



# **FCC Radio Test Report** FCC ID: 2BFXS-J5601

This report concerns: Original Grant

Project No.	:	2404G060
Equipment	:	Pan/Tilt Smart Home Camera
Brand Name	:	JUOVI
Test Model	:	J5601
Series Model	:	N/A
Applicant	:	ZOWEE TECHNOLOGY (HEYUAN) Co., Ltd
Address	:	Runye Precision Manufacturing Industrial Park, among the north of Xiangjing Road, the west of Xinpi Road and the south of Yangzi Road, located in the High-tech Zone, Heyuan City, Guangdong Province
Manufacturer	:	ZOWEE TECHNOLOGY (HEYUAN) Co., Ltd
Address	:	Runye Precision Manufacturing Industrial Park, among the north of
		Xiangjing Road, the west of Xinpi Road and the south of Yangzi Road, located in the High-tech Zone, Heyuan City, Guangdong Province
Factory	:	ZOWEE TECHNOLOGY (HEYUAN) Co., Ltd
Address	:	Runye Precision Manufacturing Industrial Park, among the north of Xiangjing Road, the west of Xinpi Road and the south of Yangzi Road, located in the High-tech Zone, Heyuan City, Guangdong Province
Date of Receipt	:	Apr. 15, 2024
Date of Test	:	Apr. 16, 2024 ~ Apr. 28, 2024
Issued Date	:	May 13, 2024
<b>Report Version</b>	:	R00
Test Sample	:	Engineering Sample No.: SSL2024041561 for power, SSL2024041559 for AC power line conducted emissions and radiated emissions below 1000MHz, SSL2024041560 for other items.
Standard(s)	:	FCC CFR Title 47, Part 15, Subpart E

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

Prepared by

<u>Sheldon. Du</u> Sheldon Ou Chay. Cai Chay Cai

Approved by

Room 108, Building 2, No.1, Yile Road, Songshan Lake Zone, Dongguan City, Guangdong, People's Republic of China

Tel: +86-769-8318-3000 Web: www.newbtl.com Service mail: btl\_qa@newbtl.com



#### 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
REPORT ISSUED HISTORY	6
1 . APPLICABLE STANDARDS	7
2 . SUMMARY OF TEST RESULTS	7
2.1 TEST FACILITY	8
2.2 MEASUREMENT UNCERTAINTY	8
2.3 TEST ENVIRONMENT CONDITIONS	9
3 . GENERAL INFORMATION	10
3.1 GENERAL DESCRIPTION OF EUT	10
3.2 TEST MODES	12
3.3 PARAMETERS OF TEST SOFTWARE	14
3.4 DUTY CYCLE	15
3.5 BLOCK DIAGRAM SHOWING THE CONFIGURATION OF SYSTEM TESTED	16
3.6 SUPPORT UNITS	16
3.7 CUSTOMER INFORMATION DESCRIPTION	16
4 . AC POWER LINE CONDUCTED EMISSIONS	17
4.1 LIMIT	17
4.2 TEST PROCEDURE	17
4.3 DEVIATION FROM TEST STANDARD	17
4.4 TEST SETUP	18
4.5 EUT OPERATION CONDITIONS	18
4.6 TEST RESULTS	18
5 . RADIATED EMISSIONS	19
5.1 LIMIT	19
5.2 TEST PROCEDURE	20
5.3 DEVIATION FROM TEST STANDARD	21
5.4 TEST SETUP	21
5.5 EUT OPERATION CONDITIONS	23
5.6 TEST RESULTS - 9 KHZ TO 30 MHZ	23
5.7 TEST RESULTS - 30 MHZ TO 1000 MHZ	23
5.8 TEST RESULTS - ABOVE 1000 MHZ	23
6.BANDWIDTH	24
	24
6.2 TEST PROCEDURE	24



Table of Contents	Page
6.3 DEVIATION FROM STANDARD	24
6.4 TEST SETUP	25
6.5 EUT OPERATION CONDITIONS	25
6.6 TEST RESULTS	25
7 . MAXIMUM OUTPUT POWER	26
7.1 LIMIT	26
7.2 TEST PROCEDURE	26
7.3 DEVIATION FROM STANDARD	26
7.4 TEST SETUP	26
7.5 EUT OPERATION CONDITIONS	26
7.6 TEST RESULTS	26
8 . POWER SPECTRAL DENSITY	27
8.1 LIMIT	27
8.2 TEST PROCEDURE	27
8.3 DEVIATION FROM STANDARD	27
8.4 TEST SETUP 8.5 EUT OPERATION CONDITIONS	28 28
8.6 TEST RESULTS	28
	20
9 . FREQUENCY STABILITY 9.1 LIMIT	
9.1 LIMIT 9.2 TEST PROCEDURE	29 29
9.3 DEVIATION FROM STANDARD	29
9.4 TEST SETUP	29
9.5 EUT OPERATION CONDITIONS	29
9.6 TEST RESULTS	29
10 . MEASUREMENT INSTRUMENTS LIST	30
11 . EUT TEST PHOTOS	33
APPENDIX A - AC POWER LINE CONDUCTED EMISSIONS	39
APPENDIX B - RADIATED EMISSION - 9 KHZ TO 30 MHZ	42
APPENDIX C - RADIATED EMISSION - 30 MHZ TO 1000 MHZ	47
APPENDIX D - RADIATED EMISSION - ABOVE 1000 MHZ	50
APPENDIX E - BANDWIDTH	93
APPENDIX F - MAXIMUM OUTPUT POWER	102



Table of Contents	Page
APPENDIX G - POWER SPECTRAL DENSITY	105
APPENDIX H - FREQUENCY STABILITY	110



# REPORT ISSUED HISTORY

	REP	ORT ISSUED HISTORY		
Report No.	Version	Description	Issued Date	Note
BTL-FCCP-2-2404G060	R00	Original Report.	May 13, 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 789033 D02 General UNII Test Procedures New Rules v02r01

#### 2. SUMMARY OF TEST RESULTS

Test procedures according to the technical standard(s):

FCC CFR Title 47, Part 15, Subpart E					
Standard(s) Section			Judgment	Remark	
15.207 15.407(b)	AC Power Line Conducted Emissions	APPENDIX A	PASS		
15.407(b) 15.205(a) 15.209(a)	Radiated Emissions	APPENDIX B APPENDIX C APPENDIX D	PASS		
15.407(a) 15.407(e)	Bandwidth	APPENDIX E	PASS		
15.407(a)	Maximum Output Power	APPENDIX F	PASS		
15.407(a)	Power Spectral Density	APPENDIX G	PASS		
15.407(g)	Frequency Stability	APPENDIX H	PASS		
15.203	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



## 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% 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	<i>U</i> ,(dB)
	DG-C02	CISPR	150kHz ~ 30MHz	2.88

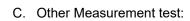
#### B. Radiated emissions test:

Test Site	Method	Measurement Frequency Range	<i>U</i> ,(dB)
DG-CB02	CISPR	9kHz ~ 30MHz	2.36

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

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

Test Site	Method	Measurement Frequency Range	<i>U</i> ,(dB)
DG-CB03 (1m)		18 ~ 26.5 GHz	3.36
	CISPR	26.5 ~ 40 GHz	3.58



Test Item	Uncertainty
Bandwidth	0.90 %
Maximum Output Power	1.3 dB
Power Spectral Density	1.4 dB
Frequency Stability	2.7 ppm
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	74%	AC 120V/60Hz	Hayden Chen	Apr. 24, 2024
Radiated Emissions -9kHz to 30MHz	23°C	59%	AC 120V/60Hz	Hayden Chen	Apr. 28, 2024
Radiated Emissions -30MHz to 1000MHz	20°C	55%	AC 120V/60Hz	Chen Mo	Apr. 19, 2024
Radiated Emissions -Above 1000 MHz	21°C	55%	AC 120V/60Hz	Allen Tong	Apr. 27, 2024
Bandwidth	23°C	55%	DC 5V	Hayden Chen	Apr. 24, 2024
Maximum Output Power	22-23°C	53-61%	DC 5V	Oliver Wang	Apr. 24, 2024- Apr. 28, 2024
Power Spectral Density	23°C	55%	DC 5V	Hayden Chen	Apr. 24, 2024
Frequency Stability	Normal & Extreme	55%	Normal & Extreme	Hayden Chen	Apr. 24, 2024



## **3. GENERAL INFORMATION**

# 3.1 GENERAL DESCRIPTION OF EUT

Equipment	Pan/Tilt Smart Home Camera		
Brand Name	JUOVI		
Test Model	J5601		
Series Model	N/A		
Model Difference(s)	N/A		
HVIN	MA1811C-4336-E		
FVIN	105		
Power Source	DC voltage supplied from AC adapter. Model: TPA-46B050100UU		
Power Rating	I/P: 100-240V~ 50/60Hz 0.2A O/P: 5.0V === 1000mA		
Operation Frequency Band(s)	UNII-1: 5150 MHz ~ 5250 MHz UNII-2A: 5250 MHz ~ 5350 MHz UNII-2C: 5470 MHz ~ 5725 MHz UNII-3: 5725 MHz ~ 5850 MHz		
Modulation Type	IEEE 802.11a/n: OFDM		
Bit Rate of Transmitter	IEEE 802.11a: 54/48/36/24/18/12/9/6 Mbps IEEE 802.11n: up to 72.2 Mbps		
Maximum Output Power _UNII-1	IEEE 802.11a: 19.04 dBm (0.0802 W)		
Maximum Output Power _UNII-2A	IEEE 802.11n(HT20): 19.20 dBm (0.0832 W)		
Maximum Output Power _UNII-2C	IEEE 802.11a: 19.21 dBm (0.0834 W)		
	IEEE 802.11n(HT20): 19.19 dBm (0.0830 W)		



#### Note:

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

#### 2. Channel List:

IEEE 802.11a, IEEE 802.11n(HT20)				
UNII-1		UNII-2A		
Channel Frequency (MHz)		Channel	Frequency (MHz)	
36	5180	52	5260	
40	5200	56	5280	
44	5220	60	5300	
48	5240	64	5320	

IEEE 802.11a, IEEE 802.11n(HT20)				
UNII	· · · · ·	UNII-3		
Channel	Frequency (MHz)	Channel	Frequency (MHz)	
100	5500	149	5745	
104	5520	153	5765	
108	5540	157	5785	
112	5560	161	5805	
116	5580	165	5825	
120	5600			
124	5620			
128	5640			
132	5660			
136	5680			
140	5700			

## 3. Antenna Specification:

Ant.	Brand	P/N	Antenna Type	Connector	Gain (dBi)
1	NHAIT	549AA-HT-0412-2	FPC	N/A	3.77



## 3.2 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 Mode Channel 36/40/48 (UNII-1)
Mode 2	TX N(HT20) Mode Channel 36/40/48 (UNII-1)
Mode 3	TX A Mode Channel 52/60/64 (UNII-2A)
Mode 4	TX N(HT20) Mode Channel 52/60/64 (UNII-2A)
Mode 5	TX A Mode Channel 100/116/140 (UNII-2C)
Mode 6	TX N(HT20) Mode Channel 100/116/140 (UNII-2C)
Mode 7	TX A Mode Channel 149/157/165 (UNII-3)
Mode 8	TX N(HT20) Mode Channel 149/157/165 (UNII-3)
Mode 9	TX A Mode Channel 140 (UNII-2C)

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 9 TX A Mode Channel 140 (UNII-2C)			

Radiated Emissions Test - Below 1GHz			
Final Test Mode Description			
Mode 9 TX A Mode Channel 140 (UNII-2C)			

Radiated Emissions Test - Above 1GHz			
Final Test Mode	Description		
Mode 1	TX A Mode Channel 36/40/48 (UNII-1)		
Mode 2	TX N(HT20) Mode Channel 36/40/48 (UNII-1)		
Mode 3	TX A Mode Channel 52/60/64 (UNII-2A)		
Mode 4	TX N(HT20) Mode Channel 52/60/64 (UNII-2A)		
Mode 5	TX A Mode Channel 100/116/140 (UNII-2C)		
Mode 6	TX N(HT20) Mode Channel 100/116/140 (UNII-2C)		
Mode 7	TX A Mode Channel 149/157/165 (UNII-3)		
Mode 8	TX N(HT20) Mode Channel 149/157/165 (UNII-3)		



	Conducted Test			
Final Test Mode	Description			
Mode 1	TX A Mode Channel 36/40/48 (UNII-1)			
Mode 2	TX N(HT20) Mode Channel 36/40/48 (UNII-1)			
Mode 3	TX A Mode Channel 52/60/64 (UNII-2A)			
Mode 4	TX N(HT20) Mode Channel 52/60/64 (UNII-2A)			
Mode 5	TX A Mode Channel 100/116/140 (UNII-2C)			
Mode 6	TX N(HT20) Mode Channel 100/116/140 (UNII-2C)			
Mode 7	TX A Mode Channel 149/157/165 (UNII-3)			
Mode 8	TX N(HT20) Mode Channel 149/157/165 (UNII-3)			

Note:

(1) For AC power line conducted emissions and radiated emission below 1 GHz test, the TX A Mode Channel 140 (UNII-2C) 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) For radiated emission Harmonic 18-40GHz test, only tested the worst case and recorded.
- (4) All the bit rate of transmitter have been tested and found the lowest rate is found to be the worst case and recorded.
- (5) For radiated emission above 1 GHz test, the polarization of Vertical and Hoizontal are evaluated, the worst case is Vertical and recorded.

# 3.3 PARAMETERS OF TEST SOFTWARE

UNII-1				
Test Software Version	IPOP_V4.0			
Frequency (MHz)	5180 5200 5240			
IEEE 802.11a	18	18.5	18.5	
IEEE 802.11n(HT20)	18	18.5	18.5	

UNII-2A				
Test Software Version	IPOP_V4.0			
Frequency (MHz)	5260 5300 5320			
IEEE 802.11a	17.5	18.5	18.5	
IEEE 802.11n(HT20)	18.5	18.5	18.5	

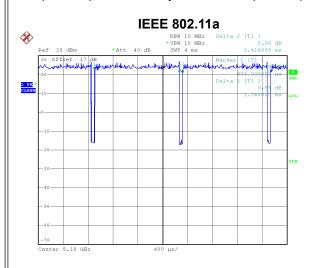
UNII-2C				
Test Software Version	IPOP_V4.0			
Frequency (MHz)	5500 5580 5700			
IEEE 802.11a	18.5 18.5 18.5			
IEEE 802.11n(HT20)	18.5	18.5	18.5	

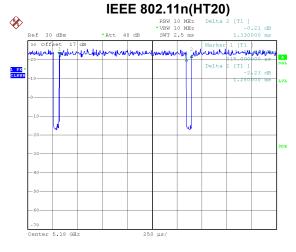
UNII-3				
Test Software Version	IPOP_V4.0			
Frequency (MHz)	5745 5785 5825			
IEEE 802.11a	18.5	17.5	17.5	
IEEE 802.11n(HT20)	18.5	18.5	18	



## 3.4 DUTY CYCLE

If duty cycle is  $\geq$  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.





Date: 24.APR.2024 16:13:04

Duty cycle = 1.368 ms / 1.416 ms = 96.61% Duty Factor = 10 log(1 / Duty cycle) = 0.15 Date: 24.APR.2024 16:14:09

Duty cycle = 1.280 ms / 1.330 ms = 96.24% Duty Factor = 10 log(1 / Duty cycle) = 0.17

#### NOTE:

For IEEE 802.11a:

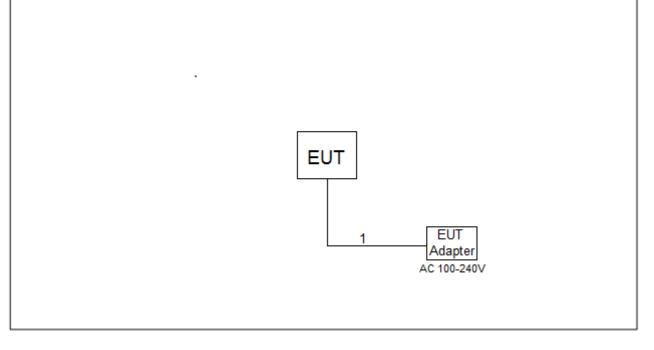
For radiated emissions frequency above 1 GHz, the resolution bandwidth of test receiver/spectrum analyzer is 1 MHz and the video bandwidth is 731 Hz (Duty cycle < 98%).

#### 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 is 781 Hz (Duty cycle < 98%).







#### 3.6 SUPPORT UNITS

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

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

#### 3.7 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	Limit (dBµV)	
(MHz)	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:

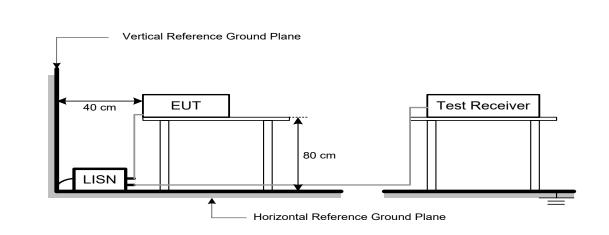
Receiver Parameter	Setting
Start Frequency	0.15 MHz
Stop Frequency	30 MHz
IF Bandwidth	9 kHz

#### 4.3 DEVIATION FROM TEST STANDARD

No deviation



## 4.4 TEST SETUP



## 4.5 EUT 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.

#### 4.6 TEST RESULTS

Please refer to the APPENDIX A.



# **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 EMISSIONS MEASUREMENT (9 kHz to 1000 MHz)

Frequency	Field Strength	Measurement Distance
(MHz)	(microvolts/meter)	(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	EIRP Limit	Band edge	Harmonic
(MHz)	(dBm/MHz)	at 3m (dBµV/m)	at 1m (dBµV/m)
5150-5250	-27	68.2	77.7 (Note 3)
5250-5350	-27	68.2	77.7 (Note 3)
5470-5725	-27	68.2	77.7 (Note 3)
	-27	68.2	77.7 (Note 3)
5725-5850	10	105.2	114.7 (Note 3)
NOTE (2)	15.6	110.8	120.3 (Note 3)
	27	122.2	131.7 (Note 3)

NOTE:

(1) The following formula is used to convert the equipment isotropic radiated power (eirp) to field strength: 1000000\sqrt{30P} E =

- (2) According to 15.407(b)(4)(i), all emissions shall be limited to a level of -27 dBm/MHz at 75 MHz or more above or below the band edge increasing linearly to 10 dBm/MHz at 25 MHz above or below the band edge, and from 25 MHz above or below the band edge increasing linearly to a level of 15.6 dBm/MHz at 5 MHz above or below the band edge, and from 5 MHz above or below the band edge increasing linearly to a level of 27 dBm/MHz at the band edge.
- (3)

$$FS_{\text{limit}} = FS_{\text{max}} - 20\log\left(\frac{d_{\text{limit}}}{d_{\text{measure}}}\right)$$

20log (d<sub>limit</sub>/d<sub>measure</sub>)=20log (3/1)=9.5 dB.



## 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 1GHz)
- b. The measuring distance of 3 m or 1m 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)
- 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 or 40 GHz, whichever is lower
RBW / VBW	1 MHz / 3 MHz for PK value
(Emission in restricted band)	1 MHz / 1/T Hz for AVG value

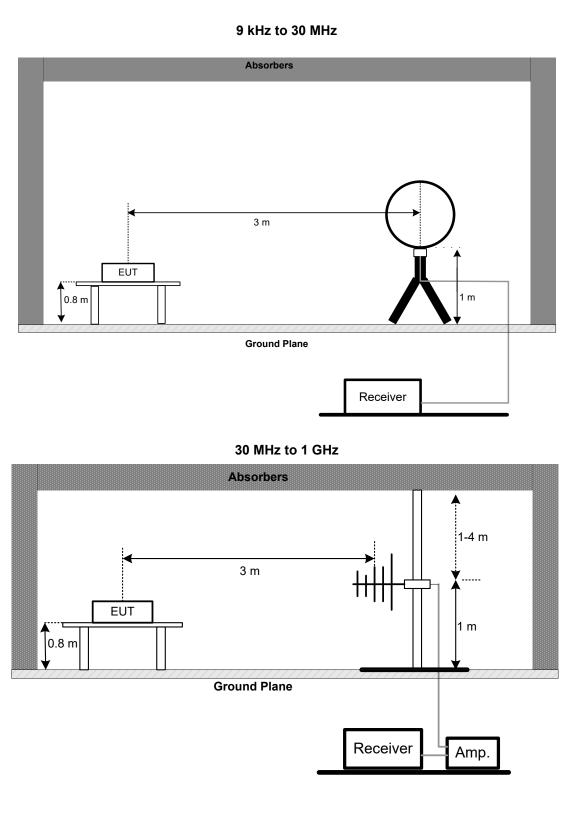
Receiver Parameters	Setting
Start ~ Stop Frequency	9 kHz~90 kHz for PK/AVG detector
Start ~ Stop Frequency	90 kHz~110 kHz for QP detector
Start ~ Stop Frequency	110 kHz~490 kHz for PK/AVG detector
Start ~ Stop Frequency	490 kHz~30 MHz for QP detector
Start ~ Stop Frequency	30 MHz~1000 MHz for QP detector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



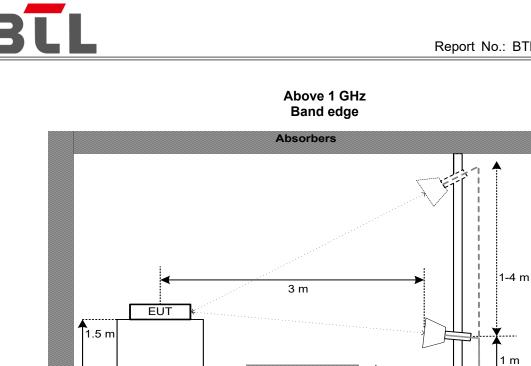
## 5.3 DEVIATION FROM TEST STANDARD

No deviation.

