ESTECH Co., Ltd.
Rm 1015, World Venture Center II,
426-5 Gasan-dong, Guncheon-gu,
Seoul, 158-803, Korea

Electromagnetic Interference Test Report

Test Report for FCC

Report Number		ESTF151308-001		
Applicant	Company name	Suprema Inc.		
	Address	16F Parkview Tower, Jeongja-dong, Bundang-gu, Seongnam, Gyeonggi, 463-863 Korea		
	Contact Person	HyeongGak Lim	Telephone	82-31-710-2442
Product	Product name	BioMini/SFU Slim(S20)		
	Model No.	BioMini/SFU Slim(S20)	Manufacturer	Suprema Inc.
	Serial No.	NONE	Country of origin	KOREA
Test date	2013/7/16 ~ 2013/7/16		Date of issue	1-Aug-13
Testing location	ESTECH Co., Ltd. 97-1, Hoeeok-ri, Majang-myeon, Icheon-si, Gyeonggi-do, Korea			
Standard	FCC PART 15 (2010) , ANSI C 63.4 (2009)			
Test item	■ Conducted Emission	■ Class A □ Class B	Test result	OK
	■ Radiated Emission	■ Class A □ Class B	Test result	OK
Measurement facility registration number	659627			
Tested by	Senior Engineer S. Y. Lee	(Signature)		
Reviewed by	Engineering Manager J.M.Yang	(Signature)		
Abbreviation	OK, Pass = Complied, Fail = Failed, N/A = not applicable			

* Note

- This test report is not permitted to copy partly without our permission
- This test result is dependent on only equipment to be used
- This test result based on a single evaluation of one sample of the above mentioned

Contents

1. Laboratory Information

1.1 General

This EUT (Equipment Under Test) has been shown to be capable of compliance with the applicable technical standards and is tested in accordance with the measurement procedures as indicated in this report.ESTECH Lab attests to accuracy of test data. All measurement reported herein were performed by ESTECH Co., Ltd.
ESTECH Lab assume full responsibility for the completeness of these measurements and vouch for the qualifications of all persons taking them.

1.2 Test Lab.

Corporation Name : ESTECH Co., Ltd.

Head Office : Rm 1015, World Venture Center II, 426-5, Gasan-dong, Geumcheon-gu, Seoul, Korea

EMC Test Lab : 97-1, Hoeeok-ri, Majang-myeon, Icheon-si, Gyeonggi-do, Korea

1.3 Official Qualification(s)

KCC : Granted Accreditation from Ministry of Information & Communication for EMC, Safety and Telecommunication
KOLAS : Accredited Lab By Korea Laboratory Accreditation Schema base on CENELEC requirements
FCC : Conformity Assessment Body(CAB) with registration number 659627 under APEC TEL MRA between the RRA and the FCC.
VCCI : Granted Accreditation from Voluntary Control Council for Interference from ITE

2. Description of EUT

2.1 Summary of Equipment Under Test

Power Rating	:	USB PORT(5 Vd.c.)
Receipt Date	:	16-Jul-13
X-tal list(s) or Frequencies generated	:	The highest operating frequency is 480 Mbps

2.2 General descriptions of EUT

Section	Specification
Sensor technology	Optical
Sensing area	17.0mm x 25.0mm
Image size(pixels)	320 x 480
Image resolution	500 dpi
Interface	USB 2.0 high speed and full speed
Dimension	82mm(W) X 57.7mm(L) X 27mm(H)
Weight	Approximately 120g
USB Cable Length	Approximately 1450mm
Operating temperature	-10 °C ~ 50 °C
Max Current	5VDC / 320mA

3. Test Standards

Test Standard : FCC PART 15 (2010)

This Standard sets out the regulations under which an intentional, unintentional, or incidental radiator may be operated without an individual license. It also contains the technical specifications, administrative requirements and other conditions relating to the marketing of Part 15 devices.

