

5.2 Band edge

Tested by:	Andrea Giovanni Galbiati	
Test date:	2024-03-18	
Test location (stand):	☐	Laboratory area (conducted)
	☐	Climatic chamber (conducted or radiated)
	☒	SAC/OATS (radiated)
Ambient temperature:	22 °C	
Relative humidity:	45 %	
Atmospheric pressure:	998 mbar	
FCC requirements (clauses):	15.247(d)	
ISED requirements (clauses):	RSS-247 5.5	
ANSI C63.10 test method (clause):	6.10.4	
EUT Test set-up:	<u>Floor-standing equipment</u> If possible, the antenna(s) of the EUT is located at a height of 1.5 m above the floor, and the intentional radiator circuitry is located within the system at a height of at least 0.8 m above the floor.	
Supplementary test set-up description:	---	
Used mains voltage/frequency:	120 V; 60 Hz	
Supplementary information:	---	

Block diagram of the test setup:

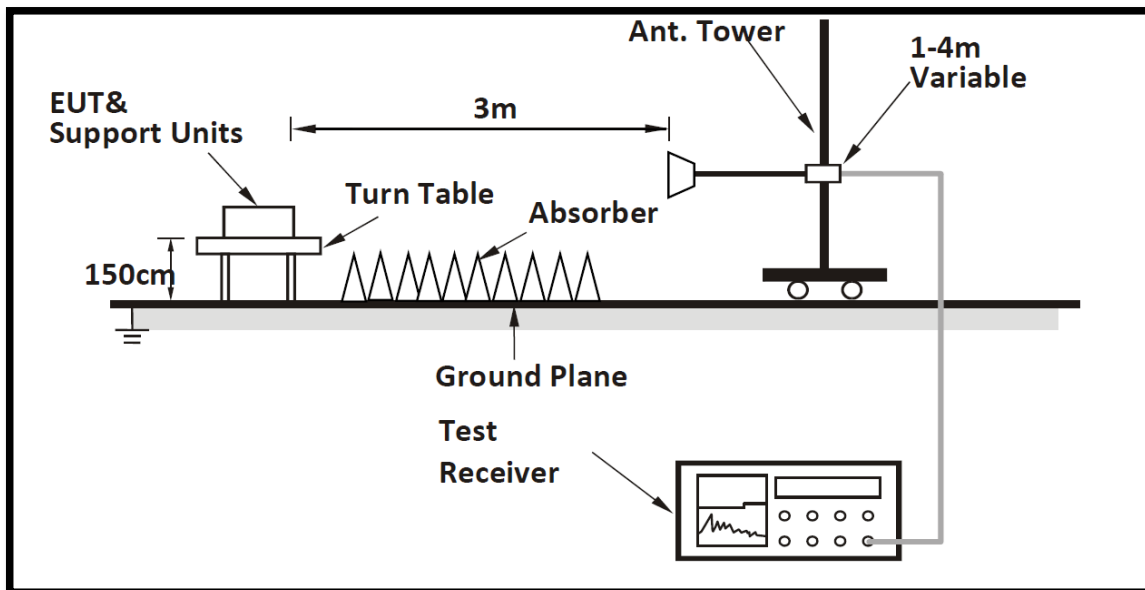
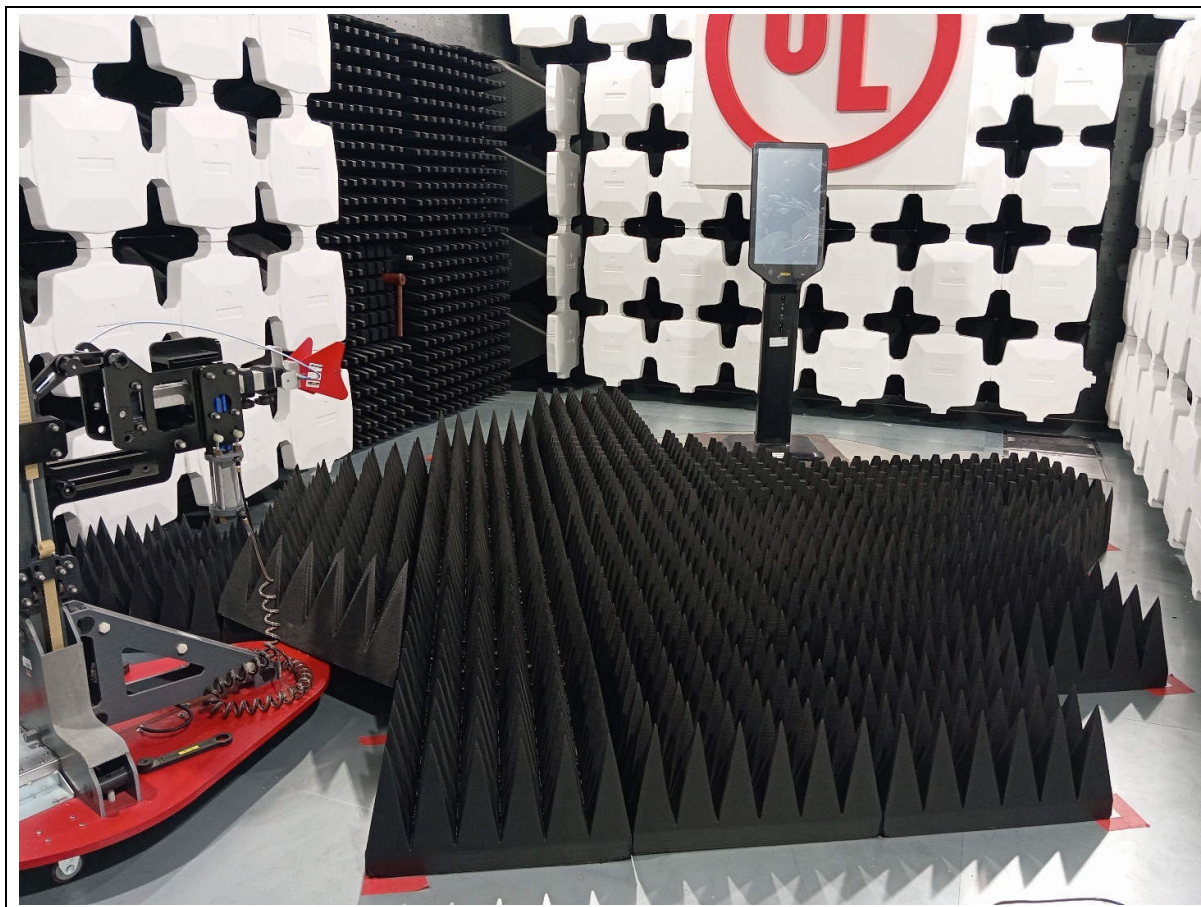


