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Test Report S/N: LR500172507AK
Test Site : LTA CO., LTD.

JAPAN MIC Test Report

Equipment Under Test	Refreshable tactile graphic display
Modle Name	DPA320X
Serial Number	N/A
Applicant	dot incorporation
Manufacturer	dot incorporation
Date of Test(s)	June 20 2025 ~ July 04, 2025
Date of Issue	July 18, 2025

This test report is prepared according to the requirements of ISO / IEC 17025.

In the configuration tested, the EUT complied with the standards specified above.

Issue to	Issue by
dot incorporation 401~405, 146, Gasan digital 1-ro, Geumcheon-gu, Seoul, Republic of Korea Tel: +2-864-1113 Fax: +2-864-1989	LTA 4, Songju-ro 236beon-gil, Yangji-myeon, Cheoin-gu Yongin-city, Gyeonggi-do, 449-822, KOREA Tel: +82-31-323-6008 Fax: +82-31-323-6010

This test report is issued under the authority of:

The test was supervised by:

Eun-Hwan Jung, Manager

In-Sun Lee, Test Engineer

Revision history

Revision	Date of issue	Description	Revised by
--	July 18, 2025	Initial	-

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1. Applicant Information

1.1. Details of applicant

Applicant : dot incorporation
 Address : 401~405, 146, Gasan digital 1-ro, Geumcheon-gu, Seoul, Republic of Korea
 TEL / FAX : TEL No : +2-864-1113 / FAX No : +2-864-1989

1.2. Manufacturer Information

Manufacturer : dot incorporation
 Address : 401~405, 146, Gasan digital 1-ro, Geumcheon-gu, Seoul, Republic of Korea
 TEL / FAX : TEL No : +2-864-1113 / FAX No : +2-864-1989

1.3. EUT Description

Kind of product	Refreshable tactile graphic display
Model name	DPA320X
Serial Number	N/A
Power supply	DC 3.6 V
Frequency range	2 402 MHz ~ 2 480 MHz (Bluetooth LE)
RF output power	0.000 3 W
Modulation technique	GFSK
Number of channels	LE : 40 ch.
Antenna gain	Chip Antenna (Max Gain : 1.63 dBi)

2. Summary of Test results

The EUT has been tested according to the following specifications

Section in Radio equipment regulations	Description of Test	Results
RE 5 Table No. 1	Frequency Tolerance	C
RE 6 Table No. 2	Occupied Bandwidth (99%) & Spread Bandwidth (90%)	C
RE 14, RE 49.20	Antenna power	C
RE 7	Unwanted emission strength	C
RE 24	RX spurious emission	C
RE 11	Dwell Time	C
RLE 6-2, RE 9-4	Interference Prevention Function	C

Note 1: C=Complies NC=Not Complies NT=Not Tested NA=Not Applicable

Standard: Article 2, Paragraph 1, item 19.

3 Frequency tolerance

3.1 Test setup



3.2 Limit

$\pm 50 \times 10^{-6}$ (50 ppm or below)

3.3 Test procedure

The transmitter output is connected to the Spectrum analyzer	
Setting the spectrum analyzer is as follows.	
Center frequency	Operating frequency
Resolution BW	10 KHz
Video BW	10 KHz
Span	1 MHz
Sweep time	Auto
Detector mode	Positive peak
Trace mode	Max. hold

3.4 Test results

Ambient temperature: 26 °C Relative humidity: 51 % R.H

Test mode : LE

Test voltage	Test voltage (DC)	Measured value (MHz)	Tolerance (ppm)	Result	Limit
Normal Voltage	Low frequency	2402.009	3.68	Pass	± 50 ppm
	Middle frequency	2440.012	4.96	Pass	
	High frequency	2480.013	5.38	Pass	
Low Voltage	Low frequency	2402.004	1.67	Pass	
	Middle frequency	2440.003	1.23	Pass	
	High frequency	2480.005	2.02	Pass	
High Voltage	Low frequency	2402.016	6.72	Pass	
	Middle frequency	2440.009	3.83	Pass	
	High frequency	2480.009	3.63	Pass	

