Certificate #7130.01

FCC Radio Test Report

FCC ID: 2AUTE-IK4R

This report concerns: Original Grant

Project No.	:	2408C344
Equipment	:	1) Industrial Barcode Printer 2) Barcode Printer
Brand Name	:	N/A
Test Model	:	iK4R
Series Model	:	iK4, HD620, HD630, HD660, P220, P330, P660, HZ420, HZ430, HZ460, MJK3, MJK6, H850, H860, H870, H880, H890, J-2000, 3000, 6000, H2, H3, H6, VK20, VK30, VK60, IPK300, IPK600, J-8300, J-8600, iV8300, iV8600, King3, King6, Iron Man3, Iron Man6
Applicant	:	Xiamen Hanin Co.Ltd
Address	:	Room 305A, Angye Building, Pioneering Park,Torch High-tech Zone, Xiamen,China
Manufacturer	:	Xiamen Hanin Co.Ltd
Address	:	Room 305A, Angye Building, Pioneering Park,Torch High-tech Zone, Xiamen,China
Factory	:	Xiamen Hanin Co.Ltd
Address	:	No. 96 Rongyuan Road, Tong'an District, Xiamen City, Fujian Province, China
Date of Receipt	:	Sep. 02, 2024
Date of Test	:	Sep. 03, 2024 ~ Nov. 04, 2024
Issued Date	:	Nov. 15, 2024
Report Version	:	R00
Test Sample	:	Engineering Sample No.: DG20240902217-3
Standard(s)	:	FCC CFR Title 47, Part 15, Subpart C

The above equipment has been tested and found compliance with the requirement of the relative standards by BTL Inc.

Prepared by : Evan Yang

Evan Yang

Approved by : Chay . Cai

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Declaration

BTL represents to the client that testing is done in accordance with standard procedures as applicable and that test instruments used has been calibrated with standards traceable to international standard(s) and/or national standard(s).

BTL's reports apply only to the specific samples tested under conditions. It is manufacture's responsibility to ensure that additional production units of this model are manufactured with the identical electrical and mechanical components. BTL assumes no responsibility for the data provided by the customer, any statements, inferences or generalizations drawn by the customer or others from the reports issued by BTL.

The report must not be used by the client to claim product certification, approval, or endorsement by A2LA or any agency of the U.S. Government.

This report is the confidential property of the client. As a mutual protection to the clients, the public and ourselves, the test report shall not be reproduced, except in full, without our written approval.

BTL's laboratory quality assurance procedures are in compliance with the ISO/IEC 17025: 2017 requirements, and accredited by the conformity assessment authorities listed in this test report.

BTL is not responsible for the sampling stage, so the results only apply to the sample as received.

The information, data and test plan are provided by manufacturer which may affect the validity of results, so it is manufacturer's responsibility to ensure that the apparatus meets the essential requirements of applied standards and in all the possible configurations as representative of its intended use.

Limitation

For the use of the authority's logo is limited unless the Test Standard(s)/Scope(s)/Item(s) mentioned in this test report is (are) included in the conformity assessment authorities acceptance respective.
Please note that the measurement uncertainty is provided for informational purpose only and are not use in determining the Pass/Fail results.

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REPORT ISSUED HISTORY

Report No.	Version	Description	Issued Date	Note
BTL-FCCP-1-2408C344	R00	Original Report.	Nov. 15, 2024	Valid

1. APPLICABLE STANDARDS

According to the specifications of the manufacturer, the EUT must comply with the requirements of the following standards:
ANSI C63.10-2013
The following reference test guidance is not within the scope of accreditation of A2LA:
KDB 558074 D01 15.247 Meas Guidance v05r02

2. SUMMARY OF TEST RESULTS

Test procedures according to the technical standard(s):

FCC CFR Title 47, Part 15, Subpart C				
Standard(s) Section	**Test Item**	**Test Result**	**Judgment**	**Remark**
15.207	AC Power Line Conducted Emissions	APPENDIX A	PASS	------
15.247(d) 15.205(a) 15.209(a)	Radiated Emission	APPENDIX B APPENDIX C APPENDIX D	PASS	------
15.247 (a)(1)(i)	Number of Hopping Frequency	APPENDIX E	PASS	------
15.247 (a)(1)(i)	Average Time of Occupancy	APPENDIX F	PASS	------
15.247(a)(1)	Hopping Channel Separation	APPENDIX G	PASS	------
15.247 (a)(1)(i)	Bandwidth	APPENDIX H	PASS	------
15.247(b)(2)	Maximum Output Power	APPENDIX I	PASS	------
15.247(d)	Conducted Spurious Emission	APPENDIX J	PASS	------
15.203	Antenna Requirement	------	PASS	**Note(2)**

Note:

(1) “N/A” denotes test is not applicable in this test report

(2) The device what use a permanently attached antenna were considered sufficient to comply with the provisions of 15.203.

2.1 TEST FACILITY

The test facilities used to collect the test data in this report is at the location of 1-2/F, 4/F, Building A, 1-2/F, Building B, 3/F, Building C, No.3, Jinshagang 1st Road, Dalang Town, Dongguan City, Guangdong People's Republic of China.
BTL's Registration Number for FCC: 747969
BTL's Designation Number for FCC: CN1377

2.2 MEASUREMENT UNCERTAINTY

ISO/IEC 17025 requires that an estimate of the measurement uncertainties associated with the emissions test results be included in the report. The measurement uncertainties given below are based on a 95.45% confidence level (based on a coverage factor (k=2))
The BTL measurement uncertainty as below table:

A. AC power line conducted emissions test:

Test Site	Method	Measurement Frequency Range	*U*,(dB)
DG-C02	CISPR	150kHz ~ 30MHz	2.88

B. Radiated emissions test:

Test Site	Method	Measurement Frequency Range	*U*,(dB)
DG-CB01	CISPR	9kHz ~ 30MHz	2.36

Test Site	Method	Measurement Frequency Range	Ant. H / V	*U*,(dB)
DG-CB03 (3m)	CISPR	30MHz ~ 200MHz	V	4.40
		30MHz ~ 200MHz	H	3.62
		200MHz ~ 1,000MHz	V	4.58
		200MHz ~ 1,000MHz	H	3.98

Test Site	Method	Measurement Frequency Range	*U*,(dB)
DG-CB03 (3m)	CISPR	1GHz ~ 6GHz	4.08
		6GHz ~ 18GHz	4.62

C. Other Measurement:

Test Item	Uncertainty
Conducted Spurious Emission	1.9 dB
Maximum Output Power	1.3 dB
Bandwidth	0.90 %
Temperature	0.8 °C
Humidity	2.2 %

Note: Unless specifically mentioned, the uncertainty of measurement has not been taken into account to declare the compliance or non-compliance to the specification.

2.3 TEST ENVIRONMENT CONDITIONS

Test Item	Temperature	Humidity	Test Voltage	Tested By	Test Date
AC Power Line Conducted Emissions	24°C	52%	AC 120V/60Hz	Hayden Chen	Oct. 24, 2024
Radiated Emissions-9 kHz to 30 MHz	25°C	50%	AC 120V/60Hz	Hayden Chen	Oct. 24, 2024
Radiated Emissions-30 MHz to 1000 MHz	22°C	51%	AC 120V/60Hz	Allen Tong	Oct. 31, 2024
Radiated Emissions-Above 1000 MHz	22°C	51%	AC 120V/60Hz	Allen Tong	Oct. 31, 2024
Number of Hopping Frequency	24°C	45-48%	DC 5V	Arvin Tong Parker Yang	Oct. 24, 2024~ Oct. 28, 2024
Average Time of Occupancy	24°C	45-48%	DC 5V	Arvin Tong Parker Yang	Oct. 24, 2024~ Oct. 28, 2024
Hopping Channel Separation	24°C	45-48%	DC 5V	Arvin Tong Parker Yang	Oct. 24, 2024~ Oct. 28, 2024
Bandwidth	24°C	45-48%	DC 5V	Arvin Tong Parker Yang	Oct. 24, 2024~ Oct. 28, 2024
Maximum Output Power	24°C	45-48%	DC 5V	Arvin Tong Parker Yang	Oct. 24, 2024~ Oct. 28, 2024
Conducted Spurious Emission	24°C	45-48%	DC 5V	Arvin Tong Parker Yang	Oct. 24, 2024~ Oct. 28, 2024

3. GENERAL INFORMATION

3.1 GENERAL DESCRIPTION OF EUT

Equipment	**1) Industrial Barcode Printer** **2) Barcode Printer**
Brand Name	**N/A**
Test Model	iK4R
Series Model	iK4, HD620, HD630, HD660, P220, P330, P660, HZ420, HZ430, HZ460, MJK3, MJK6, H850, H860, H870, H880, H890, J-2000, 3000, 6000, H2, H3, H6, VK20, VK30, VK60, IPK300, IPK600, J-8300, J-8600, iV8300, iV8600, King3, King6, Iron Man3, Iron Man6
Model Difference(s)	Just different product models, everything else is the same.
Software Version	IX4-V.1.0.0
Hardware Version	IK4RMB
Power Source	AC Mains.
Power Rating	Input Power: 100-240V~ 50/60Hz 3A
Operation Frequency	917.4 MHz ~ 927.2 MHz
Modulation Type	ASK
Bit Rate of Transmitter	1Mbps
Max. Output Power	917.4MHz: 27.56 dBm (0.5702 W)

Note:

1. For a more detailed features description, please refer to the manufacturer's specifications or the user's manual.

2. Channel List:

Channel	Frequency (MHz)	Channel	Frequency (MHz)	Channel	Frequency (MHz)
01	917.4	18	920.8	35	924.2
02	917.6	19	921.0	36	924.4
03	917.8	20	921.2	37	924.6
04	918.0	21	921.4	38	924.8
05	918.2	22	921.6	39	925.0
06	918.4	23	921.8	40	925.2
07	918.6	24	922.0	41	925.4
08	918.8	25	922.2	42	925.6
09	919.0	26	922.4	43	925.8
10	919.2	27	922.6	44	926.0
11	919.4	28	922.8	45	926.2
12	919.6	29	923.0	46	926.4
13	919.8	30	923.2	47	926.6
14	920.0	31	923.4	48	926.8
15	920.2	32	923.6	49	927.0
16	920.4	33	923.8	50	927.2
17	920.6	34	924.0		

3. Table for Filed Antenna:

Ant.	Brand	P/N	Antenna Type	Connector	Gain (dBi)
1	FUWIT	ANT-HY-V1.0	Print	N/A	-27.1

3.2 DESCRIPTION OF TEST MODES

The test system was pre-tested based on the consideration of all possible combinations of EUT operation mode.

Pretest Mode	Description
Mode 1	TX Mode Channel 01/26/50
Mode 2	TX Mode Channel 01

Following mode(s) was (were) found to be the worst case(s) and selected for the final test.

AC power line conducted emissions test	
Final Test Mode	Description
Mode 2	TX Mode Channel 01

Radiated emissions test - Below 1GHz	
Final Test Mode	Description
Mode 2	TX Mode Channel 01

Radiated emissions test - Above 1GHz	
Final Test Mode	Description
Mode 1	TX Mode Channel 01/26/50

Maximum Output Power	
Final Test Mode	Description
Mode 1	TX Mode Channel 01/26/50

Other Conducted test	
Final Test Mode	Description
Mode 1	TX Mode Channel 01/26/50

Note:

(1) For radiated emission above 1 GHz test, the spurious points of 1GHz~10GHz have been pre-tested and in this report only recorded the worst case. The remaining spurious points are all below the limit value of 20dB.

(2) For AC power line conducted emissions and radiated spurious emissions below 1 GHz test, the Channel 01 is found to be the worst case and recorded.

(3) For radiated emission above 1GHz test, both Vertical and Horizontal are evaluated, only the worst case (Horizontal) is recorded.

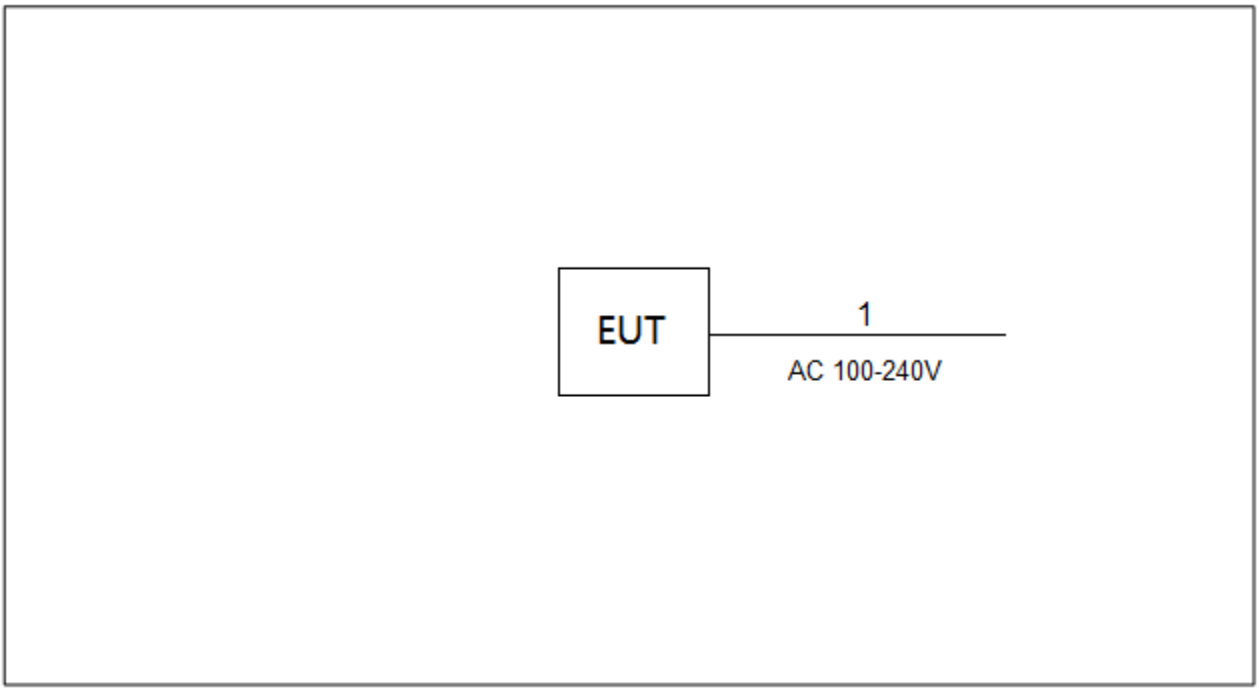
3.3 PARAMETERS OF TEST SOFTWARE

During testing, channel & power controlling software provided by the customer was used to control the operating channel as well as the output power level.

