



RF Test Report

Product Name: Smart Watch

Product Model: JPT-B19

Report Number: SYBH(Z-EMC)20210626004001-4

Reliability Laboratory of Huawei Technologies Co., Ltd.

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Applicant: Huawei Device Co., Ltd.
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Dongguan, Guangdong 523808, People's Republic
of China

Date of Receipt Test Item: 2021-07-15
Start Date of Test: 2021-07-16
End Date of Test: 2021-08-07

Test Result: Pass

Prepared by (Test Engineer)	<u>2021-08-08</u>	<u>Chang Lina</u>	<i>Chang Lina</i>
	Date	Name	Signature

Reviewed by (Test Engineer)	<u>2021-08-09</u>	<u>Rao Legian</u>	<i>Rao Legian</i>
	Date	Name	Signature

Approved By (Lab Manager)	<u>2021-08-09</u>	<u>He Hao</u>	<i>He Hao</i>
	Date	Name	Signature

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1.1 Further information

Glossary

EUT	-	Equipment under test
EN	-	European Standard
ETSI	-	European Telecommunications Standard Institute
HW	-	Hardware
QP	-	Quasi peak
S/N	-	Serial number
SW	-	Software
WPT	-	Wireless power transmission

1.2 Document history

Version	Applied changes	Date of release
V1.0	First report	2021.08.09

1.3 EUT information

1.3.1 EUT Description

JPT-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.

EUT Description	
Product Name	Smart Watch
Model Number	JPT-B19
TX Frequency	2.4G WIFI: 2412MHz to 2472MHz Bluetooth: 2402MHz to 2480MHz WPT: 110.5kHz to 148kHz NFC:13.56MHz
RX Frequency	2.4G WIFI: 2412MHz to 2472MHz Bluetooth: 2402MHz to 2480MHz BDS: 1176.45MHz/1561.098MHz Galileo: 1176.45MHz/1575.42MHz GLONASS: 1597MHz to 1607MHz GPS: 1176.45MHz/1575.42MHz WPT: 110.5KHz to 148KHz NFC:13.56MHz
MAC	CSNTQ21627000009
HW Version	R1
SW Version	2.0.1.133SP1
EUT Accessory	
Watch Wireless Charger	Manufacturer: Huawei Devices Co., Ltd. Model: CP81-1 Input voltage: 5V SN: 2102453063JV14256328
Li-polymer Battery	Manufacturer: Huawei Technologies Co., Ltd. (NVT/Lishen) Battery Model: HB532729ECW Capacity: 455 mAh Rated Voltage:3.82V Charging Voltage:4.4V

Remark: The information of the EUT is declared by the manufacturer. Please refer to the specifications or user manual for details.

1.4 Overview of operational modes within a WPT system

Mode	
■	Mode 1: Base station in stand-by, idle mode
■	Mode 2: Communication before charging, adjustment charging mode / position
■	Mode 3: Communication
■	Mode 4: Energy transmission

The mode 1, mode 2, mode 3 and mode 4 were tested, only the worst case mode data is reported in this report.

1.5 Associated Equipment Used during Test

Adapter	Model: HW-050200U02 Input voltage: 100-240V ~50/60Hz 0.5A Output voltage: 5V  2A SN: B95532J4M00016
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1.6 Applied Standards

Test standard	Version	Test description
ETSI EN 303 417	V1.1.1	Wireless power transmission systems, using technologies other than radio frequency beam in the 19 - 21 kHz, 59 - 61 kHz, 79 - 90 kHz, 100 - 300 kHz, 6 765 - 6 795 kHz ranges; Harmonised Standard covering the essential requirements of article 3.2 of Directive 2014/53/EU
ETSI EN300 330	V2.1.1	Short Range Devices (SRD); Radio equipment in the frequency range 9 kHz to 25 MHz and inductive loop systems in the frequency range 9 kHz to 30 MHz; Harmonised Standard covering the essential requirements of article 3.2 of Directive 2014/53/EU

Remark: Unless otherwise specified, the latest edition of the referenced standards (including any amendments) applies.

2 Summary of Results

Summary of Results				
Test Items	Method	Requirement	Result	Site
Permitted range of operating frequencies	ETSI EN 303 417 V1.1.1 clause 6.2	ETSI EN 303 417 clause 4.3.2	Pass	Site1
Operating frequency ranges	ETSI EN 303 417 V1.1.1 clause 6.2	ETSI EN 303 417 clause 4.3.3	Pass	Site1
H-field requirements	ETSI EN 303 417 V1.1.1 clause 6.2	ETSI EN 303 417 clause 4.3.4	Pass	Site1
Transmitter spurious emissions	ETSI EN 303 417 V1.1.1 clause 6.2	ETSI EN 303 417 clause 4.3.5	Pass	Site1
Transmitter out of band (OOB) emissions	ETSI EN 303 417 V1.1.1 clause 6.2	ETSI EN 303 417 clause 4.3.6	Pass	Site1
WPT system unwanted conducted emissions	ETSI EN 303 417 V1.1.1 clause 6.2	ETSI EN 303 417 clause 4.3.7	N/A	N/A
Receiver blocking	ETSI EN 303 417 V1.1.1 clause 6.3.2	ETSI EN 303 417 clause 4.4.2.1	Pass	Site1

Note 1: N/A is Not Applicable , all WPT systems where the cable of the primary coil is 0.8 m, is less than 3 m, so the WPT system unwanted conducted emissions is not applicable.

Note 2: If there is more than one adaptor,each one should be applied throughout the compliance test respectively, however, only the worst case will be recorded in this report.

During the measurement, the environmental conditions complied with the range listed as below.

