

Straubing, September 8, 2004

TEST-REPORT

No. 55456-40302

for

i-Port III / 868 MHz

Transceiver for ID-system

Applicant: IDENTEC SOLUTIONS AG

Test Specification: FCC Code of Federal Regulations, Part 15 Subpart C, Section 15.231

Note:

The test data of this report relate only to the individual item which has been tested. This report shall not be reproduced except in full extent without the written approval of the testing laboratory.



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1. Administrative Data

Test item (EUT)		
Type designation	i-Port III / 868 MHz	
Serial number(s):	001	
Type of equipment:	Transceiver for ID-system	
Parts/accessories:	Base-station Dedicated Antenna	
FCC-ID:		
Technical data		
Frequency range	868.000 – 868.600 MHz	
Operational frequency	868.35 MHz	
Type of modulation	10K0F1D	
Pulse frequency	N/A	
Pulse width	N/A	
Antenna	Dedicated	
Power supply	DC 12 V (10 V – 30 V)	
Applicant: (full address)	IDENTEC SOLUTIONS AG Millennium Park 2 A-6890 Lustenau Austria	
Contract identification:		
Contact person:	Mr. Josef Vogel	
Manufacturer:	IDENTEC SOLUTIONS AG	
Application details		
Receipt of EUT:	23 April 2004	
Date of test:	May, September 2004	
Note:		
Responsible for testing:	Mr. Martin Steindl	
Responsible for test report:	Mr. Martin Steindl	



2. Identification of Test Laboratory

DETAILS OF THE TEST LABORATORY			
COMPANY NAME:	Senton GmbH EMI/EMC Test Center		
ADDRESS:	Aeussere Fruehlingsstrasse 45 D-94315 Straubing Germany		
LABORATORY ACCREDITATION:	DAR-Registration No. TTI-P-G 062/94-01		
FCC TEST SITE LISTING	90926		
INDUSTRY CANADA TEST SITE REGISTRATION	IC 3050		
NAME FOR CONTACT PURPOSES:	Mr. Johann Roidt		
TELEPHONE: (+49) (0)9421 5522-0	FAX: (+49) (0)9421 5522-99		

PERSONNEL INVOLVED IN THIS TEST REPORT		
LABORATORY MANAGER:	Mr. Johann Roidt	
RESPONSIBLE FOR TESTING:	Martin Guindl Mr. Martin Steindl	
RESPONSIBLE FOR TEST REPORT:	Mr. Martin Steindl	



SUMMARY OF TEST RESULTS

The tested sample complies with the requirements set forth in the FCC Code of Federal Regulations Part 15, Subpart C, Section 15.231



3. Operation Mode of EUT

Transmitting datagram



4. Configuration

Configuration of the EUT

One antenna connected

Cables connected to the EUT

Data Input connector 1 Data Input connector 2 10/100 Base-T RS232 Output connector

Peripheral devices connected to the EUT

MaxData Laptop



5. Measuring Methods



5.1. Conducted powerline emissions

Rules and Specifications:	Sections 15.107 & 15.207
Guide:	CISPR 22

Measurement Procedure:

In general conducted emission tests in the frequency range 0.15 - 30 MHz are required to be performed with quasi-peak and average detector. To simplify testing the following procedure is used:

First the whole spectrum of emission caused by equipment under test (EUT) is recorded with detector set to peak. After that all emission levels having less margin than 20 dB to or exceeding the appropriate limit (in general average limit is 10 dB lower than quasi-peak limit) are retested with detector set to quasi-peak. If average limit is kept no additional scan with average detector is necessary. In cases of emission levels between quasi-peak and average limit an additional scan with detector set to average has to be recorded.



Test instruments used:

No.	Туре	Model	Serial Number	Manufacturer
01	EMI Receiver	ESHS 10	860043/016	Rohde & Schwarz
02	LISN	ESH3-Z5	862770/021	Rohde & Schwarz
03	LISN	ESH-3-Z5	830952/025	Rohde & Schwarz
04	Shielded Room No. 4		3FD-100 544	Euroshield



5.2. Field Strength of Emissions, Prescans in a fully-anechoic room (30 MHz – 1 GHz)

Rules and Specifications:	Sections 15.109 & 15.231
Guide:	ANSI C63.4 1997

Measurement Procedure:

Radiated emissions are measured over the frequency range from 30 MHz to 1 GHz.

