

Approved by:

JianYan Testing Group Shenzhen Co., Ltd.

Report No: JYTSZ-R12-2200080

15 Feb., 2022

CE RF Test Report

Applicant: Nebra Ltd Unit 4 Bells Yew Green Business Court, Bells Yew Green, Address of Applicant: Tunbridge Wells, East Sussex, TN3 9BJ **Equipment Under Test (EUT) Product Name:** Nebra Indoor LoRa Gateway ROCK Pi 4 Version / Nebra Indoor Helium Hotspot ROCK Pi 4 Version NEBHNT-HHRK4-433, NEBHNT-HHRK4-470, NEBHNT-Model No.: HHRK4-868, NEBHNT-HHRK4-915, NEBHNT-HHRK4-433-2, NEBHNT-HHRK4-470-2, NEBHNT-HHRK4-868-2, NEBHNT-HHRK4-915-2. NEBHNT-HHRK4-433-3. NEBHNT-HHRK4-470-3, NEBHNT-HHRK4-868-3, NEBHNT-HHRK4-915-3, NEBHNT-HHRK4-433-3, NEBHNT-HHRK4-470-3, NEBHNT-HHRK4-868-3, NEBHNT-HHRK4-915-3 Applicable standards: ETSI EN 300 220-1 V3.1.1 (2017-02) ETSI EN 300 220-2 V3.2.1 (2018-06) Date of sample receipt: 05 Jan., 2022 Date of Test: 06 Jan., to 14 Feb., 2022 Date of report issue: 15 Feb., 2022 Test Result: PASS Tested by: 15 Feb., 2022 Date: Test Engineer Reviewed by: 15 Feb., 2022 Date:

This equipment has been shown to be capable of compliance with the applicable technical standards as indicated in the measurement report and was tested in accordance with the measurement procedures specified in above the application standard version. Test results reported herein relate only to the item(s) tested.

Date:

Project Engineer

Manager

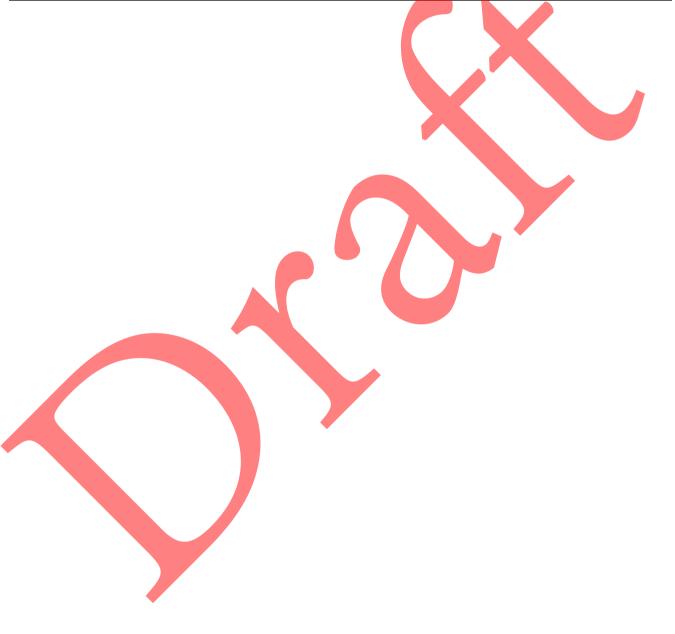
This document cannot be reproduced except in full, without prior written approval of the Company. Any unauthorized alteration, forgery or falsification of the content or appearance of this document is unlawful and offenders may be prosecuted to the fullest extent of the law. Unless otherwise stated the results shown in this test report refer only to the sample(s) tested and such sample(s) are retained for 90 days only.