Item	Required
Ambient temperature	15°C ~ 35°C
Relative humidity	25% ~ 75%
Atmospheric pressure	86kPa ~ 106kPa

3 Test Results

3.1 Permitted range of operating frequencies and Operating frequency ranges

Test Requirement: ETSI EN 303 417 Clause 4.3.2& Clause 4.3.3
Test Method: ETSI EN 303 417 Clause 6.2
Limit: ETSI EN 303 417 Clause 4.3.2.3& Clause 4.3.3.3

3.1.1 E.U.T Operation

Operating Environment:

Temperature: 22.50 °C

Humidity: 55.6% RH

Atmospheric Pressure: 1010mbar

Test mode: Mode 1, Mode 2, mode 3, mode 4

Mode 1, Mode 2, mode 3 and mode 4 were tested, only the worst case mode (mode 4) data is recorded in this report.

3.1.2 Measurement Data

Test Mode	fL(KHz)	fH(KHz)	Limit (KHz)	Result
4	116.694	117.390	100-300	PASS
	128.130	128.831	100-300	PASS
	139.277	139.956	100-300	PASS
	141.786	142.453	100-300	PASS

3.2 H-field requirements

Test Requirement: ETSI EN 303 417 Clause 4.3.4

Test Method: ETSI EN 303 417 Clause 6.2

Measurements Distance: 3 m

Limit at 10 m:

Frequency range [MHz]	H-field strength limit [dBμA/m at 10 m]	Comments
$0,019 \leq f < 0,021$	72	
$0,059 \leq f < 0,061$	69,1 descending 10 dB/dec above 0,059 MHz	See note 1
$0,079 \leq f < 0,090$	67,8 descending 10 dB/dec above 0,079 MHz	See note 2
$0,100 \leq f < 0,119$	42	
$0,119 \leq f < 0,135$	66 descending 10 dB/dec above 0,119 MHz	See note 1
$0,135 \leq f < 0,140$	42	
$0,140 \leq f < 0,1485$	37,7	
$0,1485 \leq f < 0,30$	-5	
$6,765 \leq f < 6,795$	42	

NOTE 1: Limit is 42 dBμA/m for the following spot frequencies: 60 kHz ± 250 Hz and 129,1 kHz ± 500 Hz.
NOTE 2: At the time of preparation of the present document the feasibility of increased limits for high power wireless power transmission systems to charge vehicles [i.4] was prepared. New specific requirements for such systems (e.g. higher H-field emission limits in the 79 - 90 kHz band) will be reflected within a future revision of the present document.

Measurements were performed at 3m and the limit shall be extrapolated from 10m to 3m using an extrapolation factor Figure H.2 of EN 300 330 as below.

H.2 Limits for measurements at 3 m distance

The H-field limit in dBμA/m at 3 m, H_{3m} , is determined by the following equation:

$$H_{3m} = H_{10m} + C_3$$

where:

H_{10m} is the H-field limit in dBμA/m at 10 m distance according to the present document; and

C_3 is a conversion factor in dB determined from figure H.2.

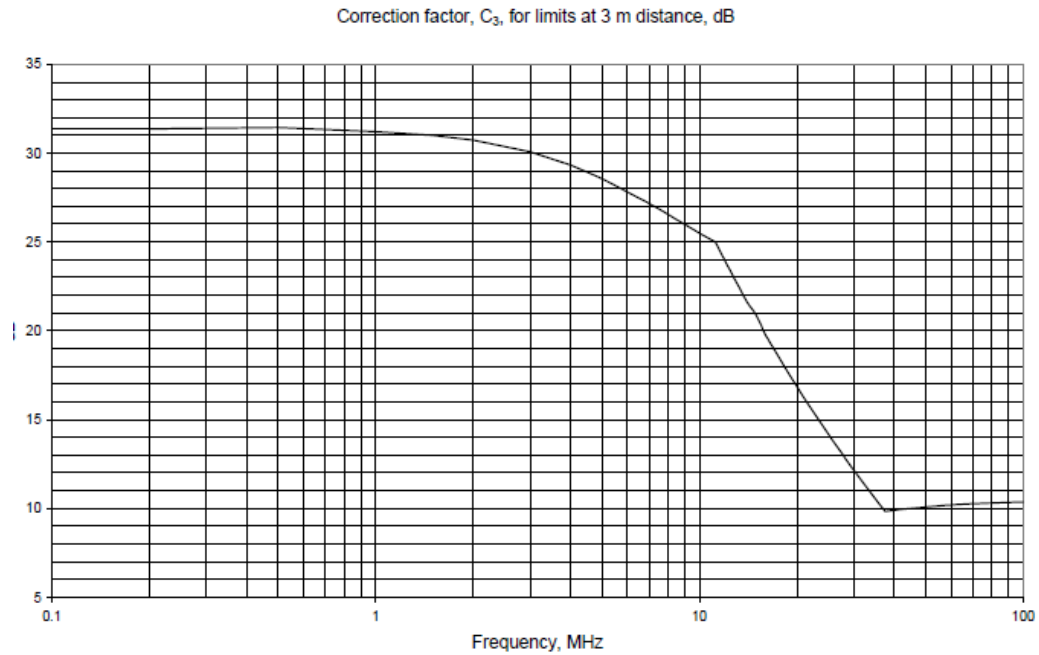


Figure H.2: Conversion factor C_3 versus frequency

For measuring equipment calibrated in dB μ V/m, the reading should be reduced by 51.5 dB to be converted to dB μ A/m.

Limit at 3 m:

Frequency(KHz)	Limit(dBuA/m) at 3m
117.047	42+31.3=73.3
128.482	65.7+31.3=97.0
139.617	42+31.3=73.3
142.125	37.7+31.3=69.0

3.2.1 E.U.T Operation

Operating Environment:

Temperature: 22.5 °C

Humidity: 53.8% RH

Atmospheric Pressure: 1010 mbar

Test mode: Mode 1, Mode 2, mode 3, mode 4

Mode 1, Mode 2, mode 3 and mode 4 were tested, only the worst case mode (mode 4) data is recorded in this report.

