dBuV/m]	[dBuV/m]	[dB]	[cm]	[DEG]
----- Horizontal -----										
1	139.610	27.5	19.4	1.5	32.1	16.3	43.5	27.2	400	1
2	562.529	30.0	23.8	3.1	32.3	24.6	46.0	21.4	200	0
3	687.655	29.9	25.4	3.4	32.4	26.3	46.0	19.7	400	300
----- Vertical -----										
4	131.850	28.0	19.2	1.5	32.1	16.6	43.5	26.9	300	295
5	642.067	28.0	24.8	3.3	32.3	23.8	46.0	22.2	400	131
6	770.103	28.4	26.6	3.6	32.3	26.3	46.0	19.7	300	0

12.4.2 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.									

12.4.3 Test data for above 1 GHz

- . 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
- . 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.									

12.5 Test data for Multiple model (Model name: BoT-nLE523D)

12.5.1 Test data for 30 MHz ~ 1 000 MHz

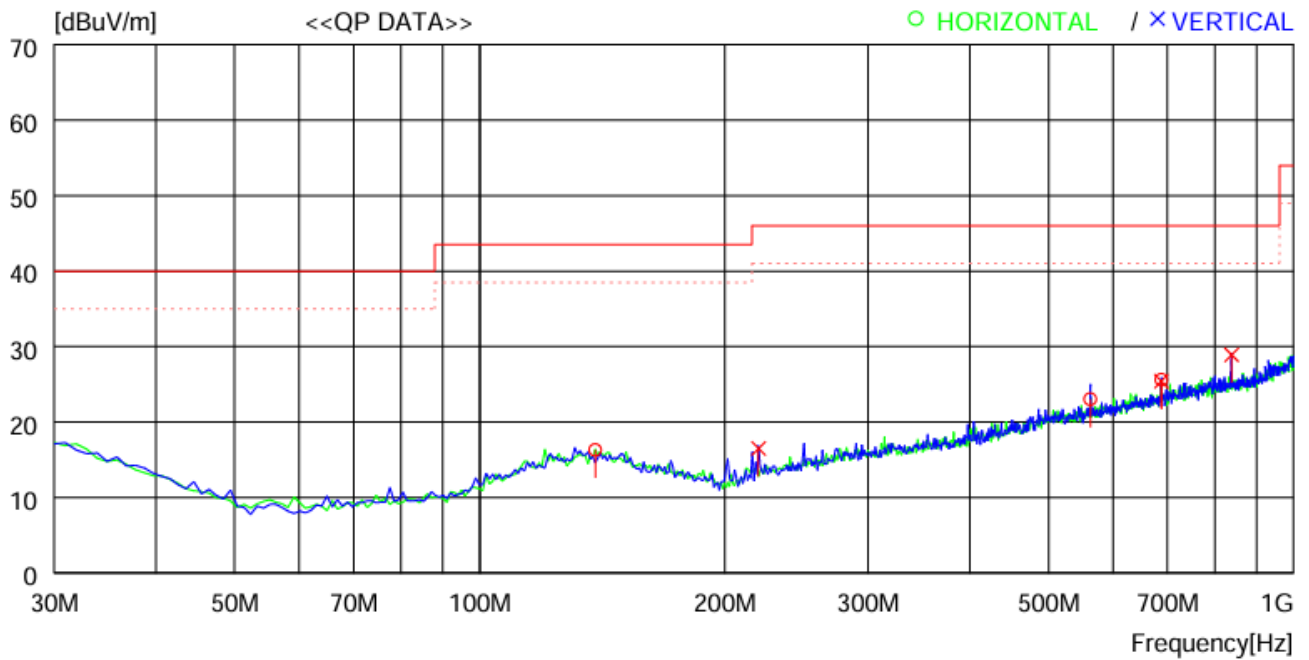
Limits apply to : FCC CFR 47, PART 15, SUBPART C, SECTION 15.247

Result : PASSED

EUT : Wireless Communication Module

Test mode : Worst case (Middle CH)

