

귀중

Evaluation Data

품 목	SMPS
품 명	ENS-2S
Rev. No.	A

2013년 11 월 08 일

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1-1. SUMMARY REPORT (ENS-2006)

항 목	기 준 값	측 정 값	비 고
INDUCTANCE	L Phase : 4.404mH N Phase : 4.404mH (3.09 ~ 5.73mH)	L Phase : 5.679mH N Phase : 5.661mH (Gain-Phase Analyzer 측정값)	오차: ±30%
		L Phase : 4.627mH N Phase : 4.626mH (LCR Meta 측정값)	
COIL	-	1.2Φ, 19Turn	
TEST VOLTAGE	2500VAC (Cutoff Current=20mA)	PASS	
ISOLATION RESISTANCE	500VDC/500MΩ Min	PASS	
LEAKAGE CURRENT	125VAC 0.5mA Max	125VAC L:0.21mA,N:0.28mA	
	250VAC 1.0mA Max	250VAC L:0.45mA,N:0.59mA	
DC RESISTANCE	110mΩ Max	L Phase : 23mΩ N Phase : 24mΩ	
허부하 TEST	ΔT=55℃ Max	85.1℃ (ΔT=30.1℃)	L/F Coil Max온도
ATTENUATION CHARACTERISTICS	NORMAL MODE	-95.74dB (f=2.587MHz)	GAIN Max
	COMMON MODE	-77.02dB (f=3.509MHz)	

1-2. SUMMARY REPORT (ENS-2010)

항 목	기 준 값	측 정 값	비 고
INDUCTANCE	L Phase : 2.745mH N Phase : 2.745mH (1.93 ~ 3.57mH)	L Phase : 3.045mH N Phase : 3.042mH (Gain-Phase Analyzer 측정값) L Phase : 2.322mH N Phase : 2.321mH (LCR Meta 측정값)	오차: ±30%
COIL	-	1.4Φ , 15Turn	
TEST VOLTAGE	2500VAC (Cutoff Current=20mA)	PASS	
ISOLATION RESISTANCE	500VDC/500MΩ	PASS	
LEAKAGE CURRENT	125VAC 0.5mA Max	125VAC L:0.25mA,N:0.26mA	
	250VAC 1.0mA Max	250VAC L:0.53mA,N:0.53mA	
DC RESISTANCE	40mΩ Max	L Phase : 19mΩ N Phase : 18mΩ	
허부하 TEST	ΔT=55℃ Max	96.2℃ (ΔT=41.2℃)	L/F Coil Max온도
ATTENUATION CHARACTERISTICS	NORMAL MODE	-99.12dB (f=6.539MHz)	GAIN Max
	COMMON MODE	-79.55dB (f=3.509MHz)	

1-3. SUMMARY REPORT (ENS-2016)

항 목	기 준 값	측 정 값	비 고
INDUCTANCE	L Phase : 0.781mH N Phase : 0.781mH (0.55 ~ 1.02mH)	L Phase : 0.842mH N Phase : 0.848mH (Gain-Phase Analyzer 측정값) L Phase : 0.697mH N Phase : 0.697mH (LCR Meta 측정값)	오차: ±30%
COIL	-	1.7Φ, 8Turn	
TEST VOLTAGE	2500VAC (Cutoff Current=20mA)	PASS	
ISOLATION RESISTANCE	500VDC/500MΩ	PASS	
LEAKAGE CURRENT	125VAC 0.5mA Max	125VAC L:0.27mA,N:0.24mA	
	250VAC 1.0mA Max	250VAC L:0.54mA,N:0.49mA	
DC RESISTANCE	20mΩ Max	L Phase : 13mΩ N Phase : 13mΩ	
허부하 TEST	ΔT=55℃ Max	95.3℃ (ΔT=40.3℃)	L/F Coil Max온도
ATTENUATION CHARACTERISTICS	NORMAL MODE	96.07-dB (f=3.462MHz)	GAIN Max
	COMMON MODE	-72.70dB (f=3.509MHz)	

1-4. SUMMARY REPORT (ENS-2020)