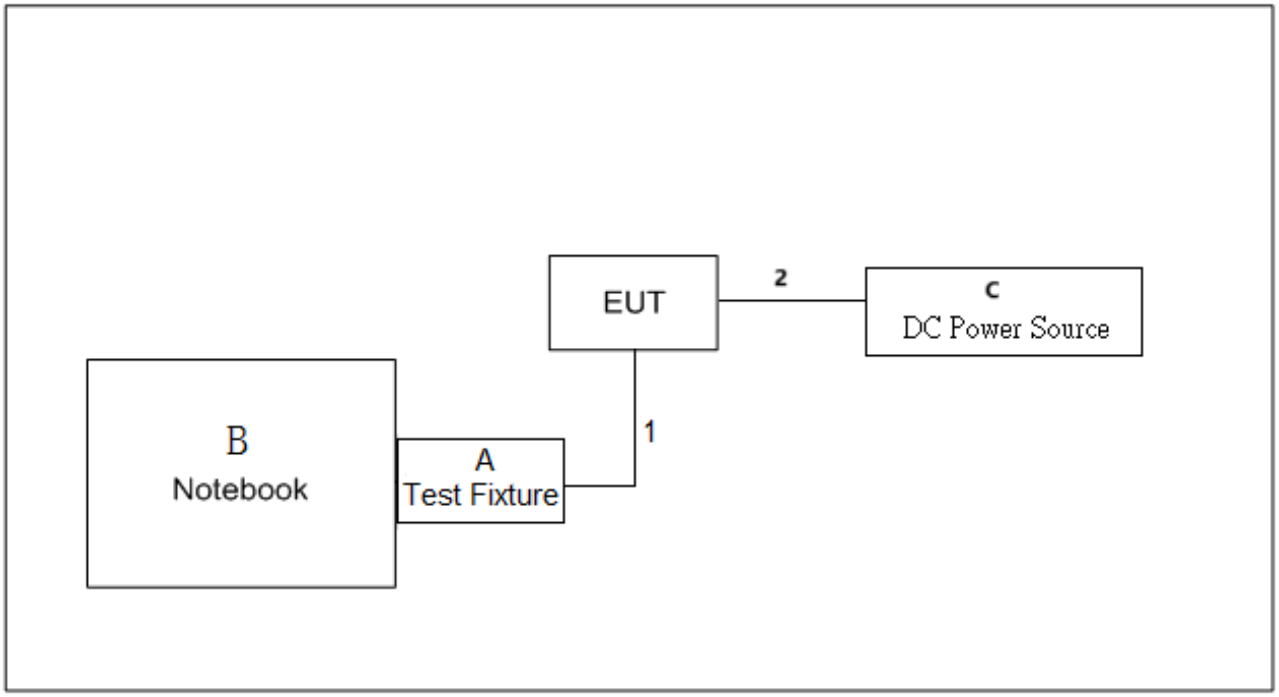
Test Software Version	URAx64 V5.2		
Frequency (MHz)	917.4	922.4	927.2
TX Mode	27	27	27

3.4 BLOCK DIAGRAM SHOWING THE CONFIGURATION OF SYSTEM TESTED

AC power line conducted emissions & Radiated Emissions - 9 kHz to 30 MHz



Radiated Emissions - Above 30 MHz



3.5 SUPPORT UNITS

AC power line conducted emissions & Radiated Emissions - 9 kHz to 30 MHz

Item	Equipment	Brand	Model No.	Series No.
-	-	-	-	-

Item	Cable Type	Shielded Type	Ferrite Core	Length
1	AC Cable	NO	NO	1.2m

Radiated Emissions - Above 30 MHz

Item	Equipment	Brand	Model No.	Series No.
A	Test Fixture	N/A	N/A	N/A
B	Notebook	HONOR	NBLK-WAX9X	N/A
C	DC Power Source	UNI-T	UDP6721	AWP7224050031

Item	Cable Type	Shielded Type	Ferrite Core	Length
1	Data Cable	NO	NO	0.2m
2	DC Cable	NO	NO	1.0m

3.6 CUSTOMER INFORMATION DESCRIPTION

1) The antenna gain is provided by the manufacturer.
2) Except for AC power line conducted emissions and radiated emissions, the results of all test items include cable losses. All cable losses are provided by the testing laboratory.

4. AC POWER LINE CONDUCTED EMISSIONS

4.1 LIMIT

Frequency of Emission (MHz)	Limit (dBμV)	
	Quasi-peak	Average
0.15 - 0.5	66 to 56*	56 to 46*
0.5 - 5.0	56	46
5.0 - 30.0	60	50

Note:

(1) The tighter limit applies at the band edges.
(2) The limit of " * " marked band means the limitation decreases linearly with the logarithm of the frequency in the range.

4.2 TEST PROCEDURE

a. The EUT was placed 0.8 meters from the horizontal ground plane with EUT being connected to the power mains through a line impedance stabilization network (LISN). All other support equipment powered from additional LISN(s). The LISN provide 50 Ohm/ 50uH of coupling impedance for the measuring instrument.
b. Interconnecting cables that hang closer than 40 cm to the ground plane shall be folded back and forth in the center forming a bundle 30 to 40 cm long.
c. I/O cables that are not connected to a peripheral shall be bundled in the center. The end of the cable may be terminated, if required, using the correct terminating impedance. The overall length shall not exceed 1 m.
d. LISN at least 80 cm from nearest part of EUT chassis.
e. For the actual test configuration, please refer to the related Item –EUT Test Photos.

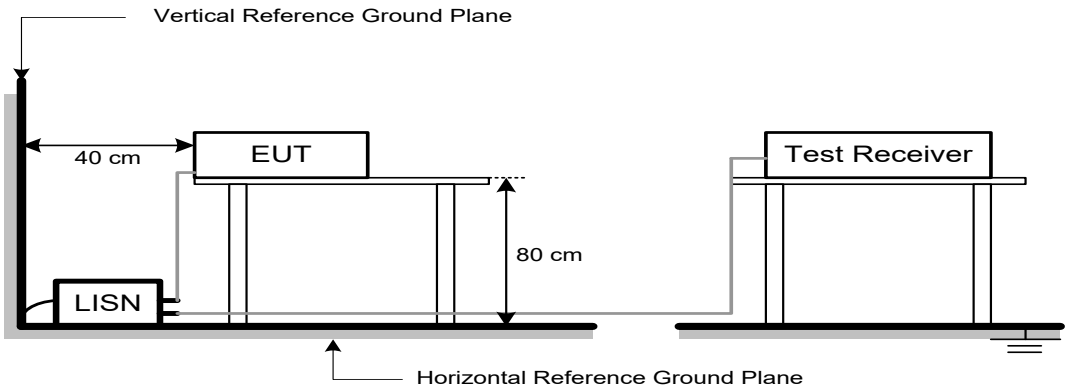
The following table is the setting of the receiver:

Receiver Parameters	Setting
Start Frequency	0.15 MHz
Stop Frequency	30 MHz
IF Bandwidth	9 kHz

4.3 DEVIATION FROM TEST STANDARD

No deviation.

4.4 TEST SETUP



4.5 EUT OPERATING CONDITIONS

The EUT was configured for testing in a typical function (as a customer would normally use it), EUT was programmed to be in continuously transmitting data or hopping on mode.

4.6 TEST RESULTS

Please refer to the APPENDIX A.

Remark:

(1) All readings are QP Mode value unless otherwise stated AVG in column of『Note』. If the QP Mode Measured value compliance with the QP Limits and lower than AVG Limits, the EUT shall be deemed to meet both QP & AVG Limits and then only QP Mode was measured, but AVG Mode didn't perform in this case, a "*" marked in AVG Mode column of Interference Voltage Measured.

(2) Measuring frequency range from 150 kHz to 30 MHz.

5. RADIATED EMISSIONS

5.1 LIMIT

In case the emission fall within the restricted band specified on 15.205(a), then the 15.209(a) limit in the table below has to be followed.

LIMITS OF RADIATED EMISSION MEASUREMENT (9 kHz-1000 MHz)

Frequency (MHz)	Field Strength (microvolts/meter)	Measurement Distance (meters)
0.009-0.490	2400/F(kHz)	300
0.490-1.705	24000/F(kHz)	30
1.705-30.0	30	30
30-88	100	3
88-216	150	3
216-960	200	3
Above 960	500	3

LIMITS OF RADIATED EMISSION MEASUREMENT (Above 1000 MHz)

Frequency (MHz)	(dBuV/m at 3 m)	
	Peak	Average
Above 1000	74	54

Note:
(1) The limit for radiated test was performed according to FCC CFR Title 47, Part 15, Subpart C.
(2) The tighter limit applies at the band edges.
(3) Emission level (dBuV/m)=20log Emission level (uV/m).

5.2 TEST PROCEDURE

a. The measuring distance of 3 m shall be used for measurements. The EUT was placed on the top of a rotating table 0.8 meter above the ground at a 3 meter semi-anechoic chamber. The table was rotated 360 degrees to determine the position of the highest radiation.(below 1 GHz)
b. The measuring distance of 3 m shall be used for measurements. The EUT was placed on the top of a rotating table 1.5 meter above the ground at a 3 meter semi-anechoic chamber. The table was rotated 360 degrees to determine the position of the highest radiation.(above 1 GHz)
c. The height of the equipment or of the substitution antenna shall be 0.8m or 1.5m; the height of the test antenna shall vary between 1 m to 4 m. Both horizontal and vertical polarizations of the antenna are set to make the measurement.
d. For each suspected emission, the EUT was arranged to its worst case and then the antenna was tuned to heights find the maximum reading (used Bore sight function).
e. The receiver system was set to peak and average detect function and specified bandwidth with maximum hold mode when the test frequency is above 1 GHz.
f. The initial step in collecting radiated emission data is a receiver peak detector mode pre-scanning the measurement frequency range. Significant peaks are then marked and then Quasi Peak detector mode re-measured.
g. All readings are Peak unless otherwise stated QP in column of Note. Peak denotes that the Peak reading compliance with the QP Limits and then QP Mode measurement didn‘t perform. (below 1 GHz)
h. All readings are Peak Mode value unless otherwise stated AVG in column of Note. If the Peak Mode Measured value compliance with the Peak Limits and lower than AVG Limits, the EUT shall be deemed to meet both Peak & AVG Limits and then only Peak Mode was measured, but AVG Mode didn‘t perform. (above 1 GHz)
i. For the actual test configuration, please refer to the related Item –EUT Test Photos.

The following table is the setting of the receiver:

Spectrum Parameters	Setting
Start ~ Stop Frequency	9 kHz~150 kHz for RBW 200 Hz
Start ~ Stop Frequency	0.15 MHz~30 MHz for RBW 9 kHz
Start ~ Stop Frequency	30 MHz~1000 MHz for RBW 100 kHz

Spectrum Parameters	Setting
Start Frequency	1000 MHz
Stop Frequency	10th carrier harmonic
RBW / VBW (Emission in restricted band)	1 MHz / 3 MHz for PK value 1 MHz / 1/T Hz for AVG value

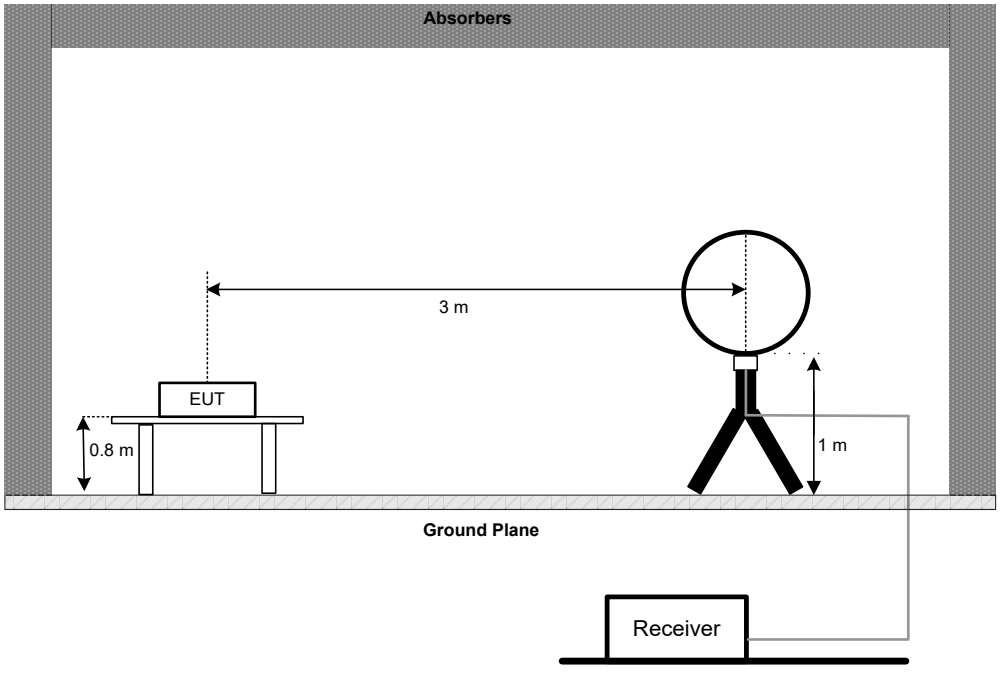
Spectrum Parameters	Setting
Start ~ Stop Frequency	9 kHz~90 kHz for PK/AVG detector
Start ~ Stop Frequency	90 kHz~110 kHz for QP detector
Start ~ Stop Frequency	110 kHz~490 kHz for PK/AVG detector
Start ~ Stop Frequency	490 kHz~30 MHz for QP detector
Start ~ Stop Frequency	30 MHz~1000 MHz for QP detector
Start ~ Stop Frequency	1 GHz~10 GHz for PK/AVG detector

5.3 DEVIATION FROM TEST STANDARD

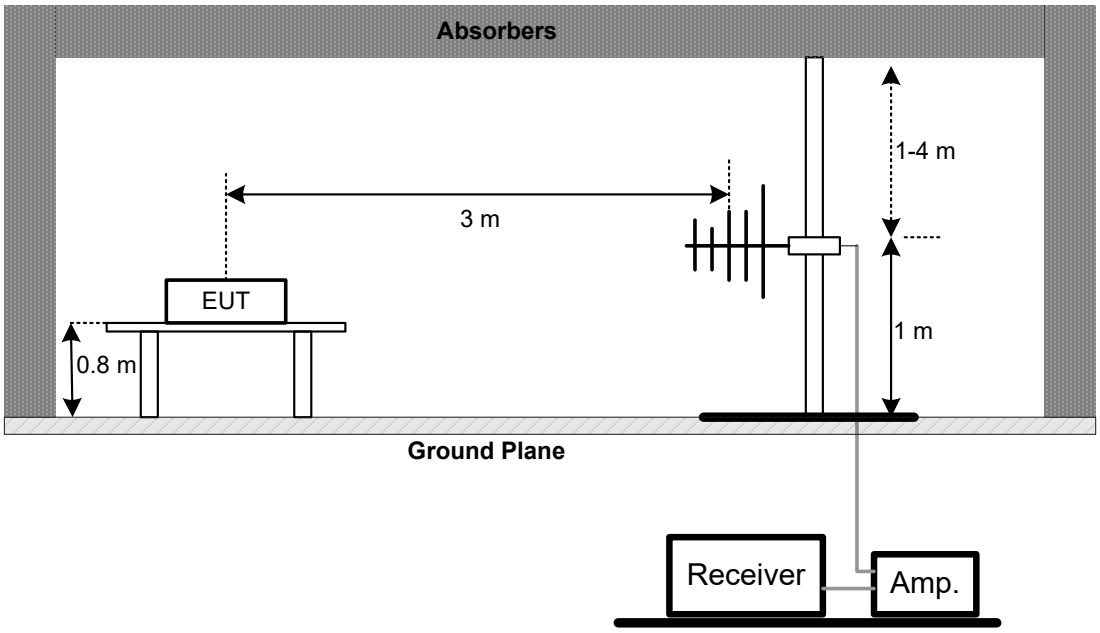
No deviation.

