Certificate #7130.01

FCC Radio Test Report

FCC ID: G95OWM7111

This report concerns: Original Grant

Project No.	:	2406C089B
Equipment	:	IoT gateway
Brand Name	:	Vantiva
Test Model	:	OWM7111IOT
Series Model	:	OWM7111IOT1
Applicant	:	Vantiva USA LLC
Address	:	4855 Peachtree Industrial Blvd. Suite 200 Norcross, Georgia 30092
Manufacturer	:	Vantiva USA LLC
Address	:	4855 Peachtree Industrial Blvd. Suite 200 Norcross, Georgia 30092
Factory	:	FUHONG PRECISION COMPONENT (BAC GIANG) COMPANY LIMITED
Address	:	Dinh Tram Industrial Zone.Nenh Ward Viet Yen Town.Bac Giang Province. Vietnam
Date of Receipt	:	Jun. 25, 2024
Date of Test	:	Jun. 25, 2024 ~ Aug. 28, 2024
Issued Date	:	Sep. 27, 2024
Report Version	:	R00
Test Sample	:	Engineering Sample No.: DG2024062512 and DG2024081298 for radiated, DG2024062512 for AC conducted power line emission, DG2024062515 for power and conducted
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 : Antony Liang

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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.

Table of Contents Page

Table of Contents Page

Table of Contents Page

REPORT ISSUED HISTORY

Report No.	Version	Description	Issued Date	Note
BTL-FCCP-7-2406C089B	R00	Original Report.	Sep. 27, 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 Emissions	APPENDIX B APPENDIX C APPENDIX D	PASS	------
15.247(a)(2)	Bandwidth	APPENDIX E	PASS	------
15.247(b)(3)	Maximum Output Power	APPENDIX F	PASS	------
15.247(d)	Conducted Spurious Emission	APPENDIX G	PASS	------
15.247(e)	Power Spectral Density	APPENDIX H	PASS	------
15.203	Antenna Requirement	------	PASS	**Note(2)**

Note:
(1) “N/A” denotes test is not applicable to this device.
(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 No.3, Jinshagang 1st Road, Dalang, 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 Measurement:

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

B. Radiated emissions Measurement:

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
Bandwidth	0.90 %
Maximum Output Power	1.3 dB
Conducted Spurious Emission	1.9 dB
Power Spectral Density	1.4 dB
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	25°C	60%	AC 120V/60Hz	Hayden Chen	Jul. 17, 2024
Radiated Emissions-9 kHz to 30 MHz	23°C	46%	AC 120V/60Hz	Hayden Chen	Aug. 05, 2024
Radiated Emissions-30 MHz to 1000 MHz	23°C	54%	AC 120V/60Hz	Jensen Zhou	Aug. 17, 2024
Radiated Emissions-Above 1000 MHz	24°C	53%	AC 120V/60Hz	Allen Tong	Aug. 23, 2024
Bandwidth	22°C	57%	PoE 54V	Parker Yang	Aug. 20, 2024
	23°C	58%	PoE 54V	Parker Yang	Aug. 23, 2024
Maximum Output Power	22°C	57%	PoE 54V	Parker Yang	Aug. 20, 2024
	23°C	58%	PoE 54V	Parker Yang	Aug. 23, 2024
Conducted Spurious Emission	22°C	57%	PoE 54V	Parker Yang	Aug. 20, 2024
	23°C	58%	PoE 54V	Parker Yang	Aug. 23, 2024
Power Spectral Density	22°C	57%	PoE 54V	Parker Yang	Aug. 20, 2024
	23°C	58%	PoE 54V	Parker Yang	Aug. 23, 2024

3. GENERAL INFORMATION

3.1 GENERAL DESCRIPTION OF EUT

Equipment	IoT gateway
Brand Name	Vantiva
Test Model	OWM7111IOT
Series Model	OWM7111IOT1
Model Difference(s)	Indoor access point device model: OWM7111IOT Outdoor access point device model : OWM7111IOT1
Software Version	5043_OWM7111IOT_FSW_V07
Hardware Version	FGR
Power Source	DC Voltage supplied from PoE Power Supply. Model: ADP-46PH-54-2- 54046EPCU
Power Rating	INPUT: 100-240V~ 50/60Hz OUTPUT: 54.0V⎓0.85A
Operation Frequency Band	903MHz - 914.2MHz
EUT Frequencies Measured	903MHz, 908.7 MHz, 914.2MHz
Modulation Type	LoRa
Bit Rate of Transmitter	500Kbps
Max. Output Power	500Kbps: 21.53 dBm (0.1422 W)

Note:

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

2. Table for Filed Antenna:

Ant.	Brand	IPN	Antenna Type	Connector	Gain (dBi)
1	Vantiva	6338358D	PCB	N/A	2.40

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_Bottom Channel; Frequency: 903 MHz
Mode 2	TX Mode_Middle Channel; Frequency: 908.7 MHz
Mode 3	TX Mode_Top Channel; Frequency: 914.2 MHz

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_Middle Channel; Frequency: 908.7 MHz

Radiated emissions test - Below 1GHz	
Final Test Mode	Description
Mode 2	TX Mode_Middle Channel; Frequency: 908.7 MHz

Radiated emissions test - Above 1GHz	
Final Test Mode	Description
Mode 1	TX Mode_Bottom Channel; Frequency: 903 MHz
Mode 2	TX Mode_Middle Channel; Frequency: 908.7 MHz
Mode 3	TX Mode_Top Channel; Frequency: 914.2 MHz

Conducted test	
Final Test Mode	Description
Mode 1	TX Mode_Bottom Channel; Frequency: 903 MHz
Mode 2	TX Mode_Middle Channel; Frequency: 908.7 MHz
Mode 3	TX Mode_Top Channel; Frequency: 914.2 MHz

Note:

(1) For radiated emission above 1 GHz test, the spurious points of 1GHz~26.5GHz 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 emissions below 1 GHz test, the Middle Channel; Frequency: 908.7 MHz is found to be the worst case and recorded.

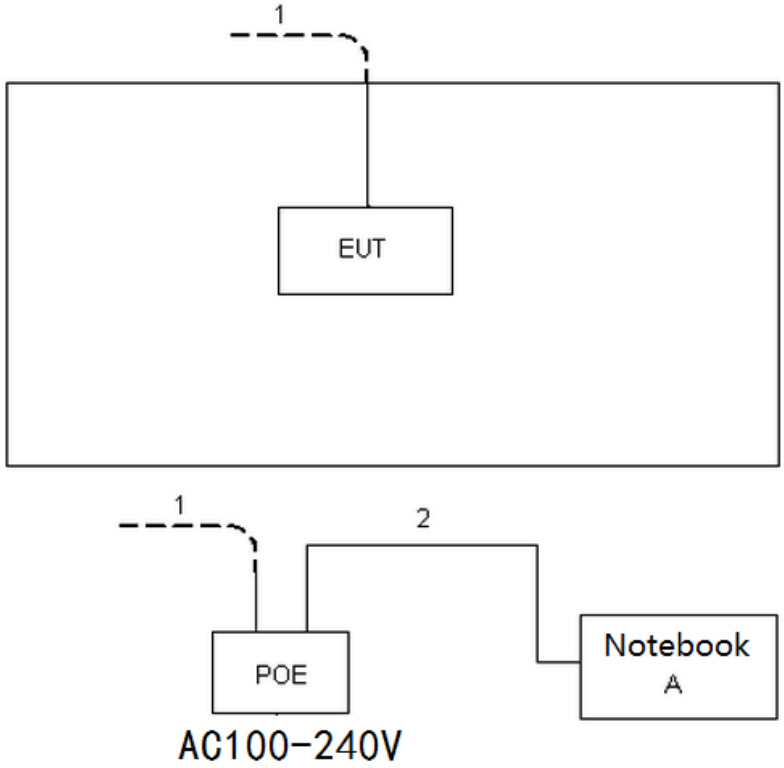
(3) For radiated emission above 1 GHz test: The polarization of Vertical and Horizontal are evaluated, the worst case is recorded.

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	IPOP V4.1		
Frequency (MHz)	903	908.7	914.2
--	M	N	N

3.4 BLOCK DIAGRAM SHOWING THE CONFIGURATION OF SYSTEM TESTED



3.5 SUPPORT UNITS

Item	Equipment	Brand	Model No.	Series No.
A	Notebook	Dell	Inspiron 15-7559	N/A

Item	Cable Type	Shielded Type	Ferrite Core	Length
1	RJ45 Cable	NO	NO	10m
2	RJ45 Cable	NO	NO	1m

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.
(3) The test result calculated as following:
Measurement Value = Reading Level + Correct Factor
Correct Factor = Insertion Loss + Cable Loss + Attenuator Factor (if use)
Margin Level = Measurement Value – Limit Value

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.

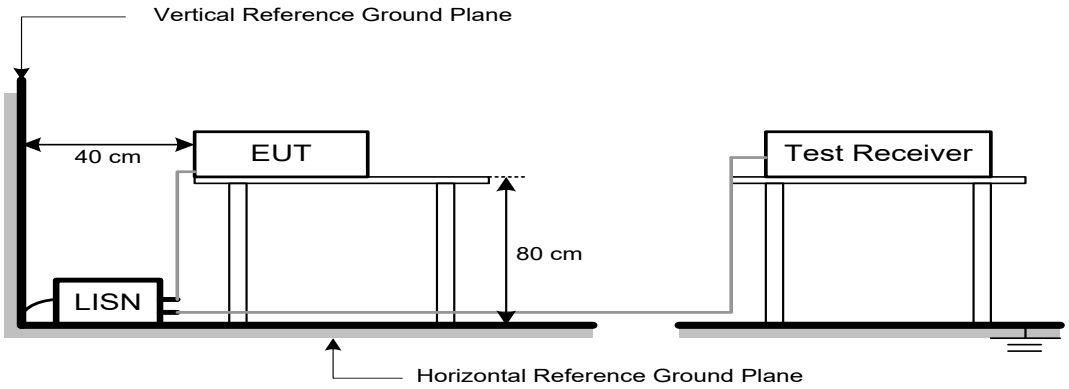
The following table is the setting of the receiver:

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 fashion (as a customer would normally use it). The EUT has been programmed to continuously transmit during test. This operating condition was tested and used to collect the included data.

