



FCC&ISED RF Test Report

Product Name: Smart Watch

Model Number: MIL-B19

Report No.: SYBH(Z-RF)20210626012001-2002

FCC ID: 2ATEYMIL-B19

IC: 25182-MILB19

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2. The laboratory has been recognized by the US Federal Communications Commission (FCC) to perform compliance testing subject to the Commission's Certification rules. The Designation Number is CN1173, and the Test Firm Registration Number is 294140.
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MODIFICATION RECORD

No.	Report No	Modification Description
1	SYBH(Z-RF)20210626012001-2002	First release.

DECLARATION

Type	Description
Multiple Models Applications	<input checked="" type="checkbox"/> The present report applies to single model. <input type="checkbox"/> The present report applies to several models. The practical measurements are performed with the model The present report only presents the worst test case of all modes, see relevant test results for detailed.

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2 General Information

2.1 Test standard/s

Applied Rules :	47 CFR FCC Part 2, Subpart J 47 CFR FCC Part 15, Subpart C ISED RSS-Gen Issue 5 ISED RSS-247 Issue2
Test Method :	FCC KDB 558074 D01 DTS Meas Guidance v05r02 ANSI C63.10-2013, American National Standard for Testing Unlicensed Wireless Devices.

2.2 Test Environment

Temperature :	TN	15 to 30	°C during room temperature tests
Ambient Relative Humidity:	25 to 75 %		
Atmospheric Pressure:	Not applicable		
Power supply :	VN	3.87	V DC by Battery

NOTE 1: 1) VN= nominal voltage, VL= low extreme test voltage, VH= High extreme test voltage;

TN= normal temperature, TL= low extreme test temperature, TH= High extreme test temperature.

NOTE 2: The values used in the test report may be stringent than the declared.

2.3 Test Laboratories

Test Location 1 :	RELIABILITY LABORATORY OF HUAWEI TECHNOLOGIES CO., LTD.
Address of Test Location 1 :	No.2 New City Avenue, Songshan Lake Science & Technology Industry Park Dongguan, Guangdong, 523808, People's Republic of China
Temperature of Test Location 1 :	25°C
Relative humidity of Test Location 1 :	55 %

2.4 Applicant and Manufacturer

Company Name :	Huawei Device Co., Ltd.
Address :	No.2 of Xincheng Road, Songshan Lake Zone, Dongguan, Guangdong 523808, People's Republic of China

2.5 Application details

2.5.1 Current Test Project/Report

Date of Receipt Sample:	2021-07-14
Start of test:	2021-07-16
End of test:	2021-09-15

3 Test Summary

Test Item	FCC Rule No.	ISED Rule No.	Requirements	Test Result	Verdict	Testing location
DTS (6 dB) Bandwidth	15.247(a)(2)	RSS-247, 5.2	≥ 500 kHz.	Appendix A	Pass	Test Location 1
Occupied Bandwidth	---	RSS-247, 5.2 RSS-Gen, 6.7	No limit	Appendix B	Pass	Test Location 1
Duty Cycle	KDB 558074 D01(6.0)	--	No limit	Appendix C	Pass	Test Location 1
Maximum Average Output Power	15.247(b)(3)	RSS-247, 5.4	FCC: For directional gain: Conducted < 30 dBm – (G[dBi] – 6 [dB]); Otherwise: Conducted < 30 dBm, ISED: Conducted < 30 dBm. EIRP < 36 dBm,	Appendix D	Pass	Test Location 1
Maximum Power Spectral Density Level	15.247(e)	RSS-247, 5.2	Conducted < 8 dBm/3 kHz.	Appendix E	Pass	Test Location 1
Band Edges Compliance	15.247(d)	RSS-247, 5.5	< -30 dBm/100 kHz if total average power ≤ power limit.	Appendix F	Pass	Test Location 1
Unwanted Emissions into Non-Restricted Frequency Bands				Appendix G	Pass	Test Location 1
Unwanted Emissions into Restricted Frequency Bands (Radiated)	15.247(d) 15.209 (NOTE 1)	RSS-247, 5.5 RSS-Gen, §6.13 RSS-Gen, 8.10	FCC Part 15.209 field strength limit; RSS-Gen 8.10 field strength limit.	Appendix H	Pass	Test Location 1
AC Power Line Conducted Emissions	15.207	RSS-Gen, 8.8	FCC Part 15.207 conducted limit; RSS-Gen, 8.8 conducted limit.	Appendix I	Pass	Test Location 1

