Product Name: Wireless Module	**Report No: ITEZA2-202400444RF3**
Model: PIOT-V3(GA)	**Security Classification: Open**
Version: V1.0	**Total Page:180**

TIRT Testing Report

Prepared By:	**Checked By:**	**Approved By:**	
Aaron Long	Stone Tang	Joky Wang	
Aaron Long	Stone Tang	Joky Wang	

Radio Test Report

FCC ID: ACJ-V3GA

This report concerns:Original Grant

Applicant:	Panasonic Corporation of North America
Address:	Two Riverfront Plaza, Newark, NJ 07102 5490
Factory:	Dalian Golden Hualu Digital Technology Co.,Ltd.
Address:	No.1 Hua Road,Qixianling,High-Tech Industrial Zone,Dalian,Liaoning Province, China
Sample No:	1000046278
Product Name:	Wireless Module
Brand Name:	Panasonic
Model No.:	PIOT-V3(GA)
Test No.:	PIOT-V3(GA)

Date of Receipt:	2024/11/25
Date of Test:	2024/11/25~2025/02/24
Issued Date:	2025/3/12
Testing Lab:	TIRT

Table of Contents Page

REPORT ISSUED HISTORY

Report No.	Version	Description	Issued Date	Note
ITEZA2-202400444RF3	V1.0	Original Report.	2025.03.12	Valid

1. SUMMARY OF TEST RESULTS

Test procedures according to the technical standard(s):

FCC CFR Title 47, Part 15, Subpart E				
Standard(s) Section	**Test Item**	**Test Result**	**Judgment**	**Remark**
Section 15.207 Section 7.2.4 ANSI C63.10	AC Power Line Conducted Emissions	APPENDIX A	PASS	------
Section 15.407(b)&15.209 Section 5.5 ANSI C63.10	Radiated Emissions	APPENDIX B APPENDIX C APPENDIX D	PASS	------
15.407(a) 15.407(e)	Bandwidth	APPENDIX E	PASS	------
Section 15.407(a)	MaximumOutput Power	APPENDIX F	PASS	------
Section 15.407(a)	Power Spectral Density	APPENDIX G	PASS	------
15.407(f)	Frequency Stability	APPENDIX H	PASS	**NOTE (5)**
Section 15.203 Section 7.1.4	Antenna Requirements	------	PASS	**NOTE (2)**
15.407(c)	Automatically Discontinue Transmission	------	PASS	**NOTE (3)**

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
(3) During no any information transmission, the EUT can automatically discontinue transmission and become standby mode for power saving.the EUT can detect the controlling signal of ACK message transmitting from remote device and verify whether it shall resend or discontinue transmission.
(4) For UNII-1 this device was functioned as a
☐Outdoor access point device
☐Indoor access point device
☐Fixed point-to-point access points device
☒Client device
(5) The manufacturer states that the frequency sability is in compliance with 15.407(f)
(6) Measurement Standard Used:
ANSI C63.10:2013

FCC Rules and Regulations Part 15 Subpart E

1.1 TEST FACILITY

Company:	Beijing TIRT Technology Service Co.,Ltd Shenzhen
Address:	104 Building C, Xinmingsheng Industrial Park No.132, Zhangge Old Village East Zone, Zhangge Community, Fucheng Street, Longhua District, Shenzhen, Guangdong, P. R. China
CNAS Registration Number:	CNAS L14158
A2LA Registration Number:	6049.01
FCC Accredited Lab.Designation Number:	CN1366
FCC Test Firm Registration Number:	820690
CAB identifier	CN0159
Company Number	31418
Telephone:	+86-0755-27087573

1.2 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% confidence level (based on a coverage factor (k=2))
The TIRT measurement uncertainty as below table:

Uncertainty	
Parameter	Uncertainty
Occupied Channel Bandwidth	±142.12 KHz
RF power conducted	±0.74 dB
RF power radiated	±3.25dB
Spurious emissions, conducted	±1.78dB
Spurious emissions, radiated (30MHz～1GHz)	±4.6dB
Spurious emissions, radiated (1GHz ~ 18GHz)	±4.9dB
Conduction Emissions(150kHz~30MHz)	±3.0dB
Humidity	±4.6%
Temperature	±0.7°C
Time	±1.25%

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

1.3 TEST ENVIRONMENT CONDITIONS

Test Item	Temperature	Humidity	Test Voltage	Tested By
AC Power Line Conducted Emissions	25.1°C	52%	DC 5V from PC	Stone Tang
Radiated Emissions-9kHz to 30MHz	24.5°C	50%	DC 5V from PC	Stone Tang
Radiated Emissions-30MHz to 1000MHz	24.2°C	53%	DC 5V from PC	Stone Tang
Radiated Emissions-Above 1000 MHz	26.0°C	53%	DC 5V from PC	Stone Tang
Bandwidth	25.0°C	56%	DC 5V from PC	Stone Tang
MaximumOutput Power	24.9°C	54%	DC 5V from PC	Stone Tang
Power Spectral Density	25.1°C	62%	DC 5V from PC	Stone Tang

1.4 Accessories of Device (EUT)

Accessories : /

Manufacturer : /

Model : /

Ratings : /

2. GENERAL INFORMATION

2.1 GENERAL DESCRIPTION OF EUT

Equipment	Wireless Module
Brand Name	Panasonic
Model No.	PIOT-V3(GA)
Test No.	PIOT-V3(GA)
Software Version	V0.1
Hardware Version//FVIN	JJBWB4321-V1.0-R0
Power Rating	DC 4.5-5.5V
Power Supply	DC 5V from PC
Operation FrequencyBand(s)	UNII-1: 5180 MHz~5240 MHz UNII-2A: 5260 MHz ~ 5320 MHz UNII-2C: 5500 MHz ~ 5700 MHz UNII-3: 5745 MHz~5825MHz
Modulation Type	IEEE 802.11n: OFDM (64QAM,16QAM,QPSK,BPSK) IEEE 802.11a: OFDM (64QAM,16QAM,QPSK,BPSK)
MaximumOutput Power _UNII-1	IEEE 802.11n40: 17.81dBm(0.060395W)
MaximumOutput Power _UNII-2A	IEEE 802.11n20: 19.08dBm(0.080910W)
MaximumOutput Power _UNII-2C	IEEE 802.11n40: 19.32dBm(0.085507W)
MaximumOutput Power _UNII-3	IEEE 802.11n: 17.56dBm(0.057016W)

Note:

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

This product contains 2 PCB Antenna(Ant Left and Ant Right), does not support MIMO, can only support SISO

2. Channel List:

IEEE 802.11a IEEE 802.11n(HT20)		IEEE 802.11n(HT40)	
UNII-1		UNII-1	
Channel	Frequency (MHz)	Channel	Frequency (MHz)
36	5180	38	5190
40	5200	46	5230
44	5220		
48	5240		

IEEE 802.11a IEEE 802.11n(HT20)		IEEE 802.11n(HT40)	
UNII-2A		UNII-2A	
Channel	Frequency (MHz)	Channel	Frequency (MHz)
52	5260	54	5270
56	5280	62	5310
60	5300		
64	5320		

IEEE 802.11a IEEE 802.11n(HT20)		IEEE 802.11n(HT40)	
UNII-2C		UNII-2C	
Channel	Frequency (MHz)	Channel	Frequency (MHz)
100	5500	102	5510
116	5580	110	5550
136	5680		
140	5700		

IEEE 802.11a IEEE 802.11n(HT20)		IEEE 802.11n(HT40)	
UNII-3		UNII-3	
Channel	Frequency (MHz)	Channel	Frequency (MHz)
149	5745	151	5755
153	5765	159	5795
157	5785		
161	5805		
165	5825		

3. Antenna Specification:

Ant.	Manufactured	Model Name	Antenna Type	Antenna location	Gain (dBi)
1	Dalian GOLDEN Hualu DIGITAL Technology Co., Ltd.	WF4321	PCB	Left	5.71
2	Dalian GOLDEN Hualu DIGITAL Technology Co., Ltd.	WF4321	PCB	Right	3.63

Note:

1) The antenna gain is provided by the manufacturer.

