ACCREDITED
CERTIFICATE #5473.01

Test Report No.:
FCC2024-0023-RF2

TEST REPORT

FCC ID	:	2BG7U-7912120X9D01
Applicant	:	Xiamen Yaxon Zhilian Technology Co.,Ltd.
Product Name	:	Intelligent Cockpit Domain Controller
Model No.	:	IMP-202M-FD

CVC Testing Technology Co., Ltd.

Applicant	**Name:** Xiamen Yaxon Zhilian Technology Co.,Ltd. **Address:** 303-E, District C, Innovation Building, Software Park, Torch High-tech Zone, Xiamen, Fujian, China
Manufacturer	**Name:** Xiamen Yaxon Zhilian Technology Co.,Ltd. **Address:** 303-E, District C, Innovation Building, Software Park, Torch High-tech Zone, Xiamen, Fujian, China
Equipment Under Test	**Product Name :** Intelligent Cockpit Domain Controller **Model No. :** IMP-202M-FD **Trade mark :** N/A **Serial no.** : N/A **Sampling :** 1-1

Date of Receipt.	2024.5.22	Date of Testing	2024.7.20

Test Specification	**Test Result**
FCC CFR47 Part 15C Radio Frequency Devices ANSI C63.10-2020/Cor1-2023 KDB 558074 D01 15.247 Meas Guidance v05r02	PASS

Evaluation of Test Result	The equipment under test was found to comply with the requirements of the standards applied. **Seal of CVC** **Issue Date:** 2024-8-26

Approved by:	Reviewed by:	Tested by:
Chen Huawen	**Xu Zhenfei**	**Lu Weiji**

Other Aspects: NONE.

Abbreviations:OK, Pass= passed Fail = failed N/A= not applicable EUT= equipment, sample(s) under tested

Note: This test report relates only to the EUT, and shall not be reproduced except in full, without written approval of **CVC**.

TABLE OF CONTENTS

1. GENERAL PRODUCT INFORMATION 4

1.1 GENERAL INFORMATION 4

2. TEST SITES 5

2.1 TEST FACILITIES 5
2.2 DESCRIPTION OF NON-STANDARD METHOD AND DEVIATIONS 5
2.3 LIST OF TEST AND MEASUREMENT INSTRUMENTS 5

3. TEST CONFIGURATION 6

3.1 TEST MODE 6
3.2 DUTY CYCLE 7

4. SUMMARY OF MEASUREMENT RESULTS 8

5. MEASUREMENT PROCEDURE 9

5.1 CONDUCTED EMISSION 9
5.2 RADIATED EMISSION 12
5.3 PEAK POWER OUTPUT -CONDUCTED 23
5.4 20DB EMISSION BANDWIDTH 25
5.5 OCCUPIED CHANNEL BANDWIDTH 27
5.6 FREQUENCY SEPARATION 29
5.7 TIME OF OCCUPANCY (DWELL TIME) 31
5.8 BAND EDGE MEASUREMENT 33
5.9 NUMBER OF HOPPING FREQUENCY 35
5.10 SPURIOUS RF CONDUCTED EMISSIONS 37

6. APPENDIX X 39

1. General Product Information

1.1 General information

Product Name	Intelligent Cockpit Domain Controller
Model No.	IMP-202M-FD
Additional model	/
Power Supply	DC 27.5V
Serial Number(SN)	/
Hardware	IMP-202M-FD-WD
Software	MPU：c0055-mt-701-wh11 MCU：WD_E3
specific power settings	DH5: Default 2DH5: Default 3DH5: Default
Antenna Type	Internal antenna
Antenna Connector	A detachable antenna
Antenna Gain	3.21 dBi (provided by client)
Beamforming gain	Unsupported (provided by client)
Frequency Range	2402MHz~2480MHz
Bluetooth Version:	5.1
Channel Number	79
Type of Modulation	GFSK, π/4DQPSK, 8DPSK
Hopping Channel Type:	Adaptive Frequency Hopping systems
Max. Conducted Power	17.48dBm
Operate Temp.Range	-35~80℃
Note： 1. The information of the EUT is declared by the manufacturer. 2. The laboratory is not responsible for the product technical specification provided by the client.	

2. Test Sites

2.1 Test Facilities

The tests and measurements refer to this report were performed by RF testing Lab. of CVC Testing Technology Co., Ltd.

Add.: No.3, Tiantaiyi Road, Kaitai Avenue, Science City, Guangzhou,Guangdong,510663, People's Republic of China

Telephone : +86-20-32293888

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FCC(Test firm designation number：CN1282)

2.2 Description of Non-standard Method and Deviations

The testing and measurement methods used in this report are applied by all standard methods. Not any non-standard method or deviation from the used standards was used.

2.3 List of Test and Measurement Instruments

Refer to **Appendix X**.

3. Test Configuration

3.1 Test Mode

The EUT has been associated with peripherals and configuration operated in a manner tended to maximize its emission characteristics in a typical application.

Test Mode	Antenna Delivery	Test Channel
DH1/DH3/DH5 2DH1/2DH3/2DH5 3DH1/3DH3/3DH5	1TX / 1RX	0,39,78,hop

The radiated emission was measured in the following position: EUT stand-up position (Z axis), lie-down position (X, Y axis). The worst emission was found in lie-down position (X axis) and the worst case was recorded.

In order to find the worst case condition, Pre-tests are needed at the presence of different data rate and different channels. Preliminary tests have been done on all the configuration for confirming worst case. Data rate and channel below means worst-case rate of each test item.

Worst-case data rates and channels are shown as following table.

Test Items	Test Modes	Test Channels
Conducted Emissions	3DH5	0
Radiated Emissions	3DH5	0
Peak Power Output -Conducted	DH5/2DH5/3DH5	0,39,78
20dB Emission Bandwidth	DH5/2DH5/3DH5	0,39,78
Occupied Channel Bandwidth	DH5/2DH5/3DH5	0,39,78
Frequency Separation	DH5/2DH5/3DH5	hop
Time of Occupancy (Dwell Time)	DH1/DH3/DH5/ 2DH1/2DH3/2DH5/ 3DH1/3DH3/3DH5	hop
Band Edge Compliance	DH5/2DH5/3DH5	0,78
Number of Hopping Frequency	DH5/2DH5/3DH5	hop
Spurious RF Conducted Emissions	DH5/2DH5/3DH5	0,39,78

3.2 Duty cycle

TestMode	Antenna	Channel	Transmission Duration [ms]	Transmission Period [ms]	Duty Cycle [%]	Limit	Verdict
DH5	Ant1	2402	2.87	3.75	76.53	---	---
	Ant1	2441	2.87	3.74	76.74	---	---
	Ant1	2480	2.87	3.74	76.74	---	---
2DH5	Ant1	2402	2.89	3.75	77.07	---	---
	Ant1	2441	2.88	3.75	76.80	---	---
	Ant1	2480	2.88	3.75	76.80	---	---
3DH5	Ant1	2402	2.88	3.75	76.80	---	---
	Ant1	2441	2.89	3.75	77.07	---	---
	Ant1	2480	2.88	3.75	76.80	---	---