## 5.4 TEST SETUP







#### Harmonic(1 GHz to 18 GHz)

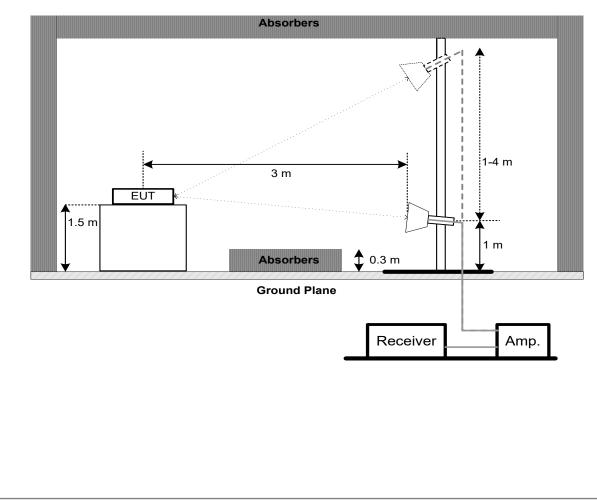
Absorbers

**Ground Plane** 

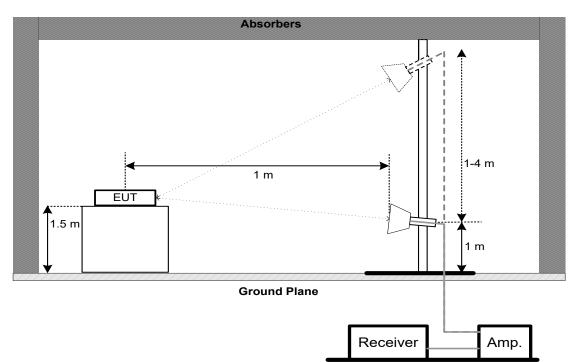
0.3 m

Receiver

Î



#### Harmonic(18 GHz to 40 GHz)



## 5.5 EUT 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.

## 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. BANDWIDTH

#### 6.1 LIMIT

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

#### 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. Spectrum Setting:
  - For UNII-1, UNII-2A, UNII-2C:

Spectrum Parameter	Setting	
Span Frequency	> 26 dB 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	> 6 dB Bandwidth
RBW	100 kHz
VBW	300 kHz
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 26 dB / 6 dB below carrier.

#### 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	Frequency Range (MHz)
FCC 15.407(a) Maximum Output Power	AP device: 1 Watt (30 dBm) Client device: 250 mW (23.98 dBm)	5150-5250	
	Maximum Output Power	250 mW (23.98 dBm)	5250-5350
		250 mW (23.98 dBm)	5470-5725
		1 Watt (30dBm)	5725-5850

#### Note:

- a. For client devices in the 5.15-5.25 GHz band, the maximum conducted output power over the frequency band of operation shall not exceed 250 mW provided the maximum antenna gain does not exceed 6 dBi. In addition, the maximum power 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 maximum conducted output power and the maximum power 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 maximum conducted 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.

#### 7.2 TEST 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.

#### 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. POWER SPECTRAL DENSITY

#### 8.1 LIMIT

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

#### 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. Spectrum Setting:
  - For UNII-1, UNII-2A, UNII-2C:

Spectrum Parameter	Setting
Span Frequency	Encompass the entire emissions bandwidth (EBW) of the signal
RBW	1 MHz.
VBW	3 MHz.
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	100 kHz.
VBW	300 kHz.
Detector	RMS
Trace average	100 trace
Sweep Time	Auto

Note:

 For UNII-3, according to KDB publication 789033 D02 General UNII Test Procedures New Rules v02r01, section II.F.5., it is acceptable to set RBW at 100kHz and VBW at 300kHz if the spectrum analyzer does not have 500 kHz RBW. Then, add 10 log (500 kHz/100 kHz) to the measured result, i.e. 7 dB.

2. During the test of U-NII 3 PSD, the measurement result with RBW=100kHz has been added 7 dB by compensating offset. For example, the cable loss is 17 dB, and the final offset is 17 + 7 = 24 dB when RBW=100kHz is used.

#### 8.3 DEVIATION FROM STANDARD

No deviation.



## 8.4 TEST SETUP

	1	
EUT		SPECTRUM
	ATT.	ANALYZER

#### 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. FREQUENCY STABILITY

#### 9.1 LIMIT

Section	Test Item	Limit	Frequency Range (MHz)
FCC 15.407(g)	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

#### 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. Spectrum Setting:

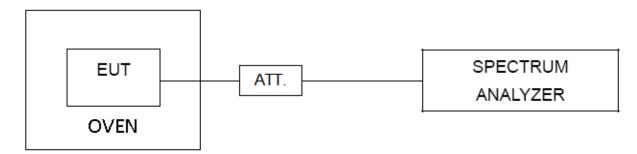
Spectrum Parameter	Setting
Span Frequency	Entire absence of modulation emissions bandwidth
RBW	10 kHz
VBW	10 kHz
Detector	Peak
Trace	Max Hold
Sweep Time	Auto

- 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 0°C~45°C.

#### 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	ESR3	103027	Jun. 16, 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	Apr. 01, 2024
2	EMI Test Receiver	Keysight	N9038A	MY56400060	Dec. 22, 2024
3	Cable	RW	LMR-400(30MHz-1 GHz)(10m+2.5m+0. 8M)	N/A	Jul. 04, 2024
4	Measurement Software	Farad	EZ-EMC Ver.NB-03A1-01	N/A	N/A
5	1266 Chamber room	ETS	12*6*6	N/A	May 21, 2024

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 INSTRUMENT	EMC001330	980998	Nov. 17, 2024
4	Cable	RegalWay	LMR400-NMNM-12 .5m	N/A	Jul. 04, 2024
5	Cable	RegalWay	LMR400-NMNM-3 m	N/A	Jul. 04, 2024
6	Cable	RegalWay	LMR400-NMNM-0. 5m	N/A	Jul. 04, 2024
7	Receiver	Agilent	N9038A	MY52130039	Dec. 22, 2024
8	Positioning Controller	MF	MF-7802	N/A	N/A
9	Measurement Software	Farad	EZ-EMC Ver.NB-03A1-01	N/A	N/A
10	966 Chamber room	СМ	9*6*6	N/A	May 17, 2024



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	981001	Nov. 17, 2024	
3	MXA Signal Analyzer	KEYSIGHT	N9020B	MY63380204	Nov. 17, 2024	
4	Double Ridged Guide Antenna	ETS	3115	75789	May 31, 2024	
5	Cable	RegalWay	RWLP50-4.0A-SMS M-12.5M	N/A	Feb. 19, 2025	
6	Cable	RegalWay	RWLP50-4.0A-NM RASM-2.5M	N/A	Aug. 08, 2024	
7	Cable	RegalWay	RWLP50-4.0A-NM RASMRA-0.8M	N/A	Aug. 08, 2024	
8	Low Noise Amplifier	CONNPHY	CLN-18G40G-4330 -K	619413	Jul. 06, 2024	
9	Cable	RegalWay	RWLP50-2.6A-2.92 M2.92M-1.1M	N/A	Jul. 26, 2024	
10	Cable	Tonscend	HF160-KMKM-3M	N/A	Jul. 26, 2024	
11	Broad-Band Horn Antenna	Schwarzbeck	BBHA9170(3m)	9170-319	Jun. 20, 2024	
12	966 Chamber room	СМ	9*6*6	N/A	May 17, 2024	
13	Attenuator	Talent Microwave	TA10A2-S-18	N/A	N/A	
14	Filter	STI	STI15-9969	N/A	Jun. 16, 2024	
15	Positioning Controller	MF	MF-7802	N/A	N/A	
16	Measurement Software	Farad	EZ-EMC Ver.NB-03A1-01	N/A	N/A	

Bandwidth &							
	Power Spectral Density						
Item	Kind of Equipment	Manufacturer	Type No.	Serial No.	Calibrated until		
1	Spectrum Analyzer	R&S	FSP38	100852	Jun. 16, 2024		
2	Attenuator	Talent Microwave	TA10A0-S-26.5	N/A	N/A		
3	DC Block	N/A	N/A	N/A	N/A		
4	Attenuator	Talent Microwave	TA10A0-S-26.5	N/A	N/A		
5	Measurement Software	BTL	BTL Conducted Test	N/A	N/A		

	Maximum Output Power					
Item	Kind of Equipment	Manufacturer	Type No.	Serial No.	Calibrated until	
1	Peak Power Analyzer	Keysight	8990B	MY51000506	Jun. 17, 2024	
2	Wideband power sensor	Keysight	N1923A	MY58310004	Jun. 17, 2024	
3	Attenuator	Talent Microwave	TA10A2-S-18	N/A	N/A	

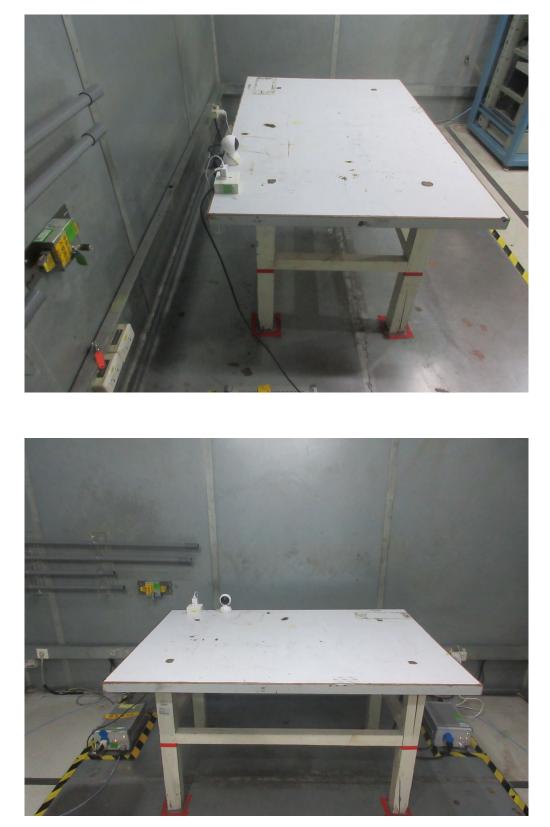


	Frequency Stability					
Item	Kind of Equipment	Manufacturer	Type No.	Serial No.	Calibrated until	
1	Spectrum Analyzer	R&S	FSP40	100185	Jun. 16, 2024	
2	Attenuator	Talent Microwave	TA10A0-S-26.5	N/A	N/A	
3	DC Block	N/A	N/A	N/A	N/A	
4	Attenuator	Talent Microwave	TA10A0-S-26.5	N/A	N/A	
5	Measurement Software	BTL	BTL Conducted Test	N/A	N/A	
6	Multi-output DC Power Supply	GW Instek	GPC-3030DN	EK880675	Jul. 07, 2024	
7	Temperature Chamber	ESPEC	SU-242	93018786	Jul. 07, 2024	
8	Cable	Woke	S02-181212-064	N/A	N/A	

Remark: "N/A" denotes no model name, serial no. or calibration specified.

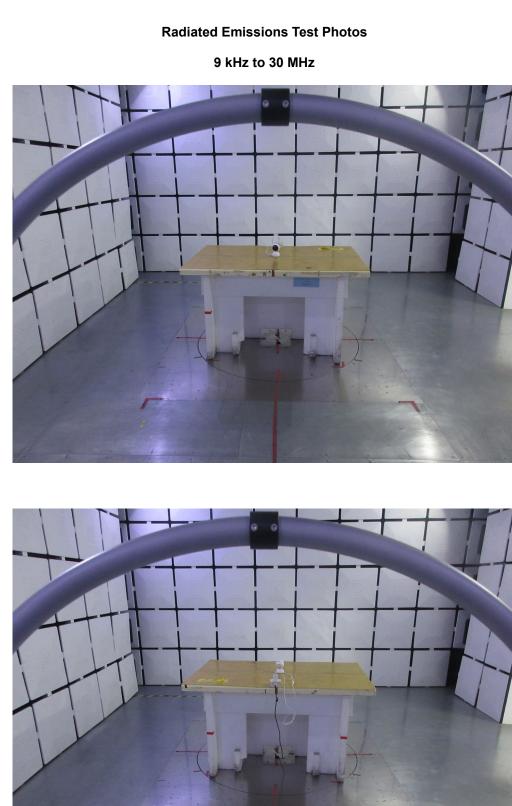
All calibration period of equipment list is one year.





**AC Power Line Conducted Emissions Test Photos** 

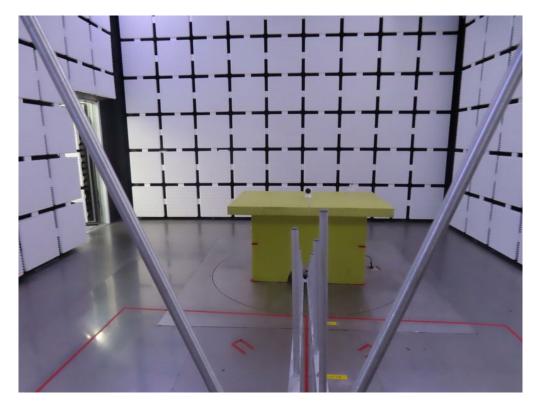


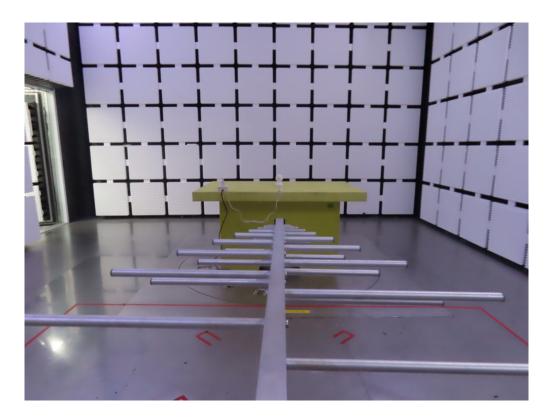




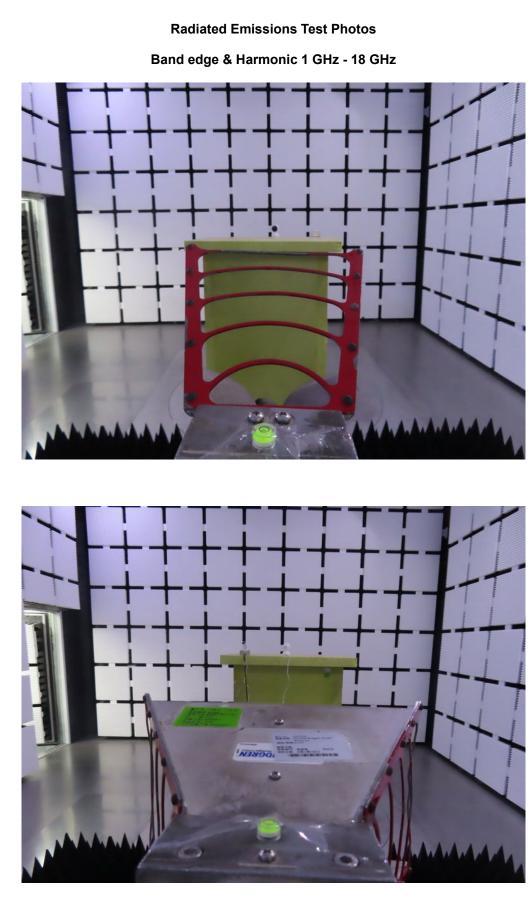
**Radiated Emissions Test Photos** 

30 MHz to 1 GHz

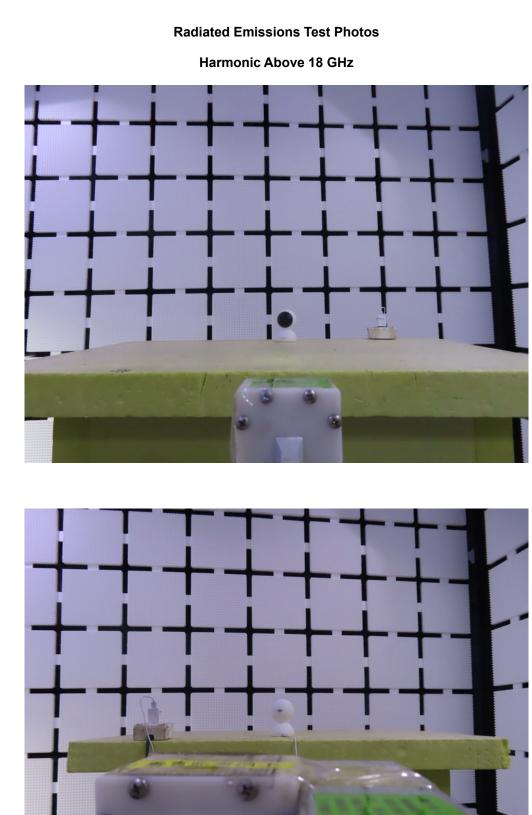






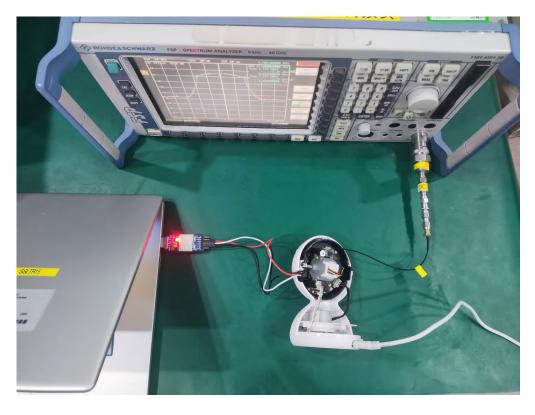


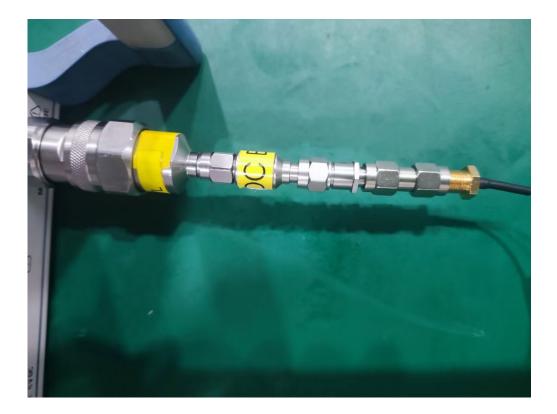






**Conducted Test Photos** 

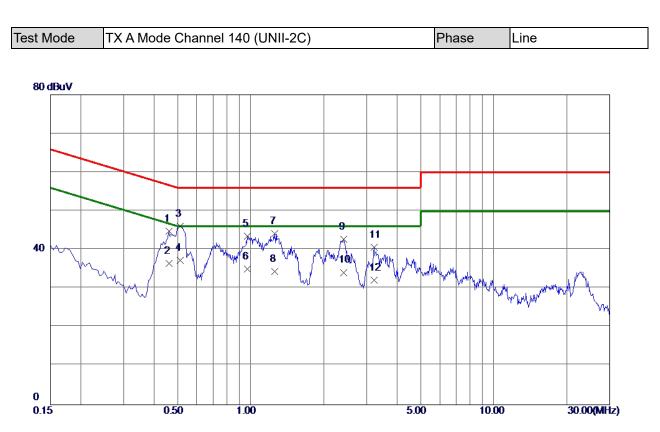






### **APPENDIX A - AC POWER LINE CONDUCTED EMISSIONS**

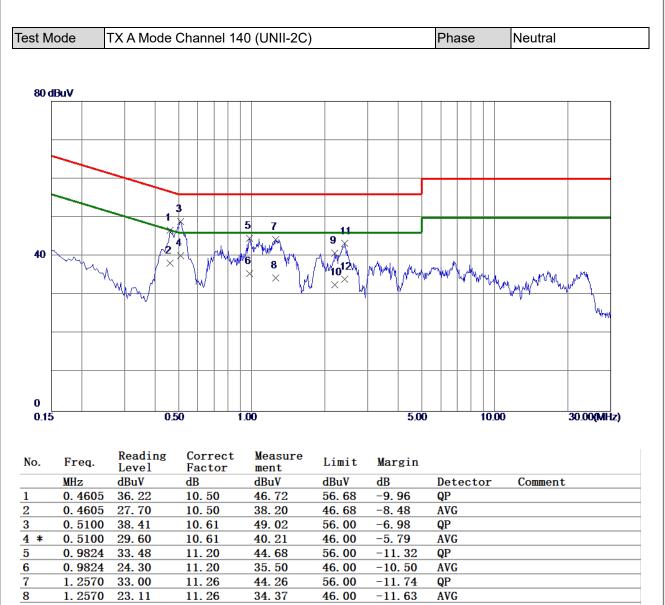




No.	Freq.	Reading Level	Correct Factor	Measure ment	Limit	Margin		
	MHz	dBuV	dB	dBuV	dBuV	dB	Detector	Comment
1	0.4605	34. 30	10. 54	44.84	<b>56.68</b>	-11.84	QP	
2	0.4605	25.90	10. 54	36.44	46.68	-10.24	AVG	
3	0.5144	35. 49	10.66	46.15	<b>56.00</b>	- <b>9</b> . 85	QP	
4 *	0.5144	26.60	10.66	37.26	46.00	-8.74	AVG	
5	0.9690	32.22	11.24	43.46	<b>56.00</b>	-12. 54	QP	
6	0.9690	23.80	11.24	35.04	46.00	-10.96	AVG	
7	1. 2570	32.78	11.31	44. 09	<b>56.00</b>	-11. 91	QP	
8	1.2570	23.10	11.31	34.41	46.00	-11. 59	AVG	
9	2. 4180	32.12	10.66	42.78	<b>56.00</b>	-13.22	QP	
10	2. 4180	23. 50	10.66	34.16	46.00	-11.84	AVG	
11	3. 2190	30.18	10. 44	40.62	56.00	-15.38	QP	
12	3. 2190	21.70	10.44	32.14	46.00	-13.86	AVG	

- Measurement Value = Reading Level + Correct Factor.
   Margin Level = Measurement Value Limit Value.





