GERI Gumi Electronics & Information Technology Research Institute
Cheomdangieop 1-ro 17, Sandong-myeon, Gumi, Gyeongbuk, Korea
TEL : 054-479-2002 FAX : 054-479-2080

TEST REPORT

Receipt No.: G-1710-EE-3553 Date of Receipt: October 16, 2017

Client: NINANO Inc.

Address: (50465)190, Yongjeonsaneopdanji-gil, Samnangjin-eup, Miryang-si, Gyeongsangnam-do, Republic of Korea

Test Sample: Electromagnetic Shielding material(#Sample No.1 ~ #Sample No.10)

Date of Test: October 20, 2017

Location: GERI

Test Results

Test Item	Test Method	Unit	Test Result	Note
Shielding Effectiveness	method of client's request	dB	See the 'test results'	-

Affirmation	Tested by Name : Hyo-Jin Jeong (Signature)	Technical Manager Name : Hyung-Soon Park (Signature)

2020. 06. 02.

Gumi Electronics & information technology Research Institute

Report Code: 5020-6441-2830

Test Results

Ⅰ. General specifications

A. Test Laboratory : GERI

B. Test Date : October 20, 2017

C. Measurement method : method of client's request

Ⅱ. DUT

A. Test sample : **Electromagnetic Shielding material(#Sample No.1 ~ #Sample No.10)**
(See the APPENDIX)

Ⅲ. Equipments

Description	Model	Manufacturer	Effective date of calibration
Network Analyzer	E5071C (S/N : MY46102706)	Agilent	2020.07.09
Coaxial Fixed Attenuator	PNR 2205-10 (S/N : J637610-05)	ATM Inc.	2020.07.07
Coaxial Fixed Attenuator	PNR 2205-10 (S/N : J637610-06)	ATM Inc.	2020.07.07
Specimen holder	EM-2107A (S/N : -)	ELECTRO-METRICS	N/A

Ⅳ. Method

A. Measure the characteristic impedance of the specimen holder and confirm the (50 ± 0.5) Ω

B. Proceed with Network analyzer Calibration

C. Test the sample after attaching the reference sample of DUT to specimen holder

D. Replace the reference sample of the DUT with the load sample

E. Test the sample after attaching the load sample of DUT to specimen holder

F. Calculate shielding effectiveness measurement

※ Refer to 'ASTM D4935-18'

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Test Results

V. Measurement results

- Shielding effect test results

(Unit : dB)

Sample name	Frequency	Reference sample	Load sample	SE	Etc.
#Sample No.1	30 MHz	-19.539	-68.225	48.686	
	100 MHz	-19.555	-68.414	48.859	
	300 MHz	-19.583	-68.349	48.766	
	500 MHz	-19.605	-67.495	47.890	
	800 MHz	-19.647	-66.026	46.379	
	1 GHz	-19.680	-65.430	45.750	
	1.5 GHz	-19.733	-62.955	43.222	
#Sample No.2	30 MHz	-19.539	-69.855	50.316	
	100 MHz	-19.555	-69.696	50.141	
	300 MHz	-19.585	-69.568	49.984	
	500 MHz	-19.606	-69.385	49.780	
	800 MHz	-19.647	-69.503	49.856	
	1 GHz	-19.679	-70.094	50.415	
	1.5 GHz	-19.737	-69.098	49.361	
#Sample No.3	30 MHz	-19.540	-64.206	44.666	
	100 MHz	-19.559	-64.134	44.575	
	300 MHz	-19.589	-63.931	44.342	
	500 MHz	-19.611	-63.850	44.238	
	800 MHz	-19.652	-63.815	44.162	
	1 GHz	-19.684	-64.005	44.321	
	1.5 GHz	-19.742	-63.777	44.034	
#Sample No.4	30 MHz	-19.538	-73.506	53.968	
	100 MHz	-19.555	-73.620	54.064	
	300 MHz	-19.584	-73.976	54.392	
	500 MHz	-19.606	-74.768	55.163	
	800 MHz	-19.647	-74.630	54.983	
	1 GHz	-19.679	-76.261	56.582	
	1.5 GHz	-19.737	-76.673	56.936	