

G5 RF SAR exclusion analysis

Product: 2,4 GHz Transceiver G5 RF10, G5 RF12, G5 RF14, G5 RF10 Display, G5 RF12 Display, G5 RF14 Display

Company: ScanrecoIndustrielektronik AB, Box 47144/ÅrstaSkolgränd 22, S-10074, Stockholm, Sweden

The radio part in this device is used in other hand-held / hand-operated devices and in equipment that is permanently installed to provide a separation distance of at least 20 cm from the user. In this hand-held / hand-operated device the antenna to extremity separation distance is at least 40 mm. The distance from the user to the antenna is at least 20 cm. Therefore body SAR is not required.

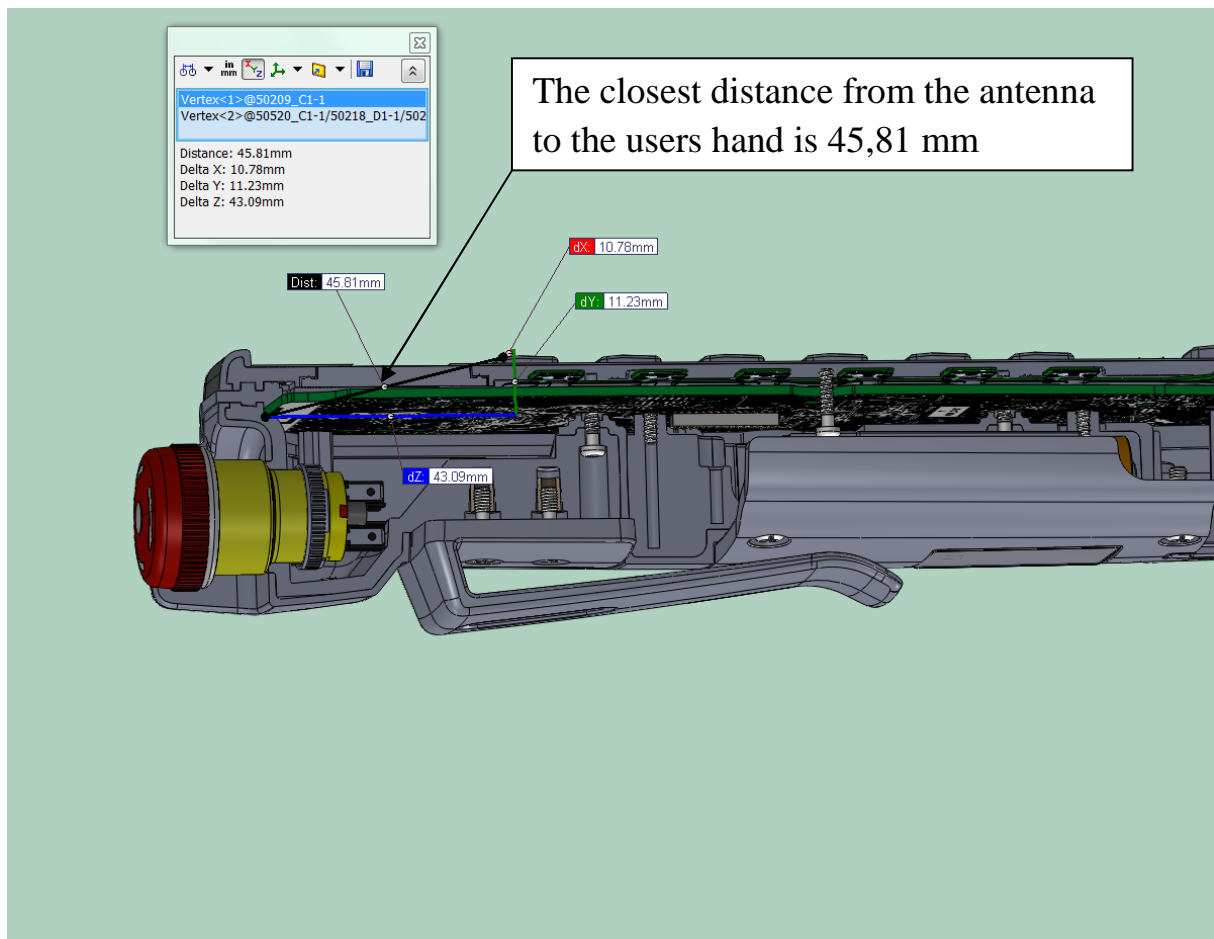
The maximum duty cycle is 72,36%. The duty cycle is hardly coded in the firmware under production and cannot be changed by the user.

Extremity SAR exclusion based on 40 mm separation distance and 72,36% maximum duty cycle is documented below.



Minimum test separation distance “d”: see 4.3.1 of 447498 “The minimum test separation distance is determined by the smallest distance from the antenna and radiating structures or outer surface of the device, according to the host form factor, exposure conditions and platform requirements, to any part of the body or extremity of a user or bystander (see 5) of section 4.1).”