*** Remark**

FT (ppm) = [(Measured value MHz) – Operating frequency(MHz)] / Operating frequency(MHz)] × 10⁶

4. Occupied bandwidth (99%) & Spread Bandwidth (90%)

4.1 Test setup



4.2 Limit

Occupied Bandwidth (99%):	26 MHz or less
Spread Bandwidth (90%)	500 kHz more

4.3 Test procedure

The transmitter output is connected to the Spectrum analyzer	
Setting the spectrum analyzer is as follows.	
Center frequency	Operating frequency
Resolution BW	300 KHz
Video BW	300 KHz
Span	5 MHz
Sweep time	Auto
Detector mode	Positive peak
Trace mode	Max. hold

4.4 Test results

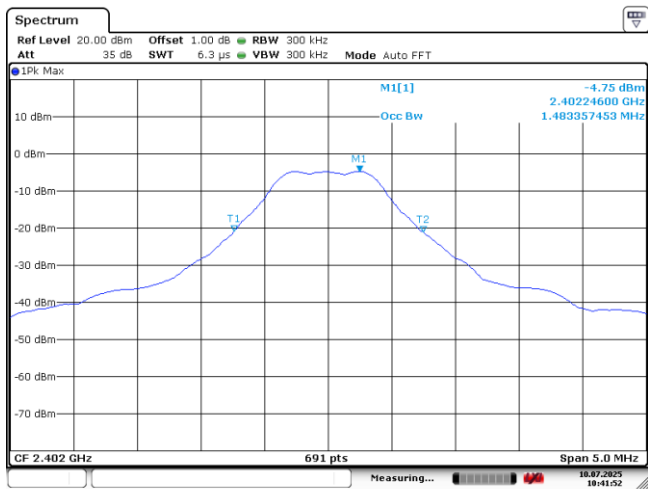
Ambient temperature: 26 °C Relative humidity: 51% R.H.