4. Summary of measurement results

Summary of measurements of results	Clause in FCC rules	Verdict	Note
Conducted Emissions	15.207	N/A	See note 2
Radiated Emissions	15.247(d),15.205,15.209	PASS	/
Peak Power Output -Conducted	15.247(b)(1)	PASS	Appendix C of BT_ diagram
20dB Emission Bandwidth	15.247(a)(1)	PASS	Appendix A of BT_ diagram
Occupied Channel Bandwidth	15.247(a)(1)	PASS	Appendix B of BT_ diagram
Frequency Separation	15.247(a)(1)	PASS	Appendix D of BT_ diagram
Time of Occupancy (Dwell Time)	15.247(a)(1)(iii)	PASS	Appendix E of BT_ diagram
Band Edge Compliance	15.247(d)	PASS	Appendix G of BT_ diagram
Number of Hopping Frequency	15.247(a)(1)(iii)	PASS	Appendix F of BT_ diagram
Spurious RF Conducted Emissions	15.247(d)	PASS	Appendix H of BT_ diagram
Antenna Requirement	15.203	PASS	See note 1

Note 1: According to 15.203, it is considered sufficient to comply with the provisions of this section.
Note 2: Not applicable to DC powered devices.

5. Measurement procedure

5.1 Conducted Emission

Ambient condition:

Temperature	Relative humidity	Pressure
23°C ~25°C	45%~50%	101.2kPa

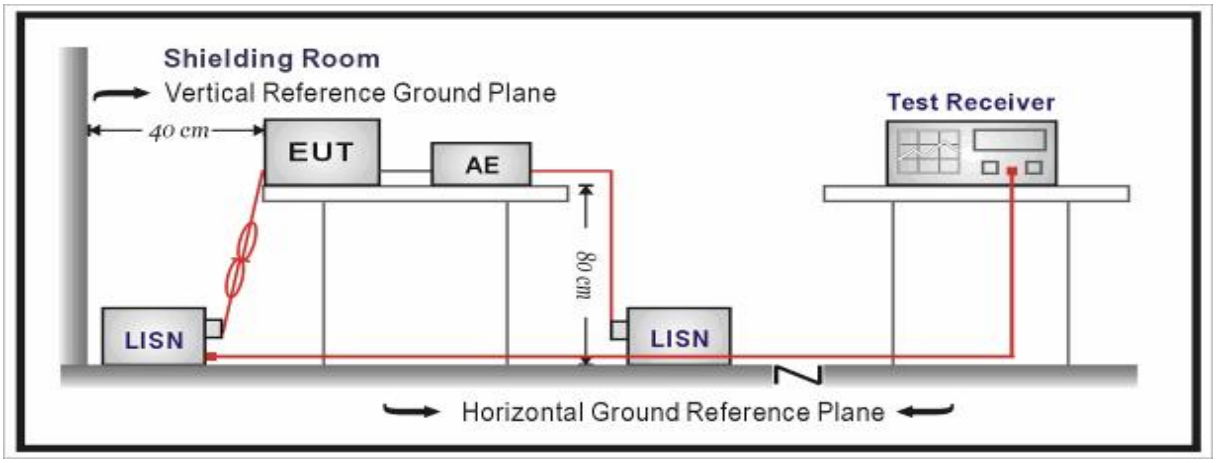
Method of Measurement:

The EUT was setup according to ANSI C63.10-2020/Cor1-2023 for compliance to FCC 47CFR 15.207 requirements. The EUT was placed on a platform of nominal size, 1 m by 1.5 m, raised 80 cm above the conducting ground plane. The vertical conducting plane was located 40 cm to the rear of the EUT. All other surfaces of EUT were at least 80 cm from any other grounded conducting surface. The EUT and simulators are connected to the main power through a line impedance stabilization network (LISN). The LISN provides a 50 ohm /50uH coupling impedance for the measuring equipment. The peripheral devices are also connected to the main power through a LISN. (Please refer to the block diagram of the test setup and photographs) Each current-carrying conductor of the EUT power cord, except the ground (safety) conductor, was individually connected through a LISN to the input power source.
The excess length of the power cord between the EUT and the LISN receptacle were folded back and forth at the center of the lead to form a bundle not exceeding 40 cm in length.
Conducted emissions were investigated over the frequency range from 0.15MHz to 30MHz using a receiver bandwidth of 9 kHz.

Limits:

Frequency (MHz)	Conducted Limits(dBμV)	
	Quasi-peak	Average
0.15 - 0.5	66 to 56 *	56 to 46*
0.5 - 5	56	46
5 - 30	60	50
Note 1: The lower limit shall apply at the transition frequencies. Note 2: The limit decreases linearly with the logarithm of the frequency in the range 0.15 MHz to 0.5 MHz.		

Test Setup:



Measurement Data

An initial pre-scan was performed on the live and neutral lines with peak detector.

Quasi-Peak and Average measurement were performed at the frequencies with maximized peak emission were detected.

Notes:

1. *The following Quasi-Peak and Average measurements were performed on the EUT:*
2. *Final Level =Reading + Factor.*

Measurement Uncertainty：

The assessed measurement uncertainty to ensure 95% confidence level for the normal distribution is with the coverage factor k = 1.96. U= 3.12 dB.

Test Results:

Conducted Emission applies to an intentional radiator that is designed to be connected to the public utility (AC) power line. Measurements to demonstrate compliance with the conducted limits are not required for devices which only employ battery power for operation and which do not operate from the AC power lines or contain provisions for operation while connected to the AC power lines.

5.2 Radiated Emission

Ambient condition:

Temperature	Relative humidity	Pressure
23°C ~25°C	45%~50%	101.2kPa

Method of Measurement:

The EUT was setup and tested according to ANSI C63.10-2020/Cor1-2023.

The EUT is placed on a turn table which is 1.5 meter above ground. The turn table is rotated 360 degrees to determine the position of the maximum emission level. The EUT was positioned such that the distance from Antenna to the EUT was 3 meters.

The Antenna is scanned from 1 meter to 4 meters to find out the maximum emission level. This is repeated for both horizontal and vertical polarization of the Antenna. In order to find the maximum emission, all of the interface cables were manipulated according to ANSI C63.10-2020/Cor1-2023 on radiated measurement.

The resolution bandwidth below 1GHz setting on the field strength meter is 120 kHz and above 1GHz is 1MHz.

The frequency range from 30MHz to 10th harmonic is checked.

Note: When doing emission measurement above 1GHz, the horn Antenna will be bended down a little (as horn

Antenna has the narrow beamwidth) in order to keeping the Antenna in the “cone of radiation” of EUT. The 3dB beamwidth is 10~60 degrees for H-plane and 10~90 degrees for E-plane.

Limits:

Radiated emissions which fall in the restricted bands, as defined in Section 15.205(a) of FCC part 15, must also comply with the radiated emission limits specified in Section 15.209(a) (see Section 15.205(c)).

