

FCC Radio Test Report

FCC ID: VYVBW1352-PCIE

This report concerns: Original Grant

Project No. Equipment Brand Name Test Model Series Model Applicant		2-PCIE hnology Corp.
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Date of Receipt	Jun. 26,	2019
Date of Test	Jun. 27,	2019 ~ Nov. 05, 2019
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Report Version	R02	
Test Sample	Enginee	ring Sample No.: DG201908301
Standard(s)	ANSI CO FCC KE	rt15, Subpart C (15.247) 53.10-2013 0B 558074 D01 DTS Meas Guidance v05r02 0B 662911 D01 Multiple Transmitter Output v02r01

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

Rose.Lin

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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.



Table of Contents	Page
REPORT ISSUED HISTORY	6
1. SUMMARY OF TEST RESULTS	7
1.1 TEST FACILITY	-
1.1 TEST FACILITY 1.2 MEASUREMENT UNCERTAINTY	8 8
1.3 TEST ENVIRONMENT CONDITIONS	8
	-
2. GENERAL INFORMATION	9
2.1 GENERAL DESCRIPTION OF EUT	9
2.2 DESCRIPTION OF TEST MODES 2.3 PARAMETERS OF TEST SOFTWARE	11 12
2.4 DUTY CYCLE	12
2.4 DOTT CTCLE 2.5 BLOCK DIAGRAM SHOWING THE CONFIGURATION OF SYSTEM TESTED	
2.6 SUPPORT UNITS	14
3. AC POWER LINE CONDUCTED EMISSIONS TEST	15
3.1 LIMIT	15
3.2 TEST PROCEDURE	15
3.3 DEVIATION FROM TEST STANDARD	15
3.4 TEST SETUP	16
3.5 EUT OPERATION CONDITIONS	16
3.6 TEST RESULTS	16
4 . RADIATED EMISSIONS TEST	17
4.1 LIMIT	17
4.2 TEST PROCEDURE	18
4.3 DEVIATION FROM TEST STANDARD	18
4.4 TEST SETUP	19
4.5 EUT OPERATION CONDITIONS	20
4.6 TEST RESULTS – 9 KHZ TO 30 MHZ	20
4.7 TEST RESULTS – 30 MHZ TO 1000 MHZ	20
4.8 TEST RESULTS – ABOVE 1000 MHZ	20
5 . BANDWIDTH TEST	21
5.1 LIMIT	21
5.2 TEST PROCEDURE	21
5.3 DEVIATION FROM STANDARD	21
5.4 TEST SETUP	21



Table of Contents	Page
5.5 EUT OPERATION CONDITIONS	21
5.6 TEST RESULTS	21
6 . MAXIMUM AVERAGE OUTPUT POWER TEST	22
6.1 LIMIT	22
6.2 TEST PROCEDURE	22
6.3 DEVIATION FROM STANDARD	22
6.4 TEST SETUP	22
6.5 EUT OPERATION CONDITIONS	22
6.6 TEST RESULTS	22
7 . CONDUCTED SPURIOUS EMISSIONS	23
7.1 LIMIT	23
7.2 TEST PROCEDURE	23
7.3 DEVIATION FROM STANDARD	23
	23
7.5 EUT OPERATION CONDITIONS	23
7.6 TEST RESULTS	23
8 . POWER SPECTRAL DENSITY TEST	24
	24
8.2 TEST PROCEDURE	24
8.3 DEVIATION FROM STANDARD 8.4 TEST SETUP	24
8.4 TEST SETUP 8.5 EUT OPERATION CONDITIONS	24 24
8.6 TEST RESULTS	24 24
9 . MEASUREMENT INSTRUMENTS LIST	25
10 . EUT TEST PHOTO	27
APPENDIX A – AC POWER LINE CONDUCTED EMISSIONS	31
APPENDIX B – RADIATED EMISSION – 9 KHZ TO 30 MHZ	34
APPENDIX C – RADIATED EMISSION – 30 MHZ TO 1000 MHZ	39
APPENDIX D – RADIATED EMISSION- ABOVE 1000 MHZ	42
APPENDIX E – BANDWIDTH	115
APPENDIX F – MAXIMUM AVERAGE OUTPUT POWER	123
APPENDIX G – CONDUCTED SPURIOUS EMISSIONS	127



Table of Contents

Page

APPENDIX H – POWER SPECTRAL DENSITY

138

REPORT ISSUED HISTORY

Report Version	Description	Issued Date
R00	Original Issue.	Nov. 06, 2019
R01	Updated the Section 2.1 and the data of Appendix F.	Nov. 12, 2019
R02	Changed the product name.	Nov. 15, 2019

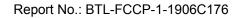
1. SUMMARY OF TEST RESULTS

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 Avrage 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	150 kHz ~ 30 MHz	2.32

B. Radiated emissions test:

Test Site	Method	Measurement Frequency Range	Ant. H / V	U, (dB)
		9kHz ~ 30MHz	V	3.79
		9kHz ~ 30MHz	Н	3.57
	CISPR	30MHz ~ 200MHz	V	4.88
		30MHz ~ 200MHz	Н	4.14
DG-CB03		200MHz ~ 1,000MHz	V	4.62
DG-CB03		200MHz ~ 1,000MHz	Н	4.80
		1GHz ~ 6GHz	-	4.58
		6GHz ~ 18GHz	-	5.18
		18GHz ~ 26.5GHz	-	3.80
		26.5GHz ~ 40GHz	-	4.30

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

1.3 TEST ENVIRONMENT CONDITIONS

Test Item	Temperature	Humidity	Test Voltage	Tested By
AC Power Line Conducted Emissions	25°C	53%	AC 120V/60Hz	Demon Deng
Radiated Emissions -9K-30MHz	25°C	60%	AC 120V/60Hz	Demon Deng
Radiated Emissions -30 MHz to 1GHz	24°C	68%	AC 120V/60Hz	Laughing Zhang
Radiated Emissions -Above 1000 MHz	24°C	68%	AC 120V/60Hz	Laughing Zhang
Bandwidth	24.8°C	60%	AC 120V/60Hz	Jonas Chen
Maximum Average Output Power	24.8°C	60%	AC 120V/60Hz	Jonas Chen
Conducted Spurious Emissions	24.8°C	60%	AC 120V/60Hz	Jonas Chen
Power Spectral Density	24.8°C	60%	AC 120V/60Hz	Jonas Chen

2. GENERAL INFORMATION

2.1 GENERAL DESCRIPTION OF EUT

Equipment	Module
Brand Name	N/A
Test Model	BW1352-PCIE
Series Model	N/A
Model Difference(s)	N/A
Power Source	Supplied from PC PCI Slot.
Power Rating	DC 3.3V
Operation Frequency	2412 MHz ~ 2472 MHz
	IEEE 802.11b: DSSS
Modulation Type	IEEE 802.11g: OFDM
	IEEE 802.11n: OFDM
	IEEE 802.11b: 11/5.5/2/1 Mbps
Bit Rate of Transmitter	IEEE 802.11g: 54/48/36/24/18/12/9/6 Mbps
	IEEE 802.11n: up to 300 Mbps
	IEEE 802.11b: 19.06 dBm (0.0805 W)
Maximum Average Output	IEEE 802.11g: 16.97 dBm (0.0498 W)
Power	IEEE 802.11n (HT20): 19.93 dBm (0.0984 W)
	IEEE 802.11n (HT40): 20.61 dBm (0.1151 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 - CH13 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	12	2467		

3. Antenna Specification:

Ant.	Brand	Model Name	Antenna Type	Connector	Gain (dBi)
1	RoHS	N/A	PCB	N/A	0
2	RoHS	N/A	PCB	N/A	0

Note:

Antenna Gain=0 dBi. This EUT supports MIMO 2X2, any transmit signals are correlated with each other, so Directional gain= G_{ANT} +10log(N)dBi, that is Directional gain=0+10log(2)dBi=3.01.



4. Table for Antenna Configuration:

4.							
	Operating Mode TX Mode	1TX	2TX				
	IEEE 802.11b	V (Ant. 1)	-				
	IEEE 802.11g	V (Ant. 1)	-				
	IEEE 802.11n (HT20)	-	V (Ant. 1 + Ant. 2)				
	IEEE 802.11n (HT40)	-	V (Ant. 1 + Ant. 2)				

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 01/06/11/12/13	
Mode 2	TX G Mode Channel 01/06/11/12/13	
Mode 3	TX N-20 MHz Mode Channel 01/06/11/12/13	
Mode 4	TX N-40 MHz Mode Channel 03/06/09	
Mode 5	TX N-40 MHz Mode Channel 03	

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	Description	
Mode 5	TX N-40 MHz Mode Channel 03	

Radiated emissions test - Below 1GHz		
Final Test Mode	I Test Mode Description	
Mode 5	TX N-40 MHz Mode Channel 03	

Radiated emissions test - Above 1GHz		
Final Test Mode	Description	
Mode 1	TX B Mode Channel 01/06/11/12/13	
Mode 2	TX G Mode Channel 01/06/11/12/13	
Mode 3	TX N-20 MHz Mode Channel 01/06/11/12/13	
Mode 4	TX N-40 MHz Mode Channel 03/06/09	

Conducted test		
Final Test Mode	Description	
Mode 1	TX B Mode Channel 01/06/11/12/13	
Mode 2	TX G Mode Channel 01/06/11/12/13	
Mode 3	TX N-20 MHz Mode Channel 01/06/11/12/13	
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: DSSS (1 Mbps) 802.11g mode: OFDM (6 Mbps) 802.11n HT20 mode : BPSK (13 Mbps) 802.11n HT40 mode : BPSK (27 Mbps) For all tests, the highest output powers were set for final test.
- (3) For radiated emission below 1 GHz test, the IEEE 802.11n40 Channel 03 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.

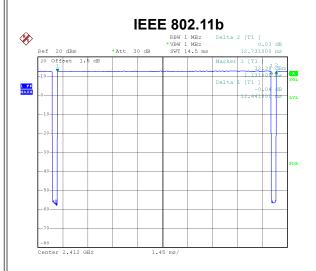
2.3 PARAMETERS OF TEST SOFTWARE

Test Software			N/A		
Frequency (MHz)	2412	2437	2462	2467	2472
IEEE 802.11b	17	17	17	17	17
IEEE 802.11g	16	16	16	16	14
IEEE 802.11n (HT20)	16	16	16	15	12
Frequency (MHz)	2422	243	37	2452	2
IEEE 802.11n (HT40)	15	16	3	15	



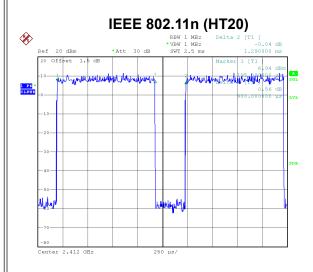
2.4 DUTY CYCLE

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: 18.SEP.2019 19:26:47

Duty cycle = 12.441 ms / 12.731 ms = 97.72% Duty Factor = 10 log(1/Duty cycle) = 0.10

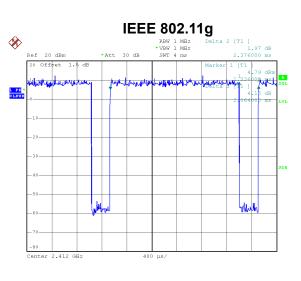


Date: 18.SEP.2019 19:30:24

Duty cycle = 0.980 ms / 1.290 ms = 75.97% Duty Factor = 10 log(1/Duty cycle) = 1.19

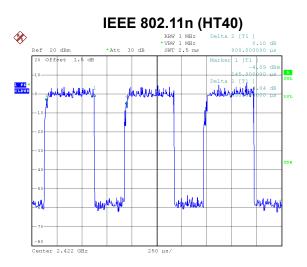
NOTE:

For IEEE 802.11g and IEEE 802.11n (HT20):



Date: 18.SEP.2019 19:29:37

Duty cycle = 2.064 ms / 2.376 ms = 86.87% Duty Factor = 10 log(1/Duty cycle) = 0.61



Date: 18.SEP.2019 19:32:26

Duty cycle = 0.480 ms / 0.800 ms = 60.00%Duty Factor = $10 \log(1/\text{Duty cycle}) = 2.22$

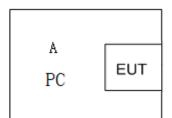
For radiated emissions frequency above 1 GHz, the resolution bandwidth of test receiver/spectrum analyzer is 1 MHz and the video bandwidth is 1 kHz (Duty cycle < 98%).

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%).



2.5 BLOCK DIAGRAM SHOWING THE CONFIGURATION OF SYSTEM TESTED



2.6 SUPPORT UNITS

Item	Equipment	Brand	Model No.	Series No.
Α	PC	DELL	H290AM-00	N/A

Item	Cable Type	Shielded Type	Ferrite Core	Length
-	-	-	-	-



3. AC POWER LINE CONDUCTED EMISSIONS TEST

3.1 LIMIT

Fraguaday of Emission (MHz)	Limit (dBµV)		
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

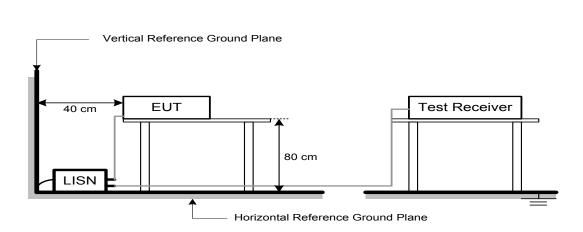
- a. The EUT was placed 0.8 meters from the horizontal ground plane with EUT being connected to the power mains through a line impedance stabilization network (LISN). All other support equipment powered from additional LISN(s). The LISN provide 50 Ohm/ 50uH of coupling impedance for the measuring instrument.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

	(dBuV/m at 3 m)	
Frequency (MHz)	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	ter 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	

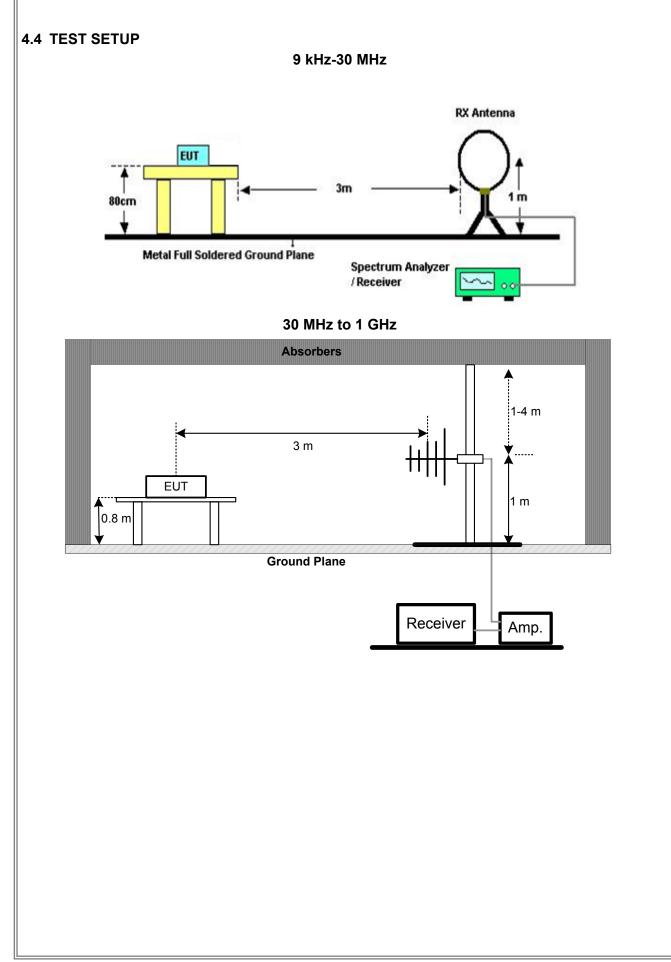
4.2 TEST PROCEDURE

- 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

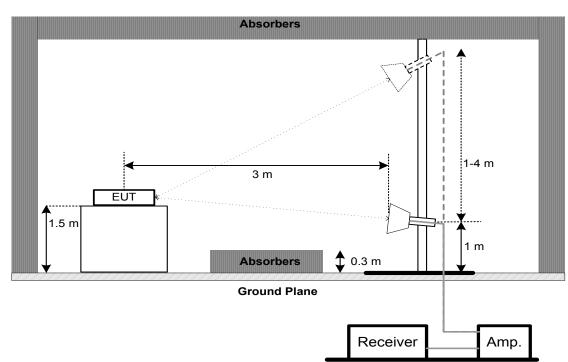
No deviation





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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(2)(2)	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. For 6dB Bandwidth Spectrum setting: RBW= 100KHz, VBW=300KHz, Sweep time = 2.5 ms. For 99% OBW Spectrum Setting: For B,G,N20 mode: RBW= 300KHz, VBW=1MHz,For N40 mode: RBW= 1MHz, VBW=3MHz, 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

EUT	Power Meter

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

EUT	

SPECTRUM

ANALYZER

8.5 EUT OPERATION CONDITIONS

The EUT was programmed to be in continuously transmitting mode.

8.6 TEST RESULTS

Please refer to the APPENDIX 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	Mar. 10, 2020	
2	LISN	EMCO	3816/2	52765	Mar. 10, 2020	
3	TWO-LINE V-NETWORK	R&S	ENV216	101447	May 19, 2020	
4	50Ω Terminator	SHX	TF5-3	15041305	Mar. 10, 2020	
5	Measurement Software	Farad	EZ-EMC Ver.NB-03A1-01	N/A	N/A	
6	Cable	N/A	RG223	12m	Mar. 12, 2020	

	Radiated Emissions - 9 kHz to 30 MHz					
Item	Kind of Equipment	Manufacturer	Type No.	Serial No.	Calibrated until	
1	Loop Antenna	EM	EM-6876-1	230	Jan. 15, 2020	
2	Cable	N/A	RG 213/U	C-102	May 31, 2020	
3	EMI Test Receiver	R&S	ESCI	100895	Mar. 10, 2020	
4	Measurement Software	Farad	EZ-EMC Ver.NB-03A1-01	N/A	N/A	

	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, 2020		
2*	Amplifier	HP	8447D	2944A09673	Aug. 11, 2021		
3	Receiver	Agilent	N9038A	MY52130039	Aug. 03, 2020		
4	Cable	emci	LMR-400(30MHz- 1GHz)(8m+5m)	N/A	May 24, 2020		
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		

	Radiated Emissions - Above 1 GHz						
Item	Kind of Equipment	Manufacturer	Type No.	Serial No.	Calibrated until		
1	Double Ridged Guide Antenna	ETS	3115	75789	Mar. 09, 2020		
2	Broad-Band Horn Antenna	Schwarzbeck	BBHA 9170	9170319	Jun. 23, 2020		
3	Amplifier	Agilent	8449B	3008A02333	Mar. 10, 2020		
4	Microwave Preamplifier With Adaptor	EMC INSTRUMENT	EMC2654045	980039 & HA01	Mar. 10, 2020		
5	Receiver	Agilent	N9038A	MY52130039	Aug. 03, 2020		
6	Controller	СТ	SC100	N/A	N/A		
7	Controller	MF	MF-7802	MF780208416	N/A		
8	Cable	mitron	B10-01-01-12M	18072744	Jun. 29, 2020		
9	Measurement Software	Farad	EZ-EMC Ver.NB-03A1-01	N/A	N/A		

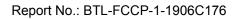
Bandwidth & Antenna Conducted Spurious Emissions & Power Spectral Density					
Item	Kind of Equipment	Manufacturer	Type No.	Serial No.	Calibrated until
					Aug. 03, 2020

Maximum Average Output Power					
Item	Kind of Equipment	Manufacturer	Type No.	Serial No.	Calibrated until
1	Peak Power Analyzer	Keysight	8990B	MY51000506	Aug. 03, 2020
2	Wideband power sensor	Keysight	N1923A	MY58310004	Aug. 03, 2020

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.