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)	Band edge/ Harmonic at 3m (dBμV/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 1GHz)
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

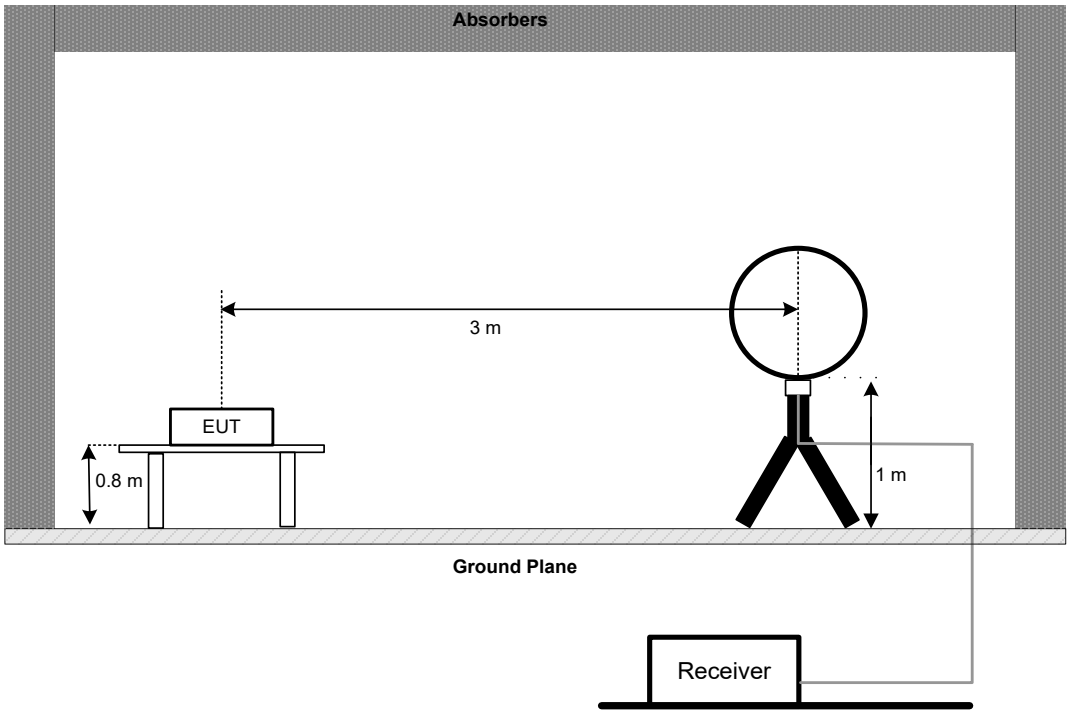
Spectrum Parameters	Setting
Start ~ Stop Frequency	9 kHz~90 kHz for PK/AVG detector
Start ~ Stop Frequency	90 kHz~110 kHz for QP detector
Start ~ Stop Frequency	110 kHz~490 kHz for PK/AVG detector
Start ~ Stop Frequency	490 kHz~30 MHz for QP detector
Start ~ Stop Frequency	30 MHz~1000 MHz for QP detector
Start ~ Stop Frequency	1 GHz~26.5 GHz for PK/AVG detector

5.3 DEVIATION FROM TEST STANDARD

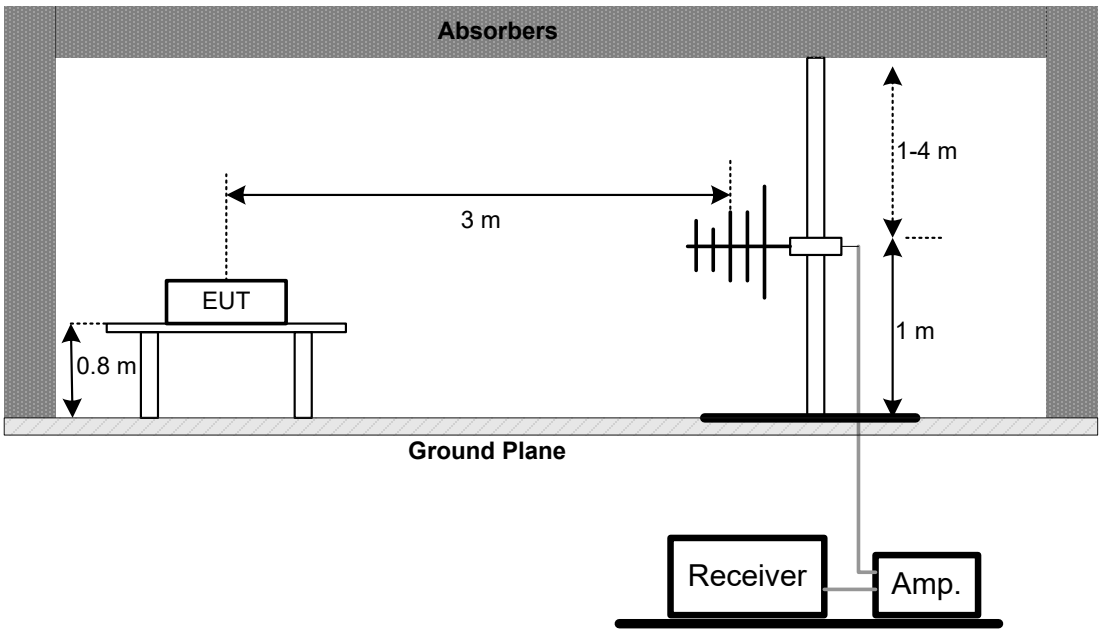
No deviation.

5.4 TEST SETUP

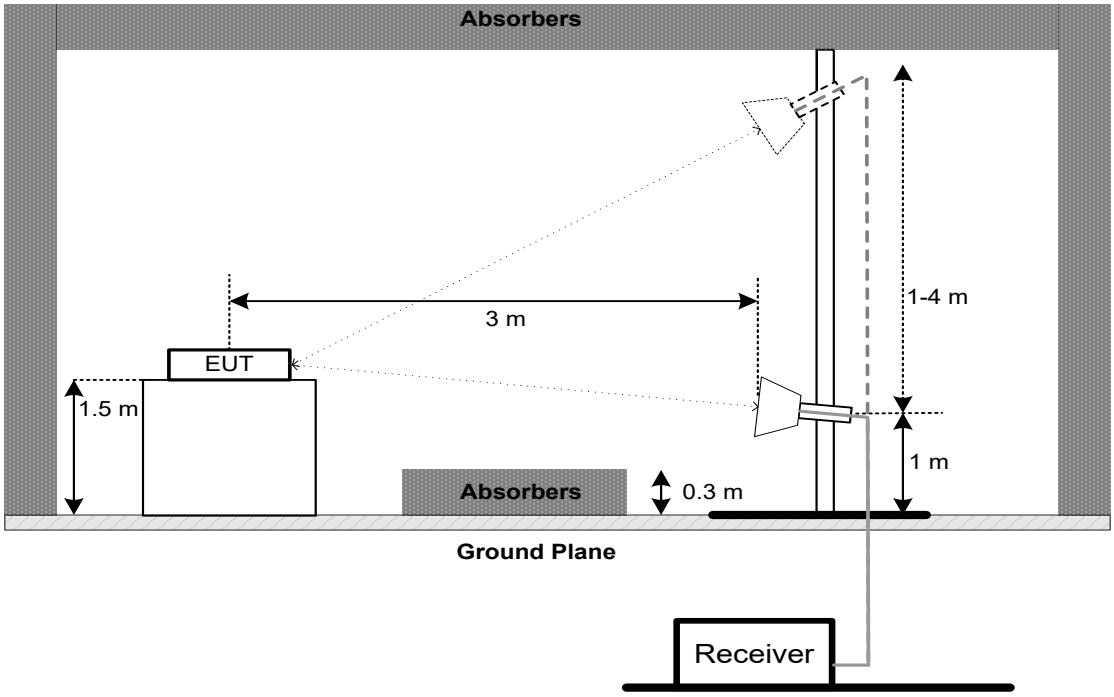
9 kHz to 30 MHz



30 MHz to 1 GHz



Above 1 GHz



5.5 EUT OPERATING CONDITIONS

The EUT was programmed to be in continuously transmitting mode.

5.6 TEST RESULT - 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 RESULT - 30 MHz TO 1000 MHz

Please refer to the APPENDIX C.

5.8 TEST RESULT - 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. BANDWIDTH

6.1 LIMIT

Section	Test Item	Limit
FCC 15.247(a)(2)	6 dB Bandwidth	>= 500 kHz
	99% Emission Bandwidth	-

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:

For 6 dB Bandwidth:

Spectrum Parameters	Setting
Span Frequency	> Measurement Bandwidth
RBW	100 kHz
VBW	300 kHz
Detector	Peak
Trace	Max Hold
Sweep Time	Auto

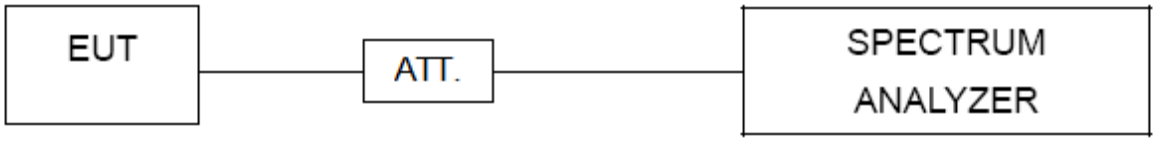
For 99% Emission Bandwidth:

Spectrum Parameters	Setting
Span Frequency	Between 1.5 times and 5.0 times the OBW
RBW	30 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. MAXIMUM OUTPUT POWER

7.1 LIMIT

Section	Test Item	Limit
FCC 15.247(b)(3)	Maximum Output Power	1.0000 watt or 30.00 dBm

7.2 TEST PROCEDURE

a. The EUT was directly connected to the spectrum analyzer and antenna output port as show in the block diagram below.

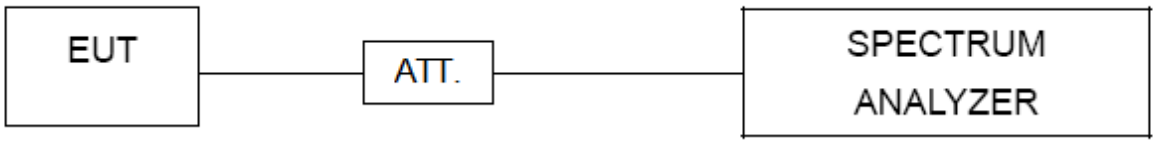
b. The following table is the setting of the spectrum analyzer:

Spectrum Parameters	Setting
Span Frequency	≥ 3×RBW
RBW	3 MHz
VBW	3 MHz
Detector	Peak
Trace	Max Hold
Sweep Time	Auto

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. CONDUCTED SPURIOUS EMISSION

8.1 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.

8.2 TEST PROCEDURE

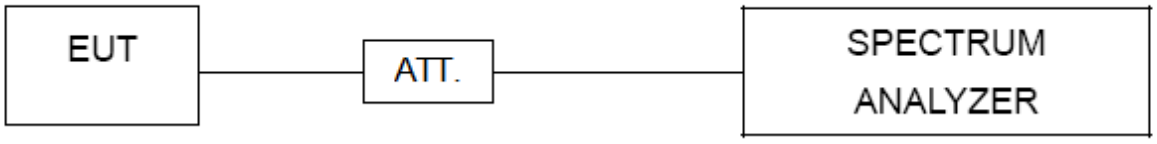
a. The EUT was directly connected to the spectrum analyzer and antenna output port as show in the block diagram below.
b. The following table is the setting of the spectrum analyzer:

Spectrum Parameters	Setting
Start Frequency	30 MHz
Stop Frequency	26.5 GHz
RBW	100 kHz
VBW	300 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. POWER SPECTRAL DENSITY

9.1 LIMIT

Section	Test Item	Limit
FCC 15.247(e)	Power Spectral Density	8 dBm (in any 3 kHz)

9.2 TEST PROCEDURE

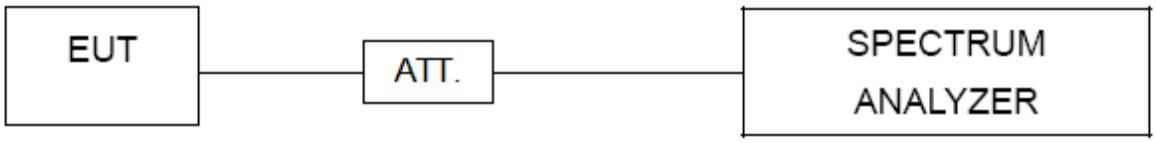
a. The EUT was directly connected to the spectrum analyzer and antenna output port as show in the block diagram below.
b. The following table is the setting of the spectrum analyzer:

Spectrum Parameters	Setting
Span Frequency	2 MHz (1 Mbps) / 4 MHz (2 Mbps)
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. 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	RG 213/U	N/A	Jun. 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	1462	Dec. 13, 2024
2	Attenuator	EMC INSTRUMENT	EMCI-N-6-06	AT-06009	Dec. 13, 2024
3	Preamplifier	EMC NSTRUMENT	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