Frequency	Limit (μV/m)	Limit (dBμV/m @3m)	Remark
0.009MHz-0.490MHz	2400/F(kHz)@300m	20lg(24000000/F(kHz))	Quasi-peak Level
0.490MHz~1.705MHz	24000/F(kHz)@30m	20lg(2400000/F(kHz))	Quasi-peak Level
1.705MHz~30.0MHz	30@30m	69.54	Quasi-peak Level
30MHz-88MHz	100@3m	40.0	Quasi-peak Level
88MHz-216MHz	150@3m	43.5	Quasi-peak Level
216MHz-960MHz	200@3m	46.0	Quasi-peak Level
960MHz-1GHz	500@3m	54.0	Quasi-peak Level

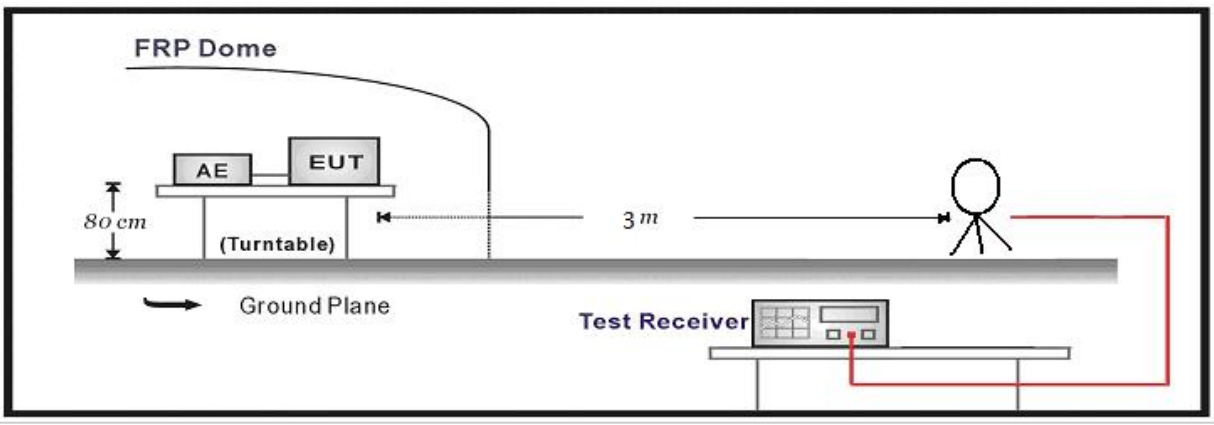
Above 1GHz	500@3m	54.0	Average Level
	5000@3m	74.0	Peak Level

Spurious Radiated Emissions are permitted in any of the frequency bands listed below:

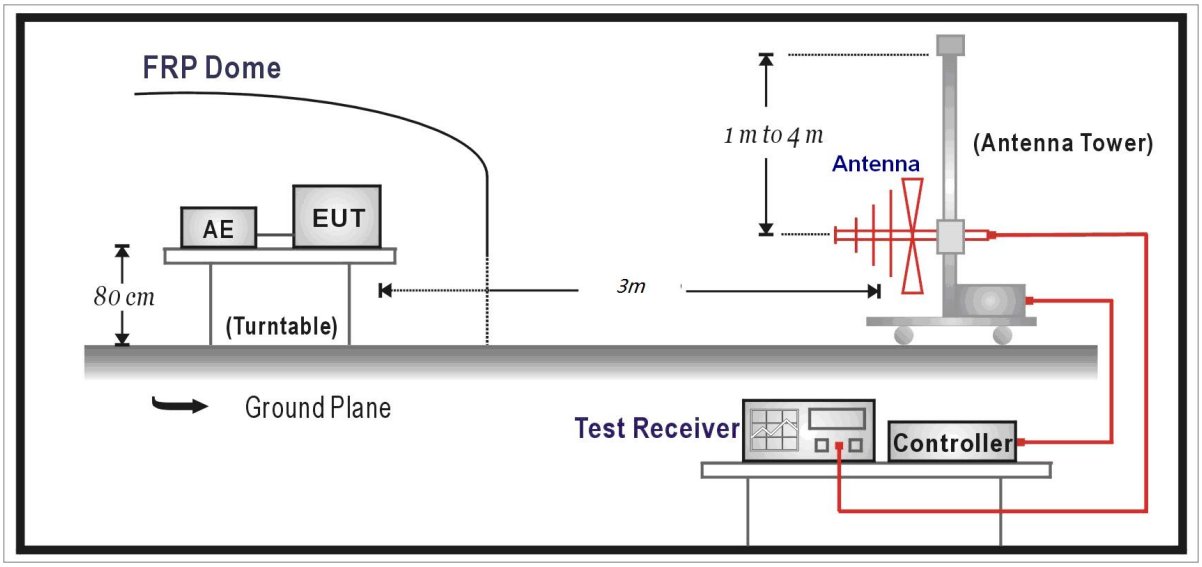
MHz	MHz	MHz	GHz
0.090-0.110	16.42-16.423	399.9-410	4.5-5.15
0.495-0.505	16.69475-16.69525	608-614	5.35-5.46
2.1735-2.1905	16.80425-16.80475	960-1240	7.25-7.75
4.125-4.128	25.5-25.67	1300-1427	8.025-8.5
4.17725-4.17775	37.5-38.25	1435-1626.5	9.0-9.2
4.20725-4.20775	73-74.6	1645.5-1646.5	9.3-9.5
6.215-6.218	74.8-75.2	1660-1710	10.6-12.7
6.26775-6.26825	108-121.94	1718.8-1722.2	13.25-13.4
6.31175-6.31225	123-138	2200-2300	14.47-14.5
8.291-8.294	149.9-150.05	2310-2390	15.35-16.2
8.362-8.366	156.52475-156.52525	2483.5-2500	17.7-21.4
8.37625-8.38675	156.7-156.9	2690-2900	22.01-23.12
8.41425-8.41475	162.0125-167.17	3260-3267	23.6-24.0
12.29-12.293	167.72-173.2	3332-3339	31.2-31.8
12.51975-12.52025	240-285	3345.8-3358	36.43-36.
12.57675-12.57725	322-335.4	3600-4400	/
13.36-13.41	/	/	/

Test Setup:

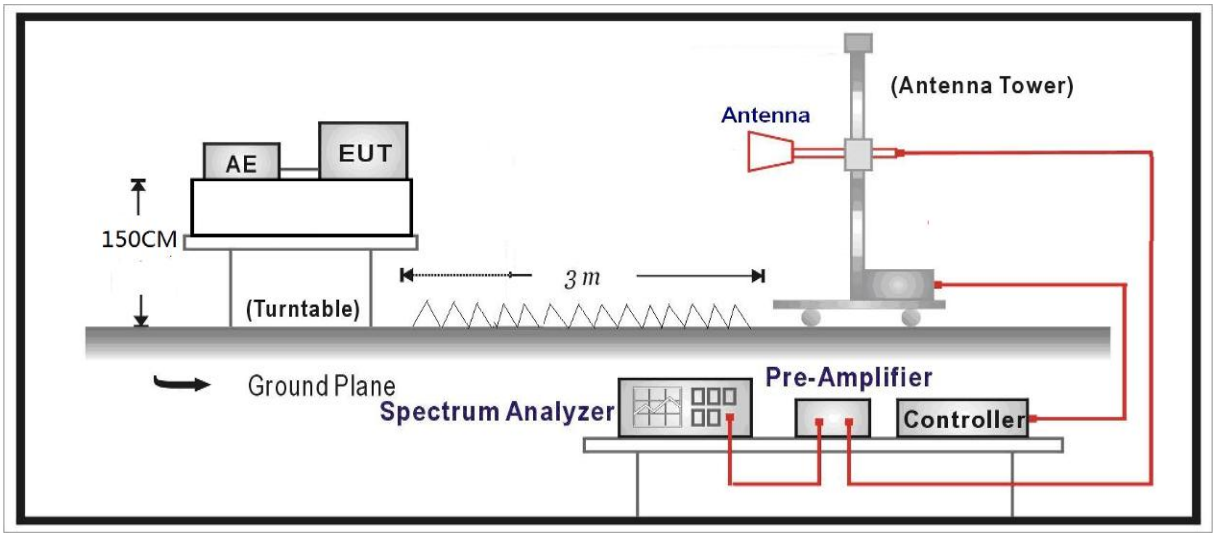
Below 30MHz Test Setup:



Below 1GHz Test Setup:



Above 1GHz Test Setup:



Measurement Data：

The field strength is calculated by adding the Antenna Factor, Cable Factor & Preamplifier. The basic equation with a sample calculation is as follows:

Final Level =Reading - Factor

Factor = Preamplifier Factor – Antenna Factor–Cable Loss

Measurement Uncertainty：

The assessed measurement uncertainty to ensure 95% confidence level for the normal distribution is with the coverage factor k = 1.96.

Frequency	Uncertainty
9KHz-30MHz	3.55 dB
30MHz-200MHz	4.19 dB
200MHz-1GHz	3.63 dB
Above 1GHz	3.68 dB

Test Results:

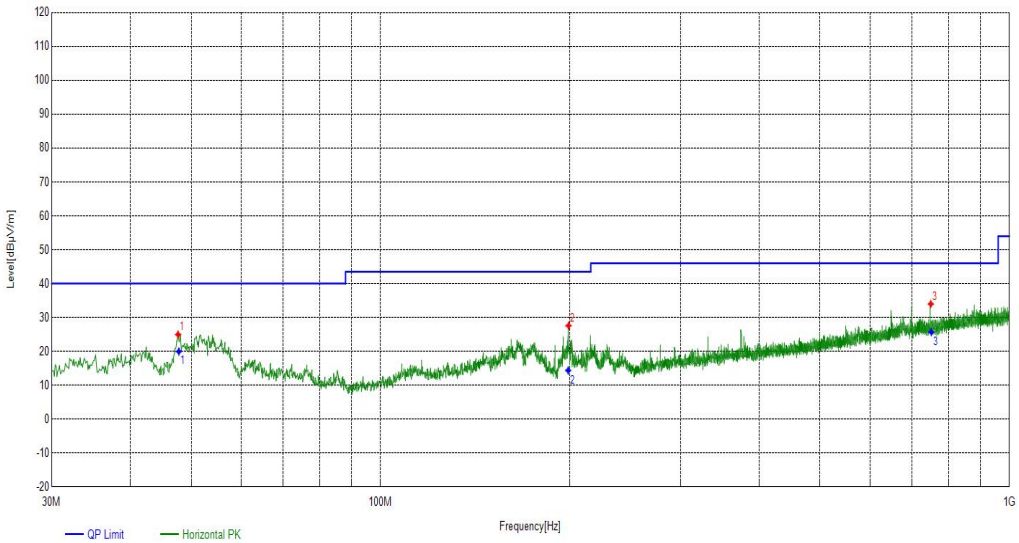
During the test, the Radiates Emission from 9kHz to 1GHz was performed in all modes with all channels and all antennas. BT 8DPSK Channel 0, antenna 1 are selected as the worst condition. The test data of the worst-case condition was recorded in this report.

Radiates Emission	9k~1G
Test channel	Worst-Case
Polarity	Horizontal

Suspected List									
Frequency [MHz]	Factor [dB]	Reading [dBµV/m]	Level [dBµV/m]	Limit [dBµV/m]	Margin [dB]	Detector	Height [cm]	Angle deg	Pass/Fail
47.6558	20.32	4.65	24.97	40.00	15.03	PK	100	340	PASS
199.0879	17.38	10.20	27.58	43.50	15.92	PK	100	110	PASS
750.006	31.27	2.72	33.99	46.00	12.01	PK	100	320	PASS

Note: 9kHz~30MHz have been test and test data more than 20dB margin.

Final Data List							
Frequency [MHz]	Factor [dB]	QP Value [dBµV/m]	QP Limit [dBµV/m]	QP Margin [dB]	Height [cm]	Angle [°]	Pass/Fail
47.7903	20.32	19.97	40.00	20.03	260	340	PASS
198.8027	17.38	14.38	43.50	29.12	360	110	PASS
751.341	31.27	25.71	46.00	20.29	320	320	PASS

