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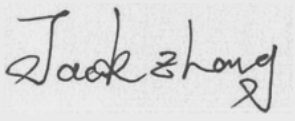
Test report No:
21C0074R-RF-US-P20V01

TEST REPORT

C Rules&Requlations FCC Exposure Evaluation Declaration

Product Name	LTE Cat.NB1/2 Data-Only Module
Trademark	CINTERION
Model and /or type reference	TN23-W
FCC ID	QIPTN23-W
Applicant´s name / address	THALES DIS AIS Deutschland GmbH Werinherstr. 81, 81541 Munich, Germany
Test method requested, standard	KDB 447498D01V07 FCC Part1.1307
Verdict Summary	IN COMPLIANCE
Documented by (name / position & signature)	Tim Cao/Project Engineer 
Approved by (name / position & signature)	Jack Zhang/ Supervisor 
Date of issue	2022-09-08
Report Version	V2.0
Report template No	Template_FCC MPE-RF-V1.0

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COMPETENCES AND GUARANTEES

DEKRA is a testing laboratory competent to carry out the tests described in this report.
In order to assure the traceability to other national and international laboratories, DEKRA has a calibration and maintenance program for its measurement equipment.

DEKRA guarantees the reliability of the data presented in this report, which is the result of the measurements and the tests performed to the item under test on the date and under the conditions stated in the report and it is based on the knowledge and technical facilities available at DEKRA at the time of performance of the test.

DEKRA is liable to the client for the maintenance of the confidentiality of all information related to the item under test and the results of the test.

The results presented in this Test Report apply only to the particular item under test established in this document.

IMPORTANT: No parts of this report may be reproduced or quoted out of context, in any form or by any means, except in full, without the previous written permission of DEKRA.

GENERAL CONDITIONS

Test Location	No. 99, Hongye Road, Suzhou Industrial Park Suzhou, 215006, P.R. China
Date(receive sample)	Dec. 02, 2021
Date (start test)	Dec. 20, 2021
Date (finish test)	Aug. 29, 2022

1. This report is only referred to the item that has undergone the test.
2. This report does not constitute or imply on its own an approval of the product by the Certification Bodies or Competent Authorities.
3. This document is only valid if complete; no partial reproduction can be made without previous written permission of DEKRA.
4. This test report cannot be used partially or in full for publicity and/or promotional purposes without previous written permission of DEKRA.

ENVIRONMENTAL CONDITIONS

The climatic conditions during the tests are within the limits specified by the manufacturer for the operation of the EUT and the test equipment. The climatic conditions during the tests were within the following limits:

Ambient temperature	15 °C – 35 °C
Relative Humidity air	30% - 60%

If explicitly required in the basic standard or applied product / product family standard the climatic values are recorded and documented separately in this test report.

POSSIBLE TEST CASE VERDICTS

Test case does not apply to test object	N/A
Test object does meet requirement	P (Pass) / PASS
Test object does not meet requirement	F (Fail) / FAIL
Not measured	N/M

ABBREVIATIONS

For the purposes of the present document, the following abbreviations apply:

EUT : Equipment Under Test
QP : Quasi-Peak
CAV : CISPR Average
AV : Average
CDN : Coupling Decoupling Network
SAC : Semi-Anechoic Chamber
OATS : Open Area Test Site
BW : Bandwidth
AM : Amplitude Modulation
PM : Pulse Modulation
HCP : Horizontal Coupling Plane
VCP : Vertical Coupling Plane
U_N : Nominal voltage
*T*x : Transmitter
*R*x : Receiver
N/A : Not Applicable
N/M : Not Measured

DOCUMENT HISTORY

Report No.	Version	Description	Issued Date
21C0074R-RF-US-P20V01	V1.0	Initial issue of report.	2022-03-02
21C0074R-RF-US-P20V01	V2.0	Page 1: Update suitable standards. Page 7-8: Update test data. (The test report No.: 21C0074R-RF-US-P20V01 V2.0 is to replace the test report No.: 21C0074R-RF-US-P20V01 V1.0, and test report 21C0074R-RF-US-P20V01 V1.0 is obsoleted.)	2022-09-08

REMARKS AND COMMENTS

1. The equipment under test (EUT) does meet the essential requirements of the stated standard(s)/test(s).
2. These test results on a sample of the device are for the purpose of demonstrating Compliance with KDB 447498 and FCC Part 1.1317
3. The measurement result is considered in conformance with the requirement if it is within the prescribed limit, It is not necessary to account the uncertainty associated with the measurement result.
4. The test results presented in this report relate only to the object tested.
5. The test report shall not be reproduced without the written approval of DEKRA Testing and Certification (Suzhou) Co., Ltd.
6. This report will not be used for social proof function in China market.
7. DEKRA declines any responsibility with the following test data provided by customer that may affect the validity of result:
   - Chapter 1.3 Antenna Information;