Test Method : ANSI C 63.4 (2009)

This standard sets forth uniform methods of measurement of radio-frequency (RF) signals and noise emitted from both unintentional and intentional emitters of RF energy in the frequency range 9 kHz to 40 GHz. Methods for the measurement of radiated and AC power-line conducted radio noise are covered and may be applied to any such equipment unless otherwise specified by individual equipment requirements. These methods cover measurement of certain decides that deliberately radiate energy, such as intentional emitters, but does not cover licensed transmitters. This standard is not intended for certification/approval of avionic equipment or for industrial, scientific, and medical (ISM) equipment These method apply to the measurement of individual units or systems comprised of multiple units

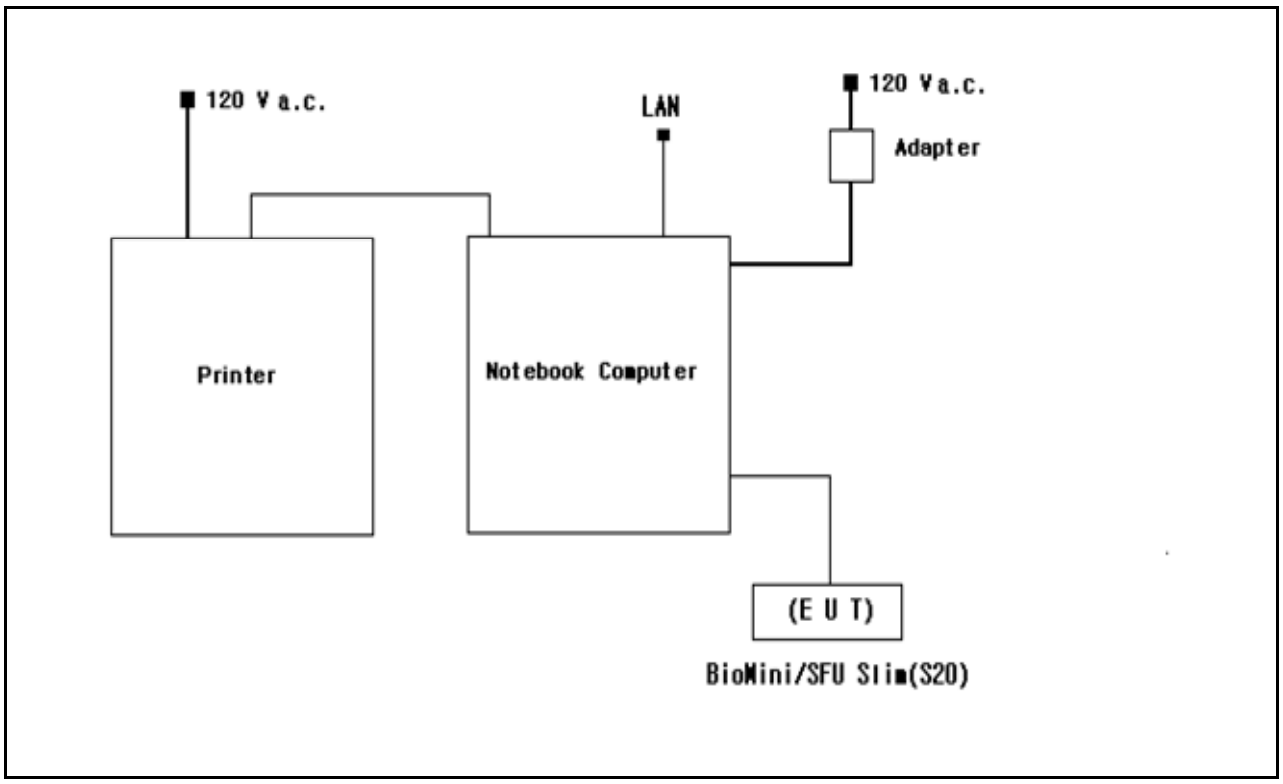
4. Measurement Condition

4.1 EUT Operation.

- The EUT was in the following operation mode during all testing

1. Connect the EUT to USB port of the Note PC.
2. Install the provided test program by the manufacturer.
3. Execute the test program and check the operating status of the EUT.
   - Check fingerprint detection and display on the note pc continuously