2 Version

Version No.	Date	Description
00	15 Feb., 2022	Original







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4 Test Summary

Test Items	Test Requirement	Test method	Result			
Transmitter Part						
Operating frequency	EN 300 220-2	EN 300 220-1	PASS*			
Operating frequency	Clause 4.2.1	Clause 5.1.2	PASS			
Effective Radiated Power	EN 300 220-2	EN 300 220-1	PASS*			
Ellective Natiated Fower	Clause 4.3.1	Clause 5.2.2	PASS			
Maximum e.r.p. spectral density	EN 300 220-2	EN 300 220-1	N/A			
waxiindin e.r.p. spectral density	Clause 4.3.2	Clause 5.3.2	IN/A			
Duty Cycle	EN 300 220-2	EN 300 220-1	PASS*			
Duty Cycle	Clause 4.3.3	Clause 5.4.2	PAGG			
Occupied Bandwidth	EN 300 220-2	EN 300 220-1	PASS*			
Occupied Baridwidth	Clause 4.3.4	Clause 5.6.3	PAGG			
Tx Out of Band Emissions	EN 300 220-2	EN 300 220-1	PASS*			
TX Out of Band Emissions	Clause 4.3.5	Clause 5.8.3	PASS			
Transient newer	EN 300 220-2	EN 300 220-1	PASS*			
Transient power	Clause 4.3.6	Clause 5.10.3	PASS			
Adjacent Channel Dower	EN 300 220-2	EN 300 220-1	N/A			
Adjacent Channel Power	Clause 4.3.7	Clause 5.11.3	IN/A			
TX behaviour under Low Voltage	EN 300 220-2	EN 300 220-1	PASS*			
Conditions	Clause 4.3.8	Clause 5.12.3	PASS			
Adoptivo Power Central	EN 300 220 <mark>-2</mark>	EN 300 220-1	N/A			
Adaptive Power Control	Clause 4.3.9	Clause 5.13.3	IN/A			
EUSS aguinment	EN 300 220-2	EN 300 220-2	N/A			
FHSS equipment	Clause 4.3.10	Clause 4.3.10.3	IN/A			
Chart tarm babayiaur	EN 300 220-2	EN 300 220-1	NI/A			
Short term behaviour	Clause 4.3.11	Clause 5.5.2	N/A			
Unwanted emissions in the	EN 300 220-2	EN 300 220-1	DACC			
spurious domain	Clause 4.2.2	Clause 5.9.3	PASS			
	Receiver Part					
DV complified	EN 300 220-2	EN 300 220-1	N1/A			
RX sensitivity	Clause 4.4.1	Clause 5.14.3	N/A			
	EN 300 220-2	EN 300 220-1				
RX Blocking	Clause 4.4.2	Clause 5.18.6	PASS*			
Polites	spectrum access conform					
Clear Channel Assessment	EN 300 220-2	EN 300 220-1				
threshold	Clause 4.5.2	Clause 5.21.2.3	N/A			
Polite spectrum access timing	EN 300 220-2	EN 300 220-1	N/A			
parameters	Clause 4.5.3	Clause 5.21.2.3				
Adaptive Frequency Agility	EN 300 220-2	EN 300 220-1	N/A			
	Clause 4.5.4	Clause 5.21.4.2				

Remark:

- 1. Pass: Meet the requirement.
- 2. N/A: Not Applicable for Non-adaptive equipment.
- 3. Pass*: Please refer to the report No.: SZAWW180830005-04W issue by Shenzhen Anbotek Compliance Laboratory Limited, The module used by EUT in this report is that of Report SZAWW180830005-04W.





5 General Information

5.1 Client Information

Applicant:	Nebra Ltd
Address:	Unit 4 Bells Yew Green Business Court, Bells Yew Green, Tunbridge Wells, East Sussex, TN3 9BJ
Manufacturer/Factory:	Nebra Ltd
Address:	Unit 4 Bells Yew Green Business Court, Bells Yew Green, Tunbridge Wells, East Sussex, TN3 9BJ

5.2 General Description of E.U.T.

J.Z General Descri						
Product Name:	Nebra Indoor LoRa Gateway ROCK Pi 4 Version / Nebra Indoor Helium Hotspot ROCK Pi 4 Version					
Model No.:	NEBHNT-HHRK4-433, NEBHNT-HHRK4-470, NEBHNT-HHRK4-868, NEBHNT-HHRK4-915, NEBHNT-HHRK4-433-2, NEBHNT-HHRK4-470-2, NEBHNT-HHRK4-868-2, NEBHNT-HHRK4-915-2, NEBHNT-HHRK4-433-3, NEBHNT-HHRK4-470-3, NEBHNT-HHRK4-868-3, NEBHNT-HHRK4-915-3, NEBHNT-HHRK4-433-3, NEBHNT-HHRK4-470-3, NEBHNT-HHRK4-868-3, NEBHNT-HHRK4-915-3					
Operation Frequency:	868.1~868.5MHz					
Hardware version:	v1					
Software version:	781099d					
Modulation:	ook					
Antenna type:	External Antenna					
Antenna Gain:	3dBi					
Power supply:	DC 12.0V					
Remark:	Model no.: NEBHNT-HHRK4-433, NEBHNT-HHRK4-470, NEBHNT-HHRK4-868, NEBHNT-HHRK4-915, NEBHNT-HHRK4-433-2, NEBHNT-HHRK4-470-2, NEBHNT-HHRK4-868-2, NEBHNT-HHRK4-915-2, NEBHNT-HHRK4-433-3, NEBHNT-HHRK4-470-3, NEBHNT-HHRK4-868-3, NEBHNT-HHRK4-915-3, NEBHNT-HHRK4-433-3, NEBHNT-HHRK4-470-3, NEBHNT-HHRK4-868-3, NEBHNT-HHRK4-915-3, The difference between the models is that the LoRa Radio module used inside is different for each variant. Along with a respective antenna for each region / frequency. The -2 and -3 flags at the end of the model number relates to the specific chip part number for the main LoRa chip.					