3.2.2 Measurement Data

Test Mode	Frequency(KHz)	Measured Level(dBuA/m)	Limit(dBuA/m) at 3m	Result
4	117.047	22.46	73.3	PASS
	128.482	21.78	97.0	PASS
	139.617	21.04	73.3	PASS
	142.125	18.10	69.0	PASS

3.3 Transmitter spurious emissions

Test Requirement: ETSI EN 303 417 Clause 4.3.5

Test Method: ETSI EN 303 417 Clause 6.2

Measurements Distance: 3 m

Limit: Table 4 with extrapolation factor as Figure H.2 and Table 5

The radiated field strength of spurious emissions below 30 MHz shall not exceed the generated H-field given in Table 4 at 10 m.

Table 4

State (see note)	Frequency $9 \text{ kHz} \leq f < 10 \text{ MHz}$	Frequency $10 \text{ MHz} \leq f < 30 \text{ MHz}$
Operating	27 dB μ A/m at 9 kHz descending 10 dB/dec	-3,5 dB μ A/m
Standby	5,5 dB μ A/m at 9 kHz descending 10 dB/dec	-25 dB μ A/m
NOTE: "Operating" means mode 2, 3 and 4 according to Table 2; "standby" means mode 1 according to Table 2.		

Measurements were performed at 3 m. The factor of test system shall be added by extrapolated factor (from 10 m to 3 m using an extrapolation factor) Figure H.2 of EN 300 330 as below.

F.2 Limits for measurements at 3 m distance

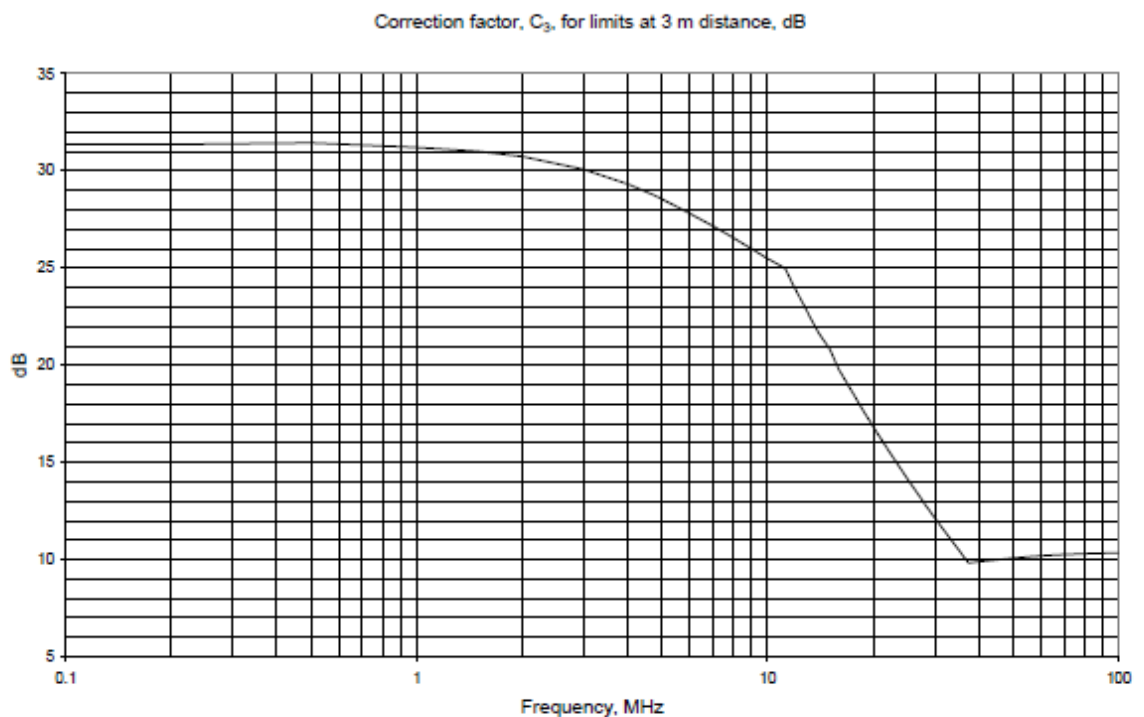
The H-field limit in dB μ A/m at 3 m, H_{3m} , is determined by the following equation:

$$H_{3m} = H_{10m} + C_3 \quad (F.2)$$

where:

H_{10m} is the H-field limit in dB μ A/m at 10 m distance according to the present document; and

C_3 is a conversion factor in dB determined from figure F.2.



The power of any radiated spurious emission between 30 MHz and 1 GHz shall not exceed the values given in Table 5.

Table 5

State (see note)	47 MHz to 74 MHz 87,5 MHz to 118 MHz 174 MHz to 230 MHz 470 MHz to 790 MHz	Other frequencies between 30 MHz to 1 000 MHz
Operating	4 nW	250 nW
Standby	2 nW	2 nW
NOTE: "Operating" means mode 2, 3 and 4 according to Table 2; "standby" means mode 1 according to Table 2.		