2.2 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 A ModeChannel 36/40/48 (UNII-1) ANT Left
Mode 2	TX N(HT20) ModeChannel 36/40/48 (UNII-1) ANT Left
Mode 3	TX N(HT40) Mode Channel 38/46 (UNII-1) ANT Left
Mode 4	TX A Mode Channel 149/157/165 (UNII-3) ANT Left
Mode 5	TX N(HT20) Mode Channel 149/157/165 (UNII-3) ANT Left
Mode 6	TX N(HT40) Mode Channel 151/159 (UNII-3) ANT Left
Mode 7	TX A Mode Channel 52/60/64 (UNII-2A) ANT Left
Mode 8	TX N(HT20) Mode Channel 52/60/64 (UNII-2A) ANT Left
Mode 9	TX N(HT40) Mode Channel 54/62 (UNII-2A) ANT Left
Mode 10	TX A Mode Channel 100/120/140 (UNII-2C) ANT Left
Mode 11	TX N(HT20) Mode Channel 100/120/140 (UNII-2C) ANT Left
Mode 12	TX N(HT40) Mode Channel 102/110/134 (UNII-2C) ANT Left
Mode 13	TX A ModeChannel 36/40/48 (UNII-1) ANT Right
Mode 14	TX N(HT20) ModeChannel 36/40/48 (UNII-1) ANT Right
Mode 15	TX N(HT40) Mode Channel 38/46 (UNII-1) ANT Right
Mode 16	TX A Mode Channel 149/157/165 (UNII-3) ANT Right
Mode 17	TX N(HT20) Mode Channel 149/157/165 (UNII-3) ANT Right
Mode 18	TX N(HT40) Mode Channel 151/159 (UNII-3) ANT Right
Mode 19	TX A Mode Channel 52/60/64 (UNII-2A) ANT Right
Mode 20	TX N(HT20) Mode Channel 52/60/64 (UNII-2A) ANT Right
Mode 21	TX N(HT40) Mode Channel 54/62 (UNII-2A) ANT Right
Mode 22	TX A Mode Channel 100/120/140 (UNII-2C) ANT Right
Mode 23	TX N(HT20) Mode Channel 100/120/140 (UNII-2C) ANT Right
Mode 24	TX N(HT40) Mode Channel 102/110/134 (UNII-2C) ANT Right

In the test, the AmebaDPlus_mptool was used and the power setting below was used for the test

Mode	Frequency(MHz)	TX power index setting
802.11a	5180	77
	5200	79
	5240	78
	5260	75
	5280	75
	5320	72
	5500	66
	5600	72
	5700	71
	5745	74
	5785	77
	5825	74

Mode	Frequency(MHz)	TX power index setting
802.11n20	5180	77
	5200	79
	5240	78
	5260	74
	5280	75
	5320	72
	5500	67
	5600	72
	5700	72
	5745	75
	5785	75
	5825	74

Mode	Frequency(MHz)	TX power index setting
802.11n40	5190	77
	5230	77
	5270	75
	5310	75
	5510	68
	5590	72
	5670	72
	5755	74
	5795	76

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 10	TX A Mode Channel 100/120/140 (UNII-2C) ANT Left

Radiated Emissions Test - Below 1GHz	
Final Test Mode	Description
Mode 10	TX A Mode Channel 100/120/140 (UNII-2C) ANT Left

Radiated Emissions Test - Above 1GHz	
Final Test Mode	Description
Mode 10	TX A Mode Channel 100/120/140 (UNII-2C) ANT Left

Pretest Mode	Description
Mode 1	TX A ModeChannel 36/40/48 (UNII-1) ANT Left
Mode 2	TX N(HT20) ModeChannel 36/40/48 (UNII-1) ANT Left
Mode 3	TX N(HT40) Mode Channel 38/46 (UNII-1) ANT Left
Mode 4	TX A Mode Channel 149/157/165 (UNII-3) ANT Left
Mode 5	TX N(HT20) Mode Channel 149/157/165 (UNII-3) ANT Left
Mode 6	TX N(HT40) Mode Channel 151/159 (UNII-3) ANT Left
Mode 7	TX A Mode Channel 52/60/64 (UNII-2A) ANT Left
Mode 8	TX N(HT20) Mode Channel 52/60/64 (UNII-2A) ANT Left
Mode 9	TX N(HT40) Mode Channel 54/62 (UNII-2A) ANT Left
Mode 10	TX A Mode Channel 100/120/140 (UNII-2C) ANT Left
Mode 11	TX N(HT20) Mode Channel 100/120/140 (UNII-2C) ANT Left
Mode 12	TX N(HT40) Mode Channel 102/110/134 (UNII-2C) ANT Left
Mode 13	TX A ModeChannel 36/40/48 (UNII-1) ANT Right
Mode 14	TX N(HT20) ModeChannel 36/40/48 (UNII-1) ANT Right
Mode 15	TX N(HT40) Mode Channel 38/46 (UNII-1) ANT Right
Mode 16	TX A Mode Channel 149/157/165 (UNII-3) ANT Right
Mode 17	TX N(HT20) Mode Channel 149/157/165 (UNII-3) ANT Right
Mode 18	TX N(HT40) Mode Channel 151/159 (UNII-3) ANT Right
Mode 19	TX A Mode Channel 52/60/64 (UNII-2A) ANT Right
Mode 20	TX N(HT20) Mode Channel 52/60/64 (UNII-2A) ANT Right
Mode 21	TX N(HT40) Mode Channel 54/62 (UNII-2A) ANT Right
Mode 22	TX A Mode Channel 100/120/140 (UNII-2C) ANT Right
Mode 23	TX N(HT20) Mode Channel 100/120/140 (UNII-2C) ANT Right
Mode 24	TX N(HT40) Mode Channel 102/110/134 (UNII-2C) ANT Right

Note:

(1) For AC power line conducted emissions and radiated emission below 1 GHz test, the TX A Mode Channel 120 (UNII-2C) ANT Left is found to be the worst case and recorded.

(2) For radiated emission above 1 GHz test, the spurious points of 1GHz~26.5GHz and 26.5GHz~40GHz 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.

(3) All the bit rate of transmitter have been tested and found the lowest rate is found tobe the worst case and recorded.

2.3DUTY CYCLE

If duty cycle is ≥ 98 %, duty factor is not required.
If duty cycle is < 98 %, duty factor shall be considered.
The output power = measured power + duty factor.
The power spectral density = measured power spectral density + duty factor.

Please refer to 5GWIFI test data attachment

NOTE:
For IEEE 802.11a:
For radiated emissions frequency above 1 GHz, the resolution bandwidth of test receiver/spectrum analyzer is 1 MHz and the video bandwidth set VBW> 1/T, Trefers to the minimum transmission duration over which the transmitter is on and istransmitting at its Maximumpower control level for the tested mode of operation.

For IEEE 802.11n(HT20):
For radiated emissions frequency above 1 GHz, the resolution bandwidth of test receiver/spectrum analyzer is 1 MHz and the video bandwidth set VBW> 1/T, Trefers to the minimum transmission duration over which the transmitter is on and istransmitting at its Maximumpower control level for the tested mode of operation.

For IEEE 802.11n(HT40):
For radiated emissions frequency above 1 GHz, the resolution bandwidth of test receiver/spectrum analyzer is 1 MHz and the video bandwidth set VBW> 1/T, Trefers to the minimum transmission duration over which the transmitter is on and istransmitting at its Maximumpower control level for the tested mode of operation.

2.4BLOCKDIAGRAMSHOWINGTHECONFIGURATIONOFSYSTEMTESTED

2.5SUPPORT UNITS

No.	Description	Manufacturer	Model	Serial Number	Certification or SDOC
1	USB TO TTL USART	N/A	N/A	N/A	N/A
2	PC	acer	N19C5	N/A	N/A
3	AC/DC ADAPTER	DELTA ELECTRONICS, INC	ADP-135NB B	N/A	N/A

3.AC POWER LINE CONDUCTED EMISSIONS

3.1LIMIT

Frequency (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.

3.2 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 equipmentpowered 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 groundplane 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.

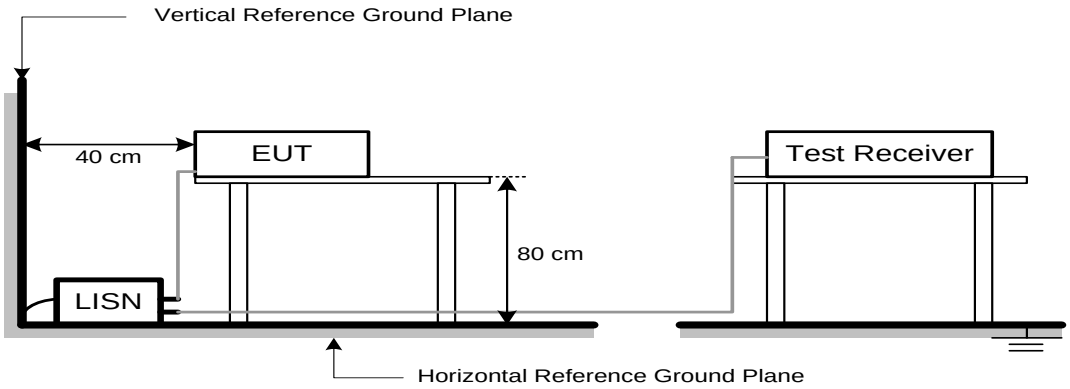
The following table is the setting of the receiver:

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

3.3DEVIATIONFROMTESTSTANDARD

No deviation

3.4TESTSETUP



The LISN edge is arranged parallel to the edge of the test table
The vertical conducting plane or wall of an RF-shielded (screened) room shall be located 40 cm to the rear ofthe EUT

3.5EUT OPERATION 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.
The EUT was programmed to be in continuously transmitting/TX mode.

