

# FCC Radio Test Report

# FCC ID: 2AG7C-SPEED14

#### This report concerns: Original Grant

Project No.	:	2010H034
Equipment	:	IP CAMERA
Brand Name	:	N/A
Test Model	:	Speed 14S
Series Model	:	Speed 14X
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		Zhejiang, China
Date of Receipt	:	Nov. 03, 2020
Date of Test	:	Nov. 03, 2020~Nov. 18, 2020
Issued Date	:	Nov. 24, 2020
<b>Report Version</b>	:	R00
Test Sample	:	Engineering Sample No.: SH2020103011, SH2020103012,
		SH2020110266-10, SH2020110266-6
Standard(s)	:	FCC Part15, Subpart C (15.247)
. ,		ANSI C63.10-2013
		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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The information, data and test plan are provided by manufacturer which may affect the validity of results, so it is manufacturer's responsibility to ensure that the apparatus meets the essential requirements of applied standards and in all the possible configurations as representative of its intended use.

#### Limitation

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



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# **APPENDIX H - POWER SPECTRAL DENSITY**

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# **REPORT ISSUED HISTORY**

Report Version	Description	Issued Date
R00	Original Issue.	Nov. 24, 2020

# 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 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. 29, Jintang Road, Tangzhen Industry Park, Pudong New Area, Shanghai 201210,China BTL's Test Firm Registration Number for FCC: 476765 BTL's Designation Number for FCC: CN1241



#### **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. Radiated emissions test:

Test Site	Method	Measurement Frequency Range	Ant. H / V	U, (dB)
		9 KHz~30 MHz	V	3.79
		9 KHz~30 MHz	Н	3.57
		30 MHz~200 MHz	V	4.04
	CISPR	30 MHz~200 MHz	Н	3.76
SH-CB01		200 MHz~1,000 MHz	V	4.24
3H-CDUI		200 MHz~1,000 MHz	Н	3.84
		1 GHz~18 GHz	V	4.46
		1 GHz~18 GHz	Н	4.40
		18 GHz~40 GHz	V	3.95
		18 GHz~40 GHz	Н	3.95

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	24°C	58%	AC 120V/60Hz Forest Li
Radiated Emissions-30 MHz to 1GHz	24°C	58%	AC 120V/60Hz Forest Li
Radiated Emissions-Above 1000 MHz	24°C	58%	AC 120V/60Hz Forest Li
Bandwidth	22°C	48%	AC 120V/60Hz Forest Li
Maximum output power & e.i.r.p.	22°C	48%	AC 120V/60Hz Forest Li
Conducted Spurious Emissions	22°C	48%	AC 120V/60Hz Forest Li
Power Spectral Density	22°C	48%	AC 120V/60Hz Forest Li



# 2. GENERAL INFORMATION

#### 2.1 GENERAL DESCRIPTION OF EUT

Equipment	IP CAMERA
Brand Name	N/A
Test Model	Speed 14S
Series Model	Speed 14X
Model Difference(s)	Two models are identical except for model name.
Software Version	Smart life
Hardware Version	PCB-SPEED14-A2MB-F37 REV1_0
Power Source	DC voltage supplied from AC/DC adapter. #1 Brand/Mode:STZY/ TPA-46B050100UU #2 Brand/Mode:GPO/ GTA92-0501000US
Power Rating	#1 I/P: 100V-240V ~ 50Hz/60Hz 0.2A O/P:5.0V 1000mA. #2 I/P: 100V-240V ~ 50Hz/60Hz 0.3A O/P:USB-A 5.0V 1.0A, 5.0W
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 150 Mbps
Maximum Output Power	IEEE 802.11b: 22.22 dBm (0.1667 W) IEEE 802.11g: 25.07 dBm (0.3214 W) IEEE 802.11n (HT20): 24.96 dBm (0.3133 W) IEEE 802.11n (HT40): 24.77 dBm (0.2999 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) CH03 - CH09 for IEEE 802.11n (HT40)							
Channel	Frequency (MHz)	Channel	Frequency (MHz)	Channel	Frequency (MHz)	Channel	Frequency (MHz)
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)	Note
1	N/A	N/A	FPC	N/A	3	N/A

### 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 N-40 MHz Mode Channel 03/06/09	
Mode 5	TX G Mode Channel 06	

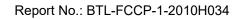
Following mode(s) as (were) found to be the worst case(s) and selected for the final test.

AC power line conducted emissions test				
Final Test Mode:	Final Test Mode: Description			
Mode 5	TX G Mode Channel 06			

Radiated emissions test - Below 1GHz	
Final Test Mode:	Description
Mode 5	TX G Mode Channel 06

Radiated emissions test- Above 1GHz	
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
Mode 4	TX N-40 MHz Mode Channel 03/06/09

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
Mode 4	TX N-40 MHz Mode Channel 03/06/09





#### NOTE:

(1) The measurements are performed at the high, middle, low available channels.

(2) 802.11b mode: CCK (1 Mbps)

802.11g mode: OFDM (6 Mbps)

802.11n HT20 mode : BPSK (6.5 Mbps)

802.11n HT40 mode : BPSK (13.5 Mbps)

For radiated emission tests, the highest output powers were set for final test.

(3) For radiated emission below 1 GHz test, the IEEE 802.11g Channel 06 is found to be the worst case and recorded.

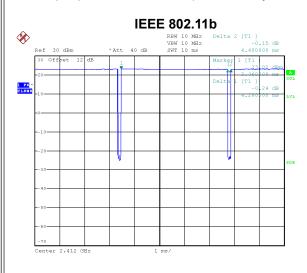
#### 2.3 PARAMETERS OF TEST SOFTWARE

Test Software		IPOP V4.0	
Frequency (MHz)	2412	2437	2462
IEEE 802.11b	default	default	default
IEEE 802.11g	default	default	default
IEEE 802.11n (HT20)	default	default	default
Frequency (MHz)	2422	2437	2452
IEEE 802.11n (HT40)	default	default	default



# 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: 6.NOV.2020 15:56:29

Date: 6.NOV.2020 15:58:23

Duty cycle = 1.285 ms / 1.325 ms = 96.98% Duty Factor = 10 log(1/Duty cycle) = 0.13

#### NOTE:

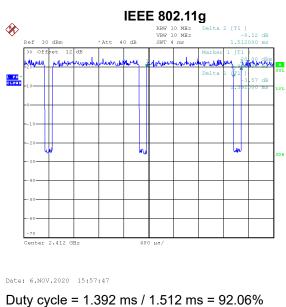
For IEEE 802.11b:

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%).

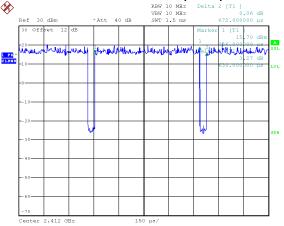
For IEEE 802.11g and IEEE 802.11n (HT20): For radiated emissions frequency above 1 GHz, the resolution bandwidth of test receiver/spectrum analyzer is 1 MHz and the video bandwidth is 1 kHz (Duty cycle < 98%).

#### For IEEE 802.11n (HT40):

For radiated emissions frequency above 1 GHz, the resolution bandwidth of test receiver/spectrum analyzer is 1 MHz and the video bandwidth is 2 kHz (Duty cycle < 98%).





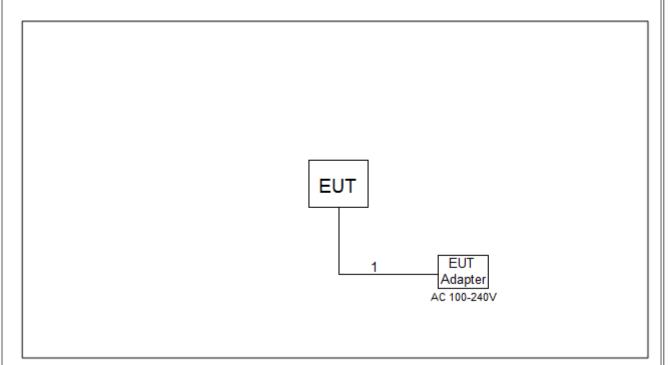


Date: 6.NOV.2020 15:59:09

Duty cycle = 0.630 ms / 0.672 ms = 93.75% Duty Factor = 10 log(1/Duty cycle) = 0.28



#### 2.5 BLOCK DIAGRAM SHOWING THE CONFIGURATION OF SYSTEM TESTED



#### 2.6 SUPPORT UNITS

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

ltem	Cable Type	Shielded Type	Ferrite Core	Length
1	DC Cable	NO	NO	1m



# 3. AC POWER LINE CONDUCTED EMISSIONS TEST

#### 3.1 LIMIT

Frequency of Emission (MHz)	Limit (d	BμV)
Frequency of Emission (MHz)	Quasi-peak	Average
0.15 - 0.50	66 to 56*	56 to 46*
0.50 - 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

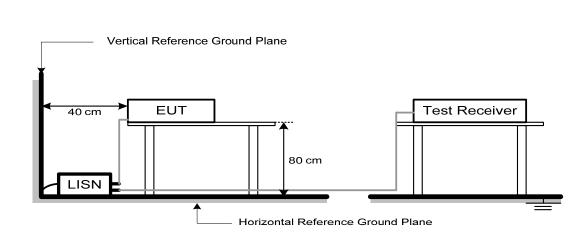
- a. The EUT was placed 0.8 meters from the horizontal ground plane with EUT being connected to the power mains through a line impedance stabilization network (LISN). All other support equipment powered from additional LISN(s). The LISN provide 50 Ohm/ 50uH of coupling impedance for the measuring instrument.
- 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)	(dBuV/m at 3 m)	
	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).
- (4) The test result calculated as following: Measurement Value = Reading Level + Correct Factor Correct Factor = Antenna Factor + Cable Loss - Amplifier Gain(if use) Margin Level = Measurement Value - Limit Value

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)
- h. All readings are Peak Mode value unless otherwise stated AVG in column of Note. If the Peak Mode Measured value compliance with the Peak Limits and lower than AVG Limits, the EUT shall be deemed to meet both Peak & AVG Limits and then only Peak Mode was measured, but AVG Mode didn't perform. (above 1 GHz)
- i. For the actual test configuration, please refer to the related Item -EUT Test Photos.

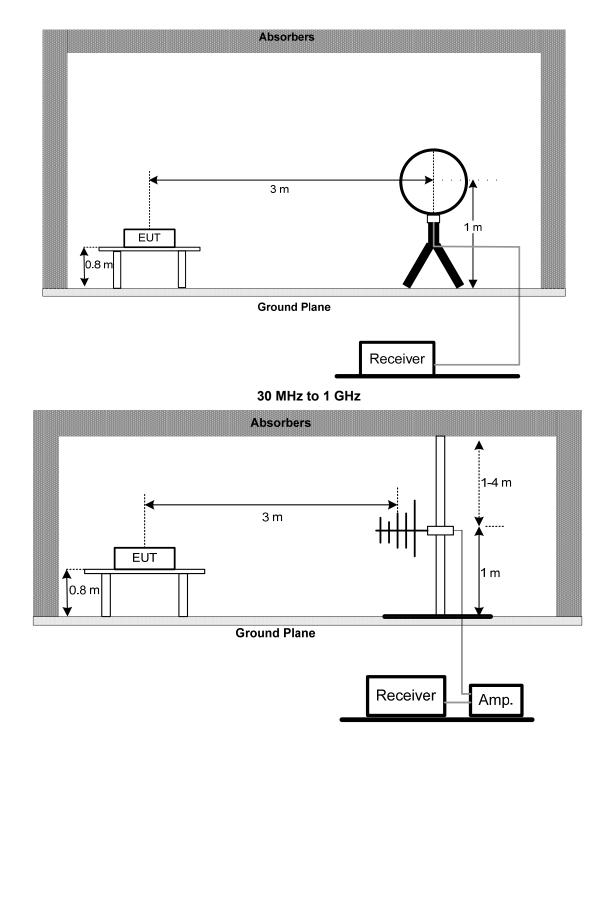
#### 4.3 DEVIATION FROM TEST STANDARD

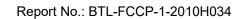
No deviation



# 4.4 TEST SETUP

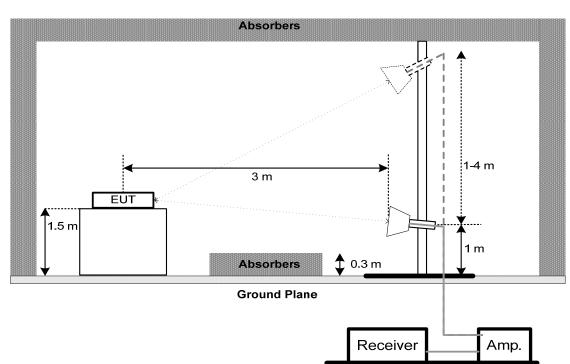
9 kHz-30 MHz





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#### 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				
15.247(a)(2)	6 dB Bandwidth	Minimum 500 kHz				
15.247 (d)(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 : 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. For 99% Emission Bandwidth N-40 Mode: RBW= 1 MHz, VBW=3 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



SPECTRUM ANALYZER

#### 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 OUTPUT POWER TEST

#### 6.1 LIMIT

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

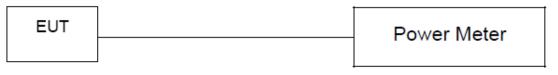
#### 6.2 TEST PROCEDURE

- 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 11.9.1.3 (for peak power) or 11.9.2.3.1 (for AVG power) 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.

