



China

FCC/ISED Test Report

Report Number : 7095022051418-00 Date of Issue: Sep. 28, 2022

Model / Serial No. : InCoax D2508 RPF ER US, InCoax D2508 US,
InCoax D2508 ER US, InCoax D2508 RPF US

Product Type : DPU

FCC ID : 2ATQM1000-0577

Applicant : Incoax Networks AB

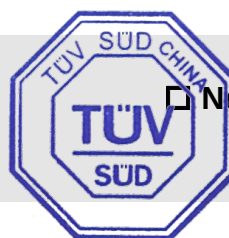
Manufacturer : Incoax Networks AB

License holder : Incoax Networks AB

Address : Utmarksvagen 4, 80291 Gavle, Sweden

Test Result : ☒ Positive ☐ Negative

Total pages : 24



Date of Test : Sep. 21, 2022 – Sep. 22, 2022

Reviewed by:

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1. Report Modification Record

Alterations and additions to this report will be issued to the holders of each copy in the form of a complete document.

Issue	Description of Change	Date of Issue
1	First Issue	09/28/2022

2. Test Facility

Test Site ■ TÜV SÜD Certification and Testing (China) Co., Ltd. Shanghai Branch
 No.16, Lane 1951, Du Hui Road, Shanghai 201108, P.R. China
 (Test Firm Registration Number: 820234)
 Telephone: +86 21 60379100 Fax: +86 21 60379100
 FCC Registration No.: 820234
 FCC Designation Number: CN1183
 ISED#: 25988
 CAB identifier: CN0101

Ambient Condition in laboratory:

Items	Test	Required(IEC68-1)	Actual
Temperature(°C)	ANSI.C 63.4 CE	15-35	21.3
Humidity (%)		25-75	56.8
Atmospheric Pressure(mbar)		860-1060	1013
Temperature(°C)	ANSI.C 63.4 RE	15-35	21.8
Humidity (%)		25-75	56.7
Atmospheric Pressure(mbar)		860-1060	1013



3.1 EUT Description

EUT Voltage	: 100-120V AC, 50/60Hz, 1.2A max or 200-240V AC, 50/60Hz, 0.6A max
-------------	---

3.2 EUT Configuration

Configuration1	: AC120V. Power on and connect to peripheral devices
----------------	--

- ☐ - Standby
- ☐ - Test Program (H - Pattern)
- ☐ - Test Program (Color Bar)
- ☐ - Test Program (Customer Specified)
- ☒ - Normal Operating Mode
- ☒ - Power on and connect to peripheral devices by Coax port.

■ - <u>Ethernet Switch</u>	Type : <u>Model: H3C S5560X-54C-EI</u>
■ - <u>Laptop</u>	Type : <u>E470, manufacture: Lenovo</u>
■ - <u>Access modem</u>	Type : <u>In:xtnd Access A101-AA ver. 1.0</u>

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N/A

3.6 EUT Modification

N/A

4. Test Summary

Test	Specification	Test Result	Remark
Conducted Emission	CFR47 Part 15 §15.107, ICES-003 §3.2.1	Pass	Refer to page 6-11
Radiated Emission	CFR47 Part 15 §15.109, ICES-003 §3.2.2	Pass	Refer to page 12-22

Remarks:

The EUT was a DPU. (An eight-channel Ethernet over Coax Access Node, capable of 2.5 Gbps on the RF port supporting up to 4 Modems.) This device defined as Class A digital device. It will be used in a commercial environment.

According to the client's declaration, the circuits and functions of these products are basically the same, the only difference is 1. The model with ER is with amplification function; 2. RPF in the model indicates reverse power supply; 3. The standards of power cord input plugs are different. US stands for American standard, so all the tests were applied on InCoax D2508 RPF ER US, other models are deemed to fulfill all the requirement without further testing.

According to the section 15.33 of FCC part 15 the highest frequency generated or used in the device or on which the device operate or tunes (MHz) is bigger than 108MHz (156MHz), so the upper frequency of measurement range (MHz) is 6GHz.

Highest frequency generated or used in the device or on which the device operates or tunes (MHz)	Upper frequency of measurement range (MHz)
Below 1.705	30.
1.705-108	1000.
108-500	2000.
500-1000	5000.
Above 1000	5th harmonic of the highest frequency or 40 GHz, whichever is lower.

According to the test data of this report, the EUT can fulfill the requirements of ICES-003, Issue 7 and no additional tests are performed.

5. Conducted Emission

5.1 Test Equipment

The following test equipments are used:

USED	Equipment Name	Model	Manufacturer	Equipment ID.	Calibration Due Date
☒	EMI test receiver	ESR3	R&S	S1503001-YQ-EMC	2023-7-31
☒	2-Line V-network	ENV216	R&S	S1503103-YQ-EMC	2023-7-31
☐	4-Line V-network	ENV4200	R&S	S1503106-YQ-EMC	2023-7-31

5.2 Test Specification

Tests are performed according to CFR47 Part 15 subpart B and ICES-003 issue 7.

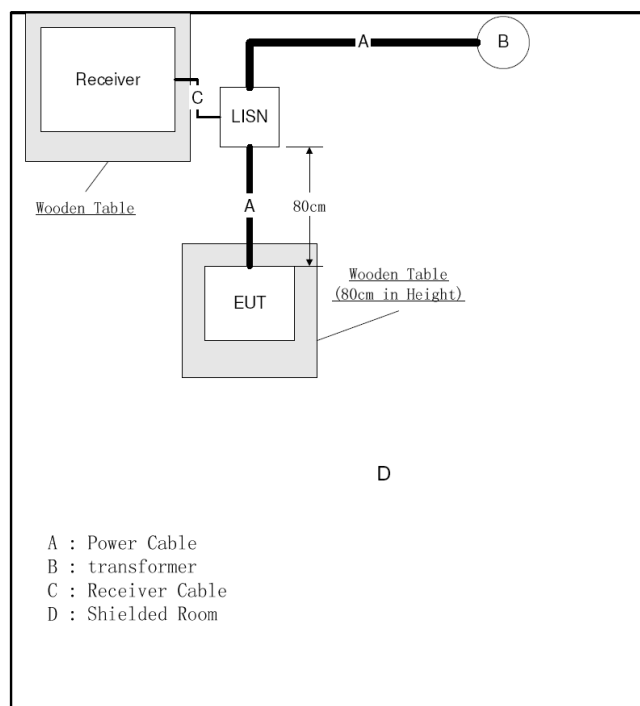
Limit as below:

CFR47 Part 15 subpart B §15.107 and ICES-003 §3.2.1 Limits (dBμV)				
Frequency (MHz)	Class A		Class B	
	QP	AV	QP	AV
0.15-0.5	79	66	66-56	56-46
0.5-5.0	73	60	56	46
5.0-30	73	60	60	50

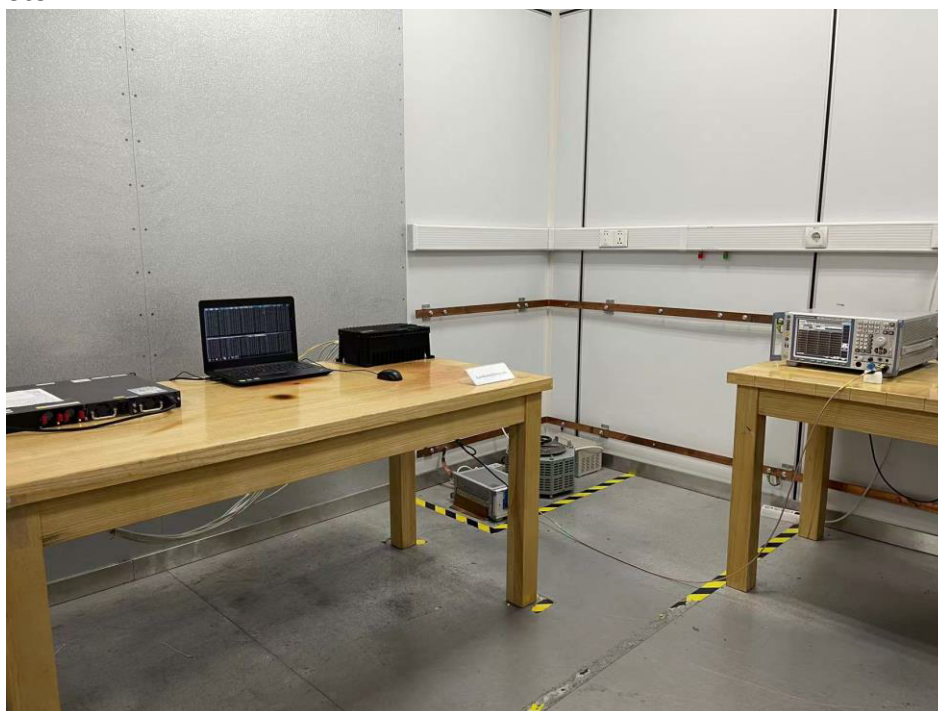
5.3 Test Procedure

The test is performed in shield room. EUT is placed on the table which is 80cm above ground plane and connected to a line Impedance Stabilization Network (LISN). The conducted emission is scanned over the frequency from 150KHz to 30MHz with peak detector. A final measurement is performed with quasi-peak detector and average detector. IF bandwidth is 10KHz.

5.4 Test Setup



5.5 Test Photo





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5.6 Test Result

150k-30MHz Conducted Emission Test

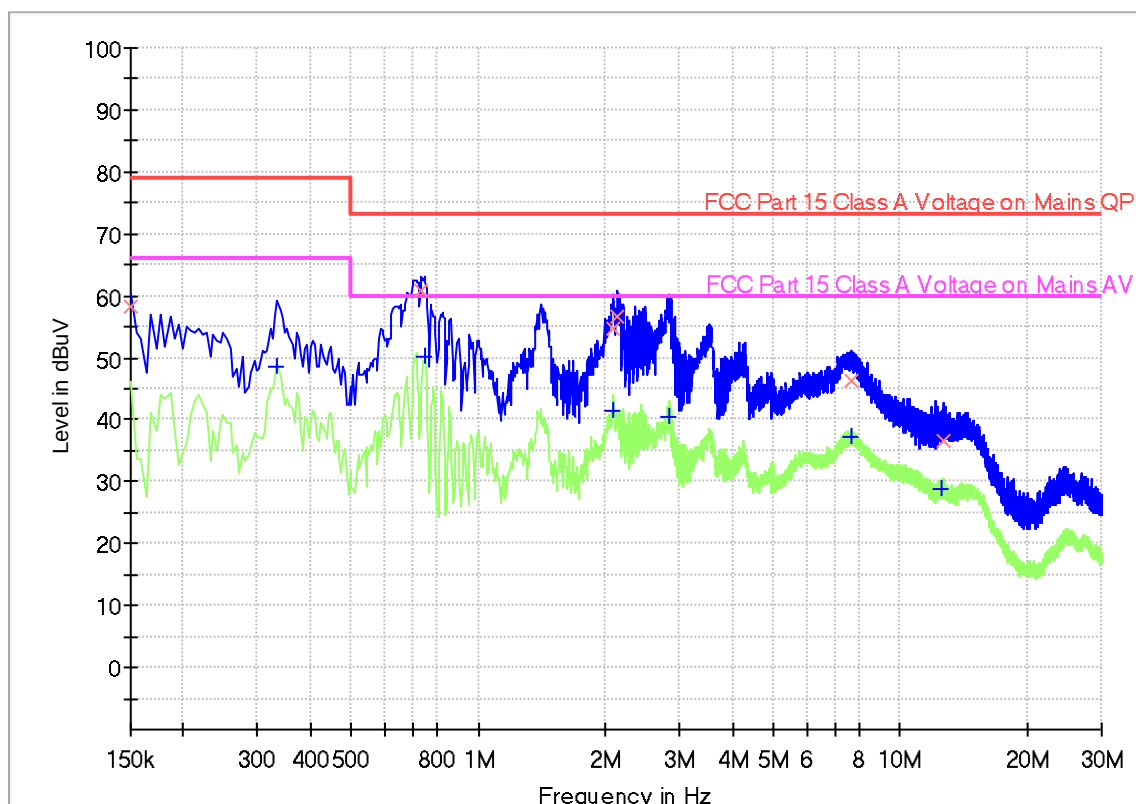
EUT Information

EUT Name:	DPU
Model	InCoax D2508 RPF ER US
Client:	Incoax Networks AB
Op Cond	Power on, AC 120V/60Hz, T21.3, H56.8%, P101.3kPa
Operator:	Guo Chengjie
Standard	FCC Part 15B Class A
Comment:	Phase L
Sample No.:	SHA-680567-1