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



No.	FREQ	READING	ANT	LOSS	GAIN	RESULT	LIMIT	MARGIN	ANTENNA	TABLE
	[MHz]	QP	FACTOR							
	[MHz]	[dBuV]	[dB]	[dB]	[dB]	[dBuV/m]	[dBuV/m]	[dB]	[cm]	[DEG]
----- Horizontal -----										
1	138.640	27.5	19.4	1.5	32.1	16.3	43.5	27.2	200	279
2	562.529	28.4	23.8	3.1	32.3	23.0	46.0	23.0	400	0
3	687.655	29.2	25.4	3.4	32.4	25.6	46.0	20.4	400	321
----- Vertical -----										
4	220.120	30.2	16.5	1.9	32.1	16.5	46.0	29.5	100	0
5	687.655	29.0	25.4	3.4	32.4	25.4	46.0	20.6	100	289
6	838.971	30.0	27.3	3.8	32.2	28.9	46.0	17.1	100	0

12.5.2 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.									

12.5.3 Test data for above 1 GHz

- . 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
- . 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.									

12.6 Test data for Multiple model (Model name: BoT-nLE523DU(PCB Antenna))

12.6.1 Test data for 30 MHz ~ 1 000 MHz

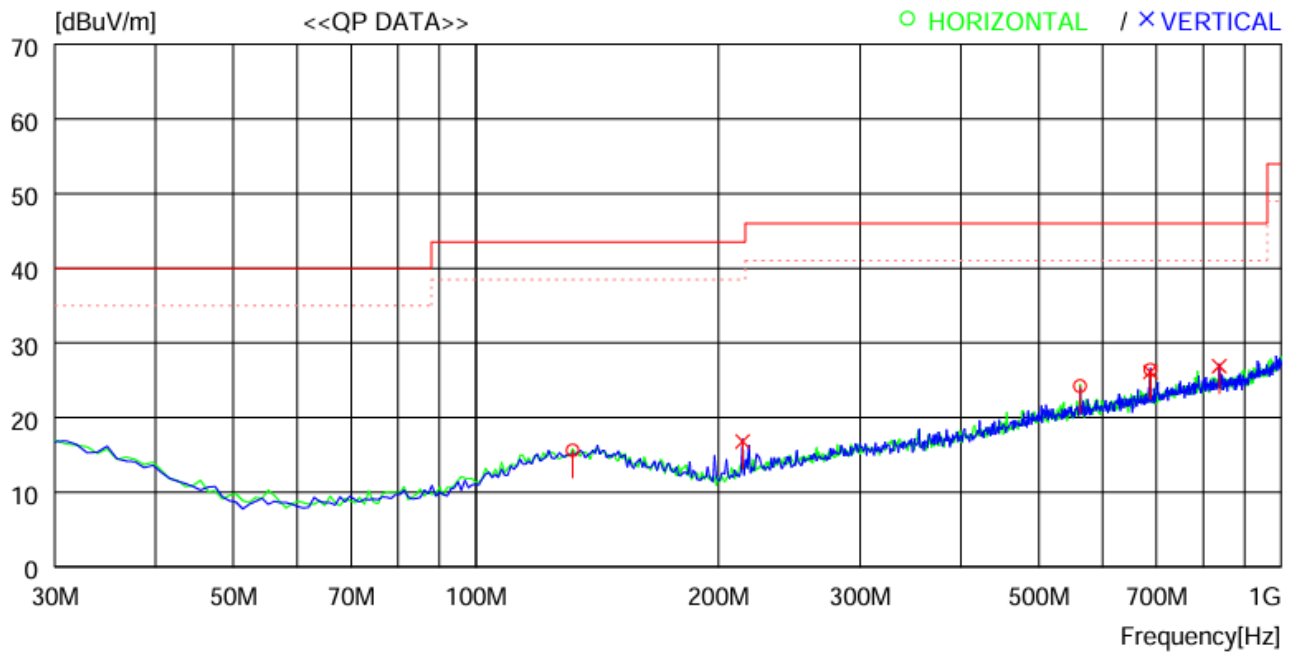
Limits apply to : FCC CFR 47, PART 15, SUBPART C, SECTION 15.247

