



TEST REPORT

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1. Report No : DRCKREL2510-0347 2. Customer • Name : VIONS INC. • Address : 12-35, Seounsaneop-ro 50beon-gil, Gyeyang-gu, Incheon, Republic of Korea 3. Use of Report : For quality control 4. Product Name / Model Name : Seismic Support Hanger / VOS-012-001 5. Test Method Used : Seismic Test Method for Telecommunication Facilities (National Radio Research Agency Announcement No. 2022-7) 6. Date of Test : September 05, 2025 7. Location of Test : ☒ Permanent Testing Lab ☐ On Site Testing (Address : 28, Baengnyeong-ro, 20Beon-gil, Cheoin-gu, Yongin-si, Gyeonggi-do, Korea) 8. Testing Environment : Temperature (25.0 ± 3.0) °C , Humidity (62.0 ± 3.0) % R.H. 9. Test Result : Refer to the attached Document The results shown in this test report refer only to the sample(s) tested unless otherwise stated. This laboratory is not accredited for the test results marked. * * *		
Affirmation	Tested by Name : Jeonggeun Lee 	Technical Manager Name : Seungsik Bong 
The above test report is the accredited test result by Korea Laboratory Accreditation Scheme, which signed the ILAC-MRA.		
October 15, 2025 Dt&C Co., Ltd. Accredited by KOLAS, Republic of KOREA		

If this report is required to confirmation of authenticity, please contact to report@dtnc.net



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1. SUMMARY

The excitation test was performed for "Seismic Support Hanger" in accordance with "National Radio Research Agency Announcement No. 2022-7 : Seismic Test Method for Communication Facilities". The excitation test was performed to demonstrate the structural integrity of the specimen under the specified excitation condition and the excitation test was performed by using Dt&C's tri-axial seismic simulator.

Required Response Spectrum (RRS) for the test specimen is determined by "National Radio Research Agency Announcement No. 2022-7 : Seismic Test Method for Communication Facilities". Tri-axial multi-frequency random motion was used for deriving the seismic simulator's motion. The random motion was amplitude-controlled in one-sixth octave bandwidths. For the excitation tests, earthquake wave excitation test (2 times) performed and the resonance search tests were performed before and after each earthquake wave excitation test.

Before, during and after excitation test, any obvious structural failures were not observed.

Based upon the results of the seismic testing, it is concluded that the subject equipment possesses sufficient structural integrity against the stress due to the given excitation event, therefore, the specimen has been qualified for the specified excitation conditions.

- RRS : Required Response Spectrum
- TRS : Test Response Spectrum

2. APPLICABLE DOCUMENT

National Radio Research Agency Announcement No. 2022-7 : Seismic Test Method for Communication Facilities



3. SPECIMEN IDENTIFICATION

3.1. Specimen Description

The description and figure of the specimen are shown in "Table 1" and "Figure 1". The size and weight of specimen is visual check and record.

<Table 1> Specimen Description

Description	Specification
Equipment Name	Seismic Support Hanger
Model Name	VOS-012-001
Manufacturer	VIONS INC.
Size	(W) 54.51 mm x (D) 54.51 mm x (H) 72.43 mm
Weight	Seismic Support Hanger (4 ea) : 0.67 kg Fixture : 172 kg Cable Tray (1/2) + Dummy : 134 kg Total : 306.67 kg

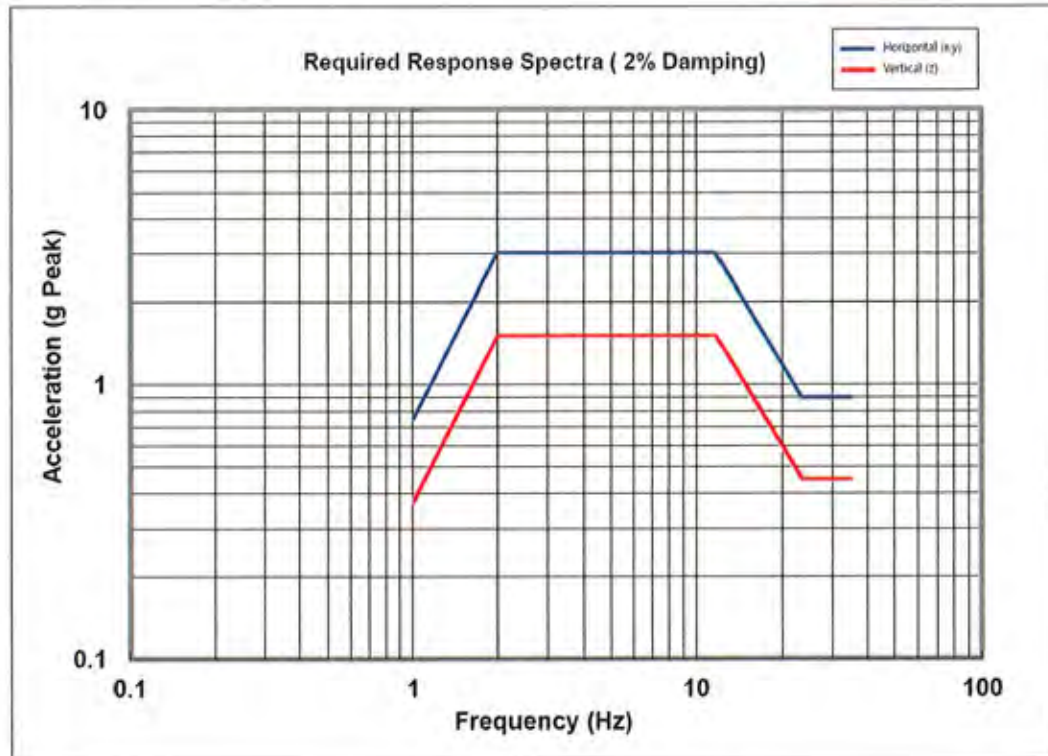


[Figure 1] Seismic Support Hanger – VOS-012-001



4. TEST QUALIFICATION REQUIREMENTS

"Figure 2" and "Table 2" show the required response spectra presented in "Seismic Test Method for Communication Facilities". For demand response spectra in the vertical direction, 50% of the zero period acceleration (ZPA) is used.



[Figure 2] Required Response Spectrum

<Table 2> Required Response Spectrum

Horizontal Direction		Vertical Direction	
Frequency (Hz)	Acceleration (g)	Frequency (Hz)	Acceleration (g)
1	0.75	1	0.375
2	3	2	1.5
11.67	3	11.67	1.5
23.33	0.9	23.33	0.45
35	0.9	35	0.45



5. SEISMIC TEST DETERMINATION CONDITION

- 1) There is no overturning or falling of the equipment to be tested.
- 2) There shall be no departure from the bottom of the equipment to be tested.
- 3) There shall be no departure components from the equipment.
- 4) There is no frame deformation or breakage of the equipment to be tested.
- 5) There shall be no deviation of the joints of the floor facilities or deviations from the fixed part of the shaking table.
- 6) There shall be no cracks, deformation or cutting of the anchoring, bolt, etc. fixing device itself.
- 7) There shall be no visible deformation or damage.



6. SEISMIC TEST METHOD

The seismic test of the test specimen was carried out according to the following procedure.
The results of the seismic test are as follows.

6.1. Initial Inspection

In the initial visual inspection, the presence or absence of abnormality of the product before the test was checked, and the components and the fixing state were confirmed.

6.2. Test Setup

The specimen was fixed in the same manner as "Table 3". Accelerometers were installed on the Table, Fixture, VOS-012-001, Cable Tray. The test setup is shown to "Figure 3"~"Figure 4".

<Table 3> Specimen Setup

Description	Bolt	Q'ty (EA)	Torque (kgf-cm)
Table - Fixture	M12 Bolt	8	770



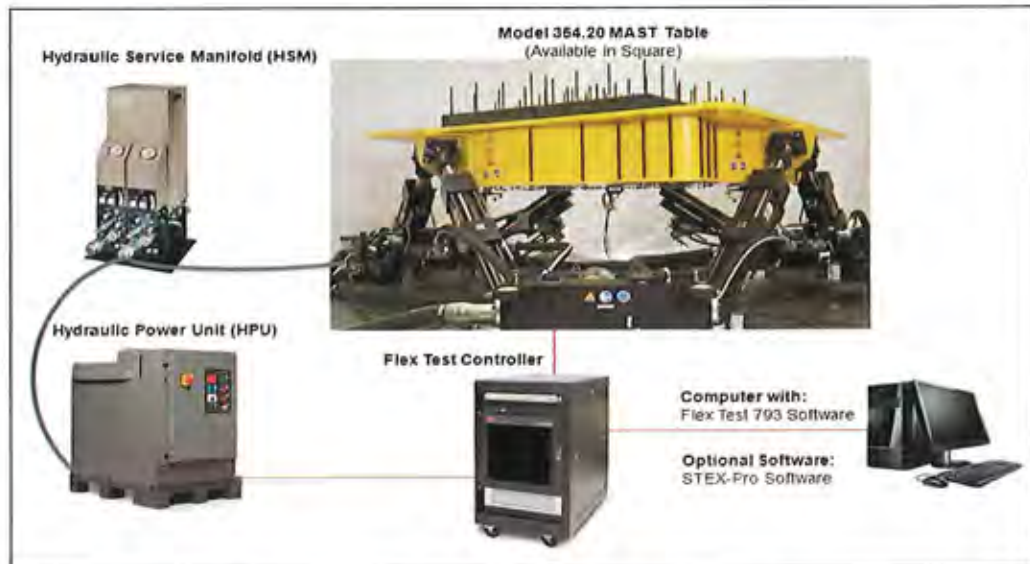
※ Note - X : Front-Back, Y : Side-side, Z : Vertical

[Figure 3] Seismic Test Setup



6.2.1. Test Facilities

Dt&C's shaker table information and measuring instrument are shown in "Figure 5", "Table 4" and "Table 5".



[Figure 4] 6 D.O.F Vibration System Configuration

<Table 4> 6 D.O.F Vibration System Specification

Description	Specification
Manufacturer	MTS systems Corporation
Table size	(2 200 x 2 200) mm
Max. Payload	2 000 kg
Excitation Axes	Translational 3 axes, Rotational 3 axes
Max. Displacement	Vertical (Z) : ± 140 mm Lateral (Y) : ± 110 mm Longitudinal (X) : ± 125 mm
Max. Acceleration, ZPA(2 000 kg)	Vertical (Z) : 6 g Lateral (Y) : 4.6 g Longitudinal (X) : 4.9 g
Simulation Frequency	(0.8 ~ 100) Hz
Excitation Mechanism	Electro-hydraulic Servo, 3 Variable Control



<Table 5> Measuring Instruments

Description	Model No. / Manufacturer	Serial No.	The Next Scheduled Calibration Date	Calibration Laboratory
SEISMIC TABLE	354.20 / MTS	SC-01-01	2026. 03. 18	SICT
ACCELEROMETER	8395A050ATTA00 / KISTLER	4789922	2026. 04. 11	SICT
		4789923	2026. 04. 11	SICT
		4789925	2026. 04. 14	SICT
	8396A050ATTA00 / KISTLER	5545364	2026. 05. 09	SICT
		5415979	2026. 04. 14	SICT
	8315A050ATTA00 / KISTLER	4795583	2026. 05. 07	SICT
		4795576	2026. 05. 07	SICT
		4795577	2026. 05. 07	SICT
HYGRO-THERMOMETER	TE-303N / CAS	191040	2026. 01. 17	SICT
ELECTRIC BLANCE (2 000 kg)	2THB / CAS	OA33	2026. 03. 10	SICT
ELECTRIC BLANCE (200 kg)	ES6200C / PRECISA	4800834	2026. 05. 30	SICT
TORQUE WRENCH	1800QL4-MH / TOHNICHI	113532E	2025. 11. 07	SICT
Digital Vernier Caliper	CD-30C / Mitutoyo	1207904	2026. 02. 14	SICT



6.3. Seismic Test

The seismic test was carried out for each item as follows.

6.3.1. Resonance Search Test

A low-level (approximately 0.2 g) single-axis sine sweep from (1 ~ 35) Hz was performed in each of the three orthogonal axes to determine major resonances. The sweep rate was 2 octave per minute. The resonance search tests were performed before and after earthquake wave excitation tests. The results of the resonance search test are shown in "Table 6".