5.3 Test mode and test environment

<u> </u>			
Test mode:			
Transmitting mode:	Keep the TX unit in transmitting mode with modulation.		
Receiving mode:	Keep the RX unit in receiving mode.		
Operating Environment	t:		
Temperature:	Normal: 15° C ~ 35° C, Extreme: -20° C ~ $+40^{\circ}$ C		
Humidity:	20 % ~ 75 % RH		
Atmospheric Pressure:	1008 mbar		
Voltage:	Normal: 230Vac, Extreme: Low 207Vac, High 253		
Voltage:	Normal: 230Vac, Extreme: Low 207Vac, High 253		

Remark:

- 1. Pre-scan the EUT stand-up position (H mode) and lie down position (E1, E2 mode) for three modes, and found the H mode worst case. The report only reflects the test data of worst mode.
- 2. "NVNT" means Normal Voltage Normal Temperature, "LVLT" means Low Voltage Low Temperature, "LVHT" means Low Voltage High Temperature, "HVLT" means High Voltage Low Temperature, "HVHT" means High Voltage High Temperature.

5.4 Description of Support Units

The EUT has been tested as an independent unit.

5.5 Measurement Uncertainty

Parameter		Expanded Uncertainty (Confidence of 95%(U = 2Uc(y)))		
Radiated Emission (30MHz ~ 1000MHz) (3m SAC)				±4.45 dB
Radiated Emission (1GHz ~ 18GHz) (3m SAC)		,		±5.34 dB

Note: All the measurement uncertainty value were shown with a coverage k=2 to indicate 95% level of confidence. The measurement data show herein meets or exceeds the CISPR measurement uncertainty values specified in CISPR 16-4-2 and can be compared directly to specified limit to determine compliance.

5.6 Additions to, deviations, or exclusions from the method

No

JianYan Testing Group Shenzhen Co., Ltd. Report Template No.: JYTSZ4b-122-C No.101, Building 8, Innovation Wisdom Port, No.155 Hongtian Road, Huangpu Community, Xinqiao Street, Bao'an District, Shenzhen, Guangdong, People's Republic of China. Tel: +86-755-23118282, Fax: +86-755-23116366





5.7 Laboratory Facility

The test facility is recognized, certified, or accredited by the following organizations:

• FCC - Designation No.: CN1211

JianYan Testing Group Shenzhen Co., Ltd. has been accredited as a testing laboratory by FCC(Federal Communications Commission). The test firm Registration No. is 727551.

● ISED - CAB identifier.: CN0021

The 3m Semi-anechoic chamber and 10m Semi-anechoic chamber of JianYan Testing Group Shenzhen Co., Ltd. has been Registered by Certification and Engineering Bureau of Industry Canada for radio equipment testing with Registration No.: 10106A-1.

• CNAS - Registration No.: CNAS L15527

JianYan Testing Group Shenzhen Co., Ltd. is accredited to ISO/IEC 17025:2017 General Requirements for the Competence of Testing and Calibration laboratories for the competence of testing. The Registration No. is CNAS L15527.

A2LA - Registration No.: 4346.01

This laboratory is accredited in accordance with the recognized International Standard ISO/IEC 17025:2017 General requirements for the competence of testing and calibration laboratories. The test scope can be found as below link: https://portal.a2la.org/scopepdf/4346-01.pdf

5.8 Laboratory Location

JianYan Testing Group Shenzhen Co., Ltd.

Address: No.101, Building 8, Innovation Wisdom Port, No.155 Hongtian Road, Huangpu Community,

Xinqiao Street, Bao'an District, Shenzhen, Guangdong, People's Republic of China.

