

RF EXPOSURE EVALUATION REPORT

Product Name: Module
Trade Mark: CINTERION
Model No. / HVIN: PLS83-W
Report Number: 200722013RFC-1
Test Standards: FCC 47 CFR Part 1 Subpart I
RSS-102 Issue 5
FCC ID: QIPPLS83-W
IC: 7830A-PLS83W
Test Result: PASS
Date of Issue: January 6, 2021

Prepared for:

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Siemensdamm 50, 13629 Berlin, Germany

Prepared by:

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Version

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V1.0	January 6, 2021	Original

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1. GENERAL INFORMATION

1.1 CLIENT INFORMATION

Applicant:	Thales DIS AIS Deutschland GmbH
Address of Applicant:	Siemensdamm 50, 13629 Berlin, Germany
Manufacturer:	Thales DIS AIS Deutschland GmbH
Address of Manufacturer:	Werinherstr. 81, 81541 Munich, Germany

1.2 EUT INFORMATION

Product Name:	Module	
Model No. / HVIN:	PLS83-W	
Trade Mark:	CINTERION	
DUT Stage:	Production Unit	
Antenna Type	External Antenna	
EUT Supports Function:	GSM Bands:	GSM850/1900
	UTRA Bands:	Band II/ Band IV/ Band V
	E-UTRA Bands:	FDD Band 2/ Band 4/ Band 5/ Band 7/ Band 12/ Band 13/ Band 26/ Band 66
		TDD Band 38/ Band 41
Sample Received Date:	July 24, 2020	

1.3 GENERAL DESCRIPTION OF APPLIED STANDARDS

The EUT is a RF product, according to the specifications of the manufacturers. It must comply with the requirements of the following standards:

FCC 47 CFR Part 1 Subpart I
RSS-102 Issue 5

All test items have been performed and recorded as per the above standards

1.4 TEST LOCATION

All tests were performed at:

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1.5 TEST FACILITY

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

CNAS-Lab Code: L9069

The measuring equipment utilized to perform the tests documented in this report has been calibrated once a year or in accordance with the manufacturer's recommendations, and is traceable under the ISO/IEC/EN 17025

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to international or national standards. Equipment has been calibrated by accredited calibration laboratories.

A2LA-Lab Certificate No.: 4312.01

Shenzhen UnionTrust Quality and Technology Co., Ltd. has been accredited by A2LA for technical competence in the field of electrical testing, and proved to be in compliance with ISO/IEC 17025: 2005 General Requirements for the Competence of Testing and Calibration Laboratories and any additional program requirements in the identified field of testing.

ISED Wireless Device Testing Laboratories

CAB identifier: CN0032

FCC Accredited Lab.

Designation Number: CN1194

Test Firm Registration Number: 259480

1.6 DEVIATION FROM STANDARDS

None.

1.7 ABNORMALITIES FROM STANDARD CONDITIONS

None.

1.8 OTHER INFORMATION REQUESTED BY THE CUSTOMER

None.

2. EQUIPMENT LIST

Please refer to the RF test report.

3. MPE EVALUATION

3.1 REFERENCE DOCUMENTS FOR EVALUATION

No.	Identity	Document Title
1	FCC 47 CFR Part 1 Subpart I	PROCEDURES IMPLEMENTING THE NATIONAL ENVIRONMENTAL POLICY ACT OF 1969
2	RSS-102 Issue 5	Radio Frequency (RF) Exposure Compliance of Radiocommunication Apparatus (All Frequency Bands)
3	KDB 447498 D01 General RF Exposure Guidance v06	RF EXPOSURE PROCEDURES AND EQUIPMENT AUTHORIZATION POLICIES FOR MOBILE AND PORTABLE DEVICES

3.2 MPE COMPLIANCE REQUIREMENT

3.2.1 Limits

3.2.1.1 FCC 47 CFR Part 1 Subpart I

According to §1.1307(b)(1), system operating under the provisions of this section shall be operating in a manner that the public is not exposed to radio frequency energy level in excess limit for maximum permissible exposure.

