RF Exposure requirements

Product name	Scan Tool
Model number	G-scan 2
FCC ID	TMGG1FDDMN015
Radio specification	2.4 GHz WLAN (IEEE 802.11 b/g) / 2.4 GHz Bluetooth TPMS (125 kHz Transmitter, 315/433 MHz Receiver)
Antenna	2.4 GHz WLAN / Bluetooth (integral PCB antenna) 125 kHz Transmitter: Loop coil antenna 315/433 MHz Receiver: integral PCB antenna
Power source	7.4 V Li-ion battery / (external) DC 7 V - 35 V

According to the KDB 447498, the following standalone SAR test exclusion was considered to qualify for the SAR test exclusion.

Tx frequency range	(WLAN) 2412 MHz - 2462 MHz / (Bluetooth) 2402 MHz - 2480 MHz (TPMS) 125 kHz
Device category	handheld portable device
Maximum conducted output power	(WLAN) 18 mW (12.67 dBm)
Limit	56 mW (distance = 29 mm)

Maximum RF power output consideration:

The device has one 2.4 GHz (WLAN/Bluetooth) transceiver module which uses the same antenna. The WLAN and Bluetooth functions cannot be simultaneously enabled, but only one transceiver can be enabled by RF switch. The 125 kHz Transmitter is only used for waking 315/433 MHz TPMS sensor installed in a vehicle tire, and it is not used with WLAN/Bluetooth functions simultaneously. Therefore simultaneous transmission SAR test exclusion is not considered, and standalone SAR test exclusion was considered when the maximum RF output power was derived from WLAN function enabled.

Test separation distance consideration:

The test separation distance is determined by the smallest distance between the outer surface of the device and user. The WLAN/Bluetooth antenna is located along the top of the display, and the device may be used as a tablet mode.

The device cannot support the display orientation to be rotated to enable viewing in portrait and landscape modes. Exposures from the antenna through the front surface of the display section are limited to the user's hands, and therefore SAR evaluation for the front surface of display screens is not necessary. Therefore the test separation distance between the antenna and user was required for the bottom surface exposure condition.

RF average power output (measured):

unit: mW

Data rate	Operating channel (for WLAN device)										
	CH1	CH2	CH3	CH4	CH5	CH6	CH7	CH8	CH9	CH10	CH11
1 Mbps	13	13	16	14	14	14	16	16	16	16	17
2 Mbps	13	13	14	15	13	15	17	17	**18**	16	16
5.5 Mbps	13	13	14	15	16	15	17	17	17	16	16
11 Mbps	13	13	14	14	15	15	**18**	**18**	**18**	16	17
6 Mbps	7	8	8	8	9	8	8	10	11	10	9
9 Mbps	7	7	8	8	9	9	9	10	10	10	9
12 Mbps	7	7	8	8	8	8	8	9	9	9	9
18 Mbps	8	9	9	9	10	9	9	10	10	10	10
24 Mbps	7	8	8	10	8	9	9	10	10	9	9
36 Mbps	7	8	8	8	8	9	8	10	10	9	9
48 Mbps	7	8	9	8	8	9	9	10	10	10	9
54 Mbps	8	8	8	8	9	9	9	9	10	9	10

unit: mW

Data rate (packet)	Operating frequency (for Bluetooth device)		
	2402 MHz	2441 MHz	2480 MHz
Basic (DH5)	0.23	0.27	0.32
EDR (2-DH5)	0.16	0.18	0.21
EDR (3-DH5)	0.17	0.19	0.22

Calculation of the SAR test exclusion:

$$\left[(18, \mathrm{mW}) \Big/ (29, \mathrm{mm})\right] \times \left[\sqrt{(2.45, \mathrm{GHz})}\right] = 1.0$$

