

Report number: 199067TRFMPE

Apparatus: VS3000 GTW/806-870

Applicant: SELEX Elsag S.p.A.

Via Giacomo Puccini, 2 - 16154 Genova- Italy

FCC ID: X5Y774-0850

Test specification:

#### **MPE ASSESSMENT**

Federal Communications Commission Office of Engineering & Technology Evaluating Compliance with FCC Guidelines for Human Exposure to Radiofrequency Electromagnetic Fields

Reviewed by: 2012-08-07

Signature Date

G. Curioni, Wireless/EMC Specialist

Tested by: 2012/08/07

Signature Date

D. Guarnone, Wireless/EMC Specialist

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Section 1: Report summary

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# Section 1: Report summary

This report contains an assessment of apparatus against specifications based upon tests carried out on samples submitted at Nemko Italy SpA.

### Test specification:

Federal Communications Commission Office of Engineering & Technology Evaluating Compliance with FCC Guidelines for Human Exposure to Radiofrequency Electromagnetic Fields

Compliance status:	Complies
Exclusions:	None
Non-compliances:	None
Report release history:	Original release
Test location:	SELEX ELSAG Via Eugenio Barsanti, Firenze, Italy.
Registration number:	481407 (10 m Semi anechoic chamber)

These tests were conducted on a sample of the equipment for the purpose of demonstrating compliance Evaluating Compliance with FCC Guidelines for Human Exposure to Radiofrequency Electromagnetic Fields

Note that the results contained in this report relate only to the items tested and were obtained in the period between the date of initial receipt of samples and the date of issue of the report.

This test report has been completed in accordance with the requirements of ISO/IEC 17025. All results contain in this report are within Nemko Italy's ISO/IEC 17025 accreditation.

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Section 2: Equipment under test

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# Section 2: Equipment under test





Brand name:

Serial number:

Connection port:

Model name or number:

Nemko sample number:

Cable length and type:

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#### Item # 1 Type of equipment: Digital Radio Test Set Brand name: **IFR** Model name or number: 3901 Serial number: 298001223 Nemko sample number: Connection port: RF Cable length and type: --Item #2 Type of equipment: Portable Field Meter + Electric Field Probe

**PMM** 

RF

--

8053 + EP330 298001223

0220J00421 + 1010J00228

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# Section 2: Equipment under test, continued

# 2.3 EUT description

Mobile Radio Unit

# 2.4 Technical specifications of the EUT

Operating frequency:	817-824/862-869 MHz
Modulation type:	Π/4 DQPSK
Occupied bandwidth:	25 kHz
Emission designator:	21K0D1E, 21K0D1W, 21K0D1D
Antenna type:	Equipment that has an external 50 Ω RF connector
Power source	Battery operated
Temperature range:	-10 to 45℃

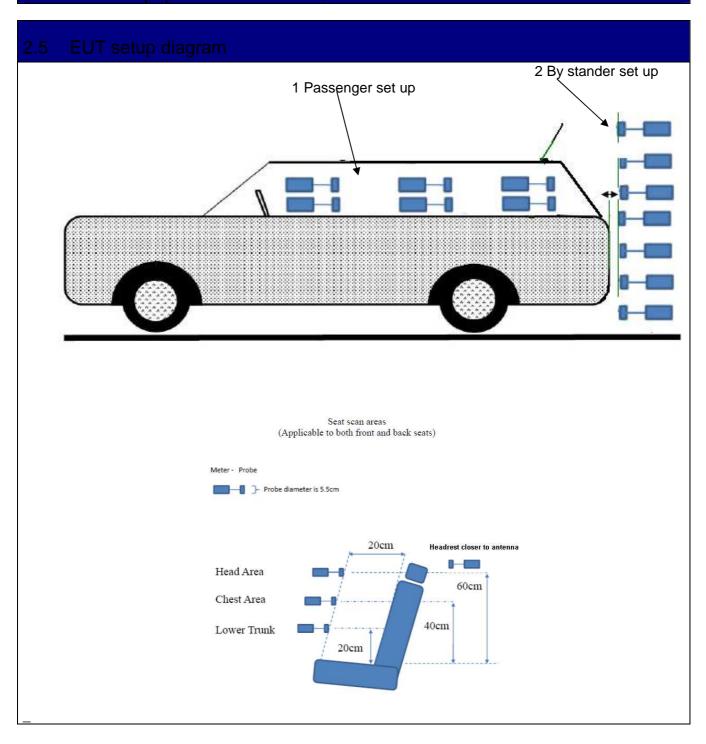


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# Section 2: Equipment under test, continued





