

FCC Part 15 Subpart B&C §15.249

Test Report

Equipment Under Test	Receiver
Model Name	AA-SM0P25B(Basic model) AA-SM0P20W(Variant model)
Serial Number	Z4E0001
FCC ID	P5A-AA-SM0P25BR
Applicant	ARESON TECHNOLOGY CORP.
Manufacturer	ARESON TECHNOLOGY CORP.
Date of Test(s)	2010.06.24 ~ 2010.07.14
Date of Issue	2010.07.30

In the configuration tested, the EUT complied with the standards specified above.

Issue to	Issue by
ARESON TECHNOLOGY CORP. 11F, No. 646, Sec. 5, Chongsin RD., San Chong 241, Taipei County, Taiwan, R.O.C Tel.: 886-911-018833	MOVON CORPORATION 194-1, Geumeo-ri, Pogok-eup, Cheoin-gu, Yongin-si, Gyeonggi-do, Korea, 449-812 Tel.: +82 +31 338 8837 Fax: +82 +31 338 8847

Revision history

Revision	Date of issue	Description	Revised by
--	July 22, 2010	Initial	--
1	July 30, 2010	FCC ID was correct	Ted Lee

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1. Attestation of test results

1.1. Details of applicant

Applicant : ARESON TECHNOLOGY CORP.
 Address : 11F, No. 646, Sec. 5, Chongsin RD., San Chong 241, Taipei County, Taiwan, R.O.C
 Contact person : Amy Chang
 Telephone : 886-911-018833

1.2. Summary of test results

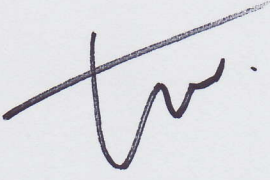

The EUT has been tested according to the following specifications;

Section in FCC part 15	Description	Result
15.209(a) 15.249(a) 15.249(d) 15.205	Fundamental, Spurious emission and edge band radiated emission	C
15.107(a)	Conducted power line test	C

※ **Abbreviation**

C Complied
 N/A Not applicable
 F Fail

Approval signatories

Test and report completed by :	Report approval by :
	
Ted Lee Test Engineer MOVON CORPORATION	Geoffrey Do Technical Manager MOVON CORPORATION

2. EUT Description

Kind of product	Receiver
Model	AA-SM0P25B(Basic model), AA-SM0P20W(Variant model)
Serial number	N/A
Power supply	DC 5.0 V
Frequency range	2 402 MHz ~ 2 479 MHz
Modulation technique	GFSK
Number of channels	16
Operating conditions	- 20 °C ~ + 55 °C
Antenna gain	- 0.31 dBi(Max.)

3. Measurement equipment

Equipment	Manufacturer	Model	Calibration due.
EMI Test Receiver	R&S	ESIB26	2010-12-28
Signal Generator	R&S	SMR27	2011-01-07
Spectrum Analyzer	R&S	FSV-40	2010-10-23
Power Meter	Agilent	E4416A	2010-11-26
Power Sensor	Agilent	9327A	2010-11-26
Horn Antenna	R&S	100236	2010-12-18
Bi-log Antenna	A.H. SYSTEM	SAS-521-7	2011-10-08
Power Amplifier	MITEQ	AM-1431	2011-01-07
Power Amplifier	MITEQ	AFS43-01002600	2011-01-07
High Pass Filter	Wainwright	WHK3.0/18G-10SS	2010-11-26
Bluetooth Tester	TESCOM	TC-3000B	2010-11-26
Directional Coupler	Narda	26733	2010-11-26
Controller	INNCO	CO2000	N/A
Antenna Master	INNCO	MA4000	N/A
LISN	R&S	ESH3-Z5	2010-11-01
Shielded Room	8m(W)X6m(L)X3.3m(H)	N/A	N/A