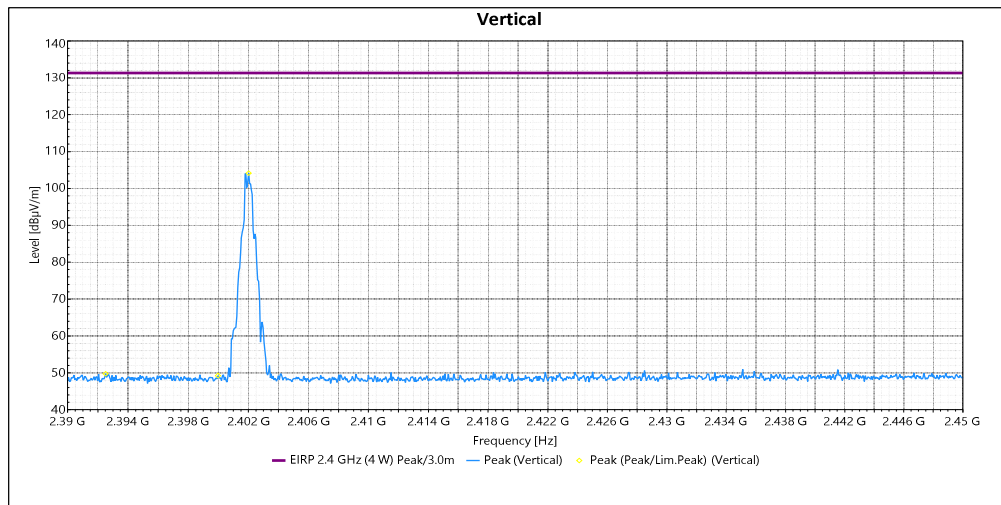
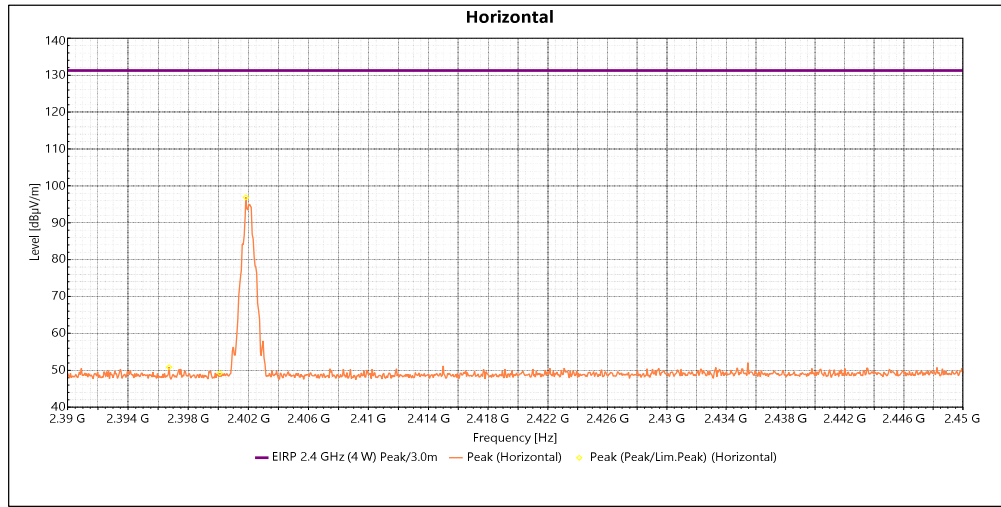
Photo of test setup:



Results

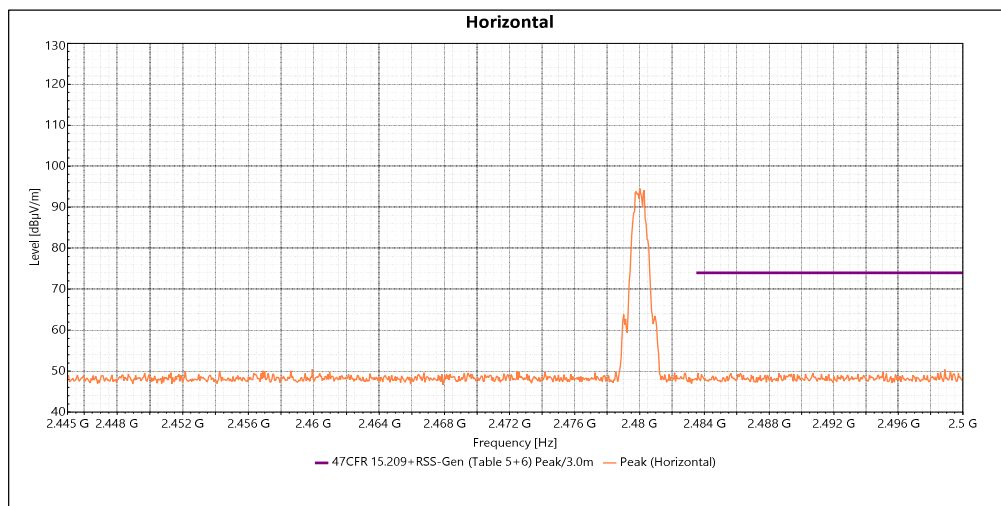
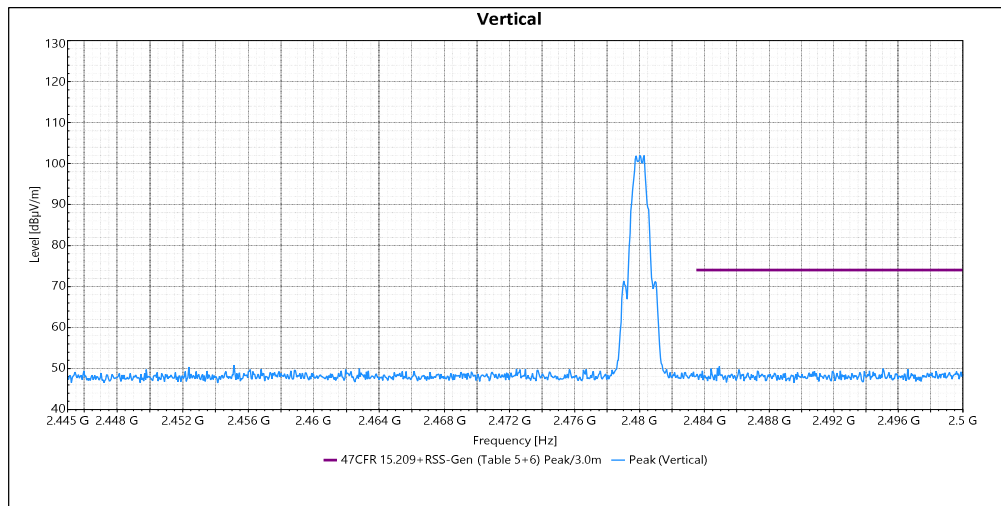
Operating Mode:	2		
Test result:	Pass	Tested on:	2024-03-18

Start Frequency: 2.39 GHz; Stop Frequency: 2.45 GHz; Step: 1000 Pts; Sweep Time: 1 s; RF Attenuation: 10 dB; RBW: 100 kHz; VBW: 300 kHz; Preamplifier: ON; Preselector: ON



Operating Mode:	3		
Test result:	Pass	Tested on:	2024-03-20

Start Frequency: 2.445 GHz; Stop Frequency: 2.5 GHz; Step: 1000 Pts; Sweep Time: 500 ms; RF Attenuation: 10 dB; RBW: 100 kHz; VBW: 300 kHz; Preamplifier: ON; Preselector: ON			
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Final measurement table (Horizontal polarization)

Channel	Max carrier frequency		Max band edge frequency		Delta (dB)	Limit (*) (dB)	Result
	MHz	dBμV/m	MHz	dBμV/m			
Mode: BT							
Low	2402	96.868	2397	50.921	52.848	≥ 20	Pass
High	2480	94.619	2483.5	48.249	46.370	≥ 20	Pass

Final measurement table (vertical polarization)

Channel	Max carrier frequency		Max band edge frequency		Delta (dB)	Limit (*) (dB)	Result
	MHz	dBm	MHz	dBm			
Mode: BT							
Low	240	104.103	2393	49.721	54.382	≥ 20	Pass
High	2480	101.954	2483.5	48.290	53.664	≥ 20	Pass

(*) 20 dB margin applied because conducted output power was measured using Peak detector.

