
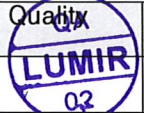
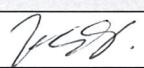

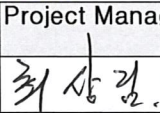


LUMIR Harmony in Differences		Non-Conformance Report		Project	DTNE	
				NCR No.	DTNE-NCR-015	
				NC Date	2020-08-31	
				Critical Item	<input type="checkbox"/> Yes <input checked="" type="checkbox"/> No	
Title		DTNPL FM EMC Test Result Issue				
NC Item	Item Name(Part Name)		DWG No.	Rev	Serial No.	Quantity
			KPLO-DTNPL-SCH	3.0	1012-KB-001F	1
	Next Higher Assembly		Procedure No.	Rev	Supplier of NC item	
	SBC PBA					
	Subsystem		NC observed location(Org.)	Model		
DTNPL		KBIO EMC 시험장	<input type="checkbox"/> EM <input type="checkbox"/> EQM <input type="checkbox"/> QM <input type="checkbox"/> PFM <input checked="" type="checkbox"/> FM			
Sec. A - Description of Nonconformance /Ref to Documents :						
NC detected during	A1 - (Non-functional) Discrepancy <input type="checkbox"/> Receiving Insp./Test <input type="checkbox"/> Inspection <input type="checkbox"/> Manufacturing <input type="checkbox"/> Integration <input type="checkbox"/> Assy. Preparation <input type="checkbox"/> Alignment <input type="checkbox"/> Other:			A2 - (Functional) Test Failure/Malfunction/Anomaly <input type="checkbox"/> Qualification Test <input checked="" type="checkbox"/> Acceptance Test <input type="checkbox"/> Function Test <input type="checkbox"/> Other:		
Initiated by	Initiator/QA	Signature	Test Operator/Cognizant Engineer	Signature		
	최재웅	최재웅	김선구			
NC Environment	<input type="checkbox"/> Laboratory <input type="checkbox"/> Ambient Temp/Humidity <input type="checkbox"/> Acoustic Noise <input checked="" type="checkbox"/> EMC <input type="checkbox"/> Sine Vibration <input type="checkbox"/> Random Vibration <input type="checkbox"/> Shock <input type="checkbox"/> Thermal Vacuum/Thermal Cycle (Temp.: °F/ °C, Pressure:) <input type="checkbox"/> Other:					
Description(5W1H)						
DTNPL FM EMC Test (2020.08.05 ~ 2020.08.07, 2020.08.21) 시험 중 Requirement 미충족 사항 발생						
Contract/Subsystem/Equipment Requirements Violated: <input type="checkbox"/> Yes <input checked="" type="checkbox"/> No						
Sec. B - Internal MRB Dispositions /Ref to Documents:						
Decisions:				Classification		
DTNPL FM EMC 시험 진행 중 요구기준에 벗어난 항목들이 발생하여 ETRI에게 공유하여 KARI의 의견 요청 진행 함. KARI에서는 노이즈 크기가 과도한 것이 아닌 것 같아 보인다는 의견을 보여 Waiver 진행 예정.				<input type="checkbox"/> Major <input checked="" type="checkbox"/> Minor		
Corrective/Preventive Actions:				Customer Notification required		
Other related documents(If applicable):				<input checked="" type="checkbox"/> Yes <input type="checkbox"/> No		
Disposition For Discrepancy:		Disposition For Test		Requirements Violated		
<input checked="" type="checkbox"/> Use As Is <input type="checkbox"/> Rework <input type="checkbox"/> Repair <input type="checkbox"/> RTV <input type="checkbox"/> Scrap <input type="checkbox"/> Other:		Failure/Malfunction/Anomaly: <input type="checkbox"/> Retest <input type="checkbox"/> Re-inspect <input type="checkbox"/> SW change <input type="checkbox"/> Other:		<input type="checkbox"/> RFD <input checked="" type="checkbox"/> RFW <input type="checkbox"/> N/A Doc. No:		
Cause of NC:						
<input checked="" type="checkbox"/> Design <input type="checkbox"/> Human Error <input type="checkbox"/> Material <input type="checkbox"/> Procedure <input type="checkbox"/> On board Software <input type="checkbox"/> Handling <input type="checkbox"/> Workmanship <input type="checkbox"/> Test Software <input type="checkbox"/> Facility/Equipment <input type="checkbox"/> Jig/Fixture <input type="checkbox"/> Test Procedure <input type="checkbox"/> Other:						
Signatures	Quality	Engineering	Product Assurance	Project Manager		
Name / Signature Date						
<input type="checkbox"/> Sec. C1 - Customer held MRB MRB No.:			<input type="checkbox"/> Sec. C2 - Customer invited MRB		Sec. D - Closeout	
Decision:					PA Name/Signature:	
Disposition:					Date:	
<input type="checkbox"/> Use As Is <input type="checkbox"/> Rework <input type="checkbox"/> Repair <input type="checkbox"/> RTV <input type="checkbox"/> Scrap <input type="checkbox"/> Retest <input type="checkbox"/> Re-inspect <input type="checkbox"/> SW change <input type="checkbox"/> Other:						
Corrective/Preventive Actions:						
Signatures	Quality	Engineering	PA	PM	Customer	
Org. Name/Signature Date						