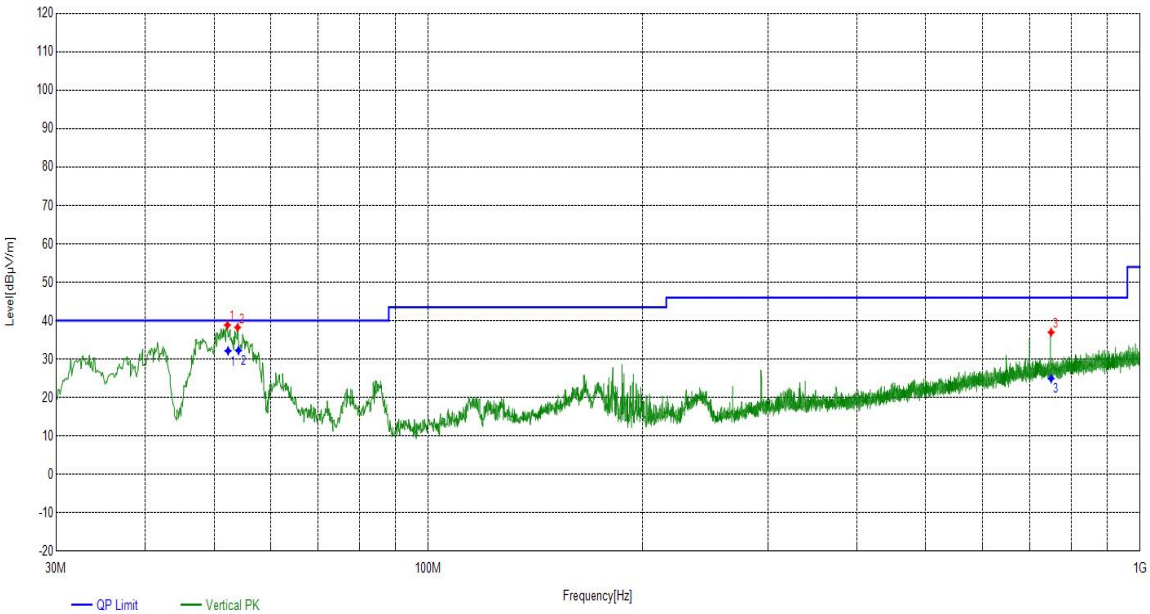


Radiates Emission	9k~1G
Test channel	Worst-Case
Polarity	Vertical

Suspected List									
Frequency [MHz]	Factor [dB]	Reading [dBµV/m]	Level [dBµV/m]	Limit [dBµV/m]	Margin [dB]	Detector	Height [cm]	Angle deg	Pass/Fail
52.2152	20.32	18.54	38.86	40.00	1.14	PK	100	110	PASS
53.9614	20.22	18.02	38.24	40.00	1.76	PK	100	80	PASS
750.006	31.27	5.70	36.97	46.00	9.03	PK	100	190	PASS

Note: 9kHz~30MHz have been test and test data more than 20dB margin.

Final Data List							
Frequency [MHz]	Factor [dB]	QP Value [dBµV/m]	QP Limit [dBµV/m]	QP Margin [dB]	Height [cm]	Angle [°]	Pass/Fail
52.3104	20.32	32.15	40.00	7.85	130	115	PASS
54.1168	20.22	32.25	40.00	7.75	220	85	PASS
750.028	31.27	24.95	46.00	21.05	240	195	PASS



During the test, the Radiates Emission from 1GHz to 40GHz was performed in all modes with all channels and all antennas. BT 8DPSK, Highest, medium, lowest channels, antenna 1 are selected as the worst condition. The test data of the worst-case condition was recorded in this report.

Radiates Emission	Above 1G
Test channel	Lowest
polarization	Horizontal

Suspected List

Frequency [MHz]	Factor [dB]	Reading [dBµV/m]	Level [dBµV/m]	Limit [dBµV/m]	Margin [dB]	Detect or	Height [cm]	Pass/ Fail
1050.0050	26.60	14.58	41.18	74.00	32.82	PK	150	PASS
2107.1107	34.42	14.56	48.98	74.00	25.02	PK	150	PASS
4422.1422	0.01	38.89	38.90	74.00	35.10	PK	150	PASS
1050.0050	26.60	7.95	34.55	54.00	19.45	AV	150	PASS
2107.1107	34.42	1.86	36.28	54.00	17.72	AV	150	PASS
4296.1296	0.25	28.51	28.76	54.00	25.24	AV	150	PASS

Note: The emission levels of other frequencies were greater than 20dB margin.

Radiates Emission	Above 1G
Test channel	Lowest
polarization	Vertical

Suspected List

Frequency [MHz]	Factor [dB]	Reading [dBµV/m]	Level [dBµV/m]	Limit [dBµV/m]	Margin [dB]	Detect or	Height [cm]	Pass/ Fail
1050.0050	26.60	21.82	48.42	74.00	25.58	PK	150	PASS
1650.0650	31.88	17.39	49.27	74.00	24.73	PK	150	PASS
3630.0630	-0.15	40.63	40.48	74.00	33.52	PK	150	PASS
1050.0050	26.60	16.65	43.25	54.00	10.75	AV	150	PASS
1645.0645	31.84	9.20	41.04	54.00	12.96	AV	150	PASS
3631.5631	-0.15	31.53	31.38	54.00	22.62	AV	150	PASS

Note: The emission levels of other frequencies were greater than 20dB margin.

Radiates Emission	Above 1G
Test channel	Medium
polarization	Horizontal

Suspected List

Frequency [MHz]	Factor [dB]	Reading [dBµV/m]	Level [dBµV/m]	Limit [dBµV/m]	Margin [dB]	Detect or	Height [cm]	Pass/ Fail
1050.0050	26.60	15.24	41.84	74.00	32.16	PK	150	PASS
8375.0375	9.81	35.09	44.90	74.00	29.10	PK	150	PASS
14555.6556	18.18	34.55	52.73	74.00	21.27	PK	150	PASS
1050.0050	26.60	9.05	35.65	54.00	18.35	AV	150	PASS
8484.5484	9.96	25.19	35.15	54.00	18.85	AV	150	PASS
14530.1530	18.27	24.18	42.45	54.00	11.55	AV	150	PASS

Note: The emission levels of other frequencies were greater than 20dB margin.

Radiates Emission	Above 1G
Test channel	Medium
polarization	Vertical

Suspected List

Frequency [MHz]	Factor [dB]	Reading [dBµV/m]	Level [dBµV/m]	Limit [dBµV/m]	Margin [dB]	Detect or	Height [cm]	Pass/ Fail
1050.0050	26.60	20.45	47.05	74.00	26.95	PK	150	PASS
3381.0381	-0.77	41.09	40.32	74.00	33.68	PK	150	PASS
8154.5154	9.45	35.98	45.43	74.00	28.57	PK	150	PASS
1050.0050	26.60	17.19	43.79	54.00	10.21	AV	150	PASS
3382.5382	-0.76	31.39	30.63	54.00	23.37	AV	150	PASS
7849.9849	9.23	25.72	34.95	54.00	19.05	AV	150	PASS

Note: The emission levels of other frequencies were greater than 20dB margin.

Radiates Emission	Above 1G
Test channel	Highest
polarization	Horizontal

Suspected List

Frequency [MHz]	Factor [dB]	Reading [dBμV/m]	Level [dBμV/m]	Limit [dBμV/m]	Margin [dB]	Detect or	Height [cm]	Pass/ Fail
1296.2296	28.83	18.39	47.22	74.00	26.78	PK	150	PASS
1400.0400	29.82	18.58	48.40	74.00	25.60	PK	150	PASS
6150.3150	5.89	35.19	41.08	74.00	32.92	PK	150	PASS
1296.0296	28.83	9.44	38.27	54.00	15.73	AV	150	PASS
1400.0400	29.82	6.61	36.43	54.00	17.57	AV	150	PASS
6034.8030	5.74	24.86	30.60	54.00	23.40	AV	150	PASS

Note: The emission levels of other frequencies were greater than 20dB margin.

Radiates Emission	Above 1G
Test channel	Highest
polarization	Vertical

Suspected List

Frequency [MHz]	Factor [dB]	Reading [dBμV/m]	Level [dBμV/m]	Limit [dBμV/m]	Margin [dB]	Detect or	Height [cm]	Pass/ Fail
1350.0350	29.34	18.25	47.59	74.00	26.41	PK	150	PASS
1643.0643	31.82	18.92	50.74	74.00	23.26	PK	150	PASS
7002.400	8.94	36.51	45.45	74.00	28.55	PK	150	PASS
1350.0350	29.34	13.82	43.16	54.00	10.84	AV	150	PASS
1645.0645	31.84	9.43	41.27	54.00	12.73	AV	150	PASS
7075.9075	8.97	25.46	34.43	54.00	19.57	AV	150	PASS

Note: The emission levels of other frequencies were greater than 20dB margin.