5.4 TEST SETUP

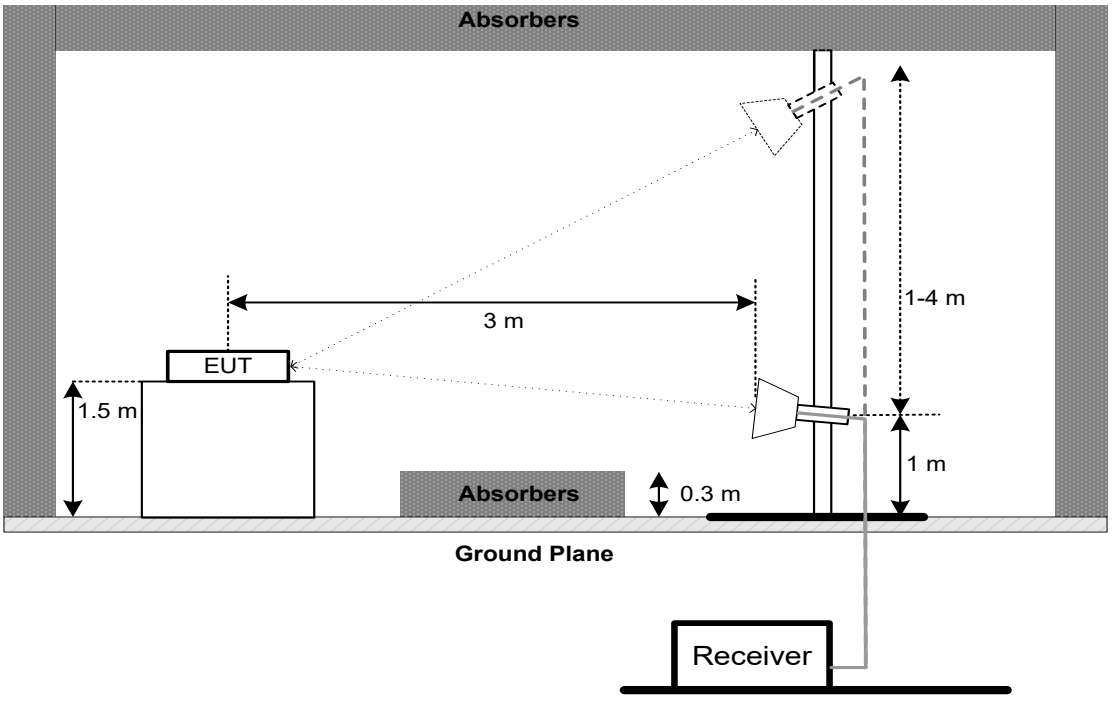
9 kHz to 30 MHz



30 MHz to 1 GHz



Above 1 GHz
Band edge & Harmonic (1 GHz to 10 GHz)



5.5 EUT OPERATING CONDITIONS

The EUT was programmed to be in continuously transmitting mode.

5.6 TEST RESULTS - 9 kHz TO 30 MHz

Please refer to the APPENDIX B.

Remark:

(1) Distance extrapolation factor = 40 log (specific distance / test distance) (dB).
(2) Limit line = specific limits (dBuV) + distance extrapolation factor.

5.7 TEST RESULTS - 30 MHz TO 1000 MHz

Please refer to the APPENDIX C.

5.8 TEST RESULTS - ABOVE 1000 MHz

Please refer to the APPENDIX D.

Remark:

(1) No limit: This is fundamental signal, the judgment is not applicable.
For fundamental signal judgment was referred to Peak output test.

6. NUMBER OF HOPPING FREQUENCY

6.1 LIMIT

Section	Test Item	Limit
FCC 15.247(a)(1)(i)	Number of Hopping Frequency	≥50

6.2 TEST PROCEDURE

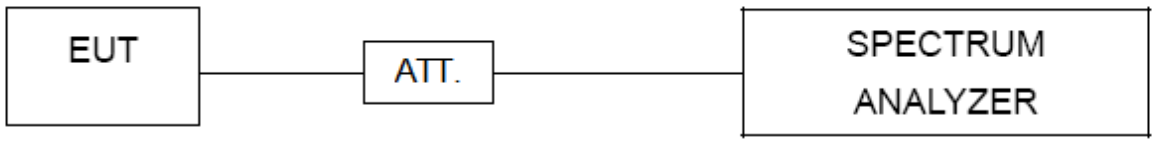
a. The EUT was directly connected to the spectrum analyzer and antenna output port as show in the block diagram below.
b. The following table is the setting of the spectrum analyzer:

Spectrum Parameters	Setting
Span Frequency	> Operating Frequency Range
RBW	100 kHz
VBW	100 kHz
Detector	Peak
Trace	Max Hold
Sweep Time	Auto

6.3 DEVIATION FROM STANDARD

No deviation.

6.4 TEST SETUP



6.5 EUT OPERATION CONDITIONS

The EUT was programmed to be in continuously transmitting mode.

6.6 TEST RESULTS

Please refer to the APPENDIX E.

7. AVERAGE TIME OF OCCUPANCY

7.1 LIMIT

Section	Test Item	Limit
FCC 15.247(a)(1)(i)	Average Time of Occupancy	0.4sec

7.2 TEST PROCEDURE

a. Measure the maximum time duration of one single pulse.
b. The EUT was directly connected to the spectrum analyzer and antenna output port as show in the block diagram below.
c. The following table is the setting of the spectrum analyzer:

Spectrum Parameters	Setting
Span Frequency	0 Hz
RBW	100 kHz
VBW	300 kHz
Detector	Peak
Trace	Max Hold
Sweep Time	100 ms and 20 s

7.3 DEVIATION FROM STANDARD

No deviation.

7.4 TEST SETUP

7.5 EUT OPERATION CONDITIONS

The EUT was programmed to be in continuously transmitting mode.

7.6 TEST RESULTS

Please refer to the APPENDIX F.

8. HOPPING CHANNEL SEPARATION

8.1 LIMIT

Frequency hopping systems shall have hopping channel carrier frequencies separated by a minimum of 25 kHz or the 20 dB bandwidth of the hopping channel, whichever is greater.

8.2 TEST PROCEDURE

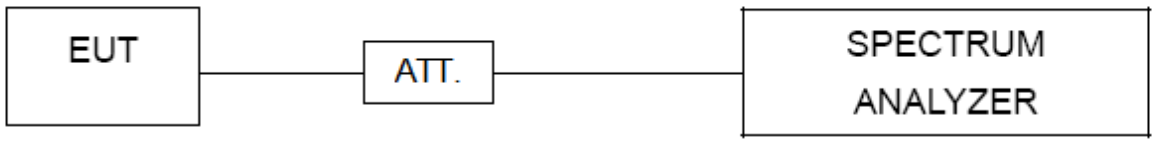
a. The EUT was directly connected to the spectrum analyzer and antenna output port as show in the block diagram below.
b. The following table is the setting of the spectrum analyzer:

Spectrum Parameters	Setting
Span Frequency	400 kHz
RBW	30 kHz
VBW	100 kHz
Detector	Peak
Trace	Max Hold
Sweep Time	Auto

8.3 DEVIATION FROM STANDARD

No deviation.

8.4 TEST SETUP



8.5 EUT OPERATION CONDITIONS

The EUT was programmed to be in continuously transmitting mode.

8.6 TEST RESULTS

Please refer to the APPENDIX G.

9. BANDWIDTH

9.1 LIMIT

Section	Test Item	Limit
FCC 15.247(a)(1)(i)	Bandwidth	The maximum allowed 20 dB bandwidth of the hopping channel is 500 kHz.

9.2 TEST PROCEDURE

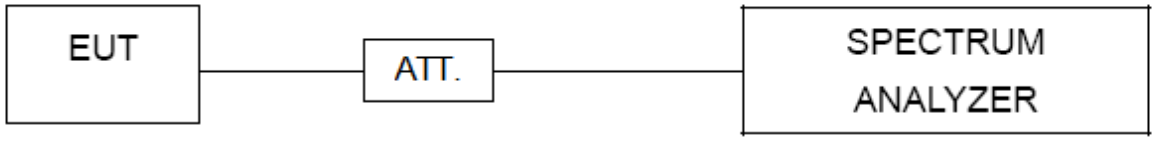
a. The EUT was directly connected to the spectrum analyzer and antenna output port as show in the block diagram below.
b. The following table is the setting of the spectrum analyzer:

Spectrum Parameters	Setting
Span Frequency	300 kHz
RBW	3 kHz
VBW	10 kHz
Detector	Peak
Trace	Max Hold
Sweep Time	Auto

9.3 DEVIATION FROM STANDARD

No deviation.

9.4 TEST SETUP



9.5 EUT OPERATION CONDITIONS

The EUT was programmed to be in continuously transmitting mode.

9.6 TEST RESULTS

Please refer to the APPENDIX H.

10. MAXIMUM OUTPUT POWER

10.1 LIMIT

Section	Test Item	Limit
FCC 15.247(b)(2)	Maximum Output Power	1.0000 Watt

Note: For frequency hopping systems operating in the 902-928 MHz band: 1 watt for systems employing at least 50 hopping channels; and, 0.25 watts for systems employing less than 50 hopping channels, but at least 25 hopping channels, as permitted under paragraph (a)(1)(i) of this section.

10.2 TEST PROCEDURE

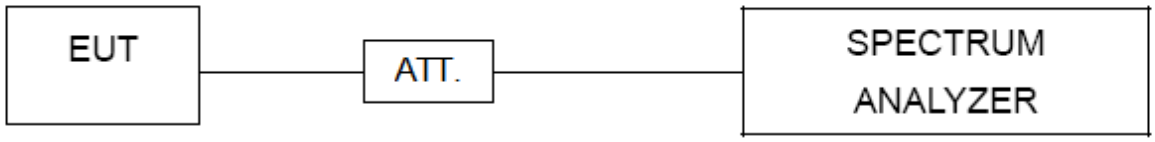
a. The EUT was directly connected to the spectrum analyzer and antenna output port as show in the block diagram below.
b. The following table is the setting of the spectrum analyzer:

Spectrum Parameters	Setting
Span Frequency	2 MHz
RBW	100 kHz
VBW	300 kHz
Detector	Peak
Trace	Max Hold
Sweep Time	Auto

10.3 DEVIATION FROM STANDARD

No deviation.

10.4 TEST SETUP



10.5 EUT OPERATION CONDITIONS

The EUT was programmed to be in continuously transmitting mode.

10.6 TEST RESULTS

Please refer to the APPENDIX I.

11. CONDUCTED SPURIOUS EMISSION

11.1 LIMIT

In any 100 kHz bandwidth outside the frequency band in which the spread spectrum or digitally modulated intentional radiator is operating, the radio frequency power that is produced by the intentional radiator shall be at least 20 dB below that in the 100 kHz bandwidth within the band that contains the highest level of the desired power, based on either an RF conducted or a radiated measurement, provided the transmitter demonstrates compliance with the peak Output Power limits. If the transmitter complies with the Output Power limits based on the use of RMS averaging over a time interval, as permitted under paragraph (b)(3) of this section, the attenuation required under this paragraph shall be 30 dB instead of 20 dB. Attenuation below the general limits specified in Section 15.209(a) is not required.

11.2 TEST PROCEDURE

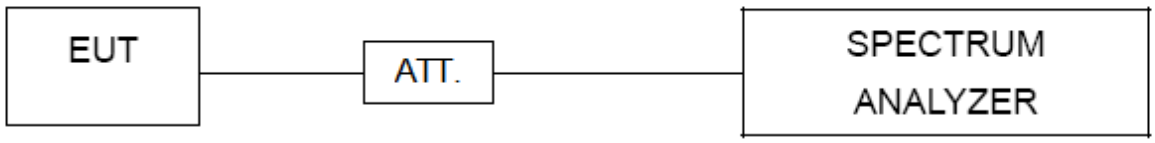
a. The EUT was directly connected to the spectrum analyzer and antenna output port as show in the block diagram below.
b. The following table is the setting of the spectrum analyzer:

Spectrum Parameters	Setting
Start Frequency	30 MHz
Stop Frequency	10 GHz
RBW	100 kHz
VBW	300 kHz
Detector	Peak
Trace	Max Hold
Sweep Time	Auto

11.3 DEVIATION FROM STANDARD

No deviation.

11.4 TEST SETUP



11.5 EUT OPERATION CONDITIONS

The EUT was programmed to be in continuously transmitting mode.

11.6 TEST RESULTS

Please refer to the APPENDIX J.