Scan Setup: Voltage with 2-Line-LISN pre [EMI conducted]

Hardware Setup:	Voltage with 2-Line-LISN
Receiver:	[ESR 3]
Level Unit:	dBuV

Subrange	Step Size	Detectors	IF BW	Meas. Time	Preamp
9 kHz - 150 kHz	100 Hz	PK+	200 Hz	0.02 s	0 dB
150 kHz - 30 MHz	4.5 kHz	PK+; AVG	9 kHz	0.01 s	0 dB





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Final Result

Frequency (MHz)	QuasiPeak (dBuV)	CAverage (dBuV)	Limit (dBuV)	Margin (dB)	Meas. Time (ms)	Bandwidth (kHz)	Line	Corr. (dB)
0.150000	58.39	---	79.00	20.61	1000.0	9.000	L1	19.5
0.334500	---	48.68	66.00	17.32	1000.0	9.000	L1	19.5
0.735000	60.71	---	73.00	12.29	1000.0	9.000	L1	19.5
0.748500	---	50.30	60.00	9.70	1000.0	9.000	L1	19.5
2.085000	---	41.36	60.00	18.64	1000.0	9.000	L1	19.5
2.085000	54.71	---	73.00	18.29	1000.0	9.000	L1	19.5
2.143500	56.74	---	73.00	16.26	1000.0	9.000	L1	19.5
2.832000	---	40.55	60.00	19.45	1000.0	9.000	L1	19.5
7.629000	---	37.15	60.00	22.85	1000.0	9.000	L1	19.6
7.647000	46.28	---	73.00	26.72	1000.0	9.000	L1	19.6
12.565500	---	28.78	60.00	31.22	1000.0	9.000	L1	19.7
12.682500	36.46	---	73.00	36.54	1000.0	9.000	L1	19.7



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150k-30MHz Conducted Emission Test

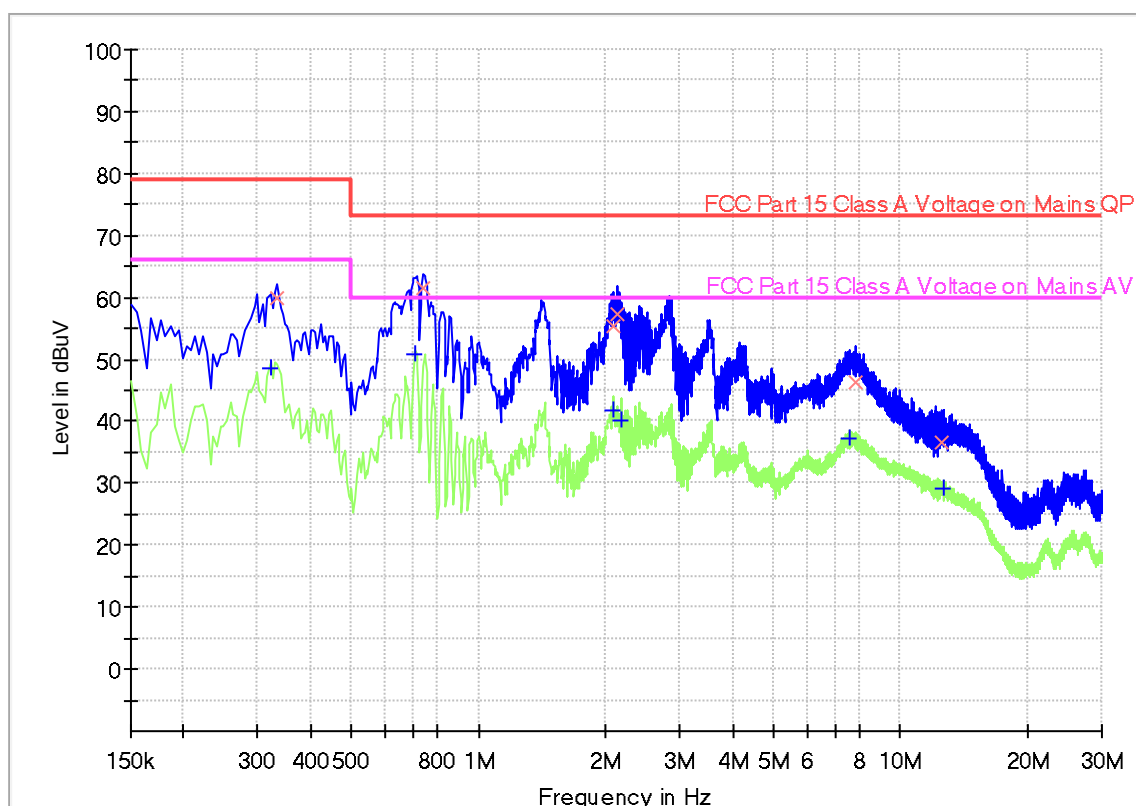
EUT Information

EUT Name: DPU
Model: InCoax D2508 RPF ER US
Client: Incoax Networks AB
Op Cond: Power on, AC 120V/60Hz, T21.3, H56.8%, P101.3kPa
Operator: Guo Chengjie
Standard: FCC Part 15B Class A
Comment: Phase N
Sample No.: SHA-680567-1

Scan Setup: Voltage with 2-Line-LISN pre [EMI conducted]

Hardware Setup: Voltage with 2-Line-LISN
Receiver: [ESR 3]
Level Unit: dBuV

Subrange	Step Size	Detectors	IF BW	Meas. Time	Preamplifier
9 kHz - 150 kHz	100 Hz	PK+	200 Hz	0.02 s	0 dB
150 kHz - 30 MHz	4.5 kHz	PK+; AVG	9 kHz	0.01 s	0 dB