56.00

46.00

56.00

46.00

-15.21

-13.43

-12.72

-11.88

QP

AVG

QP

AVG

#### **REMARKS**:

9

10

11

12

(1) Measurement Value = Reading Level + Correct Factor.

10.77

10.77

10.61

10.61

40.79

32.57

43.28

34.12

(2) Margin Level = Measurement Value - Limit Value.

30.02

21.80

32.67

23.51

2.1974

2.1974

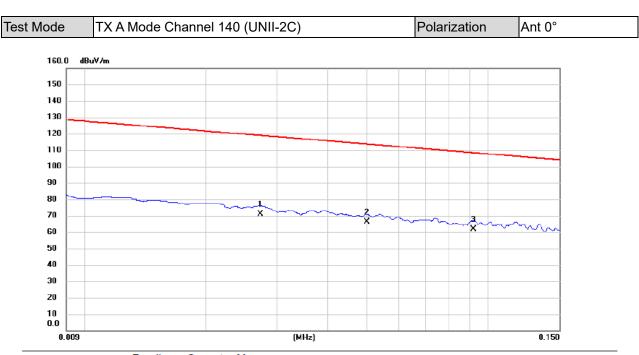
2. 4134

2.4134



### **APPENDIX B - RADIATED EMISSION - 9 KHZ TO 30 MHZ**

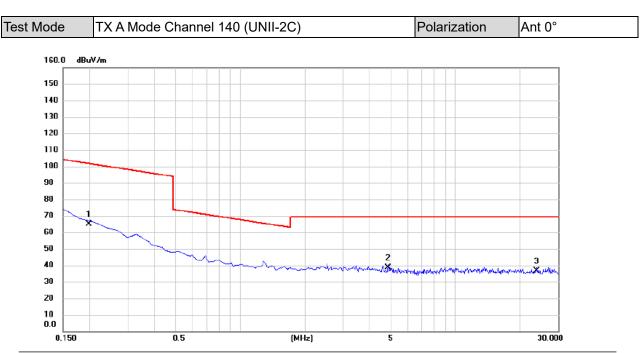




No. Mk.	Freq.	Reading Level		Measure- ment	Limit	Margin		
	MHz	dBuV	dB	dBuV/m	dBuV/m	dB	Detector	Comment
1	0.027	50.13	21.02	71.15	118.88	-47.73	AVG	
2	0.050	44.85	21.20	66.05	113.63	-47.58	AVG	
3 *	0.092	40.60	21.33	61.93	108.32	-46.39	QP	

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

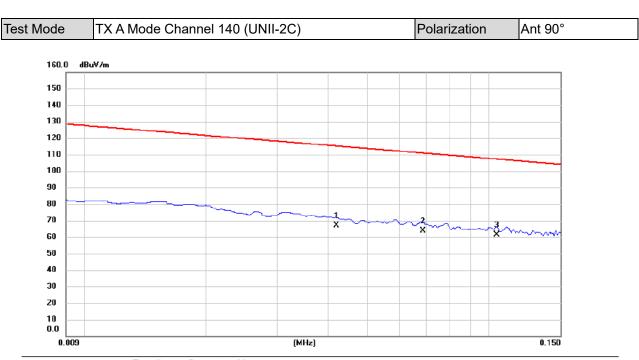




No. Mk.	Freq.	Reading Level		Measure- ment		Margin		
	MHz	dBuV	dB	dBuV/m	dBuV/m	dB	Detector	Comment
1	0.199	43.82	21.19	65.01	101.65	-36.64	AVG	
2 *	4.851	17.54	21.15	38.69	69.54	-30.85	QP	
3	23.896	14.95	21.64	36.59	69.54	-32.95	QP	

- Measurement Value = Reading Level + Correct Factor.
   Margin Level = Measurement Value Limit Value.

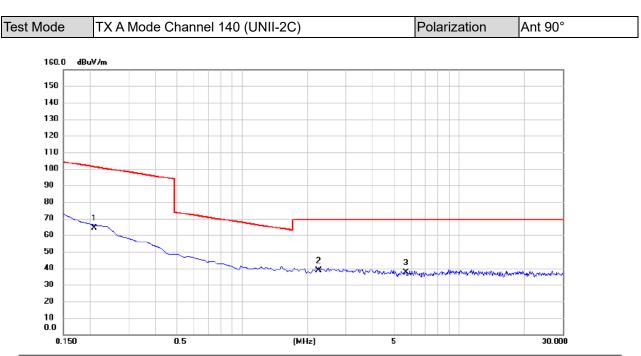




No. Mk.	Freq.		Correct Factor	Measure- ment	Limit	Margin		
	MHz	dBuV	dB	dBuV/m	dBuV/m	dB	Detector	Comment
1	0.042	45.86	21.16	67.02	115.14	-48.12	AVG	
2	0.069	42.74	21.26	64.00	110.88	-46.88	AVG	
3 *	0.104	40.15	21.32	61.47	107.23	-45.76	QP	

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





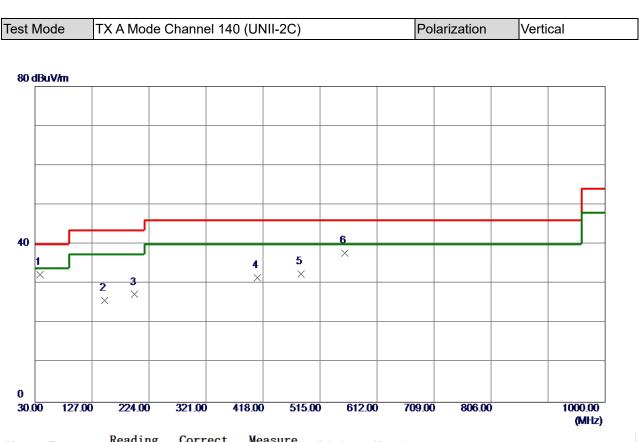
No. Mk.	Freq.			Measure- ment		Margin		
	MHz	dBuV	dB	dBuV/m	dBuV/m	dB	Detector	Comment
1	0.208	43.03	21.18	64.21	101.23	-37.02	AVG	
2 *	2.254	17.41	21.10	38.51	69.54	-31.03	QP	
3	5.672	16.32	21.16	37.48	69.54	-32.06	QP	

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



### APPENDIX C - RADIATED EMISSION - 30 MHZ TO 1000 MHZ

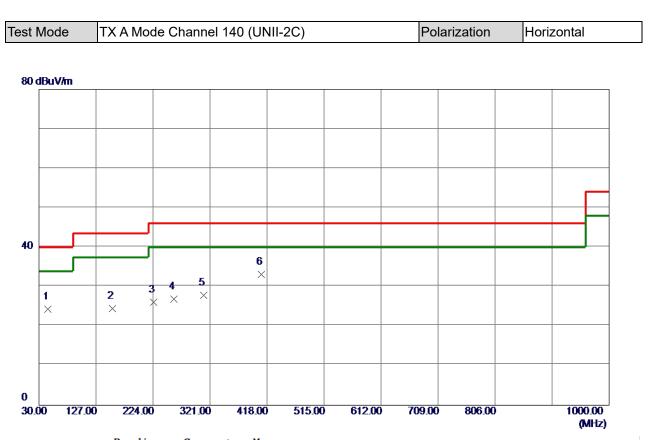




No.	Freq.	Level	Factor	measure ment	Limit	Margin		
	MHz	dBuV/m	dB	dBuV/m	dBuV/m	dB	Detector	Comment
1 *	38. 2450	44.23	-11. 98	32.25	40.00	-7.75	Peak	
2	148.8250	37.04	-11. 29	25.75	43. 50	-17.75	Peak	
3	199. 7500	41.77	-14. 49	27.28	43. 50	-16.22	Peak	
4	408. 3000	39.45	-7.93	31. 52	46.00	-14. 48	Peak	
5	482. 5050	38.79	- <b>6.</b> 38	32. 41	46.00	-13. 59	Peak	
6	556.7100	42.72	-4.94	37.78	46.00	-8.22	Peak	

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



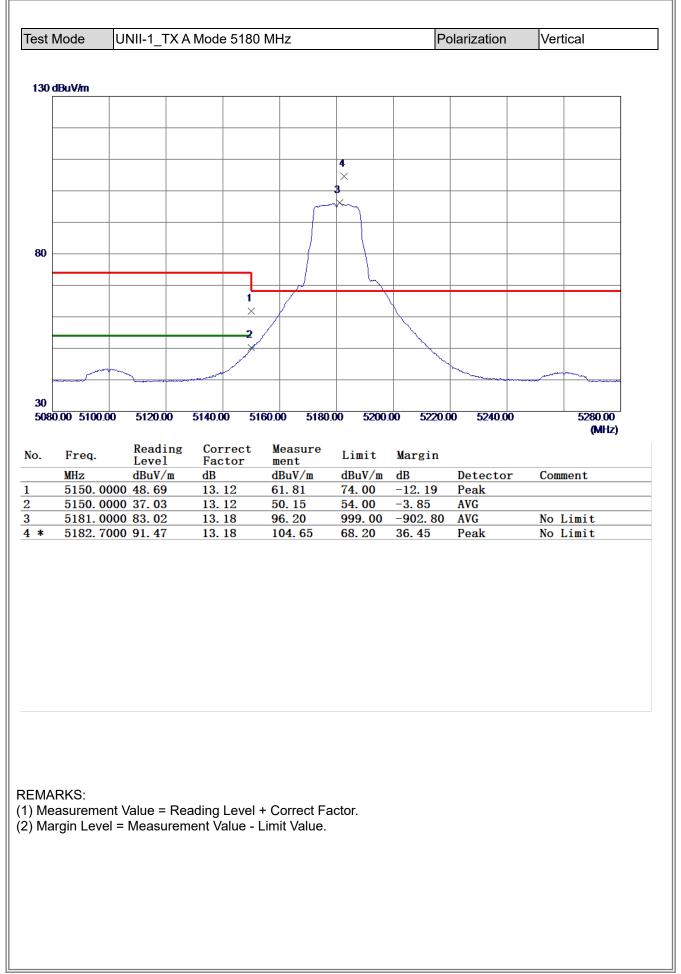


No.	Freq.	Reading Level	Correct Factor	Measure ment	Limit	Margin		
	MHz	dBuV/m	dB	dBuV/m	dBuV/m	dB	Detector	Comment
1	45. 0350	35.67	-11. 39	24.28	40.00	-15.72	Peak	
2	154.6450	35.56	-11. 08	24.48	43. 50	-19.02	Peak	
3	224.9700	40.15	-14.06	26.09	46.00	-19.91	Peak	
4	259.8900	39.01	-12. 15	26.86	46.00	-19. 14	Peak	
5	309.8450	38.26	-10. 42	27.84	46.00	-18. 16	Peak	
6 *	408. 3000	40. 98	-7. 93	33.05	46.00	-12.95	Peak	

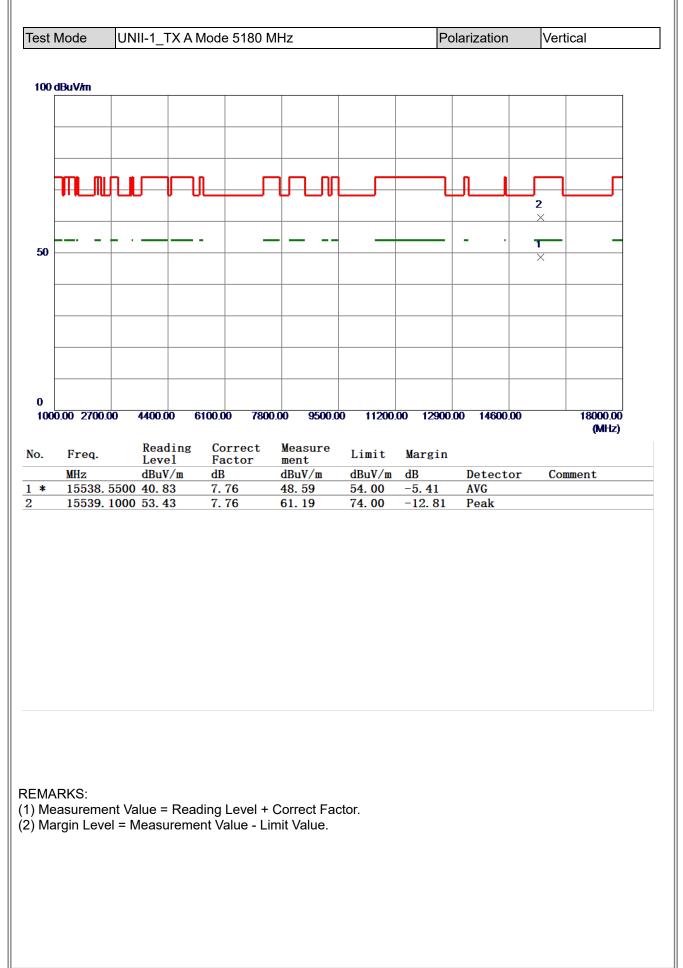
- (1) Measurement Value = Reading Level + Correct Factor.
- (2) Margin Level = Measurement Value Limit Value.



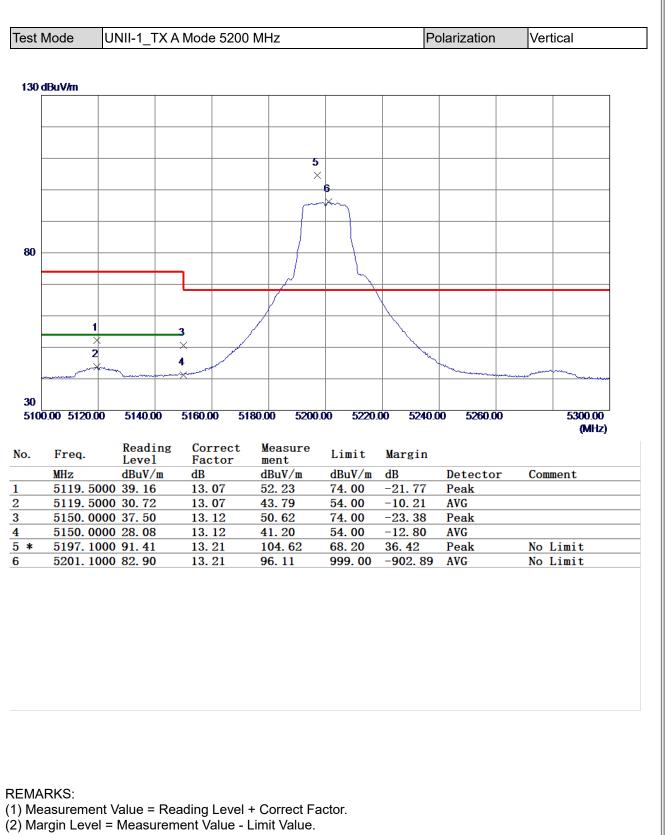
### **APPENDIX D - RADIATED EMISSION - ABOVE 1000 MHZ**



