

Straubing, June 10, 2002

TEST - REPORT

No. 55503-20031

for

FRH-SD07TU

RF-Modem using digital modulation

Applicant: Futaba Corporation

Purpose of testing: To show compliance with

FCC Code of Federal Regulations,
Part 15 Subpart C, Section §15.247

Industry Canada RSS 210, Issue 4
Low Power Licence-Exempt
Radiocommunication Devices
(All Frequency Bands)

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

Equipment Under Test (EUT):	FRH-SD07TU
Serial number(s):	0001
Type of equipment:	RF-modem using digital modulation.
Version:	as delivered
Parts/accessories:	see "Configuration of EUT and Peripheral Devices" on page 7
FCC-ID:	AZP-FRH-SD07TU
Applicant:	Futaba Corporation
(full address)	1080, Yabuzuka Chosei-son Chosei-gun Chiba-ken, 299-4395 Japan
Contract identification:	---
Contact person:	Mr. Satoru Ishii, Ph.D.
Manufacturer:	Futaba Corporation
Receipt of EUT:	14 January 2002
Date of test:	February 2002
Note:	---
Responsible for testing:	Johann Roidt
Responsible for test report:	Johann Roidt

2. Identification of Test Laboratory

Test Laboratory:
(full address): Senton GmbH EMI/EMC Test Center
Aeussere Fruehlingstrasse 45
D-94315 Straubing
Germany

Contact person: Mr. Johann Roidt
Communication: Telephone (+49) 0 94 21 / 55 22-0
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eMail: Office@senton.de

FCC registration number: 90926
Industry Canada file number: IC 3050

3. Summary of Test Results

The tested sample complies with the requirements¹ set forth in the Code of Regulations Part 15 Subpart C, Section §15.247 (intentional radiators) of the Federal Communication Commission (FCC).



Johann Roidt
Technical Manager

¹ Processing gain according to §15.247.e is not part of this test report (test performed by applicant)

4. Operation Mode of EUT

All tests were performed using the test mode of the EUT.

Transmit mode (TX):

Operating frequency [GHz]	Rated output power (conducted) [dBm]			Test performed ²
2.420				X
2.450				X
2.473				X

Receive mode (RX):

Operating frequency [GHz]	Test performed
2.420	
2.450	X
2.473	

² Full testing with bit rate 11 Mbps only

5. Configuration of EUT and Peripheral Devices

RF-modem module FRH-SD07TU was tested operating with designated antenna and connected to a Fujitsu notebook computer via the RS 232 serial interface

In table 1 used accessories and host equipment are listed (with Agere part numbers).

Item	Model or part no.	Serial no.	Designation	Manufacturer
RF-modem	N/A	0001	FRH-SD07TU	Futaba
Notebook	5033	TNTS98018460	LiteLine	Fujitsu
AC adapter	UP06021220B	9906	---	Potrans

Table 1: EUT and accessories

6. Setup of Host

Configuration of cables of host

- Non shielded power line for AC-power supply of notebook, 180 cm

Configuration of host and peripheral devices

- See table 1

7. Measuring Methods

7.1. Minimum 6 dB Bandwidth (§ 15.247.a2)

The minimum 6 dB bandwidth was measured with a spectrum analyzer connected to the antenna connector (conducted measurement) while EUT was operating in transmit mode at the appropriate center frequency.

The spectrum analyzer was set to:

RBW = 100 kHz, VBW = 100 kHz, span = 50 MHz, sweep = 20 ms

See figure 1 for the measurement setup.

Test equipment used (see equipment list for details):

02, 18, 67, 68

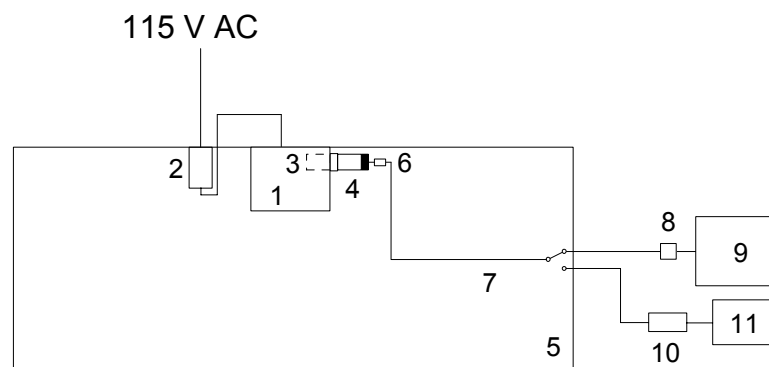


Figure 1: Measurement setup for testing on antenna connector

- | | |
|---------------------------|---------------------|
| 1 Notebook (host) | 6 DC-block |
| 2 AC adapter for notebook | 7 Test cable |
| 3 PC-card extender | 8 Attenuator |
| 4 RF-modem | 9 Spectrum analyzer |
| 5 Wooden table | 10 Power sensor |
| | 11 Power meter |

7.2. Maximum Peak Output Power (§ 15.247.b)

The maximum peak output power was measured with a power meter. The appropriate thermocouple sensor (indicating the RMS power) was connected to the antenna connector (conducted measurement) while EUT was operating in transmit mode at the appropriate center frequency.

A spectrum analyzer (set to RBW = 100 kHz, VBW = 100 kHz, span = 100 MHz, sweep = 40 ms) was used to record the shape of the transmit signal.
See figure 1 for the measurement setup.

Test equipment used (see equipment list for details):

02, 08, 09, 18, 67, 68

7.3. Peak Power Density (§ 15.247.d)

The peak power density was measured with a spectrum analyzer connected to the antenna connector (conducted measurement) while EUT was operating in transmit mode at the appropriate center frequency.

The spectrum analyzer was set to max hold with
RBW = 3 kHz, VBW = 100 kHz, span = 300 kHz, sweep = 100 s
See figure 1 for the measurement setup.

Test equipment used (see equipment list for details):

02, 18, 67, 68

7.4. Conducted Emission 0.45 MHz - 30 MHz (§15.207)

Conducted emissions were measured in the frequency range 0.45 MHz to 30 MHz. The bandwidth of the EMI-Receiver was set to 9 kHz and the detector-function was set to CISPR quasi-peak.

The test setup was made in accordance with ANSI C63.4-1992.

Measurements were performed on phase and neutral lines of the power-cords of the tested system. Preliminary scans were taken with the detector-function of the EMI-receiver set to peak to determine the conducted EMI-profile of the EUT. At the final test the cables and equipment were placed and moved within the range of positions likely to find their maximum emissions.

See figure 2 for the measurement setup.

Test equipment used (see equipment list for details):

04, 22, 23, 60, 63

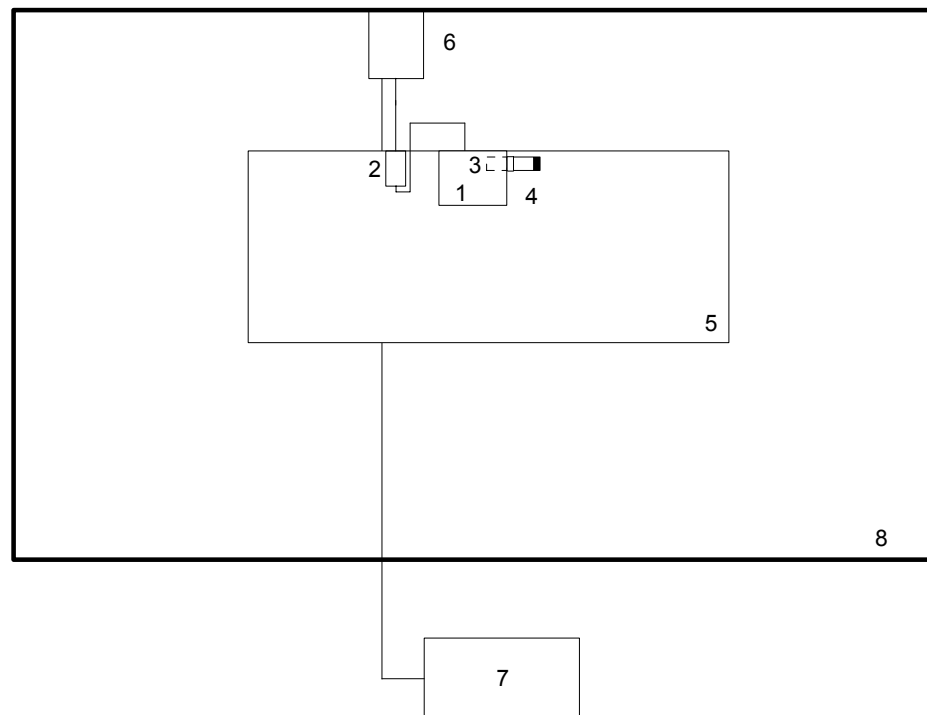


Figure 2: Measurement setup for conducted emission test

- | | | | |
|---|-------------------------|---|---------------|
| 1 | Notebook (host) | 6 | LISN for EUT |
| 2 | AC adapter for notebook | 7 | Test receiver |
| 3 | PC-card extender | 8 | Shielded room |
| 4 | RF-modem | | |
| 5 | Wooden table | | |

7.5. Radiated Emission 30 MHz - 1 GHz (§15.209, §15.247.c, §15.205.a,b)

Radiated emissions were measured over the frequency range from 30 MHz to 1 GHz. The bandwidth of the EMI-receiver was set to 120 kHz and the detector-function was set to CISPR quasi-peak.

The test setup was made in accordance with ANSI C63.4-1992. Measurements were made in both the horizontal and vertical planes of polarization. Preliminary scans were taken in a semi-anechoic room using a spectrum analyzer with the detector function set to peak. All tests were performed at a test-distance of 3 meters. For final testing an open-area test-site was used. During the tests the EUT was rotated all around and the receiving-antenna was raised and lowered from 1 meter to 4 meters 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.

See figure 3 for the measurement setup.

Test equipment used (see equipment list for details):

01, 06, 12, 38, 39, 40, 41, 58, 61, 64, 66

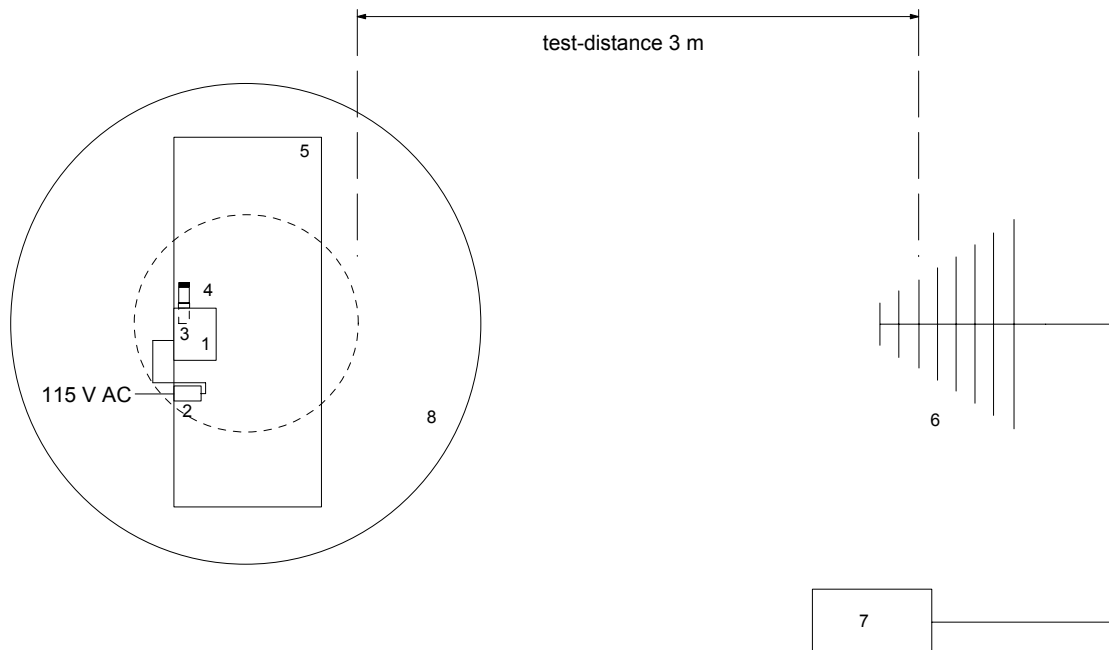


Figure 3: Measurement setup for radiated emission test below 1 GHz

- | | |
|--|--|
| <p>1 Notebook (host)</p> <p>2 AC adapter for notebook</p> <p>3 PC-card extender</p> <p>4 RF-modem</p> <p>5 Wooden table</p> | <p>6 Measurement antenna</p> <p>7 Test receiver</p> <p>8 Turn table</p> |
|--|--|

7.6. Radiated Emission 1 GHz - 25 GHz (§15.209, §15.247.c, §15.205.a,b)

Radiated emissions were measured in the frequency range 1 GHz to 25 GHz in transmit mode and 1 GHz to 12.5 GHz in receive mode. The resolution bandwidth of the spectrum analyzer was set to 1 MHz. Scans for the whole frequency range were taken with video bandwidth set to 1 MHz to check out the highest peak levels. In case of less margin to average limit additional prescans were made with video bandwidth reduced from 1 MHz to 100 kHz, 30 kHz or 10 kHz. Final measurements were performed at the critical frequencies with video bandwidth of the spectrum analyzer set to 1 kHz (average mode). EUT was rotated all around and receiving antenna was raised and lowered to find the maximum levels of emission. Cables and equipment were placed and moved within the range of position likely to find their maximum emissions. All tests were performed in a semi-anechoic chamber with a test-distance of 3 meters (except for the frequency range 18 GHz - 25 GHz where test distance was reduced to 0.5 meter).

To avoid overload in transmit mode no preamplifier was used between 1 GHz and 3.95 GHz. Above 3.95 GHz tests were performed with appropriate preamplifiers (attenuation of operating frequency by horn antenna is sufficient to avoid overload of preamplifier). For receive mode appropriate preamplifiers were used for the whole frequency range. To eliminate variations in amplification of the preamplifiers a signal generator was used for substitution (however, during testing a correction according to the minimum amplification was added).

Substitution was performed in the following steps:

- antenna cable was disconnected from receiving antenna and connected to signal generator output
- level of signal generator was increased until the reading value of the analyzer was the same as caused by EUT
- level of signal generator was noted
- final value was calculated by converting the signal generator level to dB μ V/m and adding the antenna correction factor.

See figure 4 for the measurement setup.

Test equipment used (see equipment list for details):
02, 13, 14, 16, ,42, 43, 44, 45, 46, 47, 48, 49, 57, 64

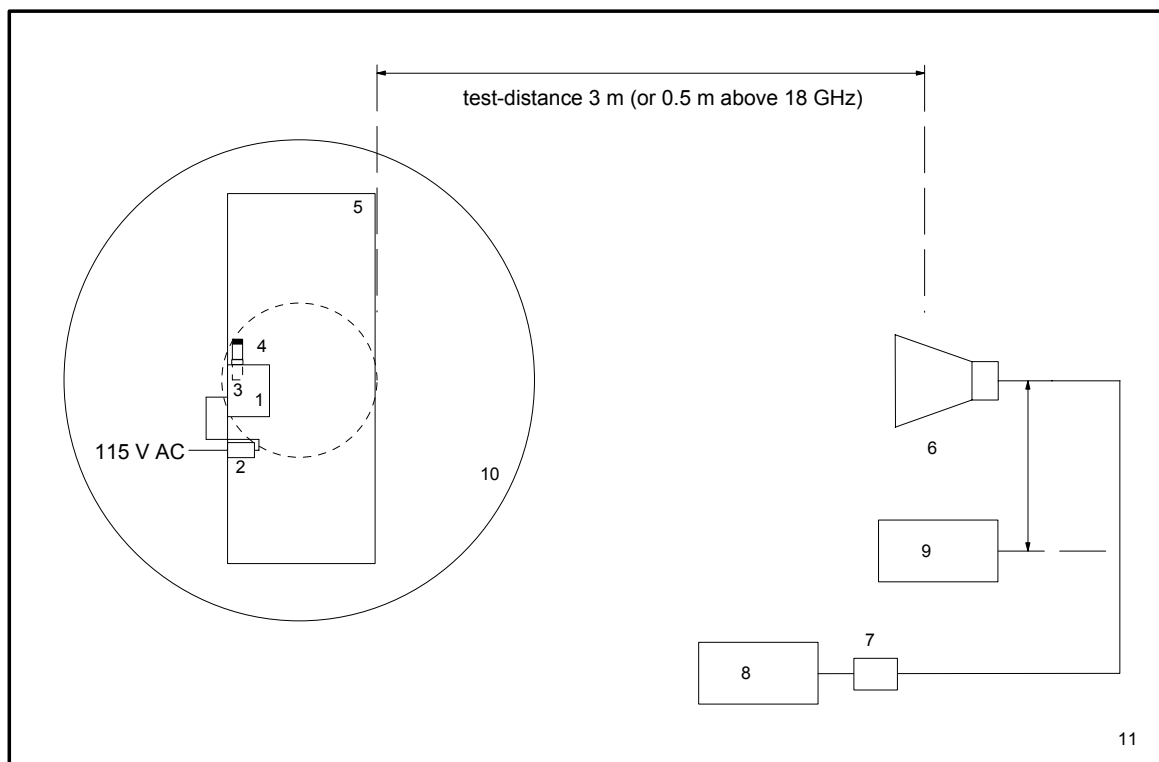


Figure 4: Measurement setup for radiated emission test above 1 GHz

- | | | | |
|----------|-------------------------|-----------|------------------------------|
| 1 | Notebook (host) | 6 | Measurement antenna |
| 2 | AC adapter for notebook | 7 | Preamplifier (if applicable) |
| 3 | PC-card extender | 8 | Spectrum analyzer |
| 4 | RF-modem | 9 | Signal generator |
| 5 | Wooden table | 10 | Turn table |
| | | 11 | Semi-anechoic room |

8. Equipment List

To facilitate reference to test equipment used for related tests, each item of test equipment and ancillaries such as cables are identified (numbered) by the Test Laboratory.

No.	Type	Model	Serial Number	Manufacturer
01	Spectrum Analyzer	R 3271	05050023	Advantest
02	EMI Test Receiver	ESMI	839379/013 839587/006	Rohde & Schwarz
03	Test Receiver	ESH 3	880112/032	Rohde & Schwarz
04	Test Receiver	ESHS 10	860043/016	Rohde & Schwarz
05	Test Receiver	ESV	881414/009	Rohde & Schwarz
06	Test Receiver	ESVP	881120/024	Rohde & Schwarz
07	Audio Analyzer	UPA	862954	Rohde & Schwarz
08	Power Meter	NRVS	836856/015	Rohde & Schwarz
09	Power Sensor	NRV-Z52	837901/030	Rohde & Schwarz
10	Power Sensor	NRV-Z4	863828/015	Rohde & Schwarz
11	Preamplifier	ESV-Z3	860907/004	Rohde & Schwarz
12	Preamplifier	R14601		Advantest
13	Preamplifier	ACX/080-3030	32640	CTT
14	Preamplifier	ACO/180-3530	32641	CTT
15	Signal Generator	SMS	872166/039	Rohde & Schwarz
16	Signal Generator	HP 8673 D	2930A00966	Hewlett Packard
17	Waveform Generator	HP 33120 A	US34005375	Hewlett Packard
18	Attenuator 20 dB	4776-20	9503	Narda
19	Attenuator 10 dB	4776-10	9412	Narda
20	Pulse Limiter	ESH 3-Z2	1144	Rohde & Schwarz
21	Pulse Limiter	11947 A	3107A00566	Hewlett Packard
22	V-Network	ESH 3-Z5	862770/018	Rohde & Schwarz
23	V-Network	ESH 3-Z5	894785/005	Rohde & Schwarz
24	V-Network	ESH 3-Z5	830952/025	Rohde & Schwarz
25	V-Network	ESH 3-Z6	830722/010	Rohde & Schwarz
26	V-Network	NSLK 8127	8127152	Schwarzbeck
27	V-Network	NNLA 8119	8119148	Schwarzbeck
28	V-Network	SE 01	01	Senton
29	T-Network	ESH 3-Z4	890602/011	Rohde & Schwarz
30	T-Network	ESH 3-Z4	890602/012	Rohde & Schwarz
31	High Impedance Probe	TK 9416	01	Schwarzbeck
32	High Impedance Probe	TK 9416	02	Schwarzbeck
33	Current Probe	ESH 2-Z1	863366/18	Rohde & Schwarz
34	Current Probe	ESV-Z1	862553/3	Rohde & Schwarz

No.	Type	Model	Serial Number	Manufacturer
35	Absorbing Clamp	MDS 21	80911	Lüthi
36	Absorbing Clamp	MDS 21	79690	Lüthi
37	Loop Antenna	HFH2-Z2	882964/1	Rohde & Schwarz
38	Biconical Antenna	HK 116	842204/001	Rohde & Schwarz
39	Biconical Antenna	HK 116	836239/02	Rohde & Schwarz
40	Log. Periodic Antenna	HL 223	841516/023	Rohde & Schwarz
41	Log. Periodic Antenna	HL 223	834408/12	Rohde & Schwarz
42	Horn Antenna	3115	9508-4553	Emco
43	Horn Antenna	3160-03	9112-1003	Emco
44	Horn Antenna	3160-04	9112-1001	Emco
45	Horn Antenna	3160-05	9112-1001	Emco
46	Horn Antenna	3160-06	9112-1001	Emco
47	Horn Antenna	3160-07	9112-1008	Emco
48	Horn Antenna	3160-08	9112-1002	Emco
49	Horn Antenna	3160-09	9403-1025	Emco
50	Digital multimeter	199	463386	Keithley
51	DC Power Supply	NGSM 32/10	203	Rohde & Schwarz
52	DC Power Supply	NGB	2455	Rohde & Schwarz
53	DC Power Supply	NGA	386	Rohde & Schwarz
54	Temperature Test Chamber	HT4010	07065550	Heraeus
55	Cable	RG214	1309	Senton
56	Cable	200CM_001	1357	Rosenberger
57	Cable	150CM_001	1479	Rosenberger
58	Cable Set EG1	RG214	1189 - 1191	Senton
59	Cable Set Cabine 1	RG214		Senton
60	Cable Set Cabine 2	RG214		Senton
61	Cable Set Cabine 3	RG214		Senton
62	Shielded Room	No. 1	1451	Senton
63	Shielded Room	No. 2	1452	Senton
64	Semi-anechoic Chamber	No. 3	1453	Siemens
65	Shielded Room	No. 4	1454	Euroshield
66	Open Area Test Site	EG 1		Senton
67	Cable for Antenna Connector			Agere
68	DC Block 0.01-18GHz		8037	Inmet Corp.
69	High pass filter			Agere

9. Photographs Taken During Testing

Photos No. 9.1 - 9.2

Test setup for radiated emission pre-test 30 MHz - 1 GHz (fully anechoic room)



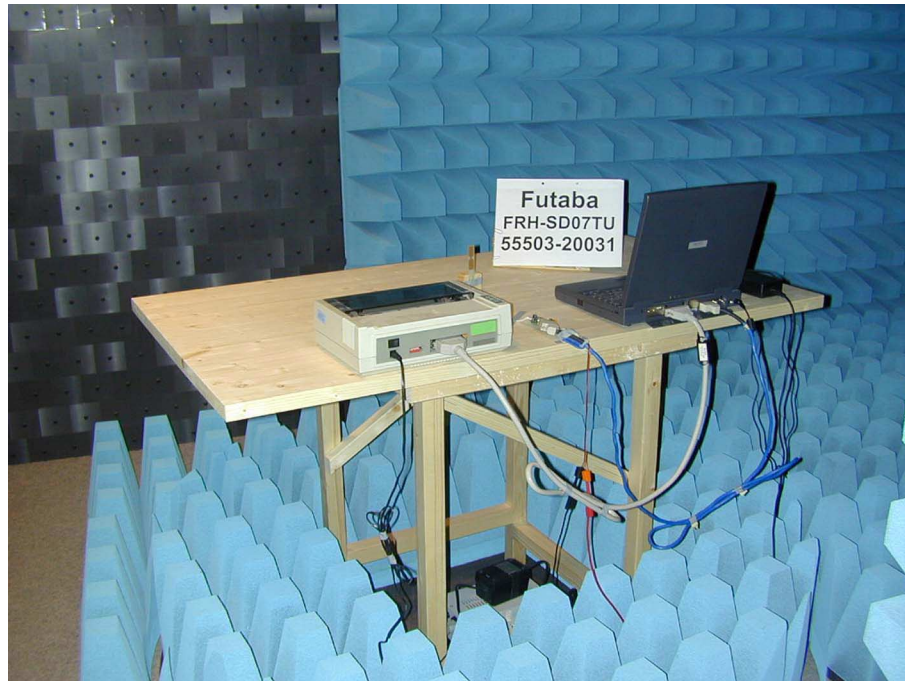
Photos No. 9.3 - 9.4

**Test setup for radiated emission pre-test 30 MHz - 2 GHz (fully anechoic room)
- continued -**



Photos No. 9.5 - 9.6

Test setup for radiated emission final test 30 MHz - 25 GHz



Photos No. 9.7 - 9.8

**Test setup for radiated emission final test 30 MHz - 25 GHz
- continued -**



10. List of Measurements

FCC Part 15	RSS 210			
Section(s):		Test	Page	Result
		Transmit mode (TX):		
15.247 (a)(2)	N/A	Minimum 6 dB bandwidth	28	Pass
15.247 (b)(3)	6.2.2 (o) b	Maximum peak output power	30	Pass
N/A	6.2.2 (o) b	Processing gain	---	Pass
15.247.d	6.2.2 (o) b	Peak power density	29	Pass
15.207	6.6	Conducted emission test 450 kHz - 30 MHz	---	Not applicable
15.247.c 15.209 15.205.a,b	N/A	Radiated emission test 9 kHz - 30 MHz	---	not applicable (acc. to §15.33)
15.247.c 15.209 15.205.a,b	6.2.2 (o) e1	Radiated emission test 30 MHz - 1 GHz	31-32	Pass
15.247.c 15.209 15.205.a,b	6.2.2 (o) e1	Radiated emission test 1 GHz - 25 GHz	31-32	Pass
		Receive mode (RX):		
15.207	7.1	Conducted emission test 450 kHz - 30 MHz	---	Not applicable
15.209	7.3	Radiated emission test 9 kHz - 30 MHz	---	not applicable (acc. to §15.33)
15.209	7.3	Radiated emission test 30 MHz - 1 GHz	34	Pass
15.209	7.3	Radiated emission test 1 GHz - 12.5 GHz	34	Pass

11. Test Results

**Test results for
Transmit (TX) mode**

**Minimum 6 dB Bandwidth,
 Part 15, Subpart C, Section 15.247 (a) (2)**

Model: FRH-SD07TU
 Type: Remote Control Transmitter
 Serial No. 001
 Applicant: Futaba Corporation
 Test Site: Radio Lab
 Distance: N/A
 Date of Test: 24 February 2002
 Tested on: Antenna connector

Specification:	The minimum 6 dB bandwidth shall be at least 500 kHz
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Test Results:

Operating frequency (MHz)	6 dB Bandwidth (kHz)	Limit (kHz)
2420.0	611.6	500
2450.0	611.6	500
2473.0	622.0	500

Classification: **Pass**

Peak Power Density, Part 15, Subpart C, Section 15.247 (d)

Model: FRH-SD07TU
 Type: Remote Control Transmitter
 Serial No. 001
 Applicant: Futaba Corporation
 Test Site: Radio Lab
 Distance: N/A
 Date of Test: 24 February 2002
 Tested on: Antenna connector

Specification:	For digitally modulated systems, the peak power spectral density conducted from the intentional radiator to the antenna shall not be greater than 8 dBm in any 3 kHz bandwidth during any time interval of continuous transmission
----------------	--

Test Results:

Operating frequency (MHz)	Peak Power Density (dBm)	Limit (dBm)
2420,0	-2.21	8
2450.0	-2.58	8
2473.0	-3.37	8

Classification: **Pass**

**Maximum Peak Output Power,
 Part 15, Subpart C, Section 15.247 (b) (3)**

Model: FRH-SD07TU
 Type: Remote Control Transmitter
 Serial No. 001
 Applicant: Futaba Corporation
 Test Site: Radio Lab
 Distance: N/A
 Date of Test: 24 February 2002
 Tested on: Antenna connector

Specification:	For systems using digital modulation in the 902-928 MHz, 2400-2483.5 MHz, and 5725-5850 MHz bands: 1 Watt (=30 dBm)
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Test Results:

Operating frequency (MHz)	Power Meter Reading (dBm)	Correction Factor (dB)	Peak Output Power (dBm)	Limit (dBm)
2420.0	7.26	0	7.26	30.0
2450.0	7.00	0	7.00	30.0
2473.0	6.04	0	6.04	30.0

Classification: **Pass**

Spurious Emissions, Part 15, Subpart C, Section 15.247 (c)

Model: FRH-SD07TU
Type: Remote Control Transmitter
Serial No. 001
Applicant: Futaba Corporation
Test Site: Radio Lab
Distance: N/A
Date of Test: 24 February 2002
Tested on: Antenna connector

Specification:	In any 100 kHz bandwidth outside the frequency band in which the digitally modulated intentional radiator is operating, the radio frequency power that is produced by the intentional radiator shall be at least 20 dB below that in the 100 kHz bandwidth within the band that contains the highest level of the desired power based on either conducted or radiated measurement
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Test Results:

Frequency (MHz)	Detector	Antenna Pol.	Analyzer Reading (dBm)	Correction Factor (dB)	Final Value (dBm)	Limit (dBm)	Margin (dB)
2040.0	Pk	N/A	-41,98	0	-41,98	-16,9	25,1
8362.6	Pk	N/A	-46,7	0	-46,7	-16,9	29,8
2072.0	Pk	N/A	-40	0	-40	-16,7	23,3
8276.0	Pk	N/A	-48,22	0	-48,22	-16,7	31,5
2093.3	Pk	N/A	-37,81	0	-37,81	-16,9	20,9
8362.6	Pk	N/A	-46,7	0	-46,7	-16,9	29,8

*** = No emissions above noise floor detected

Sample calculation of field strength values:

Field Strength (dBμV/m) = Analyzer Reading (dBμV) + Correction Factor (dB)

Test equipment used (see equipment list for details):

02, 13, 14, 16, 38, 40 ,42, 57, 64, 67

**Spurious Emissions,
Part 15, Subpart C, Section 15.247 (c)**

Model: FRH-SD07TU
Type: Remote Control Transmitter
Serial No. 001
Applicant: Futaba Corporation
Test Site: Radio Lab
Distance: 3 Meters
Date of Test: 24 February 2002
Tested on: Open Area Test Site (30-1000 MHz)
Fully anechoic Chamber (> 1 GHz)

Specification:	Radiated emissions which fall in the restricted bands as defined in Section 15.205 (a) must also comply with the radiated emission limits specified in Section 15.205 (a)
----------------	---

Test Results:

Frequency (MHz)	Detector	Antenna Pol.	Analyzer Reading (dBμV)	Correction Factor (dB)	Final Value (dBμV/m)	Limit (dBμV/m)	Margin (dB)
190,480	Pk	Horizontal	22,67	15,08	37,75	43,5	5,8
347,200	Pk	Horizontal	23,82	17,22	41,04	46	5,0
697,600	Pk	Horizontal	19,97	22,45	42,42	46	3,6
1392,000	Pk	Vertical	23,44	27,97	51,41	54	2,6
2036,000	Pk	Vertical	19,88	30,35	50,23	54	3,8
2804,000	Pk	Vertical	15,05	32,84	47,89	54	6,1

*** = No emissions above noise floor detected

Sample calculation of field strength values:

Field Strength (dBμV/m) = Analyzer Reading (dBμV) + Correction Factor (dB)

Test equipment used (see equipment list for details):

02, 13, 14, 16, 38, 40, 42, 57, 64, 67

Test results for
Receive (RX) mode

Spurious Emissions, Part 15, Subpart C, Section 15.209 (RX- Mode)

Model: FRH-SD07TU
 Type: Remote Control Transmitter
 Serial No. 001
 Applicant: Futaba Corporation
 Test Site: Radio Lab
 Distance: 3 Meters
 Date of Test: 24 February 2002
 Tested on: Open Area Test Site (30-1000 MHz)
 Fully anechoic Chamber (> 1 GHz)

Specification:	Radiated emissions which fall in the restricted bands as defined in Section 15.205 (a) must also comply with the radiated emission limits specified in Section 15.205 (a)
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Test Results:

Frequency (MHz)	Detector	Antenna Pol.	Analyzer Reading (dBμV)	Correction Factor (dB)	Final Value (dBμV/m)	Limit (dBμV/m)	Margin (dB)
190,480	Pk	Horizontal	22,67	15,08	37,75	43,5	5,8
347,200	Pk	Horizontal	23,82	17,22	41,04	46	5,0
697,600	Pk	Horizontal	19,97	22,45	42,42	46	3,6
1392,000	Pk	Vertical	23,44	27,97	51,41	54	2,6
2036,000	Pk	Vertical	19,88	30,35	50,23	54	3,8

*** = No emissions above noise floor detected

Sample calculation of field strength values:

Field Strength (dBμV/m) = Analyzer Reading (dBμV) + Correction Factor (dB)

Test equipment used (see equipment list for details):

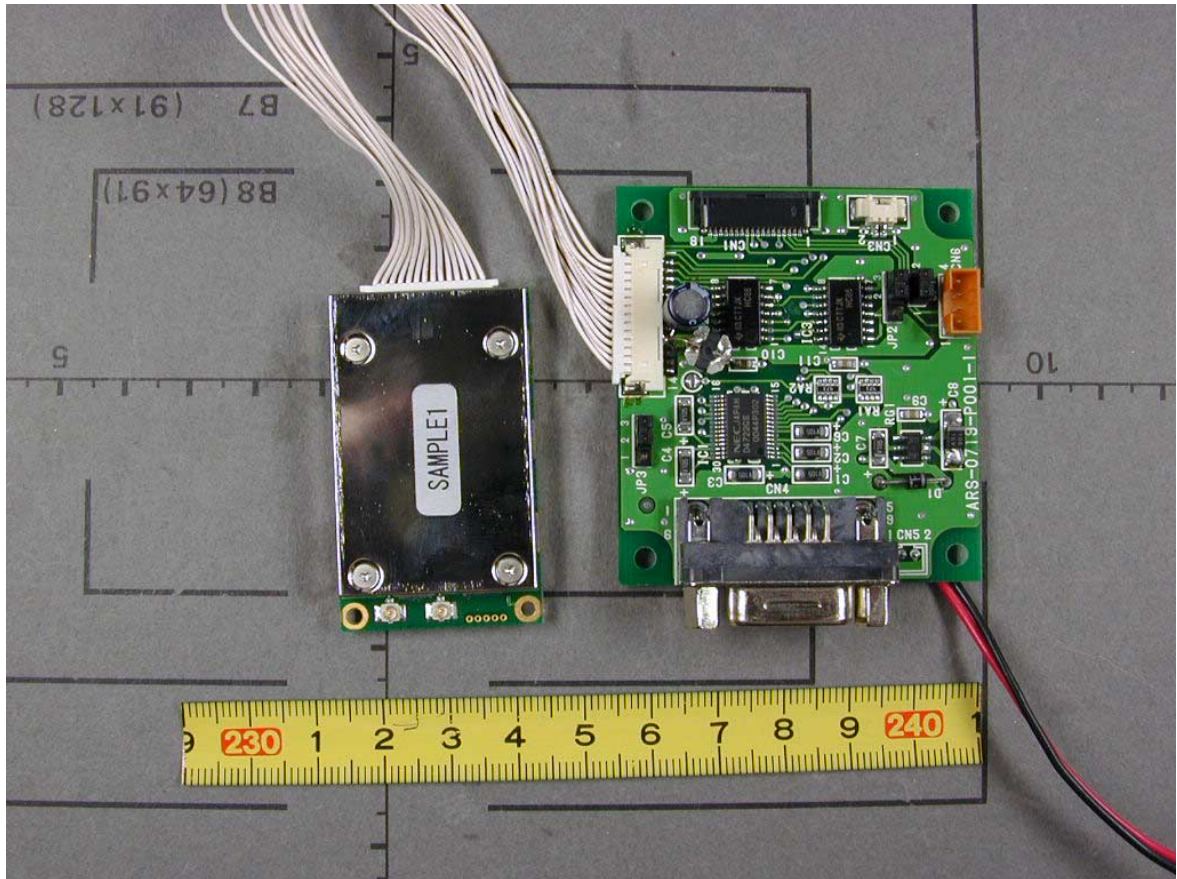
02, 13, 14, 16, 38, 40 ,42, 57, 64, 67

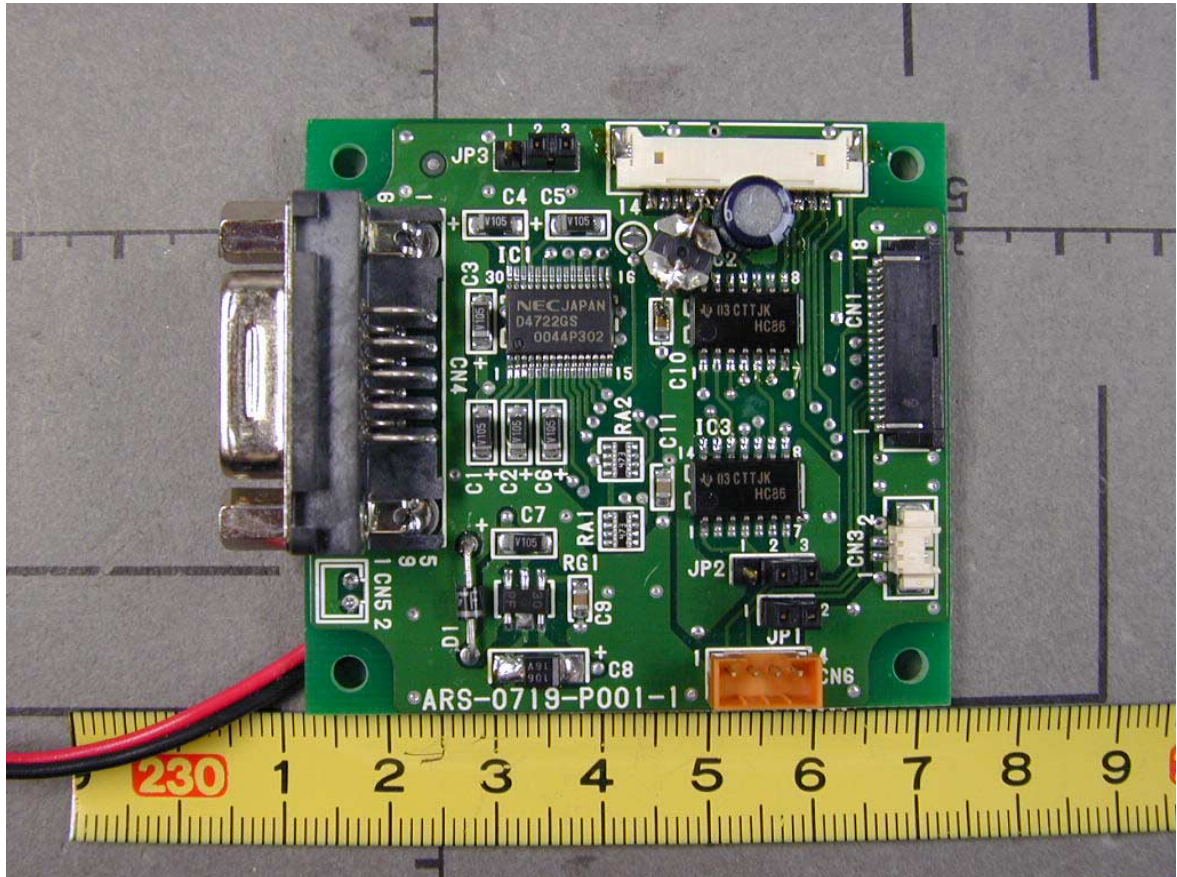
12. Additional Information supplementary to the Test Report