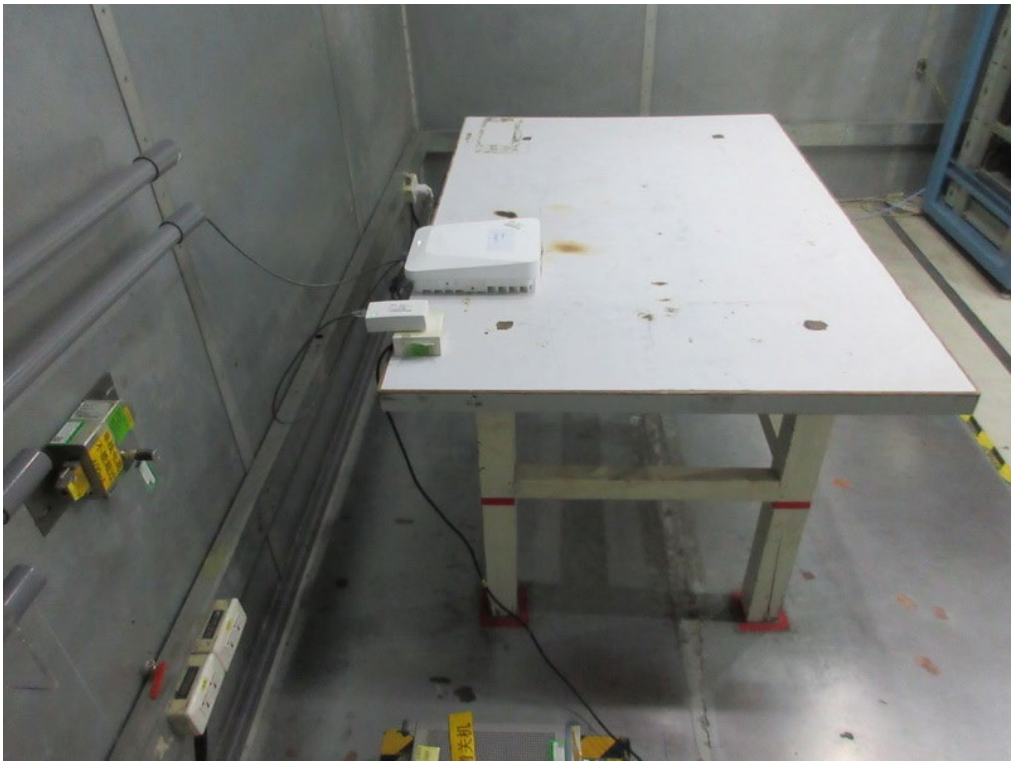
Radiated Emissions - Above 1 GHz					
Item	Kind of Equipment	Manufacturer	Type No.	Serial No.	Calibrated until
1	Receiver	Agilent	N9038A	MY52130039	Dec. 22, 2024
2	Preamplifier	EMC INSTRUMENT	EMC118A45SE	980888	Nov. 17, 2024
3	Double Ridged Guide Antenna	ETS	3115	75789	Jun. 15, 2025
4	Cable	RegalWay	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

Bandwidth & Maximum Output Power & Power Spectral Density & Conducted Spurious Emission					
Item	Kind of Equipment	Manufacturer	Type No.	Serial No.	Calibrated until
1	Spectrum Analyzer	R&S	FSP38	100852	May 31, 2025
2	Measurement Software	BTL	BTL Conducted Test	N/A	N/A
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.

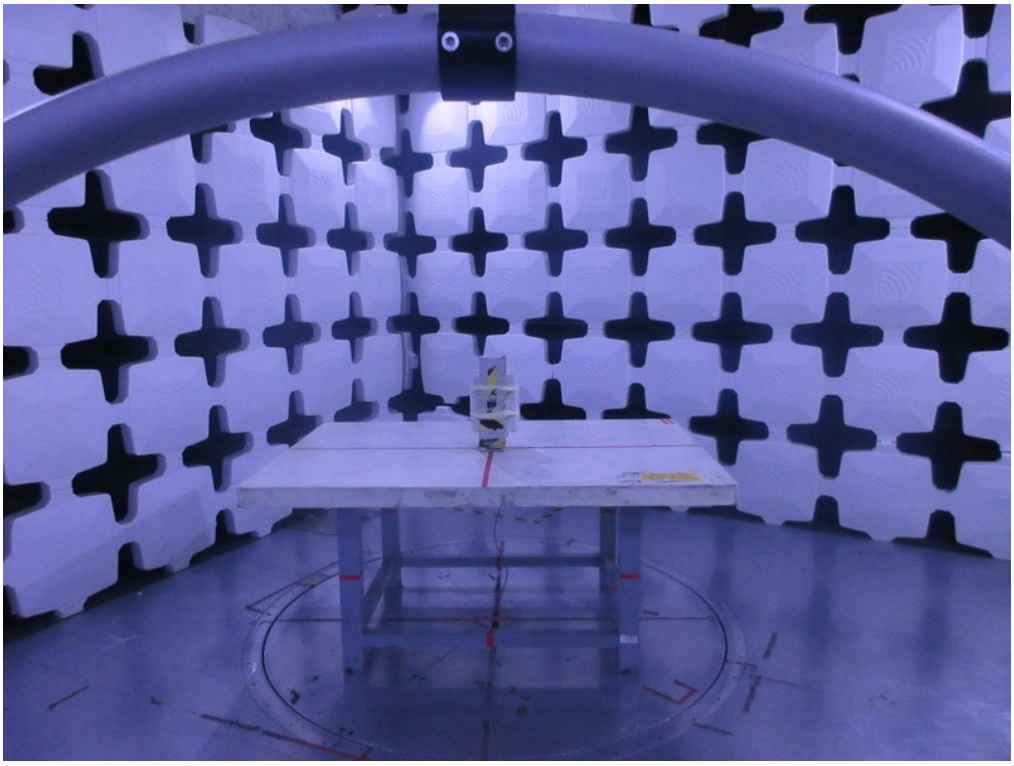
11. EUT TEST PHOTO

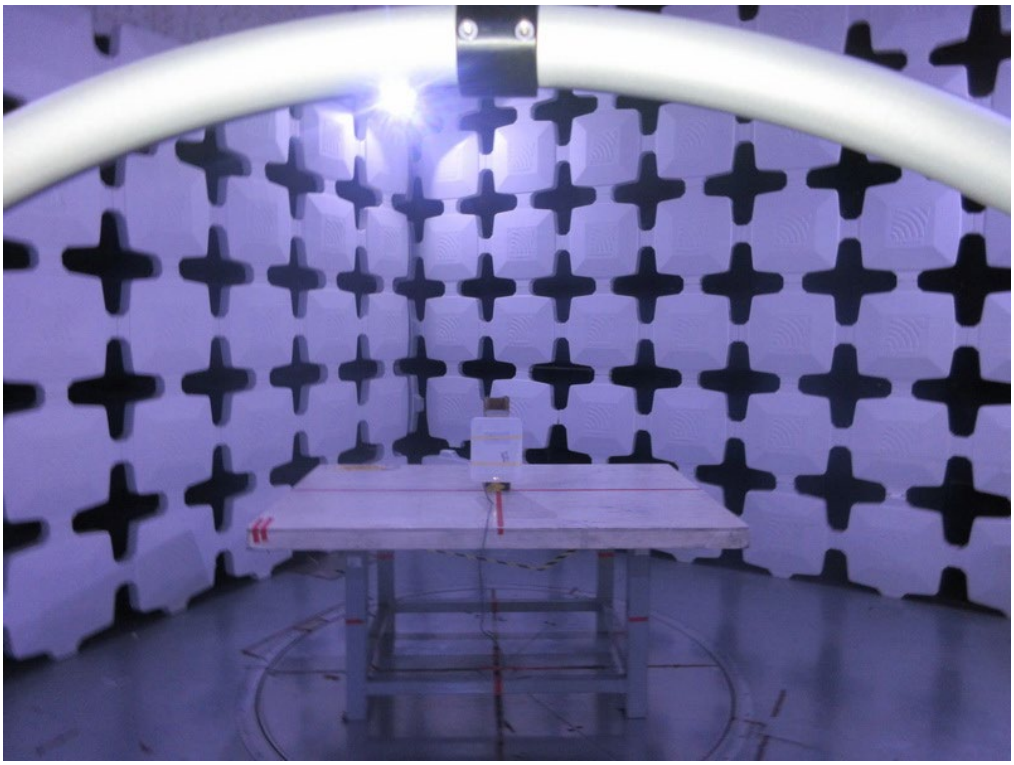
AC Power Line Conducted Emissions Test Photos



