

# **FCC Radio Test Report**

# FCC ID: 2AXJ4KC420WS

#### This report concerns: Original Grant

Project No.	:	2101C259
Equipment	:	Kasa Cam Outdoor, 24/7 Recording
Brand Name	:	tp-link
Test Model	:	KC420WS
Series Model	:	N/A
Applicant	:	TP-Link Corporation Limited
Address	:	Room 901, 9/F. , New East Ocean Centre, 9 Science Museum Road, Tsim Sha Tsui, Kowloon, Hong Kong
Manufacturer		
	:	•
Address	:	Room 901, 9/F. , New East Ocean Centre, 9 Science Museum Road, Tsim Sha Tsui, Kowloon, Hong Kong
Date of Receipt	:	
Date of Test	:	Jan. 29, 2021 ~ Feb. 22, 2021
Issued Date	:	Mar. 08, 2021
<b>Report Version</b>	:	R00
Test Sample	:	Engineering Sample No.: DG202101305 for radiated, DG2021020861
		for conducted.
Standard(s)	:	FCC Part15, Subpart C (15.247) ANSI C63.10-2013 FCC KDB 558074 D01 15.247 Meas Guidance v05r02

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

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#### Limitation

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



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# **APPENDIX H - POWER SPECTRAL DENSITY**

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# **REPORT ISSUED HISTORY**

Report Version	Description	Issued Date
R00	Original Issue.	Mar. 08, 2021

# **1. SUMMARY OF TEST RESULTS**

Test procedures according to the technical standard(s):

FCC Part15, Subpart C (15.247)							
Standard(s) Section	Test Item	Test Result	Judgment	Remark			
15.207	AC Power Line Conducted Emissions	APPENDIX A	PASS				
15.247(d) 15.205(a) 15.209(a)	Radiated Emissions	APPENDIX B APPENDIX C APPENDIX D	PASS				
15.247(a)(2)	Bandwidth	APPENDIX E	PASS				
15.247(b)(3)	Maximum Average Output Power	APPENDIX F	PASS				
15.247(d)	Conducted Spurious Emissions	APPENDIX G	PASS				
15.247(e)	Power Spectral Density	APPENDIX H	PASS				
15.203	Antenna Requirement		PASS	Note(2)			

Note:

(1) "N/A" denotes test is not applicable in this test report.(2) The device what use a permanently attached antenna were considered sufficient to comply with the provisions of 15.203.



#### 1.1 TEST FACILITY

The test facilities used to collect the test data in this report is at the location of No.3, Jinshagang 1st Road, Shixia, Dalang Town, Dongguan, Guangdong, China. BTL's Test Firm Registration Number for FCC: 357015 BTL's Designation Number for FCC: CN1240

#### **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 BTL measurement uncertainty as below table:

A. AC power line conducted emissions test:

Test Site	Method	Measurement Frequency Range	U, (dB)
DG-C02	CISPR	150kHz ~ 30MHz	2.68

#### B. Radiated emissions test:

Test Site	Method	Measurement Frequency Range	Ant. H / V	U, (dB)
		9kHz ~ 30MHz	-	3.02
		30MHz ~ 200MHz	V	4.26
	CISPR	30MHz ~ 200MHz	Н	3.38
		200MHz ~ 1,000MHz	V	3.98
DG-CB03		200MHz ~ 1,000MHz	Н	3.94
		1GHz ~ 6GHz	I	3.96
		6GHz ~ 18GHz	I	5.24
		18GHz ~ 26.5GHz	I	3.62
		26.5GHz ~ 40GHz	-	4.00

#### C. Other Measurement:

Test Item	Uncertainty
Bandwidth	±3.8 %
Maximum Average Output Power	±0.95 dB
Conducted Spurious Emission	±2.71 dB
Power Spectral Density	±0.86 dB
Temperature	±0.08 °C
Humidity	±1.5%

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	<b>25</b> ℃	53%	AC 120V/60Hz	Kwok Guo
Radiated Emissions-9K-30MHz	<b>25</b> ℃	60%	AC 120V/60Hz	Kwok Guo
Radiated Emissions-30 MHz to 1GHz	<b>26</b> ℃	52%	AC 120V/60Hz	Kwok Guo
Radiated Emissions-Above 1000 MHz	<b>24</b> ℃	60%	AC 120V/60Hz	Kwok Guo
Bandwidth	<b>25</b> ℃	45%	AC 120V/60Hz	Grani Zhou
Maximum Average Output Power	<b>25</b> ℃	45%	AC 120V/60Hz	Hand Huang
Conducted Spurious Emissions	<b>25</b> ℃	45%	AC 120V/60Hz	Grani Zhou
Power Spectral Density	<b>25</b> ℃	45%	AC 120V/60Hz	Grani Zhou

# 2. GENERAL INFORMATION

#### 2.1 GENERAL DESCRIPTION OF EUT

Equipment	Kasa Cam Outdoor, 24/7 Recording			
Brand Name	tp-link			
Test Model	KC420WS			
Series Model	N/A			
Model Difference(s)	N/A			
Power Source	DC voltage supplied from AC adapter. Model: A8-501000			
Power Rating	I/P: 100-240V~ 50/60Hz 0.2A MAX O/P: 5V === 1A			
Operation Frequency	2412 MHz ~ 2462 MHz			
Modulation Type	IEEE 802.11b: DSSS IEEE 802.11g: OFDM IEEE 802.11n: OFDM			
Bit Rate of Transmitter	IEEE 802.11b: 11/5.5/2/1 Mbps IEEE 802.11g: 54/48/36/24/18/12/9/6 Mbps IEEE 802.11n: up to 72.2 Mbps			
Maximum Average Output Power	IEEE 802.11b: 19.97 dBm (0.0993 W) IEEE 802.11g: 19.30 dBm (0.0851 W) IEEE 802.11n (HT20): 19.83 dBm (0.0962 W)			

#### Note:

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

#### 2. Channel List:

CH01 - CH11 for IEEE 802.11b, IEEE 802.11g, IEEE 802.11n (HT20)							
Channel	Channel         Frequency (MHz)         Channel         Frequency (MHz)         Channel         Frequency (MHz)         F						
01	2412	04	2427	07	2442	10	2457
02	2417	05	2432	08	2447	11	2462
03	2422	06	2437	09	2452		

#### 3. Antenna Specification:

Ant.	Brand	Model Name	Antenna Type	Connector	Gain (dBi)
1	tp-link	N/A	FPC	I-PEX	1.68

Note: The antenna gain is provided by the manufacturer.

# 2.2 DESCRIPTION OF TEST MODES

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

Pretest Mode	Description	
Mode 1	TX B Mode Channel 01/06/11	
Mode 2	TX G Mode Channel 01/06/11	
Mode 3	TX N-20 MHz Mode Channel 01/06/11	
Mode 4	TX B Mode Channel 01	
Mode 5	TX B Mode Channel 01/02/06/10/11	
Mode 6	TX G Mode Channel 01/02/06/10/11	
Mode 7	TX N-20 MHz Mode Channel 01/02/06/10/11	

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 4	TX B Mode Channel 01	

Radiated emissions test - Below 1GHz		
Final Test Mode	Description	
Mode 4	TX B Mode Channel 01	

Radiated emissions test- Above 1GHz		
Final Test Mode Description		
Mode 5	TX B Mode Channel 01/02/06/10/11	
Mode 6	TX G Mode Channel 01/02/06/10/11	
Mode 7	TX N-20 MHz Mode Channel 01/02/06/10/11	

Conducted test		
Final Test Mode	Description	
Mode 1	TX B Mode Channel 01/06/11	
Mode 2	TX G Mode Channel 01/06/11	
Mode 3	TX N-20 MHz Mode Channel 01/06/11	





NOTE:

- (1) The measurements are performed at the high, middle, low available channels.
- (2) All the bit rate of transmitter have been tested and found the lowest rate is found to be the worst case and recorded.
- (3) For radiated emission below 1 GHz test, the IEEE 802.11b Channel 01 is found to be the worst case and recorded.
- (4) For radiated emission above 1 GHz test, 1GHz~26.5GHz have been pre-tested and in this report only recorded the worst case. The remaining spurious points are all below the limit value of 20dB.

# 2.3 PARAMETERS OF TEST SOFTWARE

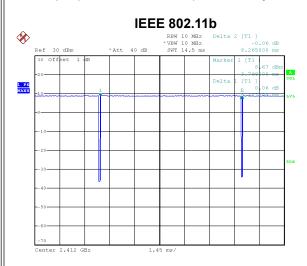
<b>Test Software</b>
----------------------

MPTool.exe



# 2.4 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.



Date: 2.FEB.2021 14:23:50

Duty cycle = 8.207 ms / 8.265 ms = 99.30% Duty Factor = 10 log(1/Duty cycle) = 0.00

 Image: Descent and Desc

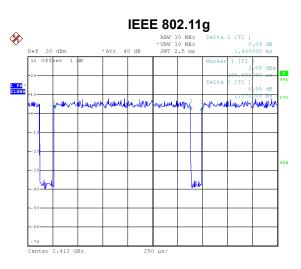
Date: 2.FEB.2021 14:26:40

Duty cycle = 1.280 ms / 1.325 ms = 96.60% Duty Factor = 10 log(1/Duty cycle) = 0.15

#### NOTE:

For IEEE 802.11g and 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 1 kHz (Duty cycle < 98%).

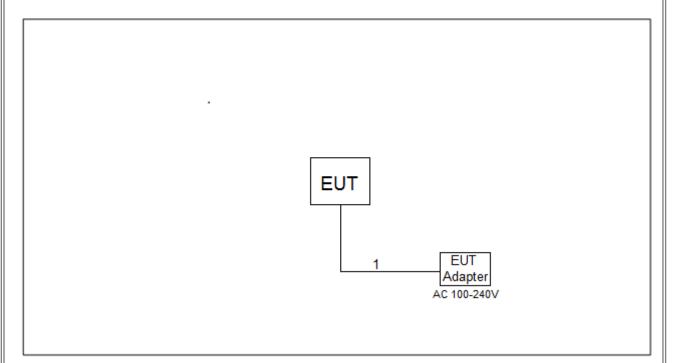


Date: 2.FEB.2021 14:27:48

Duty cycle = 1.370 ms / 1.480 ms = 92.57% Duty Factor = 10 log(1/Duty cycle) = 0.34



## 2.5 BLOCK DIAGRAM SHOWING THE CONFIGURATION OF SYSTEM TESTED



# 2.6 SUPPORT UNITS

s No.	Series No.	Model No.	Brand	Equipment	ltem
	-	-	-	-	-

ltem	Cable Type	Shielded Type	Ferrite Core	Length
1	USB Cable	NO	NO	3m





# 3. AC POWER LINE CONDUCTED EMISSIONS TEST

#### 3.1 LIMIT

Frequency of Emission (MHz)	Limit (dBµV)		
Frequency of Emission (Minz)	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.

#### The following table is the setting of the receiver

Receiver Parameters	Setting
Attenuation	10 dB
Start Frequency	0.15 MHz
Stop Frequency	30 MHz
IF Bandwidth	9 kHz

#### 3.2 TEST PROCEDURE

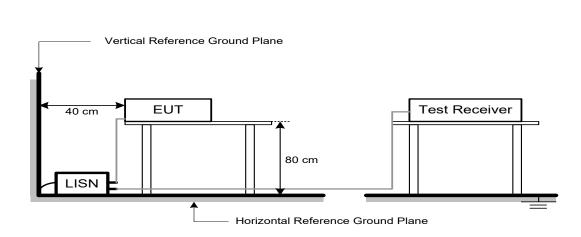
- a. The EUT was placed 0.8 meters from the horizontal ground plane with EUT being connected to the power mains through a line impedance stabilization network (LISN). All other support equipment powered from additional LISN(s). The LISN provide 50 Ohm/ 50uH of coupling impedance for the measuring instrument.
- 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.

#### 3.3 DEVIATION FROM TEST STANDARD

No deviation



# 3.4 TEST SETUP



# 3.5 EUT OPERATION CONDITIONS

EUT was programmed to be in continuously transmitting mode.

#### 3.6 TEST RESULTS

Please refer to the APPENDIX A.



# 4. RADIATED EMISSIONS TEST

## 4.1 LIMIT

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

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

Frequency	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 RADIATED EMISSION MEASUREMENT (Above 1000 MHz)

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

NOTE:

- (1) The limit for radiated test was performed according to FCC PART 15C.
- (2) The tighter limit applies at the band edges.
- (3) Emission level (dBuV/m)=20log Emission level (uV/m).

Spectrum Parameter	Setting	
Attenuation	Auto	
Start Frequency	1000 MHz	
Stop Frequency	10th carrier harmonic	
RBW / VBW	1 MHz / 3 MHz for Peak,	
(Emission in restricted band)	1 MHz / 1/T for Average	

Receiver Parameter	Setting	
Attenuation	Auto	
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	

#### 4.2 TEST PROCEDURE

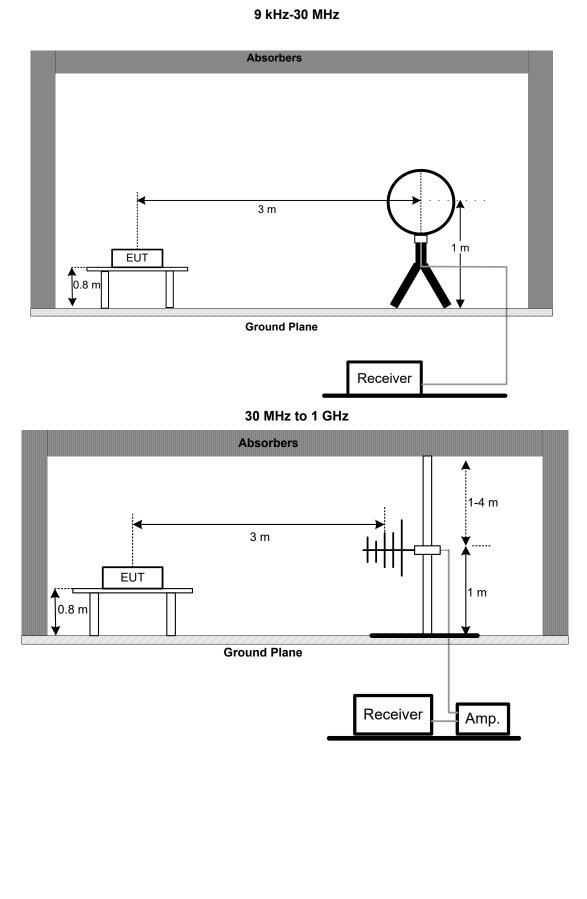
- a. The measuring distance of 3 m shall be used for measurements. The EUT was placed on the top of a rotating table 0.8 meter above the ground at a 3 meter semi-anechoic chamber. The table was rotated 360 degrees to determine the position of the highest radiation.(below 1 GHz)
- b. The measuring distance of 3 m shall be used for measurements. The EUT was placed on the top of a rotating table 1.5 meter above the ground at a 3 meter semi-anechoic chamber. The table was rotated 360 degrees to determine the position of the highest radiation.(above 1 GHz)
- c. The height of the equipment or of the substitution antenna shall be 0.8m or 1.5m; the height of the test antenna shall vary between 1 m to 4 m. Both horizontal and vertical polarizations of the antenna are set to make the measurement.
- d. For each suspected emission, the EUT was arranged to its worst case and then the antenna was tuned to heights find the maximum reading (used Bore sight function).
- e. The receiver system was set to peak and average detect function and specified bandwidth with maximum hold mode when the test frequency is above 1 GHz.
- f. The initial step in collecting radiated emission data is a receiver peak detector mode pre-scanning the measurement frequency range. Significant peaks are then marked and then Quasi Peak detector mode re-measured.
- g. All readings are Peak unless otherwise stated QP in column of Note. Peak denotes that the Peak reading compliance with the QP Limits and then QP Mode measurement didn't perform. (below 1 GHz)
- 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.

# 4.3 DEVIATION FROM TEST STANDARD

No deviation

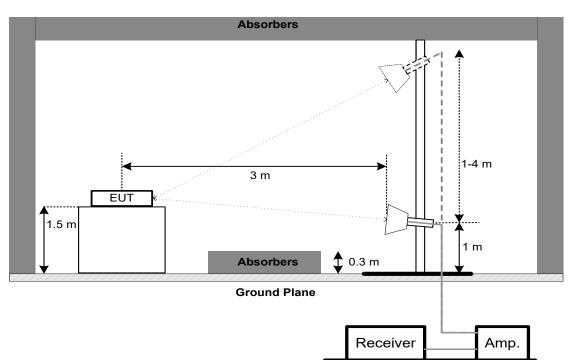


# 4.4 TEST SETUP



# <u>31L</u>

#### Above 1 GHz



#### 4.5 EUT OPERATION CONDITIONS

The EUT was programmed to be in continuously transmitting mode.

#### 4.6 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.

#### 4.7 TEST RESULTS - 30 MHZ TO 1000 MHZ

Please refer to the APPENDIX C.

## 4.8 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.



# 5. BANDWIDTH TEST

#### 5.1 LIMIT

FCC Part15, Subpart C (15.247)					
Section Test Item Limit					
15.047(a)(0)	6 dB Bandwidth	Minimum 500 kHz			
15.247(a)(2)	99% Emission Bandwidth	-			

#### 5.2 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 6 dB Bandwidth<sup>.</sup> R

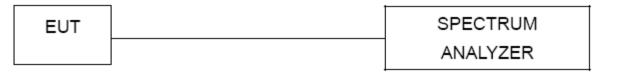
For 6 dB Bandwidth: RBW= 100 kHz, VBW=300 kHz, Sweep time = auto.

For 99% Emission Bandwidth B/G/N-20 Mode: RBW= 300 KHz, VBW=1 MHz, Sweep time = 2.5 ms. c. The bandwidth was performed in accordance with method 11.8.1 of ANSI C63.10-2013.

#### **5.3 DEVIATION FROM STANDARD**

No deviation.

#### 5.4 TEST SETUP



#### 5.5 EUT OPERATION CONDITIONS

The EUT was programmed to be in continuously transmitting mode.

