

## ETSI EN 300 330 V2.1.1 (2017-02)

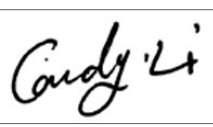
## TEST REPORT

For

**Shenzhen Huafurui Technology Co., Ltd.**

Unit 1401 & 1402, 14/F, Jinqi Zhigu Mansion (No.4 Building of Chongwen Garden), Crossing of the Liuxian Street and Tangling Road, Taoyuan Street, Nanshan District, Shenzhen, P.R. China

**Tested Model: KINGKONG 7**

<b>Report Type:</b> Original Report	<b>Product Type:</b> Smartphone
<b>Report Number:</b> SZ1210506-15265E-22J	
<b>Report Date:</b> 2021-06-21	
Candy Li	
<b>Reviewed By:</b> RF Engineer	
<b>Prepared By:</b> Shenzhen Accurate Technology Co., Ltd. 1/F., Building A, Changyuan New Material Port, Science & Industry Park, Nanshan District, Shenzhen, Guangdong, P.R. China Tel: (0755) 26503290 Fax: (0755) 26503396 <a href="http://www.atc-lab.com">Http://www.atc-lab.com</a>	

**Note:** Shenzhen Accurate Technology Co., Ltd. is not responsible for the authenticity of any test data provided by the applicant. Data included from the applicant that may affect test results are marked with an asterisk '\*'. Customer model name, addresses, names, trademarks etc. are not considered data.

This report cannot be reproduced except in full, without prior written approval of the Company. Unless otherwise stated the results shown in this test report refer only to the sample(s) tested. This report is valid only with a valid digital signature. The digital signature may be available only under the Adobe software above version 7.0

## **TABLE OF CONTENTS**

<b>GENERAL INFORMATION.....</b>	<b>3</b>
PRODUCT DESCRIPTION FOR EQUIPMENT UNDER TEST (EUT) .....	3
OBJECTIVE .....	3
TEST METHODOLOGY .....	3
<b>SYSTEM TEST CONFIGURATION.....</b>	<b>4</b>
JUSTIFICATION .....	4
EUT EXERCISE SOFTWARE .....	4
EQUIPMENT MODIFICATIONS .....	4
SUPPORT EQUIPMENT LIST AND DETAILS .....	4
EXTERNAL I/O CABLE.....	4
BLOCK DIAGRAM OF TEST SETUP .....	5
<b>SUMMARY OF TEST RESULTS.....</b>	<b>6</b>
<b>TEST EQUIPMENT LIST .....</b>	<b>7</b>
<b>ETSI EN 300 330 V2.1.1 (2017-02) §4.3.1 - PERMITTED RANGE OF OPERATING FREQUENCIES .....</b>	<b>8</b>
APPLICABLE STANDARD .....	8
<b>ETSI EN 300 330 V2.1.1 (2017-02) §4.3.2 - OPERATING FREQUENCY RANGES.....</b>	<b>9</b>
APPLICABLE STANDARD .....	9
MEASUREMENT OF MEASUREMENT .....	9
TEST DATA .....	10
<b>ETSI EN 300 330 V2.1.1 (2017-02) §4.3.3 - MODULATION BANDWIDTH .....</b>	<b>11</b>
APPLICABLE STANDARD .....	11
METHOD OF MEASUREMENT.....	11
TEST DATA .....	12
<b>ETSI EN 300 330 V2.1.1 (2017-02) §4.3.4 - TRANSMITTER H-FIELD REQUIREMENTS.....</b>	<b>14</b>
APPLICABLE STANDARD .....	14
METHODS OF MEASUREMENT.....	15
TEST DATA .....	15
<b>ETSI EN 300 330 V2.1.1 (2017-02) §4.3.8 &amp; §4.3.9 - TRANSMITTER RADIATED SPURIOUS DOMAIN EMISSION LIMITS.....</b>	<b>17</b>
APPLICABLE STANDARD .....	17
METHODS OF MEASUREMENT (<30 MHz) .....	17
METHODS OF MEASUREMENT (≥ 30 MHz).....	18
TEST DATA .....	19
<b>ETSI EN 300 330 V2.1.1 (2017-02) §4.4.2 - RECEIVER SPURIOUS EMISSIONS.....</b>	<b>20</b>
APPLICABLE STANDARD .....	20
METHODS OF MEASUREMENT (<30 MHz) .....	20
METHODS OF MEASUREMENT (≥ 30 MHz).....	21
TEST DATA .....	22
<b>EXHIBIT A - EUT PHOTOGRAPHS.....</b>	<b>23</b>
<b>EXHIBIT B - TEST SETUP PHOTOGRAPHS .....</b>	<b>24</b>
RADIATED SPURIOUS EMISSIONS TEST (BELOW 30MHz) .....	24
RADIATED SPURIOUS EMISSIONS TEST (ABOVE 30MHz) .....	24

## GENERAL INFORMATION

### Product Description for Equipment under Test (EUT)

Product	Smartphone
Tested Model	KINGKONG 7
Trade mark	CUBOT
Frequency Range	NFC:13.56MHz
Transmit H-Field	NFC:-1.24dB $\mu$ A/m @ 10m
Modulation Technique	NFC:ASK
Voltage Range	DC 3.85V from battery or DC 5V from adapter
Date of Test	2021-06-08 to 2021-06-17
Sample serial number	SZ1210506-15265E-RF-S1
Received date	2021-05-06
Sample/EUT Status	Good condition
Normal/Extreme Condition	N.V.: Nominal Voltage: 3.85V <sub>DC</sub> L.V.: Low Voltage 3.6 V <sub>DC</sub> ; L.T.: Low Temperature 0°C N.V.: Normal Voltage 4.2V <sub>DC</sub> ; N.T.: Normal Temperature +25°C H.V.: High Voltage 4.4V <sub>DC</sub> ; H.T.: High Temperature +40°C The extreme condition was declared by the manufacture
Adapter 1 information	Model: HJ-0502000W2-EU Input: AC 100-240V, 50/60Hz, 0.3A Output: DC 5V, 2.0A
Adapter 2 information	Model: HJ-0502000-UK Input: AC 100-240V, 50/60Hz, 0.3A Output: DC 5V, 2.0A

### Objective

This report is prepared on behalf of *Shenzhen Huaqifurui Technology Co., Ltd.* in accordance with ETSI EN 300 330 V2.1.1 (2017-02), 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.