Tel: +86-755-23118282, Fax:+86-755-23116366

Email: info-JYTee@lets.com, Website: http://jyt.lets.com

5.9 Test Instruments list

Radiated Emission(3M S	AC):				
Test Equipment	Manufacturer	Model No.	Manage No.	Cal.Date (mm-dd-yy)	Cal. Due date (mm-dd-yy)
3m SAC	ETS	9m*6m*6m	WXJ001-1	01-19-2021	01-18-2024
BiConiLog Antenna	Schwarzbeck	VULB9163	WXJ002	03-03-2021	03-02-2022
Biconical Antenna	Schwarzbeck	VUBA9117	WXJ002-1	06-20-2021	06-19-2022
Horn Antenna	Schwarzbeck	BBHA9120D	WXJ002-2	03-03-2021	03-02-2022
Horn Antenna	Schwarzbeck	BBHA9120D	WXJ002-3	06-18-2021	06-17-2022
Loop Antenna	Schwarzbeck	FMZB 1519 B	WXJ002-4	03-07-2021	03-06-2022
Pre-amplifier (30MHz ~ 1GHz)	Schwarzbeck	BBV9743B	WXG001-7	03-07-2021	03-06-2022
Pre-amplifier (1GHz ~ 18GHz)	SKET	LNPA_0118G-50	WXG001-3	03-07-2021	03-06-2022
EMI Test Receiver	Rohde & Schwarz	ESRP7	WXJ003-1	03-03-2021	03-02-2022
Spectrum Analyzer	KEYSIGHT	N9010B	WXJ004-2	10-27-2021	10-26-2022
Signal Generator	Agilent	N5173B	WXJ006-7	03-25-2021	03-24-2022
Simulated Station	Rohde & Schwarz	CMW500	WXJ008-3	06-17-2021	06-16-2022
Coaxial Cable (30MHz ~ 1GHz)	JYT	JYT3M-1G-NN-8M	WXG001-4	03-07-2021	03-06-2022
Coaxial Cable (1GHz ~ 18GHz)	JYT	JYT3M-18G-NN-8M	WXG001-5	03-07-2021	03-06-2022
Coaxial Cable (9kHz ~ 30MHz)	JYT	JYT3M-1G-BB-5M	WXG001-6	03-07-2021	03-06-2022
Band Reject Filter Group	Tonscend	JS0806-F	WXJ089	N	/A
Test Software	Tonscend	TS+		Version: 3.0.0.1	

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6 Technical requirements specifications