Test mode : LE

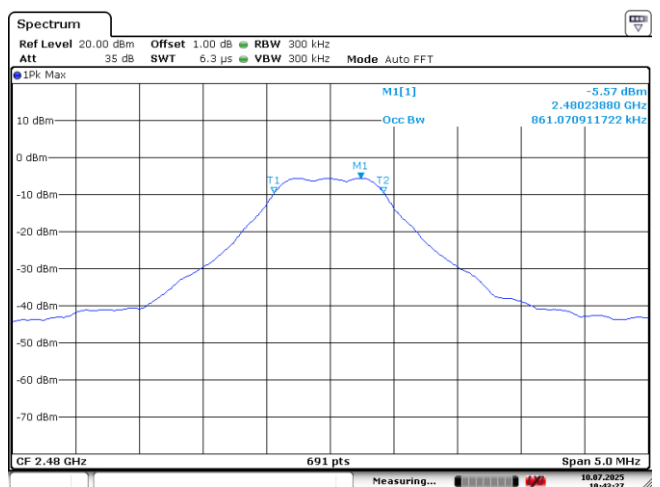
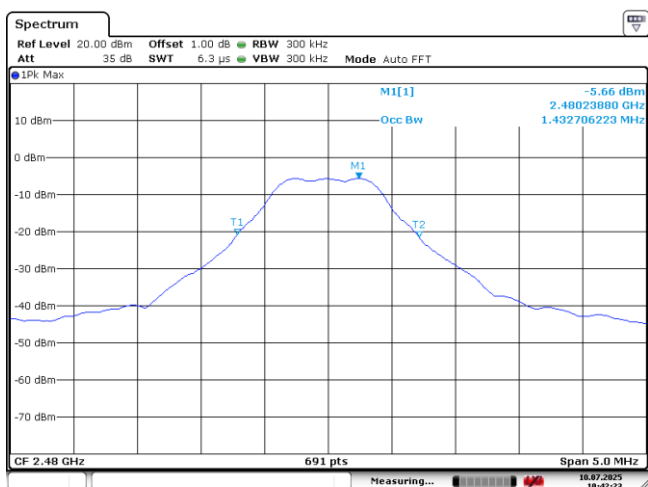
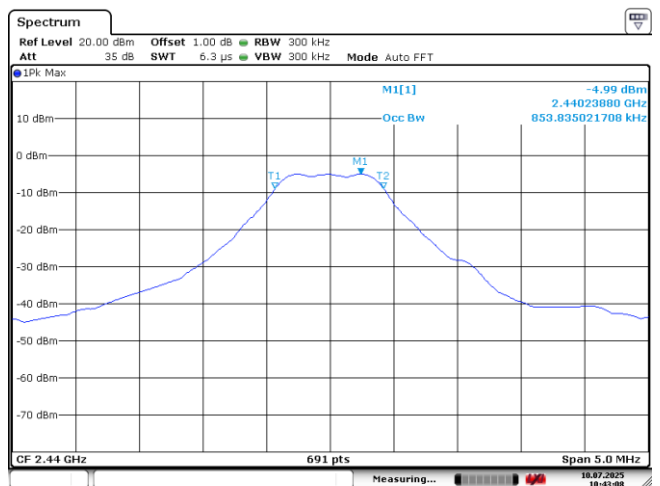
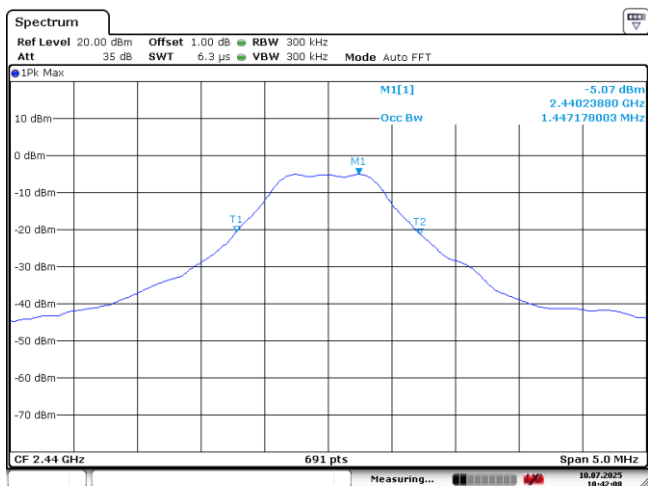
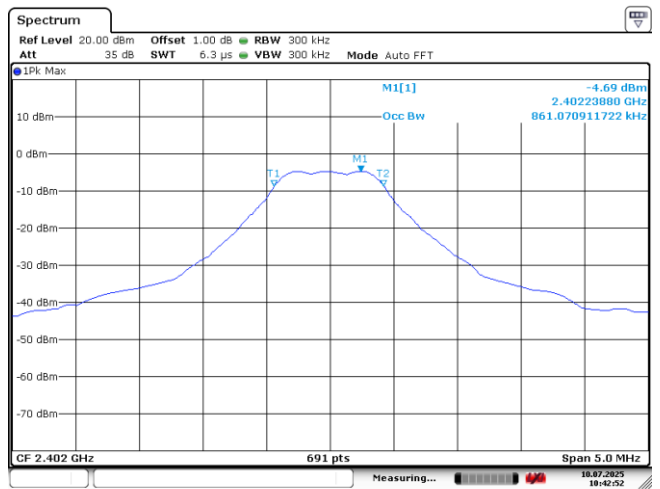
Test voltage	2,402 MHz	2,442 MHz	2,480 MHz	Result	Limit
	99% (MHz)	99% (MHz)	99% (MHz)		
3.96 (V)	1.48	1.45	1.43	Pass	26 MHz or less
3.60 (V)	1.48	1.45	1.43	Pass	
3.24 (V)	1.48	1.45	1.43	Pass	
Test	90% (MHz)	90% (MHz)	90% (MHz)		
3.96 (V)	0.861	0.854	0.861	Pass	500 kHz or more
3.60 (V)	0.861	0.854	0.861	Pass	
3.24 (V)	0.861	0.854	0.861	Pass	

Test Mode : LE / CH01,CH20,CH40 (Nomal Voltage)