Radiated Emissions Test Photos

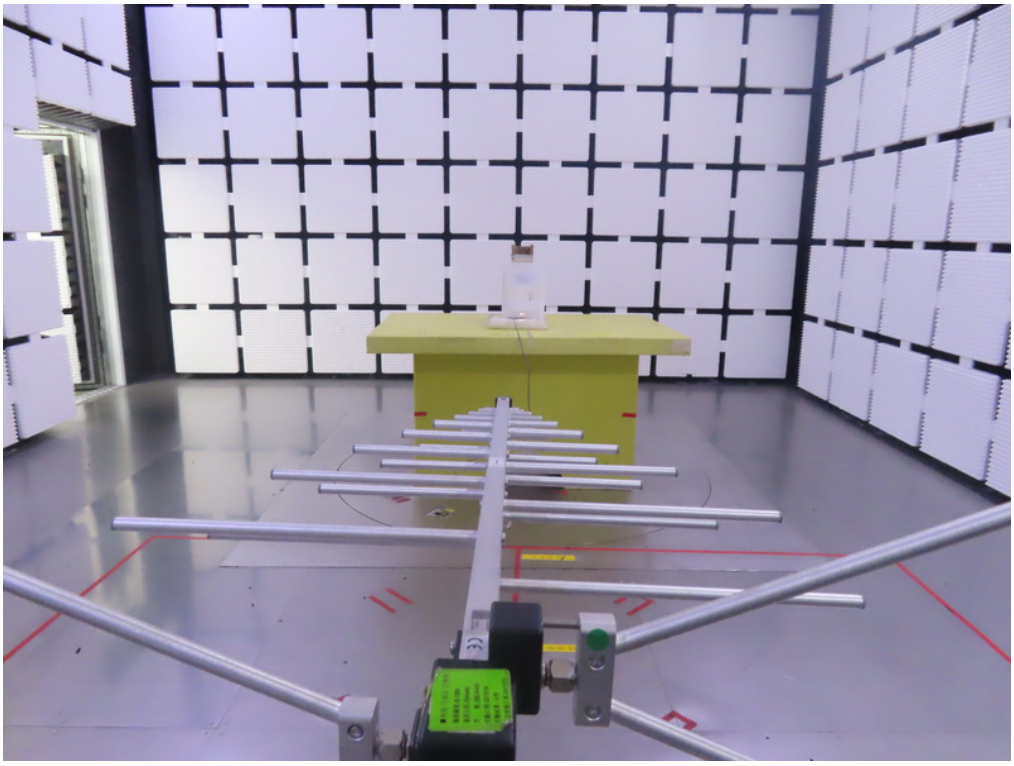
9 kHz to 30 MHz

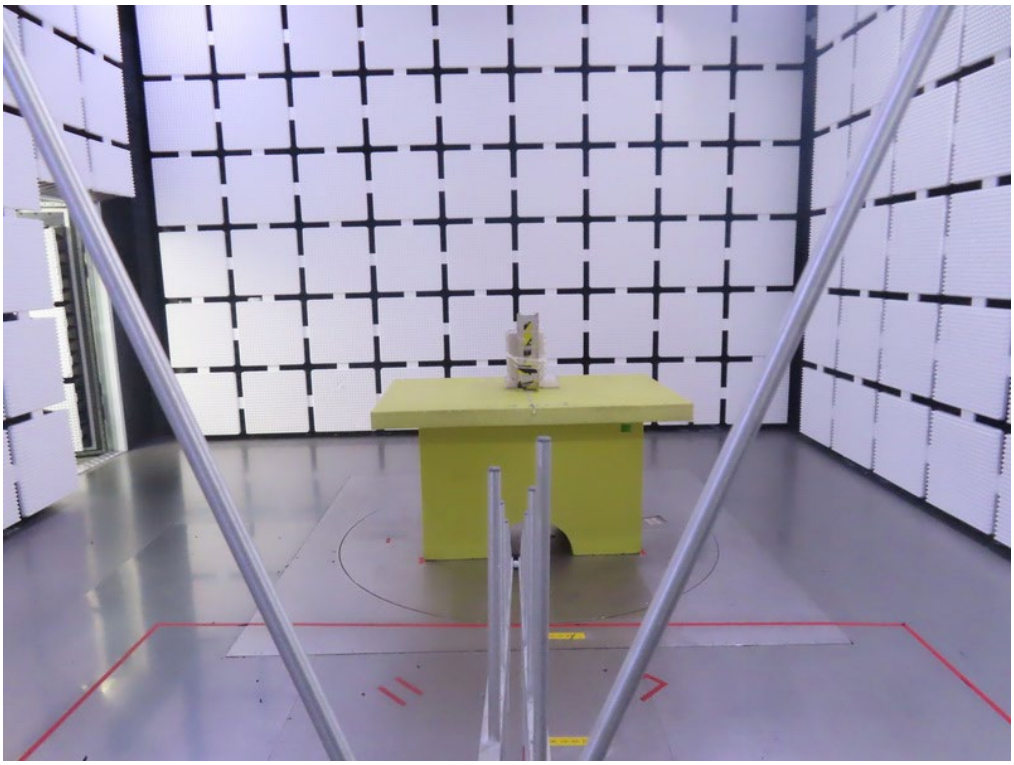




Radiated Emissions Test Photos

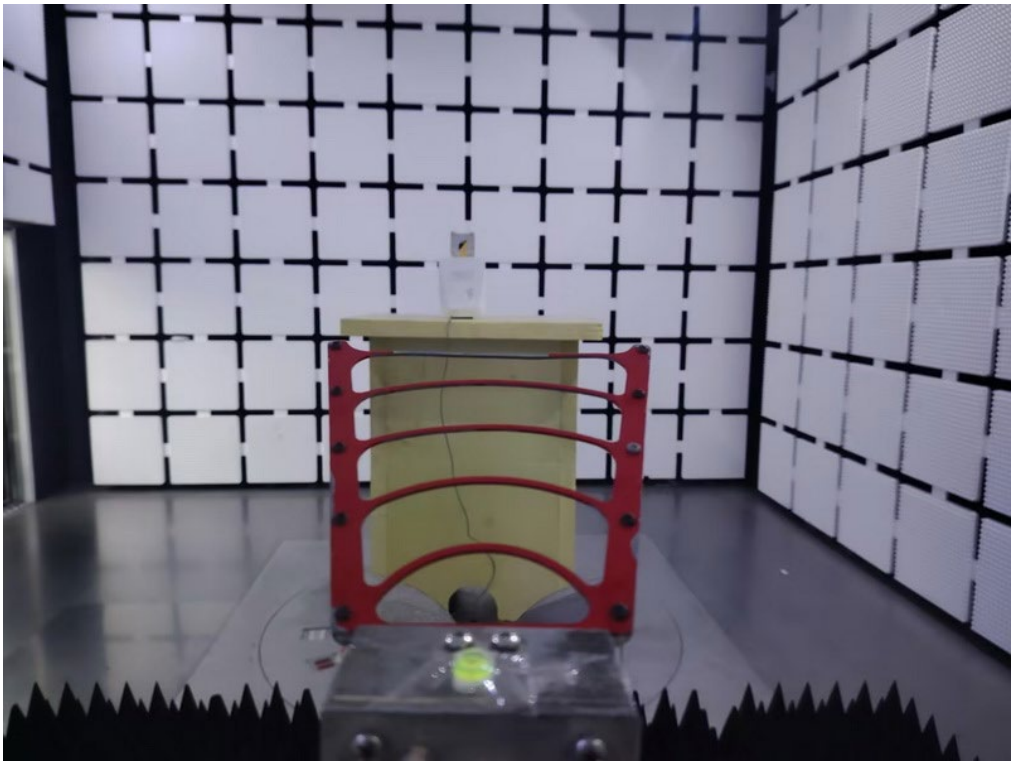
30 MHz to 1000 MHz

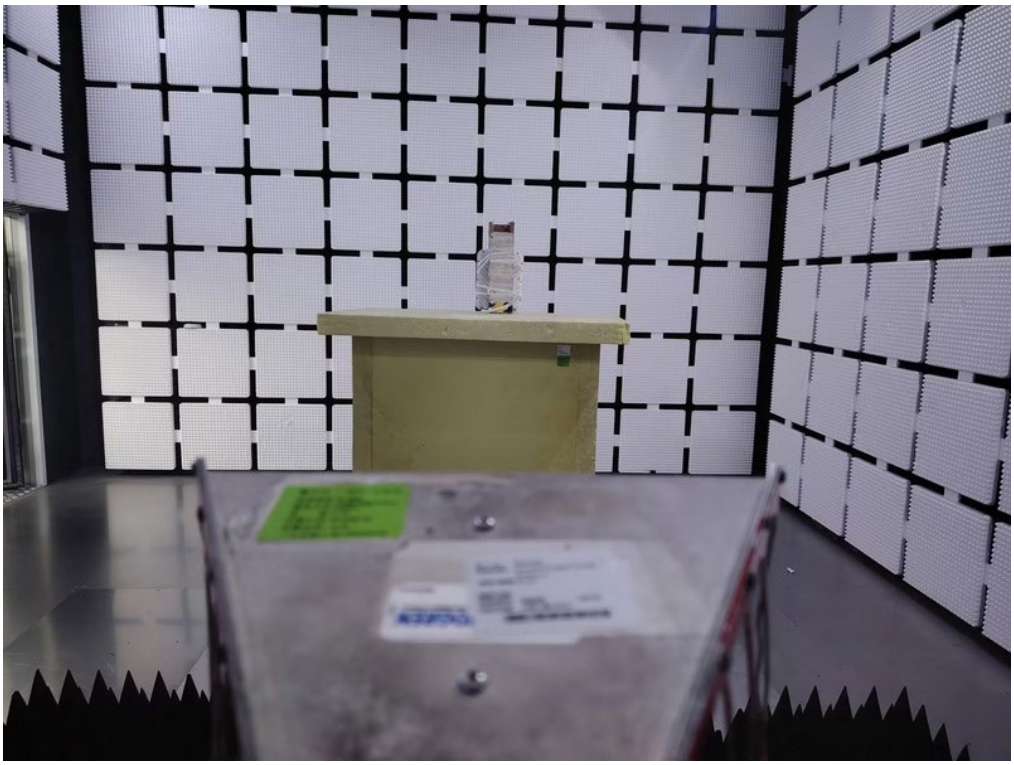




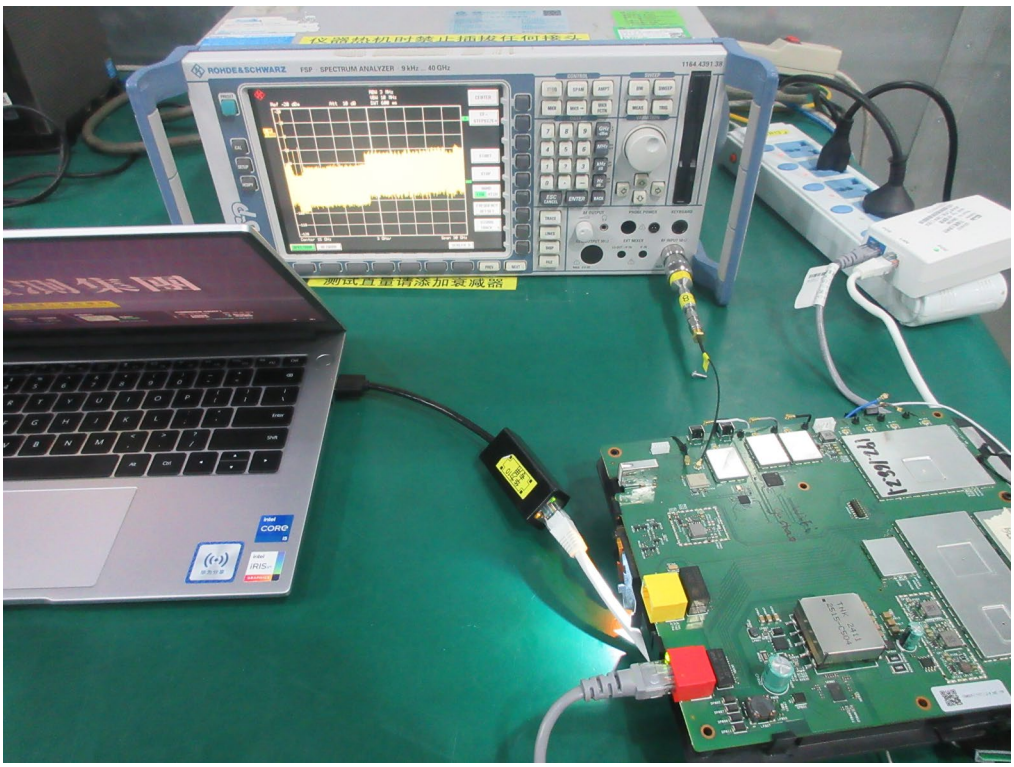
Radiated Emissions Test Photos

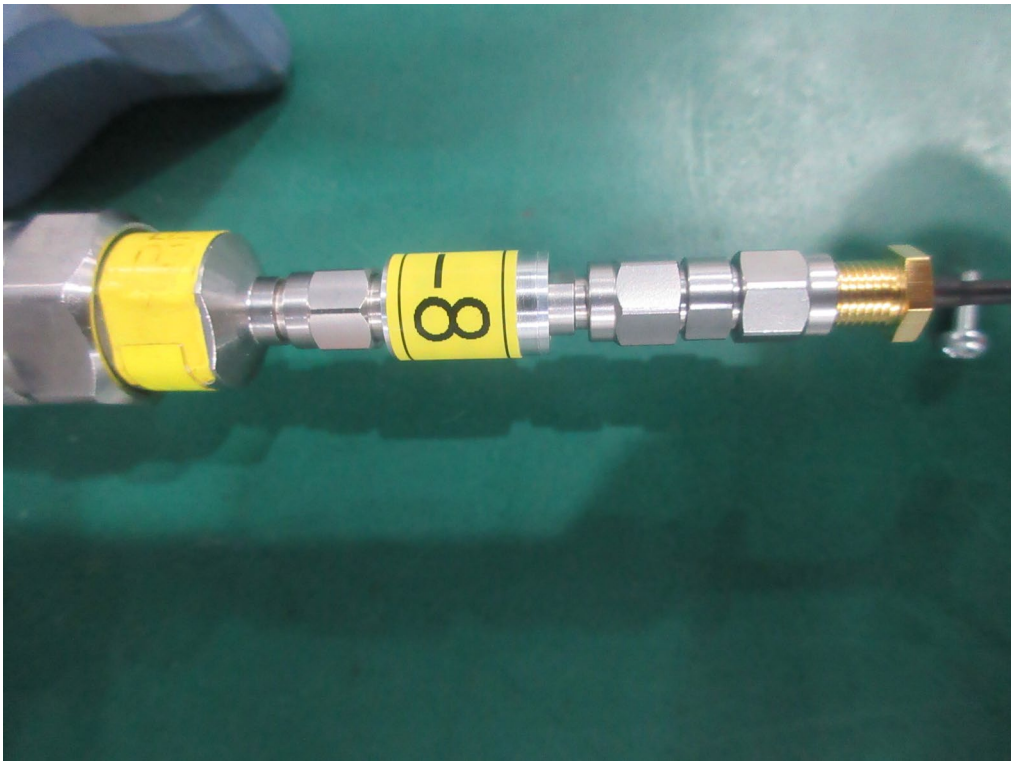
Above 1 GHz





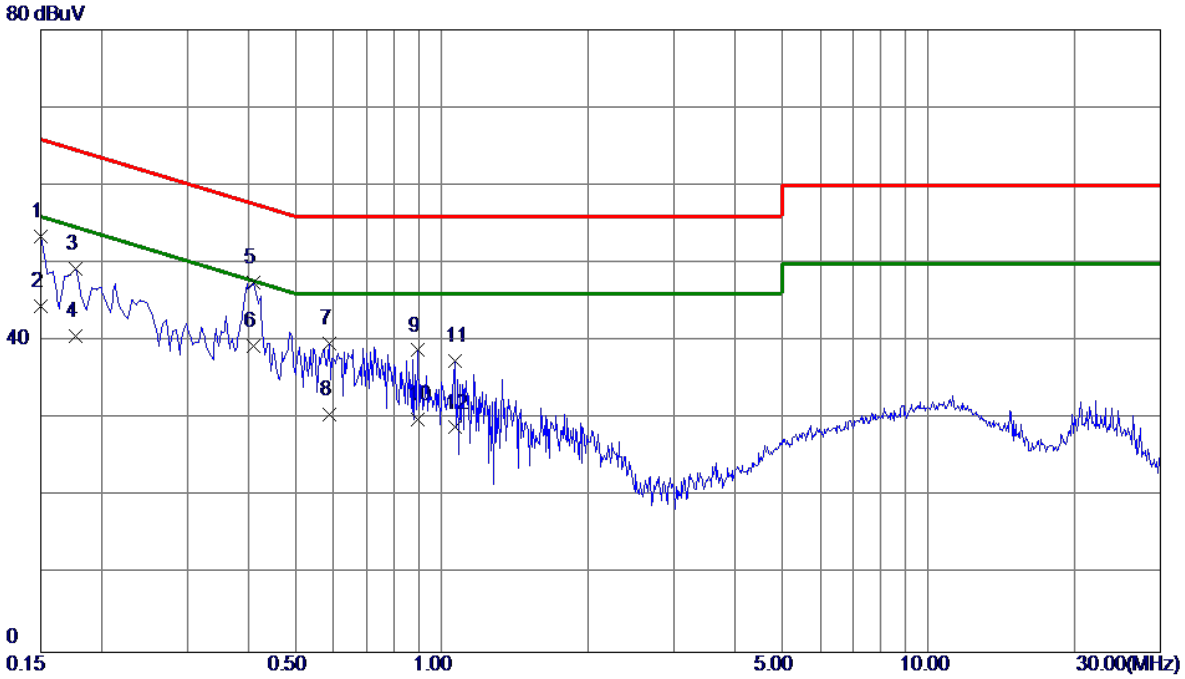
Conducted Test Photos





APPENDIX A - AC POWER LINE CONDUCTED EMISSIONS

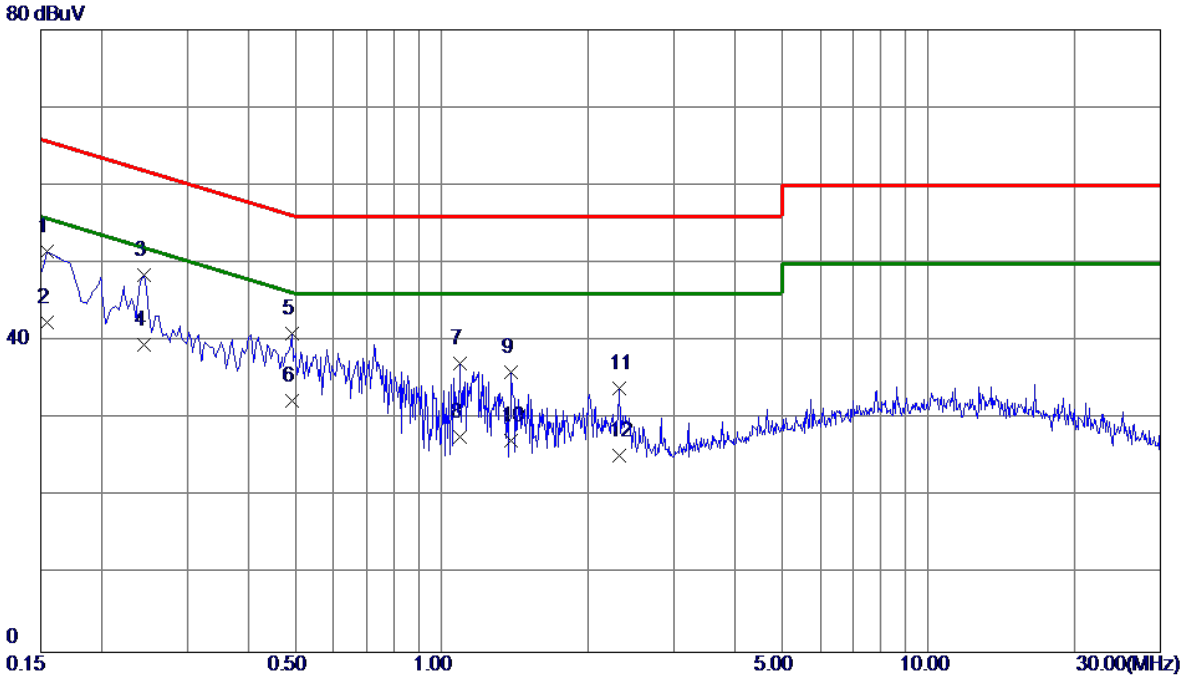
Test Mode	Middle Channel; Frequency: 908.7 MHz	Phase	Line



No.	Freq.	Reading Level	Correct Factor	Measure ment	Limit	Margin		
	MHz	dBuV	dB	dBuV	dBuV	dB	Detector	Comment
1	0.1500	43.55	9.96	53.51	66.00	-12.49	QP	
2	0.1500	34.50	9.96	44.46	56.00	-11.54	AVG	
3	0.1770	39.30	9.97	49.27	64.63	-15.36	QP	
4	0.1770	30.60	9.97	40.57	54.63	-14.06	AVG	
5	0.4110	37.04	10.43	47.47	57.63	-10.16	QP	
6 *	0.4110	28.89	10.43	39.32	47.63	-8.31	AVG	
7	0.5865	28.95	10.80	39.75	56.00	-16.25	QP	
8	0.5865	19.80	10.80	30.60	46.00	-15.40	AVG	
9	0.8925	27.61	11.19	38.80	56.00	-17.20	QP	
10	0.8925	18.70	11.19	29.89	46.00	-16.11	AVG	
11	1.0635	26.21	11.28	37.49	56.00	-18.51	QP	
12	1.0635	17.60	11.28	28.88	46.00	-17.12	AVG	