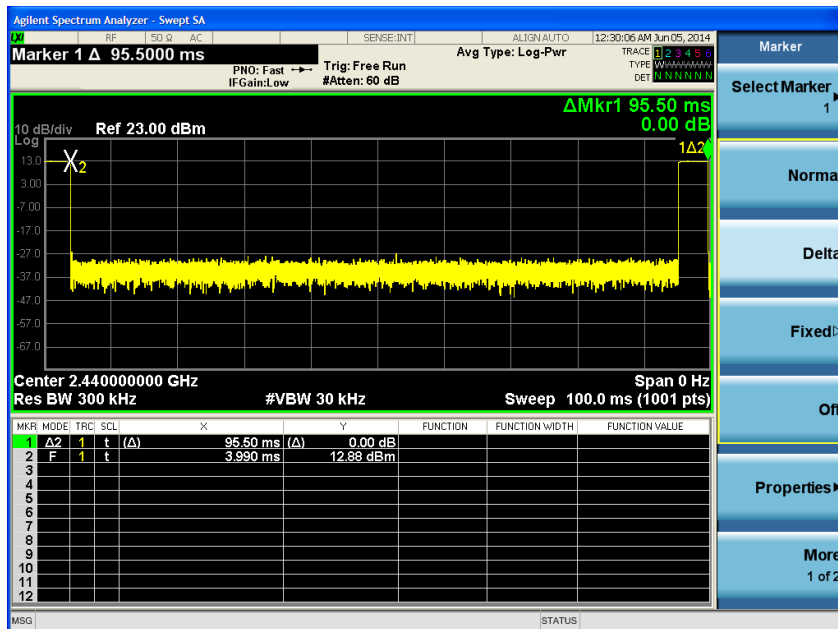
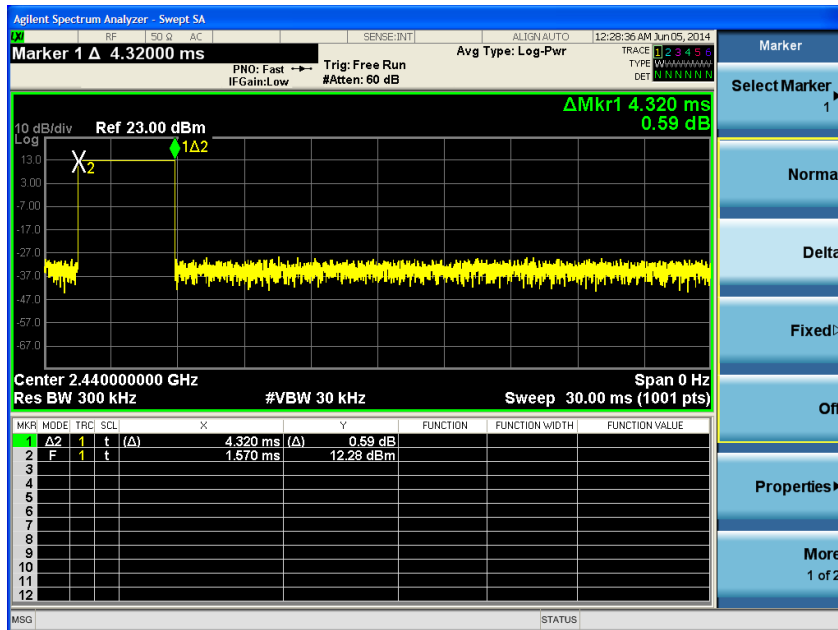
The closest distance from the antenna to the users hand is 45,81mm (see picture below).



When the device is stored on the operators belt it must be shut off. Pressing the buttons and operating the machine while the device is hanging from the belt or any other place it not allowed. It must be held in the hand.

The device has the duty cycle max 72,36%.

From the picture below the duty cycle:
 $(4,32\text{ms}/95,5\text{ms}) * 16\text{channels} = 72,36\%$



The Rated output power is 19,5dBm.
The tune up tolerance is 0,5dB.
The internal antenna gain is 0dBi.

SAR evaluation – exemption limits for routine routine evaluation based on frequency and separation distance at 2450 MHz, 10 mm, extremity = $7 \times 2.5 = 17.5$ mW

FCC extremity SAR exemption calculations as per section 4.3.1 of “447498 D01 General RF Exposure Guidance v05r02”:

P	19,25	dBm
Tune-up tolerance	0,50	dB
Duty Cycle	72,36	%
P average	68,3	mW
d	40	mm
f	2480	MHz
x	7,5	for 1-g SAR
SAR exclusion Limit	2,69	<7.5
Pmax	191	mW

* calculated using 447498 D01 General RF Exposure Guidance v05r02 section 4.3.1 1) $[(\text{max. power of channel, including tune-up tolerance, mW}) / (\text{min. test separation distance, mm})] \cdot [\sqrt{f(\text{GHz})}]$

The equipment meets the FCC SAR exemption limits and SAR measurement is not required.

RSS-102 exemption Notice_2013DRS0911 Extremity SAR Evaluation:

SAR evaluation – exemption limits for routine evaluation based on frequency and separation distance at 2450 MHz, 40 mm, extremity = $173 \times 2.5 = 432.5 \text{ mW}$

Prediction of MPE limit at a given distance

$$S = \frac{PG}{4\pi R^2}$$

S = power density
P = power input to the antenna
G = antenna gain
R = distance

Conducted output power:	19,25	(dBm)
Tune up tolerance	0,5	(dB)
Number of carriers	1	(N)
	94,4	(mW)
	0,0944	(W)
P Average	0,0683	(W)
Antenna gain:	0,0	(dBi)
Maximum antenna gain:	1,00	(numeric)
EIRP Average	0,0683	(W)
ERP Average	0,0417	(W)
Distance:	20	(cm)
Duty Cycle:	72,36	(%)
Frequency:	2400	(MHz)
MPE Limit:	1	(mW/cm ²)
Power density:	0,0136	(mW/cm ²)
	0,136	(W/m ²)
Margin	18,7	(dB)

The EIRP meets the RSS-102 exemption limits in “Notice_2013DRS0911”.

Conclusion: The product satisfies the OET Bulletin 65 Edition 97-1 and RSS-102 Notice 2013_DRS0911.

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