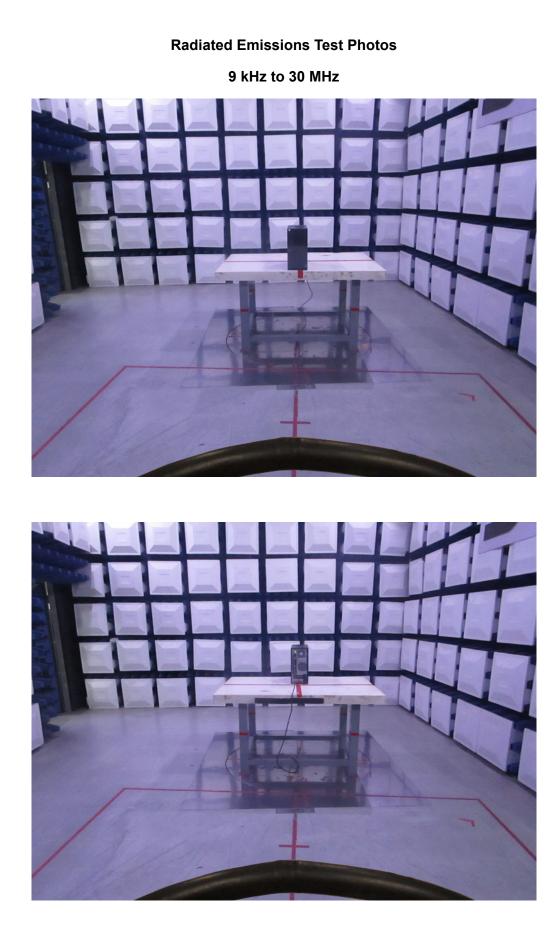
10. EUT TEST PHOTO

AC Power Line Conducted Emissions Test Photos

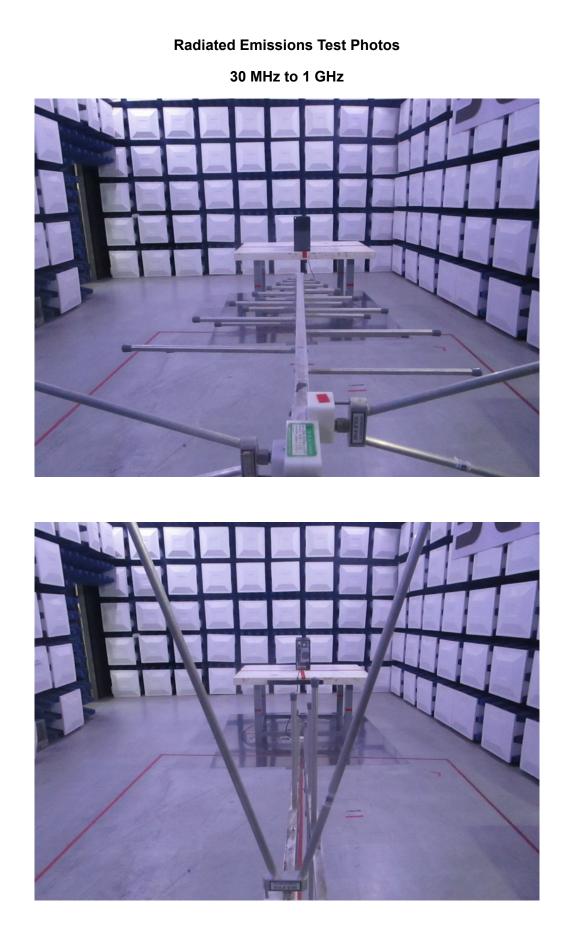




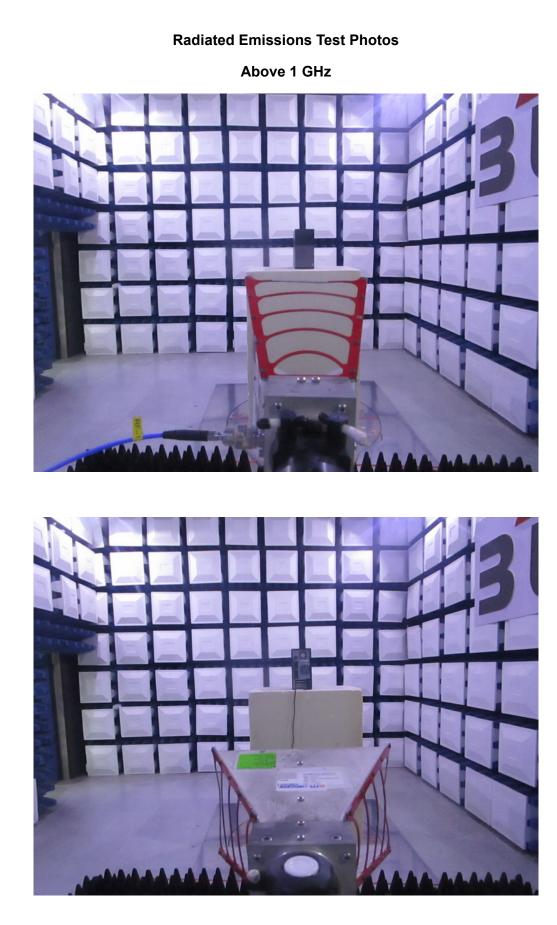
BL



BL



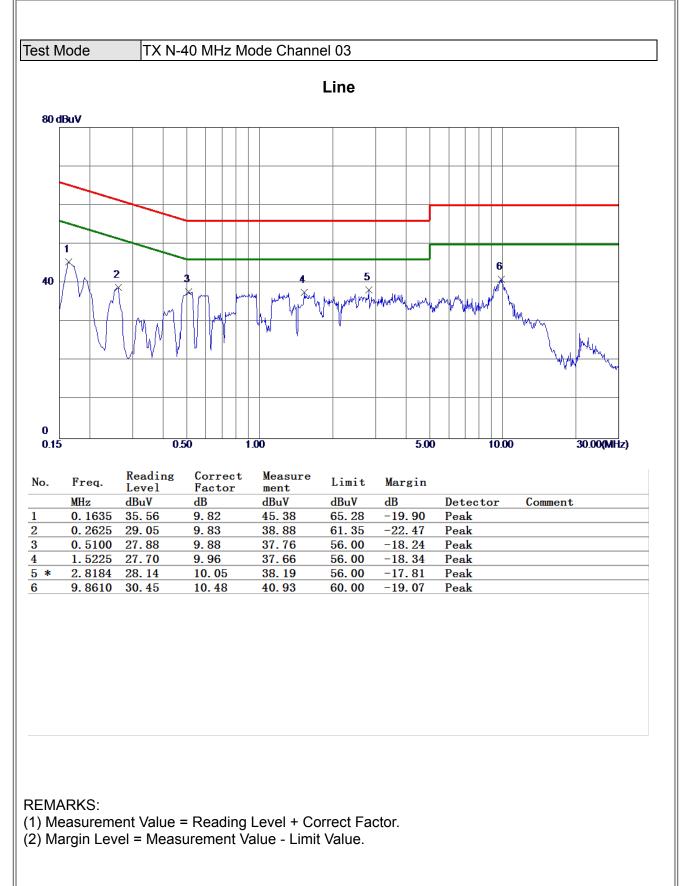




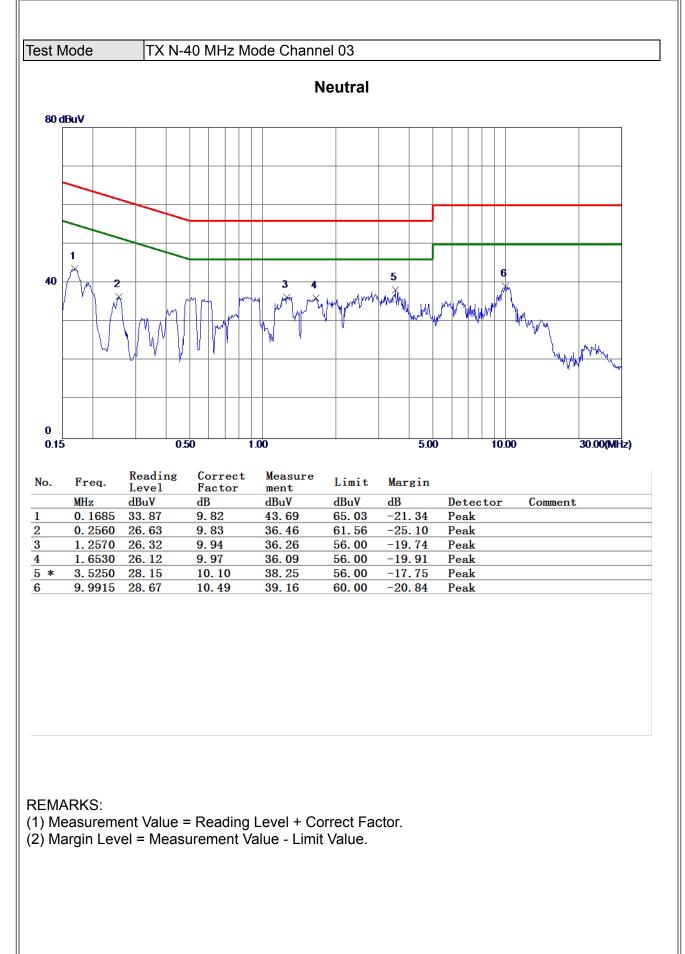


APPENDIX A - AC POWER LINE CONDUCTED EMISSIONS



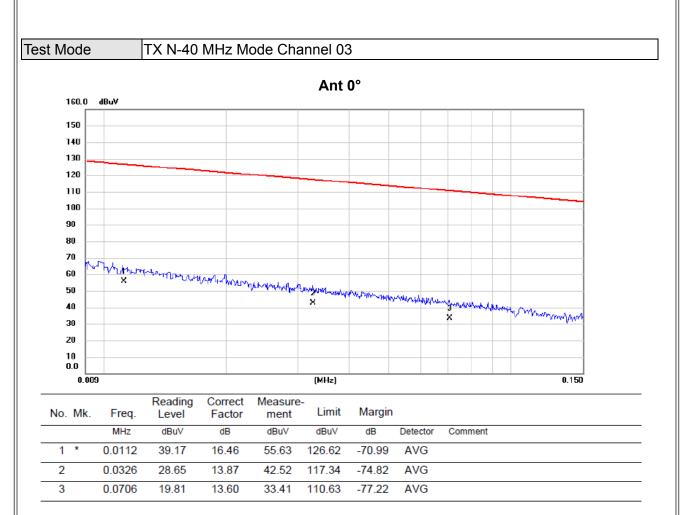






APPENDIX B - RADIATED EMISSION - 9 KHZ TO 30 MHZ

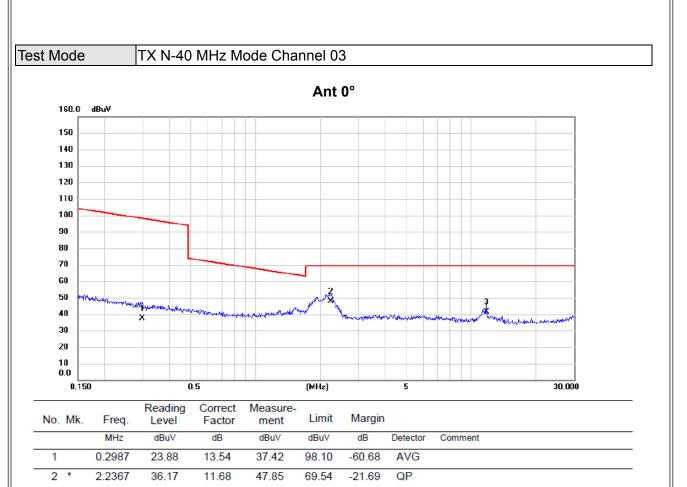




REMARKS:

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





REMARKS:

3

11.7446

29.83

11.62

41.45

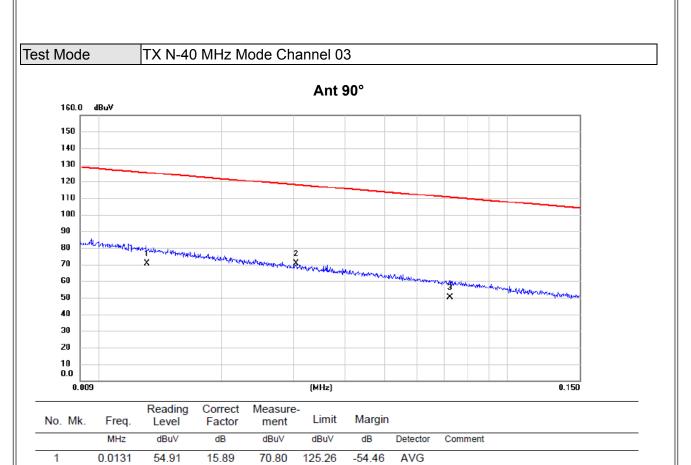
69.54

-28.09

QP

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





AVG

AVG

-47.39 -60.38

REMARKS:

2 *

3

0.0304

0.0722

56.71

36.48

13.85

13.57

70.56

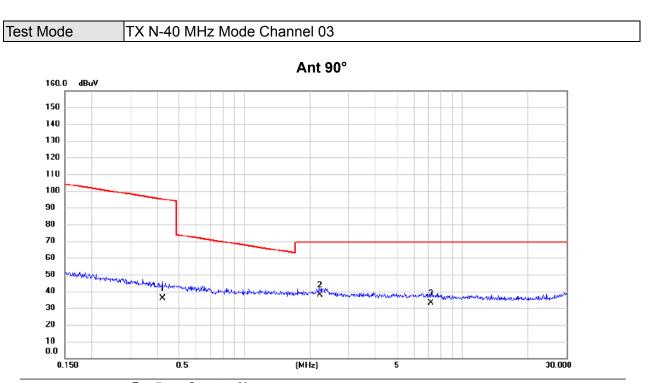
50.05

117.95

110.43

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





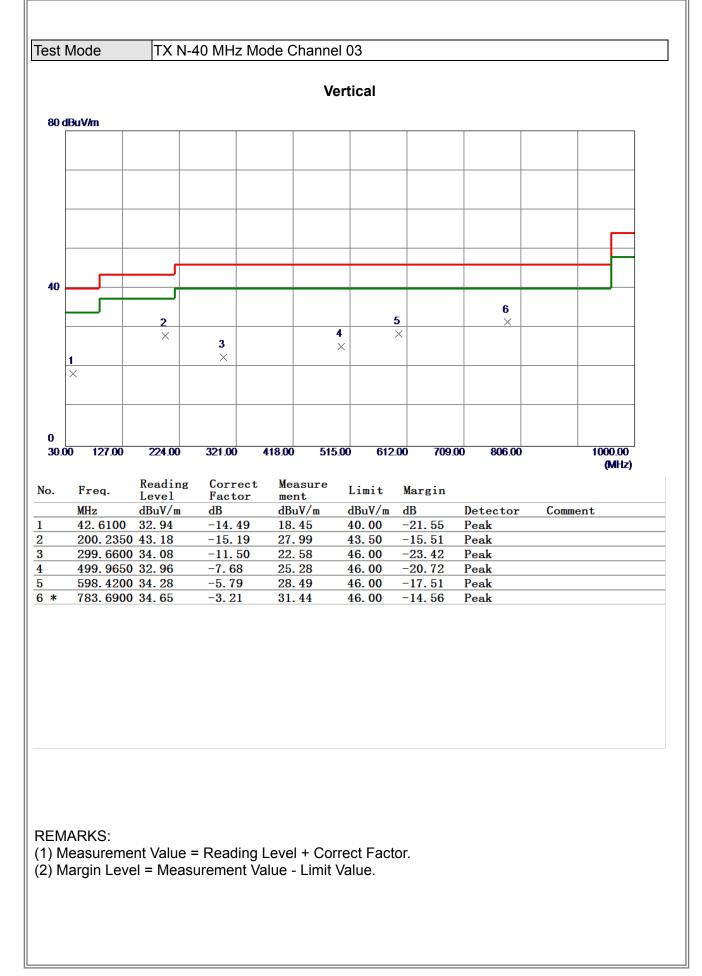
	No. Mk.	Freq.	Reading Level	Correct Factor	Measure- ment	Limit	Margin		
-		MHz	dBuV	dB	dBuV	dBuV	dB	Detector	Comment
	1	0.4215	22.71	13.25	35.96	95.11	-59.15	AVG	
	2 *	2.2132	26.07	11.69	37.76	69.54	-31.78	QP	
-	3	7.1754	21.94	11.19	33.13	69.54	-36.41	QP	

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

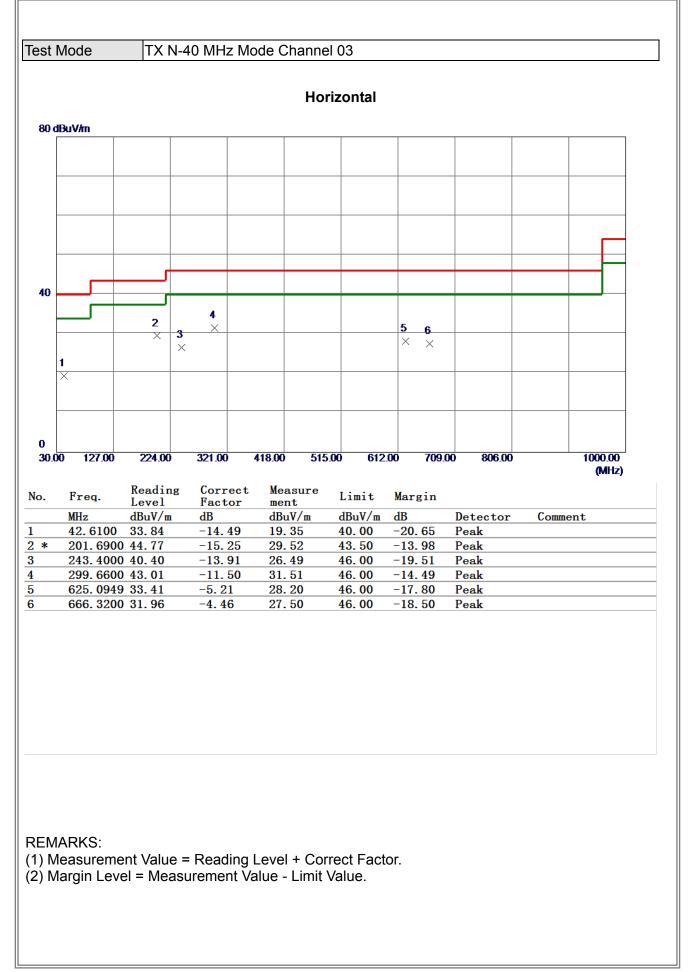


APPENDIX C - RADIATED EMISSION - 30 MHZ TO 1000 MHZ



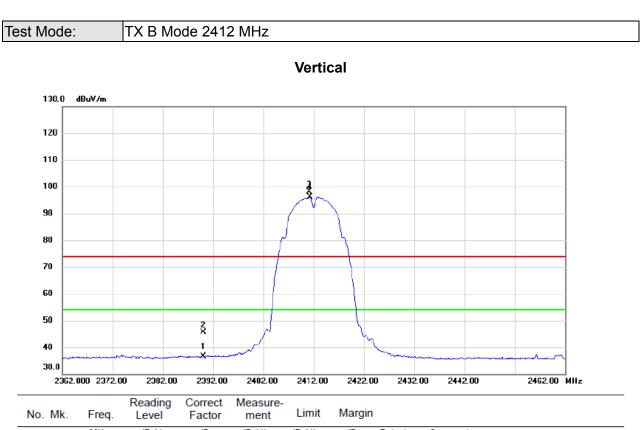






APPENDIX D - RADIATED EMISSION- ABOVE 1000 MHZ

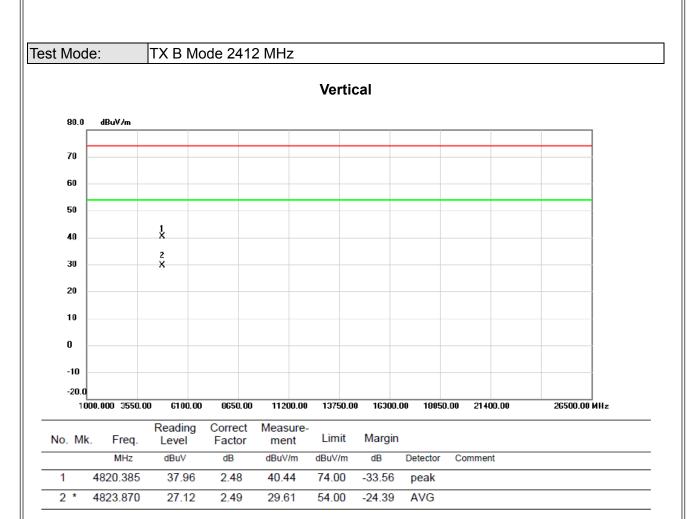




	NO. IV	NR.	Fieq.	Level	Factor	ment	Linne	margin		
-			MHz	dBuV	dB	dBuV/m	dBuV/m	dB	Detector	Comment
	1	23	390.000	30.33	6.23	36.56	54.00	-17.44	AVG	
-	2	23	390.050	39.44	6.23	45.67	74.00	-28.33	peak	
-	3 X	24	11.200	92.00	6.20	98.20	74.00	24.20	peak	No Limit
	4 *	24	11.250	90.02	6.20	96.22	54.00	42.22	AVG	No Limit

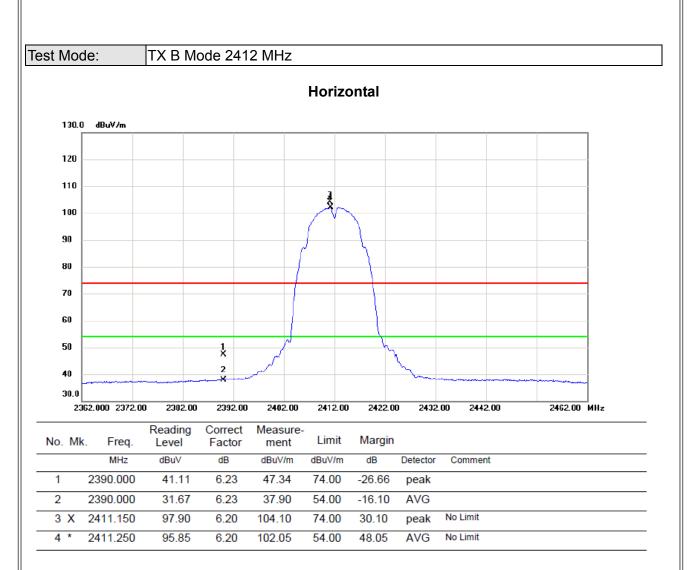
- (1) Measurement Value = Reading Level + Correct Factor.
- (2) Margin Level = Measurement Value Limit Value.