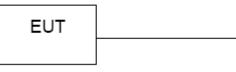
#### 7.2 TEST PROCEDURE

- 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)				
	Power Spectral Density	(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	Line Impedance Stabilisation Network	Schwarzbeck	NNLK 8121	8121-822	Mar. 21, 2021				
2	TWO-LINE V-NETWORK	R&S	ENV216	101340	Aug. 23, 2021				
3	Test Cable	emci	EMCRG400-BM-N M-10000	170628	Jul. 15, 2021				
4	EMI Test Receiver	R&S	ESCI	100082	Mar. 21, 2021				
5	50Ω Terminator	SHX	TF2-1G-A	TF2-1G-A 17051602 Mar.					
6	$50\Omega$ coaxial switch	Anritsu	Anritsu MP59B 6201750902 M		Mar. 21, 2021				
7	Measurement Software			N/A	N/A				

	Radiated Emissions - 30 MHz to 1 GHz								
Item	Kind of Equipment	Equipment Manufacturer Type No. Serial No.		Serial No.	Calibrated until				
1	TRILOG Broadband Antenna	Schwarzbeck	VULB 9168	719	Apr. 02, 2021				
2	Pre-Amplifier	emci	emci EMC9135 980400		Mar. 21, 2021				
3	MXE EMI Receiver	Keysight	N9038A	MY57150106	Mar. 21, 2021				
4	Test Cable	emci	EMC104-SM-SM-7 000	170330	Apr. 13, 2021				
5	Test Cable	emci	EMC104-SM-SM-1 000	170331	Apr. 13, 2021				
6	Test Cable	emci	emci EMC104-SM-NM-3 500 170621		Apr. 13, 2021				
7	Measurement Software	Farad	EZ-EMC Ver.NB-03A1-01	N/A	N/A				

	Radiated Emissions - Above 1 GHz							
Item	Kind of Equipment	Manufacturer	Type No.	Serial No.	Calibrated until			
петт	Double-Ridged							
1	Waveguide Horn Antenna	ETS-Lindgren	9120D	00206960	Apr. 02, 2021			
2	Pre-Amplifier	emci	EMC012645SE	980421	May. 11, 2021			
3	EXA Spectrum Analyzer	Keysight	N9010A	MY56480545	Mar. 21, 2021			
4	Test Cable	emci	EMC104-SM-SM-7 000	170330	Apr. 13, 2021			
5	Test Cable	emci	EMC104-SM-SM-1 000	170331	Apr. 13, 2021			
6	Test Cable	emci	EMC104-SM-NM-3 500	170621	Apr. 13, 2021			
7	Measurement Software	Farad	EZ-EMC Ver.NB-03A1-01	N/A	N/A			
8	MXE EMI Receiver	Keysight	N9038A	MY57150106	May. 06, 2021			
9	Double-Ridged Waveguide Horn Antenna	ETS-Lindgren	3116C	00203919	Jul. 20, 2021			
10	Pre-Amplifier	emci	EMC184045SE	980409	Mar. 21, 2021			
11	EXA Spectrum Analyzer	Keysight	N9010A	MY56480579	Mar. 21, 2021			
12	Test Cable	emci	EMC102-KM-KM-8 00	170654	Apr. 13, 2021			
13	Test Cable	emci	Super Reliable-40G-SS11- 7000	W0030860001	Apr. 13, 2021			
14	Measurement Software	Farad	EZ-EMC Ver.NB-03A1-01	N/A	N/A			
			Bandwidth					
Item	Kind of Equipment	Manufacturer	Type No.	Serial No.	Calibrated until			
1	Spectrum Analyzer	R&S	FSP40	100626	May. 06, 2021			
					·			
Items	Kind of Emiliance (		mum Output Power	Caric Na				
Item	Kind of Equipment	Manufacturer	Type No.	Serial No.	Calibrated until			
1	Peak Power Analyze	Keysight	8990B	MY51000507	Mar. 21, 2021			
2	Wideband Power Sensor	Keysight	N9123A	MY58310003	Mar. 21, 2021			
	Antenna Conducted Spurious Emissions							

	Antenna Conducted Spurious Emissions								
Item	Item Kind of Equipment Manufacturer Type No. Serial No. Calibrated until								
1	1 Spectrum Analyzer R&S FSP40 100626 May. 06, 2021								

Power Spectral Density								
Item	Kind of Equipment	Manufacturer	Type No.	Serial No.	Calibrated until			
1 Spectrum Analyzer R&S FSP40 100626 May. 06, 2021								

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

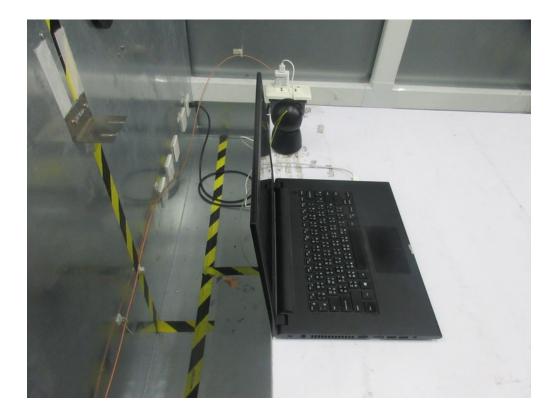
All calibration period of equipment list is one year.

**BIL** 



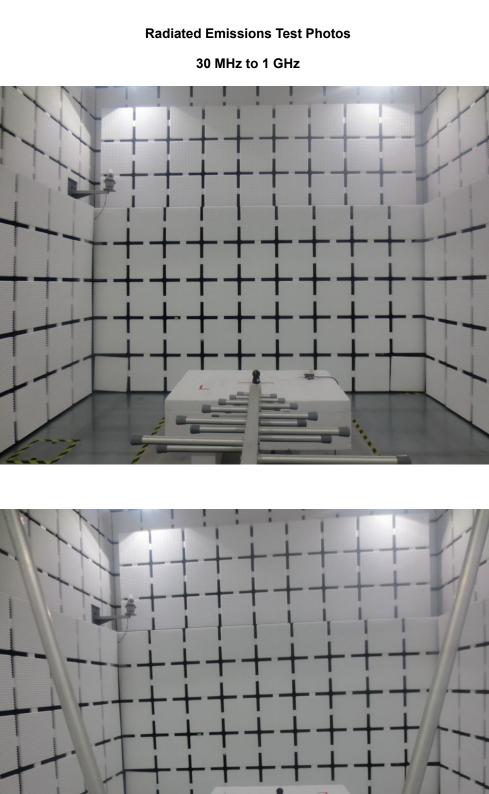
# 10. EUT TEST PHOTO

#### **Conducted Emissions Test Photos**

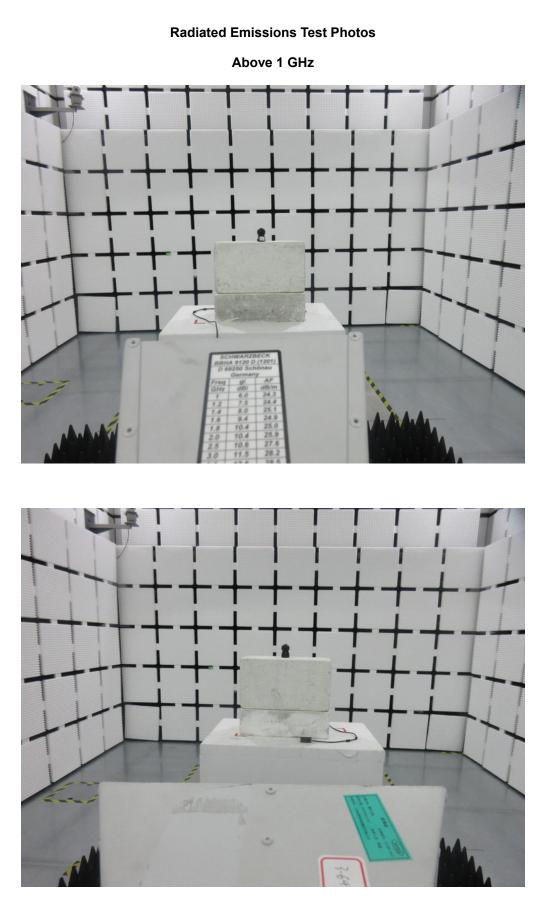








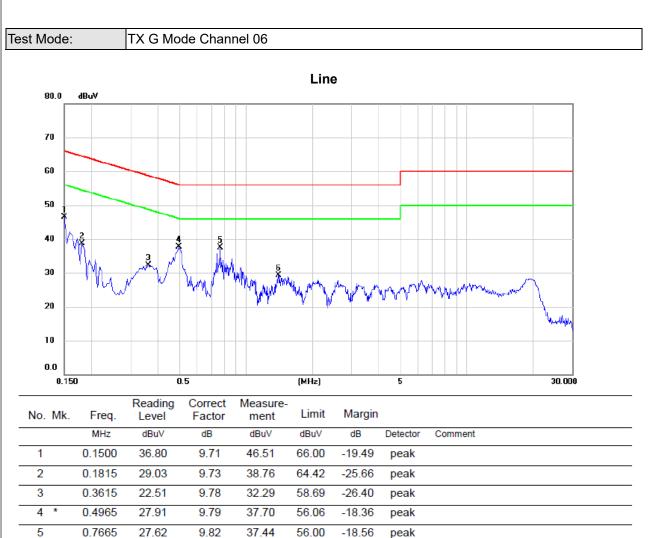






# **APPENDIX A - AC POWER LINE CONDUCTED EMISSIONS**





#### **REMARKS**:

6

1.4010

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

9.86

29.40

56.00

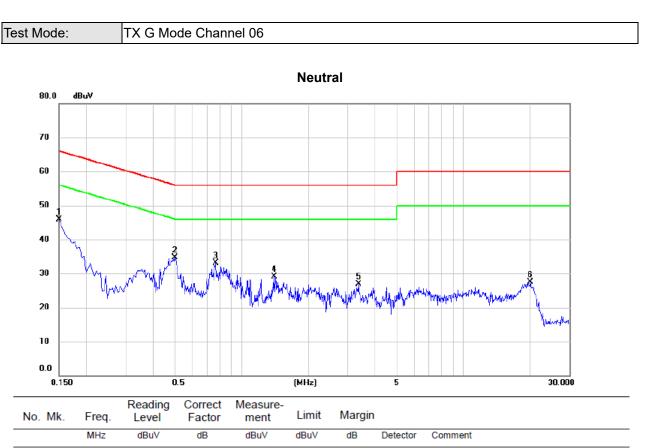
-26.60

peak

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

19.54





	MHz	dBuV	dB	dBuV	dBuV	dB	Detector	Comment
1 *	0.1500	36.30	9.68	45.98	66.00	-20.02	peak	
2	0.5010	24.95	9.77	34.72	56.00	-21.28	peak	
3	0.7665	23.28	9.81	33.09	56.00	-22.91	peak	
4	1.4010	19.22	9.84	29.06	56.00	-26.94	peak	
5	3.3630	17.04	9.96	27.00	56.00	-29.00	peak	
6	20.0040	16.88	10.57	27.45	60.00	-32.55	peak	

#### **REMARKS**:

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



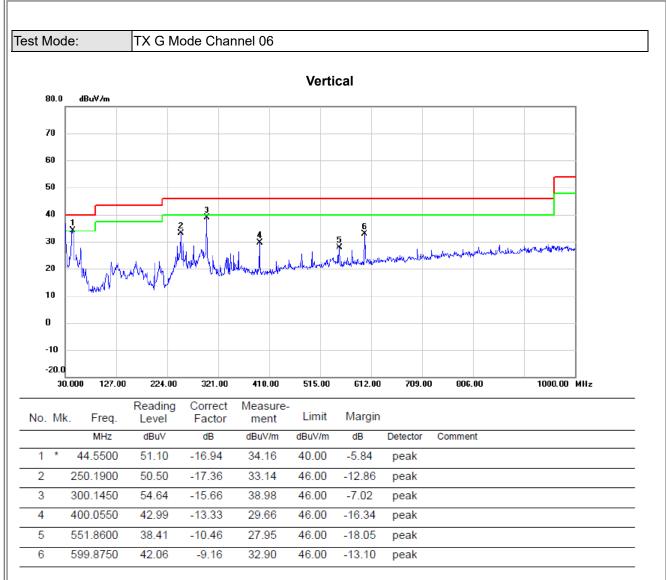
# **APPENDIX B - RADIATED EMISSION - 9 KHZ TO 30 MHZ**

Note: The measured value have enough margin over 20dB than the limit, therefore they are not reported.



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

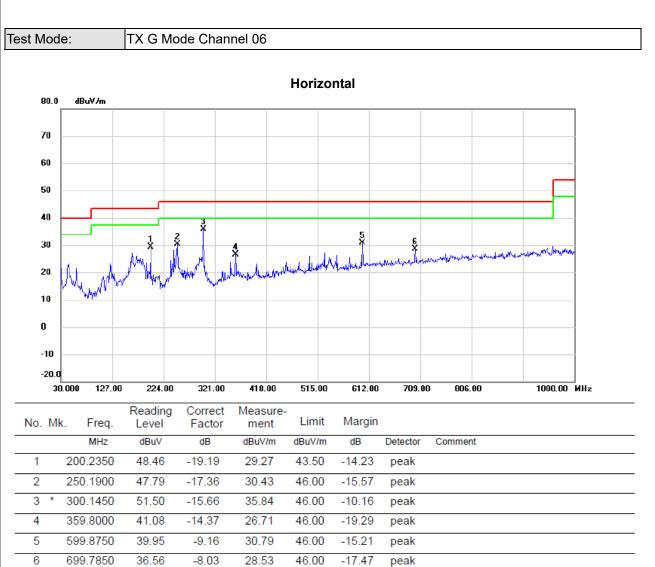
# **BIL**



#### **REMARKS**:

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





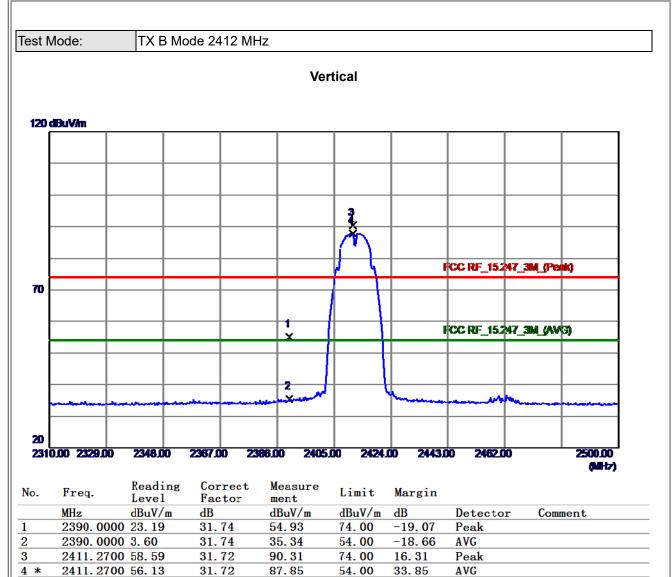
#### REMARKS:

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



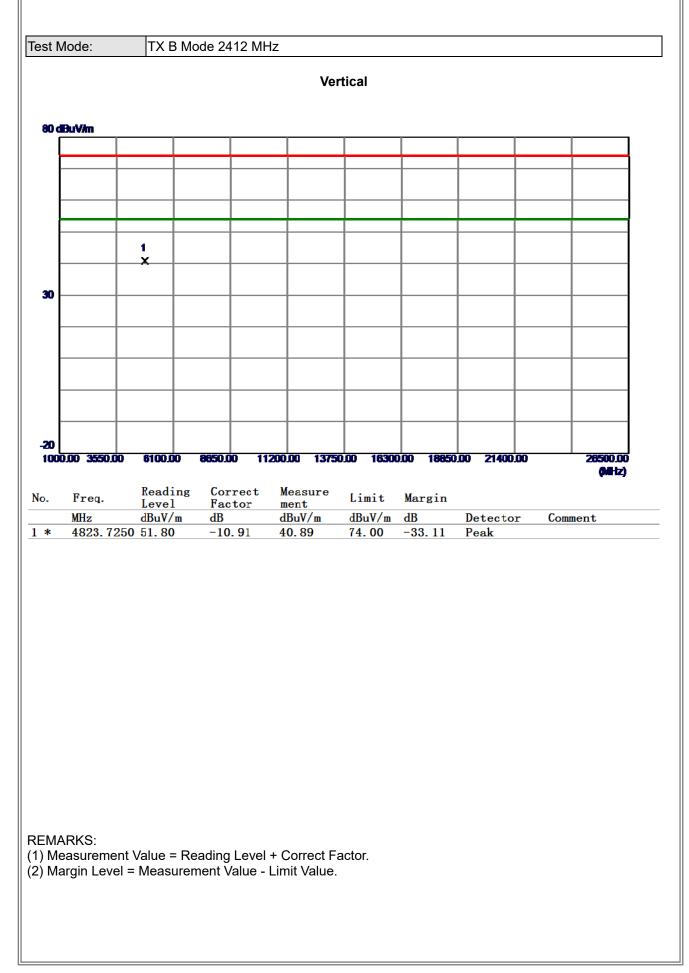
## **APPENDIX D - RADIATED EMISSION- ABOVE 1000 MHZ**



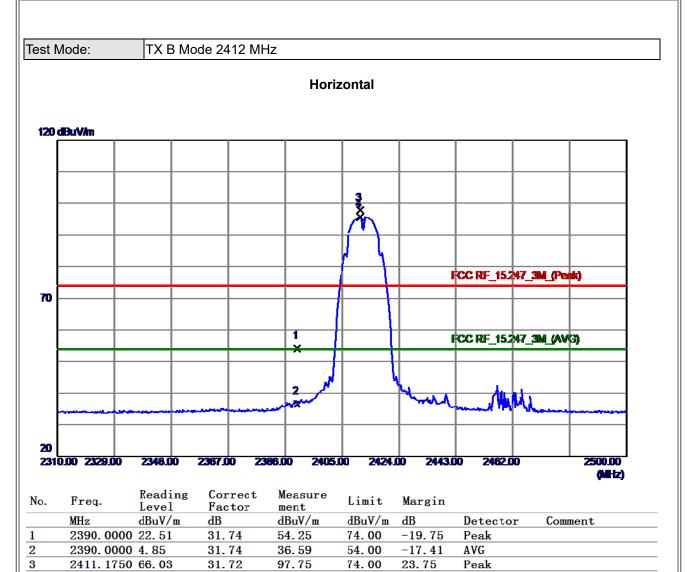


- (1) Measurement Value = Reading Level + Correct Factor.
- (2) Margin Level = Measurement Value Limit Value.