Band Edge：

During the test, the Band Edge was performed in BT all modes with all channels and all antennas.
BT 8DPSK, Highest and lowest channels, antenna 1 are selected as the worst condition. The test data of the worst-case condition was recorded in this report.

Test mode	8DPSK
Test channel	Lowest
polarization	Horizontal

Suspected List

Frequency [MHz]	Factor [dB]	Reading [dBμV/m]	Level [dBμV/m]	Limit [dBμV/m]	Margin [dB]	Detector	Height [cm]	Angle deg	Pass/ Fail
2283.1283	36.29	14.40	50.69	74.00	23.31	PK	150	118	PASS
2368.9368	37.06	12.24	49.30	74.00	24.70	PK	150	280	PASS
2390.1390	37.25	12.78	50.03	74.00	23.97	PK	150	339	PASS
2283.1283	36.29	2.69	38.98	54.00	15.02	AV	150	118	PASS
2368.9368	37.06	2.06	39.12	54.00	14.88	AV	150	148	PASS
2390.1390	37.25	2.45	39.70	54.00	14.30	AV	150	325	PASS

Test mode	8DPSK
Test channel	Lowest
polarization	Vertical

Suspected List

Frequency [MHz]	Factor [dB]	Reading [dBμV/m]	Level [dBμV/m]	Limit [dBμV/m]	Margin [dB]	Detector	Height [cm]	Angle deg	Pass/ Fail
2214.7214	35.68	12.99	48.67	74.00	25.33	PK	150	211	PASS
2299.1299	36.42	13.75	50.17	74.00	23.83	PK	150	93	PASS
2390.1390	37.25	11.76	49.01	74.00	24.99	PK	150	167	PASS
2214.7214	35.68	2.31	37.99	54.00	16.01	AV	150	315	PASS
2299.1299	36.42	2.49	38.91	54.00	15.09	AV	150	211	PASS
2390.1390	37.25	2.59	39.84	54.00	14.16	AV	150	353	PASS

Test mode	8DPSK
Test channel	Highest
polarization	Horizontal

Suspected List

Frequency [MHz]	Factor [dB]	Reading [dBµV/m]	Level [dBµV/m]	Limit [dBµV/m]	Margin [dB]	Detect or	Height [cm]	Angle deg	Pass/ Fail
2483.5483	37.71	11.97	49.68	74.00	24.32	PK	150	329	PASS
2519.1519	37.88	13.72	51.60	74.00	22.40	PK	150	285	PASS
2533.1533	37.93	13.61	51.54	74.00	22.46	PK	150	8	PASS
2483.5483	37.71	2.53	40.24	54.00	13.76	AV	150	300	PASS
2519.1519	37.88	2.56	40.44	54.00	13.56	AV	150	225	PASS
2533.1533	37.93	2.68	40.61	54.00	13.39	AV	150	2	PASS

Test mode	8DPSK
Test channel	Highest
polarization	Vertical

Suspected List

Frequency [MHz]	Factor [dB]	Reading [dBµV/m]	Level [dBµV/m]	Limit [dBµV/m]	Margin [dB]	Detect or	Height [cm]	Angle deg	Pass/ Fail
2483.5483	37.71	15.17	52.88	74.00	21.12	PK	150	359	PASS
2503.1503	37.81	14.29	52.10	74.00	21.90	PK	150	70	PASS
2561.9561	38.04	14.39	52.43	74.00	21.57	PK	150	50	PASS
2483.5483	37.71	4.19	41.90	54.00	12.10	AV	150	10	PASS
2503.1503	37.81	2.56	40.37	54.00	13.63	AV	150	20	PASS
2561.9561	38.04	2.65	40.69	54.00	13.31	AV	150	90	PASS

5.3 Peak Power Output -Conducted

Ambient condition:

Temperature	Relative humidity	Pressure
23°C ~25°C	45%~50%	101.2kPa

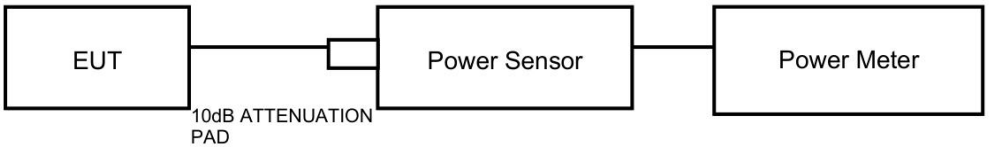
Method of Measurement:

During the process of the testing, The EUT was connected to the spectrum analyzer and Bluetooth test set via a power splitter with a known loss. The EUT is controlled by the Bluetooth test set to ensure max power transmission with proper modulation. The peak detector is used.

Limits:

Rule Part 15.247 (b) (1)specifies that " For frequency hopping systems operating in the 2400–2483.5 MHz band employing at least 75 non-overlapping hopping channels, and all frequency hopping systems in the 5725–5850 MHz band: 1 watt. For all other frequency hopping systems in the 2400–2483.5 MHz band: 0.125 watts.”

Test Setup:



Measurement Uncertainty：

The assessed measurement uncertainty to ensure 95% confidence level for the normal distribution is with the coverage factor k = 2, U= 0.44 dB.

Test Results:

TestMode	Antenna	Channel	Result[dBm]	Limit[dBm]	Verdict
DH5	Ant1	2402	16.97	≤30.00	PASS
	Ant1	2441	17.48	≤30.00	PASS
	Ant1	2480	16.40	≤30.00	PASS
2DH5	Ant1	2402	16.61	≤20.97	PASS
	Ant1	2441	16.72	≤20.97	PASS
	Ant1	2480	15.83	≤20.97	PASS
3DH5	Ant1	2402	17.32	≤20.97	PASS
	Ant1	2441	17.44	≤20.97	PASS
	Ant1	2480	16.24	≤20.97	PASS

5.4 20dB Emission Bandwidth

Ambient condition:

Temperature	Relative humidity	Pressure
23°C ~25°C	45%~50%	101.2kPa

Method of Measurement:

The EUT was connected to the spectrum analyzer through an external attenuator (20dB) and a known loss cable. RBW is set to 20 kHz; VBW is set to 100 kHz on spectrum analyzer.
Detector=Peak, Trace mode=Max hold.

Limits:

No specific occupied bandwidth requirements in part 15.247(a) (1).

Test Setup:

Measurement Uncertainty：

The assessed measurement uncertainty to ensure 95% confidence level for the normal distribution is with the coverage factor k = 2, U= 936 Hz.