6 List of test equipment

Equipment	Type	Inventory number	Manufacturer	Serial Number	Last calibration date	Calibration due date
Test Stand: Radiated emission 30 MHz to 1 GHz						
Cable 8000mm - 18 GHz	SF126/11N/11N/8000	220502	Huber+Suhner	556226/126	2023-05-03	2024-05-28
6dB Attenuator	DGA 9552 N	210263	Schwarzbeck Mess-Elektronik OHG	CH9006	2023-09-06	2024-09-28
Trilog-Broadband Antenna	VULB 9168	210290	Schwarzbeck Mess-Elektronik OHG	1244	2023-08-25	2025-08-28
NSA Normalized Site Attenuation	NSA FACT3-1.2 STD	210410	ETS-Lindgren	NSA FACT3-1.2 STD	2022-04-12	2025-04-28
Software - EMC	BAT-EMC	156535	Nexio Technologies		-	-
EMI TEST RECEIVER	ESW26	207263	Rohde & Schwarz (Koeln) GmbH & Co. KG	101512	2023-05-23	2024-05-28
SEMI-ANECHOIC CHAMBER	FACT3-1.2 STD	210407	ETS-Lindgren	-	-	-
Center, Modular RF Platform	7000-011	210859	ETS-Lindgren	00231682	-	-
Cable 2000mm - 18 GHz	SF126/11SMA/11N/2000	220503	Huber+Suhner	554756/126	2023-05-03	2024-05-28
Tilting Antenna Mast Positioning Tower	2171B/2170B	135821	ETS-Lindgren (Cedar Park, Texas)	-	-	-
Test Stand: Radiated emission 1 GHz to 18 GHz						
Tilting Antenna Mast Positioning Tower	2171B/2170B	135821	ETS-Lindgren (Cedar Park, Texas)	-	-	-
Microwave Coaxial Cable N to Sma-M	AK 9515 H	213199	Schwarzbeck Mess-Elektronik OHG	00169	2023-05-02	2024-05-28
Highpass Filter	WHKX12-2520-2800-18000-60ST	154712	Wainwright Instruments GmbH	1	2023-10-27	2024-10-28
Absorber High Frequency	EHP-12	212616	ETS-Lindgren	-	-	-
SEMI-ANECHOIC CHAMBER	FACT3-1.2 STD	210407	ETS-Lindgren	-	-	-
Center, Modular RF Platform	7000-011	210859	ETS-Lindgren	00231682	-	-
Cable 2000mm - 18 GHz	SF126/11SMA/11N/2000	220503	Huber+Suhner	554756/126	2023-05-03	2024-05-28
Double Ridged Broadband Horn Antenna	3117	138662	ETS-Lindgren (Cedar Park, Texas)	00208482	2023-01-20	2025-01-28
Cable 8000mm - 18 GHz	SF126/11N/11N/8000	220502	Huber+Suhner	556226/126	2023-05-03	2024-05-28
Software - EMC	BAT-EMC	156535	Nexio Technologies		-	-
SVSWR Voltage Standing Wave Ratio	SVSWR FACT3-1.2 STD	210409	ETS-Lindgren	SVSWR FACT3-1.2 STD	2022-04-12	2025-04-28
EMI TEST RECEIVER	ESW26	207263	Rohde & Schwarz (Koeln) GmbH & Co. KG	101512	2023-05-23	2024-05-28
Low-Noise EMI Preamplifier	BLMA 0118-4A	209025	BONN Elektronik	2113244A	2024-03-05	2025-03-28

Test Stand: Radiated emission 18 GHz to 26 GHz						
SEMI-ANECHOIC CHAMBER	FACT3-1.2 STD	210407	ETS-Lindgren	-	-	-
Cable 6000mm - 0.04 to 26.5 GHz	SF526S-600-2X11PC35501	216873	Huber+Suhner	2717237001	2024-03-04	2025-03-28
Cable 500mm - 0.04 to 40 GHz	SF102E-50-2X11SK252	216877	Huber+Suhner	536580/2E	2024-03-04	2025-03-28
Low-Noise EMI Preamplifier	BLMA 1840-1A	209026	BONN Elektronik	2113244B	2023-06-27	2024-06-28
Absorber High Frequency	EHP-12	212616	ETS-Lindgren	-	-	-
Tilting Antenna Mast Positioning Tower	2171B/2170B	135821	ETS-Lindgren (Cedar Park, Texas)	-	-	-
Software - EMC	BAT-EMC	156535	Nexio Technologies	-	-	-
EMI TEST RECEIVER	ESW26	207263	Rohde & Schwarz (Koeln) GmbH & Co. KG	101512	2023-05-23	2024-05-28
Center, Modular RF Platform	7000-011	210859	ETS-Lindgren	00231682	-	-
Double Ridged Broadband Horn Antenna	3116C	210452	ETS-Lindgren	00240011	2021-04-26	2024-04-28
Test Stand: Auxiliary equipment						
Mini Datalogger	174H	211146	Testo	83293175	2023-10-18	2024-10-28
Laser Measure	RSLDM-50H	224436	RS Pro	210743764	2023-11-10	2024-11-28
MAIN SUPPLY VARIAC	T40NC-6	80699	BELOTTI VARIATORI	-	-	-
FREQUENCY CONVERTER	FWW-SFUP 40kVA	37730	GUSTAV KLEIN	-	-	-
Mini Datalogger	174H	211147	Testo	83306371	2023-10-18	2024-10-28