<Table 6> Result of the resonance search test

Description		Before Excitation Test		After Excitation Test	
		1st Resonance ¹⁾ (Hz)	Amplitude (g/g)	1st Resonance ¹⁾ (Hz)	Amplitude (g/g)
X	Fixture	12.88	23.30	12.88	17.70
	VOS-012-001	13.00	27.20	12.88	20.10
	Cable Tray (1/2)	No Resonance		No Resonance	
Y	Fixture	12.88	24.00	12.88	28.20
	VOS-012-001	12.88	36.20	12.88	43.00
	Cable Tray (1/2)	No Resonance		No Resonance	
Z	Fixture	No Resonance		No Resonance	
	VOS-012-001	22.50	2.57	22.50	2.68
	Cable Tray (1/2)	12.13	4.48	12.13	4.58

¹⁾ 1st mode value of resonance search test



6.3.2. Excitation Test

The earthquake wave excitation test was performed by using the independent tri-axial test method. The test specimen was subjected a minimum of 20 seconds strong motion multi-frequency random motion which is amplitude-controlled in one-sixth octave bandwidths, spaced one-sixth octave apart over the frequency range of (1 ~ 35) Hz. The input motions of each axis were proved as statistically independent of each other. Test Response Spectrum (TRS) for the shake table motions were analyzed at 2 % attenuation constant for earthquake wave excitation test and plotted at one-sixth octave intervals over the frequency range of (1 ~ 35) Hz. The TRS were greater than the corresponding RRS, during and after earthquake wave excitation test, any noticeable damage and structural defects were not also observed. Maximum acceleration results are shown in "Table 7".

<Table 7> Maximum Acceleration during the excitation test

Description		Table (g)	Fixture (g)	VOS-012-001 (g)	Cable Tray (1/2) (g)
1st Excitation	X	1.12	4.27	9.41	0.45
	Y	1.03	5.11	11.57	5.32
	Z	0.80	0.86	4.07	4.95
2nd Excitation	X	1.12	4.37	8.33	0.54
	Y	1.07	4.98	12.68	4.96
	Z	0.68	0.91	4.97	5.06

6.4. Visual Inspection After Test

Visual inspection after the seismic test was performed that verified and checked whether the product was abnormal after the test, and confirmed the components and mounting state.



7. TEST RESULT

The seismic test successfully completed. The test results are below to "Table 8". The detailed test data are shown in "Attachment 1" ~ "Attachment 4"

<Table 8> Summary of Seismic Test Results

Description	Measuring & Acceptance Criteria	1st Excitation	2nd Excitation	Remark
TRS Envelop	(1 ~ 35) Hz (1/6 octave Analysis)	Enveloped	Enveloped	Refer to Attachment 2
Cross-correlation	Does not exceed 0.3	Satisfied	Satisfied	
Structural integrity	No Physical damages or defects	No abnormality	No abnormality	Refer to Attachment 1 ,3

8. CONCLUSION

"Seismic Support Hanger" was subjected to seismic tests under the conditions specified in "National Radio Research Agency Announcement 2022-7: Seismic Test Method for Communication Facilities", structural integrity were confirmed.



※ Attachment 1

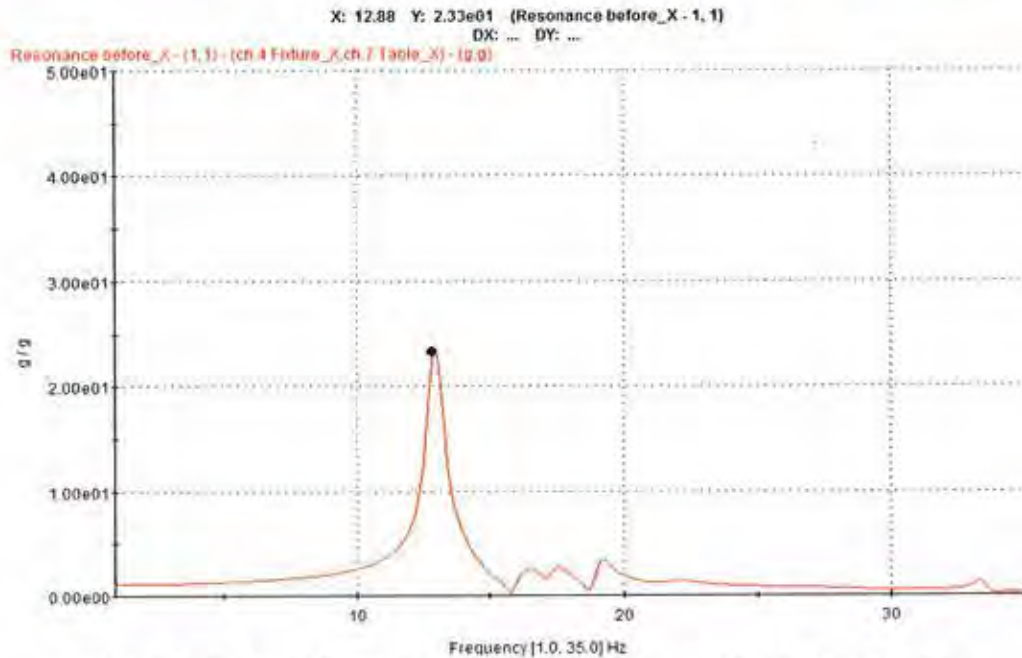
Resonance Search Test Data



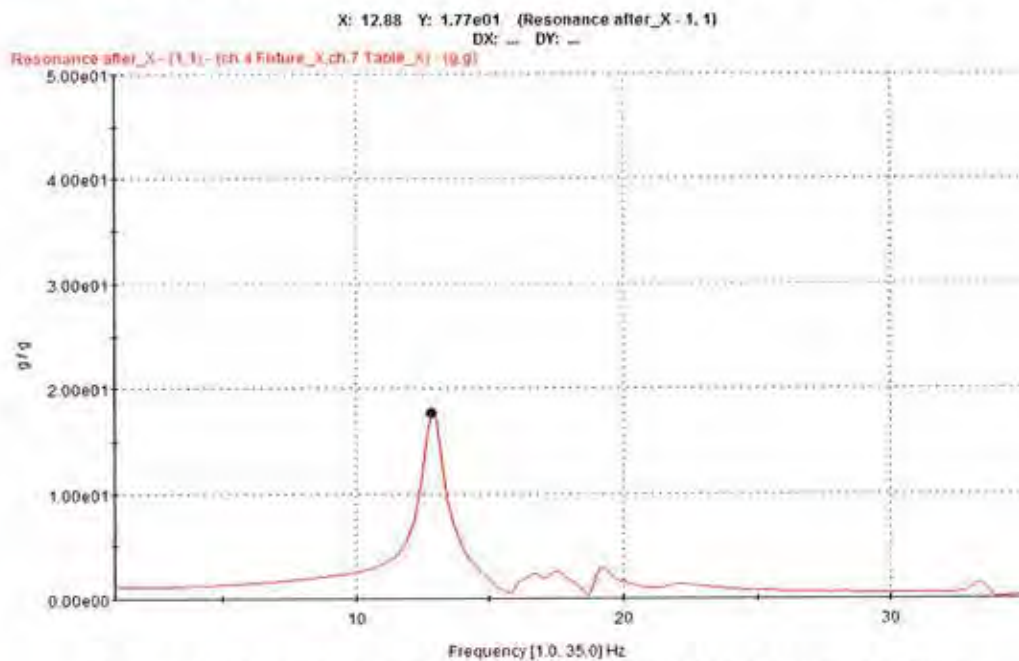
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[Figure 1-17] Z axis Resonance Search Test before Excitation Test – Cable Tray (1/2)
[Figure 1-18] Z axis Resonance Search Test after Excitation Test – Cable Tray (1/2)