Limits for Occupational / Controlled Exposure

Frequency range (MHz)	Electric Field Strength (E) (V/m)	Magnetic Field Strength (H) (A/m)	Power Density (S) (mW/cm ²)	Averaging Times E ² , H ² or S (minutes)
0.3-3.0	614	1.63	(100)*	6
3.0-30	1842/f	4.89/f	(900/f)*	6
30-300	61.4	0.163	1.0	6
300-1500	/	/	F/300	6
1500-100000	/	/	5	6

Limits for General Population / Uncontrolled Exposure

Frequency range (MHz)	Electric Field Strength (E) (V/m)	Magnetic Field Strength (H) (A/m)	Power Density (S) (mW/cm ²)	Averaging Times E ² , H ² or S (minutes)
0.3-1.34	614	1.63	(100)*	30
1.34-30	824/f	2.19/f	(180/f)*	30
30-300	27.5	0.073	0.2	30
300-1500	/	/	F/1500	30
1500-100000	/	/	1	30

Note: f = frequency in MHz; * = Plane-wave equivalent power density.

3.2.1.2 RSS-102 Issue 5

According to RSS-102 Issue 5, system operating under the provisions of this section shall be operating in a manner that the public is not exposed to radio frequency energy level in excess limit for maximum permissible exposure.

According to RSS-102 Issue 5, system operating under the provisions of this section shall be operating in a manner that the public is not exposed to radio frequency energy level in excess limit for maximum permissible exposure.

RF exposure evaluation is required if the separation distance between the user and/or bystander and the device's radiating element is greater than 20 cm, except when the device operates as follows:

- below 20 MHz⁶ and the source-based, time-averaged maximum e.i.r.p. of the device is equal to or less than 1 W (adjusted for tune-up tolerance);
- at or above 20 MHz and below 48 MHz and the source-based, time-averaged maximum e.i.r.p. of the device is equal to or less than $4.49/f^{0.5}$ W (adjusted for tune-up tolerance), where f is in MHz;
- at or above 48 MHz and below 300 MHz and the source-based, time-averaged maximum e.i.r.p. of the device is equal to or less than 0.6 W (adjusted for tune-up tolerance);
- at or above 300 MHz and below 6 GHz and the source-based, time-averaged maximum e.i.r.p. of the device is equal to or less than $1.31 \times 10^{-2} f^{0.6834}$ W (adjusted for tune-up tolerance), where f is in MHz;
- at or above 6 GHz and the source-based, time-averaged maximum e.i.r.p. of the device is equal to or less than 5 W (adjusted for tune-up tolerance).

In these cases, the information contained in the RF exposure technical brief may be limited to information that demonstrates how the e.i.r.p. was derived.

3.2.2 Test Procedure

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

3.3 MPE CALCULATION METHOD

$$S = PG/4\pi R^2 = EIRP/4\pi R^2$$

S = power density (in appropriate units, e.g., mw/cm²)

P = power input to the antenna (in appropriate units, e.g., mw)

G = power gain of the antenna in the direction of interest relative to an isotropic radiator, the power gain factor is normally numeric gain.

R = distance to the center of radiation of the antenna (in appropriate units, e.g., cm)

3.4 MPE CALCULATION RESULTS

Note: For the test results, the EUT had been tested with all conditions. But only the worst case was shown in test report.

3.4.1 WWAN results for FCC 47 CFR Part 1 Subpart I

Operating Mode	Frequency	Declared maximum conducted average output power	Max. positive tolerance according manufacturer	Antenna Gain	Calculated maximum EIRP	MPE Limit	MPE Value
	(MHz)	(dBm)	(dBm)	(dBm)	(dBm)	(mw/cm ²)	(mw/cm ²)
GSM/GPRS 850 (Avg.Burst Power)	824.2	33	2	0	35	0.5495	0.3146
	837	33	2	0	35	0.5580	0.3146
	848.8	33	2	0	35	0.5659	0.3146