1. RF Exposure Evaluation

1.1. Limits

According to § 1.1307(b)(3)(i)(B)

The available maximum time-averaged power or effective radiated power (ERP), whichever is greater, is less than or equal to the threshold Pth (mW) described in the following formula. This method shall only be used at separation distances (cm) from 0.5 centimeters to 40 centimeters and at frequencies from 0.3 GHz to 6 GHz (inclusive). Pth is given by:

$$P_{th}\ (\text{mW}) = \begin{cases} ERP_{20\ cm}(d/20\ \text{cm})^{x} & d \le 20\ \text{cm} \\ ERP_{20\ cm} & 20\ \text{cm} < d \le 40\ \text{cm} \end{cases}$$

Where

$$x = -\log_{10}\left(\frac{60}{ERP_{20\ cm}\sqrt{f}}\right) \text{ and } f \text{ is in GHz;}$$

and

$$ERP_{20\ cm}\ (\text{mW}) = \begin{cases} 2040f & 0.3\ \text{GHz} \le f < 1.5\ \text{GHz} \\ 3060 & 1.5\ \text{GHz} \le f \le 6\ \text{GHz} \end{cases}$$

d = the separation distance (cm);

Finally, when 10-g extremity SAR applies, SAR test exemption may be considered by applying a factor of 2.5 to the SAR-based exemption threshold.

1.2. Test Procedure

Software provided by client enabled the EUT to transmit and receive data at lowest, middle and highest channel individually.

The temperature and related humidity: 18℃and 78％ RH.

1.3. Test Result of RF Exposure Evaluation

Product	:	LTE Cat.NB1/2 Data-Only Module
Test Item	:	RF Exposure Evaluation
Test Site	:	AC-6

Maximum Permissble Antenna Gain Calculations:

NB-IoT band	Maximum Conduted Output power (dBm)	EIRP limit (dBm)	$Margin_{Power-EIRP}$ (dB)	Power Density limit (mW/cm^2)	Permissble EIRP under Power Density limit (dBm)	$Margin_{Power-Power\ Density}$ (dB)	Final Margin (dB)
2	23.30	33.00	9.70	1.000	37.01	13.71	9.70
4	23.52	30.00	6.48	1.000	37.01	13.49	6.48
5	23.44	40.60	17.16	0.549	34.41	10.97	10.97
12	23.51	36.92	13.41	0.466	33.70	10.19	10.19
13	23.29	36.92	13.63	0.518	34.16	10.87	10.87
17	23.95	36.92	12.97	0.469	33.73	9.78	9.78
18	23.92	40.60	16.68	0.543	34.36	10.44	10.44
19	23.89	40.60	16.71	0.553	34.44	10.55	10.55
25	23.29	33.00	9.71	1.000	37.01	13.72	9.71
26	24.09	40.60	16.51	0.543	34.36	10.27	10.27
66	23.50	30.00	6.50	1.000	37.01	13.51	6.50
85	23.43	36.92	13.49	0.465	33.69	10.26	10.26

Note: 1. The Maximum permissble antenna gain per band should be less than or equal to the Final Margin.
2. The Final Margin is determined and selected to the worst-case of $Margin_{Power-EIRP}$ and $Margin_{Power-Power\ Density}$.
3. $Margin_{Power-EIRP}$ =EIRP Limit(dBm)-Maximum Conducted Power (dBm). EIRP limit reference standard part22/ part24/ part27 and part90 for each band, EIRP = ERP + 2.15 (dB).
4. $Margin_{Power-Power\ Density}$ = Permissble EIRP under Power Density limit (dBm)-Maximum Conducted Power (dBm). Power density Limit(dBm). The max. obtained by MPE with 20cm.

RF Exposure Calculations:

NB-IoT band	Maximum Conduted Output power (dBm)	Maximum Gain (dBi)	EIRP (mW)	ERP (mW)	Distance (mm)	f(GHz)	Pth (mW)
2	23.30	9.70	1995.27	1216.19	159	1910	2002.58
4	23.52	6.48	1000.00	609.54	109	1755	1007.86
5	23.44	10.97	2760.58	1682.68	201	849	1731.96
12	23.51	10.19	2344.23	1428.90	201	716	1460.64
13	23.29	10.87	2606.16	1588.55	201	787	1605.48
17	23.95	9.78	2360.48	1438.80	201	716	1460.64
18	23.92	10.44	2728.98	1663.42	201	830	1693.20
19	23.89	10.55	2779.72	1694.34	201	845	1723.80
25	23.29	9.71	1995.27	1216.17	159	1915	2002.32
26	24.09	10.27	2728.98	1663.42	201	849	1731.96
66	23.50	6.50	1000.00	609.54	109	1780	1005.99
85	23.43	10.26	2338.84	1425.61	201	716	1460.64

Note: The RF exposure test is exempted for *LTE Cat.NB1/2 Data-Only Module* with maximum permissible gain antenna at a distance of or greater than 201mm from the human body.

The End