China

Final Result

Frequency (MHz)	QuasiPeak (dBuV)	CAverage (dBuV)	Limit (dBuV)	Margin (dB)	Meas. Time (ms)	Bandwidth (kHz)	Line	Corr. (dB)
0.321000	---	48.52	66.00	17.48	1000.0	9.000	N	19.5
0.334500	59.94	---	79.00	19.06	1000.0	9.000	N	19.5
0.708000	---	50.83	60.00	9.17	1000.0	9.000	N	19.5
0.739500	61.47	---	73.00	11.53	1000.0	9.000	N	19.5
2.080500	---	41.72	60.00	18.28	1000.0	9.000	N	19.5
2.080500	55.42	---	73.00	17.58	1000.0	9.000	N	19.5
2.139000	57.38	---	73.00	15.62	1000.0	9.000	N	19.5
2.179500	---	40.25	60.00	19.75	1000.0	9.000	N	19.5
7.593000	---	37.32	60.00	22.68	1000.0	9.000	N	19.6
7.827000	46.34	---	73.00	26.66	1000.0	9.000	N	19.6
12.556500	36.68	---	73.00	36.32	1000.0	9.000	N	19.7
12.682500	---	29.11	60.00	30.89	1000.0	9.000	N	19.7

Note 1: Emission Level = Reading level + Correction Factor

Correction Factor = LISN Factor + Cable Loss + Attenuator Factor

Margin=Limit – Emission Level

6 Radiated Emission

6.1 Test Equipment

The following test Equipment are used:

USED	Equipment Name	Model	Manufacturer	Equipment ID.	Calibration Due Date
☒	EMI test receiver	ESR3	R&S	S1503109-Y Q-EMC	2023-7-31
☒	Trilog super broadband antenna	VULB 9168	SCHWARZBE CK	S1808296-Y Q-EMC	2024-9-22
☒	Double-ridged waveguide horn antenna	HF907	R&S	S1503009-Y Q-EMC	2024-4-12
☒	Signal conditioning unit	SCU-18D	R&S	S1503012-Y Q-EMC	2023-7-31
☒	Signal and spectrum analyzer	FSV40	R&S	S1503003-Y Q-EMC	2023-7-31

6.2 Test Specification

Tests are performed according to CFR47 Part 15 subpart B and ICES-003 issue 7.

Limit as below:

CFR47 Part 15 subpart B §15.109 (dBμV/m)				
Frequency (MHz)	Class A		Class B	
	Distance	QP	Distance	QP
30-88	10m	39	3m	40
88-216	10m	43.5	3m	43.5
216-960	10m	46.4	3m	46
Above 960	10m	49.5	3m	54

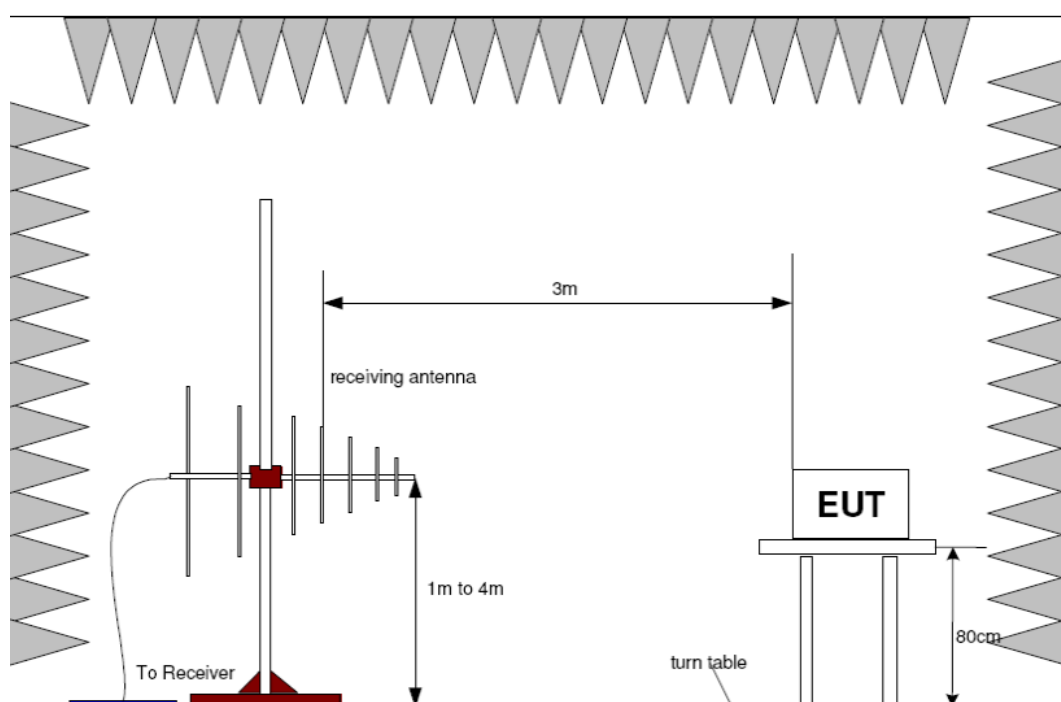
ICES-003 issue 7 §3.2.2 Limits (dBμV/m)				
Frequency (MHz)	Class A		Class B	
	Distance	QP	Distance	QP
30-88	10m	40.0	3m	40
88-216	10m	43.5	3m	43.5
216-230	10m	46.4	3m	46
230-960	10m	47.0	3m	47
Above 960	10m	49.5	3m	54

Remark: 3m limit=10m limit +k
 3m limit =10m limit+10
 $k=20\log(d1/d2)=20\log(10/3)=10$

6.3 Test Procedure

The EUT is placed on a turntable which is 80cm above ground plane. The turn table rotates 360 degrees and antenna moves up and down between 1m and 4 m to find maximum emission. Both horizontal and vertical polarizations of antenna are set in the measurement. The EUT is positioned at 3m away from antenna.