4 \*

2411.1750 63.94

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

31.72

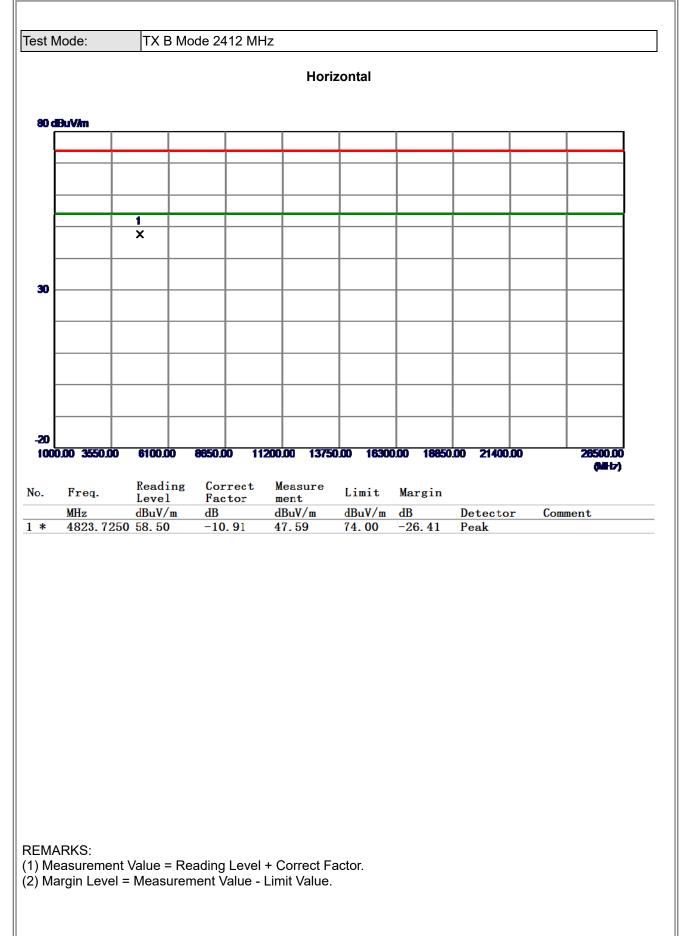
95.66

54. **00** 

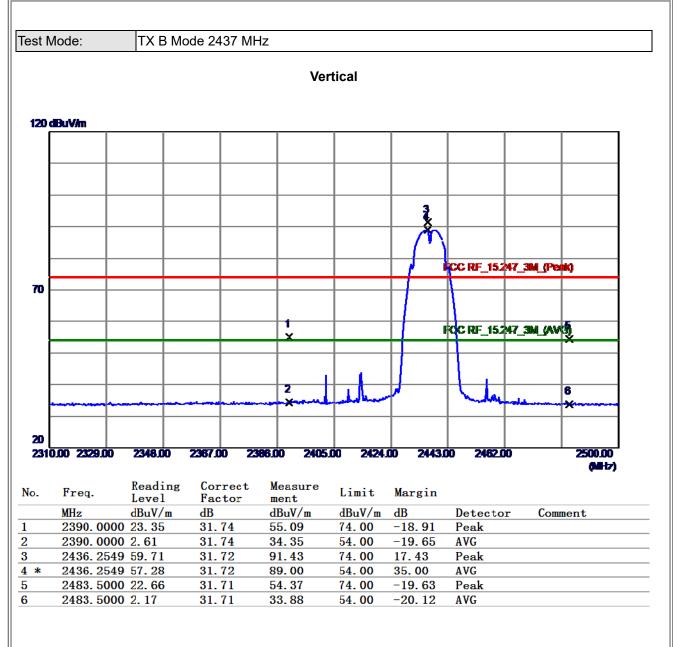
41.66

AVG



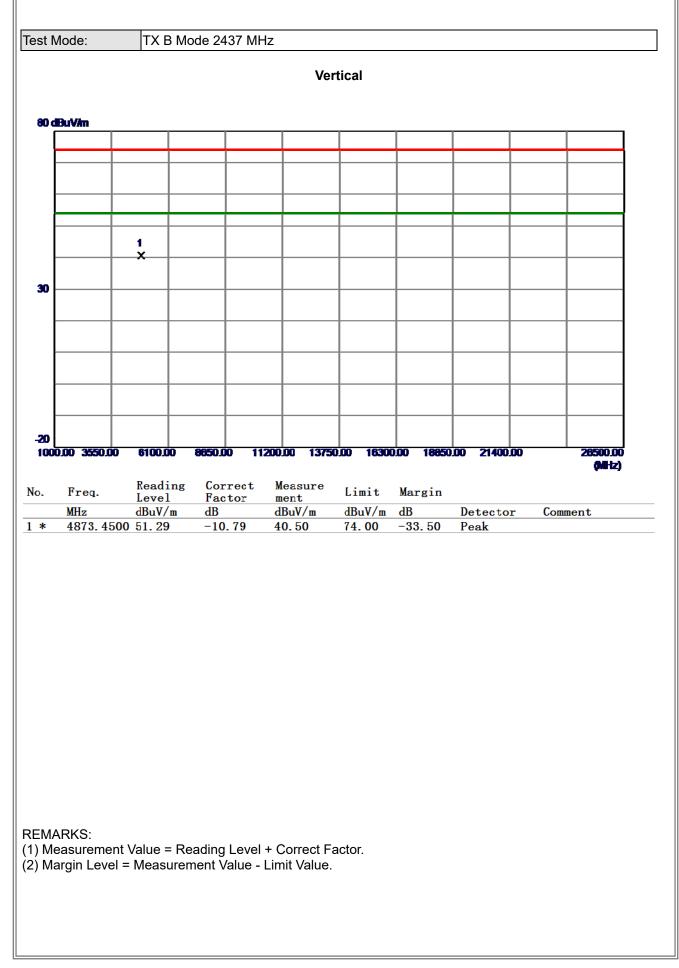




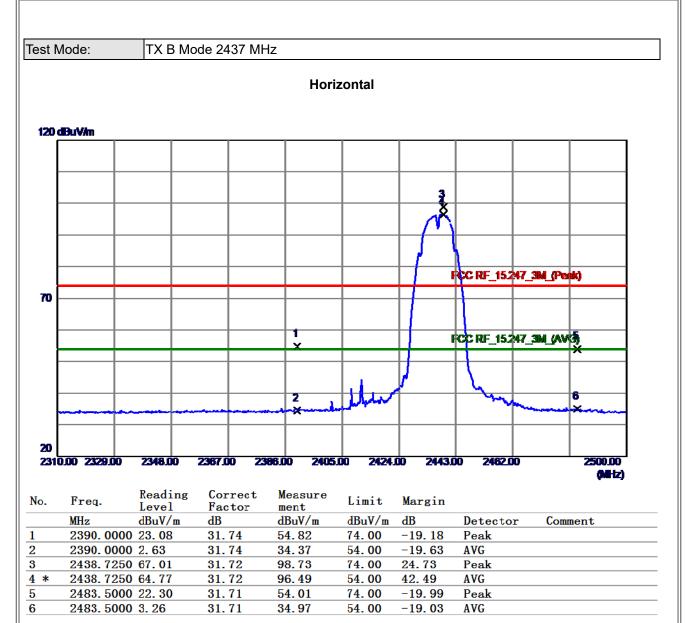


- (1) Measurement Value = Reading Level + Correct Factor.
- (2) Margin Level = Measurement Value Limit Value.



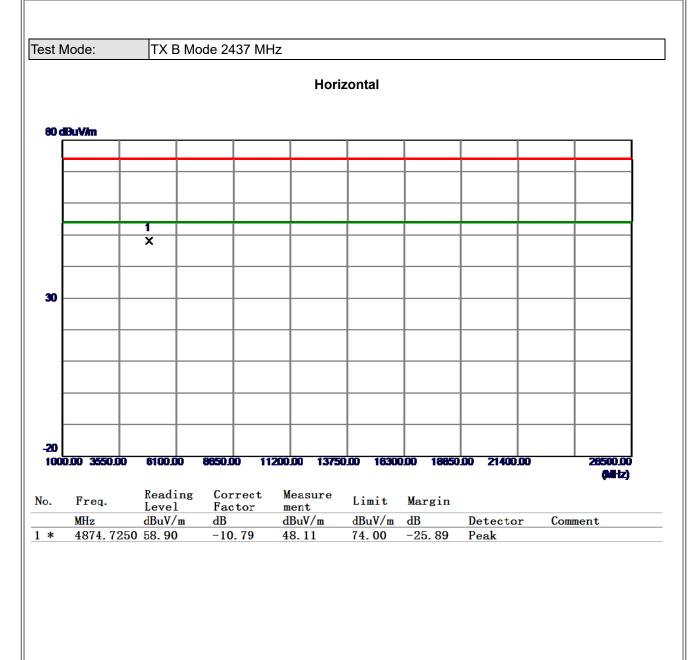






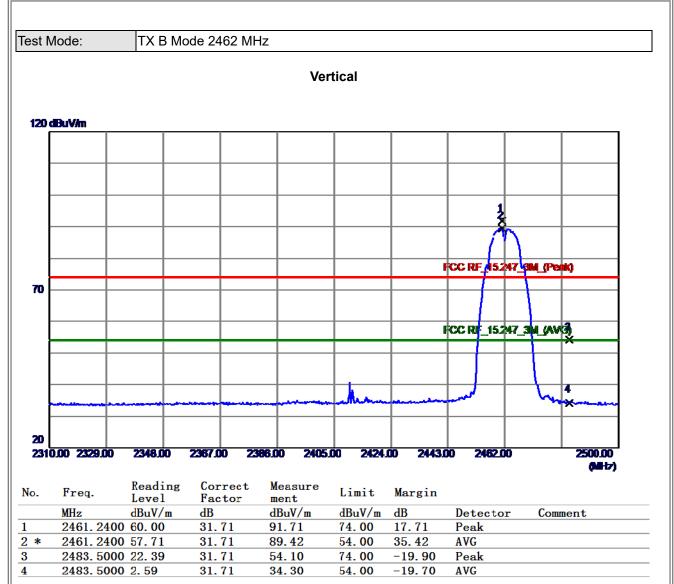
(1) Measurement Value = Reading Level + Correct Factor.





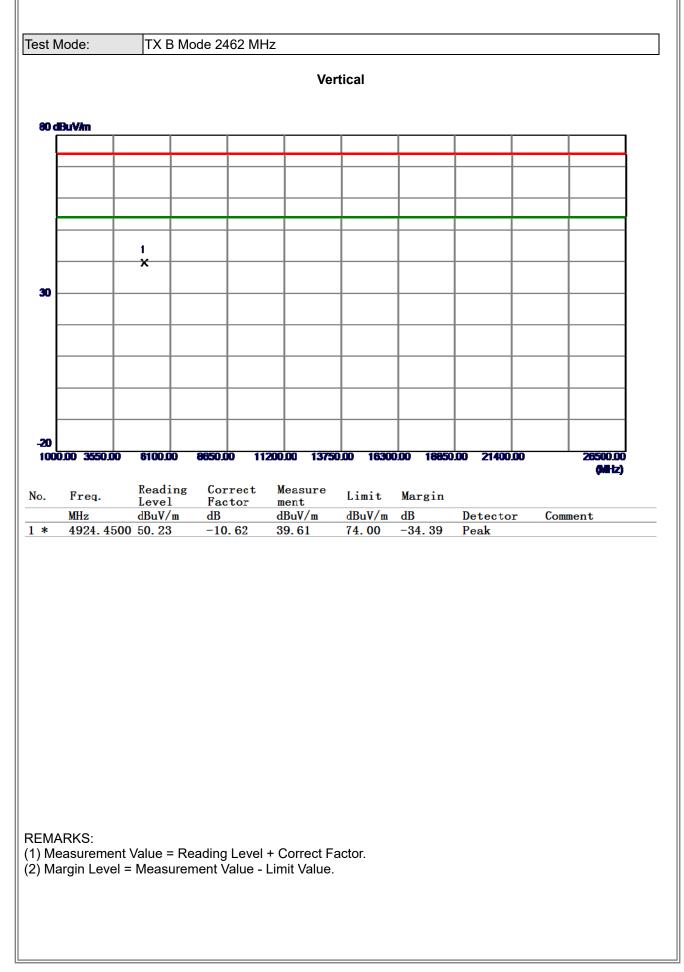
(1) Measurement Value = Reading Level + Correct Factor.



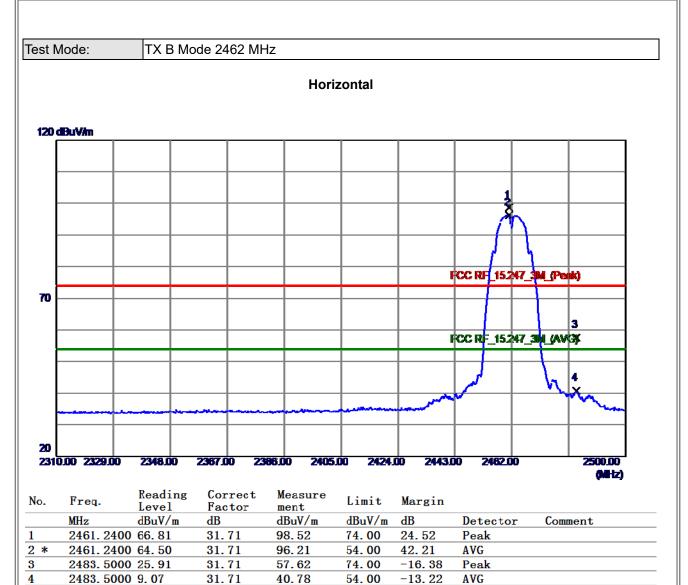


(1) Measurement Value = Reading Level + Correct Factor.