3.6 TEST RESULTS

Please refer to the APPENDIX A.

4. RADIATED EMISSIONS

4.1LIMIT

In case the emission fall within the restricted band specified on FCC Part15 C Section 15.209 and 15.205, then the FCC Part15 C Section 15.209 and 15.205 limit in the table below has to be followed.

LIMITS OF RADIATED EMISSIONS MEASUREMENT (9 kHz to 1000MHz)

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 UNWANTED EMISSION OUT OF THE RESTRICTED BANDS (Above 1000 MHz)

Frequency (MHz)	EIRP Limit (dBm/MHz)	Equivalent Field Strength at 3m (dBμV/m)
5150-5250	-27	68.2
5250-5350	-27	68.2
5470-5725	-27	68.2
5725-5850 NOTE (2)	-27	68.2
	10	105.2
	15.6	110.8
	27	122.2

NOTE:

(1) The following formula is used to convert the equipment isotropic radiated power (eirp) to field strength:

$E = \frac{1000000\sqrt{30P}}{3}$ μV/m, where P is the eirp (Watts)

(2) According to 15.407(b)(4)(i), all emissions shall be limited to a level of -27 dBm/MHz at 75 MHz ormore above or below the band edge increasing linearly to 10 dBm/MHz at 25 MHz above or belowthe band edge, and from 25 MHz above or below the band edge increasing linearly to a level of15.6 dBm/MHz at 5 MHz above or below the band edge, and from 5 MHz above or below theband edge increasing linearly to a level of 27 dBm/MHz at the band edge.

4.2TEST 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 1GHz)
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 Maximumreading (used Bore sight function).
e. The receiver system was set to peak and average detect function and specified bandwidth with Maximumhold mode when the test frequency is above 1GHz.
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 1GHz)
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 1GHz)
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 or 40 GHz, whichever is lower
RBW / VBW (Emission in restricted band)	1MHz / 3MHz for PK value 1MHz / 1/THz for AVG value

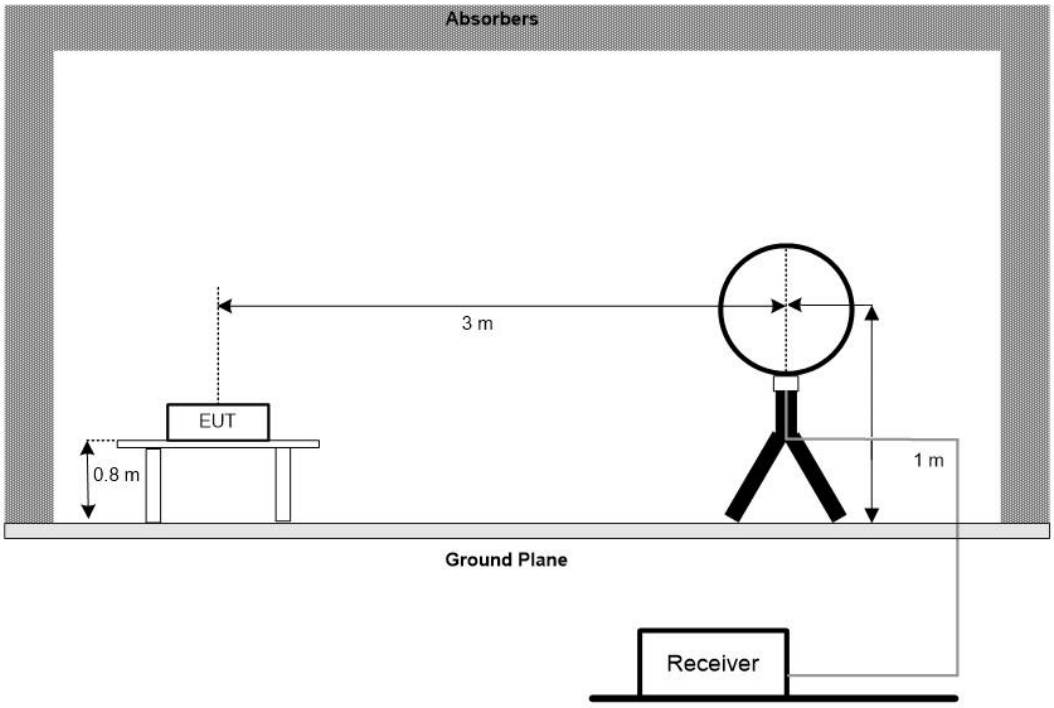
Receiver Parameters	Setting
Start ~ Stop Frequency	9 kHz~90 kHz for PK/AVG detector
Start ~ Stop Frequency	90 kHz~110 kHz for QP detector
Start ~ Stop Frequency	110 kHz~490 kHz for PK/AVG detector
Start ~ Stop Frequency	490 kHz~30 MHz for QP detector
Start ~ Stop Frequency	30MHz~1000MHz for QP detector
Start ~ Stop Frequency	1 GHz~40GHz for PK/AVG detector

4.3DEVIATIONFROMTESTSTANDARD

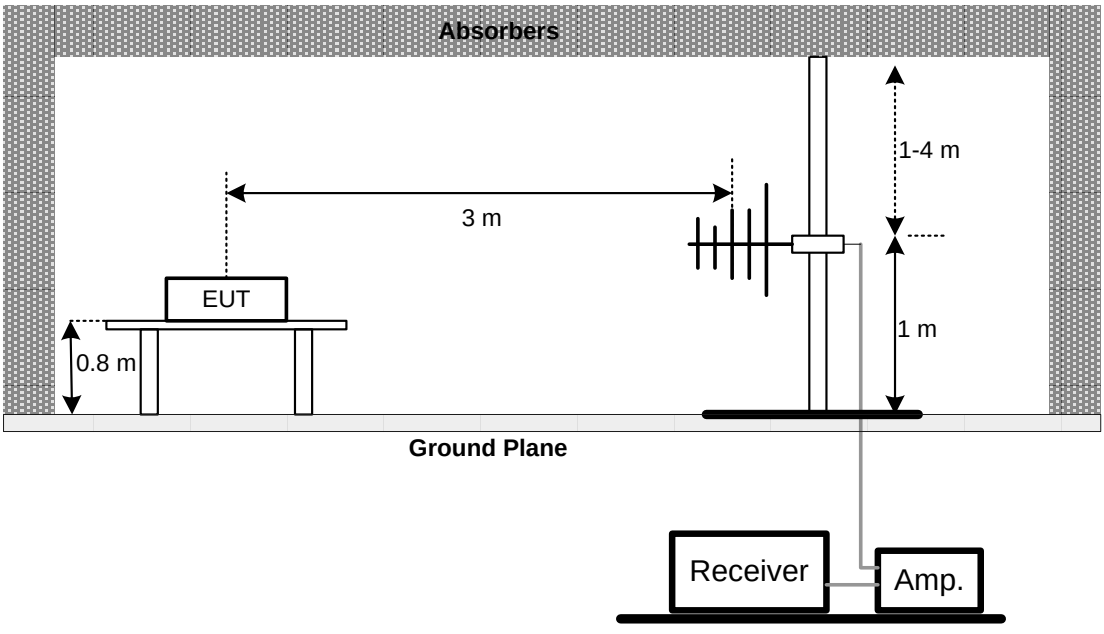
No deviation.