※ Remark

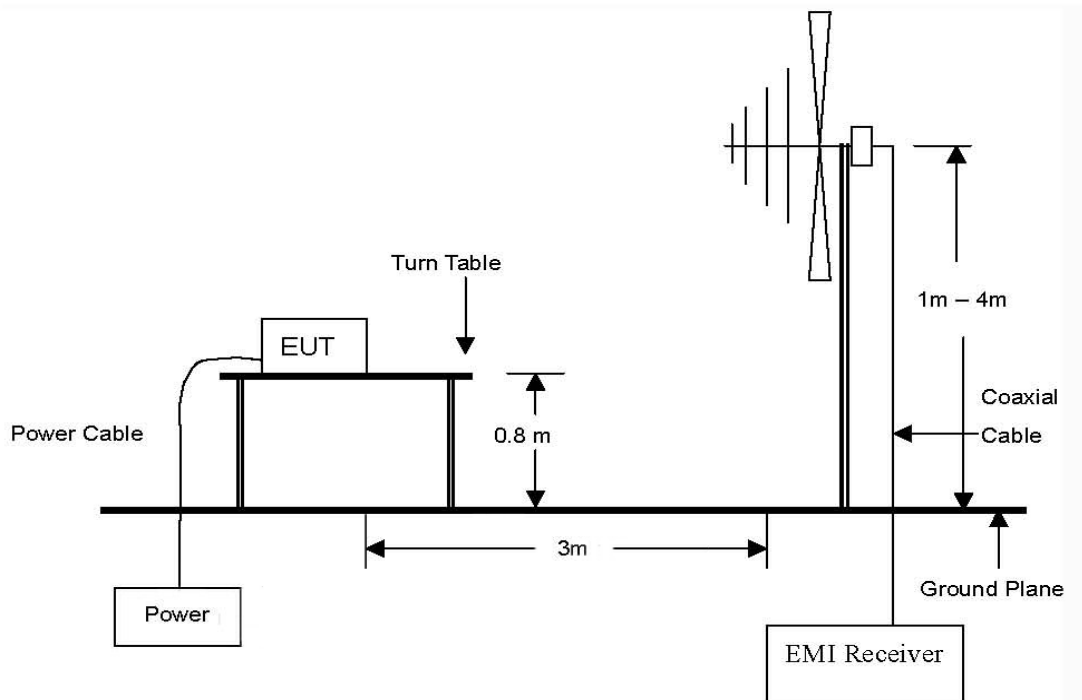
Support equipment

Description	Manufacturer	Model	Serial number
Notebook Computer	lenovo	S10-2	CBK0434403
Notebook Computer	Samsung Electronics Co., Ltd	NT-R70	BD2993AQ2021R

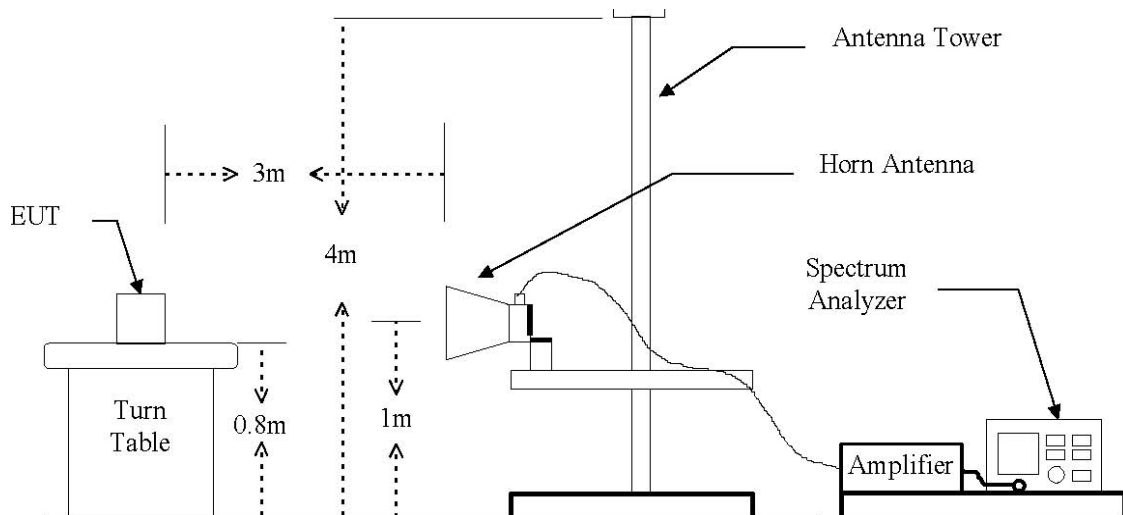
4. Fundamental, spurious emission and edge band radiated emission