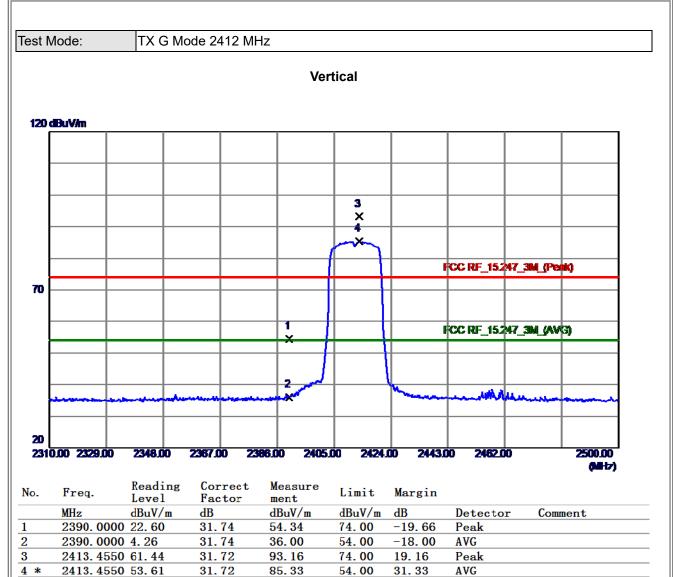
(1) Measurement Value = Reading Level + Correct Factor.





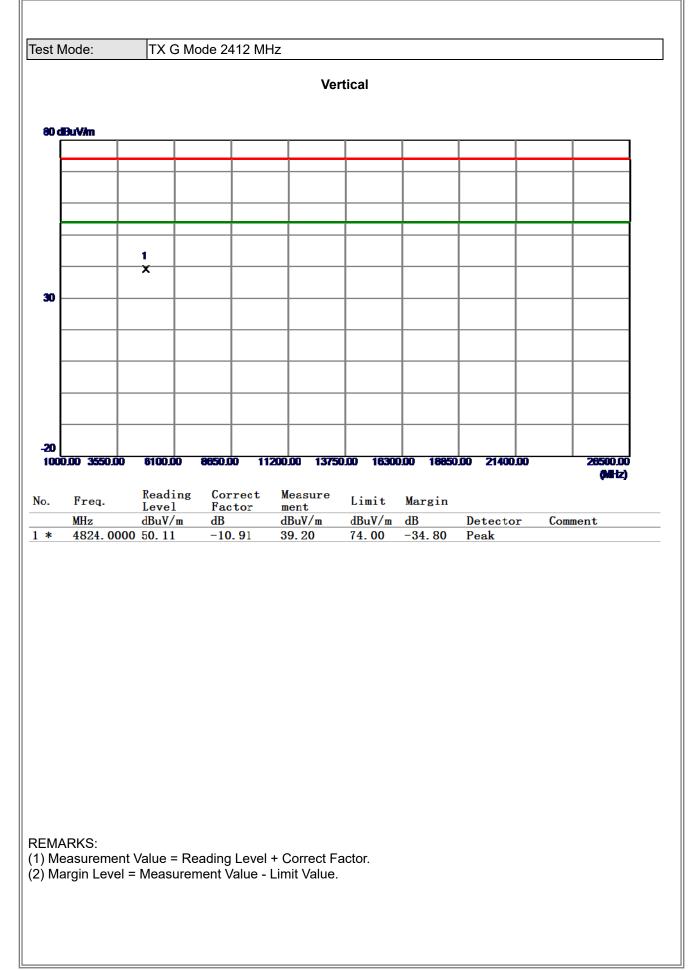
(1) Measurement Value = Reading Level + Correct Factor.



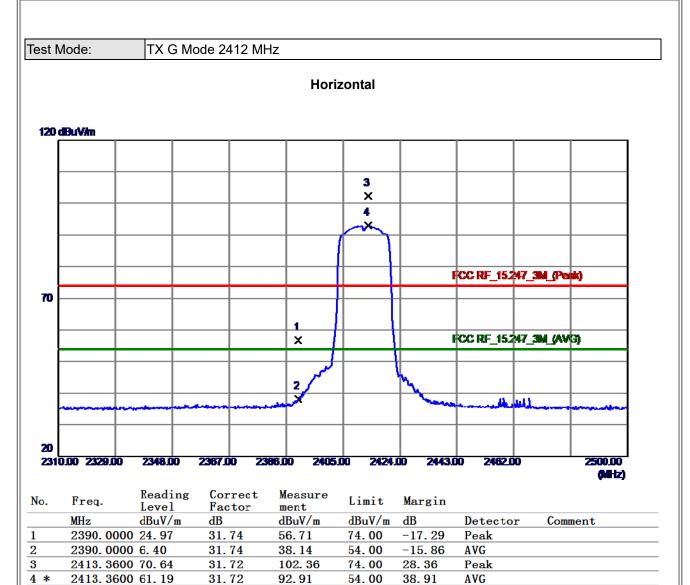


(1) Measurement Value = Reading Level + Correct Factor.



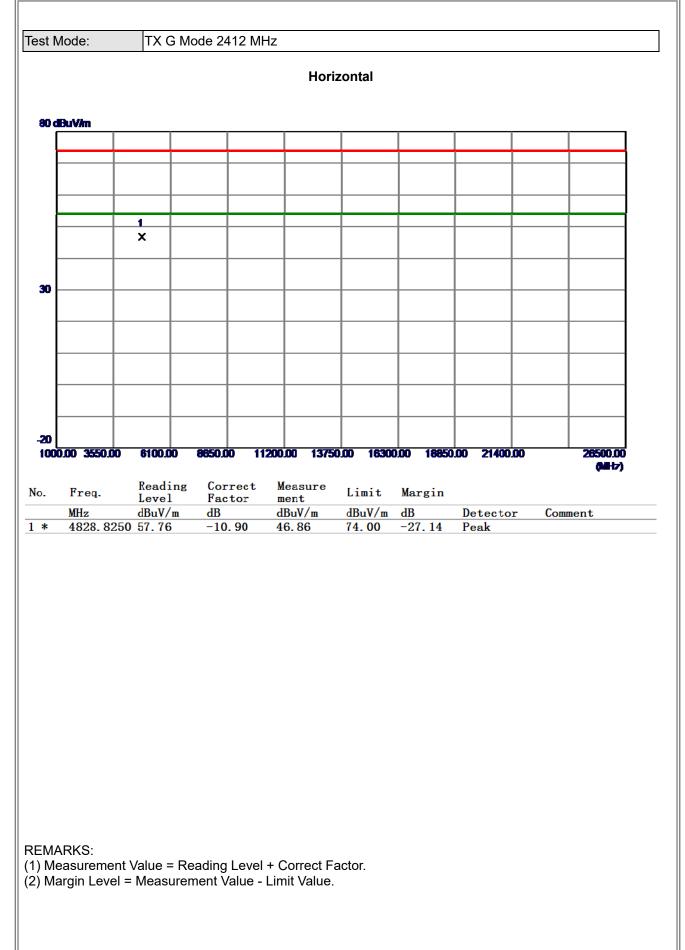




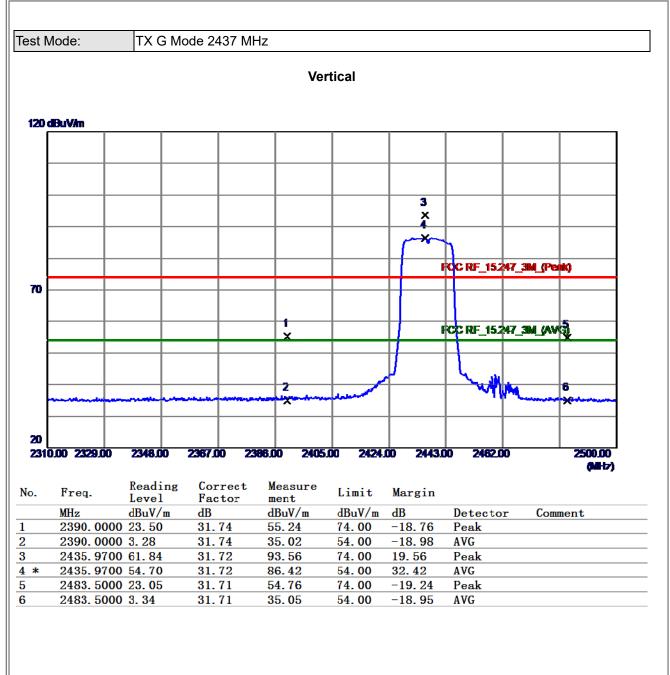


(1) Measurement Value = Reading Level + Correct Factor.



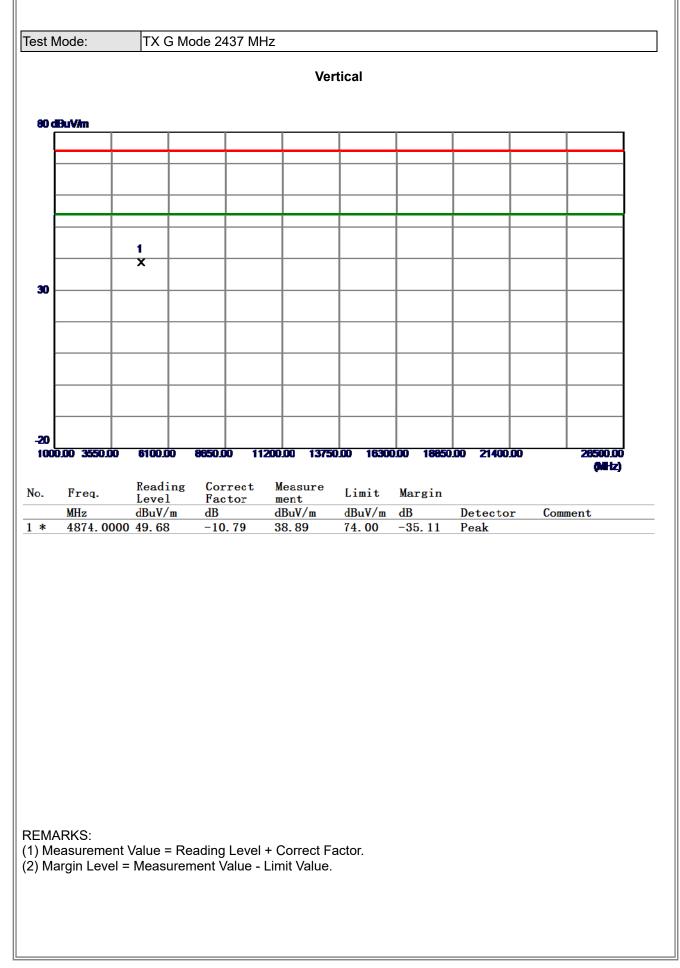




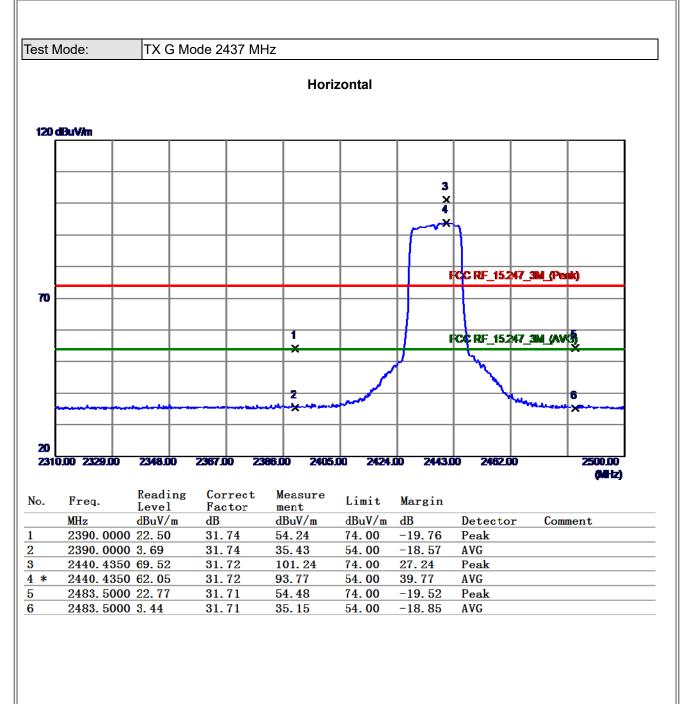


- (1) Measurement Value = Reading Level + Correct Factor.
- (2) Margin Level = Measurement Value Limit Value.



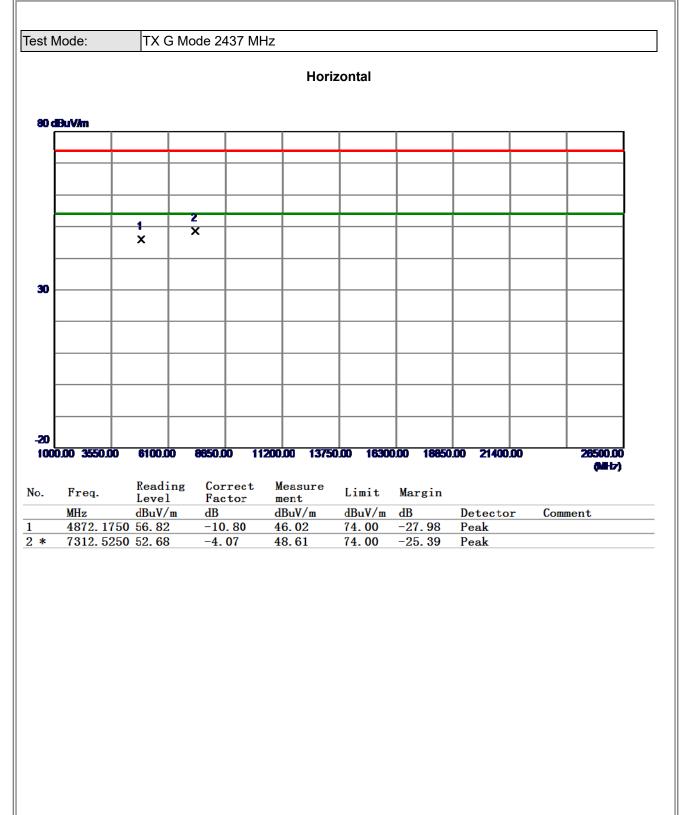






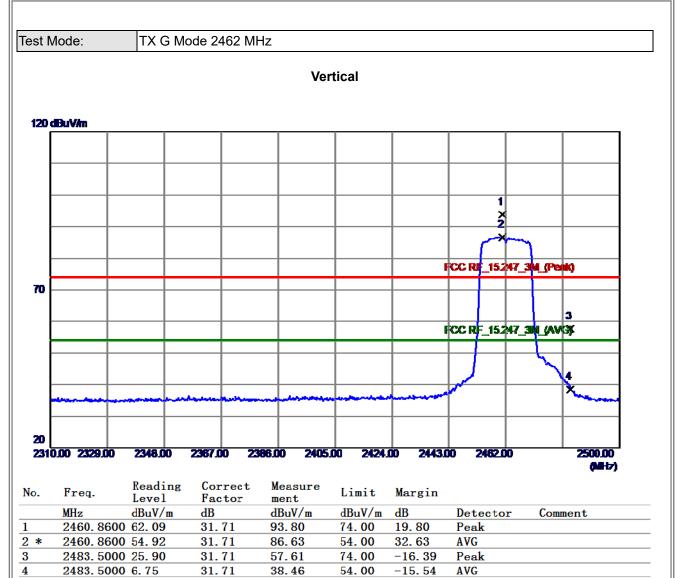
(1) Measurement Value = Reading Level + Correct Factor.