NOTE 1: According to KDB 558074 D01, antenna-port conducted measurements are acceptable as an alternative to radiated measurements for demonstrating compliance to the limits in the restricted frequency bands. If conducted measurements are performed, then proper impedance matching must be ensured and an additional radiated test for cabinet/case emissions will also be required.

NOTE2: The transmitter has an integral PCB loop antenna that is enclosed within the housing of the EUT and meets the requirements of FCC 15.203

4 Description of the Equipment under Test (EUT)

4.1 General Description

MIL-B19 is a smart watch; it can be communicated with mobile phone via Bluetooth. Watch also support alarm clock, intelligent user can judge the state of motion, scientific sleep monitoring, information assistance, heart rate monitoring, GPS functionalities and supports music playback and bluetooth calling. The BT/WIFI frequency is 2.4GHz.

Note1: Only Bluetooth BLE test data included in this report.



4.2 EUT Identity

NOTE: Unless otherwise noted in the report, the functional boards installed in the units shall be selected from the below list, but not means all the functional boards listed below shall be installed in one unit.

4.2.1 Board

Board		
Description	Software Version	Hardware Version
Main Board	2.0.1.137	R3

4.2.2 Sub- Assembly

Sub-Assembly			
Sub-Assembly Name	Model	Manufacturer	Description
Battery	HB522025EFW	Huawei Device Co., Ltd.	Rated capacity: 292mAh Nominal Voltage:  +3.87V Charging Voltage:  +4.45V

4.3 Technical Description

NOTE: For the detailed technical descriptions, see the applicant/manufacturer's specifications or user manual.

Characteristics	Description	
Operating Mode	Non-FHSS	Bluetooth 5.2
TX/RX Operating Range	2400-2483.5 MHz band	$f_c = 2402 \text{ MHz} + N * 2 \text{ MHz}$, where: - f_c = "Operating Frequency" in MHz, - N = "Channel Number" with the range from 0 to 39.
Modulation Type	Digital	GFSK,
Emission Designator	GFSK for 1Mbps: 1M00F1D GFSK for 2Mbps: 1M99F1D	
Bluetooth Power Class	Class 1	
Antenna	Description	Isotropic Antenna
	Type	<input checked="" type="checkbox"/> Integral (permanent fixed antenna, which may be built-in, designed as an indispensable part of EUT) <input type="checkbox"/> Dedicated (removable antenna supplied with EUT, designed as an indispensable part of EUT)
	Ports	<input checked="" type="checkbox"/> Ant 1, <input type="checkbox"/> Ant 2, <input type="checkbox"/> Ant 3
	Gain	-6.6 dBi (per antenna port, max.)
	Remark	When the EUT is put into service, the practical maximum antenna gain should NOT exceed the value as described above.
Power Supply	Type	<input type="checkbox"/> External DC mains, <input checked="" type="checkbox"/> Battery, <input type="checkbox"/> AC/DC Adapter, <input type="checkbox"/> Powered over Ethernet (PoE). <input type="checkbox"/> USB <input type="checkbox"/> Other_____

5 General Test Conditions / Configurations

5.1 EUT Configurations

5.1.1 General Configurations

Configuration	Description
Test Antenna Ports	Until otherwise specified, - All TX tests are performed at all TX antenna ports of the EUT, and - All RX tests are performed at all RX antenna ports of the EUT.
Multiple RF Sources	Other than the tested RF source of the EUT, other RF source(s) are disabled or shutdown during measurements.
Sensors and Antenna	Sensors and Antenna optimization function should be disabled during testing by software method to get the stable maximum power and avoid the influence of uncertain conditions