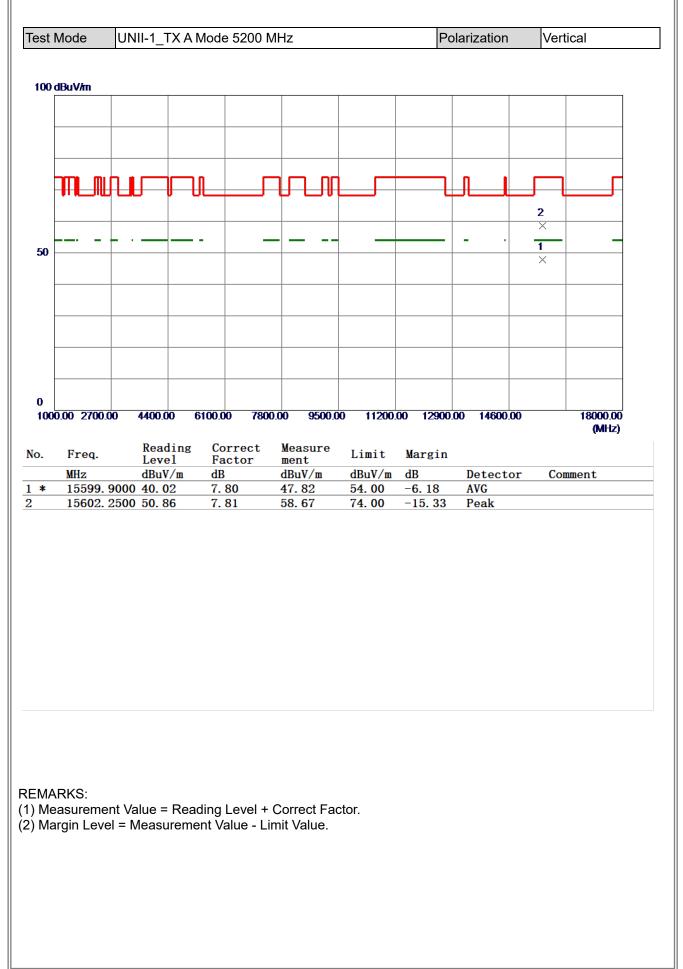




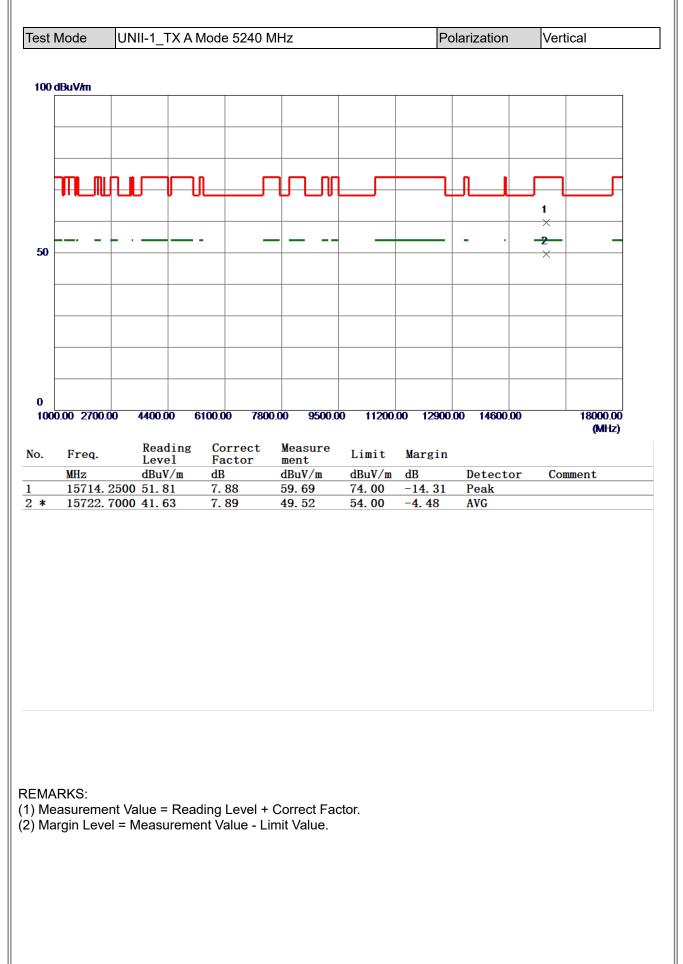




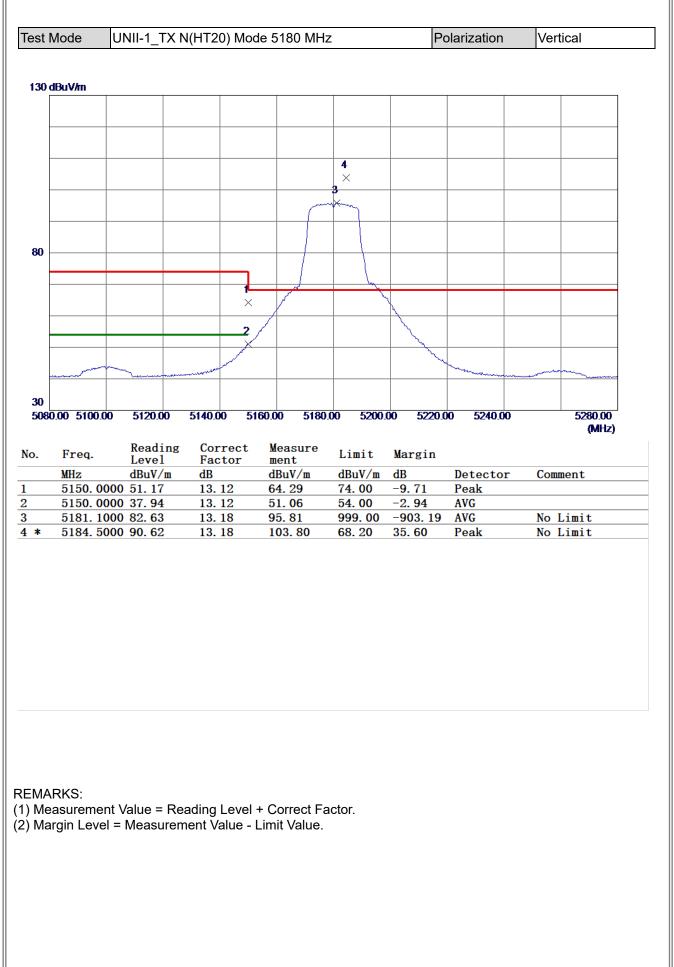




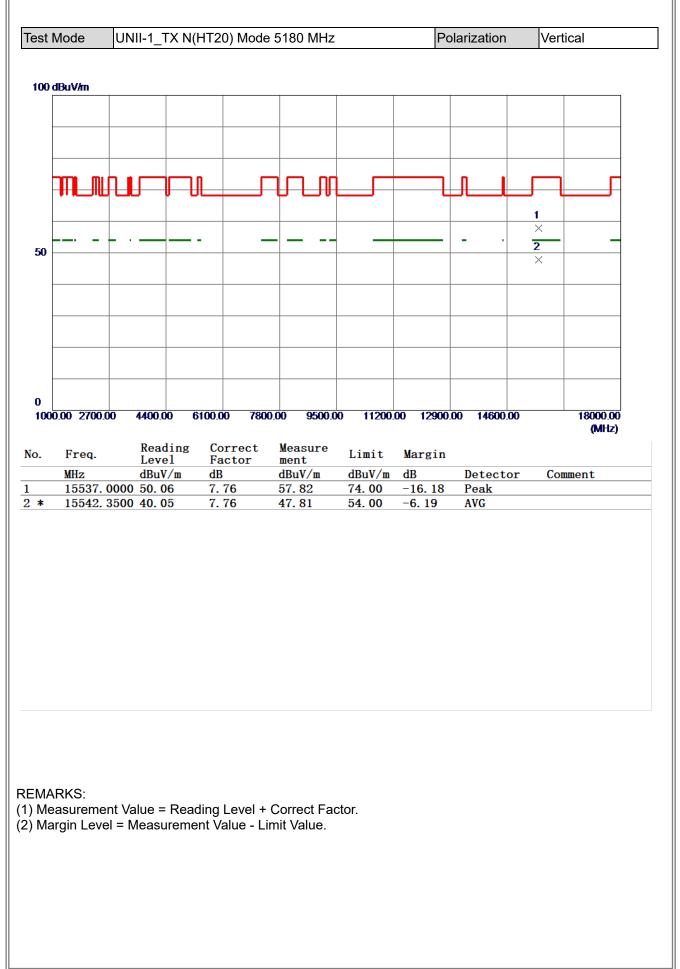




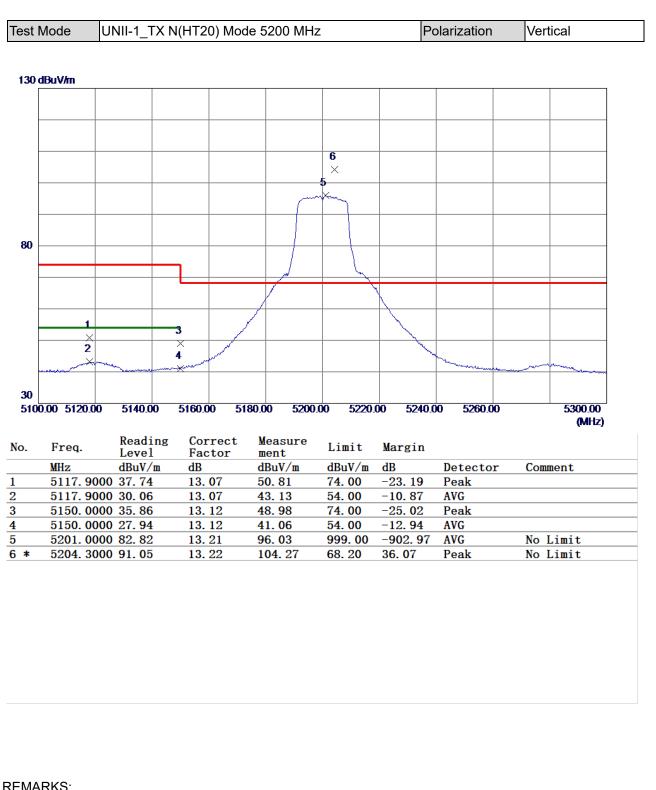






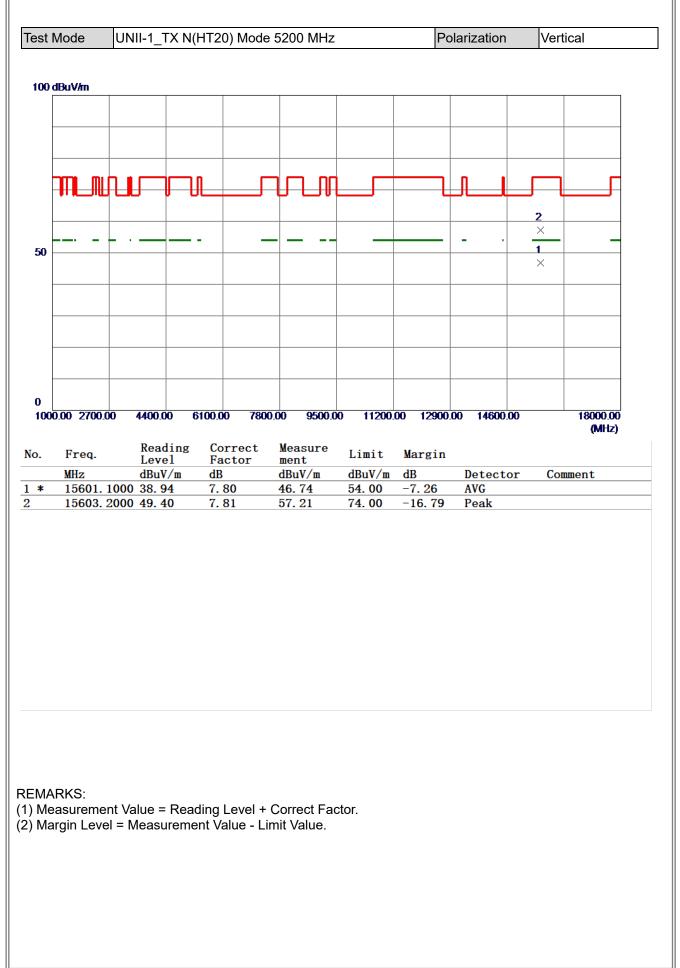




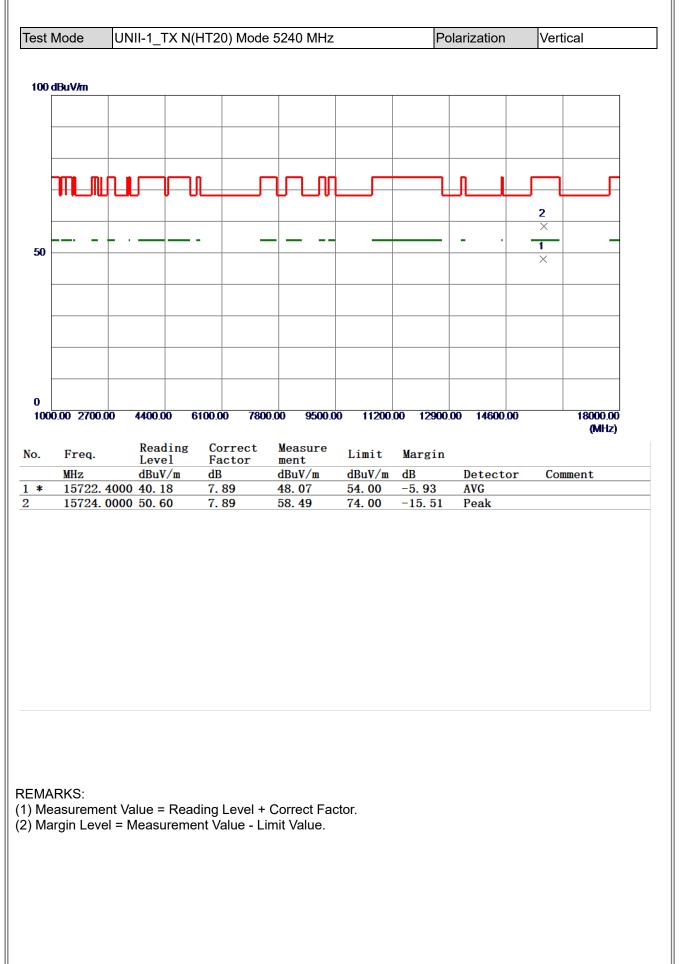


- (1) Measurement Value = Reading Level + Correct Factor.
- (2) Margin Level = Measurement Value Limit Value.

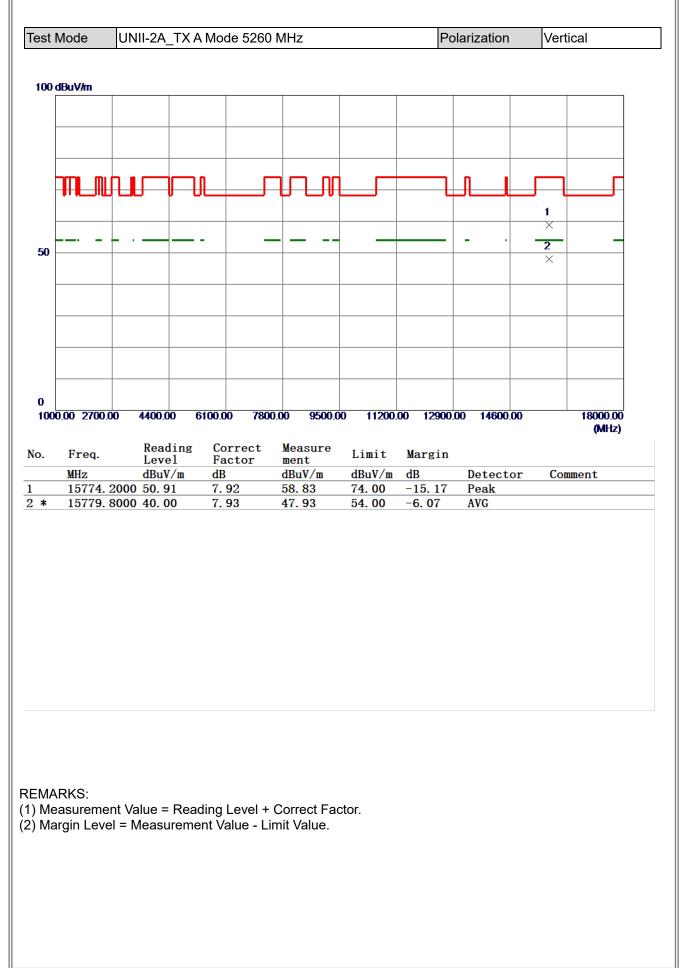


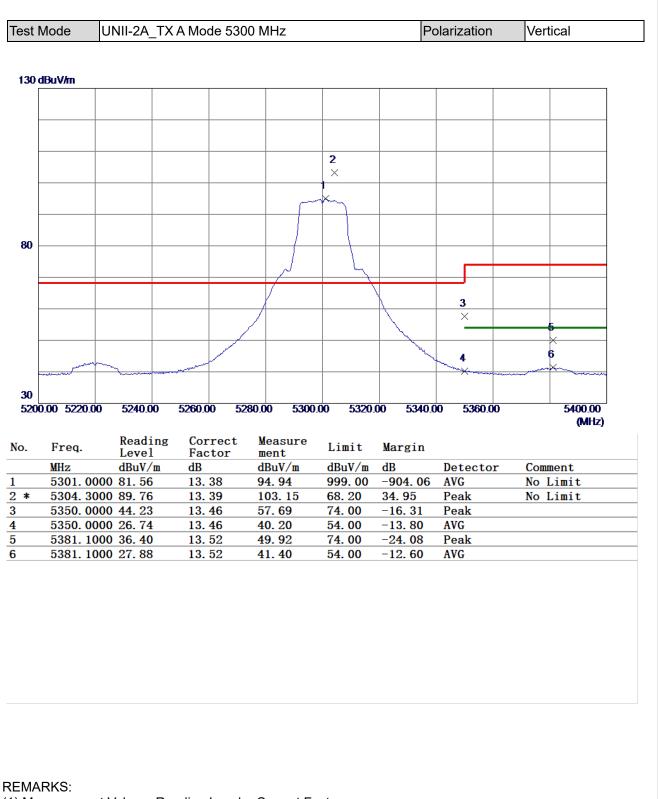






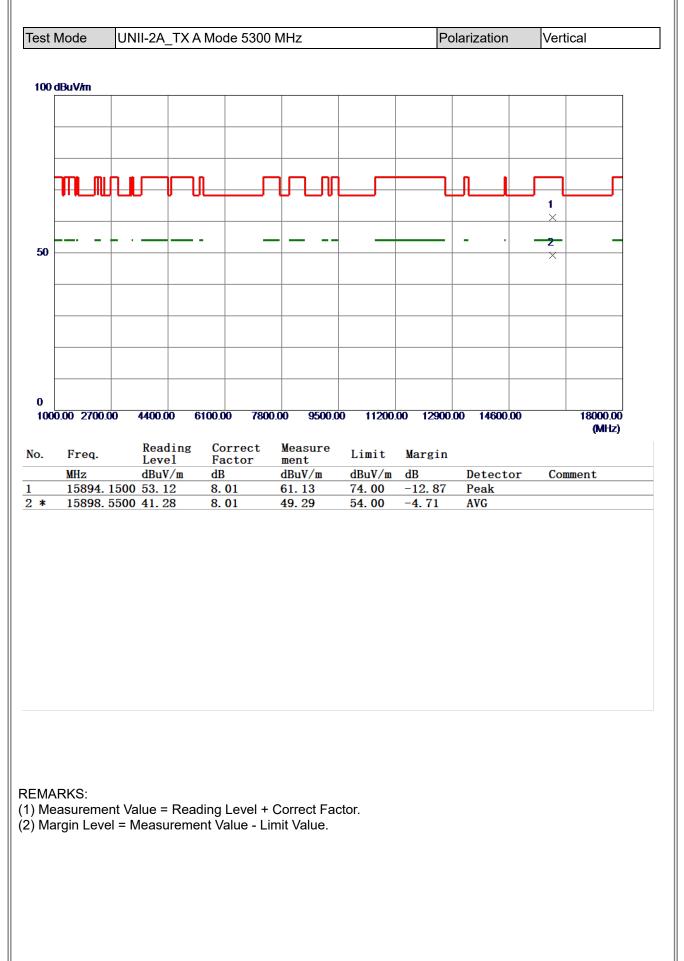


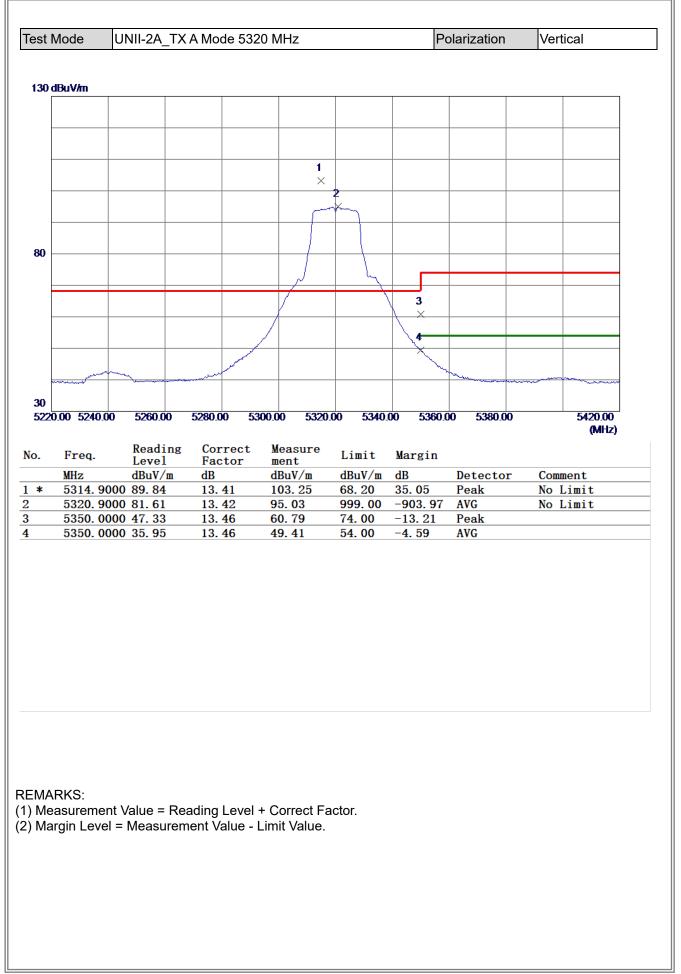




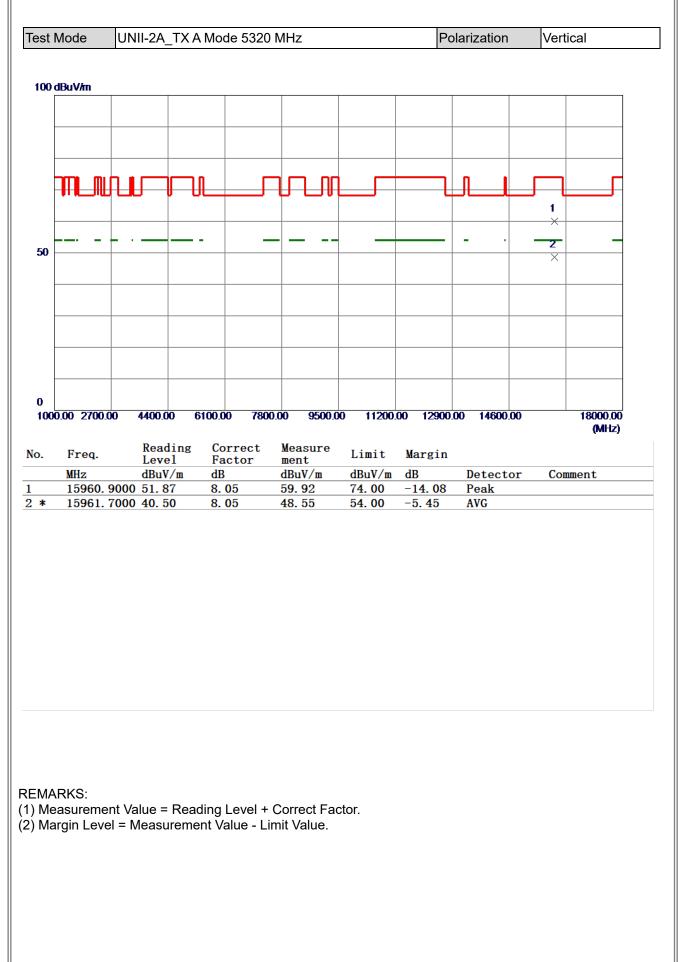
- (1) Measurement Value = Reading Level + Correct Factor.
- (2) Margin Level = Measurement Value Limit Value.



