RADIO FREQUENCY EXPOSURE

LIMIT

According to FCC, 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 levels in excess of the Commission's guidelines.

EUT Specification

EUT	Computer
Model	TREK-572 ; TREK-572XXXXXXXXXXXXXXX (where "X" may be any alphanumeric character , "-" or blank)
Frequency band (Operating)	☒ GSM 850MHz: 824.2MHz ~ 848.8MHz ☒ GSM 1900MHz: 1850.2MHz ~ 1909.8MHz ☒ WCDMA Band II: 1852.4MHz ~ 1907.6MHz ☒ WCDMA Band V: 826.4MHz ~ 846.6MHz ☒ LTE Band 2: 1852.5MHz ~ 1907.5MHz ☒ LTE Band 5: 826.5MHz ~ 846.5MHz ☒ LTE Band 25: 1852.5MHz ~ 1912.5MHz ☒ LTE Band 4: 1710.0MHz ~ 1755.0MHz ☒ LTE Band 13: 779.5MHz ~ 784.5MHz ☒ LTE Band 17: 706.5MHz ~ 713.5MHz ☒ Bluetooth 2.1 + EDR / 4.0: 2402 ~ 2480 MHz 802.11b/g/n HT20: 2412MHz ~ 2462MHz 802.11n HT40: 2422MHz ~ 2452MHz UNII Band 1: 802.11a, 802.11an HT20 : 5180MHz ~ 5240MHz 802.11an HT40 : 5190MHz ~ 5230MHz UNII Band 2A: 802.11a, 802.11an HT20 : 5260MHz ~ 5320MHz 802.11an HT40 : 5270MHz ~ 5310MHz UNII Band 2C: 802.11a, 802.11an HT20 : 5500MHz ~ 5700MHz 802.11an HT40 : 5510MHz ~ 5670MHz UNII Band 3: 802.11a, 802.11an HT20 : 5745MHz ~ 5825MHz 802.11an HT40 : 5755MHz ~ 5795MHz ☐ Others
Device category	☐ Portable (<20cm separation) ☒ Mobile (>20cm separation) ☐ Others
Exposure classification	☐ Occupational/Controlled exposure (S = 5mW/cm^2) ☒ General Population/Uncontrolled exposure (S=1mW/cm^2)

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Antenna Specification	GSM 850:	Antenna Gain :	2.17 dBi	(Numeric gain 1.65)
	GSM 1900:	Antenna Gain :	2.14 dBi	(Numeric gain 1.64)
	WCDMA Band II	Antenna Gain :	2.14 dBi	(Numeric gain 1.64)
	WCDMA Band V	Antenna Gain :	2.17 dBi	(Numeric gain 1.65)
	LTE Band 2:	Antenna Gain :	2.14 dBi	(Numeric gain 1.64)
	LTE Band 5:	Antenna Gain :	2.17 dBi	(Numeric gain 1.65)
	LTE Band 25:	Antenna Gain :	2.14 dBi	(Numeric gain 1.64)
	LTE Band 4:	Antenna Gain :	2.09 dBi	(Numeric gain 1.62)
	LTE Band 13:	Antenna Gain :	2.66 dBi	(Numeric gain 1.85)
	LTE Band 17:	Antenna Gain :	2.66 dBi	(Numeric gain 1.85)
	2.4GHz (1TX) :	Antenna Gain :	3.97 dBi	(Numeric gain 2.49)
	2.4GHz (2TX) :	Antenna Gain :	6.89 dBi	(Numeric gain 4.89)
	5GHz (1TX) :	Antenna Gain :	2.75 dBi	(Numeric gain 1.88)
	5GHz (2TX):	Antenna Gain :	9.16 dBi	(Numeric gain 8.24)

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Measurement Average output power