4.1. Test setup

The diagram below shows the test setup that is utilized to make the measurements for emission from 30 MHz to 1 GHz emissions.



The diagram below shows the test setup that is utilized to make the measurements for emission from 1 GHz to 24 GHz emissions.



4.2. Test procedures

Radiated emissions from the EUT were measured according to the dictates of ANSI C63.4:2003

4.2.1. Test procedures for radiated spurious emissions

1. The EUT was placed on the top of a rotating table 0.8 meters above the ground at a 3 meter anechoic chamber test site. The table was rotated 360 degrees to determine the position of the highest radiation.
2. During performing radiated emission below 1 GHz, the EUT was set 3 meters away from the interference receiving antenna, which was mounted on the top of a variable-height antenna tower. During performing radiated emission above 1 GHz, the EUT was set 3 meters away from the interference-receiving antenna.
3. The antenna is a broadband antenna, and its height is varied from one meter to four meters above the ground to determine the maximum value of the field strength. Both horizontal and vertical polarizations of the antenna are set to make the measurement.
4. For each suspected emission, the EUT was arranged to its worst case and then the antenna was tuned to heights from 1 meter to 4 meters and the table was turned from 0 degrees to 360 degrees to find the maximum reading.
5. The test-receiver system was set to Peak Detect Function and Specified Bandwidth with Maximum Hold Mode.
6. If the emission level of the EUT in peak mode was 10 dB lower than the limit specified, then testing could be stopped and the peak values of the EUT would be reported. Otherwise the emissions that did not have 10 dB margin would be re-tested one by one using peak, quasi-peak or average method as specified and then reported in a data sheet.

※ Remark

1. The resolution bandwidth and video bandwidth of test receiver/spectrum analyzer is 120 kHz for Peak detection (PK) or Quasi-peak detection (QP) at frequency below 1 GHz.
2. The resolution bandwidth and video bandwidth of test receiver/spectrum analyzer is 1 MHz for Peak detection and frequency above 1 GHz.
3. The resolution bandwidth of test receiver/spectrum analyzer is 1 MHz and the video bandwidth is 10 Hz for Average detection (AV) at frequency above 1 GHz.

4.3. Limit

In the section 15.249(a) :

Except as provided in paragraph (b) of this section, the field strength of emissions from intentional radiators operated within these frequency bands shall comply with the following:

Fundamental frequency	Field strength of fundamental (mV/m)	Field strength of harmonics (μ V/m)
902 ~ 928 MHz	50	500
2 400 ~ 2 483.5 MHz	50	500
5 725 ~ 5 875 MHz	50	500
24.0 ~ 24.25 GHz	250	2 500

Except as provided elsewhere in this Subpart, the emissions from an intentional radiator shall not exceed the field strength levels specified in the following table:

Fundamental frequency (MHz)	Field strength (μ V/m)	Measurement distance (m)
30 ~ 88	100*	3
88 ~ 216	150*	3
216 ~ 960	200*	3
Above 960	500	3

Remark:

Except as provided in paragraph (g), fundamental emissions from intentional radiators operating under this Section shall not be located in the frequency bands 54 - 72 MHz, 76 - 88 MHz, 174 - 216 MHz or 470 - 806 MHz. However, operation within these frequency bands is permitted under other sections of this Part, e.g., Sections 15.231 and 15.241.