12. MEASUREMENT INSTRUMENTS LIST

AC Power Line Conducted Emissions					
Item	Kind of Equipment	Manufacturer	Type No.	Serial No.	Calibrated until
1	EMI TEST RECEIVER	R&S	ESCI	100382	Dec. 22, 2024
2	TWO-LINE V-NETWORK	R&S	ENV216	101447	Dec. 22, 2024
3	Measurement Software	Farad	EZ-EMC Ver.NB-03A1-01	N/A	N/A
4	Cable	N/A	SFT205-NMNM-9M -001	9M	Nov. 27, 2024
5	643 Shield Room	ETS	6*4*3	N/A	N/A

Radiated Emissions - 9 kHz to 30 MHz					
Item	Kind of Equipment	Manufacturer	Type No.	Serial No.	Calibrated until
1	Active Loop Antenna	Schwarzbeck	FMZB 1513-60B	1513-60 B-034	Mar. 30, 2025
2	MXE EMI Receiver	Keysight	N9038A	MY56400091	Dec. 22, 2024
3	Cable	N/A	RW2350-3.8A-NMB M-1.5M	N/A	Jun. 09, 2025
4	Cable	N/A	LMR400-NMNM-8 M	N/A	Sep. 09, 2025
5	Measurement Software	Farad	EZ-EMC Ver.NB-03A1-01	N/A	N/A
6	966 Chamber room	ETS	9*6*6	N/A	May 16, 2025

Radiated Emissions - 30 MHz to 1 GHz					
Item	Kind of Equipment	Manufacturer	Type No.	Serial No.	Calibrated until
1	Trilog-Broadband Antenna	Schwarzbeck	VULB 9168	01462	Dec. 13, 2024
2	Attenuator	EMC INSTRUMENT	EMCI-N-6-06	AT-06009	Dec. 13, 2024
3	Preamplifier	EMC INSTRUMENT	EMC001330	980998	Nov. 17, 2024
4	Cable	RegalWay	LMR400-NMNM-12 .5m	N/A	Jun. 06, 2025
5	Cable	RegalWay	LMR400-NMNM-3 m	N/A	Jun. 06, 2025
6	Cable	RegalWay	LMR400-NMNM-0. 5m	N/A	Jun. 06, 2025
7	Receiver	Agilent	N9038A	MY52130039	Dec. 22, 2024
8	Attenuator	Talent Microwave	TA10A2-S-18	N/A	N/A
9	Positioning Controller	MF	MF-7802	N/A	N/A
10	Measurement Software	Farad	EZ-EMC Ver.NB-03A1-01	N/A	N/A
11	966 Chamber room	CM	9*6*6	N/A	May 16, 2025

Radiated Emissions - Above 1 GHz					
Item	Kind of Equipment	Manufacturer	Type No.	Serial No.	Calibrated until
1	Receiver	Agilent	N9038A	MY52130039	Dec. 22, 2024
2	Preamplifier	EMC INSTRUMENT	EMC118A45SE	980888	Nov. 17, 2024
3	Double Ridged Guide Antenna	ETS	3115	75789	Jun. 15, 2025
4	Cable	RegalWay	RWLP50-4.0A-SMSM-12.5M	N/A	Jul. 03, 2025
5	Cable	RegalWay	RWLP50-4.0A-NMRASM-2.5M	N/A	Jul. 03, 2025
6	Cable	RegalWay	RWLP50-4.0A-NMRASMRA-0.8M	N/A	Jul. 03, 2025
7	966 Chamber room	CM	9*6*6	N/A	May 19, 2025
8	Filter	Wairrwright Instruments Gmbh	WHK 1.5/15G-10ST	N/A	Dec. 22, 2024
9	Positioning Controller	MF	MF-7802	N/A	N/A
10	Measurement Software	Farad	EZ-EMC Ver.NB-03A1-01	N/A	N/A

Number of Hopping Frequency & Average Time of Occupancy & Hopping Channel Separation & Bandwidth & Maximum Output Power & Conducted Spurious Emission					
Item	Kind of Equipment	Manufacturer	Type No.	Serial No.	Calibrated until
1	EXA Spectrum Analyzer	Keysight	N9010A	MY55150209	Aug. 20, 2025
2	DC power supply	UNI-T	UDP6721	AWP7224050031	Mar. 20, 2025
3	Isolation attenuator	Z-Link	ASMA-16-18-2W	N/A	N/A

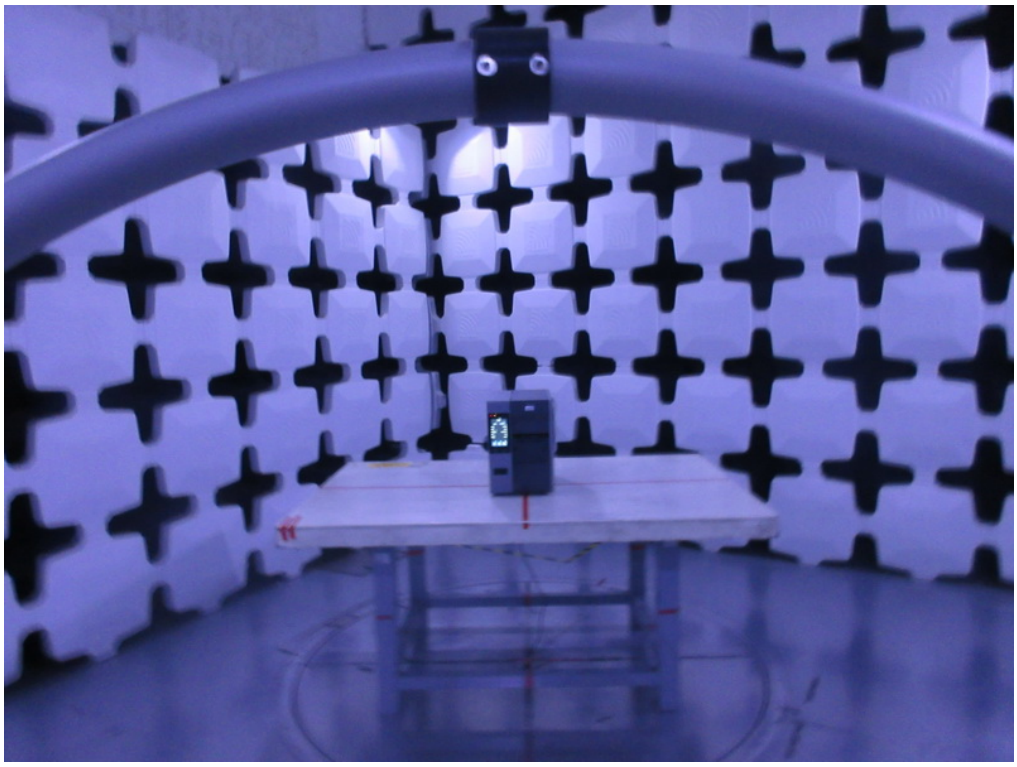
Remark "N/A" denotes no model name, serial no. or calibration specified.
All calibration period of equipment list is one year.