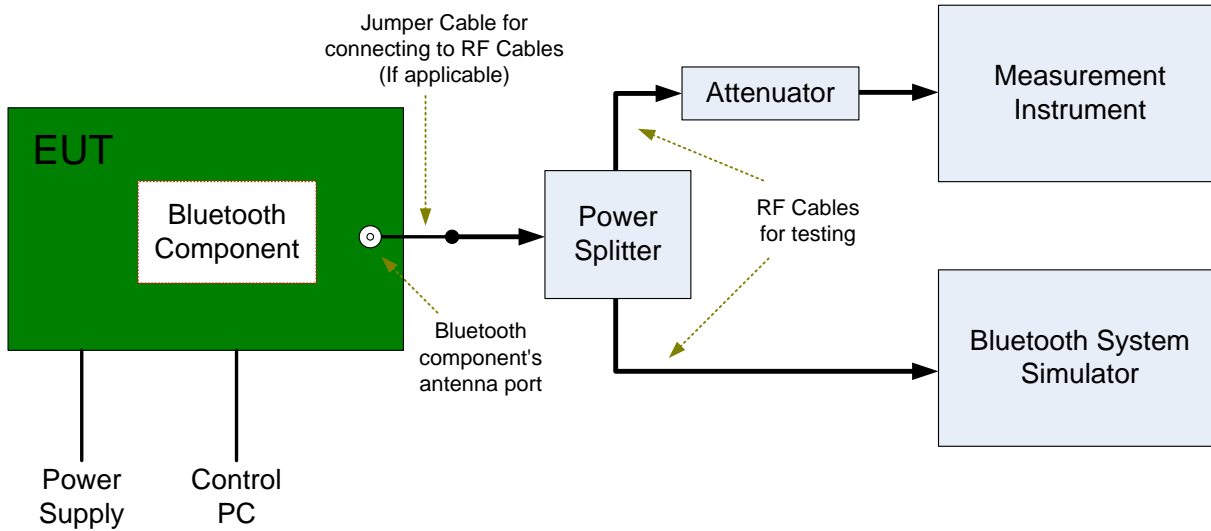
5.1.2 Customized Configurations

# EUT Conf.	Signal Description	Operating Frequency	Duty cycle
BLE_TM1_Ch0	GFSK for BLE modulation, Data Rate 1Mbps	Ch No. 0 / 2402 MHz	87.2%
BLE_TM1_Ch19	GFSK for BLE modulation, Data Rate 1Mbps	Ch No. 19 / 2440 MHz	86.8%
BLE_TM1_Ch39	GFSK for BLE modulation, Data Rate 1Mbps	Ch No. 39 / 2480 MHz	87.2%
BLE_TM2_Ch0	GFSK for BLE modulation, Data Rate 2Mbps	Ch No. 0 / 2402 MHz	59.4%
BLE_TM2_Ch19	GFSK for BLE modulation, Data Rate 2Mbps	Ch No. 19 / 2440 MHz	59.6%
BLE_TM2_Ch39	GFSK for BLE modulation, Data Rate 2Mbps	Ch No. 39 / 2480 MHz	59.4%