4.4TESTSETUP

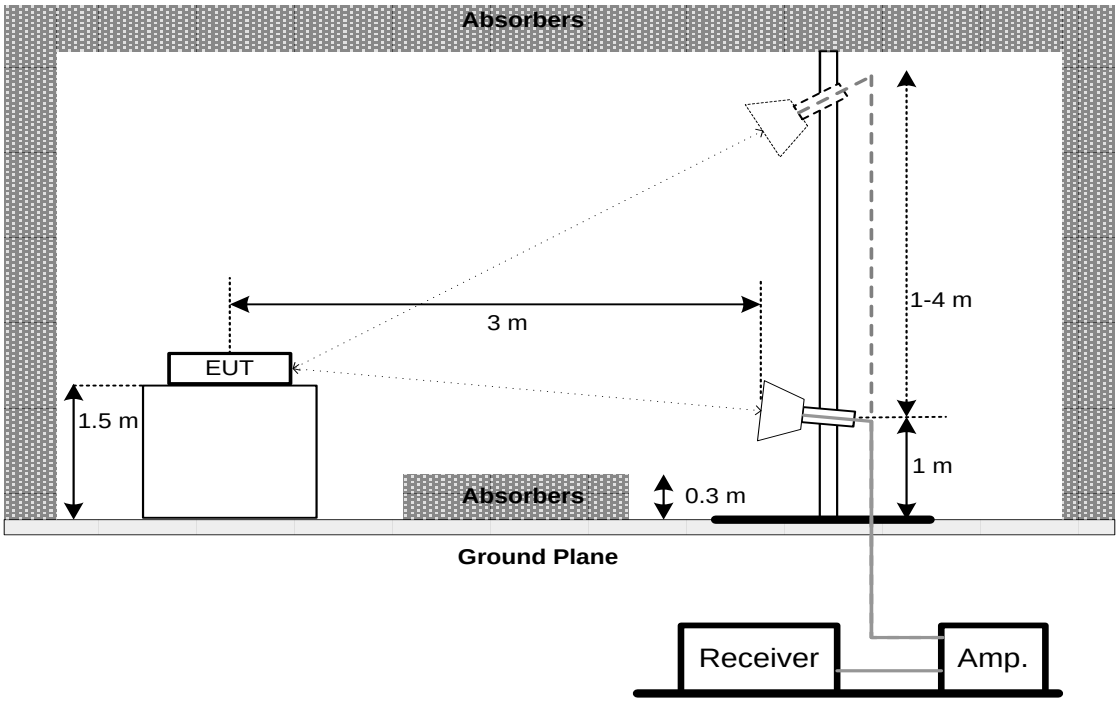
9 kHz to 30 MHz



30 MHz to 1 GHz



Above 1 GHz



4.5EUT OPERATION CONDITIONS

The EUT tested system was configured as the statements of 3.5 unless otherwise a special operating condition is specified in the follows during the testing.

4.6TEST RESULTS - 9 KHZTO 30MHZ

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.

4.7TEST RESULTS - 30 MHZTO 1000 MHZ

Please refer to the APPENDIX C.

4.8TEST RESULTS - ABOVE1000 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.

5.BANDWIDTH

5.1LIMIT

Section	Test Item	Limit	Frequency Range (MHz)
FCC Part15 E Section 15.407,	26 dB Bandwidth	-	5150-5250
	26 dB Bandwidth	-	5250-5350
	26 dB Bandwidth	-	5470-5725
	6dB Bandwidth	Minimum 500 kHz	5725-5850

5.2TEST PROCEDURE

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

b. Spectrum Setting:

For UNII-1, UNII-2A, UNII-2C

Spectrum Parameter	Setting
Span Frequency	> 26dB Bandwidth
RBW	Appromiximately 1% of the emission bandwidth
VBW	> RBW
Detector	Peak
Trace	MAX Hold
Sweep Time	Auto

For UNII-3:

Spectrum Parameter	Setting
Span Frequency	> 6dB Bandwidth
RBW	100KHz
VBW	300KHz
Detector	Peak
Trace	MAX Hold
Sweep Time	Auto

For 99% Occupied Bandwidth:

Spectrum Parameter	Setting
Span Frequency	1.5 times to 5 times the OBW
RBW	1% to 5% of the OBW
VBW	≥3*RBW
Detector	Peak
Trace	MAX Hold
Sweep Time	Auto

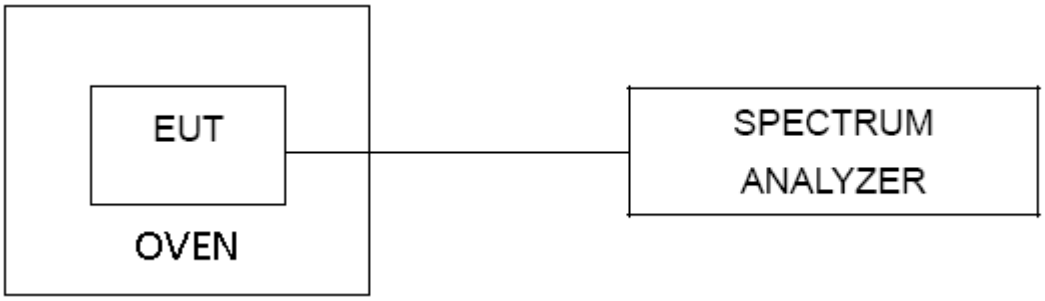
c. Measured the spectrum width with power higher than 26dB / 6dB below carrier.

d. .Compute the trace by integrating the spectrum, finally, maxhold displays the View

5.3DEVIATION FROM STANDARD

No deviation.

5.4TEST SETUP



5.5EUT OPERATION CONDITIONS

The EUT was programmed to be in continuously transmitting mode.

5.6 TEST RESULTS

Please refer to 5GWIFI test data attachment

6.MAXIMUMOUTPUT POWER

6.1LIMIT

Section	Test Item	Limit	Frequency Range (MHz)
FCC Part15 E Section 15.407	MAXimumOutput Power	AP device:1 Watt (30dBm) Client device: 250mW (23.98dBm)	5150-5250
		250mW (23.98dBm)	5250-5350
		250mW (23.98dBm)	5470-5725
		1 Watt (30dBm)	5725-5850

Note:

a. For client devices in the 5.15-5.25 GHz band, the Maximumconducted output power over the frequency band of operation shall not exceed 250 mW provided the Maximumantenna gain does not exceed 6 dBi. In addition, the Maximumpower spectral density shall not exceed 11 dBm in any 1 megahertz band. If transmitting antennas of directional gain greater than 6 dBi are used, both the Maximumconducted output power and the Maximumpower spectral density shall be reduced by the amount in dB that the directional gain of the antenna exceeds 6 dBi.

b. For the 5.25-5.35 GHz and 5.47-5.725 GHz bands, the Maximumconducted output power over the frequency bands of operation shall not exceed the lesser of 250 mW or 11 dBm + 10log B, where B is the 26dB Bandwidth in megahertz.

6.2TEST PROCEDURE

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

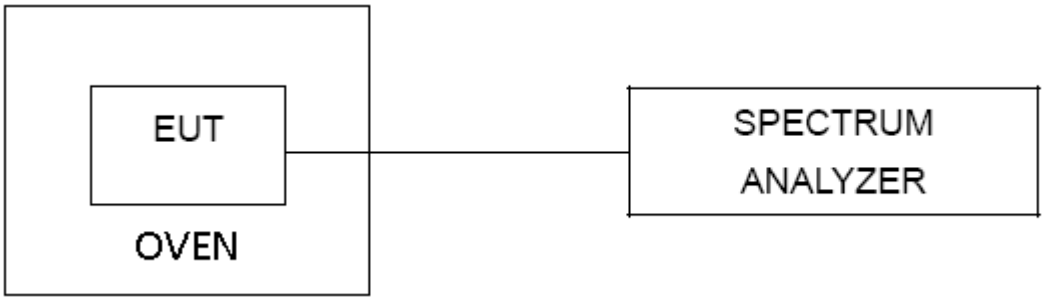
b. The test was performed in accordance with method of FCC KDB 789033 D02 General UNII Test Procedures New Rules v02r01.

c. .Compute the trace by integrating the spectrum, finally, maxhold displays the View

6.3DEVIATION FROM STANDARD

No deviation.

6.4TEST SETUP



6.5EUT OPERATION CONDITIONS

The EUT was programmed to be in continuously transmitting mode.

6.6 TEST RESULTS

Please refer to 5GWIFI test data attachment

7.POWER SPECTRAL DENSITY

7.1LIMIT

Section	Test Item	Limit	Frequency Range (MHz)
FCC Part15 E Section 15.407	Power Spectral Density	AP device:17dBm/MHz Client device:11dBm/MHz	5150-5250
		11dBm/MHz	5250-5350
		11dBm/MHz	5470-5725
		30dBm/500kHz	5725-5850

7.2TEST PROCEDURE

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

b. Spectrum Setting:

For UNII-1

Spectrum Parameter	Setting
Span Frequency	Encompass the entire emissions bandwidth (EBW) of the signal
RBW	1MHz.
VBW	3MHz.
Detector	RMS
Trace average	100 trace
Sweep Time	Auto

For UNII-3:

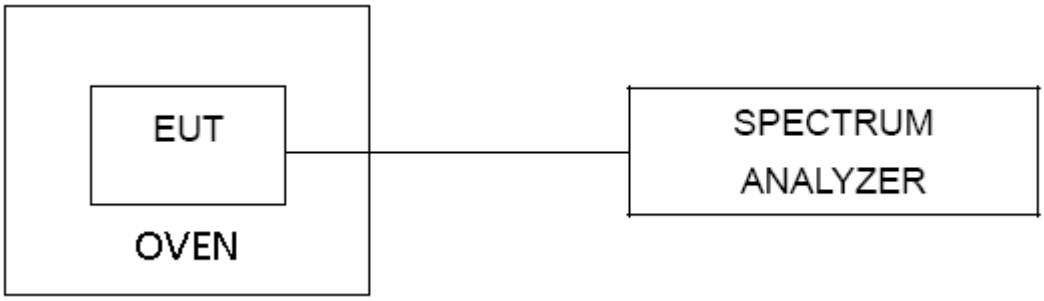
Spectrum Parameter	Setting
Span Frequency	Encompass the entire emissions bandwidth (EBW) of the signal
RBW	500KHz.
VBW	2MHz.
Detector	RMS
Trace average	100 trace
Sweep Time	Auto

c. .Compute the trace by integrating the spectrum, finally, maxhold displays the View

7.3DEVIATION FROM STANDARD

No deviation.