System	Power	
GSM850	29.53 dBm	(897.43 mW)
GSM1900	29.15 dBm	(822.24 mW)
WCDMA Band II	23.07 dBm	(202.77 mW)
WCDMA Band V	23.37 dBm	(217.27 mW)
LTE Band 2	29.07 dBm	(807.24 mW)
LTE Band 5	28.55 dBm	(716.14 mW)
LTE Band 25	28.99 dBm	(792.50 mW)
LTE Band 4	28.87 dBm	(770.90 mW)
LTE Band 13	28.62 dBm	(727.78 mW)
LTE Band 17	28.76 dBm	(751.62 mW)
1TX :		
2.4G		
IEEE 802.11b Mode	23.94 dBm	(247.74 mW)
IEEE 802.11g Mode	26.38 dBm	(434.51 mW)
IEEE 802.11gn HT 20 Mode	26.01 dBm	(399.02 mW)
IEEE 802.11gn HT 40 Mode	24.67 dBm	(293.09 mW)
Bluetooth 4.0	2.63 dBm	(1.83 mW)
Bluetooth 2.1 + EDR	5.60 dBm	(3.63 mW)
5G UNII Band 1		
IEEE 802.11a Mode	21.10 dBm	(128.82 mW)
IEEE 802.11an HT 20 Mode	21.03 dBm	(126.77 mW)
IEEE 802.11an HT 40 Mode	20.64 dBm	(115.88 mW)
5G UNII Band 2A		
IEEE 802.11a Mode	20.82 dBm	(120.78 mW)
IEEE 802.11an HT 20 Mode	20.86 dBm	(121.90 mW)
IEEE 802.11an HT 40 Mode	20.06 dBm	(101.39 mW)
5G UNII Band 2C		
IEEE 802.11a Mode	20.83 dBm	(121.06 mW)
IEEE 802.11an HT 20 Mode	20.77 dBm	(119.40 mW)
IEEE 802.11an HT 40 Mode	20.42 dBm	(110.15 mW)
5G UNII Band 3		
IEEE 802.11a Mode	20.34 dBm	(108.14 mW)
IEEE 802.11an HT 20 Mode	20.35 dBm	(108.39 mW)
IEEE 802.11an HT 40 Mode	20.50 dBm	(112.20 mW)

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Measurement Average output power	

System	Power	
2TX :		
2.4G		
IEEE 802.11b Mode	24.21 dBm	(263.63 mW)
IEEE 802.11g Mode	26.00 dBm	(398.11 mW)
IEEE 802.11gn HT 20 Mode	25.98 dBm	(396.28 mW)
IEEE 802.11gn HT 40 Mode	26.01 dBm	(399.02 mW)
Bluetooth 4.0	2.63 dBm	(1.83 mW)
Bluetooth 2.1 + EDR	5.60 dBm	(3.63 mW)
5G UNII Band 1		
IEEE 802.11a Mode	16.81 dBm	(47.97 mW)
IEEE 802.11an HT 20 Mode	16.66 dBm	(46.34 mW)
IEEE 802.11an HT 40 Mode	17.61 dBm	(57.68 mW)
5G UNII Band 2A		
IEEE 802.11a Mode	16.32 dBm	(42.85 mW)
IEEE 802.11an HT 20 Mode	16.43 dBm	(43.95 mW)
IEEE 802.11an HT 40 Mode	17.24 dBm	(52.97 mW)
5G UNII Band 2C		
IEEE 802.11a Mode	16.30 dBm	(42.66 mW)
IEEE 802.11an HT 20 Mode	16.83 dBm	(48.19 mW)
IEEE 802.11an HT 40 Mode	17.71 dBm	(59.02 mW)
5G UNII Band 3		
IEEE 802.11a Mode	22.00 dBm	(158.49 mW)
IEEE 802.11an HT 20 Mode	21.61 dBm	(144.88 mW)
IEEE 802.11an HT 40 Mode	17.64 dBm	(58.08 mW)

Evaluation applied	☒ MPE Evaluation* ☐ SAR Evaluation ☐ N/A

Remark :*1. For more details, please refer to the User's manual of the EUT.*
2. The model TREK-572 was considered the main model for testing.

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Revision History

Rev.	Issue Date	Revisions	Effect Page	Revised By
00	2015/06/04	Initial Issue	ALL	Gloria Chang

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TEST RESULTS

No non-compliance noted.