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# 2.6 Operation of the EUT during testing

Transmitting at maximum power and normal modulation to:

- 1) 817.0125MHz
- 2) 823.9875MHz
- 3) 862.0125MHz
- 4) 868.9875 MHz

# 2.7 Modifications incorporated in the EUT

There were no modifications performed to the EUT during this assessment.



Section 3: Test conditions

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#### Section 3: Test conditions

# 3.1 Deviations from laboratory tests procedures

No deviations were made from laboratory test procedures.

# 3.2 Test conditions, power source and ambient temperatures

Normal temperature, humidity and air pressure test conditions Temperature: 15–30 ℃ Relative humidity: 20–75 % Air pressure: 860–1060 hPa

When it is impracticable to carry out tests under these conditions, a note to this effect stating the ambient temperature and relative humidity during the tests shall be recorded

and stated.

Power supply range:

The normal test voltage for equipment to be connected to the mains shall be the nominal mains voltage. For the purpose of the present document, the nominal voltage shall be the declared voltage, or any of the declared voltages ±5 %, for which the equipment was designed.

# 3.3 Measurement uncertainty

Nemko S.p.A. measurement uncertainty has been calculated using the standard CISPR 16-4-2 "Specification for radio disturbance and immunity measuring apparatus and methods – Part 4-2: Uncertainties, statistics and limit modeling – Uncertainty in EMC measurements". All calculations have been performed to provide a confidence level of 95 % and can be found in Nemko S.p.A. document WML1002.

# 3.4 Test equipment

_				
Equipment	Manufacturer	Model No.	Asset/Serial No.	Next cal.
Portable Field Meter	PMM	8053	0220J00421	2012/12
Electric Field Probe	PMM	EP330	1010J00228	2012/12

Note: N/A = Not Applicable, NCR = No Cal Required, COU = CAL On Use

(\*) Equipment supplied by manufacturer's



Section 4: Results Summary Report Number: : 199067TRFMPE Specification: --

4.1 MPE: Test results									
Part	Test method	Test description	Required	Result					
§		MPE calculation	Y	Pass					
Note:									



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# Appendix A: Test results

#### MPF CALCULATION

#### a) Mobile Devices

This section describes the requirements of Section 2.1091 of the FCC's Rules (47 CFR § 2.1091) that apply to "mobile" devices. For purposes of these requirements mobile devices are defined as transmitters designed to be used in other than fixed locations and to generally be used in such a way that a separation distance of at least 20 centimeters is normally maintained between the transmitter's radiating structure(s) and the body of the user or nearby persons. In this context, the term "fixed location" means that the device is physically secured at one location and is not able to be easily moved to another location. Transmitting devices designed to be used by consumers or workers that can be easily re-located, such as wireless devices associated with a personal computer, are considered to be mobile devices if they meet the 20 centimeter separation requirement.

A fundamental aspect of the exposure guidelines is that they apply to power densities or the squares of the electric and magnetic field strengths that are spatially averaged over the body dimensions. Spatially averaged RF field levels most accurately relate to estimating the wholebody averaged SAR that will result from the exposure and the MPEs specified in Table 1 of Appendix A are based on this concept. This means that local values of exposures that exceed the stated MPEs may not be related to non-compliance if the spatial average of RF fields over the body does not exceed the MPEs. Further discussion of spatial averaging as it relates to field measurements can be found in Section 3 of this bulletin and in the ANSI/IEEE and NCRP reference documents noted there.

Assessment was performed with mobile radio installed inside the vehicle at test specified distance and test locations.