#### 5.6 TEST RESULTS

Please refer to the APPENDIX E.



# 6. MAXIMUM AVERAGE OUTPUT POWER TEST

#### 6.1 LIMIT

FCC Part15, Subpart C (15.247)				
Section Test Item Limit				
15.247(b)(3) Maximum Average Output Power 1 Watt or 30dBm				

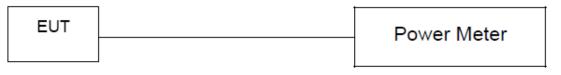
#### 6.2 TEST PROCEDURE

- a. The EUT was directly connected to the power meter and antenna output port as show in the block diagram below.
- b. The maximum conducted output power was performed in accordance with method 11.9.2.3.1 of ANSI C63.10-2013.

#### 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 F.



# 7. CONDUCTED SPURIOUS EMISSIONS

# 7.1 LIMIT

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

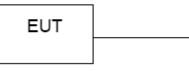
#### 7.2 TEST PROCEDURE

- a. The EUT was directly connected to the spectrum analyzer and antenna output port as show in the block diagram below.
- b. Spectrum Setting: RBW= 100 kHz, VBW=300 kHz, Sweep time = Auto.

#### 7.3 DEVIATION FROM STANDARD

No deviation.

#### 7.4 TEST SETUP



SPECTRUM ANALYZER

#### 7.5 EUT OPERATION CONDITIONS

The EUT was programmed to be in continuously transmitting mode.

#### 7.6 TEST RESULTS

Please refer to the APPENDIX G.



# 8. POWER SPECTRAL DENSITY TEST

#### 8.1 LIMIT

FCC Part15, Subpart C (15.247)					
Section Test Item Limit					
15.247(e)	Power Spectral Density	8 dBm (in any 3 kHz)			

#### 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: RBW=3 kHz, VBW=10 kHz, Sweep time = Auto.
- c. The Power Spectral Density was performed in accordance with method 11.10.2 of ANSI C63.10-2013.

#### 8.3 DEVIATION FROM STANDARD

No deviation.

#### 8.4 TEST SETUP



#### 8.5 EUT OPERATION CONDITIONS

The EUT was programmed to be in continuously transmitting mode.

#### 8.6 TEST RESULTS

Please refer to the APPENDIX H.

# 9. MEASUREMENT INSTRUMENTS LIST

	AC Power Line Conducted Emissions					
Item	Kind of Equipment	Manufacturer	Type No.	Serial No.	Calibrated until	
1	EMI Test Receiver	R&S	ESCI	100382	Feb. 28, 2021	
2	LISN	EMCO	3816/2	52765	Mar. 01, 2021	
3	TWO-LINE V-NETWORK	R&S	ENV216	101447	Feb. 28, 2021	
4	50Ω Terminator	SHX	TF5-3	15041305	Mar. 01, 2021	
5	Measurement Software	Farad	EZ-EMC Ver.NB-03A1-01	N/A	N/A	
6	Cable	N/A	RG223	12m	Mar. 10, 2021	
7	643 Shield Room	ETS	6*4*3m	N/A	N/A	

	Radiated Emissions - 9 kHz to 30 MHz					
Item	Kind of Equipment	Manufacturer	Type No.	Serial No.	Calibrated until	
1	Antenna	EM	EM-6876-1	230	Apr. 16, 2021	
2	Cable	N/A	RG 213/U	N/A	May 29, 2021	
3	EMI Test Receiver	R&S	ESCI	100895	Feb. 28, 2021	
4	Measurement Software	Farad	EZ-EMC Ver.NB-03A1-01	N/A	N/A	
5	966 Chambe Room	RM	9*6*6m	N/A	Jul. 25, 2021	

	Radiated Emissions - 30 MHz to 1 GHz					
Item	Kind of Equipment	Manufacturer	Type No.	Serial No.	Calibrated until	
1	Antenna	Schwarzbeck	VULB9160	9160-3232	Mar. 09, 2021	
2*	Amplifier	HP	8447D	2944A09673	Aug. 11, 2021	
3	Receiver	Agilent	N9038A	MY52130039	Jul. 25, 2021	
4	Cable	emci	LMR-400(30MHz-1 GHz)(8m+5m)	N/A	May 22, 2021	
5	Controller	СТ	SC100	N/A	N/A	
6	Controller	MF	MF-7802	MF780208416	N/A	
7	Measurement Software	Farad	EZ-EMC Ver.NB-03A1-01	N/A	N/A	
8	966 Chambe Room	RM	9*6*6m	N/A	Jul. 25, 2021	

	Radiated Emissions - Above 1 GHz					
Item	Kind of Equipment	Manufacturer	Type No.	Serial No.	Calibrated until	
1	Double Ridged Guide Antenna	ETS	3115	75789	May 12, 2021	
2	Broad-Band Horn Antenna	Schwarzbeck	BBHA 9170	9170319	Jul. 07, 2021	
3	Amplifier	Agilent	8449B	3008A02333	Mar. 01, 2021	
4	Microwave Preamplifier With Adaptor	EMC INSTRUMENT	EMC2654045	980039 & HA01	Mar. 07, 2021	
5	Receiver	Agilent	N9038A	MY52130039	Jul. 25, 2021	
6	Controller	СТ	SC100	N/A	N/A	
7	Controller	MF	MF-7802	MF780208416	N/A	
8	Cable	N/A	EMC104-SM-SM-6 000	N/A	May 09, 2021	
9	Measurement Software	Farad	EZ-EMC Ver.NB-03A1-01	N/A	N/A	
10	Filter	STI	STI15-9912	N/A	Jul. 25, 2021	
11	966 Chambe Room	RM	9*6*6m	N/A	Jul. 25, 2021	



Bandwidth & Conducted Spurious Emissions & Power Spectral Density						
Item	Kind of Equipment	Manufacturer	Type No.	Serial No.	Calibrated until	
1	1 Spectrum Analyzer R&S FSP40 100185 Jul. 25, 202					
2	RF Cable	Tongkaichuan	N/A	N/A	N/A	
3	DC Block	Mini	N/A	N/A	N/A	
4	Attenuator	WOKEN	6SM3502	VAS1214NL	Feb. 07, 2022	

	Maximum Average Output Power				
Item	Kind of Equipment	Manufacturer	Type No.	Serial No.	Calibrated until
1	Peak Power Analyzer	Keysight	8990B	MY51000506	Aug. 07, 2021
2	Wideband power sensor	Keysight	N1923A	MY58310004	Jul. 25, 2021
3	Attenuator	WOKEN	6SM3502	VAS1214NL	Feb. 07, 2022
4	RF Cable	Tongkaichuan	N/A	N/A	N/A

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

"\*" calibration period of equipment list is three year.

Except \* item, all calibration period of equipment list is one year.

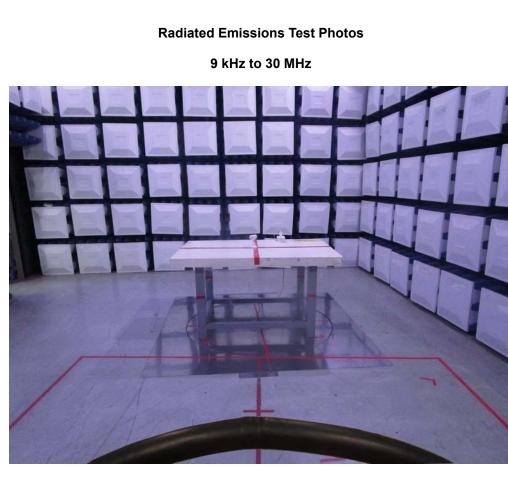


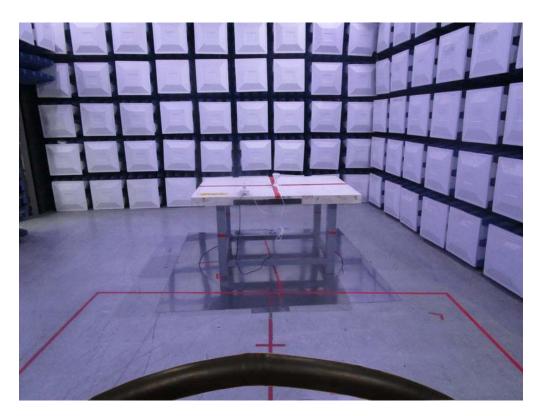
#### AC Power Line Conducted Emissions Test Photos







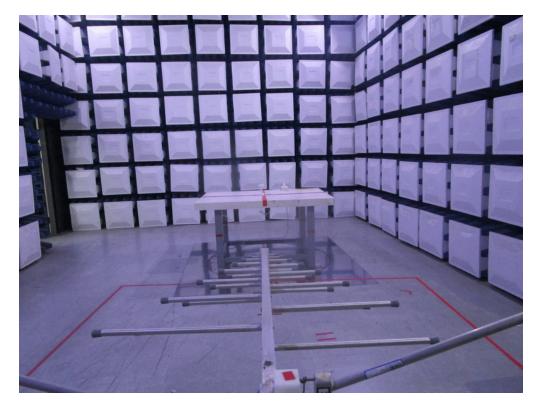






**Radiated Emissions Test Photos** 

30 MHz to 1 GHz

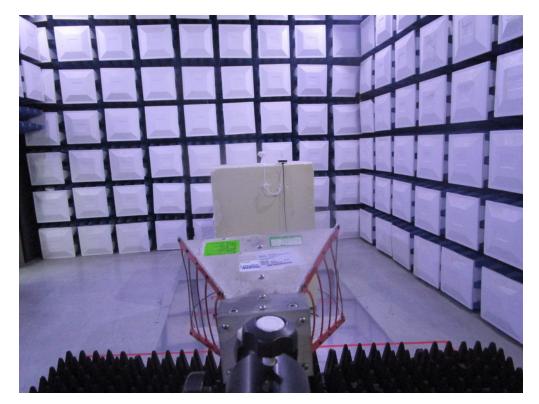






**Radiated Emissions Test Photos** 

Above 1 GHz







#### **Conducted Test Photos**

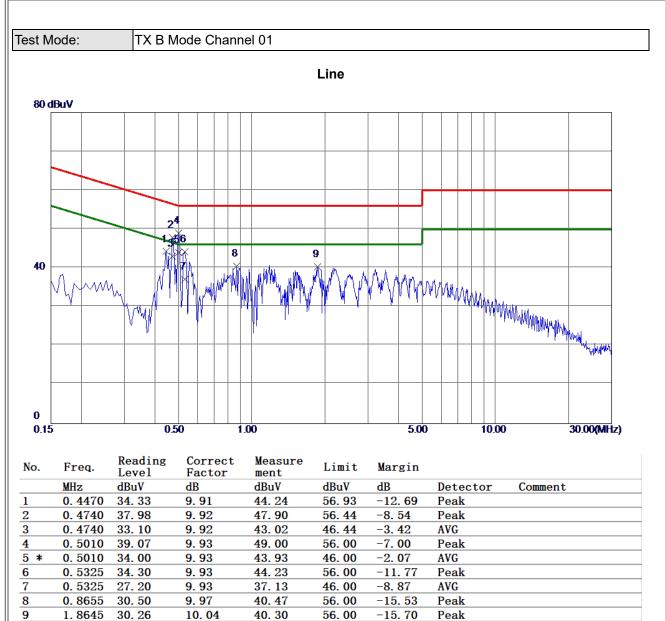






# **APPENDIX A - AC POWER LINE CONDUCTED EMISSIONS**

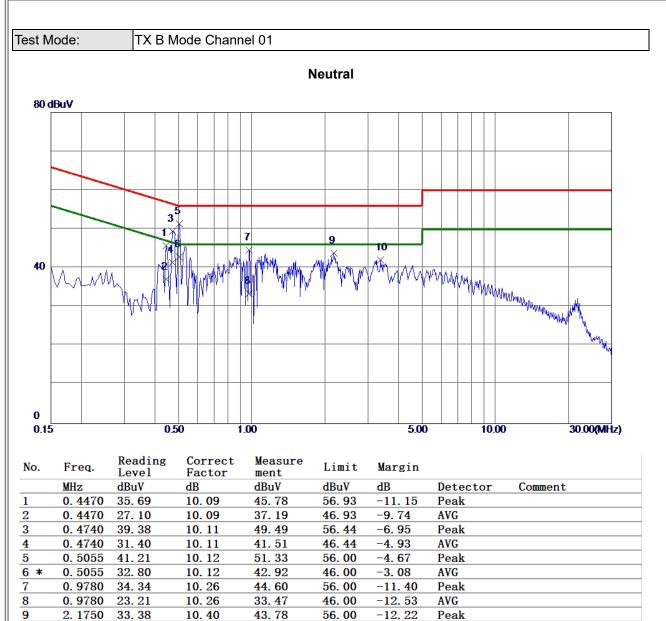




REMARKS:

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





REMARKS:

10

3. 3855 31. 59

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

10. 50

42.09

56. **00** 

-13.91

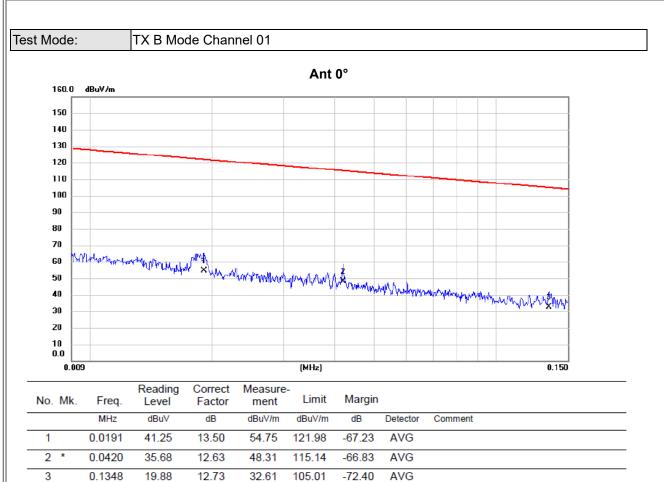
Peak

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



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

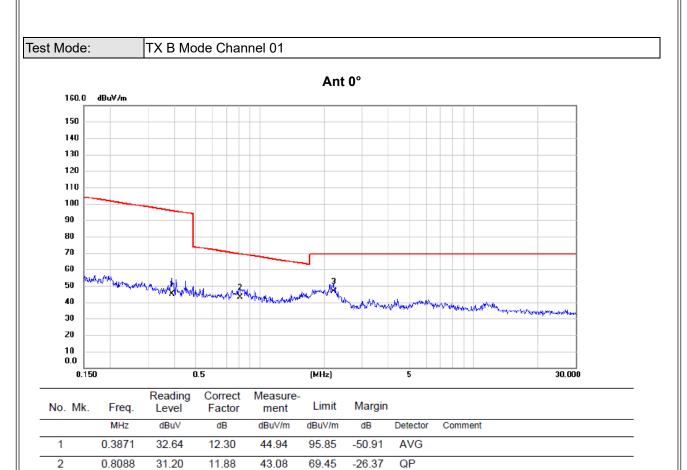




**REMARKS**:

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





3 \*

2.2250

35.48

11.20

46.68

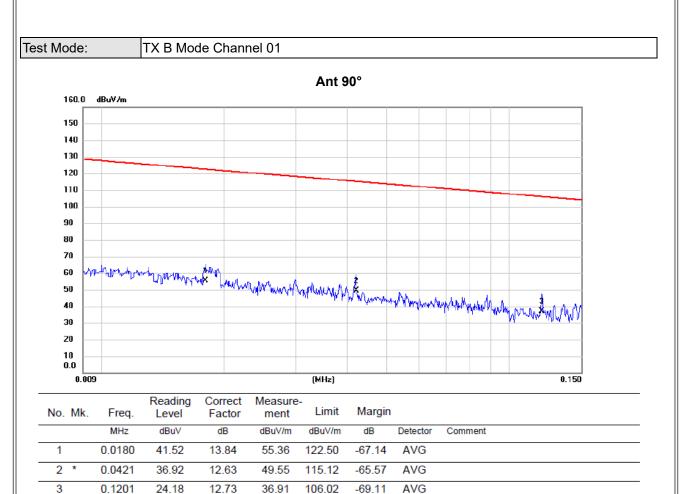
69.54

-22.86

QP

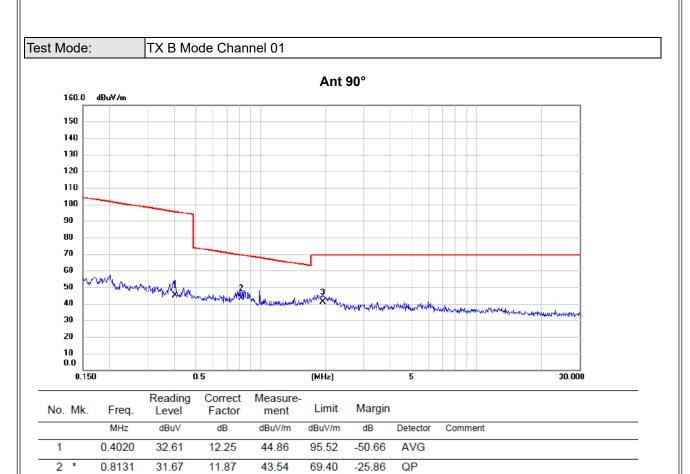
- (1) Measurement Value = Reading Level + Correct Factor.
- (2) Margin Level = Measurement Value Limit Value.