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

Test Mode	Middle Channel; Frequency: 908.7 MHz	Phase	Neutral

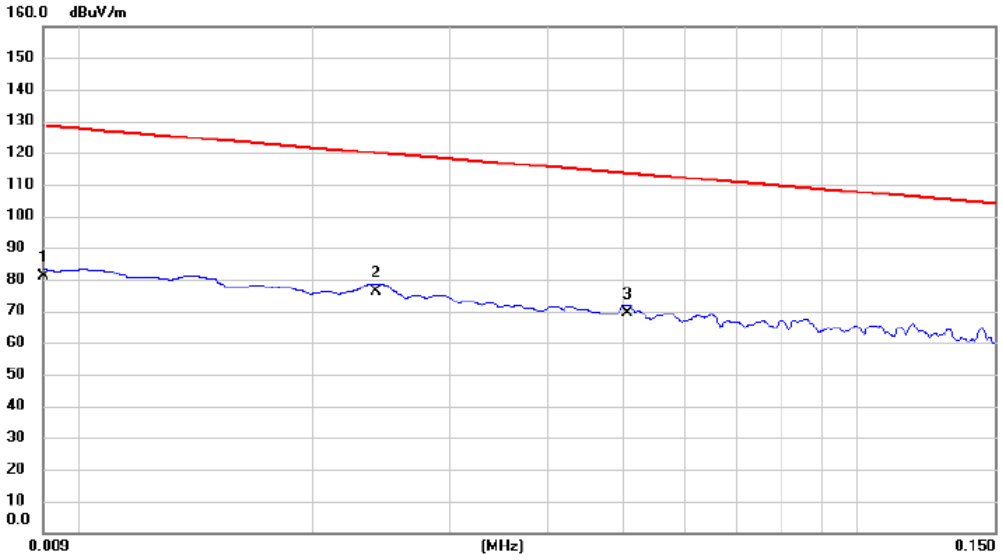


No.	Freq.	Reading Level	Correct Factor	Measure ment	Limit	Margin		
	MHz	dBuV	dB	dBuV	dBuV	dB	Detector	Comment
1	0.1545	41.64	9.93	51.57	65.75	-14.18	QP	
2	0.1545	32.51	9.93	42.44	55.75	-13.31	AVG	
3	0.2445	38.41	10.02	48.43	61.94	-13.51	QP	
4 *	0.2445	29.49	10.02	39.51	51.94	-12.43	AVG	
5	0.4920	30.34	10.57	40.91	56.13	-15.22	QP	
6	0.4920	21.80	10.57	32.37	46.13	-13.76	AVG	
7	1.0905	25.84	11.24	37.08	56.00	-18.92	QP	
8	1.0905	16.40	11.24	27.64	46.00	-18.36	AVG	
9	1.3920	24.81	11.24	36.05	56.00	-19.95	QP	
10	1.3920	15.90	11.24	27.14	46.00	-18.86	AVG	
11	2.3190	23.25	10.68	33.93	56.00	-22.07	QP	
12	2.3190	14.61	10.68	25.29	46.00	-20.71	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

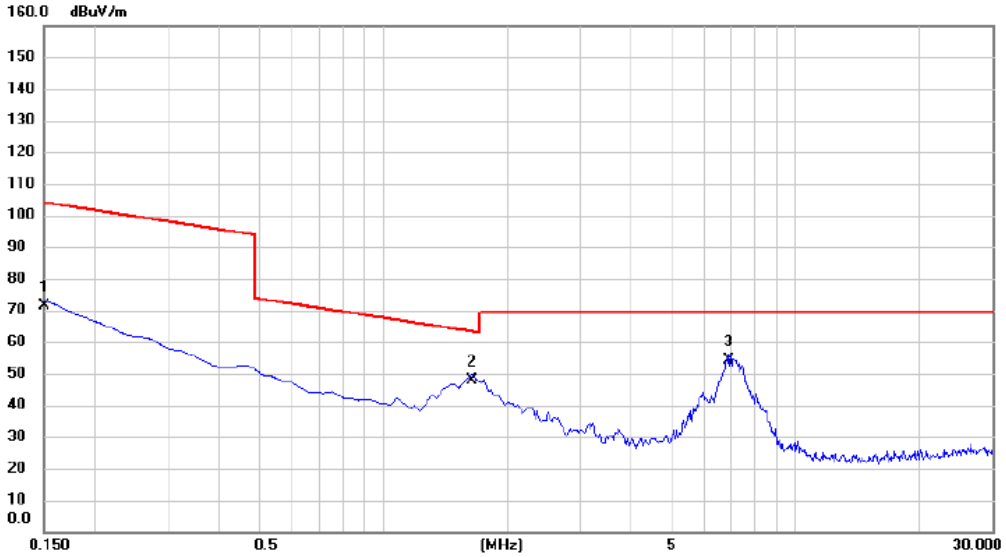
Test Mode	Middle Channel; Frequency: 908.7 MHz	Polarization	Ant 0°



No.	Mk.	Freq.	Reading Level	Correct Factor	Measure-ment	Limit	Margin		
		MHz	dBuV	dB	dBuV/m	dBuV/m	dB	Detector	Comment
1		0.0090	60.78	20.40	81.18	128.52	-47.34	AVG	
2	*	0.0241	55.12	20.92	76.04	119.96	-43.92	AVG	
3		0.0507	48.26	21.20	69.46	113.50	-44.04	AVG	

