

RF Exposure

REF-0003 is Diabetes patient data transmitter in the GSM/UMTS/LTE system. The GSM frequency band includes GSM850 and PCS1900,. The UMTS frequency band are band II/V. The LTE frequency band is Band II/IV/V/XII. The Diabetes patient data transmitter implements such functions as RF signal receiving/transmitting, LTE/UMTS and GPRS/EDGE protocol. Externally it provides USIM card interface. The EUT is powered by DC 12V/2A. For more detailed features description, please refer to the user’s manual.

Limits

Frequency range (MHz)	Electric field strength (V/m)	Magnetic field strength (A/m)	Power density (mW/cm ²)	Averaging time (minutes)
(A) Limits for Occupational/Controlled Exposures				
0.3-3.0	614	1.63	*(100)	6
3.0-30	1842/f	4.89/f	*(900/f ²)	6
30-300	61.4	0.163	1.0	6
300-1500	/	/	f/300	6
1500-100,000	/	/	5	6

(B) Limits for General Population/Uncontrolled Exposure				
0.3-1.34	614	1.63	*(100)	30
1.34-30	824/f	2.19/f	*(180/f ²)	30
30-300	27.5	0.073	0.2	30
300-1500	/	/	f/1500	30
1500-100,000	/	/	1.0	30

F=frequency in MHz

*=Plane-wave equivalent power density

RF exposure compliance will need to be determined with respect to 1.1307(c) and (d) of the FCC rules. The emissions should be within the limits at 300kHz in Table 1 of 1.1310(use the 300kHz limits for 150kHz:614V/m,1.63A/m).

Friis Formula

Friis 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 center of the radiator in cm

P_d is the limit of MPE, 1 mW/cm². If we know the maximum gain of the antenna and the total power input to the antenna, through the calculation, we will know the distance r where the MPE limit is reached.

EUT RF Exposure Evaluation

FCC ID: 2ACSCGTM400

Test Report

Antenna Gain: The maximum Gain measured in fully anechoic chamber is 2.15 / 2.15 in linear scale. Output Power Into Antenna & RF Exposure Evaluation Distance:

Operating Band	Frequency (MHz)	Antenna Gain (dBi)	Max Conducted Average Output Power (dBm)	Output Power to Antenna (dBm)	Output Power to Antenna (mw)	Power Density at R = 20 cm (mW/cm ²)	Limit (mW/cm ²)	conclusion
GSM850	824.2	2.15	32	34.15	2600.16	0.5175	0.5495	PASS
GSM1900	1850.2	2.15	30	32.15	1640.59	0.3266	1	PASS
WCDMA B2	1852.4	2.15	24	26.15	412.10	0.0820	1	PASS
WCDMA B4	1712.4	2.15	24	26.15	412.10	0.0820	1	PASS
LTE B2	1850.7	2.15	23	25.15	327.34	0.0652	1	PASS
LTE B4	1710.7	2.15	23	25.15	327.34	0.0652	1	PASS
LTE B5	824.7	2.15	23	25.15	327.34	0.0652	0.5498	PASS
LTE B12	699.7	2.15	23	25.15	327.34	0.0652	0.4665	PASS
BT	2450	2	8	10	10.00	0.0020	1	PASS

The NFC function: Electric field strength=55.3dBuV/m=582.1uV/m

dependent MPE limits= $0.5175/0.5495+0.0020/1+0.5821/61.4=0.9532<1$