Declaration of Compliance

CFR 47 Part 15 Subpart B

Test Report File No.	13-IST-0273	■ Basic	□ Alternate
Date of Receipt	March 20, 2013	Begin of test date	April 5, 2013
Date of Issue	April 27, 2013	End of test date	April 9, 2013

Kind of Product	Portable Music Player
Basic Model(s)	AK120
FCCID	QDMAK120

Applicant	IRIVER LIMITED.
Address	iriverhouse, 902-5, Bangbae-dong, Seocho-gu, Seoul, Korea
Manufacturer	IRIVER LIMITED.
Address	iriverhouse, 902-5, Bangbae-dong, Seocho-gu, Seoul, Korea

Standard	**Section 15.107, Section 15.109 [Class B Equipment]**

Test Result ■ **Positive** □ **Negative**

Tested By

B.O. KO.

Reviewed By

S.J.CHO

Comment(s)

- Investigations requested : Measurement to the relevant clauses of FCC rules and regulations Part 15 Subpart B – Unintentional Radiators, Class B.
- The test report with appendix consists of 17 pages.
- The test result only responds to the tested sample.
- It is not allowed to copy this report even partly without the allowance of IST EMC Laboratory.
- This equipment as for has been shown to be capable of continued compliance with the applicable technical standards as indicated in the measurement report and was tested in accordance with the measurement procedures specified in ANSI C63.4

TABLE OF CONTENTS

INFORMATIONS OF TEST LABORATORY

EMC LABORATORY of IST Co., Ltd.

400-19, Singal-dong, Giheung-gu, Yongin-si,

Kyonggi-Do, 446-599, Korea

TEL : +82 31 326 6700 FAX : +82 31 326 6797

KOLAS Testing No. : KT118
RRA & FCC(DoC) Designation No. : KR0018
FCC Registration No. : 400603
VCCI Member No. : 1739

Measurement Uncertainty

Conducted Emissions	U = 2.98 [dB] (Confidence level approximately 95 %, k = 2)
Radiated Emissions (Antenna - Horizontal)	U = 3.83 [dB] (Confidence level approximately 95 %, k = 2)
Radiated Emissions (Antenna - Verical)	U = 4.50 [dB] (Confidence level approximately 95 %, k = 2)

PRODUCT INFORMATION

Portable Music Player

General Specifications		
	Product Color	Black
	Dimensions	59.2 * 89 * 14.4
	Weight	143g
	Operational Temperature	-5℃ ~ 40℃
	Connection Type	USB 2.0 High Speed
	Language Support	UTF-8
	Storage type	moviNAND
	External Storage type	Micro SD x 2ea (SDHC max 32GB X 2)
	Menu Language	<English/ Korean>
	UI structure	Power(LCD Off),REW(pervious song), Play(pause), FF(next song), Volume Wheel(+/-)
	Continuous Playback Time	AUDIO: Min 20Hrs (128kbps, MP3, Vol 44, LCD Off) Min 15Hrs (16bit/44.1KHz , FLAC, Vol 44, LCD Off)
	File storage capacity	eMMC
	Equalizer	Equalizer (10 Band)
	Audio Line In/Out	Optical I/O & Headphone Out (3.5mm)
	PC Application	Iriver Plus4

	Supported O/S	Windows 2K / Windows XP / Windows Vista 32bit / Windows 7 / Windows 8
Platform	CPU	Telechips TCC 9201
	OS	Linux + Flow 1.2
	Font	Window Font; True type (IRIVER_Gothic.ttf), (TBD)
SDRAM	Support Window Font (ttf. Text)	128MB
Display	Type	2.4" 1600M
	Resolution	320 X 240
	Color Depth	16M color(RGB 888)
	Battery	2000mAh Li-Polymer, micro USB Charge (460mA)
	Charging Time	5H 30M
Feature Specifications		
Audio	Frequency Range	20Hz~20KHz
	Headphone Output Power	L: 1.5VRMS + R: 1.5VRMS (Condition No Load)
	Vol	MAX 152 Grade(0~75)
	S/N Ratio	103dB @ 1KHz, No Laod
	Frequency Characteristics	±0.1dB (Condition : 20Hz~20KHz)
	No. Channels	STEREO
	Codec supported	Decoder : WAV, FLAC, WMA, MP3, OGG,APE
	Bit Rate	44.1kHz, 48kHz, 96kHz, 192kHz (16/24bit per sample)
	Tag	ID3 V1 Tag, ID3 V2 2.0, ID3 V2 3.0
Bluetooth	Bluetooth Version	v 3.0
	Profile	A2DP, HFP
	Frequency Range	2400~2483.5MHz(2402~2480MHz)
	CH	79EA

- EMC suppression device is not used during the test.
- Please refer to user's manual.

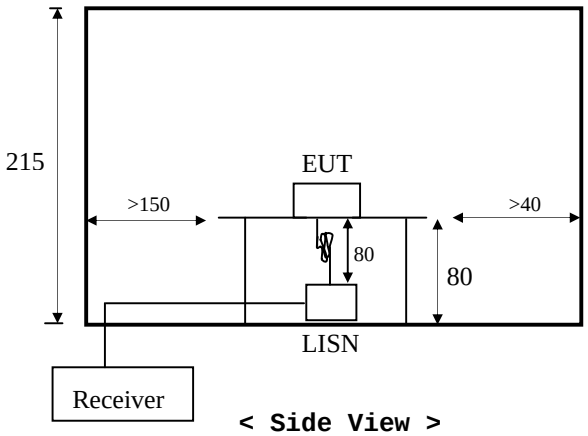
DESCRIPTIONS OF TEST

Conducted Emissions:

The measurement were performed over the frequency range of 0.15 MHz to 30 MHz using a 50 Ω/50uH LISN as the input transducer to a Spectrum Analyzer or a Field Intensity Meter. The measurements were made with the detector set for "Peak" amplitude within a bandwidth of 10KHz or for "quasi-peak" & "Average" within a bandwidth of 9 KHz.

-Procedure of Test

The line-conducted facility is located inside a shielded room No.1. A 1 m X 1.5 m wooden table 80 cm height is placed 40 cm away from the vertical wall and 1.5 m away from the other wall of the shielded room. The R/S ESH3-Z5 and Hyup-Rip KNW-407 LISN are bonded to bottom of the shielded room. The EUT is located on the wooden table with distance more than 80 cm from the LISN and powered from the Hyup-Rip LISN. The peripheral equipment is powered from the other LISN. Power to the LISNs are filtered by a noise cut power line filters. All electrical cables are shielded by braided tinned steel tubing with inner ϕ 1.2 cm. If the EUT is a DC-powered device, power will be derived from the source power supply it normally will be powered from and this supply lines will be connected to the Hyup-Rip LISN. All interconnected cables more than 1 m were shortened by non-inductive bundling to a 1 m length. Sufficient time for the EUT, support equipment, and test equipment was allowed in order for them to warm up to their normal operating conditions. The RF output of the LISN was connected to the R/S receiver to determine the frequency producing the maximum emission from the EUT. The frequency producing the maximum level was reexamined using Quasi-Peak mode by manual measurement, after scanned by automatic Peak mode for frequency range from 0.15 to 30 MHz. The bandwidth of the receiver was set to 10 kHz. The EUT, peripheral equipment, and interconnecting cables were arranged and manipulated to maximize each EME emission.



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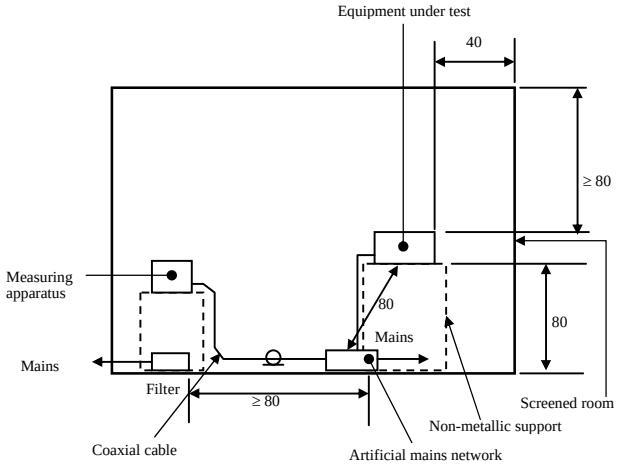