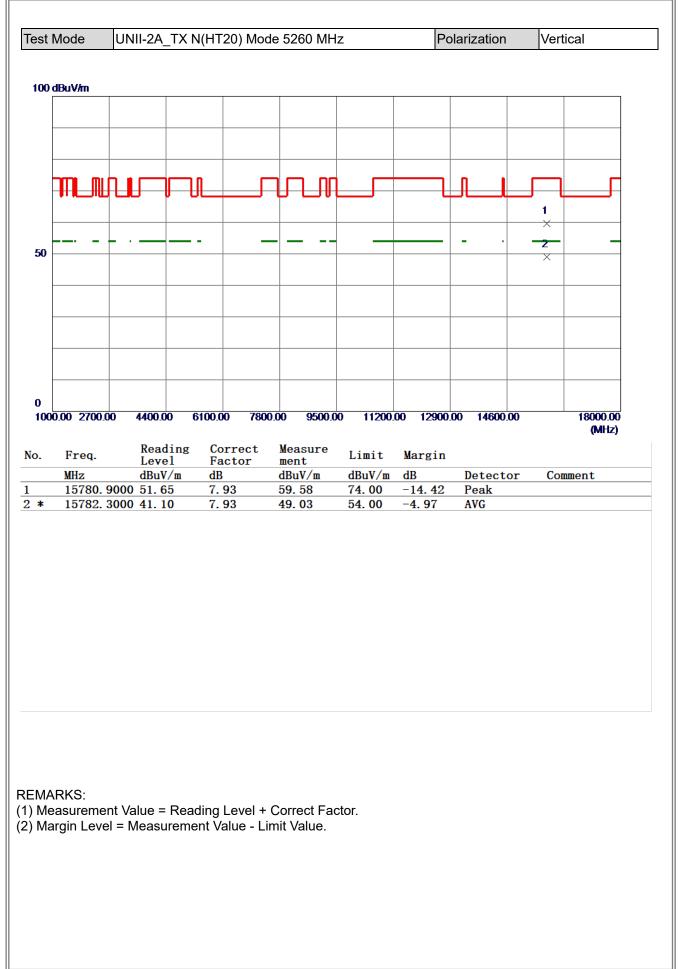




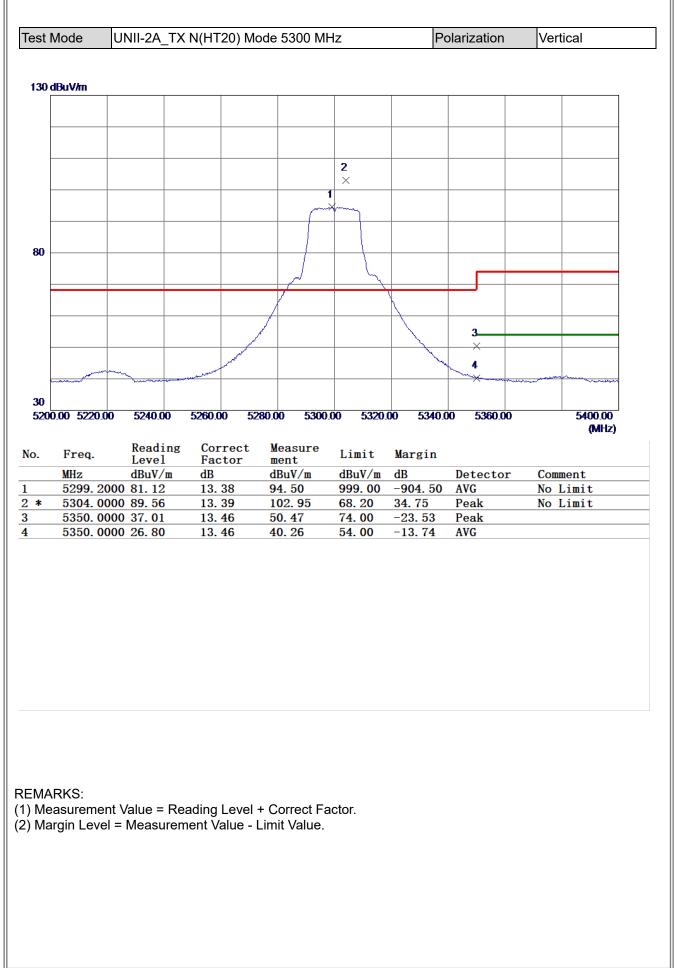




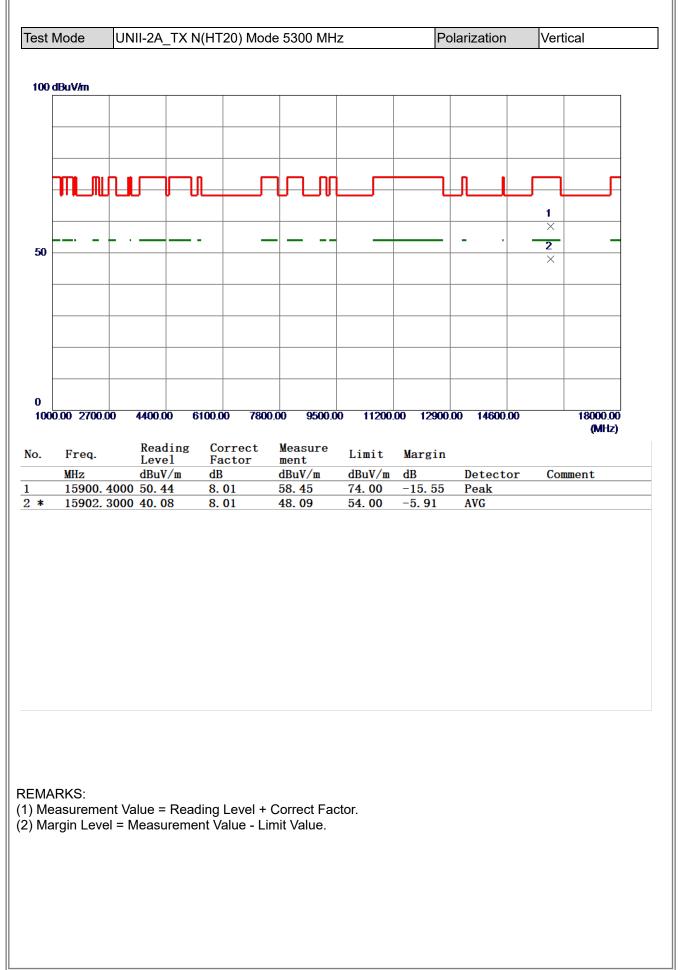




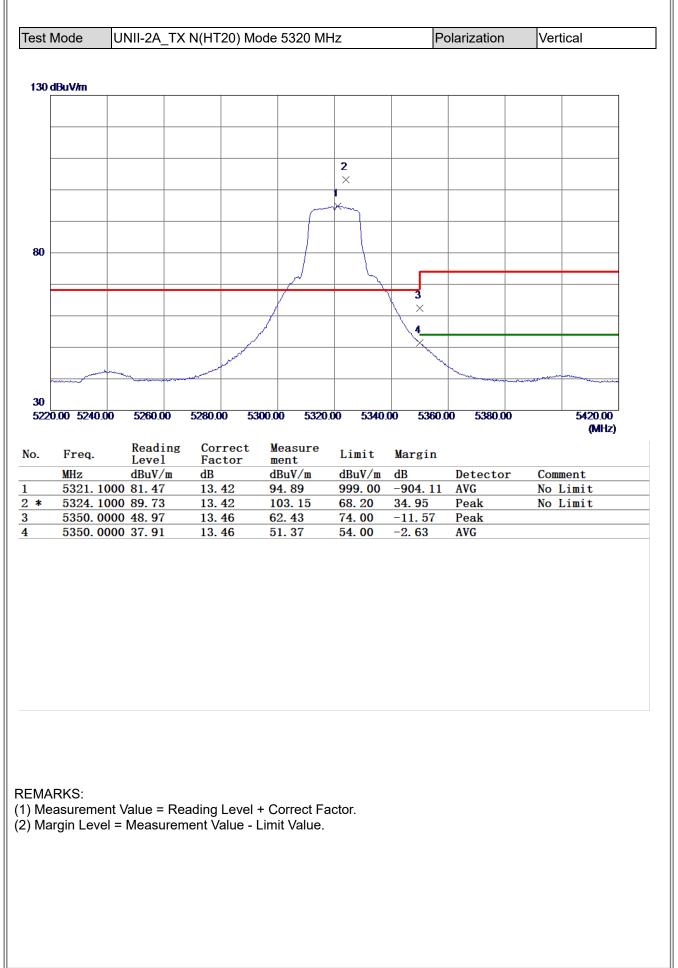




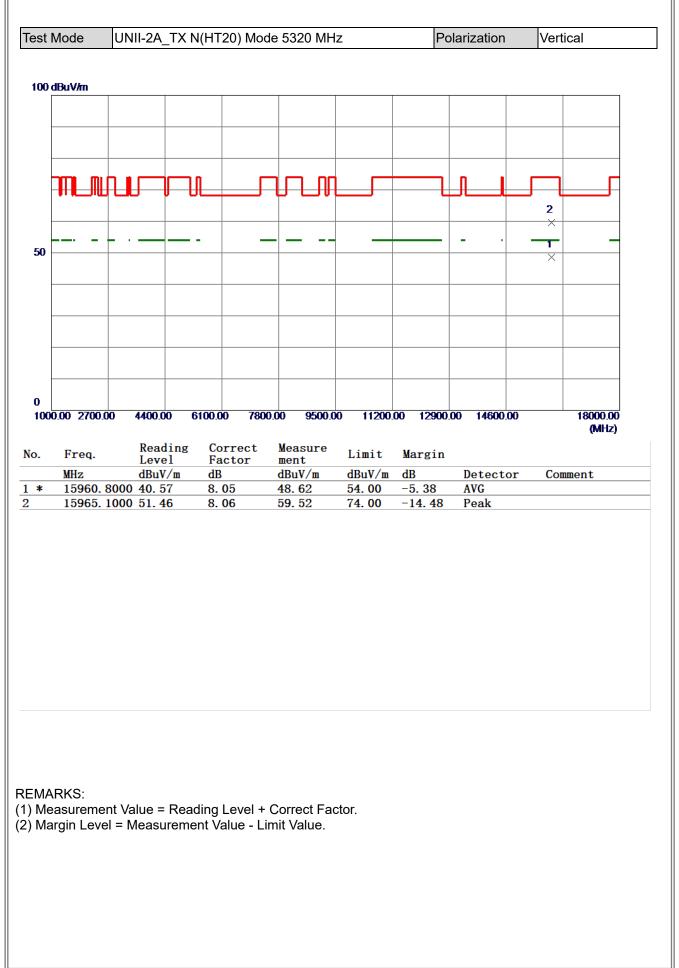


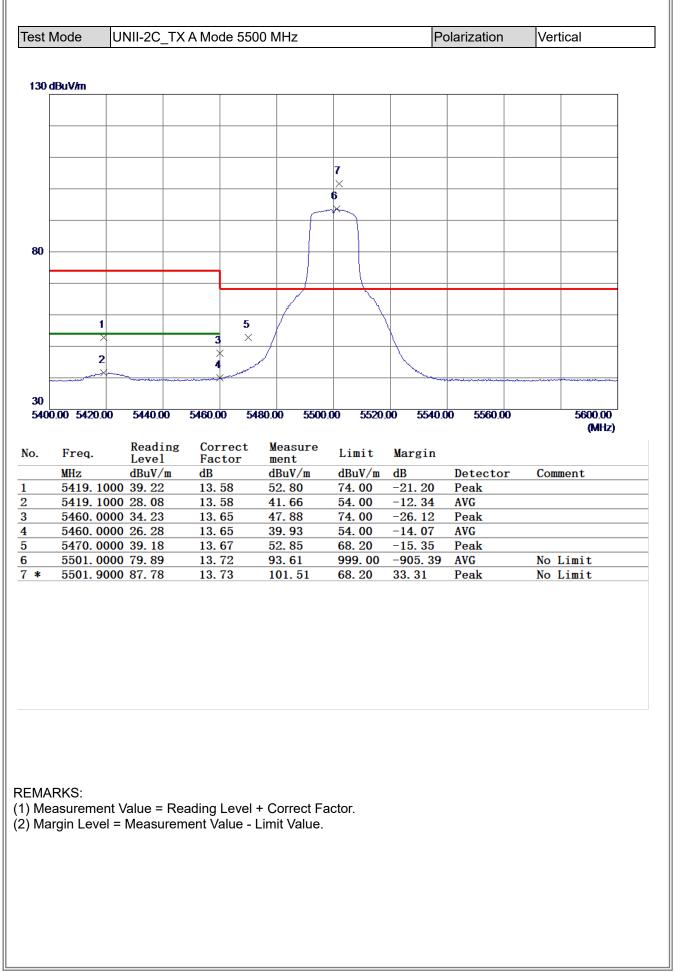




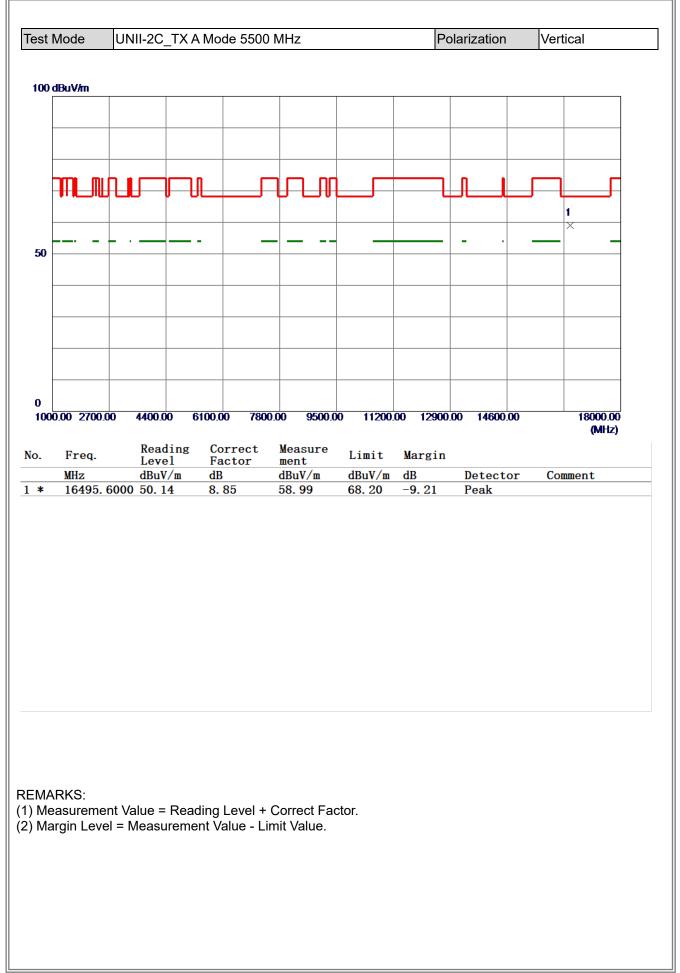




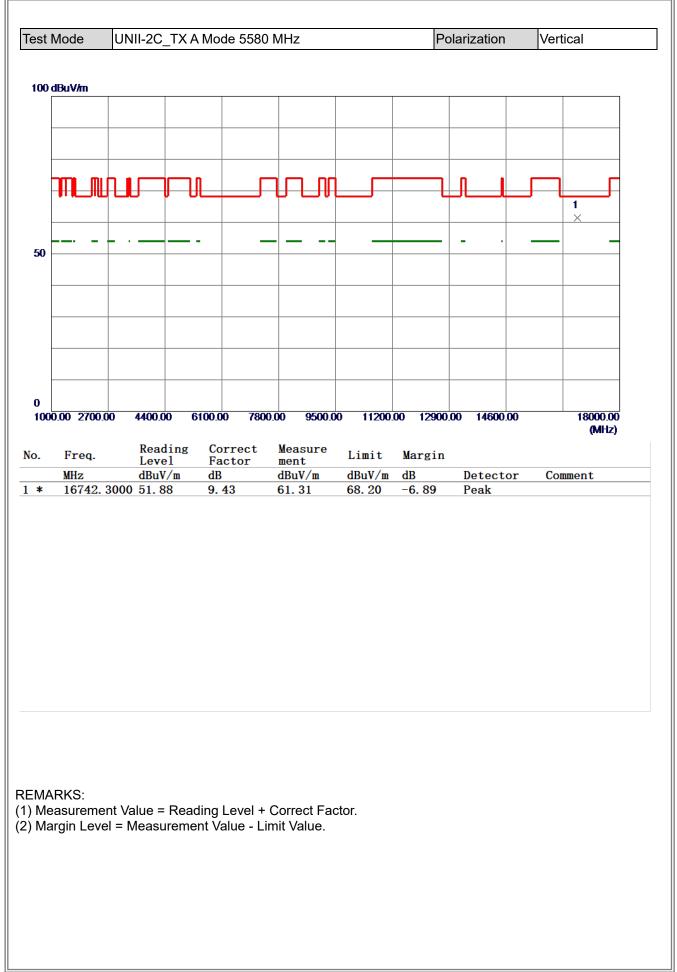




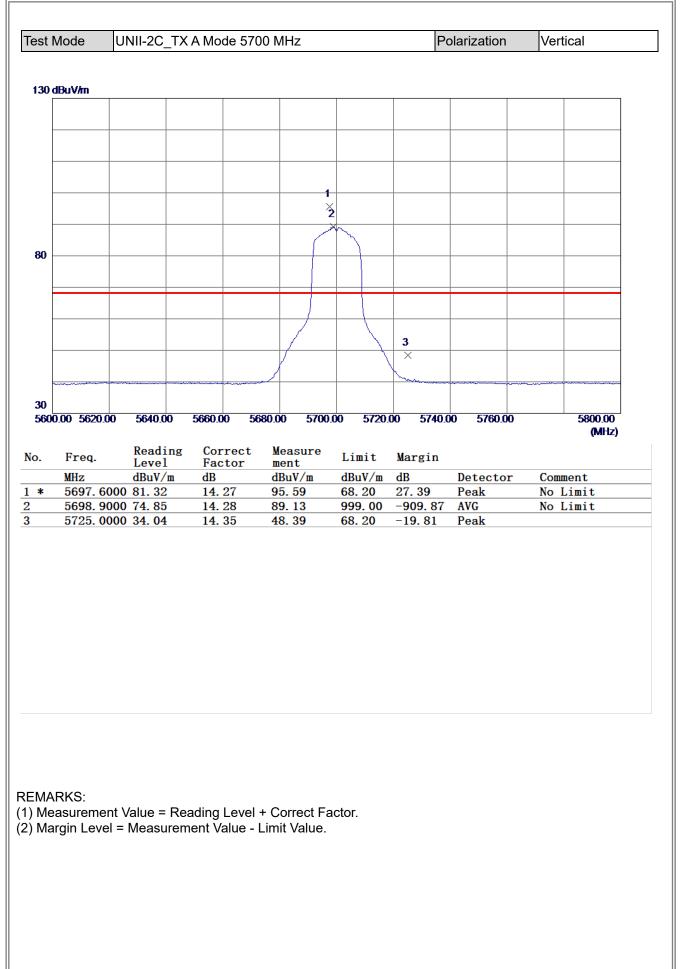




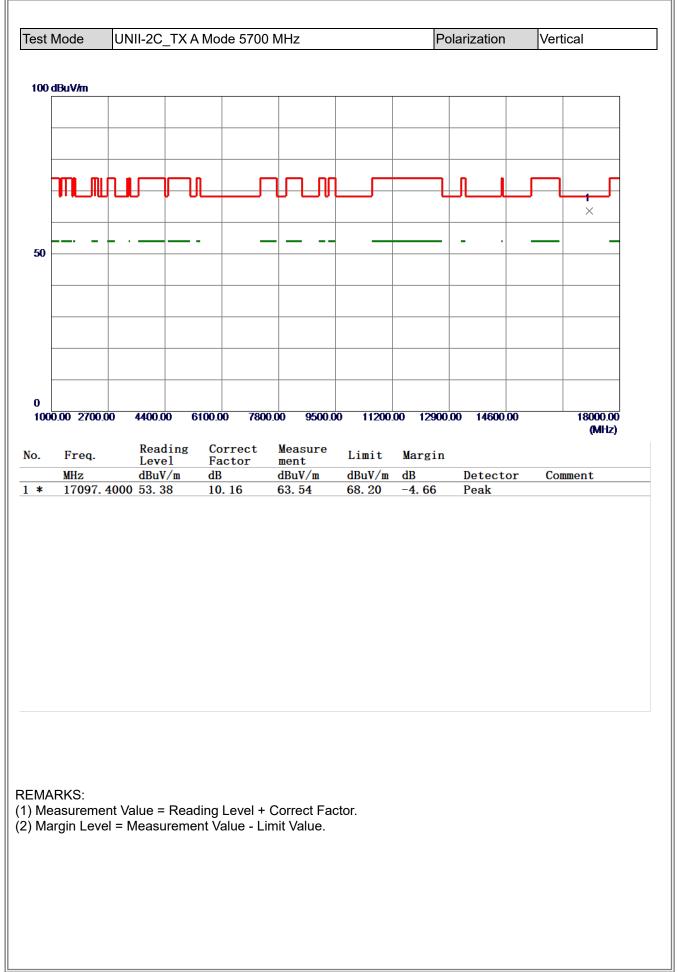




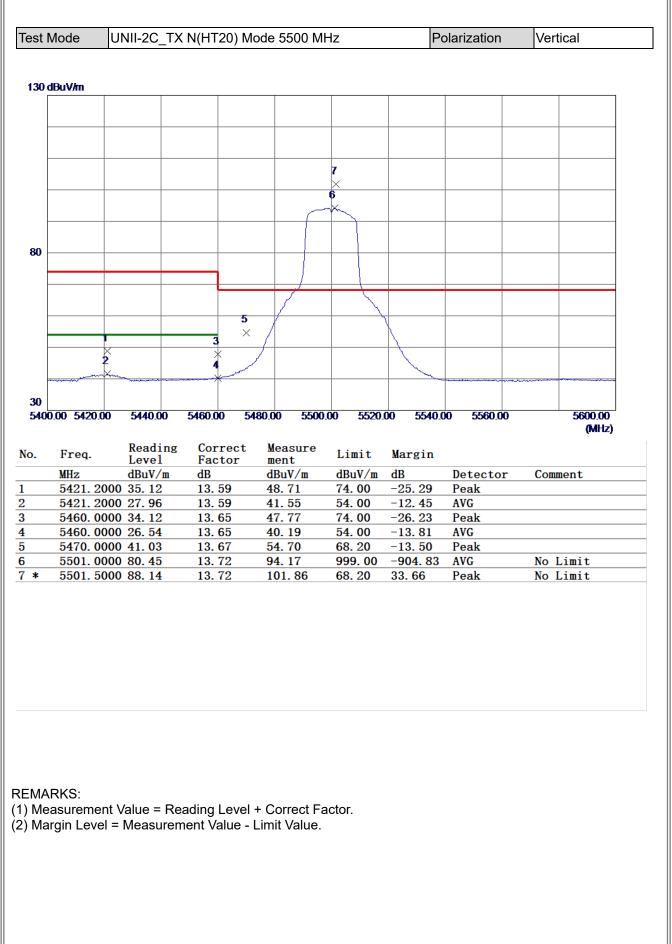
# **B**L



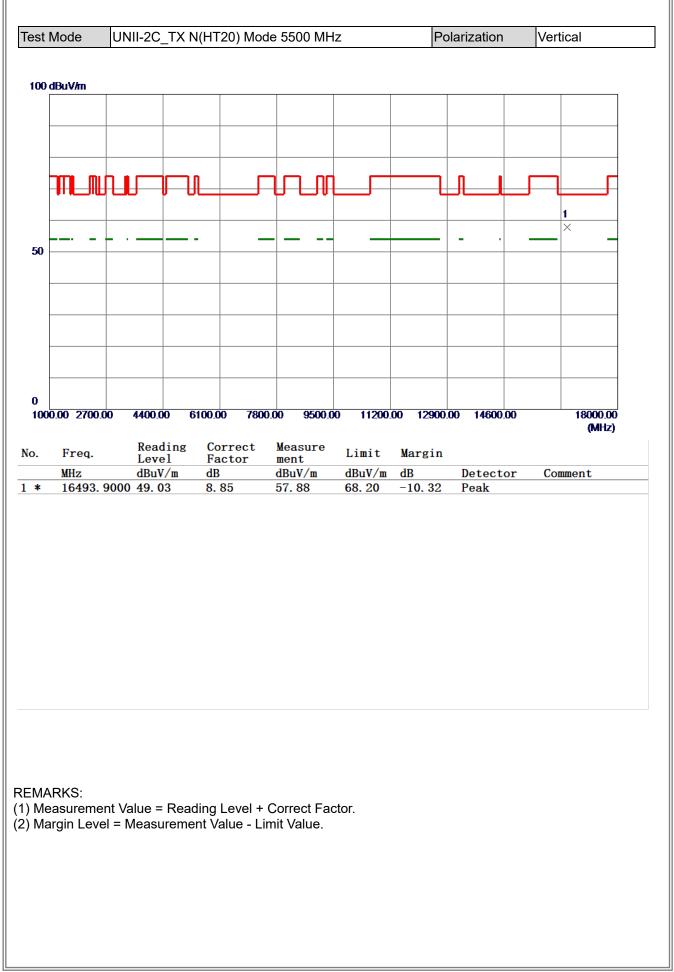




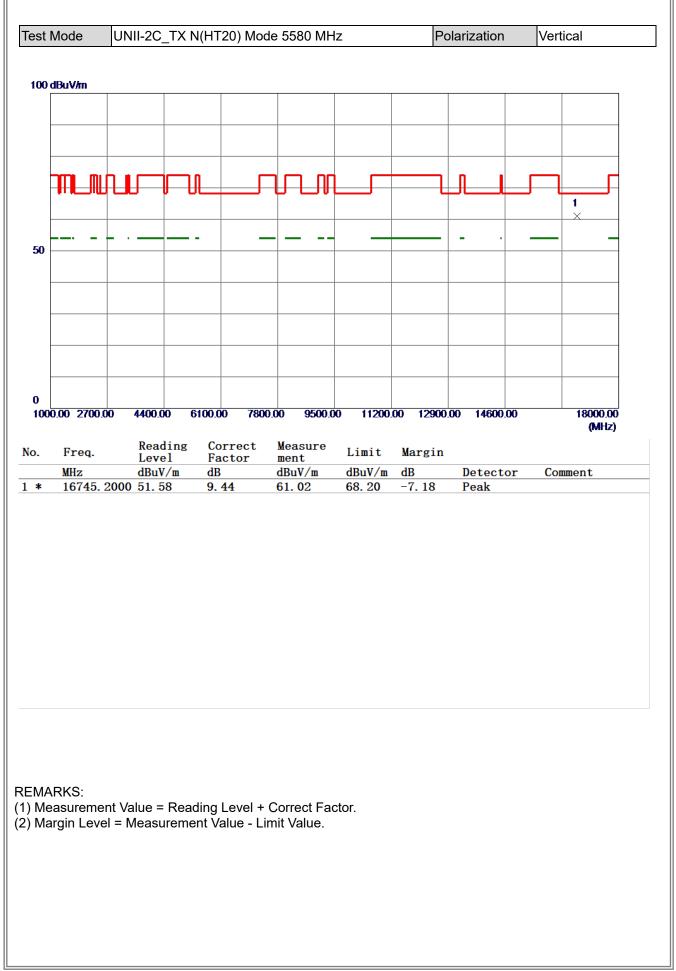




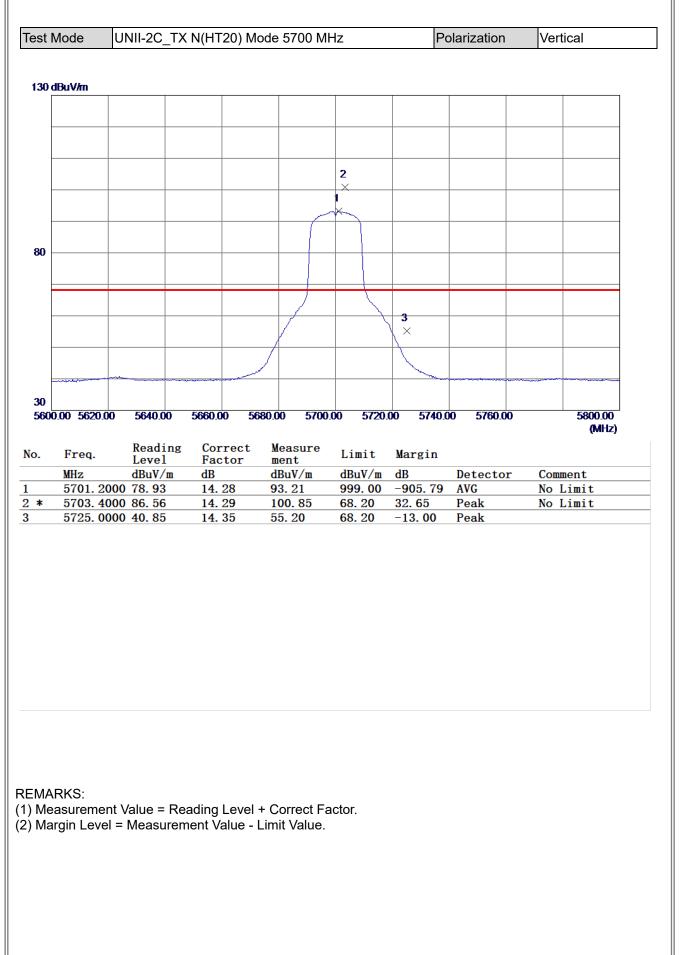




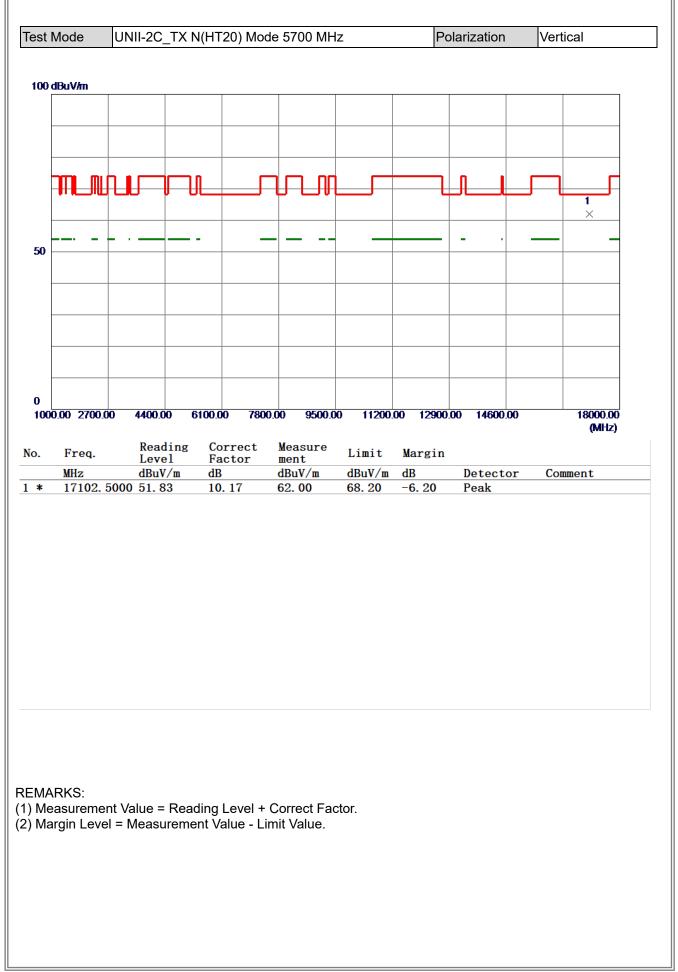




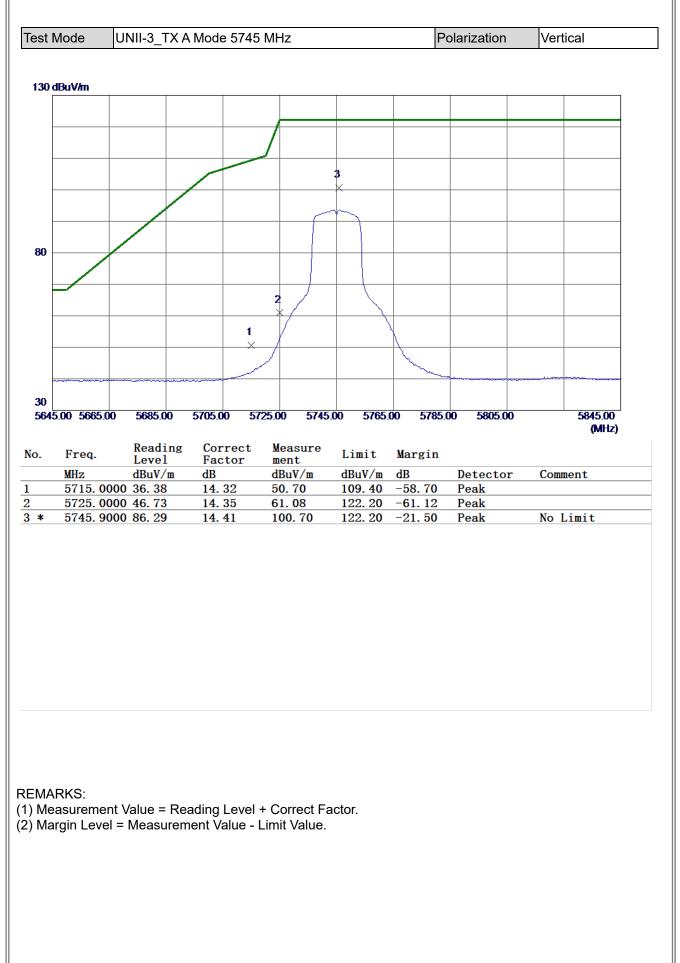




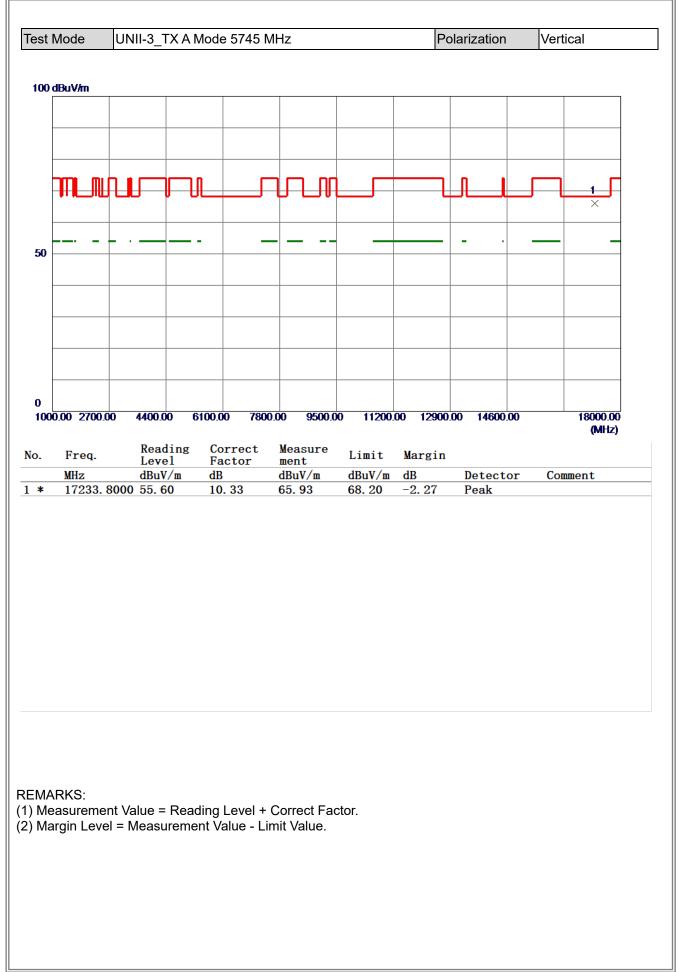




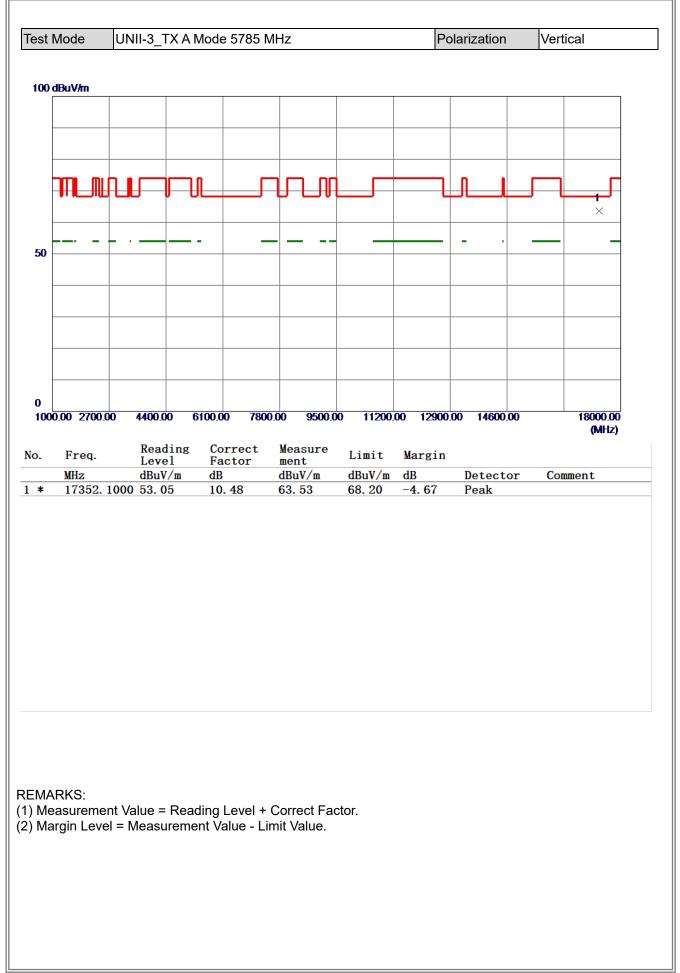




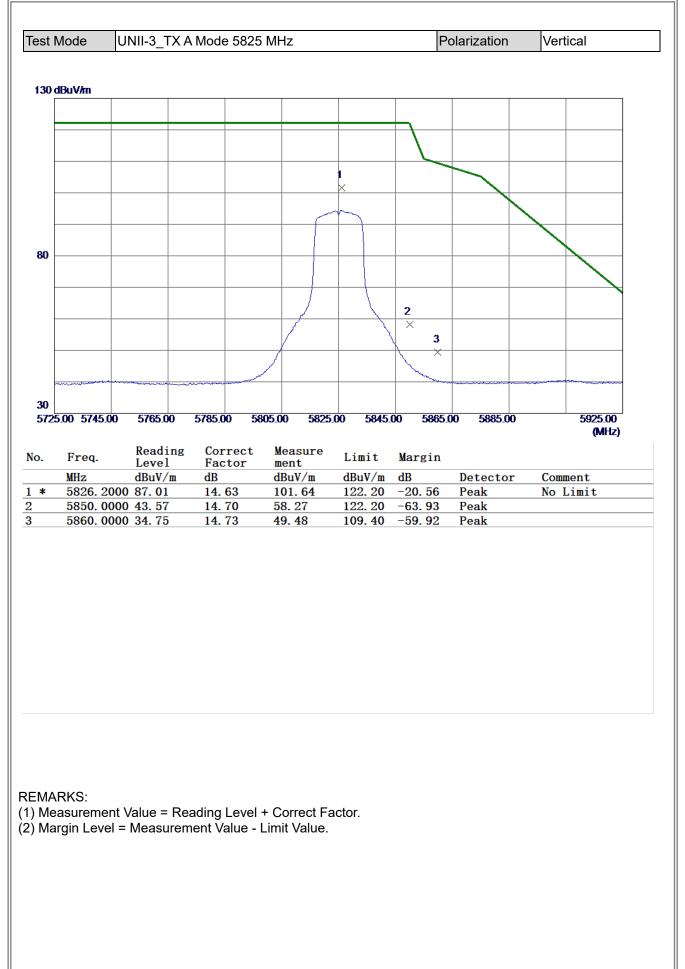




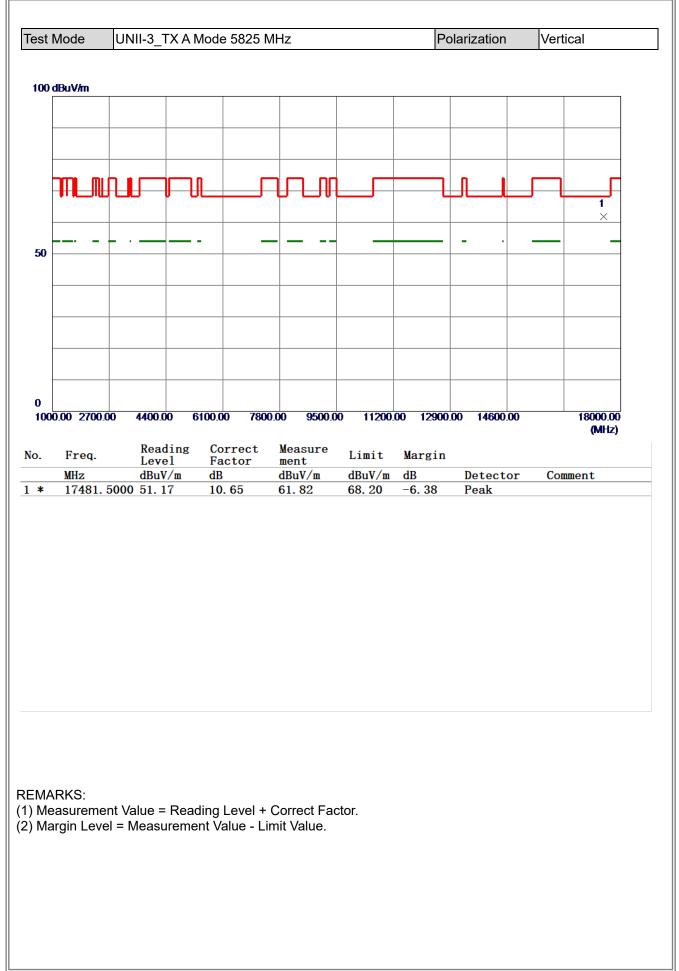




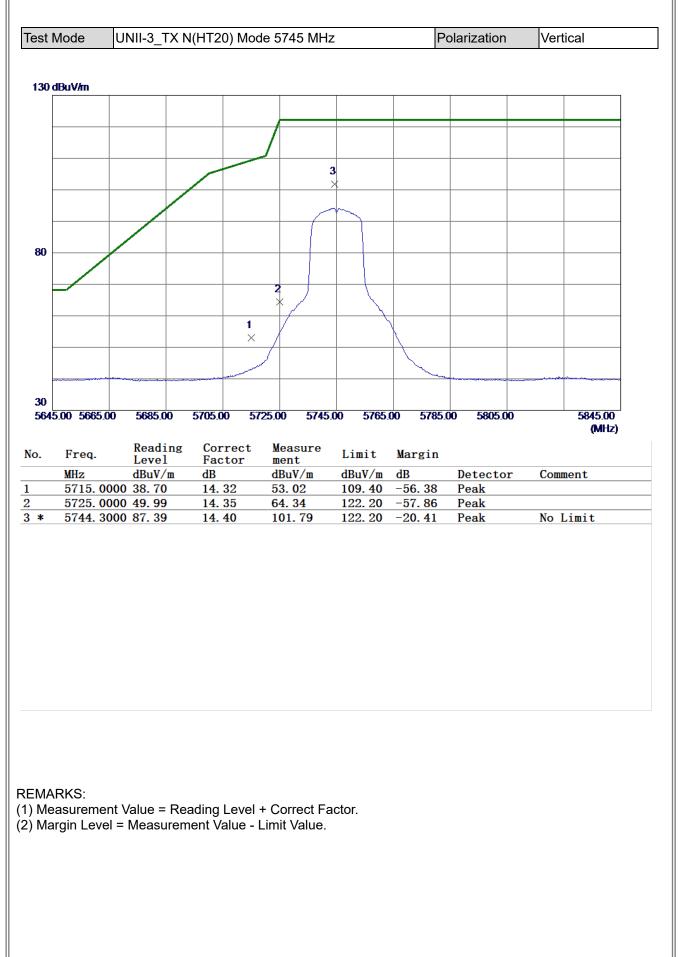