6.4 Test Setup

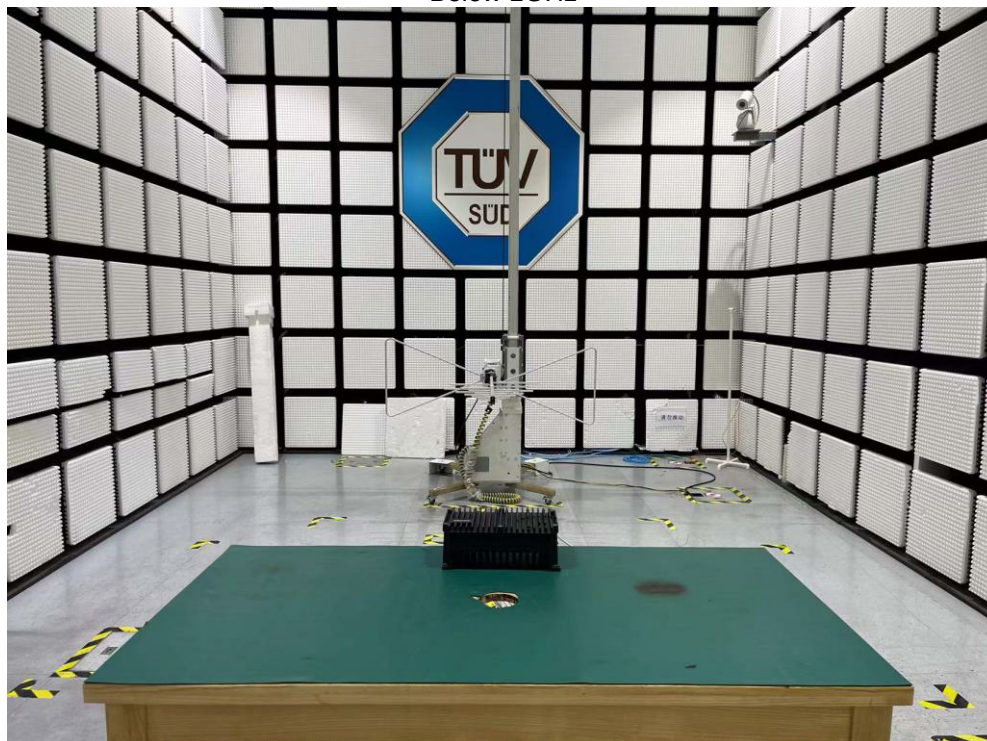


Note: w : The dimension of the line tangent to the EUT formed by θ_{3dB} at the measurement distance 3m

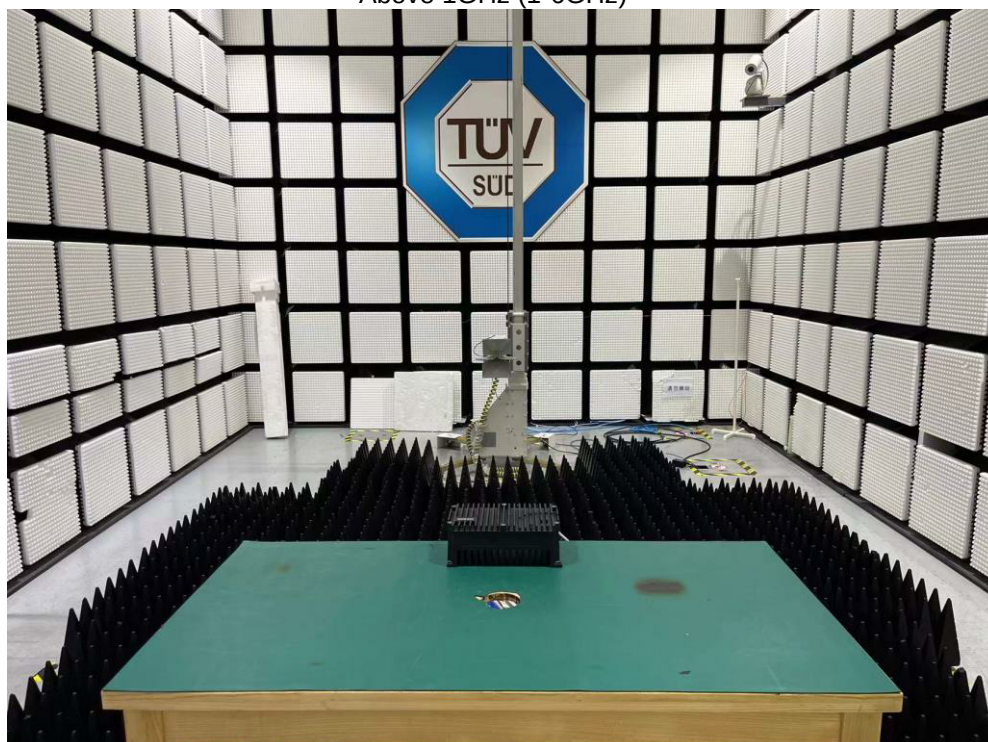
w value	Measurement frequency band	Antenna Model
1.6m	1~18GHz	HF907
1.95m	18~26.5GHz	3116C-PA
0.74m	26.5~40GHz	3116C-PA

6.5 Test Photo

Below 1GHz



Above 1GHz (1-6GHz)