< Concept Drawing >

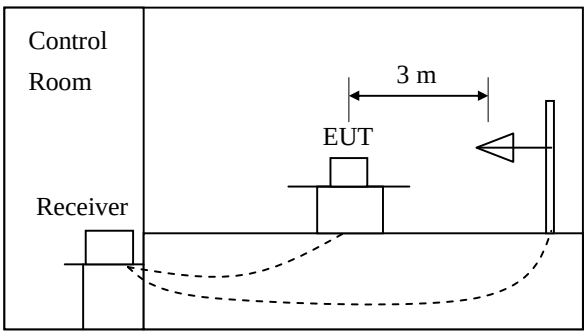
DESCRIPTION OF TEST

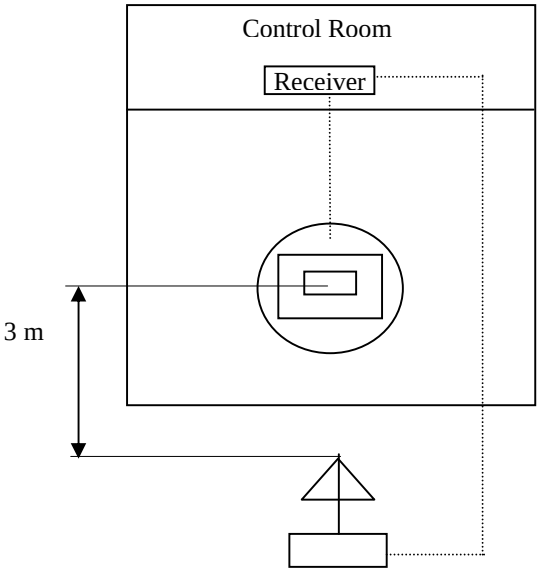
Radiated Emissions:

The measurement was performed over the frequency range of 30 MHz to 1 GHz using antenna as the input transducer to a Spectrum analyzer or a Field Intensity Meter. The measurement was made with the detector set for "quasi-peak" within a bandwidth of 120 KHz.

-Procedure of Test

Preliminary measurements were made at 3 meter using bi-log antennas, and spectrum analyzer to determine the frequency producing the max. emission in anechoic chamber. Appropriate precaution was taken to ensure that all emission from the EUT were maximized and investigated. The system configuration, mode of operation, turn-table azimuth and height with respect to the antenna were noted for each frequency found. The spectrum was scanned from 30 MHz to 1000 MHz using S/B bi-log antenna. Above 1 GHz, linearly polarized double ridge horn antennas were used. Final measurements were made at open site with 3-meters test distance using S/B bi-log antenna. The OATS have been verified in regular for its normalized site attenuation. The test equipment was placed on a wooden table. Sufficient time for the EUT, peripheral equipment, and test equipment was allowed in order for them to warm up to their normal operating condition. Each frequency found during pre-scan measurements was re-examined by manual. The detector function was set to CISPR quasi-peak mode and the bandwidth of the receiver was set to 120 kHz or 1 MHz depending on the frequency of type of signal. The EUT, peripheral equipment and interconnecting cables were re-configured to the set-up producing the max. emission for the frequency and were placed on top of a 0.8-meter high nonmetallic 1 x 1.5 meter table. The EUT, peripheral equipment, and interconnecting cables were re-arranged and manipulated to maximize each emission. The turntable containing the system was rotated; the antenna height was varied 1 to 4 meters and stopped at the azimuth or height producing the maximum emission. Each emission was maximized by: varying the mode of operation to the EUT and/or peripheral equipment and changing the polarity of the antenna, whichever determined the worst-case emission.





Equipment Under Test

EUT Type :

■ Table-Top. □ Floor-Standing.
□ Table-Top and Floor-Standing(Combination).

Operation – mode of the E.U.T. :

The equipment under test was operated during the measurement under following conditions :

□ Standby Mode
■ Operational Condition : File up/down mode, Operation mode

Configuration of the equipment under test :

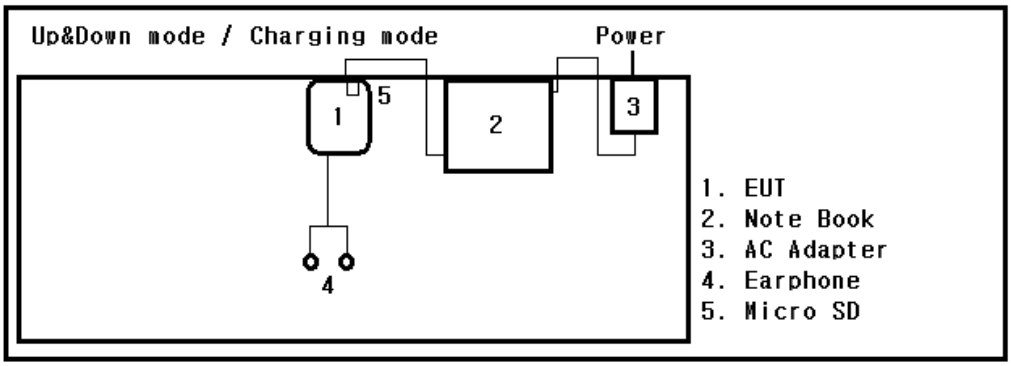
Following peripheral devices and interface cables were connected during the measurement :

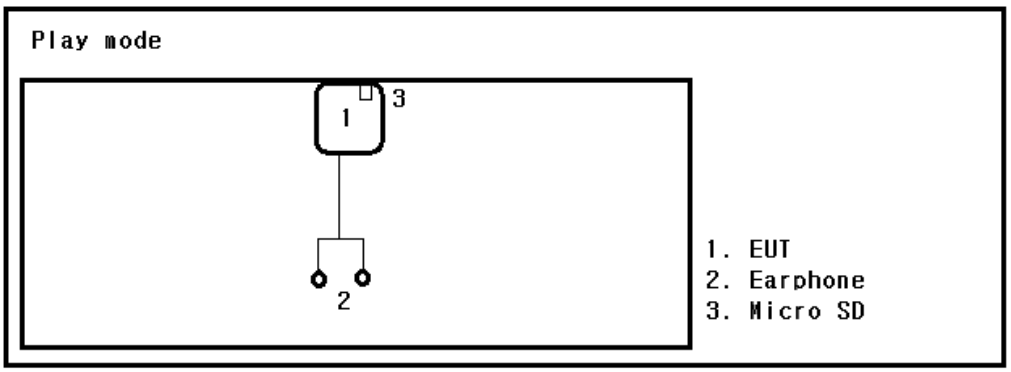
Equipment	Type	Brand	Serial No.
AK120	AK120	IRIVER LIMITED	N/A
Notebook PC	XNote R510	LG.	904QTBR02037
Earphone	N/A	N/A	N/A
AC Adapter	PA-1900-08	LG.	9302466702
Micro SD Memory	N/A	SanDisk	N/A

Connecting Interface Cables :
- Unshielded AC Power Cable : 1.8 m
- Earphone cable : 1.3m

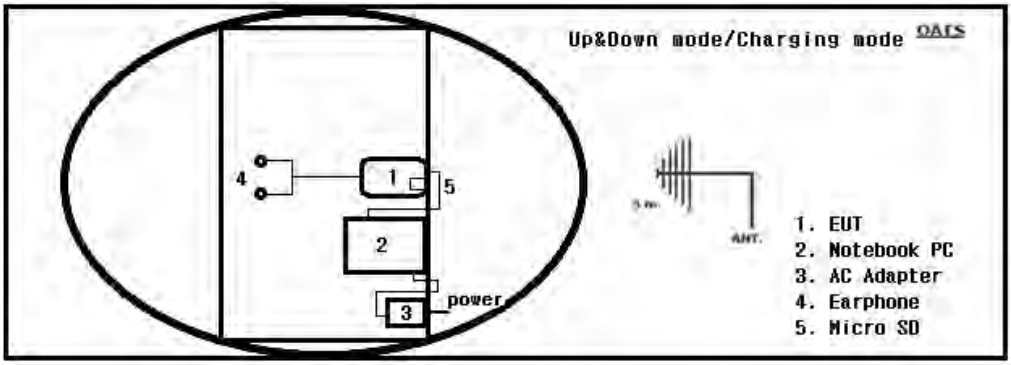
Note : Mode 1 :We tested EUT connecting a Notebook Pc. And files up & down each other.
Mode 2 :We tested EUT charging form a Notebook PC.
Mode 3 :We tested EUT playing music.
Inserted Micro SD into the EUT in test.

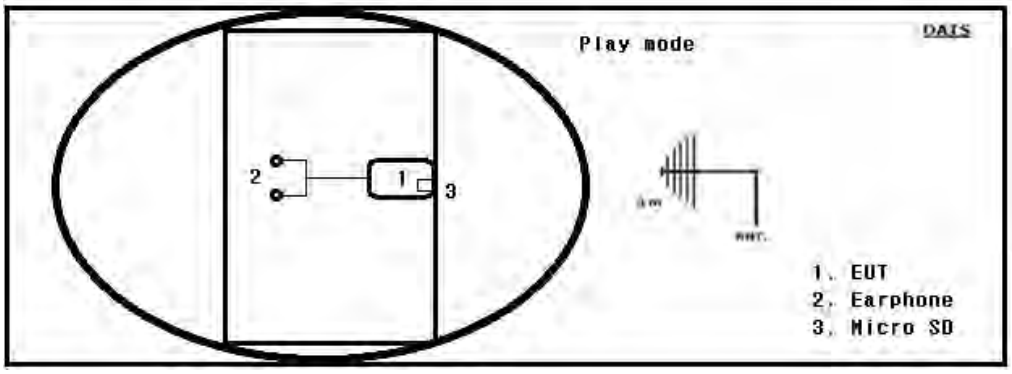
Test Set-Up





Conducted Emissions





Radiated Emissions

SUMMARY

Emissions

■ Conducted Emission

The requirements are ● MET ○ Not MET

Minimum limit margin 10.58 dB at 0.506 MHz

Maximum limit exceeding

Remarks : Limits are kept with more than 3 dB margin.