4.2 Configuration and Peripherals



4.5 EUT and Support equipment

Equipment Name	Model Name	S/N	Manufacturer	Remark (FCC ID)
BioMini/SFU Slim(S20)	BioMini/SFU Slim(S20)	NONE	Suprema Inc.	EUT
Notebook Computer	DV5-1206XT	CNF9100JMW	HEWLETT-PACKARD COMPANY	
ADAPTER	PPP012L-E	0105624202	Suzhou Li Shin Electronic Co., Ltd	
Printer	K10229	NONE	CANON VIETNAM CO,. LTD	

4.6 Cable Connecting

Start Equipment		End Equipment		Cable Standard		Remark
Name	I/O port	Name	I/O port	Length	Shielded	
BioMini/SFU Slim(S20)	USB	Notebook Computer	USB	2.0	Shielded	
Notebook Computer	POWER	ADAPTER	-	2.0	Shielded	
Notebook Computer	USB	Printer	USB	2.0	Shielded	
Notebook Computer	LAN	External Network	LAN	20.0	Unshielded	

5. Measurement of radiated disturbance

Above 30 MHz Electric Field strength was measured in accordance with FCC PART 15 (2010) . The test setup was made according to ANSI C 63.4 (2009) on an open test site, which allows a 3 m distance measurement. The EUT was placed in the center of wooden turntable. The height of this table was 0.8 m. The measurement was conducted with both horizontal and vertical antenna polarization. The turntable has fully rotated. For further description of the configuration refer to the picture of the test setup.

5.1 Measurement equipments

Equipment Name	Type	Manufacturer	Serial No.	Next Calibration date
TEST Receiver	ESCI7	ROHDE & SCHWARZ	1166.5950.07	25-Jan-14
Logbicon Antenna	VULB 9168	SCHWARZBECK	237	24-Jan-14
Turn Table	DT3000-2t	Innco System GmbH	N/A	-
Antenna Mast	MA4000-EP	Innco System GmbH	N/A	-
PREAMPLIFIER	8449B	AGILENT	3008A00595	25-Jan-14
Horn Antenna	BBHA9120D	SCHWARZBECK	469	21-Oct-13
Test Receiver	ESPI7	ROHDE & SCHWARZ	100185	25-Jan-14
Turn Table	DT1500-S	Innco System GmbH	N/A	-
Antenna Mast	MA4000-EP	Innco System GmbH	N/A	-
Antenna Master & Turn table controller	C02000-P	Innco System GmbH	CO2000/642 /28051111/L	-

5.2 Environmental Condition

Below 1 GHz -Test Place : 10 m Semi-anechoic chamber

Temperature (°C) : 21.4 ℃

Humidity (% R.H.) : 52.2 % R.H.

Above 1 GHz-Test Place : 3 m Semi-anechoic chamber

Temperature (°C) : 20.2 ℃

Humidity (% R.H.) : 55.5 % R.H.

5.3 Test data (Below 1 GHz)

Test Date : 16-Jul-13 Measurement Distance : 10 m

Frequency (MHz)	Reading (dBμV)	Position (V/H)	Height (m)	Correction Factor		Result Value(Quasi-peak)		
				Ant Factor (dB)	Cable (dB)	Limit (dBμV/m)	Result (dBμV/m)	Margin (dB)
59.80	15.26	V	1.0	12.13	1.28	39.10	28.67	10.43
144.00	11.07	V	1.0	12.27	1.95	43.50	25.29	18.21
184.00	14.72	V	1.0	10.61	2.19	43.50	27.52	15.98
230.70	16.57	V	1.0	10.53	2.40	46.50	29.50	17.00
276.60	14.42	V	1.0	12.38	2.62	46.50	29.42	17.08
330.10	9.72	H	3.0	14.01	2.85	46.50	26.58	19.92
420.00	9.15	H	2.0	16.18	3.20	46.50	28.53	17.97
480.10	8.78	H	2.0	17.32	3.40	46.50	29.50	17.00