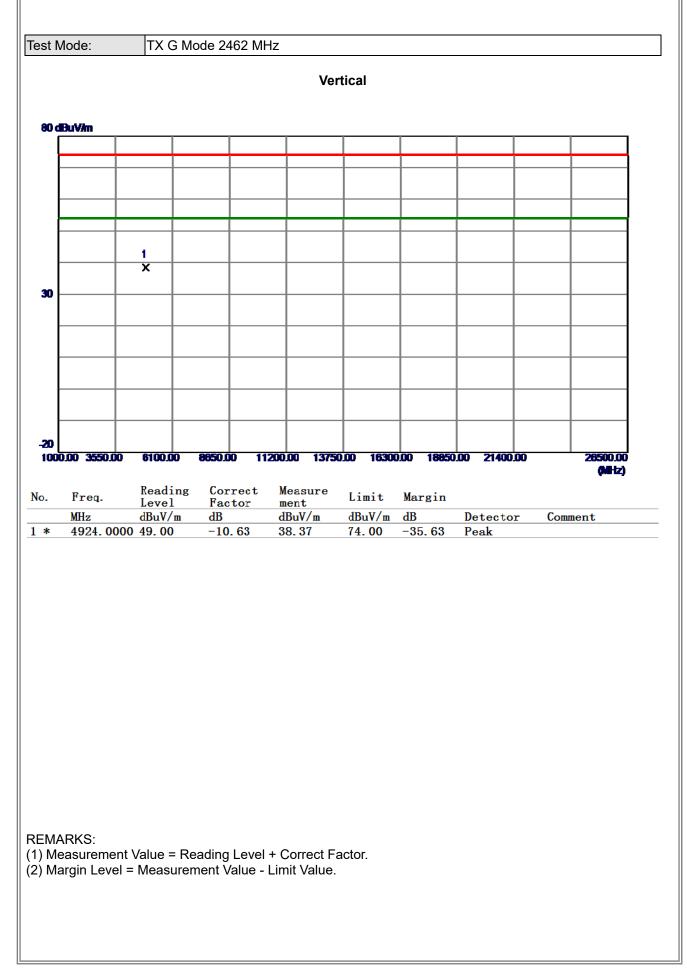
(1) Measurement Value = Reading Level + Correct Factor.



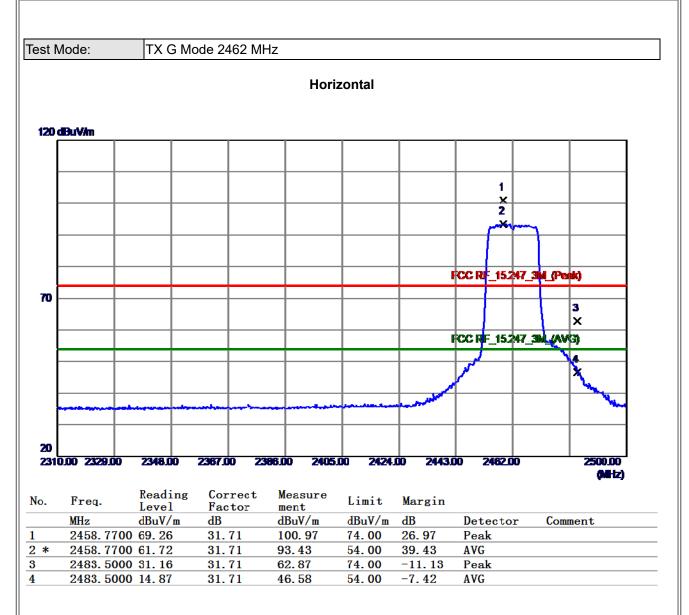


- (1) Measurement Value = Reading Level + Correct Factor.
- (2) Margin Level = Measurement Value Limit Value.









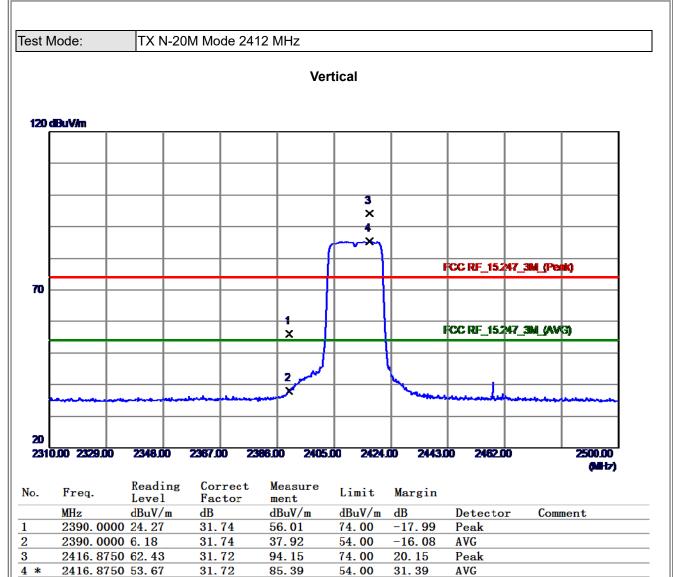
(1) Measurement Value = Reading Level + Correct Factor.





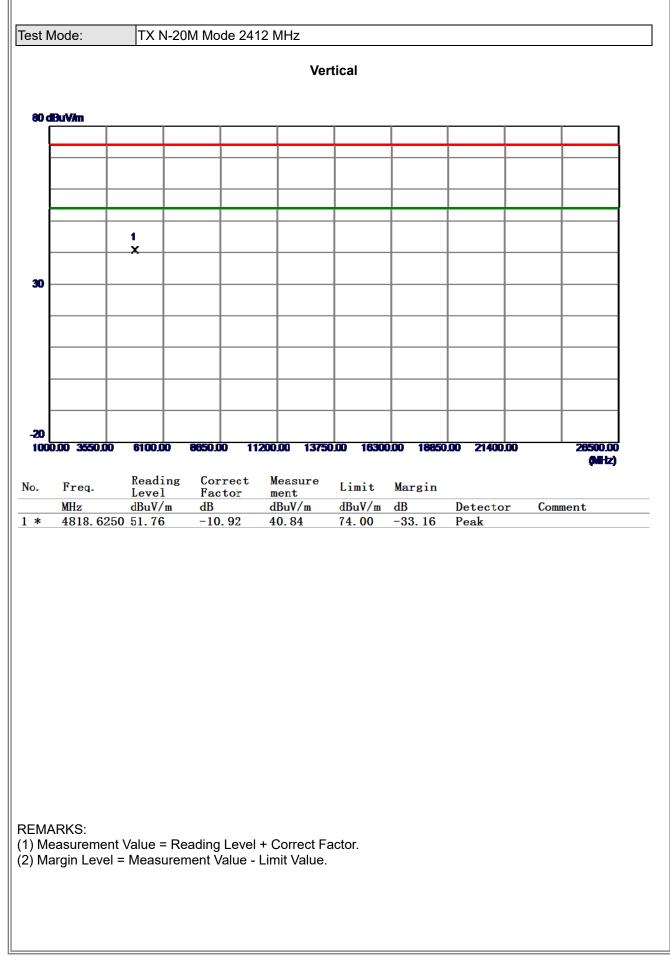
(1) Measurement Value = Reading Level + Correct Factor.



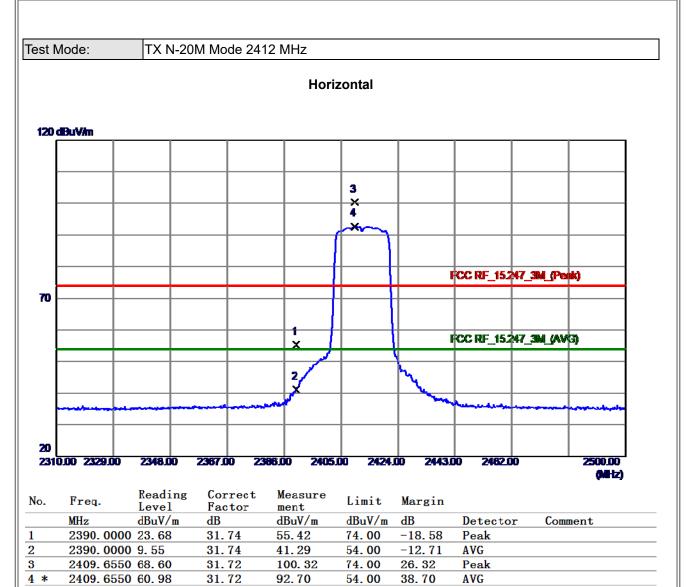


- (1) Measurement Value = Reading Level + Correct Factor.
- (2) Margin Level = Measurement Value Limit Value.



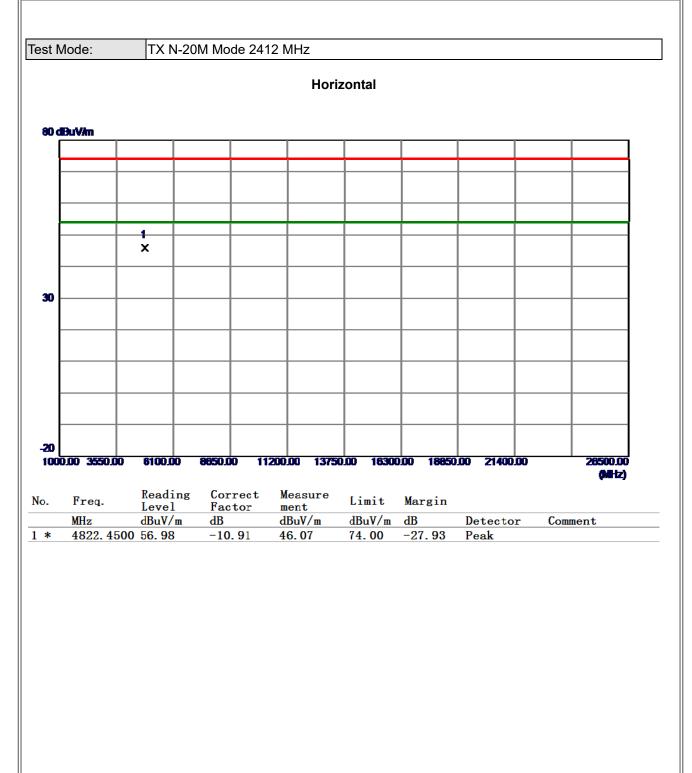






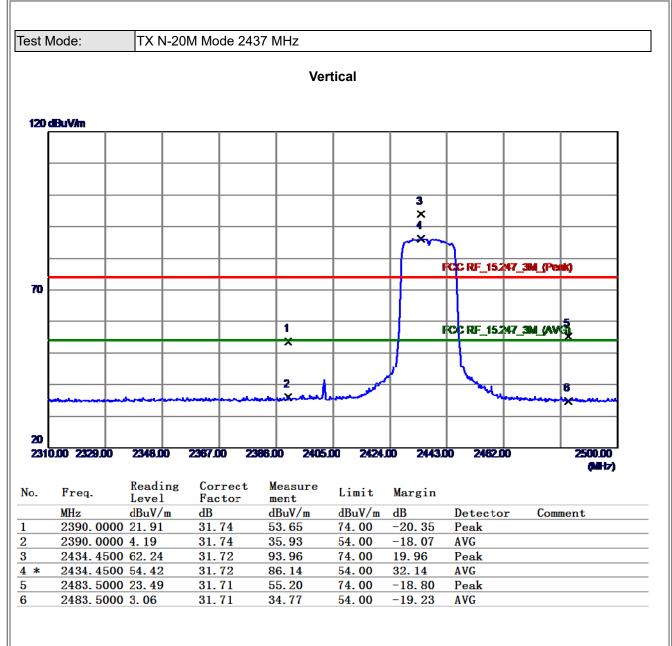
(1) Measurement Value = Reading Level + Correct Factor.





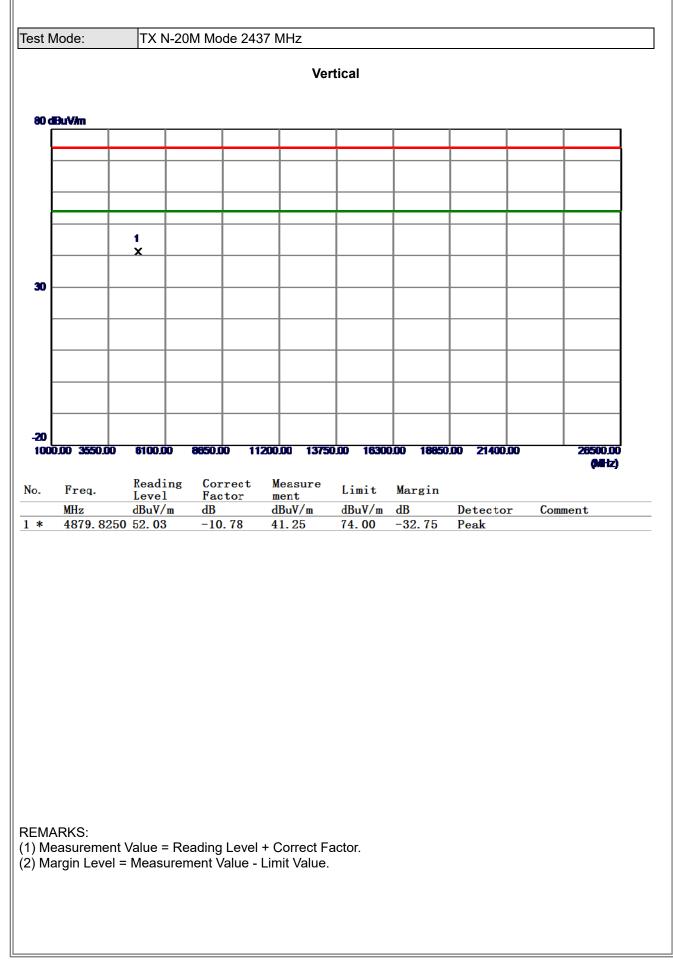
(1) Measurement Value = Reading Level + Correct Factor.