항 목	기 준 값	측 정 값	비 고
INDUCTANCE	L Phase : 0.598mH N Phase : 0.598mH (0.42 ~ 0.78mH)	L Phase : 0.684mH N Phase : 0.679mH (Gain-Phase Analyzer 측정값) L Phase : 0.563mH N Phase : 0.563mH (LCR Meta 측정값)	오차: ±30%
COIL	-	1.4Φ x2, 7Turn	
TEST VOLTAGE	2500VAC (Cutoff Current=20mA)	PASS	
ISOLATION RESISTANCE	500VDC/500MΩ	PASS	
LEAKAGE CURRENT	125VAC 0.5mA Max	125VAC L:0.27mA,N:0.22mA	
	250VAC 1.0mA Max	250VAC L:0.55mA,N:0.47mA	
DC RESISTANCE	10mΩ Max	L Phase : 12mΩ N Phase : 11mΩ	
허부하 TEST	ΔT=55℃ Max	98.2℃ (ΔT=43.2℃)	L/F Coil Max온도
ATTENUATION CHARACTERISTICS	NORMAL MODE	-93.07dB (f=2.915MHz)	GAIN Max
	COMMON MODE	-68.42dB (f=3.509MHz)	

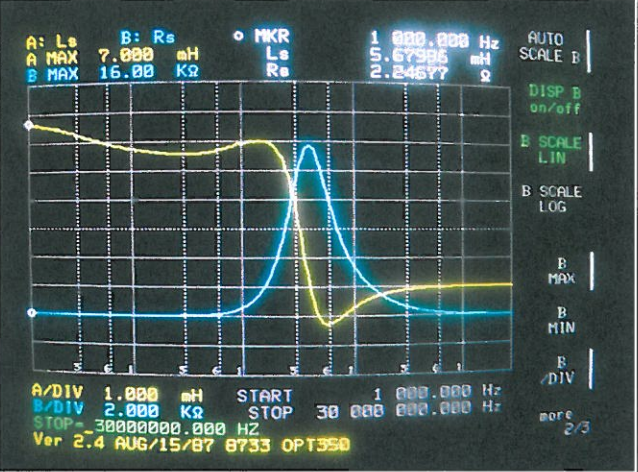
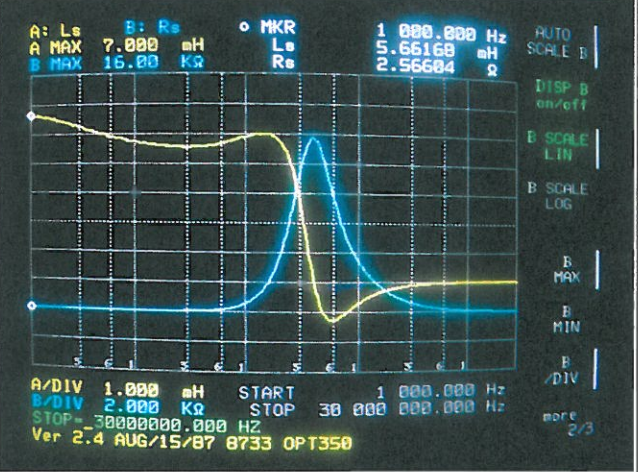
2-1. INDUCTANCE CHECK (ENS-2006)

< 계측기 >

(1) IMPEDENCE/GAIN-PHASE ANALYZER : 4194A (HP)

◇ GAIN-PHASE ANALYZER SETTING : 1.0KHz / 1.0V

◇ FREQUENCY : 1.0KHz~30MHz

PHASE	FREQUENCY	측정값	파형	비고
L PHASE	1.0KHz	5.679mH 2.246Ω		1.0mH/div 2.0KΩ /div
N PHASE	1.0KHz	5.661mH 2.566Ω		1.0mH/div 2.0KΩ /div