Test Results:

TestMode	Antenna	Channel	20db EBW[MHz]	Limit[MHz]	Verdict
DH5	Ant1	2402	0.86	---	---
	Ant1	2441	0.86	---	---
	Ant1	2480	0.86	---	---
2DH5	Ant1	2402	1.30	---	---
	Ant1	2441	1.31	---	---
	Ant1	2480	1.32	---	---
3DH5	Ant1	2402	1.30	---	---
	Ant1	2441	1.30	---	---
	Ant1	2480	1.30	---	---

5.5 Occupied Channel Bandwidth

Ambient condition:

Temperature	Relative humidity	Pressure
23°C ~25°C	45%~50%	101.2kPa

Method of Measurement:

The EUT was connected to the spectrum analyzer through an external attenuator (20dB) and a known loss cable. RBW is set to 20 kHz; VBW is set to 100 kHz on spectrum analyzer.
Detector=Peak, Trace mode=Max hold.

Limits:

No specific occupied bandwidth requirements in part 15.247(a) (1).

Test Setup:

Measurement Uncertainty：

The assessed measurement uncertainty to ensure 95% confidence level for the normal distribution is with the coverage factor k = 2, U= 936 Hz.

Test Results:

TestMode	Antenna	Channel	OCB [MHz]	Limit[MHz]	Verdict
DH5	Ant1	2402	0.77	---	---
	Ant1	2441	0.758	---	---
	Ant1	2480	0.773	---	---
2DH5	Ant1	2402	1.184	---	---
	Ant1	2441	1.181	---	---
	Ant1	2480	1.178	---	---
3DH5	Ant1	2402	1.178	---	---
	Ant1	2441	1.196	---	---
	Ant1	2480	1.184	---	---

5.6 Frequency Separation

Ambient condition:

Temperature	Relative humidity	Pressure
23°C ~25°C	45%~50%	101.2kPa

Method of Measurement:

The EUT was connected to the spectrum analyzer through an external attenuator (20dB) and a known loss cable the band edge of the lowest and highest channels were measured. The peak detector is used and RBW is set to 100 kHz and VBW is set to 300 kHz on spectrum analyzer.

Limits:

Rule Part 15.247(a)(1)specifies that “Frequency hopping systems shall have hopping channel carrier frequencies separated by a minimum of 25 kHz or the 20 dB bandwidth of the hopping channel, whichever is greater. Alternatively, frequency hopping systems operating in the 2400–2483.5 MHz band may have hopping channel carrier frequencies that are separated by 25 kHz or two-thirds of the 20 dB bandwidth of the hopping channel, whichever is greater, provided the systems operate with an output power no greater than 125 mW. ”

Note: The value of two-thirds of 20 dB bandwidth is always greater than 25 kHz.

Test Setup:

Measurement Uncertainty：

The assessed measurement uncertainty to ensure 95% confidence level for the normal distribution is with the coverage factor k = 2, U=936 Hz.

Test Results:

TestMode	Antenna	Channel	Result[MHz]	Limit[MHz]	Verdict
DH5	Ant1	Hop	1.003	≥0.860	PASS
2DH5	Ant1	Hop	1.243	≥0.880	PASS
3DH5	Ant1	Hop	0.959	≥0.867	PASS

5.7 Time of Occupancy (Dwell Time)

Ambient condition:

Temperature	Relative humidity	Pressure
23°C ~25°C	45%~50%	101.2kPa

Method of Measurement:

The EUT was connected to the spectrum analyzer and Bluetooth test set via a power splitter with a known loss. RBW is set to 1MHz and VBW is set to 3MHz on spectrum analyzer. The dwell time is calculated by: Dwell time = time slot length * hop rate * 0.4s with:

The selected EUT Packet type uses a slot type of 5-Tx&1-Rx and a hopping rate of 1600(ch*hop/s) for all channels.So the final hopping rate for all channel is1600/6=266.67(ch*hop/s)

Limits:

Rule Part15.247(a) specifies that " Frequency hopping systems in the 2400–2483.5 MHz band shall use at least 15 channels. The average time of occupancy on any channel shall not be greater than 0.4 seconds within a period of 0.4 seconds multiplied by the number of hopping channels employed."

Dwell time	≤ 400ms

Test Setup:

Measurement Uncertainty：

The assessed measurement uncertainty to ensure 95% confidence level for the normal distribution is with the coverage factor k = 2.

Requirements	Uncertainty					
Dwell Time	DH5	U=0.70ms	2DH5	U=0.70ms	3DH5	U=0.70ms

Test Results:

TestMode	Antenna	Channel	BurstWidth [ms]	TotalHops [Num]	Result[s]	Limit[s]	Verdict
DH1	Ant1	Hop	0.371	320	0.119	≤0.4	PASS
DH3	Ant1	Hop	1.620	160	0.259	≤0.4	PASS
DH5	Ant1	Hop	2.860	106.67	0.305	≤0.4	PASS
2DH1	Ant1	Hop	0.379	320	0.121	≤0.4	PASS
2DH3	Ant1	Hop	1.623	160	0.26	≤0.4	PASS
2DH5	Ant1	Hop	2.864	106.67	0.306	≤0.4	PASS
3DH1	Ant1	Hop	0.379	320	0.121	≤0.4	PASS
3DH3	Ant1	Hop	1.623	160	0.26	≤0.4	PASS
3DH5	Ant1	Hop	2.865	106.67	0.306	≤0.4	PASS

5.8 Band Edge Measurement

Ambient condition:

Temperature	Relative humidity	Pressure
23°C ~25°C	45%~50%	101.2kPa

Method of Measurement:

The EUT was connected to the spectrum analyzer through an external attenuator (20dB) and a known loss cable the band edge of the lowest and highest channels were measured. The peak detector is used and RBW is set to 100 kHz and VBW is set to 300 kHz on spectrum analyzer.

Limits:

Rule Part 15.247(d) specifies that “In any 100 kHz bandwidth outside the frequency band in which the spread spectrum or digitally modulated intentional radiator is operating, the radio frequency power that is produced by the intentional radiator shall be at least 20 dB below that in the 100 kHz bandwidth within the band that contains the highest level of the desired power, based on either an RF conducted or a radiated measurement, provided the transmitter demonstrates compliance with the peak conducted power limits.

Test Setup:

Measurement Uncertainty：

The assessed measurement uncertainty to ensure 95% confidence level for the normal distribution is with the coverage factor k = 1.96, U= 936 Hz, 2 GHz-3 GHz = 1.407 dB.

Test Result:

TestMode	Antenna	ChName	Channel	RefLevel [dBm]	Result [dBm]	Limit [dBm]	Verdict
DH5	Ant1	Low	2402	16.32	-47.31	≤-3.68	PASS
		High	2480	15.76	-48.96	≤-4.24	PASS
		Low	Hop_2402	16.38	-48.89	≤-3.62	PASS
		High	Hop_2480	16.15	-47.82	≤-3.85	PASS
2DH5	Ant1	Low	2402	11.67	-45.14	≤-8.33	PASS
		High	2480	11.41	-48.78	≤-8.59	PASS
		Low	Hop_2402	11.45	-47.94	≤-8.55	PASS
		High	Hop_2480	11.61	-48.69	≤-8.39	PASS
3DH5	Ant1	Low	2402	11.93	-45.25	≤-8.07	PASS
		High	2480	12.90	-48.64	≤-7.1	PASS
		Low	Hop_2402	11.55	-48.33	≤-8.45	PASS
		High	Hop_2480	12.71	-47.82	≤-7.29	PASS

5.9 Number of hopping Frequency

Ambient condition:

Temperature	Relative humidity	Pressure
23°C ~25°C	45%~50%	101.2kPa

Method of Measurement:

The EUT was connected to the spectrum analyzer and Bluetooth test set via a power splitter with a known loss. RBW is set to 100KHz and VBW is set to 300KHz on spectrum analyzer. Set EUT on Hopping on mode.