3.3.1 E.U.T Operation

Operating Environment:

Temperature: 22.5 °C

Humidity: 55.6% RH

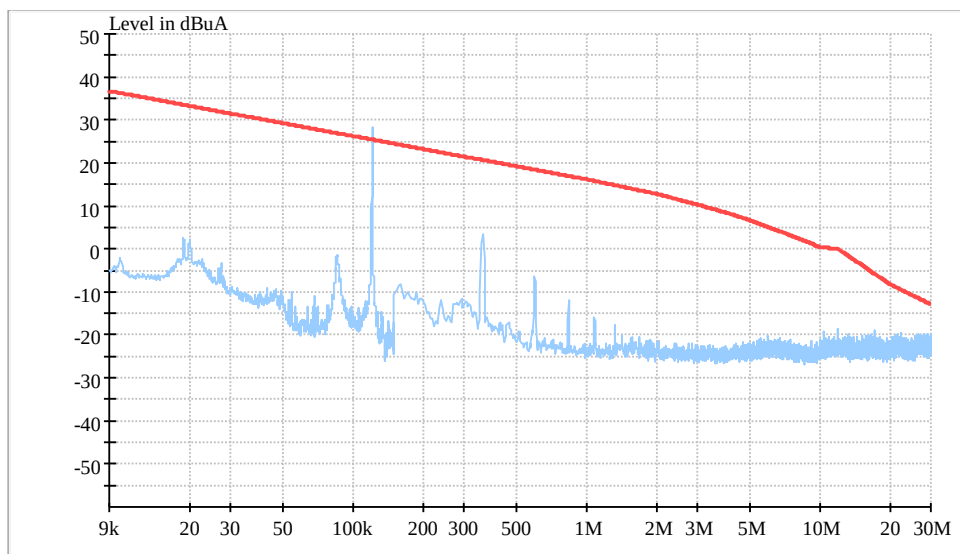
Atmospheric Pressure: 1010 mbar

Test mode: Mode 1, Mode 2, mode 3, mode 4

Mode 1, Mode 2, mode 3 and mode 4 were tested, only the worst case mode (mode 1 and mode 4) data are recorded in this report.

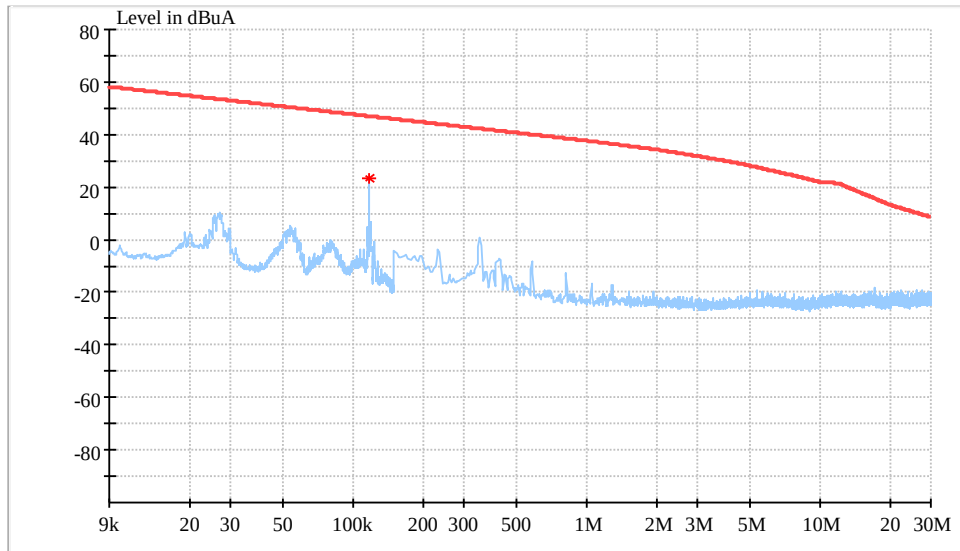
3.3.2 Measurement Data

9KHz-30MHz Test Data



Test mode 1: base station in stand-by, idle mode

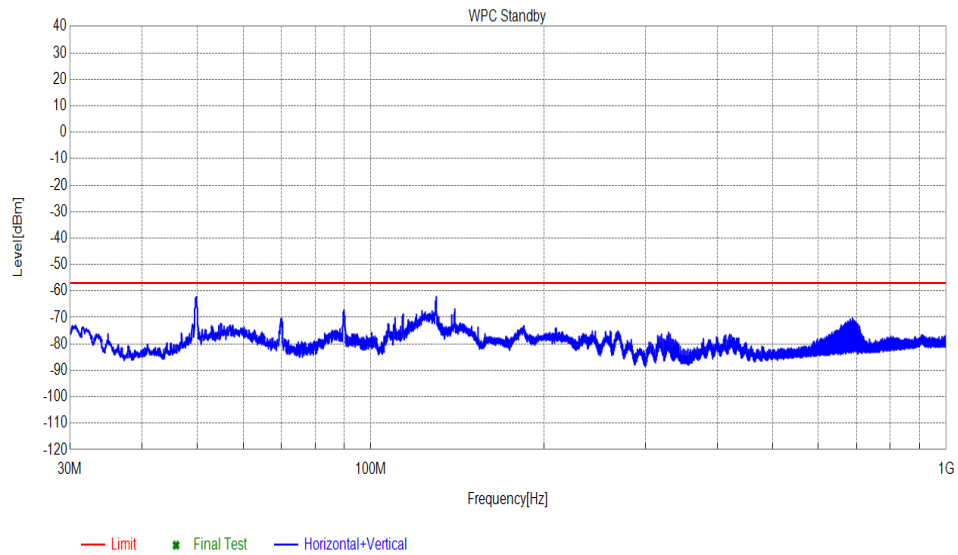
Remark: The emission which exceeds the limit is the WPT fundamental frequency.