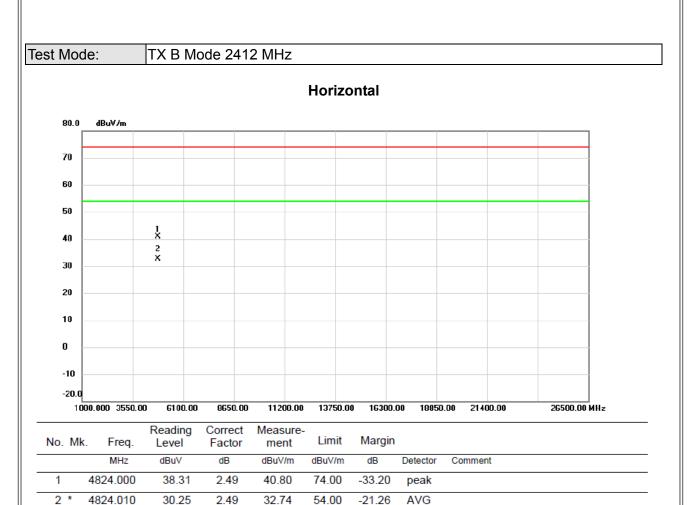
- (1) Measurement Value = Reading Level + Correct Factor.
- (2) Margin Level = Measurement Value Limit Value.





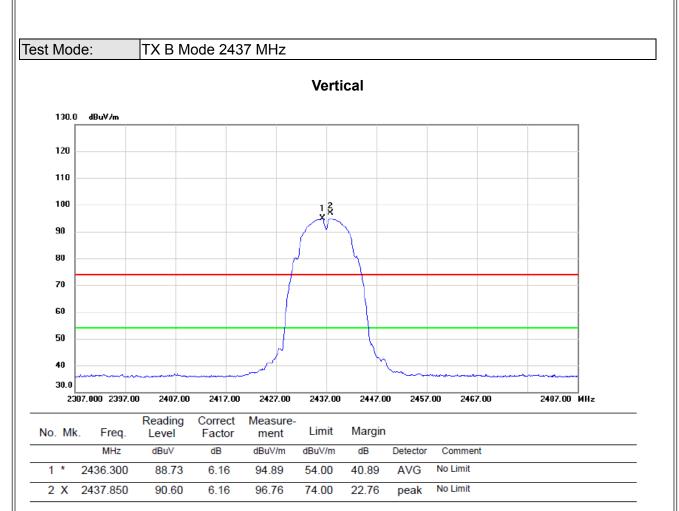
- (1) Measurement Value = Reading Level + Correct Factor.
- (2) Margin Level = Measurement Value Limit Value.





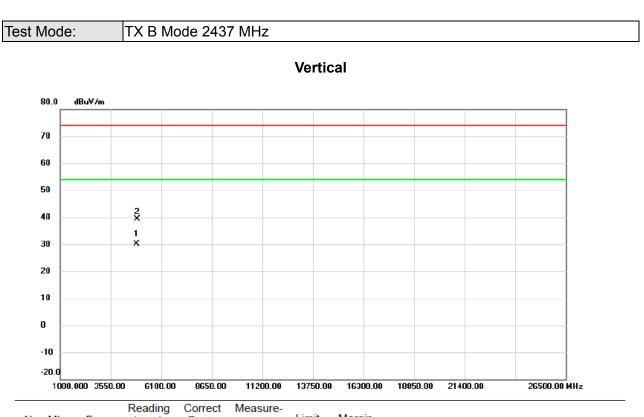
- (1) Measurement Value = Reading Level + Correct Factor.
- (2) Margin Level = Measurement Value Limit Value.





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

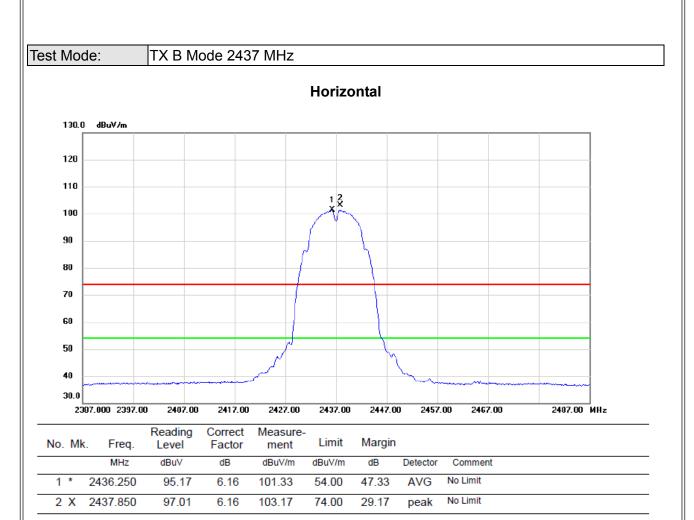




	No. N	۸k.	Freq.	Level	Factor	ment	Limit	Margin		
			MHz	dBuV	dB	dBuV/m	dBuV/m	dB	Detector	Comment
	1 *	4	873.960	27.48	2.65	30.13	54.00	-23.87	AVG	
-	2	4	877.165	36.73	2.66	39.39	74.00	-34.61	peak	

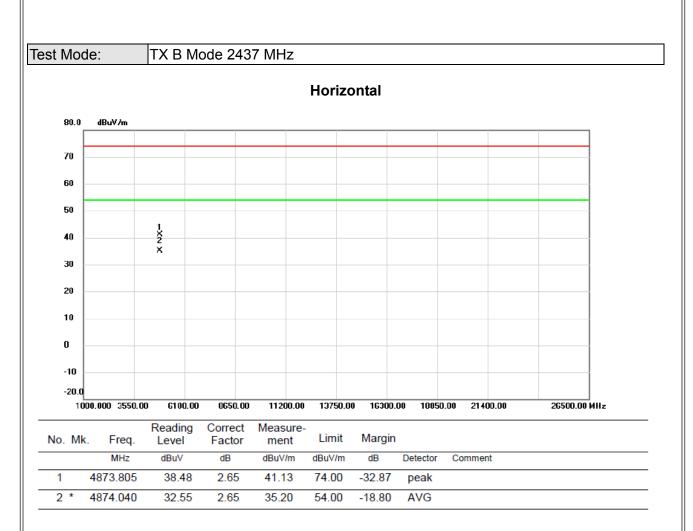
- (1) Measurement Value = Reading Level + Correct Factor.(2) Margin Level = Measurement Value Limit Value.





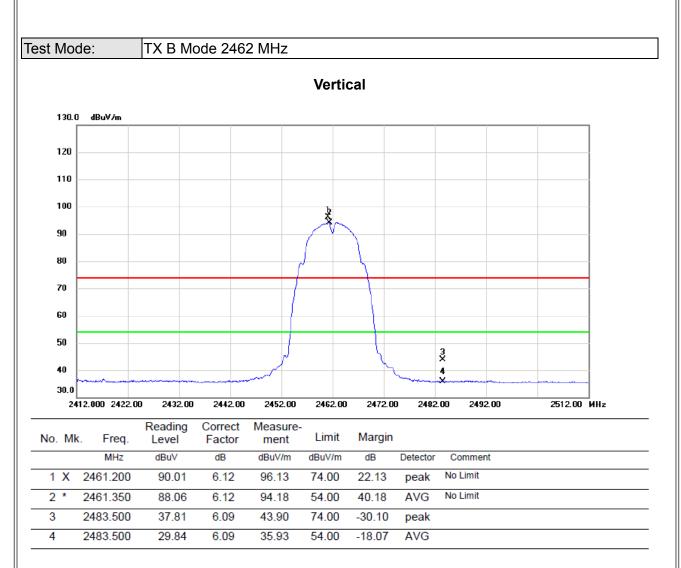
- (1) Measurement Value = Reading Level + Correct Factor.
- (2) Margin Level = Measurement Value Limit Value.





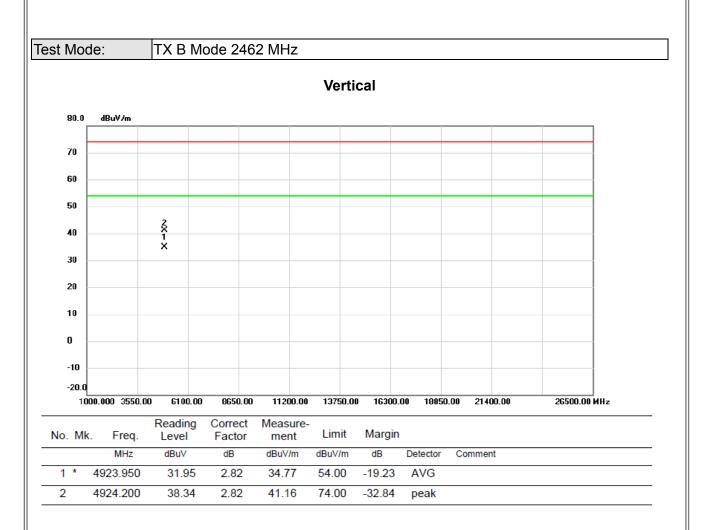
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- (2) Margin Level = Measurement Value Limit Value.





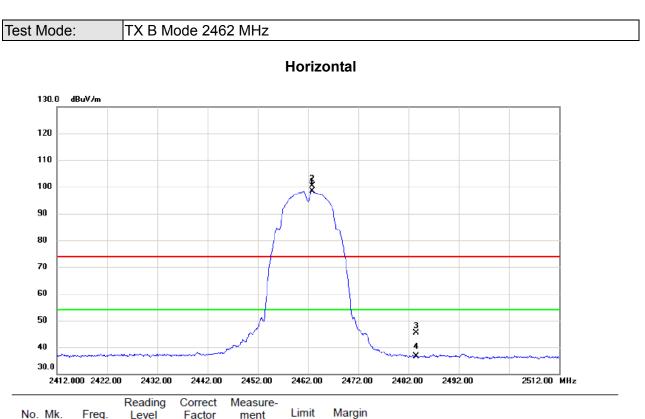
- (1) Measurement Value = Reading Level + Correct Factor.
- (2) Margin Level = Measurement Value Limit Value.





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

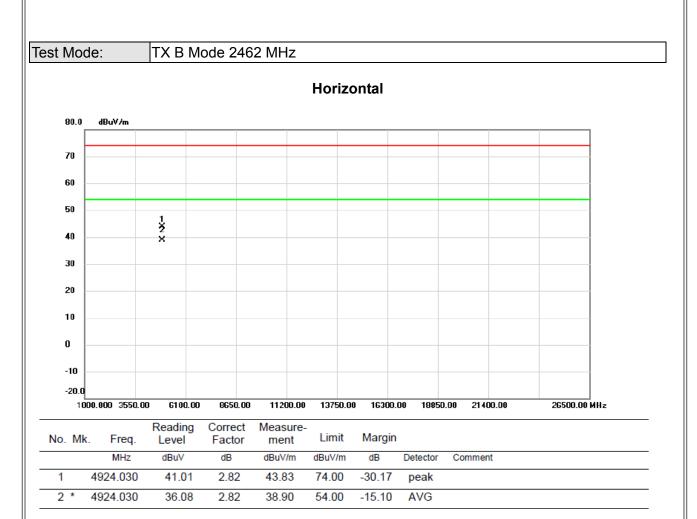




No. Mk	. Freq.	Level	Factor	ment	Limit	Margin		
	MHz	dBuV	dB	dBuV/m	dBuV/m	dB	Detector	Comment
1 *	2462.800	92.35	6.12	98.47	54.00	44.47	AVG	No Limit
2 X	2462.900	94.32	6.12	100.44	74.00	26.44	peak	No Limit
3	2483.500	39.39	6.09	45.48	74.00	-28.52	peak	
4	2483.500	30.47	6.09	36.56	54.00	-17.44	AVG	

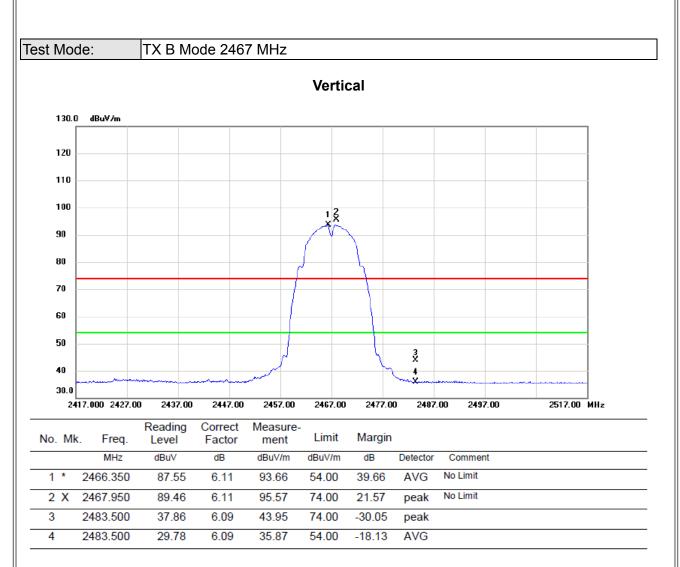
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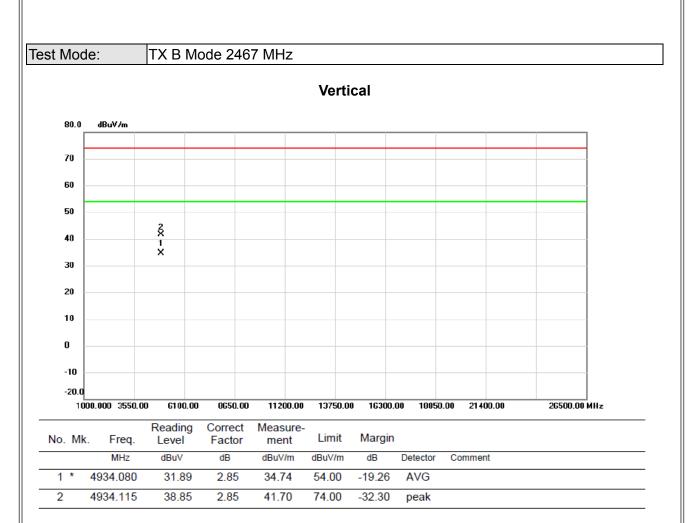
- (1) Measurement Value = Reading Level + Correct Factor.
- (2) Margin Level = Measurement Value Limit Value.





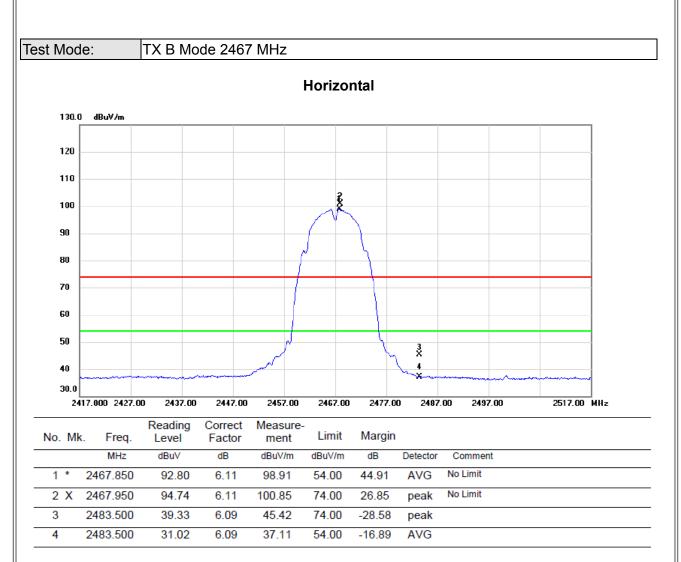
- (1) Measurement Value = Reading Level + Correct Factor.
- (2) Margin Level = Measurement Value Limit Value.





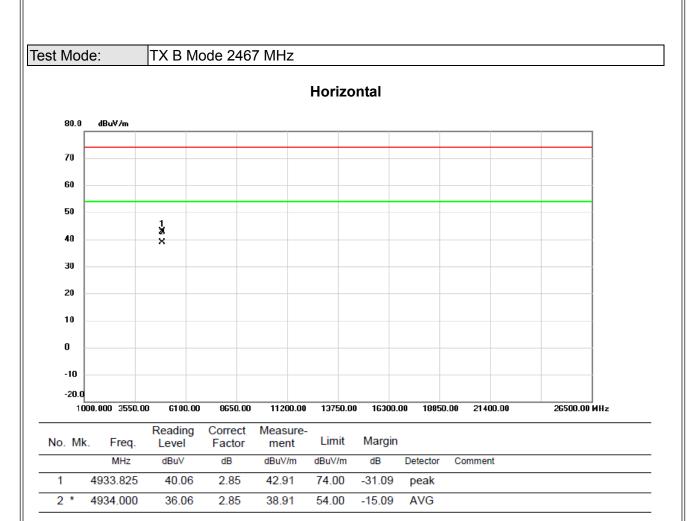
- (1) Measurement Value = Reading Level + Correct Factor.
- (2) Margin Level = Measurement Value Limit Value.





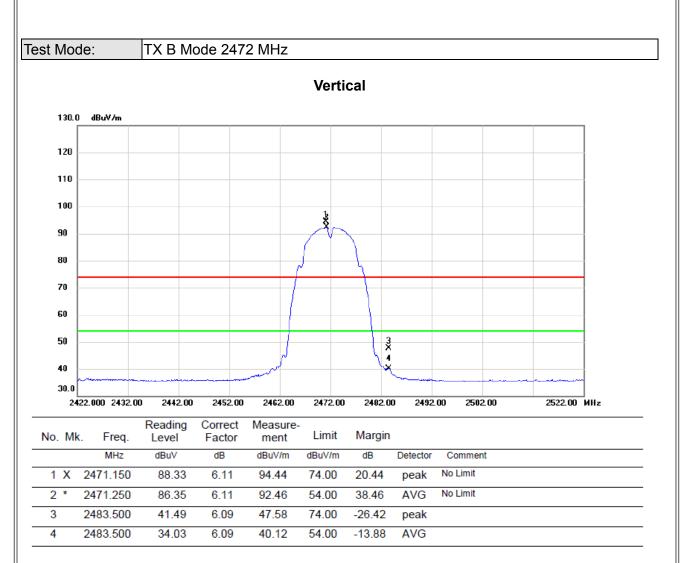
- (1) Measurement Value = Reading Level + Correct Factor.
- (2) Margin Level = Measurement Value Limit Value.





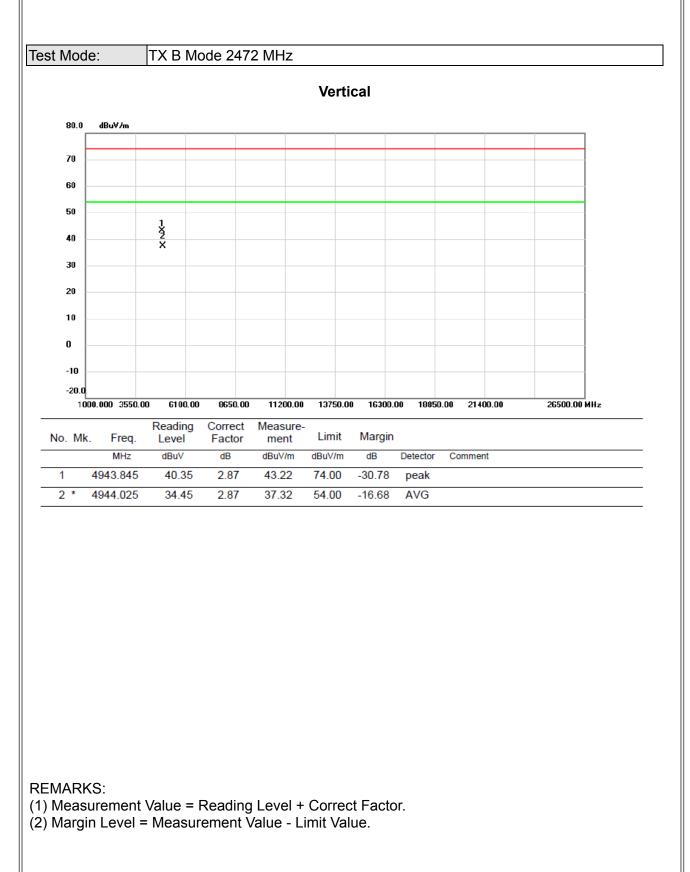
- (1) Measurement Value = Reading Level + Correct Factor.
- (2) Margin Level = Measurement Value Limit Value.