The objective is to determine the compliance of EUT with ETSI EN 300 330 V2.1.1 (2017-02).

### Test Methodology

All measurements contained in this report were conducted with ETSI EN 300 330.

Item		Expanded Measurement uncertainty
Radiated emission	30MHz-1GHz	4.28 dB ( $k=2$ , 95% level of confidence)

*Note: The extended uncertainty given in this report is obtained by combining the standard uncertainty times the coverage factor K with the 95% confidence interval. Otherwise required by the applicant or Product Regulations, Decision Rule in this report did not consider the uncertainty.*

---

## SYSTEM TEST CONFIGURATION

---

### Justification

The system was configured for testing in a typical fashion (as normally used by a typical user).

### EUT Exercise Software

No exercise software was used.

### Equipment Modifications

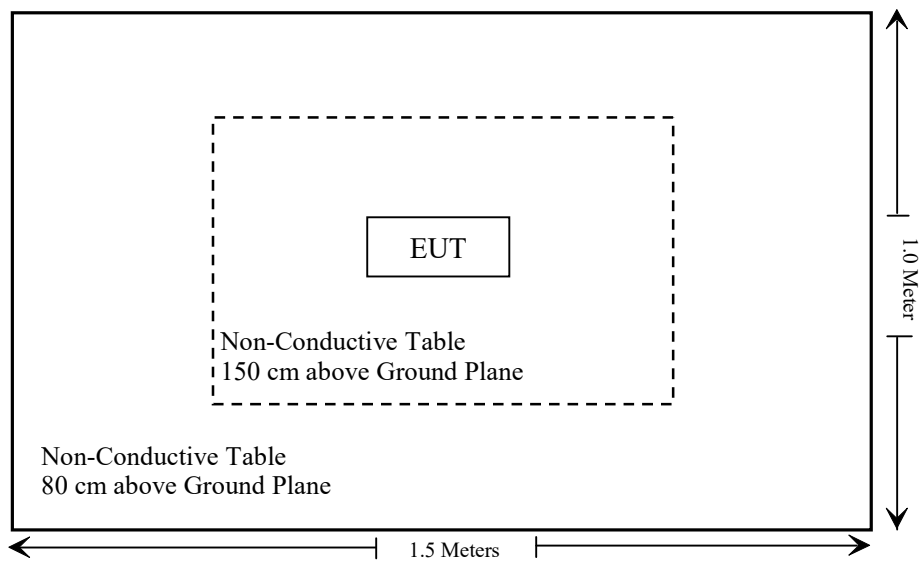
No modifications were made to the EUT tested

### Support Equipment List and Details

Manufacturer	Description	Model	Serial Number
/	/	/	/

### External I/O Cable

Cable Description	Length (m)	From Port	To
/	/	/	/

**Block Diagram of Test Setup**

## SUMMARY OF TEST RESULTS

### ETSI EN 300 330 V2.1.1 (2017-02)

EN 300 330 V2.1.1 Rules	Description of Test	Result
§4.3.1	Permitted range of operating frequencies	Compliance
§4.3.2	Operating frequency ranges	Compliance
§4.3.3	Modulation bandwidth	Compliance
§4.3.4	Transmitter H-field requirements	Compliance
§4.3.5	Transmitter RF carrier current	Not Applicable
§4.3.6	Transmitter radiated E-field	Not Applicable
§4.3.7	Transmitter conducted spurious emissions	Not Applicable
§4.3.8	Transmitter radiated spurious domain emission limits < 30 MHz	Compliance
§4.3.9	Transmitter radiated spurious domain emission limits > 30 MHz	Compliance
§4.3.10	Transmitter Frequency stability	Not Applicable
§4.4.2	Receiver spurious emissions	Compliance
§4.4.3	Adjacent channel selectivity	Not Applicable
§4.4.4	Receiver blocking or desensitization	Not Applicable

Note: This equipment has a NFC function as Product Class 1.

**TEST EQUIPMENT LIST**

Manufacturer	Description	Model	Serial Number	Calibration Date	Calibration Due Date
Rohde& Schwarz	Test Receiver	ESR	101817	2020/12/24	2021/12/23
Schwarzbeck	Bilog Antenna	VULB9163	9163-323	2020/01/05	2023/01/04
Schwarzbeck	LOOP Antenna	FMZB1516	1516131	2020/01/05	2023/01/04
SONOMA INSTRUMENT	Amplifier	310 N	186131	2020/12/25	2021/12/24
Anritsu Corp	50 Coaxial Switch	MP59B	6100237248	2020/12/25	2021/12/24
RF Coaxial Cable	Schwarzbeck	N-5m	No.1	2020/12/25	2021/12/24
RF Coaxial Cable	Schwarzbeck	N-1m	No.6	2020/12/25	2021/12/24
RF Coaxial Cable	SUHNER	N-6m	No.10	2020/12/25	2021/12/24
RF Coaxial Cable	SUHNER	N-0.5m	No.15	2020/12/25	2021/12/24
Radiated Emission Test Software: EZ_EMV V 1.1.4.2					

\* **Statement of Traceability:** Shenzhen Accurate Technology Co., Ltd. attests that all calibrations have been performed in accordance to requirements that traceable to National Primary Standards and International System of Units (SI).