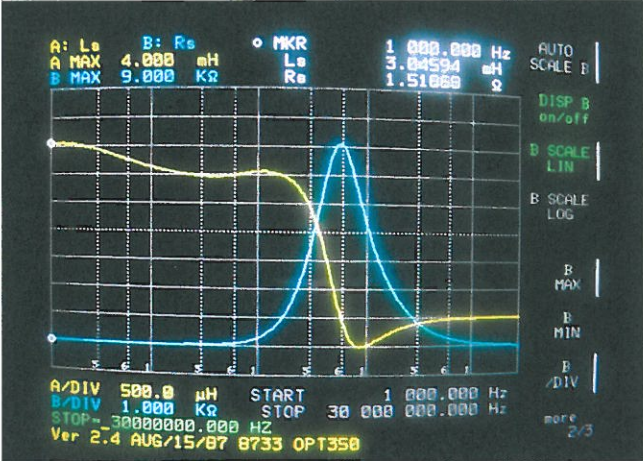
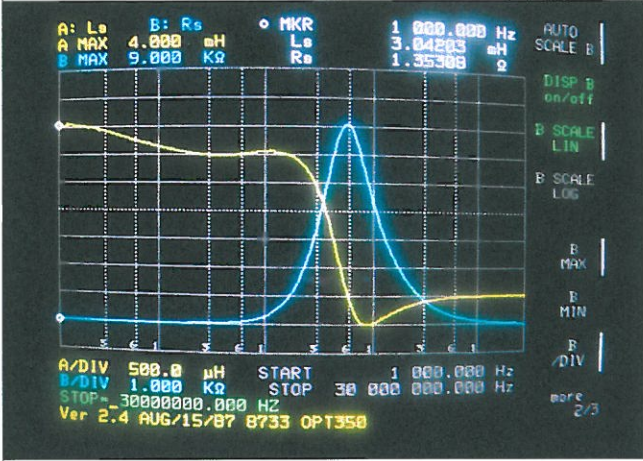
2-2. INDUCTANCE CHECK (ENS-2010)

< 계측기 >

(1) IMPEDENCE/GAIN-PHASE ANALYZER : 4194A (HP)

◇ GAIN-PHASE ANALYZER SETTING : 1.0KHz / 1.0V

◇ FREQUENCY : 1.0KHz~30MHz

PHASE	FREQUENCY	측정값	파형	비고
L PHASE	1.0KHz	3.045mH 1.518Ω		500uH/div 1.0KΩ /div
N PHASE	1.0KHz	3.042mH 1.353Ω		500uH/div 1.0KΩ /div

2-3. INDUCTANCE CHECK (ENS-2016)

< 계측기 >

(1) IMPEDENCE/GAIN-PHASE ANALYZER : 4194A (HP)

◇ GAIN-PHASE ANALYZER SETTING : 1.0KHz / 1.0V

◇ FREQUENCY : 1.0KHz~30MHz

PHASE	FREQUENCY	측정값	파형	비고
L PHASE	1.0KHz	0.842mH 0.235Ω		200uH/div 500Ω /div
N PHASE	1.0KHz	0.848mH 0.243Ω		200uH/div 500Ω /div

2-4. INDUCTANCE CHECK (ENS-2020)

< 계측기 >

(1) IMPEDENCE/GAIN-PHASE ANALYZER : 4194A (HP)

◇ GAIN-PHASE ANALYZER SETTING : 1.0KHz / 1.0V

◇ FREQUENCY : 1.0KHz~30MHz

PHASE	FREQUENCY	측정값	파형	비고
L PHASE	1.0KHz	0.684mH 0.232Ω		100uH/div 200Ω /div
N PHASE	1.0KHz	0.679mH 0.209Ω		100uH/div 200Ω /div

3-1. TEST VOLTAGE(ENS-2006)				
< 계측기 > (1) PUNCTURE TEST (HPT5015Z)				
입력	CUT OFF CURRENT	측정시간	결과	비 고
2,500VAC	20mA	1Min	PASS	

3-2. TEST VOLTAGE(ENS-2010)				
< 계측기 > (2) PUNCTURE TEST (HPT5015Z)				
ENS-2010				
입력	CUT OFF CURRENT	측정시간	결과	비 고
2,500VAC	20mA	1Min	PASS	