Result : PASSED

EUT : Wireless Communication Module

Test mode : Worst case (Middle CH)

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



No.	FREQ	READING	ANT	LOSS	GAIN	RESULT	LIMIT	MARGIN	ANTENNA	TABLE
	[MHz]	QP	FACTOR							
	[MHz]	[dBuV]	[dB]	[dB]	[dB]	[dBuV/m]	[dBuV/m]	[dB]	[cm]	[DEG]
----- Horizontal -----										
1	131.850	27.0	19.2	1.5	32.1	15.6	43.5	27.9	300	359
2	562.529	29.6	23.8	3.1	32.3	24.2	46.0	21.8	200	0
3	687.655	30.0	25.4	3.4	32.4	26.4	46.0	19.6	400	0
----- Vertical -----										
4	214.300	30.8	16.2	1.9	32.1	16.8	43.5	26.7	100	127
5	687.655	29.7	25.4	3.4	32.4	26.1	46.0	19.9	200	284
6	837.031	28.0	27.3	3.8	32.2	26.9	46.0	19.1	200	347

12.6.2 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.									

12.6.3 Test data for above 1 GHz

- . 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
- . 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.									

12.7 Test data for Multiple model (Model name: BoT-nLE523DU(Dipole Antenna))

12.7.1 Test data for 30 MHz ~ 1 000 MHz

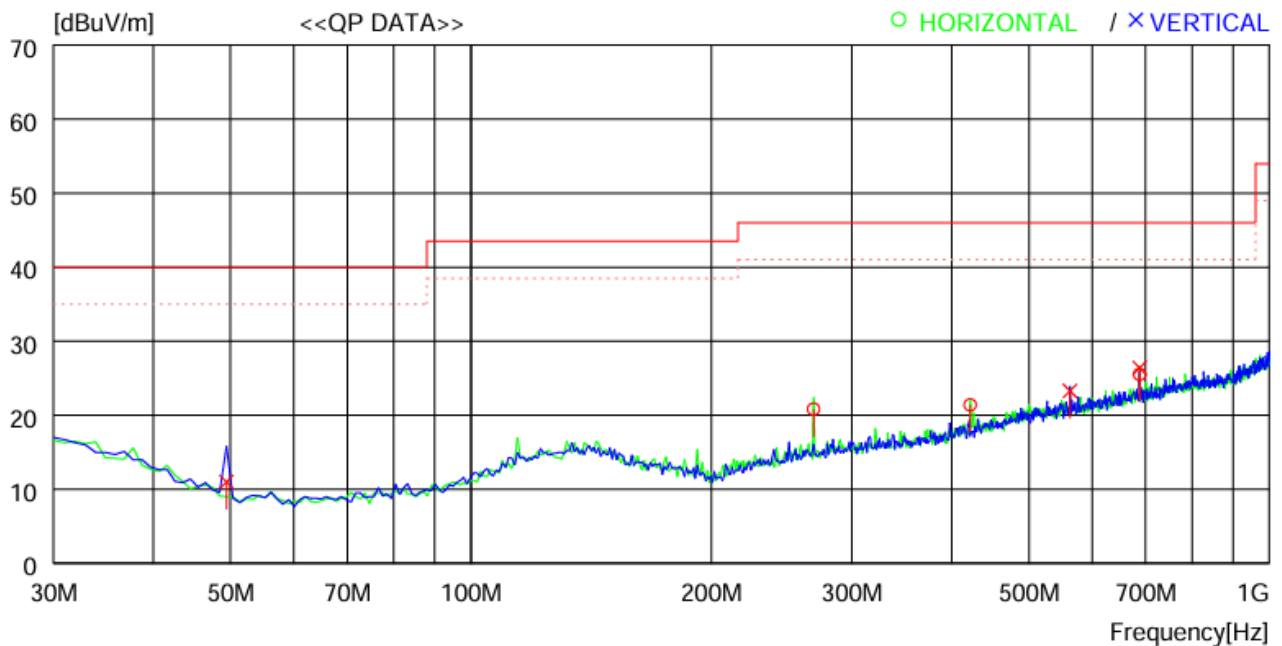
Limits apply to : FCC CFR 47, PART 15, SUBPART C, SECTION 15.247