1) External bystander MPE measurements:

Antenna is located in the rear side of roof.

Mpe measurement for by stander conditions are determined by taking the average of 10 measurements in a 2 m vertical line for each of three by stander test locations with 20 cm height increment with antenna to probe separation distances of 72 cm directly behind the vehicle, 110 cm (45 radial),102cm (90 radial).

The measuring probe is positioned orthogonal to antenna (typically parallel to ground with a vertically mounted antenna) and aimed directly at antenna axis.

These measurements are representative of person other than the operator standing next to the vehicle.

#### 2) Internal Passenger vehicle MPE measurements

Antenna is located in the rear side of roof at a minimum distance of .... Backseats passenger.

User are instructed, per installation manual to mount antenna on the roof only if a minimum distance of can't be achieved.

MPE measurements for passenger front seat and backseat conditions are determined by taking the average of three measurements (Head, Chest, and lower Trunk) inside the vehicle for both the front and back seats.

The probe handle is oriented parallel to the ground and pointed towards to the back of vehicle.

The probe is scanned continuously along three test axis which are parallel to seat angle and are 20 cm from seat surface. One test axis is at the head height, another is at the chest height and another is at lower Trunk height. The MPE is determined by averaging these three maximum values



Appendix B: Photo set up

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# MPE CALCULATION, continue..

Mpe limits:

Frequency	FCC OET Bulletin 65 Supplement C	IEEE C95.1 1992/1999	RSS 102 issue 4 – 2010
Range (MHz)	mW/cm^2	mW/cm^2	W/m^2
30 - 300	0.2		*2.0
10 – 400			
100 - 300		0.2	
100 – 400			
300 - 1,500	f/1,500		f/150
400 - 2,000			
300 - 15,000		f/1,500	
1,500 - 15,000			10.0
1,500 - 100,000	1.0		
2,000 - 100,000			
2,000 - 300,000			

<sup>\*</sup>Power density limit is applicable at frequencies greater than 100MH

Test date: 2012-07-03

Test results: Pass

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### Test data

Bystander, test position 1

Roof	Test position	E/H Field	Angle (degree)	Antenna model	Max PWR (W)	Nominal Pwr (W)	Test Frequency (MHz)	Max calculation P.D. (mW/cm <sup>2</sup> )	FCC Limit (mW/cm2)	% to specific Limit
		E Field		T-AT9007.01- BU	10.9	10	817.0125	0.00643	0.54468	1.1807
Roof	1			T-AT9007.01- BU	10.5	10	823.9875	0.00223	0.54933	0.4062
K00I	'		ld <sup></sup>	T-AT9007.01- BU	10.3	10	862.0125	0.00196	0.57468	0.3405
				T-AT9007.01- BU	10.4	10	868.9875	0.00276	0.57933	0.4757

# Bystander, test position 2

Roof	Test position	E/H Field	Angle (degree)	Antenna model	Max PWR (W)	Nominal Pwr (W)	Test Frequency (MHz)	Max calculation P.D. (mW/cm²)	FCC Limit (mW/cm <sup>2</sup> )	% to specific Limit
	2	E Field		T- AT9007.01- BU	10	10	817.0125	0.00068	0.54468	0.1251
Roof			d	T- AT9007.01- BU	10.9	10	823.9875	0.00039	0.54933	0.0717
Kooi				T- AT9007.01- BU	10.5	10	862.0125	0.00041	0.57468	0.0717
				T- AT9007.01- BU	10.3	10	868.9875	0.00073	0.57933	0.1257

# Bystander, test position 3

Roof	Test position	E/H Field	Angle (degree)	Antenna model	Max PWR (W)	Nominal Pwr (W)	Test Frequency (MHz)	Max calculation P.D. (mW/cm <sup>2</sup> )	FCC Limit (mW/cm <sup>2</sup> )	% to specifi c Limit
	3	E Field		T- AT9007.01 -BU	10.9	10	817.0125	0.00076	0.54468	0.1401
Roof				T- AT9007.01 -BU	10.5	10	823.9875	0.00045	0.54933	0.0812
ROOT				T- AT9007.01 -BU	10.3	10	862.0125	0.00049	0.57468	0.0851
				T- AT9007.01 -BU	10.4	10	868.9875	0.00055	0.57933	0.0942