5.2 Test Setups

5.2.1 Test Setup 1

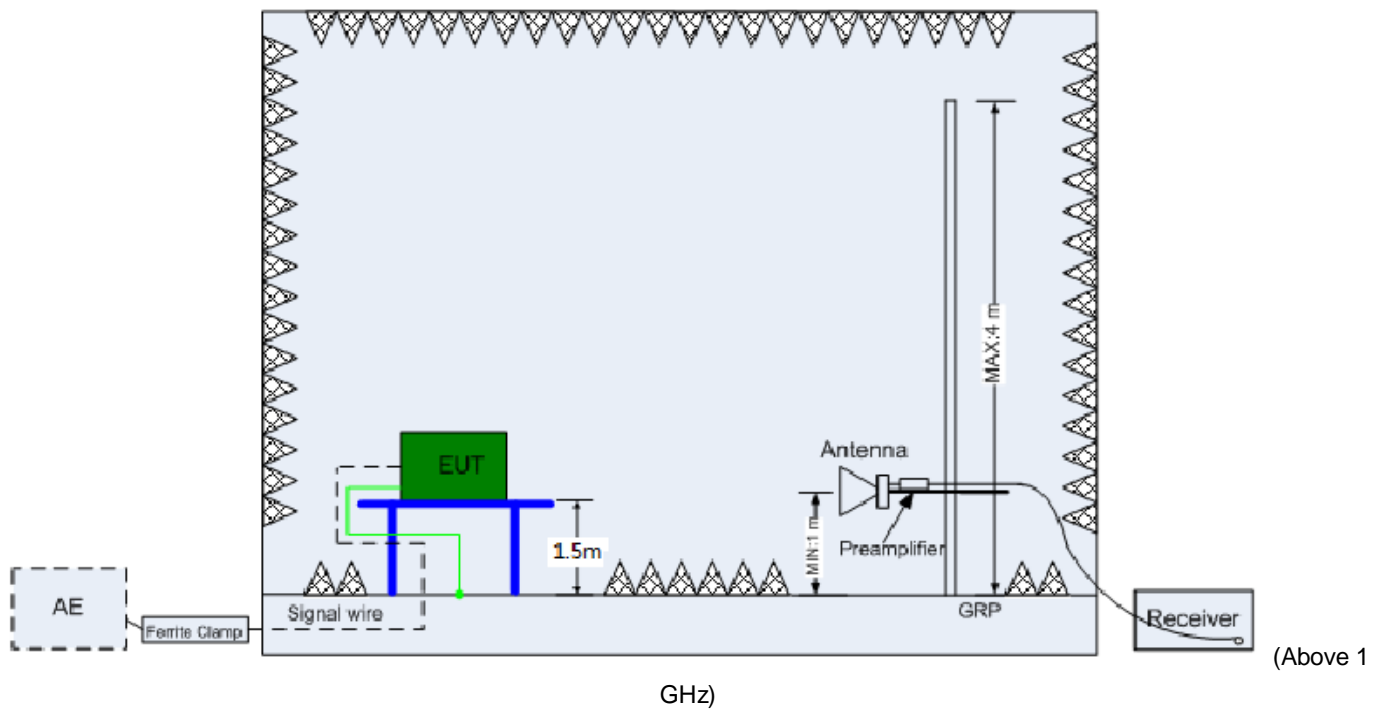
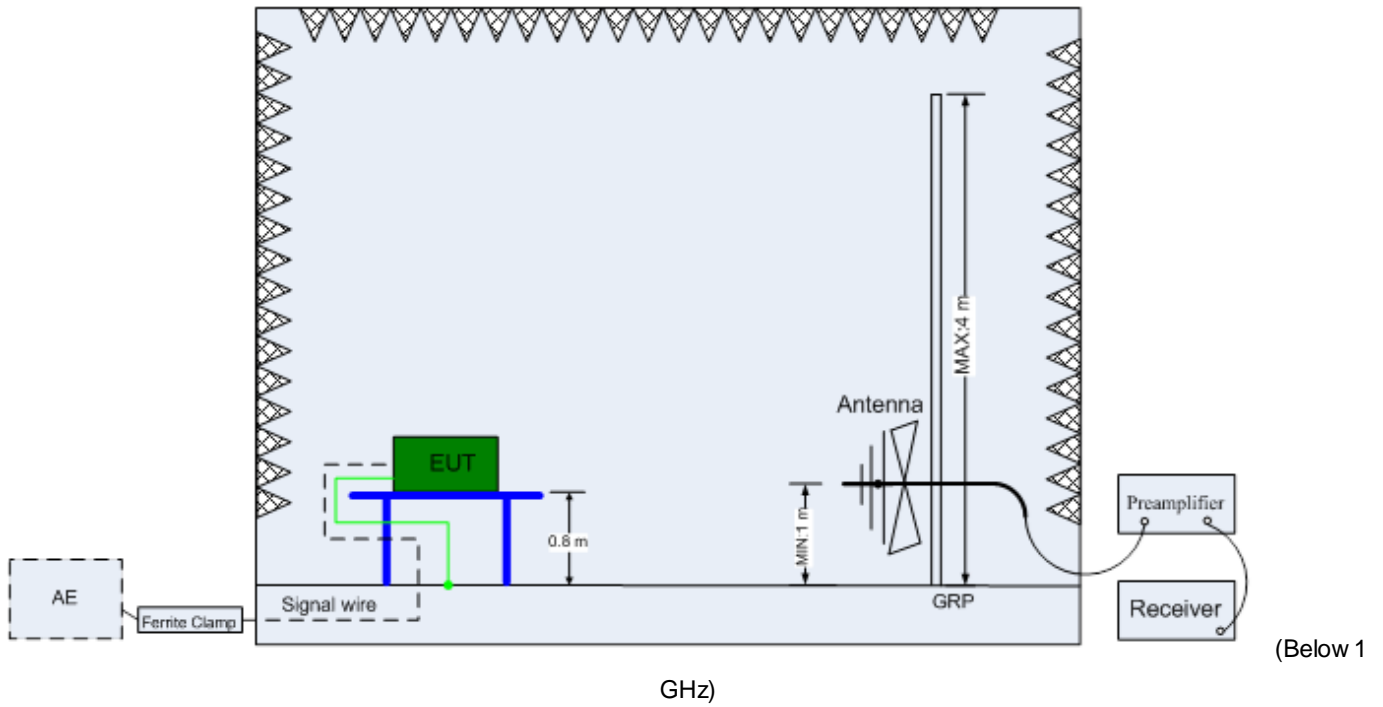
The Bluetooth component's antenna port(s) of the EUT are connected to the measurement instrument per an appropriate attenuator. The EUT is controlled by Bluetooth System Simulator and/or PC/software to emit the specified signals for the purpose of measurements.