Calculation

Given $E = \frac{\sqrt{30 \times P \times G}}{d}$ & $S = \frac{E^2}{3770}$

Where E = Field strength in Volts / meter
P = Power in Watts
G = Numeric antenna gain
d = Distance in meters
S = Power density in milliwatts / square centimeter

Combining equations and re-arranging the terms to express the distance as a function of the remaining variables yields:

$$S = \frac{30 \times P \times G}{3770 d^2}$$

Changing to units of mW and cm, using:

P (mW) = P (W) / 1000 and

d (cm) = d(m) / 100

Yields

$$S = \frac{30 \times (P/1000) \times G}{3770 \times (d/100)^2} = 0.0796 \times \frac{P \times G}{d^2}$$ ***Equation 1***

Where d = Distance in cm
P = Power in mW
G = Numeric antenna gain
S = Power density in mW / cm^2

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Maximum Permissible Exposure

Substituting the MPE safe distance using d = 20 cm into Equation 1:

$$S = 0.000199 \times P \times G$$

Where P = Power in mW
G = Numeric antenna gain
S = Power density in mW / cm²

GSM850 mode:

Frq.(MHz)	P (mW)	Gain (num.)	D (cm)	Power density in mW / cm²	Limit (mW/cm²)
848.8	897.43	1.65	20	0.2947	0.566

GSM1900 mode:

Frq.(MHz)	P (mW)	Gain (num.)	D (cm)	Power density in mW / cm²	Limit (mW/cm²)
1900	822.24	1.64	20	0.2683	1.000

WCDMA Band II mode:

Frq.(MHz)	P (mW)	Gain (num.)	D (cm)	Power density in mW / cm²	Limit (mW/cm²)
1900	202.27	1.64	20	0.0660	1.000

WCDMA Band V mode:

Frq.(MHz)	P (mW)	Gain (num.)	D (cm)	Power density in mW / cm²	Limit (mW/cm²)
850	217.27	1.65	20	0.0713	0.567

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LTE Band 2 mode:

Frq.(MHz)	P (mW)	Gain (num.)	D (cm)	Power density in mW / cm^2	Limit (mW/cm^2)
1850.76	807.24	1.64	20	0.2635	1.000

LTE Band 5 mode:

Frq.(MHz)	P (mW)	Gain (num.)	D (cm)	Power density in mW / cm^2	Limit (mW/cm^2)
836.82	716.14	1.65	20	0.2351	0.558

LTE Band 25 mode:

Frq.(MHz)	P (mW)	Gain (num.)	D (cm)	Power density in mW / cm^2	Limit (mW/cm^2)
1882.5	792.50	1.64	20	0.2586	1.000

LTE Band 4 mode:

Frq.(MHz)	P (mW)	Gain (num.)	D (cm)	Power density in mW / cm^2	Limit (mW/cm^2)
1900	770.90	1.62	20	0.2485	1.000

LTE Band 13 mode:

Frq.(MHz)	P (mW)	Gain (num.)	D (cm)	Power density in mW / cm^2	Limit (mW/cm^2)
1732.5	727.78	1.85	20	0.2679	1.000

LTE Band 17 mode:

Frq.(MHz)	P (mW)	Gain (num.)	D (cm)	Power density in mW / cm^2	Limit (mW/cm^2)
712.1	751.62	1.85	20	0.2767	1.000

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1TX :

IEEE 802.11b mode:

Frq.(MHz)	P (mW)	Gain (num.)	D (cm)	Power density in mW / cm^2	Limit (mW/cm^2)
2437	247.74	2.49	20	0.1228	1.000

IEEE 802.11g mode:

Frq.(MHz)	P (mW)	Gain (num.)	D (cm)	Power density in mW / cm^2	Limit (mW/cm^2)
2437	434.51	2.49	20	0.2153	1.000

IEEE 802.11gn HT20 mode:

Frq.(MHz)	P (mW)	Gain (num.)	D (cm)	Power density in mW / cm^2	Limit (mW/cm^2)
2437	399.02	2.49	20	0.1977	1.000

IEEE 802.11gn HT40 mode:

Frq.(MHz)	P (mW)	Gain (num.)	D (cm)	Power density in mW / cm^2	Limit (mW/cm^2)
2437	293.09	2.49	20	0.1452	1.000

Bluetooth 4.0 mode:

Frq.(MHz)	P (mW)	Gain (num.)	D (cm)	Power density in mW / cm^2	Limit (mW/cm^2)
2402	1.83	2.49	20	0.0009	1.000

Bluetooth 2.1 + EDR mode:

Frq.(MHz)	P (mW)	Gain (num.)	D (cm)	Power density in mW / cm^2	Limit (mW/cm^2)
2402	3.63	2.49	20	0.0018	1.000

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UNII Band 1:

IEEE 802.11a mode:

Frq.(MHz)	P (mW)	Gain (num.)	D (cm)	Power density in mW / cm^2	Limit (mW/cm^2)
5240	128.82	1.88	20	0.0482	1.000

IEEE 802.11an HT20 mode:

Frq.(MHz)	P (mW)	Gain (num.)	D (cm)	Power density in mW / cm^2	Limit (mW/cm^2)
5220	126.77	1.88	20	0.0474	1.000

IEEE 802.11an HT40 mode:

Frq.(MHz)	P (mW)	Gain (num.)	D (cm)	Power density in mW / cm^2	Limit (mW/cm^2)
5230	115.88	1.88	20	0.0434	1.000

UNII Band 2A:

IEEE 802.11a mode:

Frq.(MHz)	P (mW)	Gain (num.)	D (cm)	Power density in mW / cm^2	Limit (mW/cm^2)
5260	120.78	1.88	20	0.0452	1.000

IEEE 802.11an HT20 mode:

Frq.(MHz)	P (mW)	Gain (num.)	D (cm)	Power density in mW / cm^2	Limit (mW/cm^2)
5260	121.90	1.88	20	0.0456	1.000

IEEE 802.11an HT40 mode:

Frq.(MHz)	P (mW)	Gain (num.)	D (cm)	Power density in mW / cm^2	Limit (mW/cm^2)
5270	101.39	1.88	20	0.0379	1.000

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UNII Band 2C:

IEEE 802.11a mode:

Frq.(MHz)	P (mW)	Gain (num.)	D (cm)	Power density in mW / cm^2	Limit (mW/cm^2)
5700	121.06	1.88	20	0.0453	1.000

IEEE 802.11an HT20 mode:

Frq.(MHz)	P (mW)	Gain (num.)	D (cm)	Power density in mW / cm^2	Limit (mW/cm^2)
5700	119.40	1.88	20	0.0447	1.000

IEEE 802.11an HT40 mode:

Frq.(MHz)	P (mW)	Gain (num.)	D (cm)	Power density in mW / cm^2	Limit (mW/cm^2)
5550	110.15	1.88	20	0.0412	1.000

UNII Band 3:

IEEE 802.11a mode:

Frq.(MHz)	P (mW)	Gain (num.)	D (cm)	Power density in mW / cm^2	Limit (mW/cm^2)
5745	108.14	1.88	20	0.0405	1.000

IEEE 802.11an HT20 mode:

Frq.(MHz)	P (mW)	Gain (num.)	D (cm)	Power density in mW / cm^2	Limit (mW/cm^2)
5745	108.39	1.88	20	0.0406	1.000

IEEE 802.11an HT40 mode:

Frq.(MHz)	P (mW)	Gain (num.)	D (cm)	Power density in mW / cm^2	Limit (mW/cm^2)
5755	112.20	1.88	20	0.0420	1.000

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2TX :

IEEE 802.11b mode:

Frq.(MHz)	P (mW)	Gain (num.)	D (cm)	Power density in mW / cm^2	Limit (mW/cm^2)
2437	263.63	4.89	20	0.2565	1.000

IEEE 802.11g mode:

Frq.(MHz)	P (mW)	Gain (num.)	D (cm)	Power density in mW / cm^2	Limit (mW/cm^2)
2437	398.11	4.89	20	0.3874	1.000

IEEE 802.11gn HT20 mode:

Frq.(MHz)	P (mW)	Gain (num.)	D (cm)	Power density in mW / cm^2	Limit (mW/cm^2)
2437	396.28	4.89	20	0.3856	1.000

IEEE 802.11gn HT40 mode:

Frq.(MHz)	P (mW)	Gain (num.)	D (cm)	Power density in mW / cm^2	Limit (mW/cm^2)
2437	399.02	4.89	20	0.3883	1.000

Bluetooth 4.0 mode:

Frq.(MHz)	P (mW)	Gain (num.)	D (cm)	Power density in mW / cm^2	Limit (mW/cm^2)
2402	1.83	4.89	20	0.0018	1.000

Bluetooth 2.1 + EDR mode:

Frq.(MHz)	P (mW)	Gain (num.)	D (cm)	Power density in mW / cm^2	Limit (mW/cm^2)
2402	3.63	4.89	20	0.0035	1.000

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UNII Band 1:

IEEE 802.11a mode:

Frq.(MHz)	P (mW)	Gain (num.)	D (cm)	Power density in mW / cm^2	Limit (mW/cm^2)
5240	47.97	8.24	20	0.0787	1.000

IEEE 802.11an HT20 mode:

Frq.(MHz)	P (mW)	Gain (num.)	D (cm)	Power density in mW / cm^2	Limit (mW/cm^2)
5220	46.34	8.24	20	0.0760	1.000

IEEE 802.11an HT40 mode:

Frq.(MHz)	P (mW)	Gain (num.)	D (cm)	Power density in mW / cm^2	Limit (mW/cm^2)
5230	57.68	8.24	20	0.0946	1.000

UNII Band 2A:

IEEE 802.11a mode:

Frq.(MHz)	P (mW)	Gain (num.)	D (cm)	Power density in mW / cm^2	Limit (mW/cm^2)
5260	42.85	8.24	20	0.0703	1.000

IEEE 802.11an HT20 mode:

Frq.(MHz)	P (mW)	Gain (num.)	D (cm)	Power density in mW / cm^2	Limit (mW/cm^2)
5260	43.95	8.24	20	0.0721	1.000

IEEE 802.11an HT40 mode:

Frq.(MHz)	P (mW)	Gain (num.)	D (cm)	Power density in mW / cm^2	Limit (mW/cm^2)
5270	52.97	8.24	20	0.0869	1.000

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UNII Band 2C:

IEEE 802.11a mode:

Frq.(MHz)	P (mW)	Gain (num.)	D (cm)	Power density in mW / cm^2	Limit (mW/cm^2)
5700	42.66	8.24	20	0.0700	1.000

IEEE 802.11an HT20 mode:

Frq.(MHz)	P (mW)	Gain (num.)	D (cm)	Power density in mW / cm^2	Limit (mW/cm^2)
5700	48.19	8.24	20	0.0790	1.000

IEEE 802.11an HT40 mode:

Frq.(MHz)	P (mW)	Gain (num.)	D (cm)	Power density in mW / cm^2	Limit (mW/cm^2)
5550	59.02	8.24	20	0.0968	1.000

UNII Band 3:

IEEE 802.11a mode:

Frq.(MHz)	P (mW)	Gain (num.)	D (cm)	Power density in mW / cm^2	Limit (mW/cm^2)
5745	158.49	8.24	20	0.2599	1.000

IEEE 802.11an HT20 mode:

Frq.(MHz)	P (mW)	Gain (num.)	D (cm)	Power density in mW / cm^2	Limit (mW/cm^2)
5745	144.88	8.24	20	0.2376	1.000

IEEE 802.11an HT40 mode:

Frq.(MHz)	P (mW)	Gain (num.)	D (cm)	Power density in mW / cm^2	Limit (mW/cm^2)
5755	58.08	8.24	20	0.0952	1.000

Simultaneously MPE

Simultaneously MPE = MPE1/Limit1 + MPE2/Limit2 + MPE3/Limit3

2.4G + 5G + WWAN

Simultaneously MPE = 0.3883 + 0.2599 + 0.2947= 0.9429 mW/cm^2

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