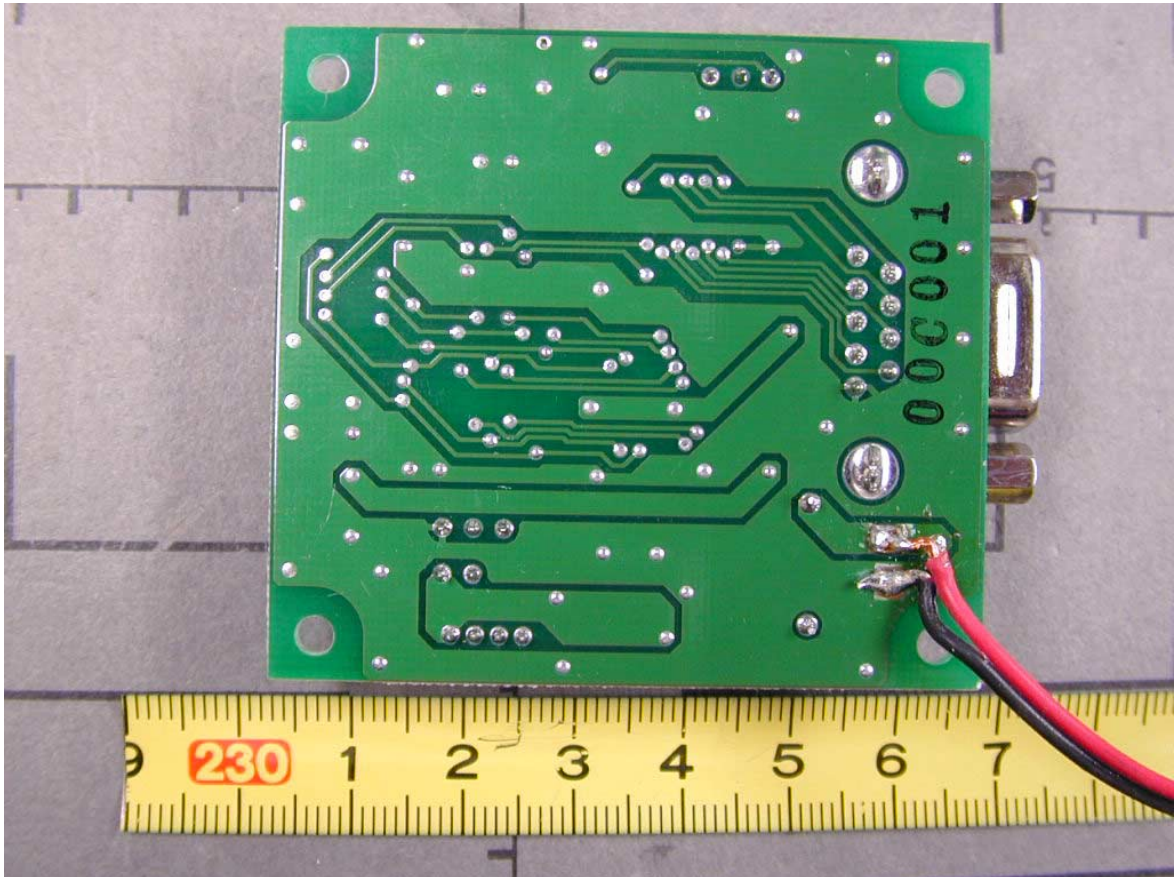
Item	Description	Collected in
1	Photographs of EUT	Annex A
2	Charts taken during testing	Annex B

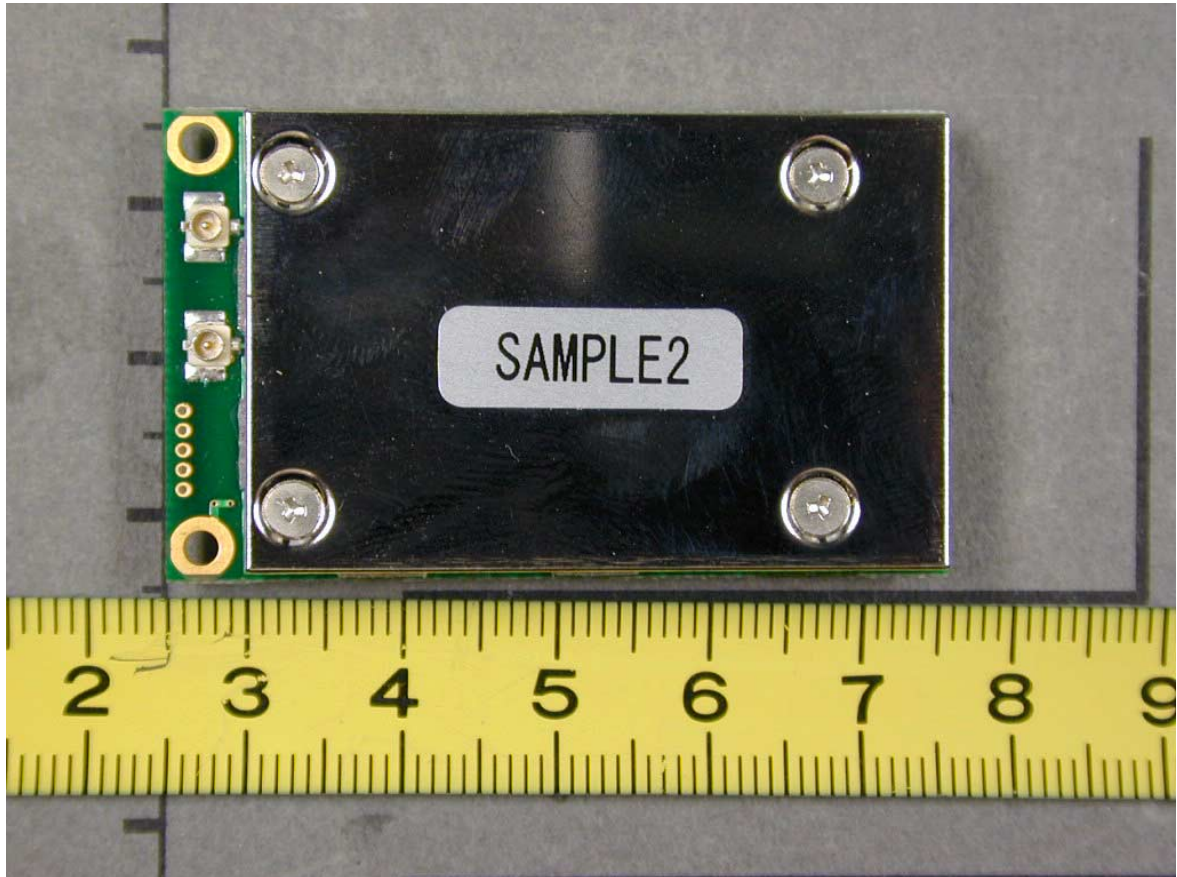
Annex A to Test Report 55503-20031

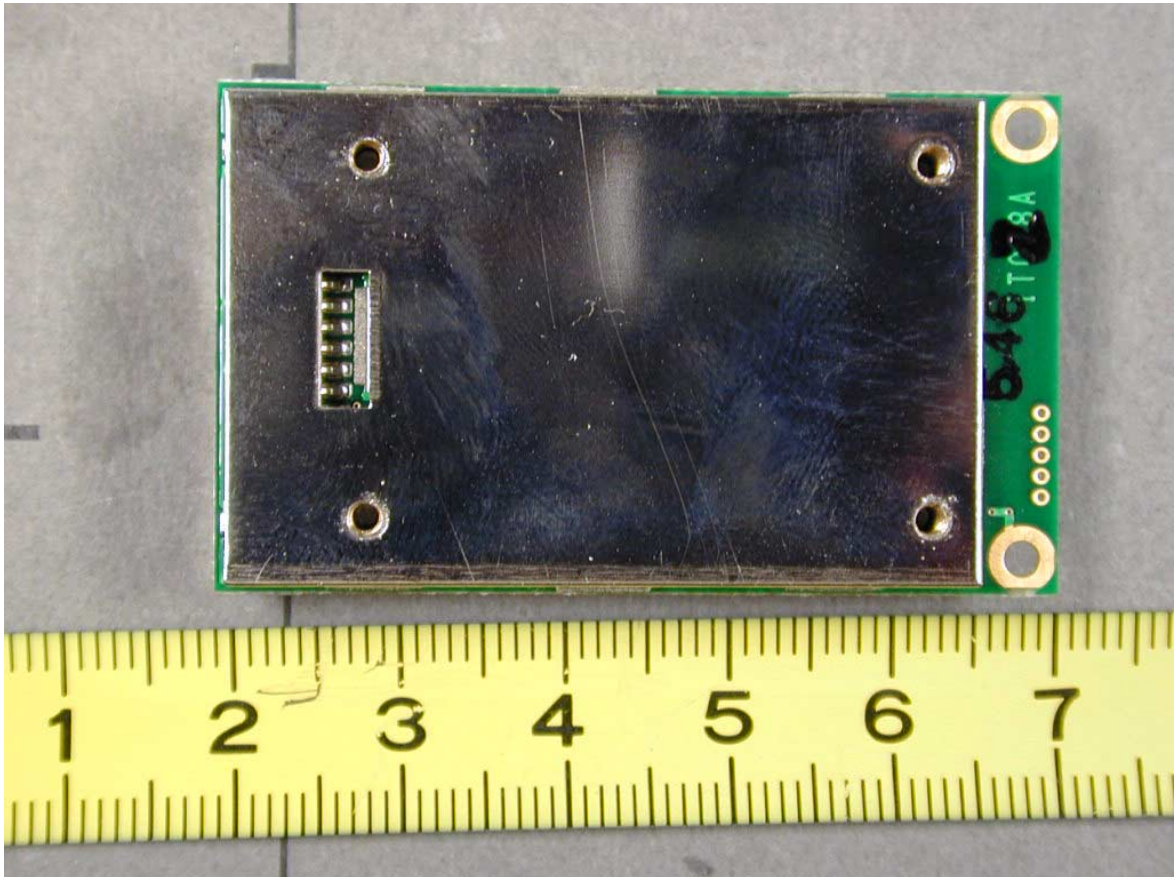
Photographs of EUT

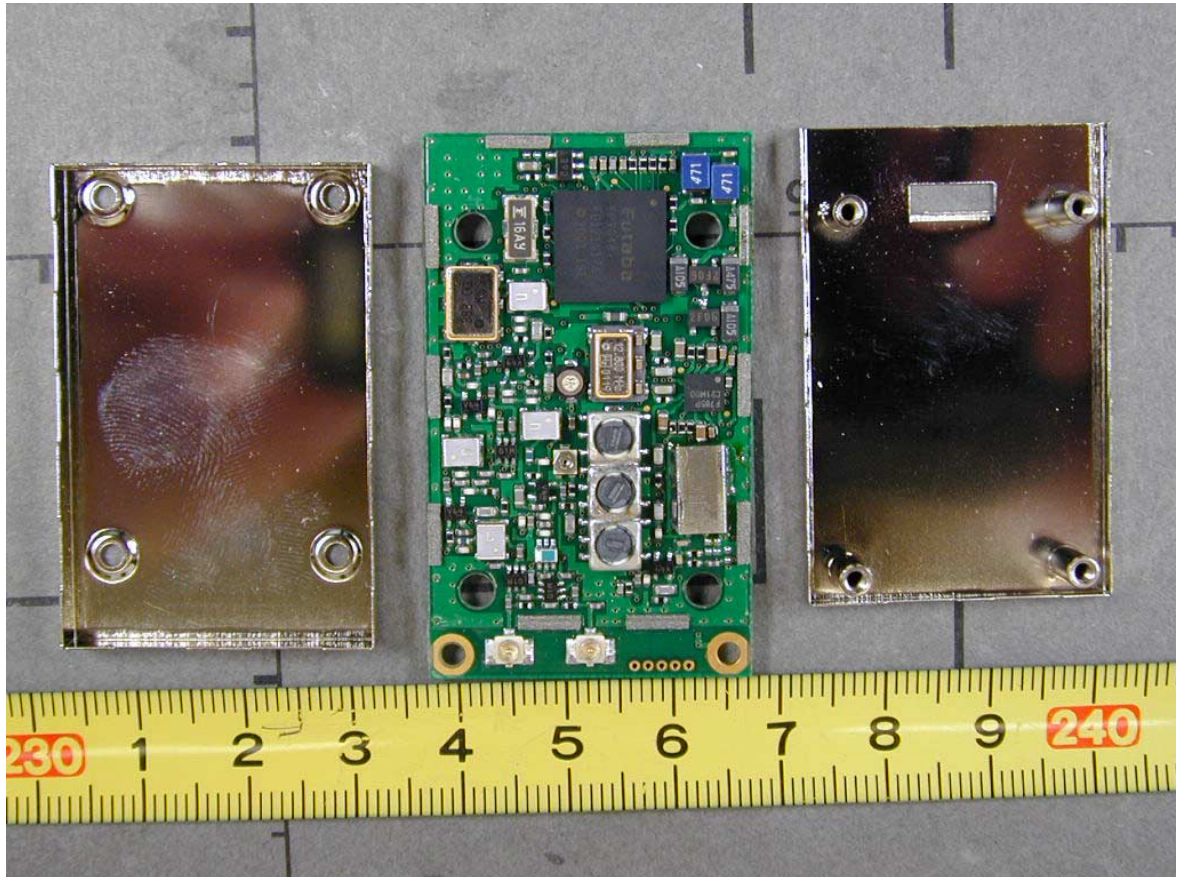


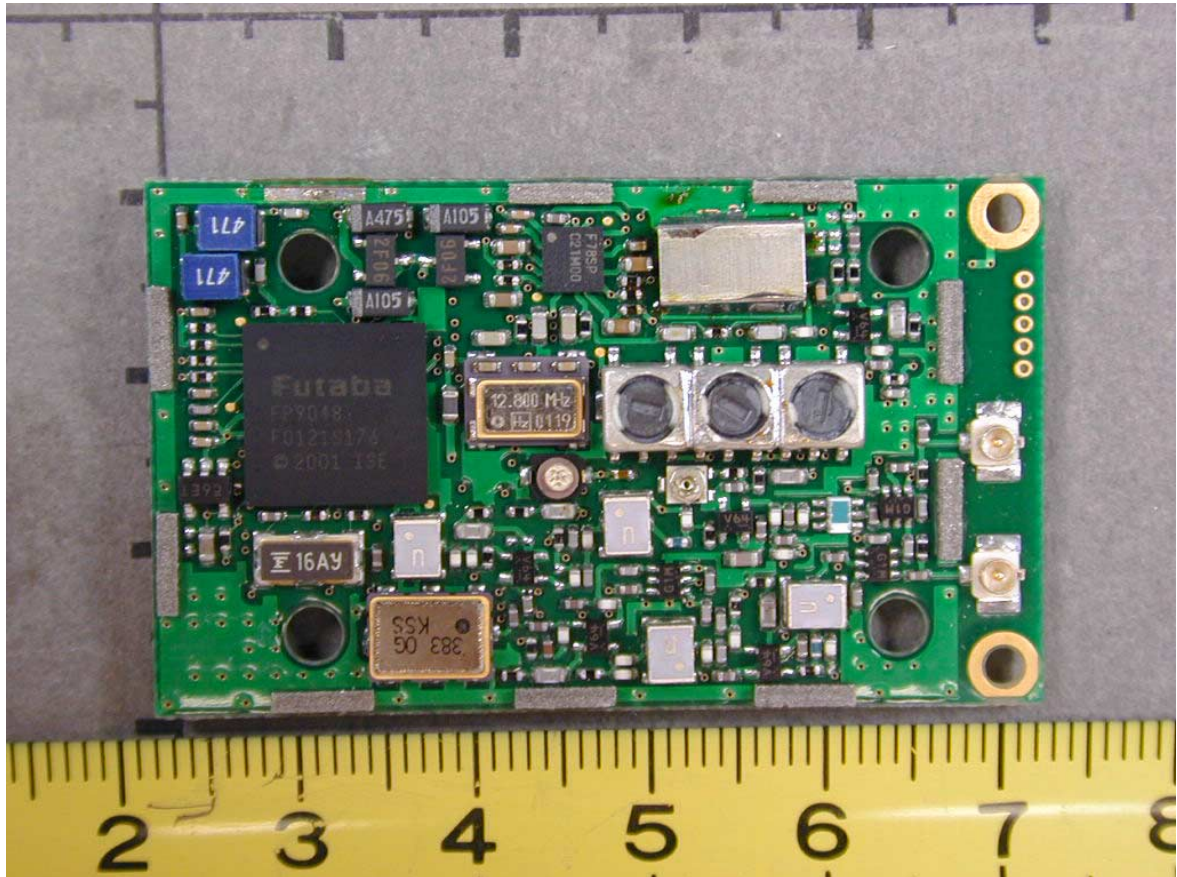


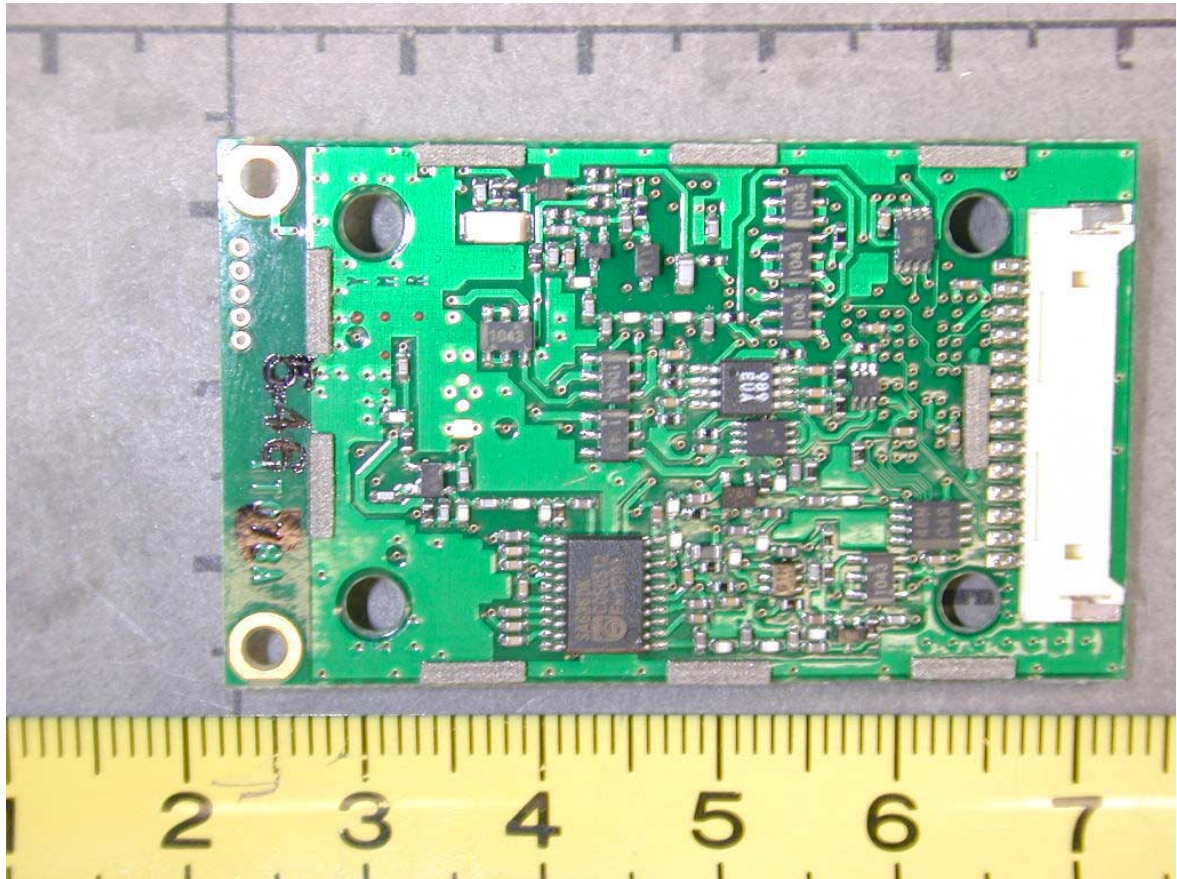












Annex B to Test Report 55503-20031

Charts taken during testing

FCC Rules 15.247 (a) (2) Bandwidth

Model:
FRH-SD07TU

Serial No.:
Sample 1

Applicant:
Futaba Corporation

Mode:
- Conducted Measurement

- Low Channel

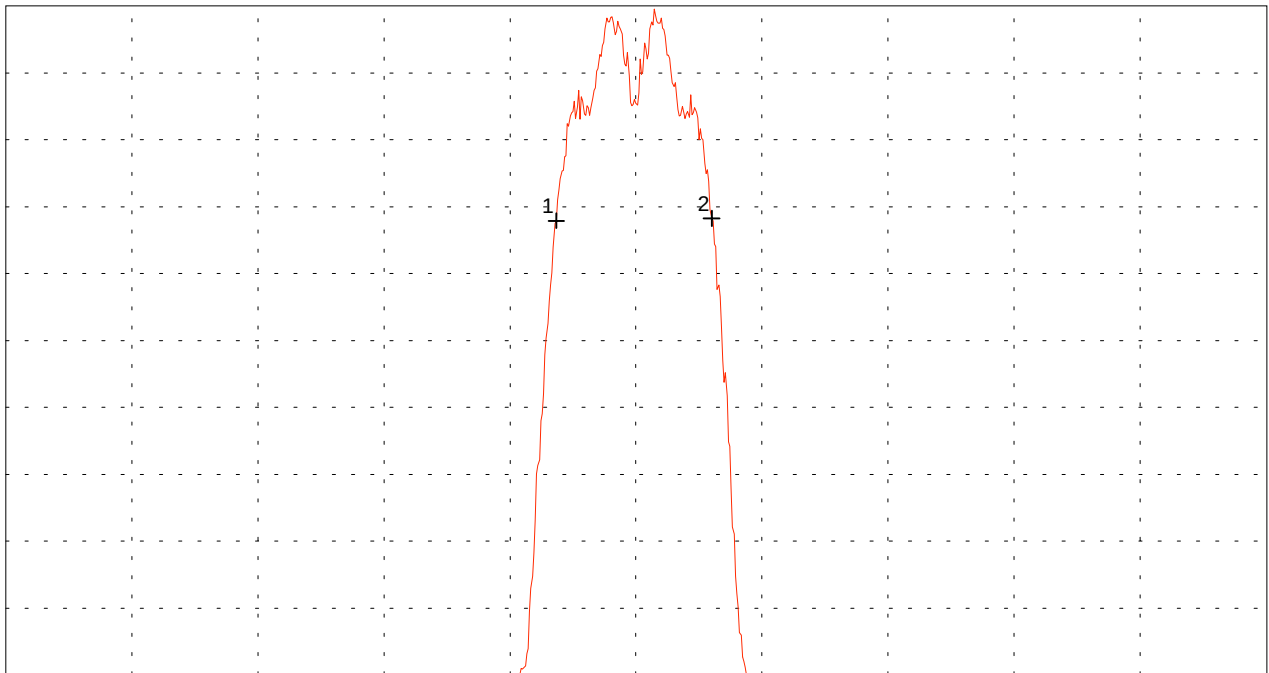
Specification:
For direct sequence systems, the minimum 6 dB bandwidth shall be at least 500 kHz

Result:
The minimum 6 dB bandwidth is 611.6 kHz

Ref.Level 1.7 dBm
2 dB/Div.

ATT 15 dB

Ref. Offset 20 dB



Start 2.4175 GHz
RBW 100 kHz

VBW 10 kHz

Stop 2.4225 GHz
SWP 60 ms

Multi Marker List

No. 1	2.419683 GHz	-4.72 dBm
No. 2	2.420300 GHz	-4.65 dBm

Tested by:
Johann Roidt

Date:
24 February 2002

Project-No.:
55503-20031

Page of pages

FCC Rules 15.247 (a) (2) Bandwidth

Model:
FRH-SD07TU

Serial No.:
Sample 1

Applicant:
Futaba Corporation

Mode:
- Conducted Measurement

- Middle Channel

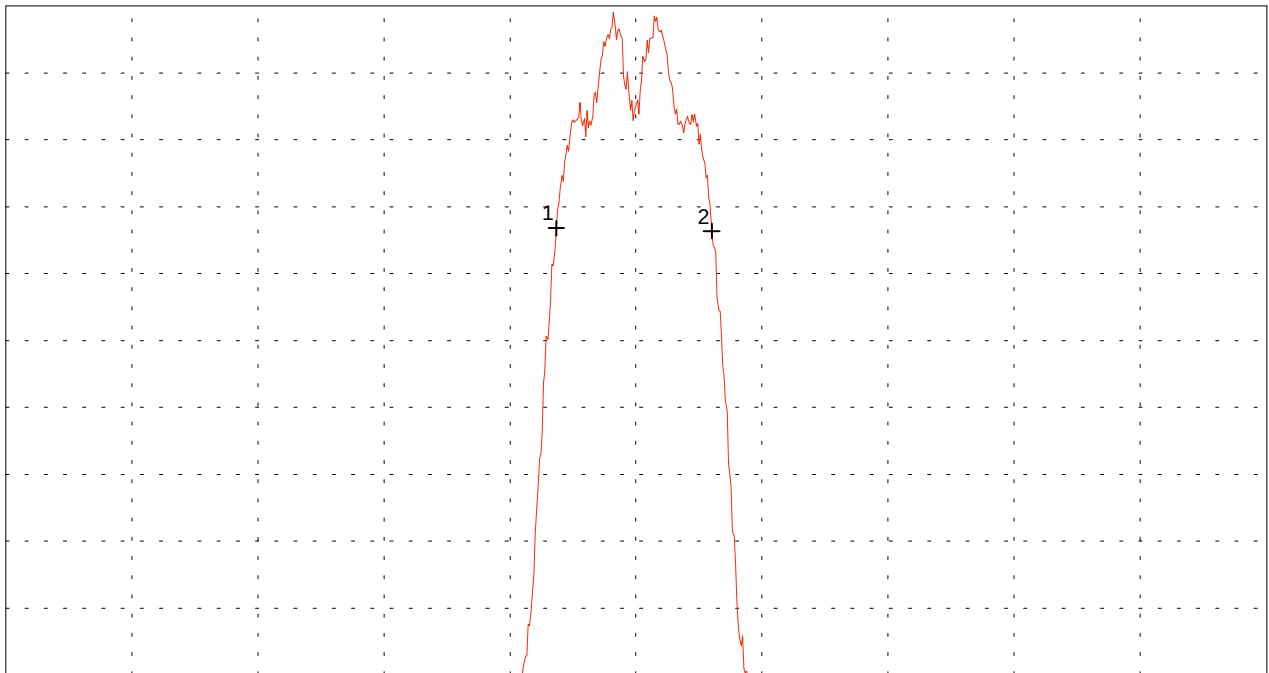
Specification:
For direct sequence systems, the minimum 6 dB bandwidth shall be at least 500 kHz

Result:
The minimum 6 dB bandwidth is 611.6 kHz

Ref.Level 1.7 dBm
2 dB/Div.

ATT 15 dB

Ref. Offset 20 dB



Start 2.4475 GHz
RBW 100 kHz

VBW 10 kHz

Stop 2.4525 GHz
SWP 60 ms

Multi Marker List

No. 1	2.449683 GHz	-4.94 dBm
No. 2	2.450300 GHz	-5.03 dBm

Tested by:
Johann Roidt

Date:
24 February 2002

Project-No.:
55503-20031

Page of pages

FCC Rules 15.247 (a) (2) Bandwidth

Model:
FRH-SD07TU

Serial No.:
Sample 1

Applicant:
Futaba Corporation

Mode:
- Conducted Measurement

- High Channel

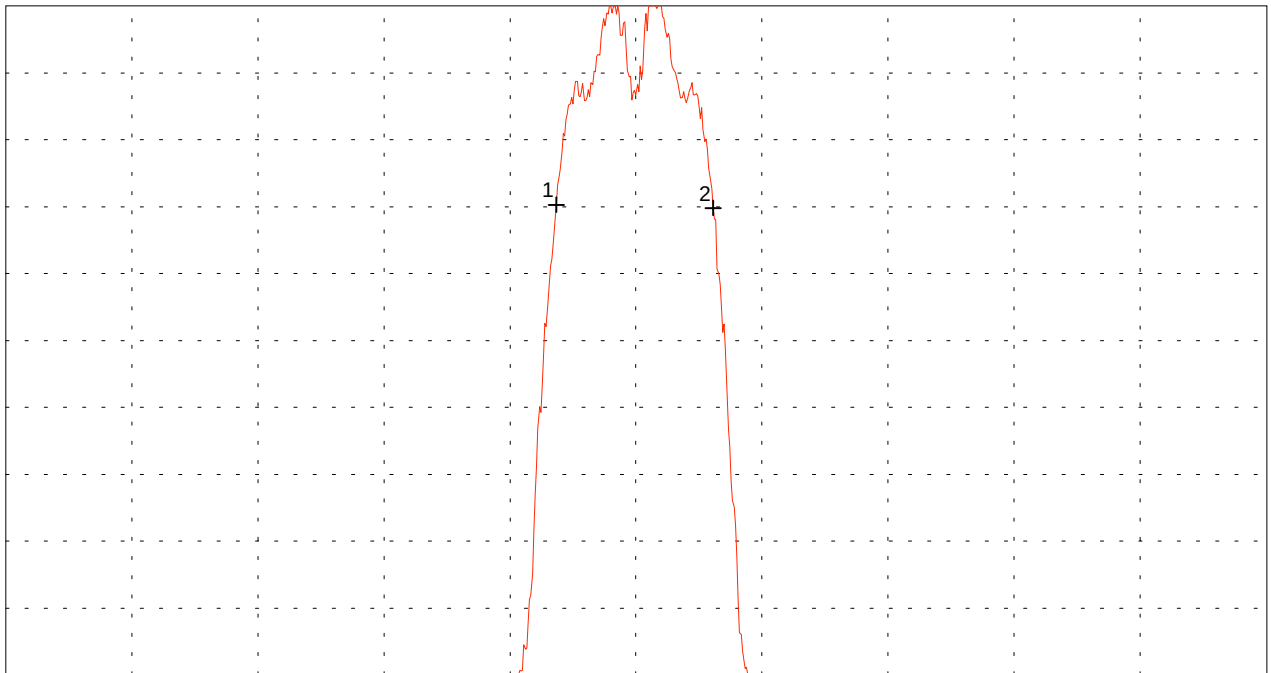
Specification:
For direct sequence systems, the minimum 6 dB
bandwidth shall be at least 500 kHz

Result:
The minimum 6 dB bandwidth is 622 kHz

Ref.Level .1 dBm
2 dB/Div.

ATT 15 dB

Ref. Offset 20 dB



Start 2.4705 GHz
RBW 100 kHz

VBW 10 kHz

Stop 2.4755 GHz
SWP 60 ms

Multi Marker List

No. 1	2.472683 GHz	-5.84 dBm
No. 2	2.473306 GHz	-5.94 dBm

Tested by:
Johann Roidt

Date:
24 February 2002

Project-No.:
55503-20031

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FCC Rules 15.247 (b) (3) Peak Power Output

Model:
FRH-SD07TU

Serial No.:
Sample 1

Applicant:
Futaba Corporation

Mode:
- Conducted Measurement

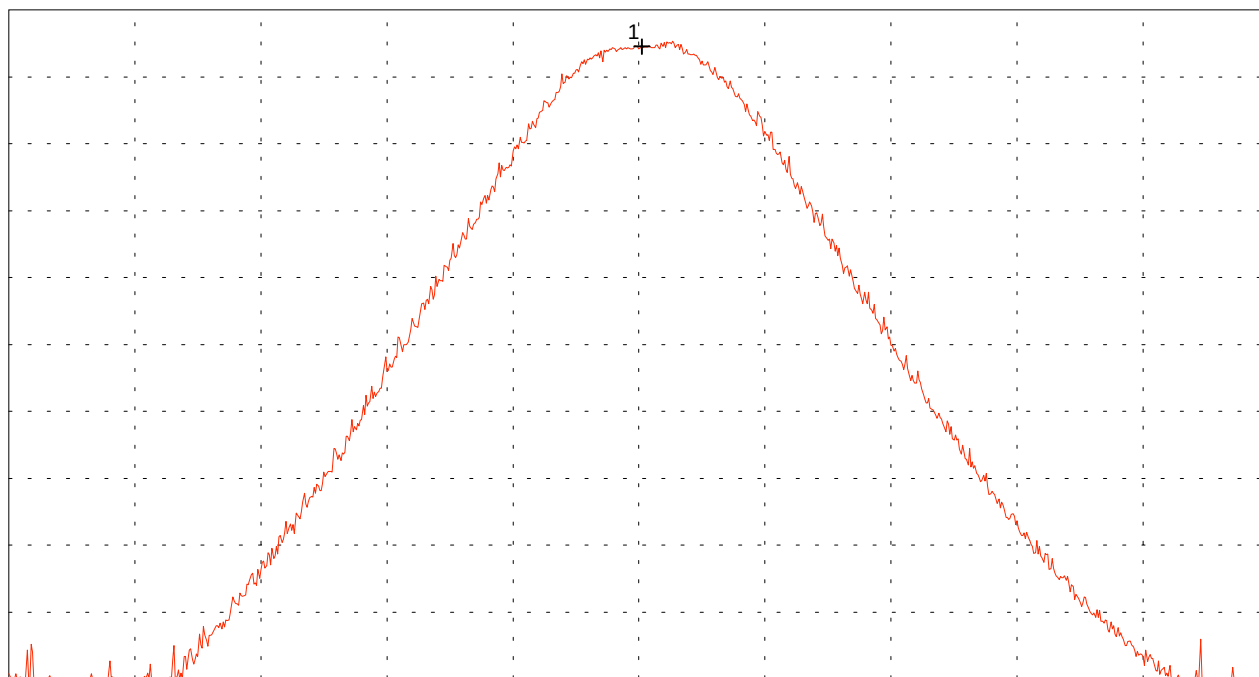
- Low Channel

Specification:
The maximum peak power shall not exceed 1 W (30dBm)

Ref.Level 10 dBm
5 dB/Div.

ATT 20 dB

Ref. Offset 20 dB



Start 2.415 GHz
RBW 1 MHz

VBW 1 MHz

Stop 2.425 GHz
SWP 20 ms

Multi Marker List

No.	Frequency	Power
No. 1	2.420022 GHz	7.26 dBm

Tested by:
Johann Roidt

Date:
24 February 2002

Project-No.:
55503-20031

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FCC Rules 15.247 (b) (3) Peak Power Output

Model:
FRH-SD07TU

Serial No.:
Sample 1

Applicant:
Futaba Corporation

Mode:
- Conducted Measurement

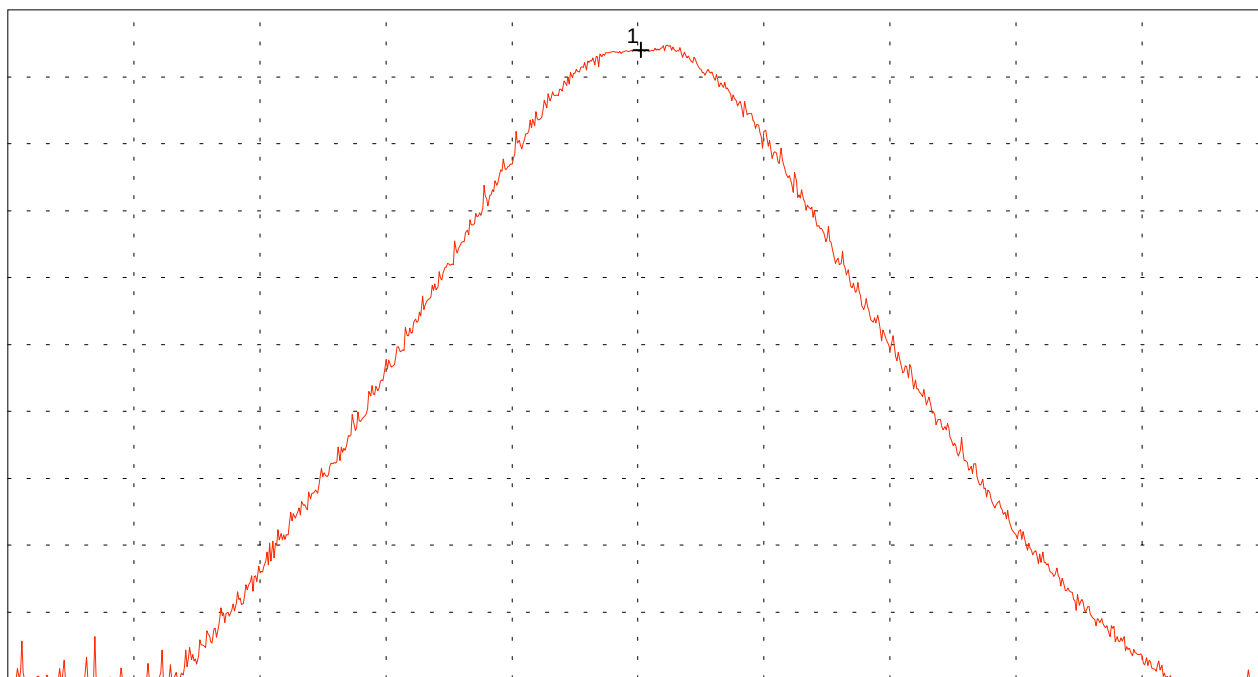
- Middle Channel

Specification:
The maximum peak power shall not exceed 1 W (30dBm)

Ref.Level 10 dBm
5 dB/Div.