Measurements were made in both the horizontal and vertical planes of polarization in a fully anechoic room using a spectrum analyzer with the detector function set to peak and resolution bandwidth set to 100 kHz. All tests were performed at a test-distance of 3 meters. Hand-held or body-worn devices are rotated through three orthogonal axes to determine which attitude and configuration produces the highest emission relative to the limit and therefore shall be used for final testing.



Fully anechoic chamber

Test instruments used:

No.	Туре	Model	Serial Number	Manufacturer
01	Spectrum Analyzer	FSP 30	100063	Rohde & Schwarz
113	Preamplifier	CPA9231A	3393	Schaffner
141	Biconical antenna	HK 116	829708/006	Rohde & Schwarz
143	Log. periodic antenna	3147	9112-1054	EMCO
003	Fully anechoic room	No. 2	1452	Albatross Projects



5.3. Fieldstrength of Emissions, Measurement at Open Area Test Site (30 MHz – 1 GHz)

Rules and Specifications:	Sections 15.109 & 15.231
Guide:	ANSI C63.4 1997

Measurement Procedure:

Measurement Procedure:

For final testing an open-area test-side was used. Radiated emissions are measured over the frequency range from 30 MHz to 1 GHz.

Measurements were made in both the horizontal and vertical planes of polarisation at a open area test side using a spectrum analyser with the detector function set to CISPR. All test were performed at a test distance of 3 meters. During the tests the EUT is rotated all around, and the receiving-antenna is rased and lowered from 1m to 4m to find the maximum levels of emissions. The cables and equipment were placed and moved within the range of position likely to find their maximum emissions.



Test instruments used:

No.	Туре	Model	Serial Number	Manufacturer
01	EMI Receiver	ESVP	881414/009	Rohde & Schwarz
141	Biconical antenna	HK 116	829708/006	Rohde & Schwarz
143	Log. periodic antenna	3147	9112-1054	EMCO
003	Open Field Test Site	No. 1	N/A	Senton



5.4. Fieldstrength of Emissions above 1 GHz

Rules and Specifications:	Sections 15.109 & 15.209
Guide:	ANSI C63.4 1997

Measurement Procedure:

Radiated emissions are measured in the frequency range 1 GHz to the 10th harmoic of the maximum frequency of the EUT.

Resolution and video bandwidth of the spectrum analyzer are set to 1 MHz. Hand-held or body-worn devices are rotated through three orthogonal axes to determine which attitude and configuration produces the highest emission relative to the limit and therefore shall be used for final testing. Additional measurements are performed at critical frequencies with reduced span. EUT is rotated all around and receiving antenna is raised and lowered to find the maximum levels of emission. The cables and equipment are placed and moved within the range of position likely to find

their maximum emissions.

All tests are performed in a fully-anechoic chamber with a test-distance of 3 meters.

If required preamplifiers are used for the whole frequency range. Special care is taken to avoid overload in transmit mode (using appropriate attenuators and filters if necessary).



Fully anechoic

No.	Туре	Model	Serial Number	Manufacturer
01	Spectrum Analyzer	FSP 30	100063	Rohde & Schwarz
143	Log. periodic antenna	3147	9112-1054	EMCO
145	Horn antenna	3115	9508-4553	EMCO
146	Horn antenna set	3160-03/-09	9112-1003	EMCO
114	Preamplifier 1-8 GHz	AFS3-00100800- 32-LN	847743	Miteq
115	Preamplifier 8-18 GHz	ACO/180-3530	32641	CTT
003	Fully anechoic room	No. 2	1452	Albatross Projects



6. Photographs Taken During Testing



Test setup for conducted emission measurement





Test setup for conducted emission measurement





Test setup for radiated emission measurement (fully anechoic room)





Test setup for radiated emission measurement (open-area test-side)







Test setup for radiated emission measurement (open-area test-side)





7. List of Measurements

FCC Part 15			
Section(s):	Test	Page(s)	Result
15.205	Restricted Bands		Pass
15.207	AC powerline emissions	20	Pass
15.231 (a) (1)	Periodic operation		Pass
15.231 (b)	Duty Cycle Correction		Not Applicable
15.231 (b)	Field strength of emissions	21	Pass
15.231 (c)	Bandwidth of emissions	22	Pass



AC powerline emissions

Rules and Specifications:	15.107, 15.207			
Guide:	CISPR 22			
Limit:	Frequency of Emission (MHz)	Conducted Limit (dBuV)		
		Quasi-peak	Average	
	0.15-0.5 0.5 – 5 5 - 30	66 to 56 56 60	56 to 46 46 50	

Test Site:	Radio Lab.