Non-Conformance Report

Project DTNE
NCR No. DTNE-NCR-015
NC Date 2020-08-31
Critical Item ☐Yes ☒No

(Continuation Sheet for Any Additional Information and Actions with clear link to the NCR)

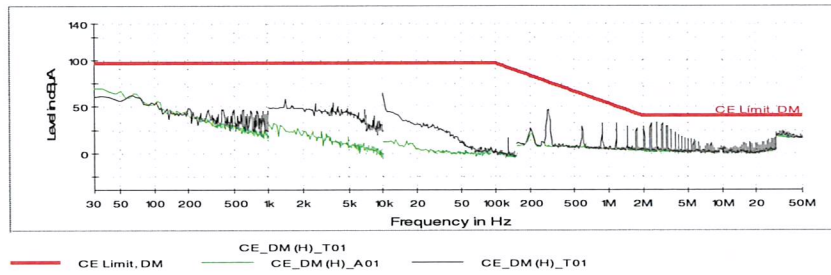
- Issue사항 : FM EMC 시험 결과가 아래와 같이 도출 됨 (2020.08.21)
■ 시험 결과 자료 첨부는 뒷장 참조

Test Item	Test Point	Requirement	Actual Value	PASS/FAIL
Bonding	Unit Case to Structure	$\leq 2.5 \text{ m}\Omega$	1.149m Ω	PASS
	Unit Case to connector - CON_PWR	$\leq 2.5 \text{ m}\Omega$	0.244m Ω	PASS
	Unit Case to connector - CON_COMM	$\leq 2.5 \text{ m}\Omega$	0.248m Ω	PASS
Isolation	Primary Power line to Structure (J1-1pin)	$> 1 \text{ M}\Omega$	10.991k Ω	FAIL
		$\leq 50 \text{ nF}$	24.1uF	FAIL
	Primary Power Return to Structure (J1-11pin)	$> 1 \text{ M}\Omega$	9.345k Ω	FAIL
Conducted Emission, Time Domain, Current & Voltage Ripple	Power Line - Voltage	$\leq 300\text{mV}$	180mv	PASS
	Power Line - DM	$\leq 30\text{mA}$	51mA(1Hz) 29.40mA(100Hz) 23.60mA(285kHz)	FAIL
	Power Line - CM	$\leq 30\text{mA}$	49.10mA(1Hz) 38.10mA(100Hz) 31.20mA(281.24kHz)	FAIL
Conducted Emission, Time Domain, Inrush Current	Power line - dl/dt	$\leq 1 \text{ A/us}$	0.435A/us	PASS
	Power line - First Peak Duration	$\leq 8 \text{ ms}$	88.88us	PASS
	Power line - Steady State	$\leq 20\text{ms}$	1.56ms	PASS
Conducted Emission, Frequency Domain, Power Lines, 30Hz~50MHz	Power line - DM (Hot)	Refer EMC specification	뒷장 참조	PASS