ATT 20 dB

Ref. Offset 20 dB



Start 2.445 GHz
RBW 1 MHz

VBW 1 MHz

Stop 2.455 GHz
SWP 20 ms

Multi Marker List

No.	Frequency (GHz)	Power (dBm)
No. 1	2.450022 GHz	7.00 dBm

Tested by:
Johann Roidt

Date:
24 February 2002

Project-No.:
55503-20031

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FCC Rules 15.247 (b) (3) Peak Power Output

Model:
FRH-SD07TU

Serial No.:
Sample 1

Applicant:
Futaba Corporation

Mode:
- Conducted Measurement

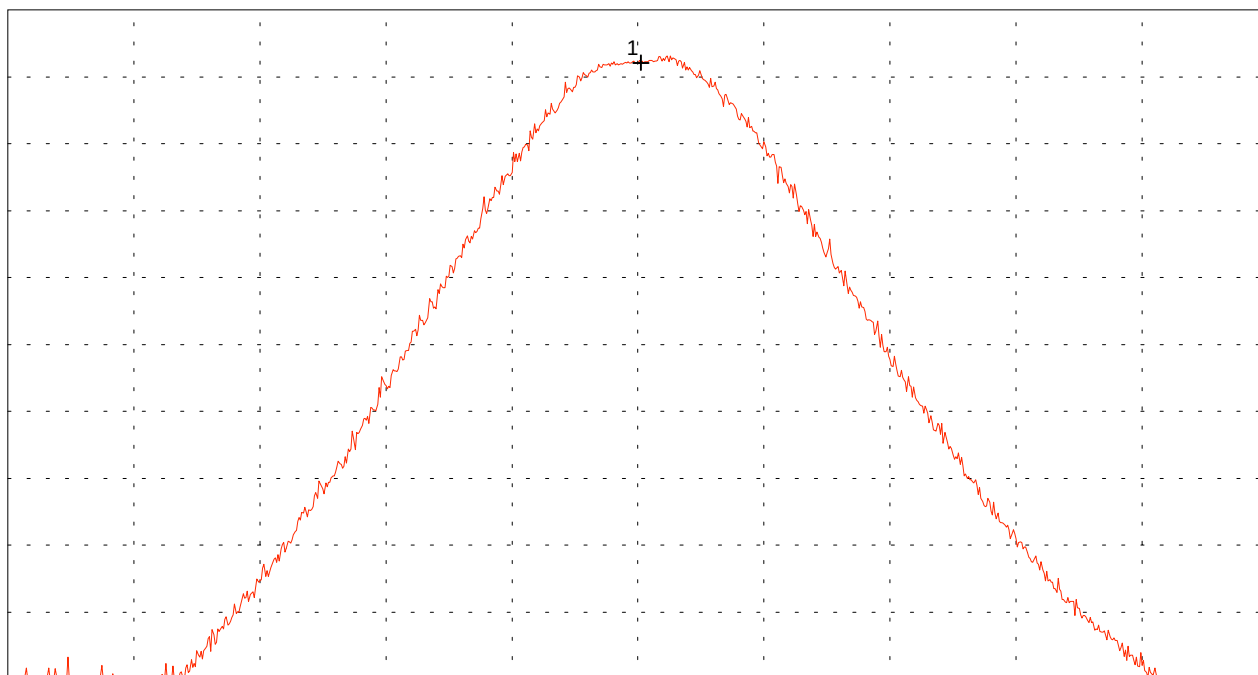
- High Channel

Specification:
The maximum peak power shall not exceed 1 W (30dBm)

Ref.Level 10 dBm
5 dB/Div.

ATT 20 dB

Ref. Offset 20 dB



Start 2.468 GHz
RBW 1 MHz

VBW 1 MHz

Stop 2.478 GHz
SWP 20 ms

Multi Marker List

No.	Frequency	Power
No. 1	2.473022 GHz	6.04 dBm

Tested by:
Johann Roidt

Date:
24 February 2002

Project-No.:
55503-20031

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FCC Rules 15.247 (d) Power Spectral Density

Model:
FRH-SD07TU

Serial No.:
Sample 1

Applicant:
Futaba Corporation

Mode:
- Conducted Measurement

- Low Channel

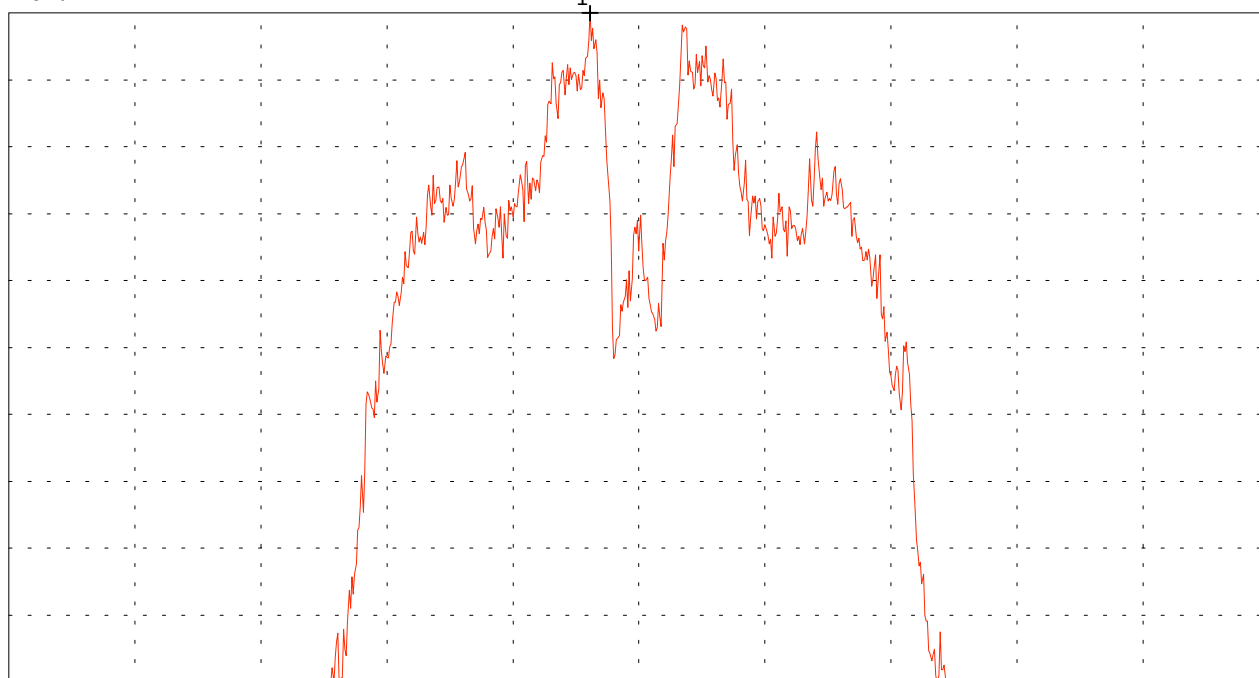
Specification:
For direct sequence systems, the peak power spectral density in any 3 kHz bandwidth shall not be greater than 8 dBm

Result: Power spectral density -2.21 dBm

Ref.Level -2.3 dBm
2 dB/Div.

ATT 10 dB

Ref. Offset 20 dB



Start 2.41925 GHz
RBW 3 kHz

VBW 30 kHz

Stop 2.42075 GHz
SWP 500 s

Multi Marker List

No.	Frequency	Power
1	2.419942 GHz	-2.21 dBm

Tested by:
Johann Roidt

Date:
24 February 2002

Project-No.:
55503-20031

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FCC Rules 15.247 (d) Power Spectral Density

Model:
FRH-SD07TU

Serial No.:
Sample 1

Applicant:
Futaba Corporation

Mode:
- Conducted Measurement

- Middle Channel

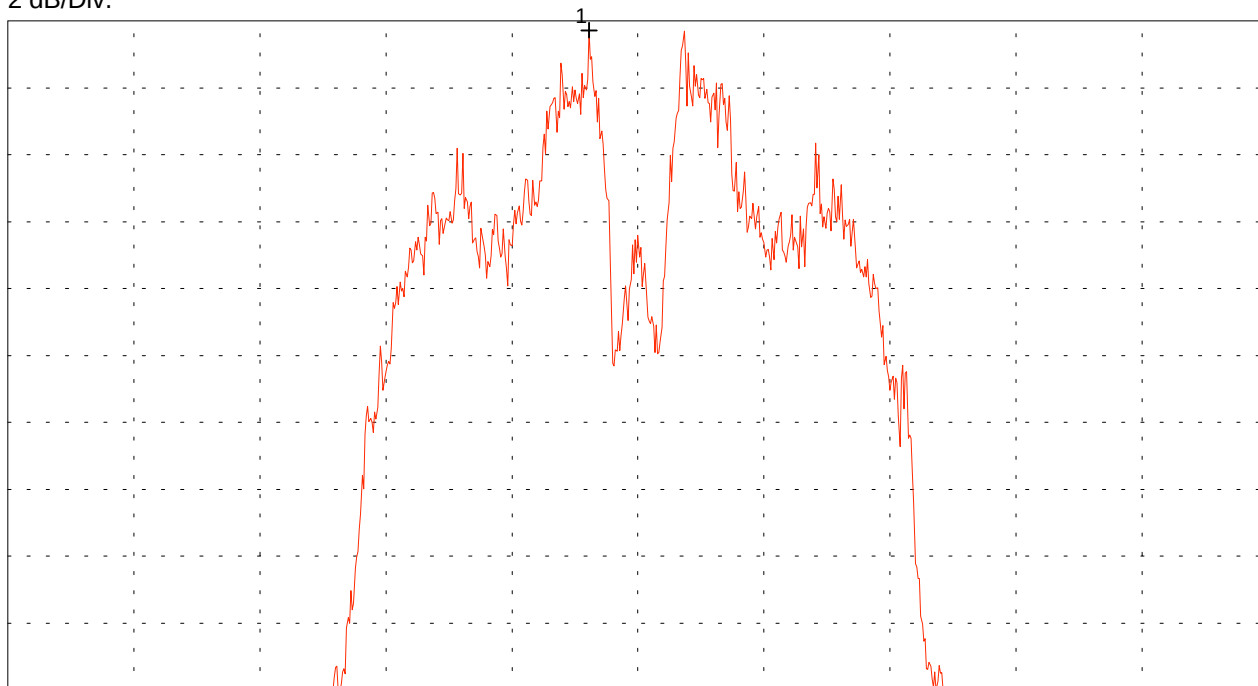
Specification:
For direct sequence systems, the peak power spectral density in any 3 kHz bandwidth shall not be greater than 8 dBm

Result: Power spectral density -2.58 dBm

Ref.Level -2.3 dBm
2 dB/Div.

ATT 10 dB

Ref. Offset 20 dB



Start 2.44925 GHz
RBW 3 kHz

VBW 30 kHz

Stop 2.45075 GHz
SWP 500 s

Multi Marker List

No.	Frequency (GHz)	Power (dBm)
1	2.449942	-2.58

Tested by:
Johann Roidt

Date:
24 February 2002

Project-No.:
55503-20031

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FCC Rules 15.247 (d) Power Spectral Density

Model:
FRH-SD07TU

Serial No.:
Sample 1

Applicant:
Futaba Corporation

Mode:
- Conducted Measurement

- High Channel

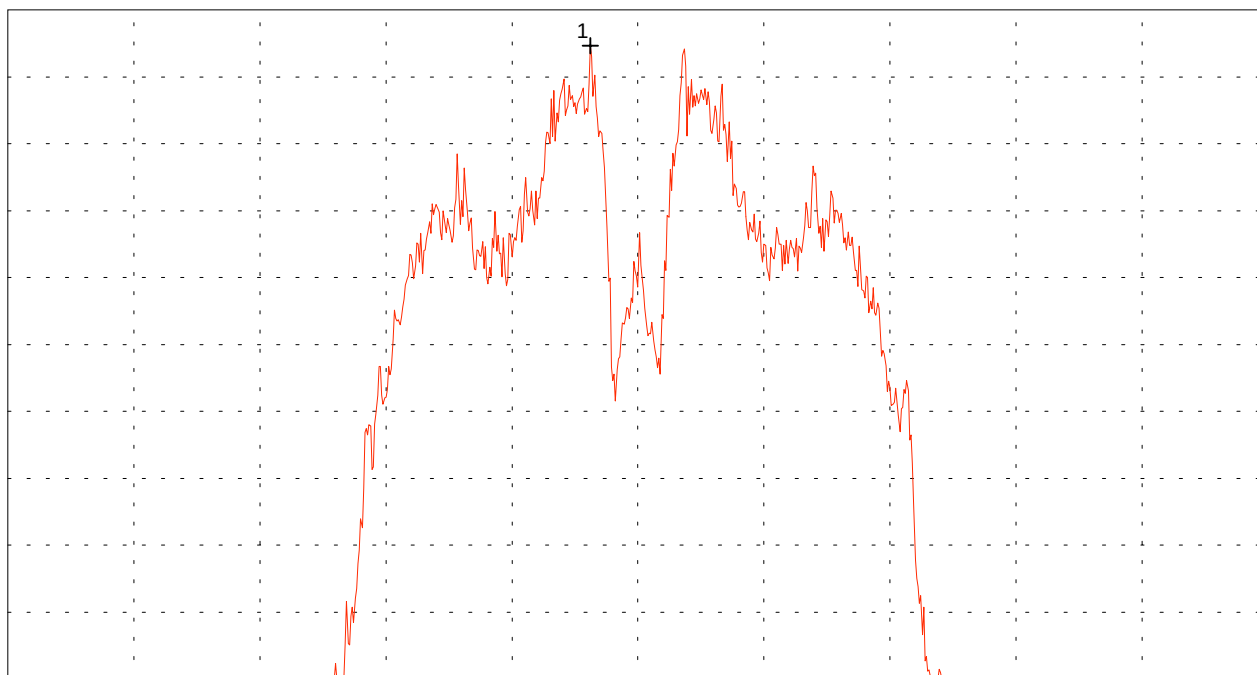
Specification:
For direct sequence systems, the peak power spectral density in any 3 kHz bandwidth shall not be greater than 8 dBm

Result: Power spectral density -3.37 dBm

Ref.Level -2.3 dBm
2 dB/Div.

ATT 10 dB

Ref. Offset 20 dB



Start 2.47225 GHz
RBW 3 kHz

VBW 30 kHz

Stop 2.47375 GHz
SWP 500 s

Multi Marker List

No.	Frequency (GHz)	Power (dBm)
1	2.472943	-3.37

Tested by:
Johann Roidt

Date:
24 February 2002

Project-No.:
55503-20031

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Bandedge Compliance 2.2 GHz - 2.6 GHz acc. to FCC Part 15 (Fully Anechoic Chamber)

Model:
FRH-SD07TU

Serial no.:
Sample 1

Applicant:
Futaba Corporation

Test site:
Fully anechoic room

Tested on:
**Test distance 3 metres
Vertical Polarization**

Date of test:
06/14/2002

Operator:
T. Eberl

Test performed:
by hand

File name:
default.emi

Comment:

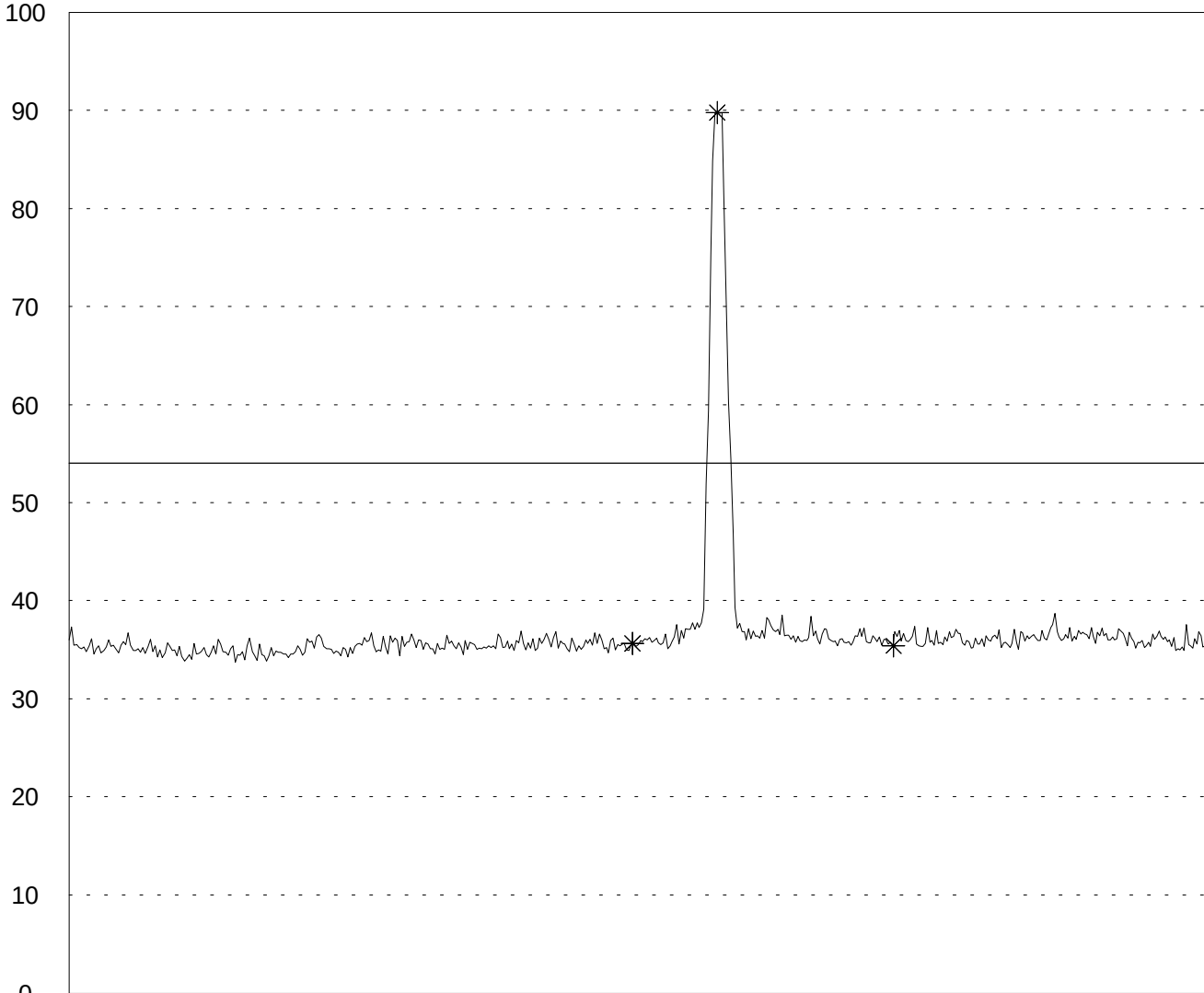
- TX mode
- f = 2.420 GHz (Low Channel)

Detector:
Peak

List of values:
Selected by hand

dBµV/m
100

Limit1: FCC Part 15 Transducer: EMCO 3115



2200

**2600
MHz**

Result:
Limit kept

Project file:
55503-20031

Page of Pages

Bandedge Compliance 2.2 GHz - 2.6 GHz acc. to FCC Part 15 (Fully Anechoic Chamber)

Model:
FRH-SD07TU

Serial no.:
Sample 1

Applicant:
Futaba Corporation

Test site:
Fully anechoic room

Tested on:
**Test distance 3 metres
Vertical Polarization**

Date of test:
06/14/2002

Operator:
T. Eberl

Test performed:
by hand

File name:
default.emi

Comment:

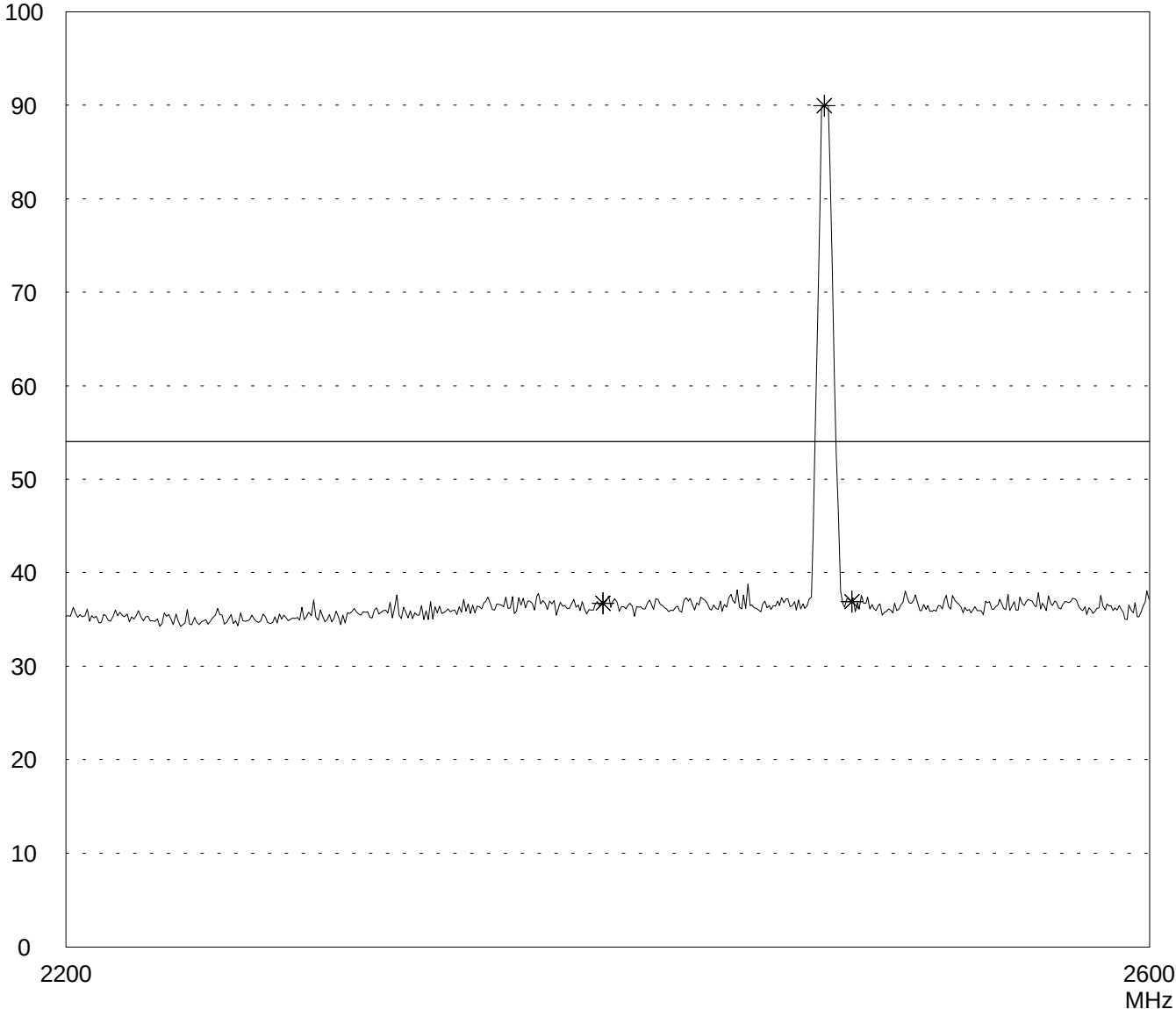
- TX mode
- f = 2.473 GHz (High Channel)

Detector:
Peak

List of values:
Selected by hand

dBµV/m
100

Limit1: FCC Part 15 Transducer: EMCO 3115



Result:
Limit kept

Project file:
55503-20031

Page of Pages

Bandedge Compliance 2.2 GHz - 2.6 GHz
acc. to FCC Part 15 (Fully Anechoic Chamber)

Model: FRH-SD07TU	Comment: - TX mode - f = 2.473 GHz (High Channel)
Serial no.: Sample 1	
Applicant: Futaba Corporation	
Test site: Fully anechoic room	
Tested on: Test distance 3 metres Vertical Polarization	
Date of test: 06/14/2002 Operator: T. Eberl	
Test performed: by hand File name: default.emi	

Detector: Peak	List of values: Selected by hand
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[illegible]

Result: Limit kept	Project file: 55503-20031	Page	of	Pages
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Bandedge Compliance 2.2 GHz - 2.6 GHz
acc. to FCC Part 15 (Fully Anechoic Chamber)

Model: FRH-SD07TU	Comment: - TX mode - f = 2.420 GHz (Low Channel)
Serial no.: Sample 1	
Applicant: Futaba Corporation	
Test site: Fully anechoic room	
Tested on: Test distance 3 metres Vertical Polarization	
Date of test: 06/14/2002 Operator: T. Eberl	
Test performed: by hand File name: default.emi	

Detector: Peak	List of values: Selected by hand
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[illegible]

Result: Limit kept	Project file: 55503-20031	Page	of	Pages
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FCC Rules 15.247 (c) Spurious Emissions

Model:
FRH-SD07TU

Serial No.:
Sample 1

Applicant:
Futaba Corporation

Mode:
- Conducted Measurement

- Low Channel

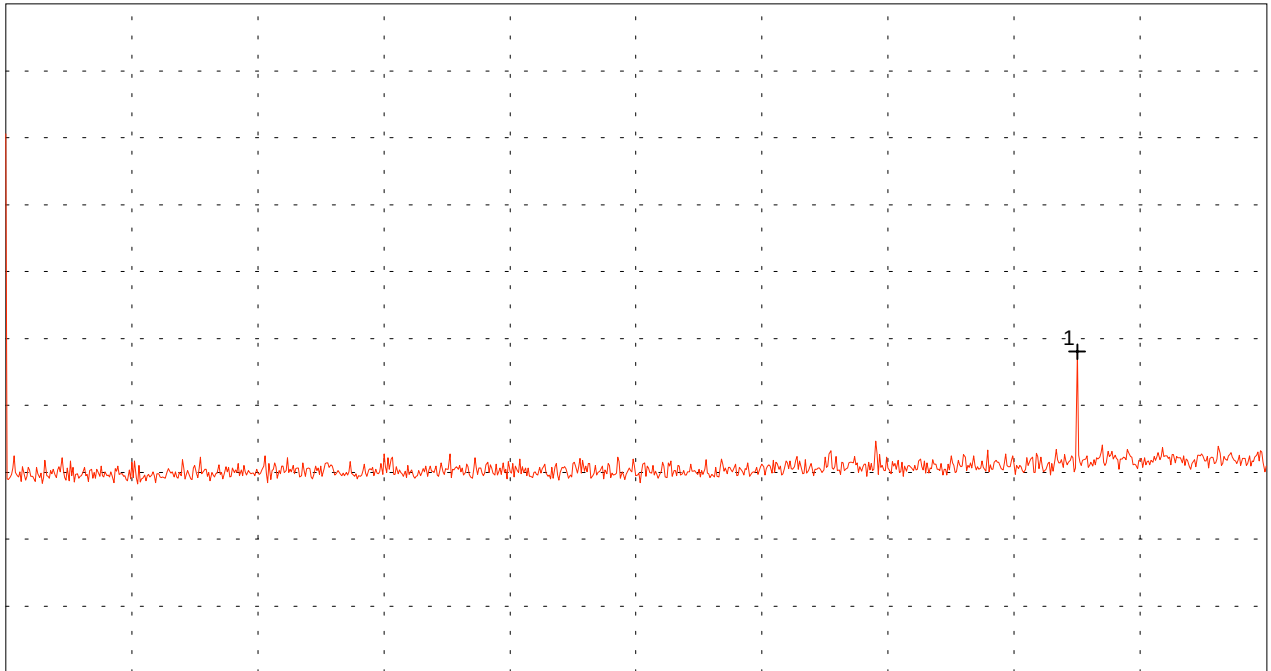
Specification:
20 dB below TX fundamental level

Result: see chart below

Ref.Level 10 dBm
10 dB/Div.

ATT 10 dB

Ref. Offset 20 dB



Start 9.000 kHz
RBW 100 kHz

VBW 100 kHz

Stop 2.400 GHz
SWP 720 ms

Multi Marker List

No.	Frequency	Power
No. 1	2.040001 GHz	-41.98 dBm

Tested by:
Johann Roidt

Date:
24 February 2002

Project-No.:
55503-20031

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FCC Rules 15.247 (c) Spurious Emissions

Model:
FRH-SD07TU

Serial No.:
Sample 1

Applicant:
Futaba Corporation

Mode:
- Conducted Measurement

- High Channel

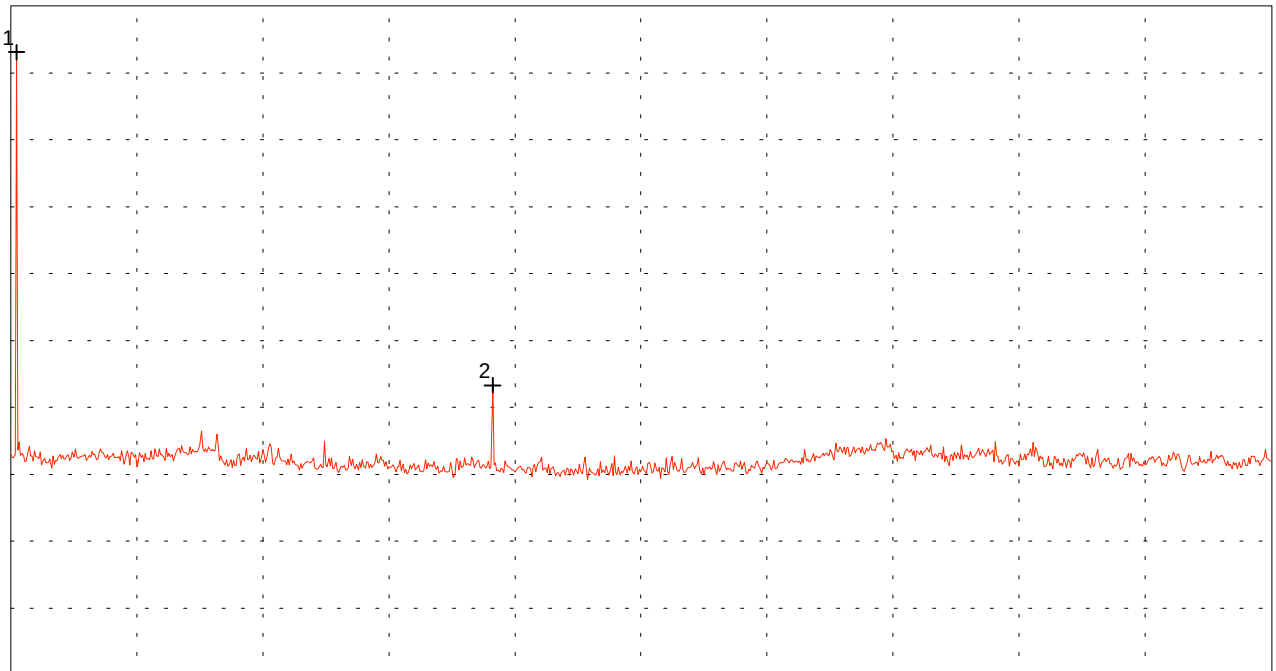
Specification:
20 dB below TX fundamental level

Result: see chart below

Ref.Level 10 dBm
10 dB/Div.

ATT 10 dB

Ref. Offset 20 dB



Start 2.400 GHz
RBW 100 kHz

VBW 100 kHz

Stop 18.000 GHz
SWP 4.80 s

Multi Marker List

No. 1	2.469333 GHz	3.10 dBm
No. 2	8.362667 GHz	-46.70 dBm

Tested by:
Johann Roidt

Date:
24 February 2002

Project-No.:
55503-20031

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FCC Rules 15.247 (c) Spurious Emissions

Model:
FRH-SD07TU

Serial No.:
Sample 1

Applicant:
Futaba Corporation

Mode:
- Conducted Measurement

- High Channel

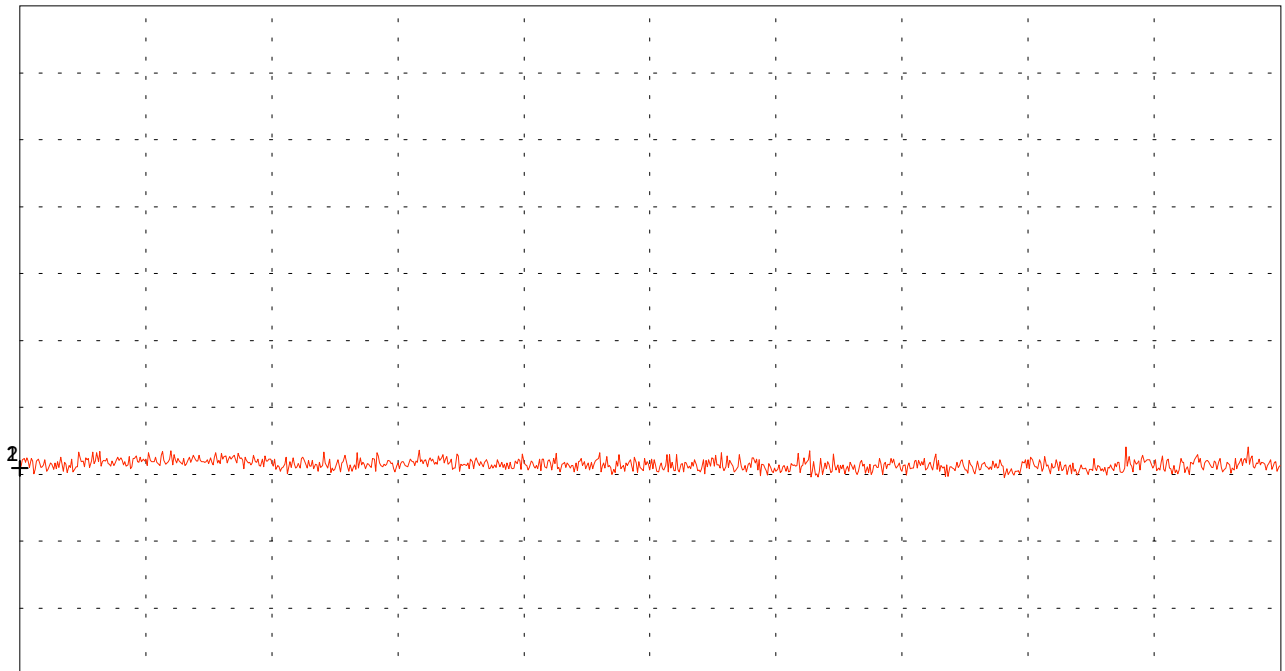
Specification:
20 dB below TX fundamental level

Result: see chart below

Ref.Level 10 dBm
10 dB/Div.

ATT 10 dB

Ref. Offset 20 dB



Start 18.000 GHz
RBW 100 kHz

VBW 100 kHz

Stop 25.000 GHz
SWP 2.20 s

Multi Marker List

No. 1	18.000000 GHz	-59.09 dBm
No. 2	18.000000 GHz	-59.09 dBm

Tested by:
Johann Roidt

Date:
24 February 2002

Project-No.:
55503-20031

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FCC Rules 15.247 (c) Spurious Emissions

Model:
FRH-SD07TU

Serial No.:
Sample 1

Applicant:
Futaba Corporation

Mode:
- Conducted Measurement

- Middle Channel

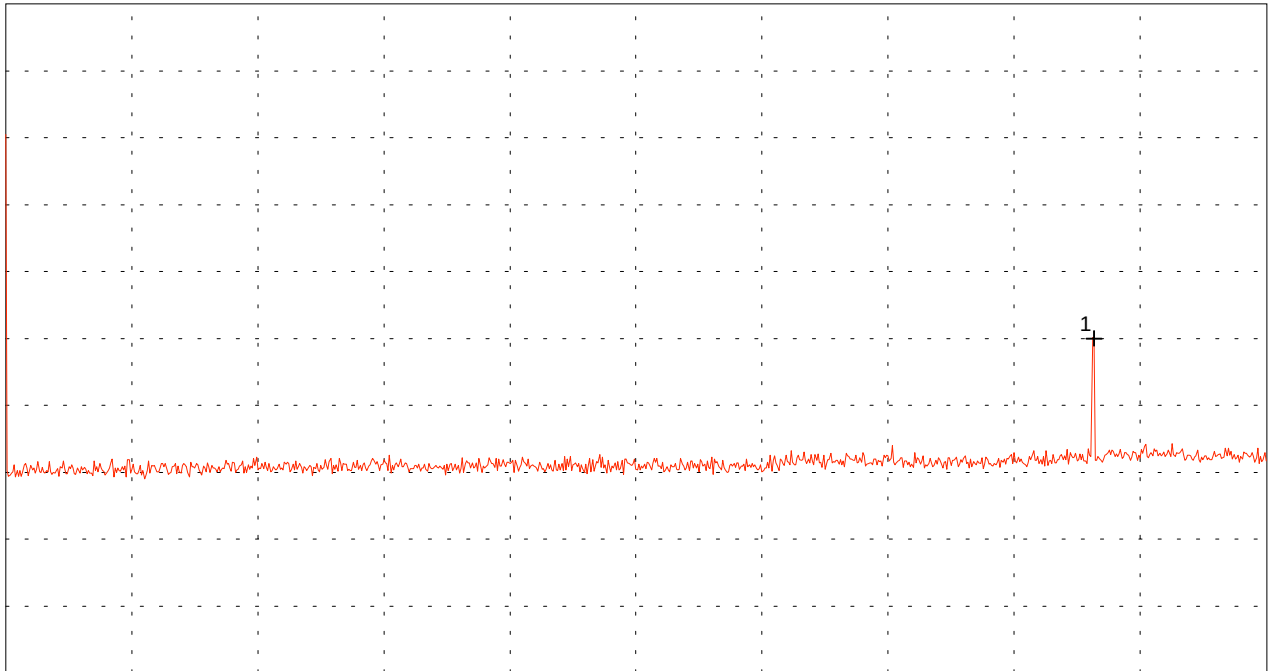
Specification:
20 dB below TX fundamental level

Result: see chart below

Ref.Level 10 dBm
10 dB/Div.