3-3. TEST VOLTAGE(ENS-2016)				
< 계측기 > (3) PUNCTURE TEST (HPT5015Z)				
입력	CUT OFF CURRENT	측정시간	결과	비 고
2,500VAC	20mA	1Min	PASS	

3-4. TEST VOLTAGE(ENS-2020)				
< 계측기 > (1) PUNCTURE TEST (HPT5015Z)				
입력	CUT OFF CURRENT	측정시간	결과	비 고
2,500VAC	20mA	1Min	PASS	

4-1. ISOLATION RESISTANCE (ENS-2006)				
< 계측기 > (1) PUNCTURE TEST (HPT5015Z)				
입력	절연저항	측정시간	결과	비 고
500VDC	500MΩ min	1Min	PASS	

4-2. ISOLATION RESISTANCE (ENS-2010)				
< 계측기 > (2) PUNCTURE TEST (HPT5015Z)				
ENS-2010				
입력	절연저항	측정시간	결과	비 고
500VDC	500MΩ min	1Min	PASS	

4-3. ISOLATION RESISTANCE (ENS-2016)				
< 계측기 > (3) PUNCTURE TEST (HPT5015Z)				
입력	절연저항	측정시간	결과	비 고
500VDC	500MΩ min	1Min	PASS	

4-4. ISOLATION RESISTANCE (ENS-2020)				
< 계측기 > (1) PUNCTURE TEST (HPT5015Z)				
입력	절연저항	측정시간	결과	비 고
500VDC	500MΩ min	1Min	PASS	

5-1. DC RESISTANCE (ENS-2006)			
< 계측기 > (1) GALVANO METER : PORTABLE WHEATSTONE BRIDGE 2755 (YOKOGAWA)			
PHASE	기준값	측정값	비 고
L PHASE	110mΩ Max	23mΩ	
N PHASE	110mΩ Max	24mΩ	

5-2. DC RESISTANCE (ENS-2010)			
< 계측기 > (2) GALVANO METER : PORTABLE WHEATSTONE BRIDGE 2755 (YOKOGAWA)			
ENS-2010			
PHASE	기준값	측정값	비 고
L PHASE	40mΩ Max	19mΩ	
N PHASE	40mΩ Max	18mΩ	

5-3. DC RESISTANCE (ENS-2016)			
< 계측기 > (3) GALVANO METER : PORTABLE WHEATSTONE BRIDGE 2755 (YOKOGAWA)			
PHASE	기준값	측정값	비 고
L PHASE	20mΩ Max	13mΩ	
N PHASE	20mΩ Max	13mΩ	

5-4. DC RESISTANCE (ENS-2020)			
< 계측기 > (1) GALVANO METER : PORTABLE WHEATSTONE BRIDGE 2755 (YOKOGAWA)			
PHASE	기준값	측정값	비 고
L PHASE	15mΩ Max	12mΩ	
N PHASE	15mΩ Max	11mΩ	

6-1. LEAKAGE CURRENT (ENS-2006)				
< 계측기 >				
(1) CLAMP LEAKER (30~300mA)				
입력	PHASE	기준값	측정값	비 고
125V	L PHASE	0.5mA	0.21mA	
	N PHASE	0.5mA	0.28mA	
250V	L PHASE	1.0mA	0.45mA	
	N PHASE	1.0mA	0.59mA	

6-2. LEAKAGE CURRENT (ENS-2010)				
< 계측기 >				
(2) CLAMP LEAKER (30~300mA)				
입력	PHASE	기준값	측정값	비 고
125V	L PHASE	0.5mA	0.25mA	
	N PHASE	0.5mA	0.26mA	
250V	L PHASE	1.0mA	0.53mA	
	N PHASE	1.0mA	0.53mA	

6-3. LEAKAGE CURRENT (ENS-2016)				
< 계측기 >				
(3) CLAMP LEAKER (30~300mA)				
입력	PHASE	기준값	측정값	비 고
125V	L PHASE	0.5mA	0.27mA	
	N PHASE	0.5mA	0.24mA	
250V	L PHASE	1.0mA	0.54mA	
	N PHASE	1.0mA	0.49mA	

