



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	A2 - (Functional) Test Failure/Malfunction/Anomaly		
	<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:	<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	YCS
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: Yes No

Sec. B - Internal MRB Dispositions /Ref to Documents:

Decisions:	Classification <input type="checkbox"/> Major <input checked="" type="checkbox"/> Minor
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.	Customer Notification required <input checked="" type="checkbox"/> Yes <input type="checkbox"/> No
Corrective/Preventive Actions:	Requirements Violated <input type="checkbox"/> RFD <input checked="" type="checkbox"/> RFW <input type="checkbox"/> N/A
Other related documents(if applicable):	Doc. No:
Disposition For Discrepancy: <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:	Disposition For Test Failure/Malfunction/Anomaly: <input type="checkbox"/> Retest <input type="checkbox"/> Re-inspect <input type="checkbox"/> SW change <input type="checkbox"/> Other:

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:
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Signatures	Quality	Engineering	Product Assurance	Project Manager
Name / Signature Date				최재웅

<input type="checkbox"/> Sec. C1 – Customer held MRB MRB No.:	<input type="checkbox"/> Sec. C2 – Customer invited MRB	Sec. D – Closeout
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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					



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(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	≤ 2.5 mΩ	1.149mΩ	PASS
	Unit Case to connector - CON_PWR	≤ 2.5 mΩ	0.244mΩ	PASS
	Unit Case to connector - CON_COMM	≤ 2.5 mΩ	0.248mΩ	PASS
Isolation	Primary Power line to Structure (J1-1pin)	> 1 MΩ	10.991kΩ	FAIL
		≤ 50 nF	24.1uF	FAIL
		> 1 MΩ	9.345kΩ	FAIL
Conducted Emission, Time Domain, Current & Voltage Ripple	Primary Power Return to Structure (J1-11pin)	≤ 50 nF	29.5uF	FAIL
	Power Line - Voltage	≤ 300mV	180mv	PASS
	Power Line - DM	≤ 30mA	29.40mA(100Hz) 23.60mA(285kHz)	FAIL
Conducted Emission, Time Domain, Inrush Current	Power Line - CM	≤ 30mA	49.10mA(1Hz) 38.10mA(100Hz) 31.20mA(281.24kHz)	FAIL
	Power line - dI/dt	≤ 1 A/us	0.435A/us	PASS
	Power line - First Peak Duration	≤ 8 ms	88.88us	PASS
Conducted Emission, Frequency Domain, Power Lines, 30Hz~50MHz	Power line - Steady State	≤ 20ms	1.56ms	PASS
	Power line - DM (Hot)	Refer EMC specification	뒷장 참조	PASS
	Power line - DM (Return)	Refer EMC specification	뒷장 참조	PASS
Conducted Emission, Frequency Domain, Signal Lines, 10kHz ~ 50MHz	Power line - CM	Refer EMC specification	뒷장 참조	FAIL
	CON_COMM	Refer EMC specification	뒷장 참조	PASS
	-X axis	Refer EMC specification	뒷장 참조	PASS
Radiated Emission, magnetic field, 30Hz ~ 100kHz	+X axis	Refer EMC specification	뒷장 참조	PASS
	Y axis	Refer EMC specification	뒷장 참조	PASS
	Z axis	Refer EMC specification	뒷장 참조	PASS
Radiated Emission, Electric field, 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

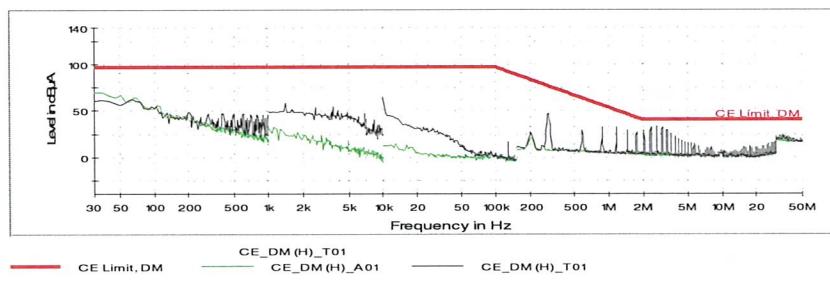
→ 검토 및 진행 사항

- (2020.08.27) 해당 부분은 QM 대비 FM에서 GND 연결 구조가 변경된 것으로 판단 되어 ETRI에게 결과를 송부 함
- (20.08.30) ETRI 사에서 KARI에 해당 Issue를 공유, KARI에서 과도한 노이즈 크기가 아닌 것으로 판단이 되어진다는 의견 수령 함