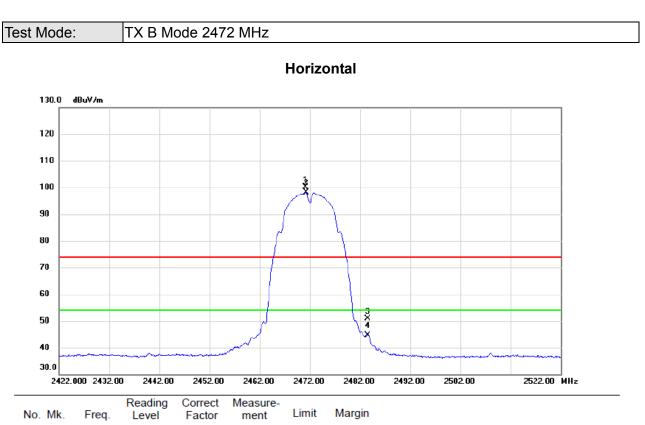


- (1) Measurement Value = Reading Level + Correct Factor.
- (2) Margin Level = Measurement Value Limit Value.





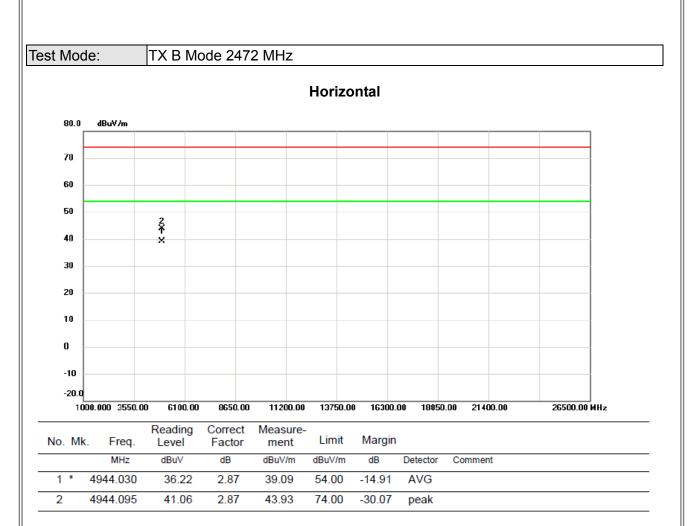




	No. Mk	. Freq.	Level	Factor	ment	Limit	Margin		
		MHz	dBuV	dB	dBuV/m	dBuV/m	dB	Detector	Comment
	1 X	2471.200	94.04	6.11	100.15	74.00	26.15	peak	No Limit
	2 *	2471.300	92.02	6.11	98.13	54.00	44.13	AVG	No Limit
	3	2483.500	44.85	6.09	50.94	74.00	-23.06	peak	
-	4	2483.500	38.64	6.09	44.73	54.00	-9.27	AVG	

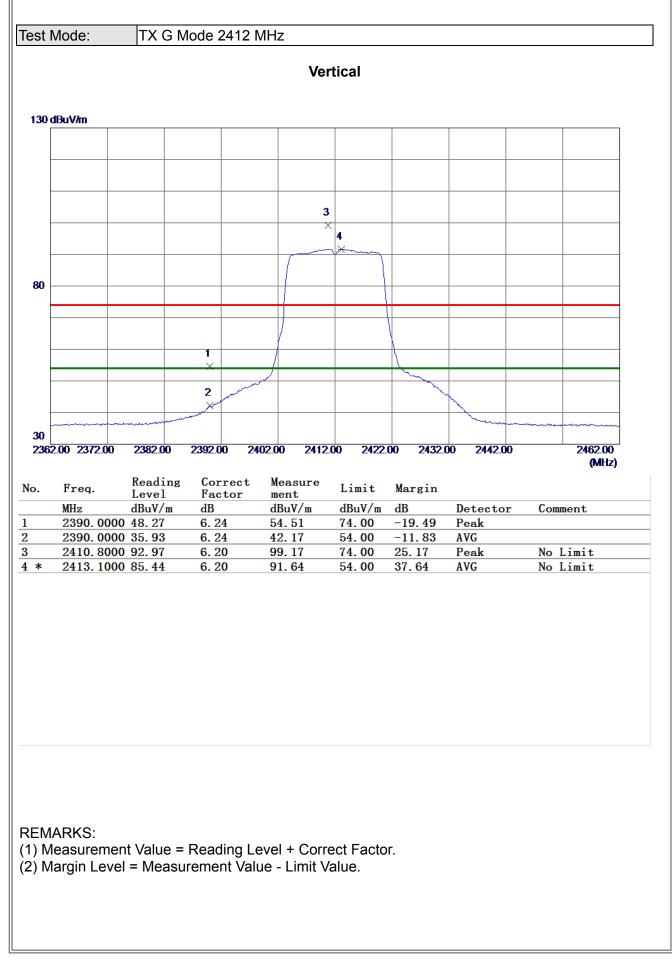
- (1) Measurement Value = Reading Level + Correct Factor.(2) Margin Level = Measurement Value Limit Value.



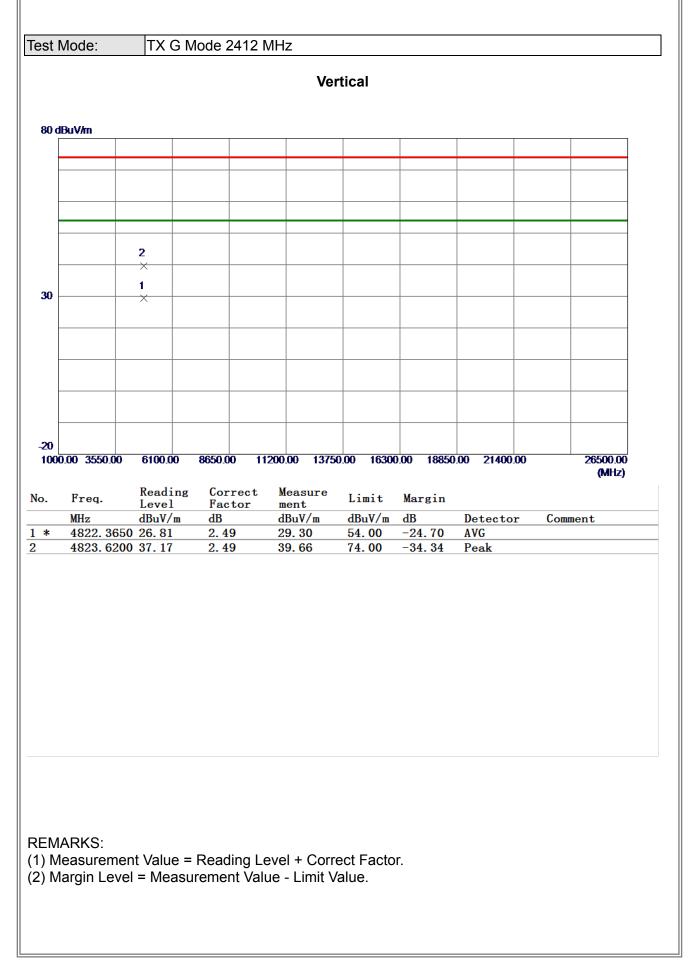


- (1) Measurement Value = Reading Level + Correct Factor.
- (2) Margin Level = Measurement Value Limit Value.