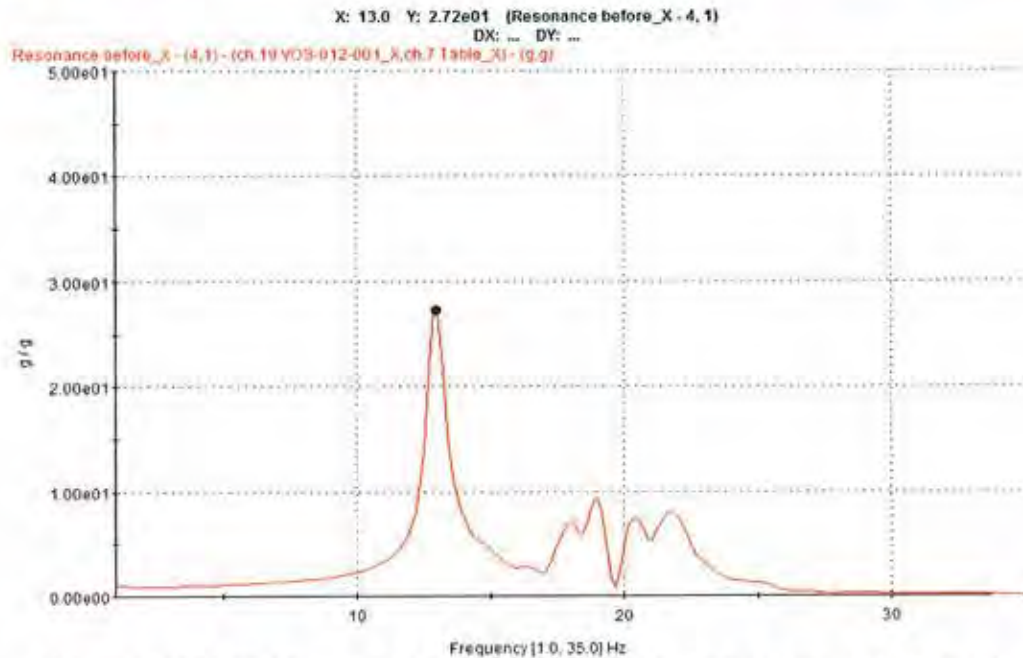


[Figure 1-1] X axis Resonance Search Test before Excitation Test - Fixture

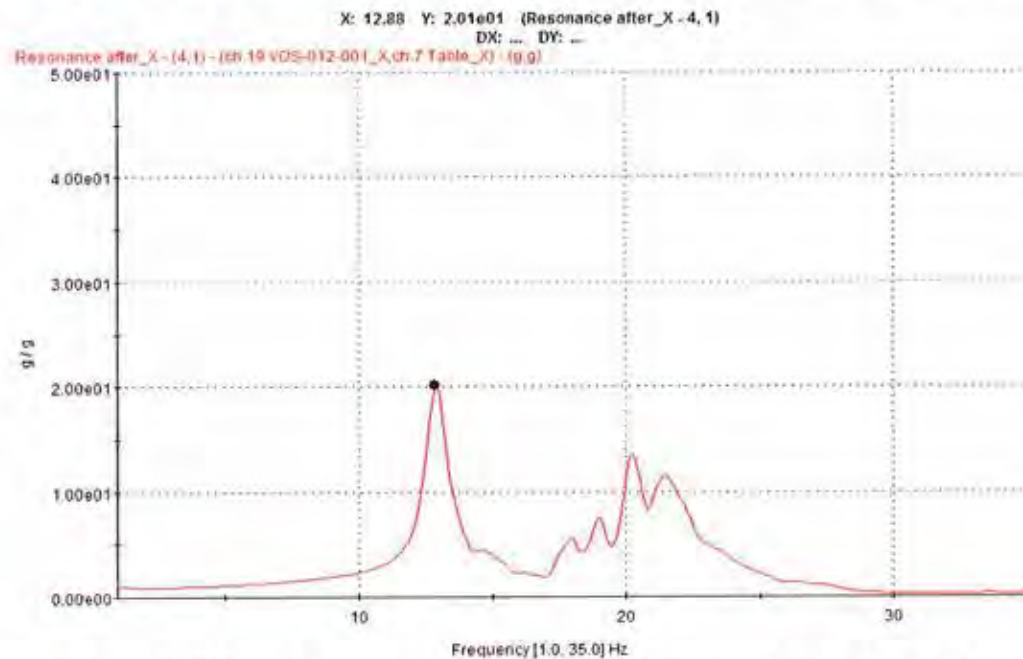


[Figure 1-2] X axis Resonance Search Test after Excitation Test - Fixture



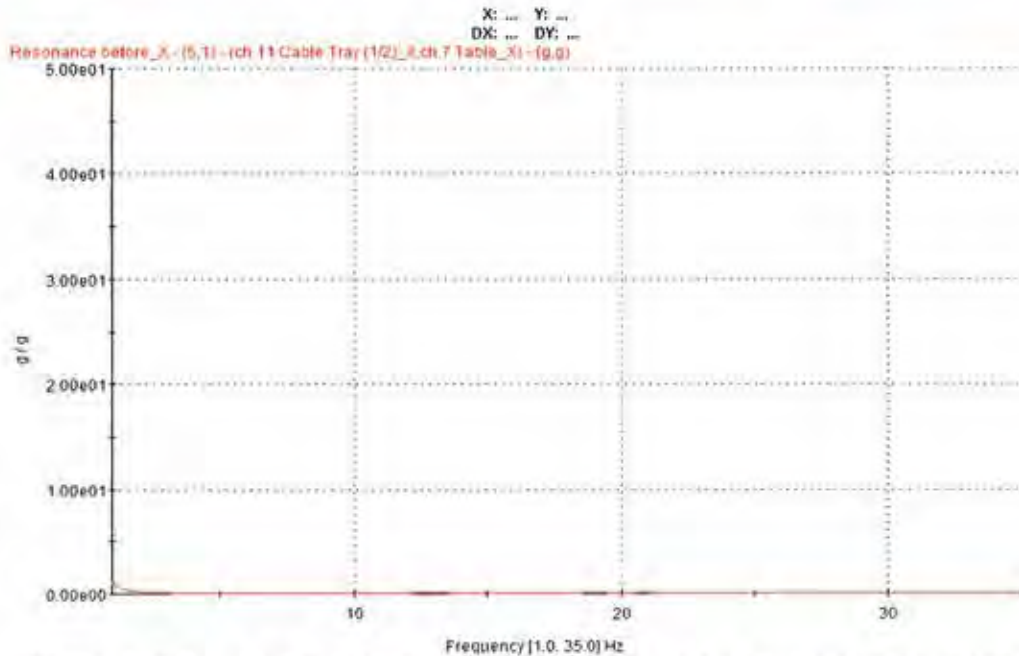


[Figure 1-3] X axis Resonance Search Test before Excitation Test - VOS-012-001

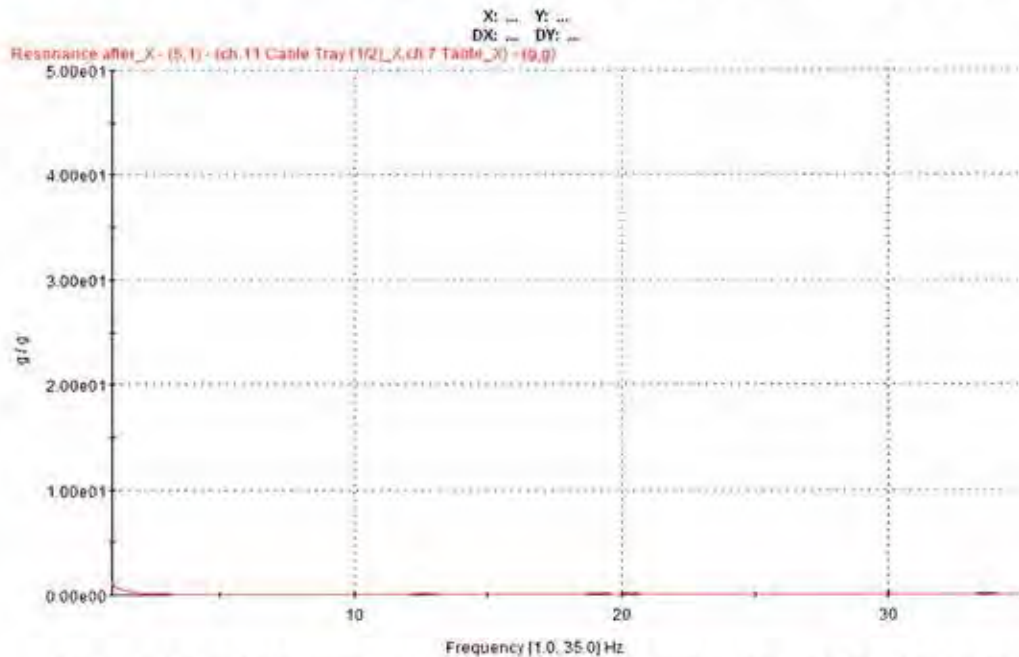


[Figure 1-4] X axis Resonance Search Test after Excitation Test - VOS-012-001



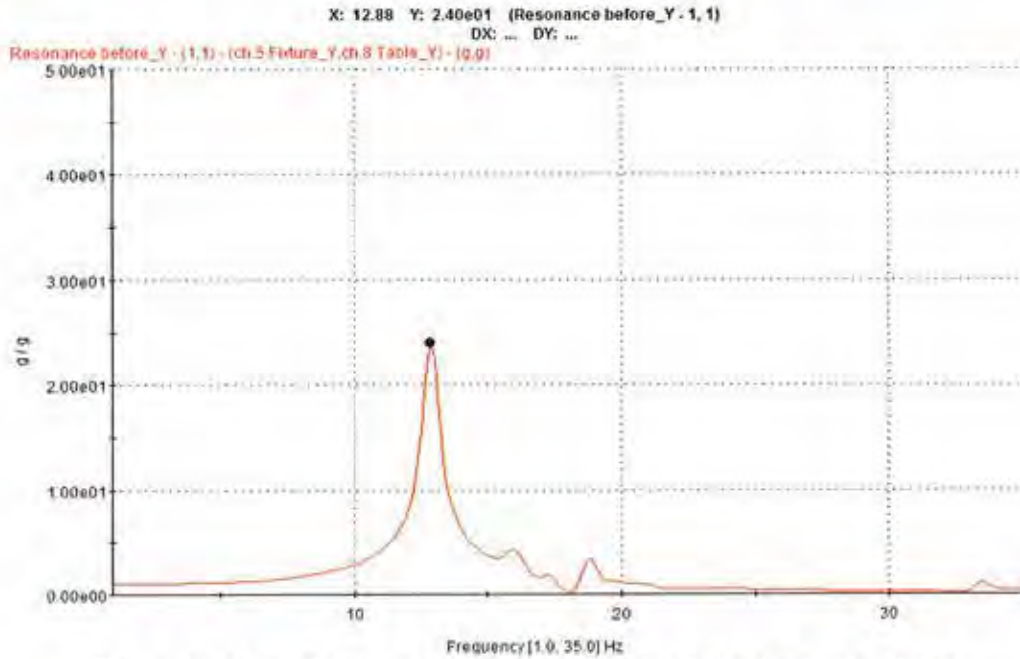


[Figure 1-5] X axis Resonance Search Test before Excitation Test – Cable Tray (1/2)

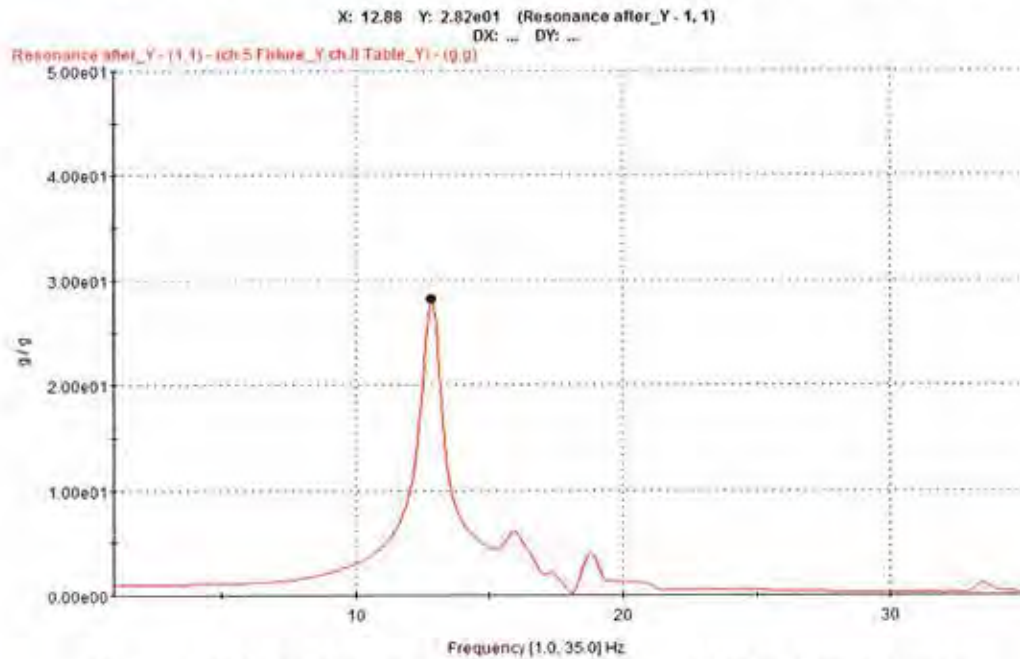


[Figure 1-6] X axis Resonance Search Test after Excitation Test – Cable Tray (1/2)