Frequency (MHz)	Detector	Analyzer Reading (dBuV)	Correction Factor (dB)	Final Value (dBµV)	Limit (dBµV)	Margin (dB)
0.150 - 30		***				

*** = No emissions above noise floor detected

Sample calculation of Final values:

Final Value (dB μ V) = Analyzer Reading (dB μ V) + Correction Factor (dB)

Test Results: Pass



Field strength of emissions

Rules and Specifications:	15.231 (b) Radiated Emission Limits				
Guide:	ANSI C63.4				
Limit:	In addition to the provisions of Section 15.205, the field strength of emissions from intentional radiators operated under Section 15.231 shall not exceed the following:				
	Fundamental Frequency (MHz)	Field Strength of Fundamental (microvolts/meter)	Field Strength of Spurious Emissions (microvolts/meter)		
	40.66 - 40.70 70 - 130 130 - 174 174 - 260 260 - 470 above 470	2.250 1.250 1.250 to 3.750** 3.750 3750 to 12.500** 12.500	225 125 125 to 375 ** 375 375 to 1250 ** 1250		

** linear interpolations

Test Site:	Open Area Test Site (< 1 GHz), Fully anechoic chamber (> 1 GHz)
Distance:	3 Meter

Frequency	Detector	Antenna	Analyzer	Antenna	Duty Cycle	Field	Limit	Margin (dB)
(MHz)		Polarization	Reading	Correction	Correction	Strength	(dBµV/m)	
			(dBµV)	(dB/m)	(dB/m)	(dBµV/m)		
81.20	QP	Ver	29.7	9.7	0.0	39.4	40.0	-0.6
82.03	QP	Ver	27.3	9.7	0.0	37.0	40.0	-3.0
82.90	QP	Ver	25.5	9.7	0.0	35.2	40.0	-4.8
83.39	QP	Ver	26.3	9.7	0.0	36.0	40.0	-4.0
85.30	QP	Ver	25.1	9.8	0.0	34.9	40.0	-5.1
868.35	QP	Ver	54.0	27.2	0.0	81.2	81.9	-0.7
1738	PK	Ver	19.1	29.5	0.0	48.6	61.9	-13.4

*** = All emissions showed more than 20 dB margin to the limit A negative value for Margin indicates, that the limit is kept.

Sample calculation of erp values:

Field Strength (dBµV/m) = Analyzer Reading (dBµV) + Antenna Correction (dB/m) + Duty Cycle Correction (dB)

Test Results:	Pass	



Bandwidth of Emission

Rules and Specifications:	15.231 c
Guide:	ANSI C63.4
Limit:	The bandwidth of the emission shall bo no wider than 0.25% of the center frequency for devices operating above 70 MHz and below 900 MHz. For devices operating above 900 MHz, the emission shall be no wider than 0.5% of the center frequency. Bandwidth is determined at the points 20 dB from the modulated carrier



Comment A: Identec Solutions: Bandwidth of Emission Date: 24.MAY.2004 18:40:22

Bandwidth: 142.8 kHz



8. Referenced Regulations

All tests were performed with reference to the following regulations and standards:

\square	FCC Part 2	Code of Federal Regulations Part 2 Frequency allocationand radio treaty matters;	October 01, 1999
	FCC Part 15 Subpart A	General rules and regulations Code of Regulations Part 15 (Radio Frequency Devices), Subpart A (General) of the Federal Communication Commission (FCC)	May 30, 2002
	FCC Part 15 Subpart B	Code of Regulations Part 15 (Radio Frequency Devices), Subpart B (Unintentional Radiators) of the Ecderal Communication Commission (ECC)	May 30, 2002
	FCC Part 15 Subpart C	Code of Regulations Part 15 (Radio Frequency Devices), Subpart C (Intentional Radiators) of the Eederal Communication Commission (ECC)	May 30, 2002
	FCC Part 74 Subpart H	Code of Regulations Part 15 (Radio Frequency Devices), Subpart H (Low Power Auxiliary Stations) of the Federal Communication	October 20, 1997
	ANSI C63.4	American National Standard for Methods of Measurement of Radio-Noise Emissions from Low-Voltage Electrical and Electronic Equipment	October, 1992
	RSS-210	Radio Standards Specification RSS-210 Issue 6 for Low Power Licence-Exempt Radiocommuniction Devices of Industry Canada	November, 2001



Charts taken during testing



Senton GmbH / EMI/EMC Laboratories / Aeussere Fruehlingsstrasse 45 / D-94315 Straubing / Tel. +49 9421 55220



Senton GmbH / EMI/EMC Laboratories / Aeussere Fruehlingsstrasse 45 / D-94315 Straubing / Tel. +49 9421 55220





Senton GmbH / Aeussere Fruehlingstrasse 45 / D-94315 Straubing / Germany / Tel. +49 (0)9421 5522-0 / Fax +49 (0)9421 5522-99





Senton GmbH / Aeussere Fruehlingstrasse 45 / D-94315 Straubing / Germany / Tel. +49 (0)9421 5522-0 / Fax +49 (0)9421 5522-99

Radiated Emission Test 1 GHz - 4 GHz acc. to FCC Part 15 (Fully Anechoic Chamber)

		•		5	,		
Model: i-Port 3 Serial no EU01 Applicar Idente Test site Fully a Tested of Test d Horizo Date of 05/24/ Test per	3 o.: ht: hc Solutions AG e: anechoic room, cab on: listance 3 metres ontal Polarization test: (2004 rformed:	oin no. 2 Operator: M. Steindl File name:		Comment: - TX mode - antenna connected - EUT: DC 12 V - Settings: frequency: 868.35 MH level: -10.3 dBm - Note: with WHKS1000	lz)-10SS high-p	oass-filter	
autom	atically	default.emi					
Detecto Peak	r:			List of values: Selected by hand			
dBµV/m	n			Limit1: FCC Part	15 Transd	ucer: VU	_B 9163
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Radiated Emission Test 1 GHz - 4 GHz
acc. to FCC Part 15 (Fully Anechoic Chamber)

Model: i-Port	3			Comment: - TX mode			
Serial n EU01	0.:			- antenna connected	ł		
Applica	nt:			- EUT: DC 12 V			
Test site				- Settings:			
Fully a	anechoic room, cabi	n no. 2		frequency: 868.35 level: -10.3 dBm	MHz		
Tested Test d	^{on:} listance 3 metres			- Note: with WHKS1	000-10SS high-pas	ss-filter	
Vertica	al Polarization				5 1		
Date of 05/24/	test: /2004	Operator: M. Steindl					
Test pe	rformed:	File name:					
autom	atically	default.emi					
Detecto Peak	r:			List of values: Selected by hand			
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Result:				Project file:			
Presca	an			55456-40302	Page	of	Pages