## **ETSI EN 300 330 V2.1.1 (2017-02) §4.3.1 - PERMITTED RANGE OF OPERATING FREQUENCIES**

---

### **Applicable Standard**

According to ETSI EN 300 330 V2.1.1 (2017-02) §4.3.1, the permitted range of operating frequencies is the frequency range over which the equipment is authorized to operate.

The permitted range of operating frequencies for intentional emissions shall be entirely within the frequency bands in table 1.

The permitted range of operating frequencies used by the EUT shall be declared by the manufacturer. The operating frequency range(s) will be tested considered under in clause 4.3.2.

**Test result:** Compliance. The manufacturer declared the operating frequency is 13.56MHz.



## ETSI EN 300 330 V2.1.1 (2017-02) §4.3.2 - OPERATING FREQUENCY RANGES

### Applicable Standard

According to ETSI EN 300 330 V2.1.1 (2017-02) §4.3.2, the operating frequency range (OFR) is the frequency range over which the EUT is transmitting. The operating frequency range of the EUT is determined by the lowest ( $f_L$ ) and highest frequency ( $f_H$ ) as occupied by the power envelope.

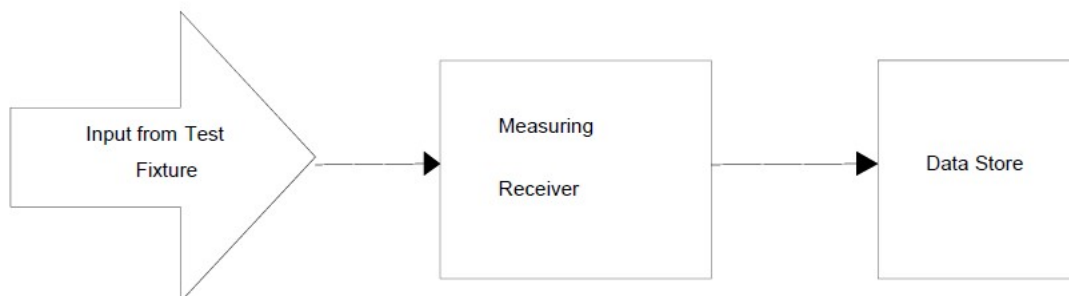
With the centre frequency of the OFR as:  $f_c = (f_H + f_L)/2$ .

An EUT could have more than one operating frequency range.

The operating frequency ranges for intentional emissions shall be entirely within the frequency bands in table 1.

### Measurement of measurement

The measuring receiver may be a spectrum analyser, oscilloscope, selective power meter or any measuring receiver which is appropriate to perform the intended measurement of the EUT.



**Figure 1: Test set-up for measurement of the operating frequencies**

OFR measurement with spectrum analyser:

The measurement antenna shall be placed at one point of the setup up. Alternatively, a current probe could be used.

A spectrum analyser with the following settings is used as measuring receiver in the test set-up:

Start frequency:	lower than the lower edge of the permitted frequency range.
Stop frequency:	higher than the upper edge of the permitted frequency range.
Resolution Bandwidth:	see table 11.
Video Bandwidth:	$\geq$ Resolution Bandwidth.
Detector mode:	RMS.
Display mode:	Maxhold.

The 99 % OBW function shall be used to determine the operating frequency range:

$f_H$  is determined.  $f_H$  is the frequency of the upper marker resulting from the OFR.

$f_L$  is determined.  $f_L$  is the frequency of the lower marker resulting from the OFR.

$f_c$  is the centre frequency.  $f_c = (f_H + f_L)/2$ .

**Test Data****Environmental Conditions**

<b>Temperature:</b>	25 °C
<b>Relative Humidity:</b>	50 %
<b>ATM Pressure:</b>	101.0 kPa

*The testing was performed by Black Ding on 2021-06-17.*

*Test Mode: Transmitting*

Voltage Supply	Temperature	$f_L$ (MHz)	$f_H$ (MHz)	$(f_H+f_L)/2$ (MHz)	Limit (MHz)
L.V.	L.T.	13.559626	13.560331	13.55998	Within 13.553 to 13.567
	N.T.	13.559635	13.560329	13.55998	
	H.T.	13.559614	13.560327	13.55997	
N.V.	L.T.	13.559612	13.560335	13.55997	
	N.T.	13.559630	13.560340	13.55999	
	H.T.	13.559609	13.560328	13.55997	
H.V.	L.T.	13.559634	13.560342	13.55999	
	N.T.	13.559633	13.560332	13.55998	
	H.T.	13.559625	13.560331	13.55998	

**Test result:** Compliance

---

## ETSI EN 300 330 V2.1.1 (2017-02) §4.3.3 - MODULATION BANDWIDTH

---

### Applicable Standard

According to ETSI EN 300 330 V2.1.1 (2017-02) §4.3.3, the modulation bandwidth contains all associated side bands above the following level:

- a) For carrier frequencies below 135 kHz:
  - 23 dB below the carrier, for RFID within the transmitter emission boundary of figure I.1, and for RFID and EAS systems within the transmitter mask of figures I.2, I.3 and I.4, see CISPR 16-1-4 [2] or the appropriate spurious limit as defined in clauses 4.3.7, 4.3.8, 4.3.9.
- b) For carrier frequencies in the range 135 kHz to 30 MHz:
  - 15 dB below the carrier or the appropriate spurious limit as defined in clauses 4.3.7, 4.3.8, 4.3.9.