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

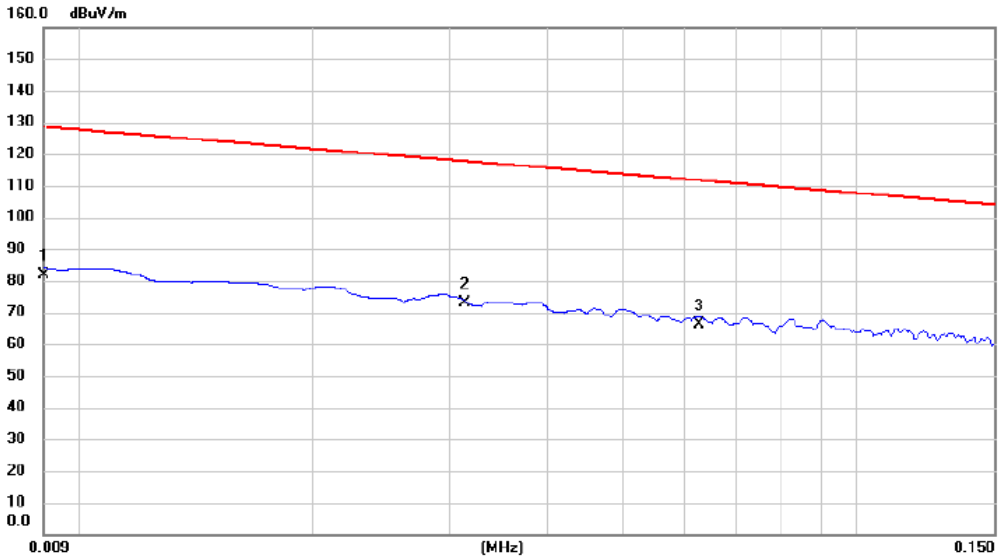
Test Mode	Middle Channel; Frequency: 908.7 MHz	Polarization	Ant 0°



No.	Mk.	Freq.	Reading Level	Correct Factor	Measure-ment	Limit	Margin		
		MHz	dBuV	dB	dBuV/m	dBuV/m	dB	Detector	Comment
1		0.1500	50.32	21.27	71.59	104.09	-32.50	AVG	
2		1.6425	26.78	21.14	47.92	63.29	-15.37	QP	
3	*	6.8662	33.12	21.19	54.31	69.54	-15.23	QP	

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

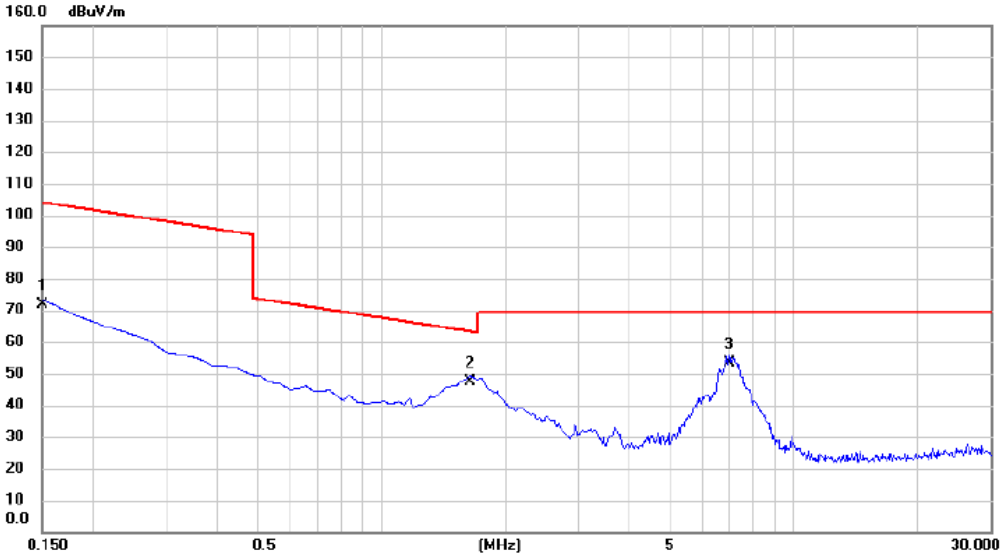
Test Mode	Middle Channel; Frequency: 908.7 MHz	Polarization	Ant 90°



No.	Mk.	Freq.	Reading Level	Correct Factor	Measure-ment	Limit	Margin		
		MHz	dBuV	dB	dBuV/m	dBuV/m	dB	Detector	Comment
1		0.0090	61.32	20.40	81.72	128.52	-46.80	AVG	
2	*	0.0313	51.79	21.11	72.90	117.69	-44.79	AVG	
3		0.0627	45.15	21.24	66.39	111.66	-45.27	AVG	

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

Test Mode	Middle Channel; Frequency: 908.7 MHz	Polarization	Ant 90°

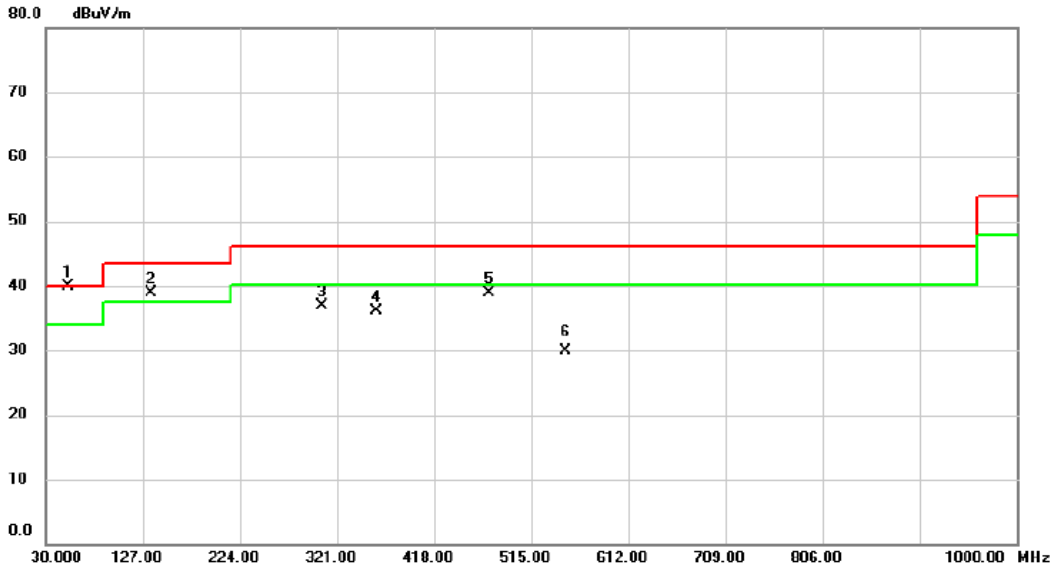


No.	Mk.	Freq.	Reading Level	Correct Factor	Measure-ment	Limit	Margin		
		MHz	dBuV	dB	dBuV/m	dBuV/m	dB	Detector	Comment
1		0.1500	50.36	21.27	71.63	104.09	-32.46	AVG	
2	*	1.6425	26.45	21.14	47.59	63.29	-15.70	QP	
3		6.9856	32.14	21.19	53.33	69.54	-16.21	QP	

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

APPENDIX C - RADIATED EMISSION - 30 MHZ TO 1000 MHZ

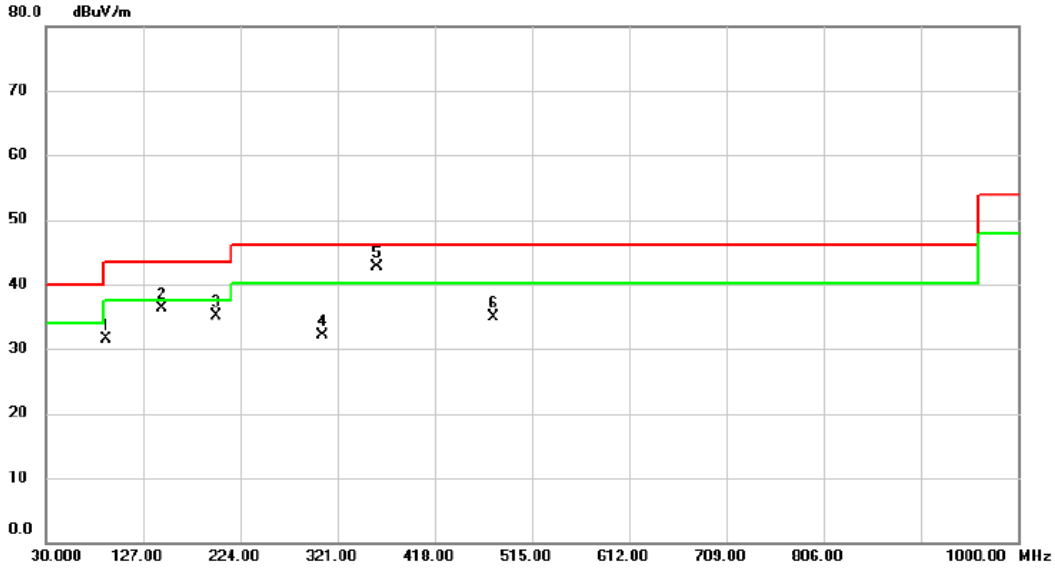
Test Mode	Middle Channel; Frequency: 908.7 MHz	Polarization	Vertical



No.	Mk.	Freq.	Reading Level	Correct Factor	Measure-ment	Limit	Margin		
		MHz	dBuV	dB	dBuV/m	dBuV/m	dB	Detector	Comment
1	*	52.7950	51.24	-11.35	39.89	40.00	-0.11	peak	
2	!	135.2450	50.93	-12.03	38.90	43.52	-4.62	peak	
3		305.9650	47.26	-10.44	36.82	46.02	-9.20	peak	
4		359.8000	45.57	-9.38	36.19	46.02	-9.83	peak	
5		473.2900	45.39	-6.42	38.97	46.02	-7.05	peak	
6		549.9200	34.97	-4.99	29.98	46.02	-16.04	QP	

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

Test Mode	Middle Channel; Frequency: 908.7 MHz	Polarization	Horizontal

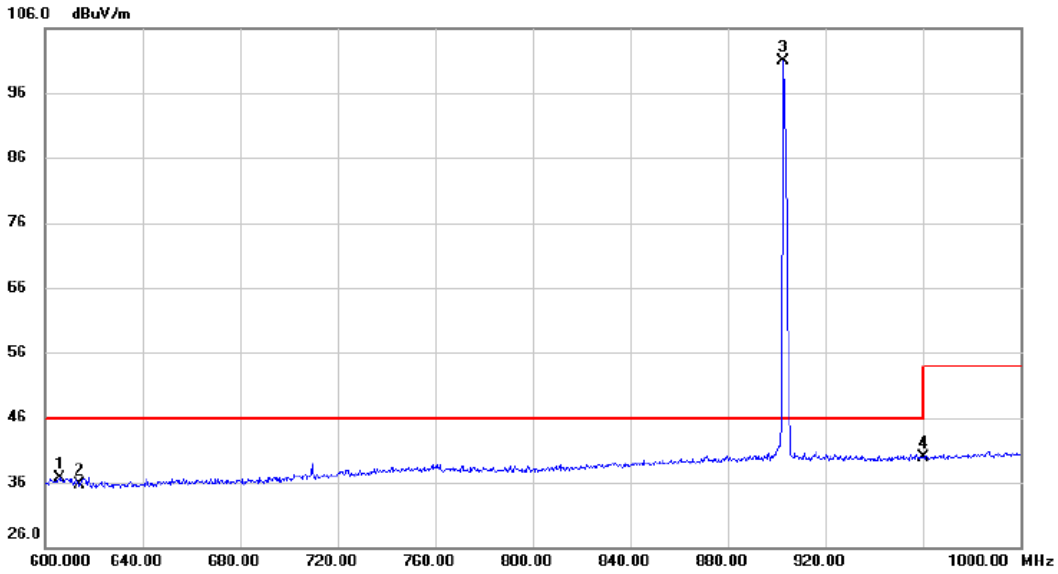


No.	Mk.	Freq.	Reading Level	Correct Factor	Measure-ment	Limit	Margin		
		MHz	dBuV	dB	dBuV/m	dBuV/m	dB	Detector	Comment
1		89.6550	48.46	-16.99	31.47	43.52	-12.05	peak	
2		145.9150	47.63	-11.38	36.25	43.52	-7.27	peak	
3		200.2350	49.48	-14.43	35.05	43.52	-8.47	peak	
4		306.4500	42.49	-10.42	32.07	46.02	-13.95	peak	
5	*	359.8000	52.16	-9.38	42.78	46.02	-3.24	peak	
6		476.2000	41.30	-6.38	34.92	46.02	-11.10	peak	