Model: i-Port 3 Serial no.: EU01 Applicant: identec Solutions AG Test site: Fully anechoic room, cabin no. 2 Tested on: Test distance 3 metres Horizontal Polarization - Note: with WHK3M/13G-10SS high-pas Date of test: Operator: 05/24/2004 M. Steindl Test performed: File name: automatically default.emi Detector: Peak 75 - 70 - 65 - 60 - 55 -	ss-filter
I-Port 3 - TX mode Serial no:: - antenna connected Applicant: - EUT: DC 12 V Identec Solutions AG - Settings: Test site: - Settings: Fully anechoic room, cabin no. 2 - Settings: Test distance 3 metres - Note: with WHK3M/13G-10SS high-pas Horizontal Polarization - Note: with WHK3M/13G-10SS high-pas Date of test: Operator: 05/24/2004 M. Steindl Test performed: File name: automatically default.emi Detector: Peak 10 dB Margin 50 Subrang dBµV/m Limit1: FCC Part 15 70 - 65 - 60 - 55 -	S-filter
Built - antenna connected Applicant: - EUT: DC 12 V Identec Solutions AG - Settings: Test site: Fully anechoic room, cabin no. 2 Tested on: - Settings: Test distance 3 metres - Note: with WHK3M/13G-10SS high-pas Horizontal Polarization - Note: with WHK3M/13G-10SS high-pas Date of test: Operator: 05/24/2004 M. Steindl Test performed: File name: automatically default.emi Detector: Peak Peak Limit1: FCC Part 15 75 - 76 - 77 - 65 - 60 - 55 -	ss-filter
Applicant: Identec Solutions AG Test site: Fully anechoic room, cabin no. 2 Test distance 3 metres - Settings: Horizontal Polarization - Note: with WHK3M/13G-10SS high-pase Date of test: Operator: 05/24/2004 M. Steindl Test performed: File name: automatically default.emi Detector: Peak 0 - 75 - 70 - 65 - 60 - 55 -	ss-filter
Test site: Fully anechoic room, cabin no. 2 Test distance 3 metres - Settings: Horizontal Polarization - Note: with WHK3M/13G-10SS high-pase Date of test: Operator: 05/24/2004 M. Steindl Test performed: File name: automatically default.emi Detector: Peak Peak 50 Subrang 05/24/2004 Limit1: FCC Part 15 Transducer: - 0 -	ss-filter
Fully anechoic room, cabin no. 2 Tested on: Tested on: Test distance 3 metres Horizontal Polarization Date of test: Operator: 05/24/2004 M. Steindl Test performed: File name: automatically default.emi Detector: Peak Peak List of values: 10 dB Margin 50 Subrang dBµV/m Limit1: FCC Part 15 Transducer: 70 65	ss-filter
Tested on: Test distance 3 metres Horizontal Polarization . Note: with WHK3M/13G-10SS high-pase Date of test: Operator: 05/24/2004 M. Steindl Test performed: File name: automatically default.emi Detector: Peak Peak List of values: 10 dB Margin 50 Subrang dBµV/m Limit1: FCC Part 15 70 . 65 . 60 . 55 .	ss-filter
Test distance 3 metres Horizontal Polarization Date of test: Operator: 05/24/2004 M. Steindl Test performed: File name: automatically default.emi Detector: Peak Peak S0 Subrang dBµV/m Limit1: FCC Part 15 Transducer: 75 70	ss-filter
Date of test: Operator: 05/24/2004 M. Steindl Test performed: File name: automatically default.emi Detector: Peak Peak 10 dB Margin 50 10 dB Margin 65 60 65 60 65 60	
OSZEW2004 IN. Otentul Test performed: File name: automatically default.emi Detector: Peak Detector: In. Otentul Peak In. Otentul dBµV/m List of values: 80 In. Otentul 75 In. Otentul 65 In. Otentul 65 In. Otentul 65 In. Otentul 60 In. Otentul	
automatically default.emi Detector: List of values: Peak 10 dB Margin 50 Subrang dBµV/m Limit1: FCC Part 15 Transducer: 80 - - 75 - - 70 - - 65 - - 60 - - 55 - -	
Detector: List of values: Peak 10 dB Margin 50 Subrang dBµV/m Limit1: FCC Part 15 Transducer: 80 - - 75 - - 70 - - 65 - - 60 - - 55 - -	
dBμV/m Limit1: FCC Part 15 Transducer: 80 75 - 70 - - 65 - - 60 - - 55 - -	es
80 75 70 65 60 55	EMCO 3160
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Result: Project file: Prescan 55456-40302 Page	5850 MHz

Radiated Emission Tes acc. to FCC Part	st 3.95 GHz - 5.85 GHz 15 (EMCO 3160)
Model: i-Port 3 Serial no.: EU01 Applicant: Identec Solutions AG Test site: Fully anechoic room, cabin no. 2 Tested on: Test distance 3 metres Vertical Polarization Date of test: Operator: 05/24/2004 M. Steindl Test performed: File name:	Comment: - TX mode - antenna connected - EUT: DC 12 V - Settings: frequency: 868.35 MHz level: -10.3 dBm - Note: with WHK3M/13G-10SS high-pass-filter
automatically last.emi	List of values:
	Limit1: ECC Part 15 Transducer: EMCO 3160
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0 3950	5000 5850 MHz
Result: Prescan	Project file: 55456-40302 Page of Pages