■ Radiated Emission

The requirements are ● MET ○ Not MET

Minimum limit margin -7.78 dB at 65.892 MHz

Maximum limit exceeding

Remarks : Limits are kept with more than 3 dB margin.

Sample Calculation

Conducted Emission

Sample Signal Strength Calculation

S(Result) = Measurement + IL + CL
Margin = Limit – S(Result)

S(Result) = Signal Strength
Measurement = Voltage at the Receiver
IL = LISN Insertion Loss
CL = Cable Loss

For example at 15.402 MHz if the measured voltage is 45.35 dBuV, the Cable loss is 0.15 dB, the insertion loss is 0.74 dB, the signal strength would be calculated:

S(Result) = 45.35 + 0.15 + 0.74 = 46.24 dBuV
Margin = 60 dBuV – 46.24 dBuV = 13.76 dB

Radiated Emission

Sample Field Strength Calculation

FS(Result) = Reading + AF + CL
Margin = Limit – FS(Result)

FS(Result) = Field Strength
Reading = Measured Voltage at the Receiver
AF = Antenna Factor
CL = Cable Loss

For example at 240.000 MHz if the measured voltage is 21.70 dBuV with an antenna Distance of 3 meters, the field intensity would be calculated:

Limit[dBuV/m] = 200[uV/m] = 20log(200) = 46.00 dBuV/m

FS(Result) = 21.70 + 10.71 + 2.28 = 34.69 dBuV/m
Margin = 46.00 dBuV/m – 34.69 dBuV/m = 11.31 dB

TEST CONDITIONS AND DATA

Conducted Emissions

[Applicable]

◆ Test Equipment Used

Model Name	Description	Manufacture	Due Calibration	Serial No.
ESCI	Test Receiver	Rohde & Schwarz	Jul 16, 2013	100373
ESH2-Z5	LISN	Rohde & Schwarz	Oct 10, 2013	842966/014
ESH3-Z2	Pulse Limiter	Rohde & Schwarz	May 10, 2013	357.8810.52

◆ Test Accessories Used

Type	Manufacturer
Aneroid Barometer	Sato
Hygrometer	Sato

◆ Environmental Conditions

Temperature	(18.2 ± 0.2) ℃
Humidity	(42.8 ± 0.2) % R.H.
Atmosphere pressure	1006 mbar

◆ Test Program See the operation mode on page 6

◆ Test Area Conducted Room #1

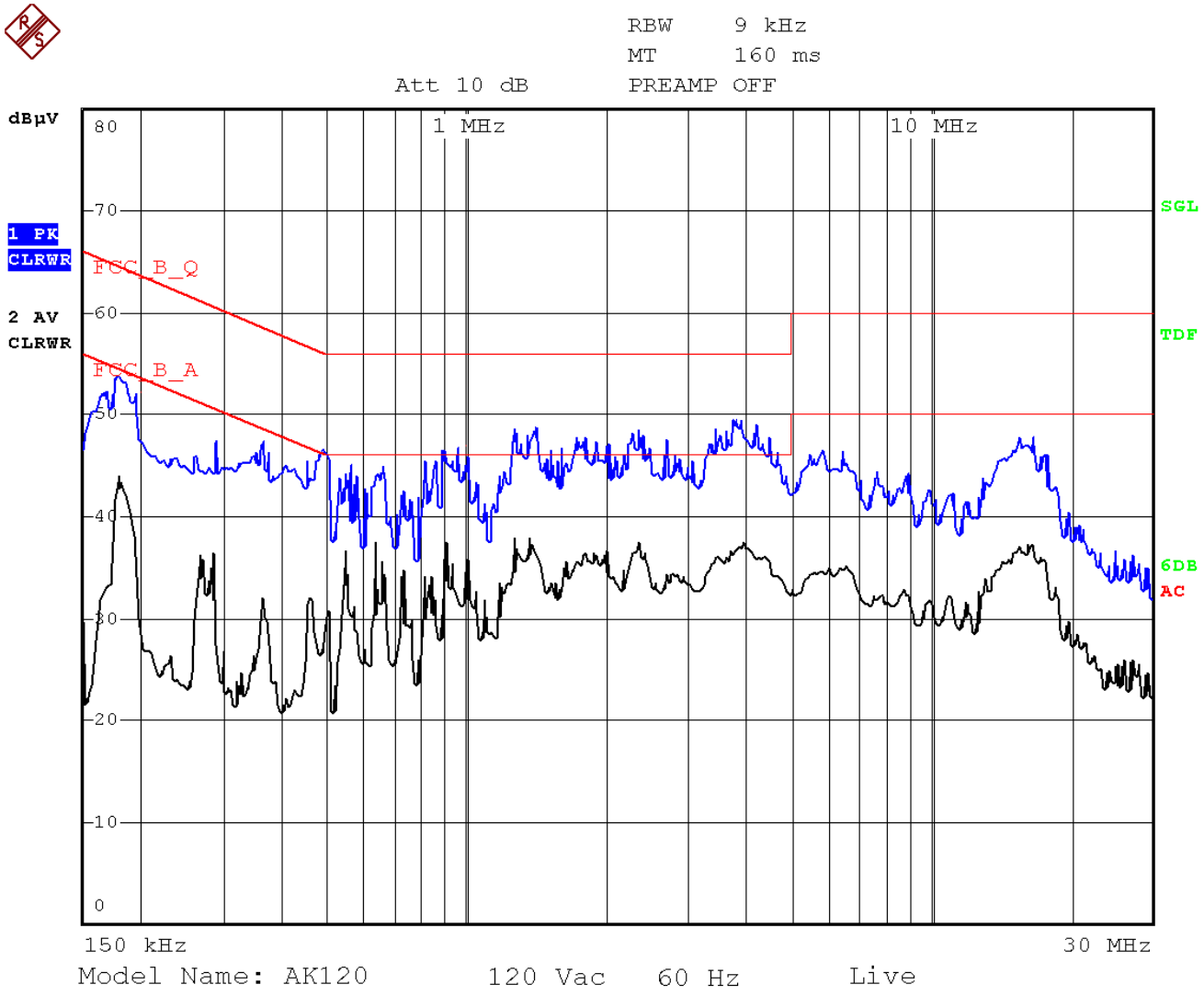
◆ Test Date April 5, 2013

Note :