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





3

1.9386

29.84

11.34

41.18

69.54

-28.36

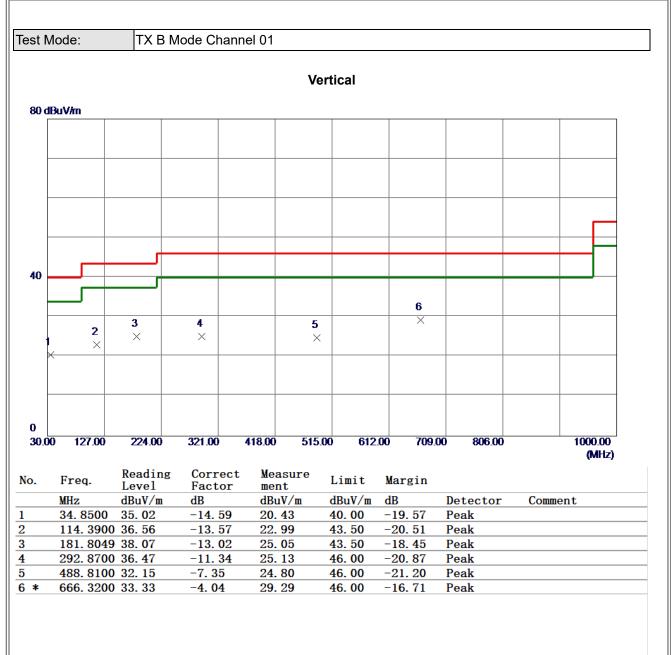
QP

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



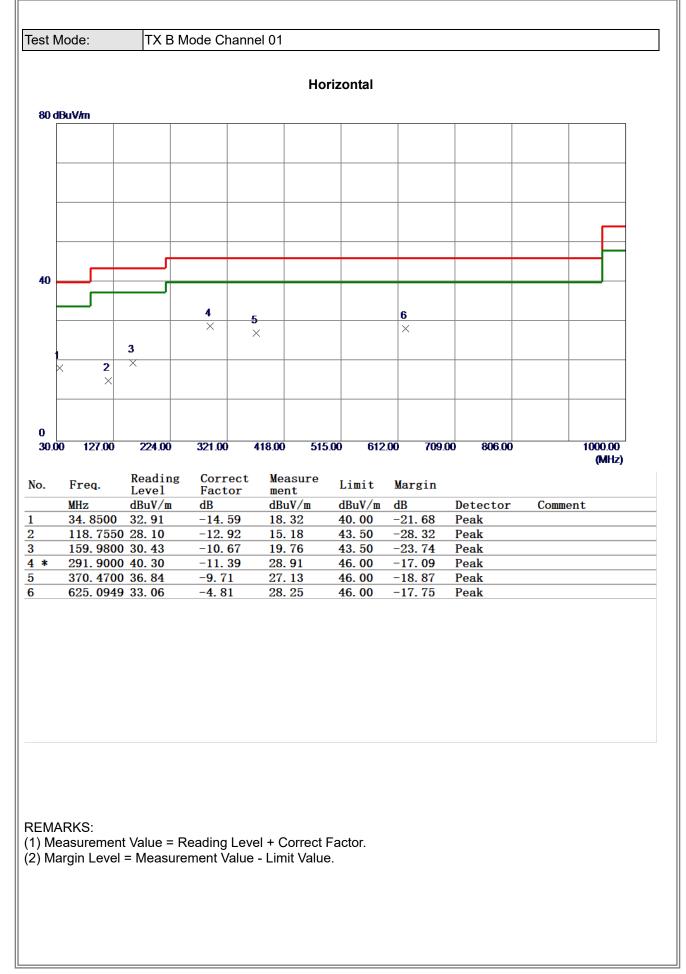
## APPENDIX C - RADIATED EMISSION - 30 MHZ TO 1000 MHZ





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

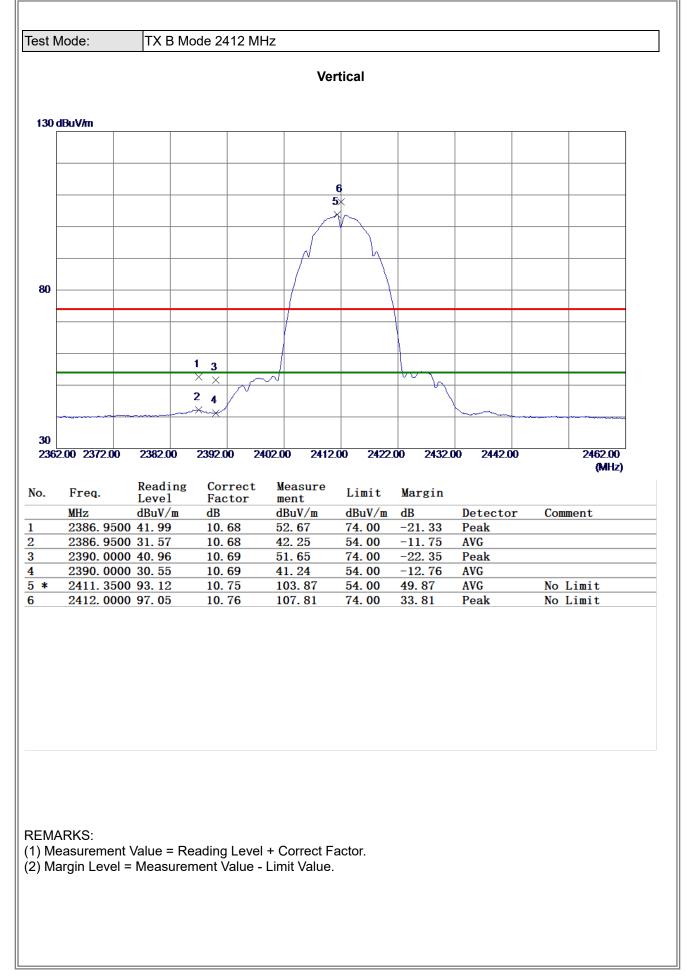




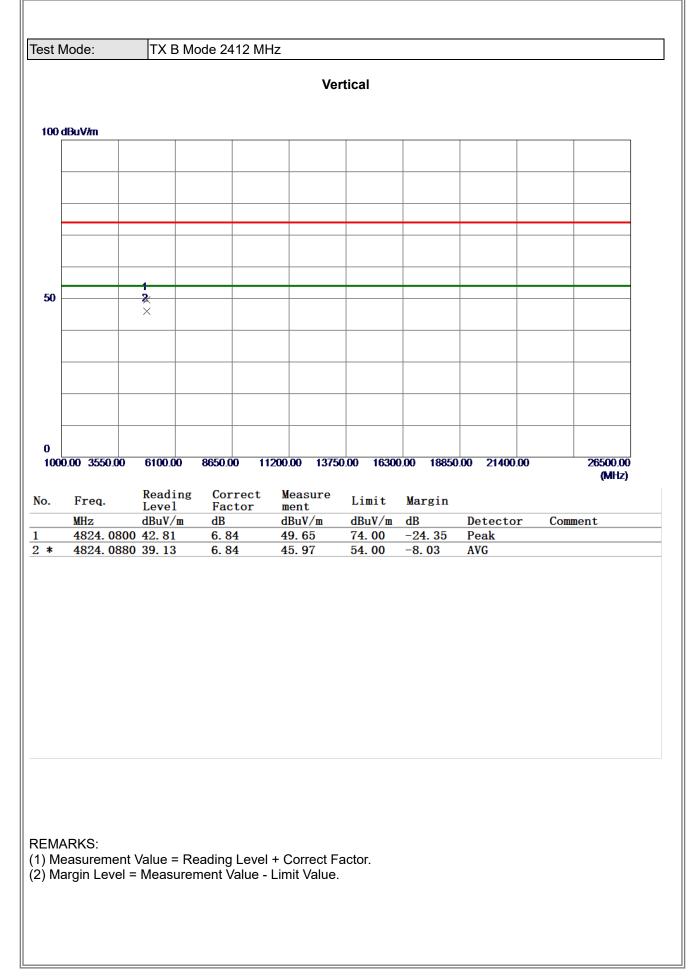


## **APPENDIX D - RADIATED EMISSION- ABOVE 1000 MHZ**

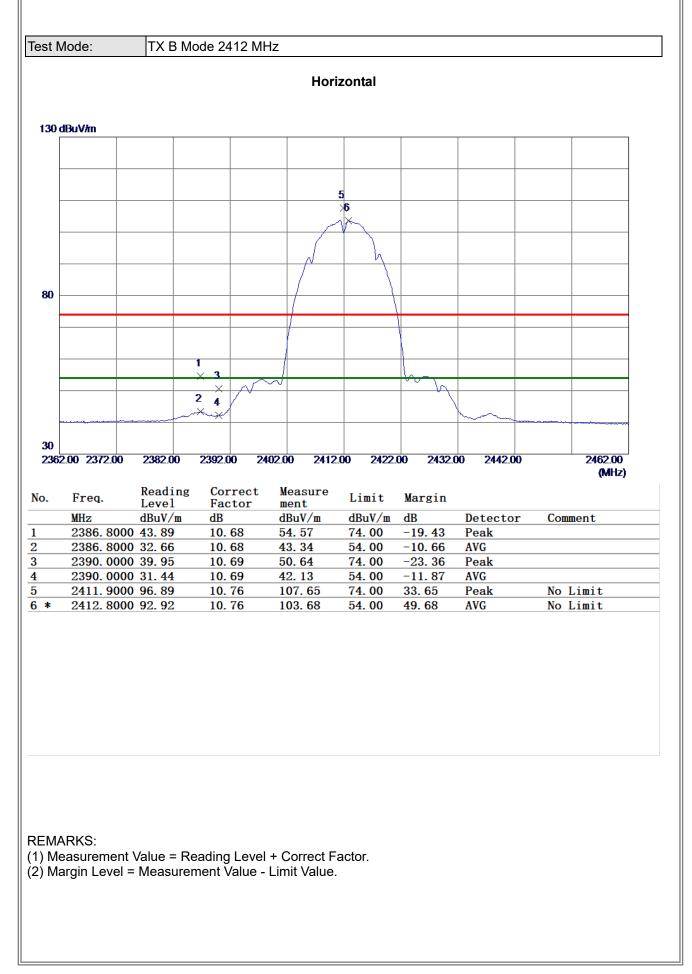




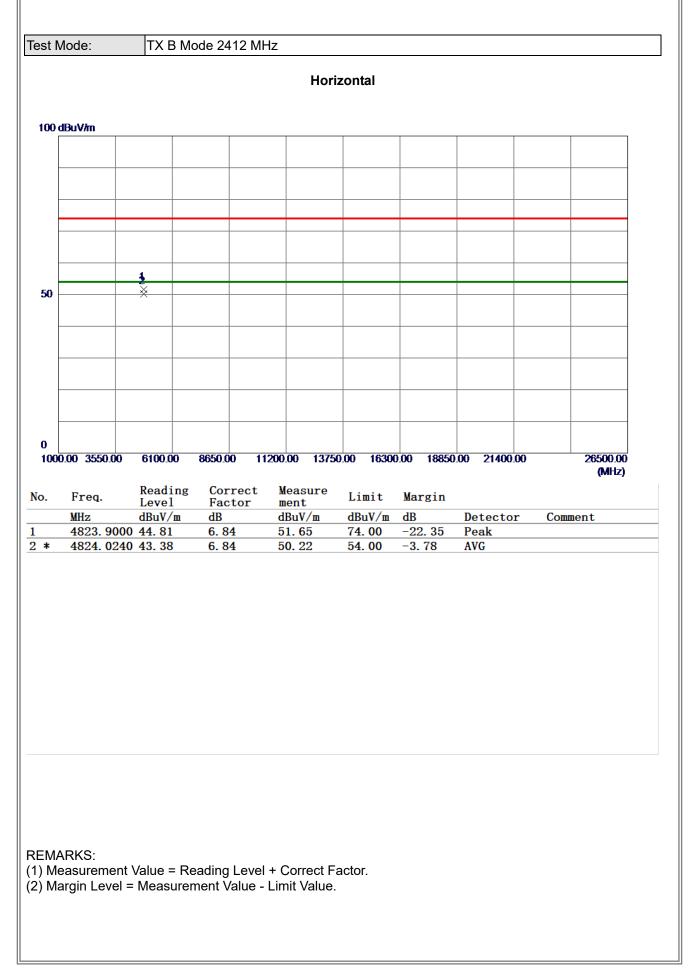




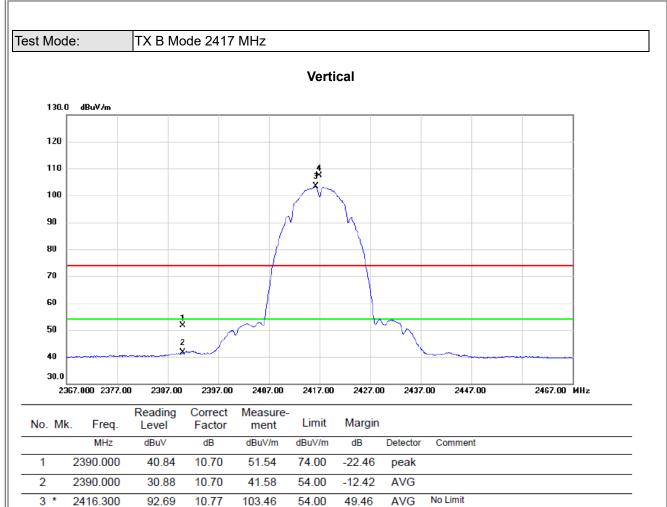












2416.950

4 X

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

96.65

10.77

107.42

74.00

33.42

peak

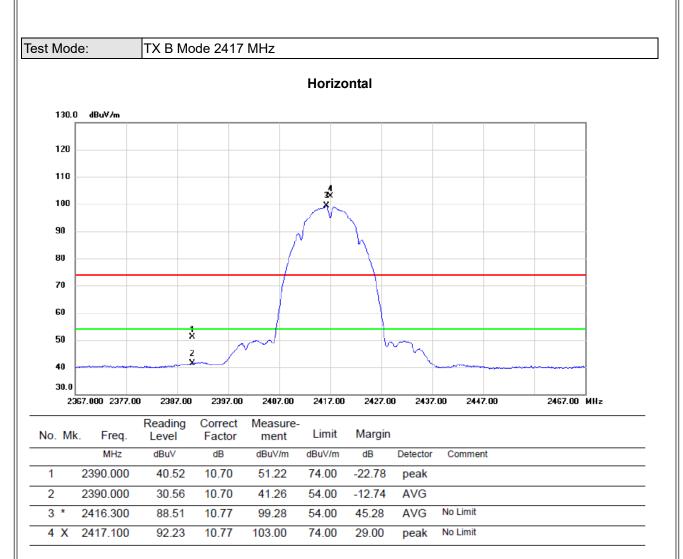
No Limit





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





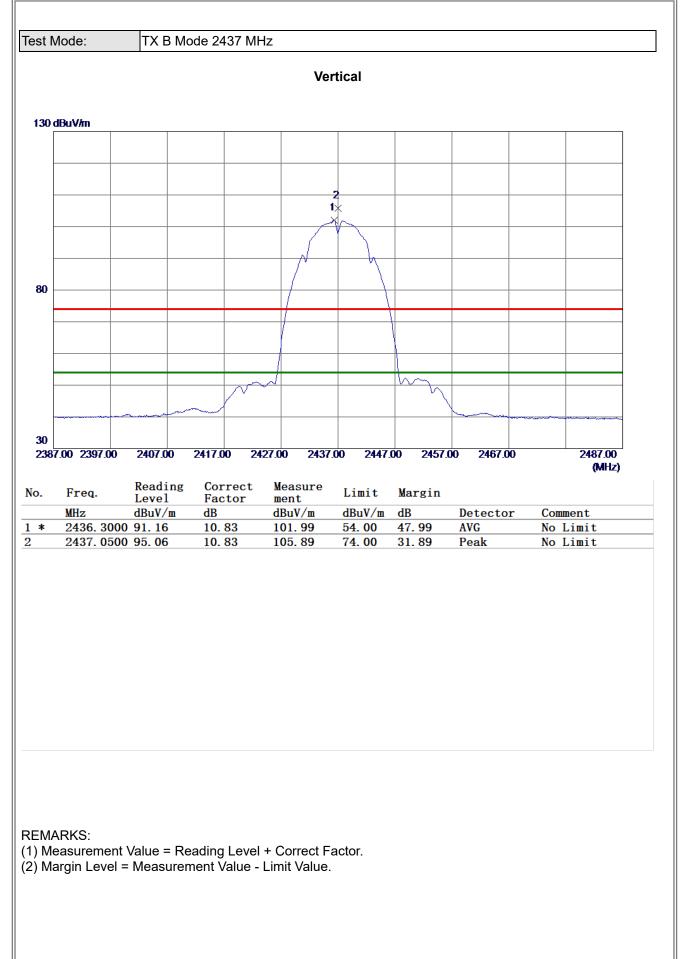
- (1) Measurement Value = Reading Level + Correct Factor.
- (2) Margin Level = Measurement Value Limit Value.



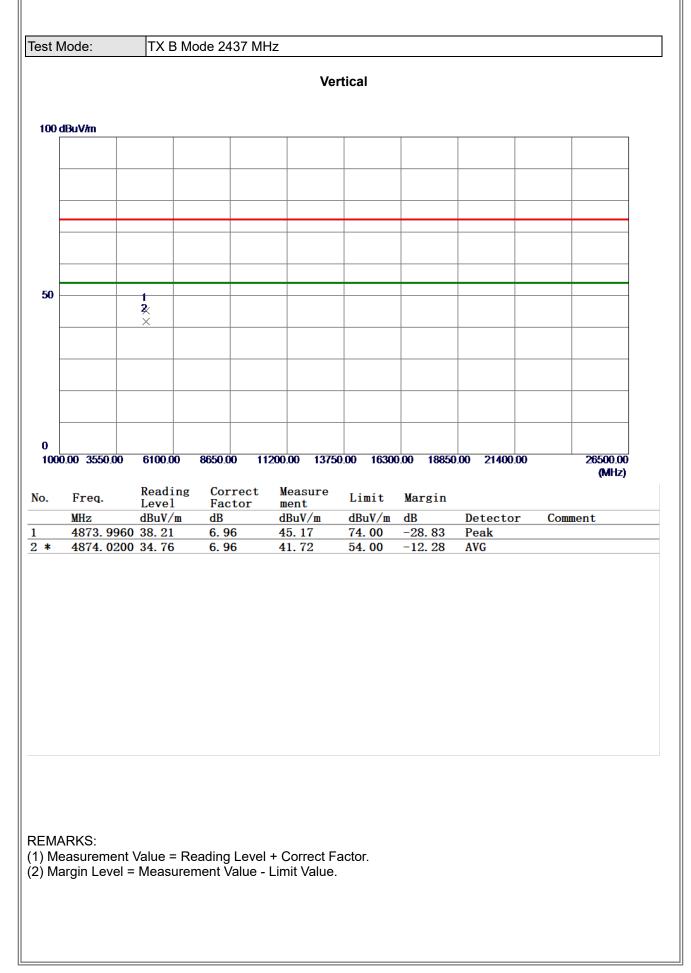


- (1) Measurement Value = Reading Level + Correct Factor.
- (2) Margin Level = Measurement Value Limit Value.