In the above emission table, the tighter limit applies at the band edges.

Fundamental frequency (MHz)	Field strength (μ V/m at 3 meter)	Field strength (dB μ V/m at 3 meter)
30 ~ 88	100	40
88 ~ 216	150	43.5
216 ~ 960	200	46
Above 960	500	54

4.4. Test results

Ambient temperature: 23 °C
Relative humidity: 46 % R.H.

4.4.1. Below 1 000 MHz

The frequency spectrum from 30 MHz to 1 000 MHz was investigated. Emission levels are not reported much lower than the limits by over 30 dB. All reading values are peak values.

Radiated emissions			Ant.	Correction factors		Total	Limit	
Frequency (MHz)	Reading (dBµV)	Detector mode	Pol.	Ant. factor (dB/m)	Amp + CL (dB)	Actual (dBµV/m)	Limit (dBµV/m)	Margin (dB)
Below 1 000	Not Detected							

※ Remark

1. All spurious emission at channels are almost the same below 1 GHz, so that middle channel was chosen at representative in final test.
2. Actual = Reading + Ant. factor + Amp + CL (Cable loss)

4.4.2. Above 1 000 MHz

Operation mode: GFSK

A. Low channel (2 402 MHz)

Radiated emissions			Ant.	Correction factors		Total	Limit	
Frequency (MHz)	Reading (dB μ V)	Detector mode	Pol.	Ant. factor (dB/m)	Amp + CL (dB)	Actual (dB μ V/m)	Limit (dB μ V/m)	Margin (dB)
2 402.00	97.63	Peak	V	28.38	- 38.20	87.81	114.00	26.19
2 390.00*	61.36	Peak	V	28.34	- 38.20	51.50	74.00	22.50
4 803.90	50.01	Peak	V	32.79	- 35.43	47.37	74.00	26.63
Above 5 000	Not Detected							
2 402.00	96.35	Peak	H	28.38	- 38.20	86.53	114.00	27.47
2 390.00*	61.02	Peak	H	28.34	- 38.20	51.16	74.00	22.84
4 803.90	53.45	Peak	H	32.79	- 35.43	50.81	74.00	23.19
Above 5 000	Not Detected							

B. Middle channel (2 439 MHz)

Radiated emissions			Ant.	Correction factors		Total	Limit	
Frequency (MHz)	Reading (dB μ V)	Detector mode	Pol.	Ant. factor (dB/m)	Amp + CL (dB)	Actual (dB μ V/m)	Limit (dB μ V/m)	Margin (dB)
2 439.00	98.46	Peak	V	28.49	- 38.17	88.78	114.00	25.22
Above 2 440	Not Detected							
2 439.00	95.34	Peak	H	28.49	- 38.17	85.66	114.00	28.34
Above 2 440	Not Detected							