99 % OBW



90 % OBW



5. Antenna power

5.1 Test setup



5.2 Limit

Output power: 0.01 W or Below

Output power tolerance: Maximum +20 %, Minimum -80 %

5.3 Test procedure

1. The transmitter output is connected to the Power meter
2. Setting the EUT is operating frequency.

5.4 Test resultsAmbient temperature: 26 °C Relative humidity: 51% R.H.

Test mode : LE

Result : Pass

Test voltage (DC)	Frequency (MHz)	Measure value	Power tolerance(%)
		(mW)	
3.96 (V)	2 402	0.343	14.26
	2 442	0.321	6.88
	2 480	0.281	-6.49
3.60 (V)	2 402	0.340	13.21
	2 442	0.317	5.65
	2 480	0.277	-7.56
3.24 (V)	2 402	0.333	11.14
	2 442	0.313	4.20
	2 480	0.276	-7.98
Declared power(W)		0.000 3 (0.000 06 ~ 0.000 36)	
Antenna gain(dBi)		1.63 dBi	
Limit		-80 ~ 20 %	

Remark: Power tolerance (%) = {[Output power- Declared power] ÷ Declared power} ×100

6. Unwanted emission strength

6.1 Test setup



6.2 Limit

Spurious Emission / Unwanted Emission Strength, Spurious area	30MHz - 2387MHz ; 2.5µW/MHz or less
	2387MHz – 2400MHz ; 25µW/MHz or less
	2483.5MHz – 2496.5MHz ; 25µW/MHz or less
	2496.5MHz – 12.5GHz ; 2.5µW/MHz or less

6.3 Test procedure

1. Connect transmitter output to the spectrum analyzer input port.
2. The EUT should be transmitting at hopping mode
3. Unwanted emission strength is measured by following setting:
4. Set the spectrum analyzer RBW: 1 MHz, VBW: same as RBW
Sweep time : auto, Start : 30 MHz, Stop : 2387 MHz. Sweep mode: single and mark highest level.
5. Set the spectrum analyzer RBW: 1 MHz, VBW: 1 MHz, Sweep time: auto, Start: 2 387 MHz, Stop: 2 400 MHz Sweep mode: single and mark highest level.
6. Set the spectrum analyzer RBW: 1 MHz, VBW: 1 MHz, Sweep time: auto, Start: 2 483.5 MHz, Stop: 2 496.5 MHz Sweep mode: single and mark highest level.
7. Set the spectrum analyzer RBW: 1 MHz, VBW: 1 MHz, Sweep time: auto, Start: 2 496.5 MHz, Stop: 12.5 GHz. Sweep mode: single and mark highest level.
8. Detector mode: Peak mode.

6.4 Test results

Ambient temperature: 26°C Relative humidity: 51% R.H.

Result : Pass

mode : LE

Voltage	Frequency	Frequency Range	Result			Limit
V	MHz	MHz	MHz	dBm	uW	uW
-10 % (DC 3.24 V)	2402	30 ~ 2387	1845.93	-62.26	0.0006	2.5
		2387 ~ 2400	2400.02	-30.79	0.8338	25
		2483.5 ~ 2496.5	2489.36	-62.13	0.0006	25
		2496.5 ~ 12500	4803.65	-46.32	0.0233	2.5
	2442	30 ~ 2387	1845.92	-58.29	0.0015	2.5
		2387 ~ 2400	2389.99	-63.20	0.0005	25
		2483.5 ~ 2496.5	2488.02	-62.53	0.0006	25
		2496.5 ~ 12500	4880.44	-47.35	0.0184	2.5
	2480	30 ~ 2387	1848.01	-63.79	0.0004	2.5
		2387 ~ 2400	2389.16	-62.62	0.0005	25
		2483.5 ~ 2496.5	2483.58	-46.85	0.0207	25
		2496.5 ~ 12500	4960.64	-50.88	0.0082	2.5
0 % (DC 3.60 V)	2402	30 ~ 2387	1845.88	-62.60	0.0005	2.5
		2387 ~ 2400	2399.99	-30.96	0.8017	25
		2483.5 ~ 2496.5	2489.32	-62.37	0.0006	25
		2496.5 ~ 12500	4803.62	-46.63	0.0217	2.5
	2442	30 ~ 2387	1845.88	-58.46	0.0014	2.5
		2387 ~ 2400	2389.95	-63.40	0.0005	25
		2483.5 ~ 2496.5	2487.99	-62.81	0.0005	25
		2496.5 ~ 12500	4880.42	-47.54	0.0176	2.5
	2480	30 ~ 2387	1847.96	-63.97	0.0004	2.5
		2387 ~ 2400	2389.11	-62.73	0.0005	25
		2483.5 ~ 2496.5	2483.54	-46.99	0.0200	25
		2496.5 ~ 12500	4960.59	-51.00	0.0079	2.5