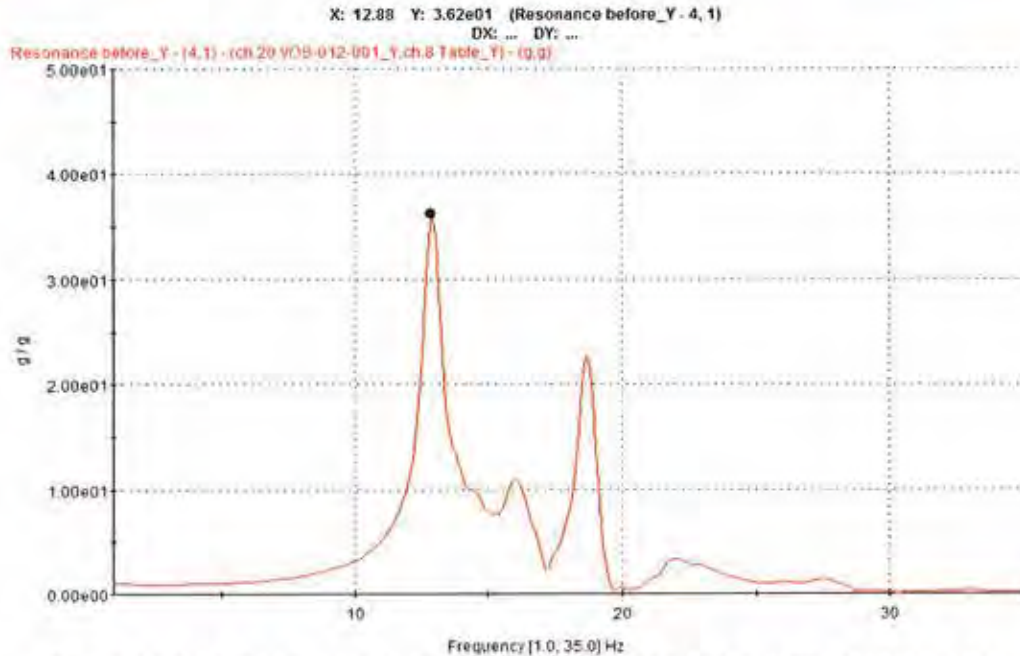


[Figure 1-7] Y axis Resonance Search Test before Excitation Test – Fixture

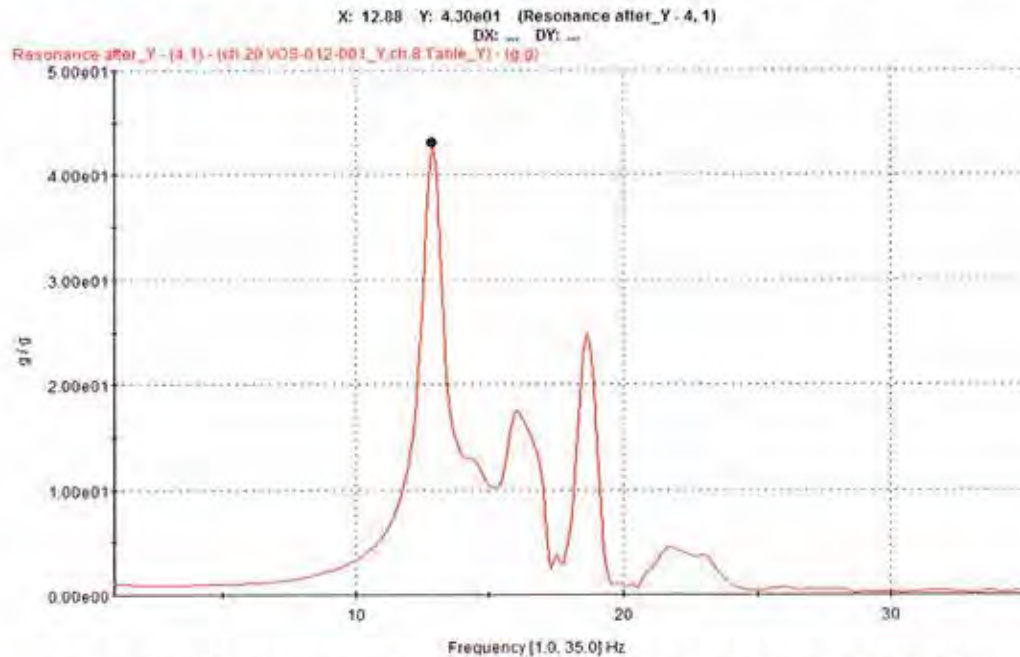


[Figure 1-8] Y axis Resonance Search Test after Excitation Test – Fixture



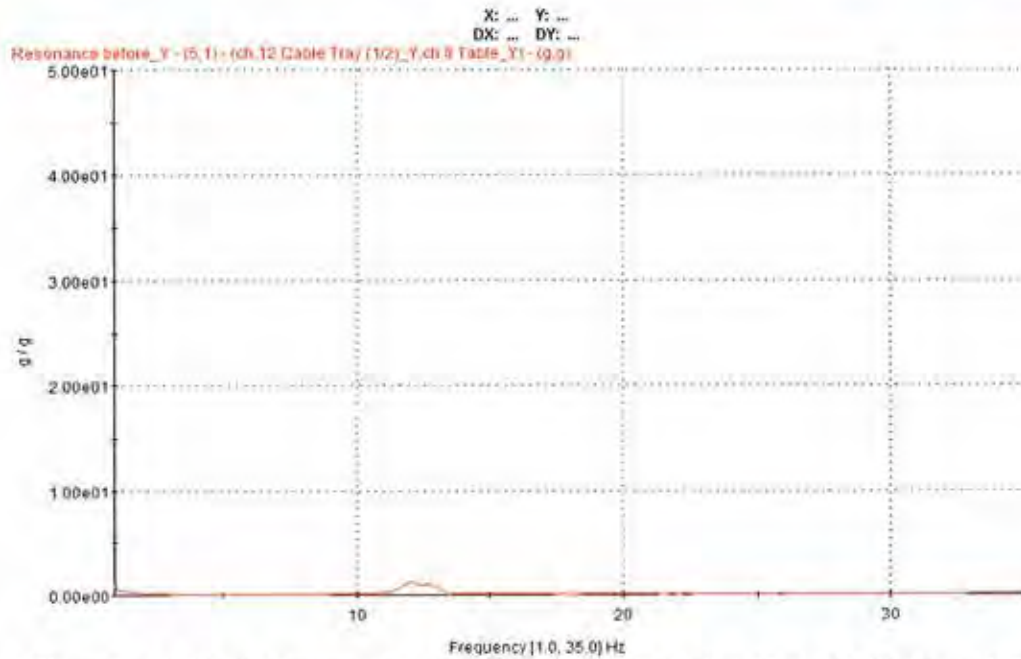


[Figure 1-9] Y axis Resonance Search Test before Excitation Test - VOS-012-001

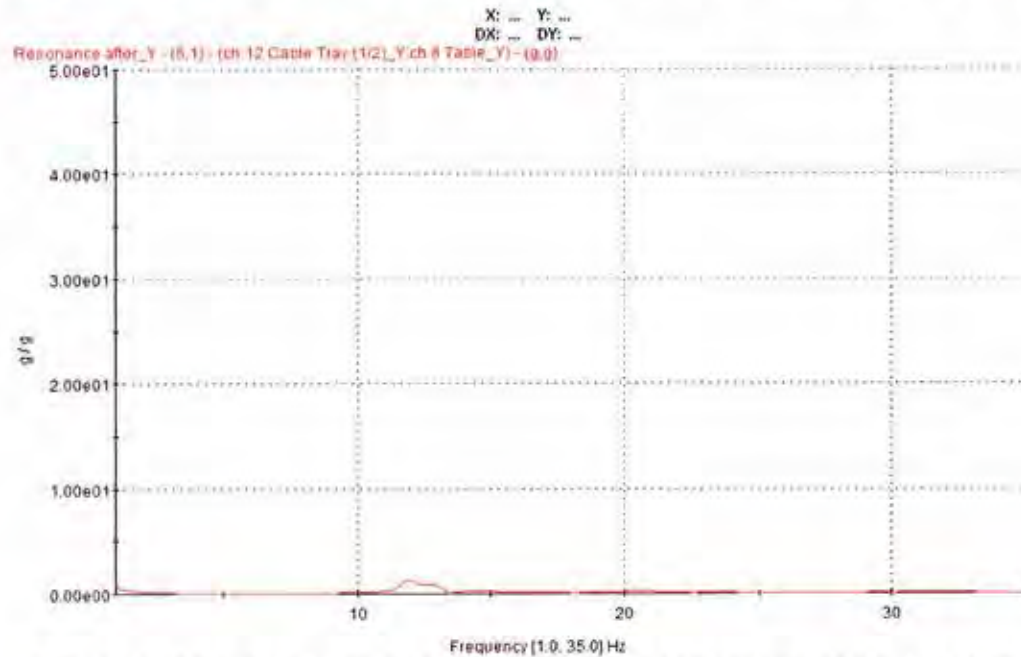


[Figure 1-10] Y axis Resonance Search Test after Excitation Test - VOS-012-001



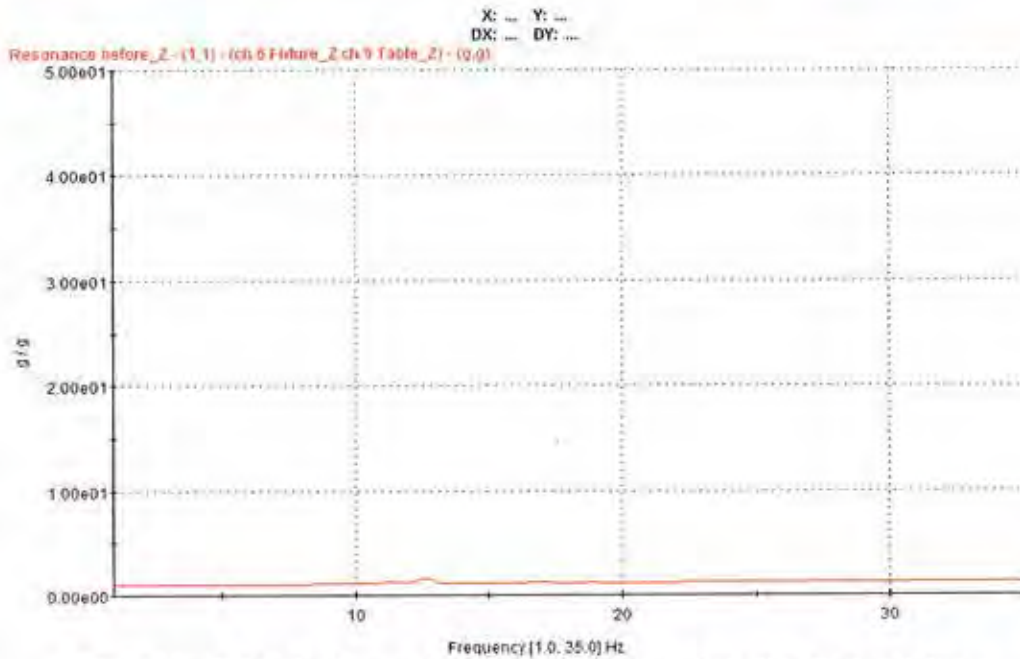


[Figure 1-11] Y axis Resonance Search Test before Excitation Test – Cable Tray (1/2)

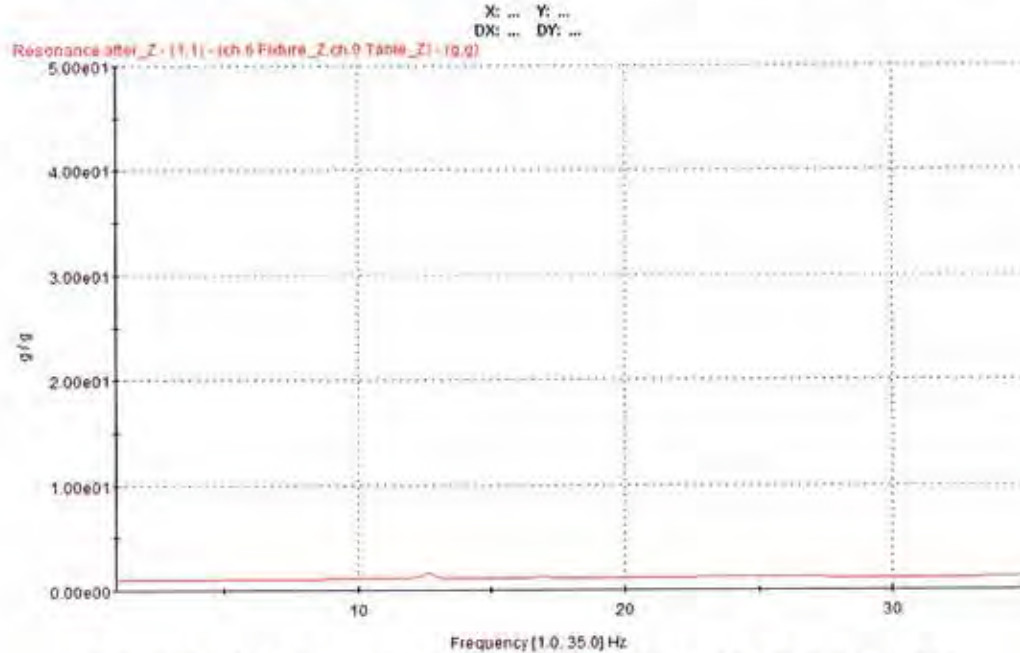


[Figure 1-12] Y axis Resonance Search Test after Excitation Test – Cable Tray (1/2)