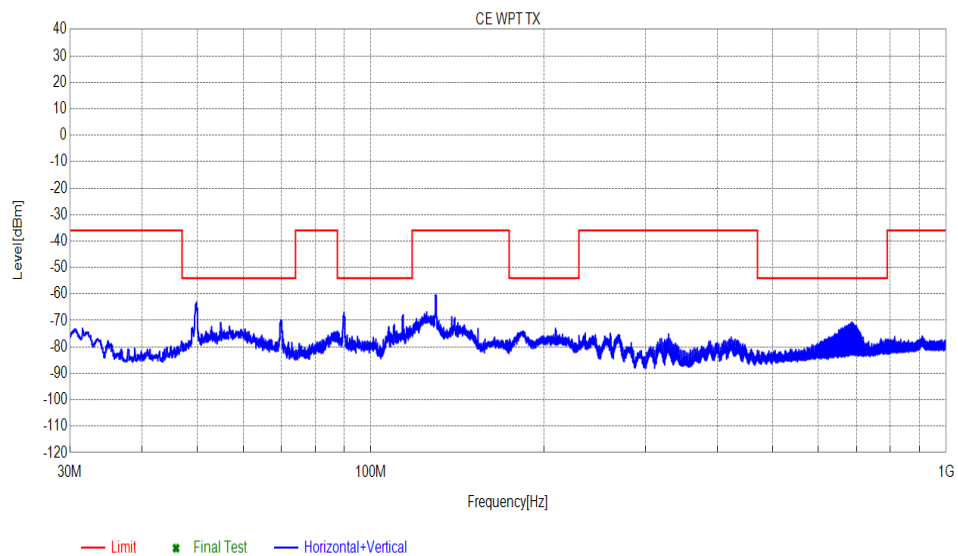
Frequency (MHz)	MaxPeak (dB μ A)	Limit (dB μ A)	Margin (dB)	Pol	Azimuth (deg)	Corr. (dB)
0.117288	23.36	47.03	23.67	H	282.0	-31.9

Test mode 4: Energy transmission

30MHz-1GHz Test Data



Test mode 1: base station in stand-by, idle mode



Test mode 4: Energy transmission

3.4.1 E.U.T Operation

Operating Environment:

Temperature: 22.5 °C

Humidity: 55.6% RH

Atmospheric Pressure: 1010 mbar

Test mode: Mode 1, Mode 2, mode 3, mode 4

3.4.2 Measurement Data

fc (KHz)	fc Measured Level(dBuA/ m)	2.5*OBW (KHz)	fsl=fc-2.5*OBW fsh=fc+2.5*OBW (KHz)	Limit at fsl&fsh (dBuA/m)	Result
117.047	22.46	1.740	fsh=115.307	73.25	PASS
			fsl=118.787		PASS
128.482	21.78	1.753	fsh=126.729	96.95	PASS
			fsl=130.235		PASS
139.617	21.04	1.698	fsh=137.919	73.26	PASS
			fsl=141.315		PASS
142.125	18.10	1.668	fsh=140.457	68.96	PASS
			fsl=143.793		PASS

The fc Measured Level is below the OOB limit at fsl&fsh, and the fsl&fsh level is below fc, so the test result is passed.

3.5 Receiver blocking

Test Requirement: ETSI EN 303 417 Clause 4.4.2

Test Method: ETSI EN 303 417 Clause 6.3.2 & Clause 4.4.2.3

Limit:

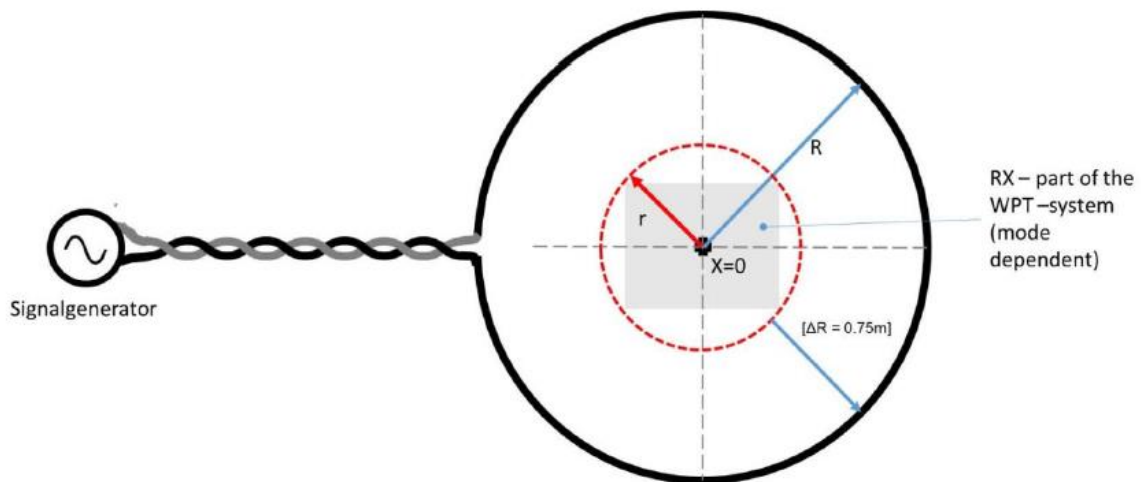
	In-band signal	OOB signal	Remote-band signal
Frequency	Centre frequency (f_c) of the WPT system (see clause 4.3.3)	$f = f_c \pm F$ (see note)	$f = f_c \pm 10 \times F$ (see note)
Signal level field strength at the EUT	72 dB μ A/m	72 dB μ A/m	82 dB μ A/m
NOTE: $F = \text{OFR}$ see clause 4.3.3.			

Wanted performance criteria:

For the purpose of the receiver performance tests, the WPT system shall produce an appropriate output under normal conditions as indicated below:

- use as intended without degradation of performance; or
- a degradation of the performance is indicated by the WPT system as described in the manual.