Conducted Emissions

UP & Down mode

Live



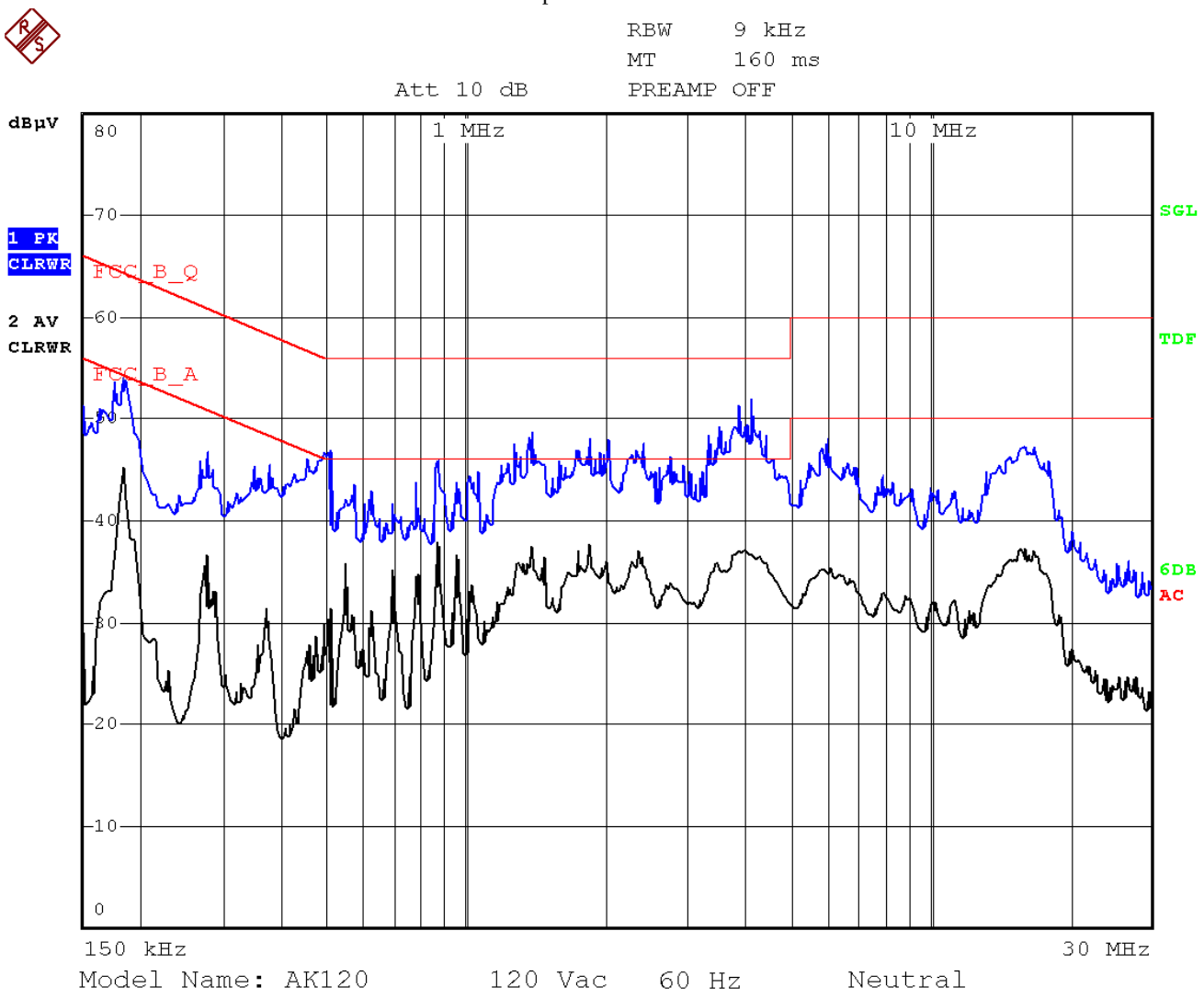
Freq. [MHz]	Measurement [dB µV]		Limit [dB µV]		Insertion Loss	Cable Loss	Result [dB µV]		Margin [dB]	
	Q-peak	Average	Q-peak	Average	[dB]	[dB]	Q-peak	Average	Q-peak	Average
0.178	50.96	45.03	64.58	54.58	0.10	0.03	51.09	45.16	13.49	9.42
0.362	41.07	32.82	58.68	48.68	0.11	0.04	41.22	32.97	17.46	15.71
0.482	43.73	28.41	56.30	46.30	0.12	0.03	43.88	28.56	12.42	17.74
1.410	44.41	36.82	56.00	46.00	0.15	0.06	44.62	37.03	11.38	8.97
16.562	42.03	36.81	60.00	50.00	0.59	0.16	42.78	37.56	17.22	12.44
25.094	30.24	24.93	60.00	50.00	0.40	0.22	30.86	25.55	29.14	24.45

Note *: File up&down mode.*

Conducted Emissions

Up & Down mode

Neutral

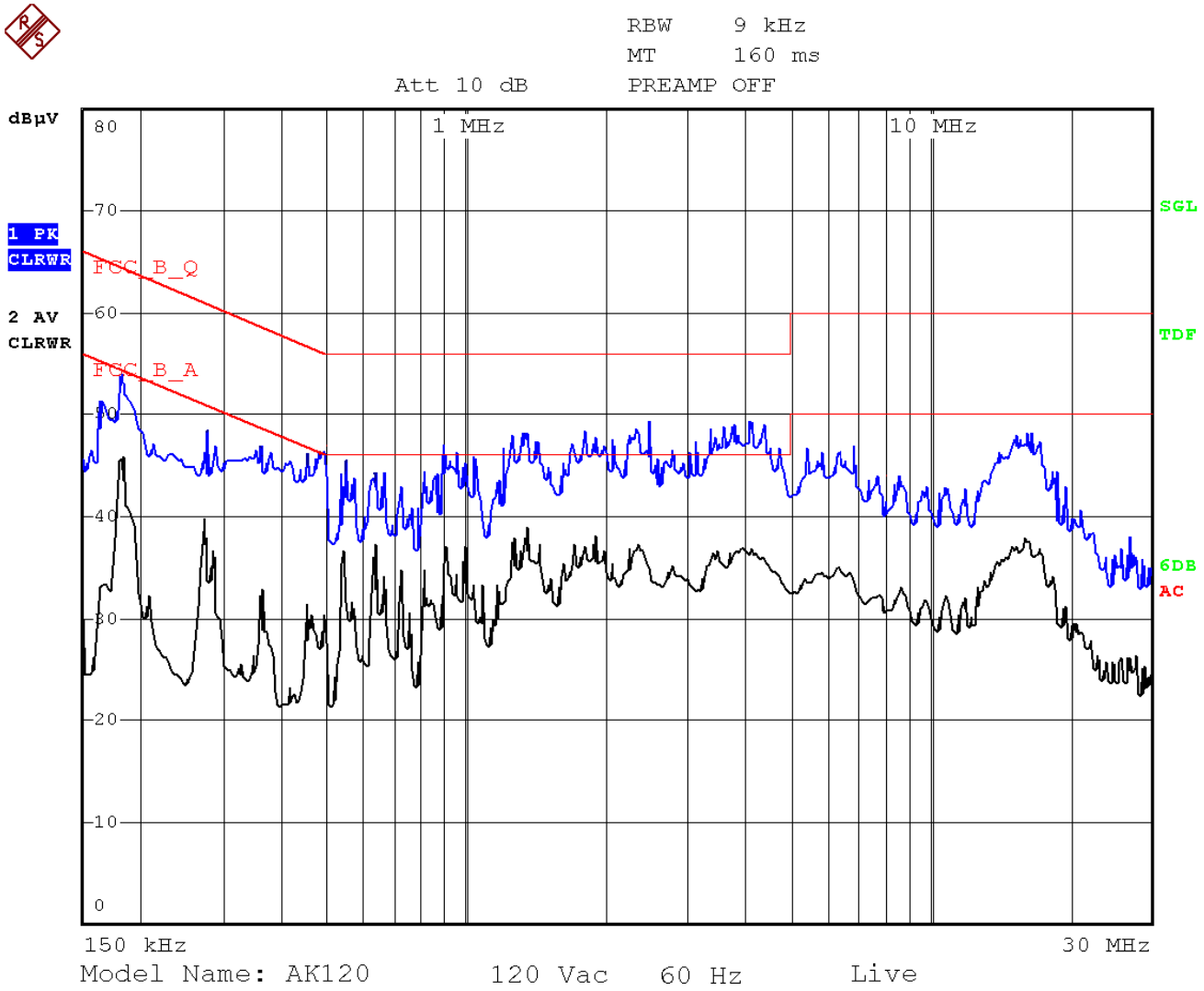


Freq. [MHz]	Measurement [dB µV]		Limit [dB µV]		Insertion Loss	Cable Loss	Result [dB µV]		Margin [dB]	
	Q-peak	Average	Q-peak	Average	[dB]	[dB]	Q-peak	Average	Q-peak	Average
0.162	48.85	32.91	65.36	55.36	0.11	0.03	48.99	33.05	16.37	22.31
0.274	43.04	37.22	61.00	51.00	0.11	0.03	43.18	37.36	17.81	13.63
0.506	45.26	30.16	56.00	46.00	0.13	0.03	45.39	30.32	10.58	15.68
4.122	43.57	36.75	56.00	46.00	0.24	0.08	43.89	37.07	12.11	8.86
5.970	40.03	34.42	60.00	50.00	0.32	0.09	40.44	34.83	19.56	15.17
11.358	35.57	30.14	60.00	50.00	0.49	0.12	36.18	30.75	23.82	19.25