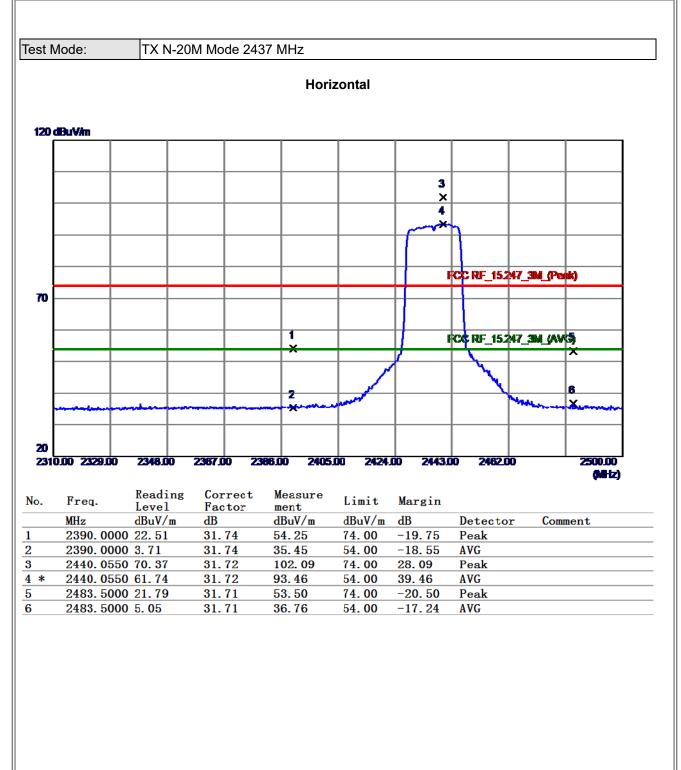


- (1) Measurement Value = Reading Level + Correct Factor.
- (2) Margin Level = Measurement Value Limit Value.



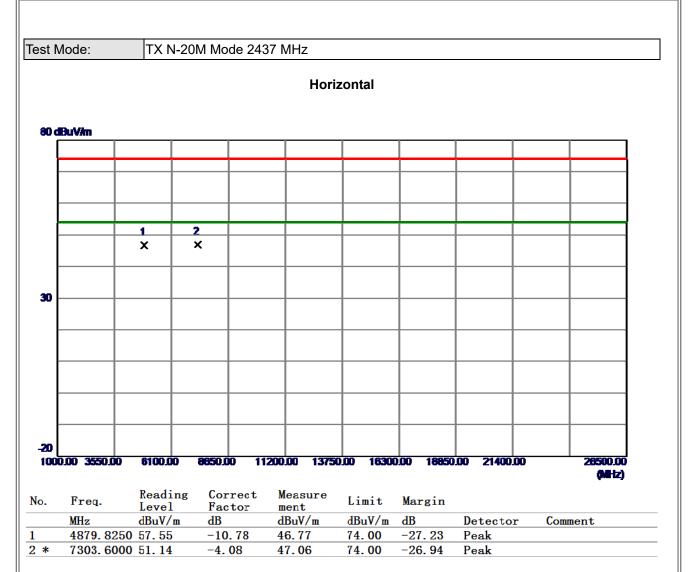






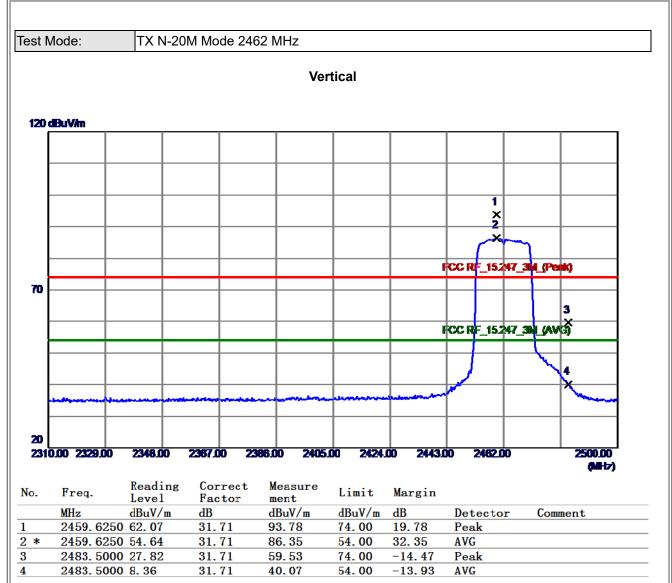
(1) Measurement Value = Reading Level + Correct Factor.





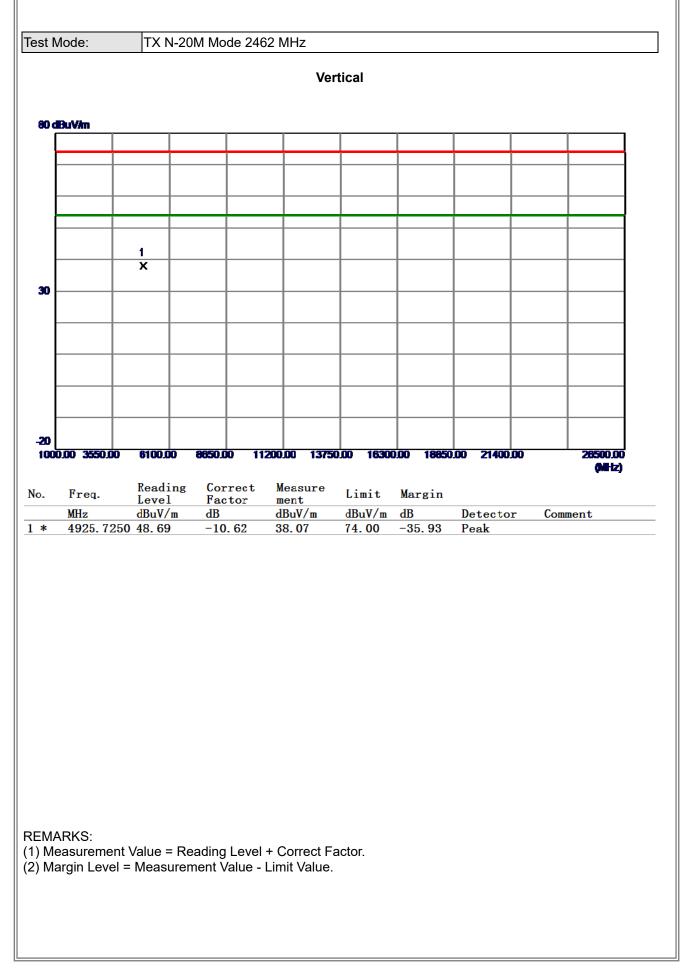
(1) Measurement Value = Reading Level + Correct Factor.



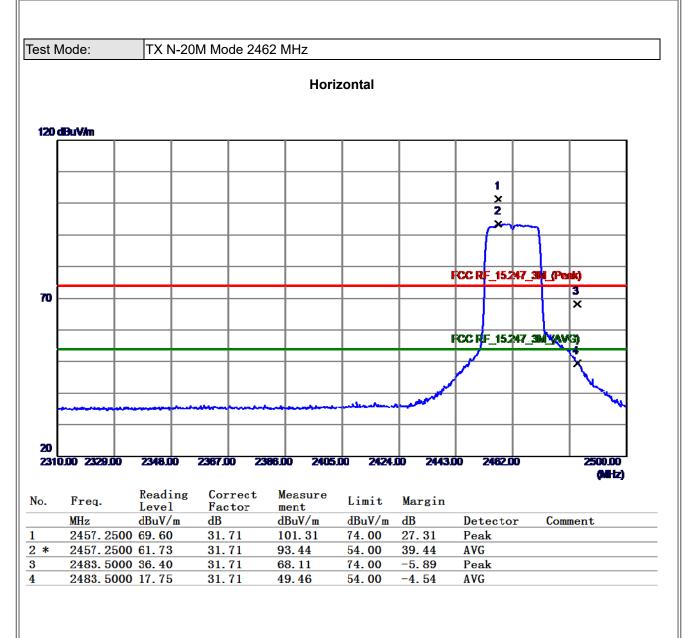


- (1) Measurement Value = Reading Level + Correct Factor.
- (2) Margin Level = Measurement Value Limit Value.









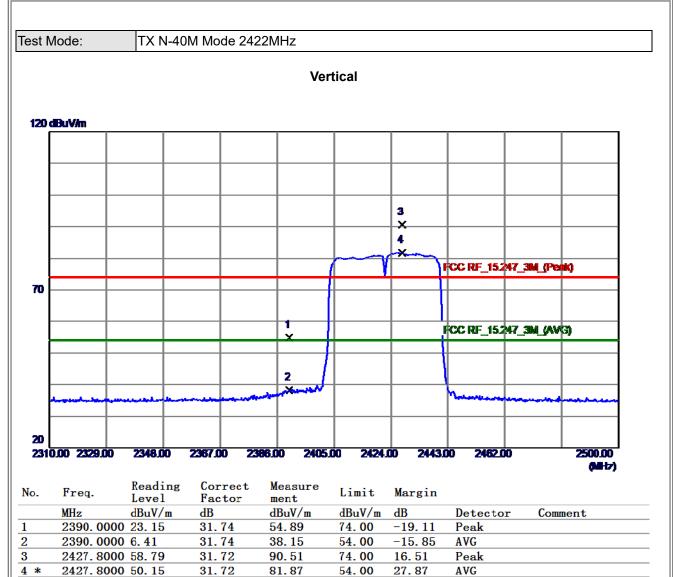
(1) Measurement Value = Reading Level + Correct Factor.





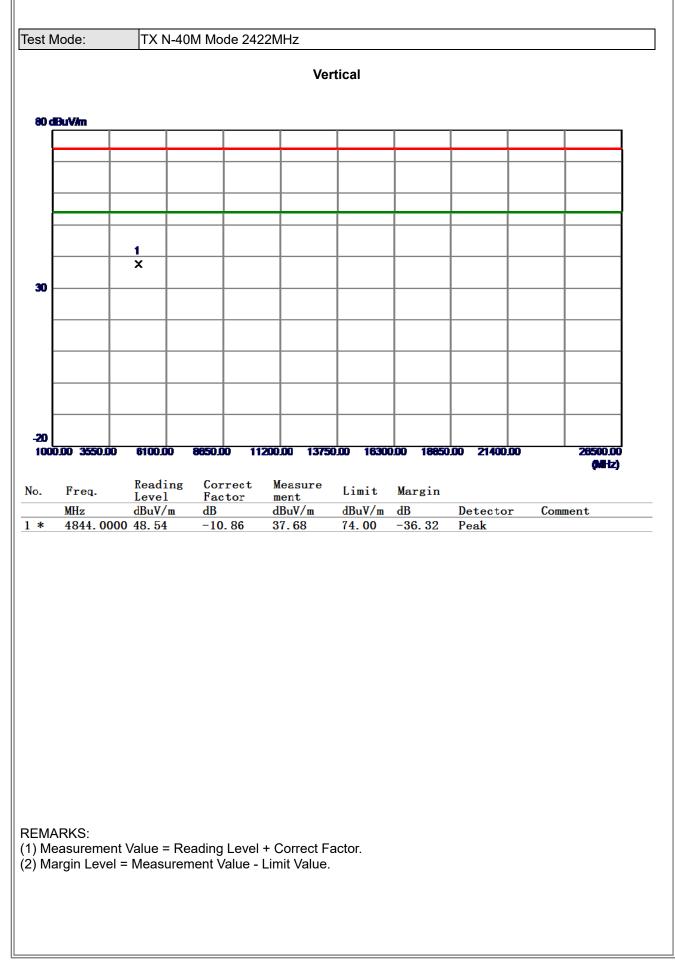
(1) Measurement Value = Reading Level + Correct Factor.



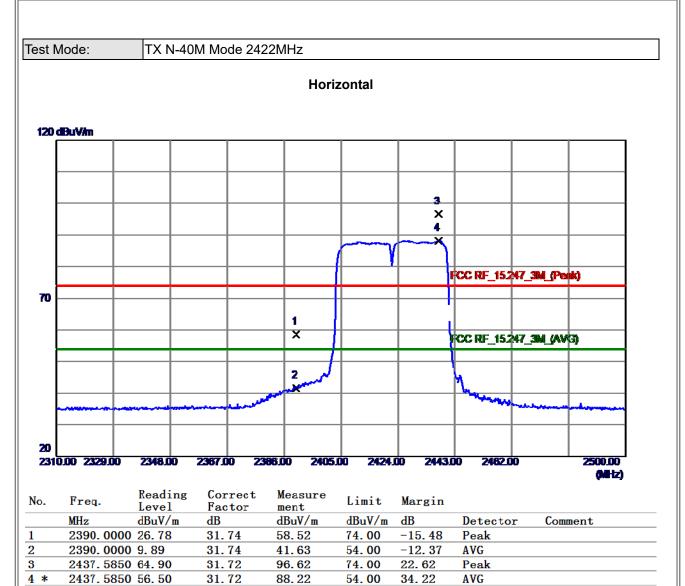


(1) Measurement Value = Reading Level + Correct Factor.



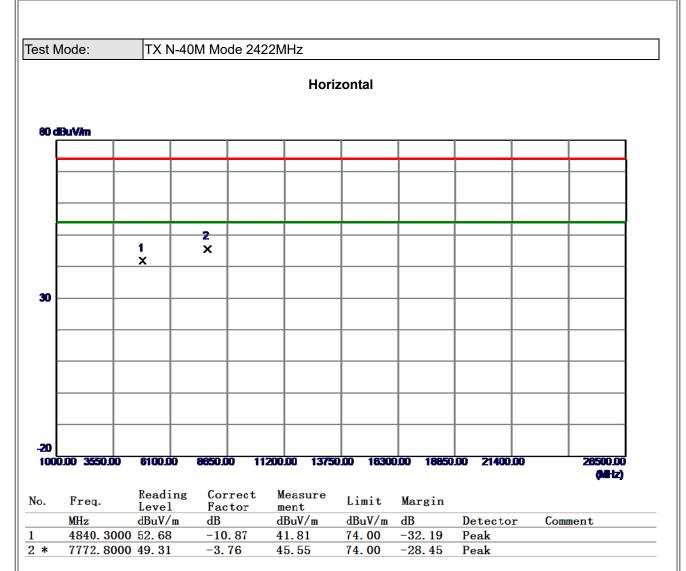






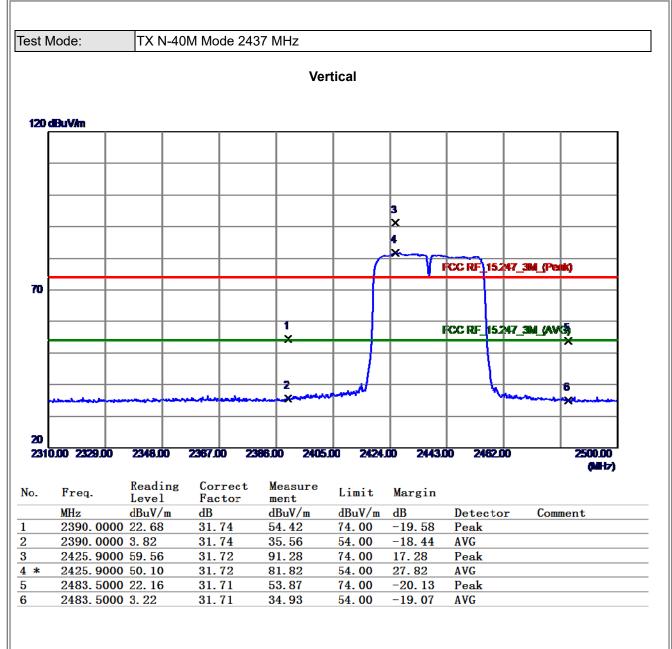
(1) Measurement Value = Reading Level + Correct Factor.