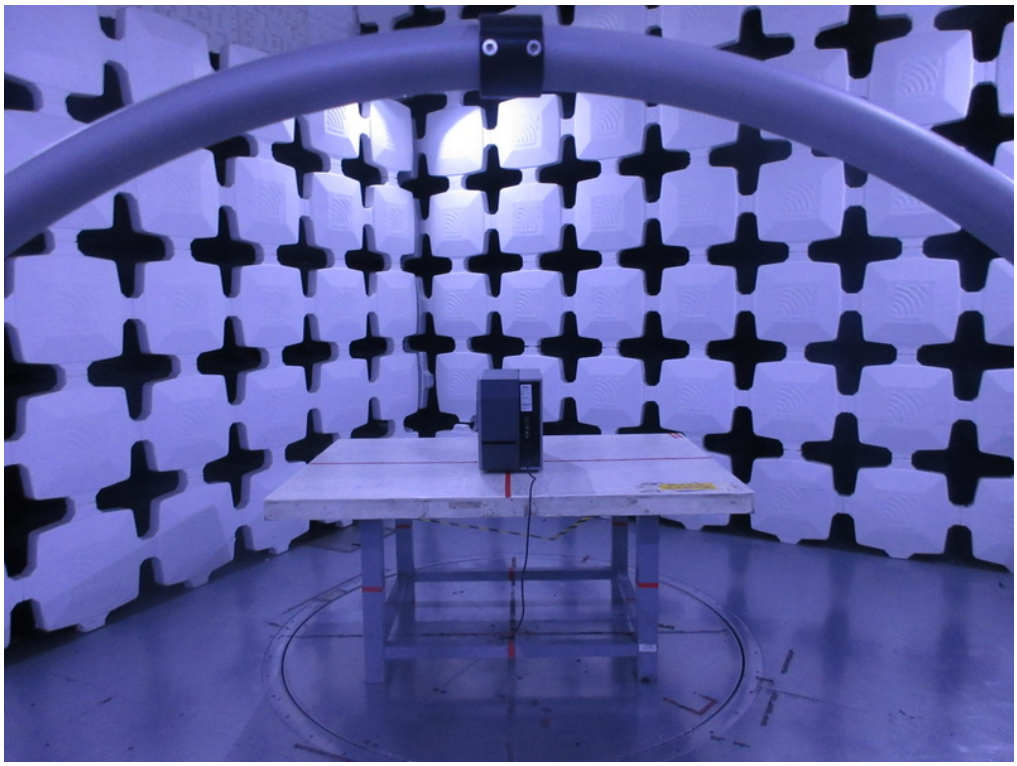
13. EUT TEST PHOTO

AC Power Line Conducted Emissions Test Photos

Radiated Emissions Test Photos

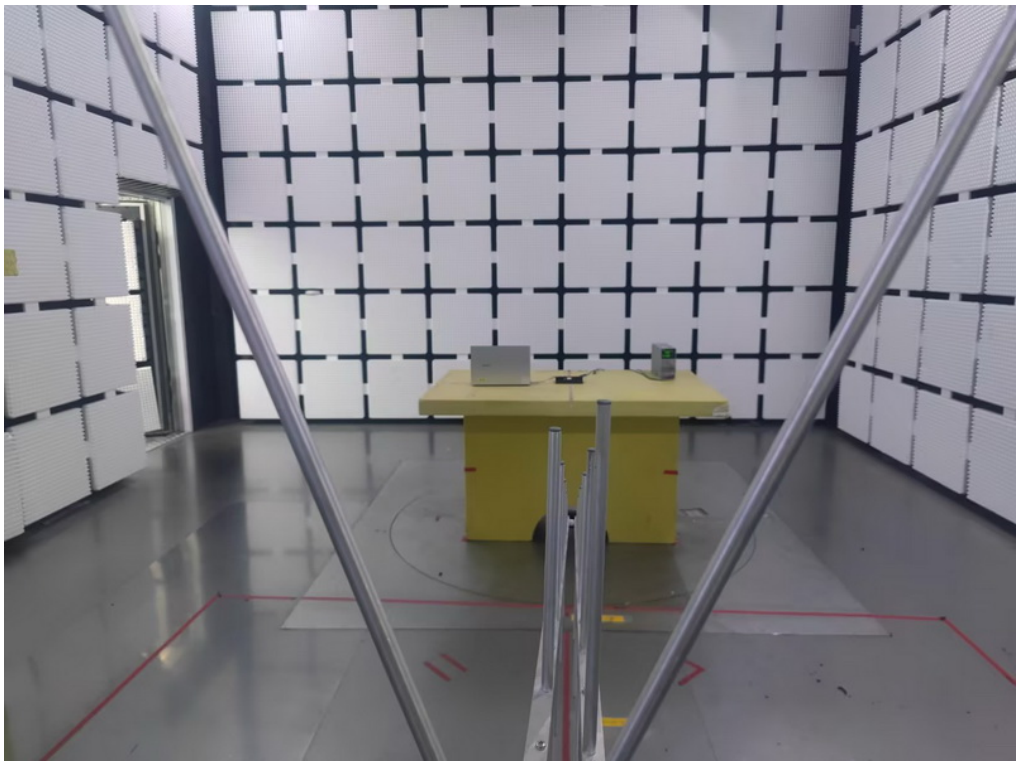
9 kHz to 30 MHz

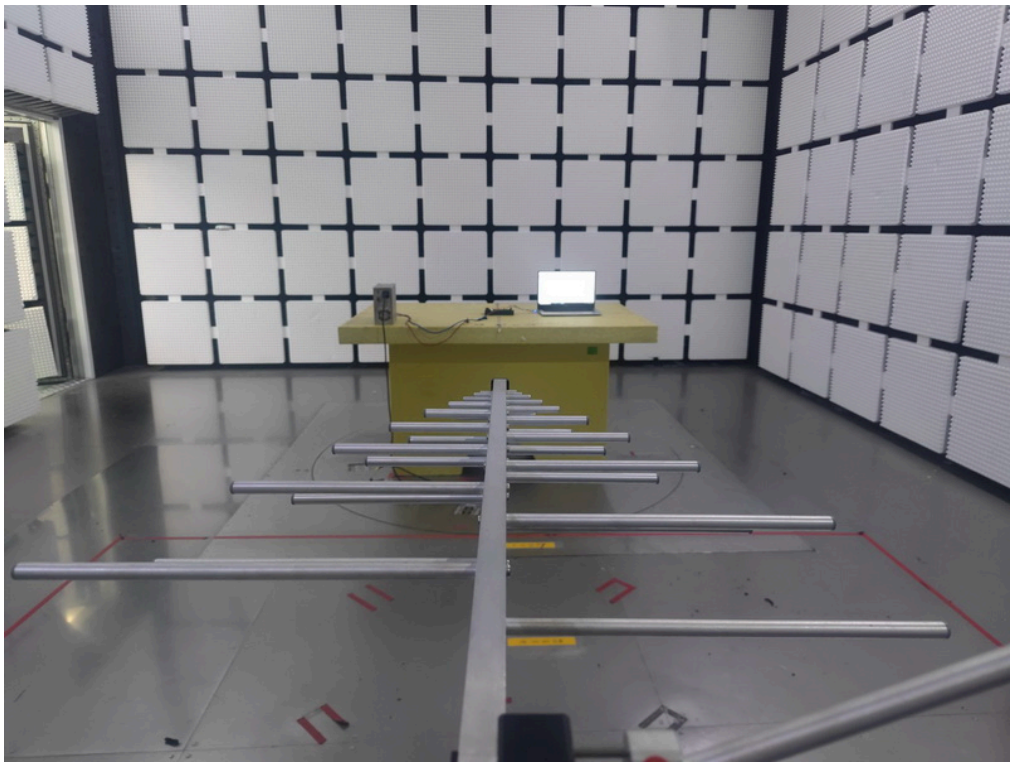




Radiated Emissions Test Photos

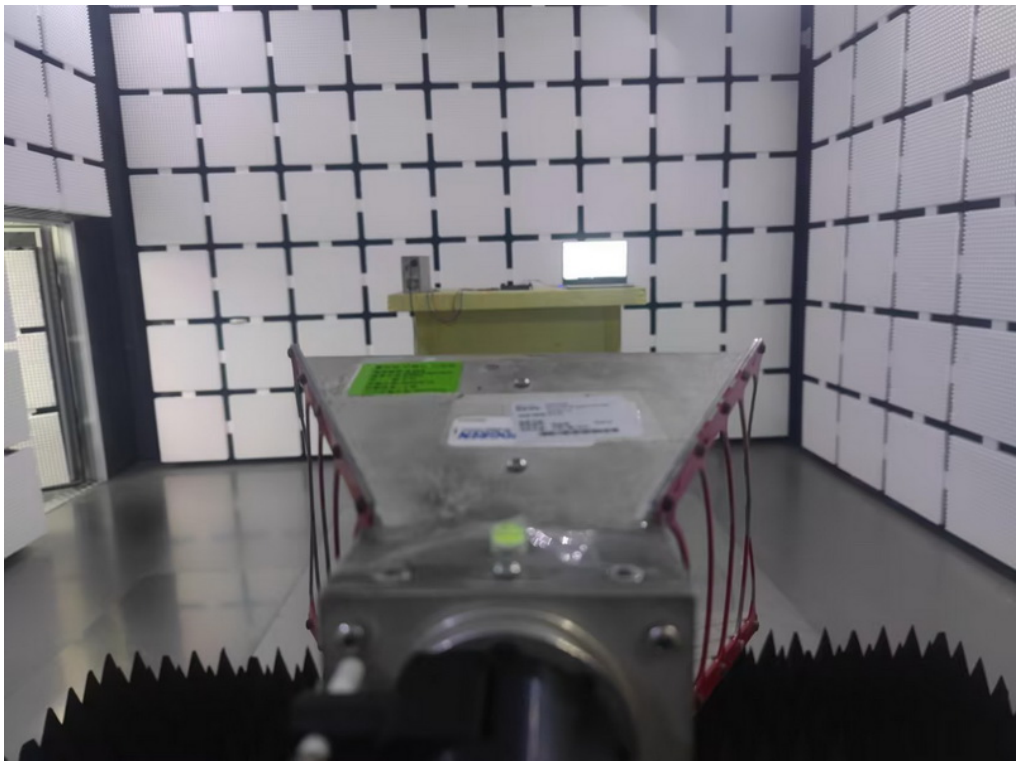
30 MHz to 1000 MHz

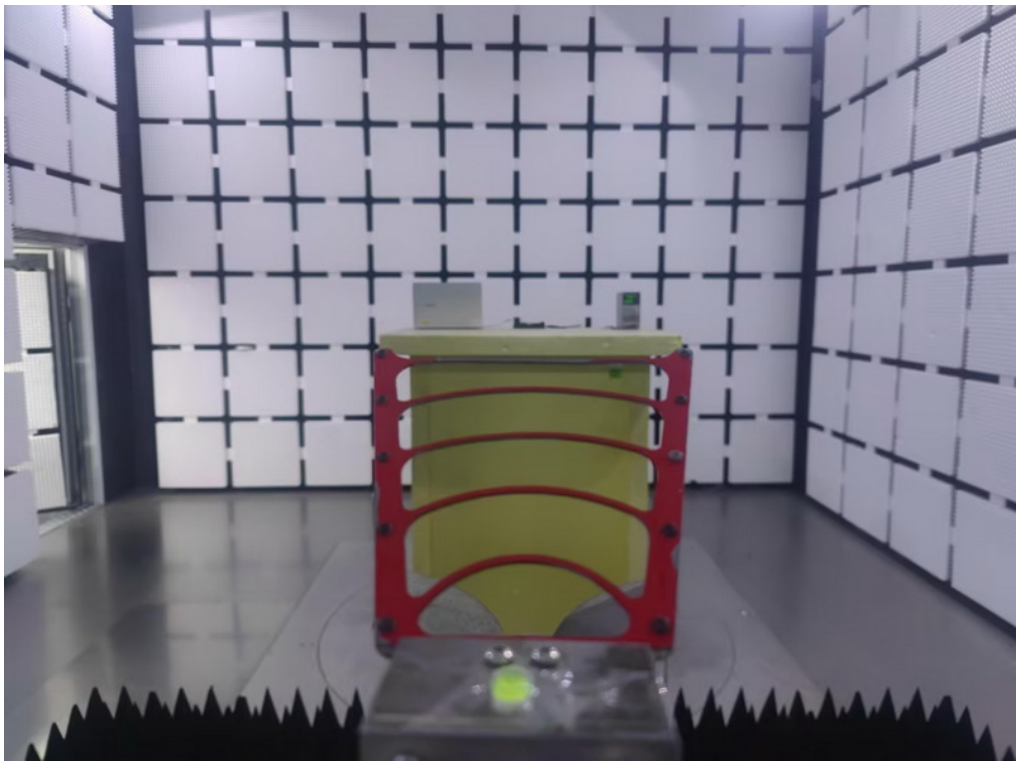




Radiated Emissions Test Photos

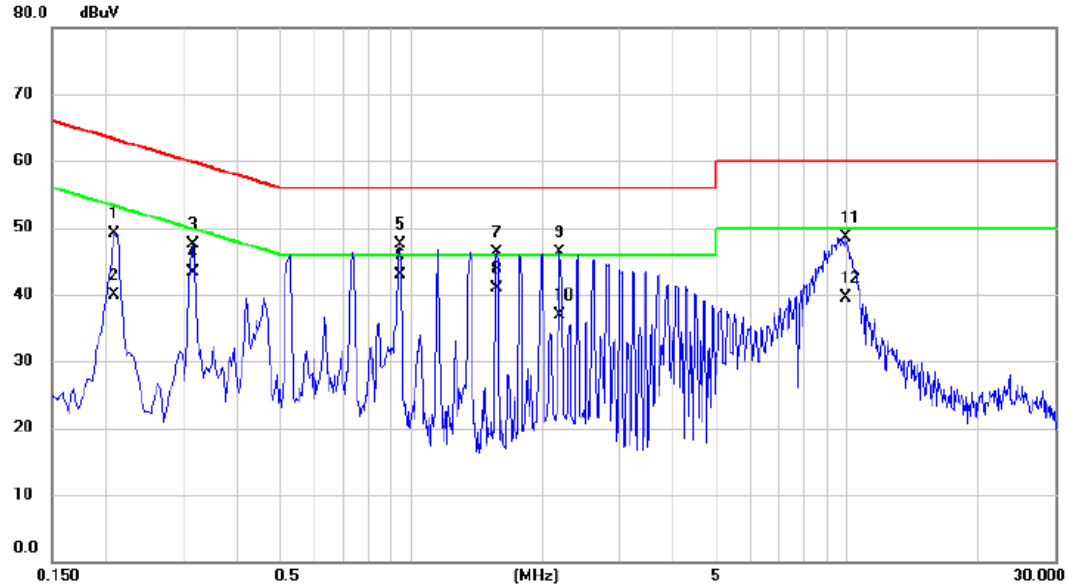
Above 1 GHz
Band edge & Harmonic (1 GHz to 10 GHz)





APPENDIX A - AC POWER LINE CONDUCTED EMISSIONS

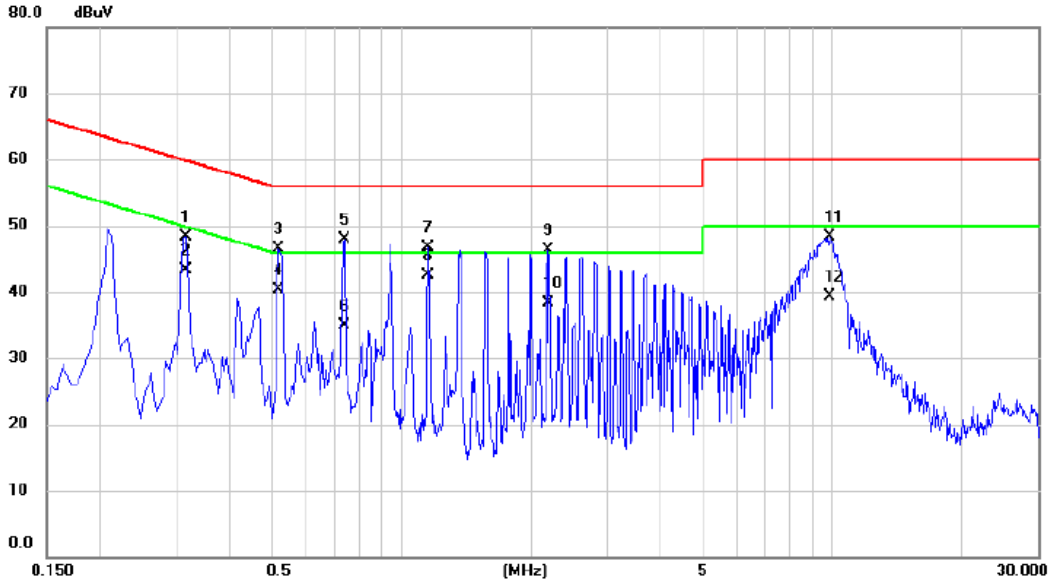
Test Mode	TX Mode_ Channel 01	Phase	Line



No.	Mk.	Freq.	Reading Level	Correct Factor	Measure-ment	Limit	Margin		
		MHz	dBuV	dB	dBuV	dBuV	dB	Detector	Comment
1		0.2085	39.30	9.74	49.04	63.26	-14.22	QP	
2		0.2085	30.10	9.74	39.84	53.26	-13.42	AVG	
3		0.3165	37.80	9.77	47.57	59.80	-12.23	QP	
4		0.3165	33.50	9.77	43.27	49.80	-6.53	AVG	
5		0.9420	37.74	9.81	47.55	56.00	-8.45	QP	
6	*	0.9420	33.00	9.81	42.81	46.00	-3.19	AVG	
7		1.5720	36.51	9.84	46.35	56.00	-9.65	QP	
8		1.5720	31.10	9.84	40.94	46.00	-5.06	AVG	
9		2.1840	36.42	9.86	46.28	56.00	-9.72	QP	
10		2.1840	27.10	9.86	36.96	46.00	-9.04	AVG	
11		9.9285	37.99	10.59	48.58	60.00	-11.42	QP	
12		9.9285	28.90	10.59	39.49	50.00	-10.51	AVG	

REMARKS:
(1) Measurement Value = Reading Level + Correct Factor.
(2) Margin Level = Measurement Value - Limit Value.

Test Mode	TX Mode_ Channel 01	Phase	Neutral

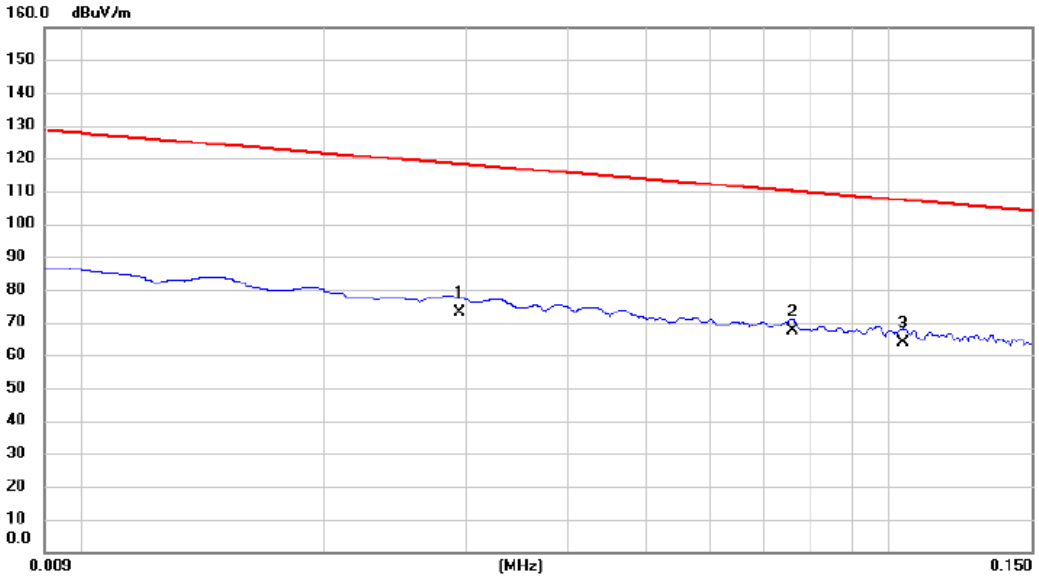


No.	Mk.	Freq.	Reading Level	Correct Factor	Measure-ment	Limit	Margin		
		MHz	dBuV	dB	dBuV	dBuV	dB	Detector	Comment
1		0.3165	38.71	9.63	48.34	59.80	-11.46	QP	
2		0.3165	33.70	9.63	43.33	49.80	-6.47	AVG	
3		0.5190	36.86	9.65	46.51	56.00	-9.49	QP	
4		0.5190	30.60	9.65	40.25	46.00	-5.75	AVG	
5		0.7395	38.15	9.67	47.82	56.00	-8.18	QP	
6		0.7395	25.20	9.67	34.87	46.00	-11.13	AVG	
7		1.1535	37.04	9.68	46.72	56.00	-9.28	QP	
8	*	1.1535	32.80	9.68	42.48	46.00	-3.52	AVG	
9		2.1975	36.68	9.71	46.39	56.00	-9.61	QP	
10		2.1975	28.60	9.71	38.31	46.00	-7.69	AVG	
11		9.8565	37.77	10.44	48.21	60.00	-11.79	QP	
12		9.8565	28.90	10.44	39.34	50.00	-10.66	AVG	

REMARKS:
(1) Measurement Value = Reading Level + Correct Factor.
(2) Margin Level = Measurement Value - Limit Value.