+10 % (DC 3.96 V)	2402	30 ~ 2387	1845.91	-62.41	0.0006	2.5
		2387 ~ 2400	2400.01	-30.59	0.8734	25
		2483.5 ~ 2496.5	2489.34	-62.08	0.0006	25
		2496.5 ~ 12500	4803.67	-46.49	0.0224	2.5
	2442	30 ~ 2387	1845.92	-58.17	0.0015	2.5
		2387 ~ 2400	2389.97	-63.21	0.0005	25
		2483.5 ~ 2496.5	2488.04	-62.68	0.0005	25
		2496.5 ~ 12500	4880.46	-47.37	0.0183	2.5
	2480	30 ~ 2387	1847.98	-63.81	0.0004	2.5
		2387 ~ 2400	2389.16	-62.42	0.0006	25
		2483.5 ~ 2496.5	2483.59	-46.79	0.0210	25
		2496.5 ~ 12500	4960.64	-50.80	0.0083	2.5

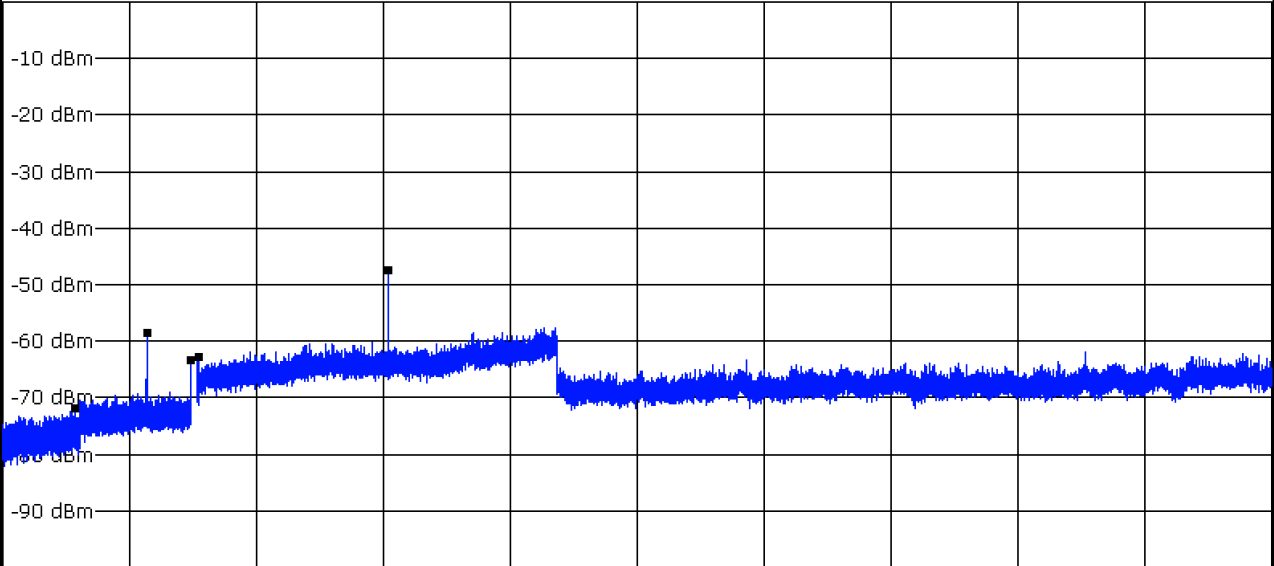
Test Mode :LE / CH20 (Nomal Voltage)