C. High channel (2 479 MHz).

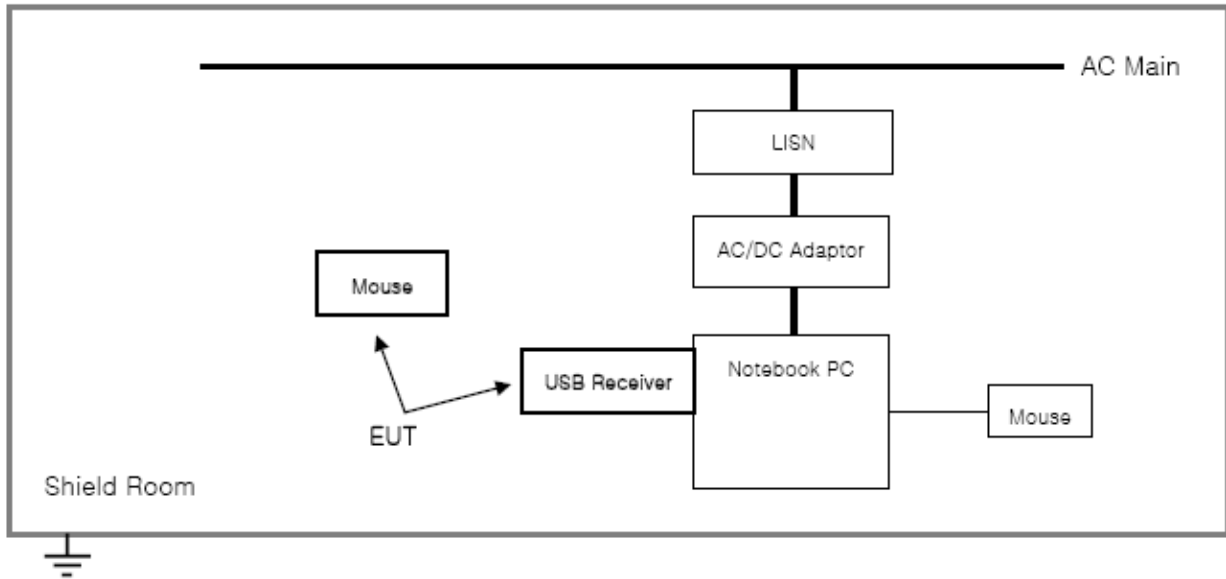
Radiated emissions			Ant.	Correction factors		Total	Limit	
Frequency (MHz)	Reading (dB μ V)	Detector mode	Pol.	Ant. factor (dB/m)	Amp + CL (dB)	Actual (dB μ V/m)	Limit (dB μ V/m)	Margin (dB)
2 479.00	99.60	Peak	V	28.26	- 38.14	89.72	114.00	24.28
2 483.50*	61.45	Peak	V	28.63	- 38.14	51.94	74.00	22.06
Above 2 490	Not Detected							
2 479.00	97.29	Peak	H	28.26	- 38.14	87.41	114.00	26.59
2 483.50*	62.18	Peak	H	28.63	- 38.14	52.67	74.00	21.33
Above 2 490	Not Detected							

※ **Remark**

1. "*" means the restricted band.
2. Measuring frequencies from 1 GHz to the 10th harmonic of highest fundamental frequency.
3. Radiated emissions measured in frequency above 1 000 MHz were made with an instrument using peak/average detector mode.
4. Average test would be performed if the peak result were greater than the average limit.
5. Actual = Reading + Ant. factor + Amp + CL (Cable loss)

5. Conducted power line test

5.1. Test setup



5.2. Limit

According to §15.107(a) for an intentional radiator that is designed to be connected to the public utility (AC) power line, the radio frequency voltage that is conducted back onto the AC power line on any frequency or frequencies, within the band 150 kHz to 30 MHz, shall not exceed the limits in the following table, as measured using a 50 uH/ 50 ohm line impedance stabilization network (LISN). Compliance with the provision of this paragraph shall be on the measurement of the radio frequency voltage between each power line and ground at the power terminal. The lower applies at the boundary between the frequencies ranges.

Frequency of Emission (MHz)	Conducted limit (dB μ V/m)	
	Quasi-peak	Average
0.15 – 0.50	66 - 56*	56 - 46*
0.50 – 5.00	56	46
5.00 – 30.0	60	50

※ **Remark**

Decreases with the logarithm of the frequency.

5.3. Test procedures

The test procedure is performed in a 6.5 m × 3.6 m × 3.6 m (L × W × H) shielded room. The EUT along with its peripherals were placed on a 1.0 m(W) × 1.5 m(L) and 0.8 m in height wooden table and the EUT was adjusted to maintain a 0.4 meter space from a vertical reference plane.

The EUT was connected to power mains through a line impedance stabilization network (LISN) which provides 50 ohm coupling impedance for measuring instrument and the chassis ground was bounded to the horizontal ground plane of shielded room. All peripherals were connected to the second LISN and the chassis ground also bounded to the horizontal ground plane of shielded room. The excess power cable between the EUT and the LISN was bundled. The power cables of peripherals were unbundled. All connecting cables of EUT and peripherals were moved to find the maximum emission.