	Power line - DM (Return)	Refer EMC specification	뒷장 참조	PASS
	Power line - CM	Refer EMC specification	뒷장 참조	FAIL
Conducted Emission, Frequency Domain, Signal Lines, 10kHz ~ 50MHz	CON_COMM	Refer EMC specification	뒷장 참조	PASS
	-X axis	Refer EMC specification	뒷장 참조	PASS
	+X axis	Refer EMC specification	뒷장 참조	PASS
Radiated Emission, magnetic field, 30Hz ~ 100kHz	Y axis	Refer EMC specification	뒷장 참조	PASS
	Z axis	Refer EMC specification	뒷장 참조	PASS
Radiated Emission, Electric filed, 10kHz ~ 18GHz	(10kHz ~ 30MHz) Vertical Polarity	Refer EMC specification	뒷장 참조	FAIL
	(10kHz ~ 30MHz) Horizontal Polarity	NA	NA	NA
	(30MHz ~ 200MHz) Vertical Polarity	Refer EMC specification	뒷장 참조	FAIL
	(30MHz ~ 200MHz) Horizontal Polarity	Refer EMC specification	뒷장 참조	PASS
	(200MHz ~ 1GHz) Vertical Polarity	Refer EMC specification	뒷장 참조	FAIL
	(200MHz ~ 1GHz) Horizontal Polarity	Refer EMC specification	뒷장 참조	PASS
	(1GHz ~ 18GHz) Vertical Polarity	Refer EMC specification	뒷장 참조	FAIL
	(1GHz ~ 18GHz) Horizontal Polarity	Refer EMC specification	뒷장 참조	PASS

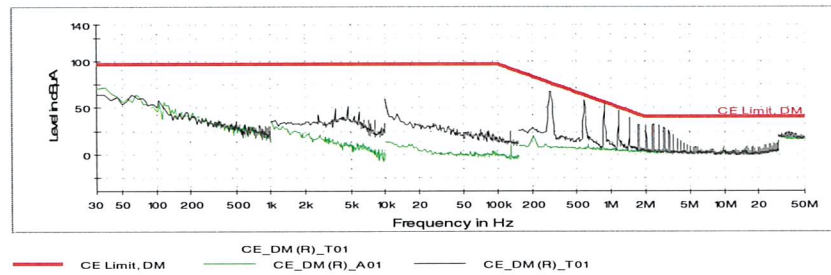
- 검토 및 진행 사항
- (2020.08.27) 해당 부분은 QM 대비 FM 에서 GND 연결 구조가 변경된 건으로 판단 되어 ETRI 에게 결과를 송부 함
 - (20.08.30) ETRI 사에서 KARI 에 해당 Issue를 공유, KARI에서 과도한 노이즈 크기가 아닌 것으로 판단이 되어진다는 의견 수령 함
- 결론
- DTNPL FM 추가 EMC 시험, 보드 수정 없이 KARI에 Waiver 진행 함