# **B**L



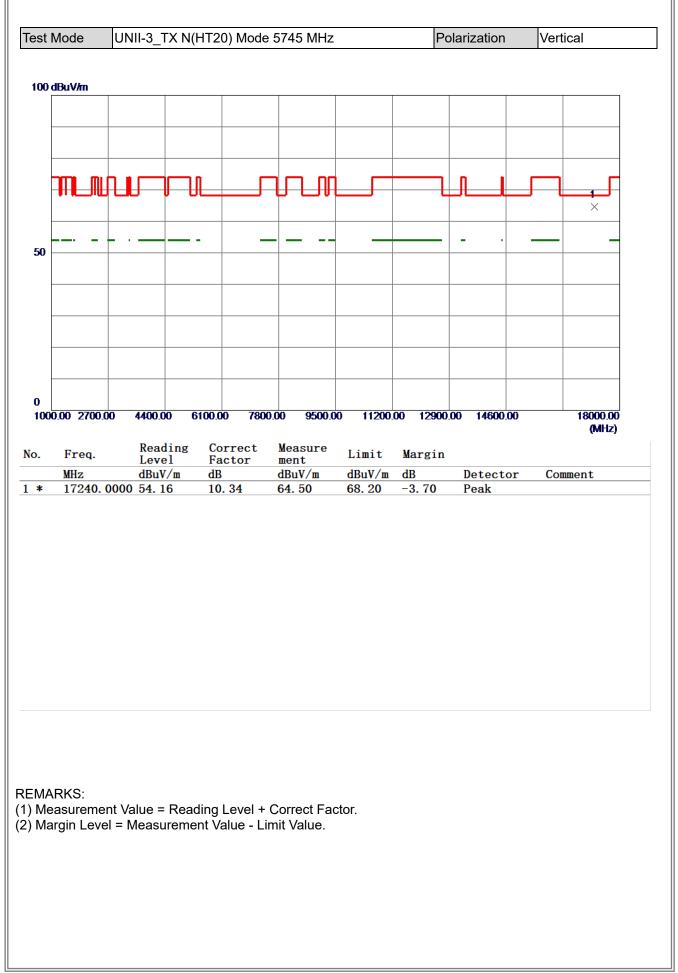




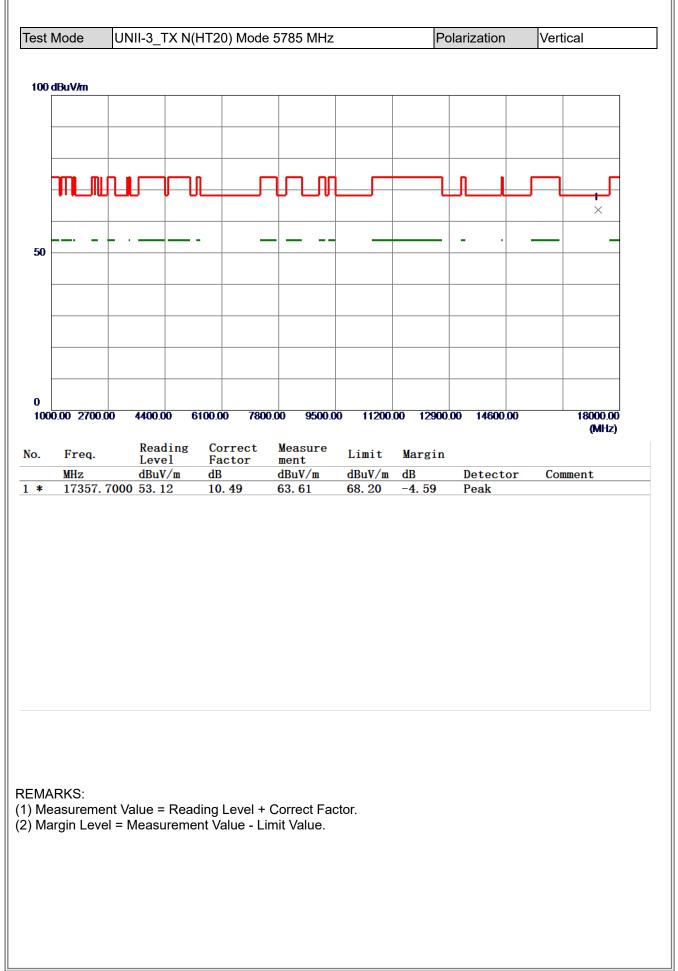




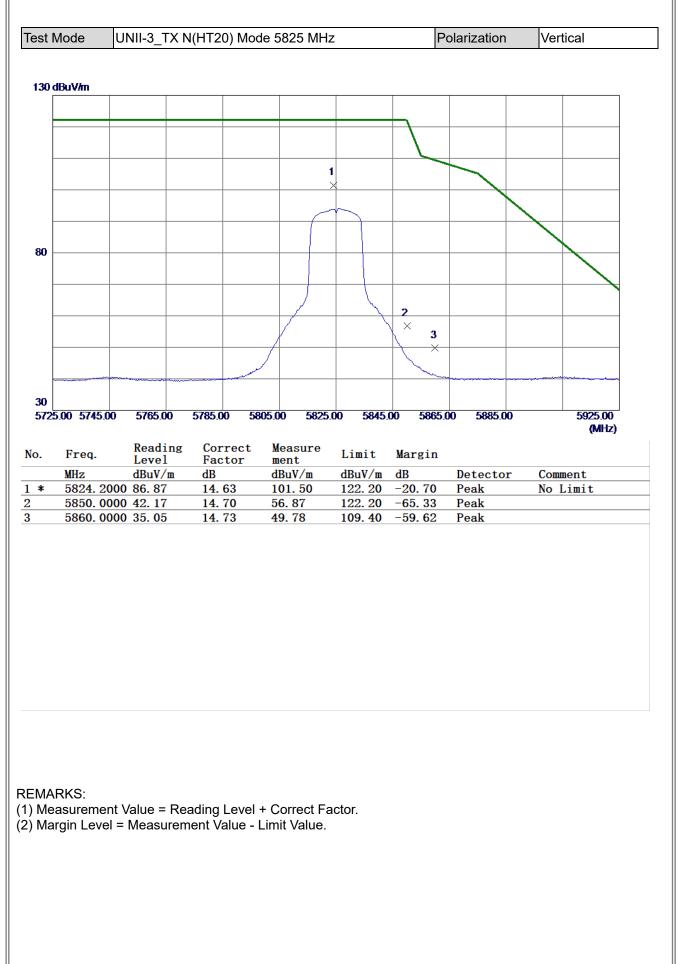




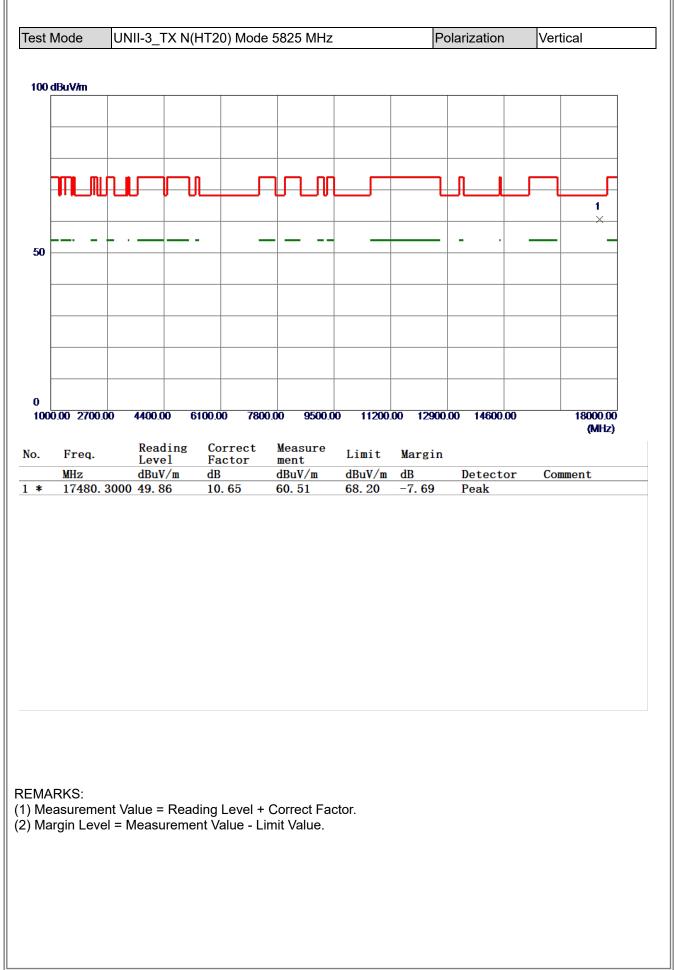




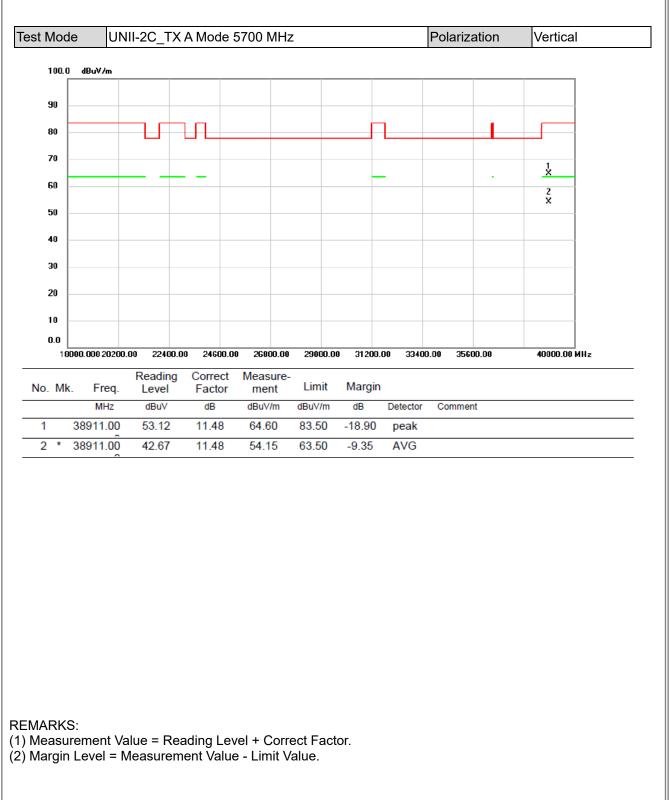
















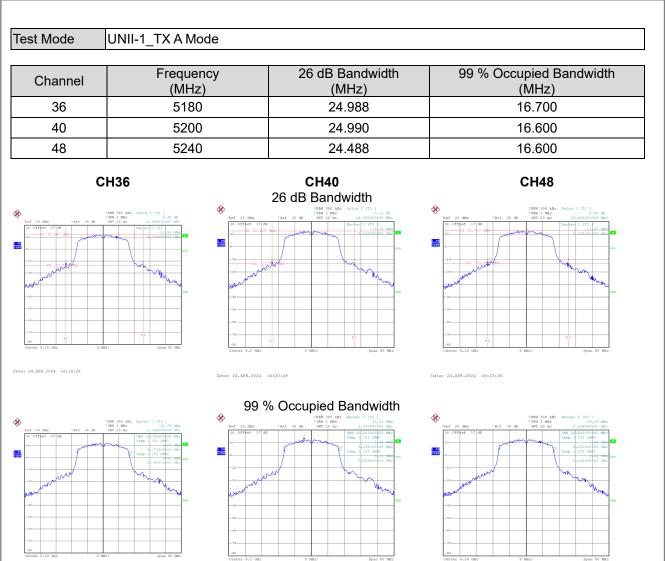
#### **REMARKS**:

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



## **APPENDIX E - BANDWIDTH**





Date: 24.APR.2024 16:18:52

Date: 24.APR.2024 16:20:14

Date: 24.APR.2024 16:22:47



Channel	Frequency	26 dB Bandwidth	99 % Occupied Bandwidth
36	(MHz) 5180	(MHz) 23.990	(MHz) 17.700
40	5200	23.899	17.700
48	5240	24.398	17.700
	CH36	CH40 26 dB Bandwidth	CH48
Part 20 cm         **** 30 cm           10 cfclet 17 m         **** 40 cm	VIWI 3 1988         -0.7 db         Far 1 20 dBs           VIWI 2 1982         1.94040610001         Far 1 20 dBs           VIWI 2 1982         1.41440         Far 1 20 dBs           VIWI 2 1982         1.414440         Far 1		Not 20 dB ***********************************