6.1 Unwanted emissions in the spurious domain

NOTE 1: f is the me f _c is the O m is 10 x n is 4 x O n; 2 5 x	rable 20: Parameters 1 ing Mode mit mode mit mode mit mode easurement frequency. perating Frequency. OCW or 500 kHz, whichever OCW. CW or 100 kHz, whichever OCW. Table 19: Sp 47 MHz to 74 87,5 MHz to 11 174 MHz to 23 470 MHz to 39 -54 dBm	ement is different from RBV purious domain emission MHz 18 MHz 00 MHz 10 MHz 11 -360	Je (s Hz Hz M N REF, use bandwidth cor On limits quencies 000 MHz Abc dBm	requencies ove 1 000 MHz
NOTE 1: f is the me f _c is the O m is 10 x n is 4 x O p is 2,5 x NOTE 2: If the valu clause 4.3 Frequency State TX mode RX and all other mode 25MHz to 4GHz	easurement frequency. operating Frequency. OCW or 500 kHz, whichever OCW. or 100 kHz, whichever OCW. at 7 MHz to 74 87,5 MHz to 11 174 MHz to 73 470 MHz to 79 -54 dBm	Frequency Rang 9 kHz ≤ f < 150 kH 150 kHz ≤ f < 30 M 30 MHz ≤ f < 6.7 M f _c + m ≤ f ∈ f _c - m f _c + n ≤ f ≤ f _c + m f _c + m ≤ f _c + m f _c + m ≤ f _c	Je (s Hz Hz M N REF, use bandwidth cor On limits quencies 000 MHz Abc dBm	see note 2) 1 kHz 10 kHz 100 kHz 10 kHz 1 kHz 1 kHz 1 kHz 1 kHz 1 MHz
NOTE 1: f is the me f c is the O m is 10 x n is 4 x O p is 2,5 x NOTE 2: If the valu clause 4.3 Frequency State TX mode RX and all other mode 25MHz to 4GHz	easurement frequency. pperating Frequency. OCW or 500 kHz, whichever OCW. e of RBW used for measur 3.10.1. Table 19: Sp 47 MHz to 74 87,5 MHz to 11 174 MHz to 29 -54 dBm	9 kHz ≤ f < 150 kH 150 kHz ≤ f < 30 M 30 MHz ≤ f < f _c - f _c - f _c - f _c - f ≤ f _c - f _c - f ≤ f _c - f ∈ f ≤ f _c - f ∈ f ∈ f _c - f ∈ f ∈ f ∈ f ∈ f ∈ f ∈ f ∈ f ∈ f ∈ f	type (s	see note 2) 1 kHz 10 kHz 100 kHz 10 kHz 1 kHz 1 kHz 1 kHz 1 kHz 1 MHz
NOTE 1: f is the m f c is the O m is 10 x n is 4 x O p is 2,5 x NOTE 2: If the valu clause 4.3 Frequency State TX mode RX and all other mode 25MHz to 4GHz	peasurement frequency. Operating Frequency. OCW or 500 kHz, whichever OCW. Table 19: Sp 47 MHz to 74 87,5 MHz to 11 174 MHz to 23 470 MHz to 79 -54 dBm	160 kHz ≤ f < 30 M 30 MHz ≤ f < f _c - f _c - m ≤ f < f _c - n f _c - n ≤ f < f _c - n f _c + n < f ≤ f _c + m f _c + m < f ≤ 1 GH 1 GHz < f ≤ 6 GH 1 GHz < f ≤ 6 GH 2 GHz + n < f ≤ 1 GH 3 GHz < f ≤ 6 GH 3 GHz + n < f ≤ 1 GH 3 GHz + n < f ≤ 1 GH 3 GHz + n < f ≤ 1 GH 3 GHz + n < f ≤ 1 GHz 3 GHz + n < f ≤ 1 GHz 4 GHz + n < f ≤ 1 GHz 5 GHz + n < f ≤ 1 GHz 6 GHz 6 GHz 6 GHz 7 GHz	Hz Hz M N N REF, use bandwidth cor On limits quencies 000 MHz abc	1 kHz 10 kHz 100 kHz 100 kHz 100 kHz 1 kHz 1 kHz 1 kHz 1 kHz 1 kHz 1 mHz
f _c is the O m is 10 x n is 4 x O p is 2,5 x NOTE 2: If the valu clause 4.3 Frequency State TX mode RX and all other mod	operating Frequency. OCW or 500 kHz, whichever OCW. or 100 kHz, whichever OCW. le of RBW used for measur 3.10.1. Table 19: Sp 47 MHz to 74 87,5 MHz to 11 174 MHz to 79 -54 dBm	30 MHz ≤ f < f _c - m ≤ f < f _c - m ≤ f < f _c - n f _c - m ≤ f < f _c - n f _c - n ≤ f < f _c - n f _c - n ≤ f < f _c - n f _c + p < f ≤ f _c + n f _c + n < f ≤ f _c + n f _c + m < f _c + m < f ≤ 1 GH I GHz < f ≤ 8 GH er is the greater. strength of the greater of the g	N _{REF} , use bandwidth coron limits quencies quencies about the desired the des	100 kHz 10 kHz 11 kHz 11 kHz 11 kHz 110 kHz 100 kHz 1100 kHz 11 MHz Trection from
f _c is the O m is 10 x n is 4 x O p is 2,5 x NOTE 2: If the valu clause 4.3 Frequency State TX mode RX and all other mod	operating Frequency. OCW or 500 kHz, whichever OCW. or 100 kHz, whichever OCW. le of RBW used for measur 3.10.1. Table 19: Sp 47 MHz to 74 87,5 MHz to 11 174 MHz to 79 -54 dBm	$f_c-m \le f < f_c-n$ $f_c-n \le f < f_c-p$ $f_c+p < f \le f_c+n$ $f_c+n < f \le f_c+m$ $f_c+m < f \le f_c+m$ $f_c-m \le f < f_c-n$ $f_c-m \le f < f_c-m$ $f_c-m \le f_c-m$ f_c-	V _{REF} , use bandwidth cor on limits quencies 000 MHz abc	10 kHz 1 kHz 1 kHz 10 kHz 100 kHz 100 kHz 1 mHz rection from
f _c is the O m is 10 x n is 4 x O p is 2,5 x NOTE 2: If the valu clause 4.3 Frequency State TX mode RX and all other mod	operating Frequency. OCW or 500 kHz, whichever OCW. or 100 kHz, whichever OCW. le of RBW used for measur 3.10.1. Table 19: Sp 47 MHz to 74 87,5 MHz to 11 174 MHz to 79 -54 dBm	$ \begin{array}{c c} f_c-n \le f < f_c-p \\ f_c+p < f \le f_c+m \\ f_c+n < f \le f_c+m \\ f_c+m < f \le f_c+m < $	V _{REF} , use bandwidth cor on limits quencies 000 MHz abc	1 kHz 1 kHz 10 kHz 100 kHz 11 MHz 1 MHz rrection from
f _c is the O m is 10 x n is 4 x O p is 2,5 x NOTE 2: If the valu clause 4.3 Frequency State TX mode RX and all other mod	operating Frequency. OCW or 500 kHz, whichever OCW. or 100 kHz, whichever OCW. le of RBW used for measur 3.10.1. Table 19: Sp 47 MHz to 74 87,5 MHz to 11 174 MHz to 79 -54 dBm	$\begin{aligned} &f_c + p < f \le f_c + n \\ &f_c + n < f \le f_c + m \\ &f_c + m < f \le f_c + m \\ &f_c + m < f \le 1 \text{ GHz} \end{aligned}$ er is the greater. is the greater. is the greater. is the greater. is different from RBV purious domain emission. If MHz are the second of the seco	N _{REF} , use bandwidth cor on limits quencies 000 MHz	1 kHz 10 kHz 100 kHz 1 MHz 1 MHz Trection from