Result : PASSED

EUT : Wireless Communication Module

Test mode : Worst case (Middle CH)

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



No.	FREQ	READING	ANT	LOSS	GAIN	RESULT	LIMIT	MARGIN	ANTENNA	TABLE
	[MHz]	QP	FACTOR	[dB]	[dB]	[dBuV/m]	[dBuV/m]	[dB]	[cm]	[DEG]
----- Horizontal -----										
1	268.620	32.4	18.4	2.1	32.1	20.8	46.0	25.2	100	359
2	421.881	29.5	21.3	2.7	32.1	21.4	46.0	24.6	200	0
3	687.655	29.1	25.4	3.4	32.4	25.5	46.0	20.5	400	171
----- Vertical -----										
4	49.400	29.0	13.2	0.9	32.1	11.0	40.0	29.0	400	49
5	562.529	28.7	23.8	3.1	32.3	23.3	46.0	22.7	300	72
6	687.655	30.0	25.4	3.4	32.4	26.4	46.0	19.6	200	249

12.7.2 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.									

12.7.3 Test data for above 1 GHz

- . 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
- . 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.									

13. CONDUCTED EMISSION TEST

13.1 Operating environment

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

13.2 Test set-up

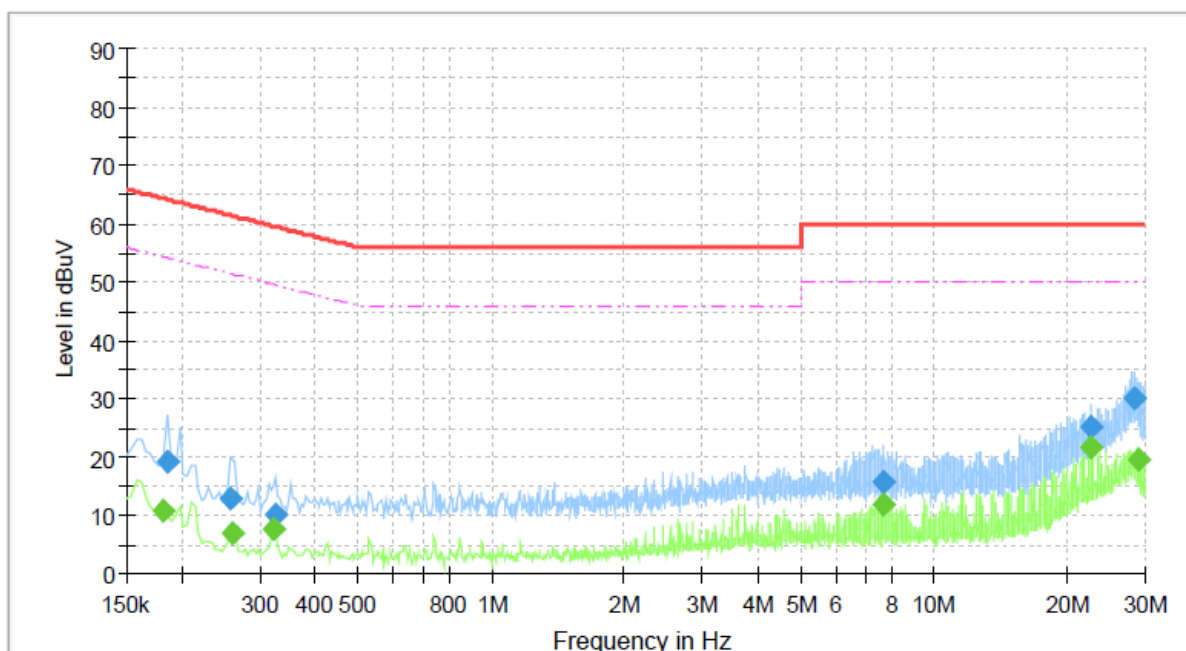
The EUT was placed on a wooden table, 0.8 m height above the floor. Power was fed to the EUT through a 50 Ω / 50 μ H + 5 Ω Artificial Mains Network (AMN). The ground plane was electrically bonded to the reference ground system and all power lines were filtered from ambient.

