Manufacturer:	Satel OY, MERINIITYNKATU 17, SALO, FI-24101
Model / HVIN:	SATEL-TR489
FCC ID:	MRBSATEL-TA43
ISED ID:	2422A–SATELTA43

Test Laboratory:	SGS Fimko Oy
Address:	Karakaarenkuja 4, FI-02610 Espoo, FINLAND
Accreditation Body:	FINAS
CAB Identifier:	T004
ISED Company Number:	8708A

REFERENCE DOCUMENTS

KDB447498 D01 General RF Exposure Guidance v06, 23 October 2015
FCC CFR 47 §1.1310, Radio frequency exposure limits
FCC CFR 47 §2.1091, Radio frequency exposure evaluation: mobile devices
RSS-102 Issue 5, 2015

EUT SPECIFICATION

RF module, 406.1 MHz to 430 MHz; 450 MHz to 470 MHz, 1W
Using the maximum power (including tune-up tolerances), the power density was calculated. Maximum antenna gain was assumed.

RF EXPOSURE RESULT

FCC

Test Description	Standard	Compliance distance
RF Exposure (General Public)	FCC CFR 47 §1.1310	=> 0.86 m when 14 dBi antenna used

ISED

Test Description	Standard	Compliance distance
RF Exposure (General Public)	RSS-102	=> 1.12 m when 14 dBi antenna used

RF EXPOSURE ASSESSMENT

FCC: Exposure Limits for Uncontrolled / Controlled Environment

Frequency Range /MHz	RF power density, occupational/controlled [mW/cm^2]	RF power density, general population/uncontrolled [mW/cm^2]
300 – 1500 MHz	f/300	f/1500

f = frequency in MHz

ISED: Exposure Limits for Uncontrolled Environment

Table 4: RF Field Strength Limits for Devices Used by the General Public (Uncontrolled Environment)

Frequency Range (MHz)	Electric Field (V/m rms)	Magnetic Field (A/m rms)	Power Density (W/m^2)	Reference Period (minutes)
0.003-10[21]	83	90	-	Instantaneous*
0.1-10	-	0.73/ ƒ	-	6**
1.1-10	87/ ƒ $^{0.5}$	-	-	6**
10-20	27.46	0.0728	2	6
20-48	58.07/ ƒ$^{0.25}$	0.1540/ ƒ$^{0.25}$	8.944/ ƒ$^{0.5}$	6
48-300	22.06	0.05852	1.291	6
300-6000	3.142 ƒ $^{0.3417}$	0.008335 ƒ $^{0.3417}$	0.02619 ƒ $^{0.6834}$	6
6000-15000	61.4	0.163	10	6
15000-150000	61.4	0.163	10	616000/ ƒ $^{1.2}$
150000-300000	0.158 ƒ $^{0.5}$	4.21 x 10^{-4} ƒ $^{0.5}$	6.67 x 10^{-5} ƒ	616000/ƒ$^{1.2}$

Note: ƒ is frequency in MHz.
* Based on nerve stimulation (NS).
** Based on specific absorption rate (SAR).

ISED: Exposure Limits for Controlled Environment

Table 6: RF Field Strength Limits for Controlled Use Devices (Controlled Environment)

Frequency Range (MHz)	Electric Field (V/m rms)	Magnetic Field (A/m rms)	Power Density (W/m^2)	Reference Period (minutes)
0.003-10[23]	170	180	-	Instantaneous*
0.1-10	-	1.6/ ƒ	-	6**
1.29-10	193/ ƒ $^{0.5}$	-	-	6**
10-20	61.4	0.163	10	6
20-48	129.8/ ƒ $^{0.25}$	0.3444/ ƒ $^{0.25}$	44.72/ ƒ $^{0.5}$	6
48-100	49.33	0.1309	6.455	6
100-6000	15.60 ƒ $^{0.25}$	0.04138 ƒ $^{0.25}$	0.6455ƒ $^{0.5}$	6
6000-15000	137	0.364	50	6
15000-150000	137	0.364	50	616000/ƒ $^{1.2}$
150000-300000	0.354 ƒ $^{0.5}$	9.40 x 10^{-4} ƒ $^{0.5}$	3.33 x 10^{-4} ƒ	616000/ƒ $^{1.2}$

Note: ƒ is frequency in MHz.
* Based on nerve stimulation (NS).
** Based on specific absorption rate (SAR).

Single transmission RF Exposure Levels (mW/cm²)

FCC
Lowest frequency (406.1 MHz)

EUT		Antenna		General Public		Controlled Environment	
Freq.	Power	Gain		Level	Safe D	Level	Safe D
MHz	W	dBi	G	mW/cm²	cm	mW/cm²	cm
406.1	1.0	0	1.0	0.27	17.172	1.35	7.680
		4	2.5		27.151		12.143
		6	4.0		34.344		15.359
		8	6.3		43.102		19.276
		10	10.0		54.303		24.285
		12	15.8		68.258		30.526
		14	25.1		86.032		38.475

Highest frequency (470 MHz)

EUT		Antenna		General Public		Controlled Environment	
Freq.	Power	Gain		Level	Safe D	Level	Safe D
MHz	W	dBi	G	mW/cm²	cm	mW/cm²	cm
470	1.0	0	1.0	0.31	16.026	1.57	7.121
		4	2.5		25.339		11.260
		6	4.0		32.052		14.242
		8	6.3		40.225		17.874
		10	10.0		50.679		22.519
		12	15.8		63.702		28.306
		14	25.1		80.290		35.677

Single transmission RF Exposure Levels (W/m²)

ISED
Lowest frequency (406.1 MHz)

EUT		Antenna		General Public		Controlled Environment	
Freq.	Power	Gain		Level	Safe D	Level	Safe D
MHz	W	dBi	G	W/m²	m	W/m²	m
406.1	1.0	0	1.0	1.59	0.224	13.01	0.078
		4	2.5		0.354		0.124
		6	4.0		0.448		0.156
		8	6.3		0.562		0.196
		10	10.0		0.708		0.247
		12	15.8		0.889		0.311
		14	25.1		1.121		0.392

Highest frequency (470 MHz)

EUT		Antenna		General Public		Controlled Environment	
Freq.	Power	Gain		Level	Safe D	Level	Safe D
MHz	W	dBi	G	W/m²	m	W/m²	m
470	1.0	0	1.0	1.75	0.213	13.99	0.075
		4	2.5		0.337		0.119
		6	4.0		0.427		0.151
		8	6.3		0.535		0.189
		10	10.0		0.675		0.239
		12	15.8		0.848		0.300
		14	25.1		1.069		0.378

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