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6.6 Test Result

30-1000MHz Radiated Emission

EUT Information

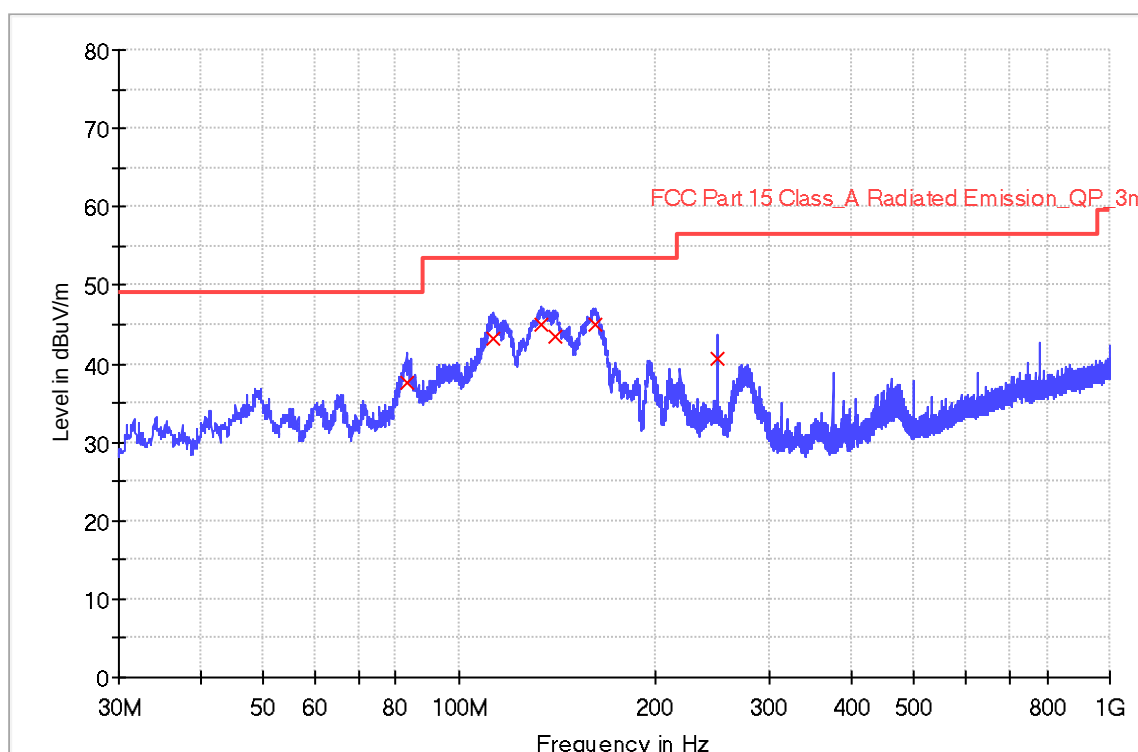
EUT Name: DPU
Model: InCoax D2508 RPF ER US
Client: Incoax Networks AB
Op Cond: Power on, AC120V,50Hz T21.8, H56.7%, P101.3kPa
Operator: Guo Chengjie
Test Spec: FCC Part 15B Class A
Comment: Horizontal
Sample No: SHA-680567-1

Sweep Setup: RE_VULB9168_pre_Cont_30-1000 [EMI radiated]

Hardware Setup: RE_VULB9168
Receiver: [ESR 3]
Level Unit: dBuV/m

Subrange	Step Size	Detectors	Bandwidth	Sweep Time	Preamp
30 MHz - 1 GHz	48.5 kHz	PK+	120 kHz	0.005 s	20 dB

RE_VULB9168_pre_Cont_30-1000





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Limit and Margin

Frequency (MHz)	QuasiPeak (dBuV/m)	Meas. Time (ms)	Bandwidth (kHz)	Height (cm)	Pol	Azimuth (deg)	Corr. (dB/m)	Margin - QPK (dB)	Limit - QPK (dBuV/m)
82.960000	37.5	1000.0	120.000	200.0	H	31.0	15.1	11.5	49.0
112.800000	43.2	1000.0	120.000	200.0	H	113.0	17.5	10.3	53.5
133.880000	45.0	1000.0	120.000	300.0	H	34.0	19.7	8.5	53.5
140.480000	43.6	1000.0	120.000	300.0	H	132.0	20.3	9.9	53.5
161.720000	45.0	1000.0	120.000	300.0	H	285.0	20.8	8.5	53.5
250.000000	40.6	1000.0	120.000	300.0	H	64.0	19.9	15.8	56.4



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30-1000MHz Radiated Emission

EUT Information

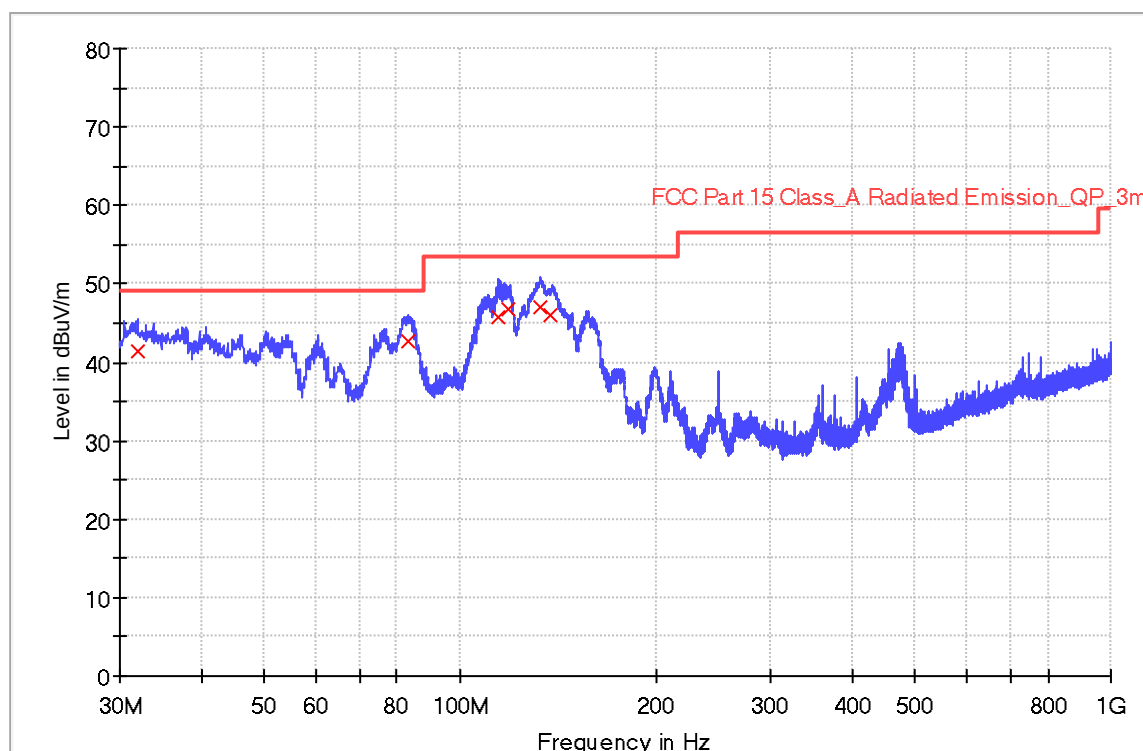
EUT Name: DPU
Model: InCoax D2508 RPF ER US
Client: Incoax Networks AB
Op Cond: Power on, AC120V,50Hz T21.8, H56.7%, P101.3kPa
Operator: Guo Chengjie
Test Spec: FCC Part 15B Class A
Comment: Vertical
Sample No: SHA-680567-1