te: 24.359.2024 16:42:59	+************************************	% Occupied Bandwidth	Date: 24.8FR.2024 16:46:39

Date: 24.APR.2024 16:42:18

Date: 24.APR.2024 16:44:46

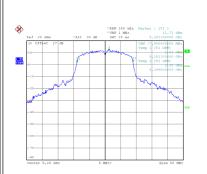
Date: 24.APR.2024 16:45:58



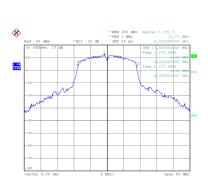
Channel	Frequency (MHz)	26 dB Bandwidth (MHz)	99 % Occupied Bandwidth (MHz)		
52	5260	23.590	16.600		
60	5300	24.690	16.600		
64	5320	24.589	16.600		
С	H52	CH60 26 dB Bandwidth	CH64		
20 dbs **** 30 db ***********************************	HEI 10 HEI ELLE 1 (13) HEI 20 HEI 2013 1.500 HEI 1.500 HEI 2014 1.500				
4.APR.2024 16:25:06	Date: 24.APR.202	24 16:31:16	Date: 24.APR.2024 16:32:29		
*AXE 30 (8) • (7) (4 × 3) (8) • (7) (8) (8) (9) • (7) (8) (9) • (7) (9) (9) (9) • (7) (9) (9) (9) (9) (9) • (7) (9) (9) (9) (9) (9) (9) (9) (9) (9) (9	<pre>mail the interval is in the interval is inter</pre>		<pre>set official and the local and the loca</pre>		