Test setup:



3.5.1 E.U.T Operation

Operating Environment:

Temperature: 22.5 °C

Humidity: 55.3% RH

Atmospheric Pressure: 1010 mbar

Test mode: Mode1, Mode 2, mode 3

Mode1, Mode 2, mode 3 were tested, only the worst case mode (mode 3) data is recorded in this report.

3.5.2 Measurement Data

Center Frequency(KHz)	FOR (KHz)
117.047	0.696
128.482	0.701
139.617	0.679
142.125	0.667

Center Frequency (KHz)	Frequency (KHz)	I (dBuA)	R (m)	Blocking H filed (dBuA/m)	Limit H filed (dBuA/m)	Result
117.047	117.047	79.02	1.0	73.0	72	PASS
	117.743	79.02	1.0	73.0	72	PASS
	116.351	79.02	1.0	73.0	72	PASS
	124.007	89.02	1.0	83.0	82	PASS
	110.087	89.02	1.0	83.0	82	PASS
128.482	128.482	79.02	1.0	73.0	72	PASS
	129.183	79.02	1.0	73.0	72	PASS
	127.781	79.02	1.0	73.0	72	PASS
	135.492	89.02	1.0	83.0	82	PASS
	121.472	89.02	1.0	83.0	82	PASS
139.617	139.617	79.02	1.0	73.0	72	PASS
	140.296	79.02	1.0	73.0	72	PASS
	138.938	79.02	1.0	73.0	72	PASS
	146.407	89.02	1.0	83.0	82	PASS
	132.827	89.02	1.0	83.0	82	PASS
142.125	142.125	79.02	1.0	73.0	72	PASS
	142.792	79.02	1.0	73.0	72	PASS

	141.458	79.02	1.0	73.0	72	PASS
	148.795	89.02	1.0	83.0	82	PASS
	135.455	89.02	1.0	83.0	82	PASS

For each test frequency the 'reaction' of the device be recorded and checked against the performance criterion. The WPT system meets the wanted performance criterion at all times. So the test is passed.

4 Main Test Instruments

Main Test Equipments						
Test item	Test Instrument	Model	S/N	Manufacturer	Calibrated deadline	Cal interval (month)
Operating frequency ranges& H-field requirements& Transmitter out of band (OOB) emissions	Receiver	ESW44	101878	R&S	Jan. 30, 2022	12
	LOOP Antennas	HFH2-Z2	100263	R&S	Mar. 14, 2022	24
Transmitter spurious emissions (30M-1GHz)	Spectrum analyzer	FSW8	104470	R&S	Nov. 08, 2021	12
	Broadband Antenna	VULB 9163	01330	SCHWARZB ECK	Aug. 10, 2022	24
Transmitter spurious emissions (9K-30MHz)	Receiver	ESW44	101878	R&S	Jan. 30, 2022	12
	LOOP Antennas	HFH2-Z2	100263	R&S	Mar. 14, 2022	24
Receiver blocking	Receiver	ESW44	101878	R&S	Jan. 30, 2022	12
	Signal generator	SMB100A	101540	R&S	Jan. 29, 2022	12
	Loop Antenna	HXYZ 9170	331	SCHWARZB ECK	N/A	N/A
	Current monitor probe	F-52	08396	FCC	Nov. 08, 2021	12
	Power amplifier	NTWPA-4K04100	20043064	RFLIGHT	Jul. 27, 2021	12
Software Information						
Test Item	Software Name		Manufacturer		Version	
H-field requirements& Transmitter out of band (OOB) emissions	EMC32		R&S		V10.60.20	
Transmitter spurious emissions	TS+		Tonscend		Ver2.1	

5 System Measurement Uncertainty

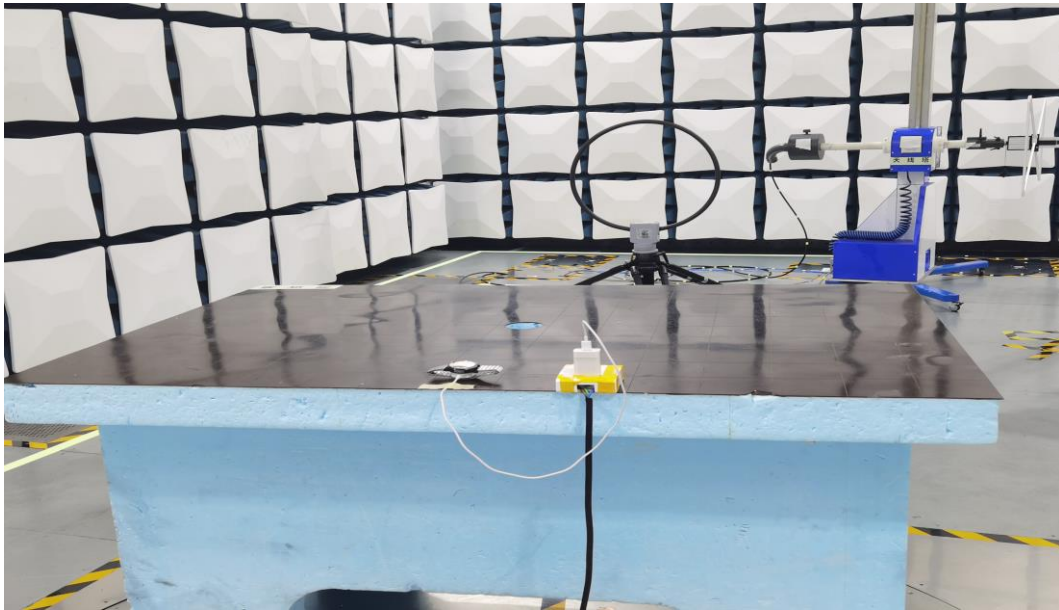
For a 95% confidence level, the measurement expanded uncertainties for defined systems, in accordance with the recommendations of ISO 17025 were:

System Measurement Uncertainty	
Maximum Uncertainty	Extended Uncertainty
H-field requirements& Transmitter out of band (OOB) Emissions& Transmitter spurious emissions(9KHz-30MHz)	U=3.87dB; k=2
Transmitter spurious emissions (30MHz-1GHz)	U=5.24dB; k=2
Receiver blocking	U=1.94dB; k=2

6 Attachment

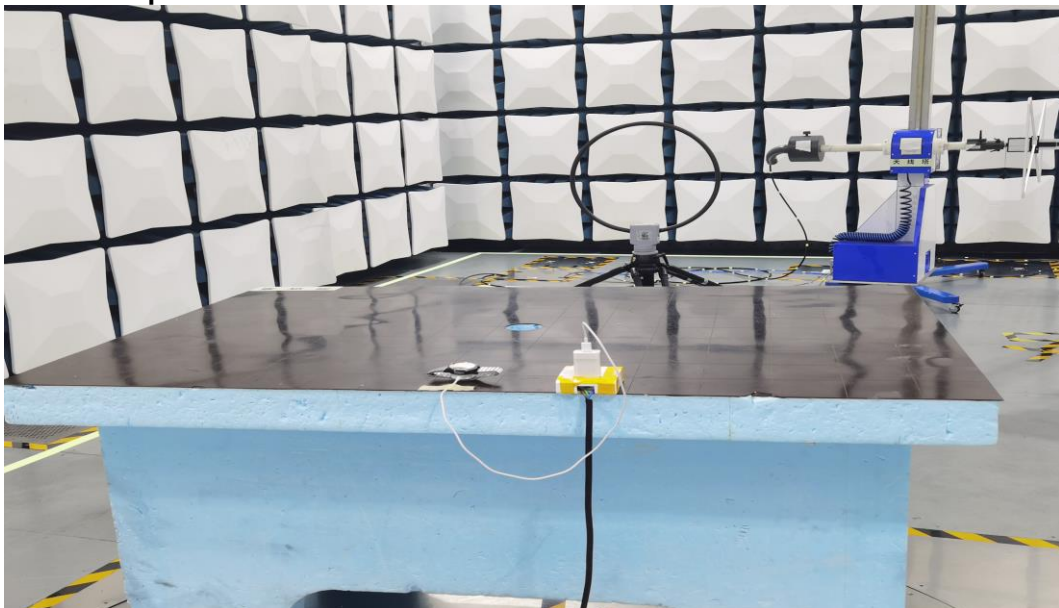
6.1 Setup Photographs of EUT

6.1.1 Operating frequency ranges



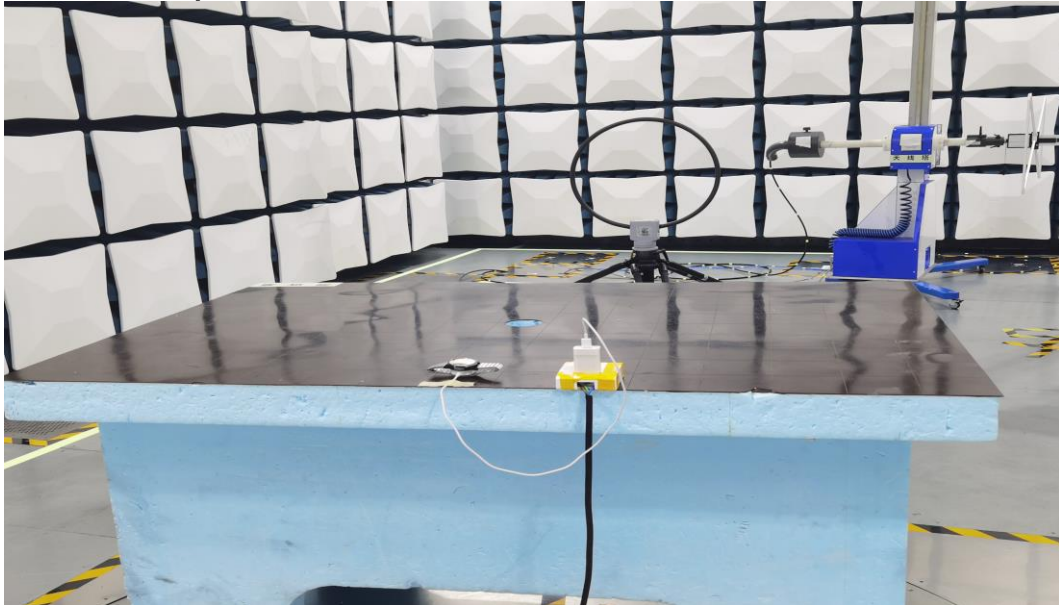
Operating frequency ranges