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

APPENDIX D - RADIATED EMISSION - ABOVE 1000 MHZ

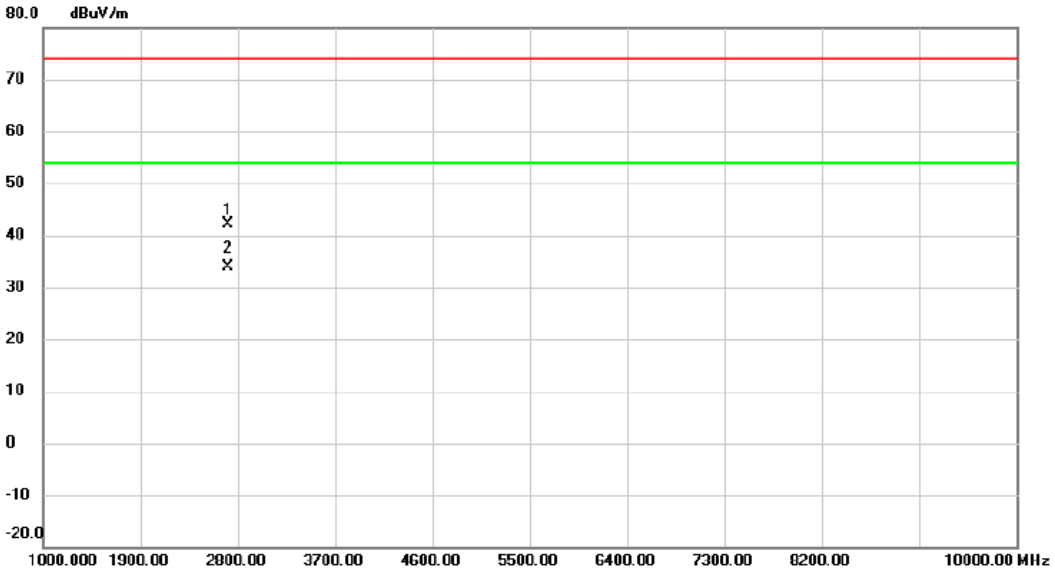
Test Mode	Bottom Channel; Frequency: 903 MHz	Polarization	Vertical



No.	Mk.	Freq.	Reading Level	Correct Factor	Measure-ment	Limit	Margin		
		MHz	dBuV	dB	dBuV/m	dBuV/m	dB	Detector	Comment
1		606.4000	30.18	6.50	36.68	46.00	-9.32	peak	
2		614.0000	29.16	6.63	35.79	46.00	-10.21	peak	
3	*	902.8000	90.56	10.30	100.86	46.00	54.86	peak	No Limit
4		960.0000	29.28	10.63	39.91	46.00	-6.09	peak	

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

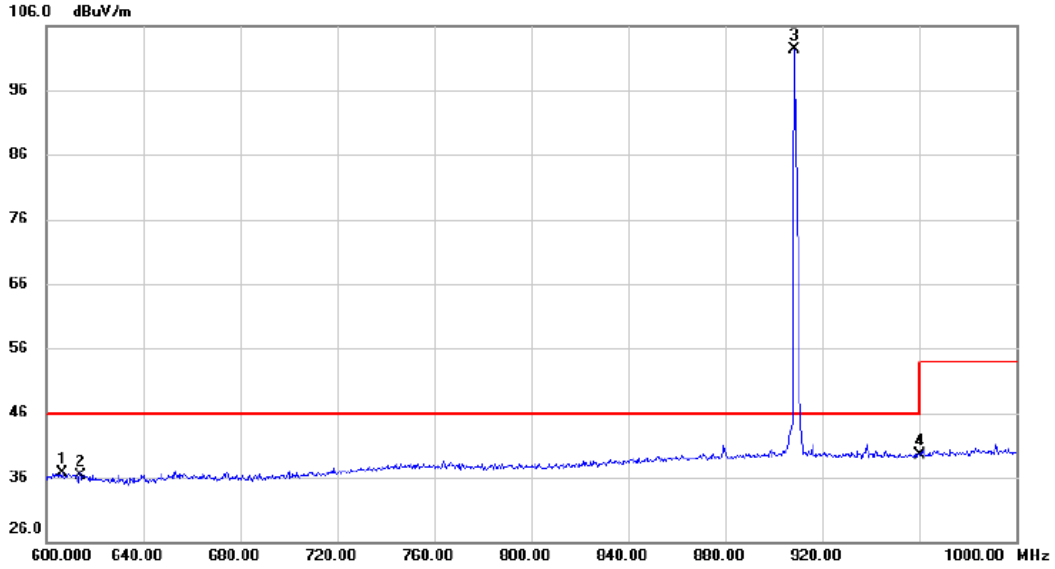
Test Mode	Bottom Channel; Frequency: 903 MHz	Polarization	Vertical



No.	Mk.	Freq.	Reading Level	Correct Factor	Measure-ment	Limit	Margin		
		MHz	dBuV	dB	dBuV/m	dBuV/m	dB	Detector	Comment
1		2710.000	43.61	-1.45	42.16	74.00	-31.84	peak	
2	*	2710.000	35.26	-1.45	33.81	54.00	-20.19	AVG	

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

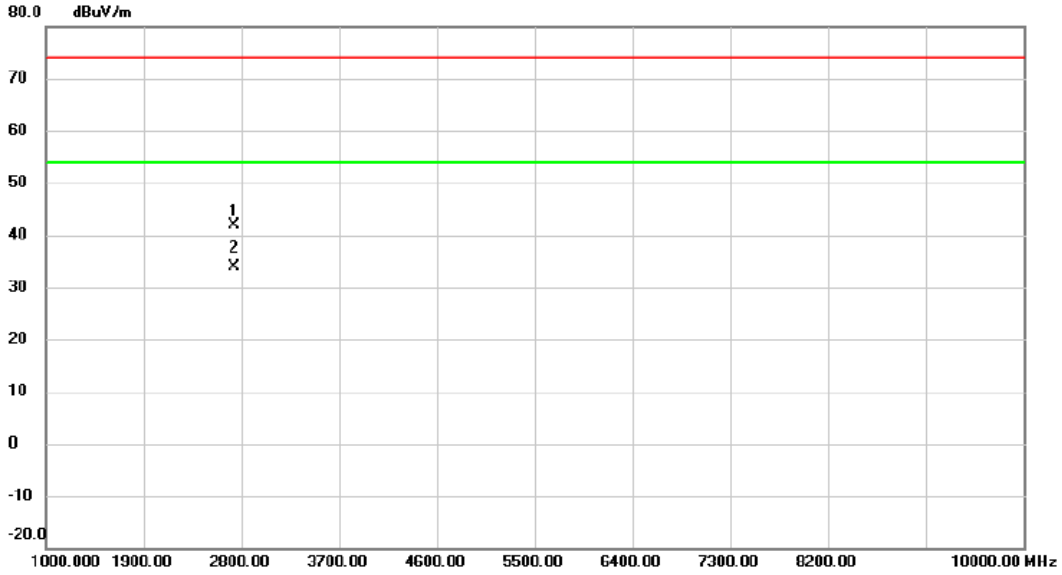
Test Mode	Middle Channel; Frequency: 908.7 MHz	Polarization	Vertical



No.	Mk.	Freq.	Reading Level	Correct Factor	Measure-ment	Limit	Margin		
		MHz	dBuV	dB	dBuV/m	dBuV/m	dB	Detector	Comment
1		606.6000	30.15	6.50	36.65	46.00	-9.35	peak	
2		614.0000	29.59	6.63	36.22	46.00	-9.78	peak	
3	*	908.6000	91.88	10.33	102.21	46.00	56.21	peak	No Limit
4		960.0000	28.85	10.63	39.48	46.00	-6.52	peak	

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

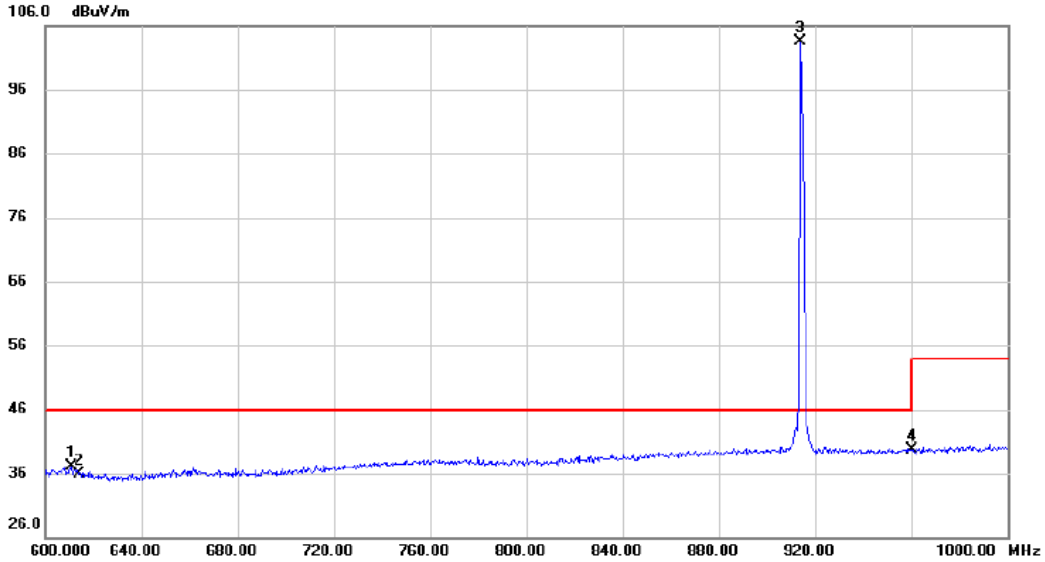
Test Mode	Middle Channel; Frequency: 908.7 MHz	Polarization	Vertical



No.	Mk.	Freq.	Reading Level	Correct Factor	Measure-ment	Limit	Margin		
		MHz	dBuV	dB	dBuV/m	dBuV/m	dB	Detector	Comment
1		2728.000	43.39	-1.40	41.99	74.00	-32.01	peak	
2	*	2728.000	35.26	-1.40	33.86	54.00	-20.14	AVG	

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

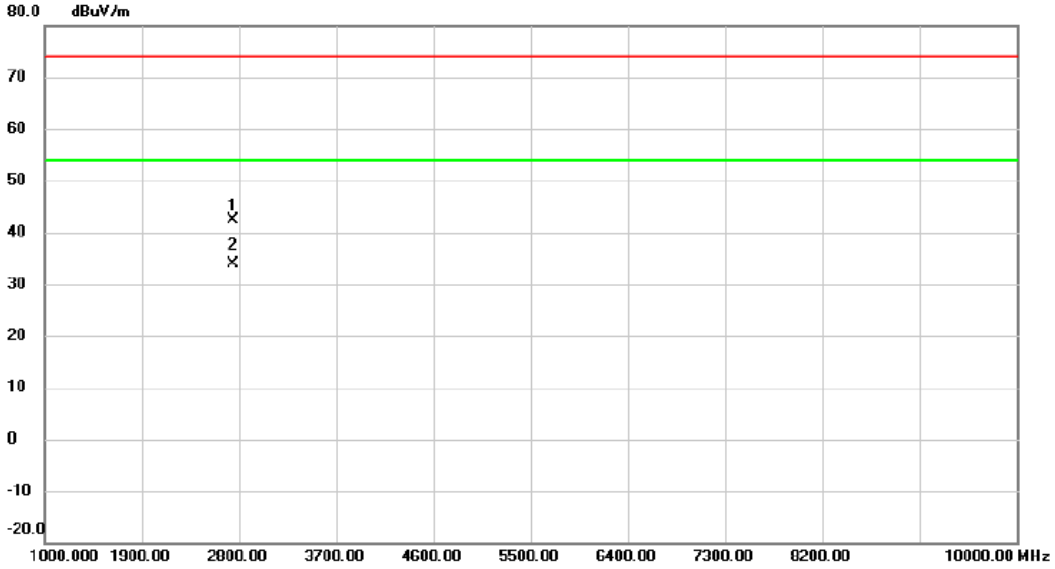
Test Mode	Top Channel; Frequency: 914.2 MHz	Polarization	Vertical