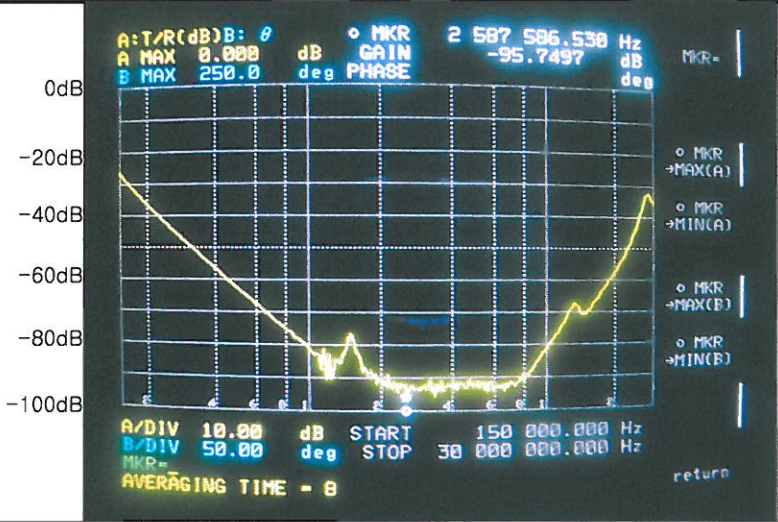
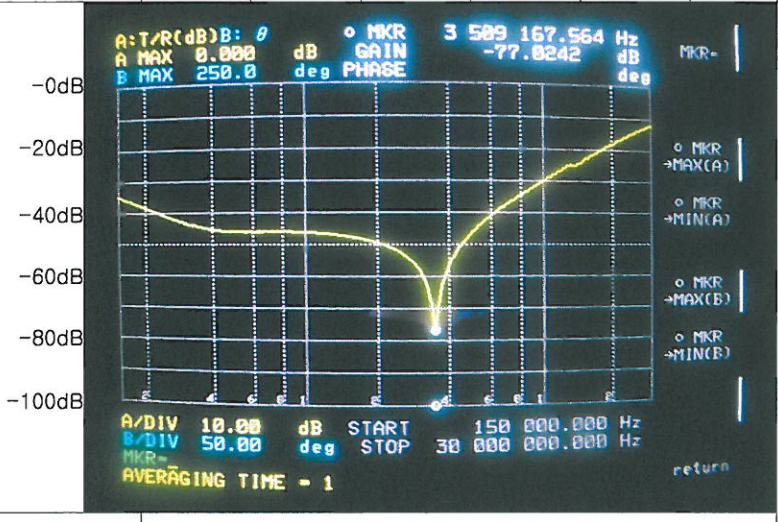
6-4. LEAKAGE CURRENT (ENS-2020)				
< 계측기 >				
(1) CLAMP LEAKER (30~300mA)				
입력	PHASE	기준값	측정값	비 고
125V	L PHASE	0.5mA	0.27mA	
	N PHASE	0.5mA	0.22mA	
250V	L PHASE	1.0mA	0.55mA	
	N PHASE	1.0mA	0.47mA	

7-1. ATTENUATION CHARACTERISTICS (ENS-2006)

< 계측기 >

(1) IMPEDENCE/GAIN-PHASE ANALYZER : 4194A (HP)