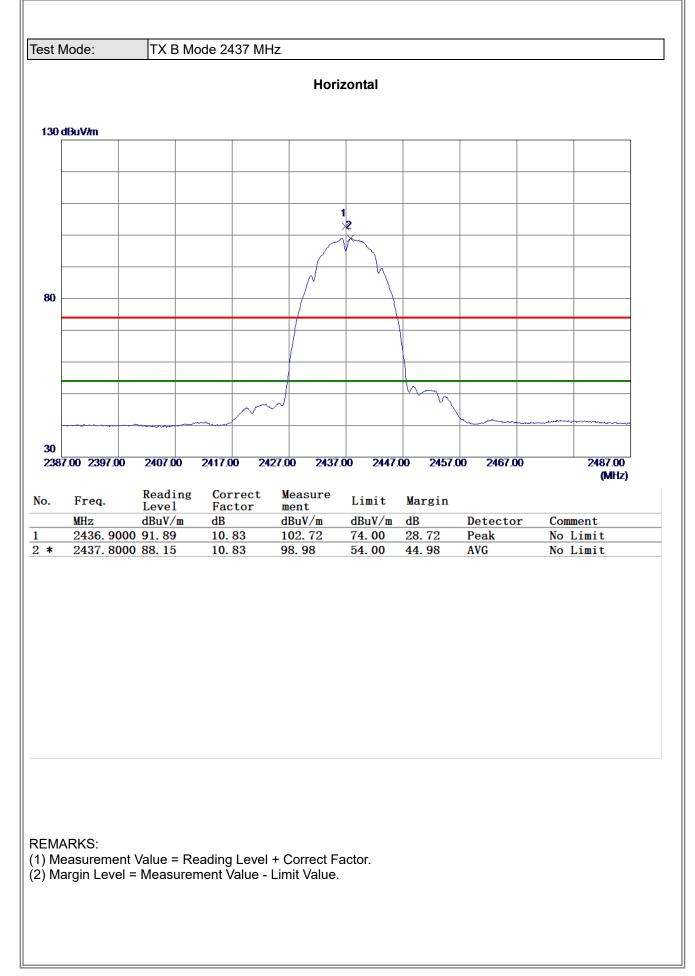




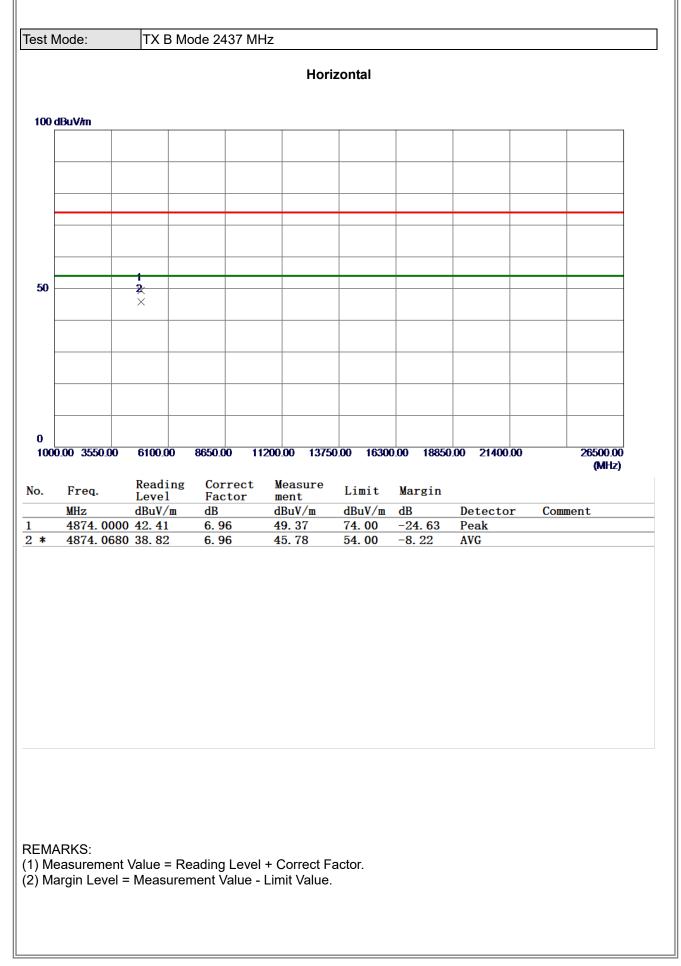




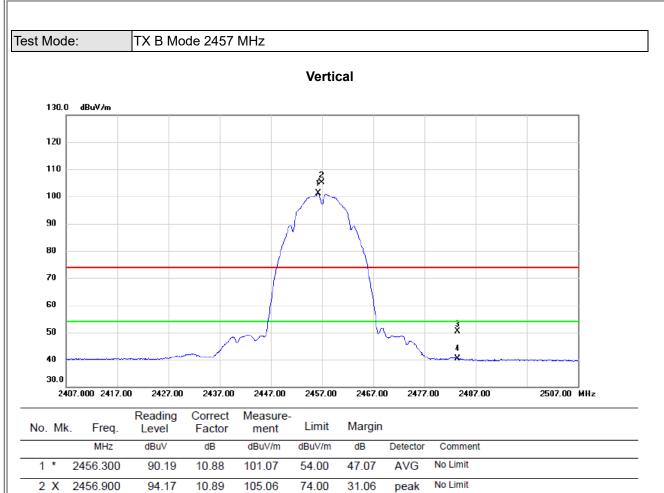












2483.500

2483.500

3

4

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

10.97

10.97

39.52

29.51

50.49

40.48

74.00

54.00

-23.51

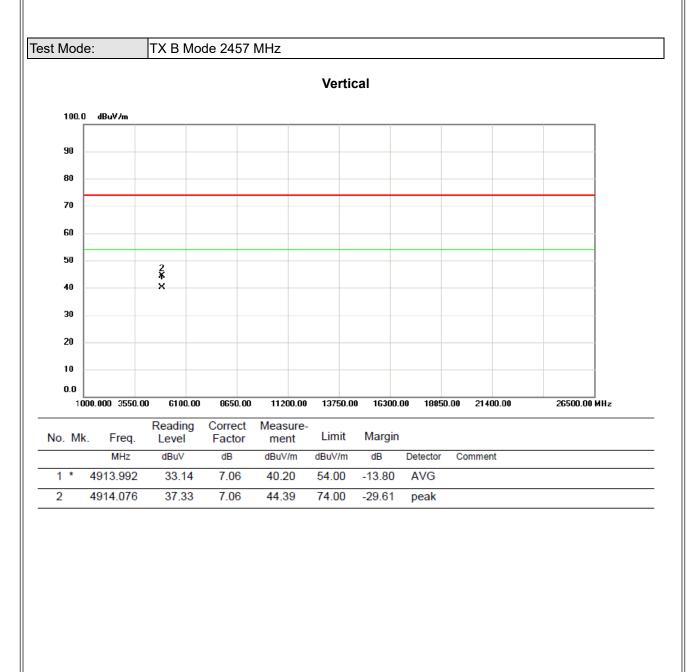
-13.52

peak

AVG

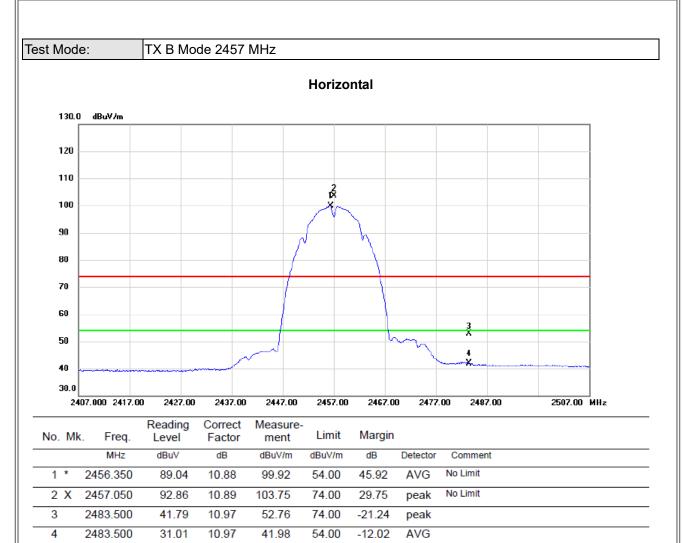
(2) Margin Level = Measurement Value - Limit Value.





- (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.