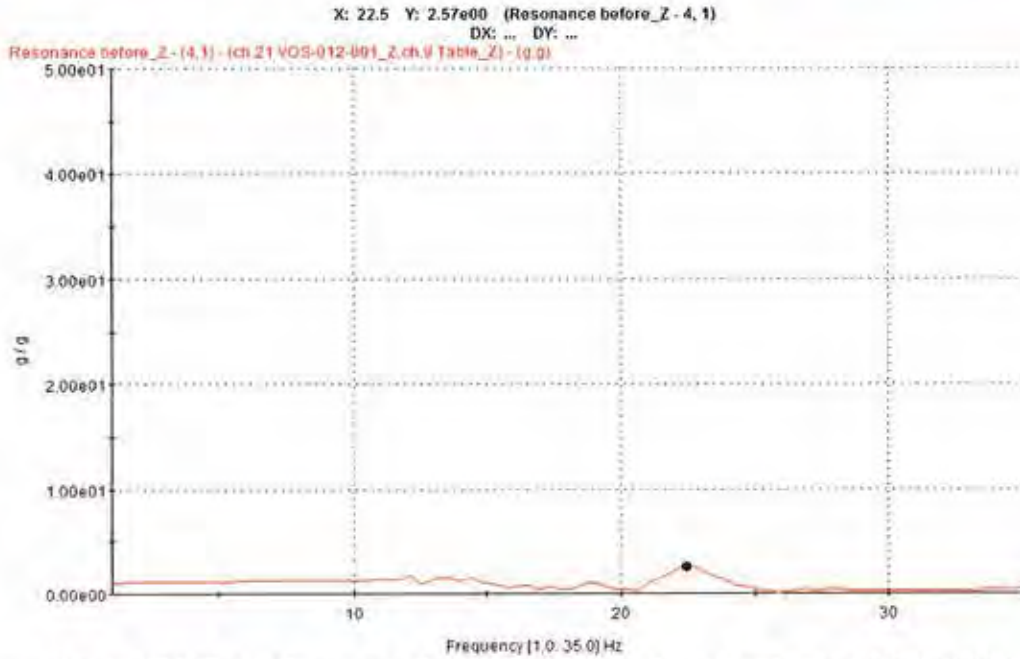


[Figure 1-13] Z axis Resonance Search Test before Excitation Test – Fixture

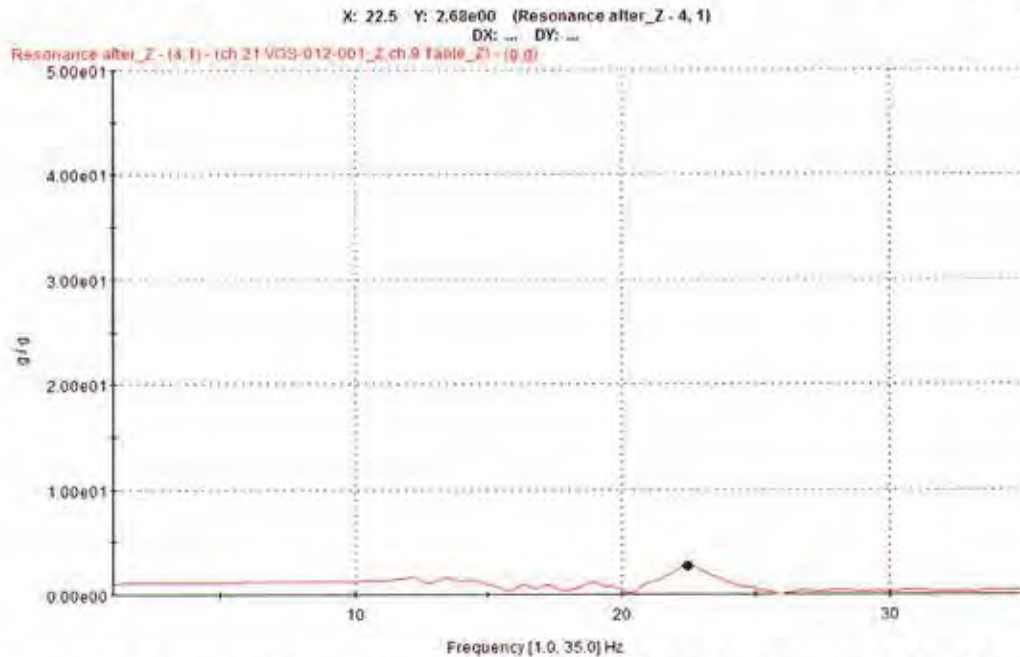


[Figure 1-14] Z axis Resonance Search Test after Excitation Test – Fixture



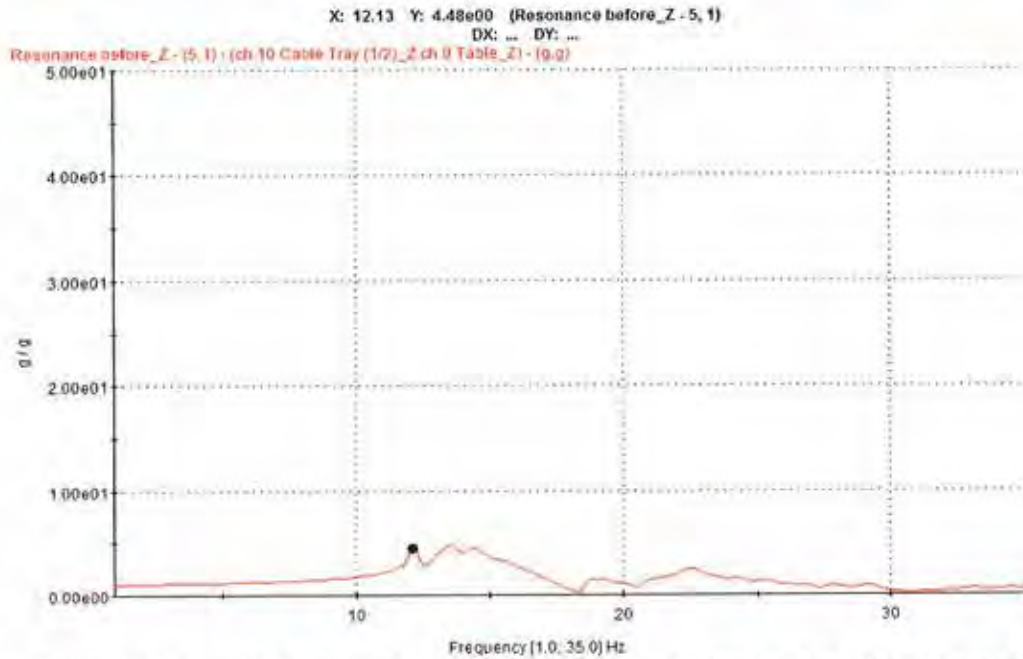


[Figure 1-15] Z axis Resonance Search Test before Excitation Test – VOS-012-001

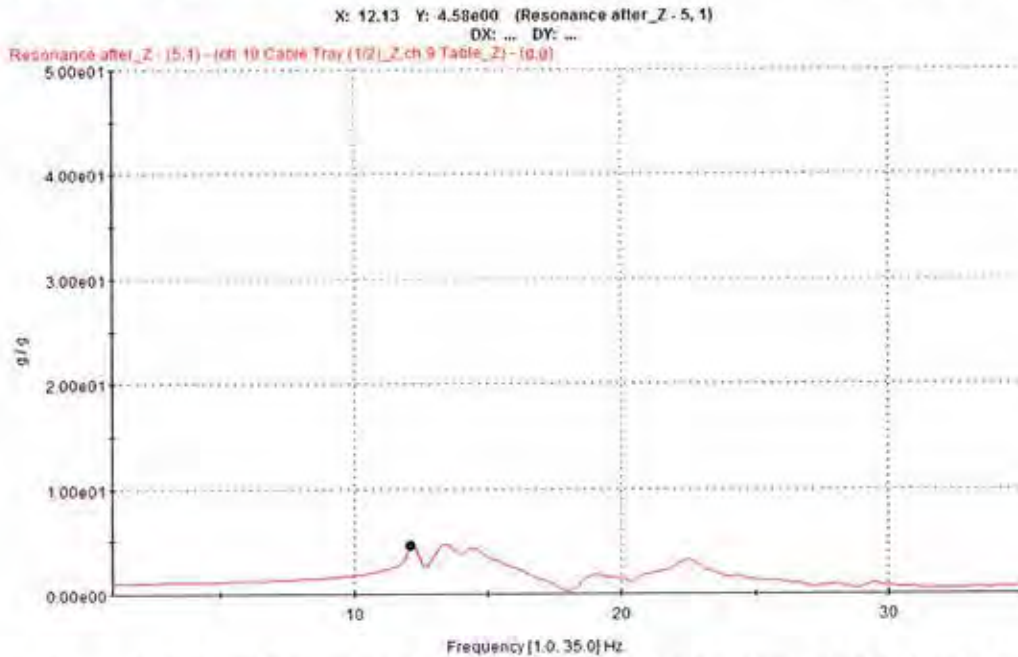


[Figure 1-16] Z axis Resonance Search Test after Excitation Test – VOS-012-001





[Figure 1-17] Z axis Resonance Search Test before Excitation Test – Cable Tray (1/2)



[Figure 1-18] Z axis Resonance Search Test after Excitation Test – Cable Tray (1/2)



※ Attachment 2

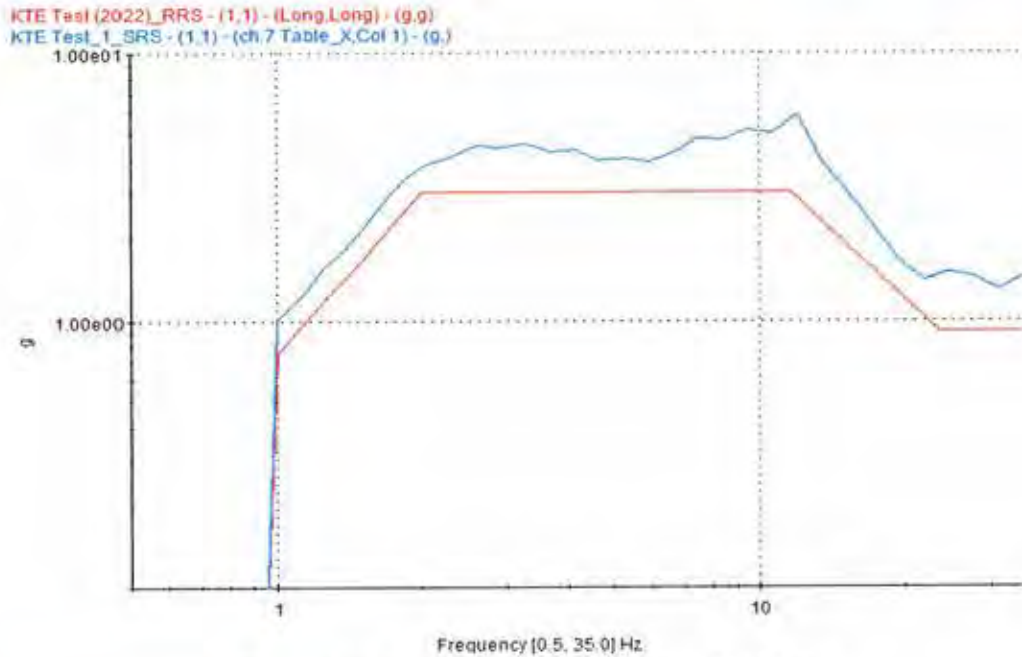
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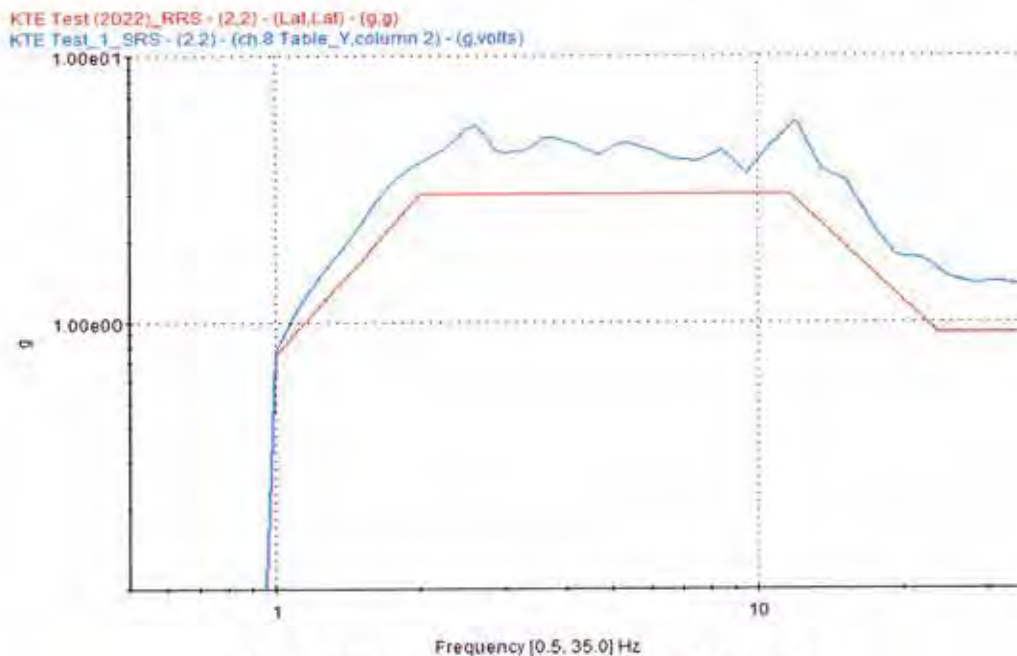
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[Figure 2-17] 2nd Excitation Test Time-history – Specimen
[Figure 2-18] 2nd Excitation Test Relative Displacement - X axis
[Figure 2-19] 2nd Excitation Test Relative Displacement - Y axis
[Figure 2-20] 2nd Excitation Test Cross-correlation – Table