Remark	H : Horizontal, V : Vertical *Result Value = Reading + Ant Factor + Cable loss *Margin= Limit - Result *The resolution bandwidth and video bandwidth of test receiver/spectrum analyzer is 120 kHz for Quasi-peak detection

5.4 Test data (Above 1 GHz)

Test Date : 16-Jul-13 Measurement Distance : 3 m

Frequency (MHz)	Reading (dBμV)	Position (V/H)	Height (m)	Correction Factor		Result Value		
				Ant Factor (dB)	Cable (dB)	Limit (dBμV/m)	Result (dBμV/m)	Margin (dB)
Peak(RBW:1 MHz VBW:1 MHz)								
1760.00	43.59	V	1.0	25.53	-29.58	80.00	39.54	40.46
1944.00	46.93	V	1.0	25.80	-29.07	80.00	43.67	36.33
2384.00	43.53	H	1.0	26.97	-28.09	80.00	42.41	37.59
5660.00	55.74	H	1.0	32.20	-22.48	80.00	65.46	14.54
Average(RBW:1 MHz VBW:10 Hz)								
1760.00	33.14	V	1.0	25.53	-29.58	60.00	29.09	30.91
1944.00	34.59	V	1.0	25.80	-29.07	60.00	31.33	28.67
2384.00	35.95	H	1.0	26.97	-28.09	60.00	34.83	25.17
5660.00	43.81	H	1.0	32.20	-22.48	60.00	53.53	6.47

Remark

H : Horizontal, V : Vertical
* Result Value = Reading + Ant Factor + Cable loss - Amplifier Gain
* Margin= Limit - Result
* The resolution bandwidth and video bandwidth of spectrum analyzer is 1 MHz and 10 Hz for average detection at frequency above 1 GHz.
* The EUT was measured up to 6 GHz frequency range but the highest operating frequency of the EUT is 480 Mps.
*Application method of the highest frequency is in the following
*Highest frequency of the EUT is less than 108 MHz, the measurement shall only be made up to 1 GHz.
*Highest frequency of the EUT is between 108 MHz and 500 MHz, the measurement shall only be made up to 2 GHz.
*Highest frequency of the EUT is between 500 MHz and 1 GHz, the measurement shall only be made up to 5 GHz.
*Highest frequency of the EUT is above 1 GHz, the measurement shall be made up to 5 times the highest frequency or 40 GHz,

6. Measurement of conducted disturbance

The continuous disturbance voltage of AC Mains in the frequency from 0.15 MHz to 30 MHz was measured in accordance to FCC PART 15 (2010) . The test setup was made according to ANSI C 63.4 (2009) in a shielded room. The EUT was placed on a non-conductive table at least 0.8 m above the ground plan. A grounded vertical reference plane was positioned in a distance of 0.4 m from the EUT. The distance from the EUT to other metal surfaces was at least 0.8 m. The EUT was only earthen by its power cord through the line impedance stabilizing network. The power cord has been bundled to a length of 1.0 m. The test receiver with Quasi Peak detector complies with CISPR 16.

6.1 Measurement equipments

Equipment Name	Type	Manufacturer	Serial No.	Next Calibration date
EMI TEST Receiver	ESHS 10	Rohde & Schwarz	844077/018	25-Jan-14
LISN	ENV216	Rohde & Schwarz	101231	25-Jan-14
LISN	ESH3-Z5	Rohde & Schwarz	838979/010	25-Jan-14
Pulse Limiter	ESH3Z2	Rohde & Schwarz	NONE	25-Jan-14

6.2 Environmental Condition

Test Place : Shielded Room

Temperature (°C) : 21.3 ℃

Humidity (% R.H.) : 52.3 % R.H.