7 Measurement instrumentation uncertainties

The Uncertainty of Measurement (UoM) for each unit measured in this Test Report was estimated in accordance with the UL International Italia document No. 23-CL-G0025 and is retained on file. Details of the estimation of UoM may be made available upon request, in particular for quantities not listed.

Measurement	Range	Ulab	Unit
Frequency	9 kHz to 40 GHz	0.5	kHz
Time	0.7 μ s to 16000 s	3.00	%
Conducted power, by spectrum analyzer	9 kHz to 40 GHz	0.45	dB
Conducted power, by fast power meter	9 kHz to 8 GHz	0.41	dB
Temperature (ambient)	15 to 35 °C	0.72	°C
Temperature (climatic chamber)	-40 to 100 °C	1.63	°C
Humidity (ambient)	30 to 70 %	5.76	%RH
Humidity (climatic chamber)	30 to 95 %	3.95	%RH
Supply voltage (AC)	0 to 500 V	3.00	%
Supply voltage (DC)	0 to 15 V	0.28	%
Conducted disturbance at mains and other port power using V-AMN	9 kHz to 150 kHz	3.71	dB
Conducted disturbance at mains and other port power using V-AMN	150 kHz to 30 MHz	3.32	dB
Radiated disturbance (magnetic field using a loop antenna)	9 kHz to 30 MHz	3.16	dB
Radiated disturbance (electric field strength in SAC 3, hybrid antenna, Hor)	30 MHz to 1000 MHz	4.22	dB
Radiated disturbance (electric field strength in SAC 3, hybrid antenna, Ver)	30 MHz to 1000 MHz	5.64	dB
Radiated disturbance (electric field strength in SAC 5, hybrid antenna, Hor)	30 MHz to 1000 MHz	3.98	dB
Radiated disturbance (electric field strength in SAC 5, hybrid antenna, Ver)	30 MHz to 1000 MHz	5.66	dB
Radiated disturbance (electric field strength in FSOATS 3) (1)	1 GHz to 6 GHz	5.43	dB
Radiated disturbance (electric field strength in FSOATS 3) (2)	1 GHz to 6 GHz	4.29	dB
Radiated disturbance (electric field strength in FSOATS 3) (1)	6 GHz to 18 GHz	5.18	dB
Radiated disturbance (electric field strength in FSOATS 3) (2)	6 GHz to 18 GHz	4.22	dB
Radiated disturbance (electric field strength in FSOATS 5) (1)	1 GHz to 6 GHz	5.12	dB
Radiated disturbance (electric field strength in FSOATS 5) (2)	1 GHz to 6 GHz	4.13	dB
Radiated disturbance (electric field strength in FSOATS 5) (1)	6 GHz to 18 GHz	5.63	dB
Radiated disturbance (electric field strength in FSOATS 5) (2)	6 GHz to 18 GHz	4.54	dB
Radiated disturbance (electric field strength in FSOATS 3) (1)	18 GHz to 40 GHz	7.63	dB
Radiated disturbance (electric field strength in FSOATS 5) (1)	18 GHz to 40 GHz	7.63	dB
Radiated Spurious Emission (ERP/EIRP, Substitution Method)	25 MHz to 26 GHz	5.97	dB
Legend/Remarks: n.d.: not defined (1) Using external EMI preamplifier. (2) Not using external EMI preamplifier. Supplementary information: - The measurement uncertainty values are calculated and correspond to an expansion factor (coverage factor) $k = 2$ (which provide confidence level of 95.45 % in the case where the distributions characterizing the actual measurement uncertainties are normal (Gaussian)). - Listed values are intended with prefix "±".			