APPENDIX B - RADIATED EMISSION - 9 KHZ TO 30 MHZ

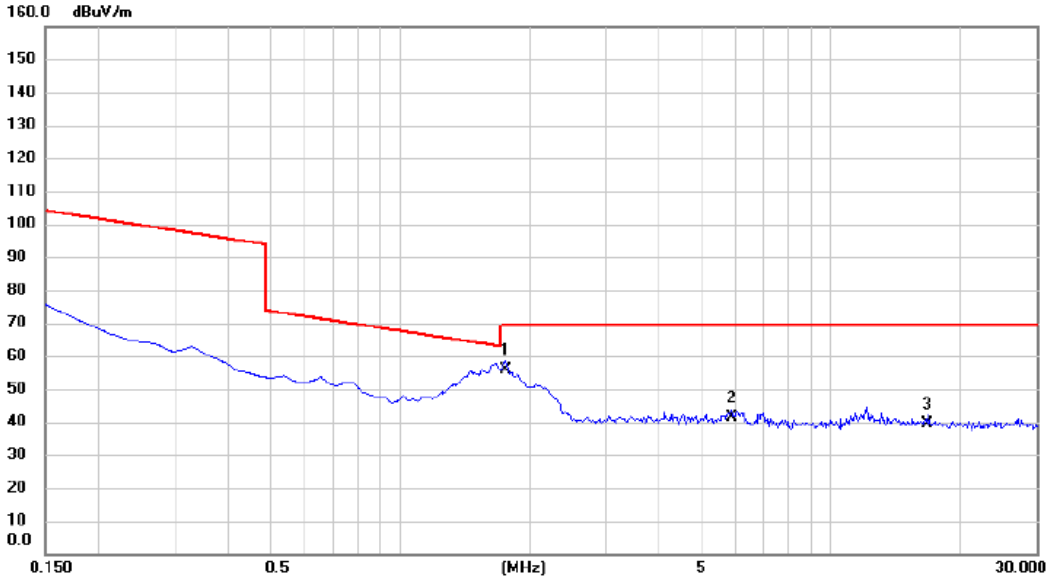
Test Mode	TX Mode_ Channel 01	Polarization	Ant 0°



No.	Mk.	Freq.	Reading Level	Correct Factor	Measure-ment	Limit	Margin		
		MHz	dBuV	dB	dBuV/m	dBuV/m	dB	Detector	Comment
1		0.0294	52.06	21.11	73.17	118.24	-45.07	AVG	
2	*	0.0758	46.03	21.32	67.35	110.01	-42.66	AVG	
3		0.1042	42.68	21.32	64.00	107.25	-43.25	QP	

REMARKS:
(1) Measurement Value = Reading Level + Correct Factor.
(2) Margin Level = Measurement Value - Limit Value.

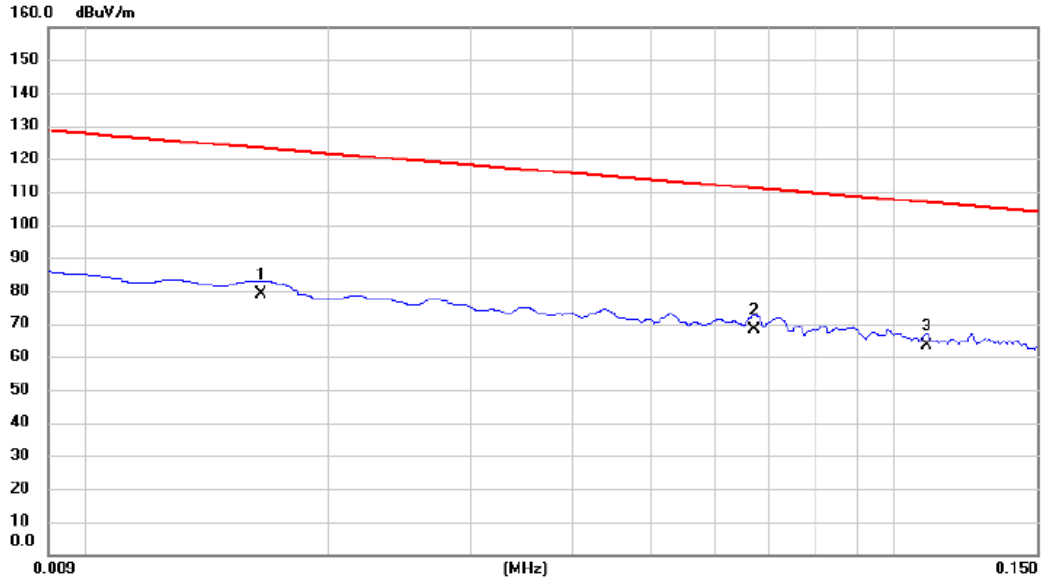
Test Mode	TX Mode_ Channel 01	Polarization	Ant 0°



No.	Mk.	Freq.	Reading Level	Correct Factor	Measure-ment	Limit	Margin		
		MHz	dBuV	dB	dBuV/m	dBuV/m	dB	Detector	Comment
1	*	1.7620	34.69	21.12	55.81	69.54	-13.73	QP	
2		5.8812	20.36	21.16	41.52	69.54	-28.02	QP	
3		16.7466	18.26	21.28	39.54	69.54	-30.00	QP	

REMARKS:
(1) Measurement Value = Reading Level + Correct Factor.
(2) Margin Level = Measurement Value - Limit Value.

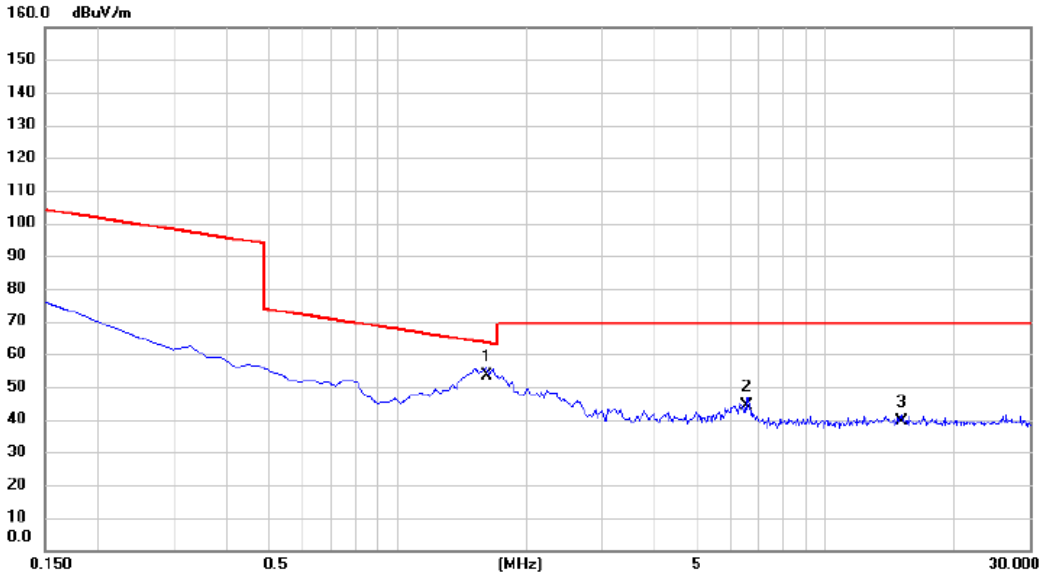
Test Mode	TX Mode_ Channel 01	Polarization	Ant 90°



No.	Mk.	Freq.	Reading Level	Correct Factor	Measure-ment	Limit	Margin		
		MHz	dBuV	dB	dBuV/m	dBuV/m	dB	Detector	Comment
1		0.0165	58.36	20.73	79.09	123.26	-44.17	AVG	
2	*	0.0672	46.89	21.29	68.18	111.06	-42.88	AVG	
3		0.1095	42.06	21.32	63.38	106.82	-43.44	QP	

REMARKS:
(1) Measurement Value = Reading Level + Correct Factor.
(2) Margin Level = Measurement Value - Limit Value.

Test Mode	TX Mode_ Channel 01	Polarization	Ant 90°

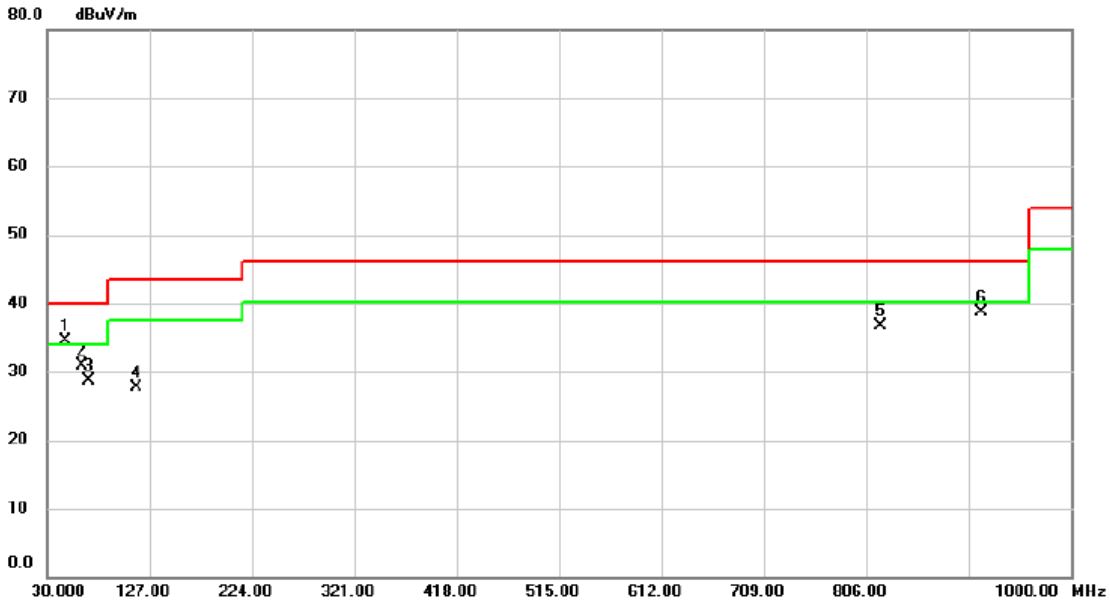


No.	Mk.	Freq.	Reading Level	Correct Factor	Measure-ment	Limit	Margin		
		MHz	dBuV	dB	dBuV/m	dBuV/m	dB	Detector	Comment
1	*	1.6126	32.16	21.14	53.30	63.45	-10.15	QP	
2		6.5678	23.06	21.17	44.23	69.54	-25.31	QP	
3		15.0153	18.03	21.23	39.26	69.54	-30.28	QP	

REMARKS:
(1) Measurement Value = Reading Level + Correct Factor.
(2) Margin Level = Measurement Value - Limit Value.

APPENDIX C - RADIATED EMISSION - 30 MHZ TO 1000 MHZ

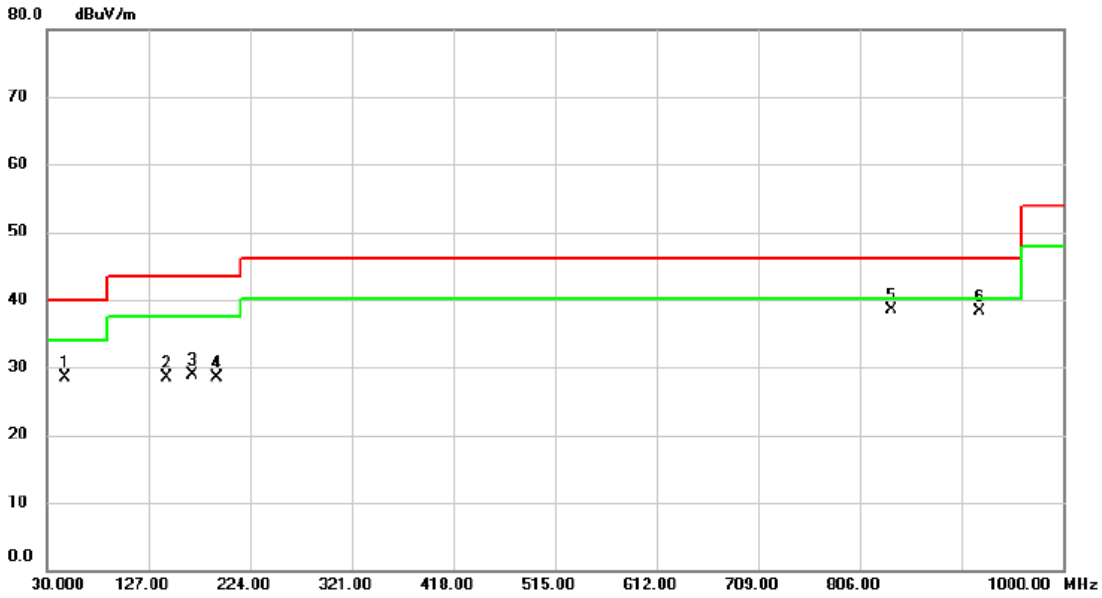
Test Mode	TX Mode_ Channel 01	Polarization	Vertical



No.	Mk.	Freq.	Reading Level	Correct Factor	Measure-ment	Limit	Margin		
		MHz	dBuV	dB	dBuV/m	dBuV/m	dB	Detector	Comment
1	*	47.945	45.75	-11.27	34.48	40.00	-5.52	peak	
2		63.465	43.38	-12.45	30.93	40.00	-9.07	peak	
3		69.285	42.00	-13.39	28.61	40.00	-11.39	peak	
4		114.875	41.36	-13.73	27.63	43.52	-15.89	peak	
5		819.095	37.66	-0.92	36.74	46.02	-9.28	peak	
6		915.610	38.29	0.37	38.66	46.02	-7.36	peak	

REMARKS:
(1) Measurement Value = Reading Level + Correct Factor.
(2) Margin Level = Measurement Value - Limit Value.