6.3 Test data

Test Date : 16-Jul-13

Frequency (MHz)	Correction Factor		Line (H/N)	Quasi-peak Value			Average Value		
	Lisn (dB)	Cable (dB)		Limit (dBμV)	Reading (dBμV)	Result (dBμV)	Limit (dBμV)	Reading (dBμV)	Result (dB)
0.15	0.12	0.17	H	79.00	55.70	55.99	66.00	39.94	40.23
0.17	0.13	0.17	N	79.00	47.90	48.20	66.00		
0.19	0.13	0.16	H	79.00	46.20	46.49	66.00		
0.20	0.13	0.16	N	79.00	46.06	46.35	66.00		
0.24	0.13	0.16	N	79.00	47.76	48.05	66.00		
0.25	0.13	0.16	H	79.00	44.42	44.71	66.00		

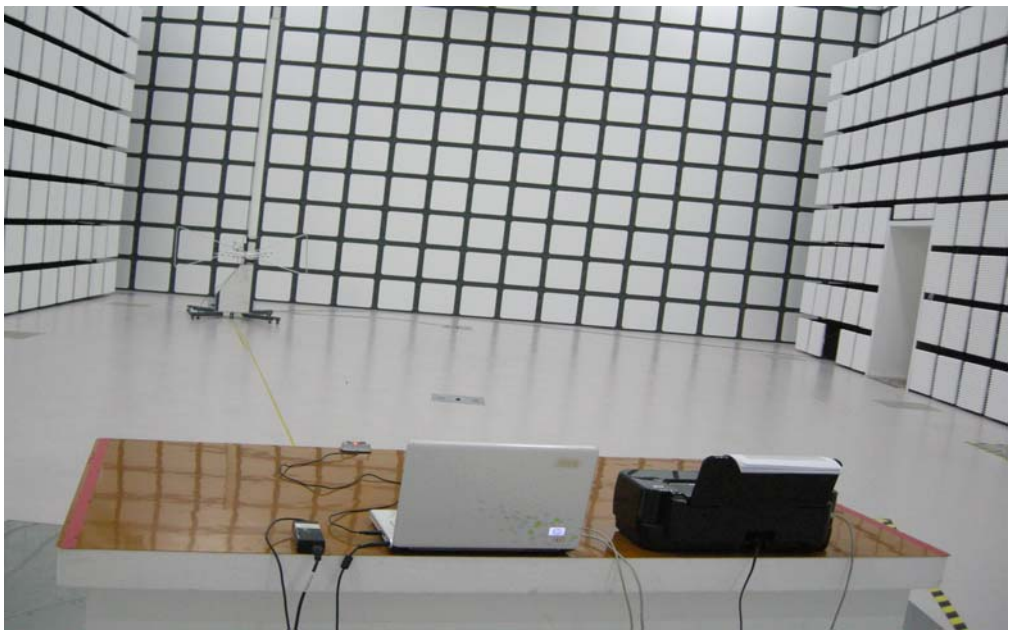
Remark	H : Hot Line, N : Neutral Line *Correction Factor = Lisn + Cable *Result = Correction Factor + Reading