5.2.2 Test Setup 2

The semi-anechoic chamber and full-anechoic chamber has met the requirement of ANSI C63.4. The test distance is 3m. The setup is according to ANSI C63.4 and CAN/CSA-CEI/IEC CISPR 22.

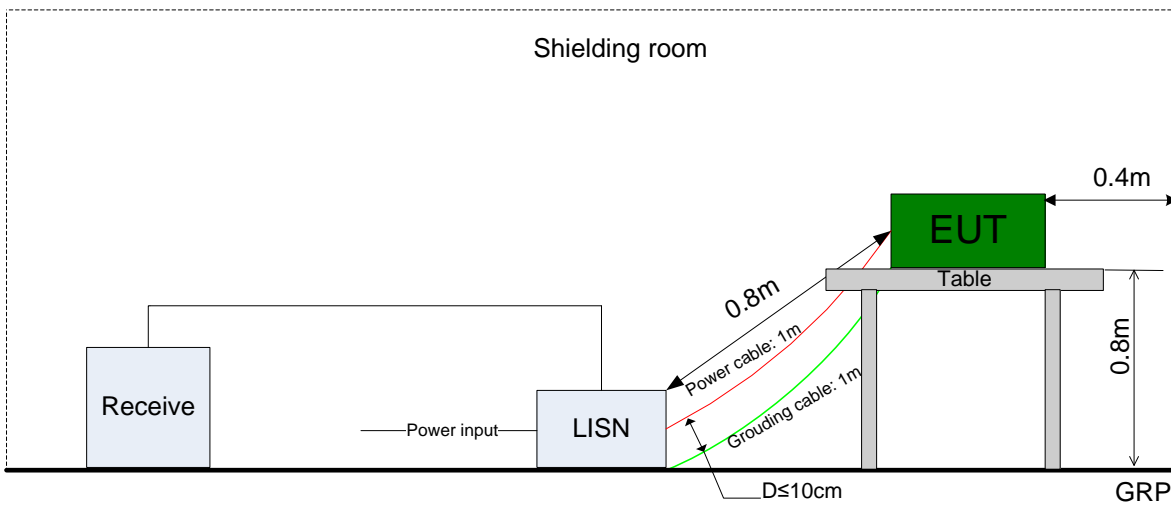
The maximal emission value is acquired by adjusting the antenna height, polarisation and turntable azimuth. Normally, the height range of antenna is 1 m to 4 m, the azimuth range of turntable is 0° to 360°, and the receive antenna has two polarizations Vertical (V) and Horizontal (H).