EDGE 850 (Avg.Burst Power)	824.2	27	3	0	30	0.5495	0.0995
	837	27	3	0	30	0.5580	0.0995
	848.8	27	3	0	30	0.5659	0.0995
GSM/GPRS 1900 (Avg.Burst Power)	1850.2	30	2	0	32	1.0000	0.1576
	1880	30	2	0	32	1.0000	0.1576
	1909.8	30	2	0	32	1.0000	0.1576
EDGE 1900 (Avg.Burst Power)	1850.2	26	3	0	29	1.0000	0.0790
	1880	26	3	0	29	1.0000	0.0790
	1909.8	26	3	0	29	1.0000	0.0790
WCDMA FDD Band II (RMS-Value)	1852.4	24	1	0	25	1.0000	0.0629
	1880	24	1	0	25	1.0000	0.0629
	1907.6	24	1	0	25	1.0000	0.0629
WCDMA FDD Band IV (RMS-Value)	1712.4	24	1	0	25	1.0000	0.0629
	1732.4	24	1	0	25	1.0000	0.0629
	1752.6	24	1	0	25	1.0000	0.0629
WCDMA FDD Band V (RMS-Value)	826.4	24	1	0	25	0.5509	0.0629
	836.4	24	1	0	25	0.5576	0.0629
	846.6	24	1	0	25	0.5644	0.0629
LTE Band 2 (QPSK,#RB=1,RMS- Value)	1860	23	2	0	25	1.0000	0.0629
	1880	23	2	0	25	1.0000	0.0629
	1900	23	2	0	25	1.0000	0.0629
LTE Band 4 (QPSK,#RB=1,RMS- Value)	1720	23	2	0	25	1.0000	0.0629
	1732.5	23	2	0	25	1.0000	0.0629
	1745	23	2	0	25	1.0000	0.0629
LTE Band 5 (QPSK,#RB=1,RMS- Value)	829	23	2	0	25	0.5527	0.0629
	836.5	23	2	0	25	0.5577	0.0629
	844	23	2	0	25	0.5627	0.0629
LTE Band 7 (QPSK,#RB=1,RMS- Value)	2510	23	2	0	25	1.0000	0.0629
	2535	23	2	0	25	1.0000	0.0629
	2560	23	2	0	25	1.0000	0.0629
LTE Band 12 (QPSK,#RB=1,RMS- Value)	704	23	2	0	25	0.4693	0.0629
	707.5	23	2	0	25	0.4717	0.0629
	711	23	2	0	25	0.4740	0.0629
LTE Band 13 (QPSK,#RB=1,RMS- Value)	779.5	23	2	0	25	0.5197	0.0629
	782	23	2	0	25	0.5213	0.0629
	784.5	23	2	0	25	0.5230	0.0629
LTE Band 26 (QPSK,#RB=1,RMS- Value)	814	23	2	0	25	0.5427	0.0629
	831.5	23	2	0	25	0.5543	0.0629
	849	23	2	0	25	0.5660	0.0629
LTE Band 38 (QPSK,#RB=1,RMS- Value)	2580	23	2	0	25	1.0000	0.0629
	2595	23	2	0	25	1.0000	0.0629

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Value)	2610	23	2	0	25	1.0000	0.0629
LTE Band 41 (QPSK,#RB=1,RMS- Value)	2506	23	2	0	25	1.0000	0.0629
	2593	23	2	0	25	1.0000	0.0629
	2680	23	2	0	25	1.0000	0.0629
LTE Band 66 (QPSK,#RB=1,RMS- Value)	1720	23	2	0	25	1.0000	0.0629
	1745	23	2	0	25	1.0000	0.0629
	1770	23	2	0	25	1.0000	0.0629

Note 1: Calculated maximum EIRP = Declared maximum conducted output power + Max. positive tolerance according manufacturer + Antenna Gain.

Note 2: Declared maximum EIRP = $10^{\left(\frac{\text{Calculated maximum EIRP}}{10}\right)}$.

Note 3: Equivalent EIRP = Declared maximum EIRP * Duty cycle.

Note 4: Margin = MPE Limit - MPE Value.