5.4. Test results

Ambient temperature: 23 °C

Relative humidity: 46 % R.H.

Frequency range: 0.15 MHz ~ 30 MHz

Measured bandwidth: 9 kHz

Freq. (MHz)	Line	Q-Peak		
		Level(dB μ V/m)	Limit(dB μ V/m)	Margin(dB)
0.153	N	43.00	65.80	22.80
0.177	H	40.70	64.60	23.90
0.210	N	33.50	63.20	29.70
0.246	N	31.90	61.90	30.00
0.402	N	32.20	57.70	25.50
0.501	H	34.10	55.90	21.80
0.546	H	35.20	55.90	20.70
0.702	H	33.50	55.90	22.40
0.990	N	26.80	55.90	29.10
1.014	N	25.20	55.90	30.70
1.521	N	23.10	55.90	32.80
1.600	N	22.70	55.90	33.20
2.259	H	21.20	56.00	34.80
2.262	N	21.70	55.90	34.20
2.958	N	23.70	55.90	32.20
2.997	H	23.40	56.00	32.60
3.880	N	25.80	55.90	30.10
3.910	H	25.60	56.00	30.40
18.28	N	27.80	59.90	32.10

Freq. (MHz)	Line	Average		
		Level(dB μ V/m)	Limit(dB μ V/m)	Margin(dB)
0.156	H	24.10	55.70	31.60
0.177	N	24.90	54.60	29.70
0.504	H	20.40	45.90	25.50
0.519	N	16.30	45.90	29.60
0.702	H	33.30	45.90	12.60
0.810	N	17.80	45.90	28.10
12.190	N	20.10	49.90	29.80
18.280	N	26.30	49.90	23.60
18.280	H	26.90	49.90	23.00
24.380	N	25.70	49.90	24.20

※ Remark

Line(H): Hot

Line(N): Neutral

Plot of conducted power line

Test mode: Hot

CONTINUOUS DISTURBANCE VOLTAGE

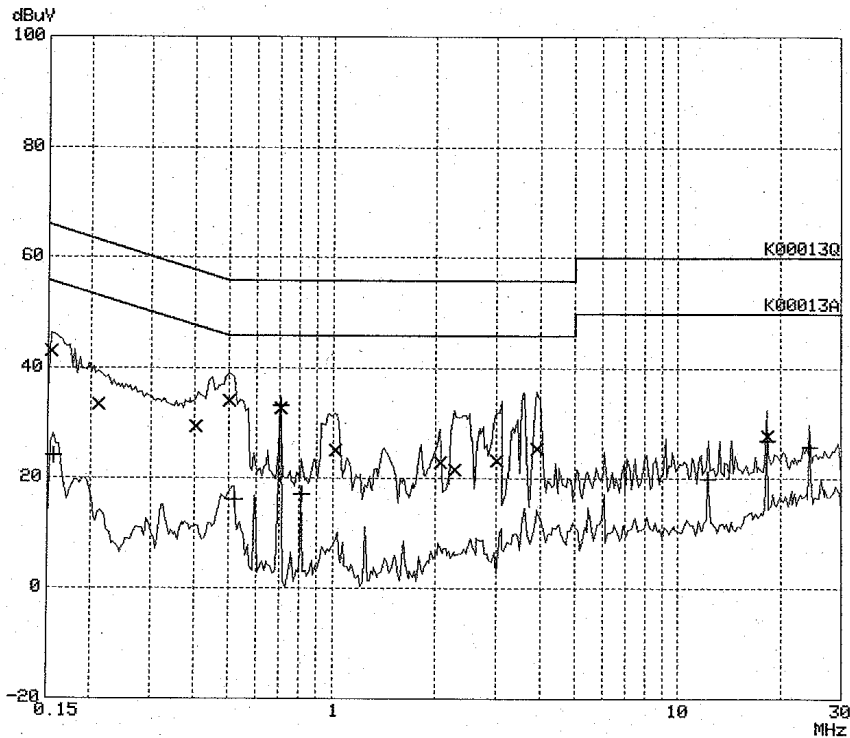
EUT: AA-SMOP20B
 Manif: ARESON 5
 Op Cond: L1
 Operator: ERI
 Test Spec: EN55022
 Date: 10. Jun 10 14:21