7.4TEST SETUP



7.5EUT OPERATION CONDITIONS

The EUT was programmed to be in continuously transmitting mode.

7.6 TEST RESULTS

Please refer to 5GWIFI test data attachment

8.FREQUENCY STABILITY

8.1LIMIT

Section	Test Item	Limit	Frequency Range (MHz)
15.407(f)	Frequency Stability	An emission is maintained within the band of operation under all conditions of normal operation as specified in the users manual.	5150-5250
			5250-5350
			5470-5725
			5725-5850

8.2TEST PROCEDURE

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

b. Spectrum Setting:

Spectrum Parameter	Setting
Span Frequency	Entire absence of modulation emissionsbandwidth
RBW	10 kHz
VBW	10kHz
Detector	Peak
Trace	MAX Hold
Sweep Time	Auto

c. The test extreme voltage is to change the primary supply voltage from 85 to 115 percent of the nominal value.

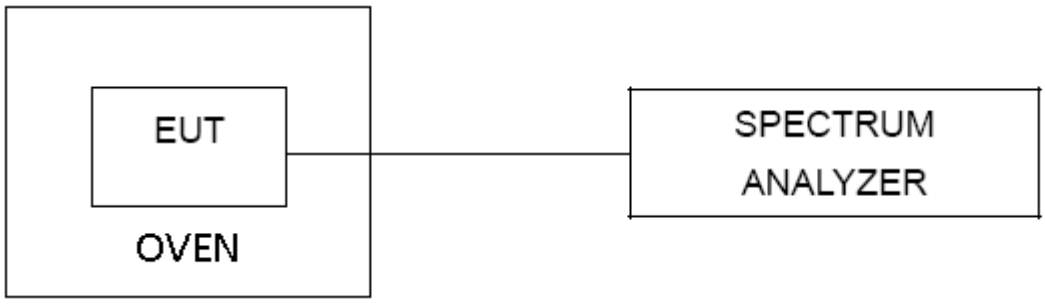
d. User manual temperature is-10°C~70°C.

c. .Compute the trace by integrating the spectrum, finally, maxhold displays the View

8.3DEVIATION FROM STANDARD

No deviation.

8.4TEST SETUP



8.5EUT OPERATION CONDITIONS

The EUT was programmed to be in continuously transmitting mode.

8.6 TEST RESULTS

Please refer to 5GWIFI test data attachment

9. MEASUREMENT INSTRUMENTS LIST

Name of Equipment	Manufacturer	Model Number	Serial Number	Last Calibration	Due Calibration
EMI Receiver	Rohde&Schwarz	ESIB 40	YH-TIRT-SAC-966-20220911	2025/01/05	2026/01/04
Integral Antenna	Schwarzbeck	VULB 9163	01314	2024/12/11	2026/12/10
Integral Antenna	Rohde&Schwarz	HF907	RSM2991424	2024/12/11	2026/12/10
Preamplifier	Emtrace	RP01A	'02017	2025/01/05	2026/01/04
Preamplifier	Schwarzbeck	BBV9744	00143	2025/01/05	2026/01/04
Loop Antenna	ZHINAN	ZN30900A	12024	2025/01/05	2026/01/04
Horn Antenna	Schwarzbeck	BBHA9170	00956	2025/01/05	2026/01/04
RF Cable	/	LMR400UF-NMNM-7.0M	/	2025/01/05	2026/01/04
RF Cable	/	SFT2050PUR-NMNM-7.0M	/	2025/01/05	2026/01/04
EMI Receiver	Rohde&Schwarz	ESR7	1316.3003K07-102611-mk	2024/11/02	2025/11/01
LISN	Rohde&Schwarz	ENV216	3560.655.12-102915-Bp	2024/11/02	2025/11/01
RF Cable	\	SFT2050PUR-NMNM-2.0M	\	2025/01/05	2026/01/04
Spectrum analyzer	ROHDE&SCHWARZ	FSU26	200732	2025/01/05	2026/01/04
Spectrum analyzer	ROHDE&SCHWARZ	FSV40-N	101722	2025/01/05	2026/01/04
Filter	HEWLETT PACKARD	JS0806-F	19K8060209	2025/01/05	2026/01/04

10.EUT TEST PHOTOS

Reference to the **appendix II external photos** and **appendix III internal photos** for details.

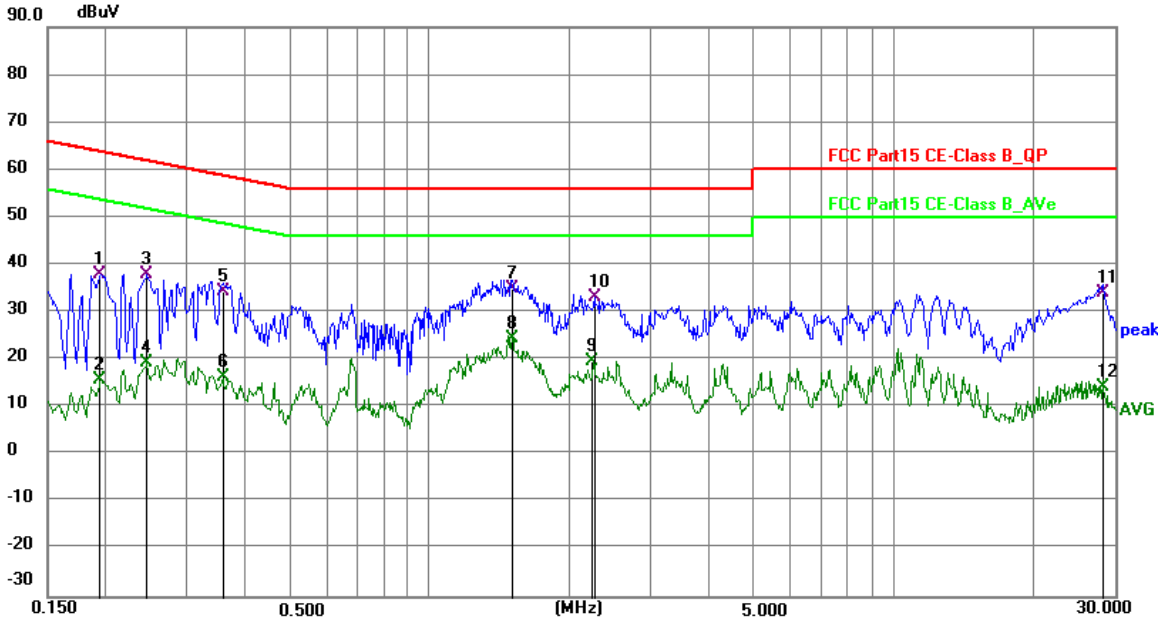
11.EUT PHOTOS

Reference to the **appendix I** Test Setup Photo for details.