8 Photos of EUT

Photo 1



Photo 2



Photo 3



Photo 4

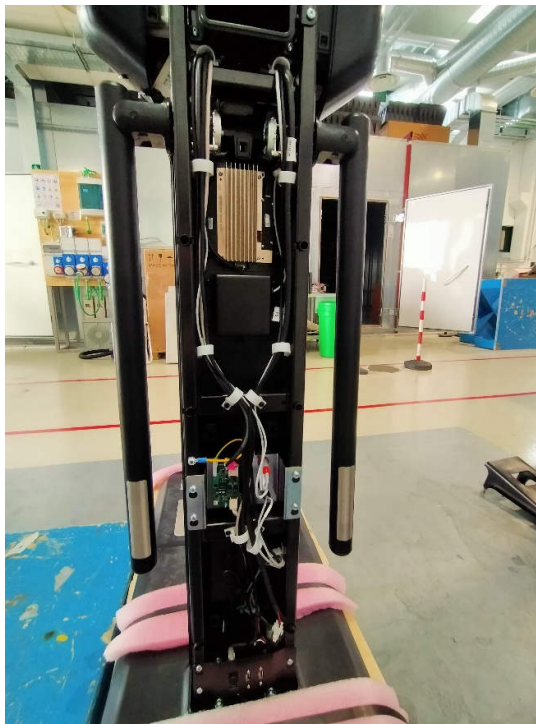


Photo 5

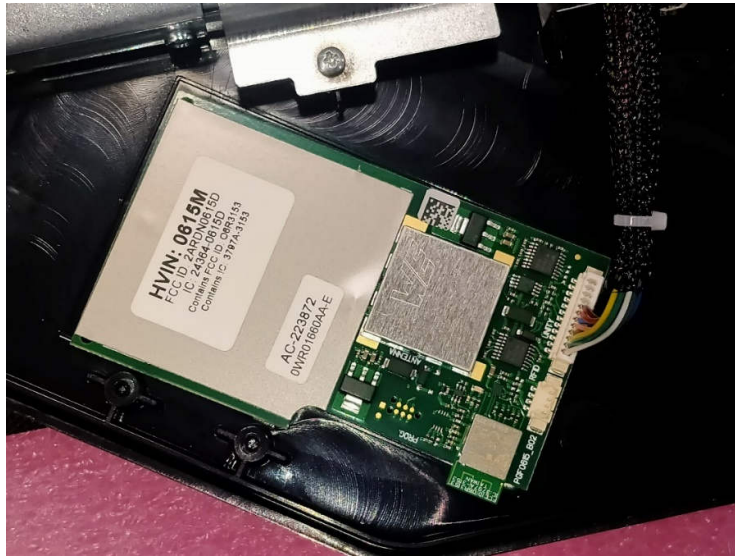
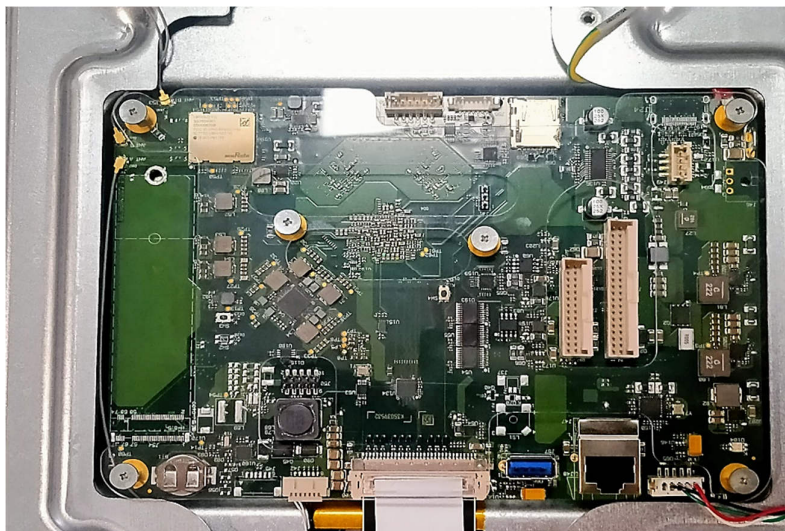


Photo 6



< END OF TEST REPORT >

Attachment 1: Critical Component List (*)

(section excluded from ILAC regulations)

