MPE REPORT

Product Name:	Global LTE Cat.M1/LTE Cat.NB2 Data-Only Module
Trade Mark:	CINTERION
Model No. / HVIN:	TX62-W
Report Number:	200415017RFC-1
Test Standards:	FCC 47 CFR Part 1 Subpart I RSS-102 Issue 5
FCC ID:	QIPTX62-W
IC:	7830A-TX62W
Test Result:	PASS
Date of Issue:	January 25, 2021

Prepared for:

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Prepared by:

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Version

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V1.0	January 25, 2021	Original

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1. Test Laboratory

Company Name:	Shenzhen UnionTrust Quality and Technology Co., Ltd.
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2. Client Information

2.1. Applicant Information

Company Name: Thales DIS AIS Deutschland GmbH

Address /Post: Siemensdamm 50, 13629 Berlin, Germany

Telephone: /

Postcode: /

2.2. Manufacturer Information

Company Name: Thales DIS AIS Deutschland GmbH

Address /Post: Werinherstr.81, 81541 Munich, Germany

Telephone: /

Postcode: /

3. Equipment Under Test (EUT) and Ancillary Equipment (AE)

3.1. About EUT

EUT Description	Global LTE Cat.M1/LTE Cat.NB2 Data-Only Module
Model name	TX62-W
LTE Frequency Band	LTE Band 2/ Band 4/ Band 5/ Band 12/ Band 13/ Band 25/ Band 26/ Band 66/ Band 71
Antenna Type	External Antenna
FCC ID:	QIPTX62-W
IC:	7830A-TX62W

3.2. Internal Identification of EUT used during the test

EUT ID*	SN or IMEI	HW Version	SW Version:	Note
200415016-A01/2 200415016-A02/2	N/A	B1	01.000	SIM
200415016-B01/2 200415016-B02/2	N/A	B1.1	01.000	ESIM

*EUT ID: is used to identify the test sample in the lab internally.

3.3. Internal Identification of AE used during the test

AE ID*	Description	Model	SN	Manufacturer
N/A	N/A	N/A	N/A	N/A

*AE ID: is used to identify the test sample in the lab internally.

4. Power Output Test Results

4.1. RF Power Output

Frequency Band	Highest Power Output(dBm)
LTE Band 2	22
LTE Band 4	22
LTE Band 5	22
LTE Band 12	22
LTE Band 13	22
LTE Band 25	22
LTE Band 26	22
LTE Band 66	22
LTE Band 71	22

4.2. Duty cycle

Mode	Duty Cycle
LTE	1:1

5. Reference Documents for FCC

5.1. Applicable Standards

The MPE report was carried out on a sample equipment to demonstrate limited compliance with FCC CFR 47 Part 2.1091.
FCC CFR 47, Part 2, FREQUENCY ALLOCATIONS AND RADIO TREATY MATTERS; GENERAL RULES AND REGULATIONS, Oct 1, 2011
Section 2.1091 Radiofrequency radiation exposure evaluation.

5.2. Test Limits

Systems operating under the provisions of this section shall be operated in a manner that ensures that the public is not exposed to radio frequency energy level in excess limit for maximum permissible exposure. In accordance with 47 CFR FCC Part 2 Subpart J, section 2.1091 this device has been defined as a mobile device whereby a distance of 0.2m normally can be maintained between the user and the device.

Limits for Occupational / Controlled Exposure

Frequency Range [MHz]	Electric Field Strength (E) [V/m]	Magnetic Field Strength (H) [A/m]	Power Density (S) [mW/cm2]	Averaging Times |E|2, |H|2 or S [miniutes]
0.3 – 3.0	614	1.63	(100)*	6
3.0 – 30	1824/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/cm2]	Averaging Times |E|2, |H|2 or S [miniutes]
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	--	--	1.0	30

Note: f=frequency in MHz; *Plane-wave equivalent power density
For the DUT, the limits for General Population / Uncontrolled Exposure are applicable.

FCC: §1.1307	Cellular Radiotelephone Service (subpart H of part 22) Non-building-mounted antennas: height above ground level to lowest point of antenna < 10 m and total power of all channels > 1000 W ERP (1640 W EIRP)
FCC §1.1307	Personal Communications Services (part 24) Broadband PCS (subpart E): non-building-mounted antennas: height above ground level to lowest point of antenna < 10 m and total power of all channels > 2000 W ERP (3280 W EIRP)
FCC §1.1310	LIMITS FOR MAXIMUM PERMISSIBLE EXPOSURE (MPE) Table 1(B) Limits for General Population/Uncontrolled Exposure 300–1500 MHz: f/1500 mW/cm² 1500–100,000 MHz: 1.0 mW/cm² Subject to routine evaluation is required when the device operate at frequencies of 1.5 GHz or below and their
FCC §2.1091	effective radiated power (ERP) is 1.5 watts or more, or if they operate at frequencies above 1.5 GHz and their ERP is3 watts or more.(a) Base stations are limited to 1640 watts peak equivalent isotropically radiated power (e.i.r.p.) with an antenna
FCC §24.232	height up to 300 meters HAAT. b) Mobile/portable stations are limited to 2 watts e.i.r.p. peak power, …
FCC §22.913	(a) Maximum ERP. The effective radiated power (ERP) of base transmitters and cellular repeaters must not exceed 500 Watts. The ERP of mobile transmitters and auxiliary test transmitters must not exceed 7 Watts.
FCC §27.50 (C)(10)	(10) Portable stations (hand-held devices) are limited to 3 watts ERP; and
FCC §27.50(d)	(4) Fixed, mobile, and portable (hand-held) stations operating in the 1710-1755 MHz band are limited to 1 watt EIRP.