f _c is the O m is 10 x n is 4 x O p is 2,5 x NOTE 2: If the valu clause 4.3 Frequency State TX mode RX and all other mod	operating Frequency. OCW or 500 kHz, whichever OCW. or 100 kHz, whichever OCW. le of RBW used for measur 3.10.1. Table 19: Sp 47 MHz to 74 87,5 MHz to 11 174 MHz to 79 -54 dBm	f _c +n <f≤f<sub>c+m f_c+m<f≤f<sub>c+m f_c+m<f≤1gh different="" domain="" ement="" emission="" er="" from="" ghz<f≤6gh="" greater,="" i="" is="" mhz="" mhz<="" purious="" rbv="" td="" the=""><td>N_{REF}, use bandwidth cor on limits quencies 000 MHz abo</td><td>10 kHz 100 kHz 1 MHz Trection from requencies ove 1 000 MHz -30 dBm</td></f≤1gh></f≤f<sub></f≤f<sub>	N _{REF} , use bandwidth cor on limits quencies 000 MHz abo	10 kHz 100 kHz 1 MHz Trection from requencies ove 1 000 MHz -30 dBm
f _c is the O m is 10 x n is 4 x O p is 2,5 x NOTE 2: If the valu clause 4.3 Frequency State TX mode RX and all other mod	operating Frequency. OCW or 500 kHz, whichever OCW. or 100 kHz, whichever OCW. le of RBW used for measur 3.10.1. Table 19: Sp 47 MHz to 74 87,5 MHz to 11 174 MHz to 79 -54 dBm	f _c +m <f≤1 1="" 10="" 11="" 12="" 13="" 14="" 15="" 16="" 17="" 18="" different="" domain="" ement="" emission="" er="" from="" g<="" gh="" ghz="" ghz<f≤8="" greater.="" in="" is="" mhz="" purious="" rbv="" td="" the=""><td>Z V_{REF}, use bandwidth cor on limits quencies 000 MHz abo</td><td>100 kHz 1 MHz rection from requencies ve 1 000 MHz -30 dBm</td></f≤1>	Z V _{REF} , use bandwidth cor on limits quencies 000 MHz abo	100 kHz 1 MHz rection from requencies ve 1 000 MHz -30 dBm
f _c is the O m is 10 x n is 4 x O p is 2,5 x NOTE 2: If the valu clause 4.3 Frequency State TX mode RX and all other mod	operating Frequency. OCW or 500 kHz, whichever OCW. or 100 kHz, whichever OCW. le of RBW used for measur 3.10.1. Table 19: Sp 47 MHz to 74 87,5 MHz to 11 174 MHz to 79 -54 dBm	r is the greater. is the greater. is the greater. ement is different from RBV purious domain emission MHz 18 MHz 10 MHz 10 MHz 10 MHz 1-360	V _{REF} , use bandwidth coron limits quencies 000 MHz abc	1 MHz rection from requencies ove 1 000 MHz -30 dBm
f _c is the O m is 10 x n is 4 x O p is 2,5 x NOTE 2: If the valu clause 4.3 Frequency State TX mode RX and all other mod	operating Frequency. OCW or 500 kHz, whichever OCW. or 100 kHz, whichever OCW. le of RBW used for measur 3.10.1. Table 19: Sp 47 MHz to 74 87,5 MHz to 11 174 MHz to 79 -54 dBm	ement is different from RBV purious domain emission MHz 18 MHz 00 MHz 10 MHz 11 -360	on limits quencies 000 MHz abc	requencies ove 1 000 MHz
Frequency State TX mode RX and all other mod	OCW or 500 kHz, whichever CW or 100 kHz, whichever OCW. It is a second of RBW used for measure 3.10.1. Table 19: Sp 47 MHz to 74 87,5 MHz to 11 174 MHz to 23 470 MHz to 79 -54 dBm	ement is different from RBV purious domain emission MHz 18 MHz 00 MHz 10 MHz 11 -360	on limits quencies 000 MHz abc	requencies ove 1 000 MHz
ris 4 x Opis 2,5 x NOTE 2: If the value clause 4.3 Frequency State TX mode RX and all other mode 25MHz to 4GHz	CW or 100 kHz, whichever OCW. a of RBW used for measur 3.10.1. Table 19: Sp 47 MHz to 74 87,5 MHz to 11 174 MHz to 79 -54 dBm	ement is different from RBV purious domain emission MHz 18 MHz 00 MHz 10 MHz 11 -360	on limits quencies 000 MHz abc	requencies ove 1 000 MHz
Frequency State TX mode RX and all other mod	e of RBW used for measur 3.10.1. Table 19: Sp 47 MHz to 74 87,5 MHz to 11 174 MHz to 23 470 MHz to 79 -54 dBm	purious domain emissic MHz Other fre 18 MHz below 1 100 MHz	on limits quencies 000 MHz abc	requencies ove 1 000 MHz
Frequency State TX mode RX and all other mod	Table 19: Sp 47 MHz to 74 87,5 MHz to 11 174 MHz to 23 470 MHz to 30 -54 dBm	purious domain emissic MHz Other fre 18 MHz below 1 100 MHz	on limits quencies 000 MHz abc	requencies ove 1 000 MHz
State TX mode RX and all other mod	Table 19: Sp 47 MHz to 74 87,5 MHz to 11 174 MHz to 23 470 MHz to 79 -54 dBm	MHz Other fre 18 MHz below 1 10 MHz 10 MHz	quencies F 000 MHz abo	-30 dBm
State TX mode RX and all other mode 25MHz to 4GHz	47 MHz to 74 87,5 MHz to 11 174 MHz to 23 470 MHz to 79 -54 dBm	MHz Other fre 18 MHz below 1 10 MHz 10 MHz	quencies F 000 MHz abo	-30 dBm
State TX mode RX and all other mode 25MHz to 4GHz	87,5 MHz to 11 174 MHz to 23 470 MHz to 79 -54 dBm	18 MHz 50 MHz 00 MHz	000 MHz abc	-30 dBm
State TX mode RX and all other mode 25MHz to 4GHz	87,5 MHz to 11 174 MHz to 23 470 MHz to 79 -54 dBm	18 MHz 50 MHz 00 MHz	000 MHz abc	-30 dBm
TX mode RX and all other mode 25MHz to 4GHz	470 MHz to 79 -54 dBm	90 MHz		
TX mode RX and all other mode 25MHz to 4GHz	-54 dBm	-36		
RX and all other mod 25MHz to 4GHz				
			ubiii	-47 dBm
Below 1GHz				
Above 1GHz	1.5m Turntable	Test Receiver	Controller	
Above 1GHz				
	AE EUT	Ground Reference Plane	Optiadl Cable Controller	
	Above 1GHz	Above 1GHz	Above 1GHz Above 1 GHz Turntable Ground Reference Plane Ground Reference Plane Ground Reference Plane Pre-Amplification Turntable Ground Reference Plane Pre-Amplification Turntable Free Amplification Test Receiver Pre-Amplification Test Receiver Pre-Amplification Test Receiver Pre-Amplification Test Receiver Pre-Amplification Test Receiver	Above 1GHz Above 1GHz Above 1 GHz Above 1 GHz