The modulation bandwidth shall be within the assigned frequency band see table 1 or  $\pm 7,5$  % of the carrier frequency whichever is the smallest. For RFID and EAS Systems, the modulation bandwidth shall be within the transmitter emission boundary of figures I.1, I.2, I.3 and I.4.

For further information, see CEPT/ERC/REC 70-03 [i.1] or ERC/ECC/CEPT Decisions as implemented through National Radio Interfaces (NRI) and additional NRI as relevant.

### Method of Measurement

The transmitter shall be connected to an artificial antenna or if the transmitter has an integral antenna, a test fixture shall be used (see clause 5.10). The RF output of the equipment shall be connected to a spectrum analyser via a 50  $\Omega$  variable attenuator.

The transmitter shall be operated at the nominal carrier power or field strength measured under normal test conditions in clause 4.3.4. The attenuator shall be adjusted to an appropriate level displayed at the spectrum analyser screen.

The transmitter shall be modulated with standard test modulation (see clauses 5.8.1 and 5.8.2). If the equipment cannot be modulated externally, the internal modulation shall be used.

For transmitters using a continuous wideband swept carrier the measurement shall be made with the sweep on.

The output of the transmitter, with or without test fixture, shall be measured by using a spectrum analyser with a resolution bandwidth appropriate to accept all major side bands. The power level calibration of the spectrum analyser shall then be related to the power level or field strength measured in clause 4.3.3. The calculation will be used to calculate the absolute level of the sideband power.

The test laboratory shall ensure that the spectrum analyser's span is sufficiently wide enough to ensure that the carrier and all its major side bands are captured.

The frequency of the upper and lower points, where the displayed power envelope of the modulation including frequency drift is equal to the appropriate level defined in clause 4.3.3 is recorded as the modulation bandwidth.

**Test Data****Environmental Conditions**

<b>Temperature:</b>	25 °C
<b>Relative Humidity:</b>	50 %
<b>ATM Pressure:</b>	101.0 kPa

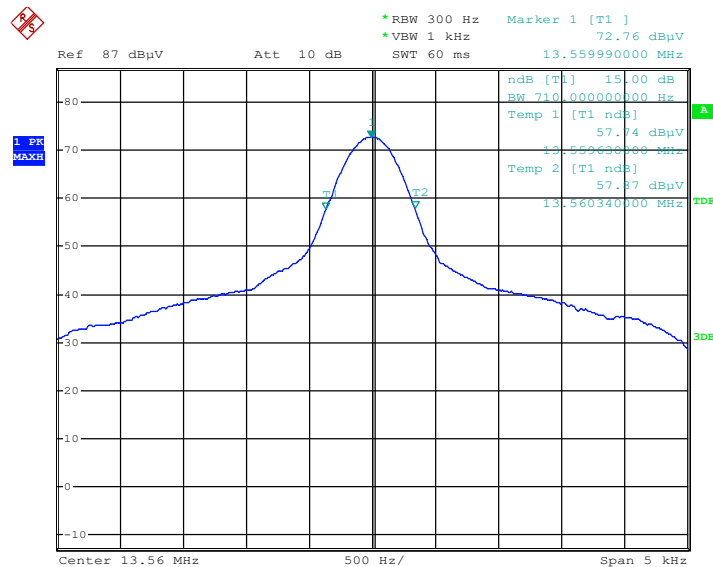
The testing was performed by Black Ding on 2021-06-17.

Test Mode: Transmitting

Voltage Supply	Temperature	f <sub>L</sub> at Low Channel (MHz)	f <sub>H</sub> at High Channel (MHz)	Limit (MHz)
N.V.	N.T.	13.559630	13.560340	Within 13.553 to 13.567

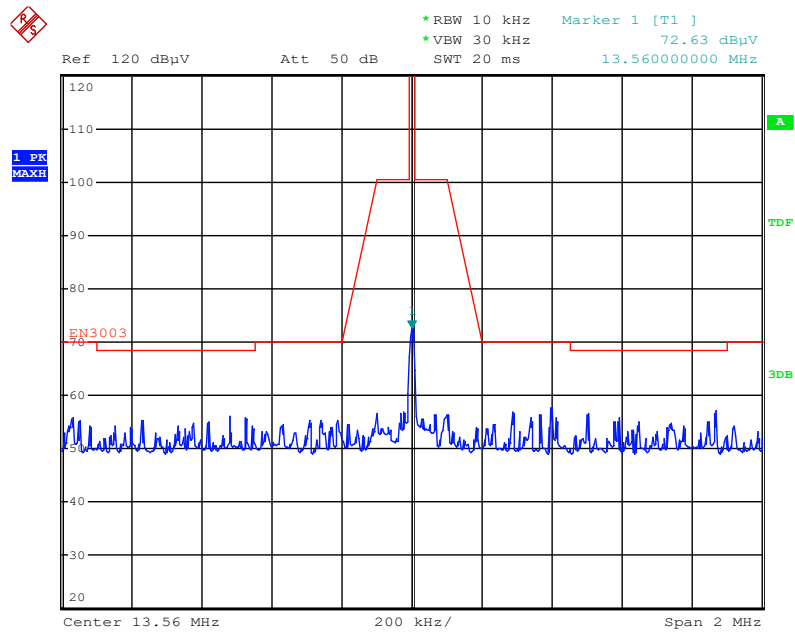
Please refer to following plot for normal condition:

15 dB Modulation Bandwidth



Date: 17.JUN.2021 10:57:44

## Mask



Date: 17.JUN.2021 12:50:31

**Test result:** Compliance

## ETSI EN 300 330 V2.1.1 (2017-02) §4.3.4 - TRANSMITTER H-FIELD REQUIREMENTS

### Applicable Standard

According to ETSI EN 300 330 V2.1.1 (2017-02) §4.3.4, in the case of a transmitter with an integral or dedicated antenna, the radiated H-field is defined in the direction of maximum field strength under specified conditions of measurement.