5.2.3 Test Setup 3

The mains cable of the EUT (maybe per AC/DC Adapter) must be connected to LISN. The LISN shall be placed 0.8 m from the boundary of EUT and bonded to a ground reference plane for LISN mounted on top of the ground reference plane. This distance is between the closest points of the LISN and the EUT. All other units of the EUT and associated equipment shall be at least 0.8m from the LISN.

Ground connections, where required for safety purposes, shall be connected to the reference ground point of the LISN and, where not otherwise provided or specified by the manufacturer, shall be of same length as the mains cable and run parallel to the mains connection at a separation distance of not more than 0.1 m.



5.3 Test Conditions

Test Case	Test Conditions		
	Configuration	Description	
6dB Emission Bandwidth (EBW)	Meas. Method	FCC KDB 558074 D01 §8.2 Option 1.	
	Test Env.	TN/VN	
	Test Setup	Test Setup 1	
	EUT Conf.	TM1_Ch0, TM1_Ch19, TM1_Ch39. TM2_Ch0, TM2_Ch19, TM2_Ch39.	
Occupied Bandwidth	Meas. Method	ANSI C63.10 Section 6.9.3	
	Test Env.	TN/VN	
	Test Setup	Test Setup 1	
	EUT Conf.	TM1_Ch0, TM1_Ch19, TM1_Ch39. TM2_Ch0, TM2_Ch19, TM2_Ch39.	
Maximum peak Conducted Output Power	Meas. Method	FCC KDB 558074 D01 §8.3.1.1	
	Test Env.	TN/VN	
	Test Setup	Test Setup 1	
	EUT Conf.	TM1_Ch0, TM1_Ch19, TM1_Ch39. TM2_Ch0, TM2_Ch19, TM2_Ch39.	
Maximum Power Spectral Density Level	Meas. Method	FCC KDB 558074 D01 §8.4	
	Test Env.	TN/VN	
	Test Setup	Test Setup 1	
	EUT Conf.	TM1_Ch0, TM1_Ch19, TM1_Ch39. TM2_Ch0, TM2_Ch19, TM2_Ch39.	
Band edge spurious emission	Meas. Method	FCC KDB 558074 D01§8.7	
	Test Env.	TN/VN	
	Test Setup	Test Setup 1	
	EUT Conf.	TM1_Ch0, TM1_Ch39. TM2_Ch0, TM2_Ch39..	
Unwanted Emissions into Non-Restricted Frequency Bands	Meas. Method	FCC KDB 558074 D01§8.5	
	Test Env.	TN/VN	
	Test Setup	Test Setup 1	
	EUT Conf.	TM1_Ch0, TM1_Ch19, TM1_Ch39. TM2_Ch0, TM2_Ch19, TM2_Ch39.	
Unwanted Emissions into Restricted Frequency Bands (Radiated)	Meas. Method	ANSI C63.10; FCC KDB 558074 D01§8.6, Radiated	
	Test Env.	TN/VN	
	Test Setup	Test Setup 2	
	EUT Conf.	30 MHz -1 GHz	TM1_Ch0(Worst Conf.),TM2_Ch0 (Worst Conf.).
		1-3 GHz	TM1_Ch0, TM1_Ch0.,TM2_Ch0, TM2_Ch39.
3-18 GHz		TM1_Ch39(Worst Conf.),TM2_Ch39(Worst Conf.).	
18-26.5 GHz		TM1_Ch39(Worst Conf.),TM2_Ch39 (Worst Conf.).	
AC Power Line	Meas. Method	AC mains conducted.	