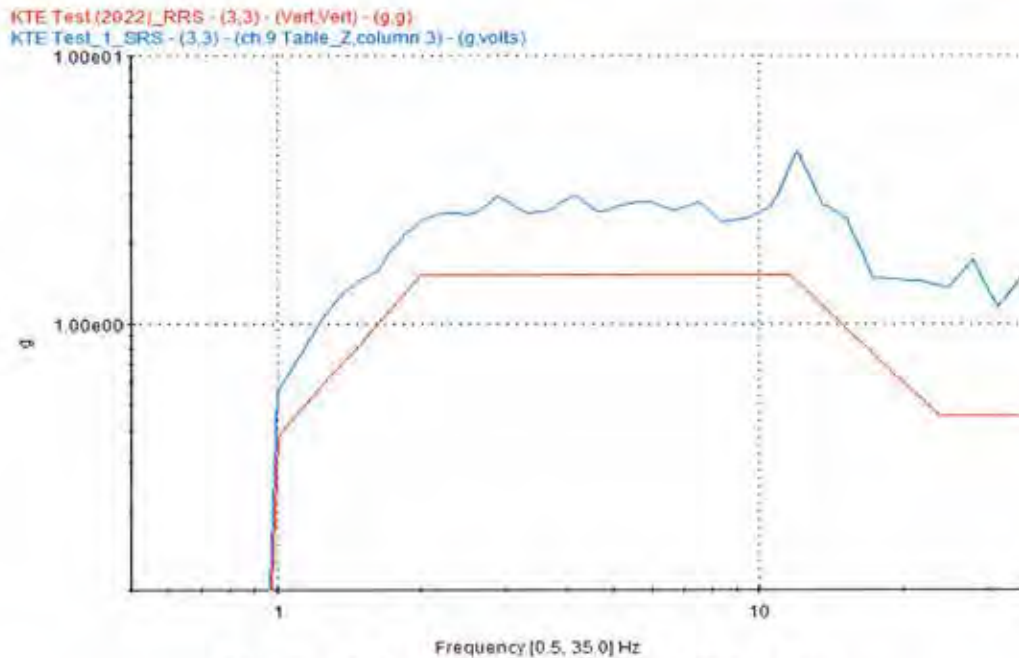


[Figure 2-1] 1st Excitation Test X axis TRS - Table

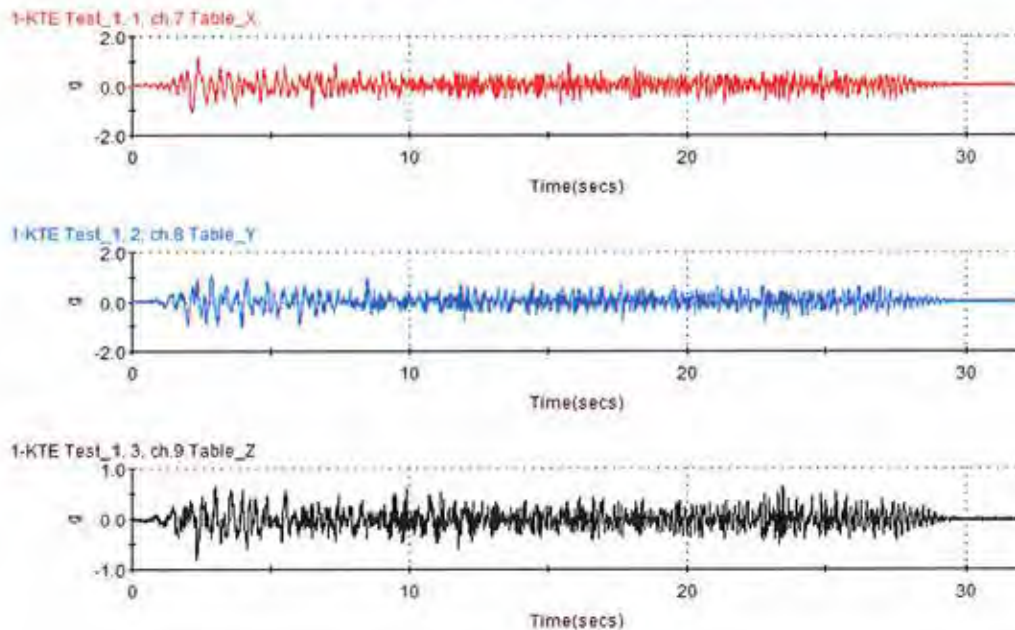


[Figure 2-2] 1st Excitation Test Y axis TRS - Table





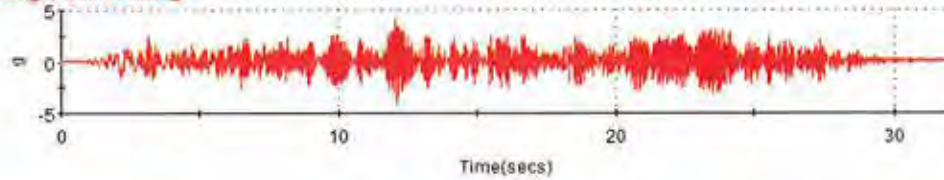
[Figure 2-3] 1st Excitation Test Z axis TRS – Table



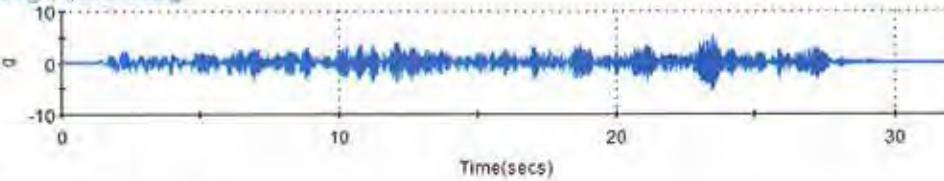
[Figure 2-4] 1st Excitation Test Time-history – Table



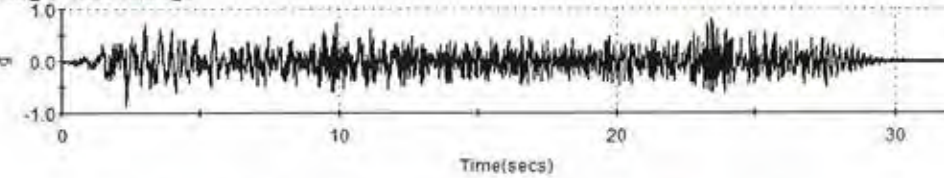
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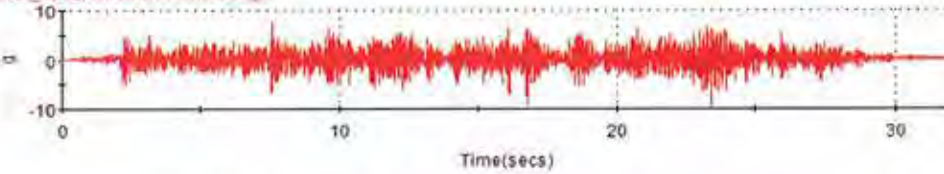


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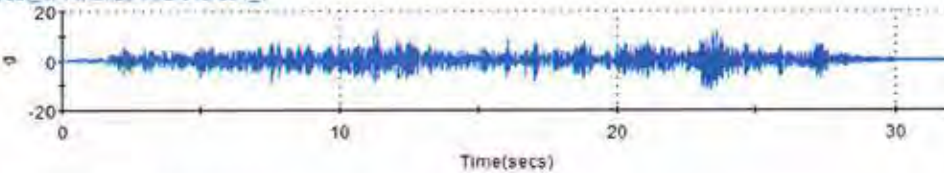


[Figure 2-5] 1st Excitation Test Time-history – Fixture

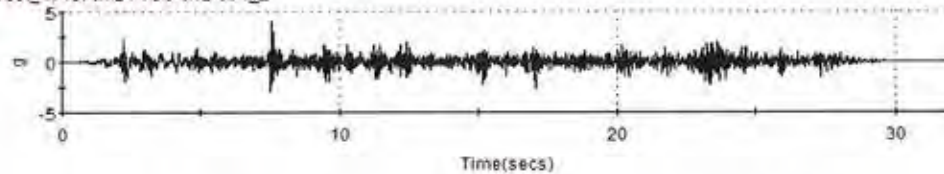
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1-KTE Test_1_14, ch.20 VOS-012-001_Y



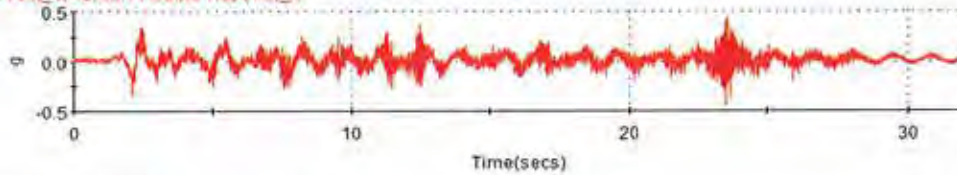
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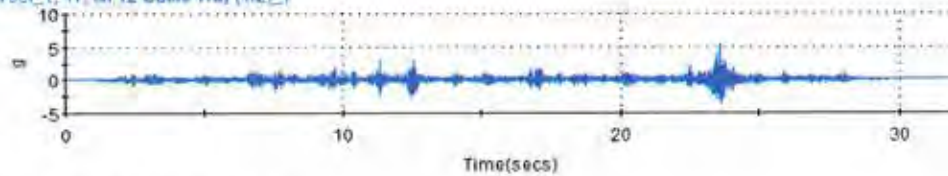
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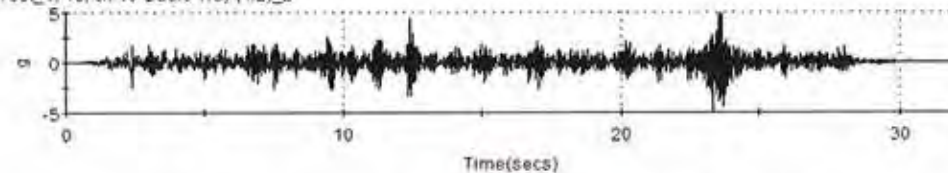
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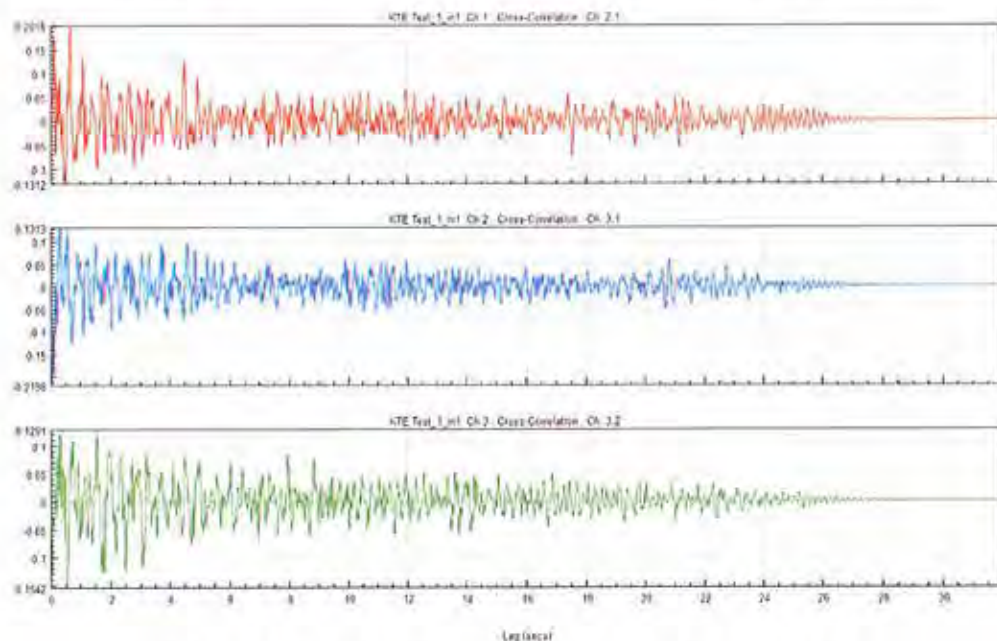
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1-KTE Test_1, 18, ch 10 Cable Tray (1/2)_Z

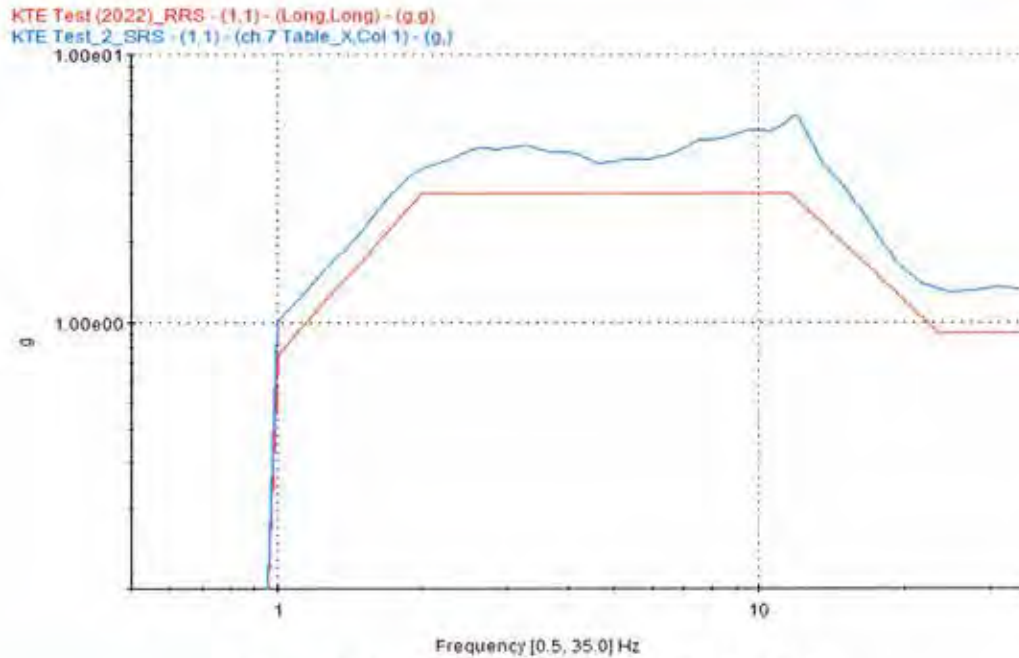


[Figure 2-7] 1st Excitation Test Time-history – Cable Tray (1/2)

