1. MAXIMUM PERMISSIBLE EXPOSURE (MPE)

1.1 General Information

Client Information

Applicant:	Global Telecom Corp
Address of applicant:	17901 Von Karman Ave, Suite 600, Irvine, California 92614 United States of America

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General Description of EUT:

Product Name:	LTE Module
Trade Name:	Global Telecom
Model No.:	Global-7243A4x4CB
Adding Model(s):	/
Rated Voltage:	DC12V
FCC ID:	S3KG7243A4CB
Equipment Type:	Fixed or Mobile device

Technical Characteristics of EUT:	
4G	
Support Networks:	FDD-LTE, TDD-LTE
Support Band:	FDD-LTE Band 2, 4, 5, 12, 13, 17, 25, 26, 66, 71 TDD-LTE Band 41
Uplink Frequency:	FDD-LTE Band 2: Tx: 1850-1910MHz, FDD-LTE Band 4: Tx: 1710-1755MHz, FDD-LTE Band 5: Tx: 824-849MHz, FDD-LTE Band 12: Tx: 699-716MHz, FDD-LTE Band 13: Tx: 777-787MHz, FDD-LTE Band 17: Tx: 704-716MHz FDD-LTE Band 25: Tx: 1850-1915MHz FDD-LTE Band 26: Tx: 814-849MHz TDD-LTE Band 41: Tx: 2496-2690MHz FDD-LTE Band 66: Tx: 1710-1780MHz FDD-LTE Band 71: Tx: 663-698MHz
Downlink Frequency:	FDD-LTE Band 2: Rx: 1930-1990MHz, FDD-LTE Band 4: Rx: 2110-2155MHz, FDD-LTE Band 5: Rx: 869-894MHz, FDD-LTE Band 12: Rx: 729-746MHz, FDD-LTE Band 13: Rx: 746-756MHz,

	FDD-LTE Band 17: Rx: 734-746MHz FDD-LTE Band 25: Rx: 1930-1995MHz, FDD-LTE Band 26: Rx: 859-894MHz, TDD-LTE Band 41: Rx: 2496-2690MHz, FDD-LTE Band 66: Rx: 2110-2200MHz, FDD-LTE Band 71: Rx: 617-652MHz
RF Output Power:	FDD-LTE Band 2: 23.79dBm, FDD-LTE Band 4: 24.04dBm, FDD-LTE Band 5: 23.55dBm, FDD-LTE Band 12: 24.01dBm, FDD-LTE Band 13: 23.41dBm, FDD-LTE Band 17: 21.44dBm FDD-LTE Band 25: 24.18dBm FDD-LTE Band 26: 23.25dBm, TDD-LTE Band 41: 23.90dBm, FDD-LTE Band 66: 23.81dBm , FDD-LTE Band 71: 23.82dBm
Type of Emission:	FDD-LTE Band 2: 17M9G7D, 17M9W7D FDD-LTE Band 4: 17M9G7D, 17M9W7D FDD-LTE Band 5: 9M00G7D, 9M00W7D FDD-LTE Band 12: 9M00G7D, 9M00W7D FDD-LTE Band13: 9M00G7D, 9M00W7D FDD-LTE Band 17: 9M00G7D, 9M00W7D FDD-LTE Band 25: 17M9G7D, 17M9W7D FDD-LTE Band 26: 13M4G7D, 13M4W7D TDD-LTE Band 41: 17M9G7D, 17M9W7D FDD-LTE Band 66: 17M9G7D, 17M9W7D FDD-LTE Band 71: 17M9G7D, 17M9W7D
Type of Modulation:	QPSK, 16QAM
Antenna Type:	PCB Antenna
Antenna Gain:	FDD-LTE Band 2:4dBi, FDD-LTE Band 4: 5dBi, FDD-LTE Band 5: 2dBi, FDD-LTE Band 12: 2dBi, FDD-LTE Band 13: 2dBi, FDD-LTE Band 17: 2dBi FDD-LTE Band 25: 4dBi FDD-LTE Band 26: 2dBi TDD-LTE Band 41: 4dBi FDD-LTE Band 66: 4dBi FDD-LTE Band 71: 1dBi

1.2 Standard Applicable

According to § 1.1307(b)(1) and KDB 447498 D01 General RF Exposure Guidance v06, 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.

(a) 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

(b) 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 equivalents power density

1.3 MPE Calculation Method

$S = (30*P*G) / (377*R^2)$

S = power density (in appropriate units, e.g., mw/cm^2)

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)

1.4 MPE Calculation Result

For FDD-LTE Band 2:
Maximum Tune-Up output power: 24.0 (dBm)
Maximum peak output power at antenna input terminal: 251.19(mW)
Prediction distance: >20(cm)
Prediction frequency: 1900.0 (MHz)
Antenna gain: 4 (dBi)
Directional gain (numeric gain): 2.51
The worst case is power density at prediction frequency at 20cm: 0.1255 (mw/cm^2)
MPE limit for general population exposure at prediction frequency: 1 (mw/cm^2)