13.3 Test Date

June 27, 2024 ~ August 02, 2024

13.4 Test data

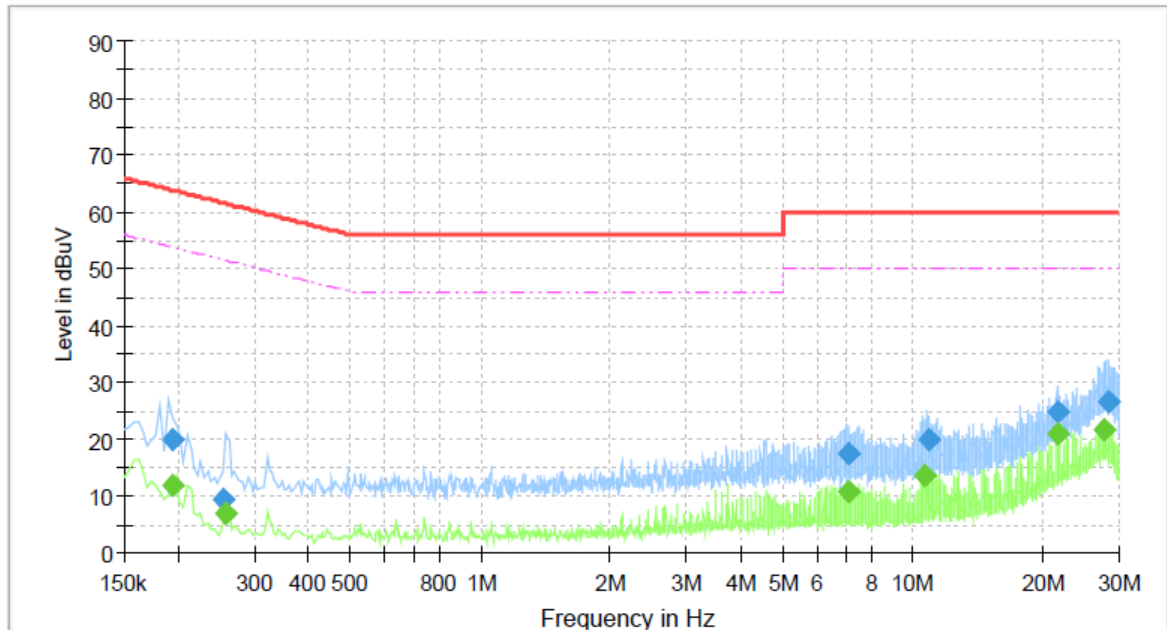
- Resolution bandwidth : 9 kHz
- Frequency range : 0.15 MHz ~ 30 MHz
- Test mode : Worst case (1 Mbps, Low CH)
- Tested Line : HOT LINE



Final Result

Frequency (MHz)	QuasiPeak (dBuV)	CAverage (dBuV)	Limit (dBuV)	Margin (dB)	Bandwidth (kHz)	Line	Corr. (dB)
0.182	---	10.84	54.42	43.57	9.0	L1	10.16
0.185	19.20	---	64.24	45.04	9.0	L1	10.16
0.258	13.00	---	61.51	48.51	9.0	L1	10.16
0.262	---	7.04	51.38	44.35	9.0	L1	10.16
0.322	---	7.72	49.67	41.95	9.0	L1	10.17
0.325	10.25	---	59.57	49.31	9.0	L1	10.17
7.653	---	11.86	50.00	38.14	9.0	L1	10.51
7.731	15.69	---	60.00	44.31	9.0	L1	10.51
22.603	---	21.68	50.00	28.32	9.0	L1	11.20
22.739	25.17	---	60.00	34.83	9.0	L1	11.20
28.377	29.98	---	60.00	30.02	9.0	L1	11.25
28.910	---	19.64	50.00	30.36	9.0	L1	11.25