Sweep Setup: RE_VULB9168_pre_Cont_30-1000 [EMI radiated]

Hardware Setup: RE_VULB9168
Receiver: [ESR 3]
Level Unit: dBuV/m

Subrange	Step Size	Detectors	Bandwidth	Sweep Time	Preamp
30 MHz - 1 GHz	48.5 kHz	PK+	120 kHz	0.005 s	20 dB

RE_VULB9168_pre_Cont_30-1000





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Limit and Margin

Frequency (MHz)	QuasiPeak (dBuV/m)	Meas. Time (ms)	Bandwidth (kHz)	Height (cm)	Pol	Azimuth (deg)	Corr. (dB/m)	Margin - QPK (dB)	Limit - QPK (dBuV/m)
31.920000	41.3	1000.0	120.000	100.0	V	359.0	19.4	7.7	49.0
83.160000	42.8	1000.0	120.000	100.0	V	253.0	15.1	6.2	49.0
114.640000	45.8	1000.0	120.000	100.0	V	17.0	17.7	7.7	53.5
118.920000	46.7	1000.0	120.000	100.0	V	223.0	18.0	6.8	53.5
133.120000	47.2	1000.0	120.000	100.0	V	359.0	19.6	6.4	53.5
137.520000	46.0	1000.0	120.000	100.0	V	186.0	20.1	7.5	53.5



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1-6GHz Radiated Emission

EUT Information

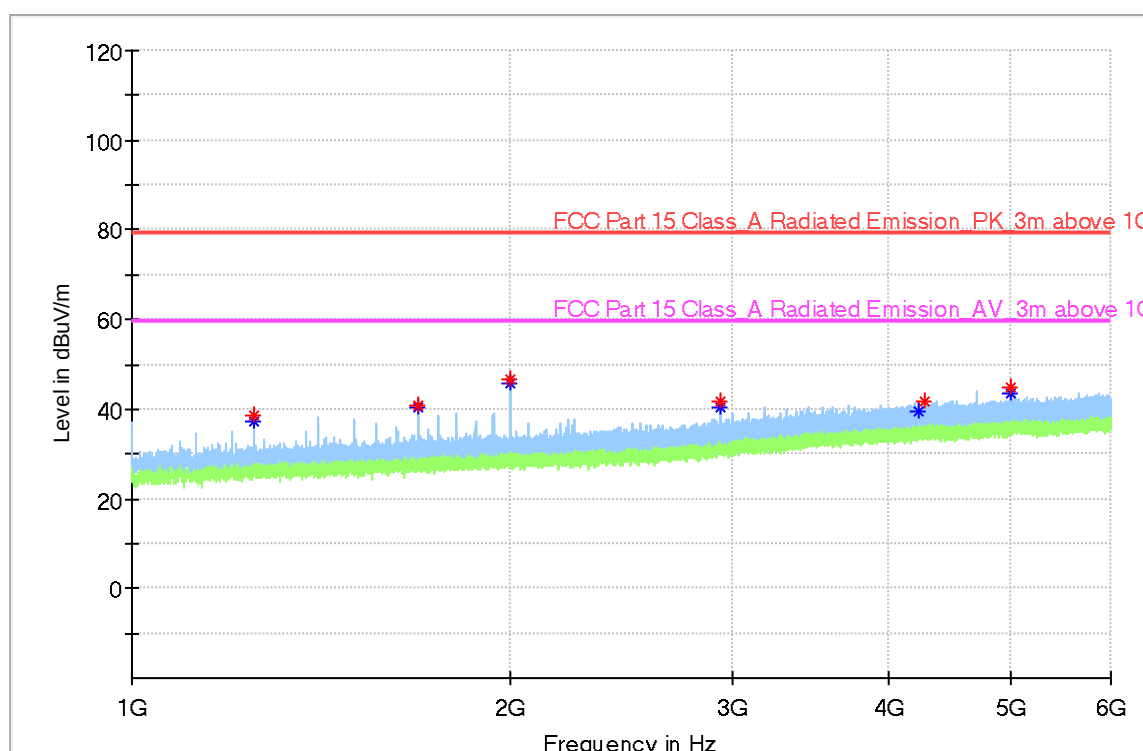
EUT Name: DPU
Model: InCoax D2508 RPF ER US
Client: Incoax Networks AB
Op Cond: Power on, AC120V,50Hz T21.8, H56.7%, P101.3kPa
Operator: Guo Chengjie
Test Spec: FCC Part 15B Class A
Comment: Horizontal
Sample No: SHA-680567-1

Sweep Setup: RE_HF907_pre [EMI radiated]

Hardware Setup: RE_HF907
Receiver: [FSV 40]
Level Unit: dBuV/m

Subrange	Step Size	Detectors	Bandwidth	Sweep Time	Preamp
1 GHz - 6 GHz	156.25 kHz	PK+ ; AVG	1 MHz	0.05 s	0 dB

Full Spectrum





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Critical Freqs

Frequency (MHz)	MaxPeak (dBuV/m)	Average (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Height (cm)	Pol	Azimuth (deg)	Corr. (dB/m)
5000.000000	---	43.66	59.50	15.84	100.0	H	33.0	6.2
5000.000000	44.76	---	79.50	34.74	100.0	H	33.0	6.2
1250.156250	38.46	---	79.50	41.04	100.0	H	52.0	-5.5
1250.156250	---	37.39	59.50	22.11	100.0	H	52.0	-5.5
4270.000000	41.89	---	79.50	37.61	100.0	H	210.0	4.5
2937.656250	---	40.22	59.50	19.28	100.0	H	332.0	0.4
2937.656250	41.70	---	79.50	37.80	100.0	H	332.0	0.4
2000.000000	---	45.93	59.50	13.57	100.0	H	336.0	-2.6
2000.000000	46.49	---	79.50	33.01	100.0	H	336.0	-2.6
4218.906250	---	39.31	59.50	20.19	100.0	H	349.0	4.4
1687.500000	40.94	---	79.50	38.56	100.0	H	354.0	-3.7
1687.500000	---	40.55	59.50	18.95	100.0	H	354.0	-3.7