Test Case	Test Conditions	
	Configuration	Description
Conducted Emissions		Pre: RBW = 10 kHz; Det. = Peak. Final: RBW = 9 kHz; Det. = CISPR Quasi-Peak & Average.
	Test Env.	TN/VN
	Test Setup	Test Setup 3
	EUT Conf.	TM1_Ch0 TM2_Ch39

6 Main Test Instruments

6.1 Current Test Project/Report

Main Test Equipments(BT/WIFI test system)					
Equipment Name	Manufacturer	Model	Serial Number	Cal Date	Cal-Due
Power Sensor	R&S	NRP2	103085/106211	2021/03/13	2022/03/12
Spectrum Analyzer	R&S	FSW26	101474	2021/07/02	2022/07/01
Universal Radio Communication Tester	R&S	CMW500	164698	2021/03/13	2022/03/12

Main Test Equipments(RE test system)					
Equipment Name	Manufacturer	Model	Serial Number	Cal Date	Cal-Due
Test receiver	R&S	ESU26	100150	2020/11/06	2021/11/05
LOOP Antennas(9kHz-30MHz)	R&S	HFH2-Z2	100263	2021/04/28	2022/04/27
Trilog Broadband Antenna (30M~3GHz)	SCHWARZB ECK	VULB 9163	9163-1303	2020/08/10	2022/08/09
Trilog Broadband Antenna (1GHz~18GHz)	SCHWARZB ECK	HF907	100391	2019/10/16	2021/10/15
Trilog Broadband Antenna (18GHz~40GHz)	SCHWARZB ECK	BBHA 9170	BBHA9170647	2019/10/29	2021/10/28
Software Information					
Test Item	Software Name		Manufacturer	Version	
RE	EMC32		R&S	V9.25.0	

Main Test Equipments(CE test system)					
Equipment Name	Manufacturer	Model	Serial Number	Cal Date	Cal-Due
Test receiver	R&S	ESU26	100150	2020/11/06	2021/11/05
Artificial Mains Network	R&S	ENV4200	100134	2021/03/14	2022/03/13
Software Information					
Test Item	Software Name		Manufacturer	Version	
CE	EMC32		R&S	V9.25.0	

7 Measurement Uncertainty

For a 95% confidence level, the measurement expanded uncertainties for defined systems, in accordance with the recommendations of ISO 17025 as following:

Test Item		Extended Uncertainty
Transmit Output Power Data	Power [dBm]	U = 0.39 dB
RF Power Density, Conducted	Power [dBm]	U = 0.66 dB
Bandwidth	Magnitude [%]	U=7%
Band Edge Compliance	Disturbance Power [dBm]	U = 0.9 dB
Spurious Emissions, Conducted	Disturbance Power [dBm]	20MHz~3.6GHz: U=0.88dB 3.6GHz~8.4GHz: U=1.08dB 8.4GHz~13.6GHz: U=1.24dB 13.6GHz~22GHz: U=1.34dB 22GHz~26.5GHz: U=1.36dB
Field Strength of Spurious Radiation	ERP/EIRP [dBm]	For 3 m Chamber: U = 3.868 dB (9 kHz to 150 kHz) U = 3.782 dB (150 kHz to 30 MHz) U = 5.24 dB (30 MHz-1 GHz) U = 4.84 dB (1 GHz-18 GHz) U = 4.62 dB (18 GHz-26.5 GHz)
AC Power Line Conducted Emissions	Disturbance Voltage[dBμV]	U=2.3 dB
Duty Cycle	Duty Cycle [%]	U=±2.06 %

8 Appendixes

Appendix No.	Description
SYBH(Z-RF)20210626012001-2002-A	Appendix for Bluetooth BLE

END