7. Photographs of test setup

7.1 Setup for Radiated Test : 30 MHz ~ 1000 MHz

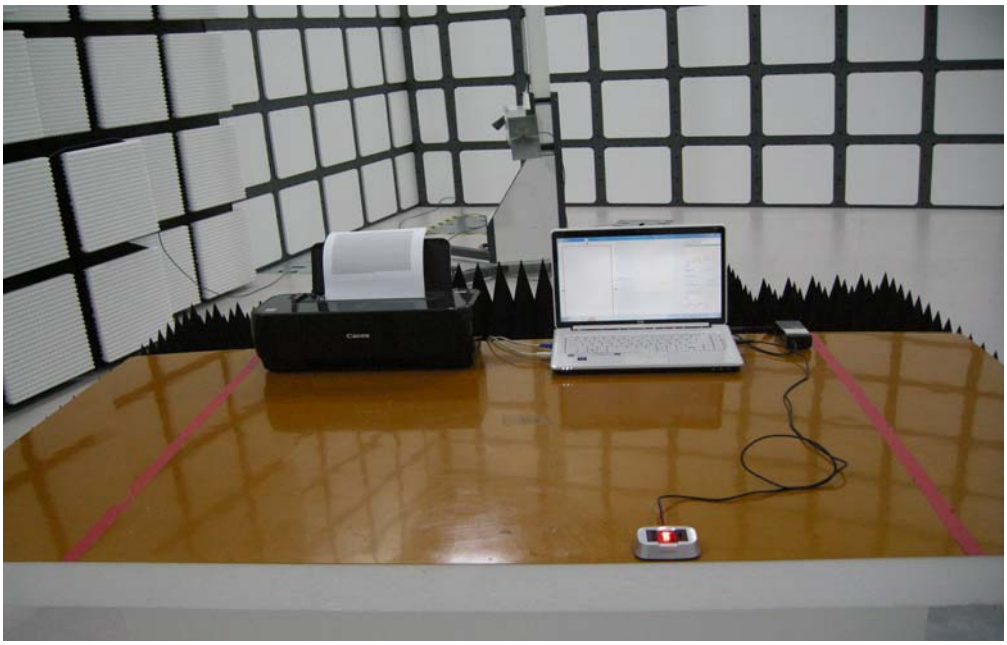
[Front]

[Rear]

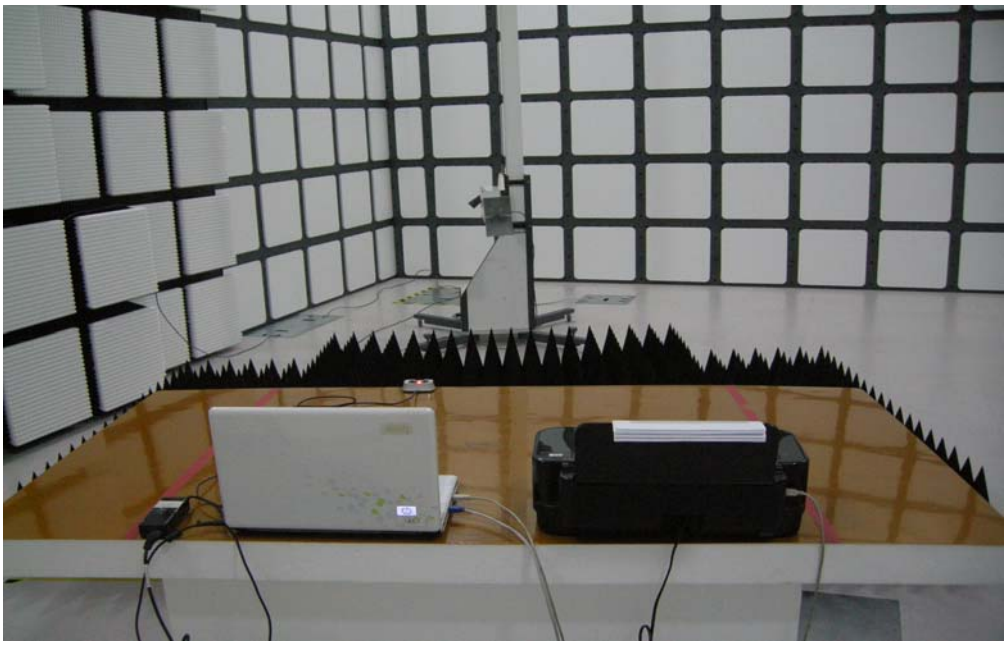


7.2 Setup for Radiated Test : Above 1 GHz

[Front]



[Rear]



7.3 Setup for Conducted Test : 0.15 MHz ~ 30 MHz

[Front]

[Rear]

8. Photographs of EUT

[Front]

[Rear]

