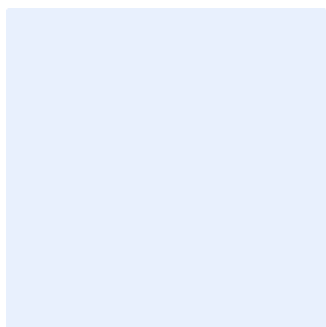


Prüfbericht-Nr.: <i>Test report no.:</i>	IN24ZOTO 001/IN24GHRL 001	Auftrags-Nr.: <i>Order no.:</i>	146879464 0010	Seite 1 von 4 Page 1 of 4
Kunden-Referenz-Nr.: <i>Client reference no.:</i>	2566340	Auftragsdatum: <i>Order date:</i>	2024-02-06	
Auftraggeber: <i>Client:</i>	75F Inc., 1650 W, 82nd St, #200, Bloomington, Minnesota, USA - 55431			
Prüfgegenstand: <i>Test item:</i>	Hyper Lite			
Bezeichnung <i>Identification</i>	7X-HS-K9X-X	Serien -Nr.: <i>Serial no.:</i>	Engineering Sample	
Auftrags-Inhalt: <i>Order content:</i>	Maximum Permissible Expoure			
Prüfgrundlage: <i>Test specification:</i>	FCC 1.1310 and RSS 102, Issue 6 KDB 447498 D01			
Wareneingangsdatum: <i>Date of sample receipt:</i>	2024-06-04			
Prüfmuster-Nr.: <i>Test sample no:</i>	A003735739-001 A003735739-002			
Prüfzeitraum: <i>Testing period:</i>	2024-06-04 - 2024-06-05			
Ort der Prüfung: <i>Place of testing:</i>	Wireless laboratory, Bangalore			
Prüflaboratorium: <i>Testing laboratory:</i>	TÜV Rheinland (India) Pvt. Ltd. 27/B,2nd cross road, Electronic city Phase1, Bangalore-560100, India FCC Test Site Registration No: 496599 IC Test Site Registration No: 27711			
Prüfergebnis*: <i>Test result*:</i>	Pass			
geprüft von: <i>tested by:</i>	genehmigt von: <i>authorized by:</i>			
Datum: <i>Date:</i>	Ausstellatum: <i>Issue date:</i>			
Stellung / Position:	Likhithesh M D Senior Engineer	Stellung / Position:	Madhu K.N Assistant Manager	
Sonstiges / Other:	FCC ID: 2AVZO-101057 IC: 25972-101057 HVIN: 101057HSL			
Zustand des Prüfgegenstandes bei Anlieferung: <i>Condition of the test item at delivery:</i>	Prüfmuster vollständig und unbeschädigt <i>Test item complete and undamaged</i>			
* Legende:	1 = sehr gut P(ass) = entspricht o.g. Prüfgrundlage(n)	2 = gut F(ail) = entspricht nicht o.g. Prüfgrundlage(n)	3 = befriedigend F(ail) = entspricht nicht o.g. Prüfgrundlage(n)	4 = ausreichend N/A = nicht anwendbar
* Legend:	1 = very good P(ass) = passed a.m. test specification(s)	2 = good F(ail) = failed a.m. test specification(s)	3 = satisfactory F(ail) = failed a.m. test specification(s)	4 = sufficient N/A = not applicable
Dieser Prüfbericht bezieht sich nur auf das o.g. Prüfmuster und darf ohne Genehmigung der Prüfstelle nicht auszugsweise vervielfältigt werden. Dieser Bericht berechtigt nicht zur Verwendung eines Prüfzeichens. <i>This test report only relates to the a. m. test sample. Without permission of the test center this test report is not permitted to be duplicated in extracts. This test report does not entitle to carry any test mark.</i>				

1 RF Exposure Report

1.1 RF Exposure Measurement

The limit for Maximum Permissible Exposure (MPE) specified in FCC 1.1310. The gain of the antennas used in the product is extracted from the Antenna data sheets provided and also the maximum total power input to the antenna is measured. Through the Friis transmission formula and the maximum gain of the antenna, we can calculate the distance, away from the product, where the limit of MPE is reached.