5.3. Calculation Information

For conservative evaluation consideration, only maximum power of each frequency band based on the tighter limits respectively are used to calculate the boundary power density.

Based on the FCC KDB 447498 D01 and 47 CFR §2.1091, the DUT is evaluated as a mobile device.

$$\text{Given} \quad S = \frac{P \times G}{4\Pi d^2} \qquad \textit{Equation 1}$$

Where

P = Power in Watts

G = Numeric antenna gain

d = Distance in meters

S = Power density in milliwatts / square centimeter

5.4. Max. Antenna gain calculations

Maximum antenna gain considerations for fixed/mobile operations for complying with limits:

Band	Highest Frame-Averaged Output Power (dBm)	Limit (mW/cm^2)	Max antenna gain at 20cm (dBi)
LTE Band 2	22	1	15.01
LTE Band 4	22	1	15.01
LTE Band 5	22	0.549	12.41
LTE Band 12	22	0.466	11.70
LTE Band 13	22	0.518	12.16
LTE Band 25	22	1	15.01
LTE Band 26	22	0.549	12.41
LTE Band 66	22	1	15.01
LTE Band 71	22	0.442	11.47

Power limit according to §22.913(a), §24.232(c), §27.50(d)(4), §27.50(c)(10), §27.50(h)(2), §27.50(b)(10), §90.635:

Band	Highest Frame-Averaged Output Power (dBm)	Limit (W) (ERP/EIRP)	Max antenna gain at 20cm(dBi)
LTE Band 2	22	2	11.01
LTE Band 4	22	1	8.00
LTE Band 5	22	7	16.45
LTE Band 12	22	3	12.77
LTE Band 13	22	3	12.77
LTE Band 25	22	2	11.01
LTE Band 26	22	7	16.45
LTE Band 66	22	1	8.00
LTE Band 71	22	3	12.77

5.5. Conclusion for maximum admissible antenna gain (FCC)

Band	Maximum admissible antenna gain (dBi)
LTE Band 2	11.01
LTE Band 4	8.00
LTE Band 5	12.41
LTE Band 12	11.70
LTE Band 13	12.16
LTE Band 25	11.01
LTE Band 26	12.41
LTE Band 66	8.00
LTE Band 71	11.47

6. Reference Documents for IC

6.1. Applicable Standards

RSS 102 Issue 5 :Radio Frequency (RF) Exposure Compliance of Radio communication Apparatus (All Frequency Bands)

6.2. Test Limits

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 MHz 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 22.48/f0.5 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 x 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.

RSS 132	The transmitter output power shall be measured in terms of average power. The equivalent isotropically radiated power (e.i.r.p.) for mobile equipment shall not exceed 11.5 watts. Refer to SRSP-503 for base station e.i.r.p. limits.
SRSP-510	5.1.2 Mobile Stations Mobile stations and hand-held portables are limited to 2 watts maximum e.i.r.p. The equipment shall employ means to limit the power to the minimum necessary for successful communication.

6.3. Calculation Information

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 x 10-2 f0.6834 W (adjusted for tune-up tolerance), where f is in MHz;

6.4. Max. Antenna gain calculations

Maximum antenna gain considerations for fixed/mobile operations for complying with limits according to RSS 102:

Band	Highest Output Power (dBm)	MPE limit (W)	Max antenna gain at 20cm (dBi)
LTE Band 2	22	2.24	11.50
LTE Band 4	22	2.12	11.27
LTE Band 5	22	1.29	9.10
LTE Band 12	22	1.15	8.61
LTE Band 13	22	1.24	8.93
LTE Band 25	22	2.24	11.50
LTE Band 26	22	1.29	9.10
LTE Band 66	22	2.12	11.27
LTE Band 71	22	1.11	8.45

Power limit according to RSS 132, RSS-133, RSS-139, RSS-199, RSS-130, SRSP-510:

Band	Highest Frame-Averaged Output Power (dBm)	Limit (W) ERP/EIRP	Max antenna gain (dBi)
LTE Band 2	22	2	11.01
LTE Band 4	22	1	8.00
LTE Band 5	22	11.5	18.61
LTE Band 12	22	11.5	18.61
LTE Band 13	22	11.5	18.61
LTE Band 25	22	2	11.01
LTE Band 26	22	11.5	18.61
LTE Band 66	22	1	8.00
LTE Band 71	22	11.5	18.61

6.5. Conclusion for maximum admissible antenna gain (IC)

Band	Maximum admissible antenna gain (dBi)
LTE Band 2	11.01
LTE Band 4	8.00
LTE Band 5	9.10
LTE Band 12	8.61
LTE Band 13	8.93
LTE Band 25	11.01
LTE Band 26	9.10
LTE Band 66	8.00
LTE Band 71	8.45

7. Summary

Band	FCC Maximum admissible antenna gain (dBi)	IC Maximum admissible antenna gain (dBi)	Total Maximum admissible antenna gain (dBi)
LTE Band 2	11.01	11.01	11.01
LTE Band 4	8.00	8.00	8.00
LTE Band 5	12.41	9.10	9.10
LTE Band 12	11.70	8.61	8.61
LTE Band 13	12.16	8.93	8.93
LTE Band 25	11.01	11.01	11.01
LTE Band 26	12.41	9.10	9.10
LTE Band 66	8.00	8.00	8.00
LTE Band 71	11.47	8.45	8.45

*** End of Report ***