Appendix 1. Special diagram

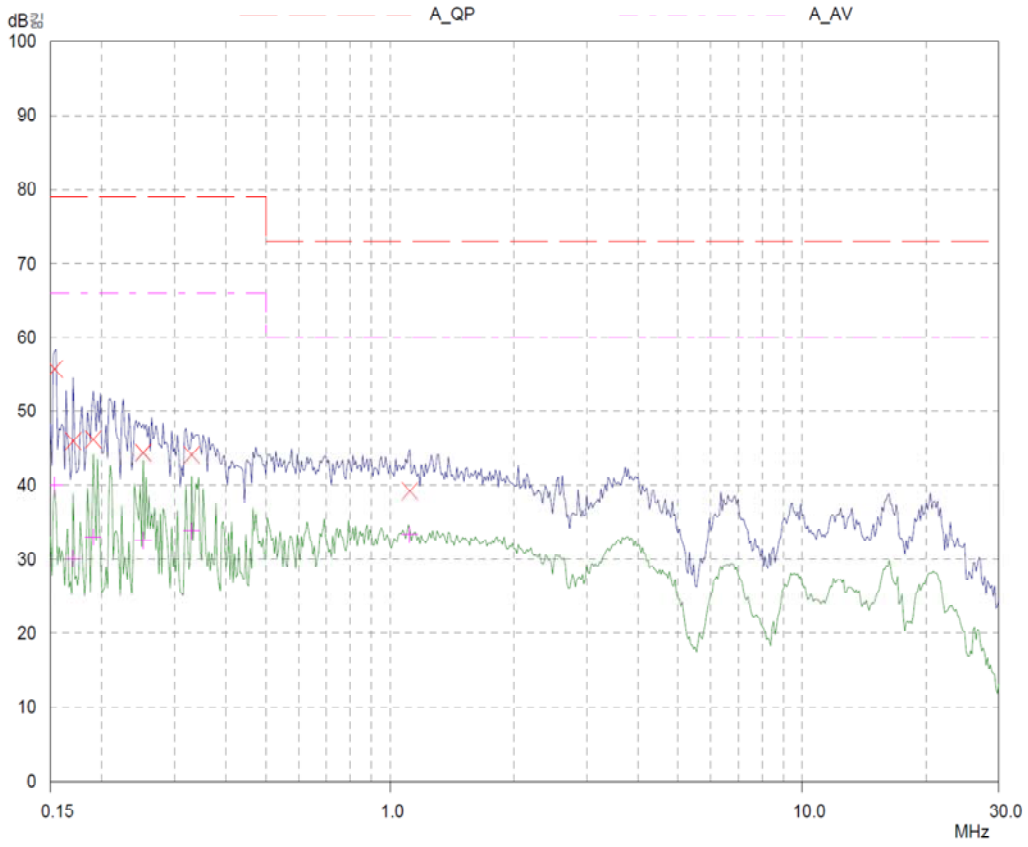
*HOT
ES TECH
HOT

16 Jul 2013 15:45

EUT:	BioMini/SFU Slim(S20)
Manuf:	
Op Cond:	120 Va.c.
Operator:	S.Y. LEE
Test Spec:	CLASS A
Comment:	
Result File:	130801_h.dat :
Scan Settings	(1 Range)

Frequencies			Receiver Settings					
Start	Stop	Step	IF BW	Detector	M-Time	Atten	Preamp	OpRge
150kHz	30MHz	0.8%	10kHz	PK+AV	10msec	Auto	OFF	60dB

Final Measurement:	Detectors:	X QP / + AV
	Meas Time:	1sec
	Subranges:	25
	Acc Margin:	0 dB



*NEUTRAL

ES TECH

16 Jul 2013 15:41

NEUTRAL

EUT:	BioMini/SFU Slim(S20)
Manuf:	
Op Cond:	120 Va.c.
Operator:	S.Y. LEE
Test Spec:	CLASS A
Comment:	

Result File: 130801_n.dat :

Scan Settings (1 Range)

Frequencies			Receiver Settings					
Start	Stop	Step	IF BW	Detector	M-Time	Atten	Preamp	OpRge
150kHz	30MHz	0.8%	10kHz	PK+AV	10msec	Auto	OFF	60dB

Final Measurement:

Detectors:	X QP / + AV
Meas Time:	1sec
Subranges:	25
Acc Margin:	0 dB