APPENDIX A - AC POWER LINE CONDUCTED EMISSIONS

Test Mode	TX A Mode Channel 120 (UNII-2C) ANT Left	Phase	Line

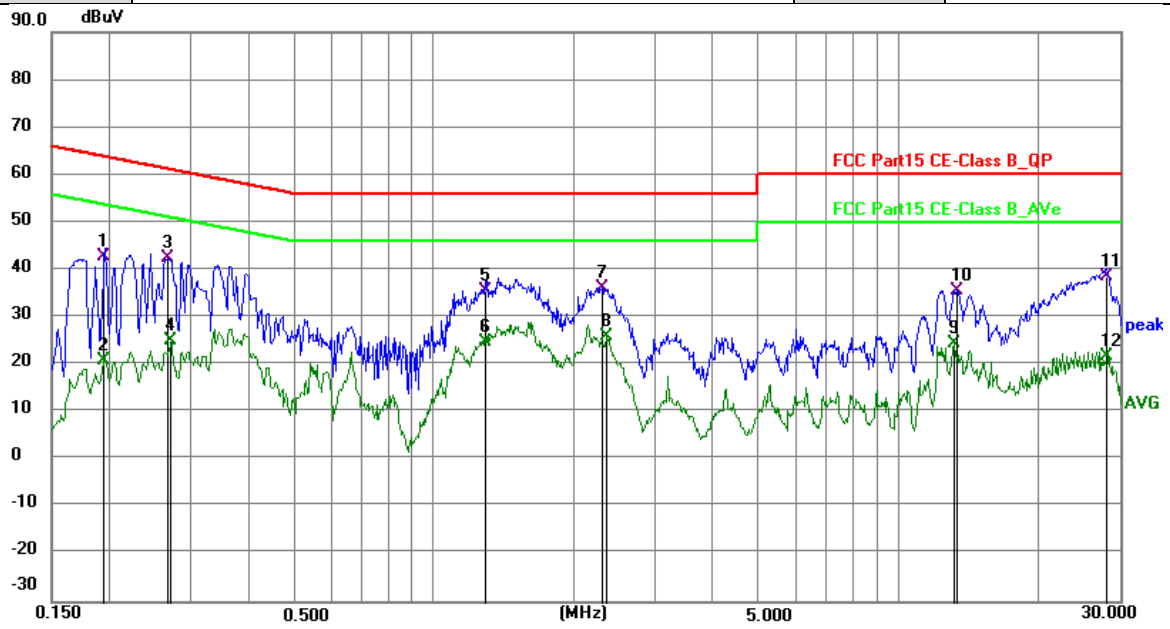
Remark: All modes had been tested, Only show the worst mode



No.	Frequency (MHz)	Reading (dBuV)	Factor (dB)	Level (dBuV)	Limit (dBuV)	Margin (dB)	Detector	P/F	Remark
1	0.1949	28.29	9.63	37.92	63.83	-25.91	QP	P	
2	0.1949	6.07	9.63	15.70	53.83	-38.13	AVG	P	
3	0.2444	28.32	9.63	37.95	61.95	-24.00	QP	P	
4	0.2444	9.83	9.63	19.46	51.95	-32.49	AVG	P	
5	0.3570	24.58	9.63	34.21	58.80	-24.59	QP	P	
6	0.3570	6.79	9.63	16.42	48.80	-32.38	AVG	P	
7 *	1.5045	25.24	9.64	34.88	56.00	-21.12	QP	P	
8	1.5045	14.73	9.64	24.37	46.00	-21.63	AVG	P	
9	2.2559	10.08	9.65	19.73	46.00	-26.27	AVG	P	
10	2.2694	23.49	9.65	33.14	56.00	-22.86	QP	P	
11	28.1940	24.18	9.74	33.92	60.00	-26.08	QP	P	
12	28.1940	4.39	9.74	14.13	50.00	-35.87	AVG	P	

REMARKS:
(1) Measurement Value = Reading Level + Correct Factor.
(2) Margin Level = Measurement Value - Limit Value.
(3) The test result has included the cable loss.

Test Mode	TX A Mode Channel 120 (UNII-2C) ANT Left	Phase	Neutral



No.	Frequency (MHz)	Reading (dBuV)	Factor (dB)	Level (dBuV)	Limit (dBuV)	Margin (dB)	Detector	P/F	Remark
1	0.1949	33.04	9.63	42.67	63.83	-21.16	QP	P	
2	0.1949	11.36	9.63	20.99	53.83	-32.84	AVG	P	
3 *	0.2670	32.88	9.63	42.51	61.21	-18.70	QP	P	
4	0.2714	15.53	9.63	25.16	51.07	-25.91	AVG	P	
5	1.2930	25.99	9.64	35.63	56.00	-20.37	QP	P	
6	1.2930	15.24	9.64	24.88	46.00	-21.12	AVG	P	
7	2.3054	26.61	9.65	36.26	56.00	-19.74	QP	P	
8	2.3550	16.27	9.65	25.92	46.00	-20.08	AVG	P	
9	13.2225	14.74	9.74	24.48	50.00	-25.52	AVG	P	
10	13.3710	25.87	9.74	35.61	60.00	-24.39	QP	P	
11	28.1040	28.78	9.74	38.52	60.00	-21.48	QP	P	
12	28.1040	12.02	9.74	21.76	50.00	-28.24	AVG	P	

REMARKS:
(1) Measurement Value = Reading Level + Correct Factor.
(2) Margin Level = Measurement Value - Limit Value.
(3) The test result has included the cable loss.

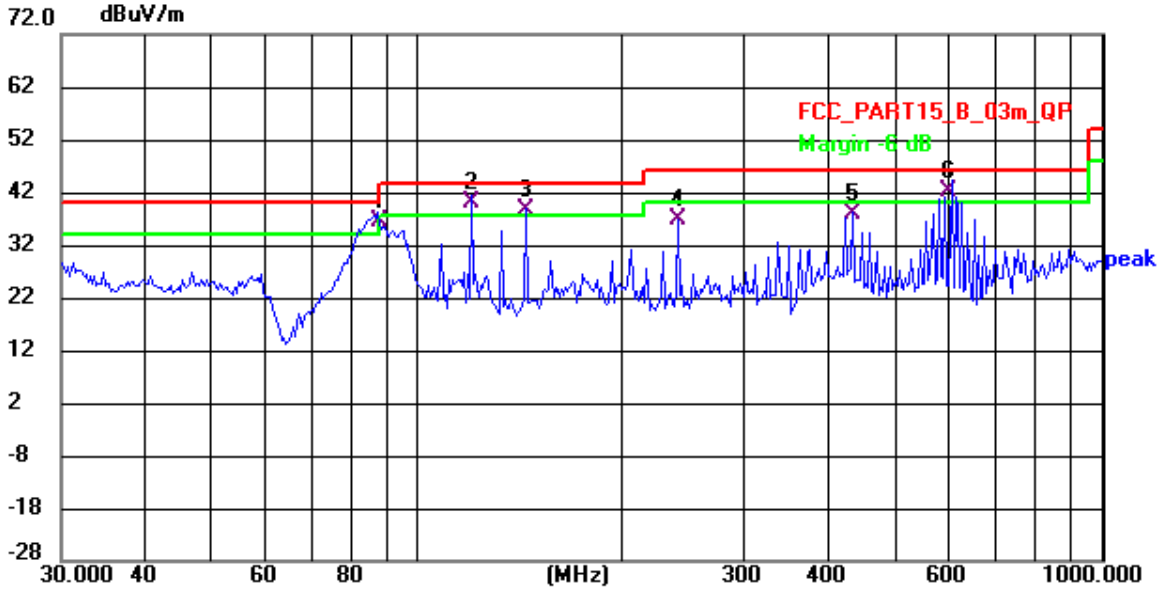
APPENDIX B - RADIATED EMISSION - 9 KHZ TO 30 MHZ

The low frequency, which started from 9 kHz to 30MHz, was pre-scanned and the result which was 20dB lower than the limit line was not reported.

There is a comparison data of both open-field test site and semi-Anechoic chamber, and the result came out very similar.

APPENDIX C - RADIATED EMISSION - 30 MHZ TO 1000 MHZ

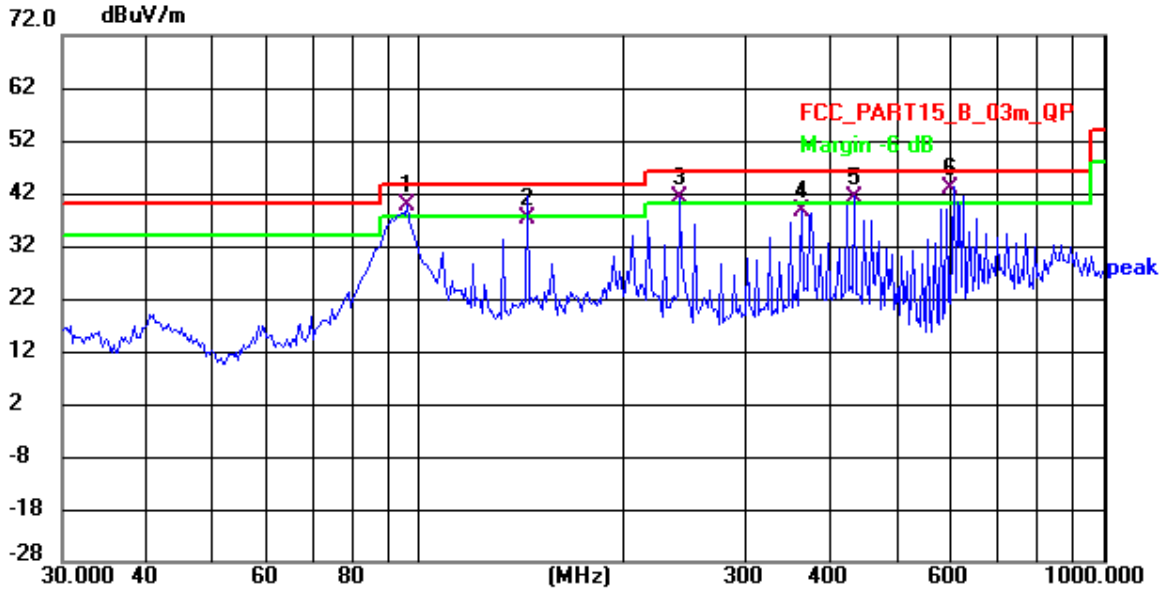
Test Mode	TX A Mode Channel 120 (UNII-2C) ANT Left	Polarization	Vertical