The frequency ranges and limits of the present document are shown in table 2. The limits are based on the European Commission Decision for SRDs [i.10], CEPT/ERC/REC 70-03 [i.1].

Table 2: H-field limits at 10 m

Frequency range (MHz)	H-field strength limit ( $H_f$ ) dB $\mu$ A/m at 10 m or specified in mW e.r.p.
$0,009 \leq f < 0,090$	72 descending 3 dB/oct above 0,03 MHz or according to note 1 (see note 5)
$0,09 \leq f < 0,119$	42
$0,119 \leq f < 0,135$	66 descending 3 dB/oct above 0,119 MHz or according to note 1 (see notes 3 and 5)
$0,135 \leq f < 0,140$	42
$0,140 \leq f < 0,1485$	37,7
$0,1485 \leq f < 30$	-5 (see note 4)
$0,315 \leq f < 0,600$	-5
$3,155 \leq f < 3,400$	13,5
4,234	9 (see note 9)
4,516	7
$7,400 \leq f < 8,800$	9
$10,2 \leq f < 11,00$	9
$12,5 \leq f \leq 20$	-7
$6,765 \leq f \leq 6,795$	42 (see notes 3 and 7)
$26,957 \leq f \leq 27,283$	42 (see note 3)
$13,410 \leq f \leq 13,553$ , $13,567 \leq f \leq 13,710$	9 (see note 6)
$13,110 \leq f \leq 13,410$ , $13,710 \leq f \leq 14,010$	-3,5 (see note 6)
$12,660 \leq f \leq 13,110$ , $14,010 \leq f \leq 14,460$	-10 (see note 6)
$11,810 \leq f \leq 12,660$ , $14,460 \leq f \leq 15,310$	-16 (see note 6)
$13,460 \leq f \leq 13,553$ , $13,567 \leq f \leq 13,660$	27 (see note 6)
$13,360 \leq f \leq 13,460$ , $13,660 \leq f \leq 13,760$	Linear transition from 27 to -3,5 (see note 6)
$13,110 \leq f \leq 13,360$ , $13,760 \leq f \leq 14,010$	-3,5 (see note 6)
$12,660 \leq f \leq 13,110$ , $14,010 \leq f \leq 14,460$	-5 (see note 6)
$13,553 \leq f \leq 13,567$	42 (see note 3) or 60 (see notes 2 and 3)
27,095	42

Frequency range (MHz)	H-field strength limit ( $H_f$ ) dB $\mu$ A/m at 10 m or specified in mW e.r.p.
26,995, 27,045, 27,095, 27,145, 27,195 (see note 8)	100 mW
NOTE 1: For the frequency ranges 9 kHz to 135 kHz, the following additional restrictions apply to limits above 42 dB $\mu$ A/m: - for loop coil antennas with an area $\geq 0,16 \text{ m}^2$ this table and table B.1 with the antenna limitations apply; - for loop coil antennas with an area between $0,05 \text{ m}^2$ and $0,16 \text{ m}^2$ table B.1 applies with a correction factor. The limit is: table value + $10 \times \log(\text{area}/0,16 \text{ m}^2)$ ; - for loop coil antennas with an area $< 0,05 \text{ m}^2$ the limit is 10 dB below table B.1. NOTE 2: For RFID (incl. NFC) and EAS applications only. NOTE 3: Spectrum mask limit, see annex I. NOTE 4: For further information see annex G. NOTE 5: Limit is 42 dB $\mu$ A/m for the following spot frequencies: 60 kHz $\pm$ 250 Hz, 66,6 kHz $\pm$ 750 Hz, 75 kHz $\pm$ 250 Hz, 77,5 kHz $\pm$ 250 Hz, and 129,1 kHz $\pm$ 500 Hz. NOTE 6: Only in conjunction with spectrum mask, see annex I. NOTE 7: The frequency range 6,765 MHz - 6,795 MHz is not a harmonised ISM frequency band according article 5.138 of the ITU Radio Regulations [i.13]. NOTE 8: Center frequencies for channelized systems by using $\leq 10 \text{ kHz}$ bandwidth. NOTE 9: The limit is valid in the range 984 kHz - 7 484 kHz for Transmitting only on receipt of a Balise/Eurobalise tele-powering signal from a train.	

For calculation rules for limits at other measurement distances, see annex H.

## Methods of measurement

The measurements of the transmitter radiated H-field shall be made on an open field test site as specified in clause C.1.3. Any measured values shall be at least 6 dB above the ambient noise level.

The H-field produced by the equipment shall be measured at standard distance of 10 m. Where this is not practical, e.g. due to physical size of the equipment including the antenna or with use of special field cancelling antenna, then other distances may be used. When another distance is used, the distance used and the field strength value measured shall be stated in the test report. In this case, the measured value at actual test distance shall be extrapolated to 10 m according to annex H and these calculations shall be stated in the test report.

The H-field is measured with a shielded loop antenna connected to a measurement receiver. The measuring bandwidth and detector type of the measurement receiver shall be in accordance with clause 5.12.

The equipment under test shall operate where possible, with modulation. Where this is not possible, it shall be stated in the test report.

For transmitters using a continuous wideband swept carrier, the measurement shall be made with the sweep off. When it is not possible to turn the sweep off the measurements shall be made with the sweep on and this shall be stated in the test report.

For measuring equipment calibrated in dB $\mu$ V/m, the reading should be reduced by 51,5dB to be converted to dB $\mu$ A/m.