ATT 10 dB

Ref. Offset 20 dB



Start 9.000 kHz
RBW 100 kHz

VBW 100 kHz

Stop 2.400 GHz
SWP 720 ms

Multi Marker List

No. 1	2.072001 GHz	-40.00 dBm
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Tested by:
Johann Roidt

Date:
24 February 2002

Project-No.:
55503-20031

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FCC Rules 15.247 (c) Spurious Emissions

Model:
FRH-SD07TU

Serial No.:
Sample 1

Applicant:
Futaba Corporation

Mode:
- Conducted Measurement

- Middle Channel

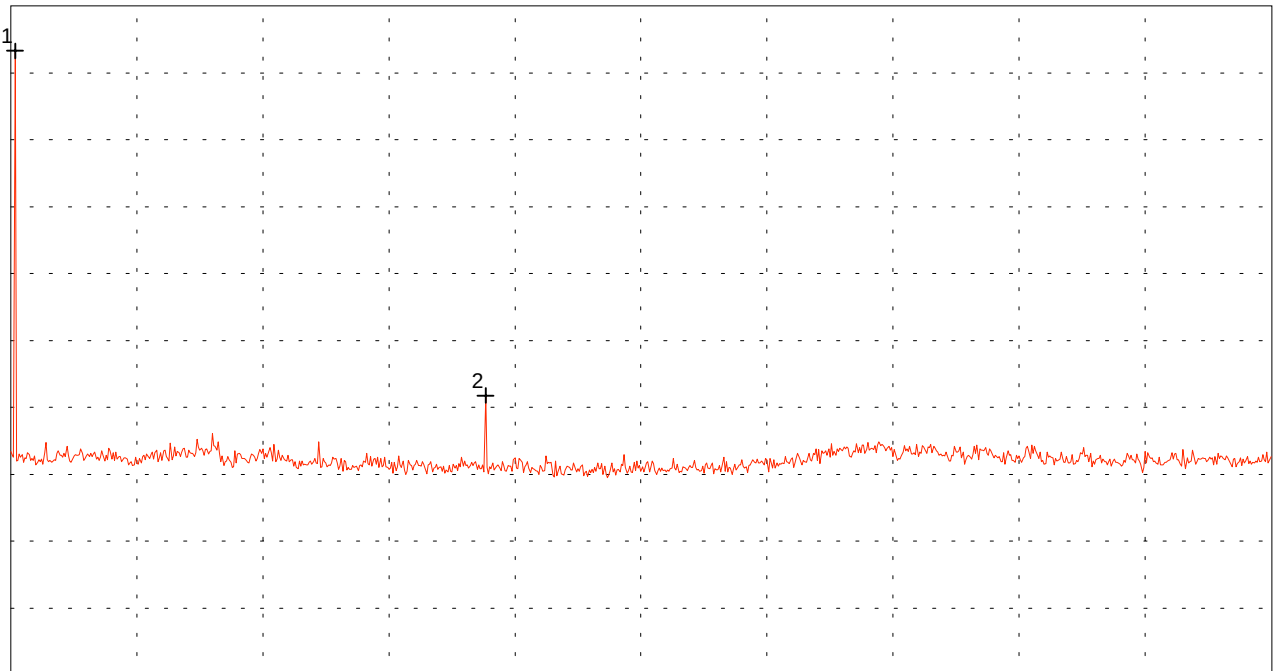
Specification:
20 dB below TX fundamental level

Result: see chart below

Ref.Level 10 dBm
10 dB/Div.

ATT 10 dB

Ref. Offset 20 dB



Start 2.400 GHz
RBW 100 kHz

VBW 100 kHz

Stop 18.000 GHz
SWP 4.80 s

Multi Marker List

No. 1	2.452000 GHz	3.30 dBm
No. 2	8.276000 GHz	-48.22 dBm

Tested by:
Johann Roidt

Date:
24 February 2002

Project-No.:
55503-20031

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FCC Rules 15.247 (c) Spurious Emissions

Model:
FRH-SD07TU

Serial No.:
Sample 1

Applicant:
Futaba Corporation

Mode:
- Conducted Measurement

- Middle Channel

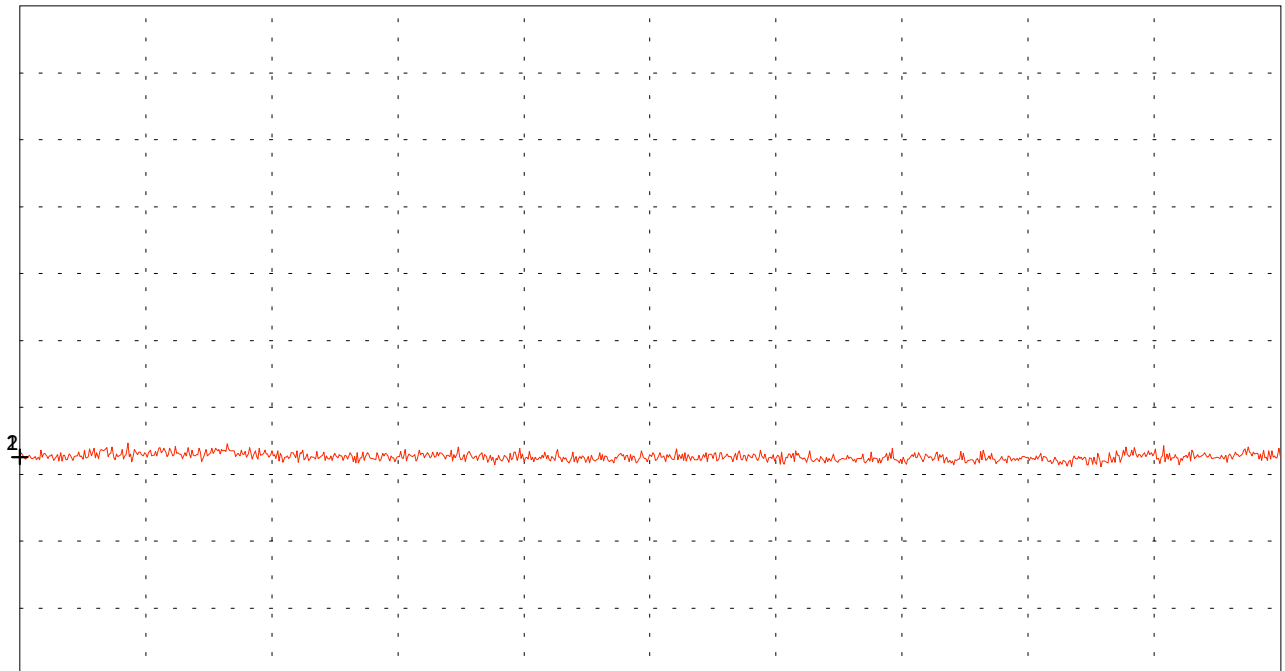
Specification:
20 dB below TX fundamental level

Result: see chart below

Ref.Level 10 dBm
10 dB/Div.

ATT 10 dB

Ref. Offset 20 dB



Start 18.000 GHz
RBW 100 kHz

VBW 100 kHz

Stop 25.000 GHz
SWP 2.20 s

Multi Marker List

No. 1	18.000000 GHz	-57.42 dBm
No. 2	18.000000 GHz	-57.42 dBm

Tested by:
Johann Roidt

Date:
24 February 2002

Project-No.:
55503-20031

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FCC Rules 15.247 (c) Spurious Emissions

Model:
FRH-SD07TU

Serial No.:
Sample 1

Applicant:
Futaba Corporation

Mode:
- Conducted Measurement

- High Channel

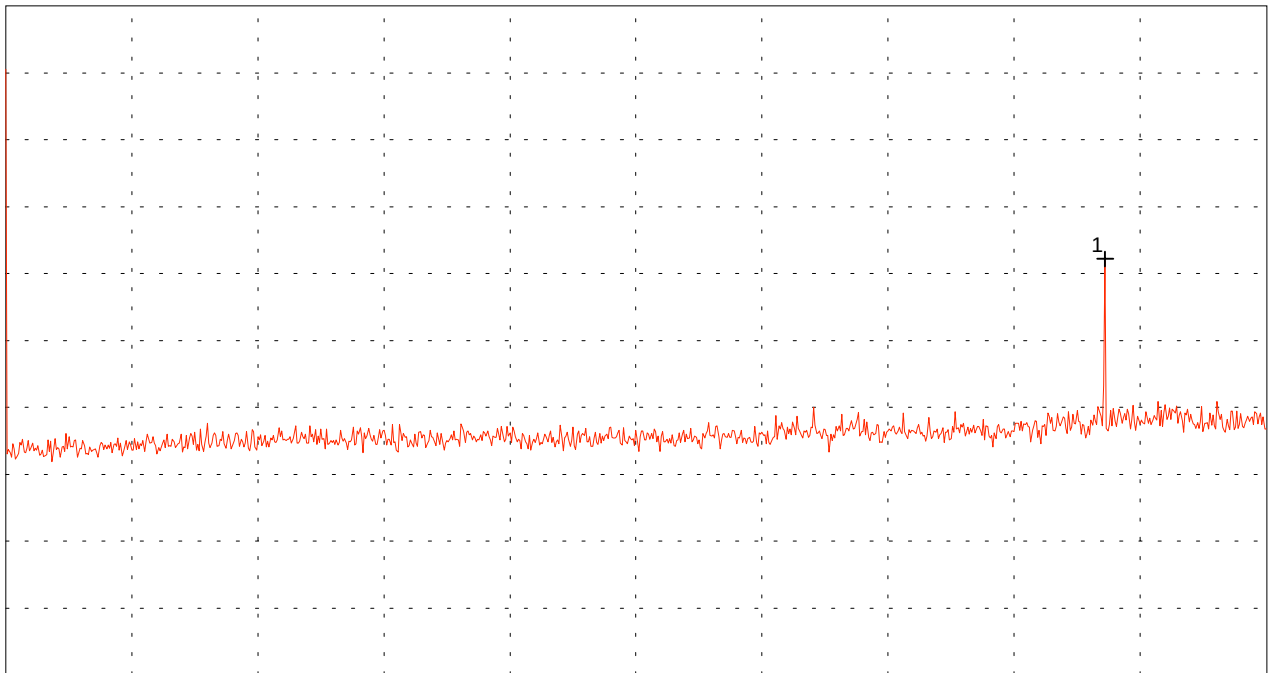
Specification:
20 dB below TX fundamental level

Result: see chart below

Ref.Level 0 dBm
10 dB/Div.

ATT 10 dB

Ref. Offset 20 dB



Start 9.000 kHz
RBW 100 kHz

VBW 100 kHz

Stop 2.400 GHz
SWP 720 ms

Multi Marker List

No.	Frequency	Power
No. 1	2.093334 GHz	-37.81 dBm

Tested by:
Johann Roidt

Date:
24 February 2002

Project-No.:
55503-20031

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FCC Rules 15.247 (c) Spurious Emissions

Model:
FRH-SD07TU

Serial No.:
Sample 1

Applicant:
Futaba Corporation

Mode:
- Conducted Measurement

- High Channel

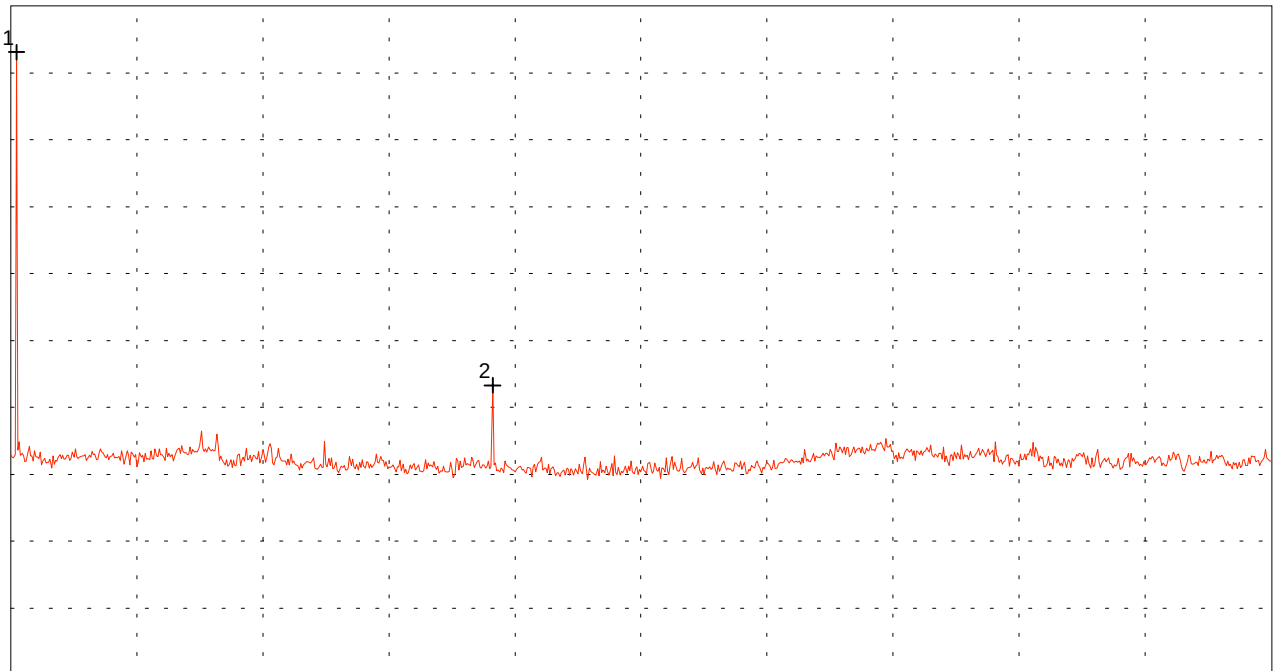
Specification:
20 dB below TX fundamental level

Result: see chart below

Ref.Level 10 dBm
10 dB/Div.

ATT 10 dB

Ref. Offset 20 dB



Start 2.400 GHz
RBW 100 kHz

VBW 100 kHz

Stop 18.000 GHz
SWP 4.80 s

Multi Marker List

No. 1	2.469333 GHz	3.10 dBm
No. 2	8.362667 GHz	-46.70 dBm

Tested by:
Johann Roidt

Date:
24 February 2002

Project-No.:
55503-20031

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FCC Rules 15.247 (c) Spurious Emissions

Model:
FRH-SD07TU

Serial No.:
Sample 1

Applicant:
Futaba Corporation

Mode:
- Conducted Measurement

- High Channel

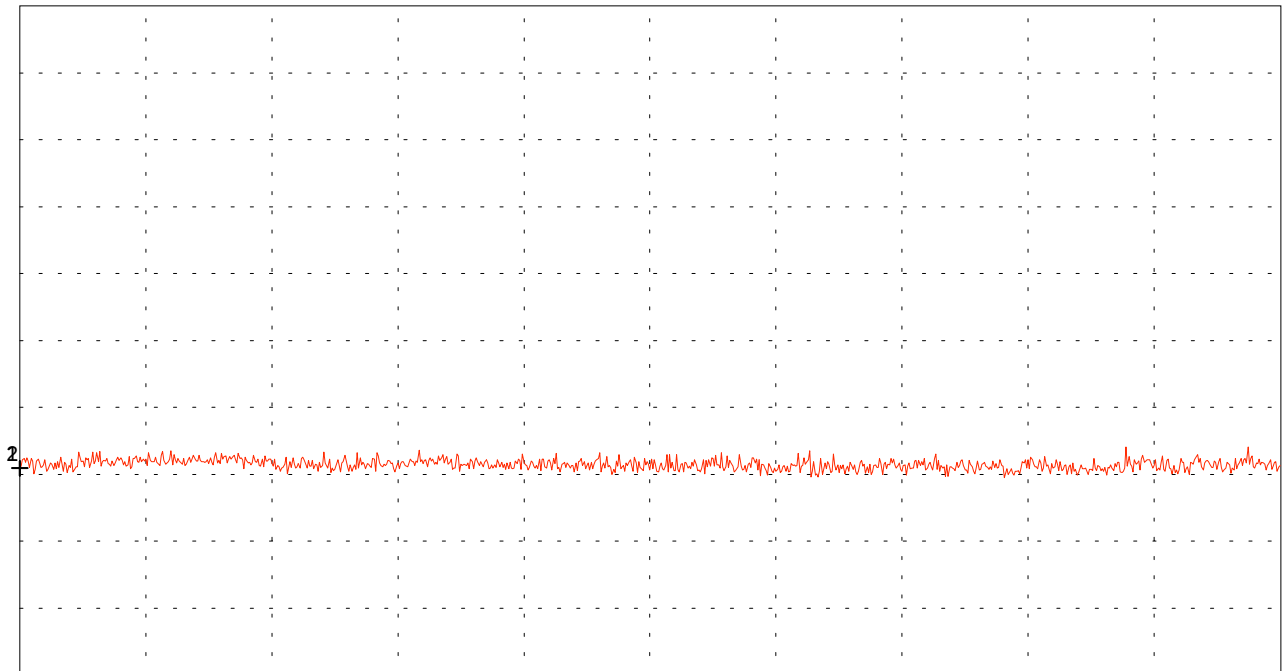
Specification:
20 dB below TX fundamental level

Result: see chart below

Ref.Level 10 dBm
10 dB/Div.

ATT 10 dB

Ref. Offset 20 dB



Start 18.000 GHz
RBW 100 kHz

VBW 100 kHz

Stop 25.000 GHz
SWP 2.20 s

Multi Marker List

No. 1	18.000000 GHz	-59.09 dBm
No. 2	18.000000 GHz	-59.09 dBm

Tested by:
Johann Roidt

Date:
24 February 2002

Project-No.:
55503-20031

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Radiated Emission Test 30 MHz - 200 MHz acc. to FCC Part 15 (Fully Anechoic Chamber)

Model:
FRH-SD07TU

Serial no.:
Sample 1

Applicant:
Futaba Corporation

Test site:
Fully anechoic room

Tested on:
Test distance 3 metres
Horizontal Polarization

Date of test:
02/06/2002

Operator:
T. Eberl

Test performed:
automatically

File name:
default.emi

Comment:

- FCC test setup
- TX mode
- f = 2.420 GHz (CH1)
- with antenna
- EUT DC powered via interface 5.0 V DC

Detector:
Peak

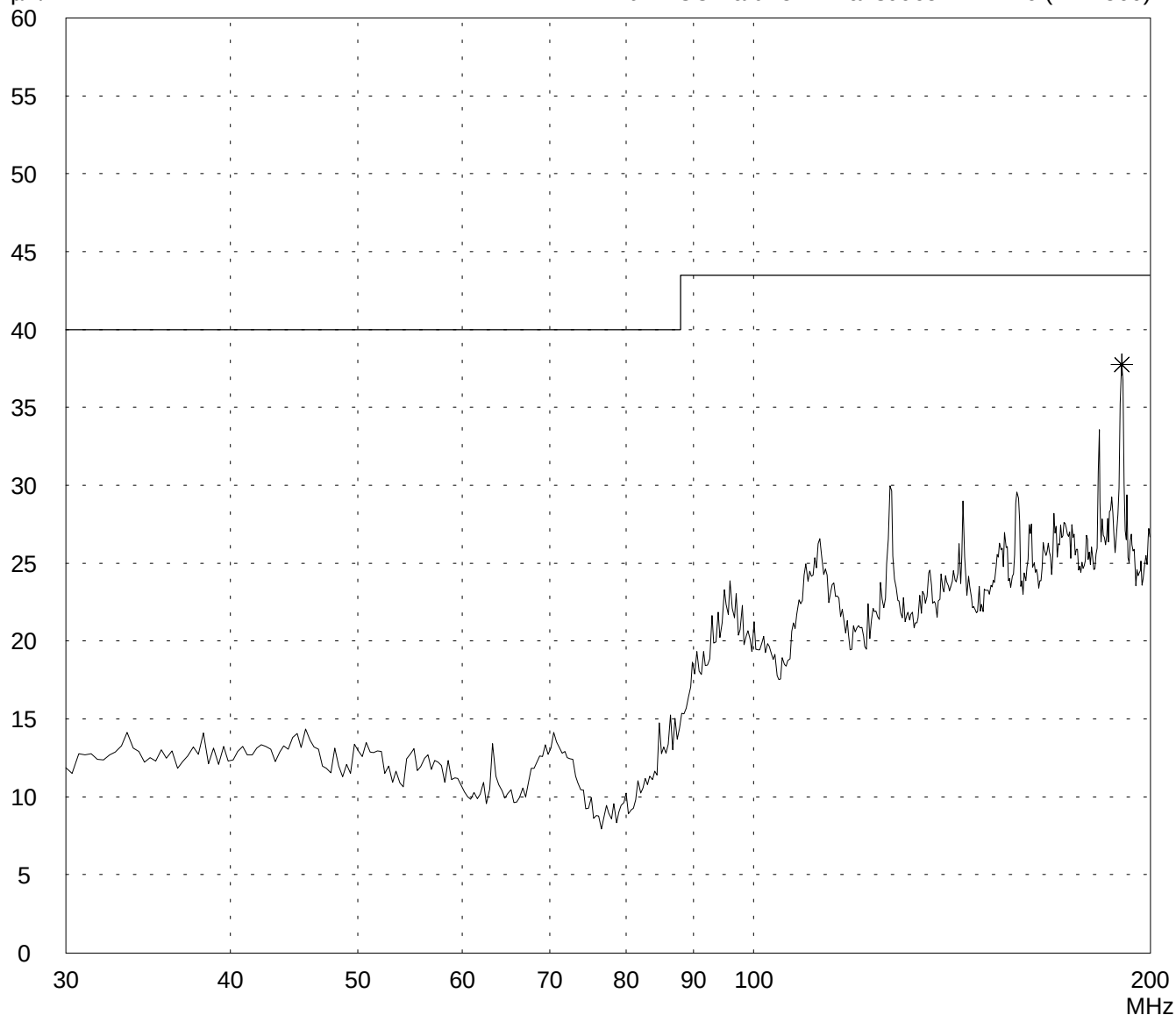
List of values:

10 dB Margin

8 Subranges

dBµV/m

Limit1: FCC Part 15 Transducer: HK 116 (Inv 1560)



Result:
Prescan

Project file:
55503-20031

Page of Pages

Radiated Emission Test 30 MHz - 200 MHz acc. to FCC Part 15 (Fully Anechoic Chamber)

Model:
FRH-SD07TU

Serial no.:
Sample 1

Applicant:
Futaba Corporation

Test site:
Fully anechoic room

Tested on:
**Test distance 3 metres
Vertical Polarization**

Date of test:
02/06/2002

Operator:
T. Eberl

Test performed:
automatically

File name:
default.emi

Comment:

- FCC test setup
- TX mode
- f = 2.420 GHz (CH1)
- with antenna
- EUT DC powered via interface 5.0 V DC

Detector:
Peak

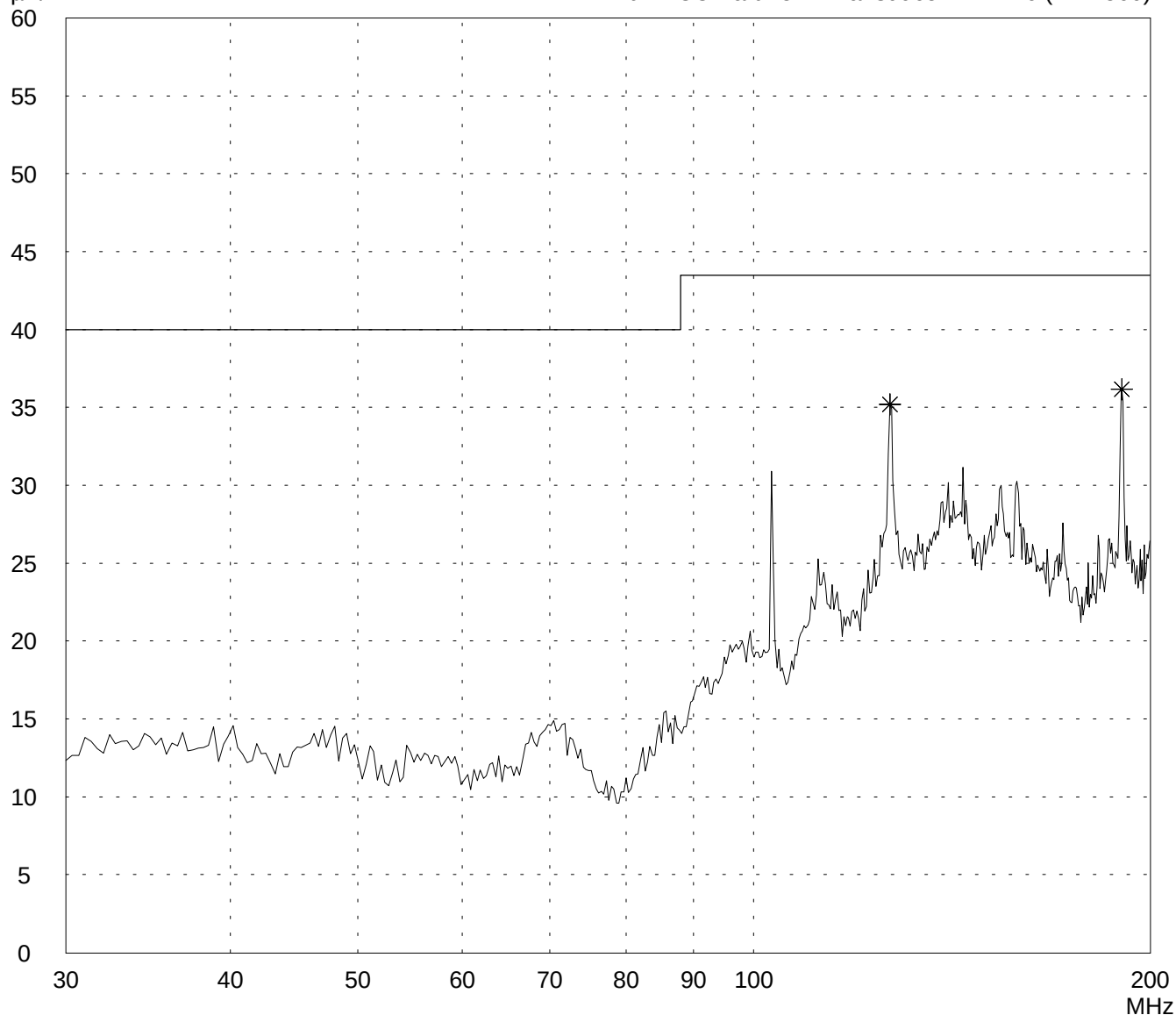
List of values:

10 dB Margin

8 Subranges

dBµV/m

Limit1: FCC Part 15 Transducer: HK 116 (Inv 1560)



Result:
Prescan

Project file:
55503-20031

Page of Pages

Radiated Emission Test 30 MHz - 200 MHz acc. to FCC Part 15 (Fully Anechoic Chamber)

Model:
FRH-SD07TU

Serial no.:
Sample 1

Applicant:
Futaba Corporation

Test site:
Fully anechoic room

Tested on:
**Test distance 3 metres
Horizontal Polarization**

Date of test:
02/06/2002

Operator:
T. Eberl

Test performed:
automatically

File name:
default.emi

Comment:

- FCC test setup
- TX mode
- f = 2.473 GHz (CH3)
- with antenna
- EUT DC powered via interface 5.0 V DC

Detector:
Peak

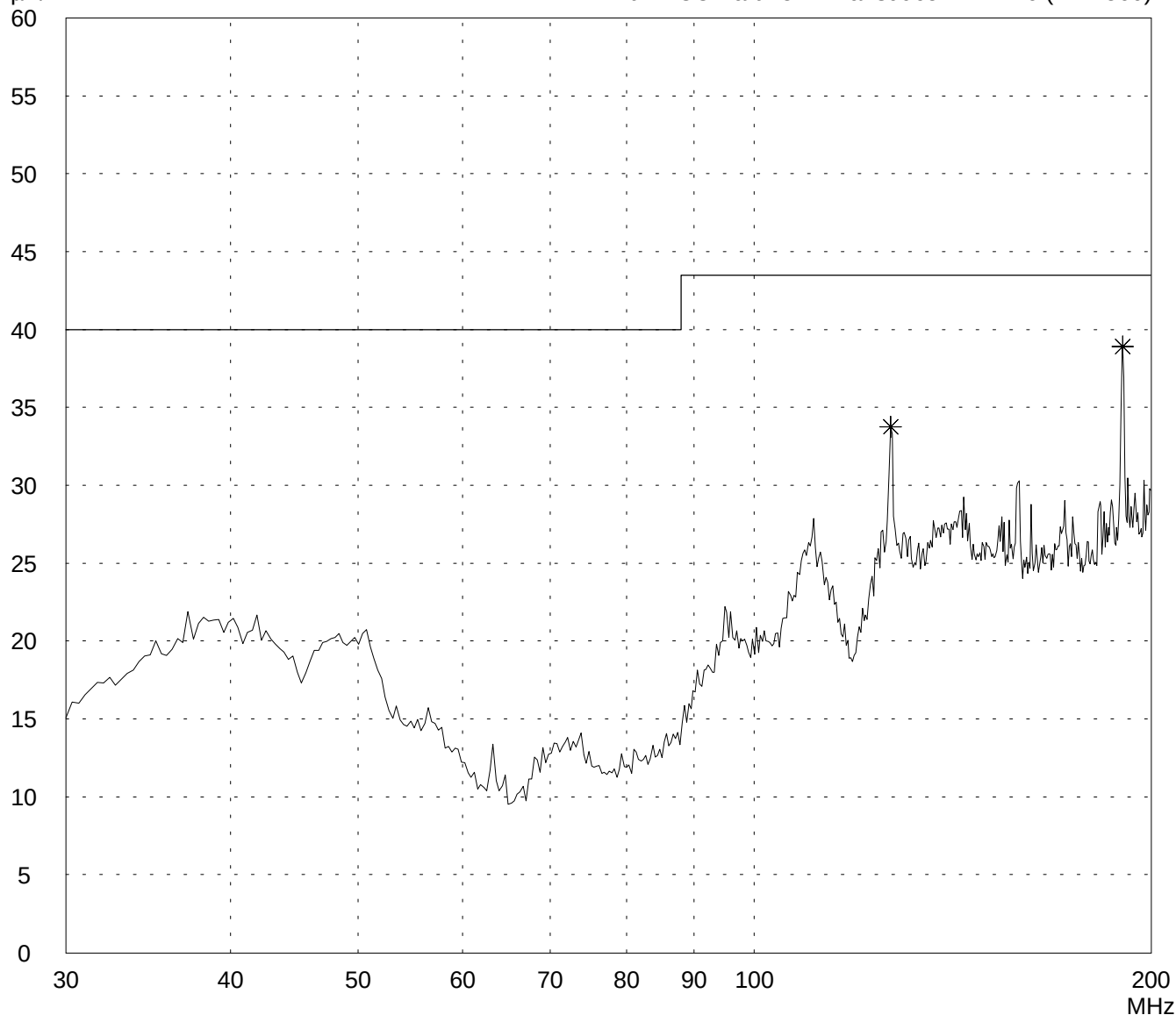
List of values:

10 dB Margin

8 Subranges

dBµV/m

Limit1: FCC Part 15 Transducer: HK 116 (Inv 1560)



Result:
Prescan

Project file:
55503-20031

Page of Pages

Radiated Emission Test 30 MHz - 200 MHz acc. to FCC Part 15 (Fully Anechoic Chamber)

Model:
FRH-SD07TU

Serial no.:
Sample 1

Applicant:
Futaba Corporation

Test site:
Fully anechoic room

Tested on:
**Test distance 3 metres
Horizontal Polarization**

Date of test:
02/06/2002

Operator:
T. Eberl

Test performed:
automatically

File name:
default.emi

Comment:

- FCC test setup
- TX mode
- f = 2.450 GHz (CH2)
- with antenna
- EUT DC powered via interface 5.0 V DC

Detector:
Peak

List of values:

10 dB Margin

8 Subranges

dBµV/m

Limit1: FCC Part 15 Transducer: HK 116 (Inv 1560)



Result:
Prescan

Project file:
55503-20031

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Radiated Emission Test 30 MHz - 200 MHz acc. to FCC Part 15 (Fully Anechoic Chamber)

Model:
FRH-SD07TU

Serial no.:
Sample 1

Applicant:
Futaba Corporation

Test site:
Fully anechoic room

Tested on:
**Test distance 3 metres
Vertical Polarization**

Date of test:
02/06/2002

Operator:
T. Eberl

Test performed:
automatically

File name:
default.emi

Comment:

- FCC test setup
- TX mode
- f = 2.450 GHz (CH2)
- with antenna
- EUT DC powered via interface 5.0 V DC

Detector:
Peak

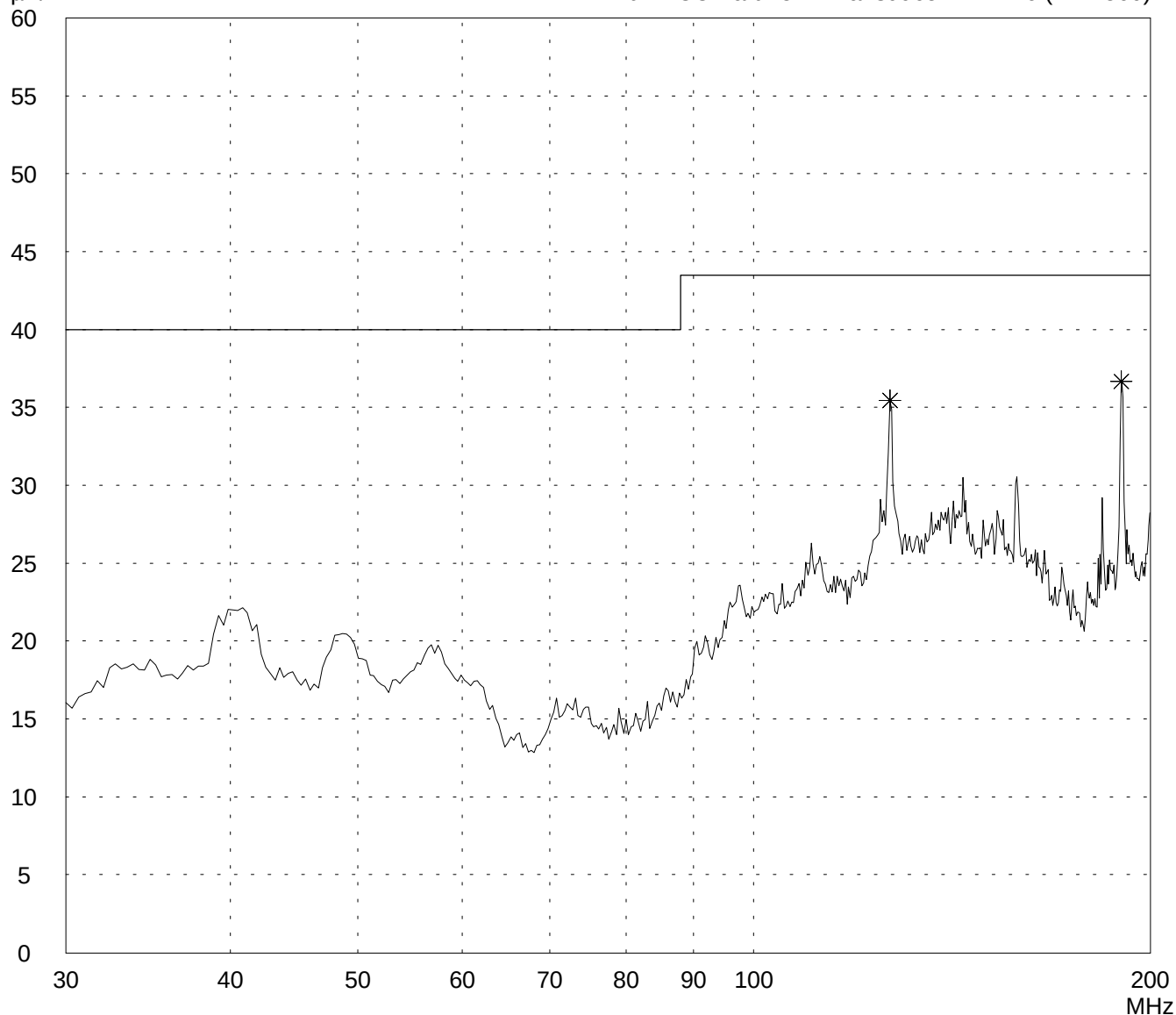
List of values:

10 dB Margin

8 Subranges

dBµV/m

Limit1: FCC Part 15 Transducer: HK 116 (Inv 1560)



Result:
Prescan

Project file:
55503-20031

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Radiated Emission Test 30 MHz - 200 MHz acc. to FCC Part 15 (Fully Anechoic Chamber)

Model:
FRH-SD07TU

Serial no.:
Sample 1

Applicant:
Futaba Corporation

Test site:
Fully anechoic room

Tested on:
**Test distance 3 metres
Vertical Polarization**

Date of test:
02/06/2002

Operator:
T. Eberl

Test performed:
automatically

File name:
default.emi

Comment:

- FCC test setup
- TX mode
- f = 2.473 GHz (CH3)
- with antenna
- EUT DC powered via interface 5.0 V DC

Detector:
Peak

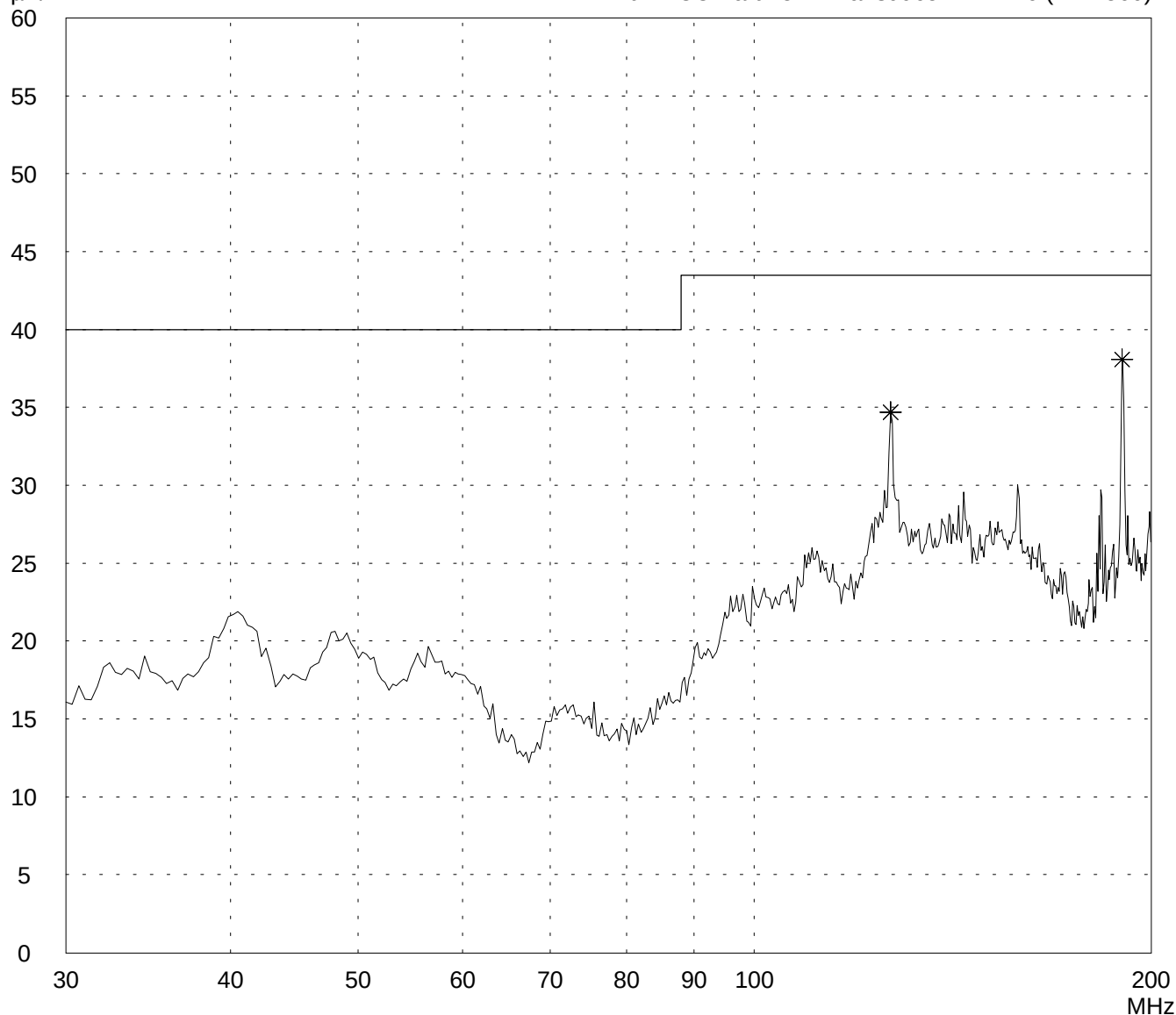
List of values:

10 dB Margin

8 Subranges

dBµV/m

Limit1: FCC Part 15 Transducer: HK 116 (Inv 1560)



Result:
Prescan

Project file:
55503-20031

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Radiated Emission Test 200 MHz - 1 GHz acc. to FCC Part 15 (Fully Anechoic Chamber)

Model:
FRH-SD07TU

Serial no.:
Sample 1

Applicant:
Futaba Corporation

Test site:
Fully anechoic room

Tested on:
**Test distance 3 metres
Vertical Polarization**

Date of test:
02/06/2002

Operator:
T. Eberl

Test performed:
automatically

File name:
default.emi

Comment:

- FCC test setup
- TX mode
- f = 2.4202 GHz (CH1)
- with antenna
- EUT DC powered via interface 5.0 V DC

Detector:
Peak

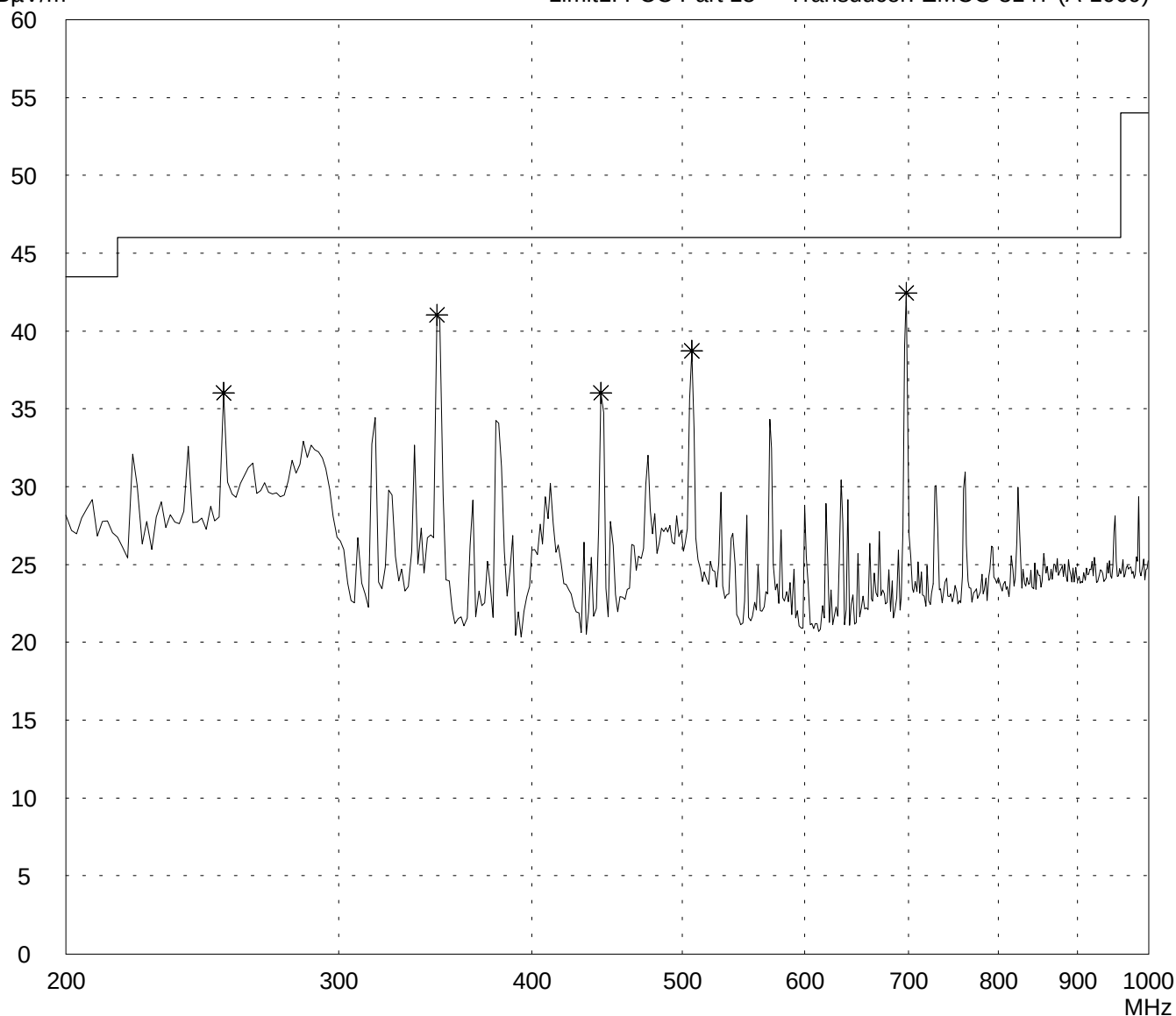
List of values:

10 dB Margin

50 Subranges

dB μ V/m

Limit1: FCC Part 15 Transducer: EMCO 3147 (A-1009)



Result:
Prescan

Project file:
55503-20031

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Radiated Emission Test 200 MHz - 1 GHz acc. to FCC Part 15 (Fully Anechoic Chamber)

Model:
FRH-SD07TU

Serial no.:
Sample 1

Applicant:
Futaba Corporation

Test site:
Fully anechoic room

Tested on:
**Test distance 3 metres
Horizontal Polarization**

Date of test:
02/06/2002

Operator:
T. Eberl

Test performed:
automatically

File name:
default.emi

Comment:

- FCC test setup
- TX mode
- f = 2.450 GHz (CH2)
- with antenna
- EUT DC powered via interface 5.0 V DC

Detector:
Peak

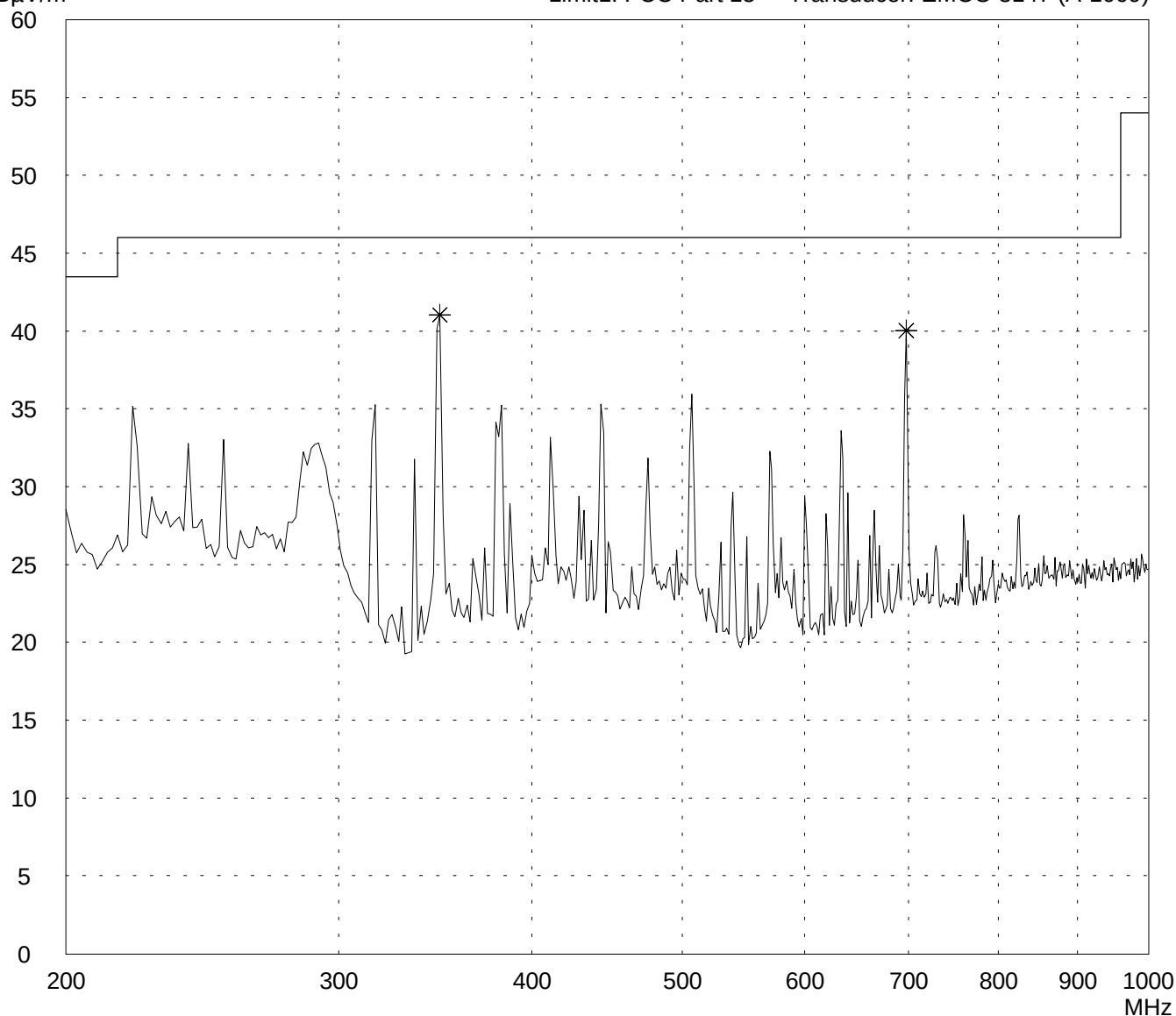
List of values:

10 dB Margin

50 Subranges

dB μ V/m

Limit1: FCC Part 15 Transducer: EMCO 3147 (A-1009)



Result:
Prescan

Project file:
55503-20031

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Radiated Emission Test 200 MHz - 1 GHz acc. to FCC Part 15 (Fully Anechoic Chamber)

Model:
FRH-SD07TU

Serial no.:
Sample 1

Applicant:
Futaba Corporation

Test site:
Fully anechoic room

Tested on:
**Test distance 3 metres
Horizontal Polarization**

Date of test:
02/06/2002

Operator:
T. Eberl

Test performed:
automatically

File name:
default.emi

Comment:

- FCC test setup
- TX mode
- f = 2.473 GHz (CH3)
- with antenna
- EUT DC powered via interface 5.0 V DC

Detector:
Peak

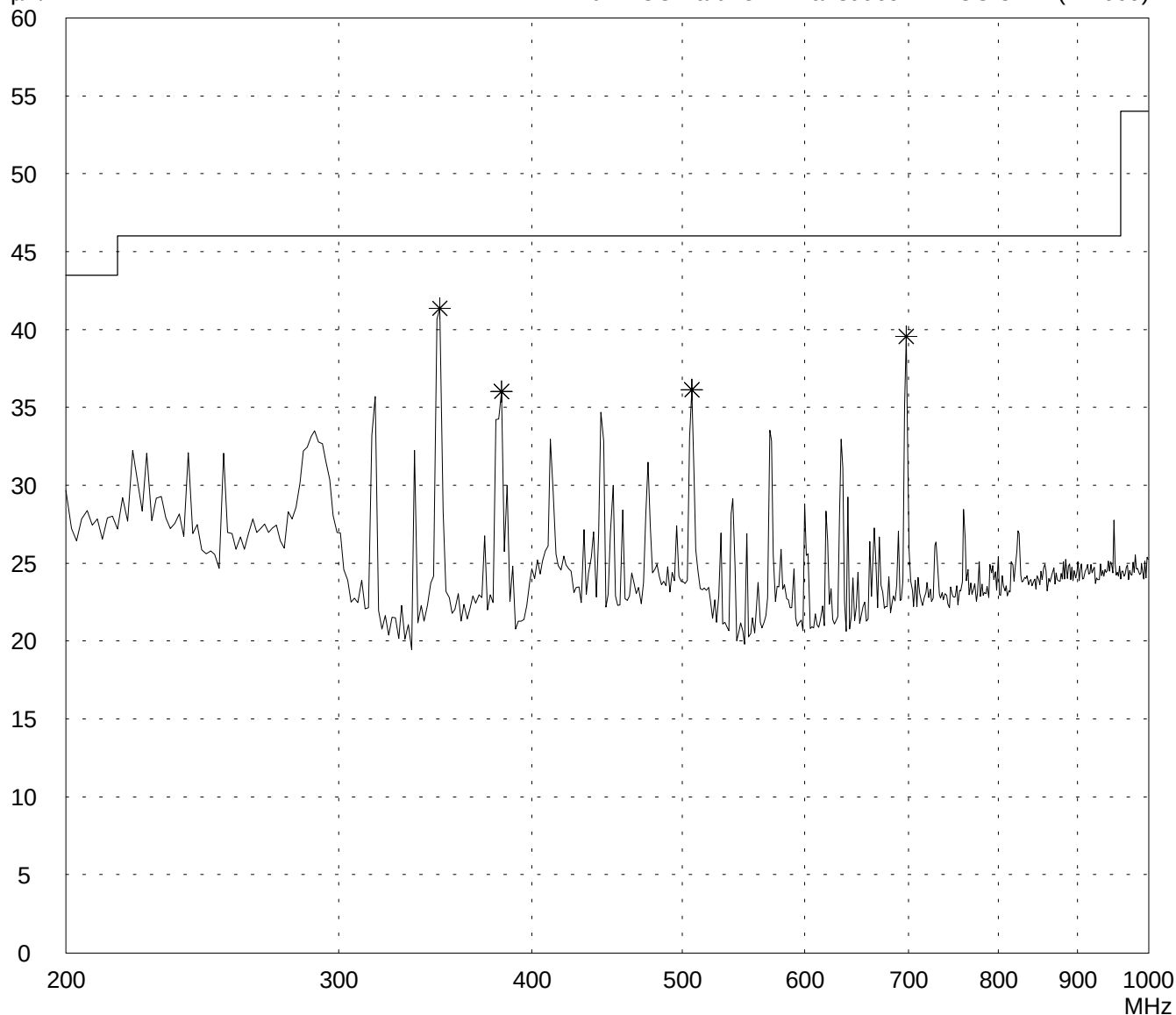
List of values:

10 dB Margin

50 Subranges

dB μ V/m

Limit1: FCC Part 15 Transducer: EMCO 3147 (A-1009)



Result:
Prescan

Project file:
55503-20031

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Radiated Emission Test 200 MHz - 1 GHz acc. to FCC Part 15 (Fully Anechoic Chamber)

Model:
FRH-SD07TU

Serial no.:
Sample 1

Applicant:
Futaba Corporation

Test site:
Fully anechoic room

Tested on:
**Test distance 3 metres
Horizontal Polarization**

Date of test:
02/06/2002

Operator:
T. Eberl

Test performed:
automatically

File name:
default.emi

Comment:

- FCC test setup
- TX mode
- f = 2.4202 GHz (CH1)
- with antenna
- EUT DC powered via interface 5.0 V DC

Detector:
Peak

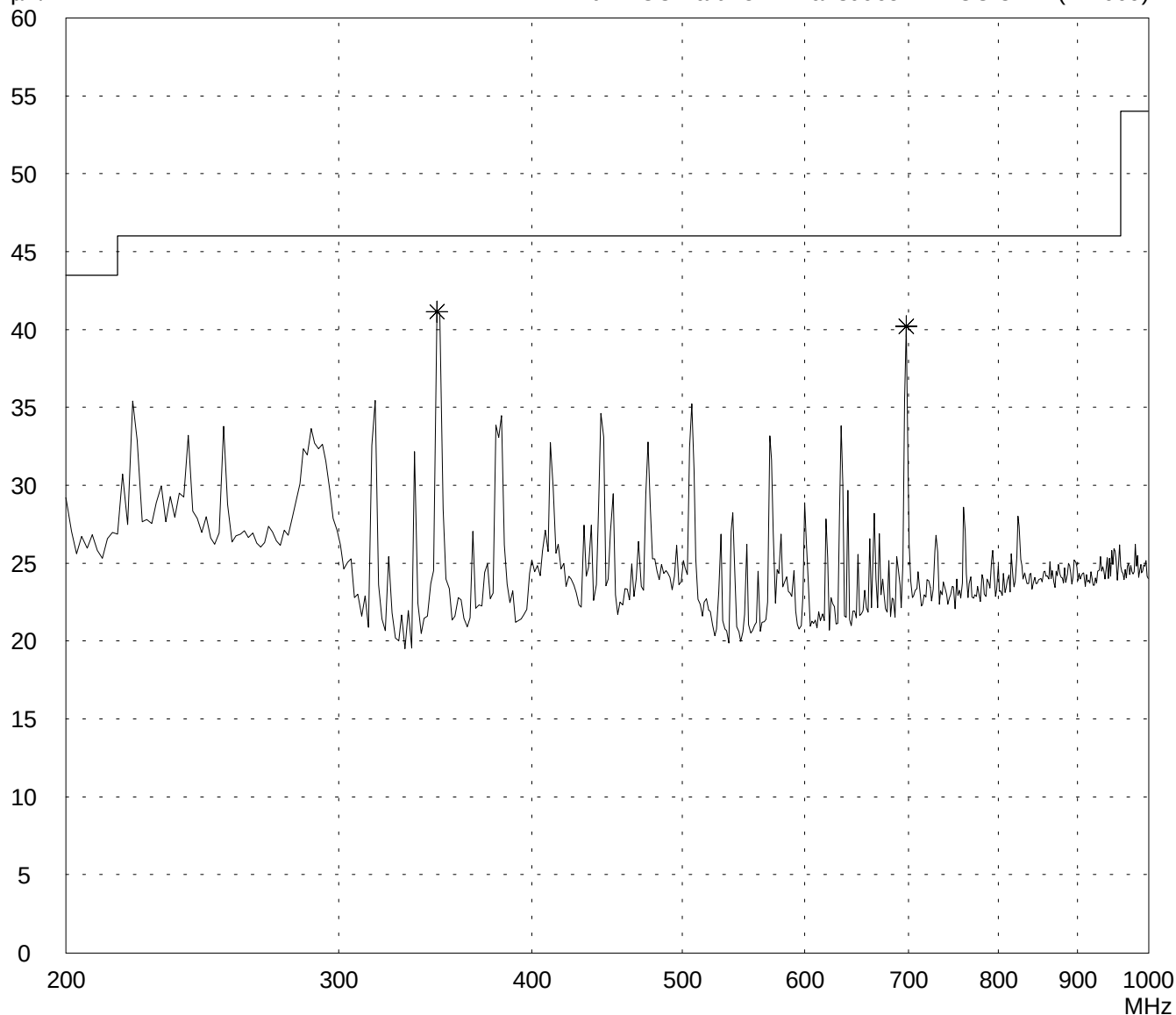
List of values:

10 dB Margin

50 Subranges

dB μ V/m

Limit1: FCC Part 15 Transducer: EMCO 3147 (A-1009)



Result:
Prescan

Project file:
55503-20031

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Radiated Emission Test 200 MHz - 1 GHz acc. to FCC Part 15 (Fully Anechoic Chamber)

Model:
FRH-SD07TU

Serial no.:
Sample 1

Applicant:
Futaba Corporation

Test site:
Fully anechoic room

Tested on:
**Test distance 3 metres
Vertical Polarization**

Date of test: 02/06/2002 Operator: T. Eberl

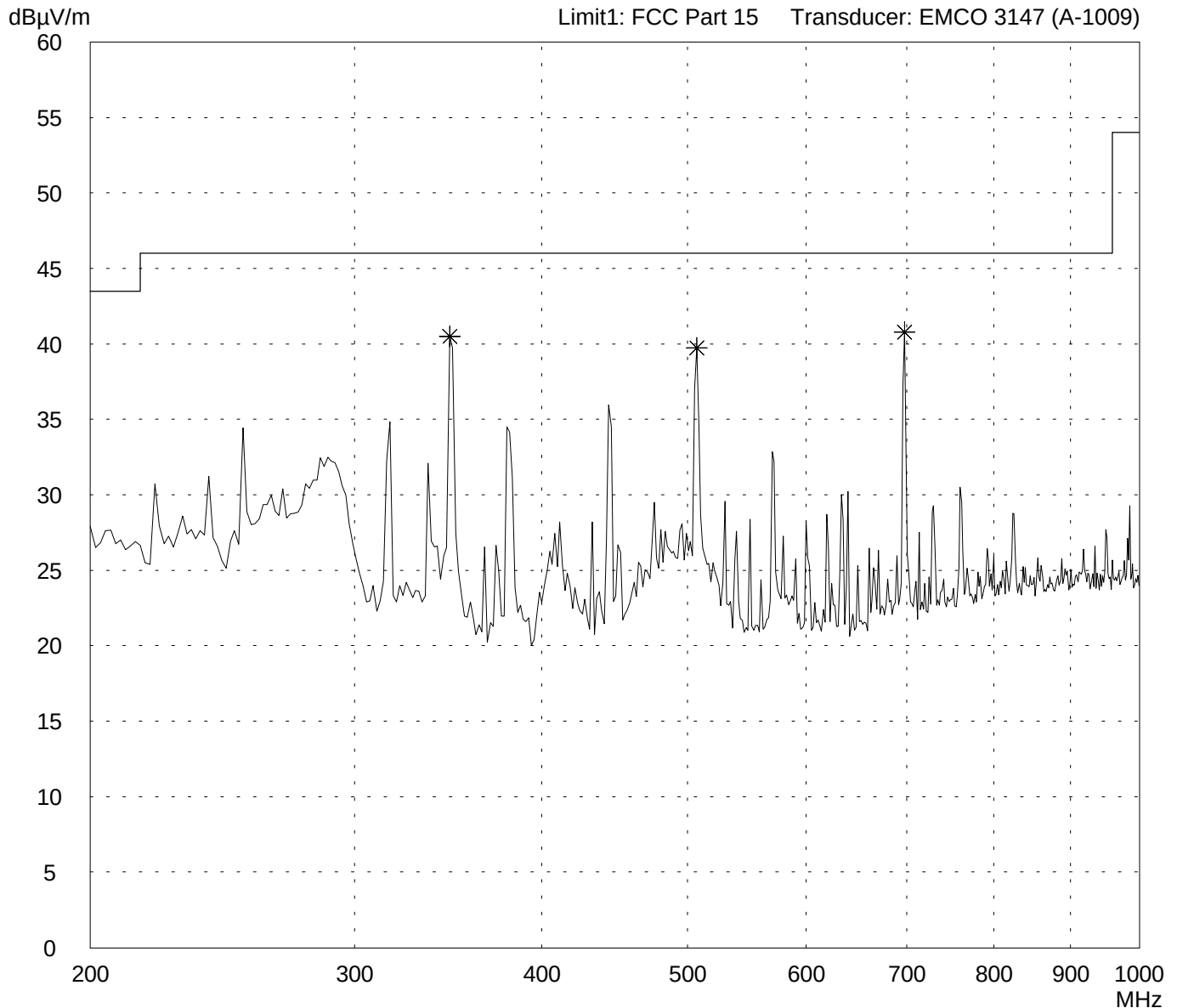
Test performed: automatically File name: default.emi

Comment:

- FCC test setup
- TX mode
- f = 2.450 GHz (CH2)
- with antenna
- EUT DC powered via interface 5.0 V DC

Detector:
Peak

List of values:
10 dB Margin 50 Subranges



Result:
Prescan

Project file:
55503-20031

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Radiated Emission Test 200 MHz - 1 GHz acc. to FCC Part 15 (Fully Anechoic Chamber)

Model:
FRH-SD07TU

Serial no.:
Sample 1

Applicant:
Futaba Corporation

Test site:
Fully anechoic room

Tested on:
**Test distance 3 metres
Vertical Polarization**

Date of test:
02/06/2002

Operator:
T. Eberl

Test performed:
automatically

File name:
default.emi

Comment:

- FCC test setup
- TX mode
- f = 2.473 GHz (CH3)
- with antenna
- EUT DC powered via interface 5.0 V DC

Detector:
Peak

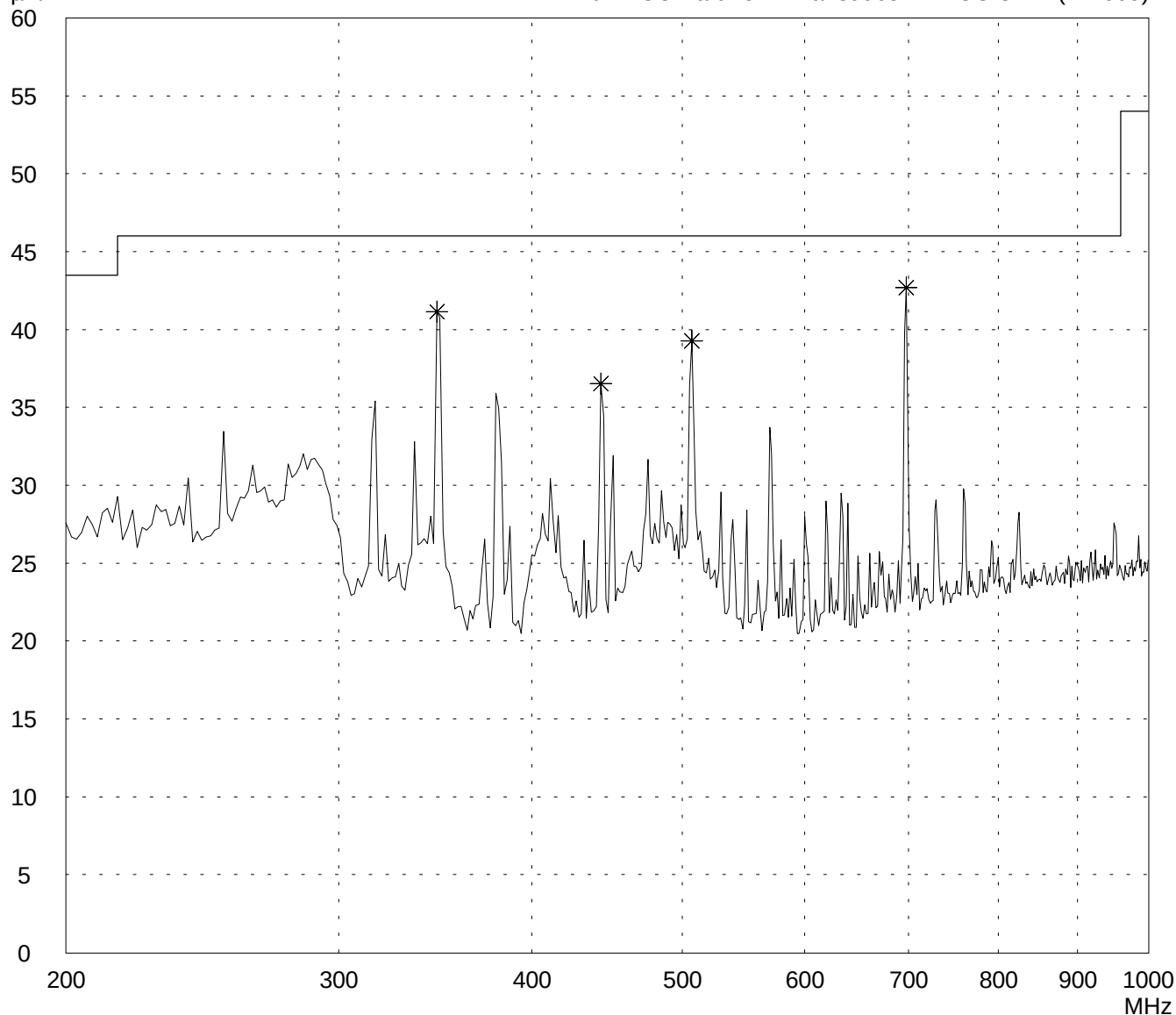
List of values:

10 dB Margin

50 Subranges

dB μ V/m

Limit1: FCC Part 15 Transducer: EMCO 3147 (A-1009)



Result:
Prescan

Project file:
55503-20031

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Radiated Emission Test 1 GHz - 3 GHz acc. to FCC Part 15 (Fully Anechoic Chamber)

Model:
FRH-SD07TU

Serial no.:
Sample 1

Applicant:
Futaba Corporation

Test site:
Fully anechoic room

Tested on:
**Test distance 3 metres
Horizontal Polarization**

Date of test:
02/07/2002

Operator:
T. Eberl

Test performed:
automatically

File name:
default.emi

Comment:

- FCC test Setup
- TX mode
- f = 2.473 GHz (CH3)
- with antenna
- EUT DC powered via interface 5.0 V DC

Detector:
Peak

List of values:

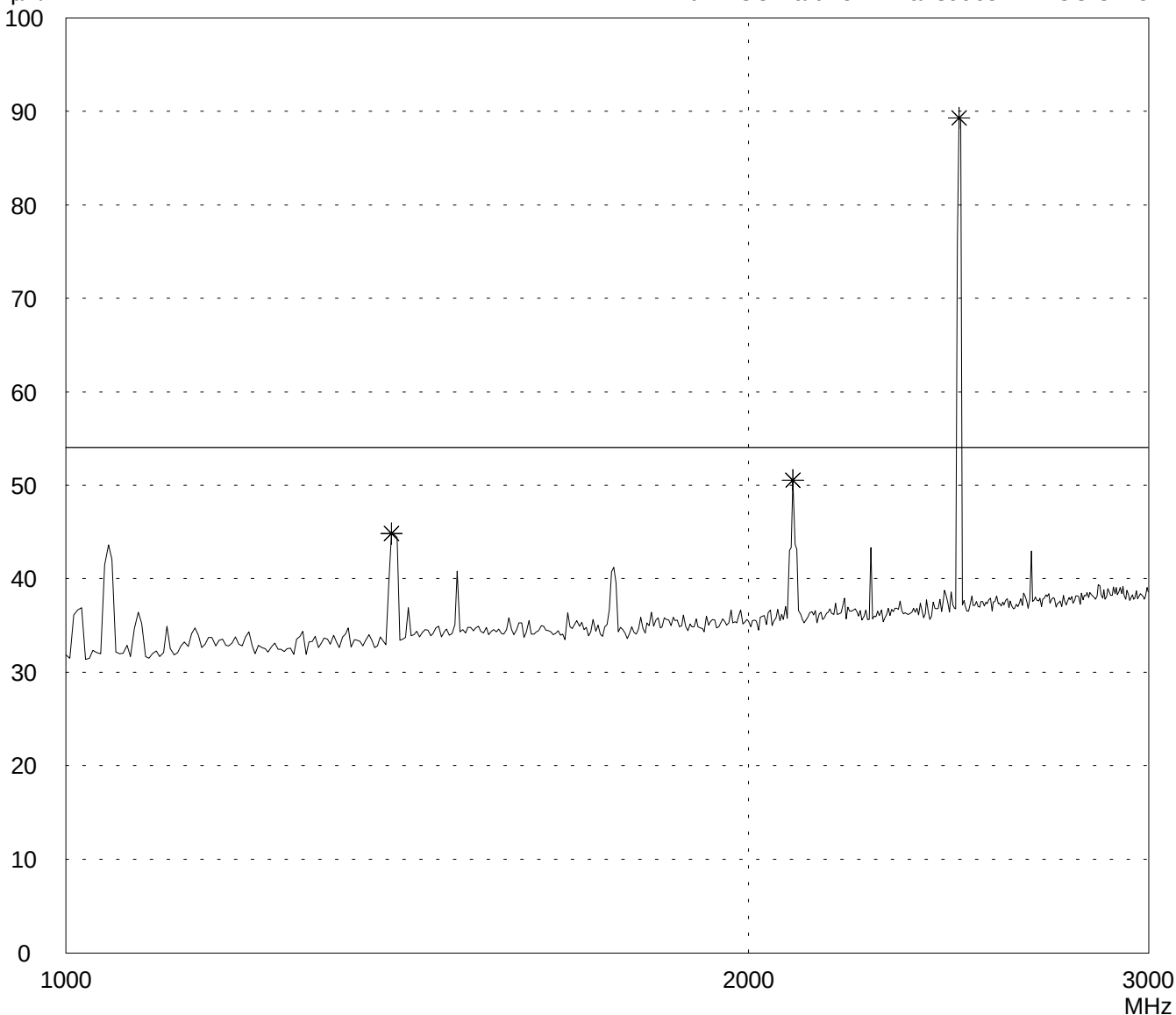
10 dB Margin

8 Subranges

dBµV/m
100

Limit1: FCC Part 15

Transducer: EMCO 3115



Result:
Limit kept

Project file:
55503-20031

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Radiated Emission Test 1 GHz - 3 GHz acc. to FCC Part 15 (Fully Anechoic Chamber)

Model:
FRH-SD07TU

Serial no.:
Sample 1

Applicant:
Futaba Corporation

Test site:
Fully anechoic room

Tested on:
**Test distance 3 metres
Horizontal Polarization**

Date of test:
02/07/2002

Operator:
T. Eberl

Test performed:
automatically

File name:
default.emi

Comment:

- FCC test Setup
- TX mode
- f = 2.450 GHz (CH2)
- with antenna
- EUT DC powered via interface 5.0 V DC

Detector:
Peak

List of values:

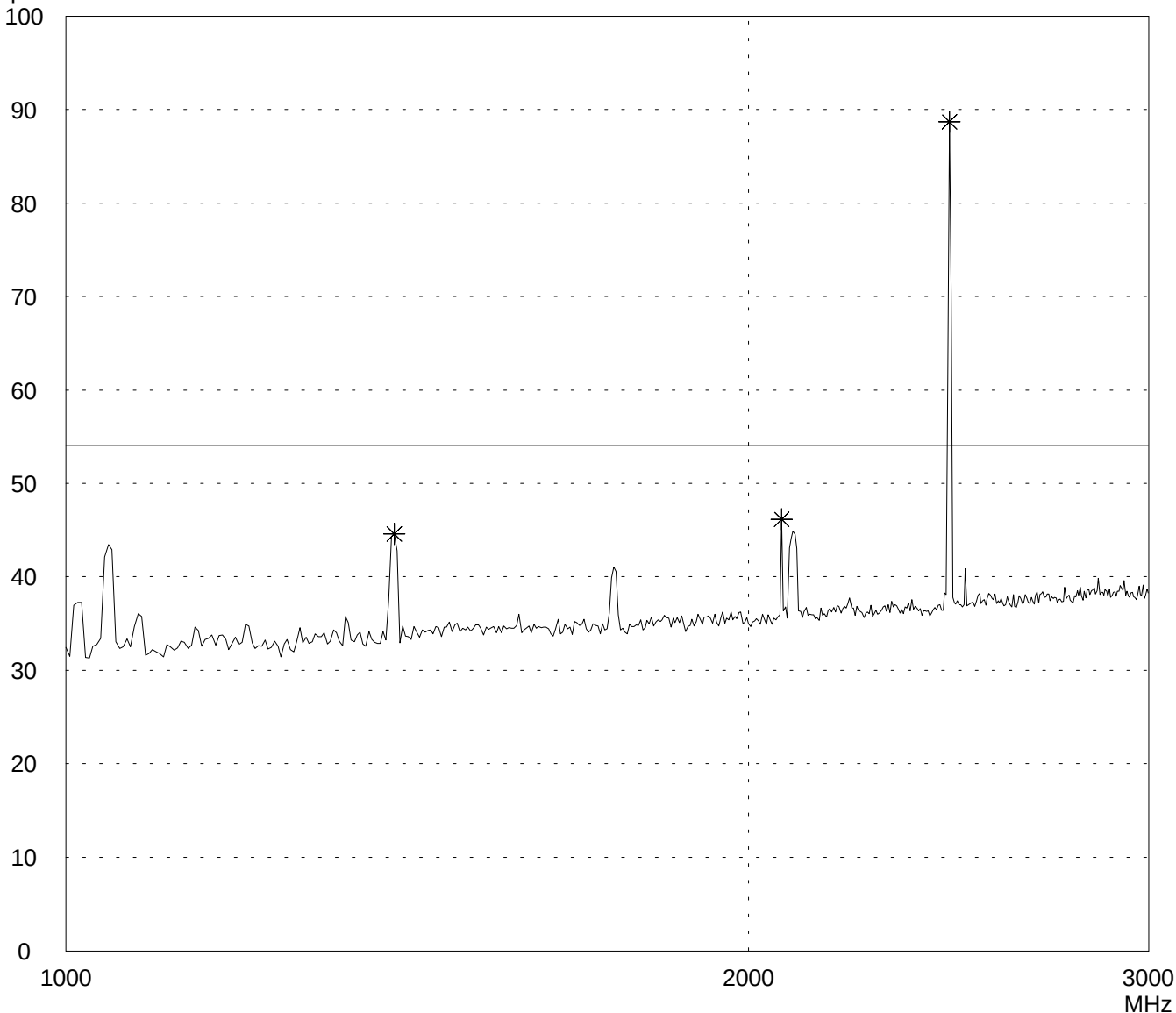
10 dB Margin

8 Subranges

dBµV/m
100

Limit1: FCC Part 15

Transducer: EMCO 3115



Result:
Limit kept

Project file:
55503-20031

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Radiated Emission Test 1 GHz - 3 GHz acc. to FCC Part 15 (Fully Anechoic Chamber)

Model:
FRH-SD07TU

Serial no.:
Sample 1

Applicant:
Futaba Corporation

Test site:
Fully anechoic room

Tested on:
**Test distance 3 metres
Horizontal Polarization**

Date of test:
02/07/2002

Operator:
T. Eberl

Test performed:
automatically

File name:
default.emi

Comment:

- FCC test Setup
- TX mode
- f = 2.420 GHz (CH1)
- with antenna
- EUT DC powered via interface 5.0 V DC

Detector:
Peak

List of values:

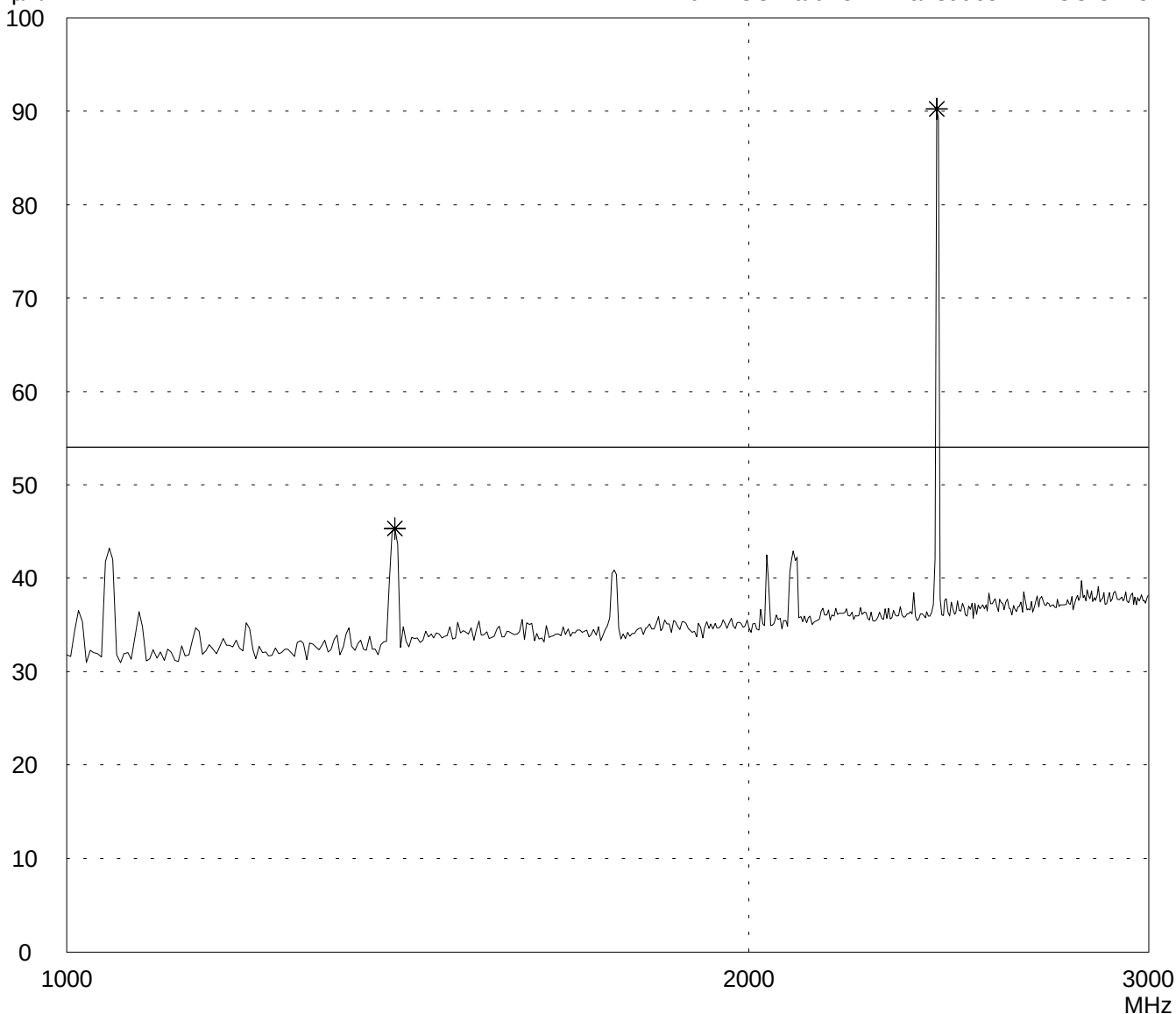
10 dB Margin

8 Subranges

dBµV/m
100

Limit1: FCC Part 15

Transducer: EMCO 3115



Result:
Limit kept

Project file:
55503-20031

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Radiated Emission Test 1 GHz - 3 GHz acc. to FCC Part 15 (Fully Anechoic Chamber)

Model:
FRH-SD07TU

Serial no.:
Sample 1

Applicant:
Futaba Corporation

Test site:
Fully anechoic room

Tested on:
**Test distance 3 metres
Vertical Polarization**

Date of test:
02/07/2002

Operator:
T. Eberl

Test performed:
automatically

File name:
default.emi

Comment:

- FCC test Setup
- TX mode
- f = 2.420 GHz (CH1)
- with antenna
- EUT DC powered via interface 5.0 V DC

Detector:
Peak

List of values:

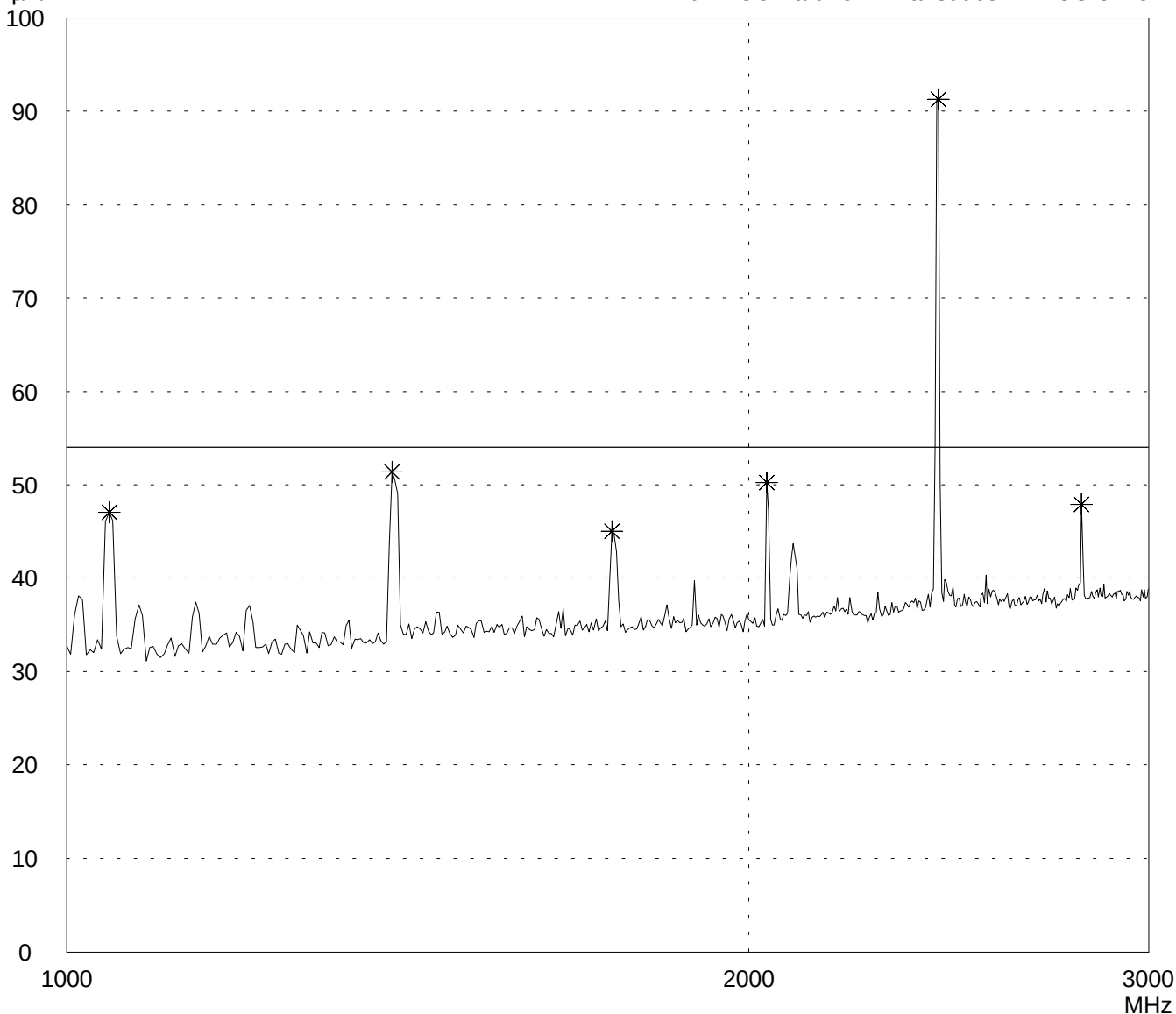
10 dB Margin

8 Subranges

dB μ V/m
100

Limit1: FCC Part 15

Transducer: EMCO 3115



Result:
Limit kept

Project file:
55503-20031

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Radiated Emission Test 1 GHz - 3 GHz acc. to FCC Part 15 (Fully Anechoic Chamber)

Model:
FRH-SD07TU

Serial no.:
Sample 1

Applicant:
Futaba Corporation

Test site:
Fully anechoic room

Tested on:
**Test distance 3 metres
Vertical Polarization**

Date of test:
02/07/2002

Operator:
T. Eberl

Test performed:
automatically

File name:
default.emi

Comment:

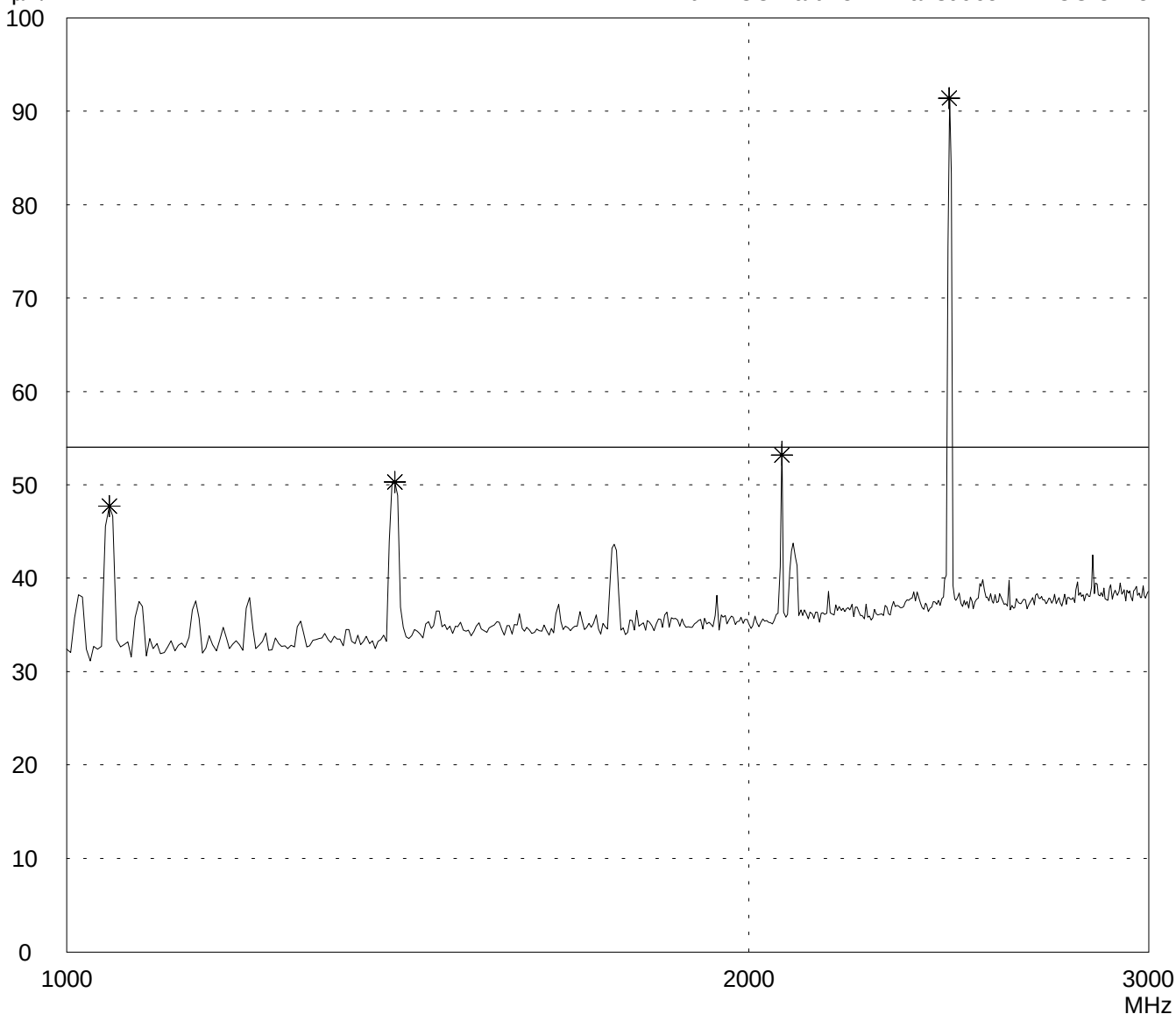
- FCC test Setup
- TX mode
- f = 2.450 GHz (CH2)
- with antenna
- EUT DC powered via interface 5.0 V DC

Detector:
Peak

List of values:
Selected by hand

dB μ V/m
100

Limit1: FCC Part 15 Transducer: EMCO 3115



Result:
Limit kept

Project file:
55503-20031

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Radiated Emission Test 1 GHz - 3 GHz acc. to FCC Part 15 (Fully Anechoic Chamber)

Model:
FRH-SD07TU

Serial no.:
Sample 1

Applicant:
Futaba Corporation

Test site:
Fully anechoic room

Tested on:
**Test distance 3 metres
Vertical Polarization**

Date of test:
02/07/2002

Operator:
T. Eberl

Test performed:
automatically

File name:
default.emi

Comment:

- FCC test Setup
- TX mode
- f = 2.473 GHz (CH3)
- with antenna
- EUT DC powered via interface 5.0 V DC

Detector:
Peak

List of values:

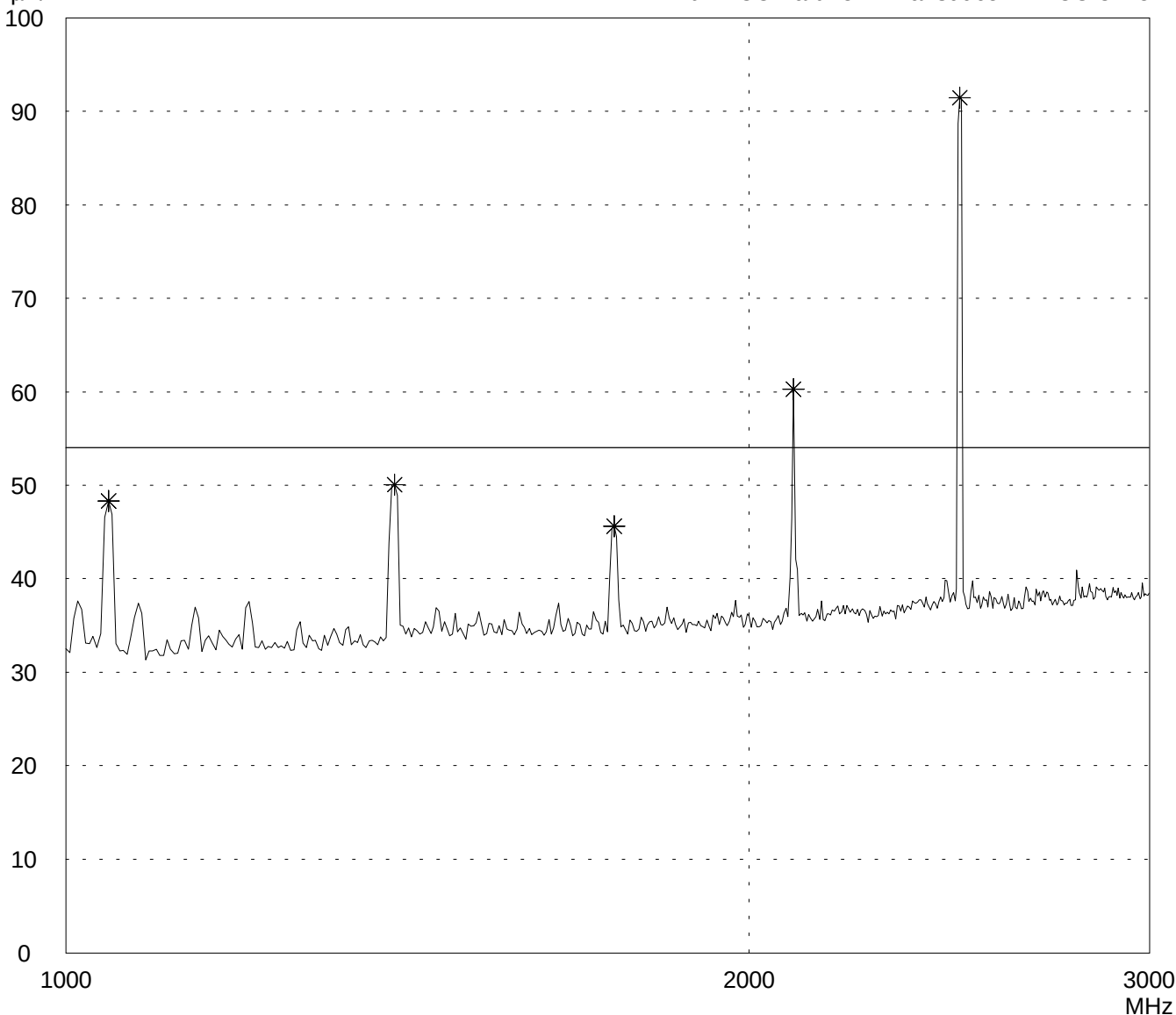
10 dB Margin

8 Subranges

dBµV/m
100

Limit1: FCC Part 15

Transducer: EMCO 3115



Result:
Limit not kept

Project file:
55503-20031

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Radiated Emission Test 8.2 GHz - 12.4 GHz acc. to FCC Part 15 (EMCO 3160)

Model:
FRH-SD07TU

Serial no.:
Sample 1

Applicant:
Futaba Corporation

Test site:
Fully anechoic room

Tested on:
**Test distance 3 metres
Horizontal Polarization**

Date of test: 02/07/2002 Operator: T. Eberl

Test performed: automatically File name: default.emi

Comment:

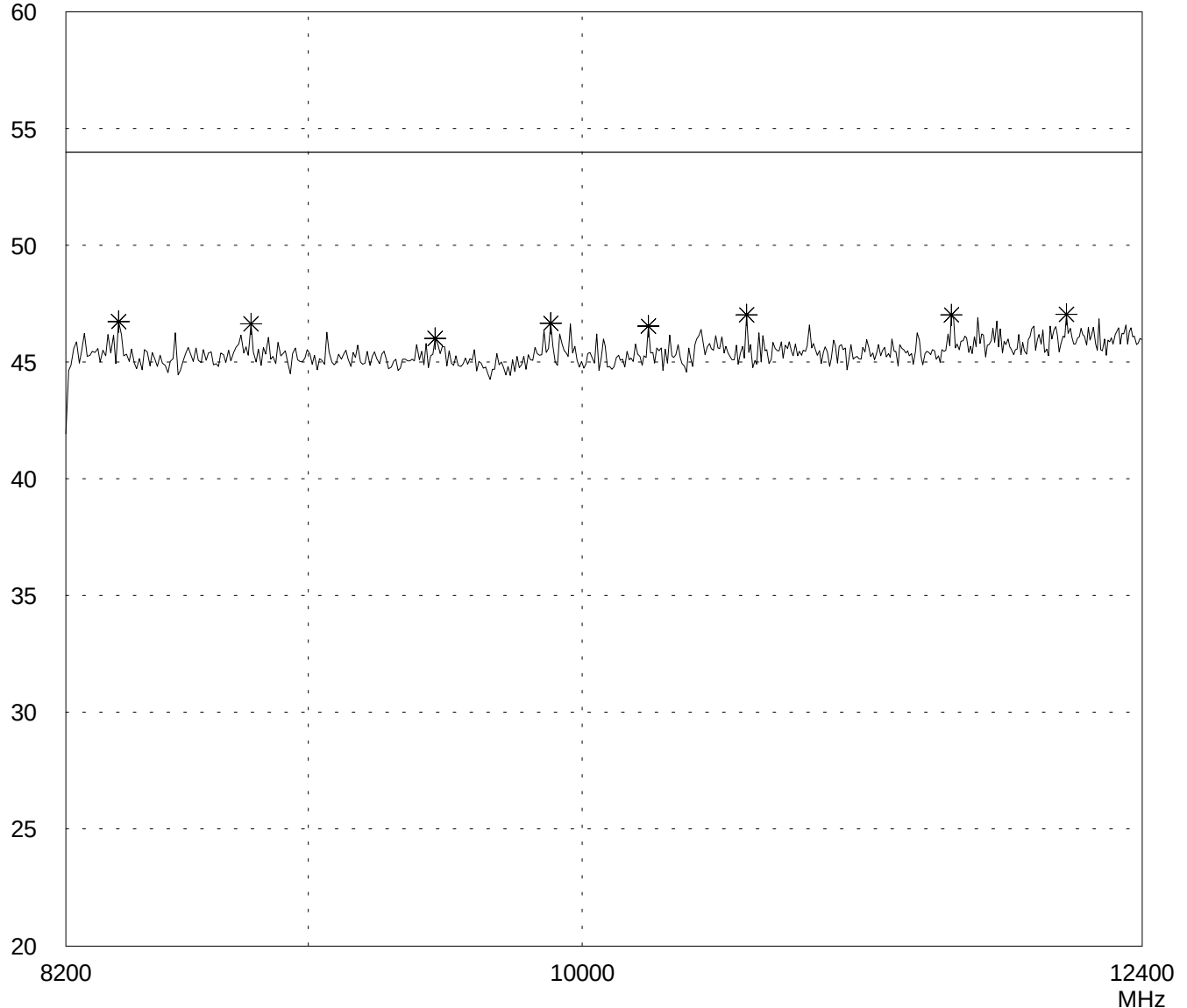
- FCC test Setup
- TX mode
- f = 2.420 GHz (CH1)
- with antenna
- EUT DC powered via interface 5.0 V DC

Detector:
Peak

List of values:
Selected by hand

dBµV/m
60

Limit1: FCC Part 15 Transducer: EMCO 3160



Result:
Limit kept

Project file:
55503-20031

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Radiated Emission Test 3 GHz - 8 GHz acc. to FCC Part 15 (Fully Anechoic Chamber)

Model:
FRH-SD07TU

Serial no.:
Sample 1

Applicant:
Futaba Corporation

Test site:
Fully anechoic room

Tested on:
**Test distance 3 metres
Horizontal Polarization**

Date of test:
02/07/2002

Operator:
T. Eberl

Test performed:
automatically

File name:
default.emi

Comment:

- FCC test Setup
- TX mode
- f = 2.450 GHz (CH2)
- with antenna
- EUT DC powered via interface 5.0 V DC

Detector:
Peak

List of values:

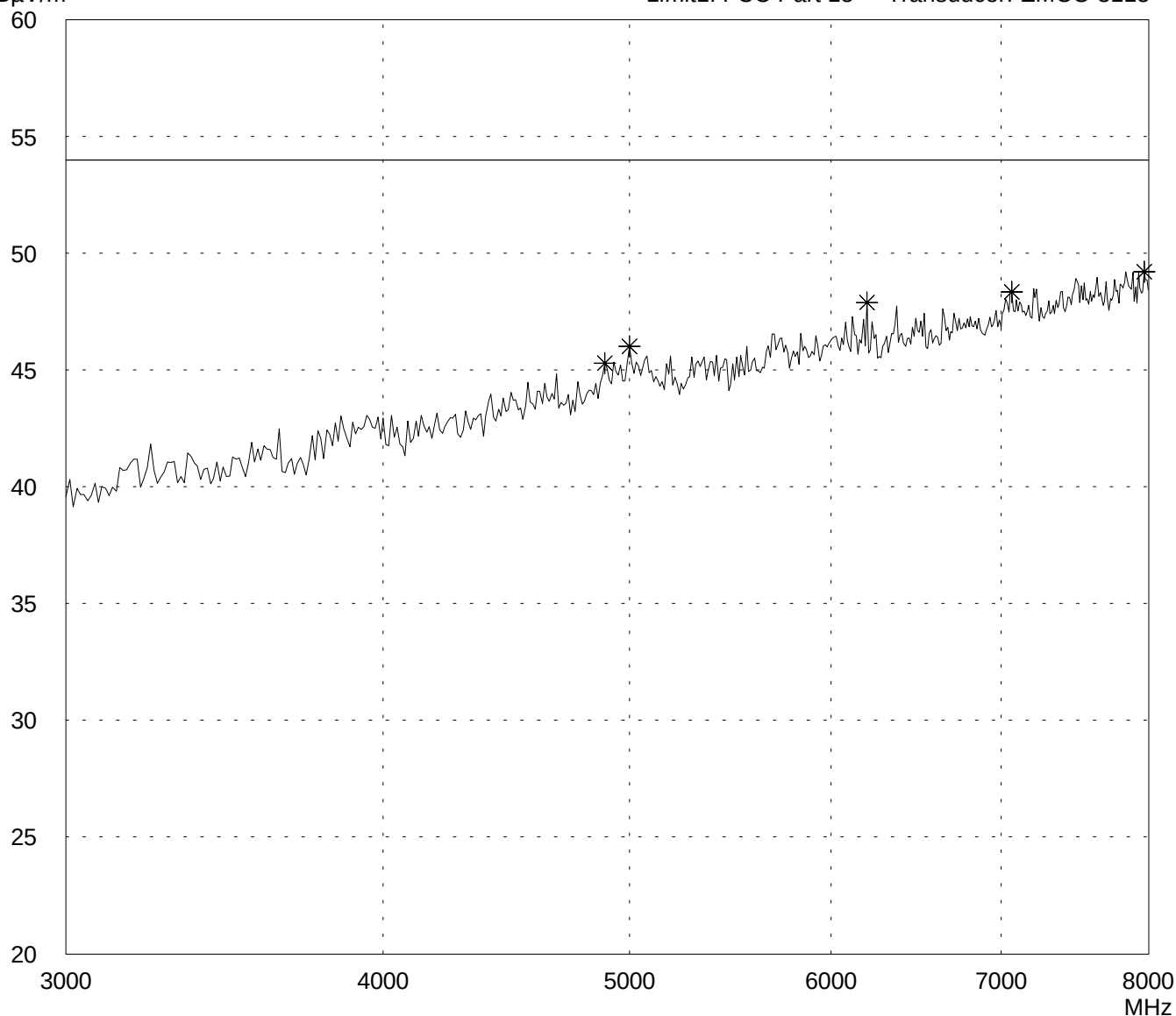
10 dB Margin

8 Subranges

dBμV/m

Limit1: FCC Part 15

Transducer: EMCO 3115



Result:
Limit kept

Project file:
55503-20031

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Radiated Emission Test 3 GHz - 8 GHz acc. to FCC Part 15 (Fully Anechoic Chamber)

Model:
FRH-SD07TU

Serial no.:
Sample 1

Applicant:
Futaba Corporation

Test site:
Fully anechoic room

Tested on:
**Test distance 3 metres
Horizontal Polarization**

Date of test:
02/07/2002

Operator:
T. Eberl

Test performed:
automatically

File name:
default.emi

Comment:

- FCC test Setup
- TX mode
- f = 2.473 GHz (CH3)
- with antenna
- EUT DC powered via interface 5.0 V DC

Detector:
Peak

List of values:

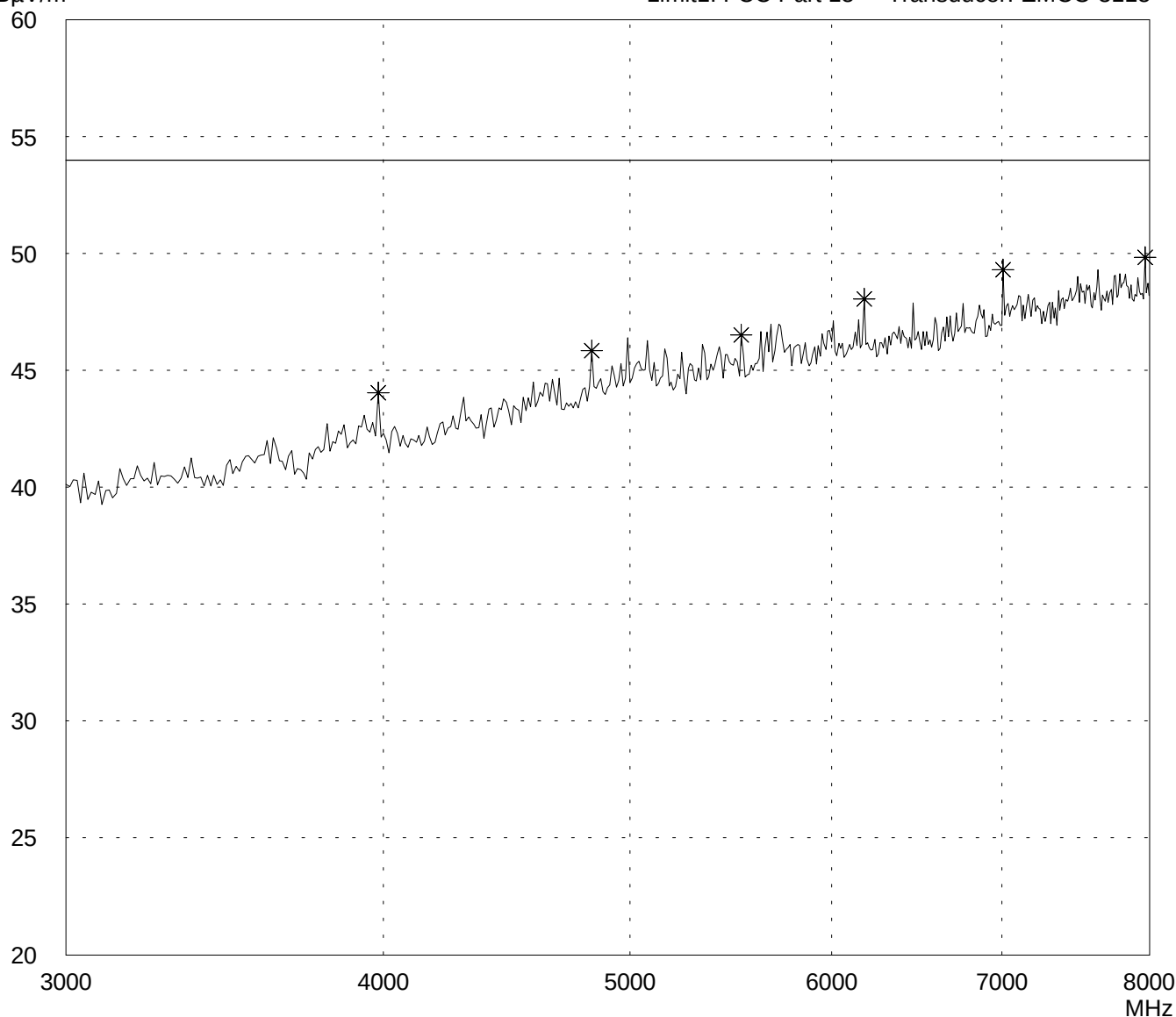
10 dB Margin

8 Subranges

dB μ V/m

Limit1: FCC Part 15

Transducer: EMCO 3115



Result:
Limit kept

Project file:
55503-20031

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Radiated Emission Test 3 GHz - 8 GHz acc. to FCC Part 15 (Fully Anechoic Chamber)

Model:
FRH-SD07TU

Serial no.:
Sample 1

Applicant:
Futaba Corporation

Test site:
Fully anechoic room

Tested on:
**Test distance 3 metres
Vertical Polarization**

Date of test:
02/07/2002

Operator:
T. Eberl

Test performed:
automatically

File name:
default.emi

Comment:

- FCC test Setup
- TX mode
- f = 2.420 GHz (CH1)
- with antenna
- EUT DC powered via interface 5.0 V DC

Detector:
Peak

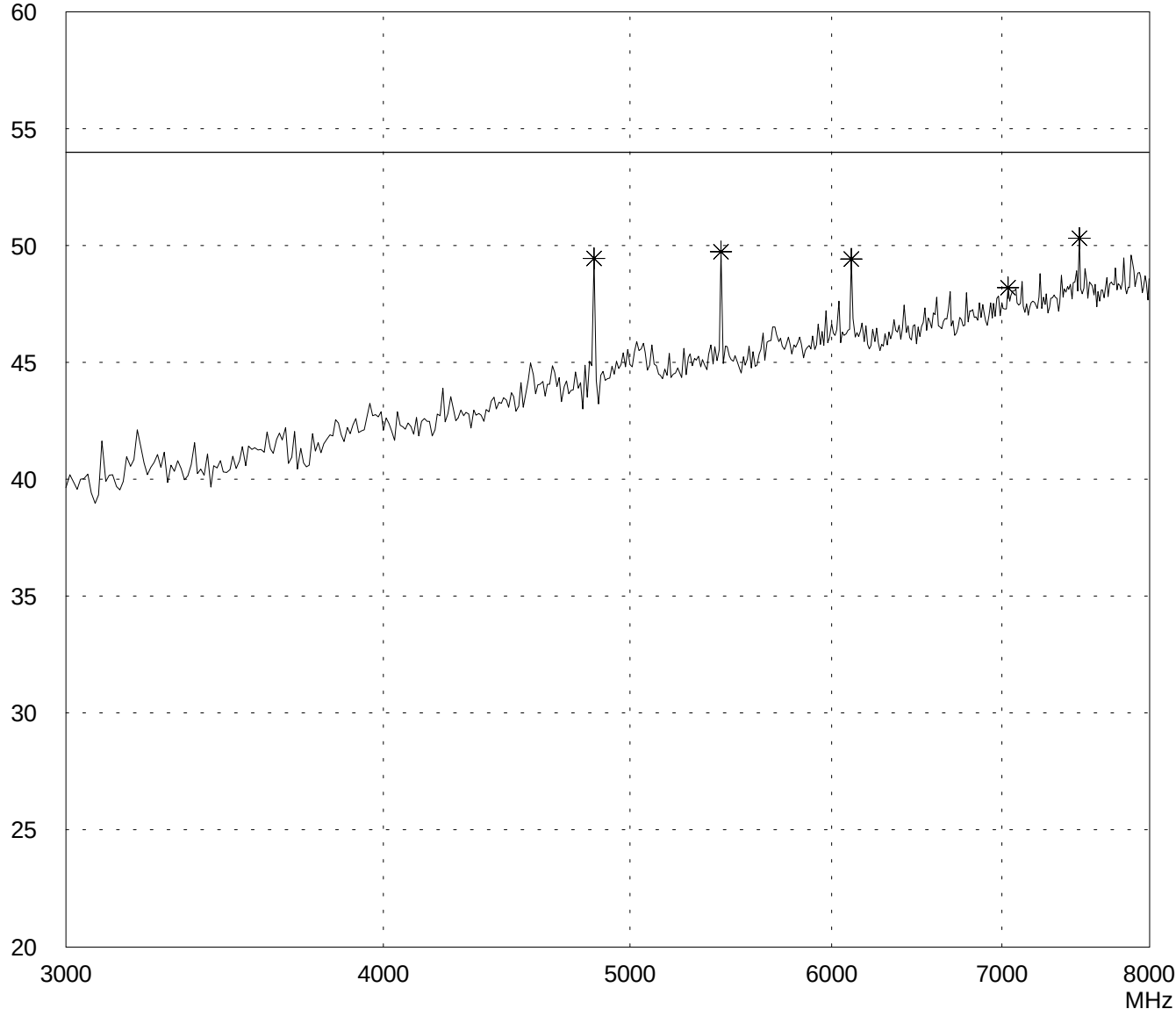
List of values:

10 dB Margin

8 Subranges

dB μ V/m
60

Limit1: FCC Part 15 Transducer: EMCO 3115



Result:
Limit kept

Project file:
55503-20031

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Radiated Emission Test 3 GHz - 8 GHz acc. to FCC Part 15 (Fully Anechoic Chamber)

Model:
FRH-SD07TU

Serial no.:
Sample 1

Applicant:
Futaba Corporation

Test site:
Fully anechoic room

Tested on:
**Test distance 3 metres
Vertical Polarization**

Date of test:
02/07/2002

Operator:
T. Eberl

Test performed:
automatically

File name:
default.emi

Comment:

- FCC test Setup
- TX mode
- f = 2.450 GHz (CH2)
- with antenna
- EUT DC powered via interface 5.0 V DC

Detector:
Peak

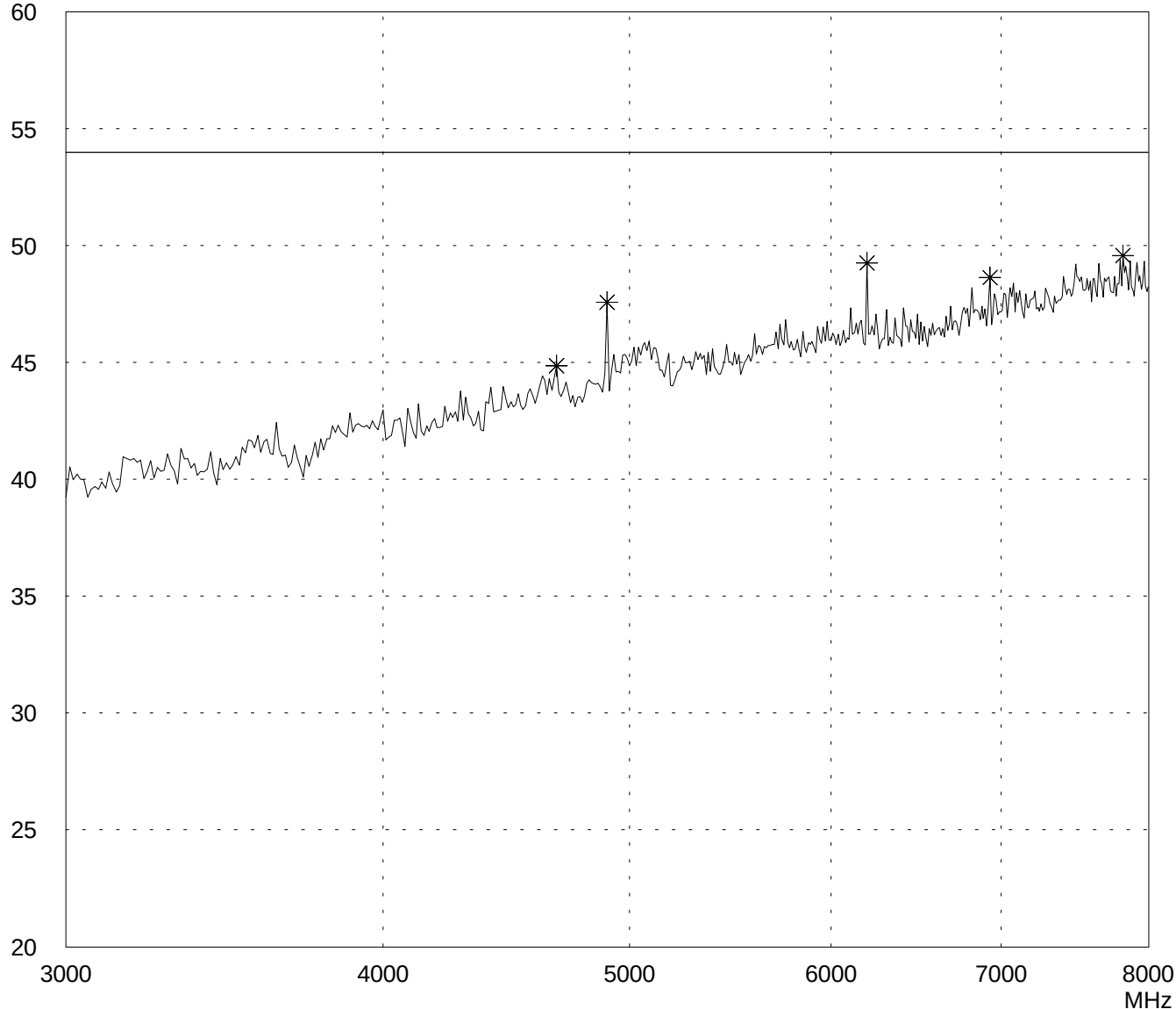
List of values:

10 dB Margin

8 Subranges

dB μ V/m
60

Limit1: FCC Part 15 Transducer: EMCO 3115



Result:
Limit kept

Project file:
55503-20031

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Radiated Emission Test 3 GHz - 8 GHz acc. to FCC Part 15 (Fully Anechoic Chamber)

Model:
FRH-SD07TU

Serial no.:
Sample 1

Applicant:
Futaba Corporation

Test site:
Fully anechoic room

Tested on:
**Test distance 3 metres
Vertical Polarization**

Date of test:
02/07/2002

Operator:
T. Eberl

Test performed:
automatically

File name:
default.emi

Comment:

- FCC test Setup
- TX mode
- f = 2.473 GHz (CH3)
- with antenna
- EUT DC powered via interface 5.0 V DC

Detector:
Peak

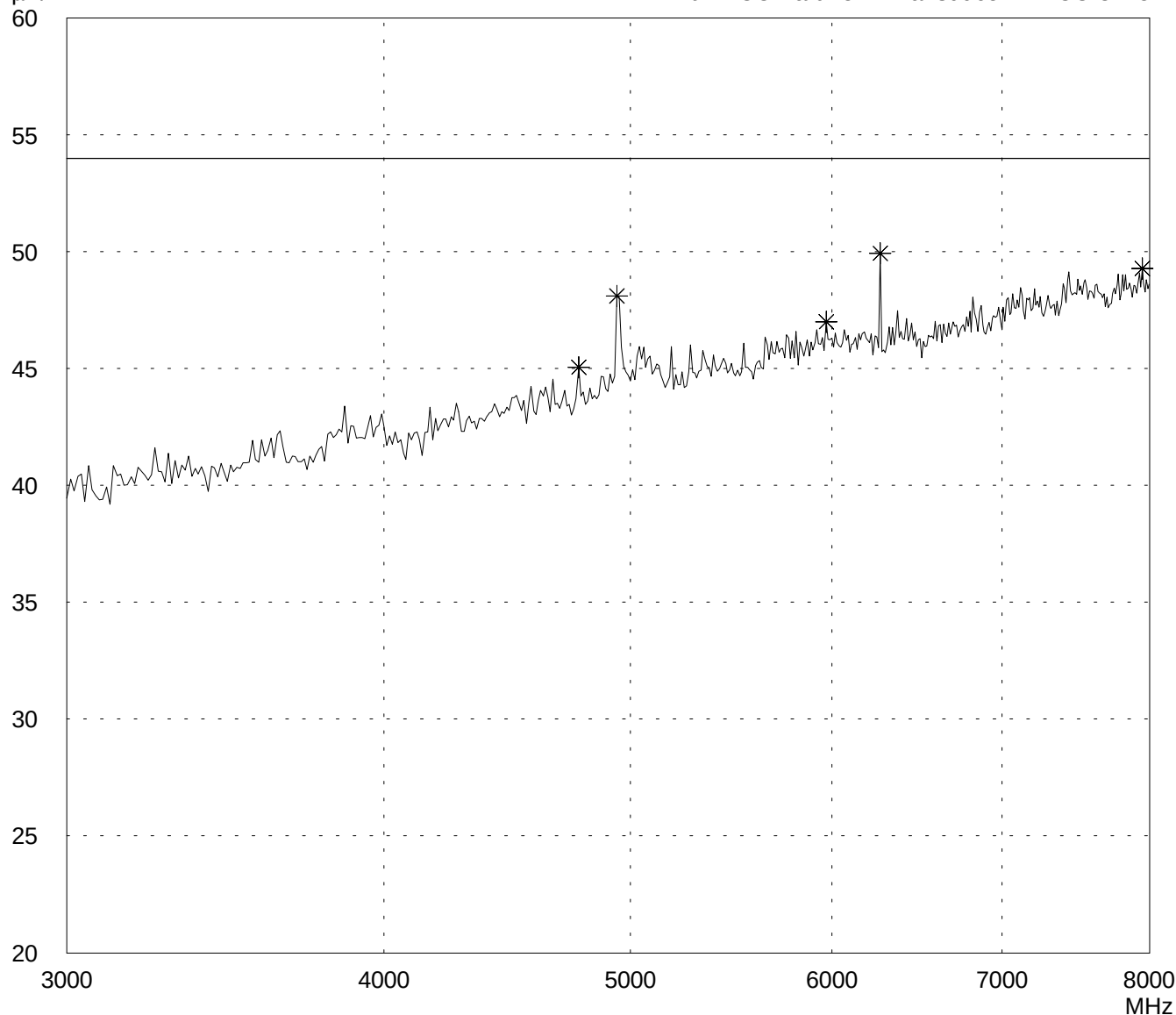
List of values:

10 dB Margin

8 Subranges

dBμV/m
60

Limit1: FCC Part 15 Transducer: EMCO 3115



Result:
Limit kept

Project file:
55503-20031

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Radiated Emission Test 3 GHz - 8 GHz acc. to FCC Part 15 (Fully Anechoic Chamber)

Model:
FRH-SD07TU

Serial no.:
Sample 1

Applicant:
Futaba Corporation

Test site:
Fully anechoic room

Tested on:
**Test distance 3 metres
Horizontal Polarization**

Date of test:
02/07/2002

Operator:
T. Eberl

Test performed:
automatically

File name:
default.emi

Comment:

- FCC test Setup
- TX mode
- f = 2.420 GHz (CH1)
- with antenna
- EUT DC powered via interface 5.0 V DC

Detector:
Peak

List of values:

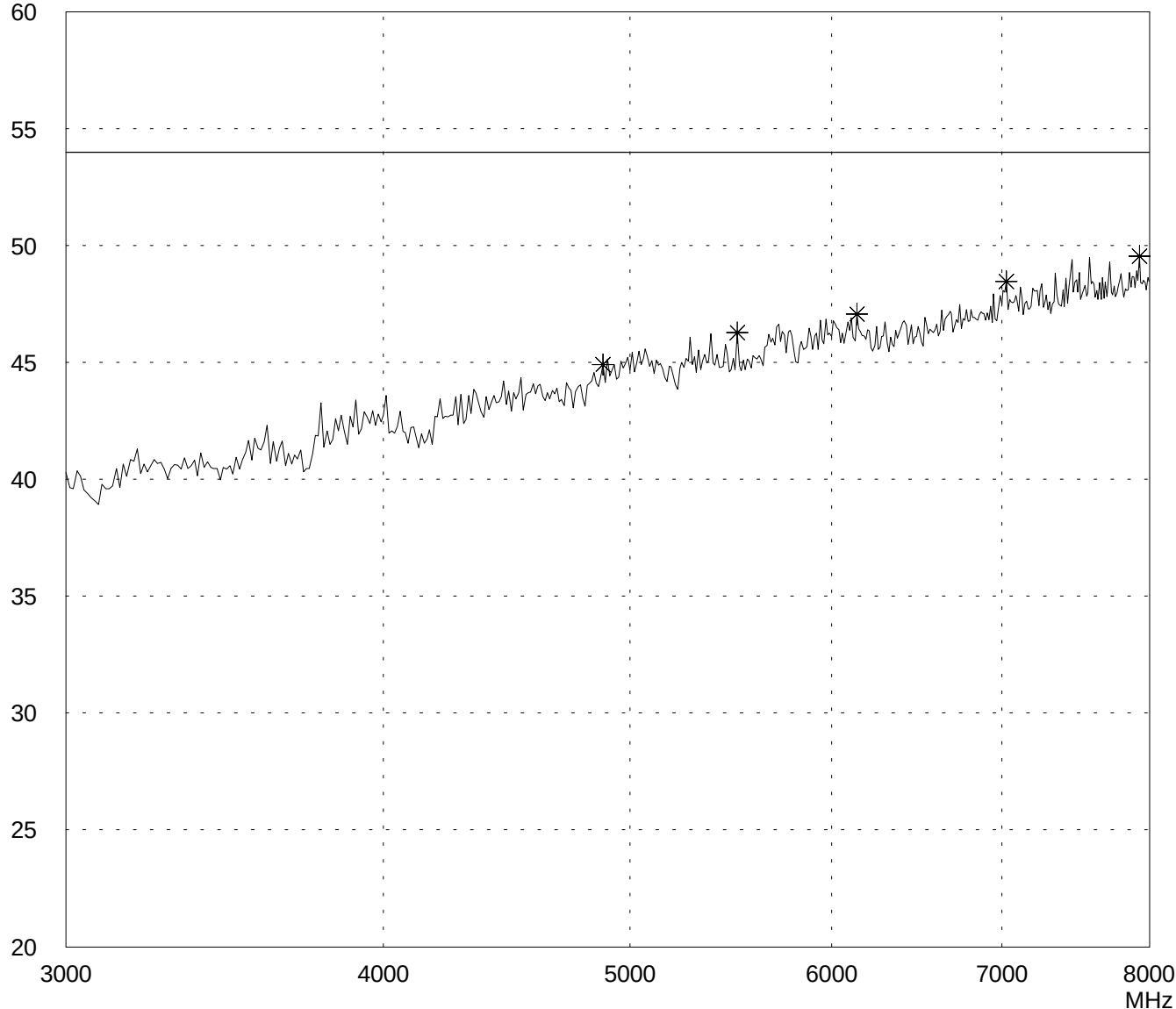
10 dB Margin

8 Subranges

dB μ V/m
60

Limit1: FCC Part 15

Transducer: EMCO 3115



Result:
Limit kept

Project file:
55503-20031

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Radiated Emission Test 8.2 GHz - 12.4 GHz acc. to FCC Part 15 (EMCO 3160)

Model:
FRH-SD07TU

Serial no.:
Sample 1

Applicant:
Futaba Corporation

Test site:
Fully anechoic room

Tested on:
**Test distance 3 metres
Horizontal Polarization**

Date of test: 02/07/2002 Operator: T. Eberl

Test performed: automatically File name: default.emi

Comment:

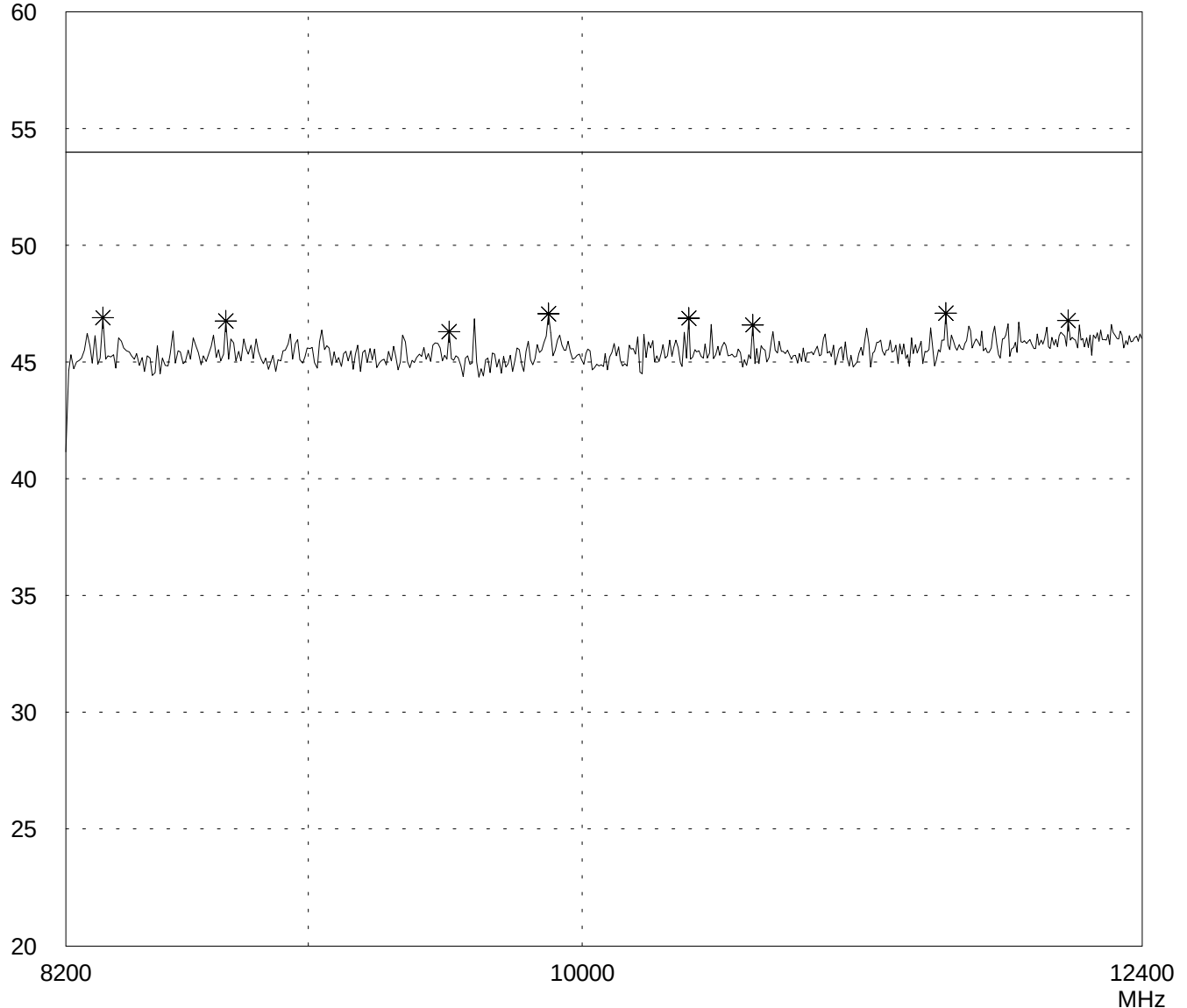
- FCC test Setup
- TX mode
- f = 2.450 GHz (CH2)
- with antenna
- EUT DC powered via interface 5.0 V DC

Detector:
Peak

List of values:
10 dB Margin 8 Subranges

dBµV/m
60

Limit1: FCC Part 15 Transducer: EMCO 3160



Result:
Limit kept

Project file:
55503-20031

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Radiated Emission Test 8.2 GHz - 12.4 GHz acc. to FCC Part 15 (EMCO 3160)

Model:
FRH-SD07TU

Serial no.:
Sample 1

Applicant:
Futaba Corporation

Test site:
Fully anechoic room

Tested on:
**Test distance 3 metres
Horizontal Polarization**

Date of test: 02/07/2002 Operator: T. Eberl

Test performed: automatically File name: default.emi

Comment:

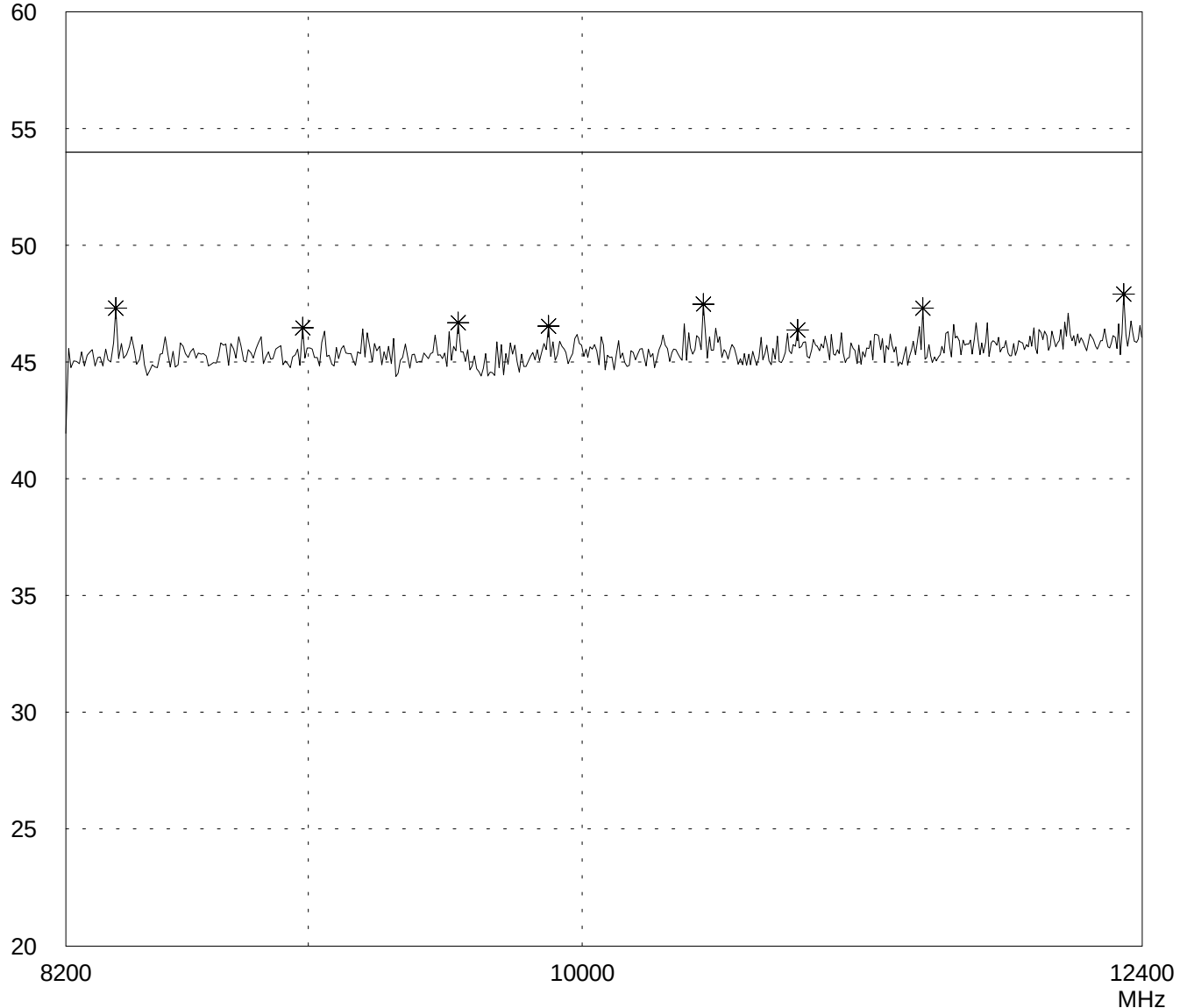
- FCC test Setup
- TX mode
- f = 2.473 GHz (CH3)
- with antenna
- EUT DC powered via interface 5.0 V DC

Detector:
Peak

List of values:
10 dB Margin 8 Subranges

dBµV/m
60

Limit1: FCC Part 15 Transducer: EMCO 3160



Result:
Limit kept

Project file:
55503-20031

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Radiated Emission Test 8.2 GHz - 12.4 GHz acc. to FCC Part 15 (EMCO 3160)

Model:
FRH-SD07TU

Serial no.:
Sample 1

Applicant:
Futaba Corporation

Test site:
Fully anechoic room

Tested on:
**Test distance 3 metres
Vertical Polarization**

Date of test: 02/07/2002 Operator: T. Eberl

Test performed: automatically File name: default.emi

Comment:

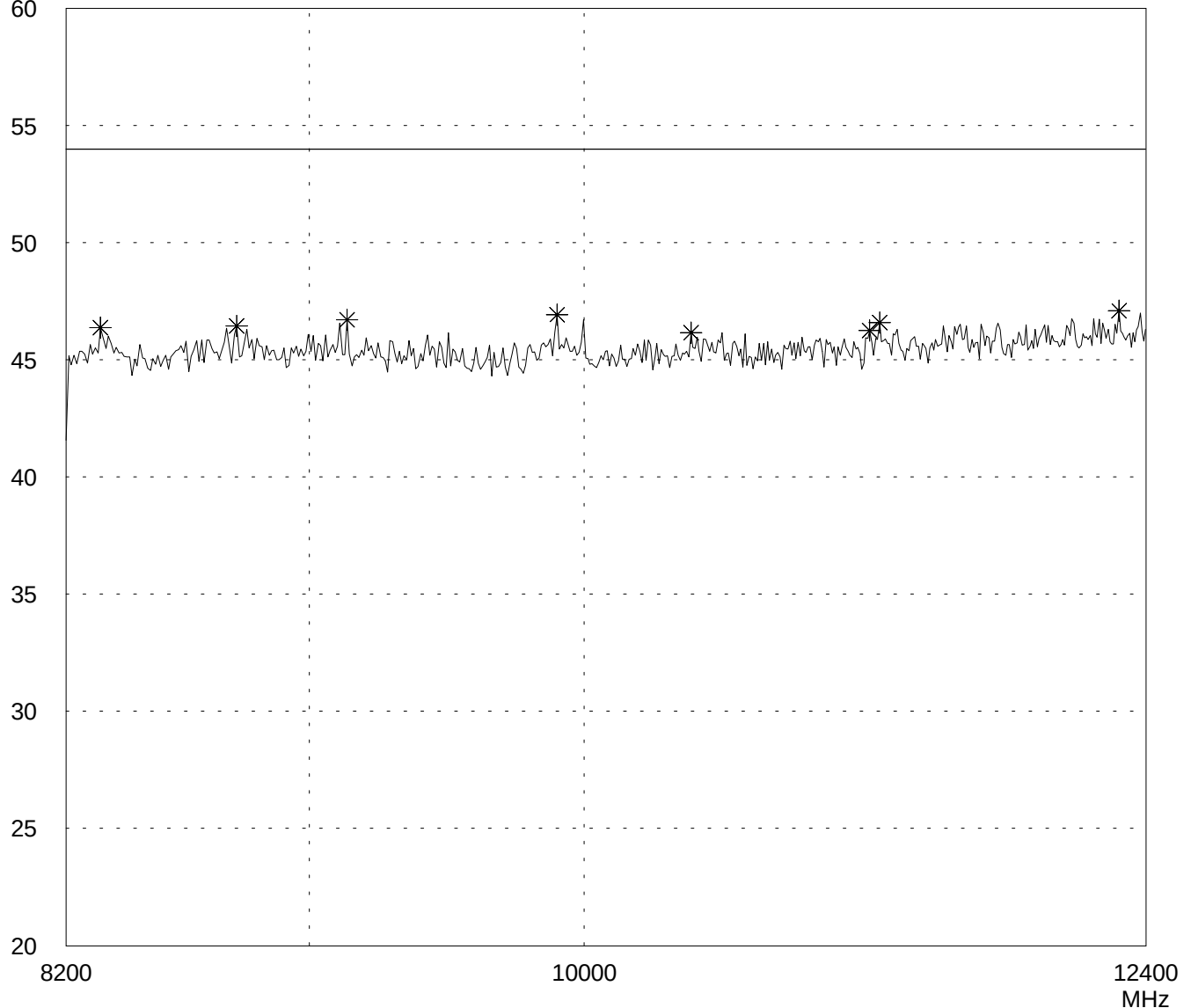
- FCC test Setup
- TX mode
- f = 2.420 GHz (CH1)
- with antenna
- EUT DC powered via interface 5.0 V DC

Detector:
Peak

List of values:
10 dB Margin 8 Subranges

dBµV/m
60

Limit1: FCC Part 15 Transducer: EMCO 3160



Result:
Limit kept

Project file:
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Radiated Emission Test 8.2 GHz - 12.4 GHz acc. to FCC Part 15 (EMCO 3160)

Model:
FRH-SD07TU

Serial no.:
Sample 1

Applicant:
Futaba Corporation

Test site:
Fully anechoic room

Tested on:
**Test distance 3 metres
Vertical Polarization**

Date of test: Operator:
02/07/2002 T. Eberl

Test performed: File name:
automatically default.emi

Comment:

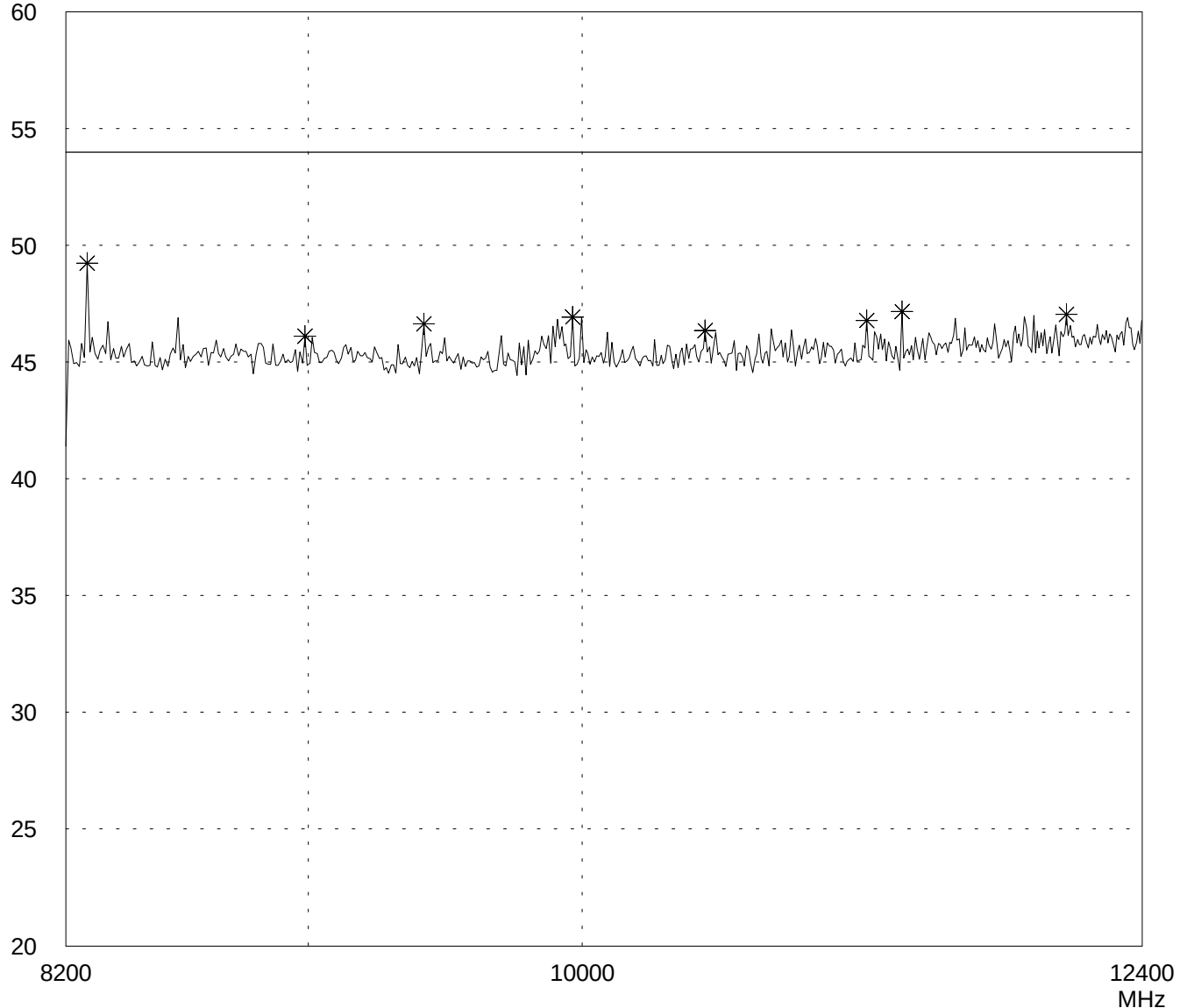
- FCC test Setup
- TX mode
- f = 2.450 GHz (CH2)
- with antenna
- EUT DC powered via interface 5.0 V DC

Detector:
Peak

List of values:
10 dB Margin 8 Subranges

dBµV/m
60

Limit1: FCC Part 15 Transducer: EMCO 3160



Result:
Limit kept

Project file:
55503-20031

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Radiated Emission Test 8.2 GHz - 12.4 GHz acc. to FCC Part 15 (EMCO 3160)

Model:
FRH-SD07TU

Serial no.:
Sample 1

Applicant:
Futaba Corporation

Test site:
Fully anechoic room

Tested on:
**Test distance 3 metres
Vertical Polarization**

Date of test:
02/07/2002

Operator:
T. Eberl

Test performed:
automatically

File name:
default.emi

Comment:

- FCC test Setup
- TX mode
- f = 2.473 GHz (CH3)
- with antenna
- EUT DC powered via interface 5.0 V DC

Detector:
Peak

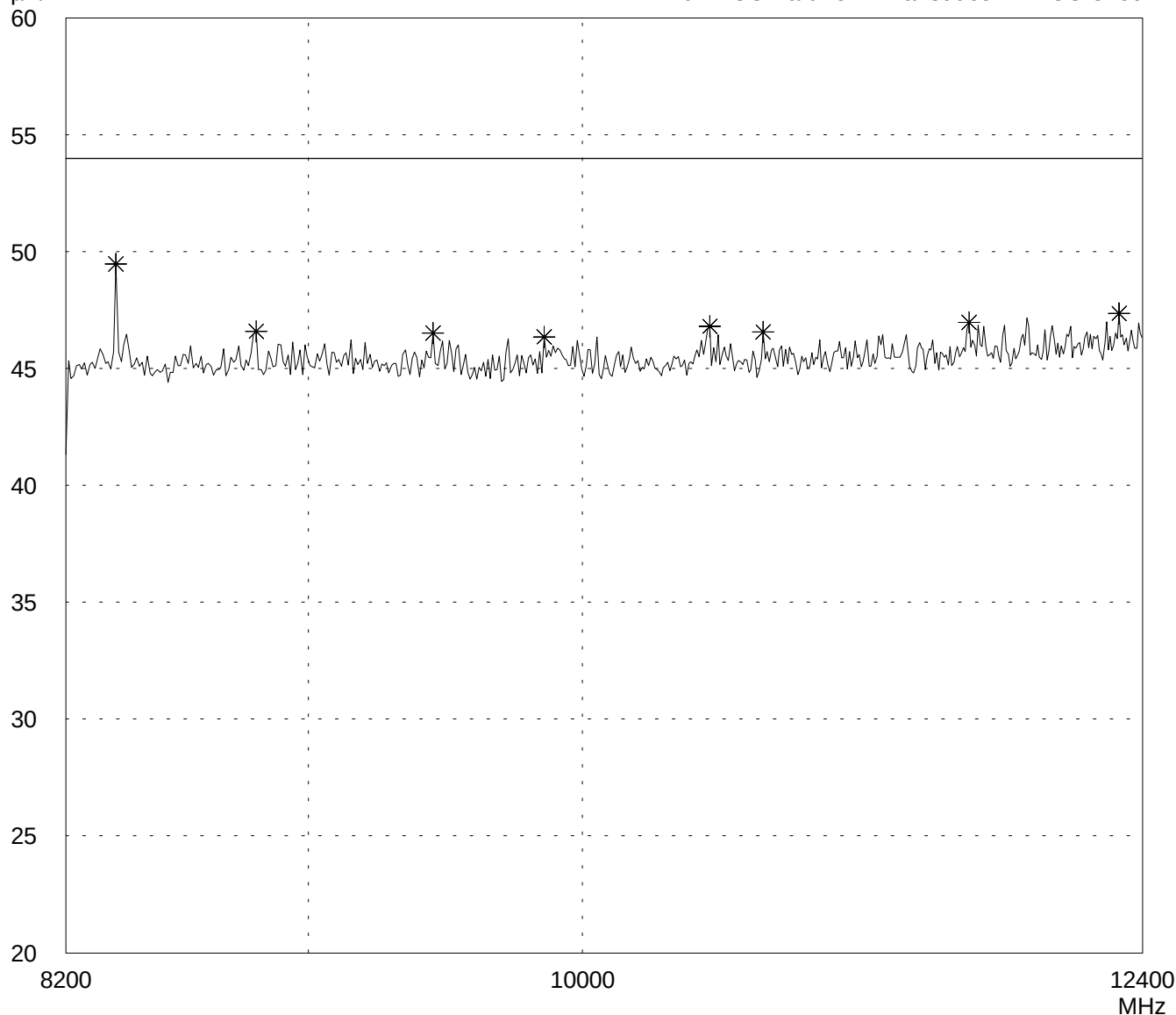
List of values:

10 dB Margin

8 Subranges

dBµV/m

Limit1: FCC Part 15 Transducer: EMCO 3160



Result:
Limit kept

Project file:
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Radiated Emission Test 30 MHz - 200 MHz acc. to FCC Part 15 (Fully Anechoic Chamber)

Model:
FRH-SD07TU

Serial no.:
Sample 1

Applicant:
Futaba Corporation

Test site:
Fully anechoic room

Tested on:
Test distance 3 metres
Horizontal Polarization

Date of test: 02/06/2002
Operator: T. Eberl

Test performed: automatically
File name: default.emi

Comment:

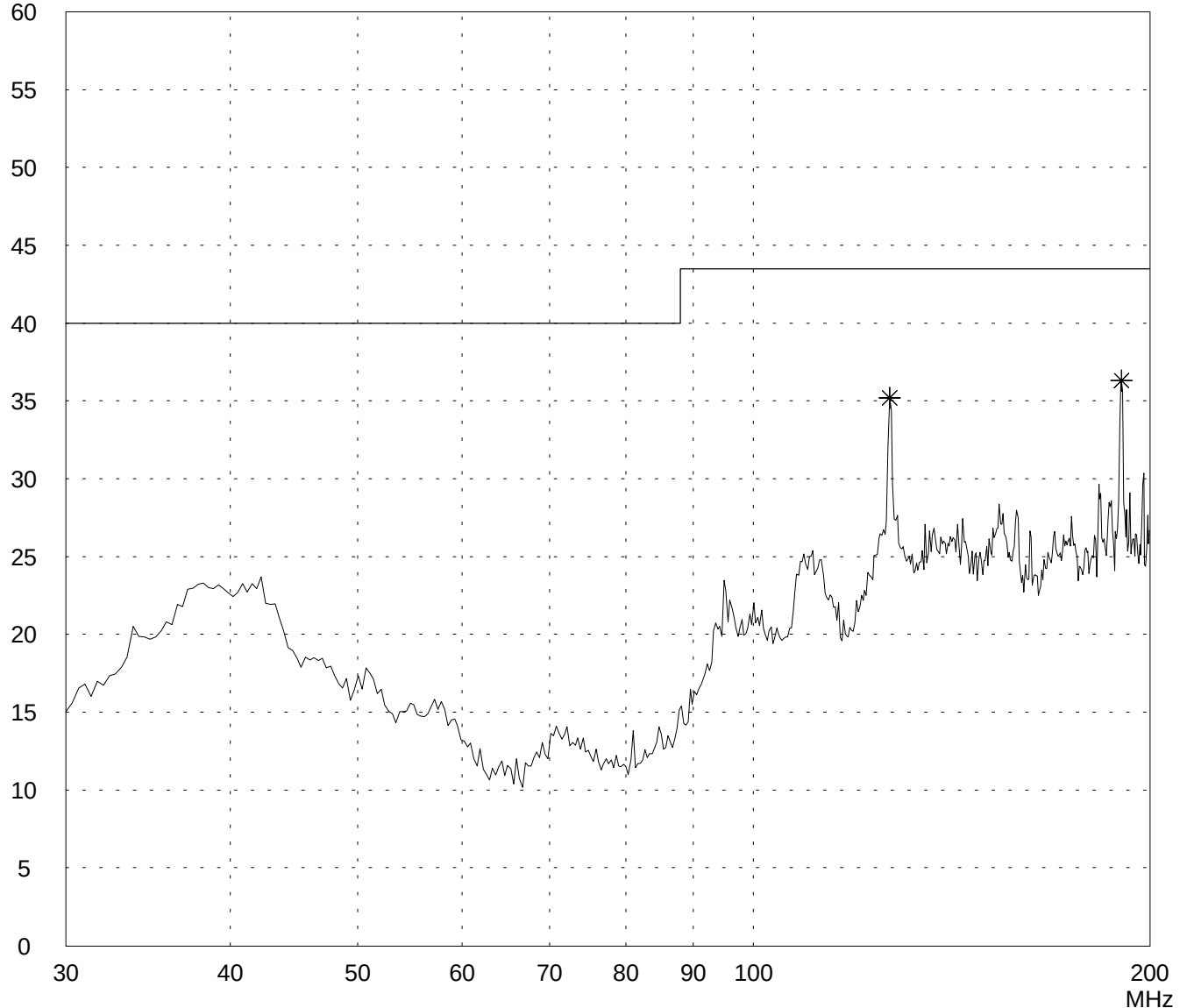
- FCC test setup
- RX mode
- f = 2.450 GHz (CH2)
- with antenna
- EUT DC powered via interface 5.0 V DC

Detector:
Peak

List of values:
10 dB Margin 50 Subranges

dB μ V/m
60

Limit1: FCC Part 15 Transducer: HK 116 (Inv 1560)



Result:
Prescan

Project file:
55503-20031

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Radiated Emission Test 30 MHz - 200 MHz acc. to FCC Part 15 (Fully Anechoic Chamber)

Model:
FRH-SD07TU

Serial no.:
Sample 1

Applicant:
Futaba Corporation

Test site:
Fully anechoic room

Tested on:
**Test distance 3 metres
Vertical Polarization**

Date of test:
02/06/2002

Operator:
T. Eberl

Test performed:
automatically

File name:
default.emi

Comment:

- FCC test setup
- RX mode
- f = 2.450 GHz (CH2)
- with antenna
- EUT DC powered via interface 5.0 V DC