Descrizione Estesa	Fornitore	Cd. comp. ass. costr.	Posizione serigrafica	UL
Cover plastica 27 Health	PERSICHETTI STAMPI S.R.L.	2358.FR6179 REV-B-NR		E220931
Batteria Non Ric Litio CR 3V 48mAh Bottone range:-40 °C to +85 °C - Lead Free	Renata	CR1225.IB		missing
Batteria Non Ric Litio CR 3V 48mAh Bottone range:-40 °C to +85 °C - Lead Free	Renata	CR1225_REN ATA		missing
Cover protettiva in Lexan 9032 trasparente sp. 2 mm per Kiosk Health E35 - RoHS	ISOPAD SPA	1069.MIN1611 REV-B		UL94-HB
Fermacavo Plastico Adesivo Rettangolare Altezza interna 8,4 mm Larghezza interna 9,1 mm Nylon 6/6 UL94 V-0 - Lead Free	ESSENTA	MWSEB-6-19A2-RT		n/a
Fermacavo Plastico Adesivo Rettangolare Altezza interna 8,4 mm Larghezza interna 9,1 mm Nylon 6/6 UL94 V-0 - Lead Free	essentra	MWSEB-6-19A-RT		n/a
Plastic Cable clips Diametro foro compatibile - 6.4 mm, Altezza interno - 2.5 mm, Larghezza interna - 8.1 mm, PA con adesivo - Lead Free	ESSENTA	MWSSEBE-1-19A2		n/a
INTERNO FOAM CASSA 10 MONITOR 27 0WR01635	Beta	4625.0725IF0 018-04		n/a
Touch Panel + LCM Module MV270FHM-N20-4944 BOE Std air bonding, new logo	FANNAL ELECTRONICS CO. LTD	5849.FN2700 T010B		
Cornice plastica 27 Health	PERSICHETTI STAMPI S.R.L.	2358.FR6178 REV-B-EG		E223153
Portabatteria SMT Bottone L=15.3mm x W=9.5mm x H3.6mm Orizzontale - Rohs Compliant	Linx Technologies Inc	BAT-HLD-012-SMT	BT1	missing
Portabatteria SMT Bottone L=15.3mm x W=9.5mm x H3.6mm Orizzontale - Rohs Compliant	Linx Technologies Inc / TE	BAT-HLD-012-SMT-TR	BT1	missing
CI Display Driver SMT ZXH LVDS 25 - 154 MHz rang ind. (-40°C +85°C) - Lead Free	TEXAS INSTRUMENTS	SN65DSI84ZX HR	U134	n/a
CI Lineare Bidirectional Load Switch SMT DFN12 Vin=3.4V to 23V range ind. (-40°C +85°C) - Lead Free	Alpha & Omega	AOZ1375DI-01	U64,U198	E495859
CI Lineare Switch SMT "120m., 1.3A Power Switch with Programmable Current Limit" SOT23-6 Vin = -0.3V to 6V range ind. (-40°C +85°C) Chip enable high - Lead Free	RICHTEK	RT9728AHGE	U138,U146,U173	missing
Led SMT Bicolore Giallo / Verde 3.2(L)x2.7(W)x1.1(H) mm 6.00 mcd (green) 2.50 mcd (yellow) 2.1V (-55 +85) - Lead Free	LITEON	LTST-C155GYKT	D104	n/a
Led SMT Verde (574 nm - Ultra Bright Yellow Green) size 0805 (50 mcd) (temp. -40 ~ +85) - Rohs Compliant	HARVATEK	HT-170UYG-DT	D107	n/a
Led SMT Verde (574 nm - Ultra Bright Yellow Green) size 0805 (50 mcd) (temp. -40 ~ +85) - Rohs Compliant	HARVATEK	B1701UYG-20D-000814	D107	n/a
Circuito Stampato per SBC custom per cliente TECHNOGYM progetto nuovo Kiosk/Ass Station Unity 5, GERBER: G0E35B10	MFG GENERICO	CSE35REVB	CS1	in allegato
Connettore TH 2 x 20p "iGrid" M ST P2 Con molla di ritenzione Range Industriale - Rohs Compliant	Molex	5016454020	J1	cURus (E29179)
Connettore TH 2 x 20p "iGrid" M ST P2 Con molla di ritenzione Range Industriale - Rohs Compliant	MOLEX	501645-4020	J1	cURus (E29179)
Connettore SMT 1 x 5p M ST P2 (-40°+140°) - Rohs Compliant	JOY-DAY	A2001WV-S-05PNLNG1G0 0L	J33	E179987
Connettore SMT 1 x 5p M ST P2 (-40°+140°) - Rohs Compliant	JOY-DAY	A2001WV-S-05PD01	J33	cURus (E179987)
Connettore SMT 1 x 5p M ST P2 (-40°+140°) - Rohs Compliant	JOY-DAY	A2001WV-S-5P01	J33	E179987
Connettore SMT 1 x 5p M ST P2 (-40°+140°) - Rohs Compliant	JOY-DAY	A2001WV-S-5P	J33	E179987
Connettore SMT RF Coassiale Ultra Small (U.FL) Presa ST 50 Ohm H=1.25mm DC= to 6 GHz Operating temperature range -40°C to +90°C - Rohs Compliant	HRS	U.FL-R-SMT-1(80)	J51,J52,J53	N/A
Connettore SMT RF Coassiale Ultra Small (U.FL) Presa ST 50 Ohm H=1.25mm DC= to 6 GHz Operating temperature range -40°C to +90°C - Rohs Compliant	HIROSE	U.FL-R-SMT(01)	J51,J52,J53	N/A
Connettore SMT RF Coassiale Ultra Small (U.FL) Presa ST 50 Ohm H=1.25mm DC= to 6 GHz Operating temperature range -40°C to +90°C - Rohs Compliant	HIROSE	U.FL-R-SMT1(10)	J51,J52,J53	N/A
Connettore SMT RF Coassiale Ultra Small (U.FL) Presa ST 50 Ohm H=1.25mm DC= to 6 GHz Operating temperature range -40°C to +90°C - Rohs Compliant	HIROSE	U.FL-R-SMT-1(10)	J51,J52,J53	N/A