→ Conducted Emission, Frequency Domain, Power Lines, 30Hz ~ 50MHz

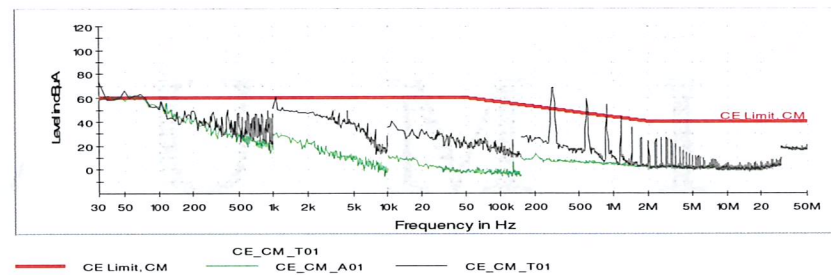
■ DM HOT



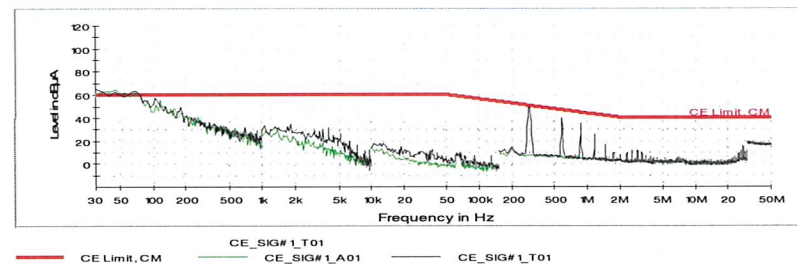
■ DM RTN



■ CM

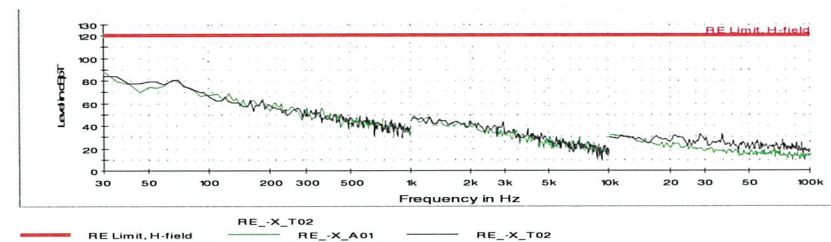


→ Conducted Emission Frequency Domain, Signal Line, 10kHz ~ 50MHz

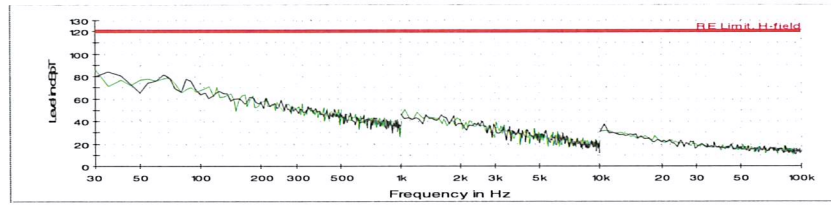


→ Radiated Emission, magnetic field, 30Hz ~ 100kHz

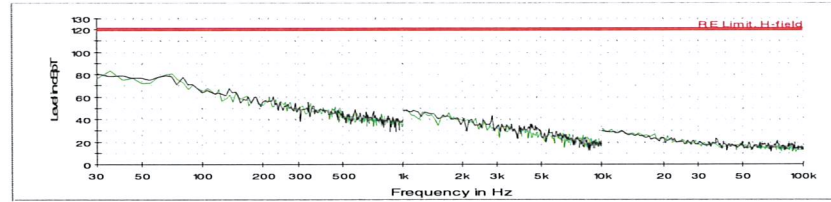
■ -X



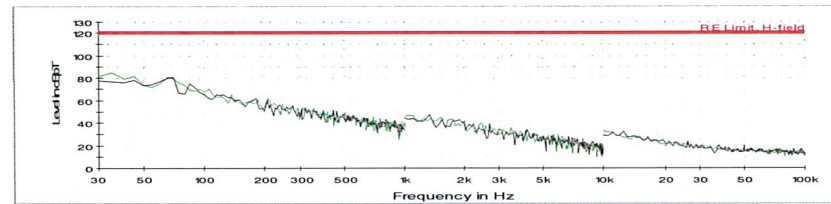
■ +X



■ Y

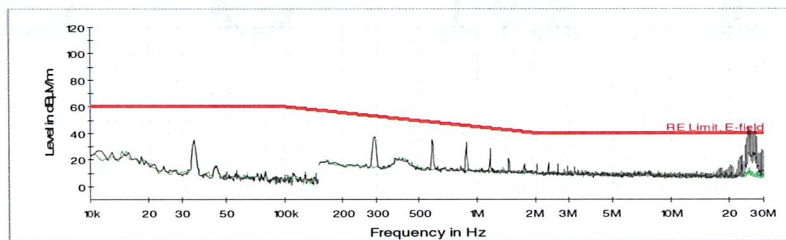


■ Z

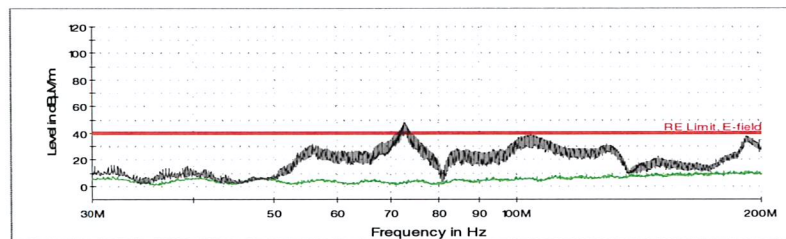


→ Radiated Emission, Electric field, 10kHz ~ 18GHz