Note *: File up&down mode.*

Conducted Emissions

Charging mode **Live**



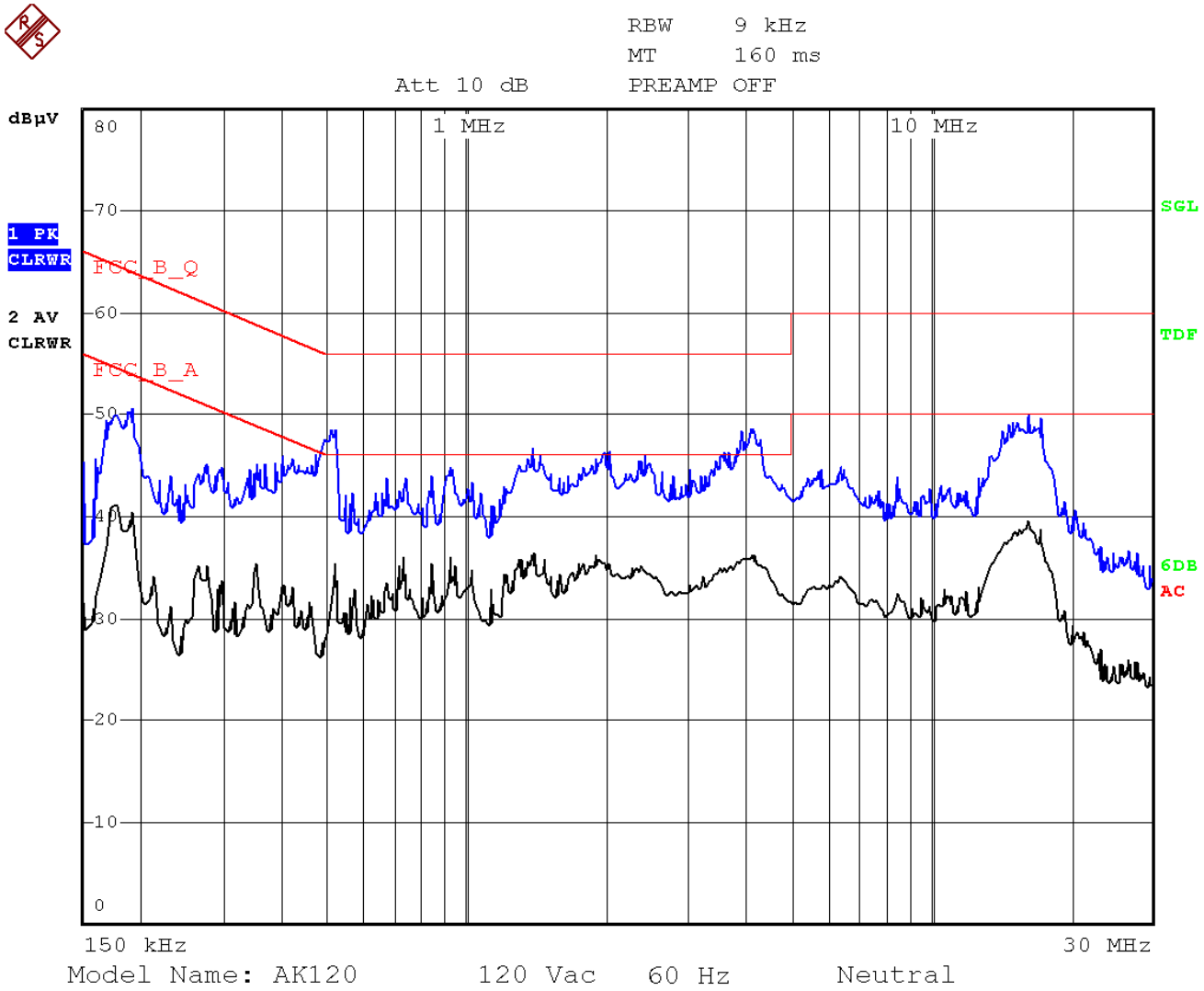
Freq. [MHz]	Measurement [dB µV]		Limit [dB µV]		Insertion Loss	Cable Loss	Result [dB µV]		Margin [dB]	
	Q-peak	Average	Q-peak	Average	[dB]	[dB]	Q-peak	Average	Q-peak	Average
0.162	49.42	41.34	65.36	55.36	0.10	0.03	49.55	41.47	15.81	13.89
0.274	44.21	38.02	61.00	51.00	0.10	0.03	44.34	38.15	16.66	12.85
0.898	42.54	34.12	56.00	46.00	0.13	0.05	42.72	34.30	13.28	11.70
2.474	41.93	34.92	56.00	46.00	0.18	0.06	42.17	35.16	13.83	10.84
10.842	37.41	32.07	60.00	50.00	0.41	0.12	37.94	32.60	22.06	17.40
26.842	30.87	25.74	60.00	50.00	0.33	0.23	31.43	26.30	28.57	23.70

Note *: Charging mode.*

Conducted Emissions

Charging mode

Neutral



Freq. [MHz]	Measurement [dB µV]		Limit [dB µV]		Insertion Loss	Cable Loss	Result [dB µV]		Margin [dB]	
	Q-peak	Average	Q-peak	Average	[dB]	[dB]	Q-peak	Average	Q-peak	Average
0.350	43.71	41.92	58.96	48.96	0.12	0.04	43.87	42.08	15.09	6.88
0.398	38.84	30.03	57.90	47.90	0.12	0.05	39.01	30.20	18.89	17.70
0.522	45.23	33.71	56.00	46.00	0.13	0.03	45.39	33.87	10.61	12.13
2.034	37.52	32.51	56.00	46.00	0.18	0.07	37.77	32.76	18.23	13.24
4.150	43.01	36.95	56.00	46.00	0.24	0.08	43.33	37.27	12.67	8.73
16.142	44.23	38.92	60.00	50.00	0.68	0.16	45.07	39.76	14.93	10.24

Note *: Charging mode.*

TEST CONDITIONS AND DATA

Radiated Emission

[Applicable]

◆ Test Equipment Used

Model Name	Description	Manufacture	Due Calibration	Serial No.
ESCS30	Test Receiver	Rohde & Schwarz	May 10, 2013	100171
VULB 9160	Antenna	Schwarzbeck	July 19, 2013	3071
ESCI7	Test Receiver	Rohde & Schwarz	Jul. 16, 2013	100872
8449B OPT H02	Pre Amplifier	HP	Oct. 11, 2013	3008A0530
3115	Horn Ant.	EMCO	Nov. 21, 2013	9012-3602

◆ Test Accessories Used

Type	Manufacturer
Aneroid Barometer	Sato
Hygrometer	Sato

◆ Environmental Conditions

Temperature	(17.6 ± 0.2) ℃
Humidity	(43.6 ± 0.2) % R.H.
Atmosphere pressure	1008 mbar

◆ Test Program See the operational condition page 6.

◆ Test Area Full-Anechoic Room (3 m)

◆ Test Date April 8, 2013

Note :

Radiated Emissions

Below 1GHz

[Applicable]

Freq. [MHz]	Reading [dBuV]	Antenna Factor [dB/m]	Cable Loss [dB]	Polar. [H/V]	Limit [dBuV/m]	Result [dBuV/m]	Margin [dB]
45.523	13.30	11.69	1.15	V	40.00	26.14	-13.86
65.892	20.70	10.14	1.38	H	40.00	32.22	-7.78
143.495	20.80	12.40	1.99	H	43.50	35.19	-8.31
191.998	24.30	9.74	2.35	H	43.50	36.39	-7.11
239.524	22.10	10.67	2.63	H	46.00	35.40	-10.60
335.557	19.50	13.73	3.05	V	46.00	36.28	-9.72

[File up&down mode]

Freq. [MHz]	Reading [dBuV]	Antenna Factor [dB/m]	Cable Loss [dB]	Polar. [H/V]	Limit [dBuV/m]	Result [dBuV/m]	Margin [dB]
43.583	14.80	11.62	1.13	V	40.00	27.55	-12.45
65.895	19.60	10.14	1.38	H	40.00	31.12	-8.88
118.274	16.90	10.99	1.82	H	43.50	29.71	-13.79
191.992	23.10	9.74	2.35	H	43.50	35.19	-8.31
239.528	17.30	10.67	2.63	V	46.00	30.60	-15.40
368.535	18.20	14.49	3.19	V	46.00	35.88	-10.12

[Charging mode]

Freq. [MHz]	Reading [dBuV]	Antenna Factor [dB/m]	Cable Loss [dB]	Polar. [H/V]	Limit [dBuV/m]	Result [dBuV/m]	Margin [dB]
43.582	13.60	11.62	1.13	V	40.00	26.35	-13.65
65.892	19.90	10.14	1.38	H	40.00	31.42	-8.58
159.015	19.70	13.29	2.12	V	43.50	35.11	-8.39
191.998	18.50	9.74	2.35	H	43.50	30.59	-12.91
288.026	14.60	12.48	2.85	H	46.00	29.93	-16.07
384.167	17.60	14.85	3.26	H	46.00	35.71	-10.29

[Play mode]