Test procedure:	Substitution method was performed to determine the actual ERP emission levels of the EUT.
	The following test procedure as below:
	Below 1GHz test procedure:
	1. On the test site as test setup graph above, the EUT shall be placed at the 1.5m support on the turntable and in the position closest to normal use as declared by the provider.
	2. The test antenna shall be oriented initially for vertical polarization and shall be chosen to correspond to the frequency of the transmitter. The output of the test antenna shall be connected to the measuring receiver.
	3. The transmitter shall be switched on, if possible, without modulation and the measuring receiver shall be tuned to the frequency of the transmitter under test.
	4. The test antenna shall be raised and lowered from 1m to 4m until a maximum signal level is detected by the measuring receiver. Then the turntable should be rotated through 360° in the horizontal plane, until the maximum signal level is detected by the measuring receiver.
	5. Repeat step 4 for test frequency with the test antenna polarized horizontally.
	 Remove the transmitter and replace it with a substitution antenna (the antenna should be half-wavelength for each frequency involved). The center of the substitution antenna should be approximately at the same location as the center of the transmitter. At the lower frequencies, where the substitution antenna is very long, this will be impossible to achieve when the antenna is polarized vertically. In such case the lower end of the antenna should be 0.3 m above the ground. Feed the substitution antenna at the transmitter end with a signal generator connected to the antenna by means of a nonradiating cable. With the antennas at both ends vertically polarized, and with the signal generator tuned to a particular test frequency, raise and lower the test antenna to obtain a maximum reading at the spectrum analyzer. Adjust the level of the signal generator output until the previously recorded maximum reading for this set of conditions is obtained. This should be done carefully repeating the adjustment of the test antenna and generator output.
	8. Repeat step 7 with both antennas horizontally polarized for each test
	frequ <mark>enc</mark> y.
	9. Calculate power in dBm into a reference ideal half-wave dipole antenna by reducing the readings obtained in steps 7 and 8 by the power loss in the cable between the generator and the antenna, and further corrected for the gain of the substitution antenna used relative to an ideal half-wave dipole antenna by the following formula:
	ERP(dBm) = Pg(dBm) – cable loss (dB) + antenna gain (dBd)
	where: Pg is the generator output power into the substitution antenna.
	Above 1GHz test procedure:
	Different between above is the test site, change from Semi- Anechoic Chamber to fully Anechoic Chamber, and the test antenna do not need to raise from 1 to 4m, just test in 1.5m height.
Test instruments:	Refer to section 5.9 for details
Test mode:	Refer to section 5.3 for details
Test results:	Pass