2

4914.256

41.56

7.06

48.62

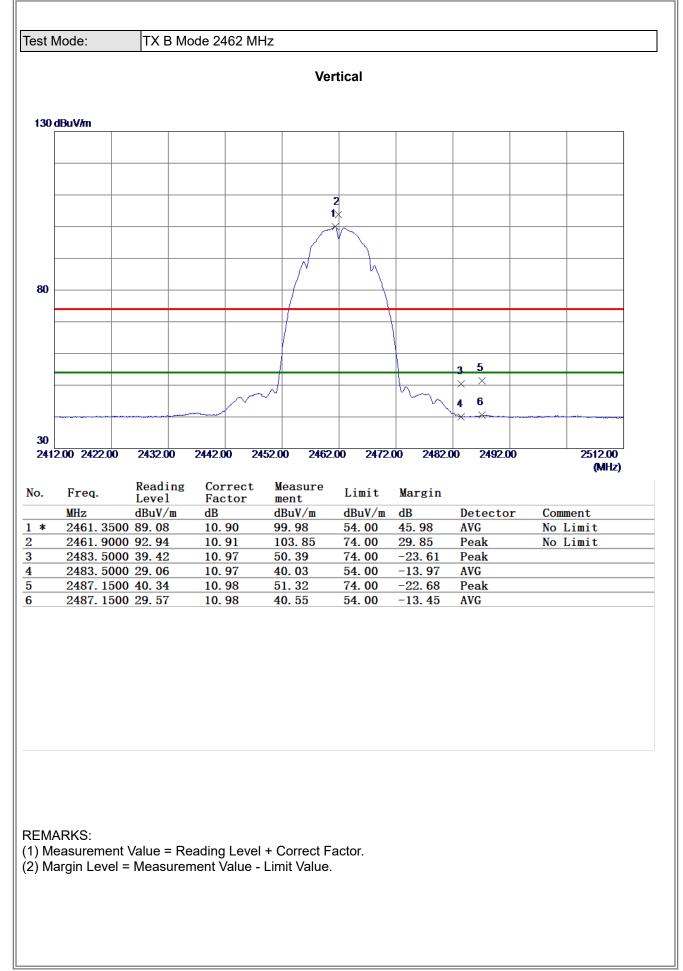
74.00

-25.38

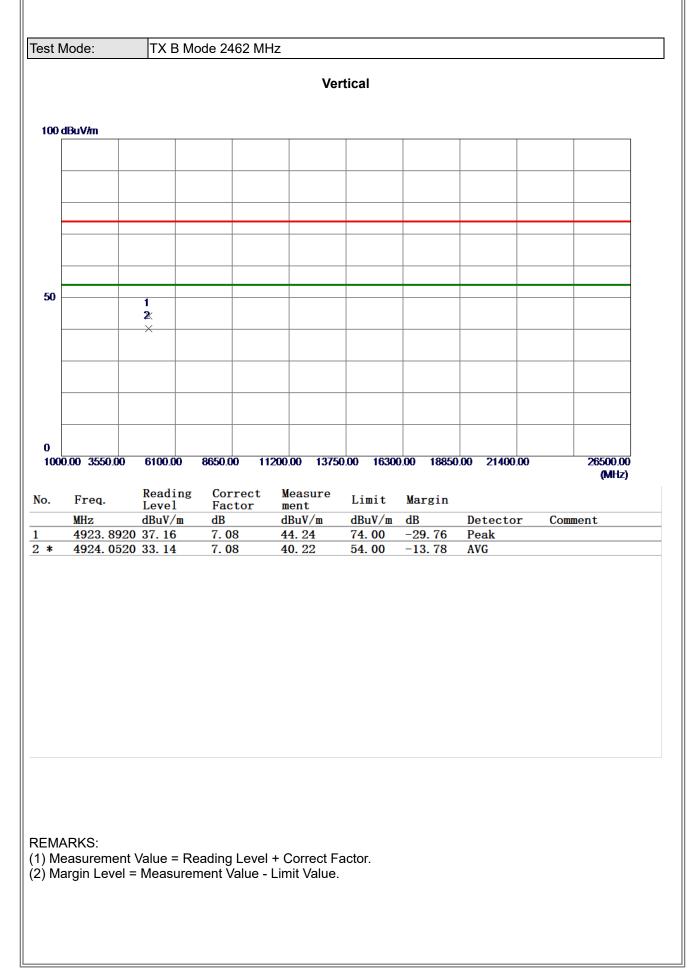
peak

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

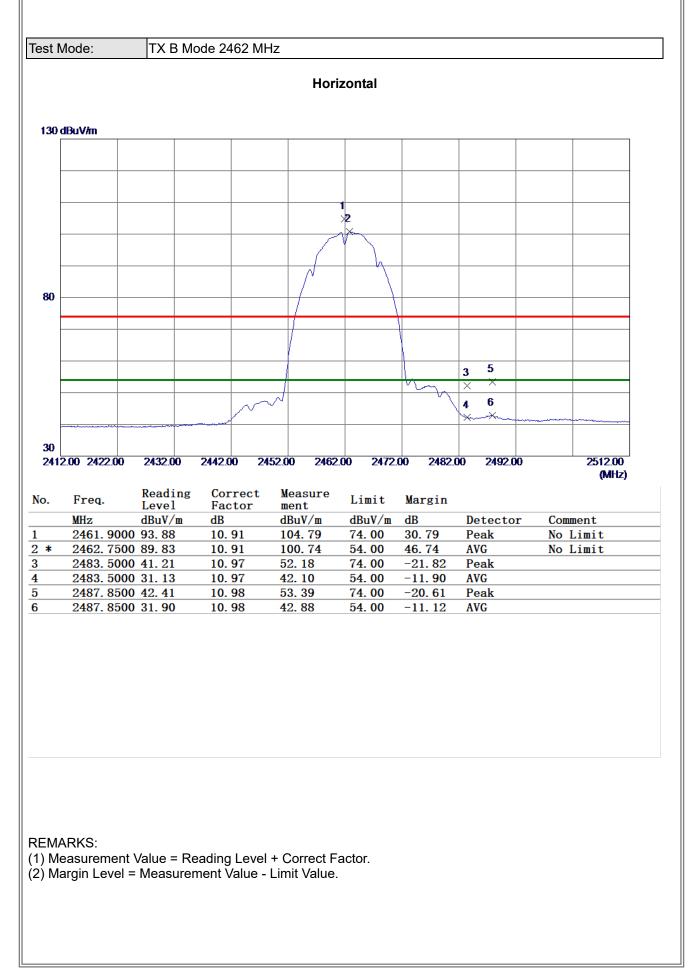




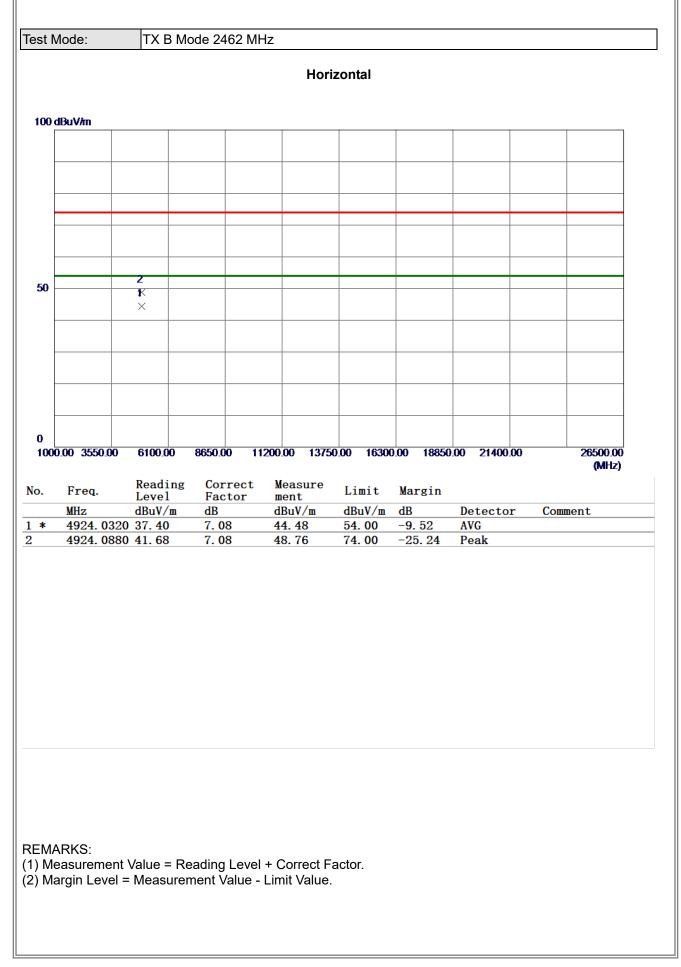




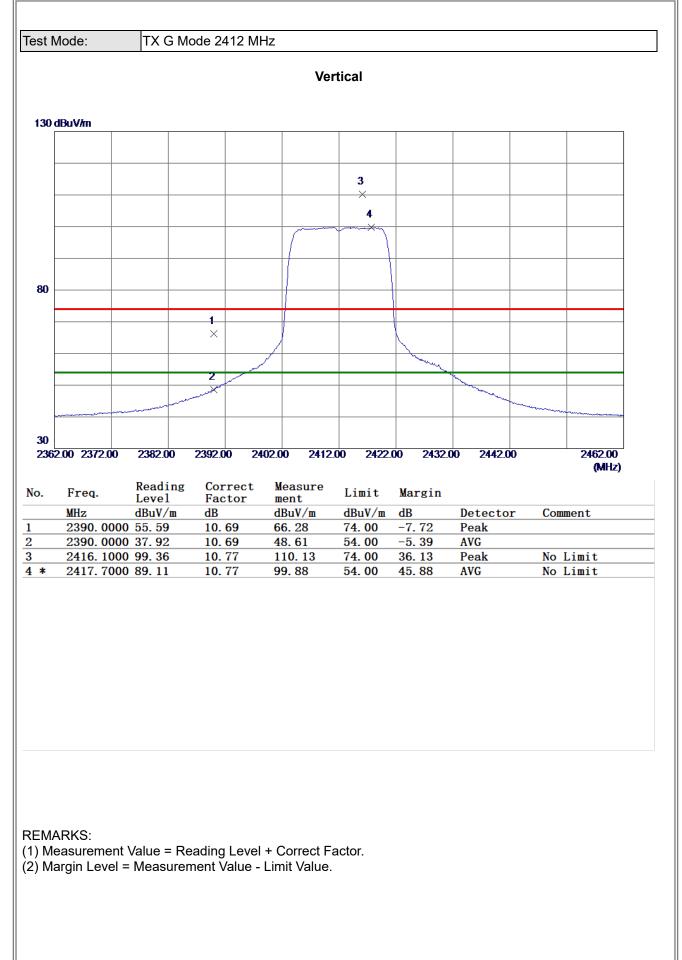




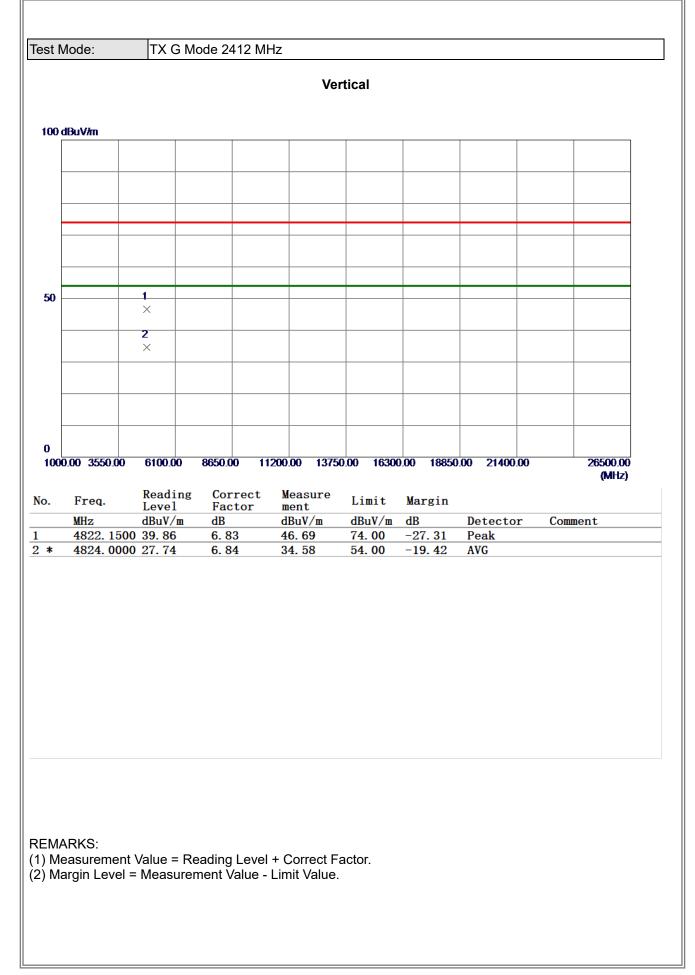




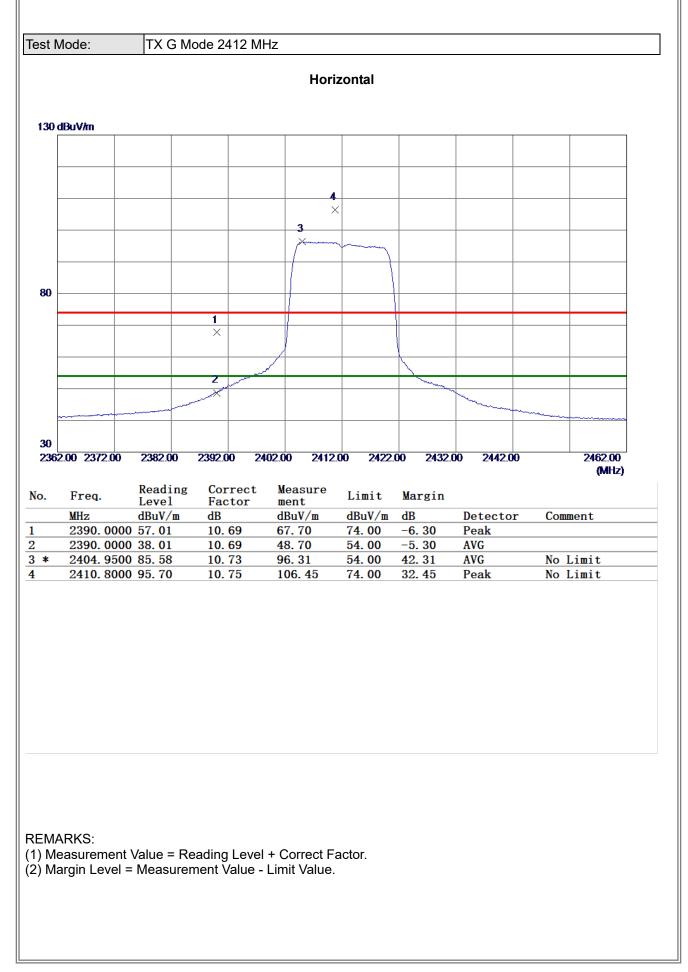




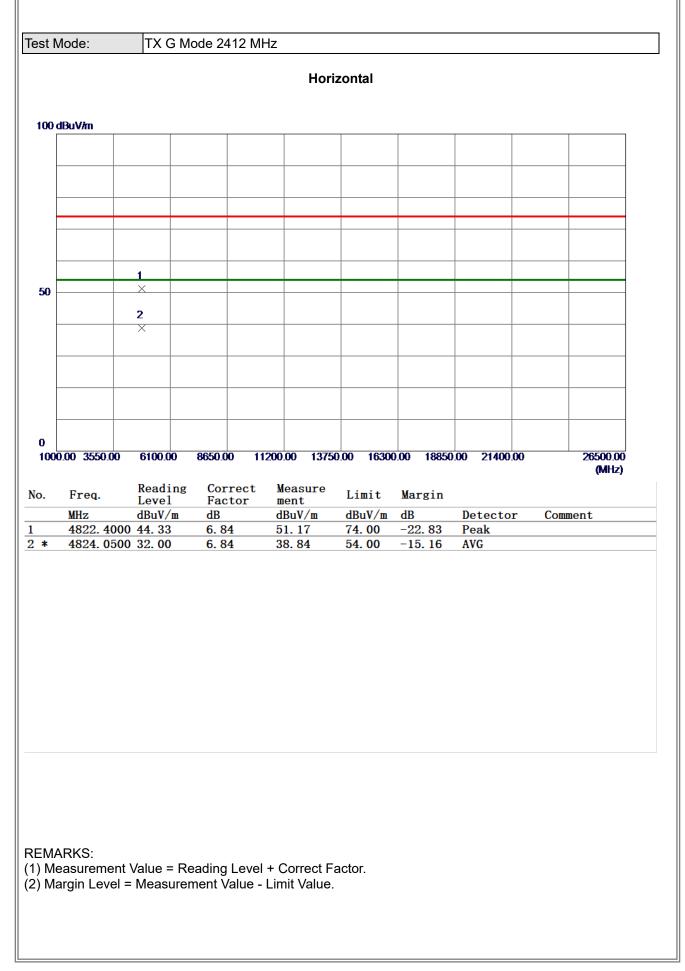




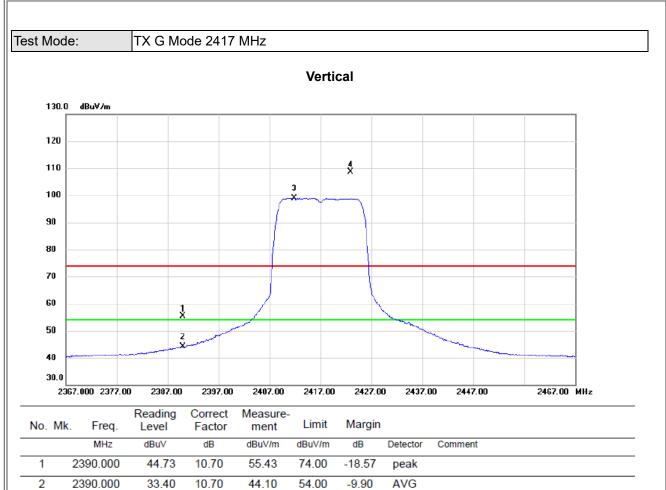












-9.90

45.00

34.55

54.00

74.00

No Limit

No Limit

AVG

peak

44.10

99.00

108.55

**REMARKS**:

2

3 \*

4 X

2411.900

2422.900

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

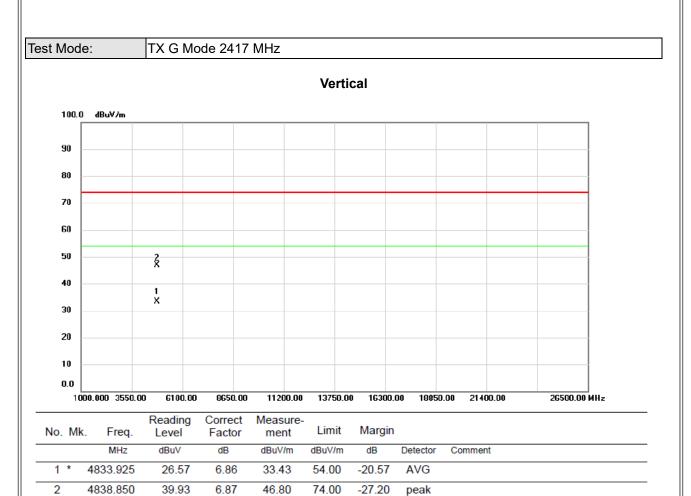
88.24

97.76

10.76

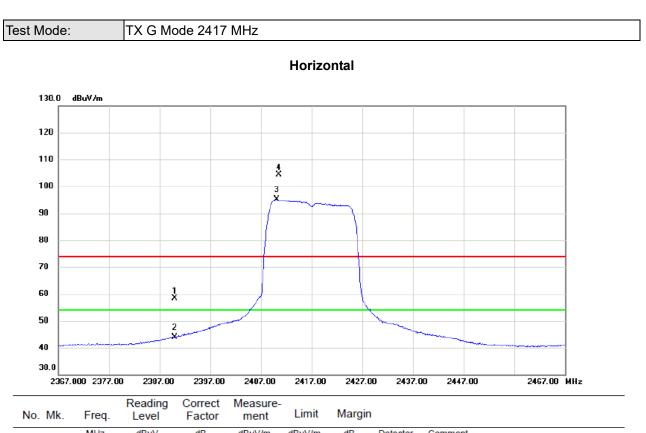
10.79





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

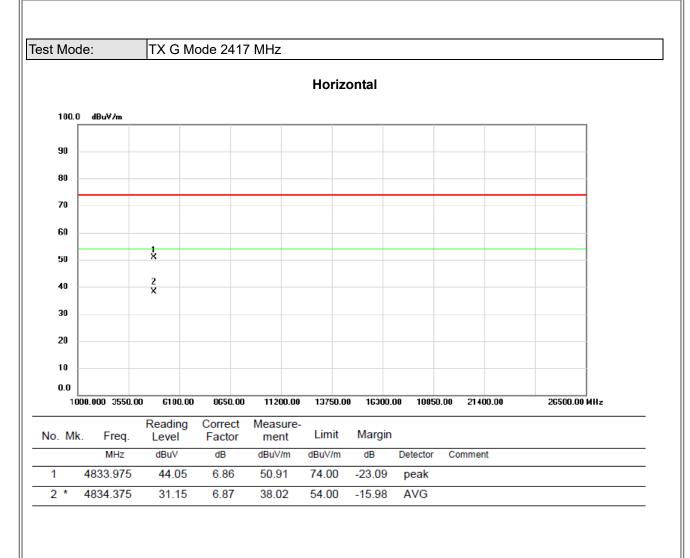




						_		
	MHz	dBuV	dB	dBuV/m	dBuV/m	dB	Detector	Comment
1	2390.000	47.56	10.70	58.26	74.00	-15.74	peak	
2	2390.000	33.27	10.70	43.97	54.00	-10.03	AVG	
3 *	2410.200	84.43	10.74	95.17	54.00	41.17	AVG	No Limit
 4 X	2410.550	93.68	10.74	104.42	74.00	30.42	peak	No Limit

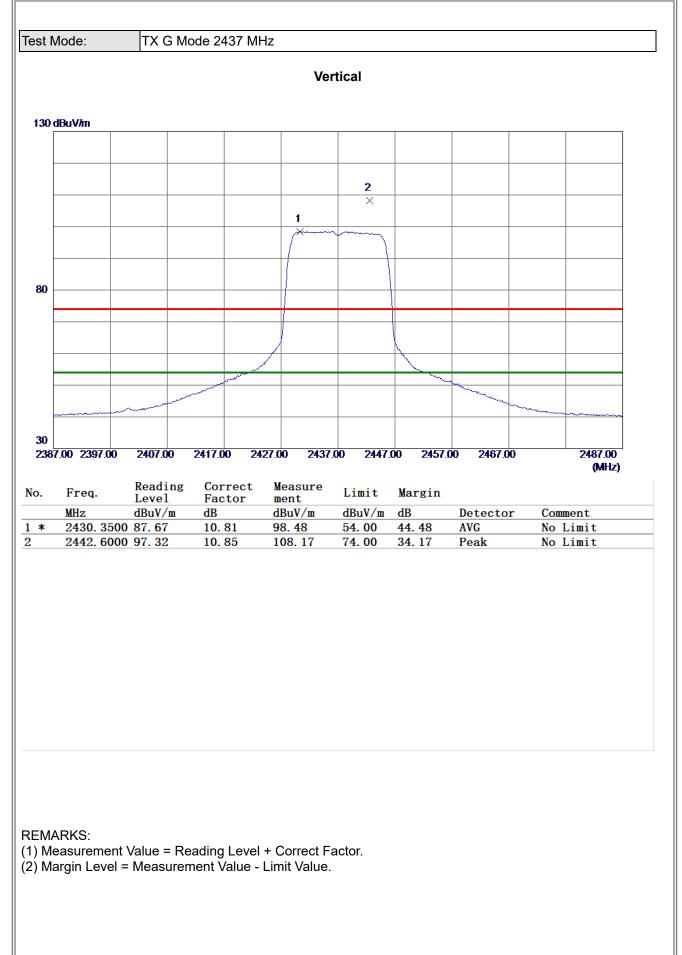
- (1) Measurement Value = Reading Level + Correct Factor.
- (2) Margin Level = Measurement Value Limit Value.



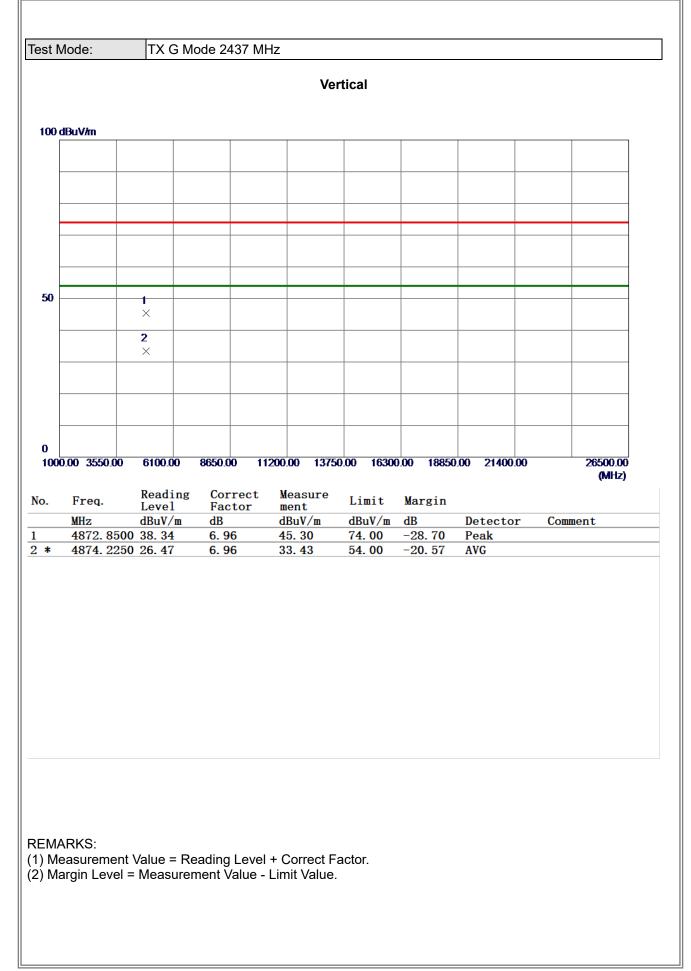


- (1) Measurement Value = Reading Level + Correct Factor.(2) Margin Level = Measurement Value Limit Value.