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### Test data

Passenger, front seat, left

Roof	Test position	E/H Field	Angle (degree)	Antenna model	Max PWR (W)	Nominal Pwr (W)	Test Frequency (MHz)	Max calculation P.D. (mW/cm²)	FCC Limit (mW/cm <sup>2</sup> )	% to specific Limit	
	Passenger, front seat, left				T- AT9007.0 1-BU	10.9	10	817.0125	0.00000	0.54468	0.0000
Roof			-	T- AT9007.0 1-BU	10.5	10	823.9875	0.00000	0.54933	0.0000	
Rooi				T- AT9007.0 1-BU	10.3	10	862.0125	0.00019	0.57468	0.0336	
				T- AT9007.0 1-BU	10.4	10	868.9875	0.00013	0.57933	0.0224	

Passenger, front seat, right

Roof	Test position	E/H Field	Angle (degree)	Antenna model	Max PWR (W)	Nominal Pwr (W)	Test Frequency (MHz)	Max calculation P.D. (mW/cm²)	FCC Limit (mW/cm²)	% to specific Limit
Roof	Passenger , front seat, right	E Field	-	T- AT9007.0 1-BU	10.9	10	817.0125	0.00007	0.54468	0.0125
				T- AT9007.0 1-BU	10.5	10	823.9875	0.00007	0.54933	0.0119
				T- AT9007.0 1-BU	10.3	10	862.0125	0.00006	0.57468	0.0112
				T- AT9007.0 1-BU	10.4	10	868.9875	0.00007	0.57933	0.0112



Via del Carroccio 4, 20853, Biassono, Italy

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### Test data

Passenger, back seat, right

Roof	Test position	E/H Field	Angle (degree)	Antenna model	Max PWR (W)	Nominal Pwr (W)	Test Frequency (MHz)	Max calculation P.D. (mW/cm²)	FCC Limit (mW/cm2)	% to specific Limit
	Passenger back seat right			T- AT9007.0 1-BU	10.9	10	817.0125	0.00109	0.54468	0.2001
Roof			-	T- AT9007.0 1-BU	10.5	10	823.9875	0.00098	0.54933	0.1792
ROOT				T- AT9007.0 1-BU	10.3	10	862.0125	0.00167	0.57468	0.2913
				T- AT9007.0 1-BU	10.4	10	868.9875	0.00156	0.57933	0.2693

Passenger, back seat, left

Roof	Test position	E/H Field	Angle (degree)	Antenna model	Max PWR (w)	Nominal Pwr (W)	Test Frequenc y (MHz)	Max calculatio n P.D. (mW/cm²)	FCC Limit (mW/cm2)	% to specific Limit
				T- AT9007.0 1-BU	10	0	817.0125	0.00136	0.54468	0.2501
Roof	Passenger back seat	E Field		T- AT9007.0 1-BU	10.9	10	823.9875	0.00105	0.54468 0.54933 0.57468	0.1911
ROOT	left	E Fleid		T- AT9007.0 1-BU	10.5	10	862.0125	0.00116	0.57468	0.2016
				T- AT9007.0 1-BU	10.3	10	868.9875	0.00143	0.57933	0.2468

Remarks: Calculation P.D.= Average over body x Probe calibration factor x Duty Cycle Max calculation P.D.= Average over body x Probe calibration factor x Duty Cycle x Max PWR/Nominal Pwr Probe calibration factor=1 Duty Cycle=0.25