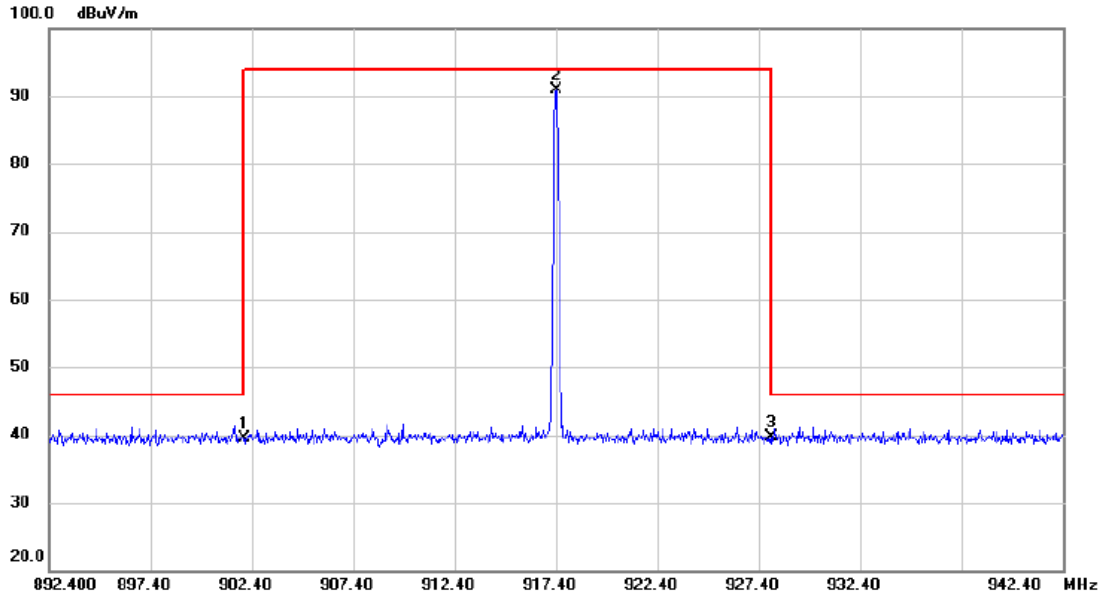
Test Mode	TX Mode_ Channel 01	Polarization	Horizontal



No.	Mk.	Freq.	Reading Level	Correct Factor	Measure-ment	Limit	Margin		
		MHz	dBuV	dB	dBuV/m	dBuV/m	dB	Detector	Comment
1		47.945	39.69	-11.27	28.42	40.00	-11.58	peak	
2		144.460	39.87	-11.46	28.41	43.52	-15.11	peak	
3		168.710	40.02	-11.20	28.82	43.52	-14.70	peak	
4		192.475	42.61	-14.02	28.59	43.52	-14.93	peak	
5	*	836.555	39.04	-0.61	38.43	46.02	-7.59	peak	
6		920.945	37.89	0.40	38.29	46.02	-7.73	peak	

REMARKS:
(1) Measurement Value = Reading Level + Correct Factor.
(2) Margin Level = Measurement Value - Limit Value.

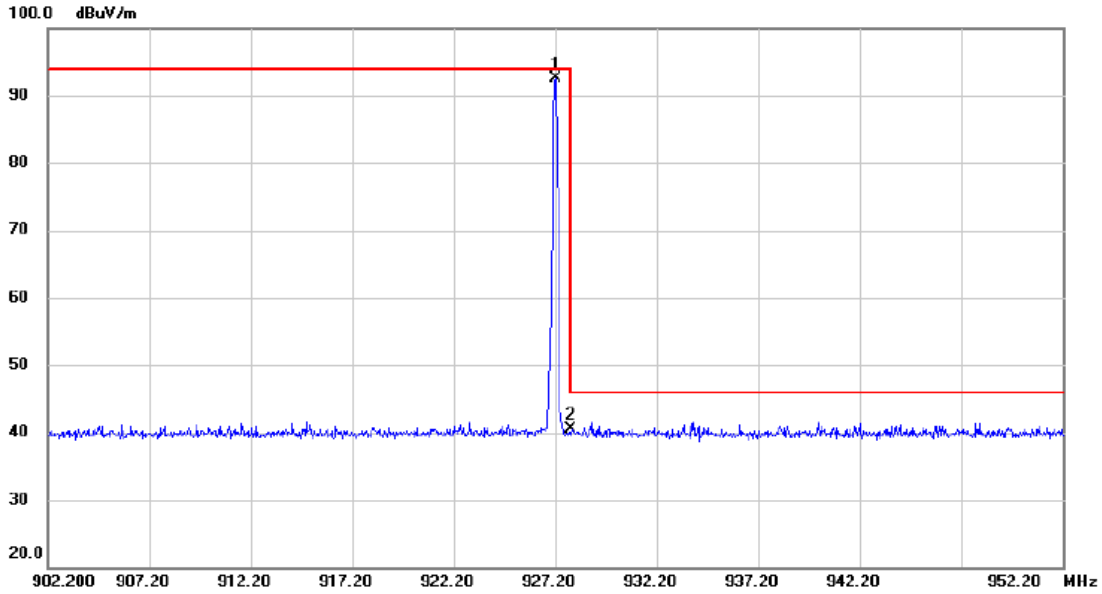
Test Mode	TX 917.4 MHz _CH01	Polarization	Horizontal



No.	Mk.	Freq.	Reading Level	Correct Factor	Measure-ment	Limit	Margin		
		MHz	dBuV	dB	dBuV/m	dBuV/m	dB	Detector	Comment
1		902.000	29.29	10.31	39.60	46.00	-6.40	peak	
2	*	917.400	80.53	10.38	90.91	94.00	-3.09	peak	No Limit
3		928.000	29.21	10.43	39.64	46.00	-6.36	peak	

REMARKS:
(1) Measurement Value = Reading Level + Correct Factor.
(2) Margin Level = Measurement Value - Limit Value.

Test Mode	TX 927.2 MHz _CH50	Polarization	Horizontal

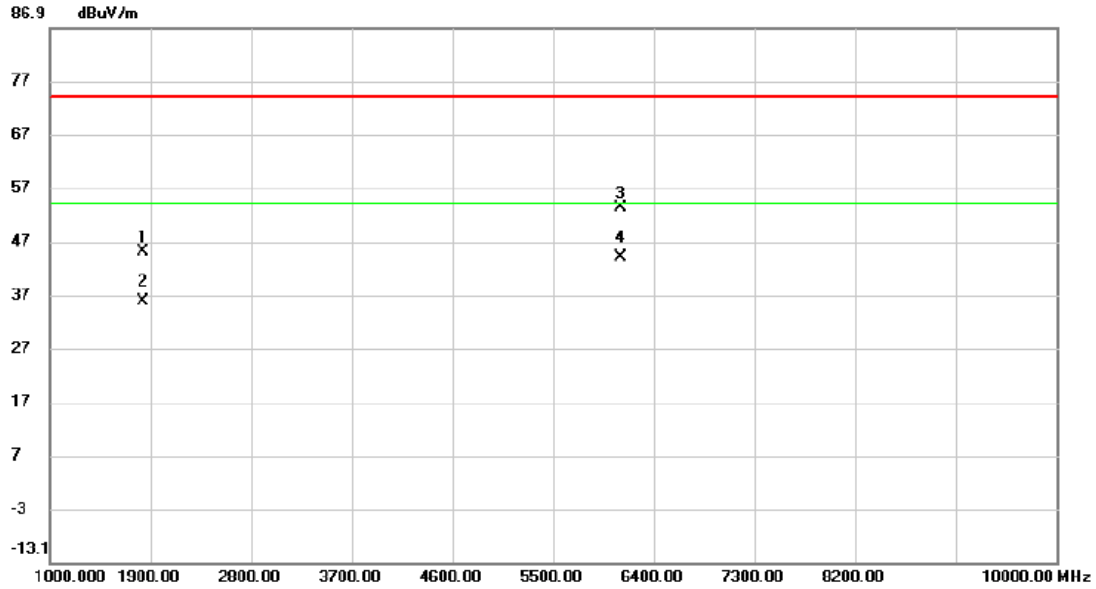


No.	Mk.	Freq.	Reading Level	Correct Factor	Measure-ment	Limit	Margin		
		MHz	dBuV	dB	dBuV/m	dBuV/m	dB	Detector	Comment
1	*	927.200	81.99	10.43	92.42	94.00	-1.58	peak	No Limit
2		928.000	29.99	10.43	40.42	46.00	-5.58	peak	

REMARKS:
(1) Measurement Value = Reading Level + Correct Factor.
(2) Margin Level = Measurement Value - Limit Value.

APPENDIX D - RADIATED EMISSION - ABOVE 1000 MHZ

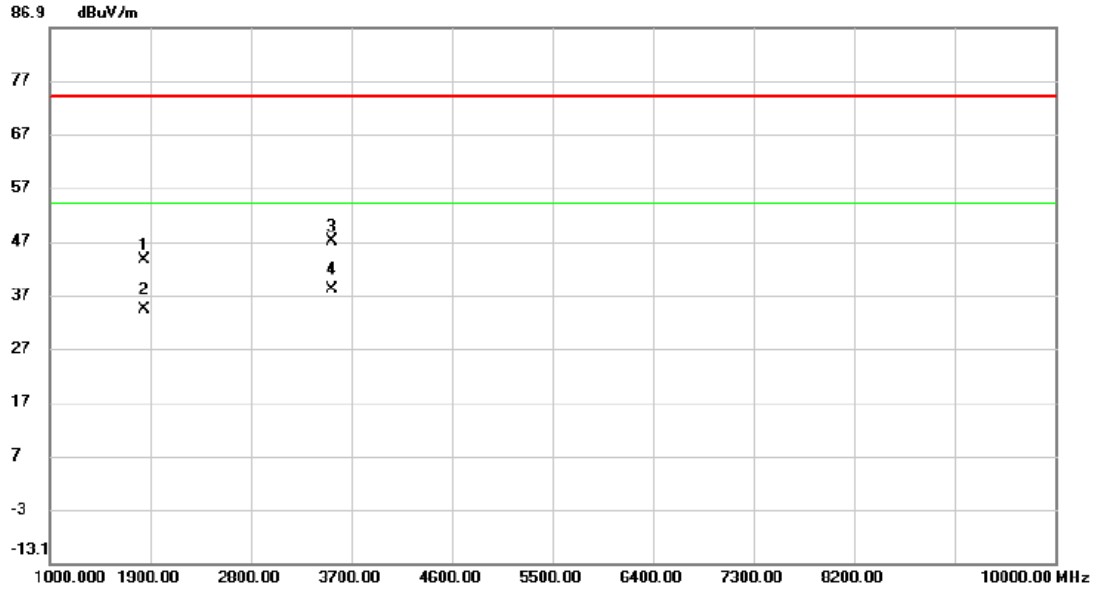
Test Mode	TX 917.4 MHz _CH01	Polarization	Horizontal



No.	Mk.	Freq.	Reading Level	Correct Factor	Measure-ment	Limit	Margin		
		MHz	dBuV	dB	dBuV/m	dBuV/m	dB	Detector	Comment
1		1837.000	48.75	-3.77	44.98	74.00	-29.02	peak	
2		1837.000	39.55	-3.77	35.78	54.00	-18.22	AVG	
3		6103.000	47.25	6.05	53.30	74.00	-20.70	peak	
4	*	6103.000	37.95	6.05	44.00	54.00	-10.00	AVG	

REMARKS:
(1) Measurement Value = Reading Level + Correct Factor.
(2) Margin Level = Measurement Value - Limit Value.

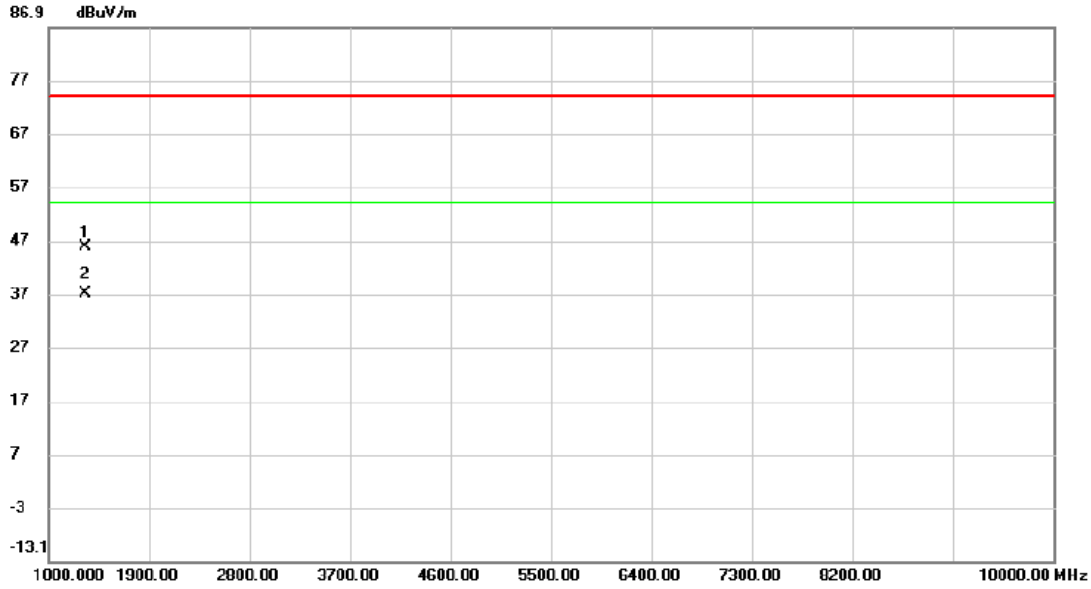
Test Mode	TX 922.4 MHz _CH26	Polarization	Horizontal



No.	Mk.	Freq.	Reading Level	Correct Factor	Measure-ment	Limit	Margin		
		MHz	dBuV	dB	dBuV/m	dBuV/m	dB	Detector	Comment
1		1846.000	47.22	-3.72	43.50	74.00	-30.50	peak	
2		1846.000	38.04	-3.72	34.32	54.00	-19.68	AVG	
3		3524.500	46.16	0.76	46.92	74.00	-27.08	peak	
4	*	3524.500	37.26	0.76	38.02	54.00	-15.98	AVG	

REMARKS:
(1) Measurement Value = Reading Level + Correct Factor.
(2) Margin Level = Measurement Value - Limit Value.

Test Mode	TX 927.2 MHz _CH50	Polarization	Horizontal



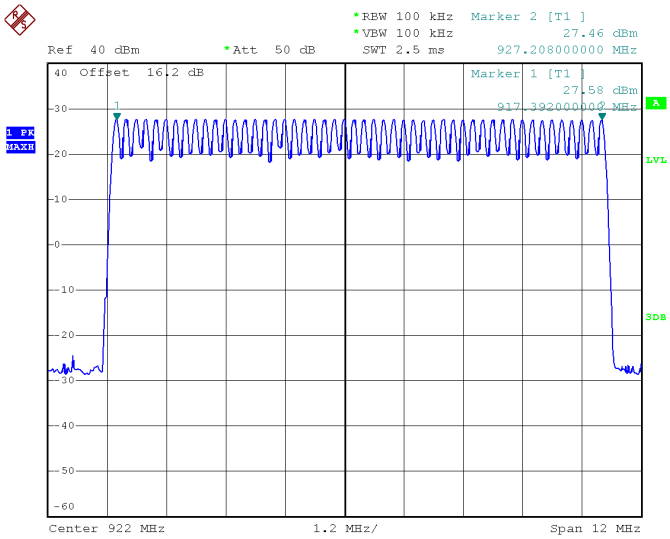
No.	Mk.	Freq.	Reading Level	Correct Factor	Measure-ment	Limit	Margin		
		MHz	dBuV	dB	dBuV/m	dBuV/m	dB	Detector	Comment
1		1333.000	52.30	-6.58	45.72	74.00	-28.28	peak	
2	*	1333.000	43.50	-6.58	36.92	54.00	-17.08	AVG	

REMARKS:
(1) Measurement Value = Reading Level + Correct Factor.
(2) Margin Level = Measurement Value - Limit Value.