Limits:

Rule Part 15.247(a) (1) (iii) specifies that" Frequency hopping systems in the 2400–2483.5 MHz band shall use at least 15 channels."

Limits	⩾ 15 channels

Test Setup:

Measurement Uncertainty：

The assessed measurement uncertainty to ensure 95% confidence level for the normal distribution is with the coverage factor k = 2, U= 0.75dB.

Test Results:

TestMode	Antenna	Channel	Result[Num]	Limit[Num]	Verdict
DH5	Ant1	Hop	79	≥15	PASS
2DH5	Ant1	Hop	79	≥15	PASS
3DH5	Ant1	Hop	79	≥15	PASS

5.10 Spurious RF Conducted Emissions

Ambient condition:

Temperature	Relative humidity	Pressure
23°C ~25°C	45%~50%	101.2kPa

Method of Measurement:

The EUT was connected to the spectrum analyzer with a known loss. The spectrum analyzer scans from 30MHz to the 10th harmonic of the carrier. The peak detector is used. Set RBW to100kHz and VBW to 300 kHz, Sweep is set to AUTO .The test is in transmitting mode.

Limits:

Rule Part 15.247(d) pacifies that “In any 100 kHz bandwidth outside the frequency band in which the spread spectrum intentional radiator is operating, the radio frequency power that is produced by the intentional radiator shall be at least 20 dB below that in the 100 kHz bandwidth within the band that contains the highest level of the desired power.

Test Setup:

Measurement Uncertainty：

The assessed measurement uncertainty to ensure 95% confidence level for the normal distribution is with the coverage factor k = 1.96.

Frequency	Uncertainty
100kHz-2GHz	0.684 dB
2GHz-26GHz	1.407 dB

Test Results:

TestMode	Antenna	Channel	FreqRange [MHz]	RefLevel [dBm]	Result [dBm]	Limit [dBm]	Verdict
DH5	Ant1	2402	Reference	15.79	15.79	---	PASS
			30~1000	15.79	-60.07	≤-4.21	PASS
			1000~26500	15.79	-47.98	≤-4.21	PASS
		2441	Reference	16.23	16.23	---	PASS
			30~1000	16.23	-60.06	≤-3.77	PASS
			1000~26500	16.23	-49.05	≤-3.77	PASS
		2480	Reference	15.24	15.24	---	PASS
			30~1000	15.24	-60.38	≤-4.76	PASS
			1000~26500	15.24	-48.35	≤-4.76	PASS
2DH5	Ant1	2402	Reference	10.50	10.50	---	PASS
			30~1000	10.50	-59.55	≤-9.5	PASS
			1000~26500	10.50	-48.97	≤-9.5	PASS
		2441	Reference	12.19	12.19	---	PASS
			30~1000	12.19	-60	≤-7.81	PASS
			1000~26500	12.19	-49.32	≤-7.81	PASS
		2480	Reference	11.33	11.33	---	PASS
			30~1000	11.33	-60.37	≤-8.67	PASS
			1000~26500	11.33	-49.12	≤-8.67	PASS
3DH5	Ant1	2402	Reference	11.63	11.63	---	PASS
			30~1000	11.63	-60.31	≤-8.37	PASS
			1000~26500	11.63	-48.41	≤-8.37	PASS
		2441	Reference	12.96	12.96	---	PASS
			30~1000	12.96	-59.86	≤-7.04	PASS
			1000~26500	12.96	-48.99	≤-7.04	PASS
		2480	Reference	9.69	9.69	---	PASS
			30~1000	9.69	-60.19	≤-10.31	PASS
			1000~26500	9.69	-48.62	≤-10.31	PASS

6. Appendix X

Test Equipment	Type/Mode	SERIAL NO.	Equipment No.	Manufacturer	Cal. Due
Communication Shielded Room 2	4m*3m*3m	CRTDSWKSR44301	/	CRT	2027/04/22
Spectrum Analyzer	FSV40	101580	DZ-000238-3	R&S	2025/04/22
RF Radio Frequency Switch	JS0806-2	19H9080187	DZ-000241	Tonscend	2025/04/27
Programmable DC Power Supply	E3644A	MY58036222	DZ-000178	KEYSIGHT	2025/04/11
5m Semi-Anechoic Chamber	SAC-5	SAC-5-2.0	EM-000557	COMTEST	2024/11/02
Spectrum Analyzer	N9010B	MY57470323	DZ-000174	KEYSIGHT	2025/01/02
EMI Test Receiver	N9038A-508	MY532290079	EM-000397	Agilent	2025/01/13
EMI Test Receiver	ESR7	102235	EM-000574	R&S	2025/01/13
loop antenna	HLA 6121	540046	EM-000546	TESEQ	2025/06/04
Broadband Antenna	VULB 9163	9163-530	EM-000342	SCHWARZBECK	2025/06/09
Waveguide Horn Antenna	HF906	360306/008	EM-000093	R&S	2025/01/13
Waveguide Horn Antenna	BBHA9170	00949	DZ-000209-2	SCHWARZBECK	2025/08/03
Preamplifier	BBV 9721	9721-050	DZ-000209-1	SCHWARZBECK	2025/06/02
Bandstop Filters	SW-BSF-2400-100-7-A1	/	EM-000495	/	2025/08/29
5G Bandstop Filters	WRCJV12-4900-5100-5900-6100-50EE	1	DZ-000186	WI	2024/12/03
Preamplifier	BBV 9721	9721-050	DZ-000209-1	SCHWARZBECK	2025/06/03
Temperature and humidity meter	MHO-C201	/	DZ-000249-2	Seconds test	2025/07/28
Temperature and humidity meter	MHO-C201	/	DZ-000249-5	Seconds test	2025/07/28

Dynacomm	Software Release	Software Developer
TS1120-3 Test System(Conduction test)	3.3.38	Tonscend
TS+（5m,Radiation test）	JS32-RE 5.0.0	Tonscend

The End

Important

1. The test report is invalid without the official stamp of CVC;
2. Any part photocopies of the test report are forbidden without the written permission from CVC;
3. The test report is invalid without the signatures of Author and Reviewer;
4. The test report is invalid if altered;
5. Objections to the test report must be submitted to CVC within 15 days;
6. Generally, commission test is responsible for the tested samples only;
7. As for the test result, "—" or " N/A" means "not applicable", " / "means "not testing", "P" means "pass" and "F" means "fail".

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