Measurement Data:

TX mode-Low							
Francisco (MILE)	Spurious	Emission	Limit (dDm)	Total Books			
Frequency (MHz)	polarization	Level(dBm)	Limit (dBm)	Test Result			
201.81	V	-81.40	54.00				
381.38	V	-80.78	-54.00				
944.71	V	-72.31	20.00				
1736.20	V	-61.54	-36.00				
2604.30	V	-55.12					
3472.40	V	-51.49	20.00				
4340.50	V	-53.50	-30.00				
50.13	Horizontal	-82.08		Dage			
221.21	Н	-82.42	-54.00	Pass			
345.74	Н	-83.02	-54.00				
807.46	Н	-73.04	26.00				
1736.20	Н	-62.09	-36.00				
2604.30	Н	-54.47					
3472.40	Н	-51.50	30				
4340.50	Н	-53.48	-30				
201.81	V	-81.40					

TX mode-Hight						
Fraguency (MHz)	Spurious	Emission	Limit (dDm)	Test Result		
Frequency (MHz)	polarization	Level(dBm)	Limit (dBm)	rest Result		
105.42	Vertical	-86.09	-54.00			
201.81	V	-81.56	-54.00			
381.38	V	-81.10	-36.00			
944.71	V	-72.66	-30.00			
1737.00	V	-62.01				
2605.50	V	-54.97	-30.00	Pass		
3474.00	V	-51.21	-30.00			
4342.50	V	-53.65				
50.13	Horizontal	-81.69	-54.00			
221.21	Н	-82.53	-54.00			
345.74	Н	-83.09	-36.00			
807.46	Н	-73.38	-30.00			
1737.00	Н	-62.29				
2605.50	Н	-54.46	-30			
3474.00	Н	-51.91	-30			
4342.50	Н	-53.35				



RX mode-LOW						
Frequency (MHz)	Spurious Emission		Limit (dDm)	Took Dooult		
	polarization	Level(dBm)	Limit (dBm)	Test Result		
105.42	V	-80.41	-57.00 -47.00	Pass		
201.81	V	-72.02				
1736.20	V	-60.47				
2604.30	V	-60.45	-57.00 -47.00			
201.81	Horizontal	-82.06				
381.38	Н	-72.93				

		RX mode-Hight		
Frequency (MHz)	Spurious Emission		Limit (dDm)	Table
	polarization	Level(dBm)	Limit (dBm)	Test Result
105.42	V	-80.76	-57.00	
201.81	V	-72.36		
1737.00	V	-60.06	-47.00	Dane
2605.50	V	-60.31	-57.00	Pass
381.38	V	-82.19		
944.71	V	-72.82	-47.00	





Test Setup Photo





8 EUT Constructional Details

Reference to the test report No. JYTSZ-R01-2200022.