◇ FREQUENCY BAND: 150KHz ~ 30MHz

측정방식	MAXIMUM GAIN	파형	비고																					
NORMAL MODE	-95.74dB (f=2.587MHz)	 <table border="1" data-bbox="454 1093 1273 1283"> <thead> <tr> <th>구분</th> <th colspan="6">COMMON MODE</th> </tr> </thead> <tbody> <tr> <td>주파수 [MHz]</td> <td>0.15</td> <td>0.45</td> <td>1</td> <td>5</td> <td>10</td> <td>30</td> </tr> <tr> <td>감쇄량</td> <td>-26</td> <td>-59</td> <td>-80</td> <td>-92</td> <td>-81</td> <td>-35</td> </tr> </tbody> </table>	구분	COMMON MODE						주파수 [MHz]	0.15	0.45	1	5	10	30	감쇄량	-26	-59	-80	-92	-81	-35	0dB(MAX) 10dB/div
구분	COMMON MODE																							
주파수 [MHz]	0.15	0.45	1	5	10	30																		
감쇄량	-26	-59	-80	-92	-81	-35																		
COMMON MODE	-77.02dB (f=3.509MHz)	 <table border="1" data-bbox="454 1803 1273 1980"> <thead> <tr> <th>구분</th> <th colspan="6">NORMAL MODE</th> </tr> </thead> <tbody> <tr> <td>주파수 [MHz]</td> <td>0.15</td> <td>0.45</td> <td>1</td> <td>5</td> <td>10</td> <td>30</td> </tr> <tr> <td>감쇄량</td> <td>-34</td> <td>-45</td> <td>-46</td> <td>-46</td> <td>-30</td> <td>-12</td> </tr> </tbody> </table>	구분	NORMAL MODE						주파수 [MHz]	0.15	0.45	1	5	10	30	감쇄량	-34	-45	-46	-46	-30	-12	0dB(MAX) 10dB/div
구분	NORMAL MODE																							
주파수 [MHz]	0.15	0.45	1	5	10	30																		
감쇄량	-34	-45	-46	-46	-30	-12																		

7-2. ATTENUATION CHARACTERISTICS (ENS-2010)

< 계측기 >

(1) IMPEDENCE/GAIN-PHASE ANALYZER : 4194A (HP)

◇ FREQUENCY BAND: 150KHz ~ 30MHz

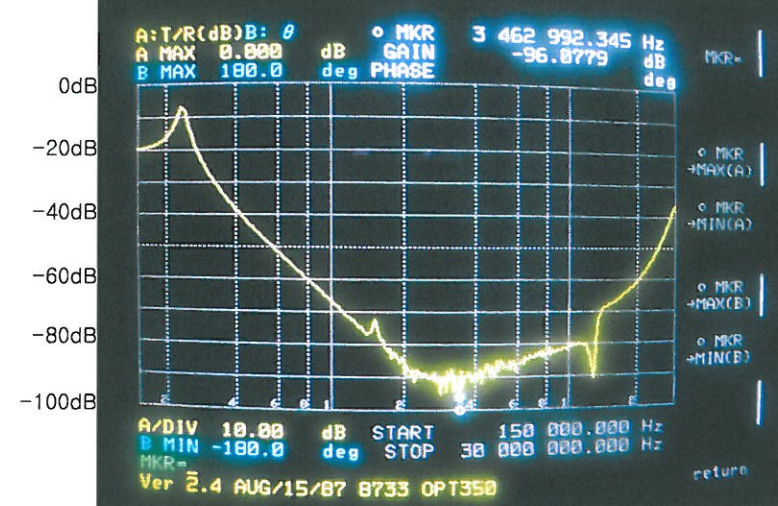
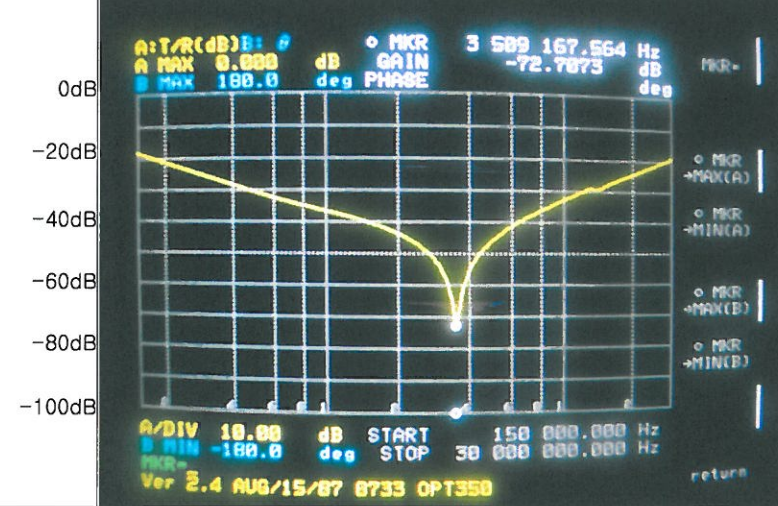
측정방식	MAXIMUM GAIN	파형	비고						
NORMAL MODE	-99.12dB (f=6.539MHz)		0dB(MAX) 10dB/div						
		구분		COMMON MODE					
		주파수 [MHz]		0.15	0.45	1	5	10	30
		감쇄량	-17	-55	-77	-93	-80	-38	
COMMON MODE	-79.55dB (f=3.509MHz)		0dB(MAX) 10dB/div						
		구분		NORMAL MODE					
		주파수 [MHz]		0.15	0.45	1	5	10	30
		감쇄량	-28	-41	-45	-46	-29	-9	