3.4.2 WWAN results for RSS-102 Issue 5

Operating Mode	Frequency	Declared maximum conducted average output power	Max. positive tolerance according manufacturer	Antenna Gain	Calculated maximum EIRP	Declared maximum EIRP	Limit
	(MHz)	(dBm)	(dBm)	(dBm)	(dBm)	(W)	(W)
GSM/GPRS 850 (Avg.Burst Power)	824.2	33	2	0	35	0.3810	1.2885
	837	33	2	0	35	0.3810	1.3022
	848.8	33	2	0	35	0.3810	1.3147
EDGE 850 (Avg.Burst Power)	824.2	27	3	0	30	0.1205	1.2885
	837	27	3	0	30	0.1205	1.3022
	848.8	27	3	0	30	0.1205	1.3147
GSM/GPRS 1900 (Avg.Burst Power)	1850.2	30	2	0	32	0.1910	2.2392
	1880	30	2	0	32	0.1910	2.2638
	1909.8	30	2	0	32	0.1910	2.2882
EDGE 1900 (Avg.Burst Power)	1850.2	26	3	0	29	0.0957	2.2392
	1880	26	3	0	29	0.0957	2.2638
	1909.8	26	3	0	29	0.0957	2.2882
WCDMA FDD Band II (RMS-Value)	1852.4	24	1	0	25	0.3162	2.2410
	1880	24	1	0	25	0.3162	2.2638
	1907.6	24	1	0	25	0.3162	2.2864
WCDMA FDD Band IV (RMS-Value)	1712.4	24	1	0	25	0.3162	2.1238
	1732.4	24	1	0	25	0.3162	2.1407
	1752.6	24	1	0	25	0.3162	2.1578
WCDMA FDD Band V (RMS-Value)	826.4	24	1	0	25	0.3162	1.2909
	836.4	24	1	0	25	0.3162	1.3015
	846.6	24	1	0	25	0.3162	1.3123
LTE Band 2	1860	23	2	0	25	0.3162	2.2473

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(QPSK,#RB=1,RMS-Value)	1880	23	2	0	25	0.3162	2.2638
	1900	23	2	0	25	0.3162	2.2802
LTE Band 4 (QPSK,#RB=1,RMS-Value)	1720	23	2	0	25	0.3162	2.1303
	1732.5	23	2	0	25	0.3162	2.1408
	1745	23	2	0	25	0.3162	2.1514
LTE Band 5 (QPSK,#RB=1,RMS-Value)	829	23	2	0	25	0.3162	1.2936
	836.5	23	2	0	25	0.3162	1.3016
	844	23	2	0	25	0.3162	1.3096
LTE Band 7 (QPSK,#RB=1,RMS-Value)	2510	23	2	0	25	0.3162	2.7581
	2535	23	2	0	25	0.3162	2.7768
	2560	23	2	0	25	0.3162	2.7955
LTE Band 12 (QPSK,#RB=1,RMS-Value)	704	23	2	0	25	0.3162	1.1569
	707.5	23	2	0	25	0.3162	1.1608
	711	23	2	0	25	0.3162	1.1648
LTE Band 13 (QPSK,#RB=1,RMS-Value)	779.5	23	2	0	25	0.3162	1.2403
	782	23	2	0	25	0.3162	1.2431
	784.5	23	2	0	25	0.3162	1.2458
LTE Band 26 (QPSK,#RB=1,RMS-Value)	814	23	2	0	25	0.3162	1.2776
	831.5	23	2	0	25	0.3162	1.2963
	849	23	2	0	25	0.3162	1.3149
LTE Band 38 (QPSK,#RB=1,RMS-Value)	2580	23	2	0	25	0.3162	2.8104
	2595	23	2	0	25	0.3162	2.8216
	2610	23	2	0	25	0.3162	2.8327
LTE Band 41 (QPSK,#RB=1,RMS-Value)	2506	23	2	0	25	0.3162	2.7551
	2593	23	2	0	25	0.3162	2.8201
	2680	23	2	0	25	0.3162	2.8844
LTE Band 66 (QPSK,#RB=1,RMS-Value)	1720	23	2	0	25	0.3162	2.1303
	1745	23	2	0	25	0.3162	2.1514
	1770	23	2	0	25	0.3162	2.1724

Note 1: Calculated maximum EIRP = Declared maximum conducted output power + Max. positive tolerance according manufacturer + Antenna Gain.

Note 2: Declared maximum EIRP = $10^{\left(\frac{\text{Calculated maximum EIRP}}{10}\right)}$.

Note 3: Equivalent EIRP = Declared maximum EIRP * Duty cycle.

Note 4: Margin = MPE Limit - MPE Value.

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APPENDIX 1 PHOTOS OF TEST SETUP

N/A

APPENDIX 2 PHOTOS OF EUT CONSTRUCTIONAL DETAILS

Refer to Appendix 2 for EUT external and internal photos.

*** End of Report ***

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