Although the Friis Transmission formula is far field assumption, the calculated result of that is an over-prediction for near field power density. It is taken as worst case to specify the safety range.

1.2 RF Exposure Limit

1.2.1 For FCC

According to FCC 1.1310: The criteria listed in the following table shall be used to evaluate the environmental impact of the human exposure to radio-frequency (RF) radiation as specified in 1.1307 (b) showed in Table 1.

Table 1: Limits for Maximum Permissible Exposure (MPE) as per FCC

Frequency Range (MHz)	Electric Field Strength (V/m)	Magnetic Field Strength (A/m)	Power Density (mW/cm ²)
Limits for Occupational / controlled Exposures			
300 - 1500	--	--	F/300
1500 – 100000	--	--	5.0
Limits for General population / Uncontrolled Exposure			
300 - 1500	--	--	F/1500
1500 – 100000	--	--	1.0

F or f = Frequency in MHz

1.2.2 For IC

According to IC RSS 102 Issue 6: The criteria listed in the following table shall be used to evaluate the environmental impact of the human exposure to radiofrequency (RF) radiation as specified in section 4 showed in Table 2.

Table 2: Limits for Maximum Permissible Exposure (MPE) as per IC

Frequency Range (MHz)	Electric Field (V/m rms)	Magnetic Field (A/m rms)	Power Density (W/m ²)	Reference Period (minutes)
0.003-10 ²¹	83	90	-	Instantaneous*
0.1-10	-	0.73/ <i>f</i>	-	6**
1.1-10	87/ <i>f</i> ^{0.5}	-	-	6**
10-20	27.46	0.0728	2	6
20-48	58.07/ <i>f</i> ^{0.25}	0.1540/ <i>f</i> ^{0.25}	8.944/ <i>f</i> ^{0.5}	6
48-300	22.06	0.05852	1.291	6
300-6000	3.142 <i>f</i> ^{0.3417}	0.008335 <i>f</i> ^{0.3417}	0.02619 <i>f</i> ^{0.6834}	6
6000-15000	61.4	0.163	10	6
15000-150000	61.4	0.163	10	616000/ <i>f</i> ^{1.2}
150000-300000	0.158 <i>f</i> ^{0.5}	4.21 x 10 ⁻⁴ <i>f</i> ^{0.5}	6.67 x 10 ⁻⁵ <i>f</i>	616000/ <i>f</i> ^{1.2}
Note: <i>f</i> is frequency in MHz. *Based on nerve stimulation (NS). ** Based on specific absorption rate (SAR).				

1.2.3 Friss Formula

Friss Transmission Formula: $P_d = (P_{out} * G) / (4 * \pi * r^2)$

Where

P_d = power density in mW/cm²

P_{out} = output power to antenna in mW

G = gain of antenna in linear scale

π = 3.1416

R = Distance between observation point and the center of radiator in cm

If we know the maximum gain of the antenna and the total output power to the antenna, through calculation, we will know MPE value at distance 20cm.

1.3 Compliance criteria

The Radio frequency Human Exposure Evaluation specification, method and procedures for Hyper Lite is in accordance with the following standard FCC 1.1310 & IC RSS 102 Issue 6.

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1.4 Test Results

Protocol: BLE & LoRa

Antenna types	Antenna gain
BLE	-1.0
LoRa	-0.8 dBi

MPE calculations :

Channel Frequency (MHz)	Maximum output power (dBm)	Tune up Value in (dB)	Antenna Gain (dBi)	Antenna gain in linear scale	Maximum output power including Tune-up value (mW)	Power Density (Pd) (mW/cm ²)	FCC Limit (mW/cm ²)	Power Density (Pd) (W/m ²)	RSS Limit (W/m ²)
2440	2.81	1	-1.0	0.7943	2.4043	0.00037	1.0	0.0037	5.40851
906	11.09	2	-0.8	0.8317	20.3704	0.00337	0.604	0.0337	2.74812

Note:

1. MPE evaluation is performed for 20 cm separation distance.
2. Manufacturer declared Tune-up tolerance of ± 2 dB is considered for LoRa and ± 1 dB for BLE considered in the calculation.

1.5 Conclusion:

The Power density of the EUT is less than defined limit as shown above, hence EUT is exempted from routine SAR evaluation.