7-3. ATTENUATION CHARACTERISTICS (ENS-2016)

< 계측기 >

(1) IMPEDENCE/GAIN-PHASE ANALYZER : 4194A (HP)

◇ FREQUENCY BAND: 150KHz ~ 30MHz

측정방식	MAXIMUM GAIN	파 형	비 고																					
NORMAL MODE	-96.07dB (f=3.462MHz)	 <table border="1" data-bbox="454 1086 1268 1276"> <thead> <tr> <th>구분</th> <th colspan="6">COMMON MODE</th> </tr> </thead> <tbody> <tr> <td>주파수 [MHz]</td> <td>0.15</td> <td>0.45</td> <td>1</td> <td>5</td> <td>10</td> <td>30</td> </tr> <tr> <td>감쇄량</td> <td>-19</td> <td>-42</td> <td>-66</td> <td>-88</td> <td>-80</td> <td>-36</td> </tr> </tbody> </table>	구분	COMMON MODE						주파수 [MHz]	0.15	0.45	1	5	10	30	감쇄량	-19	-42	-66	-88	-80	-36	0dB(MAX) 10dB/div
구분	COMMON MODE																							
주파수 [MHz]	0.15	0.45	1	5	10	30																		
감쇄량	-19	-42	-66	-88	-80	-36																		
COMMON MODE	-72.70dB (f=3.509MHz)	 <table border="1" data-bbox="454 1792 1268 1982"> <thead> <tr> <th>구분</th> <th colspan="6">NORMAL MODE</th> </tr> </thead> <tbody> <tr> <td>주파수 [MHz]</td> <td>0.15</td> <td>0.45</td> <td>1</td> <td>5</td> <td>10</td> <td>30</td> </tr> <tr> <td>감쇄량</td> <td>-18</td> <td>-29</td> <td>-36</td> <td>-45</td> <td>-32</td> <td>-36</td> </tr> </tbody> </table>	구분	NORMAL MODE						주파수 [MHz]	0.15	0.45	1	5	10	30	감쇄량	-18	-29	-36	-45	-32	-36	0dB(MAX) 10dB/div
구분	NORMAL MODE																							
주파수 [MHz]	0.15	0.45	1	5	10	30																		
감쇄량	-18	-29	-36	-45	-32	-36																		

7-4. ATTENUATION CHARACTERISTICS (ENS-2020)

< 계측기 >

(1) IMPEDANCE/GAIN-PHASE ANALYZER : 4194A (HP)

◇ FREQUENCY BAND: 150KHz ~ 30MHz

측정방식	MAXIMUM GAIN	파형	비고						
NORMAL MODE	-93.07dB (f=2.915MHz)		0dB(MAX) 10dB/div						
		구분		COMMON MODE					
		주파수 [MHz]		0.15	0.45	1	5	10	30
	감쇄량	-20	-39	-64	-85	-76	-45		
COMMON MODE	-68.42dB (f=3.509MHz)		0dB(MAX) 10dB/div						
		구분		NORMAL MODE					
		주파수 [MHz]		0.15	0.45	1	5	10	30
	감쇄량	-16	-27	-32	-40	-28	-16		