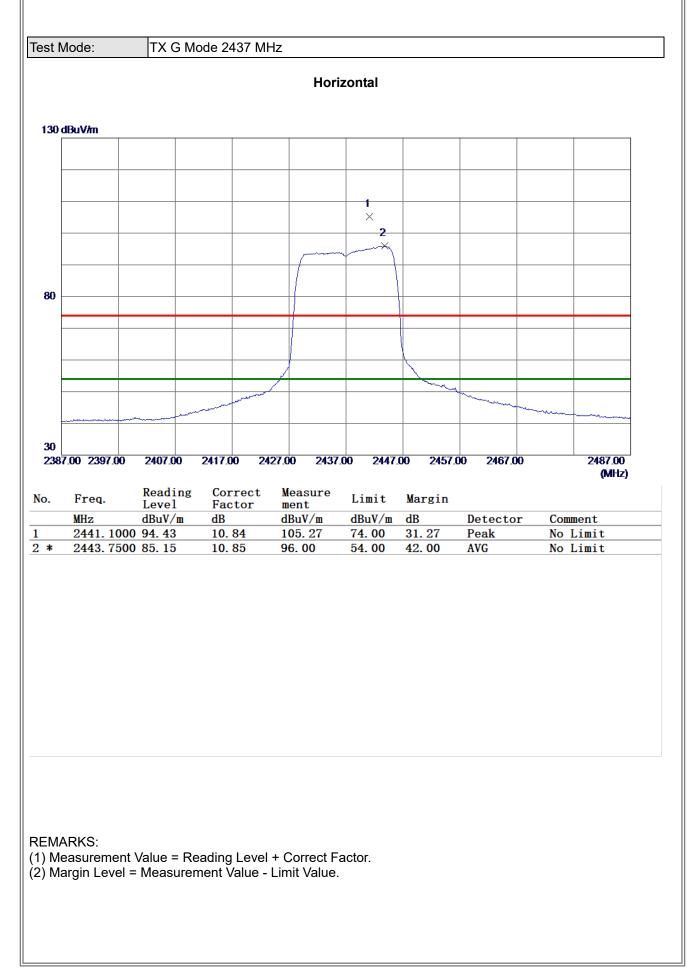




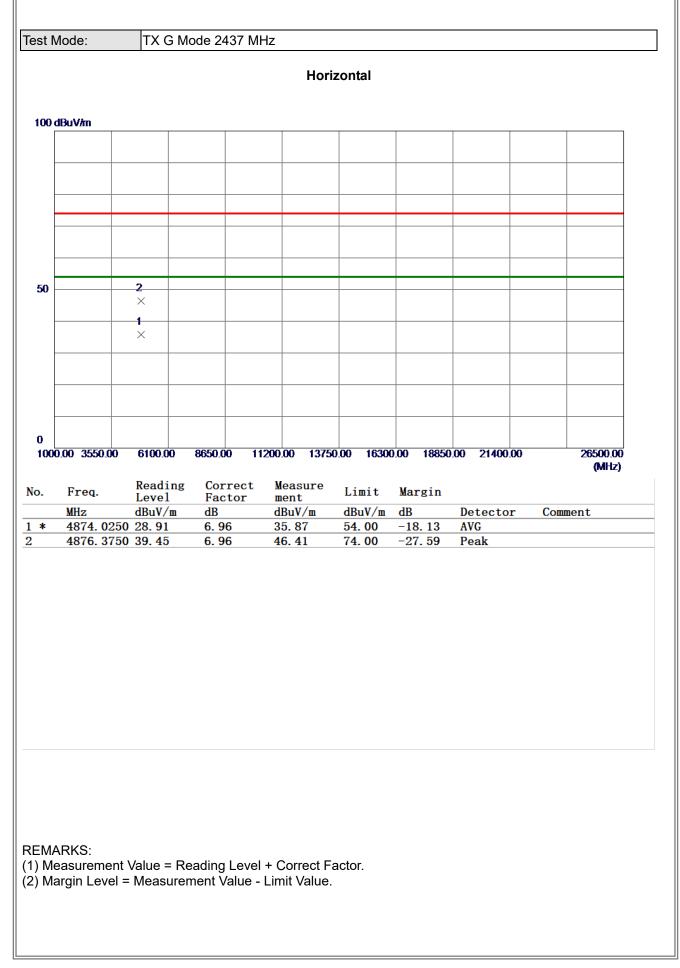




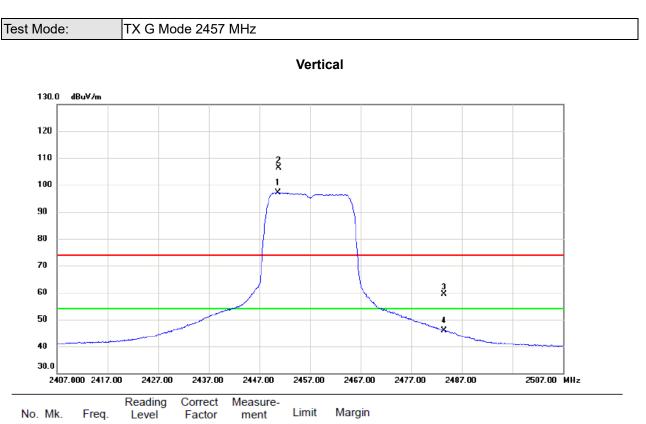








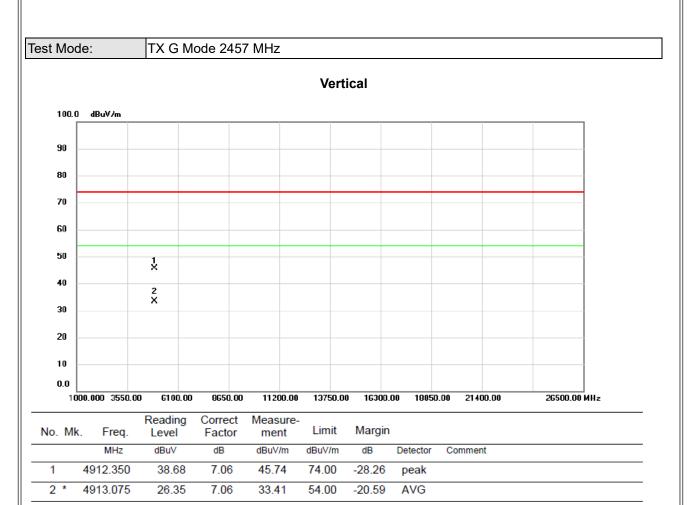




No.	Mk.	. Freq.	Level	Factor	ment	Limit	Margin		
		MHz	dBuV	dB	dBuV/m	dBuV/m	dB	Detector	Comment
1	*	2450.650	86.22	10.87	97.09	54.00	43.09	AVG	No Limit
2	Х	2450.750	95.54	10.87	106.41	74.00	32.41	peak	No Limit
3		2483.500	48.47	10.97	59.44	74.00	-14.56	peak	
4		2483.500	35.02	10.97	45.99	54.00	-8.01	AVG	

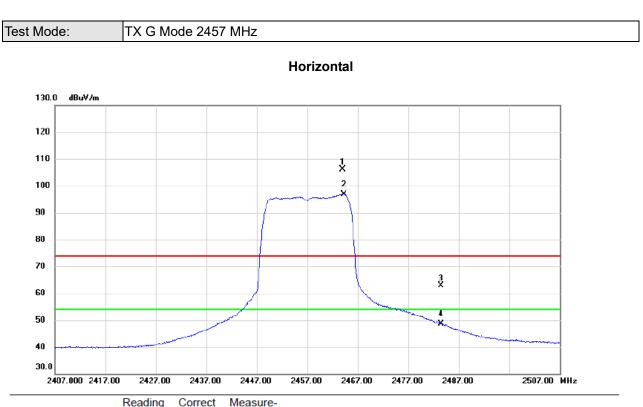
- Measurement Value = Reading Level + Correct Factor.
   Margin Level = Measurement Value Limit Value.





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





No. M	k. Freq.	Reading Level		Measure- ment	Limit	Margin		
	MHz	dBuV	dB	dBuV/m	dBuV/m	dB	Detector	Comment
1 X	2464.000	95.22	10.91	106.13	74.00	32.13	peak	No Limit
2 *	2464.250	86.03	10.91	96.94	54.00	42.94	AVG	No Limit
3	2483.500	52.02	10.97	62.99	74.00	-11.01	peak	
4	2483.500	37.70	10.97	48.67	54.00	-5.33	AVG	

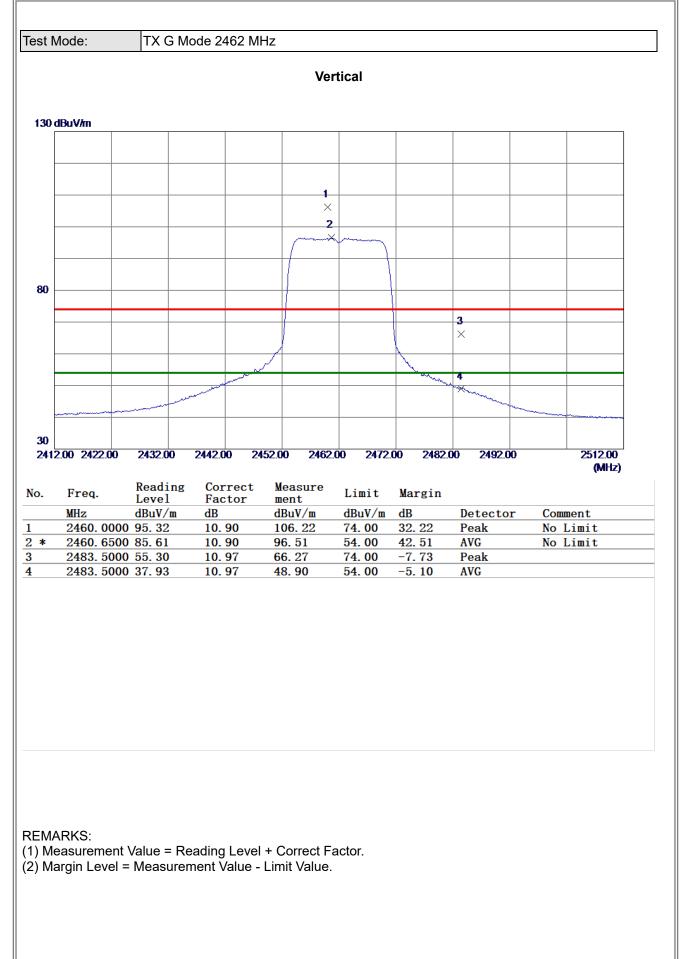
- (1) Measurement Value = Reading Level + Correct Factor.
  (2) Margin Level = Measurement Value Limit Value.



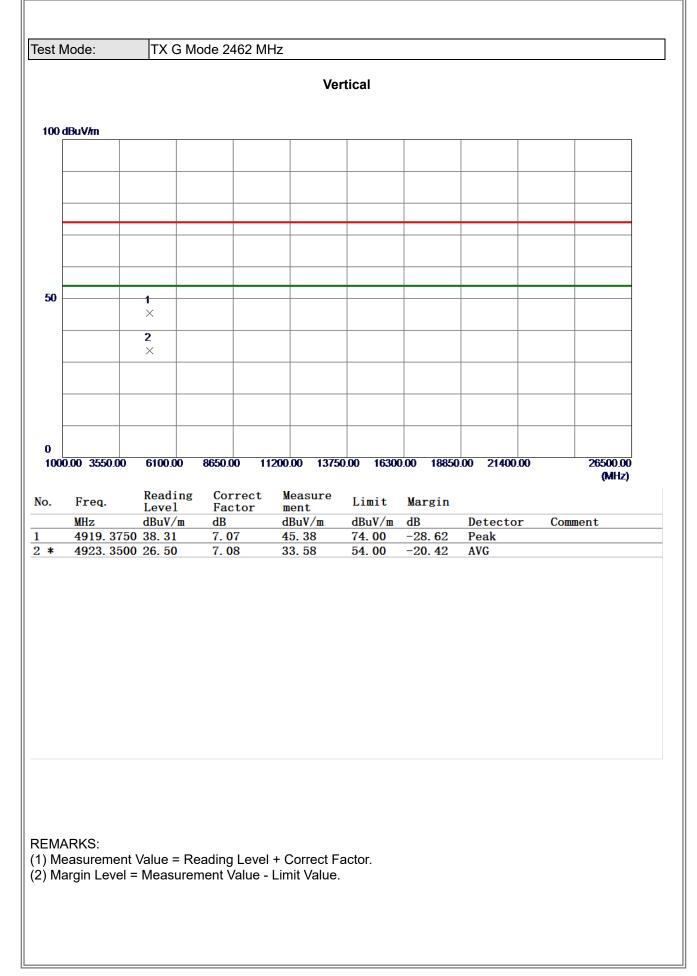


- Measurement Value = Reading Level + Correct Factor.
   Margin Level = Measurement Value Limit Value.