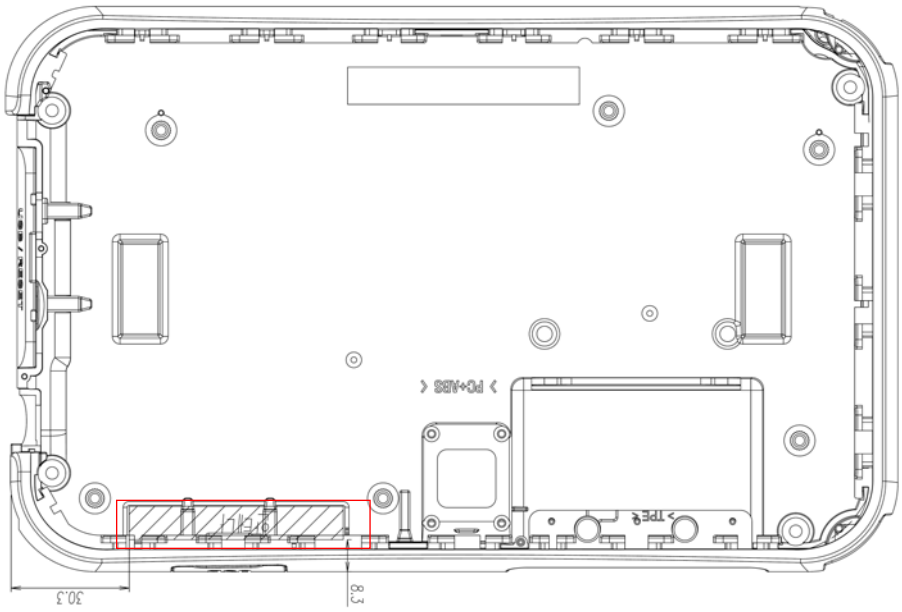
SAR test exclusion thresholds:

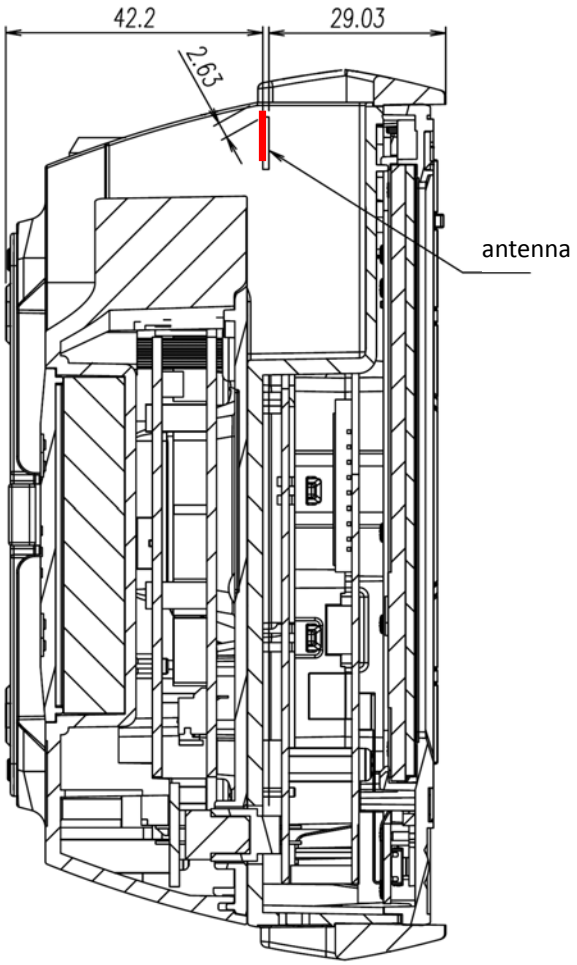
[(max. power of channel, mW) / (min. separation distance, mm] · $Vf_{(GHz)}$ ≤ 3.0 for 1-g SAR and ≤ 7.5 for 10-g extremity SAR

MHz	5	10	15	20	25	**29**	30	35	40	45	50	test separation distance (mm)
2450	10	19	29	38	48	**56**	57	67	77	86	96	SAR test exclusion threshold (mW)

The source-based time-averaged maximum conducted output power of the RF channel is less than 20 mW, and therefore the transmitter complies with the RF exposure requirements and the SAR is not required.

Drawing of the antenna location:






USB
80
70
60
50
40
30
20
10