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st d	ata																					
				_						Pos	sitio	n 1					_		_			
										Byztandor (BS) Pazit	tion						E.U.T. Max TX factor	Average over the	Calc P.D. (mW/cm <sup>2)</sup>	Max Calc. P.D (mWfcm <sup>2</sup> )	FCC lim (mW/cm	
TEFREQUENC	Y Maxpur	Initialpawer	PROBECAL FACTOR		20 cm	40 cm	n 61	) cm	80 cm	100 cm	120 cm	140 cm	1	60 cm	180 cm	200 cm						
817.0125	10.9	10	1		0	+ .	_			0.002	0.003	0.007	_	0.013	0,109	0.102	0.25	0.0236	0.0059	0.006431	0.544675	
823.9875	10.5	10	1			,				0.002	0.003	0.007	_	0.013	0.109	0.034	0.25	0.0035	0.0059	0.00223125	0.549325	
862.0125	10.3	10	1		0		_	٠	0	0.005	0.003	0.003	-	0.011	0.028	0.026	0.25	0.0076	0.0019	0.001957	0.574675	
868,9875	10.4	10	1		0			٠	0.001	0.004 DOG	sitio	0.003		0.01	0.029	0.057	0.25	0.0106	0.00265	0.002756	0.579325	
										F US Bystander (BS) Pasi		111 2					E.U.T. Max Til factor	Average aver the bady mW/cm²	CalcP.D. (mWfcm <sup>2)</sup>	Max Calc. P.D. (mW/cm <sup>2)</sup>	FCC lim (mWfcm	
TXFREQUEN	СУ Мехры	Initial pou	PROBECT FACTOR		20 cm	40 cm	60 cm	80 cm	100 cr	120 cm	,	140 cm	160 cm		180 cm	200 cm						
	10.9	10	1	-	0	0		0	0.00		_			_			0.25	0.0025	0.000625	0.00068125	0.544675	
817.0125 823.9875		10	1	_	•	0	•		0.00	0.001	_	0.001	0.001	_	0.006	0.015	0.25	0.0025	0.000625	0.00068125	0.544675	
862,0125	10.3	10	1		0	0	0	0	0	0		0	0.001		0.005	0.01	0.25	0.0016	0.0004	0.000412	0.574675	
868,9875	10.4	10	1		0	0	0	0	0			0.001	0.001		0.008	0.018	0.25	0.0028	0.0007	0.000728	0.579325	
				1						Pos	SITIO	n 3					I	1		_		
FREQUENCY	Maxpur	Initial pawer	PROBECAL	20 4	_	40cm	60 cm	80 cm	100 cm	ystandor (BS) Pasi 120 cm		140 cm	160 cr		180 cm	200 cm	E.U.T. Max TX factor	Average aver the	e CalcP.D. (mWfcm <sup>2</sup> )	Max Calc.l (mWfcm		
FREQUENCY	Mexpur	Initial pawer	FACTOR	20 4		40cm	60 cm	80 cm	100 cm	120 cm	+	140 cm	160 cr	-	180 cm	200 cm		+		+	+	
817.0125	10.9	10	-1	۰	工	0	0	0.001	0.001	0.002		0.002	0.004		0.003	0.015	0.25	0.0028	0.0007	0.00076	3 0.5446	
823.9875 862.0125	10.5	10	1		_		0	0	0.001	0.001	_	0.001	0.002	-	0.003	0.008	0.25	0.0017	0.000425	0.000446	-	
868.9875	10.4	10	1	٠,			•		0.001	0.001	$\dashv$	0	0.00	_	0.001	0.018	0.25	0.0021	0.000525	0.00054		
									Pass	senger	r fro	nt se	at le	eft								
									Parson	qorparitians					U.T. Xfactor	Average av bady mW/		CalcP.D. (mWłom <sup>2]</sup>	Max Cala (mW/a		C lim (mW/cn	
TXFREQUENCY Maxpur Initial power		PROBE FACT		Hoad		Chart	Lower Trur	nck	Hoadrost	roar												
											$\perp$											
817.01	25	10.9	10		1		0		0	0		0		0.	.25	0		0	0		0.54468	
823.98	75	10.5	10		1		0		0	0		0		0.	.25	0		0	0		0.54933	
862.01	25	10.3	10	$\Box$	1	$\neg$	0		0.001	0.002	0		$\Box$	0.25		0.0007	0075 0.0001		.0001875 0.000193125		5 0.57468	
868.98	868.9875 10.4 10 1		0.001	0.001 0.001			0		$\neg$	0.	.25	0.0005		0.000125 0.00013		13	0.57933					
									Pass	enger	fror	nt sea	at riç	ght					•			
									Para	onqorparitian	ur .				E.U.T.	Average av bady mWi		CalcP.D. (mW/cm²l	Max Calc. (mW/cn		lim (mWłcmż	
TXFREQ	UENCY	Maxpur	Initi	alpoue		PROBECAL Hood		oad	l Chart		Trunck	nck Hoadrost		17143	TXfactor		+			+		
<b>\$17.</b> 0	)125	10.9	丰	10	丰	1	$\perp$	0	0	۰	,	0.0	01		0.25	0.0002	5	0.0000625	0.000068	:125	0.544675	
823.9	9875	10.5	$\bot$	10	丄	1	_	0	0	0	•	0.0	01	$\vdash$	0.25	0.0002	5 (	0.0000625	0.000065	625	0.549325	
862.	0125	10.3		10	$\bot$	1		0	0	۰	)	0.0	01	<u>_</u>	0.25	0.0002	5 (	0.0000625	0.000064	375	0.574675	
868.9	9875	10.4		10		1		0			,	0.0	01	-	0.25	0.0002	5	0.0000625	0.00000	65	0.579325	