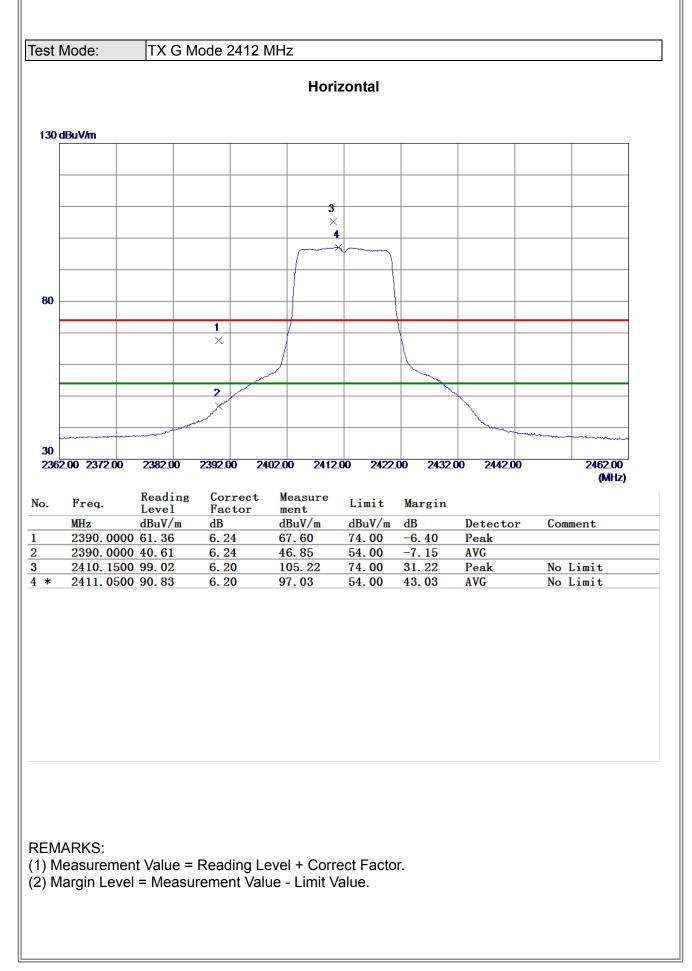




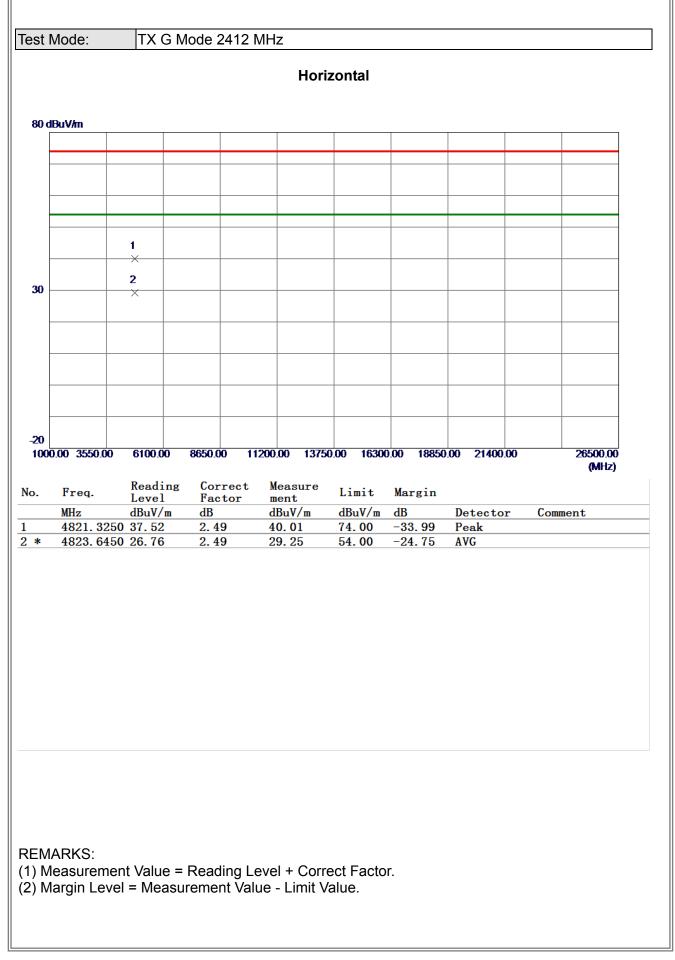




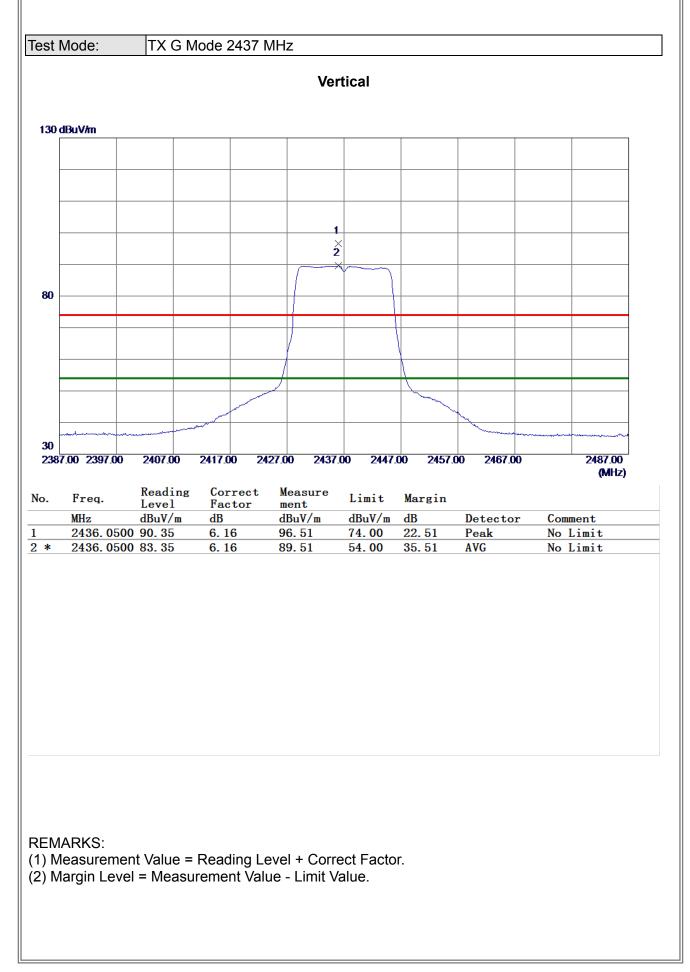




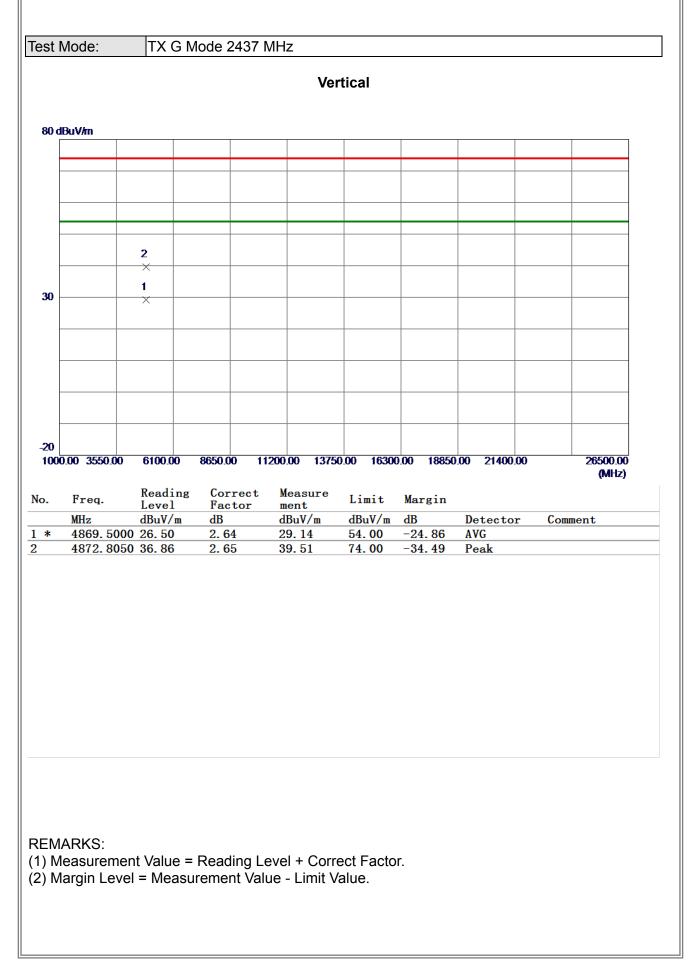




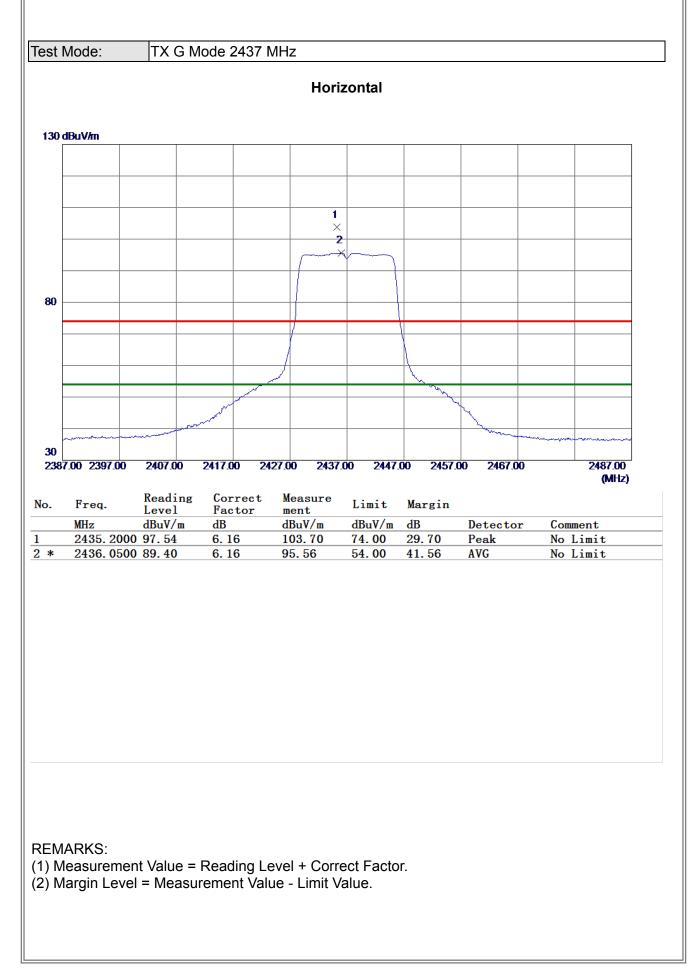




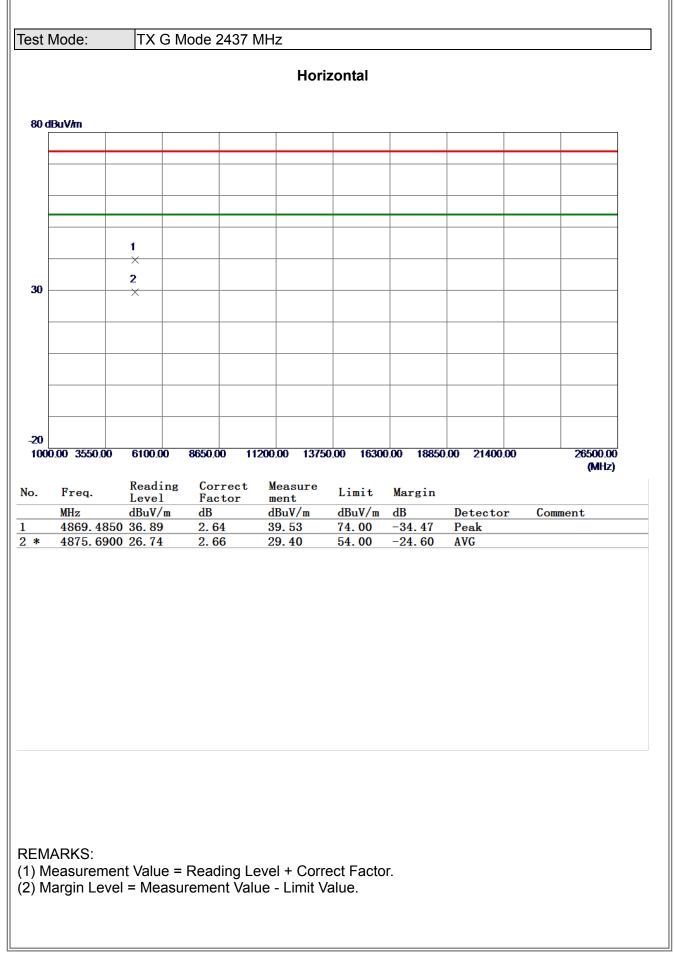




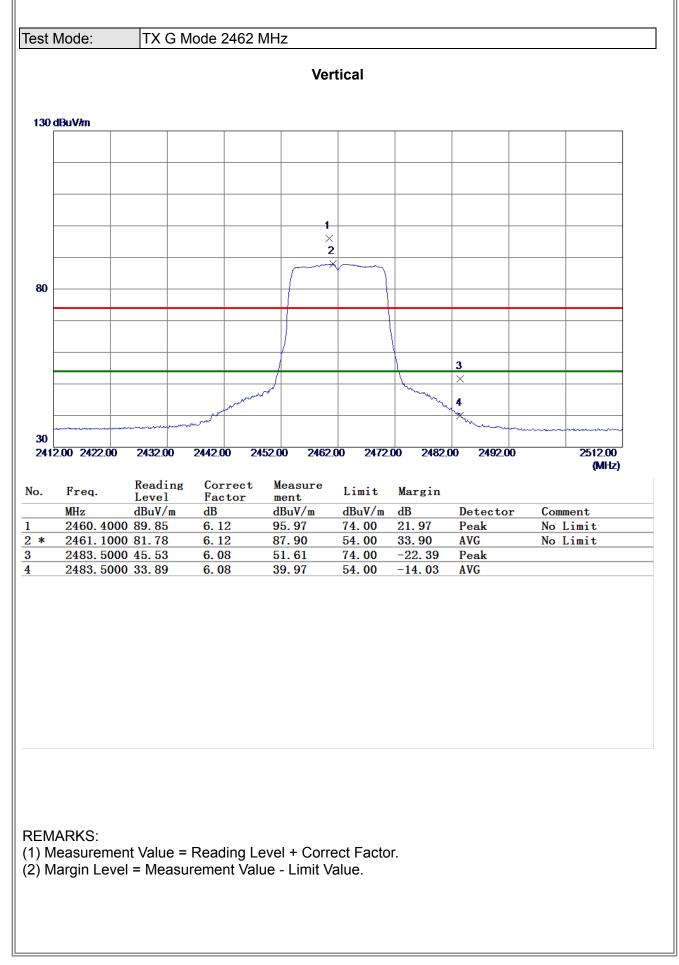




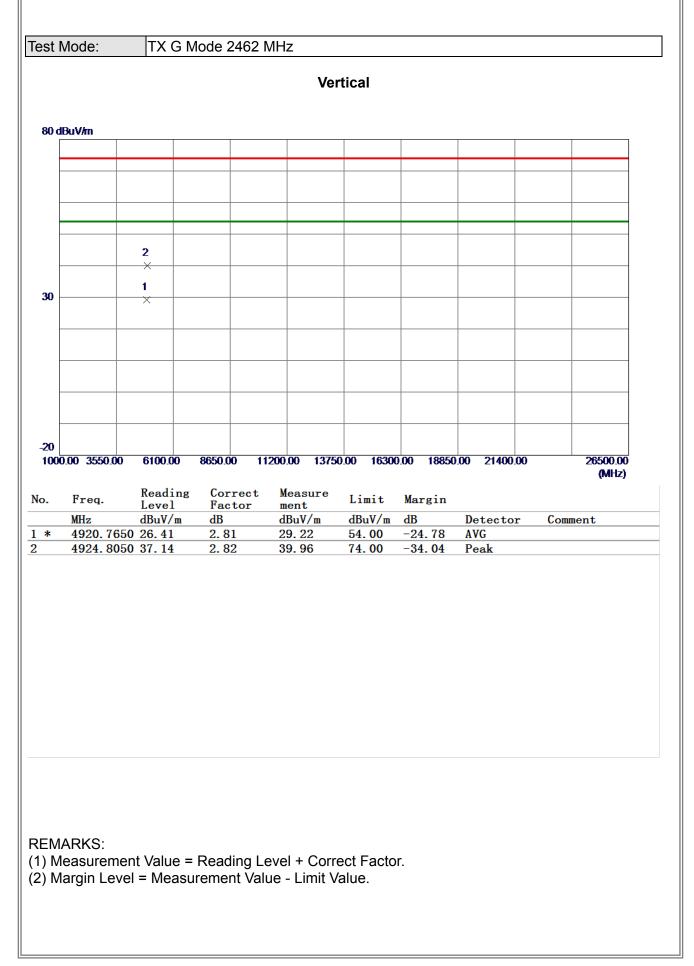




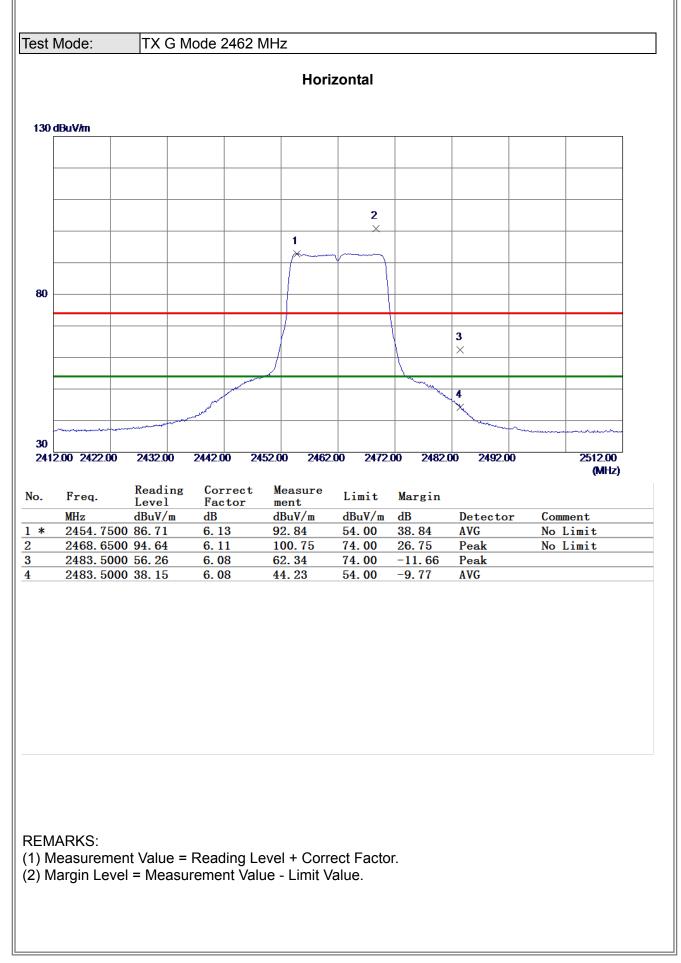




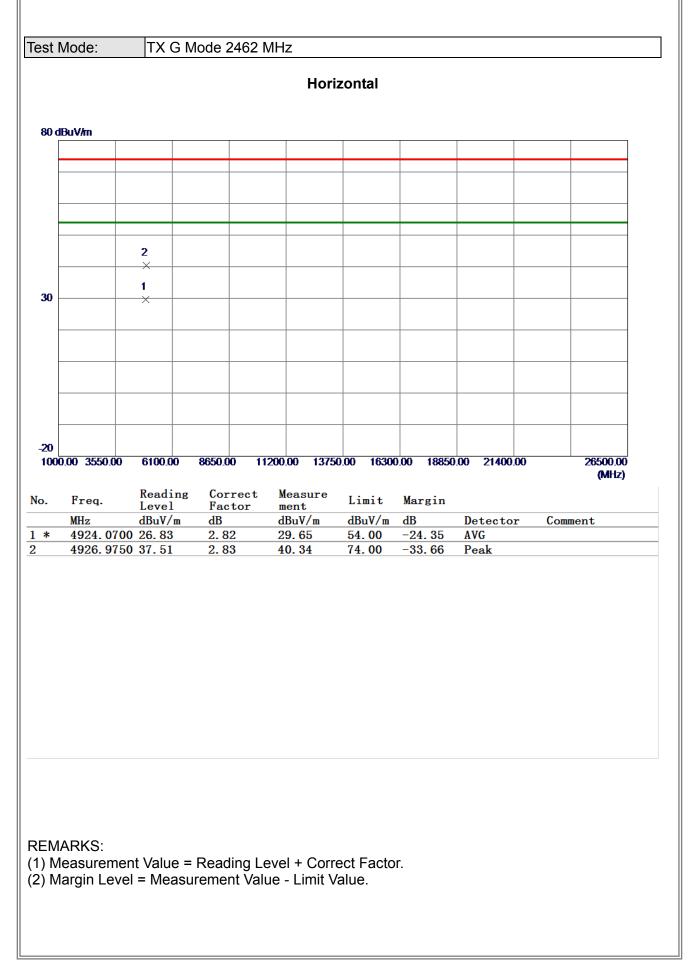




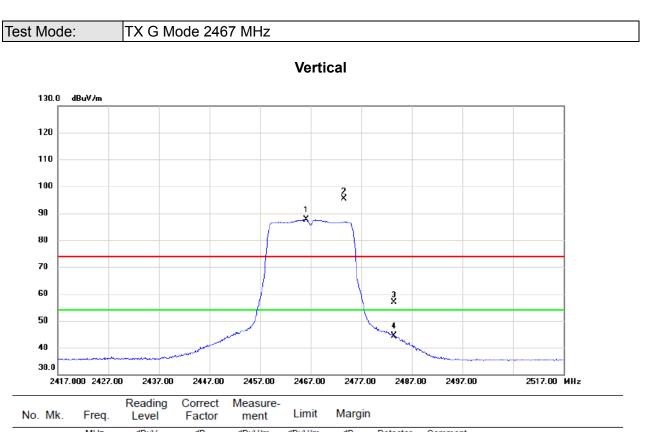








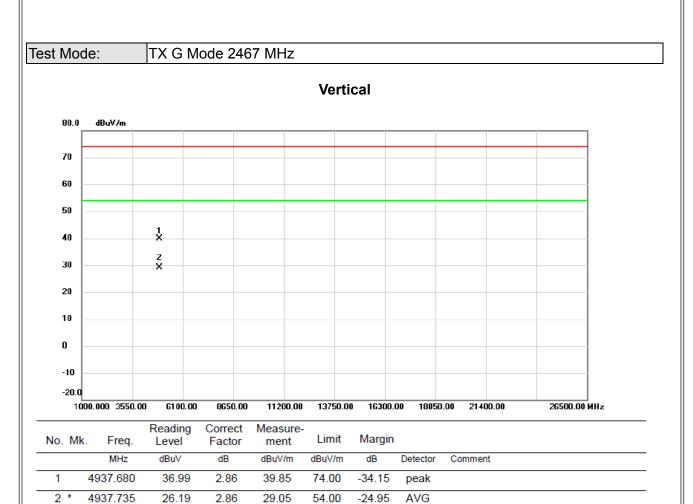




	140. 100	x. meq.	Level	racior	ment	2	margin		
-		MHz	dBuV	dB	dBuV/m	dBuV/m	dB	Detector	Comment
-	1 *	2466.200	81.54	6.11	87.65	54.00	33.65	AVG	No Limit
	2 X	2473.650	89.21	6.10	95.31	74.00	21.31	peak	No Limit
	3	2483.500	50.90	6.09	56.99	74.00	-17.01	peak	
	4	2483.500	38.34	6.09	44.43	54.00	-9.57	AVG	

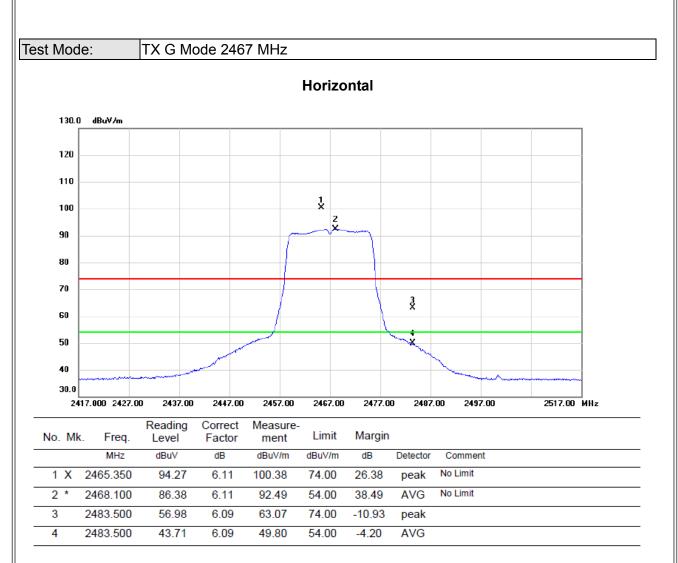
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- (2) Margin Level = Measurement Value Limit Value.





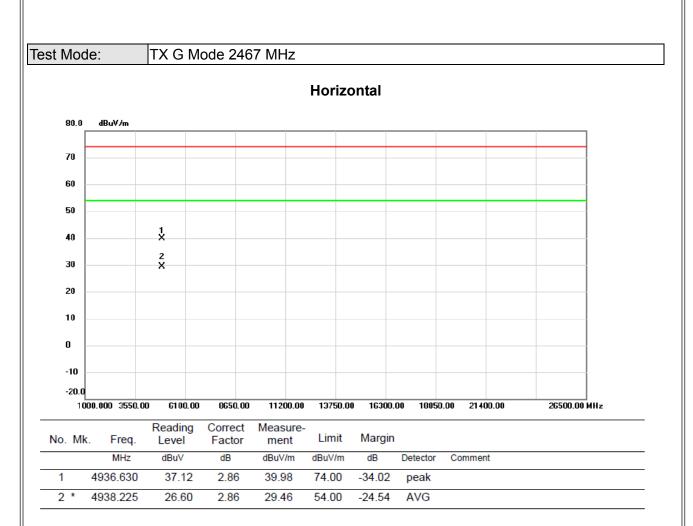
- (1) Measurement Value = Reading Level + Correct Factor.
- (2) Margin Level = Measurement Value Limit Value.





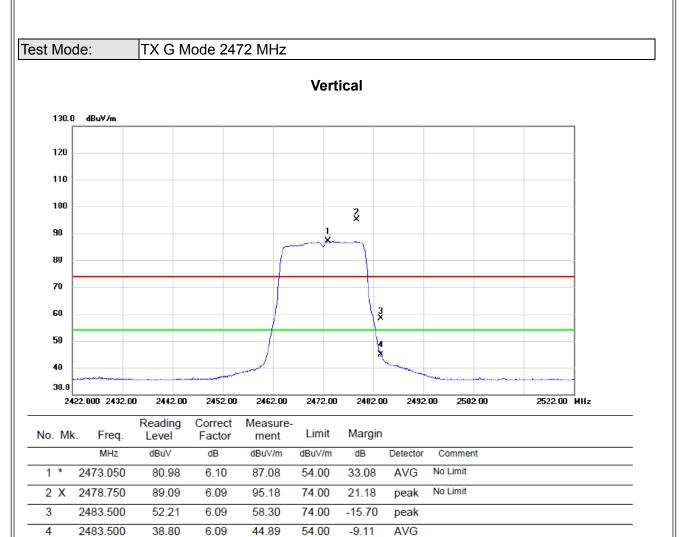
- (1) Measurement Value = Reading Level + Correct Factor.
- (2) Margin Level = Measurement Value Limit Value.





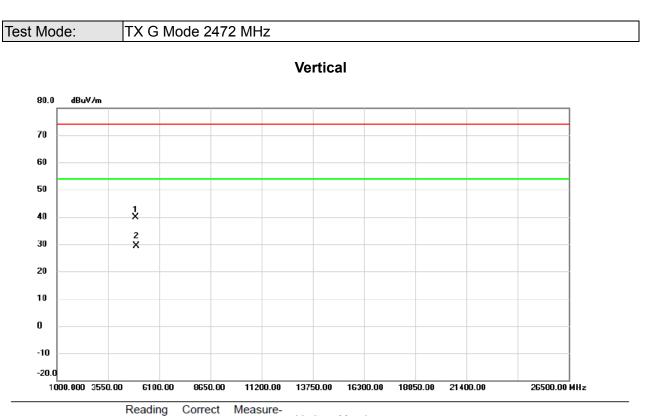
- (1) Measurement Value = Reading Level + Correct Factor.
- (2) Margin Level = Measurement Value Limit Value.





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

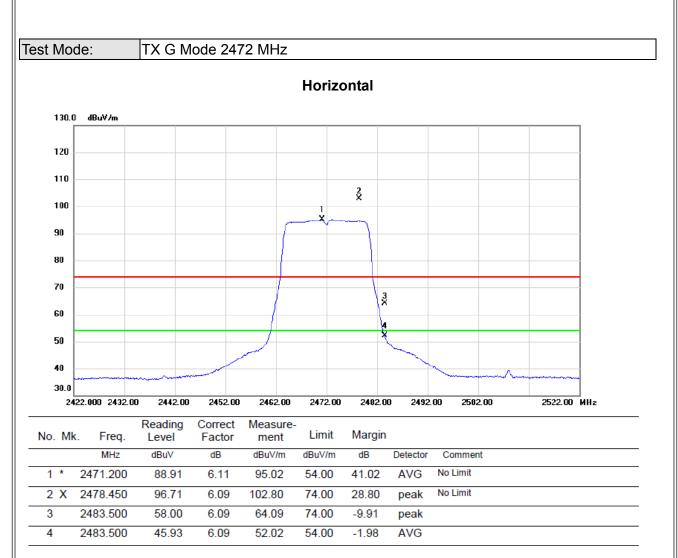




No.	Mk.	Freq.	Level	Factor	ment	Limit	Margin		
		MHz	dBuV	dB	dBuV/m	dBuV/m	dB	Detector	Comment
1		4940.335	36.96	2.86	39.82	74.00	-34.18	peak	
2	*	4945.690	26.43	2.89	29.32	54.00	-24.68	AVG	

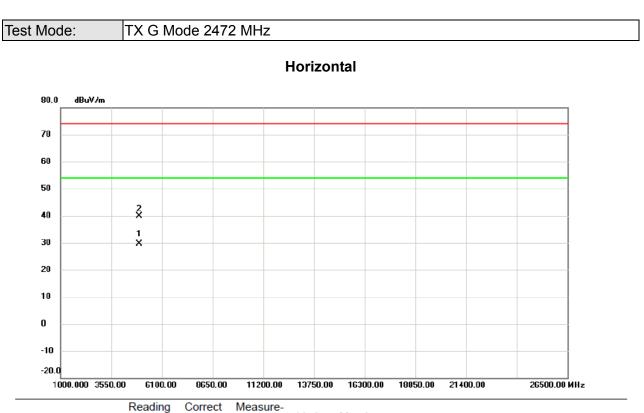
- (1) Measurement Value = Reading Level + Correct Factor.
- (2) Margin Level = Measurement Value Limit Value.





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

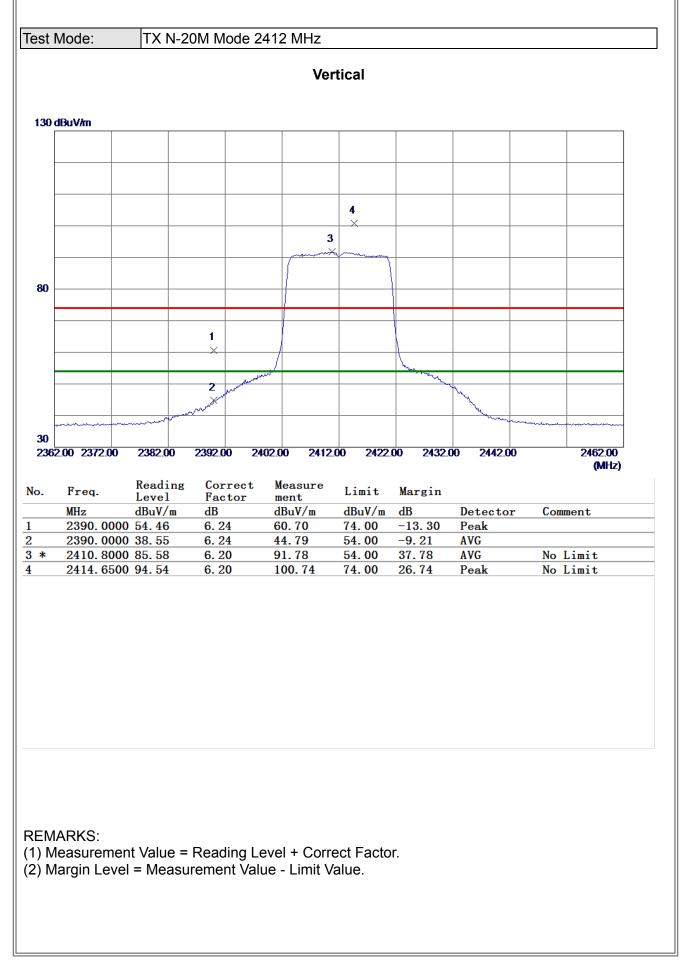




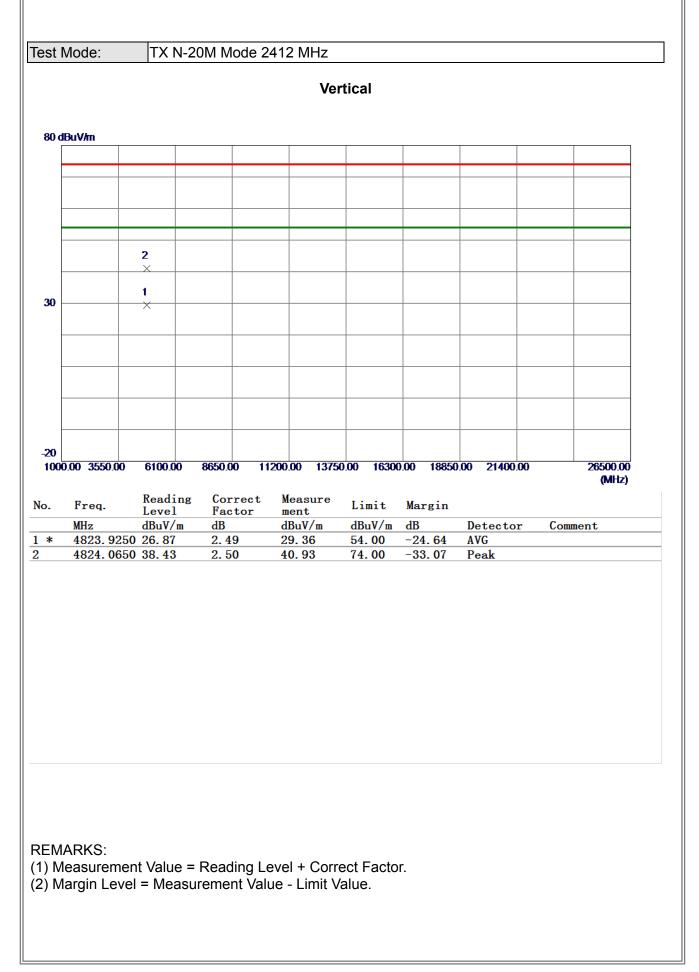
	No. Mk	. Freq.	Level	Factor	ment	Limit	Margin		
-		MHz	dBuV	dB	dBuV/m	dBuV/m	dB	Detector	Comment
	1 *	4945.270	26.72	2.88	29.60	54.00	-24.40	AVG	
-	2	4946.780	36.90	2.89	39.79	74.00	-34.21	peak	