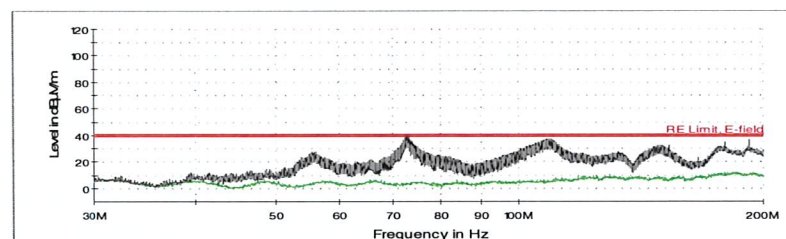
■ 10kHz ~ 30MHz (Vertical)



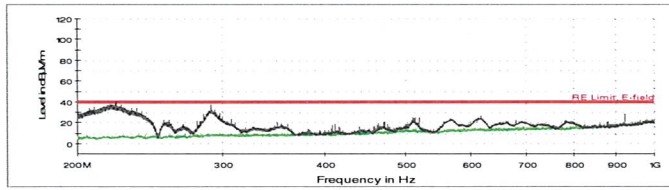
■ 30MHz ~ 200MHz (Vertical)



■ 30MHz ~ 200MHz (Horizontal)

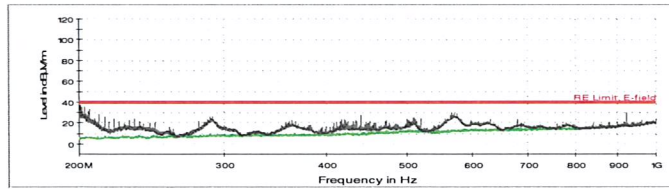


■ 200MHz ~ 1GHz (Vertical)



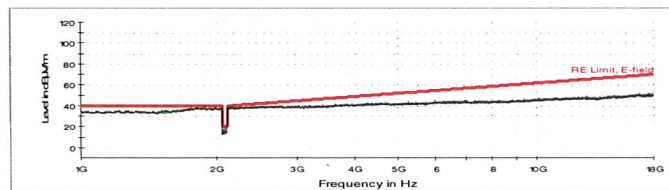
RE Limit, E-field RE_B3V_A01 RE_B3V_T01

■ 200MHz ~ 1GHz (Horizontal)



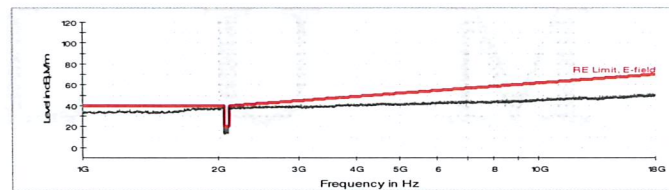
RE Limit, E-field RE_B3H_A01 RE_B3H_T01

■ 1GHz ~ 18GHz (Vertical)



RE Limit, E-field RE_B4V_A01 RE_B4V_T01

■ 1GHz ~ 18GHz (Horizontal)



RE Limit, E-field RE_B4H_A01 RE_B4H_T01