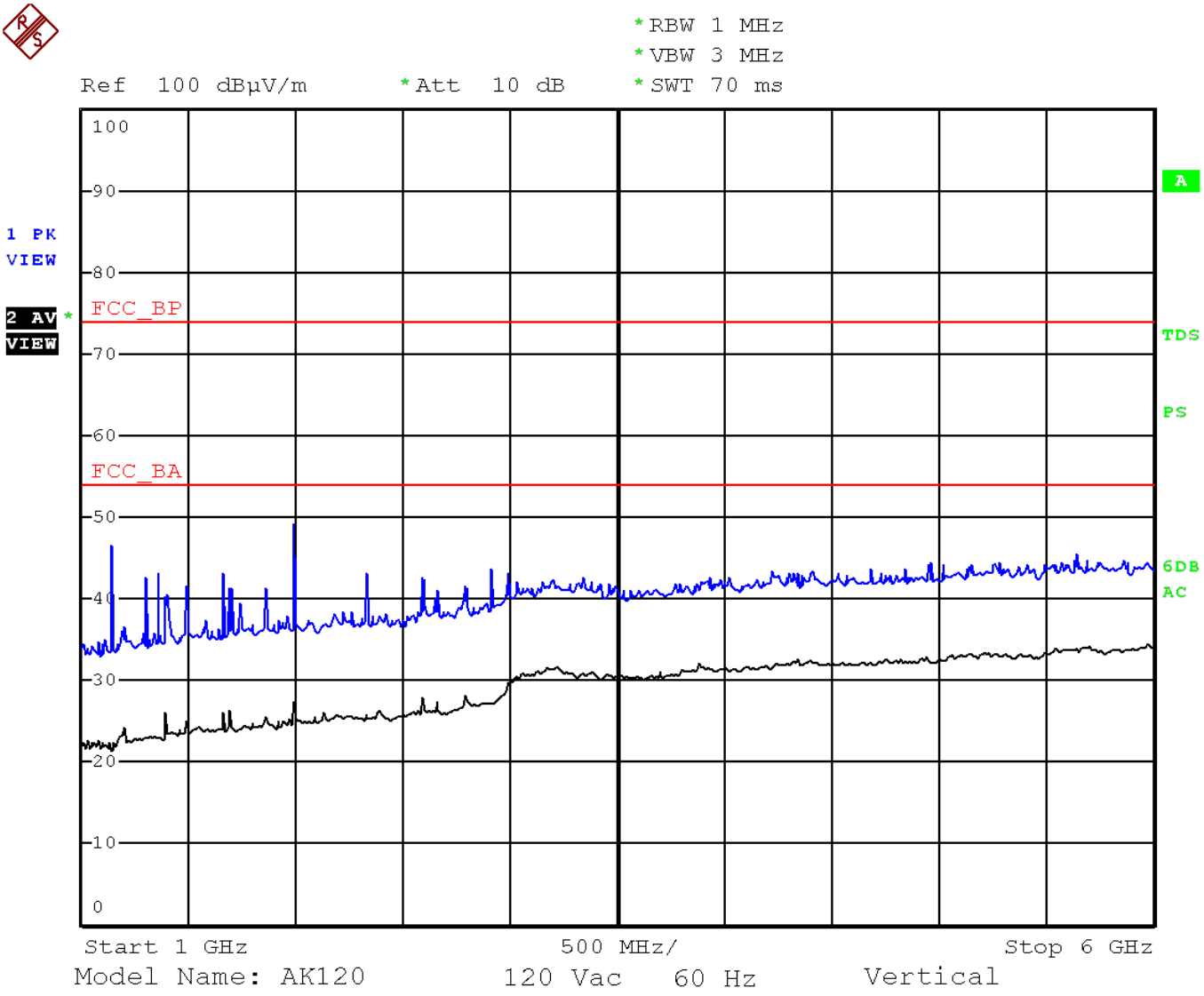
Note : Limits Below 1 GHz (3 m method)

Radiated Emissions

Above 1GHz

UP & Down mode

Vertical



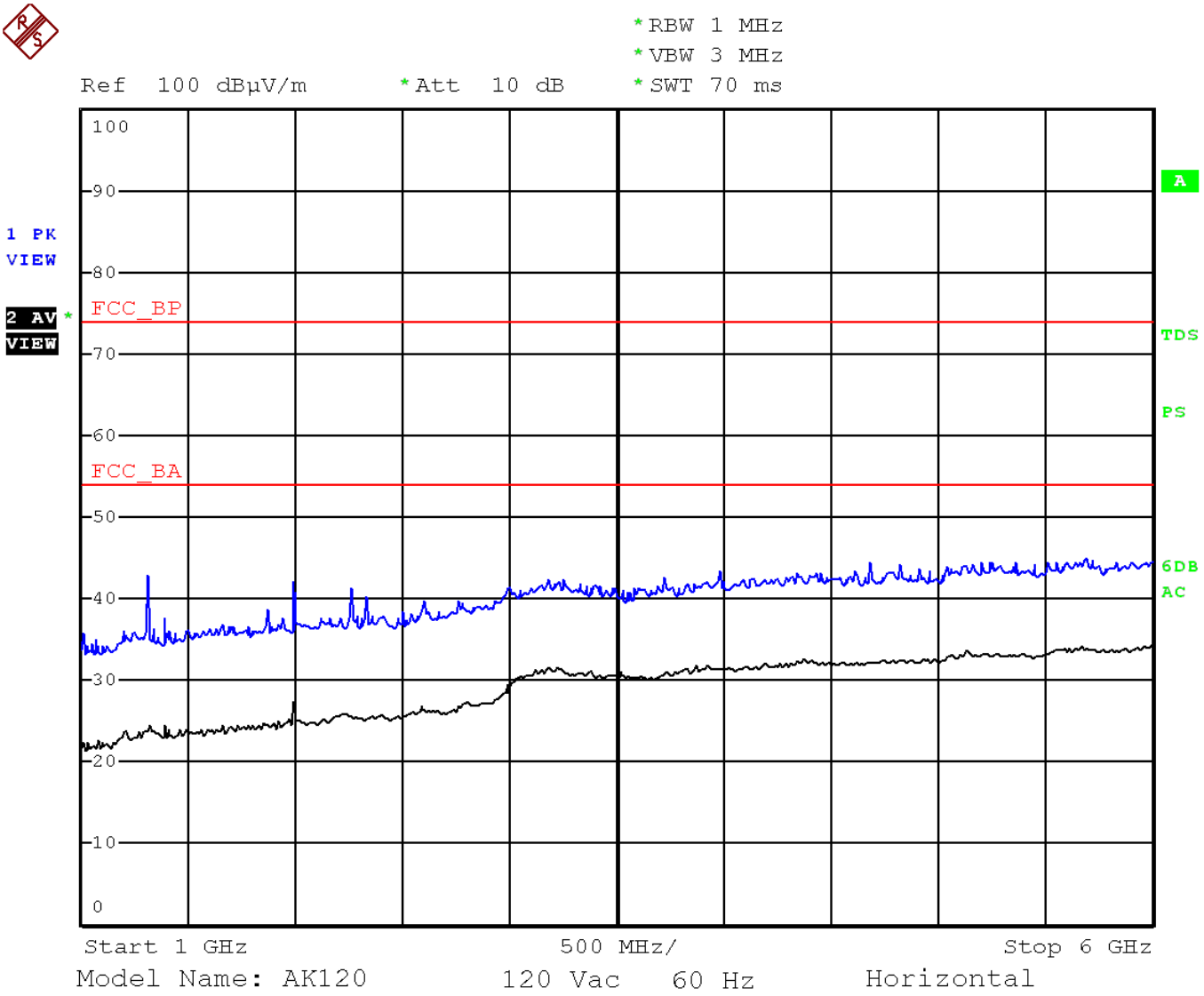
Freq. (GHz)	Reading (dBuV/m)		Ant. (cm)	Limits (dBuV/m)		Margin (dB)		Result
	Peak	Average		Peak	Average	Peak	Average	
1.143	46.50	21.50	100.00	74.00	54.00	27.50	32.50	Pass
1.362	43.17	23.08	100.00	74.00	54.00	30.83	30.92	Pass
1.664	43.08	26.06	100.00	74.00	54.00	30.92	27.94	Pass
1.995	49.12	27.44	100.00	74.00	54.00	24.88	26.56	Pass
2.332	43.23	25.73	100.00	74.00	54.00	30.77	28.27	Pass
2.913	43.64	27.19	100.00	74.00	54.00	30.36	26.81	Pass