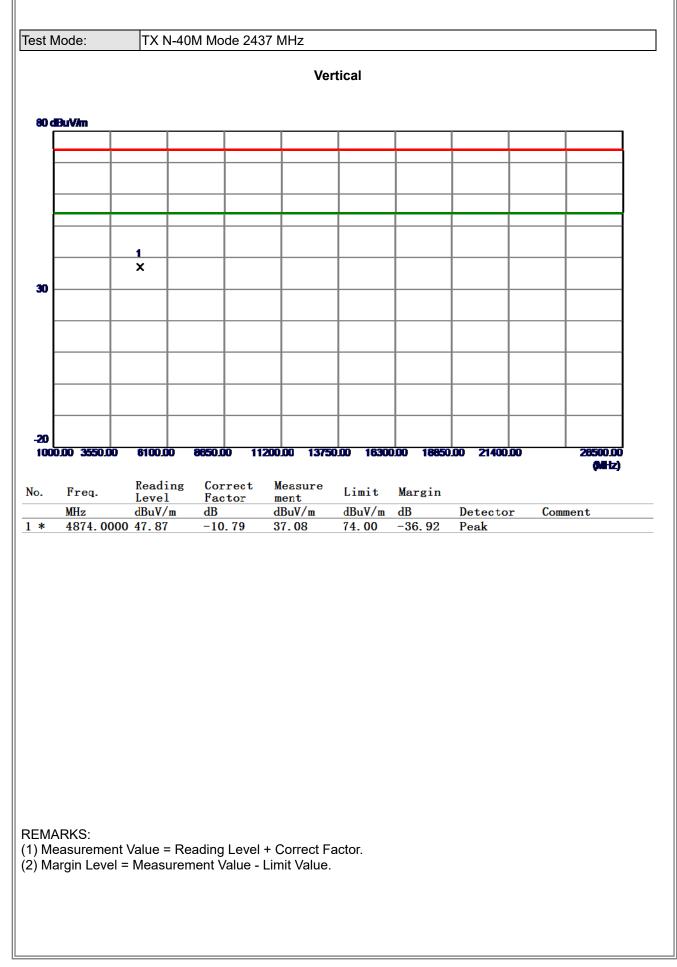
(1) Measurement Value = Reading Level + Correct Factor.



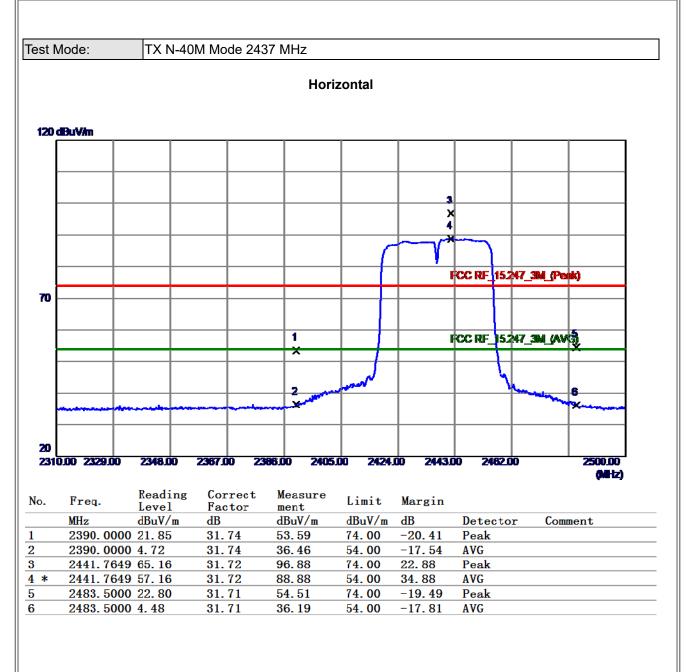


- (1) Measurement Value = Reading Level + Correct Factor.
- (2) Margin Level = Measurement Value Limit Value.



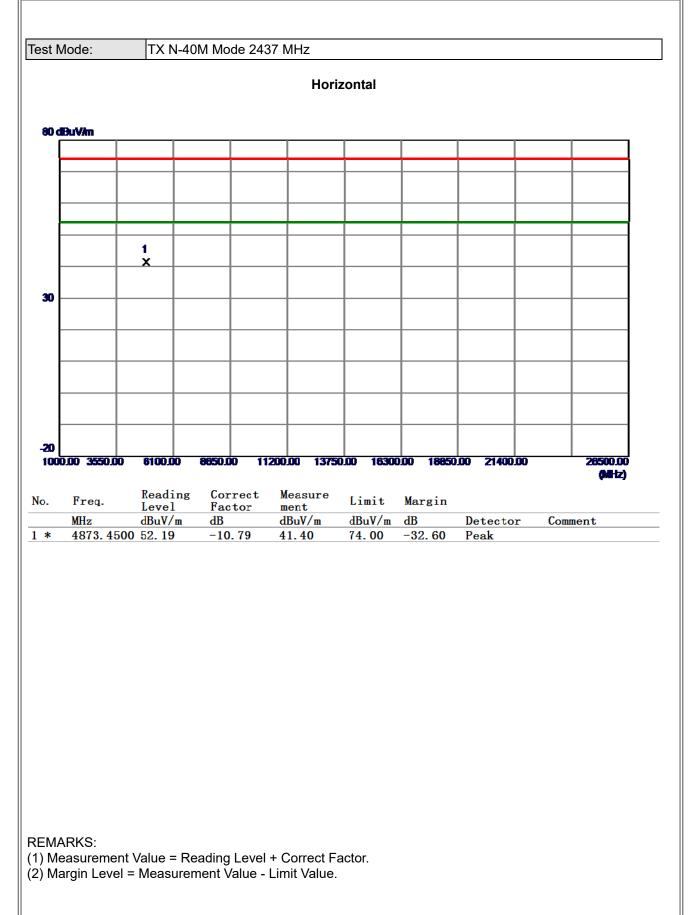




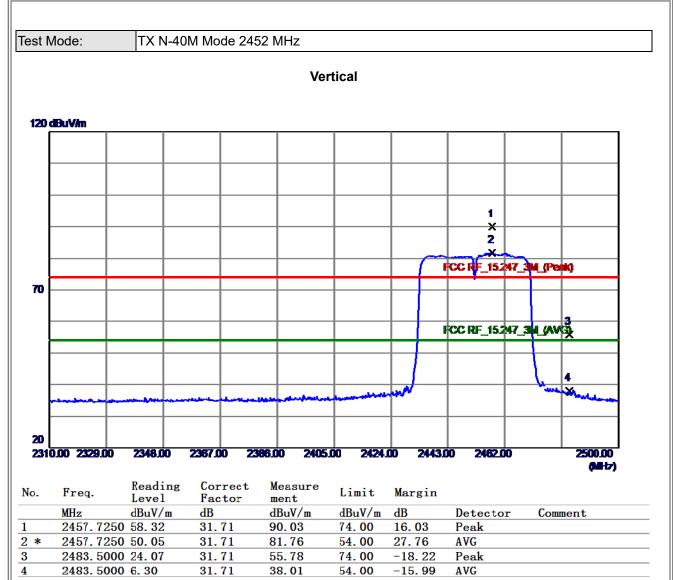


(1) Measurement Value = Reading Level + Correct Factor.



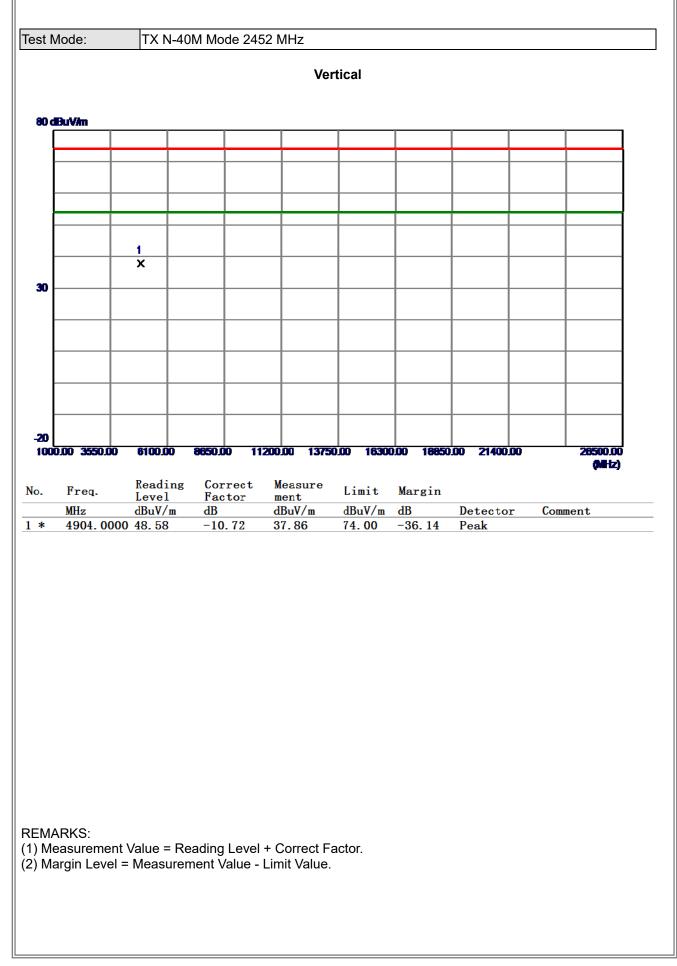




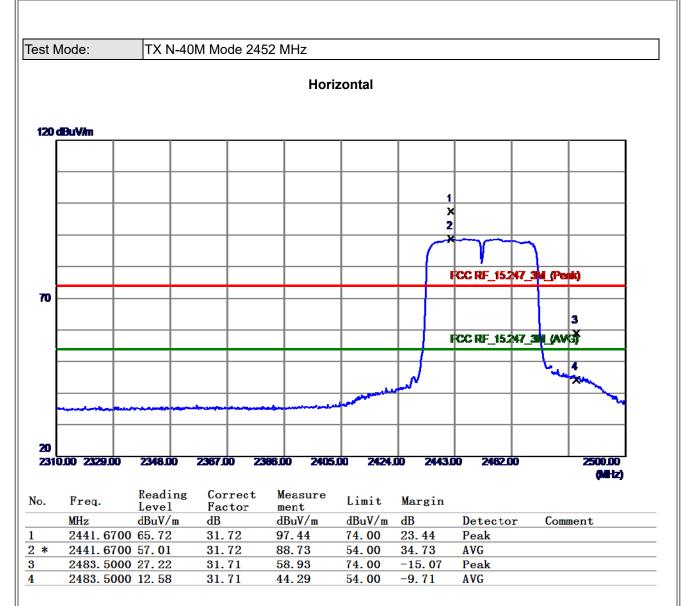


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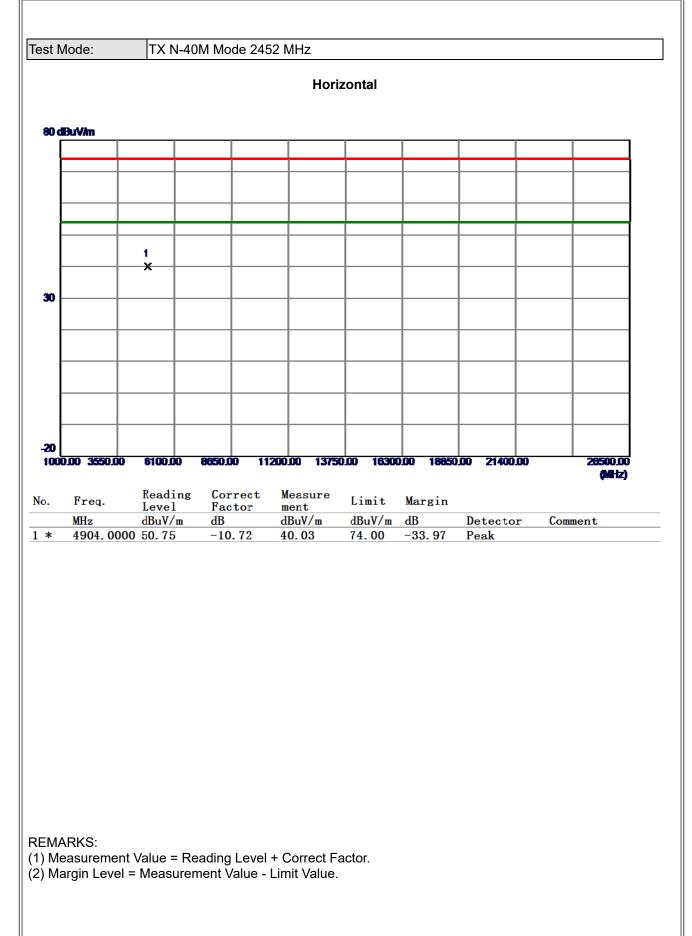






(1) Measurement Value = Reading Level + Correct Factor.







## **APPENDIX E - BANDWIDTH**



Test Mode	TX B Mode			
Channel	Frequency (MHz)	6 dB Bandwidth (MHz)	6 dB Bandwidth Min. Limit (kHz)	Result
01	2412	10.07	500	Complies
06	2437	9.56	500	Complies
11	2462	9.32	500	Complies





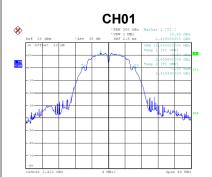


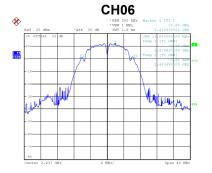
Date: 7.NOV.2020 16:14:46

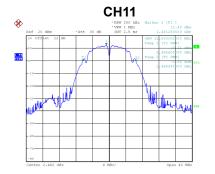
Date: 7.NOV.2020 16:16:39

Date: 7.NOV.2020 16:19:26

Channel	Frequency (MHz)	99 % Emission Bandwidth (MHz)	Result
01	2412	12.88	Complies
06	2437	12.88	Complies
11	2462	12.88	Complies







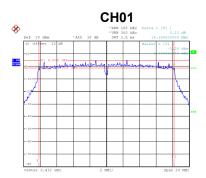
Date: 7.NOV.2020 16:14:52

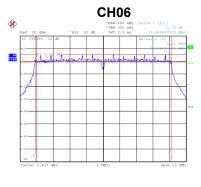
Date: 7.NOV.2020 16:16:46

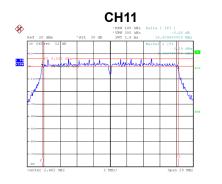
Date: 7.NOV.2020 16:19:33



Test Mode	TX G Mode			
Channel	Frequency (MHz)	6 dB Bandwidth (MHz)	6 dB Bandwidth Min. Limit (kHz)	Result
01	2412	16.34	500	Complies
06	2437	16.41	500	Complies
11	2462	16.41	500	Complies





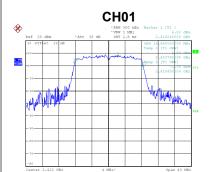


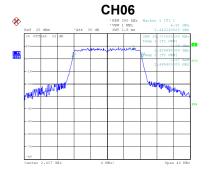
Date: 7.NOV.2020 16:26:17

Date: 7.NOV.2020 16:31:27

Date: 7.NOV.2020 17:59:04

Channel	Frequency (MHz)	99 % Emission Bandwidth (MHz)	Result
01	2412	16.64	Complies
06	2437	16.72	Complies
11	2462	16.72	Complies