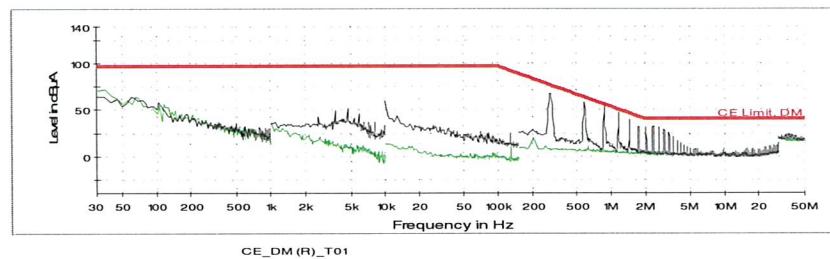
→ 결론

- DTNPL FM 추가 EMC 시험, 보드 수정 없이 KARI에 Waiver 진행 함

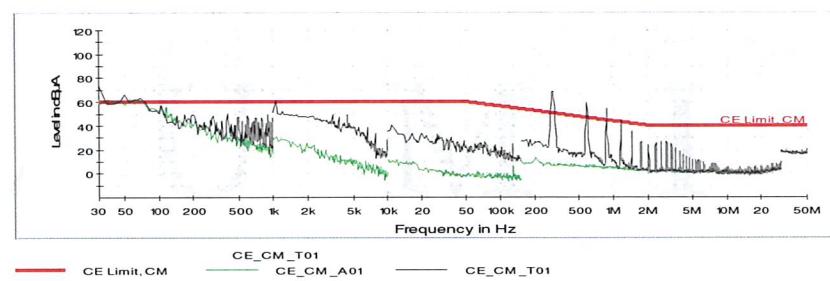
→ Conducted Emission, Frequency Domain, Power Lines, 30Hz ~ 50MHz
 ■ DM HOT



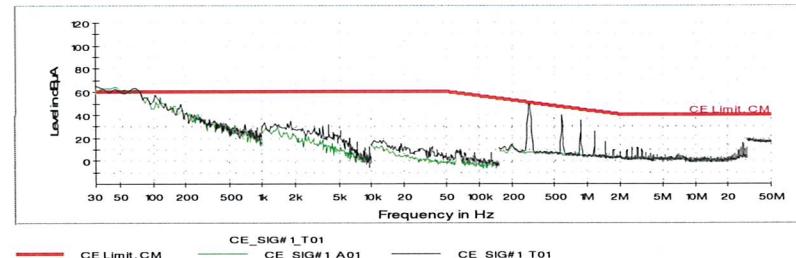
■ DM RTN



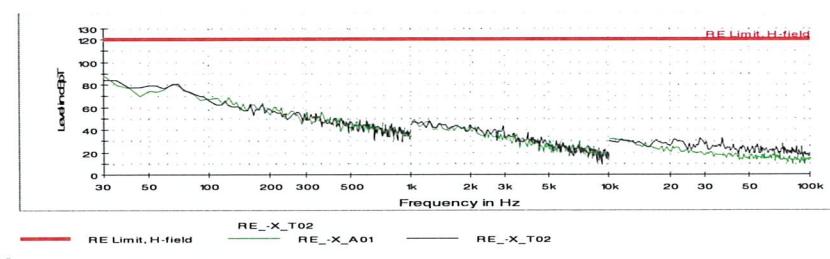
■ CM



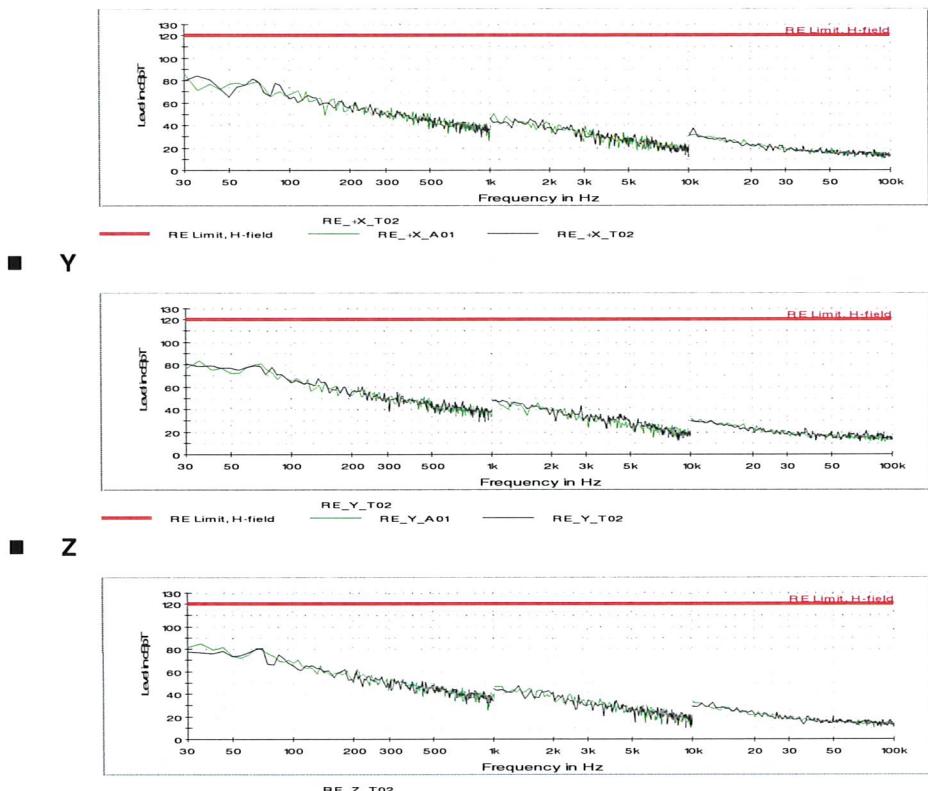
→ Conducted Emission Frequency Domain, Signal Line, 10kHz ~ 50MHz