6.1.2 H-field requirements

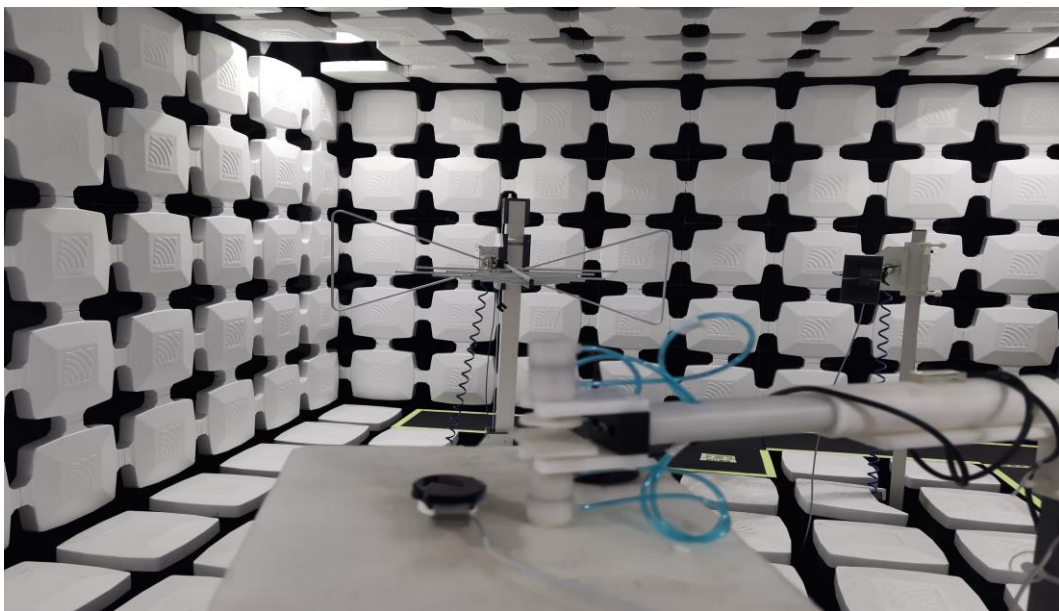


H-field requirements

6.1.3 Transmitter spurious emissions

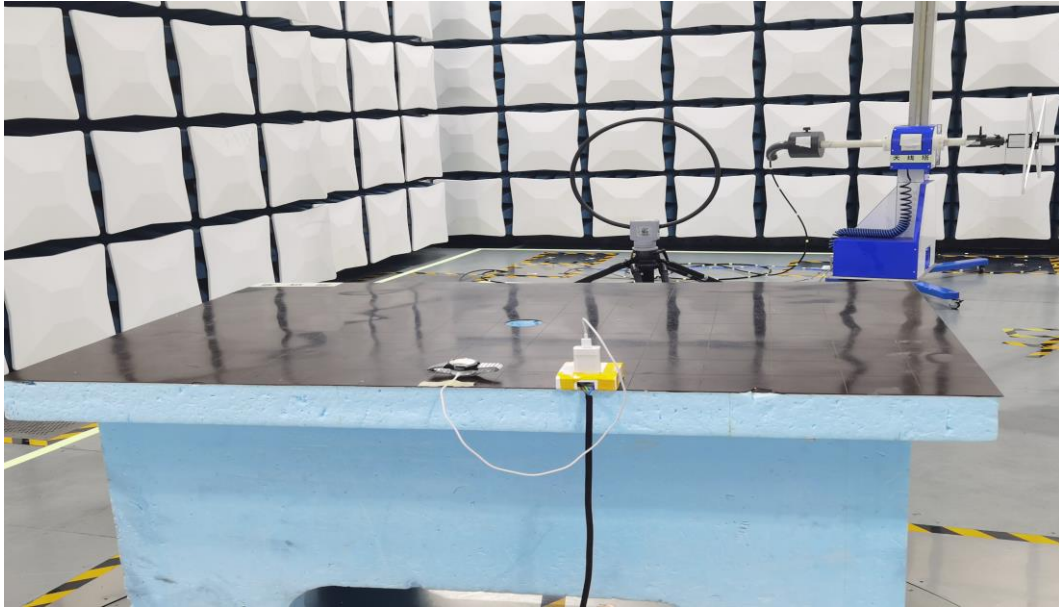


Transmitter spurious emissions (9KHz-30MHz)



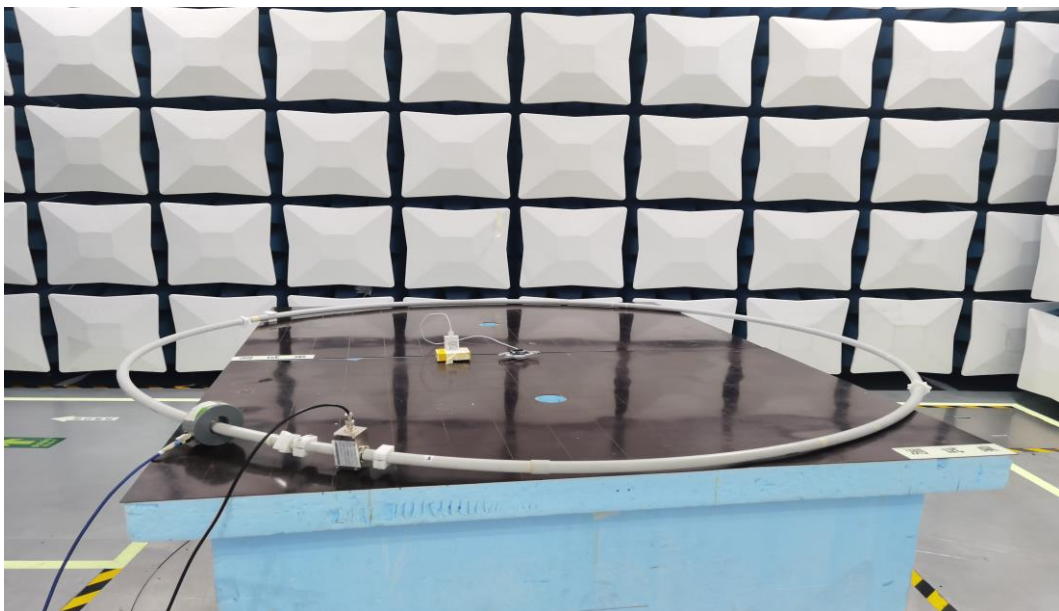
Transmitter spurious emissions (30MHz-1GHz)

6.1.4 Transmitter out of band(OOB) emissions



Transmitter out of band (OOB) emissions

6.1.5 Receiver blocking



Receiver blocking

6.2 Photographs of EUT



END