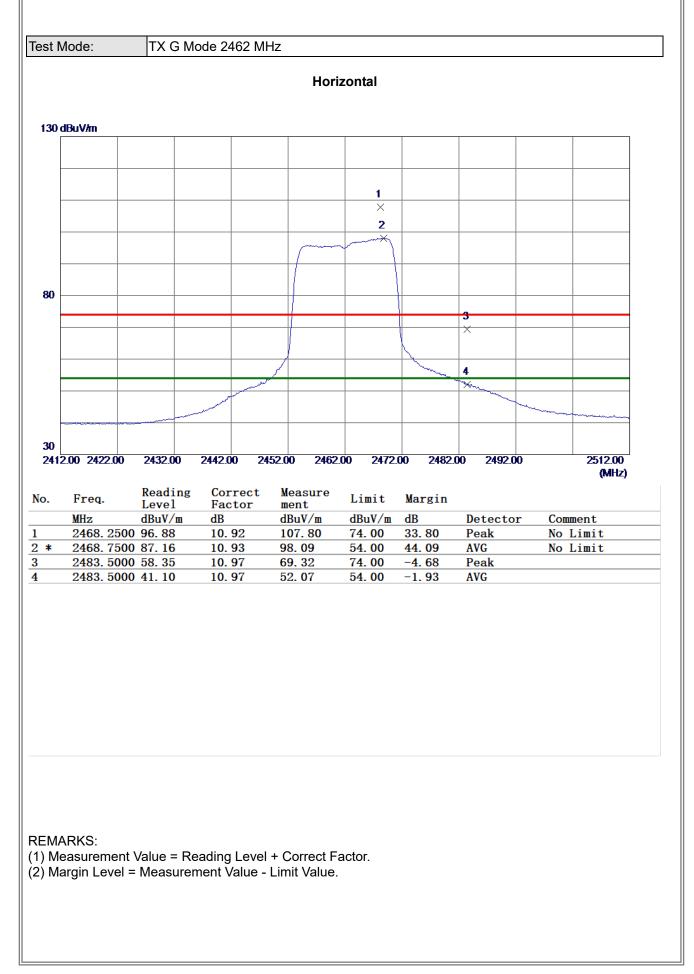




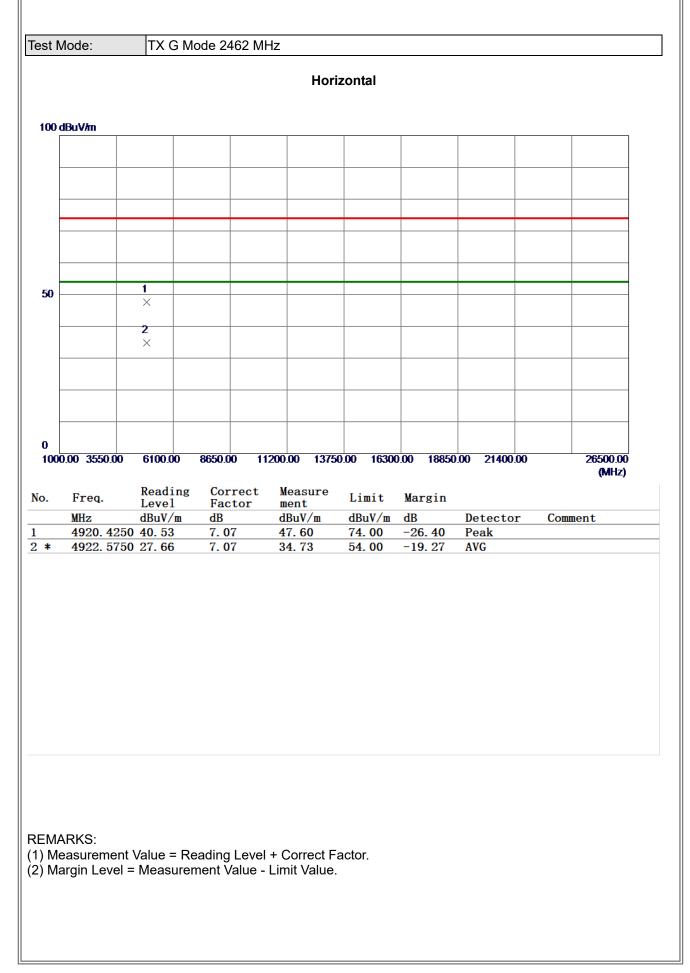




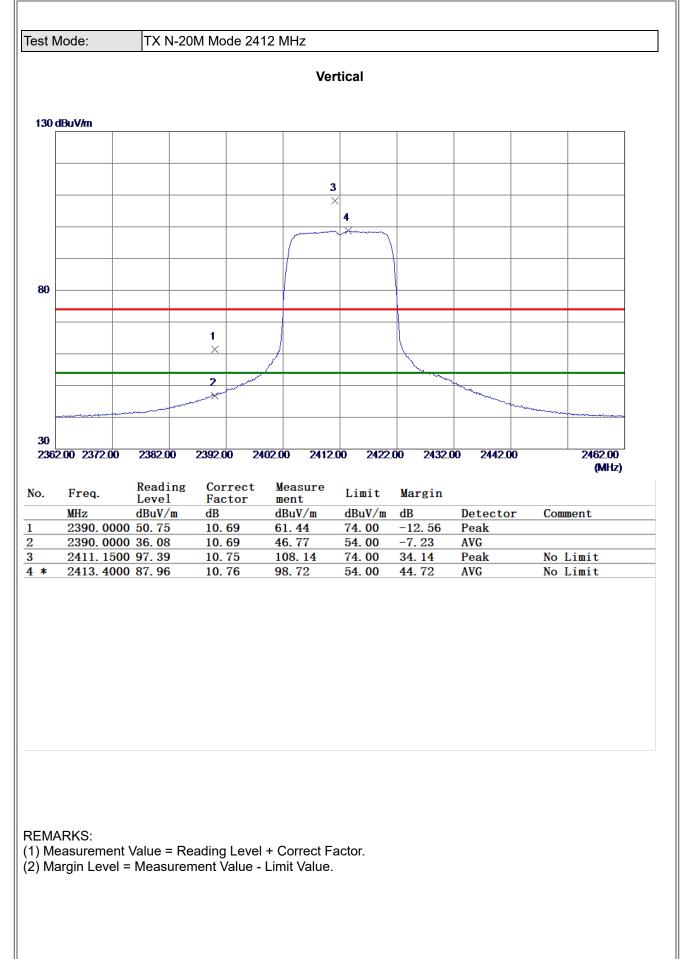




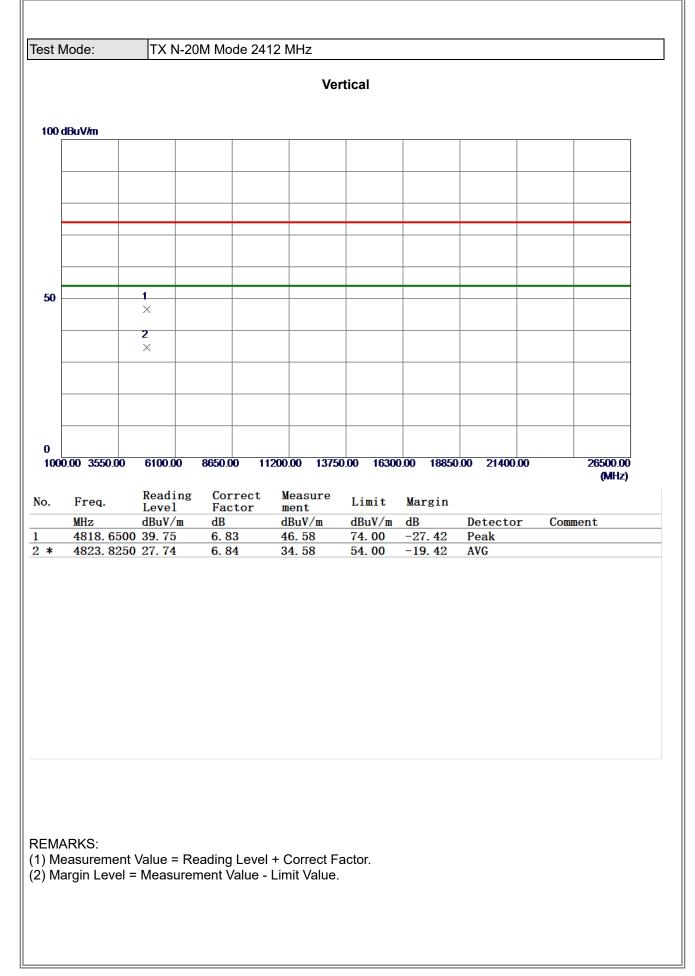




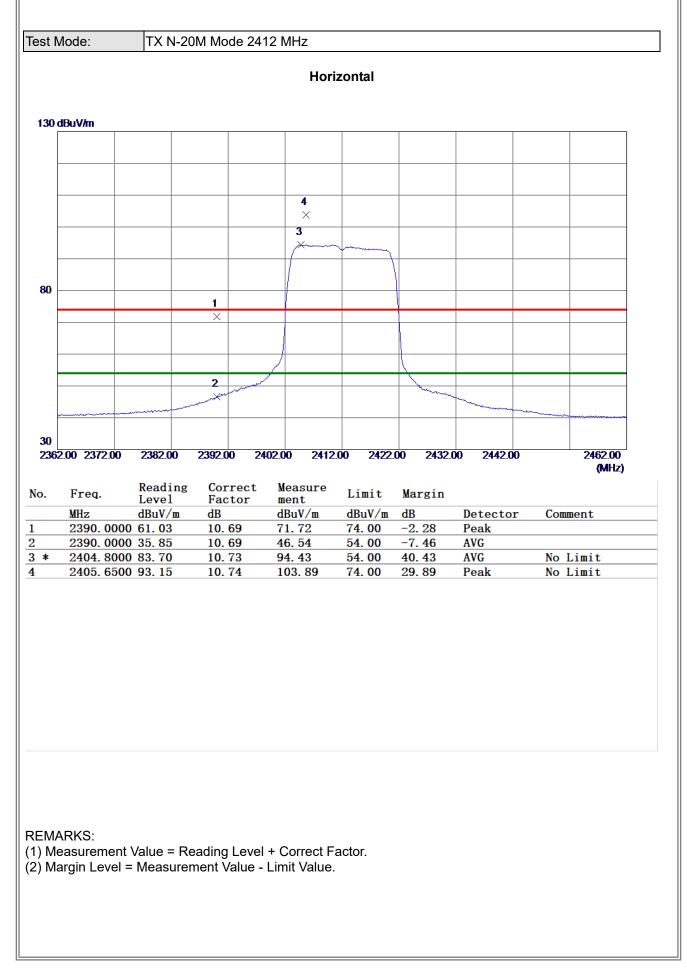




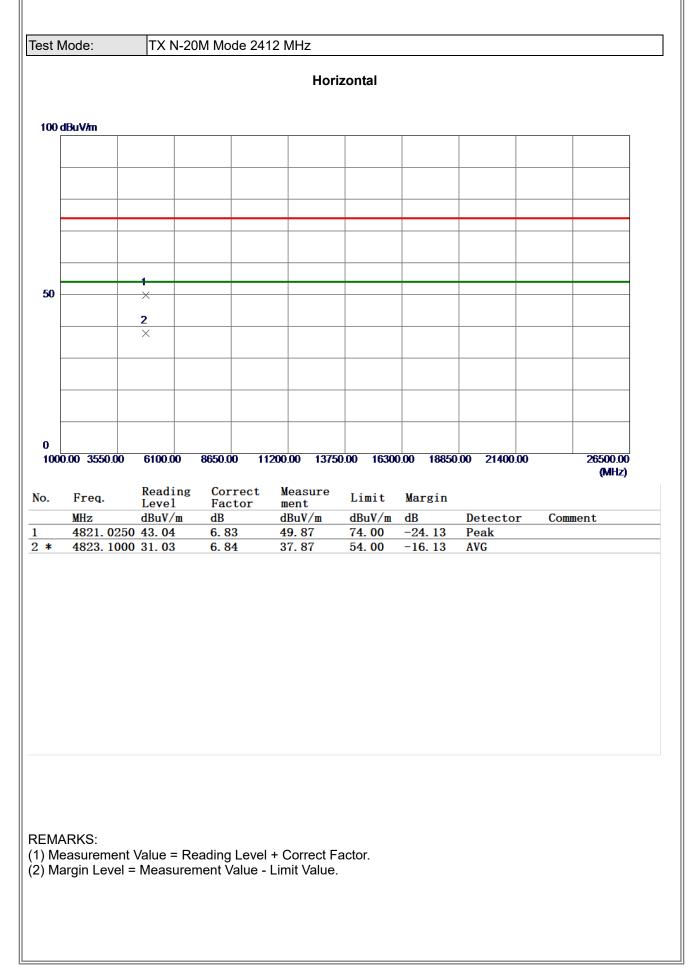




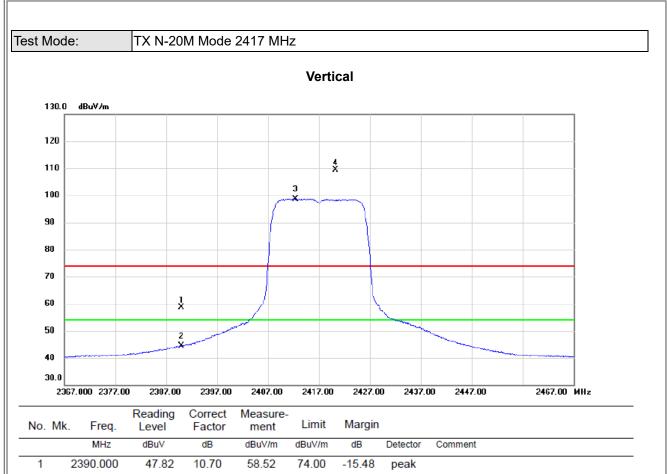












2

3 \*

4 X

2390.000

2412.350

2420.300

33.63

87.91

98.60

10.70

10.76

10.78

44.33

98.67

109.38

54.00

54.00

74.00

-9.67

44.67

35.38

AVG

AVG

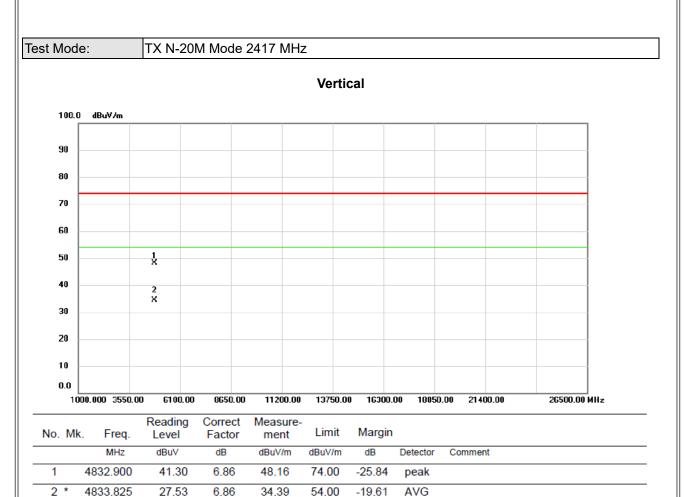
peak

No Limit

No Limit

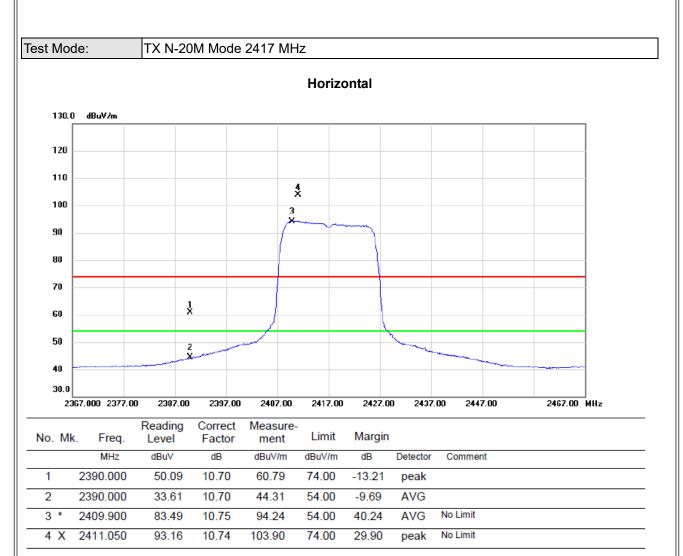
- (1) Measurement Value = Reading Level + Correct Factor.
- (2) Margin Level = Measurement Value Limit Value.





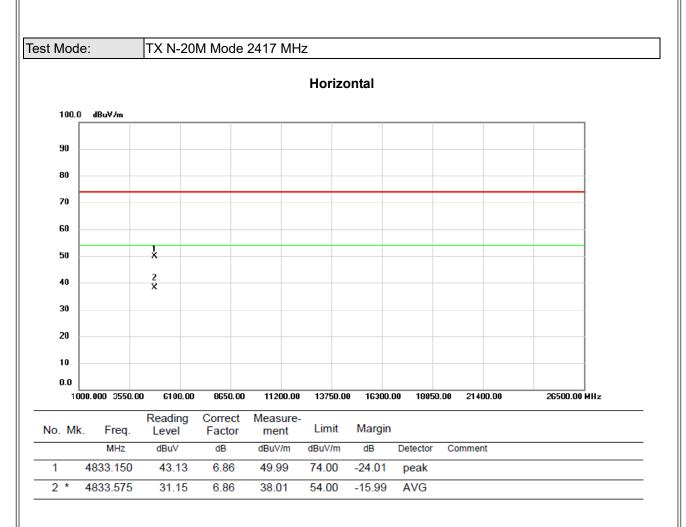
- (1) Measurement Value = Reading Level + Correct Factor.
- (2) Margin Level = Measurement Value Limit Value.





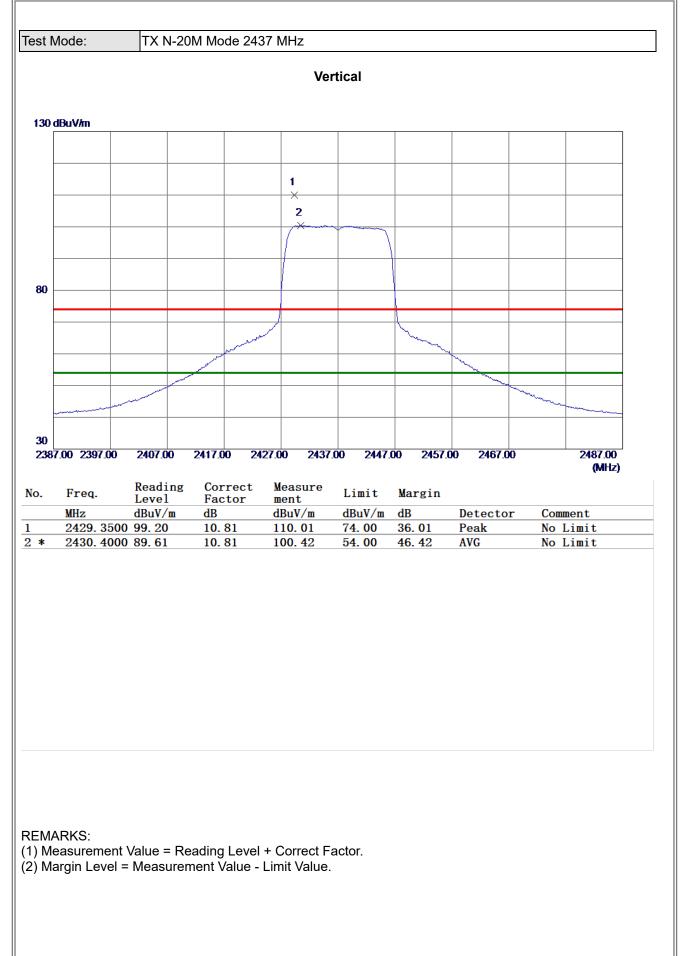
- (1) Measurement Value = Reading Level + Correct Factor.
- (2) Margin Level = Measurement Value Limit Value.



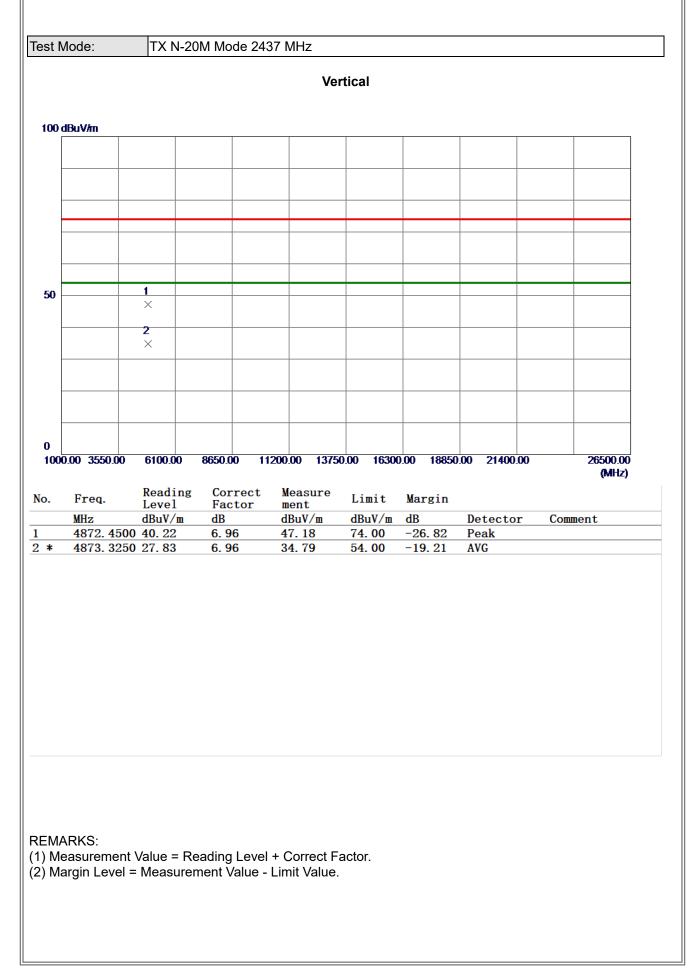


- Measurement Value = Reading Level + Correct Factor.
   Margin Level = Measurement Value Limit Value.