No.	Frequency (MHz)	Reading (dBuV)	Factor (dB/m)	Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Detector	Height (cm)	Azimuth (deg.)	P/F	Remark
1	88.093	62.15	-25.76	36.39	43.50	-7.11	QP	200	251	P	
2 *	120.002	62.93	-22.78	40.15	43.50	-3.35	QP	100	208	P	
3 !	143.776	60.08	-21.30	38.78	43.50	-4.72	QP	200	18	P	
4	240.144	60.78	-23.97	36.81	46.00	-9.19	QP	100	180	P	
5	433.340	56.21	-18.19	38.02	46.00	-7.98	QP	100	97	P	
6 !	602.674	55.79	-13.72	42.07	46.00	-3.93	QP	100	124	P	

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

Test Mode	TX A Mode Channel 120 (UNII-2C) ANT Left	Polarization	Horizontal



No.	Frequency (MHz)	Reading (dBuV)	Factor (dB/m)	Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Detector	Height (cm)	Azimuth (deg.)	P/F	Remark
1 !	95.649	64.75	-25.23	39.52	43.50	-3.98	QP	200	71	P	
2	144.011	58.33	-21.28	37.05	43.50	-6.45	QP	200	39	P	
3 !	240.144	65.01	-23.97	41.04	46.00	-4.96	QP	100	155	P	
4	360.977	58.81	-20.30	38.51	46.00	-7.49	QP	100	261	P	
5 !	433.340	59.46	-18.19	41.27	46.00	-4.73	QP	200	196	P	
6 *	600.684	56.50	-13.77	42.73	46.00	-3.27	QP	200	18	P	

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

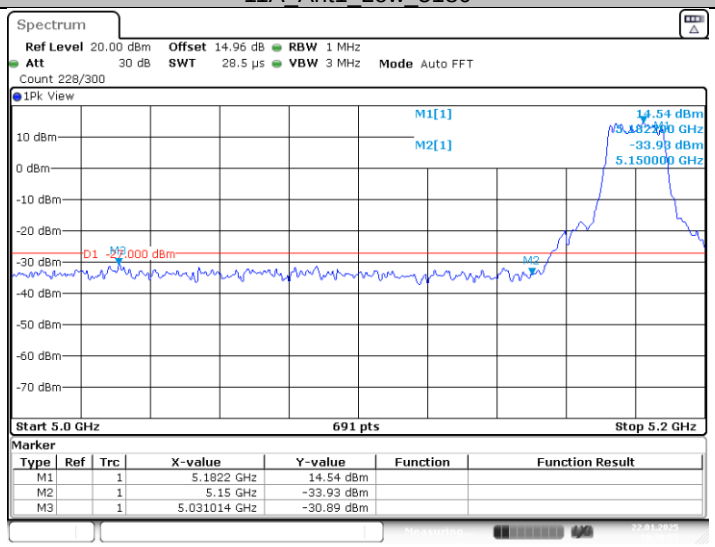
APPENDIX D - RADIATED EMISSION - ABOVE 1000 MHZ

Test Result of Band edges:

TestMode	Antenna	ChName	Freq(MHz)	Result[dBm]	Limit[dBm]	Verdict
11A	Ant Left	Low	5180	-30.89	≤-27	PASS
		High	5240	-30.36	≤-27	PASS
		Low	5260	-30.74	≤-27	PASS
		High	5320	-30	≤-27	PASS
		Low	5500	-29.69	≤-27	PASS
		High	5700	-29.03	≤-27	PASS
11N20SISO	Ant Left	Low	5180	-29.17	≤-27	PASS
		High	5240	-30.29	≤-27	PASS
		Low	5260	-30.76	≤-27	PASS
		High	5320	-29.63	≤-27	PASS
		Low	5500	-29.85	≤-27	PASS
		High	5700	-29.96	≤-27	PASS
11N40SISO	Ant Left	Low	5190	-30.68	≤-27	PASS
		High	5230	-28.5	≤-27	PASS
		Low	5270	-31.57	≤-27	PASS
		High	5310	-28.42	≤-27	PASS
		Low	5510	-30.06	≤-27	PASS
		High	5670	-29.61	≤-27	PASS

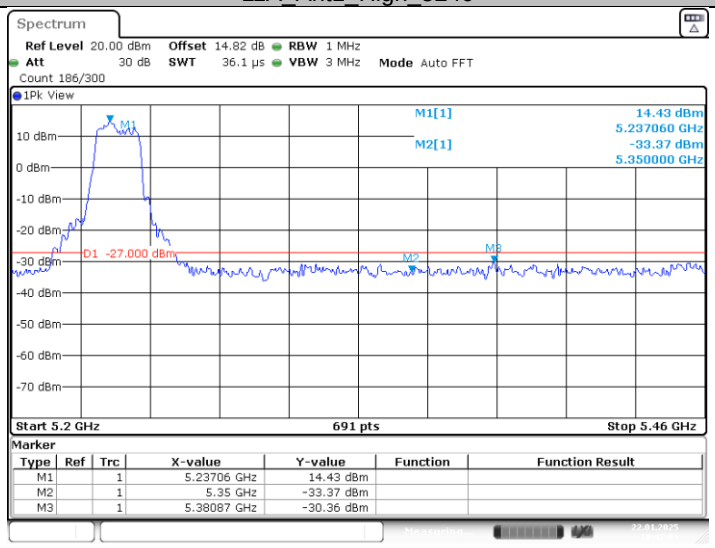
TestMode	Antenna	ChName	Freq(MHz)	FreqRange [MHz]	Result [dBm]	Limit [dBm]	Verdict
11A	Ant Left	Low	5745	5650~5700	-31.6	≤-26.26	PASS
				5700~5720	-31.79	≤10.05	PASS
				5720~5725	-30.07	≤15.98	PASS
				5760~5650	-32.26	≤-27	PASS
		High	5825	5850~5855	-30.99	≤15.65	PASS
				5855~5875	-31.59	≤10.02	PASS
				5875~5925	-31.96	≤-26.00	PASS
				5925~5935	-31.41	≤-27	PASS
11N20SISO	Ant Left	Low	5745	5650~5700	-32.28	≤-26.88	PASS
				5700~5720	-31.33	≤10.42	PASS
				5720~5725	-31.98	≤15.98	PASS
				5760~5650	-31.86	≤-27	PASS
		High	5825	5850~5855	-31.83	≤15.65	PASS
				5855~5875	-32.2	≤10.02	PASS
				5875~5925	-30.82	≤-26.15	PASS
				5925~5935	-31.79	≤-27	PASS
11N40SISO	Ant Left	Low	5755	5650~5700	-31.71	≤-26.21	PASS
				5700~5720	-32.09	≤10.05	PASS
				5720~5725	-30.46	≤15.90	PASS
				5780~5650	-30.68	≤-27	PASS
		High	5795	5850~5855	-33.23	≤15.85	PASS
				5855~5875	-29.03	≤11.48	PASS
				5875~5925	-31.84	≤-26.26	PASS
				5925~5935	-32.55	≤-27	PASS