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

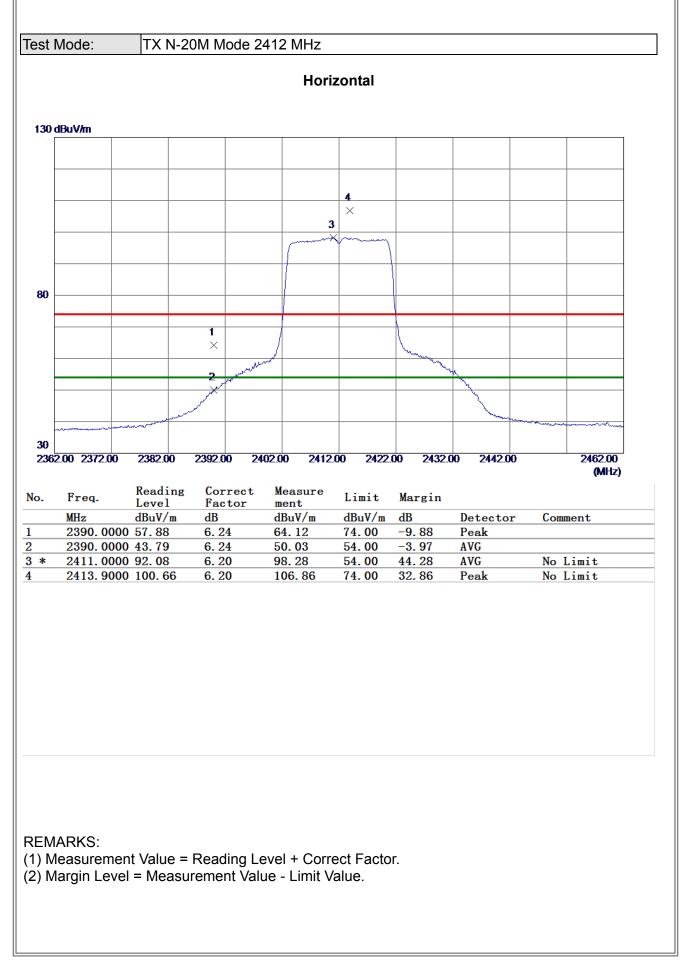


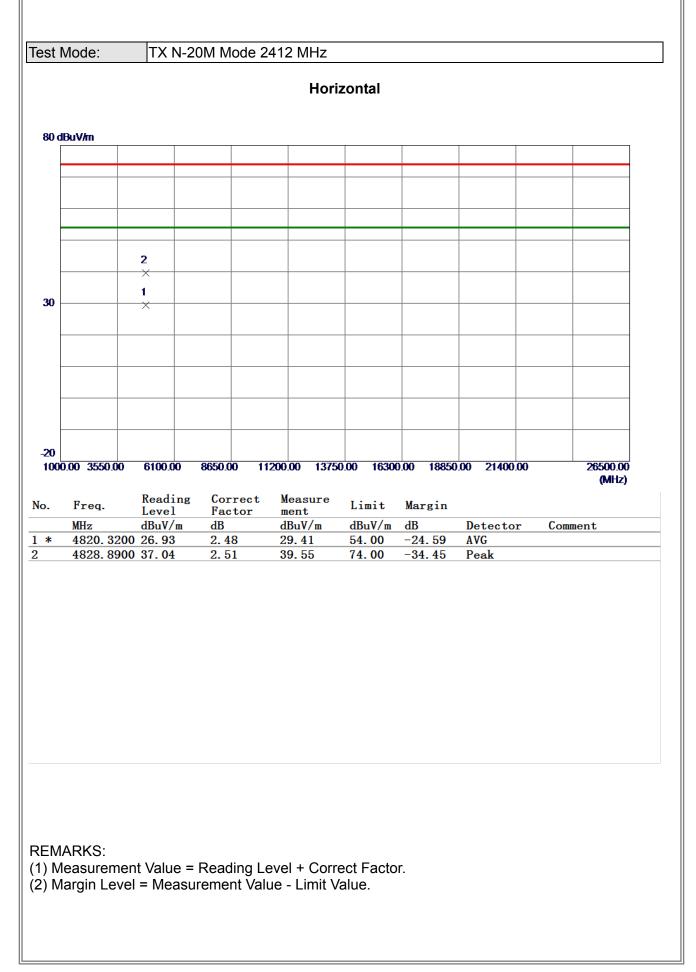




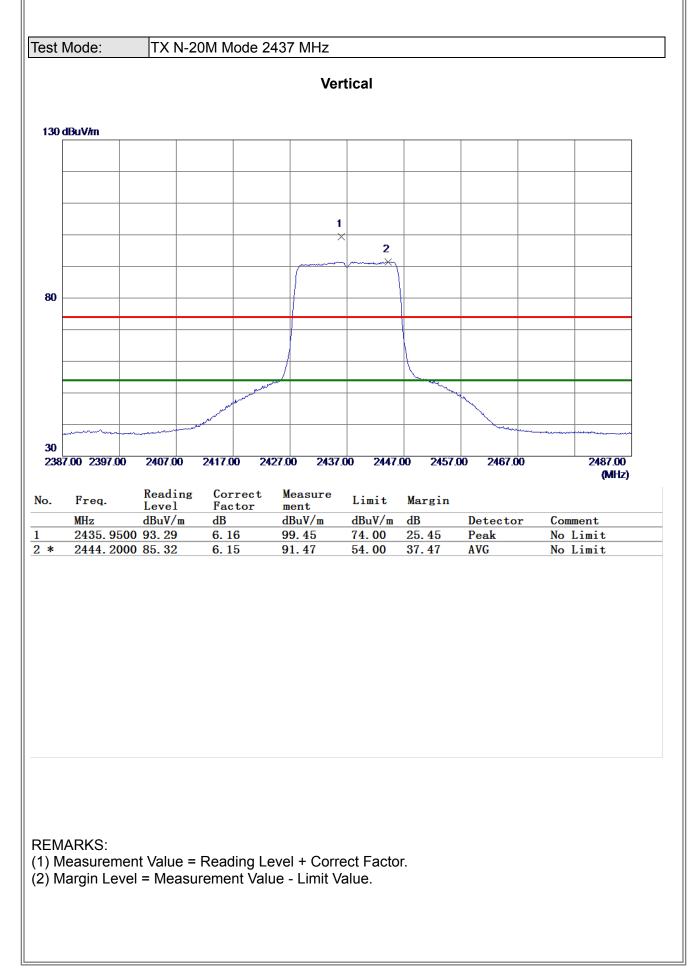




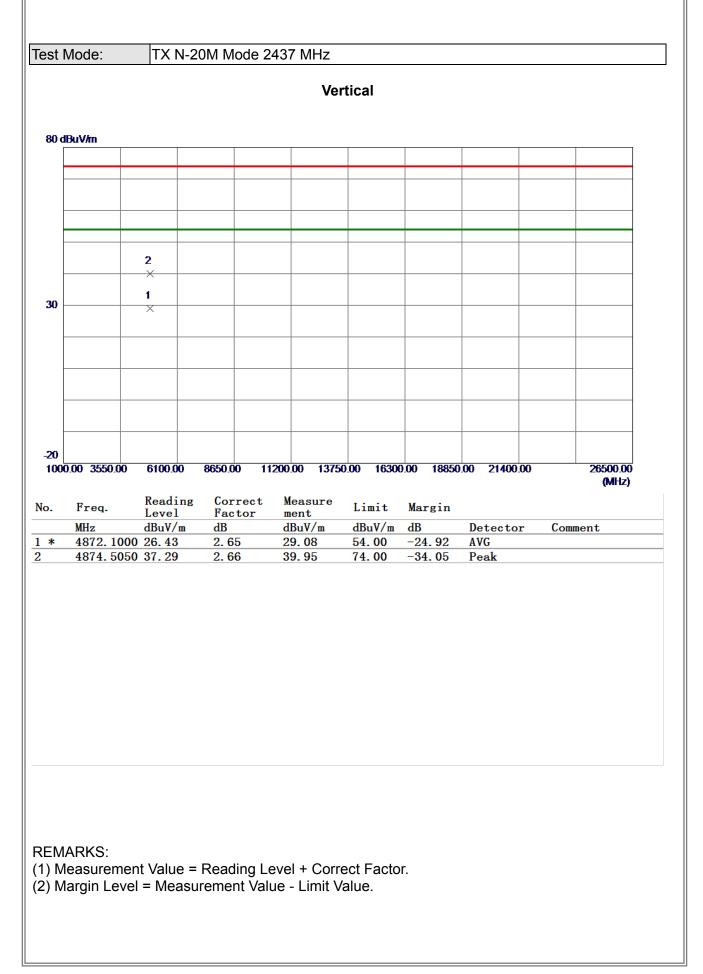




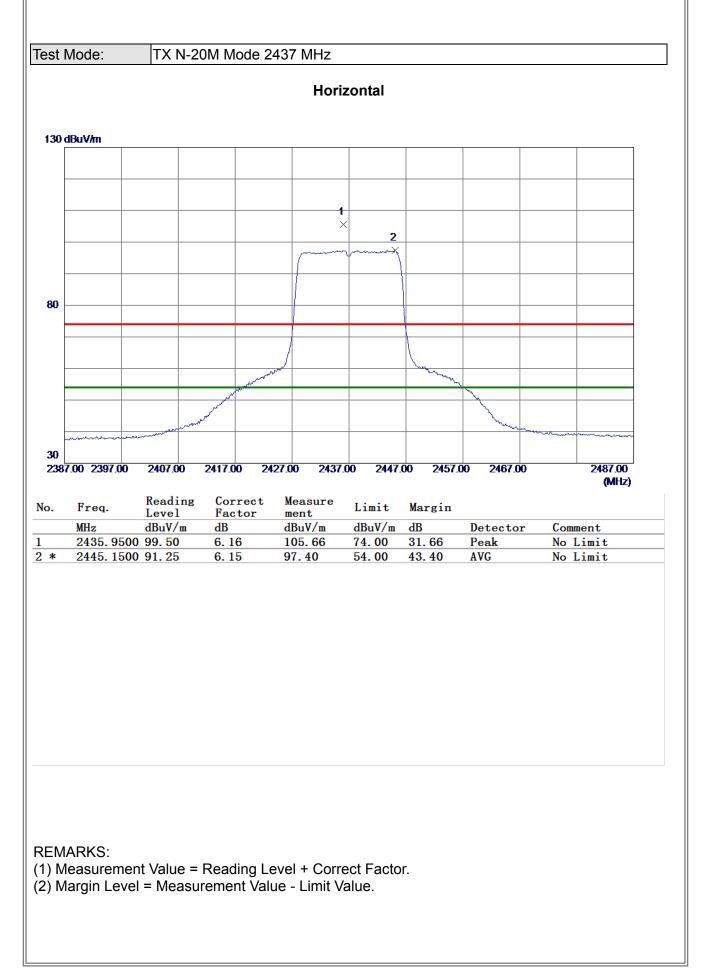




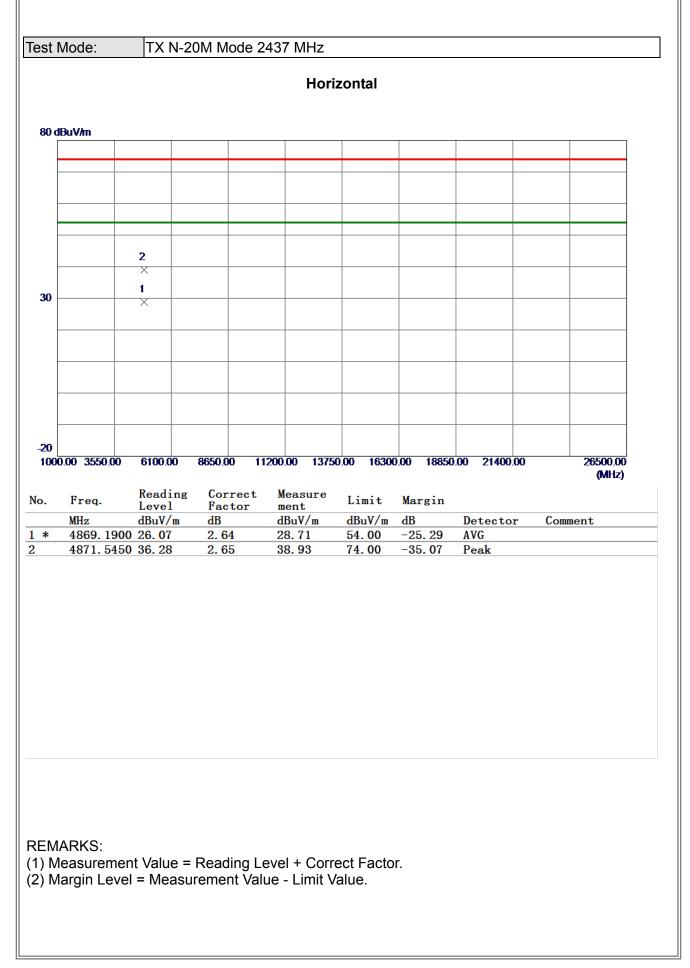




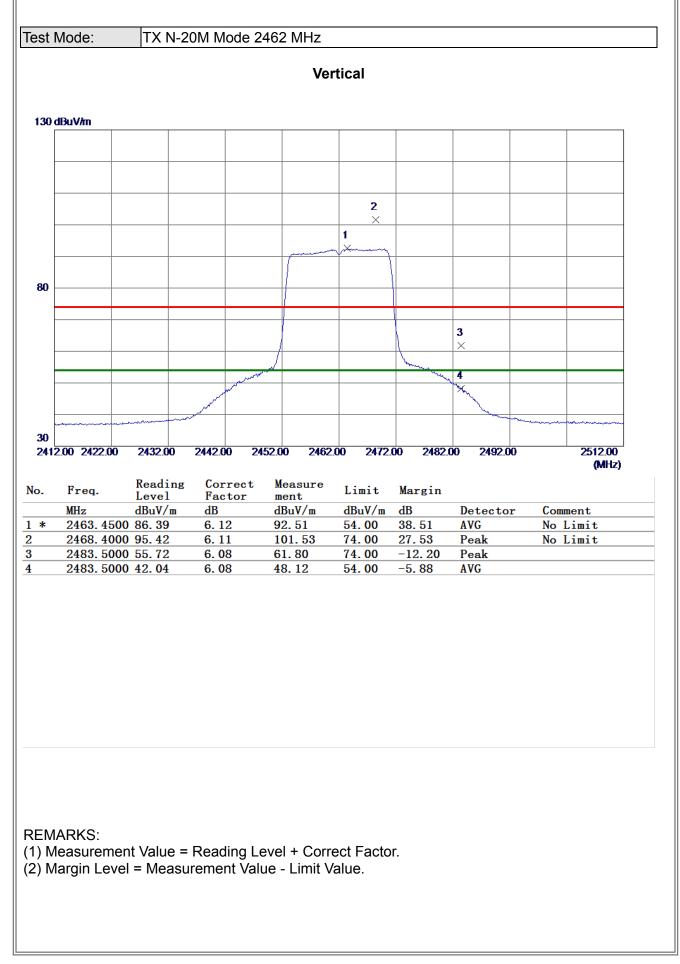




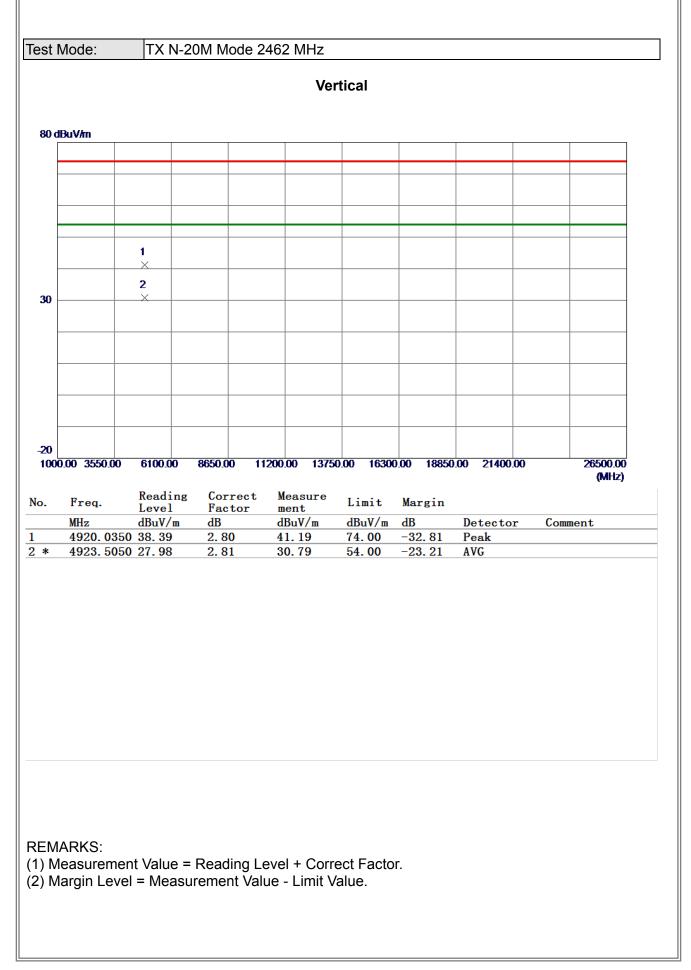




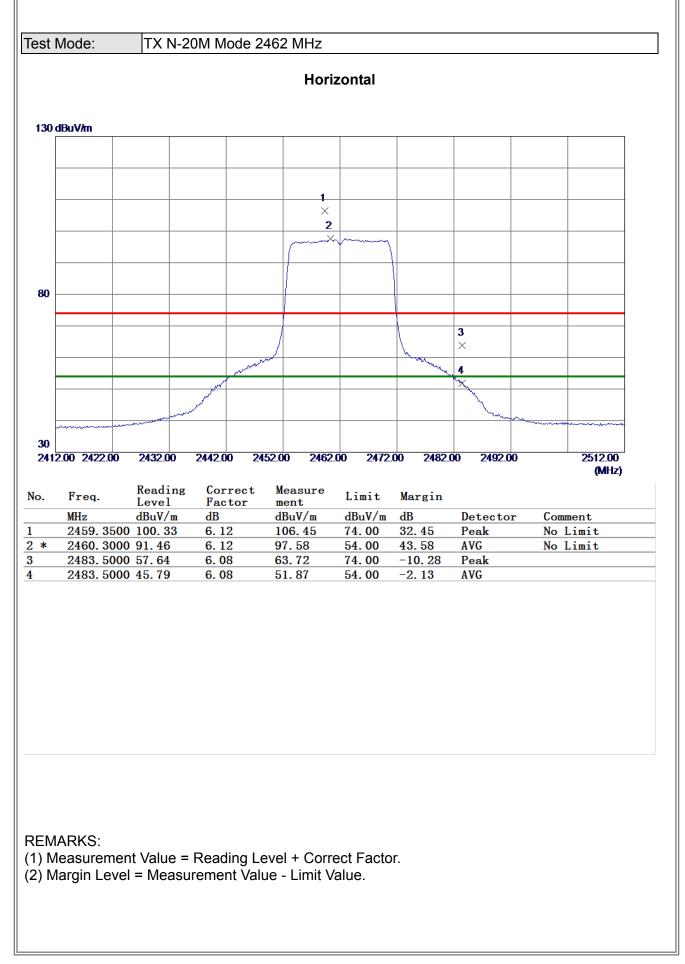


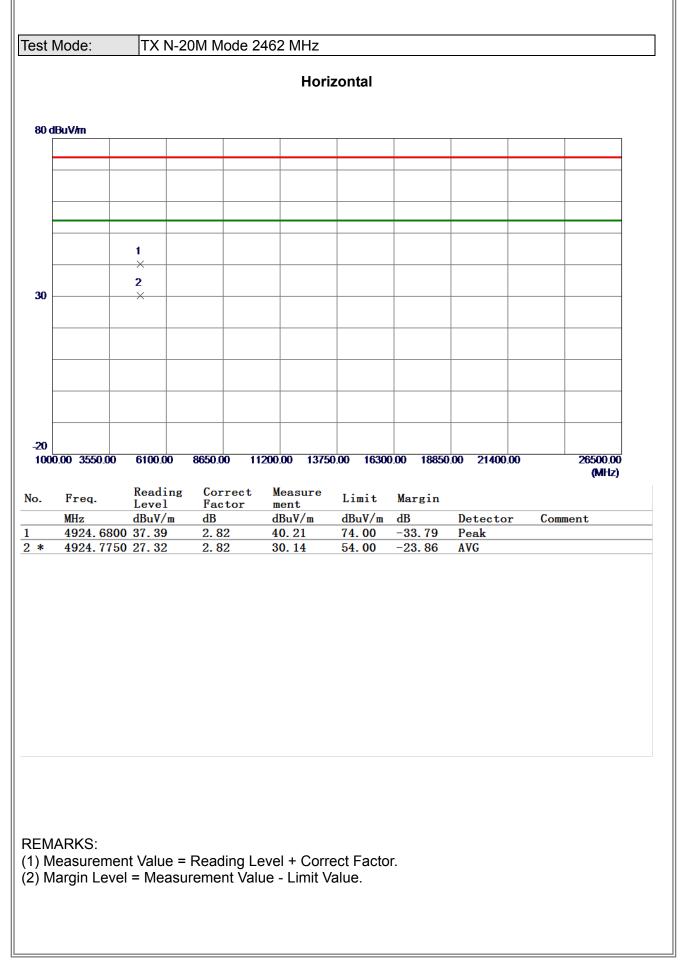




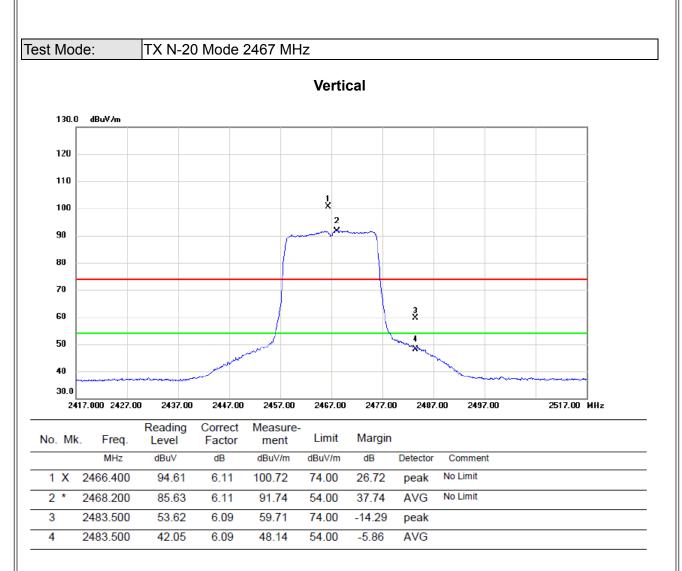






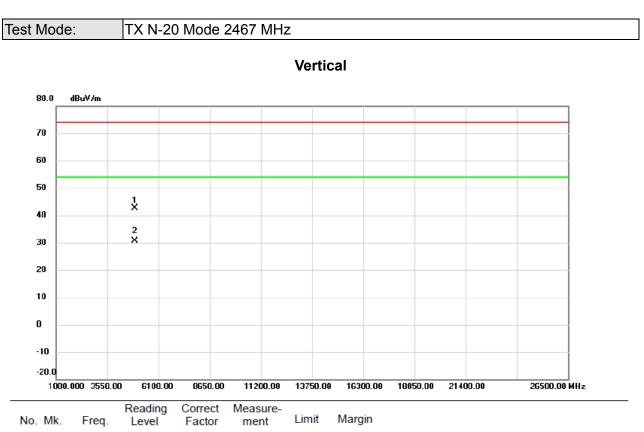






- (1) Measurement Value = Reading Level + Correct Factor.
- (2) Margin Level = Measurement Value Limit Value.

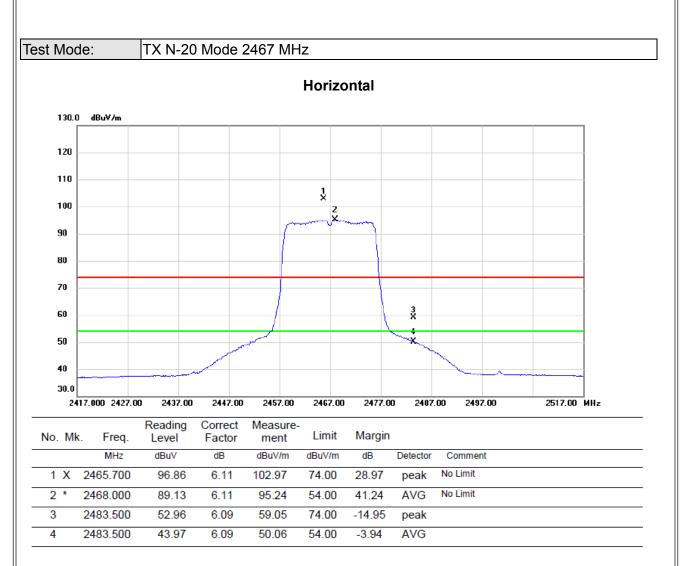




No. M	1k.	Freq.	Level	Factor	ment	Limit	Margin		
		MHz	dBuV	dB	dBuV/m	dBuV/m	dB	Detector	Comment
1	49	34.335	39.84	2.85	42.69	74.00	-31.31	peak	
2 *	49	34.705	27.72	2.85	30.57	54.00	-23.43	AVG	

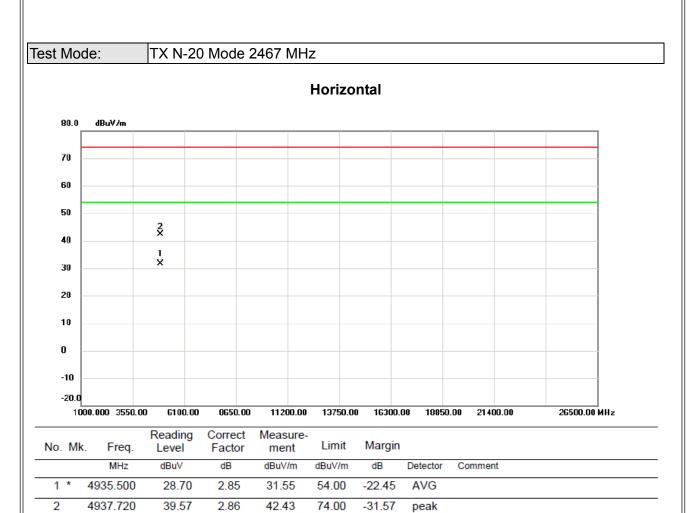
- (1) Measurement Value = Reading Level + Correct Factor.