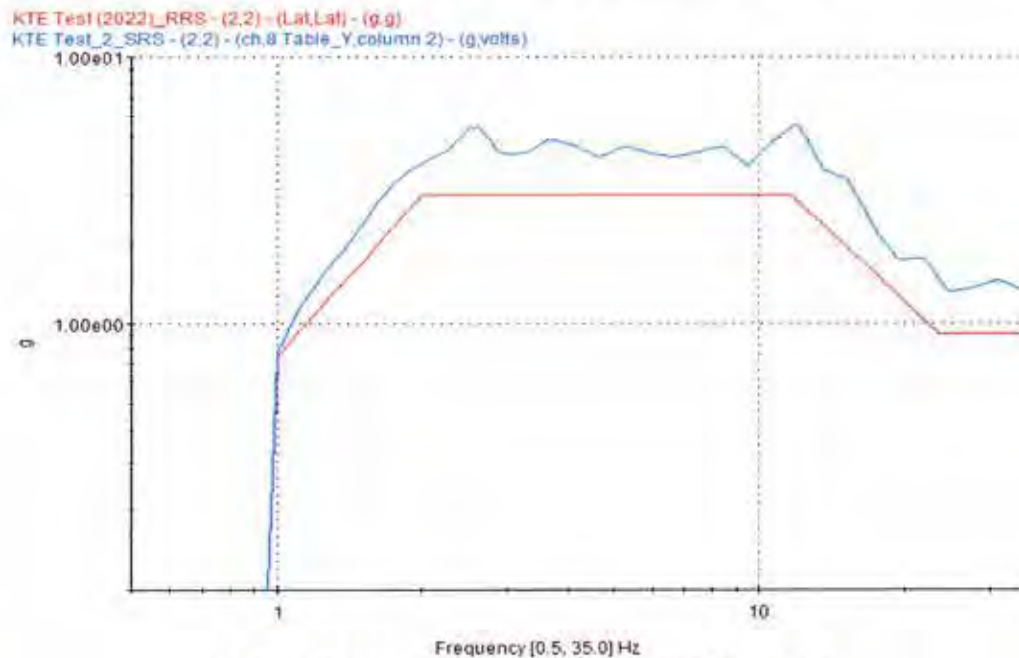


[Figure 2-8] 1st Excitation Test Cross-correlation – Table



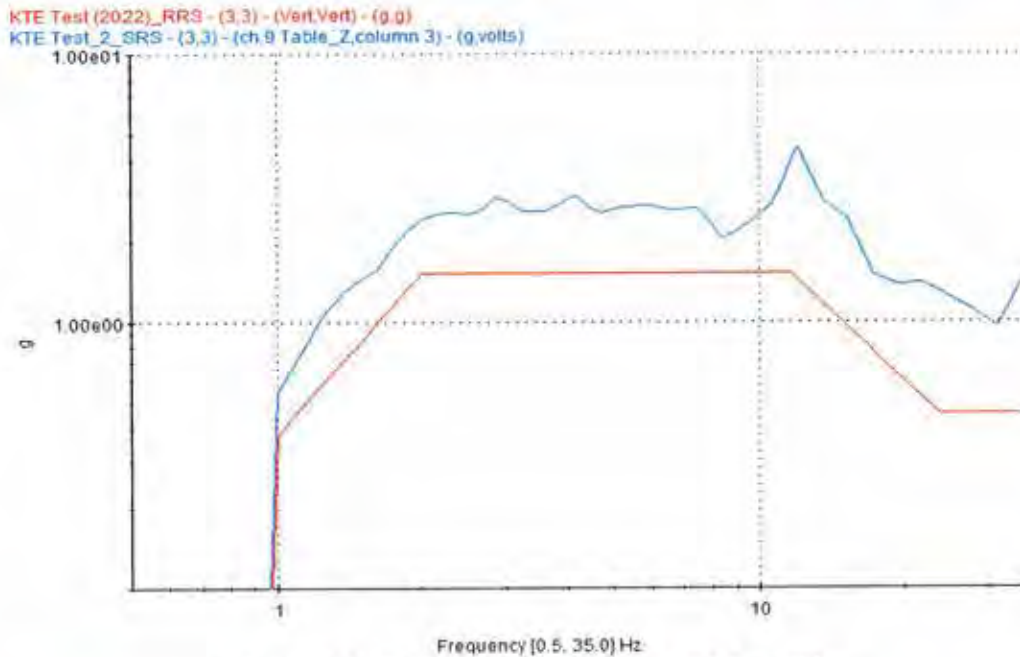


[Figure 2-9] 2nd Excitation Test X axis TRS - Table

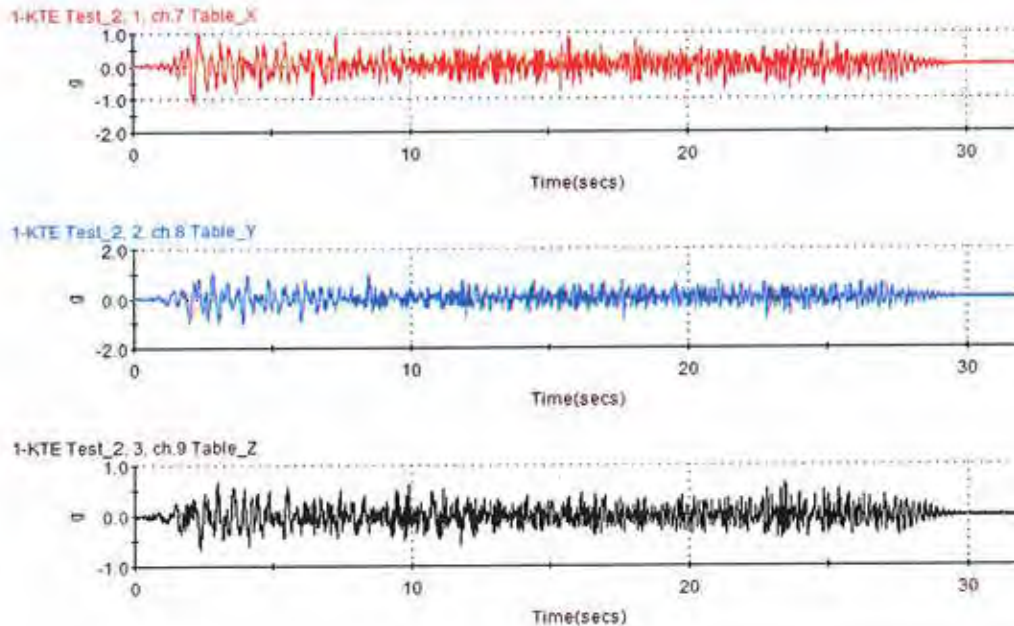


[Figure 2-10] 2nd Excitation Test Y axis TRS - Table





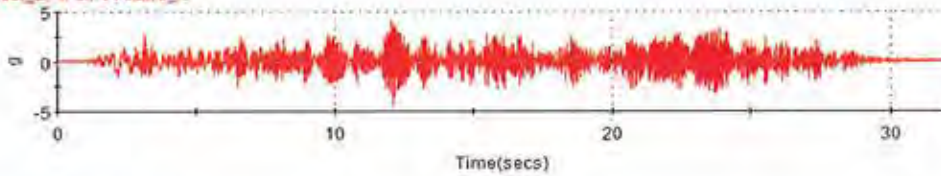
[Figure 2-11] 2nd Excitation Test Z axis TRS - Table



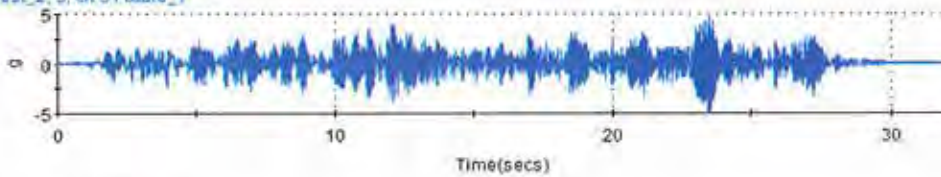
[Figure 2-12] 2nd Excitation Test Time-history - Table



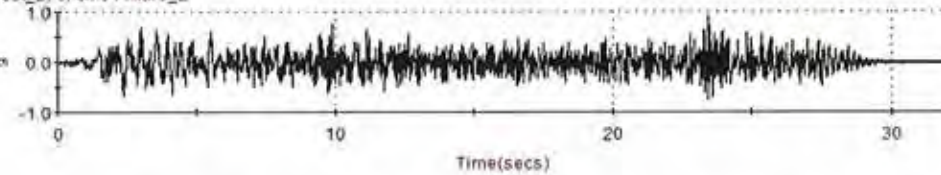
1-KTE Test_2_4, ch.4 Fixture_X



1-KTE Test_2_5, ch.5 Fixture_Y

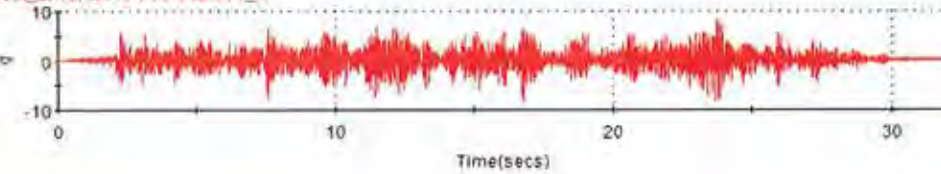


1-KTE Test_2_6, ch.6 Fixture_Z

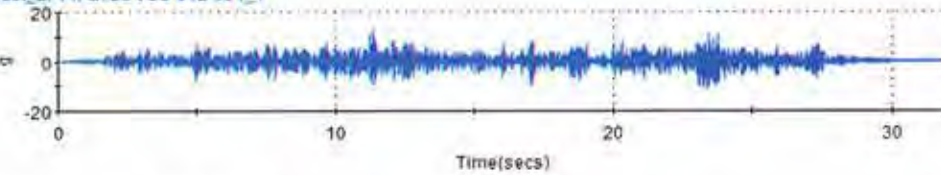


[Figure 2-13] 2nd Excitation Test Time-history – Fixture

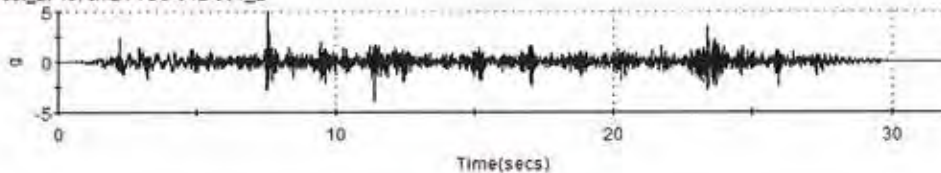
1-KTE Test_2_13, ch.19 VOS-012-001_X



1-KTE Test_2_14, ch.20 VOS-012-001_Y



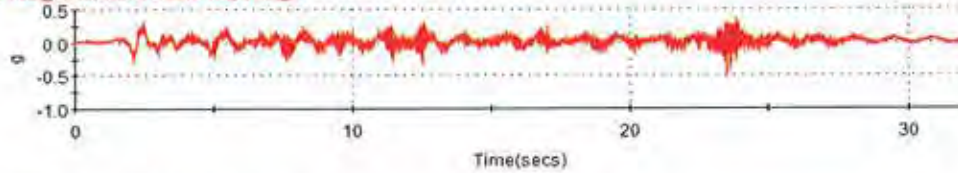
1-KTE Test_2_15, ch.21 VOS-012-001_Z



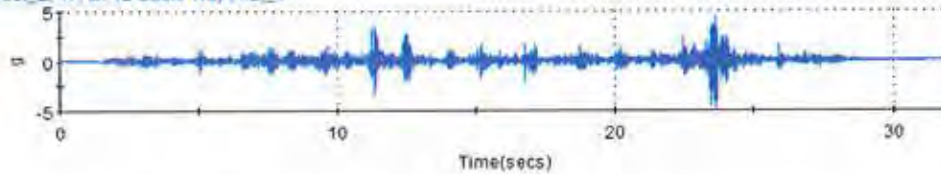
[Figure 2-14] 2nd Excitation Test Time-history – VOS-012-001