Spectrum



Ref Level 0.00 dBm Offset 1.00 dB Mode Auto Sweep

1 Max



Start 30.0 MHz 64005 pts Stop 16.0 GHz

Spurious Emissions					
Range Low	Range Up	RBW	Frequency	Power Abs	ΔLimit
30.000 MHz	1.000 GHz	100.000 kHz	939.80690 MHz	-71.94 dBm	-200.00 dB
1.000 GHz	2.387 GHz	1.000 MHz	1.84588 GHz	-58.46 dBm	-200.00 dB
2.387 GHz	2.400 GHz	1.000 MHz	2.38995 GHz	-63.40 dBm	-200.00 dB
2.484 GHz	2.497 GHz	1.000 MHz	2.48799 GHz	-62.81 dBm	-200.00 dB
2.497 GHz	16.000 GHz	1.000 MHz	4.88042 GHz	-47.54 dBm	-200.00 dB

Measuring...



26.06.2025
16:39:00

7. RX spurious emission

7.1 Test setup



7.2 Limit

Below 1 GHz: 4 nW (- 54 dBm) or less

Above 1 GHz: 20 nW (- 47 dBm) or less

7.3 Test procedure

1. Connecy transmitter output to the sppectrum analyzer input port
2. The EUT should be transmitting at low, middle and high channel.
3. RX spurious emission is measured by following setting:
4. Set the spectrum analyzer RBW: 100 kHz, VBW: 100 kHz, Sweep: Auto, Start: 30 MHz, Stop: 1 000 MHz
Max hold view, mark highest level.
5. Set the spectrum analyzer RBW: 1 MHz, VBW: 1 MHz, Sweep: Auto, Start: 1 000 MHz, Stop: 12.5 GHz.
Max hold view, mark highest level.
6. Detector mode: Peak mode

7.4 Test resultsAmbient temperature: 26℃ Relative humidity: 51% R.H

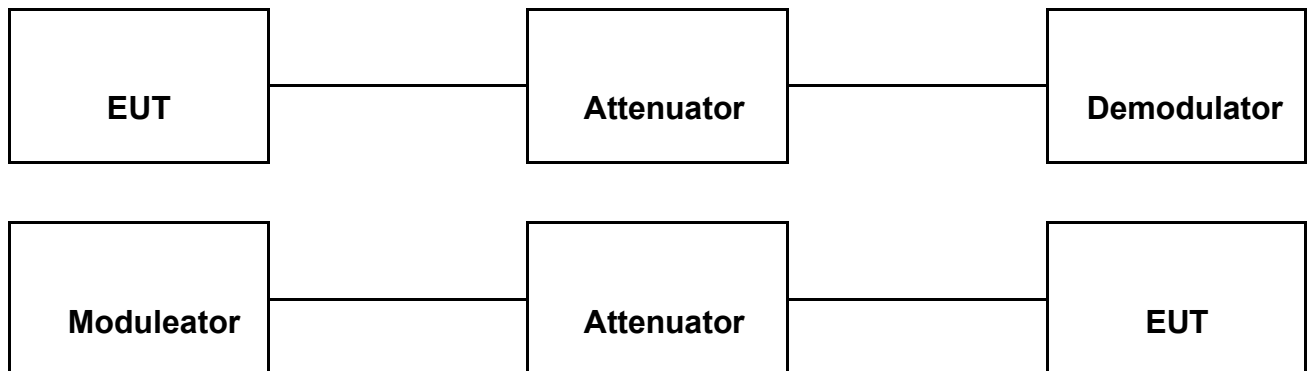
Test mode : LE

Result : Pass

Mode	Voltage	Measurement Frequency	Frequency Range	Result			Limit
	V	MHz	MHz	MHz	dBm	nW	nW
BLE	Normal Voltage	2402	30 ~ 1000	935.00	-87.87	0.002	4
			1000 ~ 12750	6802.38	-74.29	0.037	20
		2440	30 ~ 1000	943.67	-88.11	0.002	4
			1000 ~ 12750	6991.00	-73.5	0.045	20
		2480	30 ~ 1000	624.09	-87.52	0.002	4
			1000 ~ 12750	6667.01	-74.05	0.039	20

8. Interference prevention function

8.1 Test Setup



8.2 Limit

Radio equipment used mainly on the same premises and automatically transmits or receives identification code

8.3 Test results

Ambient temperature: 26°C Relative humidity: 51% R.H.