- (2) Margin Level = Measurement Value Limit Value.





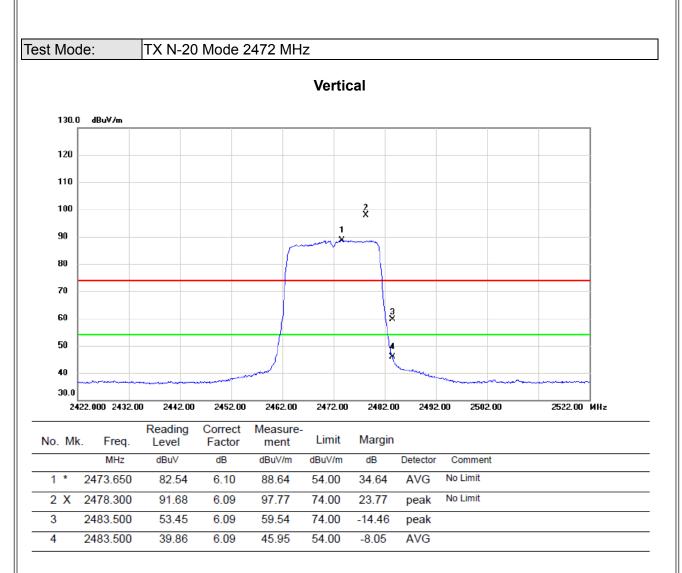
- (1) Measurement Value = Reading Level + Correct Factor.
- (2) Margin Level = Measurement Value Limit Value.





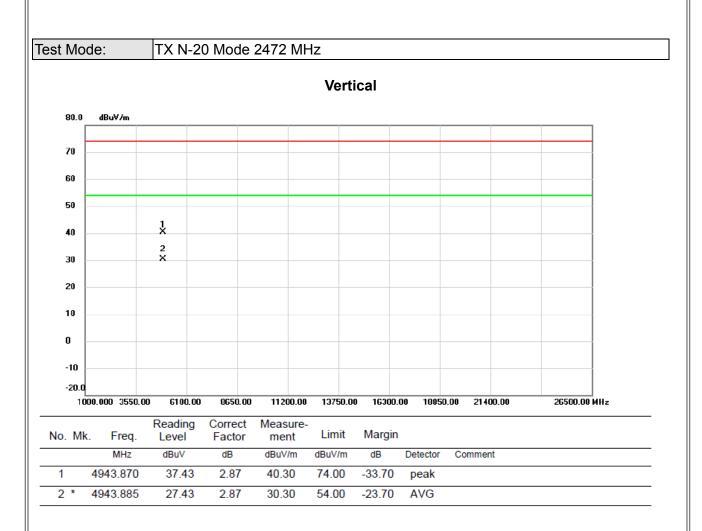
- (1) Measurement Value = Reading Level + Correct Factor.
- (2) Margin Level = Measurement Value Limit Value.





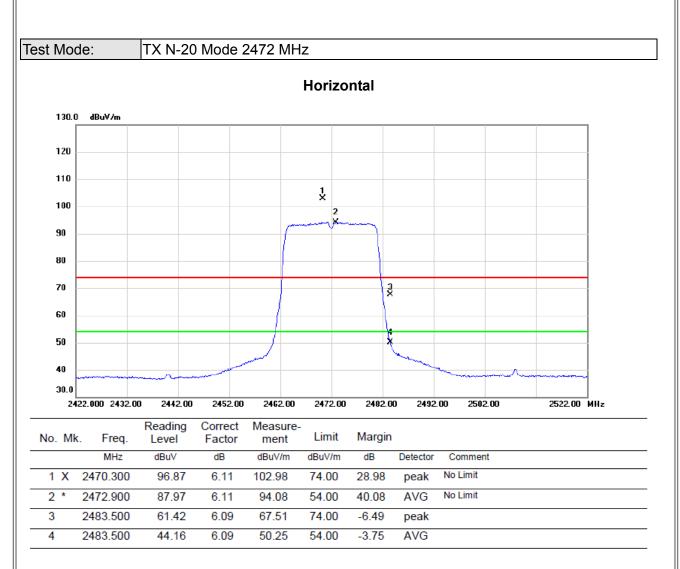
- (1) Measurement Value = Reading Level + Correct Factor.
- (2) Margin Level = Measurement Value Limit Value.





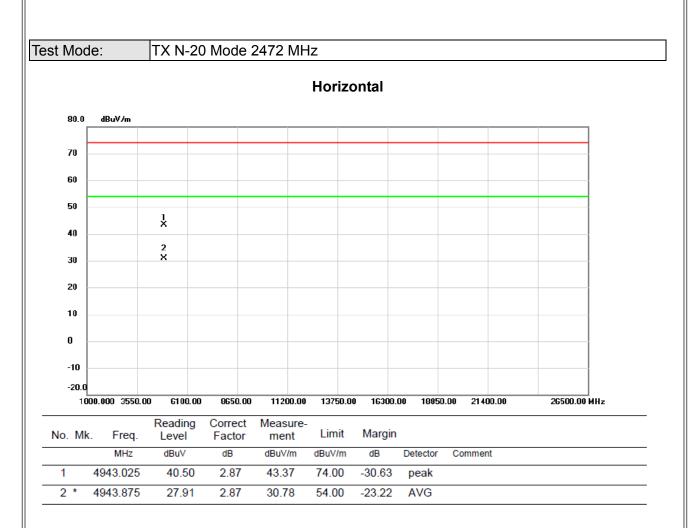
- (1) Measurement Value = Reading Level + Correct Factor.
- (2) Margin Level = Measurement Value Limit Value.





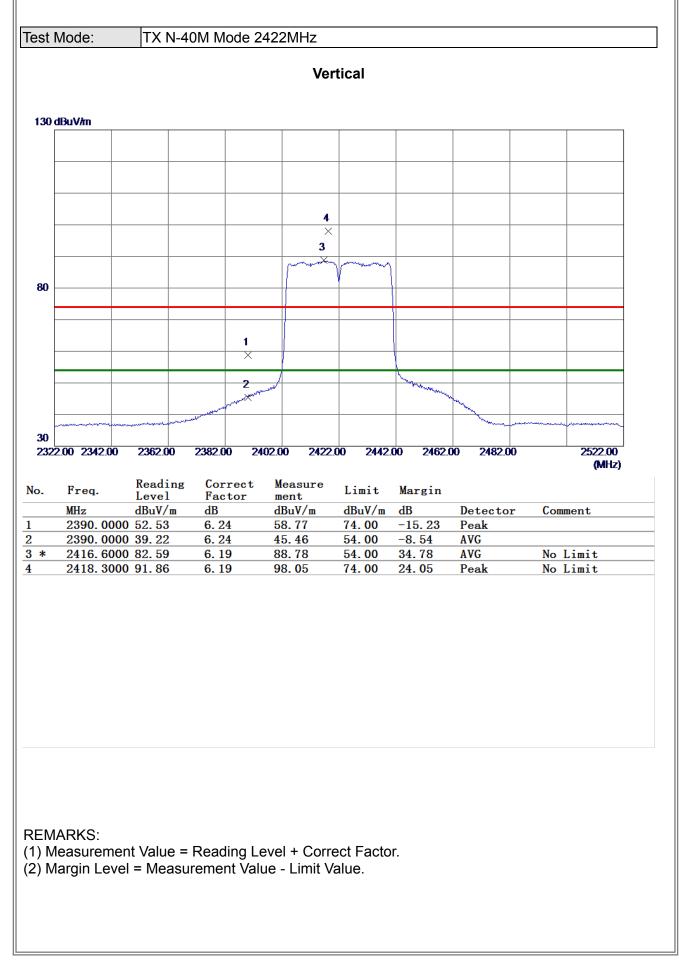
- (1) Measurement Value = Reading Level + Correct Factor.
- (2) Margin Level = Measurement Value Limit Value.

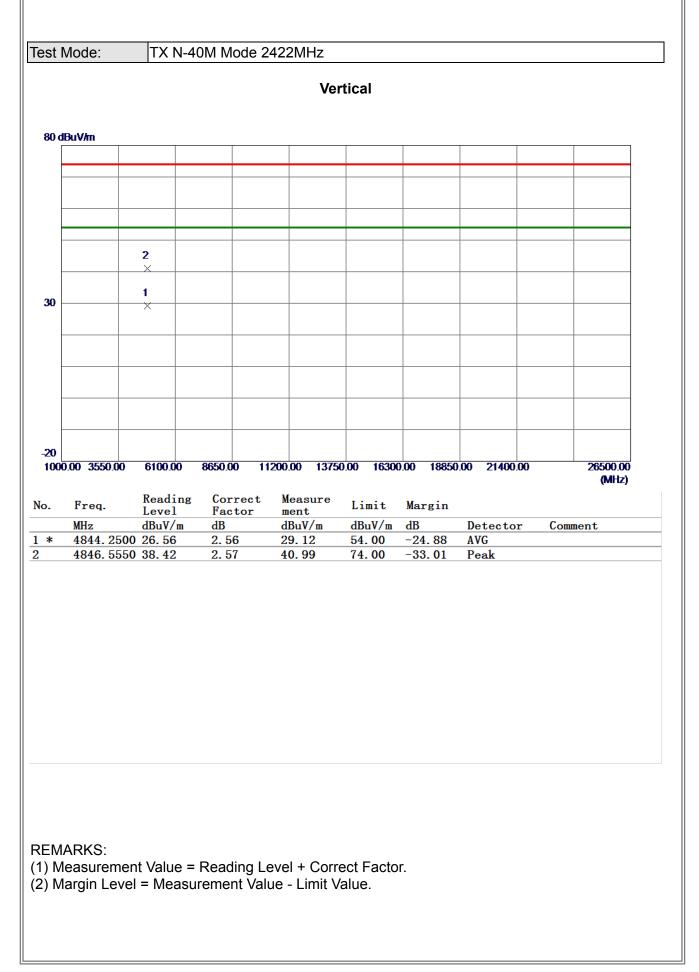


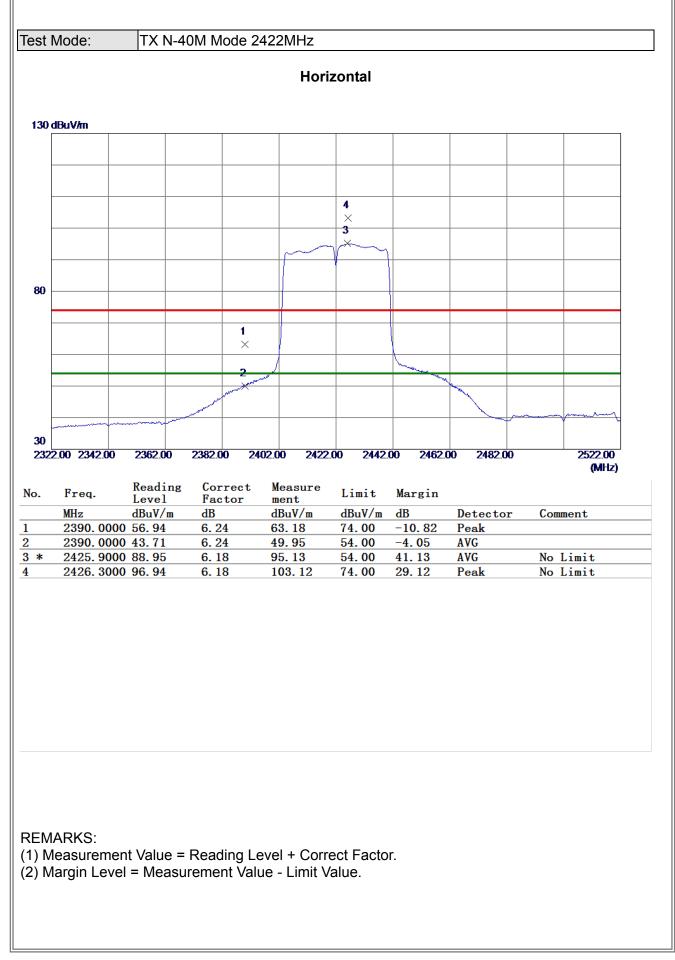


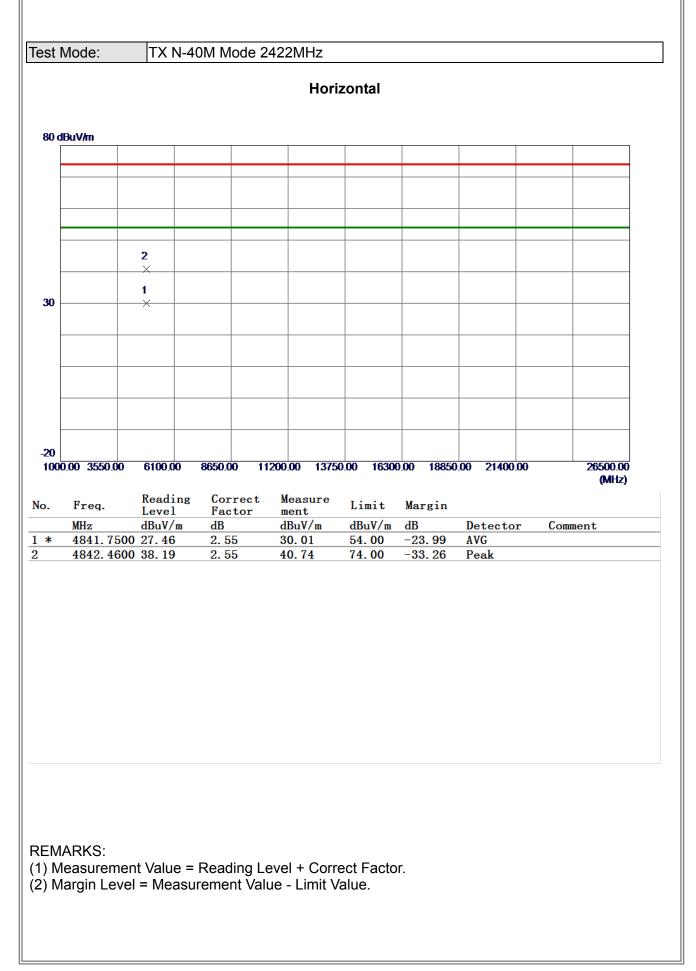
- (1) Measurement Value = Reading Level + Correct Factor.
- (2) Margin Level = Measurement Value Limit Value.