## Test Data

### Environmental Conditions

<b>Temperature:</b>	25 °C
<b>Relative Humidity:</b>	50 %
<b>ATM Pressure:</b>	101.0 kPa

The testing was performed by Black Ding on 2021-06-08.

*Test Mode: Transmitting*

Test Condition					Result
Normal	HTHV	LTLV	HTLV	LTHV	Compliance

Normal condition (worst case) as below:

Indicated		Table Angle Degree	Antenna Height (m)	Detector	Factor	Corrected Amplitude (dBμV/m) @3m	Corrected Amplitude (dBμA/m) @3m	Corrected Amplitude (dBμA/m) @10m	EN 300 330		
Freq. (MHz)	Maximum Reading (dBμV) @3m								Limit		Result
									(dBμA/m) @10m	(dBμA/m) @3m	
Transmitting											
13.56	51.76	21	1.5	QP	21.0	72.76	21.26	-1.24	60.0	82.5	Pass

**Note:**

1. According to ETSI EN 300 330, for measuring equipment calibrated in dBμV/m, the reading should be reduced by 51.5 dB to be converted to dBμA/m.
2. The tested distance between EUT and receiver, is 3 meters and according to annex H and these calculations shall be stated in the test report. The calculated Limit at 3 m distance as,  $H_{3m} = H_{10m} + C_3$ ;
3. Correction Factor=Ant.Factor+Cable Loss-Pre-Amp. Gain
4. All of the modes have been tested, just worst case recorded in the report.

**Test result:** Compliance



## ETSI EN 300 330 V2.1.1 (2017-02) §4.3.8 & §4.3.9 - TRANSMITTER RADIATED SPURIOUS DOMAIN EMISSION LIMITS

### Applicable Standard

According to ETSI EN 300 330 V2.1.1 (2017-02) §4.3.8 & §4.3.9, spurious domain emission limits are limits on emissions at frequencies other than those of the carrier and sidebands associated (clauses 4.3.2 and 4.3.3) with normal test modulation (clause 5.8).

The radiated field strength of the spurious domain emissions below 30 MHz shall not exceed the generated H-field dB $\mu$ A/m at 10 m given in table 5.

Table 5

State	Frequency 9 kHz $\leq f < 10$ MHz	Frequency 10 MHz $\leq f < 30$ MHz
Operating	27 dB $\mu$ A/m at 9 kHz descending 3 dB/oct	-3,5 dB $\mu$ A/m
Standby	5,5 dB $\mu$ A/m at 9 kHz descending 3 dB/oct	-25 dB $\mu$ A/m

Above 30MHz, The power of any radiated emission shall not exceed the values given in table 6.

Table 6

State	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

### Methods of measurement (<30 MHz)

The field strength shall be measured for frequencies below 30MHz. The equipment under test shall be measured at a distance of 10 m on an outdoor test site. The test antenna shall be a calibrated shielded magnetic field antenna. The equipment under test and test antenna shall be arranged as stated in clause C.1.

For Product Class 3 the transmitter antenna connector of the equipment under test shall be connected to an artificial antenna (see clause 5.9) and the output connector terminated.

The equipment under test shall be switched on with normal modulation. The characteristics of the modulation signal used shall be stated on the test report. The measuring receiver shall be tuned over the frequency range 9 kHz to 30MHz, except for the frequency band on which the transmitter is intended to operate.

At each frequency at which a relevant spurious signal is detected the equipment under test and the test antenna shall be rotated until maximum field strength is indicated on the measuring receiver. This level shall be noted.

If the transmitter can be operated in the standby mode, then the measurements shall be repeated in the standby mode.

For measuring equipment calibrated in dB $\mu$ V/m, the reading should be reduced by 51,5dB to be converted to dB $\mu$ A/m.

**Methods of measurement ( $\geq 30$  MHz)**

For classes 1, 2 and 4 an appropriate test site selected from annex C shall be used. The equipment shall be placed at the specified height on a non-conducting support and in the position closest to normal use as declared by the manufacturer.

The test antenna shall be oriented for vertical polarization. The output of the test antenna shall be connected to a measuring receiver.

The transmitter shall be switched on with normal modulation, and the measuring receiver shall be tuned over the frequency range 30 MHz to 1000MHz.

At each frequency at which a relevant spurious component is detected, the test antenna shall be raised and lowered through the specified range of heights until a maximum signal level is detected on the measuring receiver.

The transmitter shall then be rotated through  $360^\circ$  in the horizontal plane, until the maximum signal level is detected by the measuring receiver.

The maximum signal level detected by the measuring receiver shall be noted.

The substitution antenna shall be oriented for vertical polarization and calibrated for the frequency of the spurious component detected.

The frequency of the calibrated signal generator shall be set to the frequency of the spurious component detected. The input attenuator setting of the measuring receiver shall be adjusted in order to increase the sensitivity of the measuring receiver, if necessary.

The test antenna shall be raised and lowered through the specified range of heights to ensure that the maximum signal is received.

When a test site according to clause C.1.1 is used, there is no need to vary the height of the antenna. The input signal to the substitution antenna shall be adjusted until an equal or a known related level to that detected from the transmitter is obtained on the measuring receiver.

The input signal to the substitution antenna shall be recorded as a power level and corrected for any change of input attenuator setting of the measuring receiver.

The measure of the effective radiated power of the spurious components is the larger of the two power levels recorded for each spurious component at the input to the substitution antenna, corrected for the gain of the substitution antenna if necessary.

If an unmodulated carrier cannot be obtained then the measurements shall be made with the transmitter modulated by the normal test signal (see clause 5.8.2) in which case this fact shall be recorded in the test report.

If standby mode is available, the measurements shall be repeated in that mode.