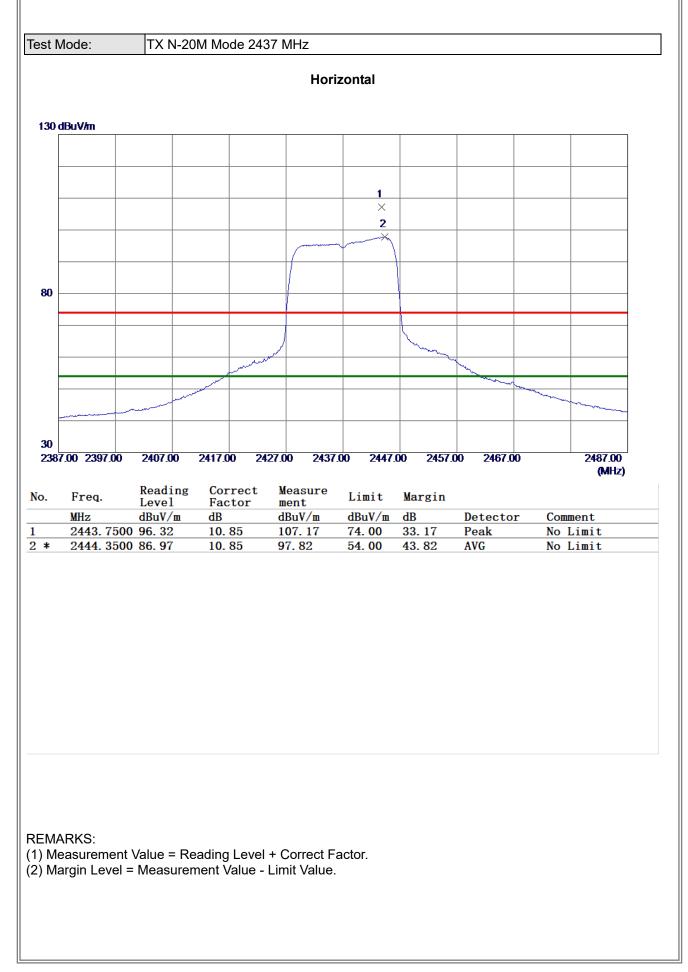




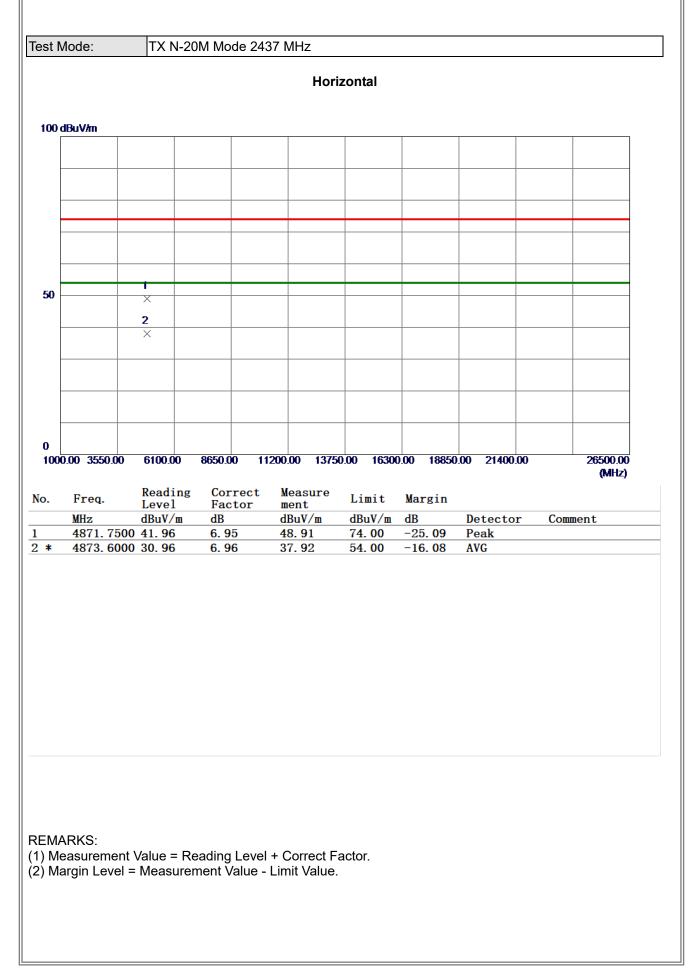




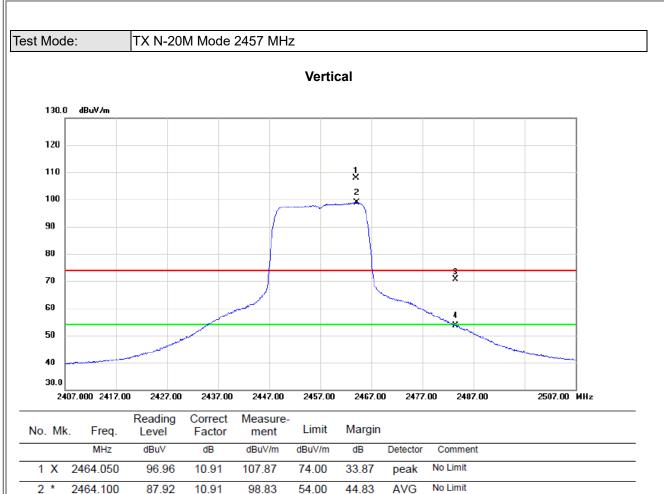












peak

AVG

-3.40

-0.28

**REMARKS**:

2 \*

2483.500

2483.500

59.63

42.75

10.97

10.97

70.60

53.72

74.00

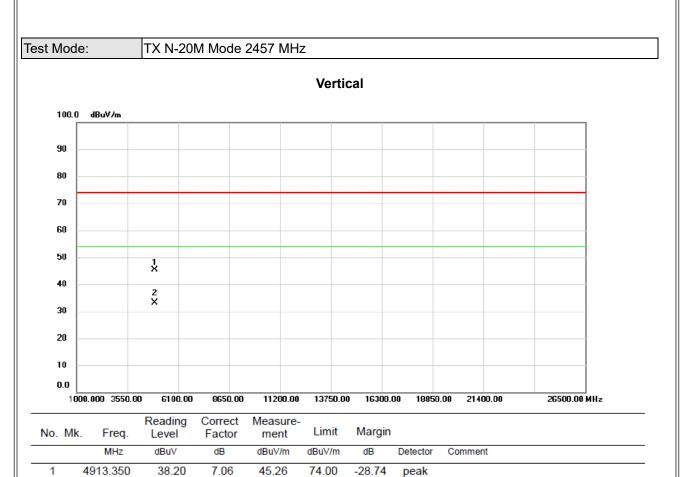
54.00

3

4

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





2 \*

4915.425

26.08

7.06

33.14

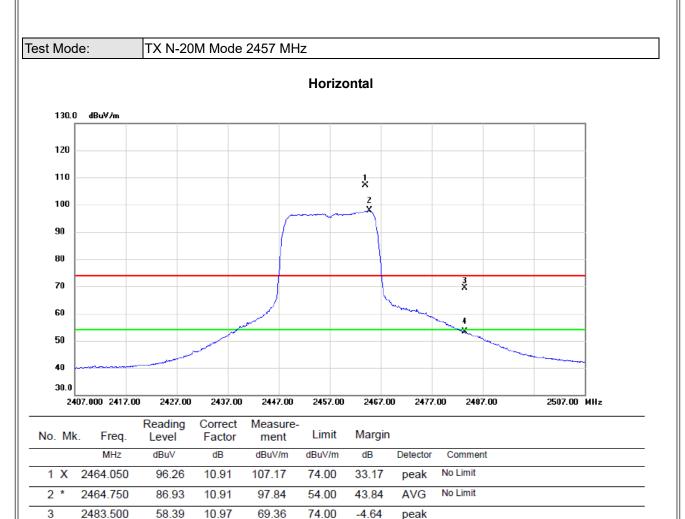
54.00

-20.86

AVG

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





4

2483.500

42.33

10.97

53.30

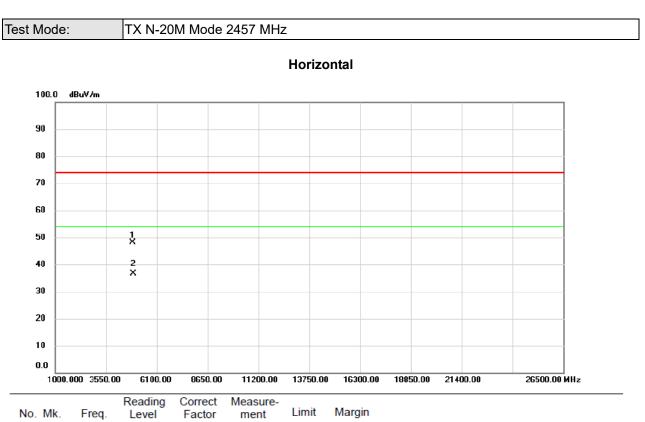
54.00

-0.70

AVG

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

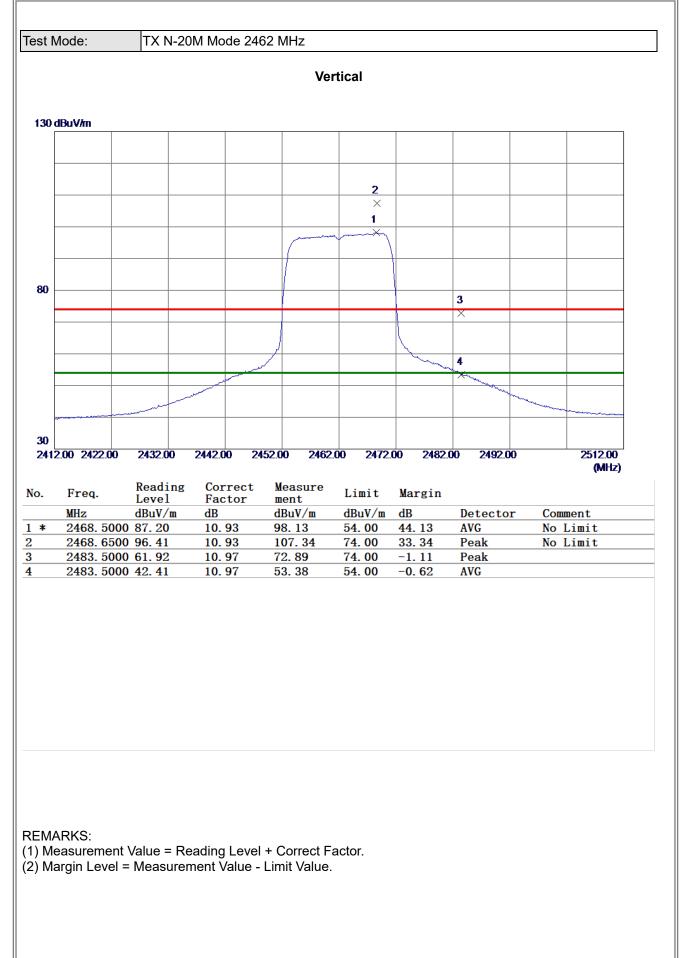




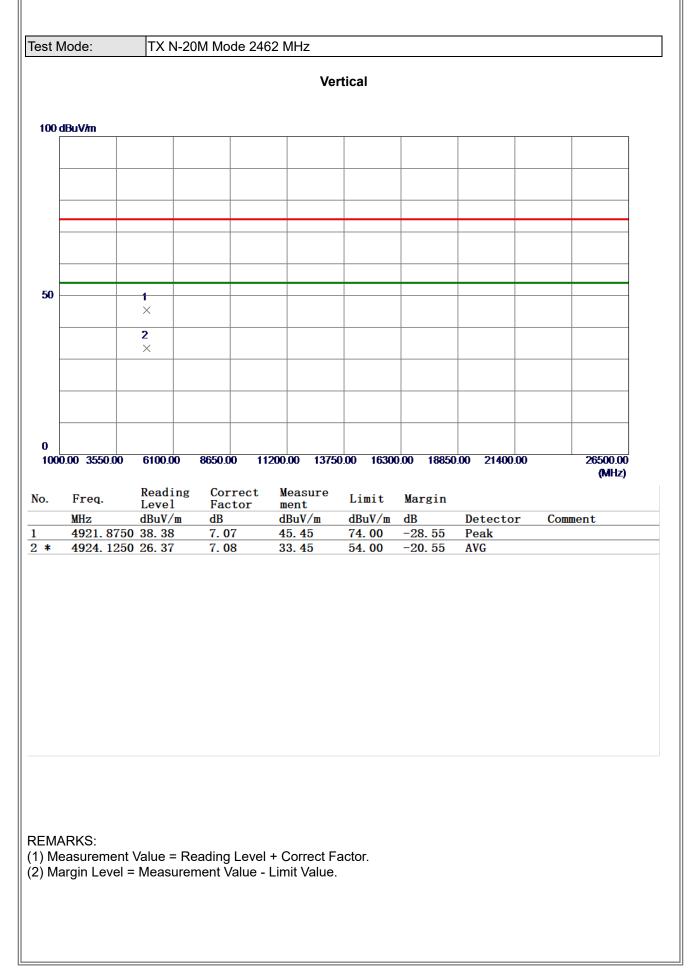
 No. N	/lk.	Freq.	Level	Factor	ment	Limit	Margin		
		MHz	dBuV	dB	dBuV/m	dBuV/m	dB	Detector	Comment
1	490	8.975	41.03	7.04	48.07	74.00	-25.93	peak	
2 *	491	4.550	29.46	7.06	36.52	54.00	-17.48	AVG	

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

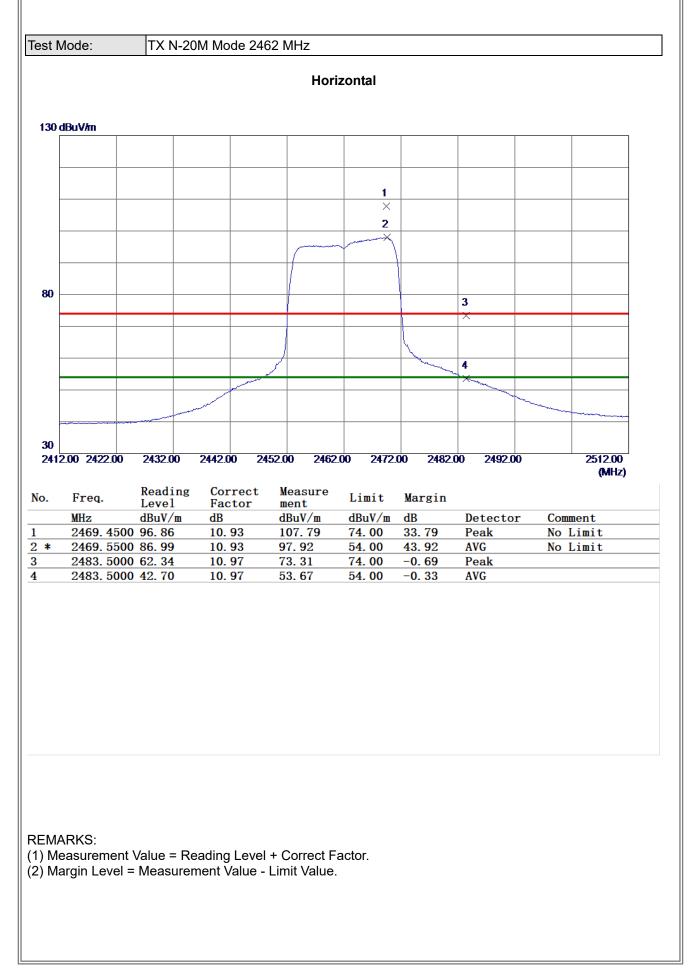




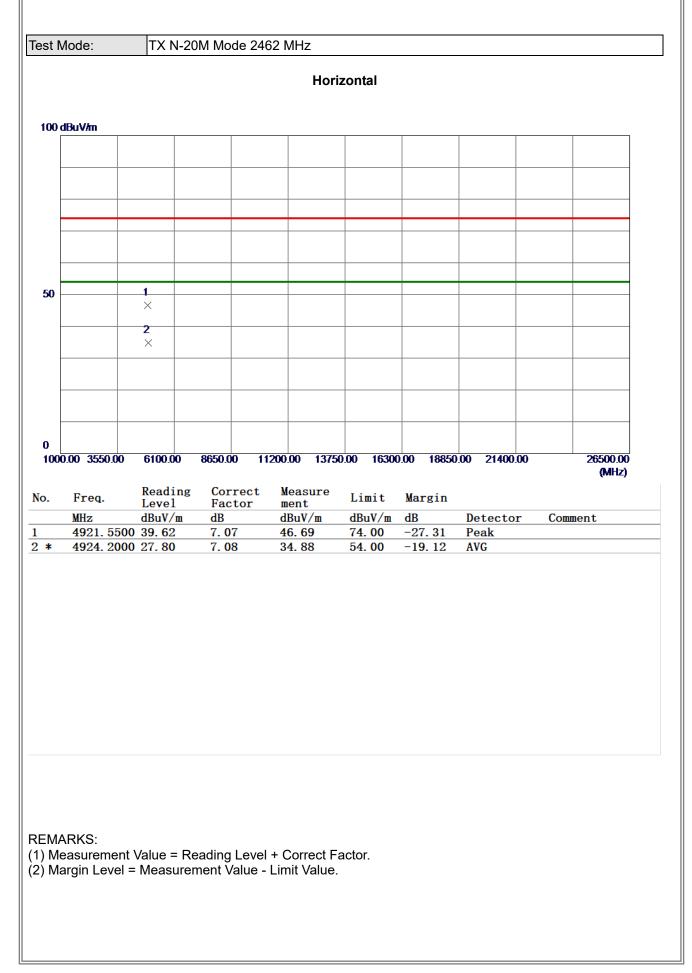










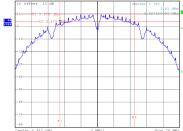




## **APPENDIX E - BANDWIDTH**



Test Mode	TX B Mode			
Channel	Frequency (MHz)	6 dB Bandwidth (MHz)	6 dB Bandwidth Min. Limit (kHz)	Result
01	2412	9.11	500	Complies
06	2437	8.59	500	Complies
11	2462	8.16	500	Complies
	H01	CH06	С	H11
• • •	Mar 2.5 ms 9.11000000 Min Marker 3 [7] 9.41 dBm 2.6742000 0Bm	*VBW 300 kHz Ref 20 dBm *Att 30 dB SWT 2.5 ms	1 107.1 -0.44 m -0.4907 500 500 -0.1007 500 500 -0.1007 500 500 -0.1007 500 500 -0.1007 500 500 -0.1007 500 500 -0.100 500 -0.1000 500 -0.100 500 -0.100 500 -	- 260 100 Mar. Delta 1 (T ) - 060 100 Mar. 0.60 100 SW7 100 Mar. 0.60 100 - 060 200 100 Mar. 1 (T ) - 060 200 000 000 - 060 200 000 000 - 060 200 000 000 - 070 000 000

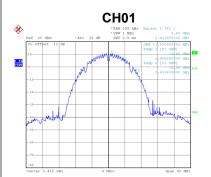


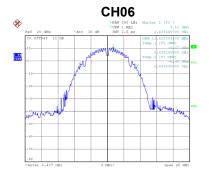




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Channel	Frequency (MHz)	99 % Emission Bandwidth (MHz)	Result
01	2412	13.52	Complies
06	2437	13.52	Complies
11	2462	13.44	Complies







Date: 7.FEB.2021 09:36:57

Date: 7.FEB.2021 09:39:40

Date: 7.FEB.2021 09:41:32

Date: 7.FEB.2021 09:41:25