Scan Settings (2 Ranges)

Frequencies			Receiver Settings			
Start	Stop	Step	IF BW	Detector	M-Time	Atten Preamp
150k	3M	3k	9k	PK+AV	5ms AUTO LN	ON
3M	30M	10k	9k	PK+AV	1ms AUTO LN	ON

Transducer No.	Start	Stop	Name
1	150k	30M	ESH3_Z6

Final Measurement: x QP / + AV
 Meas Time: 1 s
 Subranges: 16
 Acc Margin: 30dB



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Plot of conducted power line

Test mode: Neutral

CONTINUOUS DISTURBANCE VOLTAGE

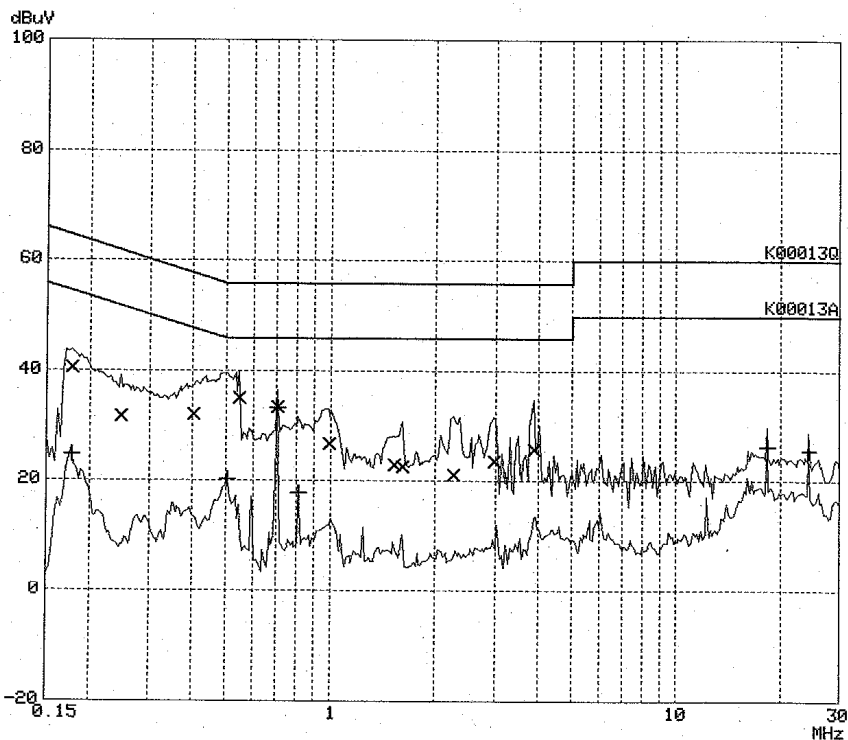
EUT: AA-SMOP208
 Manuf: ARESON 5
 Op Cond: N
 Operator: ERI
 Test Spec: EN55022
 Date: 10. Jun 10 14:32

Scan Settings (2 Ranges)

Frequencies			Receiver Settings			
Start	Stop	Step	IF BW	Detector	M-Time	Atten Preamp
150k	3M	3k	9k	PK+AV	5ms AUTO LN	ON
3M	30M	10k	9k	PK+AV	1ms AUTO LN	ON

Transducer No. Start Stop Name
 1 150k 30M ESH3_Z6

Final Measurement: x QP / + AV
 Meas Time: 1 s
 Subranges: 16
 Acc Margin: 30dB



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