**Test Data****Environmental Conditions**

<b>Temperature:</b>	25 °C
<b>Relative Humidity:</b>	50 %
<b>ATM Pressure:</b>	101.0 kPa

The testing was performed by Black Ding on 2021-06-08.

Below 30 MHz:

Test Condition					Result
Normal	HTHV	LTLV	HTLV	LTHV	Compliance

Normal condition (worst case) as below:

Indicated		Table Angle Degree	Antenna Height (m)	Detector	Factor	Corrected Amplitude (dBµV/m) @3m	Corrected Amplitude (dBµA/m) @3m	EN 300 330		
Freq. (MHz)	Maximum Reading (dBµV) @3m							Limit		Result
								(dBµA/m) @10m	(dBµA/m) @3m	
Transmitting										
0.957	35.39	128	1.5	QP	20.3	55.69	4.19	6.8	37.9	Pass
26.13	24.47	354	1.5	QP	21.8	46.27	-5.23	-3.5	11.0	Pass

Above 30 MHz:

Frequency (MHz)	Receiver Reading (dBm)	Turntable Degree	Rx Antenna		Substituted Factor (dB)	Absolute Level (dBm)	Limit (dBm)	Margin (dB)
			Height (m)	Polar (H/V)				
Transmitting								
182.14	-63.26	102	1.20	H	-5.53	-68.79	-54.00	14.79
183.19	-66.24	288	1.00	V	-2.34	-68.58	-54.00	14.58

Note: All of the modes have been tested, just worst case recorded in the report.

**Test result:** Compliance

## ETSI EN 300 330 V2.1.1 (2017-02) §4.4.2 - RECEIVER SPURIOUS EMISSIONS

### Applicable Standard

According to ETSI EN 300 330 V2.1.1 (2017-02) §4.4.2, Spurious radiation from receivers are emissions radiated from the antenna, the chassis and case of the receiver. It is specified as the radiated power of a discrete signal.

The spurious components below 30 MHz shall not exceed the generated H-field dB $\mu$ A/m values at 10 m according to table 8.

**Table 8: Receiver spurious radiation limits**

Frequency $9\text{ kHz} \leq f < 10\text{ MHz}$	Frequency $10\text{ MHz} \leq f < 30\text{ MHz}$
5,5 dB $\mu$ A/m at 9 kHz descending 3 dB/oct	-25 dB $\mu$ A/m

The spurious components above 30 MHz measured values shall not exceed 2nW.

### Methods of measurement (<30 MHz)

The field strength shall be measured for frequencies below 30MHz. The equipment under test shall be measured at a distance of 10 m on an outdoor test site. The test antenna shall be a calibrated shielded magnetic field antenna. The equipment under test and test antenna shall be arranged as stated in clause C.1.

For Product Class 3 the transmitter antenna connector of the equipment under test shall be connected to an artificial antenna (see clause 5.9) and the output connector terminated.

The equipment under test shall be switched on with normal modulation. The characteristics of the modulation signal used shall be stated on the test report. The measuring receiver shall be tuned over the frequency range 9 kHz to 30MHz, except for the frequency band on which the transmitter is intended to operate.

At each frequency at which a relevant spurious signal is detected the equipment under test and the test antenna shall be rotated until maximum field strength is indicated on the measuring receiver. This level shall be noted.

For measuring equipment calibrated in dB $\mu$ V/m, the reading should be reduced by 51,5dB to be converted to dB $\mu$ A/m.

**Methods of measurement ( $\geq 30$  MHz)**

For classes 1, 2 and 4 an appropriate test site selected from annex C shall be used. The equipment shall be placed at the specified height on a non-conducting support and in the position closest to normal use as declared by the manufacturer.

The test antenna shall be oriented for vertical polarization. The output of the test antenna shall be connected to a measuring receiver.

The transmitter shall be switched on with normal modulation, and the measuring receiver shall be tuned over the frequency range 30 MHz to 1000MHz.

At each frequency at which a relevant spurious component is detected, the test antenna shall be raised and lowered through the specified range of heights until a maximum signal level is detected on the measuring receiver.

The transmitter shall then be rotated through  $360^\circ$  in the horizontal plane, until the maximum signal level is detected by the measuring receiver.

The maximum signal level detected by the measuring receiver shall be noted.

The substitution antenna shall be oriented for vertical polarization and calibrated for the frequency of the spurious component detected.

The frequency of the calibrated signal generator shall be set to the frequency of the spurious component detected. The input attenuator setting of the measuring receiver shall be adjusted in order to increase the sensitivity of the measuring receiver, if necessary.

The test antenna shall be raised and lowered through the specified range of heights to ensure that the maximum signal is received.

When a test site according to clause C.1.1 is used, there is no need to vary the height of the antenna. The input signal to the substitution antenna shall be adjusted until an equal or a known related level to that detected from the transmitter is obtained on the measuring receiver.

The input signal to the substitution antenna shall be recorded as a power level and corrected for any change of input attenuator setting of the measuring receiver.

The measure of the effective radiated power of the spurious components is the larger of the two power levels recorded for each spurious component at the input to the substitution antenna, corrected for the gain of the substitution antenna if necessary.

If an unmodulated carrier cannot be obtained then the measurements shall be made with the transmitter modulated by the normal test signal (see clause 5.8.2) in which case this fact shall be recorded in the test report.

**Test Data****Environmental Conditions**

<b>Temperature:</b>	25 °C
<b>Relative Humidity:</b>	50 %
<b>ATM Pressure:</b>	101.0 kPa

The testing was performed by Black Ding on 2021-06-08.