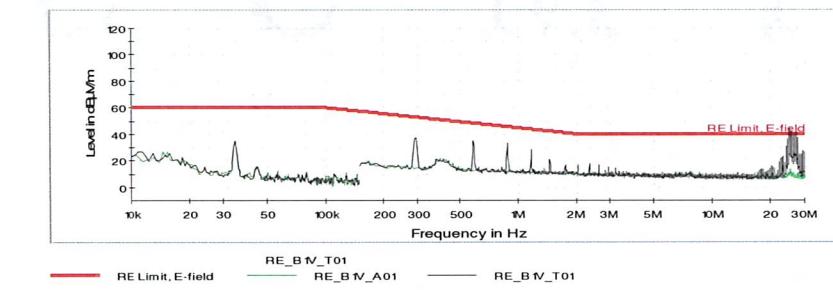
→ Radiated Emission, magnetic field, 30Hz ~ 100kHz
 ■ -X



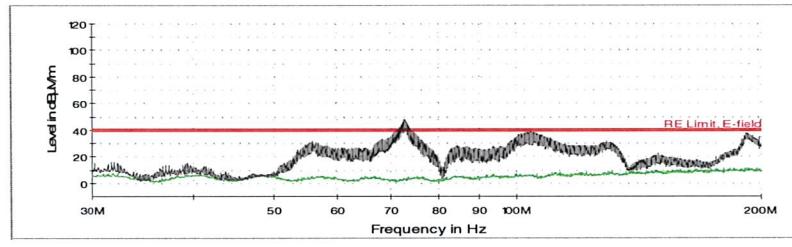
■ +X



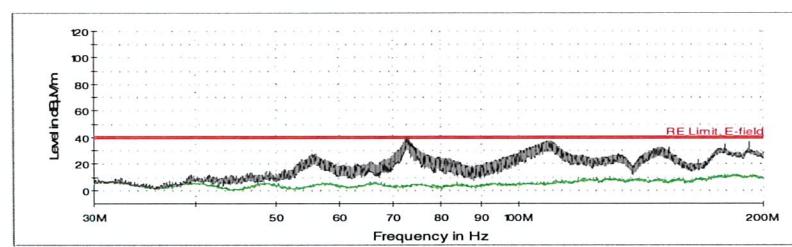
→ Radiated Emission, Electric field, 10kHz ~ 18GHz
 ■ 10kHz ~ 30MHz (Vertical)



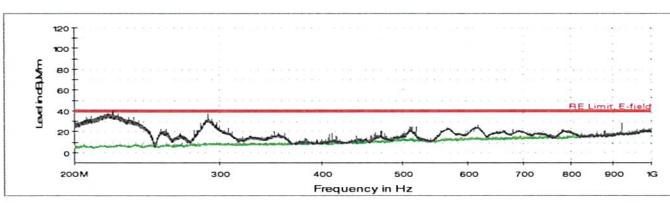
■ 30MHz ~ 200MHz (Vertical)



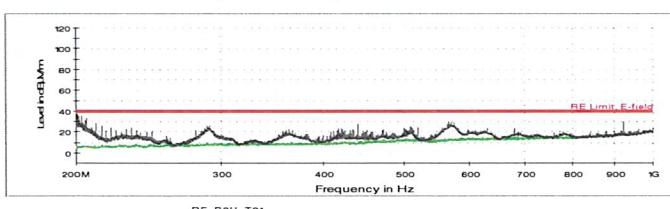
■ 30MHz ~ 200MHz (Horizontal)



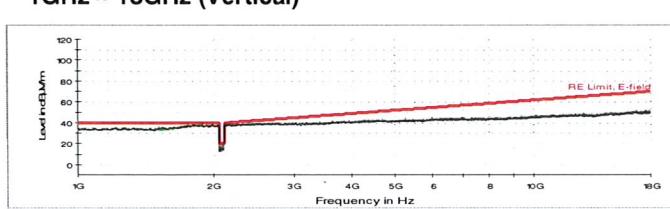
■ 200MHz ~ 1GHz (Vertical)



■ 200MHz ~ 1GHz (Horizontal)



■ 1GHz ~ 18GHz (Vertical)



■ 1GHz ~ 18GHz (Horizontal)