For FDD-LTE Band 4:
Maximum Tune-Up output power: 24.5 (dBm)
Maximum peak output power at antenna input terminal: 281.84(mW)
Prediction distance: >20(cm)
Prediction frequency: 1750.0 (MHz)
Antenna gain: 5 (dBi)
Directional gain (numeric gain): 3.16
The worst case is power density at prediction frequency at 20cm: 0.1773 (mw/cm^2)
MPE limit for general population exposure at prediction frequency: 1 (mw/cm^2)

For FDD-LTE Band 5:
Maximum Tune-Up output power: 24.0 (dBm)
Maximum peak output power at antenna input terminal: 251.19(mW)
Prediction distance: >20(cm)
Prediction frequency: 848.3 (MHz)
Antenna gain: 2 (dBi)
Directional gain (numeric gain): 1.58
The worst case is power density at prediction frequency at 20cm: 0.0792 (mw/cm^2)
MPE limit for general population exposure at prediction frequency: 0.5655 (mw/cm^2)

For FDD-LTE Band 12:
Maximum Tune-Up output power:24.5 (dBm)
Maximum peak output power at antenna input terminal: 281.84(mW)
Prediction distance: >20(cm)
Prediction frequency: 715.3 (MHz)
Antenna gain: 2 (dBi)
Directional gain (numeric gain): 1.58
The worst case is power density at prediction frequency at 20cm: 0.0889 (mw/cm^2)
MPE limit for general population exposure at prediction frequency: 0.4769 (mw/cm^2)

For FDD-LTE Band 13:
Maximum Tune-Up output power: 24.0 (dBm)
Maximum peak output power at antenna input terminal: 251.19(mW)
Prediction distance: >20(cm)
Prediction frequency: 782.0 (MHz)
Antenna gain: 2 (dBi)
Directional gain (numeric gain): 1.58
The worst case is power density at prediction frequency at 20cm: 0.0792 (mw/cm^2)
MPE limit for general population exposure at prediction frequency: 0.5213 (mw/cm^2)

For FDD-LTE Band 17:
Maximum Tune-Up output power:22.0 (dBm)
Maximum peak output power at antenna input terminal: 158.49(mW)
Prediction distance: >20(cm)
Prediction frequency: 709.0 (MHz)
Antenna gain: 2 (dBi)
Directional gain (numeric gain): 1.58
The worst case is power density at prediction frequency at 20cm: 0.0500 (mw/cm^2)
MPE limit for general population exposure at prediction frequency: 0.4727 (mw/cm^2)

For FDD-LTE Band 25:
Maximum Tune-Up output power: 24.5 (dBm)
Maximum peak output power at antenna input terminal: 281.84(mW)
Prediction distance: >20(cm)
Prediction frequency: 1907.5 (MHz)
Antenna gain: 4 (dBi)
Directional gain (numeric gain): 2.51
The worst case is power density at prediction frequency at 20cm: 0.1408 (mw/cm^2)
MPE limit for general population exposure at prediction frequency: 1 (mw/cm^2)

For FDD-LTE Band 26:
Maximum Tune-Up output power: 24.0 (dBm)
Maximum peak output power at antenna input terminal: 251.19(mW)
Prediction distance: >20(cm)
Prediction frequency: 814.7 (MHz)
Antenna gain: 2 (dBi)
Directional gain (numeric gain): 1.58
The worst case is power density at prediction frequency at 20cm: 0.0792 (mw/cm^2)
MPE limit for general population exposure at prediction frequency: 0.5431(mw/cm^2)

For TDD-LTE Band 41:
Maximum Tune-Up output power: 24.0 (dBm)
Maximum peak output power at antenna input terminal: 251.19(mW)
Prediction distance: >20(cm)
Prediction frequency: 2501.0 (MHz)
Antenna gain: 4 (dBi)
Directional gain (numeric gain): 2.51
The worst case is power density at prediction frequency at 20cm: 0.1255 (mw/cm^2)
MPE limit for general population exposure at prediction frequency: 1(mw/cm^2)

For FDD-LTE Band 66:
Maximum Tune-Up output power: 24.0 (dBm)
Maximum peak output power at antenna input terminal: 251.19(mW)
Prediction distance: >20(cm)
Prediction frequency: 1745.0 (MHz)
Antenna gain: 4 (dBi)
Directional gain (numeric gain): 2.51
The worst case is power density at prediction frequency at 20cm: 0.1255 (mw/cm^2)
MPE limit for general population exposure at prediction frequency: 1 (mw/cm^2)

For FDD-LTE Band 71:
Maximum Tune-Up output power: 24.0 (dBm)
Maximum peak output power at antenna input terminal: 251.19(mW)
Prediction distance: >20(cm)
Prediction frequency: 670.5 (MHz)
Antenna gain: 1 (dBi)
Directional gain (numeric gain): 1.26
The worst case is power density at prediction frequency at 20cm: 0.0629 (mw/cm^2)
MPE limit for general population exposure at prediction frequency: 0.4470 (mw/cm^2)

Mode for Simultaneous Multi-band Transmission
For FDD-LTE Band 12+ FDD-LTE Band 12 (worst case)
The worst case is power density at prediction frequency at 20cm: 0.0889/0.4769+0.0889/0.4769=0.3728<1

Result: Pass