Test Mode: Receiving

Below 30 MHz:

Test Condition					Result
Normal	HTHV	LTLV	HTLV	LTHV	Compliance

Normal condition (worst case) as below:

Indicated		Table Angle Degree	Antenna Height (m)	Detector	Factor	Corrected Amplitude (dBμV/m) @3m	Corrected Amplitude (dBμA/m) @3m	EN 300 330		
Freq. (MHz)	Maximum Reading (dBμV) @3m							Limit		Result
								(dBμA/m) @10m	(dBμA/m) @3m	
0.803	30.92	355	1.5	QP	20.3	51.22	-0.28	-13.94	17.16	Pass
19.26	18.09	202	1.5	QP	21.2	39.29	-12.21	-25	-7.17	Pass

Above 30 MHz:

Frequency (MHz)	Receiver Reading (dBm)	Turntable Degree	Rx Antenna		Substituted Factor (dB)	Absolute Level (dBm)	Limit (dBm)	Margin (dB)
			Height (m)	Polar (H/V)				
182.14	-63.19	164	1.10	H	-5.53	-68.72	-57.00	11.72
31.40	-61.32	77	1.10	V	-4.62	-65.94	-57.00	8.94

Note: All of the modes have been tested, just worst case recorded in the report.

**Test result:** Compliance

## **EXHIBIT A - EUT PHOTOGRAPHS**

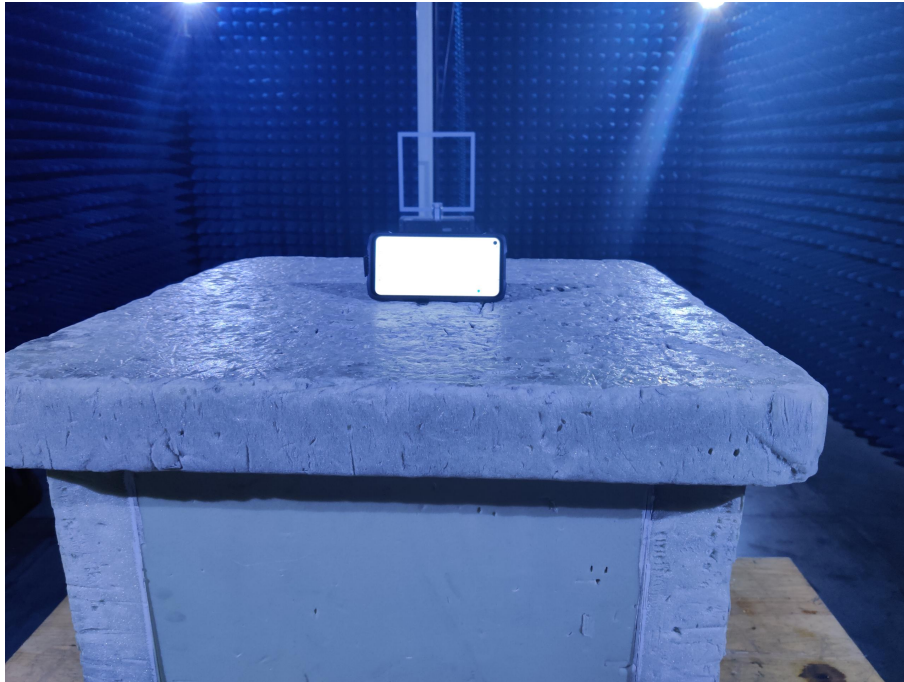
---

Please refer to the Attachment.

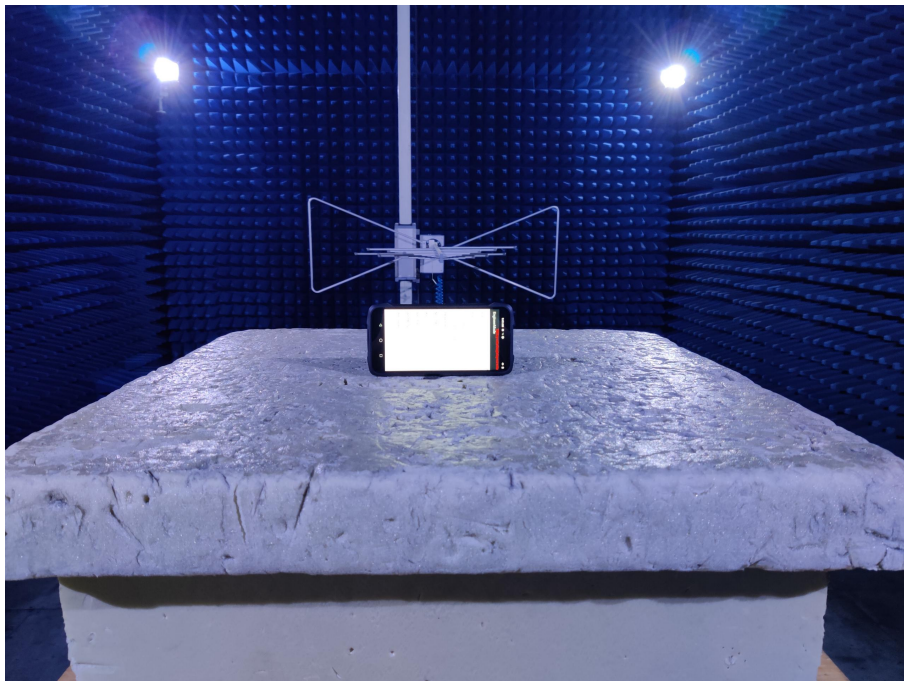


## EXHIBIT B - TEST SETUP PHOTOGRAPHS

### Radiated Spurious Emissions Test (Below 30MHz)



### Radiated Spurious Emissions Test (Above 30MHz)



\*\*\*\*\*END OF REPORT\*\*\*\*\*