APPENDIX E - NUMBER OF HOPPING FREQUENCY

Test Mode:	TX Mode

Test Mode	Hopping Mode	Limit	Test Result
Number of Hopping Frequency	50	≥50	Pass



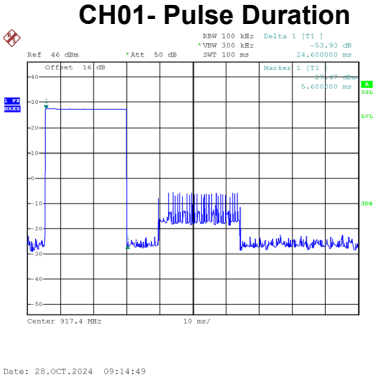
Date: 24.OCT.2024 18:50:50

APPENDIX F - AVERAGE TIME OF OCCUPANCY

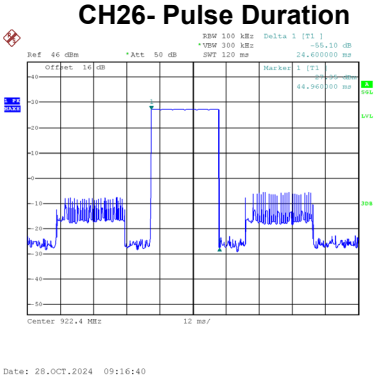
Test Mode	Hopping Mode

Channel	Frequency (MHz)	Pulse Duration (ms)	Dwell Time (s)	Limits (s)	Test Result
01	917.4	24.60	0.2460	0.4000	Pass
26	922.4	24.60	0.2460	0.4000	Pass
50	927.2	24.60	0.2460	0.4000	Pass

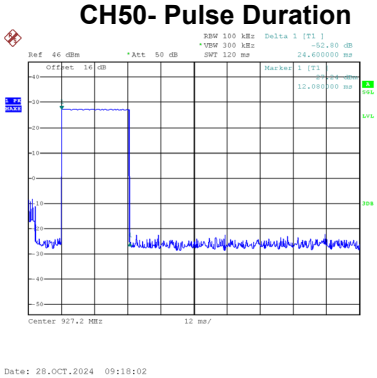
CH01- Pulse Duration



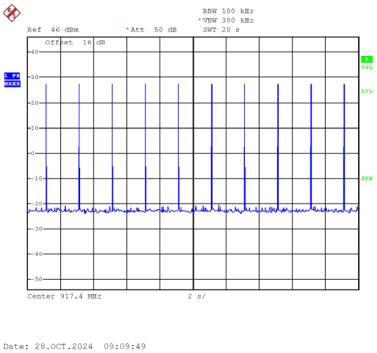
CH26- Pulse Duration



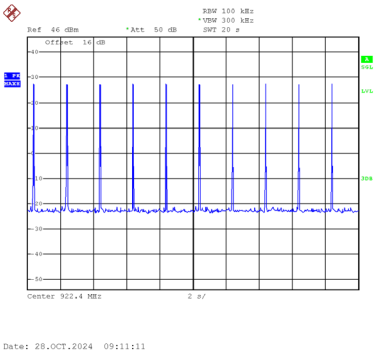
CH50- Pulse Duration



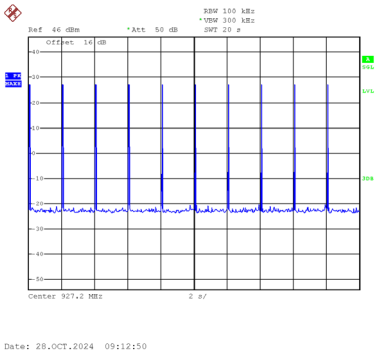
CH01- Dwell Time



CH26- Dwell Time



CH50- Dwell Time

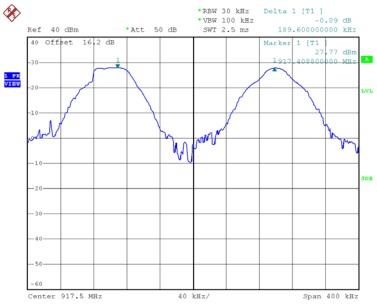


APPENDIX G - HOPPING CHANNEL SEPARATION

Test Mode	Hopping Mode

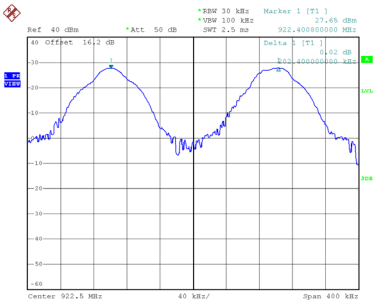
Channel	Frequency (MHz)	Channel Separation (kHz)	20 dB Bandwidth (kHz)	Test Result
01	917.4	189.60	71.40	Pass
26	922.4	202.40	72.00	Pass
50	927.2	200.80	70.20	Pass

CH01



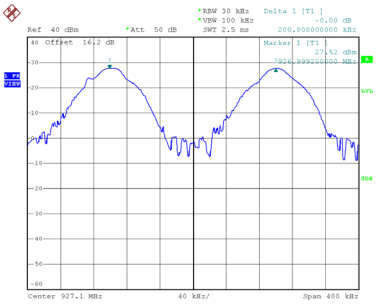
Date: 24.OCT.2024 19:02:06

CH26



Date: 24.OCT.2024 19:03:29

CH50



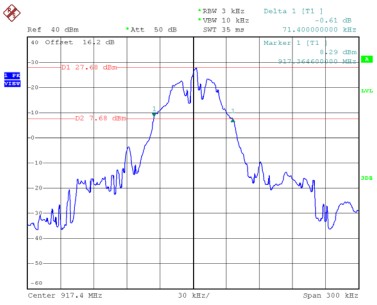
Date: 24.OCT.2024 19:04:49

APPENDIX H - BANDWIDTH

Test Mode	TX Mode

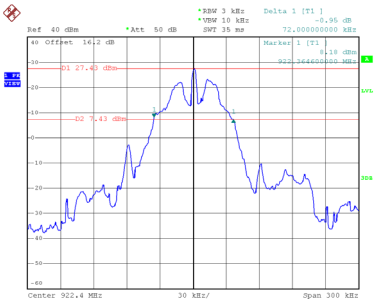
Channel	Frequency (MHz)	20 dB Bandwidth (kHz)	Test Result
01	917.4	71.40	Pass
26	922.4	72.00	Pass
50	927.2	70.20	Pass

CH01



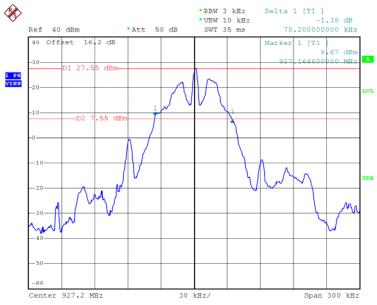
Date: 24.OCT.2024 19:08:35

CH26



Date: 24.OCT.2024 19:09:44

CH50



Date: 24.OCT.2024 19:10:52

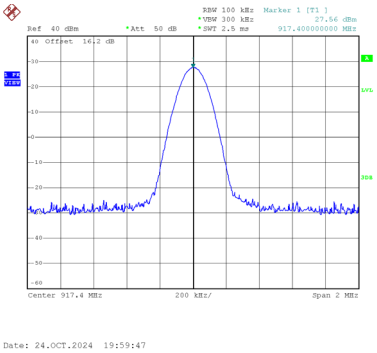
APPENDIX I - MAXIMUM OUTPUT POWER

Test Mode	TX Mode

Channel	Frequency (MHz)	Output Power (dBm)	Max. Limit (dBm)	Max. Limit (W)	Test Result
01	917.4	27.56	30.00	1.0000	Pass
26	922.4	27.34	30.00	1.0000	Pass
50	927.2	27.33	30.00	1.0000	Pass

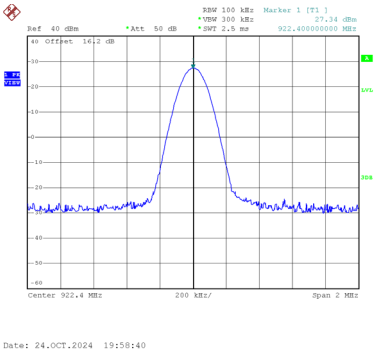
Note: Output power = Measure result + Cable loss

CH01



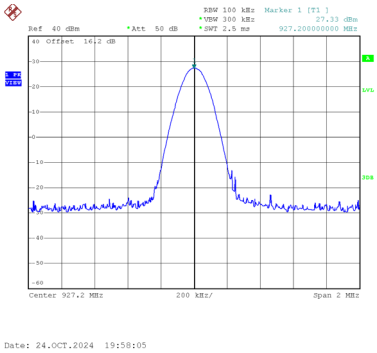
Date: 24.OCT.2024 19:59:47

CH26



Date: 24.OCT.2024 19:58:40

CH50

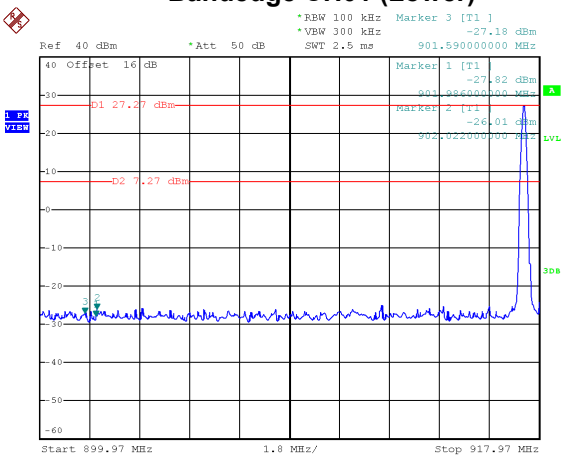


Date: 24.OCT.2024 19:58:05

APPENDIX J - CONDUCTED SPURIOUS EMISSION

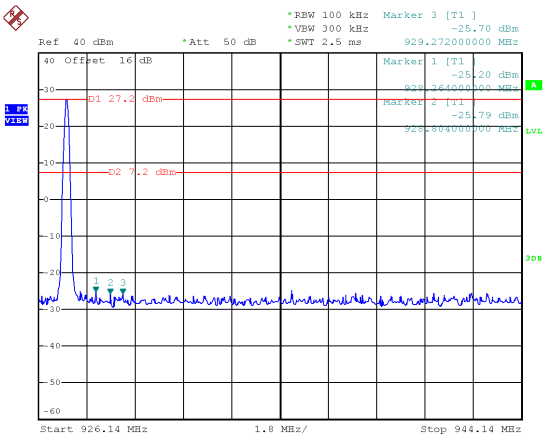
Test Mode	TX Mode

Bandedge CH01 (Lower)



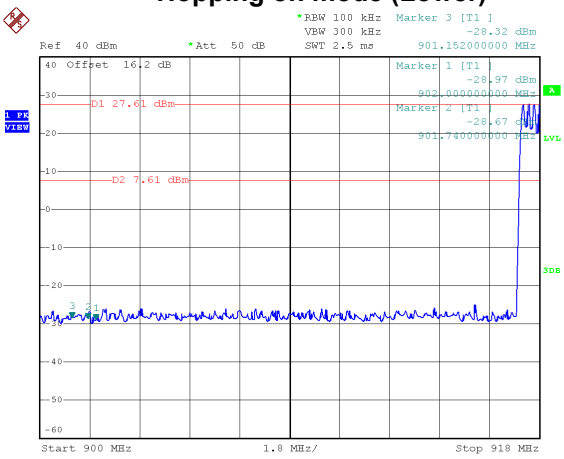
Date: 28.OCT.2024 08:49:50

Bandedge CH50 (Upper)



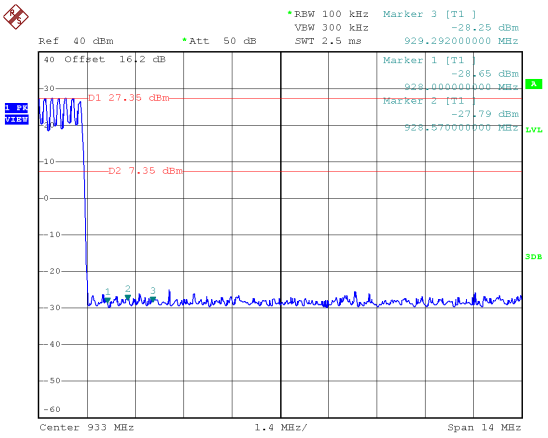
Date: 28.OCT.2024 08:56:37

Hopping on mode (Lower)



Date: 24.OCT.2024 20:33:30

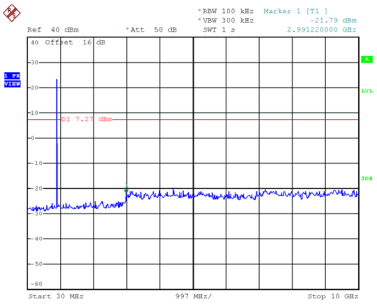
Hopping on mode (Upper)



Date: 24.OCT.2024 20:35:43

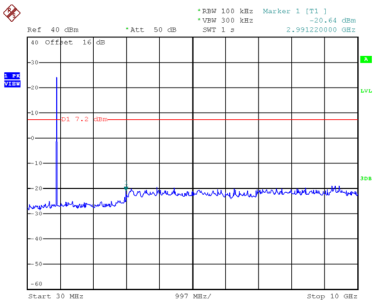
10th Harmonic of the fundamental frequency

CH01



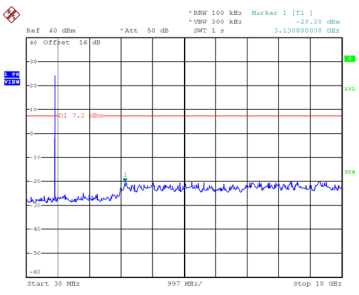
Date: 8.NOV.2024 18:53:33

CH26



Date: 8.NOV.2024 18:54:39

CH50



Date: 8.NOV.2024 18:55:15

End of Test Report