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1-6GHz Radiated Emission

EUT Information

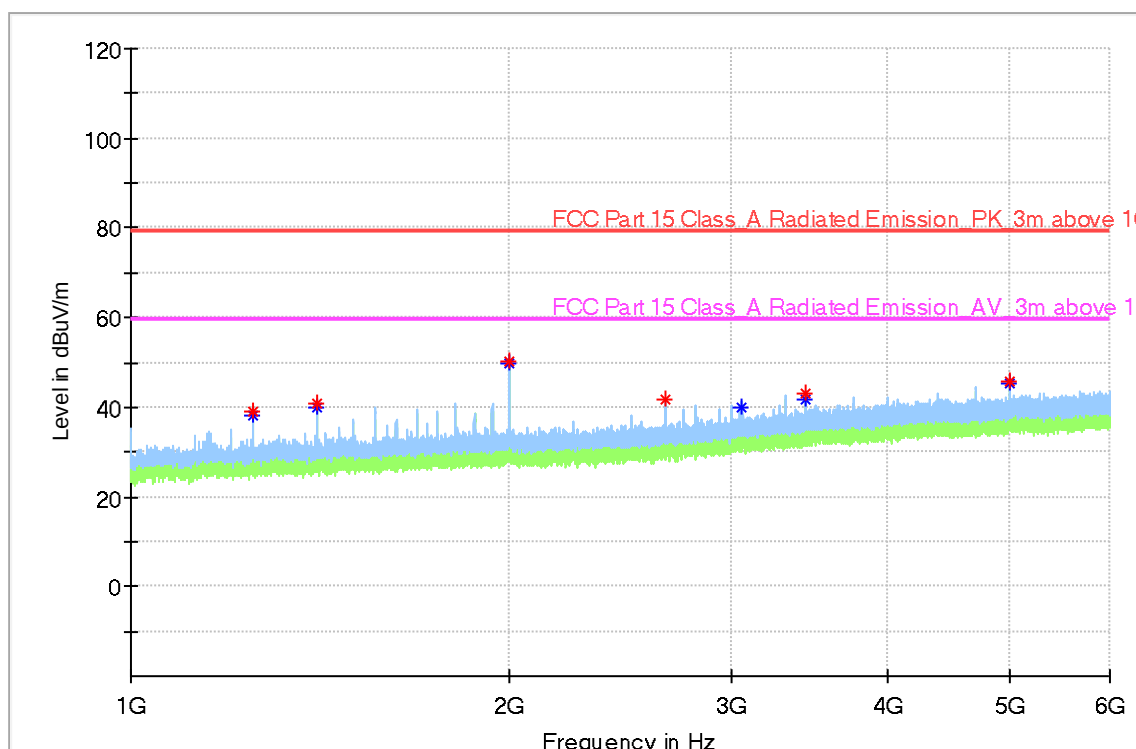
EUT Name: DPU
Model: InCoax D2508 RPF ER US
Client: Monz Handelsgesellschaft international mbH&Co.KG
Op Cond: Power on, AC120V,50Hz T21.8, H56.7%, P101.3kPa
Operator: Guo Chengjie
Test Spec: FCC Part 15B Class A
Comment: Vertical
Sample No: SHA-680567-1

Sweep Setup: RE_HF907_pre [EMI radiated]

Hardware Setup: RE_HF907
Receiver: [FSV 40]
Level Unit: dBuV/m

Subrange	Step Size	Detectors	Bandwidth	Sweep Time	Preamplifier
1 GHz - 6 GHz	156.25 kHz	PK+ ; AVG	1 MHz	0.05 s	0 dB

Full Spectrum





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Critical Freqs

Frequency (MHz)	MaxPeak (dBuV/m)	Average (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Height (cm)	Pol	Azimuth (deg)	Corr. (dB/m)
1250.156250	---	38.08	59.50	21.42	100.0	V	0.0	-5.5
1250.156250	39.03	---	79.50	40.47	100.0	V	0.0	-5.5
3062.656250	---	40.14	59.50	19.36	100.0	V	0.0	0.9
1999.843750	50.23	---	79.50	29.27	100.0	V	5.0	-2.6
2000.156250	---	49.94	59.50	9.56	100.0	V	5.0	-2.6
2657.500000	41.88	---	79.50	37.62	100.0	V	5.0	-0.8
5000.156250	45.87	---	79.50	33.63	100.0	V	21.0	6.2
5000.156250	---	45.24	59.50	14.26	100.0	V	21.0	6.2
1406.250000	---	39.99	59.50	19.51	100.0	V	336.0	-4.8
1406.250000	40.80	---	79.50	38.70	100.0	V	336.0	-4.8
3437.500000	43.18	---	79.50	36.32	100.0	V	336.0	2.4
3437.500000	---	41.88	59.50	17.62	100.0	V	336.0	2.4

Note 1: Emission Level = Reading level + Correction Factor

Corrector Factor = Antenna Factor + Cable Loss - Pre-amplifier Gain

Margin=Limit – Emission Level

7 Measurement Uncertainty

For a 95% confidence level, the measurement expanded uncertainties for defined systems, in accordance with the recommendations of ISO 17025 were:

Items	Extended Uncertainty
Conducted Disturbance at Mains Terminals	150kHz to 30MHz, 3.16dB
Radiated Disturbance	30MHz to 1GHz, 5.03dB (Horizontal) 5.12dB (Vertical) 1GHz to 18GHz, 5.49dB 18GHz to 40GHz, 5.63dB

Measurement Uncertainty Decision Rule:

Determination of conformity with the specification limits is based on the decision rule according to IEC Guide 115: 2021, clause 4.4.3 and 4.5.1.



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8 EUT Photograph

Refer to the < External Photos > & < Internal Photos >.

-----End of Test Report-----