Radiated Emissions

Above 1GHz

UP & Down mode

Horizontal



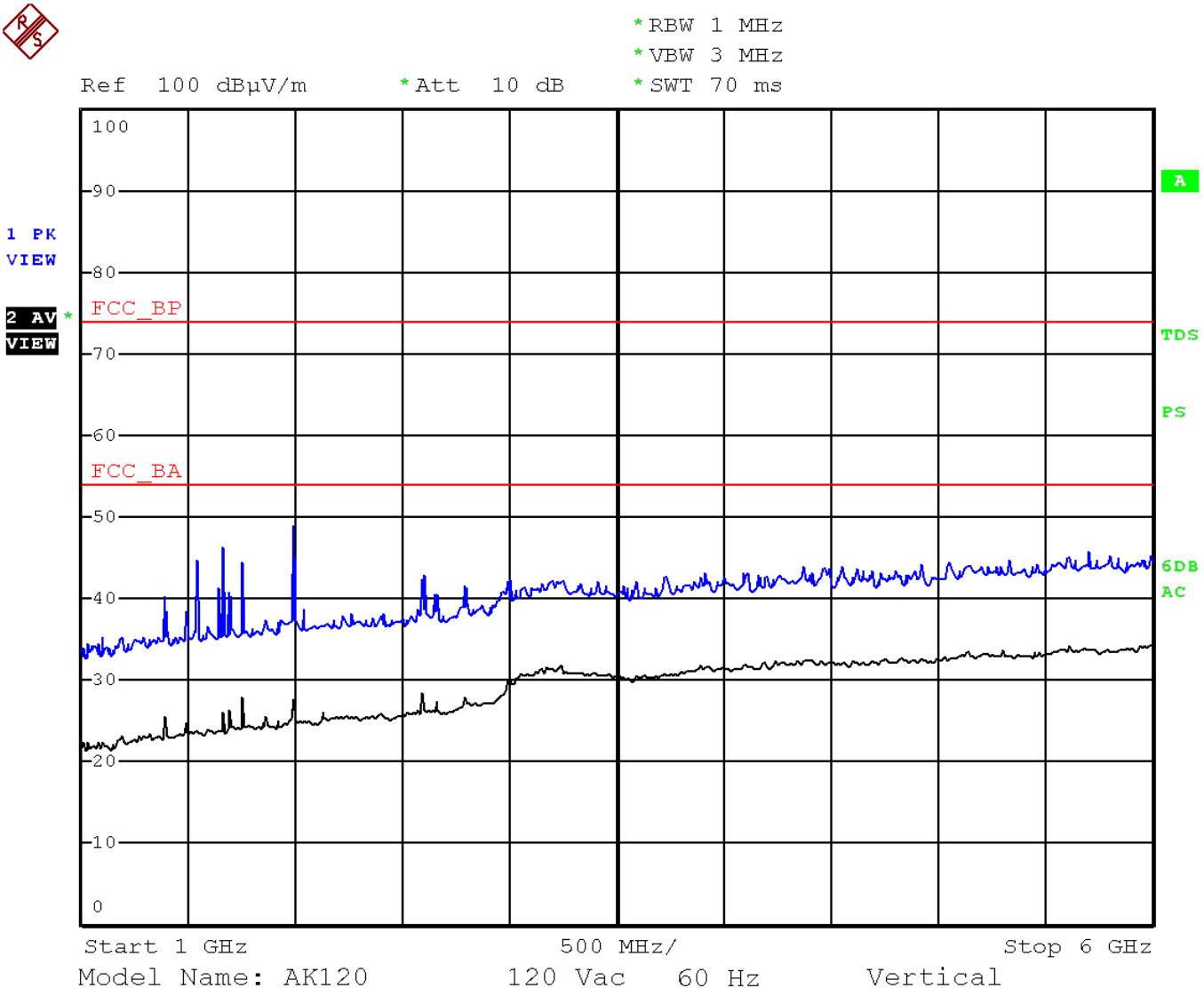
Freq. (GHz)	Reading (dBuV/m)		Ant. (cm)	Limits (dBuV/m)		Margin (dB)		Result
	Peak	Average		Peak	Average	Peak	Average	
1.315	42.92	23.88	100.00	74.00	54.00	31.08	31.12	Pass
1.994	42.05	27.43	100.00	74.00	54.00	31.95	26.57	Pass
2.261	41.38	25.84	100.00	74.00	54.00	32.62	28.16	Pass
3.982	43.35	31.49	100.00	74.00	54.00	30.65	22.51	Pass
4.684	44.58	32.18	100.00	74.00	54.00	29.42	21.82	Pass
5.693	45.02	33.91	100.00	74.00	54.00	28.98	20.09	Pass

Radiated Emissions

Above 1GHz

Charging mode

Vertical



Model Name: AK120 120 Vac 60 Hz Vertical

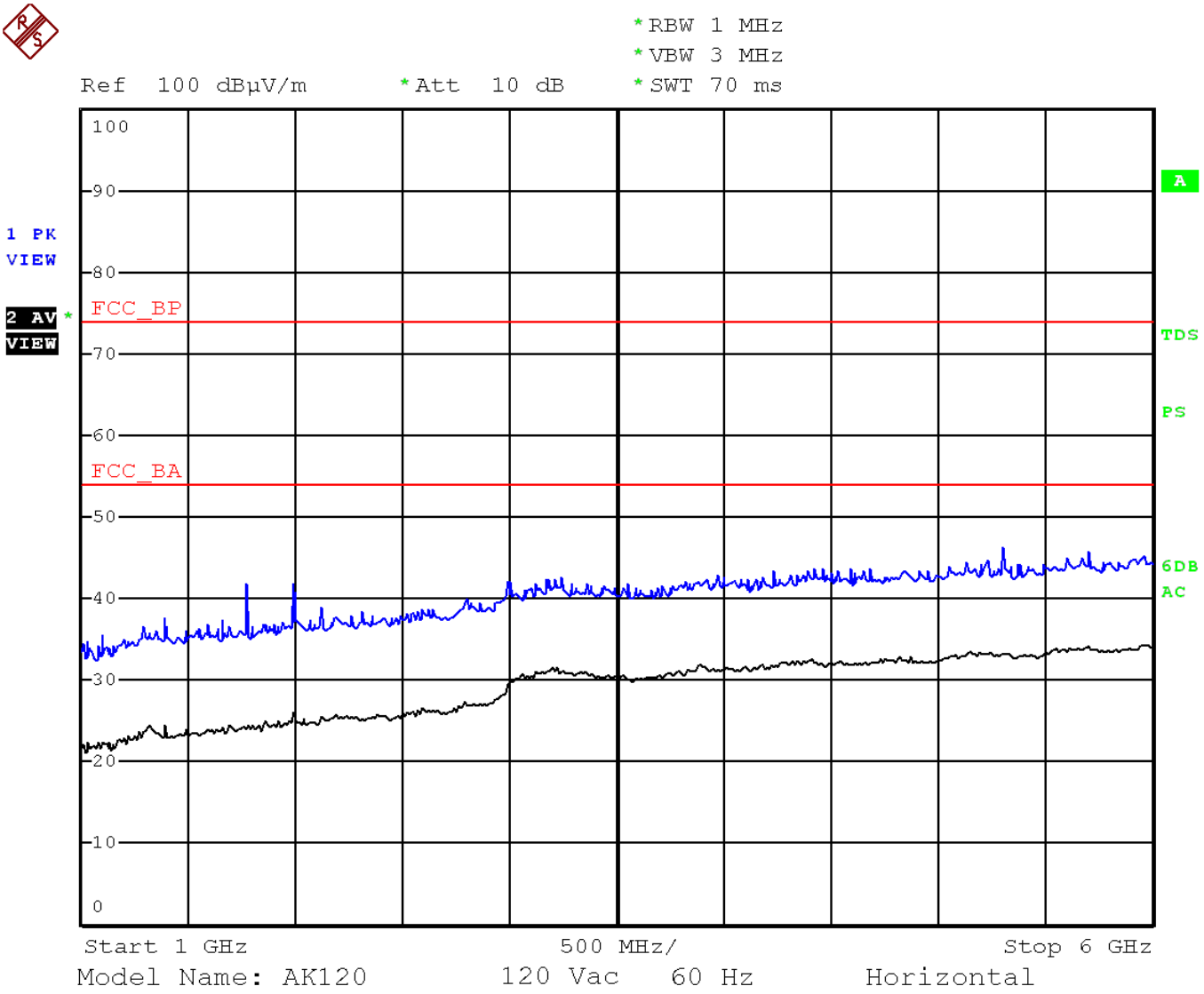
Freq. (GHz)	Reading (dBuV/m)		Ant. (cm)	Limits (dBuV/m)		Margin (dB)		Result
	Peak	Average		Peak	Average	Peak	Average	
1.391	40.18	25.52	100.00	74.00	54.00	33.82	28.48	Pass
1.543	44.66	23.80	100.00	74.00	54.00	29.34	30.20	Pass
1.664	46.36	26.05	100.00	74.00	54.00	27.64	27.95	Pass
1.752	44.40	27.90	100.00	74.00	54.00	29.60	26.10	Pass
1.994	49.03	27.67	100.00	74.00	54.00	24.97	26.33	Pass
2.603	43.04	26.79	100.00	74.00	54.00	30.96	27.21	Pass