Radiated Emission acc. to FCC Pa	Test 5 art 15	5.85 GHz - 8.2 GHz (EMCO 3160)	
Model: i-Port 3 Serial no.: EU01 Applicant: Identec Solutions AG Test site: Fully anechoic room, cabin no. 2 Tested on: Test distance 3 metres Horizontal Polarization Date of test: Operator: 05/24/2004 M. Steindl Test performed: File name: automatically default.emi	Cor - T - a - E - S fr le - N	omment: TX mode antenna connected EUT: DC 12 V Settings: requency: 868.35 MHz evel: -10.3 dBm Note: with WHK3M/13G-10SS high-pass-filter	
Detector: Peak	List	st of values: elected by hand	
dBµV/m 80		Limit1: FCC Part 15 Transducer: EMCO 3	160
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45 martin Martin Martin Martin	Mmm	with man and the second	Wm
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5			
0 5850 6000	7	7000 8000	8200 MHz
Result: Prescan	Pro 554	oject file: 5456-40302 Page of P	ages

Radiated Emission Te acc. to FCC Part	st 5.85 GHz - 8.2 GHz 15 (EMCO 3160)
Model: i-Port 3 Serial no.: EU01 Applicant: Identec Solutions AG Test site: Fully anechoic room, cabin no. 2 Tested on: Test distance 3 metres Vertical Polarization Date of test: Operator: 05/24/2004 M. Steindl Test performed: File name: automatically default.emi	Comment: - TX mode - antenna connected - EUT: DC 12 V - Settings: frequency: 868.35 MHz level: -10.3 dBm - Note: with WHK3M/13G-10SS high-pass-filter
Detector: Peak	List of values: Selected by hand
dBµV/m 80	Limit1: FCC Part 15 Transducer: EMCO 3160
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0 5850 6000	7000 8000 8200 MHz
Result: Prescan	Project file: 55456-40302 Page of Pages

Radiated Emissio acc. to FCC I	on Test 8.2 GHz - 8.7 GHz Part 15 (EMCO 3160)
Model: i-Port 3 Serial no.: EU01 Applicant: Identec Solutions AG Test site: Fully anechoic room, cabin no. 2 Tested on: Test distance 1 meter Horizontal Polarization Date of test: Operator: 05/24/2004 M. Steindl Test performed: File name: automatically default emi	Comment: - TX mode - antenna connected - EUT: DC 12 V - Settings: frequency: 868.35 MHz level: -10.3 dBm - Note: with WHK3M/13G-10SS high-pass-filter
Detector: Peak	List of values: 10 dB Margin 50 Subranges
dBµV/m	Limit1: FCC Part 15 (1 m) Transducer: EMCO 3160
70 65 60 55 50 45	Mmmmmmmmmmmmmmmmmmmmmmmmmmmmmmmmmmmmmmm
40	
35	
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25	
20	
15	
10	
5	
0 <u>8200</u>	8700 MHz
Result: Prescan	Project file: 55456-40302 Page of Pages

Radiated Emission Test 8.2 GHz - 8.7 GHz acc. to FCC Part 15 (EMCO 3160)				
Model: i-Port 3 Serial no.: EU01 Applicant: Identec Solutions AG Test site: Fully anechoic room, cabin no. 2 Tested on: Test distance 1 meter Vertical Polarization Date of test: Operator: 05/24/2004 M. Steindl Test performed: File name: automatically default emi		Comment: - TX mode - antenna connected - EUT: DC 12 V - Settings: frequency: 868.35 MHz level: -10.3 dBm - Note: with WHK3M/13G-10SS high-pass-filter		
Detecto Peak	r:	List of values: 10 dB Margin 50 Subranges		
dBµV/m	ı	Limit1: FCC Part 15 (1 m) Transducer: EMCO 3160		
70 65 60 55 50 45	honder warden war	hom Mar		
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5				
0 82	200	8700 MHz		
Result: Presca	an	Project file: 55456-40302 Page of Pages		