Diodo Switching SMT SOD323 75V 350mA (-55Å° to 150Å°) - Lead Free	MULTICOMP	1N4148WS	D39	missing
Diodo Switching SMT SOD323 75V 350mA (-55Å° to 150Å°) - Lead Free	VISHAY	1N4148WS-V-GS08	D39	missing
Diodo Switching SMT SOD323 75V 350mA (-55Å° to 150Å°) - Lead Free	VISHAY	1N4148WS-HE3-18	D39	missing
Diodo Switching SMT SOD323 75V 350mA (-55Å° to 150Å°) - Lead Free	VISHAY	1N4148WS-HE3-08	D39	missing
Diodo Switching SMT SOD323 75V 350mA (-55Å° to 150Å°) - Lead Free	VISHAY	1N4148WS-V-GS18	D39	missing
Diodo Switching SMT SOD323 75V 350mA (-55Å° to 150Å°) - Lead Free	DIODES INC.	1N4148WS-7-F	D39	missing
Tasto SMT 4 piazzole Miniatura 4.6x2.8 Verticale h=1,9mm (Operating force 120 gr) (con ground pin) (- 40 C to + 125 C) - Lead Free	C&K	KMR211G LFS	SW3,SW4	missing
CI Driver Interfaccia SMT "4 string 80V output Wled controller" QFN20 range ext. (- 40°C +125°C) - Lead Free	Monolithic Power Systems (MPS)	MP3385AGR-Z	U160	missing
CI Driver Interfaccia SMT "4 string 80V output Wled controller" QFN20 range ext. (- 40°C +125°C) - Lead Free	Monolithic Power Systems (MPS)	MP3385AGR-P	U160	missing
Connettore SMT FFC/FPC P1 mm Bottom Contact ZIF RA 30 - Lead Free	JAE	FI-X30SSLA-HF-R2500	J5	missing
Connettore SMT FFC/FPC P1.25mm Top Contact RA 6 (-25 +85) - Rohs Compliant	HR	A1253WR-SF-06P	J42	Plastic housing: E83005
Connettore TH Faston Capocorda Nudo 6.3 x 1.5mmq ST - Rohs Compliant	n.d.	534-834	J58	missing
Connettore TH Faston Capocorda Nudo 6.3 x 1.5mmq ST - Rohs Compliant	TYCO	63839-1	J58	E66717
Connettore TH Faston Capocorda Nudo 6.3 x 1.5mmq ST - Rohs Compliant	RICHCO	MC1000	J58	missing
Connector TH Telephone 1 Porta 8p ST NO Led 1000 Base-T 0+70°C - Lead Free	TRXCOM	TRJD07174D NL	J47	E321120
Connettore TH USB Single Port F ST Type "A" 3.0 9p Gold Flash -55+85°C - Lead Free	NELTRON	5076AS-09-15	J57	E319618
Connettore SMT 1 x 4p M ST P2 (-45°+140°) - Rohs Compliant	HR	A2001WV-S-04PD01	J49	E179987
Connettore SMT 1 x 4p M ST P2 (-45°+140°) - Rohs Compliant	HR	A2001WV-S-04PNLNG1G0 0L	J49	missing
Connettore SMT 1 x 6p M ST P2 (-25Å°+85Å°) - Rohs Compliant	HR	A2001WV-S-06PNLNG1G0 0L	J56	missing
Connettore SMT 1 x 6p M ST P2 (-25Å°+85Å°) - Rohs Compliant	HR	A2001WV-S-06PD01	J56	missing
Connettore SMT Micro 1 x 7p M ST P1.25 - Rohs Compliant	AMTEK	1250MS-07TW-U	J55	E322618
Connettore SMT Micro 1 x 7p M ST P1.25 - Rohs Compliant	JOY-DAY	A1250WVS-07P	J55	E179987
Connettore SMT Micro 1 x 7p M ST P1.25 - Rohs Compliant	MOLEX	53398-0771	J55	E29179
Connettore SMT Micro 1 x 7p M ST P1.25 - Rohs Compliant	AMTEK	1250MS-07TWR-U	J55	E322618
Connettore SMT Micro 1 x 7p M ST P1.25 - Rohs Compliant	JOY-DAY	A1250WVS-07	J55	E179987
Connettore SMT Micro 1 x 7p M ST P1.25 - Rohs Compliant	Joy-day	A1250WV-S-07P	J55	E179987

< END OF ATTACHMENT 1 >

Attachment 2: Product Identity Declaration / Model Variants (*)

(section excluded from ILAC regulations)

Not provided by the Applicant or Not Applicable.

< END OF ATTACHMENT 2 >

Attachment 3: Opinions and Interpretations

(section excluded from ILAC regulations)

None

< END OF ATTACHMENT 3 >