Detector:
Peak

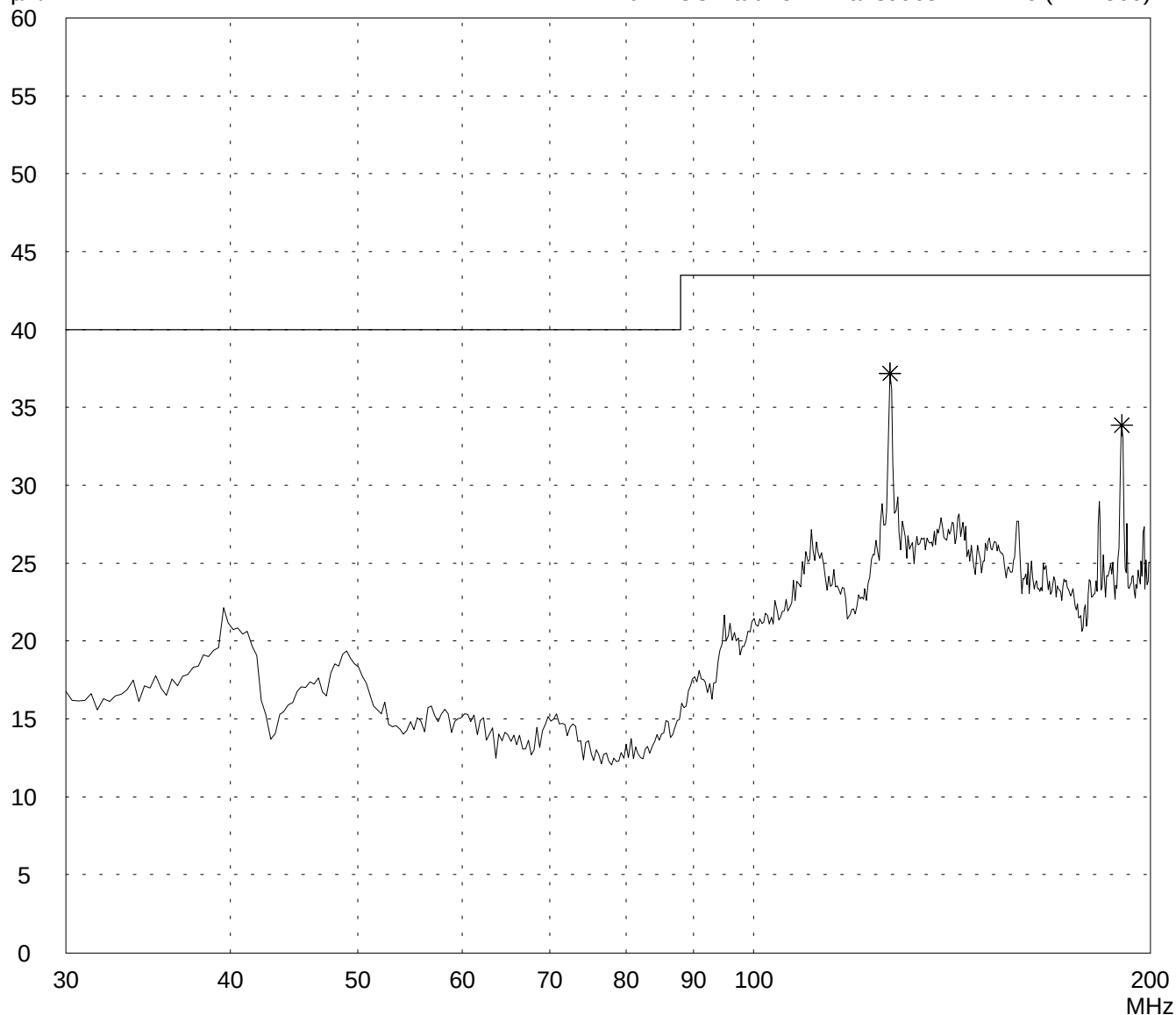
List of values:

10 dB Margin

50 Subranges

dB μ V/m

Limit1: FCC Part 15 Transducer: HK 116 (Inv 1560)



Result:
Prescan

Project file:
55503-20031

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Radiated Emission Test 200 MHz - 1 GHz acc. to FCC Part 15 (Fully Anechoic Chamber)

Model:
FRH-SD07TU

Serial no.:
Sample 1

Applicant:
Futaba Corporation

Test site:
Fully anechoic room

Tested on:
**Test distance 3 metres
Horizontal Polarization**

Date of test: 02/06/2002 Operator: T. Eberl

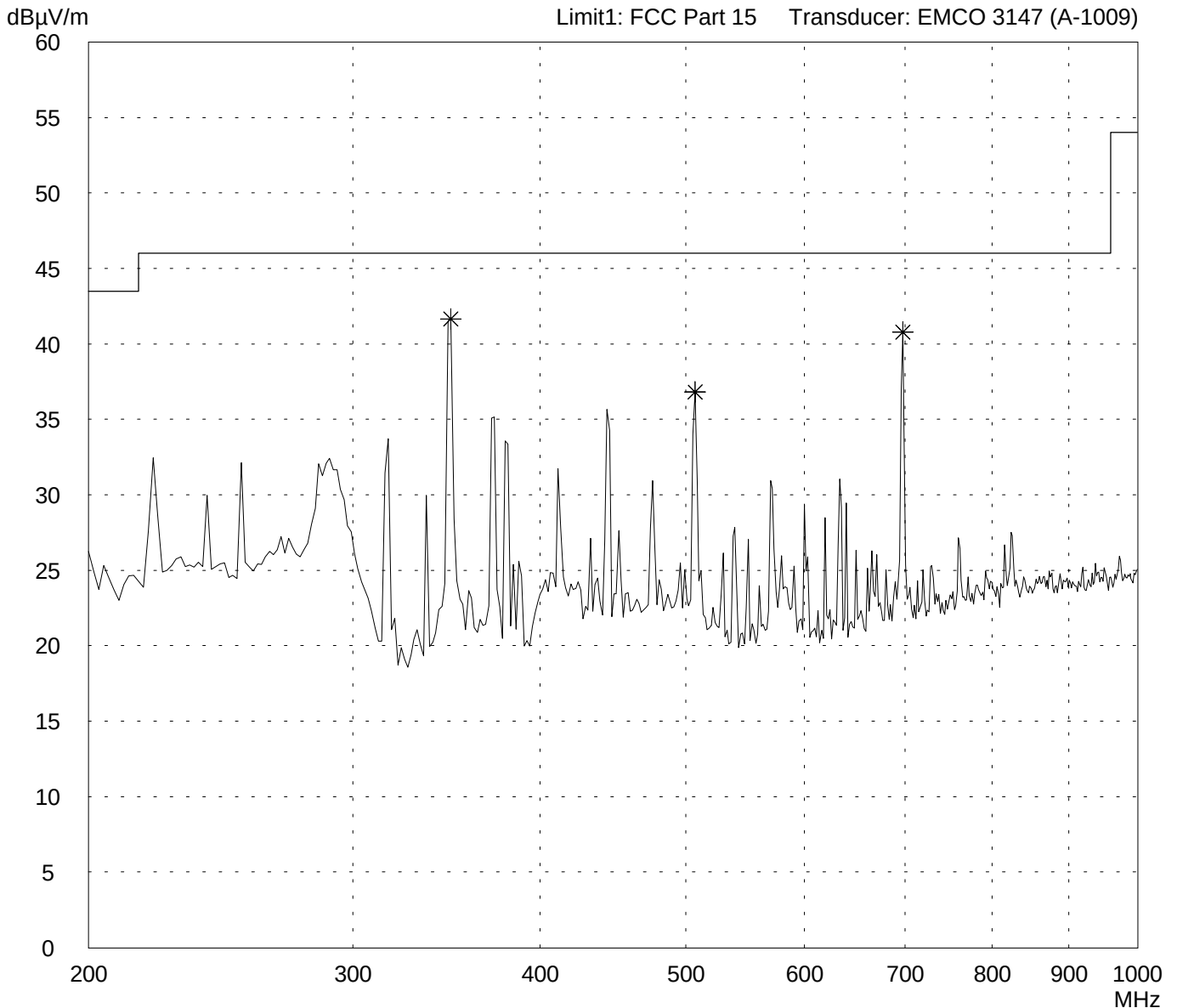
Test performed: automatically File name: default.emi

Comment:

- FCC test setup
- RX mode
- f = 2.450 GHz (CH2)
- with antenna
- EUT DC powered via interface 5.0 V DC

Detector:
Peak

List of values:
10 dB Margin 50 Subranges



Result:
Prescan

Project file:
55503-20031

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Radiated Emission Test 200 MHz - 1 GHz acc. to FCC Part 15 (Fully Anechoic Chamber)

Model:
FRH-SD07TU

Serial no.:
Sample 1

Applicant:
Futaba Corporation

Test site:
Fully anechoic room

Tested on:
**Test distance 3 metres
Vertical Polarization**

Date of test:
02/06/2002

Operator:
T. Eberl

Test performed:
automatically

File name:
default.emi

Comment:

- FCC test setup
- RX mode
- f = 2.450 GHz (CH2)
- with antenna
- EUT DC powered via interface 5.0 V DC

Detector:
Peak

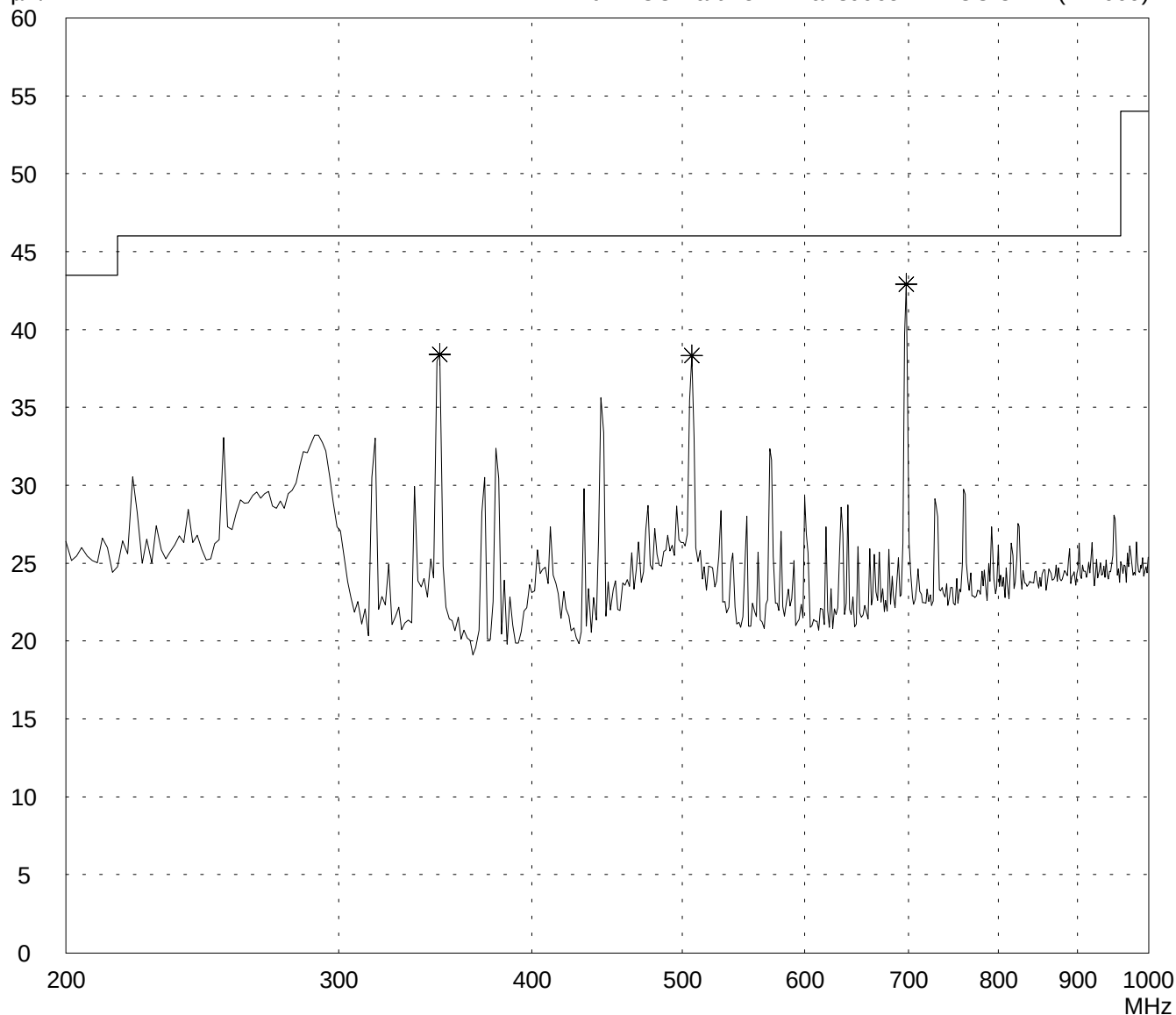
List of values:

10 dB Margin

50 Subranges

dB μ V/m

Limit1: FCC Part 15 Transducer: EMCO 3147 (A-1009)



Result:
Prescan

Project file:
55503-20031

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Radiated Emission Test 1 GHz - 8 GHz acc. to FCC Part 15 (Fully Anechoic Chamber)

Model:
FRH-SD07TU

Serial no.:
Sample 1

Applicant:
Futaba Corporation

Test site:
Fully anechoic room

Tested on:
**Test distance 3 metres
Horizontal Polarization**

Date of test:
02/07/2002

Operator:
T. Eberl

Test performed:
automatically

File name:
default.emi

Comment:

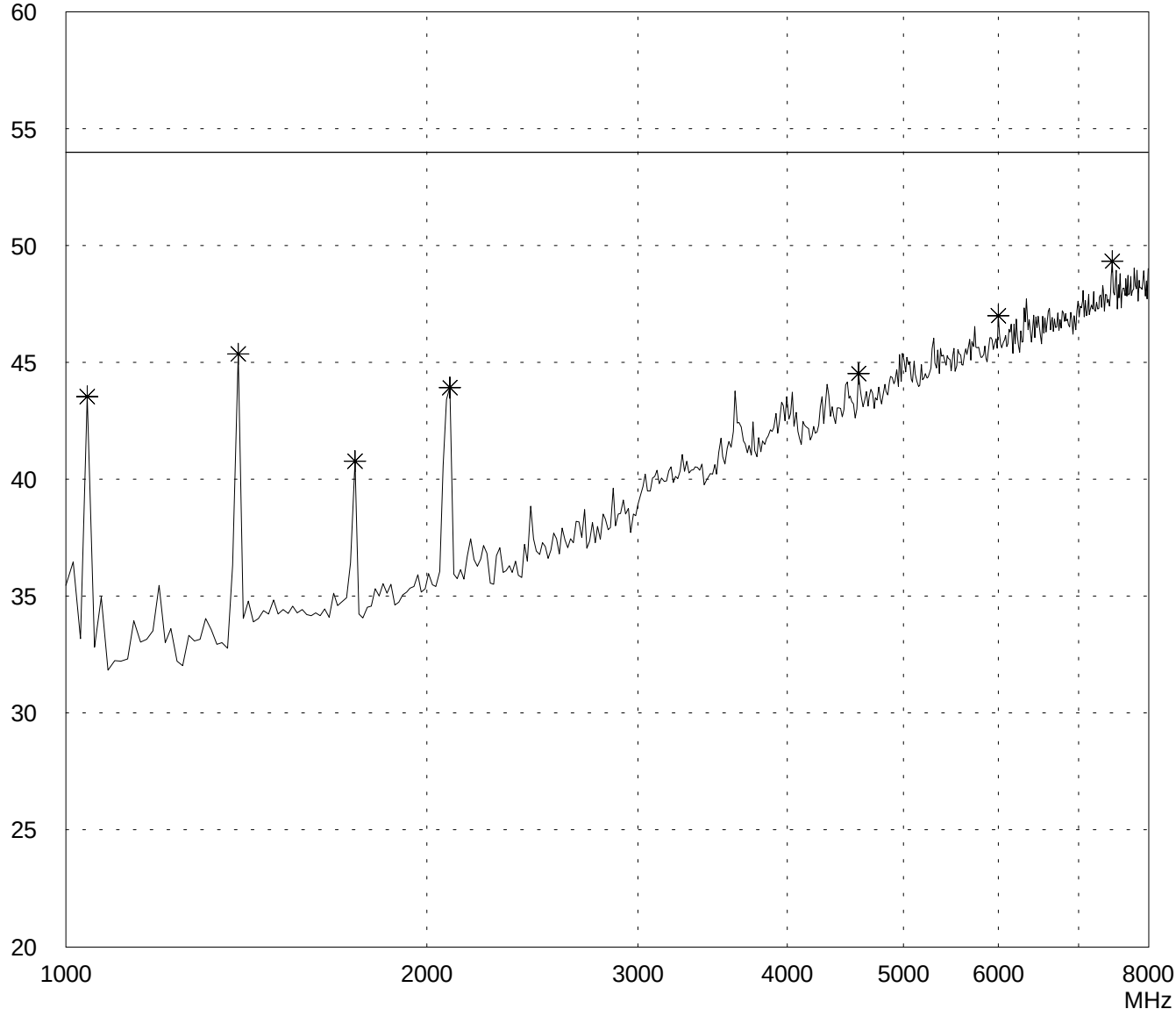
- FCC test Setup
- RX mode
- f = 2.450 GHz (CH2)
- with antenna
- EUT DC powered via interface 5.0 V DC

Detector:
Peak

List of values:
Selected by hand

dBμV/m
60

Limit1: FCC Part 15 Transducer: EMCO 3115



Result:
Limit kept

Project file:
55503-20031

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Radiated Emission Test 1 GHz - 8 GHz acc. to FCC Part 15 (Fully Anechoic Chamber)

Model:
FRH-SD07TU

Serial no.:
Sample 1

Applicant:
Futaba Corporation

Test site:
Fully anechoic room

Tested on:
**Test distance 3 metres
Vertical Polarization**

Date of test:
02/07/2002

Operator:
T. Eberl

Test performed:
automatically

File name:
default.emi

Comment:

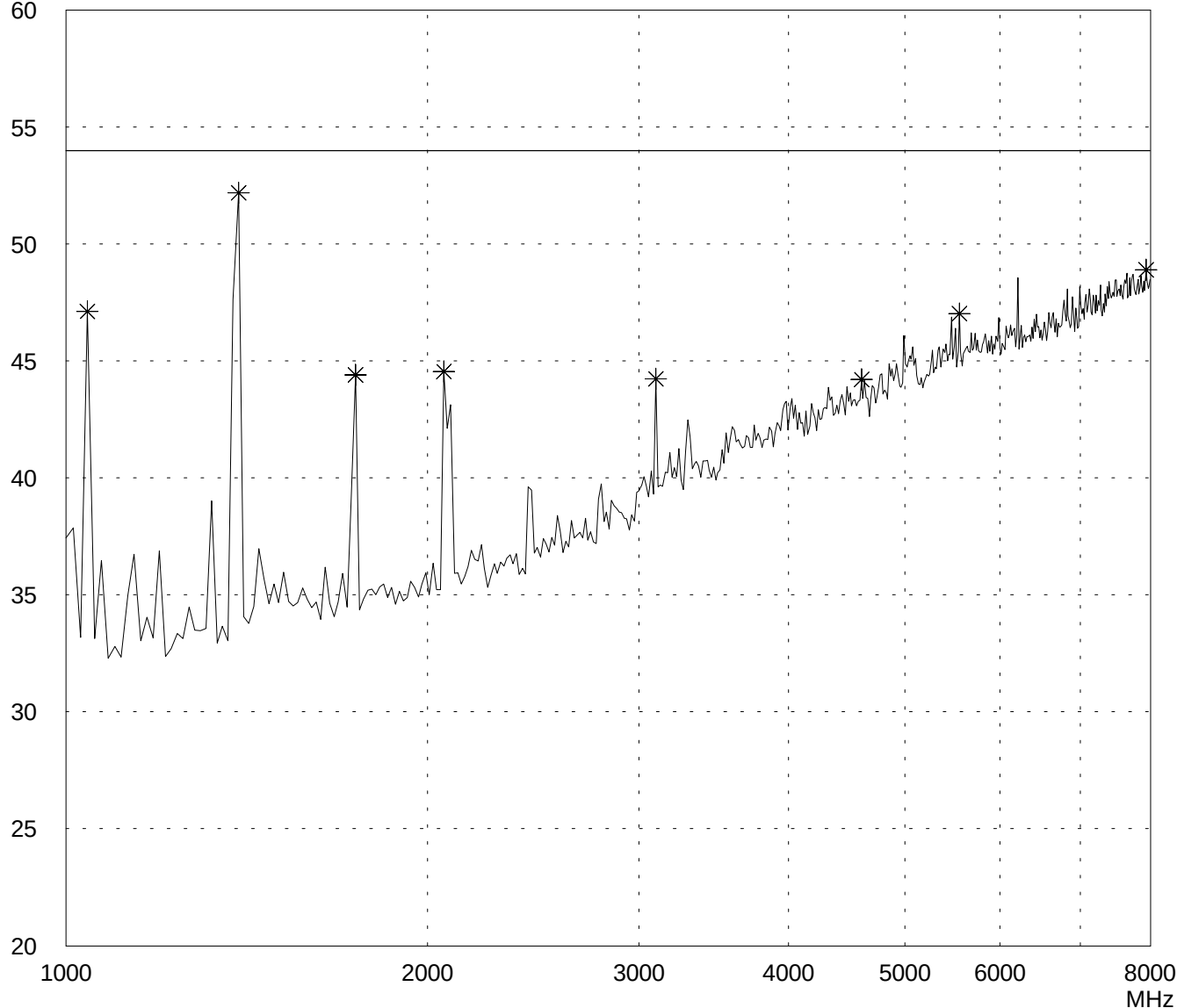
- FCC test Setup
- RX mode
- f = 2.450 GHz (CH2)
- with antenna
- EUT DC powered via interface 5.0 V DC

Detector:
Peak

List of values:
Selected by hand

dBμV/m
60

Limit1: FCC Part 15 Transducer: EMCO 3115



Result:
Limit kept

Project file:
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Radiated Emission Test 8.2 GHz - 12.4 GHz acc. to FCC Part 15 (EMCO 3160)

Model:
FRH-SD07TU

Serial no.:
Sample 1

Applicant:
Futaba Corporation

Test site:
Fully anechoic room

Tested on:
**Test distance 3 metres
Horizontal Polarization**

Date of test: Operator:
02/07/2002 T. Eberl

Test performed: File name:
automatically default.emi

Comment:

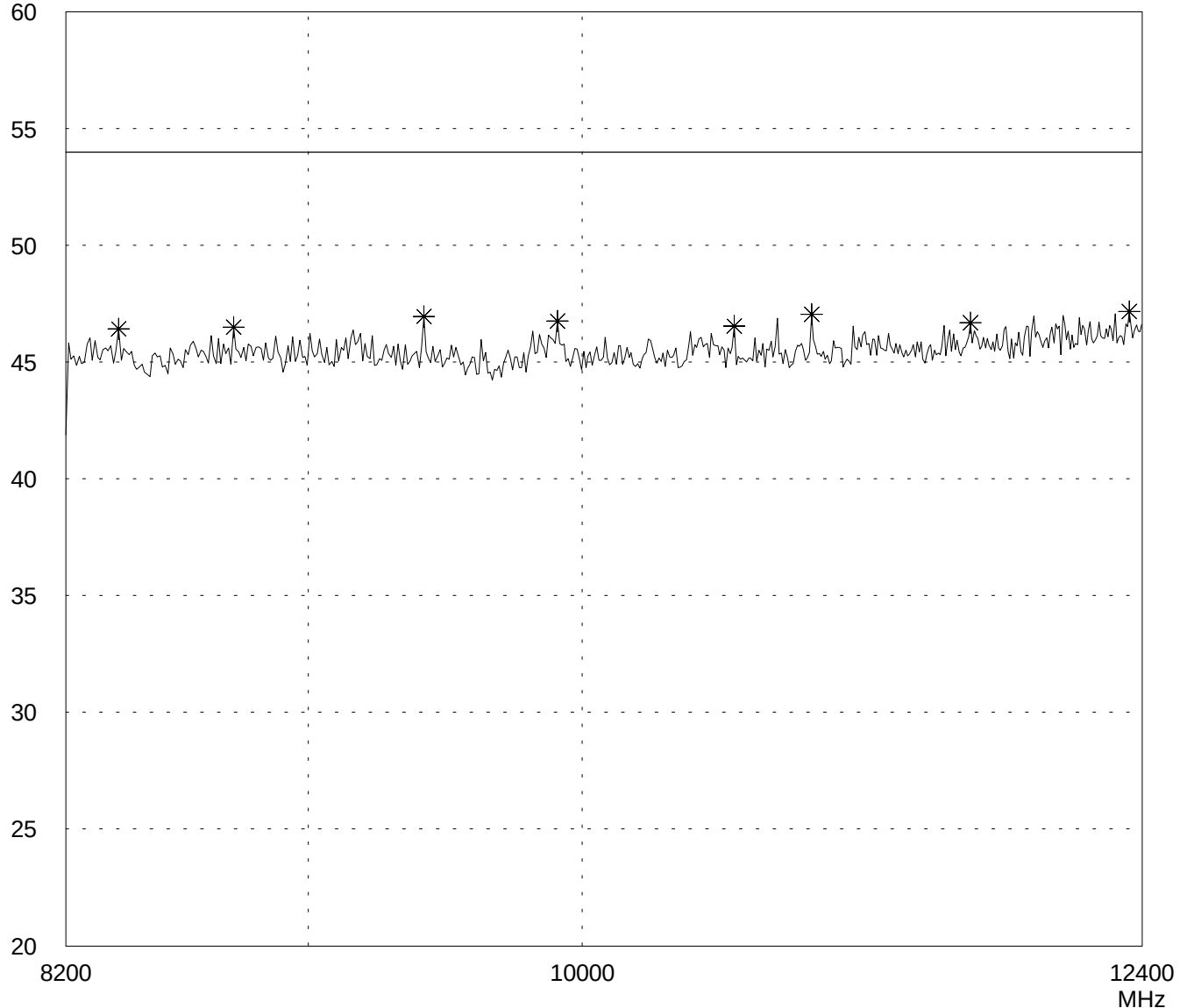
- FCC test Setup
- RX mode
- f = 2.450 GHz (CH2)
- with antenna
- EUT DC powered via interface 5.0 V DC

Detector:
Peak

List of values:
10 dB Margin 8 Subranges

dBµV/m
60

Limit1: FCC Part 15 Transducer: EMCO 3160



Result:
Limit kept

Project file:
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Radiated Emission Test 8.2 GHz - 12.4 GHz acc. to FCC Part 15 (EMCO 3160)

Model:
FRH-SD07TU

Serial no.:
Sample 1

Applicant:
Futaba Corporation

Test site:
Fully anechoic room

Tested on:
**Test distance 3 metres
Vertical Polarization**

Date of test: 02/07/2002 Operator: T. Eberl

Test performed: automatically File name: default.emi

Comment:

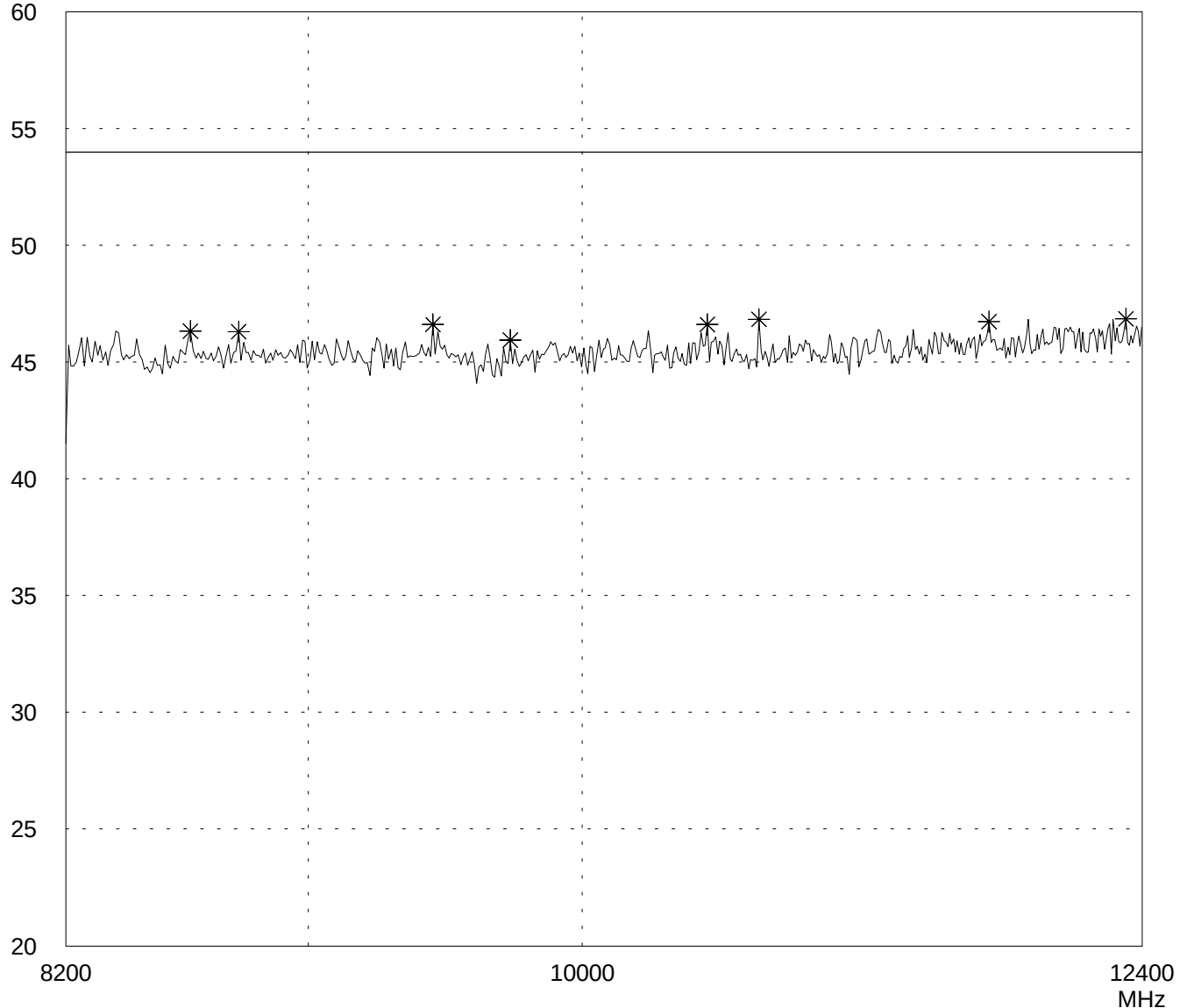
- FCC test Setup
- RX mode
- f = 2.450 GHz (CH2)
- with antenna
- EUT DC powered via interface 5.0 V DC

Detector:
Peak

List of values:
10 dB Margin 8 Subranges

dBµV/m
60

Limit1: FCC Part 15 Transducer: EMCO 3160



Result:
Limit kept

Project file:
55503-20031

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Radiated Emission Test 12.4 GHz - 18 GHz acc. to FCC Part 15 (EMCO 3160)

Model:
FRH-SD07TU

Serial no.:
Sample 1

Applicant:
Futaba Corporation

Test site:
Fully anechoic room

Tested on:
**Test distance 3 metres
Horizontal Polarization**

Date of test: Operator:
02/07/2002 T. Eberl

Test performed: File name:
automatically default.emi

Comment:

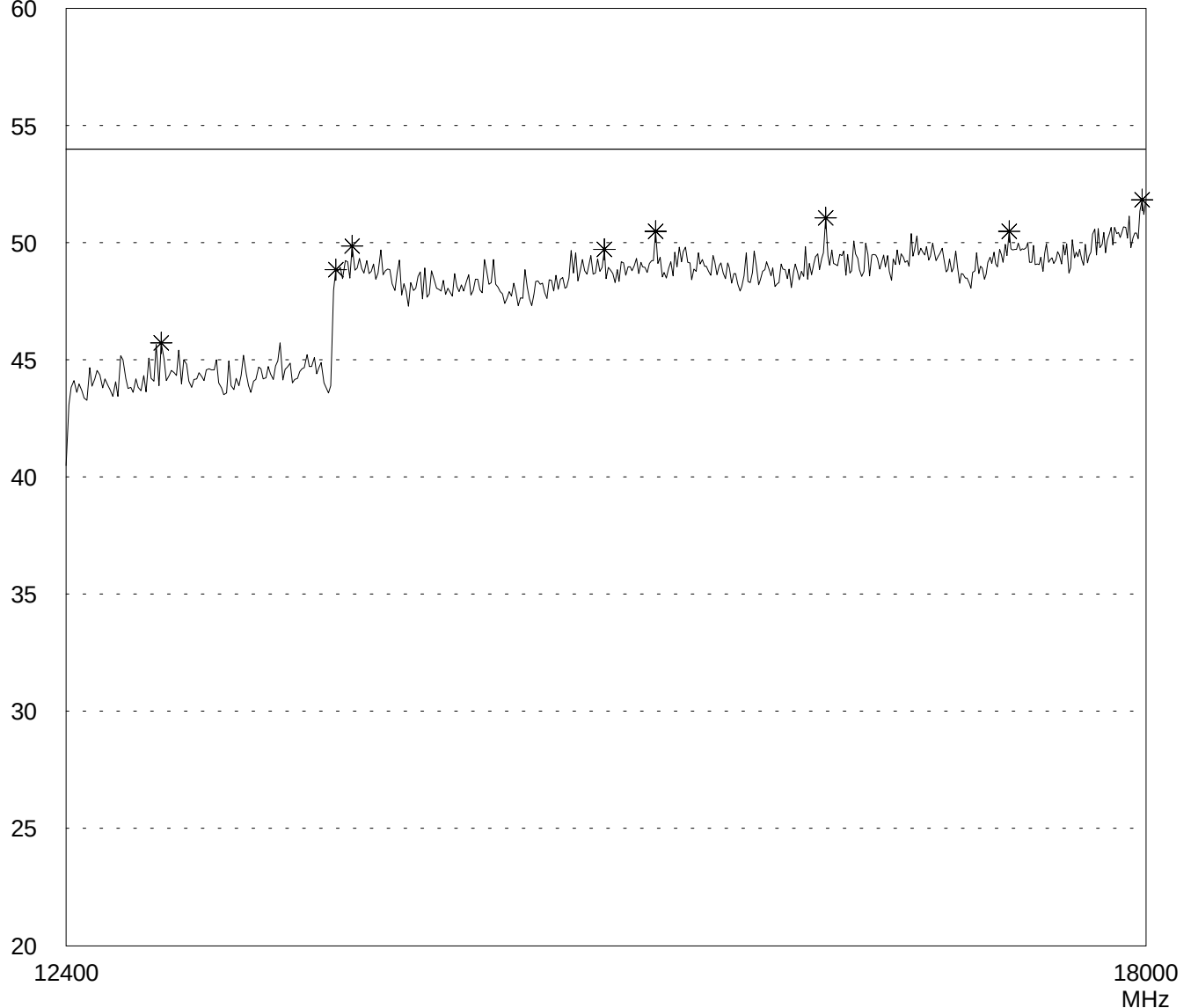
- FCC test Setup
- RX mode
- f = 2.450 GHz (CH2)
- with antenna
- EUT DC powered via interface 5.0 V DC

Detector:
Peak

List of values:
10 dB Margin 8 Subranges

dBµV/m
60

Limit1: FCC Part 15 Transducer: EMCO 3160



Result:
Limit kept

Project file:
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Radiated Emission Test 12.4 GHz - 18 GHz acc. to FCC Part 15 (EMCO 3160)

Model:
FRH-SD07TU

Serial no.:
Sample 1

Applicant:
Futaba Corporation

Test site:
Fully anechoic room

Tested on:
**Test distance 3 metres
Vertical Polarization**

Date of test: Operator:
02/07/2002 T. Eberl

Test performed: File name:
automatically default.emi

Comment:

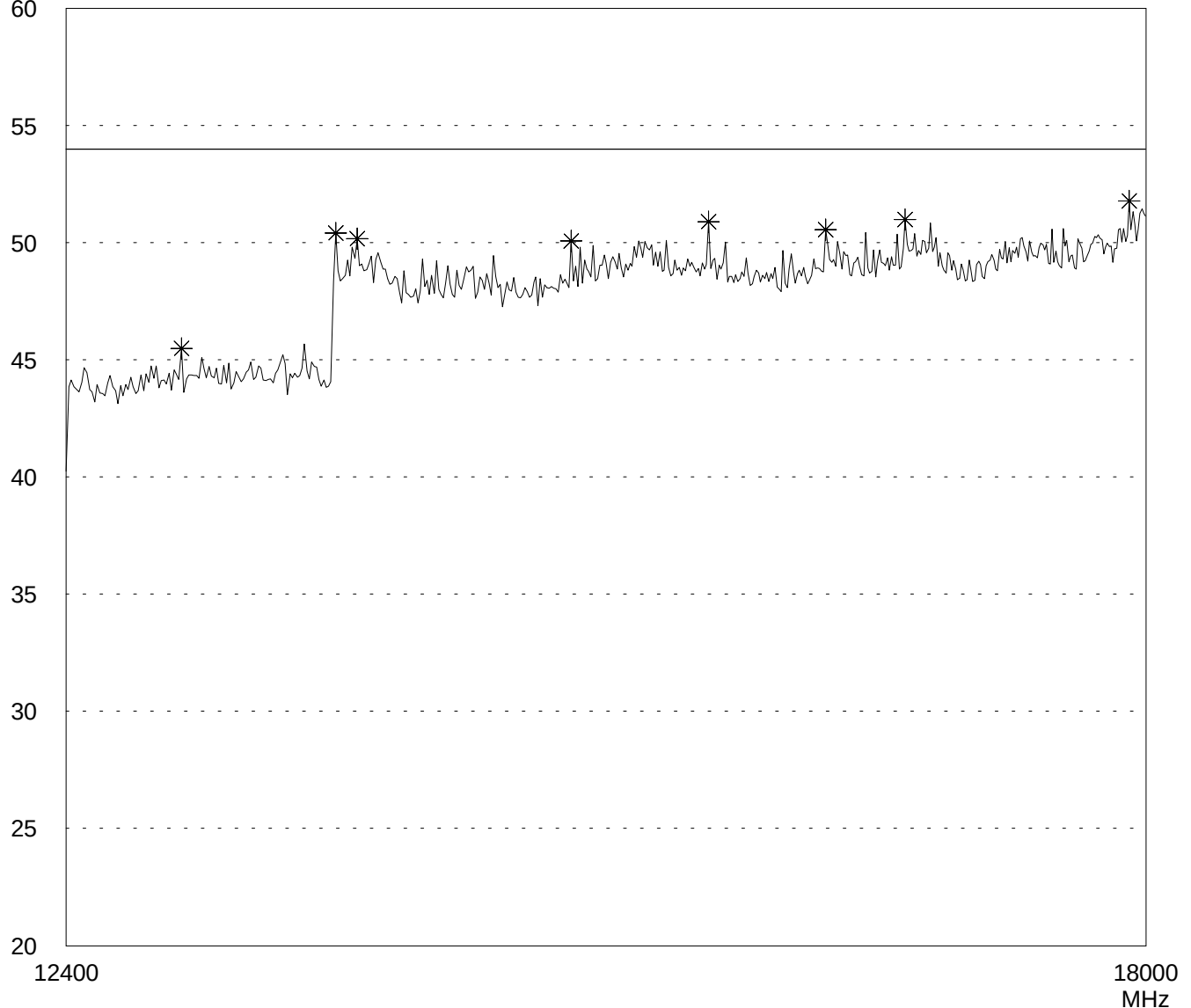
- FCC test Setup
- RX mode
- f = 2.450 GHz (CH2)
- with antenna
- EUT DC powered via interface 5.0 V DC

Detector:
Peak

List of values:
10 dB Margin 8 Subranges

dBµV/m
60

Limit1: FCC Part 15 Transducer: EMCO 3160



Result:
Limit kept

Project file:
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