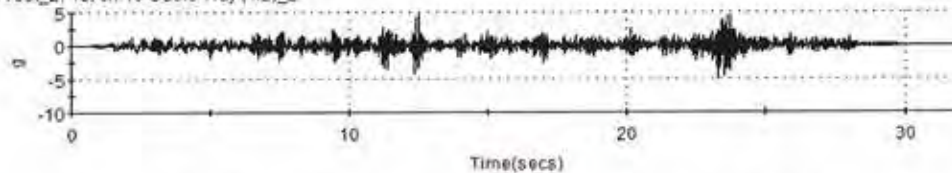
1-KTE Test_2_16, ch.11 Cable Tray (1/2)_X



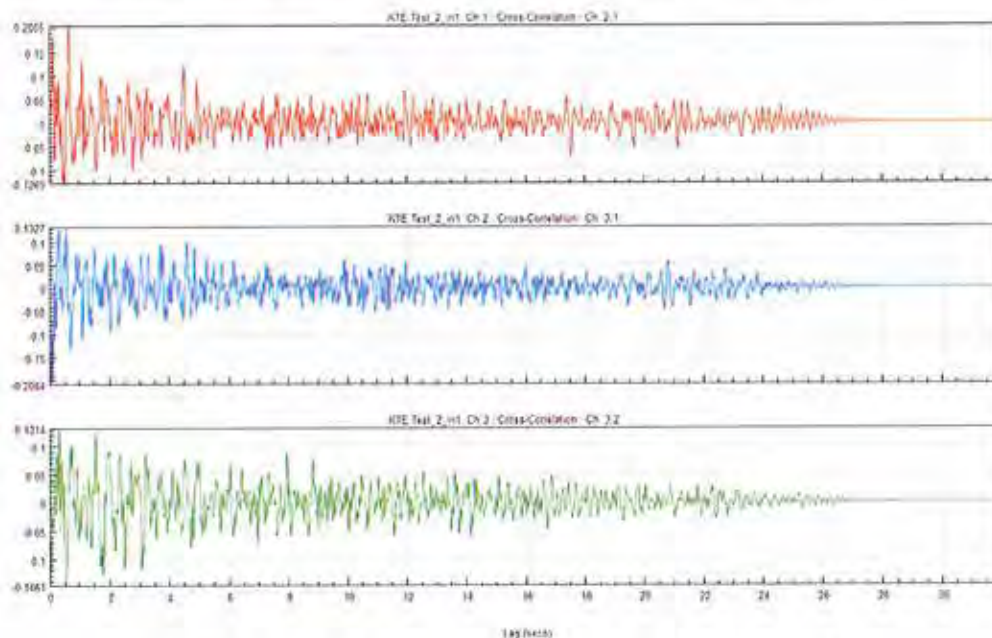
1-KTE Test_2_17, ch.12 Cable Tray (1/2)_Y



1-KTE Test_2_18, ch.10 Cable Tray (1/2)_Z



[Figure 2-15] 2nd Excitation Test Time-history – Cable Tray (1/2)



[Figure 2-16] 2nd Excitation Test Cross-correlation – Table



※ Attachment 3

Summary of Seismic Test Result



방송통신설비의 내진 시험결과 요약서

시험 책임자 : 이 정 근

1. 시험대상설비명		내진 서도스 셀러	
2. 의뢰자		독산회사 미토즈	
3. 시험기간		2025. 07. 05	
4. 시험결과			
항 목		이상여부	비고
기능 확인	통신장비 신호전송상태	-	
	전원설비 전원공급상태	-	
구조 성능 확인	시험대상설비 상단의 단방향 최대 변위폭(<75 mm)	-	
	시험대상설비의 전복 또는 전도	이상없음	
	시험대상설비의 바닥 고정부 이탈	이상없음	
	설치된 구성품의 이탈	이상없음	
	시험대상설비의 프레임 변형 또는 파손	이상없음	
	이중마루구조물 자체의 결합부분이 이탈되거나, 진동대 고정부분 이탈	-	
	앵커링, 볼트 등의 고정장치 자체의 균열, 변형 및 절단	이상없음	
	기타 육안으로 확인이 가능한 변형이나 파손	이상없음	
옥외 설비 확인	(장기복구수준) 옥외설비의 부분적 손상 여부 및 일정 기간 내 복구 대책 마련 여부	-	
	(붕괴방지수준) 옥외설비의 붕괴방지 설계여부, 내부 통신설비 및 선로가 있는 경우 안전성 확인	-	
5. 판정결과		이상없음	



※ Attachment 4

Test Photo



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[Figure 4-5] Test Specimen – VOS-012-001 #2
[Figure 4-6] Accelerometer Set up – Table
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[Figure 4-8] Accelerometer Set up – VOS-012-001
[Figure 4-9] Accelerometer Set up – Cable Tray (1/2)





[Figure 4-1] Excitation Test Set up #1

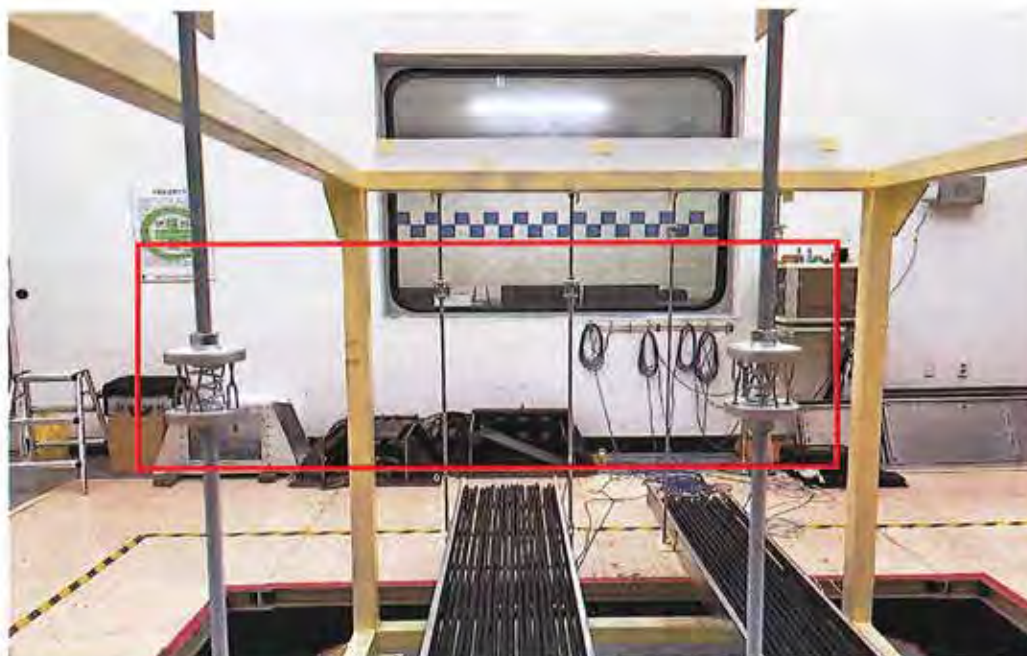


[Figure 4-2] Excitation Test Set up #2





[Figure 4-3] Excitation Test Set up #3

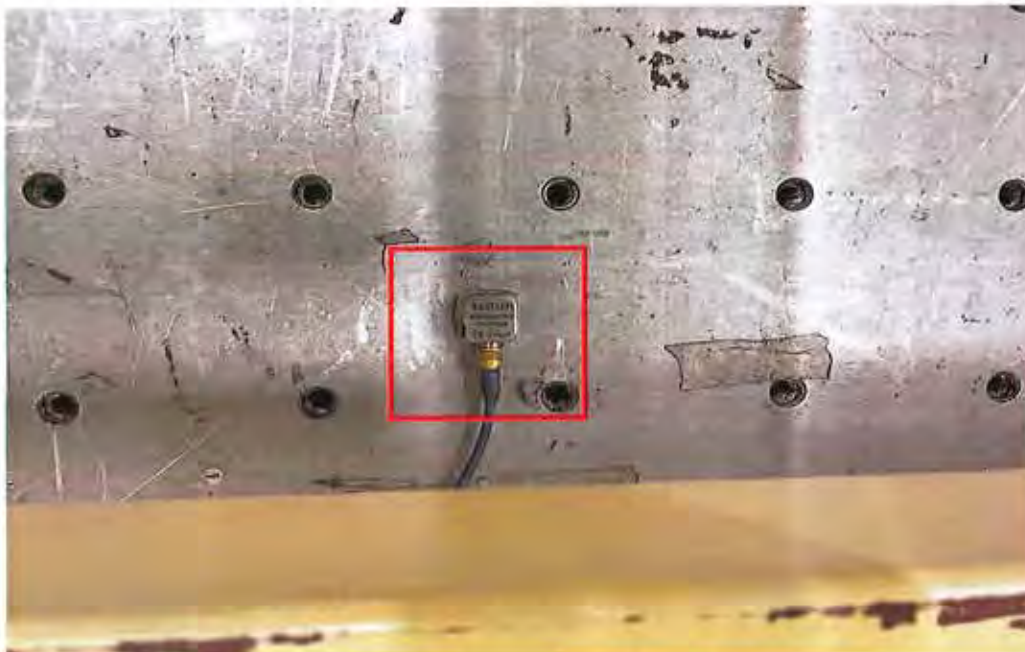


[Figure 4-4] Test Specimen - VOS-012-001 #1



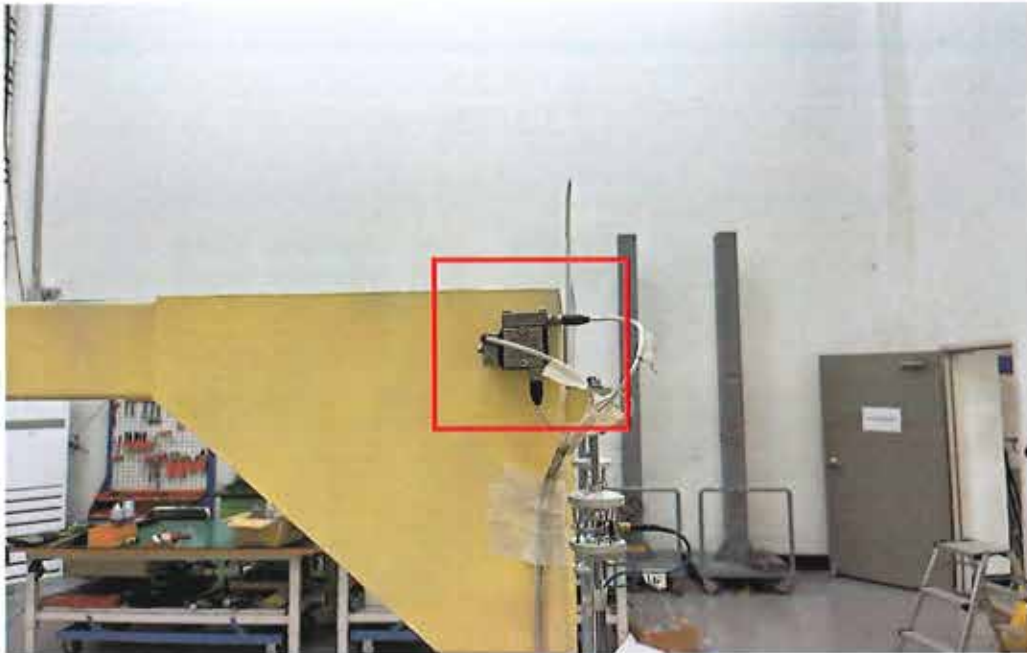


[Figure 4-5] Test Specimen - VOS-012-001 #2



[Figure 4-6] Accelerometer Set up - Table





[Figure 4-7] Accelerometer Set up – Fixture



[Figure 4-8] Accelerometer Set up – VOS-012-001





[Figure 4-9] Accelerometer Set up – Cable Tray (1/2)

- The end -