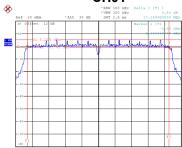
Date: 7.NOV.2020 16:26:24

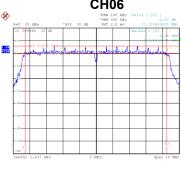
Date: 7.NOV.2020 16:31:34

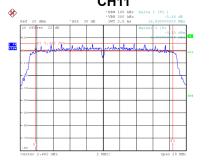
Date: 7.NOV.2020 17:59:11



Test Mode	TX N-20M Mode			
Channel	Frequency (MHz)	6 dB Bandwidth (MHz)	6 dB Bandwidth Min. Limit (kHz)	Result
01	2412	17.16	500	Complies
06	2437	17.11	500	Complies
11	2462	16.59	500	Complies
*20 Fef 20 diles *Att 30 dile 57 20 Offthet 12 dile	DW JOX ANZ 10,1595000 MHz WT 2.5 ms 17.1595000 MHz Harker 1 (T - 0.59) GHz		-	CH11 ***********************************

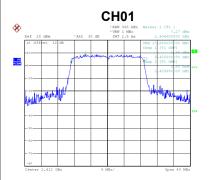




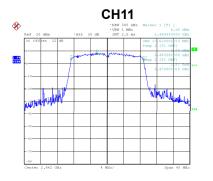


Date: 7.NOV.2020 18:00:35

Channel	Frequency (MHz)	99 % Emission Bandwidth (MHz)	Result
01	2412	17.68	Complies
06	2437	17.68	Complies
11	2462	17.52	Complies



CH06 **%** 1 1 PK VIEW UNANA ANT dild



Date: 7.NOV.2020 18:00:41

Date: 7.NOV.2020 18:26:56

Date: 7.NOV.2020 18:26:49

Date: 7.NOV.2020 20:04:11

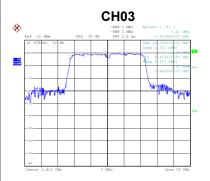
Date: 7.NOV.2020 20:04:04

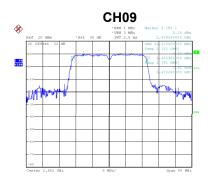


Test Mode	TX N-40M Mode			
		1		
Channel	Frequency (MHz)	6 dB Bandwidth (MHz)	6 dB Bandwidth Min. Limit (kHz)	Result
03	2422	35.27	500	Complies
06	2437	35.75	500	Complies
09	2452	35.28	500	Complies
Ref 20 dBm *Att 30 dB	H03 RMV 100 kHz Deita 1 [Ti ] VMV 100 kHz -2-30 dB SMT 5 ms 35.26996000 MHz		1 [T1 ] 0.22 dB 5.75000000 MHz Ref 20 dBm *Att 30 dB	*RBM 100 KHr Delta 1 [T1 ] *VBM 300 KHr 1.04 dB SWT 5 me 55.279910000 KHr
10 0.62 (0 + 1, 12) (00)   10 0.62 (0 + 1, 12) (00)   10 1   10 1   10 1   10 1   10 1   10 1   10 1   10 1   10 1   10 1   10 1   10 1   10 1   10 1   10 1   10 1   10 1   10 1   10 1   11 1   12 1   13 1   14 1   15 1   16 1   17 1		Image: State of the s		

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Channel	Frequency (MHz)	99 % Emission Bandwidth (MHz)	Result
03	2422	36.32	Complies
06	2437	36.32	Complies
09	2452	36.32	Complies





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## **APPENDIX F - MAXIMUM OUTPUT POWER**



Test Mode

TX B Mode

Channel	Frequency (MHz)	Peak Output Power (dBm)	Max. Limit (W)	Result
01	2412	21.91	1.0000	Complies
06	2437	22.22	1.0000	Complies
11	2462	21.97	1.0000	Complies

Test Mode TX G Mode

Channel	Frequency (MHz)	Peak Output Power (dBm)	Max. Limit (W)	Result
01	2412	24.72	1.0000	Complies
06	2437	25.07	1.0000	Complies
11	2462	24.96	1.0000	Complies

Test Mode TX N-20M Mode

Channel	Frequency (MHz)	Peak Output Power (dBm)	Max. Limit (W)	Result
01	2412	24.92	1.0000	Complies
06	2437	24.96	1.0000	Complies
11	2462	24.81	1.0000	Complies

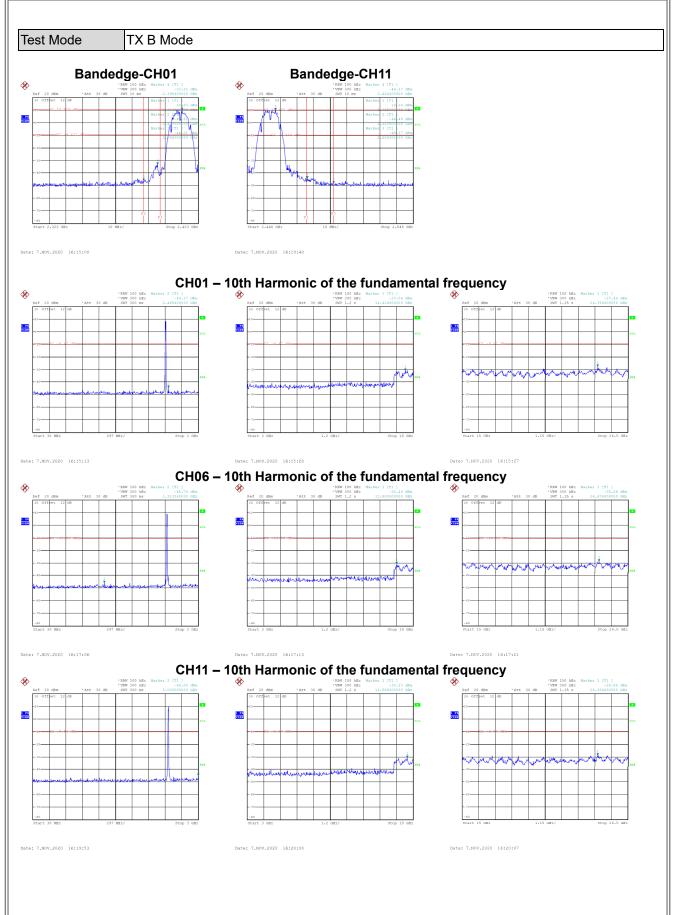
Test Mode TX N-40M Mode

Channel	Frequency (MHz)	Peak Output Power (dBm)	Max. Limit (W)	Result
03	2422	24.77	1.0000	Complies
06	2437	24.65	1.0000	Complies
09	2452	24.62	1.0000	Complies

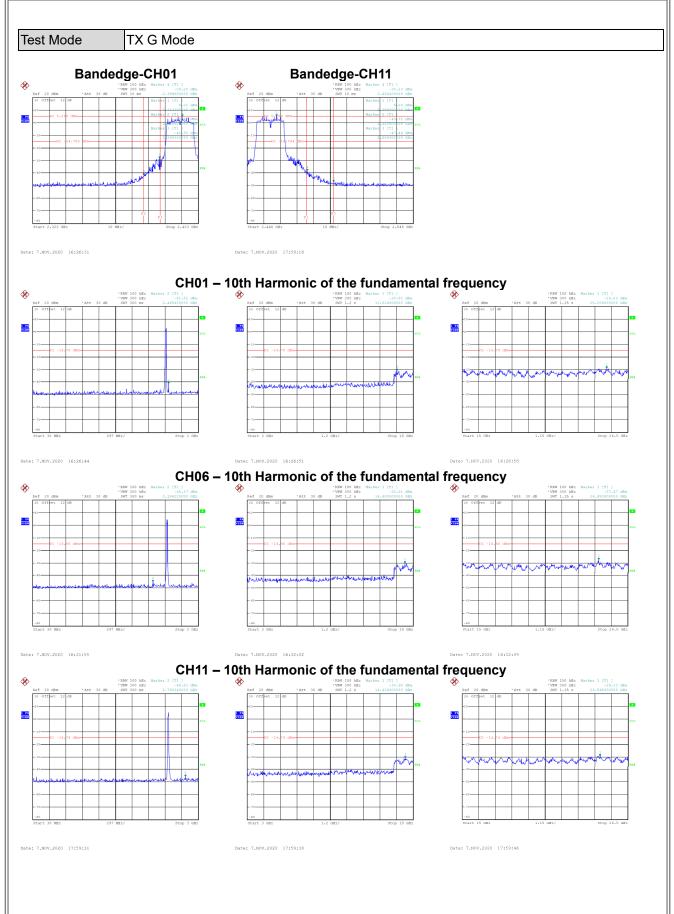


## **APPENDIX G - CONDUCTED SPURIOUS EMISSIONS**

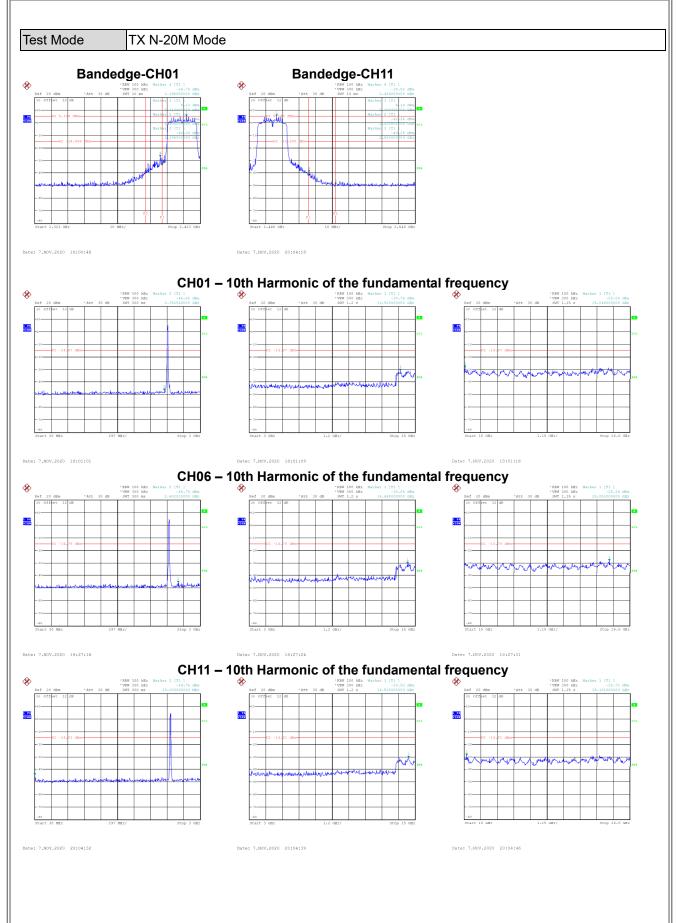




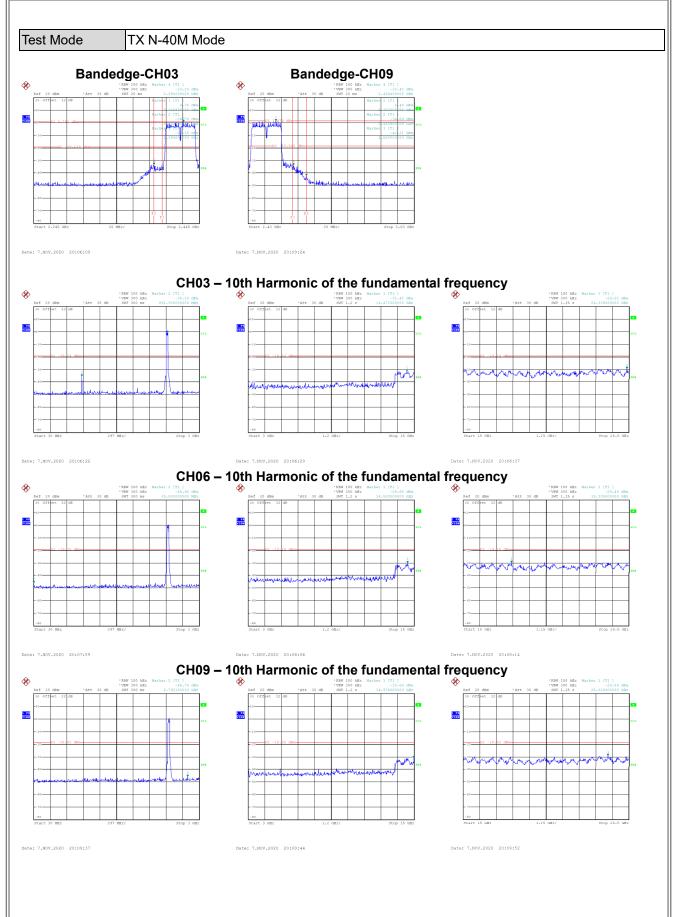










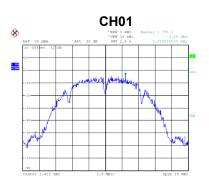




## **APPENDIX H - POWER SPECTRAL DENSITY**



Test Mode TX B Mode				
Channel	Frequency (MHz)	Power Spectral Density (dBm/3kHz)	Max. Limit (dBm/3kHz)	Result
01	2412	-3.69	8	Complies
06	2437	-4.60	8	Complies
11	2462	-2.92	8	Complies





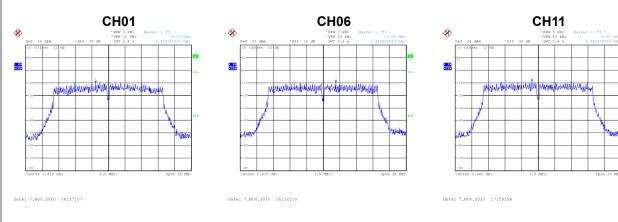


Test Mode

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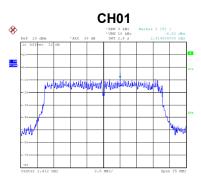
TX G Mode

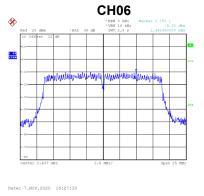
Channel	Frequency (MHz)	Power Spectral Density (dBm/3kHz)	Max. Limit (dBm/3kHz)	Result
01	2412	-9.84	8	Complies
06	2437	-9.56	8	Complies
11	2462	-8.63	8	Complies

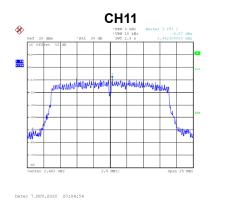




Test Mode	TX N-20M Mode			
Channel	Frequency (MHz)	Power Spectral Density (dBm/3kHz)	Max. Limit (dBm/3kHz)	Result
01	2412	-8.52	8	Complies
06	2437	-9.30	8	Complies
11	2462	-8.57	8	Complies







Test Mode

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TX N-40M Mode

Channel	Frequency (MHz)	Power Spectral Density (dBm/3kHz)	Max. Limit (dBm/3kHz)	Result
03	2422	-14.08	8	Complies
06	2437	-12.89	8	Complies
09	2452	-13.30	8	Complies