11A_Ant1_Low_5180



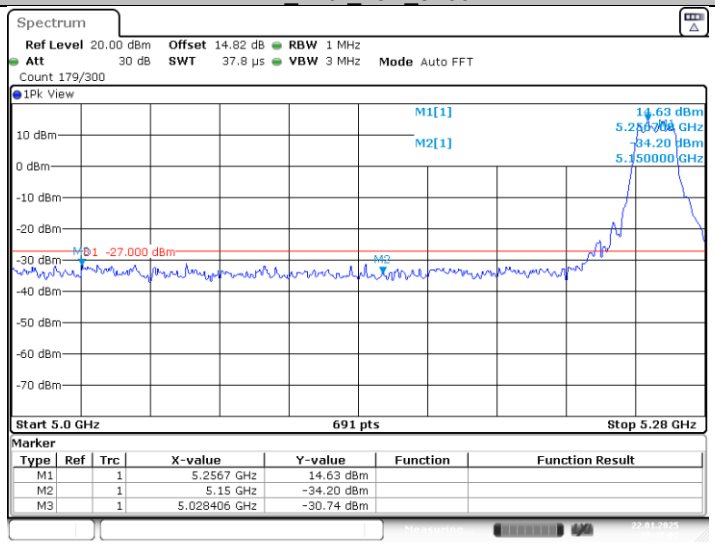
Date: 22.JAN.2025 10:30:55

11A_Ant1_High_5240



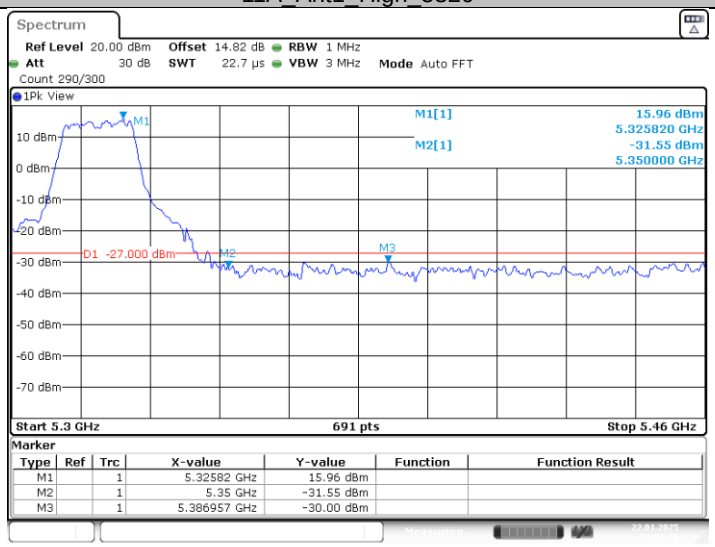
Date: 22.JAN.2025 10:42:01

11A_Ant1_Low_5260



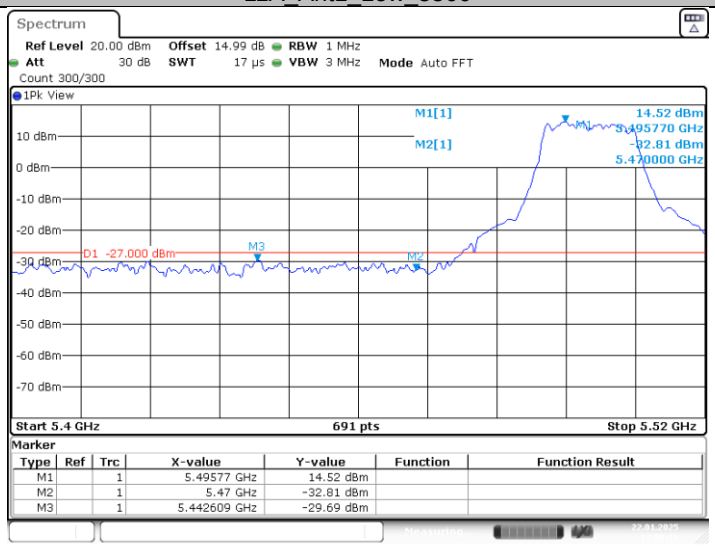
Date: 22.JAN.2025 10:48:02

11A_Ant1_High_5320



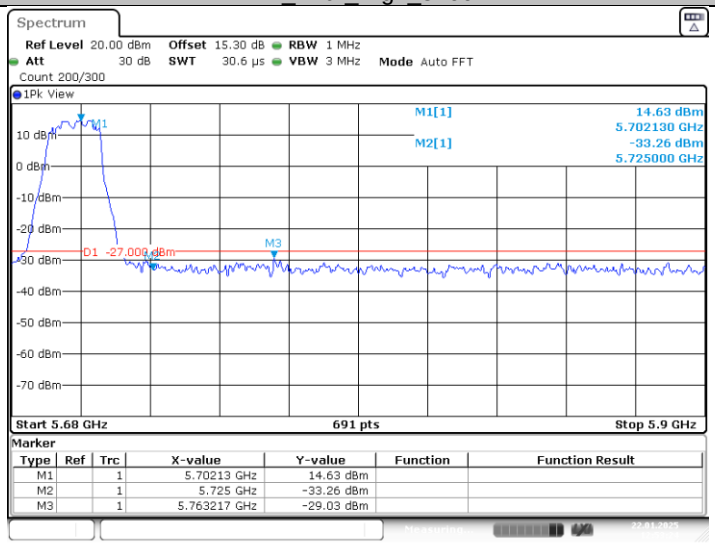
Date: 22.JAN.2025 11:03:56

11A_Ant1_Low_5500



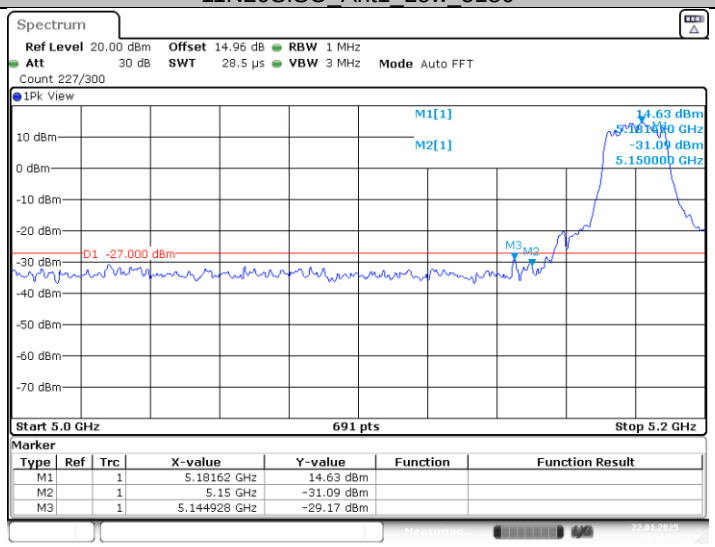
Date: 22.JAN.2025 13:00:16

11A_Ant1_High_5700



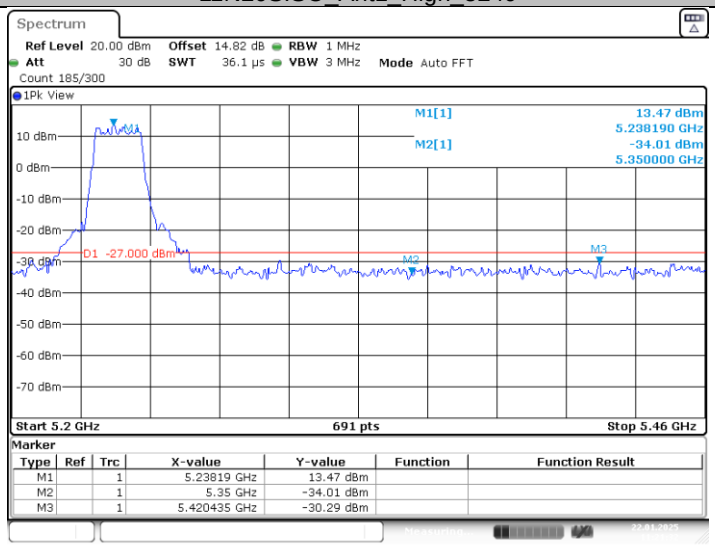
Date: 22.JAN.2025 12:53:24

11N20SISO_Ant1_Low_5180



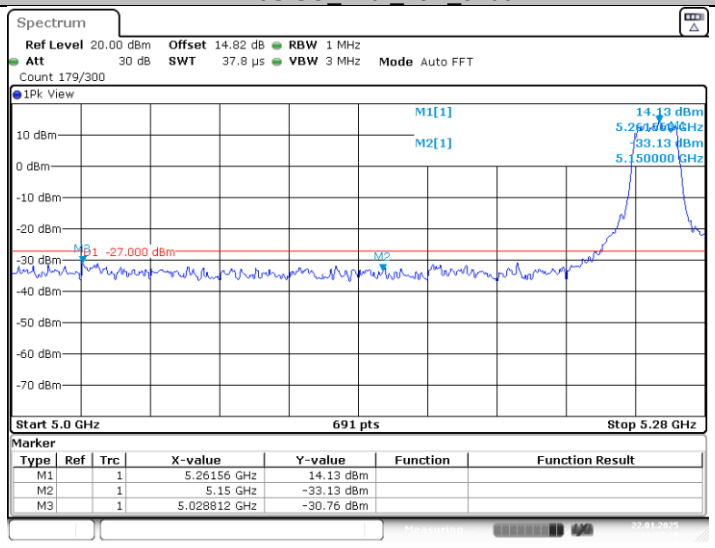
Date: 22.JAN.2025 11:10:01

11N20SISO_Ant1_High_5240



Date: 22.JAN.2025 11:21:32

11N20SISO_Ant1_Low_5260



Date: 22.JAN.2025 11:27:10