-. Tested Line : NEUTRAL LINE



Final Result

Frequency (MHz)	QuasiPeak (dBuV)	CAverage (dBuV)	Limit (dBuV)	Margin (dB)	Bandwidth (kHz)	Line	Corr. (dB)
0.194	---	11.84	53.89	42.04	9.0	N	10.18
0.194	19.95	---	63.89	43.94	9.0	N	10.18
0.254	9.39	---	61.64	52.25	9.0	N	10.18
0.258	---	6.98	51.51	44.53	9.0	N	10.18
7.103	---	10.98	50.00	39.02	9.0	N	10.49
7.127	17.40	---	60.00	42.60	9.0	N	10.49
10.707	---	13.73	50.00	36.27	9.0	N	10.70
10.849	19.90	---	60.00	40.10	9.0	N	10.71
21.531	24.86	---	60.00	35.14	9.0	N	11.15
21.531	---	20.92	50.00	29.08	9.0	N	11.15
27.840	---	21.61	50.00	28.39	9.0	N	11.21
28.273	26.63	---	60.00	33.37	9.0	N	11.22

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.

14. LIST OF TEST EQUIPMENT

Model Number	Manufacturer	Description	Serial Number	Last Cal.(Interval)
FSV40-N	Rohde & Schwarz	Signal Analyzer	102196	Jan. 15, 2024 (1Y)
FSV40-N	Rohde & Schwarz	Signal Analyzer	101651	Jan. 15, 2024 (1Y)
GP-4303D	LG Precision Co.,Ltd	DC POWER SUPPLY	5071069	Jan. 04, 2024 (1Y)
ZUP36-6	TDK-Lambda	DC POWER SUPPLY	205214-2021	Jan. 16, 2024 (1Y)
ESW44	Rohde & Schwarz	EMI Test Receiver	101851	Mar. 06, 2024 (1Y)
310N	Sonoma Instrument	Pre-Amplifier	392756	Oct. 16, 2023 (1Y)
SCU18	Rohde & Schwarz	Pre-Amplifier	102266	Jul. 04, 2024 (1Y)
SCU40A	Rohde & Schwarz	Pre-Amplifier	100436	Jan. 23, 2024 (1Y)
DT5000	Innco Systems GmbH	Turn Table	N/A	N/A
MA-4000XPET	Innco Systems GmbH	Antenna Master	MA4000/509/37211215/L	N/A
CO3000	Innco Systems GmbH	Controller	N/A	N/A
FMZB 1513	Schwarzbeck	Loop Antenna	1513-235	Mar. 20, 2024 (2Y)
HLP-2008	TDK RF Solutions	Hybrid Antenna	131313	Apr. 05, 2023 (2Y)
BBHA9120D	Schwarzbeck	Horn Antenna	9120D-1349	Jul. 02, 2024 (1Y)
BBHA9170	Schwarzbeck	Horn Antenna	BBHA9170178	Jan. 04, 2024 (1Y)
HPF 3GHz	Rohde & Schwarz	High Pass Filter	N/A	Jan. 15, 2024 (1Y)
8493C	HP	6 dB Attenuator	01925	Jul. 04, 2024 (1Y)
ESR 3	Rohde & Schwarz	EMI TEST RECEIVER	102602	Mar. 11, 2024 (1Y)
NSLK8126	Schwarzbeck	LISN	8126480	Oct. 16, 2023 (1Y)
3825/2	EMCO	AMN	9109-1869	Mar. 15, 2024 (1Y)
VTSD 9561-F	Schwarzbeck	PULSE LIMITER	01337	Nov. 23, 2023 (1Y)