No.	Mk.	Freq.	Reading Level	Correct Factor	Measure-ment	Limit	Margin		
		MHz	dBuV	dB	dBuV/m	dBuV/m	dB	Detector	Comment
1		611.0000	30.47	6.57	37.04	46.00	-8.96	peak	
2		614.0000	29.35	6.63	35.98	46.00	-10.02	peak	
3	*	914.0000	93.15	10.37	103.52	46.00	57.52	peak	No Limit
4		960.0000	29.02	10.63	39.65	46.00	-6.35	peak	

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

Test Mode	Top Channel; Frequency: 914.2 MHz	Polarization	Vertical



No.	Mk.	Freq.	Reading Level	Correct Factor	Measure-ment	Limit	Margin		
		MHz	dBuV	dB	dBuV/m	dBuV/m	dB	Detector	Comment
1		2741.500	43.73	-1.36	42.37	74.00	-31.63	peak	
2	*	2741.500	35.34	-1.36	33.98	54.00	-20.02	AVG	

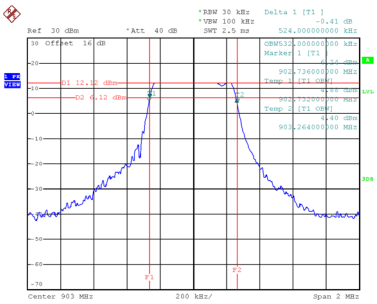
REMARKS:
(1) Measurement Value = Reading Level + Correct Factor.
(2) Margin Level = Measurement Value - Limit Value.

APPENDIX E - BANDWIDTH

Test Mode	TX Mode _500Kbps

Frequency (MHz)	6 dB Bandwidth (MHz)	99 % Occupied Bandwidth (MHz)	6 dB Bandwidth Min. Limit (MHz)	Test Result
903	0.5240	0.5320	0.5	Pass
908.7	0.5240	0.5320	0.5	Pass
914.2	0.5240	0.5320	0.5	Pass

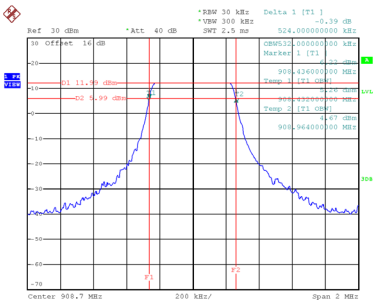
903MHz



Date: 20.AUG.2024 20:16:08

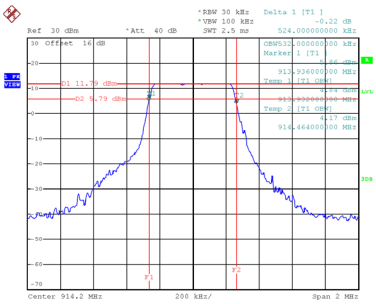
908.7MHz

6 dB Bandwidth

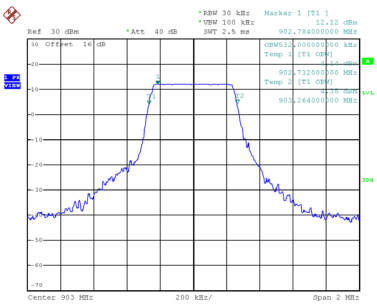


Date: 20.AUG.2024 20:32:13

914.2MHz

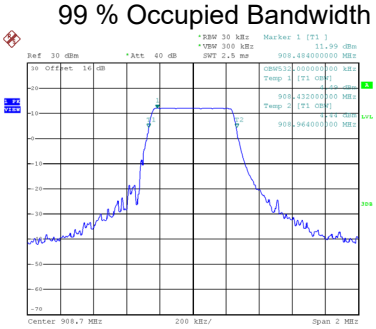


Date: 23.AUG.2024 09:32:47

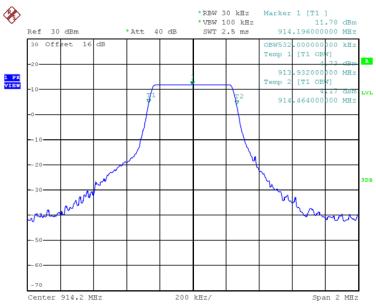


Date: 20.AUG.2024 20:14:34

99 % Occupied Bandwidth



Date: 20.AUG.2024 20:30:42



Date: 23.AUG.2024 09:31:33

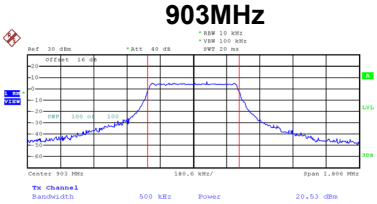
APPENDIX F - MAXIMUM OUTPUT POWER

Test Mode	TX Mode _500Kbps

Frequency (MHz)	Output Power (dBm)	Output Power (W)	Max. Limit (dBm)	Max. Limit (W)	Test Result
903	20.53	0.1130	30.00	1.0000	Pass
908.7	21.53	0.1422	30.00	1.0000	Pass
914.2	21.25	0.1334	30.00	1.0000	Pass

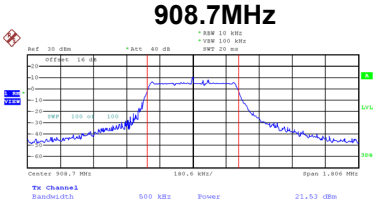
Note: Output power = Measure result + Cable loss

903MHz



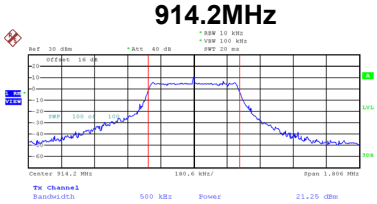
Date: 20.AUG.2024 19:59:36

908.7MHz



Date: 20.AUG.2024 20:00:44

914.2MHz

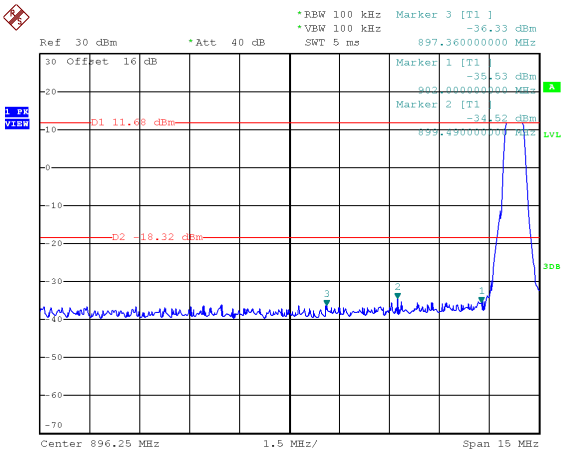


Date: 23.AUG.2024 09:24:23

APPENDIX G - CONDUCTED SPURIOUS EMISSION

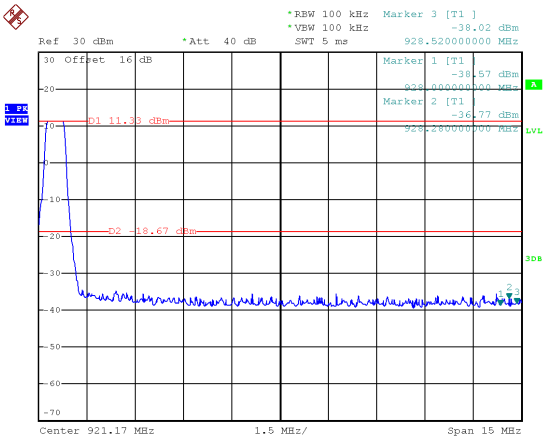
Test Mode	TX Mode _500Kbps

Bandedge 903MHz (Lower)



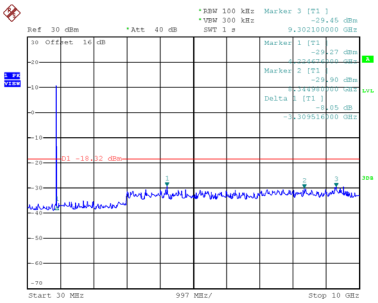
Date: 20.AUG.2024 20:18:02

Bandedge 914.2MHz (Upper)



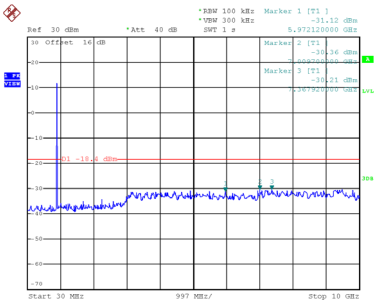
Date: 23.AUG.2024 09:35:43

903MHz – 10th Harmonic of the fundamental frequency



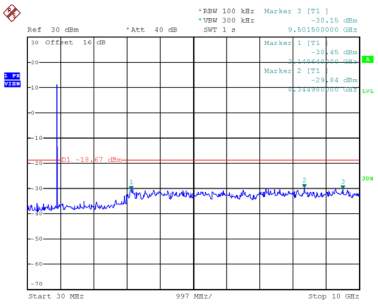
Date: 20.AUG.2024 20:28:08

908.7MHz – 10th Harmonic of the fundamental frequency



Date: 20.AUG.2024 20:38:48

914.2MHz – 10th Harmonic of the fundamental frequency



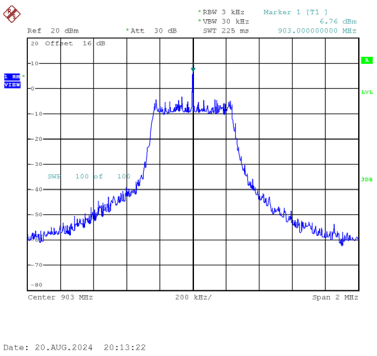
Date: 23.AUG.2024 09:37:31

APPENDIX H - POWER SPECTRAL DENSITY

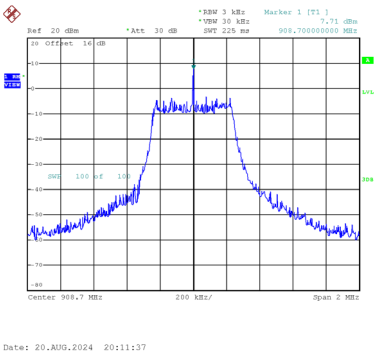
Test Mode	TX Mode _500Kbps

Frequency (MHz)	Power Spectral Density (dBm/3 kHz)	Max. Limit (dBm/3 kHz)	Test Result
903	6.76	8.00	Pass
908.7	7.71	8.00	Pass
914.2	7.95	8.00	Pass

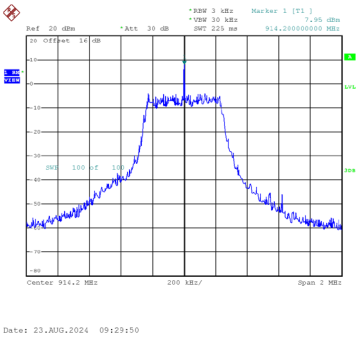
903MHz



908.7MHz



914.2MHz



End of Test Report