Appendix B: Photo set up

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### Test data

#### Passenger back seat right

				Pazzongor pazitians				E.U.T. Max TX factor	Average over the body mW/cm²	CalcP.D. (mW/cm <sup>2)</sup>	Max Calc. P.D. (mW/cm <sup>2</sup> l	FCC lim (mWłam2)
TXFREQUENCY	Maxpur	Initial pawer	PROBECAL FACTOR	Head	Chart	Lawer Trunck	Hoadrostroar					
817.0125	10.9	10	1	0.001	0	0	0.015	0.25	0.004	0.001	0.00109	0.544675
823.9875	10.5	10	1	0.001	0	0	0.014	0.25	0.00375	0.0009375	0.000984375	0.549325
862.0125	10.3	10	1	0.009	0.001	0.001	0.015	0.25	0.0065	0.001625	0.00167375	0.574675
868.9875	10.4	10	1	0.004	0.002	0.001	0.017	0.25	0.006	0.0015	0.00156	0.579325

### Passenger back seat left

						or paritians		E.U.T.	Average over the	Calc P.D.	Max Calc. P.D.	FCC lim (mW/cm2)
					rarreng	or paritians		Max TX factor	bady mWfcm²	(mWłem <sup>2]</sup>	(mW/cm²l	
TXFREQUENCY	Maxpur	Initial pawer	PROBECAL FACTOR	Head	Chart	Lawer Trunck	Hoadrostroar					
817.0125	10.9	10	1	0.002	0.001	0	0.017	0.25	0.005	0.00125	0.0013625	0.544675
823.9875	10.5	10	1	0.002	٥	0	0.014	0.25	0.004	0.001	0.00105	0.549325
862.0125	10.3	10	1	0.002	0.001	0	0.015	0.25	0.0045	0.001125	0.00115875	0.574675
868.9875	10.4	10	1	0.003	0.001	0.001	0.017	0.25	0.0055	0.001375	0.00143	0.579325



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90 cm +20 cm=110 cm (position 2)



Appendix B: Photo set up

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52 cm + 20 cm =72 cm (position 1)





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Specification: --





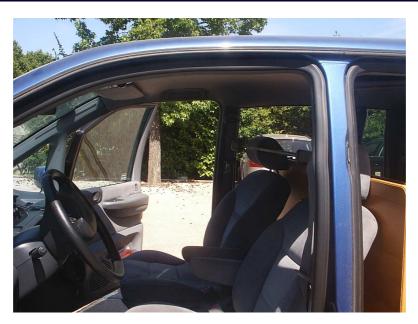
Front seat left



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Front seat right



Appendix B: Photo set up

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Specification: --



Back seat left



Antenna



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Specification: --





Radio Equipment



Appendix B: Photo set up

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Specification: --



Point 2



Point 3