Channel	hannel Frequency 26 dB Bandwidth (MHz) (MHz)		99 % Occupied Bandwidth (MHz)		
52	5260	27.089	17.900		
60 5300		26.990	17.800		
64 5320		27.050	17.800		
	CH52	<b>CH60</b> 26 dB Bandwidth	CH64		
Inf         20 ctf         10 cff           30         01 f1 cff         01 cff           30         01 f1 cff         01 cff           10         01 f1 cff         01 cff           10         01 f1 cff         01 cff           10         01 f1 cff         01 cff           11         01 cff         01 cff           10         01 cff         01 cff           10         01 cff         01 cff           11         01 cff         01 cff           12         01 cff         01 cff           10         01 cff         01 cff           11         01 cff         01 cff           12         01 cff         01 cff           13         01 cff         01 cff           14         01 cff         01 cff           15         01 cff         01 cff           16         01 cff         01 cff           17         01 cff         01 cff           18         01 cff         01 cff           19         01 cff         01 cff           10         01 cff         01 cff           10         01 cff         01 cff           10 <th>- 202 1 2 Mar 2 Ma</th> <th>42         17         11         11         11         12&lt;</th> <th>*280 200 KBC bells [17] ] *280 200 KBC bells [17] ] 197 20 MB *2 200 *27 20 MB *2 200 *27 200 *27 200 *27 200 *27 200 *27 200 *27 200 *200 *</th>	- 202 1 2 Mar 2 Ma	42         17         11         11         11         12<	*280 200 KBC bells [17] ] *280 200 KBC bells [17] ] 197 20 MB *2 200 *27 20 MB *2 200 *27 200 *27 200 *27 200 *27 200 *27 200 *27 200 *200 *		







Date: 24.APR.2024 16:47:07

Date: 24.APR.2024 16:48:28

Date: 24.APR.2024 16:49:30



Channel	Frequency (MHz)	/	26 dB Bandwidth (MHz)		99 % Occupied Bandwidth (MHz)					
100	5500			23.650			1	6.600	)	
116	5580			24.549			1	6.600	)	
140	5700			24.890			1	6.60	)	
	1100	*	26 dB B	international and the state of		A	(	CH14		
Ref 20 dBm *Att 30 dB	*RBM 300 kHz Delta 1 [T1] *USW 1 MHz -0.78 dB SWT 20 me 23.4649944000 MHz Marker 1 [T1] 7.73 22 dbm	Ref 20 dBm 20 Offset 17 dB p1 12,747 c	*Att 30 dB S	7BW 1 MHz -0. SWT 20 ms 24.5490000 Marker 1 [T1]		Ref 20 dBm 20 Offset 17 c 01 13.27	*Att 30 dB	*VBW 1 MHz SWT 20 ms	z Delta 1 (T) 24.890 Marker 1 (1	0.16 dB
12 01 13.00 dta 13 02 11.00 dta 14 02 11.00 dta 15 02 01.00 dta 15 00 dta 16 00 dta 16 00 dta 17 00 dta 18 00 dta						-10			*)	
: 24.APR.2024 16:33:55		Date: 24.APR.2024 1		ied Bandw		Date: 24.APR.2024	16:36:17			pan 50 MHz
	*REW 300 kHz Marker 1 [T1 ] *VEW 1 MEr -33.94 dEm	Ref 20 dBm	-	UBW 300 kHz Marker 1 [T1 ] /EW 1 MHz -34.	82 dBm	Ref 20 dBm	*Att 30 dB	*RBW 300 ki *VBW 1 MHz SWT 20 ms	Iz Marker 1 [1	r1 ) -34.52 dBm
Perf 2:0	Yee 1         March 1         23,94         Obs           Y 2         A model         5,256         Obs         Obs           Y 2         A model         5,456         Obs         Obs         Obs           Y 2         A model         11         Obs         Obs	20 Officet 17 d8	J. Marine	CBN 16 600000 Temp 1 [T1 CBN T2 5,5718000 Temp 2 [T1 CBN	00 MHz 1	20 Offbet 17 c			OBW 16,600 Temp 1 [71	000000 MHz OBW] 4.45 dBm 300000 GHz OBW] 2.67 dBm
- 42		- 50			308	- 40 - 50 - 60				M. Maria
-70		70				70				



Channel	Frequency (MHz)	26 dB Bandwidth (MHz)	99 % Occupied Bandwidth (MHz)			
100	5500	24.000	17.700			
116	5580	23.999	17.700			
140	5700	26.790	17.700			
(	CH100	<b>CH116</b> 26 dB Bandwidth	CH140			
20 dBm *Att 30 dB	*285 300 kHz Delta 1 [7] ] *VBW 1 MHz Delta 1 [7] ] 387 20 me 23.99971600 KHz 20 005 17] Machkel [7]	*1888 3000 kHz Delta 1 [T1 ] *789 1 MBz 0.62 dB dBm *Att 30 dB SHT 20 ms 23.998950000 MHz et 17 dB Marbert -1.4133 dBm	* 780 300 kHz beits 1 [71] * 7076 1 HGz 0.11 dB Ref 20 dBm * Att 30 dB 397 20 m2 26.79000000 HHz 20 Offlet 17 dH Kaleye 1 [71]			
		5.40 dB 7.2024 10:52:42	Image: state			
		99 % Occupied Bandwidth				
23.000 *Att 30.00	*RBW 300 kHz Marker 1 [T1 ] *VBW 1 MHZ	*RBM 300 kHz Marker 1 (T1 ) *VEW 1 MHz -35,68 dBm	**************************************			

Date: 24.APR.2024 16:50:36

Date: 24.APR.2024 16:51:51

Date: 24.APR.2024 16:53:43



Test Mod	e UNII-3_	TX A Mode			
Channel	Frequency (MHz)	6 dB Bandwidth (MHz)	99 % Occupied Bandwidth (MHz)	6 dB Bandwidth Min. Limit (MHz)	Result
149	5745	15.150	16.600	0.5	Complies
157	5785	15.300	16.700	0.5	Complies
165	5825	15.200	16.600	0.5	Complies
	CH149		<b>CH157</b> 6 dB Bandwidth	CH165	
10         072-001         1.6 x cold and and and and and and and and and an	5 NEL/	100 cm         100 cm           100 cm         100 cm	Marke L (27) 1 (3) dia 4 (4) (4) (4) (4) (4) (4) (4) (4) (4) (4	Image: Second	Macker 1 (13) 
Perf         2.0 etcm           Perf         2.0 etcm	22 Tesp 2 5.	A A		*287 300 KE *297 300 *10 10 10 10 10 10 10 10 10 10 10 10 10 1	Marker 1 (T3 ) -16.27 dm -16.27 dm very -10.25 dm -10.25 dm -

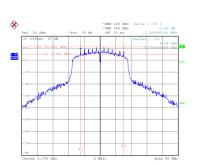
Date: 24.APR.2024 16:37:00

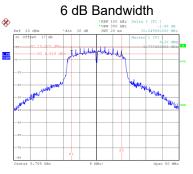
Date: 24.APR.2024 16:38:21

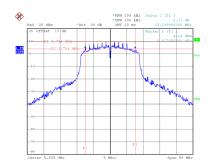
Date: 24.APR.2024 16:39:49



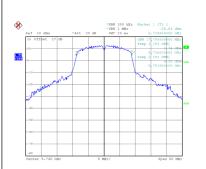
Test Mode	e UNII-3_	TX N(HT20) Mode			
Channel	Frequency (MHz)	6 dB Bandwidth (MHz)	99 % Occupied Bandwidth (MHz)	6 dB Bandwidth Min. Limit (MHz)	Result
149	5745	13.850	17.700	0.5	Complies
157	5785	15.250	17.900	0.5	Complies
165	5825	15.200	17.700	0.5	Complies
	CH149		CH157	CH165	





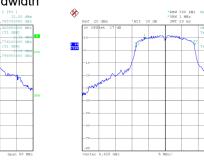


Date: 24.APR.2024 16:56:49



99 % Occupied Bandwidth 8 1 PE VIEV

Date: 24.APR.2024 16:58:34



Date: 24.APR.2024 17:02:11

Date: 24.APR.2024 16:55:59

Date: 24.APR.2024 16:57:44

Date: 24.APR.2024 17:01:24



# **APPENDIX F - MAXIMUM OUTPUT POWER**



Test Mod	Test Mode UNII-1_TX A Mode								
Channel	Frequency (MHz)	Output Power (dBm)	Duty Factor	Output Power + Duty Factor (dBm)	Max. Limit (dBm)	Max. Limit (W)	Result		
36	5180	18.20	0.15	18.35	23.98	0.2500	Complies		
40	5200	18.78	0.15	18.93	23.98	0.2500	Complies		
48	5240	18.89	0.15	19.04	23.98	0.2500	Complies		

#### UNII-1\_TX N(HT20) Mode Test Mode

Channel	Frequency (MHz)	Output Power (dBm)	Duty Factor	Output Power + Duty Factor (dBm)	Max. Limit (dBm)	Max. Limit (W)	Result
36	5180	18.12	0.17	18.29	23.98	0.2500	Complies
40	5200	18.49	0.17	18.66	23.98	0.2500	Complies
48	5240	18.74	0.17	18.91	23.98	0.2500	Complies

#### Test Mode UNII-2A\_TX A Mode

Channel	Frequency (MHz)	Output Power (dBm)	Duty Factor	Output Power + Duty Factor (dBm)	Max. Limit (dBm)	Max. Limit (W)	Result
52	5260	18.19	0.15	18.34	23.98	0.2500	Complies
60	5300	18.92	0.15	19.07	23.98	0.2500	Complies
64	5320	19.02	0.15	19.17	23.98	0.2500	Complies

#### UNII-2A\_TX N(HT20) Mode Test Mode

Channel	Frequency (MHz)	Output Power (dBm)	Duty Factor	Output Power + Duty Factor (dBm)	Max. Limit (dBm)	Max. Limit (W)	Result
52	5260	19.03	0.17	19.20	23.98	0.2500	Complies
60	5300	18.74	0.17	18.91	23.98	0.2500	Complies
64	5320	18.82	0.17	18.99	23.98	0.2500	Complies



Test Mod	Test Mode UNII-2C_TX A Mode									
Channel	Frequency (MHz)	Output Power (dBm)	Duty Factor	Output Power + Duty Factor (dBm)	Max. Limit (dBm)	Max. Limit (W)	Result			
100	5500	18.93	0.15	19.08	23.98	0.2500	Complies			
116	5580	18.81	0.15	18.96	23.98	0.2500	Complies			
140	5700	19.06	0.15	19.21	23.98	0.2500	Complies			

#### Test Mode UNII-2C\_TX N(HT20) Mode

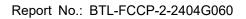
Channel	Frequency (MHz)	Output Power (dBm)	Duty Factor	Output Power + Duty Factor (dBm)	Max. Limit (dBm)	Max. Limit (W)	Result
100	5500	18.82	0.17	18.99	23.98	0.2500	Complies
116	5580	18.70	0.17	18.87	23.98	0.2500	Complies
140	5700	18.92	0.17	19.09	23.98	0.2500	Complies

#### Test Mode UNII-3\_TX A Mode

Channel	Frequency (MHz)	Output Power (dBm)	Duty Factor	Output Power + Duty Factor (dBm)	Max. Limit (dBm)	Max. Limit (W)	Result
149	5745	18.94	0.15	19.09	30.00	1.0000	Complies
157	5785	18.13	0.15	18.28	30.00	1.0000	Complies
165	5825	18.38	0.15	18.53	30.00	1.0000	Complies

#### Test Mode UNII-3\_TX N(HT20) Mode

Channel	Frequency (MHz)	Output Power (dBm)	Duty Factor	Output Power + Duty Factor (dBm)	Max. Limit (dBm)	Max. Limit (W)	Result
149	5745	18.83	0.17	19.00	30.00	1.0000	Complies
157	5785	19.02	0.17	19.19	30.00	1.0000	Complies
165	5825	18.55	0.17	18.72	30.00	1.0000	Complies

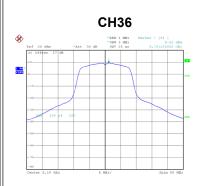




## **APPENDIX G - POWER SPECTRAL DENSITY**



Test Mode UNII-1_TX A Mode						
Channel	Frequency (MHz)	Power Spectral Density (dBm/MHz)	Duty Factor	Power Spectral Density + Duty Factor (dBm/MHz)	Max. Limit (dBm/MHz)	Result
36	5180	9.22	0.15	9.37	11.00	Complies
40	5200	9.37	0.15	9.52	11.00	Complies
48	5240	9.59	0.15	9.74	11.00	Complies



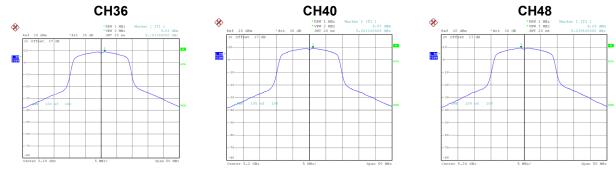
Date: 24.APR.2024 16:19:53





#### Test Mode UNII-1\_TX N(HT20) Mode

Channel	Frequency (MHz)	Power Spectral Density (dBm/MHz)	Duty Factor	Power Spectral Density + Duty Factor (dBm/MHz)	Max. Limit (dBm/MHz)	Result
36	5180	9.03	0.17	9.20	11.00	Complies
40	5200	9.07	0.17	9.24	11.00	Complies
48	5240	9.29	0.17	9.46	11.00	Complies



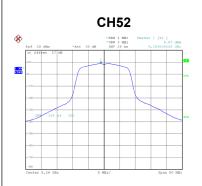
Date: 24.APR.2024 16:43:14

#### Date: 24.APR.2024 16:45:41

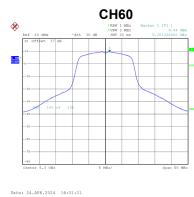
Date: 24.APR.2024 16:46:53

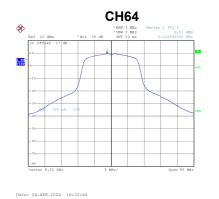


Test Mod	Test Mode UNII-2A_TX A Mode					
Channel	Frequency (MHz)	Power Spectral Density (dBm/MHz)	Duty Factor	Power Spectral Density + Duty Factor (dBm/MHz)	Max. Limit (dBm/MHz)	Result
52	5260	8.87	0.15	9.02	11.00	Complies
60	5300	9.44	0.15	9.59	11.00	Complies
64	5320	9.51	0.15	9.66	11.00	Complies



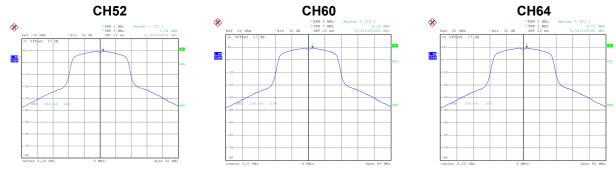
Date: 24.APR.2024 16:25:20





#### Test Mode UNII-2A\_TX N(HT20) Mode

Channel	Frequency (MHz)	Power Spectral Density (dBm/MHz)	Duty Factor	Power Spectral Density + Duty Factor (dBm/MHz)	Max. Limit (dBm/MHz)	Result
52	5260	9.54	0.17	9.71	11.00	Complies
60	5300	9.19	0.17	9.36	11.00	Complies
64	5320	9.27	0.17	9.44	11.00	Complies



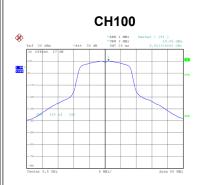
Date: 24.APR.2024 16:48:03

Date: 24.APR.2024 16:49:17

Date: 24.APR.2024 16:50:19



Test Mode UNII-2C_TX A Mode						
	Frequency	Power Spectral		Power Spectral	Max. Limit	
Channel	(MHz)	Density (dBm/MHz)	Duty Factor	Density + Duty Factor (dBm/MHz)	(dBm/MHz)	Result
100	5500	10.06	0.15	10.21	11.00	Complies
116	5580	9.74	0.15	9.89	11.00	Complies
140	5700	10.08	0.15	10.23	11.00	Complies



Date: 24.APR.2024 16:34:09





## Test Mode UNII-2C\_TX N(HT20) Mode

Channel	Frequency (MHz)	Power Spectral Density (dBm/MHz)	Duty Factor	Power Spectral Density + Duty Factor (dBm/MHz)	Max. Limit (dBm/MHz)	Result
100	5500	9.71	0.17	9.88	11.00	Complies
116	5580	9.43	0.17	9.60	11.00	Complies
140	5700	9.87	0.17	10.04	11.00	Complies



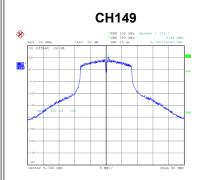
Date: 24.APR.2024 16:51:33

Date: 24.APR.2024 16:52:57

Date: 24.APR.2024 16:54:32



Test Mod	Test Mode UNII-3_TX A Mode						
Channel	Frequency (MHz)	Power Spectral Density (dBm/500 kHz)	Duty Factor	Power Spectral Density + Duty Factor (dBm/500 kHz)	Max. Limit (dBm/500 kHz)	Result	
149	5745	8.94	0.15	9.09	30.00	Complies	
157	5785	8.66	0.15	8.81	30.00	Complies	
165	5825	8.11	0.15	8.26	30.00	Complies	

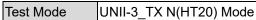




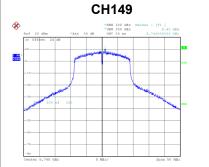


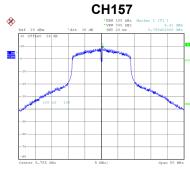
Date: 24.APR.2024 16:38:04

Date: 24.APR.2024 16:39:25

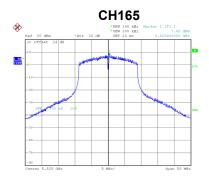


Channel	Frequency (MHz)	Power Spectral Density (dBm/500 kHz)	Duty Factor	Power Spectral Density + Duty Factor (dBm/500 kHz)	Max. Limit (dBm/500 kHz)	Result
149	5745	8.42	0.17	8.59	30.00	Complies
157	5785	8.41	0.17	8.58	30.00	Complies
165	5825	7.40	0.17	7.57	30.00	Complies





Date: 24.APR.2024 16:58:49



Date: 24.APR.2024 17:02:26

Date: 24.APR.2024 16:57:04





# **APPENDIX H - FREQUENCY STABILITY**



UNII-1

#### Voltage vs. Frequency Stability

Voltage (V)	Measurement Frequency (MHz)		
Center Frequency	5180.0000		
5.75	5180.0220		
5	5180.0220		
4.25	5180.0224		
Maximum Deviation (MHz)	0.0224		
Maximum Deviation (ppm)	4.3243		

## Temperature vs. Frequency Stability

Temperature (°C)	Measurement Frequency (MHz)
Center Frequency	5180.0000
0	5180.0220
10	5180.0100
20	5180.0008
30	5179.9956
40	5180.0008
45	5180.0056
Maximum Deviation (MHz)	0.0220
Maximum Deviation (ppm)	4.2471



UNII-2A

#### Voltage vs. Frequency Stability

Voltage (V)	Measurement Frequency (MHz)
Center Frequency	5260.0000
5.75	5260.0040
5	5260.0036
4.25	5260.0032
Maximum Deviation (MHz)	0.0040
Maximum Deviation (ppm)	0.7605

## Temperature vs. Frequency Stability

Temperature (°C)	Measurement Frequency (MHz)
Center Frequency	5260.0000
0	5260.0224
10	5260.0108
20	5260.0004
30	5259.9956
40	5260.0008
45	5260.0052
Maximum Deviation (MHz)	0.0224
Maximum Deviation (ppm)	4.2586



UNII-2C

#### Voltage vs. Frequency Stability

Voltage (V)	Measurement Frequency (MHz)
Center Frequency	5500.0000
5.75	5500.0060
5	5500.0060
4.25	5500.0064
Maximum Deviation (MHz)	0.0064
Maximum Deviation (ppm)	1.1636

## Temperature vs. Frequency Stability

Temperature (°C)	Measurement Frequency (MHz)
Center Frequency	5500.0000
0	5500.0244
10	5500.0116
20	5500.0008
30	5499.9956
40	5500.0008
45	5500.0048
Maximum Deviation (MHz)	0.0244
Maximum Deviation (ppm)	4.4364



UNII-3

#### Voltage vs. Frequency Stability

Voltage (V)	Measurement Frequency (MHz)
Center Frequency	5745.0000
5.75	5745.0104
5	5745.0116
4.25	5745.0144
Maximum Deviation (MHz)	0.0144
Maximum Deviation (ppm)	2.5065

## Temperature vs. Frequency Stability

Temperature (°C)	Measurement Frequency (MHz)
Center Frequency	5745.0000
0	5745.0252
10	5745.0108
20	5744.9992
30	5744.9952
40	5745.0008
45	5745.0068
Maximum Deviation (MHz)	0.0252
Maximum Deviation (ppm)	4.3864

#### **End of Test Report**