Radiated Emissions

Above 1GHz

Charging mode

Horizontal



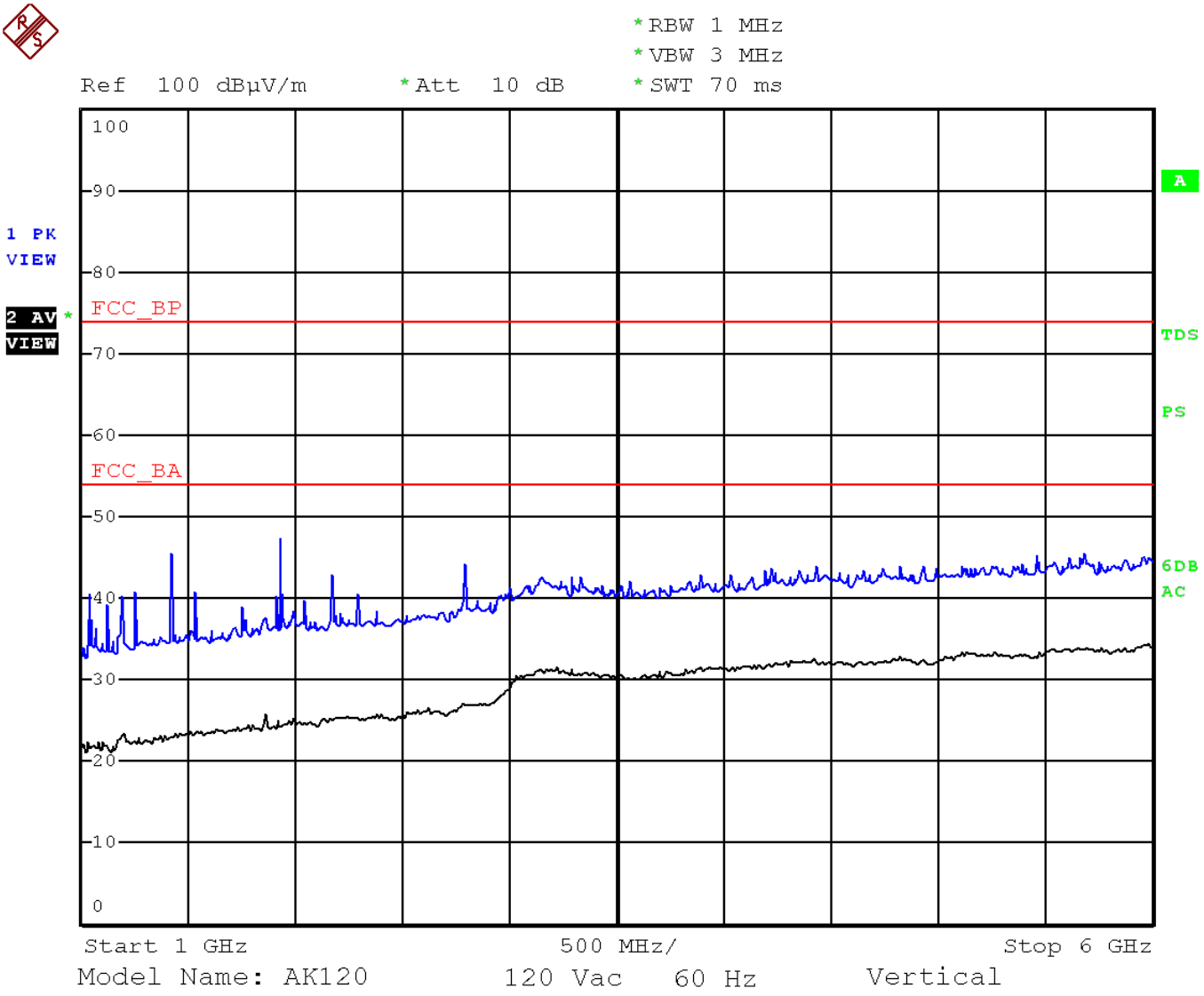
Freq. (GHz)	Reading (dBuV/m)		Ant. (cm)	Limits (dBuV/m)		Margin (dB)		Result
	Peak	Average		Peak	Average	Peak	Average	
1.392	37.67	24.54	100.00	74.00	54.00	36.33	29.46	Pass
1.771	41.83	24.11	100.00	74.00	54.00	32.17	29.89	Pass
1.993	41.75	26.03	100.00	74.00	54.00	32.25	27.97	Pass
2.995	42.07	29.62	100.00	74.00	54.00	31.93	24.38	Pass
5.302	46.31	33.20	100.00	74.00	54.00	27.69	20.80	Pass
5.701	45.82	34.29	100.00	74.00	54.00	28.18	19.71	Pass

Radiated Emissions

Above 1GHz

Play mode

Vertical



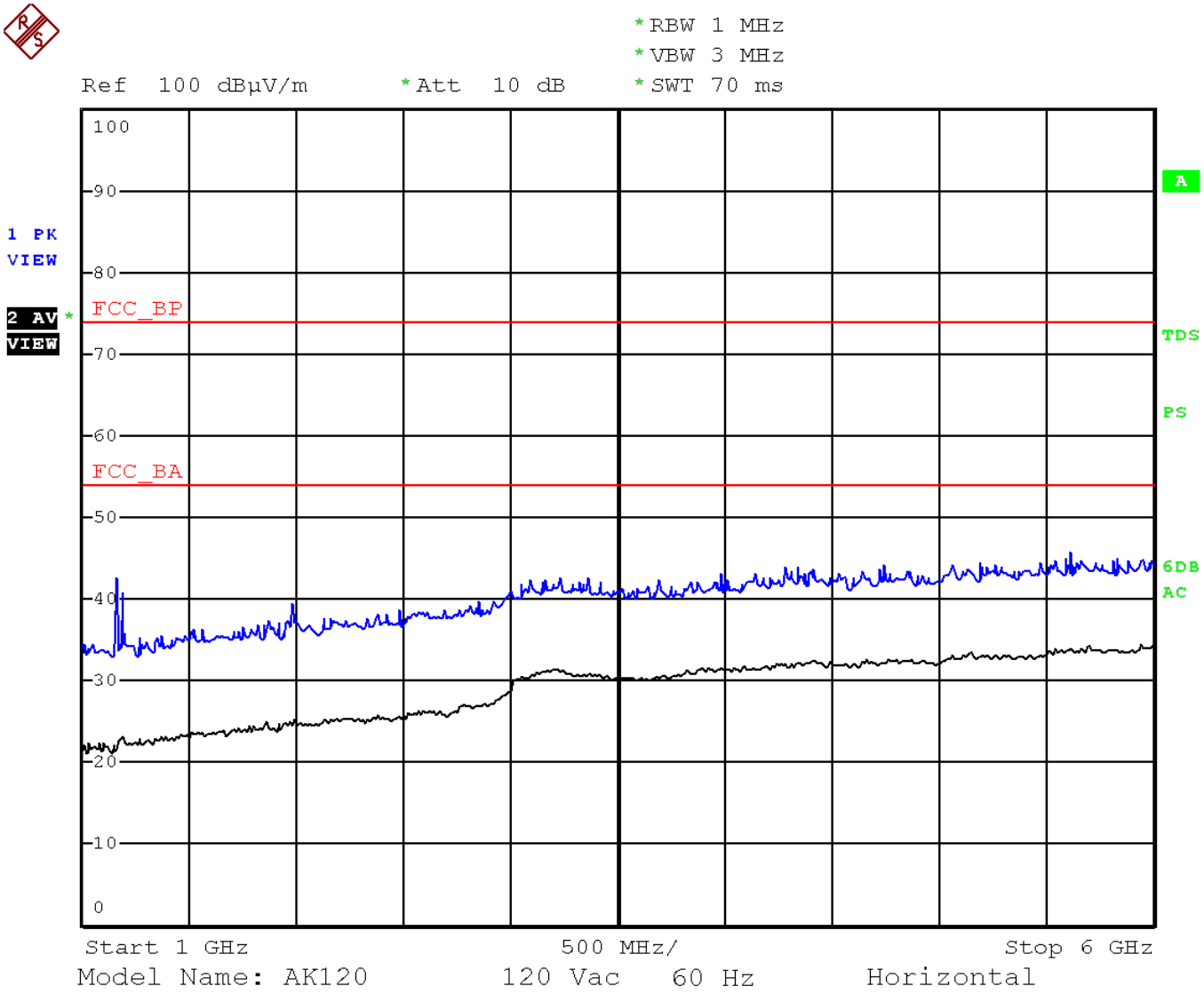
Freq. (GHz)	Reading (dBuV/m)		Ant. (cm)	Limits (dBuV/m)		Margin (dB)		Result
	Peak	Average		Peak	Average	Peak	Average	
1.042	40.63	21.53	100.00	74.00	54.00	33.37	32.47	Pass
1.253	40.92	22.84	100.00	74.00	54.00	33.08	31.16	Pass
1.424	45.42	22.97	100.00	74.00	54.00	28.58	31.03	Pass
1.932	47.49	24.25	100.00	74.00	54.00	26.51	29.75	Pass
2.173	42.82	25.10	100.00	74.00	54.00	31.18	28.90	Pass
2.794	44.17	27.02	100.00	74.00	54.00	29.83	26.98	Pass

Radiated Emissions

Above 1GHz

Play mode

Horizontal



Model Name: AK120 120 Vac 60 Hz Horizontal

Freq. (GHz)	Reading (dBuV/m)		Ant. (cm)	Limits (dBuV/m)		Margin (dB)		Result
	Peak	Average		Peak	Average	Peak	Average	
1.162	42.57	21.66	100.00	74.00	54.00	31.43	32.34	Pass
1.193	40.70	23.14	100.00	74.00	54.00	33.30	29.86	Pass
1.982	39.53	24.53	100.00	74.00	54.00	34.47	29.47	Pass
3.235	42.72	31.19	100.00	74.00	54.00	31.28	22.81	Pass
4.741	44.22	32.22	100.00	74.00	54.00	29.78	21.78	Pass
5.612	45.67	33.96	100.00	74.00	54.00	28.33	20.04	Pass