Test Power:	Normal Voltage
Test Mode:	LE
Test Result:	Good(identification code : [00025B00FF01])

9. CONSTRUCTION PROTECTION CONFIRMATION METHOD

9.1 Limit

(See Article 49-20, Item1-a of the Ordinance Regulating Radio Equipment)

The high-frequency section and modulation section of the radio equipment except for the antenna system shall not be capable of being opened easily.

9.2 CONFIRMATION METHOD

The RF and modulation portions are protected against illegal modification as following method:

Tick the appropriate box	
	1. Sealed with special screws.
	2. Plastic chassis is being welded using ultrasonic waves.
	3. Chassis is glued using a special adhesive.
	4. Metal covers are spot-fused.
	5. Cover is specially interlocked.
O	6. RF and Modulation components are covered with shielding case and this shielding case is soldered.
	7. Shield case is welded at RF and modulation parts, and ID-ROM is welded using the BGA Method.
	8. Shield case is welded at RF and modulation parts, and ID-ROM is glued at its lead with a special adhesive
	9. Shield case is welded at RF and modulation parts, and ID-ROM is glued with a non-transparent laminating agent.
O	10. RF and Modulation parts are mounted on PCB with surface mount technology, and there is no any adjustable part on PCB or adjustable parts are not exposed.

APPENDIX

TEST EQUIPMENT USED FOR TESTS

	Use	Description	Model No.	Serial No.	Manufacturer	Cal. Date	Next Cal. Date
1	■	SIGNAL ANALYZER (10 Hz ~ 40 GHz)	FSV40	101259	R&S	2024-08-30	2025-08-21
2	■	VECTOR SIGNAL GENERATOR	SMBV100A	255081	HP	2025-03-08	2026-03-07
3		SYNTHESIZED CW GENERATOR	83711B	US34490456	HP	2025-03-08	2026-03-07
4		Attenuator (3 dB)	8491A	37822	HP	2024-08-30	2025-08-21
5		Attenuator (10 dB)	8491A	63196	HP	2024-08-30	2025-08-21
6		EMI Test Receiver (~7 GHz)	ESC17	100722	R&S	2024-08-30	2025-08-21
7		RF Amplifier (~1.3 GHz)	8447D OPT 010	2944A07684	HP	2024-08-30	2025-08-21
8		RF Amplifier (1~26.5 GHz)	8449B	3008A02126	HP	2025-03-08	2026-03-07
9		Horn Antenna (1~18 GHz)	3115	00114105	ETS	2023-08-30	2025-08-30
10		DRG Horn (Small)	3116B	81109	ETS-Lindgren	2024-03-08	2026-03-08
11		DRG Horn (Small)	3116B	133350	ETS-Lindgren	2024-03-08	2026-03-08
12		TRILOG Antenna	VULB 9160	9160-3237	SCHWARZBEC K	2024-03-08	2026-03-08
13		Temp.Humidity Data Logger	SK-L200TH II A	00801	SATO	2025-03-08	2026-03-07
14		Splitter (SMA)	ZFSC-2-2500	SF61780032 6	Mini-Circuits	2025-03-08	2026-03-07
15	■	DC Power Supply	6674A	3637A01657	Agilent	2025-03-08	2026-03-07
17	■	Power Meter	EPM-441A	GB32481702	HP	2025-03-08	2026-03-07
18	■	Power Sensor	8481A	3318A94972	HP	2024-08-30	2025-08-21
19		Audio Analyzer	8903B	3729A18901	HP	2024-08-30	2025-08-21
20		Modulation Analyzer	8901B	3749A05878	HP	2024-08-30	2025-08-21
21	■	TEMP & HUMIDITY Chamber	YJ-500	LTAS06041	JinYoung Tech	2024-08-30	2025-08-21
22		Stop Watch	HS-3	812Q08R	CASIO	2024-03-14	2026-03-14
23		LISN	KNW-407	8-1430-1	Kyoritsu	2025-03-08	2026-03-07