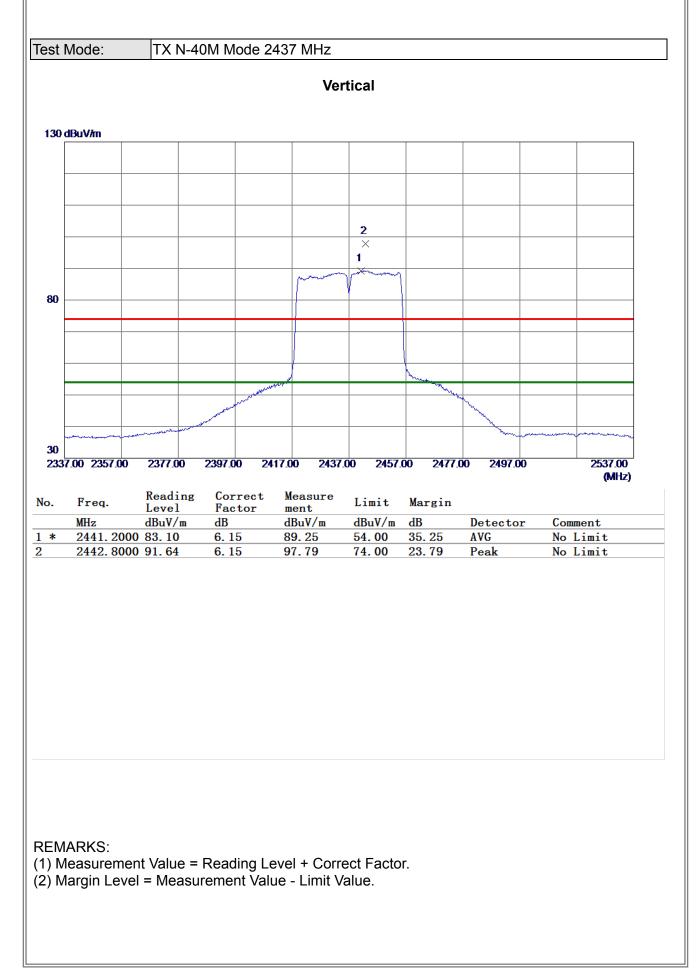


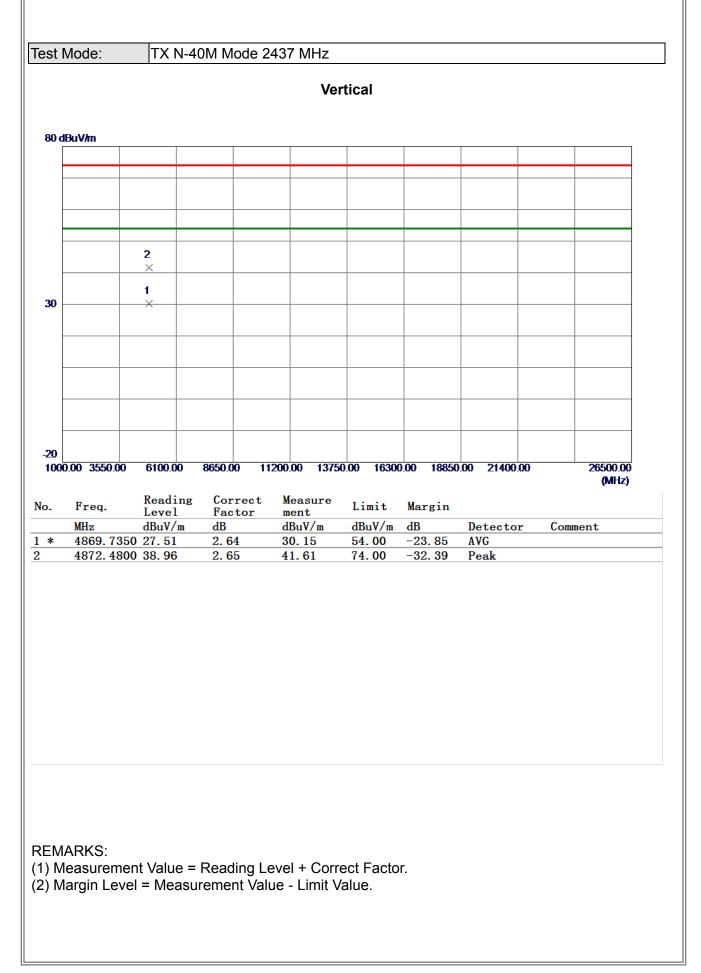


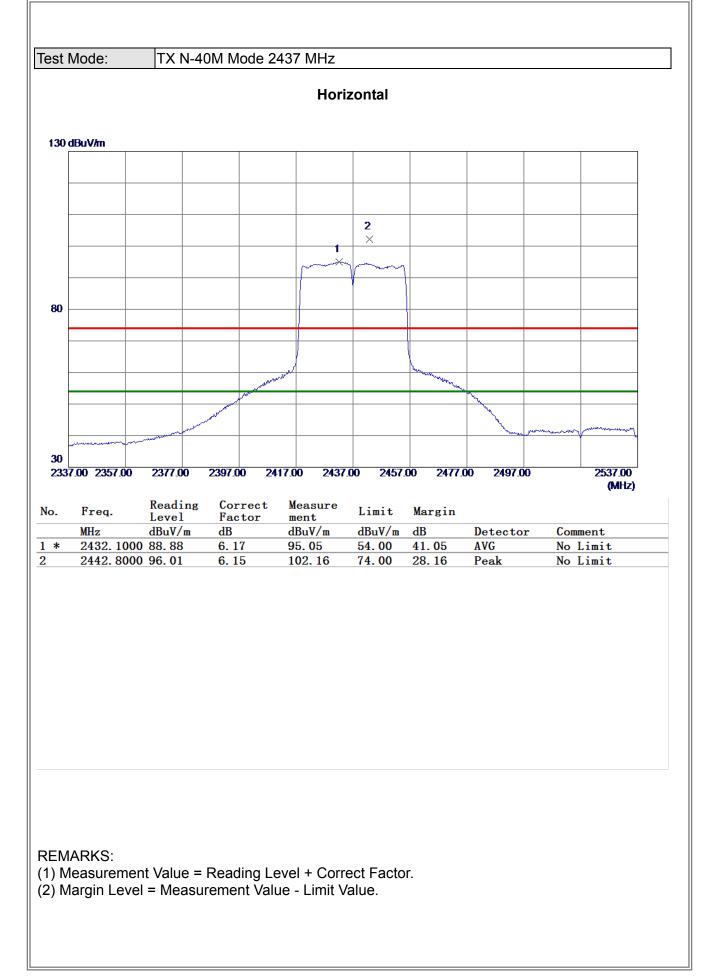


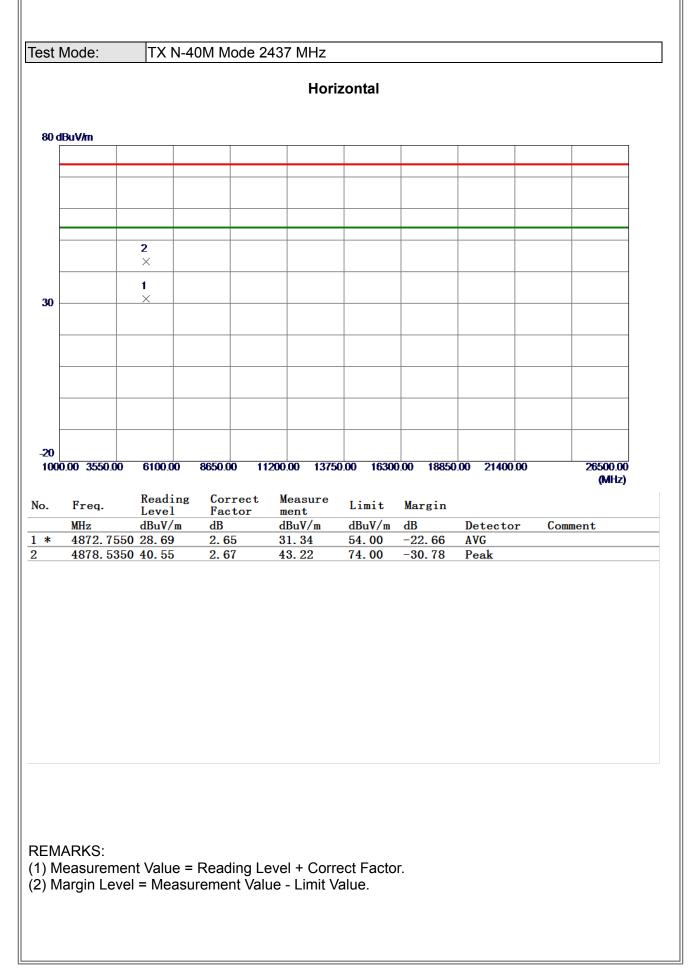




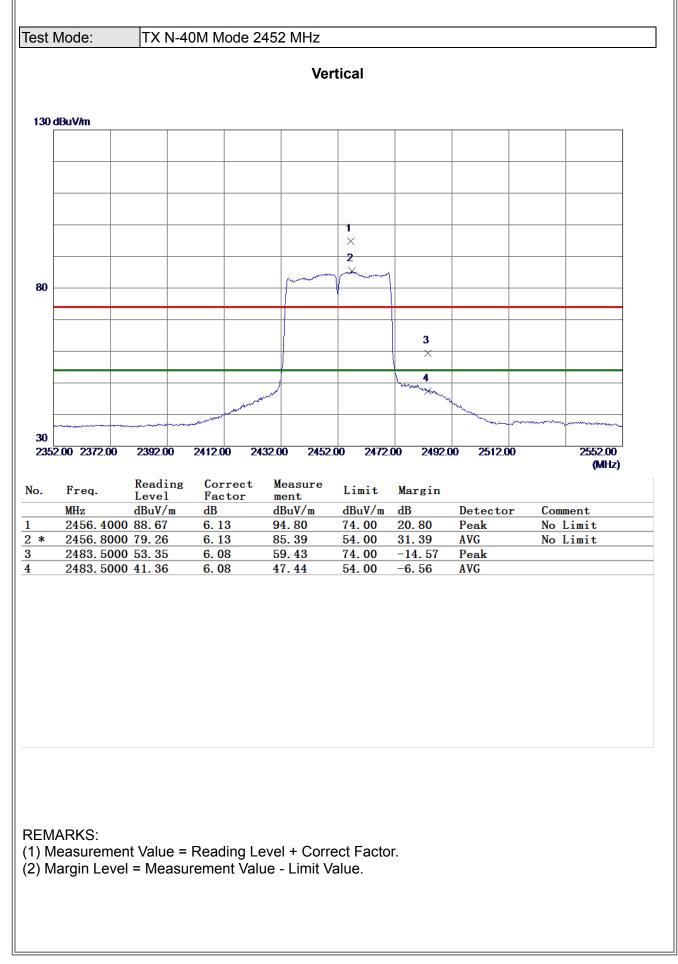


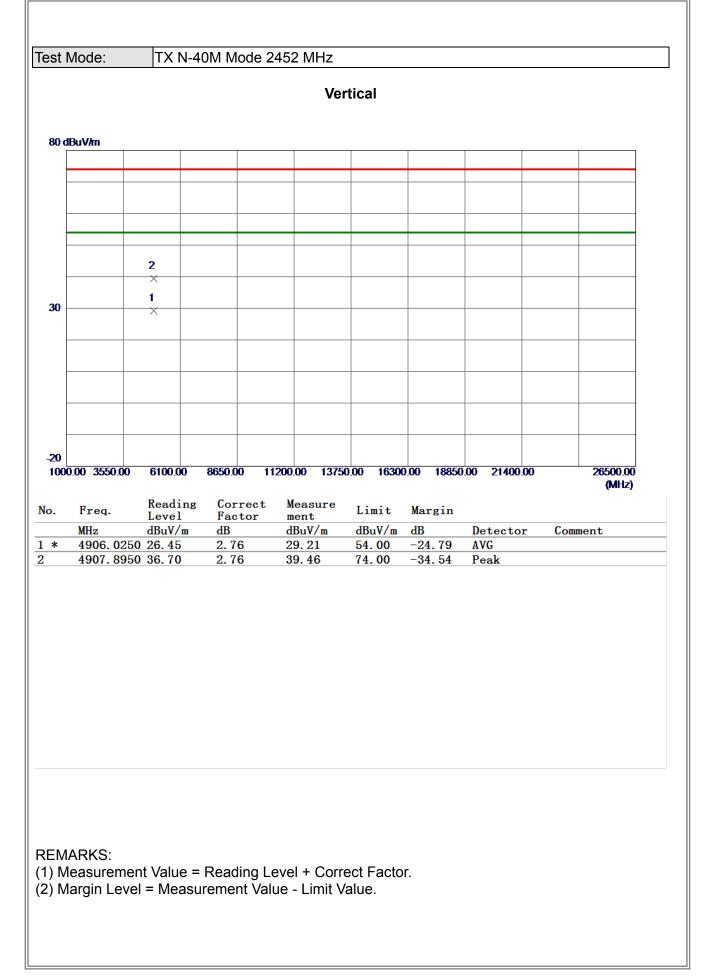


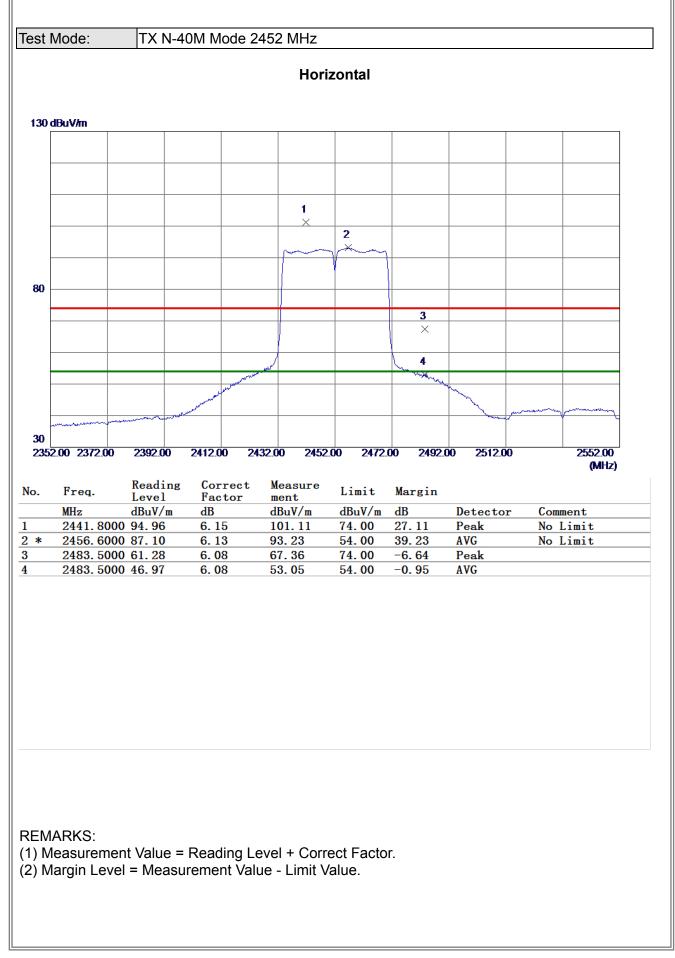


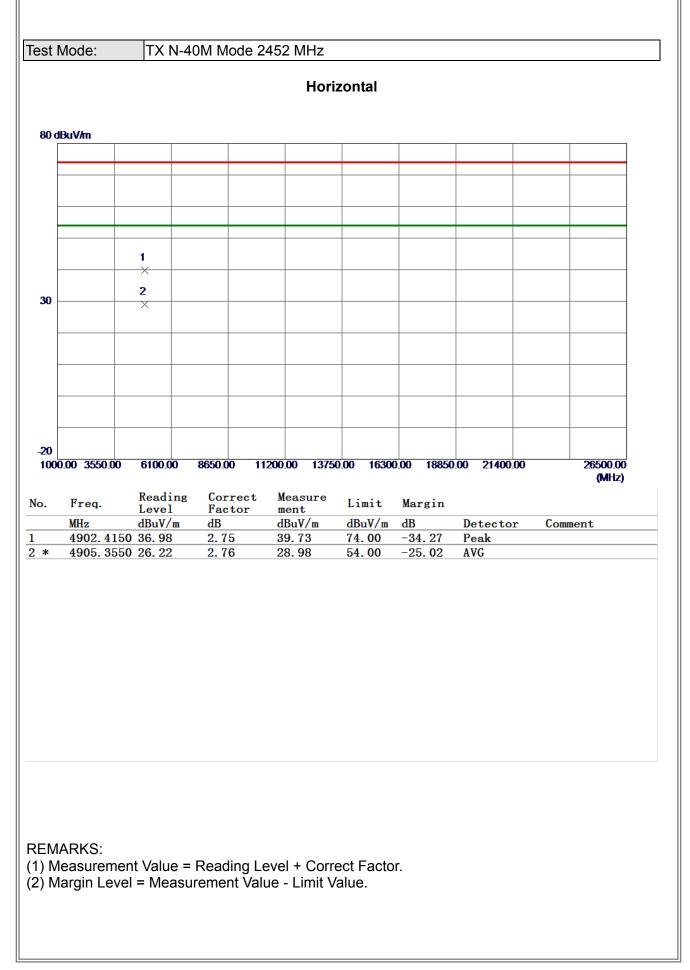










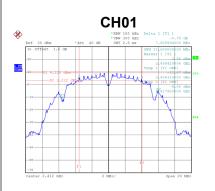


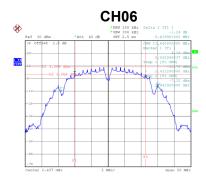


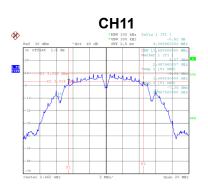
APPENDIX E - BANDWIDTH



Test Mode	TX B Mode			
Channel	Frequency (MHz)	6 dB Bandwidth (MHz)	6 dB Bandwidth Min. Limit (kHz)	Result
01	2412	7.63	500	Complies
06	2437	8.62	500	Complies
11	2462	9.07	500	Complies
12	2467	8.60	500	Complies
13	2472	8.63	500	Complies







Date: 18.SEP.2019 19:35:12

Date: 18.SEP.2019 19:36:59

Date: 18.SEP.2019 19:39:11



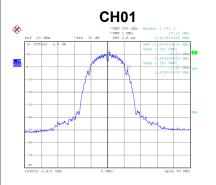
Date: 18.SEP.2019 20:15:32

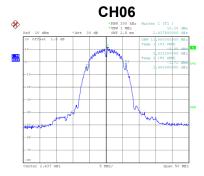


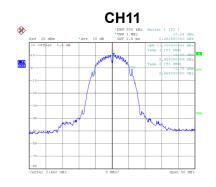
Date: 18.SEP.2019 20:17:29



Channel	Frequency (MHz)	99 % Emission Bandwidth (MHz)	Result
01	2412	11.80	Complies
06	2437	11.80	Complies
11	2462	11.70	Complies
12	2467	11.80	Complies
13	2472	11.80	Complies







Date: 18.SEP.2019 20:39:21



Date: 18.SEP.2019 20:41:35

Date: 18.SEP.2019 20:40:00

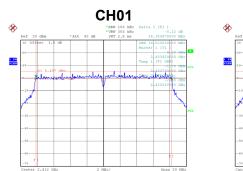
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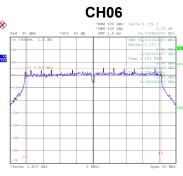


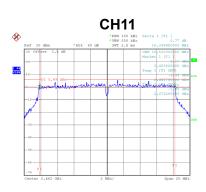
Date: 18.SEP.2019 20:42:11



Test Mode	TX G Mode			
Channel	Frequency (MHz)	6 dB Bandwidth (MHz)	6 dB Bandwidth Min. Limit (kHz)	Result
01	2412	16.39	500	Complies
06	2437	16.38	500	Complies
11	2462	16.40	500	Complies
12	2467	16.38	500	Complies
13	2472	16.46	500	Complies



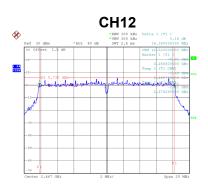




Date: 18.SEP.2019 19:42:53

Date: 18.SEP.2019 19:44:15

Date: 18.SEP.2019 19:45:35



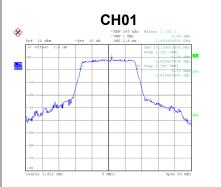
Date: 18.SEP.2019 20:19:00

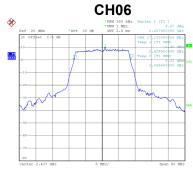
CBEH28

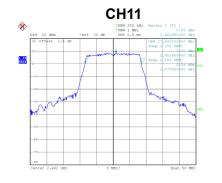
Date: 18.SEP.2019 20:20:22



Channel	Frequency (MHz)	99 % Emission Bandwidth (MHz)	Result
01	2412	17.10	Complies
06	2437	17.10	Complies
11	2462	17.00	Complies
12	2467	17.10	Complies
13	2472	17.00	Complies







Date: 18.SEP.2019 20:44:45

Date: 18.SEP.2019 20:45:37





Date: 18.SEP.2019 20:47:36

ECHERS

Date: 18.SEP.2019 20:48:38